

LITTLE BANG AND NO BIG BANG:

- The previous universe ended up with one king-sized Little Bang super cold black hole with a radius of 50 to 100 million km, precisely around the center C of the universe. Gravity brought together all mass / matter, charge, magnetic spin, radiation and kinetic energy of that previous universe into that black hole. This black hole contains all mass and energy.
- Black-hole atoms repel each other via their compressed negatively charged electron-shells. Gravity keeps these each other repelling black-hole atoms together in this giant black hole. Atomic nuclei of black hole atoms have virtually no room to vibrate. Therefore all black atoms have a standard temperature of about 2.7 kelvin. The Little Bang occurs under super-cold conditions.
- The 4 – 20 billions Big Bangs find some 20 billion (10^9) years later at the start of each galaxy!
- At the end of the construction of the Little Bang black hole the rate of all black-hole atoms goes down to zero relative to C, the center of the universe. Simultaneously the gravity of this Little Bang black hole drops to zero. (The origin of gravity is referred to the **documents E3 and E3-1**)
- Only at the very end of the formation of the Little Bang black hole, the electrical repulsion between the electron-shells of the black-hole atoms mutually becomes greater than the gravity of the Little Bang black hole. Gravity undershoots the *critical black hole gravity or Cribhgra*. At this time, the electrical repulsion between the black-hole atoms greater than gravity which the black-hole atoms held until then assembled into this black hole.
- The Little Bang black hole becomes unstable and breaks down into separate black-hole atoms. Also these atoms are unstable. These black hole atoms then fall into four steps described in only single protons and electrons. Because of the extremely low temperature all existing matter remains intact with the Little Bang in the form of an equivalent number of protons and electrons.
- During the Little Bang the atom disappears and therefore all other non-elemental forces of the universe including gravity and temperature vanish. Only electric charge and magnetic spin remain as elementary force.
- During the Little Bang the protons and electrons rearrange alternately in mono-spherical layers, one loose protons or one free electrons thick. At first the spherical layers with protons stand quiet compared C during the Little Bang; the electrons move in their spherical layers with approximately 2/3rd of the speed of light around C.
- Within that spherical layers the (electric and magnetic) spring tension is enormous both between protons mutually and between the electrons themselves. Because of it, the spherical layers expand from the outside with a universal equivalent rate of a third to half the speed of light. The atom is still missing. The expansion of the new universe starts under full gravity-free circumstances. Gravity and gravitational energy is absent as long as the atom is absent!
- In this way from the outside, the Little Bang matter sphere is peeled off. In the form of spherical mono-layers, one protons and one electrons thick. These layers of alternating protons and electrons swell by 1/3rd - 1/2rd of the speed of light c. The Little Bang black hole itself expands up during 1.300 – 1.500 years to about 500 to 750 light years. Then a hollow interior arises. The formation of this empty sphere in space marks the final completion of the Little Bang.
- With the formation of the hollow inner space around C start phase 6 of the universe cycle. The 29 phases the universe cycle described in **document G7**. The corresponding figures are set out in **document G8**.

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- 1) Thanks to the observations and input from Franklin Roos and his translation.
- 2) Thanks to the figures of Ardarshi Yadava for the figures
(in the **documents G8, 2014 F1a, F1b, F1c, F1D and F1E**).
- 3) Copyright; see **document A6**.

***1 INTRODUCTION:**

Anno 2015 almost the entire exact science has been convinced that the currently observable universe started with a Big Bang explosion that occurred from a singularity; a by gravity further collapsed black hole. This Big Bang explosion has been accompanied by the release of an enormous amount of energy and took place at extremely high temperatures.

Based on Einstein's relativity theory one supposes that during the Big Bang all present mass is transformed into 100% pure energy and immediately after (10^{-34} s) that 100% pure energy is retransformed into matter again.

In the Big Bang theory in 2015 unfortunately is still completely obscure:

- 1) how the matter is gradually converted into energy and how that energy again immediately after formed step by step is returned as matter,
- 2) what is the relationship between mass and gravity; does gravity returns with matter immediately?
- 3) What was the immediate cause for this Big Bang?
- 4) how did this extremely hot explosion just occur and via which steps did this be settled.
- 5) The first 380 thousand years after the Big Bang are still unambiguously.

The Big Bang theory is shrouded in mist and obscurity.

It is most peculiar that astronomy and other sciences accept the incomplete Big Bang theory as the start of this universe for decades. Worldwide, billions of dollars were used to proof that theory!

1.1 DOUBTS AROUND THE BIG BANG:

a) Relativity and Big Bang theory are central to the foundation in the sciences:

In preparing the Big Bang theory as a possible start of the universe the scientists in the sixties of the 20th century based it on relativity, especially on by Einstein's derived formula $E = mc^2$ for $m = \text{mass}$.

Virtually the entire exact science has been convinced fully of the accuracy of the statement that mass and energy are physically two completely equivalent quantities and that mass can be converted $E = mc^2$ into 100% pure energy and conform Einstein's theory from such 100% pure energy just as quickly and easily mass can be reconstituted. However the creation of mass/higgs particles from energy is never actually shown with laboratory tests!

In 2015 both relativity and the Big Bang theory have been widely accepted in science. Despite all the ambiguities both theories together with the formula $E = mc^2$ for $m = \text{mass}$ are cornerstones in the foundation of the sciences. Given the above considerations it is strange and dangerous!

b) Collapse of black holes to a singularity:

Partly at the behest of Einstein current science assumes that super sized black holes under their own gravity could further collapse to a very small particle or singularity. That would have happened at the Big Bang black hole. All mass, matter and energy of the entire universe is finally concentrated in such a singularity that had the physical size of a football or even less!

c) The Big Bang further considered:

In the current view of science (2015), the universe started with a Big Bang with:

- releasing from all matter of the universe from a singularity simultaneously in a split second;
- simultaneously converting all mass in pure *massless* forms of energy via $E = mc^2$ for $m =$ mass.
- Big Bang is accompanied with an extremely forceful explosion and with an extremely high temperature of estimated at about 10^{38} kelvin *).
- Then immediately (in approximately 10^{-34} s) this energy, released during the Big Bang, is reformed into particles with mass, charge and magnetic spin using the same formula $E = mc^2$ (for $m =$ mass).
- Now these particles would be higgs that grow in an unpredictable way to quarks,
- Back to that form of mass out of pure energy the new universe must be recooled hugely,
- Also the formation of mass must have been accompanied with formation of a huge amount of gravity conform Einstein!
- Finally also in an unknown way out of those mass particles neutrons (containing matter) are formed, moving away sphere-symmetrically with the speed of light from the center C of the universe.
- Then these neutrons disintegrate into an equivalent number of protons and electrons.
- This approach, a little bit devious, results in a universe containing the same number of protons and electrons.
- From protons and electrons fuse within a few minutes after the Big Bang all kinds of light nuclei.
- Only about 380 millennia later these nuclei catch shell- electrons to form atoms such as hydrogen and helium! The universe would be clear and transparent again.

-) The highest possible temperature

Using $(3/2)k_B T = (1/2)mv^2$ from kinetic gas theory with $v=c$, the highest temperature possible would be about 10^{12} kelvin.

-) Response Technical problem:

A Big Bang on the basis of the formula $E = mc^2$ for $m =$ mass, and the transformations of mass \rightarrow energy and the retransformation of energy \rightarrow mass proceeds in fact as an equilibrium reaction in which the equilibrium of the reaction emphatically lies with mass and not with energy! The Big Bang releases a lot of heat and kinetic energy. But that points to a decreasing reaction rather than on an equilibrium reaction!

-) Inflationary expanding universe:

After the Big Bang from this singularity in the center C of the universe a) space, b) gravity and c) time (the universe clock time) started then. Initially probably gravity and time move with speeds greater than the speed of light. The same applies for expanding space (inflationary universe).

Later neutrons are formed and fly away of up to the speed of light. The Big Bang theory results overall in an explosive, super hot and super fast start of the expansion of the universe and ephemerally even faster than the speed of light! And that in the presence of gravity!

-) The reason for the creation of the Big Bang is unknown:

In the Big Bang theory, no explanation is given what actually was the reason or the cause for the timing of the Big Bang. That is essential. 'No cause' is a misleading way to say 'we do not know it'.

The path along which matter is reformed to energy stepwise is not at all clear. Even in a general way this is not worked out. Also unclear is the source of arising at matter the most elemental quantities such as electric charge and magnetic spin.

d) Matter has never been formed from *pure* energy before:

In the laboratory, the science has never been able to observe the formation of matter from *pure* energy! According to the author, there is no 100% pure energy in the universe. All forms of energy take shape in the form of higgs particles, neutrinos and photons.

The smallest higgs have themselves standard already indestructible and low quantity of:

1) mass, 2) electric charge, 3) magnetic spin and 4) kinetic energy! See **document F1a 2014** with the four higgs:

- a) two super symmetric higgs as building blocks for the (anti-) proton and
- b) two super symmetric higgs as building blocks for the (anti-) electron.

From these four smallest higgs can be built neutrinos and photons. They are majoranas. Those particles are based on constructions of an even number of higgs and anti higgs. Within all majoranas such as photons and neutrinos still all the mass, charge and spin are present but those characteristics cannot be observed on the outside of these majoranas! Neutrinos and photons are real particles and *appear* pure energy but are not! See **document F1b**.

From those photons are to form even larger particles and, ultimately only ordinary protons and electrons. That process has been elaborated and explained in **document F1c**.

In the **documents F1a 2014, F1b and F1c** the author outlines the entire building of mass to matter. This construction and destruction are completely absent in both Einstein's relativity and the Big Bang theory!

e) Energy is inextricably linked to mass:

According to the author, energy does never exist as a 100% self-contained independent physical phenomenon and quantity. Universe widely always the higgs' kinetic energy is inextricably linked to: 1) mass, 2) charge and 3) magnetic spin. See **document F1a 2014**.

Because of this unbreakable link of kinetic energy to mass $E = mc^2$ cannot take place for $m = \text{mass}$! The formula $E = mc^2$ only applies for $m = \text{matter}$ and only in the case of creation and annihilation. See **document F1c Figure 15**. During annihilation, however, mass is never converted into energy!

1.2 NO HOT BIG BANG BUT A START WITH SUPER COLD LITTLE BANG:

The author discusses in chapters 2 - 4 first why:

- a) the Big Bang did not occur according to $E = mc^2$ for $m = \text{mass}$,
- b) the Big Bang did not occur on the basis of annihilation and using the formula $E = mc^2$ for $m = \text{matter}$.
- c) A Big Bang resulting in the formation of neutrons is not possible and
- d) the Big Bang cannot start from a singularity.
- e) Why only a Little Bang is possible. The Little Bang is discussed in chapter 5.

* 2) QUESTION MARKS IN THE BIG BANG THEORY:

-) **The Big Bang theory is enveloped with many ambiguities and questions:**

The start of the universe with the super hot and explosive Big Bang takes a scientific point far from smooth. Anno 2015 and more than sixty years after introduction in the Big Bang theory the science and with it thousands of theoretical physicists still have no conclusive answer to the following questions:

- What preceded the Big Bang? Nothing at all? Not even time?
- How was that singularity formed,
- How did compressed matter and energy look like in such a singularity?
How were they structured?
- What was the actual reason for the timing of the Big Bang?
- How did that Big Bang control its steps of the explosion?
- How exactly matter could be converted into 'pure' energy and how conversely the first time and later from 'pure' energy matter could be formed?
- Which elementary particles were formed sequentially in this formation?
- Why in this process were formed only ordinary protons and electrons, and no ordinary other stable particles?
- Where did remain the antimatter in the universe?
- Is the origin of gravity is still unknown.
- Is gravity really nothing but curvature of space-time?

In not any way both the Big Bang itself as the first about 380,000 years, the dark ages of the universe after the Big Bang, let declare themselves logically. After more than half a century, the Big Bang theory is still surrounded by a large number of unanswered fundamental questions.

-) **The author has serious doubts:**

Given the above questions, the author has serious doubts about the accuracy of both the relativity theory (see **document G5**, seven faults in the fundament of the theory of relativity) as the accuracy of the Big Bang theory (see this **document G6**). Those doubts are valid in much greater extent towards the creation of this universe from a singularity.

2.1 PRINCIPLES BIG BANG AND THIS UNIVERSE ARE UNCLEAR:

Today science assumes that the Big Bang occurred essentially with the explosion of a singularity. During such Big Bang first all matter is converted to energy. Already after about 10^{-34} s, so in effect at the same time, that energy was retransformed into matter via extremely vague paths in the form of elementary particles or to quarks. These quarks are in the Big Bang theory eventually transformed into neutrons, which in turn disintegrate into protons and electrons which are formed later, the atomic nuclei of hydrogen and helium.

In 2015 science has no good insight of the composition neither of black hole matter and black holes nor of the matter and energy in a singularity or in the structure of the neutron. Nevertheless science assumed that all the energy released by this big bang eventually turned into neutrons which disintegrated into an equivalent number of protons and electrons both with energy.

Via neutrons the universe got an equivalent number of protons and electrons. The Big Bang singularity must have contained all original mass of an equivalent number of protons and electrons!

Based on these unsearchable Big Bang theory, scientists are trying all kinds of events and processes to capture the universe in mathematical formulations and models still without having a clear explanation about next:

- a) The possible rise to the formation of a giant Big Bang black hole.
- b) Why this Big Bang black hole would be further collapsed into a singularity.
- c) How and why the Big Bang and now what was actually the reason that this Big Bang could turn into energy and is then immediately transformed back into matter.
- d) The composition of the Big Bang before the giant explosion.
- e) The physical properties and chemical ones of atoms in a black-and-hole state and in a singularity.
- f) The functions of black holes and other types of compact objects in the universe.
- g) The formation of mass from the conversion of energy, and then to mass again.
- h) The essential distinction between mass and matter.
- i) How the formation of matter was made *in steps* a way that permits only equivalent number of protons and electrons can be formed and thus the neutrons.
- j) The formation of the electrical charge and magnetic spin on the proton, electron and neutron.
- k) The transition from ordinary atoms to black hole atoms.
- l) The phenomenon of gravity and how to explain this phenomenon falls.
- m) Gravity is essential to understand the development, the movements of galaxies and of black holes in the universe.

In the **documents E3 and E3-1** www.uitewijkwinkel.eu , the author states the essence of gravity, and thus as well the phenomenon of gravitational energy.

This **document G6** with the Little Bang and subsequent **document G7** with the universe cycle **document G8 + figures** intended to give the author outlines answers to all the above questions. The author already knows that the universe cycle can be modeled mathematically and therefore it can be displayed quantitatively in detail.

The current models of the universe are based on all sorts of vague principles that have their origin in the Big Bang theory and the related theory of relativity. The Big Bang theory, the theory of the singularity, vacuum energy and the related theory of relativity form unabridged important cornerstones in the foundation of the sciences in 2015.

-) An overall vision and overview are missing:

Within the current science a lot of knowledge and skills are present. The author has no doubt about that! This plurality and diversity of knowledge, however, cut up and scattered across different disciplines with inside existing sub-disciplines. They all have their own specialties and specialists.

Within sciences fragmentation occurs. No one has a coherent overall picture. That goes for studies and research about the Big Bang, the universe and the basic structure and properties of mass and matter.

-) Mistakes crept into science:

In addition, as early as Newton all kind of quite annoying errors crept into the foundations of science. Already in 2008 the author has some of those mistakes have been raised at the

KNAW. That authority did not take these errors as seriously. See **document I3** of www.uitewijkwinkel.eu .

The author considers the relativity of Einstein is one of the biggest and most annoying faults in the foundation in 2015 of the science. See **document G5**. That mistake has a crippling effect on scientific thought and research.

*** 3) THE ESSENTIAL DIFFERENCE BETWEEN MASS AND MATTER:**

In **document F1a 2014** www.uitewijkwinkel.eu the author worked out Elementary Particles Model Higgs in 2014. In **document F1b**, the formation of majoranas (neutrinos and photons) is described. In **document F1c** the formation from photons of the proton and the electron described by the transition to matter. There the essential difference between mass and matter is made clear.

Matter is represented as constructions of $13 \frac{1}{2}$ photons in the form of proto-protons and proto-electrons that with the equatorial speed of light rotating around their axis. In this way rotation energy $E = \frac{1}{2}mc^2$ has been added to these constructions. In the same time this energy added the property of matter, clockwise rotation, or antimatter, anticlockwise, on this constructions next to mass, charge and spin!

That rotation with the speed of light and characteristic of (anti) matter can only vanish via annihilation.

Only an equivalent amount of matter and antimatter can annihilate into energy according $E = mc^2$ and $m =$ matter and antimatter. It is not a 100% energy but energy in the form of gamma photons. Photons are majoranas, electric dipoles (+-) and magnetic quadrupoles ($\uparrow\downarrow$) (**document F1b**) and consequently they *seem* to be without mass, charge and magnetic spin. So inside all the photons certainly all: 1) mass, 2) charge, 3) magnetic spin and 4) rotation energy are still fully present. On the outside of photons only their frequency, wavelength, linear velocity and kinetic energy can be measured. As a result, photons ostensibly seem to be pure energy. But that is not the case because the mass, charge and spin of photons cancel out and cannot be measured any longer.

The basic characteristics mass, charge, magnetic spin and kinetic energy are maintained unchanged during the annihilation! They are not annihilated or converted into energy!

-) Mass, charge, magnetic spin and kinetic energy are indestructible:

In **document F1a 2014** author postulates the premise that the basic properties of higgs: 1) mass, 2) charge, and 3) magnetic spin and 4) the kinetic basic rotation of these mass particles are indestructible in principle. These basic characteristics cannot change in 100% pure energy or vice versa! So nature does not hide 100% pure energy!

In **document F1c**, the author has worked out the fundamental distinction between mass and matter and indicated where the transition is to matter. Here it has been outlined in short.

-) Higgs are the smallest particles with mass, charge, magnetic spin and kinetic energy:

In **document F1a 2014** the smallest mass particles are formed by rotation energy. The higgs rotate clockwise or counterclockwise around their three axes. That causes three deformations and distortions generating 1) mass, 2) electric charge and 3) magnetic spin on all higgs.

On higgs level are fixed relationships between these three angular speeds. That is expressed in fixed angular velocities around a) the longitudinal axis, and b / c) in two equal but much slower angular velocities around the two transversal axes.

Except in particle accelerators all the proton-higgs posses three fixed and constant basis rotations which cannot be slowed down or be accelerated in any way.

Widely universe at higgs level resulting in:

- a) a fixed amount of kinetic energy basis,
- b) fixed angular velocities and
- c) a solid, and exactly the same amount of
 - 1) mass,
 - 2) electric charge, and
 - 3) magnetic spin!

These basic characteristics are immutable basic quantities. Outside particle accelerators they cannot be destroyed or change into energy in any way!

After collisions in particle accelerators kinetic energy is added. The angular velocities and hence mass, charge and spin of the higgs are changed temporarily. So in accelerated condition they are no constants anymore!)

As well all these facts apply for the electron-higgs.

3.1 MASS IS AN UNBREAKABLE COMBINATION OF CHARGE, MAGNETIC SPIN AND KINETIC ENERGY:

Mass and electric charge (thanks to the high fixed rotation about the longitudinal axis) with the magnetic spin (due to fixed slower rotations around both width axes) and the rotational kinetic energy, constitute the four elementary, unchanging and indestructible attributes linked to each other. See **Figures 1 - 6 item F1a 2014**.

At the very lowest level of the higgs, mass, charge, magnetic spin and rotational kinetic energy compose together an indestructible and unchanging basic characteristic of mass and thus the indestructible properties of matter. Mass converting into 100% pure energy, as Einstein had in mind, is fundamentally impossible!

That permanent and indissoluble four unit of energy, mass, charge and spin can only be broken in particle accelerators.

3.2 TWO DIFFERENT TYPES OF HIGGS:

The Higgs are described in **document F1a 2014**. The author distinguishes only two kinds of higgs:

- a) the large (anti) proton Higgs or the smallest mass particle of the (anti)proton and
- b) the small (anti) electron Higgs or the smallest mass particle of the (anti)electron.

The orientation of the rotation makes the higgs or the anti-higgs.

The (anti) proton-higgs is much heavier than the (anti) electron-higgs and generates 1843 times as much mass but quantitatively it generates the same amount of charge, and spin.

Both types of higgs of the proton are super symmetrical (**figure 1c of F1a 2014**) and attract each other entirely with both charge and spin. Both proton-higgs are mirrored and opposing, however, they cannot annihilate each other! That includes both electron-higgs.

Between the proton-higgs and the electron higgs is always electric attraction and magnetic repulsion, but they never form stable structures. Stable structures are only possible between proton-higgs mutual with both electric and magnetic attraction. The same applies for the electron-higgs!

All protons and antiprotons are only based on these two proton-higgs. All electrons and anti-electrons are only based on these two electron-higgs!

3.3 THE STRUCTURE OF PHOTON AND ANTI PHOTONS FROM HIGGS:

In **document F1b** constructions of higgs are described in the form of majoranas like frankinos (neutrinos) and photons; see **Figures 7 to 12** of **document F1b**.

All by stars emitted loose higgs, frankinos and double ones are reformed into proton-photons (infra-red) electron-ones (light) during a period of billions (10^9) of years.

In 14 to 18 billion years eventually are all by stars emitted photons formed back again into protons and electrons, and ultimately they combine to hydrogen. So all radiation is recycled to hydrogen via protons and electrons. Only gravity radiation remains untouched because it has no mass, charge, spin or energy. Then through nuclear fusion in stars or around the central black holes of the galaxy other elements are created. Only beryllium atoms and heavier can transform to black hole atoms and fall into black holes. See **figure 15d and 15th of F1c, paper F1D, F1E or figures 72 and 73 of G8**.

This fusion process is only possible in stars, in galaxies and just around the central black holes of galaxies.

3.3.1 ONLY TWO TYPES OF PHOTON / ANTI PHOTONS:

The author distinguishes only two types of photons being majoranas depending on the position on the atom where the electromagnetic radiation is generated,

a) from the nucleus or b) from the electron-shells.

ad a) The (anti-) proton-photon or infrared radiation from protons in the nucleus and The (anti) electron photon or light from the shell-electrons *around the nucleus*.

These photons are absorbed by the protons and the nuclear- electrons in the nucleus. This set of (anti) photons has a connection with the vibrations of the nucleus and temperature.

ad b): The (anti) electron-photon being light or UV and sometimes X-ray, is caused by the jump of a shell-electron to an orbit with a lower energy-level.

These photons were absorbed by the shell-electrons of the atom. These (anti) light-photons are generated only from the electron-shells.

Remember that the orientation of the rotation determents the photon to be anti or 'normal'.

-) **The biggest possible constructions with higgs are those anti-photons.**

Also they rotate standard around their three axes:

The photon and anti-one are made up of three higgs and three anti higgs.

On the outside photons have no measurable mass, charge and spin. Very deceptive these photon particles appear to be pure energy. That is not the case according to the next explication!

Never mind their direction of rotation sense, always two photons attract each other mutually due to the fact they are electric dipoles and magnetic quadrupoles. The photon and the equivalent anti photon can quench each other by interference, but they cannot neutralize their regular base rotations. As higgs and anti-ones, the normal photons and anti-one they cannot annihilate each other. This applies to two types of proton-photons and to types of electron-photons.

-) From photons can be built solely the proto-proton and proto-electron:

With this *matterless* whole and half photons and anti ones of the proton and of the electron can be constructed even larger structures in the form of a maximum of the proto-proton and the proto-electron. See figures 13, 14 and 15 of document F1c.

3.4 THE TRANSITION FROM MATTERLESS PROTO-PROTONS TO PROTONS BEING MATTER: THE SAME FOR (PROTO) ELECTRONS.

-) Matter is a structure with added photons possessing kinetic energy $E = \frac{1}{2}mc^2$:

With $13\frac{1}{2}$ of these matter-free photons and anti ones and with a total of 81 higgs can be built constructions of the (anti) proto-proton and the (anti) proto-electron. In universe only these four stable constructions are possible!

The four proto-structures of the proton and the electron based on three quarks, each with 27 higgs. See **Figure 15 in document F1c**. Those proto-structures are no (anti) matter. These matterless constructions need to get added $E = \frac{1}{2}mc^2$ as rotational energy to become matter.

That only happens when the equatorial velocity of the proto-proton and proto-electron is accelerated to the speed of light. Only then there is (anti) matter of the (anti) the proton and (anti) electron. During this acceleration the original charge and magnetic spin of the higgs do not change!

The proton and antiproton each added with $E = \frac{1}{2}mc^2$ to rotational energy are now literally matter and antimatter for each other! During annihilation they neutralize their mutual angular speed with the speed of light at their equator, while they fall apart into photons. This also applies to annihilation of the electron and its anti-electron. See **figures 15a - 15th of F1c**.

The mentioned increase of the angular speed gives an increase of the rotation energy up to $E = \frac{1}{2}mc^2$. It is transferred during a period of billions (10^9) of years passing all kind of stars, galaxies and black holes for example. At the end of this kinetic winding process in the universe only ordinary protons and electrons were formed which bind together creating hydrogen.

3.5 annihilation:

The basic feature of annihilation consists of the mutual cancellation of the angular speeds with the speed of light of the proton and anti-one or of the electron and the anti-one. The proton and anti-proton transform back to infrared photons. The electron and anti-electron change into light photons.

Following the outlined structure of protons and electrons during annihilation $2 \times 13\frac{1}{2} = 27$ photons are set free and $E = 2 \times \frac{1}{2}mc^2 = mc^2$ to rotational energy! This is *numerically* in accordance with Einstein.

Only matter with antimatter can annihilate and turn into energy (read in photons / anti-photons or into majoranas). During the annihilation the elemental mass, charge and magnetic spin were conserved. Only the basic rotations are gone, annihilated! However mass, charge and magnetic spin cannot be observed nor be measured any longer. They seem to be gone. During annihilation only the *characteristics* matter and antimatter are eliminated completely and emerge only photons and rotational energy.

In the **documents under F1a 2014, F1b and F1c** the author specifies how the proton and electron gradually be built out of higgs. the author misses and wants seriously such a proposal in relativity and the Big Bang theory!

*** 4) DURING THE BIG BANG MASS CANNOT BE SCHANGED INTO ENERGY:**

In **document G5**, the author has developed seven errors in the assumptions of the theory of relativity. There it is clear that mass of higgs cannot change into energy. For that reason, the Big Bang theory should be completely rejected.

**4.1 THE BIG BANG THEORY WITH FORMATION OF NEUTRONS
MUST ALSO BE REJECTED:**

-) During Big Bang also gravity would have to come back to earth:

The Big Bang based on $E = mc^2$ for $m =$ mass is not the only problem in this theory. Already after 10^{-34} second in a completely unknown way again 'condensed back' mass and with it gravity would have to make its come back. The Big Bang would immediately stifle and quench entirely in its own gravity.

-) Method of forming elementary particles as neutrons is also unclear in the Big Bang:

That mass of particles with a gravity is also completely unknown manner first merged into elementary particles. These particles continue to grow through quarks into neutrons. The manner in which these elementary particles gradually emerged from pure energy and how these particles eventually neutrons are formed remain both within the Big Bang theory completely unclear as to the theory of relativity. Both theories are therefore implausible.

-) Spherical shell form of the universe:

The moment after the Big Bang of elementary particles, neutrons are formed they fly away moving almost with the speed of light in all sides from the Big Bang point, the center C of the universe. The (free) neutron is unstable and falls apart in one proton, one electron, an anti neutrino and an amount of energy. These neutrons will result in a spherical universe and formation of a spherical shell containing the same number of protons and electrons!

-) Protons and electrons move in the same direction:

The protons and electrons released from the neutrons move, in principle, substantially in parallel in more or less the same direction as the initial neutron and at the same speed and direction. From this more or less parallel moving protons and electrons, however, is not a hydrogen atom to form back! Therefore, the orbits of all the electrons must, after all, are perpendicular to the paths of the protons in parallel instead of! H-atoms are not created, because the relative speeds of the particles are too fast. In a couple of hours the universe is a very hot hydrogen plasma. The adiabatic expansion gives a cool down.

-) Elements of the Periodic Table only to form from hydrogen:

How matter of the present universe (the atom or the elements of the periodic table of the elements) can be formed the author will explain in **document F1d and figures 18a - 18n, 19, 20, 21 and 22 of document F1d and phase 16a** of the universe cycle in **document G7**. It is in detail about the subsequent hydrogen supernova explosions via nuclear fusion reactions to form all possible elements and isotopes of the periodic system.

-) The formation of the hydrogen atom is a precise process:

This hydrogen atom belongs to the first element of the periodic table. However, this hydrogen atom can be formed only if the much larger proton can catch the smaller electron to go and orbit and to become a shell-electron. That is a precise process to the universe cycle.

At the time of the formation of the hydrogen atom, everything has to be matched to each other with respect to:

- a) The right distance between the proton and the electron,
- b) The right relative speeds of the proton and the electron,
- c) The adapted speed of the electron to be able to orbit around the proton, having other values in the different electron-shells.
- d) The centripetal force, being the electrical attraction of the proton and electron, must have the right strength. (coupled to the previous item)
- e) The direction of the still free electron must be perpendicular with respect to the path of the free protons.

Only then can be captured all the electrons for the full 100% in an orbit around the proton to form a hydrogen atom to be useful in the Big Bang theory.

-) A hydrogen atom cannot be made from a neutron:

In the Big Bang model neutrons are released which move linearly anywhere with the speed of light from the center C of the universe. Neutrons dissociate into free protons and free electrons which are both also move more or less with the speed of light parallel to each other from C. Due to the following reasons protons and electrons cannot form back a hydrogen atom, according to the previous section. The conditions mentioned in the preceding section are not met.

From the from neutrons released protons and electrons will in time only a minute portion to come together and after collisions and result in the formation of a number of hydrogen atoms. The majority of the protons and electrons (> 99%) will, however, can never result in the complete formation of a hydrogen atom or hydrogen molecule.

Based on the Big Bang the present matter in the universe cannot be explained.

Within the Big Bang theory lacks a clear vision of how those freed neutrons are 100% into hydrogen atoms / molecules. That is crucial as an intermediate phase to the formation of the other elements of the periodic table via nuclear fusion from hydrogen.

Conclusion: The Big Bang theory and singularity according to Einstein's $E = mc^2$ for $m =$ mass producing neutrons should be rejected totally.

4.2 NO BIG BANG BASED ON ANNIHILATION WITH $E = mc^2$ AND $m =$ MASS

-) DURING ANNIHILATION MASS IS NOT CONVERTED INTO PURE ENERGY BUT MATTER IS CONVERTED INTO PHOTONS:

In the case of a Big Bang on the basis of annihilation an equivalent amount of matter and antimatter would be indispensable. Only at the moment of the Big Bang They should converge exactly the same time and then annihilate completely. Prior to such a Big Bang would be the half of the universe have to consist of ordinary matter and the other half from the exact same amount of antimatter. That is a totally unrealistic option. Conclusion: The Big Bang is not based on annihilation!

4.3 UNIVERSE DOES NOT START FROM A SINGULARITY:

Theorists leave open the possibility that the universe was formed from the Big Bang black hole collapsed to a singularity. That can only occur if black holes and all it contains black-hole atoms could collapse much further than the black-hole atom and black holes already the case.

This further collapse is possible only if:

- a) the electron-shells of black-hole atoms (**document F1e**) further collapse and its protons, electrons and nuclei of black-hole atoms even further collapse than at black hole atoms,
- b) extreme gravity is present.

Ad a1): In black hole atoms the shell-electrons already move with at the speed of light around their nucleus. So this speed cannot continue to increase. Therefore the electron-shells of such black-hole atoms cannot compress further than is already the case in the black-hole atom! More space is lacking. See **figures 18d to 18n of document F1e**.

ad a2): In **document F1c** the spatial structures of the proton and the electron of which are shown in **figures 15a, 15b and 15 c of document F1c**. From these figures it is apparent that because of the available kinetic energy of the particles and therefore these higgs structures of the proton, the electron and cannot substantially further collapse of the nucleus than in the black--hole atoms is already the case. In black holes the negatively charged electron-shells of the black-hole atoms repel mutually net off.

Regardless of the amount of gravity, these black holes spatially it is impossible to collapse further to a singularity.

The supposed collapse of black holes to a singularity or point mass based on misunderstandings about the structure of black-hole atoms and the origin of gravity. See **document F1e and figures 18a - 18n of F1**.

ad b): During the formation of the Big Bang / Little Bang black hole the shrink speed of the black-hole atoms relative C continues to decrease due to merging of billions of no longer rotating central black holes! Correspondingly also the amount of gravity generated by the shell-electrons decreases. As well the gravity of this super-sized Big Bang black hole - as described later in the Little Bang black hole – will go down. Gravity continues to decrease until finally almost zero!

So the Big Bang black hole is lacking (gravitational) force to let collapse it even further into a singularity. From the Big Bang black hole cannot be formed a singularity!

Conclusion:

-) The lack of understanding about the origin of gravity has led physics to unrealistic notions about singularity. These concepts are the result of the direct coupling gravity to mass in the year 2015 while in fact there is only a very indirect relationship. Gravity is a speed related physical quantity of the atom *).

-) Due to the loss of speed and therefore the loss of gravity the Big Bang black hole is not to further compress by a singularity. Therefore also the universe cannot start from a singularity via a Big Bang.

*) Gravity is only generated by the shell-electrons of both the ordinary atom as the black hole atom in conjunction with the speed of these atoms in the universe with respect to the center C

of the universe. Gravity does not come from the nucleus! For the essence of gravity; see **documents E3 and E3-1**. (Gravitational radiation force universe scale)

Overall findings about the Big Bang:

-) From the theory of relativity Einstein and related Big Bang theory the manner in which the currently observable universe and the therein present matter have been effected, cannot be explained in any way.

-) The adoption in 2015 of Einstein's theory of relativity and the Big Bang theory in the foundation of science means in practice that an important part of the foundation of the particle physics, the (nuclear) physics and astrophysics rests on quicksand!

4.4 UNIVERSE DOES NOT START WITH A NOT SUPER HOT BIG BANG BUT WITH A SUPER COLD LITTLE BANG:

From chapter five the author worked out an alternative of the Big Bang in the form of a super cold Little Bang running explosion. On that Little Bang no form of mass or matter is converted into energy or vice versa.

During this Little Bang all the mass and even all matter in the form of protons and electrons remains completely fully intact. At the Little Bang all gravity vanishes and at 0 kelvin all existing black-hole atoms directly fall apart into an equivalent number of protons and electrons.

*** 5) OUTLINE LITTLE BANG UNIVERSE AND CYCLE:**

For the accompanying figures, reference is made to **document G8**.

In this document G6 from here the author develops an alternative to the Big Bang in the form of the Little Bang which takes place explosively near the absolute zero being 0 kelvin! During the Little Bang does not happen any conversion of mass or matter into energy nor vice versa. The Little Bang is settled without any form of heat!

During the Little Bang both all mass and all the matter remain fully intact and only protons and electrons are released from black-hole atoms! This Little Bang is not based on $E = mc^2$ nor for $m = \text{mass}$ nor for $m = \text{matter}$!

5.1 ESSENCES ABOUT THE CAUSE OF MAKING THE LITTLE BANG:

With the reduction in speed to almost zero the gravity of the giant globular Little Bang black hole with a radius of 50 to 100 million kilometers is at one moment lower than the mutual repulsion of black-hole atoms. Then this Little Bang black hole falls apart into loose unstable black-hole atoms. Immediately after it they decay into an equivalent number of ordinary loose protons and ordinary loose electrons. The new universe cycle starts with an equivalent number of protons and electrons.

During the Little Bang include the black-hole atoms *do not further fall apart* into smaller particles such as quarks, photons, frankinos (neutrinos), higgs or neutrons.

5.2 NO GRAVITY DURING OR AFTER THE LITTLE BANG:

During the universe cycle only 5 to 10 billion years after the Little Bang those protons and electrons bind in the formation of hydrogen atom. Then the universe expanded already a lot. With the formation of the hydrogen atom gravity is created for the first time after the Little Bang. Simultaneously with gravity automatically also an enormous amount of gravitational energy (= dark energy) compared to C was added to the universe-spherical-shell. That is the sought 'dark energy'.

The formation of the hydrogen atom, the H₂-molecule, gravity and gravitational energy takes place when the maximum expansion of the universe around C has already been completed to a high degree. Gravity slows the expansion, and also ensures that all matter and energy is returned to C again.

-) Gravitational energy is the driving 'force' of the universe cycle:

That with gravity 'free' added gravitational energy relative to C is the driving 'force' of every universe cycle. That is why overall always each cycle can settle in a completely energy-neutral manner. Thanks to this gravitational energy each universe cycle (described in **document G7**) can repeat itself endlessly.

-) Creation of gravitational energy is before the current generations of physicists difficult to understand:

Gravity and its gravitational energy compared to C emerge with the hydrogen atom but as if from nowhere. For physicists in 2015 this is unbelievable and extremely difficult to accept! It is contrary to the present common physical notion that gravity is directly related to mass instead of gravity is generated from the shell-electrons of atoms!

That completely free addition of gravitational energy resembles a 100% hocus pocus of the author but this free added gravitational energy is indeed real and inherent in the phenomenon of gravity. In **documents E3 and E3-1**, the author has derived the essence and origin of gravity including the origin of gravitational energy. Gravity is only generated from the shell-electrons of the atom interacting with any velocity of the atom in the universe within the universe-spherical-shell. Gravity does not have any direct relation with mass and the mass of the atomic nucleus does not originate gravity!
For the origin of the other physical forces and chemical ones on the atom see the **documents C1, C2, F1d and F1e**.

5.3 UNIVERSE CYCLE ON MAIN FEATURES:

The Little Bang released protons and electrons from the center C of the universe. Later on they formed hydrogen, atoms and molecules, during the universe cycle. See **document G7**. Simultaneously it is accompanied by the development of various physical forces and chemical ones including gravity. The universe is already largely expanded compared to C!

With gravity gravitational energy relative to C returns in the universe and is lots of gravity energy compared to C was added to the universe free of charge and the universe cycle! That gravitational energy comes out of nowhere to emerge! This is difficult to understand because up to 2015 always it is based on a direct link to gravity and mass! (The universe cycle requires major adaptations of the law of conservation of energy)

-) Universe-wide formation of elements of the periodic system:

Approximately 20 billion years after the Little Bang and about 20-25 billion years ago from hydrogen plasma 4 to 20 billion huge spheres of pure hydrogen were formed. They got bigger and hotter. Those billions of hydrogen bulbs are evenly distributed over a sphere with C always exactly in the center. Each sphere made of hydrogen contains matter, the kinetic energy and the gravitational energy of one galaxy.

Each of those big pure hydrogen spheres culminate in one hydrogen supernova or one Big Bang. Each galaxy starts with such a Big Bang in which are formed all other conceivable stable isotopes and unstable ones and emitted with the not yet fused hydrogen. 15% of the hydrogen fuses and about 85% does not. At the same time the central black hole of the galaxy is created.

The isotopes formed through nuclear fusion universe wide mandatory constructed in accordance with the [table of isotopes](#) of Wikipedia. See **document F1d**. Also the system of physical forces and chemical ones of all the isotopes is the same universe widely.

-) All electromagnetic radiation and particle one is transformed back into atoms incorporated into the black hole:

In a period of 14 to 18 billion years all the radiation of infra-red and light is reformed into protons and electrons and then to hydrogen. During the expansion of the universe all hydrogen in stars must fuse back to the elements beryllium and higher.

-) Atoms can be incorporated into a black hole only from beryllium:

The collapse of ordinary atoms to black-hole atoms and the incorporation into a black hole is only possible from the element beryllium. Only atoms $\geq \text{Be}$ are able to go into a black-hole state and can be incorporated into a black hole. For the transition from ordinary atoms into black-hole atoms at least two electron pairs in the electron-shells are required.

Electron pairs generate the van der Waals (- London) force increasing quadratically with the speed. At extreme velocities of the atom at least two present van der Waals forces start to form a van der Waals bond between the electron-shells of the atom with each other. These electron-shells start to dwell right near the atomic nucleus. Then ordinary atoms transform into black-hole atoms having the same overall structure as ordinary atoms. They get a 10^5 times smaller radius. See **document F1e** and **figures 18a - 18n of document F1e**.

Only from beryllium atoms can be inserted into the central black hole of the galaxy.

-) H, He and Li did not transform into black hole atoms:

The elements H, He and Li cannot enter into a black hole. Their atoms do not possess two electron pairs needed for the van der Waals/London force. Around the central black hole at first these elements need to be transformed into beryllium and higher through nuclear fusion before they can still be incorporated into the central black hole of the galaxy!

-) The expansion of the universe ends due to gravity:

Gravity slows down the expansion of the universe-spherical-shell. 200 ± 50 billion (10^9) years gravity puts an end to the shrink of the universe. In the meantime, all exhausted stars including local black holes and planets have been fully integrated into the central black hole of their galaxy. Also all forms of electromagnetic radiation and particle one are fully retransformed into protons, electrons. They combine into hydrogen. Through nuclear fusion in stars that hydrogen fuses in steps into beryllium and higher and only then it can back into one of the existing 4 to 20 billion (10^9) central black holes. This path takes to complete 15 to 20 billion years. Via this long path all electromagnetic radiation and particle one emitted by stars still incorporated and collected in the central black hole of one of the galaxies.

The expansion of the universe will stop only when all matter and all forms of radiation (except gravity) have been collected in one of the billions of accelerating rotating central black holes. At the end of the expansion all shrink-velocity is completely converted in angular speed of the central black hole of the galaxy of which the equatorial velocity is increased to approximately one third to half of the speed of light. The current phase 23 of the universe cycle requires a lot of time.

-) The Universe Cycle is settled energy neutral:

From the point of maximum expansion the (rotational) gravity will bring back simultaneously all extremely fast spinning central black holes to the center C of the universe at the end of the universe cycle. Then there the next Little Bang black hole will be formed.

-) Contraction of the universe consumes rotational energy:

On the way to C all previously added gravitational energy is fully utilized again to decrease the enormous angular speed of the central black holes to zero. This shrink-speed of the universe is oppositely directed to the rotational speed of the central black holes. Downsizing of the universe is possible only if this is at the expense of the speed of rotation of this central black holes.

This is necessary to all 4 to 20 billion central black holes to let them smoothly merge into one big black hole spherical shell of matter that eventually coalesces and further shrinks into one huge no longer rotating Little Bang black hole; see **figure 7 of document G8**. The Little Bang itself can only take place if at the end all gravity is gone. This places high demands on those billions back to C-moving central black holes.

Overall the universe cycle or Taut one is completed and settled on a completely energy-neutral manner!

-) Total main features universe cycle:

Prior to the modeling of the universe cycle its period requires 2.5 ± 0.5 billion years estimated currently. The maximum expansion is 3.0 ± 0.5 billion light years. Because of the deflection of photons and thereby curved and spiral light beams and particles of matter in the universe is really a factor of 5 to 10 times smaller than the 13.8 billion light years, which astronomers think to have measured by the different giant telescopes.

Within that physically much smaller sphere-shell shaped universe photons of infrared and light move a distance of about 13.8 billion light years; not directly but only through curved orbits within the universe-spherical-shell. See **figure 77 of document G8**.

5.4 THE UNIVERSE IS COMPLETELY FILLED WITH VIRTUAL IMAGES TO BE SUPPLIED FROM THE UNIVERSE-SPHERICAL-SHELL:

Passage through extremely thin hydrogen and helium gas or plasma and deflection by electric and magnetic fields of stars and galaxies creates a deflection in the orbits of photons and all other forms of radiation (except gravity). That deflection is estimated to average only about 1 degree per ten to forty thousand years and is not likely to be measured exactly. Such deflection is, however, sufficiently large to hold all the electromagnetic and particle radiation for 100% within the universe-spherical-shell and to leave it there to move on. The universe-spherical-shell is therefore regarded as a closed system for mass, matter, charge, spin and energy!

On earth this minimal deflection causes to completely fill the dark areas inside and outside the local universe-spherical-shell with images of galaxies derived from the universe-spherical-shell! They are not visible in itself totally dark internal and external spaces. They are completely filled with virtual images from the universe-spherical-shell! The universe is full of optical illusions!

5.5 BLACK HOLE ATOMS AND THEIR PROPERTIES:

-) Ordinary atoms are stable and generate the van der Waals/London force:

In ordinary atoms the shell-electrons have relatively low orbit speed of approximately 2.2 Mm/s, making the basic structure of ordinary atoms normally very stable. That rate of turnover of the electrons is sufficiently low to be able to form electron pairs within the electron-shells. Such a pair of electrons consists of a chemical covalent bond radical in conjunction with a mutual repulsion via the same charge and spin of both electrons. These shell-electron pairs generate under the influence of speed in the universe (and associated kinetic energy) the Van der Waals/London force. In atoms, the strength of the van der Waals/London force is proportional to kinetic energy and thus to the square of the velocity of the shell-electron pair of the atom in the universe relative to C.

-) Creation of black-hole atoms:

That van der Waals force can form

- a) (weak) bindings between atoms (giving a molecular crystal lattice in solids) and
- b) inside a single atom a bond between two electron pairs.

The latter only happens at extremely high speeds and, of course, when in the electron-shells of an atom at least two electron pairs are present. That form of van der Waals/London bonds inside the atom can occur only from beryllium!

These van der Waals/London bonds are formed inside one electron-shell and as well between two different electron-shells of the atom. The result is that all the electron-shells of the atom together collapse until right near the atomic nucleus. The ordinary atom transforms to an atom in the black-hole state with the same nucleus and the same (sub)-electron-shells filled with the same number of electrons but only loose ones, no pairs any more. So in black-hole atoms electron-shells are situated directly near the atomic nucleus.

In the transition to a black hole atom, the volume of the ordinary atom becomes about $(10^5)^3$ times smaller. This transition has been outlined and explained in more detail in **Figure 9 of document G8** and in **Figures 18a - 18n of the documents under F1e**.

In the universe all atoms of extremely compact stars are formed from ordinary atoms \geq beryllium (Be). Their electron-shells collapsed to just near the atomic nucleus.

-) Speed of the shell electrons increases to the speed of light; all electron pairs disappear:

During the collapse, the electrical energy of the shell-electrons is transferred in their kinetic energy. The speed is accelerated to the velocity of light. During the collapse of the electron-shells this enormous increase in speed results in disintegration of all electron pairs again into single electrons. Thus, the van der Waals force and bond disappear again! The collapse of the ordinary atom to black-hole atom is irreversible.

All black holes and other compact celestial bodies are completely filled with such black-hole atoms \geq beryllium. All black holes and other compact celestial bodies rotate at high speed.

-) The atoms of H, He and Li are not absorbed into a black hole:

The atoms H, He, Li, and the hydrogen molecule having no or only one pair of electrons. Inside the electron-shells of the lightest atoms cannot be formed van der Waals bond(s). These three atoms and molecules cannot collapse into a black-and-hole atom, never mind the size of the velocity or the pressure from the outside! These atoms stick around black holes and the black hole is completely out of sight.

5.6 BLACK HOLES AND THEIR PROPERTIES:

-) Black holes are standard near 0 kelvin:

In black-hole atoms the nucleus is totally contained within its electron-shells. The nuclei of black-hole atoms in their electron-shells of single electrons have virtually no room to vibrate. Therefore black-hole atoms are super cold! All black hole atoms and black holes are standard and during all conditions near absolute zero! Presumably, the temperature of all the black-hole atoms standard 2.7 kelvin which is equal to the background temperature of the universe. Because of the extremely low temperature, black holes do not emit light; but still infrared and gravity!

These shell-electrons moving almost with the speed of light cannot absorb any form of electromagnetic radiation. The enormous speed and compactness of the electron-shells also prevents black-hole atoms as a whole to absorb particle radiation. Black holes are not only super cold but are also the most perfect mirrors both for all forms of electromagnetic radiation, especially light, and for all types of particle radiation!

-) The electric spring tension between black-hole atoms mutually;

Black-hole atoms are uncharged by nature. In black holes are all black-hole atoms tightly crammed together. The electron-shells ensure that black-hole atoms repel each other, as

shown by the red arrows in **Figure 13 of document G8**. This creates a tremendous all-round electric repulsion as a spring tension between the existing black-hole atoms mutually.

-) Black hole atoms are unstable:

The revolve-speed of the shell-electrons is near the speed of light and black-hole atoms are very unstable by nature; this in contrast to celestial bodies with ordinary atoms. Black hole atoms can only be maintained within a black hole or similar compact body (including white dwarfs and neutron stars) and the presence of sufficient gravity.

If the black hole itself generates too little gravity then:

- 1) the black hole falls apart into loose black hole atoms. They themselves are also unstable,
- 2) and explosively those black hole atoms decay into an equivalent number of loose protons and electrons.

Constantly in all black holes and compact bodies a conflict occurs between this electric tension of the black-hole atoms themselves and the minimal necessary gravity, the critical black hole gravity that is required for these black-hole atoms to keep them together and to keep them stable in the black hole.

-) Black holes maintain themselves and stay stable only with sufficient gravity:

To endure the overall gravity of the black hole must always be stronger than the mutual electrical repulsion of the black-hole atoms and thus occurring electrical spring tension inside the black hole! The gravity must always be stronger than the *critical black-hole-gravity*.

The difference of gravitational attraction and electrical repulsions equals the necessary centripetal force to be able to rotate and to generate rotation-gravity.

For gravity, the author refers to his **papers E3 and E3-1**.

5.6.1 CRITICAL BLACK HOLE GRAVITY / CRIBHGRA:

The black-hole atom can only remain in state into a black hole comparable compact celestial body that of itself generate a minimum critical mass of gravity in the form of expansion-gravity and rotation-one. This minimal required amount of net gravity for black holes the author defined as the critical black hole gravity. It is a combination of:

- a) a minimal amount of matter in the form of black-hole atoms in such a black hole, coupled to
- b) a minimum amount of linear speed, kinetic energy and angular momentum of the black hole,

The *critical black hole gravity* or *Cribhgra* can be derived theoretically.

Critical black-hole-gravity corresponds to the movement, that is associated to gravity and thereby the minimal required kinetic energy of the smallest possible black hole or neutron star. That smallest possible black hole, white dwarf, pulsar, magnetar, quasar, neutron star or any other compact one has a radius of estimated to be 2 to 3 km which is coupled to a rotation speed of approximately one third of the speed of light; see **figure 12 of document G8**.

While the gravity of a black hole is stronger than critical black-hole-gravity this potentially unstable black hole with also its unstable black-hole atoms remains in normal mode. If net generated gravity decreases to less strong than critical black-hole-gravity the mutual electrical repulsion of the black-hole atoms wins of the gravity. Then the black hole near 0 kelvin falls explosively apart in loose black hole atoms and then into individual protons and free electrons.

Gravity, kinetic energy, linear speed, momentum, rotational speed and angular momentum through atoms are therefore equivalently interrelated quantities of the black-hole atom that determine the stability of black holes.

As yet according to the author it does not the matter by what quantity the requisite gravity is generated.

5.7 FORMATION OF THE LITTLE BANG BLACK HOLE:

The author describes the start of the universe from one huge so-called Little Bang black hole with a radius of about 0.05 - 0.10 billion km. It comes to a complete halt, and gravity becomes less than critical black-hole-one. This black star brought together all matter and all energy of the universe. Now it falls apart. See **figures 1-14 in document G8**.

In this Little Bang black hole all matter, electromagnetic radiation and particle one of the universe is brought together in the form of black-hole atoms \geq Be. Then all the kinetic energy and the angular momentum of the previous universe are concentrated to give the coming universe after the Little Bang starts.

Such kinetic energy and angular momentum is composed of:

- a) the shell-electrons moving at the speed of light around their atomic nuclei and
- b) in the form of the mutual repulsion between the black-hole atoms.

This caused 'spring tension' is the origin of the expansion velocity and thus the linear kinetic energy of the universe.

-) Formation of the Little Bang black hole is getting slower:

During the final phase of the formation of the Little Bang black hole it is increasingly difficult to arrange the black-hole atoms themselves to each other in relation to C. See **figure 6 of document G8**. This allows the shrink-speed of the universe continues to decrease until finally almost zero at the moment that the Little Bang black hole is filled up completely.

With this decreasing collapse-speed simultaneously separately also the overall gravity of the Little Bang black hole ever goes further towards the critical black-hole-gravity. The Little Bang black hole has a huge size with a radius of 0.05 to 0.10 million km. Only in the last stage of formation and completion of the Little Bang black hole the gravity undershoot the *critical black-hole-gravity* or *Cribhgra*. Then the Little Bang starts to bang; **figure 14 of document G8**.

5.8 THE UNIVERSE IN THE FINAL PHASE VIEWED FROM C:

-) At first accelerated contraction; later the contraction-speed declines steadily:

Viewed from the center C of the universe from all sides equally amounts of black-hole-matter being 4 to 20 billion central black holes comes in the direction of C with the same shrink-speed and diminishing kinetic energy. In their final phase they do not rotate any longer. Because of double counting the number of galaxies is much lower than the 150 - 300 billion units, which was supposed in the present; see **document G9**.

Each central black hole is the 100% remnant of one galaxy including previously emitted radiation that was transformed into protons and electrons. They react to ordinary atoms and after fusion finally to black-hole atoms.

In the final phase of the contraction of the universe central black holes, no longer rotating, are at exactly the same distance from C and they all move towards C with the same speed.

When their distance to C is about 100 billion km the central black holes do not rotate anymore and they touch, neighbor against neighbor; **figure 6 of document G8**. They flow together as water drops into one homogeneous exactly spherical shell made of black-hole matter; **figure 7 of document G8**.

Seen from C this universe-spherical-shell of black-hole matter has one uniform thickness and contraction-speed and thus an exactly equal kinetic energy density. All motion is ~~momentum~~ in the direction of C and generates the same amount of contraction-gravity everywhere. See **figures 1-9 of document G8**.

At first this universe-spherical-shell of black-hole matter still shrinks accelerated in the direction on all sides of C with 1 to 3 Mm/s after merging. Everywhere exactly the same rate, and always in the shape of a perfectly round spherical shell, both on the inside as on the outside. All the black-hole atoms are moving from the moment of merging of the central black holes via an exactly straight line, and at the same speed towards C.

-) Decrease of the contraction-speed of the universe and hence of the gravity:

However while the thickness of the universe-spherical-shell increases ordering of the black-hole atoms mutually becomes increasingly difficult. The reordering of the black-hole atoms requires kinetic energy, resulting in more spring tension. Therefore, the contraction-speed continues to decrease up to several km/s and even to several m/s. This introduces the contraction-gravity of taking increasingly clearer imaging Little Bang black hole correspondingly also increasingly in the direction of critical black-hole-gravity; **figure 14 of document G8**.

-) The further collapse of Little Bang black hole into a singularity is not possible:

Due to the decreasing gravity of the Little Bang black hole it cannot further collapse into a singularity! Thereby the hypothesis that the universe started as a Big Bang from a singularity invalidates. Concepts like singularity and vacuum energy have put the science (in full) on the wrong track to date.

From the spatial structure and dimensions of the proton and electron can be deduced that the space occupied by the particles prevents further collapse; see **figures 18 a and 18 c of document G8 and figures 18c - 18n of the documents under F1d and F1e**.

-) The Little Bang black hole is the smallest possible volume that the matter of the universe can occupy:

During shrink further, the spherical-shell of black hole matter grows thicker; see **figures 6, 7 and 10 of document G8**. The thickness of the universe-spherical-shell increases from 40 to 50 Mm until the end to the spherical Little Bang black hole with a radius of about 0.05 to 0.10 billion km at the moment that this Little Bang black-hole is completely finished; see **figure 11 of document G8**.

The radius of the interior empty space around C is getting smaller and eventually approaching to virtually zero. This Little Bang black hole with his final outer radius of about 0.05 - 0.10 billion (10^9) kilometers is the smallest possible physical space of the universe and is in all cycles exactly the same size.

-) Contraction-gravity continues to decrease to zero:

During the contraction of the universe-spherical-shell the average speed of the black hole atoms relative to C remains to decrease and therefore the by the shell-electrons generated contraction-gravity is less and less. When the Little Bang black hole is substantially completely filled, the velocity of all black hole atoms is even reduced to substantially 0 mm/s. This decreases the total shrink-gravity of the Little Bang black hole until finally almost zero; **figure 14 of document G8.**

-) Contraction of Little Bang black hole always leads to critical black-hole-gravity:

Eventually the contraction-speed takes on all sides until a few m/s, a few cm/s relative to C and in the mean time the contraction-gravity of the Little Bang black hole continues to decrease direction critical black-hole-gravity. Almost as soon as the Little Bang is completed the critical black-hole-gravity is reached.

Because gravitational radiation does not carry mass it can move with an infinite speed. Everywhere exactly simultaneously the Little Bang black hole thus achieved critical black-hole-gravity and so everywhere simultaneously it becomes unstable; **Figure 14 of document G8.**

According to the author the new universe will start from a real and present super big black hole with a radius of 0.05 to 0.10 billion kilometers which comes to a standstill so that the critical gravity is reached and the Little Bang black hole is unstable.

5.9 NO TOLERANCE TO MOVE THE CENTER C OF THE UNIVERSE:

-) Center C must always be the same point in each cycle:

That reach of the critical black-hole-gravity is only possible if that center C at each cycle always remains in the same place. The center C of the universe and also center of gravity of the universe cannot move too much during the cycle. Such displacement would be to ensure that too much is left to allow gravitational let reach critical black-hole-gravity. This situation is depicted in **figure 15 of document G8.**

-) Low tolerance for moving the center C of the universe:

To let happen a new Little Bang anyhow that Little Bang black hole must reach the critical black-hole-gravity. The tolerance of the center C at the start of the universe cycle relative to the center C at the end of each cycle of universe is very small and presumably amounts to only about a few cm to at most a few meters! The universe does not move towards its own center C!

To be able to reach critical black-hole-gravity almost exactly the same time exactly as much matter, mass and kinetic energy need to be aimed at C spherically symmetrically. And C must always remain exactly in the center of gravity of the universe.

Only then in the final stage the speed of the black-and-hole atoms of the entire Little Bang almost decreases to exactly zero mm/s with respect to the center C and critical black-hole-gravity is reached; **figure 14 of document G8.**

If the difference between C at the beginning of a cycle, and the 'C', at the end of the cycle more than a few meters that results 'net' into a too large displacement of the new Little Bang black hole and thus in excess of gravity with respect to the position of the previous Little Bang black hole.

That net displacement generates a corresponding amount of gravity which remains greater than critical black-hole-gravity. Then gravity does not decrease enough to reach critical black-hole-gravity and the next Little Bang would not occur.

In that case the universe ends, in one large stationary black hole with a radius of approximately 0.05 to 0.10 billion km and with an amount of gravity which is (slightly) greater than critical black-hole-gravity; **figure 15 of document G8**.

-) This universe is one of an infinite number of cycles; apparently critical black-hole-gravity is reached standard:

According to the author this universe is part of an infinitely long series of ever succeeding one another universe cycles. Apparently each cycle reaches critical black-hole-gravity consistently and the displacement of C is so small that at the end of each cycle, the reach to critical black-hole-gravity is never at risk.

5 .10 THE NEXT LITTLE BANG ONLY HAPPENS IF CRITICAL BLACK-HOLE-GRAVITY (CRIBHGRA) IS REACHED:

The previous universe threatened to end as one big super absolutely stationary black hole with C exactly in the center. That just does not happen. Only at the last moment before the full completion of the Little Bang black hole critical black-hole-gravity is reached. During that moment in the Little Bang black hole the electric exceeds the minimum required gravity. The Little Bang black hole is exactly everywhere unstable and simultaneously it disintegrates into loose black hole atoms.

-) End of the previous universe during the time of the unstable state of the Little Bang black hole:

Then in four steps simultaneously all black hole atoms fall apart into an equivalent number of ordinary protons and ordinary electrons. They arrange themselves in spherical mono-layers; **figures 19-27 of document G8**. Again within each spherical monolayer of protons or electrons mutual repulsion occurs due to the same sign of electrical charges; enlargement in **figure 30 of document G8**. Viewed from C that spring tension results net for universal outward spherically symmetrically expansion.

In phase 5 of the universe cycle under the influence of this electrical and magnetically spring tension the universe is expanding on all sides evenly from C with a system of mono layers filled with protons and electrons. The radial equal expansion starts at a speed of 100 to 150 Mm/s being one third to half the speed of light. In 1.300 to 1.500 years the Little Bang black hole is peeled into alternating mono-layers of one proton and one electron thick until the Little Bang black hole is peeled off and has disappeared completely. After 1.300 – 1.500 years a hollow inner space around C starts to form; **figure 30 of document G8**. That moment marks the end of the Little Bang.

*** 6) THE FIVE PHASES LITTLE BANG AND FIRST 5 PHASES
IN THE UNIVERSE CYCLE:**

6.1 PHASE 1 THE LITTLE BANG:

REACHING CRITICAL BLACK-HOLE-GRAVITY:

At the time of the start of the Little Bang, the last part of the contraction, all mass, matter and energy of the universe is 100% assembled in the Little Bang black hole with center C of the universe exactly in the middle. Around C is still a hollow interior present being several centimeters or decimeters. With continuing decrease of the contraction-speed the gravity follows the decrease and thereby also the remaining gravitational energy which is being progressively reduced to zero in the end. Then in the universe only remains kinetic energy and electrical one.

- a) Kinetic energy of the universe is to find in the shell-electrons of the black-hole atoms moving at light speed around the nucleus
- b) There is electrical energy due to the repulsion of the strongly packed black-hole atoms. Also there is electric energy between all particles in the black-hole atoms.
- c) The kinetic energy due to contraction-speed and corresponding gravitational energy run back to zero.

At the time of the Little Bang the universe attains its smallest possible size while it is built with only black hole atoms repelling each other maximal. Then gravity is exactly zero. Also the shrinkage of the universe in the previous universe cycle just ended. At the same time the new universe with a new cycle of expansion of space starts growing to 0.050 to 0.10 billion km. This Little Bang started the universe clock time exactly the same everywhere again at $t = 0.0000$ s.

Happily just prior to the Little Bang the universe is very simply and clearly to describe. In **document G7** (text) and **document G8** (figures) the full 29 phases of the whole universe cycle are described.

**6.1.1 PHASE 1: START TIME UNIVERSE CYCLE WITH REACHING CRITICAL
BLACK-HOLE-GRAVITY AND START OF THE LITTLE BANG. ALL
SHELL-ELECTRONS LEAVE THEIR ATOMIC NUCLEUS:**

-) Characteristics Phase 1 and 1a:

- End of the previous universe cycle with simultaneous restart of the cycle of the next universe.
- The Little Bang black hole with a radius of 0.05 to 0.10 billion km reaches critical black hole gravity everywhere exact same time.
- The mutual electrical and magnetic repulsion (spring tension) between the black-hole atoms becomes stronger than the critical black-hole-gravity. The black-hole-gravity held them together.
- When critical black-hole-gravity touches the Little Bang black hole then it becomes unstable anywhere exactly the same time.
- In phase 1, all black-hole atoms near 0 kelvin simultaneously divided into separate uncharged black hole atoms.

- Subsequently the uncharged black hole atoms dissociate into free nuclei and loose shell-electrons moving with the speed of light.
- Due to the outward electric tension of the electrons and the nuclei the expansion of the new universe restarts with about 1 Mm/s. This is only possible from the surface of this unstable Little Bang black hole sphere.
- The acceleration of expansion must remain low so that all protons and electrons can endure this acceleration to remain intact and particulate matter entirely unchanged maintained. (The spatial structures of the proton and the electron are shown in **Figures 14 and 15 of document F1c**)

-) The Little Bang occurs when the total gravity of the universe reaches the critical black-hole-gravity:

At the moment that the hollow interior space around C is (practically) completely filled and thus the formation of the Little Bang black hole is completed, all the black-hole atoms and their nuclei come absolutely to rest with respect to the center C of the universe; **figure 11 of document G8**. Hence the gravity of all existing black-hole atoms decreases to zero and thus the overall gravity of the Little Bang black hole almost to zero and thus of the universe as a whole!

Just before the full completion of the Little Bang black hole the gravity reaches its critical black-hole-gravity; **figure 14 of document G8**. That happens in the Little Bang black hole everywhere exactly the same time.

In **figure 12 of document G8** is the value of the critical black-hole-gravity visually represented as a small and fast rotating black hole. The minimum and maximum dimensions of the universe are given in **figure 16 of document G8** reaching the critical black-hole-gravity all black-hole atoms of the Little Bang black hole come exactly the same time into an unstable state. At first the Little Bang will start with the fall apart of this black hole in loose uncharged black hole atoms.

Simultaneously all the shell-electrons leave their nuclei moving with the speed of light. These shell-electrons organize themselves into spherical orbits around the center C of the universe. The with speed of light moving free electrons push the nuclei into spherical layers; **figure 19 of document G8**.

On any cross-section in the Little Bang globe through C one find exactly the same image of still stationary nuclei interspersed with layers of shell-electrons moving around C. Seen over the cross-section these shell-electrons move in all directions with the speed of light and always the number of electrons are equally distributed over all directions around C; ; **figure 20 of document G8**. The spherical layers with atomic nuclei are still quiet compared to C.

In phase 1 only bare, unstable, positively charged and mutually-repelling, atomic nuclei of the black hole atoms remain. They sit tightly packed together. According to the author, all nuclei have been composed solely by protons and electrons; see **Figures 19, 20, 21, 22 and 23 of the documents F1d and F1e**.

These nuclei repel each other mutually with their positive charge and equal magnetic spin. This huge rejection and through both charge and through magnetic spin causes a strong 'spring tension' within the spherical layers of nuclei. The same applies in the electron layers. .

Between these naked nuclei just sufficient space is present to allow the electrons to move around C closely to them with the speed of light. On the surface of the unstable Little Bang

black hole the net outwardly directed spring tension starts to an outwardly directed expansion from 0 m/s to one third to half the speed of light in the end.

-) All gravitational energy disappears:

At the time of the Little Bang all matter, all the mass, all of charge, any magnetic spin and all the energy of the entire universe is together near C. At that time the black-and-hole atom fall apart and thereby also disappears completely the gravity out of the universe including the last remnant of the gravitational energy. Then the amount of the gravitational energy of the universe is zero.

(It will remain so until at phase 7 - after 5 to 10 billion years of expanding - the protons and electrons proceed to the formation of the hydrogen atom. With the atom gravity and gravitational energy is back into the universe.)

-) All mass, charge, magnetic spin and energy remain constant:

The total amount of mass, charge and magnetic spin in the universe is always the same during the whole universe cycle, and is constant and is always genuine. Within the universe cycle is no "dark" mass or "dark energy". These phenomena are the result of the absence of a factor $\cos \alpha$ in the formulas used gravity.

-) No 'dark mass / matter' and 'dark energy':

In **documents E3 and E3-1** it shows that Newton and Einstein have forgotten to take a factor of $\cos \alpha$ in their gravitational formulas wherein α is the angle that two objects m_1 and m_2 on the universe-spherical-shell have relative to the center C of the universe; **figure 36 of document G8**. When applied to the scale of the universe of existing arrangements without α result of the calculations in far too little mass relative to energy. With the addition of the factor $\cos \alpha$ gravitational formulas at the current show in the universe far more gravity and thus much more material and kinetic energy to be present then calculated until now. During the universe cycle dark matter and dark energy are not needed.

-) Matter; at the Little Bang black hole atoms fall apart into individual nuclei and free electrons; no conversion of mass or matter into energy:

The center C of the universe is exactly in the center of the spherical Little Bang black hole which disintegrated in mono-layers of charged stationary nuclei and shell-electrons moving with the speed of light. Nuclei are composed of protons and electrons only. See **figure 19, 20 and 21 of document F1d**. In the universe everywhere exactly the same amount of ordinary protons and ordinary electrons are present. Once the black-hole atom disintegrates disappear the phenomenon of temperature completely. During the Little Bang the temperature equals 0 kelvin.

During the Little Bang mass or matter is not converted into energy or vice versa is again made up of energy mass of matter nor is there any form of annihilation! During the universe cycle always all mass, charge, and magnetic spin continues to be the same and in the form of all the protons and all electrons. Refer to **document G4** with the universe laws.

-) Forces; at Little Bang disappear all non elemental forces of black-hole atoms:

With the disintegration of the black-hole atom disappear:

- a) the basal centripetal force on the electron that keeps the electron orbiting around the nucleus and
- b) all other physical forces and chemical ones of the black hole atom including gravity.

At the time of the Little Bang suddenly the gravity returned from critical black-hole-gravity to zero; **figure 14 of document G8**:

After the Little Bang as properties remain only:

- 1) the mass and matter of the proton and the electron,
- 2) the elementary electric charge,
- 3) the elementary magnetic spin,
- 4) the revolving energy of the shell-electrons and
- 5) the electric repulsion (spring tension) inside the spherical layers with electrons
- 6) the electric repulsion (spring tension) inside the spherical layers with nuclei.

The electrical tension of the individual electrons and loose nuclei handle the start of a universal equal expansion compared to C. In phase 1 single released as nuclei are unstable particles.

-) Radiation; outside the 'Little bang black hole is not present any form of radiation:

During this first phase of the Little Bang lacks any form of: a) electromagnetic radiation, b) heat radiation, c) particle radiation, and d) gravity outside the universe sphere. The released shell-electrons all dwell to move within the former Little Bang black hole. These electrons are in a state of a particle radiation. They orbit at the speed of light around C.

These fast electrons collide in phase 2 to the unstable nuclei and thereby letting decay the nuclei into protons and nuclear-electrons!

-) Volume; the Little Bang black hole has the smallest possible volume that the universe can occupy:

At the time that the inner space is filled almost entirely the Little Bang black hole has been created where all matter, mass, charge, magnetic spin and kinetic energy of the universe have been concentrated in a pure ball of matter with a radius of about 0.05 to 0.10 billion (10^9) km with a very small interior hollow sphere with a radius being between a few centimeters and meters. Its center is C the center of the universe.

The disappearance of gravity makes it impossible that the Little Bang black hole would collapse into a singularity. The Little Bang black hole is the smallest possible volume that the universe can physically occupy.

-) Duration of phase 1:

At the Little Bang the previous universe ends after a universe clock time and cycle time of about 2 to 3×10^{12} years!

The new universe will start at C for all protons and electrons all exactly the same again with a new universe clock time $t = 0.0000$ second. Universe clock time is a cyclical phenomenon with clearly defined begin and end. It begins at the moment of the Little Bang and it ends at the next Little Bang. The universe clock time is linked to the Little Bang and the center C of the universe. The first phase of the Little Bang takes much less than 10^{-3} second.

-) Rotation energy and angular momentum of the shell-electrons:

At the time of the start of the Little Bang the shell-electrons move with the speed of light in orbits around C.

Each shell-electron represents the maximum amount of angular momentum compared to C. However the component sum of all angular momentums equals zero due to all present directions. These shell-electrons have the maximum and total amount of kinetic energy of the previous universe and will be transferred to the next universe.

Therefore every universe in the past and in the future always starts with exactly the same amount of kinetic energy in the shell-electrons.

Assuming that the shell-electrons in black hole atoms have the speed of light revolving their nucleus these shell-electrons possess an amount of kinetic energy which is equal to:

$E_{\text{universe}} = n_s \cdot m(e) (3.00 \times 10^8 \text{ m/s})^2$ in which:

n_s = the total number of shell-electrons at the black-hole atoms in the universe,
 $m(e)$ the mass of the electron.

-) Rotation energy and momentum of the nuclei:

At the time of Little Bang the protons and nuclear- electrons present in the Little Bang black hole do not possess kinetic energy or momentum (practically) because they (hardly) move compared to C.

Between the atomic nuclei mutually spring tension is present. It arises as a result of:

- a) the mutual displacement of the black-hole atoms during the formation of the Little Bang black hole and
- b) the electrical repulsion between the black-hole atoms mutually when the central black holes were formed in the distant past.

That spring tensions represent an amount of kinetic and electrical energy and momentum at the Little Bang released in the form of a starting universal spherically symmetrically expansion of the universe in phase 1. This expansion is uniform and precise directed away from C. The maximum amount of kinetic expansion energy of the universe can be deduced and calculated after modeling the universe cycle.

-) Arrangement into spherical electron-layers one electron thick alternating with spherical proton-layers one proton thick:

In black-hole atoms the electrons move with the speed of light around the nucleus. After the Little Bang all shell-electrons leave their nucleus. These loose electrons moving with almost the speed of light arrange themselves into spherical mono layers, one electron thick. Now they do not move around a nucleus but around the center C of the universe. All the angular momentum is concentrated in these electrons.

The black-hole atoms disintegrated into layers of alternately loose unstable nuclei and loose electrons as shown in **figure 19 of document G8**. The center of these layers is C, the center of the universe.

In all the cross-sections of the sphere the angular momentum of the electrons has been divided homogeneously in all directions; **figure 20 of document G8**.

-) Creation of radial kinetic energy in the universe by resilience nuclei:

Because of the mutual repulsion within the layers with atomic nuclei and inside the layers of electrons an enormous electric and magnetic spring tension is generated, creating a radial impulse as expansion velocity v_e to varying degrees is aimed directly away from C. The stationary nuclei of phase 1 do not possess speed or momentum.

The shell-electrons do move in their mono-layers even with the speed of light in all imaginable directions around C. The electrons of the new universe start to move in two perpendicular ways: the expansion velocity v_{expand} and the speed of revolving v_{rev} around C.

Via the spring tension, all spherical layers with atomic nuclei, and those with shell-electrons evenly and at the same speed launched radial from C. This process starts on the outside of the former Little Bang black hole. Only there is indeed a physical space available for expansion. In phase 1 of the Little Bang the expansion of the new universe starts.

This phase 1 of the Little Bang is settled by a 'reasonably smoothly running' and spherically symmetrically and zero temperature explosion missing the atoms. In a millisecond the expansion speed increases from zero to about 0,1 – 1 kilometer.

-) No inflation of the universe:

The Little Bang never inflates with a speed more than the speed of light. If the inflation the expansion rate would be faster than the speed of light all protons and electrons would fall apart to their most elementary higgs! These particles cannot merge immediately into protons and electrons! (See **documents F1a 2014, F1b and F1c** in which that rebuild process is developed)

The acceleration of the new universe must be so low that under all circumstances all protons and electrons must continue to be fully intact!

-) Potential energy or gravitational one:

Because the black-hole atom is gone all the gravity is also completely disappeared as well and with gravity all the gravitational energy in the universe! The expansion of the new universe happens without gravity and therefore it is not slowed down and from an energetic point of view it happens entirely freely!

(Only 5 to 10 billion years after the Little Bang the hydrogen is back into the universe and with it gravity and gravitational energy returns!)

-) Thickness universe-spherical-shell:

The thickness of the universe-spherical-shell is exactly the same on all sides with C exactly in the center and this thickness is approximately 0.05 to 0.10 billion km. During phase 1 the thickness of the universe-spherical-shell of nuclei and electrons increases only a few hundred meters.

-) Extreme cold universe

At the start of the Little Bang black hole its temperatures is near 0 kelvin and presumably at 2.7 kelvin. During this phase of the super cold Little Bang there is not any radiation present.

-) Next Phase 2:

The released and the speed of light moving shell-electrons divide the sprawling nuclei in one continuous motion simultaneously in separate stationary protons and loose nuclear-electrons.

6.1.2 PHASE 2: THE RELEASE OF AN EQUIVALENT NUMBER OF PROTONS AND ELECTRONS:

-) Features of phase 2:

- At 0 kelvin all nuclei split exactly simultaneously into loose protons and loose electrons.
- No formation of neutrons or other, smaller particles of the proton or that of the electron.
- Acceleration of the expansion continues until about 2 Mm/s. Decisive is the maximum acceleration that the spatial constructions of the subject matter of the proton, and that can handle of the electron;. This acceleration must remain below 1/3rd – 1/2rd of the speed of light-

- During the clashes and strong accelerations in the Little Bang, protons and electrons are not allowed to disintegrate into smaller elementary particles such as quarks, photons, neutrinos and higgs! All protons and electrons remain intact.
- Duration of the decay of nuclei takes much less than 10^{-3} second.
- The former Little Bang black hole expands further approximately one kilometer.

-) Matter: during Little Bang an equivalent number of protons and electrons occurs:

The fast electrons collide with the stationary nuclei and split these unstable nuclei into individual into protons and still separate nuclear-electrons; **figure 21 document G8.**

This splitting of the unstable nuclei requires a relatively small proportion of the kinetic energy and angular momentum of the shell-electrons. During the splitting of the nuclei heat or energy is not released. The released protons and electrons do not fall farther apart into smaller particles.

The nuclei disintegrate only into still loose protons and nuclear-electrons. The exterior of the former Little Bang black hole has an outward expansion.

-) Kinetic expansion energy:

In this phase the protons released from the nuclei of the black-hole atom still hardly move except on the outside of the former Little Bang black hole completely being built up now with an equivalent number of separate protons and electrons. Due to charge and equal magnetic spin the protons and nuclear-electrons generate a mutual repulsion within their spherical layers being formed. It creates a strong 'spring tension'. This electrical energy is transformed into lots of kinetic expansion energy.

That causes an increase of the expansion speed of the universe-spherical-shell of approximately 1 Mm/s to about 2 Mm/s. The expansion of the former Little Bang black hole accelerates further from the outer spherical shell of the universe; its core is still completely filled with material in the form of films and layers of loose protons with loose electrons.

-) Kinetic energy electrons:

The kinetic energy of the electrons rotating around C is still substantially equal to that of phase 1 and the transverse angular momentum and kinetic energy is still located entirely on the shell-electrons:

$$E_{\text{universe}} = n_s \cdot m(e) (3.00 \times 10^8 \text{ m/s})^2 \text{ with:}$$

n_s = the total number of shell-electrons the black hole atoms in the universe,

$m(e)$ the mass of the electron.

This is the maximum amount of kinetic energy of the shell-electrons at the start of the universe.

-) Forces: most forces of black-hole atoms disappear:

In the atomic nucleus, the elementary charge bonds between the protons and electrons are broken. These atomic nuclei split thereby into individual protons and relatively stagnant still nuclear-electrons.

During the Little Bang only the elementary charge force and the elementary magnetic spin force of the proton and of the electron still remain together with the characteristics of mass and of matter. Gravity, temperature and all the physical forces and chemical one 100% disappeared from the universe.

The protons and electrons attract each other through charge and repel each other via their magnetic spin. The spherical layers with protons mutually repel and that also applies to the adjacent spherical layers with electrons.

-) Radiation; no formation of elementary particles, or light; no annihilation:

In the author's Little Bang a hard assumption is considered that the released protons and electrons may not fall further apart in smaller particles of which they are composed. If that were to happen this results in a universal expansion of the Little Bang sphere with the speed of light. This would result in a total of disorderly extending explosion of this sphere with an all-sided expansion with the speed of light in the form of particles and radiation, photons, neutrinos and higgs.

In the absence of stars, galaxies and black holes that photons, neutrinos and Higgs cannot be returned to their original form of protons and electrons. Then, the possibility of back blocked formation of the hydrogen atom. Then the Little Bang and the universe end in a mixture of standard quark, strings, or even smaller particles and photons that speed away with the speed of light from C. They cannot be reformed to protons and electrons.

The option of further disintegration during the Little Bang of protons and electrons or quarks into even smaller particles must be dismissed. The maximum allowed acceleration of the proton has to be determined in particle accelerators like the Large Hadron Collider at CERN.

During the little bang all black hole atoms and atomic nuclei fall apart in *only ordinary protons (normal matter) and ordinary electrons (in fact anti matter)*; exactly the same number of which was present in the previous universe. The Little Bang theory is thus structurally different principles than the Big Bang theory.

-) What is observable from the Little Bang black hole theoretically:

On the outside the Little Bang theory can be 'perceived' thanks to the next phenomena:

- a) at the time of the start of the Little Bang suddenly the critical black-hole gravity falls to zero;
- b) the temperature disappears completely from about 2.7 kelvin to zero kelvin;
- c) the start of the expansion of the most recent Little Bang black hole with some km/s.
- d) the Little Bang takes place without any form of electromagnetic radiation and at 0 kelvin.
The Little Bang is completely dark and temperature of charge!

-) Gravitational energy:

With the atom all gravity disappeared including all gravitational energy. The new universe has no gravity until the hydrogen atom is created. The gravity-free period lasts 5 to 10 billion (10^9) years.

-) Space:

The space is still substantially equal to that of the Little Bang black hole with a radius of approximately 0.05 to 0.10 billion km. The radius increased with one to a few kilometers. The center C of the universe is always exactly in the center of this sphere.

-) Thickness of the universe-spherical-shell:

The thickness of the universe-spherical-shell is still equal on all sides, and is approximately 0.05 to 0.10 billion km, and has since been increased by several kilometers.

-) Time Phase 2:

The splitting of atomic nuclei in loose protons and electrons loose requires less than about 10^{-3} s.

-) Temperature:

Temperature is equivalent to 0 kelvin.

-) Deflection of radiation:

During this phase of the super cold Little Bang is not any radiation present. So deflection of radiation is not yet for discussion.

6.1.3 PHASE 3: TIME OF ALL FREE Acceleration nuclear-electrons BY FAST 'PEEL' Electrons:

-) Features Phase 3:

- The shell-electrons move practically with c and collide against the hardly moving nuclear-electrons. After 'a while' and many collisions all electrons get the same average speed being 0,21 Gm/s or 2/3rd of the speed of light. Of course they also get the same average kinetic energy and momentum.
- The expansion velocity of the spherical layers with protons and electrons is accelerated from 2 Mm/s to 4 Mm/s,
- There is no formation of elementary particles, neutrons or the hydrogen atom,
- It only takes much less than a millisecond.

-) Matter:

In this phase of the cycle of the universe only an equal number of protons and electrons are present; The exact same number as was present in the former universe. Smaller particles as quarks, photons or smaller ones are not formed.

-) Mass:

The amounts of mass, charge and magnetic spin are constant in the universe. Unlike matter and antimatter elementary mass cannot be converted into energy. It also does not happen during annihilation.

Mass, elementary charge and magnetic spin shape a 'trinity' of in principle indestructible invariant(s) in the universe. Always all previous and future universes start with the same number of protons and electrons and with the same amount of mass, elementary charge and magnetic spin including energy.

-) Forces:

Only the elementary charge force and magnetic spin one remained. This set of elemental forces is present on both the proton and the electron. The atom is absent so is gravity with all the other physical forces and chemical ones of the atom.

-) Kinetic energy and angular momentum of the electrons around C:

Because of the Conservation Law of momentum the shell-electrons accelerate the stationary nuclear-electrons that came from the nuclei. They share the kinetic energy and it results in one uniform speed of 207 Mm/s being 2/3rd of the speed of light. Another result is the same momentum and angular momentum for the electrons; **figure 22 of document G8**. The author assumed an average ratio of numbers of protons, nuclear-electron and shell-electrons being 21: 11: 10.

In every cross-section through C to the outside of the former Little Bang black hole the movements, the kinetic energy and the angular momentum of all electrons are exactly equal in all directions; **figure 23 of document G8**.

At this speed up the nuclear-electrons and the slow down the shell-electrons kinetic energy is not expended to heat because the atoms and their thermal energy are absent. The quantity of transverse kinetic energy and the angular momentum of the universe remain constant.

$E_{\text{universe}} = n_{\text{tot}} m(e) (2.1 \times 10^8 \text{ m/s})^2$ with
 $n_{\text{tot}} = \text{total number of electrons in the universe} = 2.1 \times n_s$
and $m(e) = \text{mass of the electron}$

In phase 3 the electrons do not yet transfer kinetic energy to the proton.

-) Kinetic energy of the protons and momentum as a result of the ‘resilience’:

With the disintegration of the black hole nuclei into loose each other repelling spherical layers of alternating protons and electrons, in this spherical layers built a great resilience remains thanks to electrical charges and magnetic spin $\uparrow\downarrow$. This spring tension manifests itself in an outwardly directed force which results in the launching of the spherical layers, one atom thick, with protons and electrons from the spherical layers, one atom thick, with C. This process starts on the outside of the former ‘Little Bang black hole’. That layer by layer peeling off the Little Bang black hole takes about 1.300-1.500 years to complete!

In this phase the expansion pushes through uniformly accelerated anywhere. This crumbling of the former Little Bang black hole proceeds fairly quiet and continues completely structured resulting in an equal omnidirectional shaped super cold and very prolonged explosion, the Little Bang.

The expansion of the spherical proton-layers and electron-ones is accelerated in phase 3 from approximately 2.0 Mm/s to about 4.0 Mm/s. The momentum of the expansion rate will accelerate too. The electrons all move in single spherical layers with approximately 2/3rd of the speed of light. That speed is perpendicular to the expansion velocity of the protons! These fast electrons ordering the layering of more and more protons and electrons in the form of perfectly round expanding spherical layers of protons and electrons; **figure 24 of document G8**.

In the spaces between the proton-layers move the much smaller electrons with approximately 2/3rd of the speed of light. Each arbitrary cross-section of the universe-spherical-shell results in the same range of speeds approximately 207 mm/s; **figure 23 of document G8**.

Every layer has its own direction of movement of the electrons around C.

-) Radiation:

Outside the spherical shell of protons and electrons no form of radiation is present. The orbiting electrons could be seen as particle radiation.

-) Gravitational energy:

Because the atom is absent, gravity is completely not present. The gravitational energy of the new universe is therefore also zero and remains zero during the expansion of the universe while gravity is absent. In the absence of gravity, the new universe can expand unhindered without the demand on energy!

-) Space:

The universe begins to expand a few kilometers, but is still substantially equal to that of the Little Bang black hole with an area with a radius of approximately 0.05 to 0.10 billion km. The center C of the universe is always exactly in the center of this sphere of loose protons and electrons.

-) Thickness of the universe-spherical-shell:

The thickness of the universe-spherical-shell increased about five kilometers spherically symmetrically.

-) Duration:

The acceleration of all the electrons to the same speed requires a lot less than 10^{-3} second.

-) Temperature:

Temperature is completely absent and is equivalent to 0 kelvin.

-) Deflection of radiation:

During this phase of the super cold Little Bang is not a light or particle radiation present. Deflection of radiation is not yet on the agenda.

**6.1.4 PHASE 4: ORDERING OF PROTONS AND ELECTRONS
IN 1:1 SPHERICAL LAYERS:**

-) Characteristics of phase 4:

- The sprawling protons-layers relative to C together with the approximately 2/3rd the speed of light around C moving electrons organize during phase 4 in a virtually infinite number of perfectly spherical mono-layers of alternately always one proton and one electron thick etc,
- Temperature is equivalent to 0 kelvin,
- In all imaginable directions around C protons have no kinetic energy. Independently thereof all electrons move with 2/3rd of c and possess an average of exactly the same amount of kinetic energy and momentum.
- Size and thickness of the universe-spherical-shell: the spherical shape with a radius of 0.05 to 0.10 billion km expands on accelerated.
- Duration: less than 10^{-3} seconds.

-) Matter: no formation of neutron or of H atoms:

During the Little Bang an equivalent number of separate ordinary protons and ordinary electrons are present. Because of the enormous speed difference between protons and electrons there is no formation of neutrons. For the formation of hydrogen atoms is lacking the necessary space as well.

-) Kinetic energy and momentum of the expanding protons:

The 'spring tension' inside the spherical layers with protons and electrons accelerates the expansion rate up to about 7.0 Mm/s. In phase 4, this outwardly directed electrical force remains and thus a maximum of the acceleration of the expansion. Modeling of the Little Bang will provide clarity around the duration of the phases 1 - 4 and the maximum acceleration of the expansion.

-) Kinetic energy electrons:

The kinetic energy and angular momentum of the previous universe is evenly distributed over all electrons that move in their spherical layers, one atom thick, with approximately 2/3rd the speed of light around C as center and in all directions equally. Then the total transverse kinetic energy of all electrons:

$$E_{\text{universe}} = n_{\text{tot}} m(e) (2.1 \times 10^8 \text{ m/s})^2 \text{ with}$$

$$n_{\text{tot}} = \text{total number of electrons in the universe} = 2.1 \times n_s$$

and $m(e)$ = mass of the electron

At any given cross-section of the universe sphere, the velocity of the electrons is again entirely identical evenly in all directions; **figure 23 of document G8**. Always at the start of each universe the total amount of kinetic energy is exactly the same. The same applies to the angular momentum.

The mentioned speed being 2/3rd - 1/2rd of the speed of light applies to the following principles and assumptions:

- 1) in black-hole atoms shell-electrons revolve with the velocity of light around the nucleus and
- 2) at an (by the author adopted) average ratio in black-hole atoms: number of protons ÷ number of nuclear-electrons ÷ the number of shell electrons = 21 ÷ 11 ÷ 10.
- 3) the nuclei do not contain neutrons but are constructed with only loose protons and loose nuclear-electrons. Each nuclear electron is bound standard to two and sometimes three protons; see **document F1d figures 19, 20, 21 and 22**.

Modeling of the universe cycle will have to clarify:

- the final average ratio of the nuclear-electrons and the shell-ones in black-hole atoms existing in a (central) black hole,
- the amount of transverse speed and related kinetic energy of the shell-electrons around the nucleus of black-hole atoms.

-) The protons arrange themselves in perfect round spherical layers, one proton thick; the electrons do the same:

The electrons and protons possess besides mass and matter only two basic forces: the *electrical charge force* and the *magnetic spin force*. Within this limited set of elementary forces and with all the (kinetic) revolving energy (moving around C), all the angular momentum is present in the electrons. After the Little Bang the newly released protons and electrons only can organize in spherical layers, one atom thick, alternating always one proton and one electron thick; **figure 25 of document G8**.

Starting from the outside of the moving matter-sphere with spherical mono-layers by about 4 Mm/s away from C with expansion velocity $v(\text{ex})$ which is accelerated to about 7 Mm/s during phase 4.

All the protons move away from C in pure straight lines. The electrons move in their spherical layers also at the same speed away from C but also in addition, they move at a speed of approximately 207 Mm/s around C in spherical layers. All of protons and electrons are arranged in perfect round circular orbits around C with C always exactly in the center.

These proton-mono-layers attract the electron-ones mutually with their opposite charges-and but also to mutually repel each other via their equal magnetic spin $M + 1$ and $M + 1$. Between the protons and electrons, there is a magnetic repulsion so that any form of physical contact is excluded. These layers cannot make any contact due to their expansion; **figure 26 document G8**.

Eventually the protons and electrons organize in perfect spherical layers increasingly up one proton and one electron thick; **figure 27 G8**. As a result of the same charge and magnetic spin is inside that spherical layers of protons and electrons enormous spring tension and thus impulse present. Due to this spring tension start the expansion of the new universe from the outside of the former 'Little Bang black hole'; **figure 28 G8**.

-) The electrons run through perfect orbits around C and they only generate their elemental forces as. The same is true for the protons:

After the arrangement of the expanding 1 : 1 mono-proton layers and mono electron layers these run in practically perfectly circular orbits around C. *In* the proton-layers the protons do not move compared to C except the expansion with $v(ex)$.

The outer layers with protons already move away from C accelerated.

In the relative position of alternating spherical layers, each one particle thick, on average every proton is surrounded by one electron and each electron by one proton.

From these ideal circular orbits the electrons do not generate any other physical force or chemical one than their *elementary charge force and spin one*. Also the proton generates only these two elementary forces. *).

*) The creation of the different chemical forces and physical forces only happens much later during the universe cycle with the formation of atoms. The first enlargement takes place when the proton and the electron associate to the hydrogen atom and the hydrogen molecule. The second and final extension of forces takes place at the nuclear fusion of hydrogen, where the remaining elements of the periodic system are formed step-by-step with protons and electrons. The structure of the periodic system and of the associated physical forces and chemical ones is monitored at each phase in the universe cycle.

-) A double movement

The electrons move in spherical orbits around C and at speeds of about 2/3rd of the speed of light. Simultaneously these orbits expand with the expansion rate being $v(ex)$. So the electrons are spiraling away from C.

-) (Kinetic) Expansion energy of the protons and electrons:

Spherical layers, one atom thick, of protons and electrons remain strictly separated due to the expansion. Inside this spherical mono-layers of protons and electrons a huge rejection is present because of the charge and magnetic spin. It results in a massive outward spring tension causing the expansion. This electrical spring tension reaches its maximum during phase 4. The magnitude of the spring tension determines the maximum expansion rate of the new universe, and thus the maximum value of the impulse of this coming universe.

The spring tension results in a further acceleration of the expansion velocity of the spherical layers with protons and electrons in a straight line away from C. This expansion rate eventually rises to approximately one third to half the speed of light. During this accelerated expansion the (kinetic) expansion energy increases at the expense of the electrical energy. In the mean time the electrical spring tension becomes weaker gradually.

The acceleration is always bounded to an upper limit in such a way that the protons and electrons are not torn apart into quarks, photons or higgs.

-) During and after the Little Bang any form of gravity is lacking:

In this ideal spherical layers of protons and electrons, all expanding with approximately 7 Mm/s, the orbit of the electrons around C do not show any abnormality. The atom is still missing. As a result, the loose electrons cannot generate gravity or any other type of physical force or chemical one.

Gravity and the other physical forces and chemical ones only come back in the universe if the proton and electron are together able to form the hydrogen atom in combination with the speed of that atom in the universe. For an explanation of the nature of gravity, the author refers to the **documents E3 and E3-1**. For the other forces see the **documents C1, C2, F1d and F1e**.

-) Gravitational energy:

The atom is absent. Gravity is completely absent and hence gravitational energy. The expansion of the spherical layers of protons and electrons from C takes place so full unimpeded needs only electrical energy and does not require any form of kinetic energy! The absence of gravity is sometimes strangely constructed free gravitational energy built up around the center C of the universe.

During the universe cycle that gravitational energy is only 5 to 10 billion years later plated at the moment that these layers of protons and electrons, being formed back the hydrogen atom. With that H-atom and its speed with respect to C gravity comes back into the universe and thus gravitational energy! **See document G7**.

-) Radiation and deflection of radiation:

Outside these starting expanding universe-spherical-shell does not exist any form of radiation. Within the sphere the electrons manifest themselves as particles radiation. During this super cold Little Bang is no light or particle radiation present. Deflection of electromagnetic radiation is not yet topic.

-) The radius of the universe sphere:

Again the radius of the universe sphere increased with a few kilometers. The center C of the universe is always exactly in the center of this sphere. Because of the expansion no physical contact between the layers occurs. Therefore no transfer can be made of kinetic energy from the fast electrons moving with 2/3rd of c and the still stationary protons.

-) Thickness of the universe-spherical-shell:

The thickness of the universe-spherical-shell is still equal on all sides, and is approximately 0.05 to 0.10 billion (10^9) km. That 'Little Bang sphere' increased some kilometers. The space of the 'Little Bang sphere' is filled with layers of protons and electrons with C exactly in the middle. This bulb still filled completely; see **figures 27 and 28 of document G8**.

-) Only one origin and center C of the universe:

The physical size of the center C of the universe equals presumably a few centimeters to decimeters. C is regarded as the absolute origin for all previous universes, present one and all still coming universes.

-) All protons and electrons 'know' C:

The basic rotations of mass and thereby the charge and magnetic spin of the proton and the electron will make protons and electrons act as tiny gyroscopic spinning tops. All individual protons and electrons in the universe recognize C as the only point in the universe where the protons really in idle compared to C and where the shell-electrons pass through perfect orbits compared C. Both particles want to return to that ideal place.

-) In all directions the same speeds of the protons and the electrons; uniformity principle universe:

After the four phases of the Little Bang the protons are still reasonably quiet and start from the outside, the expansion of several thousand km/s or some Mm/s. The tiny electrons in their electron-shells relatively more space available than the physically far more protons. These electrons can move freely without hindrance in their now perfect spherical orbits around C. At all points, and cross-sections on the spherical shell of layers of protons and electrons from the outside to C is true for the layers of electrons that all the components of $v(r1)$ and $v(r2)$ may result in all directions in the exact same speed of approximately 207 Mm/s. At any given cross-section from the outside of the bulb Little Bang layers of proton or electron to C is true in all directions always exactly the same energy distribution and the same angular momentum; **figure 23 of document G8.**

All electrons possess exactly the same amount of kinetic energy at any point on the universal globe in every imaginable direction of $v(r1)$ and $v(r2)$ is. Anywhere within the universe-spherical-shell the energy distribution of the protons and electrons is homogeneous and completely uniform in structure. This is the principle of uniformity about equal expansion rate and equal transverse velocity and related forms of kinetic energy.

-) Duration:

Arranging the layers of protons and electrons takes less than 10^{-3} second.

-) Temperature equals 0 kelvin:

The mono-spherical layers of loose protons and electrons from the Little Bang are at 0 kelvin. After the Little Bang the universe is completely dark and there any form of electromagnetic radiation, particle radiation and gravity lack.

-) Next Phase 5:

- Further accelerate the rate of expansion of the spherical mono-layers with protons and electrons.
- The spring tension decreases only as ultimately a hollow inner space around C arises.
- Then the Little Bang is considered to be completed.

6.1.5 PHASE 5: PHASE WITH REDUCTION OF RADIAL STRESS DUE TO THE END OF THE ACCELERATED EXPANSION OF THE LITTLE BANG:

-) Characteristics Phase 5:

- During phase 5 the expansion rate continues to grow from approximately 7 Mm/s to approximately 100 to 150 Mm/s or one third to half the speed of light, and possibly even more.
- This phase is decisive for the final expansion rate of the new universe, and thus for the kinetic expansion energy of the universe cycle as a whole,

- During phase 5, the Little Bang black hole is peeled in mono-layers of **one** proton and one electron thick. That peeling lasts 1300 to 1500 years. Only then a hollow interior will be created and the Little Bang is to be considered completed.
- Since gravity is missing the Little Bang black hole is expanding all the while completely unhindered by a huge constant speed of one third to half the speed of light.
- During that period the Little Bang black hole expands to a perfectly round sphere with a radius of 500 to 750 light years! The degree of inflation is also determined by the distance between mentioned mono-layers of loose protons and electrons,
- At the Little Bang theory, the universe is expanding with less than the speed of light!

-) Electrical resilience:

Because of the mutual repulsion within the spherical mono-layers of protons and electrons, there is a net outwardly directed force after phase 4. It results in a first acceleration. This growth of the expansion velocity of the spherical mono-layers of protons and electrons decreased in minutes. This results in a constant uniform expansion velocity $v(u)$ being 100 to 150 Mm/s or one third to half the speed of light.

-) The Little Bang sphere is peeled off in layers of one proton and one electron thick. It needs 1.300-1.500 years to complete.

At the end of phase 5 the formation of the hollow inner space starts and at that time the direct spring tension between the layers of protons and electrons is decreased to zero.

At the end of phase 5 all protons in the spherical proton-mono-layers move with the same speed $v(u)$ in a straight line away from C; **figures 27 and 30 of document G8:**

-) No gravity and therefore no slow down of the expansion rate:

Due to the absence of gravity the expansion of the sphere shells of protons and electrons takes place without use of kinetic energy of the electrons. The expansion is not curbed by anything.

-) Duration:

In phase 5 it takes a minimum of 1,300 to 1,500 years before a hollow inner sphere begins to form which subsequently grows with one third to half the speed of light as well as on the outside; **figure 30 of document G8.** The start of the hollow interior space forms the end of phase 5 of the universe cycle and thus the end of the Little Bang.

The phase 6 is a period with the same steady expansion of these layers of protons and electrons for no less than approximately 5 to 10 billion years without any inhibition by gravity!

-) Volume of the universe:

Phase 5 involves a universal uniform expansion of the radius of the Little Bang black hole with a radius of 0.05 to 0.10 billion kilometers to a sphere with a radius of about 500 to 750 light-years or about 5.0 to 7.5×10^{15} km. The initial volume of the universe and of the future universe-spherical-shell to calculate overall and thus is limited to about 5 to 15×10^{47} km³! Later that volume will be further extended.

The final steady expansion velocity, the duration of phase 5, and the final distance between the layers filled with protons and electrons determine the final starting volume of the universe sphere shell.

-) The distance between layers of protons and electrons has to be smaller than the radius of the H atom:

In any case the distance between the protons and electrons has to be smaller than the distance between the proton and electron in the hydrogen atom, because in phase 5, no H atoms may be formed. The formation of the hydrogen atom would, after all, also result directly in gravity. Then the expansion of the universe would be immediately curbed. The Little Bang would be smothered in its own gravity!

(The universe can reach the current size and radius of 2 to 3 billion light years solely if during the first 5 to 10 billion years after the Little Bang can expand completely undisturbed by one third to half the speed of light and that is only possible if during that time the hydrogen atom and thus gravity and gravitational energy are absent.)

After the Little Bang is the speed of the electron (approximately 207 Mm/s) much too high for the formation of the hydrogen atom. In phase 6, it will take approximately 5 to 10 billion (10^9) years before the electron has transferred much of its kinetic energy to the proton that its speed is reduced to around 2.2 Mm/s; the velocity of the electron in the hydrogen atom. In the next period, the distance between layers of the protons and electrons slows down extremely sluggishly until the radius of the hydrogen atom. This results in a considerable post-expansion of the universe-spherical-shell in the universe model.

-) Expansion velocity and related kinetic energy of the universe:

At the end of phase 5 under gravity-free conditions the universe reaches maximum stationary expansion rate which is currently estimated to be 0,10 to 0,15 Gm/s or one third to half the speed of light, and possibly even more.

This final expansion velocity $v(u)$ determines the total amount of expansion energy and that the universe gets at the beginning of the universe cycle. That energy is equal for each proton and electron.

At the end of phase 5, the final expansion velocity, and the associated impulse must be sufficiently high to be able to form the galaxies. Calculation requires modeling of the Little Bang and the universe cycle as a whole.

-) Kinetic energy and angular momentum of electrons:

In their spherical mono-layers the electrons get the same expansion rate of 100 to 150 Mm/s along as the protons: **figure 30 of document G8**. In addition, each electron of itself also has a transverse velocity of approximately 0,21 Gm/s or 2/3rd of the speed of light around C and C is always exactly in the center.

All the transverse angular momentum and energy of the new universe is located only on the electron at the start of phase 5!

-) The universe clock time:

The universe clock time starts when gravity reaches its critical minimum. When the previous universe ended at $t = 2$ to 3 billion years and at the same time started the formation of the new universe at $t = 0.0000$ s. So the universe clock is reset. Time runs from C with a constant linear velocity, and that can only forward. Time cannot be stopped or slowed down or be accelerated either in or in the vicinity of black holes. The universe clock time is always considered relative to the center C of the universe.

That linearly forward time generated in C is without mass, charge, spin and energy. Thereby always the universe clock time moves from C with an infinite speed through the universe!

So all protons and electrons in the universe have continuously exactly the same universe clock time as C!

In theoretical considerations, the time may only be measured with respect to: a) the timing of the start of the Little Bang and b) from the center C of the universe **figure 29** of **document G8**. See **document G2** for time and space.

-) Deflection of radiation:

During the Little Bang light and particle radiation are not present. Deflection of radiation is not an issue.

-) End of the Little Bang

With the emergence of the hollow interior of the Little Bang is finalized phase 6 of the universe cycle follows with a further steady expansion of the universe. See any further **document G7** in which the whole universe cycle is described.

Phases 6 to 29 are described in **document G7 (text) and G8 (figures)**.

* 7) DISCUSSION:

1) No start of the universe through a super hot Big Bang:

In chapters 1 to 4 of this document the author explained why the universe cannot be started with a Big Bang via $E = mc^2$ nor for $m = \text{mass}$ nor for $m = \text{matter}$ (= annihilation). The universe did not start a Big Bang from a singularity for the following reasons:

a) Conversion of mass to pure energy or vice versa is not possible;

$E = mc^2$ for $m = \text{mass}$ is impossible:

At first in **document F1a, F1b and F1c** the author developed a clear vision of the physical concepts of mass and matter involving mass to be indestructible and matter is voidable at the subatomic level but only through annihilation of equivalent particles of matter and antimatter. During annihilation mass is not destroyed or converted into energy. Only photons come free and they seem to be pure energy!

This conversion of mass into energy is based on a terrible misunderstanding. Photons are majoranas with mass, charge and spin, not to be measured on the outside of the photon.

The smallest mass particles are indestructible higgs. Kinetic energy causes rotations and deformations whereby are generated 1) mass, 2) -electric charge and 3) magnetic spin. Together, these four variables for a fixed unit. With higgs, frankinos (= neutrinos) photons and thus ultimately protons and electrons are built. See **documents 2014 F1a and F1b**.

b) Pure energy is not possible:

Energy is always inextricably linked to mass, charge and magnetic spin. Energy cannot be disconnected from higgs, frankinos and photons as an independent and stand-alone quantity! Pure energy is not possible! Kinetic energy is always present in the form of movement, and as radiation of photons. Frankinos and photons are majoranas. They are composed of higgs so that they have a net measured mass, charge and spin being zero from the outside. Although present mass, charge and spin are not measurable at the outside of these particles! See **document 2014 F1a and F1b**.

c) In principle the conversion of mass ↔ pure energy cannot take place:

Mass with associated charge, magnetic spin and kinetic energy of higgs, frankinos and photons are basically indestructible! In principle the mass of these particles does not turn into pure energy or the alleged 100% pure energy can be reversed into clumps of higgs. Energy comes especially in the form of photons. Einstein's formula $E = mc^2$ is not true for $m = \text{mass}$.

d) Einstein and science do not clearly distinct mass and matter in 2015:

Einstein did not recognize the essential difference between the physical concepts of mass and matter. Only matter is to destroy and only through annihilation.

e) The equation $E = mc^2$ only applies during annihilation and only for $m = \text{matter and antimatter}$:

The formula $E = mc^2$ is only valuable for $m = \text{matter}$ and only in the case of annihilation of two equivalent particles of matter and antimatter that have been built up together from just 50% of particulate matter that rotate equatorially counter-clockwise with the speed of light

and precisely 50% antimatter particles that rotate equatorially clockwise with the speed of light. (This can also be right reverse). See **document F1c**.

During annihilation photons being majoranas are released. In those photons all originally present mass, charge and magnetic spin of the matter remain completely intact but they cannot be measured anymore. Anno 2015 science does still not recognize that fundamental difference between mass and matter!

f) At least seven errors in the principles of relativity theory:

On the theory of relativity at least seven false assumptions slipped in; see **document G5 July 2015**. Those mistakes are so serious that both the theory of relativity and the Big Bang theory cannot be maintained any longer. Thus, important cornerstones away from the foundation of the current science. These cornerstones can be replaced by the universe cycle and the underlying basic documents.

g) Big Bang is not possible on the basis of annihilation:

The beginning of the universe could not take place via annihilation because then one half should be matter and the other half antimatter. Furthermore, in that the annihilation model only photons would be formed. Then the universe would consist only of photons. In the absence of stars, galaxies and black holes the orbits of those photons are not deflected. These photons follow literally pure rectilinear orbits and run in all directions. All photons forever abandoned the universe. These photons cannot reform matter and therefore no protons, electrons and hydrogen. The current universe cannot be reached through annihilation and photons; see **figures 73 and 74 of documents G8**.

In that case, the universe is a single phenomenon ending with photons. That is quite different from the currently observable universe. So through the annihilation Big Bang cannot explain the current universe.

h) Black holes cannot be further compressed into a singularity:

The black-hole atoms (**Figure 9 of document G8**) in black holes mutually repel each other net via their negatively charged electron-shells (**Figure 13 of document G8**). Therefore black hole atoms and black holes cannot be compressed further to a singularity.

The start of this universe through a Big Bang from a singularity is an absurd thought. Also 'vacuum energy' is science fiction. Both of them are the result of a lack of understanding with regard to mass and matter, the source of elemental forces on mass, atoms and the origin of gravity!

i) Forces on matter and the origin of gravity:

In the **documents C1, C2, and F1d, F1e** is explained why physical forces and chemical ones on the atom arise in relation to any speed of that atom in the universe. Those forces (such as gravity) are mainly generated by and from the shell-electrons of the atom.

Documents E3 and E3-1 specifically considers gravity. There it is clear that gravity disappears completely if the speed of normal and black hole atoms in the universe goes back to zero relative to the center C of the universe. Both documents require of the reader a completely different perspective on the phenomenon of gravity. By applying a factor $\cos\alpha$ the gravitational formulas of Newton and Einstein have been adjusted on the scale of one galaxy to the scale of the universe!

All atoms of the elements of the periodic table remain in their position. With absolute standstill in the universe the atom does not generate any longer gravity or any other physical force or chemical one. Then at a standstill all the atoms are absolute physically and

chemically inert. They become chemical and physical completely equal to each other's properties! Then all molecules are separated to their mono-atomics. All atoms are in the *annemie* state.

2) Universe goes through a regular cycle and restarts with a super cold Little Bang:

The whole universe cycle of 29 phases is described in the **documents G7 and G8**. **This document G6** describes only the Little Bang to phases 1-5 of the universe cycle.

The universe starts with a super cold (0 kelvin) Little Bang from a super big black hole containing all the matter and energy of the universe together in the form of black-hole atoms. This Little Bang occurs because in the final stage of the formation of that Little Bang black hole dropped all the speed to zero and therewith correspondingly all gravity. The Little Bang occurs when gravity reaches the critical black-hole-gravity. At that time, the repulsion between the black-hole atoms with each other becomes stronger than the gravity that the black hole kept together until then.

When gravity reaches critical black-hole-gravity near 0 kelvin, the Little Bang black hole falls apart into individual unstable black-hole atoms. These unstable black-hole atoms then in their turn at 0 kelvin decay into only single protons and electrons. At the end of phase 5 they arranged in spherical layers, one atom thick, of alternating and one proton thick or one electron thick. With the atom the temperature completely disappeared to 0 kelvin.

Those spherical layers move away from the center C of the universe with a expansion rate of approximately one third to half the speed of light. Through the Little Bang the start of the universe goes step by step and can be monitored thereby closely while that process in the Big Bang remains completely obscure.

The Little Bang is a lot simpler than the Big Bang as black-hole atoms only breakup into an equivalent number of ordinary protons and ordinary electrons and all mass and all matter remains fully intact! The Little Bang theory is relatively simple, understandable and can be visualized completely unlike the Big Bang.

3) The Little Bang and the universe cycle can be modeled completely mathematically and thereby quantified:

The start of this universe with a Little Bang is clear and uncluttered. This Little Bang can be modeled fully and the universe cycle as a whole. The author is looking for Universities and Institutes in order to model the Little Bang and the universe cycle with their help.

4) In the universe theoretically only four stable particles as entire matter are possible;

The **documents F1a 2014, F1b and F1c** make clear why the universe has been based on just four stable higgs and why there are only four stable particles entire matter: the proton and electron including their anti particles. These are the only stable building blocks of the atom, and of the anti-atom.

These four stable building blocks are made up of 3 quark and 81 higgs and have the shape of a rod that rotates equatorially with the speed of light around the longitudinal axis.

-) In this universe dwell only ordinary protons and electrons:

In this universe occur only ordinary protons and electrons and naturally anti-protons and anti-electrons. In **document F1c** has been elaborated how the structure of protons and electrons occurs from the smallest mass higgs.

-) The universe started with just two particles of matter: protons and electrons

They carry two elemental forces:

Those ordinary protons and electrons themselves have only their basic charge force and elementary magnetic spin force coming from the lowest level of the higgs. Protons and electrons do not generate any other physical force or chemical one and hence no gravity!

The elementary charge and magnetic spin of the proton and electron form the basis of the force system of the atom supplemented by the centripetal force of the electron; see **document F1c and C1**. In the universe the other physical forces and chemical ones, such as gravity, only arise with atoms move relative to C; see **documents C2 and F1d**.

5) Only formation of elements of the periodic system:

Universe wide the later nuclear fusion of hydrogen occurs with high speeds and the presence of many by speed "added" kinetic energy. In **document F1d** the guarantee is treated that during stepwise nuclear fusion from hydrogen only the isotopes may be formed of the periodic table and no other form of 'atom' See isotope table Wikipedia with all neutrons replaced by one proton and one nuclear electron.

6) Other forces and constants of nature;

All the other physical forces and chemical ones are derivatives of the known atomic structure of the protons and electrons. Most of the forces on the atom are generated by:

- a. the single shell-electrons or electron pairs:
 - 1) generated as a result of any movement of the atom in the universe and
 - 2) generating physical forces and chemical ones in response to the 'added' kinetic energies to these related speeds.
- b. the mechanical forces that come from the nucleus where they are related to:
 - 1) numerical change of the velocities and
 - 2) change of the direction of them.

The physical forces and chemical ones on the atom change quadratic with the velocity of the atom in the universe with respect to the center C of the universe.

As the only force gravity is linearly proportional with any speed in the universe.

-) Forces and bonds possess as many components as the earth is subject to speeds in the Universe:

Each speed in the universe relative to C generates its own deviation in the shell-electrons and thereby its own component of a physical force or chemical one and its bond.

The earth makes 6 to 10 separate motions in the universe in relation to C. All the physical forces and chemical ones and bonds are therefore made up of 6 to 10 separate force components. Only equal forces and equal components can form a bond. (Vector law of Uiterwijk Winkel). All the physical and chemical bonds are thus built up of 6 to 10 separate bond components!

By quantifying all velocities of the earth in the universe some problems in quantum physics can be solved. The modeling shows the number of speeds of the earth in the universe and their size!

-) Almost all constants of nature are also made up of 6 to 10 sub-constants:

This distribution of 6 to 10 components for physical forces and chemical ones and their corresponding bonds also applies to the corresponding constants of nature. These constants are also constructed from the same 6 to 10 sub constants and quantitatively depending on speed.

-) Almost all forces, bonds and natural constants are constants but not really: they change very slowly with time:

The elementary charge and magnetic spin excluded, all physical forces and chemical ones of the atom variable and dependent on the velocity of the atom in the universe. The 6 to 10 components of these other physical forces and chemical ones on the atom change extremely slowly in quantitative terms during the universe cycle.

This applies correspondingly also to the components of their respective constants of nature!

-) Only charge and spin are real constants:

The elementary electric charge and the magnetic spin of the proton and electron are the only forces quantities that are independent of the (rotational) speed. They remain very constant throughout the universe cycle and thus also the corresponding constants of nature!

At an accuracy of approximately of 10^{11} to 10^{12} these possible changes would be measurable. See further **document G10**.

-) Protons and electrons are tiny gyroscopic spinning tops:

All shell-electrons of atoms generate forces. All atoms 'know' through their shell-electrons with what speed the atom moves in the universe compared to C!

7) Reduction of the current system of four fundamental forces into two basic forces:

Protons and electrons generate only two basic forces: the elementary charge force and the elementary magnetic spin one.

Gravity, the strong nuclear force and the weak nuclear force are not elemental forces! The strong nuclear force is equivalent to an electric charge bond; the weak force is comparable to the magnetic spin force. For gravity, the author refers to the **documents E3 and E3-1**.

The author reduces the current system with four fundamental forces into a system with only two basic forces: the electric charge force and magnetic spin force.

8) The universe clock time:

The universe clock time is not speeding up or slowing down, neither in whole nor anywhere in the local universe. During a 'snapshot' the universe clock time is everywhere in the universe-spherical-shell always exactly the same as in C. Time may only be measured relative to the moment of the Little Bang and only from the center C of the universe; **figure 29 of document G8**. Einstein violated this basic principle hard.

The (Universe clock) time for all protons and electrons at the Little Bang exactly started simultaneously again at $t = 0.0000$ s The same universe clock time applies to all particles present at the Little Bang. Thereafter, the universe clock time evolves linearly forward so at a constant 'speed'. All particles in the universe always have exactly the same universe clock time.

The universe current clock time on earth is to derive and determine as a function of the location of matter with respect to C, and the space around C only through modeling the universe cycle.

Time is an independent physical quantity. The absolute time of matter is always linked to the location of that matter in the universe, and C with respect to the time that has elapsed in order to reach that location. For time and space see further **document G2**.

From every other point in the universe than C are time and space never absolute but always relative and that goes for all measurements in the universe from Earth. This relative time and space on Earth leads to all kinds of misinterpretations in the assessment of scientific measurements in space.

9) Space:

Space is the distance and the position that every piece of matter has relative to the center C of the universe. For each individual piece of matter space is in a straight line C and two (spherical) coordinates on the universe-spherical-shell.

All bits of matter in the universe together form a perfect spherical space.

Space and time together with the other ten base parameters together the twelve variables that are necessary for the description of each phase in the universe cycle. Within the scale of the universe time and space cannot be considered in isolation from the remaining ten parameters.

This interconnection between these twelve parameters makes drafting considerations complex. If only just a few of the twelve parameters are considered then this leads necessarily to errors in the research and interpretation of acquired data.

10) Theoretical considerations with respect to time and space may be made only from C:

During theoretical considerations

- no other point than C should be used in the universe and location of observation and
- the moment of the Little Bang, so when the radius of the universe is minimal, is considered as the moment the stopwatch of the (universe clock) time is started with $t = 0$. So the universal clock is reset.

As with the other parameters such as mass and matter, time can never be considered as a separate stand-alone parameter. Time is, by definition, associated with the center C of the universe, happenings and to both the start and the end of the universe cycle.

Only through modeling of the universe cycle can be derived where considered matter dwells relative to the center C of the universe over the course of time. After the Little Bang the universe clock time cannot be measured exactly any more. The universe clock time is only to determine through modeling and provisionally approximate only!

Considered from C all matter is still on average at the same distance from C and both the space and the time of those measurements always uniform and spherical. Because of the limitations of the speed of light all observations from C bear a delay of ultimately millions to several billions of years.

In fact the real universe clock time can be established properly during the reset at the start of the Little Bang. Then during the universe cycle the very clock time cannot be verified anywhere concretely. But by help of a strong and an always improved universe model time can be determined very accurately!

-) Relative time; differences in atomic clocks:

Observations from any other point in the universe than C are relative and **they** always lead to differences in the observed period; **figure 29 of document G8**. Such time differences are indeed confirmed by measurements from the earth with atomic clocks in **outer space**.

However these time differences are not realistic. They are the result of the differences in speed of approximately 10 km/s in the universe of the two clocks with respect to C. As a result, all of the physical forces and chemical ones including their bonds change. The physical forces and chemical ones in these clocks around the earth are slightly larger and will therefore engage more bonds. Those bonds are slightly weaker than the comparable bonds in the atomic clocks on Earth. This results in "measurable" but not real differences in time. Both clocks always apply exactly the same universe clock time!

11) The location of measurement is decisive:

The location of the plot can be decisive for the outcome of the measurement or observation. Measuring time and place may be effected only in absolute terms from the center C of the universe and in fact not from any other location in the universe. That applies as well for all measurements in the universe from the earth.

* 8) CONCLUSIONS:

- 1) The Big Bang Theory, based on $E = mc^2$ and $m = \text{mass}$ must be rejected completely and therefore the theory of relativity! The same goes for a Big Bang based on annihilation or from a singularity.
- 2) The Little Bang theory provides a very clear and plausible alternative to the Big Bang theory. The coming decades will be dominated by the Little Bang and the modeling of the universe cycle.
- 3) The Little Bang start as a result of the total loss of gravity *). Previously gravity brought all matter of the universe together in the Little Bang black hole.
- 4) Due to the lack of enough gravity, the critical black hole gravity was reached and this Little Bang black hole became unstable. At super-cold conditions at 0 kelvin it exploded (during all controlled conditions) apart into an equivalent number of ordinary protons and electrons.
- 5) This Little Bang can be followed by five successive phases, each of them to describe detailed and they can be modeled mathematically; see figures 9 to 30 of document G8. **)

*) For the essence of gravity see **documents E3 and E3-1**.

***) That describing and modeling is also true for the 29 steps of the cycle as a whole universe.

- These 29 steps are described in **document G7 (text) and G8 (Figures + notes)**.
- This universe cycle describes in detail how the currently observable universe came to exist as it is and how that cycle will continue in the future.
- The universe as a whole cycle can be modeled mathematically.
- Only through modeling of the whole universe cycle the 12 basic parameters of the universe and the five steps of the Little Bang can be found quantitatively.

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the first version of November 2010. Based on the **documents under F1a to F1d** the document was amended in July / August 2015.