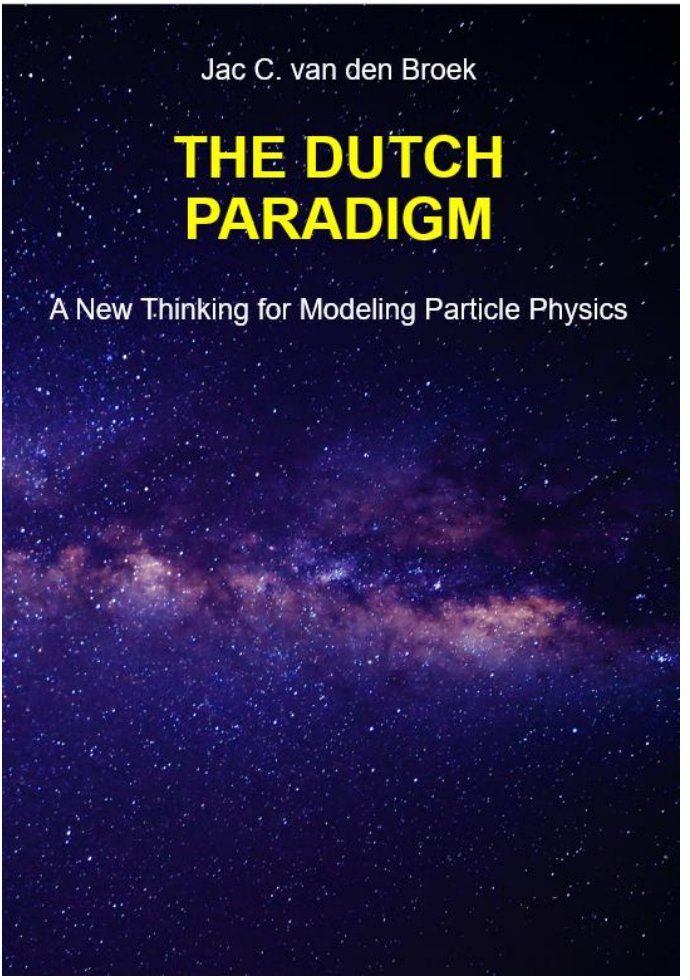
The Dutch Paradigm



Jac C. van den Broek

The Dutch Paradigm

A New Thinking for Modeling Particle Physics

Stichting The Dutch Paradigm

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Proton, neutron

Building the atom

Topics on

Validity of assumptions

1. INTRODUCTION

This book provides food for thought to widen the scientific view of the physical reality in which we live. We all have our subjective view and lots of common questions why we are here as an individual, as a human being.

We understand enough of the physical reality to use technology to bend reality to our wishes. Nevertheless, whatever we make, it will decay and recycle to its natural constituent components. We manipulate the basic "material" of our physical world like protons, electrons and most of the elements, but as the alchemists experienced, making gold is a bridge too far.

The observations of our physical reality translate into laws of nature we can apply for our technology to make life more comfortable. However, digging into the smallest details of this physical reality, we get lost. Though many scientists are trying to convince us that we are almost there in finding the Theory of Everything, we know this is far from a realistic appraisal. We have seen that scientists in Particle Physics have entered the realms of metaphysics, but still pretend to "report on objectively verifiable observations" of what in fact is not open for observation.

This work describes the outcome of a holistic thought process to search for more coherence in well-known observations. Not by reduction from complexity into fundamental parts, but in the causality of fundamental manifestations of entities we know as photons and neutrinos. We experience these manifestations through a time driven casual sequence of changes in electromagnetic phenomena.

The widely available and validated data as published by experimental physicists was input for that thought process. There has been no intentional bending of facts towards a preferred outcome. Additional first principles are stated as perceived as relevant. The subsequent thinking process can be checked on its coherence in the logic outcome as discussed in this study.

The results were unexpected, and a new paradigm for modeling emerged.

The Dutch Paradigm

The content of this book reflects the present status in "time." The outcome so far is overwhelming by the beauty of the extremely tiny world. It is the opposite of complexity, and the reader is invited to follow the steps in the modeling done. It starts with the Big Bang and follows up to and including the logic in understanding the

atoms and elements. It is a total revision that allows modeling the observations into a full new paradigm.

Understanding this holistic thought process requires knowledge and understanding of observations as available in Particle Physics. The reliable scientific information reflects data gathered through research by reduction. Some of this information needs a review and guidance given to links to publicly known and accepted data.

The sections for The Dutch Paradigm required a minimum of scientifically acceptable verbalization. Didactical material like illustrations and animations elucidate the paradigm. The animations are available on the website www.thedutchparadigm.org .

We hope that the reader will understand this new paradigm and open its mind for a better view of the world in which we live.

2. BIG BANG

The Big Bang theory is the prevailing cosmological model to explain the early development of the universe. The Dutch Paradigm presents as postulate a sequence of initial events before this early development.

There are various theories about the Big Bang, and particularly about the first extremely short period that occurred after this major event. We could describe all these theories here, but this will not be done because so far, none of them have proven to be consistent with an overall logic explanation. Similarly, religious explanations are not publicly accepted either. It is clear that humanity has always had a profound belief in some mix of eternity and a fall out of a paradise. However, these descriptions are stated in wordings that may have been acceptable for our "ancestors" but are no longer valid as logical explanations by the scientific community.

A common thread in almost all theories that currently prevail and attract credible scientific attention is a strong belief that some form of manifestation of mass as a property of matter and similarly that of energy could be and was concentrated at an extremely high density. Before the Big Bang, both physical phenomena were assumed to be in a kind of "hot spot." Most scientists are reluctant to accept that the very beginning of the universe emerged from a singularity. One of the originators of the Big Bang theory was Monsignor Georges Lemaître, a Roman Catholic priest. He thought that:

> *If the world has begun with a single quantum, the notions of space and time would altogether fail to have any meaning at the beginning; they would only begin to have a sensible meaning when the original quantum had been divided into a sufficient number of quanta. If this suggestion is correct, the beginning of the world happened a little before the beginning of space and time.*

It is also obvious that the Albert Einstein's equation $E=mc^2$ has serious constraints for application in a singularity or whatever definition of such a hot spot.

It does not allow for mass in such a singularity.

There is a high lack of clarity on what happened in the very first period of the beginning of our universe, up to the universe's first seconds. Having said this, we must acknowledge that both measuring time and stating a time lapse in seconds, refers to our perception of measurable dimensions. Nevertheless, it is possible to use this system of measurements as our standard, and as a result, we have defined, therefore, the International System of Units (or the SI system).

There are various representations of the present state of speculations regarding this first period.

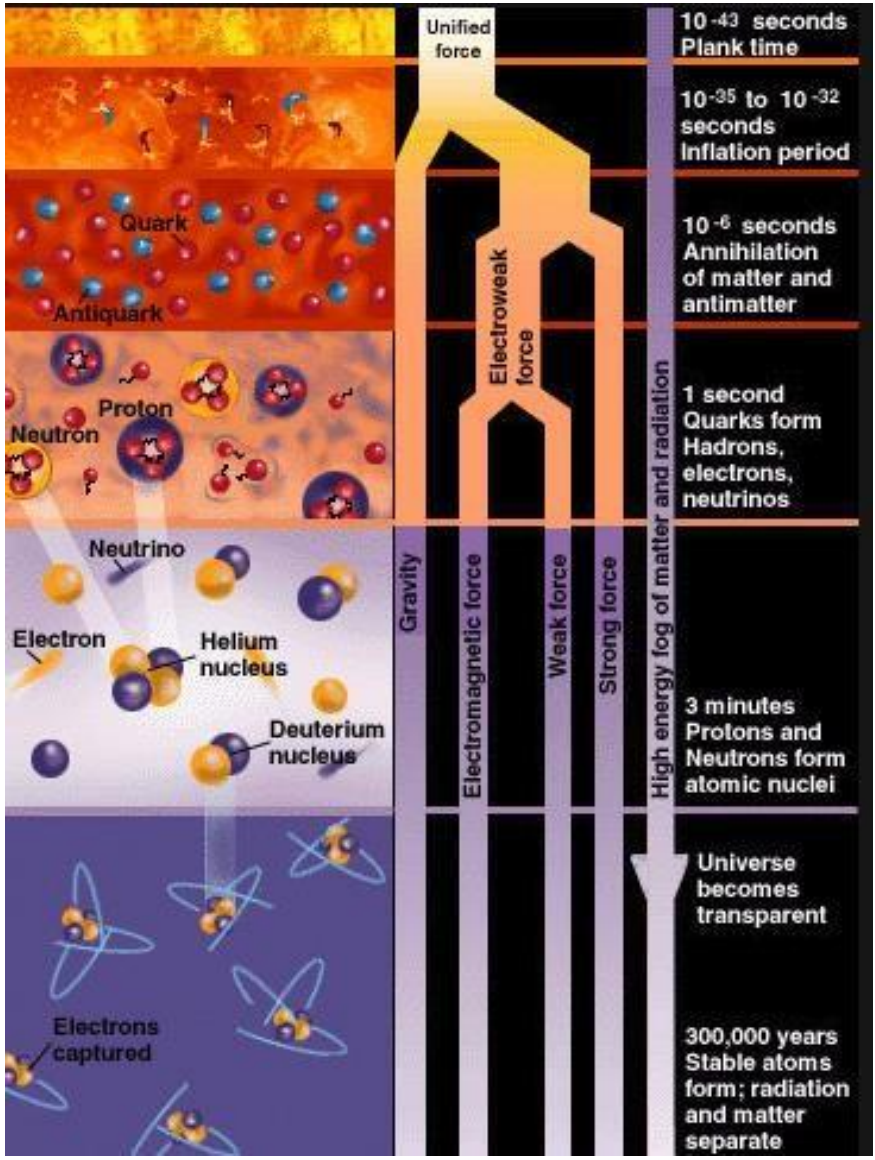
This graphic representation shows most of the actual ideas.

After 1 second, the assumption is that fundamental particles and their interactions were recognizable and entered a state of a metastable equilibrium while subjective to the impact of four different types of forces: the strong nuclear force and the weak nuclear force, the electromagnetic force and gravity.
Each of these fundamental particles and interactive forces has been subject to intense investigation by methods of reduction of particles, leading to the Standard Model of Fundamental Particles and Interactions.

So far, the scientific understanding of the prevailing cosmological ideas on the Big Bang.

Hereafter is a postulate for a possible alternative explanation for the initial events. It is a fundamentally different idea and imperative to understand the paradigm as discussed on this site.

In this explanation, we will use notions like space and time as we are familiar to us. These notions will be used only to explain the idea, and therefore we need to link into a set of notions as commonly perceived as reality. Monsignor Georges Lemaître also indicated that these notions need further understanding and this will be discussed these later in this study.



Source RedOrbit

Based on the law of conservation of energy and assuming that only after the first short period this law became valid, we may logically conclude that at the very start of the universe, there was an outburst of an enormous amount of energy. That was a new phenomenon. The word outburst to be used because it is as if that energy was not there before the start. Additionally, after this first extremely short period, we observe and understand that all kind of impacts and forces became active to interfere with the manifestations of entities by that free, uncompensated energy.

Herewith we like to suggest that this could well have happened in three specific stages:

1. **A status in which there was no observable physical exposure to energy or other physical phenomena at all**
2. **An apparent outburst of manifestations of energy during a very short period of what we call time**
3. **A period in which all kind of forces became active to create some order and transformations due to inference of the exposed free energy on entities**

This last period is relatively well known. It is in the center of a lot of theories, which range from a description of the composition of atoms up to the theory of evolution.

It is obvious that whatever we state about this very start of the Universe, will by definition be a simplified model of such an event. Therefore, there will be only a claim for indicating which driving principles could have come into action to allow observation by humanity. All as discussed previously.

What could have happened in these first two periods and in the very first amount of time in period three?

PERIOD 1.

The first status: a status in which there was no energy exposure energy at all

When we focus on this status, in which there was no manifestation of energy physically apparent or detectable, we can logically assume that there was no physical exposure. Some sort of captivity could have been present in what is familiar known to us in the analogy of potential energy. To keep this energy in rest and/or to avoid exposure, it requires compensation by another form of energy that could balance to perpetual rest. No motion induced by energy at all. This balancing arrangement was obviously totally perfect up to the start of the universe.

However, a balance on what?

We herewith like to introduce entities into the discussion now.

Again, whether one calls them entities or virtual particles or point particles, it means that the assumption is that there were manifestations of energy that were linked to and active and counteractive on entities and that those energies were perfectly in balance to rest. These entities are dimensionless and can show their existence only by their manifestations. If these manifestations were in a total perfect balance to rest, and only had potential energy, then there was nothing physical detectable in the universe. There was just rest in a singularity.

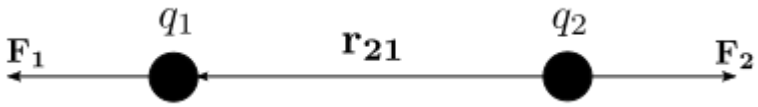
> *This perfect rest was absent during a very short period of what we call time.*

PERIOD 2.

An apparent outburst of manifestations of energy during a very short period of what we call time

From the moment that this perfect rest was absent, uncompensated carriers of energy became physically observable. It is likely that this was the energy of a nature that we experience as what we have named electrical energy. It does have characteristics that we observe as being related to electrical “charges.”

We know that electrical charges of the same nature repel each other.



These forces are acting due to the electric charges. Because we are only familiar with electrical charges bound to particles, we have a hidden assumption that these forces can only work on so-called fermions. The repulsive force can accelerate fermions in a near field, so the forces are relative to the distance between two fermions that carry electric charges. The scalar and vector forms of the mathematical equation are:

$$|\mathbf{F}| = k_e \frac{|q_1 q_2|}{r^2}$$ and $$\mathbf{F}_1 = k_e \frac{q_1 q_2}{|\mathbf{r}_{21}|^2} \hat{\mathbf{r}}_{21},$$ respectively

There is merit to think that there is no justification that this assumption is only valid for fermions. There is no indication in the mathematical expression that assumes mass manifestation as a prerequisite for a force to exercise its existence on entities involved.

Now, let us assume that during this short period in which this perfect balance was absent, all the entities that were subject to this event generated a manifestation of an uncompensated, free amount of electric energy that exercised repelling forces relative to each other. These forces brought the related entities into physical motion and “space and time” started to emerge. In other words, the related entities were on the move and showed their existence by their manifestation of the (free) electric energy on the move.

Note: The notions space and time are part of the clarification. That triggers the question: have the entities accelerated from zero to the speed of light in this short period? We will refrain from discussing this issue at this stage of explaining The Dutch Paradigm, the question is linked to our notion of time and assumes that is a continuous phenomenon. This issue is not addressed in the prevailing theories as well, though we accept in Quantum Physics that we cannot conclude on the status of phenomena in transition per Planck period.

We observe a space around us in three dimensions, so we may assume that these entities are also showing their physical existence with their electric energy manifestations in a three-dimensional universe.

PERIOD 3:

A period in which all kind of forces became active to create some order and transformations related to the exposed free energy on entities

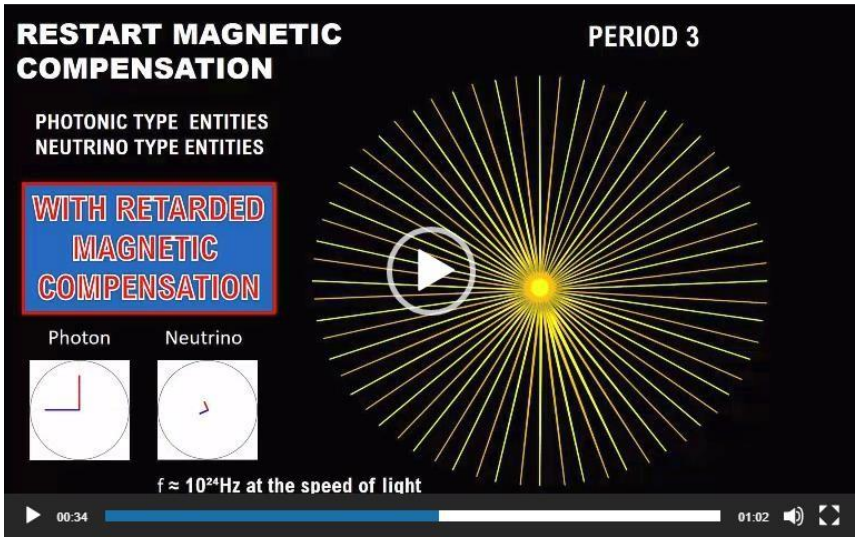
After a short period, the compensating counteractive energy started to show the impact again on each entity. This counteractive energy is known to us as magnetism. It is part of the duality of the electromagnetic system. As from this moment onwards, we can recognize that duality as the electromagnetic wave of an entity.

*This system of active and counteractive energy - the magnetic manifestation - started again, but in its **original capacity.** It cannot compensate for the portion of uncompensated, free electric energy as was a manifestation of the entity in the short period of the outburst, period 2.*

We observe that the total amount of free energy exposed to space is fixed and preserved, as from that moment of time.

The observable universe was in existence and the perception of time had started.

In a short-simplified animation:



The crucial question now to be addressed:

> *If we have a fixed amount of free energy available as a physical manifestation of the existence of entities, with retarded magnetic compensation, what could be the meaning of this for us as conscious human observers?*

Standard Model of
FUNDAMENTAL PARTICLES AND INTERACTIONS

The Standard Model is a quantum theory that summarizes our current knowledge of the physics of fundamental particles and fundamental interactions (interactions are manifested by forces and by decay rates of unstable particles).

FERMIONS
matter constituents
spin = 1/2, 3/2, 5/2, ...

Leptons spin = 1/2

Flavor	Mass GeV/c²	Electric charge
ν_e lightest neutrino*	(0–0.13)×10⁻⁹	0
e electron	0.000511	−1
ν_μ middle neutrino*	(0.009–0.13)×10⁻⁹	0
μ muon	0.106	−1
ν_τ heaviest neutrino*	(0.04–0.14)×10⁻⁹	0
τ tau	1.777	−1

Quarks spin = 1/2

Flavor	Approx. Mass GeV/c²	Electric charge
u up	0.002	2/3
d down	0.005	−1/3
c charm	1.3	2/3
s strange	0.1	−1/3
t top	173	2/3
b bottom	4.2	−1/3

*See the neutrino paragraph below.

Spin is the intrinsic angular momentum of particles. Spin is given in units of h, which is the quantum unit of angular momentum where $h = h/2\pi = 6.58\times10^{-25}$ GeV s = 1.05×10^{-34} J s.

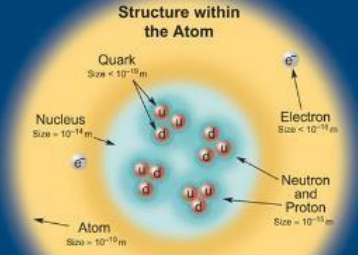
Electric charges are given in units of the proton's charge. In SI units the electric charge of the proton is 1.60×10^{-19} coulombs.

The energy unit of particle physics is the electronvolt (eV), the energy gained by one electron in crossing a potential difference of one volt. **Masses** are given in GeV/c² (remember $E = mc^2$) where 1 GeV = 10^9 eV = 1.60×10^{-10} joule. The mass of the proton is 0.938 GeV/c² = 1.67×10^{-27} kg.

Neutrinos
Neutrinos are produced in the sun, supernovae, reactors, accelerator collisions, and many other processes. Any produced neutrino can be described as one of three neutrino flavor states ν_e, ν_μ, or ν_τ, labelled by the type of charged lepton associated with its production. Each is a defined quantum mixture of the three definite mass neutrinos ν_1, ν_2, and ν_3 for which currently allowed mass ranges are shown in the table. Further exploration of the properties of neutrinos may yield powerful clues to puzzles about matter and antimatter and the evolution of stars and galaxy structures.

Matter and Antimatter
For every particle type there is a corresponding antiparticle type, denoted by a bar over the particle symbol (unless + or − charge is shown). Particle and antiparticle have identical mass and spin but opposite charges. Some electrically neutral bosons (e.g., Z^0, γ, and $\eta_c = c\bar{c}$ but not $K^0 = d\bar{s}$) are their own antiparticles.

Structure within the Atom



If the proton and neutrons in this picture were 10 cm across, then the quarks and electrons would be less than 0.1 mm in size and the entire atom would be about 10 km across.

BOSONS
force carriers
spin = 0, 1, 2, ...

Unified Electroweak spin = 1

Name	Mass GeV/c²	Electric charge
γ photon	0	0
W^-	80.39	−1
W^+ W bosons	80.39	+1
Z^0 Z boson	91.188	0

Strong (color) spin = 1

Name	Mass GeV/c²	Electric charge
g gluon	0	0

Color Charge
Only quarks and gluons carry "strong charge" (also called "color charge") and can have strong interactions. Each quark carries three types of color charge. These charges have nothing to do with the colors of visible light. Just as electrically-charged particles interact by exchanging photons, in strong interactions, color-charged particles interact by exchanging gluons.

Quarks Confined in Mesons and Baryons
Quarks and gluons cannot be isolated – they are confined in color-neutral particles called **hadrons**. This confinement (binding) results from multiple exchanges of gluons among the color-charged constituents. As color-charged particles (quarks and gluons) move apart, the energy in the color-force field between them increases. This energy eventually is converted into additional quark-antiquark pairs. The quarks and antiquarks then combine into hadrons; these are the particles seen to emerge.

Two types of hadrons have been observed in nature **mesons** $q\bar{q}$ and **baryons** qqq. Among the many types of baryons observed are the proton (uud), antiproton ($\bar{u}\bar{u}\bar{d}$), neutron (udd), lambda Λ (uds), and omega Ω^- (sss). Quark charges add in such a way as to make the proton have charge 1 and the neutron charge 0. Among the many types of mesons are the pion π^+ ($u\bar{d}$), kaon K^- ($s\bar{u}$), B^0 ($d\bar{b}$), and η_c ($c\bar{c}$). Their charges are +1, −1, 0, 0 respectively.

Properties of the Interactions
The strengths of the interactions (forces) are shown relative to the strength of the electromagnetic force for two u quarks separated by the specified distances.

Property	Gravitational Interaction	Weak Interaction (Electroweak)	Electromagnetic Interaction	Strong Interaction
Acts on:	Mass – Energy	Flavor	Electric Charge	Color Charge
Particles experiencing:	All	Quarks, Leptons	Electrically Charged	Quarks, Gluons
Particles mediating:	Graviton (not yet observed)	W^+ W^- Z^0	γ	Gluons
Strength at 10^{-18} m	10^{-41}	0.8	1	25
Strength at 3×10^{-17} m	10^{-41}	10^{-4}	1	60

Visit the award-winning web feature *The Particle Adventure* at
ParticleAdventure.org

This chart has been made possible by the generous support of:
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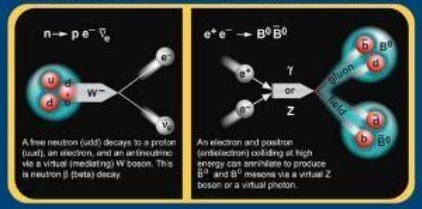
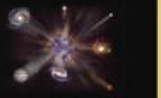
Particle Processes
These diagrams are an artist's conception. Blue-green shaded areas represent the cloud of gluons.



A free neutron (udd) decays to a proton (uud), an electron, and an antineutrino via a virtual (mediating) W boson. This is neutron β (beta) decay.

An electron and positron (antielectron) colliding at high energy can annihilate to produce B^0 and $\bar{B}^0$ mesons via a virtual Z boson or a virtual photon.

Unsolved Mysteries
Driven by new puzzles in our understanding of the physical world, particle physicists are following paths to new wonders and startling discoveries. Experiments may even find extra dimensions of space, mini-black holes, and/or evidence of string theory.

Universe Accelerating?

The expansion of the universe appears to be accelerating. Is this due to Einstein's Cosmological Constant? If not, will experiments reveal a new force of nature or even extra (hidden) dimensions of space?

Why No Antimatter?

Matter and antimatter were created in the Big Bang. Why do we now see only matter except for the tiny amounts of antimatter that we make in the lab and observe in cosmic rays?

Dark Matter?

Invisible forms of matter make up much of the mass observed in galaxies and clusters of galaxies. Does this dark matter consist of new types of particles that interact very weakly with ordinary matter?

Origin of Mass?

In the Standard Model, for fundamental particles to have masses, there must exist a particle called the Higgs boson. Will it be discovered soon? Is supersymmetry theory correct in predicting more than one type of Higgs?

3.THE STANDARD MODEL

The Standard Model of Fundamental Particles and Interactions provides - as per the currently prevailing paradigm - a graphic overview of the basic understanding of what is observed and translated into theories.

This Standard Model is also a point of reference for this book when The Dutch Paradigm suggests an alternative interpretation of observations.

In this Standard Model, there is a basic split in particles which are supposed to constitute matter (fermions) and particles that are supposed to be and referred to as force carriers (bosons). Each of these types of fundamental particles is constituents of more complex particles that are (meta)stable, with a (very) long lifetime before decay and particles that only show up during extremely short periods of time before decay into more stable particles occur.

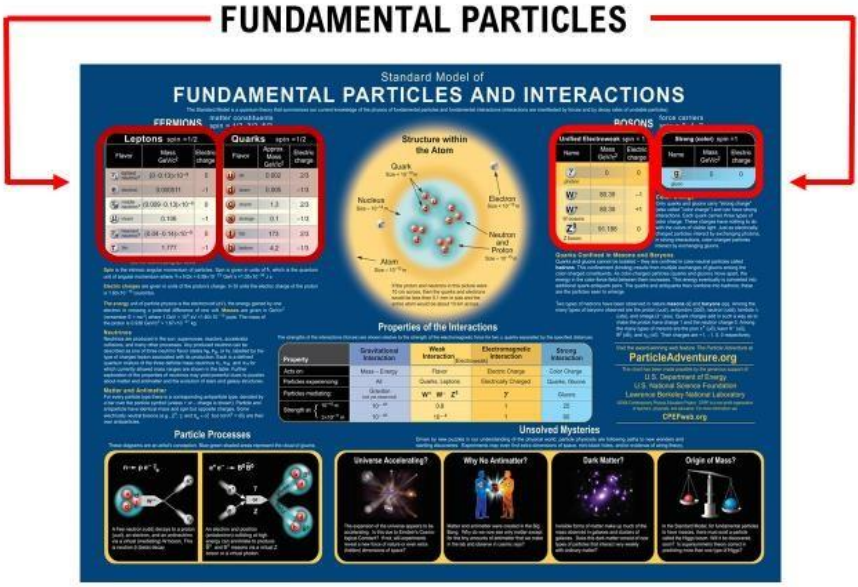
The main physical properties attributed to these particles are spin, mass, and electric charge. For each of these particles, specifically for the most stable ones, more specific descriptions and attributions of physical properties are available, will also be referred to in this site.

Each of the main physical properties is subject to a separate chapter.

4.POINT PARTICLES

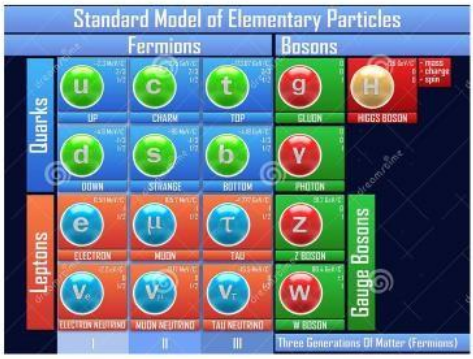
Fundamental or Elementary Particles as declared in the Standard Model, are assumed to be Point Particles.

Particles are either Fermions or Bosons. This relative to a characteristic called spin. Bosons have spin=1 and Fermions spin=1/2, values attributed per definition.



Fermions are so-called mass carriers and appreciated as the base ingredient for the matter. In the classical physics observed in everyday life, the matter is any substance that has mass and takes up space by having volume. That includes atoms, and anything made up of these, but not other energy phenomena or waves such as light or sound.

Fermions are subdivided into two categories, being Leptons and Quarks. Leptons can be observed in naked form, while Quarks are always a constituent of another particle.



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An antimatter particle for each elementary particle

All elementary particles are assumed to be point particles.

The fundamental particles are assumed to be point particles. The defining feature is that it lacks spatial extension: being zero-dimensional, it does not take up space. It is obvious that it is hard to accept that a particle that does not take up space has characteristics that eventually allow to build up to an object that we can observe. Hence, modern physics theories such as String Theory start with the axiom that all physical entities have a spatial extension. However small they may be. But, if it has spatial extension and mass, then the next question is: does it have substance and by what definition?

The fundamental particle is there, but we can only observe it through its respective manifestations. It is not physically tangible and alike a pedestrian that marks its footprint but is afterward invisible as a person.

The Dutch Paradigm accepts that fundamental particles as point particles have no spatial extension. Instead of using the name point particles, we prefer to use the notion of entity. It is a thing with distinct and independent existence; it is a *thing-in-itself* that must be distinguished from the properties it bears.

It is as defined by Immanuel Kant

> *Immanuel Kant argued the sum of all objects, the empirical world, is a complex of appearances whose existence and connection occur*

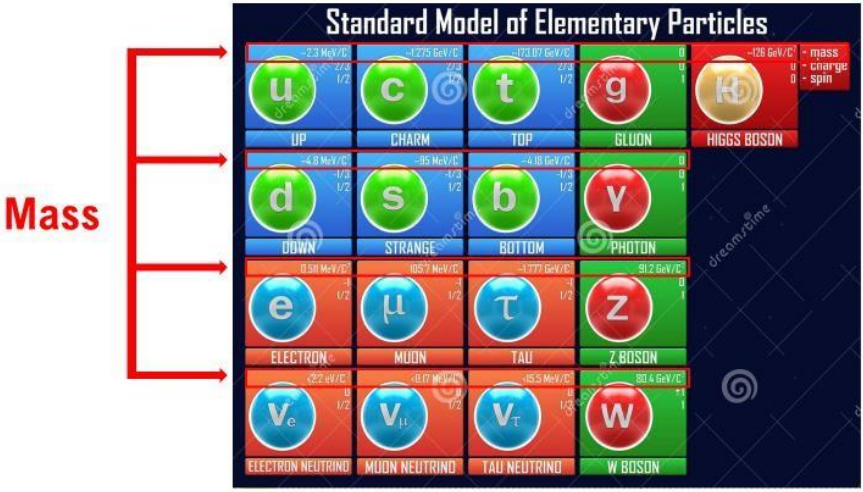
> *only in our representations. Kant introduces the thing-in-itself as follows:*
>
> *And we indeed, rightly considering objects of sense as mere appearances, confess thereby that they are based upon a thing in itself, though we know not this thing as it is in itself, but only know its appearances, viz., the way in which our senses are affected by this unknown something.— Prolegomena, § 32*

Now, if all elementary particles are point particles, then it is difficult to visualize how combinations of these elementary particles can result in constructs that are physically tangible.

In regular science, we identify a phenomenon called the Pauli Exclusion Principle.

This principle describes that certain types of point particles are not allowed to take the same position in space. It governs the rules that we can stand on the floor rather than sink through. It provides matter with the ability to become tangible.
It also allows for the macrocosmic behavior of matter as we experience in our daily life. We experience gravitation, we know that we must exert a force to accelerate matter and crashing to a sudden stop is painful.

In the Standard model is accepted that mass can be a property of an elementary point particle and mass apparently does not require a spatial extension.



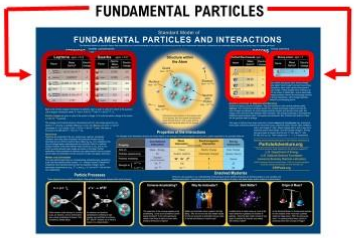
Source dreamtime

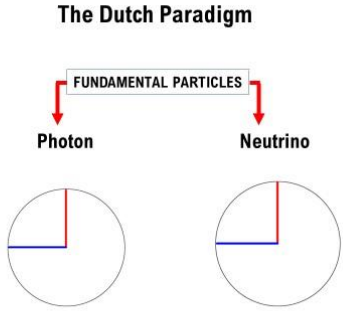
The idea that mass does not require spatial extension is difficult to comprehend. For Particle Physics, is, therefore, a convention to use as metrics for the property mass the equivalent of its energy content as per the famous equation $E=mc^2$ of Albert Einstein.

$$E = mc^2$$

$$\text{Mass} \longrightarrow m=E/c^2 \longrightarrow \text{eV}/c^2$$

Earlier is already postulated as per The Dutch Paradigm, that the only elementary particles that exist in the universe are photons and neutrinos and by definition, these are point particles.





For animation see www.thedutchparadigm.org

It is a challenge to demonstrate and explain how these two elementary particles in mutual interference show mass-like behavior, more specifically show gravitational and inertia to a world outside of their existence.

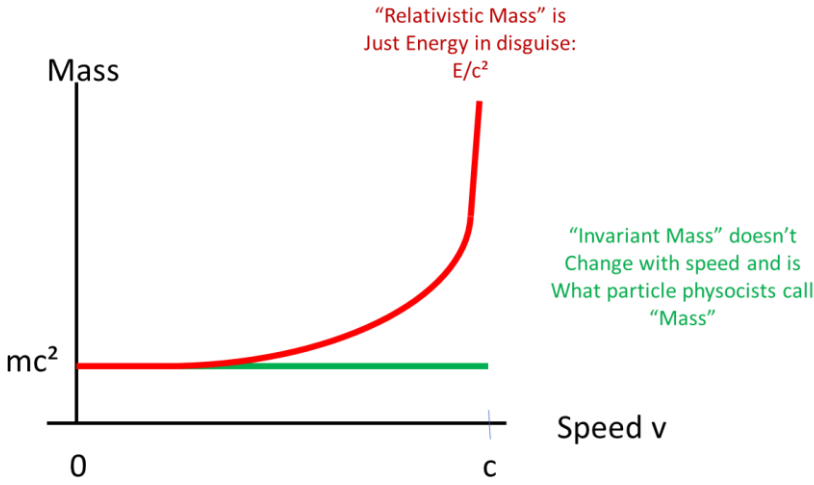
We know the photon as the prime source of light and electromagnetic radiation. A basic understanding of the properties and behavior of the neutrino is necessary and described in subsequent chapters.

5.MASS

Mass is assumed to be one of the three major physical properties of fundamental particles.

Mass is a property of matter that was first described in mathematical form by Isaac Newton in the year 1687. Mass is a property of a physical body that determines the body's resistance to being accelerated by a force and its mutual gravitational attraction with other bodies.

With Einstein's extension of the properties of mass with the notion of them also being relativistic towards a transformation into energy, it was necessary to redefine this physical property. That was by introducing the terms invariant mass and relativistic mass, as highlighted in this picture:

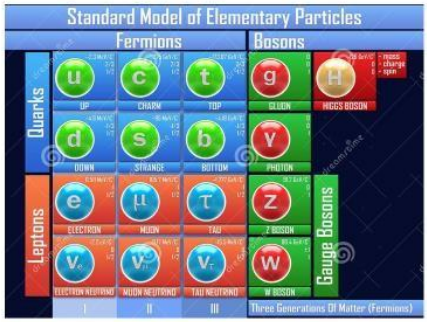


The two interpretations of what "mass" means. The first (in green) is that mass is something that does not change with speed — often called "invariant mass" or "rest mass," it is used by particle physicists. The other, "relativistic mass," is just energy divided by c-squared, and grows with speed. Note the two are almost identical at small

velocities, and so are usually equal in daily life. *Ref.* [Matt Strassler]

Although this is clear among physicists, its logic is not entirely consistent. There is a hidden assumption in this thinking: that the invariant mass is not "energy in disguise," but is instead a separate, identifiable, physical property of matter. It is possible to imagine that within a particle with a so-called invariant mass, there is still only energy, but in a form, that cannot be distorted by us anymore by a further "mechanical" reduction. Therefore it is identifeid as a fundamental particle, and consequently, we attribute invariant mass to such a fundamental particle as a separate physical property. It is indicative that we use its energy equivalent, eV/c^2 as a measure of invariant mass.

In the Standard Model, we have fundamental particles within the group of Fermions that are assumed to have mass.



+

An antimatter particle for each elementary particle

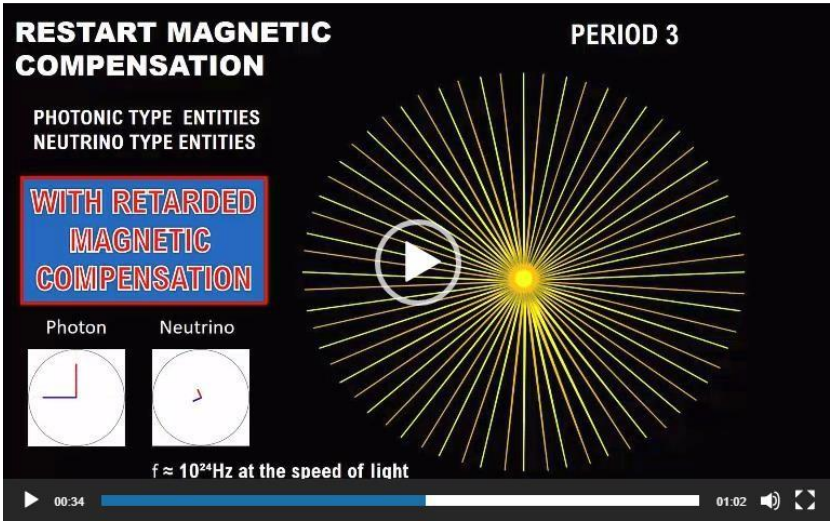
All elementary particles are assumed to be point particles.

This phenomenon is observable in isolation for Leptons, in naked form, but not so for Quarks. Quarks are part of constructs like the proton and neutron. Both proton and neutron show a substantial mass phenomenon, and therefore, the assumption is that Quarks have a comparable mass manifestation.

Fermions are the matter and anti-matter particles and basic for the mass behavior of atoms.

In the chapter on the beginning of the universe, The Dutch Paradigm postulated that only two types of fundamental particles exit, being the photon and neutrino.

This animation was made available (www.thedutchparadigm.org):



Such an animation can be helpful as a didactic tool, in so far as it supports a better understanding of an idea. For this stage of the explanation of the ideas as in The Dutch Paradigm, it is sufficient to highlight that only two fundamental particles - the photon and the neutrino - are required to eventually construct the world as we experience with our sensorial perceptions. With The Dutch Paradigm, it is a first principle that only photons and neutrinos became observable at the occasion of the Big Bang.

Within this first principle, the neutrino in naked form has a tiny mass manifestation. Therefore, another postulate is that all particles that exhibit

mass like behavior, have at least one neutrino in it. Either naked and at different levels of frequency or in a construct with a photon.

The mere fact that we are not able yet to reduce “heavy” particles like the proton triggers the continuation of a hidden assumption that invariant mass is a physical reality that links to an origin.

> *It is entirely possible that we are searching for a microscopic nonexisting physical property.*

Therefore, if (some of) the fundamental particles, as defined in the Standard Model, are constructs, it could be that what we indicate as invariant mass is also “energy in disguise.” The fact that we call these fermions and bosons fundamental is because we have not been able yet to reduce them in possible constituents. It could also be possible that we will never be able to do so, due to some currently unknown laws of nature. However, the fact of our own inability to further split these particles is not enough to accept these particles as ultimate fundamental particles.

6.ELECTRIC CHARGE

Electric charge is another physical property attributed to fundamental particles.

The description of electric charge (wikipedia):

> ***Electric charge*** *is the physical property of matter that causes it to experience a force when close to other electrically charged matter. There are two types of electric charges – positive and negative. Positively charged substances are repelled from other positively charged substances, but attracted to negatively charged substances; negatively charged substances are repelled from negative and attracted to positive. An object will be negatively charged if it has an excess of electrons, and will otherwise be positively charged or uncharged. The SI derived unit of electric charge is the coulomb (C), although in electrical engineering it is also common to use the ampere-hour (Ah), and in chemistry, it is common to use the elementary charge (e) as a unit. The symbol Q is often used to denote a charge. The study of how charged substances interact is classical electrodynamics, which is accurate insofar as quantum effects can be ignored.*
>
> *The electric charge is a fundamental conserved property of some subatomic particles, which determines their electromagnetic interaction. Electrically charged matter is influenced by and produces electromagnetic fields. The interaction between a moving charge and an electromagnetic field is the source of the electromagnetic force, which is one of the four fundamental forces (See also magnetic field).*

The electric charge is manifest as a force close to other electrically charged particles. In the Standard Model, the electron has an electric charge, while assumed to be a point particle. How to describe and visualize the impact of an electric charge? It requires understanding a point particle as being nontangible and non-visible without spatial extension, but with mass and an electric charge. This implies the electron to be material and physical.

This interaction exerts in space, and we assign to an electrically charged particle the property of an “electromagnetic field.” That electromagnetic field is not a physical reality, but an interference potential when electrically charged particles are moving relative to each other on short distance.

The description tunes towards the impact of an electric charge on other particles under specific circumstances and conditions.

Electric charge is a relativistic invariant. That means that whatever amount of energy we deploy in, for instance, a hadron collider, it does not create an impact on the electric charge. The relativistic mass may increase enormously, but it does not affect the electric charge of the matter. Also, the electric charge is independent of the invariant mass, because the electric charge of an electron and the electric charge of a proton carry the same amount of charge, but with a perceived different character. We define this perceived difference into a positive and a negative electric charge.

A positive and a negative charge attract each other. That as formulated in Coulomb’s law. By convention, the electric charge of an electron is negative and that of a proton positive. The absolute values of both types of charges are assumed to be equal, as they may annihilate each other.

7.SPIN

The third physical property attributed to fundamental particles is spin.

Spin is a phenomenon in quantum physics. Let us first examine the history.

Wikipedia:

> *Spin was first discovered in the context of the emission spectrum of alkali metals. In 1924 Wolfgang Pauli introduced what he called a "two-valued quantum degree of freedom" associated with the electron in the outermost shell. This allowed him to formulate the Pauli exclusion principle, stating that no two electrons can share the same quantum state at the same time.*

> *The physical interpretation of Pauli's "degree of freedom" was initially unknown. Ralph Kronig, one of Landé's assistants, suggested in early 1925 that it was produced by the self-rotation of the electron. When Pauli heard about the idea, he criticized it severely, noting that the electron's hypothetical surface would have to be moving faster than the speed of light in order for it to rotate quickly enough to produce the necessary angular momentum. This would violate the theory of relativity. Largely due to Pauli's criticism, Kronig decided not to publish his idea.*

> *In the autumn of 1925, the same thought came to two Dutch physicists, George Uhlenbeck and Samuel Goudsmit. Under the advice of Paul Ehrenfest, they published their results. It met a favorable response, especially after Llewellyn Thomas managed to resolve a factor-of-two discrepancy between experimental results and Uhlenbeck and Goudsmit's calculations (and Kronig's unpublished ones). This discrepancy was due to the orientation of the electron's tangent frame, in addition to its position.*

Mathematically speaking, a fiber bundle description is needed. The tangent bundle effect is additive and relativistic; that is, it vanishes if c goes to infinity. It is one half of the value obtained without regard for the tangent space orientation, but with opposite sign. Thus, the combined effect differs from the latter by a factor two (Thomas precession).

Despite his initial objections, Pauli formalized the theory of spin in 1927, using the modern theory of quantum mechanics invented by Schrödinger and Heisenberg. He pioneered the use of Pauli matrices as a representation of the spin operators and introduced a two-component spinor wave-function.

Pauli's theory of spin was non-relativistic. However, in 1928, Paul Dirac published the Dirac equation, which described the relativistic electron. In the Dirac equation, a four-component spinor (known as a "Dirac spinor") was used for the electron wavefunction. In 1940, Pauli proved the spin-statistics theorem, which states that fermions have half-integer spin and bosons integer spin.

In retrospect, the first direct experimental evidence of the electron spin was the Stern–Gerlach experiment of 1922. However, the correct explanation of this experiment was only given in 1927.

It is noticeable that the physical property of spin at first linked into an exclusion principle that determined that no two electrons can share the same quantum state at the same time. This so-called Pauli exclusion principle is a statement of what is observed. There is no theory available to back up this principle. In this respect, spin is a quantum mechanics property and assumed to be non-relativistic. Spin was also assumed to be a magnetic momentum that was related to a fundamental particle. The true cause of this spin was (and still is) unclear, but this property has proven to be affected by a magnetic field outside the particle, and the magnetic field generated by the spin carrying particle itself is shown to be measurable. MRI apparatus use this phenomenon.

There is much theoretical work currently being done on spin, and there is not a great deal of value in describing this work in the framework of The Dutch Paradigm. As a result, we take notice of this theoretical work, including the property of spin quantum numbers as described below.

Wikipedia:

Spin quantum number

As the name suggests, spin was originally conceived as the rotation of a particle around an axis. This picture is correct, so far as spin obeys the same mathematical laws as quantized angular momenta. On the other hand, spin has some peculiar properties that distinguish it from orbital angular momenta:

- *Spin quantum numbers may take half-integer values.*
- *Although the direction of spin can be changed, an elementary particle cannot be made to spin faster or slower.*
- *The spin of a charged particle is associated with a magnetic dipole moment with a g-factor that differs from 1. This could classically if the internal charge of the particle was distributed differently from its mass.*

The conventional definition of the spin quantum number s is s = n/2, where n can be any non-negative integer. Hence the allowed values of s are 0, 1/2, 1, 3/2, 2, etc. The value of s for an elementary particle depends only on the type of particle, and cannot be altered in any known way (in contrast to the spin direction described below). The spin angular momentum S of any physical system is quantized. The allowed values of S are:

$$S = \frac{h}{2\pi}\sqrt{s(s+1)} = \frac{h}{4\pi}\sqrt{n(n+2)},$$

where h is the Planck constant. In contrast, orbital angular momentum can only take on integer values of s, even values of n.

Based on this spin quantum number, fermions and bosons are different types of fundamental particles.

- *Fermions have spin of 1/2, 3/2, 5/2 …. , called half-integer spin and are assumed to be matter constituents. They obey Fermi-Dirac statistics.*
- *Bosons have spin of 0,1,2,…. called integer spin and are assumed to be force carriers. They obey Bose-Einstein statistics.*

Spin is the quantum mechanics notation for the Pauli exclusion principle. If a spin quantum number is 1/2, 3/2, and so on, then the Pauli exclusion principle states spatial restrictions for fermions, and when the spin is 1, 2,… and so, these restrictions are not applicable, as in the case of bosons.

The Dutch Paradigm will clarify the impact of spin on a neutrino and an electron. The history of the discovery of spin behavior is related to measurements on electrons in the outermost shell of an atom. This behavior was translated into the so-called Pauli exclusion principle, stating that no two electrons can share the same quantum state at the same time, but there is no theory as a back-up.

It will be clarified that spin in an electron in the outer shell of an atom induces spinor behavior, while spin in a naked neutrino is responsible for asymmetry in chirality, preferable being left handed. Both phenomena interrelate with the wave/particle behavior of neutrinos and photons.

8.ENERGY

The Standard Model has a strong focus on particles and the interactions between them: energy is the driving motivator.

Particles with half-integer spin are called fermions, and those with integer spin are called bosons. Fermions are matter constituents and bosons are assumed to be force carriers.

However, there is no focus on energy in the Standard Model.

Energy itself is the notion of ability to do something in between particles which are under exposure of this property. For a naked particle, it is a potential. Therefore, energy is also often referred to as the ability to perform "work." In physics, energy is one of the basic quantitative properties that describes a physical system or an object's state.

In 1961 Richard Feynman made the following statement about the concept of energy:

> *There is a fact, or if you wish, a law, governing all natural phenomena that are known to date. There is no known exception to this law—it is exact so far as we know. The law is called the conservation of energy. It states that there is a certain quantity, which we call energy, that does not change in manifold changes which nature undergoes. That is a most abstract idea because it is a mathematical principle; it says that there is a numerical quantity which does not change when something happens. It is not a description of a mechanism or anything concrete; it is just a strange fact that we can calculate some number and when we finish watching nature go through her tricks and calculate the number again, it is the same.*

It is not possible to handle energy in isolation. It always relates to interference by forces on particles that will cause adjusting in metrics of properties of these particles.

Energy is difficult to comprehend as an attribute because it has to do with transformations of particles and objects from one state to another.

We normally assume such an object to have a material nature. It is difficult to visualize how energy transforms properties of point particles. It transforms apparently the manifestations of such point particles into metrics of their manifestations. We can make calculations and model some of these calculations towards what we perceive as reality. These models are usually most of the time related to what we call concrete physical objects on which we exercise forces.

A concrete physical model shows itself in such a mode, due to the Pauli exclusion principle. If the matter is in a solid-state phase, then we can touch that object with our hands or tools and exercise these forces on the object. Because of the exclusion of electrons in the same quantum state, we experience this "pushing" towards other, we "feel" resistance and we exchange energy with the object. The same applies to the matter in a liquid phase, but the principle begins to become a bit strange when gaseous phases are involved.

Although scientists are working in line with what Feynman states and make observations regarding transitions also in non-tactile mode, this human understanding of energy, as it relates to tactile impact on objects is deeply ingrained in our thinking.

Bosons are called force carriers and are assumed not to have mass. However, it is not easy to visualize a force carrier as a point particle that has potential to interfere with its manifestations.

9.LIGHT

Light is a crucial phenomenon for human observers to acquire and share visual impressions of objects in the world around us.

This observation is a result of interference of manifestations of photons within our eyes. A human observer can see objects because we can combine a huge number of these interferences into an impression of what we identify and can memorize as a specific object. We can exchange impressions on objects with fellow observers and mutually conclude on characteristics of an object under observation.

This study will consider the basic properties of the manifestations of a photon only. It refers to the fundamental physics of visible light quite often because this is a central element in this work. The origin and interference characteristics of visible light are part of new ideas and models as in The Dutch Paradigm.

What is important to emphasize in this section is:

1. Light has both particle and wave characteristics

This duality showed up in the double slit experiment of Thomas Young.

1.1 The particle characteristic implies that light can show its existence in the form of a quant of energy. A beam of light is a stream of photons and that if the wave of this beam has the frequency *f*, then each photon has a free quant of energy equal to *hf* available for interference with other particles.

1.2 The wave characteristic shows wave interference

2. Light as a wave is an electromagnetic phenomenon
3. Light spans a frequency band that ranges from long radio waves up to gamma rays

4. Light as we know it travels in a straight line

5. Light is propagating traveling at the speed of light c

For each of these subjects, there are massive amounts of research available, but the very nature of light itself is still unclear. Nevertheless, we have shown to be very ingenious in exploiting the properties of light for practical applications.

Whenever required this notion of light will be extended to discuss information relevant to the elucidation of the new paradigm.

10.WAVES AND FIELDS

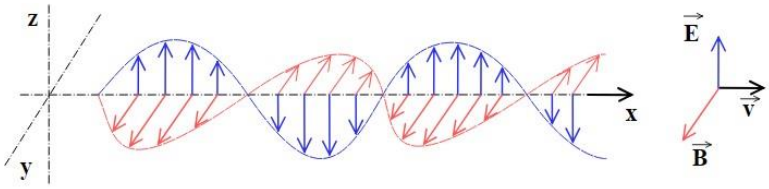
Waves and fields play a dominant role in the prevailing paradigm to explain particle interference behavior.

1. **Electromagnetic radiation**

To understand the present logic regarding electromagnetic radiation, we can use again Wikipedia as a source for information.

Wikipedia:

> *In physics, **electromagnetic radiation** (**EM radiation** or **EMR**) refers to the waves (or their quanta, photons) of the electromagnetic field, propagating (radiating) through space-time, carrying electromagnetic radiant energy. It includes radio waves , micro-waves, infrared, (visible) light, ultraviolet, X-rays, and gamma rays.*
>
> *Electromagnetic waves are produced whenever charged particles are accelerated, and these waves can subsequently interact with any charged particles. EM waves carry energy, momentum and angular momentum away from their source particle and can impart those quantities to matter with which they interact. Quanta of EM waves are called photons, which are massless, but they are still affected by gravity. Electromagnetic radiation is associated with those EM waves that are free to propagate themselves ("radiate") without the continuing influence of the moving charges that produced them, because they have achieved sufficient distance from those charges. Thus, EMR is sometimes referred to as the far field.*
>
> *In this jargon, the near field refers to EM fields near the charges and current that directly produced them, as (for example) with the simple magnets, electromagnetic induction and static electricity phenomena.*



The electromagnetic waves that compose electromagnetic radiation can be imagined as a self-propagating transverse oscillating wave of electric and magnetic fields. This diagram shows a plane linearly polarized EMR wave propagating from left to right. The electric field is in a vertical plane and the magnetic field in a horizontal plane. The electric and magnetic fields in EMR waves are always in phase and at 90 degrees to each other.

"Electromagnetic waves are well known as produced whenever charged particles are accelerated, and these waves can subsequently interfere with other electrically charged particles." That statement needs clarification because waves do not interfere with charged particles, but the wavelike electromagnetic manifestations of charged particles will do. Even so, it is also a macrocosmic description of a phenomenon. We can induce movements of such charged particles and calculate the response in the interaction towards the other charged particles. For charged particles in large objects, this is used extensively for the technical design of electric appliances.

Electromagnetic waves in free space follow Maxwell's electromagnetic wave equations.

The assumption is that the electromagnetic radiation for a photon can also form a wave. That wave shows the fluctuation in electromagnetic interference potential of a photon along the axis of propagation. This wave-like interference potential represents both the electrical and the magnetical manifestation. The photon itself is only at one point. Therefore this propagation pattern is, in fact, a nonrelativistic historical representation of the electromagnetic interference potential. The electromagnetic manifestations of the photon are assumed to be synchronous both in frequency and in phase, but there is no interference known of these electromagnetic manifestations with other charged particles. A photon does not exhibit mass behavior as observed with fermions as well. Each photon though has a quant of energy hf, a package of energy, whatever that is. This quant is not part of the wave model.

Once a photon releases from a source, it propagates without further influence from its source. The general assumption is that a photon can be "captured" and "released" by an electron orbiting an atomic nucleus under exchange of part of the energy of the quant.

The nature of electromagnetic waves has been the subject of intense scientific debate, all to understand and model this particle-wave duality.

It is obvious that there are still various mysteries hidden in this particle-wave duality.

In The Dutch Paradigm, the explanation and modeling of the particle-wave duality are at the core of this new paradigm. The perceived particle-wave duality is a logical consequence of the second period of the Big Bang.

As accepted by regular science and The Dutch Paradigm as well, the photon has electromagnetic manifestations, and it is – with some possible restrictions - not influenced by electric and magnetic fields, whether it be near- or farfields. As will be explained within the new paradigm, the quant energy of a photon can interfere with a neutrino to form the electron. That is in violation of the Standard Model, which declares an electron as a fundamental point particle.

As human beings, we have developed technical solutions to produce near-electromagnetic fields by applying forces to electrically charged particles like electrons and protons. The near-fields enable us to produce electricity, and the far-fields enable us to produce a stream of photons in random waveforms between an emitter and a receiver.

The propagation of photons through space in a vacuum is at a constant velocity, called the speed of light. This speed is a natural constant with a numerical value in SI units of:

$$C = 299{,}792{,}458 \text{ meters per second}$$

This speed in vacuum is an absolute constant because even the slightest deviation from it would blur the pictures of stars and galaxies as we can see in the sky.

2. Electromagnetic fields

The description for electromagnetic field is in Wikipedia:

Wikipedia:

> *An **electromagnetic field** (also **EMF** or **EM field**) is a physical field produced by electrically charged objects. It affects the behavior of charged objects in the vicinity of the field. The electromagnetic field extends indefinitely throughout space and describes the electromagnetic interaction. It is one of the four fundamental forces of nature (the others are gravitation, weak interaction and strong interaction).*
>
> *The field can be viewed as the combination of an electric field and a magnetic field. The electric field is produced by stationary charges, and the magnetic field by moving charges (currents); these two are often described as the sources of the field. The way in which charges and currents interact with the electromagnetic field is described by Maxwell's equations and the Lorentz force law.*
>
> *From a classical perspective in the history of electromagnetism, the electromagnetic field can be regarded as a smooth, continuous field, propagated in a wavelike manner; whereas from the perspective of quantum field theory, the field is seen as quantized, being composed of individual particles.*

The field model represents the electromagnetic interactions between objects, whereby through the enormous amount of participating particles, the interference potentials are adding up to show an almost physical existence.

11.PHYSICAL CONSTANTS

Through observations and measurements, we identify physical properties at constant values without any deviation whatsoever.

The speed of light in a vacuum is an example. That is extremely important for observation. It enables us to see the world around us in a precise way, not just in our direct environment, but also over large distances. The velocity of light is such an absolute physical constant.

There is also scientific consensus that the gravitational constant G, the Planck constant h, the electric constant ε_0, and the elementary charge e are absolute physical constants. We assume that these physical constants are invariable in space and time. For the speed of light, this has been proven over time going back to the Big Bang. For the other constants, there is a high level of confidence that we may conclude this invariability as well over extremely long periods of time, but those conclusions are based on secondary observations.

There is another group of physical constants that have no deviations.

In particle physics, it is complicated to measure some of these physical constants, due to the small scale of these particles. The measuring method itself has a measuring tolerance, but in general, there is consensus on most of the important physical constants as highlighted in the Standard Model.

There is no reasonable doubt among scientists about matters like the “invariant mass” of an electron and a proton.

12.CHAOS AT START?

Even though we are confident that the values of physical constants are valid in time, it cannot exclude that during the very first period of saying some "seconds," the physical laws and constants could have been different.

If this is a potential possibility, then under unknown circumstances, it might reoccur always and everywhere. The conditions under which this could reoccur are extremely difficult to investigate as the universe is hardly open for experiments, so most answers on such questions will remain a mystery.

Was it chaos at the start?

We can state that we have not observed deviations of these physical constants so far. We do not know what happened in the first "Planck period" of "time," but we know that after a while, matters became stable in physical constants. Also, for the Planck period itself. What is happening due to energy transformations before the first Planck period under stable conditions is a mystery.

The Dutch Paradigm introduced in the chapter Big Bang a model of the first principles that allow for a basic understanding of the role of free energy.

Understanding the causalities of energy transformations is crucial for research on the natural phenomena. To recall Feynman's description of energy:

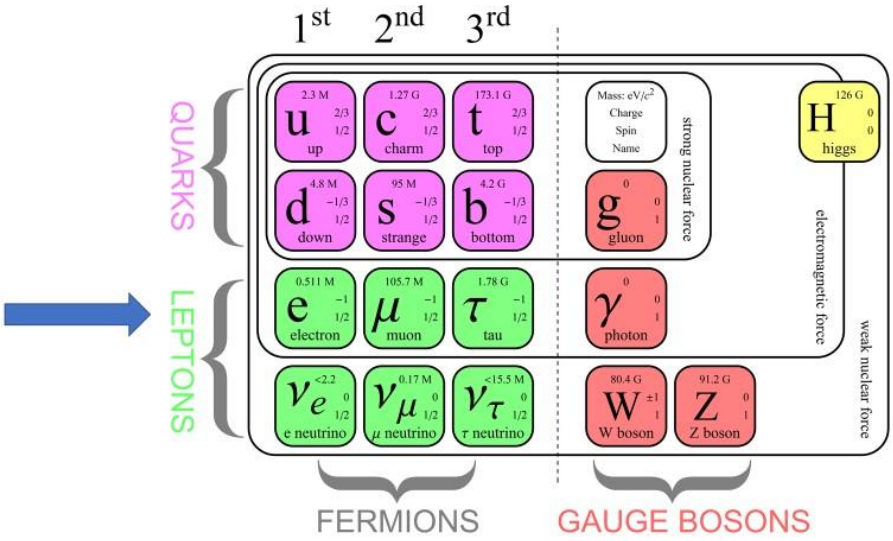
> *There is a fact, or if you wish, a* law*, governing all natural phenomena that are known to date. There is no known exception to this law—it is exact so far as we know. The law is called the* conservation of energy*. It states that there is a certain quantity, which we call energy, that does not change in manifold changes which nature undergoes. That is a most abstract idea, because it is a mathematical principle; it says that there is a numerical quantity which does not change when something happens. It is not a description of a mechanism, or anything concrete; it is just a strange fact that we can calculate some number and when we finish watching nature go through her tricks and calculate the number again, it is the same.*

What tricks is nature performing during such a transformation? Moreover, how are we able to reproduce what happened in that period?

Regular science uses for this purpose the method of experimental reduction extensively. The Large Hadron Collider in Geneva can perform experiments at a scale not seen before in Particle Physics.

13.THE ELECTRON

The electron is indicated as a Fermion and as such an elementary particle in The Standard Model.



The electron and the subsequent generations muon and tau are studied and described in detail in the scientific literature. We use as starting position for a first assessment the reference as in Wikipedia:

> *The electron is a subatomic particle, symbol e−or β−, whose electric charge is negative one elementary charge. Electrons belong to the first generation of the lepton particle family and are generally known to be elementary particles because they have no known components or substructure.*
>
> *The electron has a mass that is approximately 1/1836 that of the proton. Quantum mechanical properties of the electron include an intrinsic angular momentum (spin) of a half-integer value,*

> *expressed in units of the reduced Planck constant, ħ. As it is a fermion, no two electrons can occupy the same quantum state, in accordance with the Pauli exclusion principle. Like all elementary particles, electrons exhibit properties of both particles and waves: they can collide with other particles and can be diffracted like light. The wave properties of electrons are easier to observe with experiments than those of other particles like neutrons and protons because electrons have a lower mass and hence a longer de Broglie wavelength for a given energy.*

This introduction has many references with links to specific descriptions of notions. The information in Wikipedia regarding the electron refers to 181 sources.

Quantum Physics challenges the assumption of an electron as a point particle in so far that a non-zero volume for point particles in general, is questioned.

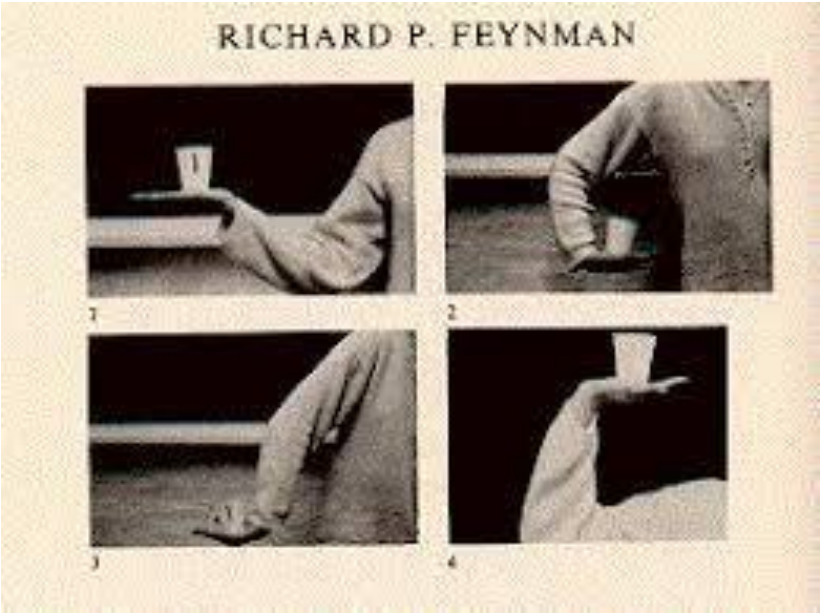
The electron shows a specific behavior called spinor. That spinor is rather complex in its driving forces and "mechanism." There are only some complex models available for clarification of this functionality.

The Wikipedia description of the spinor is:

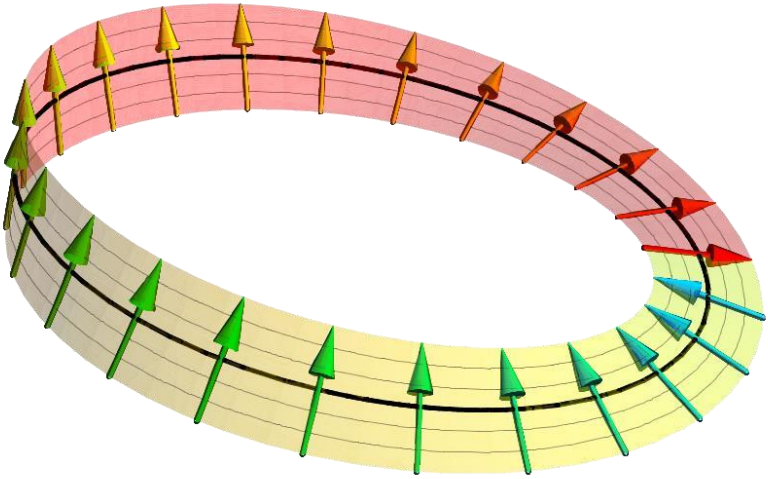
> *In geometry and physics, **spinors** are elements of a (complex) vector space that can be associated with Euclidean space. Like geometric vectors and more general tensors, spinors transform linearly when the Euclidean space is subjected to a slight (infinitesimal) rotation When a sequence of such small rotations is composed (integrated) to form an overall final rotation, however, the resulting spinor transformation depends on which sequence of small rotations was used: unlike vectors and tensors, a spinor transforms to its negative when the space is rotated through a complete turn from 0° to 360° (see picture). This property characterizes spinors. It is also possible to associate a substantially similar notion of spinor to Minkowski space in which case the Lorentz transforma-tions of special relativity play the role of rotations. Spinors were introduced in geometry by Élie Cartan in 1913. In the 1920s physicists discovered that spinors are essential to describe the intrinsic angular momentum, or "spin," of the electron and other subatomic particles.*

There are models available like:

As per Richard Feynman



Alternatively, more elaborated



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A description is available in Clifford Algebra. This mathematical description of the spinor is sufficient for technical applications.

We can conclude: the electron itself has very complex spatial manifestations, and not all are well understood and/or modeled yet.

> *With all these complex manifestations, we need to question: for what reasons is an electron identified as a fundamental point particle?*

The next chapter will handle this question.

14.THE ELECTRON IS A CONSTRUCT AND NOT A POINT PARTICLE

In the chapter on The Electron, the question was:

For what reasons is an electron identified as a fundamental particle?

An obvious answer is: because we cannot reduce an electron in other fundamental particles.

Even, so, then there is still the question: even if it is impossible to reduce an electron,

why is it assumed to be a point particle?

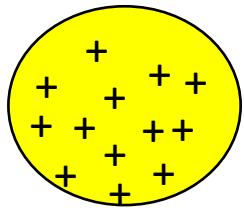
For the answer to this question, we have to go back to the years in which the debate on this question was under discussion within the scientific community.

In these years, around 1900, Henry Poincaré raised the issue that if an electron would have a spatial extension with some matter, then it would risk exploding due to the dispersed electric charge. This electric charge was assumed to be isotropic.

As per illustration:

The electron?

Poincaré

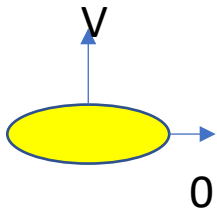


Electron will explode through Coulomb forces

Poincaré suggested that counteractive forces are required to keep the electron within its geometric form, suggested as being a ball shape.

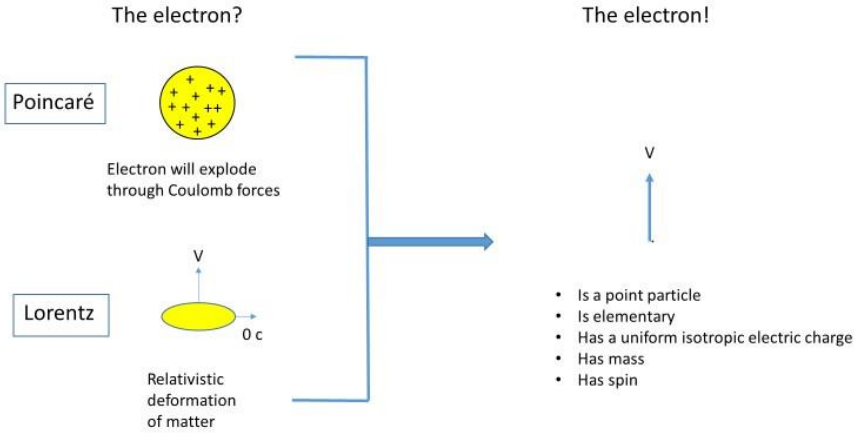
Hendrik Lorentz questioned a ball shape for the electron. An electron could accelerate up to relativistic speed and deforms in the direction of the speed, as illustrated below:

Lorentz



Relativistic deformation of matter

There is no doubt that the electron is very important in understanding Particle Physics, but there was at that time apparently no better way than to assume that the electron is a point particle with no spatial extension. If so, then both problems would become irrelevant.



Though this is a possible outcome, it still looks like finding a solution to a problem not well understood. Also, Albert Einstein, who participated in accepting this "solution" was puzzled with the electron all through his life. At the end of his life, Einstein still could not understand the mechanism of the energy exchange of light between electrons. In his words: " I would like to know what an electron is."

There have been numerous suggestions given to find another answer to the questions raised by Poincaré and Lorentz, but none have changed the outcome up till now, that assuming the electron as a fundamental point particle is still the best answer.

The Dutch Paradigm will provide an answer to address this issue by questioning the basic underlying assumptions that trigger the problems as stated.

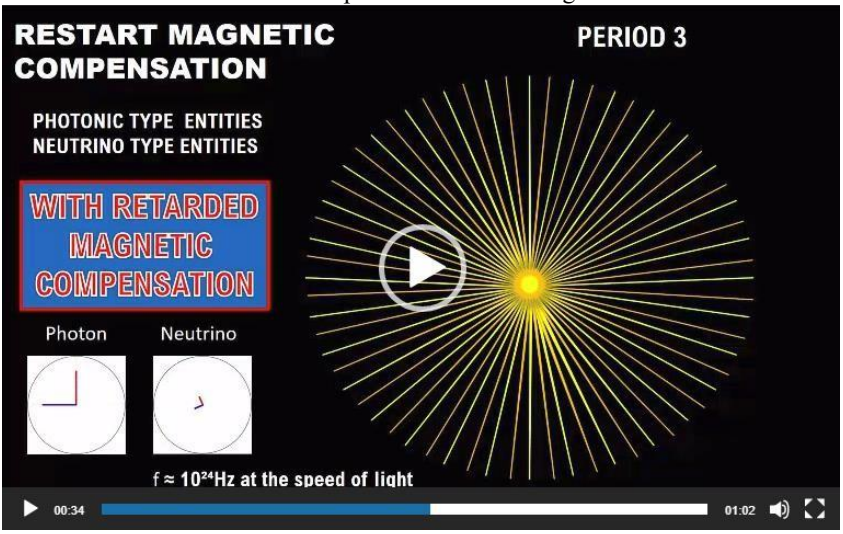
The answer is that the electron is a construct of a photon and a neutrino, which can interfere at gamma frequency into an electron. This interference is possible due to the particle/wave duality of both the photon and the neutrino.

We, therefore, need a better understanding of this particle/wave duality, to start with a photon as a result of the way the universe started.

15.AT THE BEGINNING OF THE UNIVERSE

The ideas of The Dutch Paradigm regarding the electron as a construct, link in towards ideas about the beginning of the universe. It is a precise and constructive exposure of events.

These ideas translated into a simple animation showing:



moreover, the crucial question is:

> *If we have a fixed amount of free energy available as a physical manifestation of the existence of entities, with retarded magnetic compensation, what could be the meaning of this for us as conscious human observers?*

The Dutch Paradigm clarifies that this start of the universe translates into the identification of the source of the particle/wave duality. Both the photon and neutrino show this particle/wave duality behavior.

> *That "particle"-element of the particle/wave duality links directly into what happened in period 2 at the beginning of the universe. In that period there was the outburst of energy. Free, uncompensated energy, that apparently can be modified by interference into other types of manifestation, like "mass," but will forever be the source of energy for modifying reality as perceived by the human observer.*

The ideas of the beginning of the universe as per The Dutch Paradigm are specific and need clarification for further understanding. They are choices inspired by the basic assumption that this universe is there by intention. Acceptance of such an intention is not part of the discussion or required to accept the related assumptions relevant for clarification of the new paradigm. Therefore, some further elucidation on how we perceive the universe is helpful.

To start with, we also assume within science that "our" universe had an origin and developed since into its present form, which is what conscious observers may experience.

There is no evidence yet of the reoccurrence of such an event. Maybe our physical universe is not the only one in existence, nor do we know whether the actual beginning of the universe was, in fact, a beginning, or a conversion of some sort, a transformative process.

There is for this first period no hard evidence of a sequence of events that follows a physical law of nature.

Wikipedia for a law of nature:

> *"a theoretical principle deduced from particular facts, applicable to a defined group or class of phenomena, and expressible by the statement that a particular phenomenon always occurs if certain conditions are present. Physical laws are typically conclusions that are based on repeated scientific experiments and observations over many years and which have become universally accepted within the scientific community."*

Observation stems from sensory perception by individual experience. Such perceptions are the outcome of an extremely complex process, in which massive numbers of photons meet our senses and transmit signals to our brains. We can communicate to other people on what we see and feel as if we live in a physical world and agree on the mutual observations.

This way of observing and understanding the content of perceived experiences is so universally accepted, that we do not often realize - from a purely scientific point of view - that this is still a very mysterious process. It is virtually impossible to technically translate the impact of photons into an overview that explains what is recognized when we "see" reality with our eyes. Grasping and interpreting the picture up to recognition is a mindboggling capability. We accept this capability as a given fact in a similar way that we can communicate on what we observe. The messengers of what we see are photons in a frequency band of the spectrum of electromagnetic rays that do not harm us physically. Apparently, these photons can interfere in a specific and particularly meaningful way in our eyes. To quote Johan Wolfgang von Goethe: "The eye was made by the light, for the light, so that the inner light may emerge to meet the outer light." This mysterious process is the start of our thinking process to find logic in what we observe. The scenery enlightens itself by virtually projecting pictures in our thought processes.

The processing of information can be a reference to clarify some of the assumptions of The Dutch Paradigm. It is a sideline but still important for this site on particle physics. It will not question the documented observations, but it will play a role in discussing some explanations for observed phenomena that are not (yet) part of the scientific community's present state of acceptable interpretations.

When we look to the sky at night, we see information transmitted to us by photons. These photons have had vast differences in traveling time as a naked photon, relative to their last encounter with a physical object. We may see photons that have traveled 13.7 billion years without any physical encounter, but we also see photons that had their last encounter just a few years ago. The total picture reflects the "Lebenstableau" of the universe. We see what happened up to what we assume is the start of our universe. We can see and study this scenic history of the universe in great detail, supported by technical means like telescopes to translate the photonic information into a crisp picture of the reality of the past. These pictures are nowadays even more

comprehensive then what we could see with the naked eye only, due to frequency shifting into the visible part of the spectrum by technical means. We observe these pictures and learn evermore from this scenic history of the universe.

This Lebenstableau indicates that with our present set of logical explanations, there was a beginning of the universe, as we can observe it, as people who are aware of their consciousness.

The name for this event is the Big Bang.

16.CONVENTIONS

We do not know whether the universe has a purpose. Entities are exposed rather than geometric point particles only.

Was the universe created or is it just there? Most religions have answers in their Book, but these answers are not in line with our scientific findings.

Introducing esoteric historical explanations of the universe would introduce uncontrollable elements of metaphysics in the discussion. We want to respect the mores of physicists who may wish to keep metaphysics out of the discussion. Nevertheless, with the introduction of the theory of Quantum Physics, it became unavoidable. There are serious scientific suggestions now of what might happen in between two subsequent Planck periods while this cannot be observed and thus is not open for objective validation.

It is also a metaphysical problem to accept Point Particles as having no spatial extension. We observe as human beings the impact of manifestations. We relate these manifestations to point particles. We observe these manifestations compounded in objects around us and are barely able to imagine that these objects are constructs of massive numbers of fundamental point particles. Therefore, what is the nature of a point particle? More of this type of questions are open.

In this study, there are references to subjects that are in a sense also metaphysical of nature, similar to the nonspatial character of a point particle. Such references will be entities, causality, free will, free energy. These notions will require a specific declaration of assumptions and first principles as recognized in this study.

The term entity will preferably be used rather than a point particle. The term entity is meant to avoid the idea that we encounter

> *"particles." In this study, an entity is something that exists by itself: something that is separate from other things and can be observed by their spatial manifestations.*

If for any reason, a reader still would like to avoid the word entity due to an ontological argument, he or she can use the term virtual part or point particle.

17.CAUSALITY

Causality is essential for human beings as one of the many prerequisites that are necessary to allow for a physical presence in the physical world. The world is not destructive chaos, but constructive logic.

The Dutch Paradigm has applied causality as a metaphor to understand the events of the Big Bang.

The definition of causality is:

Wikipedia:

> ***Causality*** *is the relation between an event (the cause) and a second event (the effect), where the second event is understood as a consequence of the first.*
>
> *In common usage, causality is also the relation between a set of factors (causes) and a phenomenon (the effect). Anything that affects an effect is a factor of that effect. A direct factor is a factor that affects an effect directly, that is, without any intervening factors. (Intervening factors are sometimes called "intermediate factors.") The connection between a cause(s) and an effect in this way can also be referred to as a causal nexus.*
>
> *Though the causes and effects are typically related to changes or events, candidates include objects, processes, properties, variables, facts, and states of affairs; characterizing the causal relation can be the subject of much debate.*

Causality is from a human point of view, linked to a notion of time. It is particularly relevant to support a physical environment that provides us with predictable conditions. Without this predictability, we would have no ground to stand on. When someone takes a step, then the assumption is that the person will be supported by the surface and not once, but every “time” and in a predictable way. Predictability means that one has a reasonable notion of

causality what will happen while taking the next step. We breathe the air around us and assess with our senses the surrounding. We have the notion that we grasp the physical reality to allow for support of our physical existence. That is such a fact of life that we are not aware of what has to be foreseen in physical causality to prepare the causal conditions of unforeseen effects like someones wishing to take the next step.

The predictability of physical causalities translates into laws of nature. These laws describe the so-called macrocosmic world, but also the microcosm. We assume that the laws of nature for the microcosm also determine the final behavior of the macrocosmic world.

Particle physics focus on observations and understanding of phenomena in this microcosmic world. The status of findings is as in the Standard Model of Fundamental Particles and Interactions.

In particle physics observations on phenomena with causal relations are translated into mathematical formats through the use of algorithms, principles and the like. They reflect assumed causalities within the timeframes of phenomena observed and measured. We call these laws of nature until falsification by a deviating observation requires an adjustment or refinement.

Laws of nature in causality translate into a mathematical format in which we normally use the sign

“ = “

in the resulting mathematical equation. It implies that numerical values and units, or the dimensional formats of phenomena observed and measured, are equal. It does not imply that there is causality at any given time per se because these phenomena require a minimum amount of time for completion.

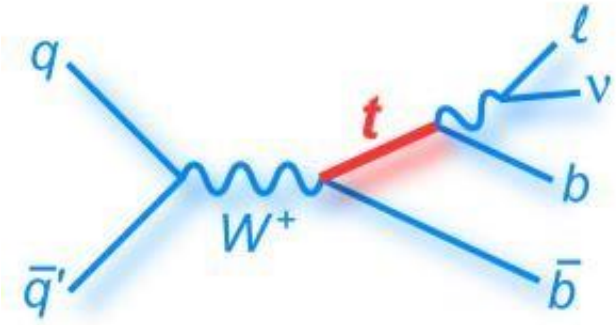
As a result, the outcome of the effect after the occurrence of a cause is only valid after such a minimum of time has lapsed.

Such a period can be very short, perceived as something happening as almost instantaneous or it will emerge over a longer period. For particle physics, it is a reflection of thoughts on perceived coherence in an observed movement of matter and energy in time. We observe a specific situation at time T1 and

another at T2, assume coherence and predict the repetition of the event under equal conditions. That translates into mathematical formulas that are valid under a set of specific assumptions. The uncertainty principle of Heisenberg reflects the inability to define a relevant set of observations at the same point in time.

When a situation at T1 transforms into a situation at T2, we must accept that this transformation needs a lapse of time to take place: by definition, it is not instantaneous. In quantum physics, we nevertheless do accept that a situation could be possible in which the equality is timeless and in effect "=" and in which cause and effect are only potential "quantum" states of a phenomenon.

The actual situation of the phenomenon in transition can also be part of the observation, and the transition subdivided into a transition logic, which follows its own rules and principles. The Feynman diagrams are an example of such transition logic.



For transitions that are perceived by human beings as being almost instantaneous, we have been satisfied for a long time with the observations on the phenomena in stable configurations of parameters as perceived by the human being. A big rock is a heavy stone and continues to be so, in our human perception. We do not perceive this as a result of the continuous renewal of microcosmic causalities, but still, it is.

We understand there is a minimum time needed for a subsequent occurrence of observable causality. We call it the Planck time.

18.LIGHT

Light is a phenomenon that has many different manifestations.

Note: this chapter has the same base as discussed under Intro Particle Physics, but with additional remarks

Light is a phenomenon that is crucial because it allows human observers to acquire and share visual impressions of objects in the world around us.

This observation is a result of interference of manifestations of photons within our eyes. A human observer can see objects because we can combine a huge number of these interferences into an impression of what we identify and can memorize as a specific object. We can exchange impressions on objects with fellow observers and mutually conclude on characteristics of an object under observation.

This study will consider the basic properties of the manifestations of a photon only. It refers to the fundamental physics of visible light quite often because this is a central element in the work that is described. The origin and interference characteristics of visible light are part of new ideas and models described in The Dutch Paradigm.

What is important to emphasize in this section is:

1. Light has both particle and wave characteristics

   This duality showed up in the double slit experiment of Thomas Young.

   The particle characteristic implies that light can show its existence in the form of a quant of energy. A beam of light is a stream of photons and that if the beam is of frequency *f*, then each photon has a free quant of energy equal to *hf* available for interference with other particles.

Additional remark: That "particle"-element of the particle/wave duality links directly into what happened in period 2 at the beginning of the universe. In that period there was the outburst of free energy.

2. The wave characteristic shows wave interference Light as a

   wave is an electromagnetic phenomenon

   Light spans a frequency band that ranges from long radio waves up to gamma rays

   Light as we know it travels in a straight line

   Light is traveling at the speed of light c

   Additional remark: Free, uncompensated energy, that apparently can be modified by interference into other types of manifestation, like "mass," but will forever be the source for modifying reality as perceived by the human observer.

For each of these subjects, there are massive amounts of research available, but the very nature of light itself is within regular science still unclear. Nevertheless, we have shown to be very ingenious in exploiting the properties of light for practical applications.

19.CAUSALITY IS BORN

A human being applies perceived causality to bend reality to his will.

We can only exercise our will, when most of the manifestations that we observe, show a high level of predictable behavior; these manifestations must be part of a causal system that is extremely reliable in the outcome. We walk, and we expect support with every new step. We remember that it was always possible to walk in this way so far. We see the Sun coming up and going down, and we rely on that, through the hours of the day and the days of the year. There is an endless number of predictable and reliable causalities that allow us to survive in our present environment. We can count on it.

Our environment must be able to react at any time for unforeseen changes, like the act of walking by a human being. All particles or entities within that environment must prepare for the next step within a very short timeframe. The support must be there in time. We can rely on the predictability of such support, only because there is a high frequent causal adjustment of the manifestations of all entities (point particles) involved.

This high frequent renewal cycle to prepare for causality as per natural laws requires a minimal amount of time, and apparently, this is the basics of quantum physics.

> *The shortest cycle is related to the concept of Planck time and the highest frequency of electromagnetic radiation that we have observed.*

The act of walking is an individual and unpredictable free choice on a macrocosmic level. It requires the availability of free energy to exercise this free choice. The causal compensation inevitably will be there as a consequence, but the compounded impact on the environment is massive and complex. It will require numerous iterations of the basic high frequent renewal of conditions of microcosmic causalities to complete.

In the thought experiment, the assumption is that the free energy emerged in the second period of the beginning of the universe. It is the “particle” element in particle/wave duality.

That is a basic assumption of The Dutch Paradigm.

20.MAGNETISM

We observe causality in action, triggered by free energy. Magnetism reflects the effects.

The free energy released in the second period of the Big Bang is the particle part of the particle/wave duality of an entity. It is "electric" by definition, as part of the electromagnetic causal system working on an entity. During this second period, the "magnetic" causal response was absent.

What is the nature of magnetism as part of the electromagnetic causal system?

Let us first declare the general description of magnetism as published in Wikipedia:

> ***Magnetism*** *is a class of physical phenomena that includes forces exerted by magnets on other magnets. It has its origin in electric currents and the fundamental magnetic moments of elementary particles. These give rise to a magnetic field that acts on other currents and moments. All materials are influenced to some extent by a magnetic field. The strongest effect is on permanent magnets, which have persistent magnetic moments caused by ferromagnetism. Most materials do not have permanent moments. Some are attracted to a magnetic field (paramagnetism); others are repulsed by a magnetic field (diamagnetism); others have a much more complex relationship with an applied magnetic field (spin glass behavior and antiferromagnetism). Substances that are negligibly affected by magnetic fields are known as nonmagnetic substances. They include copper, aluminum, gases, and plastic. Pure oxygen exhibits magnetic properties when cooled to a liquid state.*
>
> *The magnetic state (or phase) of a material depends on temperature (and other variables such as pressure and the applied magnetic field) so that a material may exhibit more than one form of magnetism depending on its temperature, etc.*

The general view is that magnetism as a phenomenon exerts forces by magnets on other magnets. Another form of magnetism is in electromagnetism. That is the type of "physical" interaction that occurs between electrically charged particles. Notice that both descriptions relate to interference between multiple entities.

The system of electromagnetic radiation is active and manifest on a single entity. Apparently, this electromagnetic system is self-induced interference in between the the electric and magnetic components.

The Dutch Paradigm assumes that magnetism per entity counteracts as a first principle the electric manifestation by compensation towards the potential equilibrium.

As a phenomenon in nature, magnetism has not shown an outburst at the start of the universe comparable to the free energy as previously discussed. Magnetism only came into action again after the very short period after the steady state before the Big Bang. It still has its characteristics as it did before the Big Bang, as in the steady state. Therefore, magnetism can be counteractive towards electric energy, but on a single entity, it is not able to compensate for the manifestation of the free energy of that entity. It is in a permanent backlash to fulfill conditions for equilibrium. In between entities it can compensate and reduce free energy. It will transform it into monopole magnetism that identifies itself as the source for the manifestation of gravity.

How magnetism does perform this counteraction on causalities is known in some special cases. We know it quite well in electromagnetic radiation and as a possibility to enable the production of electric current by moving electrical charges of electrons through space and magnetic "fields." The fact that we only know some special cases must not favor the opinion that these cases are the only ones that function in nature. We have to consider magnetism as the basic driver for other counteractions in causality between particles as well.

The indication that each fundamental particle has its anti-particle could well be a specific interpretation of this counteractive functionality of magnetism. Driving this to higher levels of complex manifestations, this could trigger the idea that also each person has its own perfect "anti"-person. It is obvious that we must be careful with this type of extrapolations, but in essence, we are indeed rebuilding the causality within of our most basic constituents of

entities on a continuous base. Every TPlanck or 10^{-44} sec again, time and time over.

Another conclusion within The Dutch Paradigm is, therefore, that a positron is not the anti-particle of an electron. The positron is still an electron but in another state of oscillation.

21.MAGNETISM BACK AGAIN

The third phase after the outburst of free energy start when magnetism as the counteractive part in electromagnetic causalities becomes active again.

To state the specific assumptions, postulates, and first principles as respected by The Dutch Paradigm:

1. Before the Big Bang, the entities had manifestations with potential capabilities of spatial manifestation and interference only
2. In the second period, all related entities became manifest in spatial activity with free electric energy only. It is the particle component as identified in the particle/wave duality
3. As from the restart in period 3, entities can interfere with their respective spatial manifestations, being the free electric energy and the electromagnetic system
4. At the start of the third period, the electromagnetic system restarted per entity, but the compensating magnetic component has an ever continuing backlog in time on the electric component.
5. That results in what we observe as a causal wave system. It is the wave component of the particle/wave duality
6. This ever continuing backlog is related to the cycle of the repetitive TPlanck
7. The amount of free energy per entity reduces by mutual and lasting interference of entities, but the backlog in time of 1 TPlanck is absolute and will not change
8. All entities, being naked or – after interference – as part of a construct, will have the speed of light as a limit. At least one of its manifestations will travel at the speed of light
9. The speed of light is an absolute reference always available and per entity
10. The electromagnetic causal system is equal for all entities, but at one type that electromagnetic system is also rotating in its plane of activity
11. Apart from the rotating capability, all entities are equal and ejected under the same conditions

12. Therefore, we can recognize by observation two types of entities, being the photon and the neutrino and the constructs based on interference of the two types of entities.

We can use experiments of thoughts to imagine what interference processes emerge out of these specific assumptions, postulates, and first principles.

22.PHOTON: LIGHT IN PHASE SHIFT

The historical path of a photon through space in an electromagnetic form as radiation is a sinusoid for both the electric and the magnetic manifestation, perpendicular to one another.

Illustrated in graphical form, it shows:

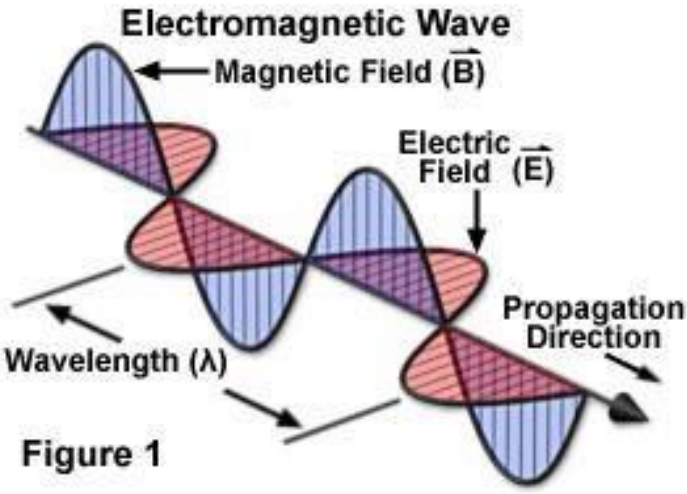
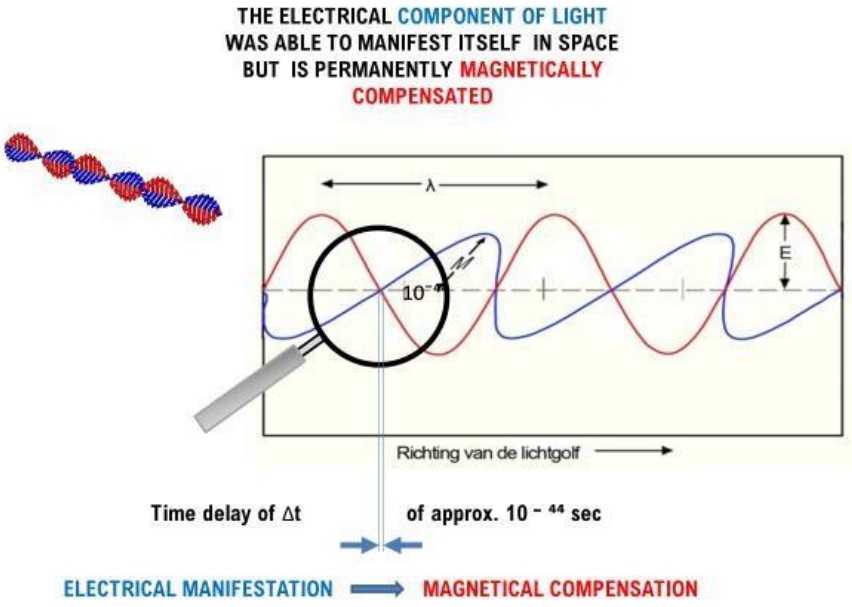


Figure 1

Both manifestations linked to the entity are in phase and symmetric, as reflected in Maxwell's equations as well.

The assumption that the electric component was uncompensated in the second period at the Big Bang has as a consequence that as from the third period, these two manifestations of electric and magnetic nature are not in total phase synchronization anymore. The two components show a small phase shift in time.

Graphically illustrated:



This time delay is fixed and assumed to be equal to 1 Planck time. The magnetic compensation had the capability for full compensation of the electric manifestation per entity before the Big Bang, but the magnetic component of the causal system came into a backlog of exercising this capability due to the small shift in time. The magnetic compensation is as from that moment on always too late. It is the transformation from virtual, non-observable instant causality into time-delayed observable causality. In the illustration, the electric component is under-compensated by the magnetic component while approaching equality and pass through zero to start an opposite behavior relative to its original character. This pattern of under- and overcompensating is perpetual. For a naked photon, the overall result is neutrality in electric and magnetic exposure to the outside world. Being electromagnetic radiation, this is a well-known characteristic of photonic light.

The total amount of free electric energy for each photon is incorporated by this small time delay of the Planck time and is relative to the wave frequency, being hF.

23.NEUTRINO: EM-SYSTEM IN ROTATION

The neutrino is the entity like the photon, but with the electromagnetic system rotating in its plane of activity.

That assumption is part of The Dutch Paradigm. It needs further explanation.

To recapitulate for linear light: looking into the direction of propagation of the naked photon, we can explain the vector action of the electrical component and the magnetic compensation of linear light as in this illustration:

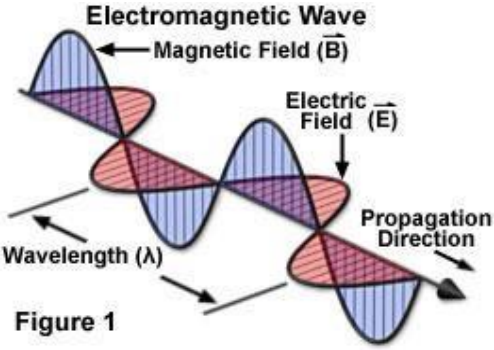
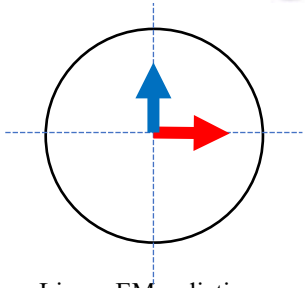
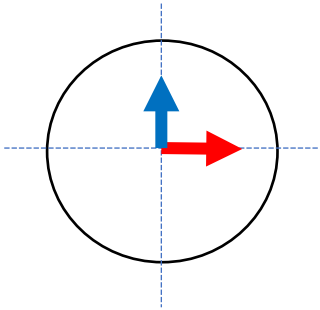


Figure 1



Linear EM radiation

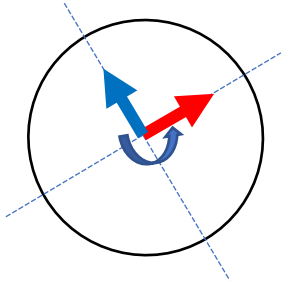


the animations available in www.thedutchparadigm.org

The electrical and magnetic vectors are active in an orthogonal sense and deliver in the direction of propagation a sinusoid movement up and down and left and right.

The two manifestations E, and B are slightly out of phase, and there is free energy in the EM manifestations of the photon, which makes the manifestations of photon observable in space. This phase shift is in the direction of the propagation in space.

Considering the second form of EM radiation, the neutrino as a photon with an additional rotation of the electromagnetic system, we can make a similar illustration



Spiraling EM radiation

The naked neutrino shows a measurable magnetic manifestation, identified as spin. The additional rotation of the EM system in action apparently shows the property spin.

This measurable magnetic manifestation is unforeseen in comparison to the properties of the photon. A naked photon does not have observable magnetic manifestations.

When reconsidering this illustration, one would expect that this form of suggested EM manifestation of the neutrino, indeed would oscillate from left to right-handed chirality and equalize to zero observable spin outside the entity.

Three observations:

1. The fact that we measure spin indicates a preference in the rotational direction.

2. Experimental physicists indeed report this unexpected preference for left-handed chirality.

3. That asymmetrical behavior is an assumed violation of symmetry in nature that is not well understood by physicists.

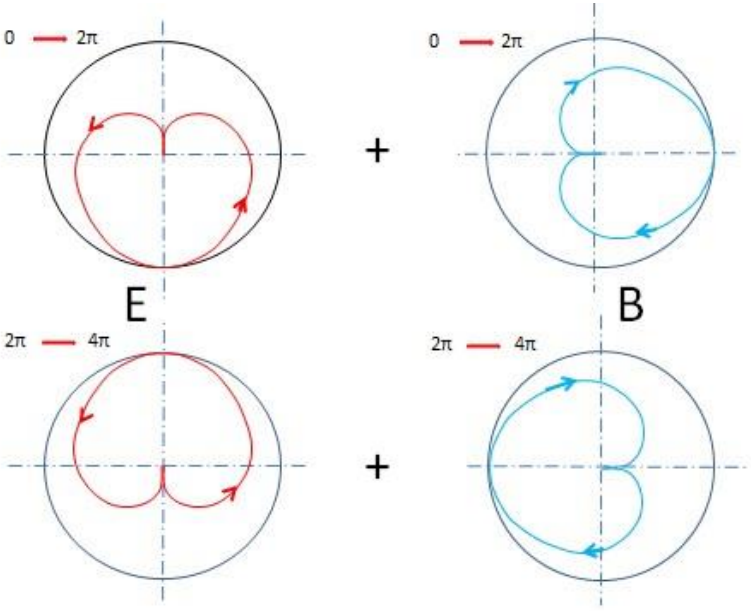
However, there is also this phenomenon of under- and overcompensation as explained for the photon.

This phenomenon of under- and overcompensating will fix the rotational direction of the spiraling manifestations of the neutrino.

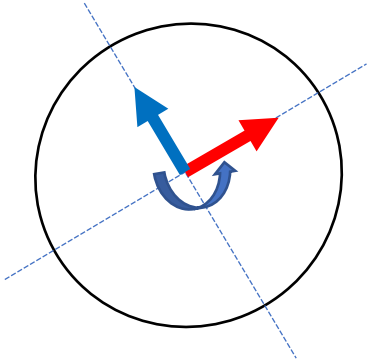
The backlash in magnetic compensation in the electromagnetic system is too late to induce the change-over of the rotational direction of the electric component. Therefore, change-over will not occur. The electromagnetic manifestations continue the rotational direction as is.

An illustration and animation of the model for the neutrino EM manifestations show this phenomenon. The electrical manifestation is growing uniformly in length and circular motion, while being compensated by the similar but perpendicular opposite magnetic manifestation but with some time delay. The illustration and animation for the neutrino are complex because there is spinor behavior around a center point. Such a spinor is reproducing itself after 720º or 4π, rather than after 360º.

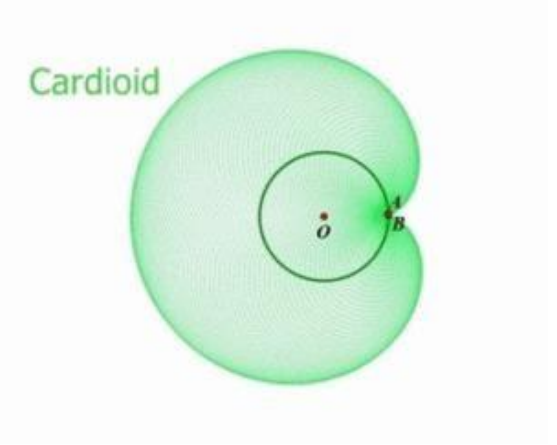
This spinor function as an illustration:



Though this is just a simple animation, it does trigger attention, because we know that this resembles in format to a cardioid as Limaçon of Pascal.

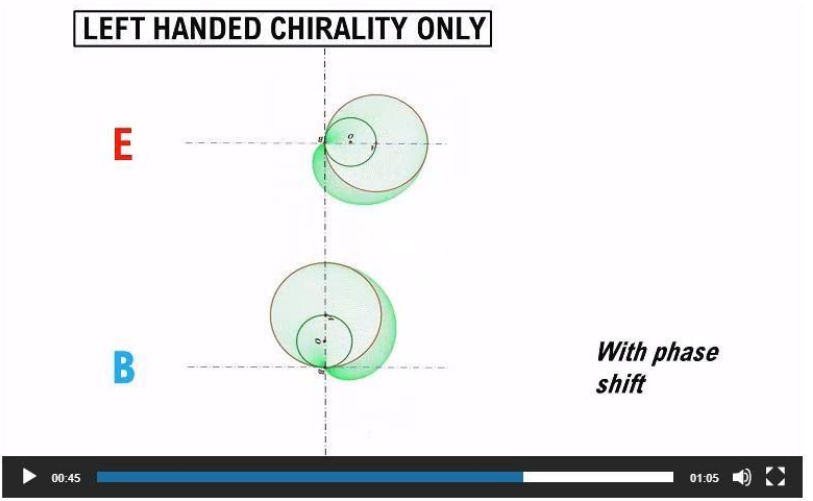


The animation (www.thedutchparadigm.org) for such a cardioid is:



Ref. John Carlos Baez

Herewith an attempt to animate this spinor phenomenon.



Most probably this is indeed the spin behavior, and more precisely spin behavior indicated being ½ spin behavior for 360°. It will show its physical existence with magnetic momentum.

This ½ spin behavior is known as a fermion characteristic. The tiniest fermion known is the neutrino which is present in the universe in unheard numbers.

Also, both manifestations will show themselves to the world as a monopole, irrespective whether the spinor is positive or negative or rotating right- or lefthanded.

The preference for left-handed chirality also means that a neutrino has momentum and that energy momentum is to be conserved.

The spinor of the neutrino can change over from left to right-handed chirality. That is known as neutrino oscillation. The trigger for such an oscillation is according to The Dutch Paradigm an external magnetic impact on bridging the backlash and triggering the spinor to change in chirality.

25.REALITY CHECK NEUTRINO CONCEPT

The Dutch Paradigm postulate that there are only two types of entities released at the Big Bang, the photon, and the neutrino. All other fundamental particles are either these two particles but at different levels of frequency, or in the construct electron.

The neutrino is the second type of entity. It has similar electromagnetic manifestations as the photon, with an additional rotation of the electromagnetic manifestations.

The comparison with the present state of knowledge of the neutrino is:

Wikipedia:

> *A **neutrino** is an electrically neutral, weakly interacting elementary subatomic particle with half-integer spin. The neutrino (meaning "small neutral one" in Italian) is denoted by the Greek letter ν (nu). All evidence suggests that neutrinos have mass, but the upper bounds established for their mass are tiny even by the standards of subatomic particles.*
>
> *Neutrinos do not carry electric charge, which means that they are not affected by the electromagnetic forces that act on charged particles such as electrons and protons. Neutrinos are affected only by the weak sub-atomic force, of much shorter range than electromagnetism, and gravity, which is relatively weak on the subatomic scale. Therefore, a typical neutrino passes through normal matter unimpeded.*
>
> *Neutrinos are created as a result of certain types of radioactive decay, or nuclear reactions such as those that take place in the Sun, in nuclear reactors, or when cosmic rays hit atoms. There are three types, or "flavors," of neutrinos: electron neutrinos, muon neutrinos, and tau neutrinos. Each type is associated with an antiparticle, called an "antineutrino," which also has neutral electric charge and half-integer spin. Whether or not the neutrino*

and its corresponding antineutrino are identical particles has not yet been resolved, even though the antineutrino has an opposite chirality to the neutrino.

Most neutrinos passing through the Earth emanate from the Sun. About 65 billion (6.5×10^{10}) solar neutrinos per second pass through every square centimeter perpendicular to the direction of the Sun in the region of the Earth.

The neutrino was postulated first by Wolfgang Pauli in 1930 to explain how beta decay could conserve energy, momentum and angular momentum (spin). This was relevant for the beta decay of a naked neutron into a proton, electron and anti-neutrino.

To allow for observation, the manifestations of neutrinos must interfere with other particles. In The Dutch Paradigm, such interferences are either with another neutrino or a photon. So far these interference capabilities are not reproduced under laboratory conditions, and therefore this claim is not validated yet.

The scientific claims for the physical properties of a neutrino are as indicated in **bold** characters:

1. **Neutrinos are created by radioactive decay, nuclear reactors or when cosmic rays hit atoms**

Neutrinos are only emitted at the very start of the universe, like the photons. Through interference with their electromagnetic manifestations, these neutrinos have become part of constructs. If a construct decays or fuse, neutrinos are released. These are the muon neutrinos and tau neutrinos, with modified electromagnetic properties. These modifications reflect the interference history.

2. **A neutrino has ½ spin and therefore is a fermion**

The convention to classify a neutrino is by identification of ½ spin.

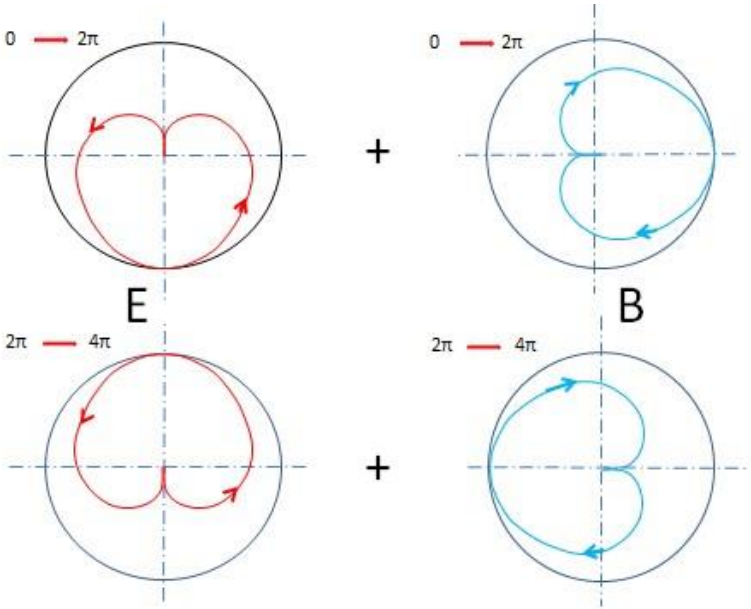
3. **A neutrino has a very small mass manifestation**

Due to a potential breach of the speed of light of the rotating electromagnetic manifestations, there is a modification in these manifestations. That induces a

transfer of energy into mass manifestation. There is a separate chapter for an explanation of this phenomenon.

A neutrino has a small magnetic momentum

The small magnetic momentum is measured and in line with the expectations as in The Dutch Paradigm. It is the consequence of preference in chirality.



5. **A neutrino has a speed slightly lower than the speed of light**

A neutrino has a tiny mass. Consequently, the assumption is that a naked neutrino cannot propagate at the speed of light. In the explanation for the origin of this tiny mass, logic shows that this assumption needs revision.

6. **A neutrino can have left or right spin**

That is in line with The Dutch Paradigm.

7. **Neutrino's show variance in the mass**

That variance is discussed under 1. The properties of the electromagnetic manifestations of the neutrino reflect the interference history of the neutrino entity. Measuring properties of the neutrino *under lab conditions* is difficult, due to lack of interference of neutrinos with other particles and constructs.

Following The Dutch Paradigm, that is a misconception. The ½ spin behavior of Fermions is neutrino ½ spin behavior. Therefore, interference of a neutrino and a photon is assumed to be possible, as will be explained further on with forming the construct electron.

The numerical values of the physical properties for a neutrino are approximations but useable for making an order of magnitude calculations. These calculations are in a separate section.

At first glance, there are no compelling discrepancies in what we know and can measure regarding neutrinos compared with the model as described in The Dutch Paradigm.

There is a specific behavior of neutrinos that is scientifically not well understood. Neutrinos show oscillation in spin direction while passing through magnetic fields. A separate section discusses this as a logical consequence of the particle/wave duality of the naked neutrino.

26.START FREQUENCIES

The Dutch Paradigm assumes that the Big Bang was a perfect event, which eventually leads to a world in which we experience all kinds of physical constants of nature.

Before the Big Bang, all photons and all neutrinos in the singularity were equal, with the indicated electromagnetic system per type in equilibrium.

Causality emerged by a short interruption of the magnetic compensation in the causal system of all involved photons and neutrinos

At the restart, all these photons and neutrinos went through the same event, that resulted in

1. The same time delay: 1 TPlanck
2. The same propagation speed: c
3. The same amplitude of the EM manifestations
4. The same start frequency of the EM manifestations
5. The same clock frequency for update of values of the EM manifestations

We can observe the constructs resulting from interferences and apply measuring techniques. The International System of Units, the SI system, allows us to exchange the values of the measurements.

Both the Planck time and the speed of light are known, but there are no values available yet for the amplitude of the components of the electromagnetic manifestations and the start frequency.

The Dutch Paradigm applies reverse engineering to determine the approximate values for both the amplitude and the starting frequency. The reverse engineering is possible, based on the model of the proton as per The Dutch Paradigm.

The amplitude is approximately 0,3 fm

The start frequency is in the bandwidth of gamma frequencies, approximately 10^{24} Hz.

The clock frequency for resetting or updating of the causality system is related to the Planck time and is somewhat more than approximately 10^{44} Hz.

26.NEUTRINO OSCILLATION

The particle-wave nature of the neutrino is the root cause for spin oscillation.

Naked neutrinos have left-handed chirality preference but can oscillate from anti-clockwise to clockwise. Therefore, the spin of a neutrino is not a fixed property. The spin can oscillate due to interference.

Wikipedia:

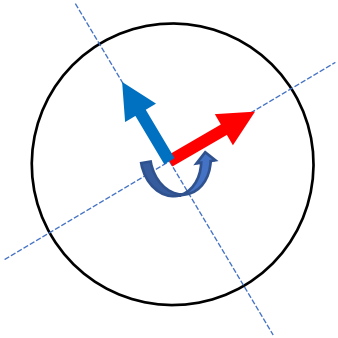
Oscillation

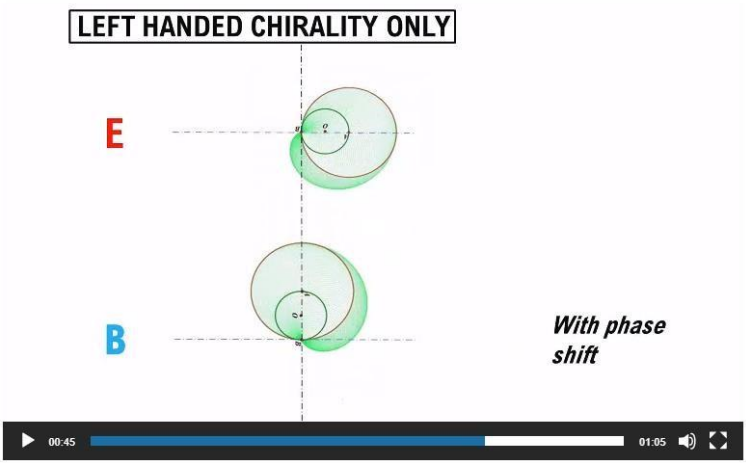
> *A practical method for investigating neutrino oscillations was first suggested by Bruno Pontecorvo in 1957 using an analogy with kaon oscillations; over the subsequent 10 years, he developed the mathematical formalism and the modern formulation of vacuum oscillations. In 1985 Stanislav Mikheyev and Alexei Smirnov (expanding on 1978 work by Lincoln Wolfenstein) noted that flavor oscillations can be modified when neutrinos propagate through matter. This so-called Mikheyev–Smirnov–Wolfenstein effect (MSW effect) is important to understand because many neutrinos emitted by fusion in the Sun pass through the dense matter in the solar core (where essentially all solar fusion takes place) on their way to detectors on Earth.*
>
> *Starting in 1998, experiments began to show that solar and atmospheric neutrinos change flavors (see Super-Kamiokande and Sudbury Neutrino Observatory). This resolved the solar neutrino problem: the electron neutrinos produced in the Sun had partly changed into other flavors which the experiments could not detect.*
>
> *Although individual experiments, such as the set of solar neutrino experiments, are consistent with non-oscillatory mechanisms of neutrino flavor conversion, taken altogether, neutrino experiments imply the existence of neutrino oscillations. Especially relevant in this context are the reactor experiment KamLAND and the accelerator experiments such as MINOS. The KamLAND experiment has indeed identified oscillations as the neutrino flavor*

conversion mechanism involved in the solar electron neutrinos. Similarly, MINOS confirms the oscillation of atmospheric neutrinos and gives a better determination of the mass squared splitting.

The Dutch Paradigm explains the preference for one type of chirality, for naked neutrinos being left-handed. It is the logical consequence of the backlog of the magnetic manifestation relative to the electric manifestation.

As per animations (www.thedutchparadigm.org):





In case a naked neutrino passes through large constructs, the neutrino can encounter an external magnetic manifestation of adequate properties that bridge the gap to allow the chirality for a change-over. Such oscillation can happen multiple times during the exposure of the neutrino to external magnetic manifestations. Eventually, it will leave such exposure with a chirality that reflects the history of the last encounter.

External magnetic manifestations of adequate properties are available with neutrinos locked up in these constructs.

27.INTERFERENCES

Interference is a well-known phenomenon of action between particles. The Dutch Paradigm recognizes photon/neutrino interference only.

The electromagnetic manifestations of the two types of entities, the photon and neutrino potentially can interfere. This interference can be consequential and strong and will last for a longer period or is weak and thereby easy to break. If the interference is consequential, then this requires causality driven by a principle.

The Dutch Paradigm recognize this principle as:

> *The transfer of free electric energy of the entities in a construct into free magnetic energy determines the resistance of the construct to decay*

On the level of entities, three types of interferences can occur:

1. Photon/Photon
2. Neutrino/Neutrino
3. Photon/Neutrino

This interference is based on single entities.

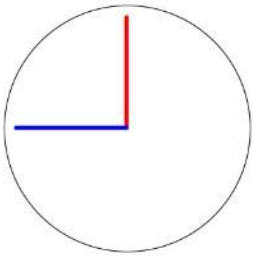
At the restart of the magnetic compensation, all these photons and neutrinos had similar start conditions, resulting in

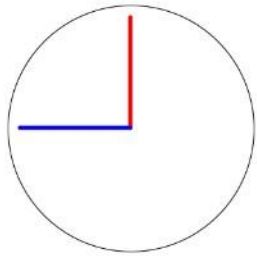
1. The same time delay: 1 TPlanck
2. The same propagation speed: c
3. The same amplitude of the EM manifestations
4. The same start frequency of the EM manifestations
5. The same clock frequency for the update of values of the EM manifestations

Each photon and neutrino type of entity will show as from the restart of the magnetic compensation, that on top of the uncompensated free electric

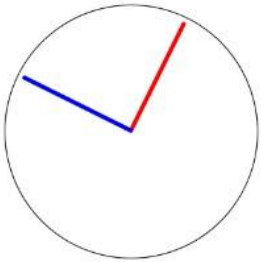
manifestation - the particle part of the entity – there is the wave-like electromagnetic manifestation as well.

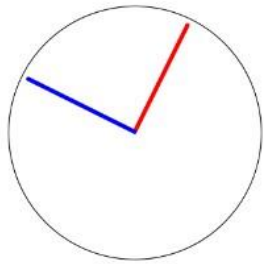
Photon/Photon



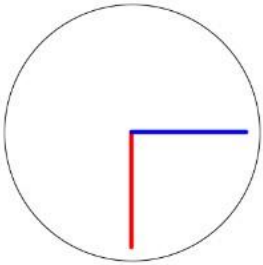


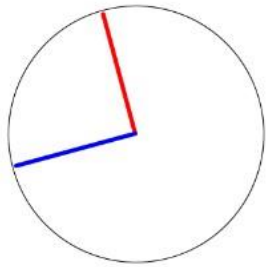
Neutrino/Neutrino





Photon/Neutrino





Animatons in www.thedutchparadigm.org

All combinations allow potentially constructive interference, provided that there is no breaching of the speed of light by the electric and magnetic manifestation or the speed of propagation of the entity.

As stated: At the restart of the magnetic compensation, all these photons and neutrinos went through the same event, that resulted in

1. The same time delay: 1 TPlanck
2. The same propagation speed: c
3. The same amplitude of the EM manifestations
4. The same start frequency of the EM manifestations
5. The same clock frequency for update of values of the EM manifestations

However, for the neutrino, the frequency of the EM manifestations reduced immediately to avoid over speeding with the rotational speed of an amplitude of the EM manifestations. This will be discussed and calculated in a subsequent chapter.

When the neutrino and the photon have one of their electromagnetic manifestations at the limit of the speed of light, then the frequency of the neutrino had to reduce.

The speed of light is absolute. Hence the frequency of the neutrino had to reduce, and free electric energy transferred to free magnetic energy. This free magnetic energy can magnetically interfere with other entities with free magnetic energy.

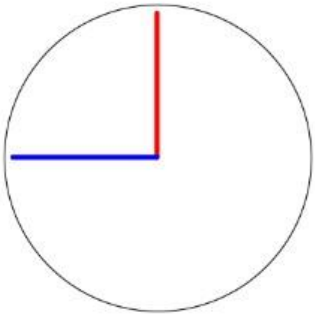
Two observations:

- *It is the start of the free monopolar gravitational attraction*
- *The frequency reduction of the neutrino is within the bandwidth of visible light*

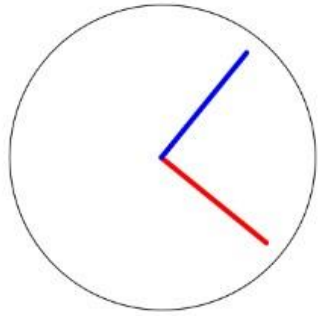
28.PHOTON/NEUTRINO INTERFERENCE: THE ELECTRON

Photon/neutrino interference will result in constructing the Electron.

In The Dutch Paradigm, the electron is a construct of a photon and a neutrino.



Photon



Neutrino

The electromagnetic manifestations of the photon and the neutrino initiate through interference a spatial arrangement of the entities relative to each other.

At the restart, all these photons and neutrinos went through the same event, that resulted in

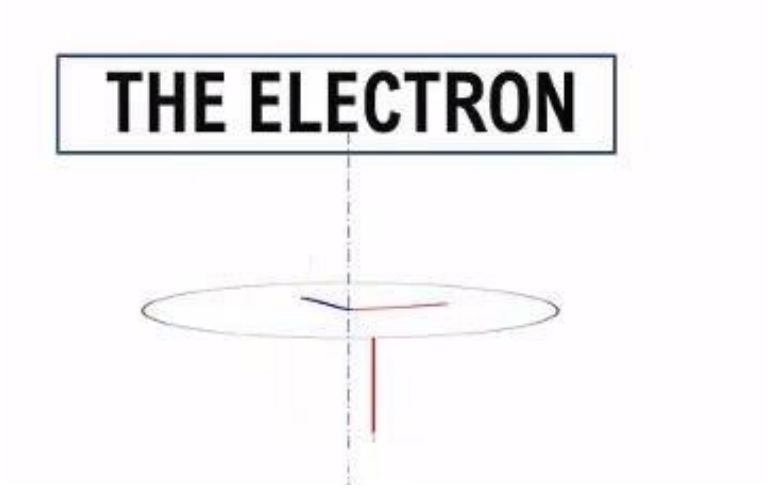
1. The same time delay: 1 Tplanck
2. The same propagation speed: c
3. The same amplitude of the EM manifestations
4. The same start frequency of the EM manifestations
5. The same clock frequency for update of values of the EM manifestations

A model of the electron, as well as an animation of the sequence of interference steps to construct the electron, will be used for explanation. For the animation, see www.thedutchparadigm.org .

Modeling in Particle Physics requires imagination. It requires that we imagine a graphic representation of entities that are themselves not visible. The entities photon and neutrino lack spatial extension. They are observable only through their electromagnetic manifestations. These manifestations are not visible or tangible either but do have a distinct spatial extension of phenomena. These manifestations mutually interfere, while properties rearrange.

The spatial rearrangement of the manifestations under interference is specific for the construct. Such a spatial arrangement is ultimately observable.

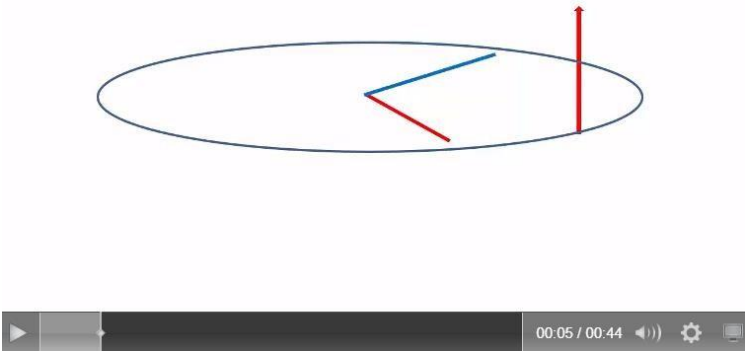
The model for the electron is in the animation:



Interference of the magnetic manifestation arranges the photon in orbit around the neutrino. It has gamma frequency and circles at the speed of light. The plane of the orbit is perpendicular to the direction of propagation of the construct electron. The magnetic manifestations under interferences are graphically simplified. The electric manifestation of the photon is in the direction of propagation as well. As a consequence of the magnetic system

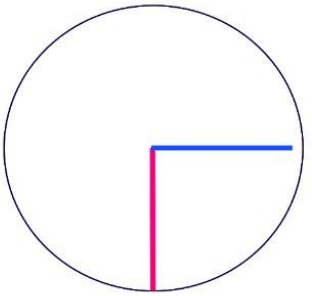
interfering with the cardioid system, the electric manifestation of the photon becomes asymmetric.

In action, as per animation:



This interference is possible due to the availability of the free electric energy of the photon. It is the "particle" manifestation as identified by regular science as particle/wave behavior of the photon.

The animation of the photon as given in this chapter is therefore in fact slightly different because of the phase shift between the electric and the magnetic manifestations.

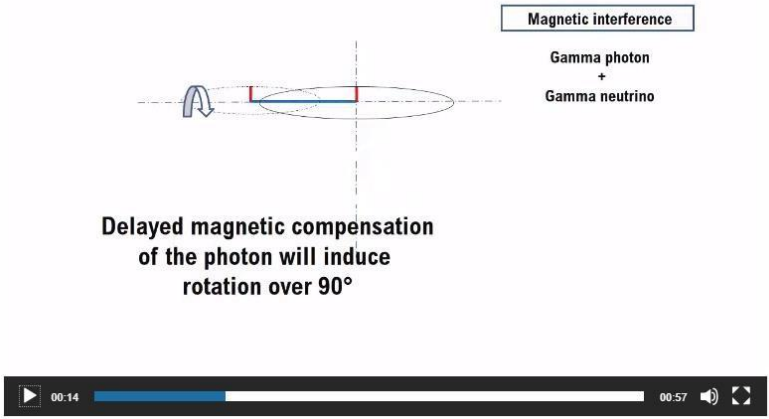


The phase shift represents the free electric energy at a value of hF.

As from the start of period 3, a spatial encounter of a photon and a neutrino became consequential. Whenever such an event occurred, then the free electric energy of a photon could interfere during 1 TPlanck with the magnetic manifestation of the neutrino.

The result of such an encounter is the forming of the construct electron.

A simplified visualization of this sequence of events is in the following animation (www.thedutchparadigm.org).



The occasion of the encounter of the free electric energy of the photon with the cardioid magnetic manifestation of the neutrino induces a momentum due to the Lorentz force. This momentum rotates the photon - being the entity without a mass manifestation - relative to the neutrino. At 90^0 rotation, the momentum is zero, and the magnetic manifestations of the photon and neutrino interfere and lock in a combined manifestation. The magnetic manifestation that compensates for the electric manifestation of the photon is in that condition asymmetric. That implies similar consequences for the electric manifestation: it becomes asymmetric as well. The electric manifestation of the photon now as part of the electron alternates in the direction of propagation of the newly formed construct.

Particle Physics recognize that asymmetry of the electron as the “electric charge.”

The model of the electron clarifies some additional phenomena:

1. Electron oscillation

The frequency of the photon is some 10^{14} Hz higher, and the magnetic manifestation of the photon will close the gap of the backlog in magnetic compensation of the neutrino. That induces an oscillation from left-handed to right-handed chirality and reverse at a frequency level of the visible light.

2. Positron

The electron will oscillate between up- and downwards asymmetry. The second state is the positron.

3. Spinor

Whenever an electron is under the interference of Coulomb forces, the oscillation triggers an additional rotation of the construct. This combination of change-over of chirality and rotation is the spinor.

4. The electric manifestation is quasi-isotropic

When the spinor induces alternation of the construct into rotational behavior, then the asymmetrical electric manifestation becomes quasi-isotropic. Such a situation is present in the electron shells of an atom.

5. Reduction in speed of the construct electron

The limit for propagation is the speed of light. Due to the electric manifestation now in the direction of the propagation reduces the speed of the construct accordingly.

6. Reduction in frequency of the construct

The combined magnetic manifestation reduces to a level in which the rotational speed of the cardioid is at the speed of light.

7. Free magnetic energy

The reduction of frequency implies that free energy reduces as per ΔhF. This energy transfers into free magnetic energy. That is monopolar gravity.

8. Surface inflation

The magnetic manifestations of the electron are active on a flat surface, perpendicular to the direction of propagation. The interference of the two magnetic manifestations inflates the size of that active surface.

9. Photon/photon interference

The photon in orbit at the speed of light can have interference with external photons. That is photonic capture and release.

In this way, the model of the electron is helpful in a better understanding of the role of this construct in its environment.

It is not a fundamental point particle

29.REALITY CHECK ELECTRON CONCEPT

For a reality check, the description of an electron as in Wikipedia is the reference.

Wikipedia:

> *The **electron** (symbol: e−) is a subatomic particle with a negative elementary electric charge. Electrons belong to the first generation of the lepton particle family, and are generally thought to be elementary particles because they have no known components or substructure. The electron has a mass that is approximately 1/1836 that of the proton. Quantum mechanical properties of the electron include an intrinsic angular momentum (spin) of a half-integer value in units of ħ, which means that it is a fermion. Being fermions, no two electrons can occupy the same quantum state, in accordance with the Pauli exclusion principle. Electrons also have properties of both particles and waves, and so can collide with other particles and can be diffracted like light. Experiments with electrons best demonstrate this duality because electrons have a tiny mass.*
>
> *The invariant mass of an electron is approximately 9.109×10^{-31} kilograms or 5.489×10^{-4} atomic mass units. On the basis of Einstein's principle of mass–energy equivalence, this mass corresponds to a rest energy of 0.511 MeV. The ratio between the mass of a proton and that of an electron is about 1836. Astronomical measurements show that the proton-to-electron mass ratio has held the same value for at least half the age of the universe, as is predicted by the Standard Model.*
>
> *Electrons have an electric charge of -1.602×10^{-19} coulomb which is used as a standard unit of charge for subatomic particles, and is also called the elementary charge. This elementary charge has a relative standard uncertainty of 2.2×10^{-8}. Within the limits of experimental accuracy, the electron charge is identical to the charge of a proton, but with the opposite sign. As the symbol e is*

used for the elementary charge, the electron is commonly symbolized by e−, where the minus sign indicates the negative charge. The positron is symbolized by e+ because it has the same properties as the electron but with a positive rather than negative charge.

The electron has an intrinsic angular momentum or spin of ½. This property is usually stated by referring to the electron as a spin ½ particle. For such particles the spin magnitude is $\sqrt{3}/2\ \hbar$. while the result of the measurement of a projection of the spin on any axis can only be $\pm\hbar/2$. In addition to spin, the electron has an intrinsic magnetic moment along its spin axis. It is approximately equal to one Bohr magneton, which is a physical constant equal to $9.27400915(23)\times10^{-24}$ joules per tesla. The orientation of the spin with respect to the momentum of the electron defines the property of elementary particles known as helicity.

The electron has no known substructure. Hence, it is defined or assumed to be a point particle with a point charge and no spatial extent. Observation of a single electron in a Penning trap shows the upper limit of the particle's radius is 10^{-22} meters. There is a physical constant called the "classical electron radius", with the much larger value of 2.8179×10^{-15} m. However, the terminology comes from a simplistic calculation that ignores the effects of quantum mechanics; in reality, the so-called classical electron radius has little to do with the true fundamental structure of the electron.

There are elementary particles that spontaneously decay into less massive particles. An example is the muon, which decays into an electron, a neutrino and an antineutrino, with a mean lifetime of 2.2×10^{-6} seconds. However, the electron is thought to be stable on theoretical grounds: the electron is the least massive particle with non-zero electric charge, so its decay would violate charge conservation. The experimental lower bound for the electron's mean lifetime is 4.6×10^{26} years, at a 90% confidence level.

The observed physical manifestations of the electron are very much in line with the model. The numerical values need a check by estimation and

calculation of the values of the properties known. That is available in a separate section.

Spin direction shows two senses of direction. Spin oscillations are not very well known, though they are not excluded. MRI is tuned to enforce spin oscillations with subsequent registration of fall back behavior.

The assumption for the values of physical properties is that these are constants of nature. That gives further rise to the assumption that the Big Bang was a perfect manifestation of the start of our universe, based on total identical entities for photons and neutrinos and starting conditions for phenomena observed.

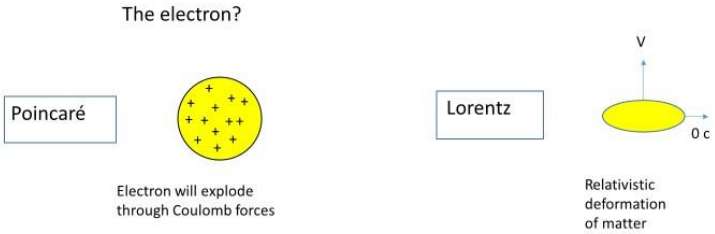
The assumption that the electric charge needs conservation under conditions of interference or decay, is not validated in The Dutch Paradigm. Whenever an electron decays, the “electric charge” will disappear.

30.THE ELECTRON IS NOT A POINT PARTICLE

The present featured model in physics for the electron is a point particle, so with no physical dimensions, an electric charge and ½ spin, and an invariant mass of unknown source. In fact, it is a construct of a gamma photon and a gamma neutrino.

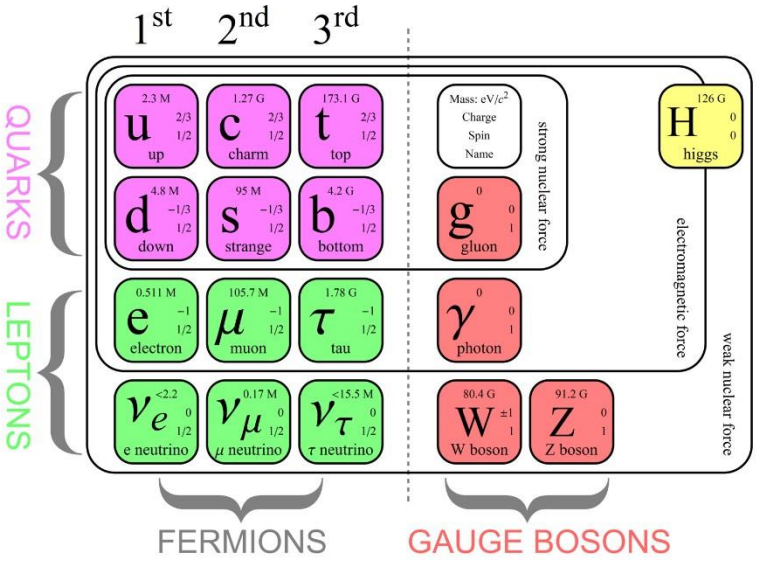
The generally accepted model allows for the complex calculations of electron behavior for events with other EM systems and mass and electric charge carrying particles. This model is nevertheless unable to explain dynamic behavior like spin resonance and absorption and release of photons.

As mentioned earlier, the featured electron model is the consensus solution for solving the issues raised by Poincaré en Lorentz. These issues relate to modeling the electron as a tiny ball of an unknown substance.

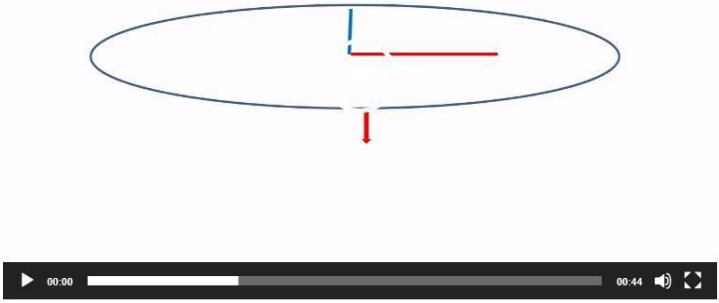


Poincaré assumed the requirement of counterforces to keep the electric charge within its spatial boundaries. His hidden assumption was a uniformly dispersed electric charge in the unknown substance.

The solution to model the electron as a fundamental point particle was accepted and is in the Standard Model of Fundamental Particle and Interactions.



The model of the electron as in The Dutch Paradigm solves the issues of Poincaré and Lorentz differently.



There is a more than the remarkable difference between the assumption that the electron is a point particle with no internal structure and the suggested construct with an internal structure of amazingly active constituents.

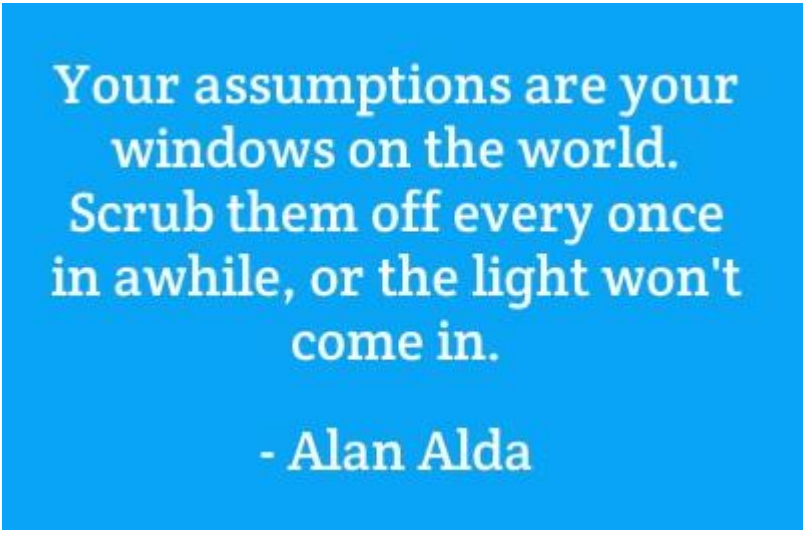
To highlight as per The Dutch Paradigm:

1. There is an orthogonal three-dimensional system available for spatial information
2. There is rotational information available, both left-handed and righthanded
3. There is a gyroscopic effect to stabilize the particle in space
4. There is a frequency differentiation between the neutrino and the photon constituent of the electron
5. There is the potential to exercise Lorentz and Coulomb forces
6. These forces do have spatial information in direction and rotation
7. There is a residual monopole magnetic capability to interfere with external particles/constructs
8. The construct electron can absorb and release frequency derived energy

This list is not conclusive. With the model of an electron as an elementary point particle, these characteristics of an electron are hidden and therefore unavailable for understanding electron behavior.

The electron is crucial for understanding many of the observations in the field of particle physics. With no view on the internal structure of the electron, the focus in regular physics is on identifying external sources to explain observed phenomena. Whenever this fails, there is a tendency to suggest on finding solutions outside the realm of observations by assuming quantum physics phenomena.

Within the models of The Dutch Paradigm, the focus is on the behavior of constituents within the electron. It opens a new view for understanding the physical world we encounter as human beings.



31.COULOMB, GRAVITATIONAL AND LORENTZ FORCES

The first construct in the universe is the electron constituted of a gamma neutrino and a gamma photon. The three forces at work in rearranging energies.

The electron has an additional interfere capability due to the asymmetric electric manifestation. This asymmetric electric manifestation can interfere with external magnetic manifestations. Also, the free magnetic manifestation of the electron - derived from the reduction of electric manifestations - can interfere with external magnetic manifestations.

The types of forces available to impact on the electron:

1. The Coulomb force
2. The gravitational force
3. The Lorentz force

The Coulomb force is directly between electrical "charges" or manifestations. That force can attract or repel. It will induce movements of constructs and thereby potentially intermingle these with external magnetic compensations.

The gravitational force is similar but is attraction only. It is monopolar as explained with the neutrino. The gravitational force is consequential for the reduction of potential energy of a construct.

The Lorentz force is a new phenomenon. The Dutch Paradigm postulates that this force is consequential for the reduction of kinetic energy of a construct

32.WHAT IS NEXT?

Interference of electrons, forming of dodecahedrons.

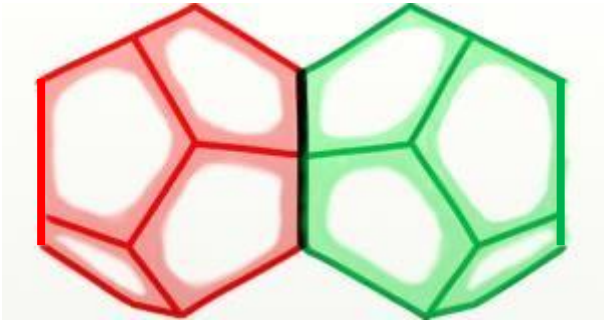
Electrons are in massive numbers present in the universe. Those electrons can interfere with other particles and constructs.

The types of forces available to impact on the electron:

1. The Coulomb force
2. The gravitational force
3. The Lorentz force

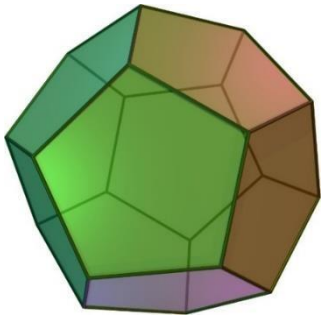
The Dutch Paradigm postulates that electrons are the constituents to construct the protons and neutrons.

The electrons arrange in a twin dodecahedron structure.



33.PROTON, NEUTRON

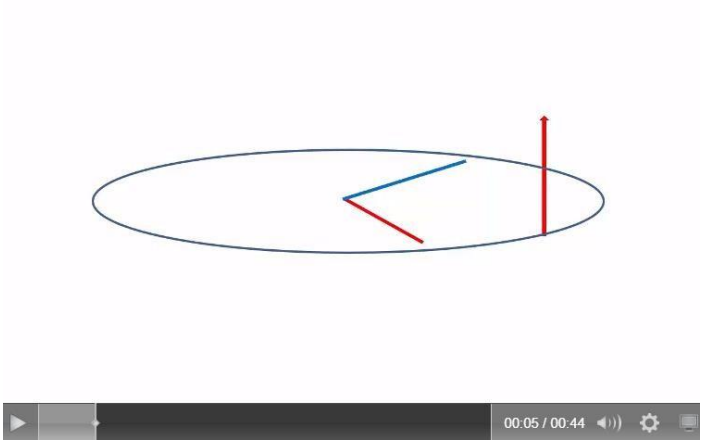
The electrons form spatial constructs with other electrons. Twelve electrons will configure into a spatial arrangement of a dodecahedron. It is the building stone of protons and neutrons.



At first sight, this is counterintuitive. Regular science assumes that electrons always mutual repel due to the similar isotropic electric charge.

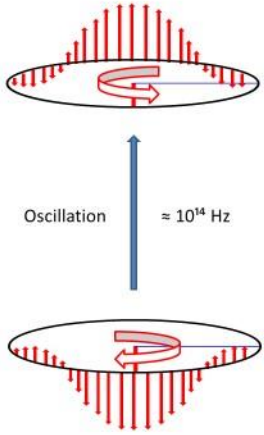
Therefore we need to have a better understanding of the oscillation behavior of naked electrons.

The animation of an electron is:



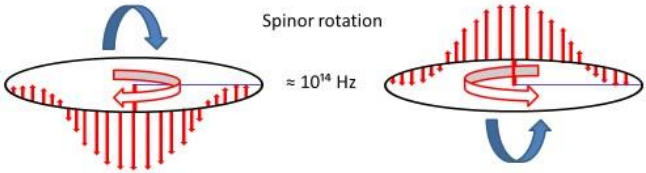
On each face of such a dodecahedron is an electron active.

The electron oscillates in chirality at a frequency of 10^{14} Hz. As explained, this oscillation is due to the small difference in frequency of the gamma photon relative to the gamma neutrino in the electron. At the change-over of chirality, the electric manifestation of the photon makes a change-over to opposite asymmetry.



As a naked electron, that oscillation is from electron into a positron. When more electrons are present, then these electrons can mutually attract each other provided that they rotate into a position of attraction. Such a rotation is alike as shown with this simple set up magnets:

Therefore, the electrons can rotate towards each other at the frequency of maximum approx. 10^{14} Hz.

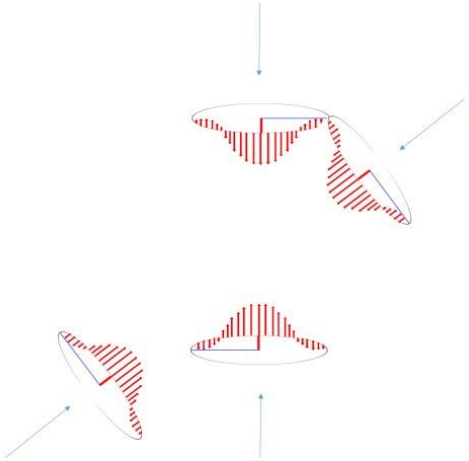


This rotation is the second part of the spinor action.

In case of a proton present, this spinor rotation of the electron would be at every oscillation, but there are no protons yet. When protons are absent, the electrons oscillate in the frequency of 10^{14} Hz and occasionally might rotate if potential attracting is possible. Each naked electron shows this behavior and therefore will neither attract or repel relative to each other.

In the very early stage of development of the universe, these electrons were formed in abundance amid an overwhelming mix of other electrons, gamma photons, and neutrinos as well. It is difficult to visualize how new constructs could emerge out of such a seemingly wild and complex mixture of particles.

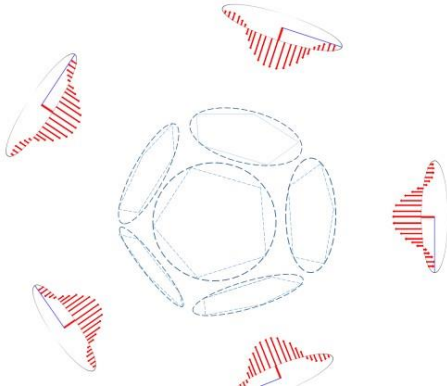
Nevertheless, this is possible. Electrons may collide at an angle. If so, that adds the activity of the Lorentz force to the Coulomb force,



The asymmetrical electric manifestation meets de magnetic manifestation of another electron, and consequently, they become mutually subjected to the Lorentz force. This Lorentz force introduces a spatial and random movement of such a couple of electrons.

> *The Dutch Paradigm postulates that out of the mix of particles, ad random spatial configurations of electrons emerge in a dodecahedrons arrangement.*

In an illustration:



12 electrons might accidentally collide in a spatial arrangement of a dodecahedron, with an electron on each face. Once such an arrangement is there, each electron will exert Lorentz forces with neighboring electrons. The vectors of these forces are all pointing inwards to the opposite electron.

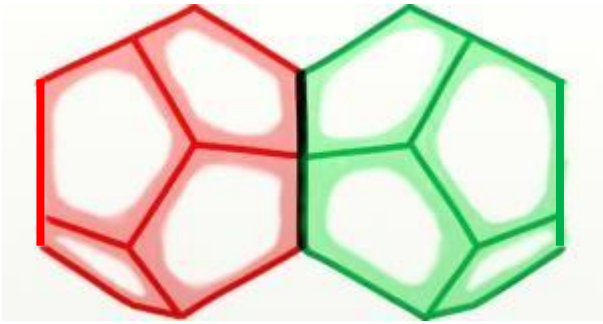
In such an arrangement, the 12 electrons are locked in position with very strong Lorentz forces. This arrangement, therefore:

1. is extremely stable
2. propagates at speed zero compared to the speed of light
3. is electrically neutral
4. the resulting spin is neutral
5. free spinor rotation per electron is not possible anymore

Moreover, once such a dodecahedron arrangement forms, it excludes itself from the mix due to the difference in speed and electric neutrality. The total mix of particles at relativistic speed reduce gradually with each dodecahedron arrangement formed. The dodecahedron is the only arrangement of the Plato "solids" able to configure a stable construct of electrons.

Even so, we still have entities without a spatial extension in a construct. It is the interference pattern of their electromagnetic manifestations that we can imagine as a spatial form of a dodecahedron in exhibiting the combined electromagnetic manifestations. There is no substance involved, while there is a mass manifestation.

Constructs of 12 electrons in a dodecahedron arrangement encounter other particles and also similar arrangements of 12 electrons in a dodecahedron arrangement. It will form twin dodecahedrons as the arrangements for the constructs neutron and proton.



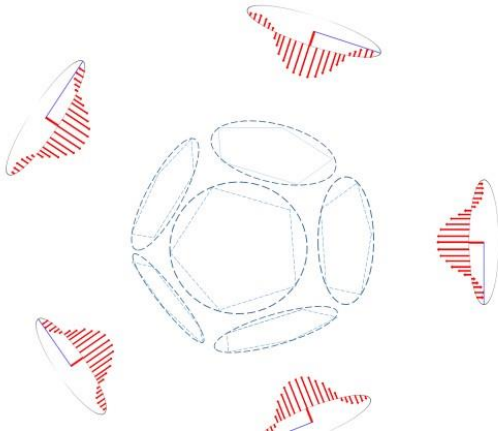
Before discussing twin dodecahedrons, we need to understand in more detail the behavioral characteristics of such a dodecahedron arrangement of electrons.

34.DODECAHEDRONS

Some behavioral characteristics of electrons arranged in a dodecahedron: Massive build up of gravitational attraction through free magnetic energy.

Buildup of gravitational attraction through free magnetic energy.

An illustration by the forming of the dodecahedron was:



Before the encounter, all 12 electrons are propagating at relativistic speed. After the encounter and forming the arrangement of the dodecahedron, that speed became zero relative to the speed of light.

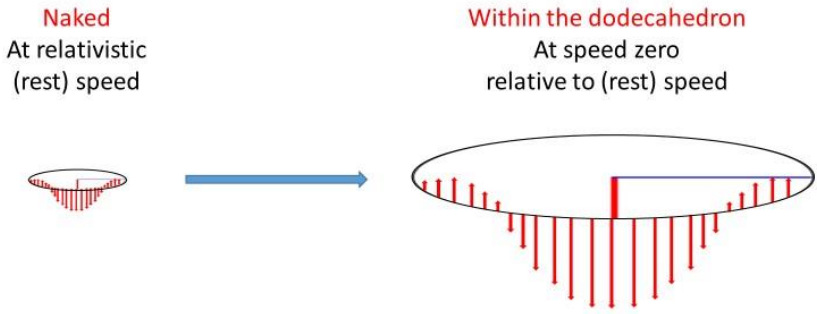
As a consequence, each electron in the dodecahedron loads itself in the direction of its propagation with kinetic energy at a level ½mV². V is the speed differential. The relativistic speed of a naked electron is its proper natural speed at which formation into the electron took place. This loading characteristic with kinetic energy is unknown in regular science. The load in kinetic energy is the equivalent of the transformation of free electric energy in free magnetic energy, by reduction of the frequency of the electron system. The addition to the magnetic manifestation of the electron is the ΔhF.

That is counterintuitive because in regular science we apply the hidden assumption that the natural rest speed of an electron is unknown. Tests near 0 ºK show electrons still have speed.

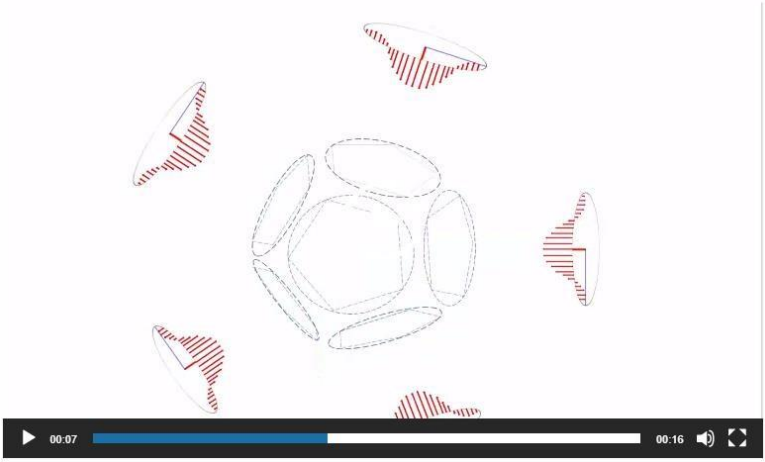
This increase in the magnetic manifestation of each electron reflects in surface inflation for the electron and volume inflation for de dodecahedron.

Per illustration:

Electron inflation



Dodecahedron arrangement in a simplified animation (www.thedutchparadigm.org):

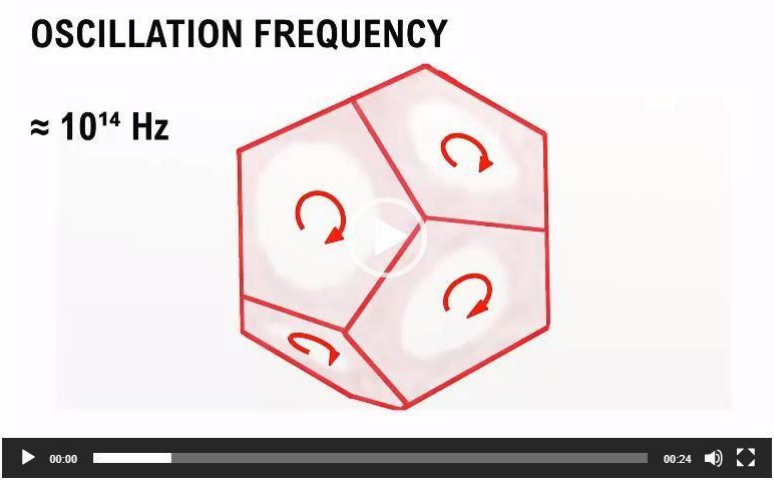


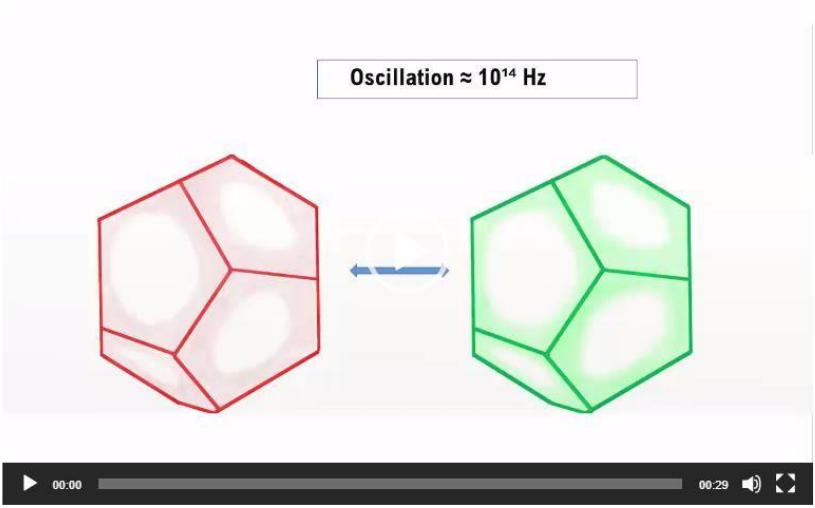
Regular science identifies the additional free magnetic manifestation as mass manifestation.

Oscillation without spinor rotation

Another characteristic is that the electrons in the dodecahedron arrangement continue to oscillate and at the frequency of approx. 10^{14} Hz.

In animation:





The dodecahedron arrangement limits the electrons to make spinor rotations.

Electromagnetically neutral behavior

In the outside world, such a single dodecahedron exhibits no noticeable resultant electrical manifestation, nor a resulting ½ spin behavior. To sum it up, such a dodecahedron act as black matter, showing so-called mass related behavior like gravitational attraction and inertia only.

Natural rest speed zero, inertia capability

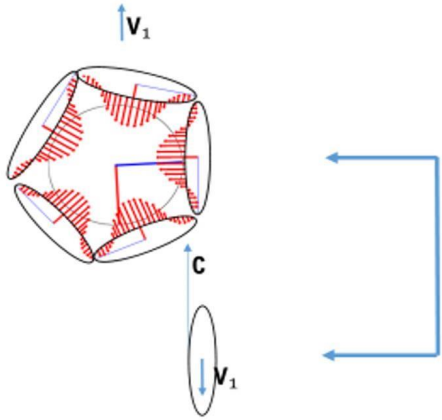
Another observation concerns the potential breach of the speed of light of the entities involved, include their electromagnetic manifestations as well. For illustration: on each face of the dodecahedron, there is a photon that orbits at the speed of light. That means that whenever a dodecahedron would accelerate in a certain direction, then the resultant speed of one or more of its photons could exceed the speed of light.

That is not possible, and therefore the speed of the dodecahedron relative to the speed of light is zero at the very moment this construct emerges. In other words, the natural speed of the dodecahedron versus the speed of light is zero.

However, we know that we can accelerate an object.

That triggers the question: what prevents any of such photons from exceeding the speed of light while being accelerated?

In illustration:



When a dodecahedron accelerates out of its natural rest speed, being zero relative to the speed of light, then within the construct, additional compensating circular vibrations are mandatory to avoid over speeding. It is a rather complex set of vibrations that deforms the dodecahedron whenever and wherever necessary to avoid over speeding of the manifestations. These vibrations are direction sensitive. These circular vibrations are direction sensitive and require the external input of energy. It is this required input of energy during acceleration that we experience as the inertial behavior of objects in daily life. Once accelerated, this system of vibrational compensation is energy stored as kinetic energy in the construct dodecahedron.

It is impressive, that this configuration of electrons in the spatial form of a dodecahedron has by itself the speed of light available as the reference to accommodate any acceleration along whatever Euclidean axes. Any acceleration against inertia, being the introduction of the compensating vibrations is stored within the construct dodecahedron as reversible kinetic energy and exactly along its axis of variation in speed. That is irrespective of

any rotation of the dodecahedron in due time. This system is self-adjusting and therefore preserving the history of acceleration.

Interference capability with other dodecahedrons

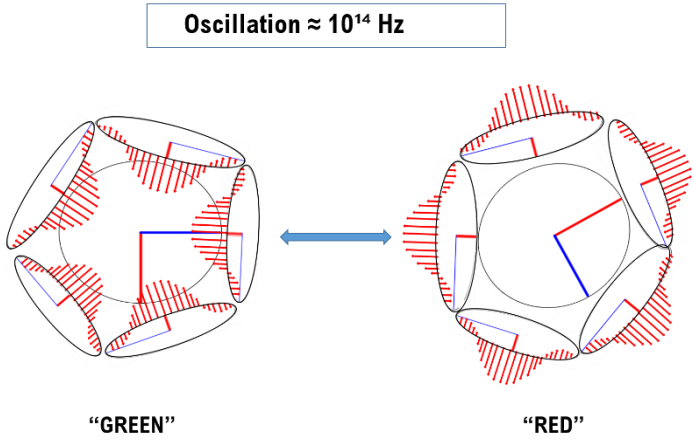
While a single dodecahedron acts in effect as “black matter” and showing little or no interaction with the outside world, it is conceivably feasible that a dodecahedron may interact with yet another single dodecahedron.

35.TWIN-DODECAHEDRONS

When two dodecahedrons collide, they form a pair.

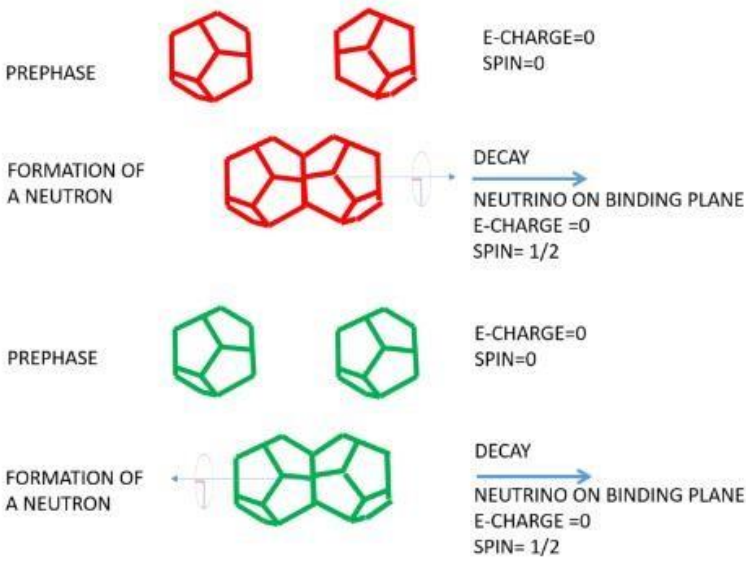
All electrons of a single dodecahedron are oscillating in sync. The mode of oscillation relates to the actual status of the chirality – left-handed of righthanded - of the neutrino and the electron from which the neutrino is a constituent.

For illustrations, the dodecahedrons having outward pointing vectors are colored red and dodecahedrons with inward pointing vectors green.



The neutron emerges when two green or two red dodecahedrons collide.

In illustration:



Two dodecahedrons *at speed above zero*, cannot have on the merging faces two neutrinos in the same chirality. The Pauli Exclusion Principle defines this behavior as a principle.

One neutrino ejects.

The Dutch Paradigm explains the logic of this Pauli Exclusion Principle principle in a separate chapter.

With one neutrino less, the neutron has ½ spin.

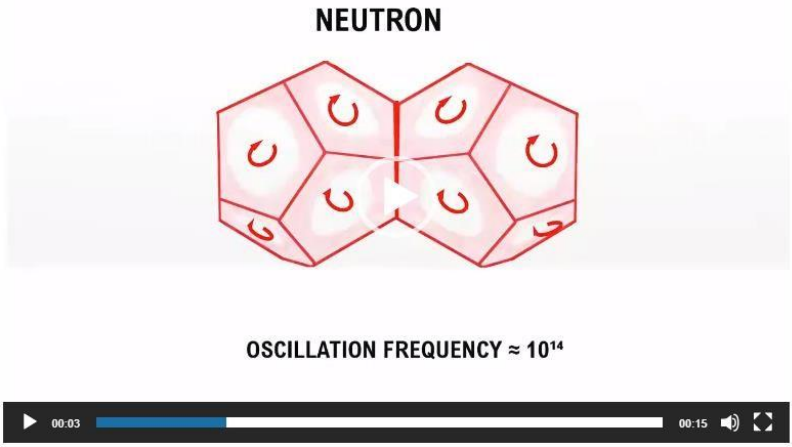
The manifestation of asymmetrical free electric energy is zero. On the binding face, the vectors representing this manifestation point and rotate in the opposite direction. The single neutrino in the binding face interferes with these two gamma photons.

The Dutch Paradigm identifies this as the ***neutron bond***.

36.NEUTRON/PROTON DECAY

The naked neutron decays in a proton.

In the twin-dodecahedron model of The Dutch Paradigm an animation of the neutron oscillation is:



The naked neutron decays within minutes in a proton. In β-decay, the neutron ejects an electron and a neutrino.

A description of the β-decay process is:

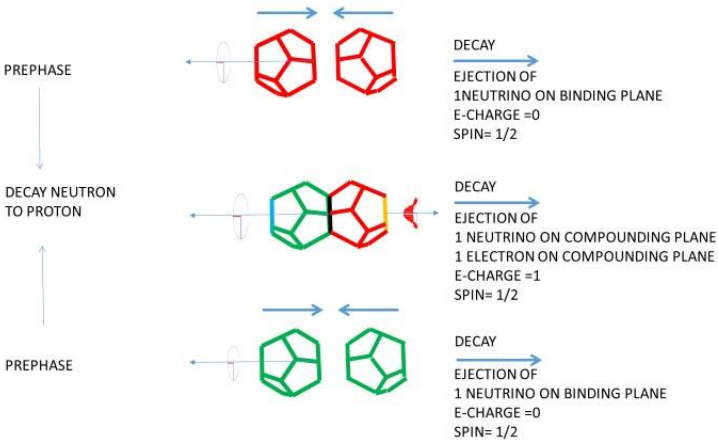
Wikipedia

> *In nuclear physics, **beta decay** (β-decay) is a type of radioactive decay in which a beta ray (fast energetic electron or positron) and a neutrino are emitted from an atomic nucleus. For example, beta decay of a neutron transforms it into a proton by the emission of an electron, or conversely a proton is converted into a neutron by the emission of a positron (positron emission), thus changing the*

nuclide type. Neither the beta particle nor its associated neutrino exists within the nucleus prior to beta decay, but are created in the decay process. By this process, unstable atoms obtain a more stable ratio of protons to neutrons. The probability of a nuclide decaying due to beta and other forms of decay is determined by its nuclear binding energy. The binding energies of all existing nuclides form what is called the nuclear valley of stability. For either electron or positron emission to be energetically possible, the energy release (see below) or Q value must be positive.

Beta decay is a consequence of the weak force, which is characterized by relatively lengthy decay times. Nucleons are composed of up or down quarks, and the weak force allows a quark to change type by the exchange of a W boson and the creation of an electron/antineutrino or positron/neutrino pair. For example, a neutron, composed of two down quarks and an up quark, decays to a proton composed of a down quark and two up quarks. Decay times for many nuclides that are subject to beta decay can be thousands of years.

For the neutron, both dodecahedrons are in the same state of oscillation. In the model of The Dutch Paradigm, β-decay initiates when the state of oscillation of the twin dodecahedrons changes to the opposite mode relative to each other.

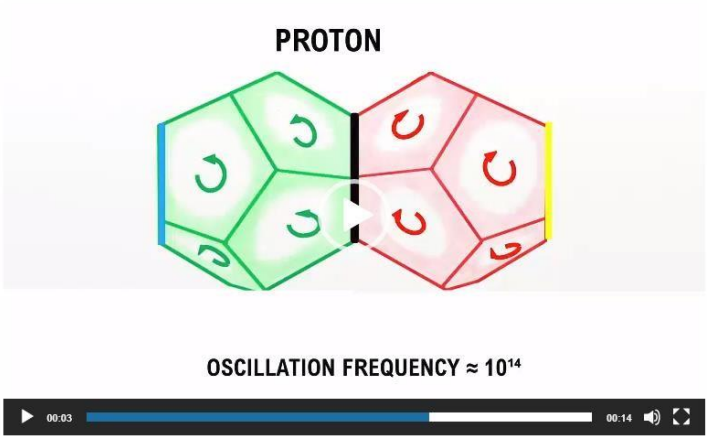


In the pre-phase two dodecahedrons collide to the neutron under ejection of one neutrino in the binding plane. The next phase is the β-decay. This β-decay initiates whenever one of the dodecahedrons start oscillating opposite to the

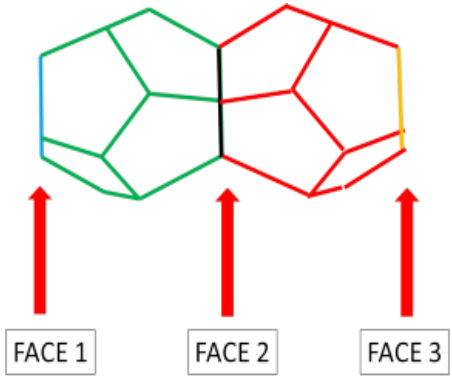
other. This due to an external event of magnetic nature, as indicated for the change-over in chirality for the neutrino.

During the β-decay, there is ejection of an electron and a neutrino.

To illustrate, the β-decay in an animation(www.thedutchparadigm.org):



The neutron modifies in β-decay in three faces to the proton.



Face 1: Only a gamma photon is in orbit in this face.

> The neutrino ejects at β-decay. Therefore there is only one gamma photon left in this face. The electric manifestation of this photon returns in the symmetric mode. The resulting spin on this face is 0.

Face 3: This face is empty.

> During β-decay the electron in this face ejected. The resulting spin in this plane is 0, and there is no electric manifestation anymore.

Face 2: In this binding face is the ***proton bond.***

> There is 1 electron in that binding face and an additional gamma photon, which originates from the neutron bond.

The ***proton bond***:

> *The **proton bond** makes the proton electrically active. Before βdecay, at an equal sense of oscillation of the two dodecahedrons, the neutron bond had two gamma photons, with their vectors pointing in an opposite direction and opposite sense of rotation. After β-decay, the two dodecahedrons oscillate in opposite sense. Therefore, the two gamma photons on the binding face are now pointing in the same direction, while still in opposite sense of direction. That means that one electron configuration will emerge. The second gamma photon continues its rotation but in a symmetric mode of the electric manifestation.*

This electron of the proton bond locks in position as well and therefore cannot perform the spinor rotation.

With each oscillation, the cardioid of the neutrino in the proton bond will change chirality. It can well be that there is a preference of a gamma photon and neutrino to interfere in the same sense of rotation, with some transfer of free energy to magnetic energy and consequences for frequencies involved.

The proton system is extremely stable, with an average life expectancy of $\geq 2.1*10^{29}$ years.

37.NEUTRON/PROTON COMPOSITES

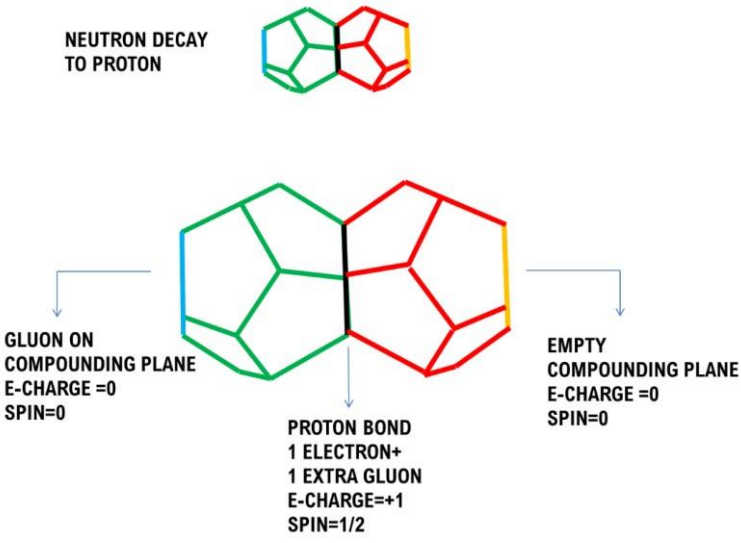
It is not possible to construct more complex nuclei by just sticking protons together.

Two protons in position to form an assembly will repel when the electric vectors point in the same direction. Under that condition, they cannot form a new construct.

However, there are possibilities for a pair of protons to assemble in a new construct.

We know by now that in the single dodecahedron structure, we have pairs of electric vectors that mutually neutralize their effects. They are per opposite pair in an electron/positron configuration, but separated and can compensate, neutralize, but not annihilate. These vectors are still there but act counteractive in their electrical impact on the assembled dodecahedron.

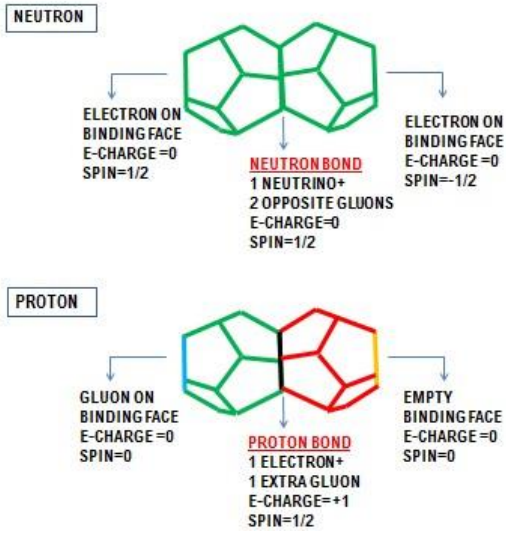
If we focus our attention on the proton first, we can draw the scheme:



Note 1: the name of gamma photon in circulation in an electron is “gluon.”

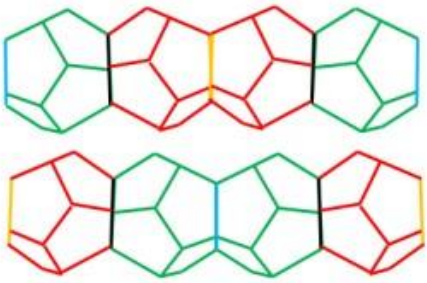
Note 2: the green and red as previously defined, a blue colored face has only a gluon, and a yellow face is empty.

The schematic representation of the neutron and the proton is:



The model allows the assumption that two protons can merge. There is compensation for each other’s electric vectors.

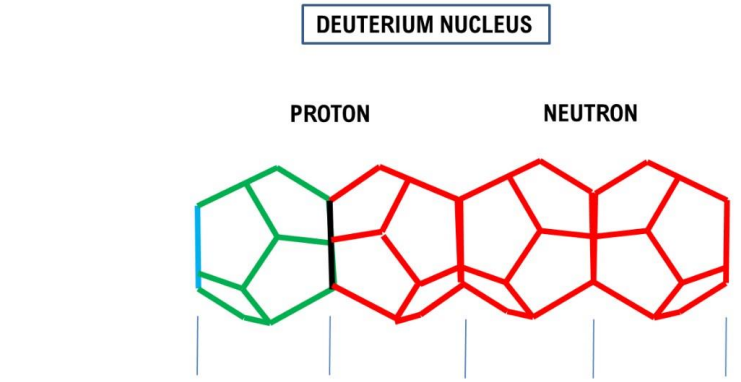
There are two possibilities:



The top version shows a binding face (the yellow face that is empty from both constituent dodecahedrons), the other one shows two blue faces with opposite charge vectors, which enables a neutron bond. The remaining electric vectors of the two protons would point in opposite directions, and such an arrangement compensates and makes up a two-proton situation with no charge and no spin. The resulting construct is dark matter again. Maybe it is there and does exist, but we cannot identify it in another way than through its mass manifestation. Such a two-proton assembly is not very stable because caused by an unsynchronized oscillation it will decay, like the neutron decay.

The neutron plays the major role in making configurations of multiple protons that show active electrical behavior outside the construct.

The first incident will be that we find an ion structure or nucleus in which one neutron binds itself to a proton. That turns out as the nucleus of deuterium.

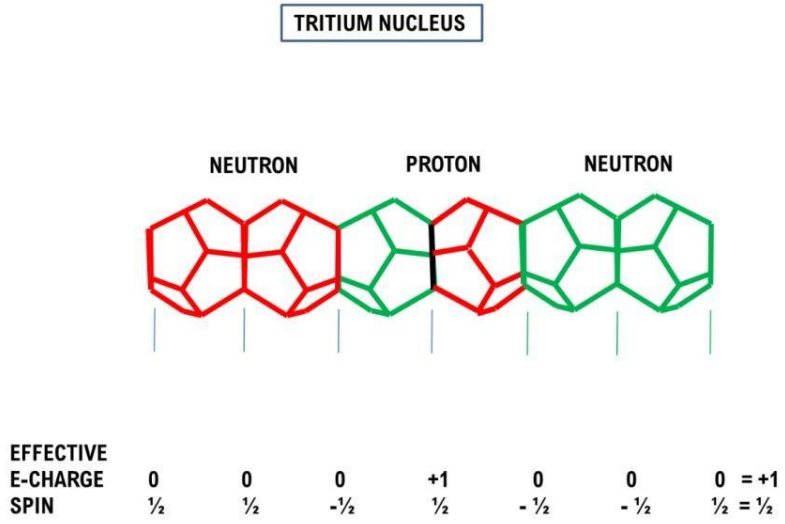


EFFECTIVE					
E-CHARGE	0	+1	0	0	0 = +1
SPIN	0	½	½	½	- ½ = 1

The result of this event apparently follows a simple rule of calculation. The neutron binds itself on the empty face of a proton, indicated as yellow. The oscillation of the neutron synchronizes with the proton. The spin is a full integer value. The stability of deuterium is high, though it is not extremely high

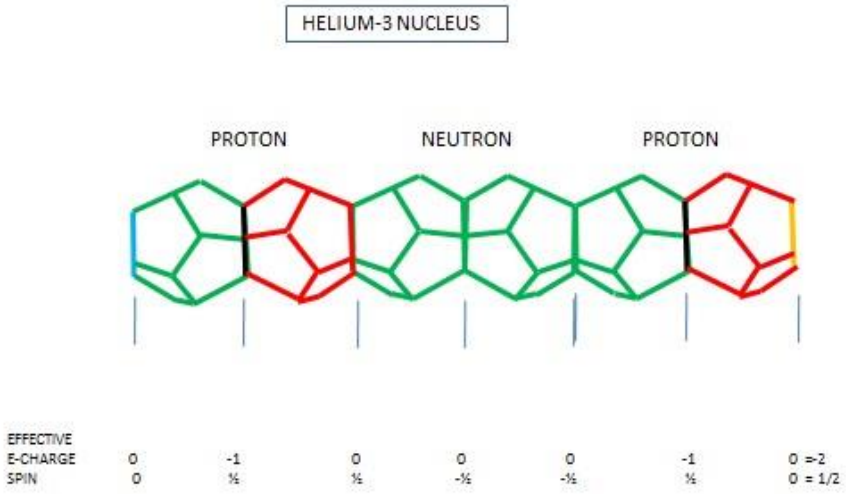
> *Note: The synchronization mechanism is the logical impact of inertial behavior of the construct at a speed > 0. The explanation for this phenomenon is in a separate section.*

The next step is a possible configuration of the nucleus of tritium.



The resulting electric manifestation is +1 and the spin ½. Tritium has an average lifetime of some 12, 32 years and decays to Helium-3. That is due to the left neutron bond to the proton. On the compounding plane, we find two gluon vectors that point in opposite directions and a neutrino in the center. Although all dodecahedrons are oscillating in sync, it is this area - this face - that is vulnerable to incidental interference with an external magnetic field. That can trigger the left dodecahedron out of synchronization, resulting in the neutron bond to flip in a proton bond. Consequently, the two vectors of negative charge within one dodecahedron will point in the same direction and a repelling force will become effective. The same could happen to the green dodecahedron on the right side. As a result, we can indicate that this nucleus of tritium is relatively stable but is prone to decay when passing through a strong magnetic field. The magnetic field must be strong because, with an average lifespan of 12 years, the active electrical nucleus had become an atom with an electron in the first shell. A neutron can bind to a proton, but as long as these bonds are neutron-based bonds, they will show the risk of instability.

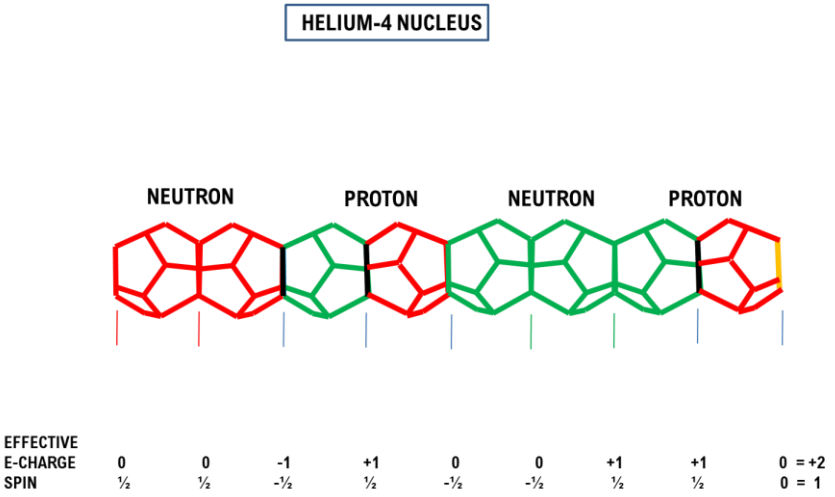
In a further step in the development of more complex nuclei, an additional proton binds itself to the deuterium nucleus and forms Helium-3.



The neutron positions itself in between two protons and binds with one proton in an empty compounding plane, as with the deuterium nucleus and with the other proton in a blue face, one with a gluon and without a neutrino. The vector direction of the two gluons is opposite. Such a configuration is possible and apparently stable because in this case, all faces are oscillating in the same mode. Whenever one of the dodecahedrons of the neutron oscillates out of synchronization, such a nucleus decay. The two gluons would point in the same direction vector wise and would repel the same electric charge in the neighboring protons. That synchronization is induced by the binding areas and most probably cause some reduction of frequencies of the constituents and a small addition to the mass manifestation.

This relatively small bandwidth of difference in frequency is the fingerprint of each element in Periodic Table of Elements.

The next step is Helium-4

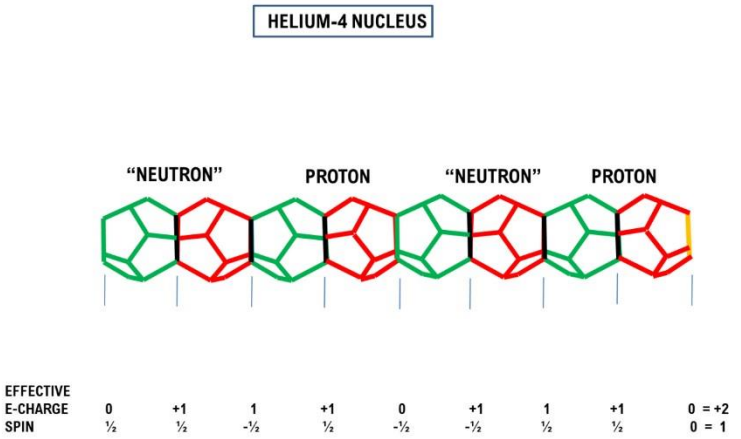


Helium-4 forms by addition of another neutron to Helium-3.

There are two extra proton bonds, two in the same vector direction and two in the opposite direction.

The stability of such a configuration is limited. On the right side, we have two vectors pointing in the same direction, and that indicates possible decay. The decay of the neutron into a proton in combination with properties of the proton bonds will increase the stability of the construct.

This configuration is:



It is stable. There is a link available of some strong proton bonds with their resulting electric vectors in the same direction, separated by two dodecahedrons.

As from this configuration, it is difficult to assign the dodecahedrons to their origin, being part of a proton or a neutron. It becomes fuzzy, but the functionality per single dodecahedron is very well identifiable.

Configuring along this line of thinking makes next steps predictable as well. So far, the build-up of configurations is represented in a line format only, to clarify the principles. The factual configuration process results in more spatial structures, possibly with additional neutrons, but they follow the structuring principles as postulated.

Dodecahedrons can form spatial more complex nuclei by a combination of using more faces with the neutron bond and other faces in combinations of twin dodecahedrons for proton bonds that are electrically neutral to the outside world.

The rules to configure the nuclei for the elements can translate in an algorithm, with indications for stability and presence of isotopes.

38.PRELIMINARY CALCULATIONS

Opening remarks.

Order of magnitude calculations will reveal whether The Dutch Paradigm assumptions are in line with observed realities.

The development of the universe up to and including the proton and neutron are in fact deterministic. The Dutch Paradigm assumes an intentional character by design. Such intention is required to be deterministic up to a certain level to allow conscious observers to understand and apply causality. The causalities will become more and more complex and maybe less deterministic. It can well be that these causalities are giving free will a chance to play an independent role - within its free physical space to act.

It is a scientifically challenging job to define mathematical formats that govern the causalities up to and including the formation of the dodecahedrons that will constitute the proton and the neutron. These are not available yet.

Nevertheless, this chapter highlights observations and calculations based on the assumption of deterministic driven events.

The basic event clock for observation of causalities is the Planck time, with the entities of photons and neutrinos released with electromagnetic manifestations at gamma frequency.

By observations over extremely short distances, we see phenomena that are not in line with classic expectations based on observation and interpretation of events in the macrocosmic world. A subatomic entity cannot lose all of its electrical free energy; there will always be a limited quant of electrical energy left without compensation, what is recognized by regular science as the particle/wave duality. There is the time limit of the Planck time and dynamic phenomena that follow rules of laws that are difficult to comprehend relatively to what is the macrocosmic “reality.”

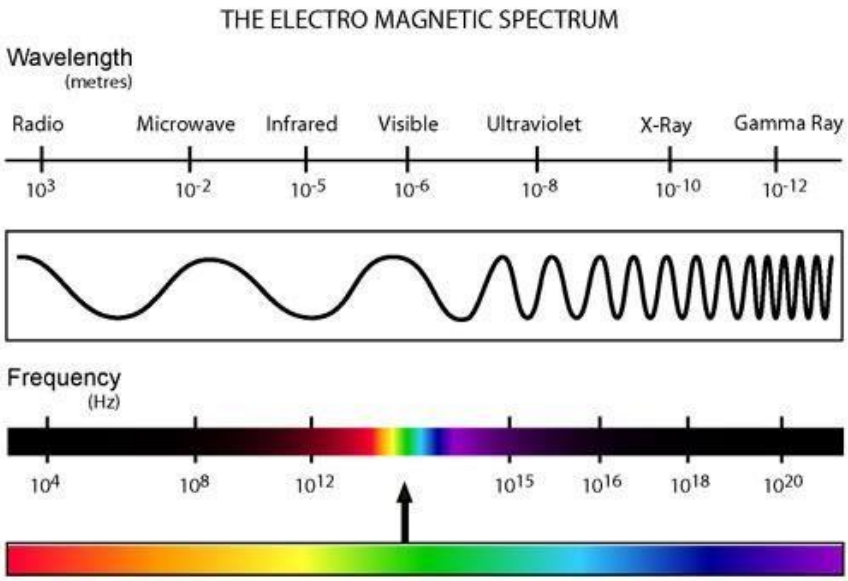
Entities propagate at an extremely high speed through the universe. In a restricted and specific space around each entity processes of an electromagnetic nature are active. These manifestations are linked to the entity. These processes will show certain impacts in this space envelope around the entity. An entity itself is without a spatial extension but makes itself observable through its manifestations. When entities are coming closer towards each other and enter in each other's space envelope of influence, processes of repelling and attraction, harmonizing and the like show their existence.

One can observe processes aiming to restore symmetry in the manifestations of the naked entity but also processes as a consequence of interfering in manifestations of each other. With these processes, more complex entities make themselves observable as constructs with macrocosmic effects allowing us to describe these effects in laws of nature. When electrons are merging into protons, we see that an electric phenomenon, "charge" shows its character as a side effect of asymmetry of its electrical manifestations in the construct electron. The same is applicable for the residual effect that we call gravity, the attractive force between entities that show "mass" behavior. As human beings, we observe in this indirect way the existence of all these entities and their constructions.

We visually observe through photon interference in the retina of our eye as well. These photons have frequencies within the bandwidth of visible light. Also, these photons originally emerged at the start of the universe on the gamma frequency, but have reduced in frequency since, due to all kind of encounters with other entities and constructs. One could consider photons as messengers between these observable spatial constructions. Separated from the observer by space but interconnected by these photonic messengers and entangled. They are messengers that can reveal details of small spatial constructions, but also show large constellations of stars and planets.

1. Gamma-rays

The electromagnetic spectrum indicates frequencies and applications.



Wikipedia:

> *The energy per photon is in electronvolts. That energy is proportional to the frequency. At a frequency of 2,4 * 10^{20} Hz, this is 1 MeV. Gamma-ray is all electromagnetic ray as from approximately 0,2 MeV (at lower frequencies we have the category of Röntgen Rays). Gamma-ray triggered by radioactive decay is under 10 MeV, but in astronomy higher levels of energy are observed.*

In linear media, any wave pattern is described as the independent propagation of sinusoidal components. The wavelength λ of a sinusoidal waveform traveling at constant speed v is given by

$$\lambda = \frac{v}{f}$$

Where v is called the phase speed (magnitude of the phase velocity) of the wave and f is the wave's frequency. In a *dispersive* medium, the phase speed itself depends upon the frequency of the wave, making the relationship between wavelength and frequency nonlinear.

In the case of electromagnetic radiation—such as light—in free space, the phase speed is the speed of light, about 3×10^8 m/s.

2. IMPACT OF FREE ENERGY

The energy in an electromagnetic manifestation of the entities photon and neutrino comprises:

1. Free electric energy
2. Potential energy in the frequent sinusoidal compensation system

The first fraction, the free energy, is the amount of energy as released in the 2nd period of the Big Bang. It is uncompensated by the magnetic compensation.

The second fraction is in the system of frequent conversion of energy from the electric to the magnetic compensation. That is the sinusoïdal conversion with the magnetic compensation of the electric energy in backlog. It is comparable to what regular science indicates as the constant annihilation, the antimatter versus matter idea. The energy in the sinusoïdal system changes with frequency. Frequency reduction in a construct will induce the transfer of free electric energy to free magnetic energy, the gravitational attraction. The magnetic free component in a construct reflects the history of interferences that had an impact on the free electric energy.

At the origin of this free energy, there was neither a wave nor a frequency phenomenon. Once released, an ejected entity became unable to compensate electric energy anymore. This energy is from then on linked to that entity as free electric, uncompensated energy. It is at the start of the 3rd period when this sinusoidal retarded annihilation process starts as a reflection of the original virtual causality in which the energy that could impact the entity was in perfect balance, being potential energy only.

We can identify this faction in the electric component of the system as free energy.

That reflects in the relation

$$f = \frac{c}{\lambda}, \quad \text{or} \quad f = \frac{E}{h}, \quad \text{or} \quad E = \frac{hc}{\lambda},$$

where:

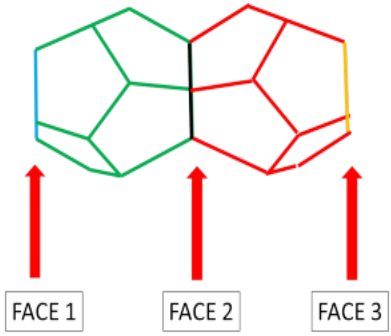
- c= 299792458 m/s is the speed of light in a vacuum
- h= 62606896(33)×10^{-34} J·s = 4.13566733(10)×10^{-15} eV·s is Planck 's constant.

Planck's constant is also relevant for the TPlanck, some 10^{-44} sec in SI terms.

Whenever free energy of an entity interferes with other entities, it impacts the compounded magnetic compensation and in case of a construct, also the speed of that construct relative to the speed of light. In some cases, this process is irreversible or almost irreversible when the construct is extremely stable.

3. **PROTON/NEUTRON**

We can now question what frequencies are relevant for the gluon and neutrinos that are part of electrons and protons. We know reasonably well the dimensions of a proton or neutron and thereby the dimensions of a single dodecahedron.



The size of a neutron is well established as relative to a proton and stated in radii that is available from http://www.slac.stanford.edu/econf/C110613/slides/215-slides.pdf

The radius of a neutron is 0,895 fm. Through the twin dodecahedron structure, this defines the wavelength of a gluon on a plane of the dodecahedron.

1 femtometer is $1fm=10^{-15}$ meter. The size of the twin dodecahedron structure is then estimated to be 2* 0,895=1,79 fm. The length of the standing wave of the gluon is equal to the perimeter of a face of the dodecahedron and is therefore approximately 2 fm. The gluon will continue at the speed of light while circling the face of the dodecahedron as part of the original electron being one of the constituents.

The frequency related to this wavelength is $f=v/\lambda$ or $f=3*10^8/2*10^{-15}= 1,5*10^{23}$ Hz.

The " mass" of a neutron is 939,565378MeV/c^2, so free energy up to 939,6 MeV is converted in additional magnetic compensation.

The free energy still available for further encounters is following out of the equation

E=hf being $E=4,135.10^{-15}.1,5.10^{23}=6,20.10^8$ eV=620 MeV related

to the constituents of 24 gluons and 23 neutrinos.

So, the reduction in free energy per single entity of 47 is 939,6/48= 19,6 MeV. That translates into an estimate for the original starting frequency as per period 3.

This starting frequency will be approximately proportional higher with a factor of (620+ 19,6)/620= 1,03.

That makes a start frequency of $1,54.10^{23}$ Hz.

NEUTRINO

The neutrino is assumed to have “mass”, though very small:

Wikipedia

> *The Standard Model of particle physics assumed that neutrinos are massless. However the experimentally established phenomenon of neutrino oscillation, which mixes neutrino flavour states with neutrino mass states (analogously to CKM mixing), requires neutrinos to have nonzero masses. Massive neutrinos were originally conceived by Bruno Pontecorvo in the 1950s. Enhancing the basic framework to accommodate their mass is straightforward by adding a right-handed Lagrangian. This can be done in two ways. If, like other fundamental Standard Model particles, mass is generated by the Dirac mechanism, then the framework would require a SU(2) singlet. This particle would have no other Standard Model interactions (apart from the Yukawa interactions with the neutral component of the Higgs doublet), so is called a sterile neutrino. Or, mass can be generated by the Majorana mechanism, which would require the neutrino and antineutrino to be the same particle.*
>
> *The strongest upper limit on the masses of neutrinos comes from cosmology: the Big Bang model predicts that there is a fixed ratio between the number of neutrinos and the number of photons in the cosmic microwave background. If the total energy of all three types of neutrinos exceeded an average of 50 eV per neutrino, there would be so much mass in the universe that it would collapse. This limit can be circumvented by assuming that the neutrino is unstable; however, there are limits within the Standard Model that make this difficult. A much more stringent constraint comes from a careful analysis of cosmological data, such as the cosmic microwave background radiation, galaxy surveys, and the Lyman-alpha forest. These indicate that the summed masses of the three neutrino varieties must be less than 0.3 eV.*
>
> *In 1998, research results at the Super-Kamiokande neutrino detector determined that neutrinos can oscillate from one flavor to another, which requires that they must have a nonzero mass. While this*

shows that neutrinos have mass, the absolute neutrino mass scale is still not known. This is because neutrino oscillations are sensitive only to the difference in the squares of the masses. The best estimate of the difference in the squares of the masses of mass eigenstates 1 and 2 was published by KamLAND in 2005:

$\Delta m221 = 0.000079\ eV^2$. In 2006, the Minos experiment measured oscillations from an intense muon neutrino beam, determining the difference in the squares of the masses between neutrino mass eigenstates 2 and 3. The initial results indicate $|\Delta m2\ 32| = 0.0027\ eV^2$, consistent with previous results from SuperKamiokande. Since $|\Delta m2\ 32|$ is the difference between two squared masses, at least one of them has to have a value which is at least the square root of this value. Thus, there exists at least one neutrino mass eigenstate with a mass of at least 0.04 eV.

In 2009 lensing data of a galaxy cluster were analyzed to predict a neutrino mass of about 1.5 eV. All neutrino masses are then nearly equal, with neutrino oscillations of order meV. They lie below the Mainz-Troitsk upper bound of 2.2 eV for the electron antineutrino. The latter will be tested in 2015 in the KATRIN experiment, that searches for a mass between 0.2 eV and 2 eV.

A number of efforts are underway to directly determine the absolute neutrino mass scale in laboratory experiments. The methods applied involve nuclear beta decay

On 31 May 2010, OPERA researchers observed the first tau neutrino candidate event in a muon neutrino beam, the first time a transformation in neutrinos had been observed, giving evidence that they have mass.

In July 2010 the 3-D MegaZ DR7 galaxy survey reported that they had measured a limit of the combined mass of the three neutrino varieties to be less than 0.28 eV. A tighter upper bound yet for this sum of masses, 0.23 eV, was reported in March 2013 by the Planck collaboration.

> *If the neutrino is a Majorana particle, the mass can be calculated by finding the half-life of neutrinoless double-beta decay of certain nuclei. The lowest upper limit, on the Majorana mass of the neutrino, has been set by EXO-200 140–380 meV*

A photon has free energy, E, that is proportional to its frequency, f, by

$$E = hf = \frac{hc}{\lambda}$$

h=4.135 667 516 * 10^{-15} eVs

It is likely that a neutrino has a similar amount of free energy. However, this free energy has only limited possibilities to interact with other entities with electromagnetic manifestations.

There is no clear understanding whether a neutrino has mass. Reports indicate a neutrino has a mass equivalent with E values between 0,04 eV up to 2,5 eV.

> *Note: It is remarkable, that this reduction in frequency is comparable to the frequencies of visible light. Visible light has an energy content of 1,68 eV – 3,26 eV and this ΔE for neutrinos is ranging from 0,04 – 2,5 eV.*
>
> *That implies that the electron and the proton oscillate at frequencies in the range of visible light.*

4. **ELECTRON**

The "invariant mass" of an electron is 0,510998928 MeV/c^2. The related energy content of this invariant mass is 0,510998928 MeV. That is the free energy equivalent transferred to mass while reducing the frequencies of the free electric manifestations and the electromagnetic system of the two entities that merged into the electron.

The assumption is an equal transfer of energy by both constituents. The difference in frequency for the gluon and the neutrino is still there.

For each of the two constituents, a portion of 0,5*0,510998928 MeV transfers into an active free magnetic compensation, with a reduction in speed relative to the speed of light.

If we compare this with the reduction of the free energy of electrons as bound in the dodecahedron, then we see 19,6 MeV compared with 0,255 MeV. That implies a frequency reduction factor for each constituent of an electron relative to the starting conditions of (620+0,255)/620= 1,0004.

If we assume that the highest frequency observed for gamma rays is valid for the initial frequency, then this forming of an electron has induced a reduction of the frequency of the gluon and neutrino. This reduction is to approximately $1{,}533.10^{23}$ Hz. That reduction is rather limited compared to the start frequency of $1{,}54.10^{23}$, all in metrics of the SI system.

There is no clear understanding about the size or spatial representation of the electron.

The difference between the amalgamation of the constituents in a naked electron, compared with the electron in a naked neutron, is in the order of magnitude of 939/(47*0,5)=40 in extended spatial representation. Without jumping to conclusions, it is noticeable that there are no major discrepancies in order of magnitudes relative to the accepted values of the properties of these constructs.

6. **DODECAHEDRON**

The forming of the dodecahedron is a dramatic development in the events of emerging constructs after the Big Bang. Some observations trigger specific questions and additional assumptions.

1. What triggers the absence of Coulomb's repelling forces of the electric charges of the electrons in the dodecahedron?

The two gluons (=gamma photons) on opposite planes neutralize the asymmetric electric manifestations. Vectors point in the opposite direction on

opposite faces. The vectors illustrate the directional sensitivity of the electrical manifestations. That gives rise to the assumption that also the Coulomb force is directionally sensitive as well. The characteristics of the electric free energy as well as the manifestation by exerting forces of the asymmetrical electrical manifestation show similarities.

2. Compensation of the ½ spin manifestations

When two neutrinos are spiraling oppositely, they compensate for each ½ spin behavior. In naked form, this would annihilate the electron/positron combination as on the two opposite faces.

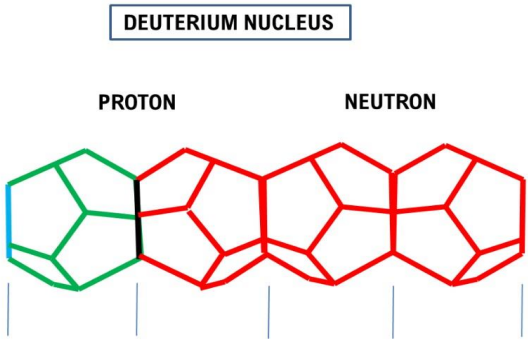
3. Free magnetic manifestation is monopolar

The free magnetic manifestations are not neutralizing while on opposite faces. That is due to the monopolar character of the free magnetic manifestation. The base of its origin is the monopolar magnetic manifestation of the neutrino of the electron on each face. Being monopolar, it can only add the manifestation impact, never subtract. Therefore, the neutrino is essential in each construct to provide the monopolar magnetic manifestation to build up what is known as the gravitational force. It has similarities with the asymmetry of the electrical manifestation as started with the construct electron.

39.NUCLEUS

The test for the building for more complex baryons was by linking protons and neutron into a chain. The next step is going 3D.

The nucleus of Deuterium:

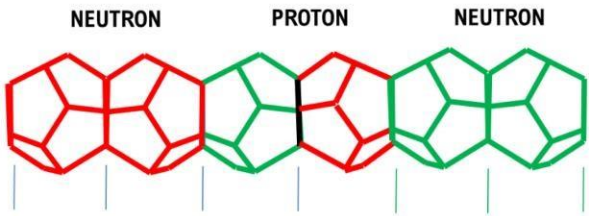


EFFECTIVE E-CHARGE	0	+1	0	0	0 = +1
SPIN	0	½	½	½	- ½ = 1

It gave the first indication of the applicability of the method of addition and subtraction of the contribution in spin and electric vector of the several binding and compounded faces to an overall assessment of the specific nucleus.

The next check was about the nucleus of Tritium:

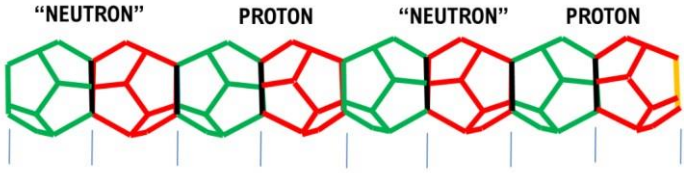
TRITIUM NUCLEUS



EFFECTIVE E-CHARGE	0	0	0	+1	0	0	0 = +1
SPIN	½	½	-½	½	- ½	- ½	½ = ½

subsequent for the nucleus of Helium-4:

HELIUM-4 NUCLEUS



EFFECTIVE E-CHARGE	0	+1	1	+1	0	+1	1	+1	0 = +2
SPIN	½	½	-½	½	-½	-½	½	½	0 = 1

The conclusion was that this is a potentially powerful way of building a model for the nuclei. It is in line with expectations for the electric and spin manifestations for these nuclei.

However, there are remarks to be made:

1. It is highly unlikely that nuclei will build up as a kind of a stick
2. It becomes unclear from which proton or neutron a dodecahedron is a constituent

We have to rethink the building principles to address issue 1. Issue 2 is not a problem; it only gives additional possibilities to make more complex constructs.

We have to consider that dodecahedrons have 12 faces. The β-decay induced a specific rearrangement in which twin dodecahedrons became available with four specific types of individual face composition:

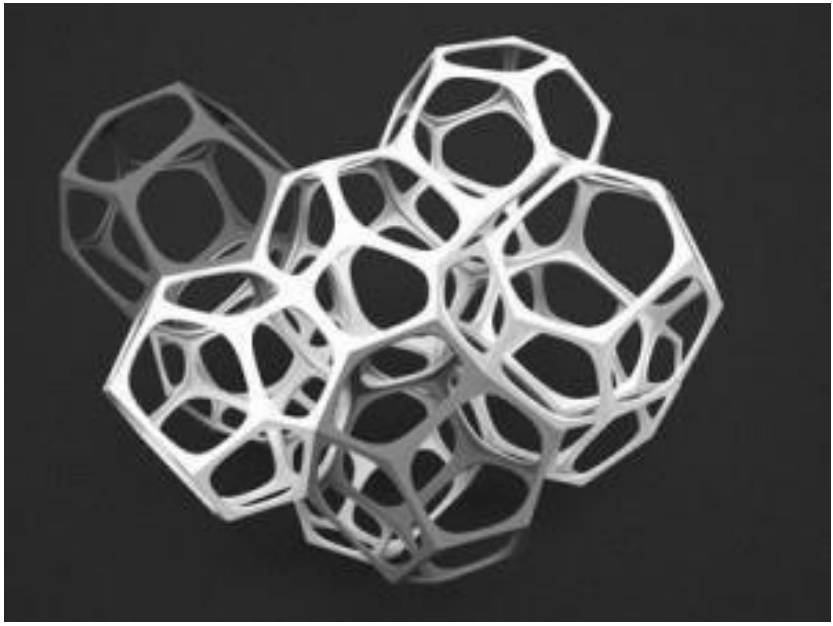
1. An electron
2. An electron with an additional gluon
3. A gluon
4. Empty

We also know that all dodecahedrons are oscillating in full synchronization, provided they have a speed > 0. The chapter on inertia clarifies this provision.

To allow for a more spatial balanced build-up of the nuclei, we consider stacking methods as the close-packing of equal spheres. The assumption that the dodecahedrons arrange in a hexagonal close-packing makes sense.

The Hexagonal close-packing for dodecahedrons requires some spatial adjustment to make a perfect fit.

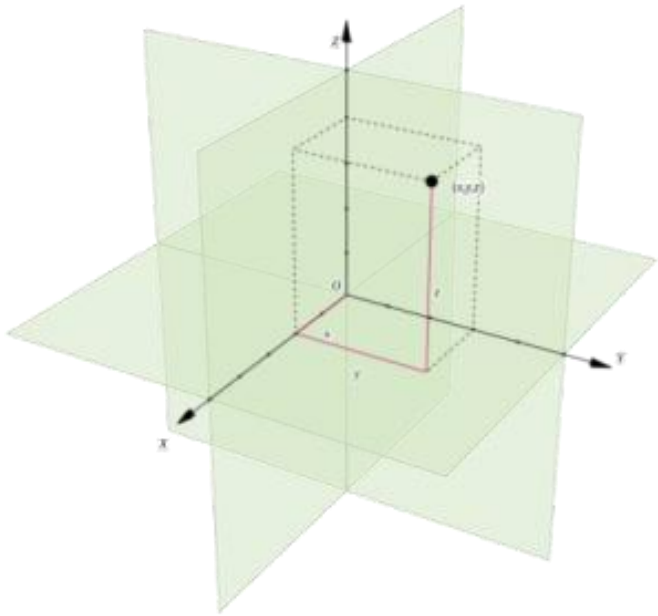
An example of a configuration in close-packing for dodecahedrons is in this 3D print:



The hexagonal close sphere packing gives the highest packing for balls, with a kissing factor of 12 for each ball. That is in line with the number of faces of a dodecahedron. There is a lot of theory available regarding close-packing, linked to building crystals and foam bubbles (Weaire-Phelan structure). Therefore, the mathematics for such structures is well known.

Because we do not know how these nuclei, in fact, have grown in the universe, we can only try to reconstruct what the result might be as from what we know of the Periodic Table of Elements.

Whenever we make such a 3D stack of dodecahedrons, it is likely that the faces that are parallel and orthogonal are the candidates for the proton bonds.



The electric vectors of these proton bonds per axis must point in the same direction to be neutral to the outside world. They are allowed to be configured parallel to one of the three axes of the Euclidean system.

As long as we keep symmetry for all opposite faces – excluded the proton bonds – this will be very helpful to construct the more complex nuclei.

The remainder of the dodecahedron functionality has two basic functions:

1. To allow building up parallel faces in three axes for the proton bounds to be stacked
2. To “glue” the dodecahedrons together

The second issue requires several mixes of possible faces on single dodecahedrons.

The adjacent faces of the kissing dodecahedrons can be modified based on the indicated available combinations:

1. An electron
2. An electron with an additional gluon
3. A gluon
4. Empty

These modifications require as prerequisite external electrical neutrality. It is quite an amount of work to prepare for all the elements in the Periodic Table, but this is doable and allows developing an algorithm.

The choices made for this build-up require additional gluons, neutrinos and the like, but that will in essence not have a major impact on the mass manifestation of the nucleus.

To compare the impact of a proton bond:

Neutron : 939.565378(21) MeV/c^2
Proton : 938.272046(21) MeV/c^2[

As can be seen, there is no significant impact when proton and neutron bonds are added. Additional gluons and neutrinos are also not a problem. We only have to be a bit more modest with electrons.

It is quite feasible that these building principles for the nuclei are the major drivers for the more complex nuclei.

40.ELECTRON SHELL

We now enter the realm of the macrocosmic world, by the forming of electron shells with electrons orbiting around the nucleus.

Much information is available regarding the electron shells. The Dutch Paradigm respects that information, but this new paradigm adds consequences on the phenomenon of electrons in orbits not yet recognized by regular science.

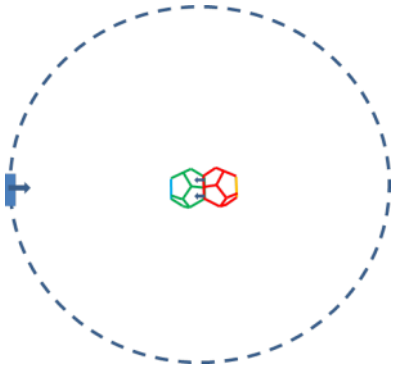
Electrons orbit around the nucleus at a speed of approximately 0.01 c. Each electron has a quant of free electric energy in its constituents that determine the frequency of the electromagnetic systems of the electron and ultimately the radius of its orbit.

Electrons in orbit interfere with the electric manifestations of a nucleus while orbiting through Coulomb's force. The nucleus manifests a compounded asymmetric electrical manifestation. Such as described previously within The Dutch Paradigm, but there is a distinct difference with the prevailing paradigm.

The prevailing paradigm assumes that both the electron and the nucleus, have an isotropic manifestation of the "electric charge" of either + or – charge. The Dutch Paradigm indicates an asymmetric electrical manifestation that is anisotropic of nature and has equal character. These differences are consequential for the interference between the electron in orbit and the nucleus.

Let us consider the first element Hydrogen. It has 1 proton and ½ spin.

The electric vector of the electron in orbit points towards the electric vector of the proton bond. The electron and the proton are mutually attracting with the Coulomb force, while the electron in orbit is propagating at a high circular speed. Due to that circular movement, the electron induces a rotation of the nucleus around its axis perpendicular to the electric vector of the proton.



In regular science, this is not recognized, due to the isotropy for the electric charge of the proton.

In as well the electron as the proton of the nucleus, energy was transferred in a sense that the electron forced the nucleus to start and maintain rotation, though with a small delay by creating a backlash that will induce the momentum to work and rotate against the inertia of the nucleus. An equilibrium in stable interference is established, under conservation of energy within the system electron in orbit, and the proton of the nucleus. The nucleus will follow a pattern that links into the inertia of the nucleus and the orbital speed of the electron.

The next nuclei under consideration are Deuterium and Tritium. These are isotopes of Hydrogen and have additional dodecahedrons. That modifies the interference variables as in the system just mentioned.

Helium has an electric charge with value 2. Its electric vectors in the nucleus point along two axes that are perpendicular. The additional electron will also orbit perpendicular to the first electron in the first electron shell. The nucleus now rotates around two axes and has higher levels of gyroscopic behavior.

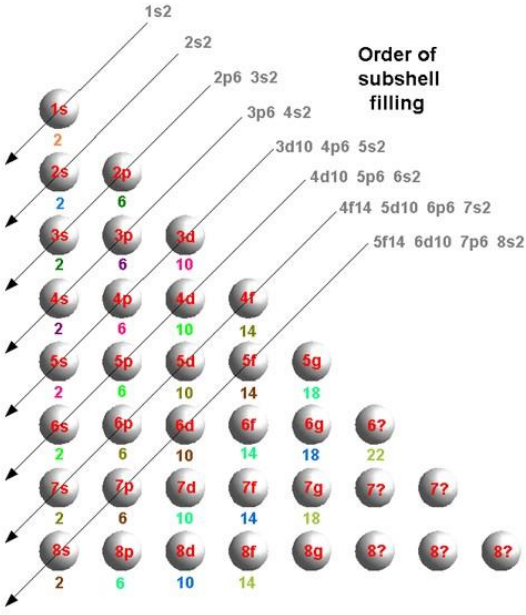
The third electron is in the second shell. That electron triggers the third axis to rotate and from then onwards, we have a system that is gyroscopically

working in the three Euclidean axes. It has a compounded complex of vibrations along three axes. That is a characteristic of the third element, being Lithium.

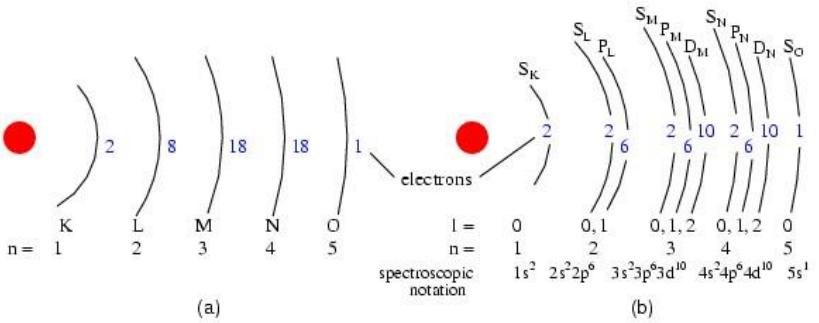
With more electrons and electron shells active, there is another effect. As from the third electron, a second shell houses an electron that will speed at approximately 0.01c. As a consequence, the nucleus will acquire higher levels of inertia and the electrons in the first shell will reduce in speed. Because the second shell is at a significantly larger diameter relative to the nucleus, the angular speed of rotation of the nucleus in its axes will react accordingly.

Due to the postulated anisotropic character of the electron, the nucleus reflects or mirror its composition towards the electrons in the subsequent shells. It has a specific vibrational response, magnetic behavior and so on. All in line with the specifics for the electrons that are the mirror image – though with a translation key – of its electric vector in the nucleus.

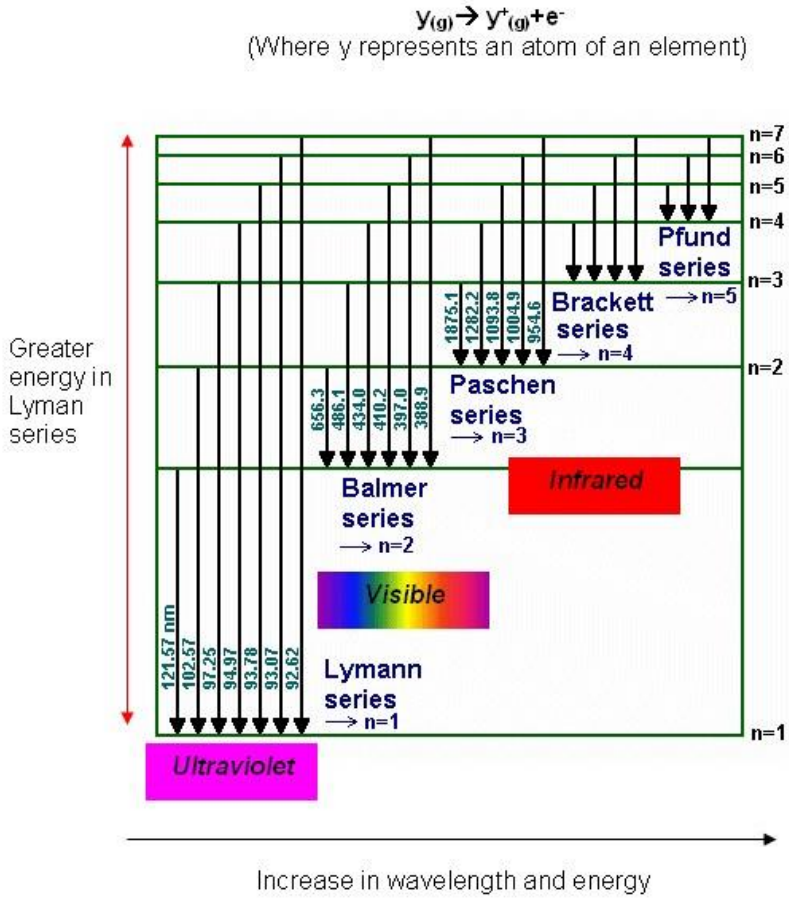
That leads to a set of shells as:



Alternatively, in a different format:



For these shells, there is much information in so-called Lyman , Balmer, Paschen, Brackett, and Pfund series.



The electrons in orbit oscillate with the frequency of approximately 10^{14} Hz and by doing so, rotate following the spinor functionality. This rotation maintains the position of attraction for the electron with Coulomb's force with the nucleus.

It is obvious that acceptance of the postulate of anisotropy for the electric manifestation as in The Dutch Paradigm opens challenging areas for further investigation.

41.INFORMATION EXCHANGE WITHIN THE ATOM

The nucleus of an atom is a build- up of entities in interference with spatial manifestations configured into twin dodecahedrons. All are interlinked within the nucleus, but also with the entities configured in electrons in the electron shells.

The factual situation reflects in its architecture and dynamics the events to build the nuclei all through the Periodic Table of Elements. That is from the proton up to the most complex nuclei.

Each nucleus of atoms of elements listed in the Table has manifestations of inertia and gravitation and electric vectors, as well as rotational speed divided over three orthogonal axes. There is abundant information available in the structure of the nucleus and specific per element.

There is also the build-up of the electron shells with electrons, orbital speed and per shell, the diameter of the shell, spinor oscillation and so on, as a mutual mirror of a set of specific states of frequencies and build-up of the nucleus.

It is prudent to assume that this mirror imaging of the shells and the nucleus relative to each other is a system of inherent information exchange and conservation. Every action in a shell will trigger a reaction in the energy states within the total system. For macrocosmic observation, these variations represent weak signals that are going through the system, but they are there and in cohesion with all electric and magnetic manifestations of entities at gamma frequencies. That is part of the system that renews the “now” experience at a frame rate of 10^{44} per second. The number of variables in constituents is limited in spatial configurations that can be known.

Isotropic electric charges as in the prevailing paradigm, do not allow for such information mirroring. Therefore, there is no recognition yet of such an information exchange.

The total system as in The Dutch Paradigm works with the basic constituents of gluons – photons at gamma frequency – and gamma neutrinos, with the free electric energy, electromagnetic system, and interference phenomena as discussed. Therefore, the number of constructs is rather limited: the electron and the dodecahedron.

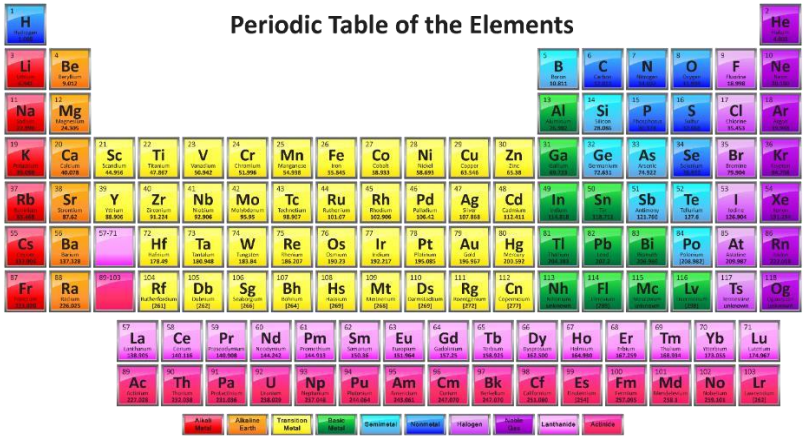
The number of participating entities is almost infinite, but the number of variables limited and the processing frequency extremely high. However, it is comprehensible.

That is the world we observe.

42.PERIODIC TABLE OF ELEMENTS

We arrived from the subatomic world in the atomic world. The macrocosmic world as we experience as our physical environment.

The periodic table:



We know a lot about all these elements. There is no need to further elucidate here on this. It is part of our daily life.

Having said this, we now have indications how to interpret some peculiarities, like the Lanthanides and the fact that the range is limited to somewhat more than 100 elements. Apparently, the heavier nuclei have difficulties to keep the integrity of the nucleus intact under high rotation in three axes. The Lanthanides are maybe reinforcements, and the other heavy elements do not need a lot to trigger degradation.

There is a lot to be studied provided there is scientific interest to do so.

43.INFORMATION EXCHANGE TO OUTSIDE THE ATOM

We are familiar with the interactions of an atom within its environment. Similar interactions are possible in the opposte direction.

The atom can share electrons of the outer shell with other atoms and form molecules. It can make a build up into crystals and become “solid,” or it can show viscous behavior towards other atoms and molecules or even become gaseous. It can bind with other elements and form chemical compositions. All these types of events will give signals through the total system regarding specific energy transformations and related frequencies of the constituents that absorb or release energy by frequency adjustments.

Moreover, it will show its impact up to an included the nucleus.

It is Panta rhei up to the cardioid of each constituent.

44.ORIGIN OF THE NEUTRINO "MASS"

The neutrino has a small "mass" manifestation. The origin can be identified.

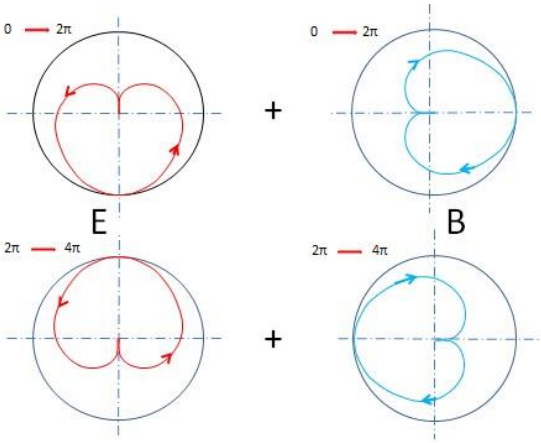
The Standard Model declares the neutrino as a fundamental particle. Consequently, it is a point particle. Nevertheless, the neutrino shows a small mass behavior, for which the origin is unclear. It is as if this mass does not require spatial extension or substance.

The Dutch Paradigm attempt to identify that origin.

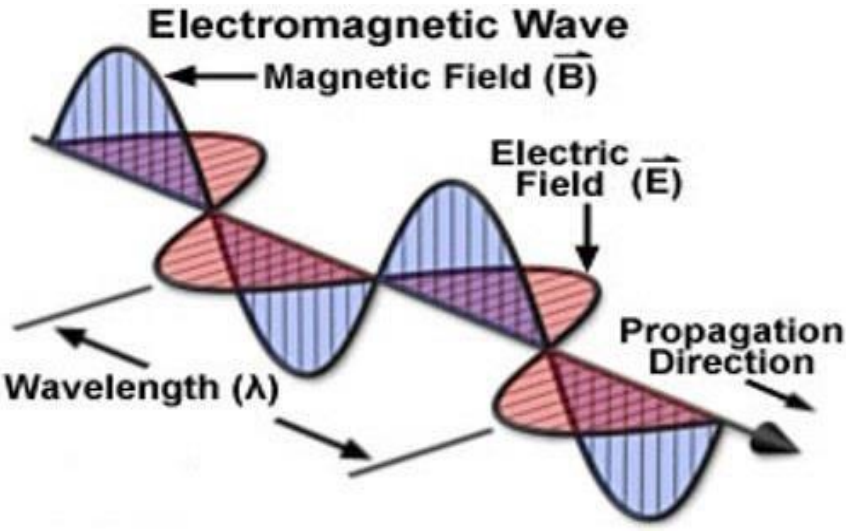
To recall, at the restart in period 3, The Dutch Paradigm postulates that all the photons and neutrinos went through the same event, that resulted in

1. The same time delay: 1 TPlanck
2. The same propagation speed: c
3. The same amplitude of the EM manifestations
4. The same start frequency of the EM manifestations
5. The same clock frequency for update of values of the EM manifestations

The EM manifestations of the neutrino are:



While the photon has



The photon and the neutrino propagate through space at the speed of light. The neutrino has the electromagnetic manifestations in a rotational mode, as a cardioid.

A question is: what is the rotational speed of the EM-manifestations of the neutrino?

The start frequency is as per calculation in reverse engineering approximately

$$F= 1{,}54.10^{23}\ \text{Hz}$$

The amplitude of the EM manifestations as from the diameter of the face on a twin-dodecahedron.

$$A_{em} = 0{,}68/2 = 0{,}34\ \text{fm}$$

That brings the circular speed of the EM manifestation of a neutrino at maximum amplitude at:

$$V= 2\pi.0{,}34.1{,}54.10^{23}= \ 3{,}28.10^{8}\ \text{m/s}$$

Obviously, that results from estimated values but is in the order of magnitude of the speed of light.

$$c = 2{,}99.10^{8}\ \text{m/s}$$

Therefore, it is plausible that the EM manifestations of the neutrino have the speed of light indeed intentional as its circular speed at maximum amplitude.

It is obvious that it is not possible to establish three assumptions at the same time:

1. The same propagation speed: c for EM manifestations
2. The same amplitude of the EM manifestations
3. The same frequency of the EM manifestations

Somewhere in the equations factor π is in and makes perfect equality not possible.

It is likely that the rotational frequency of the neutrino is reduced to avoid overspeeding relative to the speed of light. This requires a reduction of the frequency and transfer of Δ hf to the free magnetic manifestation. This is recognized by regular science as the mass equivalent.

Regular science measures a mass equivalent of the neutrino of 0,04 up to 2,5 eV.

The Dutch Paradigm assumes that the energy content of that reduction of frequency is equivalent to this value by a reduction of the quant hF of free energy relative to a reduction in the frequency of approx. 10^{14} Hz. Therefore, the frequency in the EM manifestations reduces with the same 10^{14}Hz.

That frequency reduction is within the bandwidth of visible light.

45.ABOUT GRAVITY

Without gravity, we are lost in space. Regular science indicates gravity as a weak force. The fundamentals are not yet understood. It is assumed to be a manifestation of mass, as is inertia.

The Dutch Paradigm postulates that only the photon and neutrino are fundamental particles. All other fundamental particles are either neutrinos and photons at different levels of system frequency of the electromagnetic system or a construct like an electron.

The Standard Model of Fundamental Particles and Interactions highlights mass as a distinctive property to identify additional fundamental particles, like tau and muon neutrinos and other types of electrons. The property of mass at the subatomic level is in its energy-equivalent.

The Standard Model also has quarks as an elementary particle, with mass.

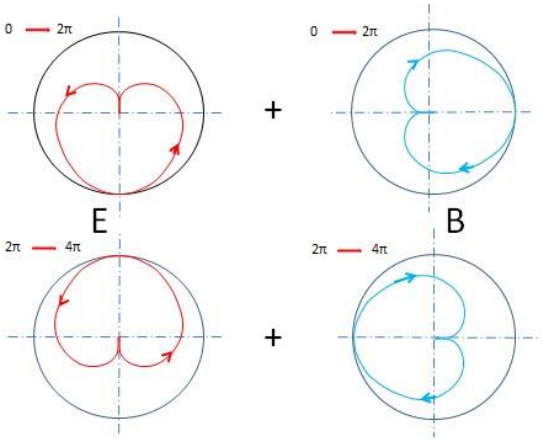
> *Although fundamentals of mass are unknown, it is a major identifying property for elementary particles as in the Standard Model.*

The Dutch Paradigm only recognizes neutrinos and photons as elementary point particles or entities. These entities, together with the constructs electron and the twin dodecahedrons have electromagnetic manifestations only. Nevertheless, there is “mass”-like behavior.

Therefore, that “mass”-like behavior needs clarification, to start with gravity.

Gravity is the transfer of free electric energy into free monopolar magnetic energy.

Monopolar magnetic manifestation originates from the rotational electromagnetic manifestation of the neutrino.



Bipolarity is impossible, due to the spatial extension of the magnetic manifestation. The manifestation can pass the central point zero but continues in the same polarity. It can only change the chirality, not the polarity. Therefore, each construct that has a mass manifestation has incorporated one or more neutrinos in its construct.

Whenever a construct like an electron and the twin dodecahedrons forms, it induces a modification of the speed of the constituents. When twelve electrons form a single dodecahedron, they change from a relativistic speed to zero. A separate section deals with the issues of inertia in those electrons as a consequence of forming a construct at speed zero.

The build-up of inertia triggers the transfer of free electric energy to free monopolar magnetic energy under reduction of the frequency of the system under construction. There is no external transfer of energy of the constituent entities. Therefore the monopolar magnetic attraction is inevitable as the outcome of this internal transfer.

Another phenomenon related to this monopolar magnetic manifestation is the two-dimensional character of this manifestation due to its rotational origin. Where the free electric energy is anisotropic, we now have a monopolar magnetic manifestation that is circular. With the spinor functionality of the electron and the three-dimensional rotational behavior of the nuclei, we have with the construct of a nucleus an all-around manifestation of this monopolar free magnetism.

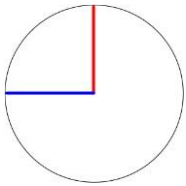
It is the perfect description of gravitational attraction.

46.KINETIC REST SPEED

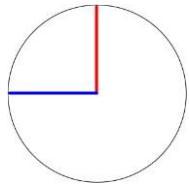
All naked entities and constructs have a kinetic rest speed.

That kinetic rest speed defines as the speed of propagation at which the entity or construct has no kinetic energy in its electromagnetic manifestations. It is the speed at which the entity of construct emerged.

For the photon and neutrino, this kinetic rest speed is the speed of light.



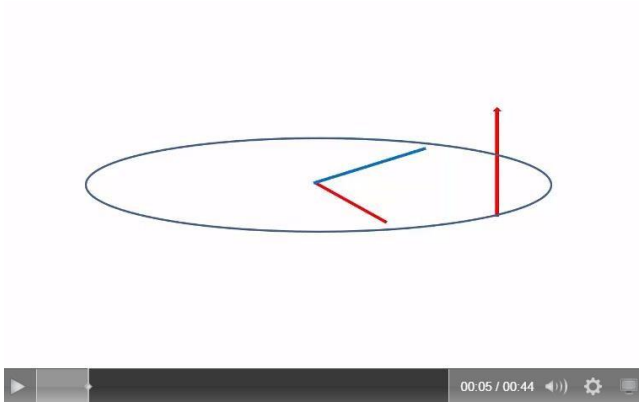
Photon



Neutrino

For the construct electron, this speed is significantly lower.

For clarification, the animation (www.thedutchparadigm.org) of the naked electron is:



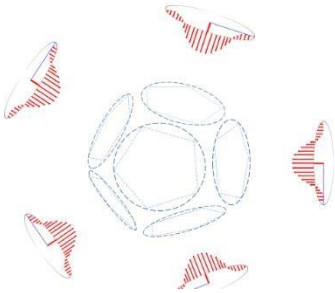
One of the postulates of The Dutch Paradigm is that the speed limit for any manifestation of an entity is the speed of light. In the electron, we have the electric manifestation of the photon active in the direction of propagation of

the construct, and therefore, the speed of the electron is reduced to avoid breaching the limit of the speed of light. The reported speed of a naked electron is at some $2{,}2.10^3$ m/s, or approx 0,01% of the speed of light.

A check reveals that the amplitude of the electric manifestation at 0,34 fm alternating at a frequency of $1{,}54.10^{23}$ Hz is already in itself active at almost the speed of light. In the electron, the electric manifestation of the photon is rotating into the direction of propagation. Therefore, the reported speed of the naked electron at $2{,}2.10^3$ m/s is well understood.

While forming the electron, there is no other interference, and therefore, this speed of $2{,}2.10^3$ m/s is the kinetic rest speed of the electron.

The rest speed for the dodecahedron is zero relative to the speed of light.



The definition of the kinetic rest speed is:

> *The speed of propagation at which the entity or construct has no kinetic energy in its electromagnetic manifestations. It is the speed at which the entity of construct emerged.*

Whenever through external interference a construct change speed, it reacts to avoid breaching with one or more of the manifestations of the constituent entities by introducing vibrational compensation. During the acceleration, the construct builds up those vibrations and therefore show inertial behavior. Without further acceleration, the vibrational compensation continuous as is the new stable situation for the construct.

> *That process is the inertial behavior of constructs.*

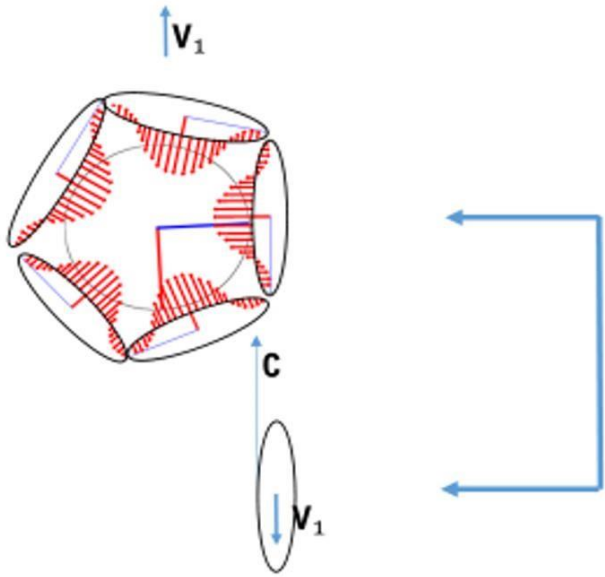
47.ABOUT INERTIA

Inertia is the process within entities and constructs to accommodate for a potential breach of the speed of light in one or more internal manifestations.

Forming the construct changes the speed of the constituents. The speed of manifestations adjusts, by reduction of the frequency of the system and transfer from free electric energy into free magnetic energy, the gravitational monopolar attraction.

Once the constituents are spatially locked in a construct, a different scenario becomes active to avoid over-speeding whenever that construct accelerates. Acceleration is building up the speed of the construct in one direction only. The reaction within the construct is vibration to compensate for the potential breach. The final compensational vibration within the construct is direction sensitive.

A simple illustration is for the dodecahedron:



Whenever the dodecahedron, as part of a twin-dodecahedron, accelerates to a speed V, then all 12 electrons get vibrational compensation specific per face.

It reflects the direction and value of the speed V. Whenever the dodecahedron rotates, the electrons adjust vibrational to the local spatial requirements. The direction and velocity of the speed within the construct are therefore conserved.

> *These vibrational responses are within the construct and preserve the history of acceleration of the construct, irrespective of the complexity of the construct.*

An observer propagating through space at the same speed alongside such a construct is not aware of such a build-up of energy in system inertia. Also, such an observer can accelerate the construct, and subsequently the system adjusts to the induced new situation through a rearrangement of the inertial reaction. The observer perceives that as an absolute inertial reaction of the construct, while in fact, it is relative.

> *The consequence of this postulate is that the planet Earth has in all its constituent twin-dodecahedrons the history preserved of its journey through space and time in a single directional speed vector.*

48.THERE IS NO MASS INVOLVED

The search to identify the origin of mass is a futile effort. There are “mass”-manifestations only.

The “mass”-manifestations result from the forming of constructs with the photon and neutrino as constituents.

1. Interference induces free electric energy to transfer into free magnetic monopolar energy. That free magnetic energy acts spherical and additive
2. Accelerating a construct induces vibrations in the construct to compensate for potential breach of the speed of light. These vibrations are direction sensitive and preserved.

Both manifestations represent observations regarding mass manifestations and laws of nature. The prevailing paradigm lacks proper modeling for understanding, and interpretation of the observations.

The Dutch Paradigm provides a model for clarification of observations.

So far, there are no major stumbling blocks identified for the assumption that this reflects a reasonable model of perceived reality.

49.DARK MATTER

The existence of dark matter is an accepted reality.

The observation of dark matter is indirect. Galaxies show gravitational behavior beyond what is attributable to visible stars. Dark matter is dark because we lack instruments for direct electromagnetic observation.

Wikipedia:

> ***Dark matter*** *is a hypothetical type of matter distinct from ordinary matter such as protons, neutrons, electrons, and neutrinos.*
>
> *Dark matter has never been directly observed; however, its existence would explain a number of otherwise puzzling astronomical observations. The name refers to the fact that it does not emit or interact with observable electromagnetic radiation, such as light, and is thus invisible to the entire electromagnetic spectrum.*
>
> *Although dark matter has not been directly observed, its existence and properties are inferred from unexplained mass in gravitational lensing calculations, which affects the motions of baryonic matter and light. It influences the universe's large-scale structure, the formation of galaxies, and affects the cosmic microwave background.*

Such a description is puzzling because dark matter is an unexplained mass manifestation, *distinctly* different from ordinary matter such as protons, neutrons, electrons, and neutrinos. That is puzzling because there is no proper idea what “ordinary” matter is. The Large Hadron Collider aims to unravel some of the secrets of ordinary matter, and hopefully, this intellectual investment in Geneva will pay off.

The single dodecahedron fits well in the description of dark matter. It can absorb photons in the thermal process, but the visible light emits in a fuzzy way. It is not so easy to explain with the information given in this site so far, but visible recognition requires atoms with electrons that can perform the full spinor functionality. Electrons in a dodecahedron are locked in place, and therefore the spinor functionality cannot fulfill such a rotation anymore.

Twin dodecahedrons can also configure into dark matter, as a construct of two protons.

Therefore, there will be many questions to be answered, but it could well be that this dark matter mystery is indicating the existence of single and twin dodecahedrons in abundance.

50.THERMAL EXPANSION

Thermal expansion is a well-known phenomenon. However The Dutch Paradigm has a different idea about the origin of the phenomenon.

It is the macrocosmic phenomenon of a body to expand or contract in volume to a change in temperature through heat transfer.

Wikipedia:

> *Temperature is a monotonic function of the average molecular kinetic energy of a substance. When a substance is heated, the kinetic energy of its molecules increases. Thus, the molecules begin moving more and usually maintain a greater average separation. Materials which contract with increasing temperature are unusual; this effect is limited in size, and only occurs within limited temperature ranges (see examples below). The degree of expansion divided by the change in temperature is called the material's* ***coefficient of thermal expansion*** *and generally varies with temperature.*

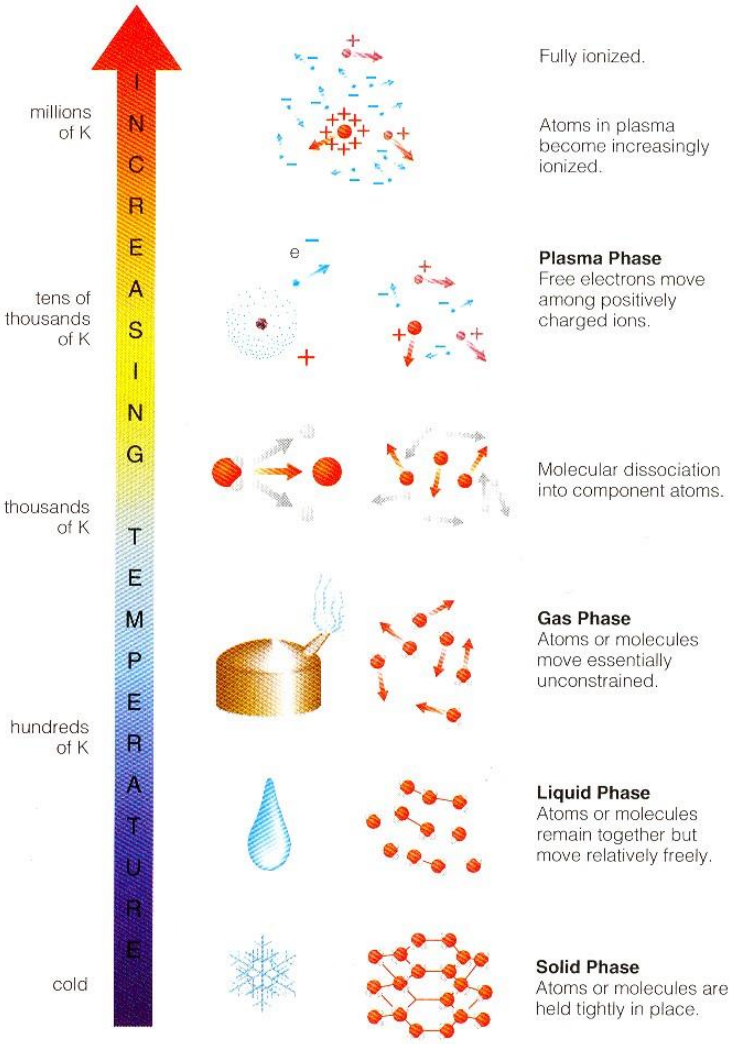
The regular assumption is that temperature is a measure of the kinetic energy of molecules. In this view, the molecules itself do not change in size. They are merely vibrating in all directions and by doing so expand trough heating. This model is not easy to understand. The ambient temperature is direction insensitive, and therefore, the vibrations have to be direction insensitive as well. Therefore, for understanding, it is likely that the prevailing paradigm hints to a spherical pulsation of the molecules.

This description is tuned to the behavior of molecules and needs interpretation to the level of atoms. Are the atoms and the nuclei as well having the same type of spherical vibration?

The Dutch Paradigm triggers another model to understand the thermal expansion.

In the illustration we have:

The general progression of phase changes.



In the lower region of the temperature scale, we have the solid, liquid and gaseous phase. At higher temperatures, the electrons in the outer shell dissociate from the nucleus. The Coulomb binding gets broken. The atoms are ionized and apart from some elements low in the Periodic Table still do have an electron shell.

The next phases will show that eventually more electrons will be released out of their Coulomb barrier.

The fact that also electrons dissociate by breaking their Coulomb barrier means that they have absorbed energy. The source for this absorbed energy is interference with photons with free electric energy at a certain level of frequency.

The idea in the prevailing paradigm of the vibrating molecules and atoms does not predict this behavior.

It is as if at the various temperature levels, the molecules and atoms submerge in an environment filled with photons that can be absorbed by the gamma photons in the constructs. Gamma photons in the electrons as well as in the dodecahedrons of the nucleus. Such absorption is by photon/photon interference. A visiting photon interferes constructively with the gamma photon in orbit in an electron, being in the shell or bound in the nucleus. Instead of an incidental passage of a photon with subsequent emission or reflection, the constructs in an atom are in environmental equilibrium with photons of different frequency as relevant for the ambient temperature. These photons are indeed visitors because there is a short passage only and a short effect of interference. The visiting photon can easily dissociate from the gamma photon and return to the environment for a next encounter. It is similar to our ability to observe objects. Sensorial observation requires a constant flow of photons in the frequency bandwidth of the visible light to and from the objects. The environment is enlightened with photons, provided there is a source that gives an ample supply of those appropriate photons.

What we observe is visible proof of the Second Law of Thermodynamics.

When the source stops emitting the appropriate photons, then through the ongoing random dissipation of the emitted photons the objects become invisible again.

The same process of dissipation occurs with photons at every level of frequency.

Therefore, whenever we refer to something as naked, like the naked photon, naked electron, and the naked proton, then we describe a situation that is simply not achievable, not realistic in the physical reality. It would mean that all these environmental impacts with photons would not be there, so it describes these constructs at zero K

We measure physical phenomena at ambient temperatures, and therefore we will always be confronted with additional photons that are interfering with more specific the gamma photons in the constructs.

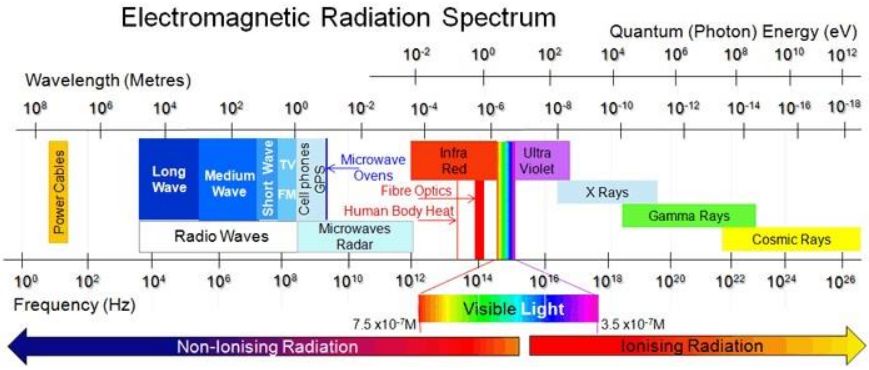
51.ABOUT DARK ENERGY

There is a source of energy that is not recognized yet, being the frequency reduction of free electric energy of photons.

The Dutch Paradigm postulates that all entities, being photons and neutrinos started with a frequency of approx. 10^{24} Hz. The free electric energy is hF. It is the particle part of what is known as the particle/wave duality.

Photons can interfere with other photons and thereby transfer energy. The frequency of the free electric energy will reduce accordingly.

When we consider the Electromagnetic Radiation Spectrum

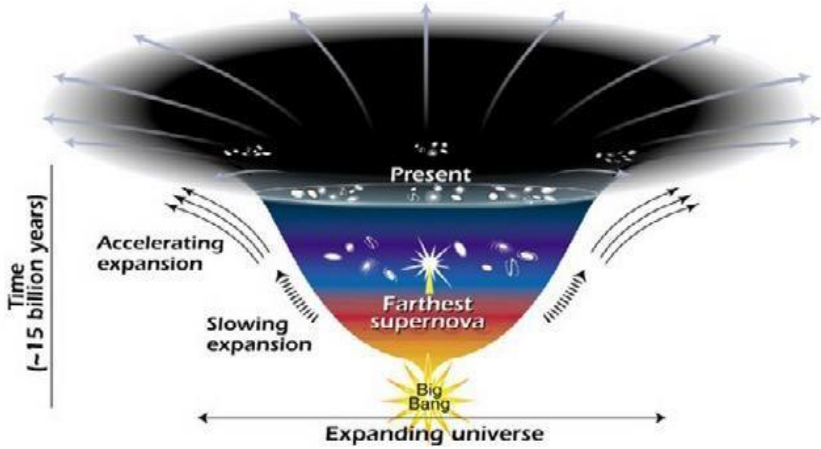


Source Electropedia

Then the question is obvious: why is there so much differentiation in frequency?

> *The answer as per The Dutch Paradigm is, that all naked photons with frequencies lower than approx. 10^{24} have transferred energy accordingly to objects in space. The lower frequencies are photons that are exhausted from their free electric energy.*

Therefore, illustrations as widely used, are impractical and confusing.



Source Ann Feild (STScI)

The idea of the Big Bang is spherical and not direction specific. Nevertheless, such illustrations are widely used, so apparently, there is merit for using to explain the several theories on dark energy.

The focus of The Dutch Paradigm is in Particle Physics. Therefore this source of "dark" energy is mentioned only. Accepting this postulate has important consequences for the build-up of inertia in objects. Kinetic energy in each object refers to its origin.

Therefore, each object refers to its origin, being the start of the universe, the position of the Big Bang.

52.PAULI EXCLUSION PRINCIPLE

The Pauli Exclusion Principle has its origin in the inability of two electrons in the same state of oscillation to interfere.

The Pauli Exclusion Principle makes the world "solid" in a sense that once atoms are there, they are restricted in occupying the same space. That introduces tangibility in the universe.

So far, there are only electromagnetic manifestations of the entities photon and neutrino, and these are not tangible. However, once the atom is build included the electron shells formed and filled, the phenomenon of tangibility comes into play when atoms collide. That is the basic phenomenon for the Pauli Exclusion Principle.

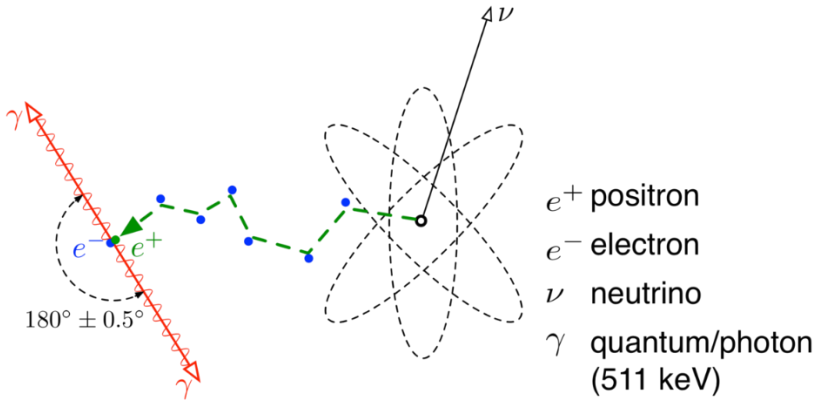
The definition of the Pauli Exclusion Principle is with quantum numbers.

Wikipedia:

> *The **Pauli exclusion principle** is the quantum mechanical principle which states that two or more identical fermions (particles with half-integer spin) cannot occupy the same quantum state within a quantum system simultaneously. In the case of electrons in atoms, it can be stated as follows: it is impossible for two electrons of a poly-electron atom to have the same values of the four quantum numbers: n, the principal quantum number, ℓ, the angular momentum quantum number, m_ℓ, the magnetic quantum number, and m_s, the spin quantum number. For example, if two electrons reside in the same orbital, and if their n, ℓ, and m_ℓ values are the same, then their m_s must be different, and thus the electrons must have opposite half-integer spin projections of 1/2 and −1/2. This principle was formulated by Austrian physicist Wolfgang Pauli in 1925 for electrons, and later extended to all fermions with his spin–statistics theorem of 1940.*

In fact, most important is that two electrons in the same state of oscillation, cannot interfere.

Two electrons with opposite oscillation can as demonstrated by the so-called electron-positron annihilation.



The Dutch Paradigm clarifies that a positron is not the anti-particle of the electron, but the same type of electron, but in opposite oscillation.

> *What in fact the Pauli Exclusion Principle implies, is that an electron-electron interference is not possible. From The postulates of The Dutch Paradigm, this makes sense. Such interference would breach the limit of the speed of light with the two neutrinos in the two electrons. It simply is not possible and therefore cannot happen.*

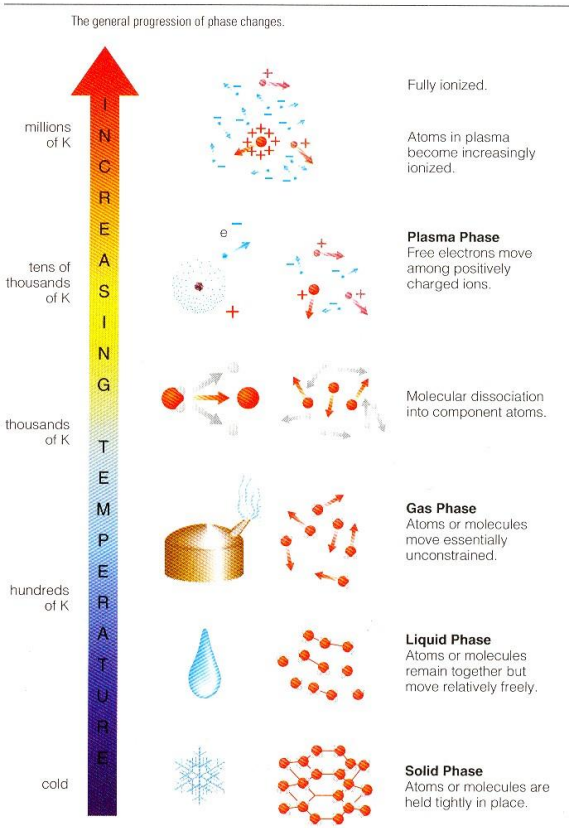
The practical consequences require further study. There is no electronpositron annihilation when two atoms collide.

As explained in the chapter building the atom, the nucleus, and the electron shells, there is an intense tuning between the nucleus and the electrons in the shells. Therefore, prudence is required to avoid oversimplification.

53.ABSOLUTE ZERO KELVIN

Thermal expansion is linear. That feature acts as an objective measure for levels of thermal comfort for humans.

The thermal expansion plotted in an XY graph, extrapolates to zero expansion. The related temperature became the absolute zero on the scale of Kelvin. In the scale of Celsius, this is – 273.15° C. That extrapolation is apparently acceptable in the temperature range in which we live. When the temperature increases beyond our thermal comfort level, we see all kind of other phenomena, as illustrated in this figure as preeviously shown:



It is extremely difficult to cool matter down to absolute zero. That is counterintuitive because as human beings, we experience cooling down like

a normal phenomenon, for which we have to protect ourselves by wearing cloth and use heating.

Regular science assumes that at 0º K all molecular motion comes to a halt. Molecular motion defines as the vibration of the total atomic system relative to its environment.

Wikipedia:

> ***Absolute zero*** *is the lower limit of the thermodynamic temperature scale, a state at which the enthalpy and entropy of a cooled ideal gas reaches its minimum value, taken as 0. The theoretical temperature is determined by extrapolating the ideal gas law; by international agreement, absolute zero is taken as −273.15° on the Celsius scale (International System of Units), which equates to −459.67° on the Fahrenheit scale (United States customary units). The corresponding Kelvin and Rankine temperature scales set their zero points at absolute zero by definition.*
>
> *It is commonly thought of as the lowest temperature possible, but it is not the lowest* enthalpy *state possible, because all real substances begin to depart from the ideal gas when cooled as they approach the change of state to liquid, and then to solid; and the sum of the enthalpy of vaporization (gas to liquid) and enthalpy of fusion (liquid to solid) exceeds the ideal gas's change in enthalpy to absolute zero. In the quantum-mechanical description, matter (solid) at absolute zero is in its ground state, the point of lowest internal energy.*
>
> *The laws of thermodynamics dictate that absolute zero cannot be reached using only thermodynamic means, as the temperature of the substance being cooled approaches the temperature of the cooling agent asymptotically. A system at absolute zero still possesses quantum mechanical zero-point energy, the energy of its ground state at absolute zero. The kinetic energy of the ground state cannot be removed.*

> *Scientists have achieved temperatures extremely close to absolute zero, where matter exhibits quantum effects such as superconductivity and superfluidity.*

An additional assumption is that at 0º K none of the basic properties of the atom and its constituents altered fatally. Whenever the temperature goes up again, the atoms will resume their presence in the condition and behavior as is specific for a certain temperature.

It is therefore likely to assume also in regular science, that temperature is related to an external impact on the atom that is relatively easy to reverse. The idea has been for a long time that the atom or molecule is vibrating as a total system, equally in all three axes. There are quite a number of these mechanical theories, and there is no final scientific verdict for acceptance or rejection. Nevertheless, it is unclear how the vibrating molecules absorb and emit their "kinetic" energy.

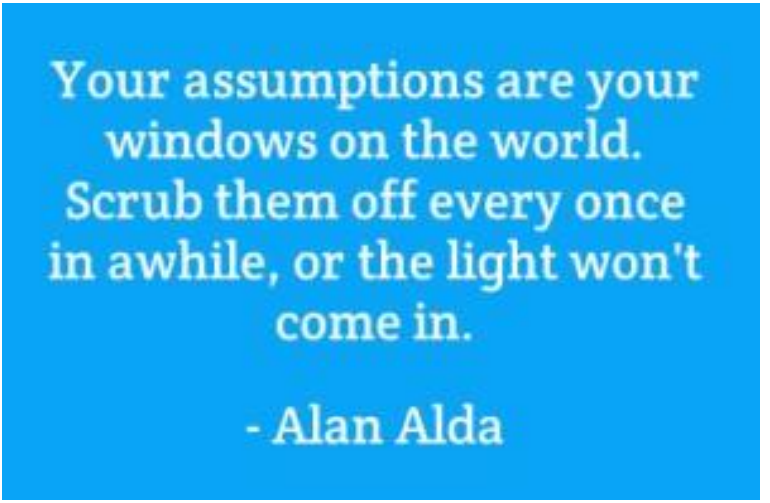
In The Dutch Paradigm, the thermal expansion defines as the exchange of photons between the environment and the objects in that environment. At 0º K there are no photons available for exchange anymore, while nothing has changed in the structure and constituents of the constructs.

54.ASSUMPTIONS

Whenever we study nature and compare observations with other human beings, we need to have a common set of assumptions. Assumptions are things that are accepted as true or certain to happen without proof.

Most of the common set of assumptions is quite often so basic that it is not even declared. We take a lot of very complex interactions for granted, just because we are intensely familiar with them. Apparently, there is at that time of commonly shared observation no reasonable indication yet about a potential variability of specific phenomena. It was a shock when Einstein stated that time was variable relative to speed. Quantum physics introduced an unexpected level of uncertainty about the status of variables. The issue of the particle/wave duality.

Some other assumptions are more specific and need a further declaration. We use the SI system for comparison of measurement; we assume objectivity when there is repeatability. We declare which variables have been assumed to be constant during an experiment. We need to declare the conditions for repeatability of the experiment and the like. Different observers must be able to arrive at the same outcome for the experiment.


Your assumptions are your windows on the world. Scrub them off every once in awhile, or the light won't come in.
- Alan Alda

55.DECLARED ASSUMPTIONS

Assumptions will be specifically declared when there are indications for influencing the outcome of an experiment.

To allow other scientists to repeat the experiment, they declare for a specific value or state. When such an experiment reproduces with the given set of assumptions, and it delivers the same result, then this is an indication that there is sufficient control over the test conditions. When a different result is measured, then this can trigger a further refinement of assumptions.

When an equation derives from the experiments that give a mathematical description of an expected outcome, then also this equation is only valid under the stated assumptions.

56.HIDDEN ASSUMPTIONS

Once a theory has shown to have a good predictive capability for the outcome of experiments, and there is also an equation available to describe the variables in a mathematical format, then this becomes a powerful tool to investigate varying values of variables that will satisfy the equality.

However, this can turn into a black spot.

A theory can become so accepted, that there is little doubt anymore about the validity of the equations. The equations set the variables for technical applications of the phenomena, and a technological contraption is a practical outcome. There is no need to declare all assumptions time and time over again made to develop the original mathematical equation. It is the realm of engineers to study and deliver the practical applications of the knowledge and construct machines, contraptions, ships, but also roads and dikes.

Engineers know very well that they have limited control to set the operational conditions. In the development phase, a set of specifications describes what performance is to be expected and under what conditions. They know their conceptions eventually degrade and will fail. They stipulate proper use and training of the operator. The operator maintains the usability by repair, replacement of parts and components until such time that maintaining functionality becomes too costly. An engineer must always anticipate on degrading conditions under use.

In Particle Physics we work the other way around. To study the fundamental particles, we try to decompose atoms and nuclei with all means. We try to do this with very complicated proton smashing machines because the composite particles are extremely stable.

Wikipedia:

> *In particle physics, an **elementary particle** or **fundamental particle** is a particle whose substructure (domain of the bigger structure which shares the similar characteristics of the domain) is unknown. Thus it is unknown whether it is composed of other particles.*

> *Known elementary particles include the fundamental fermions (quarks, leptons, antiquarks,*
>
> *and antileptons), which generally are "matter particles" and "antimatter particles," as well as the fundamental bosons (gauge bosons and Higgs boson), which generally are "force particles" that mediate interactions among fermions. A particle containing two or more elementary particles is a composite particle.*

It is remarkable that for some particles it is unknown whether they are constructs or elementary particles. We know that protons and neutrons are composite particles, but it is utmost difficult to demolish these constructs. They are almost indestructible. Some parts are declared to be fundamental, like the electron, because we have no idea how a substructure could exits, given the phenomena we attribute to an electron, like an electric charge. Some scientists state nowadays that we must model it as a kind of a cloud. If so, when the electron is in the discussion, a proper declaration is required for the underlying assumptions as taken into account: an electron is a point particle or a cloud or whatever.

Unfortunately, the electron as a point particle became an accepted starting assumption without further declaration.

57.UNKNOWN INHERENT ASSUMPTIONS

As human beings, we have our physical body to receive sensory information. It is not properly known has this sensory system works.

We can make an overview of our environment. We see, hear, feel, smell and taste. The tuning of the sensory organs is towards information that is useful for us to survive as well as to develop oneself in this environment. We add all kind of additional valuation to that information. We like or dislike some of it, get interested in specific details and are open for further attention. Scientists are free to study and investigate questions of their interest but will have limitations in funding their activities. Most of the scientific attention tunes into areas of public interest. Nobody is anxious to contribute to get an answer to a weird question. However, there is a general quest for answers to shortterm issues. We want a better weather forecast, but only for a foreseeable period. A costly study for a precise forecast for over 100 years does not get easy funding. It is maybe intriguing for an individual scientist, but who cares? We very well understand that our scientific projections have a limited scope.

There is much interest in Particle Physics, and a vast amount of money is spent to prepare for experiments that could give answers to our existentialistic questions. Though it is not done to introduce metaphysical considerations, we have no problem to nickname the Higgs boson as the “God particle” to attract attention for funding.

The study in this field tunes into the tiniest particles we can identify included their behavior over extremely short timeframes. These frames are in order of magnitude of some 10^{-15} sec. Short timeframes for our human appreciation, but relevant compared with TPlanck. Nevertheless, by setting the terms of reference for such a study, we inherently have to accept that it will be very difficult to expand the impact of what we observe to our daily reality of days and years. Despite Impressive achievements, we still must be humble in claims that we have revealed underlying secrets.

It is imperative that we continue in getting a better understanding of the physical world we are living in and by no means, we must question the intentions of scientists. However, it is obvious that we inherently work with massive amounts of unknown inherent assumptions in whatever we claim as a better understanding of reality. Claiming success for reasons of continuation of funding can act counterproductive and disrupt factual progress.

> *The question must be asked: we need to celebrate success, but are we making serious progress in unraveling underlying secrets?*

58.LAWS OF SCIENCE

In several sections, there is a reference to laws of science and theories.

What is a law of science?

Wikipedia:

> *The **laws of science** or **scientific laws** are statements that describe or predict a range of phenomena behave as they appear to in nature. The term "law" has diverse usage in many cases: approximate, accurate, broad or narrow theories, in all natural scientific disciplines (physics, chemistry, biology, geology, astronomy, etc.). An analogous term for a scientific law is a **principle**.*

Scientific laws:

1. ***Summarize** a large collection of facts determined by experiment into a single statement,*
2. *can usually be **formulated mathematically** as one or several statements or equation, or at least stated in a single sentence, so that it can be used to predict the outcome of an experiment, given the initial, boundary, and other physical conditions of the processes which take place,*
3. *are strongly supported by **empirical evidence** – they are scientific knowledge that experiments have repeatedly verified (and never falsified). Their accuracy does not change when new theories are worked out, but rather the scope of application, since the equation (if any) representing the law does not change. As with other scientific knowledge, they do not have absolute certainty (as mathematical theorems or identities do), and it is always possible for a law to be overturned by future observations.*
4. *are often quoted as a fundamental controlling influence rather than a description of observed facts, e.g., "the laws of motion require that…"*

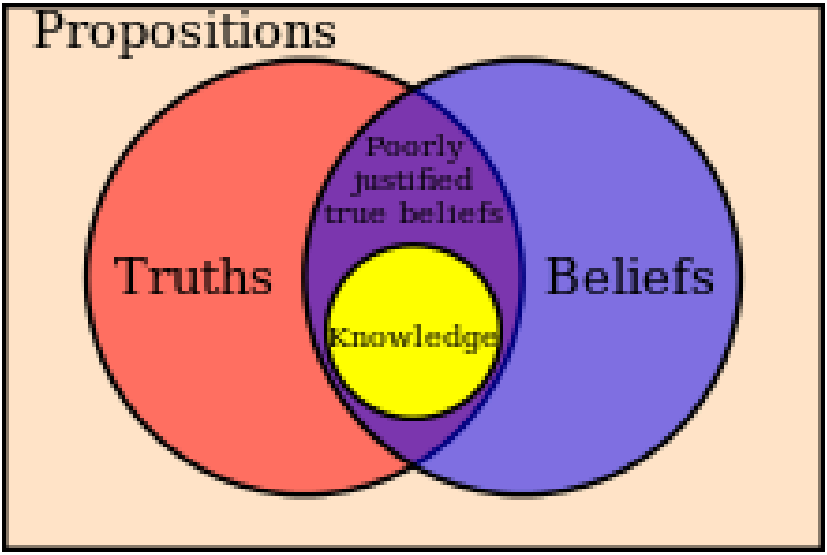
> *Laws differ from hypotheses and postulates, which are proposed during the scientific process before and during validation by experiment and observation. These are not laws since they have not been verified to the same degree and may not be sufficiently general, although they may lead to the formulation of laws. A law is a more solidified and formal statement, distilled from the repeated experiment.*
> *Although the nature of a scientific law is a question in philosophy and although scientific laws describe nature mathematically, scientific laws are practical conclusions reached by the scientific method; they are intended to be neither laden with ontological commitments nor statements of logical absolutes. According to the unity of science thesis, all scientific laws follow fundamentally from physics. Laws which occur in other sciences ultimately follow from physical laws. Often, from mathematically fundamental viewpoints, universal constants emerge from scientific laws.*

Laws of science are trying to avoid ontological commitments, but this is not possible because we try to register "facts" by observation. Observing is a very complex act, as will be discussed later. We compare the observations of many people, and if they are congruent, we more or less declare these as an overall objective observation. Such, while knowing that the process of observation has a lot of inherent hidden assumptions to fulfill. Objectivity is unattainable. It is commonly shared subjectivity.

Laws of science are supposed to be more powerful when formulated in a mathematically way, in an equation. The equation predicts the causal outcome of empirical experiments. An experiment is an orderly procedure carried out with the goal of verifying, refuting or establishing the validity of a hypothesis. Experiments provide insight into cause-and-effect by demonstrating what outcome occurs when a particular factor varies.

Executing an experiment by definition is an outcome in observations of results in time. Time in itself is assumed to be an independent variable that links into a certain set of constants of nature.

It all refers to epistemological assumptions and starting points to synchronize observations and to declare them objective.



Some of these laws of science are so “obvious” that in practice we lose track on the assumptions and starting points as related to the stated equation. By doing so, we run the risk of becoming gradually blindfolded and apply these laws as dogmas.

We therefore sometimes have to rethink the paradigms of such laws of science. In science and epistemology (the theory of knowledge), a paradigm is a distinct set of concepts or thought patterns, including theories, research methods, postulates, and standards for what constitutes legitimate contributions to a field of knowledge.

In Particle Physics, we must be aware that there are theories like general relativity and quantum physics, as well as macrocosmic laws of science that are giving conflicting results when describing cross-border thought experiments. We, therefore, must be willing to reconsider the paradigms, assumptions and starting points related to this set of theories.