GRAVITATIONAL-ENERGY AND 'DARK' ENERGY SCALE UNIVERSE

-) The document E3 and E3-1 www.uiterwijkwinkel.eu the author has derived that:
a) gravity is *only* generated by the 'shell'-electrons *of atoms* and
b) only when these atoms move relative to one of the now 9 – 11 reference points in the universe. Neutrinos, photons, quarks and loose protons and electrons do not generate any gravity nor gravitational energy! The missing 'dark' energy in universe is mainly gravitational energy!

-) The start of this universe was between 40 - 45 billion (10^9) years ago in the center C of the universe. In the final phase the then formed giant Little Bang black hole, containing and trapped all mass, matter and kinetic energy of the universe, lost all speed and thus all of its gravity! The black hole atoms in this Little Bang black all became unstable. They then fell apart into an equivalent number of protons and electrons which arrange themselves into mono-layers of protons / electrons. These layers are expanded with $1/3^{th}$ - $1/2^{th}$ the speed of light and thus without inflation or any form of gravity. Document G6 + figures.

-) About 5 to 10 billion years later, these at the Little Bang (G6) released loose protons and electrons transform into hydrogen atoms / molecules. With the H atom / H_2 molecule gravity and gravitational energy come back into the universe. At an expansion of 3.0 to 3.5 billion lightyears around C a huge amount of gravitational energy is added *free of charge* to the universe and to the cycle of the universe! (The Laws conservation of energy and momentum do not apply on the scale of the universe and the universe cycle. These Laws only apply at the beginning and end of each cycle!)

-) This 35 to 40 billion years ago, *free of charge* added *gravitational energy* is the driving motor and force behind every cycle of the universe. The universe follows the same energy neutral cycle of 29 steps (G7 text + G8 figures) in a fixed period of 2.5 to 3.5 trillion (10^{12}) years.

-) All atoms in the universe are subjected to 9 - 11 different movements relative to the 9 to 11 reference points. For all atoms these speeds makes space as 9 - 11-dimensional! These measured 11 dimensions, however, are only present at the atomic level and not at the 3D level of elementary Higgs particles. The universe-clock time is only one-dimensional. Everywhere in the universe applies exactly the same linear velocity in the time. Everywhere in the universe is always exactly the same universe clock time.

-) These 9 - 11 speeds results in 9 – 11 deviations in the orbits of all 'shell'-electrons and thus in 9 – 11 gravitational components and so in 9 – 11 contribution to the gravitational energy. Gravity and gravitational energy have a complex composition and structure since all speeds in universe change quantitatively and all the distances to reference points. The number of speeds change as well over time. Collisions between galaxies (as found by LIGO / VIRGO) results in time in just one central facet black hole. These nowadays 9 - 11 speeds go up in only one rotation speed of that giant facet black hole.

-) Gravitational energy is the anno 2017 by Science sought 'dark' energy in the universe!
Now in universe *gravitational energy* is built up from up to 9 – 11 different speed-components:
a) 8 – 10 contributions of gravitational energy which are related to each of the 8 - 10 speeds of
   atoms within in the universe sphere shell and 8 – 10 reference points present there and
b) one contribution of gravitational energy related to the fixed center C of the universe.
That requires a clear quantified vision on: a) the local form of the universe, b) the distances and
c) the different speeds of atoms in the universe and within the universe-sphere-shell.

-) The shape, size and number of speeds of atoms in the universe are only identifiable through the establishment of a <u>mathematical model</u> of the universe and modeling the universe cycle. That mathematical model is based on: a) a closed universe for mass, matter and energy, b) the 12 parameters of the universe and c) the 29 steps in the energy-neutral cycle of the universe.

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**)   Thanks to Adarshi Yadava for the wonderful figures in document E3-1 (Figures gravitation)
***) Copyright See A6.

*1) INTRODUCTION; MACRO UNIVERSE FORM AND ORIGIN GRAVITATION:

-) Universe, in the model of author Uiterwijk Winkel must have the form of a thin spherical shell:
The current thought Big Bang as start of this universe should anyway have resulted in a uniform structure of this universe. This universe cannot have another form then that of a rather *thin, curved universe-spherical-shell* which now must be rather thin and locally be completely flat. A universe as thin super-sized, perfectly round balloon that is now filled with 4 to 20 million identical *facet areas*. Each facet is containing between 200 – 500 or more galaxies. This universe-sphere-shell has one fixed **center C** with a radius at present of about 2.5 - 3.5 billion light years! Both the inner side and the outside of this universe-sphere-shell is absolutely empty. More about that later.

Such a universe-sphere-shell with gravity results in gravitational energy relative to that center **C.** With the current image in Science no center in the universe is recognized and thus no gravitational energy is recognized. That results in missing a tremendous lot of gravitational energy. In fact that is the so called 'dark' energy of the universe!

-) The slight deflections of all forms of radiation (photons) results in imaginary images:
From the earth we observe the universe, however, all sides the same with Earth more or less in the center of that universe. We don't observe the universe as a universe-spherical-shell with completely dark spaces at both sides! From the earth we see these both dark sides completely filled with virtual images of billions of galaxies.
Despite the present gravity that universe seems to expend on all sides ever faster and faster. Ostensibly the Earth is even located in the center of the universe! Based on the Big Bang theory this cannot be true. How this objective optical illusion is created?

-) Minute deflection by hydrogen and helium:
Between the galaxies in this universe-sphere-shell extreme low concentrations *of hydrogen gas* are present with only a few atoms / molecules per cm^3. Within galaxies slightly higher concentrations of hydrogen are present. In addition to hydrogen also helium gas is present as a remnant of the huge Big-Bang-like explosion that preceded and the formation of each galaxy. (All galaxies started 20-25 billion years ago *at the same time* each with their own super-hot and explosive Big Bang; **Figures 42 – 54 G8**). Inside and outside these fairly thin universe-sphere-shell there is *absolutely nothing; no* atoms / no molecules and not even radiation of neutrinos or photons! There the concentrations of hydrogen and helium are absolutely zero! That absolute vacuum of space does not allow neutrinos and photons passing through!

Within that *thin universe-sphere-shell* of some kilometers between the galaxies and about ten to twenty thousand light years at the location of the galaxies these extremely low concentrations of hydrogen and helium causes a minimal deflection in the path of all the neutrinos, and all photons. In Science, this deflection and refraction of light through gases is wrongly interpreted and identified as *gravitational lens.* Neutrinos and photons do not generate themselves gravity! So the orbits of these electromagnetic radiation cannot be deflected by gravity!

-) The deep universe is only to observe through this thin universe-sphere-shell:
That deflection of photons (and neutrinos) by those extremely low concentrations of hydrogen and helium is only 1 degree per 10 – 40 thousand light years! This minimal deflection ensures that all forms of radiation (neutrinos and photons) are curved in such way that they all 100% remain within the universe-sphere-shell and cannot escape from this universe-sphere-shell. All neutrino's and photons stay inside this shell.

-) The completely closed universe:
This minimal deflection results in a universe-sphere-shell or a universe which forms a completely closed system with no escape of neutrino's and photons and no escape of mass, matter and energy!
Because of that tiny deflection of all electromagnetic radiation (including light), we observe the universe only through that rather thin flat universe-sphere-shell.
Because of this deflection from Earth we observe an equal 13.8 billion (10^9) light years deep universe completely build up however from entirely virtual images and realities. This observed universe differs entirely from the thin universe-sphere-shell which the universe in reality is or should be. See **G9.**

1.1 GRAVITATION IS NOT LINKED TO MASS:

-1) Relation between gravity and mass?:
- In 1687 **Newton** stated that *gravity is related to the mass* of the object and the distance between two
  objects. Since then, however this direct link between mass and gravity has never been proven!
- **Einstein** coupled gravity to the distortion and curvature of space-time. **Einstein** however forgot to
  realize this distortion and curvature of the universe-sphere-shell by adding a factor **cos α** to his
  gravitational formula.
  This incomplete gravity formula by **Einstein** results in a universe and universe-sphere-shell with a 4 –
  6 x lack of gravity and thus lack of mass, matter and kinetic energy! This results in balances of the
  universe with 'dark' matter and 'dark' energy. See **Appendix 2.**
- **CERN** showed that gravity (the graviton particle) wasn't present in the debris of colliding protons!
  So gravity anyhow is not linked to the Higgs mass particles in the proton!

-) Neutrinos and photons do not possess gravitation:
Nothing indicates that neutrinos and photons themselves generate gravity. Without gravity these
particles and all electromagnetic radiation cannot be deflected by the gravity of celestial bodies!
The minimal deflections in the orbits of neutrinos and (light) photons are the result of the passage of
those particles during billions of years though extremely low concentrations of hydrogen gas and
helium gas present in the universe-sphere-shell. These deflections are not caused by gravity!
That is completely contraire with the results that proved **Einstein's** theory of relativity during the solar
eclipse in 1919!

* 2) THE FUNDAMENTAL ORIGIN OF GRAVITY AND GRAVITATIONAL ENERGY;
What's gravity then? If gravity is linked to mass than this phenomena must already be generated at the
most elementary Higgs / string / snare level! The answer to the question what gravity actually is and
where gravity is generated requires a *fundamental approach.*

-1) In the **document F1a 2014** www.uiterwijkwinkel.eu the author deduced that all matter in the
universe relies on just **four most elementary Higgs particles / strings / snares:**
- **two 'low'-energetically Higgs particles of the proton and**
- **two 'low'-energetically Higgs particles of the electron**.
The proton Higgs are thousand times bigger than the electron Higgs.

Kinetic energy results in three rotations and causes three distortions. These four most elementary Higgs
particles have a permanent and constant amount of kinetic energy which results in three fixed angular
velocities around their three axes. All Higgs particles / strings / snares have a maximum of three speed-
dimensions. All Higgs particles are 3D. (The 11 dimensions in the string theory arise from the 11
movements of *atoms* within the universe-sphere-shell. These 11 dimensions are standard present in all
atoms in the universe and thus in all atoms of the used measuring equipment. The effects of these 11
movement dominate the outcome of all results of precision measurements!)

These three rotations cause three permanent and constant distortions in all of these Higgs particles. See
Figures 1 – 6 of document F1a 2014. To combat these distortions all Higgs particles generate the same
five permanent features:
a) mass or anti-mass,
b) two basic physically quantities, namely
b1) a positive or a negative electric charge, and
b2) a parallel or anti-parallel magnetic spin; ↓ or ↑,
c) a fixed amount of kinetic energy or exactly opposite kinetic energy,
d) a minimum amount of space and volume.

In the **documents F1a 2014, F1b, F1c + figures** the author deduced that:
-A) the **proton** and **anti-proton** are build up with only these two basic 'low'-energetically and *super-
symmetric* Higgs particles of the proton. These two proton Higgs are each other's antiparticle that attract
each other but cannot annihilate with each other as well. At this most elementary Higgs level **Einstein's**
$E = mc^2$ is not possible! With these proton Higgs no other building blocks of atoms are possible.

-B) the **electron** and **anti-electron or positron** are constructed with just two basic 'low'-energetically and super-symmetric Higgs particle of the electron which also attract each other mutually and cannot annihilate with each other. At this elementary Higgs level $E = mc^2$ is not possible!
With these electron Higgs no other building blocks of atoms are possible.
The entire universe is almost 100% constructed with just these 2×2 super-symmetric Higgs particles; also all the protons and electrons in your body!

-2) The Higgs particles / strings / snares are two by two super-symmetric:
Due to the basal present constant and *fixed amount of kinetic energy* universe wide all Higgs particles rotate with fixed constant speeds to their three mutually perpendicular axes of rotation. The angular velocity about the longitudinal axis is approximately a thousand times greater than the rotations around both width axes. The deformation around the longitudinal axis is correspondingly also approximately a thousand times greater than that to the two width axles.
These rotations can be either clockwise or counter clockwise. On Higgs level these fixed opposite rotations cannot be canceled and converted into heat through annihilation. In universe annihilation is only possible at the level of equivalent matter and antimatter. See document **F1c.**

All Higgs particles compete these three deformations by generating four basic physical quantities:
-1) Rotation around the longitudinal axis results in *a fixed and constant amount of elemental mass or equivalent anti-mass,*
-2) Rotation around the longitudinal axis also results in *a fixed and constant amount of* elementary *electrically positive or negative charge,*
-3) Rotation around the width axis results in *a fixed and constant amount of parallel or anti-parallel magnetic spin ↓ or↑ and*
-4) Three fixed angular velocities together results in *a fixed and constant amount, of spatial volume!*
    (Kinetic energy prevents the state of a singularity!)

Both elementary Higgs particles of the proton are 100% *super symmetrically* mirror images to each other! That includes both Higgs particles of the electron.
With these four elementary Higgs particles in universe only to construct: a) neutrinos, b) photons and c) eventually only normal protons and electrons. These are the only building blocks of atoms. The neutron = 1 proton + 1 electron. So all matter in universe entirely relays on structures of protons and electrons.
These basic building blocks of atoms are composed entirely of only these **four 'low energetically' elementary super-symmetrically Higgs particles**!
These four Higgs together form the 'low'-energetically *Standard Model* by **Uiterwijk Winkel**.

-3) During collisions in particle accelerators all originally present super-symmetry is lost:
The 17 particles in the **current scientific accepted** *Standard Model* are all found in the debris of atoms and protons after collisions in particle accelerators. As a result of these intense and violent collisions in these particle accelerators, all debris particles of the proton become temporarily 'high-energetically' and by that '*non-naturally'* particles.
These debris particles never are 'low energetically' as is standard present in all matter of the universe!
These current 17 particles of the **Standard Model** are to be regarded as unnaturally, temporary 'high-energetically' particles. These 'high-energetically' collision products in particle accelerators never are *super symmetrical!*
Worse, these 17 particles aren't representative as building blocks for the widespread 'low' energetically matter in universe. Those 'low' energetically matter is always only constructed out of these *four* 'low' energetically and super-symmetrically elementary Higgs particles as introduced by **Uiterwijk Winkel**!
See **F1a 2014**. This model is purely theoretically and cannot be proven by experiments because than energy is added and all present super-symmetry is destroyed!

-4) By kinetic energy all Higgs standard have a volume; kinetic energy prevents the phenomenon of a 'singularity'; singularities are absolutely impossible:
Due to their kinetic energy and angular velocity these 2 x 2 elementary Higgs of the proton and the electron standard generate: *a) mass, b) electric charge, c) magnetic spin, e) a fixed volume of space and volume. That volume is never zero under all conditions!* Under all circumstances kinetic energy prevents the occurrence of a singularity!
A singularity is only possible if at the Higgs level all kinetic energy is removed. See the gray ring in **Figure 2 document F1a 2014.** In nature this state is impossible! Kinetic energy always results in a minimum standard amount of rotation speed, distortion and therefore minimum volume. That applies to

all the Higgs particles of the proton, and those of the electron. Kinetic energy and therefore angular velocities of all Higgs exclude the phenomenon of a *singularity*!

-5) On these 2 x 2 elementary Higgs particles / strings / snares there is no rotation available to generate gravity / gravitation:
On these most elementary Higgs particle no 'rotation' space is available anymore to generate gravity in addition to elementary: a) mass, b) electric charge, c) magnetic spin and d) volume. Thus gravity cannot be linked *directly* to the mass, charge, spin and volume of these four Higgs particles!
As a result all constructions of elementary Higgs particles such as neutrinos, photons **(F1b),** loose protons and loose electrons **(F1c)** as basic building blocks of the atom they all don't generate gravity as well!

-6) Gravity / gravitation is only generated by the 'shell' electrons of atoms in response to speed:
Gravitation must originate from the higher *atomic,* level. Gravitation is only possible when protons and electrons: a) to form together atoms and b) only when these atoms have a velocity in the universe versus one or more present reference points!
Gravitation and the two physical and two chemical forces are generated by the 'shell'-electrons of atoms in response to speed of the atom in the universe! See **document E3, E3-1 and F1d.** Gravity and these two physically and two chemically forces on the atom are non-elementary forces but only speed-related forces of atoms. These forces are thus linked to processes in the universe.

-7) No annihilation / creation possible Higgs / string / snare level. No Einstein's equivalence of mass and energy:
At the elementary Higgs level kinetic energy both oppositely directed rotations cannot be lifted and mutually be converted into heat. Both proton Higgs and both electron Higgs are 100% each antiparticle. This super-symmetrically Higgs attract each other mutually but they cannot cancel each other oppositely directed rotation speeds and thus cannot convert their rotation energy into heat! Among these so mutually to migratory Higgs particle annihilation isn't possible!
Einstein's *equivalence* of elementary kinetic energy with elemental mass, charge and spin doesn't exist on this elementary Higgs level! This affects the heart of the theory of relativity! See document **G5.**
At Higgs level **Einstein's** $E = mc^2$ is not true. That formula has not any role at the elementary Higgs level!

-8) Annihilation and $E = mc^2$ only possible at the higher level of matter and antimatter:
Annihilation is only possible if there is an equivalent *of matter and antimatter.* See **F1c.** Einstein's $E = mc^2$ only stands at the level of equal matter / antimatter such as protons / (anti) protons, electrons / (anti) electrons and atoms / (anti) atoms. This formula only applies for m = equivalent matter / antimatter.
Einstein's formula $E = mc^2$ does not stand here for m = mass as well!

-9) No bonds possible between *proton Higgs* and *electron Higgs*:
The position of the rotation axes of proton Higgs differ from those of the electron Higgs. This results in differences in the combination of load and magnetic spin. These differences are such that between the two elementary proton Higgs and these two electron Higgs mutually no stable bonds are possible!
Figure 5 F1a 2014.
Stable bonds are only possible between these two *super-symmetrically proton Higgs* each other and separately only between these two *super-symmetrically electron Higgs* themselves. This bonds results in larger structures of proton Higgs either constructions of electron Higgs particles in the form of successively: 1) neutrinos, 2) photons, 3) quarks and finally 4) up to a maximum of constructions of the proto-proton and the proto-electron, as well their anti-forms.
All matter in the universe is 100% constructed with these 2×2 super-symmetrically Higgs particles!
See **F1b and F1c. Especially have a look for the accompanying figures.**

-10) The long and protracted path of Higgs particles to neutrinos, photons and the proton / electron:
From these four elementary Higgs are exclusively neutrinos and then photons are to build up of the proton (infrared) and separate the neutrino's and photons of the electron (light). See **F1b the majorana's.**
Over a period of 14 – 18 billion years, *all* in the universe-sphere-shell present and by stars emitted neutrinos and photons of the proton and those of the electron in time automatically and without exception are transformed back into exclusively normal stable protons and ordinary stable electrons

and finally into hydrogen. Nothing else is possible! See **F1c** Protons and electrons are the only stable building blocks of all atoms of the periodic table. See **F1d**.
(All older information of the universe than 13.8 billion years is thus completely transferred into matter and thus completely destroyed! Our universe now is at least 40 – 45 billion years old already. This 13.8 billion year is our maximum event horizon from Earth at the universe!)

-11) Transfer of mass to matter is realized by adding $E = ½ mc^2$ rotational energy:
Matter consists of constructions of neutrinos and photons all of which are made up of these four (2 x 2) Higgs particles together with their mass, electric charge, magnetic spin and volume.
In the universe via electrical bonds between neutrinos and photons are to construct larger structures up to the maximum size of the proto-proton and separately that of the proto-electron but without the characteristics of matter or antimatter. See **F1c**.
In the course of 14 to 18 billion years these from neutrinos and photons shaped, structures rotate faster and faster during passages through the electric and magnetic fields of stars and galaxies. This increase of rotation around its own longitudinal axis goes eventually up to the speed of light!
Then $E = ½ mc^2$ kinetic energy is added to those structures of proto-protons and proto-electrons with their mass, charge, spin and volume. With that added amount of kinetic energy is also added the characteristic of *matter or antimatter* and arise the proton and to the electron. **See the documents F1a 2014, F1b and F1c www.uiterwijkwinkel.eu**

The proton and the electron, and their anti-forms are the smallest stabile particles complete matter and they are the only basic building blocks of the atom. In the universe-sphere-shell only ordinary protons and electrons are formed. It is not entirely clear why during this process no antiprotons or positrons are formed. During the building process this would continuous results in forms of annihilation and destruction. That's is not the case.

2.1 FIRST GENERATION OF ATOMS ONLY HYDROGEN; THROUGH NUCLEAR FUSION FOLLOWS THE CONSTRUCTION OF OTHER ELEMENTS OF THE PERIODIC TABLE:

1) Systematic structure of atoms, periodic system and derive their non-elemental forces:
These protons and electrons are the only stabile building blocks of atoms. This hydrogen atom is completely and 100% built up from protons and electrons. In first instance this only results in the hydrogen atom universe wide and thus atoms without neutrons in the nucleus! With that hydrogen atom a number of physical and chemical forces are introduced including gravity and the covalent radical force. That force results immediately thereafter in the formation of hydrogen molecules and the electron pair which generates the *van der Waals / London force.*

From hydrogen only by nuclear fusion are to construct all other ordinary atoms and isotopes. All these atoms are constructed out of just protons and electrons (1 neutron = 1 proton + 1 electron). For energetically reasons, this nuclear fusion building process *universe widely exclusively* results in the elements and isotopes of the periodic table as known on Earth. The construction of atoms and isotopes other than the periodic system is *energetically* not possible! See **F1d**.

2) Periodic table of black hole atoms:
Within all ordinary atoms with two or more electron pairs at extremely high speeds and pressures van der Waals / London bonds can be formed. These internal van der Waals/ London bonds within atoms are only possible when this atom has at least two or more electron pairs so starting from beryllium (Be). With these London bonds formed in the electron-shells of the atom these shells collapse towards close the nucleus. The whole atom shrinks to near the nucleus of the atom. Practically all there absorbed photons of the atom are removed and fried. In black hole atoms this nucleus hasn't any space left over for vibration. So the temperature of all black hole atoms drops to 2.7 kelvin. Black hole atoms are very cold. For that reason black hole atoms / black holes cannot emit light!
The speed of these towards the nucleus collapsed 'shell'-electrons increase towards the speed of light. This collapsed atom transforms into a black hole atom. Only elements ≥ Be and their isotopes can be transformed into black hole atoms (**F1e + Figures 18a - 18n**).

The electron shells of the elements H, H_2, He and Li have no or only one pair of electrons. The electron shells of these lightest elements can never collapse towards near the atomic nucleus. As a result, these lightest elements H, H_2, He and Li are not accepted by black holes / compact celestial bodies!

(All compact celestial bodies and black holes are surrounded by a layer of H, H_2, He and Li what these bodies withdraw from direct observations) Around the central black holes in galaxies standard a hot area is present where plasmas of H, H_2, He and Li can merge to Be and higher so that these atoms finally can be incorporated into that black hole as black hole atoms **(F1e)**.

3) Systematic derivation of non-elemental forces of atoms:
The author has systematically deduced the structure of atoms and of all the physical and chemical forces (including gravity) in all conceivable forms of matter / protons / electrons / atoms:
a) Forces elements of the periodic table (from the element H), **(document F1d)**
b) Forces elements periodic table in a black hole state (first from Be) **(document F1e)** and
c) Forces anti-atoms (only the anti-H / H_2) (to update **document C4).**

2.2 THE ORIGINE OF GRAVITY:
Gravity (and the other 2 physical and 2 chemical forces) can be generated from only the 'shell'-electrons of atoms as a result of speed of that atom in the universe. That's because any form of velocity of the atom in the universe is completely added to the ideal orbit of all 'shell'-electrons. This addition of the speed to these 'shell'-electrons results in abnormalities of their ideal orbit. Each form of velocity in universe generates its own form of deviation from that ideal orbit!
The 'shell'-electrons attempt to eliminate these by speed caused deviations from the desired ideal orbit by generating gravity and thus to realize collisions between celestial bodies through gravity. All collisions between celestial bodies result in the conversion of a part of the kinetic energy (attached photons) into free and emitted photons of light and infrared. All collisions in universe results in a decrease of the average speed of all present atoms. This results in a decreasing in the deviation of their orbits around the nucleus.
Collisions and decrease of velocity however also results in a decrease of the amount of gravity and of gravitational energy of all involved atoms! Gravity is exclusively generated by the 'shell' electrons of *atoms* and by the speed(s) of the atom in universe. See **documents gravity E3 (text) and E3-1 (figures).**
Gravity is not an elemental force and isn't generated by single protons, electrons, nuclei, quarks, photons or neutrinos nor is gravity generated by these four most elementary Higgs particles!

-) For gravity, speed / kinetic energy is indispensable:
These 'shell'-electrons (1) and 'shell'-electron pairs (2) of atoms generate gravity and those other 2 physically and 2 chemically forces only if the atom is subject to one or more velocities in the universe. These are linear and angular velocities with respect to the following reference points:
  a) The **origin C** of the universe,
  b) The rotation center **R1 of the galaxy,**
  c) The different rotation points **R1 of neighboring galaxies,**
  d) The local **star, planets and satellites and**
  e) The own rotation speed of the atom.
This results in every facet area of the universe-sphere-shell in possibly 10 to 11 different (angular) velocities of atoms in universe and correspondingly equal number of reference points in that facet area!

-) In the universe absolutely stationary atoms are all completely inert:
If the atom is absolutely motionless in the universe and within the universe-sphere-shell than all 'shell'-electrons are in perfect orbits around their nucleus. Then all 'shell'-electrons *pairs* are fallen apart into single electrons. These loose 'shell'-electrons follow perfect circular orbits around their nucleus without any deviation. In that perfect state the 'shell'-electrons however don't generate any form of gravity nor any of those two physical or two chemical forces! In absolute standstill relative to these 10 – 11 reference points all atoms are completely inert as well!
Gravitation and the other 2 physical and 2 chemical forces of the atom are speed and kinetic energy related variables. See document **F1d.**

2.2.1 GRAVITY IS NOT AN ELEMENTARY FORCE:
Thus gravity is *no elemental* force of: a) mass b) matter and c) the atom. Gravity is only a speed related force that does not even originate come from the nucleus. Gravity is only generated by the 'shell'-electrons of atoms and in combination with speeds in the universe!

From **Newton** and **Einstein** till now Science is saddled with the fact that the phenomenon of gravity is still linked to *mass and to the **mass** of the atomic nucleus*. It is not recognized that gravity is only generated from the *'shell'-electrons of atoms in combination with velocity of the atom in the universe*. Those persistent, historically established link explains why Science was not able to explain the phenomenon of gravitation until today (2017).

Gravity is originated at an unexpected location within the atom and caused by speed of atoms in universe. Author's vision is completely contraire with the widely accepted vision that gravity is related to mass.

*3) ASSUMPTIONS AND GRAVITY GRAVITATIONAL ENERGY:

3.1 ASSUMPTIONS CHARACTERISTICS OF GRAVITATIONAL RADIATION-FORCE:

1) Only in the case that *all external speeds* of the atom are zero all the 'shell'-electrons of that atom are in perfect orbits around the nucleus without any derogation! The orbits of all 'shell'-electrons are just only one electron thick. The position of each 'shell'-electron is to determine exactly. See **Figure 1 gravitation in document E3-1 www.uiterwijkwinkel.eu**

Those perfect around the nucleus moving 'shell'-electrons don't generate gravity nor any of the other two physical or any of the two chemical forces. In that situation all elements of the periodic table are possible but all atoms are 100% physically and chemically inert and don't generate gravity! These perfect atoms are only possible when the atom possesses *no kinetic energy and thus have no velocity!*

2) No atom in the universe is without kinetic energy. Kinetic energy results in 9 to 11 different movements / speeds of all atoms in the universe:
To all atoms in the universe kinetic energy is attached. So these atoms move and have velocity. No atom therefore stands still in the universe! Within each of those 4 - 20 million facet areas of the universe-sphere-shell all atoms move with the same number of at least 9 and up to 10 - 11 different (most angular-)speeds. All speeds are larger than 10 to 30 km / sec relative to the 9 – 11 existing reference points which are present within each facet area of the universe-sphere-shell. *) **)
Every form of velocity of the atom in the universe is fully added to the ideal orbit of all 'shell'-electrons. This results in an aberration from their wished ideal orbits. Any form of speed in the universe hinders all 'shell'-electrons and keeps them out of the desired ideal orbit. As a protest against this all 'shell'-electrons generate two physically and two chemically forces and gravity. **Documents F1d, E3 and E3-1.**

3) Structure of gravity:
The 'shell'-electrons of atoms, generating gravity only if there is a velocity of the atom in the universe with respect to any of the 9 – 11 reference points. The same speeds and number of reference points are present within each of these 4 à 20 million facet areas of the universe-sphere-shell.
For every facet area these points are:

       a) The **absolute center C** of the universe / the universe spherical shell: (= the Little Bang point) *),
       b) The center of rotation **R1 of the galaxy;** (= the Big Bang point of the galaxy)
       c) The rotation centers / Big Bang points **R1 of neighboring galaxies inside the facet area,**
       d) The local **star, planets, satellites**, and with respect to adjacent stars
       e) The own rotation of the atom**!**

As a result of the effects of these 9 - 11 speeds of atoms in the universe all 'shell'-electrons move within reasonable faint bands around their nucleus (**indeterminacy relation of Heisenberg**).
All 'shell'-electrons of atoms want to go back to perfect orbits around their nucleus of only one electron thick!

4) Gravitation has no relationship with mass; gravitation arises from the 'shell' electrons of atoms:
The gravitational force F_{grav} is solely generated by '*shell'-electrons* of atoms together but separately with two physical forces and two chemical forces (**F1d**). These forces are only generated when the atom is subject to speed(s) in the universe.
Gravity does not originate from the mass of the atomic nucleus nor from the mass of 'core'-electrons and 'core'-protons. (According to the author the atomic nucleus only contains protons and 'core'-

electrons. There are no neutrons in the atom nucleus! Neutrons are build up from one proton and one electron. See **document F1d + Figures**).Between *mass and gravity* exists no direct link! Gravity has nothing to do with the mass of the proton nor with the mass of the electron.

5) In the universe gravity has two purposes:
Gravitation is the protest and response of 'shell'-electrons to speed of the atom. Through gravity all 'shell'-electrons tries:
a) To slow down the current expansion speed of the universe-sphere-shell to eventually zero. This applies to all other movements of atoms within the universe-sphere-shell. In practice, this is achieved through *mutual collisions* between stars, planets and galaxies. At such collisions the present kinetic energy / speed is as much as possible converted into free energy in the form of emitted photons that are released. After such collisions is reduced:
1) the number of different speeds,
2) the average speed of all concerned atoms; all 'shell'-electron of these atoms are in energetically lower and thus better orbits than was the case before the collision!

The next 350- 450 billion year the first goal of gravitation to eliminate all nowadays present 8 – 10 different forms of velocities of atoms within the universe-sphere-shell by collisions and to concentrate all matter in one huge facet-black hole with only one angular speed. So all nowadays reference points and the current 9 - 10 speeds are eliminated one by one and reduced to zero except the remaining black-hole and his angular speed.
The second goal of gravity is to bring back all matter and all energy back to **center C** of the universe. In the end of the shrinking in **center C** this last remaining shrinking speed is finally eliminated reduced to zero as well.

b) After reaching the maximum expansion gravity contracts the universe-sphere-shell toward **center C**. Coordinated by gravity, all central facet black holes 2 - 3 trillion (10^{12}) years later arrive simultaneously back in the fixed **center C** of the universe. During this retreat all the gravitational energy of these central facet black hole is used to inhibit the angular velocity of these black holes to zero. That occurs just at the end of the contraction of the universe-sphere-shell.
That forming of the Little Bang black hole only occurs at the very end of the universe cycle that takes about 2,5 - 3.5 trillion (10^{12}) years. See **G7 and G8.**

At the **center C** all facet black holes melt simultaneously together into one giant Little Bang black hole. This process is accompanied by loss of shrinking speed and loss of de last remains of gravity and gravitational energy. This finally results in the totally destruction of this Little Bang black hole.
Inside this black hole a gigantic electrical repulsion is present between the present black hole atoms. As long there is enough gravity these repulsing atoms are held captured in this black hole. This critical amount of is defined as the *Critical black hole gravity* or **Cribhgra.**
At the very end of the contraction the shrinking speed and connected gravity eventually undershoot this *Critical black hole gravity*. At that very same moment the Little Bang black hole becomes instable and at the same moment all present black hole atoms fall apart into an equal amount of protons and electrons. At that moment the next Little Bang occurs (**G6**) and the start of the next universe!
(At the end of the cycle of the universe the amount of kinetic energy is again exactly the same as at the beginning of the cycle of the universe!)

6) Clashes between planets / stars / galaxies:
Given the enormous size of the universe macro seen matter can only loose kinetic energy and so speed through mutual collisions between celestial bodies. With such collisions, always kinetic energy is released in the form of free photons of light (electron) and infrared (proton).
As a result of these collisions, the average speed of the atoms in both objects decreases and thereby their gravity and hence their net weight and gravitational energy. After the collision all shell electrons are in more ideal orbits with lesser defects.
(Secondary on *micro-scale* this is done through the formation of physical and chemical forces. These forces can form bonds in which standard heat is released in the form of photons!)

7) *Gravity* moves to all sides without waves and with infinite speed:
Gravitational 'radiation' is without particles, without matter and without energy. Gravity is in nothing comparable to the known forms of electromagnetic radiation. Gravity hasn't any *wave character*.
Because there are no particles and mass is involved gravity is not limited to the speed of light.

'Radiation' of gravity moves all sides *straight* and even with *infinite speed.* All gravitational radiation the universe leaves the universe-sphere-shell directly at the same time it is generated!

Gravitational energy by contrast is always attached to atoms and thus connected with matter. Shock waves of gravitational energy only move through matter, and is only measurable in the form of real shock waves. Unlike gravity these shockwaves of gravitational energy are limited by the speed of light! In the **LIGO** project shockwaves of gravitational energy are measured and no waves of gravity.

8) Gravitation (power) does not deflect and is not to be measured in any way directly. As force gravity is very real present:
Gravitation 'radiation' is not deflect by mass /. Matter or by passage through gases, this in contrast to all other forms of electromagnetic radiation. Just like the speeds of the atom in the universe in relation to these 9 - 11 reference points gravity cannot be measured directly! Although not directly measurable gravity is a very real force in the universe. Gravity is effective even at distances of many millions of light years! Gravity is only measured indirectly, for example through tests.

9) The degree of deviation in the orbit of the 'shell'-electron increases linearly with speed; the with speed 'added' kinetic energy quadratic:
The deviation in the orbits of shell electrons *quantitatively linearly increases or decreases* with each cosmic form of (angular) speed. These speeds are relative to a) the **origin C of the universe, b) the R1 of the galaxy, c) the R1's of neighboring galaxies, d) local star and e) neighboring stars** in the universe.
The by speed to this 'shell'-electrons (and nucleus) 'added' amount of **kinetic energy** however, increases *quadratic* with each of these speeds ($\frac{1}{2} mv^2$).

This per 'shell'-electron generated amount of gravitational force is in principle directly proportional to the magnitude of these *cosmic speeds.* This works out as a) linear expansion velocity v_{ex} and b) the perpendicular rotational speeds $v_1, v_2, v_3, ...,v_n$ present in the universe-sphere-shell.
The generated total gravitation of an atom / object is directly proportional to both the number of 'shell'-electrons as well as with the *cosmic speeds* $v_1, v_2, v_3, ...,v_n..$

10) Every single speed in universe generates its own traceable deviation in the orbit of the 'shell'-electrons:
Each 'shell' electron from the atom generates just as much separate gravity-vectors as the cosmic velocities / speeds of the atom in the universe relative to the following 9 – 11 reference points:
1) the fixed **center C of the universe / the universe-sphere-shell** ,v_{ex} and
2) the non-fixed rotation center **R1 of the galaxy,**
3) the non-fixed rotation centers **R1 of neighboring galaxies** within each facet part,
4) the **local star and stars and planets and their / satellites:** $v_1, v_2, v_3, ...,v_n$.
Each of these 9 à 11 different forms of speed and rotational speeds caused by all existing shell-electrons / or electron-pairs of the atom an *own characteristic deviation* relative to the desired ideal path of the 'shell'-electron(1) and electron-pairs(2).

11) Every speed generates its own specific gravity component compared to the associated reference point.
Gravitation of one 'shell' electron of an atom consists of as many speed components as a range of speeds of the atom and the number of reference points in the universe and universe-sphere-shell. The gravity 'radiation' of each 'shell'-electron is thus divided into as many gravity vectors as the number of cosmic speeds.
Gravity has a complex structure (9 à 11 dimensional). This complexity is partly due to the fact that the velocities of celestial bodies during the universe cycle constantly undergo minor quantitative changes with creation of speeds that at the end of the expansion disappear again. Thus, the amount of generated gravity and connected gravitational energy changes quantitatively in time.

12) Mutual attraction via gravity works extremely selective:
In the universe mutual collisions between objects only to realize when that matter, composed of atoms attract each other mutual through gravity even over distances of millions to billions of light years. The following applies:
- Only gravity of corresponding speeds / components result in a mutually attraction!
- Different gravitational components are completely indifferent to each other.

Only similar gravitational vectors contribute to the total mutual gravitational force exerted.

The gravity associated with the expansion velocity is universal emitted to other objects in the universe. This expending gravity continues to slow down the expansion speed of the universe-sphere-shell finally to zero. In the meantime this energy is transferred into an increase of the angular speed of all galaxies.

The gravity of the rotational speeds *within* the universe-sphere-shell is effective focused within the universe-sphere-shell itself. This gravity is to realize local collisions between stars and galaxies to slow down the number of these angular speeds and to transfer them into only one angular speed.
This first results in a continuing accumulation of stars and planets in their own central black hole of the galaxy. By collisions between galaxies themselves in time all matter in all facet parts and all kinetic energy are increasingly concentrated in the sole, remaining central facet black hole.
That central facet black hole will be realized and completed in about 350 à 450 billion years. That process coincides with the end of the expansion of the universe-sphere-shell.

13) Gravitation opposite the universe-sphere-shell:
The gravity of galaxies situated at the other side of the universe-sphere-shell generate the same but negative gravity compared to the Earth. For us this gravity works out as anti-gravity. Those galaxies local indeed emit the same gravity as the Milky Way galaxy. This gravity holds together the universe-sphere-shell and ensures a maximum expansion of that universe of about 3.0 – 3.5 billion light year. Through overlap of gravity of adjacent facet areas is gravitational *indirect* and practically no longer measurable through the universe-sphere-shell transferred to the Milky-Way galaxy.

14) Adding factor cos α to the gravitational formulas by Newton and Einstein is necessary:
α is the angle between two galaxies as seen from the **center C** of the universe-sphere-shell.
Objects in the universe beyond the Milky Way the curvature of the universe-sphere-shell (= **Einstein's** space-time) becomes measurable.
Then a curvature / angle correction **cos α** has to be added to gravitational formulas of **Einstein** and **Newton**. From **C** seen the larger this angle **α** and hence the larger the distance between two objects on the universe-sphere-shell, the greater the effect of this correction for the curvature of the universe-sphere-shell. This correction is in the form of the addition of **cos α** to the gravity formulas used up to 2017. See **Appendix 2.** In fact **Einstein** forgot to adapt his space-time in his gravitational formula. ****)**

Both for the expansion gravity as well as for the gravity as a result of rotations within the universe-sphere-shell applies the same correction with this factor **cos α.** This correction becomes quantitative important for the gravity between *universe facet areas* themselves. Within one facet area the effect of **cos α** is only slightly for the individual galaxies.

15) All mass-, matter- and energy-balances of the universe are getting complete:
With **cos α** added to the formulas of **Newton** and **Einstein** the universe-sphere-shell contains much more (4 à 6 x) as much gravity, mass, matter and kinetic energy as now calculated and 'found'. With factor **cos α** added in a simple way the mass-, matter- and energy balances of the universe are getting fully throbbing. The rest of the missing energy is gravitational energy versus **center C** and the gravitational energy within the universe-sphere-shell!

16) Structure of gravity is strictly logical but complex:
The link in this document gravitation to both:
        a) the number of 'shell'-electrons of the atoms as,
        b) the number of cosmic speeds of the atom in the universe and
        c) the quantitative coupling of gravity to each of possibly up to 11 cosmic speeds of atoms in the universe and explains perfectly logical all the gravitational energy (= 'dark' energy).
Gravity (and other two physically and two chemically forces) have a complex construction consisting of the same 10 – 11 speeds components. The bonds of these physically and chemically forces consist of the same 10 - 11 speed components.

17) Structure of gravity constant is logical but also complex:
A similar structure applies correspondingly also for the *gravity constant* (and all other associated physical constants! by physical and chemical forces). See **G10.**

18) Be aware of the direct link between quantum mechanics and astrophysics
The quantitative structure of gravitation of every physically and chemically bond on earth is to analyze in detail when all speeds are known of the atom in the universe and within the universe-sphere-shell.
There is a direct link between quantum mechanics and astrophysics

3.2 ASSUMPTIONS GRAVITATIONAL ENERGY:

1) Gravitational energy cannot be measured directly but is as a form of energy indeed real present:
Just like gravity the gravitational energy cannot be measured directly and directly quantified (Measuring = knowing applies doesn't for gravity and gravitational energy!). Gravitational energy can only be calculated in relation to the previously described speeds ($\rightarrow$ gravitation), and reference points and the distance of an object to these reference points.

2) The amount of *gravitational energy* of an object is dependent on:
a) the amount by its own gravity by speeds relative to **C** and the rotation points **R1** within each facet area,
b) the distance of an object to these reference points within each facet region and
c) the amount of existing gravity on that reference point.
Gravitational energy cannot be measured directly; gravitation is only to calculate and indirectly deduce.

3) Practical problem most of these rotation points and distances are unknown:
The problem is that from those 9 à 11 reference speeds in fact only the position and the distance to the center **R1** of the Milky Way is well known. The distances to **center C** and the remaining distances to the 8 à 10 reference points inside the facet area are still unknown or held by approximation. The location of **C** is in order of magnitude well known, but not the distance to **C**.

4) Every movement atom attached to its own form of gravitational and excess gravitational energy:
Every form of velocity, rotation velocity in the universe relative to the **origin C, R1 of the galaxy, the R1's neighboring galaxies and stars / planets in the universe** and **their own rotation** generates its own distinctive form of gravitation (force).
The *distance to these points of rotation / reference points* then determines the by gravity (not directly measurable) amount of gravitational energy of atoms / objects. Within each of those 4 - 20 million facet areas of the universe the present gravitational energy can be divided to these 9 – 11 reference points. In all millions facet areas are the same 9 - 11 components of gravity and gravitation-energy (one for each speed and associated reference point) multiplied by the distance from the object to these 9 à 11 reference points.

5) Structure of gravitational energy is extremely complex:
Each velocity of the atom in the universe generates its own contribution to the total gravitational and delivers its own specific contribution to the gravitational energy. The *distances* to the various rotational / reference points determine the current quantitative amount of present gravitational energy!
The structure of gravitational energy is therefore much more complex than that of gravity itself.
To quantify gravitational energy all mutual distances to these 8 – 10 reference points must be known as well the changes therein that occur during the universe cycle. During this cycle quantitative changes occur in the amount of gravity, the distances and so the amount of present gravitational energy.
This problem is so complex that this is only to overcome by modeling and thereby quantify the universe cycle.

6) *Gravitational energy* only move through matter, and thus by waves and with the speed of light:
Unlike gravity all gravitational energy is directly bound to matter / atoms. Shock waves of gravitational energy cannot move at all sides like gravity itself. Unlike gravity all gravitational energy always moves through matter and therefore always through waves! Such (shock) waves of gravitational energy are bound by the speed of light. *Gravitational energy is measurable only in cases of shock waves within the universe-sphere-shell.*

7) What LIGO actually measured?; 'waves' of gravity or waves of gravitational energy?:
The **LIGO** and later the **Pathfinder** don't measure gravity but only (shock) waves of gravitational energy! Gravity is and remains measurement-technically a completely elusive phenomenon! We now know just what gravity and gravitational energy is!

8) Quantitative relationships:
The by 'shell'-electron generated amount of *gravitational energy* in principle is:
a) directly proportional to the magnitude of the *cosmic speed* and thereby generated gravity,
These are the linear expansion velocity v_{ex} and the perpendicular rotational speeds v_1, v_2, v_3, v_n which are present in the locally plane of the universe-sphere-shell.
b) The generated total gravitational energy of an object is directly proportional to both the number of 'shell'-electrons and with the *cosmic speeds* v_{ex}, v_1, v_2, v_3,..., $v_{n,.}$
c) The distances of the object relative to the 9 – 11 points of rotation **C, R1**, the **R1's** of the facet area, local star and neighboring stars and their planets and satellites.

9) Gravitational energy made up of components:
Each 'shell'-electron of the atom generates just separately the same gravitational energy vectors as cosmic velocities of the atom in the universe compared with the following benchmarks:
1) the **fixed center C of the universe / the universe-sphere-shell** ,v_{ex}, and
2) the **non-fixed rotation** center **R1 of the galaxy,**
3) the **non-fixed** rotation centers **R1 of neighboring galaxies** within each facet part,
4) **local stars / planets and their satellites:** v_1, v_2, v_3, ...,v_n.
That to gravity associated gravitational energy is thus divided into as many gravitational vectors as the number of cosmic speeds of the atom.

10) 'Dark' energy:
The current generation of theoretical physicists and astrophysicists anno 2017 still no real physically explanation for the phenomenon of gravitation. They don't take in account the effects of the 9 - 11 different speeds and reference points within each facet area as used by the author. Therefore in Science in energy balances lacks virtually all gravitational energy now present in the universe. This gravitational energy in fact is the intensely searched 'dark' energy in the universe:
a) the one-dimensional gravitational energy of the universe-sphere-shell with respect to **center C** and
b) the 8 - 10 dimensional gravitational energy within each of the 4 - 20 million facet parts in the universe-sphere-shell. These 9 – 11 reference point and connected gravitational energy explain all missing energy (now 'dark' energy).

11) Development of gravity and gravitational energy only to solve by modeling the universe cycle:
The structure of the existing gravity and gravitational energy in the universe is extremely complex because:
1) the reference points are missing or not well understood,
2) many connected speeds are unknown with respect to the 9 – 11 reference points, and
3) the exact distances of the celestial bodies with respect to these 9 – 11 reference points.

12) Mathematical model universe / universe-sphere-shell and universe cycle is essential:
Gravitational energy can only be quantitatively achieved with a **mathematical model** of the universe and its energy-neutral cycle! ***) See documents **G6, G7 and G8.**

*) The *current generation astrophysics rejects a universe with one fixed **center C**.*
) No account is taken of the effects of the minimal deflection of light in universe as a result of the present extremely low concentrations of hydrogen and helium in the universe-sphere-shell. These deflection ensures that the observed deep universe rests entirely on beautiful but 100% virtual images, See **G9.
***) The universe cycle is based on 12 parameters (**G3**) and the ninth Laws of the universe (**G4**).

*4) GRAVITY AND GRAVITATIONAL ENERGY FURTHER CONSIDERED:

4.1 IMPACT OF SPEED ON ORBITS OF 'SHELL'-ELECTRONS:
Atoms / celestial bodies move in space because of attached kinetic energy and gravitational energy. All kinetic energy and gravitational energy is always 100% bound to matter; unbound energy is not possible! Kinetic energy forces all atoms to move in the universe with respect to one or more reference point(s). All speeds are larger than 10 - 30 km/s, and thus relevant speeds.
Every form of velocity has its own recognizable effect and impact on the orbits of all 'shell'-electrons of atoms. Because these speeds all orbits of 'shell'-electron become vague.

-) Statement of gravity and other forces:
To achieve this ideal orbit as much as possible all 'shell'-electrons of atoms generate:
a) at *macro-scale universe*: gravity. Through collisions between galaxies, stars and planets by gravity to convert kinetic energy and gravitational energy into heat (photons) and thus to slow down the speed of all present individual atoms. All 'shell'-electrons get more ideal orbits. Documents **E3 and E3-1.**
and
b) at *micro atomic / molecular scale*: to generate two physical and two chemical forces where this 'shell'-electrons can form atomic and molecular bonds in which standard binding energy is released in the form of photons. See **F1d**. Only the bond forming electrons get an energetic more ideal orbits.
Gravity is only generated by all 'shell'-electrons of atoms.

4.2 ASPECTS OF GRAVITY AND GRAVITATIONAL ENERGY AT SCALE UNIVERSE:

Now includes:
A) The spherical shell shape of the universe and movement of celestial bodies within this universe-sphere-shell;
B) Gravity and the structure and composition of gravity,
C) Gravitational energy and the structure and composition gravitational energy.

4.2.1 ad A) THE SPFERICAL SHELL SHAPE OF THE UNIVERSE AND DISTANCES:

-) The current universe has to be the structure of a thin spherical shell. The currently observed images from the 'deep' universe are 100% distorted and imaginary and based entirely on optical illusions:
In *2017* the *Big Bang theory* is generally accepted. In that case the universe starts from one point out of a super big black hole that lost all speed and thus all gravity. It became unstable and all present black hole atoms fall directly apart into an equal amount of protons and electrons that arrange themselves in monolayers of protons and electron that spreads on all sides with a uniform expansion speed of $1/3^{th}$ – $1/2^{th}$ the speed of light and without inflation.
Then the universe must have the form of a thin spherical shell of a universe-sphere-shell. This always perfectly round spherical shell is now filled with 4 - 20 million identical *facet areas*. All facets are filled with the same amount of mass, matter and kinetic energy. Every facet area is filled with about 200 – 500 or even more galaxies! Within each facet the same 9 – 11 speeds are present.

From *Earth* we see the universe as a flat surface but not as a sphere shell. That's correct. The radius of this spherical shell is now about 2.5 to 3 billion light-years. The local curvature of this spherical shell is minimal and near zero. The universe-sphere-shell manifests itself locally as a plane!

4.2.1.1 THE COMPLETELY CLOSED UNIVERSE:
In observations from Earth it seems however that our planet is in the center of the universe. Apparently planet Earth is even in the Big Bang point! That cannot be true. This optical illusion is caused by:
1) The minimal deflection of light (photons) by the presence of extremely low concentrations of *hydrogen* and *helium* in the universe-sphere-shell. See **document G9**. All electromagnetic radiation, and all particles radiation are diffracted by these gasses in such a way that they move continue 100% within the thin universe –sphere-shell. Inside and outside of this quite thin universe-sphere-shell with billions of galaxies absolutely nothing is present in the form of mass, matter, kinetic energy not even electromagnetic radiation like photons and neutrinos.

2) The phenomenon that within a period of 14 - 18 billion years all the neutrinos and all photons in this universe-sphere-shell are fully transformed back into protons, electrons and eventually into new hydrogen atoms / molecules. Science does not realize that all neutrinos and photons have a maximum lifetime in universe!

With that in hydrogen transformed neutrinos and photons all the information disappears about the universe older than 14 - 18 billion years! For this reconstruction of protons and hydrogen see **document F1c**. On earth, we see that transformation back as high energy cosmic rays of protons, electrons and the formation of new hydrogen and new stars!

ad 1) minute concentrations of hydrogen and helium present in the universe-sphere-shell:
The universe-sphere-shell between the galaxies is filled with extremely low concentrations of hydrogen while inside all galaxies besides hydrogen also extremely low concentrations of helium gas are present as a tiny remnant of the billions of local Big Bangs which were all situated in the universe-sphere-shell. All 4 - 20 million facet areas, all now existing of 200 – 500 galaxies, started *20 - 25 billion years* ago simultaneously with their own superhot Big Bang. This Big Bangs are described in **phase 16** of the universe cycle (**G7**). See especially the **figures 42 – 54** in **G8** that give a rather detailed artist impression of these Big Bangs.

These *simultaneous* birth (Big Bangs) of hundreds of billions of galaxies are no longer perceptible to get because in the meantime all radiation include neutrinos and photons 100% are transferred back into protons, electrons, new hydrogen and into new stars. All information about the universe, older than 14 - 18 billion years, is completely disappeared and transferred into new matter! (The 'dark' period of 380.000 years in the Big Bang Theory in fact covered a period of 25 – 30 billion year!)

-) Universe-sphere-shell represents a 100% closed system:
Within this universe-sphere-shell concerns that extremely low concentrations of hydrogen and helium ensure that:
a) Within this universe-sphere-shell all forms of electromagnetic radiation such as neutrinos, photons of infrared and light and all particle radiation undergo an extremely small deflection of an average of only *1 degree* per 10 - 40 thousand light-years.
b) All radiation is that much deflected that it moves 100% within that universe-sphere-shell and cannot get outside or escape this sphere-shell.
This results in a 100% closed universe-sphere-shell for all mass, matter, electromagnetic and all particle radiation and for all the connected kinetic energy!

-) The observed deep universe is 100% virtually and is based on imaginary images:
Because of that *tiny deflection* of all types of electromagnetic and particle radiation the universe shows us space and a universe that is composed entirely with imaginary images and not that of a nice *universe-sphere-shell* which the universe according to the **Big Bang theory** and the universe model by **Uiterwijk Winkel** should be.
By this minimal deflection all absolutely dark areas on both sides this universe spherical shell are continuously be completely filled with *projections of virtual images* for 100% derived from this relatively thin universe-sphere-shell. That deep universe is only observable through this thin extreme slightly curved universe-sphere-shell! See **document G9** www.uiterwijkwinkel.eu .

4.2.1.2 THE CURRENT UNIVERSE IS MUCH OLDER THAN 13.8 BILLION YEARS:
At that deepest perceptible point of the universe is 13.8 billion light years from Earth. At that deepest visible point there are already fully functioning galaxies! To form these galaxies and Big Bangs at the beginning of these galactic systems took many billions of years. The present perceptible universe must be much older than our maximum detection limit of 13.8 billion years!
The author now assumes that the current universe at least 25 - 30 billion years older than the currently adopted 13.8 billion years. The current universe would then started 40 à 45 billion years ago and is correspondingly equally old! Our visions of the universe and its origins, as well as the current standard Big Bang theory will then have to be revised and changed radically.

-) The author has derived the complete history and future of this entire universe and described;
The beginning and the history of this universe and the overall future of this universe are qualitatively described in the documents:

- **G6: Start universe about 40 - 45 billion years ago with a super cold Little Bang (0 kelvin) with the release of an equivalent number of protons / electrons followed by an expansion without inflation,**
- **G7: Text energy-neutral cycle universe with 29 steps / phases and**
- **G8: The 80 figures of the universe cycle.**

4.2.1.3 GRAVITY SLOWS DOWN THE EXPANSION; IN THE PAST THE UNIVERSE EXPENDED FASTER AND FASTER:

At the Little Bang 40 – 45 billion years ago the Little Bang black hole fell directly apart in an equivalent numbers of protons and electrons that arranged in mono-layers of protons and electrons. See **Figures G8**. Within those mono-layers a huge electric spring tension was present which those mono-layers let expand. These mono-layers expanded with $1/3^{th}$- $1/2^{th}$ the speed of light c and thus without inflation!

After the Little Bang there are no atoms present and thus gravity and gravitational energy is lacking completely. The first 5 - 10 billion year this system of spherical monolayers protons / electrons expands without gravity thus completely unhindered. In that long period, more and more space was created both between the monolayers of protons / electrons as between the in these mono-layers present protons and electrons themselves.

After 5 - 10 billion years that space between the mono-layers of protons and electrons is mutually increased everywhere that universe wide exactly simultaneously all protons capture their own electron as 'shell'-electron to form hydrogen atoms. With this atom both gravity and gravitational energy relative to the **center C** come back into the universe. With this formation of hydrogen a huge amount of gravitational energy is free of charge added to the universe and its cycle. This the 'dark' energy of the universe.

From that moment, 35 à 40 billion years ago, gravity is decreasing the expansion speed of the universe-sphere-shell relative to the **center C.** This process continues the next 350 – 450 billion year.

When we observe the universe in fact we observe only through this thin *universe spherical shell* back in the past and in time. Then we observe that this spherical shell expands more and faster as we look further back in time (**Hubble)**. This thin universe-sphere-shell swelled formerly indeed faster and faster than at present. See **Figure 4a document E3-1**. This is consistent with what is observed and is measured. (The interpretation of the current observations unfortunately lead to false conclusions, the universe is expanding is not expending faster and faster. Contrary gravity just slows down the expansion of the universe even more and more!)

-) Expansion universe-sphere-shell comes to a complete stop; the physical space of the universe-sphere-shell is finite:

All observed galaxies are located in the universe-sphere-shell and have *now* exactly the same expansion speed relative to the center C as the Milky Way galaxy! In the future, gravity slows further and further down this expansion of the universe-sphere-shell. The hereby released energy is converted completely to an increase and the rotational speed / energy of all current galaxies which will rotate faster and faster in time. A part of this energy is transferred in gravitational energy versus **center C**.
Over 350 à 450 billion years in all 4 - 20 million facet areas through collisions all inside these facet areas present galaxies and their 8 – 10 speeds are disappeared and concentrated into just one central facet black hole that rotates equatorial with $1/3^{th}$-$1/2^{th}c$ on its longitudinal axis. Than all axis are pointed at the **center C** of the universe. See **Figure 1 G8.**

Then the current expansion speed of the whole universe-sphere-shell (now approximately 450 km/s) at the same moment comes to a complete stop. Gravity limits the maximum expansion of the universe-sphere-shell physically up to a maximum radius of about 3.0 - 3.5 billion lightyears around the **center C**. We live in a universe with finitely expansion! The adjacent seems to be happening.

Under the influence of gravity, this universe-sphere-shell with 4 à 20 million super-sized central facet black holes start shrinking towards the fixed center **C** of the universe. See **Figure 1 of G8.**

4.2.1.4 THE UNIVERSE-SPHERE-SHELL IS PARTPATED IN 4 - 20 MILLION SAME AREAS; EACH FACET AREA HAS THE SAME 10 – 11 SPEEDS / REFERENCE POINTS:

The universe-sphere-shell has one **center C** as the only *fixed* point of reference in the universe! This universe-sphere-shell consists of 4 - 20 million equivalent facet areas each of which filled with the same amount of mass, matter and kinetic energy. Every facet area now comprises an estimated 250 - 500 (and possibly more) galaxies.

Within each of these current facet portions of these universe-sphere-shell all present galaxies and celestial bodies and rotate locally around the same number approximately 10 secondary *non-fixed rotation centers* which can be considered as temporary local variable reference points.
For each celestial body and therefore every atom within each of those 4 - 20 million facet areas there are the same 11 similar reference points and hence the same maximum of 11 different speeds. All facet areas have **center C** as only fixed point in the universe.
Those remaining approximately 10 rotation / reference point in every facet of the universe-sphere-shell are not linked to fixed locations, only temporarily. These points of rotation are movable within each facet area. At the end of the expansion these points are concentrated in the final central facet black hole.

4.2.2 Ad B) GRAVITATION PURPOSE AND STRUCTURE OF GRAVITATION
Gravitation is primarily intended to reduce the speed of the atom or of objects in the universe by stripping the atom of its kinetic energy and its gravitational energy. This to atoms attached kinetic energy and gravitational energy causes these 9 - 11 speeds in universe!

In universe this stripping of attached kinetic energy can only be realized through mutual collisions between objects / bodies / galaxies. This happens only if gravity manifests itself as a mutually attractive force which even operates over huge distances of even many millions of light years!

During these collisions much kinetic energy is released in the form of photons of light (≡ the electron) and infrared (≡ the proton). After these clashes, the *average speed* of the two objects in the universe lower than before! After this clash all present 'shell' electrons are in an average lower energy level and thus in more ideal orbits than before the collision.
That loss of speed also results in loss of the amount of gravity and thus also in a loss of associated gravitational energy!

-) All 9 - 11 speeds in the universe and within the universe-sphere-shell change extremely slowly in time; The corresponding gravity and thus gravitational energy constant change in time:
All stars and planets follow the same set of 9 – 11 cosmic velocities /speeds in galaxies and within the facet area. Over a short period of about a thousand years, these 9 - 11 cosmic speeds can be regarded as *quantitatively* constants in time. This applies to a lesser extent for the movements between the galaxies themselves.
On a longer term of millions / billions of years, however, *unidirectional quantitative* changes take place on both a) the number of speeds and b) the quantitative extent of these 9 – 11 respective speeds.

-) Any form of speed results in their own force component / dimension:
Any form of which 9 - 11 speeds generates its own gravitational component. Only the same gravitation components attract each other mutually. The *gravitational constant G* is also constructed out of 9 to 11 separate components. That same includes these two physically and two chemically forces /bonds and their physical constants of nature.
(Here's a direct link exists between quantum mechanics and astrophysics!)

-) All black holes merge into one central facet black hole; all speeds merge in one angular speed:
The next coming 350 - 450 billion years all 200 to 500 galaxies within every facet area will brought together in one facet black hole through mutual collisions. The current 9 - 11 speeds merge in only one angular velocity. The angular velocity of the *central facet black holes* eventually increases to $1/3^{th}$-$1/2^{th}c$. The kinetic energy and angular velocity will be exactly equal to the kinetic energy and expansion speed at the beginning of the universe just after the Little Bang. In all facet areas are their final rotation axis precisely aimed at the fixed **center C** of the universe.
In that coming period, both the number of speeds and therewith the associated gravity will change as well the mutual distances between all objects. This also results in changes of the amount of gravitational

energy in the universe! That is quite complex. Without mathematical model these changes in number and quantity of speeds are well to predict properly. The same for the distances and gravitational energy.

-) Mathematical model of the universe and the universe cycle is needed:
These 10 à 11 reference points and associated (angle) speeds are only to estimate after the establishment of a mathematical model of the universe-sphere-shell and after a quantitative elaboration. The distances to **center C** and to the 8 - 10 reference points inside each facet area are necessary to determine the current amounts of gravitational energy. That is most of the missing amount of 'dark' energy in the universe. That gravitational energy is the engine and driving force behind the universe cycle.

4.2.2.1 IMPACT OF NUCLEAR FUSION ON THE NUMBER OF 'SHELL' ELECTRONS AND GRAVITY:

-) At nuclear fusion in stars 'shell' electrons disappear thus gravity and gravitational energy:
In nuclear fusion in stars 'shell'-electrons are bound to the protons present in the atomic nucleus. In nuclear fusion thereby disappears both a) that by 'shell'-electrons generated gravity and b) the corresponding gravitational energy! The mass remains the same!
This loss of gravity tends to be a decrease of mass. This is very *deceptive*. *Even more deceptive* it looks like *mass is converted into energy* or into photons! That is not the case!

Nuclear fusion in stars results in a loss of 'shell'-electrons, gravity and gravitational energy. That is to the detriment of the driving force and engine behind the universe cycle! Only by modelling and through quantitative calculation above changes are to follow and quantitatively expressed for any moment.

4.2.3 ad C) PURPOSE AND BENEFITS OF GRAVITATIONAL ENERGY (= DARK ENERGY):

-) *Gravitational energy* of an object is made up of:
1) Velocities / kinetic energy of the atoms of the object and atoms present therein with respect to the distinguish 9 - 11 reference points. Each speed of atoms generates its own deviation and thus its own component of gravitation, and
2) The distance (s) of these objects with their atoms to these local 9 to 11 different reference points within each of the 4 to 20 million facet parts of the universe / the universe-sphere-shell.
These 9 – 11 speeds and distances are not constant over time but are subjected to very slowly changes. That causes gravitational energy (= dark energy of the universe) has a much more complex structure than gravity itself certainly on the scale of the universe and the universe-sphere-shell. For this a mathematically is necessary.

4.2.3.1 GRAVITATIONAL ENERGY IS THE MOTOR BEHIND THE UNIVERSE CYCLE:
The *energy-neutral cycle* of the universe consist of 29 sequential steps that complete a total cycle in 2.5 - 3.5 trillion (10^{12}) years. See **Appendix 1 and document G7 and G8.** Within that cycle is to explain all mass / matter and kinetic energy.
The universe starts each cycle with a super cold, at *0 kelvin* settled *Little Bang* of which the last occurred 40 to 45 billion (10^9) years ago. See **G6 + Figures).** After the Little Bang the universe was expanding spherical system of mono-layers protons and electrons. There were no atoms and thus no gravity nor gravitational energy. As long as the atom and hence gravity is absent this universe should expands to infinity.
However approximately 5 - 10 billion years after the Little Bang all protons caught their own 'shell'-electron and formed hydrogen which results in the generation of gravity and corresponding gravitational energy. Since then gravity inhibits the expansion of the universe. Thereby expansion energy is transferred into an increase in the angular speed of galaxies. We are now at the beginning of **step 23** of **29** and at 40 à 45 billion years after the Little Bang and start of this universe. In about 350-450 million years everywhere the expansion will be simultaneously reduced to zero.

Gravity and associated gravitational energy form the spindle, motor and driving force to get back all matter (atoms) and kinetic energy back to that fixed **center C** of the universe. Gravitational energy in

fact is the driving force behind this cycle. The universe-sphere-shell is a fully closed system for all present:1) mass, 2) matter 3) electric charge, 4) magnetic spin and kinetic energy!

In **documents G7 and G8** the author not only describes how the previous 22 steps have been completed, but he also describes all steps of this cycle in future to be completed until the next *Little Bang* in **step 29.** Then the universe starts all over again with the completion of the next energy-neutral cycle, which is unwound in exactly the same manner as this universe and all former universes. See documents **G7 (text) and G8 (> 80 figures)**.

*5) PURPOSE DOCUMENT: MODELING AND UNIVERSE CYCLE FOR COMPLETION OF ALL THE 'DARK' MATTER AND ALL THE 'DARK' ENERGY:

5.1 MATHEMATICAL MODEL UNIVERSE VITAL:

This universe cycle of 29 steps can be mathematically modelled; the whole cycle then to be quantified in detail!
The universe and its energy-neutral cycle are based on:
1) A 100% closed system for mass, matter, kinetic energy, neutrinos and photons (electromagnetic radiation),
2) The 12 basic parameters of the universe (**G3**),
3) The 9 Laws of the universe (**G4**) and
4) The 29 steps, each with in principle, single chemically and (nuclear) physically changes.
   (**Documents G7 and G8**)
5) Those 29 seamlessly continuous models together form the whole mathematically model of the universe and its cycle.

For every step of the 29 steps of this energy-neutral cycle of the universe an own mathematical model can be made. All 29 models are based on the same 12 parameters of the universe (**G3**). Those 29 models connect seamlessly and therefore are to merge into one whole universe model of the universe and its cycle based on the nine universe laws (**G4**).
At the beginning and at the end of every cycle there is always present exactly the same amount of *mass, matter and kinetic energy*. Then all gravity and all gravitational energy are disappeared.

-) Laws conservation of mass / matter and of energy apply only at the beginning and the end of the universe cycle:
At the beginning and end of the universe cycle is always present exactly the same amount of mass, matter and kinetic energy. Only then apply the Laws conservation of mass, matter, kinetic energy and momentum because there is no gravity nor gravitational energy.
About 5 – 10 billion years after the Little Bang (some 40 – 45 billion years ago) hydrogen atoms and molecules are formed from loose protons and electrons. With hydrogen gravity and gravitational energy come back in the universe. With that formation of hydrogen an enormous amount of gravity and gravitational energy is free of charge, added to the cycle of the universe.

This free added gravitational energy disturbs the Law conservation of energy completely. This gravity held the universe together. Gravitational energy is the driving force behind this universe cycle.
Gravity and gravitational energy bring back all matter and energy to the **center C** of the universe.
The *quantitative* development of gravity and connected gravitational energy is only possible after the mathematically modeling of the universe and these 29 steps in this overall totally energy-neutral cycle of the universe.

-) Boundaries of mass, matter kinetic energy and space to determine to complete one cycle:
With such a model is to determine within which boundaries and limits of mass, matter, kinetic energy and space this energy-neutral cycle of the universe can be completed and possible for:
a) mass, matter and thus number of protons and electrons,
b) kinetic energy / electric spring tension,
c) within which maximum space (billions of light years) around the **center C,**
d) and which amount of gravity and gravitational energy is necessary .
For that energy-neutral cycle the author refers to the **G7 and G8 documents**.

5.2 ALL ATOMS SUBJECT TO DIFFERENT SPEEDS:

From the **center C** seen in *every facet part* of the universe-sphere-shell all the galaxies are subjected to (exactly) the same system of 9 to 11 different movements / cosmic speeds $v_{ex}, v_1, v_2, v_3, ..., v_n$ in universe. All these linear and (rotation / angular) speeds exceed 10 to 30 km/s. Those speeds exist in every facet adjacent to the current linear expansion velocity v_{ex} of the universe-sphere-shell. Within each facet of this universe-sphere-shell the same types of rotational speed $v_1, v_2, v_3, ..., v_n$ are present. These speeds are perpendicular to the local expansion velocity v_{ex} with respect to the **center C.** This number of $9 - 11$ speeds / dimensions in universe are not comparable with the on Earth known three-dimensional system!

These 9 to 11 speeds of all atoms in the universe are required in order to quantitatively reduce all forces and their bindings in their $9 - 11$ force / binding components. If these $9 - 11$ speeds are known then the **quantum mechanics** and **quantum chromo dynamics (QCD)** can be filled quantitatively in detail

-) Modelling of the universe cycle is needed both to recognize a) all speeds, b) all reference points and thus c) all distances and to *quantify* them:
All the atoms within the universe-sphere-shell are subjected to 9 - 11 different speeds. Each velocity of the atom in the universe adds its own effects to all orbits of the present 'shell'-electrons. Modelling of the universe cycle is necessary in order to get clarity:
- A) in the *number of speeds* of the Earth in the universe and within the universe-sphere-shell,
- B) the *quantitative extent* of those speeds versus the center **C** and
- C) the distances to various reference points and rotation points **R1** of galaxies within the universe-sphere-shell.

Gravity components in combination with their distances are necessary to determine the amount of *gravitational energy* of the mass / matter in question. These are the mutual distances d:
1) with respect to the **center C of the universe**: d_{C1},
2) relative to the **center R1 of the local (Milky Way) galaxy**: $d_{R1\,1}, d_{R1\,2}, d_{R1\,3}, d_{R1\,4}, .. d_{R1\,n}$,.
3) with respect to other **centers R1** of adjacent galaxies within the facet part: $d_{R1-R2}, d_{R1-R3}, d_{R1-R4}, ... d_{R1-Rn}$,
4) relative to the local star / planet / satellite,
5) the own angular velocity of the atom.
Only then is to determine the total amount of gravitational energy of each object in the universe and the present gravitational energy of the universe as a whole.

-) Collisions between galaxies reduces the number of galaxies in all facet areas until eventually only one central black hole with only one angular speed remains:
The next 350 - 450 billion year gravity will slow down the expansion speed towards zero. During that period till the end of the expansion of the universe-sphere-shell all energy of the expansion is transferred into rotational speed / energy of the now present galaxies. Within all facet areas all now present galaxies collide till only one huge central facet black hole is remaining.
At the end of the expansion each facet black hole contains the same amount of mass, matter and kinetic energy of about 200 - 500 (or more) galaxies. From the current $8 - 10$ speeds only one angular velocity of this central facet black hole remains.
The rotation axis of all these central facet black holes are exactly pointed at the **center C** of the universe. The angular velocity of this final central facet black hole is increased to $1/3^{th} - 1/2^{th}$ the speed of light c. This speed is just as great as the expansion speed of the universe just after the Little Bang some 350 - 450 billion years earlier.
All axes of rotation of these final central facet black holes are exactly focused at the **center C** of the universe. See **Figure 1 G8.**

-) Expansion universe ends each facet area in one central black hole:
Gravity slows down the expansion velocity v_{ex} of all galaxies down to zero. So the expansion of the universe will end and followed by contraction of the universe-sphere-shell. Before that moment:
a) all previously emitted electromagnetic and particle radiation have to be transformed back into protons, electrons, and into hydrogen atoms / molecules,
b) in stars by nuclear fusion all hydrogen is transferred into elements $\geq$ Be and
c) all stars and their planets including all their satellites are fully integrated in the local central black hole R1,
d) in all $4 - 20$ million facet areas all present 250 à 500 central black holes are fully incorporated in the large central facet black hole in the universe-sphere-shell. This is the **Hawkins black hole** with only

one rotation speed and one gravitational component and in principle only one gravitational energy component to the **center C** of the universe.
See **Figure 1 G8** and beyond.

-) On any collision between galaxies disappear least one of the current 8 à 10 cosmic speeds within the universe-sphere-shell:
With each collision between galaxies disappears always at least one of the 8 at 10 (n) speeds! Through 2^n of such collisions all 8 à 10 eventually speeds will be reduced to just only one angular speed. **LIGO** and **LISA** gets very busy with billions already occurred collisions between galaxies. In future billions of similar bigger and bigger collisions will happen!
Black hole matter consists of both physical and chemical totally inert loose black hole atoms that only generate rotation / angular gravity and a strong *magnetic field*. All black holes are super cold (2.7 K) and not able to emit light nor to absorb light!

5.3 MATHEMATICAL MODEL DELIVERS QUANTITATIVE BENCHMARKS FOR REVIEW OF ALL MEASUREMENT DATA UNIVERSE:
Through the mathematically modelling the 29 different single steps a total mathematical models can be created of the whole universe and its energy-neutral cycle. For every moment such a mathematical model shows a completed *quantitative* model of the universe-sphere-shell with: a) the whole history of the universe, b) present universe as well c) the entire future of this universe. At any time can be shown a complete *qualitative* and *quantitative filled* universe and its cycle!
Such a mathematical model is an indispensable calibrator for all astrophysical measurements!
A practical and absolutely essential framework for the interpreters of all measurements from space!

5.4 IN THE NETHERLANDS IS ADEQUATE KNOWLEDGE PRESENT FOR THIS MATHEMATICALLY MODELLING OF THE CYCLE OF THE UNIVERSE:
Just in **The Netherlands** there are dozens of scientist's capable modeling this universe and its cycle. This requires approximately one - two year, 5 – 10 scientists and a total of 5 – 10 man years.
This modeling could be achieved through a partnership between universities and their academic institutions. Of course international cooperation is possible as well. (Universities, ESA, ESTEC, CERN)

-) Universe model for verifying measurement data:
On the basis of such a quantitative presented universe model both the entire past of the universe as well the whole future of this universe can be quantified in detail! Such a model unveils at any desired moment an in detail filled universe both qualitatively as quantitatively!
That is an indispensable tool for interpreting and testing of all the measurement data from inside the Milky Way galaxy as well from outside in the deep universe in the universe-sphere-shell!

*6) DISCUSSION: RESULT AND THEORY OF GRAVITATION / GRAVITATION ENERGY:

6.1 ADJUSTMENTS FOR IONIZATION ATOMS:
At high temperature and high cosmic velocities the atom becomes greatly deformed by ionization. This involves atoms with a total or partial loss of 'shell'-electrons. These 'shell'-electrons lose their ability to generate gravity as well to receive and absorb these gravitational 'radiation' from outside.
This loss of gravity also results in a loss of the connected gravitational energy. As a result in stars there is more mass and matter present than measured at the outside of the star on the basis of gravity of this star.

6.2 AT NUCLEAR FUSION GRAVITY DISAPPEARS AND THUS GRAVITATION ENERGY:
During nuclear fusion 'shell'-electrons are transformed into 'core'-electrons together with released energy in the form of speed and photons. These 'core'-electrons lost their ability to generate gravity and gravitational energy. During its lifetime all stars loses gravity, weight and gravitational energy as well!

The shaped helium-4 atom as a fusion product of 4-H atoms only 2 of the original 4 'shell'-electrons remain. Only these two remaining 'shell'-electrons still generate gravity. The two electrons merged with the atomic nucleus as 'core'-electrons don't generate gravity anymore. The gravity generated by helium atoms is only 50% of the gravity generated by the original 4 H atoms! The gravity, the weight and gravitational energy is halved. The mass however remains more or less constant!

From a distance, it seems like mass has disappeared while according to the author in fact only gravity is disappearance and thus weight! Measure technical seen pretty much the same result. *The interpretation of the observation however is based on a world of difference!*

As a result of nuclear fusion in the sun and other stars, the number of 'shell'-electrons in stars and in galaxies decreases in time and thus the gravity (and correspondingly the gravitational energy).

6.3 PLANETS MOVE IN EVER WIDER ORBITS AROUND THEIR STAR:

By fusion all the stars lose more and more and finally up to a maximum 61.8% of their 'shell'-electrons in the case of forming U_{238}. Then 38.2% of the original 'shell'-electrons of hydrogen are over. During this nuclear fusion process in stars the surrounding planets roughly keep the same amount of 'shell'-electrons and thus the same amount of gravity.

The loss of gravity of the star of > 50 – 60 % results in a process where these planets get very slowly in wider orbits around their star! This is also actual to the sun and the distance sun - earth. This is experimentally observed by astronomers.

6.4 THE ALLEGED 'DARK' MATTER:

The author derived in this **documents E3 and E3-1** the origin of gravity. The universe-sphere-shell and therefore necessity of adding a factor **cos α** to the gravitational formulas of **Einstein** and **Newton** will lead to a full review of the mass / matter and energy balances of the universe.

Einstein's gravitational formula with **cos α included** all missing mass and matter will be found. This also results in 4 – 6 x more kinetic energy and gravitational energy for example:

a) gravitational energy relative to the **center C** of the universe.

b) rotation gravity of the central black hole is present in the center of all galaxies,

c) rotation gravity present in all facet areas versus the 9 – 10 there present reference points in these facet area's.

With these solutions enough gravity will be found to fill all so-called 'dark' matter and even all 'dark' energy (= gravitational energy). By modelling the universe and cycle of the universe these concepts are to fill completely quantitatively. The concepts of 'dark' matter and 'dark' energy will disappear completely from Science within a few years.

*7) CONCLUSIONS:

1) In universe gravity / gravitation is a real physical force bus not always present during the cycle of the universe. During the first 5 – 10 billion year after the super cold Little Bang only loose protons and electrons are present. In that beginning atoms are absent and so gravity and gravitational energy are absent as well. After this period hydrogen is formed and so gravity and gravitational energy came back in the universe that in reality has the structure of a universe-sphere-shell.

2) Gravity as force is *only* generated by atoms and only by the 'shell'-electrons of atoms together, but separately, with two different physically and two chemically forces. Gravity and these other four forces are the result of velocity / kinetic energy of the atom in the universe within the universe-sphere-shell.

3) Gravity and thereby indirectly gravitational energy is caused by the same 9 – 11 different forms of (angular) speeds of atoms present within all equally 4 - 20 million facet areas of the universe-sphere-shell. All facet areas together constitute this perfect round universe-sphere-shell that is expanding now at some 450 Mm/s. Gravity slows down this expansion speed of the universe-sphere-shell towards zero in about 350 – 450 billion year.

4 Each (angular) speed in every facet area of the universe is linked to his own point of reference. Each kind of speed within each facet generates its own gravitional component on atoms! Now gravity of the 'shell'-electrons is everywhere built up from the same 9 - 11 components. Gravity has an extremely complex composition and structure.

5) The two physically and two chemically forces and their associated bonds are also generated by the 'shell'-electrons and electron pairs of atoms and are primarily associated with kinetic energy. They are built up from the same 9 - 11 force- and bond components.
All these five forces and their bonds can be split quantitatively in their 9 - 11 components from which they are constructed as soon as these 9 – 11 nowadays speeds of atoms in the universe are quantitatively known! *Here a direct link exits between speeds of atoms in the universe and quantum mechanics!*

6) Gravitation is *linearly related to speed* of atoms in universe. This applies indirectly also for gravitational energy!
The other physically and chemically forces are *linearly related to kinetic energy* and thus *quadric to* speed of the atom in universe! For this reason, gravitation is so much weaker than the other forces of atoms in nature.

7) In 2017 the current gravitation formulas of **Newton** and **Einstein** are only applicable within a single galaxy. Outside the Milky Way and on the scale of the universe-sphere-shell these gravitation formulas are only to be used in case a factor **cos α** is added to these formulas.
This factor **cos α** is the concrete realization of **Einstein's** curvature of space-time and is in fact the correction for the curvature of the universe-sphere-shell. Within the Milky Way this curvature is near zero and **cos α = 1.0000.**

8) The effects of the correction factor **cos α** grows as the distance between galaxies in the universe-sphere-shell increases and thus the angle α increases. On the universe-sphere-shell **cos α** first goes down to 0 and then sinks further to -1 for the opposite of the universe-sphere-shell. (See **Figures E3-1**)

9) With the factor **cos α** added to **Einstein's** gravitational formulas this results in a universe with much more gravity and thus in 4 – 6 times more mass / matter and kinetic energy present than calculated until 2017 without **cos α**. This also means that at least 4 à 6 times more gravitational energy is present in universe!

10) The currently missing 'dark' mass / matter and part of this 'dark' energy on balances of the universe sheets is (almost) entirely due to lack of this correction **cos α** in the used current used gravitational formulas.

11) Gravitational energy follows the development and building of gravity / gravitation. To establish this gravitational energy not only the 9 – 11 speeds and related components of gravity should be known but also the 9 – 11 distances relative to **center C** and to the 8 à 10 different rotation centers that are now

present in every facet area within the universe-sphere-shell. Therefore, gravitational energy is even much more complex in layout and structure than gravity itself.

12) The rest of the missing 'dark' energy is entirely due to gravitational energy with respect to: a) the **center C** of the universe, b) the **rotation center R1** of the galaxy, c) **the R1's** within every facet part of the universe and d) relative to **stars, planets and satellites.** That missing 'dark' energy is simply gravitational energy!

13) The explanation of the author for the phenomenon of gravity and necessity for adding **cos α** to formulas both the mass balance and energy balance of the universe to fully throbbing.

14) In the universe and during the cycle of the universe at any moment there is *no 'dark' mass / matter nor 'dark' energy*. All mass, matter and energy can be rather simply explained. These current concepts will completely disappear from scientific research.

15) The number of speeds and the distances in the universe change in time during the cycle of the universe and so changes the related gravity and gravitational energy.
Quantitatively that changes in speeds and distances can only be solved by modeling the universe and the universe cycle. That mathematically model is based on: the 29 phases of the whole cycle (**G7 + G8**), the 12 basic parameters of the universe (**G3**), and within the frameworks of the nine Laws of the universe. (**G4).**

16) The author gives an explanation:
a) the origin and cause of gravity and gravitational energy,
b) the need for addition of **cos α** to gravitational formulas as compensation for the curvature of space
    (= **Einstein's** space-time) and
c) the structure of the currently observable universe as a universe-sphere-shell with a fixed **center C.**
That requires for astrophysicists to develop a mathematically model of the universe and its cycle. They have to adjust their own models radically.

*8) COPYRIGHT:

The author started his website www.uiterwijkwinkel.eu in 2007 his documents in Dutch and also translated into English. The quality of these translations requires the necessary care and efforts!

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APPENDIX 1: OUTLINE STRUCTURE AND THE UNIVERSE AND UNIVERSE CYCLE:

1) ONLY PROTONS AND ELECTRONS ARE RELEASED AT THE SUPER COLD LITTLE BANG SOME 40 – 45 BILLION YEAR AGO:

-) Increase physical space between protons and electrons:
At the Little Bang, some 40 – 45 billion year ago, the giant Little Bang black hole with a diameter of 50 - 100 million km around **center C** of the universe at *zero degrees Kelvin* fell directly apart into an equivalent number of protons and electrons. See document **G6.**
During the Little Bang these freed protons and electrons arrange themselves in a giant sphere consisting of mono-layers with loose protons and loose electrons. In this mono-layers there is an extremely high electrical and magnetic repulsion and spring tension. Because of this electrical spring tension within these mono-layers this system of mono-layers expands from **C** on all sides with similar speed of $1/3^{th}$-$1/2^{th}$ the speed of light c.
In addition, only the electrons also rotate within their monolayers at a speed of $2/3^{th}$ c around the **center C** of the universe; the protons don't rotate within their own mono-layers. See **document G6 + figures in G8** www.uiterwijkwinkel.eu .

In the first period of 5 - 10 billion (10^9) years only loose protons and electrons are present. The atom is completely absent. So gravity and gravitational energy and are 100% absent as well.
As long as the atom and thus gravity is absent, these mono-layers of protons and electrons expend from **C** without gravitation and thus completely unhindered with $1/3^{th}$-$1/2^{th}$ the speed of light c!

As a result of the expansion of the universe-sphere-shell versus **C** in this period increases:
a) both the space between these mono-layers of protons / electrons as
b) the distances between protons and electrons within these mono-layers.

After the first 5 à 10 billion years the inter-space between the protons and electrons is increased in such way that each proton gets sufficient space around to catch its own 'shell'-electron. This results universe wide at exactly the same moment in the formation of exclusively hydrogen atoms.
These hydrogen atoms transfer directly into hydrogen molecules. With that hydrogen atom / molecule in combination with (expansion) speed in de universe all kinds of physical and chemical forces are generated on hydrogen including gravity. See **documents F1c + F1d**.

2) FREE OF CHARGE ADDED GRAVITATIONAL ENERGY TO THE UNIVERSE AS DRIVING FORCE OF THE CYCLE OF THE UNIVERSE:
This hydrogen was formed already 35 - 40 billion (10^9) years ago and 5 à 10 billion years after the Little Bang. The forming of hydrogen took place at the expansion velocity v_{ex} of the universe of $1/3^{th}$-$1/2^{th}$ the speed of light c. At that moment the radius of the expansion of the universe-sphere-shell around **center C** was already 2.5 - 3 billion lightyears and that distance was reached without any form of inflation!
Because gravity was completely absent this expansion didn't cost any energy and was completely free of charge!

-) The hydrogen atom / molecule created from scratch a huge amount of *gravity*:
This enormous expansion velocity v_{ex} results to all the hydrogen atoms in a large deviation in the orbits of all just entrapped 'shell'-electrons. These entrapped 'shell' electrons themselves committed for a perfect round orbit around the proton core of only one electron thin.
This 'shell'-electrons react to that, by speed induced, deviation by generating *gravity* and separately covalent chemical radical force. Hydrogen atoms than transfer directly into hydrogen molecules. This newly formed electron pair of the hydrogen molecule generates a new force: the van der Waals force / London force. See **F1d.**
Since the forming of the atom / molecule gravity continues to inhibit the expansion of the universe-sphere-shell down and finally to a complete standstill over 350 – 450 billion year from now.
After that gravity eventually brings back all atoms back to the **center C** of the universe in the form of black holes and black hole atoms. Coordinated by gravity they are delivered simultaneously at **C** again.

-) The hydrogen create from scratch also an enormous amount of *gravitational energy*:
With this hydrogen and its gravity a huge amount of *gravitational energy* compared to the **center C** is 100% free of charge added to the universe and to this universe cycle. This gravitational energy is the driving force / engine behind the return of all the atoms / molecules to the **center C**. This gravitation energy is the driving force behind the completion of the whole universe cycle.
(Due to this 100% free added gravitational energy the Laws of conservation of energy and momentum has lost all value on the scale of the universe and its cycle! The law of conservation of mass and matter, in principle stands!)

-) End of free buildup of gravitational energy:
With gravity the free of charge built up of potential energy compared to **C** stops abruptly. Through a *mathematically universe model* is to calculate how big this 'added' gravitational energy (the amount of gravitational x distance versus **C**) should be minimal to add enough energy to the universe-sphere-shell to go through and finish the whole cycle.

Gravity ensures that the velocity of matter (atoms / molecules) in the universe relative to **C** is decelerated. This results in the conversion of kinetic expanding energy into rotational energy of all nowadays present galaxies. Gravity will initially collect all matter in each of those 4 - 20 million facet areas first in local galaxies and eventually together in one big central facet black hole. That moment coincides with the maximum expansion of the universe-sphere-shell.
Under the influence of gravity and coordinated by gravity those 4 - 20 million *facet black holes* turn back to the **center C** of the universe. Gravity keeps all matter in the universe together. The connected gravitational energy is the driving force for the completion of the cycle of the universe. It takes 2.5 - 3.5 trillion (10^{12}) years before this fully shrinking the universe-sphere-shell has been realized. That contraction of the universe-sphere-shell is completed with the next Little Bang and start of next universe and universe cycle.

3) FREE OF CHARGE STRUCTURE OF POTENTIAL ENERGY FOR THE PERIOD WITHOUT GRAVITY:

-) Each cycle generates its own gravitational energy to settle the entire cycle:
The period with only protons and electrons there are *no atoms and thus no gravity and no gravitational energy*. This first period of expansion without atoms and gravity takes 5 - 10 billion years to complete. During that period there is, physically seen a *completely free* built up of gravitational energy relative to the **origin C** of the universe / the universe-sphere-shell.
This newly formed hydrogen atom / molecule moves from **center C** with $1/3^{th} - 1/2^{th}$ the speed of light *c*. That speed results in large deviations in the path of the newly captured 'shell'-electrons. As protest all 'shell'-electrons generate a tremendous amount of gravity and thus correspondingly a lot of gravitational energy compared with **C** as well! (For the physicists anno 2017 this vision is perhaps unpalatable. Then the Laws of conservation of energy and momentum don't apply any longer on the scale of the universe and its cycle!)

With each cycle, the universe this *gravitational energy is* 100% *free of charge* added. This gravitational energy is the engine for passing through the next steps and finally all steps of the whole universe cycle. The universe / the universe-sphere-shell as a whole is thus a ***perpetual motion machine***!

The cycle starts with a super cold Little Bang (**G6**) and without E = mc². This Little Bang is a super cool alternative to the Big Bang. Only in **step 16** of the universe cycle (**G7**) and about 15 - 20 billion years after the Little Bang (**G6**) and 20 - 25 billion years ago all galaxies started simultaneously with their own super-hot Big Bang!
The **center C** of the universe is and remains the only and always exactly the same *mass center point of* the universe-sphere-shell and of all previous cycles and all coming universes.

4) PURPOSE GRAVITY AND GRAVITATIONAL ENERGY:
Gravitational aims all the atoms in the universe:

1) Universe widely to concentrate all mass and matter to the local **center R1** of the current galaxy by mutual collisions between stars and planets.

2) In all facet area's to concentrate all now present 250 - 500 or more galaxies and their central black holes in one central facet black hole by mutual collisions between these galaxies. This process takes the next 350 - 450 billion years to complete; gravitation continues to slow down this expansion of the universe-sphere-shell towards zero.

3) At the end of expansion, the universe is without any radiation and is completely dark. The universe-sphere-shell then consists of 4 – 20 million central facet black holes. All rotation axes are exactly focused at the **center C** of the universe.

4) Gravity brings back all central facet black holes eventually simultaneously back to the **center C** of the universe. In the meantime the angular speed of the black holes is decreasing very slowly.

5) Around **center C** all 4 - 20 million facet black holes are melting together into a single Little Bang black hole which gets a radius of 50 - 100 million km containing all mass, matter and kinetic energy of the universe.

6) In the last phase, all speeds is decreasing are decreasing to zero, and thus the gravity and the gravitational energy of this gigantic Little Bang black hole drops to zero.

7) At the end of the formation of the Little Bang black hole the total gravity meets the *Critical black hole gravity* (**Cribgra**). Then the next Little Bang occurs and starts the next universe.

8) Gravitational energy is the driving force and engine for the universe to go through its full cycle.

-) Effects of gravity and collisions between galaxies in the universe cycle:
a) In stars by nuclear fusion all hydrogen, helium and lithium is converted into Be and higher, Only atoms ≥ Be can be incorporated into a black hole and finally the central black hole of the galaxy.
Thus the elements H, He and Li cannot enter a black hole! These elements stay all outside the black hole! Through nuclear fusion to Be and higher these light atoms are preserved and made suitable for incorporation into a black hole of the galaxy.
This nuclear fusion of hydrogen however is accompanied by a loss of 'shell'-electrons and thus loss of gravity and gravitational energy!

b) Since approximately 25 billion years and the next 250 - 350 billion years, all neutrinos and photons emitted by stars will be transformed into protons, electrons and hydrogen again. That upgrading process from neutrino's and photons to new hydrogen stakes about 14 à 18 billion years (**F1c**). This process destroys all older information of the universe!
Out of that newly constructed hydrogen new stars are formed where hydrogen is converted by nuclear fusion is transferred into He, Li, Be and higher. Only ordinary atoms ≥ Be that can transfer into black hole atoms / matter and can be accepted by a black hole,
In the meantime all neutrinos, photons from stars are transferred into hydrogen and by nuclear fusion in stars transformed into beryllium and finally absorbed by one or the central black holes of the remaining galaxies. (All black holes in fact are the vacuum cleaners of the universe!)

c) All in stars / planets present H, He and Li remains outside this central black hole. Through nuclear fusion in the central hot zone of the galaxy these atoms are transformed into Be and higher. Only Be and higher are acceptable for the central black hole of the galaxy.

d) The universe-sphere-shell consists of 4 - 20 million almost identical facet area's each containing 250 – 500 or more galaxies. By collisions the 9 – 11 angular velocities of these galaxies gradually decreases in time and they finally come in orbits closer around the central black hole of the facet area.

In every facet through mutual collisions between galaxies gravitational adds all 250 - 500 central holes of the galaxies are brought together in finally *one central facet black hole*. In every facet area, in the past and the future this means some 300 - 500 or more collisions between galaxies and their central black holes!

e) At the end of the expansion over 350 – 450 billion year in all facet areas by collisions of galaxies all now present 200 – 500 present galaxies are reduced into one super black hole with only one angular speed. All rotation axis are pointed at **C**. See **Figure 1 in G8.** That process coincides with the reduction of the expansion speed of the universe to zero.
At the end of the expansion no loose neutrinos, photons and normal atoms are present anymore. The universe is 100 % dark and without electromagnetic radiation. Then universe-sphere-shell reached its maximum expansion and the universe its maximum space with everywhere the same radius of about 2.5 at 3.5 billion light-years compared with the **center C.**

f) Then all the expansion energy is converted into rotational energy and rotational gravitational energy. Gravity then turn around simultaneously downsizing the universe-sphere-shell consisting of 4 à 20 million super-size central facet black holes rotating with $1/3^{th}$– $1/2^{th}$ the speed of light c.
However, the speed of rotation of these facet black holes and connected gravity is directed oppositely to the shrinking velocity and thereby associated shrinking gravity. After a first initial acceleration the shrinking velocity will asymptotically increase to a constant shrinking speed of 100 - 150 Mm/s. This prevents a Big Crunch of the universe-sphere-shell!

g) This inhibition of the acceleration of the shrinking speed comes at the expense of the rotation speed and rotation gravity and associated gravitational energy of these millions central facet black holes This constantly shrinking takes 2 - 3 trillion (10^{12}) years to complete. At the end of the contraction all central facet black holes rotate slower and slower. At the end of the contraction of the universe=sphere-shell they don't rotate at all anymore.
During the contraction their angular speed is decreasing and so their gravity and gravitational energy is decreasing as well. In de meantime the distances between these central facet black holes on the shrinking universe-sphere-shell are diminishing as well. The net mutual attraction remains more or less the same and thus the shrinking velocity of the universe-sphere-shell! The total gravity of the universe-sphere-shell is decreasing and thus the amount of gravitational energy of this universe-sphere-shell versus C!

h) Driven by gravity all facet black holes bring all the mass / matter and kinetic energy of the universe back to the **center C**. Coordinated by gravity these black holes return *simultaneously* at the **center C** of the universe where they merge into one gigantic Little Bang black hole that has a diameter of 50 - 100 million km or more.

i) The loss of speed and thus gravity and gravitational energy, however, still pending further. Eventually, the gravitation of this Little Bang black hole decreases to the point of the **Critical black hole gravity** (**Cribhgra, G6**) is reached.
At that moment the repelling of the electron shells of the black hole atoms becomes larger than the gravitational force that literally held captive these black hole atoms in this black holes and captured in the Little Bang black hole.
At that moment the gravity meets **Cribhgra** the next Little Bang takes place. At that moment all black hole atoms exactly the same moment become instable. All black hole atoms disintegrate in four steps *directly* into an equivalent number of protons and electrons. No $E = mc^2$! The next universe starts with exactly the same equivalent number of protons and electrons! See documents **G6, G7, G8 and figures**.
One total *energy-neutral cycle* of the universe requires 29 steps / phases and takes 2.5 - 3.5 trillion (10^{12}) years to complete!

APPENDIX 2: EINSTEIN FORGOT TO ADD A FACTOR COS α TO HIS GRAVITATIONAL FORMULAS:

1) THE UNIVERSE-SPHERE-SHELL REQUIRES ADDING A FACTOR *COS* α TO THE GRAVITATION FORMULAS BY NEWTON AND EINSTEIN:

Newton connected gravity to mass. Two centuries later **Einstein** associated gravity in a more *mathematically way to the curvature of space-time* and thus connected gravitational energy to that concept.

When **Newton** and **Einstein** developed their theories and gravitation formulas both had however no idea about: a) the structure of the universe, b) the structure of the atom, c) let alone the effects of speed in the universe on the atomic and d) specifically the effects of speed in the universe on the orbits of 'shell'-electrons of atoms.

Although based improper the **fourth law of Newton and Einstein's formula** in practice are very well applicable to the scale of a solar system and even on the scale of one galaxy. That is because of the direct link that exits between the number of 'shell'-electrons of present atoms and the amount of mass of a celestial body!! However a link lacks between gravity with speeds of atoms in the universe.

Unfortunately, **Einstein** forgot to adapt the curvature of the space / the universe-sphere-shell by adding a **factor cos α** to his gravitational formulas**.** This _α_ is the angle between two objects on the universe-sphere-shell with respect to the **center C** of the universe.

-) Within one galaxy cos α = 1.0000:
Without that factor **cos α** the fourth Law of **Newton** and the usual gravitational **Einstein** formula only apply within one galaxy, and for us on Earth only within the Milky Way. Within our galaxy there is still no real curvature of space and in the universe-sphere-shell. So within our galaxy **cos α = 1.0000**.

-) In the universe-sphere-shell this factor _cos α_ first sinks to 0 and further sinks to -1:
Outside the Milky Way however, this factor **cos α** has to be added to gravitational formulas to compensate the curvature of space / the universe-sphere-shell.
Beyond our galaxy **cos α** first goes down to zero and sinks even up to -1 for the opposite of the universe / the universe-sphere-shell. See **Figure 36 G8 and the comparable figure in E3-1**.

In **document E3 www.uiterwijkwinkel.eu** the general law of gravitation is derived for the scale of the universe. The in **E3** derivative gravitational formulas by **Franklin Roos** are based on numbers of 'shell'-electrons of atoms and speed in the universe. In those formulas this **factor _cos α_** is added.

-) Lack of this factor cos α results in large deficits on mass, matter and energy balances of the universe:
The shortfalls (2017) on the mass, matter and energy balances of the universe arise mainly because in the current gravitational formulas of **Newton** and **Einstein** this factor **cos α** is missing. With that factor **cos α** added to the current gravitational formulas by **Newton** and **Einstein** the universe / the universe-sphere-shell is containing 4 - 6 times as much gravity and thereby correspondingly well as 4 - 6 times as much mass, matter and kinetic energy is being calculated. Omission of this factor **cos α**, Science put themselves quite the wrong way up till now (2017).

-) From the current universe image lacks the need adding a factor _cos α_ to the gravitational formulas of Newton and Einstein:
We see a universe that is apparently expanding in all directions even faster and faster. That image unfortunately is based on optical illusions. We can only observe the deep universe through the thin wall of the universe-sphere-shell and there present extremely low concentrations of hydrogen and helium. **See G9.** The observed deep universe on Earth in fact is almost entirely based on virtual images.

2) ADDING COS α SOLVES ALL PROBLEMS WITH 'DARK' MATTER AND 'DARK' ENERGY:
With that *factor cos α* added to the formulas the universe-sphere-shell is correspondingly containing a 4 – 6 fold as much gravity and 4 - 6 times more on *mass / matter and kinetic energy* than calculated without *cos α.*

The author provides therefore a very simple and physically conclusive explanation for both the alleged 'dark' mass / matter as well already a large part of the supposed 'dark' kinetic energy. The rest of those missing 'dark' energy in the universe is nothing else but *gravitational energy*!

-) Modelling universe and cycle of the universe results in a totally different view:
The universe cycle of the author will require astrophysicists to take more distance from the theory of relativity and a differently look at the currently observable universe, its history and the changes occurring therein. Current mathematical models should be adapted drastically! Most is that all measurement results from deep universe can be places against a fully quantified universe!