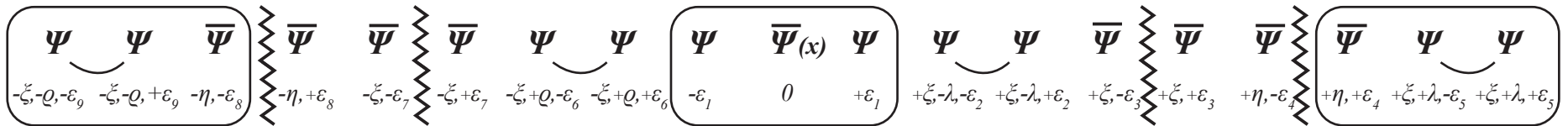


The Universe Code Ψ -19, the unified composition and order system of the Universe

Ψ -19

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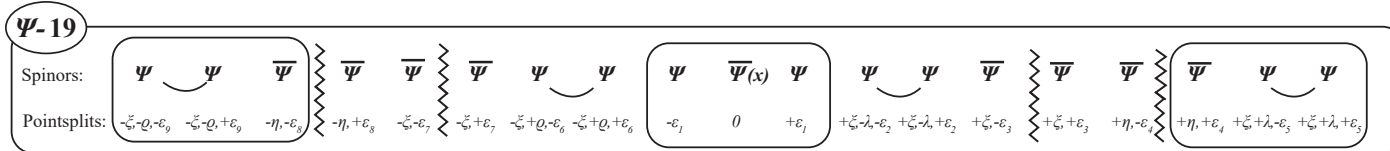
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Ψ -19 uniformly governs the construction of the Universe both at small scale (elementary particles) and at large scale (global structures of the Universe), i.e. all components of the Universe.

- Primordial Universe before the Big Bang
- The Big Bang
- The Universe after the Big Bang:
 - Dark Matter
 - Normal Matter/Antimatter
 - Dark Energy with the coupled construction of 4-dimensional space-time

The Universe Code Ψ -19,*
the unified composition and order system of the Universe *



(Ψ -19) uniformly governs the construction of the Universe both at small scale (elementary particles) and at large scale (global structures of the Universe), i.e. all components of the Universe:

- **Primordial Universe before the Big Bang**
- **The Big Bang**
- **The Universe after the Big Bang: - Dark Matter, - Normal Matter/Antimatter, - Dark Energy with the coupled construction of 4-dimensional space-time**

The present theory analytically develops, explains, represents and determines: See among other chapters in particular chapter:

- The Universe before the Big Bang (Primordial Universe). The elementary particles of the Primordial Universe and why the Primordial Universe led to the Big Bang.
- The Big Bang Reproduction Cascade including absolutely all fine and global composition structures, presented in full detail.
- Why this Big Bang cascade is simultaneously a reproduction cascade of the elementary particles created in the Big Bang and hence why the laws of nature are universally valid in the Universe.
- The Earliest Universe directly after the Big Bang and the explanation of the composition of the Earliest Universe ($\frac{2}{3}$ Dark Matter, $\frac{1}{3}$ Normal Matter/Antimatter).
- The elementary particle spectrum of Normal Matter/Antimatter and Dark Matter including the inner-structural composition of each individual elementary particle of Normal Matter/Antimatter and Dark Matter and their physical properties such as mass, charge, force structure, force magnitudes, force range, etc.
- That the force structure of Normal Matter is as follows: strong interaction ***St***, electromagnetic interaction ***γ***, weak interaction ***Z***, gravitation ***G***
- That the elementary particle set of Normal Matter: ***p⁺, e⁻, ν; St, γ, Z, G*** assembles into the organizational entity of the hydrogen atom ***H*** by low energies.

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|-----------------------|
| VI., XI. |
| XI. |
| XI. |
| XI. |
| XI., XI.36., XIII. |
| X. |
| X. |

- How the mass of each elementary particle forms, as well as what mass actually is.
- How the charge of each elementary particle forms, as well as what charge actually is
- Why charge is quantized, and why charge exists in two forms of $+$ and $-$.
- Why certain elementary particles have mass and others do not have mass.
- Why certain elementary particles have charge and others do not have charge.
- Why all charged elementary particles have mass.
- What the global structure and the causal links in the construction and development process of the Universe are.
- The transformation processes governing the composition of the Universe from the Big Bang until today.
- Why the proportion of Dark Matter and Normal Matter/Antimatter decreased and why the proportion of Dark Energy increased over this period.
- The full details of Dark Energy with the coupled construction of 4-dimensional space-time created as the product of matter annihilation processes.
- What Dark Energy actually is and what space-time actually is and how it is created.
- The inner-structural relation between mass, space-time and energy.

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|---------------|
| VI. |
| VI. |
| VI.6., IX.15. |
| XI.36. |
| XI.36. |
| VI. |
| XIII., XIV. |
| XII. |
| XII. |
| XII. |
| XII. |
| XII. |

Overall summary:

Absolutely everything that physically exists in the Universe originates from one and the same Universe Code **Ψ -19**.

Therefore: **Ψ -19** is the “Fundamental System of the Universe“.

Respectively: **Ψ-19** is the “Fundamental System of Everything“.

Or expressed somewhat more dramatically:


Ψ -19 is the “Complete Formula of the Universe”.


Respectively: **Ψ -19 is the “World Formula“.**

* The structure Ψ -19 is necessarily and unequivocally created from the elementary structure I.1., I.2., I.3. as described in Chapters I-V., becoming the fundamental structure of all manifestations of matter and force in the Universe, both at small scale and at large scale.

$$\begin{aligned} D \Psi(x) &= \Psi(x - \sigma_1) \overline{\Psi}(x) \Psi(x + \sigma_1); \sigma_1 \rightarrow 0 \\ D \overline{\Psi}(x) &= \overline{\Psi}(x - \sigma_2) \Psi(x) \overline{\Psi}(x + \sigma_2); \sigma_2 \rightarrow 0 \end{aligned}$$

$x \equiv \bullet$ interaction point, $D = \frac{d}{dx}$, $dx \equiv \sigma \equiv$ point split

with repulsion \equiv 

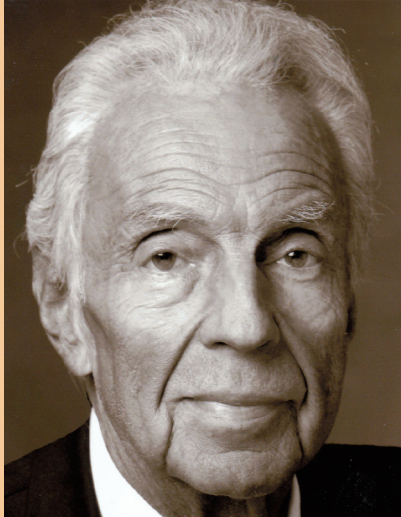
attraction \equiv 

=

l.1., l.2., l.3. \equiv elementary structure of the universums

** See in particular Chapter XIII.

Norbert Winter



- Norbert Winter, born 1942, raised in Göttingen
- Studied Physics at the Universities of Heidelberg and Munich
- Doctorate in Physics with a thesis on elementary particle theory
- Employed at the Max-Planck Institute for Physics in Munich
- 1974-2006, change of career into the insurance industry, including 25 years as board member or chairman of various insurance companies
- Despite this professional activities constant engagement with questions of logic and physics and constant contact with high-energy physicists
- From 2006, intensive engagement with questions of logic and physics
- From 2008, concrete and targeted development of the following works:

abbrev.

- | | |
|--|--------|
| • 14/04/2011: “The Construction of Matter” | ADM |
| • 06/03/2012: “Matter, Logic, and Existence” | MLE |
| • 19/04/2013: “The Highly Massive Scalar Boson” | HSB |
| • 26/05/2014: “The Law of Greatest Simplicity” | GDE |
| • 22/05/2015: “The Unified Construction Process of the Universe from Smallest to Largest” | EAU |
| • 17/12/2015: “The Act of Creation of the Universe” | UEA |
| • 04/08/2016: “The Development Process of the Universe from the Big Bang until Today” | UEP |
| • 04/08/2016: “The Unified Construction Process of the Universe and the Development Process of the Universe from the Big Bang until Today (Chapters I.-XII.)“ | EAU |
| • 17/03/2017: “The Universe Code Ψ - 19” | UC-GFU |
| • 17/03/2017: “The 6 Key Processes in the Creation and Development of the Universe” | KPU |
| • 17/03/2017: “The Universe Code Ψ - 19, the unified composition and order system of the Universe” (Chapters I.-XIV.), revised edition of EAU” | UC-AOS |

Preface

Suppose that one continuously pursues the same idea over the course of 7 years, hoping to develop it into a comprehensive theory. With any luck, there will be a few milestones along the way that offer us the opportunity to step back and ask whether we are on the right path towards this ambitious goal.

The first such milestone was reached in 2010/2011. At this point, it became clear how the construction process of matter could be derived from a completely specific fundamental dynamic (I.1., I.2., I.3.), and how the point split dynamic of this construction process creates a separation-binding structure that leads to the formation of elementary particles by means of a chain of subsequent processes.

This separation-binding structure first leads to the formation of the preformation structure $\Psi_{\chi U}^{(19)}$, which in turn leads to other formation processes that create the 3 elementary fermions p^+ , e^- , ν , as well as the 4 force bosons of the strong, electromagnetic, weak, and gravitational interaction.

The collection thus formed corresponds precisely to the elementary particle set of Normal Matter. Given the right energy boundary conditions, this set forms into the H-atom. Given yet other boundary conditions, this simplest possible atom structure (the H-atom) creates the whole atomic spectrum of Normal Matter/Antimatter, as has been thoroughly studied by atomic physics.

It also became clear exactly how the specific properties of each elementary particle arise within this construction process, and in particular how the mass of each elementary particle forms, as well as what mass actually is, how the charge of each elementary particle forms, as well as what charge actually is, why charge is quantized, and why it exists in the two forms of + and -.

An explanation for why certain elementary particles have neither mass nor charge could also be given.

- To me, these explanations represented the **1st major confirmation** that this theory is correct.

On 14/04/2011, the first publication was ready: “The Construction of Matter” (ADM).

This initial success naturally motivated me to expand this theoretical approach, leading to the completion of “Matter, Logic, and Existence” (MLE) over the course of the next year 2011/2012, with a final publication date of 06/03/2012.

This publication explored the structure of the Primordial Universe before the Big Bang, the first ever manifestation of reality. It became clear that, in this Primordial Universe before the Big Bang, there must have been some most extremely highly repulsive, highly massive, and most extremely short-range anti-gravitational force \overline{G} , dominating the Primordial Universe absolutely. The specific properties of this anti-gravitational force \overline{G} then necessarily led to the Big Bang, which resulted in the creation of the elementary particle set (p^+ , e^- , ν ; strong boson, electromagnetic boson, weak boson, gravitational boson). The structure of each of these phenomena was already laid out by MLE in rough terms, and then the full details and causal connections were

developed and analysed later in UEA (“The Act of Creation of the Universe) and EAU (“The Unified Construction Process of the Universe from Smallest to Largest”) – both completed in 2015.

MLE also began to explore several other aspects, but only in rough terms. This included further exploring development processes up to the scale of macromolecular structures, as well as the chirality of bio-molecules, and the fundamental structure of growth and annihilation processes.

The special role of the neutron as the first non-elementary particle was also analysed in MLE, together with the set of its decomposition variants. The physical structures thus developed and the inner relations between them were developed into the first path towards a new philosophical “existential logic” in a special chapter, Chapter XI. (MLE).

In 2012/2013, the discussion about the Higgs boson was reignited within the physics community after a scalar particle with a mass of 125 GeV was found at Cern.

But, as explained in detail in ADM and MLE, the present theory explains the mass of elementary particles as arising from an inner-structural split density of ≥ 2 within the construction process of each elementary particle, and so does this theoretical approach does not require an additional mass-creating particle, and thus does not need a Higgs boson.

“The Highly Massive Scalar Boson” (HSB), completed on 19/04/2013, therefore explained how the 125 GeV scalar particle might instead be the strong boson responsible for the strong interaction. This makes sense, because the gluon particle responsible for the strong interaction has so far not been identified in isolation at Cern, but only as part of complex gluon jets.

In the following year 2013/2014, “The Law of Greatest Simplicity” (GDE), completed on 26/05/2014, restated everything that had been developed so far in the simplest possible terms, working according to the underlying principle of the “law of greatest simplicity”. This principle states that complexity is necessarily generated step by step from the simplest possible foundation by means of dynamic structures.

Then, in 2014/2015, now that the inner-structural composition of each elementary particle and thus each elementary particle set had become clear from the previous work, namely:

- $\left[\begin{array}{l} \text{both the Primordial Universe before the Big Bang (3 neutrinos: } \nu_1, \nu_2, \nu_3; \text{ 3 force bosons: } {}_5\overline{G} \equiv \text{most extremely repulsive,} \\ {}_2R \equiv \text{repulsive, } {}_3G \equiv \text{most extremely weakly attractive, each with the inner-structural elementary particle composition} \\ \text{shown in VII.3.)} \end{array} \right.$
- $\left[\begin{array}{l} \text{and the Normal Matter after the Big Bang (} p^+, e^-, \nu; \text{ strong, electromagnetic, weak, and gravitational force bosons, each} \\ \text{with the inner-structural elementary particle composition shown in X.8.)} \end{array} \right.$

“The Unified Construction Process of the Universe from Smallest to Largest” (EAU) was finished on 22/05/2015, and “The Act of Creation of the Universe” (UEA) was completed on 17/12/2015.

These publications asked and answered the question of why the Big Bang led to the identical reproduction of this elementary particle set, as well as every law of nature observed in the Normal Matter segment of the Universe.

In fact, as was explored and analysed in full detail, the Big Bang was a sequence of finely structured, mini-Big Bang events, each occurring at the smallest possible scale, coming together to create the Big Bang phenomenon at the most colossally massive scale. Each of these mini-Big Bang events created exactly one elementary particle set of Normal Matter (p^+, e^-, ν ; strong, electromagnetic, weak, and gravitational bosons).

An exact analysis of the global Big Bang process then shows that the so-called Big Bang was a most-colossal-scale Big Bang cascade of these individual finely structured mini-Big Bang processes. The central neutrino of each elementary particle set thus created was then subsequently broken down by the resulting smallest-scale mini-Big Bang process (see XI.23.).

Since the central neutrino, like any observable elementary fermion, has a substructure of 3 basis spinors due to its structural composition (e.g. see XI.36.), which in the case of the central neutrino is namely $\nu = \Psi \bar{\Psi} \Psi$, each individual Big Bang process leads to a three-fold cascading replication, as presented in detail by XI.23.. This and only this explains why, due to the three-fold structure of the Big Bang cascade, directly after the Big Bang, the Universe created by the Big Bang, i.e. the earliest stage of the Universe around 13.8 billion years ago, consisted of $66.6\% \equiv \frac{2}{3}$ Dark Matter and $33.3\% \equiv \frac{1}{3}$ Normal Matter, as described in detail in XI.23., XI.26., XI.27., XI.28.. This earliest-stage composition ($\frac{2}{3} / \frac{1}{3}$) of the Universe has been confirmed by the measurements of space telescopes (e.g. Planck measurements on 21/03/2013); for details, see XII.2..

- Personally, the explanation of the composition of the Earliest Universe directly after the Big Bang given by this theory ($\frac{2}{3}$ Dark Matter, $\frac{1}{3}$ Normal Matter/Antimatter) represents the **2nd major confirmation** of the correctness of the theory, together with the understanding that the elementary particle set of Normal Matter can be formed from the preformation structure $\Psi_{\Sigma U}^{(19)}$, which became clear in 2010.

From this structural composition of matter, we can clearly and analytically deduce what the composition of Dark Matter must be and indeed is, or in other words what the elementary particles of Dark Matter are, how they are inner-structurally composed, and what force structures and properties they possess (e.g. see XI.36.), namely:

3 neutrinos, of which 2 neutrinos have mass, and one, the central neutrino, is massless.

3 force bosons with different magnitudes, effects, and masses

${}_4\bar{G} \equiv$ most extremely strongly repulsive, highly massive, extremely short-range

${}_4G \equiv$ most extremely weakly attractive, massive, short-range

${}_0R \equiv$ repulsive, massless, long-range

as described in Chapter XI., in particular XI.26., and XI.36..

This means: The theory presented here gives a precise description of the inner-structural composition of the elementary particles of Dark Matter and their properties and force structures.

Until now, the elementary particles of Dark Matter have not yet been observed experimentally. However, Cern currently working towards being capable of detecting them and researching their properties.

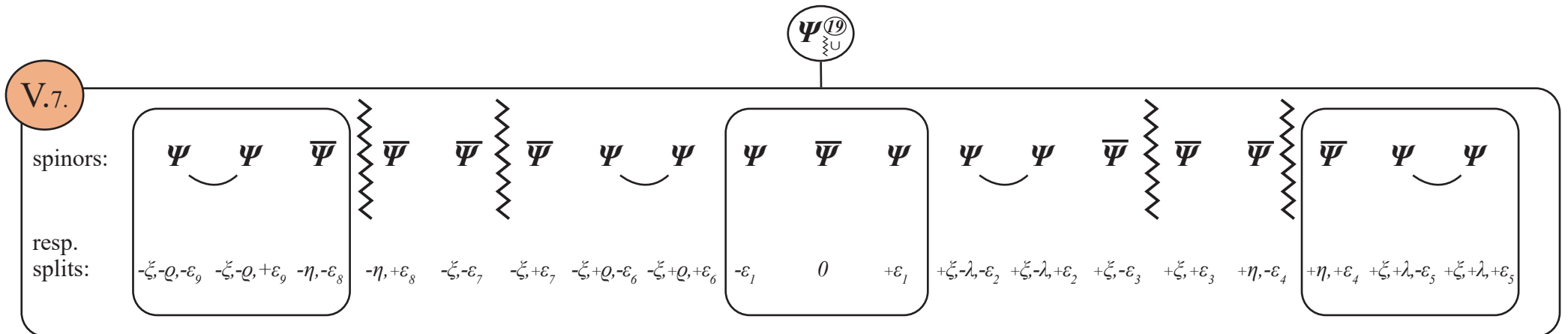
- If the individual Dark Matter elementary particles analytically predicted by this theory are found experimentally, and have the properties predicted by this theory, it would represent the **3rd major confirmation** that the theory is correct.

This also means – and this is an extremely important fact:

Dark Matter and its elementary particles and

Normal Matter and its elementary particles

arise from the exact same preformation structure $\Psi_{\text{U}}^{(19)}$ according to their respective formation processes – as described in detail by this work, and thus have identical origins. Specifically, they both arise from:



In the following year 2015/2016, after completing my analysis of the composition of the Universe directly after the Big Bang, I considered the question of why, over the course of the 13.8 billion years since the Big Bang, the proportion of both Dark Matter and Normal Matter in the composition of the Universe had constantly decreased, and why the proportion of Dark Energy had steadily increased in its place, coupled with the construction of expanding 4-dimensional space-time. What actually is Dark Energy, and how is it created?

In “The Development Process of the Universe from the Big Bang until Today” (UEP), completed on 04/08/2016, respectively in Chapter XII. of this work, the annihilation processes of Dark Matter and Normal Matter are analysed and described in full detail. These publications explain how these annihilation processes generate the creation processes of Dark Energy with the coupled construction of expanding 4-dimensional space-time, and how the Dark Energy bosons and the coupled construction of expanding 4-dimensional space-time are created as by-products of the **preformation structure** $\Psi_{\text{U}}^{(19)}$. These development processes of the Universe continue to unfold to this day.

- Personally, I view the fact that this theory can explain why – consistent with space telescope measurements – the development of the Universe from the Big Bang until today involved and continues to involve a constant reduction of the proportions of Dark Matter and Normal Matter, and conversely a constant increase in the proportion of Dark Energy together with the coupled construction of expanding 4-dimensional space-time, as the **4th major confirmation** of the correctness of this theory.

Furthermore, the detailed analysis presented below explains

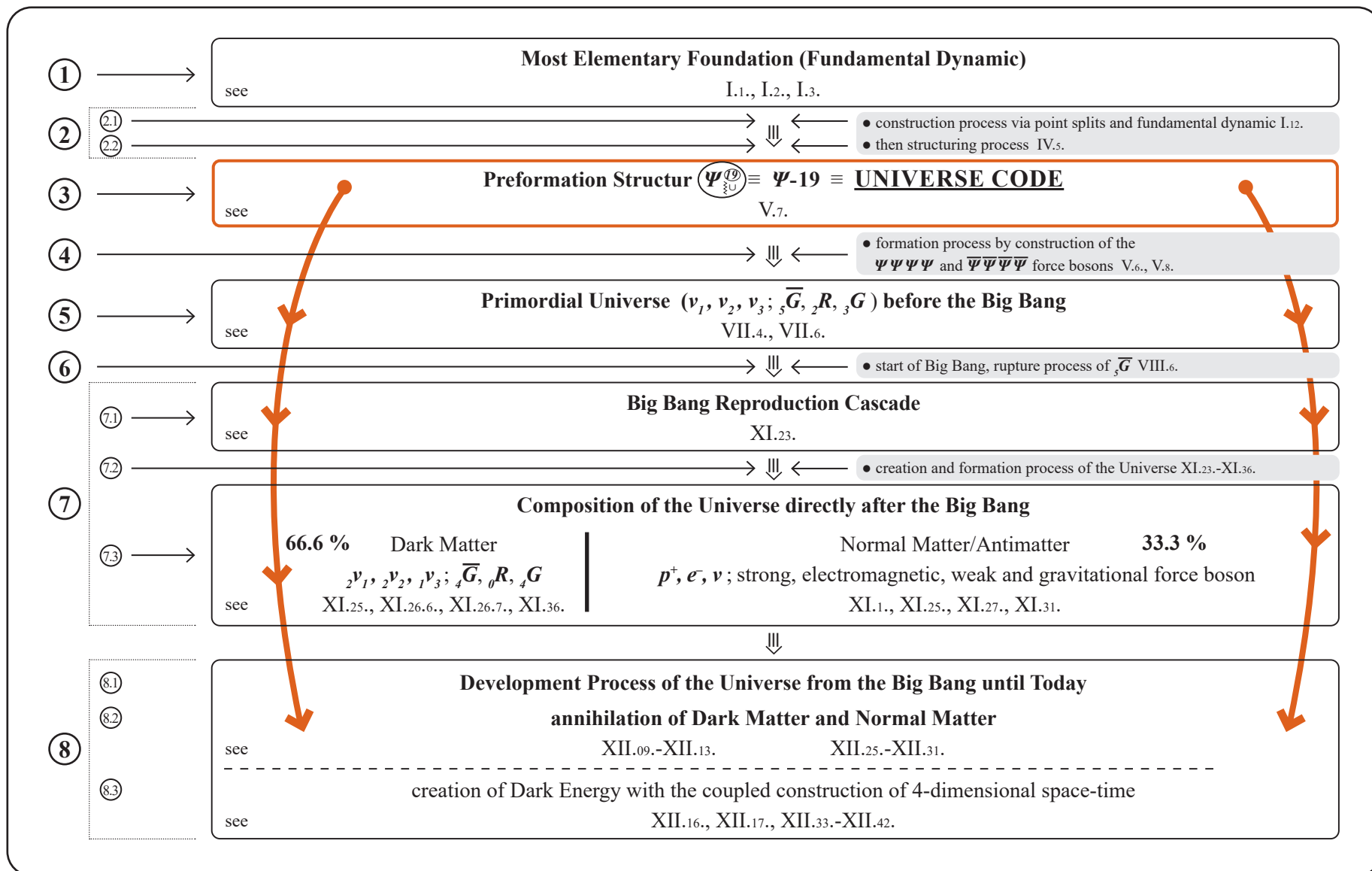
- **what space-time actually is,**
- **why space-time even exists in the first place,**
- **how space-time was created,**
- **and why space-time is 4-dimensional.**

This concludes the presentation of how this work, Ch. I.-XII., developed over time, from 2010-2016.

Now, at the beginning of 2017, with the completion of Chapter XIII., **The Universe Code** $\Psi - 19$, after analysing and taking into account all 8 previous works (2010-2016, see above), every individual and global process chain involved in the construction and development of the Universe have been exhaustively derived and analysed in detail, both in terms of their structural dynamics and the causal connections between them (see XIII.1., XIII.1.①-⑧, XIII.2. - XIII.12.).

The following global process chain deserves special emphasis:

XIII.1.



As well as the results derived in detail in Chapter XIII.:

XIII.4.

The Universe has an overarching, unified, inner-structural global composition and order system $\Psi_{\text{U}}^{(19)}$, that inner-structurally composes and creates all of its components, i.e.:

- **Dark Matter**
- **Normal Matter**
- **Dark Energy with the coupled construction of 4-dimensional space-time**

This means that:

XIII.5.

This inner-structural global composition and order system $\Psi_{\text{U}}^{(19)} \equiv$ preformation structure is the Universe Code $\Psi - 19$, that fully constructs and determines the development of the Universe, from the smallest scales to the largest scales.

Furthermore, all events within the Universe are explained from the “perspective of unification” in Chapter XIII., which has an especially significant meaning within physics. Seen through the lens of this perspective, all individual physical processes, each of which unfolds very differently, are brought together and viewed as a single, unified global process.

The underlying reason behind this unification perspective – as is explained in detail throughout this work – is that each and every physically existing entity has an inner structure that consists of and is generated by the same **preformation structure** $\Psi_{\Sigma U}^{(19)} \equiv \text{unified Universe Code } \Psi - 19$, and thus has the same, identical origin. The act of an observer's perception and insight reaching a “state of perspective” that enables him or her to recognize each elementary particle as having arisen from this unified origin may be viewed and described as the specific “unification process” associated with this elementary particle. However, since each and every entity that physically exists in the Universe (i.e. all elementary matter and force particles) is inner-structurally composed of and constructed from the same **preformation structure** $\Psi_{\Sigma U}^{(19)} \equiv \text{Universe Code } \Psi - 19$, the perspective of the observer will ultimately reach a maximum level of perception and advancement, resulting in a global unification process, arising from the unified origin of all elementary matter and force particles in the Universe, namely the one and same preformation structure $\Psi_{\Sigma U}^{(19)}$. This unified global process can logically be divided into 5 smaller unification processes as presented below:

XIII.8.

- ① The small unification of the electromagnetic and weak interaction
- ② The medium unification of the strong, electromagnetic, and weak interaction
- ③ The great unification of the strong, electromagnetic, weak, and gravitational interaction
- ④ The super-great unification of all interactions (\equiv force bosons) in the Universe, i.e.:

- of the Primordial Universe before the Big Bang ${}_5\overline{G}, {}_3G, {}_2R$
- of Dark Matter ${}_4\overline{G}, {}_4G, {}_0R$
- of Normal Matter $St, \gamma, Z, {}_1G$
- of Dark Energy E_1, E_2 with coupled 4-dimensional space-time elementary particle structure.

- ⑤ The most colossally great global unification of all force bosons and matter fermions
(thus of every physically existing entity)

| | bosons | fermions |
|--------------------------|---|--|
| - of the Prim. Universe: | ${}_5\overline{G}, {}_3G, {}_2R;$ | ${}_1\nu_1 \equiv$ massless neutrino, ${}_1\nu_2 \equiv$ massless neutrino, ${}_1\nu_3 \equiv$ massless neutrino |
| - of Dark Matter: | ${}_4\overline{G}, {}_4G, {}_0R;$ | ${}_2\nu_1 \equiv$ massive neutrino, ${}_2\nu_2 \equiv$ massive neutrino, ${}_1\nu_3 \equiv$ massless neutrino |
| - of Normal Matter: | $St, \gamma, Z, {}_1G;$ | $p^+ \equiv$ proton, $e^- \equiv$ electron, $\nu \equiv$ massless neutrino |
| - of Dark Energy: | E_1, E_2 with the coupled construction of 4-dimensional space-time elementary entities. | |

Thus: This **global unification** ⑤ is justified by and originates from the fact that all of the elementary matter and force particles listed in in XIII.8. (both bosons and fermions) unequivocally and exhaustively formed from one and the same **preformation structure** $\Psi_{\Sigma U}^{(19)} \equiv \text{Universe Code } \Psi - 19 \equiv V.7.$ into individual and specific elementary particles, as is shown and represented in detail in each individual case in Chapters I. - XIV. of this work (for a summary, see XI.^{36.}, XII.^{42.}).

This theme of unification is and has been (for more than 60 years) the object of physics research.

As of today (17/03/2017), a global summary of the EAU is given as follows:

Global summary (for a detailed analysis and summary, see Ch. XIII.):

- The entire matter and force structure of the Universe,

- Dark Matter

- Normal Matter/Antimatter,

- as well as Dark Energy with the coupled construction of 4-dimensional space-time

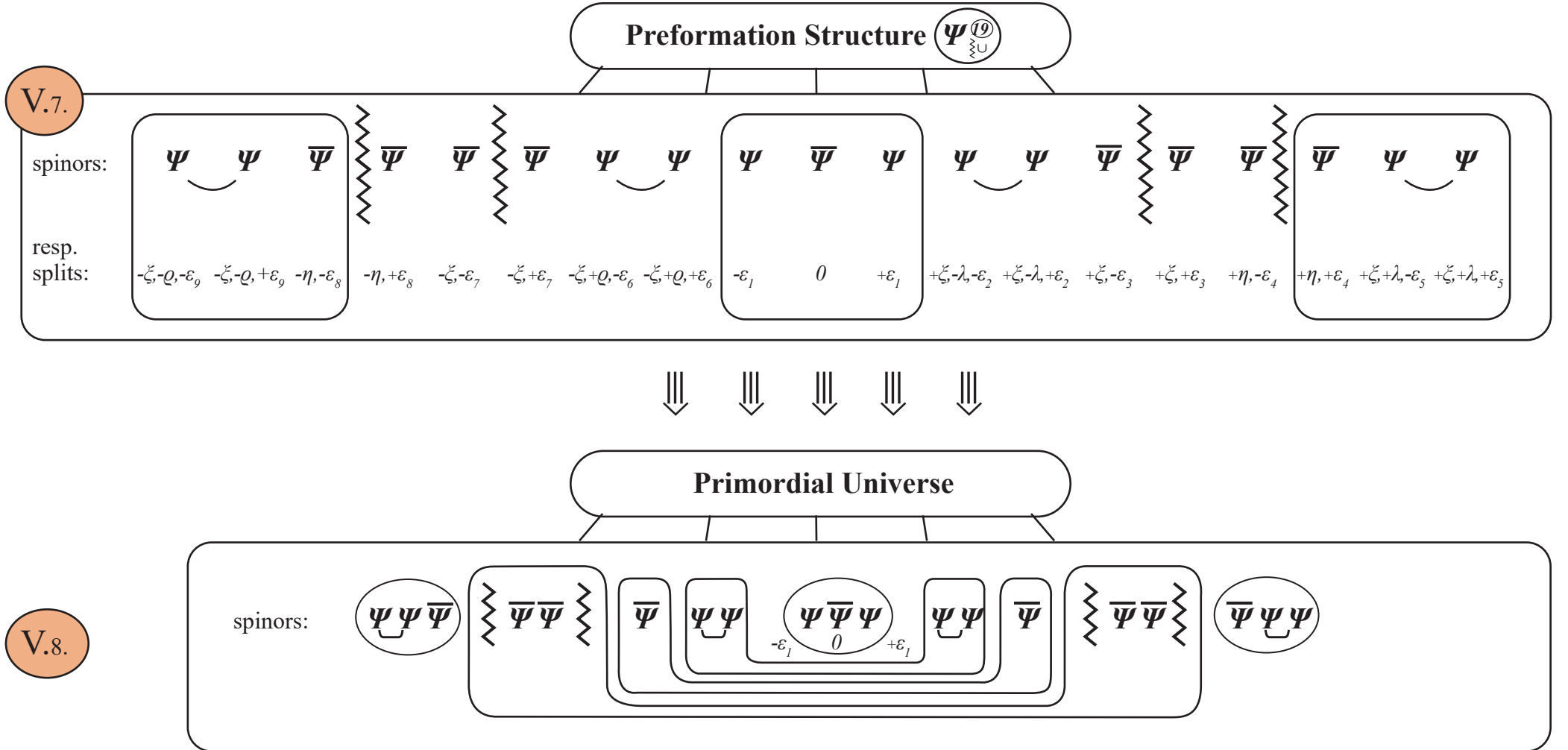
developed from one and the same preformation structure $\Psi_{\text{U}}^{(19)} \equiv \text{V.7.}$ and therefore has one identical origin.

This is explained in full detail by this presentation.

- This preformation structure $\Psi_{\text{U}}^{(19)} \equiv \text{V.7.}$, together with all of its individual and fine-structure details, is the structure that necessarily and unequivocally follows from the elementary foundation I.1., I.2., I.3. (see Chapters I.-V.). This means that I.1., I.2., I.3. and consequently V.7. represent the unified inner-structural composition and order system from which the small-scale (elementary particles) and large-scale (global structures of the Universe) developed. As for the formation of the preformation structure $\Psi_{\text{U}}^{(19)}$: The inner structure IV.2., IV.4. of the unstructured composition system $\Psi^{(27)} \equiv \text{III.4.}$ created from the point split dynamic and the fundamental dynamic system-intrinsically leads to the formation of the structuring foundation $\Psi^{(8)} \equiv \text{IV.5.}$ (for the details, see Chapter IV.). The incorporation of this structuring foundation $\Psi^{(8)}$ into $\Psi^{(27)}$ creates the structured preformation structure $\Psi_{\text{U}}^{(19)}$.

This preformation structure $\Psi_{\text{U}}^{(19)}$ is thus the unified inner-structural composition and order system of every process in the Universe, from the smallest scales to the largest, and can therefore be described as the “Universe Code $\Psi - 19$ ”.

- The first Universe ever to emerge (\equiv the Primordial Universe before the Big Bang \equiv first ever manifestation of reality) forms from this preformation structure $\Psi_{\xi U}^{(19)}$ (\equiv inner-structural composition of the Universe) by means of the formation processes (see I.2.2., V.3., V.4., V.5., V.6., V.8., V.9., V.10.), which were originally initialized by the fundamental dynamic I.1., I.2., I.3., and which therefore necessarily occur:



- This creates the force bosons $\Psi\Psi\Psi\Psi$ and $\bar{\Psi}\bar{\Psi}\bar{\Psi}\bar{\Psi}$ as well as – as predetermined by the preformation structure $\Psi_{\Sigma U}^{(19)}$ – the 3 elementary fermions $\Psi\Psi\bar{\Psi}$, $\Psi\bar{\Psi}\Psi$, $\bar{\Psi}\Psi\Psi$ and the boson $\bar{\Psi}\bar{\Psi}$ (see the process V.7., V.8.).

As a result of the inner-structural composition of all of these elementary particles in the Primordial Universe, as predetermined by the preformation structure $\Psi_{\Sigma U}^{(19)}$ (with inwards-maximized point split distributions, see V.5.-V.10.), each elementary particle in the Primordial Universe V.8. has the following inner-structural composition (for details, see VII.1.-VII.8.):

$$\begin{aligned} {}_5\bar{G} &\equiv \Psi\Psi\Psi\Psi \text{ (5-split)}, {}_3G \equiv \bar{\Psi}\bar{\Psi}\bar{\Psi}\bar{\Psi} \text{ (3-split)}, {}_2R \equiv \bar{\Psi}\bar{\Psi} \text{ (2-split)} \quad \leftarrow \text{ bosons} \\ \nu_1 &\equiv \Psi\Psi\bar{\Psi} \text{ (1-split)}, \nu_2 \equiv \Psi\bar{\Psi}\Psi \text{ (1-split)}, \nu_3 \equiv \bar{\Psi}\Psi\Psi \text{ (1-split)} \quad \leftarrow \text{ fermions} \end{aligned}$$

Thus, the properties of the elementary particles of this Primordial Universe are fully determined, as described by V.6., VI.3., and so the properties of the Primordial Universe (before the Big Bang) are in turn fully determined. This also explains why the Primordial Universe necessarily led to the Big Bang, which unfolded by means of the rupture process of ${}_5\bar{G}$ (see VIII.6.).

- Everything that follows from the composition of the Primordial Universe and the resulting rupture of ${}_5\bar{G}$: the Big Bang cascade XI.23. and the formation of the Universe directly after the Big Bang XI.26., XI.27. ($\frac{2}{3}$ Dark Matter, $\frac{1}{3}$ Normal Matter/Antimatter) is presented in full detail below.

The preformation structure $\Psi_{\Sigma U}^{(19)}$ also determines the inner-structural composition of each of the subsequently forming elementary particles (both of Dark Matter and of Normal Matter/Antimatter), and therefore also determines and creates (in accordance with VI.3.-VI.5., VII.5.) the properties of each of these elementary particles (mass, charge, force structure, force magnitudes, etc.) (see e.g. XI.36.).

- **Therefore, the present theory is capable of:**

- analytically explaining, representing, and determining all of the individual and global structures of the Primordial Universe (before the Big Bang) and thus all of the individual and fine structure of the Big Bang (see XI.23.), as well as the resulting construction of the Entire Universe (see e.g. XI.26.-XI.28.).
- analytically determining the composition of the Universe and its components ($\frac{2}{3}$ Dark Matter, $\frac{1}{3}$ Normal Matter/Antimatter) and the corresponding inner-structural elementary particle composition of each component, and thus this theory determines and analytically describes all of their physical properties.
- analytically determining the development process of the Universe from the Big Bang until Today, thus providing a explanation of the following:
 - Why and how the proportions of Dark Matter and Normal Matter/Antimatter decreased over time, and why this continues to this day.
 - Why and how, conversely, the proportion of Dark Energy increased, with the coupled construction of expanding 4-dimensional space-time, and why this continues to this day.
 - i.e. what the inner-structural composition of Dark Energy is, and what the underlying nature of space-time is.

- The presented theory can also explain – as is described in full detail throughout this work (see in particular Ch. XIII.) – why all of these processes, responsible for the construction and development of the Universe from small scales to large scales, **are derived from one and the same composition and order system $\Psi_{\Sigma U}^{(19)} \equiv V.7.$, and why this $\Psi_{\Sigma U}^{(19)}$ in turn is a necessary and unequivocal consequence of the most elementary foundation $I.1., I.2., I.3.$.**

In other words:

$I.1., I.2., I.3.$ and consequently $V.7.$ is the unified composition and order system of the Universe,

we could also say:

$\Psi_{\Sigma U}^{(19)} \equiv$ $V.7.$ is the Universe Code $\Psi - 19$ that fully constructed and developed the Universe from its smallest components (elementary particles) to its largest (global structures), and which continues to do so to this day.

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The 2nd fundamental process:

The original creation of the spinor collection from the fundamental interaction according to the minimality principle:

$$D_{\sigma_{13}}^{(13)} \Psi(x) \equiv \Psi^{(27)}(x, \sigma_{13})$$

The creation of the most elementary form of structuring: separation – binding from the system-intrinsic point split dynamic

Chapter IV.

p. 74-78

The 3rd fundamental process:

The original creation of the structuring process from the point split dynamic. The construction of the structuring foundation $\Psi^{(8)}$ and the creation of the structure elements $\tilde{\mathbb{Z}} \equiv$ separation and $\cup \equiv$ binding.

Chapter V.

p. 79-88

The 4th fundamental process:

The construction of the preformation structure $\Psi_{\mathbb{U}}^{(19)}$ and the resulting first creation act leading to the Primordial Universe. The formation of the boson force structure, caused by the most fundamental structuring process: “separation” and “binding”, driven by the point split dynamic, and the formation of the fermion structure, driven by the preformation structure and the minimality principle

Chapter VI.

p. 89-99

The creation of mass and charge

from the dynamically generated point split densities of each formation entity.

Mass and charge as dynamically formed physical system quantities:

massless \equiv point split density of 0 or 1

mass $\neq 0 \equiv$ point split density of 2 or more (point curvature)

charge $\neq 0 \equiv$ point split density of 3 or more (point compression)

Chapter VII.

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The Primordial Universe as the first ever manifestation of the Universe,

its force and particle structure and the intrinsic programming of the Big Bang by means of the systemically necessary massive (and hence short-range) repulsive anti-gravitational force boson \overline{G} .

Chapter VIII. The Big Bang:

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causes, inner composition, consequences.

The inevitable rupture of the anti-gravitational force boson \overline{G} . Each phase of the dynamic event: before the Big Bang, Big Bang, after the Big Bang. The fragments after the rupture.

Chapter IX. The post-Big Bang Universe:

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The reformation of the Universe after the Big Bang. The creation of the strong force boson (strong interaction) and the energy-momentum boson $E - I$ from the fragments of the anti-gravitational force boson \overline{G} , which ruptured during the Big Bang, and the repulsive boson R . The skew symmetry (parity asymmetry) caused by the Big Bang in the energy-momentum boson created in the Big Bang. The new point split distribution (from the inside outwards) caused by the Big Bang (repulsion event). The formation of the proton p^+ and the elektron e^- .

Chapter X. The creation of the electromagnetic and weak force

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by partial decomposition of the energy-momentum boson $E - I$. The formation of the elementary particle set: p^+ , e^- , ν ; created by the Big Bang. The strong-electromagnetic-weak-gravitational boson (St, γ, Z, G) , namely the **hydrogen atom H**.

Chapter XI.

p. 145-186

The construction process of the Entire Universe by means of a most colossal reproduction cascade, propagating from the centre of the first elementary particle set (\equiv prototype) created in the first Big Bang event. The nature of the Big Bang as a cascade of connected individual Big Bang events in a most colossal chain reaction. The formation of the most colossal reproduction set of identical copies of the prototype. The universal validity of the laws of nature as a result of this identical reproduction. The limitation of the construction of the Universe by the end of the Big Bang when the production capacity is reached by the reproduction processes, slowing them down.

Chapter XII.

p. 187-220

The development process of the Universe from the Big Bang until Today

- The initial composition of the Universe directly after the Big Bang. Measurement data from the Planck space telescope.
- The processes governing change within the Universe over time: annihilation of Normal Matter and Dark Matter and conversely creation of Dark Energy with the coupled construction of the expanding structure of space-time.
- The inner-structural relation between mass, space-time, and energy.
- The different inner-structural compositions of the pairwise annihilation processes of Normal Matter/Antimatter (\equiv fermion pair annihilation) and Dark Matter (\equiv boson pair annihilation) and the consequences for the development process of the Universe.
- The first annihilation processes of the Normal Matter/Antimatter in the Universe directly after the Big Bang and conversely the first creation of energy-momentum bosons with the coupled construction of expanding 4-dimensional space-time elementary structure entities.
- The space-time of the Universe as a “by-product” resulting from the annihilation processes of massive matter.
- Thus: Space-time is not an *a priori* property of the Universe, but a resulting by-product.
The overall composition balance of the Dark Energy in the Universe and the coupled construction of expanding space-time over time, from the Big Bang until Today. Comparison with Planck space telescope measurement data.

Chapter XIII.

p. 221-267

The Universe Code $\Psi - 19$

- $\Psi - 19 \equiv \Psi_{\Sigma U}^{19}$ is the overarching unified inner-structural composition and order system from which:
Dark Matter is inner-structurally composed, i.e. from which the Dark Matter elementary particles and their properties are inner-structurally composed and created.
- Normal Matter/Antimatter is inner-structurally composed, i.e. from which the Normal Matter elementary particles and their properties are inner-structurally composed and created.
- Dark Energy and the coupled construction of expanding 4-dimensional space-time are inner-structurally composed, i.e. from which Dark Energy bosons and the coupled expanding 4-dimensional space-time elementary entities are inner-structurally composed and created.

Chapter XIV.

p. 268-285

The 6 key processes in the creation and development of the Universe – retrospective summary

- (KP1): Before the creation of the Universe (preformation structure $\Psi_{\Sigma U}^{19} \equiv \text{Universe Code } \Psi - 19$)
- (KP2): The creation of the Universe (the Primordial Universe before the Big Bang - ${}_5\overline{G}, {}_3G, {}_2R; \nu_1, \nu_2, \nu_3$ -)
- (KP3): The rupture process of the Primordial Universe (the rupture of ${}_5\overline{G} \equiv \text{start of the Big Bang}$)
- (KP4): The Big Bang production cascade (for full details, see XI.23.)
- (KP5): The Universe directly after the Big Bang ($\frac{2}{3}$ Dark Matter, $\frac{1}{3}$ Normal Matter/Antimatter)
- (KP6): The construction of Dark Energy with the coupled construction of expanding 4-dimensional space-time

Final remarks

p. 286-290

Annex

p. 291-348

Summary $\textcircled{1.} - \textcircled{29.}$

Overview of results in this document:

The following results are shown and presented in full detail:

See Chap.:

| | | |
|-----|---|--------------|
| 1. | What the unified fundamental dynamic of the construction process of the Universe is. | I. |
| 2. | Why force structures are created and what the original fundamental forces are (repulsion, attraction). | I., V., VII. |
| 3. | Why mass forms and what mass actually is. | VI. |
| 4. | Why charge forms and what charge actually is. | VI. |
| 5. | Why there exists precisely one elementary charge, existing in \oplus and \ominus forms in Normal Matter/Antimatter. | VI. |
| 6. | What the structure of the Universe was before the Big Bang, i.e. the structure of the Primordial Universe. | VII., XI. |
| 7. | That the first force ever to be created in the Primordial Universe – and thus the first force ever to exist – was the anti-gravitational force \overline{G} . | VII., XI. |
| 8. | How this first ever anti-gravitational force \overline{G} is inner-structurally composed. | VII., XI. |
| 9. | That this first ever anti-gravitational force \overline{G} necessarily led to the Big Bang. | VIII., XI. |
| 10. | That the Big Bang was actually a vast cascade of individual finely detailed Big Bang events and that the Entire Universe was ultimately created as the sum of these Big Bang processes. | XI. |
| 11. | How, as a result of this Big Bang cascade, the entire elementary particle spectrum of the Universe was put together, and what the individual elementary particles actually are. | XI. |

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| 12. | Why this Big Bang cascade is simultaneously a reproduction cascade of the elementary particles created in the Big Bang and hence why the laws of nature are universally valid in the Universe. | XI. |
| 13. | Why and how this Big Bang cascade and thus the reproduction cascade ended and why the Entire Universe exists in its current form. | XI. |
| 14. | What the full spectrum of all elementary particles that exist in the Universe was directly after the Big Bang, with their mass, charge, force action, force range, and inner-structural particle composition: an exhaustive list of 12 elementary particles, divided into 2 parts. | XI. |
| 15. | That the “Dark Matter” and “Normal Matter/Antimatter” parts of the Universe are fully included in this list and that the physical properties of the corresponding elementary particles are determined by their inner-structural particle composition, as stated in the list, and that the composition mix of the Universe directly after the Big Bang: “Dark Matter” $\equiv 66.6\%$; “Normal Matter/Antimatter” $\equiv 33.3\%$. | XI. |
| 16. | That 2 of the 3 different types of neutrino have mass, and why they have this mass. | XI. |
| 17. | That and how the mass, charge, force action, force range of the elementary particles of “Dark Matter” are analytically determined by their inner-structural particle composition, and that the individual elementary particles of “Dark Matter” have extremely low range and most extremely high magnitude, and that they will be experimentally observable once suitable high-resolution capacity is available. | XI. |
| 18. | <p>That the energy-momentum $(E - I)$ created by the Big Bang is parity-asymmetric, and that it partially decomposes into the lower-energy decomposition product $(E - I) \rightarrow (\gamma Z)$ as the structure formation and expansion of the Universe continues due to the energy consumption associated with this process, which creates the electromagnetic force γ, as well as the weak force Z.</p> <p>Wherever (γZ) is created, the parity asymmetry of the decomposed energy-momentum $(E - I) \rightarrow (\gamma Z)$ is passed on in the form of parity asymmetry in the weak Z-boson.</p> | IX., X. |

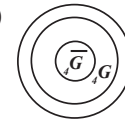
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| 19. | <p>That the force structure of Normal Matter is as follows:</p> <ul style="list-style-type: none"> - strong interaction (St) - electromagnetic interaction (γ) - weak interaction (Z) - gravitation (G) | X. |
| 20. | <p>That the elementary particle set of Normal Matter:</p> <p>$(p^+), (e^-), (\nu); (St), (\gamma), (Z), (G)$</p> <p>assembles into the organizational entity of the hydrogen atom (H).</p> | X. |
| 21. | <p>What the initial composition of the Universe was directly after the creation process of the Universe (Big Bang):</p> <p>66.6% Dark Matter and 33.3% Normal Matter/Antimatter (see UEA), with the list of individual fermionic and bosonic elementary particles. The concept of “matter” includes both substance-related matter and force-related matter.</p> | XI. |
| 22. | <p>Why the development process of the Universe over time from the Big Bang until Today involved:</p> <p>annihilation processes of Normal Matter and Dark Matter and conversely creation processes of Dark Energy with the coupled creation of the expanding 4-dimensional space-time elementary structure entities.</p> <p>Thus: It is shown that the space-time of the Universe does not exist “a priori”, but only began to be created the “moment” that the creation process of the Universe was complete, directly after the Big Bang.</p> <p>Thus: It will be shown that space-time is created as a “by-product” of the annihilation of the massive elementary particles that had just been created by the Big Bang, which continues to unfold to this day by means of further such annihilation processes.</p> | XII. |

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| 23. | <p>How each of these Dark Matter annihilation processes unfolds inner-structurally, and how Dark Energy is created inner-structurally, and how/why this led and continues to lead to the creation and coupling of expanding 4-dimensional space-time elementary structure entities to the newly created Dark Matter bosons.</p> <p>Thus: We will see what Dark Energy actually is, and how it is coupled to the construction of expanding 4-dimensional space-time, and therefore what space-time actually is, and how it is created.</p> | XII. |
| 24. | <p>How each of these Normal Matter/Antimatter annihilation processes unfolds inner-structurally, how this generates energy-momentum bosons inner-structurally, and how this leads to the creation and coupling of the expanding space-time elementary structure entities.</p> <p>We will in particular see how the space-time was first constructed directly after the Big Bang.</p> | XII. |
| 25. | <p>How the Dark Energy bosons thus created are inner-structurally composed, and that the Dark Energy bosons created from the annihilation of Dark Matter are inner-structurally different from the energy-momentum bosons created from the annihilation of Normal Matter/Antimatter.</p> | XII. |
| 26. | <p>That the inner-structural composition of the pairwise annihilation processes of Normal Matter/Antimatter ($\equiv (e^+ e^-), (p^+ p^-) \equiv$ fermion pair annihilation) and of Dark Matter ($\equiv {}_4\overline{G}, {}_4G \equiv$ boson pair annihilation) are not the same, and what consequences this has for the overall course of the development processes from the Big Bang until Today.</p> | XII. |
| 27. | <p>What the inner-structural relation between mass, space-time, and energy is.</p> | XII. |
| 28. | <p>How exactly the balance of the Universe developed over time from the Big Bang until Today.</p> <p>Thus, the meaning of the structural sequence: <u>matter – mass</u> – annihilation and conversely <u>Dark Energy – space-time</u> – creation.</p> | XII. |
| 29. | <p>Why the development of the Universe caused by the annihilation and creation processes described below creates an expanding space with an “outer” 4-dimensional space-time structure and an integrated “inner” 2-dimensional SU2 structure (isospace), as is consistent with reality.</p> | XII. |
| 30. | <p>Why the composition of the Universe “Today” is precisely as shown by the measurement data gathered by the Planck space telescope.</p> | XII. |

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| 31. | What the global structure and the causal links in the construction and development process of the Universe are. | XIII., , XIV. |
| 32. | That this global process unfolds in a sequence of 8 consecutive sub-processes, and how this sequence of processes is causally connected. | XIII. |
| 33. | <p>That the “centrepiece” of the Universe is given by the preformation structure $\Psi_{\Sigma U}^{(19)} \equiv \text{Universe Code } \Psi - 19$, which forms the overarching unified inner-structural composition and order system of the Universe, from which</p> <ul style="list-style-type: none"> • Dark Matter is inner-structurally composed, i.e. the Dark Matter elementary particles and their properties are inner-structurally composed and created. • Normal Matter/Antimatter is inner-structurally composed, i.e. the Normal Matter elementary particles and their properties are inner-structurally composed and created. • Dark Energy and the coupled construction of expanding 4-dimensional space-time elementary entities are inner-structurally composed and created. | XIII. |
| 34. | That the preformation structure $\Psi_{\Sigma U}^{(19)} \equiv \text{Universe Code } \Psi - 19 \equiv V.7.$ necessarily and unequivocally formed as a logical consequence of the elementary system I.1., I.2., I.3.. | XIII. |

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| 35. | <p>That, as laid out in Chap. I.-XIII., all physical events in the Universe developed and continue to develop from the Universe Code $\Psi-19$ (each of which is presented in detail in Chap. I.-XII.).</p> <p>That the following processes developed from the Universe Code $\Psi-19$. Given the wide diversity of physical events, these processes may be referred to as unification processes:</p> <ol style="list-style-type: none"> ① <u>The small unification</u> of the electromagnetic and weak interaction (of Normal Matter) ② <u>The medium unification</u> of the strong, electromagnetic, and weak interaction (of Normal Matter) ③ <u>The great unification</u> of the strong, electromagnetic, weak, and gravitational interaction (of Normal Matter) ④ <u>The super-great unification</u> of all interactions (\equiv force bosons) in the Universe, i.e.: <ul style="list-style-type: none"> - of Dark Matter ${}_4\overline{G}, {}_4G, {}_0R$ - of Normal Matter $St, \gamma, Z, {}_1G$ - of Dark Energy E_1, E_2 with its coupled 4-dimensional space-time elementary entity-based structure. ⑤ <u>The most colossally great global unification (global unity)</u> of all force bosons and all matter fermions (thus of everything that physically exists): <ul style="list-style-type: none"> - of the Primordial Universe: ${}_5\overline{G}, {}_3G, {}_2R; {}_1\nu_1 \equiv$ massless neutrino, ${}_1\nu_2 \equiv$ massless neutrino, ${}_1\nu_3 \equiv$ massless neutrino - of Dark Matter: ${}_4\overline{G}, {}_4G, {}_0R; {}_2\nu_1 \equiv$ massive neutrino, ${}_2\nu_2 \equiv$ massive neutrino, ${}_1\nu_3 \equiv$ massless neutrino - of Normal Matter: $St, \gamma, Z, {}_1G; p^+ \equiv$ proton, $e^- \equiv$ electron, $\nu \equiv$ massless neutrino - of Dark Energy: E_1, E_2 with the coupled construction of 4-dimensional space-time elementary entities, <p>Therefore, that each and every physically existing object in the Universe has one and the same origin, thus that each and every physically existing object is based on the same original structure and resulting inner-structural composition. This unified original structure is the preformation structure $\Psi_{\xi U}^{(19)}$, justifying the name of Universe Code $\Psi-19$.</p> | XIII. |
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| 36. | <p>Based on this analytical knowledge of the inner-structural composition and therefore the properties of each Dark Matter elementary particle ${}_4\overline{G}$, ${}_4G$, ${}_0R$; ${}_2\nu_1$, ${}_2\nu_2$, ${}_1\nu_3$, it would be theoretically possible to analytically predict the form of the <u>fundamental Dark Matter</u> atom – the counterpart of the H-atom of Normal Matter (H-atom made of the Normal Matter elementary particles St, γ, Z, \overline{G}; p^+, e^-, ν), and then construct higher Dark Matter atoms from this fundamental Dark Matter atom, thus developing the atomic physics of Dark Matter – analogously to the atomic physics of Normal Matter. When doing so, one fact that might prove important is that – as presented and analysed in VI.4. – the highly massive 4-split elementary particles ${}_4\overline{G}$ and ${}_4G$ each have an as-yet-undetermined gravitational charge q resp. \overline{q} (not electrical charge!) and therefore – analogously to Normal Matter, for which the electrical charge $\oplus\ominus$ of the ≥ 3-split elementary particles p^+ and e^- leads to the creation of hydrogen – Dark Matter also leads to the formation of a fundamental Dark Matter atom (A), the fundamental structural unit of Dark Matter, thus further leading to the construction of other, higher Dark Matter atoms. Pursuing this line of research represents a new, extremely interesting area of research, namely the “<u>atomic physics of Dark Matter</u>”.</p> | XIII. |
| 37. | <p>That the entire creation and development process of the Universe unfolds in 6 key processes (KP)</p> <p>(KP1) : Before the creation of the Universe (preformation structure $\Psi_{\text{U}}^{(19)} \equiv \text{Universe Code } (\Psi-19)$)</p> <p>(KP2) : The creation of the Universe (the Primordial Universe before the Big Bang ${}_5\overline{G}$, ${}_3G$, ${}_2R$; ν_1, ν_2, ν_3 -)</p> <p>(KP3) : The rupture process of the Primordial Universe (the rupture of ${}_5\overline{G} \equiv \text{start of the Big Bang}$)</p> <p>(KP4) : The Big Bang production cascade (for the full details, see XI.23.)</p> <p>(KP5) : The Universe directly after the Big Bang ($\frac{2}{3}$ Dark Matter, $\frac{1}{3}$ Normal Matter/Antimatter)</p> <p>(KP6) : The construction of Dark Energy with the coupled construction of expanding 4-dimensional space-time</p> | XIV. |



Summary:

We shall show that there is a unified dynamic minimal structure that governs the construction and formation process of the Universe, from **the smallest scales of the Universe** – the construction of elementary particles together with all of the force and matter-related laws that they satisfy – **up to the largest scales of the Universe** – the cosmogenetic composition and formation structure of the Universe as a whole, with all of its various phases: before the Big Bang, the Big Bang, after the Big Bang, until today.

Thus: This document analyses the most elementary level of reality, that which underlies every real event, and from which all events of the Universe developed. We will consider each phase in this development and follow the individual formation stages step-by-step without needing to make any additional assumptions at any point.

Thus: Below, we will gradually see how, in the first phase, the structuring foundation necessarily required for the construction of each and every process of reality is the most elementary of all structures, and is dynamically constructed from the two structuring elements “separation” and “binding”. This structuring process is the reason why “Something” can be distinguished from “Something Else” in the first place. The ability to make this distinction is necessarily required in order for processes of any kind to form and unfold.

This then leads to the formation of the preformation structure (**V.1.**, **V.2.**), which underlies all subsequent processes.

Thus: This document shows why and how the structuring foundation (separation, binding) derived from the point split dynamic represents the two fundamental forces in every force system, namely: **the repulsion force** \equiv **separation** and **the attraction force** \equiv **binding**, and how this most fundamental force structure is constructed from the basis spinors **V.6.**

Furthermore, we shall show how the point split-separated dynamic construction processes create the resulting formation entities, and how specific point split densities then dynamically form in each case, which create “**point curvature**” and **therefore mass** at point split densities of ≥ 2 , and “**point compression**” and **therefore charge** at point split densities of ≥ 3 . This happens exactly as can be observed in reality: massless particles, massive particles with different masses, uncharged particles, \pm charged particles, existence of precisely one quantized elementary charge in two forms, \pm .

In the first act in the development of all events in the Universe (**V.7.**, **V.8.**), the first ever manifestation of reality forms from the preformation structure, before the Big Bang, namely the Primordial Universe (**V.10.**, **V.11.**, **VII.4.**), whose particle and force structure is precisely determinable and will be presented in full detail (**VII.1.** to **VII.8.**).

The first ever force in the Primordial Universe, i.e., the first force ever to form in our Universe and Everything, – as shown in detail in (VII.1. to VII.9.) – is necessarily the most extremely massive (and therefore most extremely short-range), most extremely strong repulsion force, named the anti-gravitational force \overline{G} (VIII.1. to VIII.10.), whose inner-structural composition necessarily and invariably endows it with the two properties ① \equiv short range due to its mass structure and ② \equiv repulsive force due to its inner-structural basis spinor composition. This force then necessarily and inevitably leads to a rupture (VIII.2., VIII.3., VIII.6.), i.e. leads to the **Big Bang**. The resulting fragments – after the Big Bang – reform to give the so-called “strong force” (VIII.8., VIII.9.) and an energy-momentum formation (IX.2. to IX.11.) that inherits the repulsive momentum of the ruptured anti-gravitational boson (\overline{G}).

Thus, the only force structures that exist after the Big Bang are the **gravitational force** and the **strong force** (XI.10.). There also exists the energy-momentum boson. The electromagnetic and weak forces do not yet exist at this point, only forming later by means of the partial breakdown of the energy-momentum formation into the electromagnetic and weak bosons (X.5.1., X.5.2.).

Hence: Directly after the Big Bang, the post-Big Bang part of the Universe (IX.10.) forms, consisting of the two components described in XI.36.. The energy-momentum boson created from the rupture-based structure of the Big Bang is skew-symmetric (parity-asymmetric) (IX.9.). This skew symmetry is subsequently inherited by the weak force Z when the $E-I$ boson partially decomposes into γZ .

All of this is presented throughout these chapters in full detail, step by step, with no omissions. It is shown that what we know as the Big Bang was in fact a most colossal superposition of $\left[\frac{3^{(n_f-1)}-1}{2} \right]$ finely structured individual Big Bang events $n = 1, 2, 3, \dots n_f$ ($n_f \equiv$ final production level) XI.23., which began in the **first** individual Big Bang event (VIII.6.), the one that created the first elementary particle set, i.e. the prototype (VIII.10., IX.2., IX.11.) and in which, at the utmost centre of the Universe, at the absolute centre of the rupture, the first individual Big Bang event caused a fragile neutrino to form (restructuring) (XI.2. to XI.7.),

From the substructure (inner-structural composition of basis spinors) of this fragile central neutrino (XI.7.) $\nu \equiv \psi \bar{\psi} \psi$, and nothing else, a most colossal reproduction factory is opened along this central rupture axis (XI.7.). The “unimaginable” capacity of $3^{(n_f-1)}$ identical \square -particles and $\left[\frac{3^{(n_f-1)}-1}{2} \right]$ identical \boxtimes -particles, $n=1,2,3,\dots n_f$ is then reproduced in a **most colossal reproduction cascade** (XI.8. to XI.23.).

This identical reproduction process is precisely why the laws of nature are universally valid.

This **most colossal Big Bang** event is known as the Big Bang in the annals of the history of the Universe. Over the course of this Big Bang, around 13.8 billion years ago, the Entire Universe in its full capacity was generated essentially “at once” in the tiniest fraction of a second, the first second ever to exist.

We will show that this reproduction process (XI.22. to XI.27.) intrinsically causes the Big Bang chain reaction space to become increasingly full as the reproduction continues (XI.29.1., XI.30.), leading the Big Bang chain reaction towards a limit, which is reached when – as shown in XI.15. to XI.18. – the continuously accumulating products of the individual production processes fill the reaction space as the production capacity is approached, slowing each of the individual Big Bang processes, and thus slowing the reproduction as a whole (XI.30.). Once the Universe reaches its full capacity of identical elementary particle sets, the Big Bang reproduction process ends (see Chap. XI., esp. XI.23.).

Furthermore, Chap. IX. shows in detail how the Big Bang leads to the skew symmetry (parity asymmetry) of the energy-momentum created during the Big Bang. This skew symmetry is then passed down via the partial decomposition of the energy-momentum $E - I$ into the electromagnetic interaction (γ -boson) and the weak interaction (Z -boson), i.e. by the decomposition $E - I \rightarrow \gamma Z$, resulting in the parity-asymmetric boson structure $Z \equiv \overline{\Psi} \overline{\Psi}$ of the weak interaction in a necessarily occurring process, as presented in detail in X.7.

This document examines the development processes of the Entire Universe. We shall present the unified construction processes from which every event in the history of the Universe until today formed, from the smallest scales to the largest. Chap. XI. studies the composition of the Entire Universe directly after the Big Bang, which was namely:

$$\frac{2}{3} \equiv 66.6 \% \equiv \text{„Dark Matter“} \quad \text{and} \quad \frac{1}{3} \equiv 33.3 \% \equiv \text{„Normal Matter/Antimatter“}$$

The inner-structural particle composition of the “Dark Matter” elementary particles and the “Normal Matter/Antimatter” elementary particles will be presented, and the mass/charge/force structure of these elementary particles will be derived from each of their inner particle structures, summarized in the list of constituents XI.36. .

The list **XI.36.** gives the full elementary particle spectrum of the Entire Universe including “Dark Matter”. The list gives an exact analysis of every particle.

Based on this foundation, the processes governing the changes that have occurred within the Universe from the Big Bang until Today will then be presented, together with how they unfolded and continue to unfold. We will show why the annihilation processes of both Normal Matter/Antimatter and Dark Matter parts happened and continue to happen, and how conversely the creation processes of Dark Energy and the coupled construction of expanding 4-dimensional space-time elementary structure entities (i.e. the expanding construction of space-time) happened and continues to happen.

Thus, we will show that 4-dimensional space-time did not exist a priori, but was first created after the Big Bang as a result of annihilation processes (pairwise annihilation processes) as a “by-product” of the massive matter particles that had just been created by the Big Bang, and continues to be generated by these “ongoing” annihilation processes.

Furthermore, we will show how each of these matter annihilation processes unfolds inner-structurally, as well as the inner-structural composition of the Dark Energy bosons, and how (and why) this results in the construction of expanding 4-dimensional space-time elementary structure entities – coupled to the Dark Energy bosons.

Thus: Every aspect of the inner-structural relation between mass, space-time, and energy will be derived, and we shall present how this determined the quantitative balance of the development of the Universe over time from the Big Bang until Today, explaining the nature of the structural progression of the Universe:

annihilation of matter – mass and conversely creation of Dark Energy – space-time .

Chap. XIII. shows that (and how) the matter and force composition of the Entire Universe, and therefore every component of the Universe, i.e.:

- Dark Matter, with elementary particles ${}_4\overline{G}, {}_4G, {}_0R; {}_2\nu_1, {}_2\nu_2, {}_1\nu_3$
- Normal Matter/Antimatter, with elementary particles $p^+/p^-, e^-/e^+, \nu; St, \gamma, Z, G$
- Dark Energy, with the Dark Energy bosons E_1, E_2 and the coupled construction of expanding 4-dimensional space-time

formed from one and the same **preformation structure** $\Psi_{\text{U}}^{(19)}$, and therefore that all components of the Universe have the same identical origin.

Furthermore, it is shown that – as presented in detail in Chap. I.-V. – this preformation structure

$\Psi_{\text{U}}^{(19)}$ formed from the fundamental dynamic I.1., I.2., I.3. by means of a necessary and unequivocal process.

Thus: This **preformation structure** $\Psi_{\text{U}}^{(19)} \equiv \text{V.7.}$, underlying everything, is the unified inner-structural composition and order system from which the Universe developed, both at the smallest scales (elementary particles) and at the largest scales (global structures of the Universe), i.e. from which every component of the Universe developed, namely:

- Dark Matter
- Normal Matter/Antimatter
- Dark Energy with the coupled construction of expanding 4-dimensional space-time

This means that, simplifying the notation by writing $\Psi\text{-19}$ instead of $\Psi_{\text{U}}^{(19)}$:

$\Psi_{\text{U}}^{(19)} \equiv \Psi\text{-19} \equiv \text{V.7.}$ is the unified inner-structural composition and order system

of the Universe \equiv Universe Code $\Psi\text{-19}$

In Chap. XIV., in a global retrospective summary, we will show that the causal chain of the perfectly and seamlessly interlocking **individual processes in the creation and development sequence of the Universe** presented in Chap. I.-XIII. can be represented **in the form of a causality sequence of 6 consecutive key processes** (for details, see Chap. XIV., **KP1** → **KP6**).

Chapter I.

The foundations:

**The question of the most elementary of all possible structural compositions of the Universe.
Principle of minimality, fundamental interaction, point split, identity principle.**

Preliminary remarks to Chapter I.:

Chapter I. discusses the formation of the foundations upon which physics is constructed, thus the formation of the most elementary physical foundation.

Anyone who finds this too “fundamental” or linguistically and terminologically too “philosophical” can simply skip this chapter and view I.1., I.2., I.3., I.5., I.7., I.8. not as fundamentally derived relations, but as the fixed axioms upon which the physics of Chapters II.-XIV. are developed.

Thus: After taking note of I.1., I.2., I.3., I.5., I.7., I.8., any reader who is so inclined may skip directly to Chapters II.-XIV.

To the best of our current knowledge, the Universe is 13.8 billion years old.

But this immediately raises the question: What was there before this beginning of the Universe?

Or, to state this question more precisely: What did the Universe arise from at that time, and how?

We currently know that there was a Big Bang 13.8 billion years ago. But again, this leaves the questions of what existed before this Big Bang, and why it happened, unanswered.

So: Right at the beginning – before the Big Bang – there must have been some existential act that created a “Something” – whatever the nature of this Something may have been – or, to phrase it philosophically, a something that is “not Nothing”. Determining the nature of this most elementary Something is the goal of Chapter **I.**

We therefore pose the question:

- **Does there exist a most elementary Something, i.e. a most elementary basic structure, that cannot be decomposed into something more elementary still?**
- **If there does exist such a most elementary Something, what are its properties?**
- **And furthermore: Does this most elementary basic structure intrinsically possess a construction principle that initiates the construction processes required to fully and unequivocally create real matter (matter particles and force particles), i.e. the building blocks of the Universe?**

Remark: Throughout the text, the concept of “matter” refers to both substance matter and force matter, i.e. anything that is physically measurable.

The answer to this question is, as developed and presented below:

- There does exist such a universal “most elementary matter”-generating process.
- This process is based on the principle of greatest simplicity (minimality principle) (see “The Law of Greatest Simplicity” (GDE), 26/05/2015).

- The most fundamental basis entity in this creation process is the most general possible physical and mathematical entity, i.e. a spinor Ψ . Thus and only thus can all other physical and mathematical entities be constructed, by taking suitable products of these basis spinors, including

scalars, vectors, tensors, higher-level structured spinors, etc.

Thus: In the (elementary particle creation process), since this process strictly satisfies the principle of greatest simplicity (minimality principle), there only exist the basis spinors Ψ , and nothing else, i.e. there are no other basis entities.

- The creation process of the most elementary matter is fundamentally dynamic, i.e. the basis spinors Ψ only exist in a strictly non-linear interaction structure. By the (principle of greatest simplicity (minimality principle)), this interaction structure must have (the simplest possible structure).

Thus: The following holds, writing $D \equiv \frac{d}{dx}$ for the differential operator and $dx \equiv \sigma \equiv$ point split:

The **fundamental dynamic** underlying the **most elementary matter creation process** is:

I.1.

$$D \Psi(x) = \Psi(x-\sigma_\alpha) \bar{\Psi}(x) \Psi(x+\sigma_\alpha); \quad \sigma_\alpha \equiv \text{point split with } \sigma_\alpha \rightarrow 0$$

I.2.

$$D \bar{\Psi}(x) = \bar{\Psi}(x-\sigma_\beta) \Psi(x) \bar{\Psi}(x+\sigma_\beta); \quad \sigma_\beta \equiv \text{point split with } \sigma_\beta \rightarrow 0$$

The following point split dynamic therefore holds:

I.2.1.

with $\bullet \equiv$ interaction point, point split dynamic $\sigma \neq 0, \sigma \rightarrow 0$

repulsion \equiv separation $\xleftarrow{-\sigma} \bullet \xrightarrow{+\sigma}$ repulsion \equiv separation
 attraction \equiv binding $\longrightarrow \bullet \longleftarrow$ attraction \equiv binding

If **I.1.** and **I.2.** hold independently from each other, then both $\Psi_{(x)}$ and $\bar{\Psi}_{(x)}$ must be spinors with four components, for the following reason:

From **I.1.**, it holds that: $D \underset{1}{\Psi} = \underset{2}{\Psi} \underset{3}{\bar{\Psi}} \underset{4}{\Psi}$ and, from **I.2.**, it holds that: $D \underset{5}{\bar{\Psi}} = \underset{6}{\bar{\Psi}} \underset{7}{\Psi} \underset{8}{\bar{\Psi}}$,

and so if both **I.1.** and **I.2.** hold together, there exists the following spinor structure.

I.2.2.

Ψ is a $\Psi = \underset{1}{\Psi}, \underset{2}{\Psi}, \underset{4}{\Psi}, \underset{7}{\Psi}$ -spinor, and so a 4-component spinor

$\bar{\Psi}$ is a $\bar{\Psi} = \underset{3}{\bar{\Psi}}, \underset{5}{\bar{\Psi}}, \underset{6}{\bar{\Psi}}, \underset{8}{\bar{\Psi}}$ -spinor, and so also a 4-component spinor

The physical meaning of the point split σ in **I.1.** and **I.2.** is based on the fact that the fundamental interaction $D \Psi = \Psi \bar{\Psi} \Psi$ and $D \bar{\Psi} = \bar{\Psi} \Psi \bar{\Psi}$ cannot occur at a fixed point x , since the differential operator D that sets the interaction in motion by definition forms a point split by forming the differential operator $\frac{d}{dx}$ and thus forming dx , since this dx is in fact precisely the point split σ itself, i.e. $dx \equiv \sigma$.

In other words: The existence of a fundamental interaction structure automatically implies the existence of the differential operator $D \equiv \frac{d}{dx}$, which in turn, writing $dx \equiv \sigma$, automatically implies the existence of the point split σ , and the equality between the left and right sides of equations **I.1.** and **I.2.** is necessarily satisfied.

I.3.

From the fundamental interaction: $D \Psi = \Psi \bar{\Psi} \Psi$ and $D \bar{\Psi} = \bar{\Psi} \Psi \bar{\Psi}$, it follows that:
 By definition, the differential operator D has a so-called length dimension of -1
 (definition: $\dim D = -1$). Therefore, it follows from the fundamental interaction that:

$$\text{Length dimension of } \Psi = -\frac{1}{2} ; \dim \Psi = -\frac{1}{2}$$

$$\text{Length dimension of } \bar{\Psi} = -\frac{1}{2} ; \dim \bar{\Psi} = -\frac{1}{2},$$

and it therefore also holds that the fundamental interaction **I.1.**, **I.2.** has a dimensionless coupling constant, and therefore can be renormalized. This is also why, for simplicity of notation, the dimensionless coupling constant in **I.1.**, **I.2.** is not explicitly stated, as it does not hold any significance for the structure of the interaction.

It follows that: The basis spinors $\Psi_{(x)}$ and $\bar{\Psi}_{(x)}$ are not observable entities.

In any phase of the Universe, observable entities satisfy the following:

I.4.

- observable fermions have dimension $-\frac{3}{2}$ and are therefore $\Psi^{(3)}$ -objects ^{*1)}
- observable bosons have dimension (-1) or (-2) and are therefore $\Psi^{(2)}$ - or $\Psi^{(4)}$ -objects
- observable energy-momentum-formations $(E - I)$ have dimension (-2) and are therefore $\Psi^{(4)}$ -objects, where energy has dimension (-1) and momentum has dimension (-1)

*1) Remark: the notation $\Psi^{(n)}$, $n=1, 2, 3, 4$ means: spinor product of n spinors, including both Ψ and $\bar{\Psi}$.

This notation can also be used in general for $n > 4$, in which case it refers to the point split-separated local neighbourhood (x, σ) .

I.5.

In the most elementary creation process of the Universe, the following identity principle holds:

- In the most elementary creation process, no 2 or more elementary entities are created identically.
- Whenever the most elementary dynamic creation process reaches a situation in which 2 identical elementary entities might be created, the dynamic process is initiated by the fundamental dynamic I.1. and I.2., which either
 - dynamically extends or restructures the creation system (in terms of the specific relations between the basis spinors),
 - in such a way that, as a result of this extension or restructuring, there ultimately do not exist any 2 (or more) identical entities in the most elementary creation process.

I.5.1.

I.5.2.

The above identity principle I.5. is the “MOST FUNDAMENTAL LOGICAL AND ONTOLOGICAL PRINCIPLE” and is the “all-powerful designing principle” governing the physical existence and creation process of the Universe and its intrinsic most elementary forces.

The presentation below will systematically indicate whenever this identity principle I.5. of the original creation process applies to the situation at hand.

I.6.

Initiated by the fundamental dynamic $I.1.$, $I.2.$, $I.3.$ and governed by the identity principle $I.5.$, $I.5.1.$, $I.5.2.$ – before the first creation process of the Universe actually physically manifests – there unfolds a multi-stage creation process of basis spinor collections in the split neighbourhood (x, σ) of the local origin of the interaction (x) , which, over the course of the subsequent development of the creation process, becomes the local centre (x) of the Universe as it forms.

The creation process of the Universe thus continues until the dynamically generated basis spinor raw material satisfies the following two necessary conditions for the creation of the most elementary matter, in accordance with the principle of greatest simplicity (minimality principle):

I.7.

I.7.1.

Most elementary matter particle creation condition ① \equiv ET 1 :

The spinor raw material generated by the fundamental dynamic I.1. and I.2. must be structurable in such a way that – by means of this structuring – identifiable physical entities can be obtained, i.e. it must be possible to form the structuring momentum and structuring energy required for structuring from the spinor raw material thus generated.

I.7.2.

Most elementary matter particle creation condition ② \equiv ET 2 :

Once the structuring process of the spinor raw material is complete following its creation, i.e. once the structuring entities have formed, and once the structuring momentum and structuring energy required for this structuring have been consumed and the corresponding structuring output has concluded, there must remain sufficient additional dynamically generated basis spinor raw material left over in order for the individual, observable and therefore identifiable elementary particles, i.e. $\Psi^{(n)}$ -objects, $n \geq 2$, to form according to I.4. .

These most elementary matter particle creation conditions having the following meanings:

Explanation of ET 1:

Any structuring process of a set necessarily involves separating parts of this set and binding together parts of this set.

Thus: Every structuring process occurs via the sub-processes “separation” and “binding”. Each of these two structuring acts requires its own structuring momentum and structuring energy. So: In the fundamental elementary particle creation process, and before any manifestation of reality, there must form

**both a separation momentum and a separation energy
as well as a binding momentum and a binding energy**

which then in turn begin to act.

Since – as we already know – both momentum and energy have a length dimension of (-1) , in order for the structuring processes of separation and binding to occur, a spinor subset with the following dimension must be available:

| | | | | |
|------------------|---------------|---|----------|------------------------------------|
| Process | \Rightarrow | separation mom. + separation energy + binding mom. + binding energy | \equiv | Total |
| | | \Downarrow | | \Downarrow |
| Length dimension | \Rightarrow | $\begin{matrix} (-1) & + & (-1) & + & (-1) & + & (-1) \end{matrix}$ | | $\begin{matrix} (-4) \end{matrix}$ |
| | | \Downarrow | | |

I.8.1.

Thus: The **overall structuring process** requires a basis spinor set of **length dimension (-4)**

\Rightarrow This means: The **spinor raw material** generated according to **I.6.** must include a **spinor subset of dimension (-4)** as the structuring foundation required to complete the structuring. Since, by **I.3.**, the basis spinors Ψ and $\bar{\Psi}$ both have dimension $-\frac{1}{2}$, i.e.

$\dim \Psi = -\frac{1}{2}$ and $\dim \bar{\Psi} = -\frac{1}{2}$, this must namely be a **spinor subset (Ψ^8)** with $[\dim (\Psi^8)] = [\dim (-4)]$,

where the notation **(Ψ^8)** means: a spinor product of 8 basis spinors Ψ or $\bar{\Psi}$, i.e. including both Ψ - and $\bar{\Psi}$ -spinors.

This structuring foundation **(Ψ^8)** can be subdivided into one **(Ψ^4)** -separation component and one **$(\bar{\Psi}^4)$** -binding component; for details, see **IV.5.** and **V.4.**

I.8.

Thus: The elementary matter particle creation conditions **ET 1**, **ET 2**, (**I.7.** and **I.8.**) determine the **minimum volume** of spinor raw material **I.6.** that must be generated by the fundamental dynamic **I.1.** and **I.2.** – in the split-open local neighbourhood (x, σ) , namely:

The following volume is required:

in order to satisfy **ET 1** (structuring of the spinor set) (see **I.7.**): precisely **8 basis spinors**

in order to satisfy **ET 2** (creation of each most elementary matter particle) (see **I.7.**), additionally:

to generate each **most elementary matter fermion**:

3 basis spinors

to generate each **most elementary matter boson**:

2 or 4 basis spinors

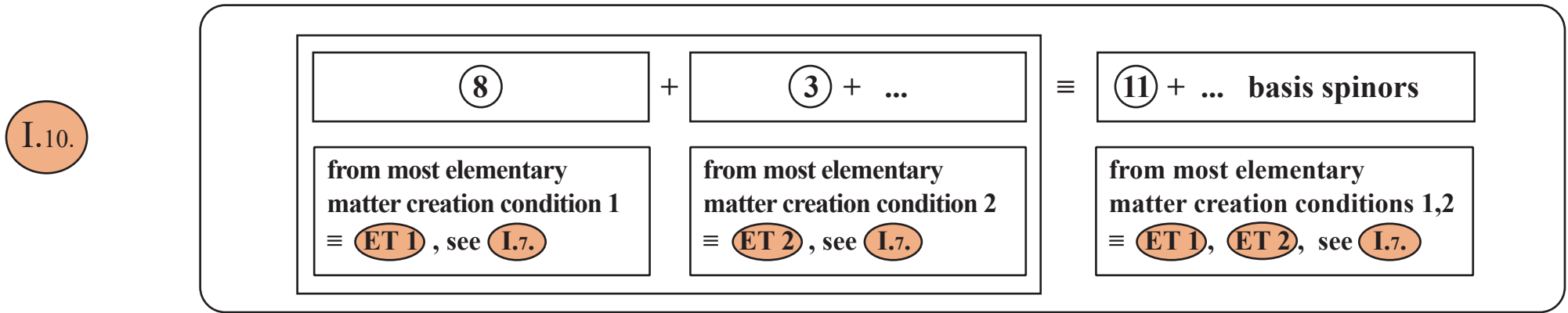
which means: even if we assume the **existence of only one most elementary matter fermion**

at least **3 basis spinors**

Since the **total spinor material** **I.6.**, **I.7.**, to be generated is a highly dense spinor $\Psi^n(x, \sigma)$ – where n is odd – in the split local neighbourhood (x, σ) as a result of the requirements placed on the creation structure constructed by the fundamental dynamic **I.1.**, **I.2.**, **I.3.** and since **ET 1** (structuring) requires an **even number of basis spinors**, specifically **8**, at least one **most elementary matter fermion** Ψ^3 , must be created in order for **ET 2** to be satisfied, i.e. one most elementary matter particle with an **odd** number of basis spinors.

It follows that:

The dynamically generated (spinor raw material (see I.9.)) must include at least:



Thus: The (most elementary matter creation process) constructs itself (as simply as possible),
or in other words by means of the most minimal construction structure that could possibly form from the

$$\text{fund. dynamic I.1.} \equiv D \Psi(x) \equiv \lim_{\sigma_a \rightarrow 0} \Psi(x - \sigma_a) \bar{\Psi}(x) \Psi(x + \sigma_a) \quad \text{and} \quad \text{I.2.} \equiv D \bar{\Psi}(x) \equiv \lim_{\sigma_\beta \rightarrow 0} \bar{\Psi}(x - \sigma_\beta) \Psi(x) \bar{\Psi}(x + \sigma_\beta)$$

– i.e. from the simplest possible non-linear structure, given I.3. .

The creation logic followed by this construction structure is based on the principle that every basis spinor dynamically generated by the process (I.1.) and (I.2.) is (once again exposed to the fundamental dynamic while the system still remains open), i.e. so long as the (point split σ is $\neq 0$), i.e. the limit value at the (point split, $\lim \sigma = 0$) is not attained. Thus:

The most elementary matter creation process continues until the most elementary matter creation conditions (ET 1) and (ET 2) (see (I.7.)) are satisfied.

This implies – without yet considering in detail the development of each individual point split – the following most elementary matter creation and development structure (for details, see later e.g. (III.4.1.)):

The most elementary matter construction structure develops from the (fundamental dynamic (I.1.), (I.2.), (I.3.)) in the form of an (open system) in the (1st point split phase: point split $\sigma \neq 0$, $\sigma \rightarrow 0$, but point split σ not yet $= 0$) i.e. in the point split-open (local neighbourhood (x, σ) , $\sigma \neq 0$) and is completed – as shown later in detail (see (I.12.)) – by means of precisely (13 systemically necessary individual differential operations), where each individual differential operation has the same type as the fundamental dynamic (I.1.), (I.2.), (I.3.), and each such instance of the fundamental dynamic acts upon precisely one single basis spinor (Ψ or $\bar{\Psi}$) – locally separated by the point split (while $\sigma \neq 0$).

This number of 13 individual differential operations is the (smallest possible number) that satisfies the requirements (ET 1), (ET 2), (see (I.7.)).

It follows that: $D^{(13)}$ develops as follows in the point split-open local neighbourhood (x, σ_{13}) , over the course of 3 phases (see diagram I.12.):

I.11.

① differential operation $D^{(1)}$ \Rightarrow basis stage $\Psi^{(3)}$, not sufficient – by ET 1 –
 \Rightarrow another ③ differential operations $D^{(2-4)}$ \Rightarrow 1st creation stage $\Psi^{(9)}$, not sufficient – by ET 2 –
 \Rightarrow another ⑨ differential operations $D^{(5-13)}$ \Rightarrow 2nd creation stage $\Psi^{(27)}$, sufficient – by ET 1 and ET 2 –
 \Rightarrow the creation process is complete.

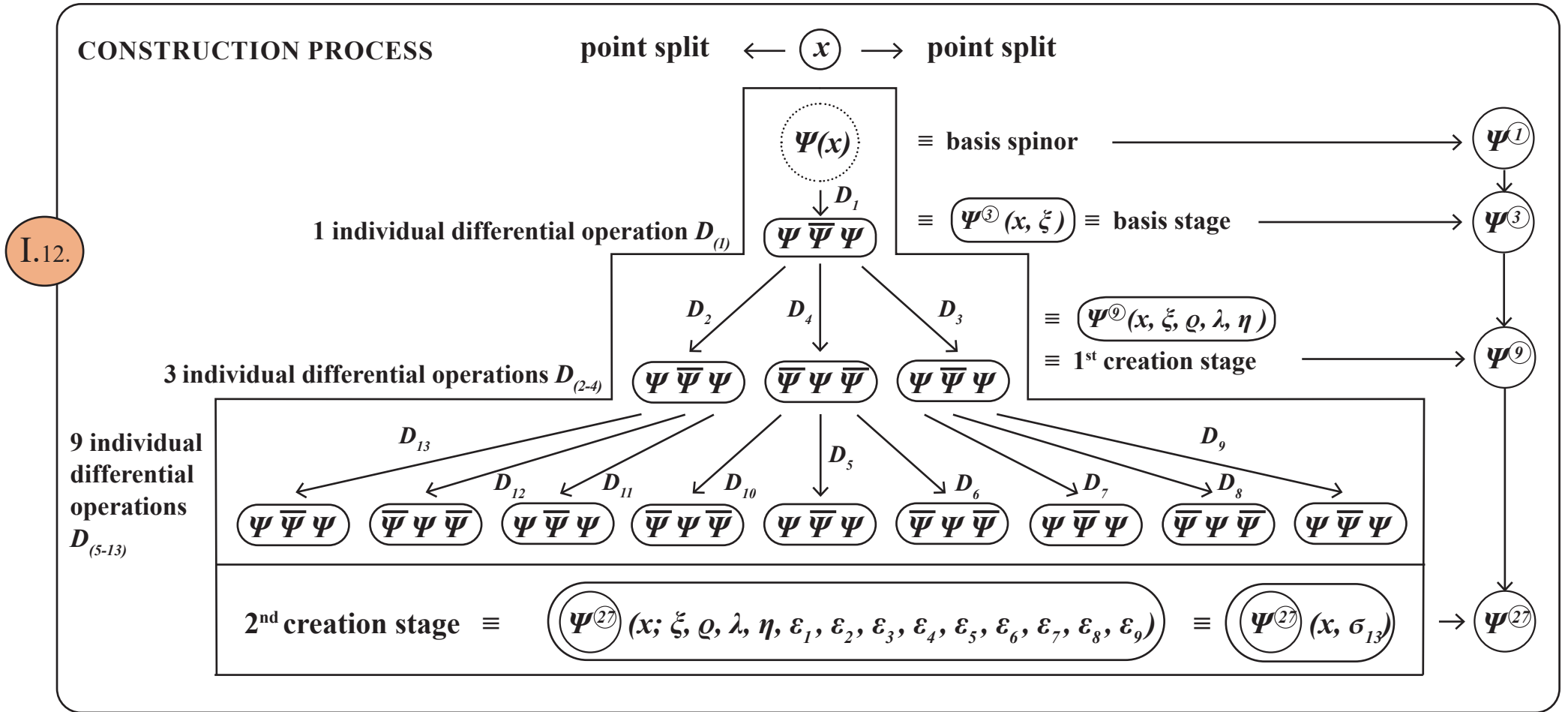
Thus, the most elementary matter construction process is a cascade of precisely ⑬

individual differential operations $D^{(1, 2-4, 5-13)} \equiv D^{(13)}(x, \sigma_{13})$ in the point split-open local neighbourhood (x, σ_{13})

each driven by the fundamental dynamic I.1., I.2., I.3. and unfolding at specific, separated points in space-time $(x, \sigma_{(1+3+9)})$, where each point split is generated by the corresponding differential operation.

This gives the following most elementary creation and composition structure in the form of a structured process dynamically generated by the fundamental dynamic I.1., I.2., I.3. via ⑬ specific individual differential operations :

»



Thus: Since, in the (system opening phase $\sigma_{13} \neq 0$), the spinor construction product $\Psi^{(27)}(x, \sigma_{13})$ is localized within the split neighbourhood (x, σ_{13}) , the Pauli principle is not violated. The individual physical objects that will subsequently be generated in the (system closing phase $\sigma \rightarrow 0$) (see Chap. VI. ff.) have (at most 4 inner basis spinors) and therefore satisfy the Pauli principle as $\Psi^{(4)}$ -objects in the (particle creation process).

The dynamic creation logic according to which the spinor set of raw material required for the most elementary matter creation process is constructed – in accordance with (I.9.), (I.10.), (I.12.) – originates from the fact that, in the fundamental dynamic

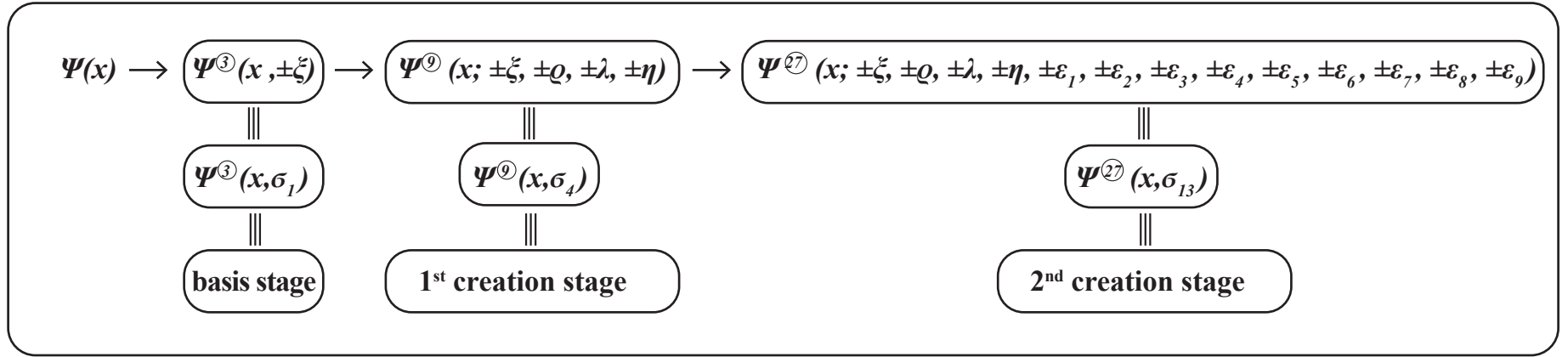
$$D\Psi \equiv \lim_{\xi \rightarrow 0} \Psi(x-\xi) \bar{\Psi}(x) \Psi(x+\xi), \text{ due to the } \left(\text{point split formation contained by this dynamic } \xi \neq 0, \overleftarrow{x} \overrightarrow{x} \right)$$

– in the (first phase of the point split process) – i.e. in the (system opening phase $\sigma \neq 0$), before the (limit value $\lim \sigma = 0$ is reached in the final phase of the point split process), the following holds:

The 3 spinors of the basis state $\Psi^{(3)}(x, \xi)$, see (I.12.), still form an open system such that $\xi \neq 0$ i.e. have not yet been bound by the (attainment of the limit value $\lim \xi = 0$).

These 3 individual spinors of the basis stage $\Psi^{(3)}(x, \xi)$ – which are still open in the 1st stage of the point split event $\xi \neq 0$ (i.e. still exist in an open interaction) – each develop their own (system-intrinsic interaction potential) as individual (basis spinors of $\dim - \frac{1}{2}$) existing at separate points in space-time $(x-\xi)$, (x) , $(x+\xi)$, where $\xi \neq 0$, before they are bound by the (attainment of the limit $\lim \xi = 0$). Thus, they construct the (global system already initiated) by the fundamental dynamic (I.1.), (I.2.), (I.3.) – as described structurally in (I.12.) – step by step, as follows (see (I.13.)):

I.13.



Thus: The fundamental dynamic **I.1.** and **I.2.**, which follows from the necessary existence of the point split (see **I.1.**, **I.2.**, **I.3.**), or in other words from the fact that the existence of the point split $(dx) \equiv (-\xi, +\xi)$ automatically follows from the existence of the $(\text{differential operator } D \equiv \frac{d}{dx})$ and which happens in the point split opening phase $\xi \neq 0$, initiates the entire **(most elementary matter creation system)**, which subsequently creates **(individual manifestations of most elementary matter)** together with their **(specific force and matter particles)** in the **(point split closing phase $\lim \sigma = 0$)** by means of the previously generated dynamic rough structures (see Chap. **II.** - **X.**).

I.14.

The basis stage $\Psi^{(3)}(x, \xi)$ forms from the fundamental dynamic $D\bar{\Psi} \equiv \Psi \Psi \Psi$, see I.1.,
 i.e., from the prozess $\Psi(x) \xrightarrow{D} \Psi^{(3)}(x, \pm\xi)$,
 before the point split limit value $\lim \xi = 0$ is attained,
 i.e.: $\Psi(x-\xi) \bar{\Psi}(x) \Psi(x+\xi) \equiv \Psi^{(3)}(x, \pm\xi) \equiv \text{basis stage}$

I.15.

The 1st creation stage $\Psi^{(9)}(x; \pm\xi, \pm\varrho, \pm\lambda, \pm\eta)$ forms from the point split-open
 basis stage $\Psi^{(3)}(x, \xi), \xi \neq 0$ by allowing this same fundamental dynamic I.1., I.2., I.3.
 to act upon each of these 3 split – and thus open – basis spinors $\Psi(x-\xi), \bar{\Psi}(x), \Psi(x+\xi)$,
 continuing to act until $\xi \neq 0$, thus dynamically creating the 1st creation stage
 $\Psi^{(9)}(x, \sigma_4)$ with $\sigma_4 = (\pm\xi, \pm\varrho, \pm\lambda, \pm\eta)$ by means of a logical process, see I.12..

I.16.

Since the 1st creation stage $\Psi^{(9)}(x, \sigma_4)$ is a spinor product of 9 spinors in the split local neighbourhood $x, \sigma_4 \neq 0$, it does not yet meet the elementary particle creation condition ET 2 (see I.7.). The 2nd creation stage therefore necessarily forms by means of the same structural process logic that created the 1st creation stage $\Psi^{(9)}(x, \sigma)$ before the point split limit value $\lim \xi, \varrho, \lambda, \eta = 0$ is attained, i.e. in the point split-open dynamic state $\Psi^{(9)}(x, \sigma_4 \neq 0)$, by once again applying exactly the same dynamic that governed the construction \rightarrow of the basis stage into the 1st creation stage, namely:

the fundamental dynamic I.1., I.2., I.3. acts upon each of the 9 split and therefore open spinors $\Psi^{(9)}(x, \sigma_4), \sigma_4 \neq 0$, thus causing

the spinor set to triple by means of 9 individual fundamental dynamic differential processes (see I.12.)

I.16.

The result of the **overall creation process** is therefore a **spinor product set** $\Psi^{(27)}(x, \sigma_{13})$ in the split-separated local neighbourhood (x, σ_{13}) with a

total point split $\sigma_{13} = (x; \pm\xi, \pm\varrho, \pm\lambda, \pm\eta, \pm\varepsilon_1, \pm\varepsilon_2, \pm\varepsilon_3, \pm\varepsilon_4, \pm\varepsilon_5, \pm\varepsilon_6, \pm\varepsilon_7, \pm\varepsilon_8, \pm\varepsilon_9)$,

that has now been extended to **(13) individual point splits**, where **each individual point split** is caused by one of **(13) individual fundamentally dynamic differential operations**, i.e. of type

$$D \bar{\Psi}(x) \equiv \bar{\Psi}(x - \sigma_\alpha) \Psi(x) \bar{\Psi}(x + \sigma_\alpha) \quad \text{or} \quad D \Psi(x) \equiv \Psi(x - \sigma_\beta) \bar{\Psi}(x) \Psi(x + \sigma_\beta).$$

Since, at first, the entire creation process unfolds within the open, split neighbourhood (x, σ_{13}) , and therefore before the point split limit value $\sigma_{13} \equiv 0$ is attained, i.e. while $\sigma_{13} \neq 0$, the **Pauli principle does not apply**.

Specifically, the **entire most elementary matter creation process** unfolds in the form of the following **consecutive subprocesses** (see Chap. **II.** - **V.**).

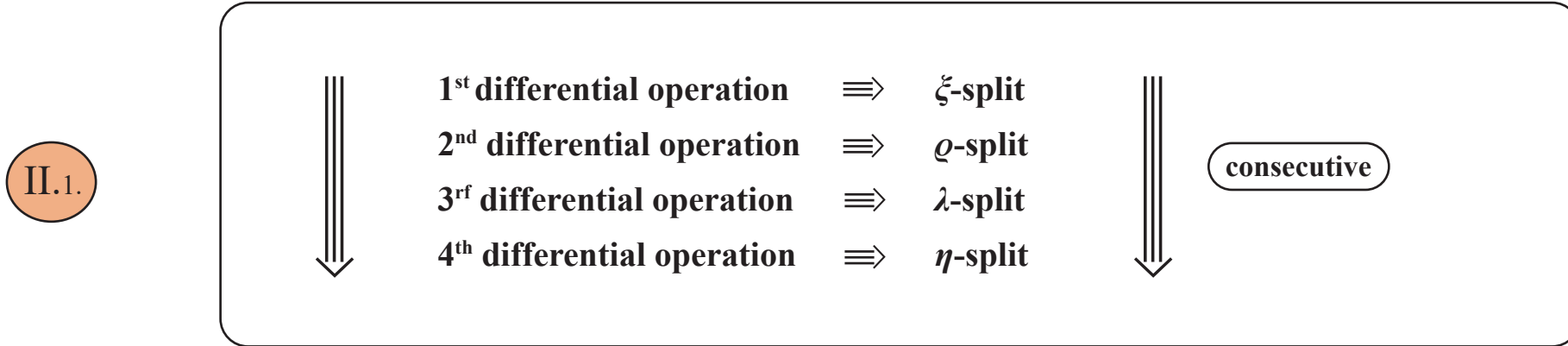
Chapter II.

The 1st fundamental process:

The physical meaning of differential processes and the construction system of the point split dynamic that they initiate.

The construction of the 1st creation stage $\Psi^{\circledast}(x, \sigma_4)$ by the fundamental dynamic in the point split-separated local neighbourhood (x, σ_4)

The global process sequence begins with the (1st fundamental process), by means of which the (1st creation stage) is constructed from the (basis stage) and the (local point split configuration) is established – as the 1st fundamental process unfolds – by the necessarily occurring (4 consecutive differential operations), which specifically have the following successive process structure (see I.12.):



so the (1st creation stage $\Psi^9(x, \sigma_4)$) (see I.12., I.13.) is constructed according to II.1. and has the following detailed point split structure:

1st fundamental prozess

$$\Psi^{(9)} \equiv \Psi(x) \quad \downarrow D_{\xi-split} \equiv \text{1st differential operation} \quad \equiv D^{(4)} \Psi(x)$$

$$\text{2nd differential operation} \equiv D_{\varrho-split} \begin{matrix} \Psi(x-\xi) & \bar{\Psi}(x) & \Psi(x+\xi) \\ \swarrow & & \end{matrix}$$

$$\begin{matrix} \Psi(x-\xi-\varrho) & \bar{\Psi}(x-\xi) & \Psi(x-\xi+\varrho) & \bar{\Psi}(x) & \Psi(x+\xi) \\ & & & \searrow D_{\lambda-split} \equiv \text{3rd differential operation} & \end{matrix}$$

$$\Psi(x-\xi-\varrho) \quad \bar{\Psi}(x-\xi) \quad \Psi(x-\xi+\varrho) \quad \bar{\Psi}(x) \quad \Psi(x+\xi-\lambda) \quad \bar{\Psi}(x+\xi) \quad \Psi(x+\xi+\lambda)$$

$$\downarrow D_{\eta-split} \equiv \text{4th differential operation}$$

II.2.

$$\equiv \left(\Psi(x-\xi-\varrho) \quad \bar{\Psi}(x-\xi) \quad \Psi(x-\xi+\varrho) \right) \left(\bar{\Psi}(x-\eta) \quad \Psi(x) \quad \bar{\Psi}(x+\eta) \right) \left(\Psi(x+\xi-\lambda) \quad \bar{\Psi}(x+\xi) \quad \Psi(x+\xi+\lambda) \right)$$

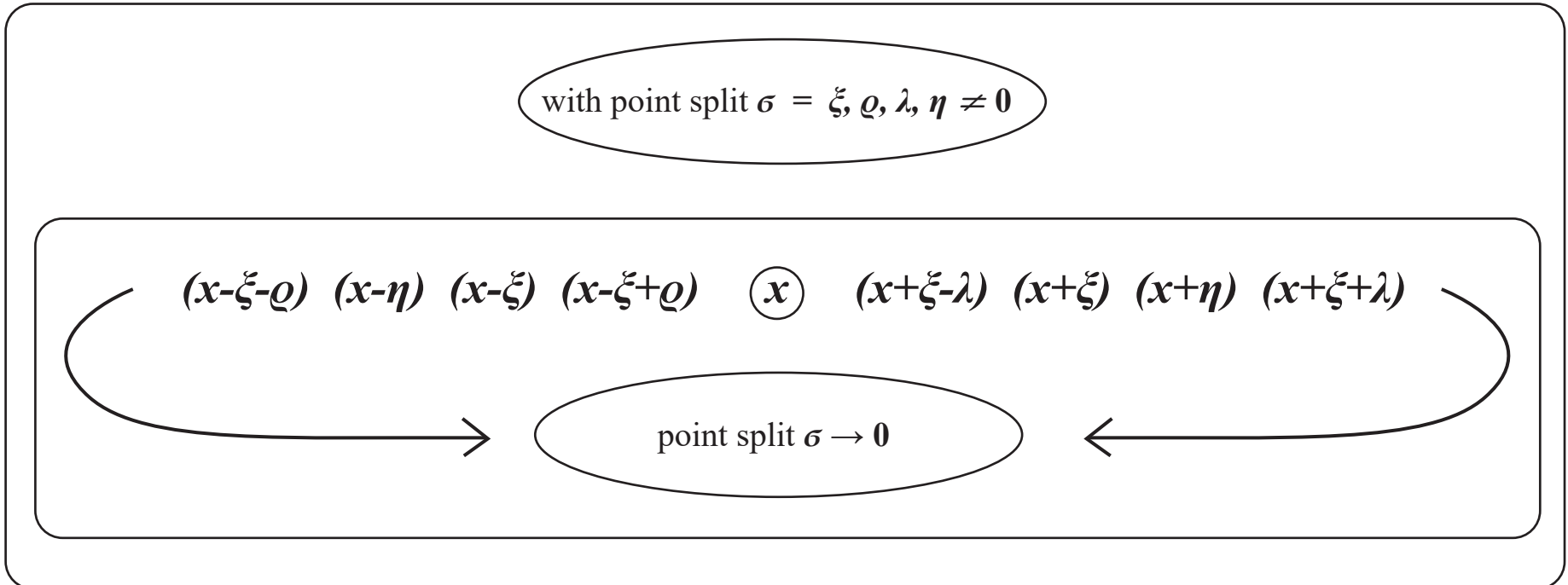
$$\equiv \Psi(x-\xi-\varrho) \quad \bar{\Psi}(x-\xi) \quad \Psi(x-\xi+\varrho) \quad \bar{\Psi}(x-\eta) \quad \Psi(x) \quad \bar{\Psi}(x+\eta) \quad \Psi(x+\xi-\lambda) \quad \bar{\Psi}(x+\xi) \quad \Psi(x+\xi+\lambda)$$

All 4 point splits $(\xi, \varrho, \lambda, \eta)$ are mutually independent.

The order in which the point splits are generated – as shown in II.2. – is $\xi, \varrho, \lambda, \eta$ (since by II.2. η is initiated after ξ).

By II.2., due to the 4 necessary, successively initiated differential operations (D^{\oplus}) , the effective relative distance length of the point split $\sigma = (\xi, \varrho, \lambda, \eta) \neq 0$, $\sigma \rightarrow 0$, where σ is at the local point x , i.e. the point split neighbourhood (x, σ) , is as follows (since η is initiated after ξ (by II.2.)) and therefore $(x-\eta)$ is a greater distance from the origin of interaction x than $(x-\xi)$ and therefore naturally also a greater distance than $(x-\xi+\varrho)$):

II.3.



II.3., therefore establishes the dynamic configuration II.2. in the form of an ordering of the

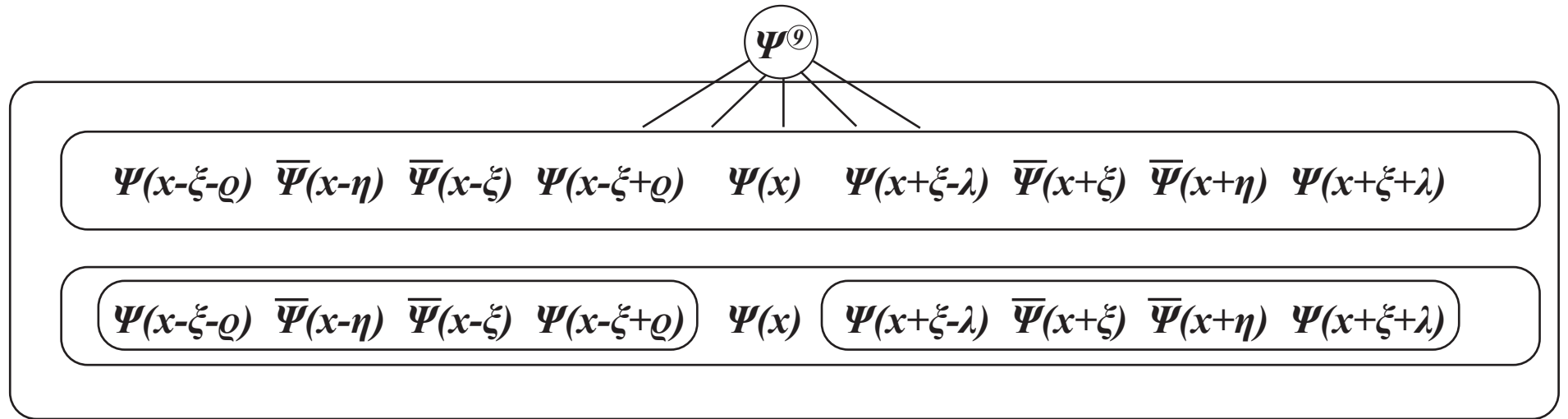
local distance of the spinors in the point-split neighbourhood of the local origin x

with the following effective local configuration :

II.4.

and

II.5.



By I.10. the $\Psi^9(x, \sigma_4)$ -structure II.4. does not satisfy the most elementary matter condition ET2,

which therefore leads to the construction of the 2nd creation stage according to I.12..

While the (point split limit value $\sigma_4 = \xi, \varrho, \lambda, \eta \rightarrow 0$) has not yet been attained, i.e. while ($\sigma_4 = \xi, \varrho, \lambda, \eta \neq 0$), and so the (9) individual basis spinors of ($\Psi^9(x, \sigma_4)$) (see (I.12.)) are localized at their respective, separate (point split-generated) points in space-time within the (open point split neighbourhood (x, σ_4) , $\sigma_4 \neq 0$) the exact (same dynamic situation is activated) that led via (I.1.), (I.2.), (I.3.) from the basis stage ($\Psi^3(x, \xi)$) \rightarrow the 1st creation stage ($\Psi^9(x; \xi, \varrho, \lambda, \eta)$).

And this means that:

The fundamental dynamic (I.1.) and (I.2.) acts upon each of the (9) individual, point split-separated basis spinors in the spinor product ($\Psi^9(x, \sigma_4)$), thus leading by means of (9) separate individual differential operations $D_{(x, \sigma_4)}^{5-13}$ to a non-linear (tripling) of the spinor set (see (I.12.)).

This triggers the (2nd fundamental process), writing (D^9) to denote the nine (individual differential operations) in the split local neighbourhood (x, σ_4) (see (I.1.), (I.2.), (I.3.), (I.12.)).

Chapter III.

The 2nd fundamental process:

The original creation of the spinor collection from the fundamental interaction according to the minimality principle:

$$\left(D_{\sigma_{13}}^{(13)} \Psi(x) \right) \equiv \left(\Psi^{(27)}(x, \sigma_{13}) \right)$$

The creation of the most elementary form of structuring: separation – binding from the system-intrinsic point split dynamic.

The 2nd fundamental process unfolds as follows (with the specific 9 individual differential operations $D^{(v)}$, with $v = 1, \dots, 9$, where each $D^{(v)}$ acts upon the 1st creation stage $\Psi^{(9)}(x, \sigma_4)$ created by the 1st fundamental process in the point split-separated local neighbourhood (x, σ_4) . Thus, the 2nd fundamental process generates the additional 9 point splits $(\varepsilon_1, \dots, \varepsilon_9)$)

III.1.

$$D^{(9)}(\Psi^{(9)}(x, \sigma_4)) \equiv \Psi^{(27)}(x, \sigma_{13}) \text{ with } \sigma_{13} = (\xi, \varrho, \lambda, \eta, \varepsilon_1, \varepsilon_2, \varepsilon_3, \varepsilon_4, \varepsilon_5, \varepsilon_6, \varepsilon_7, \varepsilon_8, \varepsilon_9)$$

where the incorporation of $\Psi^{(9)} \equiv D^{(4)}\Psi(x)$ means that: in the point split-open system – i.e. before the $\lim \sigma = 0$ is attained, the following holds:

III.2.

$$D_{\sigma_9}^{(9)}(\Psi^{(9)}(x, \sigma_4)) = D_{\sigma_9}^{(9)}(D_{\sigma_4}^{(4)}\Psi(x)) = D_{\sigma_{13}}^{(13)}\Psi(x) = \Psi^{(27)}(x, \sigma_{13})$$

namely within the split-open global process, i.e. while $\sigma \neq 0$

III.3.

$$D_{\sigma_{13}}^{(13)}\Psi(x) \equiv \Psi^{(27)}(x, \sigma_{13}) \text{ with } \lim \sigma_{13} = (\xi, \varrho, \lambda, \eta, \varepsilon_1, \varepsilon_2, \varepsilon_3, \varepsilon_4, \varepsilon_5, \varepsilon_6, \varepsilon_7, \varepsilon_8, \varepsilon_9) \rightarrow 0$$

III.3. satisfies **both fundamental elementary particle creation conditions for the global system** , namely **ET 1** , **ET 2** (see **I.7.**) and thus **I.10.** is also satisfied.

This also concludes the creation process of the **total spinor raw material** , i.e. the **spinor collection** $\Psi^{(27)}(x, \sigma_{13})$ generated strictly by the fundamental dynamic **I.1.** and **I.2.** in the point split-separated local neighbourhood (x, σ_{13}) is a **$\Psi^{(27)}$ -product** that satisfies the elementary particle creation conditions **ET1** and **ET2** . This prompts the development of the elementary particle creation structure **unequivocally initiated by the fundamental dynamic** . **All physically existing elementary particles must exhaustively and unequivocally form** from this structure, **as does in fact occur – as shown later (Chap. **III.** - **IX.**)** .

However, we shall first give a full representation of the $\Psi^{(27)}(x, \sigma_{13})$ -collection , showing the detailed point split structure:

Thus: The 2nd fundamental process leads to the creation of a dynamic spinor collection of **(27 spinors)** in the neighbourhood of the **(local point x)**, with the 13 independent point splits $\sigma_{(13)} \equiv \xi, \eta, \varrho, \lambda, \varepsilon_1, \varepsilon_2, \varepsilon_3, \varepsilon_4, \varepsilon_5, \varepsilon_6, \varepsilon_7, \varepsilon_8, \varepsilon_9$,

III.4

$$\Psi^{(27)}$$

$$\equiv$$

$$\Psi(x-\xi+\varrho-\varepsilon_6) \quad \bar{\Psi}(x-\xi+\varrho) \quad \Psi(x-\xi+\varrho+\varepsilon_6) \quad \Psi(x-\varepsilon_1) \quad \bar{\Psi}(x) \quad \Psi(x+\varepsilon_1) \quad \Psi(x+\xi-\lambda-\varepsilon_2) \quad \bar{\Psi}(x+\xi-\lambda) \quad \Psi(x+\xi-\lambda+\varepsilon_2)$$

$$\Psi(x-\xi-\varrho-\varepsilon_9) \quad \bar{\Psi}(x-\xi-\varrho) \quad \Psi(x-\xi-\varrho+\varepsilon_9) \quad \bar{\Psi}(x-\eta-\varepsilon_8) \quad \Psi(x-\eta) \quad \bar{\Psi}(x-\eta+\varepsilon_8) \quad \bar{\Psi}(x-\xi-\varepsilon_7) \quad \Psi(x-\xi) \quad \bar{\Psi}(x-\xi+\varepsilon_7)$$

$$\bar{\Psi}(x+\xi-\varepsilon_3) \quad \Psi(x+\xi) \quad \bar{\Psi}(x+\xi+\varepsilon_3) \quad \bar{\Psi}(x+\eta-\varepsilon_4) \quad \Psi(x+\eta) \quad \bar{\Psi}(x+\eta+\varepsilon_4) \quad \Psi(x+\xi+\lambda-\varepsilon_5) \quad \bar{\Psi}(x+\xi+\lambda) \quad \Psi(x+\xi+\lambda+\varepsilon_5)$$

$$\equiv$$

$$\Psi^{(13)} \quad \bar{\Psi}(x) \quad \Psi^{(13)}$$

Alternatively to the representation **III.4.** – for conciseness – the following **box form** can also be used as a representation of $\Psi^{(27)}$:

Example: $\Psi(x - \xi - \varrho - \varepsilon_g)$ may be written as

| | |
|------------------|--|
| Ψ | ← spinor |
| x | ← origin of interaction |
| $-\xi - \varrho$ | ← point split of the 1 st fundamental process |
| $-\varepsilon_g$ | ← point split of the 2 nd fundamental process |

Thus, the 2nd creation stage $\Psi^{(27)}(x, \sigma_{13})$ in the point split-open local neighbourhood (x, σ_{13}) may be fully represented as:

| III.4.1. $\Psi^{(27)}$ | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------------|------------------|------------------|------------------|---------|------------------|------------------|--------|------------------|------------------|------------------|------------------|------------------|--------------|------------------|------------------|------------------|------------------|------------------|--------|------------------|------------------|---------|------------------|------------------|------------------|------------------|
| Ψ | $\bar{\Psi}$ | Ψ | $\bar{\Psi}$ | Ψ | $\bar{\Psi}$ | $\bar{\Psi}$ | Ψ | $\bar{\Psi}$ | Ψ | $\bar{\Psi}$ | Ψ | Ψ | $\bar{\Psi}$ | Ψ | Ψ | $\bar{\Psi}$ | Ψ | $\bar{\Psi}$ | Ψ | $\bar{\Psi}$ | $\bar{\Psi}$ | Ψ | $\bar{\Psi}$ | Ψ | $\bar{\Psi}$ | Ψ |
| x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x |
| $-\xi - \varrho$ | $-\xi - \varrho$ | $-\xi - \varrho$ | $-\eta$ | $-\eta$ | $-\eta$ | $-\xi$ | $-\xi$ | $-\xi$ | $-\xi + \varrho$ | $-\xi + \varrho$ | $-\xi + \varrho$ | 0 | 0 | 0 | $+\xi - \lambda$ | $+\xi - \lambda$ | $+\xi - \lambda$ | $+\xi$ | $+\xi$ | $+\xi$ | $+\eta$ | $+\eta$ | $+\eta$ | $+\xi + \lambda$ | $+\xi + \lambda$ | $+\xi + \lambda$ |
| $-\varepsilon_g$ | 0 | $+\varepsilon_g$ | $-\varepsilon_8$ | 0 | $+\varepsilon_8$ | $-\varepsilon_7$ | 0 | $+\varepsilon_7$ | $-\varepsilon_6$ | 0 | $+\varepsilon_6$ | $-\varepsilon_1$ | 0 | $+\varepsilon_1$ | $-\varepsilon_2$ | 0 | $+\varepsilon_2$ | $-\varepsilon_3$ | 0 | $+\varepsilon_3$ | $-\varepsilon_4$ | 0 | $+\varepsilon_4$ | $-\varepsilon_5$ | 0 | $+\varepsilon_5$ |

≡

| | | |
|---------------|-----------------|---------------|
| $\Psi^{(13)}$ | $\bar{\Psi}(x)$ | $\Psi^{(13)}$ |
|---------------|-----------------|---------------|

By the (1st and 2nd fundamental processes), this spinor set $\Psi^{(27)}$ contains 3 categories of spinors:

III.5.

I

8 basis spinors originating from the 1st fundamental process
(spinors whose point split does not contain an ε -split)

II

18 basis spinors from the 2nd fundamental process, each containing one ε -split

III

and, of course, the $\Psi(x)$ -spinor, which was carried through both
fundamental processes at the local origin of interaction x without a split.

$$\equiv \text{II} + \text{III} = (18 + 1) \equiv 19 \text{ basis spinors}$$

III.5.1.

Thus: $\text{I} + \text{II} + \text{III} \equiv 27$ basis spinors in the point split-separated local neighbourhood

Because of the point split-dynamically generated structure of the spinor collection $\Psi^{(27)}(x, \sigma_{13})$ (see III.4.)

there is a fundamental distinction between the 8 original basis spinors generated by the 1st creation stage II.2. – i.e. during the 1st fundamental process.

This distinction arises from the fundamental order and structure created by the fundamental point split process at the origin of interaction (x) , i.e. the centre (x) of the overall system $\Psi^{(27)}(x, \sigma_{13})$.

III.6.1.

point split prozess

① opening: $\xi \neq 0, \eta \neq 0 \Rightarrow$

② closing: $\xi \rightarrow 0, \eta \rightarrow 0 \Rightarrow$

$$\begin{array}{c} \begin{array}{cc} -\xi & +\xi \\ \leftarrow x & \rightarrow \end{array} ; \begin{array}{cc} -\eta & +\eta \\ \leftarrow x & \rightarrow \end{array} \\ \begin{array}{cc} -\xi & +\xi \\ \rightarrow x & \leftarrow \end{array} ; \begin{array}{cc} -\eta & +\eta \\ \rightarrow x & \leftarrow \end{array} \end{array}$$

\equiv repulsion process \equiv separation process

\equiv attraction process \equiv binding process

Therefore, within $\Psi^{(27)}(x, \sigma_{13})$, i.e. the spinor collection containing the set of spinors necessarily generated – according to **ET2** – in the split-open local neighbourhood (x, σ_{13}) , there exists the following – point split-dynamically generated – distinction between the basis spinors that were created earlier in the 1st fundamental process.

the 4 Ψ -spinors, that split directly at the origin of interaction (x) ,

i.e. the spinors with primary splits, are

namely $\Psi(x-\xi) \Psi(x-\eta) \Psi(x+\xi) \Psi(x+\eta)$, i.e. ξ and η are primary splits according to **II.2.**

and

the 4 $\bar{\Psi}$ -spinors, that split at the interaction point $(x \pm \xi)$ – i.e. at an

interaction point $(x \pm \xi)$ already containing a primary split –

are spinors with secondary splits (ϱ, λ) and are,

namely $\bar{\Psi}(x-\xi-\varrho) \bar{\Psi}(x-\xi+\varrho) \bar{\Psi}(x+\xi-\lambda) \bar{\Psi}(x+\xi+\lambda)$, i.e. ϱ and λ are secondary splits according to **III.6.**

III.6.2.

This structuring process, which originates from the original act of creation (construction process **III.1.**) and necessarily occurs at the most fundamental level – since it is point split-dynamically initiated around the origin of interaction (x) – constructs the following systemically necessary structuring entities:

(separation momentum, separation energy)

as well as

(binding momentum, binding energy) .

By means of this (structuring foundation), the total raw material $\Psi^{(27)}(x, \sigma_{13})$ generated by the fundamental dynamic builds structure “from within itself”, i.e. (from the inside outwards), and (without any external trigger). This structuring therefore occurs as a most fundamental (system-intrinsic act). The intrinsic structuring of the raw material $\Psi^{(27)}$ already represents the development of the (rough structure of the first ever manifestation of the Universe) .

All of this occurs during the (open point split event $\sigma \neq 0$, $\sigma \rightarrow 0$, i.e. during the system opening phase), in which the (global system) initiated by the fundamental dynamic **I.1.**, **I.2.**, **I.3.** is (released throughout) a (multi-stage elementary particle creation process) – in accordance with **I.12.** – developing the global system (step by step).

This (most fundamental phase of the creation process of the Universe) continues (until physically real objects have formed) for the first time within the Universe, namely the (most elementary of all representable objects), (the most elementary force/matter entities), as derived and presented in Chapter **VII.**

In other words: Until the (first events in the history of the Universe) have created all of the “material” that induces the Big Bang. However, we shall first consider a representation of the system-intrinsic structuring process of $\Psi^{(27)}$.

Chapter IV.

The 3rd fundamental process

The original creation of the structuring process from the point split dynamic.

The construction of the structuring foundation Ψ^8 and the creation of the structure elements

\approx \equiv separation \equiv repulsion and \cup \equiv binding \equiv attraction

By means of the point split proces (see **I.2.1.**):

IV.0.

First point split $\sigma \neq 0$: $\leftarrow x \rightarrow$ (repulsion)

Then point split $\sigma \rightarrow 0$: $\rightarrow x \leftarrow$ (attraction)

the structuring dynamic that will be developed by the global system according to **III.7.** is released:

IV.1.

The splits ξ and η (and no others) split directly at the point of interaction (x) – as shown in **III.6.1.** – and are therefore primary splits.

In this **primary separation process**, the 4 spinors of the $\Psi^{(27)}(x, \sigma_{I3})$ -system directly associated with the **primary splits $-\xi, -\eta, +\xi, +\eta$** (see **III.4.** and in particular **III.4.1.**), namely:

IV.2.

$\Psi(x-\xi) \dots \Psi(x-\eta) \dots \Psi(x+\xi) \dots \Psi(x+\eta)$ form into the **separation energy-momentum** necessary by **I.8.1.** to endow the spinor set $\Psi^{(27)}(x, \sigma_{I3})$ with the structure of 4 separating elements $\dots \tilde{\xi} \dots \tilde{\xi} \dots \tilde{\xi} \dots \tilde{\xi} \dots$.

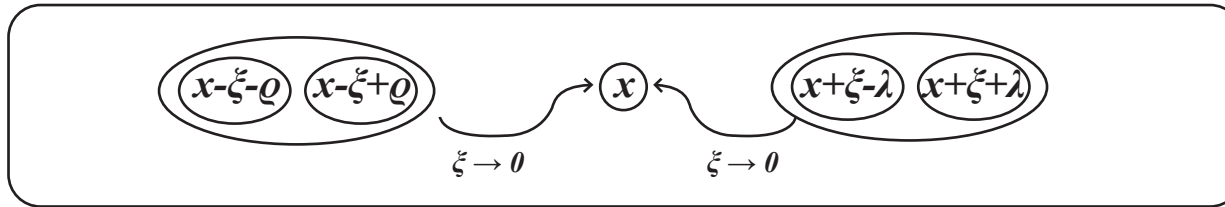
The binding structure works analogously:

The spinors of $\Psi^{(27)} \equiv \text{III.4.}$ at the local points $(x-\xi-\varrho), (x-\xi+\varrho), (x+\xi-\lambda), (x+\xi+\lambda)$, – thus also without an ξ -split – have a binding effect, since the (splits ϱ, λ) of these spinors are not directly located at the origin of interaction (x) , or in other words they are not primary splits, but instead split at points in space-time $(x \pm \xi)$ that already have an ξ -split, and thus are secondary splits.

As a consequence of this, the dynamic point split process:

first, point split $\sigma \neq 0$ (here $\xi \neq 0$), then, point split $\sigma \rightarrow 0$ (here $\xi \rightarrow 0$) acts as a binding structure as $\xi \rightarrow 0$.

IV.3.



IV.4.

Thus: There exists the binding energy-momentum:

$$(E \oplus I)_{\text{binding}} = \overline{\Psi}(x-\xi-\varrho) \dots \overline{\Psi}(x-\xi+\varrho) \dots \overline{\Psi}(x+\xi-\lambda) \dots \overline{\Psi}(x+\xi+\lambda)$$

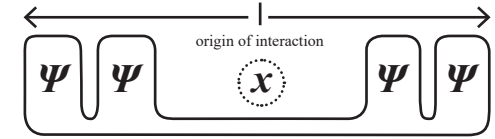
This causes the following dynamic system process to unfold: “First, point split $\sigma \neq 0$ ” and “then, point split $\sigma \rightarrow 0$ ”.

This creates the structuring required by the process: separation and binding (see III.6.2.)

namely as

structuring separation ψ energy-momentum

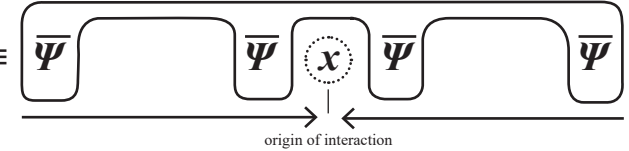
$$\equiv (E - I)_{\text{separation}}$$



and

structuring binding $\bar{\psi}$ energy-momentum

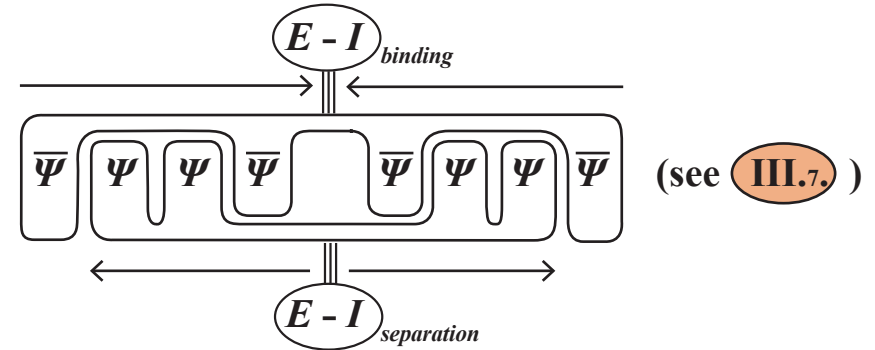
$$\equiv (E - I)_{\text{binding}}$$



IV.5.

The structuring foundation is

$$\psi^{(8)} \equiv$$



Thus: In the 3rd fundamental process, the $\psi^{(8)}$ begins to act (see I.8.1.).

This action causes it to be consumed as the structuring is completed, creating the subsequently

active separation and binding elements „ $\tilde{\sim}$ “ and „ \cup “ in the resulting $\psi^{(19)}$ -spinor set.

IV.6.

$$\psi^{(27)} \xrightarrow{(E - I)_{\text{separation}} \uparrow (E - I)_{\text{binding}}} \psi^{(19)}_{\tilde{\sim} \cup}$$

Thus, the $\psi^{(19)}$ -spinor collection, structured with the structural elements $\tilde{\sim} \equiv \text{separation}$ and $\cup \equiv \text{binding}$ in order to allow particle formation, is unequivocally generated as follows:

IV.7.

The individual spinors that make up the $(E - I)_{\text{separation}}$ act with a structuring effect and are consumed by this structuring action, forming the $(\text{separation energy-momentum})$, namely $(E - I)_{\text{separation}}$, which acts from the inside of $\Psi^{(27)}$.

Wherever these $(E - I)_{\text{separation}}$ -spinors act, the

$(\text{separation structure element})$ is created.

The $(\text{bindings-energy-momentum}) \equiv (E - I)_{\text{binding}}$, works analogously, namely:

IV.8.

The individual spinors that make up the $(E - I)_{\text{binding}}$ act with a structuring effect and are consumed by this structuring action, forming the $(\text{binding energy-momentum}) (E - I)_{\text{binding}}$, which acts from the inside. This binding action is what consumes them. Wherever these $(E - I)_{\text{binding}}$ -spinors act, the

$(\text{binding structure element})$ is created.

This gives the 4th fundamental process:

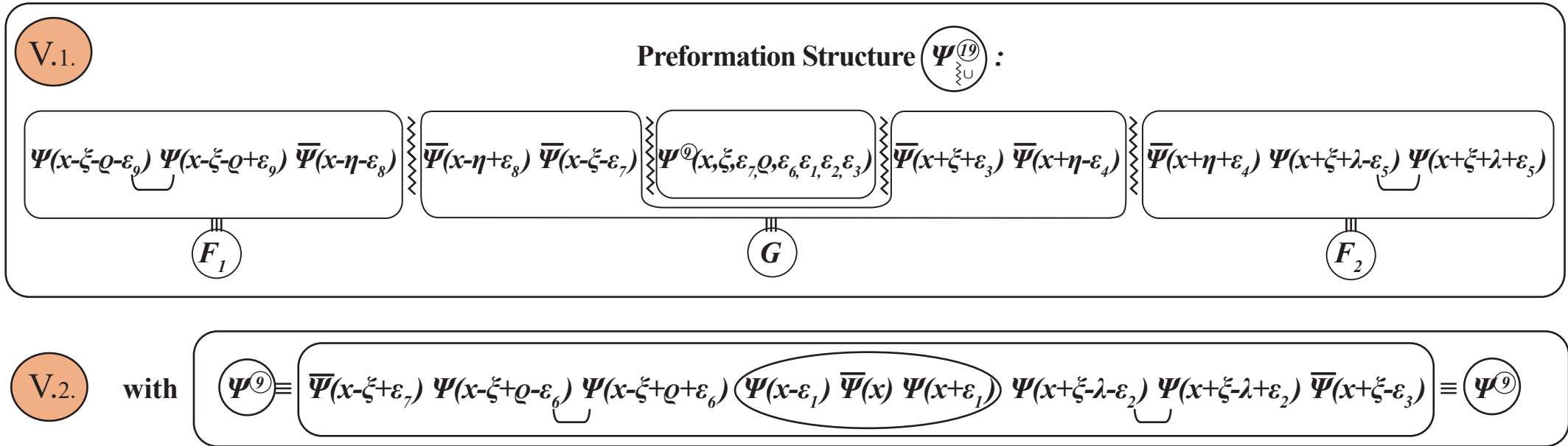
Chapter V.

The 4th fundamental process:

The construction of the preformation structure $\Psi_{\text{U}}^{(19)}$ and the resulting first creation act leading to the Primordial Universe. The formation of the boson force structure, caused by the most fundamental structuring process: “separation” and “binding”, driven by the point split dynamic, and the formation of the fermion structure, driven by the preformation structure and the minimality principle.

By means of the (1st, 2nd, and 3rd fundamental processes), and after IV.2. and IV.4. begin to act according to IV.7. and IV.8. respectively, the structured $\Psi^{(19)}$ -set is created from $\Psi^{(27)}$ together with its dynamically generated point split sets

as follows: $\Psi^{(27)} \xrightarrow[E-I \text{ binding}]{E-I \text{ separation}} \Psi_{\text{U}}^{(19)}$ and may therefore be represented as follows:



where both structurally identical parts $\overline{\Psi} \overline{\Psi}$ and $\overline{\Psi} \overline{\Psi}$ must be combined together into $G \equiv \overline{\Psi} \overline{\Psi} \cup \overline{\Psi} \overline{\Psi}$ by the identity principle I.5.).

The underlying structure of all physical events $\Psi_{\text{U}}^{(19)}$ has developed – as shown in full detail in UC-AOS, Chap. 1-4 – according to **I.12.**, via the following multi-stage equation system of differential processes. This overall system of equations builds up successively via 13 individual nonlinear differential operations of elementary type **I.1.**, **I.2.**, **I.3.** as specified in **I.12.**. In other words, **I.12.** is the starting point. From this develops:

V.1.1.

$$\begin{array}{ccc}
 \boxed{\begin{array}{c} D_{\sigma_{13}}^{(13)} \Psi(x) \\ \text{I.12.} \equiv \text{III.1.} \equiv \text{III.2.} \equiv \text{III.3.} \end{array}} & \equiv & \boxed{\begin{array}{c} \Psi^{(27)}(x, \sigma_{13}) \\ \text{III.4.} \equiv \text{III.4.1.} \end{array}} \\
 & \xrightarrow[\text{IV.2., IV.3., IV.4., IV.5., IV.6.}]{\text{structuring through separation } \tilde{\text{U}} \text{ and binding } \cup \equiv \Psi^{(6)} \equiv \text{IV.5.}} & \\
 & & \boxed{\begin{array}{c} \Psi^{(27-8)}(x, \sigma_{13}) \\ \text{V.1., V.2.} \end{array}} \tilde{\text{U}} \boxed{\begin{array}{c} \Psi_{\text{U}}^{(19)}(x) \\ \text{V.3., V.7.} \end{array}} \equiv \boxed{\Psi - 19}
 \end{array}$$

V.1.2.

Thus

$$\left[D_{\sigma_{13}}^{(13)} \Psi(x) \right]_{\tilde{\text{U}}} \equiv \boxed{\Psi_{\text{U}}^{(19)}(x, \sigma_{13})} \equiv \boxed{\Psi_{\text{U}}^{(19)}(x)} \equiv \boxed{\Psi - 19}$$

V.1.3.

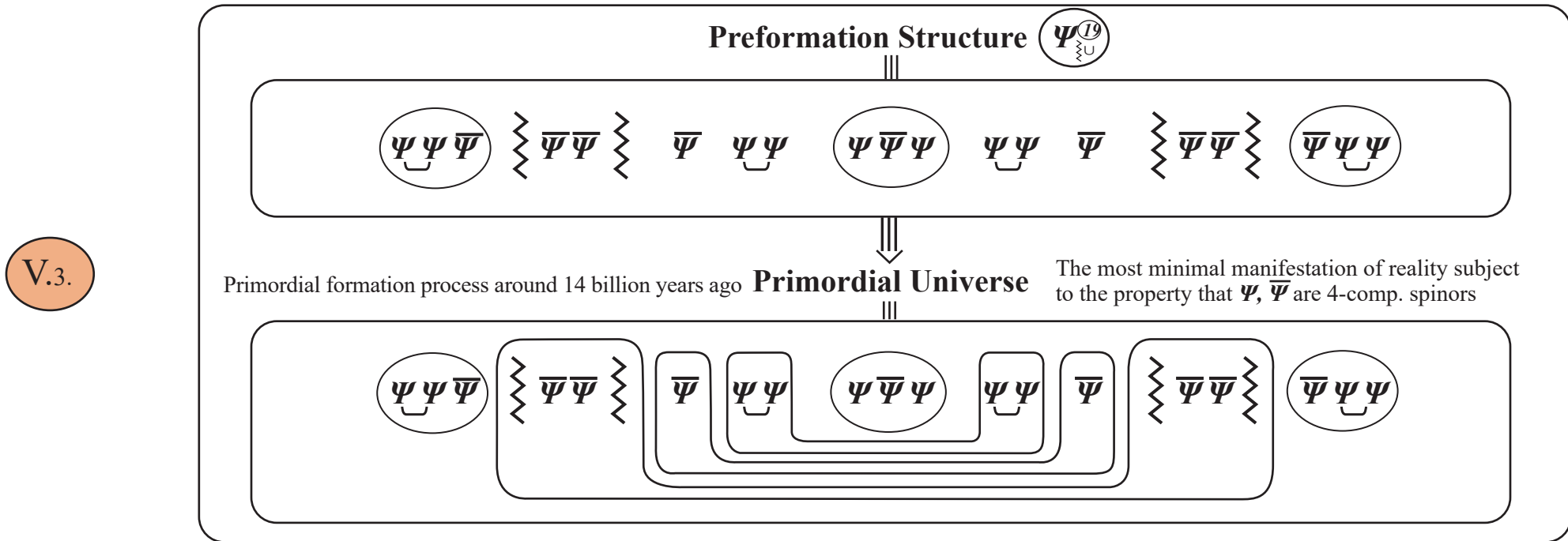
or in box form (see V.7.):

$$\left[D_{\sigma_{13}}^{(13)} \Psi(x) \right]_{\tilde{\text{U}}} \equiv \boxed{\Psi_{\text{U}}^{(19)}(x, \sigma_{13})} \equiv \boxed{\Psi_{\text{U}}^{(19)}(x)} \equiv \boxed{\Psi - 19} \equiv \boxed{\text{V.7.}}$$

spinors: $\Psi \quad \Psi \quad \bar{\Psi} \quad \bar{\Psi} \quad \bar{\Psi} \quad \bar{\Psi} \quad \Psi \quad \Psi \quad \Psi \quad \bar{\Psi}(x) \quad \Psi \quad \Psi \quad \Psi \quad \bar{\Psi} \quad \bar{\Psi} \quad \bar{\Psi} \quad \bar{\Psi} \quad \bar{\Psi} \quad \Psi \quad \Psi$

pointsplits: $\begin{array}{cccccccccccccccccccc} -\zeta, -\varrho, -\varepsilon_9 & -\zeta, -\varrho, +\varepsilon_9 & -\eta, -\varepsilon_8 & -\eta, +\varepsilon_8 & -\zeta, -\varepsilon_7 & -\zeta, +\varepsilon_7 & -\zeta, +\varrho, -\varepsilon_6 & -\zeta, +\varrho, +\varepsilon_6 & -\varepsilon_1 & 0 & +\varepsilon_1 & +\zeta, -\lambda, -\varepsilon_2 & +\zeta, -\lambda, +\varepsilon_2 & +\zeta, -\varepsilon_3 & +\zeta, +\varepsilon_3 & +\eta, -\varepsilon_4 & +\eta, +\varepsilon_4 & +\zeta, +\lambda, -\varepsilon_5 & +\zeta, +\lambda, +\varepsilon_5 \end{array}$

This structured $\Psi_{\text{U}}^{(19)}$ is the inner preformation structure from which all reality must form. We could also call it the **Pre-Universe**, from which more than 13.8 billion years ago the first manifestation of the Universe developed – the **Primordial Universe**. Thus, at the very beginning of the **creation and development processes of the Universe**, the **Primordial Universe** was the most symmetric possible **manifestation of reality**, centred around the origin of interaction (x) in **V.1.**, and was the first object to be created from the preformation structure **V.1.** This **Primordial Universe** formed as follows:



This primordial creation process unfolds in accordance with the property that (see **I.2.1.**), Ψ and $\bar{\Psi}$ are both spinors with 4 components, and therefore form the most highly symmetric possible Ψ and $\bar{\Psi}$ -structures from the preformation structure **V.1.** – in accordance with the minimality principle **I.0.3.** The rest forms as a result of the requirements associated with the global fermionic structure $\Psi_{\text{U}}^{(19)}$.

In this **(first creation act of the Primordial Universe)**, the following two 4-spinor formations were therefore created, where both Ψ and $\bar{\Psi}$ are 4-component spinors, in accordance with **I.2.2.**:

the $\Psi^4 \equiv (\Psi \ \Psi \ \Psi \ \Psi)$ -formation and the $\bar{\Psi}^4 \equiv (\bar{\Psi} \ \bar{\Psi} \ \bar{\Psi} \ \bar{\Psi})$ -formation,

in the form of the

$$\text{structuring foundation } \Psi^8 \equiv (\Psi^4 + \bar{\Psi}^4).$$

which arises from the point split dynamic by **IV.5.** and is therefore systemically intrinsic. This formation Ψ^8 originates from the point split, and therefore by **IV.5.**, has the predetermined form of

$$\Psi^4 \equiv (\Psi \ \Psi \ \Psi \ \Psi) \equiv \text{separation} \quad \text{and} \quad \bar{\Psi}^4 \equiv (\bar{\Psi} \ \bar{\Psi} \ \bar{\Psi} \ \bar{\Psi}) \equiv \text{binding}.$$

This **(separation and binding action)**, and thus the associated separation and binding structure, is therefore **(fixed as a pre-established structure)** throughout all subsequent events.

V.4.

Because of this pre-established action and function of the structure foundation $\Psi^{(8)}$ (IV.5.) the following holds from the very beginning of all events that unfold within the Universe:

$\Psi \Psi \Psi \Psi$ -configurations have a separating effect \equiv repulsive

$\bar{\Psi} \bar{\Psi} \bar{\Psi} \bar{\Psi}$ -configurations have a binding effect \equiv attractive

Furthermore:

Each separation structure element $\tilde{\sim}$ in the preformation structure $\Psi^{(19)}$ (V.1.) is directly surrounded by 2 $\bar{\Psi}$ -spinors, i.e. $\bar{\Psi} \tilde{\sim} \bar{\Psi}$.

Thus, in all subsequent events (all events in the Universe until today),

the spinor configuration $\bar{\Psi} \bar{\Psi}$ is predetermined to be repulsive – we could also say that this is “pre-established” – following from the most fundamental structure act IV.5. that precedes all events in the Universe.

Also:

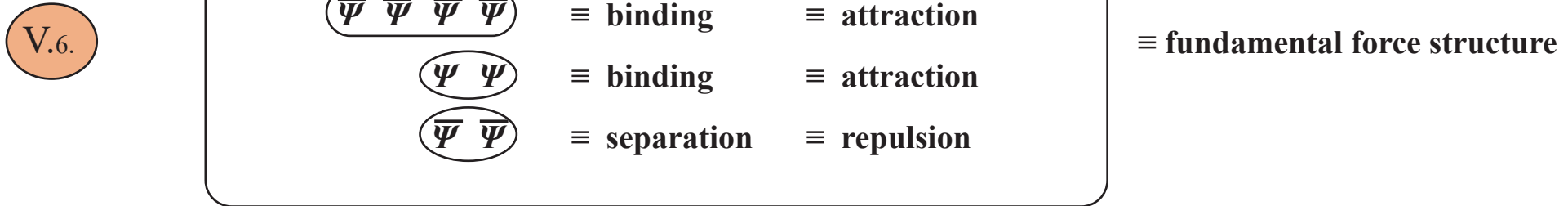
Each binding structure element \cup in the preformation structure $\Psi^{(19)}$ (V.1.) is directly surrounded by 2 Ψ -spinors, i.e. $\Psi \cup \Psi$.

Thus, in all subsequent events (all events in the Universe until today),

the spinor configuration $\Psi \Psi$ is predetermined to be attractive – we could also say that this is “pre-established” – following from the most fundamental structure act IV.5. that precedes all events in the Universe.

V.5.

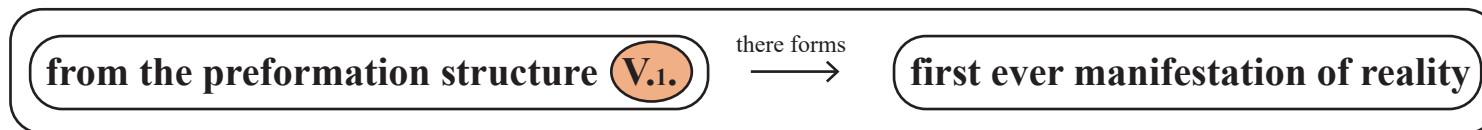
These properties **V.5.**, which are caused by the fundamental structuring into “separation” and “binding” (see **IV.5.**) and which therefore hold throughout the whole construction of the Universe and the whole history of the Universe from its very beginning, namely the **following pre-established properties**:



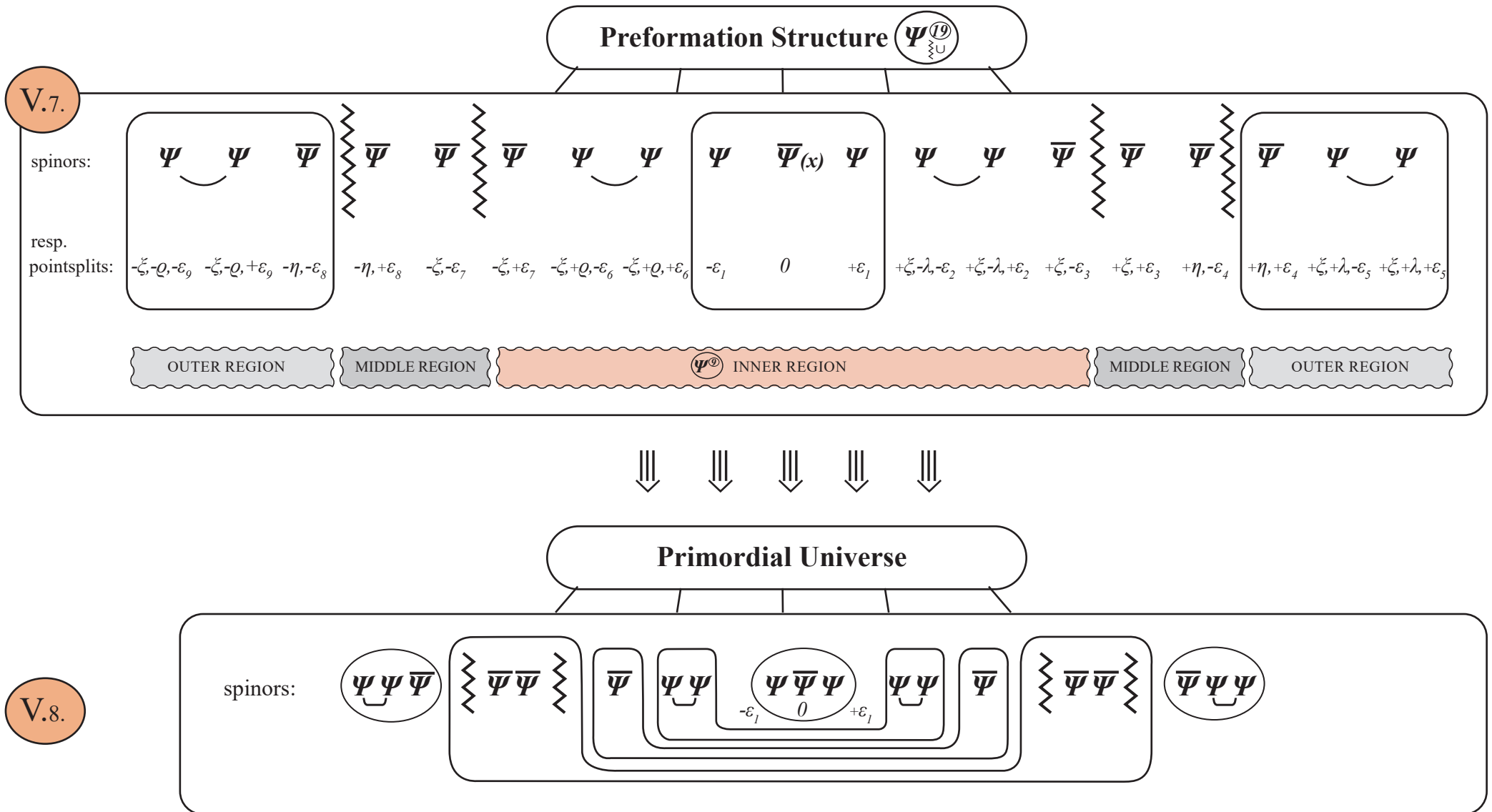
also cause the boson force structure intrinsic to this first ever Primordial Universe to form at the beginning of all events in the Universe, namely in the first creation act of the Primordial Universe.

The structure of the Primordial Universe may therefore be described as follows:

By **V.3.**, the structure of the Primordial Universe is

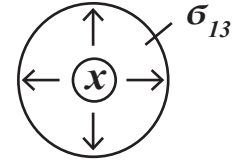


together with the point split densities formed in the dynamic creation process:



V.8.

The Primordial Universe develops according to the construction process **III.1.** to **III.4.**,
 (from the inside outwards around the central origin of interaction (x)),
 via the formation of the dynamically generated point split σ_{13} (see **III.4.**), i.e. in the point
 split-separated neighbourhood (x, σ_{13}) dof the preformation structure $\Psi_{\Sigma}^{(19)}(x, \sigma_{13})$, namely:



(Initiated by the construction process, which unfolds from the inside outwards), the point split
 distribution during the first creation process of the Universe is arranged maximally inwards,
 i.e. concentrated on the inner region Ψ^9 in **V.1.**, **V.2.** as much as possible.

Thus: The middle region ($\equiv G$) is only acted upon by point splits that exist outside of core region Ψ^9
 in **V.2.**. Similarly, the outer region is only acted upon by point splits that exist outside of the middle
 region.

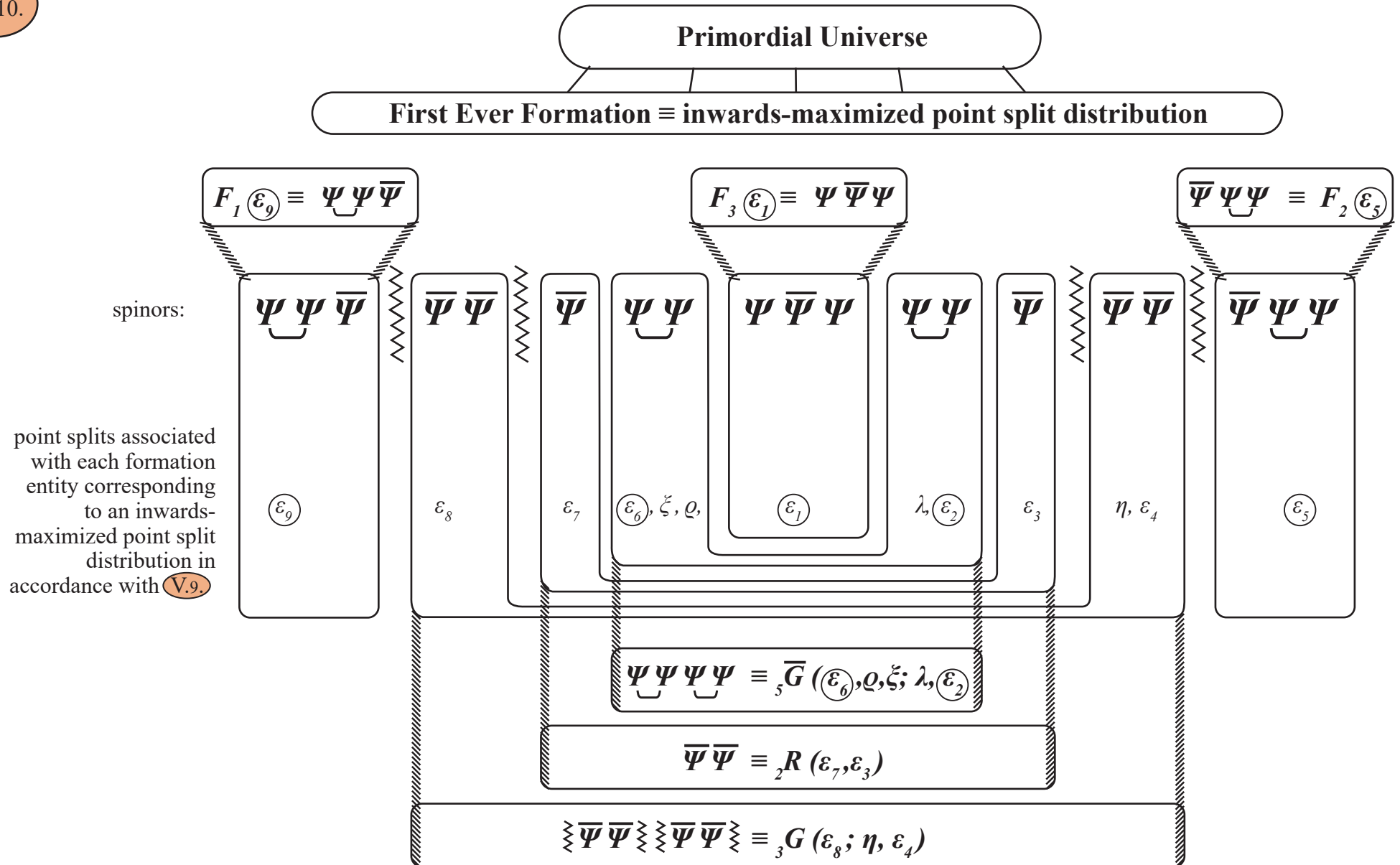
V.9.

Whenever a point split σ^v , $v=1, \dots, 13$, is used to form a (formation entity in **V.8.**) by participating in
 the construction of the (inner structure) (the point split density) of this formation entity, it then
 becomes unavailable for the construction of other formation entities.

This means: In the creation process and the formation of the Primordial Universe, there is the
 following point split process sequence:

Maximization of the point split distribution, as much as possible, towards the inner region Ψ^9 in
V.7.. Thus, the formation entities of the Primordial Universe **V.8.** have the point split distributions:

V.10.



With

| | | |
|--------------------|--|--------|
| F_1, F_2 | \equiv structurally determined by the preformation structure | V.7. |
| F_3 | \equiv structurally determined by the minimality principle | I.2.1. |
| ${}_5\overline{G}$ | \equiv structurally determined by the identity principle | I.5. |
| ${}_3G$ | \equiv structurally determined by the identity principle | I.5. |
| ${}_2R$ | \equiv structurally determined by what remains | |

the formation entities of the first ever formation, or in other words the individual fermion and boson entities of the Primordial Universe, are as follows, assuming an inwards-maximized point split distribution, thus determining the structure of the Primordial Universe, before the Big Bang, 13.8 billion years ago:

V.11.

| | | | |
|------------------|---|--------------|----------------------|
| Fermions: | $F_1(\varepsilon_9); F_2(\varepsilon_5); F_3(\varepsilon_1)$ | \equiv all | 1-point split object |
| Bosons: | ${}_5\overline{G}(\varepsilon_6, \varrho, \xi; \lambda, \varepsilon_2)$ | \equiv | 5-point split object |
| | ${}_2R(\varepsilon_7, \varepsilon_3)$ | \equiv | 2-point split object |
| | ${}_3G(\varepsilon_8; \eta, \varepsilon_4)$ | \equiv | 3-point split object |

where the symbols of the bosons \overline{G} , R , G are chosen to reflect their most fundamental properties V.5.:

| | | | |
|-----------------------|---|---------------------|-----------------------------|
| $\overline{G} \equiv$ | $\Psi \Psi \Psi \Psi$ | \equiv repulsive | \equiv „anti-gravitation“ |
| $R \equiv$ | $\overline{\Psi} \overline{\Psi}$ | \equiv repulsive | \equiv „repulsion“ |
| $G \equiv$ | $\overline{\Psi} \overline{\Psi} \overline{\Psi} \overline{\Psi}$ | \equiv attractive | \equiv „gravitation“, |

with reference to our current concept of “gravitation”.

Chapter VI.

The creation of mass and charge from the dynamically generated point split densities of each formation entity.

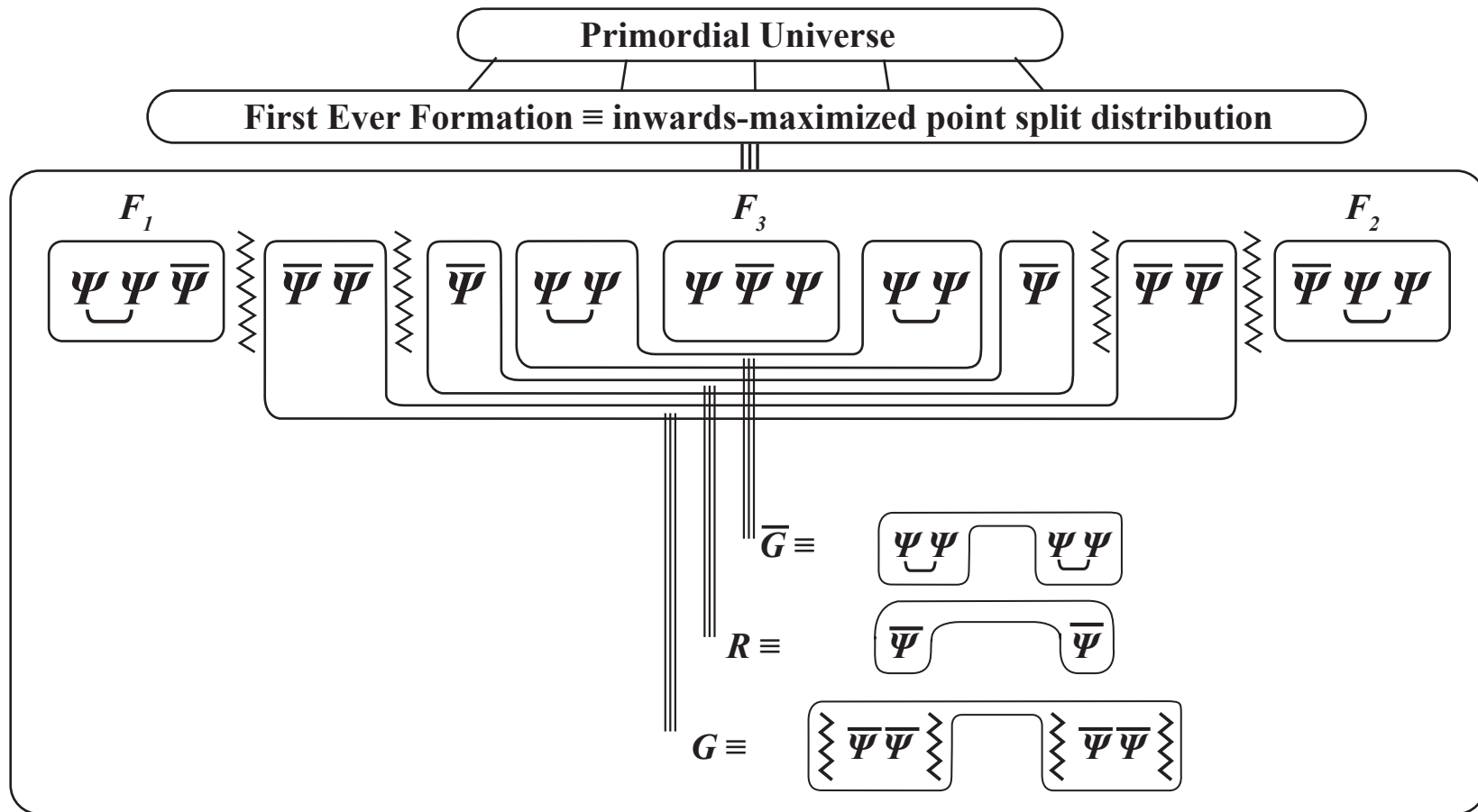
Mass and charge as dynamically formed physical system quantities:

massless \equiv point split density 0 oder 1

mass $\neq 0$ \equiv point split density 2 oder more (point curvature)


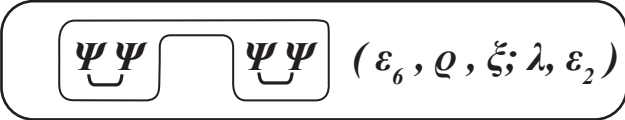




charge $\neq 0$ \equiv point split density 3 oder more (point compression)

In order to determine the physical properties of the first ever manifestation of reality thus formed \equiv Primordial Universe, we shall examine the point split densities of the formation entities that specifically formed within the Primordial Universe: F_1, F_2, F_3 ; \bar{G}, R, G (see V.11.) in order to characterize their physical effects:



We shall therefore investigate the inner structure of the each of the formation components $F_1, F_2, F_3 ; {}_5\bar{G}, {}_2R, {}_3G$ of the Primordial Universe:

VI.2.

| | | | |
|--------------|---|----------------------|---|
| $F_1 \equiv$ |  | ${}_5\bar{G} \equiv$ |  |
| $F_2 \equiv$ |  | ${}_2R \equiv$ |  |
| $F_3 \equiv$ |  | ${}_3G \equiv$ |  |

where the circle notation $(\epsilon_v), v = 1, 2, 5, 6, 9$ indicates that both the $(+\epsilon_v\text{-split})$ and the corresponding $(-\epsilon_v\text{-split})$ are consumed by particle formation within a given physical formation entity $(F_1, F_2, F_3 ; \bar{G})$

Thus: The following $(\text{inner structure elements})$ form within the formation components $(F_1, F_2, F_3 ; {}_5\bar{G}, {}_2R, {}_3G)$:

- The $(\text{inner point split collision density}) \equiv$
The inner collision density produced by the inner point split densities of each inner basis spinor.
- The $(\text{inner point split coherence structure}) \equiv$
The inner-structural spinor coherence of the inner basis spinors with respect to each other.

This raises the question of the physical meaning of each **inner spinor coherence density** and each **inner point split collision density** (see **VI.3.6.**).

In this chapter (Chapter **VI.**), we shall first examine the point split densities in full generality rather than restricting ourselves to the special case of the Primordial Universe, so that our conclusions are valid for all subsequent events of the Universe, in every phase of the Universe:

Before analysing the formation of each particle, we shall investigate the structural properties of the point split densities at the local point x ($x \pm \sigma$, $\sigma \rightarrow 0$):

VI.3.

point split densities:

- **0 or 1-split particles \equiv massless particles :**

0 or 1 split do not influence the structure of space-time during particle formation – as can immediately be seen:



VI.3.1.

Hence: Spinor sets of $\Psi^{(n)}$ with 1 split can reach the local point x unimpeded as $\sigma \rightarrow 0$ (i.e. during the particle formation process):

Hence: Particles with split densities of **0 or 1 splits are massless and therefore also chargeless, since they do not influence the structure of space-time.**

- **2-split particles \equiv particles with mass $\neq 0$:**

2 splits influence the structure of space-time during particle formation:



Since σ_1 and σ_2 are independent, the **2-split** spinor sets interacting within the structure of space-time “collide” with each other (see above) in the neighbourhood of the local point x as $\sigma_1 \rightarrow 0$ bzw. $\sigma_2 \rightarrow 0$, leading to point curvature around x , and consequently to **\equiv creation of mass** :
 A split density of 2 independent splits creates bending near the local point :

Mass is defined as point curvature, and hence spinor interactions resulting in at least 2 splits create mass by means of the associated curvature of space-time.

Hence: Particles with split density ≥ 2 have mass $\neq 0$

- **3-split particles \equiv formation of charge :**

3 splits influence the structure of space-time

Thus: The presence of 3 independent splits causes the local point x not only to develop curvature, but also to be compressed, and this compression causes the mass created by 2 splits to become denser.

This point compression creates charge, specifically

... $\Psi\bar{\Psi}$ -sequence \equiv **positive charge** (\equiv standardized definition of \oplus -charge)
 ... $\bar{\Psi}\Psi$ -sequence \equiv **negative charge** (\equiv standardized definition of \ominus -charge)

The fact that charge is formed by 3 splits automatically explains why every charged particle has mass, which already formed from the first 2 splits.

VI.3.4.

- **4-split particles \equiv charge and mass :**

With **(4 splits)**, the 3-split state (charge) is covered with an additional layer of mass as a result of the more complex 4-split density.

Thus: 4-split particles have higher mass than the corresponding 3-split particles.
This explains why the **(mass of the proton (4-split particle))** is greater than **(the mass of the electron (3-split particle))**.

VI.3.5.

- **5-split particles \equiv charge and mass :**

Particles that ultimately contain more than **(4 point splits)** and which are inner-structurally composed of **(≤ 3)** basis spinors are **fragile** due to their high split density, i.e. they **(cannot exist as “stable” elementary particles)**.

The **(4-basis-spinor, 5-point-split)** particle $(\overline{5}G) \equiv \left[\begin{array}{cc} \Psi \Psi & \Psi \Psi \\ \text{---} & \text{---} \end{array} \right] (\varepsilon_6, \varrho, \xi; \lambda, \varepsilon_2)$ see **V.10.**,

i.e. the first particle ever created in the Primordial Universe, from within which the construction of the Universe began, is analysed in Chapter **VIII.** in full detail together with all of its consequences.

Inner spinor coherence density and inner point split collision density

The stronger the split density collisions between the inner basis spinors of an elementary particle, the greater the mass of that elementary particle.

The intensity of the split density collisions between the inner basis spinors depends on 2 other criteria:

- ① **The inner basis spinor number of the elementary particle** ,
 i.e. how many basis spinors compose that elementary particle,
 i.e. whether there it has 2 or 3 or 4 basis spinors, and thus whether the collision of split densities is distributed over 2 or 3 or 4 basis components of the elementary particle.
 Thus: If more basis components (basis spinors) are available, the collision space is larger, and so the point split collision density is smaller, i.e. the mass of the elementary particle is smaller.
- ② **The inner coherence of the elementary particle** ,
 i.e. the inner-structural composition of the elementary particle,
 i.e. whether there are inner-structural binding elements „ \sqcup “ or separation element „ \bowtie “ within the inner structure of the elementary particle:
 „ \sqcup “-binding elements increase the inner coherence and therefore increase the mass.
 „ \bowtie “-separation elements decrease the inner coherence and therefore decrease the mass.

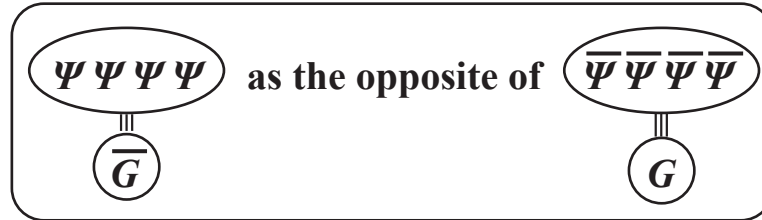
This determines the composition of each individual elementary particle :

And one final fundamental remark:

By **V.10.**, **V.11.**, the Primordial Universe has **two and only two** (≥ 3) -split particles, namely:

$$({}_5\overline{G}) \equiv \boxed{\underbrace{\Psi\Psi} \quad \underbrace{\Psi\Psi}} \equiv \text{5-split object} \quad \text{and} \quad ({}_3G) \equiv \boxed{\underbrace{\overline{\Psi}\overline{\Psi}} \quad \underbrace{\overline{\Psi}\overline{\Psi}}} \equiv \text{3-split object}$$

with opposite spinor configurations:



Thus, the charge \overline{q}_0 of the **5-split particle** $\equiv {}_5\overline{G}$ is the opposite of the charge q_0 of the **3-split particle** $\equiv {}_3G$, so that the charge of the total system $(\overline{q}_0 + q_0 = 0)$, i.e.: $\overline{q}_0 = -q_0$, (which in this case is the Primordial Universe) is neutral, as must necessarily be the case.

Hence: In the Primordial Universe, there only existed one elementary charge $|q_0|$, which takes 2 opposite values, which we may refer to as the gravitational elementary charge, and which takes the value \overline{q}_0 for the force boson ${}_5\overline{G}$ and q_0 for the force boson ${}_3G$, which, after the Big Bang, due to the particle formation point split stabilization process (see **XI.26.6.** \Rightarrow **XI.26.7.**), reforms as \overline{q}_0 and q_0 in the appropriately renormalized Dark Matter particles ${}_4\overline{G}$ and ${}_4G$.

This **elementary gravitational charge q_0** is therefore the **primordial elementary charge** that formed in the Primordial Universe, before the Big Bang, i.e. the charge that forms in particles with a **(≥ 3) -split structure**, due to the **point split penetration process** presented in **VI.3.3.**

This means:

For the elementary gravitational charge, by **VI.4.** :

$$\bar{q}_0 + q_0 = 0$$

but this also means that:

\bar{q}_0 and q_0 have the same charge magnitude $|q_0|$,

which again in turn implies that:

Since the only elementary particles that exist in the elementary particle set **V.10.** of the Primordial Universe are ${}_5\bar{G}$ and ${}_3G$, and no other charge formations exist:

The elementary gravitational charge $|q_0|$ is quantized.

This quantized magnitude $|q_0|$ implies that the elementary particle set **V.10.** of the Primordial Universe is neutral.

This is a separate concept from the elementary charge of Normal Matter p^+ and e^- , which only forms after the Big Bang, during the creation of Normal Matter (see Chapters **IX.**, **X.**, **XI.** and in particular **XI.23.**) as “electric charge” when the corresponding electromagnetic interaction forms together with its force boson γ .

Chapter VII.

The Primordial Universe as the first ever manifestation of the Universe, its force and particle structure, and the intrinsic programming of the Big Bang by means of the systemically necessary (and hence short-range) repulsive anti-gravitational force boson $\textcircled{\overline{G}}$.

The following 6 individual formation components of the Primordial Universe form according to **V.10.** and **VI.2.** from the preformation structure **V.1.** – which was system-intrinsically constructed as described in **I.** → **V.** :

The 3 most elementary fermions:

$$\begin{aligned}
 F_1 (\varepsilon_9) &\equiv \boxed{\Psi \Psi \bar{\Psi}} (\varepsilon_9) \equiv \text{1-split object} \stackrel{\text{by VI.3.1.}}{\equiv} \text{massless} \equiv \text{named: } \boxed{\text{neutrino}_1} \equiv \nu_1 \\
 F_2 (\varepsilon_5) &\equiv \boxed{\bar{\Psi} \Psi \Psi} (\varepsilon_5) \equiv \text{1-split object} \equiv \text{massless} \equiv \text{named: } \boxed{\text{neutrino}_2} \equiv \nu_2 \\
 F_3 (\varepsilon_1) &\equiv \boxed{\Psi \bar{\Psi} \Psi} (\varepsilon_1) \equiv \text{1-split object} \equiv \text{massless} \equiv \text{named: } \boxed{\text{neutrino}_3} \equiv \nu_3
 \end{aligned}$$

VII.1.

The 3 most elementary bosons:

$$\begin{aligned}
 {}_5\bar{G} (\varepsilon_6, \varrho, \xi; \lambda, \varepsilon_2) &\equiv \boxed{\Psi \Psi \quad \Psi \Psi} (\varepsilon_6, \varrho, \xi; \lambda, \varepsilon_2) \stackrel{\text{by V.6, VI.3.}}{\equiv} \text{5-split object} \equiv \text{massive, strongly repulsive} \\
 &\equiv \text{named: } \boxed{\text{anti-gravitational force}} \\
 {}_2R (\varepsilon_7, \varepsilon_3) &\equiv \boxed{\bar{\Psi} \quad \bar{\Psi}} (\varepsilon_7, \varepsilon_3) \equiv \text{2-split object} \equiv \text{massive, repulsive} \\
 &\equiv \text{named: } \boxed{\text{repulsion force}} \\
 {}_3G (\varepsilon_8; \eta, \varepsilon_4) &\equiv \boxed{\bar{\Psi} \bar{\Psi} \quad \bar{\Psi} \bar{\Psi}} (\varepsilon_8; \eta, \varepsilon_4) \equiv \text{3-split object} \equiv \text{massive, weakly attractive} \\
 &\equiv \text{named: } \boxed{\text{gravitational force}}, \text{ not yet the} \\
 &\quad \text{long-range } \boxed{\text{1-split}} \text{ gravitational force } G_1
 \end{aligned}$$

Thus, the properties of the force action of each of the most elementary bosons \overline{G} , R , G are already predetermined by the most **fundamental structuring act** (I.8., IV.5., V.6.) that precedes everything else, i.e. pre-established in the structure of all subsequent events, see in particular Chapters IV., V.

This means that:

The Primordial Universe formation (V.3., V.4., V.6., V.7., V.8., V.10.) is the first ever formation and therefore, by the minimality principle (I.0.3.), the simplest possible formation that can be constructed from the preformation structure (V.1.). Physically, this follows from the fact that the spinors $\overline{\Psi}$, Ψ – because of the dynamic (I.1., I.2., I.3.) – are all 4-component spinors (see I.2.2.), and must manifest this **4-componenttness** physically – subject to the minimality principle (I.0.) – by forming

$\Psi \Psi \Psi \Psi$ and $\overline{\Psi} \overline{\Psi} \overline{\Psi} \overline{\Psi}$ – formations in accordance with V.4.

concretely manifesting the 4-componenttness of $\overline{\Psi}$ and Ψ predetermined by (I.1., I.2., I.3.) in reality.

Thus, **the preformation structure V.1.** necessarily and unequivocally develops into the following formations by means of the **first creation act**:

$$\overline{G} \equiv \begin{array}{|c|c|} \hline \Psi \Psi & \Psi \Psi \\ \hline \end{array} \quad \text{as a manifestation of the 4-componentness of } \Psi \text{ in reality}$$

$$R \equiv \begin{array}{|c|c|} \hline \overline{\Psi} & \overline{\Psi} \\ \hline \end{array} \quad (\text{by V.8.}) \text{ structural residual configuration in the } \gg \Psi^9 \gg \text{-region}$$

$$G \equiv \begin{array}{|c|c|} \hline \gg \overline{\Psi} \overline{\Psi} \gg & \gg \overline{\Psi} \overline{\Psi} \gg \\ \hline \end{array} \quad \text{as a manifestation of the 4-componentness of } \overline{\Psi} \text{ in reality}$$

VII.2.

as the **first individual formation**, i.e. **individual components, of the Primordial Universe**.

Due to their **inner spinor structure** and the associated modes of action predetermined by the most fundamental structuring act – as described in **V.6.** – the force actions of the bosons \overline{G} , R , G have the following properties (see **V.11.**):

$$\overline{G} \equiv \begin{array}{|c|c|} \hline \Psi \Psi & \Psi \Psi \\ \hline \end{array} \equiv \text{repulsive} \equiv \text{named: anti-gravitational force}$$

$$R \equiv \begin{array}{|c|c|} \hline \overline{\Psi} & \overline{\Psi} \\ \hline \end{array} \equiv \text{repulsive} \equiv \text{named: repulsive force}$$

$$G \equiv \begin{array}{|c|c|} \hline \gg \overline{\Psi} \overline{\Psi} \gg & \gg \overline{\Psi} \overline{\Psi} \gg \\ \hline \end{array} \equiv \text{attractive} \equiv \text{named: gravitational force}$$

Thus: The Primordial Universe before the Big Bang consisted of

3 fermions \equiv 3 massless neutrinos with different structures :

$$\nu_1 \equiv F_1 \equiv \underbrace{\Psi \Psi \bar{\Psi}}_{(\varepsilon_9)} \quad \nu_2 \equiv F_2 \equiv \underbrace{\bar{\Psi} \Psi \Psi}_{(\varepsilon_5)} \quad \nu_3 \equiv F_3 \equiv \underbrace{\Psi \bar{\Psi} \Psi}_{(\varepsilon_1)}$$

and:

3 bosons \equiv 3-force mix :

$$\begin{aligned} {}_5\bar{G} &\equiv \text{most extremely strong, repulsive, absolutely dominant force} \\ {}_2R &\equiv \text{normally strong, repulsive force} \\ {}_3G &\equiv \text{most extremely weak, attractive force} \end{aligned}$$

where, by V.6., VI.3.2., VI.3.3., VI.3.4., VI.4.

$$\begin{aligned} {}_5\bar{G} &\equiv \underbrace{\underbrace{\Psi \Psi}_{(\varepsilon_6)} \underbrace{\Psi \Psi}_{(\varepsilon_2)}}_{(\varepsilon_6, \varrho, \xi; \lambda, \varepsilon_2)} \equiv \text{repulsive} \equiv \underbrace{\bar{m}}_{\bar{q}_0}, \bar{q}_0; \\ {}_2R &\equiv \underbrace{\underbrace{\bar{\Psi} \bar{\Psi}}_{(\varepsilon_7)} \underbrace{\bar{\Psi} \bar{\Psi}}_{(\varepsilon_3)}}_{(\varepsilon_7, \varepsilon_3)} \equiv \text{repulsive} \equiv \underbrace{m}_m; \\ {}_3G &\equiv \underbrace{\underbrace{\underbrace{\Psi \Psi}_{(\varepsilon_8)} \underbrace{\Psi \Psi}_{(\varepsilon_4)}}_{(\varepsilon_8; \eta, \varepsilon_4)}}_{(\varepsilon_8; \eta, \varepsilon_4)} \equiv \text{attractive} \equiv \underbrace{\bar{m}}_{q_0}, q_0; \end{aligned}$$

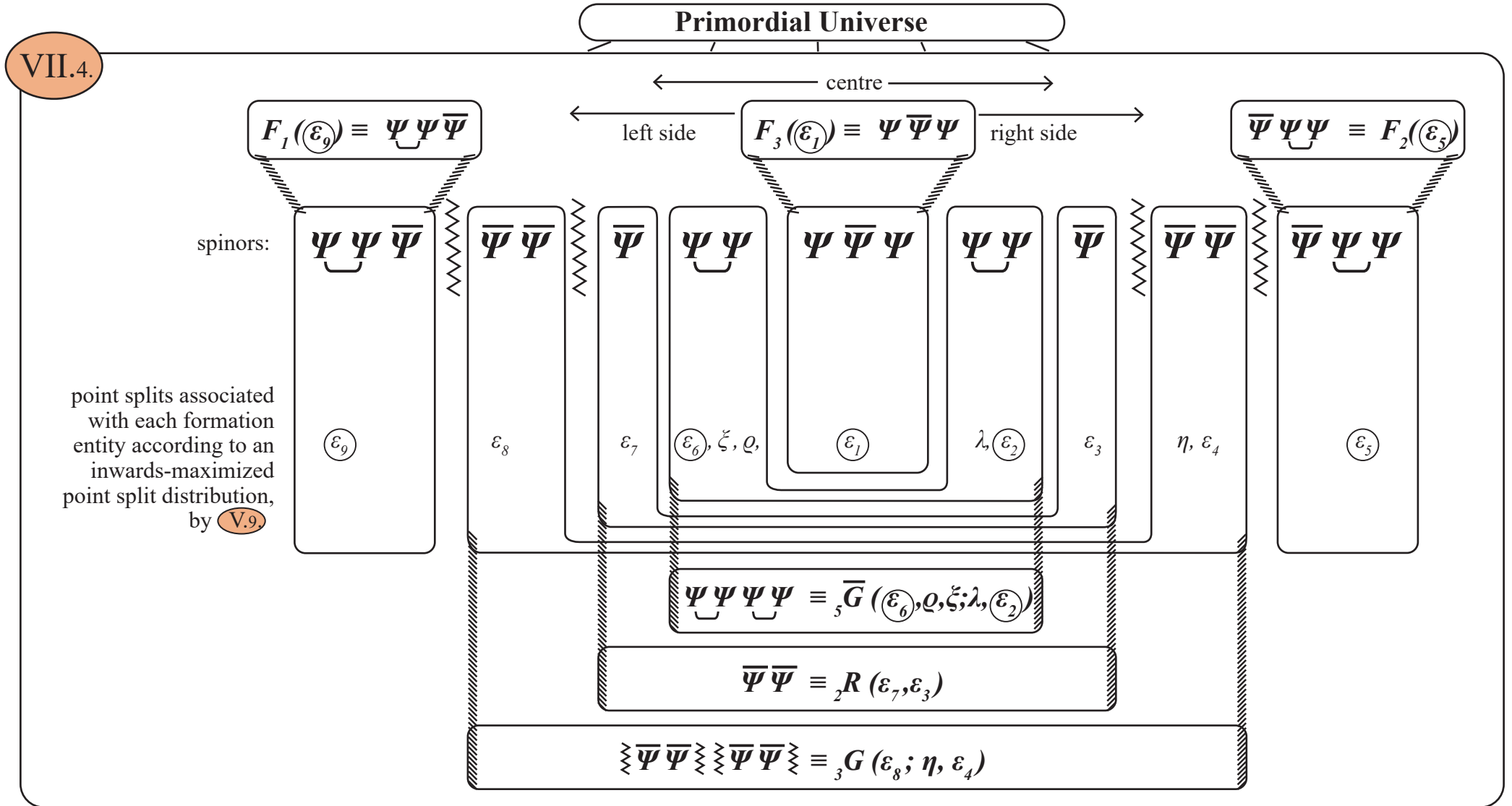
\bar{q}_0 because of the $\Psi\Psi\Psi\Psi$ -configuration, \bar{m} means extremely high mass (see VI.4.), i.e. most extremely short range $\sim 10^{-18}$ cm

massive, range $\sim 10^{-14}$ cm

q_0 because of the $\bar{\Psi}\bar{\Psi}\bar{\Psi}\bar{\Psi}$ -configuration, with $\bar{q} + q = 0$, \bar{m} means extremely high mass, i.e. range $\sim 10^{-14}$ cm

VII.3.

This implies the following particle and force structure in the Primordial Universe (see **V.10.**)



Thus: The Primordial Universe is (was) **absolutely centred**, **point-split-wise centred**, and **shapewise centred**.

The physical properties of each individual formation (**VII.3.**) are determined by the inner structure of each **individual formation entity** .

This inner structure is determined by **3 factors** :

1st factor: **inner split density collision structure**,
specifically the split density collision structure of the inner basis spinors
that form each individual formation entity.

2nd factor: **inner coherence structure** , specifically the inner-structural spinor
configuration of the basis spinors in the composition of the **individual formation entity** .

3rd factor: The force structure properties (see **V.6.**) pre-established by the most
fundamental structuring act (**IV.5.**), i.e.:

| | | | | |
|---|---------------------|---|---------------------------|---------------------|
| $\psi \ \psi \ \psi \ \psi$ | \equiv repulsive | ; | $\psi \ \psi$ | \equiv attractive |
| $\bar{\psi} \ \bar{\psi} \ \bar{\psi} \ \bar{\psi}$ | \equiv attractive | ; | $\bar{\psi} \ \bar{\psi}$ | \equiv repulsive |

VII.5.

Thus, the following statements hold for the individual forces \overline{G} , R , G of the Primordial Universe (before the Big Bang):

VII.6.

$${}_5\overline{G} \equiv \boxed{\underbrace{\Psi\Psi} \quad \underbrace{\Psi\Psi}} (\varepsilon_6, \varrho, \xi; \lambda, \varepsilon_2) \equiv \text{5-split object}$$

\equiv by VI.3.5. most extremely massive, i.e. most extremely short-range ($\sim 10^{-18}$ cm), with charge \overline{q}

\equiv by V.6. a repulsive force, as a $(\Psi\Psi\Psi\Psi)$ -configuration

\equiv due to the (double binding element „UU“) most extremely high inner-structural spinor coherence and therefore most extremely high force magnitude by VII.5.



$${}_5\overline{G} \equiv \begin{array}{c} \text{centre} \\ \vdots \\ \boxed{\underbrace{\Psi\Psi} \quad \underbrace{\Psi\Psi}} \\ \vdots \\ \text{centre} \end{array} \equiv$$

acting from the centre outwards, most extremely strong, extremely massive and therefore extremely short-range repulsion force (separation force), named (anti-gravitational force)

VII.6.

$$\begin{aligned}
 {}_2R &\equiv \boxed{\overline{\Psi} \quad \overline{\Psi}} (\varepsilon_7, \varepsilon_3) \equiv \text{2-split object} \\
 &\equiv \text{by VI.3.2. massive (i.e. short-range)} \\
 &\equiv \text{by V.6. repulsive, due to the } \overline{\Psi}\overline{\Psi}\text{-structure} \\
 &\equiv \text{due to the indirect inner-structural spinor coherence, a slightly weakened, normal force} \\
 &\quad \text{magnitude, named repulsion force}
 \end{aligned}$$

$$\begin{aligned}
 {}_3G &\equiv \boxed{\begin{array}{c} \text{⌞} \overline{\Psi}\overline{\Psi} \text{⌞} \\ \text{⌞} \overline{\Psi}\overline{\Psi} \text{⌞} \end{array}} (\varepsilon_8; \eta, \varepsilon_4) \equiv \text{3-split object} \\
 &\equiv \text{by VI.3.3. massive (i.e. short-range), with charge } q \\
 &\equiv \text{by V.6. an attractive (binding) force as a } \overline{\Psi}\overline{\Psi}\overline{\Psi}\overline{\Psi}\text{-configuration)} \\
 &\equiv \text{due to the quadrauple separation structure „⌞⌞⌞⌞“, most extremely weak} \\
 &\quad \text{inner-structural spinor coherence and therefore most extremely weak force magnitude}
 \end{aligned}$$



$${}_3G \equiv \begin{array}{c} \text{centre} \\ \vdots \\ \boxed{\begin{array}{c} \text{⌞} \overline{\Psi}\overline{\Psi} \text{⌞} \\ \text{⌞} \overline{\Psi}\overline{\Psi} \text{⌞} \end{array}} \\ \vdots \\ \text{centre} \end{array} \equiv$$

acting towards the centre inwards, most extremely weak, massive, and therefore short-range attraction force (binding force), named gravitational force, but not yet the long-range 1-split gravitational force G_1 as will form later, after the Big Bang.

VII.7.

Furthermore: Due to the (double structure binding element „ $\cup\cup$ “), the coherence of the basis spinors of the anti-gravitational force ${}_5\overline{G} \equiv \boxed{\Psi\Psi} \boxed{\quad} \boxed{\Psi\Psi}$ is many, many times ($\gg 10^{40}$) stronger than the gravitational force ${}_3G$, which, due to its structure with (quadruple separation elements „ \\\\\\\\ “), has most extremely weak coherence between its inner basis spinors. Due to this (immense difference) between the inner basis spinor coherence of each force, the force magnitude of ${}_5\overline{G}$ is immensely higher than the force magnitude of ${}_3G$.

VII.8.

It follows that: The Primordial Universe first created more than 13.8 billion years ago consisted of:

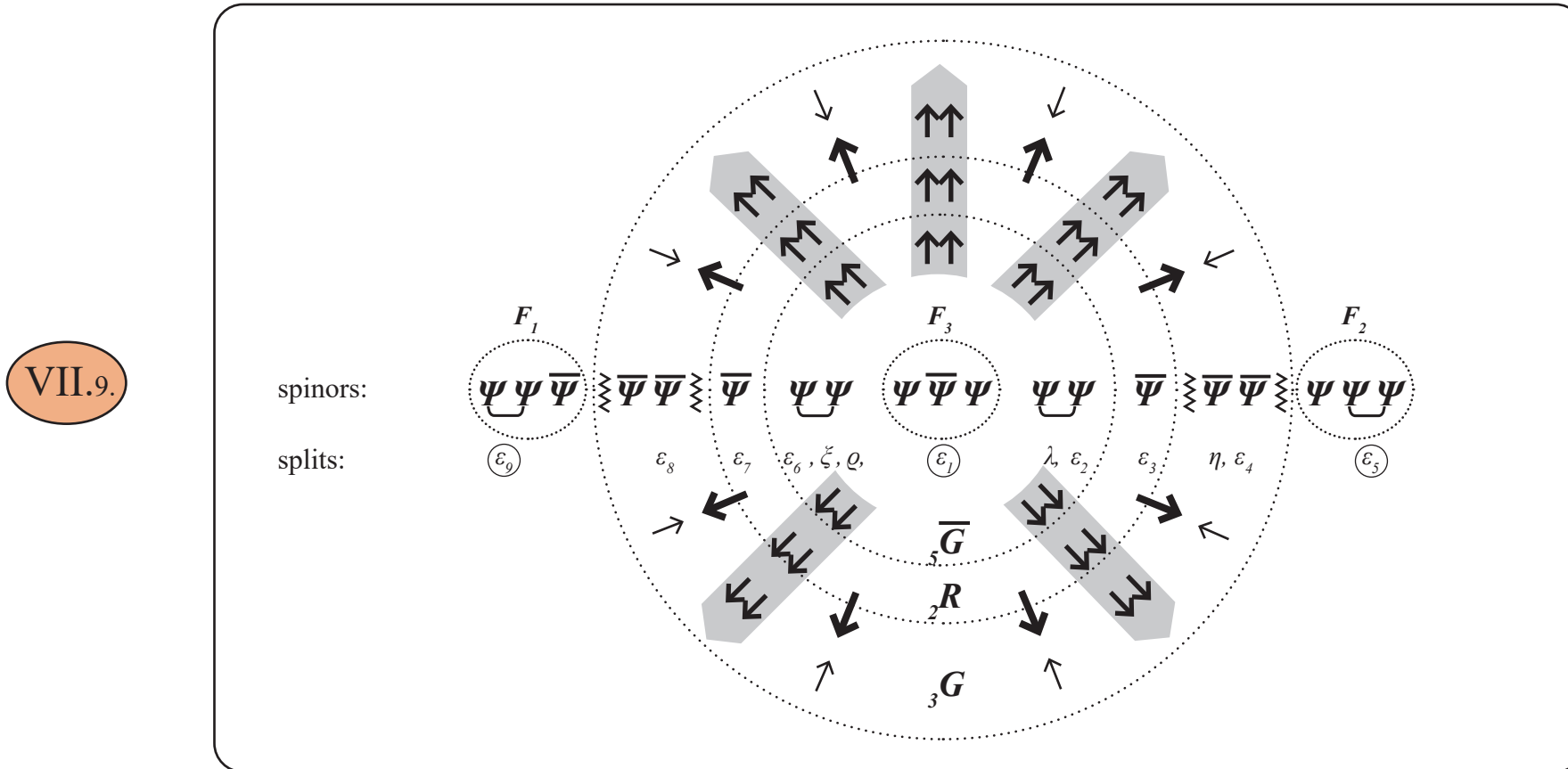
(3 types of neutrino $F_1, F_2, F_3 \equiv 3$ fermions)

(3 massive and therefore short-range ($< 10^{-14}$ cm) force bosons)

${}_5\overline{G}$ (10^{-18} cm), ${}_2R$ (10^{-14} cm), ${}_3G$ (10^{-14} cm), which together sum to give a most extremely repulsive total force, since the force structure and magnitudes satisfy: (${}_5\overline{G} \gg \gg \gg \gg \gg \dots \gg {}_3G$).

Thus: The absolutely dominant force in the Primordial Universe is the force ${}_5\overline{G}$, which is a repulsive force named the (anti-gravitational force), since its inner structure is the opposite of the force ${}_3G = (\overline{\Psi}\overline{\Psi}\overline{\Psi}\overline{\Psi})$. This latter force still exists as a force structure in the Universe today, now (after the Big Bang IX.2.) in the form of a (1-split) formation and hence a long-range force. It is known as (gravitation), namely ${}_1G$. This explains the choice of name for \overline{G} : ($\overline{G} = \text{anti-gravitational force}$).

Thus: The Primordial Universe existed more than 13.8 billion years ago. It was most extremely small (\equiv range of a massive force is $\leq 10^{-14}$ cm, and by VII.6. all 3 forces ${}_5\overline{G}$, ${}_2R$, ${}_3G$ of the Primordial Universe were massive and therefore short-range, namely $\leq 10^{-14}$ cm). The Primordial Universe therefore had the following structure and shape:



with ${}_5\overline{G} \equiv$ repulsive \equiv **immensely strong**, most highly massive (short-range)

${}_2R \equiv$ repulsive \equiv **normally strong**, massive (short-range)

${}_3G \equiv$ attractive \equiv **immensely weak**, massive (short-range)

The Primordial Universe, as the first ever manifestation of reality, was most extremely small, essentially a tiny point with mass, and was absolutely dominated by a most extremely massive and therefore most extremely short-range, most extremely repulsive force,

named:

anti-gravitational force

${}_5\overline{G} \equiv$

$$\left(\underbrace{\Psi \Psi} \quad \underbrace{\Psi \Psi} \quad (\varepsilon_6), \varrho, \xi; \lambda, \varepsilon_2) \right)$$

This force ${}_5\overline{G}$ will be studied in detail in Chapter **VIII. to understand how and why the Big Bang happened.**

Chapter VIII.

The Big Bang: causes, inner composition, consequences.

The inevitable rupture of the anti-gravitational force boson \overline{G} .

Each phase of the dynamic event: before the Big Bang, Big Bang, after the Big Bang.

The fragments after the rupture.

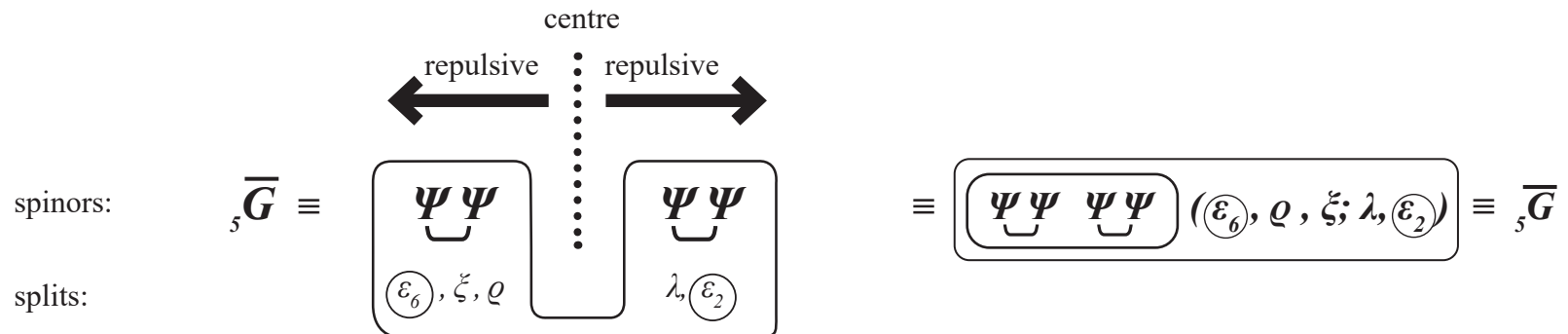
In Chapter VII., we saw how the Primordial Universe formed as the first ever manifestation of reality more than 13.8 billion years ago (most extremely small, essentially a “tiny point” with mass). It was shown that the absolutely dominant force formation in this Primordial Universe was the centrally-outwards-acting

most extremely massive repulsive force ${}_5\overline{G} \equiv$  $(\varepsilon_6, \varrho, \xi; \lambda, \varepsilon_2)$

(see V.11.), whose inner structure and outer action will now be investigated in detail:

By V.6., \overline{G} is a centrally localized repulsive force, i.e.

VIII.1.



Due to its (high split density of 5 splits), by VI.3.5., ${}_5\overline{G}$ is an unstable, extremely massive and therefore extremely short-range (range $\sim 10^{-18}$ cm), most extremely strongly repulsive force (see V.6.).

Thus: ${}_5\overline{G}$ acts in a most extremely short-ranged, most extremely repulsive manner from the centre of the Primordial Universe outwards.

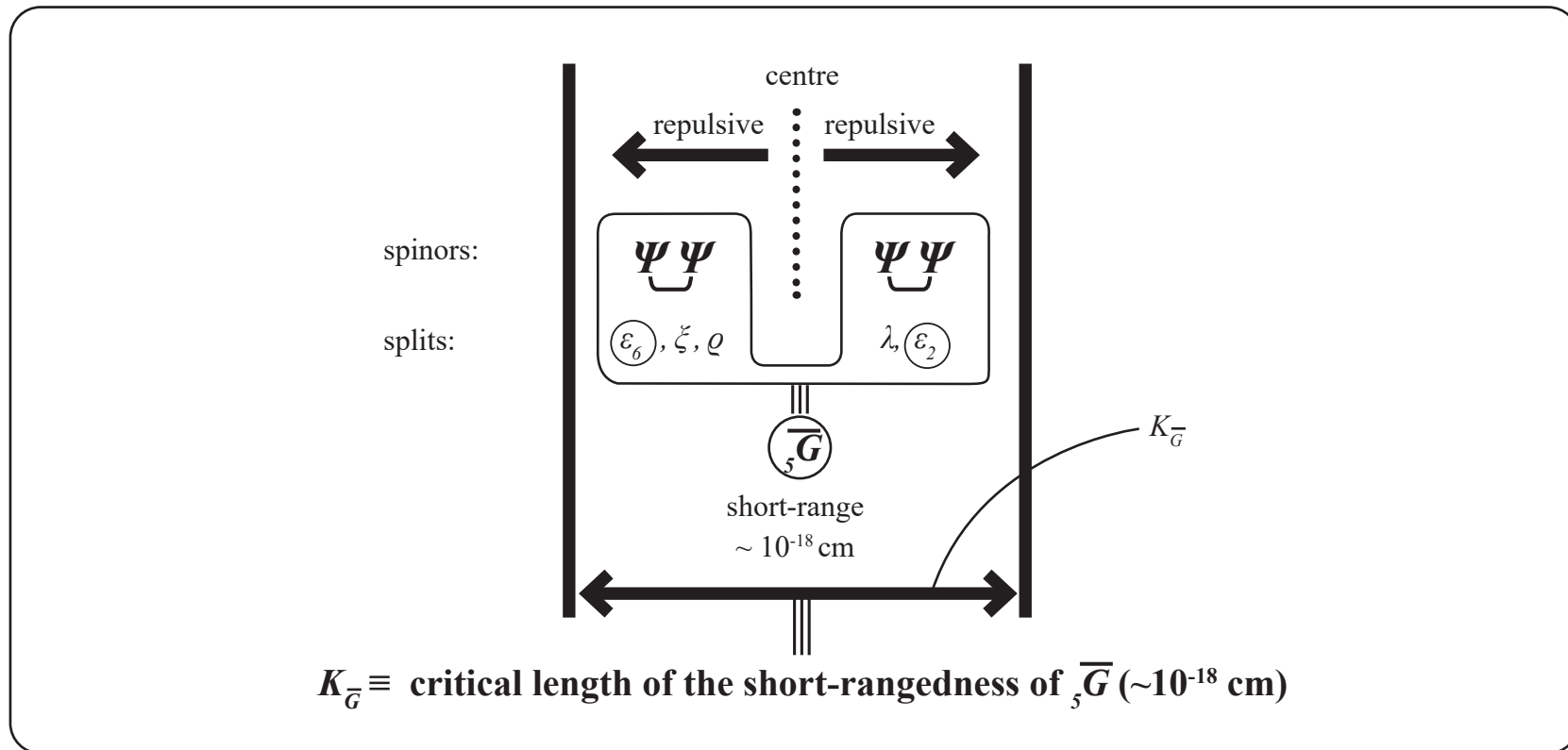
In order to analyse the consequences of this short-range, repulsive force action, we must examine it “step by step” in full detail.

To do this, we must first analyse the physical meaning of a short-range force. For example, we know from Cern the exact measurements of the weak force Z (2-split object), which has a mass of around 125 GeV and therefore a range of around 10^{-15} cm.

It seems therefore entirely reasonable to conclude that, as a (5-split) object (VI.3.5.), the dominant repulsive anti-gravitational force ${}_5\overline{G} \equiv \boxed{\Psi\Psi} \boxed{\Psi\Psi} (\varepsilon_6, \varrho, \xi; \lambda, \varepsilon_2)$ in the Primordial Universe more than 13.8 billion years ago has a significantly higher mass than the weak force Z , which is a (2-split) object (see VI.3.2.).

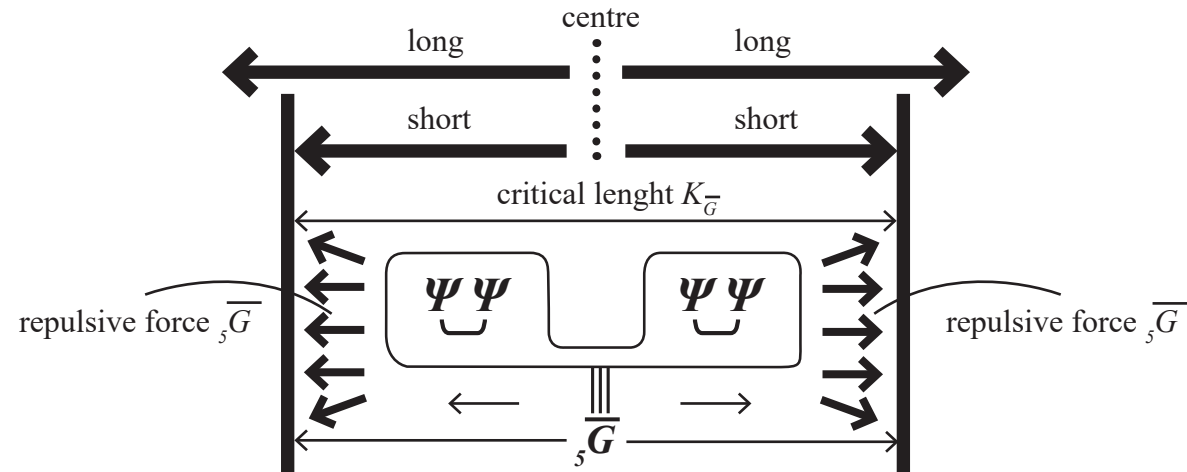
Therefore, the (range of the repulsive anti-gravitational force ${}_5\overline{G} \ll 10^{-14}$ cm (ca. 10^{-18} cm (?))), and hence the dominant force ${}_5\overline{G}$ in the Primordial Universe is as follows:

VIII.2.



Thus: There exists a critical length K_G within which this force \bar{G}_5 acts as a short-range force. Due to the repulsive action of \bar{G}_5 outwards from the centre of the Primordial Universe VII.9. more than 13.8 billion years ago, the following therefore occurs before the Big Bang:

VIII.3.



Due to the most extremely strong (intrinsic repulsion away from the centre) associated with it (see V.6., VII.7.), the extremely massive – and therefore extremely short-range – gradual repulsive expansion of the repulsive anti-gravitational force ${}_5\overline{G}$ necessarily reaches the (critical length $K (\sim 10^{-18} \text{ cm})$), beyond which the force ${}_5\overline{G}$ cannot extend due to its extremely high mass structure (\equiv short-range):

The mass structure of

$${}_5\overline{G} \equiv \boxed{\begin{array}{c} \underbrace{\Psi\Psi} \\ \dots \varepsilon_6 \dots \end{array}} \quad \boxed{\begin{array}{c} \underbrace{\Psi\Psi} \\ \dots \varepsilon_2 \dots \end{array}} \equiv {}_5\overline{G}(\varepsilon_6, \varrho, \xi; \lambda, \varepsilon_2)$$

is concretely and inevitably associated with

and “imprinted” onto the spinor configuration $\overline{G} \equiv \underbrace{\Psi\Psi} \underbrace{\Psi\Psi}$ by the 2 circled ε_6 - and ε_2 -splits,

i.e. the point splits that are only structurally available in the spinor configuration \overline{G} (see VI.2.5.),

Hence: Due to the composition of its basis, ${}_5\overline{G} \equiv \boxed{\begin{array}{c} \underbrace{\Psi\Psi} \\ \dots \varepsilon_6 \dots \end{array}} \quad \boxed{\begin{array}{c} \underbrace{\Psi\Psi} \\ \dots \varepsilon_2 \dots \end{array}}$ inevitably contains at least the

the splits ε_6 and ε_2 and is therefore necessarily a massive force and so is inevitably limited to the short region within the critical length $K_{\overline{G}}$ in VIII.3.

VIII.4.

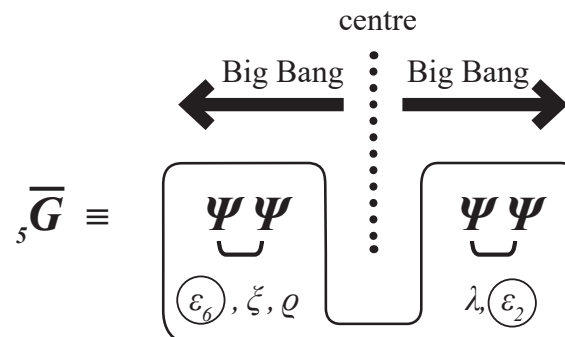
VIII.5.

However, **this limitation to the critical length K** naturally acts against the intrinsically predetermined, most extremely strong **repulsive anti-gravitational force** ${}_5\overline{G} \equiv \underbrace{\Psi\Psi} \quad \underbrace{\Psi\Psi}$ by **VIII.3.**, which means that there must be some “liberation act” – figuratively speaking – i.e. a “rupture”, namely the Big Bang around 13.8 billion years ago.

In the following, we shall see in detail how this “existential rupture”, known as the Big Bang, unfolded from the centre of the most extremely small Primordial Universe **VII.4.**, and how the other parts of the Primordial Universe were affected by this Big Bang, which fragments were left after the Big Bang, and how these **Big Bang rupture fragments** reformed to construct a new Universe, namely the post-Big Bang Universe:

We begin by examining the consequences of the rupture (Big Bang) on the anti-gravitational force \overline{G} that caused it. The rupture of ${}_5\overline{G}$ itself maybe represented as follows:

VIII.6.



VIII.7.

Thus: After the rupture of ${}_5\overline{G} \equiv \underbrace{\Psi\Psi} \quad \underbrace{\Psi\Psi}$ into two structurally identical fragments

$$\text{3-split object} \equiv \underbrace{\underbrace{\Psi\Psi}_{(\varepsilon_6, \xi, \varrho)}} \quad \text{---} \quad \underbrace{\underbrace{\Psi\Psi}_{\lambda, (\varepsilon_2)}} \equiv \text{2-split object}$$

by the identity principle **I.5.**, only one of these fragments can “survive” after the Big Bang and continue to exist.

VIII.8.

By the minimality principle **I.0.3.** the “surviving” part must be the simpler of the two, namely the **2-split** object $\equiv \underbrace{\Psi\Psi}_{(\varepsilon_2, \lambda)}$.

The more complex **3-split** object $\equiv \underbrace{\underbrace{\Psi\Psi}_{(\varepsilon_6, \xi, \varrho)}}$ then opens up – in accordance with the identity principle **I.5.** – thus becoming part of a new structure.

This means:

After the Big Bang, i.e. after the most extremely strong repulsion act from the centre outwards (VIII.7.), the very first thing that forms is a boson that survives the Big Bang,

(2-split) boson $\equiv \left(\Psi \Psi (\varepsilon_2, \lambda) \right)$, which acts attractively by (V.6.),

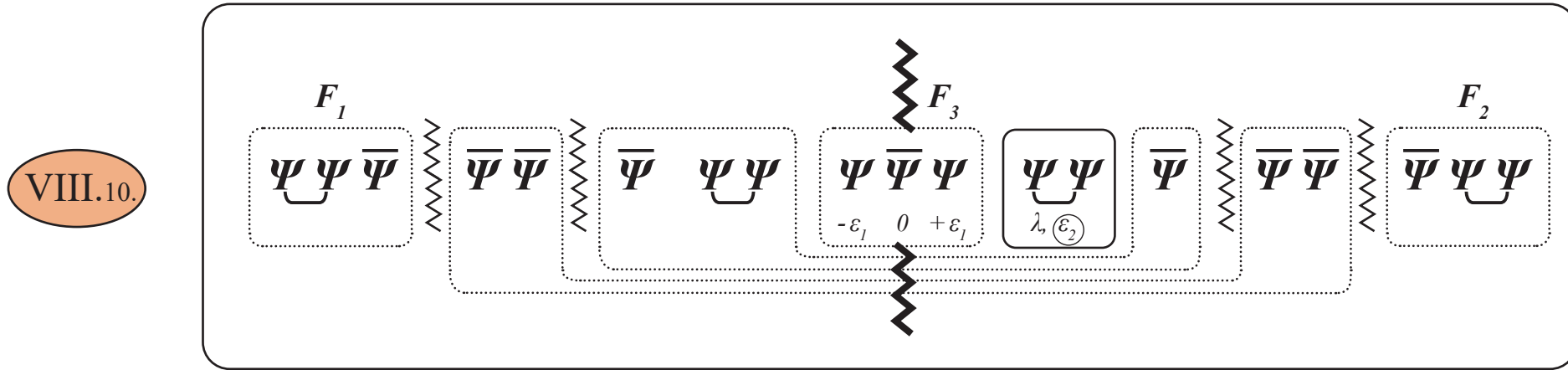
and which becomes the heart of the newly developing (elementary set of the post-Big Bang Universe).

It follows that:

The (central force around which the elementary set of the post-Big Bang Universe forms) is the Big Bang fragment $\left(\Psi \Psi (\varepsilon_2, \lambda) \right)$, see (V.6.) (\equiv strong force).

The (Big Bang repulsion act), which results in the rupture (VIII.7.) from the centre of the Primordial Universe (VII.9.) outwards, does not only affect the (anti-gravitational force ${}_5\overline{G}$) that triggered this repulsion act, but also acts upon all other parts of the original Primordial Universe.

Hence, directly after the Big Bang, by VIII.6., VIII.7., VII.4., there is the following open situation:



The dotted lines show how the formation after the Big Bang must unfold around the fixed central component

$\psi\psi(\epsilon_2, \lambda)$, because:

- the preformation structure V.1. still holds
- the identity principle I.5. still holds
- and
- the minimality principle I.0.3. still holds

leading the post-Big Bang Universe to develop the structure represented in VIII.10.).

The physical consequences that this has on the structuring and reformation of the Universe after the Big Bang are examined in detail below in Chapter IX.

Chapter IX.

The post-Big Bang Universe:

The reformation of the Universe after the Big Bang.

The creation of the strong force boson (strong interaction) and the energy-momentum boson from the fragments of the anti-gravitational force boson $\textcircled{\overline{G}}$, which ruptured during the Big Bang, and the repulsive boson \textcircled{R} .

The skew symmetry (parity asymmetry) caused by the Big Bang in the energy-momentum boson created in the Big Bang.

The new point split distribution (from the inside outwards) caused by the Big Bang (repulsion act).

The formation of the proton $\textcircled{p^+}$ and the electron $\textcircled{e^-}$.

The point split distribution after the Big Bang, i.e. after the Big Bang repulsion act **VIII.10**, unfolding from the inside outwards, satisfies the following: After the Big Bang, the point split distribution must be distributed outwards-maximally. This means that each of the outer formation entities in **VIII.10**, namely (F_1) and (F_2) , must be maximally extended by point splits – as much as allowed by the preformation structure **V.1** – by means of the repulsion act, unfolding from the inside outwards.

IX.1.

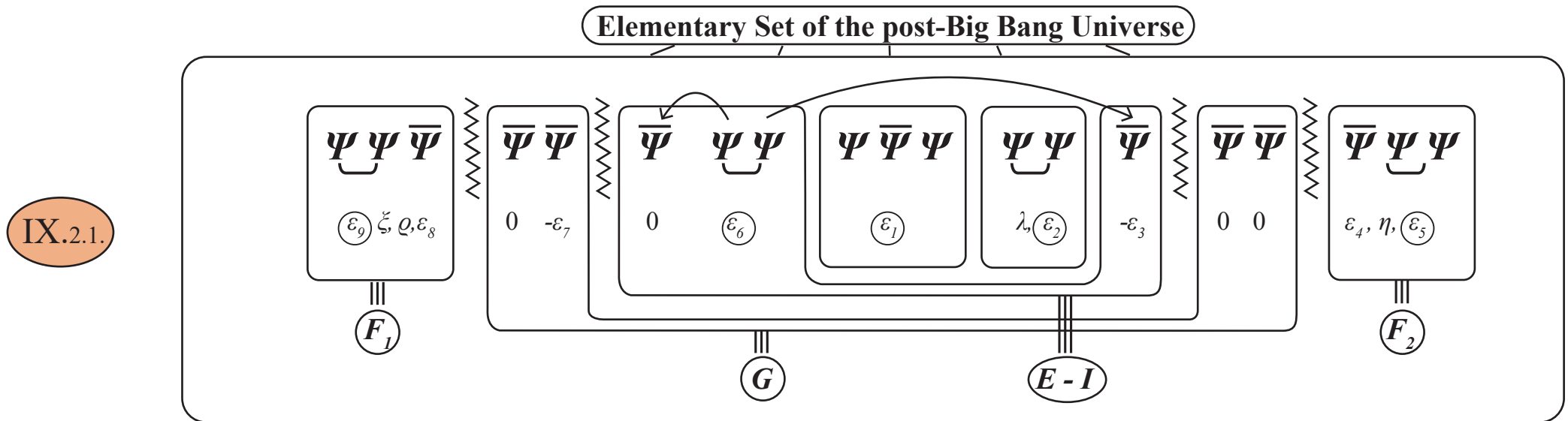
$$\begin{array}{c}
 \text{Big Bang} \\
 \vdots \\
 (F_1(\varepsilon_9)) \longrightarrow F_1(\varepsilon_9, \varepsilon_8, \xi, \varrho, \eta) \equiv \underbrace{\Psi \Psi \bar{\Psi}}(\varepsilon_9, \varepsilon_8, \xi, \varrho, \eta) \\
 (F_2(\varepsilon_5)) \longrightarrow F_2(\varepsilon_4, \varepsilon_5, \eta, \xi) \equiv \underbrace{\bar{\Psi} \Psi \Psi}(\varepsilon_4, \varepsilon_5, \eta, \xi)
 \end{array}$$

Since, after maximizing the point split distribution in **VIII.10** from the inside outwards, only F_1 and F_2 ≥ 3 -split objects, i.e. objects that have charge (see **VI.3.3**, **VI.3.4**), the charges of F_1 and F_2 must neutralize each other so that the system is charge-neutral as a whole. Since a total of 7 different point splits are available for the formation of F_1 and F_2 - by **IX.1**, since both F_1 and F_2 must be ≥ 3 -Split objects, and finally since the split distribution in **VIII.10** satisfies the property that the previously formed central component $\underbrace{\Psi \Psi}(\varepsilon_2, \lambda) \equiv \text{surviving fragment from the Big Bang}$ (see **VIII.10**) already contains the λ -split and therefore has consumed it, λ is no longer available for the formation of F_2 .

Hence: $(F_1) \equiv \underbrace{\Psi \Psi \bar{\Psi}}(\varepsilon_9, \varepsilon_8, \xi, \varrho)$ and $(F_2) \equiv \underbrace{\bar{\Psi} \Psi \Psi}(\varepsilon_4, \varepsilon_5, \eta)$,

i.e. first $F_1 \equiv p^+$ then $F_2 \equiv e^-$ form together as an effectively interconnected process. This is precisely why $F_2 \equiv e^- \equiv$ electron, as a 3-split object, has a lower mass than $F_1 \equiv p^+ \equiv$ proton, which is a 4-split object.

After the Big Bang **VIII.10.** and before the final reformation, the Universe necessarily consists of the fragments and individual formations described in Chapter **VIII.**:



Thus, after the Big Bang, the following entities form:

IX.3.

$$\textcircled{St} \equiv \boxed{\underbrace{\Psi \Psi}_{\lambda \quad \varepsilon_2}} \equiv \textcircled{St}(\lambda, \varepsilon_2) \equiv \text{strong interaction force boson}$$

IX.4.

$$\textcircled{E - I} \equiv \boxed{\underbrace{\bar{\Psi} \Psi \Psi}_{0 \quad \varepsilon_6 \quad 0} \quad \underbrace{\bar{\Psi}}_{\varepsilon_3}} \equiv \textcircled{E - I}((\varepsilon_6), \varepsilon_3) \equiv \text{energy-momentum boson}$$

created from the Big Bang repulsion act

and

IX.5.

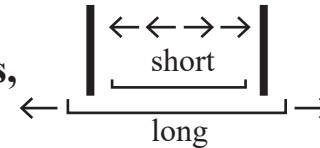
$$\textcircled{G} \equiv \boxed{\underbrace{\bar{\Psi} \bar{\Psi}}_{0 \quad \varepsilon_7} \quad \underbrace{\bar{\Psi} \bar{\Psi}}_{0 \quad 0}} \equiv \textcircled{G}(\varepsilon_7) \equiv \text{gravitational force boson}$$

And the following holds:

IX.6.

After the Big Bang \equiv repulsion rupturing act (see VIII.6.),

due to the “breakthrough” from short to long scales,



the gravitational force $\textcircled{G} \equiv$ IX.5. must be a long-range force, i.e. \textcircled{G} must be a ≤ 1 -split object by VI.3.1., as is indeed the case, as an ${}_I G(\varepsilon_7)$ -object.

IX.7.

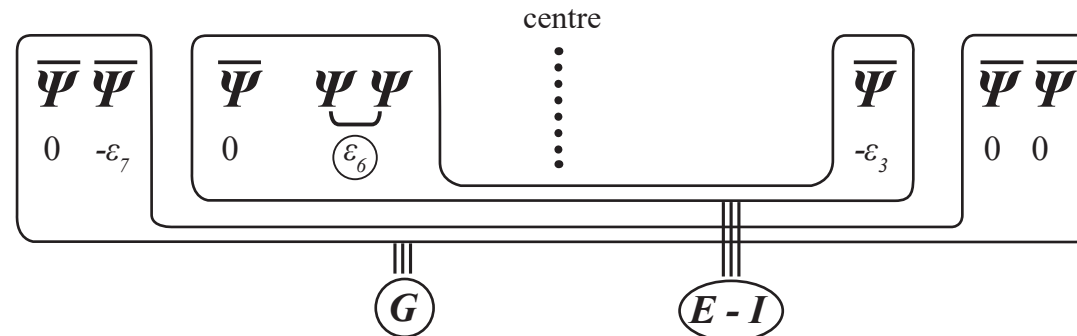
Since the (4-split) fermion F_1 and the (3-split) fermion F_2 have opposite charges by IX.3. and therefore the sum of (F_1) and (F_2) is charge-neutral, the (energy-momentum) formation $(E - I) \equiv$ IX.4. must be an uncharged formation.

This means that, by VI.3.1. and VI.3.2. $(E - I)$ must be a (< 3)-split object, as is indeed the case as an $(E - I) (\varepsilon_6, \varepsilon_3)$ -object. Furthermore, the (energy-momentum) formation must be an (object with length dimension (-2)), namely (-1) for the energy and (-1) for the momentum,

as is indeed the case as an $\begin{array}{|c|c|c|c|} \hline \bar{\Psi} & \Psi & \Psi & \bar{\Psi} \\ \hline -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} \\ \hline \end{array} \equiv \begin{array}{|c|} \hline (E - I) \\ \hline -2, \text{ as } \dim \Psi = -\frac{1}{2} \\ \hline \end{array} \text{-object.}$

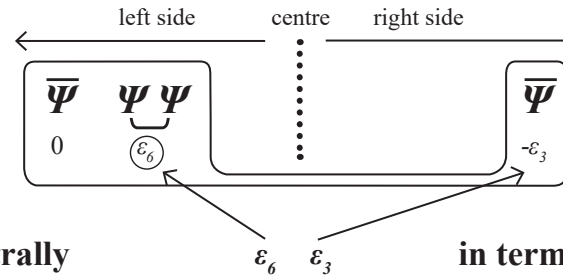
Thus: By IX.3., IX.6. and IX.7., there must necessarily and unequivocally form the following split density distribution in the (post-Big Bang Universe) for (the individual formations $(E - I)$ and (G))

IX.8.



Hence: The energy-momentum formation $(E - I) \equiv \boxed{\bar{\Psi} \underbrace{\Psi \Psi} \cup \bar{\Psi}}$ created by the Big Bang repulsion act

IX.9.



is distributed centrally in terms of its point split structure, but not in terms of its shape structure. The “left side” has 3 basis spinors, whereas the “right side” has 1 basis spinor.

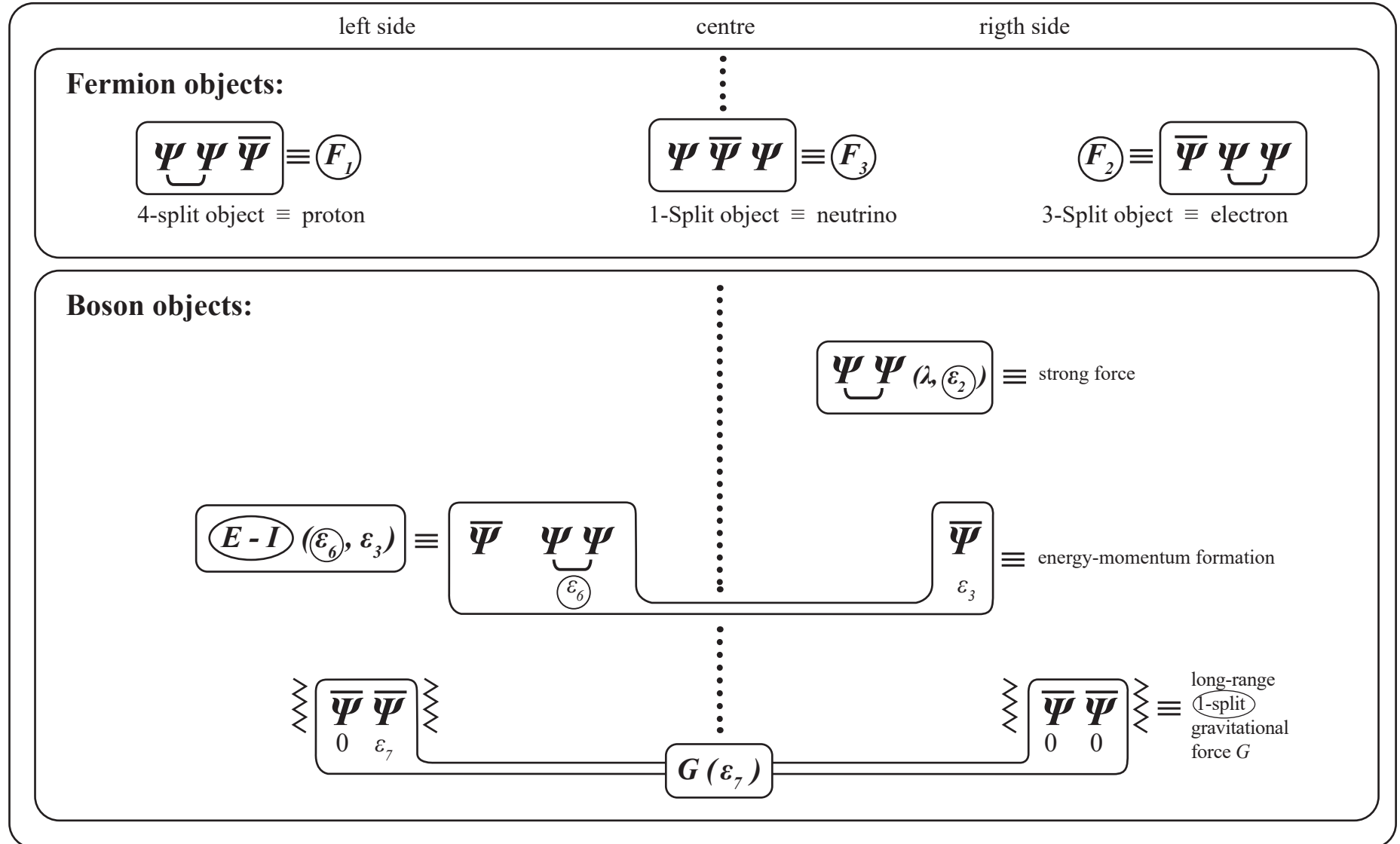
This means: The skew symmetry (\equiv parity asymmetry) inevitably created by the inner structure of the Big Bang (see VIII.10.) is existential, by which we mean: existence-creating, specifically $(E - I)$ -creating. This skew symmetry is necessarily and therefore inevitably caused by the unavoidable rupture-based structure of the Big Bang around 13.8 billion years ago, and is therefore unavoidably predetermined, or “imprinted”, in the events of the post-Big Bang Universe. It could only have happened this way, and not any other.

The energy-momentum formation $(E - I)$ forms after the Big Bang from the fragments of the repulsive anti-gravitational boson \bar{G} and the repulsion force boson R , both from before the Big Bang (VII.4., VIII.10.).

IX.9.1.

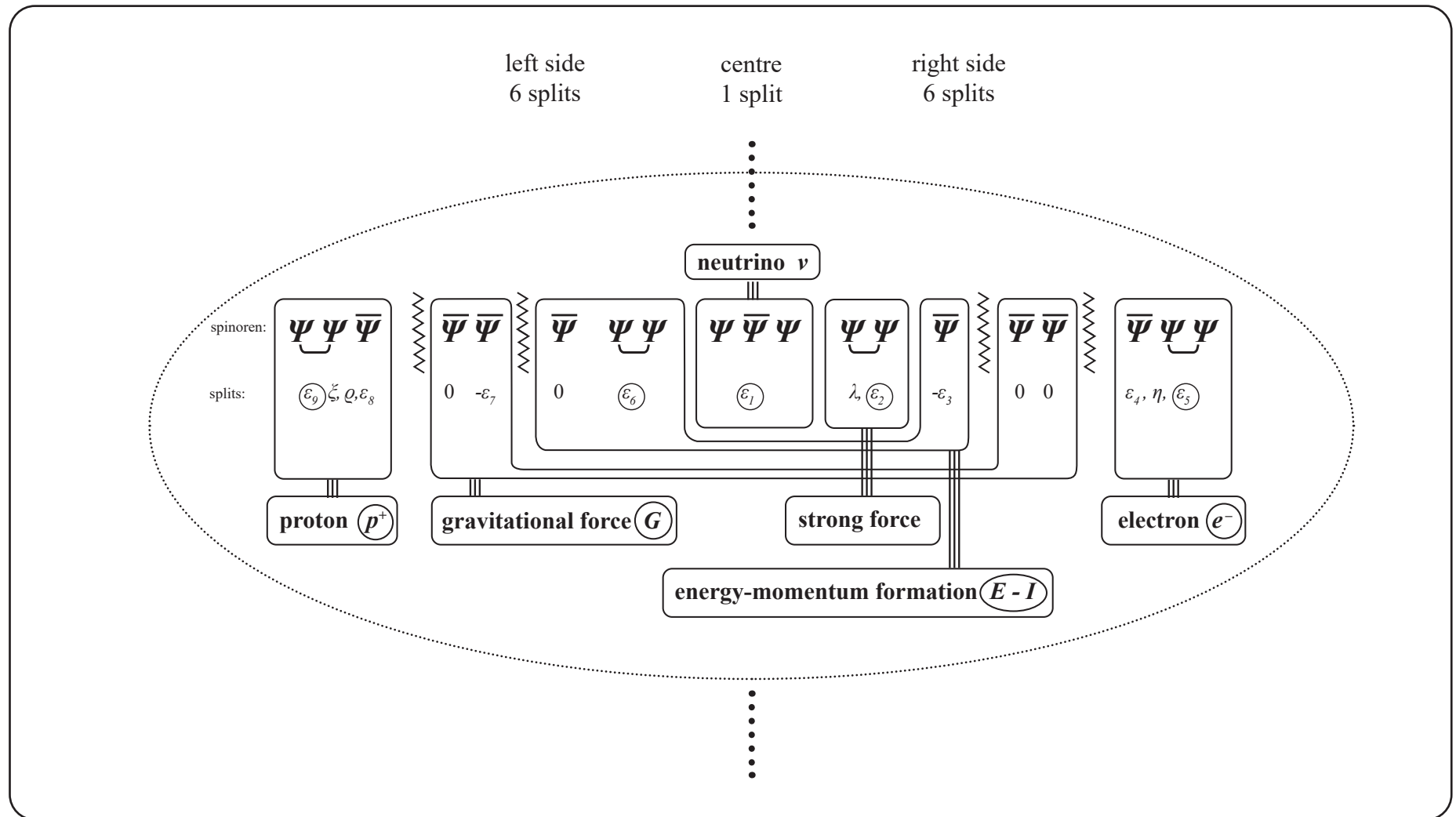


Thus, the individual components of the **(post-Big Bang part of the Universe)** that passes through the Big Bang – structurally generated from the centre of the Big Bang – form as follows:



Thus: The **(post-Big Bang part of the Universe)**, which forms immediately after the Big Bang, and which passes through the Big Bang, has the following structure:

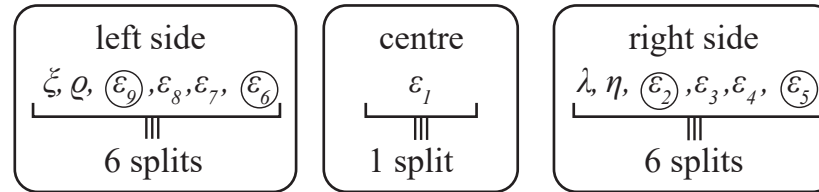
IX.11.



Thus: The elementary set of the **(post-Big Bang part of the Universe)**, which forms immediately after the Big Bang, and which passes through the Big Bang, has the following overall structure:

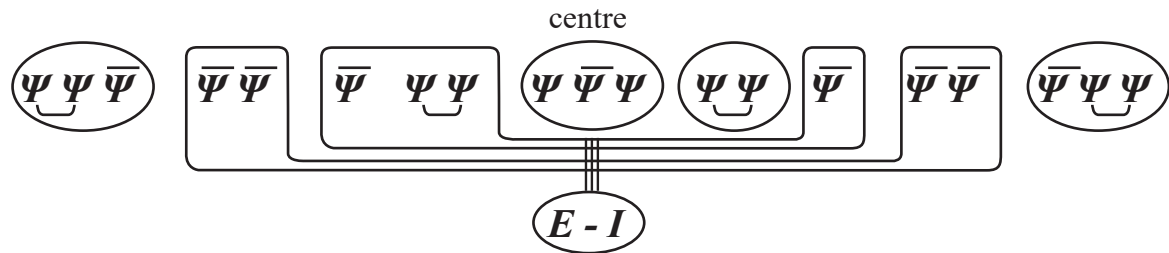
IX.12.

centred in terms of splits



IX.13.

but not in terms of shape:



IX.14.

Thus: The **(energy-momentum)** $\equiv (E - I)$ which thus forms is the skew-symmetric

$$\text{(energy-momentum) formation} \equiv (E - I) \equiv \begin{array}{c} \text{centre} \\ \begin{array}{|c|} \hline \Psi \quad \Psi \quad \Psi \\ \hline \end{array} \\ \begin{array}{c} 0 \quad \varepsilon_6 \quad \varepsilon_3 \end{array} \end{array},$$

created from the Big Bang **VIII.10.** by **IX.8.**. In this phase of the **(post-Big Bang part of the Universe)**, directly after the Big Bang, the electromagnetic force and the weak force do not yet exist.

The electromagnetic force is only created later along with the weak force – as will be shown in Chapter **X.**

One final remark:

By **IX.11.** the post-Big Bang elementary particle set that formed immediately after the Big Bang and which passes through the Big Bang consists of exactly 2 elementary particles, both of which have (≥ 3) point splits.

This means:

Since, by **VI.3.3.**, charge forms in elementary particles with a split density of (≥ 3) , there are only 2 charged elementary particles in **IX.11.**, namely:

- das proton $p^+ \equiv \Psi \Psi \bar{\Psi}(\varepsilon_9, \xi, \varrho, \varepsilon_8) \equiv \text{4-split elementary particle and}$
- das electron $e^- \equiv \bar{\Psi} \Psi \Psi(\varepsilon_4, \eta, \varepsilon_5) \equiv \text{3-split elementary particle}$

where p^+ has a $(+)$ -charge by the standardized definition **VI.3.3.**, due to its $(\Psi \Psi \bar{\Psi})$ -spinor configuration, and e^- has a $(-)$ -charge by the standardized definition **VI.3.3.**, due to its $(\bar{\Psi} \Psi \Psi)$ -spinor configuration, with $(q^+ + q^-) \equiv 0$.

It follows that the elementary particle set **IX.11.** is neutral when viewed as a single system, which is necessarily true anyway, because of the global formation structure.

But this also means that:

IX.15.

The post-Big Bang elementary particle set **IX.11.** that forms after the Big Bang has completed contains: precisely one elementary charge (q_o) , which by **VI.3.3.** exists

- in both a positive form $(q_o)^+$ (proton p^+)

and

- in a negative form $(q_o)^-$ (electron e^-),

which neutralize each other, as they have identical absolute magnitudes $|(q_o)|$, meaning that the elementary particle set **IX.11.** is charge-neutral as a whole.

This also means that the elementary charge (q_o) is quantized, and this quantized magnitude $|(q_o)|$ is the underlying reason for the neutralization $(q_o)^+ + (q_o)^- \equiv 0$ of the elementary particle set **IX.11.** as a whole.

Chapter X.

The creation of the electromagnetic and weak force by partial decomposition of the energy-momentum boson.

The formation and development of the elementary particle set: p^+ , e^- , ν created by the Big Bang.

The strong-electromagnetic-weak-gravitational boson (S , γ , Z , G), namely the hydrogen atom.

As described in Chapter IX. the **energy-momentum** formation $(E - I)$ forms after the Big Bang:

X.1.

$$(E - I) \equiv \boxed{\bar{\Psi} \underbrace{\Psi \Psi}} \boxed{\bar{\Psi}} ((\varepsilon_6), \varepsilon_3)$$

created by the Big Bang repulsion act (see VIII.6.).

X.2.

This leads to a continuous formation process that creates the inner structure of every sub-system in the Universe.

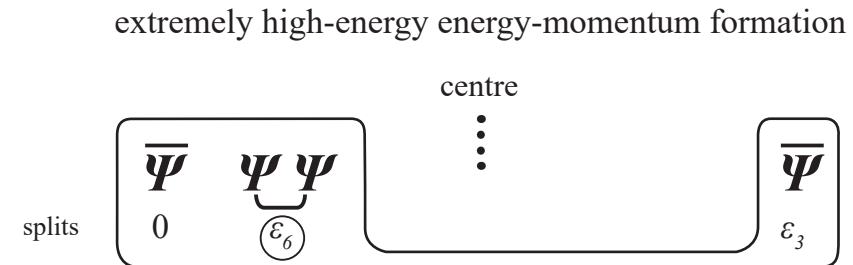
X.3.

Sets of energy-momentum are continuously drawn from the reservoir of **energy-momentum** created in the Big Bang for the inner and outer construction of the **post-Big Bang part of the Universe**.

Hence: In terms of the **energy-momentum** $\boxed{\bar{\Psi} \underbrace{\Psi \Psi}} \boxed{\bar{\Psi}}$ of the individual components of the Universe, the following happens:

X.4.

**extremely high-energy
energy-momentum state,
since created directly
by the Big Bang:**

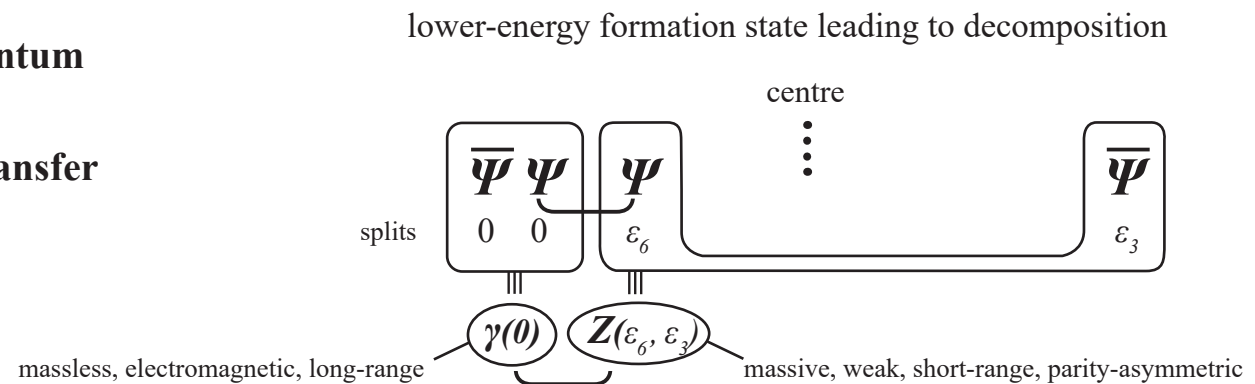


energy-
momentum
transfer:

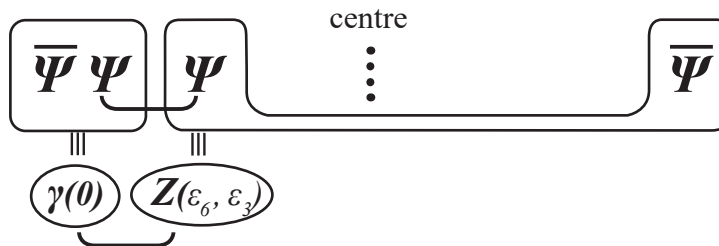


**consumption of energy-momentum for structure formation in the
post-Big Bang part of the Universe that passes through the Big Bang**

**weaker energy-momentum
after completion of
energy-momentum transfer**



Chapter **VII.** of GDE (The Law of Greatest Simplicity) and also Chapter **VII.** of MLE (Matter, Logic, Existence...) show in detail that this formation is:



X.5.1.

the coupled pair corresponding to the electromagnetic-weak interaction, namely γ and Z , with precisely the properties that we are physically familiar with:

electromagnetic force $\gamma(0) \equiv \bar{\psi}\psi(0) \equiv \text{0-split object} \equiv \text{long-range} \equiv \text{massless}$

weak force $Z(\epsilon_6, \epsilon_3) \equiv \bar{\psi}\psi(\epsilon_6, \epsilon_3) \equiv \text{2-split object} \equiv \text{short-range} \equiv \text{massive}$

X.5.2.

Thus: In certain sub-regions of the Universe, the **energy-momentum formation** $E-I$ decomposes into its **lower-energy components** γ and Z .

Hence: In these parts of the Universe, which include our solar system (light \equiv electromagnetic radiation), the electromagnetic and weak interaction is created from the **energy-momentum formations** (see **X.4.**).

The skew symmetry (\equiv parity asymmetry) of the **energy-momentum formation** (see **IX.8.**)

X.6.

$$(E - I) \equiv \begin{array}{|c|} \hline \bar{\Psi} \quad \underbrace{\Psi \Psi}_{\varepsilon_6} \\ \hline 0 \end{array} \quad \begin{array}{c} \text{centre} \\ \vdots \end{array} \quad \begin{array}{|c|} \hline \bar{\Psi} \\ \hline \varepsilon_3 \end{array}$$

that was originally created by the Big Bang repulsion act, as described in **VIII.10.**, and thus unavoidably “imprinted” onto the post-Big Bang part of the Universe by the Big Bang, is carried forwards by the decomposition process

X.7.

of the energy-momentum

DECOMPOSITION

into the coupling pair

 $(E - I)$  γ Z

$$\begin{array}{|c|} \hline \bar{\Psi} \quad \underbrace{\Psi \Psi}_{\varepsilon_6} \\ \hline 0 \end{array} \quad \begin{array}{c} \text{centre} \\ \vdots \end{array} \quad \begin{array}{|c|} \hline \bar{\Psi} \\ \hline \varepsilon_3 \end{array}$$



$$\begin{array}{|c|} \hline \bar{\Psi} \quad \Psi \\ \hline 0 \quad 0 \end{array} \quad \begin{array}{|c|} \hline \Psi \\ \hline \varepsilon_6 \end{array} \quad \begin{array}{c} \text{centre} \\ \vdots \end{array} \quad \begin{array}{|c|} \hline \bar{\Psi} \\ \hline \varepsilon_3 \end{array}$$

into the inner structure of the weak force $Z \equiv \begin{array}{|c|} \hline \Psi \\ \hline \varepsilon_6 \end{array} \quad \begin{array}{c} \text{centre} \\ \vdots \end{array} \quad \begin{array}{|c|} \hline \bar{\Psi} \\ \hline \varepsilon_3 \end{array}$ and therefore is preserved throughout the structures **atom \rightarrow molecule \rightarrow macromolecule \rightarrow **,

e.g. recognizable in the “left-handnesses” of the protein molecules of living beings – and only living beings.

The physical properties of these force matter particles, e.g. (p^+) , (e^-) , (ν) , (St) , (γ) , (Z) , (G) and others – described as “Normal Matter” as opposed to “Dark Matter” – predicted by various theories (e.g. the standard model, string theory, etc.) are being experimentally tested in massive accelerators (e.g. Cern). In future, these experiments will also be expanded to search for “Dark Matter”, at which point it would be helpful to have an a priori theory of the structural composition and the physical properties of these “Dark Matter” particles (see Chapter **XI.**).

As part of the theoretical approach we are developing here: www.norbert-winter.com/elementarteilchentheorie.html

- „The Unified Construction Process of the Universe (the Big Bang Cascade) and the Development Process of the Universe from the Big Bang until Today (Annihilation and Creation)”, 04/08/2016
- “The Development Process of the Universe from the Big Bang until Today”, 04/08/2016
- “The Act of Creation of the Universe”, 17/12/2015
- GDE, “The Law of Greatest Simplicity”, 26/05/2014
- “The Highly Massive Scalar Strong Boson”, 19/04/2013
- MLE, “Matter, Logic, and Existence”, 06/03/2012
- “The Construction of Matter”, 14/04/2011

these works show how, starting at the **(beginning)** of the **(creation of the Universe)** via the Big Bang until now, the following matter and force structure arose in our region of the Universe (see in particular GDE, **VII.70.**), which is re-summarized here as **X.8.**.

proton: (p^+) \equiv $\Psi \Psi \bar{\Psi} \quad (-\xi, -Q, -\varepsilon_8, (\pm \varepsilon_9))$ \equiv 3 basis spinor - 4-split object

electron: (e^-) \equiv $\bar{\Psi} \Psi \Psi \quad (+\eta, +\varepsilon_4, (\pm \varepsilon_5))$ \equiv 3 basis spinor - 3-split object

neutrino: (ν) \equiv $\Psi \bar{\Psi} \Psi \quad (\pm \varepsilon_1)$ \equiv 3 basis spinor - 1-split object

strong interaction: (St) \equiv $\Psi \Psi \quad (-\lambda, (\pm \varepsilon_2))$ \equiv 2 basis spinor - 2-split object

electromagnetic-weak interaction: $(\gamma, Z)^{*(1)}$ \equiv $\bar{\Psi} \Psi \quad \Psi \quad \bar{\Psi} \quad (-\varepsilon_3, (\pm \varepsilon_6))$, $^{*(1)}$ by the decomposition of energy-momentum

where the components are connected together with „ \cup “, but nonetheless exists separately as individual physical objects (see VII.23. to VII.33.)

(Z) \equiv $\Psi \dots \bar{\Psi} \quad (+\varepsilon_6, -\varepsilon_3)$ \equiv 2 basis spinor - 2-split object

(γ) \equiv $\bar{\Psi} \Psi \quad (0)$ \equiv 2 basis spinor - 0-split object

gravitonic interaction: (G) \equiv $\begin{matrix} \diagup & \diagdown \\ \Psi & \bar{\Psi} \end{matrix} \quad \begin{matrix} \diagdown & \diagup \\ \bar{\Psi} & \Psi \end{matrix} \quad (-\varepsilon_7)$ \equiv 4 basis spinor - 1-split object

X.8.

 $\hat{=}$

VII.70.

(GDE)

The full details of how this connection between particles and forces is constructed, e.g. due to the effects of each the 3 factors **VII.5.**,

namely, the properties of the elementary fermions:

$(p^+) \equiv \text{proton}$, $(e^-) \equiv \text{electron}$, $(\nu) \equiv \text{neutrino}$

with respect to mass, charge, type of interaction, magnitude of interaction, etc.,

as well as the properties of the elementary bosons:

$(St) \equiv \text{strong interaction}$, $(\gamma) \equiv \text{electromagnetic}$, $(Z) \equiv \text{weak interaction}$,
 $(G) \equiv \text{gravitational interaction}$,

are exhaustively summarized in **GDE, VII.1. to VII.80.** in 40 pages.

If we summarize **X.8.**, i.e. everything that formed as a **single system** in the form of an elementary particle set initiated by the Big Bang – including quantitatively – as follows:

$$\Psi_{\text{U}}^{(19)} \equiv \begin{array}{l} \text{1 proton } (p^+), \text{ 1 electron } (e^-), \text{ 1 neutrino } (\nu); \\ \text{1 strong interaction boson } (St), \text{ 1 electromagnetic boson } (\gamma), \text{ 1 weak boson } (Z), \\ \text{1 gravitational boson } (G), \end{array}$$

then we see that $\Psi_{\text{U}}^{(19)}$ viewed as an organizational entity

i.e. one **elementary particle set viewed as a single organizational entity**, is precisely that which is known as a

X.9. hydrogen atom $\equiv \text{H}$

whose predominant role in the composition of matter is well-understood.

Furthermore, MLE chapters XII. and XIII. already give a rough outline of how this development sequence continues in the lower-energy atomic \rightarrow molecular \rightarrow macromolecular regions

X.10.

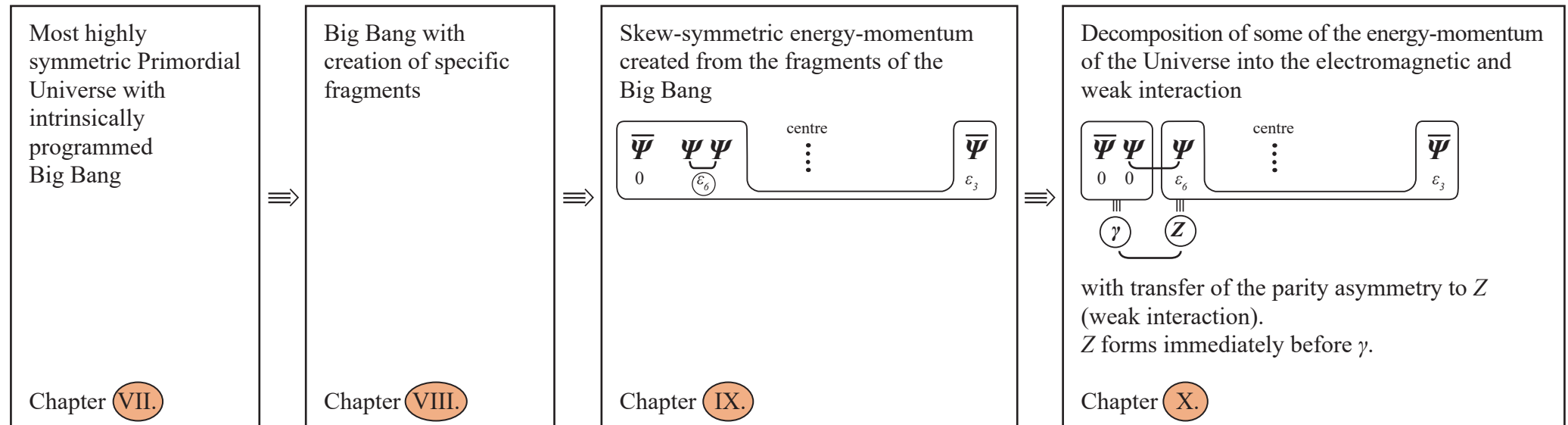
The cited reference also explains why the skew symmetry (parity-asymmetry) of the energy-momentum formation (see IX.1., IX.2.) originating from the Big Bang might possibly be ultimately responsible for the (parity asymmetry) \equiv „left-handedness” of the protein molecules of living organisms.

This is motivated by the following observation:

**ALL PROTEIN MOLECULES PRODUCED BY LIVING ORGANISMS
ARE LEFT-HANDED**

This leads to the question:

Within the development process of the Universe (see Chapters VII., VIII., IX., X.),
i.e. within the process shown below:



what is the role of parity asymmetry, created by the Big Bang and carried forwards in the weak interaction,

X.11.

in the construction of the protein molecules of living organisms

and hence

in the construction of life itself?

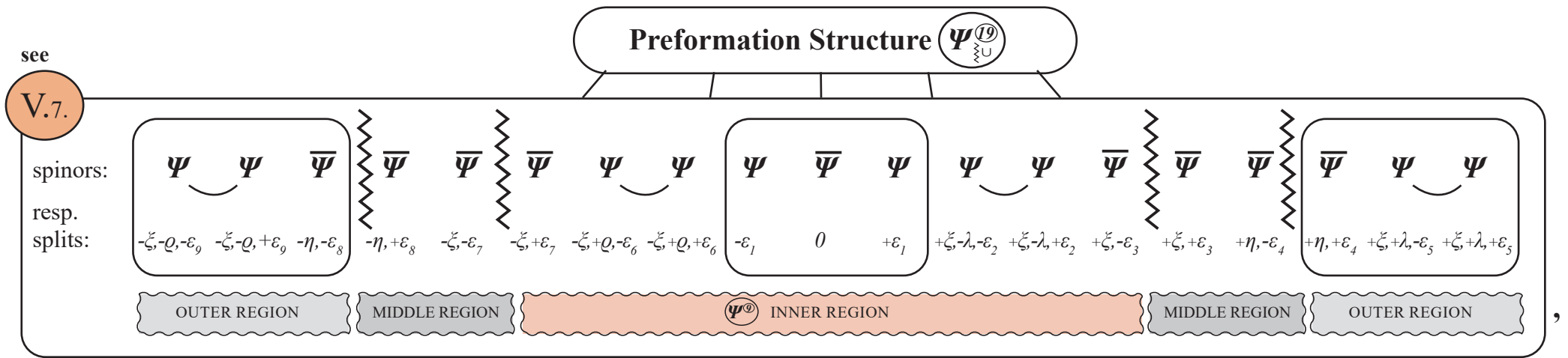
This question is significant to our understanding of ourselves and will be investigated in a separate, dedicated work.

Chapter XI.*

- **The construction process of the Entire Universe by means of a most colossal reproduction cascade, propagating from the centre of the first elementary particle set (\equiv prototype) created in the first Big Bang event.**
- **The nature of the Big Bang as a most colossal cascade of connected individual Big Bang events in a most colossal chain reaction. The formation of the most colossal reproduction set, identical to the prototype.**
- **The general validity of the laws of nature as a result of this identical reproduction.**
- **The limitation of the construction of the Universe by the end of the Big Bang when the production capacity is reached in the Big Bang reaction space by the construction processes gradually becoming too slow at the end of the reproduction cascade.**
- **The composition of the Universe after the Big Bang:
66.6% Dark Matter, 33.3% Normal Matter/Antimatter**
- **The exhaustive list of elementary particles of “Normal Matter” and “Dark Matter” that exist in the Universe, as well as their inner-structural particle composition.**
- **The elementary particles of Dark Matter and their physical properties.
Derivation of their inner-structural particle composition and their properties.**

* Chapter XI. has been fully revised since the first edition in 22/05/2015 and republished on 17/12/2015, as well as in the form of a separate publication, “The Act of Creation of the Universe”.

Chapters **I.** to **X.** showed how the construction of the preformation structure $\Psi_{\text{U}}^{(19)}$ initially happened:

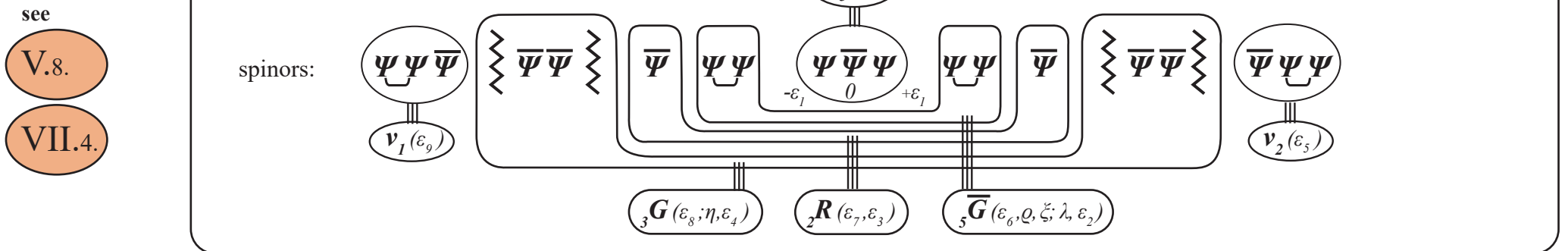


and that the Primordial Universe then formed



as the first ever manifestation of the Universe:

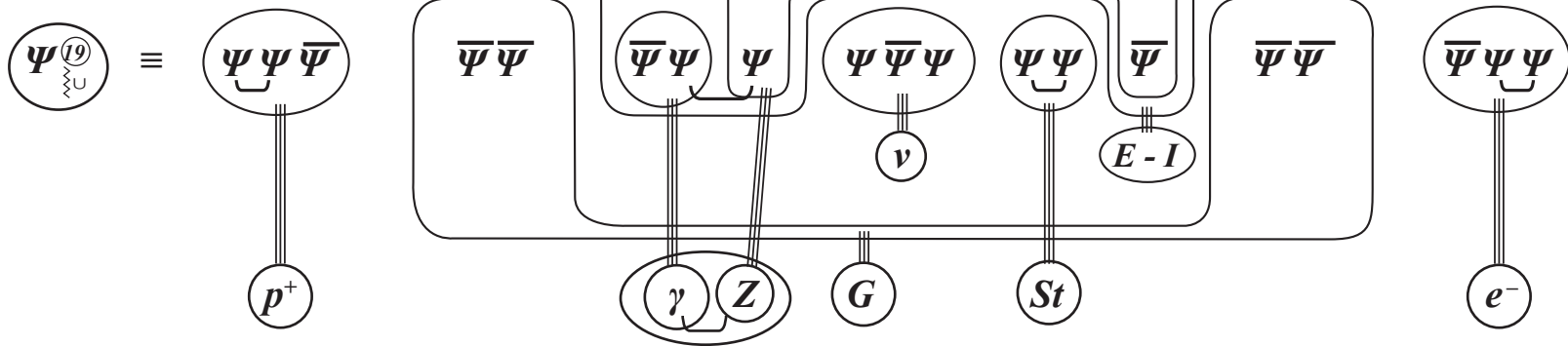
(see **VII.3.**, **VII.4.**)



* For the bosons ${}_5\overline{G}$, ${}_2R$, ${}_3G$, the left subscript indicates how many different point splits exist in the inner-structural composition of the boson. For example: ${}_5\overline{G}$ means that ${}_5\overline{G}$ contains 5 different point splits, etc.

and that the formation of this “tiny” unstable Primordial Universe (unstable because of the 5-split boson $(\bar{5}\bar{G})$ which is itself unstable by VI.3.5.) leads to the rupture of this $(\bar{5}\bar{G})$ boson precisely because of the most extremely strongly repulsive and most extremely massive and hence most extremely short-range anti-gravitational force $(\bar{5}\bar{G})$ (VIII.2. to VIII.10.), and that this rupture (mini-Big Bang) of the $(\bar{5}\bar{G})$ boson creates the post-Big Bang elementary set (IX.2.):

post-Big Bang elementary set:



with

fermions: $(p^+ \equiv \text{proton})$, $(e^- \equiv \text{electron})$, $(\nu \equiv \text{neutrino})$

bosons: $(St \equiv \text{strong interaction boson})$, $(G \equiv \text{gravitational boson})$

$(E - I \equiv \text{energy-momentum boson})$

i.e. $(E - I) \rightarrow (\gamma)(Z) \equiv \text{electromagnetic-weak boson in sub-regions of the Universe } (< 10\%)$
where the electromagnetic and weak interaction exists

This primordial construction process however only creates one (\equiv ①) elementary particle set.

This naturally leads to the question: How did the “incredible” quantity of elementary particles comprising the Entire Universe form? And does this Universe contain any other force or matter elementary particles?

And thus to the question: How did the following process arise?



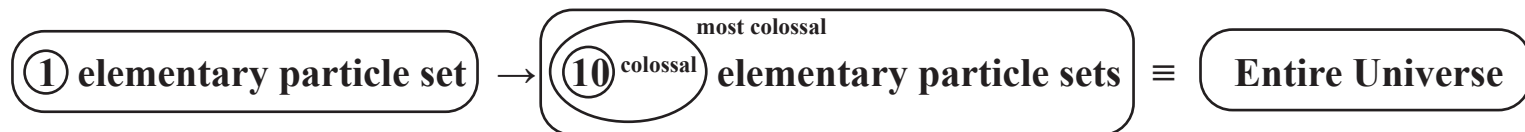
Everything began with the **Existential Act**, which existed at the beginning of Everything (see Chapter **I.**): There exists “Something”, and this “Something” is the minimal possible existing “Something”, without which there would exist nothing. This single **① minimal Something** (see **I.1.**, **I.2.**, **I.3.**) is:

There exists $\Psi, \bar{\Psi}$ with: $D \Psi(x) \equiv \lim_{\sigma_\alpha \rightarrow 0} \Psi(x - \sigma_\alpha) \bar{\Psi}(x) \Psi(x + \sigma_\alpha)$; $D \bar{\Psi}(x) \equiv \lim_{\sigma_\beta \rightarrow 0} \bar{\Psi}(x - \sigma_\beta) \Psi(x) \bar{\Psi}(x + \sigma_\beta)$; otherwise nothing.

This Existential Act, as shown in Chapters **I.** to **X.**, leads to the construction of the elementary set $\Psi_{\sum U}^{(19)}(x, \sigma)$ with **⑩** basis spinors, from which all elementary particles (matter and force particles) that could possibly exist after the Big Bang must form:

XI.1.1.

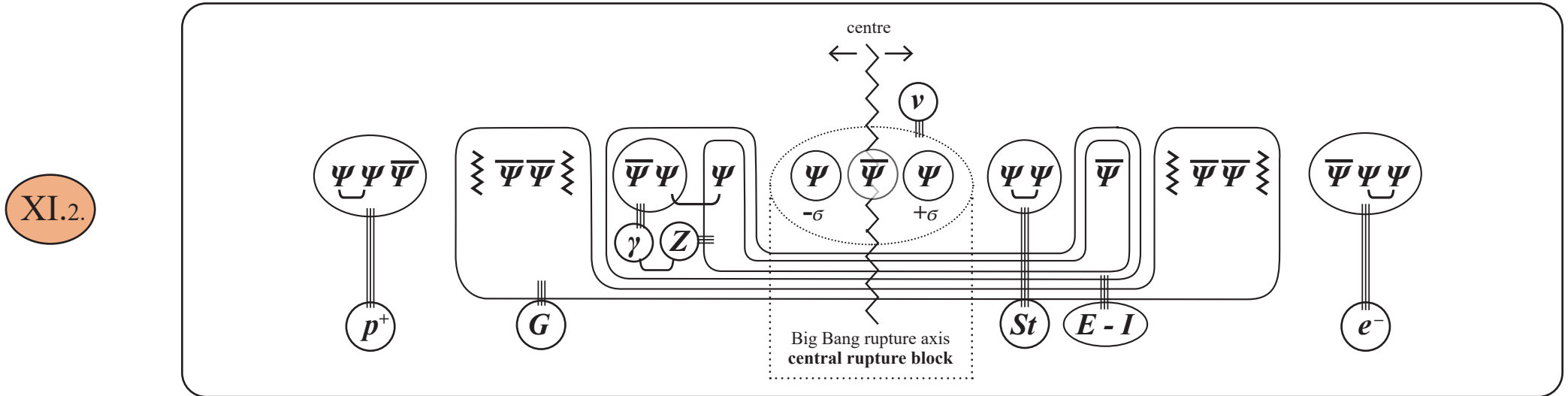
The development stages (Chapters **I.** to **X.**) leading to the final construction of the elementary set $\Psi_{\text{U}}^{(19)}$ (see **XI.1.**), must therefore include a special development stage in which some **reproduction mechanism** is necessarily triggered, which leads to the construction of not just 1 elementary set $\Psi_{\text{U}}^{(19)}$ but a most colossal reproduction cascade of the form:



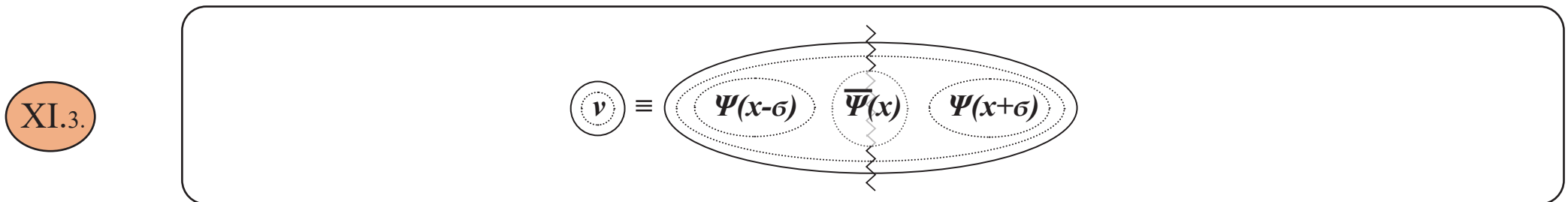
This leads us to ask:

At which point in the development of the Universe was this **reproduction triggered**, together with this **colossally reproducing construction process**?

As described in Chapters VII., VIII., IX., the post-Big Bang formation is created from the Primordial Universe formation VII.4., VII.6., by means of the Big Bang process (rupture process) VIII.3. to VIII.7. (see VIII.10.):



Therefore, as shown in XI.2. and VIII.10. there forms a central Big Bang rupture axis $\leftarrow \rightarrow$, effectively as a central restructuring particle made fragile by the Big Bang $\leftarrow \rightarrow$, the fragile restructured neutrino:



with the Big Bang rupture axis $\leftarrow \rightarrow$ running through its centre.

This means: Each of the individual spinors in the central rupture block **XI.3**, i.e. in

XI.4.

$$\Psi(x-\sigma) \quad \bar{\Psi}(x) \quad \Psi(x+\sigma) \equiv \nu \equiv \text{restructured neutrino}$$

are pushed away from each other – because of the preceding system-intrinsic rupture of the repulsive, most extremely massive (and therefore most extremely short-range) **anti-gravitational force boson \bar{G}** (see **VIII.3.** to **VIII.7.**) – i.e. by the rupture

XI.5.

$$\bar{G} \equiv \begin{array}{c} \leftarrow \quad \rightarrow \\ \boxed{\begin{array}{c} \Psi \Psi \\ \varepsilon_6, \xi, \varrho \end{array}} \quad \text{---} \quad \boxed{\begin{array}{c} \Psi \Psi \\ \lambda, \varepsilon_2 \end{array}} \\ \rightarrow \end{array} \equiv \bar{G}(\varepsilon_6, \xi, \varrho; \lambda, \varepsilon_2) \quad (\text{see VIII.6.})$$

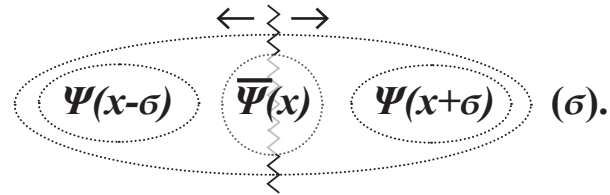
which also causes the original central neutrino $\nu \equiv \Psi \bar{\Psi} \Psi$ in the Primordial Universe (see **VII.4.**) to split as:

XI.5.1.

$$\begin{array}{c} \leftarrow \quad \rightarrow \\ \boxed{\begin{array}{c} \Psi \Psi \\ \varepsilon_6 \end{array}} \quad \boxed{\begin{array}{c} \Psi \\ -\sigma \end{array}} \quad \boxed{\begin{array}{c} \bar{\Psi} \\ +\sigma \end{array}} \quad \boxed{\begin{array}{c} \Psi \Psi \\ \varepsilon_2 \end{array}} \\ \text{short} \\ \text{long} \end{array}$$

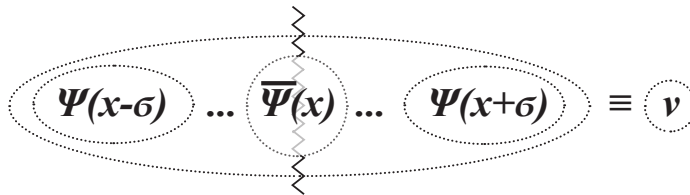
XI.6.

i.e. as a secondary splitting object



Thus – triggered by this first mini-Big Bang – in the first elementary particle set (prototype) there forms a fragile, reconstructed, massless **1-split central block** that is open with respect to the Big Bang split:

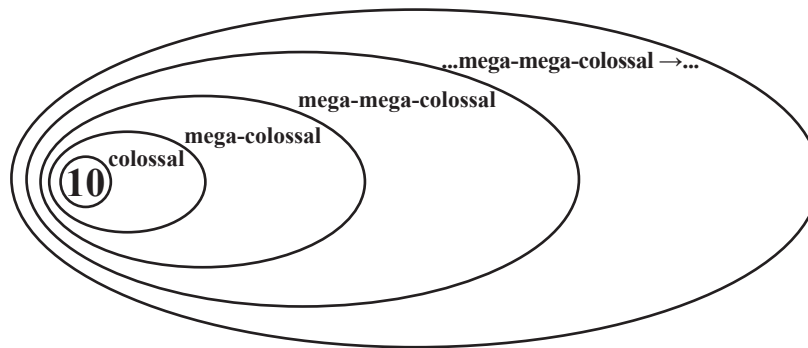
XI.7.



from which – triggered by the inner-most rupture (see **VIII.6.**) –

a „reproduction factory“ is opened, creating a “sheerly inconceivable number” of

XI.8.



elementary particle sets :

$$\nu_1, \nu_2, \nu_3, \bar{\mathbf{\mathcal{G}}}_5, \mathbf{\mathcal{R}}_2, \mathbf{\mathcal{G}}_3$$

see **VII.3.**

$$p^+, e^-, \nu, \mathbf{\mathcal{S}t}; \mathbf{\mathcal{E}-I} \text{ or } \gamma_{\nu}, \mathbf{\mathcal{Z}}, \mathbf{\mathcal{G}}_1$$

see **XI.2.**

which subsequently form the **Entire Universe** (see section **XI.36.** later).

This creates

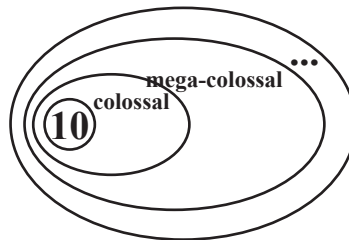
- **at large scales** , all **cosmogenetic entities** studied by cosmology in the widest sense

and,

- **at small scales** , the **sub-atomic, atomic, and molecular composition of matter** studied by elementary particle physics, atomic physics, and molecular physics, ranging up to macromolecular, chemical and biochemical compound structures.

HOW the creation of the Universe came into being by means of the Big Bang process from the inner-most region of the event outwards, and the precise details of this most colossal-scale process, namely

XI.9.



-fold reproduction of the elementary particle set

$$\nu_1, \nu_2, \nu_3, \overline{G}_5, R_2, G_3 \text{ and } p^+, e^-, \nu, St; E-I \text{ or } \gamma, Z, G_1$$

see section **XI.36.** below

and **WHY** this incredible reproduction quantity of identical elementary particle sets was created, forming the Entire Universe and guaranteeing that the **laws of physics** are **universal laws** hold uniformly everywhere, on every continent of our Earth as well as every other corner of the Universe, i.e. there are **uniformly valid laws of nature** , as presented in Chapters **I.** to **X.** , ... ➡

... , all of this can be traced back to the chain reaction process of a reproduction mechanism unfolding in the inner-most central block (XI.7.) $\Psi(x-\sigma) - \bar{\Psi}(x) - \Psi(x+\sigma)$, $\sigma \neq 0$ of XI.2. .

This means: The reproduction chain reaction unfolds from the centre of the central neutrino in XI.2, which is fragile due to being ripped apart by the first mini-Big Bang.

XI.10.

$$\nu \equiv \Psi(x-\sigma) \dots \bar{\Psi}(x) \dots \Psi(x+\sigma), \sigma \neq 0$$

This happens as follows: The mini-Big Bang split $\sigma \neq 0$ $\begin{smallmatrix} \leftarrow & \rightarrow \\ -\sigma & +\sigma \end{smallmatrix}$ causes the individual basis spinors

XI.11.

of the central neutrino $\nu \equiv \Psi \dots \bar{\Psi} \dots \Psi$ to be pushed apart.

This mini-Big Bang split $\sigma \neq 0$ separates them into individual objects, thus “individualizing” them and hence exposing each of them to the fundamental dynamic I.1., I.2., I.3., as described in Chapter I., i.e.

XI.12.

$$\text{the } \textcircled{3} \text{ individual basis spinors in } \nu \equiv \Psi(x-\sigma) \overset{\sigma}{\leftarrow} \dots \bar{\Psi}(x) \overset{\sigma}{\rightarrow} \dots \Psi(x+\sigma) \overset{\text{individualization}}{\equiv} \Psi_0(x-\sigma) \overset{\sigma}{\leftarrow} \dots \bar{\Psi}_0(x) \overset{\sigma}{\rightarrow} \dots \Psi_0(x+\sigma)$$

each become the starting point of an independent dynamic construction process, precisely as described in detail in Chapters I. to X. .

Thus: From the middle (\equiv inner-most central block **XI.10.**) of the elementary particle set **XI.2.** that formed directly after the first mini-Big Bang **VIII.6.**, another construction process is triggered:

XI.13.

$$\begin{aligned}
 \Psi_0(x-\sigma) &\longrightarrow \Psi_{\theta_{\sum U}}^{(19)}(x-\sigma) \equiv \text{elementary particle set}, \quad \text{by } \mathbf{XI.2.} \\
 \bar{\Psi}_0(x) &\longrightarrow \bar{\Psi}_{\theta_{\sum U}}^{(19)}(x) \equiv ? \\
 \Psi_0(x+\sigma) &\longrightarrow \Psi_{\theta_{\sum U}}^{(19)}(x+\sigma) \equiv \text{elementary particle set}, \quad \text{by } \mathbf{XI.2.}
 \end{aligned}$$

XI.14.

Thus: $\Psi_0(x-\sigma)$ is the starting spinor for the creation of a $\Psi_{\theta_{\sum U}}^{(19)}(x-\sigma)$ -systems,
 $\bar{\Psi}_0(x)$ is the starting spinor for the creation of a $\bar{\Psi}_{\theta_{\sum U}}^{(19)}(x)$ -systems,
 $\Psi_0(x+\sigma)$ is the starting spinor for the creation of a $\Psi_{\theta_{\sum U}}^{(19)}(x+\sigma)$ -systems.

XI.15.

Thus: As a result of the mini-Big Bang split $\sigma \neq 0$ $\begin{pmatrix} \leftarrow & \rightsquigarrow & \rightarrow \\ -\sigma & \rightsquigarrow & +\sigma \end{pmatrix}$,
the 3 components of the central neutrino ν **XI.10.** are “individualized” (see **XI.11.**).
This “individualization” of the 3 individual components triggers and executes three dynamic processes

$$(\Psi \rightarrow \Psi_{\theta_{\sum U}}^{(19)}) \text{ or } (\bar{\Psi} \rightarrow \bar{\Psi}_{\theta_{\sum U}}^{(19)}) \text{ as presented in Chapters } \mathbf{I.} \text{ to } \mathbf{X.}$$

XI.16.

Thus: The separation of the 3 basis spinors of the central neutrino ν (XI.10., XI.11., XI.12.) in the inner-most central block (XI.7., XI.2.) as a consequence of the necessarily occurring first mini-Big Bang (VIII. esp. VIII.5. to VIII.10.) leads to the individualization of each of these 3 basis spinors:

$$\nu \equiv \overleftarrow{\Psi_\theta(x-\sigma)} \dots \overline{\Psi}_\theta(x) \dots \overrightarrow{\Psi_\theta(x+\sigma)}$$

XI.17.

Thus: The mini-Big Bang rips apart the existing dynamic relation between these 3 basis spinors: Thus: They are individually separated by the (mini-Big-Bang-driven individualization process) within the (central block) XI.7., each of them becoming the starting spinor Ψ_θ of a separate, independent, dynamic system $\Psi_\theta^{(27)}$ (III.4.), which by IV.5. then creates the structured system $\Psi_{\theta \xi U}^{(19)}$ by internally forming the structural foundation $\Psi_\theta^{(8)}$ (IV.5.). This system then, in turn, forms into a newly existing manifestation of reality, the (primordial force-matter) set VII.3., VII.4., which again, due to the primordial force boson (\overline{G}_5) newly created within it, leads to another mini-Big Bang VIII.6. by means of a (3rd production process), etc., etc., etc., ..., initiating and constructing a cascade of Big Bangs and hence a reproduction cascade (see below XI.23.).

Since the composition of the spinors Ψ_0 and $\bar{\Psi}_0$ is completely structurally and dynamically symmetric;

namely: • both Ψ_0 and $\bar{\Psi}_0$ are 4-component spinors such that $\overline{(\bar{\Psi}_0)} = \Psi_0$
 • both Ψ_0 and $\bar{\Psi}_0$ satisfy a unified symmetric dynamic:

$$D \Psi_0 = \Psi_0 \bar{\Psi}_0 \Psi_0, \text{ (I.1.)} \quad D \bar{\Psi}_0 = \bar{\Psi}_0 \Psi_0 \bar{\Psi}_0, \text{ (I.2.)}$$

it doesn't matter whether a (Ψ_0) spinor or a $(\bar{\Psi}_0)$ spinor is the starting spinor of each dynamic system construction process.

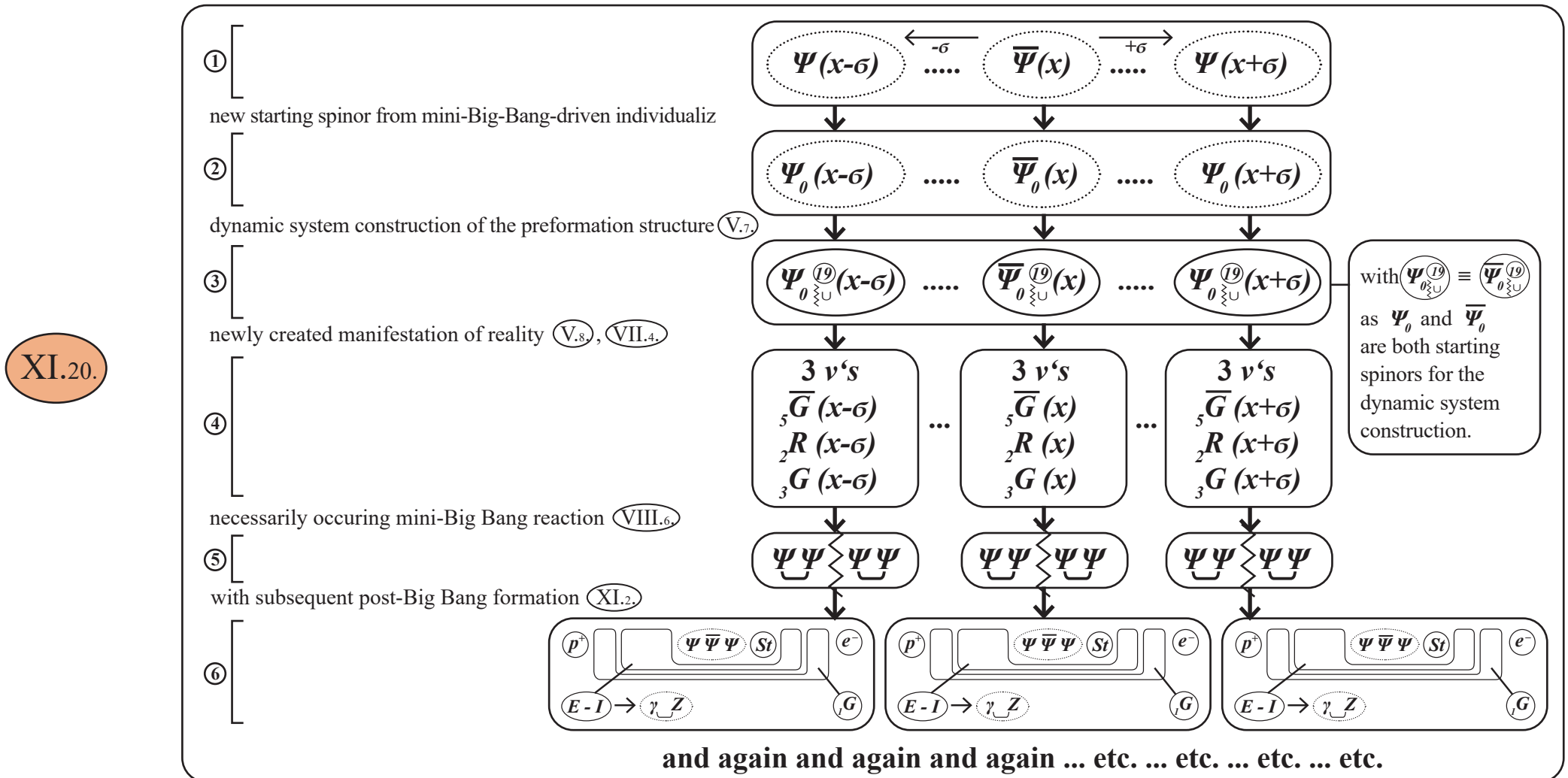
Thus: If Ψ_0 is the starting spinor, a $(\Psi_{0\frac{19}{\sum U}})$ -system is constructed.

If $\bar{\Psi}_0$ is the starting spinor, a $(\bar{\Psi}_{0\frac{19}{\sum U}})$ -system is constructed.

Both systems $(\Psi_{0\frac{19}{\sum U}})$ and $(\bar{\Psi}_{0\frac{19}{\sum U}})$ are constructed absolutely identically (with identical steps, as described in (I.) to (X.)) and are therefore identically structured, and hence physically identical.

The only thing that matters is that the starting spinor – either Ψ_0 or $\bar{\Psi}_0$ – is “individualized” in its starting position (XI.16.), thus acting as a dynamic starting spinor, i.e. that the starting spinor – either Ψ_0 or $\bar{\Psi}_0$ – caused by the corresponding individual mini-Big Bang $(\begin{smallmatrix} \leftarrow & \rightarrow \\ -\sigma & +\sigma \end{smallmatrix})$ (XI.10.) is “individualized” (XI.15.) within the central rupture region (XI.7.) and therefore necessarily (as described in (I.) to (X.)) generates a new dynamic system $(\Psi_{0\frac{19}{\sum U}})$, which forms a new (VII.4.)-system and hence necessarily generates a new instance of the Big Ban (VIII.6.), etc., etc., etc., ..., thus constructing the cascade (XI.23.).

Thus: Each “mini-Big-Bang-driven” individualized spinor at the central rupture region **XI.7.** in the central **(3-spinor rupture block)** (central neutrino **XI.10.**), regardless of whether it was originally a (Ψ) -spinor or a $(\bar{\Psi})$ -spinor, becomes the starting spinor (Ψ_0) of a new $(\Psi_0^{(19)})$ -system and therefore a new **(primordial force-matter set)** **VII.4.**, with the following process structure:

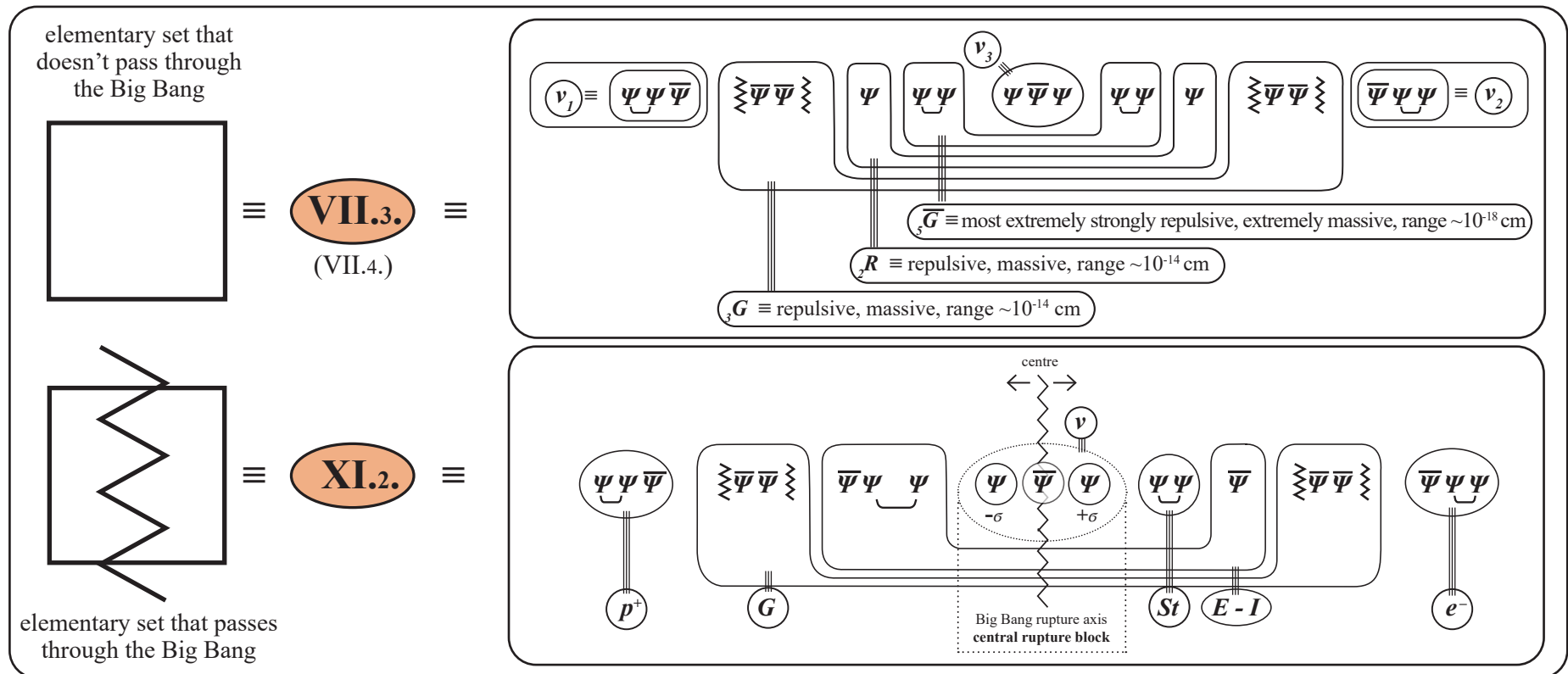


XI.21.

During this chain reaction process and the resulting reproduction cascade, the Pauli principle is not violated, since every mini-Big Bang process creates a point split $(\sigma \neq 0)$ by means of which the individualization process and next iteration of production occurs. This most colossal reproductive construction **XI.20.** and most colossal quantity of $(\sigma_v \neq 0)$ ($v = 1 \dots$ to some most colossal number) thus created leads to the construction of the Universe within the Big Bang reaction space.

We introduce the following symbolic notation in order to more easily represent the processes and structures involved in the chain reaction process of this most colossal reproduction cascade:

XI.22.

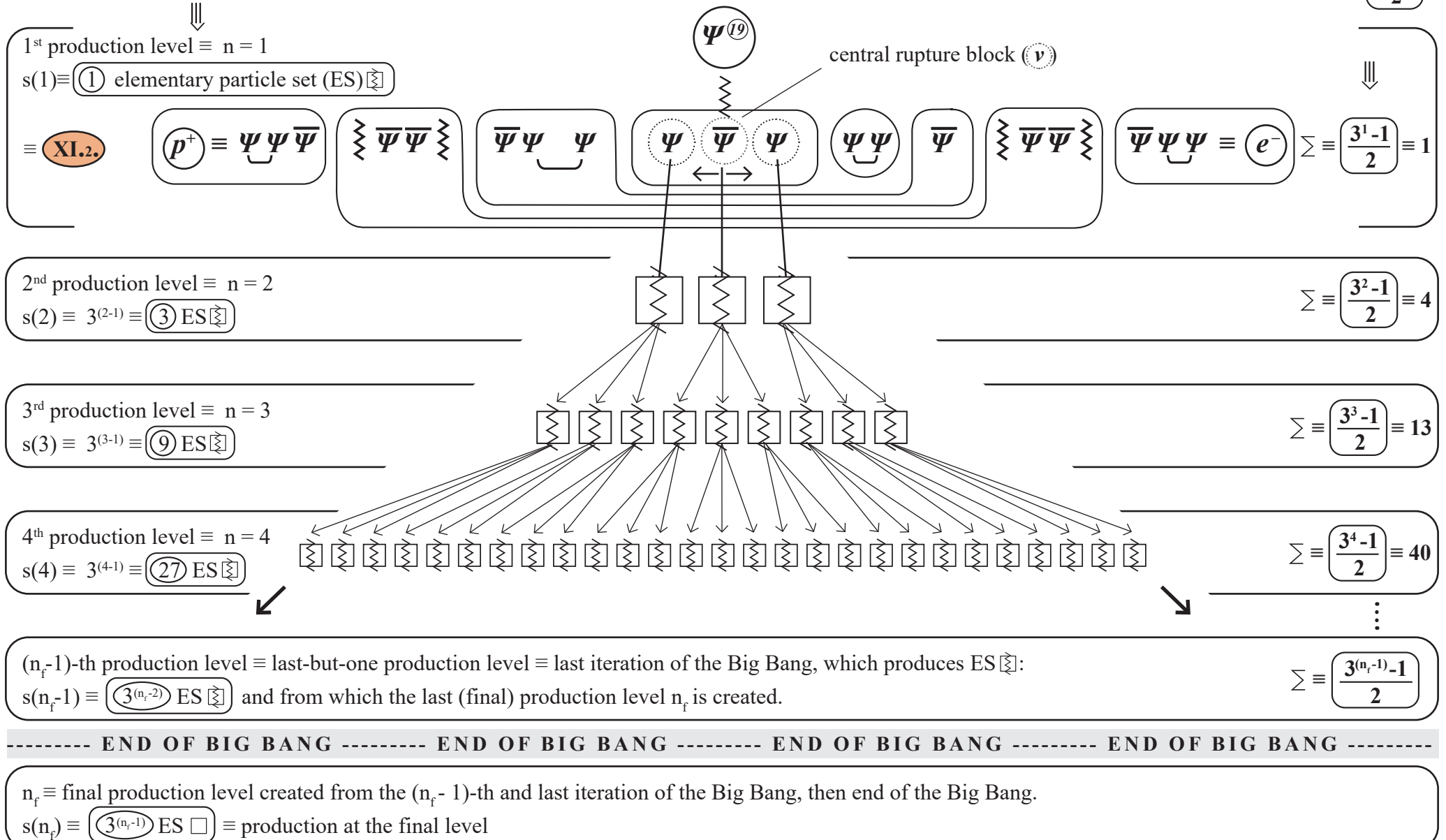


Big Bang Production Cascade

XI.23.

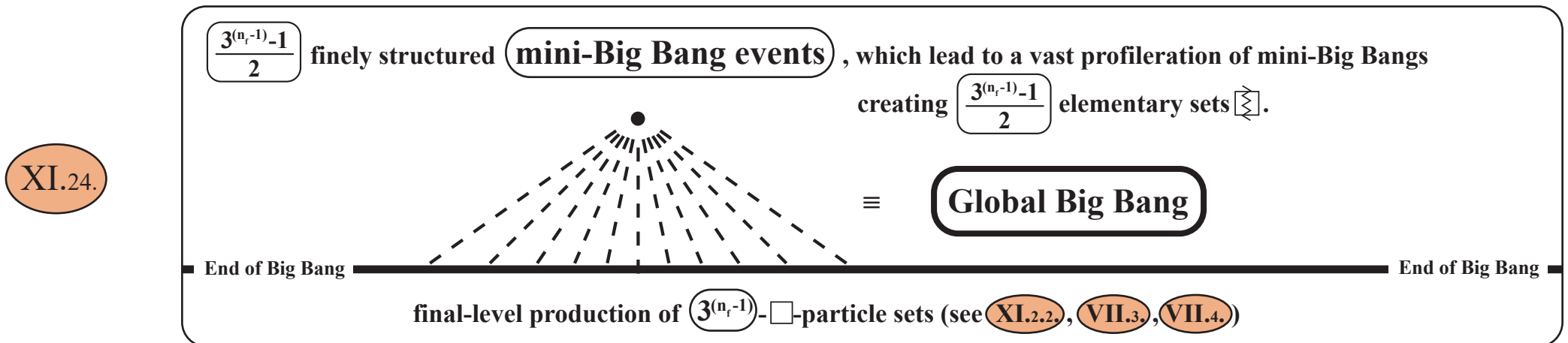
n-th production level, elementary sets produced: $s(n) \equiv 3^{n-1}$

number of elementary particle sets produced so far $\sum \equiv \frac{3^n - 1}{2}$



As shown in **XI.23.**, in an ever-intensifying reproduction, the **(1st elementary particle set)** \equiv **(prototype)** \equiv **(p^+ , G , $E-I$, ν , St , e^-)** (see **VIII.**) \equiv **(1st production level)** forms into 3 new elementary particle sets as described in Chapters **I.** to **X.** due to **(the fragile)** rupture-susceptible central neutrino $\nu \equiv$ **(Ψ $\bar{\Psi}$ Ψ)** (**XI.6.**) contained in this 1st elementary particle set and the **(reproduction machinery)** (**XI.13.**) associated with it. Each of these **(3 new elementary particle sets)** then unavoidably **(trigger 3 mini-Big Bang events)** (as described in Chapter **VIII.**), each of which in turns leads to the **(next production of 3 new elementary particle sets)**, etc.

This builds up the reproduction cascade shown in **XI.23.**, each **(reproduction process)** triggering a **(corresponding mini-Big Bang)**, in such a way that this most colossal reproduction process leads to the creation of $\frac{3^{(n_r-1)}-1}{2}$ - elementary sets \boxtimes , as well as the additional creation of $3^{(n_r-1)}$ \square -particles, i.e. particles that do not pass through the Big Bang process, remaining preserved in the original **(primordial matter structure \square)** (**XI.22.**, **VII.3.**) to form the “substance of force-matter”, commonly known as “Dark Matter”.



Thus, this construction structure of the (Big Bang cascade (\equiv production cascade) **XI.23.**), which created the Entire Universe around 13.8 billion years ago – probably in the tiniest fraction of a second (the first ever second) – tells us the structural composition of the Universe: Directly after the Big Bang, as a result of the Big Bang production cascade **XI.23.**, the composition of the Entire Universe satisfies the following (composition mix relation **R**):

XI.25.

$$\mathbf{R} \equiv \frac{\text{Component ①} \quad \text{The production set of the } (3^{(n_r-1)})\text{-}\square\text{-elementary sets (VII.4.)} \equiv \text{„Dark Matter“ created in the (final production level } n_f\text{)}}{\text{Component ②} \quad \text{The sum of all } \frac{3^{(n_r-1)}-1}{2}\text{-}\bowtie\text{-elementary sets (XI.2.)} \equiv \text{„Normal Matter/Antimatter“ that pass through the Big Bang}}$$

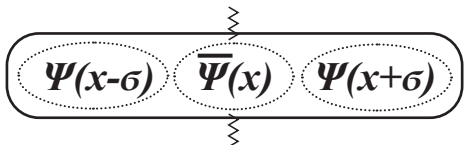
$$\Downarrow$$

$$\mathbf{R} \equiv \frac{(3^{(n_r-1)})\text{-}\square\text{-sets (XI.23., VII.4.)}}{\frac{3^{(n_r-1)}-1}{2}\text{-}\bowtie\text{-sets (XI.23., XI.2.)}} \equiv \frac{(3^{(n_r-1)})}{\frac{3^{(n_r-1)}-1}{2}} \equiv 2 \frac{(3^{(n_r-1)})}{(3^{(n_r-1)}-1)}$$

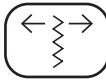

$$\mathbf{R} \equiv (2), \text{ for } n \gg 1$$

When we analyse the Big Bang reproduction cascade (XI.23.), we see that the creation and construction process of the Entire Universe, including both Dark Matter and Normal Matter, developed from the

central rupture block $(\nu) \equiv$ .

This central rupture block (ν) is namely the central neutrino $(\nu) \equiv$  (see XI.2. - XI.3.)
made fragile by the rupture process of ${}_5\overline{G}$ (see VIII.3. - VIII.8.).

Thus: Due to the nature of the creation process of the Universe (XI.23.), the central neutrino $(\nu) \equiv \Psi \overline{\Psi} \Psi$ exist:

- both in the Normal Matter part ($33.3\% \equiv \frac{1}{3} \equiv$ sum of of production levels $\sum (1 \text{ to } n_f)$), namely in the form of the fragile central neutrino (ν) (XI.3.) reconstructed by the Big Bang process (VIII.6.), along the central Big Bang rupture axis  by (VIII.10.), (XI.2.), (XI.3.):
- and in the Dark Matter part ($66.6\% \equiv \frac{2}{3} \equiv$ final production level n_f in (XI.23.), in the form of the central neutrino elementary particle, untouched by the Big Bang process  (rupture process of ${}_5\overline{G}$ (VIII.6.)).

It is worth noting that, as it happens, the creation process of the Entire Universe **XI.23.** developed from the simplest of all elementary fermions, namely the massless 1-split central neutrino $\nu \equiv \Psi \bar{\Psi} \Psi_{(\varepsilon_l)}$ (see the central rupture block ν in the Big Bang production cascade **XI.23.**).

This central neutrino $\nu \equiv \Psi \bar{\Psi} \Psi$ is furthermore:

- The only elementary particle that belongs to both Dark Matter and Normal Matter.
- The only elementary fermion that is inner-structurally symmetric:

$$\nu \equiv \Psi \bar{\Psi} \Psi \text{ (1 split)}, \text{ by contrast with } p^+ \equiv \Psi \Psi \bar{\Psi} \text{ (4 split)}, e^- \equiv \bar{\Psi} \Psi \Psi \text{ (3 split)},$$

$${}_2\nu_1 \equiv \Psi \Psi \bar{\Psi} \text{ (2 split)}, {}_2\nu_2 \equiv \bar{\Psi} \Psi \Psi \text{ (2 split)}; \text{ (see list of components XI.36.)}.$$

- The one and only elementary particle that is directly created by the fundamental dynamic **I.1.** $\equiv D \Psi \equiv \Psi \bar{\Psi} \Psi$ see the construction process **I.12.**, with $D_5 \Psi(x) = \lim_{\varepsilon_l \rightarrow 0} (\Psi(x-\varepsilon_l) \bar{\Psi}(x) \Psi(x+\varepsilon_l))$.

Thus, it holds that

The Entire Universe created in the Big Bang production process **XI.23.** consists of precisely **(2) components** directly after the Big Bang, i.e. when it is “newly born”:

XI.26.

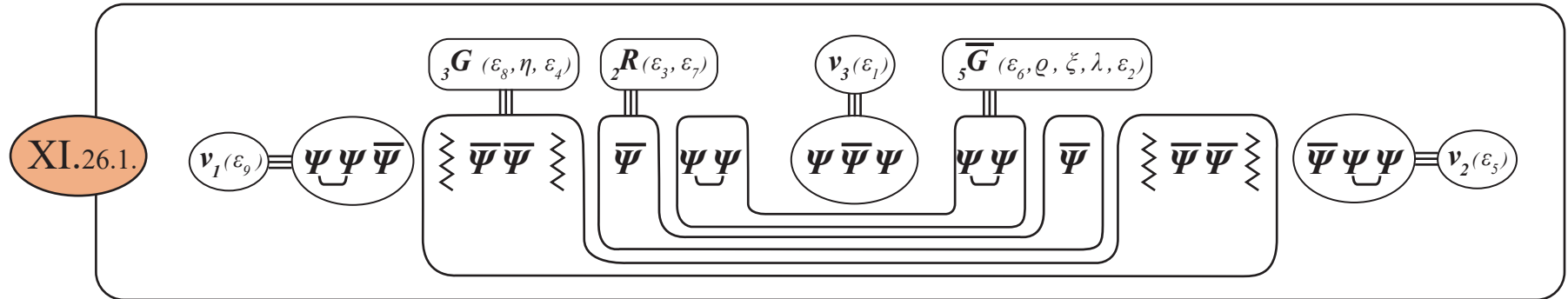
Component (1) \equiv **(66.6 %)** \equiv **($\frac{2}{3}$)** \equiv **($3^{(n_f-1)}$ \square -sets)**, with \square as in **VII.4.**, **XI.22.** \equiv **„Dark Matter“**,

i.e. the \square -elementary sets that do not pass through the Big Bang rupture process **VIII.6.** at the end of the production process, but are created in the final production level (n_f) (**XI.23.**) after the Big Bang reaction space (**XI.23.**) reaches production capacity and becomes full. Directly after the Big Bang, this **(66.6%)** of the Universe, which consists of \square -sets, corresponds to the components of the Universe more commonly known as “Dark Matter”. In 2013, the Planck space telescope (Planck Surveyor) found, based on its measurements, consistently with similar previous results such as COBE and WMAP, that the “Dark Matter” proportion of the Universe around 380,000 years after the Big Bang, i.e. “shortly after the Big Bang”, was roughly 63%, which matches almost exactly the **($\frac{2}{3} \equiv 66.6\%$ -Component (1))** that the present theoretical approach predicts must necessarily exist directly after the Big Bang, as a consequence of the Big Bang production process **XI.23.**

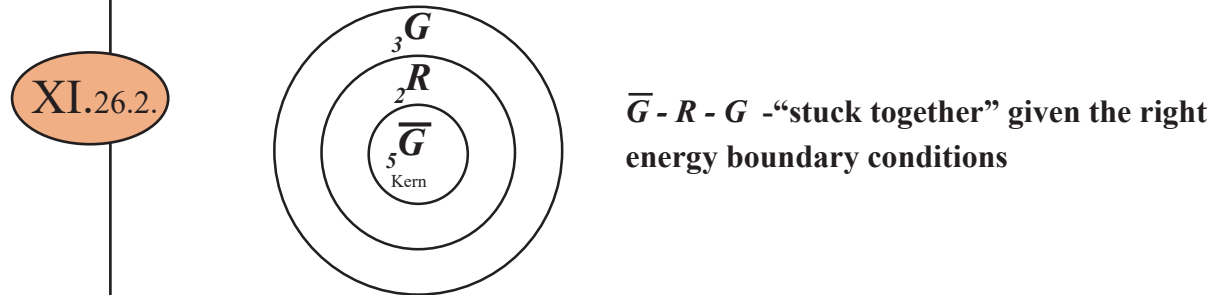
We currently do not have any experimental knowledge of the physical composition of “Dark Matter”, but we are searching for it.

According to the theoretical approach presented here, “Dark Matter” consists of “ \square -particles”, i.e. the particles whose inner-structural composition and physical properties are analysed in detail in **VII.3.**, **VII.4.**, namely ...

... namely the \square -particles (**XI.22.**, **XI.23.**, **VII.4.**, **VII.6.**), i.e. the $(\nu_1, \nu_2, \nu_3, {}_5\overline{G}, {}_2R, {}_3G)$ -particles:



Given certain energy boundary conditions, in accordance with the structural composition of **XI.26.1.**, the bosons ${}_5\overline{G}$, ${}_2R$, ${}_3G$ can “stick together”, which can be represented in the form of the following structure-layer model:



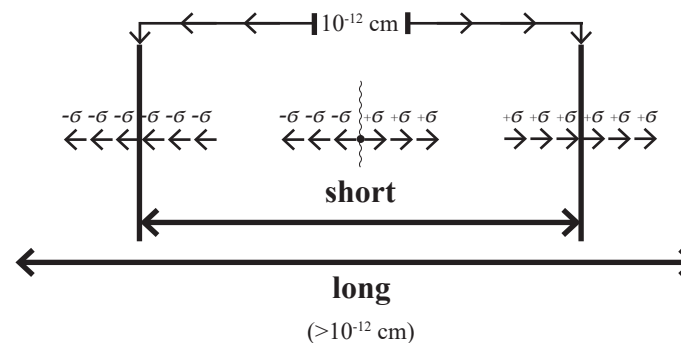
XI.26.

The \square -particles (see VII.4.) (i.e. “Dark Matter”) thus satisfy the property that, given the right energy boundary conditions, they can form structurally layered “clumps” as shown in XI.26.2., where the inner-most region (\equiv nucleus) consists of

(\overline{G}_5) -bosons (\equiv most extremely repulsive, extremely massive, extremely short-range ($\sim 10^{-18}$ cm)), „surrounded by“
 (G_3) -bosons (\equiv attractive, massive, short-range ($\sim 10^{-14}$ cm)) and
 (R_2) -bosons (\equiv repulsive, massive, range ($\sim 10^{-14}$ cm)) (see XI.22., VII.3.).

The \square -particles of Component ① are created in the production level (n_f) of the reproduction cascade XI.23., i.e. at the end of the Big Bang and reproduction cascade, once the Big Bang reaction space has already been packed full by the most colossal overall production set, and therefore enlarged (\equiv extended \equiv expanded) by the (total set of $(\sigma_n \neq 0)$ splits, $n = 1 \dots n_f$) created by every individual reproduction process, i.e. once the expansion of space-time had already begun:

XI.26.3.



XI.26.

Thus, once the (short-range structure) of the Big Bang reaction space ($< 10^{-12}$ cm) with its exclusively short-range bosons ${}_5\overline{G}$, ${}_2R$, ${}_3G$ created to full capacity by the individual Big Bang events

$(\sigma_v \neq 0)$, $\sum v \equiv \frac{3^{(n_r-1)}-1}{2}$, a (long-range structure ($> 10^{-12}$ cm)) is created, and the following happens:

Between the two other bosons produced in the final level (n_f) – other than ${}_5\overline{G}$ – (see XI.23.), which are namely $({}_2R) \equiv (\overline{\Psi} \overline{\Psi}_{(\varepsilon_3, \varepsilon_7)})$ and $({}_3G) \equiv (\overline{\Psi} \overline{\Psi} \overline{\Psi} \overline{\Psi}_{(\varepsilon_8, \eta, \varepsilon_4)})$, the inner point split distribution shifts.

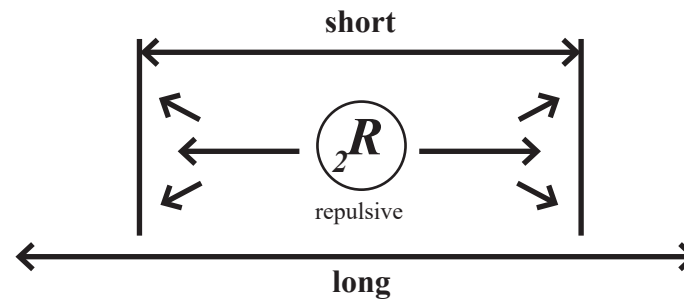
This is made possible by the original distribution of the point splits $(\varepsilon_3, \varepsilon_7)$ in the preformation structure

V.7., and is caused by the repulsion force exerted by the massive and therefore short-range 2-split

boson $({}_2R \equiv \overline{\Psi} \overline{\Psi}_{(\varepsilon_3, \varepsilon_7)})$ by means of the following process: The repulsion force of the massive

$({}_2R)$ - (2-split) boson initiates an expansion process:

XI.26.4.



XI.26.

Since the two point splits $(\varepsilon_3, \varepsilon_7)$ of the $\textcircled{2}R \equiv \overline{\Psi} \Psi_{(\varepsilon_3, \varepsilon_7)}$ -boson are not originally bound to $\textcircled{2}R$ by the underlying preformation structure **V.7.** – unlike the exclusive $\textcircled{(\varepsilon_2, \varepsilon_6)}$ -binding to $\textcircled{5\overline{G}}$ that necessarily led to the rupture of $\textcircled{5\overline{G}}$ (see **VIII.6.**) – the intrinsic repulsion process of $\textcircled{2}R_{(\varepsilon_3, \varepsilon_7)}$ triggers the following point-split-shifting process between the bosons $\textcircled{2}R$ and $\textcircled{3}G$ by transferring the $\textcircled{(\varepsilon_3, \varepsilon_7)}$ -splits

XI.26.5.

$$\textcircled{5\overline{G}} \equiv \textcircled{\Psi \Psi \Psi \Psi_{(\varepsilon_6, \varrho, \xi, \lambda, \varepsilon_2)}} \text{ remains unchanged}$$

$$\textcircled{2}R \equiv \textcircled{\overline{\Psi} \Psi_{(\varepsilon_3, \varepsilon_7)}} \equiv \textcircled{2\text{-split object}} \equiv \text{massive} \equiv \text{short-range}$$

$$\longrightarrow \textcircled{0}R \equiv \textcircled{\overline{\Psi} \Psi_{(0\text{-Split})}} \equiv \textcircled{0\text{-split object}} \equiv \text{massless} \equiv \text{long-range}$$

$$\textcircled{3}G \equiv \textcircled{\Xi \overline{\Psi} \Psi \Xi \overline{\Psi} \Psi_{(\varepsilon_8, \eta, \varepsilon_4)}} \equiv \textcircled{3\text{-split object}}$$

$$\longrightarrow \textcircled{5}G \equiv \textcircled{\Xi \overline{\Psi} \Psi \Xi \overline{\Psi} \Psi_{(\varepsilon_8, \varepsilon_7, \eta, \varepsilon_3, \varepsilon_4)}} \equiv \textcircled{5\text{-split object}}$$

XI.26.

XI.26.6.

Thus: The \square -particles produced at the end of the Big Bang **XI.23.** (\equiv “Dark Matter” \equiv 66.6% of the Entire Universe) take the form of the following 3 bosons after this $(\varepsilon_3, \varepsilon_7)$ -shift:

$${}_5\overline{G} \equiv \underbrace{\Psi \Psi}_{\underbrace{\quad}} \underbrace{\Psi \Psi}_{\underbrace{\quad}} \equiv \text{most extremely strong repulsion force} \equiv \text{anti-gravitational force, extremely massive, most extremely short-range (10}^{-18} \text{ cm range)}$$

$${}_0R \equiv \overline{\Psi} \overline{\Psi} \equiv \text{massless, long-range, medium-strength repulsion force}$$

$${}_5G \equiv \underbrace{\underbrace{\overline{\Psi} \overline{\Psi}}_{\underbrace{\quad}} \underbrace{\overline{\Psi} \overline{\Psi}}_{\underbrace{\quad}}}_{\underbrace{\quad}} \equiv \text{extremely weak attraction force} \equiv \text{gravitational force, highly massive, extremely short-range (10}^{-16} \text{ cm range)}$$

as well as the following 3 fermions:

+ 3 types of massless **1-split** neutrino with different inner-structural compositions:

$$\nu_1 \equiv \underbrace{\Psi \Psi}_{\underbrace{\quad}} \overline{\Psi} \underbrace{(\varepsilon_9)}_{\underbrace{\quad}} \equiv {}_1(\nu_1), \quad \nu_2 \equiv \overline{\Psi} \underbrace{\Psi \Psi}_{\underbrace{\quad}} \underbrace{(\varepsilon_5)}_{\underbrace{\quad}} \equiv {}_1(\nu_2), \quad \nu_3 \equiv \underbrace{\Psi \overline{\Psi}}_{\underbrace{\quad}} \Psi \underbrace{(\varepsilon_1)}_{\underbrace{\quad}} \equiv {}_1(\nu_3)$$

or, written in closed form:

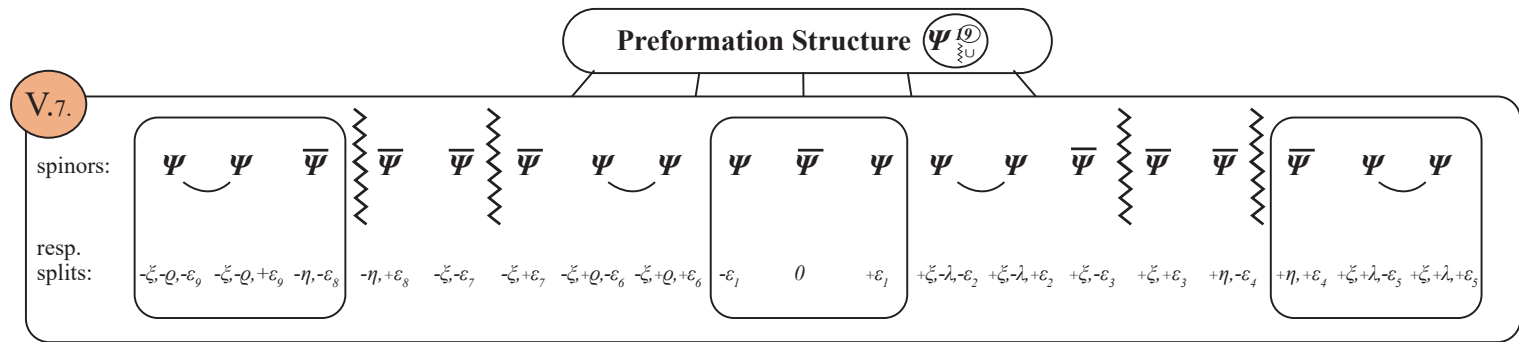
The \square -particles produced at the end of the Big Bang cascade **XI.23.** are:

$$\text{XI.26.6.1.} \quad {}_5\overline{G} + {}_0R + {}_5G + {}_1(\nu_1) + {}_1(\nu_2) + {}_1(\nu_3)$$

XI.26.

XI.26.6.

Now, by **VI.3.5.**, particles with more than 4 point splits are fragile because of their excessive split density, i.e. cannot exist as “stable” elementary particles. This principle now applies to $\overline{({}_5G)}$ and $({}_5G)$. Consequently, in the particle formation process at the end of the Big Bang cascade **XI.23.**, i.e. in the final level n_f , during which the \square -particles $\equiv \overline{({}_5G)} + ({}_0R) + ({}_5G) + ({}_1\nu_1) + ({}_1\nu_2) + ({}_1\nu_3)$ (see **XI.26.6.1.**) are created as “open raw material”, ultimately caused by the preformation structure **V.7.** which underlies everything and its dynamically constructed and therefore interrelated point split structure:

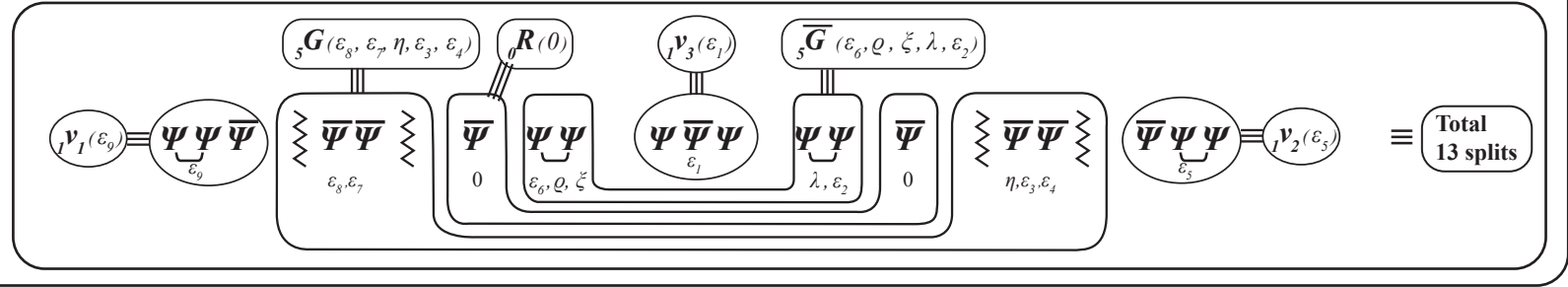


there unfolds the following \square -particle stabilization and closing process :

XI.26.

XI.26.6.

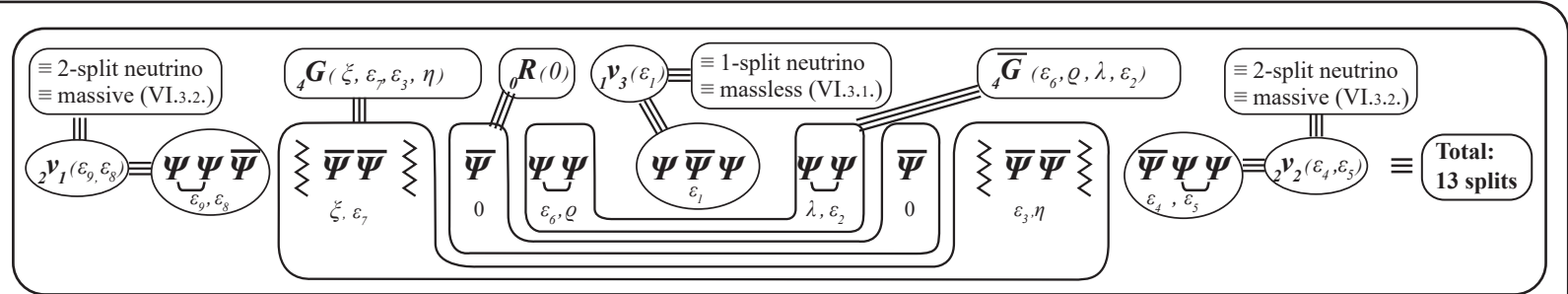
□-Particle Formation Process (“Dark Matter”) at the End of the Big Bang Cascade
(Point Split Stabilization Process)



point split stabilization process

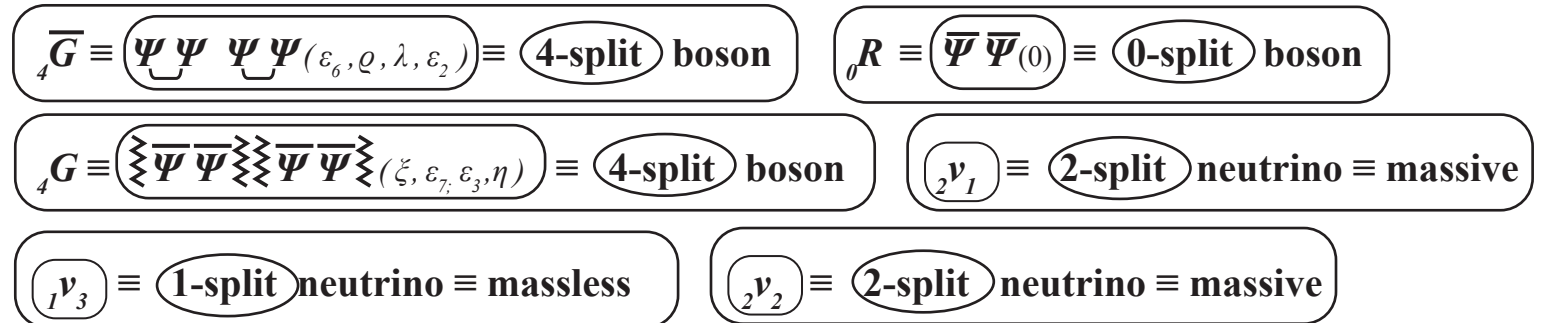


≡ particle stabilization process



XI.26.7.

Thus: The stable, finalized □-particles (≡ “Dark Matter” particles ≡ 66.6% of the Entire Universe) created at the end of the particle formation process of the Big Bang reproduction cascade XI.23. have the following inner-structural particle composition:



XI.26.

XI.26.7.

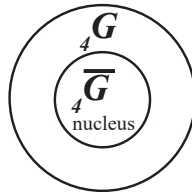
Thus: The Component ① \equiv 66.6% of the Entire Universe (directly after the Big Bang) \equiv “Dark Matter” consists of the 3 force bosons **XI.26.**:

- $\textcircled{4}\overline{G} \equiv \textcircled{\text{cross}} \equiv$ highly massive and correspondingly short-ranged at around 10^{-17} cm, most extremely strongly repulsive-acting bosons
- $\textcircled{4}G \equiv \textcircled{\text{star}} \equiv$ massive and correspondingly short-ranged at around 10^{-15} cm, most extremely weakly attractive-acting bosons
- $\textcircled{0}R_0 \equiv \text{XI.26.6.} \equiv$ massless and therefore long-ranged, medium-strength repulsive-acting bosons

as well as the 3 types of neutrino with different inner structures*:

- $\textcircled{2}\nu_1 \equiv \textcircled{\psi\psi\overline{\psi}}_{(\varepsilon_9, \varepsilon_8)} \equiv \textcircled{2\text{-split}} \text{ neutrino} \stackrel{\text{VI.3.2.}}{\equiv} \text{mass} \neq 0 \equiv \text{massive neutrino}$
- $\textcircled{2}\nu_2 \equiv \textcircled{\overline{\psi}\psi\psi}_{(\varepsilon_4, \varepsilon_5)} \equiv \textcircled{2\text{-split}} \text{ neutrino} \stackrel{\text{VI.3.2.}}{\equiv} \text{mass} \neq 0 \equiv \text{massive neutrino}$
- $\textcircled{1}\nu_3 \equiv \textcircled{\psi\overline{\psi}\psi}_{(\varepsilon_1)} \equiv \textcircled{1\text{-split}} \text{ neutrino} \stackrel{\text{VI.3.1.}}{\equiv} \text{mass} = 0 \equiv \text{massless neutrino}$

This implies that, given the right energy boundary conditions, the massive “Dark Matter” particles $\textcircled{4}\overline{G}$ and $\textcircled{4}G$ form the following layered clumps:



* This (the existence of massive neutrinos) is consistent with the conclusions of the work by Takaaki Kajiba and Arthur McDonald (Nobel prize 2015).

XI.26.

This is the matter distribution of **Component ①** \equiv “Dark Matter” \equiv 66.6% of the Universe directly after the Big Bang, in the early stages of the Universe around 13.8 billion years ago. If we momentarily disregard the differences in coherence structure between the internal basis spinors Ψ and $\bar{\Psi}$ of each particle, namely $\textcircled{G} \equiv$ „ $\sqcup \sqcup$ “ and $\textcircled{G} \equiv$ „ XXXXXX “, the “Dark Matter” particles ${}_4\bar{G} \equiv \textcircled{\Psi \Psi \Psi \Psi}$ and ${}_4G \equiv \textcircled{\bar{\Psi} \bar{\Psi} \bar{\Psi} \bar{\Psi}}$ act as $\textcircled{G} \equiv \Psi \Psi \Psi \Psi$ and $\textcircled{G} \equiv \bar{\Psi} \bar{\Psi} \bar{\Psi} \bar{\Psi}$ -particles, i.e. as a partially structured “particle-antiparticle” pair (**V.6.**), with different **mass and force magnitude** structures due to their different inner coherence structures (**VIII.5.**).

Hence, the “Dark Matter” particles ${}_4G$ and ${}_4\bar{G}$ will not undergo the “rapid” direct annihilation processes that occur with “Normal Matter”, e.g. in the case of $e^+ e^-$ -annihilation, where both e^+ and e^- have the same mass and therefore the same physical properties, only differing in their charges \oplus and \ominus .

The features of these annihilation processes of “Normal Matter” ($e^+ e^- ; p^+ p^-$) are analysed in detail in a later section **XI.29.**

Thus: The dominant “Dark Matter” elementary particle is, by **XI.26.7.**, the most extremely repulsive-acting, highly massive (i.e. short-range, with a range of $\sim 10^{-17}$ cm) stable anti-gravitational force boson ${}_4\bar{G} \equiv \textcircled{\Psi \Psi \Psi \Psi}$.

XI.26.

From the “Planck space telescope measurements”, we know the change over time in the composition of the Universe:

„Today“ (13.8 billions years after Big Bang)

Dark Matter proportion $\equiv 27\%$

Dark Energy proportion $\equiv 68\%$

compared to

380,000 years after the Big Bang \equiv early stages

Dark Matter proportion $\equiv 63\%$ Dark

Energy proportion $\equiv 0\%$

In the meantime, during which the Universe expanded, there must therefore have been processes that transform **Dark Matter \rightarrow Dark Energy** and something else:

“Dark Matter” is destroyed and

“Dark Energy” is created.

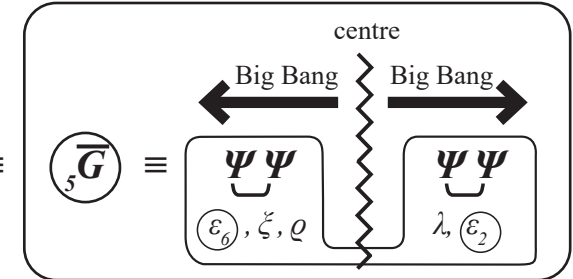
How these transformation processes unfolded in the meantime; what the underlying transformation structure of **“Dark Matter” \rightarrow “Dark Energy”** is; how “Dark Energy” is constructed and what the inner composition structure of “Dark Energy” actually is; whether there are different sub-structures of “Dark Energy”; and what fundamental process associated with “Dark Energy” drives the accelerating expansion of the Universe; all of these questions are analysed in Chapter **XII.**

But first, we shall analyse **Component ②** of the Earliest Universe (see **XI.25.**):

XI.27.

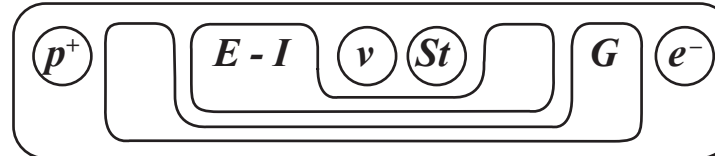
Component ② = 33.3 % = $\frac{1}{3}$ of the Entire Universe = $\frac{3^{(n_f-1)}-1}{2}$ \boxtimes -sets ; with \boxtimes see XI.2.,

i.e. the elementary sets \boxtimes , that passed through the Big Bang process VIII.6. =



Due to the most colossal quantity of $({}_5\overline{G})$ -particles that are produced and which rupture within the most colossally dense Big Bang reaction space during production levels (1 to n_f-1), by XI.22., a smaller subset of these rupture processes do not result in an elementary particle in the form of the $\Psi\Psi(\lambda, \varepsilon_2)$ fragment (right-hand side of $({}_5\overline{G}) \equiv \text{VIII.6.}$) – as described in Chapter VIII. (VIII.6., VIII.10.) and XI.2. – which namely survives as the strong boson $(St) \equiv \Psi\Psi(\varepsilon_6, \rho)$ and therefore, as described in Chapters VIII., IX., leads to the construction of

the elementary set IX.1.



in subsequent processes, as $(E - I)$ partially decomposes into (γ_Z) (see Chapter IX.).

Instead, the identically structured $\Psi\Psi(\varepsilon_6, \rho, \zeta)$ -fragment (left side of $({}_5\overline{G}) \equiv \text{VIII.6.}$) forms into the strong boson (St) as $\Psi\Psi(\varepsilon_6, \rho) \equiv (St)$ after being forced by the Big Bang to transfer an ξ -split.

XI.27.

Thus, by VIII.8., after the rupture VIII.6., the 2-split object- $\Psi\Psi(\lambda, \varepsilon_2)$ survives by default, by the minimality principle I.0.3., because it is the “simpler object”, thus forming into the strong interaction boson (St) as a $\Psi\Psi(2 \text{ split})$ boson, which then, as described in detail in Chapters VII. and IX., leads to the construction of the “normal”

$$\text{matter elementary set} \equiv \left(p^+ \left[\left(E - I \right) \left(\nu \right) \left(St \right) \right] G \right) e^-, \text{ with } (E - I) \rightarrow \gamma Z$$

which is exactly what we usually call “matter”. In the majority of the most colossal number of individual Big Bang events, this is what happens. However, simultaneously, in a smaller proportion of these processes, due to the most colossal quantity of $(\bar{5}G)$ -particles VIII.6. that are produced and which then rupture within the most colossally dense Big Bang reaction space XI.23., it is the 3-split- $\Psi\Psi(\varepsilon_6, \varrho, \xi)$ -fragment that instead survives in the form of the 2-split- $\Psi\Psi(\varepsilon_6, \varrho)$ -object, after being forced to transfer its $(\xi\text{-split})$ by the Big Bang, making it structurally identical to the strong boson $(St) \equiv \Psi\Psi(\varepsilon_6, \varrho)$ while integrating the $\Psi\Psi(\lambda, \varepsilon_2)$ -fragment into an $(E - I)(\varepsilon_2, \varepsilon_7)$ -formation and absorbing the split into a $(p^-(\eta, \varepsilon_4, \lambda, \varepsilon_5))$ -formation.

Then, in a series of phases completely analogous to those described in Chapter IX., the “normal”

$$\text{antimatter elementary set} \equiv \left(e^+ \left[\left(St \right) \left(\nu \right) \left(E - I \right) \right] G \right) p^-, \text{ with } (E - I) \rightarrow \gamma Z$$

is formed. This explains the creation of Antimatter.

XI.28.

Regarding the probability of each process within the most colossal quantity of individual Big Bang events,

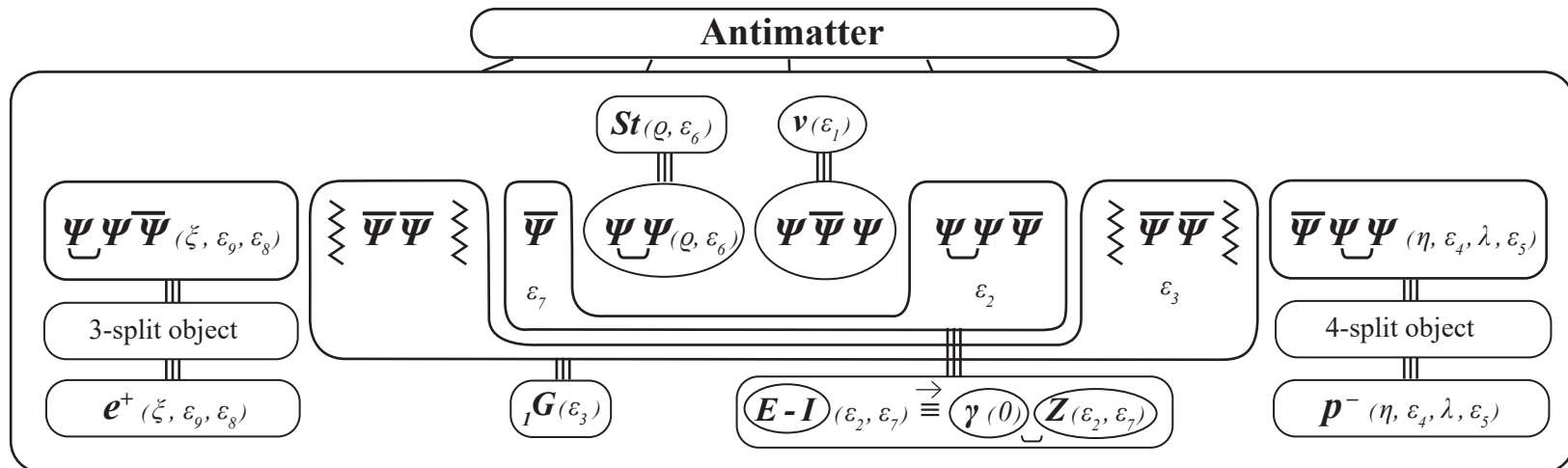
the construction of matter, i.e. $(St) \equiv \Psi\Psi(\lambda, \varepsilon_2)$ -formation and

the subsequently triggered processes leading to (p^+) , $(E - I) \equiv \gamma Z$, (ν) , (St) , (G) , (e^-) -set formation

is more common, since it proceeds from a simpler fragment of the Big Bang process **VIII.6.** than

the construction of antimatter, i.e. the formation of $(St) \equiv \Psi\Psi(\varrho, \varepsilon_6)$, triggered by the Big Bang, which originates from the more complex rupture fragment $\Psi\Psi(\varepsilon_6, \varrho, \xi)$ of the Big Bang process **VIII.6.** - when the ξ -split is repulsed by the Big Bang – and then automatically forms the

(elementary set of antimatter). The full details of the (inner-structural point split composition of antimatter) are as follows:

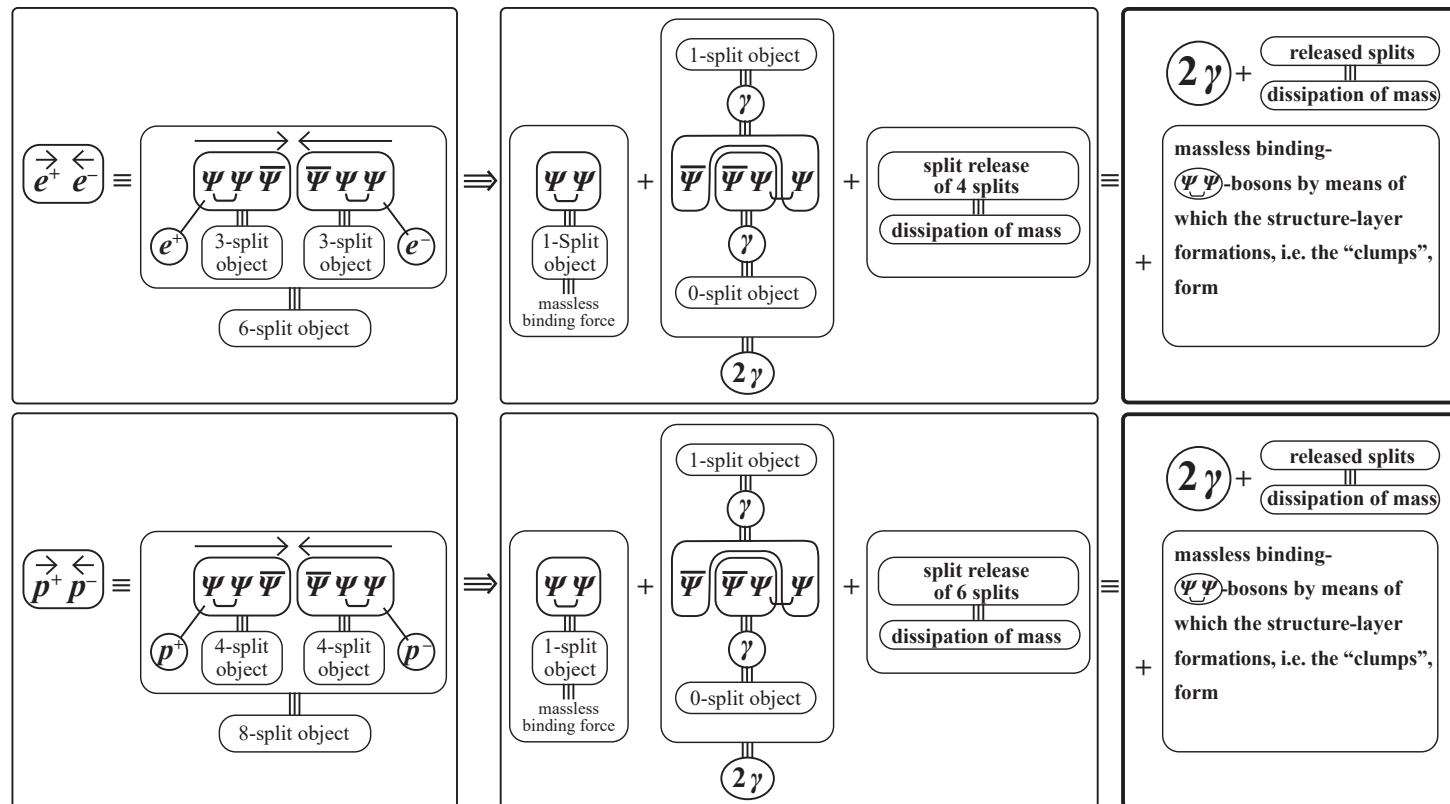


Consequently: After the Big Bang, from the **33.3 %-[Σ]-Component ②** (**XI.27.**)

- the **larger set** forms into **matter (matter atoms)** $\equiv (p^+, G, E-I, \nu, St, e^-; \text{mit } E-I \rightarrow \gamma Z)$
- the **smaller set** forms into **antimatter (antimatter atoms)** $\equiv (e^+, G, St, \nu, E-I, p^-; \text{mit } E-I \rightarrow \gamma Z)$

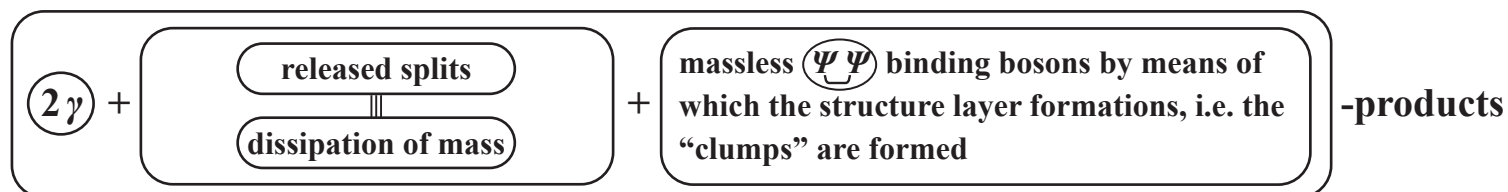
And: The **matter-antimatter** pairs, namely $(\vec{e}^+ \overleftarrow{e}^-)$ and $(\vec{p}^+ \overleftarrow{p}^-)$ create the well-known “annihilation processes”:

XI.29.



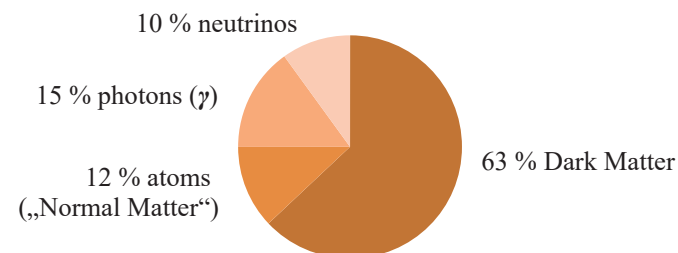
XI.30.

Thus: Directly after the Big Bang, i.e. when “matter” and “antimatter” form (totalling 33.3% of the Universe directly after the Big Bang XI.27.), with quantitatively more matter than antimatter, by XI.29., the annihilation processes described in XI.29. necessarily occur. However, since the proportion of matter is greater than the proportion of antimatter, the antimatter is completely destroyed by the annihilation processes and only matter remains, together with the annihilation end products. According to the so-called “Planck measurements” (“Planck” space telescope), 380,000 years after the Big Bang – in other words shortly after the Big Bang – the proportion of matter (atoms) in the Universe was around 12%, i.e. 21% of the initial Universe must therefore represent annihilation end products from matter-antimatter annihilation (see XI.29.):



From the Planck data (as well as the COBE and WMAP data), we know the following facts about the composition of the Universe “shortly” (~380,000 years) after the Big Bang

Planck measurements (Planck Published Papers, 21/03/2013)



XI.31.

Thus: These “Planck” measurements are essentially consistent with the “model” results of the theoretical approach presented in this work (see XI.23.),

namely the composition mix $\text{Component } ① \equiv \text{XI.26.} + \text{Component } ② \equiv \text{XI.27.}$ with:

Component ① $\equiv 66.6\%$ \equiv “Dark Matter” $\equiv \square$ -particles, see VII.4., XI.22., XI.36.

Component ② $\equiv 33.3\%$ \equiv Matter/Antimatter $\equiv \boxtimes$ -particles, see X.1., XI.22., XI.27., XI.29., XI.30.,

where the proportion of matter is greater than the proportion of antimatter (see XI.29.), so that, after the matter-antimatter annihilation processes XI.30., the remaining fraction of matter of 12% “survives”, and the rest of this Component ②, corresponding to a proportion of 21% of the initial Universe, is given by the end products of the annihilation process, which by XI.30. are:

$\gamma \equiv \text{photons} \equiv 15\% + \text{split release products} + \nu$'s not bound by atom formation
 $\equiv 10\% + \text{massless } \Psi\Psi \text{ binding forces as structure-carriers}$

As for the measured neutrino proportion of 10%, we should bear in mind that, according to this theoretical approach, “Dark Matter” (\square -particles, see VII.4., XI.22., XI.26.1.) also contains neutrinos, meaning that a fraction of the measured 10% neutrinos, namely 3.6%, belong to “Dark Matter”. The matter/antimatter fraction also contains neutrinos that are not attributable to atom formation.

Thus, this theoretical approach is highly consistent with the experimental Planck measurements.

Moreover, the “Planck measurements” from 2013 found a slight asymmetry in the matter distribution of the Universe, which must necessarily be so according to our present theoretical approach, due to the parity asymmetry of the $(E - I)$ boson **IX.15.**, which forms from the rupture-based structure of the Big Bang process **VIII.6.**, **VIII.10.**.

XI.32.

Another remark:

The Universe was created around 13.8 billion years ago in the Big Bang cascade **XI.23.** by a most colossally gigantic reproduction of identical \square -particles and identical \boxtimes -particles.

The fact that all of these **(reproduction processes of \square - and \boxtimes -particles are identical)** explains the universal validity of the laws of nature.

XI.33.

And one final remark:

When **(considering the reproduction cascade **XI.23.**)** we might ask how and why the **(Big Bang reproduction process chain)** came to an end.

In other words:

(What ended the Big Bang?) and

(Why wasn't the Big Bang even more vast?) and

(Why isn't the Entire Universe even “more full” than it actually is?)

XI.34.

The answer is:

When the Big Bang reaction space in the Big Bang cascade **XI.23.** becomes too full and thus too slow because of the most colossal set of

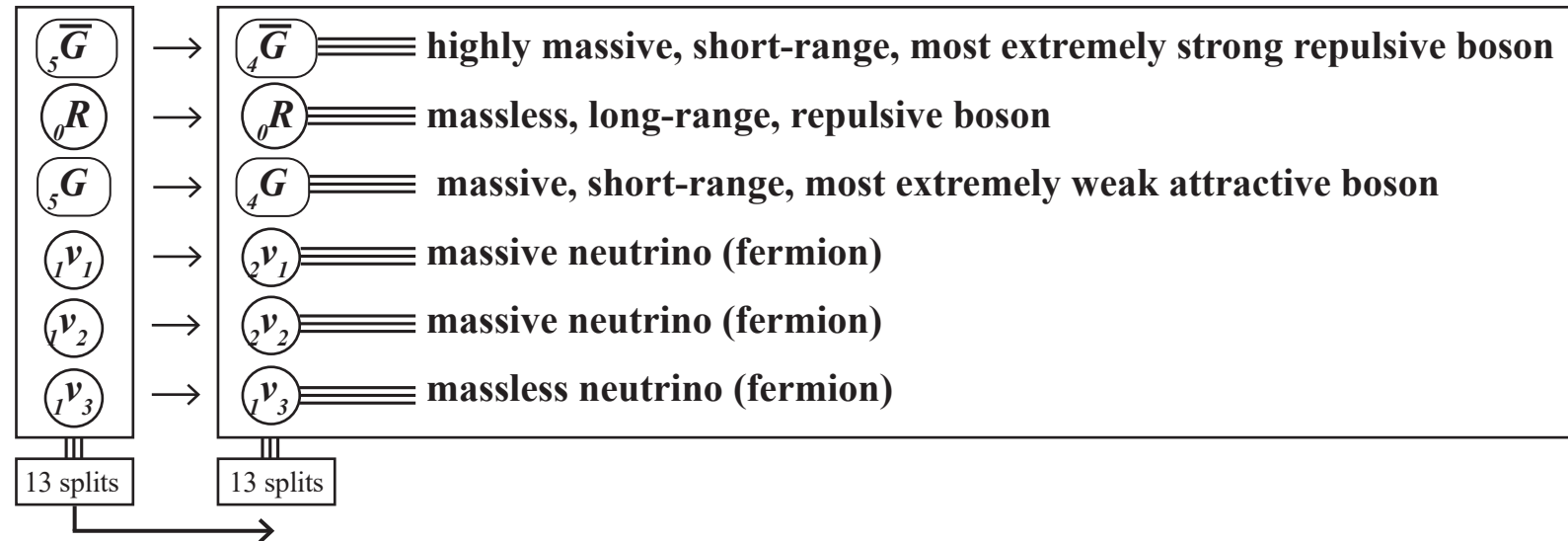
$\left(\frac{3^{(n_f-1)}-1}{2} \right) \begin{array}{|c|} \hline \text{ } \\ \hline \end{array}$ -sets created by the first (n_f-1) production levels (see **XI.22.**)

as well as the $(3^{(n_f-1)}) \square$ -sets created by the final level n_f] (see **XI.22.**)

meaning that the $(\overline{G}_5) \equiv (\Psi \Psi \Psi \Psi \text{ (5-split)})$ -bosons created by the (final production level n_f) (among others) are so densely “surrounded” by other particles within the Big Bang reaction space – each (\overline{G}_5) particle is associated with **(8)** other particles in the Big Bang reaction space – that the most extremely strong repulsive force of these (\overline{G}_5) bosons is weakened by these surrounding particles.

Because of this weakening, the rupture processes **VIII.6.** can no longer occur, ending the Big Bang cascade.

After the end of the Big Bang cascade, the \square -particle (\equiv Dark Matter particle) stabilization process (\equiv point split stabilization process), \equiv **XI.26.7.** takes place (analysed in detail in **XI.26.**):



Thus: The unstable (by **VI.3.5.**) bosons $\begin{pmatrix} \overline{G} \\ 5 \end{pmatrix}$ and $\begin{pmatrix} G \\ 5 \end{pmatrix}$ are stabilized during the elementary particle formation phase directly after the end of the Big Bang by transferring one split each to the neutrinos $\begin{pmatrix} \nu_1 \\ 1 \end{pmatrix}$ and $\begin{pmatrix} \nu_2 \\ 1 \end{pmatrix}$ forming the 2 massive 2-split neutrinos $\begin{pmatrix} \nu_1 \\ 2 \end{pmatrix}$ and $\begin{pmatrix} \nu_2 \\ 2 \end{pmatrix}$:

The initial state of the Universe (Earliest Universe) 13.8 billion years ago has now been fully created and its 2 components (“Dark Matter” \equiv **XI.26.**; “Normal Matter/Antimatter”) \equiv **XI.27.** \rightarrow **XI.30.**) have physically formed and therefore their inner-structural particle composition and resulting physical properties can be analysed, and are listed in the following component list **XI.36.**

XI.36.

The Components $(\frac{2}{3}, \frac{1}{3})$ of the total Universe directly after the Big Bang, and the corresponding $(6, 6) \equiv 12$ elementary particles

Dark Matter

| Component ① $\equiv 66.6\%$ | Inner-Structural Particle Composition | by V., VI. | Mass/Charge | Force Structure | Range | Found? |
|--|---|---------------|--|-----------------------------------|---------------|---------|
| neutrino ₁ (ν_1) | $\Psi\Psi\bar{\Psi} (\varepsilon_9, \varepsilon_8)$ \equiv 2-split fermion | \Rightarrow | massive (mass $\neq 0$) | | | yes |
| neutrino ₂ (ν_2) | $\bar{\Psi}\Psi\Psi (\varepsilon_4, \varepsilon_5)$ \equiv 2-split fermion | \Rightarrow | massive (mass $\neq 0$) | | | yes |
| neutrino ₃ (ν_3) | $\Psi\bar{\Psi}\Psi (\varepsilon_1)$ \equiv 1-split fermion | \Rightarrow | massless | | | yes |
| anti-gravitational boson (\bar{G}) | $\Psi\Psi \text{ --- } \Psi\Psi (\varepsilon_6, \varrho; \lambda, \varepsilon_2)$ \equiv 4-split boson | \Rightarrow | extremely high mass, charged with anti-gravitational elementary charge \bar{q}_θ | most extremely strongly repulsive | 10^{-17} cm | not yet |
| repulsive boson (R_θ) | $\bar{\Psi} \text{ --- } \bar{\Psi} (0)$ \equiv 0-split boson | \Rightarrow | massless | repulsive | long | not yet |
| gravitational boson (G) | $\Psi\bar{\Psi}\Psi\bar{\Psi} \text{ --- } \Psi\bar{\Psi}\Psi\bar{\Psi} (\zeta, \varepsilon_7, \varepsilon_3, \eta)$ \equiv 4-split boson | \Rightarrow | massive, charged with gravitational charge q_θ with $(\bar{q}_\theta + q_\theta) = 0$ | most extremely weakly attractive | 10^{-15} cm | not yet |
| as well as the end products created from the annihilation of (G, \bar{G}) , including the split release products thus created, and the Dark Energy created from these and other annihilation processes with coupled 4-dimensional space-time structure | | | | | | not yet |

Normal Matter/Antimatter

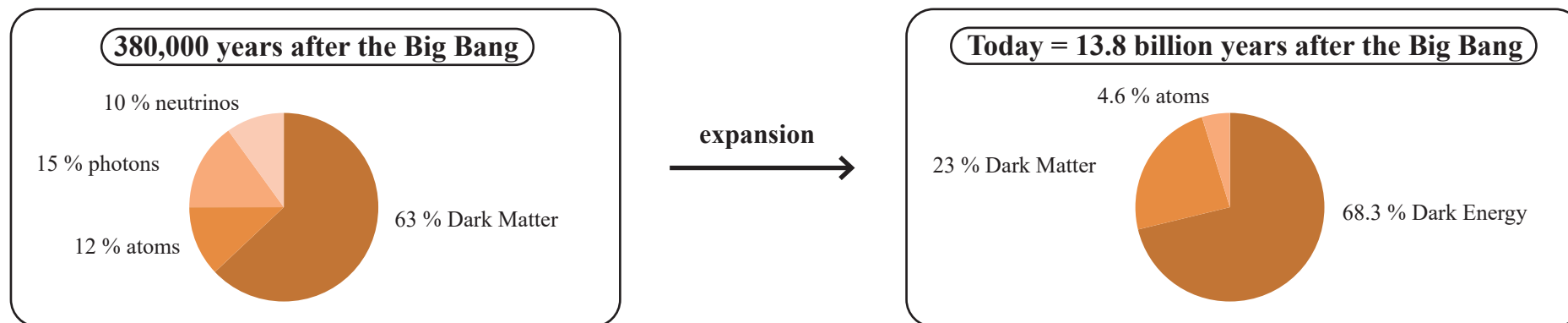
| Component ② $\equiv 33.3\%$ | Inner-Structural Particle Composition | by V., VI. | Mass/Charge | Force Structure | Range | Found? |
|--|---|---------------|--|----------------------------------|---------------|--------|
| proton (antiproton*) $(p^+)(\bar{p})$ | $\Psi\Psi\bar{\Psi} (\varepsilon_9, \zeta, \varrho, \varepsilon_8)$ \equiv 4-split fermion | \Rightarrow | higher mass, charge $\oplus (\ominus)$ | | | yes |
| electron (positron*) $(e^+)(\bar{e})$ | $\bar{\Psi}\Psi\Psi (\varepsilon_4, \eta, \varepsilon_5)$ \equiv 3-split fermion | \Rightarrow | low mass, charge $\ominus (\oplus)$ | | | yes |
| neutrino (ν) | $\Psi\bar{\Psi}\Psi (\varepsilon_1)$ \equiv 1-split fermion | \Rightarrow | massless | | | yes |
| strong force (St) | $\Psi\Psi (\lambda, \varepsilon_2)$ \equiv 2-split boson | \Rightarrow | massive, uncharged | strongly attractive | 10^{-13} cm | yes |
| energy-momentum $(E-I)$ | $\bar{\Psi}\Psi\bar{\Psi}\bar{\Psi} (\varepsilon_6, \varepsilon_3)$ \equiv 2-split boson | \Rightarrow | | | | yes |
| partial decomposition into $(\gamma)(Z)$ | $\bar{\Psi}\Psi\bar{\Psi}\bar{\Psi} (\varepsilon_6, \varepsilon_3)$ \Downarrow | | | | | yes |
| electromag. force (γ) | $\bar{\Psi}\Psi (0 \text{ split})$ \equiv 0-split boson | \Rightarrow | massless | medium strong | long | yes |
| weak force (Z) | $\Psi\bar{\Psi} (\varepsilon_6, \varepsilon_3)$ \equiv 2-split boson | \Rightarrow | massive, uncharged | weak | 10^{-15} cm | yes |
| gravitation (G) | $\Psi\bar{\Psi}\Psi\bar{\Psi} \text{ --- } \Psi\bar{\Psi}\Psi\bar{\Psi} (\varepsilon_7)$ \equiv 1-split boson | \Rightarrow | massless | most extremely weakly attractive | long | yes |
| as well as the annihilation end products $((e^+, e^-, p^+, p^-))$, see XI.29. | | | | | | yes |

* For the detailed point split distributions of antimatter particles, see XI.28.

The values given for the constituents of the Universe in the list **XI.36.** (which follow from the theoretical approach presented in this work) relate to the early stages of the Universe, directly after it was created in the Big Bang. As shown in **XI.26.** to **XI.32.**, this “model data” is consistent with the “measurement data” of the Planck telescope, which measured the composition of the Universe 380,000 years after the Big Bang, i.e. in the early stages of the Universe. Other measurements that hope to capture even earlier stages of the Universe are currently in progress.

However, the empirical “space telescopes” (“Planck”, “Cobe”, “WMAP”) are not only capable of measuring the early stages of the Universe, but also its present state today.

Thus, the Planck telescope (as well as others) has measured a strong shift in the composition of the Universe over the course of the period **“380,000 years after the Big Bang” → until “today”** :



The questions of how these “shifting and transformation processes” arose, and in particular why “Dark Matter” was annihilated and “Dark Energy” was created between these two moments in time, as well as the details of what “Dark Energy” actually is, are presented in the following chapter, Chapter **XII.**

Chapter XII.*

The development process of the Universe from the Big Bang until today

- **The initial composition of the Universe directly after the Big Bang. Measurements from the Planck space telescope.**
- **The processes governing change within the Universe over time: Annihilation of Normal Matter and Dark Matter and conversely, creation of Dark Energy with the coupled construction of the expanding structure of space-time.**
- **The inner-structural relation between mass, space-time, and energy.**
- **The different inner-structural compositions of the pairwise annihilation processes of Normal Matter/Antimatter (\equiv fermion pair annihilation) and Dark Matter (\equiv boson pair annihilation) and the consequences for the development process of the Universe.**
- **The first annihilation process of the Normal Matter/Antimatter in the Universe directly after the Big Bang, and conversely the first creation of energy-momentum bosons with the coupled construction of expanding 4-dimensional space-time elementary structure entities.**
- **The space-time of the Universe as a “by-product” resulting from the annihilation processes of massive matter. Thus: Space-time is not an a priori property of the Universe, but a resulting by-product.**
- **The overall composition balance of the Dark Energy in the Universe and the coupled construction of expanding space-time over time, from the Big Bang until Today. Comparison with Planck space telescope measurement data.**

* Chapter XII. has also been published separately as “The Development Process of the Universe from the Big Bang until Today”, on 04/08/2016.

In the previous publication “The Act of Creation of the Universe” (abbrev. UEA), a theoretical approach (model) describing the creation of the Universe was presented.

This presentation shows how the Entire Universe formed 13.8 billion years ago, and derived the individual constituents of the Universe thus created (see UEA, **XI.37.** \equiv UEP, **XII.1.**)

XII.1.

| Dark Matter | | | |
|--------------------------------------|---------------------------------------|---|--------------------------|
| Component ① \equiv 66.6 % | Inner-Structural Particle Composition | | |
| neutrino ₁ (ν_1) | \equiv | $\boxed{\Psi\Psi\Psi}(\varepsilon_9, \varepsilon_9)$ | \equiv 2-split fermion |
| neutrino ₂ (ν_2) | \equiv | $\boxed{\bar{\Psi}\Psi\Psi}(\varepsilon_4, \varepsilon_3)$ | \equiv 2-split fermion |
| neutrino ₃ (ν_3) | \equiv | $\boxed{\Psi\bar{\Psi}\Psi}(\varepsilon_1)$ | \equiv 1-split fermion |
| anti-gravitational boson (\bar{G}) | \equiv | $\boxed{\Psi\Psi}\boxed{\Psi\Psi}(\varepsilon_6, Q; \lambda, \varepsilon_2)$ | \equiv 4-split boson |
| repulsive-Boson (R_0) | \equiv | $\boxed{\bar{\Psi}}\boxed{\bar{\Psi}}(0)$ | \equiv 0-split boson |
| gravitational boson (G) | \equiv | $\boxed{\bar{\Psi}\Psi\bar{\Psi}}\boxed{\bar{\Psi}\Psi\bar{\Psi}}(\zeta, \varepsilon_7, \varepsilon_3, \eta)$ | \equiv 4-split boson |

| Normale Matter/Antimatter | | | |
|--|---------------------------------------|---|--------------------------|
| Component ② \equiv 33.3 % | Inner-Structural Particle Composition | | |
| proton (antiproton*) $(p^+)(p^-)$ | \equiv | $\boxed{\Psi\Psi\Psi}(\varepsilon_9, \zeta, Q, \varepsilon_9)$ | \equiv 4-split fermion |
| electron (positron*) $(e^+)(e^-)$ | \equiv | $\boxed{\bar{\Psi}\Psi\Psi}(\varepsilon_4, \eta, \varepsilon_3)$ | \equiv 3-split fermion |
| neutrino (ν) | \equiv | $\boxed{\Psi\bar{\Psi}\Psi}(\varepsilon_1)$ | \equiv 1-split fermion |
| strong force (S) | \equiv | $\boxed{\Psi\Psi}(\lambda, \varepsilon_2)$ | \equiv 2-split boson |
| energy-momentum $(E-I)$ | \equiv | $\boxed{\bar{\Psi}\Psi}\boxed{\Psi\bar{\Psi}}(\varepsilon_6, \varepsilon_3)$ | \equiv 2-split boson |
| partial decomposition into $(\gamma)(Z)$ | \equiv | $\boxed{\bar{\Psi}\Psi}\boxed{\Psi\bar{\Psi}}(\varepsilon_6, \varepsilon_3)$ | \equiv 2-split boson |
| electromag. force (γ) | \equiv | $\boxed{\bar{\Psi}\Psi}(0 \text{ Split})$ | \equiv 0-split boson |
| weak force (Z) | \equiv | $\boxed{\Psi\bar{\Psi}}(\varepsilon_6, \varepsilon_3)$ | \equiv 2-split boson |
| gravitation (G) | \equiv | $\boxed{\bar{\Psi}\Psi\bar{\Psi}}\boxed{\bar{\Psi}\Psi\bar{\Psi}}(\varepsilon_7)$ | \equiv 1-split boson |
| as well as the resulting annihilation end products $((e^+, e^-, p^+, p^-))$, see XI.29. | | | |

UEA describes the construction of the Big Bang production cascade **XI.23.**, with all of its $\frac{3^{(n_r-1)}-1}{2}$ finely detailed mini-Big Bang events, resulting in the creation of the Universe, namely by means of the creation of $\frac{3^{(n_r-1)}-1}{2}$ elementary sets \boxtimes (\equiv Normal Matter/Antimatter) \equiv **33.3% of the Entire Universe**, as well as the creation of $3^{(n_r-1)}$ \square -particle sets (\equiv Dark Matter) \equiv **66.6% of the total Universe** at the final level of production, i.e. everything that does not pass through the Big Bang process.

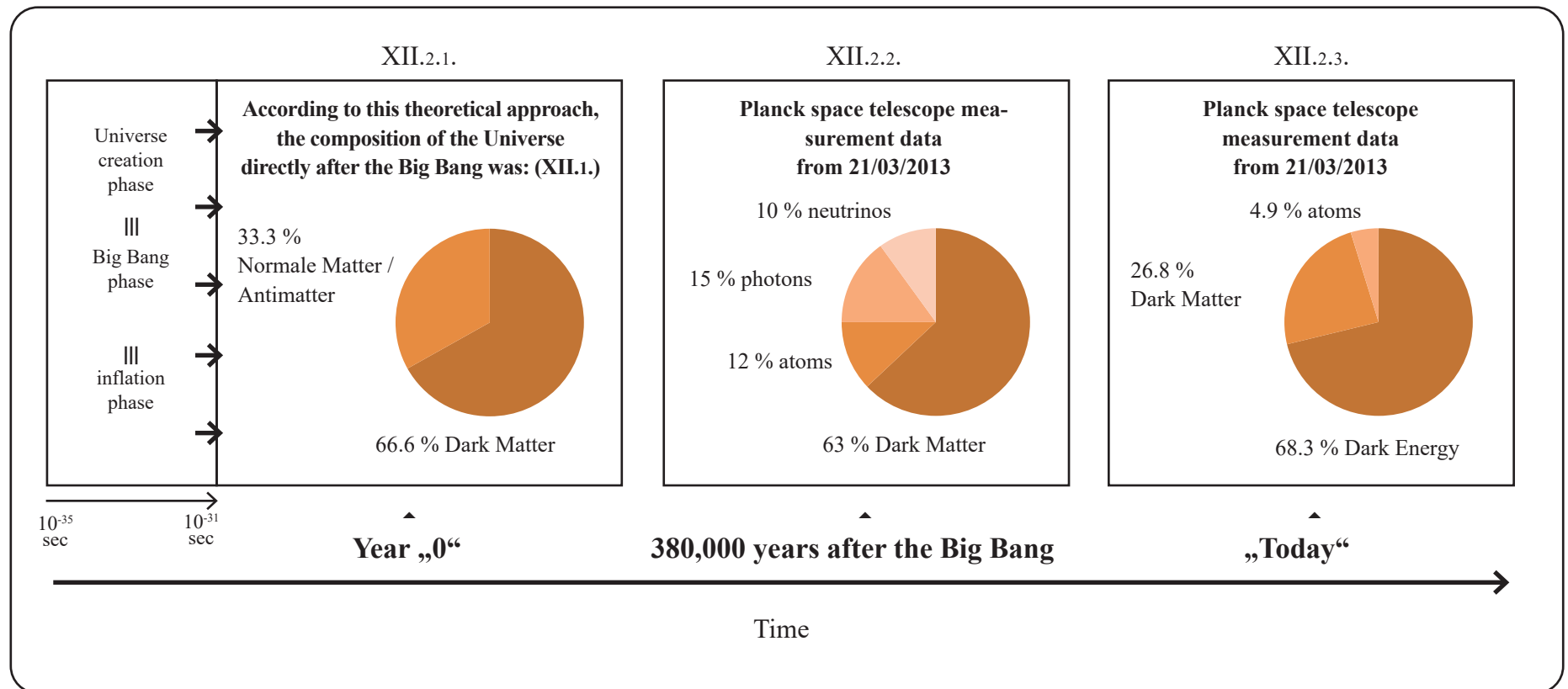
The Big Bang production cascade **XI.23.** is therefore the creation phase encompassing everything up to the formation of individual particles, i.e. the creation phase of the Universe, also known as the “inflation phase” during which – presumably within the tiniest fraction of a second – the Universe expanded by a factor of least 10^{26} (some sources even estimate a factor of around 10^{30} , and yet others suggest a factor of around 10^{50}). Some sources conjecture that the Universe was around 10 cm in size after this inflation (give or take a little).

Thus: In this creation phase of the Universe (\equiv inflation phase), the individual elementary particles had not yet formed, and each particle was still in its respective creation phase (formation phase).

The creation phase (\equiv inflation phase) only ended once everything was “complete”, i.e. once all elementary particles **XI.37.** \equiv **XII.1.** had formed.

Since the beginning of the existence of the Universe, i.e. since the Big Bang and the initial composition of the Universe in its Earliest Stages (**XI.36.**) thus created, the inner composition of the Universe has evolved over time, as follows (see in particular Planck space telescope):

XII.2.



To better understand these results **XII.2.** especially **XII.2.1.** and **XII.2.2.**, note that:

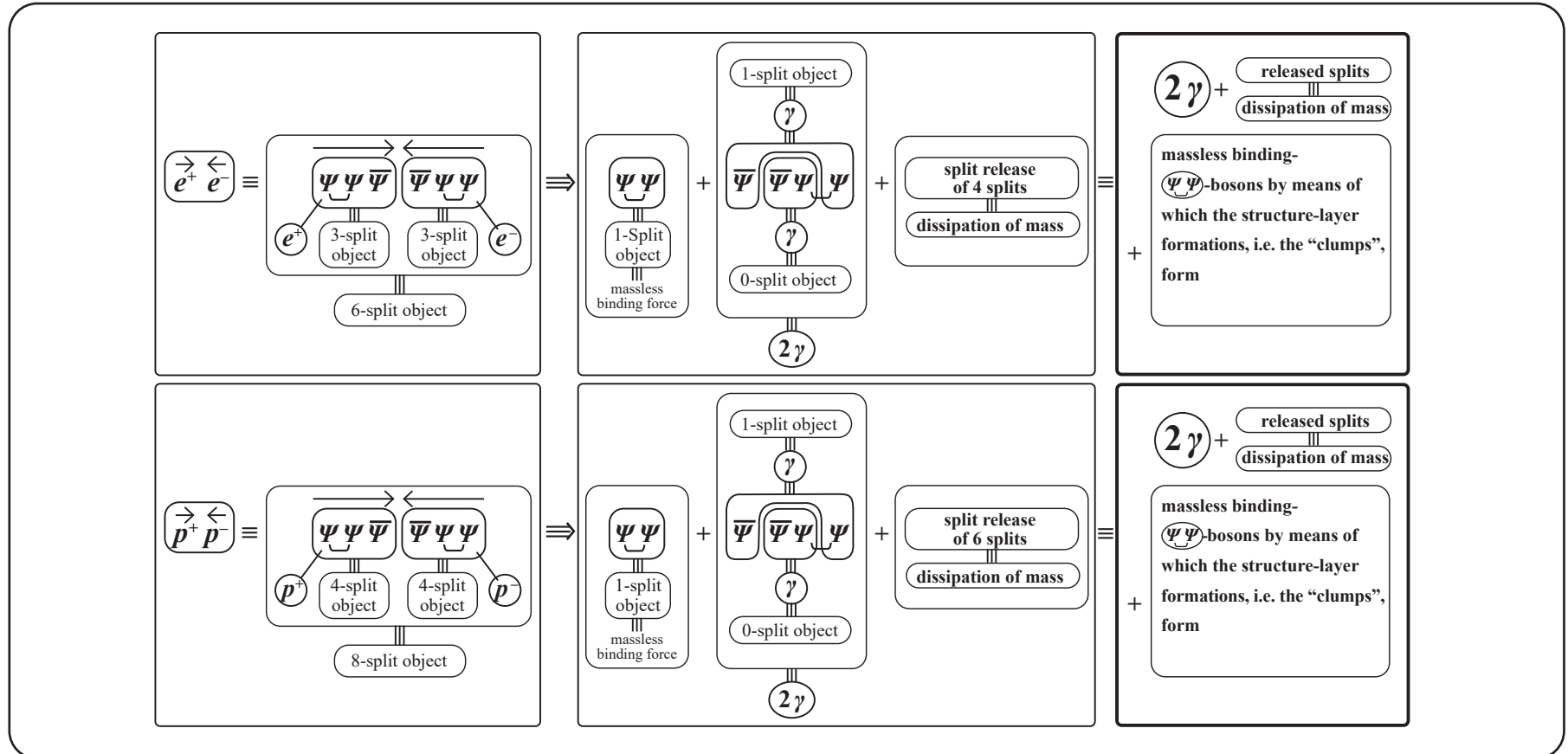
According to the theoretical approach adopted here **XI.1.** \rightarrow **XI.36.** there were so-called annihilation processes

$(e^+ e^- \rightarrow 2\gamma + \dots)$ and $(p^+ p^- \rightarrow 2\gamma + \dots)$ between matter and antimatter (see **XI.29.**) directly after the Big Bang in the 33.3% Normal Matter/Antimatter segment of the Universe (see **XI.27.**, **XI.28.**)

XI.29.

III

XII.3.



As a result of these type **XII.3.** annihilation processes, the **33.3% Normal Matter/Antimatter** segment of the Universe in **XII.2.1.** had the following composition at the moment of decoupling 380,000 years after the Big Bang, by the Planck space telescope measurements **XII.2.2.** :

33.3% Normal Matter/Antimatter segment

33.3 % \equiv **12 % atoms, 15 % photons, 6.3 % neutrinos**

XII.4.1.

The ~3.6% neutrinos missing from the Planck measurements are found in the Dark Matter part of the Planck measurements, since, according to this theoretical approach (see UEA **XI.36.**)

as well as the bosons $(R; {}_4\bar{G}; {}_4G)$
the Dark Matter segment also contains the 3 neutrinos $({}_2\nu_1; {}_2\nu_2; {}_1\nu_3)$ enthält.

XII.4.2.

This means: The values predicted by the present theoretical approach **XII.2.1.** are consistent with the Planck measurements **XII.2.2.** .

This also means: The Planck measurements confirm the predictions of this theory.

This leads to the following question: How and why, as shown in **XII.2.**, did the

processes governing the change in the composition of the Universe unfold, over the period between the “moment of decoupling” (380,000 years after the Big Bang) and “Today” (13.8 billion years after the Big Bang)?

XII.5.

And hence to the questions:

What transformation processes have there been in the Universe since it began to exist?

Why has the proportion of Dark Matter in the Universe decreased over this 13.8-billion-year period?

Why has the proportion of Normal Matter decreased over this period?

Why has the proportion of Dark Energy increased over this period?

What are the origins and structures of these annihilation and construction processes?

What is the actual nature of Dark Energy?

What is the connection between the composition of Dark Energy and the space-time structure of the Universe, as well as the expansion of this space-time within the Universe?

Why is this expansion of the Universe currently accelerating?

XII.6.

To answer these questions **XII.5.**, we must first study and answer the following questions:

- What types of interaction processes occur within the Dark Matter segment and within the Normal Matter segment?
- Thus: What processes occurred within the segments of matter that disappeared over this 13.8-billion-year period?
- And what types of interaction process led to the deconstruction of matter in each case?

UEA presents the inner-structural composition of each individual Dark Matter particle, allowing the physical properties of each particle to be derived (see EAU; **VII.5.** , **XI.36.**).

This also means that this theoretical approach allows us to break down and analyse each of the individual interaction processes that occur within the Dark Matter segment in terms of individual Dark Matter particles.

This allows the interaction processes within the Dark Matter part of the Universe to be analysed together, which enables us to answer the following questions:

XII.7.

- how the deconstruction of Dark Matter gradually unfolded over time and continues to unfold,
- what each of the individual Dark Matter annihilation processes are,
- what “new” entity is created to replaced the annihilated matter.

We can give similar answers for the 33.3% Normal Matter/Antimatter segment.

We shall begin with the 66.6% Dark Matter segment of the Universe:

XII.8.

III

XI.37.
Partial

| Dark Matter | | | | |
|--|---------------------------------------|---|---|-----------------|
| Component ① ≡ 66,6 % | Inner-Structural Particle Composition | | | |
| neutrino ₁ $\odot \nu_1$ | ≡ | $\boxed{\Psi \Psi \bar{\Psi}} (\varepsilon_9, \varepsilon_8)$ | ≡ | 2-split fermion |
| neutrino ₂ $\odot \nu_2$ | ≡ | $\boxed{\bar{\Psi} \Psi \Psi} (\varepsilon_4, \varepsilon_5)$ | ≡ | 2-split fermion |
| neutrino ₃ $\odot \nu_3$ | ≡ | $\boxed{\Psi \bar{\Psi} \Psi} (\varepsilon_1)$ | ≡ | 1-split fermion |
| anti-gravitational boson $\odot \bar{G}$ | ≡ | $\boxed{\Psi \Psi} \boxed{\Psi \Psi} (\varepsilon_6, \varrho; \lambda, \varepsilon_2)$ | ≡ | 4-split boson |
| repulsive-Boson $\odot R_0$ | ≡ | $\boxed{\bar{\Psi}} \boxed{\bar{\Psi}} (0)$ | ≡ | 0-split boson |
| gravitational boson $\odot G$ | ≡ | $\boxed{\bar{\Psi} \bar{\Psi} \bar{\Psi}} \boxed{\bar{\Psi} \bar{\Psi} \bar{\Psi}} (\zeta, \varepsilon_7, \varepsilon_3, \eta)$ | ≡ | 4-split boson |

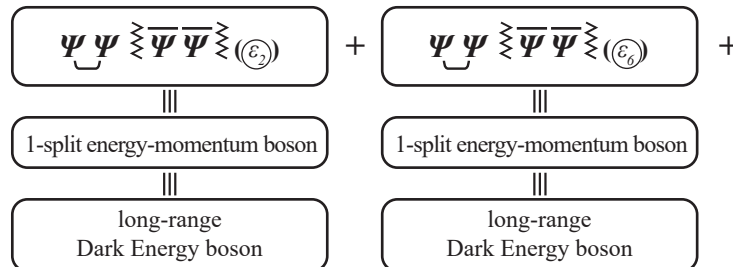
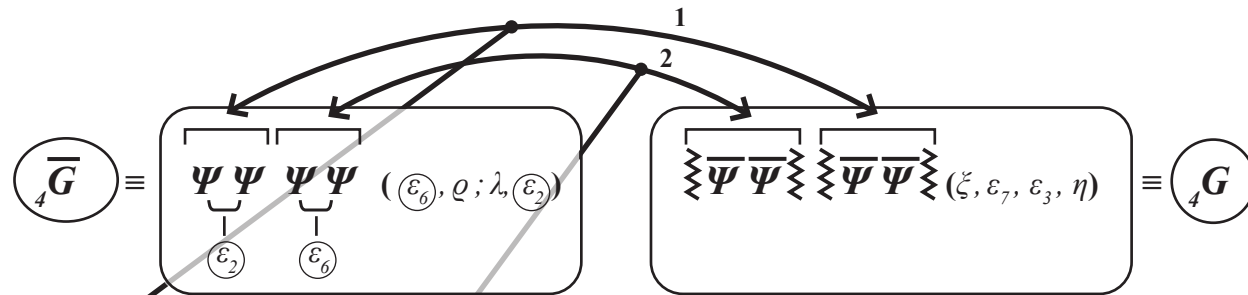
Dark Matter pair annihilation processes:

$${}_4\bar{G} \equiv \underbrace{\Psi \Psi}_{\varepsilon_2} \underbrace{\Psi \Psi}_{\varepsilon_6} (\varepsilon_6, \varrho; \lambda, \varepsilon_2) \rightarrow \leftarrow {}_4G \equiv \underbrace{\bar{\Psi} \bar{\Psi}}_{\xi} \underbrace{\bar{\Psi} \bar{\Psi}}_{\varepsilon_3} (\xi, \varepsilon_7, \varepsilon_3, \eta)$$

$$\Downarrow$$

Sporadically, as a result of this pairwise interaction, over very long periods of time, there occur individual penetration-style interaction processes, which lead to individual decomposition-style interaction processes, i.e. annihilation processes of the following type:

sporadic decomposition $\equiv \Downarrow \equiv ({}_4\bar{G} \ {}_4G)$ -pair annihilation processes



construction object with 6 released splits $\textcircled{6} \equiv \overline{(\varrho, \lambda; \varepsilon_3, \eta, \varepsilon_7, \xi)} \equiv$
 \equiv "physical object" created from the $({}_4\bar{G}, {}_4G)$ -annihilation
 with 6 degrees of freedom
 initiated by the 6 released splits $(\varrho, \lambda; \varepsilon_3, \eta, \varepsilon_7, \xi)$
 \Downarrow
 4-dimensional space-time with integrated
 2-dimensional SU2 isospace components

As a result of these decomposition and recreation processes, Dark Energy bosons are newly created (see **XII.9.**). We could also state this as: From the pairwise Dark Matter annihilation of the massive (\bar{G}_4, G_4) -bosons, pairs of long-range, massive Dark Energy bosons (E_1, E_2) are created. These Dark Energy bosons (see **XII.9.**) are automatically, necessarily, and inevitably coupled with the construction of a new object with $(6 = (4+2)$ degrees of freedom).

This means:

The (construction of Dark Energy) from the annihilation processes **XII.9.** of Dark Matter is automatically (associated with the construction of a newly emerging physical construction object), which is newly created by the release of $(6 = (4+2)$ splits) per elementary set originally bound to the Dark Matter bosons (\bar{G}_4, G_4) , and which therefore possesses $(4+2) = 6$ degrees of freedom by **XII.9.** This physical (construction object with (6) degrees of freedom) newly created from the above annihilation processes is:

XII.10.

4-dimensional space time
with integrated
2-dimensional SU2 isospace components

,

as is consistent with reality.

The reason behind the strict and inevitable validity of (conservation principle of 13 splits per elementary set) is:
For each elementary set, the Universe is fundamentally, exclusively, and inevitably (for details, see EAU) constructed by the construction process

$$D_{13 \text{ splits}}^{(13)} \Psi(x) \equiv \Psi^{(27)}(x, 13 \text{ splits}) \quad \text{see EAU, III.1.} \rightarrow \text{III.4.}.$$

XII.11.

Therefore:

The highest conservation principle, which must be satisfied by every process in the Universe, is that there must be (13 splits for each created elementary set), applicable to every single elementary set of Dark Matter, as well as every single elementary set of Normal Matter/Antimatter.

This split conservation number (13) must also be satisfied during the annihilation processes of both Dark Matter and Normal Matter/Antimatter. These (13 dynamically created splits per elementary set) are:

$$\xi, \varrho, \lambda, \eta; \varepsilon_1, \varepsilon_2, \varepsilon_3, \varepsilon_4, \varepsilon_5, \varepsilon_6, \varepsilon_7, \varepsilon_8, \varepsilon_9 \quad (\text{see e.g. EAU; V.7., XI.36.})$$

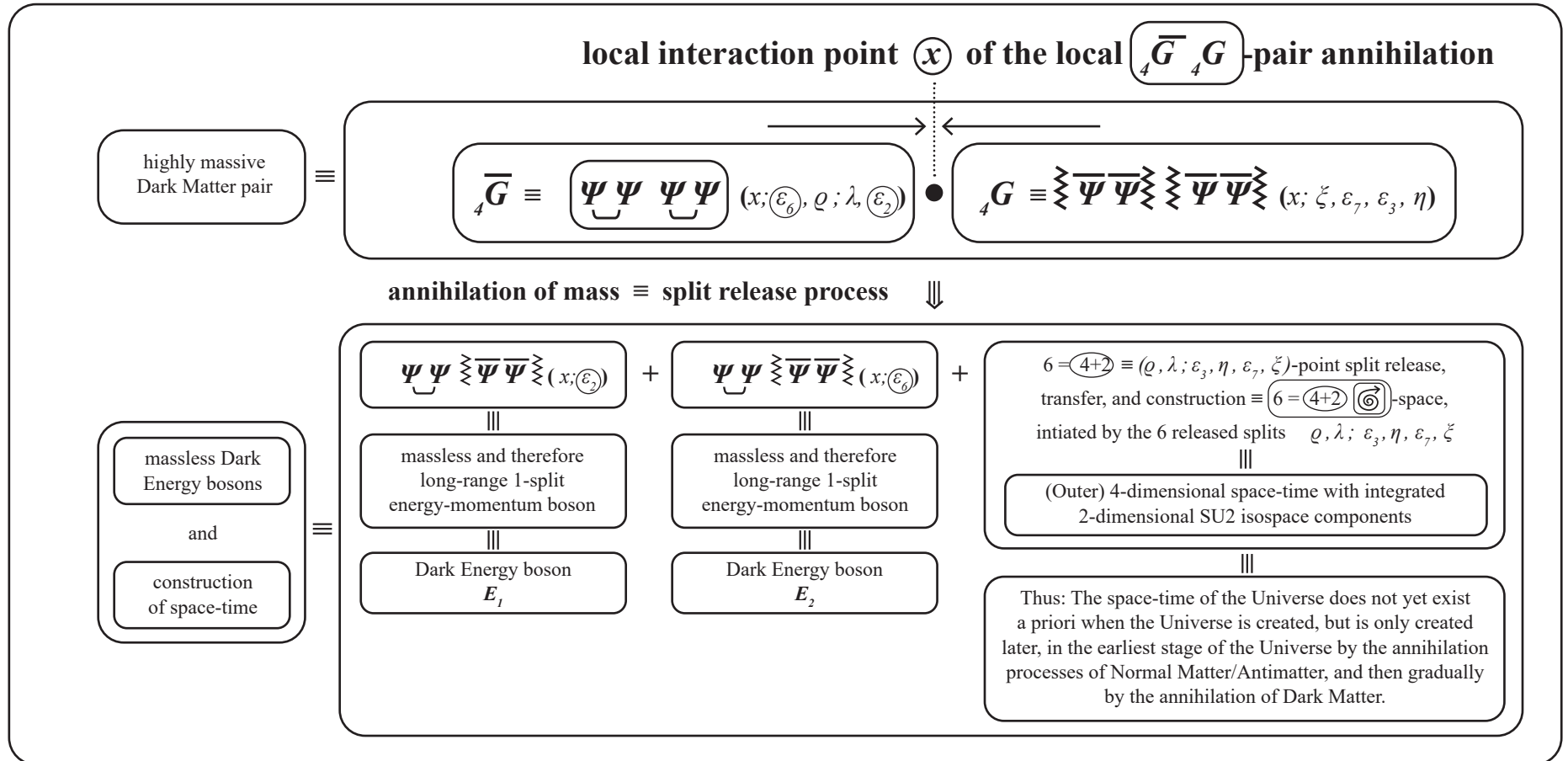
Thus: In every interaction and transformation process of any single event in the Universe, the total number of splits must be (13) for each elementary set. No matter what this implies.

Hence: This principle of split conservation must also be satisfied by annihilation processes.

Let us now return to considering the annihilation processes **XII.9.** of the Dark Matter pair $\boxed{{}_4\bar{G}{}_4G}$ in order to gain a better understanding of the **(relation between mass and space)**.

To do so, we shall again analyse the annihilation processes **XII.9.**, which are in fact mass annihilation processes, from the perspective of mass and space:

XII.12.



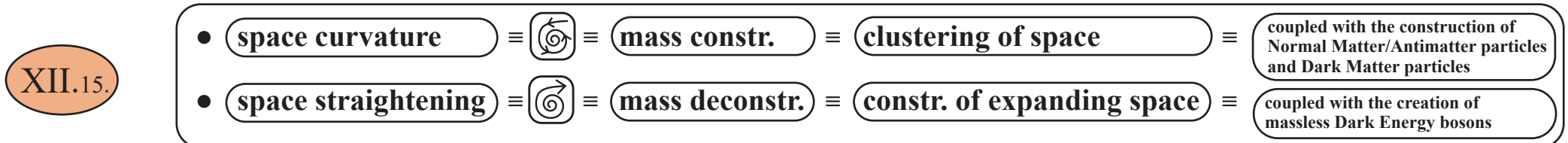
From **XII.12.**, it follows that: The local interaction point ($x = \bullet$) of the $(\bar{G}_4^+ G_4^-)$ -pair annihilation is “straightened out” by the expanding $(4+2)$ -split release (⌚) – due to the annihilation of mass – or in other words “opened up”. Thus: Starting from the local interaction point ($x = \bullet$), due to the (⌚) -split release from the annihilation processes **XII.12.** the following happens:



In **VI.3.2.**, it was shown that point curvature is created by $(\text{split clustering processes with split densities } \geq 2)$, and that this point curvature creates mass, and therefore the curvature of space is related to mass. If we symbolically write $(\text{split clustering} \equiv \text{point curvature})$ as (⌚) , and the inverse act, namely $(\text{split release} \equiv \text{point straightening})$, as (⌚) , then we see that:

- XII.14.**
- mass is generated at the mass point \odot by $(\text{split densities } \geq 2)$, i.e. (⌚) , and
 - $(4\text{-dimensional space-time structure entities})$ are created by $(\text{split releases } \geq 4)$, i.e. (⌚) .

It follows that:



XII.12. to **XII.15.** thus showed how and by means of which processes **4-dimensional space-time** formed and continues to form.

The reason lies specifically in the mass annihilation processes according to which

- massive elementary particles are pairwise annihilated (see **XII.12.**, **XII.17.**)
- and massless elementary particles are also pairwise created (see **XII.12.**, **XII.12.**).

By **XII.9.**, **XII.12.**, the annihilation and creation processes that occur within the 66.6% Dark Matter segment of the Universe are:

The pair annihilation $\bar{G}_4 G_4$ and simultaneous pair creation of the massless **1-split** Dark Energy bosons E_p, E_2 .

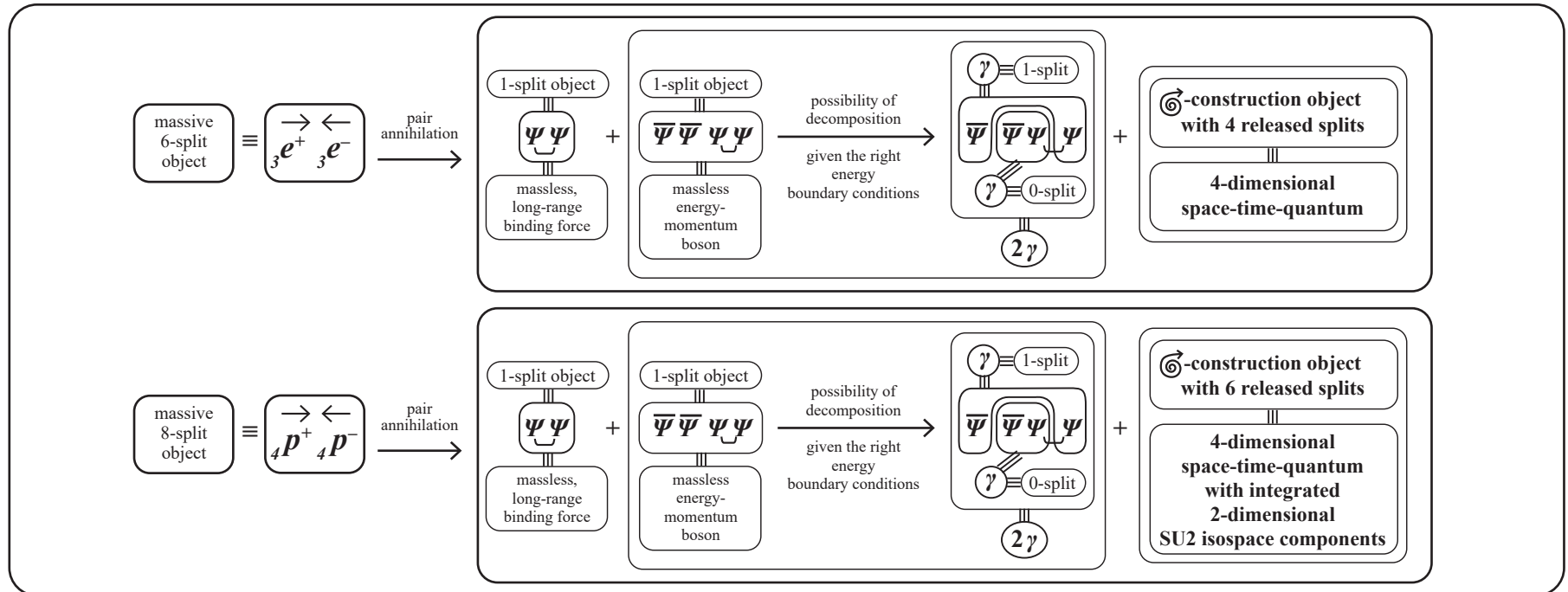
Due to the deconstruction of mass associated with this annihilation process and the resulting $(4+2)=(6)$ -split release process \vec{G}_{4+2} (see **XII.12.**), the E_p, E_2 bosons thus created are in turn associated with the construction of:

4-dimensional **space-time** elementary structure entities with their integrated 2-dimensional SU2 isospace components.

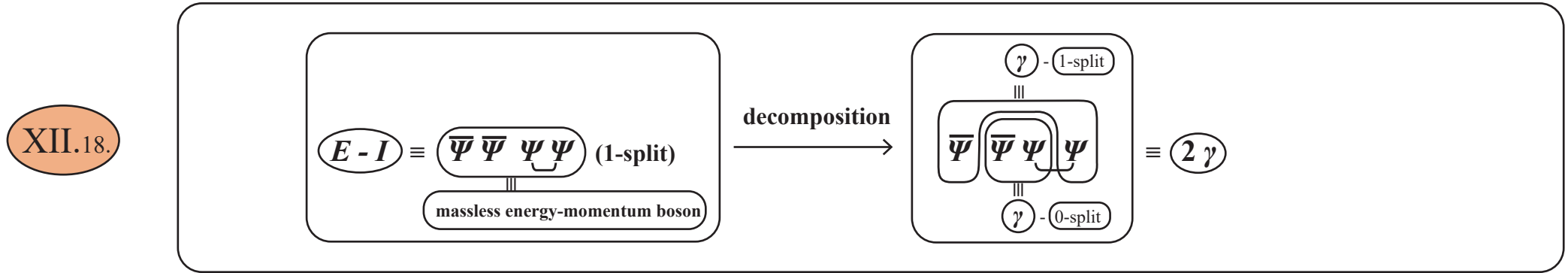
XII.16.

By **XI.29.**, the annihilation processes that occur within the 33.3% Normal Matter/Antimatter segment of the Universe are $(e^+ e^- \rightarrow 2 \gamma + \dots)$ and $(p^+ p^- \rightarrow 2 \gamma + \dots)$, which are experimentally well-understood and which, according to our theoretical approach (see **XI.27.** \rightarrow **XI.30.**), occurred directly after the Big Bang, i.e. as soon as the particles had formed. By **XI.28.**, more Normal Matter formed than Antimatter during the Big Bang. Since, at the time, the “freshly” formed Universe directly after the Big Bang, i.e. directly after the Big Bang phase (see **XI.23.** \equiv creation phase \equiv “inflation phase”), was a most extremely compact and most extremely massive “smallest possible structure” (some sources estimate that it was only ~ 10 cm in size), the Normal Matter/Antimatter pairs $(e^+ e^-)$ and $(p^+ p^-)$ were densely packed together, which necessarily led to the well-known pair annihilation processes **XI.29.**.

XII.17.

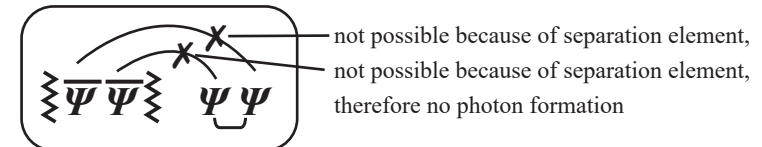


If we analyse **XII.17.** (and **XI.29.**) more closely, we see that the (2γ) -photon creation, which has been physically observed at the moment of decoupling (see **XII.2.2.**) in the form of a “release of light”, is a consequence of the decomposition process of a long-range, massless (1-split) energy-momentum boson primarily created by the annihilation of Normal Matter-Antimatter:



It can easily be seen that this decomposition process into photons (γ) cannot occur in the case of the Dark Energy bosons E_1 and E_2 , which by **XII.12.** are created in the annihilation processes of Dark Matter $(\bar{G}_4 G_4)$.

The reason for this lies in the differences in the inner-structural composition of **XII.18.**, i.e. $E - I \equiv (\bar{\Psi} \bar{\Psi} \Psi \Psi)$ compared **XII.12.**, i.e. E_1 and $E_2 \equiv (\bar{\Psi} \bar{\Psi} \Psi \Psi)$. With the Dark Energy bosons E_1 and $E_2 \equiv (\bar{\Psi} \bar{\Psi} \Psi \Psi)$, we immediately see that $(\bar{\Psi} \Psi)$ binding states cannot occur due to the inner-structural separation elements $\bar{\Psi} \bar{\Psi}$, i.e. no photons can be created:



Furthermore, the following holds:

Normal Matter (i.e. (p^+, e^-)) is only slightly different from Normal Antimatter (i.e. (p^-, e^+)) in terms of inner-structural particle composition. Explicitly:

XII.19.

$$\begin{array}{c} \xrightarrow{\quad} \xleftarrow{\quad} \\ \boxed{e^+ \ e^-} \equiv \boxed{\begin{array}{c} \xrightarrow{\quad} \xleftarrow{\quad} \\ \underbrace{\Psi \ \Psi \ \bar{\Psi}}_{(3 \text{ split})}^+ \ \underbrace{\bar{\Psi} \ \Psi \ \Psi}_{(3 \text{ split})}^- \end{array}} ; \quad \boxed{p^+ \ p^-} \equiv \boxed{\begin{array}{c} \xrightarrow{\quad} \xleftarrow{\quad} \\ \underbrace{\Psi \ \Psi \ \bar{\Psi}}_{(4 \text{ split})}^+ \ \underbrace{\bar{\Psi} \ \Psi \ \Psi}_{(4 \text{ split})}^- \end{array}}
 \end{array}$$

i.e. the only difference in inner-structural composition between Normal Matter and Normal Antimatter lies in the differences in the positioning of the $\bar{\Psi}$ (which, incidentally, as explained in VI.3.3. is why they have different \oplus charges).

Since Antimatter and Normal Matter are mostly identical inner-structurally, the Normal Matter and Antimatter pair annihilation processes XII.19. occur “maximally quickly” and are therefore “much faster” than the more complex Dark Matter pair annihilation processes, which have stronger inner-structural differences:

XII.20.

$$\begin{array}{c} \xrightarrow{\quad} \xleftarrow{\quad} \\ \boxed{{}_4\bar{G} \equiv \underbrace{\Psi \ \Psi \ \Psi \ \Psi}_{(4 \text{ split})}} \quad \boxed{{}_4G \equiv \underbrace{\bar{\Psi} \ \bar{\Psi} \ \bar{\Psi} \ \bar{\Psi}}_{(4 \text{ split})}} \Rightarrow \text{see XII.9.}
 \end{array}$$

It therefore also follows that, in the early stages of the Universe, i.e. directly after the Big Bang (in other words, directly after the completion of elementary particle construction), after the creation phase (\equiv “inflation phase”),

- the most extremely rapid pair annihilation processes **XII.17.** only occurred straight away within the 33.3% Normal Matter/Antimatter segment, and therefore, in the early stages of the Universe, initially only massless, long-range energy-momentum bosons with inner-structural type

XII.21.

$\overline{\Psi} \overline{\Psi} \underbrace{\Psi \Psi}_{(1\text{-split})}$ were created (see **XII.17.**),

which then, by **XII.18.**, become photons by decomposition, thus being written into the history of the Universe as a “flash of light” at the moment of decoupling, as is visible in the Planck space telescope diagram **XII.2.2.** wiederfinden.

- whereas in the 66.6% Dark Matter segment, the annihilation processes $\overleftrightarrow{{}_4G}$ (see **XII.9.**), only occurred most extremely “slowly”, and therefore only individually and sporadically, due to the maximally different inner-structural particle composition of

XII.22.

$\overleftrightarrow{{}_4G} \equiv \underbrace{\Psi \Psi}_{(4\text{-split})} \underbrace{\Psi \Psi}_{(4\text{-split})}$ and ${}_4G \equiv \underbrace{\overleftrightarrow{\Psi} \overleftrightarrow{\Psi}}_{(4\text{-split})} \underbrace{\overleftrightarrow{\Psi} \overleftrightarrow{\Psi}}_{(4\text{-split})}$,

and therefore had not occurred to any significant extent by the moment of decoupling (380,000 after the Big Bang), and so were not reflected in the measurements. As we already mentioned earlier in **XII.4.2.**, the fact the Dark Matter percentage of 63% (measured by the Planck space telescope) is smaller than the 66.6% stated in **XII.2.2.** is not related to the Dark Matter annihilation processes, but is explained by the fact that neutrinos are excluded from the measurements, since, by **XII.1.**, Dark Matter contains neutrinos. Therefore, as explained in **XII.4.2.**, 3.6% of the neutrinos in **XII.2.2.** should be attributed to Dark Matter, giving the correct Dark Matter percentage of 66.6%. Hence: In the earliest and early stages of the Universe, from creation until the moment of decoupling (380,000 years after the Big Bang), the only processes that had occurred to any significant extent were

XII.23.

rapid Normal Matter/Antimatter annihilation processes,

which, directly after the Big Bang, i.e. directly after the creation phase of the Universe, while the Universe was still extremely dense, and thus the pairs $(e^+ e^-)$ and $(p^+ p^-)$ were still most extremely densely “packed” within the Normal Matter/Antimatter segment, took the form of

XII.24.

vast quantities $(e^+ e^-)$ - and $(p^+ p^-)$ - pair annihilation processes on the most colossally gigantic scales.

By **XII.17.**, this led :

XII.25.

firstly, to the creation of a most colossally gigantic quantity of energy-momentum bosons of type $(\bar{\Psi} \bar{\Psi} \Psi \Psi \text{ (1-split)})$, which then partially decomposed (by **XII.18.**) into a most colossally gigantic quantity of photons ($= \gamma$ -set). This photon set was observed by the Planck space telescope (ESA, 21st March 2013) as a most colossally gigantic flash of light at the moment of decoupling ($\sim 380,000$ years after the Big Bang).


XII.26.

secondly, as a result of the annihilation of mass associated with the pair annihilation processes $(e^+ e^-)$ and $(p^+ p^-)$ by **XII.17.**, to most colossally vast bursts of point split releases, namely,

from the $(e^+ e^-)$ -processes, most colossally gigantic

bursts of  -releases

from the $(p^+ p^-)$ -processes, most colossally gigantic

bursts of  -releases

by means of which, by **XII.17.** a most colossally gigantic set of expanding $(4\text{-dimensional space-time elementary structure entities})$ with $(\text{partially integrated 2-dimensional SU2 components})$

was created..

And hence:

By means of these most colossally gigantic annihilation processes **XII.17.**; **XII.23.**, which occurred directly after the creation phase of the Universe, there occurred a most colossally gigantic annihilation of mass(see **XII.17.**, **XII.23.**), which in turn led to the creation of a most colossally gigantic set of expanding

XII.27.

⑥-elementary structure entities from the 4 , resp. $4+2=6$ released splits).

Thus, as a consequence of the (principle of conservation of 13 splits per elementary set) (= highest conservation law of all events in the Universe, see **V.7.**, **XI.36.**), an expanding $4+2$ -dimensional “space” is constructed

XII.28.

i.e. a space with

- “outer” 4-dimensional space-time structure (4-dimensional space-time-quantum ⑥) and integrated
- “inner” 2-dimensional SU2 structure (isospace)

as is consistent with reality.

XII.29.

Precisely this Normal Matter/Antimatter annihilation process **XII.17.**; **XII.23.**

- was and is most colossally fast, because of the inner-structural particle composition of $(e^+ e^-)$, $(p^+ p^-)$
- occurred in a most colossally gigantic manner, because of the most colossally dense compactness of the Universe directly after its creation phase,
- annihilated around **10-20%** of the Entire Universe, i.e. around **30-60%** of the Normal Matter/Antimatter of the Universe, all at once in a single moment, after the Universe had just been created by its Big Bang production cascade **XI.23.**

with the following consequences for the Universe:

XII.30.

because of the annihilation processes of the mass $(e^+ e^-)$, $(p^+ p^-)$ -particles, i.e. $(e^+ e^-)$, $(p^+ p^-)$ -annihilation (see **XII.17.**),

- creation of sets of massless photons (2γ) , resp.
- creation of sets of massless, long-range, energy-momentum bosons and the coupled
- creation of 4-dimensional space-time elementary structure entities, resp.
- creation of 4-dimensional space-time elementary structure entities with integrated 2-dimensional SU2 structure.

XII.31.

This means: The 4-dimensional space-time of the Universe did not exist a priori when the Universe was created, but was first generated after the Universe was created by means of the subsequently occurring specific transformation processes (= annihilation processes XII.17. ; XII.12.) .

Now, from the Planck space telescope measurements XII.2., we know the composition of the Universe at the moment of decoupling, 380,000 years after the Big Bang. When compared to the theoretical data (model data) XII.2.1. predicted by the theoretical approach presented here, these measurements XII.2.2. indeed indicate that, as described in XII.17. → XII.31., only the “rapid” Normal Matter/Antimatter annihilation processes occurred to any significant extent in the beginning phase of the Universe before the moment of decoupling.

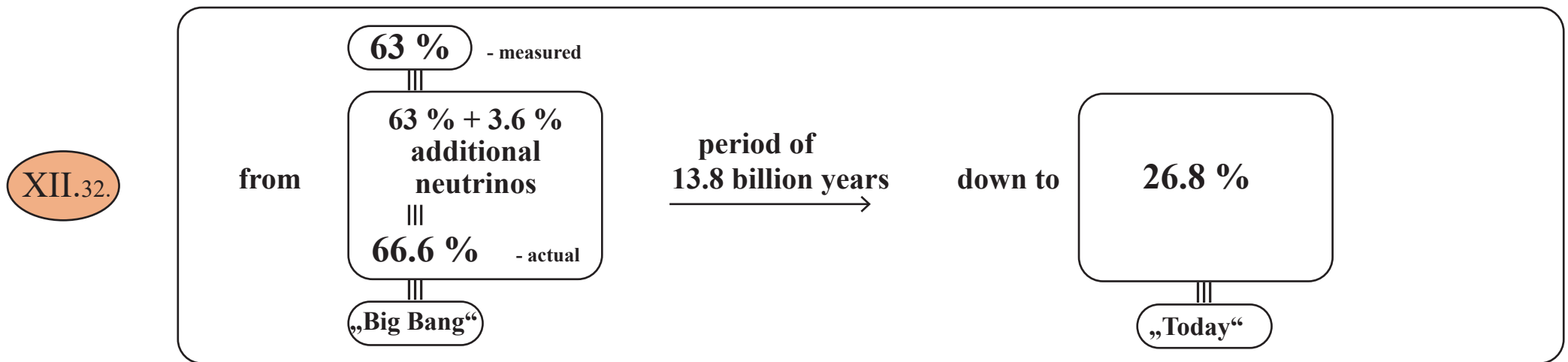
The “measured 63% Dark Matter segment” corresponds to the newly formed 66.6% Dark Matter segment at the moment creation of the Universe (Big Bang), after accounting for 3.6% neutrinos, since, according to our theoretical approach, Dark Matter also contains 3 types of neutrinos (2 massive neutrinos (ν_1, ν_2) , as well as 1 massless neutrino (ν_3)).

This is also analysed in XII.4.2. .

Thus, in the beginning phase of the Universe (until the moment of decoupling), there were only extremely few, isolated, i.e. sporadic, pair annihilation processes of type $(\bar{G}_4 G_4)$ XII.9. ; XII.12. in the 66.6% Dark Matter segment, which is a consequence of the significant differences in the inner-structural composition of \bar{G}_4 and G_4 and is analysed in detail in XII.9. .

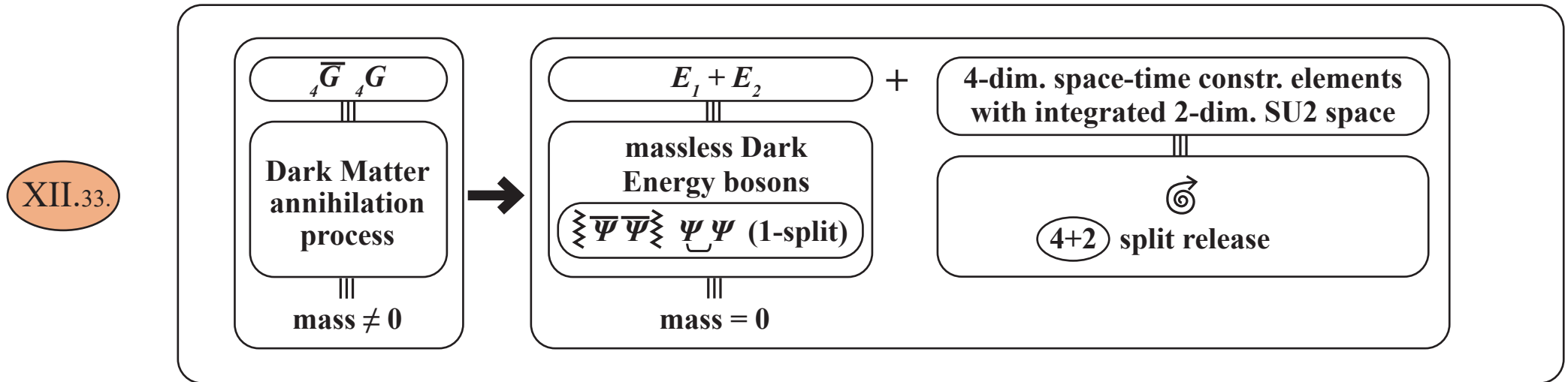
The period of (13.8 billion years, from the Big Bang until today) , is (36,316 times longer) than the (380,000-year) period from the Big Bang until the moment of decoupling.

Thus, in this long subsequent period of 13.8 billion years, there were in total sufficiently many sporadically occurring and therefore cumulatively enough “slow” Dark Matter $(\bar{G}_4 G_4)$ -annihilation processes of type XII.9. ; XII.12. to induce the following change in the Dark Matter part of the composition of the Universe between the moment of decoupling and today, by XII.32.:



This means:

By means of the deconstruction, as shown in XII.32. of a fraction of Dark Matter amounting to $(66.6\% - 26.8\%) = 39.8\%$ of the Universe over the period ranging (from the creation of the Universe until today), the Dark Matter annihilation processes XII.9. ; XII.12. :



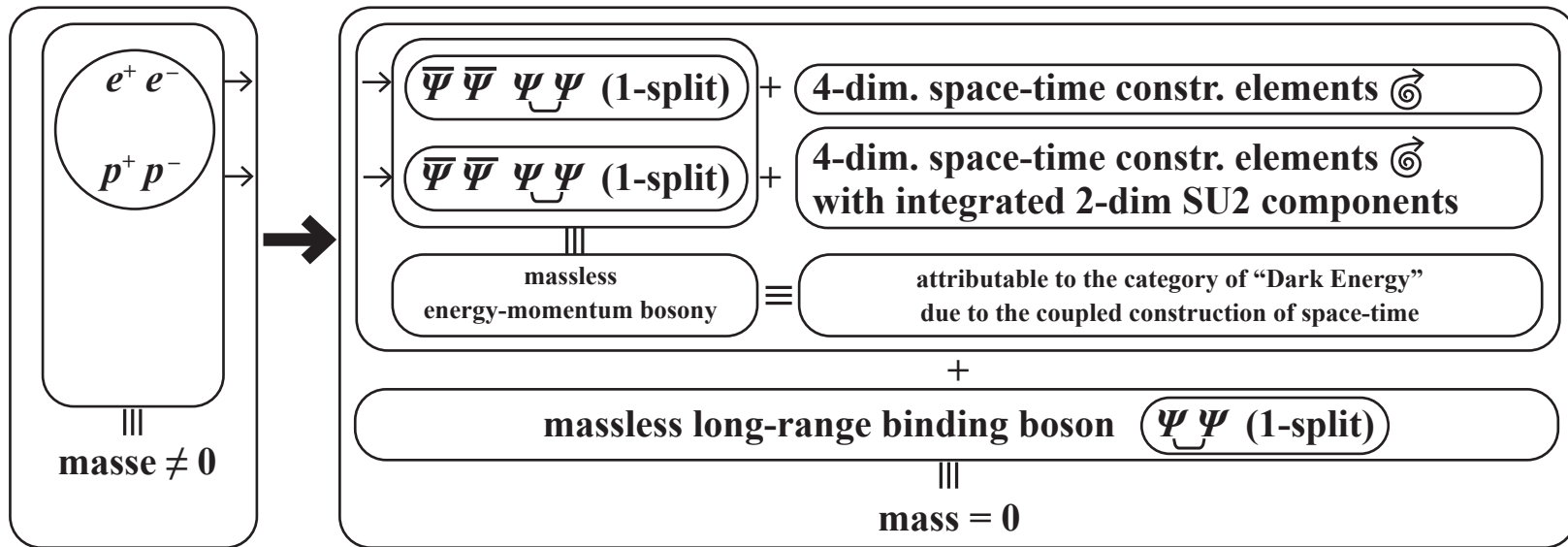
led to the proportional (construction of 39.8% Dark Energy) in the Universe, together with the (construction of expanding 4-dimensional space-time) and (its partially integrated 2-dimensional SU2 components), from this (deconstruction of 39.8% Dark Matter).

XII.34. Thus: (39.8% of the 68.3% Dark Energy) in the Universe today measured by the Planck space telescope (see XII.2.3.) is attributable to the annihilation of a $(66.6\% - 26.8\%) = 39.8\%$ Dark Matter fraction of the Universe.

The rest, namely a $(68.3\% - 39.8\%) = (28.5\%)$ Dark Energy fraction of the Universe, comes from Normal Matter/Antimatter pair annihilation processes that occur within the $(33.3\% \text{ Normal Matter/Antimatter fraction})$ of the Universe, as follows:

Right at the beginning of the existence of the Universe, i.e. immediately after the Big Bang phase (creation phase), as soon as (e^\pm, p^\pm) were created, the “rapid” $(e^\pm \text{ and } p^\pm)$ -annihilation processes began within the Normal Matter/Antimatter segment, as described in detail in **XII.17.** \rightarrow **XII.30.** :

XII.35.



XII.36.

This leads to the annihilation of mass, which is compensated by the construction of the expanding 4-dimensional space-time elementary structures \textcircled{C} coupled to the long-range massless energy-momentum bosons $\bar{\Psi} \bar{\Psi} \Psi \Psi$ (1-split) .

XII.37.

In the period between the beginning of the Universe and the moment of decoupling (380,000 years after the Big Bang), these processes lead to the deconstruction of **(21.3% Normal Matter/Antimatter)** in the Universe, and conversely to the construction of a **(21.3% energy-momentum in the Universe)**, which by **XII.35.** is coupled to the construction of expanding 4-dimensional space-time **(6)**, and which may therefore be classified in the category of “Dark Energy”.

XII.38.

Furthermore, between the moment of decoupling and “Today”, by **XII.2.2.**, **XII.2.3.**, the fraction of Normal Matter in the Universe decreased from **(12% down to 4.8% today)**, which was triggered by the sum of all sporadically occurring **($e^+ e^-$)**- and **($p^+ p^-$)**-annihilation processes throughout this extended period of time, which then created a **(fraction of 12% - 4.8% = 7.2% Dark Energy in the Universe)**.

XII.39.

Overall, this means:

The 68.3% Dark Energy fraction of the Universe measured “Today” by the Planck space telescope **XII.2.3.** consists of:

| | |
|-------|--|
| 39.8% | fraction from Dark Matter annihilation between decoupling and today. |
| 21.3% | fraction from Normal Matter/Antimatter annihilation between the Big Bang and decoupling. |
| 7.2% | fraction from Normal Matter/Antimatter annihilation between decoupling and today. |

|||

(68.3% Dark Energy fraction of the Universe “Today”)

The Dark Energy bosons thus created from the pairwise annihilation of mass **XII.12.**, **XII.17.** are automatically, inevitably, and necessarily,

by the **highest conservation principle of all events in the Universe** \equiv
 \equiv **conservation of 13 splits per elementary set,**
applicable to both Dark Matter and Normal Matter/Antimatter ,

XII.40. coupled to the construction of an object with **4 or 4+2 released splits** ,
 i.e. a physical “construction” built from the **4 or 4+2 splits released** from the pairwise annihilation
 of mass **XII.12.**, **XII.17.** in which these **released splits are incorporated** , and by means of which the
 expanding **4- or 4+2-dimensional elementary space structure entities** are constructed in every
 event associated with an annihilation process. In summary:

XII.41. An expanding space is constructed with 4-dimensional space-time elementary units **⑥** (space-time-quantums)
 i.e. with an
 and integrated

- “outer” 4-dimensional space-time structure(4-dimensional space-time-quantums **⑥**)
- “inner” 2-dimensional SU2 structure (isospace in case of normal matter)
 as is consistent with reality.
- “inner” 2-dimensional structure analogously to the isospace in the case of dark matter,
 which has to be proven experimentally and probably has to do with a „gravitational charge“.

Thus, the composition of the Universe “Today” can be divided into the following 3 parts:

XII.42.

Component ① ≡ 26.8 % ≡ Dark Matter

| | | Inner-Structural Particle Composition | |
|--------------------------|-----------------|--|-------------------|
| neutrino ₁ | (ν_1) | $\boxed{\Psi \Psi \bar{\Psi}} (\epsilon_9, \epsilon_8)$ | ≡ 2-split fermion |
| neutrino ₂ | (ν_2) | $\boxed{\bar{\Psi} \Psi \Psi} (\epsilon_4, \epsilon_5)$ | ≡ 2-split fermion |
| neutrino ₃ | (ν_3) | $\boxed{\Psi \bar{\Psi} \Psi} (\epsilon_1)$ | ≡ 1-split fermion |
| anti-gravitational boson | (\widehat{G}) | $\boxed{\Psi \Psi} \text{---} \boxed{\Psi \Psi} (\epsilon_6, \varrho; \lambda, \epsilon_2)$ | ≡ 4-split boson |
| repulsive-Boson | (R_ϱ) | $\boxed{\bar{\Psi}} \text{---} \boxed{\bar{\Psi}} (0)$ | ≡ 0-split boson |
| gravitational boson | (\widehat{G}) | $\boxed{\bar{\Psi} \Psi} \text{---} \boxed{\bar{\Psi} \Psi} (\xi, \epsilon_7, \epsilon_3, \eta)$ | ≡ 4-split boson |

Component ② ≡ 4.9 % ≡ Normal Matter/Antimatter

| Component 2 ≡ 33,3 % | | Inner-Structural Particle Composition | |
|--|---------------|---|-------------------|
| proton (antiproton*) | $(p^+)(p^-)$ | $\boxed{\Psi \Psi \bar{\Psi}} (\epsilon_9, \xi, \varrho, \epsilon_8)$ | ≡ 4-split fermion |
| electron (positron*) | $(e^+)(e^-)$ | $\boxed{\bar{\Psi} \Psi \Psi} (\epsilon_4, \eta, \epsilon_5)$ | ≡ 3-split fermion |
| neutrino | (ν) | $\boxed{\Psi \bar{\Psi} \Psi} (\epsilon_1)$ | ≡ 1-split fermion |
| strong force | (St) | $\boxed{\Psi \Psi} (\lambda, \epsilon_2)$ | ≡ 2-split boson |
| energy-momentum | $(E-I)$ | $\boxed{\bar{\Psi} \Psi} \text{---} \boxed{\Psi \bar{\Psi}} (\epsilon_6, \epsilon_3)$ | ≡ 2-split boson |
| partial decomposition into | $(\gamma)(Z)$ | $\boxed{\bar{\Psi} \Psi} \text{---} \boxed{\Psi \bar{\Psi}} (\epsilon_6, \epsilon_3)$ | ↓ |
| electromag. force | (γ) | $\boxed{\bar{\Psi} \Psi} (0 \text{ Split})$ | ≡ 0-split boson |
| weak force | (Z) | $\boxed{\Psi \bar{\Psi}} (\epsilon_6, \epsilon_3)$ | ≡ 2-split boson |
| gravitation | (G) | $\boxed{\bar{\Psi} \Psi} \text{---} \boxed{\bar{\Psi} \Psi} (\epsilon_7)$ | ≡ 1-split boson |
| as well as the resulting annihilation end products $((e^+, e^-, p^+, p^-))$, see XI.29. | | | |

XII.42.

Component ③ \equiv 68.3 % \equiv Dark Energy with the coupled construction of expanding 4-dimensional space-time

- of which 28.5% \equiv energy-momentum bosons $(\bar{\Psi} \bar{\Psi} \Psi \Psi \text{ (1-split)})$
 with the coupled construction of expanding 4-dimensional space-time,
 created from the annihilation of a 28.5% fraction of Normal Matter/Antimatter (see XII.17.)

- of which 39.8 % \equiv energy-momentum bosons $(\tilde{\bar{\Psi}} \tilde{\bar{\Psi}} \tilde{\Psi} \tilde{\Psi} \text{ (1-split)})$
 with the coupled construction of expanding 4-dimensional space-time,
 created from the annihilation of a 39.8% fraction of Dark Matter (see XII.12.)

XII.43.

If we summarize the history of the Universe from its creation until Today, as in Chap. **XI.**, **XII.**, there are two important points to note:

- In the creation act of the Universe 13.8 billion years ago, the initial composition of the Universe resulted from a most colossally gigantic cascade of individual finely detailed elementary processes, namely the Big Bang cascade (**XI.23.**), and was specifically given by **(66.6% Dark Matter + 33.3% Normal Matter/Antimatter)**, with the elementary particles listed individually in **XI.36.**

Presumably – as conjectured by some sources – the Universe directly after the Big Bang was a most colossally dense “tiniest object of around 10cm in size”. 4-dimensional **space-time** did not yet exist in this creation phase of the Universe (Big Bang).

XII.43.

- After the Universe was created as described above, and the elementary particles of matter had formed individually, the matter-mass annihilation processes immediately began, thus leading (by XII.17., XII.12., XII.13.) to the construction of expanding space-time:
 - The first processes to be initiated were the inner-structurally simpler Normal Matter/ Antimatter annihilation processes, the details of which are derived in EAU. Thus: It is shown that these annihilation processes and the associated deconstruction of mass led to the following transformation processes:

structured mass ($e^+ e^-, p^+ p^-$) $\xrightarrow{\quad}$ into

structured energy ($\bar{\psi} \bar{\psi} \psi \psi$ (1-split)) + construction of expanding space-time

- Later, the more complex annihilation processes of Dark Matter began, namely the transformation processes:

structured mass ($G \bar{G}$) $\xrightarrow{\quad}$ into

structured Dark Energy ($\tilde{\bar{\psi}} \tilde{\bar{\psi}} \psi \psi$ (1-split)) + construction of expanding space-time

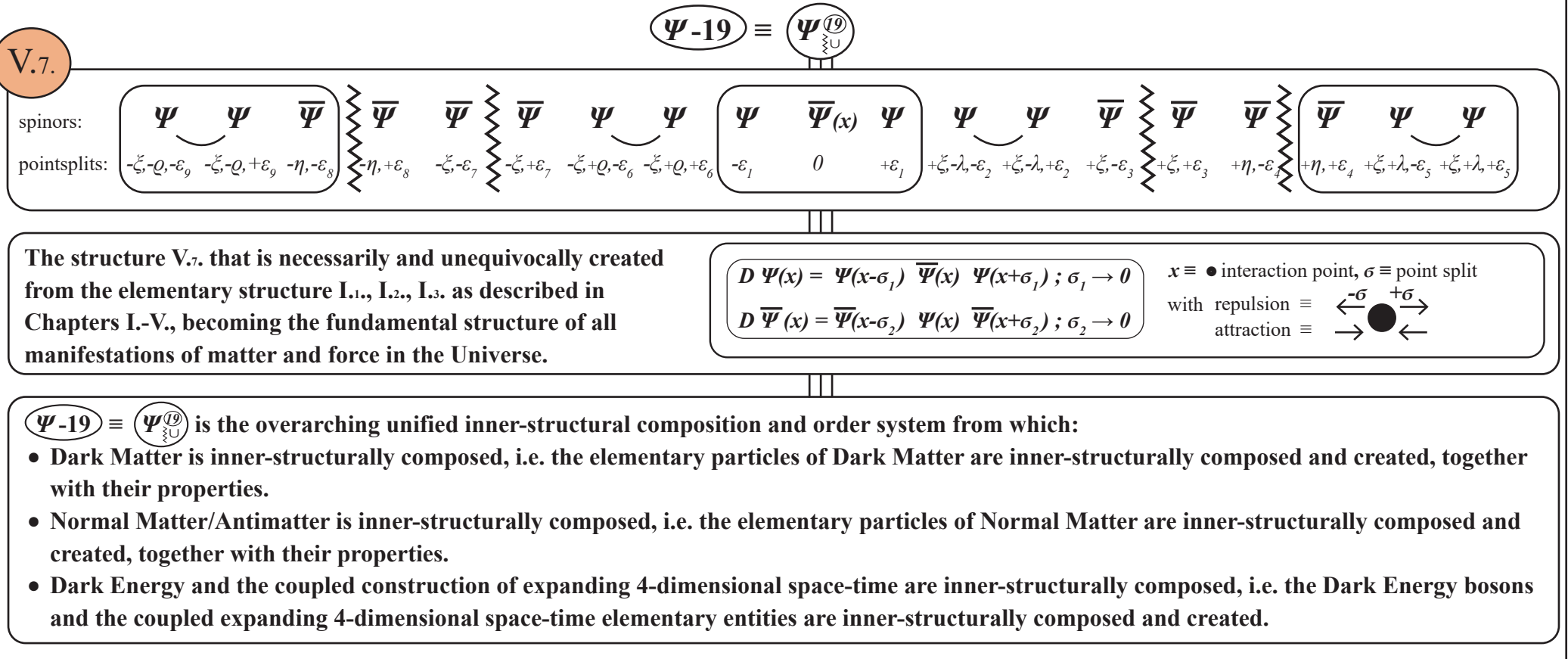
as described in detail in this work.

Thus: The matter-mass annihilation processes that have been continuously unfolding since the beginning of the Universe lead to the continuously accumulating construction of 4-dimensional space-time, and thus to a constant intensification of this construction of expanding space-time.

After various phases, corresponding to different matter-mass annihilation profiles, this has led and continues to lead to an accelerated expansion of the Universe, as is e.g. observable today.

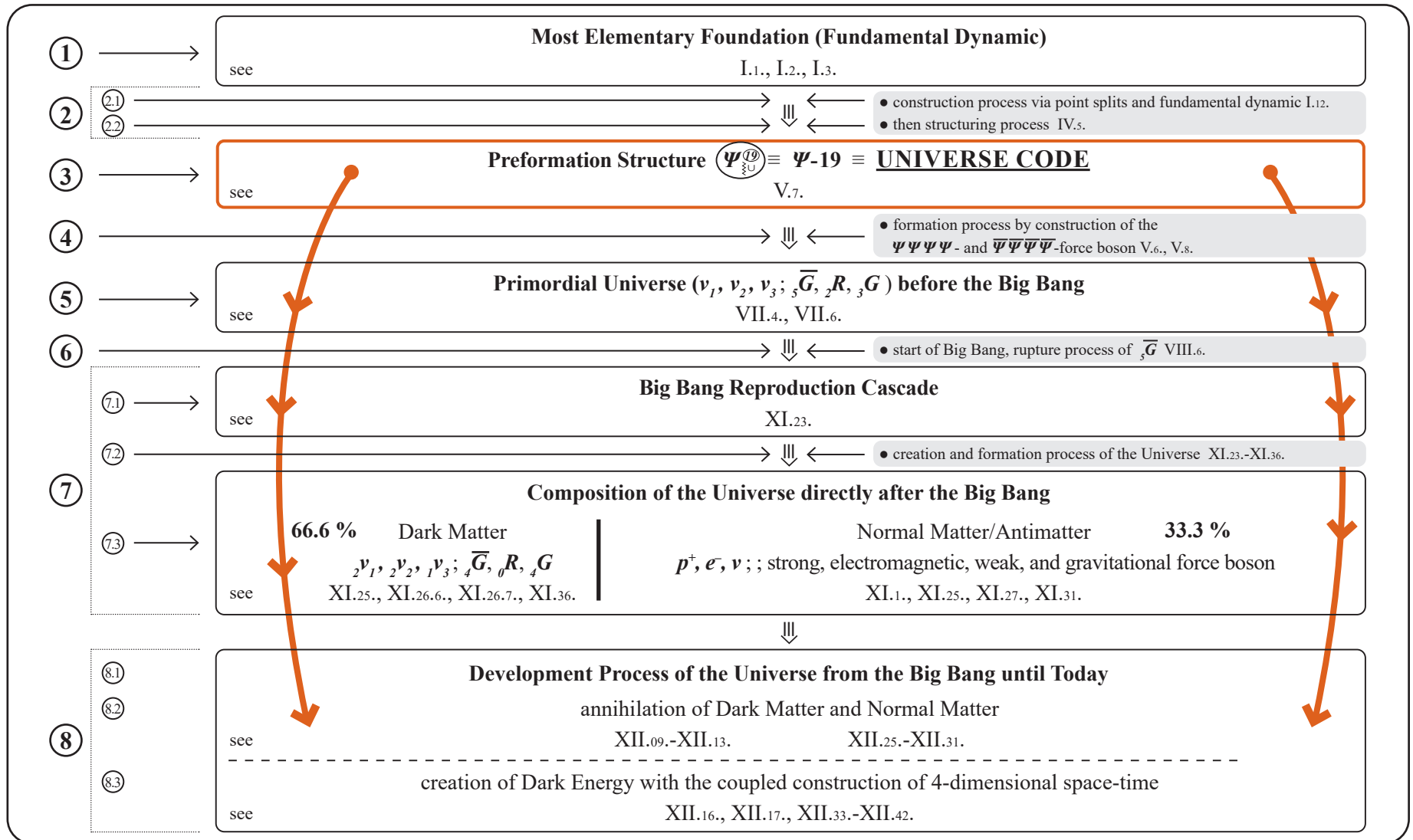
Chapter XIII.*

The Universe Code Ψ -19, the Complete Formula of the Universe



* Chapter XIII. has also been published separately as “The Universe Code Ψ -19, the Complete Formular of the Universe” on 17/03/2017.

Chapters I.-XII. presents and explains the construction and development process of the Universe in terms of both its overall structure and the causal connections between its parts. During the construction and development process of the Universe, the following chain of global and individual processes unfolds:



XIII.1.

We shall now give individual descriptions of the step ①-⑧ in XIII.1. :

The following individual descriptions XIII.1. ① - XIII.1. ⑧ of the chain of processes in the construction and development of the Universe each correspond to the chapters, sections, and subsections in Chap. I.-XIII. The reader can therefore refer to this additional relevant content in each case. Nevertheless, a minimal effort has been made to be self-sufficient in each of the following individual descriptions XIII.1. ① - XIII.1. ⑧.

The objective of Chapter XIII. is to show that all manifestations of matter and force in the Entire Universe developed from one and the same original structure \equiv Universe Code Ψ -19 \equiv preformation structure $\Psi_{\text{U}}^{(19)} \equiv$ V.7. meaning that they all come from the same identical origin.

This original underlying structure of everything is reflected even Today in the form of the Universe Code Ψ -19 in the inner-structural composition of each elementary particle in the elementary particle sets of

- Dark Matter
- Normal Matter/Antimatter
- Dark Energy with the coupled construction of expanding 4-dimensional space time elementary entities

(see (XI.36. , XI.42.).

The inner-structural composition of each elementary particle unequivocally determines its physical properties (see V.6. , VI.3.). These elementary particles are therefore in principle experimentally observable, provided that the necessary experimental conditions can be met.

Normal Matter/Antimatter has been extensively researched experimentally (e.g. at Cern).

Dark Matter and Dark Energy will be experimentally observed and researched in future (e.g. at Cern).

We have only just begun, but we hope to be on the right path.

This publication presents a global theory that includes Dark Matter and Dark Energy as well as Normal Matter/Antimatter, and which can analytically determine and represent the elementary particles corresponding to each type of matter. Within the context of this theory, it is shown that all elementary particles

- of Dark Matter**
- of Normal Matter/Antimatter**
- of Dark Energy with the coupled construction of expanding 4-dimensional space-time**

existing in the Universe are uniformly developed and constructed from the Universe Code Ψ -19.

This identical inner-structural origin of all elementary particles, i.e.

- of Dark Matter**
- of Normal Matter/Antimatter**
- of Dark Energy with the coupled construction of expanding 4-dimensional space-time**

is presented in full detail in terms of the inner-structural composition of each elementary particle

in XIII.1. 7.2.1 for the elementary particles of Dark Matter

in XIII.1. 7.2.2 for the elementary particles of Normal Matter/Antimatter

in XIII.1. 8.2 / 8.3 for Dark Energy and the coupled expanding 4-dimensional space-time elementary entities

Readers who are specifically interested in the Universe Code Ψ -19 as the unified origin of all elementary particles in the Universe can skip the next sections XIII.1. ① - XIII.1. ⑥ and resume reading at sections

XIII.1. 7.2, XIII.1. 7.3, XIII.1. 8.2, XIII.1. 8.3 .

Thus: Specifically, the following detailed chain of processes unfolds, corresponding to the subsection **XIII.1.** :

XIII.1. ① : The formation of the most elementary foundation (fundamental dynamic) (see I.1. - I.4.):

Ψ exists as the most general possible “Something”, and there exists a “Something Else” that can be distinguished from this “Something”, namely $\bar{\Psi}$. Both of these things satisfy the simplest possible non-linear interaction with respect to each other, which is (with $D \equiv \frac{d}{dx}$ and $dx \equiv \sigma$):

I.1. $D \Psi(x) = \Psi(x-\sigma_\alpha) \bar{\Psi}(x) \Psi(x+\sigma_\alpha) ; \sigma_\alpha \equiv \text{point split with } \sigma_\alpha \rightarrow 0$

I.2. $D \bar{\Psi}(x) = \bar{\Psi}(x-\sigma_\beta) \Psi(x) \bar{\Psi}(x+\sigma_\beta) ; \sigma_\beta \equiv \text{point split with } \sigma_\beta \rightarrow 0$

\equiv

most elementary
structure

where $x \equiv \bullet \equiv$ interaction point satisfying: point split dynamic $\sigma \neq 0, \sigma \rightarrow 0$

repulsion \equiv separation

attraction \equiv binding



repulsion \equiv separation

attraction \equiv binding

Thus: The point split is unequivocally defined by the differential operator $D \equiv \frac{d}{dx}$, namely as $dx \equiv \sigma$, and acts according to the system of equations **I.1.** and **I.2.** The point split structure **repulsion and attraction** describes the elementary structure of every possible force within the global system, and so no further assumptions are required.

If **I.1.** and **I.2.** each hold independently of each other, then both $\Psi(x)$ and $\bar{\Psi}(x)$ must be 4-component spinors, for the following reason: From **I.1.** it follows that: $D \Psi = \Psi_2 \bar{\Psi}_3 \Psi_4$ and from **I.2.** it follows that: $D \bar{\Psi} = \bar{\Psi}_5 \Psi_6 \bar{\Psi}_8$, and so if both **I.1.** and **I.2.** hold, there is the following spinor structure.

I.2.2.

Ψ is a $\Psi = \begin{pmatrix} \Psi & \Psi & \Psi & \Psi \\ 1 & 2 & 4 & 7 \end{pmatrix}$ -spinor, i.e. a 4-component spinor

$\bar{\Psi}$ is a $\bar{\Psi} = \begin{pmatrix} \bar{\Psi} & \bar{\Psi} & \bar{\Psi} & \bar{\Psi} \\ 3 & 5 & 6 & 8 \end{pmatrix}$ -spinor, i.e. a 4-component spinor

I.3.

From the fundamental interaction: $D \Psi = \Psi \bar{\Psi} \Psi$ and $D \bar{\Psi} = \bar{\Psi} \Psi \bar{\Psi}$, it follows that:
By definition, the differential operator D has a so-called length dimension of -1
(definition: $\dim D = -1$). Therefore, from this fundamental interaction:

$$\text{length dimension of } \Psi = -\frac{1}{2} ; \dim \Psi = -\frac{1}{2} \quad \text{length dimension of } \bar{\Psi} = -\frac{1}{2} ; \dim \bar{\Psi} = -\frac{1}{2} ,$$

1

Because both $\Psi_{(x)}$ and $\bar{\Psi}_{(x)}$ have length dimension $-\frac{1}{2}$:

The basis spinors $\Psi_{(x)}$ and $\bar{\Psi}_{(x)}$ are not observable entities. Observable entities satisfy the following:

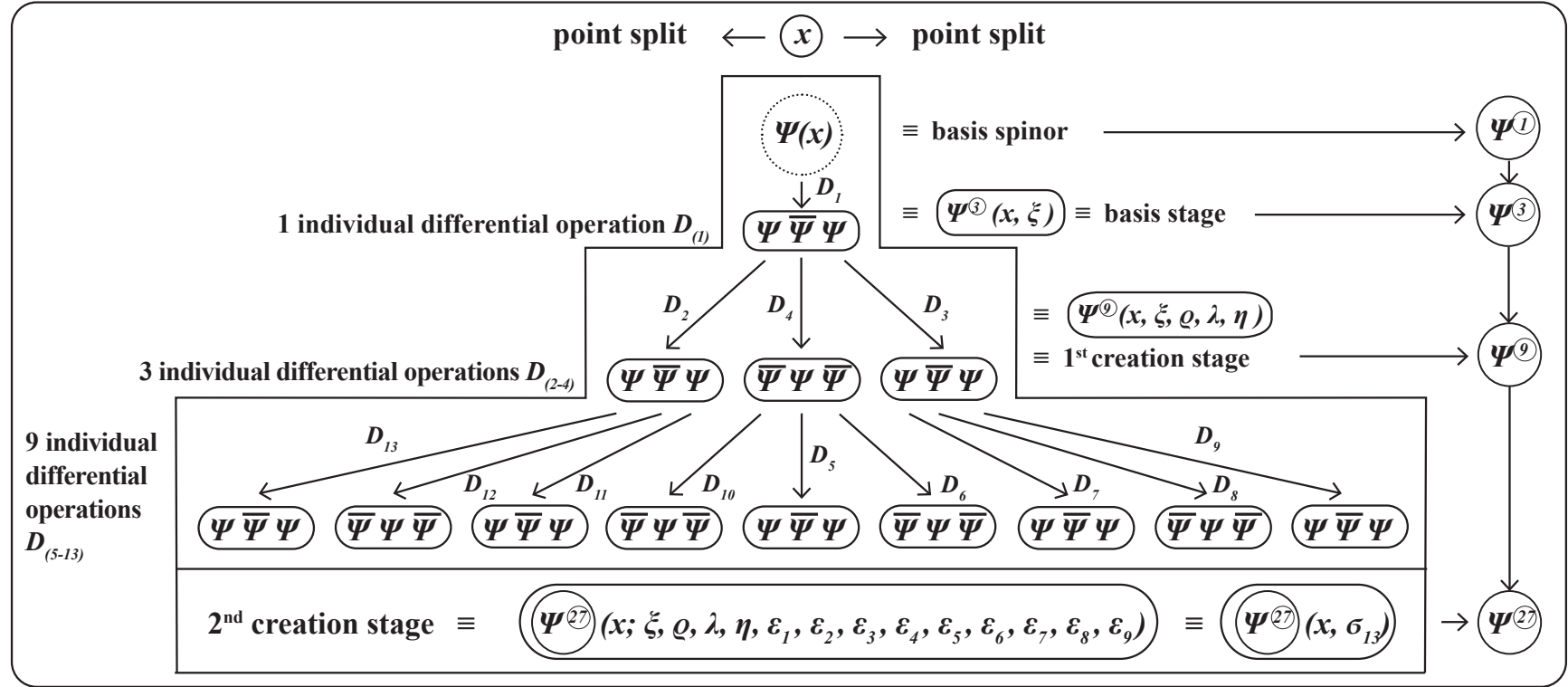
I.4.

- observable fermions have dimension $-\frac{3}{2}$ and are therefore $\Psi^{(3)}$ -objects ^{*1)}
- observable bosons have dimension -1 or -2 and are therefore $\Psi^{(2)}$ - or $\Psi^{(4)}$ -objects

*1) Remark: The notation $\Psi^{(n)}$, $n=1, 2, 3, 4$ means: spinor product of n spinors, either of the form $\bar{\Psi}$ or Ψ .

This notation is also applicable in general for $n > 4$, in which case it refers to the point split-separated local neighbourhood (x, σ) .

XIII.1. ②, ②.1: The formation of the construction process via point splits and the fundamental dynamic (see I.12., III.4.1.):



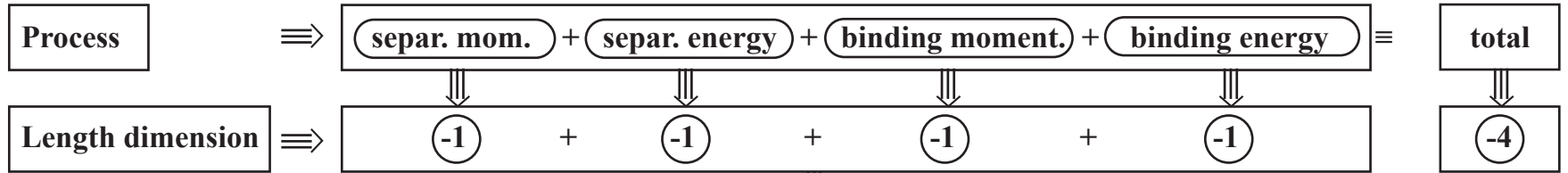
Taking into account the local arrangement – with the ordering from II.4. – of the 1st creation stage $\Psi^{(9)}(x, \sigma_4)$ as well as the point split-separated 2nd creation stage $\Psi^{(27)}(x, \sigma_{13})$ created by the 2nd fundamental process – as described in III.1. to III.4. – the following specifically holds:

$\Psi^{(27)}$

| Ψ | $\bar{\Psi}$ | Ψ | $\bar{\Psi}$ | Ψ | $\bar{\Psi}$ | $\bar{\Psi}$ | Ψ | $\bar{\Psi}$ | Ψ | $\bar{\Psi}$ | Ψ | Ψ | $\bar{\Psi}$ | Ψ | Ψ | $\bar{\Psi}$ | Ψ | $\bar{\Psi}$ | Ψ | $\bar{\Psi}$ | $\bar{\Psi}$ | Ψ | $\bar{\Psi}$ | Ψ | $\bar{\Psi}$ | Ψ |
|------------------|------------------|------------------|------------------|---------|------------------|------------------|--------|------------------|------------------|------------------|------------------|------------------|--------------|------------------|------------------|------------------|------------------|------------------|--------|------------------|------------------|---------|------------------|------------------|------------------|------------------|
| x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x |
| $-\xi - \varrho$ | $-\xi - \varrho$ | $-\xi - \varrho$ | $-\eta$ | $-\eta$ | $-\eta$ | $-\xi$ | $-\xi$ | $-\xi$ | $-\xi + \varrho$ | $-\xi + \varrho$ | $-\xi + \varrho$ | 0 | 0 | 0 | $+\xi - \lambda$ | $+\xi - \lambda$ | $+\xi - \lambda$ | $+\xi$ | $+\xi$ | $+\xi$ | $+\eta$ | $+\eta$ | $+\eta$ | $+\xi + \lambda$ | $+\xi + \lambda$ | $+\xi + \lambda$ |
| $-\varepsilon_9$ | 0 | $+\varepsilon_9$ | $-\varepsilon_8$ | 0 | $+\varepsilon_8$ | $-\varepsilon_7$ | 0 | $+\varepsilon_7$ | $-\varepsilon_6$ | 0 | $+\varepsilon_6$ | $-\varepsilon_1$ | 0 | $+\varepsilon_1$ | $-\varepsilon_2$ | 0 | $+\varepsilon_2$ | $-\varepsilon_3$ | 0 | $+\varepsilon_3$ | $-\varepsilon_4$ | 0 | $+\varepsilon_4$ | $-\varepsilon_5$ | 0 | $+\varepsilon_5$ |

III.4.1.

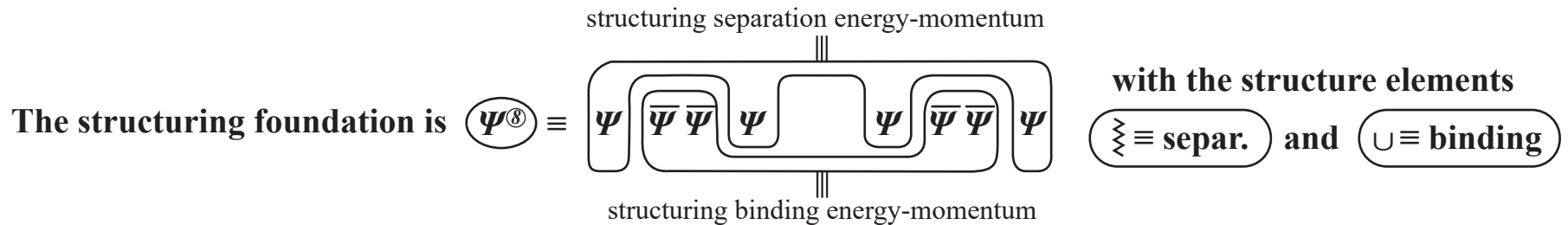
XIII.1. ②, ②.2: The formation of the structuring and preformation processes (see I.8., IV.1. - IV.8.):



Thus: The overall structuring process requires a basis spinor set of length dimension -4

\Rightarrow This means: The spinor raw material generated by **I.6.** must include a spinor subset of dimension -4, which is required for structuring. Since, by **I.3.**, the basis spinors Ψ and $\bar{\Psi}$ have dimension $-\frac{1}{2}$, $\dim \Psi = -\frac{1}{2}$, this must namely be

a spinor subset $\Psi^{\otimes 8}$ with $[\dim \Psi^{\otimes 8}] = [\dim -4]$



(2.2) \Rightarrow How exactly the structuring foundation Ψ^8 forms is described below:

By means of the point split:

First point split $\sigma \neq 0$: $\leftarrow x \rightarrow$ (repulsion)

Then point split $\sigma \rightarrow 0$: $\rightarrow x \leftarrow$ (attraction)

the structuring dynamic that will be developed by the global system according to III.7. is released:

IV.1.

The splits ξ and η (and no others) split directly at the point of interaction x – as shown in III.6.1. – and are therefore primary splits.

2

In this (primary separation process), the 4 spinors of the $\Psi^{27}(x, \sigma_{I_3})$ -system directly associated with the (primary splits $-\xi, -\eta, +\xi, +\eta$) (see III.4. and in particular III.4.1.), namely:

IV.2.

$\overbrace{\Psi(x-\xi) \dots \Psi(x-\eta) \dots \Psi(x+\xi) \dots \Psi(x+\eta)}$ form into the (separation energy-momentum) necessary by I.8.1. to endow the spinor set $\Psi^{27}(x, \sigma_{I_3})$ with the structure of 4 separating elements $\dots \tilde{\sim} \dots \tilde{\sim} \dots \tilde{\sim} \dots \tilde{\sim} \dots$.

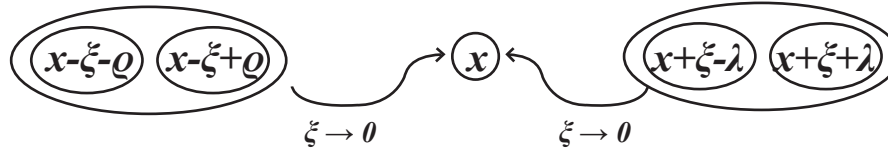
(2.2) \Rightarrow The binding structure works analogously:

The spinors of $\Psi^{(27)} \equiv \text{III.4}$ at the local points $(x-\xi-q), (x-\xi+q), (x+\xi-\lambda), (x+\xi+\lambda)$, – thus also without an ξ -split – have a binding effect, since the (splits q, λ) of these spinors are not directly located at the origin of interaction (x) , or in other words they are not primary splits, but instead split at points in space-time $(x \pm \xi)$ that already have an ξ -split, and thus are secondary splits.

As a consequence of this, the dynamic point split process:

first, point split $\sigma \neq 0$ (here $\xi \neq 0$), then, point split $\sigma \rightarrow 0$ (here $\xi \rightarrow 0$) acts as a (binding structure) as $\xi \rightarrow 0$

IV.3.



IV.4.

Thus: There exists the binding (energy-momentum) $\equiv \overline{\Psi}(x-\xi-q) \dots \overline{\Psi}(x-\xi+q) \dots \overline{\Psi}(x+\xi-\lambda) \dots \overline{\Psi}(x+\xi+\lambda)$ which endows the spinor set $\Psi^{(27)}(x, q_{13})$ with the structure of 4 binding elements.

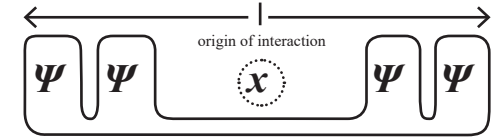
This causes the following dynamic system process to unfold: “First, point split $\sigma \neq 0$ ” and “then, point split $\sigma \rightarrow 0$ ”.

This creates the structuring required by the process: (separation) and (binding) (see III.6.2).

2.2 \Rightarrow

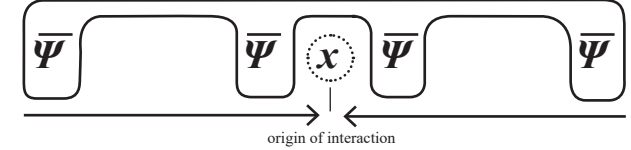
Namely as

$$\text{structuring separation energy-momentum} \equiv (E - I)_{\text{separation}} \equiv$$



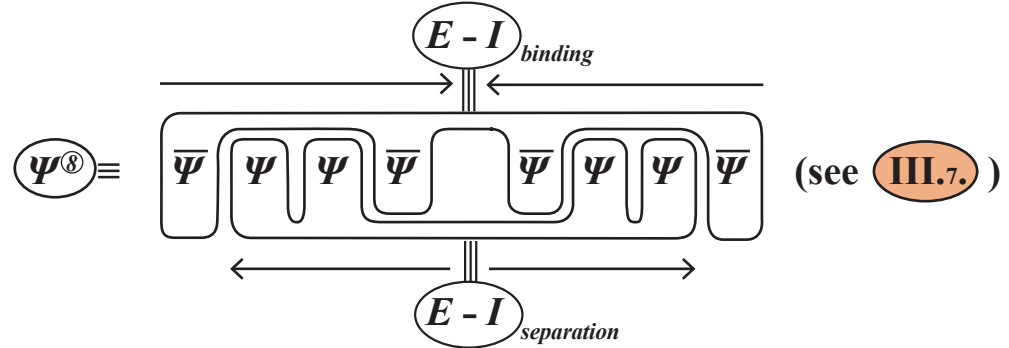
and

$$\text{structuring binding energy-momentum} \equiv (E - I)_{\text{binding}} \equiv$$



IV.5.

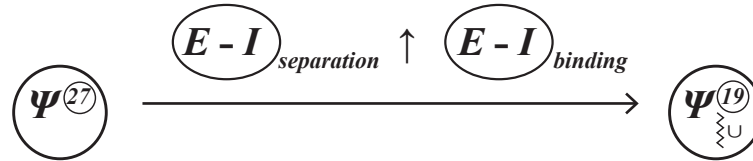
The structuring foundation is



2

Thus: In the 3rd fundamental process, the **separation and binding energy-momentum** $\equiv \Psi^8$ begins to act (see I.8.1.). This action causes it to be consumed as the structuring is completed, creating the subsequently **active separation and binding elements “ \tilde{z} ” and “ \cup ” in the resulting Ψ^{19} -spinor set**.

IV.6.



Thus, the Ψ^{19} -spinor set, structured with the structural elements $\tilde{z} \equiv \text{separation}$ and $\cup \equiv \text{binding}$ in order to allow particle formation, is unequivocally generated as follows:

(2.2) \Rightarrow

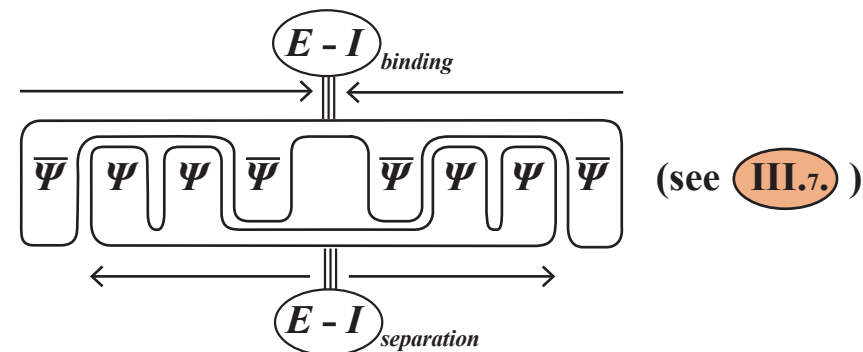
IV.7.

The individual spinors that make up the $(E - I)_{\text{separation}}$ act with a structuring effect and are consumed by this structuring action, forming the separation **energy-momentum**, namely $(E - I)_{\text{separation}}$ which acts from within $\Psi^{(27)}$. Wherever these $(E - I)_{\text{separation}}$ spinors act, the **separation structure element** \approx is created.

The **binding energy-momentum** $\equiv (E - I)_{\text{binding}}$, works analogously, namely:

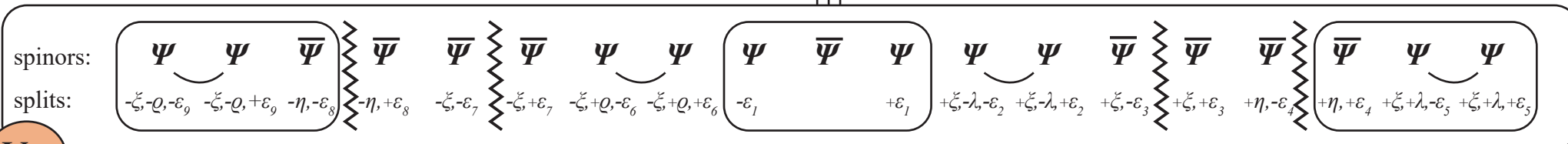
The individual spinors that make up the $(E - I)_{\text{binding}}$ act with a structuring effect and are consumed by this structuring action, forming the internally-acting **binding energy-momentum** $(E - I)_{\text{binding}}$. This binding action is what consumes them. Wherever these $(E - I)_{\text{binding}}$ -spinors act, the **binding structure element** \cup is created.

IV.8.

$$\Psi_{\text{U}}^{(19)} \equiv \Psi-19$$
$$\psi^8 \equiv$$


$\Psi^{27} \equiv \text{III.4.1.}$

| Ψ | $\overline{\Psi}$ | Ψ | $\overline{\Psi}$ | Ψ | $\overline{\Psi}$ | $\overline{\Psi}$ | Ψ | $\overline{\Psi}$ | Ψ | $\overline{\Psi}$ | Ψ | Ψ | $\overline{\Psi}$ | Ψ | Ψ | $\overline{\Psi}$ | Ψ | $\overline{\Psi}$ | Ψ | $\overline{\Psi}$ | $\overline{\Psi}$ | Ψ | $\overline{\Psi}$ | Ψ | $\overline{\Psi}$ | Ψ |
|------------------|-------------------|------------------|-------------------|---------|-------------------|-------------------|--------|-------------------|------------------|-------------------|------------------|------------------|-------------------|------------------|------------------|-------------------|------------------|-------------------|--------|-------------------|-------------------|---------|-------------------|------------------|-------------------|------------------|
| x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x |
| $-\xi-q$ | $-\xi-q$ | $-\xi-q$ | $-\eta$ | $-\eta$ | $-\eta$ | $-\xi$ | $-\xi$ | $-\xi$ | $-\xi+q$ | $-\xi+q$ | $-\xi+q$ | 0 | 0 | 0 | $+\xi-\lambda$ | $+\xi-\lambda$ | $+\xi-\lambda$ | $+\xi$ | $+\xi$ | $+\xi$ | $+\eta$ | $+\eta$ | $+\eta$ | $+\xi+\lambda$ | $+\xi+\lambda$ | $+\xi+\lambda$ |
| $-\varepsilon_9$ | 0 | $+\varepsilon_9$ | $-\varepsilon_8$ | 0 | $+\varepsilon_8$ | $-\varepsilon_7$ | 0 | $+\varepsilon_7$ | $-\varepsilon_6$ | 0 | $+\varepsilon_6$ | $-\varepsilon_1$ | 0 | $+\varepsilon_1$ | $-\varepsilon_2$ | 0 | $+\varepsilon_2$ | $-\varepsilon_3$ | 0 | $+\varepsilon_3$ | $-\varepsilon_4$ | 0 | $+\varepsilon_4$ | $-\varepsilon_5$ | 0 | $+\varepsilon_5$ |



V.7.

XIII.1. ④: The formation process via the construction of the $\Psi\Psi\Psi\Psi$ and $\bar{\Psi}\bar{\Psi}\bar{\Psi}\bar{\Psi}$ -force bosons (see V.5. - V.8):

Because of the pre-established action and function of the structure foundation $\Psi^{(8)}$ (IV.5.) the following holds from the very beginning of all events that unfold within the Universe:

$\Psi\Psi\Psi\Psi$ -configurations have a separating effect \equiv repulsive

$\bar{\Psi}\bar{\Psi}\bar{\Psi}\bar{\Psi}$ -configurations have a binding effect \equiv attractive

Furthermore: Each separation structure element \approx in the preformation structure $\Psi^{(19)}$ (V.1.) is directly surrounded by 2 $\bar{\Psi}$ -spinors, i.e. $\bar{\Psi}\approx\bar{\Psi}$.

Thus, in all subsequent events (all events in the Universe until today),

the spinor configuration $\bar{\Psi}\bar{\Psi}$ is predetermined to be repulsive – we could also say that this is “pre-established”, following from the most fundamental structure act IV.5. that precedes all events in the Universe.

Also: Each binding structure element \cup in the preformation structure $\Psi^{(19)}$ (V.1.) is directly surrounded by 2 Ψ -spinors, i.e. $\Psi\cup\Psi$.

Thus, in all subsequent events (all events in the Universe until today),

the spinor configuration $\Psi\Psi$ is predetermined to be attractive – we could also say that this is “pre-established”, following from the most fundamental structure act IV.5. that precedes all events in the Universe.

④ \Rightarrow

These properties **V.5.**, which are caused by the fundamental structuring into “separation” and “binding” (see **IV.5.**) and which therefore hold throughout the whole construction of the Universe and the whole history of the Universe from the very beginning, namely **the following pre-established properties**:

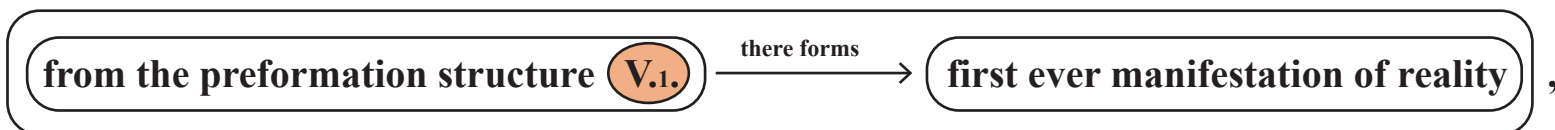
| | | |
|---|---------------------|---------------------|
| $\Psi \ \Psi \ \Psi \ \Psi$ | \equiv separation | \equiv repulsion |
| $\bar{\Psi} \ \bar{\Psi} \ \bar{\Psi} \ \bar{\Psi}$ | \equiv binding | \equiv attraction |
| $\Psi \ \Psi$ | \equiv binding | \equiv attraction |
| $\bar{\Psi} \ \bar{\Psi}$ | \equiv separation | \equiv repulsion |

 \equiv fundamental force structure

also cause the boson force structure intrinsic to this first ever Primordial Universe to form at the beginning of all events in the Universe, namely in the first creation act of the Primordial Universe.

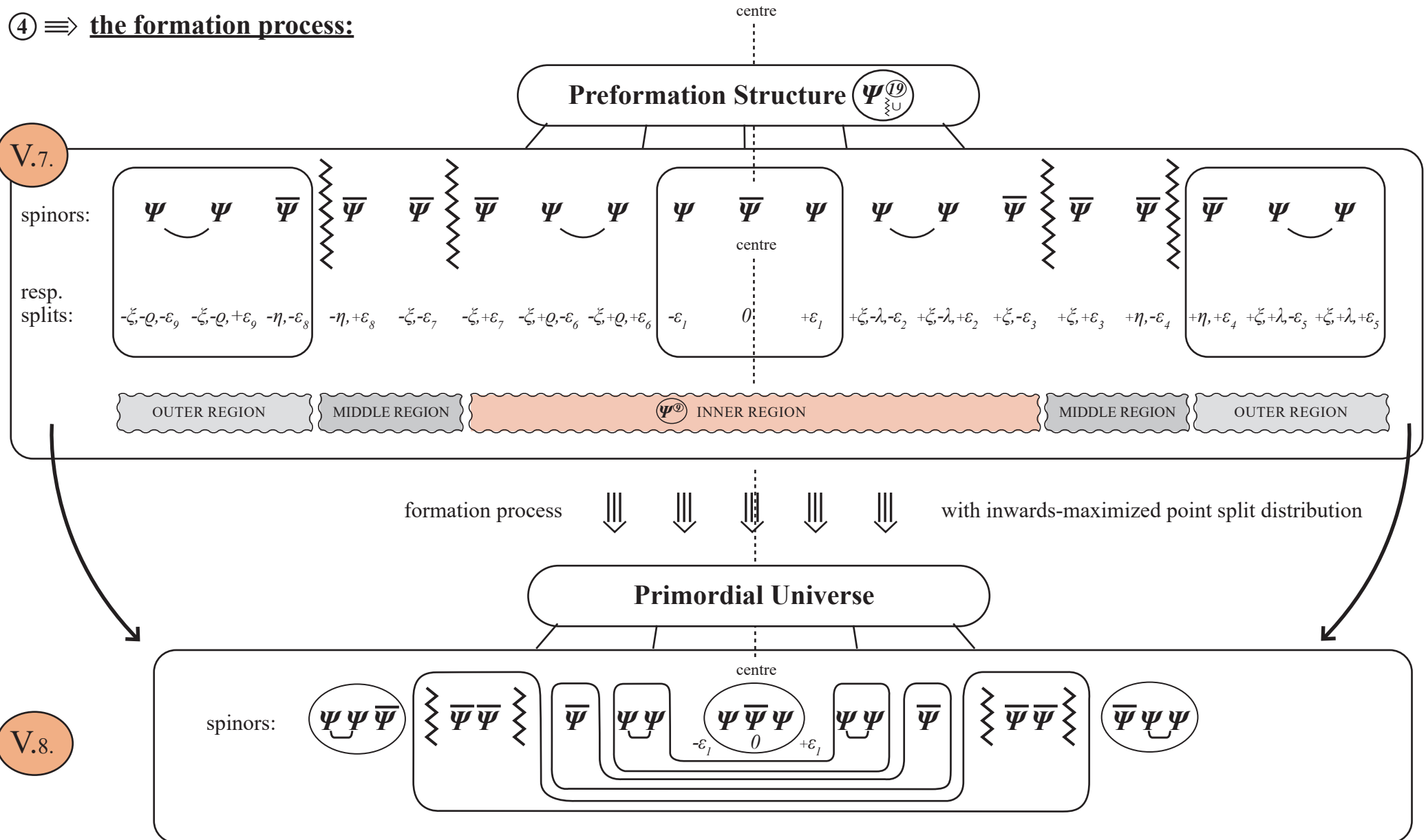
The structure of the Primordial Universe may therefore be described as follows:

By **V.3.** the structure of the Primordial Universe is



together with the point split densities formed in the dynamic creation process:

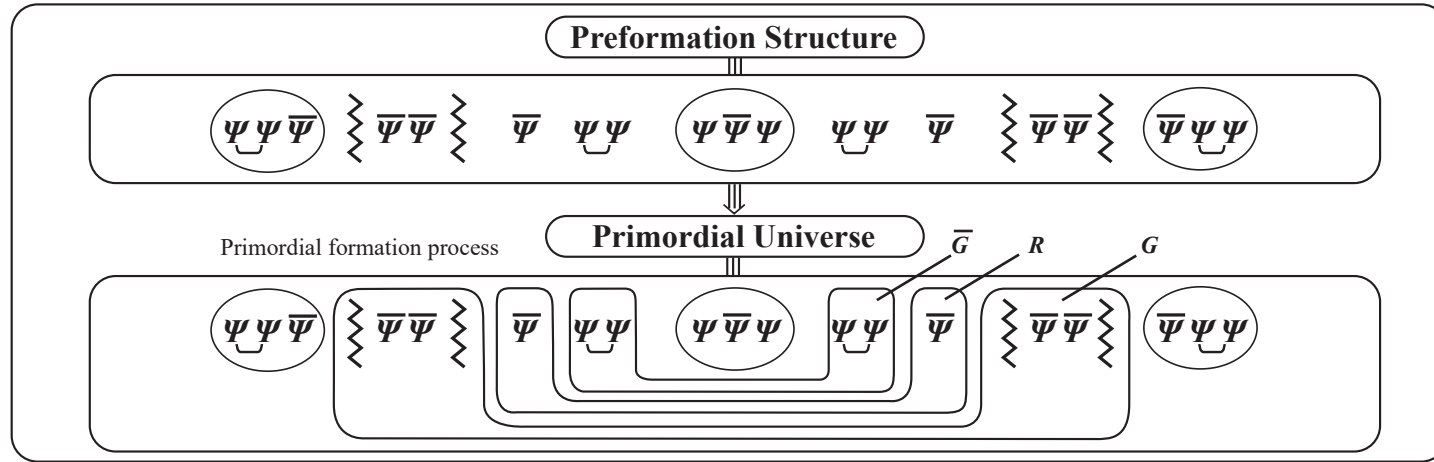
④ \Rightarrow **the formation process:**



XIII.1. ⑤: The Primordial Universe before the Big Bang: The first ever manifestation of reality (see V.3., V.10., VII.1.):

Since both Ψ and $\bar{\Psi}$ (see I.2.2.) are 4-component spinors in the primordial formation process, the $\Psi^{(4)}$ and $\bar{\Psi}^{(4)}$ -formations are created from the preformation structure V.7. in accordance with the minimality principle I.0.3. .

The rest forms as a result of the requirements associated with the global fermionic structure $\Psi^{(19)}$:



with the 4-spinor formations

$$\bar{G} \equiv \Psi^{(4)} \equiv \begin{array}{|c|c|} \hline \Psi\Psi & \Psi\Psi \\ \hline \end{array} \equiv \begin{array}{|c|} \hline \Psi\Psi\Psi\Psi \\ \hline \end{array} \stackrel{\text{by IV.5.}}{=} \text{repulsive} \equiv \text{separating}$$

$$G \equiv \bar{\Psi}^{(4)} \equiv \begin{array}{|c|c|} \hline \bar{\Psi}\bar{\Psi} & \bar{\Psi}\bar{\Psi} \\ \hline \end{array} \equiv \begin{array}{|c|} \hline \bar{\Psi}\bar{\Psi}\bar{\Psi}\bar{\Psi} \\ \hline \end{array} \stackrel{\text{by IV.5.}}{=} \text{attractive} \equiv \text{binding}$$

and

$$R \equiv \bar{\Psi}^{(2)} \equiv \begin{array}{|c|c|} \hline \bar{\Psi} & \bar{\Psi} \\ \hline \end{array} \equiv \begin{array}{|c|} \hline \bar{\Psi}\bar{\Psi} \\ \hline \end{array} \stackrel{\text{by V.5.}}{=} \text{repulsive}$$

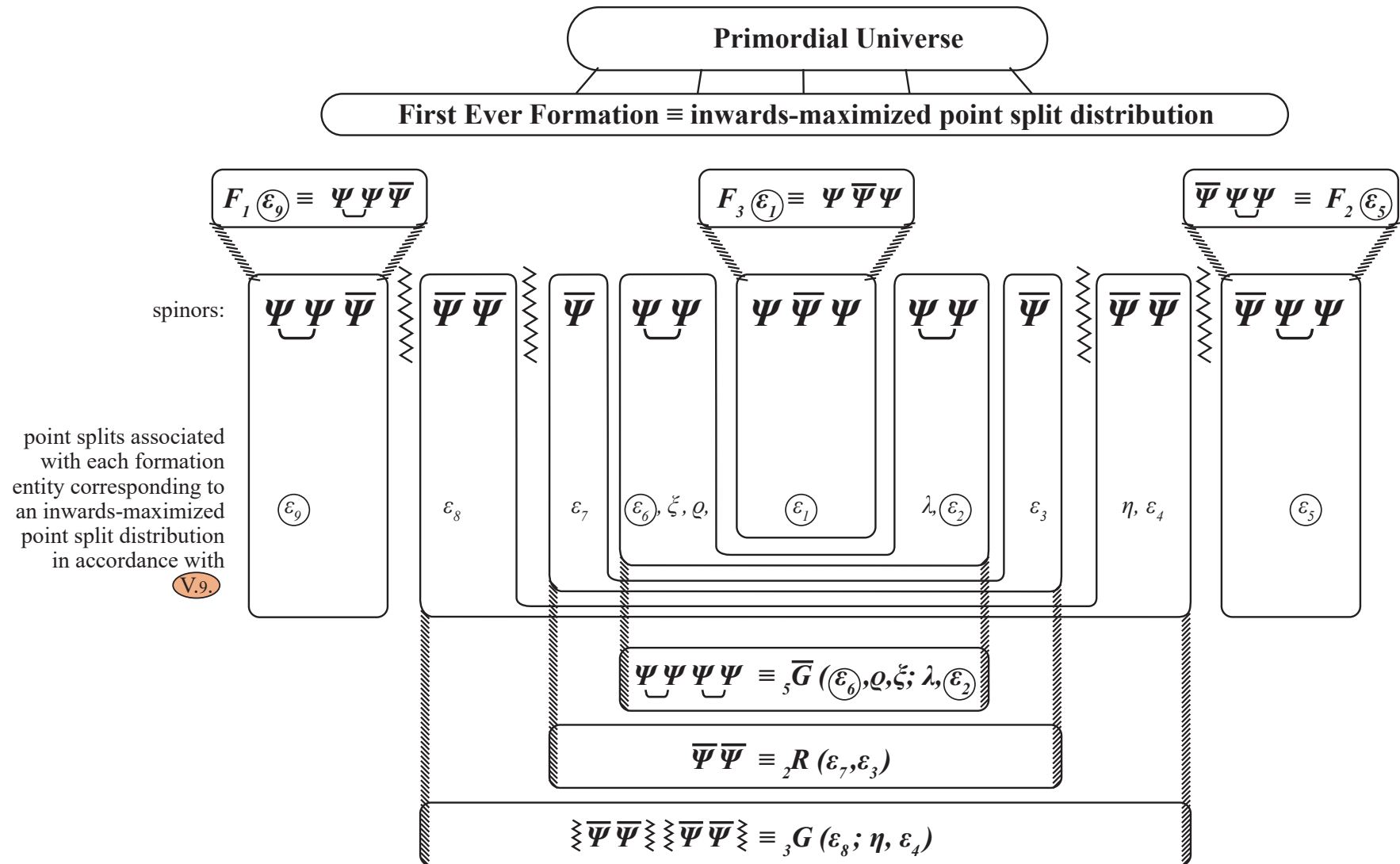
This primordial formation process determines all subsequent events associated with the fundamental force structure:

$(\bar{\Psi}\bar{\Psi}\bar{\Psi}\bar{\Psi}) \equiv \text{repulsion}$; $(\Psi\Psi\Psi\Psi) \equiv \text{attraction}$, and since the separation elements \sim always occur as $(\bar{\Psi}\sim\bar{\Psi})$:

$(\bar{\Psi}\bar{\Psi})$ -formations are repulsive; and since the binding elements \sqcup always occur as $(\Psi\Psi)$: $(\Psi\Psi)$ -formations are attractive (see V.6.).

⑤ \Rightarrow

V.10.



⑤ \Rightarrow As a result of the inwards-maximized point split distribution (see **V.8.**) the inner-structural composition of each individual elementary particle of the Primordial Universe satisfies:

The 3 most elementary fermions:

$$\begin{aligned}
 F_1(\varepsilon_9) &\equiv \boxed{\Psi \Psi \bar{\Psi}}(\varepsilon_9) \equiv \text{1-split object} \stackrel{\text{by VI.3.1.}}{\equiv} \text{massless} \equiv \text{named: } \boxed{\text{neutrino}_1} \equiv \nu_1 \\
 F_2(\varepsilon_5) &\equiv \boxed{\bar{\Psi} \Psi \Psi}(\varepsilon_5) \equiv \text{1-split object} \equiv \text{massless} \equiv \text{named: } \boxed{\text{neutrino}_2} \equiv \nu_2 \\
 F_3(\varepsilon_1) &\equiv \boxed{\Psi \bar{\Psi} \Psi}(\varepsilon_1) \equiv \text{1-split object} \equiv \text{massless} \equiv \text{named: } \boxed{\text{neutrino}_3} \equiv \nu_3
 \end{aligned}$$

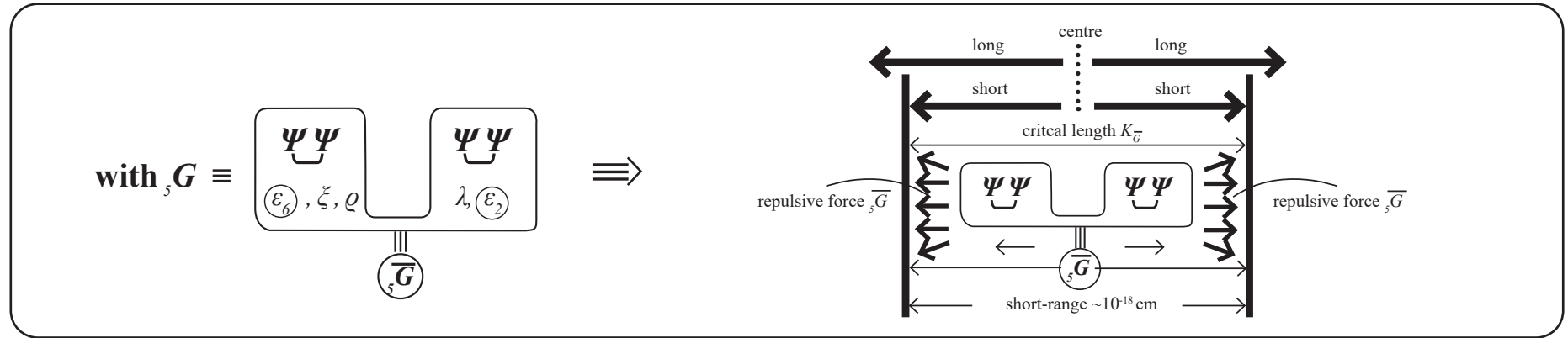
VII.1.

The 3 most elementary bosons:

$$\begin{aligned}
 {}_5\bar{G}(\varepsilon_6, \varrho, \xi; \lambda, \varepsilon_2) &\equiv \boxed{\Psi \Psi \quad \Psi \Psi}(\varepsilon_6, \varrho, \xi; \lambda, \varepsilon_2) \equiv \text{5-split object} \stackrel{\text{by V.6, VI.3.}}{\equiv} \text{massive, strongly repulsive} \\
 &\equiv \text{named: } \boxed{\text{anti-gravitational force}} \\
 {}_2R(\varepsilon_7, \varepsilon_3) &\equiv \boxed{\bar{\Psi} \quad \bar{\Psi}}(\varepsilon_7, \varepsilon_3) \equiv \text{2-split object} \equiv \text{massive, repulsive} \\
 &\equiv \text{named: } \boxed{\text{repulsion force}} \\
 {}_3G(\varepsilon_8; \eta, \varepsilon_4) &\equiv \boxed{\bar{\Psi} \bar{\Psi} \quad \bar{\Psi} \bar{\Psi}}(\varepsilon_8; \eta, \varepsilon_4) \equiv \text{3-split object} \equiv \text{massive, weakly attractive} \\
 &\equiv \text{named: } \boxed{\text{gravitational force}}, \text{ not yet the} \\
 &\quad \text{long-range } \boxed{\text{1-split}} \text{ gravitational force } G_l
 \end{aligned}$$

XIII.1. ⑥: The origin and beginning of the Big Bang (see VIII.3., VIII.6., XI.2., XI.3.):

The absolutely dominant force in the Primordial Universe (before the Big Bang) is the first ever manifestation of reality, namely the most extremely strongly repulsive, highly massive and unstable force boson ${}_5\overline{G}(\varepsilon_6, \varrho, \xi; \lambda, \varepsilon_2)$ (see V.3.):



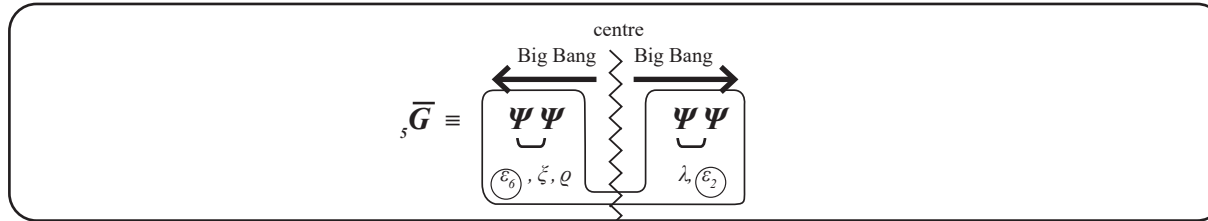
Due to the most extremely strong **intrinsic repulsion away from the centre** associated with it (see V.6., VII.7.), the extremely massive – and therefore extremely short-range – gradual repulsive expansion of the repulsive anti-gravitational force ${}_5\overline{G}$ necessarily reaches the **critical length K ($\sim 10^{-18}$ cm)**, beyond which the force ${}_5\overline{G}$ cannot extend due to its extremely high mass structure (\equiv short-range):

The mass structure of ${}_5\overline{G} \equiv \overline{\Psi\Psi} \overline{\Psi\Psi} \equiv {}_5\overline{G}(\varepsilon_6, \varrho, \xi; \lambda, \varepsilon_2)$ is concretely and inevitably associated with and “imprinted” onto the spinor configuration $\overline{G} \equiv \overline{\Psi\Psi} \overline{\Psi\Psi}$ by the 2 circled ε_6 - and ε_2 -splits.

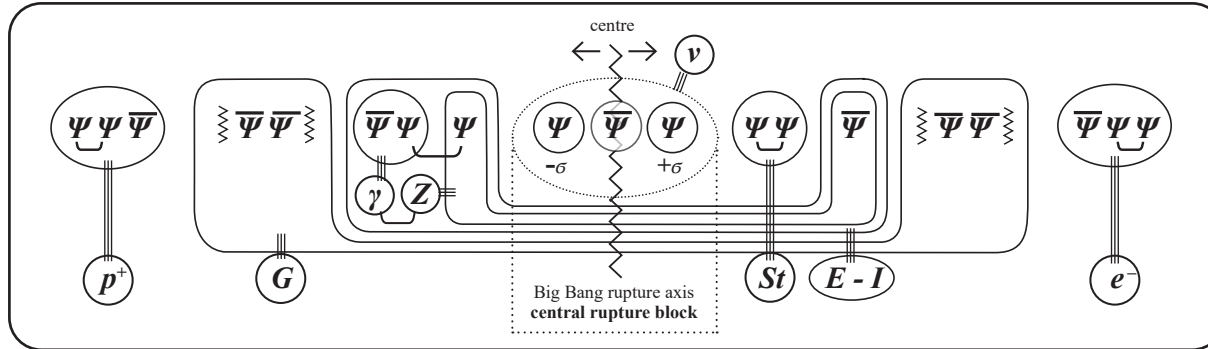
Hence: Due to the composition of its basis ${}_5\overline{G} \equiv \overline{\Psi\Psi} \overline{\Psi\Psi}$ inevitably contains at least the splits ε_6 and ε_2 and is therefore necessarily a massive force and so is inevitably limited to the **short region within the critical length K_G** in VIII.3. .

⑥ \Rightarrow This limitation to the critical length K naturally works against the intrinsically predetermined, most extremely strong repulsive anti-gravitational force ${}_5\bar{G} \equiv \underbrace{\Psi\Psi} \underbrace{\Psi\Psi}$ by VIII.3., which means that there must be some “liberation act” – figuratively speaking – i.e. a “rupture”, namely the Big Bang around 13.8 billion years ago. The instability of $({}_5\bar{G})$ leads to the fundamental Big Bang process:

VIII.6.



resulting in the following post-Big Bang formation with an outwards-maximized point split distribution (see XI.1.)



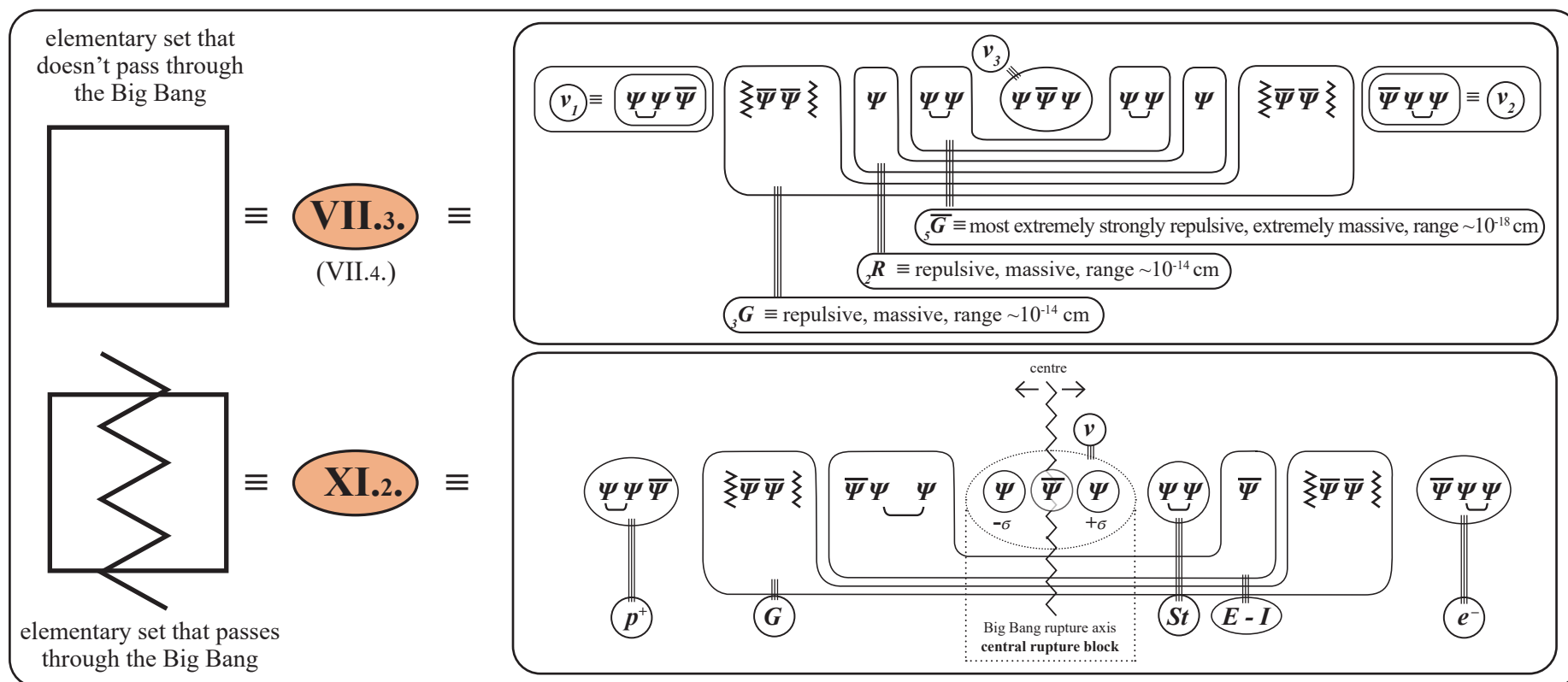
Therefore, as described in XI.2. and VIII.10., there forms a central rupture axis $\leftarrow \rightsquigarrow$ in the Big Bang, effectively a central restructuring particle made fragile by the Big Bang $\leftarrow \rightsquigarrow_{-\sigma} \rightsquigarrow_{+\sigma}$, the fragile restructured neutrino:

XI.3.

$\nu \equiv \Psi(x-\sigma) \quad \bar{\Psi}(x) \quad \Psi(x+\sigma)$ with the Big Bang rupture axis \rightsquigarrow running through its centre. Thus, the 3 basis spinors of the “fragile neutrino” are individualized by the mini-Big Bang split $\sigma \neq 0$, and as a result of this individualization each becomes the starting point of a new, independent dynamic construction process $\Psi \rightarrow \Psi^{(19)}$.

XIII.1. 7.1: The Big Bang production cascade (see XI.22., XI.23.):

We introduce the following symbols in order to more easily represent the structures involved in the chain reaction process of this most colossal reproduction cascade:



Big Bang Production Cascade

7.1 \Rightarrow XI.23.

n-th production level, elementary sets produced: $s(n) \equiv 3^{n-1}$

number of elementary particle sets produced so far $\sum \equiv \frac{3^n - 1}{2}$

1st production level $\equiv n = 1$

$s(1) \equiv \textcircled{1}$ elementary particle set (ES) Ξ

\equiv XI.2.

$$p^+ \equiv \psi \psi \bar{\psi}$$

$$\Xi \bar{\psi} \bar{\psi} \Xi$$

$$\bar{\psi} \psi \psi$$

$$\psi \psi \psi$$

$$\psi \psi$$

$$\bar{\psi}$$

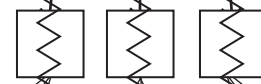
$$\Xi \bar{\psi} \bar{\psi} \Xi$$

$$\bar{\psi} \psi \psi \equiv e^-$$

$$\sum \equiv \frac{3^1 - 1}{2} \equiv 1$$

2nd production level $\equiv n = 2$

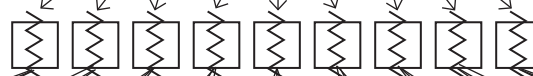
$s(2) \equiv 3^{(2-1)} \equiv \textcircled{3}$ ES Ξ



$$\sum \equiv \frac{3^2 - 1}{2} \equiv 4$$

3rd production level $\equiv n = 3$

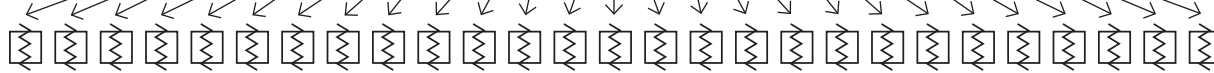
$s(3) \equiv 3^{(3-1)} \equiv \textcircled{9}$ ES Ξ



$$\sum \equiv \frac{3^3 - 1}{2} \equiv 13$$

4th production level $\equiv n = 4$

$s(4) \equiv 3^{(4-1)} \equiv \textcircled{27}$ ES Ξ



$$\sum \equiv \frac{3^4 - 1}{2} \equiv 40$$

\vdots

$(n_f - 1)$ -th production level \equiv last-but-one production level \equiv last iteration of the Big Bang, which produces ES Ξ :

$s(n_f - 1) \equiv \textcircled{3^{(n_f - 2)}}$ ES Ξ and from which the last (final) production level n_f is created.

$$\sum \equiv \frac{3^{(n_f - 1)} - 1}{2}$$

----- END OF BIG BANG ----- END OF BIG BANG ----- END OF BIG BANG ----- END OF BIG BANG -----

$n_f \equiv$ final production level created from the $(n_f - 1)$ -th and last iteration of the Big Bang, then end of the Big Bang.

$s(n_f) \equiv \textcircled{3^{(n_f - 1)}}$ ES $\square \equiv$ production at the final level

(see V.7., XI.2., XI.26.):

☐ --particle formation process (Dark Matter) at the end of the Big Bang cascade



XIII.1. **7.2.2): Component (2) \equiv Normal Matter \equiv 33.3 % of the Earliest Universe $\equiv \left(\frac{3^n-1}{2}\right)$ - \boxtimes -elementary sets (see **XI.2.**)**

$$\begin{array}{c}
 \text{spinors:} \\
 \text{13 splits:}
 \end{array}
 \begin{array}{c}
 \begin{array}{c} \Psi \quad \Psi \quad \bar{\Psi} \\ \text{---} \end{array} \\
 \begin{array}{c} \bar{\zeta}_-^{\zeta_-} \bar{\varrho}_- \bar{\varepsilon}_9 \quad \bar{\zeta}_-^{\zeta_-} \bar{\varrho}_- \bar{\varepsilon}_9 \quad \bar{\eta}_- \bar{\varepsilon}_8 \\ \vdots \end{array}
 \end{array}
 \begin{array}{c}
 \Psi \\
 \text{---}
 \end{array}
 \begin{array}{c}
 \bar{\Psi} \quad \bar{\Psi} \\
 \text{---}
 \end{array}
 \begin{array}{c}
 \bar{\Psi} \quad \Psi \quad \Psi \\
 \text{---}
 \end{array}
 \begin{array}{c}
 \Psi \quad \bar{\Psi} \quad \Psi \\
 \text{---}
 \end{array}
 \begin{array}{c}
 \Psi \quad \Psi \quad \bar{\Psi} \\
 \text{---}
 \end{array}
 \begin{array}{c}
 \bar{\Psi} \quad \bar{\Psi} \quad \bar{\Psi} \\
 \text{---}
 \end{array}
 \begin{array}{c}
 \bar{\Psi} \quad \Psi \quad \Psi \\
 \text{---}
 \end{array}
 \begin{array}{c}
 \bar{\Psi} \quad \Psi \quad \Psi \\
 \text{---}
 \end{array}
 \begin{array}{c}
 \bar{\zeta}_-^{\zeta_-} \bar{\varrho}_- \bar{\varepsilon}_7 \quad \bar{\zeta}_-^{\zeta_-} \bar{\varrho}_- \bar{\varepsilon}_7 \quad \bar{\zeta}_-^{\zeta_-} \bar{\varrho}_- \bar{\varepsilon}_6 \quad \bar{\zeta}_-^{\zeta_-} \bar{\varrho}_- \bar{\varepsilon}_6 \quad \bar{\zeta}_-^{\zeta_-} \bar{\varrho}_- \bar{\varepsilon}_6 \quad \bar{\zeta}_-^{\zeta_-} \bar{\varrho}_- \bar{\varepsilon}_6 \\
 \vdots
 \end{array}
 \begin{array}{c}
 \bar{\zeta}_-^{\zeta_-} \bar{\varrho}_- \bar{\varepsilon}_1 \quad 0 \quad \bar{\zeta}_-^{\zeta_-} \bar{\varrho}_- \bar{\varepsilon}_1 \\
 \vdots
 \end{array}
 \begin{array}{c}
 \bar{\zeta}_-^{\zeta_-} \bar{\varrho}_- \bar{\varepsilon}_2 \quad \bar{\zeta}_-^{\zeta_-} \bar{\varrho}_- \bar{\varepsilon}_2 \quad \bar{\zeta}_-^{\zeta_-} \bar{\varrho}_- \bar{\varepsilon}_3 \quad \bar{\zeta}_-^{\zeta_-} \bar{\varrho}_- \bar{\varepsilon}_3 \quad \bar{\zeta}_-^{\zeta_-} \bar{\varrho}_- \bar{\varepsilon}_3 \quad \bar{\zeta}_-^{\zeta_-} \bar{\varrho}_- \bar{\varepsilon}_3 \\
 \vdots
 \end{array}
 \begin{array}{c}
 \bar{\zeta}_-^{\zeta_-} \bar{\varrho}_- \bar{\varepsilon}_4 \quad \bar{\zeta}_-^{\zeta_-} \bar{\varrho}_- \bar{\varepsilon}_4 \quad \bar{\zeta}_-^{\zeta_-} \bar{\varrho}_- \bar{\varepsilon}_5 \quad \bar{\zeta}_-^{\zeta_-} \bar{\varrho}_- \bar{\varepsilon}_5 \quad \bar{\zeta}_-^{\zeta_-} \bar{\varrho}_- \bar{\varepsilon}_5 \quad \bar{\zeta}_-^{\zeta_-} \bar{\varrho}_- \bar{\varepsilon}_5 \\
 \vdots
 \end{array}
 \end{array}$$

↓ and from this, with an inwards-maximized point split distribution, the first formation process: ↓

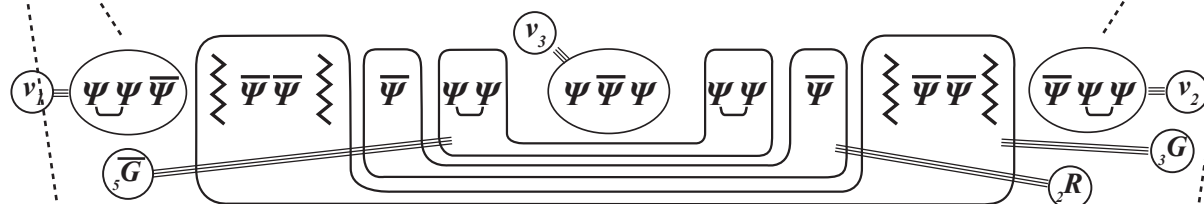
3. The formation of the unstable first ever Primordial Universe before the Big Bang:

$$\left(\underbrace{\Psi\Psi} \quad \underbrace{\Psi\Psi} \right) \equiv {}_5\overline{G}(\varepsilon_8, \varepsilon_7, \eta, \varepsilon_3, \varepsilon_4)$$

$$\overline{(\Psi\Psi)} \equiv {}_2R(\varepsilon_7, \varepsilon_3)$$

$$\overline{\langle \overline{\Psi} \overline{\Psi} \rangle \langle \overline{\Psi} \overline{\Psi} \rangle} \equiv {}_3G(\varepsilon_s, \eta, \varepsilon_A)$$

as well as the 3 neutrinos ν_1, ν_2, ν_3



The instability of ${}_5G$ leads to the Big Bang, thus causing an outwards-maximized point split distribution, resulting in the post-Big Bang formation

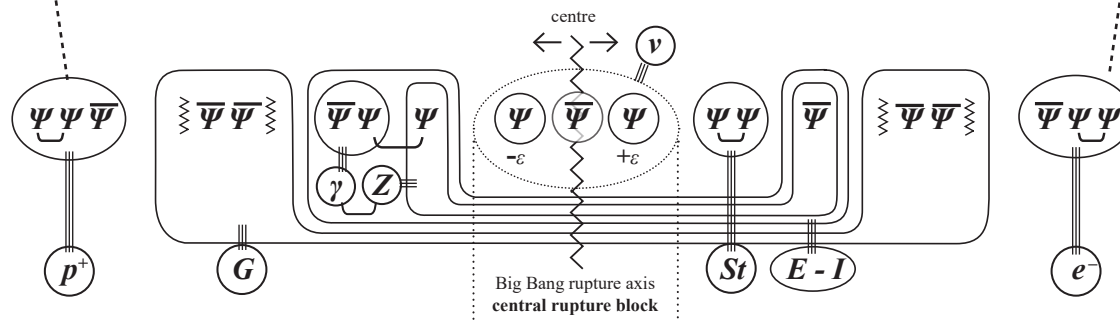
Diagram illustrating a Big Bang Big Bang (BB-BB) spacetime. The diagram shows two universes, each starting from a Big Bang singularity and expanding outwards. The left universe contains a scalar field with parameters $(\epsilon_6, \zeta, \rho)$ and the right universe contains a scalar field with parameters (λ, ϵ_2) . The two universes are separated by a central region labeled "centre".

XI.2. resulting in the post-Big Bang formation::

with:

 $\nu_1 \equiv \text{massive neutrino}, \nu_2 \equiv \text{massive neutrino}, \nu_3 \equiv \text{massless neutrino};$ $G \equiv$ highly massive, extremely short-range, extremely strongly repulsive boson;

$G \equiv$ massive, short-range, extremely weakly attractive boson;

 $\theta R_\theta \equiv$ massless, long-range, medium-strong repulsive boson

XIII.1. 7.3: The construction of the Universe after the Big Bang (see XI.36.):

XI.36. The Components $(\frac{2}{3}, \frac{1}{3})$ of the total Universe directly after the Big Bang, and the corresponding $(6, 6) \equiv 12$ elementary particles

Dark Matter

| Component ① $\equiv 66.6\%$ | Inner-Structural Particle Composition | by V., VI. | Mass/Charge | Force Structure | Range | Found? |
|--|---|---------------|--|-----------------------------------|---------------|---------|
| neutrino ₁ (ν_1) | $\Psi\Psi\Psi (\varepsilon_9, \varepsilon_9) \equiv 2\text{-split fermion}$ | \Rightarrow | massive (mass $\neq 0$) | | | yes |
| neutrino ₂ (ν_2) | $\bar{\Psi}\Psi\Psi (\varepsilon_4, \varepsilon_3) \equiv 2\text{-split fermion}$ | \Rightarrow | massive (mass $\neq 0$) | | | yes |
| neutrino ₃ (ν_3) | $\Psi\Psi\Psi (\varepsilon_1) \equiv 1\text{-split fermion}$ | \Rightarrow | massless | | | yes |
| anti-gravitational boson (\bar{G}) | $\Psi\Psi \square \Psi\Psi (\varepsilon_6, \varrho; \lambda, \varepsilon_2) \equiv 4\text{-split boson}$ | \Rightarrow | extremely high mass, charged with anti-gravitational elementary charge \bar{q}_θ | most extremely strongly repulsive | 10^{-17} cm | not yet |
| repulsive boson (R_θ) | $\bar{\Psi} \square \bar{\Psi} (0) \equiv 0\text{-split boson}$ | \Rightarrow | massless | repulsive | long | not yet |
| gravitational boson (G) | $\Xi\bar{\Psi}\bar{\Psi}\Xi \Xi\bar{\Psi}\bar{\Psi}\Xi (\zeta, \varepsilon_7, \varepsilon_3, \eta) \equiv 4\text{-split boson}$ | \Rightarrow | massive, charged with gravitational charge q_θ with $(\bar{q}_\theta + q_\theta) = 0$ | most extremely weakly attractive | 10^{-15} cm | not yet |
| as well as the end products created from the annihilation of (G, \bar{G}) , including the split release products thus created, and the Dark Energy created from these and other annihilation processes with coupled 4-dimensional space-time structure | | | | | | not yet |

Normal Matter/Antimatter

| Component ② $\equiv 33.3\%$ | Inner-Structural Particle Composition | by V., VI. | Mass/Charge | Force Structure | Range | Found? |
|--|---|---------------|--|----------------------------------|---------------|--------|
| proton (antiproton*) $(p^+ (p^-))$ | $\Psi\Psi\Psi (\varepsilon_9, \zeta, \varrho, \varepsilon_9) \equiv 4\text{-split fermion}$ | \Rightarrow | higher mass, charge $\oplus (\ominus)$ | | | yes |
| electron (positron*) $(e^+ (e^-))$ | $\bar{\Psi}\Psi\Psi (\varepsilon_4, \eta, \varepsilon_3) \equiv 3\text{-split fermion}$ | \Rightarrow | low mass, charge $\ominus (\oplus)$ | | | yes |
| neutrino (ν) | $\Psi\bar{\Psi}\Psi (\varepsilon_1) \equiv 1\text{-split fermion}$ | \Rightarrow | massless | | | yes |
| strong force (St) | $\Psi\Psi (\lambda, \varepsilon_2) \equiv 2\text{-split boson}$ | \Rightarrow | massive, uncharged | strongly attractive | 10^{-13} cm | yes |
| energy-momentum $(E-I)$ | $\bar{\Psi}\Psi\Psi\bar{\Psi} (\varepsilon_6, \varepsilon_3) \equiv 2\text{-split boson}$ | \Rightarrow | | | | yes |
| partial decomposition into (γ, Z) | $\bar{\Psi}\Psi \Psi \bar{\Psi} (\varepsilon_6, \varepsilon_3) \Downarrow$ | | | | | yes |
| electromag. force (γ) | $\bar{\Psi}\Psi (0 \text{ split}) \equiv 0\text{-split boson}$ | \Rightarrow | massless | medium strong | long | yes |
| weak force (Z) | $\Psi \bar{\Psi} (\varepsilon_6, \varepsilon_3) \equiv 2\text{-split boson}$ | \Rightarrow | massive, uncharged | weak | 10^{-15} cm | yes |
| gravitation (G) | $\Xi\bar{\Psi}\bar{\Psi}\Xi \Xi\bar{\Psi}\bar{\Psi}\Xi (\varepsilon_7) \equiv 1\text{-split boson}$ | \Rightarrow | massless | most extremely weakly attractive | long | yes |
| as well as the annihilation end products $((e^+, e^-, p^+, p^-))$, see XI.29. | | | | | | yes |

* For the detailed point split distributions of antimatter particles, see **XI.28.**

In the exact same way that the elementary particles of Normal Matter ($\overbrace{p^+, e^-, \nu}^{\text{fermions}}; \overbrace{St, \gamma, Z, G}^{\text{bosons}}$) form the fundamental atom of Normal Matter (hydrogen atom) given the right energy boundary conditions, from which the entire spectrum of Normal Matter atoms forms given corresponding energy boundary conditions, according to the well-understood field of atomic physics,

the elementary particles of Dark Matter ($\overbrace{{}_4\overline{G}, {}_4G, {}_0R}^{\text{bosons}}; \overbrace{{}_2\nu_1, {}_2\nu_2, {}_1\nu_3}^{\text{fermions}}$) also form into the fundamental atom of Dark Matter (referred to here as the “D-atom”) given the right energy boundary conditions. The most important component of this fundamental atom of Dark Matter (D-atom) is the



-structure entity, which consists of the two Dark Matter elementary particles ${}_4\overline{G}, {}_4G$:

7

${}_4\overline{G} \equiv$ extremely high mass, most extremely strongly repulsive, extremely short-range (10^{-17} cm), anti-gravitational boson with charge \overline{q}_0
 ${}_4G \equiv$ massive, extremely weakly attractive, short-range (10^{-15} cm) gravitational boson with charge q_0

where \overline{q}, q “naturally” does not refer to electrical charge, but rather gravitational charge, which only exists in Dark Matter and which must be investigated by experimental Dark Matter research in order to discover experimental classifications and simplifications.

Thus: ${}_4\overline{G}$ has a force range of only 10^{-17} cm. Outside of this force range, the anti-gravitational force does not act.

${}_4G$ has a force range of only 10^{-15} cm. Within this force range, the gravitational force acts attractively.

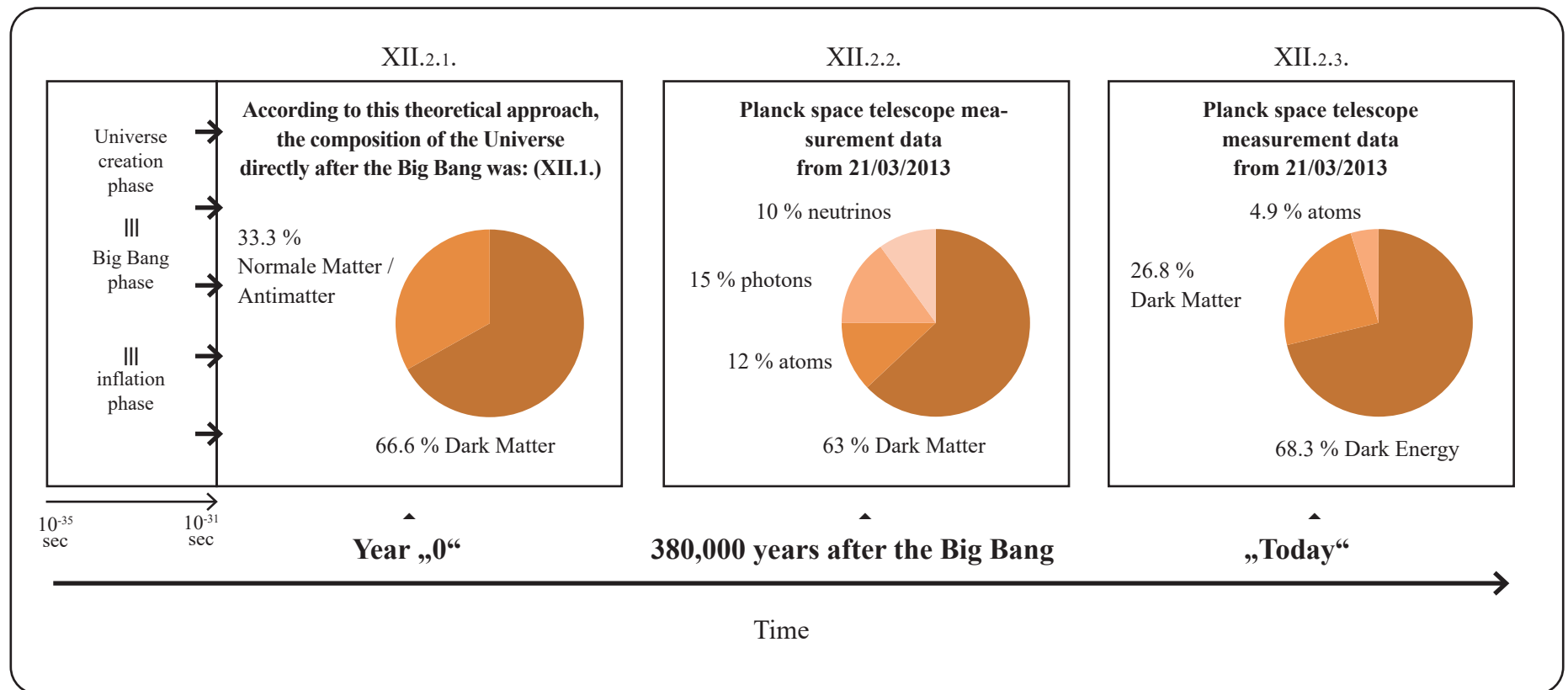
This leads to the construction of the extremely highly massive charge-neutral $\overline{q}_0 + q_0 \equiv 0$ -structure entity \overline{G}_G , from which the fundamental atom of Dark Matter (D-atom) then develops together with other Dark Matter elementary particles (${}_0R; {}_2\nu_1, {}_2\nu_2, {}_1\nu_3$), and consequently, given the right energy boundary conditions, the full spectrum of all Dark Matter atoms. This explains the high fraction of mass attributable to Dark Matter in space telescope measurements.

XIII.1. ⑧ : The development process of the Universe from the Big Bang until Today (see XII.2.-XII.4., XII.9.-XII.18., XII.42.):

- The annihilation of Dark Matter and Normal Matter
- The creation of Dark Energy with the coupled construction of expanding 4-dimensional space-time

XIII.1. ⑧.1 : Overall:

The composition of matter has drastically changed throughout the development of the Universe from the Big Bang until Today:

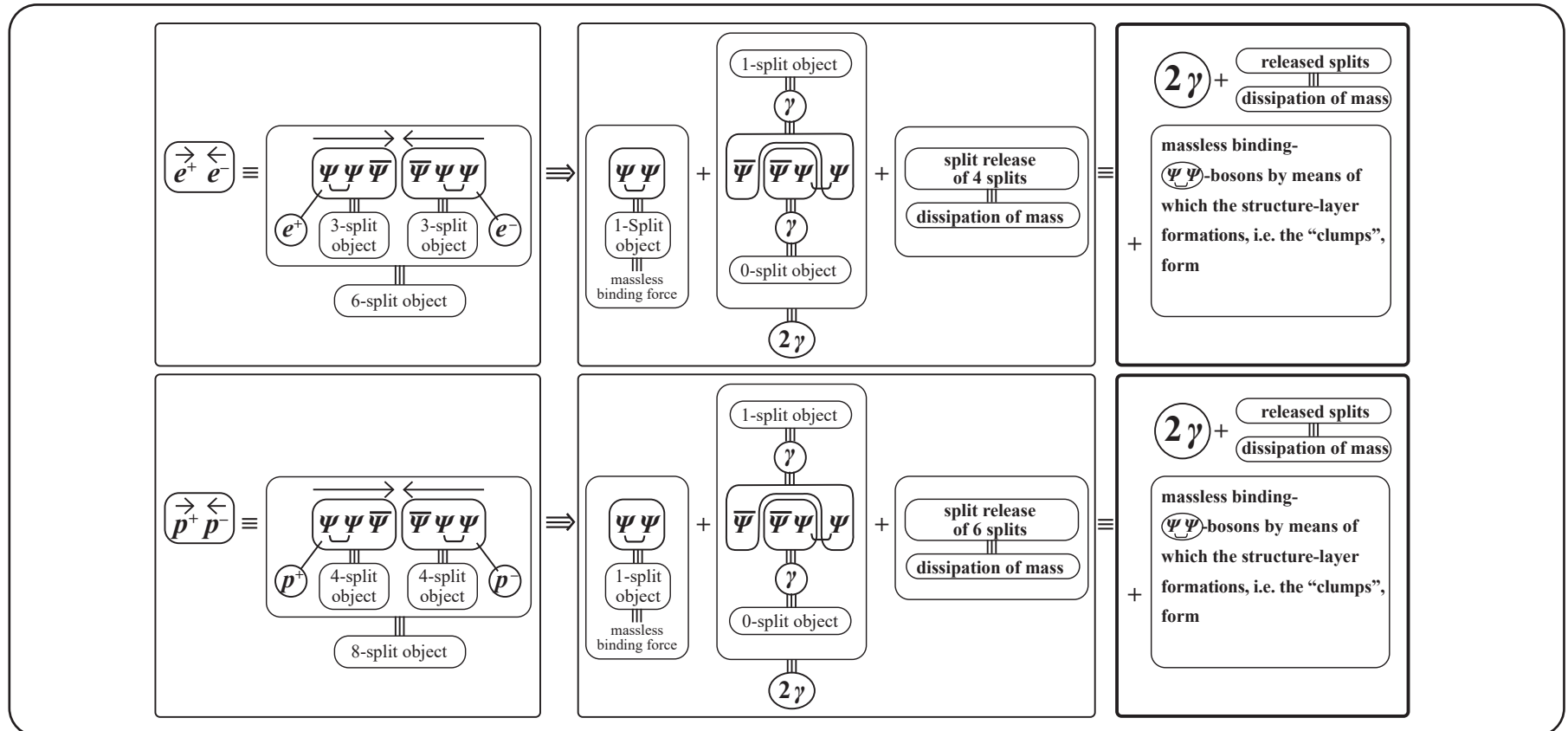


(8.1) \Rightarrow

To better understand these results XII.2., esp. XII.2.1. and XII.2.2., note that:

According to the theoretical approach adopted here (UEA, XI.1. \rightarrow XI.36., there were so-called annihilation processes

$e^+ e^- \rightarrow 2\gamma + \dots$ and $p^+ p^- \rightarrow 2\gamma + \dots$ between matter and antimatter (see XI.29.) directly after the Big Bang in the 33.3% Normal Matter/Antimatter segment of the Universe (see XI.27., XI.28.):



(8.1) \Rightarrow

Because of these type **XII.3.** annihilation processes, the 33.3% Normal Matter/Antimatter segment of the Universe in **XII.2.1.**, had the following composition at the moment of decoupling 380,000 years after the Big Bang, by the Planck space telescope measurements **XII.2.2.** :

33.3% Normal Matter/Antimatter segment

33.3 % \cong 12% atoms, 15% photons, 6.3% neutrinos

The ~3.6% neutrinos missing from the Planck measurements are found in the Dark Matter part of the Planck measurements, since, according to this theoretical approach (see UEA **XI.36.**),

as well as the bosons $({}_0R; {}_4\overline{G}; {}_4G)$, the 66.6 % Dark Matter segment also contains the 3 neutrinos $({}_2\nu_1; {}_2\nu_2; {}_1\nu_3)$.

XII.4.1.

8

XII.4.2.

This means: The value predicted by the present theoretical approach **XII.2.1.** are consistent with the Planck measurements **XII.2.2.** .

This also means: The Planck measurements confirm the predictions of this theory.

(8.1) \Rightarrow Thus:

For each elementary particle set, the Universe is fundamentally, exclusively, and inevitably constructed by the

construction process $D_{13 \text{ splits}}^{(13)} \Psi(x) \equiv \Psi^{(27)}(x, 13 \text{ splits})$ see (III.1.) \rightarrow (III.4.) (in particular (I.2.)),

i.e. after the necessary and intrinsic creation of the structuring $\Psi^{(8)}$ (see (IV.5.)), the preformation structure forms as

$\Psi_{\text{U}}^{(19)}(x, 13 \text{ splits}) \equiv \Psi$ -19 \equiv inner-structural composition and order system of the Universe \equiv Universe Code Ψ -19.

This happens subject to:

XII.11.

The highest conservation principle, which must be satisfied by every process in the Universe, is that there must be (13) splits for each created elementary set, applicable to every individual Dark Matter elementary set and every individual Normal Matter/Antimatter elementary set.

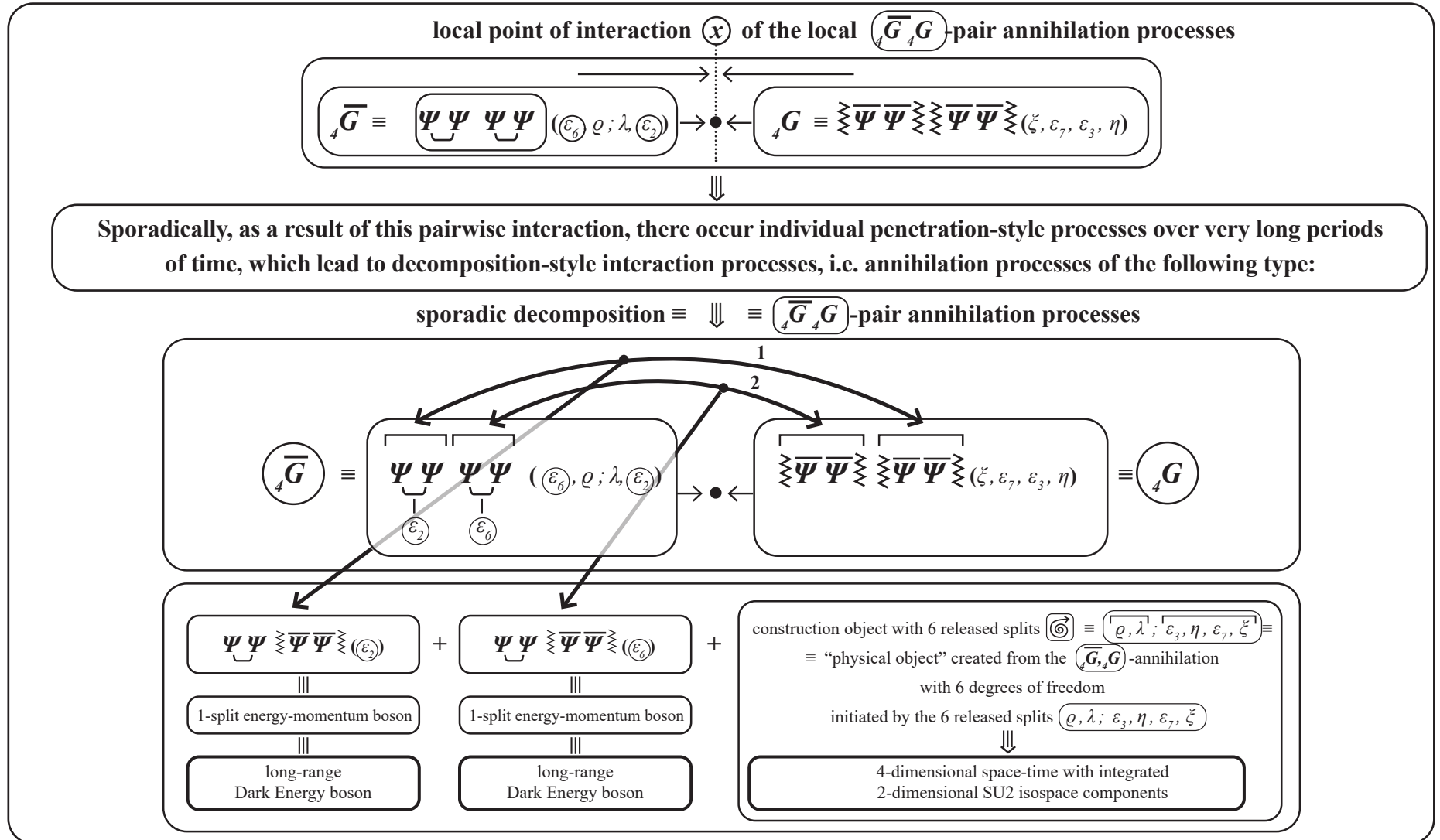
This split conservation number (13) must also be satisfied by the annihilation processes of Dark Matter, as well as those of Normal Matter/Antimatter. These (13) dynamically created splits per elementary set are:

$\xi, \varrho, \lambda, \eta; \varepsilon_1, \varepsilon_2, \varepsilon_3, \varepsilon_4, \varepsilon_5, \varepsilon_6, \varepsilon_7, \varepsilon_8, \varepsilon_9$ (see e.g. (V.7.), (XI.36.))

Thus: In every interaction and transformation process of any single event in the Universe, the total number of split must be (13) in each elementary set. No matter what this implies.

Hence: This principle of split conservation must also be satisfied by annihilation processes.

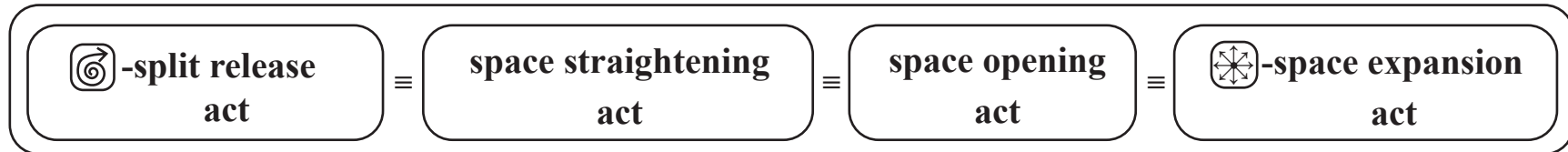
XIII.1. (8.2): The annihilation processes of Dark Matter and conversely the creation of Dark Energy with the coupled creation of expanding 4-dimensional space-time elementary structure entities.



(8.2) \Rightarrow From XII.9., it follows: The local interaction point $(x = \bullet)$ of the $(\bar{G}_4 G_4)$ -pair annihilation is “straightened out” by the expanding (4+2)-split release $\left(\begin{smallmatrix} \curvearrowright \end{smallmatrix}\right)$ – due to the annihilation of mass – or in other words “opened up”.

Thus: Starting from the local interaction point $(x = \bullet)$, due to the $\left(\begin{smallmatrix} \curvearrowright \end{smallmatrix}\right)$ -split release from the annihilation processes XII.12., the following happens:

XII.13.



In VI.3.2., it was shown that point curvature is created by (split clustering processes with split densities ≥ 2), and that this point curvature creates mass, and therefore the curvature of space is related to mass. If we symbolically write (split clustering \equiv point curvature) as $\left(\begin{smallmatrix} \curvearrowright \end{smallmatrix}\right)$, and the inverse act, namely (split release \equiv point straightening), as $\left(\begin{smallmatrix} \curvearrowleft \end{smallmatrix}\right)$, then we see that:

XII.14.

- mass is generated at the mass point \odot by (split densities ≥ 2), i.e. $\left(\begin{smallmatrix} \curvearrowright \end{smallmatrix}\right)$, and
- 4-dimensional space-time structure entities are created by (split releases ≥ 4), i.e. $\left(\begin{smallmatrix} \curvearrowleft \end{smallmatrix}\right)$.

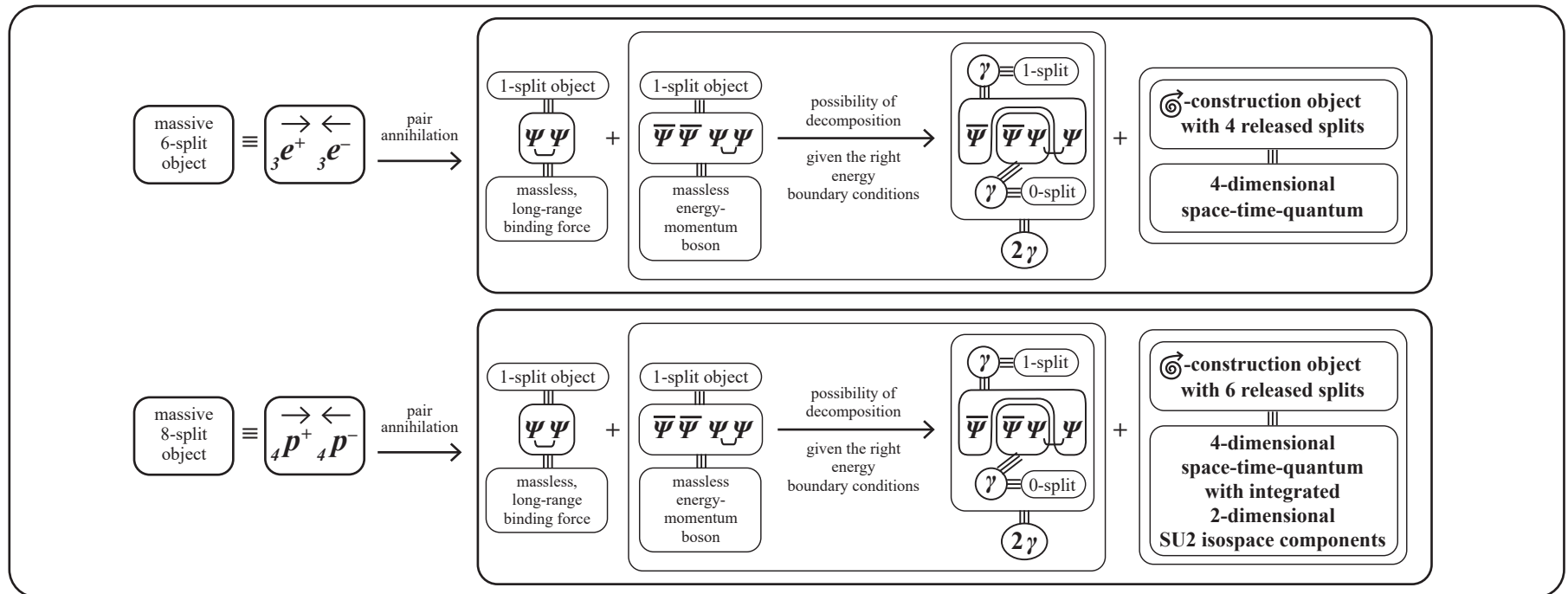
It follows that:

XII.15.

- (space curvature) $\equiv \left(\begin{smallmatrix} \curvearrowright \end{smallmatrix}\right) \equiv$ (mass constr.) \equiv (clustering of space) \equiv (coupled with the construction of Normal Matter/Antimatter particles and Dark Matter particles)
- (space straightening) $\equiv \left(\begin{smallmatrix} \curvearrowleft \end{smallmatrix}\right) \equiv$ (mass deconstr.) \equiv (constr. of expanding space) \equiv (coupled with the creation of massless Dark Energy bosons)

XIII.1. 8.3): The annihilation processes of Normal Matter/Antimatter and conversely the creation of Dark Energy with the coupled creation of expanding 4-dimensional space-time elementary structure entities.

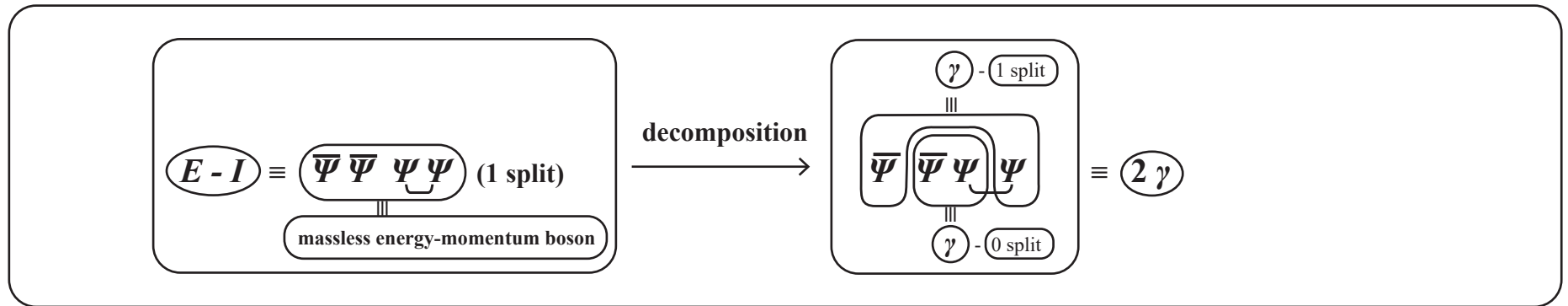
The same principle as for Dark Matter annihilation occurs with the annihilation processes of Normal Matter/Antimatter:



The annihilation processes of Normal Matter/Antimatter lead to the creation of massless energy-momentum bosons $E - I$, which, given the right energy boundary conditions, decompose into bosons:

(8.3) \Rightarrow

The annihilation processes of Normal Matter/Antimatter lead to the creation of massless energy-momentum bosons $(E - I)$, which, given the right energy boundary conditions, decompose into bosons:



It can easily be seen that this decomposition process into photons (γ) cannot occur in the case of the Dark Energy bosons E_1 and E_2 , which by XII.12. are created in the annihilation processes of Dark Matter $(\bar{G}_4 G_4)$, because of the inner-structural separation elements $\approx \approx \approx$.

XIII.1. (8.4): The creation of Dark Energy with the coupled construction of 4-dimensional space-time:

As a result of these decomposition and recreation processes, Dark Energy bosons are newly created (see XII.9.).

We could also state this as: From the pairwise Dark Matter annihilation of the massive (\bar{G}, G) bosons, pairs of long-range, massive Dark Energy bosons (E_1, E_2) are created in pairs. These Dark Energy bosons (see XII.9.) are automatically, necessarily, and inevitably coupled with the construction of a new **object with $6 = 4+2$ degrees of freedom**.

This means:

The **construction of Dark Energy** from the annihilation processes XII.9. of Dark Matter is automatically **associated with the construction of a newly emerging physical construction object**, which is newly created by the release of **$6 = 4+2$ splits** per elementary set originally bound to the Dark Matter bosons (\bar{G}, G) and which therefore possesses **$4+2 = 6$ degrees of freedom** by XII.9. . This physical **construction object with 6 degrees of freedom** newly created from the above annihilation processes is:

XII.10.

**4-dimensional space-time
with integrated
2-dimensional SU2 isospace components** ,

as is consistent with reality.

Thus, the composition of the Universe “Today” can be divided into the following 3 parts (see XII.42.):

Component ① \equiv 26.8 % \equiv Dark Matter

| | Inner-Structural Particle Composition | | |
|--------------------------|---------------------------------------|--|--------------------------|
| neutrino ₁ | (ν_1) | $\equiv \boxed{\Psi \Psi \bar{\Psi}} (e_9, e_8)$ | \equiv 2-split fermion |
| neutrino ₂ | (ν_2) | $\equiv \boxed{\bar{\Psi} \Psi \Psi} (e_4, e_5)$ | \equiv 2-split fermion |
| neutrino ₃ | (ν_3) | $\equiv \boxed{\Psi \bar{\Psi} \Psi} (e_1)$ | \equiv 1-split fermion |
| anti-gravitational boson | (\widehat{G}) | $\equiv \boxed{\Psi \Psi} \boxed{\Psi \Psi} (e_6, \varrho; \lambda, e_2)$ | \equiv 4-split boson |
| repulsive-Boson | (R_ϱ) | $\equiv \boxed{\bar{\Psi}} \boxed{\bar{\Psi}} (0)$ | \equiv 0-split boson |
| gravitational boson | (G) | $\equiv \boxed{\bar{\Psi} \bar{\Psi}} \boxed{\bar{\Psi} \bar{\Psi}} (\xi, e_7, e_3, \eta)$ | \equiv 4-split boson |

Component ② \equiv 4.9 % \equiv Normal Matter/Antimatter

| | Inner-Structural Particle Composition | | |
|--|---------------------------------------|--|--------------------------|
| proton (antiproton*) | $(p^+)(p^-)$ | $\equiv \boxed{\Psi \Psi \bar{\Psi}} (e_9, \xi, \varrho, e_8)$ | \equiv 4-split fermion |
| electron (positron*) | $(e^+)(e^-)$ | $\equiv \boxed{\bar{\Psi} \Psi \Psi} (e_4, \eta, e_5)$ | \equiv 3-split fermion |
| neutrino | (ν) | $\equiv \boxed{\Psi \bar{\Psi} \Psi} (e_1)$ | \equiv 1-split fermion |
| strong force | (St) | $\equiv \boxed{\Psi \Psi} (\lambda, e_2)$ | \equiv 2-split boson |
| energy-momentum | $(E-I)$ | $\equiv \boxed{\bar{\Psi} \Psi} \boxed{\Psi \bar{\Psi}} (e_6, e_3)$ | \equiv 2-split boson |
| partial decomposition into | $(\gamma)(Z)$ | $\equiv \boxed{\bar{\Psi} \Psi} \boxed{\Psi \bar{\Psi}} (e_6, e_3)$ | \Downarrow |
| electromag. force | (γ) | $\equiv \boxed{\bar{\Psi} \Psi} (0 \text{ Split})$ | \equiv 0-split boson |
| weak force | (Z) | $\equiv \boxed{\Psi \bar{\Psi}} (e_6, e_3)$ | \equiv 2-split boson |
| gravitation | (G) | $\equiv \boxed{\bar{\Psi} \bar{\Psi}} \boxed{\bar{\Psi} \bar{\Psi}} (e_7)$ | \equiv 1-split boson |
| as well as the resulting annihilation end products $((e^+, e^-, p^+, p^-))$, see XI.29. | | | |

Component ③ \equiv 68.3 % \equiv Dark Energy with the coupled construction of expanding 4-dimensional space-time

- of which 28.5% \equiv energy-momentum bosons $\bar{\Psi} \bar{\Psi} \Psi \Psi$ (1-split)
with the coupled construction of expanding 4-dimensional space-time,
created from the annihilation of a 28.5% fraction of Normal Matter/Antimatter (see XII.17.)

- of which 39.8 % \equiv energy-momentum bosons $\tilde{\Psi} \tilde{\Psi} \Psi \Psi$ (1-split)
with the coupled construction of expanding 4-dimensional space-time,
created from the annihilation of a 39.8% fraction of Dark Matter (see XII.12.)

SUMMARY:

The development process XIII.1. ① - XIII.1. ⑧ shows that:

- All matter and force constructions in the Universe, i.e. all components of the Universe,
 - Dark Matter,
 - Normal Matter/Antimatter
 - Dark Energy with the coupled construction of expanding 4-dimensional space-time, developed from one and the same preformation structure $\Psi_{\text{U}}^{(19)}$ and therefore have the same identical origin. This is all described in detail in these pages (see in particular also XIII.1. ⑦.2.1., ⑦.2.2)

- This preformation structure $\Psi_{\text{U}}^{(19)} \equiv \text{V.7.}$, together with all of its individual and fine structures, is the structure that necessarily and unequivocally results from the elementary foundation I.1. , I.2. , I.3. (see Chap. I.-V.).

Thus: I.1. , I.2. , I.3. and consequently V.7. represent the unified inner-structural composition and order system from which the Universe developed, both at small scales (elementary particles) and at large scales (global structures of the Universe), i.e. from which all components of the Universe,

- Dark Matter,
- and Normal Matter/Antimatter
- as well as Dark Energy with the coupled construction of expanding 4-dimensional space-time,

are inner-structurally created, composed, and developed.

XIII.2.1.

- And this in turn means:

There exists an overarching uniform, inner-structural global composition and order system Ψ_{U}^{19} , governing the construction of:

- both Dark Matter
- and Normal Matter/Antimatter
- as well as Dark Energy with coupled expanding 4-dimensional space-time.

Adopting a slightly more dramatic expression and introducing simpler symbolic notation:

$\Psi_{\text{U}}^{19} \equiv \Psi-19 \equiv \text{V.7.}$ is the inner-structural composition and order system of the Universe

or:

$\Psi_{\text{U}}^{19} \equiv \Psi-19 \equiv \text{V.7.}$ is the Universe Code $\Psi-19$.

Bearing in mind that these pages (see Chap. I.-V.) presented and explained in detail how the preformation structure $\Psi_{\Sigma U}^{(19)} \equiv \Psi-19 \equiv V.7.$ is the structure that necessarily and unequivocally follows from the elementary foundation $I.1.$, $I.2.$, $I.3.$, this in turn means that:

$I.1.$, $I.2.$, $I.3.$ and consequently $V.7.$ is the Fundamental System of the Universe

XIII.3.

or to express this more simply and attractively:

$I.1.$, $I.2.$, $I.3.$ and consequently $V.7.$ is the Universe Code $\Psi-19$,
that uniformly governs the construction of the Universe both at small scales (elementary particles)
and at large scales (global structures of the Universe), underlying everything that physically exists.

This means:

Since each and every physical event (formation of matter and forces), no matter how different they may seem, develops from one and the same preformation structure $\Psi_{\text{U}}^{(19)} \equiv \text{V.7.} \equiv \text{Universe Code } \Psi-19$ this identical physical origin uniting the vast diversity of all individual physical process represents an example of what is commonly referred to as a unification process in physics.

These “unification processes” are simply the analytical derivation

- of the inner-structural particle composition of each force boson (in terms of basis spinors and point splits)
- and the inner-structural particle composition of each matter fermion (in terms of basis spinors and point splits) from the preformation structure $\Psi_{\text{U}}^{(19)} \equiv \text{Universe Code } \Psi-19$, that underlies everything, and which also determines every physical property of these elementary particles by V.7. , VI.3. .

Every aspect of every force boson and every matter fermion in the elementary particle spectrum of the Universe, including:

- the Primordial Universe before the Big Bang
- Dark Matter
- Normal Matter
- Dark Energy with the coupled construction of expanding 4-dimensional space-time

could therefore be analytically derived and represented (for a summary, see XI.36. ; XII.42.).

By deriving the inner structure of the composition of every individual elementary particle from the Universe Code Ψ -19, we also obtain representations of the sub-unification processes for which the field of physics has been searching for the last 60 years with little success.

Every aspect of this inner-structural elementary particle composition is fundamentally and exhaustively explored and fully presented in Chap. I.-XIII., with references to the previous publications: ADM, MLE, HSB, GDE, EAU, UEA, UEP.

Thus: From the Universe Code Ψ -19 \equiv preformation structure $\Psi^{19}_U \equiv V.7.$ underlying absolutely everything, namely each and every manifestation of matter and force in the Universe, the following physical unification processes can be derived by considering the process of how the inner-structural composition of each force boson and each matter fermion forms:

- ① The small unification of the electromagnetic and weak interaction
- ② The medium unification of the strong, electromagnetic, and weak interaction
- ③ The great unification of the strong, electromagnetic, weak, and gravitational interaction
- ④ The super-great unification of all interactions (\equiv force bosons) in the Universe, i.e.:

- of the Primordial Universe before the Big Bang \bar{G}_5, G_3, R_2

- of the universe after the Big Bang, i.e.:

- of Dark Matter \bar{G}_4, G_4, R_0

- of Normal Matter St, γ, Z, G_1

- of Dark Energy E_1, E_2 with the coupled construction of 4-dimensional space-time elementary entities.

XIII.4.

⑤ The most colossally great global unity (unified origin \equiv Universe Code $\Psi - 19$) of all force bosons and all matter fermions (and thus of everything that physically exists):

| | bosons | fermions |
|-------------------------------|---|--|
| - of the Primordial Universe: | $\overline{G}_5, {}_3G, {}_2R;$ | ${}_1\nu_1 \equiv$ massless neutrino, ${}_1\nu_2 \equiv$ massless neutrino, ${}_1\nu_3 \equiv$ massless neutrino |
| - of Dark Matter: | $\overline{G}_4, {}_4G, {}_0R;$ | ${}_2\nu_1 \equiv$ massive neutrino, ${}_2\nu_2 \equiv$ massless neutrino, ${}_1\nu_3 \equiv$ massive neutrino |
| - of Normal Matter: | $St, \gamma, Z, {}_1G;$ | $p^+ \equiv$ proton, $e^- \equiv$ electron, $\nu \equiv$ neutrino |
| - of Dark Energy: | E_p, E_2 with the coupled construction of 4-dimensional space-time elementary entities. | |

This global unity ⑤ is explained by and originates from the fact that every elementary particle listed in ⑤ (both bosons and fermions) is unquestionably and completely formed from one and the same preformation structure $\Psi_{\Sigma U}^{(19)} \equiv \text{V.7.} \equiv$ Universe Code $\Psi - 19$ as is presented and described in each case in Chap. I.-XIII. (for a summary, see XI.36., XII.42.)

XIII.5.

Overall summary: Absolutely everything that physically exists in the Universe originates from one and the same preformation structure $\Psi_{\Sigma U}^{(19)}$, and thus originates from the same fundamental code, and thus originates from the same Universe Code $\Psi - 19$.

One could say: $\Psi - 19$ is the creation code of the Universe.

Personal summary:

Over the 7 years that it took me to explore this approach, I found recurring evidence that my work is on the right track and is worth pursuing.

For example, among others,

- the **1st major confirmation** for me was in 2010/2011, when I understood how the construction process of matter arises from the fundamental dynamic **I.1., I.2, I.3** and how the point split dynamic develops this construction process into a separation-binding structure, which by means of a chain of processes leads to the **preformation structure** $\Psi_{\Sigma U}^{(19)}$ which then forms into each of the individual elementary particles p^+, e^-, ν by means of their respective formation processes, as well as the 4 force bosons of the strong, electromagnetic, weak, and gravitational interaction. Once the right energy boundary conditions are available, the H-atom then forms, representing the fundamental atom of Normal Matter. These ideas were first published in “The Construction of Matter” (ADM) on 14/04/2011.
- the **2nd major confirmation** for me was in 2014/2015, when the analytical details of what the first entity ever to emerge in the whole history of the Universe must necessarily have been, i.e. the first ever manifestation of reality to exist, namely the Primordial Universe before the Big Bang. I understood that this Primordial Universe $({}_5\bar{G}, {}_3G, {}_2R, {}_1\nu_1, {}_1\nu_2, {}_1\nu_3)$ was structured a way that necessarily and inevitably lead to the Big Bang, and I also realized exactly how this process had unfolded some 13.8 billion years ago. I was able to give a fully detailed analytical description of the Big Bang, thus showing that the Universe directly after the Big Bang consisted of 66.6% Dark Matter $({}_4\bar{G}, {}_4G, {}_0R, {}_2\nu_1, {}_2\nu_2, {}_1\nu_3)$ and 33.3% Normal Matter $(p^+, e^-, \nu, St, \gamma, Z, G)$. The proportions of this mixture are consistent with the measurements taken by the Planck space telescope on 21/03/2013.
 “The Unified Construction Process of the Universe” (EAU, Chapter XI.) was published on 22/05/2015, and “The Act of Creation of the Universe” (UEA) was published on 17/12/2015, presenting these ideas.

- The **3rd major confirmation** was when the analysis of the Big Bang production cascade revealed the nature of each of the elementary particles of Dark Matter ($\overline{G}, G, R; \nu_1, \nu_2, \nu_3$) and their respective inner-structural compositions and the properties that they must possess as a result.

There have not yet been any experimental results about the elementary particles of Dark Matter, but Cern is currently researching them.

See also EAU, Chapter XI., published on 22/05/2015, and UEA, published on 17/12/2015.

- In the subsequent year 2016, I found the **4th major confirmation** that this approach is correct when I realized that this theory can explain why – as testified by the space telescope measurements – the development of the Universe from the Big Bang until Today involves the continuous annihilation of Dark Matter and Normal Matter and conversely the continuous construction of Dark Energy with the coupled construction of expanding 4-dimensional space-time, which is still happening to this day. On 04/08/2016, “The Development Process of the Universe from the Big Bang until Today” (UEP) was published, together with a revised version of Chapter XII. of this work on the same date.

- But I consider the **most important evidence** of the correctness of this approach to reside in the conclusion that (as described in this chapter) every event in the Universe is derived from one and the same origin, namely the simplest possible elementary structure **I.1., I.2, I.3** from which:
 - first, as described in detail in Chapters I.-V., **the preformation structure** $\Psi_{\Sigma U}^{(19)} \equiv \text{Universe Code } \Psi-19$ necessarily and unequivocally forms. This $\Psi_{\Sigma U}^{(19)}$
 - thus becomes the overarching, unified inner-structural composition and order system of the Universe,
 - and the **Universe Code** $\Psi-19$ sets all events in the Universe in motion by means of the necessary and unequivocal causal links between each of the formation processes described in detail in Chap. I.-XIII.:

before the Big Bang – during the Big Bang – after the Big Bang until Today.

XIII.6.

Thus: The Universe Code $\Psi-19$ contains absolutely all fine-structural, global-structural, and composition-related information required for each of the necessary and unequivocal formation processes presented in detail in Chap. I.-XIII. to set every single event in the Universe in motion.

Chapter XIV.*

**The 6 key processes in the creation and development of the Universe
– retrospective summary.**

When analysing the causal links of all of the seamlessly interconnected individual processes in the history of the creation and development of the Universe described in Chapters I.-XIII. globally, we can recognise a strict causal sequence of the following 6 key processes:

- (KP1) : Before the creation of the Universe (preformation structure $\Psi_{\text{U}}^{(19)} \equiv \text{Universe Code } (\Psi - 19)$)**
- (KP2) : The creation of the Universe (the Primordial Universe before the Big Bang - ${}_5\overline{G}, {}_3G, {}_2R; \nu_1, \nu_2, \nu_3$ -)**
- (KP3) : The rupture process of the Primordial Universe (the rupture of ${}_5\overline{G} \equiv \text{the beginning of the Big Bang}$)**
- (KP4) : The Big Bang production cascade (in full detail: XI.23.)**
- (KP5) : The Universe directly after the Big Bang ($\frac{2}{3}$ Dark Matter, $\frac{1}{3}$ Normal Matter/Antimatter)**
- (KP6) : The construction of Dark Energy with the coupled construction of expanding 4-dimensional space-time**

These key process specifically unfold as follows:

* Chapter XIV. was also published separately as “The 6 Key Processes in the Creation and Development of the Universe”, on 17/03/2017.

XIV.1.

(KP1)**Before the creation of the Universe**

The formation of the inner-structural composition and order system of the Universe $\Psi_{\text{U}}^{(19)} \equiv$
Preformation structure of the Universe $\Psi_{\text{U}}^{(19)} \equiv (\text{V.7.}) \equiv \text{Universe Code } (\Psi - 19)$

**(KP2)****Then: The creation of the primordial manifestation of the Universe \equiv**

The Primordial Universe before the Big Bang (${}_5\overline{G}$, ${}_3G$, ${}_2R$; ν_1, ν_2, ν_3); with a size of around 10^{-14} cm

**(KP3)**

The rupture process of the force boson ${}_5\overline{G}$ in the Primordial Universe \equiv fundamental process of the Big Bang \equiv beginning of the Big Bang. Thus: The rupture process of ${}_5\overline{G}$ sets the Big Bang in motion

**(KP4)****The Big Bang production cascade****(KP5)**

The result of the Big Bang production cascade is the formation of the Universe directly after the Big Bang ($\frac{2}{3}$ Dark Matter, $\frac{1}{3}$ Normal Matter/Antimatter)

**(KP6)**

The construction of Dark Energy with the coupled construction of expanding 4-dimensional space-time created by the pair annihilation processes of Dark Matter (${}_4\overline{G}$, ${}_4G$) and the pair annihilation process of Normal Matter/Antimatter ($p^+ p^-$, $e^+ e^-$)

The formation of the inner-structural composition and order system of the Universe $\Psi^{(19)}_{\text{U}}$ \equiv preformation structure of the Universe $\Psi^{(19)}_{\text{U}}$
 \equiv (V.7.) \equiv Universe Code $\Psi - 19$

The Universe is thought to be around 13.8 billion years old. This raises the question: What was there before then, and how did the Universe begin to exist in the first place? What are the inner composition and order structures from which the Universe could have or must have been created, leading to what we know as reality?

Before the creation of the Universe, there must therefore have been some inner-structural composition and order process that develops into a Universe Code that governs all subsequent events in the Universe:

before the Big Bang – Big Bang – after the Big Bang until today, including all global and fine structures and all manifestations of matter and forces.

This construction process of the Universe Code \equiv Universe Code $\Psi - 19$ \equiv preformation structure $\Psi^{(19)}_{\text{U}}$ is namely:

The formation of the most elementary structure \equiv
 see I.1., I.2., I.3.

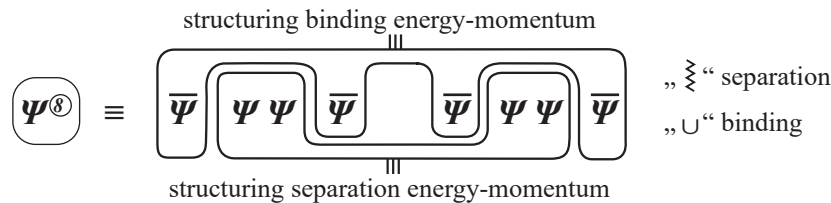
$$\begin{aligned} D \Psi(x) &= \Psi(x-\sigma_1) \bar{\Psi}(x) \Psi(x+\sigma_1); \sigma_1 \rightarrow 0 \\ D \bar{\Psi}(x) &= \bar{\Psi}(x-\sigma_2) \Psi(x) \bar{\Psi}(x+\sigma_2); \sigma_2 \rightarrow 0 \end{aligned}$$

with repulsion $\equiv \leftarrow^{-\sigma} \quad \overset{+\sigma}{\rightarrow}$
 attraction $\equiv \rightarrow \bullet \leftarrow$

The formation of the construction process \equiv
 see I.12.

$$D_{\sigma_{5-13}}^{5-13} (D_{\sigma_{1-4}}^{1-4} \Psi(x)) \equiv \Psi^{(27)}(x, \sigma_{13})$$

The formation of the structuring process \equiv



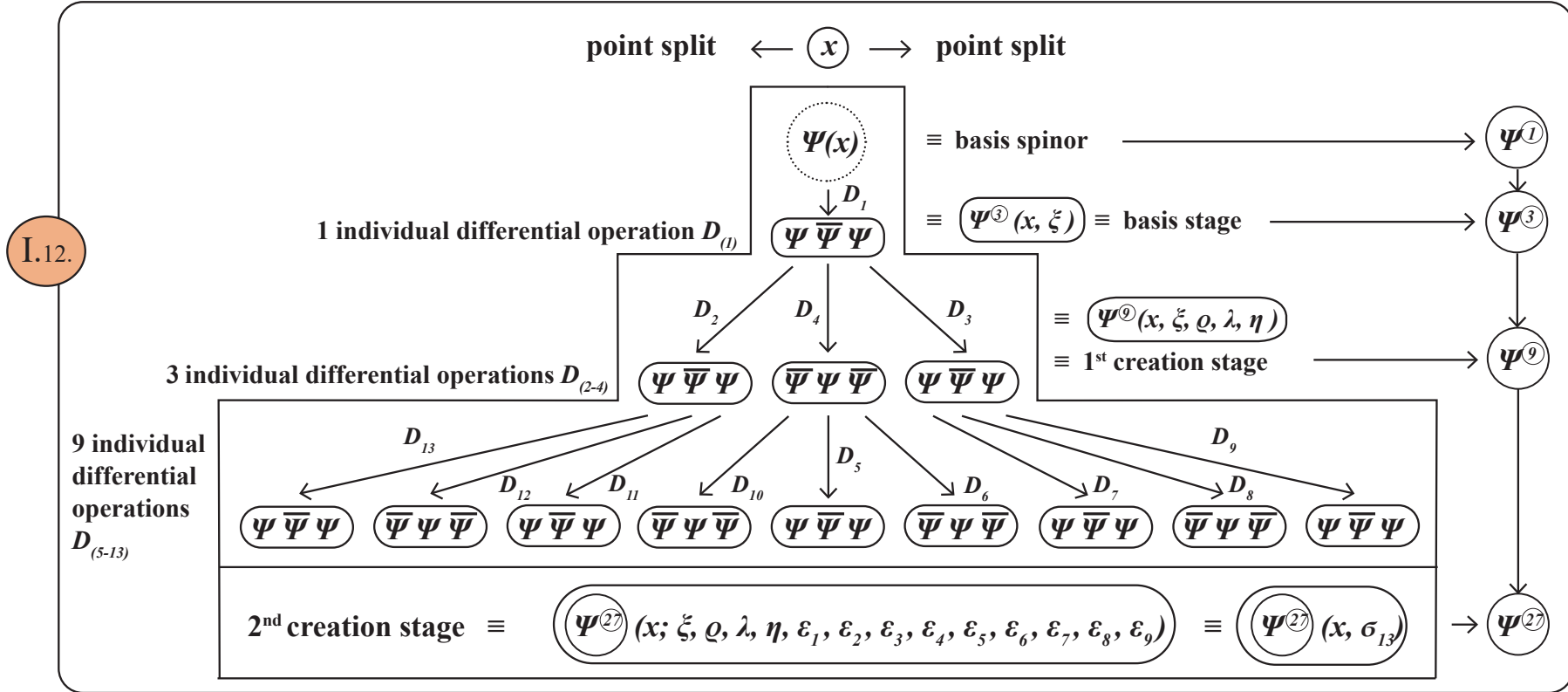
see IV.5.

The formation of the preformation struture $\Psi^{(19)}$ by incorporating the structuring foundation $\Psi^{(8)}$ into $\Psi^{(27)}$.

$$\Psi^{(19)}_{\text{U}} \equiv \left(\Psi \Psi \bar{\Psi} \right) \approx \bar{\Psi} \bar{\Psi} \approx \bar{\Psi} \Psi \Psi \left(\Psi \bar{\Psi} \Psi \right) \Psi \Psi \bar{\Psi} \approx \bar{\Psi} \bar{\Psi} \approx \left(\bar{\Psi} \Psi \Psi \right)$$

see V.7.

Thus: First, the construction process:



Taking into account the local arrangement – with the ordering from II.4. – of the 1st creation stage $\Psi^{(9)}(x, \sigma_4)$ – as well as the point split-separated 2nd creation stage $\Psi^{(27)}(x, \sigma_{13})$ created by the 2nd fundamental process – as described in III.1. to III.4., the following specifically holds:

$\Psi^{(27)}$

| Ψ | $\bar{\Psi}$ | Ψ | $\bar{\Psi}$ | Ψ | $\bar{\Psi}$ | $\bar{\Psi}$ | Ψ | $\bar{\Psi}$ | Ψ | $\bar{\Psi}$ | Ψ | $\bar{\Psi}$ | Ψ | $\bar{\Psi}$ | Ψ | $\bar{\Psi}$ | Ψ | $\bar{\Psi}$ | Ψ | $\bar{\Psi}$ | $\bar{\Psi}$ | Ψ | $\bar{\Psi}$ | Ψ | $\bar{\Psi}$ | Ψ |
|------------------|------------------|------------------|------------------|---------|------------------|------------------|--------|------------------|------------------|------------------|------------------|------------------|--------|------------------|------------------|------------------|------------------|------------------|--------|------------------|------------------|---------|------------------|------------------|------------------|------------------|
| x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x |
| $-\xi - \varrho$ | $-\xi - \varrho$ | $-\xi - \varrho$ | $-\eta$ | $-\eta$ | $-\eta$ | $-\xi$ | $-\xi$ | $-\xi$ | $-\xi + \varrho$ | $-\xi + \varrho$ | $-\xi + \varrho$ | 0 | 0 | 0 | $+\xi - \lambda$ | $+\xi - \lambda$ | $+\xi - \lambda$ | $+\xi$ | $+\xi$ | $+\xi$ | $+\eta$ | $+\eta$ | $+\eta$ | $+\xi + \lambda$ | $+\xi + \lambda$ | $+\xi + \lambda$ |
| $-\varepsilon_9$ | 0 | $+\varepsilon_9$ | $-\varepsilon_8$ | 0 | $+\varepsilon_8$ | $-\varepsilon_7$ | 0 | $+\varepsilon_7$ | $-\varepsilon_6$ | 0 | $+\varepsilon_6$ | $-\varepsilon_1$ | 0 | $+\varepsilon_1$ | $-\varepsilon_2$ | 0 | $+\varepsilon_2$ | $-\varepsilon_3$ | 0 | $+\varepsilon_3$ | $-\varepsilon_4$ | 0 | $+\varepsilon_4$ | $-\varepsilon_5$ | 0 | $+\varepsilon_5$ |

III.4.1.

Then, the structuring and preformation process:

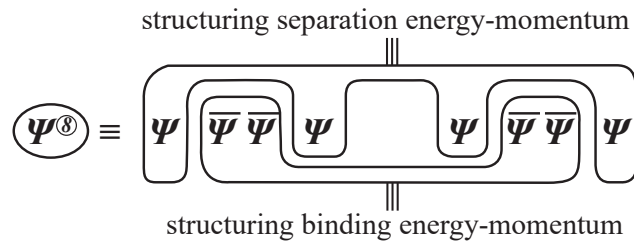
| | | | | |
|------------------|---------------|---|----------|--|
| Process | \Rightarrow | separ. mom. + separ. energy + binding moment. + binding energy | \equiv | Total |
| Length dimension | \Rightarrow | $\begin{matrix} \Downarrow \\ \Downarrow \\ \Downarrow \end{matrix} \begin{matrix} \Downarrow \\ \Downarrow \\ \Downarrow \end{matrix} \begin{matrix} \Downarrow \\ \Downarrow \\ \Downarrow \end{matrix} \begin{matrix} \Downarrow \\ \Downarrow \\ \Downarrow \end{matrix}$ | | $\begin{matrix} \Downarrow \\ \Downarrow \\ \Downarrow \end{matrix}$ |
| | | $\begin{matrix} \text{(-1)} & + & \text{(-1)} & + & \text{(-1)} & + & \text{(-1)} \end{matrix}$ | | $\begin{matrix} \text{(-4)} \end{matrix}$ |

Thus: The overall structuring process requires a basis spinor set of length dimension (-4)

\Rightarrow This means: The spinor raw material generated by **I.6.** must include the spinor subset of dimension (-4), required for structuring.

Since, by **I.3.**, the basis spinors Ψ and $\bar{\Psi}$ have dimension $-\frac{1}{2}$, $\dim \Psi = -\frac{1}{2}$, this must namely be a spinor subset $\Psi^{(8)}$ with $[\dim \Psi^{(8)}] = [\dim (-4)]$

The structuring foundation is



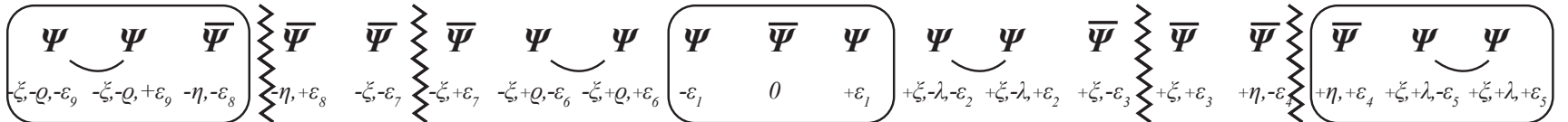
with the structure elements

$\approx \equiv$ separ. and $\cup \equiv$ bind.

Incorporating the structure $\Psi^{(8)}$ into $\Psi^{(27)}$ gives the preformation structure $\Psi^{(19)}$:

spinors:

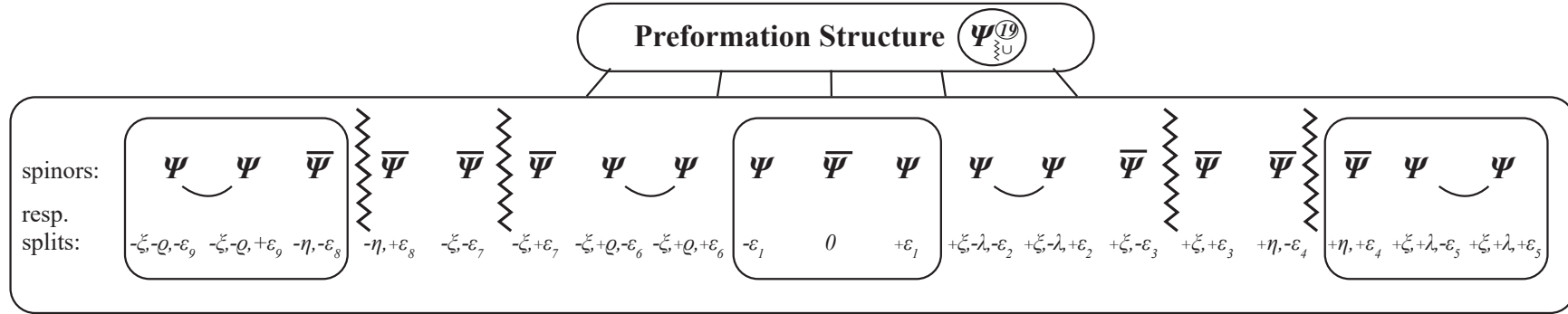
splits:



≡ The Primordial Universe before the Big Bang (${}_5\overline{G}$, ${}_5G$, ${}_2R$; v_1 , v_2 , v_3) with a size of around 10^{-14} cm ≡ essentially a “bulky point”

From the

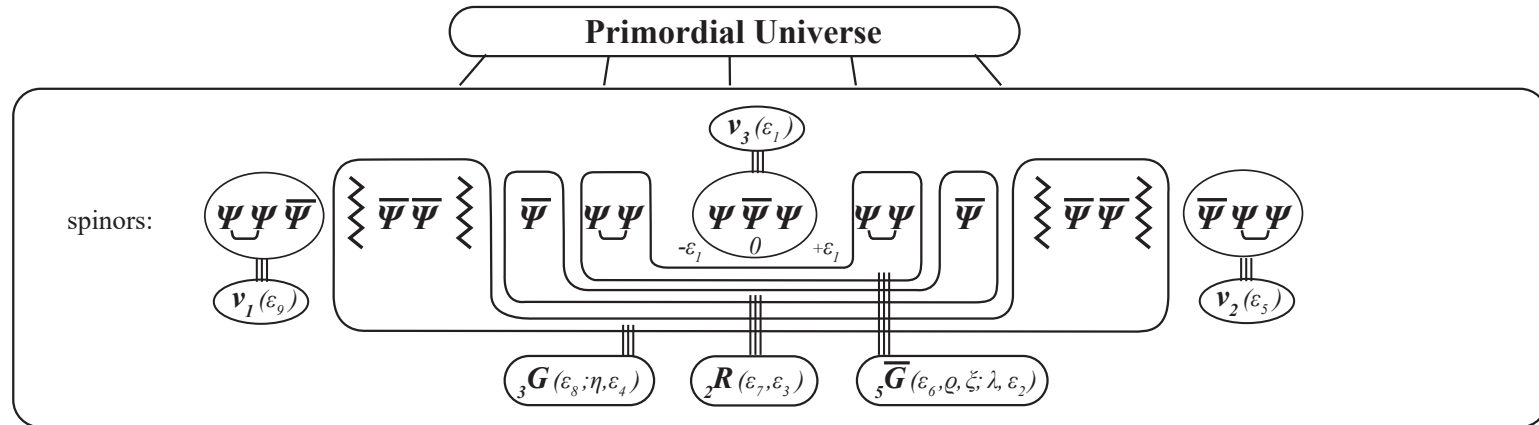
V.7.



that formed according to (KP1), another formation process is then initiated by the fact that Ψ , $\overline{\Psi}$ are both 4-component spinors, creating the $\Psi \Psi \Psi \Psi$ - and $\overline{\Psi} \overline{\Psi} \overline{\Psi} \overline{\Psi}$ -formation structures. The rest of the formation forms from the underlying preformation structure and the requirement that $\Psi_{\Sigma U}^{(19)}$ should have a global fermionic structure. This leads to the creation of the Primordial Universe with an inwards-maximized point split distribution:

V.8.

VII.4.



The left subscript of the bosons ${}_5\overline{G}$, ${}_2R$, ${}_3G$ indicates how many different point splits are in the inner-structural composition of the boson. For example: $({}_5\overline{G})$ means that $({}_5\overline{G})$ contains 5 different point splits.

Thus: The Primordial Universe before the Big Bang consists of

3 fermions \equiv (3 massless neutrinos with different structures):

$$\nu_1 \equiv F_1 \equiv \underbrace{\Psi \Psi \bar{\Psi}}_{(\varepsilon_9)} \quad \nu_2 \equiv F_2 \equiv \underbrace{\bar{\Psi} \Psi \Psi}_{(\varepsilon_5)} \quad \nu_3 \equiv F_3 \equiv \underbrace{\Psi \bar{\Psi} \Psi}_{(\varepsilon_1)}$$

as well as:

3 bosons \equiv (3-force mixture):

$$\begin{aligned} {}_5\bar{G} &\equiv \text{most extremely strong, repulsive, absolutely dominant force} \\ {}_2R &\equiv \text{normally strong, repulsive force} \\ {}_3G &\equiv \text{most extremely weak, attractive force} \end{aligned}$$

where, by V.6., VI.3.2., VI.3.3., VI.3.4., VI.4.

$$\begin{aligned} {}_5\bar{G} &\equiv \underbrace{\underbrace{\Psi \Psi} \quad \underbrace{\Psi \Psi}}_{(\varepsilon_6, \varrho, \xi; \lambda, \varepsilon_2)} \equiv \text{repulsive} \equiv \underbrace{\bar{m}}_{\bar{q}_0}, \bar{q}_0; \\ {}_2R &\equiv \underbrace{\underbrace{\bar{\Psi}} \quad \underbrace{\bar{\Psi}}}_{(\varepsilon_7, \varepsilon_3)} \equiv \text{repulsive} \equiv \underbrace{m}_m; \\ {}_3G &\equiv \underbrace{\underbrace{\underbrace{\Psi \Psi} \quad \underbrace{\Psi \Psi}}_{(\varepsilon_8; \eta, \varepsilon_4)}}_{\text{attractive}} \equiv \underbrace{\bar{m}}_{q_0}, q_0; \end{aligned}$$

\bar{q}_0 because of the $\Psi\Psi\Psi\Psi$ -configuration, \bar{m} means extremely high mass (see VI.4.), i.e. most extremely short range $\sim 10^{-18}$ cm

massive, range $\sim 10^{-14}$ cm

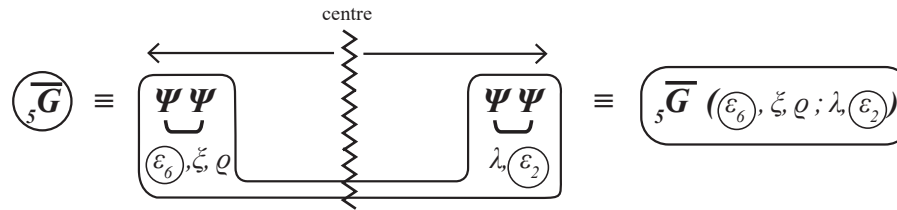
q_0 because of the $\bar{\Psi}\bar{\Psi}\bar{\Psi}\bar{\Psi}$ -configuration, with $\bar{q} + q = 0$, \bar{m} means extremely high mass, i.e. range $\sim 10^{-14}$ cm

The Primordial Universe before the Big Bang was therefore a “bulky point” with a size of around 10^{-14} cm.

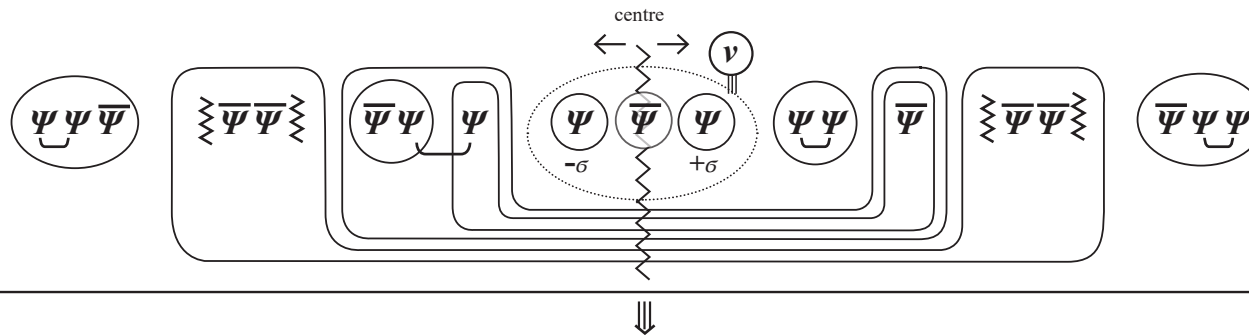
\equiv fundamental process of the Big Bang \equiv beginning of the Big Bang, i.e. the rupture process of ${}_5\overline{G}$ sets the Big Bang process in motion

The formation of the first ever force boson $({}_5\overline{G})$, i.e. the most extremely strong anti-gravitational force, the first ever force to emerge and exist, leads to the process that founds the Universe by means of the fundamental Big Bang process intrinsically associated with the $({}_5\overline{G})$ -boson

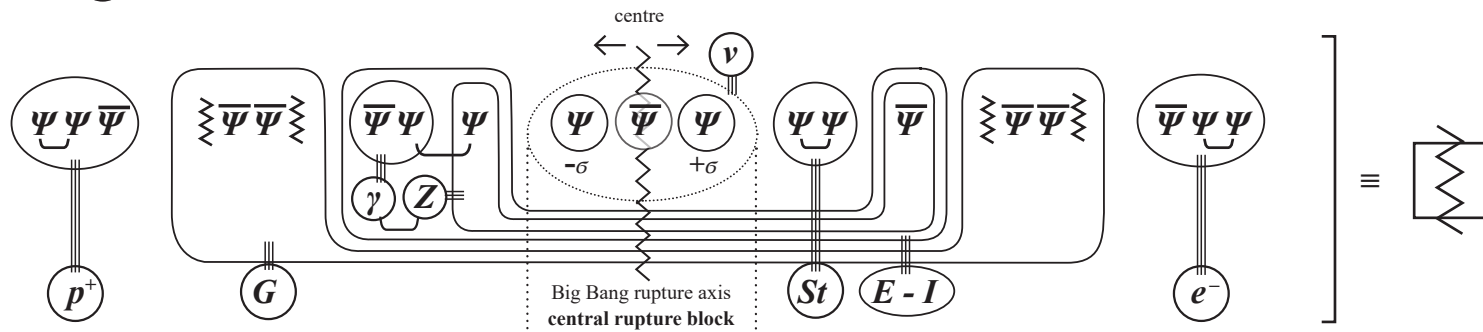
Rupture prozess of $({}_5\overline{G})$:



Thus: Within the whole of the Primordial Universe, this leads to a dissipation and reformation process with a point split distribution that is outwards-maximized because of the Big Bang rupture process:



As a consequence of the rupture of $({}_5\overline{G})$ (and therefore the beginning of the Big Bang), the post-Big Bang elementary set forms anew:



The elementary particle set created by the Big Bang (IX.10., IX.11.) forms as follows after the partial decomposition of $(E - I) \rightarrow (\gamma, Z)$ als

proton: (p^+) \equiv $\left(\Psi \Psi \bar{\Psi} \quad (-\xi, -Q, -\varepsilon_8, (\pm \varepsilon_9)) \right) \equiv$ 3 basis spinor - 4-split object

electron: (e^-) \equiv $\left(\bar{\Psi} \Psi \Psi \quad (+\eta, +\varepsilon_4, (\pm \varepsilon_5)) \right) \equiv$ 3 basis spinor - 3-split object

neutrino: (ν) \equiv $\left(\Psi \bar{\Psi} \Psi \quad (\pm \varepsilon_1) \right) \equiv$ 3 basis spinor - 1-split object

strong interaction: (St) \equiv $\left(\Psi \Psi \quad (-\lambda, (\pm \varepsilon_2)) \right) \equiv$ 2 basis spinor - 2-split object

electromagnetic-weak interaction: (γ, Z) \equiv $\left(\bar{\Psi} \Psi \quad \left(\Psi \quad \bar{\Psi} \right) \quad (-\varepsilon_3, (\pm \varepsilon_6)) \right),$

where the components are connected together with „ \cup “, but nonetheless exists separately as individual physical objects (see VII.23. to VII.33.)

(Z) \equiv $\left(\Psi \dots \bar{\Psi} \quad (+\varepsilon_6, -\varepsilon_3) \right) \equiv$ 2 basis spinor - 2-split object

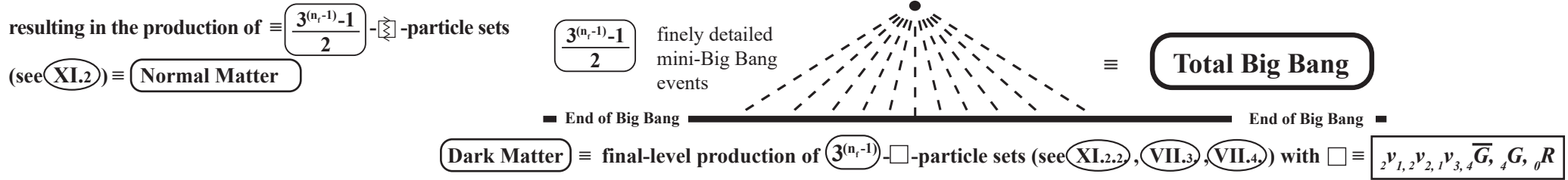
(γ) \equiv $\left(\bar{\Psi} \Psi \quad (0) \right) \equiv$ 2 basis spinor - 0-split object

gravitonic interaction:: (G) \equiv $\left(\begin{array}{c} \text{⌞} \end{array} \bar{\Psi} \bar{\Psi} \begin{array}{c} \text{⌞} \end{array} \begin{array}{c} \text{⌞} \end{array} \bar{\Psi} \bar{\Psi} \begin{array}{c} \text{⌞} \end{array} \quad (-\varepsilon_7) \right) \equiv$ 4 basis spinor - 1-split object

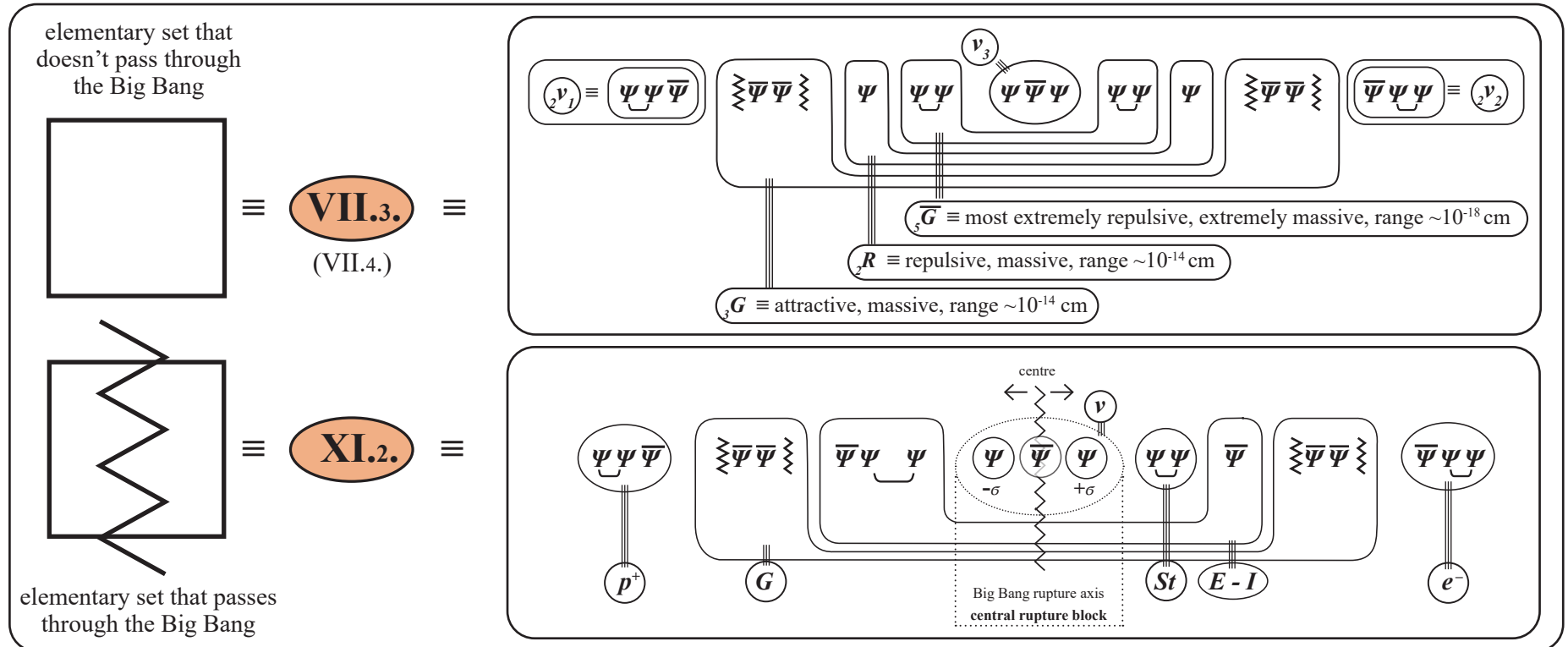
X.8.

(KP3)

This central Big Bang rupture axis leads to the Big-Bang-driven separation and therefore individualization of the 3 basis spinors in the central rupture region. As a result of this individualization, these 3 separated basis spinors then reform, each as the starting spinor of an independent dynamic construction process $\Psi_0 \rightarrow \Psi_0^{(19)}$, leading to the creation of 3 new construction systems, and thus to the creation of a 3-fold growth chain reaction (see (XI.20.), (XI.22.), (XI.23.)) :



To represent the structure of this chain reaction within the most colossal Big Bang production cascade more concisely, we introduce the following symbolic notation:



XI.23.

Big Bang Production Cascade

n-th production level, elementary sets produced: $s(n) \equiv 3^{n-1}$

number of elementary particle sets produced so far $\boxtimes \Sigma \equiv \left(\frac{3^n - 1}{2} \right)$

1st production level \equiv n = 1

$$s(1) \equiv \boxed{\textcircled{1} \text{ elementary particle set (ES)} \begin{array}{c} \nearrow \\ \searrow \end{array}}$$

≡ **XI.2.**

$$\boxed{(p^+ \equiv \underbrace{\psi \psi}_{\text{}} \bar{\psi})}$$
$$\overline{\Psi\Psi}$$
$$\overline{\Psi} \Psi \quad \Psi$$

central rupture block (ν)


$$\overline{\Psi} \underbrace{\Psi \Psi} \equiv (e^-)$$
$$\Sigma \equiv \frac{3^1 - 1}{2} \equiv 1$$

2nd production level $\equiv n = 2$

$$s(2) \equiv 3^{(2-1)} \equiv \boxed{\textcircled{3} \text{ ES } \boxed{\text{Z}}}$$
$$\Sigma \equiv \left(\frac{3^2 - 1}{2} \equiv 4 \right)$$

3rd production level $\equiv n = 3$

$$s(3) \equiv 3^{(3-1)} \equiv \boxed{\textcircled{9} \text{ ES } \boxed{\text{Z}}}$$
$$\Sigma \equiv \left(\frac{3^3 - 1}{2} \equiv 13 \right)$$
$$4^{\text{th}} \text{ production level} \equiv n = 4$$
$$s(4) \equiv 3^{(4-1)} \equiv \boxed{\boxed{27} \text{ ES } \boxed{\text{Z}}}$$
$$\Sigma \equiv \left(\frac{3^4 - 1}{2} \equiv 40 \right)$$

(n_f-1)-th production level \equiv last-but-one production level \equiv last iteration of the Big Bang, which produces ES \boxtimes :

$s(n_f-1) \equiv \left(3^{(n_f-2)} \text{ES} \right)$ and from which the last (final) production level n_f is created.

$$\Sigma \equiv \left(\frac{3^{(n_f-1)} - 1}{2} \right)$$

END OF BIG BANG ----- END OF BIG BANG ----- END OF BIG BANG ----- END OF BIG BANG -----

$n_f \equiv$ final production level created from the $(n_f - 1)$ -th and last iteration of the Big Bang, then end of the Big Bang.

$$s(n_f) \equiv \boxed{\boxed{3^{(n_f-1)} \text{ ES } \square}} \equiv \text{production at the final level}$$

XI.36.

The Components ($\frac{2}{3}, \frac{1}{3}$) of the total Universe directly after the Big Bang, and the corresponding (6, 6) \equiv 12 elementary particles

Dark Matter

| Component ① \equiv 66.6 % | Inner-Structural Particle Composition | by V., VI. | Mass/Charge | Force Structure | Range | Found? |
|---|--|---------------|--|-----------------------------------|---------------|---------|
| neutrino ₁ (ν_1) | $\Psi\Psi\bar{\Psi} (\varepsilon_9, \varepsilon_8)$ \equiv 2-split fermion | \Rightarrow | massive (mass $\neq 0$) | | | yes |
| neutrino ₂ (ν_2) | $\bar{\Psi}\Psi\Psi (\varepsilon_4, \varepsilon_5)$ \equiv 2-split fermion | \Rightarrow | massive (mass $\neq 0$) | | | yes |
| neutrino ₃ (ν_3) | $\Psi\bar{\Psi}\Psi (\varepsilon_1)$ \equiv 1-split fermion | \Rightarrow | massless | | | yes |
| anti-gravitational boson (\bar{G}) | $\Psi\Psi \quad \Psi\Psi (\varepsilon_6, \varrho; \lambda, \varepsilon_2)$ \equiv 4-split boson | \Rightarrow | extremely high mass, charged with anti-gravitational elementary charge \bar{q}_θ | most extremely strongly repulsive | 10^{-17} cm | not yet |
| repulsive boson (R_θ) | $\bar{\Psi} \quad \bar{\Psi} (0)$ \equiv 0-split boson | \Rightarrow | massless | repulsive | long | not yet |
| gravitational boson (G) | $\bar{\Psi}\bar{\Psi}\bar{\Psi} \quad \bar{\Psi}\bar{\Psi}\bar{\Psi} (\zeta, \varepsilon_7, \varepsilon_3, \eta)$ \equiv 4-split boson | \Rightarrow | massive, charged with gravitational charge q_θ with $(\bar{q}_\theta + q_\theta) = 0$ | most extremely weakly attractive | 10^{-15} cm | not yet |
| as well as the end products created from the annihilation of (G, \bar{G}), including the split release products thus created, and the Dark Energy created from these and other annihilation processes with coupled 4-dimensional space-time structure | | | | | | not yet |

Normal Matter/Antimatter

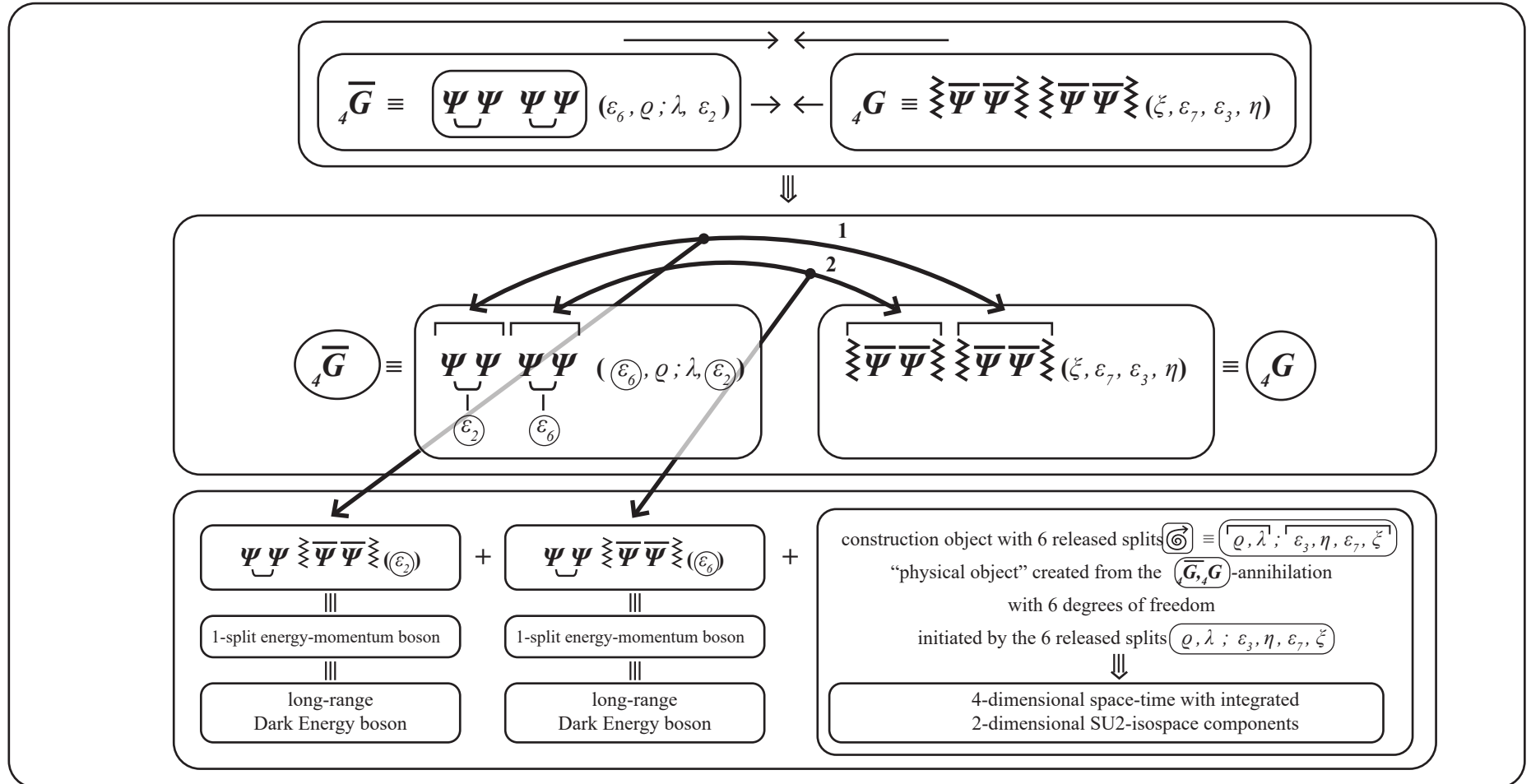
| Component ② \equiv 33.3 % | Inner-Structural Particle Composition | by V., VI. | Mass/Charge | Force Structure | Range | Found? |
|---|--|---------------|--|----------------------------------|---------------|--------|
| proton (antiproton*) ($p^+ (p^-)$) | $\Psi\Psi\bar{\Psi} (\varepsilon_9, \zeta, \varrho, \varepsilon_8)$ \equiv 4-split fermion | \Rightarrow | higher mass, charge $\oplus (\ominus)$ | | | yes |
| electron (positron*) ($e^+ (e^-)$) | $\bar{\Psi}\Psi\Psi (\varepsilon_4, \eta, \varepsilon_5)$ \equiv 3-split fermion | \Rightarrow | low mass, charge $\ominus (\oplus)$ | | | yes |
| neutrino (ν) | $\Psi\bar{\Psi}\Psi (\varepsilon_1)$ \equiv 1-split fermion | \Rightarrow | masless | | | yes |
| strong force (St) | $\Psi\Psi (\lambda, \varepsilon_2)$ \equiv 2-split boson | \Rightarrow | massive, uncharged | strongly attractive | 10^{-13} cm | yes |
| energy-momentum ($E-I$) | $\bar{\Psi}\Psi\bar{\Psi}\bar{\Psi} (\varepsilon_6, \varepsilon_3)$ \equiv 2-split boson | \Rightarrow | | | | yes |
| partial decomposition into (γ, Z) | $\bar{\Psi}\Psi\bar{\Psi}\bar{\Psi} (\varepsilon_6, \varepsilon_3)$ | | | | | yes |
| electromag. force (γ) | $\bar{\Psi}\Psi (0 \text{ split})$ \equiv 0-split boson | \Rightarrow | massless | medium strong | long | yes |
| weak force (Z) | $\Psi\bar{\Psi} (\varepsilon_6, \varepsilon_3)$ \equiv 2-split boson | \Rightarrow | massive, uncharged | weak | 10^{-15} cm | yes |
| gravitation (G) | $\bar{\Psi}\bar{\Psi}\bar{\Psi} \quad \bar{\Psi}\bar{\Psi}\bar{\Psi} (\varepsilon_7)$ \equiv 1-split boson | \Rightarrow | massless | most extremely weakly attractive | long | yes |
| as well as the annihilation end products ((e^+, e^-, p^+, p^-)), see XI.29. | | | | | | yes |

* For the detailed point split distributions of antimatter particles, see XI.28.

with the coupled construction of expanding 4-dimensional space-time, created by the pair annihilation processes of Dark Matter (${}_4\bar{G}, {}_4G$) as well as the pair annihilation processes of Normal Matter/Antimatter ($p^+ p^-, e^+ e^-$)

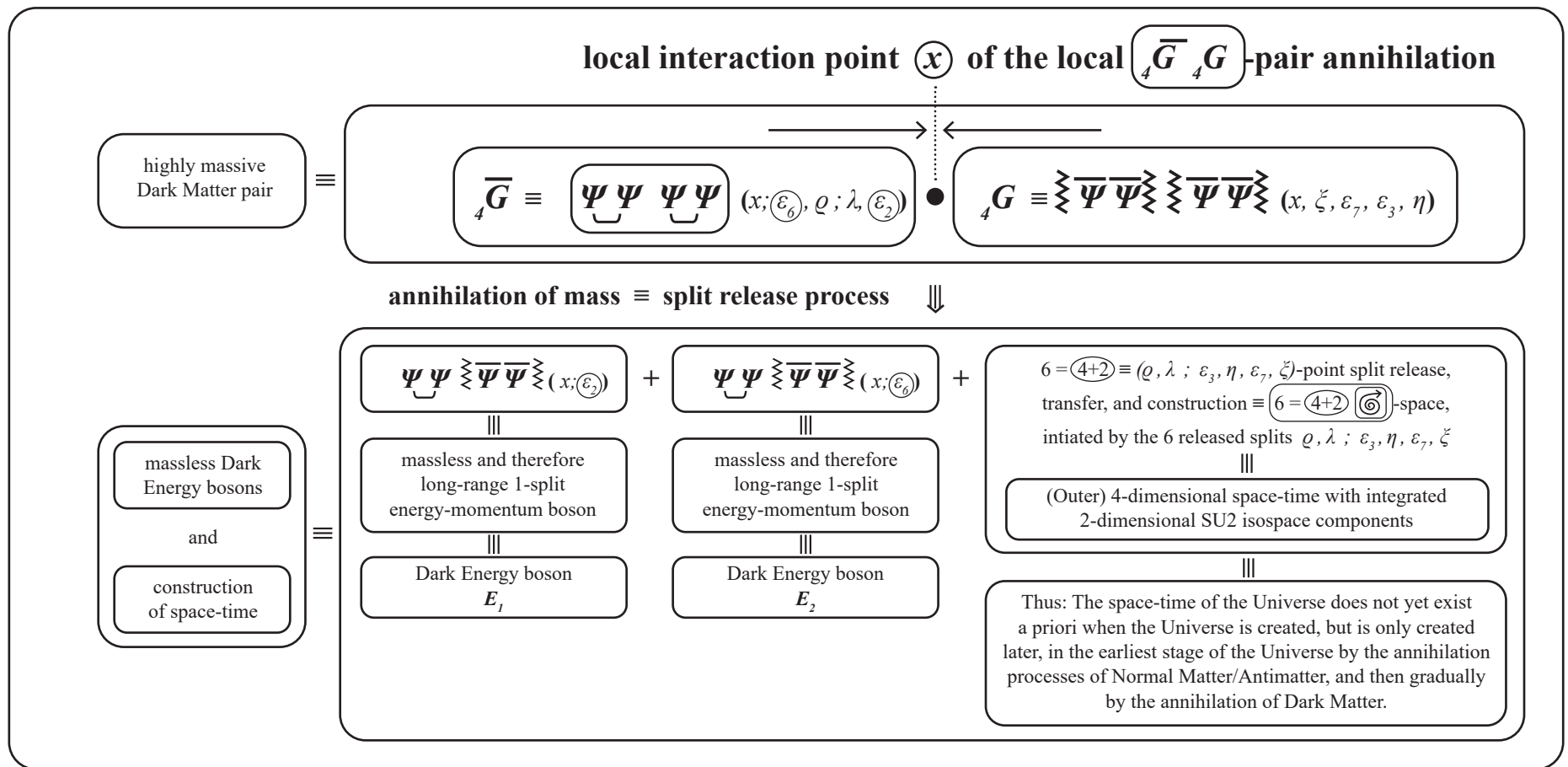
Annihilation of Dark Matter: The annihilation processes of Dark Matter and conversely the creation of Dark Energy with the coupled creation of expanding 4-dimensional space-time elementary strutures

XII.9.





with the coupled construction of expanding 4-dimensional space-time

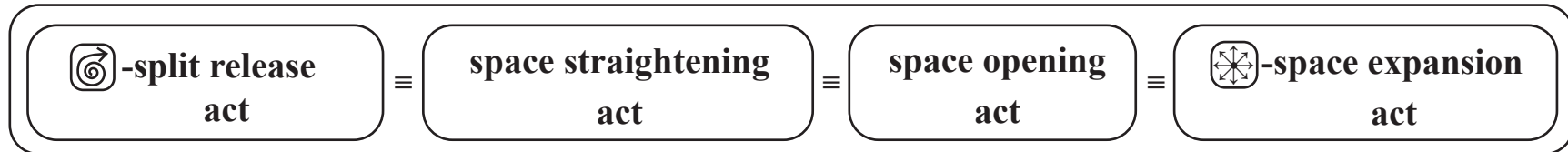
Thus





with the coupled construction of expanding 4-dimensional space-time



From **XII.12.**, it follows that: The local interaction point $(x = \bullet)$ of the $(\bar{G}_4^+ G_4^-)$ -pair annihilation is “straightened out” by the expanding **(4+2)-split release**  – due to the annihilation of mass – or in other words “opened up”. Thus: Starting from the local interaction point $(x = \bullet)$, due to the **(6)-split release**  from the annihilation processes **XII.12.** the following happens:

XII.13.





In **VI.3.2.**, it was shown that point curvature is created by **(split clustering processes with split densities ≥ 2)**, and that this point curvature creates mass, and therefore the curvature of space is related to mass. If we symbolically write **(split clustering \equiv point curvature)** as , and the inverse act, namely **(split release \equiv point straightening)**, as , then we see that:

XII.14.

- mass is generated at the mass point \odot by **(split densities ≥ 2)**, i.e. , and
- **(4-dimensional space-time structure entities)** are created by **(split releases ≥ 4)**, i.e. .

It follows that:

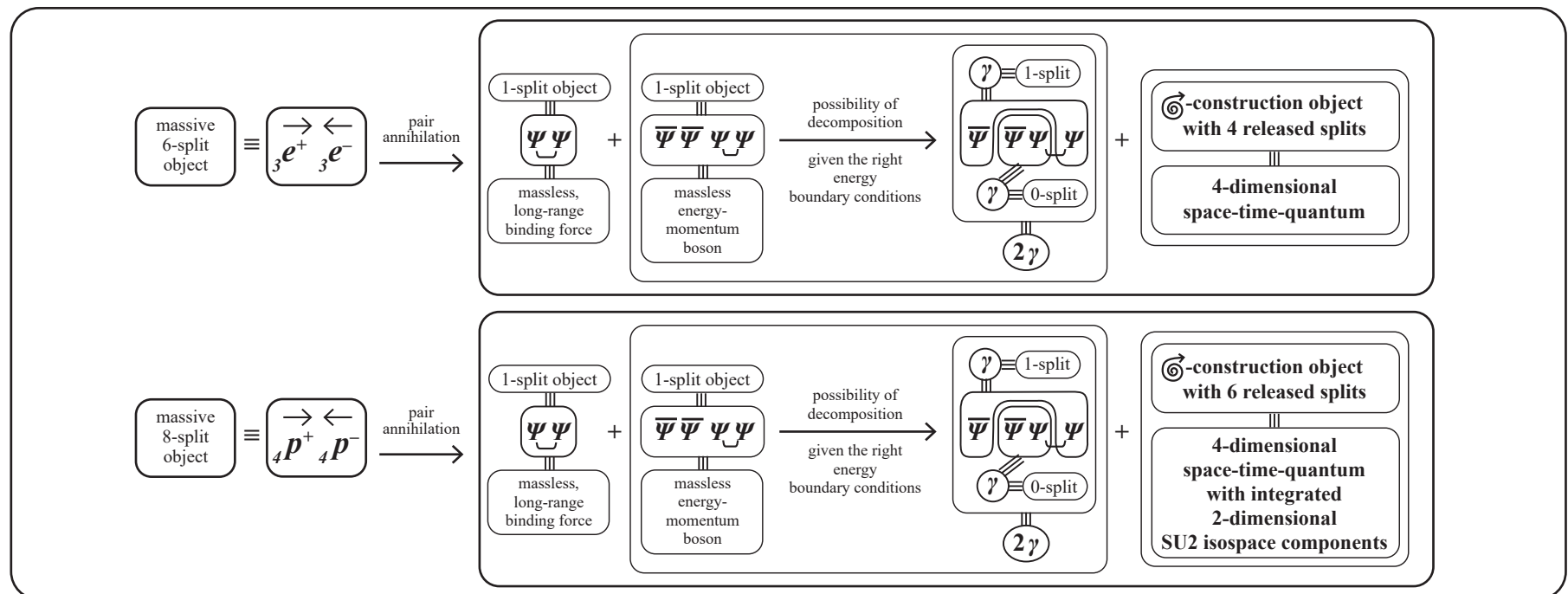
XII.15.

- **(space curvature)** \equiv  \equiv **(mass constr.)** \equiv **(clustering of space)** \equiv **(coupled with the construction of Normal Matter/Antimatter particles and Dark Matter particles)**
- **(space straightening)** \equiv  \equiv **(mass deconstr.)** \equiv **(constr. of expanding space)** \equiv **(coupled with the creation of massless Dark Energy bosons)**

with the coupled construction of expanding 4-dimensional space-time

The annihilation processes of Normal Matter/Antimatter and conversely the creation processes of energy-momentum bosons with the coupled creation of expanding 4-dimensional space-time elementary structure entities Annihilation of Normal Matter/Antimatter: Similar processes unfold within the Normal Matter/Antimatter segment.

By **XI.28.**, more Normal Matter formed than Antimatter during the Big Bang. Since, at the time, the “freshly” formed Universe directly after the Big Bang, i.e. directly after the **Big Bang phase** (see **XI.23.** \equiv creation phase), was a most extremely compact and most extremely massive “smallest possible structure” (some sources estimate that it was only ~ 10 cm in size), the Normal Matter/Antimatter pairs $e^+ e^-$ and $p^+ p^-$ were densely packed together, which necessarily led to the well-known pair annihilation processes **XI.29.**



with the coupled construction of expanding 4-dimensional space-time

Thus, the composition of the Universe “Today” can be divided into the following 3 components (see XII.42.):

Component ① ≡ 26.8 % ≡ Dark Matter

| | | Inner-Structural Particle Composition | |
|--------------------------|-----------------|---|-------------------|
| neutrino ₁ | (ν_1) | $\Psi\Psi\bar{\Psi}(\epsilon_9, \epsilon_9)$ | ≡ 2-split fermion |
| neutrino ₂ | (ν_2) | $\bar{\Psi}\Psi\Psi(\epsilon_4, \epsilon_5)$ | ≡ 2-split fermion |
| neutrino ₃ | (ν_3) | $\Psi\bar{\Psi}\Psi(\epsilon_1)$ | ≡ 1-split fermion |
| anti-gravitational boson | (\widehat{G}) | $\Psi\Psi\Psi\Psi(\epsilon_6, \varrho; \lambda, \epsilon_2)$ | ≡ 4-split boson |
| repulsive-Boson | (R_ϱ) | $\bar{\Psi}\bar{\Psi}(\varrho)$ | ≡ 0-split boson |
| gravitational boson | (G) | $\bar{\Psi}\bar{\Psi}\Psi\Psi(\xi, \epsilon_7, \epsilon_3, \eta)$ | ≡ 4-split boson |

Component ② ≡ 4.9 % ≡ Normal Matter/Antimatter

| | | Inner-Structural Particle Composition | |
|--|---------------|--|-------------------|
| proton (antiproton*) | $(p^+)(p^-)$ | $\Psi\Psi\bar{\Psi}(\epsilon_9, \xi, \varrho, \epsilon_9)$ | ≡ 4-split fermion |
| electron (positron*) | $(e^+)(e^-)$ | $\bar{\Psi}\Psi\Psi(\epsilon_4, \eta, \epsilon_5)$ | ≡ 3-split fermion |
| neutrino | (ν) | $\Psi\bar{\Psi}\Psi(\epsilon_1)$ | ≡ 1-split fermion |
| strong force | (St) | $\Psi\Psi(\lambda, \epsilon_2)$ | ≡ 2-split boson |
| energy-momentum | $(E-I)$ | $\bar{\Psi}\Psi\Psi\bar{\Psi}(\epsilon_6, \epsilon_3)$ | ≡ 2-split boson |
| partial decomposition into | $(\gamma)(Z)$ | $\bar{\Psi}\Psi\Psi\bar{\Psi}(\epsilon_6, \epsilon_3)$ | ⇓ |
| electromag. force | (γ) | $\bar{\Psi}\Psi(0 \text{ Split})$ | ≡ 0-split boson |
| weak force | (Z) | $\Psi\bar{\Psi}(\epsilon_6, \epsilon_3)$ | ≡ 2-split boson |
| gravitation | (G) | $\bar{\Psi}\bar{\Psi}\Psi\Psi(\epsilon_7)$ | ≡ 1-split boson |
| as well as the resulting annihilation end products $((e^+, e^-, p^+, p^-))$, see XI.29. | | | |

with the coupled construction of expanding 4-dimensional space-time

Component ③ \equiv 68.3 % \equiv Dark Energy with the coupled construction of expanding 4-dimensional space-time

- of which 28.5% \equiv energy-momentum bosons $(\bar{\Psi} \bar{\Psi} \Psi \Psi \text{ (1-split)})$
with the coupled construction of expanding 4-dimensional space-time (space-time-quantums ⑥),
created from the annihilation of a 28.5% fraction of Normal Matter/Antimatter (see XII.17.)
- of which 39.8 % \equiv energy-momentum bosons $(\tilde{\bar{\Psi}} \tilde{\bar{\Psi}} \tilde{\Psi} \tilde{\Psi} \text{ (1-split)})$
with the coupled construction of expanding 4-dimensional space-time (space-time-quantums ⑥),
created from the annihilation of a 39.8% fraction of Dark Matter (see XII.12.)

Closing remarks

At this point, I would like to thank the people and works to whom and which much of this endeavour is owed.

- **G.W.F. Hegel**, whose “Science of Logic” I worked through, or perhaps “suffered through”, for 2 years, some **55 years** ago, and without which I could not have achieved the systematic approach and thinking required by the present work.

When I was young, between 17 and 22 years old, I was highly motivated by philosophy in general. I was especially interested in the so-called “ontological difference between being (das Sein) and beings (das Seinende)” that had been explored by various philosophers over a period of over two-and-a-half thousand years.

At the time – in the transitional period between my last year of school and my first years of university – I engaged in an intensive study of **Plato, Descartes, Spinoza, Leibniz, Kant, Hegel, Kierkegaard, Nietzsche, Dilthey, Frege, Husserl, Whitehead, Wittgenstein, Heidegger, and others**, in parallel to my school and university work, for around 5 years.

I learned that, as well as “observable beings”, there must be an underlying “composition structure of being” (sub-structure), which, despite dynamically and inner-structurally composing and determining “observably existing beings”, does not exist in the form of an isolatable, observable, and therefore measurable entity.

If we apply this “ontological difference”, whose many facets have been discussed, analysed, and represented over such a long period of time by the thinkers listed above, to physics, we find:

The inner-structural composition (dynamic substructure) underlying all observable physical entities is the structure of the matter construction process I.12. - I.16. that logically follows from the most elementary foundation I.1., I.2., I.3. and the preformation structure V.7. that forms from this process and other subsequent formation processes.

Thus: The dynamic basis spinors Ψ and $\bar{\Psi}$ of this substructure, each with a length dimension $-\frac{1}{2}$ of only exist within the interaction structure I.1., I.2., I.3., and therefore do not exist as such as autonomous, free, isolatable entities, i.e. they are not observable entities.

This is precisely why and the only possible reason why (as presented in this work) the matter construction processes I.12. - I.16., and the preformation structure V.7. can exist at all, leading to the formation of each elementary particle (see e.g. XI.36.).

Each of the elementary particles thus formed have a specific inner-structural composition consisting of Ψ 's and $\bar{\Psi}$'s, determining their specific properties. These properties, determined by the inner-structural composition of these elementary particles, can be physically established, observed, measured, and are valid in complete generality.

-
- **Werner Heisenberg**, at whose Max Planck institute I worked for 7 years some **50 years** ago, and who – as a physicist and as an individual – made a lasting impression on me. His non-linear spinor theory – as the reader may already have guessed – has accompanied me throughout the entirety of my life in some form or another.

And, whenever I mention Heisenberg, ...

- ... **H.P. Dürr** cannot be far behind – my doctoral supervisor.
H.P. Dürr gifted me with a friendly teacher/student relationship for **50 years**.
Over many long years, we deliberated time and time again on every possible topic.
H.P. Dürr gave me valuable food for thought in every field – not just physics – which never failed to be incredibly meaningful to me.
Regretfully, H.P. Dürr passed away on 18/05/2014.

I would also like to mention

- ... **Harald Fritzsch**, whom I have known for more than **50 years**, and who has ever been my friend.
My friendship with him encouraged my interest in physics to constantly grow – even as I pursued other professional activities – and I followed the development of the “standard model” of elementary particle physics that he crafted together with M. Gell-Mann, and others, with sustained interest.

Through Harald Fritzsch, I also had the opportunity to meet – some **45 years** ago –

- ... **Murray Gell-Mann**, one of the great minds of modern physics. In M. Gell-Mann, I once again recognized, as I wrote in MLE, Chapter XI. on the question of the great minds of physics – Isaac Newton, Max Planck, Albert Einstein, and Werner Heisenberg – that their exceptional contributions are never limited to their respective specialist fields, but their brilliance radiates outwards into other areas and domains, with deep ramifications.

And while I cannot list everyone here, even though they might mean equally as much to me, I would especially like to name

- ... **Leo Stodolsky**, with whom I have been friends since his arrival at the Max Planck Institute for Physics, Munich from the USA. Together with him and his family and friends, I have undertaken and experienced much over the decades.

From 1974 to 2006, in order to focus on intensively pursuing other professional activities, I took a 32-year “vacation” from physics – including 25 years as a board member or chairman of various insurance companies.

However: Despite this “vacation”, my interest in my primary vocations – physics, philosophy, and logic – naturally never wavered, and so I have made these my primary focus for the last 7-8 years following my retirement and convalescence – as had always been my plan in life.

Finally:

I would especially like to thank

- **Indra Siemsen**, who – over a period of 7 years – has brought my handwritten manuscripts to life with the “art of graphical design”, and, with an impressive precision that I would never have thought possible, coaxed them into a readable form. To her, I owe the precisely organized and ordered structure that allowed the development and compilation of the whole work to proceed as optimally as possible along its many-layered small-scale and large-scale threads. I am grateful to have always had this structure to guide me.

FIN

Annex

Outline of the most important structure processes of the Universe.

Brief summary ①. - ②⑨.

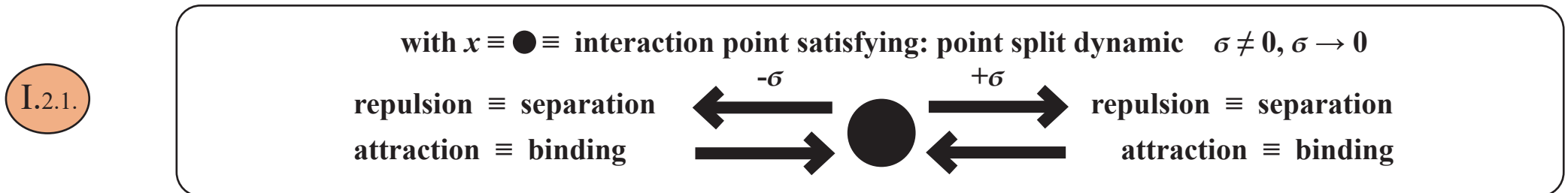
Ψ exists as the most general possible “Something”, and there exists a “Something Else” that can be distinguished from that “Something”, namely $\bar{\Psi}$. Both of these things satisfy the simplest possible non-linear interaction with respect to each other, which is (with $D \equiv \frac{d}{dx}$ and $dx \equiv \sigma$):

| | | | |
|------|---|---|--------------------------------------|
| I.1. | $D \Psi(x) = \Psi(x-\sigma_\alpha) \bar{\Psi}(x) \Psi(x+\sigma_\alpha) ; \sigma_\alpha \equiv \text{point split with } \sigma_\alpha \rightarrow 0$ | ≡ | most elementary structure |
| I.2. | $D \bar{\Psi}(x) = \bar{\Psi}(x-\sigma_\beta) \Psi(x) \bar{\Psi}(x+\sigma_\beta) ; \sigma_\beta \equiv \text{point split with } \sigma_\beta \rightarrow 0$ | | |

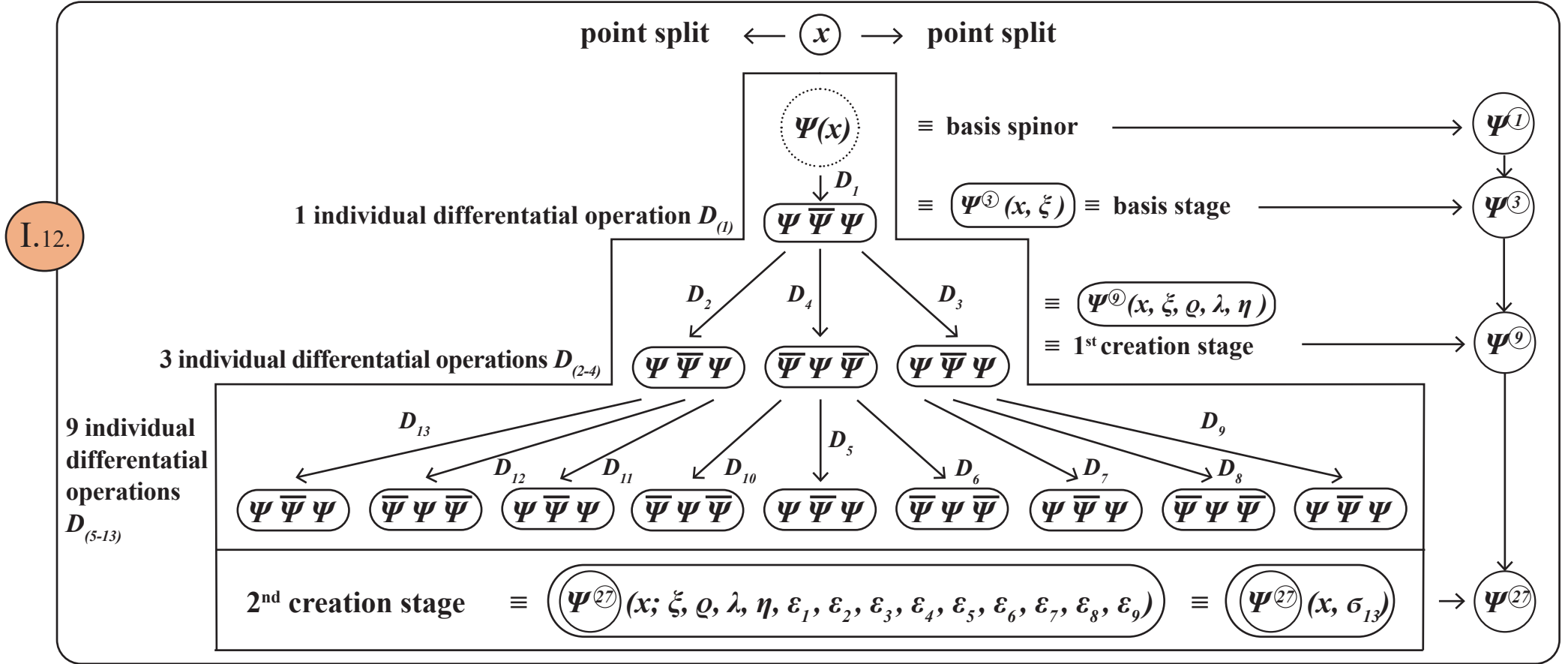
In order for this elementary structure to exist, it follows from the differential operator $D \equiv \frac{d}{dx}$ that both Ψ and $\bar{\Psi}$ must have length dimension - $\frac{1}{2}$ and must be 4-component spinors (see I.2.1., I.2.2.).

In I.1. and I.2. σ is the point split (x, σ) associated with the interaction point (x) .

There is the following point split dynamic:



Thus: The point split is unequivocally defined by the differential operator $D \equiv \frac{d}{dx}$, namely as $dx \equiv \sigma$, and acts according to the system of equations I.1. and I.2.. The point split structure (repulsion and attraction) describes the elementary structure of every possible force within the total global, and so no further assumptions are required.



Taking into account the local arrangement – with the ordering from ②.4. – of the 1st creation stage $\Psi^9(x, \sigma_4)$ as well as the point split-separated 2nd creation stage $\Psi^{27}(x, \sigma_{13})$ created by the 2nd fundamental process – as described ③.1. to ③.4. – the following specifically holds:

③.4.1.

Ψ^{27}

| Ψ | $\bar{\Psi}$ | Ψ | $\bar{\Psi}$ | Ψ | $\bar{\Psi}$ | $\bar{\Psi}$ | Ψ | $\bar{\Psi}$ | Ψ | $\bar{\Psi}$ | Ψ | $\bar{\Psi}$ | Ψ | $\bar{\Psi}$ | Ψ | $\bar{\Psi}$ | Ψ | $\bar{\Psi}$ | Ψ | $\bar{\Psi}$ | $\bar{\Psi}$ | Ψ | $\bar{\Psi}$ | Ψ | $\bar{\Psi}$ | Ψ |
|------------------|------------------|------------------|------------------|---------|------------------|------------------|--------|------------------|------------------|------------------|------------------|------------------|--------|------------------|------------------|------------------|------------------|------------------|--------|------------------|------------------|---------|------------------|------------------|------------------|------------------|
| x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x |
| $-\xi - \varrho$ | $-\xi - \varrho$ | $-\xi - \varrho$ | $-\eta$ | $-\eta$ | $-\eta$ | $-\xi$ | $-\xi$ | $-\xi$ | $-\xi + \varrho$ | $-\xi + \varrho$ | $-\xi + \varrho$ | 0 | 0 | 0 | $+\xi - \lambda$ | $+\xi - \lambda$ | $+\xi - \lambda$ | $+\xi$ | $+\xi$ | $+\xi$ | $+\eta$ | $+\eta$ | $+\eta$ | $+\xi + \lambda$ | $+\xi + \lambda$ | $+\xi + \lambda$ |
| $-\varepsilon_9$ | 0 | $+\varepsilon_9$ | $-\varepsilon_8$ | 0 | $+\varepsilon_8$ | $-\varepsilon_7$ | 0 | $+\varepsilon_7$ | $-\varepsilon_6$ | 0 | $+\varepsilon_6$ | $-\varepsilon_1$ | 0 | $+\varepsilon_1$ | $-\varepsilon_2$ | 0 | $+\varepsilon_2$ | $-\varepsilon_3$ | 0 | $+\varepsilon_3$ | $-\varepsilon_4$ | 0 | $+\varepsilon_4$ | $-\varepsilon_5$ | 0 | $+\varepsilon_5$ |

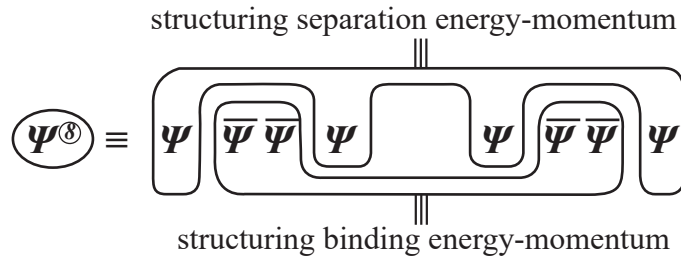
| | | | | | | | | | | |
|------------------|---------------|-------------|---|---------------|---|-----------------|---|----------------|----------|-------|
| Process | \Rightarrow | separ. mom. | + | separ. energy | + | binding moment. | + | binding energy | \equiv | Total |
| Length dimension | \Rightarrow | -1 | + | -1 | + | -1 | + | -1 | | -4 |

Thus: The overall structuring process requires a basis spinor set of length dimension -4

\Rightarrow This means: The spinor raw material generated by I.6 must include the spinor subset of dimension -4, required for structuring.

Since, by I.3., the basis spinors Ψ and $\bar{\Psi}$ have dimension $-\frac{1}{2}$, $\dim \Psi = -\frac{1}{2}$, this must namely be a spinor subset $\Psi^{(8)}$ with $[\dim \Psi^{(8)}] = [\dim -4]$

The structuring foundation is



with the structure elements

$\approx \equiv$ separ. and $\cup \equiv$ bind.

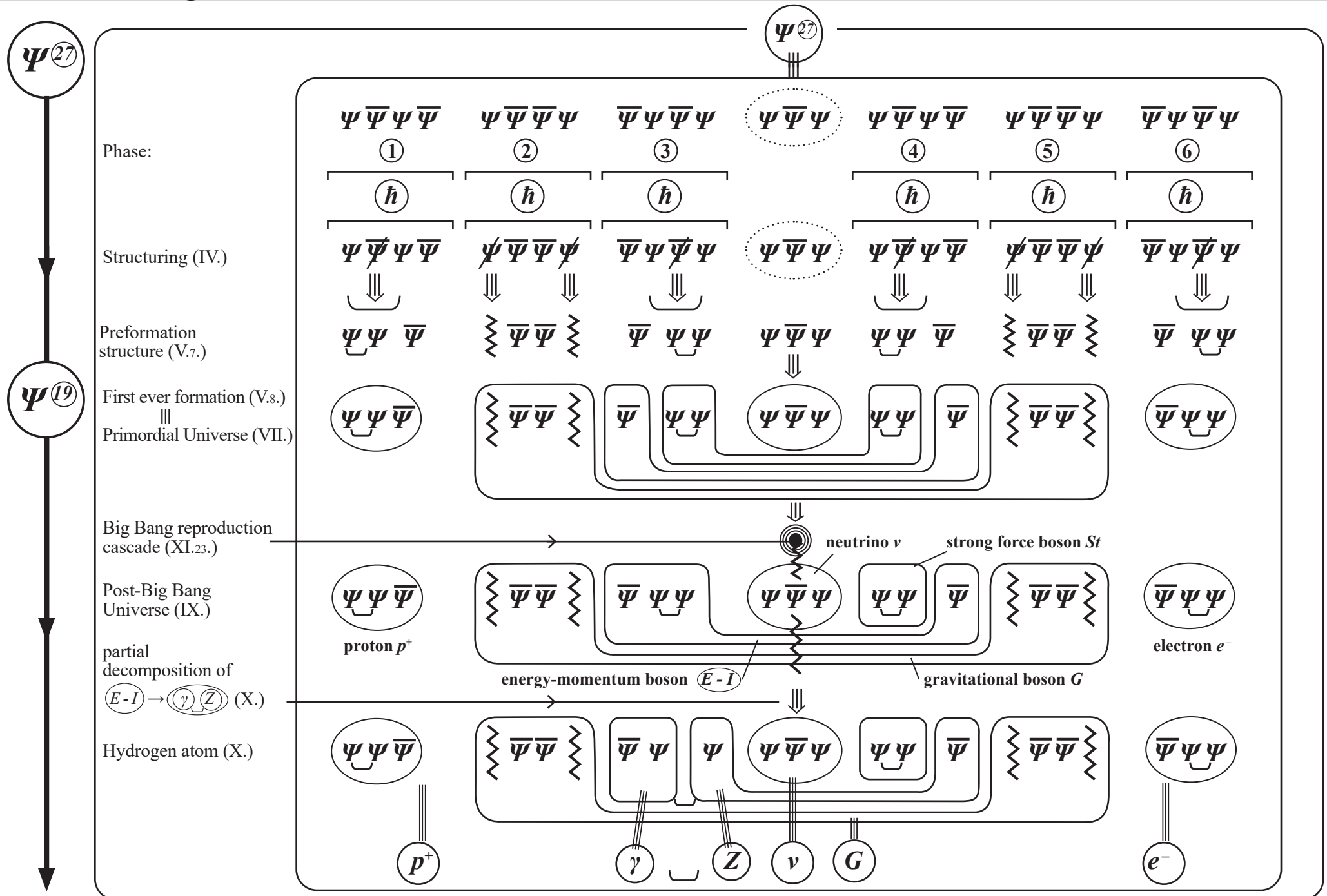
Incorporating the structure $\Psi^{(8)}$ into $\Psi^{(27)}$ gives the preformation structure $\Psi^{(19)}$:

spinors:

splits:



3. STRUCTURING, PREFORMATION, AND FORMATION PROCESSES



The creation of mass and charge from the dynamically created point split densities of the individual formation entities.
Mass and charge as dynamically formed system entities.

VI.3.

point split densities:

- 0 or 1-split particles \equiv massless particles :

(0 or 1 split) do not influence the structure of space-time during particle formation – as can immediately be seen:



VI.3.1.

Hence: Spinor sets of Ψ^n with 1 split can reach the local point x unimpeded as $\sigma \rightarrow 0$ (i.e. during the particle formation process):

Hence: Particles with split densities of (0 or 1 splits) are massless and therefore also chargeless, since they do not influence the structure of space-time..

- **2-split particles \equiv particles with mass $\neq 0$:**

2 splits influence the structure of space time during particle formation:



Since σ_1 and σ_2 are independent, the **2-split** spinor sets interacting within the structure of space-time “collide” with each other (see above) in the neighbourhood of the local point x as $\sigma_1 \rightarrow 0$ bzw. $\sigma_2 \rightarrow 0$, leading to point curvature around x , and consequently to **\equiv creation of mass** :
 A split density of 2 independent splits creates bending near the local point :

Mass is defined as point curvature, and hence spinor interactions resulting in at least 2 splits create mass by means of the associated curvature of space-time.

Hence: Particles with split density ≥ 2 have mass $\neq 0$

- **3-split particles \equiv formation of charge :**

3 splits influence the structure of space-time

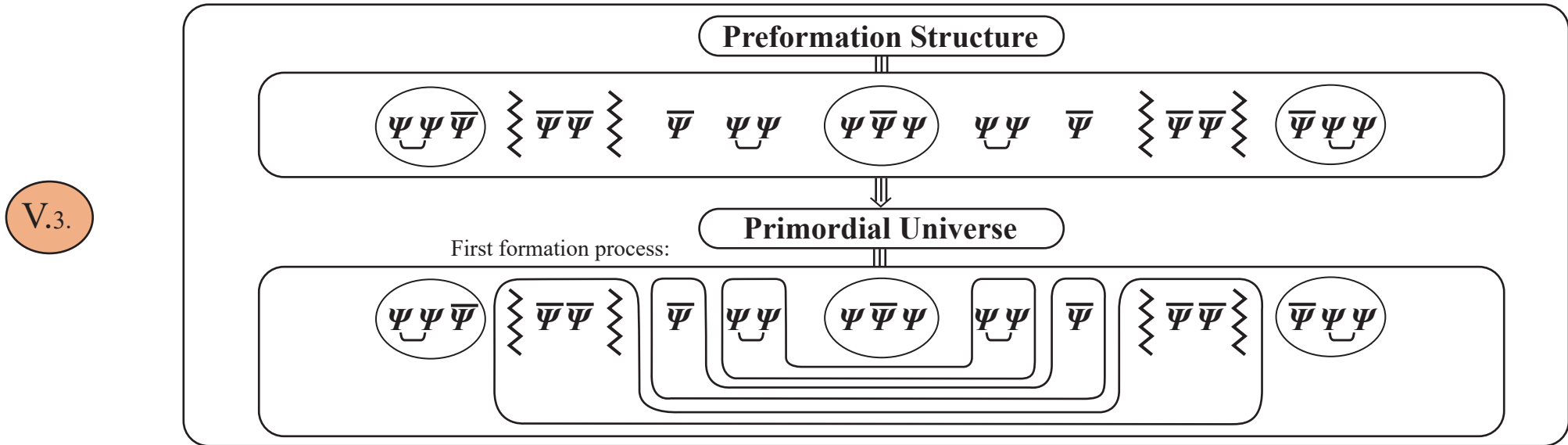
Thus: The presence of 3 independent splits causes the local point x not only to develop curvature, but also to be compressed, and this compression causes the mass created by 2 splits to become denser.

This point compression creates charge, specifically

... $\Psi\bar{\Psi}$ -sequence \equiv **positive charge** (\equiv standardized definition of \oplus -charge)
 ... $\bar{\Psi}\Psi$ -sequence \equiv **negative charge** (\equiv standardized definition of \ominus -charge)

The fact that charge is formed by 3 splits automatically explains why every charged particle has mass, which already formed from the first 2 splits.

Since both Ψ and $\bar{\Psi}$ (see ①.2.2.) are 4-component spinors in the primordial formation process, the $\Psi^{(4)}$ and $\bar{\Psi}^{(4)}$ -formations are created from the preformation structure ⑤.7. in accordance with the minimality princip ①.0.3. The rest forms as a result of the requirements associated with the global fermionic structure $\Psi^{(19)}$:



with the 4-spinor formations

$$\begin{aligned} \bar{G} &\equiv \Psi^{(4)} \equiv \boxed{\Psi\Psi} \boxed{\Psi\Psi} \equiv \boxed{\Psi\Psi\Psi\Psi} \stackrel{\text{by IV.5.}}{=} \text{repulsive} \equiv \text{separating} \\ G &\equiv \bar{\Psi}^{(4)} \equiv \boxed{\bar{\Psi}\bar{\Psi}} \boxed{\bar{\Psi}\bar{\Psi}} \equiv \boxed{\bar{\Psi}\bar{\Psi}\bar{\Psi}\bar{\Psi}} \stackrel{\text{by IV.5.}}{=} \text{attractive} \equiv \text{binding} \\ \text{and} \quad R &\equiv \bar{\Psi}^{(2)} \equiv \boxed{\bar{\Psi}} \boxed{\bar{\Psi}} \equiv \boxed{\bar{\Psi}\bar{\Psi}} \stackrel{\text{by V.5.}}{=} \text{repulsive} \end{aligned}$$

This primordial formation process determines all subsequent events associated with the fundamental force structure:

$\boxed{\bar{\Psi}\bar{\Psi}\bar{\Psi}\bar{\Psi}} \equiv \text{repulsion}$; $\boxed{\Psi\Psi\Psi\Psi} \equiv \text{attraction}$, and since the separation elements \boxtimes always occur as $\boxed{\bar{\Psi}\boxtimes\bar{\Psi}}$: $\boxed{\bar{\Psi}\bar{\Psi}}$ -formations are repulsive; and since the binding elements \sqcup always occur as $\boxed{\Psi\Psi}$: $\boxed{\Psi\Psi}$ -formations are attractive (see ⑤.6.).

3 fermions \equiv 3 massless neutrinos with different structures:

$$\nu_1 \equiv F_1 \equiv \boxed{\psi \psi \bar{\psi}} (\varepsilon_9) \equiv \text{1-split object} \equiv \text{massless neutrino (by VI.3.1.)}$$

$$\nu_2 \equiv F_2 \equiv \boxed{\bar{\psi} \psi \psi} (\varepsilon_5) \equiv \text{1-split object} \equiv \text{massless neutrino (by VI.3.1.)}$$

$$\nu_3 \equiv F_3 \equiv \boxed{\psi \bar{\psi} \psi} (\varepsilon_1) \equiv \text{1-split object} \equiv \text{massless neutrino (by VI.3.1.)}$$

3 bosons \equiv 3-force mix:

$$\begin{aligned} {}_5\bar{G} &\equiv \boxed{\psi \psi \text{---} \psi \psi} (\varepsilon_6, \varrho, \xi; \lambda, \varepsilon_2) \equiv \text{5-split object} \\ &\equiv \text{most extremely strongly repulsive force (by V.6., VII.5.)} \\ &\equiv \text{most extremely massive and therefore most extremely short-range, } \sim 10^{-18} \text{ cm range (by VI.3.5.)} \end{aligned}$$

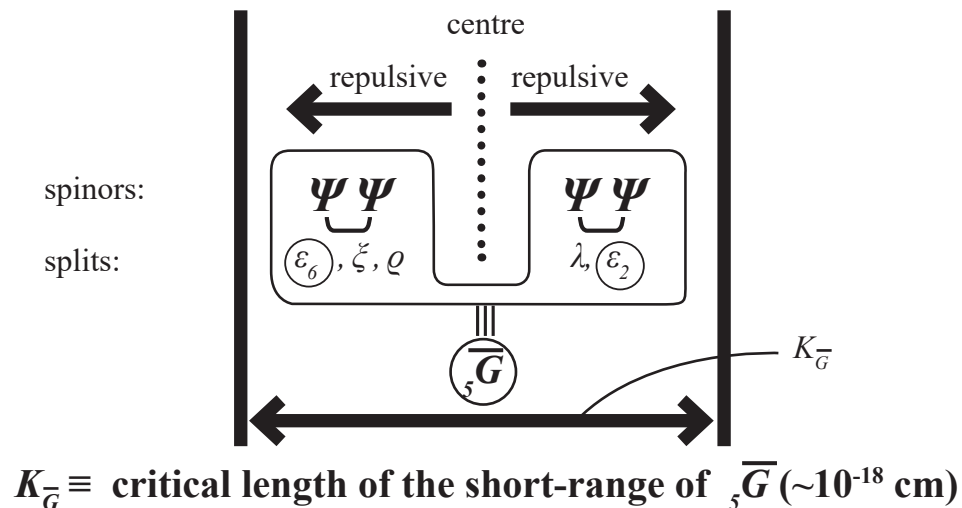
$$\begin{aligned} {}_2R &\equiv \boxed{\bar{\psi} \text{---} \bar{\psi}} (\varepsilon_7, \varepsilon_3) \equiv \text{2-split object} \\ &\equiv \text{repulsive force (by V.6., VII.5.)} \\ &\equiv \text{massive and therefore short-range, } \sim 10^{-14} \text{ cm range (by VI.3.2.)} \end{aligned}$$

$$\begin{aligned} {}_3G &\equiv \boxed{\bar{\psi} \bar{\psi} \text{---} \bar{\psi} \bar{\psi}} (\varepsilon_8; \eta, \varepsilon_4) \equiv \text{3-split object} \\ &\equiv \text{most extremely weakly attractive force (by V.6., VII.5.)} \\ &\equiv \text{most extremely massive and therefore most extremely short-range, } \sim 10^{-14} \text{ cm range (by VI.3.3.)} \end{aligned}$$

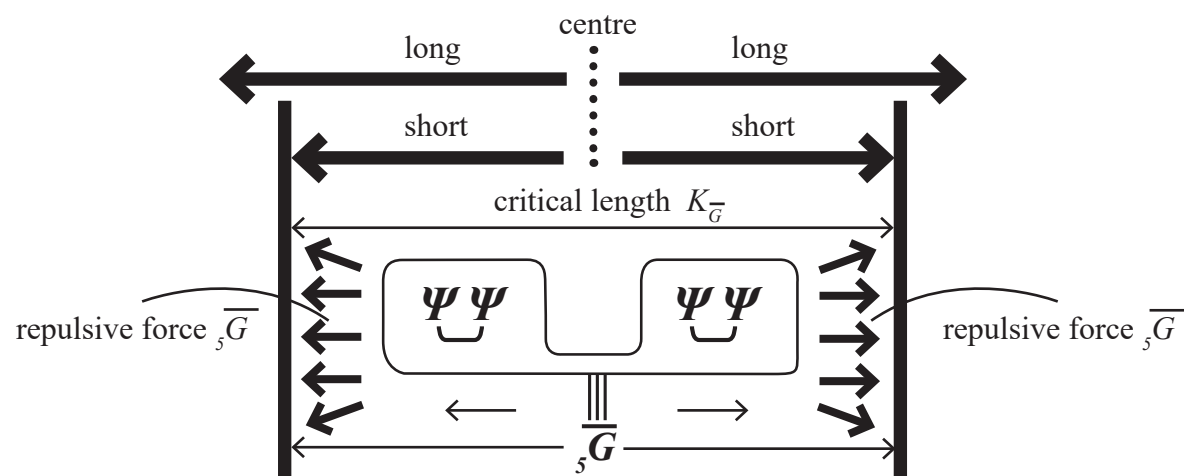
VII.1.

Thus: The Primordial Universe, as the first ever manifestation of reality, was most extremely small, essentially a tiny point with mass, and was absolutely dominated by a most extremely massive and therefore most extremely short-range force \overline{G} (range $\sim 10^{-18}$ cm), which was most extremely strongly repulsive. This anti-gravitational force \overline{G} is what triggered the Big Bang.

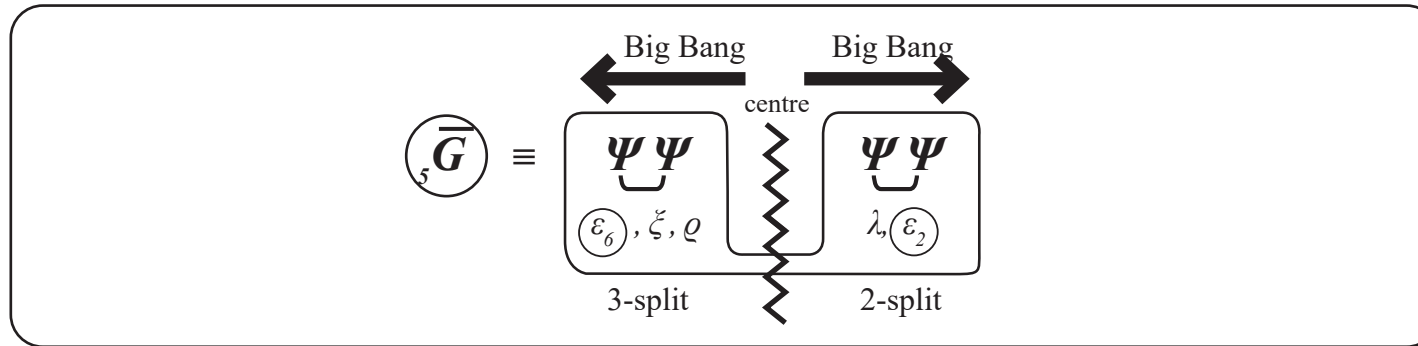
VIII.2.



VIII.3.

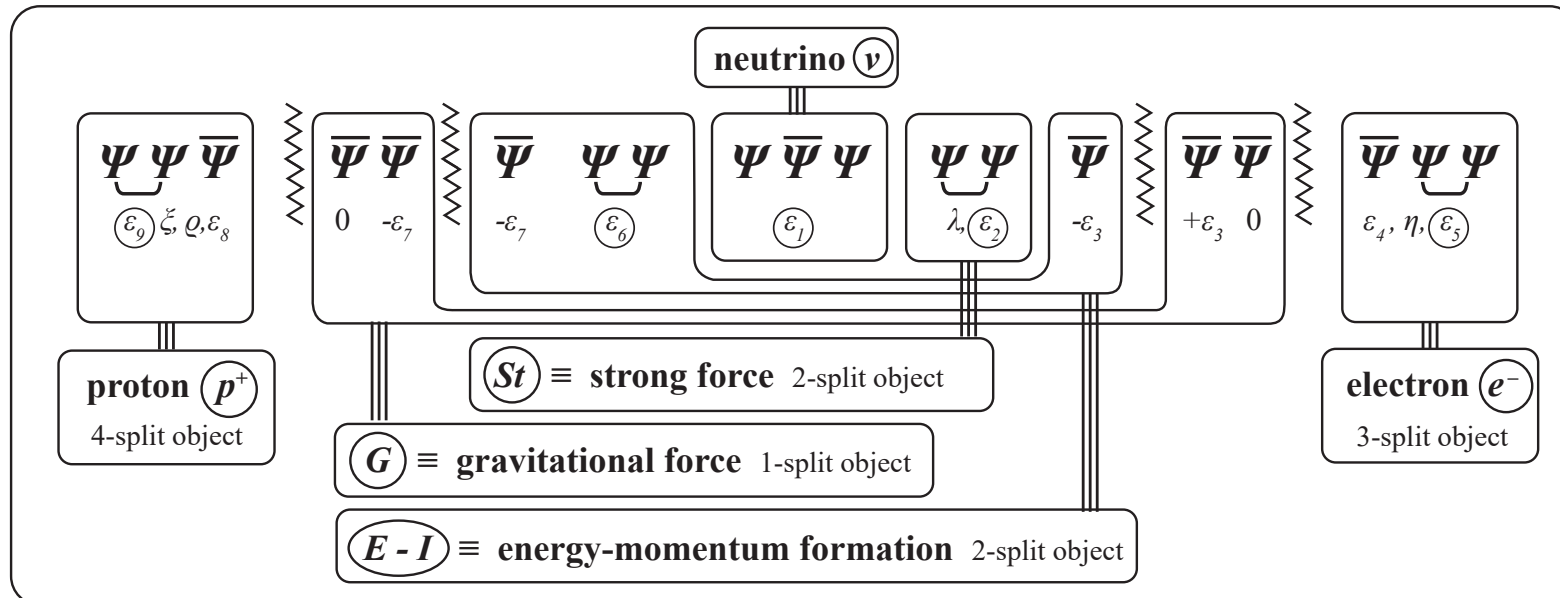


VIII.6.

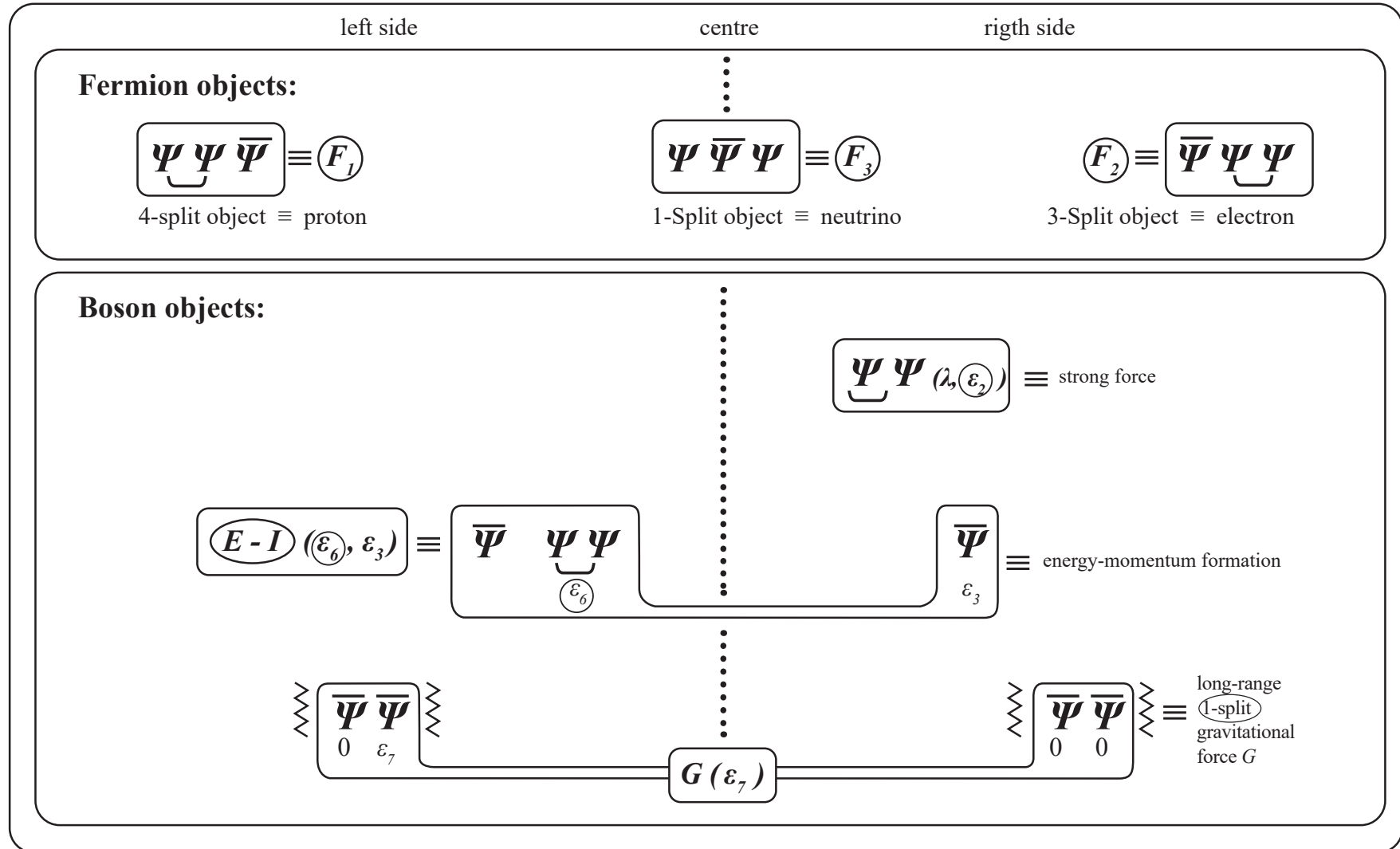


After the rupture of \bar{G}_5 into two structurally identical fragments, by the identity principle **I.5.**, only one of these fragments can “survive” after the Big Bang and continue to exist. By the minimality principle, this must be the simpler **2-split** object $\equiv \Psi\Psi(\epsilon_2, \lambda)$. Thus, after the Big Bang $\leftarrow \rightsquigarrow$, this leads to an outwards-maximized point split distribution with the following global formation:

IX.2.



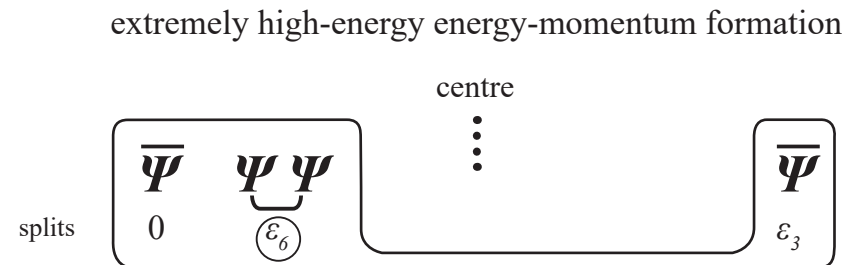
The Big Bang repulsion act from the inside outwards leads to an inside-outwards maximized point split distribution (see IX.1., IX.10., X.11.). This leads to the formation of the individual components of the **post-Big Bang Universe** – structurally created from the centre of the Big Bang – as follows:



IX.10.

X.4.

**extremely high-energy
energy-momentum state,
since created directly
by the Big Bang:**

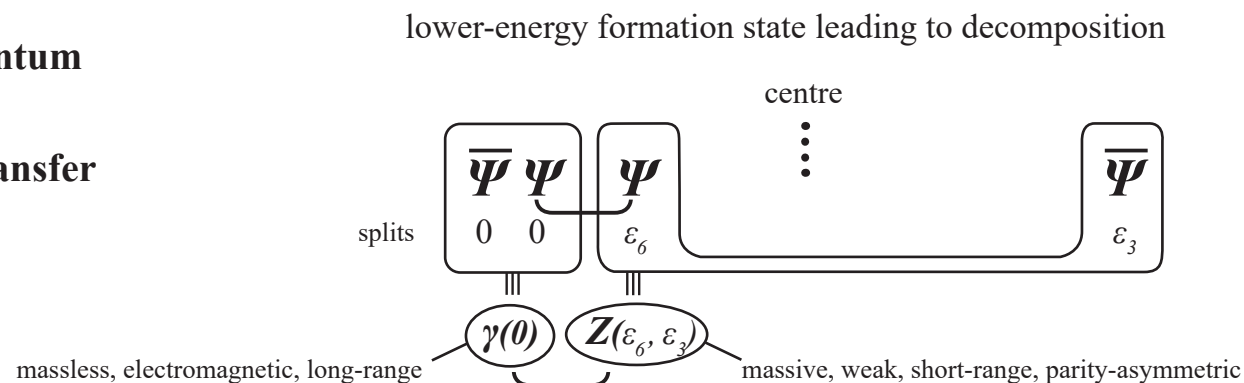


energy-
momentum
transfer:



**consumption of energy-momentum for structure formation in the
post-Big Bang part of the Universe that passes through the Big Bang**

**weaker energy-momentum
after completion of
energy-momentum transfer**



The skew symmetry (\equiv parity asymmetry) of the **energy-momentum formation** (see **IX.8.**)

X.6.

$$(E - I) \equiv \begin{array}{|c|} \hline \bar{\Psi} \quad \underbrace{\Psi \Psi}_{\varepsilon_6} \\ \hline 0 \end{array} \quad \begin{array}{c} \text{centre} \\ \vdots \end{array} \quad \begin{array}{|c|} \hline \bar{\Psi} \\ \hline \varepsilon_3 \end{array}$$

that was originally created by the Big Bang repulsion act, as described in **VIII.10.**, and thus unavoidably “imprinted” onto the post-Big Bang part of the Universe by the Big Bang, is carried forwards by the decomposition process

X.7.

of the energy-momentum

DECOMPOSITION

into the coupling pair

 $(E - I)$  $(\gamma \quad Z)$

$$\begin{array}{|c|} \hline \bar{\Psi} \quad \underbrace{\Psi \Psi}_{\varepsilon_6} \\ \hline 0 \end{array} \quad \begin{array}{c} \text{centre} \\ \vdots \end{array} \quad \begin{array}{|c|} \hline \bar{\Psi} \\ \hline \varepsilon_3 \end{array}$$



$$\begin{array}{|c|} \hline \bar{\Psi} \quad \Psi \\ \hline 0 \quad 0 \end{array} \quad \begin{array}{|c|} \hline \Psi \\ \hline \varepsilon_6 \end{array} \quad \begin{array}{c} \text{centre} \\ \vdots \end{array} \quad \begin{array}{|c|} \hline \bar{\Psi} \\ \hline \varepsilon_3 \end{array}$$

into the inner structure of the weak force $(Z) \equiv \begin{array}{|c|} \hline \Psi \\ \hline \varepsilon_6 \end{array} \quad \begin{array}{c} \text{centre} \\ \vdots \end{array} \quad \begin{array}{|c|} \hline \bar{\Psi} \\ \hline \varepsilon_3 \end{array}$ and therefore is preserved throughout the structures **atom \rightarrow molecule \rightarrow macromolecule \rightarrow **,

e.g. recognizable in the “left-handnesses” of the protein molecules of living beings – and only living beings.

The elementary particle set (**IX.10.**, **IX.11.**) created by the Big Bang forms after the partial decomposition of $(E - I) \rightarrow (\gamma \cup Z)$ as follows

proton: (p^+) \equiv $\left(\underbrace{\Psi \Psi \bar{\Psi}}_{\cup} (-\xi, -Q, -\varepsilon_8, (\pm \varepsilon_9)) \right) \equiv$ **3 basis spinor** - **4-split** object

electron: (e^-) \equiv $\left(\bar{\Psi} \underbrace{\Psi \Psi}_{\cup} (+\eta, +\varepsilon_4, (\pm \varepsilon_5)) \right) \equiv$ **3 basis spinor** - **3-split** object

neutrino: (ν) \equiv $\left(\Psi \bar{\Psi} \Psi (\pm \varepsilon_1) \right) \equiv$ **3 basis spinor** - **1-split** object

strong interaction: (St) \equiv $\left(\underbrace{\Psi \Psi}_{\cup} (-\lambda, (\pm \varepsilon_2)) \right) \equiv$ **2 basis spinor** - **2-split** object

electromagnetic-weak interaction: $(\gamma \cup Z)^{*(1)}$ \equiv $\left(\underbrace{\bar{\Psi} \Psi}_{\cup} \underbrace{\Psi \bar{\Psi}}_{\cup} (-\varepsilon_3, (\pm \varepsilon_6)) \right),$ ^{*1)} by the decomposition of energy-momentum

where the components are connected together with „ \cup “, but nonetheless exists separately as individual physical objects (see **VII.23.** to **VII.33.**)

(Z) \equiv $\left(\overbrace{\Psi \dots \bar{\Psi}}^{\cup} (+\varepsilon_6, -\varepsilon_3) \right) \equiv$ **2 basis spinor** - **2-split** object

(γ) \equiv $\left(\underbrace{\bar{\Psi} \Psi}_{\cup} (0) \right) \equiv$ **2 basis spinor** - **0-split** object

gravitonic interaction: (G) \equiv $\left(\underbrace{\underbrace{\Psi \bar{\Psi}}_{\cup} \underbrace{\Psi \bar{\Psi}}_{\cup}}_{\cup} (-\varepsilon_7) \right) \equiv$ **4 basis spinor** - **1-split** object

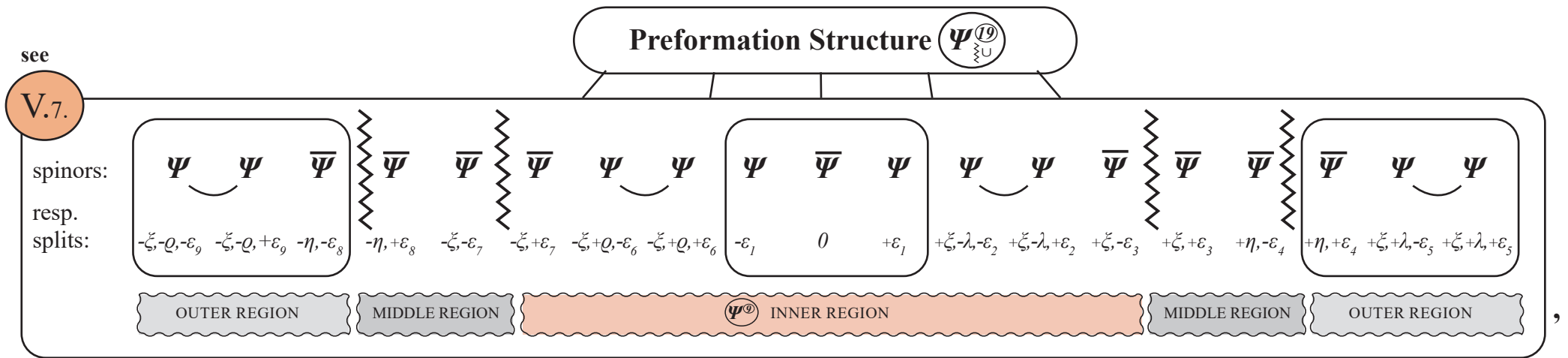
X.8.

 $\hat{=}$

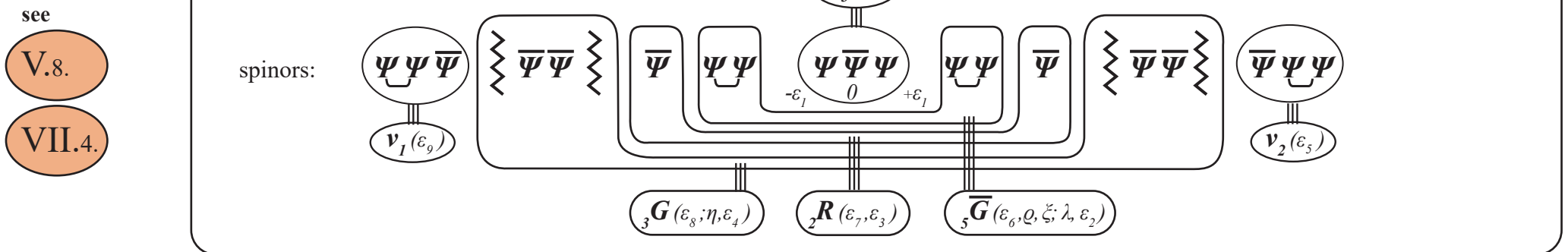
VII.70.

(GDE)

Chapters **I.** to **X.** showed how the construction of the preformation structure $\Psi_{\text{U}}^{(19)}$ initially happened:



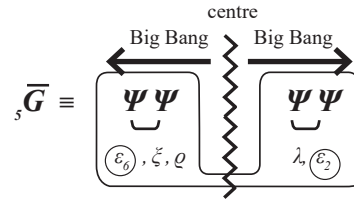
and that the Primordial Universe then formed $\Downarrow \Downarrow \Downarrow$ as the first ever manifestation of the Universe:
(see **VII.3.**, **VII.4.**)



* For the bosons ${}_5\overline{G}$, ${}_2R$, ${}_3G$, the left subscript indicates how many different point splits exist in the inner-structural composition of the boson.
For example: $({}_5\overline{G})$ means that $({}_5\overline{G})$ contains 5 different point splits, etc.

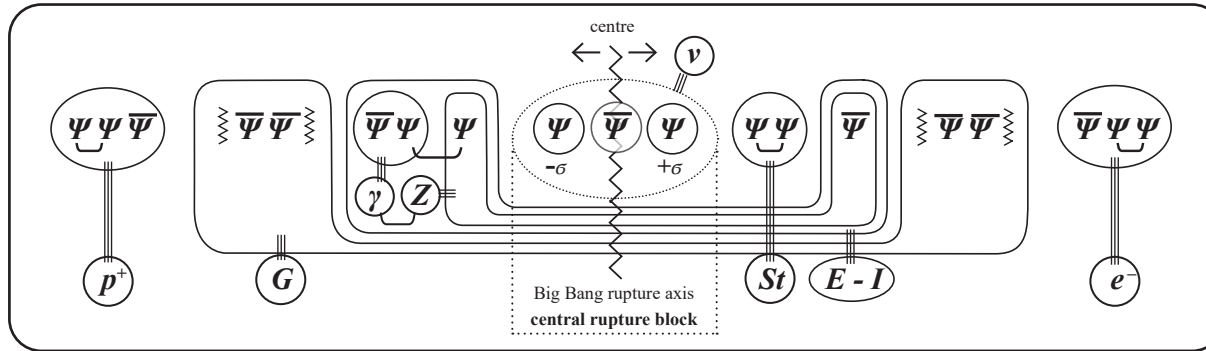
The instability of (\bar{G}) led to the fundamental process of the Big Bang:

VIII.6.



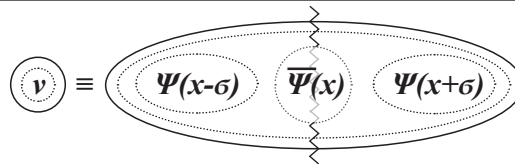
resulting in the post-Big Bang formation:

XI.2.



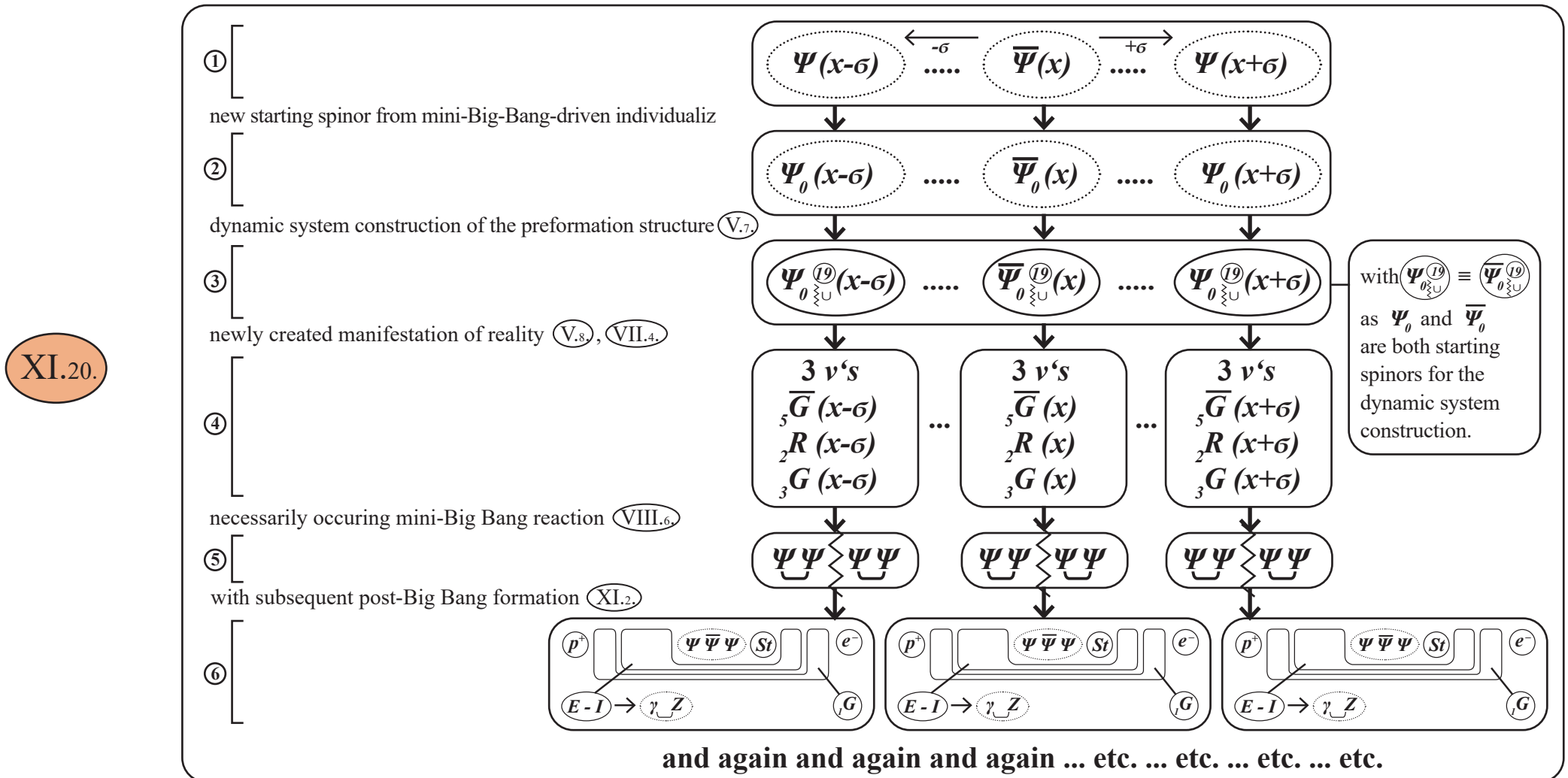
Therefore, as described in XI.2. and VIII.10., there forms a **central rupture axis** $\leftarrow \rightsquigarrow$ in the Big Bang, effectively a **central restructuring particle** made fragile by the **Big Bang** $\leftarrow \rightsquigarrow$, the fragile restructured neutrino:

XI.3.

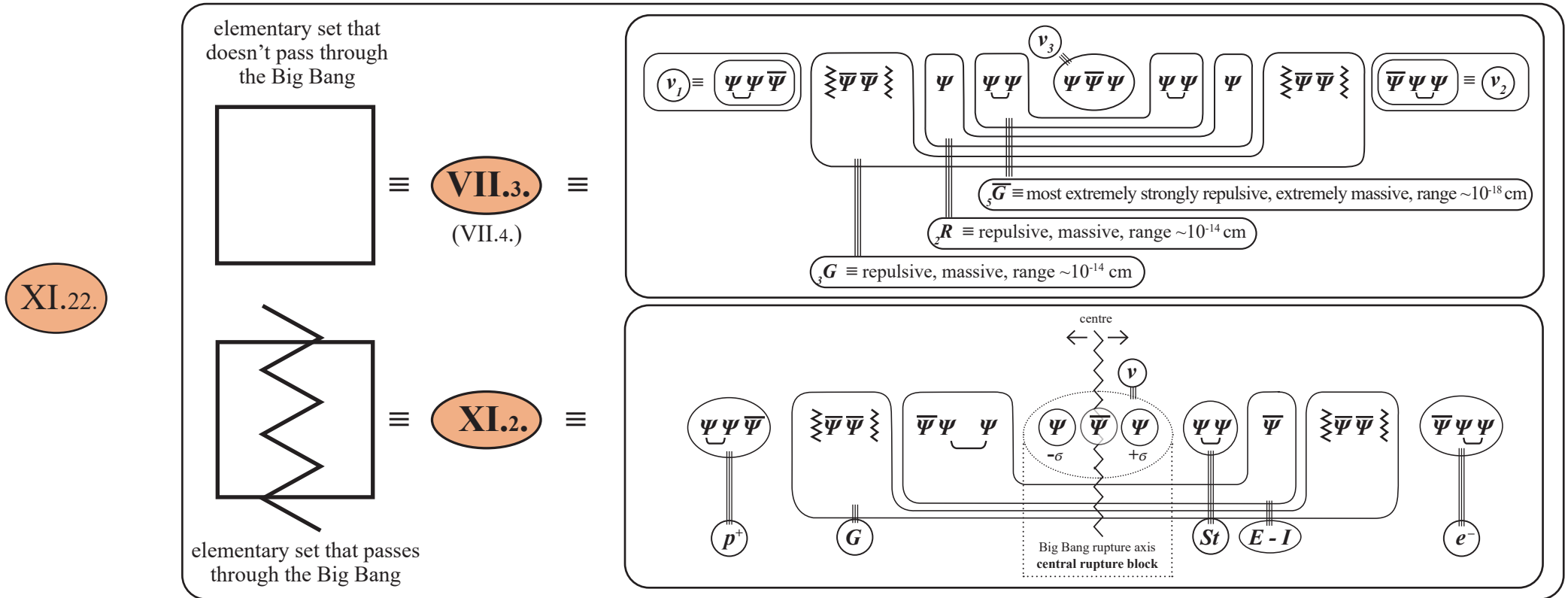


with the **Big Bang rupture axis** $\leftarrow \rightsquigarrow$ running through its centre, thus “individualizing” the 3 basis spinors of the “fragile neutrino” as a result of this **mini-Big Bang split** $(\sigma \neq 0)$, making each of them the starting point of a new independent dynamic construction process $\Psi \rightarrow \Psi^{(19)}$.

Thus: Each “mini-Big-Bang-driven” individualized spinor at the central rupture region **XI.7.** in the central **(3-spinor rupture block)** (central neutrino **XI.10.**), regardless of whether it was originally a (Ψ) -spinor or a $(\bar{\Psi})$ -spinor, becomes the starting spinor (Ψ_0) of a new $(\Psi_0^{(19)})$ -system and therefore a new **(primordial force-matter set)** **VII.4.**, with the following process structure:

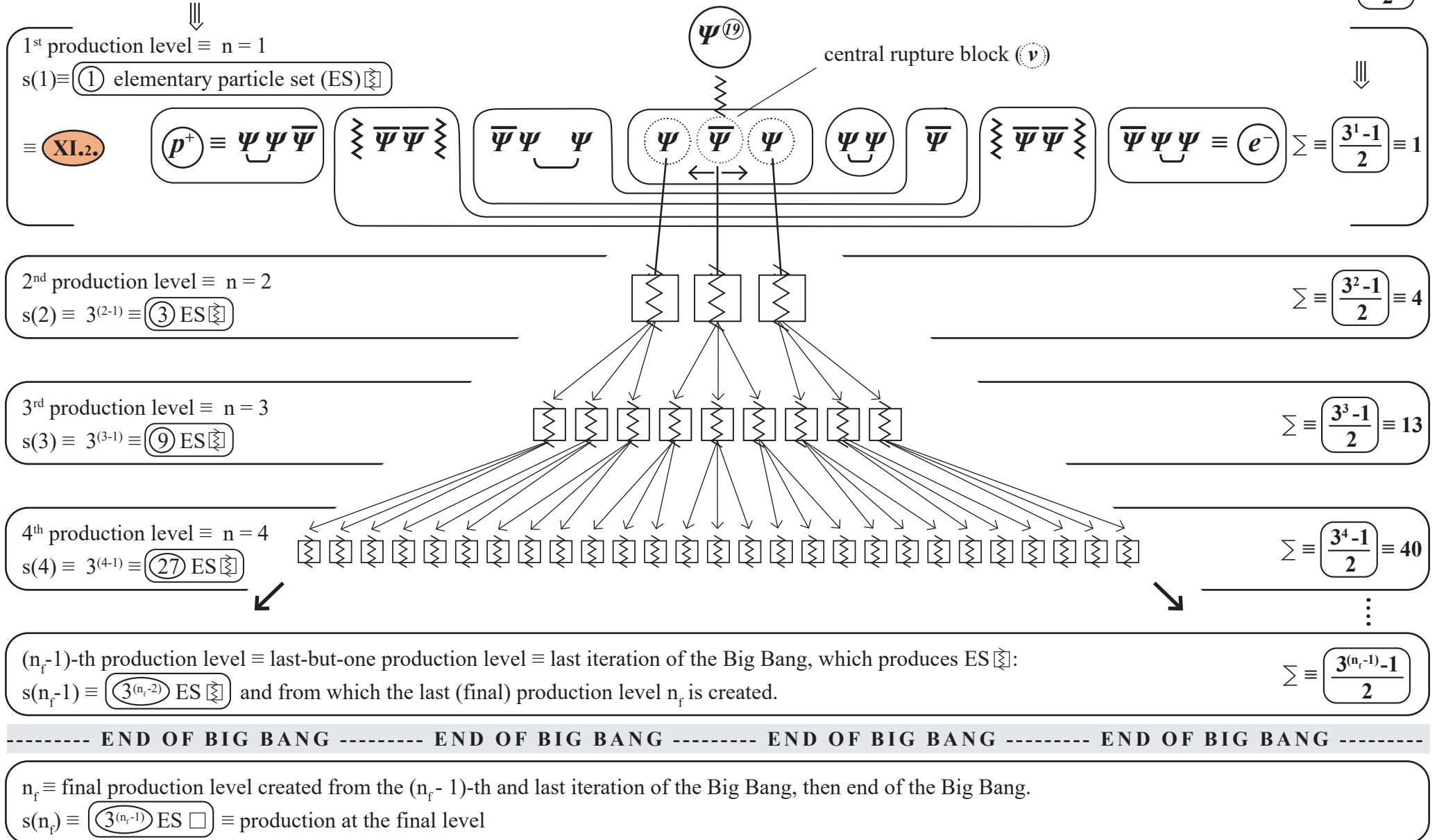


We introduce the following symbolic notation in order to more easily represent the structures involved in the chain reaction process of the most colossal reproduction cascade:



XI.23.

Big Bang Production Cascade

n-th production level, elementary sets produced: $s(n) \equiv 3^{n-1}$ number of elementary particle sets produced so far $\sum \equiv \frac{3^n - 1}{2}$ 

Thus, this construction structure of the (Big Bang cascade \equiv production cascade) **XI.23.**, which created the Entire Universe around 13.8 billion years ago – probably in the tiniest fraction of a second (the first ever second) – tells us the structural composition of the Universe: Directly after the Big Bang, as a result of the Big Bang production cascade **XI.23.**, the composition of the Entire Universe satisfies the following (composition mix relation **R**):

XI.25.

$$\mathbf{R} \equiv \frac{\text{Component ① The production set of the } 3^{(n_r-1)}\text{-}\square\text{-elementary sets (VII.4.)} \equiv \text{„Dark Matter“ created in the (final production level } n_f\text{)}}{\text{Component ② The sum of all } \frac{3^{(n_r-1)}-1}{2}\text{-}\bowtie\text{-elementary sets (XI.2.)} \equiv \text{„Normal Matter/Antimatter“ that pass through the Big Bang}}$$

$$\Downarrow$$

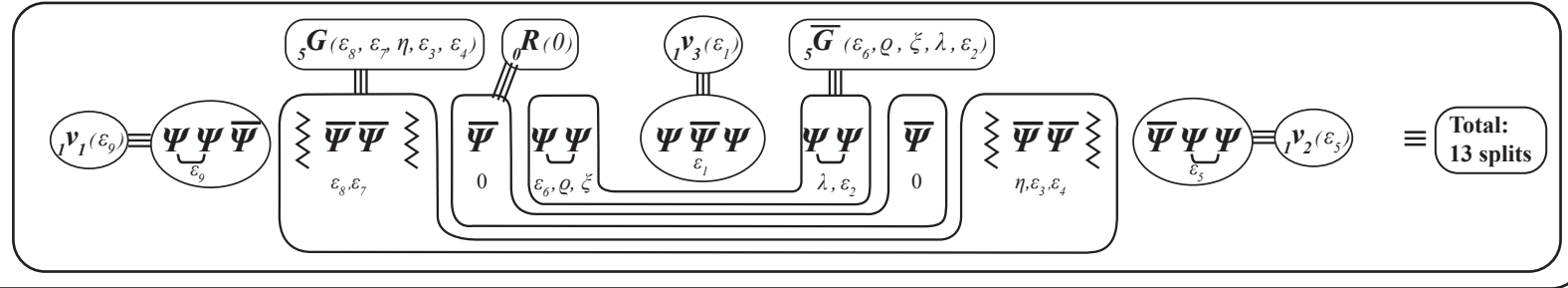
$$\mathbf{R} \equiv \frac{3^{(n_r-1)}\text{-}\square\text{-sets (XI.23.; VII.4.)}}{\frac{3^{(n_r-1)}-1}{2}\text{-}\bowtie\text{-sets (XI.23.; XI.2.)}} \equiv \frac{3^{(n_r-1)}}{\frac{3^{(n_r-1)}-1}{2}} \equiv 2 \frac{3^{(n_r-1)}}{3^{(n_r-1)}-1}$$

$$\mathbf{R} \equiv \textcircled{2}, \text{ for } n \gg 1$$

XI.26.

XI.26.6.

Component ① ≡ „Dark Matter“ ≡ 66,6 % of the Earliest Universe ≡ $3^{(n_r-1)}$ -□-elementary sets
□-Particle Formation Process (“Dark Matter”) at the End of the Big Bang Cascade
(Point Split Stabilization Process)



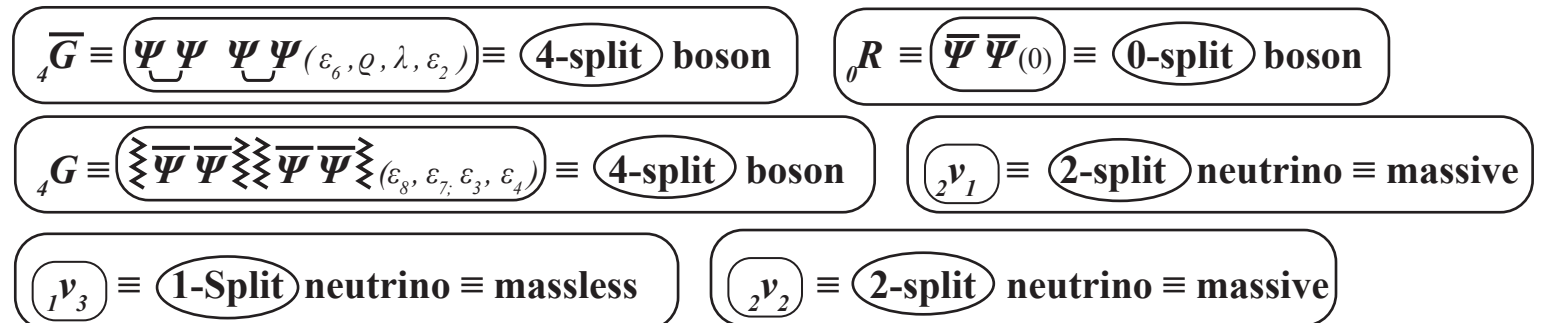
point split stabilization process



≡ particle stabilization process

XI.26.7.

Thus: The stable, finalized □-particles (≡ “Dark Matter” particles ≡ 66.6% of the Entire Universe) created at the end of the particle formation process of the Big Bang reproduction cascade XI.23. have the following inner-structural particle composition:



XI.26.

XI.26.7.

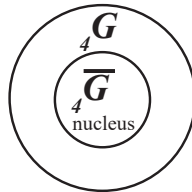
Thus: The Component ① \equiv 66.6% of the Entire Universe (directly after the Big Bang) \equiv “Dark Matter” consists of the 3 force bosons **XI.26.**:

- $(\bar{G}) \equiv \left[\begin{array}{c} \updownarrow \\ \leftarrow \rightarrow \end{array} \right] \equiv$ highly massive and correspondingly short-ranged at around 10^{-17} cm, most extremely strongly repulsive-acting bosons
- $(G) \equiv \left[\begin{array}{c} \downarrow \uparrow \\ \rightarrow \leftarrow \\ \uparrow \downarrow \\ \leftarrow \rightarrow \end{array} \right] \equiv$ massive and correspondingly short-ranged at around 10^{-15} cm, most extremely weakly attractive-acting bosons
- $(R_0) \equiv \text{XI.26.6.} \equiv$ massless and therefore long-ranged, medium-strength repulsive-acting bosons

as well as the 3 types of neutrino with different inner structures*:

- $(\nu_1) \equiv (\Psi \Psi \bar{\Psi})_{(\varepsilon_9, \xi)} \equiv \text{2-split neutrino} \stackrel{\text{VI.3.2.}}{\equiv} \text{mass} \neq 0 \equiv \text{massive neutrino}$
- $(\nu_2) \equiv (\bar{\Psi} \Psi \Psi)_{(\eta, \varepsilon_5)} \equiv \text{2-split neutrino} \stackrel{\text{VI.3.2.}}{\equiv} \text{mass} \neq 0 \equiv \text{massive neutrino}$
- $(\nu_3) \equiv (\Psi \bar{\Psi} \Psi)_{(\varepsilon_1)} \equiv \text{1-split neutrino} \stackrel{\text{VI.3.1.}}{\equiv} \text{mass} = 0 \equiv \text{massless neutrino}$

This implies that, given the right energy boundary conditions, the massive “Dark Matter” particle $s(\bar{G})$ and (G) form the following layered clumps:



* This (the existence of massive neutrinos) is consistent with the conclusions of the work by Takaaki Kajiba and Arthur McDonald (Nobel prize 2015).

the elementary set **IX.1.**

p^+ $E - I$ v St G e^-

317

XI.27.

Thus, by VIII.8., after the rupture VIII.6., the 2-split object- $\Psi\Psi(\lambda, \varepsilon_2)$ survives by default, by the minimality principle I.0.3., because it is the “simpler object”, thus forming into the strong interaction boson (St) as a $\Psi\Psi(2 \text{ split})$ boson, which then, as described in detail in Chapters VII. and IX., leads to the construction of the “normal”

$$\text{matter elementary set} \equiv \left(p^+ \left[\left(E - I \right) \left(\nu \right) \left(St \right) \right] G \right) e^-, \text{ mit } (E - I) \rightarrow \gamma Z$$

which is exactly what we usually call “matter”. In the majority of the most colossal number of individual Big Bang events, this is what happens. However, simultaneously, in a smaller proportion of these processes, due to the most colossal quantity of $(\bar{5}G)$ -particles VIII.6. that are produced and which then rupture within the most colossally dense Big Bang reaction space XI.23., it is the 3-split- $\Psi\Psi(\varepsilon_6, \varrho, \xi)$ -fragment that instead survives in the form of the 2-split- $\Psi\Psi(\varepsilon_6, \varrho)$ -object, after being forced to transfer its $(\xi\text{-split})$ by the Big Bang, making it structurally identical to the strong boson $(St) \equiv \Psi\Psi(\varepsilon_6, \varrho)$ while integrating the $\Psi\Psi(\lambda, \varepsilon_2)$ -fragment into an $(E - I)(\varepsilon_2, \varepsilon_7)$ -formation and absorbing the split into a $(p^-(\eta, \varepsilon_4, \lambda, \varepsilon_5))$ -formation.

Then, in a series of phases completely analaogous to those described in Chapter IX., the “normal”

$$\text{antimatter elementary set} \equiv \left(e^+ \left[\left(St \right) \left(\nu \right) \left(E - I \right) \right] G \right) p^-, \text{ with } (E - I) \rightarrow \gamma Z$$

is formed. This explains the creation of Antimatter.

Regarding the probability of each process within the most colossal quantity of individual Big Bang events,

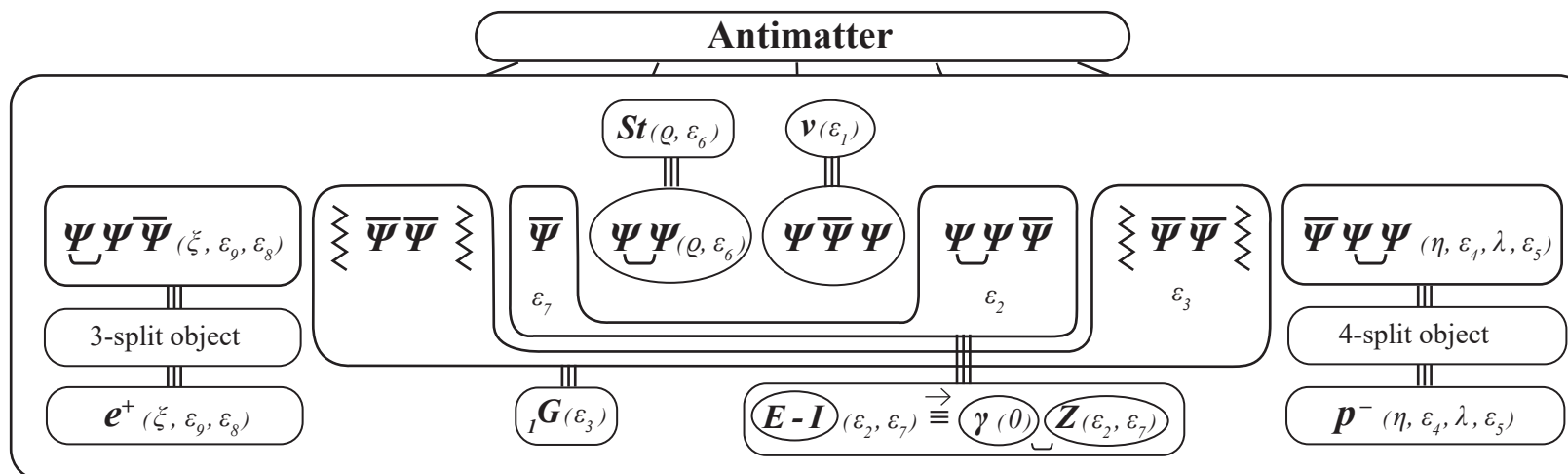
the construction of matter, i.e. $(St) \equiv \Psi\Psi(\lambda, \varepsilon_2)$ -formation and

the subsequently triggered processes leading to (p^+) , $(E - I) \equiv (\gamma Z)$, (ν) , (St) , (G) , (e^-) -set formation

is more common, since it proceeds from a simpler fragment of the Big Bang process VIII.6. than

the construction of antimatter, i.e. the formation of $(St) \equiv \Psi\Psi(\varrho, \varepsilon_6)$, triggered by the Big Bang, which originates from the more complex rupture fragment $\Psi\Psi(\varepsilon_6, \varrho, \xi)$ of the Big Bang process VIII.6. - when the ξ -split is repulsed by the Big Bang – and then automatically forms the

elementary set of antimatter. The full details of the inner-structural point split composition of antimatter are as follows:

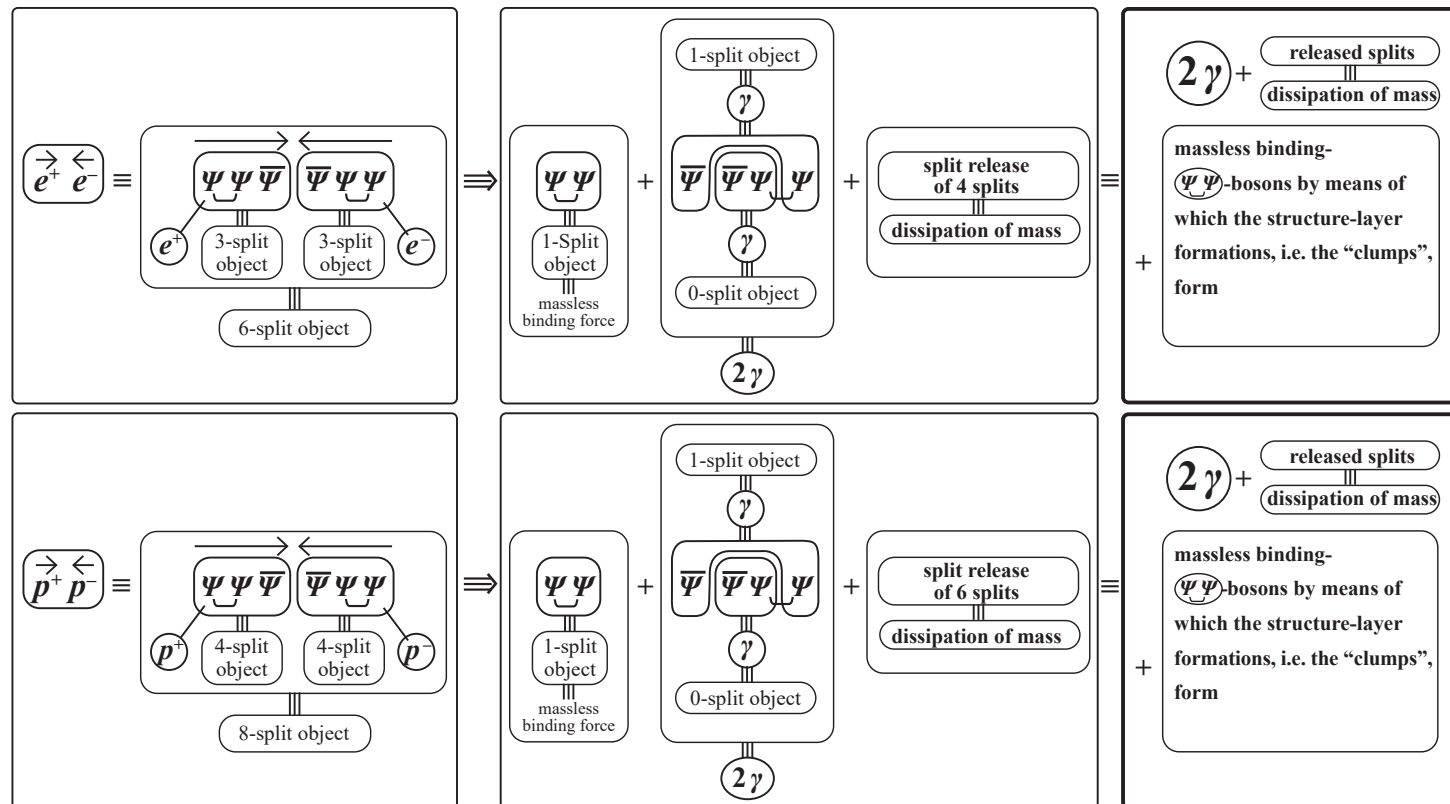


Consequently: After the Big Bang, from the **33,3 %-[Ξ]-Component (2)** (**XI.27.**)

- the **larger set** forms into **matter (matter atoms)** $\equiv (p^+, G, E-I, \nu, St, e^-; \text{mit } E-I \rightarrow \gamma_Z)$
- the **smaller set** forms into **antimatter (antimatter atoms)** $\equiv (e^+, G, St, \nu, E-I, p^-; \text{mit } E-I \rightarrow \gamma_Z)$

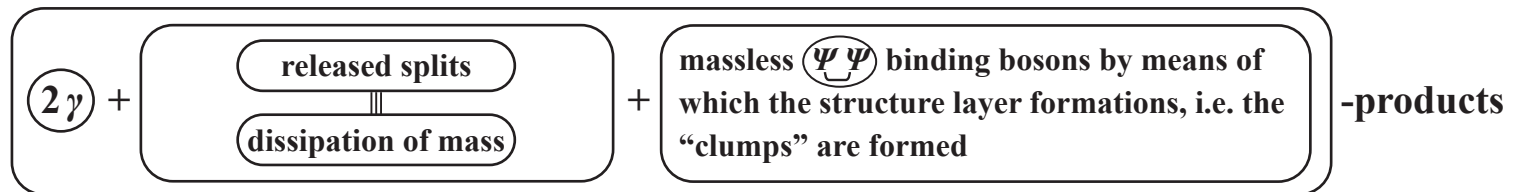
And: The **matter-antimatter** pairs, namely $(\vec{e}^+ \overleftarrow{e}^-)$ and $(\vec{p}^+ \overleftarrow{p}^-)$ create the well-known “annihilation processes”:

XI.29.



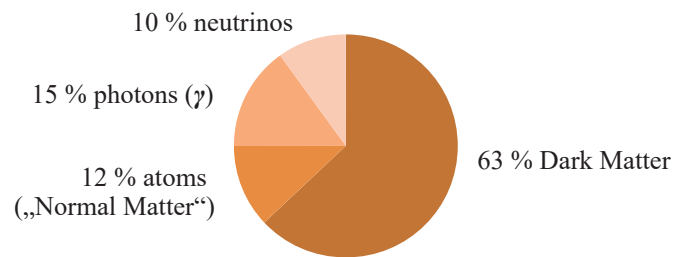
XI.30.

Thus: Directly after the Big Bang, i.e. when “matter” and “antimatter” form (totalling 33.3% of the Universe directly after the Big Bang XI.27.), with quantitatively more matter than antimatter, by XI.29., the annihilation processes described in XI.29. necessarily occur. However, since the proportion of matter is greater than the proportion of antimatter, the antimatter is completely destroyed by the annihilation processes and only matter remains, together with the annihilation end products. According to the so-called “Planck measurements” (“Planck” space telescope), 380,000 years after the Big Bang – in other words shortly after the Big Bang – the proportion of matter (atoms) in the Universe was around 12%, i.e. 21% of the initial Universe must therefore represent annihilation end products from matter-antimatter annihilation (see XI.29.):



**From the Planck data (as well as the COBE and WMAP data),
we know the following facts about the composition of the Universe
“shortly” (~380,000 years) after the Big Bang**

Planck measurements (Planck Published Papers, 21/03/2013)



Thus: These “Planck” measurements are essentially consistent with the “model” results of the theoretical approach presented in this work (see XI.23.), namely the composition mix $\text{Component } ① \equiv \text{XI.26.} + \text{Component } ② \equiv \text{XI.27.}$ with:

Component ① $\equiv 66.6\%$ \equiv “Dark Matter” $\equiv \square$ -particles, see VII.4., XI.22., XI.36.

Component ② $\equiv 33.3\%$ \equiv Matter/Antimatter $\equiv \boxtimes$ -particles, see X.1., XI.22., XI.27., XI.29., XI.30.,

where the proportion of matter is greater than the proportion of antimatter (see XI.29.), so that, after the matter-antimatter annihilation processes XI.30., the remaining fraction of matter of 12% “survives”, and the rest of this Component ②, corresponding to a proportion of 21% of the initial Universe, is given by the end products of the annihilation process, which by XI.30. are:

$\gamma \equiv \text{photons} \equiv 15\% + \text{split release products} + \nu$ ’s not bound by atom formation
 $\equiv 10\% + \text{massless } \Psi\bar{\Psi} \text{ binding forces as structure-carriers}$

As for the measured neutrino proportion of 10%, we should bear in mind that, according to this theoretical approach, “Dark Matter” (\square -particles, see VII.4., XI.22., XI.26.1.) also contains neutrinos, meaning that a fraction of the measured 10% neutrinos, namely 3.6%, belong to “Dark Matter”. The matter/antimatter fraction also contains neutrinos that are not attributable to atom formation.

Thus, this theoretical approach is highly consistent with the experimental Planck measurements.

XI.31.

Moreover, the “Planck measurements” from 2013 found a slight asymmetry in the matter distribution of the Universe, which must necessarily be so according to our present theoretical approach, due to the parity asymmetry of the $(E - I)$ boson IX.15., which forms from the rupture-based structure of the Big Bang process VIII.6., VIII.10. .

XI.32.

Another remark:

The Universe was created around 13.8 billion years ago in the Big Bang cascade XI.23. by a most colossally gigantic reproduction of identical \square -particles and identical \boxtimes -particles.

The fact that all of these reproduction processes of \square - and \boxtimes -particles are identical explains the universal validity of the laws of nature.

XI.36.

The Components ($\frac{2}{3}, \frac{1}{3}$) of the total Universe directly after the Big Bang, and the corresponding (6, 6) \equiv 12 elementary particles

Dark Matter

| Component ① ≡ 66.6 % | Inner-Structural Particle Composition | | by V.,VI. | Mass/Charge | Force Structure | Range | Found? |
|--|---------------------------------------|--|-----------|--|-----------------------------------|----------------------|---------|
| neutrino ₁ (2ν ₁) | ≡ | <div><div><div>ΨΨΨ̄</div><div>(ε₉, ε₈)</div></div></div> ≡ 2-split fermion | ⇒ | massive (mass ≠ 0) | | | yes |
| neutrino ₂ (2ν ₂) | ≡ | <div><div><div>Ψ̄ΨΨ</div><div>(ε₄, ε₅)</div></div></div> ≡ 2-split fermion | ⇒ | massive (mass ≠ 0) | | | yes |
| neutrino ₃ (1ν ₃) | ≡ | <div><div><div>ΨΨΨ</div><div>(ε₁)</div></div></div> ≡ 1-split fermion | ⇒ | massless | | | yes |
| anti-gravitational boson (4Ḡ) | ≡ | <div><div><div><div>ΨΨ</div><div>ΨΨ</div></div><div>(ε₆, ϱ; λ, ε₂)</div></div></div> ≡ 4-split boson | ⇒ | extremely high mass, charged with anti-gravitational elementary charge q̄ _θ | most extremely strongly repulsive | 10 ⁻¹⁷ cm | not yet |
| repulsive boson (0R _θ) | ≡ | <div><div><div><div>Ψ̄</div><div>Ψ̄</div></div><div>(0)</div></div></div> ≡ 0-split boson | ⇒ | massless | repulsive | long | not yet |
| gravitational boson (4G) | ≡ | <div><div><div><div>Ψ̄ΨΨ̄</div><div>Ψ̄ΨΨ̄</div></div><div>(ζ, ε₇, ε₃, η)</div></div></div> ≡ 4-split boson | ⇒ | massive, charged with gravitational charge q _ϑ with (q̄ _θ + q _θ) = 0 | most extremely weakly attractive | 10 ⁻¹⁵ cm | not yet |
| as well as the end products created from the annihilation of (4G, 4Ḡ), including the split release products thus created, and the Dark Energy created from these and other annihilation processes with coupled 4-dimensional space-time structure | | | | | | | not yet |

Normal Matter/Antimatter

| Component ② ≡ 33.3 % | Inner-Structural Particle Composition | | by V., VI. | Mass/Charge | Force Structure | Range | Found? |
|--|--|--------------------------|---------------|--|----------------------------------|---------------|--------|
| proton (antiproton*) $(p^+)(\overline{p^-}) \equiv$ | $\boxed{\Psi \Psi \overline{\Psi}}_{(\varepsilon_9, \zeta, \varrho, \varepsilon_8)}$ | \equiv 4-split fermion | \Rightarrow | higher mass, charge $\oplus (\ominus)$ | | | yes |
| electron (positron*) $(e^+)(\overline{e^-}) \equiv$ | $\boxed{\overline{\Psi} \Psi \Psi}_{(\varepsilon_4, \eta, \varepsilon_5)}$ | \equiv 3-split fermion | \Rightarrow | low mass, charge $\ominus (\oplus)$ | | | yes |
| neutrino $(\nu) \equiv$ | $\boxed{\Psi \overline{\Psi} \Psi}_{(\varepsilon_1)}$ | \equiv 1-split fermion | \Rightarrow | masless | | | yes |
| strong force $(St) \equiv$ | $\boxed{\Psi \Psi}_{(\lambda, \varepsilon_2)}$ | \equiv 2-split boson | \Rightarrow | massive, uncharged | strongly attractive | 10^{-13} cm | yes |
| energy-momentum $(E-I) \equiv$ | $\boxed{\overline{\Psi} \Psi \overline{\Psi}}_{(\varepsilon_6, \varepsilon_3)}$ | \equiv 2-split boson | \Rightarrow | | | | yes |
| partial decomposition into $(\gamma)(Z) \equiv$ | $\boxed{\overline{\Psi} \Psi} \boxed{\overline{\Psi} \Psi}_{(\varepsilon_6, \varepsilon_3)} \Downarrow$ | | | | | | yes |
| electromag. force $(\gamma) \equiv$ | $\boxed{\overline{\Psi} \Psi}_{(0 \text{ split})}$ | \equiv 0-split boson | \Rightarrow | massless | medium strong | long | yes |
| weak force $(Z) \equiv$ | $\boxed{\Psi \overline{\Psi}}_{(\varepsilon_6, \varepsilon_3)}$ | \equiv 2-split boson | \Rightarrow | massive, uncharged | weak | 10^{-15} cm | yes |
| gravitation $(G) \equiv$ | $\boxed{\overline{\Psi} \overline{\Psi} \overline{\Psi}} \boxed{\overline{\Psi} \Psi \overline{\Psi}}_{(\varepsilon_7)}$ | \equiv 1-split boson | \Rightarrow | massless | most extremely weakly attractive | long | yes |
| as well as the annihilation end products $((e^+, e^-, p^+, p^-))$, see XI.29. | | | | | | | yes |

* For the detailed point split distributions of antimatter particles, see XI.28.

1st phase: Before the Big BangReference
in summary


The formation of the most elementary structure \equiv
$$\begin{aligned} D \Psi(x) &= \Psi(x-\sigma_1) \bar{\Psi}(x) \Psi(x+\sigma_1); \sigma_1 \rightarrow 0 \\ D \bar{\Psi}(x) &= \bar{\Psi}(x-\sigma_2) \Psi(x) \bar{\Psi}(x+\sigma_2); \sigma_2 \rightarrow 0 \end{aligned}$$
 with $x \equiv \bullet$ interaction point, $\sigma \equiv$ point split

repulsion $\equiv \begin{array}{c} \leftarrow -\sigma \quad +\sigma \rightarrow \\ \bullet \end{array}$
attraction $\equiv \begin{array}{c} \rightarrow \quad \leftarrow \\ \bullet \end{array}$

①

The formation of the construction process $\equiv \Psi^{(27)}(x, \sigma_{13}) \equiv D_{\sigma_{5-13}}^{5-13} (D_{\sigma_{1-4}}^{1-4} \Psi(x))$

②


The formation of the structuring process $\equiv \Psi^{(8)} \equiv$ 

„U“ binding
„Z“ separation

③

The formation of the preformation structure $\Psi^{(19)}$ by incorporating the structuring foundation $\Psi^{(8)}$ into $\Psi^{(27)}$:

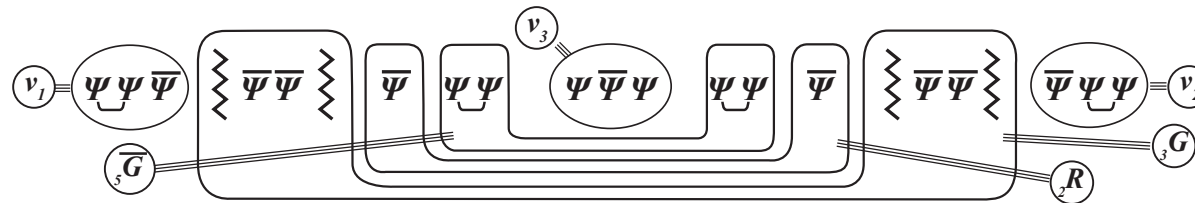
$\Psi^{(19)}$



③

↓ and the formation of the first formation process, with an inwards-maximized point split distribution: ↓

The formation of the unstable first ever Primordial Universe, before the Big Bang:



④

⑤

⑥

$\bar{5}G \equiv \Psi \Psi \Psi = \text{5-split anti-gravitational boson} \equiv \text{most extremely strongly repulsive, highly massive (short-range)}$

$2R \equiv \bar{\Psi} \bar{\Psi} = \text{2-split repulsive boson} \equiv \text{repulsive, massive (short-range)}$

$3G \equiv \bar{\Psi} \bar{\Psi} \bar{\Psi} = \text{3-split gravitational boson} \equiv \text{extremely weakly attractive, massive (short-range)}$

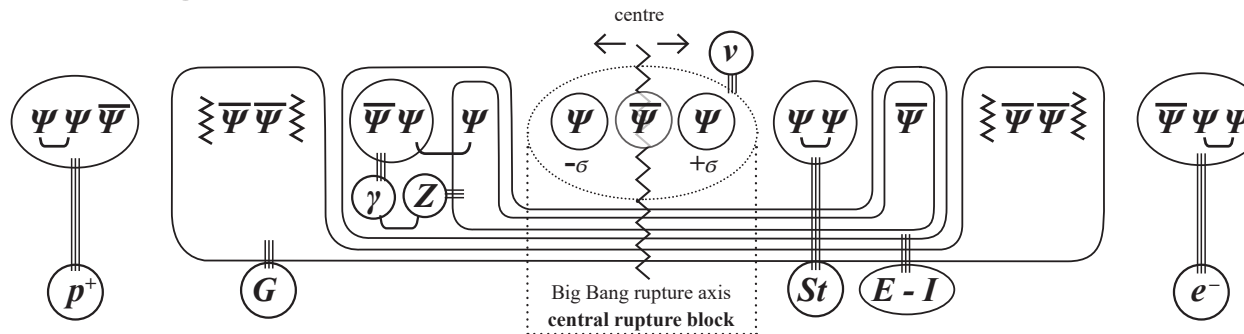
2nd phase: The Big BangReference
in summary

The formation of the first ever force boson (\overline{G}), i.e. the most extremely strong anti-gravitational force, the first ever force to emerge and exist, leads to the process that founds the Universe by means of the fundamental Big Bang process intrinsically associated with the (\overline{G})-boson:

$$\overline{G} \equiv \left[\begin{array}{c} \overleftarrow{\Psi\Psi} \quad \overrightarrow{\Psi\Psi} \\ \varepsilon_0, \zeta, \varrho \quad \lambda, \varepsilon_2 \end{array} \right] \equiv \overline{G}(\varepsilon_0, \zeta, \varrho; \lambda, \varepsilon_2)$$

7

As a consequence of the rupture of (\overline{G}) (and therefore the beginning of the Big Bang), the post-Big Bang elementary set forms anew:

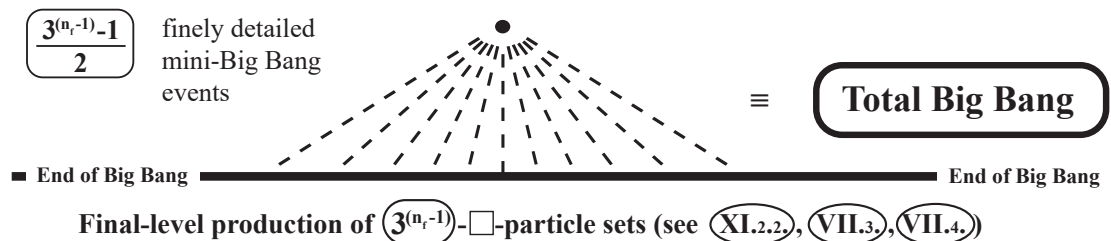


8

9

10

This central Big Bang rupture axis leads to the Big-Bang-driven separation and therefore individualization of the 3 basis spinors in the central rupture region. As a result of this individualization, these 3 separated basis spinors then reform, each as the starting spinor of an independent dynamic construction process $\Psi_0 \rightarrow \Psi_0^{(9)}$, leading to the creation of 3 new construction systems, and thus to the creation of a 3-fold growth chain reaction (see XI.20., XI.22., XI.23.):



11

12

3rd phase: After the Big BangReference
in summary

The Big Bang process ends when the Big Bang reaction space becomes too full with the most colossal quantity of $\frac{3^{(n_r-1)}-1}{2}$ -sets plus the $3^{(n_r-1)}$ -sets during the Big Bang cascade. The surrounding compactness weakens the most extremely strong repulsion force of the surrounded \overline{G} bosons, and, as a result, the rupture processes (VIII.6.) can no longer occur.

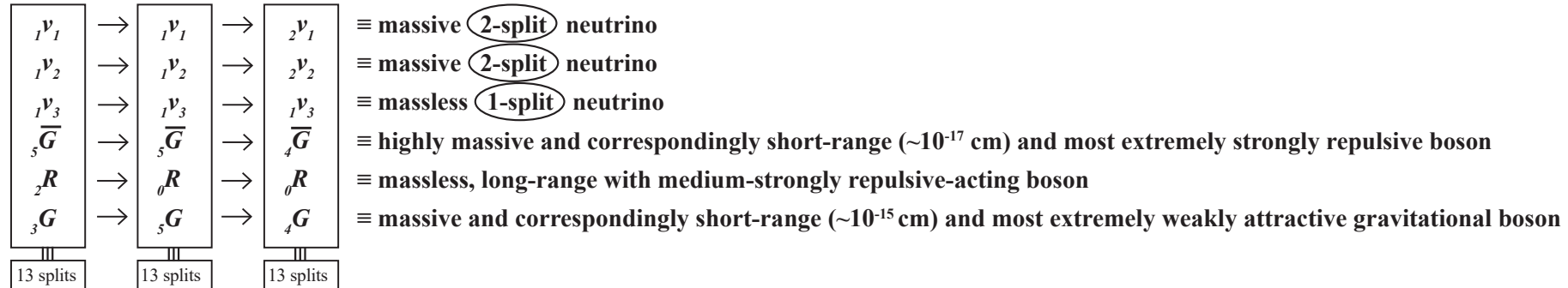
(12)

(13)

Directly after the end of the Big Bang cascade, the Universe (i.e. the “Earliest Universe” 13.8 billion years ago) consisted of 2 components:

Component ① ≡ “Dark Matter” ≡ 66.6% of the Earliest Universe ≡ 3 fermions ν_1, ν_2, ν_3 , 3 bosons $\overline{G}, {}_2R, {}_3G$.

The following particle stabilization processes take place (XI.26.):



Component ② ≡ “Normal Matter/Antimatter” ≡ 33.3% of the Earliest Universe:

$p^+ (p^-)$ ≡ proton (antiproton)

$e^- (e^+)$ ≡ electron (positron)

ν ≡ massless neutrino

St ≡ strong interaction boson ≡ strong force

$(E - I)$ ≡ (energy-momentum) boson

III
↓
partial decomposition

γ_Z ≡ electromagnetic-weak interaction boson

γ ≡ electromagnetic interaction boson ≡ electromagnetic force

Z ≡ weak interaction boson ≡ weak force

G ≡ gravitational interaction boson ≡ graviton ≡ gravitational force

as well as the annihilation end products created from (e^+, e^-, p^+, p^-) (XI.29.)

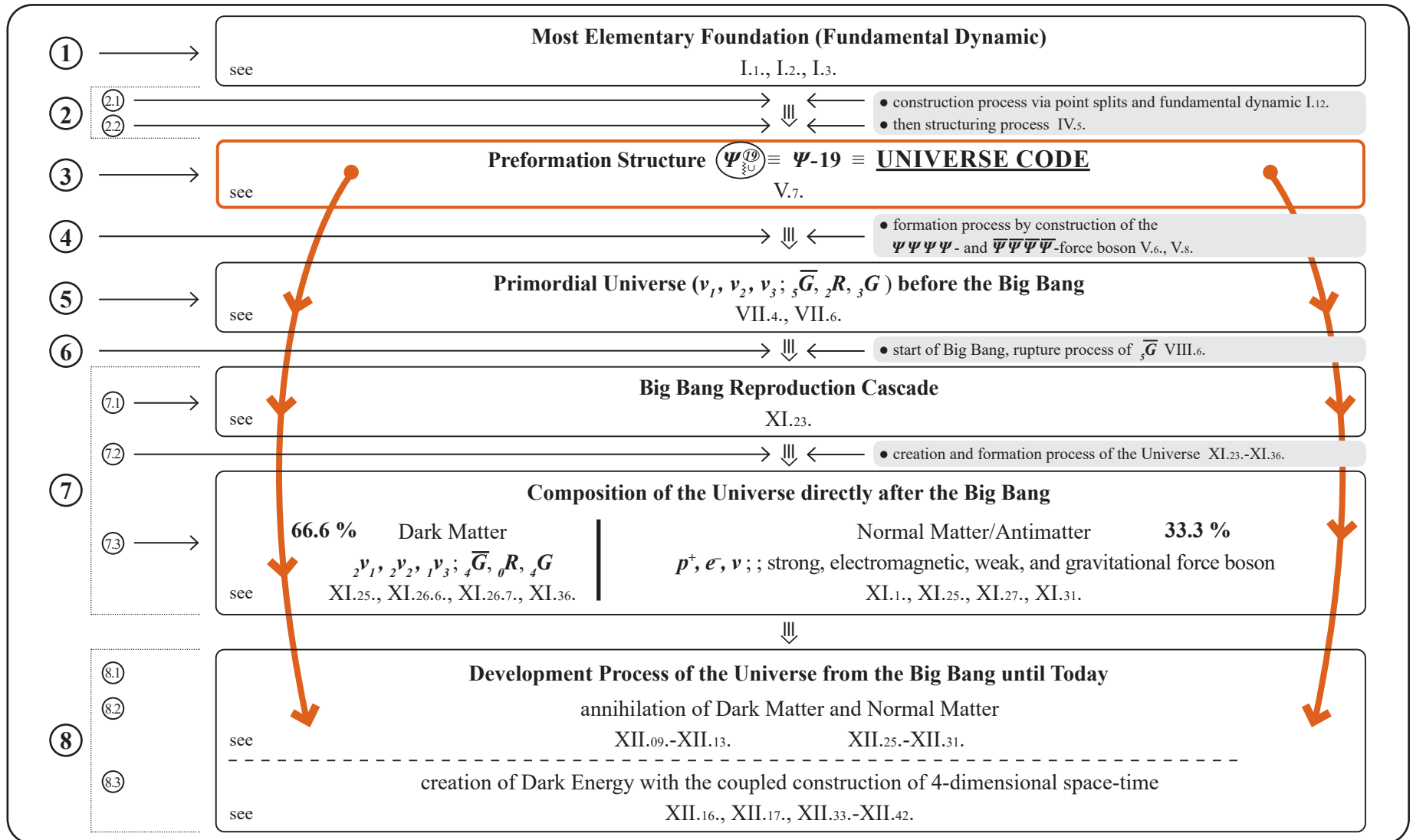
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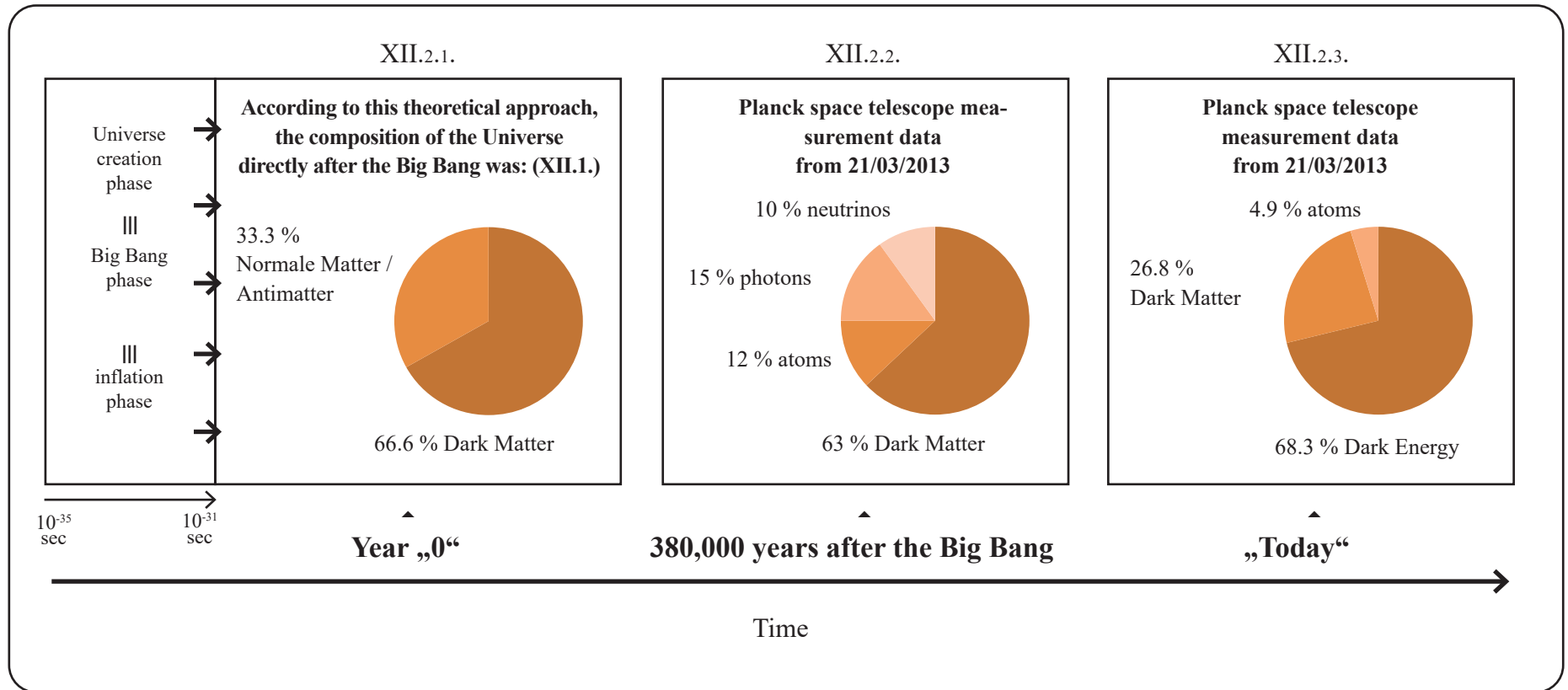
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Chapters I.-XII. presents and explains the construction and development process of the Universe in terms of both its overall structure and the causal connections between its parts. During the construction and development process of the Universe, the following chain of global and individual processes unfolds:

XIII.1.



XII.2.



XII.5.

What transformation processes have there been in the Universe since it began to exist?

Why has the proportion of Dark Matter in the Universe decreased over this 13.8-billion-year period?

Why has the proportion of Normal Matter decreased over this period?

Why has the proportion of Dark Energy increased over this period?

What are the origins and structures of these annihilation and construction processes?

What is the actual nature of Dark Energy?

What is the connection between the composition of Dark Energy and the space-time structure of the Universe, as well as the expansion of this space-time within the Universe?

Why is this expansion of the Universe currently accelerating?

in the development of the Universe over time since it began to exist.

XII.6.

To answer these questions **XII.5.**, we must first answer the following questions:

What types of interaction processes occur within the Dark Matter segment and within the Normal Matter segment?

In other words, within the parts of the Universe's matter that disappeared over the course of this 13.8-billion-year period.

And what types of interaction process lead to the deconstruction of matter in each case?

UEA gives a description of the inner-structural composition of each Dark Matter particle.

This allows the interaction processes that unfold within the Dark Matter part of the Universe to be analysed together, thus enabling the following questions to be answered:

XII.7.

- **how the gradual deconstruction of Dark Matter unfolded over time**
- **what the individual Dark Matter annihilation processes are**
- **what “new” entities are created to replace the annihilated parts.**

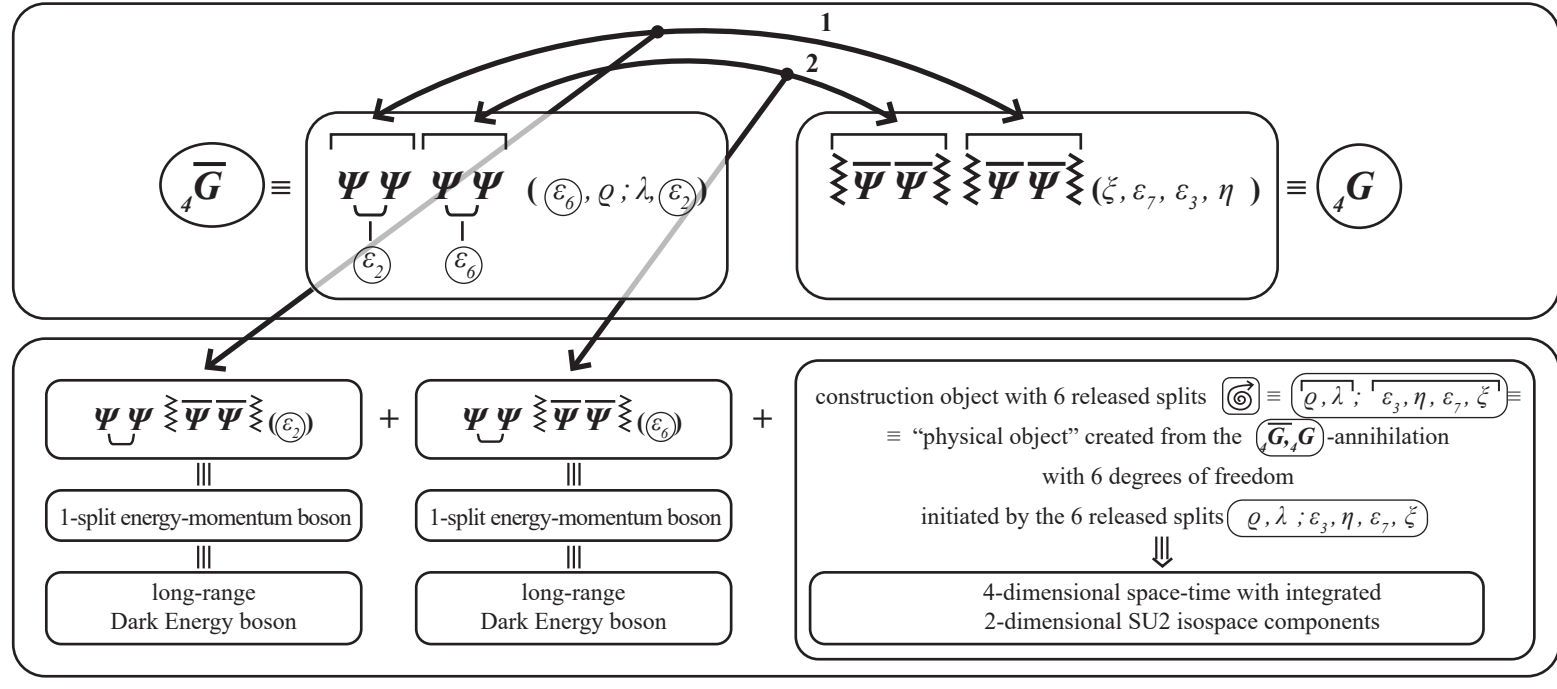
We can give similar answers for the 33.3% Normal Matter/Antimatter segment.

The annihilation processes of Dark Matter and conversely the creation of Dark Energy with the coupled creation of expanding 4-dimensional space-time elementary structure entities

$$\begin{array}{c}
 \xrightarrow{\quad} \xleftarrow{\quad} \\
 \boxed{{}_4\bar{G} \equiv \underbrace{\Psi\Psi}_{\varepsilon_2} \underbrace{\Psi\Psi}_{\varepsilon_6} (\varepsilon_6, \varrho; \lambda, \varepsilon_2)} \rightarrow \leftarrow \boxed{{}_4G \equiv \underbrace{\bar{\Psi}\bar{\Psi}}_{\xi} \underbrace{\bar{\Psi}\bar{\Psi}}_{\varepsilon_3} (\xi, \varepsilon_7, \varepsilon_3, \eta)} \\
 \Downarrow
 \end{array}$$

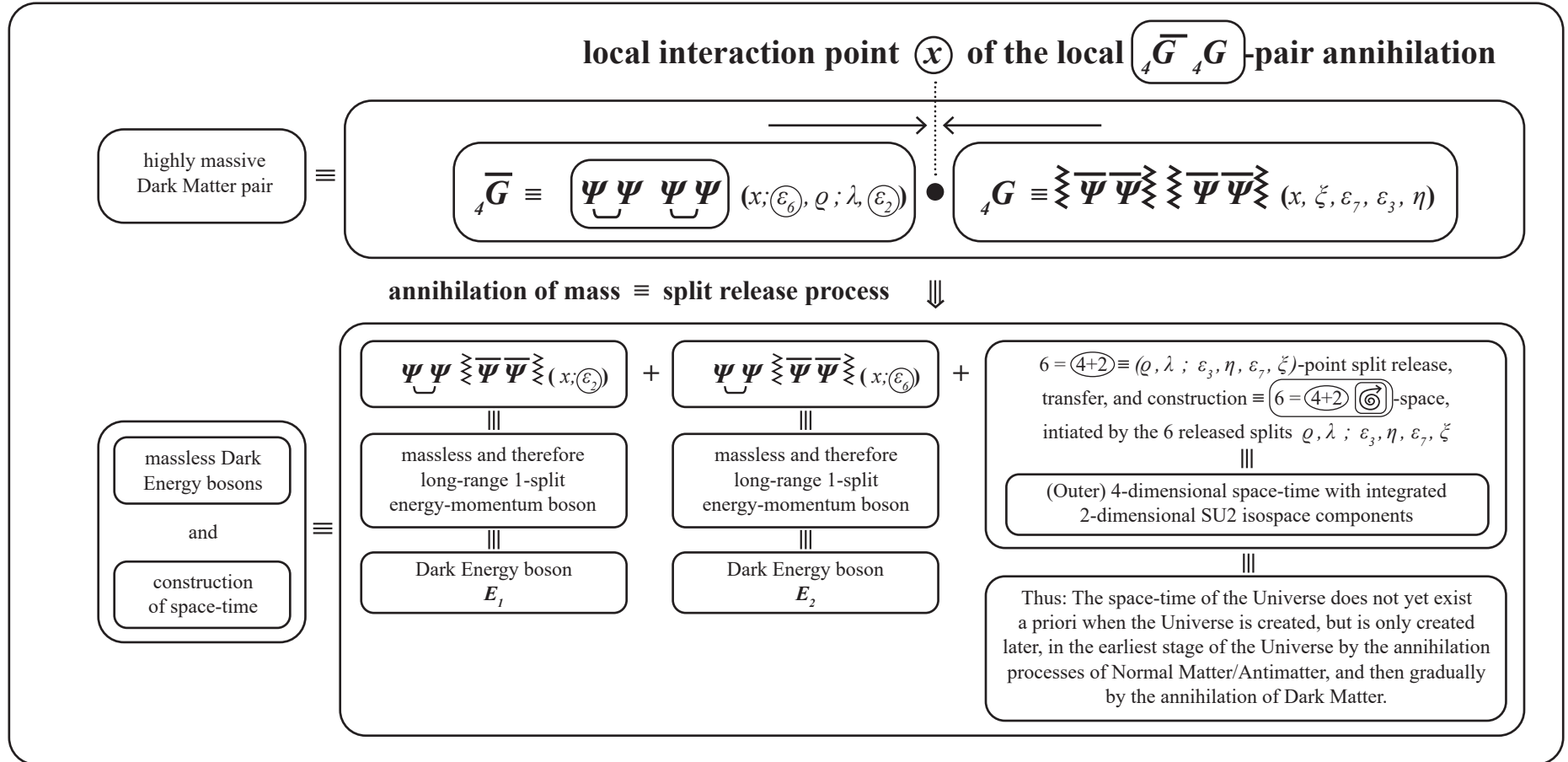
Sporadically, as a result of this pairwise interaction, over very long periods of time, there occur individual penetration-style interaction processes, which lead to individual decomposition-style interaction processes, i.e. annihilation processes of the following type:

sporadic decomposition $\equiv \Downarrow \equiv \boxed{{}_4\bar{G} \quad {}_4G}$ -pair annihilation processes



Thus:

XII.12.



From XII.12., it follows that: The local interaction point $(x = \bullet)$ of the $(\bar{G}_4^+ G_4^-)$ -pair annihilation is “straightened out” by the expanding $(4+2)$ -split release (⌚) – due to the annihilation of mass – or in other words “opened up”. Thus: Starting from the local interaction point $(x = \bullet)$, due to the (⌚) -split release from the annihilation processes XII.12., the following happens:

XII.13. $(\text{⌚})\text{-split release act} \equiv \text{space straightening act} \equiv \text{space opening act} \equiv (\text{⌚})\text{-space expansion act}$

In EAU, VI.3.2., it was shown that point curvature is created by $(\text{split clustering processes with split densities } \geq 2)$, and that this point curvature creates mass, and therefore the curvature of space is related to mass. If we symbolically write $(\text{split clustering} \equiv \text{point curvature})$ as (⌚) , and the inverse act, namely $(\text{split release} \equiv \text{point straightening})$, as (⌚) , then we see that:

- XII.14.
- mass is generated at the mass point \odot by $(\text{split densities } \geq 2)$, i.e. (⌚) , and
 - $(4\text{-dimensional space-time structure entities})$ are created by $(\text{split releases } \geq 4)$, i.e. (⌚) .

It follows that:

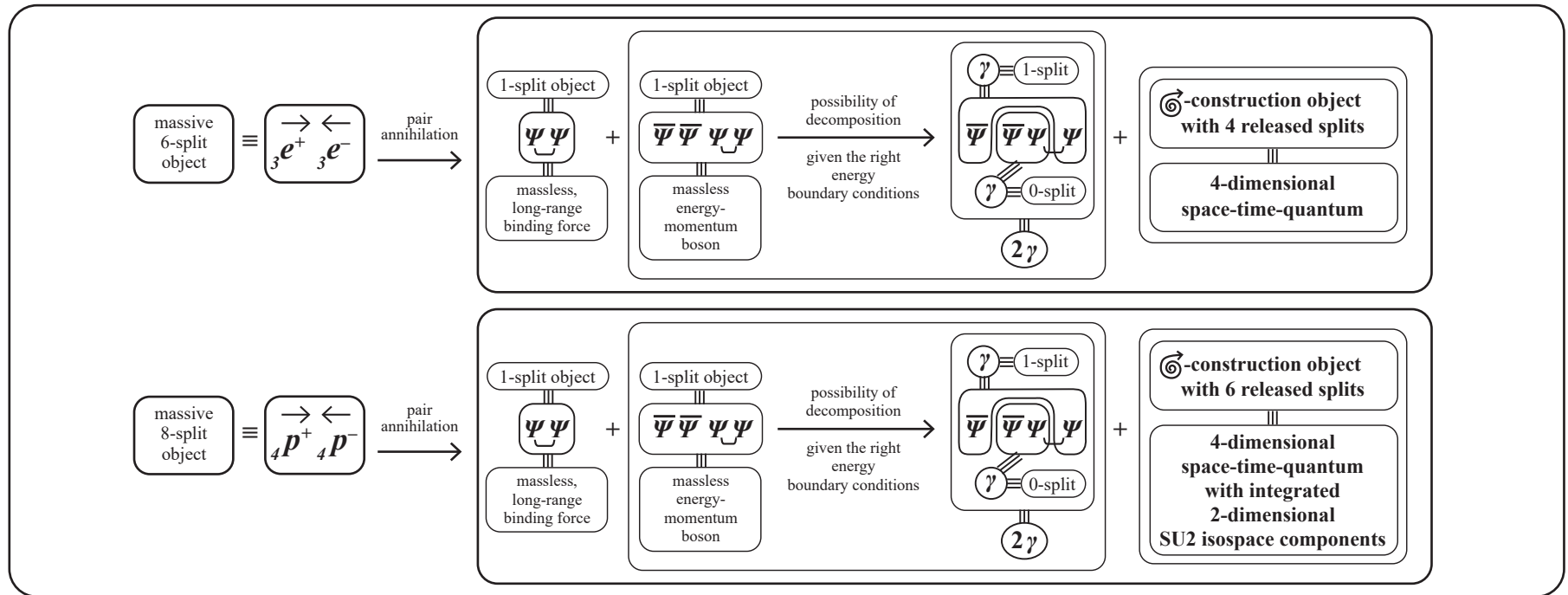
XII.15.

- $(\text{space curvature}) \equiv (\text{⌚}) \equiv (\text{mass constr.}) \equiv (\text{clustering of space}) \equiv (\text{coupled with the construction of Normal Matter/Antimatter particles and Dark Matter particles})$
- $(\text{space straightening}) \equiv (\text{⌚}) \equiv (\text{mass deconstr.}) \equiv (\text{constr. of expanding space}) \equiv (\text{coupled with the creation of massless Dark Energy bosons})$

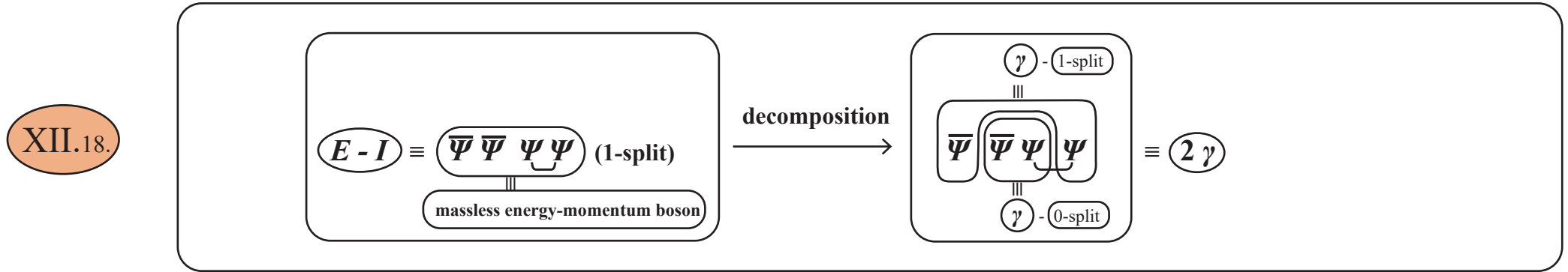
The annihilation processes of Normal Matter/Antimatter and conversely the creation processes of energy-momentum bosons with the coupled creation of expanding 4-dimensional space-time elementary structure entities

By **XI.28.**, more Normal Matter formed than Antimatter during the Big Bang. Since, at the time, the “freshly” formed Universe directly after the Big Bang, i.e. directly after the **Big Bang phase (see UEA XI.23. = creation phase)**, was a most extremely compact and most extremely massive “smallest possible structure” (some sources estimate that it was only ~10 cm in size), the Normal Matter/Antimatter pairs $e^+ e^-$ and $p^+ p^-$ were densely packed together, which necessarily led to the well-known pair annihilation processes **XI.29.**.

XII.17.

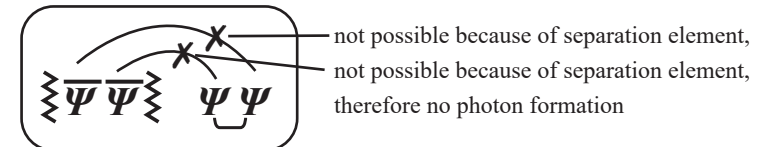


If we analyse (XII.17.) (and (XI.29.)) more closely, we see that the (2γ) -photon creation, which has been physically observed at the moment of decoupling (see (XII.2.2.)) in the form of a “release of light”, is a consequence of the decomposition process of a long-range, massless (1-split) energy-momentum boson primarily created by the annihilation of Normal Matter-Antimatter:



It can easily be seen that this decomposition process into photons (γ) cannot occur in the case of the Dark Energy bosons E_1 and E_2 , which by (XII.12.) are created in the annihilation processes of Dark Matter $(\bar{G}_4 G_4)$.

The reason for this lies in the differences in the inner-structural composition of (XII.18.), i.e. $(E - I) \equiv (\bar{\Psi} \bar{\Psi} \Psi \Psi)$ compared (XII.12.), i.e. E_1 and $E_2 \equiv (\bar{\Psi} \bar{\Psi} \Psi \Psi)$. With the Dark Energy bosons E_1 and $E_2 \equiv (\bar{\Psi} \bar{\Psi} \Psi \Psi)$, we immediately see that $(\bar{\Psi} \Psi)$ binding states cannot occur due to the inner-structural separation elements $\bar{\Psi} \bar{\Psi}$, i.e. no photons can be created:

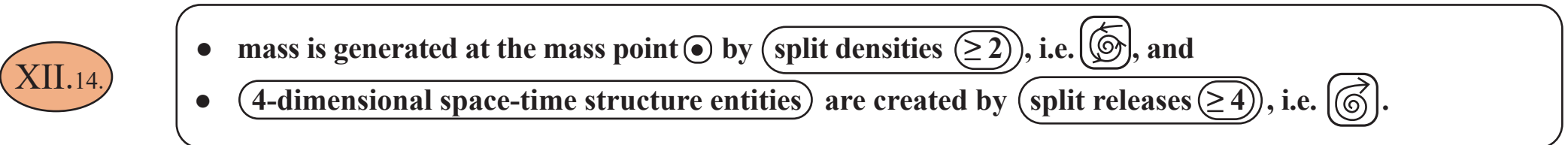


illustrated with the example of Dark Matter annihilation processes and in general

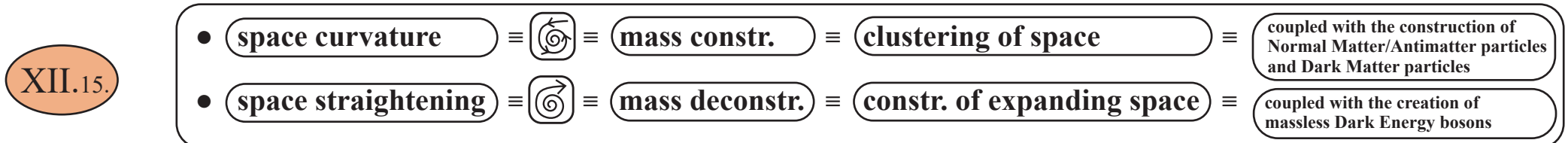
From XII.12., it follows that: The local interaction point $(x = \bullet)$ of the $(\bar{G}_4^+ G_4^-)$ -pair annihilation is “straightened out” by the expanding (4+2)-split release (⌚) – due to the annihilation of mass – or in other words “opened up”. Thus: Starting from the local interaction point $(x = \bullet)$, due to the (⌚) -split release from the annihilation processes XII.12., the following happens:



In EAU, VI.3.2., it was shown that point curvature is created by (split clustering processes with split densities ≥ 2), and that this point curvature creates mass, and therefore the curvature of space is related to mass. If we symbolically write (split clustering \equiv point curvature) as (⌚) , and the inverse act, namely (split release \equiv point straightening), as (⌚) , then we see that:



It follows that:



XII.12. to **XII.15.** thus showed how and by means of which processes **4-dimensional space-time** formed and continues to form.

The reason lies specifically in the mass annihilation processes according to which

- massive elementary particles are pairwise annihilated (see **XII.12.**, **XII.17.**)
- and massless elementary particles are also pairwise created (see **XII.12.**, **XII.12.**).

By **XII.9.**, **XII.12.**, the annihilation and creation processes that occur within the 66.6% Dark Matter segment of the Universe are:

The pair annihilation $\bar{G}_4 G_4$ and simultaneous pair creation of the massless **1-split** Dark Energy bosons E_1, E_2 .

Due to the deconstruction of mass associated with this annihilation process and the resulting $(4+2)=(6)$ -split release process \vec{G}_{4+2} (see **XII.12.**), the E_1, E_2 bosons thus created are in turn associated with the construction of:

4-dimensional **space-time** elementary structure entities with their integrated 2-dimensional SU2 isospace components.

XII.16.

of Normal Matter/Antimatter ($\equiv \overline{e^+ e^-}, \overline{p^+ p^-} \equiv$ fermion pair annihilation) and of Dark Matter ($\equiv {}_4\overline{G} {}_4G \equiv$ boson pair annihilation) and their ramifications for the overall history of the change processes in the Universe from the Big Bang until Today.

Furthermore, the following holds:

Normal Matter (i.e. $\overline{p^+, e^-}$) is only slightly different from Normal Antimatter (i.e. $\overline{p^-, e^+}$) in terms of inner-structural particle composition. Explicitly:

XII.19.

$$\overline{e^+ e^-} \equiv \overbrace{\overbrace{\Psi \Psi \overline{\Psi}}^{+} \overbrace{\overline{\Psi} \Psi \Psi}^{-}}^{+} ; \quad \overline{p^+ p^-} \equiv \overbrace{\overbrace{\Psi \Psi \overline{\Psi}}^{+} \overbrace{\overline{\Psi} \Psi \Psi}^{-}}^{+} ;$$

i.e. the only difference in inner-structural composition between Normal Matter and Normal Antimatter lies in the differences in the positioning of the $\overline{\Psi}$ (which, incidentally, as explained in **VI.3.3.** is why they have different \oplus charges).

Since Antimatter and Normal Matter are mostly identical inner-structurally, the Normal Matter and Antimatter pair annihilation processes **XII.19.** occur “maximally quickly” and are therefore “much faster” than the more complex Dark Matter pair annihilation processes, which have stronger inner-structural differences:

XII.20.

$${}_4\overline{G} \equiv \overbrace{\overbrace{\Psi \Psi \Psi \Psi}^{+}}^{+} ; \quad {}_4G \equiv \overbrace{\overbrace{\overline{\Psi} \overline{\Psi} \overline{\Psi} \overline{\Psi}}^{-}}^{-} \Rightarrow \text{see } \text{XII.9.}$$

It therefore also follows that, in the early stages of the Universe, i.e. directly after the Big Bang (in other words, directly after the completion of elementary particle construction), after the creation phase (\equiv “inflation phase”),

- the most extremely rapid pair annihilation processes **XII.17.** only occurred straight away within the 33.3% Normal Matter/Antimatter segment, and therefore, in the early stages of the Universe, initially only massless, long-range energy-momentum bosons with inner-structural type

XII.21.

$\overline{\Psi} \overline{\Psi} \underbrace{\Psi \Psi}_{(1\text{-split})}$ were created (see **XII.17.**),

which then, by **XII.18.**, become photons by decomposition, thus being written into the history of the Universe as a “flash of light” at the moment of decoupling, as is visible in the Planck space telescope diagram **XII.2.2.** wiederfinden.

- whereas in the 66.6% Dark Matter segment, the annihilation processes $\overleftrightarrow{{}_4\overline{G}} \overleftrightarrow{{}_4G}$ (see **XII.9.**), only occurred most extremely “slowly”, and therefore only individually and sporadically, due to the maximally different inner-structural particle composition of

XII.22.

${}_4\overline{G} \equiv \underbrace{\Psi \Psi}_{(1\text{-split})} \underbrace{\Psi \Psi}_{(1\text{-split})} \text{ (4-split) and } {}_4G \equiv \underbrace{\overline{\Psi} \overline{\Psi} \overline{\Psi} \overline{\Psi}}_{(4\text{-split})} \text{ ,}$

The first annihilation process of Normal Matter/Antimatter in the Universe directly after the Big Bang, and conversely from this first annihilation the first creation of energy-momentum bosons with the coupled first creation of expanding 4-dimensional space-time elementary structure entities.

Thus: The 4-dimensional space-time of the Universe did not exist a priori, but was only created after the creation of the Universe as a “by-product” of the annihilation processes of newly created matter. Hence, as a result of the continuously unfolding matter annihilation processes, the construction of space-time unfolds in a continuously accumulating manner, leading to a continuously unfolding intensification of the construction of space-time and thus to the accelerated expansion of the Universe over time.

In the earliest stage of the Universe, from creation until the moment of decoupling (380,000 years after the Big Bang), the only processes that had occurred to any significant extent were:

XII.23.

rapid Normal Matter/Antimatter annihilation processes,

which, directly after the Big Bang, i.e. directly after the creation phase of the Universe, while the Universe was still extremely dense, and thus the pairs $(e^+ e^-)$ and $(p^+ p^-)$ were still most extremely densely “packed” within the Normal Matter/Antimatter segment, took the form of

XII.24.

vast quantities of $(e^+ e^-)$ - and $(p^+ p^-)$ -pair annihilation processes on gigantic scales.

By XII.17., this led:

XII.25.

firstly, to the creation of a most colossally gigantic quantity of energy-momentum bosons of type $(\bar{\Psi} \bar{\Psi} \Psi \Psi)$ (1-split), which then partially decomposed (by XII.18.) into a most colossally gigantic quantity of photons ($= \gamma$ -set). This photon set was observed by the Planck space telescope (ESA, 21st March 2013) as a most colossally gigantic flash of light at the moment of decoupling (~380,000 years after the Big Bang).

XII.26.

secondly, as a result of the annihilation of mass associated with the pair annihilation processes $(e^+ e^-)$ and $(p^+ p^-)$ by XII.17., to most colossally vast bursts of point split releases, namely,

from the $(e^+ e^-)$ -processes, most colossally gigantic

bursts of  -releases
4 Splits

from the $(p^+ p^-)$ -processes, most colossally gigantic

bursts of  -releases
(4+2) Splits

by means of which, by XII.17. a most colossally gigantic set of expanding 4-dimensional space-time elementary structure entities with partially integrated 2-dimensional SU2 components was created..

And hence:

By means of these most colossally gigantic annihilation processes **XII.17.**; **XII.23.**, which occurred directly after the creation phase of the Universe, there occurred a most colossally gigantic annihilation of mass(see **XII.17.**, **XII.23.**), which in turn led to the creation of a most colossally gigantic set of expanding

XII.27.

⑥-elementary structure entities from the 4 , resp. $4+2=6$ released splits .

Thus, as a consequence of the principle of conservation of 13 splits per elementary set (= highest conservation law of all events in the Universe, see **V.7.**, **XI.36.**), an expanding $4+2$ -dimensional “space” is constructed

XII.28.

i.e. a space with

- “outer” 4-dimensional space-time structure (4-dimensional space-time-quantum ⑥) and integrated
- “inner” 2-dimensional SU2 structure (isospace)

as is consistent with reality.

XII.29.

Precisely this Normal Matter/Antimatter annihilation process (XII.17.); (XII.23.)

- was and is most colossally fast, because of the inner-structural particle composition of $(e^+ e^-)$, $(p^+ p^-)$
- occurred in a most colossally gigantic manner, because of the most colossally dense compactness of the Universe directly after its creation phase,
- annihilated around (10-20%) of the Entire Universe, i.e. around (30-60%) of the Normal Matter/Antimatter of the Universe, all at once in a single moment, after the Universe had just been created by its Big Bang production cascade (XI.23.)

with the following consequences for the Universe:

XII.30.

because of the annihilation processes of the mass $(e^+ e^-)$, $(p^+ p^-)$ -particles, i.e. $(e^+ e^-)$, $(p^+ p^-)$ -annihilation (see (XII.17.)),

- creation of sets of massless photons (2γ) , resp.
- creation of sets of massless, long-range, energy-momentum bosons and the coupled
- creation of 4-dimensional space-time elementary structure entities, resp.
- creation of 4-dimensional space-time elementary structure entities with integrated 2-dimensional SU2 structure.

XII.31.

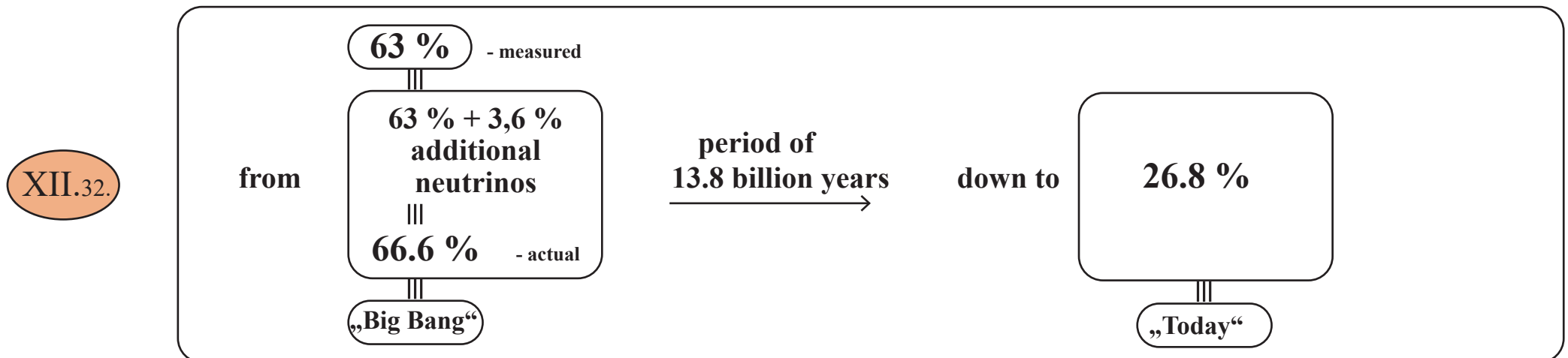
This means: The 4-dimensional space-time of the Universe did not exist a priori when the Universe was created, but was first generated after the Universe was created by means of the subsequently occurring specific transformation processes (= annihilation processes (XII.17.; XII.12.)).

of the Universe and conversely the individual proportional (percentagewise) construction processes of the Dark Energy of the Universe with the coupled construction of 4-dimensional space time, over the entire period from the Big Bang until Today.

In the beginning phase of the Universe (until the moment of decoupling), there were only extremely few, isolated, i.e. sporadic, pair annihilation processes of type $\overline{G}_4 G_4$ XII.9. ; XII.12. in the 66.6% Dark Matter segment, which is a consequence of the significant differences in the inner-structural composition of \overline{G}_4 and G_4 and is analysed in detail in XII.9. .

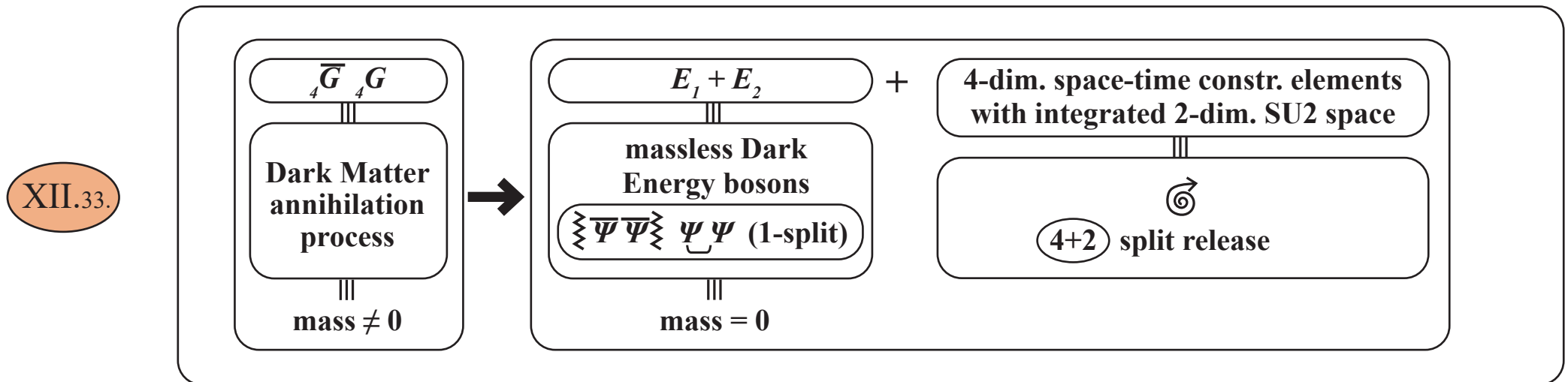
The period of 13.8 billion years, from the Big Bang until today, is 36,316 times longer than the 380,000-year period from the Big Bang until the moment of decoupling.

Thus, in this long subsequent period of 13.8 billion years, there were in total sufficiently many sporadically occurring and therefore cumulatively enough “slow” Dark Matter $\overline{G}_4 G_4$ -annihilation processes of type XII.9. ; XII.12. to induce the following change in the Dark Matter part of the composition of the Universe between the moment of decoupling and today, by XII.32.:



This means:

By means of the deconstruction, as shown in XII.32. of a fraction of Dark Matter amounting to $(66.6\% - 26.8\%) = 39.8\%$ of the Universe over the period ranging (from the creation of the Universe until today), the Dark Matter annihilation processes XII.9. ; XII.12. :

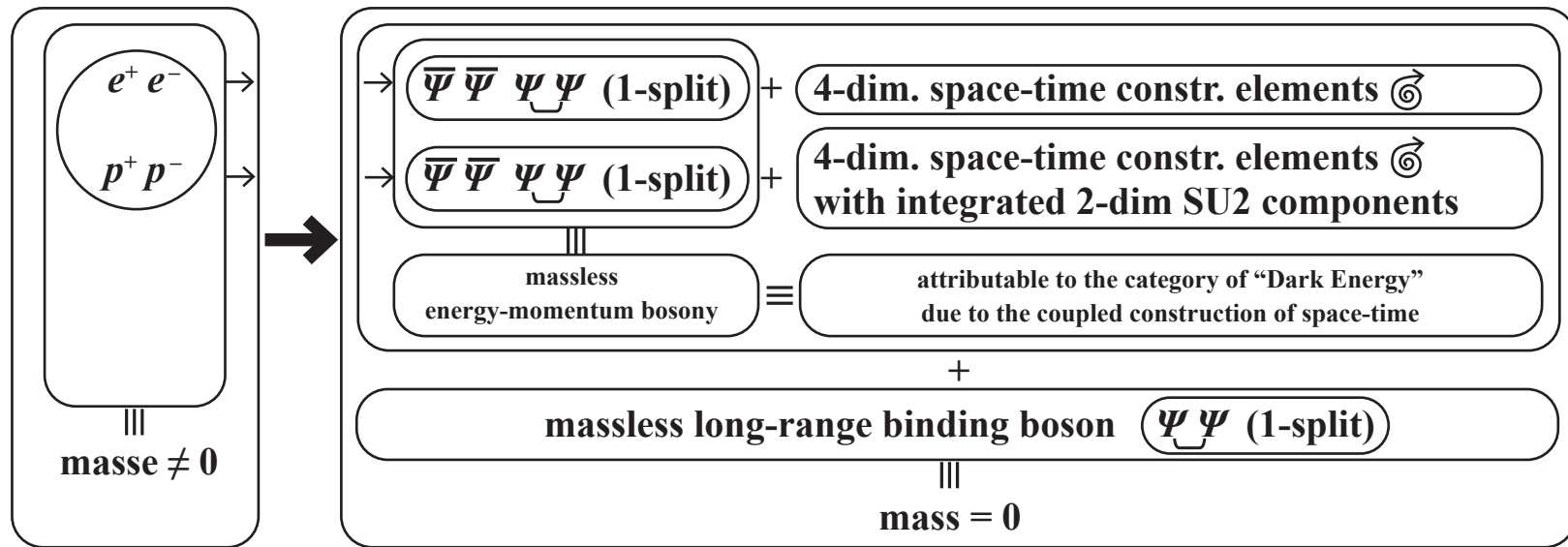


led to the proportional (construction of 39.8% Dark Energy) in the Universe, together with the (construction of expanding 4-dimensional space-time) and (its partially integrated 2-dimensional SU2 components), from this (deconstruction of 39.8% Dark Matter).

XII.34. Thus: (39.8% of the 68.3% Dark Energy) in the Universe today measured by the Planck space telescope (see XII.2.3.) is attributable to the annihilation of a $(66.6\% - 26.8\%) = 39.8\%$ Dark Matter fraction of the Universe.

of the Universe and conversely the individual proportional (percentagewise) construction processes of the Dark Energy of the Universe with the coupled construction of 4-dimensional space time, over the entire period from the Big Bang until Today.

Right at the beginning of the existence of the Universe, i.e. immediately after the Big Bang phase (creation phase), as soon as e^\pm, p^\pm were created, the “rapid” e^\pm and p^\pm -annihilation processes began within the Normal Matter/Antimatter segment, as described in detail in XII.17. → XII.30. :

XII.35.

XII.36.

This leads to the annihilation of mass, which is compensated by the construction of the expanding 4-dimensional space-time elementary structures $\textcircled{\circlearrowright}$ coupled to the long-range massless energy-momentum bosons $\bar{\Psi} \bar{\Psi} \Psi \Psi$ (1-split) .

XII.37.

In the period between the beginning of the Universe and the moment of decoupling (380,000 years after the Big Bang), these processes lead to the deconstruction of **(21.3% Normal Matter/Antimatter)** in the Universe, and conversely to the construction of a **(21.3% energy-momentum in the Universe)**, which by **XII.35.** is coupled to the construction of expanding 4-dimensional space-time **(6)**, and which may therefore be classified in the category of “Dark Energy”.

XII.38.

Furthermore, between the moment of decoupling and “Today”, by **XII.2.2.**, **XII.2.3.**, the fraction of Normal Matter in the Universe decreased from **(12% down to 4.8% today)**, which was triggered by the sum of all sporadically occurring **($e^+ e^-$)**- and **($p^+ p^-$)**-annihilation processes throughout this extended period of time, which then created a **(fraction of 12% - 4.8% = 7.2% Dark Energy in the Universe)**.

XII.39.

Overall, this means:

The 68.3% Dark Energy fraction of the Universe measured “Today” by the Planck space telescope **XII.2.3.** consists of:

39.8% fraction from Dark Matter annihilation between decoupling and today.

21.3% fraction from Normal Matter/Antimatter annihilation between the Big Bang and decoupling.

7.2% fraction from Normal Matter/Antimatter annihilation between decoupling and today.

III
68.3% Dark Energy fraction of the Universe “Today”

The overall construction of the Dark Energy of the Universe and the coupled construction of expanding 4-dimensional space-time over the entire period from the Big Bang until Today. Comparison with Planck space telescope measurement data.

XII.39.

Overall, this means:

The 68.3% Dark Energy fraction of the Universe measured “Today” by the Planck space telescope

XII.2.3. consists of:

39.8% fraction from Dark Matter annihilation between decoupling and today.

21.3% fraction from Normal Matter/Antimatter annihilation between the Big Bang and decoupling.

7.2% fraction from Normal Matter/Antimatter annihilation between decoupling and today.

68.3% Dark Energy fraction of the Universe “Today”

The Dark Energy bosons thus created from the pairwise annihilation of mass **XII.12.**, **XII.17.** are automatically, inevitably, and necessarily,

XII.40.

as a consequence of the **highest conservation principle of all events in the Universe** =

= **conservation of 13 splits per elementary set,**
applicable to both Dark Matter and Normal Matter/Antimatter ,

XII.40.

coupled to the construction of an object with $(4 \text{ or } 4+2) \text{ released splits}$,
i.e. a physical “construction” built from the $(4 \text{ or } 4+2) \text{ splits released}$ from the pairwise annihilation
of mass XII.12. , XII.17. in which these $\text{released splits are incorporated}$, and by means of which the
expanding $(4\text{- or } 4+2)\text{-dimensional elementary space structure entities}$ are constructed in every
event associated with an annihilation process. In summary:

XII.41.

An expanding space is constructed with

- “outer” 4-dimensional space-time structure
- and integrated
- “inner” 2-dimensional SU2 structure (isospace)
- as is consistent with reality.