Prologue

Numerous questions around the origin of the Laws of Physics remain unanswered. Following an extended process of "trial and error", the author has succeeded in situating this lack of understanding in a particular historical evolution of the theories of Physics. More precisely, as a result of Minkowski's choice, an unintentional straight-jacket emerged, resulting in Einstein's insights remaining limited to the understanding of the behavior of Matter. Yet fathoming the essence of Matter remained concealed.

Embarking on a different route than the one chosen by Minkowski, enables us to make a fundamental qualitative distinction between space and time. Non-abstraction of these dimensions brings two types of precursors into view. On the one hand there are the mathematical imaginary precursors or predimensions, which have a course, on the other hand there are the mathematical real dimensions without a course. Combinations of these predimensions constitute Core-dimensions that are part of a pre-Cosmic state represented by "-1". The predimensions emerge from the pre-Cosmic state through a multiplicative decomposition of "-1", rather than through an additive division of "0" (vacuum-fluctuation). The predimensions with a course comprise one course of time and five courses of space. These predimensions drive the forces and produce energy. The predimensions without a course constitute an absolute spacetime.

The Model develops this basic principle and does not encounter a curved spacetime; as a result it turns out that gravity is not a Field. Thus the Model suggests that gravitons do not exist. The courses in Matter display affinity with absolute spacetime. This affinity materializes as mass and as charge with certain courses. The Model also puts forward that the Higgs boson, as currently advocated by Physics, doesn't exist. The boson found in CERN is part of Dark Matter.

The Model shows that this approach enables the unveiling of the structure of all kinds of Matter. The selective coupling of several predimensions allows for a description of the various particles of the Standard Model as well as for an explanation of their interrelationships. Current Physics are perfected by the Model, relying on less specialized theories.

Introduction

This work provides an insight into the physical reality behind the origin of dimensions. A step-by-step research of this development enables us to elaborate on a comprehensive phenomenology of Matter. This provides an ever-increasing ability to explain the systematics proposed in this Model. Abandoning the Field approach, a hierarchical structure of Matter appears. This clarifies that higher energy particles can produce lower energy particles, but equally reveals which particles can degenerate into much heavier variants. A deeper insight is also gained in as yet unexplained phenomena. For example hidden anti-Matter is discovered and the image of the Big Bang has been revised.

1) The presented Model provides a systematic understanding of the physical phenomena that lead to the behavior of Matter. This permits the verification/distinction of/between physical reality and human artefacts that result from a non-optimal/inadequate point of view/perspective[1].

[1] For example the epicycloids that were "required" for the description of the motion of planet/stars in the sky, from a geometric perspective.

2) The presented basic instruments also allow for conjecture on as yet undiscovered characteristics of Matter.
3) The adjustment/development of adequate mathematics [2] to arrive at accurate calculations presents a big challenge.
4) This approach demands more study and further development to reach a deeper insight in the nature of Matter and ultimately, the structure of the Universe.

A non-exhaustive overview of a number of phenomena as clarified by the Model:

- The necessity of the law of conservation of energy;
- The reversibility of the arrow of time;
- The reason why there is quantification;
- The origin of the constants c and h;
- The true meaning of the uncertainty principles;
- The reason why superposition does not exist;
- The essential nature of ordinary photons;
- The surprising influenceability of the charge of a particle;
- The congruently existence of electro-photons and magneto-photons;
- The provenance for the negative binding energy in atoms;
- An explanation of the wave and particle behavior of matter;
- An explanation of the spin phenomenon;
- The true mechanism behind Pauli's principle;
- The true nature and the lair of antimatter;
- The existence of 4 kinds of neutrinos and their characteristics, the oscillation of 3 of them and the existence of one virtual neutrino;
- The synthesis of nucleons and the formation of muons and tauons;
- The understanding of quarks, their charge, their colors and their generations;
- The realization and explanation of the fact that 99% of the mass of nucleons is missing;
- An explanation for the existence of Strong nuclear force and the function of gluons;
- An explanation for the existence of Weak nuclear force and the function of intermediary vector bosons;
- The non-existence of axions, gravitons, Higgs-bosons;
- The nature of Radiant Matter, inertia and gravitation;
- The nature of Dark Matter, GRB's;
- The nature of Dark Energy, Quasars;
- An alternative explanation for Cosmic abundance;
- A solution for the Horizon problem;
- The existence of Cosmobolism and an adjustment of the Big Bang;
- The existence of vast empty space of 1 billion light years diameter;
- The first steps to a deterministic quantum physics aided by electromagnetic photons;

[2] Like Minkowski, Riemann, Schrödinger, Dirac.

- The properties of SIMULTANEITY and NON-LOCALITY and their importance for coherence;
- Why interaction constants exist and the role of SIMULTANEITY;
- …

Chapter 1. A Model of Origin founded on Core-dimensions
(A chapter that reveals the origin and the nature[3] of energy and forces.)

In the area of the Universe known to us rules an inviolable 'Law of the Conservation of Energy'. This means that every form of Matter remains in the same moment, in what we call Now. One can think of several causes for such a strict Law of Nature. One of them is absolute symmetry[4] of spacetime used in current Physics. Another possibility is that every form of Matter is being pulled by one and the same course of time. This can only happen when that course of time is **an internal actor** of each type of Matter.

For the time being the essence of the course of time is mathematically inconceivable. This gave Minkowski the freedom to make the whole dimensional foundation of spacetime 'real'.[5] His choice necessitates a plus sign for every spatial coordinate[6] and a minus sign for the variable of time. Minkowski-Space[7] is characterized by the expression $s^2 = x^2 + y^2 + z^2 - c^2t^2$ where x, y, and z are spatial variables and t the time variable. As such the **'imaginary'**[8] nature of the dimension of time is moved to the abstract sphere of the coordinates. This tolerates calculations in which space and time appear in mixed form. As a result a fundamental restriction also occurs; the underlying **nature** of the dimension of time gets lost. This shuts us off the source for the full picture.

When we want to study the nature of the course of time, we need to reconsider Minkowski's choice. This equals to embarking on a search for the origin of the dimension of time or, in other words, for its tangible predecessor: its **predimension.** The predimension of the course of time as a result is 'imaginary'. The plus sign in Minkowski's equation shows us that the spatial predimensions are 'real'. As opposed to the 'imaginary' predimension, the 'real' predimensions can take on the role of an **external actor.**

Because predimensions are one-fold precursors they only can be rectilinear.

From the following properties, we can observe that the study of the Laws of Physics is fundamental to understanding the predimensions:
* space permits free reversal because the 'real' predimensions involved in its construction are reversible and have no-course,
* in the course of time reversal is not possible; its 'imaginary' predimension is irreversible and has a course.

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[3] The nature of a physical phenomenon is the source of its complete picture; considered analytically we can only describe that phenomenon by its individual properties and as a result we don't maintain all of its essential properties or its essence.

[4] Noether observed this in 1918. She proceeded to lay the foundation for the use of symmetries during her exploration of the Laws of Physics.

[5] We use the 'single' quotation marks ' ' to indicate that we are dealing with a term of mathematical significance.

[6] A coordinate is a number that indicates the section of a dimension that is taken into account.

[7] In 1908 Hermann Minkowski realized that the special theory of relativity, as constructed by Albert Einstein in 1905, is best formulated in a non-Euclidic space. In Physics, this Minkowski-space, or Minkowski spacetime, is the mathematical base in which the three ordinary spatial dimensions are combined with a single dimension of time in a four-dimensional surface. It represents a spacetime in which space and time can't be distinguished; they are situated in a mix of 4-dimensional spacetime.

[8] An imaginary number is derived from the definition $i = \sqrt{-1}$. Multiplied by itself an imaginary number results in a negative number: $i \times i = -1$..

Conclusion: linear 'real' predimensions precede spatial dimensions. They are reversible and as a result have **no course**. An imaginary predimension precedes the dimension of time that is irreversible and as a result **has a course**.

To form a usable picture of this reality we will need to call upon our imagination and to some extent, remove ourselves from analytical arguments. In the mathematical mix of 'imaginary' and 'real' components a mathematical field emerges that renders certain orderings impossible[9]. However, such orderings are possible in the coupling of two 'real' components.
To form a operable picture the assumption can then be made that this is the result of the loss of tangible data by the 'imaginary' component. These **data** can also be called **information.** To avoid several analytical discussions, this assumption is converted into the following Axiom.

Axiom
An 'imaginary' predimension **loses data** or has a tendency to do so (whatever these data may be).
A 'real' predimension has a tendency to **retain data.**

Such a loss of data in 'imaginary' predimensions prevents a 'point' from returning to an earlier position, which results in a **course.** This causes the irreversibility of a course. The opposite occurs on a 'real' predimension. 'Points' on a 'real' predimension tend to store data. If the tendency to lose data signifies "obtaining a course", then the tendency to store data signifies "keeping its position"; this represents a kind of **memory.** It enables us to put forward that 'real' and 'imaginary' predimensions are **counterparts.** This implies that for every 'real' predimension an 'imaginary' predimension exists and vice versa.

When the 'imaginary' predimension of the course of time is an internal actor of Matter, this will equally be the case for the spatial 'imaginary' predimensions. It seems logical to put forward that the 'real' predimensions then are external to Matter. 'Points' on an 'imaginary' predimension show an irreversible progression, they are pulled forward in their dimension: they show a course. The above demonstrates that beside the course of time spatial predimensions with a course exist; we call them the **courses of space**[10].

Having a course equates to having **potency.** Only one course appears to have an observable effect i.e. time. The courses of space do not appear to influence it, they don't remove Matter from Now. Their potency appears to have another effect. This leads us to a first assumption that looks as follows:

Assumption 1
All courses are internal actors of Matter: the courses form it, cause its energy and drive its **forces.**
The predimensions without a course constitute an external actor of Matter; together they are **absolute spacetime**.

Storing data as well as losing data do not go together. The predimension's tendency to lose data will be maximal when its direction in relation to its 'real' complement is perpendicular. For the same reason this perpendicular direction differs to that of the other 'real' predimensions. Each source of data is limited. This means that a course can't be sustained. The course of time however does not experience weakening. The loss of data appears to be compensated. This is only feasible because of the existence

[9] In the field of complex numbers a relation of order for the calculation + and * is missing.
[10] This is a new concept. Such a course implies that the point of action is irresistibly pulled in a specific direction. More on this subject later in this Chapter.

of a course in the opposite sense. As a result we observe that every 'imaginary' predimension has an **opposite.** As a result, three types of pre dimensions exist: 'real', 'imaginary' and its 'imaginary opposite'. Hence a second assumption as stated below.

Assumption 2
The three types of predimensions were united in a so-called **Core-dimension** in a **pre-Cosmic state.** Several Core-dimensions existed.

The courses don't develop as long as a Core-dimension is not **uncorded**. Because there was no course of time, the initial pre-Cosmic state was a-causal. Due to the lack of development of the courses, the trinity of a Core-dimension has **maximal POTENCY**. Terms in small capital letters indicate that we are dealing with POTENCY of a pre-Cosmic nature. Hence the thesis below.

Thesis
All Core-dimensions together formed an **utmost POTENCY** from which the Universe developed.

To support this Thesis and both Assumptions we state the following **remarkable findings** that were derived by some from the Standard Model and the relativistic equations:
* George Sparling[11] arrives at the expression[12] $s^2 = x^2 + y^2 + z^2 - t^2 - u^2 - v^2$, in which u and v are new variables of time that point at the existence of additional time-like dimensions.
* Itzhak Bars[13] detects the existence of a second time-like dimension alongside a fourth spatial dimension.
* Sean M. Carroll and Jennifer Chan [14] introduce, for reasons of symmetry, the necessity for the existence of a reversed arrow of time.

Sparling demonstrates the existence of at least three courses that accompany the three 'real' predimensions. Our argument and symmetry entail that the three courses also have opposites. The Model takes Itzhak Bars who demonstrates that there is a fourth spatial dimension, into account.

This implies that the initial pre-Cosmic state contained six Core-dimensions.
This means that this Model is based on 6 'real' and on 12 'imaginary' rectilinear predimensions. The latter are the courses and their respective counterparts.

The following two chapters are fairly abstract and can only be understood by re-reading them regularly and not looking at them analytically initially.

[11] Sparling, George A. J. "Germ of a synthesis: space-time is spinorial, extra dimensions are time-like." *Proc. R. Soc. A.* doi:10.1098/rspa.2007.1839.
[12] Mathematician suggests extra dimensions are time-like: http://www.physorg.com/news96027669.html
[13] Itzhak Bars, Research Interests: http://physics1.usc.edu/~bars/research.html#2T

[14] "Spontaneous Inflation and the Origin of the Arrow of Time." Sean M. Carroll and Jennifer Chan

Chapter 2 - *Uncording* Core-dimensions and developing Core-spaces
(A chapter, which puts forward a customizable mathematical approach to understand the physical nature of predimensions and allowing us to develop a Model.)

An ◙-operator is introduced. This operator is used to represent the 'joined up activity' of 'real' and/or 'imaginary' predimensions. In an equation, the ◙-operator acts as a multiplication. Reversed, the ◙-operator behaves as a division. This division is represented by the customary / symbol. Equations based on the ◙-operator are canonical[15]. The equality is represented by the symbol ≡.
Predimensions are represented by a small bold letter, the accompanying apostrophe indicates that the dimension in question in 'imaginary'. If **g** represents a 'real' predimension, the 'imaginary' opposite complements will be +**g**' and -**g**'.
The **Core-dimensions** composed of predimensions are represented by a bold capital letter. Core-dimensions are given a subscript p when they still belong to the pre-Cosmic state. A random pre-Cosmic Core-dimension $\mathbf{G}_p$ has the following expression $\mathbf{G}_p \equiv [\mathbf{g} \text{ ◙ } (+\mathbf{g}' \text{◙ } -\mathbf{g}')] = [\mathbf{g} \text{ ◙ } -\mathbf{g}'^2]$. The square in this expression implies that the courses are not yet uncorded.
Square brackets [ ] indicate the presence of POTENCY in a predimensional equation. This happens when Core-dimensions are not uncorded or when they are simultaneously active in the Universe. In such a case we use the index U.

Two opposite courses develop through the uncording of a Core-dimension. When the courses 'operate simultaneously' with their 'real' complement, we use the term **affinity**. This affinity is described by adding **g** to the root of $-\mathbf{g}'^2$ resulting in the expression: $+\mathbf{G}_{U(niverse)} \equiv (\mathbf{g} \text{ ◙ } +i\mathbf{g}')$. Its opposite then results in: $-\mathbf{G}_U \equiv (\mathbf{g} \text{ ◙ } -i\mathbf{g}')$. Recombining the opposites results in the dual Core-dimension $\pm\mathbf{G}_U \equiv [\mathbf{g} \text{ ◙ } \mathbf{g}'^2]$. Please note the square brackets [ ] used because of the presence of POTENCY. Reconstitution of $\pm\mathbf{G}_U$ and the original Core-dimension $\mathbf{G}_p$ result in a different inner symbol. The opposite activity of the courses in the Universe appears to hold an **inner opposition.** This means that $\mathbf{G}_p$ can't be reassembled after uncording. In $+\mathbf{G}_U$ or $-\mathbf{G}_U$ the multiplication by 'i' transforms the 'imaginary' course into something 'real'. Therefore the 'imaginary' factor 'i' has a constraining action, i.e. the restraining of the course relevant to its real complement. This is only possible when affinity exists for this complement. Subsequently this is called the **constraining factor** 'i'.

As put forward in Chapter 1, the pre-Cosmic state is acausal because the course of time is not uncorded. This state therefore has no origin. Because of the lack of a developing course, a state of absolute **SIMULTANEITY** reigned in pre-Cosmic state. This is a state of POTENCY and because the courses are constrained this state is therefore 'real'.
Violating[16] SIMULTANEITY has caused the development of a first pair of courses, namely the **courses of time** +**t**' and –**t**'. The first uncorded Core-dimension $\mathbf{T}_p$, resulted in the predimensions that are represented by **t** and ±**t**'. The Core-dimensions that subsequently uncorded no longer were able to produce pure time. According to the order of uncording they will increasingly gain space-like properties. More on this can be found in Chapter 7.
From now on we represent these Core-dimensions by $\mathbf{S}_p$, **S** being **X**, **Y**, … with **r** being **x**, **y**,…. These Core-dimensions also contain the **courses of space** ±**s**'. Prior to the uncording of the secondary Core-dimensions, the pre-Cosmic state did not have spatial development and was therefore **NON-LOCAL**.

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[15] An equation is called canonical when the appropriate positive constants still need to be attributed to achieve homogeneity on either side of the '≡' -symbol. Expressions or units (m, s, J, …) of measurement needing to be "metrically" accurate can affect the ease with which they can be described. We use a canonical equation because allowing for some reserve is justified when attributing a metric to the notion of 'course'.
[16] An anti-causal input that has damaged the integrity or plenitude of SIMULTANEITY.

The Pre-Cosmic state and the Universe show a remarkable resemblance. Due to the SIMULTANEITY that reigned in the pre-Cosmic state and because of the non-locality observed in quantum physics[17], each of the two entities can be considered **one whole**. Because they contain POTENCY they can be represented by [**1**]. Here 1 is written in bold because it contains all the predimensions.

Our Thesis discussed the existence of an extreme POTENCY. To be extreme such a POTENCY requires that the observed expansion of the Universe did originally not exist. Suppose that d is the diameter of space in both entities, i.e. pre-Cosmic d = d_P and in the Universe d = d_U. Diameter d_p originally being zero evolves into d_U which becomes infinite. The above-mentioned internal opposition turns the pre-Cosmic state and the Universe into opposite entities of f $[\mathbf{1}]_p$ = [-**1**] en $[\mathbf{1}]_U$ = [**1**]. When [-**1**] transformed into [**1**] this resulted into a transformation of d_P into $1/d_p = d_U$. The full representation of the transformation then becomes $-1/d_p = d_U$. This **inversion** occurs when the characteristics of the pre-Cosmic state transfer to the Universe and vice versa. Without indexes the equation becomes: –1/d = d. When d = x then -1/x = x and $-1 = x^2$. This means that x = ± i. It also means that -1 becomes twice 'i' and also that the pre-Cosmic state dissolves into to constituent parts with an 'imaginary' nature. The predimensional uncording of [-**1**] is represented by the expression $[\text{-}\mathbf{1}]_{pdim}$. The ◙-operator indicates whether dissolved predimensions belong together or have been combined.

$[\text{-}\mathbf{1}]_{pdim}$ =
t' (= first conceivable nature of an 'imaginary' predimension, the 'imaginary' time)
◙ **s**' (= second conceivable nature of an 'imaginary' predimension, the 'imaginary' space)
In summary: $[\mathbf{-1}]_{pdim}$ = [**t**' ◙ **s**'].

This way the **course of time t'** and **course of space s**' where created. Because of property –1/i = i the imaginary dimensions in equations are treated in the same way[18]. De division [-1/**t**'] then equals the opposite or [-1/**t**'] ≡ [**t**'].
We observe only one dimension of time whereas numerous spatial dimensions are observed. We therefore assume that more than one course of space exist and **s**' has the capability to **'fold out'.** This distinction points to a difference in the nature of such courses.

The constituents that came into being have a tendency to retransform into POTENCY. However $\pm\mathbf{S}_U$ can't return to $\mathbf{S}_p$ because of the inner opposition. Therefore the 'real' and 'imaginary' components of $\pm\mathbf{T}_U$ and $\pm\mathbf{S}_U$ **rearrange**. Minkowski couples time and space by adopting the coordinates' metric. Such a coupling, at predimension-level, is also found in the Model, in the first rearrangement of $\pm\mathbf{T}_U$ and $\pm\mathbf{S}_U$. In the rearrangement, the 'imaginary' predimension of time is coupled to the 'real' predimensions of space. Conversely the other rearrangement contains 'real' time coupled to the 'imaginary' predimensions of space. These rearrangements are therefore the two **Core-**spaces ($\mathbf{SR_1}$ en $\mathbf{SR_2}$). The expression $[\mathbf{-1}]_{pot}$ indicates the uncording of pre-Cosmic POTENCY:

[17] This was observed in experiments of quantum entanglement.
[18] Note that - in this context - the use of the mathematical concept of 'imaginary' numbers is explicitly restricted to predimensions with a modulus (magnitude) that is always 1 (compare to the 'direction vector'). This should not be confused with calculations in a metric that uses coordinates for each of the dimensions.

$[\mathbf{-1}]_{pot}$ generates:

CS_1 = (**t**′ coupled to the ‘real space’ **s**)
and
CS_2 = (**t** coupled to the ‘imaginary space **s’**)

Due to the presence of the course of time and the ‘real’ space, **CS_1** is a Core-space with **macroscopic** properties. On the other hand the predimensions of **CS_2** contain a qualitative extension of what has been known to date: a ‘real’ time and courses of space. These courses of space are the ‘imaginary’ predimensions that, according to Thesis 1 are concealed in Matter; **CS_2** thus being a Core-space with **microscopic** properties. Based on the Model’s Thesis 1, **elementary Matter** is formed through the combinations of ‘points’ from both Core-spaces. Furthermore we are already able to observe that **CS_1** is a Core-space that contains **Force**[19] as a result of the constraining factor of the course of time and **CS_2** a Core-space that contains **Timeless Energy**[20] as a result of a non-course of time and the courses of space. The Force of **CS_1** results in gravity and Timeless energy results in the other Forces[21].

The constraining factor of the course of time has the ability to **neutralize** the constraining factor of the courses of space (i x i = -1). This causes a chain reaction and the ‘immaterial’ POTENCY of the courses of space transforms into “material” energy. The ‘points’ of both Core-spaces are the Model’s **Core-points**[22].
In the course of time the speed of movement in its dimension is called **pace**. The **drive** is the real **“tendency to persist”**[23] or **strength** of a course. This tendency to persist can be stopped by the constraining factor ‘i’ emerged at the end of the second paragraph of this Chapter. Where symbol δ represents the drive, the uncording of $[\mathbf{-1}]_{pdim}$ is expressed as follows:

$$[\mathbf{-1}]_{pdim} = [\delta \times \mathbf{t}' \boxdot 1/\delta \times \mathbf{s}']$$

According to the ratios of Minkowski-space (x, y, z, ict), δ equals c: this represents a ‘drive-constant’[24] in the first instance. Thus 1/δ equals 1/c: the drive-constant of each course of space. As a result $[\delta \times \mathbf{t}' \boxdot 1/\delta \times \mathbf{s}'] = [c \times \mathbf{t}' \boxdot 1/c \times \mathbf{s}']$.

Taking the constraining factor ‘i’ and constant c that accompany the course into account, the Core-dimension **CS_1** is represented by the predimension expression (**s**, ic**t**′) in which **s** represents a random ‘real’ spatial predimension. The latter determines the metric correlation between the courses and the ‘real’ spatial pre-dimensions. The expressions of the Minkowski-space and those of **CS_1** differ fundamentally. The expression of **CS_1** contains the ‘imaginary’ nature of the course of time. This is in

[19] When dividing Energy by distance (the ‘real’ component in this Core-space) we obtain the metric of Force.
[20] When multiplying Energy by time (the ‘real’ component in this Core-space) we obtain the metric of the Planck constant, which in fact represents an energy that is not bound by time.
[21] The fact that POTENCY is divided in this way across two Core-spaces is the intrinsic reason why Einstein wasn’t able to apply his field approximation of gravitation to electromagnetism. A Unified Field Theory is therefore not conceivable according to the concept of this Model.
[22] The mathematical properties of the Core-points are derived in Chapter 3.
[23] Applied to mechanical clocks, pace can be compared with the cadence determined by the position of the weight on the pendulum. The fact that the clock continues to work is because of the state of ‘unrest’ that is caused by the weights.
[24] Equally in the equation $E = mc^2$ is c a constant that intrinsically doesn’t represent speed.

contrast to the expression of Minkowski-space in which the 'imaginary' nature of time has wrongly been shifted to the coordinates[25].
The Model makes use of **T** ≡ (**t** ◙ i**t**′) and ±**S** ≡ [**s** ◙ ±i**s**′]. Note that the opposite of the course of time is not included in the expression **T**, hence the missing square brackets. What happens to the opposite of the course of time will be discussed in Chapter 7. Also note the full triplet of predimensions in ±**S**: a real spatial dimension combined with two opposite courses of space, hence the use of square brackets.

When Core-dimensions ±**X**, ±**Y** and ±**Z** are uncorded, their courses of space ±**x**′, ±**y**′, ±**z**′ form Core-space $\mathbf{CS}_2$. During the formation of $\mathbf{CS}_2$ the courses of space have claimed the following factors: the constraining factor 'i', the constant 1/c and the 'real' time **t** that was contained in **T**. Hence the expression for $\mathbf{CS}_2$: (i**s**′/c, **t**) containing the courses of space **s**′ = ±**x**′, ±**y**′, ±**z**′. Note that 1/c is related to each course of space in the expression $\mathbf{CS}_2$ and other predimensional operations that are yet to be calculated. The presence of 1/c in every course of space is the constraining effect of the "**predimensional metric**" in $\mathbf{CS}_2$. In summary, the following applies: [c x **t**′ ◙ 1/c x **s**′] = (c x **t**′) ◙ (1/c x **s**′) = (c**t**′) ◙ (**s**′/c) for every **s**′.

According to Thesis 1, the Model's 'real' predimensions **s** and **t** create an absolute spacetime that precedes the formation of Matter. This absolute spacetime[26] **cannot be directly observed**. In contrast, the 'imaginary' predimensions or courses are present in the formed Matter. They have some affinity with the absolute spacetime. The Model investigates what properties this affinity provides to Matter.

The courses end up in Matter, the 'real' predimensions remain outside of Matter. When this is allowed by **the predimensional structure** of the Core-points, an affinity of some courses with absolute spacetime exists. This affinity follows the predimensional metric of the formed Core-spaces. Affinity slows down the loss of data in the courses. In spatial predimensions affinity brings about **the formation** of **rest mass.** In time this brings about energy without rest mass and because we are dealing with time, this affinity provides Matter with a memory. As a result it transpires that courses drive both energy and the forces of Matter. The Core-dimension **E**, treated in more detail in Chapter 7, which uncorded after **T**, correspondingly causes the **origin of charges**.

Expanding on the Model's Assumption 1: an affinity between the courses and external absolute spacetime causes the emergence of **rest mass** and **charge**.

Assumption 1 (completed)
All courses are internal actors of Matter: courses form Matter, kindle its **Energy** and drive its **Forces**. Predimensions without course constitute an external actor of Matter; together they are **absolute spacetime.**
An affinity of the courses and the external absolute spacetime cause **rest mass** and **charge.**

As a result an external energy field does not exist, nor a Higgs field. This Model emphatically denies the existence of Higgs Bosons.

[25] When squared, the 'imaginary' nature disappears. This enabled an elementary description of gravity. Its simplicity blinded Einstein; it led him to ignore the fundamental importance of the 'imaginary' nature of the course of time.

[26] Héctor Múnera's calculations of the Michelson and Morley experiment demonstrated the existence of "absolute space" (https://www.academia.edu/37244389/Absolute_velocity_of_earth_from_our_positive_Michelson-Morley_experiment). The calculation of the correlation of Matter to absolute spacetime is treated in Chapter 8 of this text.

H.3. Recombinations of Core-points to create Matter.

(A chapter in which we recognize Matter as energetic and size-less points)

The structure/contents of this chapter contains theoretical as well as empirical constituents. In the treatment of the different particles, the reasons for this approach will only gradually become clearer. At the onset they appear to be a ploy, but a preceding difficult to grasp hidden logic, will become apparent. Only a detailed knowledge of the Model can lead to a full understanding of this methodology.

Elementary Matter consists of energy that is present in Now. This implies that the recombinations of Core-dimensions are subject to the following **conditions**:

1. Remain in Now: the involvement of the course of time is required.
2. Energy in Now stems from the uncorded POTENCY: the involvement of at least one course of space is required.

Only in a **recombination** of a Core-point of $\mathbf{CS}_1$ with a Core-point of $\mathbf{CS}_2$ can both conditions be satisfied; therefore the recombination of **t**'◙ **s**' is ever-present. Yet other recombinations exist that rely on an influence of affinity:

- that of time, 'real' combined with 'imaginary', **t** ◙ i**t**'. Recombinations that can be represented by $\mathbf{T}_{\mathbf{aff(inity)}}$.
- that of space, 'real' recombined with 'imaginary' (**s** ◙ i**s**'). Spatial recombinations that can be represented by $\mathbf{S}_{\mathbf{aff}}$.

$\mathbf{T}_{\mathbf{aff}}$ and $\mathbf{S}_{\mathbf{aff}}$ can only remain in Now when associated with a recombination of **t**' and **s**': (**t**' ◙ **s**'). As well as complying with the two above-mentioned conditions, i.e. having a course and showing affinity with time[27], the two Core-points that are able to recombine have to display a mutual relationship at the level of **predimensional composition**.

Recombinations that have one course of space are **recombinations of first order**. Those with two courses of space are **second order recombinations** and so on. Showing a mutual relationship indicates that the Core-points involved in **higher order recombinations** are more complex.

The most basic Core-Point $\mathbf{CS}_1$ thus has a course, shows affinity with time because it is the course of time and contains the real predimension **e** of the yet to be introduced Core-dimension **E,** as an expansion of the Model. Thus this simplest of the Core-points demonstrates the necessary metric similarity with the simplest Core-point of $\mathbf{CS}_2$ yet to be discussed.,

The simplest Core-point of $\mathbf{CS}_1$ has composition: (**e**, i**c**t'). Hence, this Core-point of $\mathbf{CS}_1$ shows affinity with the 'real' spatial predimension **e.**

A Core-point can only have one course; it moves, as it were, in a unique direction. A Core-point can show affinity with more than one 'real' spatial predimension. So a Core-point of $\mathbf{CS}_1$ contains the course of time combined with an affinity with possibly several 'real' spatial predimensions. All orders of recombination only have one $\mathbf{CS}_1$-Core-point; after all we can only observe one course of time.

[27] Being related to time means showing an affinity with 'real' time and/or containing the course of time.

Given the existence of several courses of space, the story is quite different for the **CS**$_2$-Core-points. The most basic Core-point of **CS**$_2$ is (i**x**'/c, **t**) as it has one course of space and also shows affinity with 'real' time. To arrive at a recombination of a higher order, the number of **CS**$_2$-Core-points equal to the number of courses of space are involved in the recombination. One Core-point is not able to move in two directions, as a Core-point is pulled through a course of space in one distinct direction.

To recombine with several **CS**$_2$-Core-points a **CS**$_1$-Core-point has to display predimensional similarities. It requires an adjusted predimensional composition by showing affinity with 'real' spatial predimensions. A **CS**$_1$-Core-point of orders of higher recombination will be more complex than that of a first order recombination. We will see later on that all **CS**$_1$ Core-points show affinity with the 'real' spatial predimension **e** resulting in an **asymmetry**[28] of the **CS**$_1$ Core-point and the **CS**$_2$ Core-points. This asymmetry is continued in higher order recombinations.

Because Core-points that stem from **CS**$_1$ always contain the course of time, it represents the most important course. As explained, the course of time is the basis for the Law of conservation of Energy. The 3-dimensional space we observe, hints at the existence of three 'real' spatial predimensions. These are represented by **x**, **y**, and **z**. As discussed, their appearance goes together with the emergence of three corresponding courses of space and their opposites. They are represented by ±**x**', ±**y**' and ±**z**'. All originate from three spatial Core-dimensions **X**, **Y** and **Z**.

Expanded the Model, in line with Sparling's insights, contains two time-like[29] spatial Core-dimensions **D** and **E** in addition to the Core-dimension **T** of pure time. We will discuss that the courses of Core-dimension **D** are involved in the formation of Dark Matter and that courses of Core-dimension **E** are responsible for driving Electromagnetism. As will be revealed in the step-by-step formation of Matter, **E** is closer to pure time **T** than the more spatial **D**.
The complete predimensional representation of **CS**$_1$ becomes: (**x**, **y**, **z**, **d**, **e**, ic**t**'). The complete predimensional representation of **CS**$_2$ becomes: (±i**x**'/c, ±i**y**'/c, ±i**z**'/c, ±i**d**'/c, ±i**e**'/c, **t**).

As the second order recombination has two courses of space by definition, it requires two **CS**$_2$-Core-points. In this recombination a **CS**$_1$-Core-point (**x**, **e**, ic**t**') requires that **x** can equate **y**, **z** or **d**. The third order requires an **CS**$_1$-Corepoint (**x**, **y**, **e**, ic**t**') in which **x** or **y** can be the same or also **z** or **d**.

The extended version of our thesis becomes:

Thesis (extended)
All Core-dimensions combined form an **utmost POTENCY** from which the Universe originated.
As a result of the uncording of the pre-Cosmic POTENCY, Core-spaces **CS**$_1$ and **CS**$_2$ emerged.
Matter is formed of recombinations of the size-less Core-points of the two Core-spaces
CS$_1$ = (**r**, ic**t**') and **CS**$_2$ = (i**r**'/c, **t**) where **r** = **x**, **y**, **z**, **d** and at least **e** and **r' = x**', **y**', **z**', **d**' or **e**'.

[28] This asymmetry is related to the not completely identical nature of the predimensions in question.
[29] We put forward that the spatial Core-dimensions **D** and **E** are time-like, because they escape direct spatial observation. They also escape observation of time because they can't influence pure time because of their time-like nature.

During recombination a return to the pre-Cosmic state takes place. Recombinations remain in Now. As mentioned in Chapter 2, an **inversion** occurs when properties of the pre-Cosmic state transfer to the Universe and vice versa. Thus an inversion is applied to every recombination's expression "Rec". This provides the **energy amount of a recombination** E_R = 1/Rec. POTENCY is turned into an energy that is always positive.

Chapter 4 - First order recombinations

(A chapter in which we discover the reason for the existence of quantification and of the uncertainty relations; discover wave- and particle behavior of light; get a first indication of the mechanism for the formation of mass; find out something about the nature of anti-Matter[30] and eventually realize what spin really is.)

A first order recombination is expressed as follows: $Rec_1 \equiv \{(\mathbf{e}, ic\mathbf{t}') \boxdot (i\mathbf{x}'/c, \mathbf{t})\}$. According to the above-mentioned rules, its energy is: $E_{R1} = 1/Rec_1 \equiv \mathbf{e} \boxdot \mathbf{t} \,/\, \{(ic\mathbf{t}') \boxdot (i\mathbf{x}'/c)\}$. If, for the sake of simplicity, we don't consider the presence of **e** then $E_{R1} \equiv (-1/\mathbf{x}') \boxdot (\mathbf{t}/\mathbf{t}')$.
The expression obtained above can be calculated in two ways[31].
The **first calculation** sees the introduction of the physical size of affinity and the course of time. This happens using two substitutions in the expression $(\mathbf{t}/\mathbf{t}')$ that is converted into $\#_t/t'$.

- The affinity of **t**' with predimensions **t** is expressed in an amount of data that are lost to a lesser degree. The larger the affinity, the larger the amount of data. Their amount is expressed using an integer that is symbolized by $\#_t$.
- Factor **t**' represents the predimensional course of time. The factor's size is time as understood from our observation. This size $|\mathbf{t}'|$ is expressed[32] as t', representing measured time.

We obtain $E_{R1} = (-1/\mathbf{x}').(\#_t/t')$. Factor $\#_t/t'$ is a number divided by time. This factor resembles the expression for **the frequency v** of a photon. Because factor $\#_t/t'$ is a purely numerical entity, the energy is contained in the other factor $(-1/\mathbf{x}')$. If this recombination represents a photon, then $E_{R1} = E = h.v$ and $(-1/\mathbf{x}') \equiv h$, the Planck constant[33]. The reversed form $(-1/\mathbf{x}')$ is represented by $\mathbf{x}'$. We are no longer dealing with energy after this inversion[34] but with another aspect of the course of space: $|\mathbf{x}'|$ is the speed of this type of course. When this is the speed of the studied photon, we assume for the time being that $|\mathbf{x}'| = c$, is a very large constant. Hence the size of $(-1/\mathbf{x}')$ is very small and $h \equiv (-1/\mathbf{x}')$ a minimal energetic constant[35]. This means that $(-1/\mathbf{x}')$ represents a very small packet of energy that is not yet connected to the course of time: a **quantum.**
Rearranging the expression of the energy of this recombination results in: $E_{R1} = \#_t \,.\, (h/t')$. Factor h/t' demonstrates that such a quantum is coupled to the course of time; this makes its energy observable in Now. When $\#_t = 1$, we are dealing with the smallest amount of observable energy. E_{R1} then is

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[30] Counterpart of Matter. When it is combined with Matter both are converted into radiation (annihilation). Feynman explains the existence of anti-Matter by reversing the arrow of time.
[31] A number of properties such as affinity, active, passive, simultaneity and SIMULTANEITY that are addressed during these calculations will be treated in more detail in Chapter 9.
[32] We use t' instead of t because of the conceivable confusion with the 'real' predimension **t**.
[33] This constant is expressed in Joule x time, which can be interpreted as Timeless energy, a characteristic of $\mathbf{CS}_2$.
[34] In a single reversal the expression is no longer energy, but another property. In a double reversal it remains energy. We will require the latter in the second calculation.
[35] As $\mathbf{x}'$ belongs to $\mathbf{CS}_2$, it is understandable that $\mathbf{CS}_2$ is a Core-space with microscopic properties. This also illustrates that $\mathbf{x}'$ is contained in Matter.

minimal: $E_{min} = h/t'$. Every form of energy that we measure is equal to, or bigger than E_{min}. The smallest difference in energy (ΔE) measured within the smallest difference of time (Δt') introduced to the expression of E_{min}, then results in $\Delta E \geq h/\Delta t'$. This can be converted into $\Delta E.\Delta t' \geq h$. It is the first **uncertainty relation**[36]. Course of time t' originates from $\mathbf{CS_1}$, energy E originates from $\mathbf{CS_2}$. This means that the properties of both the Core-dimensions are present in Matter. When we then embark on our search for the smallest differences in these properties we hit a boundary. This boundary indicates that we can't simultaneously measure the properties' details of both Core-dimensions. Thus we have discovered the origin and the fundamental significance of the uncertainty relations.

The presence of the frequency in expression $E_{R1} = h.(\#_t/t') = h.\nu$ clarifies that in this first calculation we are dealing with a photon that behaves as **a wave.** Factor $\#_t$ indicates the number of packages of the photon's energy. Because of the memory of **t** the data $\#_t$ are situated in that predimension. As we are dealing with a predimension and not a Core-dimension, the reversibility is in fact "simultaneity" without POTENCY. As a result we call this simultaneity **passive**[37] and it is only connected to the Past and Now. The photon that behaves as a wave will be able to interact with the equivalent[38] information of other photons that were previously situated in this environment[39]. This allows interference of individual photons that are discharged separately in time. That signifies as much as: **superposition does not exist.**

Superposition is an interpretation of phenomena that emerge because the memory of real time is not known. When one studies the experiments related to superposition with the notion of the existence of real time, then one arrives at the conclusion that one isn't dealing with superposition but with the reaction to information from preceding photons. As a matter of fact, all these experiments are performed in the sequences of equivalent photons.

The information $\#_t$ for the 'real' predimension **t** remains present in a specific environment as long as it is not pushed aside by other information $\#_t$. As a result a photon will be sensitive to information originating from **preceding photons** and so to speak, will detect them. How long the information $\#_t$ is carried in a specific environment by the 'real' predimension **t**, can be experimentally verified. At the same time one can check which factors erase this information. Wave-interaction can occur in equivalent photons,=; because of $\#_t = \#_t$ no exchange of $\#_t$ is possible. The photon's energy is not threatened. The result is that with $\#_t \neq \#_t$, no wave-interaction between the photons can take place. When the amount of energy-determining data $\#_t$ of a photon is likely to be affected, then the total of $\#_t$ is automatically taken to safety. We will see further on that for this reason the photon will display particle characteristics. We already observed that the photons' energy is expressed as follows: $E_{R1} = (-1/\mathbf{x}').(\#_t/t')$. In this expression $(-1/\mathbf{x}') = h$ and is a quantum. The amount $\#_t$ then is the number of quanta. Even if these quanta are spread spatially because of wave-behavior, they form an unbreakable

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[36] The second is the one of impulse and place.

[37] This simultaneity is deliberately written in small letters, because it doesn't have the same load as the SIMULTANEITY that results from the formation of POTENCY.

[38] The information carried by a photon is **equal** to that of other photons when their $\#_t$ are equal $\#_t = \#_t$. The information is **similar** when the data $\#_t$ of the present photons is not equal, $\#_t \neq \#_t$.

[39] An experiment by Leonard Mandel in 1991. Prior to an interference experiment he put up several track detectors. One expects that interference does not occur during an interference experiment when the track detectors are activated. But it transpired that even when the track-detectors were not activated, no interference occurred. It is our view that the earlier tests left remnants on the 'real' predimension **t.**

whole were they to experience deterioration. This whole, expressed as (-1/**x**′).$\#_t$, represents timeless energy that is linked to the course of time. This energy is of a non-local[40] character (here too its reach can be verified experimentally). When track-detectors are set, they will localize the wave's parts and the photon will automatically behave as a single particle, as can be seen below.

In **the second calculation** we are being led by the effect of the recombination of the predimensions of time. The expression E_{R1} is then rearranged as follows: $E_{R1} \equiv \mathbf{t} \,/\, \{(ic\mathbf{t}') \boxdot (i\mathbf{x}'/c)\} \equiv \mathbf{t} \,/\, (i\mathbf{t}' \boxdot i\mathbf{x}')$. As mentioned this expression will continue to represent energy in a double reversal. The two reversals that occur are that of (i**x**′) and that of (i**t**′) that then appear in the numerator. The expression then becomes: $E_{R1} \equiv \{(\mathbf{t} \boxdot i\mathbf{t}') \boxdot (i\mathbf{x}')\} \equiv \mathbf{T}_{\mathbf{aff}} \boxdot (i\mathbf{x}')$. In Chapter 7, a **scenario of descent** is proposed. It demonstrates the presence of a **limited course -t**′ in the recombination. The resulting factor $\mathbf{T}_{aff}$ therefore represents a limited reconstruction of the Core-dimension $\mathbf{T} = \mathbf{T}_E$ with index E, because it also represents an amount of energy. $\mathbf{T}_E$ then represents the so-called **active**[41] SIMULTANEITY that contains the data $\#_t$. These data are then are no longer available for interaction with other photons. In this second calculation, we are dealing with a photon that behaves like a **particle.** When a photon ends up in a situation with a presence of unequal[42] data, it takes its own data into safety by behaving as a particle. This protection of its energetic integrity is **a necessity because of the Law of conservation of Energy.**

Both Core-spaces are connected in a photon by $\mathbf{T}_E \equiv (\mathbf{t} \boxdot i\mathbf{t}')$, the factor that determines its energy. This means that observations related to Core-space $\mathbf{CS}_1$-behaviour (particle) such as **determination of position**[43] will annihilate the $\mathbf{CS}_2$-behaviour (wave) of the photon. Thus the feasibility of determination of position appears to be **crucial** for the transition of **the wave-** to **particle-behavior**.

The photon has no useful affinity with a 'real' spatial predimension; no recombination with the only present course of space **x**′ occurs. As a result there is no affinity with the above-mentioned absolute spacetime. The photon experiences this as if there were no resistance. This confirms the completed Thesis 1 i.e. **no rest mass** is formed. In factor (i**x**′) we encounter the restraining factor 'i' combined with course of space **x**′. In Chapter 2 we observed that in these conditions the restraining factor can't stop the course of space. The particle will, as a result, move at the speed c. Yet the presence of the restraining factor 'i' in factor (i**x**′) is important for another element of the photon's behavior. The restraining factor as it happens plays a role when the photon encounters a recombination of a higher order. It can then bind to the recombination when affinity with the 'real' complement of the course **x**′ of the photon exists.

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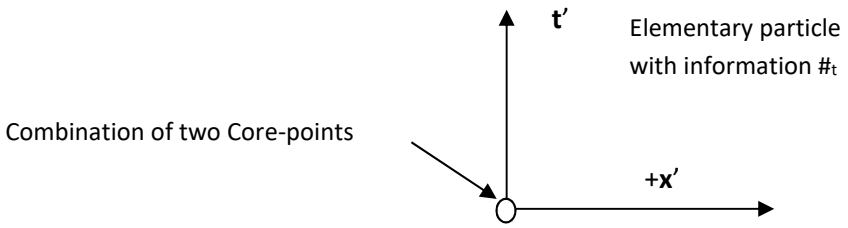
[40] This non-locality is written in small letters on purpose because it isn't exactly the same property as NON-LOCALITY resulting from the formation of POTENCY.

[41] Active, because of the presence of a limited piece –**t**′ there is POTENCY, see also the end of this chapter and Chapter 7.

[42] Unequal in fact is alike and signifies that the $\#_t$ of the other participating particles is not the same.

[43] This will prove to be important in the discussion of the refraction and reflection of Light in Chapter 6.

In a graphical representation of the predimensions of this particle (**configuration**) we make the assumption that **x**' and **t**' are perpendicular. The courses start from two different Core-points: **t**' pulls at the Core-point of $\mathbf{CS}_1$ and **x**' pulls at the Core-point of $\mathbf{CS}_2$. As a result, the particle follows the course of time as well as the course of space. Because the particle has no connection with absolute spacetime it will adopt the speed c of the course of space.



Following the course of time signifies that the particles remains in Now. This confirms our starting point in which we put forward that this is necessary for the Law of conservation of Energy[44]. This law of conservation is linked to the continuity of time because, according to this Model, every form of Matter contains the course of time. This means that **antimatter** too obeys this rule. This is antithetical to its current concept in which time has to be reversed[45]. The Model does provide a rather unexpected solution. The course of time and the courses of space are related to such a degree that a reversal of the course of space provides a suitable explanation. In the above configuration we are dealing with +**x**', where -**x**' is also plausible. Because the sense of a course of space is of no importance for this particle, the photon is **its own anti-particle**: whether it is +**x**' or -**x**' that drives the photon, it doesn't affect the behavior of the independent photon. This dual configuration explains what we call **spin**, **spin-up** and **spin-down**. When photons fly in the same direction, one can't distinguish whether they are driven by +**x**' or -**x**'. This has allowed us to discover the origin of anti-Matter and spin.

We can **summarize** the properties of this recombined form of Matter as follows:

- It complies with the energy formula E = h.v and as a result behaves as a wave.
- When its amount of energy threatens to be affected by observation, this form of Matter will automatically start behaving as a particle. In this recombination no Core-point can be found that displays affinity with a 'real' spatial predimension. As a result no recombination with a course of space occurs. The particle is free of every resistance with respect to absolute spacetime and has **no rest mass.**
- Some recombinations have a strict correlation to the direction of their course of space. This is the case when the course of space is ±**x**', ±**y**', or ±**z**'. As mentioned, these courses are related to the spatial dimensions observed. As a result the direction of this recombinations is steadfast.

[44] We have seen that the conservation of data $\#_t$ is a second condition.

[45] Feynman, CPT-invariance see also Chapter 6.

Other recombinations can enjoy **full directional freedom.** This is the case when we are dealing with a course of space that differs from ±**x**', ±**y**', or ±**z**'. As mentioned, such courses are not related to the spatial dimensions we observe.

- A particle can be its own anti-particle without needing to reverse time.
- The dual configuration explains the phenomenon **spin**.

Chapter 6 will study the properties of the origin of photons more in detail.

H.5. The Standard Model and some salient facts

Before studying the higher-order recombinations, a quick overview of some findings of the Standard Model.
A particle's mass[46] is expressed through its energy of eV (electron volt). Nucleons, neutrons and protons, each are made of three quarks. A neutron has no charge and has a mass of 939,57 MeV, a proton has a +1 charge and a mass of 938,27 MeV. Ordinary quarks come in "flavors": **Up** (**u**) and **Down** (**d**). Every flavor can have three so-called colors: blue, red and green. The quarks are presumed to be connected to each other by a force called **Strong Interaction**. This is the strongest force known to man and it only exists between quarks in the nucleus of an atom. Whereas photons are the carriers of electromagnetic force, gluons (**g**) are the carriers of this force. Gluons can alter the color of quarks. This happens in a very fast sequence e.g. during a chain reaction in which the quark's changes:
$u_{g(reen)} + g_{antigreen,red}$ $(=g_{ag,r}) \rightarrow u_{r(ed)}$.

Each quark "flavor" has two heavier equivalents, called "generations":

- **Up** constitutes the first generation, **Charm** the second and **Top** the third.
- **Down** constitutes the first generation, **Strange** the second and **Bottom** the third.

These form the six "flavors" of quarks.
Up and its equivalents have a charge of +⅔, **down** and its equivalents have a charge of -⅓. A **neutron** exists of one **up** and two **down** quarks resulting in a charge of +⅔ - ⅓ - ⅓ = 0 and expressed as n^0. A **proton** exists of two **up** and one **down** resulting in a charge of +⅔ +⅔ - ⅓ = +1 expressed as p^+. The three quarks that form a nucleon must be of a different color. A neutron looks as follows, using a random color choice: $u_b d_r d_g$.
An **Electron** too has a number of generations. A **Muon** being its second generation whereas a **Tau** being its third. Neutrinos are related to electrons. As a result the second generation of an **electron neutrino** ν_ε is the **muon neutrino** ν_μ and the third the **tau neutrino** ν_τ.

Particles:

QUARKS: Have never been observed in isolation. Spin = ½		
"flavor" UP: u_b, u_r and u_g Electric charge: + ⅔ Mass: 2 MeV	"flavor" CHARM: c_b, c_r and c_g Electric charge: + ⅔ Mass: 1,25 GeV	"flavor" TOP: t_b, t_r and t_g Electric charge: + ⅔ Mass: 171 GeV
"flavor" DOWN: d_b, d_r and d_g Electric charge: - ⅓ Mass: 5 MeV	"flavor" STRANGE: s_b, s_r and s_g Electric charge: - ⅓ Mass: 95 MeV	"flavor" BOTTOM: b_b, b_r and b_g Electric charge: - ⅓ Mass: 4,2 GeV

[46] Mass can be expressed in a quantity of energy because of $E = mc^2$. The basic unit is electron volt eV, prefix k is one thousand times the base unit, M is one million times, G is one billion times.

LEPTONS: don't experience Strong Interaction and can be observed in isolation. They have no "color". Each neutrino in fact is a mix of a number of kinds of neutrinos. They each have a mass of a single eV. Spin = ½.		
Electron-neutrino: ν_ε Electric charge: 0 Mass: < 2,2 eV	Muon-neutrino: ν_μ Electric charge: 0 Mass: < 170 keV	Tau-neutrino: ν_τ Electric charge: 0 Mass: < 15,5 MeV
Elektron: e^- Electric charge: -1 Mass: 0,511 MeV	Muon: μ^- Electric charge: -1 Mass: 106 MeV	Tau: τ^- Electric charge: -1 Mass: 1,78 GeV

BOSONS: At quantum level all forces are carried by a special group of particles with Spin=1			
Photons: γ Electric charge: 0 Mass: 0 Quanta of light carry electromagnetic interaction of light, electro-magnetic interaction (e-m) and have an impact on charged particles. They carry over an infinite distance.	Z-Boson: **Z** Electric charge: -1 Mass: 91 GeV Intermediate boson for weak interaction in which the identity of the interacting particle doesn't change. They carry 10^{-18} meter.	W^+ and W^- boson: **W** Electric charge: +1 or -1 Mass: 80,4 GeV Intermediate boson in interactions in which the particle's "flavor" and charge change. They carry over 10^{-18} meter.	Gluons: **g** Electric charge: 0 Mass: 0 There are 8 kinds. They carry strong interaction. They influence quarks and other gluons. They don't experience e-m or weak interaction.

Interactions:

Strong Interaction: acts on quarks and gluons. Binds them together into neutrons, protons and other particles. Protons and neutrons are kept together in the nucleus by this force.	**Electromagnetic Force**: acts on charged particles which doesn't change them. This force is responsible for the reciprocal repelling of particles with the same charge.
Weak Interaction: acts on quarks and leptons. Its best-known effect is the transformation of a down-quark into an up-quark whilst an electron and an anti-electron-neutrino are set free.	**Gravitation**: acts on all particles, including photons.

Nuclear physics discovered some peculiar things. A few examples below:

- A proton has a mass of 938,27 MeV, a neutron has a mass of 939,57 MeV. The combined mass of the quarks in a neutron only equates 12 MeV. This means that the quarks only have 1,3% of the of the nucleon's mass. The situation is even worse in a proton. Here the ratio is less than 1%. Physics states that the 99% of other energy originates from the **Strong Interaction** between the quarks.

- The transformation[47] of a **neutron** ($\mathbf{n^0}$) into a **proton** ($\mathbf{p^+}$) creates a very short-life particle: $\mathbf{W^-}$ (80,3 GeV). The $\mathbf{W^-}$ particle has a negative charge and is called **intermediate vector boson**. This transformation is represented as follows: $\mathbf{n^0 \rightarrow p^+ + W^-}$. A $\mathbf{W^-}$ boson transforms very fast into an **electron** $\mathbf{e^-}$ (0,511 MeV) and **anti-electron-neutrino**[48] $\overline{\nu}_\varepsilon$ (51 eV). A neutron becomes a proton when a down quark changes into an up quark. When, for instance, d_g changes into u_g the reaction will be written as follows: $\mathbf{n^0 \rightarrow p^+ + W^-}$ of $u_b d_r d_g \rightarrow u_b d_r u_g + \mathbf{e^-} + \overline{\nu}_\varepsilon$.
- A $\mathbf{W^-}$ is 85 times heavier than its originating particle and it is nearly 143,000 heavier than the particles into which it transforms. Physics can accept this violation of the Law of conservation[49] of Energy because of the Uncertainty principle. This relationship allows for an uncertainty around the particle's energy as long as its existence is sufficiently short. Another explanation is hard to come by as modern Physics doesn't have an answer to the question of what causes a particle to experience rest mass.
- The anti-electron-neutrino $\overline{\nu}_\varepsilon$ can manifest as an electron-neutrino ν_ε when it encounters a neutron to form a proton and an electron. This phenomenon of an anti-particle behaving like a normal particle is called **crossing**.

[47] This happens during the β decline in the so-called Weak interaction. Veltman "Facts and Mysteries in Elementary Particle Physics". p.267 and following pages.
[48] The line above a particle indicates that it is an anti-particle.
[49] M. Veltman "Facts and Mysteries in Elementary Particle Physics" p.250, p.268.

Chapter 6 - Second order recombinations

(Chapter in which we study electrons and unlock the secret of antimatter. We try to understand the mechanism of negative binding energy and Pauli's principle. In addition we discover how higher order particles can create lower order particles and understand why a second order particle, such as the neutrino almost behaves like a **first order particle**. A **deterministic quantum vision** starts to emerge.)

The Model's extended base from Chapter 3 allows for a large quantity of recombinations. Not all of them are of a physical significance. The following steps clarify why we will use real predimension **e** in the $\mathbf{CS}_1$-Core-point.

Using the previously explained calculation rules enables us to study 2nd order recombinations. By definition, these contain two courses of space and thus consist of three Core-points: one $\mathbf{CS}_1$-Core-point suited to this order, and two $\mathbf{CS}_2$-Core-points. Such a recombination is expressed as: $Rec_2 \equiv$ (**x**, **e**, ic**t**′) ◙ (±i**x**′/c, **t**) ◙ (±i**y**′/c, **t**) and in its energetic form becomes:
$E_{R2} \equiv 1/Rec_2 \equiv$ **x** ◙ **e** ◙ **t** / {(±i**x**′/c) ◙ (±i**y**′/c) ◙ (ic**t**′)}. Because only one predimension **t** exists, it only appears once in the numerator of E_{R2}.

The expression $E_{R2} \equiv$ **x** ◙ **e** ◙ **t** / {(±i**x**′/c) ◙ (±i**y**′/c) ◙ (ic**t**′)} ≡ **x** ◙ **e** ◙ **t** . c / {(±i**x**′ ◙ ±i**y**′) ◙ (i**t**′)} in which:
factor (±**x**′◙±**y**′) is replaced by ($\mathbf{s}_2$′) where the index 2 indicates a recombination of two courses of space and
factor **x** is replaced by $\mathbf{s}_1$, index 1 because of affinity of a spatial predimension.
This results in the expression $E_{R2} \equiv$ (**e** ◙ **t** / **t**′) ◙ ($\mathbf{s}_1$ / ±**s**′).c

When in the Core-point $\mathbf{CS_1}$ affinity is present for the 'real' predimension **x** and the Core-point $\mathbf{CS_2}$ contains a course of space **x**′, a recombination resulting in $\mathbf{X}_{aff}$ = **x** ◙ i**x**′ is feasible. Through the formation of such a recombination, one of the two courses of space is constrained and therefore neutralized. This is the reason why the second course of space keeps its freedom. This **liberated course of space** is a **singular predimensional remainder** of the two courses of space contained in factor (-1/$\mathbf{s}_2$′). This singular nature makes it possible for factor (-1/$\mathbf{s}_2$′) to be equated to (-1/**x**′) of the photon, and there we found that (-1/**x**′) ≡ h. Adopting this equality, we can turn E_{R2} into $E_{R2} \equiv$ ($\mathbf{s}_1$ ◙ **e** ◙ **t**.c)/(i$\mathbf{s}_2$′◙**t**′) ≡ $\mathbf{s}_1$ ◙ **e** ◙ **t**.i ◙ (h/**t**′).c
Factor $\mathbf{s}_1$ is replaced by s_1, **e** has no energetic role to play in terms of affinity and can be replaced by 1, **t** because of its amount of data by $\#_t$, as in the first order recombination, **t**′ because of its size by t′ and $\#_t/t' = v$, resulting in: $E_{R2} = \#_t.r_1.i.(h/t').c = r_1 . i.(h . \#_t/t').c$.
Resulting in the expression for E_{R2} : $E_{R2} = r_1.i.(h.v).c$.
This is the **energy formula** for second order recombinations[50].

In the already discussed 2nd order recombination $\mathbf{X}_{aff}$ can also be $\mathbf{Y}_{aff}$ or $\mathbf{Z}_{aff}$. This factor ensures that the energy of the recombination displays affinity with the **pure spatial** predimensions **x**, **y** and **z** of absolute spacetime. Such an affinity with a pure spatial predimension does not exist in the photon; the

[50] This expression is generalized in Chapter 8 for all orders of recombination. This generalization will play an important role when we discuss "normal" photons at the end of this chapter.

photon as it were, is spatially always on the run. In Chapter 8 we will reveal to what degree such an affinity with pure spatial predimensions results in the formation of **rest mass**.

In the discussed 2nd order recombination factor ($\mathbf{s}_2'$) ≡ h represents liberated course of space. This liberated course of space is responsible for the particle's pull. When this liberated course is predimension -**e**', it recombines with **e** into $\mathbf{E}_{aff}$ = **e** ◙ i**e**' and then the course of space -**e**' is not entirely liberated. As **E** is not related to the three pure spatial dimensions, $\mathbf{E}_{aff}$ doesn't form a rest mass and -**e**' enjoys a **full directional freedom**. As was the case for Core-dimension **T,** we will demonstrate in the scenario of descent in Chapter 7 that also for Core-dimension **E** a limited amount of +**e**' remains present. This way the factor $\mathbf{E}_{aff}$ represents a limited reconstruction of Core-dimension **E** = $\mathbf{E}_E$ with index E because, just as was the case in rest mass, it represents an amount of energy[51]. This energy $\mathbf{E}_E$ is not bound to a place, but enjoys an identical mechanism of origin to that of rest mass. $\mathbf{E}_E$ represents here so-called **active**[52] NON-LOCALITY. The energy $\mathbf{E}_E$ will then represent the **charge** of the formed particle. Therefore **having a rest mass and carrying charge are irrevocably connected** in 2nd order recombinations.

A 'real' spatial predimension can recombine with its corresponding course of space in two opposite directions. In this case the configuration contains $+\mathbf{X}_{aff}$ or $-\mathbf{X}_{aff}$ or the other two pure recombinations $\pm\mathbf{Y}_{aff}$ en $\pm\mathbf{Z}_{aff}$. Just like in the photon this variance in the configuration determines the particle's **spin**, either being a **spin up** or a **spin down**. Two particles with the same configuration and, as a result the same spin, can't occupy the same position[53] in space. This doesn't apply to particles with opposite spin; these can occupy the same position in space. This is basically stating the same as formulated in the **Pauli principle**[54]. Spin and its results provide us with the reason to assume that, in the already-mentioned specific predimensional mix, the formed second order recombinations are **electrons**. The links between the Core-points of an electron are then represented as follows: (**x**, **e**, ic**t**') ◙ (±i**x**'/c, **t**) ◙ (-i**e**'/c, **t**). The recombined $\pm\mathbf{X}_{aff}$ or $\pm\mathbf{Y}_{aff}$ or $\pm\mathbf{Z}_{aff}$ provide rest mass to this particle that contains NON-LOCALITY in its charge $\mathbf{E}_E$ whilst it can also contain SIMULTANEITY with the potential formation of $\mathbf{T}_E$. In this configuration we make use fat arrows to represent $\pm\mathbf{X}_{aff}$, $\mathbf{E}_E$ and $\mathbf{T}_E$:

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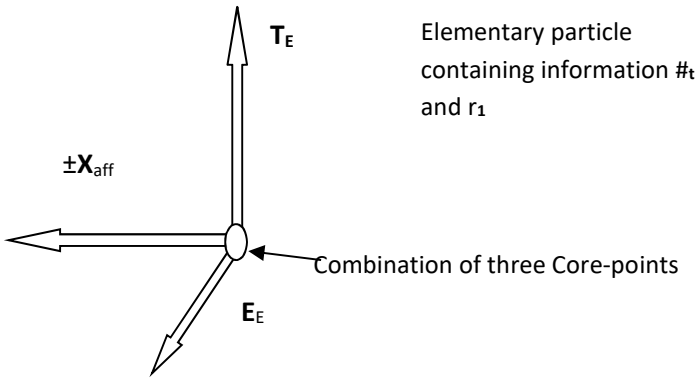
[51] Further on we will see that this recombination constitutes an electron and that $\mathbf{E}_E$ represents a charge. That the charge represents energy that is independent from rest mass can be verified by measuring the charge of an electron in a **hydrino**. Such a hydrino originates in the Catalyst Induced Transitions (CIHT) of Randell Mills. According to this Model, half of the energy gained in this experiment originates from the charge of the electron.

[52] Active because, as a result of the presence of a limited amount +**e**' there is POTENCY, also discussed in Chapter 7 and the Epilogue

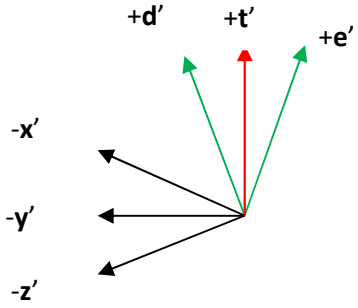
[53] A Core-point with a course of space has a unique position in the Core-dimension. A course of space that points in the opposite direction *can* start from the same position.

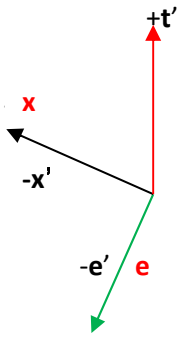
[54] Exclusion principle that claims that no spin ½ particles of the same propensity can be found in the same situation. Veltman p.51.



This configuration becomes simpler in its representation when 'real' spatial dimensions are mentioned separately. They are indicated by the red color next to the corresponding course of space. On the other hand there are 6 courses that are represented by arrows using the following **convention**: arrows for the pure courses of space **x**', **y**' and **z**' are represented by **black**, arrows of the other two non-pure *courses of space **d**' and **e**' by **green** and the arrow for the course of time **t**' in **red**.

The **convention** for each configuration:



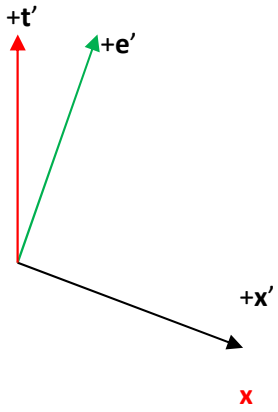


The electron is represented (e.g. with -**x**') in the configuration to the right. Here ±**x**' recombines with **x** (or ±**y**' with **y**, or ±**z**' with **z**). Affinity for a 'real' predimension in the Core-point of $\mathbf{CS_1}$ is represented by the letter **x**. The rest mass, formed as a result is required as otherwise this configuration would not represent an electron. Because affinity for real predimensions **e** and **t** is found in all recombinations, except in photons. They are not included to keep matters simple. This reveals that a configuration is a simplified representation of an energy formula.

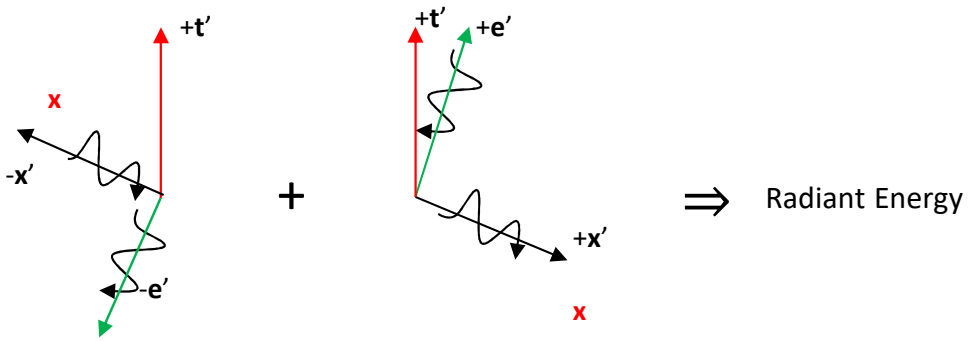
An approach, using such configurations is the most appropriate to gain insight in the Model. Such a configuration after all clarifies the structural construction of the presented Matter, allowing us to compare the consequences of the presence of this structure to current knowledge of Elementary Matter. This presents an optimal starting point for further interpretation and the development of energy formulae.

In Physics we are familiar with the so-called **CPT-invariance** (charge, parity, time). Because of this invariance matter and anti-matter are connected. Transposed into the Model this can be considered a **predimensional switch**: if we change the arrow representing charge –**e**' change into

+e' then, according to our current interpretation we have to change **+t'** in **–t'**. This is impossible in the Model which will change course of space **–x'** into **+x'**. Thereby the configuration is mirrored, which changes parity. In this way we obtain the configuration of a **positron**. This clarifies **why antimatter does not require an opposite arrow of time**.



It enables us to understand better what **annihilation**[55] really is. When an electron encounters a positron, opposite courses will neutralize each other. The resulting release of energy forms large quantities of photons.

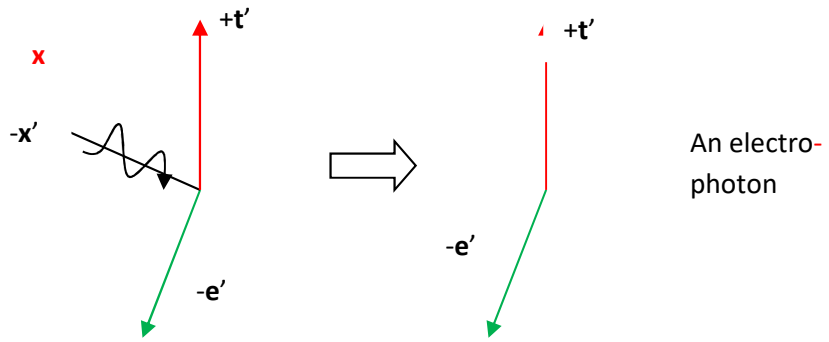


The configuration of an electron is more complex than that of the studied photons. Therefore it is logical to assume that the more complex electron generates the simpler photon. We will discover in Chapter 7 that, in general, higher order recombinations can generate the energy required to create lower order recombinations. During this creation the configuration of the higher order particle will be partially or fully transferred to the lower order particle. The comparison of the configuration of an electron to the one of a photon reveals how this is possible. During such a creation, for example, one of the courses in the configuration of the higher order particle can't be taken to that of the lower order particle. Part of the drive of the course that was transferred is then given in to create a photon. This represents a decrease in the above-mentioned "tendency to persist" for the course in question; its strength somewhat diminishes.

[55] This phenomenon occurs when matter and antimatter meet. They both convert into radiant energy.

The electron's configuration shows two courses that can be used to this end. This indicates that at least two types of photons exist. The **regular photons** known in electromagnetism will be encountered at the end of this chapter as a **third type of photons**. They derive their energy from the electrons' change of speed and can carry both courses in the configuration. We know from the above that **–e'** represents **the electrical properties; x'** will then need to take care of the manifestation of the **magnetic properties**.

A **first type of photon** emerges when **±x'** relinquishes part of its drive. This is represented in the configuration below by the wavy line. A copy of the remaining courses is made during the creation of the so-called **electro-photons:**



When these types of photons are created, the thrust of **±x'** will diminish in the electron. This will result in the decrease of $\pm \mathbf{X}_{aff}$ = (**x** ◙ ±i**x'**), which means that the rest mass of the generating electron diminishes. Such a phenomenon occurs during the formation of an atom and is known as **negative binding energy**: when one ads the mass of a proton m_p to the mass of an electron m_e, the resulting sum is larger than that of the formed hydrogen atom m_H or $m_p + m_e > m_H$. The electron involved in the formation of an atom will generate a first type of photons as represented in the above configuration on the right[56].

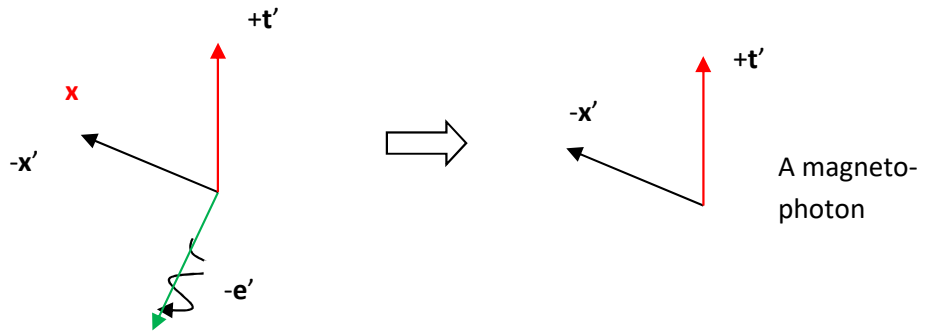
What are the electro-photons' properties?

1) This photon is pulled by **-e'**. The course is not a pure course of space and it experiences, as already observed, a **full directional freedom**. This allows for the photon to have a curved orbit.
2) There is no appropriate 'real' predimension to form one of the possible $\mathbf{S}_{aff}$, thus no rest mass is formed. As a result of the irrevocable link between rest mass and charge, the course **-e'** is not **active as a charge.**
3) Several of these photons can be simultaneously produced during atom formation; in this case the negative binding energy is equal to their combined energy.

A **second type photon** emerges when **–e'** relinquishes part of its drive. This second type of photons takes part of the thrust of **–e'** along, which results in the **decrease in** the electron's **charge**[57]. This is represented in the configuration below by the wavy line.

[56] The electric field around an atom caused by these photons, has no magnetic component, which means that this photon can't propagate as light and remaining "invisible" as a result.

[57] Refer also to the above remark of the Catalyst Induced Hydrino Transition (CIHT) on an energy that is independent of rest mass, being stored in a charge.



Because the resulting photon is pulled by ±**x**' (or ±**y**' or ±**z**') its path has a **well-defined spatial direction**. Because the configuration of such photons then does not contain –**e**' and as a result shows no electronic properties, this type of photon is a **magneto-photon.** The energy of the resulting photon originates in the decrease of energy of the electron's charge: we suspect that in this case this energy can only be a source for a single magneto-photon. The charge decrease causes for the electron to search for a new electric equilibrium within the atom of which it is a constituent[58].

Neutrinos

The Model's comprehensive ability results from the fact that a **neutrino's** configuration can be examined. A neutrino has an opposite lepton-number of an electron, which corresponds in the Model to declaring that it is also a 2nd order recombination.

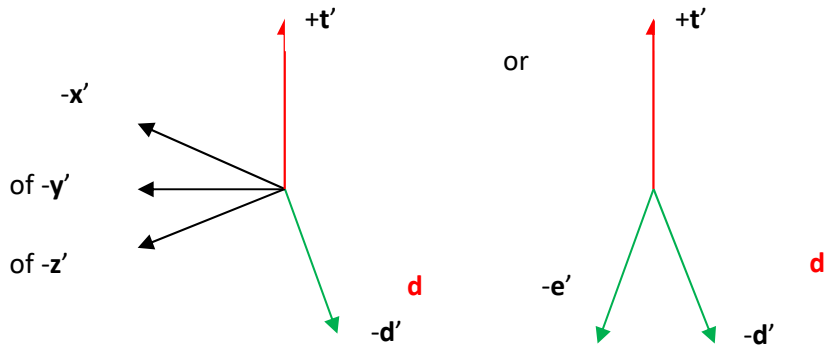
The properties of a neutrino, which will be explained further on are:

1. Absence of charge,
2. having a very small rest mass,
3. being hard to observe,
4. having a speed nearing the speed of light,
5. being its own antiparticle,
6. being left-handed,
7. showing oscillation between their three manifestations (a kind of transformation).

The existence of a fourth neutrino is still up for discussion. It appears to be a neutral neutrino because it doesn't take part in the oscillation. We will discuss how this can be understood from the configurations that are determined by the Model.

When discussing the intermediary vector boson in Chapter 7, it will become clear why we replace, in this configuration, the predimension -**e**' of the electron by -**d**' to arrive at the neutrino. This replacement results in this particle having **no charge** (1). Because this is a second order particle, we assume that -**d**' recombines with **d** to form -$\mathbf{D_E}$. As already mentioned, **d** is not related to the three pure spatial predimensions. As a result, **the rest mass of this particle can't be directly observed** (2). The presence of the alien to our space, -$\mathbf{D_E}$ will result in this particle **hardly interacting** (3) with Radiant Matter (photons-electrons-nucleons). As can be observed in the configuration below, there are four possibilities for a liberated course of space: -**x**', -**y**' or -**z**' and also –**e**'. So a fourth, **virtual neutrino** remains plausible. See also in Chapter 7 as to why the presence of a minus-sign is required.

[58] Again connected to the Catalyst Induced Hydrino Transition (CIHT). NON-LOCALITY of $\mathbf{E_E}$ produces and equal reduction of charge in the proton. Its energy is released in the form of kinetic energy. This is the cause of observed plasma.



In **each of the four cases** the particle experiences a pull because of the free course of space. Because $-D_E = (d \circledcirc -id')$ as a rest mass is not detectible, the configuration resembles that of a photon. Due to its non-detectible rest mass this particle can reach **the speed** (4) of the course of space, i.e. c. This is, due to the lack of detectible rest mass, a 2nd order recombination that behaves as a 1st order recombination. Because of the similarity to the photon's configuration, the essence of -**x**', -**y**' of -**z**' won't determine spin. As a result, a particle can be **its own anti-particle** (5). This phenomenon is called **crossing**. Being left-handed goes together with the combination of –**x**', -**y**' or –**z**' with –**d**' (6). Because of the presence of -**d**', the configuration can be rotated when influenced by external factors[59] that affect the orientation of -**d**'. This implies that the courses sensitive to direction, i.e. -**x**', -**y**' or -**z**' **convert into** each other. These conversions signify that the three configurations are able to convert into each other; they oscillate (7).

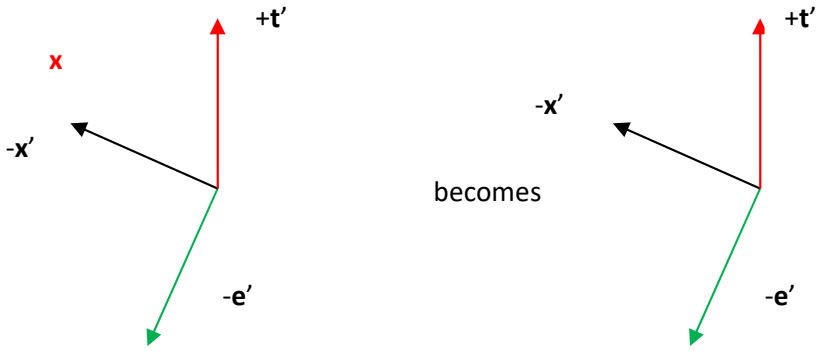
The **difference in strength** of -**x**', -**y**' and -**z**' is noticeable. After all an Electron-neutrino has an energy of maximum 2,2 eV, a Muon-neutrino 170 keV and a Tau-neutrino of 15,5 MeV. We wil return to this at the end of the next chapter, in which we will discuss three generations of the additional leptons[60].
In the fourth virtual neutrino –**e**' has no spatial orientation and as a result doesn't participate in the oscillation-process. This fourth neutrino has no charge as rest mass of Radiant Matter is lacking. Therefore the pull of –**e**' is transformed into speed.

Regular photons

The formula of energy $E_{R2} = r_1 . i.(h . \#_t/t').c$ of a 2nd order recombination is generalized in Chapter 8. Parameters such as the mass of the electron m_e, relative motion v_R of a recombination that accordingly represents a particle, and its entire impulse p_t are introduced as follows:
$E_{R2} = r_1 . i^1(h.v) . c^1 = m_{e0}.v_R{}^1.c = p_t . c$. The order of the particles' behavior is generally equal to the order of the corresponding recombination. The generalization enables us to discover that **the energy** of particles that behave as a 2nd order, is completely **sensitive-to-speed**[61]. We must be dealing with electrons, gluons or 3rd order particles (quarks) that behave as 2nd order.
The direct correlation of speed with energy of the particles that behave as 2nd order, causes for their changes of speed to be always accompanied by the **emission** or **absorption** of 1st order particles. In normal circumstances neither quarks nor gluons are capable of significant independent changes in

[59] For example the presence of other Dark Matter.
[60] The electron, the Muon and the Tau.
[61] In contradiction to the relativistic increase in mass that only occurs at speeds nearing the speed of of light.

speed. Electrons on the other hand, are. When as a result of a change of speed a 1st order particle is created, it will be a copy of the 2n[d] order particle which lacks affinity with the pure spatial part of absolute spacetime. As a result no rest mass is formed and, just like in the neutrino, we are dealing with a behavior of 1[st] order. This signifies that a third type of photons emerges that in configuration, are a mix of the electro-photons and the magneto-photons already described: we call them **electro-magnetic photons** or regular photons. The formula of energy of this photon is expanded from $E_{R1} = (-1/\mathbf{x}').(\#_t/t')$ to $E_{R1} = (-1/\mathbf{x}').(1/\mathbf{e}').(\#_t/t')$. The amount of energy of this photon is determined by the amount of information $\#_t$ which under vacuum is equally divided between the two courses of space.



The creation of regular photons doesn't produce a difference in charge, but only a difference in speed of the electron concerned. We already observed that all changes in speed of electrons are accompanied by emission or absorption of photons. An acceleration or deceleration of electrons can result in both phenomena, dependent on the direction of –**e**' and **x**' (or **y**' or **z**').
The courses of space are a constituent of Core-space $\mathbf{CS}_2$ and the course of time is a constituent of $\mathbf{CS}_1$. The latter Core-space has a metric that is close to the known space-time, allowing us to perform calculations in it. This is different for Core-space $\mathbf{CS}_2$. The above also signifies that we need to return to a mechanistic notion of the atom[62], admittedly in a spacetime that is completed by the properties of Core-space $\mathbf{CS}_2$. This means that we don't have a full mathematical foundation for this phase of the Model's development. It is therefore more appropriate to continue working with configurations and arrows. This allows us to verify intelligibly what happens to a photon under certain circumstances.
A photon can behave as a particle or a wave. After the two elaborations in Chapter 4, we observed that this distinction is applicable when a determination of position is conceivable. This is the case in **refraction**[63]. There the determination of position is feasible between the starting point (source) and the point of arrival (detector). This causes a fundamental distinction with **reflection**[64] where such an event doesn't occur.

Refraction

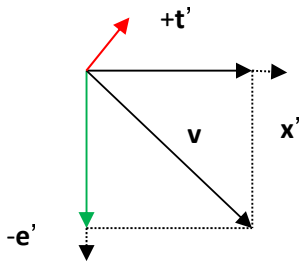
[62] As opposed to the probability principles of quantum physics.

[63] Bending of light or refraction is the manifestation when rays of light change direction when moving from one medium (transparent matter) into another.

[64] Reflection of light.

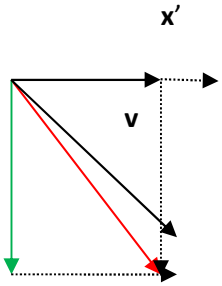
When refraction occurs, the photon will invade the medium in a defined place and will end up behaving as a particle. In this case the arrows in the configuration determine the non-metric phenomenology i.e. the **CS**$_2$-behaviour.

The arrow **v** is the result of the activity of two courses of space **x**' (of **y**' of **z**') and –**e**'.
They are orthogonal and, because of the presence of the equally orthogonal +**t**', are forced to remain in their respective determined plane[65].
Arrow **v** indicates what happens to **x**' influenced by –**e**'.
The size and direction of **v** will experience its influence.



When a regular photon moves into one medium (with a certain atomic structure) and transfers to another medium (with a different atomic structure), two events can occur: -**e**' becomes, influenced by the other atomic structure, larger or smaller. The amount of the photon's energy, as observed in expression $E_{R1} = (-1/\mathbf{x}').(1/\mathbf{e}').(\#_t/t')$, is determined by the amount of information $\#_t$, that it in a vacuum is distributed equally over the two courses of space, as already put forward. When |-**e**'| = |**x**'| the size of the projection of **v** onto **x**', $|\mathbf{v}|_{x'}$ = c, the speed of light c. In the above configuration we can observe that the projection onto **x**' is incomplete, thus we can assume that the speed of pure course of space **x**' is larger than c and maximum $\sqrt{2}$ = 1,4142 times larger. Please note: the representation in the Core-dimension **CS**$_2$ relates to the strength of the drive, the speed is a property of spacetime as known to us (and this is not entirely the same as Core-space **CS**$_1$). When |-**e**'| alters, two situations occur:

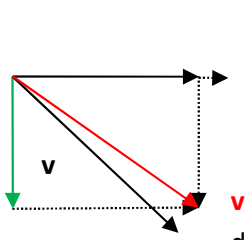
|-**e**'| becomes larger



v changes direction

or

|-**e**'| becomes



v changes direction

[65] We will discover in Chapter 8 that **t**' can deviate from its course, dependent on the amount of energy. This results in relativistic corrections.

There is either an influence for |-**e**′| to become larger (more $\#_t$ on –**e**′ and less on **x**′) or an influence for |-**e**′| to become smaller (less $\#_t$ on –**e**′ and more on **x**′).
Under normal circumstances the photon when it comes into contact with the other medium, comes into contact with another charge than the one of its originating medium; resulting in |-**e**′| becoming larger. This is the **first case** (graph on the left) in which we are dealing with a **positive refraction.** When –**e**′ increases, **x**′ has a weaker drive, resulting in decreasing |**v**|. The speed of the photon is lower than before because $|\mathbf{v}|_{x'}$ [66]. When $\#_t$ is for the drive -**e**′ then $|\mathbf{v}|_{x'} = 0$. This can occur in certain circumstances in a very short time-span until $\#_t$, its environmental influence[67], spontaneously shifts to direction –**x**′.
The second case (drawing on the right), deals with a **negative refraction** [68]. Because of the weakening of –**e**′ $\#_t$ is shifted towards **x**′.
The drive of **x**′ grows stronger resulting in $|\mathbf{v}|_{x'}$ enlarging with $|\mathbf{x}'|_{max} = c\sqrt{2}$.
This explains the properties of the refraction of light. It means that there is no or far less absorption and emission in this phenomenon than previously assumed. By knowing Core-space $\mathbf{CS}_2$ we can understand the overall behavior of photons. The courses of space determine the refraction's **angle** and also the photon's **speed** in space-time or: the courses of space determine the **geometry** and the **dynamic** of the photons' behavior.
Space-time, which as such doesn't appear in the Model, can now be defined as follows: the unit of space is the distance travelled in one unit of the course of time ***t****′ at a speed of c.*

Reflection
In reflection the point of contact with the medium is not significant; as a result there is no determination of position. Light will behave like a wave and as a result, the reflection will comply with the geometric regularity observed in interference.
For the regular photons that obey to the formula of energy $E_{R1} = (-1/\mathbf{x}').(1/\mathbf{e}').(\#_t/t')$ a transversal[69] activity is possible. This allows for light to be polarized[70] as a result of the direction of the involved courses of space (1/**x**′), (1/**y**′), (1/**z**′) or (1/**e**′). As a result light has **4** possible **directions of polarization**.
The fact that these directions are perpendicular is clearly observed when dealing with Brewster's angle[71]. At a specific angle of incidence of light a very special effect occurs. Part of the light will refract whereas the other will reflect. The reflection happens perpendicular to the refracting beam, whilst the reflected light is totally polarized in a perpendicular direction on the angle of incidence and the plane of reflection. In this condition of partial determination of position, we are dealing with a reflection in which light behaves both like a wave as well as a particle.

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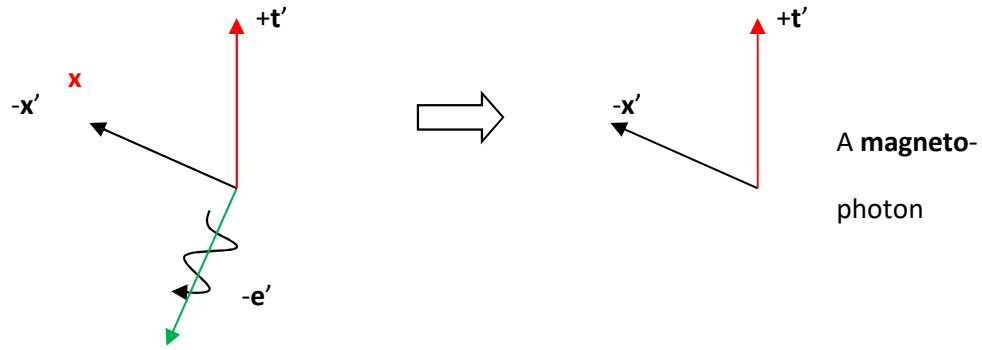
[66] This notion is fundamentally different to that of Quantum Physics where the speed decrease is attributed to the absorption and emission of the photon by the medium's atoms.
[67] For example, in experiments in which one briefly stops light by repeatedly letting it bounce on highly cooled planes.
[68] Victor Veselago predicted in 1968 the existence of materials with a negative refractive-index.
[69] Perpendicular in relation to the progression or propagation.
[70] Polarized light is light of which the electrical and magnetic component together point in the same direction.
[71] Brewster's angle or the polarization angle is understood in optics as the angle of incidence where light is totally polarized and with the reflected beam being perpendicular to the refracting beam.

The **electro-magnetic photons** studied above are of a completely different order to that of the **magneto-photons** that we deduced prior the neutrinos. The magneto-photons emerge as a result of a loss of charge in electrons and appear as follows:



Due to the lack of an electrical component magneto-photons will experience neither refraction nor reflection. These types of photons probably have a speed nearing c $\sqrt{2}$. As a result they follow a shorter route than the electro-magnetic photons and they can only be observed when absorbed by an atom during a collision. They have high energy and collide easily; they can't be influenced by charged particles or electro-magnetic photons because they lack the electrical component. They are produced in the earlier-mentioned CIHT, when the so called hydrino's emerge. The energy that is released in the production of one hydrino H(1/4) is 204 eV. The hydrino is represented with the addition of (1/4) because Randell Mills postulates that the energy originates from a broken quantum number equating 1/4.
According to the Model this energy originates from the loss of charge in the involved electrons and, due to the non-local properties of the electron's charge, as much as the proton's loss of charge. The latter loss is responsible for the formation of plasma in CIHT. The loss of charge equal in both the electron and proton, is the reason why the hydrino remains a stable atom.
The loss of charge can be calculated and measured. Its calculation is possible when we realize that the mass in an electron's configuration originates in the same way as its charge; except that we are dealing with a different course of space. As a result one can expect for the mass and the charge of the electron to represent the same amount of energy. When we halve the released 204 eV and convert this into mass using the formula $E=mc^2$, we obtain a mass that represents 0,02% of the mass of an electron. We therefore expect that, because half of the released energy originates from the electron's charge, the charge will reduce by 0,02% when producing a hydrino H(1/4). The same applies to the charge of a proton.

The course of space -**d**' appearance observed in neutrinos confirms that, in this type of Matter, we are dealing with Dark Matter. In Chapter 3 we put forward that the 'real' predimension **d** has attributes that are related to pure space. Because it isn't fully-fledged space, it is connected to our 3-dimensional pure space but without being recognized as such. We already observed some examples of the fact that **lower order particles can be created by a part of the energy of higher order particles. As such, we can assume that Dark Matter precedes Radiating Matter.**

Chapter 7 - Higher orders of recombination

(Where we discover additionally to regular quarks and electrons their heavier siblings; start to gain an understanding of Dark Matter and Dark Energy, including gluons and even one of the intermediary vector bosons.]

The **following orders of recombination** are:

- A **third order** recombination (Rec_3) of a $\mathbf{CS}_1$ Core-point, that shows affinity with three 'real' spatial predimensions, including **e**, and three $\mathbf{CS}_2$ Core-points that each have a course of space.
- A **fourth order** recombination: in line with the above procedure. Affinity with four 'real' spatial predimensions, including **e**, recombined with four courses of space.
- A **fifth order** recombination: in line with the above procedure. Affinity with the five 'real' spatial predimensions that are recombined with the five courses of space. This constitutes the Model's **highest order particle.**

As discussed earlier with the neutrinos, we observed that courses in their original state[72] show a different strength. As a result of the division into two Core-spaces, one of which contains the course of time, we assume that the course of time carries with it half the original POTENCY. As a result **E** can be found in the other Core-space but in decreased strength; a course that again takes with it half of the remaining POTENCY followed by **D** and finally **Z**, **Y** and **X**. Once Matter is formed, its courses of space **Z**, **Y** and **X** appear to have equal strength. We will discover the reason why this occurs further on this chapter, when we discuss nucleosynthesis.

Core-dimensions uncord in a distinct order: **T**, **E**, **D**, **Z**, **Y** and **X**. **T** has uncorked and produced **t** and ±**t**'. Hence there is only one Universe that has the course of time +**t**'. It will transpire that every opposite course inclusive -**t'** plays a role in this unique Universe. This excludes the existence of a second Universe that is based on a complete course -**t'**. The absence of a complete course -**t**' results in the **irreversibility of the course of time**, hence the observed **causality** and the existence of the **Law of conservation of Energy.**

As observed in Chapter 6, lower orders of recombination tend to obtain their energy from higher order recombinations. This implies that Matter was created by converting the strength of -**t**' into energy. As a result of this **descent** all orders of Matter contain a limited amount of course -**t**', its size being proportional to their amount of energy[73]. The transformation of -**t**' produces highest order particles. Supposedly these are the fifth order particles or what we call **Dark Energy** or **DE**. These particles are the predecessors of the fourth order particles that can be considered **Dark Matter** or **DM.** Fifth order particles sacrifice the course of space +**e**' to create fourth order particles. This descent will result in particles carrying onward a limited part of the course +**e**' from the fourth order of Matter; its size being proportional to the amount of energy these particles represent[74].

At the end of this chapter an explanation can be found as to why this sacrifice of +**e**' has no electrical effect on Radiant Matter. The effect on the whole Universe is discussed in Chapter 8.

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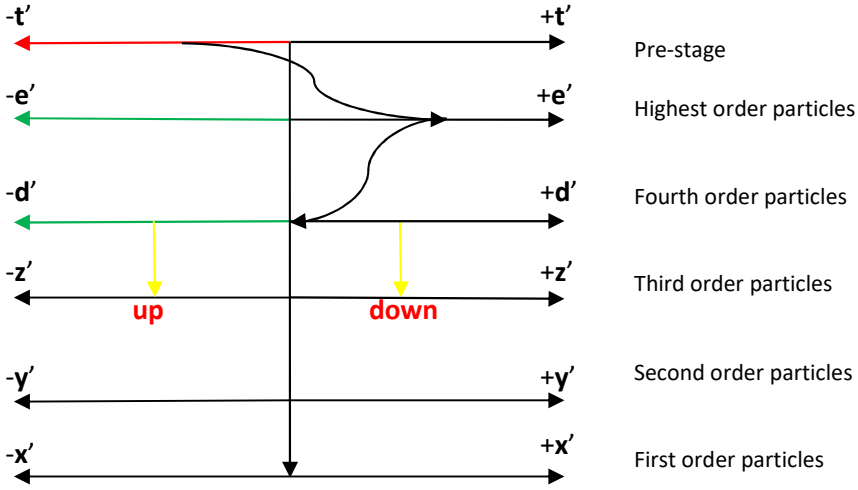
[72] Preceding the formation of Matter.

[73] We pointed to this in Chapter 4 in the second elaboration of the photon as a particle.

[74] We pointed at this in Chapter 6 when discussing the phenomenon charge.

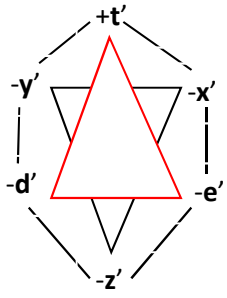
When discussing quarks below it will become clear that fourth order particles sacrifice courses of space ±**d**' to generate third order particles. They form the foundation of **Radiant Matter** or **RM.** These particles are quarks of two basic forms: **up** (charm, top) and **down** (strange, bottom). The course–**d**' generates the energy for the up-quarks and course +**d**' for the down-quarks.

The transitions are represented in the so-called "**scenario of descent**":



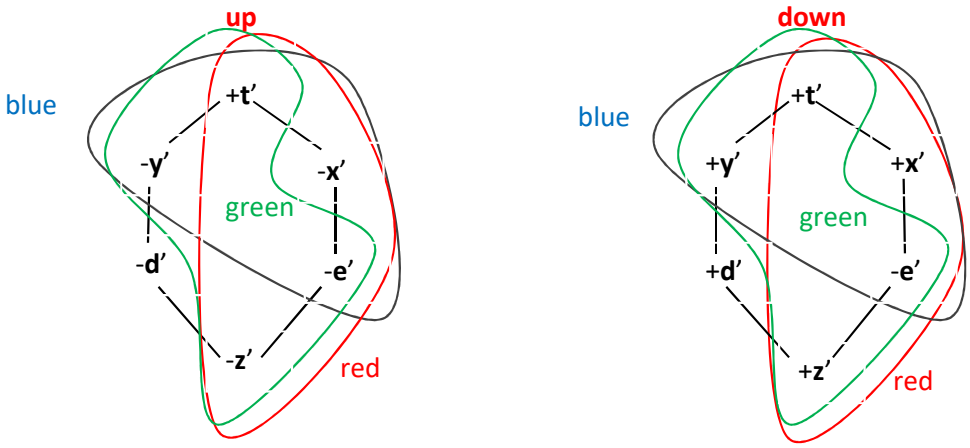
The courses of space +**e**' and +**d**' create **no anti-Matter**[75] but create Dark Matter and even **an important constituent of Radiant Matter:** the down-quarks.
Current Cosmology claims that an equal amount of Matter and anti-Matter emerged with the origin of the Universe. As shown in the scenario of descent this anti-Matter has never existed by itself, never mind that it would have "disappeared".

The courses in the scenario of descent can't be used in a random order. A sort of **equilibrium** is required between the pure courses of space
and the non-pure courses of space added to time.
In the **diagram** to the right the most logical order is used.
We will appreciate this order when we decode the quarks with this diagram.
The equilibrium represented in the diagram is arrived at as follows:
the course of time being the strongest, is positioned
against all its opposite other courses.
The pure courses of space are represented by a black triangle and
the others by a red triangle.



[75] Anti-Matter can originate spontaneously in a transformation of energy into Matter: in the originations of an electron-positron combination from a photon a particle originates with a course –**e**' (electron) and to compensate another particle with t +**e**' (positron) originates and vice versa.

The predimensional switch of the CPT-invariance allows us to understand quark formation. We already used this switch in Chapter 6 when discussing antimatter. According to the Model +**t**' can't alter its sign. In a possible switch it will always be two courses of space that change their symbol. When e.g. -**x**' switches, or in other words, alters its sign, the closest course of space will also switch: -**y**' becomes +**y**'. When -**z**' switches it will also cause the switch of -**d**' because that course of space is situated closest.
When performing the two switches we arrive at two situations as represented in the diagrams below: one constructed around -**d**' and one constructed around +**d**'. The two constructed diagrams arrived at, comply with the demands of the scenario of descent for the formation of up-quarks and the down-quarks. In the up-quarks -**d**' generates the energy to form third order particles energy, in the down-quarks this is taken care of by +**d**'. To be a third order particle the formed configuration won't contain a fourth course of space. As -**e**' is always taken along three possibilities emerge: they are the so-called **colors of the quarks** as shown in the diagrams below (the choice of color is random).



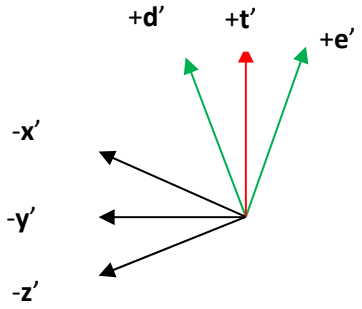
This enables us to establish the configurations of the three colors' up- and down-quarks. In the electrons we saw that -**e**' produces a full negative charge. In both above-mentioned cases the charge will be negative and not fractionated. This does not yet correspond to the fact that an up-quark has a fractionated charge of +⅔ and a down-quark a charge of -⅓. Therefore a configuration without a matching charge is called **a prephase-quark**. The fractionated state of the charge will only become clear at the end of this chapter after the discussion on gluons and an intermediate vector boson; their production after all is responsible for the formation of the stable charge in the quark.

First of all we look into what theoretical Physics tells us about what occurs in a nucleon. Here three quarks of a different color are attracted to one another because of Strong Interaction. This closeness causes a **mutual conflict** amongst the quarks. The quarks attack each other by means of **gluons** that can affect the color of the quarks under siege. Physics claims this conflict is resolved through a **chain reaction** of such an energy that it provokes 99% energy (mass) of the nucleon in question. A neutron n^0 has no charge and is composed of one up-quark and two down-quarks. A proton p^+ has a charge of +1 and is composed of two up-quarks and down-quark. For example a neutron is $u_b d_r d_g$ and, originating from that neutron, a proton can be $u_b d_r u_g$.

We now investigate this chain reaction using the pre-stage quarks derived from the above diagrams. Only three pre-stage quarks of a different color can be used to compose a nucleon. With the help of the configurations we will consider a number **nucleosynthesis** reactions. This will show us what constitutes Strong Interaction and how it works. This interaction is far stronger than that of electro-magnetism. In electrons we observed that electro-magnetism is driven by a single liberated course of space. Strong Interaction will be related to the appearance of at least two liberated courses of space. Two liberated courses of space in one pre-stage quark form a **fork**. As a result a pre-stage quark experiences a huge pull in a certain direction. Pre-stage quarks can only remain in the same region of space when they meet pre-stage quarks with a fork that pulls more or less in an opposite direction. This process is only possible when liberated courses of space in such a fork are of an equal strength.

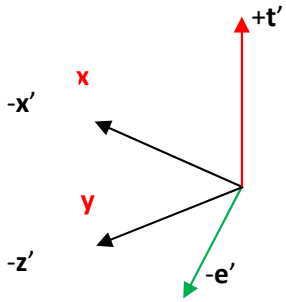
Let's first freshen up the direction of the arrows:

The **convention** for each configuration:



Let's then start with the configuration of a **red pre-stage up-quark**[76]. We select affinity with two 'real' predimensions that don't fully correspond to the two relevant courses of space. Accordingly we retain two liberated courses of space that can form the required fork.

In Radiant Matter we are only dealing with **x**, **y** and **z**. Because affinity with **t** and **e** doesn't restrict the freedom of the corresponding course of space, we can consider -**e**' as liberated. As a result, either -**x**' or -**z**' will be recombined to form mass.
We choose for a scenario where –**x**' is recombined, we will use the term **fixed**. Besides there is affinity with the real spatial predimensions (**x**, **y**) where **y** is not able to recombine with -**z**'.
The two liberated courses of space are -**z**' and -**e**'.

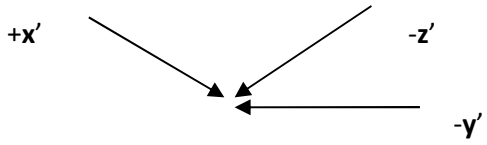


a red pre-stage up-quark

[76] A proton in which a red pre-stage up-quark has a fixed –**z**' instead of a -**x**', has different recombined colleague-quarks. This can imply the existence of a second type of protons or neutrons of the same color. This fact can affect the way atoms are constructed. We will discuss this further at the end of this chapter.

This option is extended to the blue pre-stage up-quark which has affinity with **y**, **z**. There -**y**' is fixed, whereas in the green pre-stage up-quark with affinity with **z**, **x;** it is -**z**' that is fixed. We select the same 'real' predimensions for the down-quarks. Based on this selection, we proceed to construct a nucleon. A proton of a composition $u_r d_b u_g$ will have a red pre-stage up-quark with two liberated courses of space -**z**' and -**e**', a blue pre-stage down-quark with liberated courses of space +**x**' and –**e**' and a green pre-stage up-quark with liberated courses of space -**y**' and -**e**'. Note that the down-quark in question has a plus sign for **x**'. Course -**e**' has no spatial orientation and occurs in the three pre-stage quarks. When the three pre-stage quarks meet, the courses of space +**x**', -**y**' and –**z**' are present.

This results in the following condition:



The arrows pointing to one another don't just result from our convention. In fact we are dealing with a three-dimensional situation that allows us to imagine that three quarks of the correct configuration keep each other in the same region of space. The -**e**' of each quark is pushed from its position by the other quark's -**e**' to form forks that will intercept each other. This event also influences the direction of +**x**', -**y**' and -**z**'. The three quarks that have two liberated courses of space will flex towards each other. This explains why we need three colors of quarks to form a nucleon. It also explains why the mutual attraction of quarks doesn't abate[77] when they are scattered in very heavy collisions.

As mentioned above, in the initial stage a different strength of ±**z**', ±**y**' and ±**x**' exists. In the scenario of descent ±**z**' is closest to ±**d**', followed by ±**y**' and then by ±**x**'. Earlier we already observed a significant difference in strength between the courses ±**t**', ±**e**' and ±**d**'. In neutrinos we observe that ±**z**', ±**y**' and ±**x**' display a difference in strength in their initial stage. The configuration of an electron is reasonably simple. However **three generations** of leptons exist: the **electron**, the **muon** and the **tau**. Their energetic difference has to be the result of a difference in strength in the three courses of space ±**z**', ±**y**' and ±**x**'. The fact that there are exactly three generations of leptons corresponds to the scenario of descent; *no others exist*. Course of space ±**z**' has the highest energy and ±**y**' sits right between ±**z**' and ±**x**'. The differences are considerable as a tau's energy is 1,78 GeV and is formed with ±**z**'. The energy of a muon is 0,106 GeV and is formed with ±**y**' or a weakened ±**z**'. The energy of an electron is 0,511 MeV and if formed by ±**x**' or a weakened ±**y**' or a weakened ±**z**'.

At the pre-stage quarks that participate in nucleosynthesis we observed that, to achieve equilibrium, an equal strength in both courses of space of the fork is required. This means that ±**y**' and ±**z**' had to release their difference in strength to ±**x**' in the form of energy particles. They achieved this by delivering high-energy lower order particles: muons and tauons or otherwise high-energy photons.

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[77] M. Veltman writes on p. 224:" … the energy continues to increase no Matter the distance of the quarks' separation."

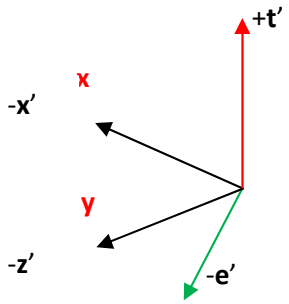
When one adds these loaded or non-loaded particles to existing atom nuclei, they will destabilize the nucleons resulting in fusion processes[78]. These fusion processes also occurred in an originating Universe that may have been "cold". *Hence it didn't require the high temperatures of a Big Bang.*
Relinquishing muons and tauons causes a divergence in the original energetic condition of the pre-stage quarks. A blue pre-stage quark loses the energetic equivalent of one muon, a red one that of a tau and the green one the equivalent of one muon and one tau. In nucleosynthesis the equivalent of the energy of 2 muons and 2 tauons is released. This causes a **huge negative nuclei-binding energy** in a single nucleon of approximately 3,77 GeV in the form of one or more energy-rich photons.

The forks' activity combined with the negative nuclei-binding energy explains **the Strong Interaction**. This merging of effects is what makes the Strong Interaction so powerful.

And now on to the story of the gluon

A story in which we also discover what the second- and third-generation quarks look like.

A gluon can cause a change of color in the above-mentioned red pre-stage up-quark by, for example transforming -**z**' into -**y**'. The transformed quark is then no longer a pure pre-stage up-quark because two courses of space are fixed.
It has become a heavier equivalent and will end up as a semi-blue pre-stage charm-quark.

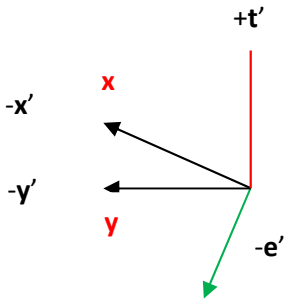


a red pre-stage up-quark

However, this is impossible because it has a mass of 1,25 GeV, which is too heavy for the nucleon in which it occurs.
Something has to have decreased the strength of-**x**' or -**y**'.

What phenomenon causes this weakening is explained later on with the intermediate vector-boson $\mathbf{W^-}$.

Such a transformation explains why the mass of a nucleon is much heavier than the sum of the three pre-stage quarks.

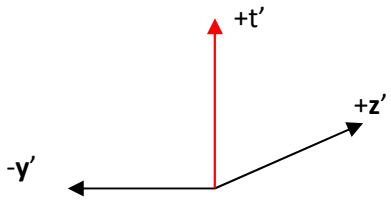


a semi-blue pre-stage charm-quark

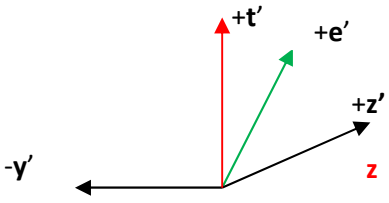
A gluon that can execute such a transformation is called a **specific gluon**: $\mathbf{g_{antir\text{-}redl,\ blue}}$.

[78] Through Muon-catalyzed fusion (μCF)

It has to have the ability to transform the involved courses of space. To achieve this, it needs to remove -**z**' and to add -**y**'. To cause such a transformation, a gluon only needs these two courses of space in its configuration and will therefore be a **second order** particle. As a gluon has no **rest mass**, it will have no affinity with a 'real' predimension. That the configuration doesn't contain -**e**' also transpires from the fact that the gluon is **not susceptible to electro-magnetism**. Taking all of this into account, the gluon will look as follows:



Where can such a gluon $\mathbf{g}_{ar,b}$ originate from?
As already observed it is
delivered by a third order particle.
Let's find the delivering configuration.
Because it neutralizes -**z**', the particle has to have +**z**' at its disposal. The need for differing symbols f or the courses of space signifies that the delivering particle is not a normal pre-stage quark.
A predimensional switch occurred.
Assuming that the course of space +**z**' was fixed then -**y**' must have experienced a switch.

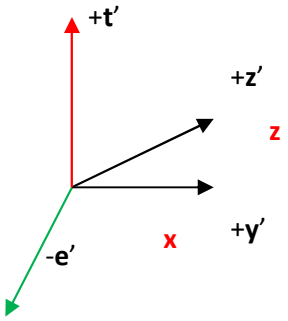


an intermediary state = the green pre-stage anti-down-quark

Affinity with **e** is not dependent on a configuration which enables -**e**' to switch to +**e**'. When we reconstruct the delivering particle as such, it appears to be an **intermediary state** of another pre-stage quark.

To trace the original pre-stage quark we switch +**e**' back again into –**e**' and -**y**' into +**y**'.

The result is a **green pre-stage down-quark**.
This implies that the intermediary is nothing less than the **green pre-stage anti-down-quark**.
As this kind of green pre-stage down-quark is able to send $\mathbf{g}_{ar,b}$ gluons that can transform the red pre-stage up-quarks into blue pre-stage charm-quarks. These $\mathbf{g}_{ar,b}$ gluons can equally be active as $\mathbf{g}_{ab,r}$ for the pre-stage down-quarks.



a green pre-stage down-quark

The summary below is limited to the produced gluons. What happens to the pre-stage quarks will be treated later in when discussing an intermediary vector-boson.
The configuration of the gluon allows for six permutations: (-**x**', +**y**'), (-**x**', +**z**'), (+**x**', -**y**'), (+**x**', -**z**'), (-**y**', +**z**') and (+**y**', -**z**')[79].

Theoretical Physics claims that there are **8** types of **gluons**. In the Model **only 6 gluons** exist, but with a double action. Also when gluons collide, they can transform into one another. For example(+**x**', -**z**') + (-**y**', +**z**') results in (+**x**', -**y**') or for an up-quark this means that a $\mathbf{g}_{\text{antil-blue, green}}$ which merges with a $\mathbf{g}_{\text{anti—red,blue,}}$ forms a $\mathbf{g}_{\text{anti—red,green}}$. *The Model does not include "diagonal" gluons such as* $\boldsymbol{g}_{\textit{anti-red,red}}$ *that classic Physics assumes to exist. This difference of concept can explain why* ***no axion***[80] *is needed*.

When a double recombination occurs in a pre-stage quark, the original red pre-stage up-quark in fact is a blue pre-stage charm-quark. This is an outright **second generation** quark as opposed to the above-described semi-blue pre-stage charm-quark.
Below we describe a third exceptional and extremely temporary recombination i.e. an intermediate vector-boson that temporarily exhibits multiple recombinations. A **pre-stage top-quark** can be formed in the same way. Because of nearly totally absent mobility, an even more inert **third generation** quark is formed.

And finally, the intermediate vector-boson W$^-$

The fact that a pre-stage quark forms an intermediary state is a result of the forks of the two other quarks being **threat** to its orientation and therefore to the spatial equilibrium of the intercepted fork. It is the reason why the dimensional switch takes place. If gluons, originating from an intermediary state, succeed in changing the color of another quark, the threat of their fork dissipates.

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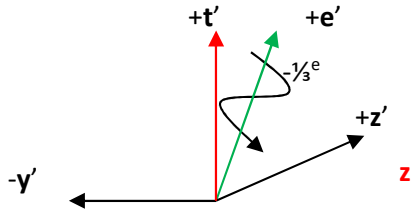
[79] When validating this with the Model we discover a certain systematics:
A blue pre-stage (up en down)-quark can bring about two gluons: (+**x**', -**y**') and (-**x**', +**y**').
(+**x**', -**y**') acts on a pre-stage up-quark as a $\mathbf{g}_{\text{anti-red, green}}$
and on a pre-stage down-quark as a $\mathbf{g}_{\text{anti-green, red.}}$
(-**x**', +**y**') acts on a pre-stage up-quark as a $\mathbf{g}_{\text{anti-green,red}}$
and on a pre-stage down-quark as a $\mathbf{g}_{\text{anti-red,green.}}$
A red pre-stage (up en down)-quark can bring about two types of gluons: (+**x**', -**z**') and (-**x**', +**z**').
(+**x**', -**z**') acts on a pre-stage up-quarks as a $\mathbf{g}_{\text{anti-blue, green}}$
and on a pre-stage down quark as a $\mathbf{g}_{\text{antig-green, blue.}}$
(-**x**', +**z**') acts on a pre-stage up-quark as $\mathbf{g}_{\text{anti-green,blue}}$
and on a pre-stage down-quark as a $\mathbf{g}_{\text{anti-blue, green.}}$
A green pre-stage (up en down)-quark can deliver two types of gluons: (+**y**', -**z**') and (-**y**', +**z**').
(+**y**', -**z**') acts on a pre-stage up-quark as a$\mathbf{g}_{\text{anti-blue, red}}$
and on a pre-stage down-quark as a $\mathbf{g}_{\text{anti-red,blue.}}$
(-**y**', +**z**') acts on a pre-stage up-quark as a $\mathbf{g}_{\text{anti-red, blue}}$
and on a pre-stage down-quark as a $\mathbf{g}_{\text{anti-blue, red.}}$

[80] The **axion** is a hypothetical elementary particle that was put forward by the Peccei-Quinn theory in 1977 to solve quantum chromodynamics' (QCD) strong-Charge-Parity problem. The strong CP-problem is a **violation** of the postulated **CP symmetry**.

Above, we fixed **z'** in the green pre-stage quarks. This was not a random choice as only a few options have satisfactory results. A continuous switch of a pre-stage quark with its intermediary state has a few unexpected consequences:

The intermediary state's configuration is revisited in the diagram to the right.



The curve on +**e'** indicates that the energy for the formation of the gluons originates from +**e'**.
Because there are three quarks in a nucleon a third of its energy is transformed into gluons.

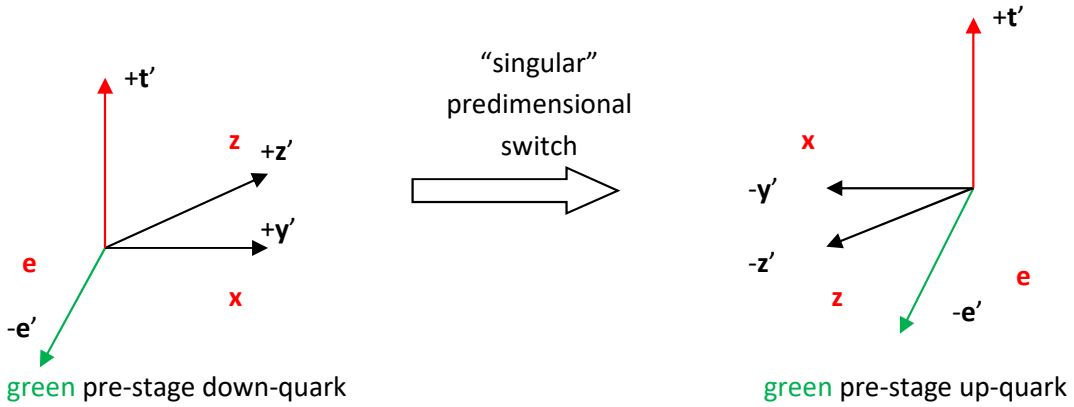
This implies that in the intermediary state +**e'** still retains +⅔ capacity. When a regular switch occurs between the green pre-stage down-quark and its intermediary we obtain an average charge of -1 +⅔ = -⅓. This illustrates that that ⅓ of the energy of +**e'** is used to deliver gluons and that **a down-quark with its observed charge is the result of a dynamic process.**

In neutrino-oscillation we stated that it is feasible for a course of space in a certain one direction to switch into another. These courses are part of a Core-space. As the recombined Core-spaces are predimensional opposites, such a switch is compensated by an opposite switch in the other Core-space. We call this the **flip-over mechanism**. This cascade of conversions obeys the above-mentioned diagram that decodes the quarks. In the courses' diagram the switch from one to the other happens in a counter-clockwise direction and to compensate, the conversion of the 'real' predimensions in the diagram happens in a clockwise direction.
Represented as follows:

y' ← **x'**
↓ ↑
d' **e'** and as a result in compensation
↘ ↗
z'

y → **x**
↑ ↓
d **e**
↖ ↙
z

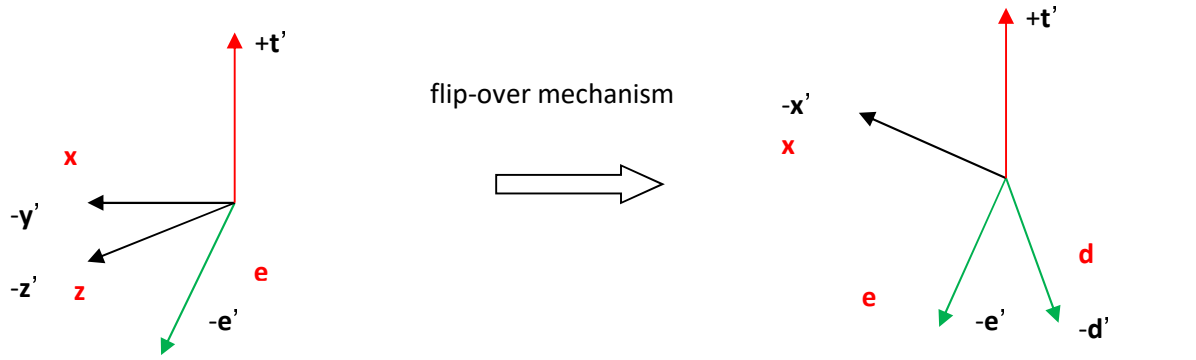
We start with a green pre-stage **down**-quark and transform it into a green pre-stage **up**-quark by means of an "singular" predimensional switch. "Singular" because as a result of its presence in a nucleon, **the charge can't change**. As a result a recombined course of space needs to switch.



green pre-stage down-quark

green pre-stage up-quark

This instability starts the flip-over mechanism. In this case **x** will transform into **e**, **e** in **z** and **z** in **d**. Yet affinity with **x** will remain a little longer as affinity with **e** already exists.



groene prefase up-quark

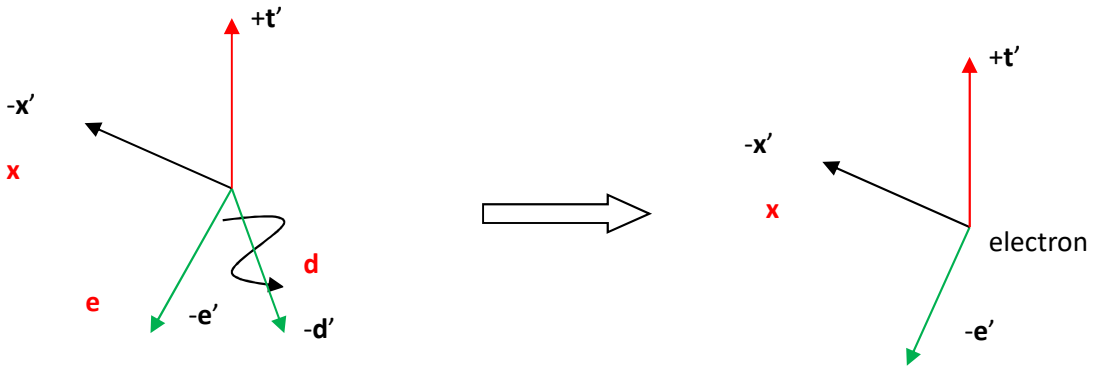
intermediate vectorboson W^-

As a result of the three temporary recombinations a very heavy third generation particle: **the intermediate vector-boson W^-** appears. As mentioned, these recombinations can only exist very briefly.[81] The instability of this temporary particle leads to the emergence of two new particles.

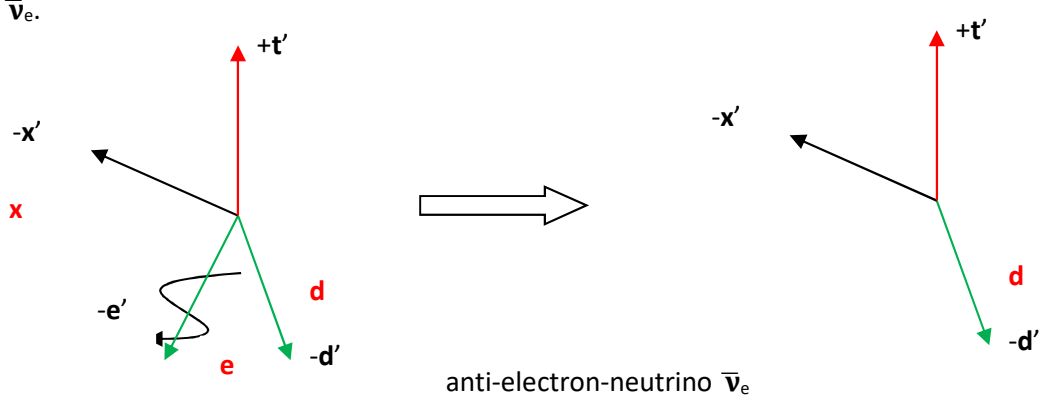
[81] Be warned: this state of affairs only works when we use **x** and **z** as 'real' predimensions because of the flip-over mechanism's predimensional order. This means that a neutron, constructed with a green pre-stage down-quark with a fixated **y**, cannot transform into a proton.

Two steps occur simultaneously:

During the first step some of the energy of -**d**' will be used to bring about an **electron**. The intermediate discharges:

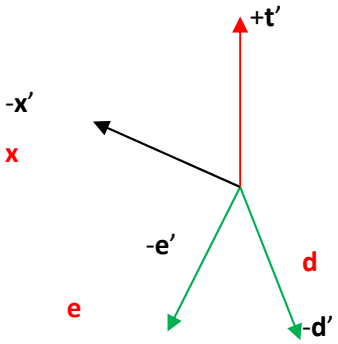


During the second step some of the energy of -**e**' will be consumed to bring about an **anti-electron-neutrino** $\overline{\nu}_e$.



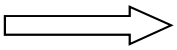
During the transformation with these constituent quarks in a nucleon of $\mathbf{n^0}$ in $\mathbf{p^+} + \mathbf{e^-} + \overline{\nu}_e$ or $u_b d_r d_g \rightarrow u_b d_r u_g + \mathbf{e^-} + \overline{\nu}_e$ the following three steps take place:

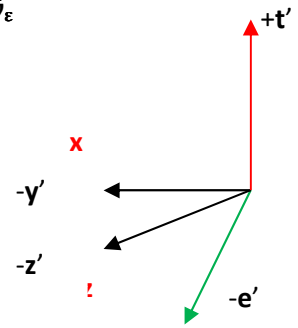
1) First $d_g \rightarrow u_g$. When the discharged intermediate reverts, we take into account that in the flip-over it was the original -**y**' that delivered the energy for the origin of the electron through -**d**' and that it is the original -**z**' that delivers the energy for the origin of the anti-electron-neutrino through -**e**'. This signifies that eventually both courses -**y**' and -**z**' weaken in the green pre-stage up-quark. This weakening of the green pre-stage up-quark proves that, when a $\mathbf{g}_{\text{anti-green, red}}$ changes into a semi-red pre-stage charm-quark, it has a mass that is far smaller than 1,25 GeV as already suggested at the beginning of the gluon story.



intermediate vector-boson $\mathbf{W^-}$

Delivers an anti-electron-neutrino $\bar{\nu}_\varepsilon$ and electron $\mathbf{e^-}$ and re switches





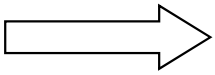
weakened green pre-stage up-quark

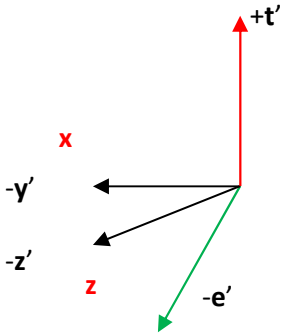
This weakened green pre-stage up-quark doesn't conserve its negative charge. It engages in a predimensional switch and as a result becomes an intermediate. At that moment it is capable to emit gluons and this intermediate stabilizes in the form of a green up-quark.

Production of gluons $\mathbf{g}_{\text{anti-blue, red}}$ (up)

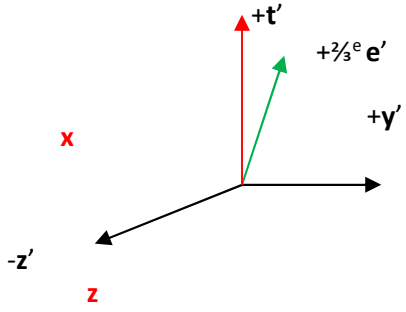
and $\mathbf{g}_{\text{anti-red,blue}}$ (down)

and loses $\frac{1}{3}^{e}$ of +**e'**.



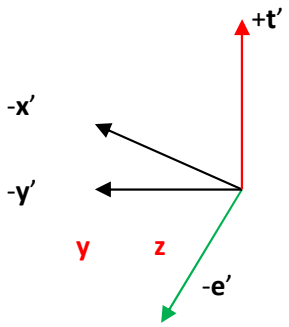


weakened green pre-stage up-quark

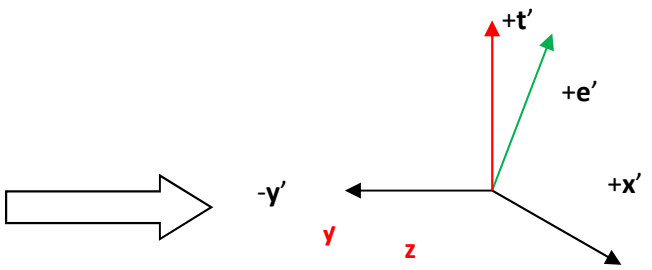


green up-quark

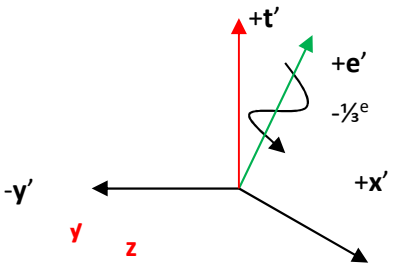
2) then $u_{bpre} \rightarrow u_b$



blue pre-stage up-quark



intermediary blue pre-stage up-quark

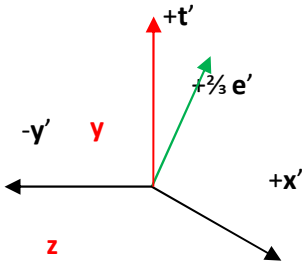


intermediary blue pre-stage up-quark

Production of gluons

$g_{anti\text{-}red,green}$ (up)

and $g_{anti\text{-}greem,\ red}$ (down)



blue up-quark

3) We already know that the pre-stage form of d_{rpre} → d_r regularly switches to its intermediary state, which gives it a charge of -⅓. As a result, the red down-quark is part of a dynamic process.

In the synthesis of the resulting nucleon $u_b d_r u_g$ we arrive at **a proton** with a charge of +1.
For **a neutron** such as $u_b d_r d_g$ this signifies that the two down-quarks are active **switchers,** each with a charge of -⅓. Because they are active switchers their gluons in turns attack the up-quark. This starts a continuous "color change chain-reaction" and u_b remains in its intermediary state in self-defense. It becomes a sturdy up-quark with a charge of +⅔.

In short, we can imagine all reactions as follows. Each pre-stage quark that participates in the formation of a nucleon has two liberated courses of space. Because they are of a different color, they have a different predimensional configuration and therefore they experience strong mutual pull to one another. A predimensional conflict occurs because of the presence of -**e**' in each of them. As a result one of the pre-stage quarks will switch to its intermediary state and start to produce gluons to force one of the other colors to change its status into that of a heavier quark (semi-second generation). This quark is less hostile to the nucleon's composition as one of the courses of space is recombined; it

does no longer experience a strong pull. This situation can't be sustained very long, otherwise the nucleon would scatter due to a lack of balance of the other quarks' the strong pull.

All of this illustrates how a neutron turns into a proton and how this delivers an electron and an electro-neutrino $\overline{\nu}_e$. Combined, they bring about **hydrogen atoms.** The Model reveals how 6 Core-dimensions are uncorded. After a continuous descent of higher order particles into lower order particles this led to the creation of a Universe filled with hydrogen atoms.

Some final remarks for further exploration

Not all formed neutrons transfer into protons. As a result the spontaneous origin of deuterium and tritium are possible. Together with the production of muons and tauons during nucleosynthesis, this supplies an explanation for the existence of **cosmic abundance** or the H/He-relationship in a Universe that begins "cold".

As far as the **spin** of the described particle is concerned**:**

- All the particles we associate with Matter have spin ½. In the Model all electrons and pre-stage quarks have one recombination of a course of space with its 'real' complement.
- All the particles we associate with forces have spin 1. In the Model photons (E-M Force) and gluons (Strong Interaction) have no course of space recombination. In the described $\mathbf{W}^-$ boson (Weak Interaction) all courses of space are recombined.

Chapter - 8. Gravity and Cosmology
(A chapter that studies how the several manifestations of Matter played a role in a forming Universe)

When discussing photons and electrons we were introduced to energy formulae. Photons, being particles of first order, comply with $E_{R1} = h.(\#_t /t') = h.v$ and electrons being of second order comply with the expression $E_{R2} = r_1 . i.(h . \#_t/t').c$. When these formulae are completed for all five orders of recombination, the following general energy formula can be deducted: $E_{Rk} = r_{k-1} .i^{k-1} [h. \#_t /t'].c^{k-1}$ with k = 1 to 5, the order of the recombination.
In this formula $-1/\mathbf{r}_k'$ represents the Planck constant h, at least when this factor refers to the single predimensional remainder[82] of the courses of space. The real factor $\mathbf{r}_{k-1}$ represents affinity with reference to absolute spacetime. All particles, including Dark Matter and Dark Energy, comply with the general formula of energy. In photons we observed that, due to the presence of factor (h/t'), particles obey the uncertainty principles. This factor is observed for all particles and all particles in the Universe obey to it.

The general formula can be adapted to $E_{Rk} = r_{k-1} . i^{k-1}.(h . \#_t/t') . c^{k-1}$ or $E_{Rk} = r_{k-1} . i^{k-1}.(h.v) . c^{k-1}$. The factor $(h . \#_t/t') = (h.v)$ contains energy. With i^{k-1} factor h.v constitutes the particle's **energy base**. We now relate the particle's energy base to its **rest mass** m_0 and to the square of its **relative movement** or velocity v_R**.** This way the energy base $i^{k-1}.(h.v)$ is substituted by $m_0v_R^2$. As mentioned, factor r_{k-1} represents the affinity of the formed particle with absolute spacetime. The particle's affinity with absolute spacetime increases with the order of recombination. Affinity r_{k-1} is associated with ratio $1/v_R^{k-1}$ which results in $r_{k-1} = 1/v_R^{k-1}$. The effect of these two substitutions will become clear later.

Where k = 1, $E_{R1} = r_0 . i^0(h.v) . c^0$. No affinity with absolute spacetime exists. Therefore r_0= 1 means that there is no rest mass and $c^0 = 1$ results in $E_{R1} = h.v$. This represents the energy of a first order particle, such as the **photon**. By above-mentioned substitutions we arrive at $E_{R1} = m_{f0}.v_R^{2,}$ despite the compatibility of $m_{f0} = 0$ with $E = m.c^2$ because the photon moves at the speed of light resulting in $v_R = c$.

Where k = 2, E_{R2} represents energy of second order particles, like the **electrons**.
$E_{R2} = r_1 . i^1(h.v) . c^1 = m_{e0}.v_R^1.c = p_t . c$ as we know from relativity $p_t = (m_e^2.c^2 + p_e^2)^{½}$ and p_t represents the total impulse.

Where k = 3 , E_{R3} represents energy of third order particles, such as **quarks**. $E_{R3} = r_2 . i^2(h.v) . c^2 = m_{q0}.v_R^0.c^2$ and in $v_R^0 = 1$, $E_{R3} = m_{q0}.c^2$.

Spatial freedom reigns in E_{R1} because there is no affinity with the spatial component of absolute spacetime. This freedom also exists in E_{R3} because of the absence of v_R because $v_R^0 = 1$. As E_{R2} is situated between these two possibilities, we can assume that the same spatial freedom applies for the three kinds of particles. Every change of speed will then need to be introduced from outside, which explains the existence of **inertia**. Changes of speed in relation to absolute spacetime, not nearing the speed of the course of space, don't have a significant influence on these particles' energetic value. The spatial

[82] We introduced this concept in the calculation of electrons on p. 22.

freedom allows the influence of **gravity** on these particles. The first three orders of recombination are called **Radiant Matter (RM)**. *Spatial freedom stops us from discovering absolute spacetime, based on experiments with Radiant Matter.* Neutrinos don't belong to **RM** because of the presence of the **d-**predimension.

The pre-stage quark, introduced in Chapter 7, has only one recombined course of space. Therefore, from an energy viewpoint, this quark behaves like a second order particle. Gluons have no combined space course at all. Therefore they behave like first order particles. Because of two recombined courses of space, the heavier semi-charm (or strange) quark behaves like a third order particles. In general we can assume that general energetic behavior of nucleons is that of second order particles and that they obey $E = c.\ (m^2.c^2 + p^2)^{½}$.

The energy formulae of the recombinations of fourth and fifth order can't contain rest mass. The formulae explain that we are dealing with particles that have the lowest energy at the speed of light. In this case mass at lowest energy will be represented by index c in m_c.

When k = 4, $E_{R4} = r_3\ .\ i^3(h.v)\ .\ c^3 = m_{hc}.c^3v_R^{-1} = m_{hc}.c^3/v_R$. The index h is derived from 'huge'. This is **Dark Matter (DM)**. We also call these **c^3-particles**.

When k = 5, $E_{R5} = r_4\ .\ i^4(h.v)\ .\ c^4 = m_{gc}.c^4v_R^{-2} = m_{gc}.c^4/v_R^2$. Index g is derived from 'gigantic'. This is **Dark Energy** (**DE**). We call these **c^4-particles**..

In these formulae the relative motion v_R sits in the denominator. This means that they can't experience rest mass, because at rest with $v_R = 0$, these particles' energy would grow infinitely. At speed c they have an energy comparable to that of **RM** as $v_R = c$ and $c^3/v_R = c^2$ and $c^4/v_R^2 = c^2$. The formulae explain that these particles can't change speed without a drastic change in energy. This is impossible in an environment of conservation of energy. This means that it is **impossible** for **RM- and DE-** particles **to be susceptible to gravity**.

With regard to affinity with absolute spacetime, an equilibrium appears to exist between **RM**-particles on the one hand and **DM**- and **DE**-particles on the other. This equilibrium on the one hand represents a surprising degree of freedom to **RM** as well as representing an as yet unknown massive energy-dependency for **DM** and **DE**.

The special relationship of **RM** with absolute spacetime has consequences. These are clearly demonstrated in the footnote calculations[83] with the expression of $E = m.c^2$. They reveal the **relativistic laws**.

Based on these new insights, we will bring a number of cosmological phenomena into the limelight.

For **RM**- and **DE**-particles not to be susceptible to gravity, does not prevent them from influencing other particles. We will investigate the nature of this influence later in this article; it is proportionate to their energy. The existence of the energy of **DM** and **DE**-particles is not directly detectable, especially in the form of gravity. This is derived from the fact that the configuration of neutrino and electron are essentially the same, whilst their mass differs. When we compare an electron-neutrino's mass with that of an electron, we arrive at a ratio of at least 2,2 eV /0,511 MeV = 0,0000043 = $4,3.\ 10^{-6}$. This ratio of **RM** and **DE** on the one hand **RM** on the other, can be larger because we don't know exactly the size of the electron-neutrino's mass. This ratio implies that only a small part of the energy of **DM** and **DE** is detectable using our **RM**-standards. We call this ratio the **DME-transparency**.

Configurations of c^3-particles can occur in a number of ways. Affinity can exist for the 'real' predimensions (**x**, **y**, **z**). Through the absence of **d** they will display all their energy in the spectrum of **RM**. These heavy particles are not observed in the Universe. Because of their high energy, these types of c^3-particles will have a strong gravitational force. When they are present in a hydrogen cloud they cause it to contract, resulting in the formation of stars. We therefore call these c^3-particles **stafos** (van star formation). This component of **DM** finds itself within the stars.
The other c^3-particles with affinity (**x**, **y**, **d**) or (**x**, **z**, **d**) or (**y**, **z**, **d**) with a continuous presence of **d** are written as $c^3_{\mathbf{d}}$-particles. These type of particles occur three times more than stafos. Because they have the same order of recombination $c^3_{\mathbf{d}}$-particles are related to stafos.

The c^4-particles only have affinity with the **d-**predimension. $c^3_{\mathbf{d}}$- and c^4-particles can, helped by their affinity with the **d**-predimension, form a structure for the Universe. We call this structure the **d-structure**. This **d**-structure prevents the Universe from imploding. Because c^4-particles display the strongest affinity with absolute spacetime, they can be considered the **d-**structure's foundation stones

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[83] We take into account that d.../dt' = the derivative of a variable, s = the displacement, v = velocity = ds/dt', the momentum p = m.v = m.ds/dt', m is mass, the acceleration a = dv/dt', F = force = m.a = dp/dt'. It is possible to start from the following definition of energy: F.ds/dt' = dE/dt'. In this equation we substitute F by dp/dt' and ds/dt' by v: dp/dt'.v = dE/dt'. In this equation we substitute p by m.v. We get [d(m.v)/dt'].v = dE/dt'. We multiply both parts of this equation by 2.m (2 times mass) and we introduce $E = m.c^2$, c is the speed of light. We get $2.m.v.d(m.v)/dt' = 2.m.d(m.c^2)/dt'$. If we suppose that mass is a function of time (see E. Noether) we can include each variable in the derivative.
$d(m^2.v^2)/dt' = d(m^2.c^2)/dt'$ and we integrate: $m^2.v^2 = m^2.c^2$ + a constant. We can find the value of this constant by using the starting conditions: at v = 0 this equality becomes $0 = m_0^2.c^2$ + constant (m_0 is rest mass). This means that the value of the constant = $- m_0^2.c^2$. Now we can introduce this constant in the equation and we get $m^2.(c^2 - v^2) = m_0^2.c^2$. From this equation we take the root: $m = m_0.c.\ (c^2 - v^2)^{-½}$ and we divide the second part of this equation by c/c = 1. We get $m = m_0.(1 - v^2/c^2)^{-½}$. This means that mass is a function of the velocity and of time.

or beacons. We call the c^4-deeltjes **beacos** (of beacon). The **d**-dimension causes a relationship between the stafos and the beacos. This means that there is a relationship between stafos and the **d**-structure.

The DME-transparency prevents that we can observe the **d-**structure. This has two direct effects.
The first effect is that the **d**-structure disposes of an unnoticeably huge amount of energy. This implies that it has the same influence on passing photons as **supergravitation,** but without deviating the photons of their path. This influence weakens the energy of passing photons. This influence equally provides a different explanation[84] for the existence of **Hubble's law**.
The second effect is that the **d**-structure's presence and its weak observation in the **RM** causes **Cosmic background radiation**.

At the origin of the Universe, **RM** was formed at the centre. The stafo's triggered the origin of stars that after a while turned into black holes. The $c^3_{\mathbf{d}}$-particles and c^4-particles scattered at the speed of light. At that point they had their lowest energy. They were only able to slow down when they absorbed energy. This energy could only have originated from the black holes in the centre. Spacetime ceases to exist in a black hole and energy becomes NON-LOCAL. In the timespan between the origin of the **RM** and the origin of black holes $c^3_{\mathbf{d}}$- and c^4-particles dispersed. The conservation of energy of the Universe forces the $c^3_{\mathbf{d}}$ - and c^4-particles to absorb NON-LOCAL energy and therefore to slow down.
The following two phenomena can be caused by this charging of the $c^3_{\mathbf{d}}$ - and c^4-particles. The first option is for the $c^3_{\mathbf{d}}$-particles to speed up and to release massive amounts of energy and thus cause **Gamma Ray Bursts** (GRB's).
The second option is for c^4-particles to speed up and release gigantic amounts of energy to cause the origin of the **Quasars** that create galactic systems.

This signifies that an alternative vision to the one of the Big Bang is feasible. The Universe started more as a **Gigantic Firework**. First there was a high burning center and when that disappeared the far-flung dispersed parts were ignited to create distant galactic systems. An **enormous empty space**[85] then remains in the centre. This point of view solves the **horizon problem**[86]. It proclaims that the Universe looks identical in every direction.

The Gigantic Firework allows for a fundamental role of the **d-**structure. The c^4-particles are **d**-structure's beacons or centre's. This signifies that the related course of space **d'** is pointing away from these centre's. The neutrinos formed in the burning stars are, according to the norms of the RM scattered in random directions. For the **d**-predimension, the mass-forming recombination[87] of the neutrinos is pointing at the centre of the galactic system. As the largest part of neutrinos are formed

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[84] And not by the yet accepted Doppler effect.
[85] This large empty space has a diameter of 1 billion light years. http://www.newscientist.com/article/dn12546-biggest-void-in-space-is-1-billion-light-years-across.html
[86] The problem results of the fact that several regions of the Universe have no "contact" with each other, due to their large distances, but yet they have the same temperature and other physical properties. This is not possible as the exchange of information (or energy, warmth, etc.) can only take place at the speed of light.
[87] In Chapter 6 we observed that the neutrino's mass is formed by a recombination of **d** and **d'**.

in the **d**-predimension, this means that active stars have a kind of thrust away from the galactic system's centre. When stars become inactive they won't be able to stay away from this centre. As already known, this phenomenon is a black hole, which can absorb old stars. This phenomenon was observed in our Milky Way where thousands of "old" stars circle around the central black hole.

The Gigantic Firework results in the following scenario of origin. First the **RM** burned in the centre of the Universe and **DM** and **DE** scattered. When the first stars were burnt out, they no longer produced sufficient neutrinos to stay clear of the central black hole, which resulted in their destruction. This annihilation is comparable to the **catabolism** known from Biology. By slowing down **DM** and **RM** absorbed NON-LOCAL energy, which they pumped through acceleration back in the Universe by means of GRB's and quasars. This rebuilding is comparable to **anabolism** in Biology. This anabolism causes the formation of star systems in which, once more, catabolism occurs. In this fashion what resembles a Cosmic Metabolism is active, we call this **Cosmobolism**.

Besides neutrino-thrust, the motion of stars can be influenced by the presence of stafos at their centre. Given that the stafos' energy changes drastically with their speed; stars in motion won't fully obey the laws of gravity of **RM**. *This kindles the impression that their motion is influenced by the presence of Dark Matter that can't be found "somewhere" outside of the galactic system. The latter forms our present premise. It is not logical that six times the mass of a star system would find itself on its exterior without a disruption of the path of the light that moves towards us from distant galaxies by this mass.*

The presence of stafos at the centre of stars creates super-gravitation. This facilitates the start of fusion processes. The absence of such particles with super-gravitation is the reason why nuclear fusion demands considerable higher temperatures on earth. Stafos can also promote the formation of a black hole when a star has burnt out. The same applies to beacos at the centre of the Universe.

To understand the division of energy in the Universe, we need to observe to what degree POTENCY is transformed. The scenario of decent more or less provides the following picture:

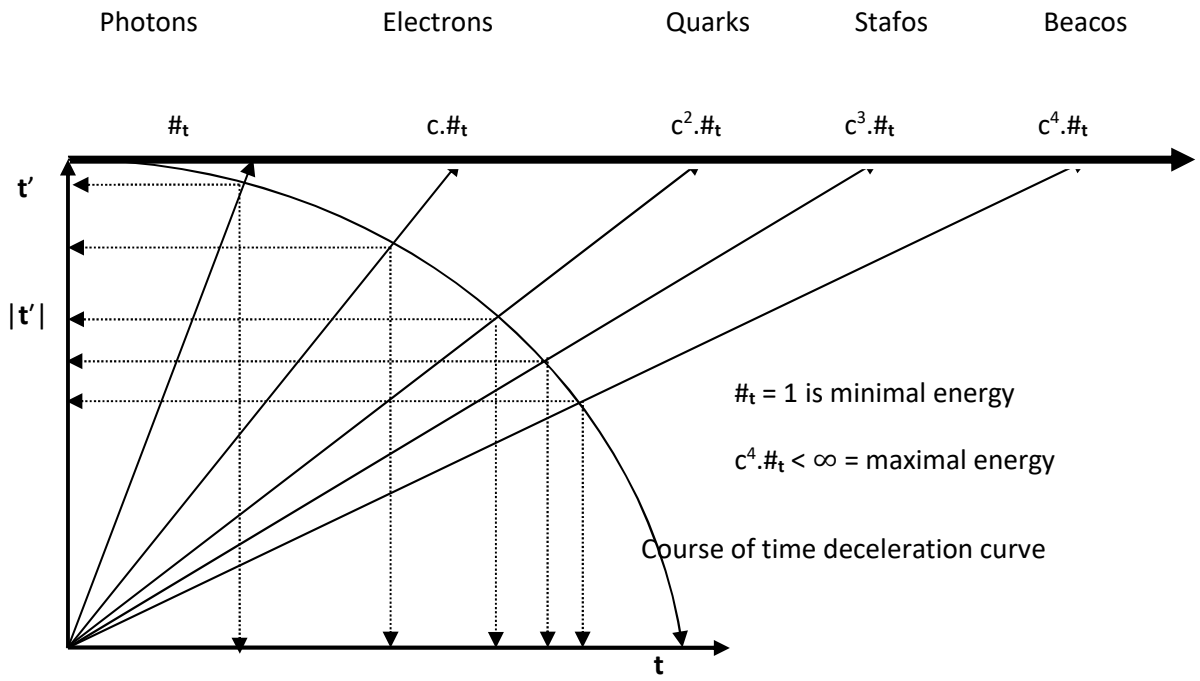
Core-dimension **T** represents 50 % POTENCY
Core-dimension **E** represents 25 % POTENCY
Core-dimension **D** represents 12.5 % POTENCY
Core-dimension **Z** represents 6.25% POTENCY
Core-dimension **Y** represents 3.125 % POTENCY
Core-dimension **X** represents 3.125 % POTENCY

Due to the different strengths of the courses, the currently accepted division of Matter in the Universe is: 4% R**M**, 23% **DM** and 73% **DE,** which seems logical. The strongest courses after all are those of **DM** and **DE**.
Based on the above-mentioned division, we can proceed to the below speculation.
Part of the courses that form ordinary Matter are also present in **DM** and **DE**. For example neutrinos form 6% of **DM** and contain courses **X**, **Y** and **Z** in combination with -**d**'. Radiant Matter is mainly formed based on the energies represented by half the courses of **Z**, **Y** and **X** or 6,25 %. This is higher than the accepted 4%. It allows us to understand that energy originating from **T** via -**t**' and from **E** via +**e**' does

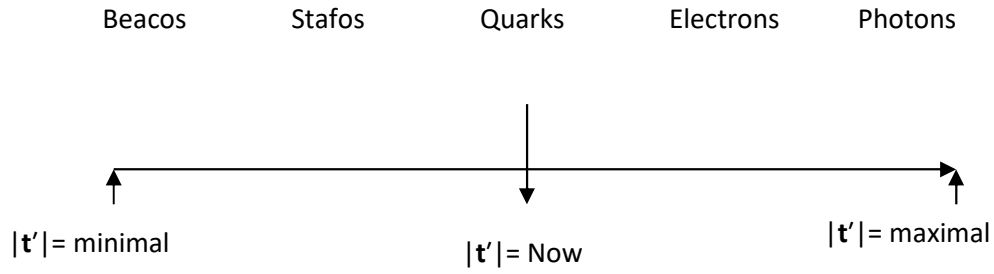
not descend into **RM**. The latter confirms our conjecture that the energy of a charge is not contained in $E = mc^2$. We already assumed this when discussing hydrinos.

The energies represented by **T** and **E** together provide 75%. In the epilogue we will observe that the story of **DE** doesn't add up. As a Matter of fact, the amount **DE** represents less than half of the proposed 73%.

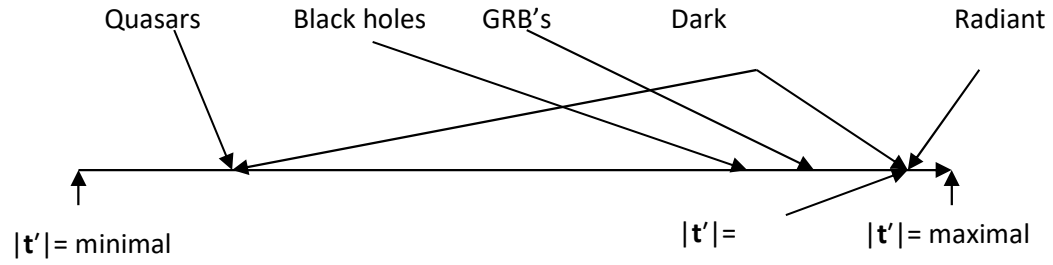
The amount $\#_t$ is a result of the amount of the energy of Matter according to the general formula of energy $E_{Rk} = r_{k-1} .i^{k-1} [h. \#_t /t'].c^{k-1}$.



The magnitude of the affinity appears to influence the amount of **t**' of the particles in question. Translated into a diagram, these effects are represented as follows.



The above figures violate reality because the deceleration curve of the course of time looks totally different; it is a straight line. We can clarify this by tweaking the last figure.



As everything has to be preserved in Now, the maxima need to be decelerated and the minima accelerated. From a relativistic viewpoint, increasing the speed causes a deceleration of time and this way the maxima decelerate. That would imply that the least energy-rich photons fly fastest, that electrons have to develop speed to remain in Now and that quarks perhaps have no need for acceleration because they find themselves on the average.
In this phase of the development of the Model, it is still unclear what it is exactly that can accelerate the minima: gravity, rotation? It does entail though that the 50% POTENCY in +**t**' will be converted in energy of Matter on the one hand and gravitational phenomena on the other. The other 50% of POTENCY in the other courses will be transformed into the other forces and their energies.