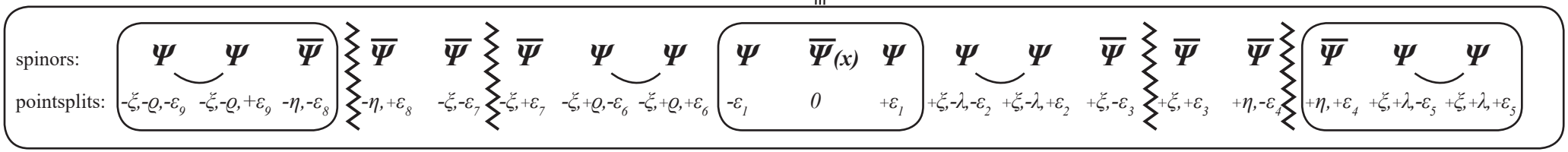
Norbert Winter

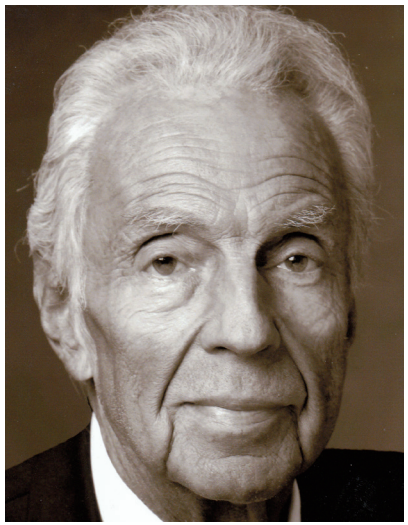
UC-5

The Universe Code Ψ-19,

the creation system of dark energy with the coupled construction of 4-dimensional space-time

$$\left[D^{(13)}_{\sigma_{13}} \Psi(x) \right]_{\wr\cup} \equiv \Psi^{(19)}_{\wr\cup}(x,\sigma_{13}) \equiv \Psi^{(19)}_{\wr\cup}(x) \equiv \Psi\text{-}19$$





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, supervisor H.P. Dürr
- Employed at the Max-Planck Institute for Physics in Munich, student of Werner Heisenberg
- 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:

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, Kap. I-X.)
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)
17/03/2017: “The 6 Key Processes in the Creation and Development of the Universe” (KPU)
17/03/2017: “The Universe Code Ψ-19” (UC)
17/03/2017: “The Universe Code Ψ-19, the unified composition and order system of the Universe“ (UC-AOS)
16/02/2018: “Guide to the source and generating code of the Universe“ (WW-UEC)
16/02/2018: “The Universe Code Ψ-19, the creation system of the entire process of the universe“ (UC-G)
16/02/2018: “UC-1 – The creation of the Universe Code Ψ-19“
16/02/2018: “UC-2 – The Universe Code Ψ-19,
- The creation system of the first ever manifestation of the universe before the big bang (≡ primordial universe)
- The creation system of mass and charge“

16/02/2018: “UC-3 – The Universe Code Ψ-19, the creation system of the big bang (rupture of ${}_5G$) in the primordial universe
- The restructuring of the elementary particle set that has passed through the Big Bang
- the formation of the normal matter elementary particle set = $\overbrace{p^+, e^-, \nu ; St, \ \gamma, Z, G}$ ≡ h-atom given suitable energy boundary conditions“

16/02/2018: “UC-4 – The Universe Code Ψ-19, the creation system:
- of the Big Bang Reproduction Cascade including absolutely all fine and global composition structures of the Earliest Universe directly after the Big Bang ($\frac{2}{3}$ Dark Matter / $\frac{1}{3}$ Normal Matter)
- of the elementary particles of Dark Matter and Normal Matter including their inner-structural particle composition and their physical properties“

16/02/2018: “UC-5 – The Universe Code Ψ-19, the creation system of dark energy with the coupled construction of 4-dimensional space-time“

Preface:

After publication of the paper

The universe code Ψ-19,
the unified composition and order system of the universe

≡ UC-AOS (abbr.)

I have received numerous letters with the question:

1. of whether it would be possible - due to the abundance of the overall material and the breadth of the topic of the paper UC-AOS (Chapter I. - XIV., 356 pages) - to recommend a guide with the help of which one can find a clear path through the overall text of the paper

2. what, according to my opinion and with respect to the present overall situation of elementary particle physics and space physics, are the most important topics on either field

3. Some letters contained the question of whether it would be possible to represent the overall universe process as developed in UC-AOS in full details, in a closed, neatly arranged form on approx. 30-50 pages.

4. In other letters, the request was made to split the comprehensive paper UC-AOS into its 5-6 core topics, whereas each of these 5-6 core topics should be 30-50 pages in length, thus easily readable and preferably deal with a topic that is currently being discussed.

The questions 1. and 2. have been answered in the paper:

Guide to the source and generating code of the Universe at small scale (elementary particles) and at large scale (global structures of the Universe) (2/16/2018).

The third question has been dealt with within the paper:

The universe code Ψ-19,
the generation system of the complete universe process (2/16/2018).

Question 4 is dealt with within the following 5 papers **UC-1** $\rightarrow$ **UC-5**:

UC-1 (02/16/2018)
UC-2 (02/16/2018)
UC-3 (02/16/2018)
UC-4 (02/16/2018)
UC-5 (02/16/2018)

Following UC-1, UC-2, UC-3 and UC-4, we continue with the paper UC-5:

The present work **„UC-5“** refers to the work UC-AOS.
Therefore, the numerical references used in the following text refer to the numerical representation of the paper UC-AOS.

Thus, the reader can directly navigate to the text within the entire paper UC-AOS and retrieve the required information from the relevant text passages, in case further information on a certain subject is needed.

UC-5 contains the following outline:

- **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 4-dimensional 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 (≡ fermion pair annihilation) and Dark Matter (≡ 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.**

In the previous publication UC-4, 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. ≡ UEP, XII.1.)

XII.1.

Dark Matter

Component ① ≡ 66.6 %		Inner-Structural Particle Composition	
neutrino$_1$	ν_1	≡ $\Psi\Psi\overline{\Psi}$ $(\varepsilon_9, \varepsilon_8)$	≡ 2-split fermion
neutrino$_2$	ν_2	≡ $\overline{\Psi}\Psi\Psi$ $(\varepsilon_4, \varepsilon_5)$	≡ 2-split fermion
neutrino$_3$	ν_3	≡ $\Psi\overline{\Psi}\Psi$ (ε_1)	≡ 1-split fermion
anti-gravitational boson	$\overline{G}$	≡ $\Psi\Psi$ $\Psi\Psi$ $(\varepsilon_6, \varrho\,; \lambda, \varepsilon_2)$	≡ 4-split boson
repulsive-Boson	R_0	≡ $\overline{\Psi}$ $\overline{\Psi}$ (0)	≡ 0-split boson
gravitational boson	G	≡ $\{\overline{\Psi}\overline{\Psi}\}$ $\{\overline{\Psi}\overline{\Psi}\}$ $(\xi, \varepsilon_7, \varepsilon_3, \eta)$	≡ 4-split boson

Normale Matter/Antimatter

Component ② ≡ 33.3 %		Inner-Structural Particle Composition	
proton (antiproton*)	p^+ (p^-)	≡ $\Psi\Psi\overline{\Psi}$ $(\varepsilon_9, \xi, \varrho, \varepsilon_8)$	≡ 4-split fermion
electron (positron*)	e^+ (e^-)	≡ $\overline{\Psi}\Psi\Psi$ $(\varepsilon_4, \eta, \varepsilon_5)$	≡ 3-split fermion
neutrino	ν	≡ $\Psi\overline{\Psi}\Psi$ (ε_1)	≡ 1-split fermion
strong force	St	≡ $\Psi\Psi$ (λ, ε_2)	≡ 2-split boson
energy-momentum	E - I	≡ $\overline{\Psi}\Psi$ Ψ $\overline{\Psi}$ $(\varepsilon_6, \varepsilon_3)$	≡ 2-split boson
partial decomposition into	γ Z	≡ $\overline{\Psi}\Psi$ Ψ $\overline{\Psi}$ $(\varepsilon_6, \varepsilon_3)$	
electromag. force	γ	≡ $\overline{\Psi}\Psi$ (0 Split)	≡ 0-split boson
weak force	Z	≡ Ψ $\overline{\Psi}$ $(\varepsilon_6, \varepsilon_3)$	≡ 2-split boson
gravitation	G	≡ $\{\overline{\Psi}\overline{\Psi}\}$ $\{\overline{\Psi}\overline{\Psi}\}$ (ε_7)	≡ 1-split boson

as well as the resulting annihilation end products ((e^+, e^-, p^+, p^-)), see XI.29.

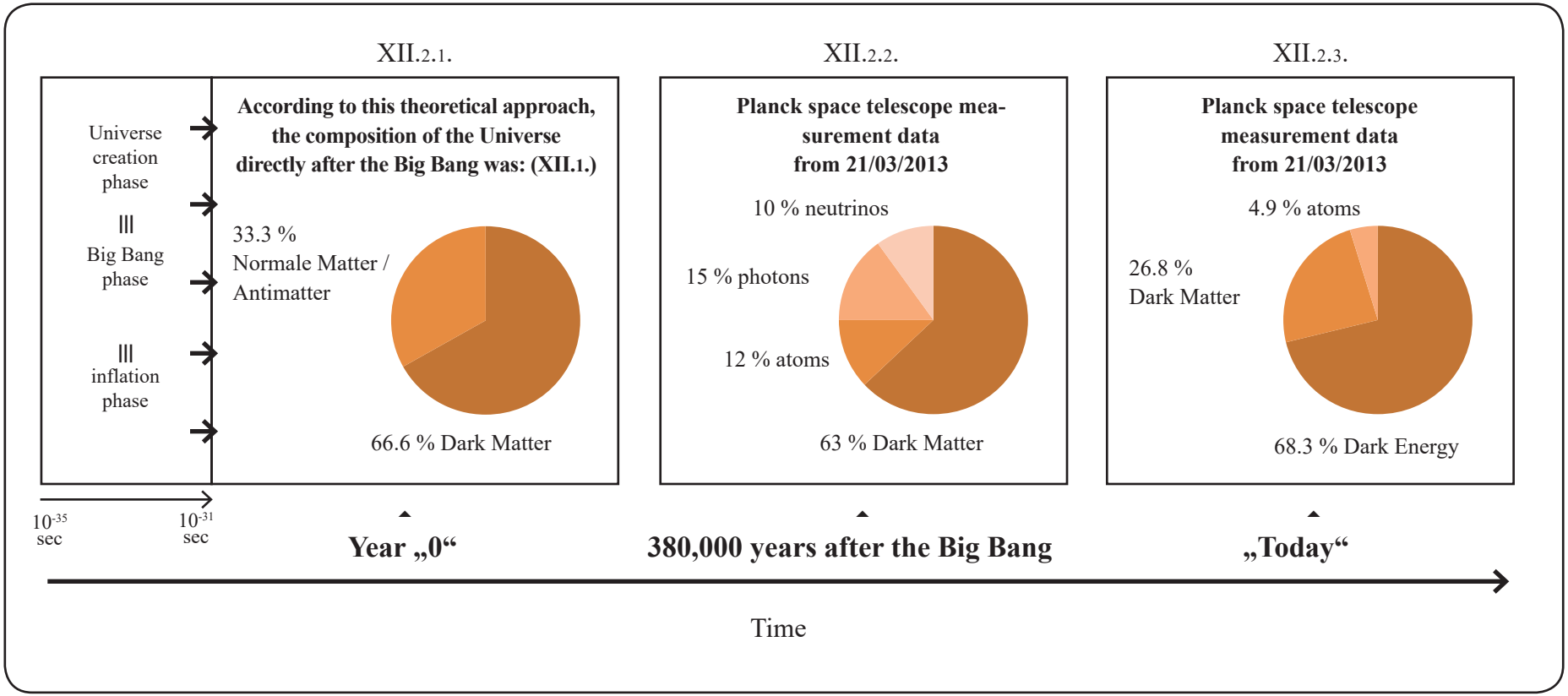
UC-4describes the construction of the Big Bang production cascade XI.23., with all of its $\frac{3^{(n_f-1)}-1}{2}$ finely detailed mini-Big Bang events, resulting in the creation of the Universe, namely by means of the creation of $\frac{3^{(n_f-1)}-1}{2}$ elementary sets ⧖ (≡ Normal Matter/Antimatter) ≡ 33.3% of the Entire Universe , as well as the creation of $3^{(n_f-1)}$ □-particle sets (≡ Dark Matter) ≡ 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 (≡ 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 (≡ inflation phase) only ended once everything was "complete", i.e. once all elementary particles XI.37. ≡ 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.



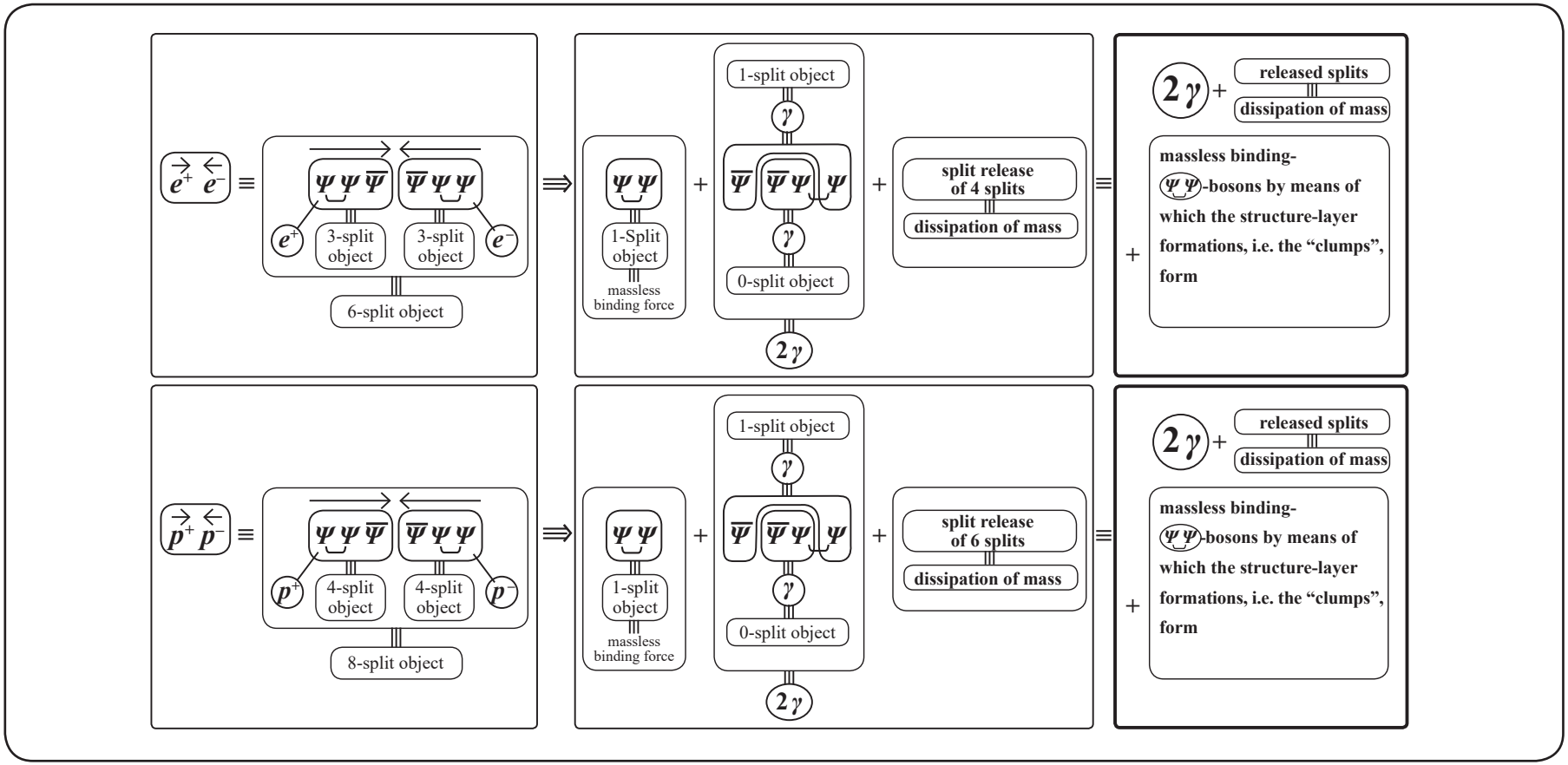
To better understand these results XII.2. especially XII.2.1. and XII.2.2., note that:

According to the theoretical approach adopted here XI.1. → XI.36. there were so-called annihilation processes $e^+ e^- \rightarrow 2\gamma + \ldots$ and $p^+ p^- \rightarrow 2\gamma + \ldots$ 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.

|||

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.:

XII.4.1.

33.3% Normal Matter/Antimatter segment

33.3 % ≅ 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 Dark Matter segment also contains the 3 neutrinos $({}_2\nu_1);\ ({}_2\nu_2);\ ({}_1\nu_3)$.

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 occurr 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.

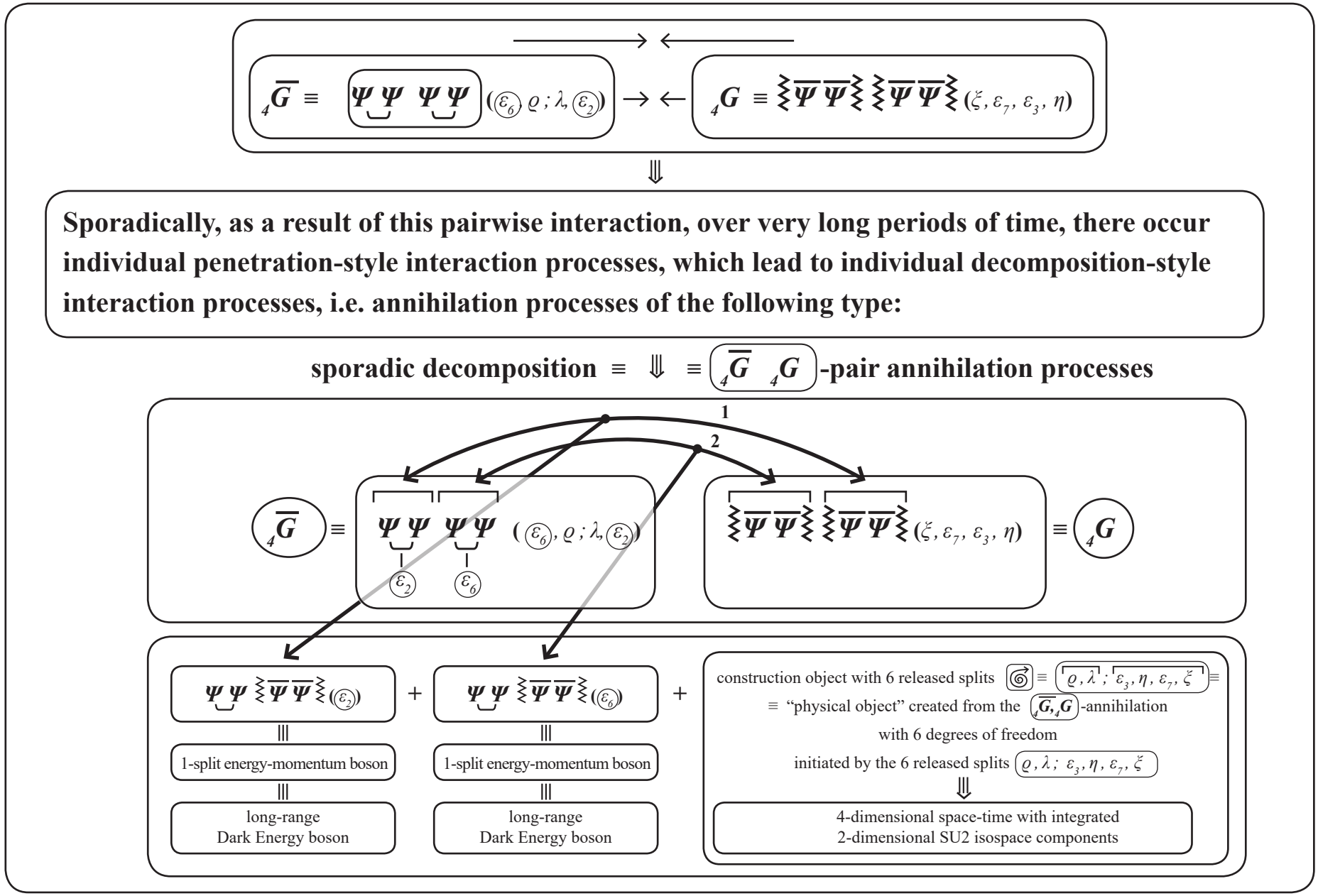
III

XI.37. Partial

Dark Matter					
Component ① ≡ 66,6 %			**Inner-Structural Particle Composition**		
neutrino$_1$	$({}_2\nu_1)$	≡	$\Psi\Psi\overline{\Psi}$ $(\varepsilon_9, \varepsilon_8)$	≡	2-split fermion
neutrino$_2$	$({}_2\nu_2)$	≡	$\overline{\Psi}\Psi\Psi$ $(\varepsilon_4, \varepsilon_5)$	≡	2-split fermion
neutrino$_3$	$({}_1\nu_3)$	≡	$\Psi\overline{\Psi}\Psi$ (ε_1)	≡	1-split fermion
anti-gravitational boson	$({}_4\overline{G})$	≡	$\Psi\Psi$ $\Psi\Psi$ $(\varepsilon_6, \varrho; \lambda, \varepsilon_2)$	≡	4-split boson
repulsive-Boson	$({}_0R_0)$	≡	$\overline{\Psi}$ $\overline{\Psi}$ (0)	≡	0-split boson
gravitational boson	$({}_4G)$	≡	$\{\overline{\Psi}\overline{\Psi}\}$ $\{\overline{\Psi}\overline{\Psi}\}$ $(\xi, \varepsilon_7, \varepsilon_3, \eta)$	≡	4-split boson

XII.9.

Dark Matter pair annihilation processes:



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 $({}_4\overline{G}, {}_4G)$-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 $({}_4\overline{G}, {}_4G)$, 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

$D^{(13)}_{13\ \text{splits}}\ \Psi(x) \equiv \Psi^{(27)}(x,\ 13\ \text{splits})$ **see EAU, III.1. → 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:

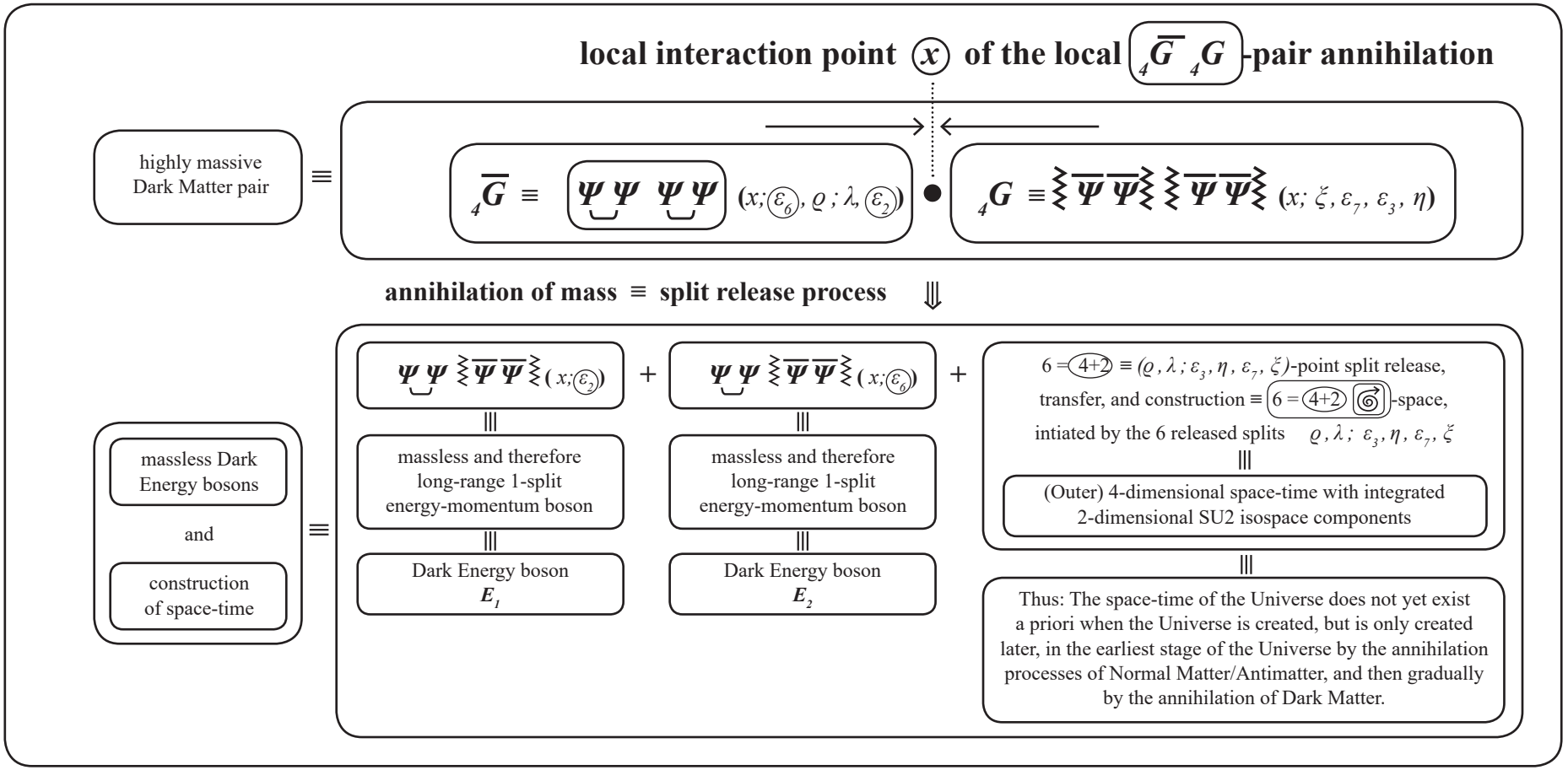
$\xi, \varrho, \lambda, \eta ; \varepsilon_1, \varepsilon_2, \varepsilon_3, \varepsilon_4, \varepsilon_5, \varepsilon_6, \varepsilon_7, \varepsilon_8, \varepsilon_9$ **(see e.g. EAU; V.7., XI.36.)**

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 ${}_4\overline{G}\ {}_4G$ 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 ${}_4\overline{G}^{+}\,{}_4G^{-}$-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.

-split release act ≡ space straightening act ≡ space opening act ≡ -space expansion act

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 ≡ point curvature as , and the inverse act, namely split release ≡ point straightening, as , then we see that:

XII.14.

- mass is generated at the mass point ⊙ 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 ≡ ≡ mass constr. ≡ clustering of space ≡ coupled with the construction of Normal Matter/Antimatter particles and Dark Matter particles
- space straightening ≡ ≡ mass deconstr. ≡ constr. of expanding space ≡ coupled with the creation of massless Dark Energy bosons

XII.12. to XII.15. thus showed how and by means of which processes 4-dimensional space-time formed and continues to form.

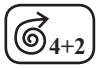
The reason lies specifically in the mass annihilation processes according to which

- **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:

XII.16.

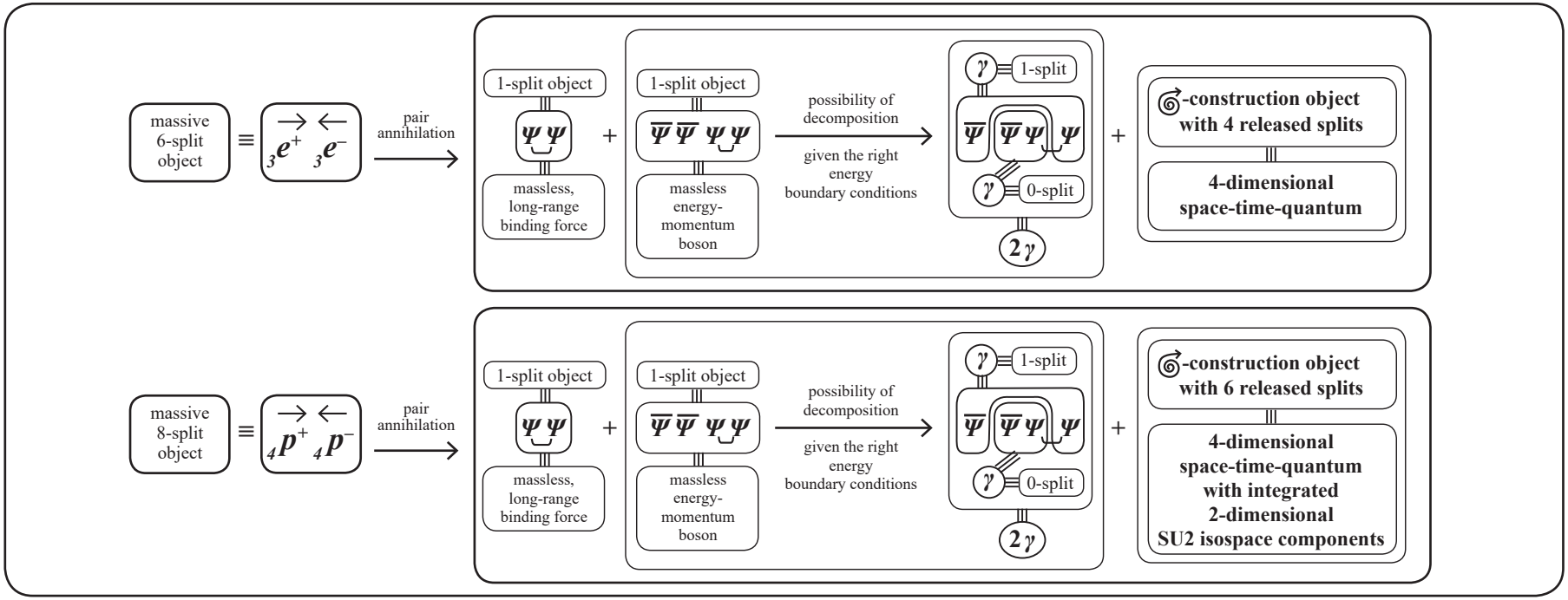
The pair annihilation $_4\overline{G}\ _4G$ and simultaneous pair creation of the massless 1-split Dark Energy bosons E_1, E_2.

Due to the deconstruction of mass associated with this annihilation process and the resulting 4+2=6-split release process  (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 (space-time-quantum) with their integrated 2-dimensional SU2 isospace components.

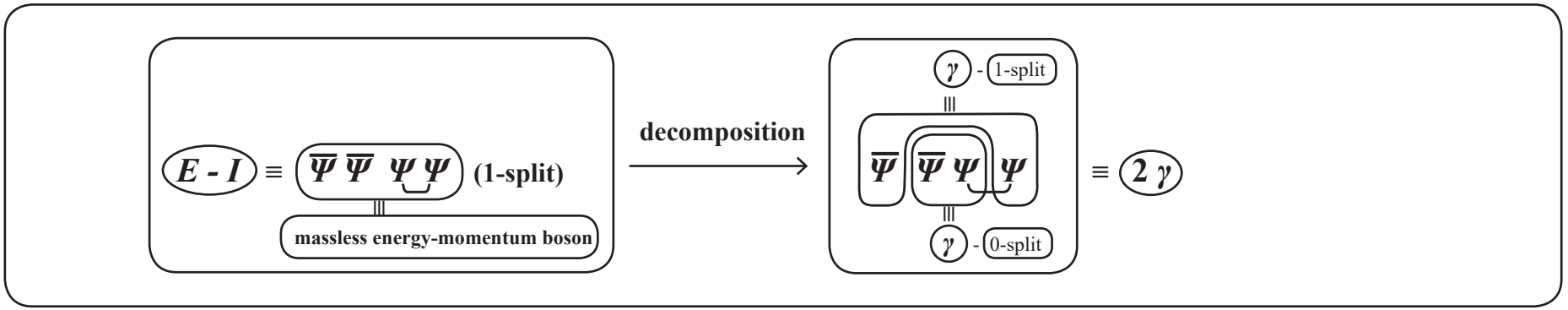
By XI.29., the annihilation processes that occur within the 33.3% Normal Matter/Antimatter segment of the Universe are $e^+ e^- \rightarrow 2\gamma + ...$ and $p^+ p^- \rightarrow 2\gamma + ...$, which are experimentally well-understood and which, according to our theoretical approach (see XI.27. → XI.30.), 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. ≡ creation phase ≡ "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.



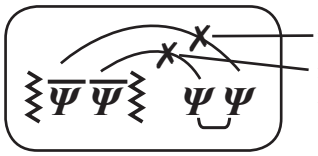
If we analyse XII.17. (and XI.29.) more closely, we see that the 2γ-photon creation, which has been physically observed at the moment of decoupling (see XII.2.2.) in the form of a "release of light", is a consequence of the decomposition process of a long-range, massless (1-split) energy-momentum boson primarily created by the annihilation of Normal Matter-Antimatter:

XII.18.



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 $\overline{G}\,G$.

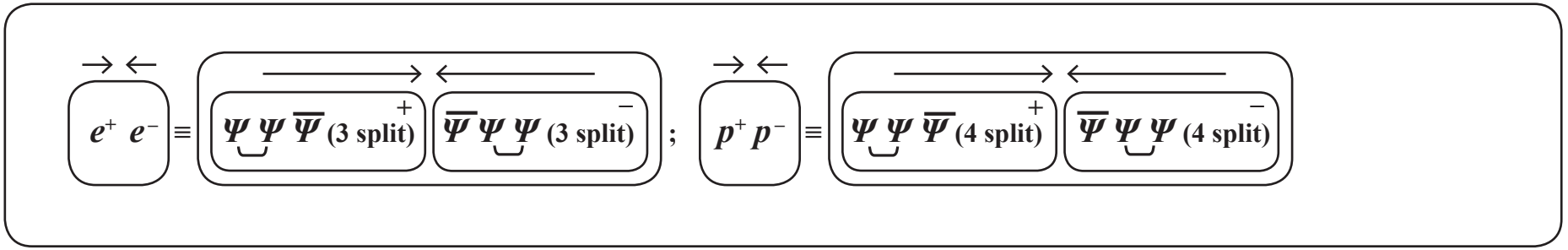
The reason for this lies in the differences in the inner-structural composition of XII.18., i.e. $E - I \equiv \overline{\Psi}\,\overline{\Psi}\;\Psi\Psi$ compared XII.12., i.e. E_1 and $E_2 \equiv \{\overline{\Psi}\,\overline{\Psi}\}\;\Psi\Psi$. With the Dark Energy bosons E_1 and $E_2 \equiv \{\overline{\Psi}\,\overline{\Psi}\}\;\Psi\Psi$, we immediately see that $\overline{\Psi}\Psi$ binding states cannot occur due to the inner-structural separation elements $\{\}$, i.e. no photons can be created:



not possible because of separation element,
not possible because of separation element,
therefore no photon formation

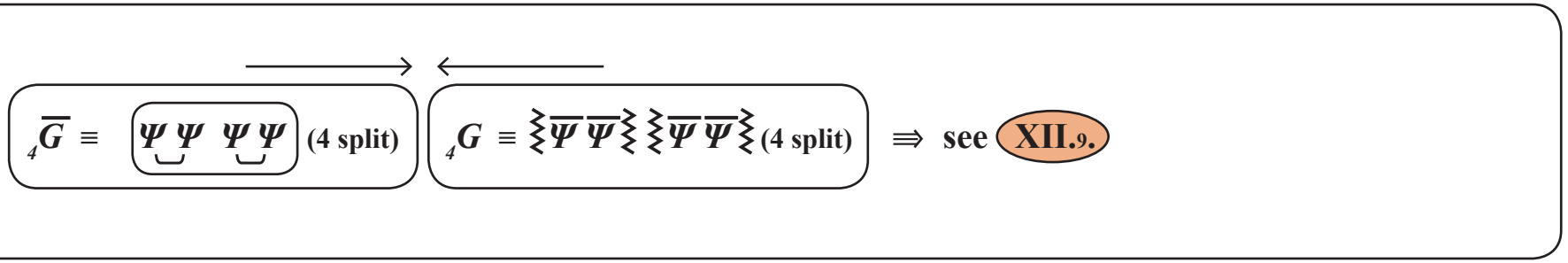
Furthermore, the following holds:
Normal Matter (i.e. (p^+, e^-)) is only slightly different from Normal Antimatter (i.e. (p^-, e^+)) in terms of inner-structural particle composition. Explicitly:

XII.19.



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, incidentically, as explained in VI.3.3. is why they have different $\pm$ 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.



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 (≡ "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.

$\overline{\Psi}\,\overline{\Psi}\;\underset{\smile}{\Psi\Psi}$ (1-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** ${}_4\overrightarrow{\overline{G}}\;{}_4\overleftarrow{G}$ **(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.

${}_4\overline{G} \equiv \underset{\smile}{\Psi\Psi}\;\underset{\smile}{\Psi\Psi}$ (4-split) **and** ${}_4G \equiv \overline{\Psi}\,\overline{\Psi}\,\overline{\Psi}\,\overline{\Psi}$ (4-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 $\overline{\Psi}\,\overline{\Psi}\,\underset{\smile}{\Psi\,\Psi}$ (1-split) , which then partially decomposed (by XII.18.) into a most colossally gigantic quantity of photons (= γ-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 (4 splits) -releases

from the $p^+\,p^-$-processes, most colossally gigantic bursts of (4+2 splits) -releases

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.

-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) 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 bosonsand 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 $({}_2\nu_1)$, $({}_2\nu_2)$, as well as 1 massless neutrino $({}_1\nu_3)$).

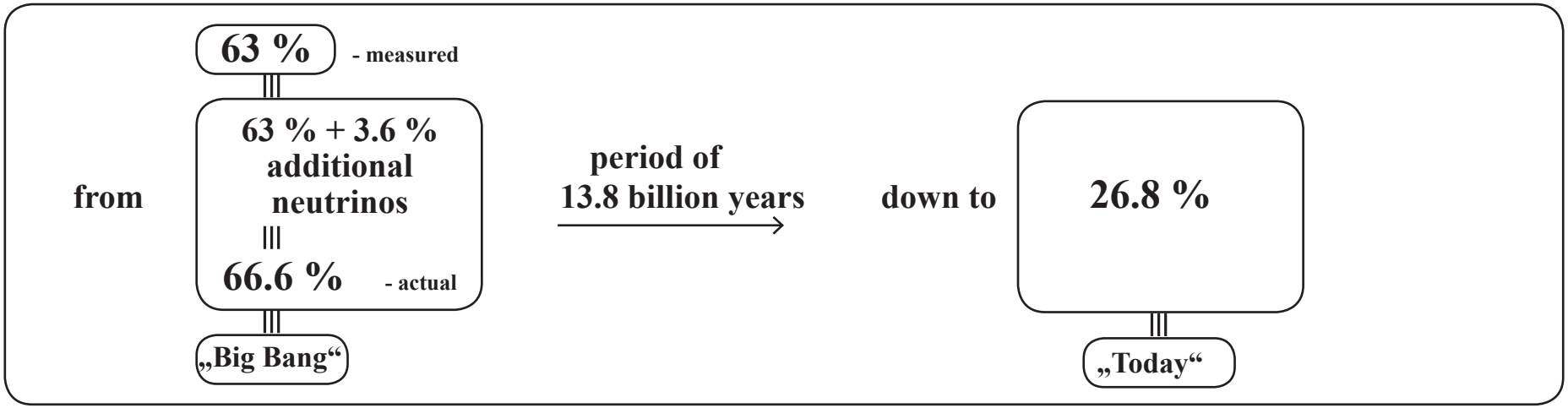
This is also analysed in XII.4.2. .

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 $({}_4\overline{G}\ {}_4G)$ 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 ${}_4\overline{G}$ and ${}_4G$ 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 occuring and therefore cumulatively enough "slow" Dark Matter $({}_4\overline{G}\ {}_4G)$ -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.:

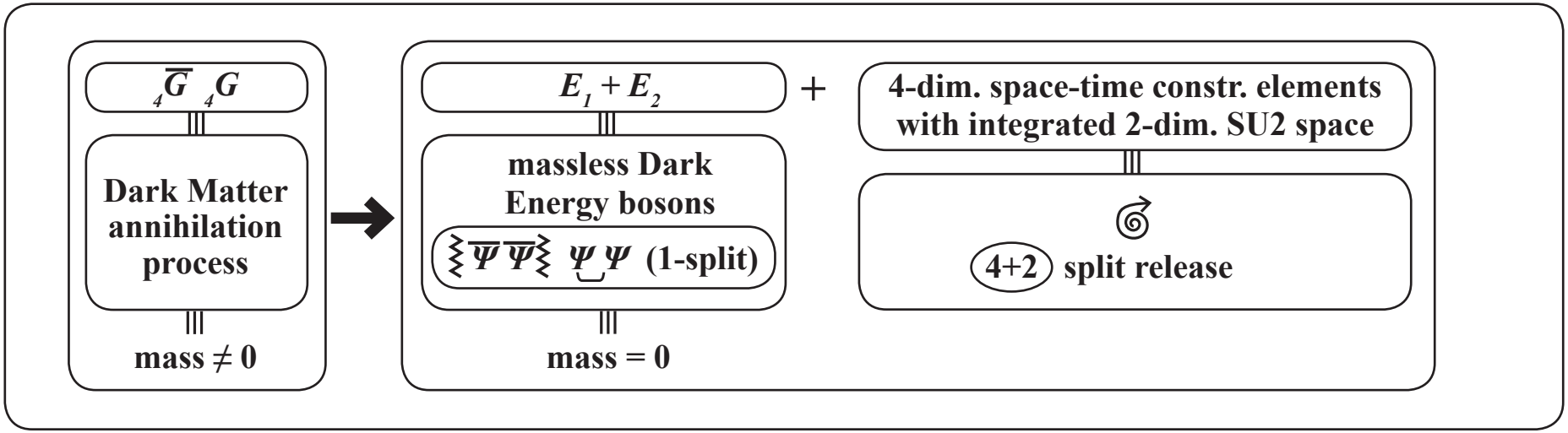
XII.32.



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. ; XII12. :

XII.33.



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.

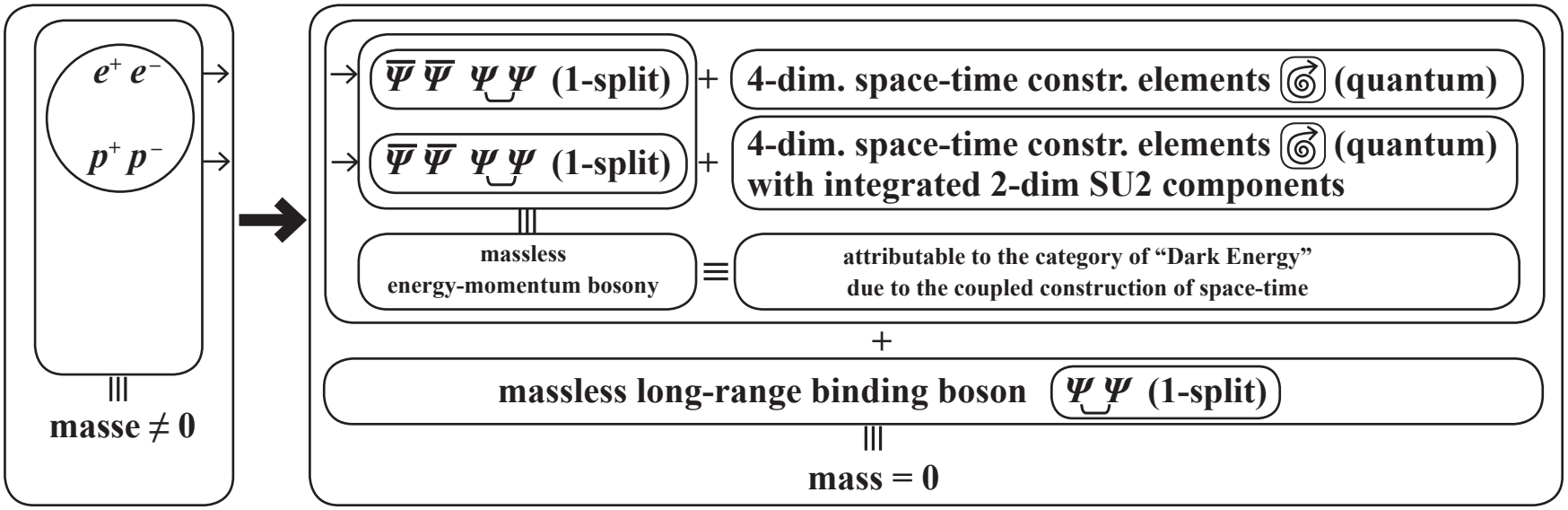
XII.34.

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% Normal Matter/Antimatter fraction) of the Universe, as follows:

XII.35.

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.36.

This leads to the annihilation of mass, which is compensated by the construction of the expanding 4-dimensional space-time elementary structure units (space-time-quantum) coupled to the long-range massless Dark Energy-boson $\overline{\Psi}\,\overline{\Psi}$ $\Psi\Psi$ (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, 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,

XII.40.

by 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 ,

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 (space-time-quantums)
i.e. with an
and integrated

- **"outer" 4-dimensional space-time structure(4-dimensional space-time-quantums)**
- **"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) ≡	$\Psi\Psi\overline{\Psi}$ $(\varepsilon_9, \varepsilon_8)$	≡ 2-split fermion
neutrino$_2$	(ν_2) ≡	$\overline{\Psi}\Psi\Psi$ $(\varepsilon_4, \varepsilon_5)$	≡ 2-split fermion
neutrino$_3$	(ν_3) ≡	$\Psi\overline{\Psi}\Psi$ (ε_1)	≡ 1-split fermion
anti-gravitational boson	$(\overline{G})$ ≡	$\Psi\Psi$ $\Psi\Psi$ $(\varepsilon_6, \varrho; \lambda, \varepsilon_2)$	≡ 4-split boson
repulsive-Boson	(R_0) ≡	$\overline{\Psi}$ $\overline{\Psi}$ (0)	≡ 0-split boson
gravitational boson	(G) ≡	$\{\overline{\Psi}\overline{\Psi}\}$ $\{\overline{\Psi}\overline{\Psi}\}$ $(\xi, \varepsilon_7, \varepsilon_3, \eta)$	≡ 4-split boson

Component ② ≡ 4.9 % ≡ Normal Matter/Antimatter

Component 2 ≡ 33,3 %		Inner-Structural Particle Composition	
proton (antiproton*)	$(p^+)(p^-)$ ≡	$\Psi\Psi\overline{\Psi}$ $(\varepsilon_9, \xi, \varrho, \varepsilon_8)$	≡ 4-split fermion
electron (positron*)	$(e^+)(e^-)$ ≡	$\overline{\Psi}\Psi\Psi$ $(\varepsilon_4, \eta, \varepsilon_5)$	≡ 3-split fermion
neutrino	(ν) ≡	$\Psi\overline{\Psi}\Psi$ (ε_1)	≡ 1-split fermion
strong force	(St) ≡	$\Psi\Psi$ (λ, ε_2)	≡ 2-split boson
energy-momentum	$(E-I)$ ≡	$\overline{\Psi}\Psi$ Ψ $\overline{\Psi}$ $(\varepsilon_6, \varepsilon_3)$	≡ 2-split boson
partial decomposition into	$(\gamma)(Z)$ ≡	$\overline{\Psi}\Psi$ Ψ $\overline{\Psi}$ $(\varepsilon_6, \varepsilon_3)$	
electromag. force	(γ) ≡	$\overline{\Psi}\Psi$ (0 Split)	≡ 0-split boson
weak force	(Z) ≡	Ψ $\overline{\Psi}$ $(\varepsilon_6, \varepsilon_3)$	≡ 2-split boson
gravitation	(G) ≡	$\{\overline{\Psi}\overline{\Psi}\}$ $\{\overline{\Psi}\overline{\Psi}\}$ (ε_7)	≡ 1-split boson
as well as the resulting annihilation end products $((e^+, e^-, p^+, p^-))$, see XI.29.			

XII.42.

Component ③ ≡ 68.3 % ≡ Dark Energy with the coupled construction of expanding 4-dimensional space-time (space-time-quantum)

- of which 28.5% ≡ energy-momentum bosons $\overline{\Psi}\,\overline{\Psi}\;\Psi\Psi$ (1-split) with the coupled construction of expanding 4-dimensional space-time (space-time-quantum), created from the annihilation of a 28.5% fraction of Normal Matter/Antimatter (see XII.17.)

- of which 39.8 % ≡ energy-momentum bosons $\{\overline{\Psi}\,\overline{\Psi}\}\;\Psi\Psi$ (1-split) with the coupled construction of expanding 4-dimensional space-time (space-time-quantum), 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 10 cm 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 ($e^+ e^-$, $p^+ p^-$) $\overrightarrow{\text{into}}$

  structured energy ($\overline{\Psi}\,\overline{\Psi}\;\Psi\Psi$ (1-split)) + construction of expanding space-time

  - Later, the more complex annihilation processes of Dark Matter began, namely the transformation processes:

  structured mass (${}_4G\;\;{}_4\overline{G}$) $\overrightarrow{\text{into}}$

  structured Dark Energy ($\{\overline{\Psi}\,\overline{\Psi}\}\;\Psi\Psi$ (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.