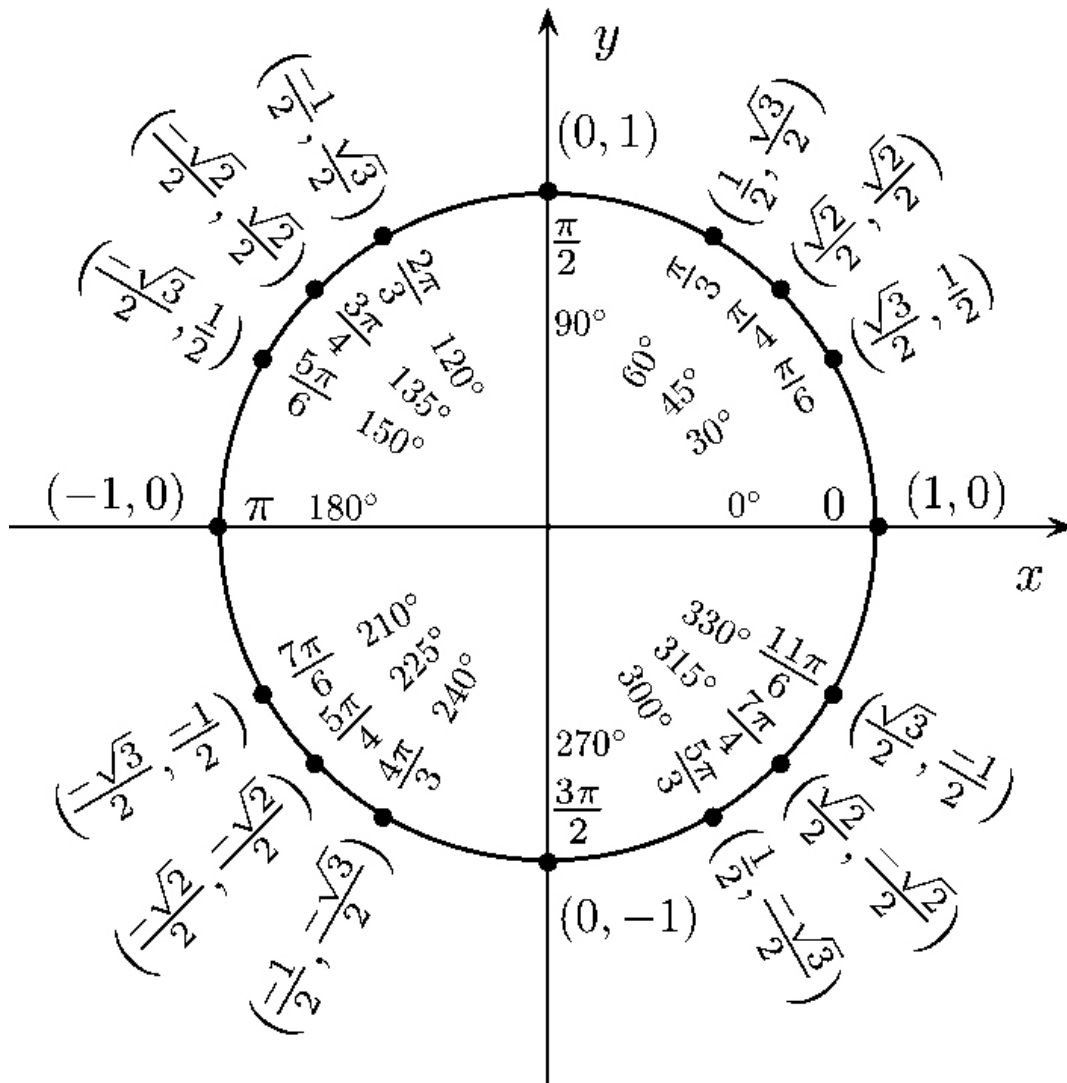


# Metric Science

Gerhard Jan Smit and Jelle Ebel van der Schoot

In this article a particle is being presented that explains all known forces of nature. The particle has no dimensions, it is a dimensional basic particle. Hence it gets the following name: 'dimensional basic' (db) particle. The core of this discovery is that the separate fundamental forces of nature: - the strong interaction, the electromagnetic interaction, the weak interaction and the gravitational interaction - are calculatable with one formula out of one principle. The statistical math of the quantum theory is set aside in favor of a goniometric approach. Gravitation is the only force that matters and the strong force, the electromagnetic force and the weak force can be explained out of gravitation while gravity itself is only caused by the curvature of db's. The formula for the extent of curvature around a db is:  $\sqrt{x^2+y^2+z^2} \times Kr = 1$ . In the formula: x, y, z, are coordinates in spacetime [m], Kr = curvature [m<sup>-1</sup>].



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# Metric Science

**By: Gerhard Jan Smit and Jelle Ebel van der Schoot.**

Now, for the first time, a particle will be presented in this article through which all forces are explained in a satisfactory way. It concerns the so-called dimensional basic (db or  $\lambda$ ). After much reflection, Gerhard Jan Smit and Jelle Ebel van der Schoot are of the opinion that with this theory, the foundation of the observed particles and forces has been found. In this article we start with an outline of the observed conflicts within quantum mechanics. After that, the theory will be described, the dimensional basic followed by the consequences for the photon, the electron, the quarks, the protons and neutrons, the more complex particles and the nature of electromagnetic fields. We will finish with a short expression of euphoria (Beauty in the order) and a justification.

Quote by Einstein: "Imagination is more important than knowledge. For knowledge is limited to all we now know and understand, while imagination embraces the entire world, and all there ever will be to know and understand."

## **Outline of observed conflicts within quantum mechanics**

It seems an impossibility to indicate the properties of a macroscopic object using quantum logic. The properties of microscopic elementary particles that are known at this time make this very difficult. Elementary particles have properties that cannot be defined, or only in a complex way. One significant problem is that the gravity at the level of the elementary particles will not be straight-jacketed into the Standard Model (Newton). In the macroscopic world, facts (position, speed and time) are true facts. In the microscopic world, one cannot often say that these are true or untrue. This begs the question: How well do we understand the world at the atomic scale?

For example, Werner Heisenberg claimed: "The subatomic world demonstrates again and again that we live in a psychedelic world that, to our common sense, is completely absurd."

According to the current models the world is made up of particles; this includes electrons, protons, and neutrons. Protons and neutrons are made up of constituent particles (quarks). Particles move under the influence of forces. Recognizable are the short distance force (weak interaction) and the long distance forces (strong, electromagnetic and gravitational interactions). There has been considerable progress in the search for a united theory of these forces. The description of all these

particles and forces takes place within quantum mechanics. Quantum mechanics is not just another physical theory; it is a framework for all physical theories. Quantum mechanics describes the nature of the particles and the forces that interfere with each other from the particles.

In order to study the smallest building blocks of matter particle accelerators are used. In this method elementary particles are artificially accelerated and brought into collision with other particles, creating new particles. Through observation of their tracks (whether or not deflected into a magnetic field (only electrically charged particles)) and mutual collisions the properties of the particles can be studied. Does this provide us with a good picture of the world or is our picture a description of the results of these multiple experiments? Do the experiments supply a good fundamental description of the entity of the particles?

One would like an interpretation of quantum mechanics that corresponds with the experience in the macroscopic world *and* that is represented by classic mechanics. However, the classic world is in part not consistent with the world of quantum mechanics. This leads to essential questions. Can the universe be represented by quantum mechanics? It seems a reasonable expectation that the atoms in the universe would obey the laws of physics. Currently this doesn't seem to be the case.

First of all, on the macro level there are observations of deviating speeds in galaxies. These speeds do not correspond with the directly observed matter and can only be explained by the presence of unknown mass called dark matter. From data of gravitational lenses there is strong evidence as to the presence of dark matter. These data suggest the presence of dark matter in clusters and around galaxies. Although this matter has never directly been observed the indirect evidence of its existence is overwhelming.

On a micro level too the questions are fundamental. For example, within quantum mechanics there is the unexplained phenomenon of entanglement. Two particles that simultaneously come into being – but are situated at a great distance from each other – each turn out to possess properties that correspond with each other. This would bring to mind a common cause in the classic sense. However, if the situation changes for one of the particles (e.g. the spin) then the situation will simultaneously change for the other particle. It seems as if from a distance an instantaneous transmission of information takes place. So this correlation between the two particles ostensibly goes beyond what is considered possible in classic physics. The fact that a particle does not choose a specific state until its observation (measuring) brought Einstein to remark: *“God does not play dice.”* It is clear that Einstein meant that there must be an underlying, understandable reason for the presumed transmission of

information. However, to this day, a satisfactory explanation for this phenomenon has not been found.

There are also questions in which micro level and macro level both play a role. First there is the attraction of a photon by a gravitational field. A photon is deflected in its track by a heavy mass in space. Why does the photon obey to Einstein's ideas of curved spacetime? Traditionally the photon is considered to be massless, the reason why the underlying mechanism has not yet been fully understood. Then there is the gravitational redshift that a photon undergoes when close to an object with an enormous curvature. For example, on the event horizon of a black hole the redshift becomes extreme (infinite). Although both of these phenomena have been universally accepted and observed there is no full comprehension. Why does the photon undergo such a deflection and what is the mechanism of the gravitational redshift?

In this article an unconventional explanation is proposed which forms the foundation for the understanding of nuclear forces both on the micro as well as the macro scale.

## Dimensional Basic

The axiom is that the most elementary particle in existence is the dimensional basic (db or  $\lambda$ ). The  $\lambda$  itself has no dimensions (no length, no width and no height). The  $\lambda$  is found everywhere in the universe and is always moving through spacetime, where the speed of the movement of the  $\lambda$ , in respect to its surroundings, can have any value. The curvature of space on the location of the  $\lambda$  is infinite while time on the location of the  $\lambda$  stands still. The  $\lambda$  behaves like a black hole without dimensions. The  $\lambda$  is the building block of all that we perceive.

The formula for the extent of spacetime curvature around a  $\lambda$  is:

$$\sqrt{x^2 + y^2 + z^2} \times Kr = 1 \tag{0}$$

In the formula: x, y, z, are coordinates in spacetime [m], Kr = curvature [m<sup>-1</sup>].

Formula (0) describes the relative lessened extent of curvature of spacetime surrounding the  $\lambda$ . In the formula the distance from a specific point in spacetime to the  $\lambda$  is always greater than zero.

Through agglomeration, or rather joint interaction, the  $\lambda$ -particles form phenomena that at a certain moment rise above the observational limit. The  $\lambda$  itself exists below the observational limit and so it cannot directly be demonstrated.

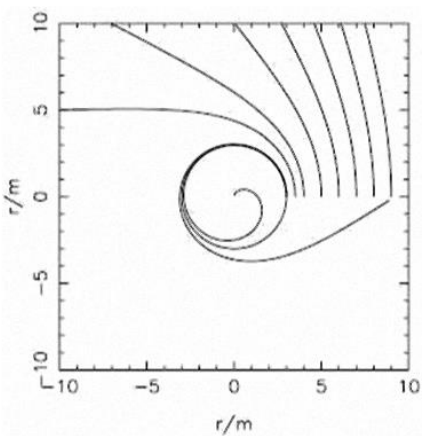
The distance between the various  $\lambda$ s varies in time by movements relative to each other. The directions of movements are being influenced by one another according to gravitational laws. The movement paths are being optically influenced for the outside observer by the curvatures of spacetime caused by the  $\lambda$ s themselves. This means that time slows down while relative space around a  $\lambda$  becomes smaller when the  $\lambda$ s are approaching each other. Time speeds up and relative space around a  $\lambda$  becomes larger when the  $\lambda$ s go from one another.

The  $\lambda$  is different than other particles in that respect that other particles consist out of multiple  $\lambda$ s while the  $\lambda$  itself is a singular particle. Each  $\lambda$  is a singularity (infinite curvature) on itself while other particles than the  $\lambda$  are a combination of multiple  $\lambda$ s and thus a system of multiple singularities.

The observed forces (strong, electromagnetic, weak and gravitation) have the same origin. The cause of these forces are because of the characteristics of a singular  $\lambda$ . The observed forces are in fact a sum of complex circular movements that come to exist when multiple  $\lambda$ s interact with each other.

**Coding the dimensional basic**

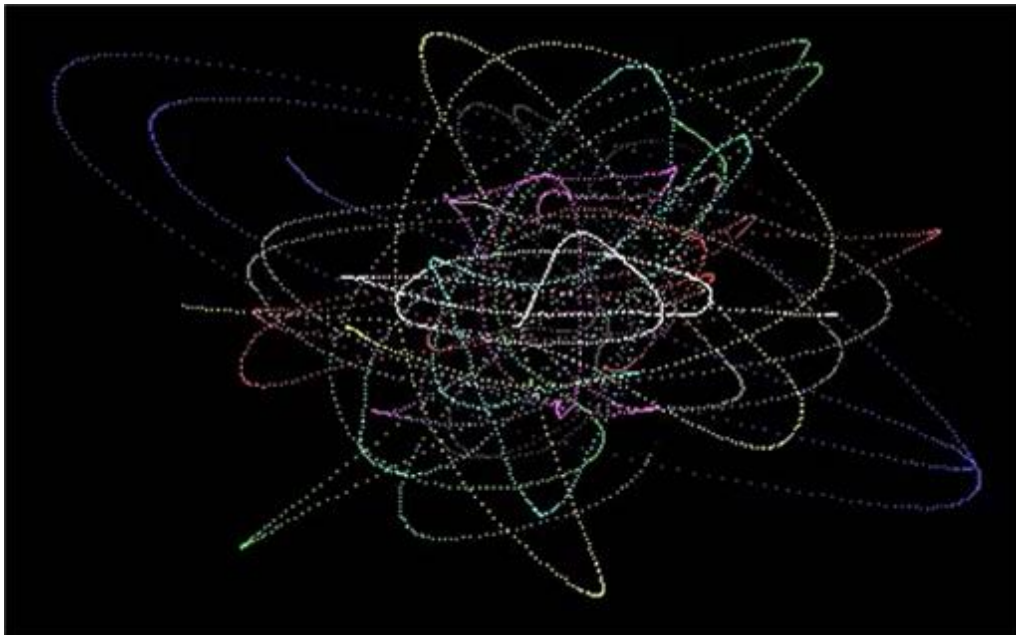
Figure 1: The tracks of two interacting  $\lambda$ s at different distances from each other.  
 (Original: Deflection of the tracks of a photon close to an object with a heavy mass.)



In figure 1 is shown how the movement tracks of photons react to the event horizon of a black hole. The same regularity applies to a binary black hole system. This is equal to the movement tracks of two  $\lambda$ s in respect to each other with the difference that the two  $\lambda$ s have no event horizon. These movement tracks are equal in behavior to Newton’s laws of gravity. The Pauli principle is never violated because the  $\lambda$ s have no dimensions, they can approach each other, but can never touch

each other. On the basis of that information the Borland C computer program 'Newton' has been developed. This computer programmed model shows the movement tracks of  $\lambda$ s in three dimensional spacetime, in which the movement tracks of the  $\lambda$ s follow the gravitational laws. A three dimensional snapshot with nine interacting  $\lambda$ s is shown in figure 2. In this figure the Einsteinian bending of spacetime has not been taken into account. The computer program 'Newton' gives the possibility to show time delay in video, thus making clear the principle of time delay.

Figure 2: Three dimensional view of calculated movement tracks of nine  $\lambda$ s during a random time.



A second model that has been developed is the Borland C computer plot program 'Einstein'. This computer program has been developed to show how spacetime around a  $\lambda$  is being bend as seen by an outside observer, the extent of bending calculated according to formula (0).

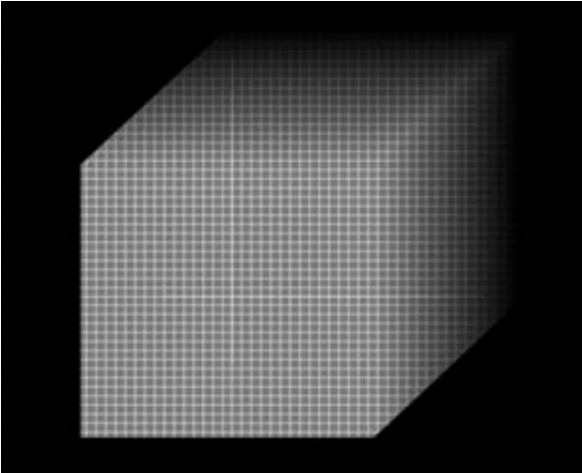
Just like one  $\lambda$  as a singular singularity causes bending of spacetime because of an infinite curvature, a multitude of  $\lambda$ s will show a stronger bending of spacetime because of a sum of infinite curvatures. As Einstein made clear, we can speak of curved spacetime instead of linear spacetime. The more mass an object has, the more spacetime bends. One can say that invariant mass is the sum of the curvatures of a certain amount of  $\lambda$ s close to each other in respect to their surroundings. In case of for example three billion clustered  $\lambda$ s one can speak of three billion times infinite curvature. This makes it possible to isolate infinite numbers in comparison equations and thus clusters of  $\lambda$ s can be expressed as an absolute number. A cluster of a certain amount of  $\lambda$ s will have an absolute number of infinite curvatures. In this way one can speak of cluster A with X times infinite curvatures, while cluster B has Y times infinite curvatures. The infinities on both sides of the comparison can be done

away with and only the absolute proportions of X and Y remain for the respective clusters. The curvature of a cluster of  $\lambda$ s with an absolute amount of  $\lambda$ s correlates with the invariant mass of an object and a certain extent of bending of spacetime.

The extent of bending of spacetime is calculated using formula (0), where the extent of curvature on a specific position of spacetime is being calculated. A bigger curvature means that spacetime is more bended, whereas a smaller curvature means that spacetime is less bended.

An example of this is shown in figure 3. In figure 3 the plot of a cube of spacetime is shown. The Einsteinian bending of a cube of spacetime is made visual. While figure 3a shows no bending of spacetime because of the absence of a  $\lambda$ , the bending in a cube of spacetime, and thus deformed distances for an outside observer, in figure 3b have been calculated according to formula (0) because of the position of a  $\lambda$  in the center of the cube of spacetime. At the center of the six surfaces of the cube of spacetime the distance to the  $\lambda$  is the smallest, for the outside observer it appears that that piece of spacetime is closer to the  $\lambda$  than it should be in linear (uncurved) spacetime, this because of the bending of spacetime, made visual by formula (0). Hence the pointy form of the corners of the cube of spacetime, there the distance to the  $\lambda$  is the biggest. Because of the bending of spacetime the distance is bigger for the outside observer than it should be according to a linear scale, this again made visual by calculating the extent of bending of spacetime according to formula (0). The closer spacetime is to a  $\lambda$ , the higher the curvature and the more spacetime will be bend.

Figure 3: Three dimensional calculated view of the bending of a cube of spacetime under the influence of a  $\lambda$ .



3a. Uncurved (linear) cube of spacetime.



3b. Cube of spacetime curved by the presence of a  $\lambda$  in the center.



Concluding:

The Newtonian gravitational laws represent the straight movement paths as being caused by the bending of spacetime. Thus Newton's laws of gravity apply to the movement paths of the  $\mu$  or a multitude of  $\mu$ s.

Both computer programs together represent the movement and character of the  $\mu$ . The reality of the  $\mu$  can be simulated by computer programs according to mathematical laws, taking into account the reality of formula (0) and the thereby caused bending of spacetime. A third model, incorporating formula (0) in the cartesian coordinate system, splitting the calculation of the bending of space and the delay of time, should be able to simulate the universe as a whole, calculating and visualizing the  $\mu$  movement tracks with Einsteinian bending of space and delay of time. Whereas a model with an infinite amount of  $\mu$ s is practically not possible, a model with a subset of a large number of  $\mu$ s should be possible.

Addendum IV shows the source codes of the Borland C computer programs 'Newton' and 'Einstein', preceded by a MS Quick Basic example of  $\mu$  movement analysis with which figure 2 and figure 25 have been calculated.

## Gravitation in relation to curvature

Einstein showed that gravitation can be understood in terms of curvatures. Curvatures should be expressed in dimensions that describe spacetime. The metric system is an internationally adopted decimal system of measurement. It is in widespread use, and where it is used, it is the only or most common system of weights and measures. It is also known as the International System of Units (SI). Physics will use the SI standard, in chemistry some like to use ångström, in cosmology one will use lightyears or parsecs. For this subject the SI standard is used.

The ideas of Einstein are widely accepted, although there has never been a real theoretic thesis that combines curvature and the traditional Newtonian gravitation laws.

Formula (0) characterizes the influence of a single  $\mu$ -particle on its surroundings. We are suggesting a new way in understanding gravity.

$$\text{Formula (0) can also be written as: } Kr = \frac{1}{\sqrt{x^2+y^2+z^2}} \text{ (m}^{-1}\text{)} \quad (0a)$$

$$\text{When we use coordinates where } y=0 \text{ and } z=0 \text{ we can simplify the formula to } Kr = \text{abs} \frac{1}{x} \text{ (m}^{-1}\text{)} \quad (0b)$$

The apparent weight of an object in peace (figure 4) at the equator on the surface of the earth can traditionally be found as followed:

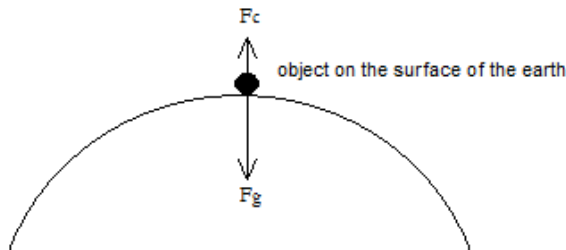
$$W_{\text{object}} = F_g - F_c$$

$W_{\text{object}}$  is the apparent weight of an object (N)

$F_g$  is the gravitation force of the earth on an object in peace ( $\text{kg}\cdot\text{m}\cdot\text{s}^{-2}$ )

$F_c$  is the centripetal force ( $\text{kg}\cdot\text{m}\cdot\text{s}^{-2}$ )

Figure 4: Object on the surface at the equator of the earth.



Huygens stated what is now known as the second of Newton's laws of motion in a quadratic form. In 1659 he derived the now standard formula for the centripetal force, exerted by an object describing a circular motion, for instance on the string to which it is attached. In modern notation:

$$F_c = \frac{m V^2}{r} \quad \left[ \text{kg}\cdot\text{m}\cdot\text{s}^{-2} = \frac{\text{kg}(\text{m}\cdot\text{s}^{-1})^2}{\text{m}} \right]$$

$F_c$  is the centripetal force ( $\text{kg}\cdot\text{m}\cdot\text{s}^{-2}$ )

$M$  is the mass of an object (kg)

$V$  the velocity ( $\text{m}\cdot\text{s}^{-1}$ )

$r$  the radius (m)

Newton's law of universal gravitation states that a particle attracts every other particle in the universe using a force that is directly proportional to the product of their masses and inversely proportional to the square of the distance between their centers. It is a part of classical mechanics and was formulated in Newton's work *Philosophiæ Naturalis Principia Mathematica* ("The Principia"), first published on 5 July 1687. In modern notation:

$$F_g = G \frac{m_1 m_2}{r^2} \quad \left[ \text{kg}\cdot\text{m}\cdot\text{s}^{-2} = \text{kg}\cdot\text{m}\cdot\text{s}^{-2} \text{m}^2 \text{kg}^{-2} \frac{\text{kg}\cdot\text{kg}}{\text{m}^2} \right]$$

$F_g$  is the force between the masses ( $\text{kg}\cdot\text{m}\cdot\text{s}^{-2}$ )

$G$  is the gravitational constant ( $6,67384 \times 10^{-11} \text{ N}\cdot\text{m}^2\text{kg}^{-2}$ )

$m_1$  is the first mass (kg)

$m_2$  is the second mass (kg)

$r$  is the distance between the centers of the masses (m).

For the calculation of the apparent weight of an object in peace on the surface of the earth we can use the following equation:

$$W_{\text{object}} = G \frac{m_1 m_2}{r^2} - \frac{m_2 V^2}{r} \quad \left[ \text{kg}\cdot\text{m}\cdot\text{s}^{-2} = \text{kg}\cdot\text{m}\cdot\text{s}^{-2} \text{m}^2 \text{kg}^{-2} \frac{\text{kg}\cdot\text{kg}}{\text{m}^2} - \frac{\text{kg}(\text{m}\cdot\text{s}^{-1})^2}{\text{m}} \right]$$

$W_{\text{object}}$  is the apparent weight of an object (N or  $\text{kg}\cdot\text{m}\cdot\text{s}^{-2}$ )

$G$  is the gravitational constant ( $6,67384 \times 10^{-11} \text{ N}\cdot\text{m}^2\text{kg}^{-2}$ )

$m_1$  mass of the earth (kg)

$m_2$  mass object in peace (kg)

$r$  is the distance between the centers of the earth and the object on the surface of the earth (m)

$V$  the velocity surface of the earth ( $\text{m}\cdot\text{s}^{-1}$ )

Using formula (0) an object on earth will undergo the following curvature.

$$Kr_{\text{earth} \rightarrow \text{object}} = \sum_{i=1}^n Kr_i \quad [m^{-1} = m^{-1}] \quad (1)$$

$Kr_{\text{earth} \rightarrow \text{object}}$  is the sum of the curvatures the object will experience from every particle (n) that is a part of planet earth ( $m^{-1}$ )

The object can be defined by the energy ( $E_{\text{object in peace}}$ ) of the object. When we say that the object on earth will experience a curvature caused by all the particles of the earth it is likely that these curvatures will seize on to the energy of the object. The energy of the object reflects the amount of particles of the object. Thus the weight of an object can be derived from the following formula:

$$W_{\text{object}} = \sum_{i=1}^n Kr_i E_{\text{object at peace}} \quad [kg.m.s^{-2} = m^{-1}kg.m^2s^{-2}] \quad (2)$$

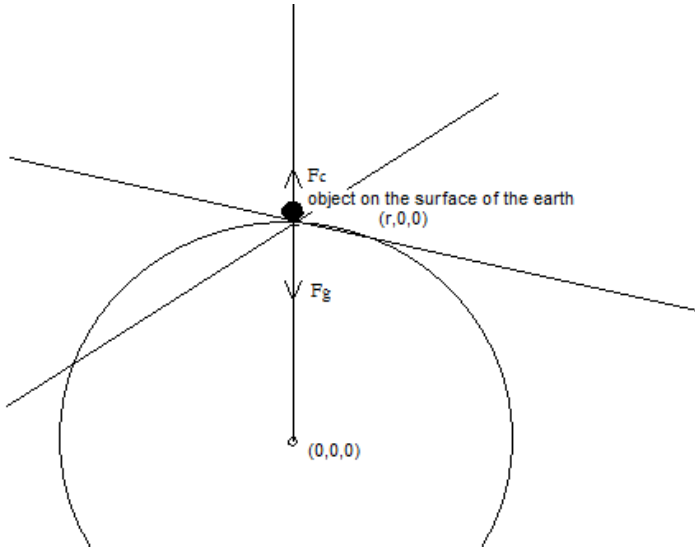
$W_{\text{object}}$  is the apparent weight of an object (N)

$Kr_i$  curvatures the object will experience from a particle (i) that is a part of planet earth ( $m^{-1}$ )

$E_{\text{object at peace}}$  is the energy of an object in peace on the surface of planet earth (J or N.m or  $kg.m^2s^{-2}$ )

Formula (2) delivers a force that has the dimension  $kg.m.s^{-2}$ , this is Newton [N].

Figure 5: Object on the surface of the earth (at the equator) with coordinates (r,0,0).



$Kr_i$  in formula (2) is dependent on coordinates in the x-, y- and z-direction. In the system as shown in figure 5 the axis from the object to the middle of planet earth is chosen to be the x-axis. Because the earth is symmetric -below the object- we can conclude that the cumulated curvatures in the y-direction and the cumulated curvatures in the z-direction are both zero. Due to this the object is not rolling in the y- or the z-direction. The coordinates are chosen in a system where  $y = 0$  and  $z = 0$ .

Therefore we can now write formula (2) as follows:

$$W_{\text{object}} = \sum_{i=1}^n \frac{1}{x_i} E_{\text{object in peace}} \quad [kg.m.s^{-2} = m^{-1}kg.m^2s^{-2}] \quad (2a)$$

$W_{\text{object}}$  is the apparent weight of an object (N)

$E_{\text{object in peace}}$  is the energy of an object in peace on the surface of planet earth (J or N.m or  $kg.m^2.s^{-2}$ )

$x_i$  is the position of a particle i that will have a curvature that is felt by the object (m)

In formula (2a)  $x_i$  is always a fraction of the radius of the earth ( $r$ ). We can now write this formula as follows:

$$W_{\text{object}} = \left( \frac{1}{a_1 \times r} + \frac{1}{a_2 \times r} + \frac{1}{a_3 \times r} + \frac{1}{a_4 \times r} \dots \dots \dots \frac{1}{a_n \times r} \right) E_{\text{object at peace}} \quad [\text{see 2a}] \quad (2b)$$

$$W_{\text{object}} = \left( \frac{1}{a_1} + \frac{1}{a_2} + \frac{1}{a_3} + \frac{1}{a_4} \dots \dots \dots \frac{1}{a_n} \right) \frac{1}{r} E_{\text{object at peace}} \quad [\text{see 2a}] \quad (2c)$$

$$W_{\text{object}} = S \frac{1}{r} E_{\text{object in peace}} \quad [\text{kg.m.s}^{-2} = \text{m}^{-1}\text{kg.m}^2\text{s}^{-2}] \quad (2d)$$

$W_{\text{object}}$  is the apparent weight of an object (N)  
 $E_{\text{object in peace}}$  is the energy of an object in peace on the surface of planet earth (J or Nm or  $\text{kgm}^2\text{s}^{-2}$ )  
 $r$  is the distance between the centers of the earth and the object on the surface of the earth ( $6378 \times 10^3$  m)  
 $a_i$  is the specific position of a particle "i" as a fraction of the radius of planet earth  
 $S$  is the ST constant

Using the traditional formula for apparent weight of an object in peace on the surface of the earth we can write the following range for the apparent mass of an object:

$$W_{\text{object}} = S \frac{1}{r} E = G \frac{m_1 m_2}{r^2} - \frac{m_2 V^2}{r} \quad [\text{kg.m.s}^{-2} = \text{m}^{-1}\text{kg.m}^2\text{s}^{-2} = \text{kg.m.s}^{-2}\text{m}^2\text{kg}^2 \frac{\text{kg.kg}}{\text{m}^2} - \frac{\text{kg}(\text{m.s}^{-1})^2}{\text{m}}] \quad (2e)$$

$W_{\text{object}}$  is the apparent weight of an object (N)  
 $E$  is the energy of an object in peace on the surface of planet earth (J or Nm or  $\text{kg.m}^2\text{s}^{-2}$ )  

- $E_{1 \text{ kg}}$  is  $8,987551783 \times 10^{16}$  J
- $E_{\text{atomic unit } (1,66 \times 10^{-27} \text{ kg})}$  is  $1,492417954 \times 10^{10}$  J

 $r$  is the distance between the centers of the earth and the object (m) ( $r$  to the surface of the earth is  $6378 \times 10^3$  m)  
 $S$  is the ST constant  
 $G$  is the gravitational constant ( $6,67384 \times 10^{-11} \text{ N} \cdot \text{m}^2\text{kg}^{-2}$ )  
 $m_1$  mass of the earth ( $5,9722 \times 10^{24}$  kg)  
 $m_2$  mass object in peace  
 $V$  the velocity surface of the earth ( $464,23 \text{ m.s}^{-1}$ )

To find the property for constant  $S$  we can simplify formula (2e). For this we will use some substitutions (formula 2e1, 2e2 and 2e3 into 2e). This will result in formula (2e4) and finally in formula (2e10). Using known quantities we can derive the value of the ST constant.

$$E_{\text{object in peace}} = m_2 C^2 \quad (2e1)$$

$$m_1 = \frac{4}{3} \pi r^3 \rho \quad (\text{kg}) \quad (2e2)$$

$$V = \frac{2\pi r}{86400} \quad (\text{m.s}^{-1}) \quad (2e3)$$

$$S \frac{1}{r} m_2 C^2 = G \frac{\frac{4}{3} \pi r^3 \rho m_2}{r^2} - \frac{\left(\frac{2\pi r}{86400}\right)^2 m_2}{r} \quad (2e4)$$

$$S \frac{1}{1} C^2 = G \frac{\frac{4}{3} \pi r^2 \rho}{1} - \frac{\left(\frac{2\pi r}{86400}\right)^2}{1} \quad (2e5)$$

$$S = \left( G \frac{4}{3} \pi \rho - \left(\frac{2\pi}{86400}\right)^2 \right) \frac{1}{c^2} r^2 \quad (2e6)$$

$$S = (1,536231227 \times 10^{-6} - 5,288496871 \times 10^{-9}) \frac{1}{c^2} r^2 \quad (2e7)$$

$$S = 1,53094273 \times 10^{-6} \frac{1}{c^2} r^2 \quad (2e8)$$

$$S = 1,703403515 \times 10^{-23} r^2 \quad (2e9)$$

$$S_{\text{equator}} (S_e) = 6,929255398 \times 10^{-10} \quad (2e10)$$

$P_{\text{earth}}$  is the density of planet earth ( $\frac{4}{3}\pi r^3 \rho = 5,9722 \times 10^{24} \rightarrow \rho = 5495,309903 \text{ kg}\cdot\text{m}^{-3}$ )

$R_{\text{earth}}$  is the radius of planet earth (m) ( $r_{\text{equator}}$  is  $6378 \times 10^3$  m)

G is the gravitational constant ( $6,67384 \times 10^{-11} \text{ N}\cdot\text{m}^2\cdot\text{kg}^{-2}$ )

C is the lightspeed ( $299792458 \text{ m}\cdot\text{s}$ )

$\Pi$  is 3,141 592 653 .....etcetera

The resulting formula (3) is a formula that reflects the implication of Einstein's theory about curvatures on gravity. This formula is made fit for masses on the equator of the planet. This is the situation where the forces work axial to the rotation axis of the planet. The gravitation laws of Newton are specific for this situation. Formula (3) gives an outcome that meets the outcome calculated in the traditional Newtonian way.

$$W_{\text{object}} = S_e \frac{1}{r} E_{\text{object in peace}} \quad [\text{kg}\cdot\text{m}\cdot\text{s}^{-2} = \text{m}^{-1}\text{kg}\cdot\text{m}^2\text{s}^{-2}] \quad (3)$$

$W_{\text{object}}$  is the apparent weight of an object (N)

E is the energy of an object in peace on the surface of planet earth (J or Nm or  $\text{kg}\cdot\text{m}^2\text{s}^{-2}$ )

r is the distance between the centers of the earth and the object on the surface of the earth (m)

$S_e$  is the ST constant on the equator ( $6,929255398 \times 10^{-10}$ )

In the following example we will give the outcome of the calculation of the apparent mass of 1 kg and 1 u, on the equator of planet earth, through formula (3) and the traditional formula for the calculation of the apparent weight of an object in peace. The outcomes slightly differ.

$$W_{\text{object}} = S_e \frac{1}{r} E_{\text{object in peace}} \quad (3)$$

$S_{\text{equator}} = 6,929255398 \times 10^{-10}$

$R_{\text{earth}}$  is the radius of planet earth (m) ( $r_{\text{equator}}$  is  $6378 \times 10^3$  m)

$E_u$  is  $1,492417954 \times 10^{-10}$  (J or Nm or  $\text{kg}\cdot\text{m}^2\cdot\text{s}^{-2}$ )

$E_{\text{kg}}$  is  $8,987551783 \times 10^{16}$  (J or Nm or  $\text{kg}\cdot\text{m}^2\cdot\text{s}^{-2}$ )

Formula (3) gives:

$$W_{u, \text{ at the equator}} = 1,621408774 \times 10^{-26} \text{ N}$$

$$W_{1\text{kg}, \text{ at the equator}} = 9,764352729 \text{ N}$$

$$W_{\text{object}} = G \frac{m_1 m_2}{r^2} - \frac{m_2 v^2}{r}$$

$W_{\text{object}}$  is the apparent weight of an object (N)

G is the gravitational constant ( $6,67384 \times 10^{-11} \text{ N}\cdot\text{m}^2\cdot\text{kg}^{-2}$ )

$m_1$  mass of the earth (kg) ( $5,9722 \times 10^{24}$  kg)

$m_2$  mass object in peace (kg) (1 kg / 1 u or  $1,660538921 \times 10^{-27}$  kg)

r is the distance between the centers of the earth and the object on the surface of the earth (m)

v the velocity surface of the earth ( $\text{m}\cdot\text{s}^{-1}$ ) ( $464,23 \text{ m}\cdot\text{s}^{-1}$ )

The traditional formula for the calculation of the apparent weight of an object in peace gives:

$$W_{u, \text{ at the equator}} = 1,6213989 \times 10^{-26} \text{ N}$$

$$W_{1\text{kg}, \text{ at the equator}} = 9,764293262 \text{ N}$$

When we want to calculate the apparent mass of 1 kg on the equator of the moon we first have to define the ST constant  $S_{e-moon}$ . For this we have to put in the correct numbers ( $\rho_{moon} = 3344 \text{ kg.m}^{-3}$ ,  $r_{moon \text{ at the equator}} = 1738,1 \times 10^3 \text{ m}$ ) into formula (2e7).

$$W_{\text{object}} = S_e \frac{1}{r} E_{\text{object in peace}} \quad (3)$$

$S_{e \text{ moon}}$  is  $3,124459609 \times 10^{-11}$   
 $R_{\text{moon at the equator}} = 1738,1 \times 10^3 \text{ m}$   
 $E_{\text{kg}}$  is  $8,987551783 \times 10^{16} \text{ (J or Nm or kg.m}^2.\text{s}^{-2})$

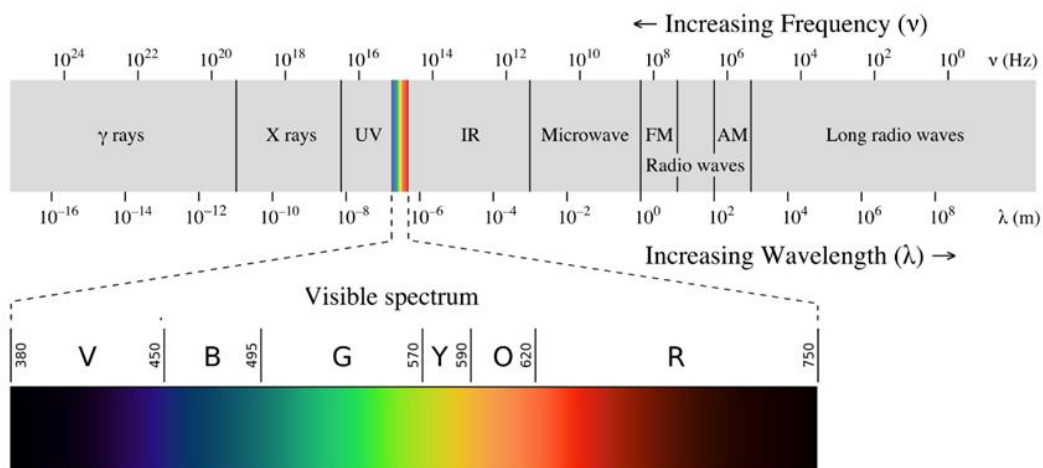
Formula (3) gives:

$$W_{1\text{kg, at the equator of the moon}} = 1,615628705 \text{ N}$$

This is about 16,5 % of the weight on earth. This meets the value as is given by the United States National Aeronautics and Space Administration.

## The photon

Figure 6: The electromagnetic spectrum.



When two  $\lambda$ -particles enter into the direct sphere of influence of each other's curvature, a strong interaction  $S_e$  will be formed between the two. This is comparable to a star-planet combination such as the sun and the earth (illustration 1a). The difference is that the  $\lambda$ -particles are without a dimension and with an infinite curvature in the center (illustration 1b). This indicates that time, for the outside observer, infinitely slows down when the particles approach each other. So the combination of the two  $\lambda$ s has an enormous life span. The analogy of the curvatures around black holes is striking.

Illustration 1a: Earth in curvature field of sun.

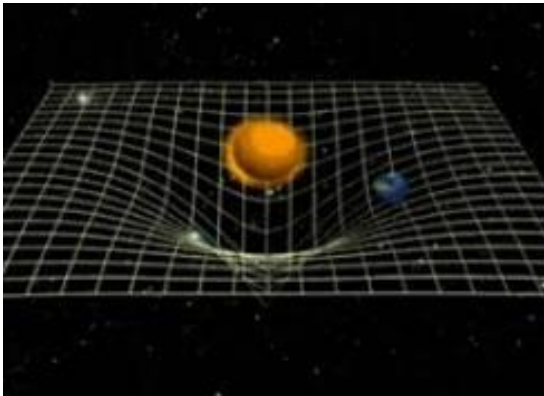
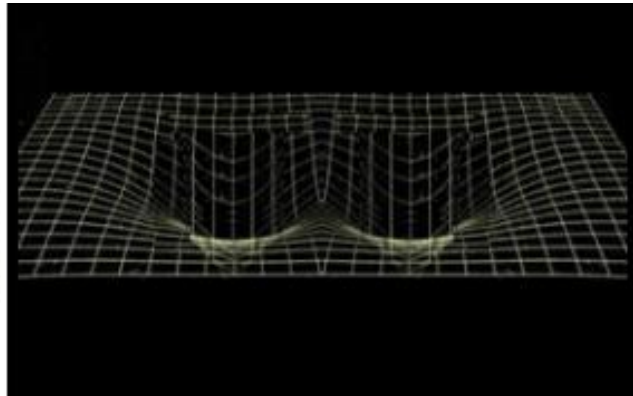


Illustration 1b: Depiction of curvatures 2- $\lambda$ -particle.



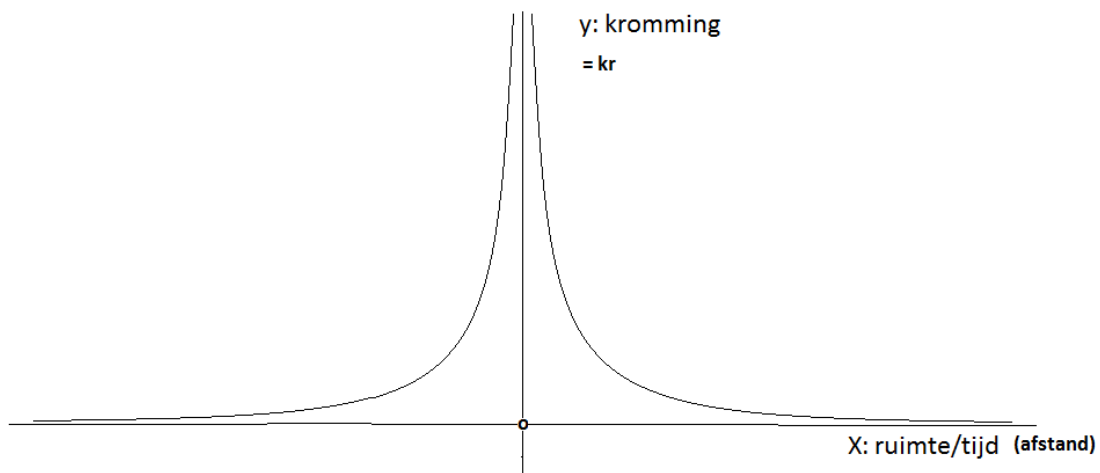
To calculate the curvatures around a single  $\lambda$  we can use a simplification of formula (0):

$$Kr = \text{abs} \frac{1}{x} \tag{0b}$$

In the formula: Kr = curvature [ $\text{m}^{-1}$ ], x = spacetime [m].

Formula (0b) results in figure 7 shown below.

Figure 7: Absolute two dimensional schematic projection of the curvature strength around a  $\lambda$  where X is the distance in spacetime and Y is the amount of curvature (kr).

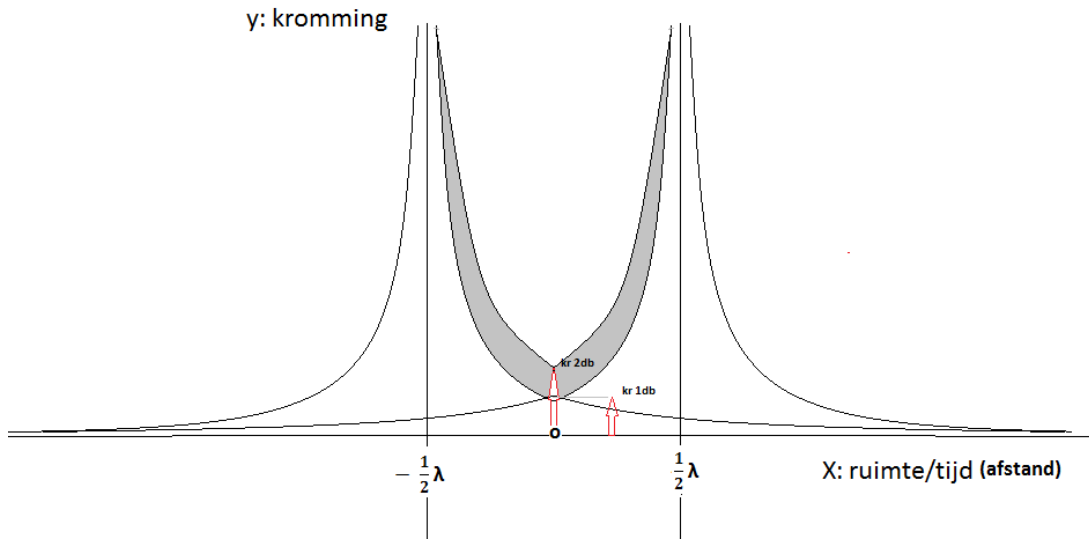


(X: ruimte/tijd (afstand) = spacetime (distance), Y: kromming = curvature = kr)

In figure 7 is shown that on the location of the  $\lambda$  (on  $X = 0$ ) the curvature is infinite while the curvature becomes smaller when the distance to the  $\lambda$  enlarges.

In figure 8 the graphic of a two- $\lambda$ -system is shown. Two or more  $\lambda$ s result in a sum of curvatures on the spacetime surface between the  $\lambda$ s. In figure 8 this is made clear by marking resultant curvature in greyshade. One can say that the invariant mass of a two- $\lambda$ -system is being caused by a stronger bending of spacetime between  $\lambda$ -particles.

Figure 8: Absolute two dimensional schematic projection of the curvature strength around a 2- $\lambda$ -system where X is the distance in spacetime and Y is the amount of curvature (kr).



(X: ruimte/tijd (afstand) = spacetime (distance), Y: kromming = curvature)

The curvature of the combined particles is found using the formula (4). The curvature in the center between the particles is found when X = 0.

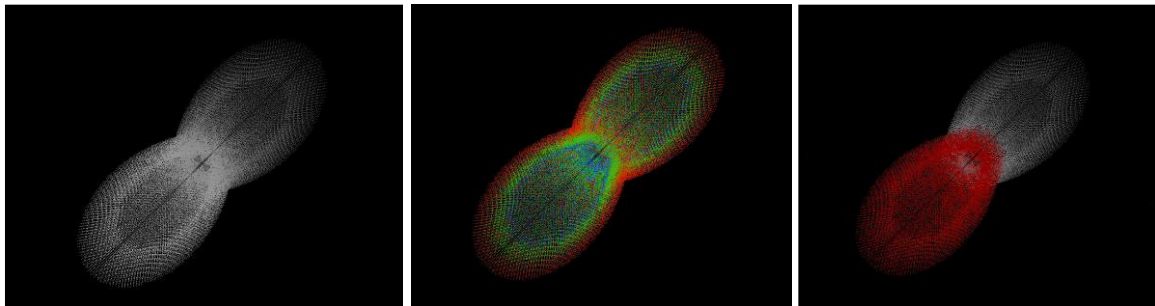
$$kr = \text{abs} \frac{1}{x + \frac{1\lambda}{2}} + \text{abs} \frac{1}{x - \frac{1\lambda}{2}} \quad (4)$$

In the formula Kr = curvature [m<sup>-1</sup>],  $\lambda$  = distance between both particles/wavelength [m].

The resulting established surface between both asymptotes has a surface of  $2 * \int_{0,5\lambda}^{\lambda} \ln(x)$ . This is equal to  $2 \ln 2$  (constant). The total surface (this is the surface in which the results on the left and right side of the graphic have been incorporated) has the value of  $2 \ln(2) + 2 * \int_{\lambda}^{\infty} \frac{1}{x} dx$ .

The hypothesis is that the 2- $\lambda$ -particle is a photon. A calculation of curvatures that the observer can detect is shown in figure 9. The wavelength of the photon is equal to the distance  $\lambda$  between both particles. A schematic depiction of a photon and its movement in spacetime is shown in figure 10.

Figure 9: Three dimensional calculations of the curvatures of a 2- $\lambda$ -particle (photon).



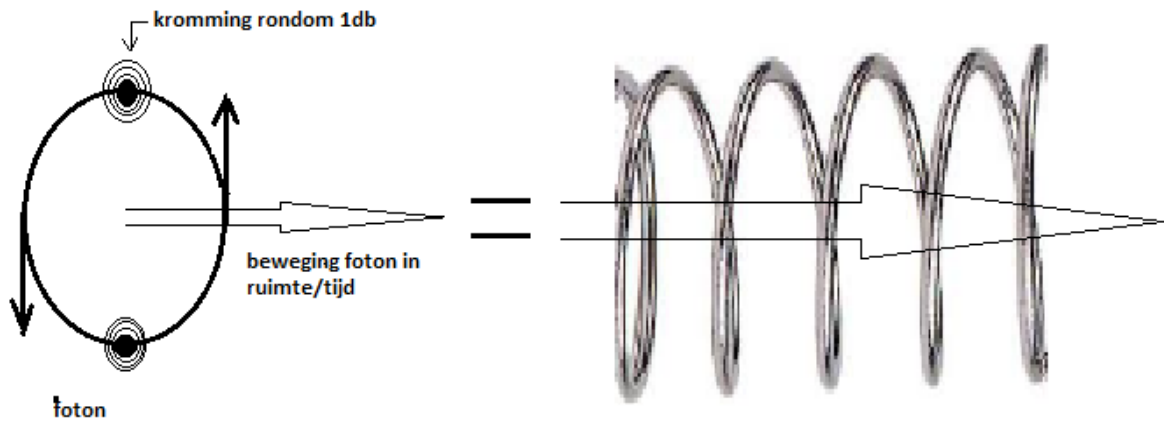
9a. Photon (greyscale).

9b. Photon (blue is high curvature, red is low curvature).

9c. Photon (each  $\lambda$  its own color).



Figure 10: Schematic projection of a photon.



(kromming rondom 1db = curvature around 1db, beweging foton in ruimte/tijd = movement photon in spacetime)

In a photon in the red spectrum (620 nm) the  $kr_{620nm}$  (when  $x = 0$ ) has a value of  $6.45 \times 10^6 \text{ m}^{-1}$ .

For a gamma-photon (0.001 nm) the  $kr_{0,001nm}$  (when  $x = 0$ ) has a value of  $4.0 \times 10^{12} \text{ m}^{-1}$ .

The surface is equal for each photon  $2 \ln(2) + 2 * \int_{\lambda}^{\infty} \frac{1}{x} dx$ .

The curvatures of the photons specially differ in the center (see formula (4)). The curvature rises when the wavelength gets smaller (gamma photon 0,001 nm:  $Kr = 4,0 \times 10^{12} \text{ m}^{-1}$ ). The curvature drops when the wavelength gets bigger (visible light 620 nm,  $Kr = 6,5 \times 10^6 \text{ m}^{-1}$ ).

In the center of the photon the coordinates of the system are:  $x = 0$ ,  $y = 0$  and  $z = 0$ . When we use  $x = 0$  in formula (4) we can find formula (5).

$$Kr = \frac{4}{\lambda} \tag{5}$$

In the formula  $Kr$  = curvature [ $\text{m}^{-1}$ ],  $\lambda$  = distance between both particles/wavelength [m].

The traditional formula for photon energy is:

$$E = \frac{h \times c}{\lambda}$$

E = energy of a photon [Joule or  $\text{kg} \cdot \text{m}^2 \cdot \text{s}^{-2}$ ]  
 h = Planck's constant:  $6,626 \times 10^{-34}$  [Joule·s]  
 c = Speed of light:  $2,998 \times 10^8$  [ $\text{m} \cdot \text{s}^{-1}$ ]  
 $\lambda$  = wavelength [m]

When we combine formula (5) and the traditional formula for photon energy we will get:

$$E[\text{Joule}] = \frac{h \times c \times Kr}{4} \tag{5a}$$

$$E[\text{joule}] = 5,0 \times 10^{-26} \times Kr \tag{5b}$$

$$E[eV] = 3,1 \times 10^{-7} \times Kr \tag{5c}$$

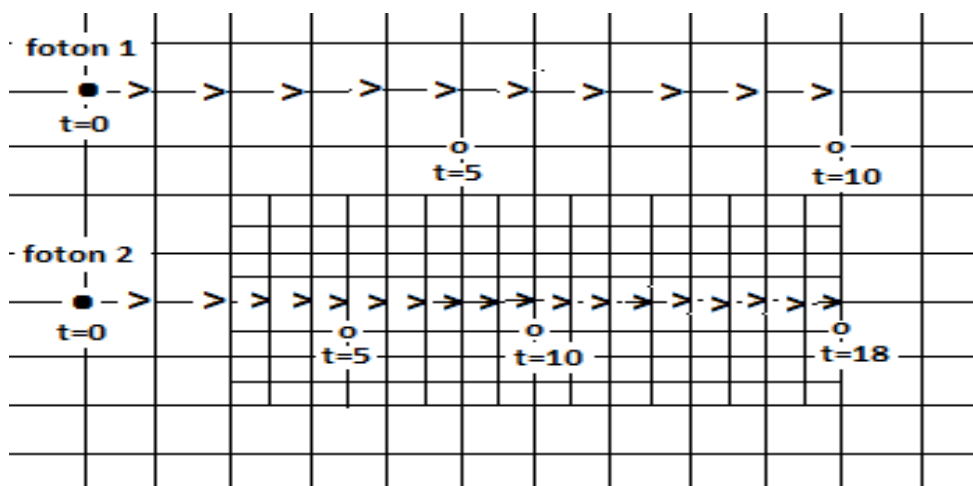
- E = energy of a photon [Joule or  $kg \cdot m^2 \cdot s^{-2}$ ]
- E [eV] = energy of a photon [eV] (1 eV =  $1,602 \times 10^{-19}$  Joule)
- h = Planck's constant:  $6,626 \times 10^{-34}$  [Joule·s]
- c = Speed of light:  $2,998 \times 10^8$  [m·s<sup>-1</sup>]
- Kr = curvature in the center of the photon ( $Kr = \frac{4}{\lambda}$ ) [m<sup>-1</sup>]
- $\lambda$  = wavelength [m]

Conclusion: The energy of a photon can be calculated on basis of its curvature and vice versa.

A photon exists out of two  $\lambda$ -particles and therefore has an elongated form (three dimensional calculations; see figure 9). One can see this in polaroid glasses. The photons come through vertical (or horizontal) slits in the material of the glasses. The angle of the internal  $\lambda$  movement of the approaching photon (which can be 360 degrees, see figure 10) is right-angled to its forward movement in spacetime and makes that the photon comes through the slits of the glasses or not.

The speed of a photon in vacuum is  $299\,792\,458 \text{ ms}^{-1}$ . In a medium like air, water or glass the speed will seem to be slower. This seems to be caused by higher curvatures close to particles the photon meets on its way through these materials. Figure 11 shows photons that have tracks through different curvature fields. Note that the photon 1 on  $t_{10}$  has a different position in spacetime than photon 2 on  $t_{10}$ . To the outside observer photon 1 seems to move faster. When you are traveling on the back of a photon you will not experience a delay, you will travel with constant speed.

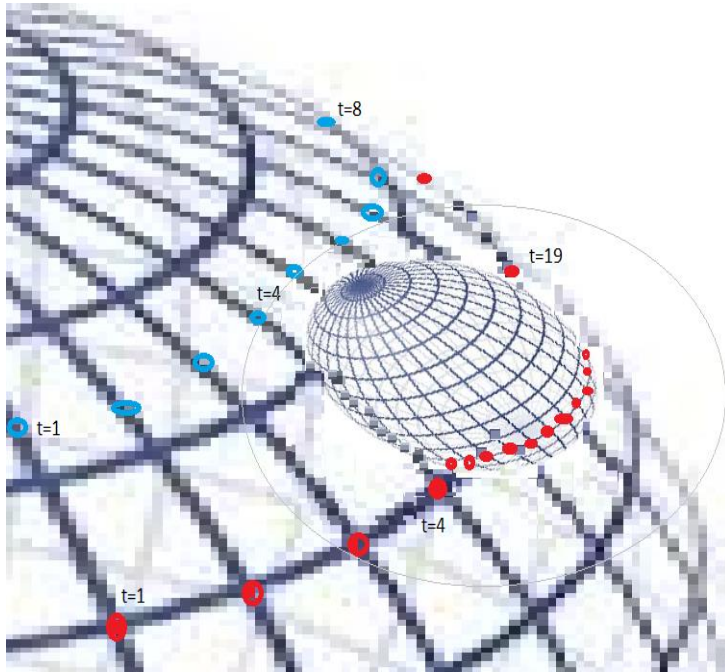
Figure 11: Schematic view of two dimensional plane speed difference of two photons moving through different curvature fields as seen for an outside observer.



In a more realistic way the principle of apparent speed-delay is shown in figure 12. Here we see two photons traveling within the curvatures of a huge object. In this example the blue photon has no significant interaction with curvatures of the smaller object. We can state that the distance of the blue photon to the smaller object is relatively big. The red photon finds the smaller object in its track

and is temporarily caught by the curvatures of this object. The track of the red photon will give the outside observer the impression that the red photon is traveling slower than the blue photon but in fact it is traveling with constant speed.

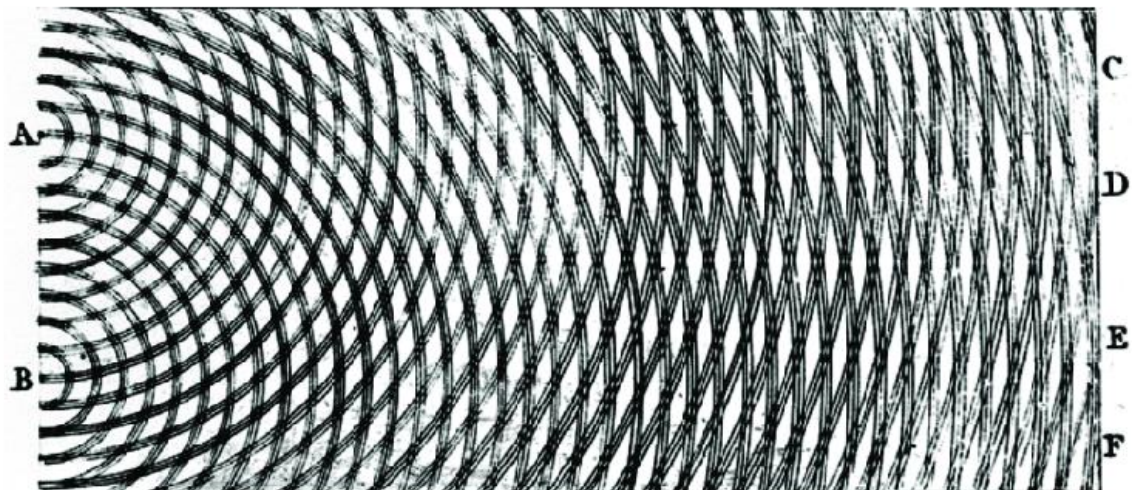
Figure 12: Schematic view of three dimensional plane speed difference of two photons moving through different curvature fields as seen for an outside observer.



## The refraction of light

The law of refraction (not diffraction) of light, which would much later come to be known as Snell's law, was accurately described by the scientist Ibn Sahl at the Baghdad court in 984. In the manuscript 'On Burning Mirrors and Lenses' Sahl used the law to derive lens shapes that focus light with no geometric aberrations. The effects of refraction of light were first carefully observed and characterized by Francesco Maria Grimaldi who also coined the term diffraction, from the Latin *diffringere*, 'to break into pieces', referring to light breaking up into different directions. The results of Grimaldi's observations were published posthumously. Isaac Newton studied these effects and attributed them to inflexion of light rays. James Gregory observed the refraction patterns caused by a bird feather, which was effectively the first refraction grating to be discovered. Thomas Young performed a celebrated experiment demonstrating interference from two closely spaced slits. Explaining his results by interference of the waves emanating from the two different slits he deduced that light must propagate as waves. Augustin-Jean Fresnel did more definitive studies and calculations of refraction and thereby gave great support to the wave theory of light that had been advanced by Christiaan Huygens and reinvigorated by Young, against Newton's particle theory.

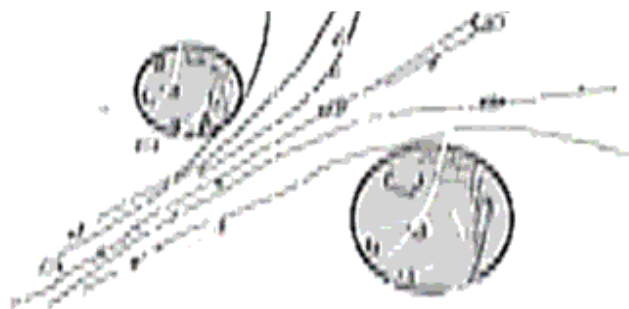
Figure 13: Thomas Young's sketch of two-slit refraction which he presented to the Royal Society in 1803.



Since the introduction of laser light the refraction of light can be observed in a more accurate way.

Figure 14 shows the movement tracks of meteorites in the curvature of planets. Likewise photons will have deflected movement tracks in proximity to an atom. Traditionally in an excited state atoms temporarily have the energy of the photon included in their system and the photoelectric effect often is used to show light acting as a particle (photons). It seems there is a correlation between the mutual interactions of photons and electrons around an atomic nucleus.

Figure 14: The movement tracks of a cloud of meteorites floating between two planets.



When one looks closely at figure 13 one sees that the patterns do not suggest wave patterns. It becomes obvious that the phenomena are caused by scattered light particles due to the influence of curvatures of specific atoms that are present in the material needed to create the used slits. Figure 13 can also be seen as an image of the curvatures that exist at the edges of the slits (A and B). The curvatures are caused by the electrons that surround the atoms of the used material to create the slits. A direct consequence of that is that different materials will give different refraction patterns.

## Electron shells around nuclei

In chemistry and atomic physics an electron shell may be thought of as an orbit filled with electrons that are circling around a nucleus. The closest shell to the nucleus is called the s-shell, followed by the p-shell, then the d-shell, the f-shell and the g-shell and so on further and further from the nucleus.

Each shell consists of one or more subshells and each subshell consists of one or more atomic orbitals. Each subshell is constrained to hold  $4\ell + 2$  electrons at most, namely ( $\ell = 0, 1, 2, 3 \dots$ ):

- Each **s** (sharp) subshell holds at most 2 electrons;
- Each **p** (principal) subshell holds at most 6 electrons;
- Each **d** (diffuse) subshell holds at most 10 electrons;
- Each **f** (fundamental) subshell holds at most 14 electrons;
- Each **g** (next in alphabet after f) subshell holds at most 18 electrons.

Table 1: Shells around specific nuclei

Atomic number (z)	Element	Subshell (electrons in subshell), Madelung energy ordering rule	Amount of subshells according to Madelung [12]	Amount of shells only looking at s, p, d, f
3	Lithium	$1s^2 2s^1$	2	1 (s)
4	Beryllium	$1s^2 2s^2$	2	1 (s)
6	Carbon	$1s^2 2s^2 2p^2$	3	2 (s, p)
11	Sodium	$1s^2 2s^2 2p^6 3s^1$	4	2 (s, p)
12	Magnesium	$1s^2 2s^2 2p^6 3s^2$	4	2 (s, p)
13	Aluminium	$1s^2 2s^2 2p^6 3s^2 3p^1$	5	2 (s, p)
19	Potassium	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^1$	6	2 (s, p)
20	Calcium	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2$	6	2 (s, p)
22	Titanium	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^2$	7	3 (s, p, d)
26	Iron	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^6$	7	3 (s, p, d)
29	Copper	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^9$	7	3 (s, p, d)
30	Zinc	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10}$	7	3 (s, p, d)

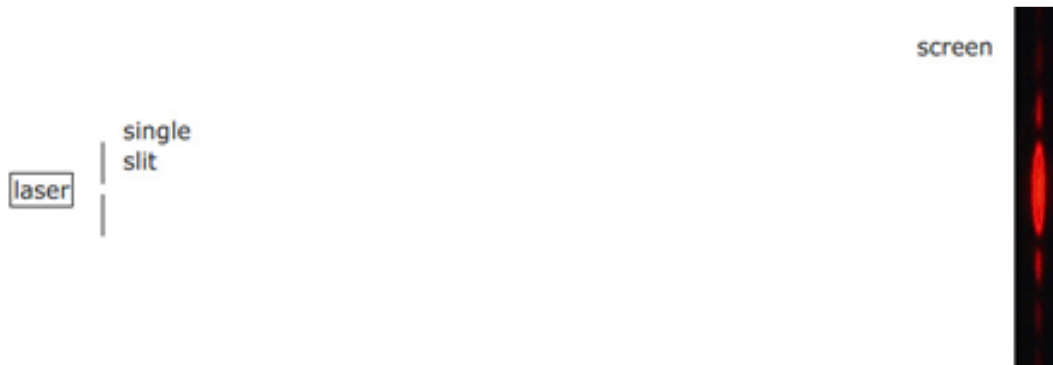
Table 2: Filling orbitals (orb.) according to Madelung energy ordering rule

Filling orbitals (orb.) according to Madelung energy ordering rule [12]															
(N: total amount of electrons, E: element)															
Orb.	$1s^2$	$2s^2$	$2p^6$	$3s^2$	$3p^6$	$4s^2$	$3d^{10}$	$4p^6$	$5s^2$	$4d^{10}$	$5p^6$	$6s^2$	$4f^{14}$	$5d^{10}$	$6p^6$
N	2	4	10	12	18	20	30	36	38	48	54	56	70	80	86
E	He		Ne		Ar			Kr				Xe			Ra
Note that Helium, Neon, Argon, Krypton, Xenon, Radon and Oganesson are noble gases. They all have in common that the p-orbital is completely filled with electrons or in case of Helium completely empty.															

## Light refraction

Figure 15 shows the setup for a refraction experiment using a single slit. Notice the broad central maximum and the equally spaced, successively weaker maxima on either side.

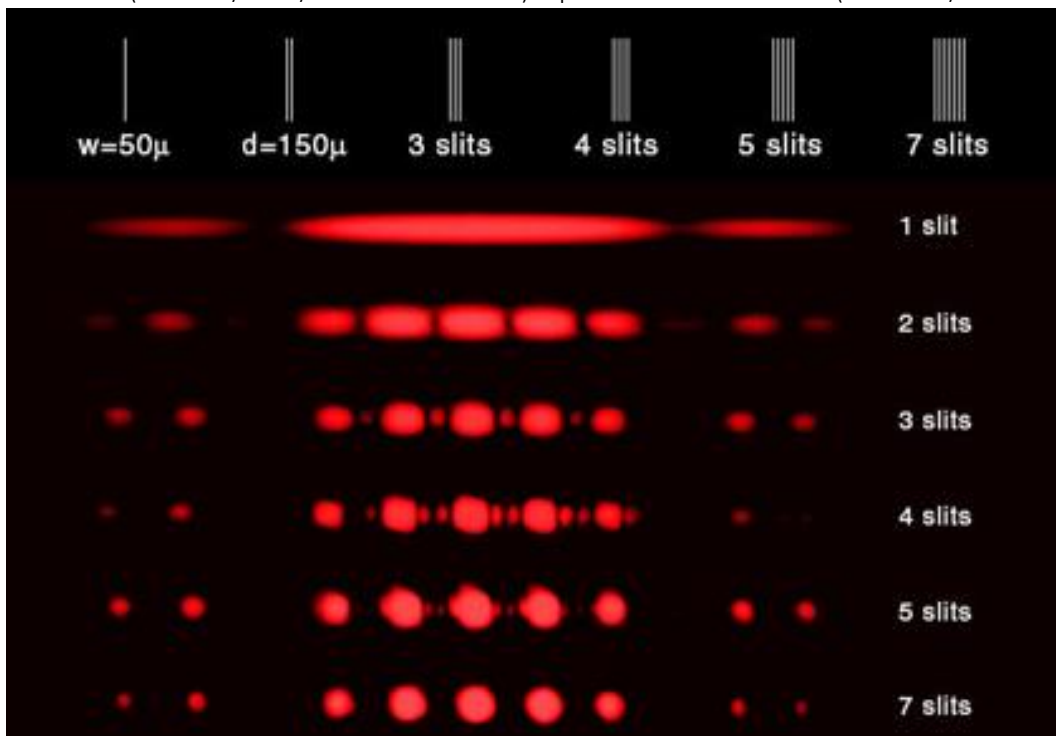
Figure 15: Setup refraction experiment.



In the following figure 16 multiple slits are used.

Figure 16: The effect of multiple slits/aluminium slide.

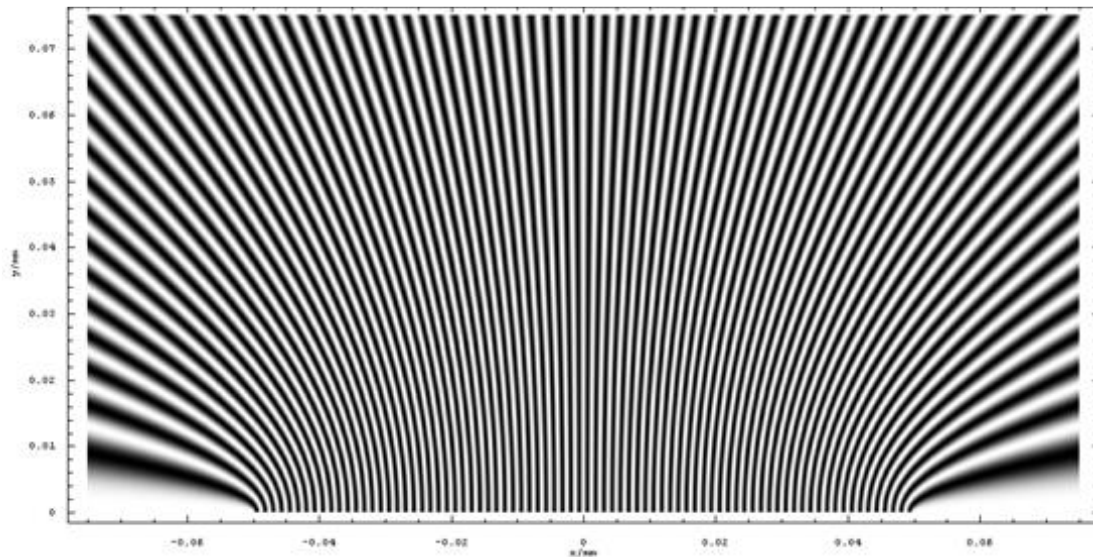
Slit width  $50\mu$  (50 microns/0.0019/2 thousandths of an inch). Separation between the slit  $150\mu$  (150 microns/ 6 thousandths of an inch).



The separation between the slits in the used slide (figure 16) is so narrow that the beams of light will behave as one beam of light (see figure 17) although 7 slits are used.



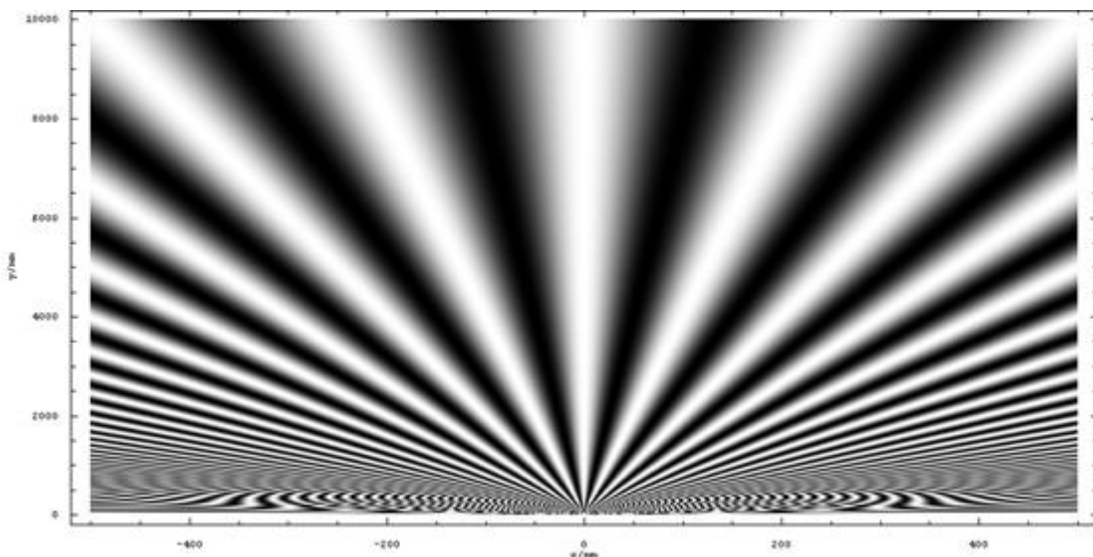
Figure 17: Images of beams of light through a slide with multiple slits.



Every slit gives the same pattern [ (••)n ••••• (••)n]. In this: n=1, 2, 3 ....

The beams leave the slits as is shown in figure 18. Every beam holding the described pattern. The effect of the use of more slits is that the pattern gets more clear (better resolution).

Figure 18: Images of beams of light through a slide with multiple slits.



We recognise (figure 16) 5 dots in the middle and on the left and on the right there is a repeating pattern of 2 dots. Another characterising of the same image is: 1 dot in the middle and on the left and right side a repeating pattern of 2 dots.

Figure 19: Images the pattern caused by monochrome light through a slide with multiple slits.



The pattern is caused by the bending of photons in a discrete pattern caused by the curvature of electrons that circle in discrete orbitals around nuclei on the edge of the used slits.

This means that the material of the slides (creating the slits) is responsible for the found pattern. The slides consist of aluminium.

In table 1 can be found that aluminium has two kinds of orbitals (s and p). These orbitals are responsible for the bending of the photons in the monochrome light beam.

Explanation refraction pattern (figure 19):

- The one dot in the middle is caused by the photons that are attracted equally from both sides of the slit. These photons will go straight forward and hit the screen in the middle (if the slits are broad the central dot will become more dominant);
- The first dot on the left side -of the middle of the screen- is caused by photons that are bended by the s-orbital\* of the aluminium nucleus on the left side of each different slit;
- The second dot on the left side -of the middle of the screen- is caused by photons that are bended by the p-orbital\* of the aluminium nucleus on the left side of each different slit;
- The first dot on the right side -of the middle of the screen- is caused by photons that are bended by the s-orbital\* of the aluminium nucleus on the right side of each different slit;
- The second dot on the right side -of the middle of the screen- is caused by photons that are bended by the p-orbital\* of the aluminium nucleus on the right side of each different slit;
- The repeating pattern (2 dots, both left and right) is caused by cumulating curvatures of present aluminium nuclei. The cumulating curvature of the s-orbitals\* are responsible for the repeating inner dots. The cumulating curvature of the p-orbitals\* are responsible for the repeating outer dots. This pattern will fade out while further removed from the centre of the screen.

\*The choice for s- or p-orbital is an assumption.



### Conclusions:

1. With the introduction of laser light the refraction of light can be shown in an accurate way.
2. One can recognise a clear pattern through the use of a monochrome light beam.
3. The pattern is caused by the bending of photons in a discrete pattern caused by the curvature of electrons that circle in discrete orbitals around nuclei on the edge of the used slits.
4. The found patterns do not suggest a wave pattern.
5. The found patterns are caused by scattered light particles due to the influence of curvatures of specific atoms that are present in the material needed to create the used slits.
6. The use of a material like titanium, iron, copper or zinc will lead to the following refraction pattern:

[ (•••)n ••• ••• (•••)n]. In this: n=1, 2, 3 ....

### **Cosmological consequences of the photon as a two- $\lambda$ -system**

It is clear that a moving 2- $\lambda$ -particle – under the influence of a nearby object with an extreme curvature – will have a deflected track. This is in fact what is observed (see figure 1). If a photon on its track is influenced by curvatures caused by other particles, the photon will be brought out of balance. This means that the movement tracks in time of the internal two  $\lambda$ s will become centrifugal spiral shaped, i.e. the enlargement of the radius of its internal circular movement. Under the influence of extreme curvatures the photon will undergo a wavelength shift. We call this “the aging of the photon”. Because both  $\lambda$ -particles experience an enormous curvature via each other within the photon this is an extremely slow process for the observer. But during a trip through spacetime lasting many light-years (e.g. 10 billion light-years) the effect can be seen by the observer.

The redshift at a certain moment in time is given through the following formula:

$$\lambda_{observer} = \lambda_{standard} + Constant \times S \quad (6)$$

In the formula  $\lambda_{observer}$  is the wavelength of the photon [nm] at the position of the observer,  $\lambda_{standard}$  is the wavelength of the photon [nm] on its place of birth, the Constant is a space-constant that is due to the fluctuating curvatures that the photon will meet on its way through spacetime, S is the traveling distance of the photon in spacetime between the place of birth and the position of the observer [m].

To date, the observed cosmic redshift in the universe has been explained mostly through the hypothetical expansion of the universe. The redshift is explained as a Doppler effect but it seems that the cosmic redshift is the result of the aging of the photon. This effect takes place when photons have traveled extreme distances (e.g. 10 billion light years) in spacetime. As mentioned before, the

aging of the photons is caused by the proximity of curvatures which the photon encounters in transit. As previously stated, these curvatures are present everywhere in the universe as  $\lambda$ s. The observed redshift is in fact a gravitational redshift. A direct conclusion could be that there is no such thing as an expansion of the universe. The observations of a seemingly accelerated expanding universe can be explained by the aging of the photon and thus there are doubts concerning the validity of the hypothesis of dark energy being responsible for the expanding of the universe at an accelerating rate.

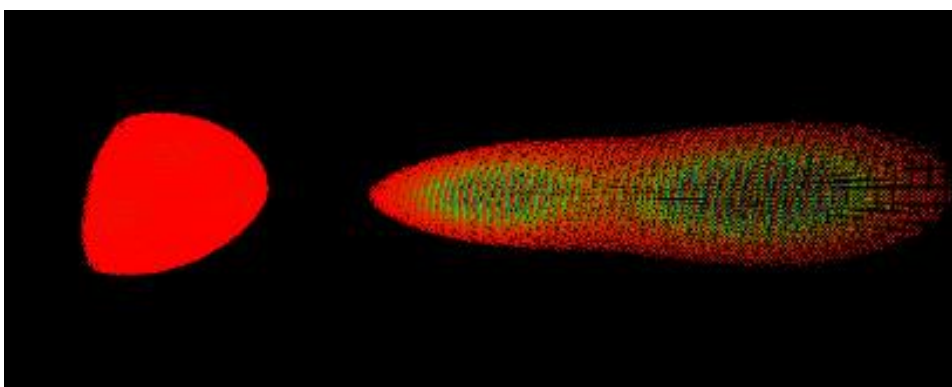
It is important to note that the large amounts of  $\lambda$ s are responsible for the observed presence of dark energy and dark matter. The  $\lambda$ s are in fact the sought after dark matter. This can explain the deviating speeds of galaxies. The movements in space can be explained in a Newtonian way. The by Einstein suggested cosmological constant in the theory of relativity is in fact a resumptive description of the presence of  $\lambda$ s. Einstein later on rejected his own suggestion on the basis of "Hubbles Law". It seems that his suggestion indeed was right.

The  $\lambda$  plays a crucial role in the explanation of fluctuations in the spectrum of cosmic background radiation. The matter responsible has never before been observed. We believe that some types of the cosmic background are formed through the mutual interactions of the 1-  $\lambda$ -particles. This sometimes causes photons of completely different wavelengths to be formed, which together cause the pattern of cosmic background radiation.

## Black holes

Under the influence of extreme curvatures in space the aging of a photon can accelerate greatly. This is observable near black holes (see figure 20). The closer the track of a photon to a black hole, the greater the aging. In fact, close to an event horizon (Schwartzschild scale) of a black hole the aging (gravitational redshift) is approaching infinity.

Figure 20: Three dimensional calculated view of the curvatures of a photon under the influence of an externally large curvature.



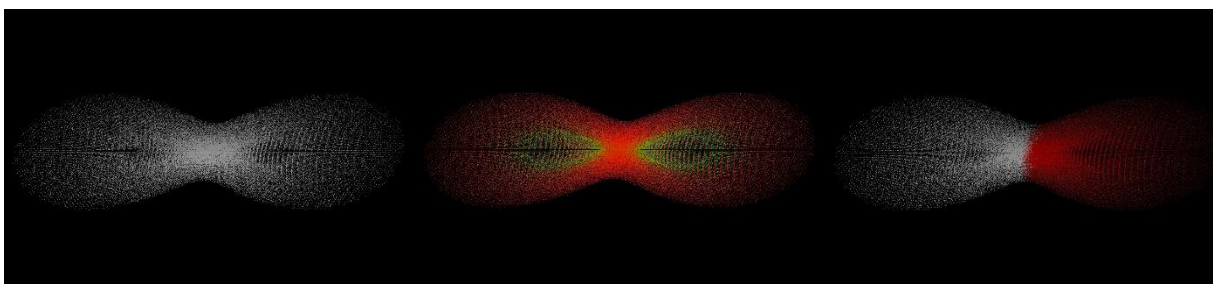
In our universe there is a limit to density of  $\lambda$ s, culminating in a black hole when the density gets beyond a boundary because of the relative high quantity of  $\lambda$ -particles. The curvature of the black hole depends on the size of the black hole and is a result of its internal  $\lambda$  quantity. Also here the Pauli principle will not be violated since the  $\lambda$ -particle will never get in the same position as another  $\lambda$ -particle. They can get close in a circling way while under the influence of each other's curvature. We can say that what appears to be instantaneous and linear in time and space for particles involved will appear to be a slow process for an outside observer. This means that within a black hole time will operate at a different level. The increasing curvature in the black hole system makes that time slows down for the outside observer.

In our universe photons have a certain range for  $\lambda$  (range approximately 1000 nm up to  $1 \times 10^{-3}$  nm). They are part of the electromagnetic spectrum where  $\lambda$  can have any value between zero and infinity. In our universe  $\lambda$  cannot be higher than the size of our universe. It might be that in a black hole (underneath the event horizon) the particles sequence of our universe repeats itself within a range of  $\lambda$  that is much smaller than the  $\lambda$  we can detect on earth. Theoretically  $\lambda$  in this black hole cannot be bigger than the size of this black hole.

Imagine that if the  $\lambda$  range of the electromagnetic spectrum is not infinite in our universe, our universe is not infinite in spacetime and our universe may be a black hole for an observer above our universe. This observer is living in a universe where all the particles operate within a range that is much larger than ours. For this observer things on earth move rather slow. This observer could also tell if the black hole that our universe is would have a spin and the observer might observe that because of that spin there is a favorable direction in which  $\lambda$ s move, what might be the underlying cause for our universe to exist dominantly out of "right handed" particles (for example electrons instead of positrons).

## Electrons

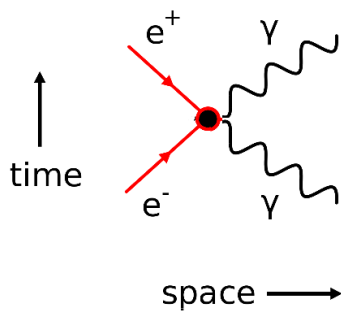
Figure 21: Three dimensional calculated views of the curvatures of an electron/positron. Respectively; greyscale is depth, curvature range where red represents relative low curvature while blue represents relative high curvature, individual curvature range for each  $\lambda$ .



When a photon with a speed of approximately  $299\,792\,458\text{ ms}^{-1}$  moves through spacetime, the internal movement tracks of the 1- $\lambda$ s are right-angled to this movement. If a change of direction of this movement in respect to its internal  $\lambda$  movement takes place, this speed will be put in the spin of the photon. The hypothesis is that this photon with an extra internal spin is an electron.

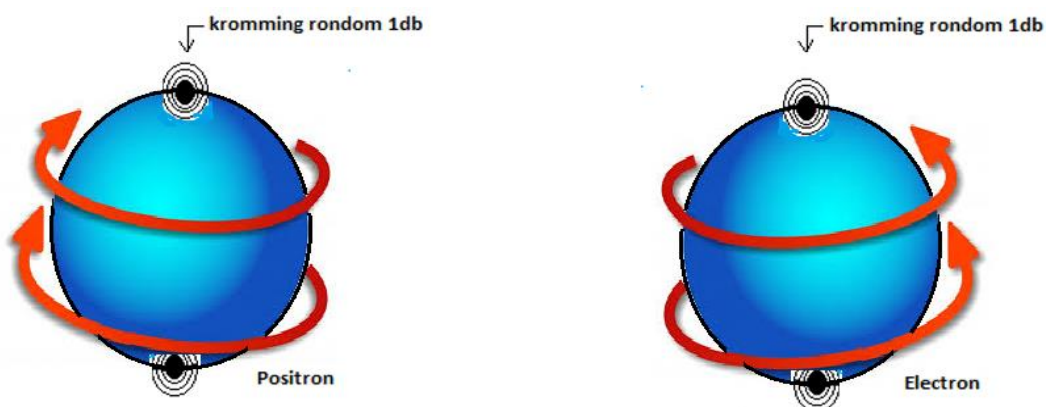
Observations have shown that a positron and an electron are annihilated which causes two gamma-photons to be released. This is depicted in the Feynman diagram below (figure 22).

Figure 22: Feynman diagram annihilation positron and electron.



At a confrontation between an electron and a positron a true annihilation does not take place. However, an “extinguishing” of both spins does take place in which the 2- $\lambda$ -particles start to behave like gamma-photons. So this still refers to the same 2- $\lambda$ -particles. The Feynman diagram can also be read in reverse. Two gamma-photons together form a positron and an electron. Each of the photons is made up of two  $\lambda$ -particles with only a rotation around the y-axis (see figure 10). The electron is a 2- $\lambda$ -particle with an extra spin (towards the photon) around the x-axis (clockwise). The positron is also a 2- $\lambda$ -particle with an extra spin around the x-axis, but counter-clockwise. This is depicted in figure 23. The photon is easy to imagine as a plate. The electron (or positron) can be imagined as a sphere.

Figure 23: Schematic depiction electron and positron.



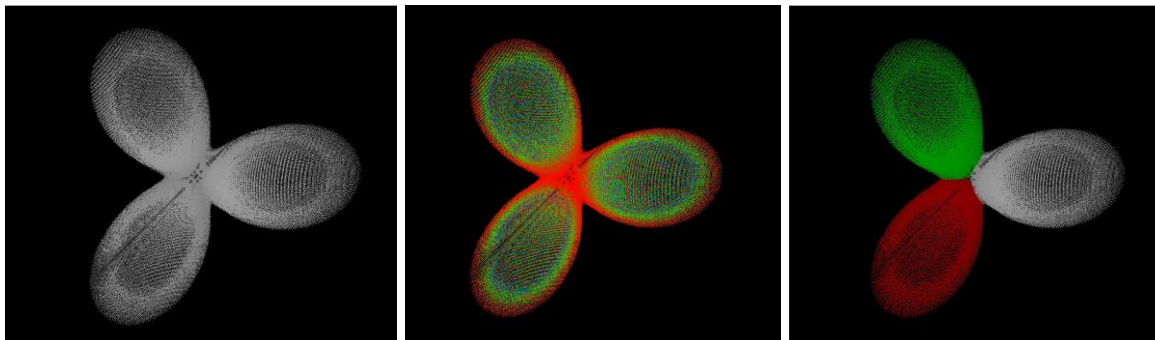
(kromming rondom 1db = curvature around 1db)

## Quarks, protons and neutrons

Literature describes quarks as constituent particles. The quarks can occur in various ways. In a proton or a neutron one can see multiple quarks that are oriented up or down. A proton is known to consist of three quarks, two of which are up (2 Qu) and one down (1 Qd).

In our view a quark is an interaction between three 1- $\lambda$ s. A calculation of curvatures as seen by the outside observer is shown in figure 24.

Figure 24: Three dimensional calculations of the curvatures of a quark.



24a. Quark (greyscale).

24b. Quark (blue is high curvature, red is low curvature).

24c. Quark (each  $\lambda$  its own color).

Three dimensional calculated snapshots of the internal  $\lambda$  movement of a quark in spacetime can be seen in figure 25.

Figure 25: Three dimensional calculations of the internal movement tracks of  $\lambda$ s inside a quark.

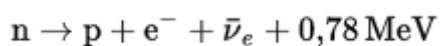


25a. Quark, time = 1 .

25b. Quark, time = 2.

25c. Quark, time = 3.

A neutron is unstable and rapidly dissociates into an electron, a proton and an electron-anti-neutrino.



From this comparison is inferred that a neutron loses a quark during its disassociation into a proton. The withdrawing quark (that consists of three  $\lambda$ s) is very unstable and will immediately disassociate

into an electron ( $2\text{-}\mu$ ) and an anti-neutrino ( $1\text{-}\mu$ ). The anti-neutrino is in fact a  $1\text{-}\mu$ -particle that leaves the system of three ( $3\text{-}\mu$ /quark) and in an ultra-short time displays an extra curvature in its immediate surroundings. This is observed as the anti-neutrino. The electron proves observable while the proton also forms.

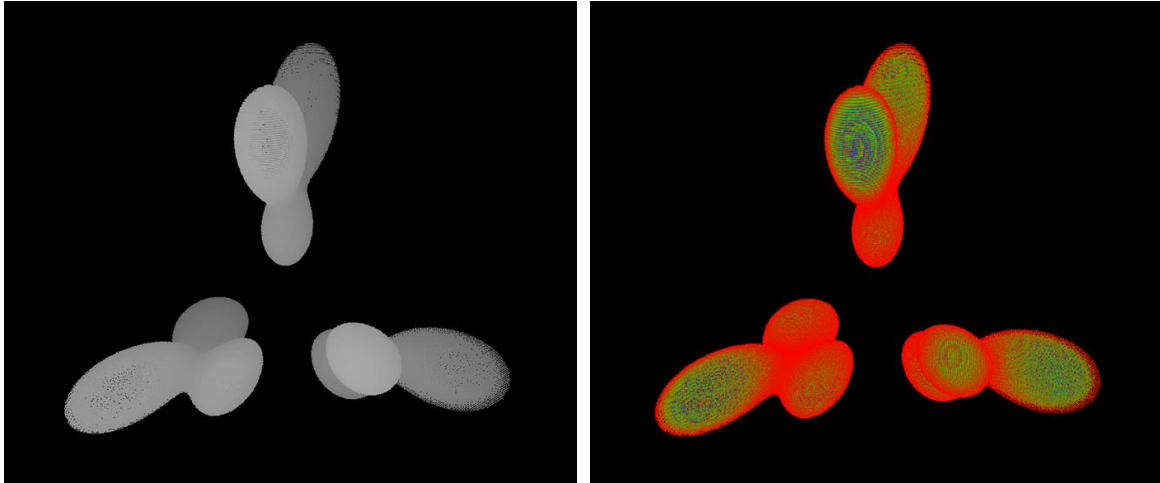
We conclude from this that a neutron consists of a foursome of quarks. Of these, two quarks are up and two quarks are down. This also explains the fact that, different from the proton, the neutron does not show a positively oriented field. The disassociation into a proton takes place during the expelling of a down quark. This will be further explained shortly.

Chadwick won the Nobel prize for experiments he performed that showed that neutron radiation consists out of uncharged particles with about the same mass as protons. This is an important reason that in the current insights the axiom is that both protons and neutrons consist of a threesome of quarks. It is important to understand that following Einstein's ideas there is no such thing as mass. Mass is only a resultant power in the specific situation that appears on earth. Newton has described this specific situation with his laws in an outstanding way. In Newtonian mechanics, mass is a combination of the gravitational force and the centripetal force. The centrifugal force is an inertial force (also called a 'fictitious' or 'pseudo' force) directed away from the axis of rotation that appears to act on all objects when rotating. All measurements of position and velocity must be made relative to some frame of reference.

The orbit of a neutron around planet earth appears to be the same as the orbit of a proton around planet earth because they have an almost similar curvature. In their orbit they are hit likewise by particles ( $1\text{-}\mu$ s and other). Collisions with other particles will slow down the speed of the neutron or the proton. Every collision reduces the speed of the neutron or the proton in their orbit around planet earth. Every collision will bring the object in a lower orbit around planet earth. The process stops when the neutron or the proton hits the surface of earth. This process we call "falling". On the surface of earth the neutron or the proton will have the same speed as the surface of earth and they will stay in the corresponding orbit.

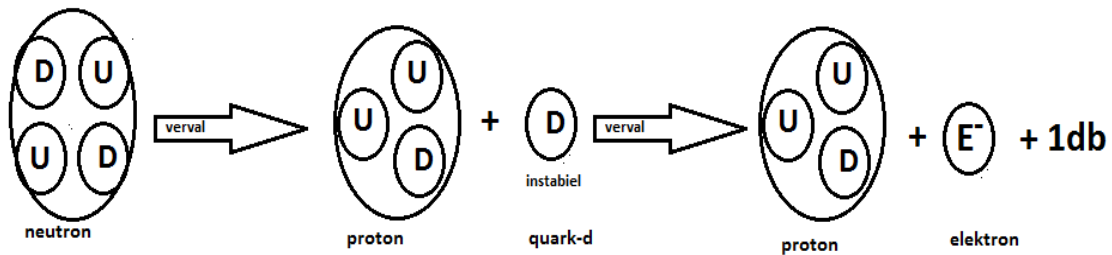
Thus a neutron consists of two up-quarks and two down-quarks (Qu, Qd, Qu, Qd). A calculation of the curvatures within a neutron is shown in figure 29. A proton consists of two up-quarks and one down-quark (Qu, Qu, Qd). A calculation of the curvatures within a proton is shown in figure 26.

Figure 26: Three dimensional calculated view of the curvatures of a proton as seen for an outside observer.



Concluding: During the disassociation into a proton the following happens:

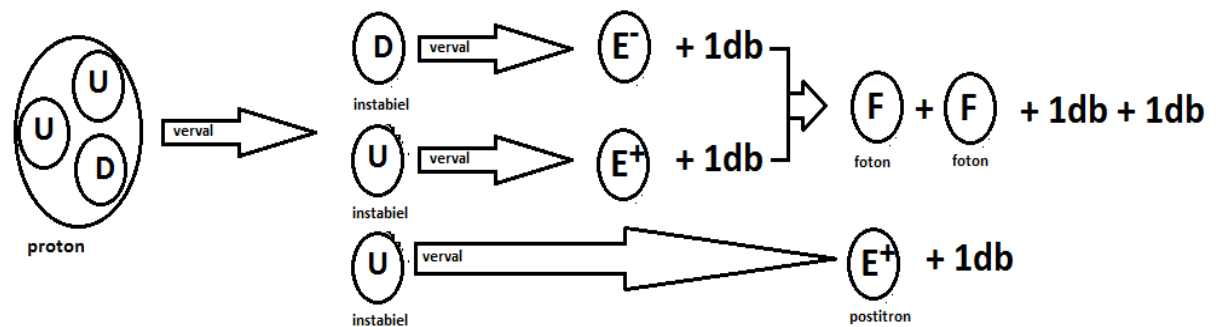
Figure 27: Disassociation neutron into a proton, electron and 1  $\lambda$ .



(verval = decay, instabil = unstable)

In principle the proton is very stable. Yet it can be said that during the disassociation of a proton this will take place as follows:

Figure 28: Disassociation proton into a positron, 2 gamma-photons and 3x1  $\lambda$ .



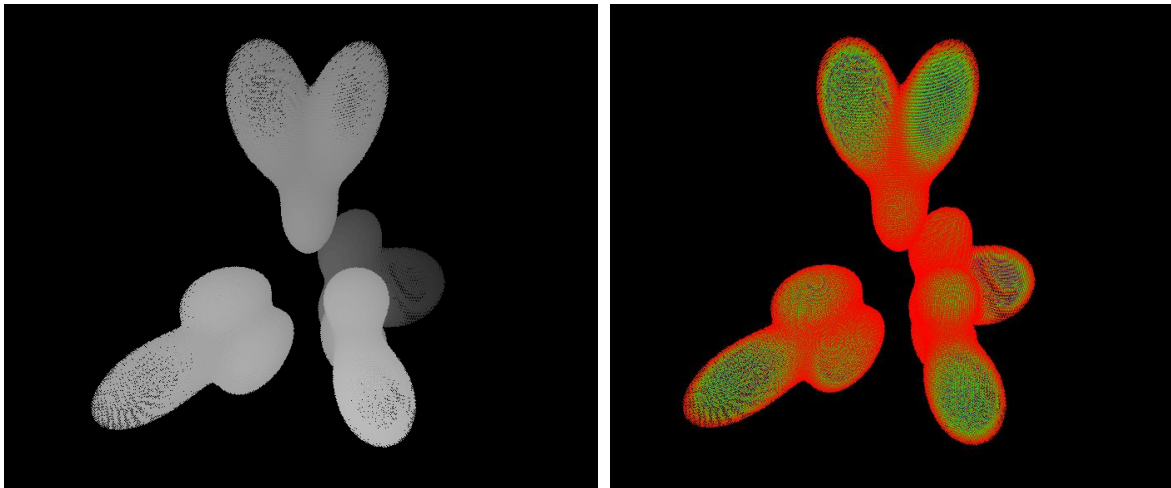
(verval = decay, instabil = unstable)

At a disassociation the proton will result in a positron, two gamma-photons and three  $1-\mu$ -particles.

In an ultra-short time these  $1-\mu$ -particles will display an extra curvature in the immediate surroundings. These are observed as anti-neutrinos.

The described disassociation can in fact be observed by physicists. This provides our theory with evidence within the current observations.

Figure 29: Three dimensional calculated view of the curvatures of a neutron as seen for an outside observer.



## Hawking radiation

### Current insights on Hawking radiation

On Wikipedia the following can be found about Hawking radiation:

*Hawking radiation is blackbody radiation that is predicted to be released by black holes, due to quantum effects near the event horizon. It is named after the physicist Stephen Hawking, who provided a theoretical argument for its existence in 1974, and sometimes also after Jacob Bekenstein, who predicted that black holes should have a finite, non-zero temperature and entropy.*

*Hawking's work followed his visit to Moscow in 1973 where the Soviet scientists Yakov Zeldovich and Alexei Starobinsky showed him that, according to the quantum mechanical uncertainty principle, rotating black holes should create and emit particles. Hawking radiation reduces the mass and energy of black holes and is therefore also known as black hole evaporation. Because of this, black holes that do not gain mass through other means are expected to shrink and ultimately vanish. Micro black holes are predicted to be larger net emitters of radiation than larger black holes and should shrink and dissipate faster.*



In June 2008, NASA launched the Fermi space telescope, which is searching for the terminal gamma-ray flashes expected from evaporating primordial black holes. NASA designed on 9 August 2007 the mission with a five-year lifetime, with a goal of ten years of operations. One of the key scientific objectives of the Fermi mission is: *“Search for evaporating primordial micro black holes (MBH) from their presumed gamma burst signatures [Hawking Radiation component].”*

Although Hawking radiation is not seriously questioned a steady evidence is not found by NASA or others.

### Consideration 1

A photon consists of two  $\lambda$ -particles that are moving in each other's curvature (figure 10) and traveling through spacetime. A photon is influenced on its track by curvatures caused by other particles. Hereby the photon will be brought out of balance. Under the influence of extreme curvatures in space, the aging of a photon can accelerate greatly. This is observable near black holes. The closer the track of a photon to a black hole, the greater the aging. In fact, close to an event horizon of a black hole, the aging (gravitational redshift) is approaching infinity. In this process the photon will undergo spaghettification caused by extreme tidal forces. At a certain point the photon can no longer escape and is being captured by the black hole.

One can imagine that in the process of spaghettification there is a situation that the absorption is not yet an accomplished fact. In the “slow” process (for the outside observer) the 1-  $\lambda$ -particles within the photon are being separated as a wire. They are still entangled but the entanglement gets weaker. It is thinkable that at this moment one of the particles is being captured and the other escapes from the event horizon. This will give a 1-  $\lambda$ -radiation which cannot be seen with the traditional methods. This radiation is not caused by vaporisation of a black hole but is due to the devastating tidal forces of the black hole.

### Sonic black hole in the laboratory

Jeff Steinhauer (Technion-Israel of Technology) claims to have created a sonic black hole to observe Hawking radiation and its quantum weirdness, all within the safe confines of his laboratory.

To recreate the effects of an event horizon Steinhauer used a laser to trap atoms in place on one side of the condensate and a second laser to create a step potential on the other side. The step potential acts like a waterfall, once atoms go over the limit they quickly speed up, travelling faster than the

speed of sound and are considered as being inside the event horizon. Atoms that don't make it over the step potential move at subsonic speeds and are interpreted as being outside of the event horizon. The speed of flow in the superfluid mimics the gravitational pull of black holes.

Photons -particles of vibrational energy- escape (according to current insights) analogous to Hawking radiation.

Steinhauer's results are published in Nature Physics and show that (according to current insights) Hawking radiation is entangled. He measured the correlation function - a measure of how the properties of two particles in different positions are related - and found a high correlation for high-energy photons but low correlation for low-energy photons.

Photons equidistant from the event horizon were correlated and had equal and opposite energy, Steinhauer explained (this is analogous to Positron Emission Tomography, red.).

Particles are -according to Steinhauer- created out of nothing. According to Steinhauer it doesn't violate the principle of physics however, as the total energy balances out to zero.

"The entanglement verifies the quantum nature of the Hawking radiation," the Steinhauer paper said. The next step, Steinhauer hopes, is to use artificial black holes to tackle larger problems like the information paradox or maybe even quantum gravity.

### Consideration 2

In his experiment Steinhauer traps atoms and brings these atoms in an agitated state. Among these atoms there are neutrons. These neutrons can undergo the process as shown in figure 27 and figure 28. Seen from our perspective the complete decay of a neutron -through a proton- will end up in four photons  $[\gamma; \gamma]$ . There are two different pairs of photons. The pairs differ in characteristics. One pair of photons will be created instantly in the decay of a proton. This pair will be highly energized and highly entangled. The other pair is created when the electron that is created in the first step ( $n \rightarrow e^- + 1 \mu + p$ ) finds the positron. The positron is created in the second step ( $p \rightarrow 2 \gamma + 3 \mu + e^+$ ). This photon pair will be less energized and less entangled.

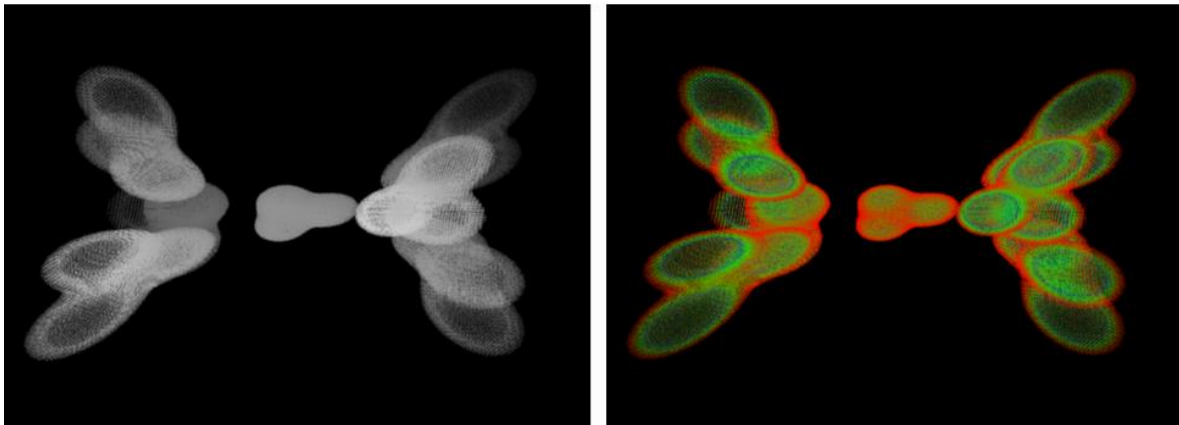
Our conclusion meets the observation of Steinhauer.

## More complex particles

In more complex particles, the mutual interactions will become more and more complicated. These particles – rationalized from the basis – can be mathematically determined and simulated. Within these simulations we expect that the previously mentioned entanglements of particles can be explained. The entanglement is possible because particles (whether constituent or not) can be under the influence of each other's curvatures. This phenomenon can take place at very large distances. Such a situation will – caused by the relatively weak curvature – be unstable and experience a rapid disassociation. Because the entanglement is caused by curvatures, changes that one of the “partner-particles” experiences will instantaneously be experienced by the other “partner-particle”. Thus, there is an underlying, understandable reason for the observed transmission (no playing dice).

The principle of Einsteinian bending of spacetime is found within particles. When curvatures get extreme because of short distances within particles the outside observer will find that elements of the particle seem to come to a full stop. This seems the case for the outside observer but the inner particles (  $\mu$ s, quarks, protons, neutrons) are still racing through spacetime with enormous speed.

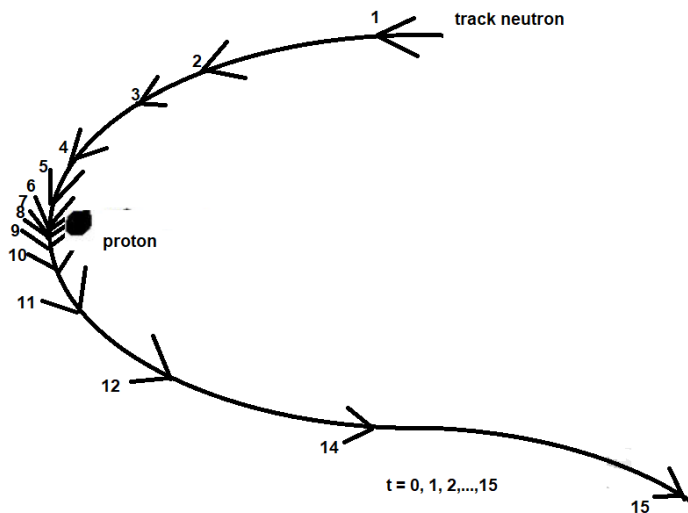
Figure 30: Three dimensional calculated view of the curvatures of a deuterium core as seen for an outside observer.



The core of a deuterium atom exists only out of one proton and one neutron. In figure 30 the curvatures of a deuterium core are shown. To the left the proton, to the middle/right the neutron. Remarkable is that the quark in the middle seems to be smaller than the surrounding quarks, this is the effect of a locally enlarged curvature of spacetime. The proton and the neutron within their own complex movement tend to the configuration as shown in figure 30. The timing within the described process is depicted in figure 31. In figure 31 the proton is held statically. The observer is theoretically situated on the proton. The proton and the neutron tend to circle in each other's curvature as shown in figure 31. In a Newtonian way they will approach each other as shown and then remove from one another. We can say that what appears to be instantaneous and linear in time and space for the

proton and the neutron will appear to be a slow process for an outside observer. When the distance between the proton and the neutron becomes more narrow the movements seems to slow down for the outside observer. Movements seem to speed up again when the distance between the proton and the neutron gets bigger. The nearest point appears to be an “anchor” for the outside observer. Speed seems to come here to a full stop because of extreme curvatures. The half-life of the deuterium is unknown. The deuterium core appears to be stable but it is all a matter of perspective.

Figure 31: Schematic view of the trajectory of a neutron to a proton.



## Positron Emission Tomography (PET) seen in a new light

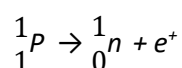
Positron Emission Tomography (PET) uses the principle of the so called annihilation of positrons with electrons while gamma-photons  $[\gamma, \gamma]$  are released. These gamma-photons  $[\gamma, \gamma]$  can be detected with a scanner giving information about location and appearance of specific organs.

The necessary positrons can be given by radioactive decay of certain atoms like Carbon-11 and Oxygen-15.

### Current insights

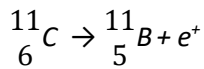
The case Study “Positron Emission Tomography (Last updated 11:48, 12<sup>th</sup> June 2016)” gives the following description:

*The emission of a positron is represented by:*



*(with a small but important correction by red.)*

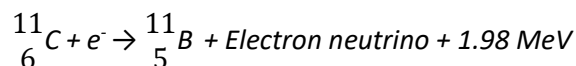
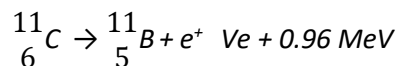
This shows that the positron (represented here by  $e^+$ ) speeds out of the nucleus while the neutron stays inside the nucleus. Consider the following nuclear reaction that is common in PET scans of the brain where carbon-11 is used as the tracer molecule.



Notice that in this example of positron emission, the nuclide changes into a different element and as it gives off a positron particle, the atomic number is lowered by one, but the mass of the new element stays the same as the carbon that has decayed.

Wikipedia on this subject:

*Carbon-11 or  $C^{11}$  is a radioactive isotope of carbon that decays to boron-11. This decay mainly occurs due to positron emission; however, around 0.19–0.23% of the time, it is a result of electron capture. It has a half-life of 20 minutes.*



*Carbon-11 is commonly used as a radioisotope for the radioactive labeling of molecules in positron emission tomography. Among the many molecules used in this context is the radioligand [ ${}^{11}\text{C}$ ]DASB (labeled with carbon-11).*

### Decay of protons

Positron Emission Tomography (PET) uses –as assumed in the published articles (Case Study: Positron Emission Tomography (Last updated 11:48, 12<sup>th</sup> June 2016))– the transition of protons to neutrons.

On Wikipedia one can find that there is currently no experimental evidence that proton decay occurs when a proton is on its own, while for a neutron one can find that the decay of the free neutron is possible.

Wikipedia:  $n^0 \rightarrow p^+ + e^- + \nu_e$

$\nu_e$  in the formula is a little more or less 0.78 MeV ( $1,25 \cdot 10^{-13}$  Joule),  $1 \text{ eV} \approx 1,60 \cdot 10^{-19}$  Joule.

There are claims of the transition of protons to neutrons within the decay of more complex particles. In many cases there is a relation with Positron Emission Tomography. Relevant in this case is the decay of  $C^{11}$  and  $O^{15}$ .

### Consideration

According to our theory the transition of a solitary proton to a neutron is complex and not to be expected. Following our equation the organization of matter needed in a reverse reaction by which a proton changes into a neutron does not lead to the forming of gamma-photons [3,3].

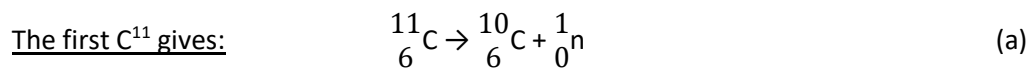
The equations are given in figure 27 and figure 28 in the chapter 'Quarks, protons and neutrons'. According to the theory only the decay of a proton can lead instantly to the appearance of gamma-photons [3,3].

The theory suggests different mechanisms for Positron Emission Tomography (PET). First an explanation for the decay of Carbon-11 is given, then an explanation for the decay of Oxygen-15 is given.

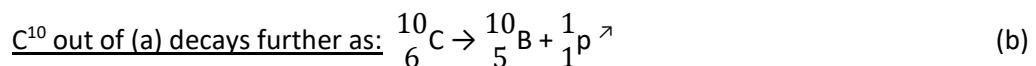
### Carbon-11

Carbon-11 is an isotope of carbon, frequently used in positron emission tomography, or PET imaging. It has 6 protons, 5 neutrons, and 6 electrons. It has a half-life of 20 minutes.

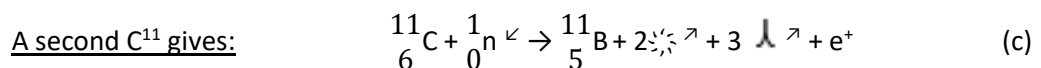
### Decay $C^{11}$ (2 atoms)



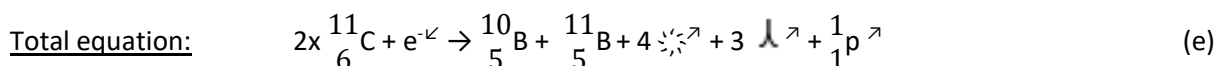
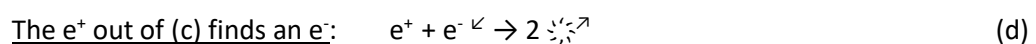
$C^{10}$  is not stable/half-life 20 sec\*,  ${}_{0}^{1}n$  is used in (c).



$B^{10}$  is stable\*, possibility: [ $p \rightarrow 2 \gamma + 3 \mu + e^+$ ], in that case the proton will not be seen, the  $e^+$  will follow (d).



In (c): [ $p \rightarrow 2 \gamma + 3 \mu + e^+$ ],  ${}_{0}^{1}n$  is delivered by (a),  $B^{11}$  is stable\*.

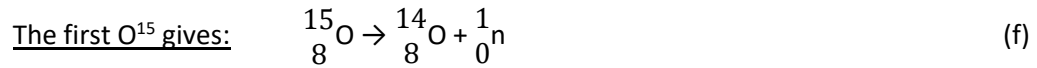


Possibility: [ $p \rightarrow 2 \gamma + 3 \mu + e^+$ ], in that case the proton will not be seen, the  $e^+$  will follow (d).

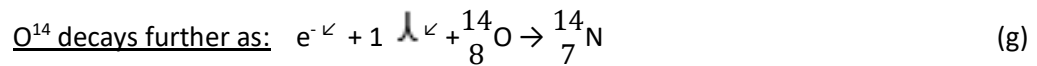
## Oxygen-15

Oxygen-15 is an isotope of oxygen and is also frequently used in positron emission tomography, or PET imaging. It has 8 protons, 7 neutrons, and 8 electrons. It has a half-life of 122 seconds.

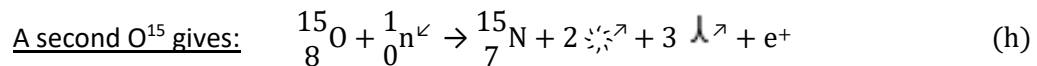
### Decay O<sup>15</sup> (2 atoms)



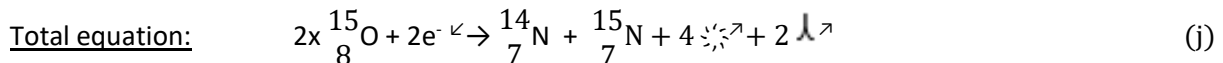
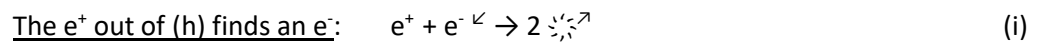
O<sup>14</sup> is not stable/half-life 70 sec\*,  ${}^1_0\text{n}$  is used in (h).



In (g) [ $\text{e}^{-} + 1 \text{ } \lambda + \text{p} \rightarrow \text{n}$ ], N<sup>14</sup> is stable\*.



In (h): [ $\text{p} \rightarrow 2 \text{ } \gamma + 3 \text{ } \lambda + \text{e}^{+}$ ],  ${}^1_0\text{n}$  is delivered by (f), N<sup>15</sup> is stable\*.



The given half-lives\* are taken from: <http://periodictable.com/Isotopes/007.15/index2.p.full.prod.html> .

## **Magnetic field lines in relation to curvatures**

Magnets and magnetism are known for centuries. The study of magnetic fields seems to have begun in 1269 when French scholar Petrus Peregrinus de Maricourt mapped out the magnetic field on the surface of a spherical magnet using iron needles [note]. He also clearly articulated the principle that magnets always have both a north and a south pole. Although magnetic fields are well known and well-studied there is no explanation for the existence of field lines.

In the chapter "The refraction of light" we have tried to explain that the found patterns -that can be found through the refraction of light- are caused by scattered light particles due to the influence of curvatures of specific atoms that are present in the material needed to create the used slits. The pattern is caused by the bending of photons in a discrete pattern caused by the curvature of electrons that circle in discrete orbitals around nuclei on the edge of the used slits. This means that the material of the slides (creating the slits) is responsible for the found pattern. Since the introduction of laser light the refraction of light can be observed in a more accurate way.

When we look closely we see that the patterns do not suggest wave patterns. It becomes obvious that the phenomena are caused by scattered light particles due to the influence of curvatures of specific atoms that are present in the material needed to create the used slits. The curvatures are caused by the electrons that surround the atoms of the used material to create the slits. A direct consequence of the described idea is that different materials will give a different refraction pattern. This seems the case indeed. The electron shells around nuclei are responsible for the refraction of light.

Field lines can be made clear when using iron filings randomly dropped on paper that is covering a magnet. When one shakes the paper in a gentle way the field pattern will occur. The pattern is caused by the bending of the movement tracks of  $1-\lambda$ -particles in a discrete pattern around the magnet. This is caused by the curvature of electrons that circle in discrete orbitals around the nuclei of the used (electro)magnet. Due to the influence of curvatures of specific atoms that are present in the material needed to create the magnet the field lines are created. This phenomena is analogue to patterns we see in the refraction of light.

Note: His Epistola Petri Peregrini de Maricourt ad Sygerum de Foucaucourt Militem de Magne, which is often shortened to Epistola de magne, is dated 1269 C.E.

## Electromagnetic fields

Electromagnetic fields around an energized wire behave like fluids within a centrifugal pump. This type of pump has been developed in the end of the 17<sup>th</sup> century by Denis Papin. If the fan of a centrifugal pump begins to rotate the fluid within the fan will get a tangential speed (= speed in the direction of the periphery). The centrifugal force that hereby arises makes the fluid being pushed to the outer periphery of the fan. In this the mechanical energy (the rotation of the fan) is being converted into potential and kinetic energy. In analogy to, the electrons (who all have a like-minded spin) will be hurled to the outer periphery of the wire. On the outside of the wire the curvatures caused by the electrons will be large. Through these curvatures the  $1-\lambda$ -particles will be sucked in. This causes a whirlwind of  $1-\lambda$ -particles which will rotate around the energized wire. This causes the electromagnetic fields with their attractive force. This process is depicted in figure 32. By winding an energized wire in a coil the electromagnetic forces are being cumulated, this resulting in the fields as observed around an energized coil. This process is depicted in figure 33. When positrons are send through a wire the fields will show an opposite direction with respect to the fields caused by electrons.



Figure 32: Schematic view of electromagnetic fields around an energized wire.

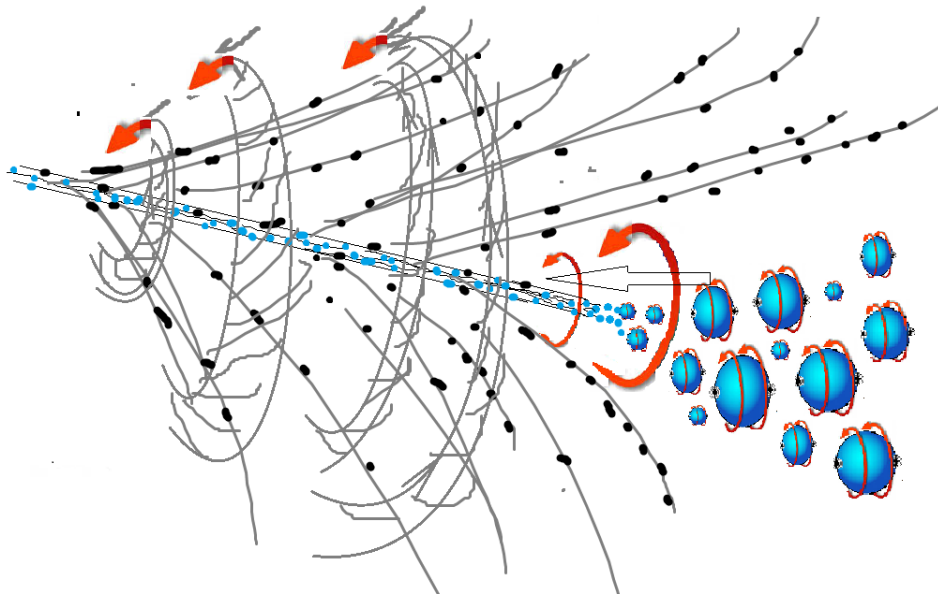
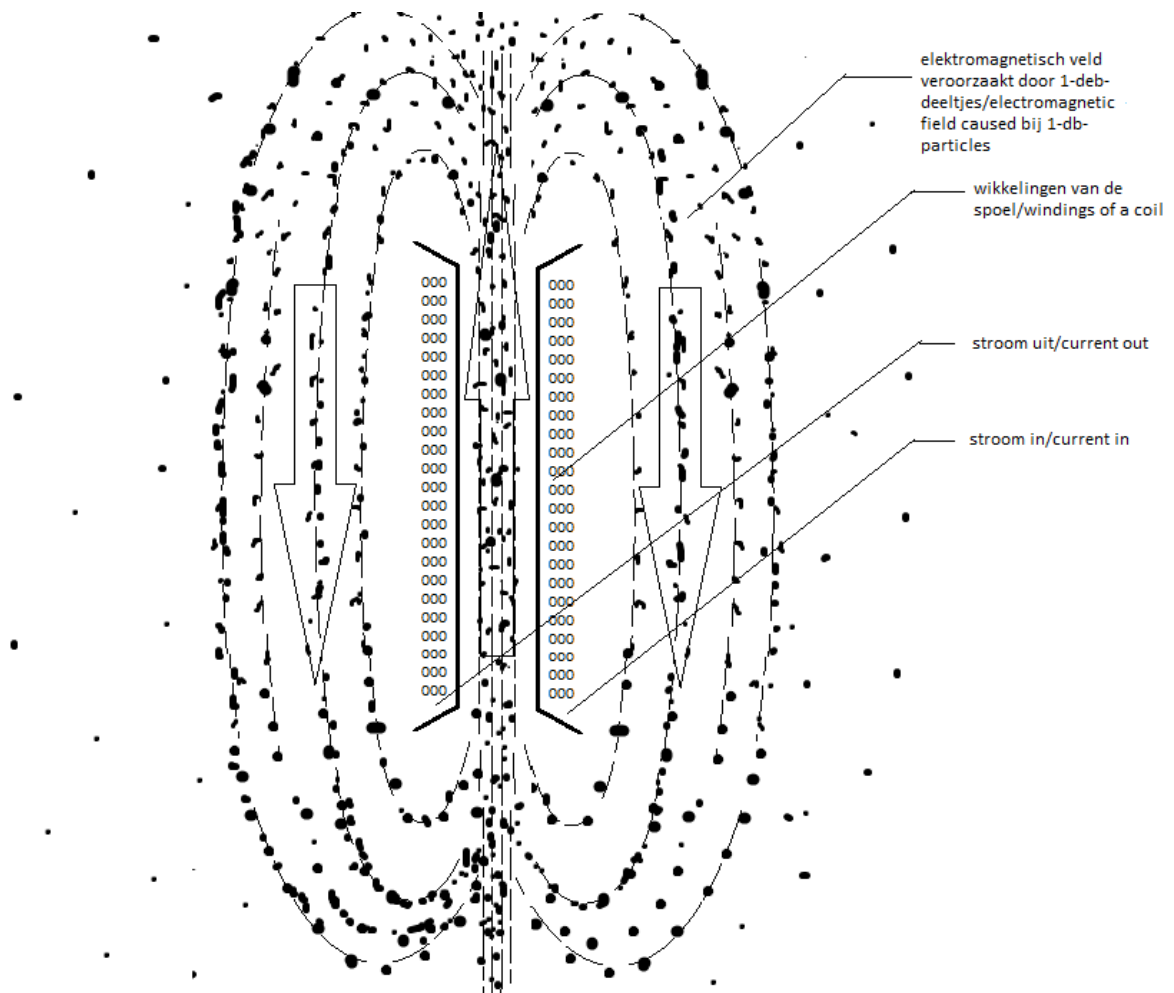


Figure 33: Schematic view of electromagnetic fields in and around an energized coil.



## Memorandum about quantum field theory (QFT)

Most physicists approach questions around the electromagnetic according to the quantum field theory. The quantum field theory (QFT) is meant to setup a quantum mechanical theory of the electromagnetic fields. With the QFT quantum degrees of freedom in space (particle states) are being indexed. Then symmetric quantum states together form a quantum field. The particles behave identical and together are the cause of a resulting quantum field (electromagnetic field). The current quantum field theory is mathematically not rigorous. The last decades several attempts have been made to place quantum field theory on a solid mathematical base by formulating a set of axioms for it. Finding the right axioms still is an open and difficult mathematical problem. This is one of the Millennium prize problems.

The curvatures around a particle are fundamental for arousing an electromagnetic quantum field. There is a symmetry that creates a symmetric field as described in the QFT. There is however little reason for the description and the use of symmetric (bosonic) or anti-symmetric (fermionic) states. The arousing of an electromagnetic field can completely and fully be understood from the perspective of Einstein's teachings of curvatures. The field will occur when particles like electrons accumulate at a specific position or in a specific movement. This will instantly lead to the attraction of  $\lambda$ -particles by which a quantum field can be observed.

## Beauty in the order

To us, this model constitutes a good candidate for a new foundation to represent the observed particles and forces. The short distance force (weak) and the long distance forces (strong, electromagnetic and gravitational) can be explained from the described curvatures.

We are amazed by the simplicity and the beauty of all this. The first words "Let there be light." (Genesis) are remarkable. The photon is the first reaction that rises above our observation level. After that all phenomena can be derived according to a relatively simple concept. The world can be described with Newton and Einstein. Reflecting out of this basis one arrives at explanations for a multitude of phenomena. All observed interactions can be explained using this simple model. This has in fact always been the expectation of the great physicists. A simple model that can explain the forces of nature, this theory realizes all expectations. This discovery in the area of physics of elementary particles demonstrates that order is the basis of creation. We are of the opinion that we are looking at the fundamentals of the structure, but the mystery of life remains.

## Acknowledgement

The  $\lambda$  was devised by Gerhard Jan Smit during the years 1986 to 1993. He shared the theory of the  $\lambda$ , the character of dark matter, electromagnetic radiation, electrons, quarks, curvature phenomena of complex particles, the relative variable speed of light through various curvature fields, the aging of a photon, the improbability of the hypothetical expansion of the universe, the  $\lambda$ 's responsibility for the movement of galaxies, its responsibility for the cosmic background and the properties of black holes on the 7<sup>th</sup> October 2016 with Jelle Ebel van der Schoot.

Further deductions of the theory applying to photons, electrons, positrons, the cosmological constant and the deuterium core were developed jointly. Jelle Ebel van der Schoot has posited the theory of the proton and the neutron and their decay. In December 2016 Gerhard Jan Smit has calculated and described the properties of a deuterium core while on the 7<sup>th</sup> of January 2017 Jelle Ebel van der Schoot has found and described an explanation for electromagnetic fields, both starting from the then present theory. During 2017 several subhypotheses have been worked out, leaning on more insights from both of us. All this has resulted in the present article.

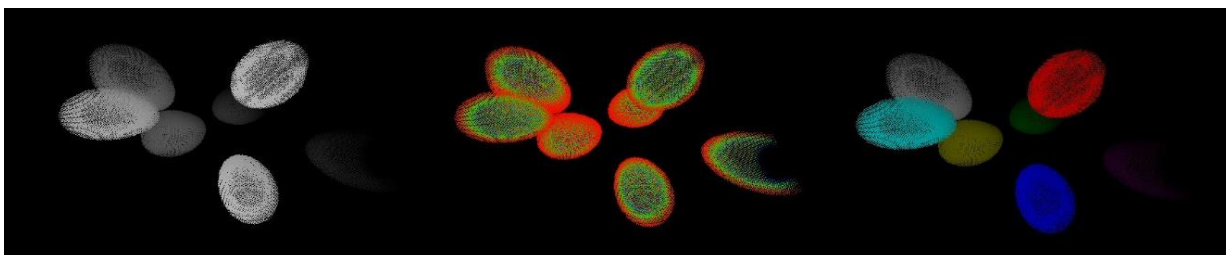
We express special gratitude to Democritus, Newton, Einstein, and for the remainder to God, who does not play dice.

Authors: Gerhard Jan Smit, Jelle Ebel van der Schoot, Nijmegen, The Netherlands.

© 2016, Version 1.0 legally registered 21<sup>st</sup> November 2016,

Version 2.0: 21<sup>st</sup> Januari 2018, Revision 1<sup>st</sup> April 2021.

Figure 34: Curvatures dark matter: Seven  $\lambda$ s. Respectively; greyscale is depth, curvature range where red represents relative low curvature while blue represents relative high curvature, individual curvature range for each  $\lambda$ .



Sites: [www.metric.science](http://www.metric.science) & [www.dbphysics.com](http://www.dbphysics.com) Contact: [info@dbphysics.com](mailto:info@dbphysics.com)

## Addendum I - External references

Figure 1 is from “Presentation Black Holes”, John Heise, University Utrecht. Illustration 1a is from “Building Blocks of the Universe”, Len Zoetemeijer. Illustration 1b is derived from illustration 1a. Figures 6, 13, 15-18, 22 have been taken from the internet. The other figures were produced by us.

The figures of the curvatures of a cube of space, photons, electrons, quarks, protons, neutrons, the deuterium core and dark matter were made using the plot program ‘Einstein’ which was developed by Gerhard Jan Smit in 1996.

A part of the “Metric Science” article contents of the chapter “Outline of observed conflicts within quantum mechanics” is based on “Review of Roland Omnés, The Interpretation of Quantum Mechanics”, William Faris, November 1996. Insights on the universe were taken from the books “Het punt Omega”, John Gribbin, 1988 and “Galaxies in the Universe”, L.S. Sparke and J.S Gallagher III, 2007.

Knowledge is easily retrieved by external resources on the internet.

The information on protons, neutrons, quarks and the disassociation of particles is general information that can be found on Wikipedia. Below are shown some essential hyperlinks we've used to deepen the insights touched by the article.

Aufbau Principle:

[https://en.wikipedia.org/wiki/Aufbau\\_principle#The\\_Madelung\\_energy\\_ordering\\_rule](https://en.wikipedia.org/wiki/Aufbau_principle#The_Madelung_energy_ordering_rule)

Cartesian coordinate system:

[https://en.wikipedia.org/wiki/Cartesian\\_coordinate\\_system](https://en.wikipedia.org/wiki/Cartesian_coordinate_system)

Case Study – Positron Emission Tomography:

[https://chem.libretexts.org/Textbook\\_Maps/Physical\\_and\\_Theoretical\\_Chemistry\\_Textbook\\_Maps/Supplemental\\_Modules\\_\(Physical\\_and\\_Theoretical\\_Chemistry\)/Nuclear\\_Chemistry/Applications\\_of\\_Nuclear\\_Chemistry/Radiation\\_in\\_Biology\\_and\\_Medicine%3A\\_Positron\\_Emission\\_Tomography](https://chem.libretexts.org/Textbook_Maps/Physical_and_Theoretical_Chemistry_Textbook_Maps/Supplemental_Modules_(Physical_and_Theoretical_Chemistry)/Nuclear_Chemistry/Applications_of_Nuclear_Chemistry/Radiation_in_Biology_and_Medicine%3A_Positron_Emission_Tomography)

Centrifugal force:

[https://en.wikipedia.org/wiki/Centrifugal\\_force](https://en.wikipedia.org/wiki/Centrifugal_force)

Christiaan Huygens:

[https://en.wikipedia.org/wiki/Christiaan\\_Huygens](https://en.wikipedia.org/wiki/Christiaan_Huygens)

Cosmic background radiation:

[https://en.wikipedia.org/wiki/Cosmic\\_background\\_radiation](https://en.wikipedia.org/wiki/Cosmic_background_radiation)

Dark energy:

[https://en.wikipedia.org/wiki/Dark\\_energy](https://en.wikipedia.org/wiki/Dark_energy)

Dark matter:

[https://en.wikipedia.org/wiki/Dark\\_matter](https://en.wikipedia.org/wiki/Dark_matter)

Diffraction:

<https://en.wikipedia.org/wiki/Diffraction>

Diffraction from a single slit. Young's experiment with finite slits:

<http://www.animations.physics.unsw.edu.au/jw/light/single-slit-diffraction.html#1>

Electron shell:

[https://en.wikipedia.org/wiki/Electron\\_shell](https://en.wikipedia.org/wiki/Electron_shell)

Fermi Gamma-ray Space Telescope:

[https://en.wikipedia.org/wiki/Fermi\\_Gamma-ray\\_Space\\_Telescope](https://en.wikipedia.org/wiki/Fermi_Gamma-ray_Space_Telescope)

Free neutron decay:

[https://en.wikipedia.org/wiki/Free\\_neutron\\_decay](https://en.wikipedia.org/wiki/Free_neutron_decay)

Hawking radiation:

[https://en.wikipedia.org/wiki/Hawking\\_radiation](https://en.wikipedia.org/wiki/Hawking_radiation)

Isotopes of carbon:

[https://en.wikipedia.org/wiki/Isotopes\\_of\\_carbon](https://en.wikipedia.org/wiki/Isotopes_of_carbon)

Isotopes of oxygen:

[https://en.wikipedia.org/wiki/Isotopes\\_of\\_oxygen](https://en.wikipedia.org/wiki/Isotopes_of_oxygen)

Lab-grown black hole proves Stephen Hawking's radiation claims – physicist:

[https://www.theregister.co.uk/2016/08/16/quantum\\_hawking\\_radiation\\_has\\_been\\_created\\_in\\_a\\_lab\\_claims\\_physicst/](https://www.theregister.co.uk/2016/08/16/quantum_hawking_radiation_has_been_created_in_a_lab_claims_physicst/)

Magnetic field:

[https://en.wikipedia.org/wiki/Magnetic\\_field](https://en.wikipedia.org/wiki/Magnetic_field)

Micro black hole:

[https://en.wikipedia.org/wiki/Micro\\_black\\_hole](https://en.wikipedia.org/wiki/Micro_black_hole)

Moon fact sheet:

<https://nssdc.gsfc.nasa.gov/planetary/factsheet/moonfact.html>

Newtons law of universal gravitation:

[https://en.wikipedia.org/wiki/Newton%27s\\_law\\_of\\_universal\\_gravitation](https://en.wikipedia.org/wiki/Newton%27s_law_of_universal_gravitation)

Photon energy:

[https://en.wikipedia.org/wiki/Photon\\_energy](https://en.wikipedia.org/wiki/Photon_energy)

Physics – Mechanics: Gravity (5 of 20) The effect of Earth's rotation on gravity:

<https://www.youtube.com/watch?v=IVtdC3Pynr0>

Proton decay:

[https://en.wikipedia.org/wiki/Proton\\_decay](https://en.wikipedia.org/wiki/Proton_decay)

Waves- Double slit diffraction:

[https://en.wikibooks.org/wiki/Waves/Double\\_slit\\_Diffraction](https://en.wikibooks.org/wiki/Waves/Double_slit_Diffraction)

## Addendum II - Forum

Question: If particle and wave is the same thing u should also write zero point wave.

Answer: A particle consisting of multiple db's will imprint an extra curvature on the spacetime surface between the db's. In this a particle is not a wave, it is a cluster of more than one interacting db's. The wave property it possesses are its internal db-movement tracks in time. These movement tracks in time can be described as a wave function. A singular db does not have a wave property.

So particle and wave is not the same thing.

Although it can be said that in case of a multiple db particle the extra curvature imprint on spacetime is a wave function in itself, so then the particle equals that wave function it exhibits in time. One can say that the multiple db particle is in a sense the fluctuating spacetime surface and is in this case the wave.

Question: How will this particle be affected by time?

Answer: The higher the curvature of the multiple db particle, the slower its internal movements will seem for the outside observer. Internal time dilation because of the relative strong bending of spacetime.

Question: Is it similar to a black hole?

Answer: The singular db has a property that is almost similar to a black hole. The db has a black hole like curvature imprint on its surrounding spacetime. The difference is that the db particle has no spatial dimensions (length, width, height) and a black hole does.

The db is a singularity, the curvature of the particle is infinite (or so to say, spacetime is infinitely bended) on the location of the db.

Question: It is hard to imagine particles without spatial dimensions. It is almost similar to energy. For my own knowledge, if black hole reaches singularity why does emit radiation. Could this mean that when something reaches singularity it changes its dimension to energy?

Answer: In the db model only the db itself has an infinite curvature and is the only singularity that exists. All macro structures, from elementary particles to black holes, exist out of those singularities but are never a singularity on its own. They can get very high curvatures on the spacetime surface between the db particles but always a fraction of infinity.

So in our universe nothing but the db ever is a true singularity.

Energy is always a resultant power of miscellaneous variables and is a property of spacetime. The more spacetime bends within the multiple db particle, the more energy the particle contains. But it will never contain an infinite curvature on the spacetime surface between the db's so even if singularity changes its dimension to energy, it will not happen since none of the multiple db particles will ever reach singularity, not even a black hole.

A black hole has an enormous curvature on its event horizon, the more mass, the more spacetime bends, but it is limited in its amount of bending of spacetime. The bending of spacetime on the event horizon is such that it destructs all traditional known particles, including photons, but the curvature experienced by the particles will not be infinite, but is dependant on the internal db quantity of the black hole which lead to a specific curvature strength at the event horizon of the black hole.

A black hole can emit various types of radiation. Within the theory of the db there is of course db-radiation. This can occur in various ways. Db's, if under the right angle and right speed, can leave the black hole system and one could say that it is db radiation. Furthermore all types of radiation will be emitted in the process of decomposing particles that get to near to the event horizon of a black hole. Those particles are ripped apart due to the tidal forces of the black hole. The elements of the decomposed particle that can escape the event horizon will be the observed radiation.

Question: So which dimension does db particles exist in??

Answer: The db exists in 3 dimensional spacetime where it has a location and on that location the curvature and thus the bending of spacetime are infinite.

Question: The equation written about db is it correct? And did u discuss on physics forums and what do they think? I am not good in math.

Answer: The equation is correct, but also an assumption. It has been derived step by step through deducing and writing computer algebra to support the theory. In the end the only logical conclusion for the curvature around a db is according to formula (0).

The theory has not yet been discussed on many fora because it isn't taken all to serious. It seems to defy the theories of general relativity and quantum mechanics, which is not the case. It just lays down a deeper, more fundamental explanation for the observed forces and particles, in sync with observations in various fields of physics as described in the 'Metric Science' article.

The theory is like putting on glasses to see even sharper into the micro world than before.



## **Addendum III - Patents**

In order to optimize the software calculating the movement and character of  $\mu$ s a new type of computer chip has been thought of. The accompanying patent for the chip is shown below.

### **Patent NL: 2018026: Method and system for storage and processing of data.**

Inventor: Gerhard Jan Smit

#### Field

The invention relates to a method and a system for the processing of digital information.

#### Background

For the storage of data there are several systems in circulation. One can think of:

Magnetic discs: diskette, harddisk, RAID, DAS, zipdisc, jaz, minidisc;

Optical discs: compact disc, dvd, blu-ray, hd-dvd, CBHD, EVD, HVD, UMD, VMD;

Magnetic tapes: compact cassette, microcassette, dat, dcc, digital video;

Electronic: RAM, registermemory, ROM, cartridge, PROM, EPROM, EEPROM, flashmemory, memory card, solid state drive, USB-stick, Cavendish-cel, DOM, MRAM, PCRAM, VRAM;

Punched paper: punch card, punch tape;

Others: cache, NAS, SAN.

For the development of computer technology and the processing of great amounts of data there is need for powerful software and big storage volumes. Besides enlargement of storage volumes and speedup of processing (computing capacity) is reliability of the data of great importance. The current way of storage and processing of information has its limits. Seen from this perspective a new way of data storage and processing of information is of great importance.

#### Resumé of the invention

The invention has a method for the processing of data, compassing:

The retrieval of a digital data file;

The conversion of the digital file to a real number and the generation of an analog signal that represents that real number;

The storage of the analog signal in an analog storage unit.

In further elaboration of the invention, processing can also be effected, included:

The conversion of the analog signal of the in an analog storage unit stored analog signal that represents the real number in a digital data file.

The invention also provides a system for processing of digital data, in which the system includes:

An analog storage unit with an input and an output;

A first converter configured for the conversion of a digital data file in a real number and the generation of an analog signal that represents the real number and that serves as input for the analog data storage unit;

A second converter for the conversion of the in the analog data storage unit stored analog signal and the conversion of the real number in a digital data file.

Further elaborations of the invention are described in the conclusions to follow and will be further clarified below.

In order to generate large storage capacity and as a means for improved computing capacity, the analogue storage is proposed. For this, a binary sequence is converted to a real number. This real number is converted into an analog signal that can be stored, for example, as an electric voltage, an amperage or an electric resistance. The analog signal thus stored can be read and be converted to a binary sequence corresponding to the original binary sequence that served as the basis for the conversion to the analog signal. The information may contain text files but can also have an arithmetical meaning. The original information can contain any string of characters with any length.

With the aid of the method and the system according to the invention the following effects/benefits can be achieved:

Large storage capacity can be generated by analog storage of encrypted information, for this purpose a binary sequence is converted to a real number;

Large computing capacity can be generated by using analogue storage of encrypted information, for this purpose a binary sequence is converted to a real number;

Digital information can be coded to a real number and is stored on an analog storage unit as a voltage, an amperage or as a resistance; the analog signal (that represents the real number) can be read and then to the need for the benefit of the user be decoded into digital information; the selected real number is again used for this purpose and converted to a binary sequence;

The information stored in the manner described above can possibly contain text files but can

also have an arithmetic meaning; the stored information relates to each random string of any length;

The invention is applicable within computers, tablets, smartphones and various other electronic facilities;

If the analogue storage units are connected in parallel and/or in series then possibilities for PU-use arise (Processor/Processing Units), ROM-use (Read Only Memory), and RAM-use (Random Access Memory), multiple circuits can lead to intelligent computational solutions.

Further elaborations are described in the subclaims. The invention will be further described below with reference to the figures.

### Short description of the figures

Figure 1 shows a schematic representation of an example of a system according to the invention;

Figure 2A shows a representation of redundant storage of an analog signal, the analog signal representing 0;

Figure 2B shows a representation of redundant storage of an analogue signal, where the analog signal represents a value different from 0.

Fig. 1: A schematic representation of an example of a system according to the invention.

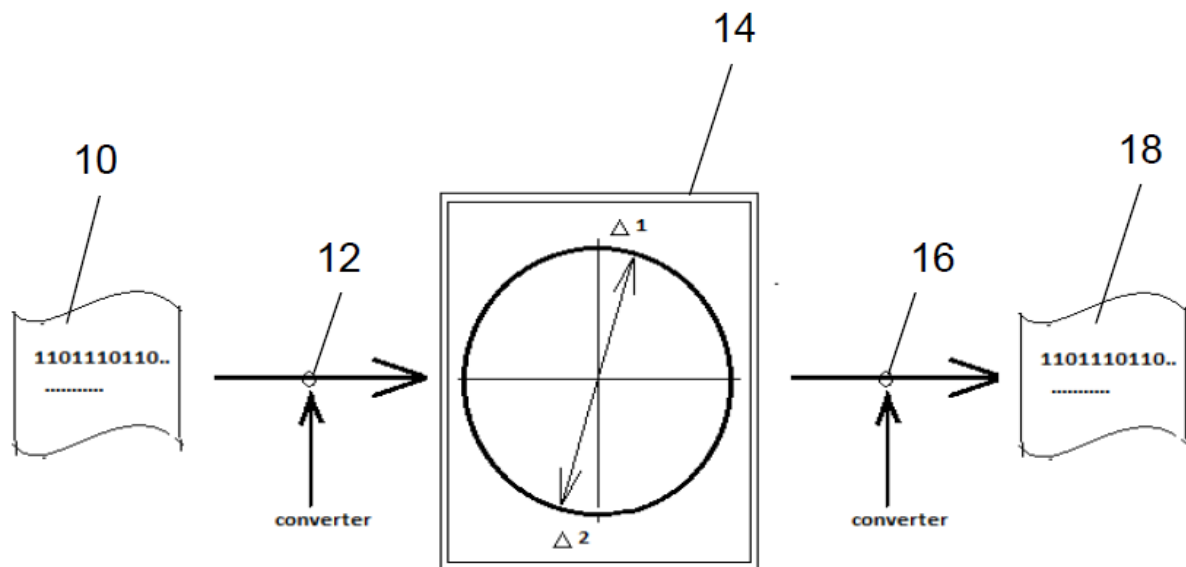


Fig. 1

Fig. 2A: A representation of redundant storage of an analog signal, the analog signal representing 0; Fig. 2B: A representation of redundant storage of an analogue signal, where the analog signal represents a value different from 0.

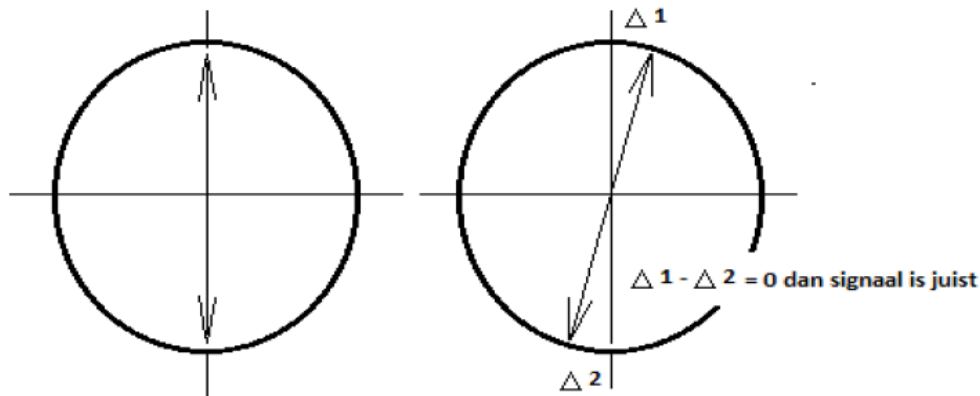


Fig. 2A

Fig. 2B

( $\Delta 1 - \Delta 2 = 0$  dan signaal is juist :  $\Delta 1 - \Delta 2 = 0$  then signal is correct)

### Detailed description

The invention relates to the analog storage of information of any string and of any length.

For this, a binary sequence is converted into a real number. This real number is then converted into an analog signal that can be stored in an analogue storage unit. The analog signal may for example comprise an electric voltage, an electric current strength or an electrical resistance. The information thus stored can then be read again and converted into a binary sequence, in particular the same binary sequence that served as input and on the basis of which the analog signal was generated.

Figure 1 shows a schematic representation of a system for the processing of digital data. In it with reference numeral 10 first a digital data file is indicated in the form of a binary sequence. This binary sequence becomes converted in converter 12 into an analog signal that represents a real number. This analog signal is stored in an analog storage unit 14. In the example shown, this is a redundant analog storage unit in which the analogue signal is stored twice as  $\Delta 1$  and  $\Delta 2$ .

The analog signal can be output from the analog storage unit 14 via an output to a second converter 16 which converts the analog signal in a second binary sequence 18 that forms a digital data file that corresponds to the first digital data file 10.

Figure 2A shows a representation of redundant storage of an analog signal, the analog signal representing 0. Fig. 2B shows a representation of redundant storage of an analogue signal, where the analog signal represents a value different from 0. The analog signal is stored twice, once as  $\Delta 1$  and once as  $\Delta 2$ . To check if the saved analog signal is stored correctly, it can be determined whether the

difference between  $\Delta 1$  and  $\Delta 2$  is zero (i.e.,  $\Delta 1 - \Delta 2 = 0$ ). If this is the case, it can be assumed that the conversion of the binary sequence to the analog signal is executed correctly.  $\Delta 1$  and  $\Delta 2$  can, for example, be determined in succession with the same converter 12. However, it is also possible that  $\Delta 1$  and  $\Delta 2$  are parallel determined with two different converters 12 converting the binary file each in their own way to an analogue signal.

Binary information (binary sequence) turned into a real number can be done by means of software. The real number can have a text as origin but can also have an arithmetical meaning. The generated real number is saved via the software as a value between 0 and 1. We expressly mention that in essence any readable number can be produced and handled. The choice here to choose "0 <= number <1" is of practical origin. The number can assume every length. This depends on the amount of original information and character of the analogue storage unit used ( examples are a capacitor or a battery). The number can be expressed binary (example: 0.100001011110010101 ... .etc ... ..), decimal (example 0.1453345673385245 ... etc ....), hexadecimal or as another numerical expression. The software that is used to generate the real number must use a strict, set routine. This is important because the real number will eventually be translated back to the original binary information. In our example, the real number always starts with "0.". This achieves that the value of the real number is between 0 and 1.

The real number determined by the software becomes one-to-one written to an analogue medium for example as a voltage, an amperage or as a resistance. Redundancy for recording the signal makes sense. A representation of redundant storage is shown in Figure 2.

When the analogously written real number must be addressed for the purpose of reading information and this information must be made accessible for a user then a conversion must be carried out for this purpose, for example by means of software. This software applies the same strict, set routine but then in reverse order (decoding). In the manner described here large amounts of information can be recorded. The information can be used for storage or for arithmetic applications. Information provided within computers or other electronic equipment written binary can be directly (whether or not preceded by "0." or another number) written one-to-one to an analogue medium as a voltage, an amperage or as a resistance. In this case, the software described above can be omitted. Here again, applying redundancy to the recording of the signal makes sense.

When the in this method and this system used analogue storage units are connected in parallel and/or in series then the possibilities for PU use (Processor/Processing Units), ROM use (Read Only Memory), and RAM usage (Random Access Memory) arise.

Multiple circuits can lead to intelligent computational solutions.

To produce a chip on which the analog signals can be written one can use traditional analog bipolar transistors or field-effect transistors (FET). It is useful to use FETs on a molecular scale. To this end,

please refer to the article by Yoshihiro Kubozono, Keita Hyodo, Shino Hamao, Yuma Shimo, Hiroki Mori & Yasushi Nishihara ([www.nature.com/scientificreports](http://www.nature.com/scientificreports) dated 6 December 2016). In the article with the title: "Transistor Properties of 2,7- DialkylSubstituted Phenanthro [2,1-b: 7,8-b ' ] dithiophene" is indicated that Phanancens are very suitable molecules for use in FETs. This allows chips in which this invention is processed to be built on a small scale.

In further elaboration of the invention the following may apply:

For the purpose of analog storage, the original binary information (binary sequence) can by means of software be converted into a real number;

The generated real number may have a text as origin but can also have an arithmetic meaning consisting out of each random string of any length;

A binary sequence is written via the software as a real number;

The software that is used to generate the real number must use a strict, set routine;

The real number determined by the software is written to an analog medium or an analog storage unit in the form of an analogue signal, such as for example a voltage, a resistance or an amperage;

The writing of the real number must be completely analogous;

The recorded real number can be addressed and be made accessible for the user, here conversion of the real number to a binary sequence should take place (decoding);

Information (a sequence) that is written binary within computers or other electronic equipment can also directly be written as a real number on an analogue medium, for example as a voltage, an amperage or as a resistance. In that case, the described software can stay away;

An example of an analog storage unit is a capacitor or a battery.

The various examples described above can be combined in different manners independently of each other and with each other. The reference numbers in the detailed description and the conclusions do not limit the description of the embodiments and serve only for clarification.

## Conclusions

1. A method for processing data, comprising:
  - providing a digital data file;
  - converting the digital data file to a real number and generating an analog signal that represents the real number;
  - storing the analog signal in an analog storage unit.

2. The method according to claim 1, wherein converting the digital data file to a real number and the generation of an analogue signal representing the real number includes:
  - to normalize the digital data file to a real number between 0 and 1.
3. The method according to claim 2, wherein the normalizing is being executed by 0. to place for the digital file consisting of zeros and ones.
4. The method according to any one of claims 1-3, wherein it also includes:
  - converting the data stored in the analog storage unit as an analog signal representing the real number in a digital data file.
5. The method according to claim 4, wherein the conversion of the, in the analog storage unit stored analog signal, that represents the real number in a digital data file, is executed by the real number that is represented by multiplying the analog signal by 10, and from the real number thus obtained, that only contains zeroes and ones, is turned into a digital file that has the same series of zeros and ones included as obtained from the real number.
6. The method according to any one of the preceding claims, wherein the analog signal is an electrical voltage, an electric current or a electrical resistance.
7. A system for processing digital data, where the system includes:
  - an analog storage unit with an input and an output;
  - a first converter configured for converting a digital file into a real number and generate an analogue signal representing the real number and serving as input for the input from the analog storage unit;
  - a second converter for converting the, into the analog storage unit stored analog signal, in a real number, and the converting of the real number into a digital data file.
8. The system according to claim 7, wherein the analog storage unit is selected from the group comprising at least one of the following components:
  - analog bipolar transistors;
  - field effect transistors (FET);
  - a capacitor; and
  - a battery.
9. The system according to claim 7 or 8, wherein the analogue storage unit is configured to store the analog signal in the shape of an electrical voltage, an electric current or a electrical resistance.

**End of document Patent NL: 2018026**

Two patents have been developed in order to produce energy out of the 1- $\mu$ -particles theory.

**Patent NL: 2018126: Method and system of producing photons, as well a method assembly for producing electric power or heat.**

Inventor: Jelle Ebel van der Schoot

Field

The invention relates to a method and an apparatus for generating photons, as well as a method and an assembly for producing electrical power and/or heat.

Theoretical background

Zero point particle : Gerhard Jan Smit and Jelle Ebel van der Schoot have published a theory [0] on the internet ([www.dbphysics.com](http://www.dbphysics.com) , [www.metric.science](http://www.metric.science)). The core of the theory is that the most elementary particle that exists is a zero point particle (dimensional basic, 1-db). This particle has only one property: an infinite curvature in the core. The particle itself has no size (no length, no width and no height). The particle is located everywhere in the universe. The particle is always moving through spacetime. The particles form at aggregation, or rather joint interaction, phenomena that exceed the observational limit. If two 1-db particles come into the direct sphere of influence of each other's curvature, there is a strong interaction between the two. The resulting 2-db particle is a photon.

Fire phenomena: The development of photons can, for example, be observed in the burning of materials containing carbon-13 (C13) or hydrogen (H1). An example of this is the burning of wood (C<sub>x</sub>H<sub>y</sub>). Carbon is hereby converted with oxygen to carbon dioxide, hydrogen is hereby converted with oxygen to water. The joint binding energy (enthalpy) for carbon dioxide and water is lower than the binding energy of its starting product (wood: C<sub>x</sub>H<sub>y</sub>). The surplus of binding energy becomes released as heat ( $\Delta H = HC_xH_y - HCO_2 - HH_2O$ ) [1]. The mass of the resulting products can be calculated as follows: 1 mol C<sub>x</sub>H<sub>y</sub> with an amount of (x + y) mol O<sub>2</sub> gives a yield of x mol CO<sub>2</sub> and + y mol H<sub>2</sub>O [2]. The parameters "x" and "y" are random numbers. The two known equations [1] and [2] do not explain the origin of the photons. In view of the aforementioned theory [0], the explanation for the formation of the photons in the flame (plasma) lies in the interaction of 1-db particles that interact with each other thus creating photons (z mol 1-db particles give z mole of 2-db particles ( photons) [3]. The parameter "z" is a random number here.

The relevant comparisons when burning C<sub>x</sub>H<sub>y</sub> (example) are:



- With regard to enthalpy:  $\Delta H = HCxHy-HCO_2-HH_2O$  [1].
- With regard to mass: 1 mol  $CxHy$  with  $(x + y)$  mol  $O_2$  gives  $x$  mol  $CO_2$  and  $y$  mol  $H_2O$  [2].
- With regard to photons:  $z$  moles of 1-db particles give  $z$  moles of 2-db particles (  $\gamma$  photons) [3].

The parameters "x", "y" and "z" are random numbers.

Plasma: The described process (formation of photons) takes place in plasma (aggregation state). This is a condition in which particles of a gaseous substance are to a greater or lesser extent ionized. In plasma some atoms have, by the increasing of temperature or other added energy forms, lost one or more electrons. The unleashed electrons move freely through spacetime and the remaining core is then ionized. When enough atoms are ionized to change the electric character of the gas noticeable one speaks of plasma. This aggregation state is also called gas discharge and is very common in nature: next to dark energy (1-db particles in spacetime) 99% of the known mass in the universe consists of plasma.

### Summary of the invention

The invention describes how 1-db particles in a plasma can be brought into interaction with each other and how photons can be produced.

To this end the invention provides a device according to claim 1, an assembly according to claim 8 and a method according to claim 11.

A plasma lamp was first described by Tesla and became designated by him as an inert gas discharge tube. This known inert gas discharge tube is normally filled with an inert gas. According to one aspect of the invention, however, it is filled with a gas having a spin =  $\frac{1}{2}$ . This gas is preferably hydrogen. In this gas with spin =  $\frac{1}{2}$  a plasma is created. The plasma is placed in a powerful electromagnetic field (fig 1). The electromagnetic field must be so powerful that the atoms will focus like magnets "like-minded" within the field. Photons (  $\gamma$  ) in accordance with equation [3]) will develop in the plasma because 1-db particles interact with each other. The setup can be placed in a Faraday cage to eliminate potential disturbing fields.

The photons (  $\gamma$  ) arising with the aid of the method and/or device can be collected with existing photosensitive elements with which power and/or heat can be generated. Such a combined system (photon generator and photosensitive elements) can be used in various ways for power and/or heat supply (cars, homes, industrial processes).

In use of the device or in the application of the method the gas with spin =  $\frac{1}{2}$  is not consumed. It only serves as a kind of catalyst for forming photons from the 1-db particles. As said these 1-db particles move freely through spacetime and exist as well automatically in the translucent housing where they will together be paired and form photons. The energy generated by the device delivered in the form

of photons is therefore first supplied from the universe in the form of the 1-db particles that freely circulate in that universe. The energy that the system consumes for forming its plasma and forming the magnetic field is only a fraction of the energy that is supplied in the form of the 1-db particles, which, in the system are combined to form the photons. The in the produced photons present energy can be usefully applied, for example, for generating power through photovoltaic cells or for heating a medium such as a gas or a liquid for in example collectors.

Brief description of the figures

Fig. 1 schematically shows a cross-sectional view of an example of a device. With the aid of this device photons can be generated.

Fig. 1: A schematic cross-sectional view of an example of a device. With the aid of this device photons can be generated.

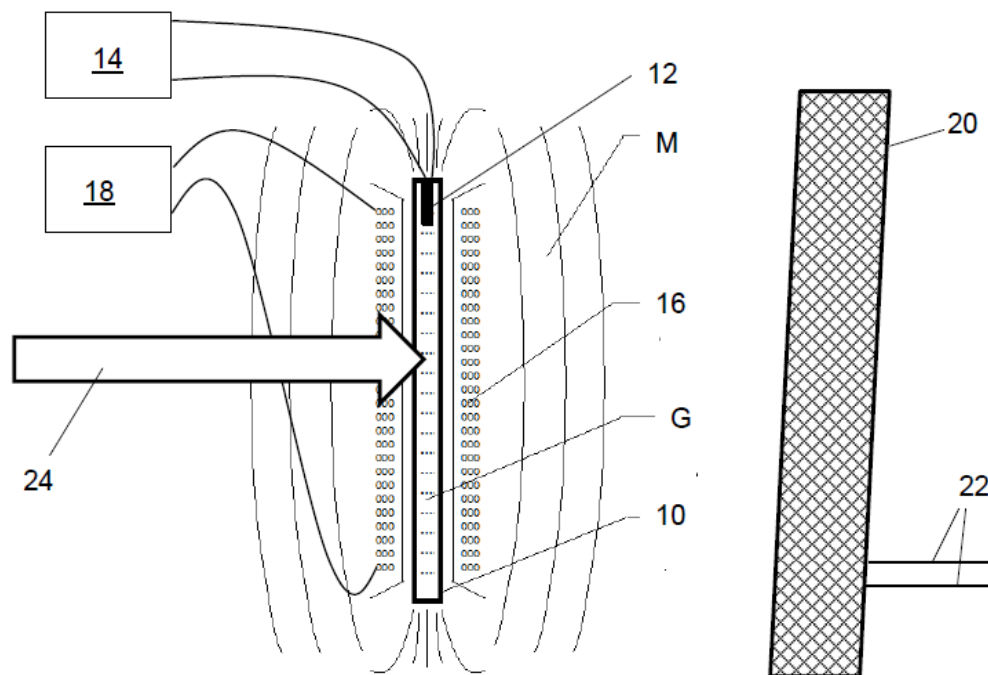


Fig. 1

Detailed description

An example of the device is shown in figure 1. In the most general terms, an apparatus is provided for producing photons, the device comprising a plasma lamp which is provided with:

- a light-transmitting housing 10 filled with a gas G;
- an electrode 12 arranged in or near the housing to form a plasma in the gas; and
- a power supply 14 for electrically energizing the electrode 12.

The gas in the plasma lamp is characterized by spin =  $\frac{1}{2}$ . Furthermore, the device 16, 18 is provided with a device for creating a magnetic field in the light-transmitting housing. With arrow 24 the supply of 1-db particles from the universe in the plasma of the gas with spin =  $\frac{1}{2}$  is indicated. Combining these 1- db particles to pairs in the magnetized plasma leads to the formation of photons. For example, the photons can be collected by a converter 20, such as a collector or a photovoltaic panel. The with that process generated electric power or heated medium can be transported via pipes 22 to a consumer. In an embodiment the light-transmissive housing can be tubular and stretched in an axial direction. With that the device for creating a magnetic field in the light-transmissive housing can include a coil 16 which is provided with electrically conductive windings. The windings wrap around the tubular translucent housing 10 to form a magnetic field in the tubular housing that extends in the axial direction.

In an embodiment, the gas in the plasma vapor can be hydrogen.

In an embodiment, the power supply for the electrode can be an alternating voltage supply 14 with a voltage in the range of 2-10 kV and a frequency in the range of 20 - 50 kHz.

In an embodiment, the power supply 14 for the electrode can be a DC voltage source as well as a high-voltage transformer and an electronic high-frequency oscillator.

In an embodiment, the device 16, 18 can be used to create a magnetic field in the light-transmitting housing 10 including a coil 16 that is connected to a direct current source 18. In further elaboration of this embodiment, the DC power source 18 can be a battery. Further, an assembly of the device is provided for producing photons as described above and a converter 20 for converting the energy present in the produced photons in electric power and/or heat.

In an embodiment, the transducer 20 can include a photovoltaic cell.

In an embodiment, the converter 20 may comprise a collector to generate heat in a heat transfer medium, such as a liquid or a gas.

Finally, a method is provided for producing photons. The method includes:

- Providing a gas that is characterized by spin =  $\frac{1}{2}$  in a light-transmitting housing 10;
- creating a plasma in the gas by forming an electric field in the light-transmitting housing 10;
- and
- creating a magnetic field in the light-transmitting housing 10.

In an embodiment, the gas with spin =  $\frac{1}{2}$  can be hydrogen gas.

In an embodiment, the electric field can be an alternating voltage field that is formed by an electrode that is connected to an AC voltage source.

In an embodiment, the magnetic field can be constant and being formed by a coil 16 connected to a DC voltage source 18.

In an embodiment, the method can further comprise:

the collection of the photons produced and the conversion of the the energy in heat therein by means of heating of a medium such as a gas or a liquid and/or in electrical flow.

### Conclusions

1. A device for producing photons comprising:
  - a plasma lamp with:
    - a light-transmitting housing filled with a gas;
    - an electrode arranged in or near the housing for forming of a plasma in the gas; and
    - a power supply for electrically energizing the electrode;
  - characterized by**
    - the gas in the plasma lamp is characterized by spin =  $\frac{1}{2}$  ;
    - a device for creating a magnetic field in the translucent housing.
2. The device according to claim 1, where the light-transmissive housing is tubular and extends in an axial direction, and where the device for creating a magnetic field in the light-transmissive housing comprises a coil provided with electrically conducting windings, the windings wrapping around the tubular light-transmitting housing to form a magnetic field in the tubular housing that extends in the axial direction.
3. The device according to claim 1 or 2, wherein the gas in the plasma lamp is hydrogen.
4. The device according to one of the preceding claims, wherein the power supply for the electrode is an AC power supply with a voltage in the range of 2 - 10 kV and a frequency in the range of 20 - 50 kHz.
5. The device according to claim 4, wherein the power supply for the the electrode comprises a direct current source and a high voltage transformer and an electronic high-frequency oscillator.
6. The device according to one of the preceding claims, wherein the device for creating a magnetic field in the light-transmissive housing comprises a coil connected to a direct current source.
7. The device according to claim 1, that the direct current source is a battery.
8. An assembly of the device according to one of the foregoing conclusions and a converter for converting the in the produced photons present energy in electrical power and/or heat.
9. The assembly according to claim 8, wherein the transducer is a photovoltaic cell.
10. The assembly according to claim 8 or 9, wherein the transducer comprises a collector for generating heat in a heat transfer medium, such as a liquid or a gas.

11. A method for producing photons comprising:
  - providing a gas that is characterized by spin =  $\frac{1}{2}$  in a light-transmitting housing;
  - creating a plasma in the gas by forming an electric field in the light-emitting housing; and
  - creating a magnetic field in the light-transmitting housing.
12. The method according to claim 11, wherein the gas with spin =  $\frac{1}{2}$  is hydrogen gas.
13. The method according to claim 11 or 12, wherein the electric field is an AC field that is formed by an electrode that is connected to an AC voltage source.
14. The method according to any one of claims 11-13, wherein the magnetic field is constant and is formed by a coil that is connected to a DC voltage source.
15. The method according to one of the preceding claims, further including:
  - the capture of the photons produced and the conversion of the energy in heat therein by means of heating of a medium such as a gas or a liquid and/or in electrical power.

**End of document Patent NL: 2018126**

## **Patent NL: 2018127: Method and a device for nuclear fusion.**

Inventor: Jelle Ebel van der Schoot

### Field

The invention relates to a method and a device for nuclear fusion.

### Theoretical background

Zero point particle: Gerhard Jan Smit and Jelle Ebel van der Schoot have published a theory [0] on the internet ([www.dbphysics.com](http://www.dbphysics.com) , [www.metric.science](http://www.metric.science)). The core of the theory is that the most elementary particle that exists is a zero point particle (dimensional basic, 1-db). This particle has only one property: an infinite curvature in the core. The particle itself has no size (no length, no width and no height). The particle is located everywhere in the universe. The particle is always moving through spacetime. The particles form at aggregation, or rather joint interaction, phenomena that exceed the observational limit.

Cold nuclear fusion: Cold fusion is nuclear fusion that can occur at a relatively low level temperature. The name cold fusion was originally used for the fusion of hydrogen isotopes using muons (1-db particles) as a catalyst. It was assumed that the electrons from hydrogen atoms are replaced by muons (1-db particles), so that the atoms are brought so close together that the electric repulsion is overcome and a fusion of the atomic nuclei has become possible.

Nowadays, the name "cold fusion" is mainly used for a number of methods, some of which are scientific controversial.

"Hot" nuclear fusion (the fusion of light atoms to heavier) is the energy source of the sun and the stars. In the sun hydrogen atoms melt in a plasma together under the influence of the enormous pressure in the core at 15 million degrees. In nuclear fusion experiments on earth, as in the Joint European Torus (JET), nuclear fusion takes place at a temperature of 150 million degrees. There are a few claims that fusion takes place with other physical processes without such extremely high temperatures needed. The most important is the claim of Martin Fleischmann and Stanley Pons. On 23 March 1989 they shared in a press conference that they had achieved nuclear fusion under much milder conditions. It was about the side effect of an electrochemical reaction on one palladium electrode where hydrogen was formed. Hydrogen in the palladium electrode is absorbed and the two scientists reported that thereby the hydrogen nuclei can fuse and that as a result with their setup more energy was released than they put into it. In addition they reported that they had detected released neutrons on fusion of hydrogen nuclei. Since 1989 many new evidences are produced but these are not so indisputable that the vision on cold nuclear fusion has changed in the mind of most

scientists.

In the article by Cravens, D. and D. Letts "The Enabling Criteria or Electrochemical Heat: Beyond Reasonable Doubt " (Dennis Gravens, Dennis Letts, Amridge University Box 1317 Cloudcroft, NM 88317 USA 12015 Ladrido Lane Austin, TX 78727 USA) argue Dennis Gravens and Dennis Letts, however, that the observation of Martin Fleischmann and Stanley Punch can be accepted without any reasonable doubt. Dennis Gravens and Dennis Letts presented these findings on the "International Conference on Condensed Matter Nuclear Science. 2008, Washington, DC ".

Other names for the cold fusion method are: Low Energy Nuclear Reactions (LENR), Chemically Assisted Nuclear Reactions (CANR), Lattice Assisted Nuclear Reactions LANR) and Condensed Matter Nuclear Science (CMNR).

Plasma: The described fusion process takes place in a plasma (aggregation state). This is a condition in which particles of a gaseous substance are to a greater or lesser extent ionized. At plasma some atoms, by temperature increase or other added energy forms, lost one or more electrons. The unleashed electrons move freely through spacetime and the remaining core is then ionized. When enough atoms are ionized, the electric character of the gas is noticeable and one speaks of plasma. This aggregation state is also called gas discharge and is very common in nature: next to dark energy (1-db particles in spacetime) 99% of the known mass in the universe consists of plasma.

### Summary of the invention

The invention provides a device according to claim 1, an assembly according to claim 7 and a method according to claim 10.

Nuclear fusion takes place with such a device and method in a plasma with hydrogen (protium (H) in the presence of palladium as a catalyst (or another material with similar properties) like tungsten) in a powerful electromagnetic field.

The energy released according to the invention is collected with existing techniques with which power and/or heat can then be generated. Such a combined system can be used for the generation of electricity and/or heat. The present invention describes how hydrogen (protium) in plasma phase, under the influence of a powerful electromagnetic field, in palladium ((or another material with similar properties) such as tungsten) is absorbed where the hydrogen nuclei can merge. Palladium (or another material with similar properties) functions here as a catalyst. With this proces energy is released.

The relevant equations (using the theory [0]) in the nuclear fusion are:

- $2x_1 \text{ mol } \{\text{protium ( H) + e- + 1-db}\} \leftrightarrow x_1 \text{ mol deuterium ( H) [1]}$
- $y_1 \text{ mol } \{\text{deuterium ( H) + protium ( H) + e- 15 + 1-db}\} \leftrightarrow y_1 \text{ mol tritium ( H) [2]}$
- $z_1 \text{ mol } \{\text{deuterium ( H) + tritium ( H)}\} \rightarrow z_1 \text{ mol } \{\text{helium ( He) + neutron ( n)}\} + z_1 \times 17,6 \text{ MeV [3]}$

If the reactions go through one-to-one to the end reaction [3] then this yields the following equations:

- $4x_1 \text{ mol } \{\text{protium ( H) + e- 20 + 1-db}\} \leftrightarrow 2x_1 \text{ mol deuterium ( H)}$
- $x_1 \text{ mol } \{\text{deuterium ( H) + protium ( H) + e- + 1-db}\} \leftrightarrow x_1 \text{ mol tritium ( H)}$
- $x_1 \text{ mol } \{\text{deuterium ( H) + tritium ( H)}\} \rightarrow x_1 \text{ mol } \{\text{helium ( He) + neutron ( n)}\} + x_1 \times 17,6 \text{ MeV}$

The total reaction equation is:

- $5x_1 \text{ mol } \{\text{protium ( H) + e- 25 + 1-db}\} \rightarrow x_1 \text{ mol } \{\text{helium ( He) + neutron ( n)}\} + 5x_1 \times 17,6 \text{ MeV [4]}$

Note 1:

The numbers  $x_1$ ,  $y_1$  and  $z_1$  are random.

Note 2:

Assumed is that the electron becomes the consumed reaction product (equation [1] and [2]) and comes from the original hydrogen atom (H·).

Note 3:

Comparable processes take place in atomic hydrogen welding. Very high temperatures can be built up with atomic hydrogen welding, even higher than the melting point of the element with the highest melting point: tungsten (3422 ° C). This is achieved because hydrogen gas (H<sub>2</sub>) is guided by an arc between two tungsten electrodes. This invention is from Irving Langmuir. Irving Langmuir has won the nobel prize for chemistry (1932) for his merits in the area of surface chemistry. The extremely high temperatures generated that can be achieved via the invention of Irving Langmuir can not be explained with the current insights (excluding the theory [0]).

Note 4:

During the fusion process as described here also photons are generated until the moment that protium is consumed for an important part. This process is described in the patent NL: 2018126. Within an Inert Gas Discharge Tube (invention of Tesla) a plasma is created with sufficient hydrogen



(protium (H)) in the presence of palladium (or in the presence of another material with similar properties such as tungsten). The plasma is being brought in a powerful electromagnetic field (fig 1). The electromagnetic field must be so powerful that the atoms protium (H) act like magnets "Like-minded" and will focus within the field. In the plasma - in or on the surface of the palladium (or other materials with similar properties such as tungsten) - nuclear fusion takes place in accordance with the equations [1], [2], [3] and [4]. The device can be controlled, among other things, by varying the size of the surface of the palladium present (or another material with similar properties). The device can be set up in batches in which the protium is used up. The device can be operated as a continuous process where hydrogen is continuously administered to the plasma. Helium is to be separated then. The setup can be placed in a Faraday cage to eliminate potential disturbing fields. The energy released according to the invention is collected with existing techniques that can then be used to generate electricity and/or heat. Such a combined system can be used in various ways for the purpose of generating power and/or heat.

Brief description of the figures

Fig. 1 schematically shows a cross-sectional view of an example of a device with the aid of which the photons can be generated.

Fig. 1: A schematical cross-sectional view of an example of a device with the aid of which the photons can be generated.

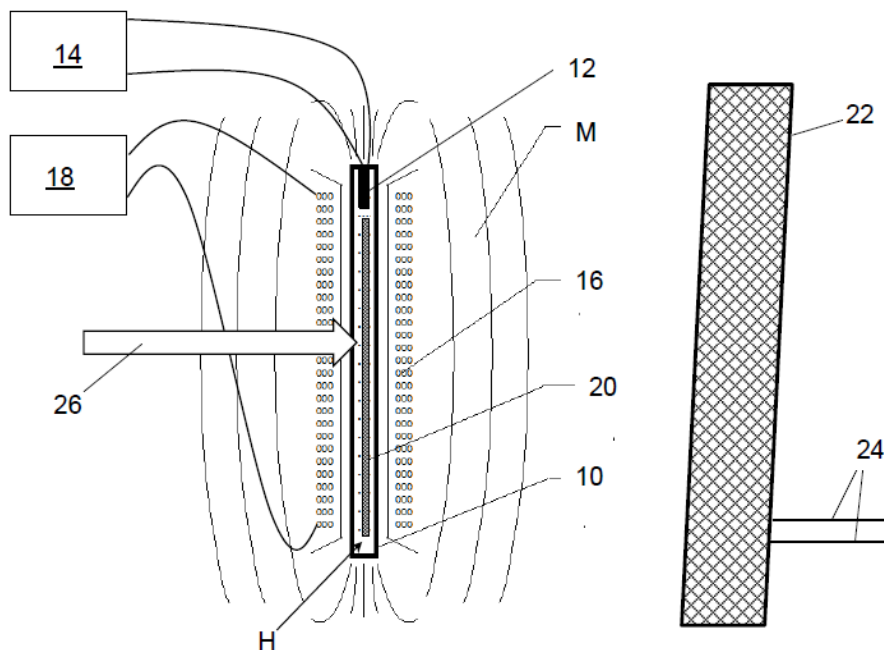


Fig. 1

### Detailed description

An example of the device is shown in figure 1.

In the most general terms, the invention provides a device for performing a nuclear fusion process comprising:

- a housing 10 filled with hydrogen H;
- an electrode 12 arranged in or near the housing 10 for forming of a plasma (protium (H)) with the hydrogen;
- a power supply 14 for electrically energizing the electrode 12;
- a device 16, 18 for creating a magnetic field M in the housing 10; and
- palladium 20 or another material with similar properties such as tungsten incorporated in the housing 10.

In an embodiment, the housing can be tubular and extend in an axial direction. The device for creating a magnetic field in the housing may include a coil 16 provided with electrically conducting windings. The windings 16 are wrapped around the tubular housing 10 to form a magnetic field in the tubular housing 10 extending in the axial direction.

In an embodiment, the power supply for the electrode 12 can be an AC power supply 14 with a voltage in the range of 2-10 kV and a frequency in the range of 20 - 50 kHz.

In an embodiment, the power supply for the electrode 12 can be a direct current source as well as a high-voltage transformer and a electronic high-frequency oscillator.

In an embodiment, the device for creating a magnetic field in the housing comprises a coil 16 connected to a direct current source 18.

In an embodiment, the direct current source 18 may be a battery.

Arrow 26 in the figure represents the supply of the zero-point particles or 1-db particles from the universe. The 1-db particles are described above in the theoretical background and are also mentioned in the above formula [1], [2] and [4].

Further, an assembly is provided of the above described device and a converter 22 for converting the in the nuclear fusion produced energy in electrical power and/or heat.

In an embodiment, the transducer 22 can include a photovoltaic cell.

In an embodiment, the converter 22 can have a heat exchanger comprised for generating heat in a heat transfer medium, such as a liquid or a gas.

The electric power or the heated liquid or the heated gas can be supplied to a consumer via lines 24.

Finally, a method is provided for performing a fusion process for the production of energy. The method includes:

providing hydrogen;  
to provide palladium 20 or the like with comparable properties such as tungsten in the hydrogen material;  
creating a plasma (protium (H)) with the hydrogen through it forming an electric field therein; and  
creating a magnetic field in the plasma;  
with the influence of the circumstances thus created nuclear fusion occurs and helium and neutrons form by release of energy.

In an embodiment, the electric field can be an alternating voltage field that is formed by an electrode 12 that is connected to an alternating voltage source 14.

In an embodiment, the magnetic field M can be constant and be formed by a coil 16 connected to a DC voltage source 18.

In an embodiment, the method can further comprise converting the energy produced by the nuclear fusion into heat by means of heating a medium such as a gas or a liquid and/or in electric power.

### Conclusions

1. An apparatus for performing a nuclear fusion process comprising:
  - a housing filled with hydrogen;
  - an electrode arranged in or near the housing to form a plasma (protium (H)) with the hydrogen;
  - a power supply for electrically energizing the electrode;
  - a device for creating a magnetic field in the housing; and
  - palladium or other material with similar properties like tungsten that is included in the housing.
2. The device according to claim 1, wherein the housing is tubular and extends in an axial direction, and wherein the device for the creating a magnetic field in the housing comprises a coil provided with electrically conductive windings, the windings wrapped around a tubular housing to form a magnetic field in the tubular housing extending in the axial direction.
3. The device according to one of the preceding claims, wherein the power supply for the electrode is an AC power supply with a voltage in the range of 2-10 kV and a frequency in the range of 20 - 50 kHz.
4. The device according to claim 3, wherein the power supply for the electrode comprises a direct current source and a high voltage transformer and an electronic high-frequency oscillator.
5. The device according to one of the preceding claims, wherein the device for creating a magnetic field in the housing is a coil which is connected to a direct current source.

6. The device according to claim 1, that the direct current source is a battery.
7. An assembly of the device according to one of the foregoing conclusions and a converter for converting the in the nuclear fusion produced energy in electrical power and/or heat.
8. The assembly according to claim 7, wherein the transducer is a photovoltaic cell.
9. The assembly according to claim 8 or 9, wherein the transducer comprises a heat exchanger for generating heat in a heat transfer medium, such as a liquid or a gas.
10. A method for performing a nuclear fusion process for the benefit of producing energy including:
  - providing hydrogen;
  - providing palladium or another material with comparable properties such as tungsten in the hydrogen;
  - creating a plasma (protium (H)) with the hydrogen through it forming an electric field therein; and
  - creating a magnetic field in the plasma;
  - with the influence of the circumstances thus created nuclear fusion occurs and helium and neutrons form by release of energy.
11. The method according to claim 10, wherein the electric field is an alternating voltage field that is formed by an electrode that is connected to an AC voltage source.
12. The method according to claim 10 or 11, wherein the magnetic field is constant and is formed by a coil that is connected to a DC voltage source.
13. The method according to one of the preceding claims, further including:
  - converting the energy produced by the nuclear fusion into heat by heating a medium such as a gas or a liquid and/or in electric power.

**End of document Patent NL: 2018127**

## Addendum IV - Computer program sources

Addendum IV shows the source codes of the Borland C computer programs 'Newton' and 'Einstein', preceded by a MS Quick Basic example of  $\mu$  movement analysis.

The MS Quick Basic model and the first Borland C model are an interpretation of the Newtonian gravitational laws. The second Borland C model is a three dimensional snapshot of curvatures of spacetime caused by the most elementary possible particles ( $\mu$ 's) as derived from Einstein's ideas. Another model would be the model Newton combined with the model Einstein and there the time fragmentation in the model Newton comes in, it should act as the per  $\mu$  experienced curvature caused by all other  $\mu$ 's in spacetime. The final model would be where formula (0) could be incorporated in the cartesian coordinate system, splitting the calculation of the bending of space and the delay of time. The how to is to be found in the goniometric area of Riemann mathematics.

### 1) db movement analysis (MS Quick Basic)

REM (C) G.J. Smit, Nijmegen, Nederland

REM This software is published under the GNU General Public License v3.0

REM Program purpose: db movement analysis

KEY(1) ON: ON KEY(1) GOSUB afrondschoonscherm

KEY(2) ON: ON KEY(2) GOSUB andermode

KEY(3) ON: ON KEY(3) GOSUB nieuwecoordinaten

KEY(4) ON: ON KEY(4) GOSUB windowgrootte

KEY(5) ON: ON KEY(5) GOSUB sterktezwaartekracht

KEY(6) ON: ON KEY(6) GOSUB nieuwaantaldeeltjes

KEY(7) ON: ON KEY(7) GOSUB lijnmetwis

KEY(8) ON: ON KEY(8) GOSUB lijnzonderwis

KEY(9) ON: ON KEY(9) GOSUB willekeuroud

KEY(10) ON: ON KEY(10) GOSUB willekeurnieuw

DIM x(100, 103), y(100, 103), z(100, 103), xfz(100), yfz(100), zfz(100)

DIM x2d(200), y2d(200)

SCREEN 12, 0: CLS

xyz = 100

mfz = .1

aantal = 3

scherm = 1

begincord = 1

lijn = 0

willoud = 100

willnieuw = 1

wg = 3 \* willoud

afrond = 0

WINDOW (-wg, wg)-(wg, -wg)

prog = 1

WHILE prog > 0

CLS

FOR tel = 0 TO aantal - 1

x(tel, 0) = (RND(1) \* 2 \* willoud) - willoud: x(tel, 1) = x(tel, 0) + (RND(1) \* 2 \* willnieuw) - willnieuw

y(tel, 0) = (RND(1) \* 2 \* willoud) - willoud: y(tel, 1) = y(tel, 0) + (RND(1) \* 2 \* willnieuw) - willnieuw

z(tel, 0) = (RND(1) \* 2 \* willoud) - willoud: z(tel, 1) = z(tel, 0) + (RND(1) \* 2 \* willnieuw) - willnieuw

NEXT tel

IF begincord = 1 THEN GOSUB bcord

GOSUB status

prog = 2

WHILE prog > 1

FOR tel1 = 0 TO aantal - 1

$x(\text{tel1}, 2) = x(\text{tel1}, 1) - x(\text{tel1}, 0)$

$y(\text{tel1}, 2) = y(\text{tel1}, 1) - y(\text{tel1}, 0)$

$z(\text{tel1}, 2) = z(\text{tel1}, 1) - z(\text{tel1}, 0)$

FOR tel2 = tel1 TO aantal - 1

$x(\text{tel1}, 3 + \text{tel1}) = x(\text{tel2}, 1) - x(\text{tel1}, 1)$

$y(\text{tel1}, 3 + \text{tel1}) = y(\text{tel2}, 1) - y(\text{tel1}, 1)$

$z(\text{tel1}, 3 + \text{tel1}) = z(\text{tel2}, 1) - z(\text{tel1}, 1)$

$x(\text{tel2}, 3 + \text{tel2}) = -x(\text{tel1}, 3 + \text{tel1})$

$y(\text{tel2}, 3 + \text{tel2}) = -y(\text{tel1}, 3 + \text{tel1})$

$z(\text{tel2}, 3 + \text{tel2}) = -z(\text{tel1}, 3 + \text{tel1})$

$x(\text{tel1}, 3 + \text{aantal} + \text{tel1}) = \text{ABS}(x(\text{tel1}, 3 + \text{tel1}))$

$y(\text{tel1}, 3 + \text{aantal} + \text{tel1}) = \text{ABS}(y(\text{tel1}, 3 + \text{tel1}))$

$z(\text{tel1}, 3 + \text{aantal} + \text{tel1}) = \text{ABS}(z(\text{tel1}, 3 + \text{tel1}))$

$x(\text{tel2}, 3 + \text{aantal} + \text{tel2}) = \text{ABS}(x(\text{tel2}, 3 + \text{tel2}))$

$y(\text{tel2}, 3 + \text{aantal} + \text{tel2}) = \text{ABS}(y(\text{tel2}, 3 + \text{tel2}))$

$z(\text{tel2}, 3 + \text{aantal} + \text{tel2}) = \text{ABS}(z(\text{tel2}, 3 + \text{tel2}))$

NEXT tel2

NEXT tel1

FOR tel1 = 0 TO aantal - 1

$\text{xfz}(\text{tel1}) = 0$

$\text{y fz}(\text{tel1}) = 0$

$\text{zfz}(\text{tel1}) = 0$

FOR tel2 = 0 TO aantal - 1

IF  $x(\text{tel1}, 3 + \text{aantal} + \text{tel2}) > 0$  THEN  $\text{xfz}(\text{tel1}) = \text{xfz}(\text{tel1}) + x(\text{tel1}, 3 + \text{tel2}) * \text{mfz} / x(\text{tel1}, 3 + \text{aantal} + \text{tel2})$

IF  $y(\text{tel1}, 3 + \text{aantal} + \text{tel2}) > 0$  THEN  $\text{y fz}(\text{tel1}) = \text{y fz}(\text{tel1}) + y(\text{tel1}, 3 + \text{tel2}) * \text{mfz} / y(\text{tel1}, 3 + \text{aantal} + \text{tel2})$

IF  $z(\text{tel1}, 3 + \text{aantal} + \text{tel2}) > 0$  THEN  $\text{zfz}(\text{tel1}) = \text{zfz}(\text{tel1}) + z(\text{tel1}, 3 + \text{tel2}) * \text{mfz} / z(\text{tel1}, 3 + \text{aantal} + \text{tel2})$

```

NEXT tel2

x(tel1, 0) = x(tel1, 1)

IF afrond = 0 THEN x(tel1, 1) = x(tel1, 0) + x(tel1, 2) + xfz(tel1) ELSE x(tel1, 1) = INT(x(tel1, 0) + x(tel1, 2) + xfz(tel1))

y(tel1, 0) = y(tel1, 1)

IF afrond = 0 THEN y(tel1, 1) = y(tel1, 0) + y(tel1, 2) + yfz(tel1) ELSE y(tel1, 1) = INT(y(tel1, 0) + y(tel1, 2) + yfz(tel1))

z(tel1, 0) = z(tel1, 1)

IF afrond = 0 THEN z(tel1, 1) = z(tel1, 0) + z(tel1, 2) + zfz(tel1) ELSE z(tel1, 1) = INT(z(tel1, 0) + z(tel1, 2) + zfz(tel1))

NEXT tel1

```

```

midx = 0

```

```

midy = 0

```

```

midz = 0

```

```

FOR tel = 0 TO aantal - 1

```

```

midx = midx + x(tel, 1)

```

```

midy = midy + y(tel, 1)

```

```

midz = midz + z(tel, 1)

```

```

NEXT tel

```

```

midx = midx / aantal

```

```

midy = midy / aantal

```

```

midz = midz / aantal

```

```

w2dx = midy - midx * .5

```

```

w2dy = midz - midx * .5

```

```

IF lijn = 2 THEN GOSUB wislijn:

```

```

FOR tel = 0 TO aantal - 1

```

```

x2d(tel) = y(tel, 1) - x(tel, 1) * .5

```

```

y2d(tel) = z(tel, 1) - x(tel, 1) * .5

```



NEXT tel

WINDOW (-wg + w2dx, wg + w2dy)-(wg + w2dx, -wg + w2dy)

IF lijn = 0 THEN GOSUB tekenpunt: ELSE GOSUB tekenlijn:

WEND

WEND

andermode:

scherm = scherm + 1

IF scherm > 2 THEN scherm = 0

IF scherm = 0 THEN SCREEN 9, 0: WIDTH 80, 43: COLOR 1, 10

IF scherm = 1 THEN SCREEN 12: WIDTH 80, 60

IF scherm = 2 THEN SCREEN 13

GOSUB status

RETURN

afrondschoonscherm:

IF afrond = 0 THEN afrond = 1 ELSE afrond = 0

GOSUB status

RETURN

nieuwecoordinaten:

prog = 1

CLS

RETURN

sterktezwaartekracht:

PRINT "Mate van zwaartekracht is: "; mfz

INPUT "Nieuwe mate: ", mfz

GOSUB status

RETURN

nieuwaaantaldeeltjes:

PRINT "Aantal deeltjes is: "; aantal

INPUT "Nieuw aantal: ", aantal

IF aantal < 1 THEN aantal = 1

IF aantal > 50 THEN aantal = 50

CLS

prog = 1

RETURN

windowgrootte:

PRINT "Windowgrootte is: "; wg

INPUT "Nieuwe grootte: ", wg

IF wg < 10 THEN wg = 10

IF wg > 500 THEN wg = 500

GOSUB status:

RETURN

willekeuroud:

PRINT "Randomize oude coördinaat is: "; willoud

INPUT "Nieuwe randomize factor: "; willoud

IF willoud < 1 THEN willoud = 1

IF willoud > 10000 THEN willoud = 10000

wg = 3 \* willoud

CLS

prog = 1

RETURN

willekeurnieuw:

PRINT "Randomize nieuwe coördinaat is: "; willnieuw

INPUT "Nieuwe randomize factor: "; willnieuw

IF willnieuw < .0000001 THEN willoud = .0000001

IF willnieuw > 1000 THEN willnieuw = 1000

CLS

prog = 1

RETURN

lijnzonderwis:

IF lijn = 1 THEN lijn = 0 ELSE lijn = 1

CLS

IF lijn = 0 THEN GOSUB status:

RETURN

lijnmetwis:

IF lijn = 2 THEN lijn = 0 ELSE lijn = 2

CLS

IF lijn = 0 THEN GOSUB status:

RETURN

bcord:

begincord = 0

x(0, 0) = xyz: x(0, 1) = xyz

y(0, 0) = 0: y(0, 1) = -.9

z(0, 0) = 0: z(0, 1) = .9

x(1, 0) = 0: x(1, 1) = .9

y(1, 0) = xyz: y(1, 1) = xyz

z(1, 0) = 0: z(1, 1) = -.9

x(2, 0) = 0: x(2, 1) = -.9

y(2, 0) = 0: y(2, 1) = .9

z(2, 0) = xyz: z(2, 1) = xyz

RETURN

tekenpunt:

FOR tel = 0 TO aantal - 1

PSET (x2d(tel), y2d(tel)), 7 + tel

NEXT tel

RETURN

tekenlijn:

FOR tel1 = 0 TO aantal - 1

FOR tel2 = tel1 TO aantal - 1

LINE (x2d(tel1), y2d(tel1))-(x2d(tel2), y2d(tel2)), 2 + tel1 + tel2

NEXT tel2

NEXT tel1

RETURN

wislijn:

CLS

RETURN

status:

CLS

IF scherm = 0 THEN PRINT "EGA (16k)"

IF scherm = 1 THEN PRINT "VGA (16k)"

IF scherm < 2 THEN PRINT "Window-grootte :"; wg

IF scherm < 2 THEN PRINT "Sterkte Fzwaarte:"; mfz

IF scherm < 2 THEN PRINT "Aantal 1db's :"; aantal

IF scherm < 2 THEN PRINT "r\_oud :"; willoud

IF scherm < 2 THEN PRINT "r\_nieuw :"; willnieuw

IF scherm < 2 THEN PRINT "Afronding c\_oud :"; afrond

RETURN

## 2) Program Newton (Borland C)

```
// (C) 1996 G.J. Smit, Nijmegen, Nederland

// This software is published under the GNU General Public License v3.0

// The program 'Newton' is a n-body model where simultaneously for the positions of multiple dimensional basics (theoretical infinite curvature) moving through spacetime interact with each other according to gravitational laws.

#include "stdio.h"

#include "stdlib.h"

#include "conio.h"

#include "string.h"

#include "float.h"

#include "math.h"

#include "graphics.h"

#include "svga256.h"

FILE *bestand;      // Pointer voor geopend bestand.

char b_naam[12];    // Naam van actief bestand.

char b_test;       // Controle voor bestaan bestand.

char toets;        // Variabele voor ingedrukte toets.

int t1,t2,t3,t4;   // Tellers voor lussen.

int stap,dim,deel; // Aantal stappen, dimensies en deeltjes.

int spoor;         // Lengte afbeelding in tijd per deeltje.

int prog;         // Programma einde.

int i_temp;       // Tijdelijk opslag integer.

int midd;        // Middelpunt in tekening aan/uit.

int modus;       // Kleur per deel/diepte.

float w_g, w_x, w_y; // Windowgrootte, x en y coördinaatgrootte.

float x_max, y_max; // Aantal pixels op beeldscherm.

float t_frag, grens; // Tijdfragmentatie en grenswaarde ruimte.

float r_o, r_n;    // Bereik willekeurige begincoördinaten.

float fzx, fzy, fzz; // Zwaartekracht per as.

float g_temp;     // Grenswaarde wisseling.
```

```

float f_temp;      // Tijdelijk opslag float.

float midx, midy;  // Middelpunt berekening-variabelen.

float diepte;     // Kleur-diepte variabele.

float huge x3[1851][4]; // Maximaal 250 x3d-coördinaten.

float huge y3[1851][4]; // Maximaal 250 y3d-coördinaten.

float huge z3[1851][4]; // Maximaal 250 z3d-coördinaten.

float huge x2[1851][30]; // Maximaal 30 x2d-coördinaten per deeltje.

float huge y2[1851][30]; // Maximaal 30 y2d-coördinaten per deeltje.

int huge DetectSvga256(){ int Vid; Vid=4; return Vid; }

void theorie(void) // Rekenkundig variabele verhoudingen.

{ t1=0; t2=2639;

  installuserdriver("Svga256",DetectSvga256);

  initgraph(&t1,&t2,"");

  setcolor(7);

  for(t1=0; t1<20; t1++)

  { line(x_max/2+200-t1*10, y_max/2, x_max/2, y_max/2+t1*10);

    line(x_max/2-t1*10, y_max/2, x_max/2, y_max/2+200-t1*10);

    line(x_max/2-200+t1*10, y_max/2, x_max/2, y_max/2-t1*10);

    line(x_max/2+t1*10, y_max/2, x_max/2, y_max/2-200+t1*10);

  }

  getch();

  closegraph();

}

void varbestand(void) // Variabele waarden bestand inlezen.

{ bestand=fopen(b_naam,"r");

  if(bestand==NULL) b_test=0;

  else

  { fscanf(bestand, "%d%d%f%f%f", &stap, &deel, &r_o, &r_n, &t_frag, &grens);

    if(grens!=0) w_g=1.5*grens;

```

```

    b_test=1;

}

fclose(bestand);

}

void menuopbeeld(void)

{ clrscr();

  textcolor(10);

  printf("[b]estandsnaam  ");

  if(b_test==0) printf("-"); else printf("+");

  printf(" : %s\n\n", b_naam);

  printf("[c]oördinaten\n");

  printf("[w]illekeur   : %f\n", r_o);

  printf("[r]ichting    : %f\n\n", r_n);

  printf("[t]ijdfragmentatie : %f\n", t_frag);

  printf("[g]rens       : %f\n\n", grens);

  printf("[s]tappen      : %d\n", stap);

  printf("[d]eel        : %d\n\n", deel);

  printf("[v]enster      : %f\n", w_g);

  printf("[p]rojectie    : %d\n", spoor);

  printf("M goedmaken voor 3d: ");

//printf("[m]iddelpunt   : ");

  if(midd==0) printf("uit\n"); else printf("aan\n");

  printf("[k]leurmodus    : ");

  if(modus==0) printf("deel\n\n\n"); else printf("diepte\n\n\n");

  printf("[R]ekenen [E]n [T]ekenen [S]toppen\n\n\n");

}

void menuvraag(void)

{ toets=getch();

  if(toets==98) { printf("Nieuwe bestandsnaam? ");

    scanf("%s", &b_naam); }

```

```

if(toets==99) { printf("Invoer coördinaten, nog programmeren...");
    getch(); }

if(toets==119) { f_temp=r_o; printf("Maximale willekeur? ");
    scanf("%f", &r_o);
    if(r_o<0||r_o==0||r_o>30000) r_o=f_temp; }

if(toets==114) { f_temp=r_n; printf("Maximale richting? ");
    scanf("%f", &r_n);
    if(r_n<0||r_o==0||r_o>2500) r_o=f_temp; }

if(toets==116) { f_temp=t_frag; printf("Nieuwe tijdfragmentatie? ");
    scanf("%f", &t_frag);
    if(t_frag<0||t_frag==0||t_frag>1) t_frag=f_temp; }

if(toets==103) { f_temp=grens; printf("Grens van ruimte? ");
    scanf("%f", &grens);
    if(grens<0||grens>32500) grens=f_temp; }

if(toets==115) { i_temp=stap; printf("Aantal stappen? ");
    scanf("%d", &stap);
    if(stap<1||stap>32500) stap=i_temp; }

if(toets==100) { i_temp=deel; printf("Aantal deeltjes? ");
    scanf("%d", &deel);
    if(deel<2||deel>1850) deel=i_temp; }

if(toets==118) { f_temp=w_g; printf("Venstergrootte? ");
    scanf("%f", &w_g);
    if(w_g<0||w_g==0||w_g>32500) w_g=f_temp; }

if(toets==112) { i_temp=spoor; printf("Aantal fragmenten? ");
    scanf("%d", &spoor);
    if(spoor<0||spoor>30) spoor=i_temp; }

if(toets==109) { if(midd==0) midd=1; else midd=0; }

if(toets==107) { if(modus==0) modus=1; else modus=0; }

}

void willekeur(void)

{ for(t1=0;t1<deel;t1++)

```



```

{ x3[t1][0]=2*(random(32767)*r_o/32767)-r_o;
  y3[t1][0]=2*(random(32767)*r_o/32767)-r_o;
  z3[t1][0]=2*(random(32767)*r_o/32767)-r_o;
  x3[t1][1]=x3[t1][0]+2*(random(32767)*r_n/32767)-r_n;
  y3[t1][1]=y3[t1][0]+2*(random(32767)*r_n/32767)-r_n;
  z3[t1][1]=z3[t1][0]+2*(random(32767)*r_n/32767)-r_n;
}
}

void reken(void) // Kaal [R]ekenen, snelste routine.

{ // Bestand voor coördinaten openen.

  bestand=fopen(b_naam,"w");

  fprintf(bestand, "%d %d %f %f %f %f", stap, deel, r_o, r_n, t_frag, grens);

  for(t1=0;t1<deel;t1++)

  fprintf(bestand, " %f %f %f", x3[t1][1], y3[t1][1], z3[t1][1]);

  // Coördinaten berekenen, schrijven naar disk en naar tekst-beeldscherm.

  for(t1=0;t1<stap;t1++)

  { for(t2=0;t2<deel;t2++)

    { x3[t2][3]=0;

      y3[t2][3]=0;

      z3[t2][3]=0;

    }

    for(t2=0;t2<deel;t2++)

    { x3[t2][2]=x3[t2][1]-x3[t2][0];

      y3[t2][2]=y3[t2][1]-y3[t2][0];

      z3[t2][2]=z3[t2][1]-z3[t2][0];

      for(t3=t2;t3<deel;t3++)

      { fzx=x3[t3][1]-x3[t2][1];

        fzy=y3[t3][1]-y3[t2][1];

        fzz=z3[t3][1]-z3[t2][1];

        if(fzx!=0) { fzx=1/fzx; x3[t2][3]=x3[t2][3]+fzx;

```

```

        x3[t3][3]=x3[t3][3]-fzx; }

if(fzy!=0) { fzy=1/fzy; y3[t2][3]=y3[t2][3]+fzy;

        y3[t3][3]=y3[t3][3]-fzy; }

if(fzz!=0) { fzz=1/fzz; z3[t2][3]=z3[t2][3]+fzz;

        z3[t3][3]=z3[t3][3]-fzz; }

}

x3[t2][0]=x3[t2][1];

y3[t2][0]=y3[t2][1];

z3[t2][0]=z3[t2][1];

x3[t2][1]=x3[t2][0]+x3[t2][2]+x3[t2][3];

y3[t2][1]=y3[t2][0]+y3[t2][2]+y3[t2][3];

z3[t2][1]=z3[t2][0]+z3[t2][2]+z3[t2][3];

}

for(t2=0;t2<deel;t2++)

fprintf(bestand, " %f %f %f", x3[t2][1], y3[t2][1], z3[t2][1]);

putchar(13); printf("%d",t1+1);

}

fclose(bestand);

b_test=1;

}

void rekenmetopties(void) // [R]ekenen met grens en/of t_frag aan.

{ // Bestand voor coördinaten openen.

bestand=fopen(b_naam,"w");

fprintf(bestand, "%d %d %f %f %f %f", stap, deel, r_o, r_n, t_frag, grens);

for(t1=0;t1<deel;t1++)

fprintf(bestand, " %f %f %f", x3[t1][1], y3[t1][1], z3[t1][1]);

// Coördinaten berekenen, schrijven naar disk en naar tekst-beeldscherm.

for(t1=0;t1<stap;t1++)

{ for(t2=0;t2<deel;t2++)

{ x3[t2][3]=0;

```

```

y3[t2][3]=0;

z3[t2][3]=0;

}

for(t2=0;t2<deel;t2++)

{ x3[t2][2]=x3[t2][1]-x3[t2][0];

y3[t2][2]=y3[t2][1]-y3[t2][0];

z3[t2][2]=z3[t2][1]-z3[t2][0];

for(t3=t2;t3<deel;t3++)

{ fzx=x3[t3][1]-x3[t2][1];

fzy=y3[t3][1]-y3[t2][1];

fzz=z3[t3][1]-z3[t2][1];

if(fzx!=0) { fzx=1/fzx; x3[t2][3]=x3[t2][3]+fzx;

x3[t3][3]=x3[t3][3]-fzx; }

if(fzy!=0) { fzy=1/fzy; y3[t2][3]=y3[t2][3]+fzy;

y3[t3][3]=y3[t3][3]-fzy; }

if(fzz!=0) { fzz=1/fzz; z3[t2][3]=z3[t2][3]+fzz;

z3[t3][3]=z3[t3][3]-fzz; }

}

// Bewerk coördinaten als t_frag ongelijk aan 1.

if(t_frag!=1)

{ x3[t2][2]=x3[t2][2]*t_frag; x3[t2][3]=x3[t2][3]*t_frag;

y3[t2][2]=y3[t2][2]*t_frag; y3[t2][3]=y3[t2][3]*t_frag;

z3[t2][2]=z3[t2][2]*t_frag; z3[t2][3]=z3[t2][3]*t_frag;

}

// Bepaal de nieuwe coördinaten.

x3[t2][0]=x3[t2][1];

y3[t2][0]=y3[t2][1];

z3[t2][0]=z3[t2][1];

x3[t2][1]=x3[t2][0]+x3[t2][2]+x3[t2][3];

y3[t2][1]=y3[t2][0]+y3[t2][2]+y3[t2][3];

z3[t2][1]=z3[t2][0]+z3[t2][2]+z3[t2][3];

// Test grensoverschrijding.

```

```

if(grens>0)

{ if(x3[t2][1]<-grens||x3[t2][1]>grens)

  { g_temp=x3[t2][1]; x3[t2][1]=-x3[t2][0]; x3[t2][0]=-g_temp; }

if(y3[t2][1]<-grens||y3[t2][1]>grens)

  { g_temp=y3[t2][1]; y3[t2][1]=-y3[t2][0]; y3[t2][0]=-g_temp; }

if(z3[t2][1]<-grens||z3[t2][1]>grens)

  { g_temp=z3[t2][1]; z3[t2][1]=-z3[t2][0]; z3[t2][0]=-g_temp; }

}

}

for(t2=0;t2<deel;t2++)

fprintf(bestand, " %f %f %f", x3[t2][1], y3[t2][1], z3[t2][1]);

putchar(13); printf("%d",t1+1);

}

fclose(bestand);

b_test=1;

}

void rekenenteken(void) // [E]n.

{ t1=0; t2=2639;

installuserdriver("Svga256",DetectSvga256);

initgraph(&t1,&t2,"");

w_x=(x_max+1)/(w_g*2); w_y=(y_max+1)/(w_g*2);

printf("   |%d|%d|%f|%f|%f|%f|%f|%d|s",

      stap, deel, r_o, r_n, t_frag, grens, w_g, spoor, b_naam);

gotoxy(0,0);

midd=0; spoor=0; modus=0;

// Bestand voor coördinaten openen.

bestand=fopen(b_naam,"w");

fprintf(bestand, "%d %d %f %f %f %f", stap, deel, r_o, r_n, t_frag, grens);

for(t1=0;t1<deel;t1++)

fprintf(bestand, " %f %f %f", x3[t1][1], y3[t1][1], z3[t1][1]);

```

// Coördinaten berekenen, schrijven naar disk en naar grafisch beeldscherm.

```
for(t1=0;t1<stap;t1++)
{
  for(t2=0;t2<deel;t2++)
  {
    x3[t2][3]=0;
    y3[t2][3]=0;
    z3[t2][3]=0;
  }
  for(t2=0;t2<deel;t2++)
  {
    x3[t2][2]=x3[t2][1]-x3[t2][0];
    y3[t2][2]=y3[t2][1]-y3[t2][0];
    z3[t2][2]=z3[t2][1]-z3[t2][0];
    for(t3=t2;t3<deel;t3++)
    {
      fzx=x3[t3][1]-x3[t2][1];
      fzy=y3[t3][1]-y3[t2][1];
      fzz=z3[t3][1]-z3[t2][1];
      if(fzx!=0) { fzx=1/fzx; x3[t2][3]=x3[t2][3]+fzx;
                  x3[t3][3]=x3[t3][3]-fzx; }
      if(fzy!=0) { fzy=1/fzy; y3[t2][3]=y3[t2][3]+fzy;
                  y3[t3][3]=y3[t3][3]-fzy; }
      if(fzz!=0) { fzz=1/fzz; z3[t2][3]=z3[t2][3]+fzz;
                  z3[t3][3]=z3[t3][3]-fzz; }
    }
  }
  // Bewerk coördinaten als t_frag ongelijk aan 1.
  if(t_frag!=1)
  {
    x3[t2][2]=x3[t2][2]*t_frag; x3[t2][3]=x3[t2][3]*t_frag;
    y3[t2][2]=y3[t2][2]*t_frag; y3[t2][3]=y3[t2][3]*t_frag;
    z3[t2][2]=z3[t2][2]*t_frag; z3[t2][3]=z3[t2][3]*t_frag;
  }
  // Bepaal de nieuwe coördinaten.
  x3[t2][0]=x3[t2][1];
  y3[t2][0]=y3[t2][1];
```

```

z3[t2][0]=z3[t2][1];

x3[t2][1]=x3[t2][0]+x3[t2][2]+x3[t2][3];

y3[t2][1]=y3[t2][0]+y3[t2][2]+y3[t2][3];

z3[t2][1]=z3[t2][0]+z3[t2][2]+z3[t2][3];

// Test grensoverschrijding.

if(grens>0)

{ if(x3[t2][1]<-grens||x3[t2][1]>grens)

  { g_temp=x3[t2][1]; x3[t2][1]=-x3[t2][0]; x3[t2][0]=-g_temp; }

  if(y3[t2][1]<-grens||y3[t2][1]>grens)

  { g_temp=y3[t2][1]; y3[t2][1]=-y3[t2][0]; y3[t2][0]=-g_temp; }

  if(z3[t2][1]<-grens||z3[t2][1]>grens)

  { g_temp=z3[t2][1]; z3[t2][1]=-z3[t2][0]; z3[t2][0]=-g_temp; }

}

}

for(t2=0;t2<deel;t2++)

fprintf(bestand, " %f %f %f", x3[t2][1], y3[t2][1], z3[t2][1]);

for(t2=0;t2<deel;t2++)

{ x2[t2][0]=y3[t2][1]-x3[t2][1];

  y2[t2][0]=-z3[t2][1]+x3[t2][1]/2;

  x2[t2][0]=x_max/2-w_x*x2[t2][0];

  y2[t2][0]=y_max/2-w_y*y2[t2][0];

  putpixel(x2[t2][0],y2[t2][0],2+t2);

}

putchar(13); printf("%d",t1+1);

}

putchar(13); printf("Klaar");

fclose(bestand);

b_test=1;

getch();

closegraph();

}

```

```

void geendisk(void) // [A]leen rekenen en tekenen.

{ t1=0; t2=2639;

installuserdriver("Svga256",DetectSvga256);

initgraph(&t1,&t2,"");

w_x=(x_max+1)/(w_g*2); w_y=(y_max+1)/(w_g*2);

if(modus!=0) diepte=255/(w_g*2);

printf("   |%d|%d|%f|%f|%f|%f|%f|%f|XXXXXX",

        stap, deel, r_o, r_n, t_frag, grens, w_g, spoor);

gotoxy(0,0);

// Coördinaten berekenen, schrijven naar grafisch beeldscherm.

for(t1=0;t1<stap;t1++)

{ for(t2=0;t2<deel;t2++)

{ x3[t2][3]=0;

y3[t2][3]=0;

z3[t2][3]=0;

}

putchar(13);printf("%d", t1);

if(midd>0) { midx=0; midy=0; }

for(t2=0;t2<deel;t2++)

{ x3[t2][2]=x3[t2][1]-x3[t2][0];

y3[t2][2]=y3[t2][1]-y3[t2][0];

z3[t2][2]=z3[t2][1]-z3[t2][0];

for(t3=t2;t3<deel;t3++)

{ fzx=x3[t3][1]-x3[t2][1];

fzy=y3[t3][1]-y3[t2][1];

fzz=z3[t3][1]-z3[t2][1];

if(fzx!=0) { fzx=1/fzx; x3[t2][3]=x3[t2][3]+fzx;

x3[t3][3]=x3[t3][3]-fzx; }

if(fzy!=0) { fzy=1/fzy; y3[t2][3]=y3[t2][3]+fzy;

y3[t3][3]=y3[t3][3]-fzy; }

```

```

if(fzz!=0) { fzz=1/fzz; z3[t2][3]=z3[t2][3]+fzz;

                z3[t3][3]=z3[t3][3]-fzz; }

}

// Bewerk coördinaten als t_frag ongelijk aan 1.

if(t_frag!=1)

{ x3[t2][2]=x3[t2][2]*t_frag; x3[t2][3]=x3[t2][3]*t_frag;

  y3[t2][2]=y3[t2][2]*t_frag; y3[t2][3]=y3[t2][3]*t_frag;

  z3[t2][2]=z3[t2][2]*t_frag; z3[t2][3]=z3[t2][3]*t_frag;

}

// Bepaal de nieuwe coördinaten.

x3[t2][0]=x3[t2][1];

y3[t2][0]=y3[t2][1];

z3[t2][0]=z3[t2][1];

x3[t2][1]=x3[t2][0]+x3[t2][2]+x3[t2][3];

y3[t2][1]=y3[t2][0]+y3[t2][2]+y3[t2][3];

z3[t2][1]=z3[t2][0]+z3[t2][2]+z3[t2][3];

// Test grensoverschrijding.

if(grens>0)

{ if(x3[t2][1]<-grens||x3[t2][1]>grens)

  { g_temp=x3[t2][1]; x3[t2][1]=-x3[t2][0]; x3[t2][0]=-g_temp; }

  if(y3[t2][1]<-grens||y3[t2][1]>grens)

  { g_temp=y3[t2][1]; y3[t2][1]=-y3[t2][0]; y3[t2][0]=-g_temp; }

  if(z3[t2][1]<-grens||z3[t2][1]>grens)

  { g_temp=z3[t2][1]; z3[t2][1]=-z3[t2][0]; z3[t2][0]=-g_temp; }

}

}

for(t2=0;t2<deel;t2++)

{ x2[t2][0]=y3[t2][1]-x3[t2][1];

  y2[t2][0]=-z3[t2][1]+x3[t2][1]/2;

  if(midd>0)

  { midx=midx+x2[t2][0];

    midy=midy+y2[t2][0];

```



```

    }
}
if(midd>0) { midx=midx/deel; midy=midy/deel; }

for(t2=0;t2<deel;t2++)

{ if(midd>0)

    { x2[t2][0]=x_max/2+midx-w_x*x2[t2][0];

      y2[t2][0]=y_max/2+midy-w_y*y2[t2][0];

    }

else

    { x2[t2][0]=x_max/2-w_x*x2[t2][0];

      y2[t2][0]=y_max/2-w_y*y2[t2][0];

    }

if(modus==0) putpixel(x2[t2][0],y2[t2][0],2+t2);

else putpixel(x2[t2][0],y2[t2][0],1+(x3[t2][1]+w_g)*diepte);

if(spoor>0)

{ if(t1<spoor-1)

    { x2[t2][spoor-1-t1]=x2[t2][0]; y2[t2][spoor-1-t1]=y2[t2][0]; }

else

    { putpixel(x2[t2][spoor-1],y2[t2][spoor-1],0);

      for(t3=spoor-1;t3>0;t3--)

        { x2[t2][t3]=x2[t2][t3-1]; y2[t2][t3]=y2[t2][t3-1]; }

    }

}

putchar(13); printf("%d",t1+1);

}

putchar(13); printf("Klaar");

getch();

closegraph();

}

void teken(void)

```

```

{ t1=0; t2=2639;

installuserdriver("Svga256",DetectSvga256);

initgraph(&t1,&t2,"");

// Berekenen hoeveelheid pixels per ,nheid.

w_x=(x_max+1)/(w_g*2); w_y=(y_max+1)/(w_g*2);

bestand=fopen(b_naam,"r");

fscanf(bestand, "%d%d%f%f%f", &stap, &deel, &r_o, &r_n, &t_frag, &grens);

printf("  |%d|%d|%f|%f|%f|%f|%d|%s",

      stap, deel, r_o, r_n, t_frag, grens, w_g, spoor, b_naam);

if(modus!=0) diepte=255/(w_g*2);

for(t1=0;t1<stap+1;t1++)

{ putchar(13);printf("%d", t1);

if(midd>0) { midx=0; midy=0; }

for(t2=0;t2<deel;t2++)

fscanf(bestand, "%f%f%f", &x3[t2][1], &y3[t2][1], &z3[t2][1]);

for(t2=0;t2<deel;t2++)

{ x2[t2][0]=y3[t2][1]-x3[t2][1];

y2[t2][0]=-z3[t2][1]+x3[t2][1]/2;

if(midd>0)

{ midx=midx+x2[t2][0];

midy=midy+y2[t2][0];

}

}

if(midd>0) { midx=midx/deel; midy=midy/deel; }

for(t2=0;t2<deel;t2++)

{ if(midd>0)

{ x2[t2][0]=x_max/2+midx-w_x*x2[t2][0];

y2[t2][0]=y_max/2+midy-w_y*y2[t2][0];

}

```

```

else

{ x2[t2][0]=x_max/2-w_x*x2[t2][0];

  y2[t2][0]=y_max/2-w_y*y2[t2][0];

}

if(modus==0) putpixel(x2[t2][0],y2[t2][0],2+t2);

else putpixel(x2[t2][0],y2[t2][0],1+(x3[t2][1]+w_g)*diepte);

if(spoor>0)

{ if(t1<spoor-1)

  { x2[t2][spoor-1-t1]=x2[t2][0]; y2[t2][spoor-1-t1]=y2[t2][0]; }

  else

  { putpixel(x2[t2][spoor-1],y2[t2][spoor-1],0);

    for(t3=spoor-1;t3>0;t3--)

    { x2[t2][t3]=x2[t2][t3-1]; y2[t2][t3]=y2[t2][t3-1]; }

  }

}

}

}

}

putchar(13); printf("Klaar");

fclose(bestand);

getch();

closegraph();

}

void main(void)

{ // Beginwaarden zetten.

  stap=250; deel=3; r_o=100; r_n=.0001; t_frag=1; grens=0; w_g=500; spoor=0;

  midd=0; spoor=0; modus=0;

  clrscr(); textcolor(10);

  // Grafische modus bepalen.

  t1=0; t2=2639;

  installuserdriver("Svga256",DetectSvga256);

```

```

initgraph(&t1,&t2,"");

x_max=getmaxx(); y_max=getmaxy();

closegraph();

// Test of standaard bestand bestaat.

strcpy(b_naam, "bestand.xyz");

b_test=0;

varbestand();

// Begin programma-lus.

prog=1;

do

{ menuopbeeld();

toets=0;

menuvraag();

// [b]estandsnaam.

if(toets==98) varbestand();

// [R]eken.

if(toets==82)

{ if(b_test==1)

{ printf("Bestand %s overschrijven? [j/n] ", b_naam);

i_temp=getch();

putchar(13); printf(" ");

putchar(13);

if(i_temp==106) b_test=0;

}

if(b_test==0)

{ willekeur();

if(grens>0||t_frag!=1) rekenmetopties(); else reken();

}

}

if(toets==69)

```

```

{ if(b_test==1)

{ printf("Bestand %s overschrijven? [j/n] ", b_naam);

i_temp=getch();

putchar(13); printf("                ");

putchar(13);

if(i_temp==106) b_test=0;

}

if(b_test==0)

{ willekeur();

rekenenteken();

}

}

// [T]eken.

if(toets==84) teken();

if(toets==65) { willekeur(); geendisk(); }

if(toets==81) theorie();

if(toets==63) { printf("Bedacht en geschreven door G.J.Smit.");

getch(); }

if(toets==83) prog=0;

} while(prog>0);

}

```

### 3) Program Einstein (Borland C)

```
// (C) 1996 G.J. Smit, Nijmegen, Nederland

// This software is published under the GNU General Public License v3.0

// The program 'Einstein' photographs (plots) a piece of Einsteinian spacetime where individual and multiple dimensional basics can be seen,
// showing the deformation of spacetime as seen for an outside observer.

#include "conio.h"

#include "graphics.h"

#include "math.h"

#include "process.h"

#include "stdio.h"

#include "stdlib.h"

#include "string.h"

FILE *vkini;           // Actieve rekenvariabelen.

FILE *vkxyz;          // Krommingssterkte en virtuele 3D-coördinaten.

FILE *vkfilm;         // Film krommingsverloop.

char fiotest;         // Menu +/- controle op bestaande bestanden.

char prog;           // Stuur programmaverloop.

float xd[24],yd[24],zd[24]; // Coördinaten van maximaal 24 1db's.

char deel,dtel,ctel; // Actieve hoeveelheid 1db's en teller daarvoor en teller voor invoer coördinaten.

float bereik,stap;    // Formaat en resolutie van berekende ruimte-kubus.

float kromming,afstand; // Sterkte en spreiding van de zichtbare kromming.

char ruimte;         // Al of niet afbeelden als gekromde ruimte.

float schaal;        // Grootte van afbeelding op scherm.

char kl_modus;       // Kleurenpalette/kleurmodus.

float dummy,begin,eind; // Waarden voor film.

float frag;          // Voor film krommingsverloop.

char film;           // Bepaalt film aan/uit in tekenfunctie.

int ftel,fx,fy;      // Besturing film.

unsigned far fk;     // Besturing film.

char toets;          // Test op toetsaanslag in menu.
```

```

float x,y,z;          // Actieve rekencoördinaten.

float afx,afy,afz,afs,krm; // Berekenen krommingssterkten.

float xtot,ytot,ztot; // Berekenen visuele coördinaten.

float ktot;          // Berekenen totale krommingssterkte per coördinaat.

int v1,v2;          // Instellen video-mode.

float x2,y2;        // 2D coördinaten voor het beeldscherm.

float kleur,midx,midy; // Kleur van te tekenen pixel + relocatie.

float afst,kl_w;    // Voor tekenen in kl_modus=2.

char c_invoer;      // Voor invoer coördinaten.

char bnaam[13],t naam[13]; // Voor variabele bestandsnaam

int huge DetectSvga256() { int vid; vid=4; return vid; }

void kleur_mod(void)

{ v1=0;v2=2341;

installuserdriver("Svga256",DetectSvga256);

initgraph(&v1,&v2,"");

midx=getmaxx()/2;midy=getmaxy()/2;

if(kl_modus==0) { for(dtel=0;dtel<63;dtel++) setrgbpalette(32+dtel,dtel,dtel,dtel); }

if(kl_modus==1)

{ for(dtel=0;dtel<64;dtel++) setrgbpalette(128+dtel,63-dtel,dtel,0);

for(dtel=0;dtel<64;dtel++) setrgbpalette(192+dtel,0,63-dtel,dtel);

}

if(kl_modus==2)

{ for(dtel=0;dtel<32;dtel++) setrgbpalette(32+dtel,2*dtel,2*dtel,2*dtel);

for(dtel=0;dtel<32;dtel++) setrgbpalette(64+dtel,2*dtel,0,0);

for(dtel=0;dtel<32;dtel++) setrgbpalette(96+dtel,0,2*dtel,0);

for(dtel=0;dtel<32;dtel++) setrgbpalette(128+dtel,0,0,2*dtel);

for(dtel=0;dtel<32;dtel++) setrgbpalette(160+dtel,2*dtel,2*dtel,0);

for(dtel=0;dtel<32;dtel++) setrgbpalette(192+dtel,0,2*dtel,2*dtel);

for(dtel=0;dtel<32;dtel++) setrgbpalette(224+dtel,2*dtel,0,2*dtel);

}

```

```

setfillstyle(1,0);

}

void reken(void)
{
    _setcursortype(_NOCURSOR);

    strcpy(tnaam,bnaam); strcat(tnaam, ".ini");

    vkini=fopen(tnaam, "wb");

    fprintf(vkini, "%d %f %f ",deel,bereik,stap);

    for(dtel=0;dtel<deel;dtel++) fprintf(vkini, " %f %f %f",xd[dtel],yd[dtel],zd[dtel]);

    fclose(vkini);

    // Bestand openen voor krommingssterkte en visuele 3D coördinaten.

    strcpy(tnaam,bnaam); strcat(tnaam, ".xyz");

    vkxyz=fopen(tnaam, "wb");

    // Berekenen krommingssterkten per coördinaat per deeltje in kubus.

    for(x=-bereik;x<bereik;x+=stap)

    { gotoxy(14,19); printf(" : %5.3f procent",x/(2*bereik)*100+50);

    for(y=-bereik;y<bereik;y+=stap)

    { for(z=-bereik;z<bereik;z+=stap)

    { ktot=0; xtot=0; ytot=0; ztot=0;

    for(dtel=0;dtel<deel;dtel++)

    { afx=(x-xd[dtel])*(x-xd[dtel]); // Afstand per x,y,z as.

    afy=(y-yd[dtel])*(y-yd[dtel]);

    afz=(z-zd[dtel])*(z-zd[dtel]);

    afs=sqrt(afx+afy+afz); // Afstand coördinaat tot deeltje.

    if(afs!=0) krm=1/(afs*afs); else krm=1000000; // Krommingssterkte bepalen.

    // Bepalen coördinaten voor representatie van visuele ruimte door krommingssterkte.

    ktot+=krm;

    xtot+=(x-xd[dtel])/krm;

    ytot+=(y-yd[dtel])/krm;

    ztot+=(z-zd[dtel])/krm;

```



```

    }

    fprintf(vkxyz,"%f %f %f %f ",ktot,xtot,ytot,ztot);

    }

}

if(kbhit()!=0)

{ if(getch()==27) x=bereik;

}

}

fclose(vkxyz);

if(fiotest==0||fiotest==1) fiotest=1; else fiotest=3;

if(toets==27)

{ unlink(tnaam);

if(fiotest==3) fiotest=2; else fiotest=0;

}

toets=32;

}

void teken(void)

{ if(film==0)

{ strcpy(tnaam,bnaam); strcat(tnaam, ".ini");

vkini=fopen(tnaam,"rb");

fscanf(vkini,"%d%f%f",&deel,&bereik,&stap);

for(dtel=0;dtel<deel;dtel++) fscanf(vkini,"%f%f%f",xd[dtel],yd[dtel],zd[dtel]);

fclose(vkini);

printf("Deel:%d Bereik:%f Stap:%f Kromming:%f Afstand:%f Ruimte:%d Kleur:%d Schaal:%f",

        deel,bereik,stap,kromming,afstand,ruimte,kl_modus,schaal);

}

else

{ bar(0,0,1023,767);

gotoxy(1,1);

printf("FC : Begin:%f Eind:%f Fragment:%f Kromming:%f Afstand:%f Ruimte:%d Kleur:%d Schaal:%f",

        begin,eind,frag,kromming,afstand,ruimte,kl_modus,schaal);

```

```

}

setcolor(7);line(0,18,1023,18);setcolor(10);

strcpy(tnaam,bnaam); strcat(tnaam, ".xyz");

vkxyz=fopen(tnaam,"rb");

for(x=-bereik;x<bereik;x+=stap)

{ line((x/(2*bereik)*100+50)*10.24,18,((x+stap)/(2*bereik)*100+50)*10.24,18);

for(y=-bereik;y<bereik;y+=stap)

{ for(z=-bereik;z<bereik;z+=stap)

{ fscanf(vkxyz,"%f %f %f %f",&ktot,&xtot,&ytot,&ztot);

if(ktot>kromming-afstand&&ktot<kromming+afstand)

{ if(ruimte==0) { xtot=x; ytot=y; ztot=z; }

x2=(ytot-.5*xtot)*schaal;

y2=(ztot-.5*xtot)*schaal;

if(kl_modus==0) kleur=(x+bereik)/(2*bereik)*62+1;

if(kl_modus==1)

{ if(ktot>kromming&&ktot<(kromming+afstand)) kleur=160+64*(ktot-kromming)/afstand;

else kleur=160+64*(ktot-kromming)/afstand;

}

if(kl_modus==2)

{ afst=1000000;

kl_w=32;

for(dtel=0;dtel<deel;dtel++)

{ afx=(x-xd[dtel])*(x-xd[dtel]);

afy=(y-yd[dtel])*(y-yd[dtel]);

afz=(z-zd[dtel])*(z-zd[dtel]);

afs=sqrt(afx+afy+afz);

if(afst>afs)

{ afst=afs;

kl_w=32*dtel;

}

}

```

```

}
kleur=(x+bereik)/(2*bereik)*30+1+kl_w;
}
putpixel(midx+x2,midy-y2,32+kleur);
}
if(kbhit()!=0)
{ if(getch()==27)
{ if(ruimte==0)
printf("\n\nOnderbroken k:%f x:%f y:%f z:%f x2:%f y2:%f",ktot,x,y,z,x2,y2);
else
printf("\n\nOnderbroken k:%f x:%f y:%f z:%f x2:%f y2:%f",ktot,xtot,ytot,ztot,x2,y2);
x=bereik; y=bereik; z=bereik;
if(film!=0) // Als film creëren dan einde beeld-lus.
{ kromming=eind;
film=0;
}
}
}
}
}
}
fclose(vkxyz);
if(film==0)
{ getch();
toets=32;
}
else
{ for(fy=19;fy<768;fy++)
{ for(fx=0;fx<1024;fx++)
{ fk=getpixel(fx,fy);
if(fk!=0) fprintf(vkfilm,"%d %d %u ",fx,fy,fk);
}
}
}

```

```

    }
}
}

void animatie(void)

{ putchar(13);

printf("KF : Begin:%f Eind:%f Fragment:%f Ruimte:%d Kleur:%d Schaal:%f",
      begin,eind,frag,ruimte,kl_modus,schaal);

vkfilm=fopen("vkfilm.xyz","rb");

do

{ fscanf(vkfilm,"%d",&ftel);

if(ftel<0)

{ if(ftel!=-1)

{ if(ftel==-1000) printf("      Laatste beeld");

toets=getch();

if(toets!=27) bar(0,19,1023,767);

else toets=32;

}

fscanf(vkfilm,"%d",&fx);

}

else fx=ftel;

fscanf(vkfilm,"%d",&fy);

fscanf(vkfilm,"%u",&fk);

putpixel(fx,fy,fk);

} while(ftel>-999);

fclose(vkfilm);

}

void cord_in(void) // Nu 24 deeltjes in te voeren

{

```

```

for(dtel=0;dtel<deel;dtel++)

{ clrscr();

printf("Bestandsnaam : %s\n",bnaam);

printf("Teken ");

if(fiotest==1||fiotest==3) printf("+"); else printf("-");

printf(" R]ekenen\n");

printf("F]ilm ");

if(fiotest==2||fiotest==3) printf("+"); else printf("-");

printf(" C]re%oren\n");

printf("w]illekeur [i]nvoeren\n");

printf("d]eel : %d\n",deel);

printf("b]ereik : %f\n",bereik);

printf("s]tap : %f\n",stap);

printf("k]romming : %f\n",kromming);

printf("a]fstand : %f\n",afstand);

printf("r]uimte : ");

if(ruimte==0) printf("lineair\n"); else printf("gekromd\n");

printf("s]c]haal : %f\n",schaal);

printf("k]leur : ");

if(kl_modus==0) printf("3D grijswaarden\n");

if(kl_modus==1) printf("2D krommingssterkte\n");

if(kl_modus==2) printf("3D per deeltje\n");

printf("b]egin : %f\n",begin);

printf("ei]nd : %f\n",eind);

printf("f]ragment : %f\n",frag);

for(ctel=0;ctel<dtel;ctel++)

{ gotoxy(38,1+ctel);

printf("%d : %f %f %f",ctel,xd[ctel],yd[ctel],zd[ctel]);

}

gotoxy(1,19); printf("Deel : %d\n",dtel);

```

```

printf("x > "); scanf("%f",&xd[dtel]);

printf("y > "); scanf("%f",&yd[dtel]);

printf("z > "); scanf("%f",&zd[dtel]);

}

toets=32;

}

void main(void)

{ // Bepalen van beginwaarden voor actieve rekenvariabelen.

strcpy(bnaam,"vkveld");

strcpy(tnaam,bnaam); strcat(tnaam,".ini");

vkini=fopen(tnaam,"rb");

if(vkini==NULL)

{ fiotest=0;

deel=7; bereik=10; stap=.25;

for(dtel=0;dtel<deel;dtel++)

{ xd[dtel]=((random(32767)*bereik)/32767-bereik/2)*2;

yd[dtel]=((random(32767)*bereik)/32767-bereik/2)*2;

zd[dtel]=((random(32767)*bereik)/32767-bereik/2)*2;

}

}

else

{ fiotest=1;

fscanf(vkini,"%d%f%f",&deel,&bereik,&stap);

for(dtel=0;dtel<deel;dtel++)

{ fscanf(vkini,"%f%f%f",&xd[dtel],&yd[dtel],&zd[dtel]);

}

}

fclose(vkini);

// Testen of vkveld.xyz bestaat.

strcpy(tnaam,bnaam); strcat(tnaam,".xyz");

```

```

vkxyz=fopen(tnaam,"rb");

if(vkxyz==NULL) fiotest=0;

fclose(vkxyz);

// Bepalen van beginwaarden voor actieve tekenvariabelen.

kromming=1; afstand=.25; schaal=10; ruimte=0; kl_modus=0;

// Bepalen van beginwaarden voor actieve filmvariabelen.

vkini=fopen("vkfilm.ini","rb");

if(vkini==NULL)

{ begin=.5; eind=1.5; frag=.25;

}

else

{ if(fiotest==0) fiotest=2; else fiotest=3;

fscanf(vkini,"%f%f%f%d",&begin,&eind,&frag,&kl_modus);

}

fclose(vkini);

// Testen of vkfilm.xyz bestaat.

vkfilm=fopen("vkfilm.xyz","rb");

if(vkfilm==NULL) { if(fiotest==1||fiotest==3) fiotest=1; else fiotest=0; }

fclose(vkfilm);

// Menu -> begin programma-lus.

prog=1; do

{ // Menu op het scherm.

_setcursortype(_NOCURSOR);

clrscr();

printf("Bestandsnaam : %s\n\n",bnaam);

printf("[T]ekenen ");

if(fiotest==1||fiotest==3) printf("+"); else printf("-");

printf(" [R]ekenen\n");

```

```

printf("[F]ilm ");

if(fiotest==2||fiotest==3) printf("+"); else printf("-");

printf("  [C]re%oren\n");

printf("[w]illekeur [i]nvoeren\n");

printf("[d]eel   : %d\n",deel);

printf("[b]ereik  : %f\n",bereik);

printf("[s]tap    : %f\n",stap);

printf("[k]romming : %f\n",kromming);

printf("[a]fstand  : %f\n",afstand);

printf("[r]uimte   : ");

if(ruimte==0) printf("lineair\n"); else printf("gekromd\n");

printf("[s][c]haal : %f\n",schaal);

printf("[k][l]eur  : ");

if(kl_modus==0) printf("3D grijswaarden\n");

if(kl_modus==1) printf("2D krommingssterkte\n");

if(kl_modus==2) printf("3D per deeltje\n");

printf("[b][e]gin   : %f\n",begin);

printf("[e][n]d     : %f\n",eind);

printf("[f]ragment  : %f\n",frag);

// Bestandsnaam afdrukken

// Coördinaten op het scherm.

for(dtel=0;dtel<deel;dtel++)
{ gotoxy(38,1+dtel);

  printf("%d : %f %f %f",dtel,xd[dtel],yd[dtel],zd[dtel]);

}

// Keuze voor functie en afhandeling daarvan.

toets=getch(); gotoxy(1,19); _setcursortype(_NORMALCURSOR);

if(toets==27) prog=0;

```



```

if(toets==100)

{ printf("Aantal 1db's ? "); scanf("%d",&deel);

  if(deel<1) deel=1; if(deel>24) deel=24;

  if(kl_modus==2) kl_modus=0;

}

if(toets==98)

{ printf("Maximale coördinaten ? "); scanf("%f",&bereik);

  if(bereik==0) bereik=10; if(bereik<0) bereik=-bereik;

}

if(toets==115)

{ gotoxy(1,19); printf("Resolutie ? "); scanf("%f",&stap);

  if(stap==0) stap=.25; if(stap<0) stap=-stap;

}

if(toets==119)

{ for(dtel=0;dtel<deel;dtel++)

  { xd[dtel]=((random(32767)*bereik)/32767-bereik/2)*2;

    yd[dtel]=((random(32767)*bereik)/32767-bereik/2)*2;

    zd[dtel]=((random(32767)*bereik)/32767-bereik/2)*2;

  }

}

if(toets==105) cord_in();

if(toets==107)

{ printf("Zichtbare kromming ? "); scanf("%f",&kromming);

  if(kromming==0) kromming=1; if(kromming<0) kromming=-kromming;

}

if(toets==97)

{ printf("Afstand tot zichtbare kromming ? "); scanf("%f",&afstand);

  if(afstand==0) afstand=.25; if(afstand<0) afstand=-afstand;

}

if(toets==114)

{ if(ruimte==0) ruimte=1; else ruimte=0;

}

```

```

if(toets==99)

{ printf("Grootte (op 1024x768) ? "); scanf("%f",&schaal);

  if(schaal==0) schaal=10; if(schaal<0) schaal=-schaal;

}

if(toets==108)

{ if(kl_modus==0) kl_modus=1;

  else

  { if(kl_modus==1)

    { if(deel<8) kl_modus=2; else kl_modus=0; }

    else

    { if(kl_modus==2) kl_modus=0; }

  }

}

if(toets==101)

{ printf("Beginkromming ? "); scanf("%f",&begin);

  if(begin<0) begin=-begin;

}

if(toets==110)

{ printf("Eindkromming ? "); scanf("%f",&eind);

  if(eind<0) eind=-eind;

}

if(toets==102)

{ printf("Fragmentatie ? "); scanf("%f",&frag);

}

if(toets==109)

{ printf("Nieuwe bestandsnaam ? "); scanf("%s",&bnaam);

// Testen of bnaam.ini bestaat.

strcpy(tnaam,bnaam); strcat(tnaam, ".ini");

vkini=fopen(tnaam,"rb");

if(vkini==NULL)

```

```

{ fiotest=0;

// deel=7; bereik=10; stap=.25;

// for(dtel=0;dtel<deel;dtel++)

// { xd[dtel]=((random(32767)*bereik)/32767-bereik/2)*2;
// yd[dtel]=((random(32767)*bereik)/32767-bereik/2)*2;
// zd[dtel]=((random(32767)*bereik)/32767-bereik/2)*2;

// }

}

else

{ fiotest=1;

fscanf(vkini, "%d%f%f", &deel, &bereik, &stap);

for(dtel=0;dtel<deel;dtel++)

{ fscanf(vkini, "%f%f%f", &xd[dtel], &yd[dtel], &zd[dtel]);

}

}

fclose(vkini);

// Testen of bnaam.xyz bestaat.

strcpy(tnaam, bnaam); strcat(tnaam, ".xyz");

vkxyz=fopen(tnaam, "rb");

if(vkxyz==NULL) fiotest=0;

fclose(vkxyz);

}

if(toets==82)

{ if(fiotest==1||fiotest==3)

{ printf("Bestand overschrijven (j/n) ? ");

toets=getch();

if(toets==106)

{ putchar(13); printf(" ");

putchar(13); printf("Rekenen");

reken(); toets=32;

}

}

```

```

}

else

{ putchar(13); printf("Rekenen");

  reken();

}

}

if(toets==84)

{ if(fiotest==0||fiotest==2)

  { printf("Bestand bestaat niet ! "); getch();

  }

  else

  { film=0;

    kleur_mod();

    teken();

    closegraph();

  }

}

if(toets==67) // Film creëren.

{ if(fiotest==3) // Test of vkfilm.xyz bestaat.

  { printf("Bestand overschrijven (j/n) ? ");

    toets=getch();

    if(toets==106) fiotest=1;

  }

  if(fiotest==1)

  { // Kijk naar variabelen voor bereik & stap.

    vkini=fopen("vkveld.ini","rb");

    fscanf(vkini,"%d%f%f",&deel,&bereik,&stap);

    for(dtel=0;dtel<deel;dtel++)

    { fscanf(vkini,"%f%f%f",&xd[dtel],&y[dtel],&z[dtel]);

    }

    fclose(vkini);

```

```

// Begin beeld-lus.

kleur_mod();

vkini=fopen("vkfilm.ini","wb");

fprintf(vkini,"%f %f %f %d",begin,eind,frag,kl_modus);

fclose(vkini);

vkfilm=fopen("vkfilm.xyz","wb");

film=1; ftel=1;

for(kromming=begin;kromming<eind;kromming+=frag)

{ fprintf(vkfilm,"%d ",ftel);

  teken();

  ftel++;

}

fprintf(vkfilm,"-1000");

fclose(vkfilm);

fiotest=3;

if(film==0)

{ fiotest=1;

  unlink("vkfilm.xyz");

}

closegraph();

}

if(fiotest==0||fiotest==2)

{ printf("Bestand bestaat niet ! "); getch();

}

toets=32;

}

if(toets==70)

{ if(fiotest==3)

{ vkini=fopen("vkveld.ini","rb");

fscanf(vkini,"%d%f%f",&deel,&bereik,&stap);

for(dtel=0;dtel<deel;dtel++)

{ fscanf(vkini,"%f%f%f",&xd[dtel],&y[dtel],&z[dtel]);

```

```

}

fclose(vkini);

kleur_mod();

animatie();

closegraph();

}

if(fiotest==2)

{ kleur_mod();

animatie();

closegraph();

}

if(fiotest<2)

{ printf("Bestand bestaat niet ! "); getch();

}

toets=32;

}

if(toets==63)

{ for(dtel=1;dtel<15;dtel++)

{ gotoxy(1,dtel); printf("

");

}

clrscr();

printf("( 04-96, Nijmegen -> G.J.Smit Geb:08-01-68, Veendam )\n");

printf(" De theorie in hoeverre het betrekking heeft op dit programma. Dit pro-\n");

printf("gramma geeft een stilstaande foto van een aantal 1db's in een bepaalde ruimte,\n");

printf("op een bepaalde afstand van elkaar. Er is geen beweging, alleen hun onderlinge\n");

printf("positie. Dit programma berekend een kubus ruimte met een bepaalde grootte met\n");

printf("als middelpunt x,y,z-coördinaat (0,0,0). De 1db's hebben een bepaalde locatie\n");

printf("met elk zijn specifieke coördinaten in die kubus. Op het punt waar de 1db zich\n");

printf("bevindt is de ruimte oneindig sterk gekromd (de 1db • s de gekromde ruimte!).\n");

printf("Op een bepaalde afstand van een 1db is de ruimte de in die mate gekromd als\n");

printf("bepaalt door 1/afstand (of waarschijnlijker 1/afstand^2 zoals wij dat waar-\n");

printf("nemen bij o.a. de zwaartekracht) (en logisch met een 3-dimensionaal heelal\n");

```

```

printf("gezien de 'localiteit' van energie (energie=mate van kromming t.o.v. omgeving)?\n");
printf("Een 1db is net als alle omliggende ruimte, alleen is in dat punt de ruimte ten\n");
printf("opzichte van de omgeving een factor oneindig sterker gekromd. Het is allemaal\n");
printf("puur relatief. Want ook al is de omliggende ruimte op een bepaalde afstand\n");
printf("bijvoorbeeld de helft van de 1db kromming, dan is die ruimte daar ook oneindig\n");
printf("gekromd (0.5*i=i). Er is dus alleen sprake van een relatief sterkere kromming,\n");
printf("slechts absoluut, en eindig in verhouding tot andere 1db's. Dat wil zeggen;\n");
printf("meetbare parameters zijn onderlinge afstand en onderlinge snelheid. Ze zijn\n");
printf("allen oneindig, doch meetbaar eindig in verhouding tot elkaar Met welke\n");
printf("snelheid naderen ze elkaar en welke afstand hebben ze tot elkaar? In principe\n");
printf("meetbaar, in elk geval berekenbaar. ");

getch(); clrscr();

printf("Technische opmerkingen:\n\n");

printf("Bereik: Kleiner dan .01 en groter dan 100 levert onbetrouwbare resultaten op.\n");
printf("    Dit door het maximum bereik van 'float-type' variabelen.\n\n");
printf("Schaal: De schaal is alleen re%oel in lineaire-ruimte afbeelding. In gekromde-\n");
printf("    ruimte afbeelding is de grootte het resultaat van een algoritme dat\n");
printf("    bepaalt in hoeverre de kromming van de 1db's de in 3D berekende kubus\n");
printf("    van vlakke ruimte vervormd. ");

getch();
}
} while (prog>0);
}

```

*"The thought. Capture her... she might fly away."*

From the bundle: You'll become older too.



Gerhard Jan Smit



Jelle Ebel van der Schoot

#### Question about the Pauli principle:

There can be circumstances that particles like electrons accumulate on a specific position. How do you make sure that the Pauli principle is not violated in this case?

#### Reaction:

It is an empiric fact that electrons can accumulate. The Pauli principle will –in our opinion- not be violated since the db-particle will never get in the same position as another db-particle. They can get close in a circling way while under the influence of each other's curvature. What appears to be instantaneous and linear in time and space for two particles will appear to be a slow process for an outside observer. This is the case when particles get really close like quarks within an atom. The increasing curvature in the system makes that time seems to slow down for the (human) observer. The Pauli principle is never violated.

#### Divergent forces:

In the article you state: "this model constitutes a good candidate for a new foundation to represent the observed particles and forces. The short distance force (weak) and the long distance forces (strong, electric and gravitational) can be explained from the described curvatures". Gluons are massless. The Higgs mechanism only adds mass to weak interaction particles (Z/W-bosons). How do you take that into account?

#### Reaction:

We are of the opinion that the strong and the weak forces have exact the same origin. The strong forces within an atom (for instance within a proton) where the quarks have found an anchor-point is stable due to the short distances. Within the atom for the outside observer time has slowed down. That is why the position of the quarks in the atom seems stable. It is only a matter of perspective. In a set of molecules (for instance water) where the distances between the different molecules is such that the molecules are within a reasonable influence of each other's curvature also a stability will be achieved. The molecules will stay together in a structure but obviously the situation is not stable as the (human) observer can observe.

About "the massless gluon". We are not convinced of the existence of gluons. But we always argue within our theory. We admit that we lack knowledge but in some way that can be an advantage. Maybe you will disagree with that. I am sure you will.

#### Cumulation of curvatures:

As you know gravitation could be considered in two different ways (Einstein's equivalence principle), like Newton "masses perform forces to each other" or like general relativity "masses warp space-time and masses move (free-falling) on geodesics in space-time". Do you think the curvature of db and photons and electrons you talk about, add additional curvatures (besides their masses) to space-time?

#### Reaction:

In our view every single particle will add additional curvatures, always. We don't speak about masses in this case. We tried to build a bridge between Einstein's curvatures and the Newtonian gravitation laws. We did that in the chapter "Gravitation in relation to curvature". We hope our effort makes sense. The point is: How to get the values (constant) we have to put into our formula? For this we had to use the known values on earth. As a result our formula gives an outcome that meets the outcome as calculated in the traditional Newtonian way.

There is the possibility that we have a circle reasoning. But still it seems to make sense.