PYTHAGOREAN NATURE

F. M. Sanchez

April 16, 2023

Abstract

Crucial Pythagorean scientific developments, checkable by everyone, have been missed, refuting the Universe expansion and the initial Big Bang model, imposing the cosmological steady-state model. The single electron cosmology gives a close estimation of the Hubble length, meaning the matter is in fact a matter-antimatter oscillation in a Permanent Bang cosmology, where dark matter is an out of phase oscillation. The nuclear fusion cosmic model gives the background temperature 2.73 Kelvin, validating the Hoyle’s prediction of permanent neutron creation, an ultimate limit of physics. The Diophantine treatment of the Kepler laws induces the Space-Time quantification in a Total Quantum Physics, pushing back the Planck wall by a factor $10^{61}$, resolving so the vacuum energy dilemma. The three-body gravitational hydrogen model explains the Tachyonic Three Minutes Formula giving half the Hubble radius, thus its critical mass, showing the Universe is a Particle in the Cosmos, whose radius is deduced from holographic Space-Time Quantification. The Kotov Doppler-free oscillation rehabilitates the tachyonic physics of the bosonic string theory in the Octonion Topological Axis prolonging the Quaternion Periodic Table, implying the string-spin identification and gives $G$, compatible with the BIPM measurements but $2 \times 10^{-4}$ larger than the official value. This confirms the Higgs mass is tied to the third perfect couple 495-496. The so-called "free parameters", as well as the Archimedes pi, are confirmed to be computation basis, in liaison with the Holography and Holic Principles, opening the way to a revolution in mathematics where the Happy Family of the sporadic groups and the Egyptian Nombrol 3570 are central. The parameter values are deduced in the ppb domain by Optimal Polynomial Relations involving the Large Lucas Prime Number, the forth (last) term of the Combinatorial Hierarchy. The photon-neutrino background manages to divide this prime number by holographic terms respecting the symmetry electron-hydrogen. The data analysis rehabilitates the Wyler’s and the Eddington theory, which predicted correctly the supersymmetry Proton-Tau. The tachyonic synthesis defines the Neuron, the characteristic time of the neuro-musical Human, corresponding to 418/8 Hz, three octavus down the La bemol for the chording 442.9. The Total Quantum Physics introduces the Human Measure Mass $\times$ Heigth, and connects with the Solar system, the CMB and the DNA through musical scales, introducing the Cosmobiology where the CMB is identified with the genetic code of the Universe. The classical Anthropic Principle is replaced by the "Solanthropic" one, meaning the triplet Solar System - Earth - Human is alone in the Cosmos. In the general Devolution scheme, opposite to the Darwin’s myth and explaining the fall of the official science, this predicts a total of Human beings of 38 billions.
Contents

1 THE MISSED PHYSICS 3
  1.1 The Single Electron Cosmology: oscillation matter-antimatter . . 3
  1.2 The Universe as a fusion reactor . . . . . . . . . . . . . . . . . . . . . 4
  1.3 The Diophantine Kepler Laws, the Cosmos and the Topon . . . . 8
  1.4 The Three Minutes calculus . . . . . . . . . . . . . . . . . . . . . 10
    1.4.1 The Gravitational di-hydrogen Model . . . . . . . . . . . . . 11
    1.4.2 The Universe ("Hubble-Lemaître") radius . . . . . . . . . . 12
    1.4.3 The Hubble constant . . . . . . . . . . . . . . . . . . . . . . . 12
    1.4.4 The steady-state cosmology single temporal parameter . . . 12
    1.4.5 The Eddington statistical radius . . . . . . . . . . . . . . . . . 13
    1.4.6 The Eddington’s Large Number Formulation . . . . . . . . . 13
    1.4.7 The Critical Mass Canonical Relation . . . . . . . . . . . . . 13
    1.4.8 The Cosmic role of the Weak Bosons . . . . . . . . . . . . . . 13
    1.4.9 The Connection with the Single Electron Cosmology . . . . . 14
  1.5 The Holographic Background . . . . . . . . . . . . . . . . . . . . . . 14
  1.6 The Kotov tachyonic oscillation . . . . . . . . . . . . . . . . . . 15
  1.7 The prophetic Eddington’s Fundamental Theory . . . . . . . . . . . 16
  1.8 The Temporal Fermi Cosmic Connection . . . . . . . . . . . . . . . . 16

2 THE INDUCTIVE SCIENTIFIC METHOD 18
  2.1 The Optimal Correlation Principle . . . . . . . . . . . . . . . . . . 18
  2.2 The Optimized Gravitation Constant . . . . . . . . . . . . . . . . 18
  2.3 The Universe as a mono-atomic star . . . . . . . . . . . . . . . . . 21
  2.4 The pertinence of the Eddington’s 136 and 137 . . . . . . . . . . . 21
  2.5 Musical Relations implied by the Kotov Tachyon . . . . . . . . . . 22
  2.6 The Combinatorial Hierarchy . . . . . . . . . . . . . . . . . . . . . 23
  2.7 The Physical Musical Frequency . . . . . . . . . . . . . . . . . . . 24
  2.8 The Decisive Egyptian number \( \tau_0 = 3570 \) . . . . . . . . . . . 24

3 HOLOPHYSICS 25
  3.1 The Holographic Principle . . . . . . . . . . . . . . . . . . . . . . 25
  3.2 The Holic Principle . . . . . . . . . . . . . . . . . . . . . . . . . . . 26
    3.2.1 The Holic-Holographic mono-electron radius \( R_1 \) . . . . 27
  3.3 The Musical Cosmic Holography . . . . . . . . . . . . . . . . . . . . . 27
  3.4 The Higgs number and the Economic Formalism . . . . . . . . . . . 28
  3.5 The Tachyo-Holography, Photon and Graviton Masses . . . . . . . 29
  3.6 The Wien constant and the Bernouilli Function . . . . . . . . . . . 30
  3.7 The Eddington’s Hyper-Symmetry Proton-Tau . . . . . . . . . . . 31

4 DIOPHANTINE PHYSICS 32
  4.1 The Systema Number and the Great Musical Scale . . . . . . . . . . 32
  4.2 The Cosmic Axis and the Bosonic String Theory . . . . . . . . . . . 33
  4.3 The red-shift periodicity . . . . . . . . . . . . . . . . . . . . . . . . 34
  4.4 The rehabilitation of Wyler’s Formulas . . . . . . . . . . . . . . . . 34
  4.5 The Symbolic Holographic Principle . . . . . . . . . . . . . . . . 35
  4.6 The Electric \( \pi_q \) value . . . . . . . . . . . . . . . . . . . . . . 36
  4.7 The Lucas and Euler Large Mersenne Numbers . . . . . . . . . . . 36
  4.8 The Electrical Moonshine . . . . . . . . . . . . . . . . . . . . . . . 37
1 THE MISSED PHYSICS

The official physics have missed several elementary, but crucial approaches. In particular, this is due to a much excessive confidence to present mathematics, which is always unable to explain the 30 or so "free parameters". Only Eddington explained the origin of the number 137 in physics, but as soon as the electrical constant $\alpha \approx 137.0359991$ appeared to be slightly different, the officials rejected the Eddington Fundamental Theory. This forgetting of the Science history (for instance the atomic masses was not exactly whole multiples of the hydrogen mass) implied the present crisis in Physics.

1.1 The Single Electron Cosmology: oscillation matter-antimatter

According to a famous discussion between Wheeler and Feynman [10], the former proposed that the best explanation for the identity of electrons is to admit there is only one such Electron, which rapidly sweeps the landscape, with transformation in a Positron at each backward time passage.
The distribution of the Haas-Bohr trajectories obeys the $n^2$ factor. A space paving would be more natural through a series of spheres whose radius follows the direct $n$ rule. So we consider the following dynamic paving, checking

$$2\pi m_e r_n v_n = h,$$

$$r_n = n\lambda_e$$
$$v_n = c/n$$

Suppressing the first orbit where $v_1 = c$, and assuming a classical $1/r^2$ probability, the mean radius would identifies with the Hass-Bohr radius for a limiting radius $R_1$ such that:

$$r_{HB} = \sum_{n=2}^{\infty} \frac{R_1}{\lambda_n} \frac{1/n}{1/n^2} \Rightarrow R_1 \approx 1.49365473 \times 10^{26} \text{ m}$$

This induces a rapid oscillation matter-antimatter resolving at last the antimatter problem. To answer the objection of Feynman that there is no balance between the electron and positron number, Wheeler answered that the positron could be hidden in the proton. Of course, this balance is granted in our mater-antimatter oscillation.

Moreover, $R_1 \approx \sqrt{R_{HB,\text{hot}}}$, and from $p_{\text{hot}} = (4a^4/3)^{1/2} \approx (\pi)^2 \sqrt{a}$, the elimination of $l_K$ and $\sqrt{a}$ leads to the ppb holographic relation:

$$(4\pi q / 3)(aa_w)^3 \approx 4\pi q_{a/\mu} (P/a)^2$$

where $\pi q_{a/\mu} = 3 + 1/(7 + \mu / \tau d_e)$. This confirms the above symbolic holographic principle, specifying the $\pi q$ value, so the electric charge adimensional value $q = \sqrt{4\pi q / a}$ in the ppb range.

A detailed study suggests that the dark matter is a dephased matter-antimatter oscillation.

### 1.2 The Universe as a fusion reactor

Arguing for the steady-state cosmology, Thomas Gold proposed that the Universe can be thought as a fusion reactor transforming Hydrogen in Helium in an on-going process [14], for which the energy efficiency is $1 - m_{He/4m_H} \approx 1/140$.

This would imply the existence of a background field. From the total critical mass $M = \rho c^2 / 2G$, the critical mass density is $\rho_{cr} = 3c^2 / (8\pi G R^2) \approx 9.5 \times 10^{-27} \text{ kg m}^{-3}$. Taking account of the baryon relative density of 0.045, and a Helium mass ratio of about 0.25, this means a mass density of Helium of about $0.25 \times 0.045 \times 9.5 \times 10^{-27} = 1.06 \times 10^{-28} \text{ kg m}^{-3}$, and the radiant energy released by the fusion process has for density $(1/140) 1.06 \times 10^{-28} c^2 \approx 6.4 \times 10^{-14} \text{ J m}^{-3}$.

Equalizing this density with the black body energy density $(\pi^2 / 15)(kT)^4 / (hc)^3$ leads to $T \approx 3.0 \text{ K}$. Taking account of the above neutrino field, the factor $\pi^2 / 15$ must be replaced by 1.106, leading to a temperature 2.7 Kelvin, sufficient close to the real value to furnish a strong argument in favor of Coherent Cosmology.

But it was not published at this epoch, because the two other co-authors, Hoyle and Bondi, wanted to precise the thermal mechanism, while Gold argued that Nature is always prolific in producing thermostatic agents. Hoyle recognized later that the whole development of cosmology would have been different if they had accepted the Gold’s idea, without identifying the thermostatic agent: this model not only predicted the background, but also its correct temperature,
which was far from being the case for the Big Bang cosmology. Later, the absence of such an internal agent was used against the steady-state model, while some have invoked iron whiskers [40], but were not convincing. Of course, there is an external thermostatic agent: the Cosmos itself (section 5.2).

The following Letter has been submitted in January 2023 to Astrophysical journals

Steady-state Universe as a fusion reactor
F.M. Sanchez, V.A. Kotov, C. Bizouard, C. Marchal

Résumé : In the steady-state Universe, considered as a nuclear fusion reactor, the thermalized photon-neutrino radiation has a temperature of about 2.7 K, compatible with that of the observed cosmic microwave background and the Galaxy thermalized stellar radiation. It is proposed this background is also an emanation of the external thermostat, i.e. the Cosmos.

Arguing for the steady-state cosmology (Bondy and Gold 1948; Hoyle 1948), Thomas Gold proposed in that epoch that the real Universe can be represented as a fusion reactor transforming hydrogen to helium in a permanent on-going process (see Hoyle et al. 2000). Let us examine his argument on the basis of the most recent cosmological observations (Workman et al. 2022).

The helium mass proportion in the observed Universe is close to 0.24, and the steady-state theory postulates this fraction must be constant in time. According to the hydrogen atom mass, \( m_{H} = 1.00784 \text{ amu} \) (atomic mass unit: 1 amu = 1.66054 \( \times 10^{-27} \text{ kg} \)), and that of a helium atom, \( m_{\frac{1}{2}He} = 4.00260 \text{ amu} \), this fusion reaction is accompanied by the mass defect

\[
\Delta m = 4m_{H} - m_{\frac{1}{2}He} = 4 \times 1.00784 - 4.00260 = 0.02876 \text{ amu}, \quad (4)
\]

with the energy release \( \Delta mc^{2} \), and the corresponding efficiency

\[
\frac{\Delta m}{4m_{H}} = 1 - \frac{m_{\frac{1}{2}He}}{4m_{H}} \approx \frac{1}{140}. \quad (5)
\]

In the hypothesis that any helium atom in the Universe is produced by hydrogen, the value of about 1/140 of its mass must be attributed to radiation. With the Universe obeying critical condition, the total Universe’s mass \( M = Rc^{2}/2G \), where \( R = 1.372(10) \times 10^{26} \text{ m} \) (or 14.5 \( \times 10^{9} \text{ light-years} \)) is the Hubble length (the standard error is shown in brackets, and notations are usual), and this leads to the critical mass density

\[
\rho_{cr} = \frac{3c^{2}}{8\pi GR^{2}} \approx 8.539 \times 10^{-27} \text{ kg m}^{-3}. \quad (6)
\]

Taking into account the baryon relative density of nearly 0.045, and the helium mass abundance ratio of about 0.24, one gets for the permanent helium mass density:

\[
\rho_{He} = 0.24 \times 0.045 \times \rho_{cr} \approx 0.922 \times 10^{-28} \text{ kg m}^{-3}. \quad (7)
\]

Supposing that this density results exclusively from the creation-fusion process, where the steady-state creation produces hydrogen atoms only (or neutrons, with the relative energy release excess of \( (m_{n} - m_{H})/m_{H} \approx 8.3 \times 10^{-4} \)), but no quarks, one gets the released energy density
\[ u_f = \frac{1}{140} \rho_{He} c^2 \approx 5.919 \times 10^{-14} \text{ J m}^{-3}. \quad (8) \]

The cosmic microwave background (CMB) exhibits the thermal equilibrium spectral distribution at the temperature \( T_{CMB} = 2.7255(6) \text{ K} \), corresponding to the black body energy density

\[ u_{CMB} = \frac{\pi^2 (kT)^4}{15 (hc)^3}. \quad (9) \]

The temperature for which the two densities are identical, is

\[ T = \frac{1}{k} \left( \frac{15}{140 \pi^2} \rho_{He} h^3 c^5 \right)^{1/4} \approx 2.97 \text{ K}. \quad (10) \]

But this temperature would be slightly modified if we take into account the neutrino field with the energy density (Ryden 2017, Eq. 5.16)

\[ u_\nu = n_\nu \left( \frac{4}{11} \right)^{4/3} u_{CMB}, \quad (11) \]

where \( n_\nu = 3 \), the number of neutrino species. Thus, the total energy density of the “photon plus neutrino” background is equal to

\[ u_{rad} = \left[ 1 + \frac{21}{8} \left( \frac{4}{11} \right)^{4/3} \right] u_{CMB} \approx 1.68 u_{CMB}. \quad (12) \]

Thus, the factor \( \pi^2/15 \approx 0.66 \) in Eqs. (6) and (7) must be replaced by \( (\pi^2/15) \times 1.68 \approx 1.105 \), producing \( T \approx 2.61 \text{ K} \), remarkably close to the observed value. This gives the strong argument in favor of the steady-state cosmology.

These calculations were not published at that epoch, because the two co-authors, Bondy and Hoyle, wanted to precise the thermal mechanism, while Gold insisted that Nature itself is always prolific in producing thermostatic agents. Later on Hoyle (1948) recognized that the whole development of cosmology would have been quite different if they accepted the Gold’s idea, without identifying the thermostatic agent: besides thermal background, this model predicted as well its correct temperature, which occurred far from that in the case of the Big Bang cosmology. Later on the absence of such internal agent was employed against the steady-state model, while some authors have invoked iron whiskers (see, e.g., Wickramasinghe 2006), but that was not convincing. Recently, it has been showed that the Galaxy contribution to the microwave background radiation has a temperature 2.81 Kelvin (Pecker 2015).

In the standard cosmology, an essential parameter is the ratio between the CMB photon number \( n_{ph} \) over the Universe atomic number \( n_H = M/m_H \). We have noted that this ratio is about the square of ratio between the energy density ratio \( u_{cr}/u_{CMB} \). By taking account of the standard Neutrino background there is a precise correlation:

\[ \sqrt{2n_{ph}/n_H} \approx u_{cr}/u_R \Rightarrow T \approx 2.73 \text{ Kelvin} \quad (13) \]
This formulation is analogous to the statistical one of the Eddington’s critical initial Universe (Eddington 1936), his interpretation to the double large number cosmic correlation, where $m'_e = m_e/(1 + 1/p)$ is the reduced electron mass

$$\frac{\hbar c}{G_m m_p} = \sqrt{M/m'_e} = R/2\lambda_H \quad \Rightarrow \quad R \approx 13.8 \text{ Gly} \quad (14)$$

Strangely enough, Eddington did not remark that the above Large Number is close to the most famous mathematical Large number, the prime Lucas number $N_L = 2^{127} - 1$. The computer shows, with the normalized Fermi mass $F = m_F/m_e$, defined by the Fermi constant $G_F = \hbar^3/m_F^2c$, and with the Single-Electron universe radius $R_1$, which depends only on the Compton electron wavelength $\lambda_e$ and the Bohr radius $r_B = a\lambda_e(1 + 1/p)$, where $a \approx 137.0359991$,

$$p \approx 1836.152673 \text{ and } p_W = 6\pi^5$$

$$N_L \approx (2\pi\lambda_{hot}/\lambda_e)(\pi\lambda_{hot}/\lambda_H)^2 \quad \Rightarrow \quad T_{hot} = \frac{hc}{k\lambda_{hot}} \approx 2.7258205 \text{ Kelvin} \quad (15)$$

$$\frac{F^5}{6} = (\frac{\lambda(F)}{\lambda_e})^3 \quad \Rightarrow \quad T(F) = \frac{hc}{k\lambda(F)} \approx 2.725820(3) \text{ Kelvin} \quad (16)$$

$$\lambda_1 = (p+1) \left( \frac{R_1/l_P}{2\pi p_W} \right)^{1/2} \quad \Rightarrow \quad T_1 = \frac{hc}{k\lambda_1} \approx 2.7258206 \text{ Kelvin} \quad (17)$$

both three values compatible with the measurement $T_{CMB} = 2.725(6)$ Kelvin.

The definition of $R_1$ is recalled

$$R_1/\lambda_e \sum_{2}^{2n} 1/n \quad \Rightarrow \quad R_1 \approx 1.49365473 \times 10^{26} \text{ m } \approx 15.774311559 \text{ Gal} \quad (18)$$

With $m_P$ the Planck mass, the 2 factor in Eq(11) eliminates in

$$m_P^4 \approx M m_e m_p m_H. \quad (19)$$

putting the observable Universe in the same status as a particle. Introducing the Universe Compton wavelength $d = h/Mc$, the critical condition means that the Universe Bekenstein-Hawking entropy writes as a 2D-1D holographic relation :

$$R = 2GM/c^2 \quad \Rightarrow \quad \pi(R/l_P)^2 = 2\pi R/d \quad (20)$$

So the inflation hypothesis is not necessary to explain the critical character.

This has not been emphasized because $d$ is much smaller $(2.5 \times 10^{-61})$ that the Planck length. This may be considered as a Space quantum (Sanchez et al 2022).

The Topological Axis (Sanchez et al 2019) suggests that the Universe is the last gauge boson in an external Cosmos. Moreover, this Hubble radius is compatible with $c$ times the standard so-called universe age, possibly meaning that standard calculations are correct but not their interpretation. In fact the Big Bang idea may be conserved, but not its primordial character, to be replaced by a Permanent Bang, a very rapid oscillation matter-antimatter. So the antimatter dilemma would be resolved.
This Hubble radius is also equivalent to the radius defined in our gravitational hydrogen molecule model, which is characterized by the following holographic formulation, where $l_p$ is the Planck length, $\lambda_e = \hbar/m_ec$, $\lambda_p = \hbar/m_pc$, $\lambda_H = \hbar/m_HC$, $T_{\text{hol}} = \frac{hc}{k\lambda_{\text{hol}}}$

\[
2\pi \frac{R}{\lambda_e} = \pi \frac{\lambda_H}{l_p} = \left(4\pi/3\right) \left(\frac{\lambda_{\text{hol}}}{\lambda_{2H}}\right)^3 \Rightarrow T_{\text{hol}} \approx 2.731 \text{ Kelvin.} \quad (21)
\]

where the term $c^3$ eliminates, both in 1D-2D and the 2D-3D holographic relations. So the simple non-c dimensional analysis starting from $\hbar, G, m_0$, where $m_0$ is the geometric mean between the 3 main atomic particles, electron, proton, neutron, gives directly half the Hubble radius $R/2$. This was deposited in March 1997 at the Paris Academy. And the simple non-c dimensional analysis starting from $\hbar, G, kT_g$ gives $G\lambda^4/(kT)^3$ as the five power of the hydrogen Compton wavelength, with a numerical coefficient close to $8/3$. So, the above 1D-2D-3D holographic relations could have been discovered by elementary study.

The above statistical ratio $11/4$ appears directly in the correlation

\[
\sqrt{R/2\lambda_e} \approx (11/4)(\lambda_{\text{CMB}}/\lambda_e)^2 \Rightarrow T_{\text{CMB}} \approx 2.7266 \text{ Kelvin} \quad (22)
\]

The classical gravitational energy of the critical Universe is

\[
E_{\text{grav}} = -(3/5)Gm^2/c^2; \quad R = 2GM/c^2 \Rightarrow E_{\text{grav}} = -(3/10)Mc^2 \quad (23)
\]

So the separation 0.3 / 0.7 of the Universe energy is quite natural: the proportion 0.7 of the so-called dark energy must be invariant, so identifies with the cosmological constant. Moreover the corresponding atomic number identifies with the Eddington large number $N_{Ed} = 136 \times 2^{256}$

\[
-E_{\text{grav}}/m_HC^2 = 136 \times 2^{256} \Rightarrow R_{Ed} \approx 13.8 \text{ Gly} \quad (24)
\]

Considering the lethal mammal temperature $40^\circ$ Celcius, or $T_{\text{mam}} \approx 313$ Kelvin, and its nominal wavelength $hc/kT_{\text{mam}}$

\[
\sqrt{R_{\text{mam}}l_p} \approx \lambda_{\text{mam}} \Rightarrow R_{\text{mam}} \approx 13.8 \text{ Gly} \quad (25)
\]

This strong anthropic argument was ignored, due to the believing in the variability of the Hubble radius.

The thermalizing process is not yet identified, but we conjecture that our Universe is enclosed in fact in a thermal bath — the real external Cosmos (Sanchez et al. 2019, 2022), which is so directly observable through the CMB field, contrary to the non-scientific multivers.

1.3 The Diophantine Kepler Laws, the Cosmos and the Topon

We have shown that the quantification of Length and Time in Kepler’s laws implies an angular momentum quantum, identified with the reduced Planck’s constant, showing a mass-symmetry with the Newtonian constant $G$. This leads
to the Diophantine Coherence Theorem which generalizes the synthetic resolution of the Hydrogen spectrum by Arthur Haas, three years before Bohr [30]. Any mass pair \((m_G, m_h)\) is associated to a series of Keplerian orbits:

\[
L_n = \frac{(n h)^2}{G m_G m_h^2}.
\]

For the Hydrogen atom, for which \(L_n = n^2 \lambda_e a\), the Diophantine analysis leads to:

\[
m_G = \frac{m_P^3}{m_N^3} = m_A \quad ; \quad m_h = m_e
\]

This means that another choice \(m_G = m_e; m_h = m_P^3\) is a priori possible, by introducing the Planck-Nambu mass \(m_P^3 = m_P/\sqrt{\alpha}\), which is close to the Human Oocyte mass. Indeed, with a biological density of 1.05 g/ml [9], the Planck-Nambu mass corresponds to a sphere of diameter 0.15 mm: this is exactly the diameter of the oovocyte in its maximal extension. Note that the Planck mass is very large by respect to the standard particles, and this is called the Hierarchy problem in Particle Physics. It is strange that nobody, including the tenants of the classical Anthropic Principle did not insist on its proximity with the Human oocyte mass.

The following lengths are tied by the Bekenstein-Hawking holographic relation:

\[
R_{hol} = \frac{2\hbar^2}{G m_N^3} ; \quad R_C = \frac{2\hbar^2}{G m_P^3}
\]

\[
\pi(R_{hol}/l_P)^2 = 2\pi R_C/d_0 \quad ; \quad d_0 = h^2/G m_P^3
\]

where \(d_0\) is interpreted as the space quantum (Topon), while \(R_C\) is the Cosmos radius, and \(R_{hol}\) its holographic reduced radius, close to the Hubble radius, with the canonic deviation:

\[
u = R_{hol}/R = pH/\alpha^3
\]

With \(M_{hol} = R_{hol}c^2/2G\), the critical mass of the sphere of radius \(R_{hol}\), one observes the Geo-Dimensional Cosmos-Universe Couple Relation, where \(t_H = R/c\) is the Hubble time constant of the exponential galaxy recession:

\[
\ln^2(R_C/\lambda_e) - \ln^2(M_{hol}/m_e) \approx \ln^2(R/\lambda_e) + \ln^2(t_H/t_e) = 2\ln^2(t_H/t_e)
\]

which confirms the \(G\) value to 10 ppm precision [31].

There is a direct holographic ppb connection between the cosmic reduced holographic radius and the Neuron:

\[
4\pi\eta(t_N/t_e)^2 \approx 2\pi R_{hol}/\lambda_e \quad (\eta = 1 + 2/(3 \times 139)
\]

Now the question is: what is the passage from the above 2D-1D holography to the 3D world? This was predicted in a “closed draft” at the French Academy (March 1997), in addition to the 3 minutes formula: a sphere is generated by the rotation of a disk around a diameter [31], in the spirit of the scanning holography which showed so efficient in practical holography, where a spherical reference wave is generated by a laser beam rotating around its beam waist. Thus, the above entropy relation is simply extended:

\[
\pi(R_{hol}/l_P)^2 = 2\pi R_C/d_0 = 2\pi N_m R_C/\lambda_m \quad ; \quad \lambda_m = N_m d_0
\]
This the Universal Resonance: each particle of mass \( m \) has a Compton wavelength a whole multiple of the Topon \( d_0 \approx 3.0 \times 10^{-36} m \).

There is a dramatic holographic confirmation of the pertinence of this Cosmic holographic reduced radius:

\[
4\pi (R_{hol}/\lambda_{Wi})^2 \approx e^a \tag{33}
\]

where \( \lambda_{Wi} \) is the Wien CMB wavelength (Table 1). This perfect holographic formula shows that the CMB, despite its thermal spectral distribution, supports information, as is confirmed by the CMB Anisotropy Distribution which follows a precise statistical function [1]. This suggests that the background field must be considered as the cosmic-genetic code of the Universe, as confirmed below.

The above mass \( m_A \) plays a central role in the Solanthropic Principle. One notes:

\[
m_A/m_e \approx a_w^n \approx (4/3)\tau^{12}, \tag{34}
\]

leading to the symbolic holographic relation:

\[
\pi a_w^2 \approx (4\pi/3)\sqrt{(a/137)(\tau^4/n_t^3)} \quad (5.3 \text{ ppm}). \tag{35}
\]

A dramatic confirmation of the above Cosmos radius \( R_C \) is the following relation involving the number \( \tau_0 = 3570 \):

\[
\frac{R_C}{l_P} \approx \beta_{\tau_0}(3a)^2/4 \times 137 \quad (0.7 \text{ ppm}) \tag{36}
\]

The improbability of this relation excludes any possibility of chance: the Coherent Cosmology [31] is confirmed.

### 1.4 The Three Minutes calculus

The Conceptual Synthesis compares the essential measurements with the synthesis of three universal constants. The Three Basic Concepts are the Length, the Time and the Mass. Detailed Analysis show that the electricity can be reduced to these mechanical concepts. Indeed, the electrical force between two elementary electric charge separated by the distance \( l \) is:

\[
F_{qq} = \frac{he}{al^2} \quad a \approx 137.0359991 \tag{37}
\]

The electrical constant \( a \) is hidden in the cumbersome electrical units of the International System of Unit. It is why engineers and researchers cannot communicate, explaining in part the present blockade of the technology. Another reason of the blockade is the lack of comprehension of the quantum Physics, which must be connected to the steady-state Cosmology, as proved by the 3-minutes calculus, recalled below.

The inverse of \( a \) is often used, called the fine structure constant". It has only historical interest, as the Diophantine Analysis confirms below. Indeed \( a \) is closed to the prime number 137, which receive an explanation by Eddington. The fact that this was rejected prove that physicists have forgotten one of the pillar principle of Physics: the Approach Principle, stating that one can progress without knowing the ultimate theory.
It is the Americans, these impudent colonizers of Science, who are responsible for this serious logical anomaly, of not using the mass of the electron as a unit of mass. This is how the Mars Climate Orbiter probe, which was to orbit Mars in 1999, crashed to the ground, due to an error in the braking parameters of the Lockheed-Martin company’s thrusters. The company was using units in miles, feet and pound-force, as opposed to NASA’s metric system. This loss of 125 million dollars should have encouraged the Americans to convert to the metric system. And the International System of Units should have eliminated all these parasitic electrical units like Coulomb, Ampere, Volt, etc...

According to Henri Poincaré (Dernières Penseés, Conférence de Londres, 1913), the main universal constants are invariant, because any variation would deny the Physics existence.

Curiously enough, this Principle was not emphasized. For example, Paul Dirac dared to propose a temporal variation of the gravitational constant $G$, while George Gamow coined a variation of the electrical constant $a$. Due to the relative slowness of the light celerity $c$, the astrophysical observations reveal the past, and no such variations was never observed.

After the publication at Cambridge of his Holic Principle, Francis Michel Sanchez obtained a sabbatical year at the Orsay University. Revisiting cosmology, by applying the most basic physical method, the dimensional analysis, he got in his 3 first minutes (Sept. 1997) half the Hubble Radius. The chosen constants were the evident choice: $\hbar, G$ and the product of the masses of the three main atomic particles: electron, proton, neutron. Indeed, the rejection of $c$ is quite natural in the spirit of a non-local cosmology. This proves that:

1. The cosmology was never considered before as a normal physical theory.

2. The rejection of $c$, corresponding to tachyonic physics, was never considered before.

3. This calculus gives the single parameter of the steady-state cosmology, 13.8 Giga years, showing that the Hubble radius is invariant: no more Universe expansion nor Initial Bang.

6. No-one take care of this result: the officials are too confident to established theory.

1.4.1 The Gravitational di-hydrogen Model

Three years before Bohr, Arthur Haas obtained the atom radius $r$, simply by the identification of three energy forms, where $v_e$ is the electron speed, and $\lambda_e = \hbar/m_e c$ the electron’s Compton’s wavelength:

$$m_e v_e^2 = \hbar c / a r = \hbar v_e / r$$

$$\Rightarrow v_e = c / a \quad ; \quad r = a \lambda_e$$

(38)

Consider the tiny gravitational force between a proton and an hydrogen atom, both orbiting on a circle of invariant radius $R$, where an electron is also circulating with the speed $v_e$. Such a 3-body problem is declared insoluble in
official physics. But the extension of the Haas method produces the correct result:

\[ m_e v_e^2 = G m_p m_H R = \hbar v_e / R \]

\[ \Rightarrow v_e = G m_p m_H / 2 \quad ; \quad R = 2 h^2 m_e m_p m_H \]  \hspace{1cm} (39)

This means that the above electric constant \( a \) must be replaced by its gravitational corresponding term \( a_G = \hbar c / G m_p m_H \), and the gravitational energy writes \( \hbar c / 2 a_G R \).

Taking account of the critical condition, this writes in a symmetric way:

\[ \hbar c / G m_e m_p = R / 2 \lambda_H = \sqrt{M / m_e^\prime} \]  \hspace{1cm} (40)

where \( m_e^\prime = m_e m_p / (m_e + m_p) \), is the electron reduced mass.

This corresponds to the Eddington’s approach, based on the non standard proton-electron symmetry, where the statistical term involves the total number of electrons in the Universe, introducing the following Single-Electron Cosmology.

1.4.2 The Universe (“Hubble-Lemaître”) radius

This 3 minutes Hubble radius is \( R = 13.8 \) billion light-years, correcting the 13.7 value of the epoch, and was deposed in a closed draft at the French academy in March 1998. It was published with much difficulty in 2006 by Pecker, against the opposition of Narlikar [29]. Laurent Gueroult placed this formula on the French Wikipedia, in the section ‘Analyse Dimensionnelle’, but there was not any reaction, proving the general apathy of the scientific community. Of course, 13.8 Giga years is not an Universe age but the time constant of renewal of the new-born galaxies.

The standard cosmology has a part of truth, since its so-called Universe age is precisely 13.8 Giga years. This Permanent Bang concept confirms the rapid oscillation matter-antimatter of the Single electron Cosmology.

1.4.3 The Hubble constant

Presently, 25 years after this discovery, the predicted value for the Hubble constant, 70.8 (km/s)/Mpc, corrects the tension between the theoretical Hubble radius and its direct measurement. This is the rejection of the c-speed limitation taboo, which is rather a frontier between two domains, the bradyons and the tachyons. As predicted, it is exactly what the first observations of the Webb Telescope reveals. So 3 minutes of real physics has done better that a whole scientific community during a century.

1.4.4 The steady-state cosmology single temporal parameter

The steady-state cosmology is governed by a single temporal parameter, which is identified to \( t = R / c \). Considering the non-relativist gravitational and energy of the receding galaxies, one shows that the critical condition is equivalent to

\[ E_G + E_{kin} = 0 \quad \Rightarrow E_G = -(3/10)M c^2 \]  \hspace{1cm} (41)

So the complement \((7/10)\) is quite natural, identified to the dark energy.
1.4.5 The Eddington statistical radius

The 3 minutes formula Universe radius $R$ is compatible with the Eddington’s statistical formulation of its initial Universe radius (rejecting the Big Bang but admitting the Universe expansion), but without emphasis on the elimination of $c$, using the cumbersome $c = 1$ in his equations.

1.4.6 The Eddington’s Large Number Formulation

Eddington has interpreted the double correlation of the large numbers in physics as a statistical relation, while we use the Holographic principle which valid the critical condition, adopted by Eddington for different reason. Its best symmetric formulation involves the gravitational force between Proton and Electron:

$$\frac{\hbar c}{G m_e m_p} = \frac{R}{2 \lambda_p} = \sqrt{\frac{M}{m_e^{(red)}}}$$  \hspace{1cm} (42)

where the reduced electron mass $m_e^{(red)} = m_e/(1+1/p)$ is identified to $m_e m_p / m_H$ (14 ppb). This replacement of neutron by Hydrogen in the 3 minutes formula is justified by the gravitational di-Hydrogen model, entering the Holophysics which was deduced from it, since the holographic interpretation is direct from the formula, the factor 2 being identified with the Archimede testimony one, the ratio of the perimeter to the area of a unit radius disk.

*The Holographic Principle explains the critical condition.* It was not possible for Eddington since, strangely enough, the holography, this fundamental property of waves, was discovered only in 1947 [12] (section 2.1).

1.4.7 The Critical Mass Canonic Relation

This factor 2 disappears in the symmetric relation:

$$m_p^4 = M m_e m_p m_H.$$  \hspace{1cm} (43)

*The Universe appears in the same footing that usual particles, electron, proton and Hydrogen. This means there is an external Cosmos, whose radius will be deduced by the Diophantine physics, showing it is defined by the standard monochromatic holography using $l_P$ (section 3.1).*

1.4.8 The Cosmic role of the Weak Bosons

Moreover, the Hydrogen gravitational molecule model specifies the product $W \times Z$, symmetrizing the noted fact that $a_G$ is of order $W^8$ [7], where the gravitational coupling is $a_G = R/2\lambda_e$:

$$\frac{R}{\sqrt{\lambda_p \lambda_H}} \approx (WZ)^4 \approx \frac{a^{7/2}}{2\sqrt{5}}$$  \hspace{1cm} (0.2 ppm)  \hspace{1cm} (44)

The central place of these weak bosons in standard model is quite justified. Also the seventh power of the weak coupling enters the Holic Principle predictions (section 2.1). This is confirmed in the following section.

THE MAIN APPLICATION OF THE PRINCIPLE OF CONCEPTUAL SYNTHESIS TO COSMOLOGY: THE "THREE-MINUTE CALCULATION"
GIVES THE HALF-RADIUS AND THUS THE CRITICAL MASS OF THE
UNIVERSE. Wikipedia, dimensional analysis in cosmology. Believing to dom-
inate the theory, and forgetting the Principle of Approach, the officials have
neglected the conceptual natural approach to cosmology. It is enough to ex-
clude the light speed $c$, much too slow for the cosmic Coherence, replacing it
by the average of the atomic masses to obtain the half radius of the Universe,
directly measurable (Box n°4) thus its critical mass, which implies, consider-
ing the canonical gravitational ratio $10/3$, a number of neutrons equal to the
Eddington Great Number $1362^{2}56$:

1.4.9 The Connection with the Single Electron Cosmology

With the above Cosmos radius $R_{c}$, the connection is:

$$R_{c}^{3} \approx R_{c} R_{l} \sqrt{3}(H/p)^{2}(\pi \mu/\pi) \quad ; \quad \mu = 3 + 1/(7 + 1/\sqrt{\mu}) \quad (45)$$

1.5 The Holographic Background

The Hydrogen gravitational molecule model induces an 1D-2D holographic re-
lation involving the three wavelengths $l_{p}$, $\lambda_{e}$, and $\sqrt{\lambda_{p} \lambda_{H}}$. The holographic
natural extension 1D-3D involves the three wavelengths: $\lambda_{e}$, $\lambda_{H}$ (the Hydrogen
Molecule Compton wavelength) and the reduced wavelength of the Microwave
background $\lambda_{cmb}$:

$$2\pi \frac{R}{\lambda_{e}} \approx \pi \left( \frac{\lambda_{p} \lambda_{H}}{l_{p}^{2}} \right)^{2} \approx (4\pi/3) \left( \frac{\lambda_{cmb}}{\lambda_{H}} \right)^{3} \quad (46)$$

The deviation $0.6 \%$ is very close to the ratio $R/2^{128}$, and implies the factor
$p/p_{W}$, where $p_{W} = 6\pi^{5}$ (section 3.5). This results in the following 4D holo-
graphic formula involving the Lucas Number $N_{L} = 2^{127} - 1$:

$$N_{L} \approx \pi \frac{\lambda_{cmb}}{\lambda_{e}} \left( \frac{\pi}{\lambda_{cmb} \lambda_{H}} \right)^{2} \Rightarrow T_{cmb} \approx 2.725 \, 820 \text{ Kelvin} \quad (47)$$

which is compatible with the most precise official cosmologic measurement, the
background temperature 2.7255(6) Kelvin. Note how Nature manages to divide
the prime number $N_{L}$, with holographic factors.

Eliminating $H$ between $N_{L} \approx 2^{2}(\lambda_{cmb}/\lambda_{e})^{3}H^{2}$ and $R/l_{K} \approx 4H^{4}$ leads to:

$$F \frac{R l_{K}}{\lambda_{e}^{2}} \approx (2\pi^{2}(\frac{\lambda_{cmb}}{\lambda_{e}})^{3})^{3} \frac{137(a - 1)\beta^{2}}{2a^{2}} \approx 0.3 \, \text{ppm} \quad (48)$$

So the more precise official quantity ($\lambda_{cmb}$) connects with the most overall
precise one ($l_{K}$), confirming the Hubble-radius $R$.

After the acceleration of galaxy recession, the critical Universe, and the non-
expansion of the Universe, all predicted by the steady-state cosmology, a forth
prediction of Permanent Cosmology will arise:

The next shocking surprise for the officials will be when the Webb telescope
will show that the temperature is the same everywhere.

This failure is the result of the choice of the physics community, to follow
Einstein instead of Poincaré who have insisted on the inadequacy of differential
equations in cosmology, because this would induce a multiplicity of universes
(now, the official Multiverse). The introduction of Diophantine equations was the real motivation to introduce the above Holic Principle, permitting to distinguish Time, Length and Mass ratios in these Diophantine Equations. The section will recall how the simplest Diophantine Equation identifies with the third Kepler’s law, leading to an essential symmetry between the Newton and Planck constants.

In the standard cosmology, an essential parameter is the ratio between the CMB photon number $n_{ph}$ over the Universe atomic number $n_H = M/m_H$. We have noted that this ratio is about the square of density ratio $u_{cr}/u_{CMB}$. By taking account of the standard Neutrino background $u_{CNB} = u_{CMB} \times (n_\nu/8)(4/11)^{4/3}$ in the energy ratio. With the number of neutrino species $n_\nu = 3$ one observes another Eddington’s type relation using the total energy density:

\[
\sqrt{2n_{ph}/n_H} \approx \frac{u_{cr}}{u_{cmb} + u_{cmb}} \quad (0.4 \%) \quad (49)
\]

This shows that the Cosmic Neutrino background takes an important part in the total background which will be interpreted as a Cosmos Information Field in section 5.1.

Moreover, the statistical ratio 11/4, which is the cube of the temperature ratio between the CMB and the Neutrino Field, appears directly in the correlations, leading to an holographic relation involving $\lambda_0 = (\lambda_e\lambda_H\lambda_{CMB})^{1/3} \approx r_e\lambda_e/\lambda_F$ : where $r_e$ is the Electron classical radius and $\lambda_F$ the Fermi wavelength:

\[
\sqrt{R/2\lambda_e} \approx (11/4)(\lambda_{cmb}/\lambda_e)^2H/\sqrt{ppW} \quad (0.3 \text{ ppm}) \quad (50)
\]

\[
\Rightarrow \quad 2\pi R/\lambda_p \approx (4\pi/3)(2\lambda_{CNB}/\lambda_0\lambda_0)^3
\]

1.6 The Kotov tachyonic oscillation

According to the patent tachyonic character of the Kotov period $t_K$, which do not show Doppler shift for several quasars, the elimination of $c$ between the gravitational and weak coupling constants is considered and found compatible with the identification: $\sqrt{a_Ga_w} = t_K/t_e$, with $t_e = h/m_e c^2$. The study of this expression leads to:

\[
\frac{t_K}{Pt_e} = \frac{\sqrt{a_Ga_w}}{P} = \frac{F}{\sqrt{pH}} = \frac{\mu^2}{a} = \frac{2\pi a_p pH}{F} \approx \frac{FWZ\alpha_n^2}{P} \approx \frac{(2\pi\Pi_c)^2 pH}{Z^2}
\]

(51)

From the Optimal Correlation Principle, these relations were considered firstly (2004) as definitions of $F$ and $a_s$, from the very precise determination of the Muon mass, specifying the Fermi mass $F$ with 2 more digits, which were confirmed 8 years later. The introduction of the Atiyah constant $\Gamma$ was determinant to fix the $a_w$ value through [31]:

\[
a_w = F^2 = (2 \times 137 \times \Gamma)^3
\]

(52)
This permits to specify the strong coupling $a_s$ and the muon mass to the ppb precision. The latter implies the tau mass through the Koide relation \[17\] which involves the sum $(\tau + \mu + 1) = (2/3)(\sqrt{\tau} + \sqrt{\mu} + 1)^2$, which checks:

$$p_K = (1 + \mu + \tau)/2 = (1 + \sqrt{\mu} + \sqrt{\tau})/3 \approx 4\pi (a p H)^{1/4} \ (0.5 \ \text{ppm}) \quad (53)$$

calling for a real consideration of the Koide relation.

It is observed that the Kotov length $l_K = c t_K$ correlates with the Single electron Radius:

$$R_1/l_K = a_w (4\pi p/p_W)^2 \Rightarrow (4\pi p/p_W)^2 l_K^3 = R R_1 \lambda_e/2$$

where $p_W = 6\pi^5$

### 1.7 The prophetic Eddington's Fundamental Theory

In the spirit of Pythagoras, the father of the Natural Philosophy, the central parameters, apart such basic constants as $\pi$ and $e$, must be whole numbers, and, in the first place, the number $137$. Indeed, Physics is based on Mathematics, but the latter is based on *Arithmetics, the queen of Mathematics*, as Gauss stated.

The number 137 has been justified, among other parameters, by Sir Stanley Eddington. He also predicted the Tau Lepton, with a right estimation of mass and, from the large number correlations, he deduced an optimal Universe, whose horizon is confirmed by the most recent measurements of the Hubble radius. It has been discarded because of the factor 7 error in the initial Hubble measurement of the observable universe radius. This Eddington cosmology connects gravitation and quantum theory, the two pillars of physics which cannot be tied by the standard physics.

This number 137 is encountered in the Bible: in particular the lifetime of Ismaël, Lévi and Amram.

Prisoners of an Unique Thought, Dogmatism and Censorship, the standard system has not realized that the new measurements of the Hubble constant rehabilitates the Eddington’s theory. The standard system also neglected the necessary simplification of Units. This leads nowadays to a separation between physicists and engineers: technology is rising up but not the fundamental knowledge: the first article on the laser has been refused to publication, opening 20 years of procedure. As the laser effect is always unexplained, this means a blockage in the quantum physics interpretation, which must begin by cosmology, as the three minutes calculus shows.

In particular, the standard unit of mass in theoretical physics is the cumbersome electron-volt. Instead, the choice of the electron mass permits to observes dramatic relations between the so called free-parameters.

### 1.8 The Temporal Fermi Cosmic Connection

In the 3 minutes calculation, from the constants $\hbar, G, m_0 = (m_e m_p m_H)^{1/3}$, looking for a time instead of a length, leads to:

$$\frac{\hbar^3}{G^2 m_0^3} \approx 5.52 \times 10^{57} \ \text{s} \quad (55)$$
It is well known that the cosmic critical density is tied to the Hubble time \( t_H = R/c \) by:
\[
\rho_c = \frac{3}{8\pi G t_H^2}
\]
So it is natural to compute the time given by the triplet: \( h, \rho_c, G_F \), involving the Fermi constant instead of \( G \). One obtains:
\[
t_{h, \rho_c, G_F} = \frac{\hbar^4}{\rho_c^{3/2} G_F^{5/2}} \approx 5.48 \times 10^{57} \text{ s} \approx t_K(O_M/\sqrt{2} \approx e^4/F) \tag{56}
\]
where \( O_M \) is the Monster Group cardinal. The proximity of these times indicates a fundamental property of the parameters. Introducing the \( R \) value in the first expression, the identification leads to:
\[
t_{h, \rho_c, G_F} = \frac{\hbar R}{2Gm_0^2} \Rightarrow (m_0/m_e)^{3/2} \approx (4\pi)^2 \sqrt{a} \approx 42 \text{ ppm} \tag{57}
\]
this number is close to the last Euler idoneal number 1848, noted in a preceding analysis [32]. Note the liaison:
\[
e\Phi^3 \approx \frac{495}{\sqrt{1848}} (7 \text{ ppm}) \approx \frac{60\sqrt{a}}{61} (43 \text{ ppm}) \; ; \; 61/60 \approx \left(\frac{n_1}{p}\right)^{12} (0.3 \text{ ppm}) \tag{58}
\]
Interestingly enough, the above relation was induced through the following remark, implying the Human oocyte (section 3.1):
\[
\frac{P}{\sqrt{a}} \approx \frac{m_{oocyte}}{m_e} \approx \Phi^{102} \; ; \; \frac{P}{c} \approx \Phi^{105} \Rightarrow \sqrt{a} \approx e\Phi^3 \tag{59}
\]
Introducing the above Neuron \( t_N \), this leads to:
\[
\left(\frac{Pt_N}{\sqrt{2} t_H (8\pi/3)^{3/4}}\right)^3 \approx (4\pi)^4 a \quad (84 \text{ ppm}) \tag{60}
\]
The numerical term shows the correlation:
\[
(8\pi/3)^{9/4} \approx (g_2/g_1)(8Hp/n_2p_W)^2 \quad (1.4 \text{ ppm}), \tag{61}
\]
while the temporal ratio shows:
\[
\frac{P t_N}{t_H} \approx \frac{495}{\sin \theta} \approx \frac{l_1 \cos \theta}{\lambda_{cmb}} \approx \frac{3^3 \times 137}{2^2 \cos \theta} \approx \frac{\tau a^2 \cos \theta}{\mu} \tag{62}
\]
where appears the wavelength of the CMB and the number 495, which is the antecedent of the third perfect number 496, the dimension of the SO32 group, and also tied to the Mathieu group order: \( 495 = M_{11}/16 \). Its square is the candidate for the mass ratio Higgs/Electron. The length \( l_1 \) is the unit distance meter, which was related to the Earth radius by the Egyptians (section 5.4).

This is a dramatic multi-correlation around the number 1054 of notes in the Great Musical Scale (section 3.2).

Any possibility of intervention of hazard is ruled out by the relation:
\[
g_Z = \sqrt{g_1^2 + g_2^2} = \frac{m_Z}{m_{Higgs}} = \frac{Z}{495^2} \approx \frac{1838.5}{\tau_0/\sqrt{2} = \sqrt{R_T}/l_1} (25 \text{ ppb}) \tag{63}
\]
This last relation confirms the mass ratio Higgs/electron to be 495\(^2\), while 1838.5 is the half whole value close to the bicodon-Hydrogen mass ratio (section 5.3), and \( \tau_0 = 3570 \) is the Egyptian number, whose connection with the Earth radius \( R_T \) and the unit meter \( l_1 \) is explained in the following section.

The intervention of the Earth radius confirms the Solanthropic Principle.
2 THE INDUCTIVE SCIENTIFIC METHOD

The history of Science has showed that the Inductive Scientific Method was often complementary to the classical hypothetico-deductive one. There are 4 steps:

1. Observations
2. Measurements
3. Correlations between the measurements, using central parameters
4. Looking for the useful mathematical structures.

This was the "hypotheses non fingo" Newton procedure, which led to the infinitesimal calculus, but Newton, and, rather strangely, also Poincaré, missed the Total Quantum Physics, an evident consequence of the Diophantine treatment of the Kepler’s laws [30].

The two first steps of the above program are realized by the Particle Physics, which has accumulated considerable and precise data. But the third step is lacking: there is no serious correlation study. Indeed, even the dramatic Koide relation between the Leptons masses, which revealed so predictive for the Tau mass, is not seriously considered.

2.1 The Optimal Correlation Principle

The scientific system is piloted by formalists, which use only the hypothetico-deductive method from known mathematical structures. This leads to the present blockage of Physics: about 30 parameters emerge, which are not recognized by mathematicians. Even the whole number 137, justified by Eddington, is unknown in Number Theory. This proves the deficiency of present Arithmetics, so explains the present failure of the hypothetico-deductive method. This article is devoted to confirm that hidden arithmetical structures are at work in Physics, and propose that they are related to Eddington’s Fundamental Theory.

The general belief is that there are no simple relations between the particle masses, arguing there are tied through complex mathematics with the quark masses, which are not directly measurable.

But this is reductionist thinking, the simplest idea being to consider these 30 parameters as optimal calculation bases. So they must be tied by the Optimal Correlation Principle. This leads to the optimal physical values in the ppb range (Table 1) [31].

But, more surprising, there are also very precise relations between the general parameters and some biological and Human parameters, as well as particular properties of the Sun, the Earth, and the 10 planets solar system. This suggests the Solanthropic Principle must replace the current rough Anthropic one, ill-founded on a refuted expansion cosmology.

2.2 The Optimized Gravitation Constant

The gravitation constant $G$, deduced from the canonical $c−$ free relation $k_K/\lambda_e = \sqrt{\alpha_G \bar{\alpha}_{\bar{\gamma}}}$, is compatible with the BIPM measurements, but is $2 \times 10^{-4}$ larger than the official value, wrongly taken as a mean between discordant measurements.
Considering the proximity of the Lucas Large prime number \( N_L = 2^{127} - 1 \) with \( R/2\lambda_e \), we introduce \( p_G = P/\sqrt{N_L} \approx 1831.531 \). From the Polynomial Optimal Correlation Principle, the computer indicates \( G \approx 6.67545706 \times 10^{-11} \) S. I.,

\[
\left( \frac{H}{p} \right)^5 = \left( \frac{p}{p_Gd_e} \right)^2 \Rightarrow G \approx 6.67545706 \times 10^{-11} \quad \text{S. I.},
\]

This formula is confirmed and the photon-neutrino background field, with \( \lambda_{CMB} = \lambda \):

\[
N_L = \pi \left( \frac{\lambda}{\lambda_H} \right)^2 (2\pi \frac{\lambda}{\lambda_e}) \approx \frac{R}{2\lambda_e} (d_e(H/p)^2)^2 \approx \left( \frac{\lambda^2_{CMB}d_eH^2}{\lambda^2_\pi p^2} \right)^2 p_W / p
\]

Interestingly enough, Nature tries to divide the Prime Lucas Number. This implies that the background obeys the \( 2\pi \) and \( d_e \) - free formula:

\[
\frac{R}{2\lambda_e} \approx \left( \frac{\lambda^2_{CMB}}{\lambda^2_\pi} \right)^2 \frac{p_W}{H^2}
\]

The above \( G \) value is at 33 ppb from the following value, with \( \beta = 1/(H - p) = (1 - 1/2a^2)^{-1} \approx 1.000026626 \) the hydrogen relativist factor:

\[
\sqrt{\frac{H}{p}} = \frac{2Fp^4n_t\beta}{F_H^{\lambda_2}}
\]

The last relation was deduced from the observation, with \( l_K \) the Kotov length:

\[
\sqrt{\frac{R}{l_K}} = 2\sqrt{\frac{a_G}{a_w}} = \sqrt{\frac{2F}{F_H^{\lambda_2}}} \approx 2(H/p)^2p_G\sqrt{\rho_G^2} \approx 17 \text{ ppb}
\]

This traduces by the quasi-holic relation:

\[
(n_t/p^2)^3 \left( \frac{84F^2}{H^3n_t} \right)^3 \approx (PF)^2 \approx O_M\sqrt{6F}/8
\]

corresponding to the holographic relation involving the Monster group cardinal, an the \( \pi \) value corresponding to the Eddington’s Proton-Electron ratio \( p_E = 1847.599459 = 6\pi_E^2 \):

\[
4\pi_E(O_M/2P^2)^2 \approx (4\pi/3)(2F)^3 \quad \text{(6 ppm)}
\]

The Monster cardinal appears also in \( O_M \approx h^2\sqrt{2}/Gm_0^5 \) where \( m_0 \) is the geometric mean of the triplet electron-proton-neutron. In fact, eliminating \( O_M \) one observes, with \( p_E \approx 1847.599459 \) the Eddington Proton/Electron mass ratio:

\[
\frac{137n_t}{ap} \left( \frac{R}{4KP_E^{2/3}} \right)^2 \approx (4/3)F^3 \quad \text{(0.1 ppm)}
\]

So, the Eddington’s approach is rehabilited.

Moreover, the following relations confirms this value of \( G \) in the ppb precision, not obtainable by computer calculation, but from logic and aesthetics. The optimal base \( e \) and the geometrical base \( \pi \) must play a central role, leading to the discovery of, where \( p_G = m_E/\sqrt{N_Lm_e} \) is defined from the Lucas Large Prime
Number $N_L = 2^{127} - 1$, the deviation of the last relation $R/2\lambda_e \approx N_L = 2^{127} - 1$
shows:

$$p_G^2 = P^2/N_L \approx \rho H - 137^2 - \pi^2 - e^2$$

(72)

The deviation seems to depend only on 137 and $a$, so we define:

$$pH - p_G^2 = a_G^2 = \left(\frac{a^7}{137^3}\right)^{1/2} \Rightarrow G \approx 6.675453706 \times 10^{-11} \text{ S. I.}$$

(73)

giving the selected $G$ value ppb precision. Moreover, the canonical Diophantine

$\sqrt{1836}$ appears in :

$$P/\sqrt{1836p} \approx \frac{a^{11}137^5d^2_e}{(\rho H - p_G)^2}$$

(74)

So the ppb $G$ value is confirmed by the Diophantine Number 1836, whose square
appears as a monster in the series OEIS A072470.

Moreover:

$$\left(\frac{a^7}{137^3}\right)^{1/2} - 137^2 = a_G^2 - 137^2 \approx \frac{3570.3}{\mu} \approx a_s(1 + \pi/3)$$

(75)

$$R/2\lambda_e = P^2/pH \approx N_L(1 - (137^2 + \pi^2 + e^2)/(\rho H)) \text{ (6 ppb)}$$

(76)

$$a^2 = 137^2 + \pi^2 \Rightarrow \pi_a \approx 3 + 1/(6 + (\pi_q/3)^2) ; \text{ } aq^2 = 4\pi_q$$

(77)

showing a symmetry between 137, $e$ and $\pi$, implying the pure charge $q$. Such an
efficiency of the Inductive Scientific Method, the direct study of data, suggests a
connection between the Consciousness and the Cosmos, this is a first indication
for the Solanthropic Principle.

Moreover, with $\tau$ the mass ratio tau/electron, $n_t$ the mass ratio neutron-electron:

$$N_t^2 \approx P^4a_w\tau^2\rho^n(H\beta/n_t) \Rightarrow G \approx 6.675453644 \times 10^{-11} \text{ S. I.}$$

(78)

This corresponds also to the following direct holographic relation involving
a modified $\pi$ value $\pi_P = 3 + 1/(7 + 1/\sqrt{a + 1})$ :

$$\frac{4\pi P}{3}P^{3/2} \approx a^{16} \Rightarrow G \approx 6.675453717 \times 10^{-11} \text{ S. I.}$$

(79)

while the base $\pi$ is manifest in :

$$P \approx \pi^{(a-2)/3}d_e\sqrt{\beta} \Rightarrow G \approx 6.675453749 \times 10^{-11} \text{ S. I.}$$

(80)

Moreover, introducing the "economic" large number $N_4 = e^{e^e}$ :

$$N_4^{1/2(a-1)^2} \approx P^2n_t\sqrt{\beta}/H \Rightarrow G \approx 6.675452867 \times 10^{-11} \text{ S. I.}$$

(81)

at 125 ppb from the above values.

The Fermi constant $G_F = \hbar^2/m_e^2c$ implies the Fermi mass $m_F$ checking
$F = m_F/m_e = (2 \times 137\Gamma)^{-3/2} \approx 573007.3652$, where $\Gamma = \gamma a/\pi$ is the Atiyah’s
(2018) constant. This $F$ value exhibits the crystallographic ratio $\eta_c = 1 + 1/(3 \times 139) \approx F/\eta_c^5$ (Sanchez et al. 2021)

$$P \approx \frac{F^5}{\eta_c^4} \Rightarrow G \approx 6.675453718 \times 10^{-11} \text{ S. I.}$$

(82)
Such a series of ppb correlations cannot be attributed to chance: so this validates the above correlation with the Lucas Number. *It is strange enough that the most famous Large Number of Number Theory was not compared before with the most famous physical Large Number (Eddington 1936), of the same order* $10^{40}$. This $G$ value is compatible with the $10^{-5}$ precise BIPM measurement (Quinn et al. 2014), but is about $2 \times 10^{-4}$ larger than the official value, wrongly adopted as the average of the incompatible results.

2.3 The Universe as a mono-atomic star

Paul Davies [8] considers a star as a ball of gas of radius $R_s$, which remains in equilibrium if its self-gravity is supported by the combined effort of its internal pressure and its electron degeneracy pressure. This will be the case if the gravitational energy per particle is comparable to the thermal energy $k_B T$ plus the degeneracy energy. For hydrogen gas this implies:

$$k_B T + N_s^{2/3} \frac{\hbar^2}{m_e R_s^2} = G M m_p / R_s = G m_p^2 N_s / R_s$$  \hspace{1cm} (83)

where $N_s$ is the total number of protons in the star. At low density (large $R_s$) the degeneracy term is negligible, so the temperature rises as $1 / R_s$. As the radius shrinks, the temperature reaches a maximum when

$$G m_p^2 N_s / R_s - N_s^{2/3} \text{ max} \Rightarrow R_s = \frac{2 \hbar^2}{G m_p^2 N_s^{1/3}}$$  \hspace{1cm} (84)

$$\Rightarrow \text{ For } N_s = 1 : R_s m_p / m_H = R$$

In this expression, the 2 factor comes from the thermal effect.

2.4 The pertinence of the Eddington’s 136 and 137

According to Eddington, the electric parameter $a$ is tied to the number 137, itself tied to 136. The discriminant $\Delta_E = \sqrt{136^2 - 40}$ of the Eddington’s equation $x^2 - 136x + 10 = 0$ shows:

$$\Delta_E (a / 137)^4 \approx 136 \approx (-31 \text{ ppm})$$  \hspace{1cm} (85)

Looking for correlations involving the weak parameter $\sin \theta$, the computer shows:

$$\Delta_E (a / 137)^3 \approx \frac{(8d_e)^2}{\sin \theta} \approx (0.6 \text{ ppm})$$  \hspace{1cm} (86)

meaning:

$$a \approx \frac{136 \times 137 \sin \theta}{(8d_e)^2} \approx (31 \text{ ppm})$$  \hspace{1cm} (87)

$$a^3 \approx \frac{136 \times 137^2 \times d_e^7}{(8d_e)^2} \approx (1.4 \text{ ppm})$$  \hspace{1cm} (88)

proving the pertinence of theses numbers. Looking for precise (0.1 ppm) correlations specifying the weak parameters $W$ and $Z$, the computer shows, with $\Gamma = \gamma a / \pi$ :

$$W \approx \frac{137^2 \Gamma}{3d_e} \approx \pi \left( \frac{\Gamma a \sin \theta}{e} \right)^3$$  \hspace{1cm} (89)
\[ Z \approx \frac{\pi^4 p^2 a}{137 d_e n_t} \approx \frac{136^3 d_e \sin^2 \theta}{\pi} \] (90)

and with the gravitational huge number \( P \):

\[
\left( \frac{W^2}{Z} \right)^4 \approx \frac{127 P}{128 \times 64} \quad \text{(38 ppm)} \approx \frac{P d_p^2}{a \sin \theta} \quad \text{(-12 ppm)} \quad (91)
\]

Focusing on the Eddington's number, the computer shows:

\[
W^6 \approx \frac{F^{131361813710}}{F^{3137^{5}}} \quad \text{(-0.19 ppm)} \quad (92)
\]

\[
Z^6 \approx \frac{F^{5a^2136^{14}}}{F^{21a^{9}}} \quad \text{(0.16 ppm)} \quad (93)
\]

Taking account of the relations \( P^{10} \approx F^{14d_{67}} \) and \( a^{12} \approx P p \), this makes appears

the 60th triangular number \( 1830 = 60 \times 61/2 \), and its successor \( 1831 \), which is

the maximal number of parts by cutting a cake in 60 cuts (as \( 137 \) is the number

for 16 cuts):

\[
a^{1/3} \approx \frac{1830 \times 1831 \times W p W}{\beta pZF} \quad (0.2 \text{ ppm}) \quad (94)
\]

the couple \( 1831, 1832 \) is the 30th 31th couple of the OEIS A118551, favoring,

since \( 1830 = 60 \times 61/2 \), the dimension 30 of the Topological axis. Note that

this sequence contains also 1836 and 1837. Thus the Eddington’s equation is

completely rehabilitated.

### 2.5 Musical Relations implied by the Kotov Tachyon

The following relations are deduced from the study of the Kotov cosmic coherent

period \( t_K [37],[5] \). The first relation uses the basic Single-Electron Universe

radius \( R_1 \), which depends only on the electron Compton wavelength and the

Haas-Bohr radius: \([31], \) with \( l_K = ct_K \):

\[
\frac{R_1}{l_K} \approx a_w (4\pi p/p W)^2 ; \quad \pi p/p W \approx (3 + 1/(7 + \mu/\tau))(n_t/\beta p) \quad (1 \text{ ppm}) \quad (95)
\]

This defines \( t_K \approx 9600.591768 \) at slight deviation from Kotov’s measurements (2

ppm), but consistent with the following optimization in the 30 ppb range. The

fractional development of \( \pi p/p W \) is very special, where the Electron magnetic

moment \( \mu_e = 2d_e \) appears:

\[
\pi p/p W \approx 3 + 1/(6 + \mu_e^{1/12}) = \pi_{\mu_e} \quad (5 \text{ ppb}) \quad (96)
\]

proving that Nature uses deviation from the non-physical mathematical \( \pi \), appear-

ning in the relation, induced by the fact that the deviation \( 2^{128}L_e/R \approx

1.00560031 \) apears in a term close to the canonic \( e^{256} \approx 3R_{had}R_c/2RL_w \):

\[
\pi(\frac{l_K R}{L_w L_c})^2 = 4\pi(\frac{l_K}{L_c})^6 \approx (4\pi_{\mu_e}/3)(2e^2)^{128} \quad (0.8 \text{ ppm}) \approx \frac{2n_t^2 R_{had}R_c}{H^2 R L_w} \quad (41 \text{ ppm})
\]

(97)
whose holographic character is ascertained by introducing \((2e^2)^{1/3} \approx e^2/3\) with
a deviation checking:

\[
e^{2/3}/(2e^2)^{1/3} \approx (8/5)^{1/128} \quad (81 \text{ ppb})
\]  

(98)

leading to the discovery of:

\[
e/(2 \times 3^3)^{1/4} \approx (8/5)^{3/2^6} \approx (\frac{n_t}{p})^2 \approx (\frac{n_t}{(137a)^{1/4}})^{1/4} \quad (3 \text{ ppb})
\]  

(99)

which specifies as:

\[
(\frac{7 + n_t/p}{5})^3 \approx (n_t/p)^{2/10} \quad (1.5 \text{ ppm})
\]  

(100)

This proves that \(n_t/p\) is an important mathematical ratio, checking also:

\[
(n_t/p)^{\sqrt{n_t/p}} \approx 4\pi (p/p_W)^2 \quad (1.2 \text{ ppm})
\]  

(101)

2.6 The Combinatorial Hierarchy

The huge difference between gravitation and electroweak couplings is called the Hierarchy Problem. A computer directly shows the following relation between the Electron Gravitational Parameter \(P\), the weak coupling constant \(a_w\) and the square root of the electric constant \(\sqrt{a}\):

\[
10 \ln P \approx 7 \ln a_w + 134 \ln \sqrt{a} \quad (0.11 \text{ ppm})
\]  

(102)

Note that the deviation corresponds to the ratio \(311\pi/99\). Since \(10 = 3 + 7\) and \(134 = 7 + 127\), one recognizes in the exponents the characteristic numbers of the Combinatorial Hierarchy [4]: 3, 7, 127, the three first Catalan-Mersenne numbers (OEIS A007013), whose following term (and final in the Combinatorial Hierarchy) is the famous Lucas Large Prime Number \(2^{127} - 1\). With the Planck-Nambu mass \(m_P' = m_P/\sqrt{a}\), one gets:

\[
\sqrt{a} \approx P^3 \left(\frac{P'}{a_w}\right)^7 \approx (Pn_t^7)^3 \approx \Gamma^{137}/\sqrt{2} \approx \pi^{136+137} \approx e^{137/5} \approx \pi^{5e+3} \approx a_2^{1837d/4\pi}
\]  

\[
\approx g_1^{-1838/2\pi} \approx g_2^{-1837/\beta^3} \approx g_3^{-2\pi/3} \approx g_0^{-16e\cos^2\theta} \approx s^{-2a\cos^2\theta}
\]  

\[
\Rightarrow e^{2\pi F} \approx g_1^{(1838/d_e)^3} \approx a_2^{(1837.5d_e)^2/2} \quad \Rightarrow e^{4\pi F} \approx (\sqrt{a}/g_1)^{\pi H\beta^3}
\]  

\[
\sqrt{a} \approx (a/4)^4 (2^{127}/p n_t a_w \sqrt{a})^7 ; \quad 2^{127/4} \approx (\pi/a_n)^5 \frac{a_7}{137\beta p} \rightarrow (\pi/a_n)^5 \approx d_e
\]  

\[
\frac{a}{16\pi} \approx e \frac{d_e n_t^2 \beta^4}{H^2} \quad (6 \text{ ppm}) \approx \frac{1}{\sin \theta \cos^2 \theta \beta^2} \quad (1 \text{ ppm})
\]  

(103)
showing a dramatic liaison with the Atiyah constants \( \Gamma = \gamma a / \pi \) and \( a = \sqrt{a^2 - 137^2} \). The Planck-Nambu ratio \( P' = P / \sqrt{a} \) will appear in the Diophantine Physics (Section 3.1). Note that from the holographic approach \( 3P \approx p^7 \),
on one observes a different intervention of \( P^{\prime} \):

\[
P/4 \approx (\sqrt{p_G \sqrt{p_F}})^7 \quad \Rightarrow \quad P^{10} \approx (\sqrt{a}/4)^4 (2^{127}/p_m)^7
\]
calling for more study.

### 2.7 The Physical Musical Frequency

The three main universal constants (c excluded), defines the time :

\[
l_{h,G,F} = t_N = \frac{G^{5/4}_F}{h^2 G^{3/4}} = t_p (\frac{m_P}{m_F})^{5/2} \approx 19.1369997 \text{ ms}
\]
where \( m_P, m_F \) are the Planck and Fermi masses. This corresponds to the frequency 52.254 Hz, close to the electric one in Europe. More precisely, it is 3 octaves down the frequency 418.04, half a tone from the frequency 442.9 Hz.

This means that this last frequency could be the best fit for the concert pianos, and the preferred tune would be La bemol Major, or Fa mineur. This could enlight the curious tuning problem of concert pianos, which seems to indicate a sensibility to absolute musical scale of some chord musicians, who sometimes critic the piano tuning.

So, this time is characteristic of the Human nervous system: this is the first, and strongest, indication towards the Solanthropic Principle: Humanity would be alone in the Cosmos, as this paper confirms.

The two others quantities derived from the 3 main constants are:

\[
l_{h,G,F} = l_p (\frac{m_P}{m_F})^{3/2} \approx 1.376054631 \times 10^{-10} \text{ m}
\]

\[
m_{h,G,F} = m_p (\frac{m_P}{m_F})^{-1/2} = \sqrt{m_pm_F} \approx 1.065807123 \times 10^{-16} \text{ kg}
\]
The first value is close to the Hass-Bohr radius (factor about 13/5). The second one is intermediary between the Planck and Fermi masses. Note that the large gap between these masses is the Particle Physics Hierarchy Problem.

### 2.8 The Decisive Egyptian number \( \tau_0 = 3570 \)

The number of symmetries in a n-dimensional crystal show connections with the entire values 137 and 1836 of the main physical parameters [32]. This leads to the examination of the number \( \tau_0 = 3570 \), close to the Tau/Electron mass ratio. Indeed, it shows the following dramatic property of the Golden Number \( \Phi \), whose whole powers are tied to the terms of the Lucas recurrence series (OEIS A000032), defined by \( n_L(1) = 1, n_L(2) = 3 \):

\[
\tau_0 = 3570 = (2 + 3 + 5 + 7) \times 2 \times 3 \times 5 \times 7 = 17 \times 210 = n_L(17) - 1 \approx \Phi^{17} - 1
\]
The characteristic point in this number 3570 is that it uses in a symmetric fashion the basic quartet of numbers, 2; 3; 5; 7, which, according to the Holic Principle (section 2.1), are respectively tied to the natural concepts: Time, Space, Mass, Field. Since neither 137 nor this number \( \tau_0 = 3570 \) are signaled by mathematicians, this confirms a Number Theory Deficiency. Rather surprisingly, the numbers 137 and 3570 were known by the Egyptians [11]. One observes, with \( \tau_0 = 3570 = 60^2 - 30 \):

\[
60\sqrt{3570} = 3570\, \eta_2 \approx R_{\text{hol}}l_P/2\lambda_e (9 \text{ ppm})
\]

\[
\eta_2 = 60/\sqrt{\tau_0} \approx e^{1/239} \approx \pi^{1/2 \times 137} \approx \Phi^{1/115}
\]

\[
e/\pi \Phi \approx \tan \theta \sqrt{\eta_2/\eta_1} \quad (1 \text{ ppm})
\]

showing a special \( e - \pi \Phi \) harmony, calling for more study. Moreover:

\[
\frac{495}{g_1 = g_2 \tan \theta} \approx \frac{2 \times 137^3 \sqrt{\eta_1}}{\tau_0 \sqrt{\eta_2/\eta_1}} \quad (0.8 \text{ ppm})
\]

where \( \tau_0 + 1 = 3571 \approx \Phi^{17} \) is the 17th term of the Lucas series. This confirms that the meter unit \( l_1 \) is pertinent in the ppm domain, while the second \( l_1 \) is in the 100 ppm domain.

The Hubble Universe radius ratio \( R/\lambda_e \) shows this dramatic correlation:

\[
(4\pi)^2 R/\lambda_e \approx (\tau_0/\tau)^5 \quad (12 \text{ ppm})
\]

This corresponds to 3 ppb on \( \tau \), the mass ratio Tau/Electron.

Since \( \tau_0 = 3570 = 17 \times 210 \), this is related to the relation, involving the above central ratio \( u \):

\[
R/\lambda_e \approx (2/u)^{210} \quad (0.3\%).
\]

This is a confirmation of the Holic Principle [28], which favors the exponent 210, as explained in the following section.

3 HOLOPHYSICS

3.1 The Holographic Principle

In the same manner that the Higgs mechanism was inspired by an analogy with superconductivity, the Holographic principle was the idealization of practical holography.

The holography is the most practical way to deal with huge information. So, it is natural to consider the DNA chain as a temporal hologram. Such a concept of temporal linear holography was introduced in the Sanchez thesis (1975). The idea that global holographic equations could replace the classical differential ones was submitted by Sanchez, an holography specialist, to the de Broglie Foundation in 1993, which rejected it after six months delay. Strangely enough, at the same epoch, Gerard t’Hooft coined the term hologram in a theoretical model which connects a 3-dimension space to its boundary, a 2 dimension one, writing in Dimensional-reduction in quantum gravity, gr-qc 9310026v1 (19 Oct.
The situation can be compared with a hologram of a three dimensional image on a two-dimensional surface. So the two approaches may have been completely independent.

There are two kinds of holography. The most common is the monochromatic one, where a single wavelength is at work. But Dennis Gabor, in his original work, presented a new microscopic principle, a di-chromatic holography, one for the recording, the other for the lecture of the hologram magnified by the amplification factor, the ratio of the two wavelengths. This leads to a perfect 3D imagery.

In the official studies [6] there is a single wavelength, the Planck length $l_p$, the so-called natural length defined by the convention $\hbar = c = G$. The official approach starts from the black hole thermodynamics, but, strangely enough, no one recognized that the horizon radius of a black hole of horizon $R$ and mass $M = Rc^2/2G$ is given by a Gabor-type 2D-1D using $l_p$ and the Compton wavelength $d_M = \hbar/Mc$ of the black hole, considered as a particle, the natural consequence of the ‘no hair’ theorem:

$$\pi(R/l_p)^2 = 2\pi R/d_M$$  \hspace{1cm} (112)

which identifies not only with the Bekeinstein-Hawking entropy of the Black hole, but also with the testimony of Archimedes where the same constant $\pi$ is involved in the perimeter and the area of a circle, inducing a 2 factor between the perimeter and the area of a unit sphere. Nobody published this relation, because $d_M$ is inferior to the Planck length, which is considered as a limit, the so-called Planck wall.

If the official theorists had not taken this taboo such seriously, they would have deduced that the critical condition in cosmology, which identifies with the above relation, results directly from a 2D-1D Gabor-type holography, and so the recourse to the inflation would has not been necessary.

### 3.2 The Holic Principle

In 1994, Sanchez presented the essential idea, which is replacing differential equations by global ones, at the ANPA in Cambridge, so also introducing the Holic Principle, which identifies the dimensions of spaces with physical categories: 2 for Time, 3 for Space, 5 for Mass and 7 for Field.

So the third Keper law is justified, whose Diophantine treatment, i.e. assuming that Length an Time are quantified, results in a length proportional to the square of a whole number $n$, while the time is proportional to the cube of $n$. The other Kepler's law is the constancy of the area speed along a trajectory, which, since $4 - 3 = 1$, is thus simply proportional to $n$, implying a quantum for this area speed, which identifies with the Planck's constant divided by a mass.

It is strange that such an elementary argument was kept unnoticed during 350 years. If Newton had not insisted in differential equations for describing the ellipse, he surely could have found it. Even more strangely, Poincaré does not recognized this evidence. But, since he declared that the cosmology cannot be founded on differential equations, it is sure he would have found this if he has not disappeared so young. But such a Two-Times Physics ask for an explanation, given in section 2.2.
Extending the resolution to the Mass and Field ratio, the canonical Holic formula, since $2 \times 3 \times 5 \times 7 = 210$ writes:

$$T^2 = L^3 = M^5 = F^7 = n^{210}$$  \hspace{1cm} (113)

which is verified for the Universe radius, with $u = R_{hol}/R = pH/a^3$ and $2/u \approx 1/(1 - ln2/2)$ through:

$$R/\lambda_e \approx (2/u)^{210} \, a^{11/4}$$  \hspace{1cm} (8 ppm)  \hspace{1cm} (114)

$$\left(1 - ln2/2 \right)^{210} \approx \frac{\tau}{\sqrt{ppG}}$$  \hspace{1cm} (18 ppm)  \hspace{1cm} (115)

where $\tau$ is the Tau/Electron mass ratio, which was predicted by Eddington as the "heavy mesotron" from Hypersymmetry with the Proton.

### 3.2.1 The Holic-Holographic mono-electron radius $R_1$

The hearth of the Holographic Principle is the relation $x^2 = y^3$. This applies to the parameters $P$ (mass ratio Planck-electron) and $p$ (mass ratio Proton-electron) in the form:

$$3P = p^7 \quad p_P \approx 1840.978$$  \hspace{1cm} (116)

The mono-electron radius $R_1$ checks, with the Hass-Bohr radius $r_{HB}$:

$$\frac{R_1}{r_{HB}} \approx \left(\frac{(a/\pi)^6}{\mu^2}\right)^7$$  \hspace{1cm} (117)

$$\frac{R_1}{2r_{HB}} \approx \left(\frac{p_P^3}{\mu^2}\right)^7$$  \hspace{1cm} (118)

### 3.3 The Musical Cosmic Holography

The holographic principle favors the form $x^2 = y^3$. With $x = p$ this shows $y \approx 6^3$, a Pythagorean particularity since $3^3 + 4^3 + 5^3 = 6^3$. More precisely $6^9 \approx 3p^2_G = 3P^2/2^{127}$ leading to $P^2 \approx 2^{136}3^8$. The holographic Cosmos reduced radius exhibits the musical correlation $R_{hol}/\lambda_e = 2P^2/a^3 \approx 3^{14}(d_eH/n_4)$, where:

$$(d_eH/n_4) \approx (\pi/3)^{1/a} \approx (4\pi/\sqrt{a})^{1/210} \approx (d^2p_{m}/a^3)^{1/(4\times210)}$$ (12 ppb)  \hspace{1cm} (119)

where the holic central number 210 appears, tied to the economic numbers by:

$$3^4 + 2^7 + 1 = 2 \times 3 \times 4 \times 5 = 210$$  \hspace{1cm} (120)

Combining the two above musical relation thus leads to:

$$P^2 \approx 2^{136}3^8 \approx 3^{37}a^{3/2} \quad \Rightarrow 6^{137} \approx 3^{210}(r_B/\lambda_e)^3(a/137)^{1/2}/\beta$$  \hspace{1cm} (2.4 ppm)  \hspace{1cm} (121)

with $r_B$ the Bohr hydrogen radius, defined by $r_{HB}/\lambda_e = a(1 + 1/p)$. The importance of this result is that, while 137 is tied to 127 by the Lucas-Mersenne series $3 + 7 + 127 = 137$, the huge number $6^{127}$ is of the order of $R_c/\lambda_e$, while $R/2\lambda_e \approx N_L = 2^{127} - 1$, the Lucas Number, meaning the musical decomposition $6 = 2 \times 3$ resumes the Cosmos-Universe relation.
3.4 The Higgs number and the Economic Formalism

The measured value of the mass ratio Higgs Boson/Electron is compatible with 495$^2$, where 495 is the first term of the perfect couple 495-496, where 496 is the dimension number of the string group SO3. By nalogy with the above economic form 3$^{34}$, we introduce the analog number, implying the crystallographic number 495$^{495}$, 3.4 The Higgs number and the Economic Formalism

This means also particular relations, which have been independently observed: (32) 495/3 = 165 $\approx$ (2$\sqrt{137}\pi$)$^{1/2}$ (50 ppb), and with $\pi_5 = n_i/2\pi$, the 3.5 ppm approximation to the monstrous fifth term 292.6345874 in the fractional development of $\pi$. Recall that the fractional development of is an unsolved mathematical problem, but nobody remarked the liaison between $\pi_5$ and $n_i$:

$$495^{495} \approx (P/2)^{\pi_5^4} \approx e^{137p^6/a^2\sin^2\theta} \approx P^{3/\ln p + 1/\ln P}^3 \approx a^{(2a)^{2n}} \approx a^{495^{165}}$$

(122)

This means a geometrical relation between the central parameters $a$ and $p$,

$$a^2 \approx p^2 \approx e^{3/2} \approx (F/\pi)^{10/3}(\ln p)^3 \approx (2\pi)^{2/\ln p} \approx a^2$$

(123)

tied also with the cardinals of the Monster group $O_M$ and the Baby-Monster group $O_B$:

$$a^3 \approx (O_M O_B)^{\sqrt{\pi/\ln p}} \approx O_M^{2/3} \approx O_B^{4/3}$$

(124)

The analog expression with $p_0 = p_W(p/H)^2$ implies the economic number $E_3 = e^{a^2}$

$$(p_0^2)^3 \approx E_3 a^{3/2} \quad E_4^{1/4} \approx P^{(a-1)^2}$$

(125)

while:

$$E_3/E_2 \approx 2\sqrt{pH}(p/p_W)^2 (0.8 \text{ ppm}) \quad E_3/E_4^2 \approx 8 \times 127 \approx e^7 \approx (F/Z)^6$$

(126)

$$8E_2^3 \approx H \quad (33 \text{ ppm}) \quad 8E_2^3 \approx n_1 \pi \quad (6.7 \text{ ppm})$$

(127)

$$P^2 \approx (3\sqrt{2})^2 H/n_1 \quad (34 \text{ ppm}) \quad \approx (1/\sin\theta)^{495/\ln p} \sqrt{a/137} \quad (6 \text{ ppm})$$

(128)

Introducing $\pi$-dependent canonic economic factors:

$$\Rightarrow (2\pi)^{2/\ln p} \approx 495^{495^2/8} \approx \pi^{\pi} \approx (\pi/2)^2 \approx \pi^{\pi} \approx e^{a^2}$$

(129)

So the above economic numbers plays a role in physics, but have not been remarked in mathematics.

The above relations implies that $P/2 \approx e^{16\pi}$, whose deviation is doubly remarkable

$$P/2e^{16\pi} \approx 1 + 137^2a/\beta_0 p_H^2 \quad (0.45 \text{ ppm}) \approx (4\pi^3/2p_w)^2 \quad (0.8 \text{ ppm})$$

(130)

Note the direct relations:

$$\pi_5/\ln(\pi_5) \approx \ln P \beta p/p_w \quad (0.4 \text{ ppm}) \quad F \approx (4\pi/3)(\ln P)^3$$

(131)

This means also particular relations, which have been independently observed:

$$R/\lambda_e^{1/210} \approx 2a^3/p_H \quad (15 \text{ ppm}) \quad \ln p/\ln a \approx \ln \tau/\ln a \approx 210/a$$

(132)

This implies also the liaison between $\sin\theta$ and the canonic number $a_0 = \pi^{-1} = e^{\pi^2/2}$

$$\pi^3 \approx a_0 \sin^2\theta$$

(133)
which appears also in
$$\tau/\mu + 2 \approx a_0/e^2$$  \hfill (134)

Moreover, this implies, with $8a \approx e^7$ and $lnp \approx e^e/2$:
$$p^{1/p} \approx e^{1/e^7} \sin \theta \approx (3\pi)^{1/4a} \Rightarrow d^4p/H \approx (H\beta^2)^{1/1837} \approx (e^{e^2}/2)^{1/495}$$  \hfill (135)

Thus, the Higgs number is confirmed, as well as the connection with the $\pi$ Diophantine approximation problem, and the sporadic groups, since $a^a$ is tied to the product of the cardinals of the 20 groups of the happy family, and the Pell-Fermat and Lucas-Lehmer generators [31].

3.5 The Tachyo-Holography, Photon and Graviton Masses

The above Two-Times Physics is tied to the "photonde" concept: before a photon is detected, an overall mechanism involves the whole Universe through a feed-back tachyonic process. It is for this only reason that the energy of the photon is not dispersed away: the Universe compute what is the best place for collecting the whole energy of the photon.

This suggests the existence of a tachyonic pre-signal which determine which atom is devoted for the photon reception. Such a non-locality is specific of the quantum formalism, similar to the holographic one [31]. The Einstein model of the 'free propagating photon' is misleading, but is always central in the physics community: it is one cause for the present blockage of theoretical physics.

Gabor has associated the holographic resonance condition to a magnification of the hologram pattern. This was never achieved practically, but Nature could use another way: using a second speed $c'$ for tachyonic signals.

The sign of this tachyo-holography is the Kotov oscillation which shows no Doppler effect. Taking account of the Kotov length $l_K = ct_K$ [22], we have shown the following holographic cosmic [32] relation with the weak wavelength $\bar{\lambda}_w = \lambda_c/a_w$:
$$2\pi R/\lambda_w = 4\pi(l_K/\lambda_c)^2.$$  \hfill (136)

This relation use four lengths. A simplification towards only three lengths will occur by introducing a second Electron wavelength $\lambda_{e}'$, such that:
$$2\pi R/\lambda_{e}' = 4\pi(l_K/\lambda_{e})^2 = 4\pi(\lambda_w/\lambda_{e}')^2.$$  \hfill (137)

This means that $\lambda_{e}' = \hbar/m_ec'$ is defined using a signal speed $c'$ such that:
$$\frac{c'}{c} = \frac{\lambda_{e}'}{\lambda_e} = \frac{l_K}{l_w},$$  \hfill (138)

leading to $c' \approx 7.3367 \times 10^{44}$ m/s.

corresponding to two special masses associated with $\lambda_w$ and $\lambda_e$, which are natural candidates for the photon and graviton masses:
$$m_{ph} = \frac{\hbar}{c'e\lambda_w} \approx 1.22 \times 10^{-55} \text{kg}$$  \hfill (139)

$$m_{gr} = \frac{\hbar}{c'e\lambda_e} \approx 3.72 \times 10^{-67} \text{kg} = m_{ph}/a_w$$
This photon mass was anticipated by Christian Marchal [24]. The confirmation of the pertinence of these masses is the following tachyonic symmetric relation:

$$\frac{R_C R_{h_d}}{R} \approx \frac{\hbar^2}{G m_{bc} m_{ph} m_{gr}}$$

(140)

where $m_{bc}$ is the DNA bi-codon mass (section 5.3)

### 3.6 The Wien constant and the Bernoulli function

According to the preceding sections, the physical parameters must be connected to the parameters of the black body law. Indeed, Atiyah notes [2]:

*Hirzebruck (Topological methods in algebraic geometry) following in the steps of Euler and Riemann, introduced a formal algebraic process of multiplicative sequences. In such processes he defined exponentials over $\mathbb{Q}$. He showed that any such exponential has a generating function, and he focused on the Todd exponential, whose generating function is the Bernoulli function $\frac{x}{1-e^{-x}}$. The fact that this function is analytic implies that the Hirzebruck process extends from $\mathbb{Q}$ to $\mathbb{R}$. Strangely enough, Atiyah do not emphasize the fact that the above Bernoulli function is the kernel of the Planck’s law.

A central black-body parameter is the Wien constant, the ratio between the nominal and the Wien wavelength: $w_5 = 5(1 - e^{-w_5}) \approx 4.965114232$, a constant largely used by physicists, but unknown by current mathematics, which shows a dramatic pertinence in the neutron-electron mass ratio $n_t$, the proton one $p$ and the excess electron magnetic moment $d_e$:

$$n_t^{1/3} \approx w_5 (\frac{\pi}{2})^2$$

(16 ppb)

$$p \approx a^{3/2} \ln(3 + 1/(7 + 1/\sqrt{a}(\ln \pi)^{1/3})$$

(141)

$$d_e \approx (1 + e^{-w_5})^{1/6}$$

(0.16ppm)

One note the proximity $a \approx e^{w_5} - 2\pi$, suggesting $a$ to be a trigonometric line. Indeed, $\cos a \approx 1/e$:

$$a \approx e^{w_5} - 2\pi$$

(42 ppm)

$$\cos a \approx 1/e$$

(22 ppm)

(142)

$$\Rightarrow a \approx 44\pi - \arccos 1/e$$

(65 ppb)

This formula was extensively shown on the web, without indication of its provenance. The number 44 could be tied to the 22 dimensions of the X GUT boson (section 3.3).

$$\arccos 1/e \approx - \ln q$$

(35 ppb)

(143)

$$\Rightarrow a \approx 44\pi + \ln q$$

(0.2 pm)

So the parameters are clearly tied to the black-body’s ones.
3.7 The Eddington’s Hyper-Symmetry Proton-Tau

The most characteristic symbolic liaison between $a$ and $p$ is the following relation:

$$ p^{a^3} \approx (a^3)^{(a^3)} . $$

(144)

There is a similar relation tying the heavy leptons:

$$ \tau^{a^2} \approx (\mu)^{((2\pi/3)^a)^2} . $$

(145)

This confirms the Hyper-Symmetry Proton-Tau, predicted by Eddington who called "heavy Mesotron" the new particle, which was discovered only 35 years later, in a total surprise, since the Eddington’s theory has been rejected and forgotten. Here is the prophetic Eddington’s sentence:

"There seems to be no reason why there should not also exist heavy mesotrons which decay into protons and negatrons. Their mass is obtained by substituting $m_e$ for $m_p$ in (104-5). The result is $2.38 m_p$.”

The true value is 1.89, smaller by a factor near $\sqrt{\pi}/2$. The Eddington’s value for the mass ratio Muon/Electron is $\mu/e \approx 173.98$. One observes the following relations:

$$ \frac{\mu}{\mu_e} \approx 20 \frac{\mu}{\tau} \approx 2^{1/4} $$

(146)

A more direct confirmation of the Proton-Tau symmetry is provided by the relations:

$$ \frac{\sqrt{pH\mu\tau}}{F} \approx e_F = \frac{106}{39} (-5.9 \text{ ppm}) \approx e\left(\frac{137}{a}\right)^{1/2} (2.9 \text{ ppm}) $$

(147)

$$ \Rightarrow \left(\frac{\sqrt{pH\mu\tau}}{F}\right)^3 \approx \frac{106 \times 137 e^2}{39 a} (6 \text{ ppb}) $$

(148)

Since the discovery of the Higgs boson, no observation favors the Supersymmetry, the hope of theoreticians to deblock the Particle Physics, but no one recalls the Eddington’s prediction.

Moreover, the symmetry Tau-Nucleon is patent in:

$$ \frac{F}{n_t} \approx \left(\frac{\tau^3}{pHn_t}\right)^3 (5.4 \text{ ppm}) \approx \frac{H}{n_t} \left(\frac{r}{H}\right)^9 (5.4 \text{ ppm}) $$

(149)

showing that this Eddington’s Hypersymmetry is tied to a Proton-Hydrogen-Neutron one and a cubic process, confirmed by:

$$ \left(\frac{2a^3}{ppc}\right)^2 \approx \left(\frac{n_t}{p}\right)^{1/2} \frac{F^2}{ppc} (2.4 \text{ ppm}) $$

(150)

tying gravitation and particle physics.

Concerning the main parameters of Particle physics, the computer shows

$$ \tau^6 \approx \frac{n_t^2 F^4}{(\mu H/p)^5} (1.8 \text{ ppm}) $$

(151)

Its pertinence is confirmed by the computer leading to (10 ppb precision):

$$ P^4 \approx F^4a^4a^6n_{pn}n_\mu^6\tau^3 \Rightarrow \left(\frac{p}{Fa^{9/2}}\right)^4 \approx n_{pn}(H\tau(\mu/137)^2)^3. $$

(152)
Taking account of \( F^2/pH = \mu^4/a^2 \), this implies:

\[
R/2\lambda_c \approx (p\mu)^{1/2}(\mu a)^7((H\tau)^{1/2}/137)^3
\]

(153)

with \( R/(\lambda_p\lambda_H)^{1/2} = (WZ)^4 \), this means the property:

\[
2p(H\mu t)^{1/2}(\frac{\mu a(H\tau)^{1/2}}{137})^3 \approx \left(\frac{WZ}{\mu a}\right)^4
\]

(154)

This shows the symmetries \( a - \mu \) and \( H - \tau \). The proton-Tau symmetry is confirmed by the ppb relation:

\[
\frac{\tau}{\sqrt{ppG}} = \left(2a^3/p_G^2\right)^{3/2} \frac{1}{d_c(a/137)^2}
\]

(155)

This confirms also \( G \) and the Koyde relation defining the \( \tau \) value from the \( \mu \) one.

Thus it is time to come back to the Eddington’s Fundamental Theory.

4 DIOPHANTINE PHYSICS

4.1 The Systema Number and the Great Musical Scale

In the same perspective of all-arithmetic physics, the "Arithmetic Relators" have been introduced by Thiébault Moulin [26]. Indeed its “Système Number”:

\[
N_S = 2^{65} \cdot 3^{41} \cdot 5^{28} \approx e^{137}/2\pi \approx (2\pi)^{2\sqrt{3}T} (0.07 \%) \approx 495^{6/2\pi d_e} (0.6 \%)
\]

(156)

is based on the second optimal musical scale with 41 notes [15]. From \( 2 \times 41 = 3^4 + 1 \) and \( 65 = 2^6 + 1 \) this is tied with the separation Cosmos- Universe, the proximity of the 4-step cubic operation of base 3 with the 4-step Combinatorial Hierarchy with base 2, where \( R_{hol} \) is the reduced holographic radius of the huge Cosmos behind [31]:

\[
\frac{R_{hol}}{\lambda_c} \approx 3^{41} (0.03 \%) \approx (4/3)(2^{27} \approx R/\lambda_c) (0.56 \%)
\]

(157)

In fact, the above musical scale with 41 notes is the sixth in the logical order given by the fractional series of \( \ln 3/\ln 2 \) (OEIS n° A028507): 1, 1.1, 1.2, 1.3, 1.5, 2.23… This last number is the entire part of \( e^\tau \) and \( 2\sqrt{a} \). Thus, the ninth scale is very special: \( 2^{1/665} \approx 3^{1/1054} \). One observes the dramatic relations:

\[
3^{665} \approx \mu^a \approx (\sqrt{a})^7/\sqrt{\pi} \approx \tau^{(p/a)^2/2}
\]

\[
\sqrt{665} \ln 3 \approx 3^3 + 4/a \quad (63 \text{ ppb})
\]

(158)

This last number will be decisive in the couple Sun-Earth (section 4.3).
4.2 The Cosmic Axis and the Bosonic String Theory

The Cosmic Large Number correlations, when extended to small numbers exhibits a series of 8 holic relations of the simplest form \( y = x^2 \) with successive inversion in a symmetry macro-micro-physics. This leads to the Topological Axis (or Cosmic Axis) [31], which appears to be the skeleton of main physical parameters distribution. This is comforted by the following considerations

From gauge symmetry considerations, Itzhak Bars [3] have shown that Time with \( d_T = 1 \) dimension when associated with \( d_S \) spatial dimensions is equivalent to two dimensions-Time associated to \( d_S + 2 \) spatial dimensions. This means that, from the simplest Single-Electron cosmic sweeping model \( d_T = 1, d_S = 1 \) [31], with a total of 2 dimensions, this is equivalent to \( d_T = 2, d_S = 3 \). From the Holic Principle [28] which states that in the basic Diophantine equations the exponents are the dimensions, this implies the Kepler law:

\[
T^2 = L^3 .
\] (159)

Considering this Kepler Law as a Diophantine Equation, i.e. assuming the quantification of both Time and Length, we have shown how the symmetry between the Newton and Planck constants involves quantum physics and coherent cosmology [30]. This symmetry is patent when one separates the mass from the kinematic terms, and there is a logical place for a speed, identified as the light speed:

\[
GM = L^3/T^2 \quad ; \quad \hbar/M = L^2/T = GM/c \quad \Rightarrow \hbar c / G = m_P^2
\] (160)

Note that in a Space with more than 3 dimensions, the atoms would be unstable [39] [13]. The intuitive Space - Time involves 4 dimensions instead of the 5 of Kaluza-Klein model [16]. We suppose that this dimension 4 is the periodicity starting from \( d = 2 \). So one gets the series of twice the odd numbers. When limited to 8 numbers, this is the Bott octonion sequence of the Cosmic Axis:

\[
2, 6, 10, 14, 22, 26, 30.
\] (161)

The 4 first numbers, corresponding to quaternion algebra, are the spectroscopic numbers of the Periodic Table, respectively for orbital numbers \( k = 0;1;2;3 \) [32]. So the string concept, identifies with the spin one, both with 2 dimensions.

Moreover, the gauge bosons seem are clearly associated to the odd values of \( k \):

\[
k = 1, d = 6, \quad \text{Gluon (massive)}
\]

\[
k = 3, d = 14, \quad \text{Weak boson}
\]

\[
k = 5, d = 22, \quad \text{GUT boson}
\]

\[
k = 7, d = 30, \quad \text{Universal boson}
\] (162)

The liaison between the associated Topological function \( f(d) = e^{d/4} \) and the particle physics is the following dramatic relation, involving the string-spin generator term:

\[
f(2) = e^{\sqrt{2}} \approx \frac{\sqrt{2}}{g_1} \approx \frac{\sqrt{7}}{g_2} \approx \frac{\sqrt{T}}{g_3}
\] (163)
where $\Gamma = \gamma a/\pi$ is the Atiyah’s constant, and $g_1, g_2, g_3$ are the gauge coupling constants, where the following symmetry is admitted: $g_1g_3 \approx g_2/(1 + g_1^2 + g_2^2)$. One recognizes the numbers 2, 7 and 25.5 appearing in the Nambu rule [27] for the Pion, Kaon, Tau.

Let us recall the optimal relations between the gauge coupling constants:

$$1/g_0 = 2a^3/ppc \approx 1 + g_1^2 + g_2^2 \quad (0.13 \text{ ppm}) ; \quad \frac{g_0}{g_2^2} \approx \frac{a^{3/2}}{1373e^2} \quad (0.20 \text{ ppm})$$

(164)

We proposed the following symmetric value of $g_3$, which shows the property:

$$g_1g_3 = g_0g_2 \approx (e/\pi \tau/\mu)^6 \quad (3 \text{ ppm}) ; \quad \pi \tau/\mu = 3 + 1/(7 + \mu/\tau)$$

(165)

confirming that the parameters are tied to the fractional development of $\pi$.

Here, it is a symbolic one where the final term 17 = $\tau_0/\mu_0$ of the above Ptolemae approximation is replaced by $\tau/\mu$.

In the Topological Axis, the Cosmos seems to correspond to the symbolic orbital number $k = e^2$. This induces a liaison between the optimal base $e$ and the simplest base 2:

$$2^{e^2+1/2} \approx e^{2e} + e^2 + 1/8\sqrt{137} \quad (2 \text{ ppb})$$

(166)

The Topological Axis takes then the name of Cosmic Axis [31]. The following sections will extend its denomination to ”Cosmo-Anthropic” or ”Solanthropic” Axis.

4.3 The red-shift periodicity

William Tifft has revealed a periodicity $\Delta v \approx 72 \text{ km/s}$ in the galaxy red-shifts. This corresponds to $c/\Delta \approx 4170$, which is close to mass ratio Fermi/Nambu $\approx 4181.5$, which is itself close to the 19th Fibonacci number 4181. Comparing this number with the above holic number $\tau_0 = 3570$, this leads to:

$$\frac{4181}{3570} \approx \frac{\sqrt{137}d_e}{10} \quad (3 \text{ ppb})$$

(167)

Moreover $3570/10 = 357$ is close to the $(P/F^3)^{1/2}$, leading to:

$$\frac{P^5}{Pa^3} \approx 1 + \frac{2}{3 \times 139} \quad (1 \text{ ppb})$$

(168)

where 139 is the above Atiyah’s Algebra number (section 3.7). This correction factor appears in the holographic relation tying the cosmic holographic radius with the Neuron (section 3.1).

4.4 The rehabilitation of Wyler’s Formulas

Armand Wyler [44] proposed the following formulas, from holographic considerations in spaces of dimensions 5 and 7:

$$p \approx p_W = 6\pi^5 \quad (18.8 \text{ ppm})$$

$$a \approx (16/9)(120\pi^{11})^{1/4} \quad (0.61 \text{ ppm})$$

(169)
This approach supported many critics, but nobody looked for the special \( \pi \)-value this implies. In the formula for \( a \), the corresponding \( \pi \)-value is very special:

\[
\pi_W = 3 + \frac{1}{7 + \frac{1}{16 - \frac{2}{163}}} = \frac{67 \times 863}{45 \times 409}
\]

\[
\Rightarrow \quad a_W \approx 137.359990936148
\]

which is compatible with the measured value 137.035999084(21). The power 11 could be tied to the 11 D supergravity \cite{42}.

This confirms the Wyler’s approach, whose value for \( a \) has been discarded, because of the single use of the mathematical value of \( \pi \), which cannot be realized in the Total Quantum Physics.

### 4.5 The Symbolic Holographic Principle

As seen above the Holographic Principle is manifest in Cosmology. But since the real Total Quantum Holographic Principle cannot use the mathematical \( \pi \), because it is not rational, a more general version, the Symbolic one, uses different values of \( \pi \) which are rational, even in a symbolic manner. So we introduce the quasi-holographic relation tying the two Heavy Leptons:

\[
\pi \tau \tau^2 = \left(\frac{4\pi}{3}\right)\mu^3.
\]

With the choice

\[
\tau/2 = 6\pi_r^2 \quad ; \quad \mu = 2\pi_{\mu}^4
\]

the above quasi-holographic relation is correct to 158 ppm.

Another case is the holographic relation tying the gravitational, electrical and Fermi coupling constants:

\[
4\pi(P/a)^2 \approx \left(\frac{4\pi}{3}\right)(aa_w)^3 \quad (0.1\%)
\]

The rather large imprecision is drastically reduced by using the following \( \pi \) values:

\[
4\pi_{\tau/\mu}(P/a)^2 \approx \left(\frac{4\pi}{3}\right)(aa_w)^3 \quad (0.6\ ppm).
\]

The first value is the Ptolemae approximation \( 3 + \frac{1}{7 + \frac{1}{17}} \), where 17 is replaced by \( \tau/\mu \). The second one is the canonic value \( \pi_q = \frac{aq^2}{4} \approx 2 + \ln q \).

Also, there is:

\[
4\pi p_G^2 \approx 2\pi_{30}\sqrt{aa_w} \quad ; \quad \pi_{30} = 3 + 7 + \frac{1}{30} = 3.221\ \frac{211}{211} \quad (0.6\ ppm).
\]

Moreover, the corresponding length \( ct_N \approx 9R_T/10 \), enters a \( \lambda_e \) monochromatic holographic relation with \( R_{hol} \), with \( \eta = F^5/P\alpha^3 = 1 + 2/\left(3 \times 139\right) \) with also a relation with the Egyptian length \( D_{Eg} = 3570\ l_1 = \sqrt{2R_T}/l_1 \) defining the meter \( l_1 \) from the Earth radius \( R_T \) (section 5.4):

\[
\eta\left(\frac{ct_N}{\lambda_e}\right)^2 = \frac{R_{hol}}{2\lambda_e} \approx \frac{D_{Eg}}{l_p} \quad (0.06\ %)
\]
Eliminating $D_{E_8}$ implies the following connection involving $p_W = 6\pi^5 = \frac{(2\pi)^3}{4\pi^3}$, and leads to the following symmetric holographic relation:

$$\frac{4}{3} \approx (p_W d_e^2) (0.5 \text{ ppm})$$

$$(R_C R_T l_1)^{1/3} \approx \frac{137\pi^{1/3}2\pi^2(\lambda_e d_e)^3}{(4\pi/3)^{2/3}(al_F)^2} (60 \text{ ppb}) \approx \frac{R_W a^{3/2}}{\sqrt{p_W}} (3 \text{ ppm})$$

defining the meter to 180 ppb. Interestingly enough the additive term $137\pi^{1/3} \approx 200.65$ is close to the Human Measure (section 5.5). Through the above ppb connection with the musical Human nervous system, this confirms the unicity of the tetrade Cosmos-Universe-Earth-Human, the Solanthropic Principle.

### 4.6 The Electric $\pi_q$ value

According to the standard theory, the electrical parameter $a$ is related to the electric charge $q = W\sin \theta$ where $\cos \theta = W/Z$ by the relation $aq^2 = 4\pi$. Now these parameters are sufficiently well defined to observe that this relation is out by 0.01%. As seen in the previous section it is what one must face in a Diophantine world: the mathematical $\pi$ must not be the final word. So the above relation must be understood as defining a specific value $\pi_q$:

$$\pi_q \approx 2 + \ln \pi \ (15 \text{ ppb}) \ ; \ \pi_q \approx 3 + 1/(7 - 1/(11 + 1/25)) \approx \frac{1999}{1907} (3 \text{ ppb})$$

$$\ln a \approx \frac{a^2}{1836 + 1/\Phi} \ (0.4 \text{ ppm}) \ ; \ \ln \Phi \approx \frac{a^2 p}{p_W n_t} \ (0.3 \text{ ppm})$$

$$(4\pi n_t/p)^2 \approx \frac{d_e \sqrt{p/p_W}}{(\pi/3)^{2/3}} (0.4 \text{ ppm}) \ ; \ \pi_q \approx \frac{n_e}{n_t} \left(\frac{\pi}{e}\right)^2 (1.6 \text{ ppm})$$

$$\ln P/\pi \approx \frac{\pi e}{\sqrt{a_s}} (1 + 1/\sqrt{p/\eta}) \approx \frac{\pi q a_s}{\Phi} (1 + 1/n_t) \ (40 \text{ ppb}), (11 \text{ ppb})$$

This comforts the Diophantine Physics, in particular through the Golden Number $\Phi$.

This corresponds to the following $\pi - e$ large number correlation:

$$e^{\pi e} + 135 \approx \pi^{1907n_D/\sqrt{\pi}} \approx a \sqrt{D} \approx D_{ppc}/a^2$$

where $D = 1966883$ is the Monster group dimension.

### 4.7 The Lucas and Euler Large Mersenne Numbers

The Lucas Large Mersenne number $N_L = 2^{127} - 1$, where 127 is itself a Mersenne number. It results from the above holography analysys the identification defining the CMB wavelength $\lambda_{\text{CMB}} = hc/k_BT_{\text{CMB}}$:

$$N_L = \frac{2\pi \lambda_{\text{CMB}}}{\lambda_e} \approx \frac{\pi \lambda_{\text{CMB}}^2}{\lambda_H^2}$$

Now $\lambda_{\text{CMB}}/\lambda_e$ is close to the Euler Mersenne number $N_E = 2^{31} - 1$, where 31 is also a Mersenne number. The correlations show:

36
\[ N_E^2 = N_L/8N_E^2 \approx \frac{\pi^4 a^{3/2} p^2 H n_t}{a_w W Z} \quad (70 \text{ ppb}) \]
\[ \frac{\lambda_{CMB}}{N_E \lambda_c} \approx \frac{\pi^3 a_w Z}{(p n_t)^2 W} \quad (0.5 \text{ ppm}) \]
\[ \Lambda = \frac{1}{\pi} \frac{\lambda_{CMB}^2}{\lambda_c^2} = \frac{8\pi \lambda_{CMB}/\lambda_c}{\lambda_H^2} \approx \frac{N_E^2 P n_t}{a_w W^2 p \sqrt{a}} \quad (0.6 \text{ ppm}) \]
\[ \frac{P}{p W^2 \sqrt{a}} \approx \frac{4 H a^2}{\pi^2 Z} \approx \frac{a_w A}{N_E^2 n_t} \quad (0.4 \text{ ppm}) \]

The Lucas number is also close to \( R/2\lambda_c \). The correlation analysis shows that two corrections occur, which are connected with the ratio \( a/137 \):

\[ N_L \approx \frac{R}{2\lambda_c} \frac{H(4\pi)^2 \sqrt{a}}{n_t^2} \frac{W Z \sqrt{a}}{a_w} \quad (0.16 \text{ ppm}) \]
\[ \frac{H(4\pi)^2 \sqrt{a}}{n_t^2} \approx \left( \frac{a}{137} \right)^{17+1/4} \quad (24 \text{ ppb}) \]
\[ \frac{a_w}{W Z \sqrt{a}} \approx \left( \frac{a}{137} \right)^4 \quad (1.8 \text{ ppm}) \]

4.8 The Electrical Moonshine

A dramatic connection was made between a priori very distinct domains, implying the dimension \( D = 196883 \) of the Monster group. Edgar Witten suggested that its logarithm could be pertinent [43]. Indeed, one observes, with \( d_0 = 26 \), the main dimension of the bosonic string theory:

\[ 6d_0 \ln D \approx (137/\pi_{16})^2 \quad (24 \text{ ppb}) \approx (a/\pi)^2 - 1 \quad (49 \text{ ppb}) \]
\[ 2d_e D \sqrt{a} \cos^2 \theta \approx E_3^{1/2} p \sqrt{\langle n_t/H \rangle} \quad (0.6 \text{ ppm}) \]
\[ 4\sqrt{D} E_3^{1/2} \approx (16e)^2 p H / n_t d_e \quad (5 \text{ ppm}) \]

where \( \pi_{16} = 3 + 1/(7 + 1/16) = 355/113 \), and \( E_3 = e^{e^e} \).

4.9 The Monster Group

The Monster group cardinal us tightly tied to the Rydbergh reduced wavelength \( \lambda_{Ryd} = 2(aH/p)^2 \lambda_c \):

\[ O_M \approx (p/n_t)(d_e a \lambda_{Ryd}/H)^2 \quad (3, 4 \text{ ppm}) \]

confirming that the Total Quantum Physics is tied to the Monster group, which shows also

\[ O_M/48 \approx (1836 \times 1837 \times 1838.5)^5 p (n_t/1838.5) \quad (45 \text{ ppb}) \]
The logarithms of $O_M$ shows also the following relations, :

\[
3 \ln O_M/e \approx 137 \quad \text{(68 ppm)}
\]

\[
\ln O_M/\ln \ln \ln O_M \approx 2 \times 137 \quad \text{(8 ppm)}
\]

The orders of the monster groups $O_M$ and $O_B$ checks:

\[
O_M O_B \approx \Phi^{420}/\sqrt{\pi} \quad \text{(0.6 %)}
\]

\[
O_M O_B \approx n_{ph}/\ln \pi \quad \text{(0.7 %)}
\]

### 4.10 The Atiyah’s Algebra Formula

The Atiyah’s formulation for 137 is $2^7 + 2^3 + 2^0$, associated to three algebra\[2\]. Including the lacking complex algebra term $2^1$, this defines $137 = 139 - 2$. Now $139 \approx e^{\pi^2/2} = i^{-i\pi} = a_0$. The latter’s checks :

\[
\sqrt{a_0} = i^{-\ln i} = e^{(\pi/2)^2} \approx \sqrt{\pi} + \frac{d_c}{\sqrt{a}} \quad \text{(14 ppb)}
\]

\[
K_{0}/7 \approx \sqrt{\pi} a_0 \quad \text{(39 ppm)}
\]

comforting the pertinence of the Nambu rule \[27\], where the relations $\tau_0 = \frac{H_0 \sqrt{a_0}}{2 \pi a K_0}$ and $\sqrt{\pi} = \frac{a W_{\pi}}{2 K_{\pi} H_{\pi}}$ specify the strange mesons masses: $K_0 \approx 973.811$ and $K_{\pm} \approx 966.122$.

### 4.11 The Ramanujan-Hardy Partition Formula

Main physical parameters are clearly tied to the Ramanujan-Hardy asymptotic formula for the number of partitions of a whole number. Indeed with:

\[
Part(n) = \frac{e^{\pi \sqrt{2n/3}}}{4n\sqrt{3}}
\]

\[
Part(137) \approx \frac{a W}{H} \quad \text{(8 ppm)} \quad f(18) (\ln \pi)^4 \quad \text{(48 ppm)}
\]

\[
Part(1836) \approx \frac{p^2 a \sqrt{H/n}}{p} \quad \text{(2 ppm)} \approx 2\sqrt{O_M O_B} / (\pi) \approx \Phi^{\mu+2}
\]

where $f(18)$ is the topological function $f(d) = e^{2\pi^2/d}$ for $d = 18$. Since $\mu$ is close to the canonical Holic number \[28\] $210 = 2 \times 3 \times 5 \times 7$ this establishes a link between the Golden Number and the orders of the monster groups $O_M$ and $O_B$.

### 4.12 The Economic Numbers

Introducing the 4th order economic number $E_4 = \exp(\exp(\exp(1)$, one observes the dramatic:

\[
E_4^{1/4} \approx p^{(\alpha-1)^2}
\]

(190)
The corresponding $E_3$ and $E_2$ checks:

\[
E_3/(2E_2)^3 \approx 137 \\
E_2^{1/2} \approx 6\alpha_4/13 \\
E_3/E_2^3 \approx (F/Z)^6 \\
(2\alpha)^3/E_3 \approx 137^2/\tau
\]

(5.7 ppm)  
(18 ppb)  
(65 ppm)  
(0.6 ppm)

This opens a new research domain.

### 4.13 The Lucas-Lehmer series and the Pell-Fermat generator

The number $a^a$ is related to the Cosmos volume, with unit length the Hass-Bohr radius \cite{31},

\[
a^a \approx \frac{4\pi^2}{3} \left( \frac{p}{n_t} \right)^2 \left( \frac{R_G}{\tau_{HB}} \right)^3
\]

(10 ppm)  \hspace{1cm} (192)

and to the product of the cardinals of the 20 sporadic groups of the Happy Family of the Monster. Moreover it is close to the ninth term of the Lucas-Lehmer series, which is used to decide if a number of the form $2^n-1$ is prime. Its starts from 4 and proceeds by the law $a_{n+1} = a^2 - 2$ (OEIS A003010).:

\[
a \ln a \approx \sum_{i=1}^{20} \ln O_i \\
(400 ppm)
\]

\[
a \ln a \approx 2^n \ln(2 + \sqrt{3})
\]

(47 ppm)  \hspace{1cm} (193)

\[
a \ln a \approx 3(2^8 - 1) \ln(1 + \sqrt{2})
\]

(0.4 ppm)  \hspace{1cm} (194)

This connects the generator $(2 + \sqrt{3})$ of the Lucas-Lehmer series with $(1 + \sqrt{2})$, that of the Pell-Fermat series.

### 4.14 The Monster Number $\pi_5$ in the $\pi$ fractional series

Recall that the fractional development of $\pi$ is an unsolved problem in mathematics. The Ptolemae's approximation $377/120$ involves the Egyptian series $1 + 1/2 + 1/3 + 1/4 + 1/5 = 137/60$. The OEIS A001203 gives the numbers in the fractional series of $\pi$:

\[
3, 7, 15, 1, 292, 1, 1, 2, 1, 3, 1, 14, 2, 1, 2, 4, 2, 6, 6, 99, ...
\]

So, the Monster Number $\pi_5 = 292.6345904$ could be related to the parameters. Indeed:

\[
\pi_5 \approx n_t/2\pi
\]

(3.4 ppm)  \hspace{1cm} (195)

It is surprising that such an evident correlation has escaped general attention.
4.15 The Golden Number and its powers

The ratio $8/5$ is a canonic approximation for $\Phi$. One notes

$$p \approx (8/5)^{16}/d_e^4 \quad (5 \text{ ppm})$$

$$\Rightarrow \sqrt{2} \approx 2(\Phi^2_4 - 1) ; \quad \Phi_4 = 1 + 1/(1 + (1 + (1 + (1 + p^{1/16})))$$

The term $\Phi^2/2$ is very close to the number $\Omega_2 = e^{e^{-11}}$, the unknown extension of the number $\Omega_1 = e^{e^{-1}}$ (OEIS A201942). One observes:

$$p/\Omega_2 \approx a^3/p \quad (7 \text{ ppm})$$

$$p\Omega_2 \approx (1836/a)^3 \quad (0.9 \text{ ppm})$$

$$\Rightarrow p_0p^2 \approx (1836)^3 \quad (8 \text{ ppm})$$

5 DIOPHANTINE ASTRONOMY

The Modern Science really began when Kepler tried to find an harmony in the sky. This is the prolongation of his study.

5.1 The Kotov, Schwabe, Milankovitch and Cosmic cycles

The Hubble period $T = R/c$ and the Kotov period $t_K \approx 9600.59$ second are clearly tied to the Schwabe Period 11.02 years, the Milankovitch 100 000 years and an unexplained 400 000 years, called "Cosmic". With $l_K = ct_K$ and the Bohr’s radius $r_B = a(1 + 1/p)\lambda_e$, we propose the holographic definitions:

$$\frac{R}{r_B} = \left(\frac{R}{l_{Sch}}\right)^{4} = \left(\frac{R}{l_{Milank}}\right)^{7} \approx W^7$$

$$\left(\frac{R}{l_K}\right)^2 = \left(\frac{\pi K}{3}\right)^{3} = \left(\frac{R}{l_{Cosmic}}\right)^{6} \quad \pi_K = \pi \frac{\beta e^c}{\sqrt{\pi n_1/8}} \approx \frac{22}{7} \quad (29 \text{ ppm})$$

producing $t_{Sch} \approx 11.019708$ years, $t_{Milank} \approx 87 367.5$ years and $t_{Cosmic} \approx 387 170.2$ years. The synthetic way to connect these relations involves the cube of the length ratios, and the Holic Principle involves the power 28:

$$\left(\frac{R}{r_B}\right)^3 = \left(\frac{R}{l_{Sch}}\right)^3 = \left(\frac{R}{l_K}\right)^3 = \left(\frac{R}{l_{Cosmic}}\right)^3 \approx M_{11}^{28}$$

where $M_{11} = 8 \times 9 \times 10 \times 11 = 16 \times 495$ is the order of the first Mathieu group. Mathematicians have not emphasized the fact that the definition of a perfect number implies its antecedent. For instance the couple $(5,6)$ is perfect since the sum of the true divisors of 6 est $6-1 = 5$. In this definition the use of the unity as a divisor is escaped. We have suggested that this co-perfect number 495 is the square root of the mass ratio Higgs/Electron.
5.2 The Music of the Sun

We have studied the $t_K \approx 9600.59$ s period of both the Sun and several quasars.

As recalled above, since the latter are without any Doppler effect, apart some de-phasings, it was viewed as the sign of non-local physics. So we proposed the following holographic relations with the Universe radius $R$ and Cosmos radius $R_C$, with $l_K = c t_K$:

$$l_K^3 \approx R^2 r_e / 2 \approx R^3 l_P / 3 r_e \approx R_c l_P r_e / \sqrt{3} \Rightarrow l_K^3 \approx R_c^4 r_e^4 / R^3 \quad (200)$$

In fact, instead of the classical radius of the electron $r_e$, the wavelength of the Pions appears to specify these relations:

$$l_K^3 \approx (3/\pi a) R^2 / \lambda_{\Pi_0} ; \quad \lambda_{\Pi_0} = \sqrt{(a^2 - 137^2)} \Rightarrow \Pi_0 \approx 264.14539 \quad (201)$$

$$l_K^3 \approx R_c^2 (2d_e \lambda_{\Pi_0} n_e / p_W) / R^3 ; \quad p_W = 6 \pi^5 \Rightarrow \Pi_{\pm} \approx 273.13265$$

This mass ratio charged pion/electron $\Pi_{\pm}$ is within the 1.3 ppm official precision. For the neutral one $\Pi_0$, this value is $2\sigma$ larger than the standard value. It is significant to obtain such precise results by a succession of elementary approaches.

The current solar cycle 25 prolonged the list of the Wolf number extrema observed from Galileo’s time: 75 epochs, from 1610 to 2022, — and those extrema fixed the Schwabe’s period as 11.07(4) years. The Hale’s magnetic cycle of the Sun, therefore, is equal to 22.14(8) years.

This Schwabe sun period $T_{Sch}$ seems associated with the neutral Pion wavelength, through:

$$r_{HB} \lambda_{\Pi_0} \approx T_{Sch} \Rightarrow T_{Sch} \approx 11.018 \text{ years} \quad (202)$$

where $r_{HB} = (aH/p)\lambda_6$ is the Haas-Bohr’s atomic radius. The length $l_{sch} = c T_{sch}$ enters a holographic relation:

$$\left( \frac{R}{l_K} \right)^2 \approx \frac{\pi a p}{3 \beta H} \left( \frac{R}{l_{sch}} \right)^3 \quad (0.6 \text{ ppm}) \quad (203)$$

So, the cosmic origin of the Schwabe period cannot be denied. According to 54-year observations of the Sun-as-a-star, through Zeeman measurements performed in 1968–2021 by the Crimean Astrophysical Observatory (CrAO), Wilcox Solar Observatory (Stanford) and five other observatories of the world, the variation of the solar mean magnetic field reveals a saw-tooth shape, supporting thus this cosmological status of the Hale cycle; this sharp rise of the magnetic temporal profile means cosmic periodic quantum transitions [21].

Another periodicity, about 5 minutes, has been detected in the sun [38], which corresponds to the same musical note (Lab) that the one deduced from the Neuron $t_N = G_5^{3/4} / h^2 G^{3/4} \approx 19.137$ ms appearing in the Permanent Cosmology [31](section):

$$t_s \approx 2^{14} t_N \approx 313,541 \text{ s} \Rightarrow 1/t_s \approx 3.19 \text{ mHz} \quad (204)$$

So, this sun oscillation period confirms the musical octave-reduction principle which favors the diapason 442.9 Hz.
5.3 The Sun-Earth couple and the Great Musical Scale

Kotov [20] has revealed the following relation tying the spin period of the Sun $t_S = 27.027(6)$ to the mean terrestrial day, the Earth spin period, while $T_E = 365.26$ $t_E$ is the Earth orbital period:

$$\frac{(t_S)^2}{t_E^2} \approx \frac{2T_E}{t_E} \quad (0.04 \%)$$  \hspace{1cm} (205)

With $2 = 2\pi/\pi$, this is a basic holographic relation. Moreover, this number has been signaled above (Eq. 20), as characterizing the Large Musical scale:

$$665 \ln 3 \approx \frac{(t_S)^2}{t_E} \quad (0.04 \%) \approx 6 \ln \mu \quad (60 \text{ ppm}) \quad (206)$$

Such a correlation specifies the system Sun-Earth. Moreover, with $p_P = a^{12}/P$:

$$\frac{p_{Ed}\Delta_{Ed}}{a} \approx p_G \quad (64 \text{ ppm}) \approx \frac{p_P}{d_e^2} \quad (120 \text{ ppm})$$

$$\Rightarrow \quad \frac{p_{Ed}\Delta_{Ed}}{a} \approx p_G \quad (64 \text{ ppm}) \approx \frac{p_P}{d_e^2}$$  \hspace{1cm} (207)

This confirms the implication of the Eddington's mass ratio, $p_{Ed} \approx 1847.599459$, the ratio of the two roots of his equation $10x^2 - 136x + 1 = 0$ with discriminant $\Delta_{Ed} = (136^2 - 40)^{1/2}$. Thus, the system Sun-Earth rehabilitates the Eddington's equation. From the approximate holographic relation $4a^3/3 \approx p^2$, one observes:

$$\frac{T_E}{t_S} \approx \left(\frac{4}{3}\left(\sqrt{\frac{137a}{3}}\right)^3\right)^{1/2} \approx \frac{1836}{\Delta_{Ed}} \quad (0.02 \%)$$

$$\Rightarrow \quad \frac{(4\pi/3)(\sqrt{137a})^3}{a} \approx 4\pi/3 \left(\sqrt{137a}\right)^3 ; \quad \pi_0 = 3 + 1/(7 + 2/(\pi_0)^2) \approx (0 \text{ pb})$$

$$\Rightarrow \quad (4\pi/3)(\sqrt{137a})^3 \approx 137^2 W/2a \quad (70 \text{ pb})$$  \hspace{1cm} (208)

The presence of $\pi_0 \approx 3.1415527254$ confirms thus is an holographic relation. The elimination of $\pi_0$ leads to a 70 pb relation mixing the usual topologic terms, $2 \, 3$ and $\pi$ with $137$, $a$, $\Delta_{Ed}$, 1836 and $W = 137^2 \Gamma/3d_e$ ([31], where $\Gamma$ is the Atiyah constant. With our value $Z = /\pi^4 a p^2/137 d_e n_t$, another 70 ppb relation appears, leading to the following ppb relations:

$$1836^2 \approx \frac{5 \Delta_{Ed} Z}{2^8 137 W} \approx \frac{3 \pi^2 Z^2 W^3}{2^9 137^4 a^5} \quad (10 \text{ pb})$$

$$\Rightarrow \quad \left(\frac{137a \Delta_{Ed}}{W}\right)^4 \approx \frac{12 \times 137 Z}{\pi^4 a}$$  \hspace{1cm} (209)

This proves that the number $1836^2$ must have arithmetic singularity. Indeed, 1836 figures as a special term in the OEIS A018930, acting by its square.
Moreover, \( x_1 = 13.59264308 \), the larger root of the Eddington’s equation, checks:

\[
s \times x_1 \approx 3 + 1/(7 + \mu/\tau) \quad (0.25 \text{ ppm}) \quad (210)
\]

Such a direct liaison with the Weak-Mixing angle \( s \) confirms that the above Eddington’s equation is of central importance, calling for more study. This is a strong indication towards the “Solanthropic” Principle: the system Sun-Earth-Human would be unique in the Universe.

5.4 The Earth-Moon couple and the quark symbolic masses

In the couple Earth-Moon, the ratio of the diameters is close to \( 11/3 \), which is not a musical ratio. But \( q \times (11/3) \approx 10/9 \), which is a classical musical interval.

This means that the electric charge number obeys:

\[
10/q \approx 33 = 495/15 \quad (1.9 \%)
\]

\[
\Rightarrow 495 \ q \approx 150 \approx (p(a/137)^2)^{2/3} \quad (0.16 \text{ ppm}) \quad (211)
\]

\[
(O_M/48)^{1/24} \approx 150 \quad (1 \text{ ppm})
\]

The number 150 represents the combination \( uud \), with the symbolic masses of the quarks, forming the first perfect couple: \( u = 5; d = 6 \).

It was recognized that 496, the dimension of the \( SO32 \) group, is the third perfect number. But it is not generally explained that the perfect quality concerns in fact a couple of numbers. For instance, in the perfect couple 5; 6, the former is the sum of the true divisors of the second, where the unity is not considered as a true divisor, in conformity with the Pythagoras spirit where the Unity (called ”Monade”) is only additive, but not multiplicative. The perfect couple 495-496 shows up in:

\[
496 \ q \approx (\pi/3)^2 a/\sqrt{3} \quad (0.2 \text{ ppm}) \quad (212)
\]

\[
495 \ q \approx (\pi/3)^2 (a_w/WZ)^2 (p/p_W)^4 \quad (1.6 \text{ ppm})
\]

confirming the value and central role of the pure electrical charge number \( q \). It is enlightening that this was obtained without using the computer: this is a new manifestation of the connection Cosmos-Consciousness. Moreover, since it was induced by the couple Earth-Moon, this means the singularity of this couple.

Moreover, 496 appears in the following:

\[
\frac{\sqrt{a_w}}{a_s} \approx \frac{496}{\sqrt{\pi q/\pi}} \quad (2.5 \text{ ppm}) \approx 2(2\pi a)^3 \quad (\approx -6.5 \text{ ppm}) \quad (213)
\]

where \( \pi_a = \sqrt{a^2 - 137^2} \). So 496 is at the heart of the parameters.
5.5 The Solar System and the gauge couplings

Kepler was looking for a celestial harmony in the planets, which culminates in his third law, characterized by the two main numbers 2 and 3 of Pythagoras music, which, to his great surprise and delight, appear as exponents connecting Space and Time. This was the prefiguration of the Holic Principle [28] which leads to the Total Quantum Physics [30].

Valey Kotov has also connected the Time and Space by showing that his cosmic coherent period $t_K$ and the associate length $ct_K$ are statistically central elements in the solar system [19]. In particular, one day is very close to $9t_K$, while for Jupiter the spin period is $6\Phi t_K$, Saturn: $4\Phi t_K$, Uranus: $4\Phi t_K$, Neptune: $6\Phi t_K$, where $4\Phi$ is the golden number appears roughly speaking, the orbital periods of the 4 first elements of the solar system follows a singularity: Sun (spin 30 days), Mercure (88 days), Venus (225 days) and the Earth (365 days). Jean-Marie Souriau [35] considered the multiple 5 of the additive series beginning by the perfect couple 5:6, a series used for long by the cathedral workers. This defines the numbers 30, 55, 84, 140, 225, 365, showing a tight correspondence. According to this author, the appearance of the golden number is normal, since this number and its square are the most irrational numbers, this explains why the series stop at the Earth, again particularizing our planet in the Solar System.

Moreover, the above sun Schwabe’s period agrees surprisingly well with the value, inferred by Scafetta [33] from the analysis of configurations of Venus, Earth and Jupiter and, consequently, of their gravitational tides on the Sun.

The combined alignment repeats every:

$$T_{VEJ} = (\frac{3}{T_V} - \frac{5}{T_E} + \frac{2}{T_J})^{-1} \approx 22.14 \text{ years} \quad (214)$$

where $T_V = 224.701 \text{ days}$, $T_E = 365.256 \text{ days}$ and $T_J = 4332.589 \text{ days}$ are sidereal orbital periods of the respective planets (Table 2).

Due to its rather large eccentricity, Mars has played a central role in the fundamental discovery by Kepler of the area speed law. The orbital period ratio of Mars and Earth : $687/365 = 3\pi_0/5$, implies a rational value $\pi_0$ such that (to 47 ppm, 28 ppm and 30 ppm):

$$T_{Mars}/T_{Earth} = 3\pi_0/5 \approx (4\pi_0)^{1/4} \approx \tau/\tau_{Ed} \approx (2a^3/\mu_4)^{3/2} \quad (215)$$

the last expression involves directly the third Kepler law.

Concerning now the spatial elements, note that the Bode-Titius regularity is always not explained by current physics. But Kotov [18] has shown a very interesting series for the semi-axes of 10 planets, 4 internal and 6 external (including Pluto and Eris), by respect to the Asteroid Ring (Table 3). The main parameter in his study is the ratio between the Kotov length and the Earth semi-axes $f_K \approx 19.2394778$, which shows the following correlation, with $\epsilon = E_{ph}/k_BT = \pi^4/30\xi(3) \approx 2.701178018$ where $E_{ph}$ is the mean energy by photon in the thermal radiation:

$$f_K^2 \approx \epsilon \quad a \quad (3 \text{ ppm}) \quad (216)$$

Such a relation with a main parameter of the black-body radiation is comforting the approach. Its pertinence is confirmed in the Table 4 which shows that these
distances connect dramatically with the gauge coupling constants. In particular, the Venus case implies:

\[
\left( \frac{a}{137} \right)^4 \approx \frac{4g_1^2}{\sin \theta} \quad (0.9 \text{ ppm}) \approx \frac{WZ\sqrt{a}}{a_w} \quad (-1.7 \text{ ppm})
\]

\[
\Rightarrow 4 \tan \theta \approx \frac{\sqrt{a} \cdot 495^4}{a_w} \quad (2.6 \text{ ppm}) \approx \frac{137}{64} \quad (55 \text{ ppm})
\]

confirming the Higgs number 495.

Resuming the astrophysics considerations: there is an overall harmony implying the most basic concepts of theoretical physics. It is the very achievement of the Kepler’s task.

6 COSMOBIOLOGY

This natural scientific domain was the most neglected of all.

6.1 The CMB as the genetic code of the Universe

The root of any cosmology is to consider the Universe as a whole. In standard cosmology it is a relativistic whole. But in our Coherent Cosmology, it is a quantum whole. This means the Universe must be considered as a particle in an external Cosmos [31]. It is indeed the very message of the Cosmic Axis.

Mathematics integrates Physics but not Biology. Indeed the current Mathematics and Physics are both reductionist, while Biology is evidently holistic, in harmony with our Coherent Cosmology. For this reason, it is logical to interpret the Cosmic Micro-wave Background (CMB) as the genetic code of the Universe. This defines the new domain of Cosmobiology.

This is supported by the following perfect holographic relation involving the Wien CMB wavelength \( \lambda_{W} \):

\[
e^a \approx 4\pi \left( \frac{R_{hal}}{\lambda_{W}} \right)^2 \quad (0.1\%)
\]

\[
e^{137^2/a} \approx 4\pi \left( \frac{137R}{\lambda_{cmb}} \right)^2 \quad (9\text{ ppm})
\]

\[
e^a \approx q^{-p/16} \quad (0.04\%)
\]

So the CMB would be the Unitary Information Field, whose fluctuations statistics involves directly mathematical functions [1]. While the spectral distribution of the CMB is almost exactly a thermal one, it bears information.

6.2 The Cosmo-Thermal Relations

Introducing the scale factor \( j = 8\pi^2/\ln 2 \) [36], which checks:

\[
e^n \approx a - j \quad (67 \text{ ppm}) \approx j/\ln a \quad (-47 \text{ ppm})
\]

this scale factor \( j \) correlates directly with \( p, s \) and 495:
\[
p/16 \approx j + 1 \quad (0.1 \%) \quad (220)
\]
\[
j + 1/2 \approx 495 \ s \quad (16 \ ppm)
\]

As shown by Schrödinger [34], the temperature is a central parameter in Biology. For instance, in spite of very different conditions, the mammal temperature \( T_{\text{mam}} \approx 37.5 \) Celsius = 310.65 Kelvin is the same for the polar bear and the african antilop. One observes:

\[
T_{\text{mam}}/T_{\text{cmb}} \approx j (0.04 \%) \quad (221)
\]

So there is a concordance of biological and physical parameters, comforting the Cosmobiology.

Moreover, with \( P = \lambda_e/l_P \): \( R_{\text{hol}}/\lambda_e = 2P^2/a^3 \), \( R/\lambda_e = 2P^2/pH \) and \( \lambda_W/\lambda_e \approx P/a^3pH \), meaning there is a symmetry between the Hubble radius \( R \), the Cosmic holographic radius \( R_{\text{hol}} \) and the Wien CMB wavelength:

\[
P^3 \approx RR_{\text{hol}}/4\lambda_e \lambda_W \quad (0.03 \%) \quad (222)
\]

\[
P^3 \approx (2\pi R/\lambda_e)(2\pi ct_K/r_e) \quad (0.07 \%)
\]

These relations confirm that the CMB background radiation is directly the emanation of the Cosmos, external to the Universe, not the 'fossil' trace of a Big Bang. Moreover, this symmetry integrates the Kotov length \( ct_K \), which plays a central role above in the Solar System.

There is a double holographic relation tying \( R, l_P \) with the CMB Field:

\[
2\pi R/\lambda_e = 4\pi (\lambda_p \lambda_H)/l_P^2 \approx (4\pi/3)(\lambda_{\text{cmb}}/\lambda_{H_2})^3 \quad (0.6 \%) \quad (223)
\]

giving 2.73 Kelvin. A slight modification implying \( p_W \) leads to another holographic relation giving the temperature 2.72582 Kelvin, compatible with measurement [31].

The mean length between \( l_P \) and the Universe radius \( R \) corresponds to the lethal mammal temperature, while with the holographic radius, it is the Water Triple Point:

\[
hc/k\sqrt{Rl_P} \approx 313.1 \ Kelvin = 39.9 \ Celcius
\]

\[
hc/k\sqrt{R_{\text{hol}}l_P} \approx 313.1 \ Kelvin = 0.3 \ Celcius
\]

This is the Water triple point temperature \( T_{H_2O} \) defining the Celcius unit, which is tightly connected with the triple points of Hydrogen (13.4 Kelvin) and Oxygen (54.4 Kelvin) through the relation:

\[
T_{H_2}T_{O_2} \approx T_{H_2O}T_{\text{CMB}} \quad (1 \%)
\]

These relations are only specific of mammal and molecular properties, so they not in direct numerical relation with Human. But they are so simple and so direct that, from the idealist aspect, they are really "anthropic".
6.3 The DNA, the Cosmic Oscillation and the quarks symbolic masses

The atomic masses of the DNA nucleotides are clearly related to Particle Physics parameters (Table 5), where the number $\sqrt{5}$ is central. One observes, with $n_t$ the mass ratio neutron/electron:

$$ A + T + 1/2 \approx C + G - 1/2 \approx n_t/3 \approx 2\sqrt{5} \times 137 \quad (226) $$

Firstly, this means that the mean mass of the bi-codon (three nucleotide pairs), $m_{bc} = 3m_H(A + T + C + G)/2 = 1839.3m_H$, is about $n_t m_H$. Note that, with the pure isotopic atoms, the mean bi-codon mass is special:

$$ 6(C + T + A + G)/4 \approx 1838.418 \approx H \sqrt{n_t/p} \quad (0.1 \text{ ppm}) \quad (227) $$

This mean bicodon mass is tied to the above cosmic period:

$$ \frac{\hbar^2}{Gm_{bc}} \approx 2\epsilon t_K \quad (0.7 \%) \quad (228) $$

This means a tight connection between the DNA and the above Cosmic tachyonic oscillation. Moreover:

$$ \epsilon^a \approx \frac{R}{l_P \sqrt{(A + T)}} \quad (0.01 \%); \quad a \ln a/\ln 3 \approx C + G \quad (0.01 \%) \quad (229) $$

reveals a liaison with CMB and the Cosmos volume tied to $a^a$, confirming the CMB is the Cosmogenic code and that the optimal whole base identifies with the number of doublets in the bi-codon. Moreover, the bi-codon mass enters the center of the Cosmic Axis, whose maximal dimension is 30:

$$ m_{bc}/m_e \approx (\Pi_\pm/\Pi_0)e^{15} \quad (0.06 \%) \quad (230) $$

Secondly this implies:

$$ n_t/a \approx 5 \times 6^2 \quad (231) $$

where $u = 5$ and $u = 6$ are the symbolic quark masses describing the neutron $udd = 180$, while the proton combination $uud = 150$ was encountered above (section 13).

This implies the following arithmetic property of 137, clearly tied to the Wyler formula $p_W = 5\pi^5$ :

$$ 6 \times 5^5 = 137^2 - 19 = 136 \times 137 + 118 \quad (232) $$

where 137 = 118 + 19, where 118 is the atomic number of the terminal atom (Orgamesson) in the periodic table, a relation itself connected to high-dimension crystallography [32].

The DNA chain molecule must be a temporal hologram: an electric current running along emit a field governing the organism. With its radius 2 nm, the angular momentum of a signal with speed $c$ is $0.6 m^2/s$, which favors the human units, the meter and the second, as precised below (section 18).
The number of cells in a Human adult is rather well defined, between 30
and 45 thousand billion cells [25]. Now the number of classical electron radius
\(r_e = \lambda_e/a\) in a length of 0.1 m, which is \(35.5 \times 10^{12}\), shows a dramatic correlation
with the above Egyptian number \(\tau_0 = 3570\) :

\[
N_{cell} = \frac{0.1 \, l_1}{r_e} \approx \frac{n_W Z \tau_0}{2 p \sqrt{2}} \approx H_0 1837^{5/2} \quad (233)
\]

6.4 The Egyptian Meter as natural unit

The length unit meter was known by the Egyptian, by reference with the Earth
radius: it is the height corresponding to an horizon distance of \(D_{Eg} = 3570\)
meter[11]. This Egyptian Earth radius checks, where \(n_H = M/m_H\) the atomic
mass of the Cosmos :

\[
R_{Eg} = D_{Eg}^2/2 = 6372\, 450 \text{ meter} \quad (0.1 \%) \approx R_e/e n_H \quad (0.3 \%) \quad (234)
\]

Thus, the introduction of the meter \(l_1\), the length unit, confirms the Cosmos
radius. How the Egyptian took care of this number 3570 is a mystery of Science
History. What is evident is that they knew the "Egyptian series" defining

\[
\begin{align*}
137 &= 60 (1+1/2+1/3+1/4+1/5), \text{ as attested by the Ptolemae approximation} \\
\pi_{pt} &= 377/120 = 2 + (1 + 1/2 + 1/3 + 1/4 + 1/5)/2. \text{ Even more surprising,} \\
\text{they knew the Third Combinational Hierarchy term } 3 + 7 + 127 = 137, \text{ as is} \\
\text{attested by the Karnak Hypostyle Room, located between the second and third} \\
pillar of the Karnak Amon Temple exhibiting } 134 = 7 + 127 \text{ columns. They} \\
\text{knew also the Mersenne number definition } 7 = 8 - 1, \text{ as attested by the first} \\
column half row composed of 7 column plus one giant central one. \\
\text{Moreover:}
\end{align*}
\]

\[
\begin{align*}
\frac{495}{g_1} = g_2 \tan \theta &\approx \frac{2 \times 137^3 \sqrt{2}}{\tau_0 \sqrt{pW}} \quad (0.8 \text{ ppm}) \\
\frac{1}{\beta} \left( \frac{495^2}{Z} \right) = \frac{\sin \theta}{g_1} \approx \frac{10}{9} &\approx \frac{\lambda_e K}{l_2} \quad (0.4 \text{ ppm}) \approx \frac{\left( \tau_0 + 1 \right)^2}{20 d_e F} \quad (3 \text{ ppm}) \quad (235)
\end{align*}
\]

\[
\frac{495^2}{Z} = \frac{\sin \theta}{g_1} \approx \frac{\tau_0}{1838.5 \sqrt{2}} \quad (10 \text{ ppb}) \quad 10d_e F t_1 \approx c t_N \quad (71 \text{ ppm})
\]

where \(\tau_0 + 1 = 3571 \approx 4^{17}\) is the 17th term of the Lucas series. This confirms
that the meter unit \(l_1\) is pertinent in the ppm domain, while the second \(l_1\) is in
the 100 ppm domain.

6.5 The Human Measure and the Absolute Speed

The pertinence of the unit meter \(l_1\) implies that of the unit mass kg = \(m_1\), as
is attested by the following dramatic relations, with \(p_P = a^{12}/P\). The Human
Measure Number is about the power 11 of the Golden Number, this number 11 being its fifth power. This specifies the dimension 11 of supergravity [42]:

\[ h^2/Gm^2 l_1m_1 \approx 200.7675604 \approx \mu - 6 \ (4 \text{ ppm}) \approx \left( \frac{11}{4} \right)^4 \ (20 \text{ ppm}) \]

\[ \mu \approx \frac{12}{\alpha_0} \frac{m e^r H}{m_1 l_1} \ (0.09 \% ) \approx \Phi \Phi^5 - 1 \ (0.03 \% ) \approx (\pi - 1)^7 \ (0.08 \% ) \]

\[ \mu - 6 \approx d_e (\sqrt{a/2})^3 (68 \text{ ppm}) \approx a \pi^{1/3} (330 \text{ ppm}) \approx Y = (8 \pi a^{3/2})^{1/2} (120 \text{ ppm}) \]

\[ Y \approx \frac{g_1 \rho_p}{\pi} \ (30 \text{ ppm}) \approx \frac{138}{291} \ ( -40 \text{ ppm}) \Rightarrow (4 \pi)^2 a^{3/2} \approx 138 \rho_p \ (10 \text{ ppm}) \]

(236)

where 11/4 and \( \pi^2/15 \) are two main parameters (section 21) of the thermal radiation. Moreover this ties to 10 ppm the \( SU_1 \) constant \( g_1 \) with the gravitational huge term \( P = m_p/m_e \). Note that \( \rho_p \approx a^{12}/P \) is very close to the proton/electron mass ratio, the deviation being \( a/137 \) at 5.3 ppm.

Moreover, the Earth liberation speed \( v_T = \sqrt{2GM_T/R_T} \approx 11185 \text{ m/s} \) shows a correlation with the atomic speed \( c/a \), where \( l_1 = 1 \text{ m} \), \( m_1 = 1 \text{ kg} \):

\[ 2^{2/53} c/a \approx \frac{m e^r H}{l_1 m_1} \approx 485 \ (40 \text{ ppm}) \]

(237)

which exhibits the Indian music interval \( 2^{1/53} \approx 3^{1/84} \approx 6^{1/137} \).

Introducing the speed \( V_0 \) of the Local Group, measured, by respect of the CMB, around 620 km/s. With the above Human Measure this gives a singular kinetic momentum:

\[ h^2/Gm^2 c/V_0 \approx R/\Lambda_r \]

\[ \Rightarrow c/V_0 \approx \frac{m_p m_H}{m_e m_r} \approx 485 \Rightarrow V_0 \approx 618 \text{ km/s} \]

This is the definite prove that Relativity do not apply at the cosmologic level

6.6 The three human units, meter, kilogram and second

The three human units, meter, kilogram and second, are separately tied to physical parameters, the Earth radius and mass, the Sun mass, the gauge couplings and \( t_N \), the Neuron (section 1.6):

\[ l_1 = 1 \text{ meter} = 2R_T/\tau_0^2 \approx \frac{\lambda_2}{a^2 \rho_{60} \sqrt{\tau_0}} \ (8 \text{ ppm}) \]

\[ m_1 = 1 \text{ kg} \approx (m_e H^2 \approx m_{bc}) \times \frac{2 \pi R}{\sqrt{R_T l_1}} \ (30 \text{ ppm}) \]

\[ m_1 = 1 \text{ kg} \approx \frac{\rho^{2} m^2}{M} \ (0.6 \% ) \approx \frac{90 \sqrt{M_S m_e}}{c \cos \theta} \ (0.2 \% ) \]

(393)

\[ t_1 = 1 \text{ second} \approx \frac{t_N \tau_0}{8 \pi e} \ (18 \text{ ppm}) \]

\[ D \approx \frac{R_T^2 d^2 l_1 m_e}{N_L l_R h \lambda} \ (18 \text{ ppm}) \approx \frac{(4 \pi)^2 \beta 1848}{\pi \sin \theta} \ (0.15 \text{ ppm}) \]
The last relation characterizes the speed unit m/s, through the Monster group dimension $D = 196883$ (section 3.8), where appears the ratio $R_1/(4\pi)^2 \approx a_w/p_w$ (section 1.3).

Moreover, $m_{Hu} = 100$ kg checks:

$$\frac{d^4 m_{Hu}}{m_p} \approx \frac{a_w a}{137 a_s^2} (-23.5 \text{ ppm}) \approx \frac{D \tau_0 60^2}{4a} (48 \text{ ppm})$$

$$\Rightarrow \frac{d^4 m_{Hu}}{m_p} \approx \left(\frac{D \tau_0 60^2 a a_s^2}{4 \times 137^2 a_s^4}\right)^{1/3} (0.5 \text{ ppm}) \quad (240)$$

So, the optimal Human mass is tightly related to the Planck mass, itself related to the oocyte mass $m_{oo} \approx m_P/\sqrt{a}$.

6.7 The Devolution Number

Considering the above relation:

$$r_{HB} m_A = \frac{h^2}{G m_e^2} \approx 200.7675604 \text{ kg } \times \text{ m.} \quad (241)$$

With $l_1$ the length unit meter, corresponding in the Earth gravitational field to the pendulum period of 2 second, this defines the Human Measure, where the associated Human mass is thus $m_h \approx 100$ kg, exhibiting the following number:

$$N_A = \frac{2l_1}{r_{HB}} \approx \frac{m_A}{m_{Hu}} \approx 37.7 \text{ billion} \quad (242)$$

It is remarkable that the number of atomic radius in the Human height of 2 meters is so close to the number of Human weight of 100 kg in the mass appearing so naturally in the Diophantine resolution of the Kepler laws. It is why it is called Armageddon mass. Indeed, the Devolution theory predicts that the total number of Human is limited by the process of mutations, which, contrary to the Darwin theory, cannot statistically be positive. So, one possible interpretation of this number would be the total number of Humans. This would mean that a small number of future generations is left.

The pertinence of this Devolution Number is its proximity of its square (80 ppm) with the following correlation involving the Higgs perfect couple 495-496, with $\lambda_w = \lambda_e/a_w$:

$$\frac{\lambda_{cmb}}{\lambda_w} \approx \left(\frac{a_e^2}{2\pi}\right)^6 \frac{d_e \pi q}{\pi} (8 \text{ ppm}) \approx \frac{4P(p-1)\sqrt{3}}{495 \times 496} (0.3 \text{ ppm}) \quad (243)$$

meaning the following holographic relation involving the CMB wavelength:

$$\pi N^2_A \approx \pi \left(\frac{2l_1}{r_{HB}}\right)^2 \approx 2\pi \frac{\lambda_{cmb}}{\lambda_w} \quad (244)$$

confirming the cosmogenic role of the CMB background.

7 Conclusion: The Pythagorean Solanthropy

The connection of physical parameters with biological ones is out of any doubt, especially from the Cosmo-thermal relations (section 5.2) and the DNA ones
One could deduce that Life is Universal. But the Neuron time, so coherent with the Human nervous system, is central in the specific correlations involving the Human surroundings. Firstly, the ppb relation 74 relies the Neuron length $ct_N$ with $R_{hol}$ the reduced holographic radius, and checks an holographic relation involving the Egyptian Length 3570 meter, defined from the Earth radius, producing another correlation to 100 ppb. Secondly, the relations 19-20-21 shows the liaison of the Neuron with the Higgs number 495 and the gauge coupling constants, in an overall improbability in the ppb domain. Thirdly, these gauge couplings are specific of the Solar System centered on the Asteroid ring and the Earth, the incredible Table 6 showing that each of the 10 planets (not eight) shows ppm connection with the gauge couplings with also an an overall improbability in the 100 ppb domain. Finally, the devolution number, through the relations 124 and 125, is associated to a 100 ppb correlation with the CMB main wavelength.

So the conclusion is clear: the huge number of potential star systems in the Universe ($10^{24}$) is nothing by respect to the cumulated improbability of the connections, around $10^{39}$. This proves the unicity of the system Solar System-Earth-Human in the Cosmos.

However, this does not prove that the Life would be limited to our planet. But as the pig oocyte as the same dimension that the Human one, it seems probable rather that the Life itself is unique in our planet. The main difference, of course, is that the pig does not play the violon-cello, as these strange musicians possessing an absolute musical sensibility which corrects the concert piano pitch.

The excess of formalism induced a separation of Science into multiple domains. The return to the direct inductive scientific method reunifies all these domains. In particular the return to the intuitive mass concept is determinant. Indeed, in the 3 first minutes of a reappraisal of cosmology (Sept. 1997), Francis Sanchez, taking account of the existence of three main particles in Atomic Physics has deduced the tachyonic formula (without $c$) which gives half the Hubble radius, so directly the mass of the critical observable Universe, which so appears as a particle in an external Cosmos, identified as the final gauge boson by the Cosmic Axis. The geometrical mean of these four masses identifies with the Planck mass, which is $\sqrt{137}$ times the Human oocyte mass, which is the geometric mean between the electron and the Armageddon mass, the strange mass of a mountain, which results from the Diophantine analysis of the Kepler laws.

This analysis is based on the symmetry between the Newton and Planck constants, by respect to the mass concept: while astrophysics uses the product $Gm$, nobody remarks that, in quantum physics, it is $/m$ which has a kinematic meaning. And the ratio between the two kinematics term is a speed, so using $c$, this deduces at once the Planck mass from the three universal constants. This simple reasoning would have not escaped Newton if he had not been polarized in the differential equations, and has reasoned as a real pythagorician, by using Diophantine ones.

So, why nobody acclaimed this evidence, which was deposed in a sealed draft in the Paris Academy in March 2018 (and in the Dimensional Analysis section in the French wikipedia), and was published with difficulty in 2006 by Pecker (against the rejection of the co-editor Narlikar), in a short letter where the modern Hubble constant value 13.8 was replacing the current 13.7 for the first time [29]. In fact, the officials believe that this gives the Universe age, while
in fact it is the time of renewal of new-born galaxies in an Universe without expansion. Of course, the first observations of the telescope Webb shows that there is no "dark age" at all, so the Primordial Bang model is out.

One reason for this blockage is that the Particle Physics standard model considers that the mass concept has only a secondary importance. The pure equations do not use the mass concept, and it is only an additive Higgs-Englert-Brout mechanism which give mass to particles. The standard model use extensively the convention $c = 1$, so identifying the concepts of Time and Length.

This paper demonstrates that it is a dreadful misconception, so it is not really surprising that the real importance of the mass concept escapes the analysis. The holophysical analysis of the photo-wave shows clearly that the mass is a memory, a number of informations. It is why the DNA bi-codon mass is so related to the parameters.

Moreover, as the Human consciousness of whole numbers is central in our synthesis, this means also a Philosophy-Science reunification, a return to the Pythagoras ”Natural philosophy”. Note that this consciousness connection has nothing to do with the cumbersome Von Neumann-Wigner’s one associated with the wave-packet reduction [41].

Jean-Claude Pecker has been finally convinced by our arguments, and wrote this historical comment (2 August 2019) in a mail group of discussion, which contradict a whole life of anti-Pythagorism:

Il est clair pour moi qu’une bonne description de l’univers doit en effet impliquer des relations arithmétiques ; on sait qu’à l’échelon du végétal, les suites de Fibonacci se retrouvent dans la nature; les lois de Kepler sont aussi de nature arithmétique. Je pense que la nature même de la matière implique des mathématiques du discontinu, autrement dit arithmétiques. L’apparence du continu n’est vraisemblablement due qu’à l’énormité des nombres impliqués dans la description des phénomènes.

A salient point is that there is no need to be an advanced mathematician to test the numerical relations: everybody can check the relations, and appreciate their improbability. These relations indicate the way towards the missing parts of Number Theory. One of these is clearly to find an equivalent of the Mersenne Numbers on base 3. Indeed, the salient point is that the fourth cube of 3 is close to the seventh square of 2 which is two times the fourth step of the Combinatorial Hierarchy : $3^4 \approx (4/3)^{2^7}$. (section 3.2). This gives at once the separation between the Cosmos holographic reduced radius and the Universe radius.

The relations are so elegant and improbable that this excludes the Multiverse idea, based on the supposition that the parameters are really "free".

The very fact that the 3 minutes formula was missed during a century, and the Newton-Planck symmetry for 350 years, is a new prove of the general devolution.

As predicted [31], the James Webb telescope is correcting the formalists which have betrayed the genuine scientific spirit, that of Pythagoras.

7.1 The two rival cosmologies

There was an intensive debate between the two main models for cosmology. However the confrontation was rather unequal, because the steady-state model has been victim of his essential scientific quality, to be easily refutable : it
suffices that one of the global statistical cosmic property shows deviation along the distance of observation. It is why opponents have believed they have succeed to prove its refutation.

But the steady-state model has correctly predict both the critical character and the galaxy recession acceleration. Jean-Claude Pecker, alas recently deceased, took seriously the Eddington quest on the Galaxy temperature, and was the leader of the opposition to a too dogmatic scientific system which censored any refutation of the mainstream theory.

Indeed, the first observations of the JWST seem to confirm a one more prediction of the steady-state cosmology: a far field with no difference in galaxy population. In our reappraisal of steady-state cosmology, our Hubble radius corresponds to $70.79 \text{(km/s)}/\text{Mpc}$, which is intermediary between the two official values in dramatic tension (5%), that of the Planck mission and that of the direct novae measurement.

So, the JWST is prompted to check the validity of theses so-called refutations. In particular, to concentrate towards the most precise cosmic measurement: the Universe temperature. This study predicts its invariability with observation distance.

7.2 The merging of the two rival cosmologies

Finally, as the official so-called Universe age is 13.8 Giga years, while the Hubble radius is 13.8 Giga lightyears, this means something is correct in the official approach, only a spatial quantity was unduly replaced by a temporal one. This implies that the Big Bang idea finally applies, but not its Primordial aspect. So, this introduces the PERMANENT BANG, meaning the Universe is destroyed and reconstructed in a very rapid sequence ($10^{104}\text{hertz}$), an oscillation between matter and antimatter.

Bibliography


Table 1: Physical Constants

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gravitation Constant ([31])</td>
<td>(G \approx 6.675 \times 10^{-11} \text{ kg}^{-1} \cdot \text{m}^3 \cdot \text{s}^{-2})</td>
</tr>
<tr>
<td>Planck constant (\text{&quot;exact&quot;}) (h = 2\pi \hbar)</td>
<td>(h = 6.62607015 \times 10^{-34} \text{ kg} \cdot \text{m}^2 \cdot \text{s}^{-1})</td>
</tr>
<tr>
<td>Fermi Constant</td>
<td>(G_F \approx 1.435850 \times 10^{-62} \text{ kg} \cdot \text{m}^5 \cdot \text{s}^{-2})</td>
</tr>
<tr>
<td>NEURON (t_N = G_F^{5/4} / h^2 C^{3/4} = l_e P^{3/2} / P^{5/2}) ((t_e = \lambda_e / c))</td>
<td>(t_N = 19.1369997 \text{ ms Speed of light in vacuum})</td>
</tr>
<tr>
<td>Planck mass (m_P = (hc/G)^{1/2})</td>
<td>(m_P \approx 2.176246257 \times 10^{-8} \text{ kg})</td>
</tr>
<tr>
<td>Planck length (l_P = h/cm_P)</td>
<td>(l_P \approx 1.616394471 \times 10^{-35} \text{ m})</td>
</tr>
<tr>
<td>Electron mass</td>
<td>(m_e \approx 9.1093837015 \times 10^{-31} \text{ kg})</td>
</tr>
<tr>
<td>Electron Compton reduced wavelength (\lambda_c = h/m_e c)</td>
<td>(\lambda_c \approx 3.8615926755 \times 10^{-13} \text{ m})</td>
</tr>
<tr>
<td>Hass-Bohr Atomic Radius</td>
<td>(r_{HB} \approx 5.294654093 \times 10^{-11} \text{ m})</td>
</tr>
<tr>
<td>Single-Electron Universe radius</td>
<td>(R_1 \approx 1.492365473 \times 10^{26} \text{ m})</td>
</tr>
<tr>
<td>Observable Universe radius</td>
<td>(R \approx 1.306713899 \times 10^{26} \text{ m})</td>
</tr>
<tr>
<td>Critical density (\rho_{cr} = 3c^2/8\pi GR^2)</td>
<td>(\rho_{cr} \approx 9.41197989 \times 10^{-27} \text{ kg} \cdot \text{m}^{-3})</td>
</tr>
<tr>
<td>Holographic cosmic radius (R_{holog} = u R) ; (u = pH/a^3)</td>
<td>(R_{holog} \approx 1.712894163 \times 10^{26} \text{ m})</td>
</tr>
<tr>
<td>Cosmic radius ((R_C/R_C = C/c \approx 6.94549387 \times 10^{60}))</td>
<td>(R_C \approx 9.075773376 \times 10^{86} \text{ m})</td>
</tr>
<tr>
<td>Topon (Space Quantum)</td>
<td>(d \approx 3.05066351 \times 10^{-96} \text{ m})</td>
</tr>
<tr>
<td>Kotov Cosmic Coherent Period (t_K = l_K/c)</td>
<td>(t_K \approx 960.591457 \text{ s} [23])</td>
</tr>
<tr>
<td>First Tachyonic speed</td>
<td>(c' \approx 7.336574671 \times 10^{44} \text{ m/s})</td>
</tr>
<tr>
<td>Photon mass (m_{ph} = h/cd_K)</td>
<td>(m_{ph} \approx 1.222184483 \times 10^{-55} \text{ kg})</td>
</tr>
<tr>
<td>Graviton mass (m_{gr} = m_{ph}/a_w)</td>
<td>(m_{gr} \approx 3.722342724 \times 10^{-67} \text{ kg})</td>
</tr>
<tr>
<td>CMB Temperature</td>
<td>(T_{CMB} \approx 2.725820138 \text{ K})</td>
</tr>
<tr>
<td>CMB Wien wavelength</td>
<td>(\lambda_{W} \approx 1.063082472 \times 10^{-3} \text{ m})</td>
</tr>
<tr>
<td>Boltzmann Constant (&quot;exact&quot; conversion factor)</td>
<td>(k_B = 1.38064910^{-23} \text{ J K}^{-1})</td>
</tr>
<tr>
<td>Planck-Nambu mass (m_P' = m_P/\sqrt{a} \approx \text{Human oocyte mass})</td>
<td>(m_P' \approx 1.859048422 \times 10^{9} \text{ kg})</td>
</tr>
<tr>
<td>Armaggedon mass (m_A = m_P'^2/m_N)</td>
<td>(m_A \approx 3.793957035 \times 10^{12} \text{ kg})</td>
</tr>
<tr>
<td>CMB Temperature (T_{CMB} \equiv T_{CMB}(11/4)^{1/3})</td>
<td>(T_{CMB} \approx 2.725820 \text{ K})</td>
</tr>
<tr>
<td>CMB reduced wavelength (\lambda_{ cmb} = h/c kT_{CMB})</td>
<td>(\lambda_{ cmb} \approx 8.400716617 \times 10^{-4} \text{ m})</td>
</tr>
<tr>
<td>Universe photon number</td>
<td>(n_{ph} \approx 3.840045899 \times 10^{87})</td>
</tr>
<tr>
<td>Earth Half Orbital Axis (A_T = c t_K / f_K) (f_K \approx 19.2539478)</td>
<td>(A_T = 149.597870700 \text{ m &quot;exact&quot; (u.a.)})</td>
</tr>
<tr>
<td>Parameter</td>
<td>Value</td>
</tr>
<tr>
<td>------------------------------------------------</td>
<td>------------------------------</td>
</tr>
<tr>
<td>Planck/Electron mass ratio $P = m_P/m_e$</td>
<td>$P \approx 2.389,015,08 \times 10^{22}$</td>
</tr>
<tr>
<td>Electrical Constant</td>
<td>$a \approx 137.035,999,084(21)$</td>
</tr>
<tr>
<td>Electron Excess Magnetic moment</td>
<td>$d_e \approx 1.001,159,652,180,96$</td>
</tr>
<tr>
<td>Atiyah-Sanchez constant $a_0 = e^{-i\pi} = e^{\pi^2/2}$</td>
<td>$a_0 \approx 139.0456367$</td>
</tr>
<tr>
<td>Gravitational Coupling constant $a_G = m_P^2/m_H$</td>
<td>$a_G \approx 1.691,936,468 \times 10^{38}$</td>
</tr>
<tr>
<td>Weak Coupling constant $a_w = F^2 = h^3/eGm_e^2$ [32]</td>
<td>$a_w \approx 3.283,374,406 \times 10^{11}$</td>
</tr>
<tr>
<td>Strong Coupling constant [32]</td>
<td>$a_s \approx 8.434502914$</td>
</tr>
<tr>
<td>Proton/Electron mass ratio $p = m_p/m_e$</td>
<td>$p \approx 1836.152,673,43$</td>
</tr>
<tr>
<td>Wyler Proton/Electron mass ratio $p_W = 6\pi^5$ [44]</td>
<td>$p_W \approx 1836.118,019$ exact</td>
</tr>
<tr>
<td>Neutron/Electron mass ratio $n_t = m_n/m_e$</td>
<td>$n_t \approx 1838.683,661,7$</td>
</tr>
<tr>
<td>Hydrogen/Electron mass ratio $H = m_H/m_e$</td>
<td>$H \approx 1837.152,660,14$</td>
</tr>
<tr>
<td>Lucas gravitational ratio $p_G = P/\sqrt{N_L}$</td>
<td>$p_G \approx 1831.531,181$</td>
</tr>
<tr>
<td>Electro-gravitational ratio $p_P = a^{12}/P$</td>
<td>$p_P \approx 1835.680,119$</td>
</tr>
<tr>
<td>Koida-Sanchez constant $p_K = (1 + \mu + \tau)/2 = (1 + \sqrt{\mu} + \sqrt{\tau})/3$</td>
<td>$p_K \approx 1842.604,994$</td>
</tr>
<tr>
<td>Hydrogen correction factor $\beta = 1/(H - p) = (1 - 1/2a^2)^{-1}$</td>
<td>$\beta \approx 1.000026626$</td>
</tr>
<tr>
<td>Muon/Electron mass ratio $\mu = m_\mu/m_e$ [31]</td>
<td>$\mu \approx 206.768,286,9$</td>
</tr>
<tr>
<td>Tau/Electron mass ratio $\tau = m_\tau/m_e$ [31]</td>
<td>$\tau \approx 3477.441,701$</td>
</tr>
<tr>
<td>Higgs Boson mass ratio $H^{(0)} = m_{Hgs}/m_e$ [32]</td>
<td>$H_0 \approx 495^2$</td>
</tr>
<tr>
<td>W-boson mass ratio $W = m_W/m_e$</td>
<td>$W \approx 157340.1093$</td>
</tr>
<tr>
<td>Z-boson mass ratio $Z = m_Z/m_e$</td>
<td>$Z \approx 178451.7529$</td>
</tr>
<tr>
<td>A-dimensional Electric Charge $q = W\sin\theta/H_0 = \sqrt{4\pi q/a} = G_F$</td>
<td>$q \approx 0.302,973,2214$</td>
</tr>
<tr>
<td>Electric $\pi$ value $\pi_q = aq^2/4$</td>
<td>$\pi_q \approx 3.144,729,933$</td>
</tr>
<tr>
<td>Weak-mixing angle $s = qR/R_{hel}$</td>
<td>$s \approx 0.231,128,9347$</td>
</tr>
<tr>
<td>SU1 gauge constant $g_1 = q/\sin\theta$, $\cos\theta = W/Z$</td>
<td>$g_1 \approx 0.343,625,7561$</td>
</tr>
<tr>
<td>SU2 gauge constant $g_2 = W/H_0$</td>
<td>$g_2 \approx 0.642,139,0034$</td>
</tr>
<tr>
<td>SU3 gauge constant $g_3 = g_0g_2/g_1$, $g_0 = ppc/2a^3$</td>
<td>$g_3 \approx 1.221,047,167$</td>
</tr>
<tr>
<td>Charged Pion mass ratio $\Pi_+ = m_{P_{\pi_+}}/m_e$</td>
<td>$\Pi_+ \approx 273.132,8472$</td>
</tr>
<tr>
<td>Neutral Pion mass ratio $\Pi_0 = m_{P_{\pi_0}}/m_e$</td>
<td>$\Pi_0 \approx 264.145,3915$</td>
</tr>
</tbody>
</table>
Table 3: Tachyonic Generalization of the 3 MINUTES FORMULA

<table>
<thead>
<tr>
<th>$m_G$</th>
<th>$m_h$</th>
<th>$\frac{(h/m_h)^2}{Gm_G}$</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>$m_e$</td>
<td>$m_p$</td>
<td>$\lambda_e$</td>
<td>Elimination of $c = \frac{Gm_p}{h/m_p} = \frac{h}{m_e\lambda_e}$</td>
</tr>
<tr>
<td>$\sqrt{m_p m_H}$</td>
<td>$m_p$</td>
<td>$\sqrt{\lambda_p \lambda_H}$</td>
<td>Eddington’s symmetry Electron-Proton</td>
</tr>
<tr>
<td>$m_e$</td>
<td>$\sqrt{m_p m_H}$</td>
<td>Universe $\frac{R}{2}$</td>
<td>gravitational di-hydrogene model (3 MINUTES FORMULA)</td>
</tr>
<tr>
<td>$m_p a^3$</td>
<td>$\sqrt{m_p m_H}$</td>
<td>$\lambda_{W,i}$</td>
<td>pr. $3.2 \times 10^{-4}$; CMB WIEN COSMOGENIC WAVELENGTH</td>
</tr>
<tr>
<td>$m_N$</td>
<td>$m_N$</td>
<td>$R_{hol}/2$</td>
<td>$m_N = am_e$: Nambu mass ; holographic definition of $R_{hol}$</td>
</tr>
<tr>
<td>$m_A$</td>
<td>$m_A$</td>
<td>$d$</td>
<td>Topon = Space Quantum ; $m_A = m_p^2/m_N$</td>
</tr>
<tr>
<td>$m_e$</td>
<td>$m'_p$</td>
<td>H atom $r^{(0)}_{HB}$</td>
<td>$m'<em>p = m_P / \sqrt{a} \approx m</em>{oo} :$ HUMAN OOCYTE MASS</td>
</tr>
<tr>
<td>$m_A$</td>
<td>$m_e$</td>
<td>H atom $r^{(0)}_{HB}$</td>
<td>$m_A = m_{oo}^2/m_e :$ Armageddon mass</td>
</tr>
<tr>
<td>$m_{bc}^{(0)}$</td>
<td>$m_{bc}^{(0)}$</td>
<td>$2l_K$</td>
<td>pr. $6.3 \times 10^{-4}$ ; $m_{bc}^{(0)}$ isotopic DNA BI-CODON MASS</td>
</tr>
<tr>
<td>$m_{Hu}$</td>
<td>$m_e$</td>
<td>$2l_1 = 2m$</td>
<td>$\frac{2m}{r_{Hu}} = \frac{m_A}{m_{Hu} \approx 100 \text{ kg}} = N_A :$ Nombre d’Armageddon $\approx 38 \times 10^9$</td>
</tr>
<tr>
<td>$um_{bc}^{(0)}$</td>
<td>$\sqrt{m_{ph} m_{yr}}$</td>
<td>Cosmos $R_C$</td>
<td>pr. $4.7 \times 10^{-4}$; $m_{phantom} = \frac{h}{c l_K} = a_w m_{graviton} ; u = \frac{R_{hol}}{R}$</td>
</tr>
</tbody>
</table>
Table 4: Some cosmic timescales (periods) observed in the solar system.

<table>
<thead>
<tr>
<th>Object</th>
<th>Period</th>
<th>Symbol</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Sun</td>
<td>Hale’s cycle</td>
<td>$T_H$</td>
<td>22.14(8) years</td>
</tr>
<tr>
<td>–”–</td>
<td>Schwabe’s cycle</td>
<td>$T_{Sch}$</td>
<td>11.07(4) years</td>
</tr>
<tr>
<td>–”–</td>
<td>7-year cycle</td>
<td>$t_S$</td>
<td>7.09(16) years</td>
</tr>
<tr>
<td>–”–</td>
<td>spinning (sidereal)</td>
<td>$t'_S$</td>
<td>27.027(6) days</td>
</tr>
<tr>
<td>–”–</td>
<td>spinning (synodic)</td>
<td>$t''_S$</td>
<td>25.165(6) days</td>
</tr>
<tr>
<td>–”–</td>
<td>pulsation</td>
<td>$t_K$</td>
<td>9600.606(120) s</td>
</tr>
<tr>
<td>Venus</td>
<td>orbital (sidereal)</td>
<td>$T_V$</td>
<td>224.701 days</td>
</tr>
<tr>
<td>–”–</td>
<td>orbital (synodic)</td>
<td>$T'_V$</td>
<td>583.924 days</td>
</tr>
<tr>
<td>–”–</td>
<td>spinning (sidereal)</td>
<td>$t_V$</td>
<td>243.025 days</td>
</tr>
<tr>
<td>–”–</td>
<td>spinning (synodic)</td>
<td>$t'_V$</td>
<td>145.930 days</td>
</tr>
<tr>
<td>Earth</td>
<td>orbital</td>
<td>$T_E$</td>
<td>365.256 days</td>
</tr>
<tr>
<td>–”–</td>
<td>spinning</td>
<td>$t_E$</td>
<td>1 day</td>
</tr>
<tr>
<td>Moon</td>
<td>orbital (sidereal)</td>
<td>$T_M$</td>
<td>27.322 days</td>
</tr>
<tr>
<td>Jupiter</td>
<td>orbital</td>
<td>$T_J$</td>
<td>4332.589 days</td>
</tr>
<tr>
<td>Earth–Venus</td>
<td>conjunction</td>
<td></td>
<td>243 years</td>
</tr>
</tbody>
</table>
Table 5: Numerical regularity for 10 planets [18].

<table>
<thead>
<tr>
<th>Planet</th>
<th>( A ) (u.a)</th>
<th>( l_K/2\pi A )</th>
<th>( 2A/l_K )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mercure</td>
<td>0.327</td>
<td>7.912 ≈ 8</td>
<td></td>
</tr>
<tr>
<td>Venus</td>
<td>0.723</td>
<td>4.235 ≈ 4</td>
<td></td>
</tr>
<tr>
<td>Earth</td>
<td>1</td>
<td>3.062 ≈ 3</td>
<td></td>
</tr>
<tr>
<td>Mars</td>
<td>1.524</td>
<td>2.009 ≈ 2</td>
<td></td>
</tr>
<tr>
<td>Asteroid</td>
<td>2.9</td>
<td>1.056 ≈ 1</td>
<td></td>
</tr>
<tr>
<td>Jupiter</td>
<td>5.203</td>
<td>0.541 ≈ 1/2</td>
<td></td>
</tr>
<tr>
<td>Saturn</td>
<td>9.539</td>
<td>0.992 ≈ 1</td>
<td></td>
</tr>
<tr>
<td>Uranus</td>
<td>18.182</td>
<td>1.994 ≈ 2</td>
<td></td>
</tr>
<tr>
<td>Neptune</td>
<td>30.058</td>
<td>3.125 ≈ 3</td>
<td></td>
</tr>
<tr>
<td>Pluton</td>
<td>39.44</td>
<td>4.100 ≈ 4</td>
<td></td>
</tr>
<tr>
<td>Eris</td>
<td>67.5</td>
<td>7.017 ≈ 7</td>
<td></td>
</tr>
</tbody>
</table>
Table 6: Solar System and gauge couplings. Semi-axes of 10 planets and Asteroid Ring, in astronomical units, in function of physical parameters. The implication of \( \delta = a - 137 \), \( r_a = a/137 \), \( \pi_a = (a^2 - 137^2)^{1/2} \) and the Golden Number \( \Phi \) confirms the Arithmetical Physics. The implication of \( \Delta_{Ed} = (136^2 - 40)^{1/2} \) confirms the Eddington’s Fundamental Theory. A decisive implication (0.3 ppm) results from the Kotov’s ratio 4 between Asteroids and the Venus semi-axes. Decisive implications results from the Pluton and Eris axes, implying they are true planets. Since the semi-ax is taken as unit (the u.a.), this confirms definitely the central role of the Earth in this very special solar system.

<table>
<thead>
<tr>
<th>Planet</th>
<th>A (u.a)</th>
<th>Formula</th>
<th>Implication</th>
<th>ppm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mercure</td>
<td>0.387</td>
<td>( \frac{\sin \theta}{g_3} \approx 0.386 \approx \frac{1}{4g_1} )</td>
<td>( e^2 g_1 \sin \theta \approx \frac{6}{5d_w a \pi} )</td>
<td>0.6</td>
</tr>
<tr>
<td>Venus</td>
<td>0.723</td>
<td>( \frac{g_1}{\sin \theta} \approx 0.728 \approx \frac{1}{4g_1} )</td>
<td>( 2g_1 / r_a \approx \sqrt{\sin \theta} )</td>
<td>0.4</td>
</tr>
<tr>
<td>Earth</td>
<td>( A_T = 1 )</td>
<td>( 1 / g_0 = \frac{g_0}{g_1} \approx 1.530 )</td>
<td>( g_0 / g_1 \approx g_0 / g_2 \approx \frac{6r_a}{\pi d_w^2} )</td>
<td>3</td>
</tr>
<tr>
<td>Mars</td>
<td>1.524</td>
<td>( 1 / g_0 \approx 2.910 )</td>
<td>( 1 / g_0 g_2 \approx 15 (p_w / n_i)^2 )</td>
<td>6</td>
</tr>
<tr>
<td>Jupiter</td>
<td>5.203</td>
<td>( e^2 g_1 \approx 5.207 \approx \frac{1}{4g_2} )</td>
<td>( g_2 g_3 \approx \delta (p/p_w) \frac{\Delta_{Ed}^{1/2}}{a^2} )</td>
<td>6</td>
</tr>
<tr>
<td>Saturn</td>
<td>9.539</td>
<td>( \frac{g_1}{\delta} \approx 9.545 \approx \frac{4\sqrt{\alpha}}{g_3} )</td>
<td>( a_s^3 \approx \frac{f_k^2 \beta^2 \sqrt{2}}{a^3} )</td>
<td>3</td>
</tr>
<tr>
<td>Uranus</td>
<td>19.182</td>
<td>( 2a_s / \cos \theta \approx \frac{f_k g_1 \tau}{4\pi p} \approx 19.180 )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neptune</td>
<td>30.058</td>
<td>( 16a_s \sin^2 \theta \approx 30.04 \approx \frac{aW^2}{91.4n_w} )</td>
<td>( 8a_s r_a \sin^2 \theta \approx \frac{15}{15} (n_i / H)^2 \approx (n_i / H)^2 )</td>
<td>2</td>
</tr>
<tr>
<td>Pluton</td>
<td>39.44</td>
<td>( \frac{16g_1}{p} \approx \frac{\pi}{\tau} \frac{q_{aw}}{WZ} )^2 \approx (2\pi)^2 )</td>
<td>( \frac{\beta a}{(a_w / WZ)^2} \approx \frac{\pi a}{2 + Z / W} \approx 0.014 )</td>
<td></td>
</tr>
<tr>
<td>Eris</td>
<td>67.5</td>
<td>( \frac{8a_s \approx 67.476 \approx e^2}{g_1} )</td>
<td>( g_1 \approx \frac{e^2 \pi^2 d_w \mu W}{8a_s \pi^2} )</td>
<td>0.07</td>
</tr>
</tbody>
</table>

Table 7: DNA nucleotides. Standard masses: H = 1.00784, C = 12.0096, N = 14.00643, O = 15.9990, P = 30.974. They connect both with Pythagorian formulas involving the square root of 5 and main parameters of Particle Physics.

<table>
<thead>
<tr>
<th>anh.mnph.desoxy</th>
<th>Formula</th>
<th>Sb</th>
<th>Mass/mH</th>
</tr>
</thead>
<tbody>
<tr>
<td>-cytidine (dCMP)</td>
<td>C_{10}H_{12}N_{3}O_{4}P</td>
<td>C</td>
<td>286.93 \approx \sqrt{5} 128 \approx \frac{\mu H Z a}{\tau R} (10 \text{ ppm})</td>
</tr>
<tr>
<td>thymidine (dTMP)</td>
<td>C_{10}H_{13}N_{3}O_{4}P</td>
<td>T</td>
<td>301.83 \approx \sqrt{5} 135 \approx \frac{\mu \Pi_0}{a_\Pi \Pi_0} (40 \text{ ppm})</td>
</tr>
<tr>
<td>adenosine (dAMP)</td>
<td>C_{10}H_{12}N_{3}O_{4}P</td>
<td>A</td>
<td>310.77 \approx \sqrt{5} 139 \approx \frac{2Z \times 137}{W} (20 \text{ ppm})</td>
</tr>
<tr>
<td>guanosine (dGMP)</td>
<td>C_{10}H_{12}N_{3}O_{4}P</td>
<td>G</td>
<td>326.65 \approx \frac{\sqrt{5} 1836}{4\pi} \approx \frac{Z}{2\Pi \Pi_0} (80 \text{ ppm})</td>
</tr>
<tr>
<td>Number</td>
<td>Approximation</td>
<td>Implication</td>
<td>Remark</td>
</tr>
<tr>
<td>--------</td>
<td>---------------</td>
<td>-------------</td>
<td>--------</td>
</tr>
<tr>
<td>$\Phi$</td>
<td>$\approx \frac{1}{u \sin \theta}$ \hspace{1cm} (720 ppm)</td>
<td>$\approx \frac{e}{\pi \tan \theta}$ \hspace{1cm} (690 ppm)</td>
<td>$\cos \theta = \frac{W}{Z} \approx \frac{\pi}{ue}$ \hspace{1cm} (30 ppm)</td>
</tr>
<tr>
<td>$\Phi$</td>
<td>$\approx \frac{a^3}{1836^2 \sin \theta}$ \hspace{1cm} (10 ppm)</td>
<td>$\Phi \approx \left( \frac{2}{\sin \theta} \right)^{1/3}$ \hspace{1cm} (224 ppm)</td>
<td>$\sin \theta$ confirmed</td>
</tr>
<tr>
<td>$\Phi$</td>
<td>$\approx (\frac{a}{137})^{\rho_{e\rho}/P}$ \hspace{1cm} (0.25 ppm)</td>
<td>$\approx 7$ \hspace{0.5cm} (80 ppm)</td>
<td>$\frac{a}{137}$ Eddington couple</td>
</tr>
<tr>
<td>$\Phi$</td>
<td>$\approx a^{(1836+1/\Phi)/a^2}$ \hspace{1cm} (0.20 ppm)</td>
<td>1836 confirmed</td>
<td>$a$ base confirmed</td>
</tr>
<tr>
<td>Number</td>
<td>Approximation</td>
<td>Implication</td>
<td>Remark</td>
</tr>
<tr>
<td>--------</td>
<td>---------------</td>
<td>-------------</td>
<td>--------</td>
</tr>
<tr>
<td>$\Phi^2/2$</td>
<td>$\approx \Omega_2 p/H \beta^2$ (38 ppb)</td>
<td>$\Omega_2 = e^{-\alpha_2}$</td>
<td>$\Omega_2 \approx \frac{1836^2 - (\tau/\mu)^2}{a^3}$</td>
</tr>
<tr>
<td>$\Phi^3/3$</td>
<td>$\approx \sqrt{2}$</td>
<td>$\sin \theta \approx \sqrt{2}/3$</td>
<td>$\sin \theta$ principal value</td>
</tr>
<tr>
<td>$\Phi^4/4$</td>
<td>$\approx \sqrt{3}$</td>
<td>$\Phi^8 \approx 48 - 1$</td>
<td></td>
</tr>
<tr>
<td>$\Phi^5/5$</td>
<td>$\approx \pi/\sqrt{2}$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\Phi^6/6$</td>
<td>$\approx \sqrt{3}$</td>
<td>$1/g_4^2 \sin \theta$</td>
<td>gluon dim 6</td>
</tr>
<tr>
<td>$\Phi^7/7$</td>
<td>$f(2) = e^{\sqrt{2}}$</td>
<td>$(\Phi^7/7)^{256} \approx (17/2)e^{217/2}$</td>
<td>Cosmic Axe connec.</td>
</tr>
<tr>
<td>$\Phi^8/8$</td>
<td>$\approx \sqrt{138}/2$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\Phi^9/9$</td>
<td>$\approx a_{nt}/p\beta$ (0.2 ppm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\Phi^{10}/10$</td>
<td>$\approx (9\mu)^{1/3}$ (75 ppm)</td>
<td></td>
<td>superstring 10d</td>
</tr>
<tr>
<td>$\Phi^{11}$</td>
<td>$\approx (\mu + 1)$ (300 ppm)</td>
<td>$\approx W/\sqrt{F}$ (117 ppm)</td>
<td>$\Phi^5 \approx 11$</td>
</tr>
<tr>
<td>$\Phi^{12}$</td>
<td>$\approx (\mu - 8)d_e$ (31 ppm)</td>
<td>$\approx (\pi e^{\mu_0}/2)^{1/2}$</td>
<td>$e^\pi \approx 2\sqrt{a}$</td>
</tr>
<tr>
<td>Human Mes. Nb. (HMN) $(8\pi a^3/2)^{1/2}$</td>
<td>$\approx (\mu - 6)$ (120 ppm)</td>
<td></td>
<td>supergravity 11d</td>
</tr>
<tr>
<td>$\Phi^{12}/12$</td>
<td>$\approx 2n_t/a$ (73 ppm)</td>
<td>$\approx 12\sqrt{5}$</td>
<td>quarks 5 and 6</td>
</tr>
<tr>
<td>$\Phi^{13}/13$</td>
<td>$\approx 40$</td>
<td>$\approx (an_t/H)^{3/4}$ (3 ppm)</td>
<td></td>
</tr>
<tr>
<td>$\Phi^{14}/14$</td>
<td>$\approx \sqrt{n_\pi p F/W}$ (24 ppm)</td>
<td>$f(14) \approx F/7 \approx H_0/3$</td>
<td>weak bosonic dim 14</td>
</tr>
<tr>
<td>$\Phi^{15}/15$</td>
<td>$\approx (\mu + 1)$ (300 ppm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\Phi^{16}/16$</td>
<td>$\approx (a_0 - 1)8e^{2e}/n_t$ (16 ppm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$(\Phi^{17} - 1)/17$</td>
<td>$\approx 210$ (80 ppb)</td>
<td>Liaison Mu-Tau</td>
<td>3570 Egyptian Number</td>
</tr>
</tbody>
</table>

63
Table 10: The Golden Number and 32 D world

<table>
<thead>
<tr>
<th>Number</th>
<th>Approximation</th>
<th>Implication</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\Phi^{18}$/18</td>
<td>$\pi \sqrt{5} a/3$</td>
<td>$\approx \sqrt{5} e^{\omega}$</td>
<td>CMB dim 18</td>
</tr>
<tr>
<td>$\Phi^{19}$/19</td>
<td>$p/(2 + \sqrt{3})$ (118 ppm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\Phi^{20}$/20</td>
<td>$\sqrt{T} H/n_t$ (10 ppm)</td>
<td>$\approx a_s 200.5/\sqrt{5}$</td>
<td>HMN $\approx \sqrt{5F}/a_s$</td>
</tr>
<tr>
<td>$\Phi^{21}$/21</td>
<td>$138 a_s$</td>
<td>$\approx a_s \sqrt{a_0 a} (a/137)^4$ (5 ppm)</td>
<td>$\Phi^{21} \approx p_G^2/a$</td>
</tr>
<tr>
<td>$\Phi^{22}$/22</td>
<td>$60^2/2$</td>
<td>$f(22) \approx P/2p\sqrt{3}b^2$</td>
<td>strong X boson dim 22</td>
</tr>
<tr>
<td>$\Phi^{24}$/24</td>
<td>$24 (a_t/a)^2$</td>
<td>$\approx 2^3 a_s$</td>
<td>24 transverses dim.</td>
</tr>
<tr>
<td>$\Phi^{26}$/26</td>
<td>$3e^3c$ (47 ppm)</td>
<td>$e^{3c} \approx \tau\pi/8e^{2c}$ (7 ppm)</td>
<td>26 D bosonic string</td>
</tr>
<tr>
<td>$\Phi^{30}$/30</td>
<td>$a^2/137q$ (17 ppm)</td>
<td>$\approx (30\sqrt{2} \approx \Phi^{10}a/\sqrt{50}$</td>
<td>Universal bosonic string 30 D</td>
</tr>
<tr>
<td>$\Phi^{32}$/32</td>
<td>$W a_c(a/137)^2/(a - 136)$ (34 ppm)</td>
<td>$\approx 2e^c p_{Ed}$ (34 ppm)</td>
<td>Edd. eq. confirmed</td>
</tr>
</tbody>
</table>
Table 11: Main Confirming Relations

<table>
<thead>
<tr>
<th>Number</th>
<th>Approximation</th>
<th>Implication</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>$i^{-1}lni = e^{(\pi/2)^2}$</td>
<td>$\approx \sqrt{a} + \frac{d_e}{\sqrt{a}}(14 \text{ ppb})$</td>
<td>137 = 139 − 2</td>
<td>Atiyah Algebras</td>
</tr>
<tr>
<td>$2 + ln\pi = \pi q$</td>
<td>$\approx a(q/2)^2$ (15 ppb)</td>
<td>q pure electric charge</td>
<td>symbolic $\pi$ value</td>
</tr>
<tr>
<td>$2^{128}$</td>
<td>$\approx R/\lambda_e$</td>
<td>double Lucas Number</td>
<td>Universe : base 2</td>
</tr>
<tr>
<td>$6^{128}$</td>
<td>$\approx R_C/\lambda_e$</td>
<td>6 = 2 × 3</td>
<td>Cosmos : base 3</td>
</tr>
<tr>
<td>$a^a$</td>
<td>$\approx \sqrt{a_s}\sqrt{p_H}/\sqrt{\pi}$</td>
<td>$a_s$ value confirmed</td>
<td>$\sqrt{a_s}$ optimal base</td>
</tr>
<tr>
<td>$a^a$</td>
<td>$\approx 4\pi^2/3 (R_C/r_{HB})^3$</td>
<td>Cosmic rad. $R_C$ confirmed</td>
<td>$a$ special base</td>
</tr>
<tr>
<td>$3^{365} \approx 2^{1054}$</td>
<td>$\approx \mu^a \approx \sqrt{a} \tau/\pi$</td>
<td>Heavy Leptons useful</td>
<td>$\sqrt{a}$ optimal base</td>
</tr>
<tr>
<td>$665$</td>
<td>$\approx 3\Phi \times 137$</td>
<td>$\sqrt{665 \times 666} \approx F/2\pi a$</td>
<td>$\Phi^3 \approx \mu d_e$</td>
</tr>
<tr>
<td>$665 \ln 3/2$</td>
<td>$\approx 365.288$</td>
<td>$\approx$ year/day</td>
<td>Earth year special</td>
</tr>
<tr>
<td>$\sqrt{665 \ln 3}$</td>
<td>$\approx 27.03$</td>
<td>$\approx$ solar spin/day</td>
<td>Sun spin special</td>
</tr>
<tr>
<td>$\sqrt{665 \ln 3/2}$</td>
<td>$\approx 1836/\sqrt{\Delta_{Ed}}$</td>
<td>$\Delta_{Ed} = 136^2 - 40$</td>
<td>Edd. eq. confirmed</td>
</tr>
<tr>
<td>$10(N_{Ed=136} 2^{256})$</td>
<td>$\approx n_n = M/m_n$</td>
<td>$\approx R_C/\tau R_T$</td>
<td>Liaison Cosmos-Earth</td>
</tr>
<tr>
<td>$3570$</td>
<td>$\approx \sqrt{2R_T/t_1}$</td>
<td>$\approx \tau$: Tau (terminal Lepton)</td>
<td>$l_1$ (metre) natural unit</td>
</tr>
<tr>
<td>$3570$</td>
<td>$\approx a t_1/2 t_N$</td>
<td>$t_N = G_p^{3/4}/h^2 G^{3/2}$; Neuron</td>
<td>$t_1$(second) natural unit</td>
</tr>
<tr>
<td>Neuron/ms</td>
<td>$\approx 19.14$</td>
<td>La flat (418.0 Hz) - 3 octaves</td>
<td>Hum. La = 442.9 Hz</td>
</tr>
<tr>
<td>$153$</td>
<td>$\approx \beta P^2/p f(26)$</td>
<td>$153 = 1^3 + 3^3 + 5^3 = 1836/12$</td>
<td>26D bosonic string</td>
</tr>
<tr>
<td>$f(30) = e^{3n/4}$</td>
<td>$\approx \lambda_c/153^2 d_R$</td>
<td>$d_R = 2l_p^2/R$ (Universe Topon)</td>
<td>30D confirmed</td>
</tr>
<tr>
<td>$e^{c - g_2}$</td>
<td>$\approx 2c$</td>
<td>$\approx \ln R_C/\lambda_c$</td>
<td>Cosmic Axis confirmed</td>
</tr>
<tr>
<td>$495^{495}$</td>
<td>$\approx p_{PP}^{sin^2 \theta}$</td>
<td>$p_p \approx a^{12}/P$</td>
<td>Higgs number conf.</td>
</tr>
<tr>
<td>$1/g_1$</td>
<td>$\approx e^{c + a - 1}$ (12 ppm)</td>
<td>$\frac{1}{g_1} - g_1 \approx f(-g_1) \approx (a^2/10)^{1/8}$</td>
<td>Topol. funct. conf.</td>
</tr>
<tr>
<td>$\frac{a}{a - 1}$</td>
<td>$\approx 3^{1/50}$ (27 ppb)</td>
<td>unknown musical scale</td>
<td>optimal base 3</td>
</tr>
<tr>
<td>$\frac{a}{a + 1}$</td>
<td>$\approx 3^{a/F}$ (3 ppb)</td>
<td>$F/a \approx 4181$</td>
<td>19th Fibonacci nb.</td>
</tr>
<tr>
<td>$612 = 1836/3$</td>
<td>$2 \times 17 \times 18$</td>
<td>Nucleotide atomic mass</td>
<td>2 + 15th Fibonacci nb.</td>
</tr>
</tbody>
</table>