# Towards Science Unification Through Number Theory

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## Abstract

The mass concept introduces a symmetry between gravitation and quantum physics in the Keplerian Diophantine equation. This connects the Bohr's orbits with the Permanent Holographic Oscillatory Bang model (PHOB), showing up the mean DNA bi-codon mass which connects to 0.1 ppm with the Topological Axis. The local c-observable base 2 Universe appears as a gauge boson in the base 3 Tachyonic Cosmos with massive photon and graviton. This induces a scalar boson mass tied to the geometric extension of the Weinberg triangle, correlating the three gauge couplings U(1)-SU(2)-SU(3) with the gravity constant $G$. The Fermat-Wieferich couple shows a non-standard symmetry eta-tau and permits to define the fine-structure constant within its 0.15 ppb indetermination. The Mirimanoff couple connects to 0.1 ppm with the electron-proton-neutron triplet, tied to the 9D-10D-11D crystallographic symmetries, connected with the generalized Riemann hypothesis, trough the terminal Euler suitable number. This confirms the Eddington's Fundamental Theory, in particular the non-standard symmetry proton-tau. The running number of the string dimension series of the Topological Axis is identified with the orbital quantum number, associating the spin 1/2 and the string dimension 2. This excludes the concepts of Multiverse, Continuum, Infinity, Locality and Zero mass Particle, and leads to stringent predictions.

**Keywords** Computation Principle · Holographic Principle · Holic Principle · Cosmology · Number theory · String Theory · Bit-String Physics · DNA nucleotides · Crystallographic Symmetry · Periodic Table · Sporadic Groups.

## 1 Introduction: the *invariant* Hubble radius

Despite many tremendous advances in Physics unification, the standard model of particles, after decades of intense research, is always unable to integrate gravitation. On the other hand, the string theory shows up a spin 2 graviton and introduces the elegant multi-dimensional Holographic Principle, but seems unable to connect with the reality. In particular, the Holographic Principle is not applicable to the usual 4D space-time, due to the official temporal variation of $R$, the Hubble horizon radius. According to Schwarz : *"this turns out to be surprisingly difficult"* [1].

In fact, the present-day value for $R$ introduces a dramatic crisis. Despite an optimisation of six parameters, the standard $\Lambda CDM$ cosmologic model leads to the present-day Hubble constant $H_0 = c/R \approx 67.74 \pm 0.46$ km/s by Megaparsec [2], while, since several years, direct measurements, using different methods, confirm a significant discrepancy. In particular, the latest measurement is $69.8 \pm 0.8$ [3].

This discrepancy is widely discussed, but this last value was predicted long ago, by the mere application of $c$-free MLT dimensional analysis [4]. This value was later justified by the model of the Gravitational Hydrogen Molecule [5], which is also the limit of a star radius when its atomic number is reduced to unity, [6]. With Giga light-year (Gly) unit, where $\lambda_e = \hbar/m_e c$ is the electron reduced wavelength, this is:

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$$R = 2a_G \, \lambda_e = 2\hbar^2/Gm_e m_p m_H \approx 13.811977 \; Gly \tag{1}$$

corresponding to $H_0 \approx 70.790 \; kms^{-1}Mpc^{-1}$, compatible with the above last measurement. Moreover, this value connects within $10^{-3}$ with the reduced topological function $g(k) = exp(2^{k+1/2})/k$, for $k = 6$ ($d = 2 + 4k = 26$), see Graphics 3, where the dimension 26 is the privileged dimension of the string bosonic theory [7]:

$$R \approx g(6) \, \lambda_e = 13.82 \; Gly \tag{2}$$

The Topological Axis (Graphics 3) rehabilitates the Large Number Correlations, whose the *single* official justification is the Anthropic Principle, which also is used to justify the so-called "biologic fine-tuning" through the Multiverse model [8]. But such a rough argument cannot explain the above precision, so *the Topological Axis recover the ancestral idea of an unique Universe.*

According to Russel *"The most surprising in the modern science is its come back to Pythagorism"* [9]. The aim of this article is to confirm this, in particular the pertinence of the Holic Principle, the diophantine form of the Holographic Principle, supporting an invariant Hubble radius. Also we show that the DNA characteristic mass is a central physical parameter, via $10^{-7}$ fine-tunnig with the mean dimension 16 of the Topologic Axis, which so was indeed *predictive*.

The standard cosmological model is not completely refuted, since the so-called "Universe age" is so close to $R/c$. Considering matter as a very rapid matter-antimatter vibration, a "Permanent Holographic Oscillatory Bang model" (PHOB) has been proposed, where the Planck wall is reduced by a factor $10^{61}$ [10], and the "dark matter" would be $\pi$-phased oscillation. The sum of baryons and anti-phased dark baryons has *the invariant relative density 3/10* [7], as confirmed by a formula in Table 4, which rehabilitates the Eddington's Baryon Large Number $136 \times 2^{256}$ [11].

The Table 4 shows 55 simple formulas for the Hubble radius $R$. This recalls the 14 molecular formula of Jean Perrin that definitely established the existence of atoms, based on 6 different theories. In this table also, numeric terms from different approaches are used: [6], [8], [11], [12] and [27]. But the most significant is the Holic Theory, recalled below, characterized by the "primal factorial 7", the number $210 = 2 \times 3 \times 5 \times 7$. The appearance of $210^{210}$ and $\mu^\mu$ resolves at last a complete mystery in the standard model: the *arithmetic* origin of the muon/electron mass ratio. Note that the approximation $\mu \approx 210$ is central in the Bit-String Physics [17], and will be confirmed below.

In this article, the search for precision correlations uses the precisely defined values obtained by the "maximal correlation principle" (Tables 1 and 2) [7]. It is supposed that the scalar boson/electron mass ratio is $H^{(0)} = 495^2$, as confirmed in this article to 0.1 ppm. The corresponding gauge coupling *brute* constants for the groups U(1) and SU(2) are, with $cos\theta = W/Z$ (the gauge coupling $g_3$ for SU(3), (this article will induce the value of the SU(3) coupling $g_3 \approx 1.221$, see Eq.(5)):

$$\begin{cases} g_1 = Zsin\theta/H^{(0)} \approx 0.3436256 \\ g_2 = W/H^{(0)} \approx 0.6421390 \\ q = g_1 cos\theta = g_2 sin\theta = (4\pi/a)^{1/2} \end{cases} \tag{3}$$

with $q$ the *adimensional* electric charge. *The above "maximal correlation principle" between the "free parameters" is consistent with the identification of the latter with "computation basis". This supports the pertinence of the "economic numbers" $a^a$, $210^{210}$ and $\mu^\mu$.* Indeed, it was shown that the "basic economic numbers" of the form exp(exp(exp... plays a central role in the cosmic computation, entering two formula of the Hubble radius Table 4.

## 2   The Computing Principle: the Tachyonic Holographic Cosmos

The classical theory associates conservation law with symmetry. More generally, a conservation law can be seen as the result of a computation. So, the main hypothesis is that the Cosmos, considered as a black-hole of radius $R_C$ is a super-computer [5]. This is a very controversial domain. In particular, Y. Ng [14] introduces wrongly a "quantum foam" of dimension $(Rl_P^2)^{1/3} \approx 10^{-15}$ m, a length independantly found through the Computation Principle [5]. With the above hypothesis of an *invariant* Hubble radius $R$, this can be rather associated with the *invariant* electron classical radius. Hence, the "classical radius" of the Universe was defined as *the radius which is the simplest elimination of c between the classical electron radius and the Planck length formula. Indeed the speed c is way too small to inter-connect a so vast Cosmos*:

$$R_e = 2r_e^3/l_P^2 = 2\hbar^2/Gm_N^3 \qquad M_N = m_P^4/m_N^3 \tag{4}$$

Table 1: Adimensional primary constants

| name | symbol | value | imp (ppb) |
|------|--------|-------|-----------|
| Euler-Napier constant | $e$ | 2.718281828459042 | "exact" |
| Archimedes constant | $\pi$ | 3.14159265358979 | "exact" |
| Euler-Mascheroni constant | $\gamma$ | 0.57721566490153 | "exact" |
| Wien factor $w_i = hc/k_B T \lambda_{Wien} = 5(1 - e^{-w_i})$ | $w_i$ | 4.96514245 | "exact" |
| Scale-factor $8\pi^2/ln2$ | $j$ | 113.9106346 | "exact" [5] |
| Electric coupling constant ($\alpha^{-1}$) | $a$ | 137.035999084(21) | 0.15 |
| Electron Excess Magnetic moment | $d_e$ | 1.00115965218128 | 0.15 |
| Atiyah constant | $\Gamma = \gamma a/\pi$ | 25.17809724196 | 0.15 |
| Optimized massive scalar boson/Electron mass ratio | $H^{(0)}$ | $495^2 = 245025$ | exact, $H_{mes}^{(0)}$: 245000(250) |
| Optimized charged weak boson/Electron mass ratio | $W$ | 157340.1093 | ppb [5] $W_{mes}$: 157297(24) |
| Optimized neutral weak boson/Electron mass ratio | $Z$ | 178451.7524 | ppb [5] $Z_{mes}$: 178450(4) |
| Optimized charged Pion/Electron mass ratio | $\Pi_+$ | 273.1328373 | ppb [5] $\Pi_{+mes}$: 273.13288(47) |
| Optimized neutral Pion/Electron mass ratio | $\Pi_0$ | 264.143971 | ppb [5] $\Pi_{0mes}$: 264.14341(97) |
| Optimized eta Meson/Electron mass ratio $4(\Pi_0\Pi_+)^{1/2}(137/a)^8$ | $\eta$ | 1072.147344 | $\eta_{mes}$: 1072.139(33) |
| Optimized "Squared Effective ($m_Z$) Weak-mixing angle" $e/32sin\theta(cos\theta)^2$ | $(\sin\theta_{effZ})^2$ | 0.2315965 | $(\sin\theta_{effZ})^2_{mes}$: 0.23153(4) |
| DNA Adenine-Thymine couple principal mass/$m_H$ | $o_1$ | 612.312280 | [23] |
| DNA Guanine-Cytosine couple principal mass/$m_H$ | $o_2$ | 613.299802 | [23] |
| Lucas Large Prime Number | $N_L$ | $2^{127} - 1$ | exact |
| Eddington Large Number | $N_E$ | $136 \times 2^{256}$ | exact |
| Proton/Electron mass ratio $m_p/m_e$ | $p_t$ | 1836.15267343 | 0.06 |
| Hydrogen/Electron mass ratio | $H$ | 1837.15266014 | 0.06 |
| Relativistic correction factor $1/(H - p)$ | $\beta$ | 1.000026597 | 0.1 |
| Neutron/Electron mass ratio | $n_t$ | 1838.6836617 | 0.5 |
| Optimized Muon/Electron mass ratio | $\mu$ | 206.7682869 | 0.1 $\mu_{mes}$: 206.7682830 |
| Optimized Koide Tau/Electron mass ratio | $\tau$ | 3477.441701 | 0.1 $\tau_{mes}$: 3477(2) |
| Fermi Sanchez-Atiyah mass ratio: $\sqrt{a_w}$ | $F$ | 573007.3652 | 0.22 $F_{mes}$: 573007.362 |
| Planck ratio $m_P/m_e$ | P | $2.389015907 \times 10^{22}$ | ppb [5] |
| Gravitational proton ratio $PN_L^{-1/2}$ | $p_G$ | 1831.531181 | ppb [5] |
| Optimised Gravitational (inverse) coupling constant $R/2\lambda_e = P^2/pH$ | $a_G$ | $1.691936467 \times 10^{38}$ | ppb [5] |
| Optimised Electroweak (inverse) coupling constant $(2\Gamma \times 137)^3$ | $a_w$ | $3.283374406 \times 10^{11}$ | ppb [5] |
| Optimised Strong (inverse) coupling constant $a_w/2\pi(pH)^{3/2}$ | $a_s$ | 8.434502906 | ppb [5] $a_{s(mes)}$:8.47(7) |

The factor 2 comes from the Schwarzschild horizon formula $R_e = 2GM_N/c^2$, implying the Nambu mass $m_N = am_e$, central in particle physics [15]. *This considers the mass concept as primordial, specially the Panck mass $m_P$, excluding any Zero mass particle concept* [7].

We introduce the "Weinberg-Sanchez" natural geometric extension of the Weinberg triangle [26], $1/g_0 = 1 + g_1^2 + g_2^2 = 1 + (Z/H^{(0)})^2$. With the BE-Higgs scalar boson mass ratio, by respect to electron: $H^{(0)} = 495^2$ (125.208 GeV) [7], the radius ratio $R_e/R$ obeys the following $10^{-7}$ precise relations, involving $G$ through $p_G = P/2^{127/2}$ (from the Combinatorial Hierarchy [12]) and the Wien factor $w_i$. So $1/g_0$ is identified as $g_2/g_1g_3$ where $g_3$ is the inverse SU(3) coupling, while $g_1 = W/H^{(0)}$ is the U(1) coupling and $g_2 = Z sin\theta/H^{(0)}$ is the SU(2) coupling, with $cos\theta = W/Z$:

$$\begin{cases} 1/g_0 = 1 + g_1^2 + g_2^2 \approx (R_e/2R) \approx 2(H/p_t)(\beta\sqrt{a_s}/w_i)^{1/2} \\ g_0g_2 = g_1g_3 \end{cases} \quad (5)$$

In this manner, in conformity with the standard model, $g_3$ is connected with the strong coupling constant, but through the Wien factor which is not pertinent in the present standard model, but must be central in cosmology, due to the thermal character of the Cosmic Microwave Background (CMB).

Note that the small difference between $g_0$ and $g_2$ induces one formula in the Hubble Table. The radius $R_e$ is about 30% larger than $R$, so *$R_e$ was identifed to the holographic reduced Cosmos radius [7], defined by the Bekenstein-Hawking entropy of the sphere with radius $R_e$* [16]: $\pi(R_e/l_P)^2 = 2\pi R_C/l_P$, so:

$$R_c = R_e^2/2l_P \approx 2^{128}l_P(Rg_0/\lambda_H)^2 \approx 9.075773 \times 10^{86}m \quad (6)$$

Table 2: Table of Physical constants

| name | Symbol | unit | Value | imprecision (ppb) |
|---|---|---|---|---|
| Reduced Planck constant $h/2\pi$ | $\hbar$ | J s | $1.05457181 \times 10^{-34}$ | "exact" |
| Optimized Gravitation constant | G | $kg^{-1}m^3 s^{-1}$ | $6.67545375 \times 10^{-11}$ | [5] $G_{mes}$: 6.67430 |
| Relativity speed | c | $ms^{-1}$ | 299792458 | exact |
| Fermi constant | $G_F$ | $Jm^3$ | $61.435851 \times 10^{-62}$ | 500 |
| Electron mass $m_e = m_p/p = m_H/H = m_n/n_t$ | $m_e$ | kg | $9.1093837015 \times 10^{-31}$ | 0.3 |
| Electron reduced wavelength $\hbar/m_e c$ | $\lambda_e$ | m | $3.861592675 \times 10^{-13}$ | 0.3 |
| Electron classical radius $\hbar/am_e c$ | $r_e$ | m | $2.817940322 \times 10^{-15}$ | 0.45 |
| Hydrogen Bohr radius $a(1 + 1/p)\lambda_e$ | $r_H$ | m | $5.294654092 \times 10^{-15}$ | 0.45 |
| CMB temperature | $T_{CMB}$ | K | 2.725820138 | [5], $T_{CMB(mes)}$ 2.7255(6) |
| CMB reduced wavelength | $\lambda_{CMB} = \hbar c/k_B T T_{CMB}$ | m | $8.400716621 \times 10^{-4}$ | [5] |
| CMB Wien wavelength | $\lambda_{CMB}/w_i$ | m | $1.063082472 \times 10^{-3}$ | [5] |
| CMB photon length | $l_{phCMB} = \lambda_{CMB}(16\pi\xi(3))^{-1/3}$ | m | $1.34513098 \times 10^{-3}$ | [5] |
| Non-Local length | $l_{nl}$ | m | $2.878184911 \times 10^{12}$ | [5] |
| Hubble length (Universe radius) | $R$ | m | $1.306713894 \times 10^{26}$ | [5] |
| Mono-electron Universe radius | $R_1$ | m | $1.492365473 \times 10^{26}$ | [5] |
| Cosmos holographic radius | $R_e$ | m | $1.712894163 \times 10^{26}$ | [5] |
| Cosmos radius | $R_C$ | m | $9.075773376 \times 10^{86}$ | [5] |
| Universe mass | $M$ | kg | $8.7965248 \times 10^{52}$ | [5] |
| Cosmos holographic mass | $M_N$ | kg | $1.15308454 \times 10^{53}$ | [5] |
| Cosmos mass | $M_C$ | kg | $2.247604 \times 10^{113}$ | [5] |

*The Table 5 presents 24 formula confirming this Cosmos radius.*

There is an unambigous numerical relation between the Cosmos, its holographic reduced sphere and the Universe (fig. 1), separating the mass concept from the cinematik one. The Universe seems characterized by the constant $c$ in the equivalence between the spatial and temporal terms, hence the following 2 factor [7]:

$$(ln(R_c/\lambda_e))^2 \approx (ln(M_e/m_e)^2 + 2(ln(R/\lambda_e)^2) \tag{7}$$

This will be related to the following Holic Principle (Section 3).

The Topological Axis rehabilitates the bosonic part of the string theory which has the apparent imperfection it includes tachyons. In fact, it is rather an advantage in order to explain the quasar non-Doppler oscillation, introducing a non-local period $t_{nl} \approx 9600,06(2)$ s [18]. Indeed, the ratio of this period and the electron period $t_e = h/m_e c^2$ is given by the elimination of $c$ between the electro-weak constant $a_w$ and the inverse gravitational coupling $a_G = R/\lambda_e$:
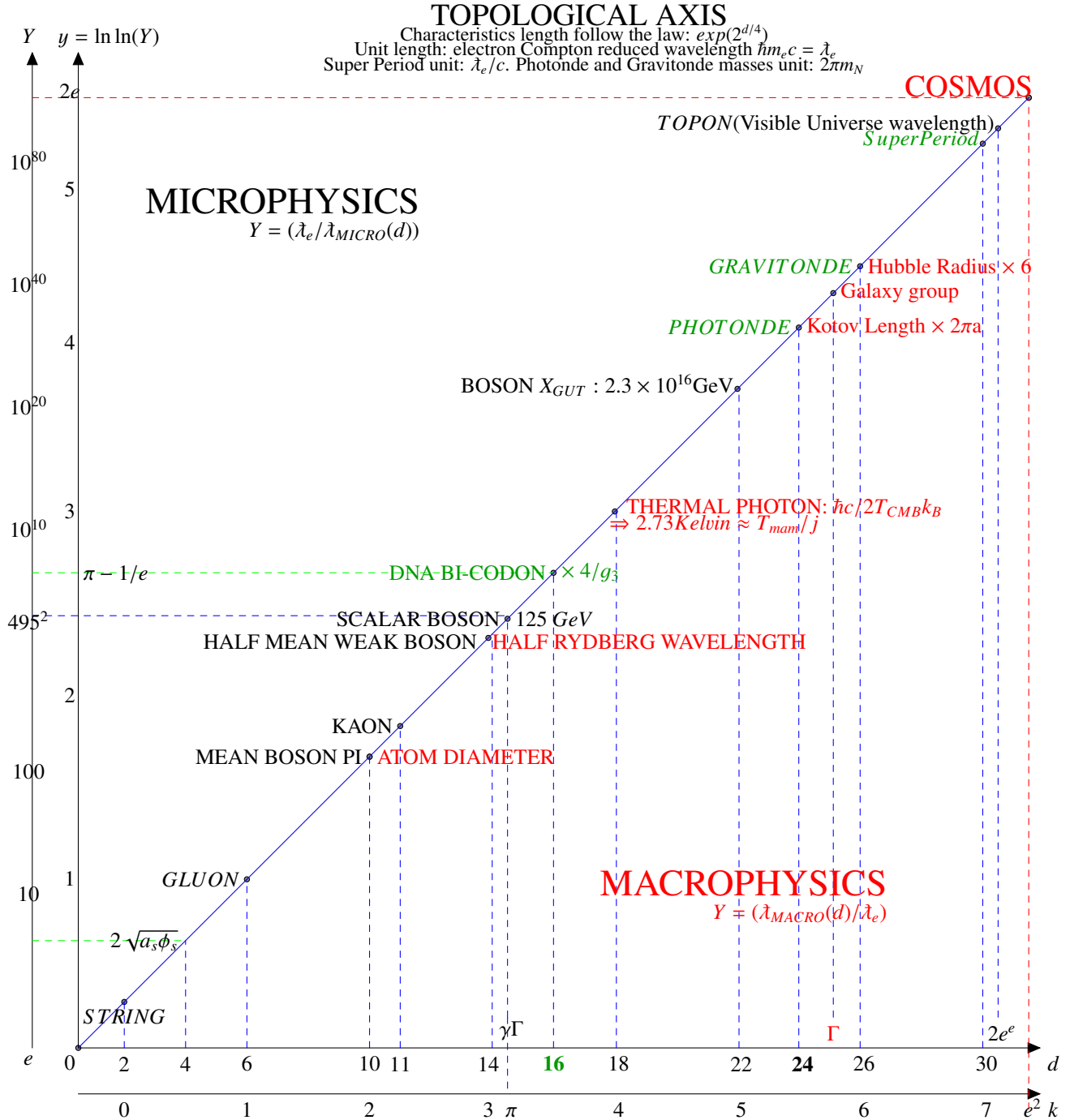
$$t_{nl}/t_e \approx (a_G a_w)^{1/2} \tag{8}$$

This gives a $G$ value precise to $10^{-6}$, compatible with the BIPM $10^{-5}$ precise measurement [20]. This implies that the official value of $G$, *the incongruous mean between incompatible measurements*, is too weak by 8 $\sigma$.

By analogy with the practical holography, which is a two-step process, it was introduced a two-step interaction procedure, with a precursor speed $C = R_C/R$ much greater than $c$, leading to the following masses for the photon and graviton [7]:

$$\begin{cases} m_{ph} = \hbar/c^2 t_{nl} \\ m_{gr} = m_{ph}/a_w \end{cases} \tag{9}$$

In the Topological axis, these masses correspond to the special string dimensions 24 (transverse dimensions) and 26 (main dimension), and will be determinant in the following section. Note that, with $r_H$ the Bohr's radius and the relativistic factor $1/\beta = H - p$ (1 ppm):

$$f(24)^{1/26} \approx d_e(r_H/\beta\lambda_e)^{1/2} \tag{10}$$

## TOPOLOGICAL AXIS
Characteristics length follow the law: $exp(2^{d/4})$
Unit length: electron Compton reduced wavelength $\hbar m_e c = \lambda_e$
Super Period unit: $\lambda_e/c$. Photonde and Gravitonde masses unit: $2\pi m_N$

$Y$   $y = \ln\ln(Y)$

$2e$                                                                    COSMOS

$TOPON$(Visible Universe wavelength)
$10^{80}$                                                        $SuperPeriod$

$5$

**MICROPHYSICS**
$Y = (\lambda_e/\lambda_{MICRO}(d))$

$10^{40}$                                           $GRAVITONDE$ Hubble Radius $\times 6$
                                                        Galaxy group
                        $PHOTONDE$ Kotov Length $\times 2\pi a$

$4$

$10^{20}$                          BOSON $X_{GUT}$ : $2.3 \times 10^{16}$GeV

$3$

$10^{10}$                    THERMAL PHOTON: $\hbar c/2T_{CMB}k_B$
                        $\Rightarrow 2.73 Kelvin \approx T_{mam}/j$

$\pi - 1/e$  ------  DNA-BI-CODON $\times 4/g_3$

$495^2$      SCALAR BOSON $\bullet$ 125 $GeV$
          HALF MEAN WEAK BOSON $\bullet$ HALF RYDBERG WAVELENGTH

$2$

          KAON
          MEAN BOSON PI ATOM DIAMETER

$100$

$1$  $GLUON$                                    **MACROPHYSICS**
                                            $Y = (\lambda_{MACRO}(d)/\lambda_e)$

$10$

$2\sqrt{a_s\phi_s}$

$STRING$

$\gamma\Gamma$                          $\Gamma$                $2e^e$

$e$   0   2   4   6   10 11   14   **16**   18   22   **24**   26   30   $d$

       0       1       2     3 $\pi$    4       5       6       7   $e^2$  $k$

Bosonic string dimensions: $d = 4k + 2$ from k=0 to k=7 (Bott sequence). From k= 0 to k = 4: spectroscopic numbers

Table 3: The Topological Axis follows the law $exp(2^{d/4})$ for the main physical characteristics lengths, with unit length the electron Compton reduced wavelength: $\hbar/m_e c = \lambda_e$. This is the reunion of height 2D-1D holographic relations, hence the name 'Topological Axis', and the extrapolation towards smaller numbers of the Eddington's Large Number correlations. The double natural logarithms y = ln(ln(Y)) of the main dimensionless physical quantities (Y) corresponds to the special string dimension series, which identifies with the spectroscopic series with spin 2, where k is the orbital quantum number, d = 4k + 2, from k = 0 to k = 7, characteristics of a Bott octonion sequence, as anticipated by Atiyah, whose constant $\Gamma = \gamma a/\pi$ is central. The mean value $d = 16$ connects directly with the DNA bi-codon, decisive in the Holic Cosmology, where $g_3$ is the Weinberg-Sanchez SU(3) unification factor (Eq(4)), $\phi_s$ the golden number, $m_N = am_e$ the Nambu mass, and $j = 8\pi^2/ln2$ the scale factor [7].

Table 4: 55 formula for the Hubble radius $R$

| Formula | Value (Gly) | Remarks |
| --- | --- | --- |
| $2\hbar^2/Gm_e m_p m_H$ | 13.81197676 | Gravitational Hydrogen Molecule radius [5] |
| $(H/p_t)R_{1H}$ | 13.81197676 | From mono-atomic star limit radius $R_{1H}$ [6] |
| $\lambda_w(t_{nl}/t_e)^2$ | 13.81197676 | Identification predicting $t_{nl} \approx 9600.591457 s$ (Eq.(5)) |
| $(\lambda_p\lambda_H)^{1/2}(WZ)^4$ | 13.81197676 | Symetrising the published relation $a_G \approx W^8$ [8] |
| $\lambda_e 2^{128}/d_e^2(m_H/m_p)^6$ | 13.81197676 | Empirical, from the Combinatorial Hierarchy Lucas Large Number [12] |
| $(n_t p_W/1836p)^{1/2}\lambda_e(2^{18}/\pi\sqrt{a})^{10}$ | 13.81197711 | From $(2g_3)^{21} \approx s_0/2\pi$; $p_W = 6\pi^5$ and $s_0 \approx (2\pi)^2\sqrt{a}$ |
| $(1/g_0)\lambda_H(R_C/2^{128}l_P)^{1/2}$ | 13.81197801 | From $1/g_0 = 1 + g_1^2 + g_2^2 \approx 2a^3/pp_G$, with $p_G = P/2^{127/2}$ |
| $(\lambda_p\lambda_H)^{1/2}a_w^{7/2}a/2\sqrt{5}$ | 13.81197801 | From $(WZ)^8 \approx a^2 a_w^7/20$ |
| $\lambda_e(p_{hol}/p)^2 E^{\sqrt{a}/2}$ | 13.811984 | Liaison between $E = exp(exp(e))$ and $p_{hol}^2 = 4a^3/3$ |
| $(H/p_W)(2\pi^2 a^3)^5\lambda_e$ | 13.811956 | with $p_W = 6\pi^5$, 5D holography in the gravitational Hydrogen molecule [7] |
| $4a^4\lambda_e(m_{bc}^{(0)}/m_H)^9(p_t/p_W)^2$ | 13.811964 | DNA bi-codon mass as calculation basis |
| $\lambda_e(WH/Zp)^{1/2}C_y^{(0)32}/6f(26)$ | 13.811948 | Cytosine topologic pertinence $C_y^{(0)} \approx f(10) = f(26)^{1/16}$ |
| $\lambda_e(N_{ph}(n_t/p_t)^2/\pi\sqrt{g_0})^{1/7}$ | 13.81197 | with $N_{ph}$ the Cosmos photon number, confirms that the Universe is a cosmic gauge boson, act |
| $R_C(a_s e^{2/a}210^{-210})^{1/8}$ | 13.81198 | With the holic number $210^{210}$, confirming the couple Universe- Cosmos |
| $l_P\sqrt{a}(\mu^\mu Wp/ZH)^{1/8}$ | 13.81198 | Shows the pertinence of the computational term $\mu^\mu$ |
| $12F_{137}^2 l_P(m_{bc}^{(0)}/m_e)^{3/2}/pH\beta^2$ | 13.81194 | With the Fibonacci prime number $F_{137}$ and the bi-codon mass |
| $12d_e(p_t/p_W)^4 F_{137}^2 l_P(m_{bc}^{(0)}/m_e)^{1/2}/\beta^2$ | 13.81195 | With the Fibonacci prime number $F_{137}$ and the bi-codon mass |
| $F_{137}(2l_P f(26)\lambda_e(m_{bc}^{(0)}/m_e + 1)^{1/2})^{1/2}$ | 13.81208 | With the Fibonacci prime number $F_{137}$ and the bi-codon mass |
| $(H/p_t)(ad_e/137)^4 R_{R_c,M_N}$ | 13.81203 | From the geo-adimensional Cosmos-Universe (Fig.1) |
| $(137\beta/a)^2 R_C R_e l_P^2/a_w l_{nl}^2\lambda_{bc}^{(0)}$ | 13.81194 | Holic Principle, with the reduced wavelength of the DNA bi-codon. |
| $(\pi a/6 \times 137)\lambda_e(1/g_0)^{210}$ | 13.81185 | From $(1/g_0) \approx 2R/R_e \approx (R/\lambda_e)^{1/210}$ (Eq. 14)) |
| $(136/137)2l_{nl}a^3 f(16)$ | 13.8120 | Empirical, with the central value $f(16) = e^{16}$ |
| $(137^4/ap_t^2)\lambda_{WCMB}(e^a/4\pi)^{1/2}$ | 13.8120 | Confirming the Wien CMB wavelength, from $4\pi(R_e/\lambda_{WCMB})^2 \approx e^a$ |
| $(\lambda_p\lambda_H)^{1/2}a_w^4 a^{14}/137^{16}$ | 13.8119 | $137, a, a_w$ as computation basis |
| $(2a/137)q^2 Z^{16}\lambda_p\lambda_H/2^{127}\lambda_e$ | 13.8221 | Cosmic role of electric charge $q = g_1\cos\theta = g_2\sin\theta$ |
| $4o_2\sqrt{Z}\lambda_e\lambda_{CMB}/l_P$ | 13.8129 | Confirms the cosmic thermal bath and the couple GC with mass $o_2 m_H$ |
| $(H/p_t)(Gm_n/c^2)(10N_{Ed}/3)$ | 13.8125 | From the Eddington Number $136 \times 2^{256}$ and the gravitational parameter 10/3 [7] |
| $R_e(f(-2)/exp(exp(-g_1))^{128}/d_e^3$ | 13.8117 | Symmetry $R_e/R$ associated to symmetry f(2)-$g_1$ (string-SU(1) gauge coupling) |
| $2\lambda_e(1836 + s_0/2)^{\sqrt{a}}$ | 13.8123 | Pertinence of the symmetry 1836-1848 (Eq.(25)) |
| $(\lambda_p\lambda_H)^{1/2}(P/a^{13/2})^5/2\sqrt{5}$ | 13.8124 | From the relation $a_w^7 \approx P^{3+7}/a^{(7+127)/2}$ [7] |
| $6(\lambda_e^2/\lambda_w)(a/\pi)^{16}$ | 13.8124 | From the Topologial Axis: $f(18) \approx H^3 \approx (a/\pi)^4(6^{1/2}a_w)^{1/2}$ |
| $4\lambda_e aWZa_w^{1/2}(p_t H)^3$ | 13.817 | Empirical |
| $4l_{nl}(p_t H/d_e)^2$ | 13.815 | Empirical |
| $\lambda_e(2/d_e^8)^{128}/(2g_0 - 1)$ | 13.815 | Empirical, from the Combinatorial Hierarchy Lucas Large Number [12] |
| $2\lambda_H 2^{210}(a_w/P)^2$ | 13.811 | Pertinence of the holic term $2^{210}$ |
| $\lambda_e e^a/p_t^6\Gamma$ | 13.811 | confirms the pertinence of the Atiyah constant $\Gamma$ |
| $l_P(\pi 210^{210}/8)^{1/8}$ | 13.81 | Pertinence of the holic term $210^{210}$ |
| $R_e a^a/\Pi_{heur}$ | 13.81 | with the product of the 20 happy sporadic groups $\Pi_{heur} \approx e^{674.5210287}$ |
| $2\hbar^2/Gm_e m_p m_n$ | 13.80 | c-free dimensional analysis [10] |
| $(\Pi_+/\Pi_0)\lambda_e e^{1/(g_0-g_2)}$ | 13.82 | Confirms the pertinence of $g_0$ and $g_2$ |
| $l_{nl}2p_t^3 H/d_e$ | 13.82 | $p$ and $H$ as computation basis |
| $(\lambda_{CMB}/(j + 1))^2/l_P$ | 13.80 | Central role of mammal temperature: $T_{mam} \approx jT_{CMB}$, with $j = 8\pi^2/ln2$ |
| $2\lambda_e(1/sin\theta)^{10d_e\sqrt{137}}$ | 13.80 | Corresponds to $(1/sin\theta) \approx 3/\sqrt{2} \approx p^{1/10}$ |
| $\lambda_e\pi^{155/2}$ | 13.80 | $\pi$ calculation basis: $2^{1/155} \approx \pi^{1/16^2} \approx (2\pi)^{1/3\times137}$ |
| $2\lambda_e E^{2\sqrt{a_s}}$ | 13.79 | Pertinence of the basic economic number $E = e^{e^e}$ |
| $\lambda_e(6/\pi)^{r_H/\lambda_e}$ | 13.78 | $6/\pi$ calculation basis |
| $\lambda_e\Gamma^{55/2}$ | 13.77 | Atiyah's constant $\Gamma$ calculation basis |
| $g(6)\lambda_e$ | 13.82 | with the reduced topological function $g(k) = exp(2^{k+1/2})/k$, for k = 6, d = 26 |
| $2l_{nl}(a\mu)^3$ | 13.84 | Empirical |
| $(2l_{nl}^3/r_e)^{1/2}$ | 13.75 | 2D-3D Holography with the non-local length $l_{nl}$ |
| $(r_e^2 R_C)^{2/3}/l_{nl}$ | 13.75 | Confirms the Cosmos non-locality |
| $R_1^2/R_e$ | 13.75 | With the single electron radius $R_1$ [7], which specifies the approach $a \approx ln a_G$ [8] |
| $(2\lambda_e/3)(\lambda_{CMB}/\lambda_{H_2})^2$ | 13.90 | 2D-3D holography in the hydrogen molecule |
| $(4\pi\lambda_{CMB})^4/r_H^3$ | 13.78 | Empirical, confirming the CMB invariance |
| $(l_P/2)(\lambda_{CMB}^2\lambda_p/\lambda_{CNB}r_e^2)^6$ | 13.7 | Complementarity of photons and neutrinos backgrounds |

Table 5: 28 formula for the Cosmos radius $R_C$

| Formula | Value ($10^{86}$m) | Remarks |
|---|---|---|
| $R_e^2/2l_P$ | 9.07577 | 1D-2D Holographic Principle with $R_e$ [5] |
| $Re^{210}(f(16)e^{e^6}9\mu/n_t)^{-1/6}$ | 9.07577 | confirms the role of the central topologic term $f(16) = e^{16}$ |
| $e^{210}l_{Wien}\beta(\sin\theta_{effZ})^4$ | 9.07577 | confirms the Holic Principle and the CMB temperature invariance |
| $2^{128}l_P(g_0R/\lambda_H)^2$ | 9.07577 | with $1/g_0 = 1 + g_1^2 + g_2^2 = 1 + (Z/H^{(0)})^2$ |
| $\lambda_e\,exp(exp(exp(exp(exp(-g_2)))))$ | 9.07577 | The final log of $R_c/\lambda_e$ is a SU(2) coupling: $g_2 \approx W/(495^2 + (\tau/\mu)^2)$ |
| $e^\mu\lambda_{CMB}(R_e/R)^2(p_t/p_{t0})^4$ | 9.07584 | confirms the CMB temperatur invariance, with $p_{t0} = 1836$ |
| $e^\mu\lambda_{Wien}e/2\beta^2\sqrt{d_e}$ | 9.07575 | confirms the CMB temperature invariance, through the Wien wavelength |
| $e^\mu l_{phCMB}((a-136)p_t/p_{t0})^2$ | 9.07573 | confirms the CMB temperature invariance, through its photon length $l_{phCMB}$ |
| $e^\mu\lambda_e\beta^{1/2}(p_t/n_t)^{1/4}$ | 9.07576 | confirms the CMB temperature invariance |
| $2(a/137\beta)^2l_{nl}^4\lambda_{bc}^{(0)}/R_e\lambda_e l_P^2$ | 9.07580 | Holic Principle, with the reduced wavelength of the DNA bi-codon |
| $l_P\,(\sqrt{a_w}(a)^2)^{16}$ | 9.07568 | Computation with the nuclear coupling $a_w$ and $a_s$ |
| $l_P\,(210^{210}(8e)^{-1/2})^{1/4}$ | 9.07585 | Holic central term $210^{210}$ |
| $2^{136}R(g_0\lambda_{CMB}/\lambda_e)^2$ | 9.080 | Connection with the CMB thermal background. |
| $Rl_{nl}^2a_w/R_Nr_{bc}^{(0)}$ | 9.081 | Holic Principle, Eq.(15), with $r_{bc}^{(0)} = Gm_{bc}^{(0)}/c^2$ |
| $2r_H3^{210}/1830$ | 9.076 | Empiric, base 3 Holic term, with $1830 = (60\times61)/2$ |
| $l_P(p/H)(R\Pi_{26}/R_e)^{1/3}$ | 9.076 | with the product of orders of the 26 sporadic groups $e^{674.5210287}$ [5] |
| $\lambda_P\,(210^{210}/\sqrt{(8e)})^{1/4}$ | 9.076 | Empirical, using the Holic Number $210^{210} \approx \tau^{2\mu/3} \approx e^{e2\mu}$ |
| $\lambda_e g(7)(H/p)^2 P/6$ | 9.076 | with the reduced topologic function for $d = 30 : g(7) = f(30)/7$ [5] |
| $24\lambda_e\pi^{210}/a^3$ | 9.077 | Empiric, with base $\pi$ holic term |
| $a^2\lambda_{Wien}^4/(p_Kl_P)^3$ | 9.078 | Empiric, confirms $T_{CMB}$ with $p_K = (1 + \mu + \tau)/2$ [13] |
| $\sqrt{3}l_{nl}^3/r_e l_P$ | 9.07 | with the non-local length $l_{nl}$ |
| $\lambda_e g(7)(a^2p_t p_G)^2$ | 9.08 | Empiric [5] |
| $\lambda_e e^{(p_{00}+1/2)/8}$ | 9.09 | natural base $e$, with $p_{00} = (60\times61)/2$ |
| $\lambda_e e^{e^{2e}+1}/2\pi$ | 9.11 | natural base $e$ in the Topological Axis |
| $(ln(R_c/\lambda_e))2 \approx (ln(M_e/m_e)^2 + 2(ln(R/\lambda_e)^2)$ | 9.12 | c-observable Universe Cosmos couple $(R/\lambda_e = t/t_e)$ , fig 1 |
| $\lambda_e g(7)(\lambda_{CMB}/r_H)^3$ | 9.1 | Empirical, invariance of the thermal background [5] |
| $(Rl_{nl})^{3/2}/r_e^2$ | 9.2 | From non-local holography [5] |
| $l_P\,\mu^{\mu R_e/3R}$ | 9.0 | $\mu$ calculation basis, close to holic base 210 |

showing that the electric parameter $a = (p/H)r_H/\lambda_e$ is central in the Topological Axis.

## 3   The Holic Principle

The string theory considers space-time as a secondary property [19], so the concepts of mass, length and time are, in final, related to pure numbers. Indeed an arithmetic-physical synthesis has been anticipated by the Holic Principle [34], a simplified form of the Holographic Principle.

Recall that holistic equations are prefered to differential ones, in order to eliminate free parameters. The systematic use of differential equations in the standard physics is the origin of the proliferation of free parameters.

In any Diophantine equation, this Holic Principle allows to discriminate a temporal ratio $T$, acting by its square, from a spatial ratios $L$, acting by its cube (due to the 3D space). Indeed, *the simplest Diophantine Equation, which implies a 2-dimensional Time*, $T^2 = L^3 = n^6$ is the Diophantine form of the third law of Kepler, it implies: $L_n = r_n/r_1 = n^2$ (the Bohr's orbit law) and $T_n = t_n/t_1 = n^3$. Hence, with $v_n = r_n/t_n$:

$$\begin{cases} r_nv_n^2 = r_1v_1^2 = Gm_G \\ r_nv_n = nr_1v_1 = n\hbar/m_\hbar \end{cases} \tag{11}$$

*These gravito-quantum equations introduce an "hyper-symmetry" between the universal constants $G$ and $\hbar$, by respect to the mass concept: the undefined masses $m_G$ and $m_\hbar$. So, this defines the conceptual trajectories:*
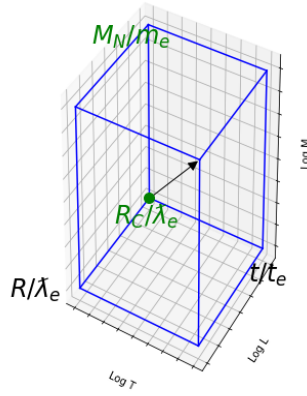
Figure 1: *Geo-adimensional Cosmos-Universe couple*, with unit length the Electron Compton reduced wavelength. In a 3D Super-space, logarithms of physical ratios are considered vectors. The Cosmos radius $R_C$ appears as the norm of the vector using for length and time projections the same value $R/\lambda_e = t/t_e$. For the mass projection it is $M_N/m_e$ where $M_N$ is the critical mass in the Cosmos *reduced spherical hologram* of radius $R_e$. This is a dramatic geometrical confirmation (not dependant of the base for logarithms) of the Extended (2D-1D) Holographic Principle applied to the Bekenstein-Hawking Universe entropy. So the Universe is characterised by the c-equivalence $R/\lambda_e = t/t_e$, where $t$ is the Hubble time (no relation with any "Universe age").

$$\begin{cases} r_n = n^2 r_1 \\ r_1 = \hbar^2/Gm_G m_\hbar^2 \end{cases} \tag{12}$$

With $m_G = m_e^{(red)} = m_e m_p/(m_e + m_p)$, the classical electron reduced mass and $m_\hbar = m_P/\sqrt{a}$, this is the Bohr's orbits distribution. The above PHOB Cosmology includes the following 6 more special cases (Table 4), using the main masses, plus a new one $m_{bc}$, close to $m_H^2/m_e$, *which identifies with the DNA bi-codon mass*, studied in the next section.

So, the PHOB Cosmology is tied to the couple $G, \hbar$, while the classical quantum theory uses in fact the "photonde" couple $\hbar, c$, and the gravitation theory the "gravitonde" couple $G, c$. These three couples define the "Trihedra of Constants" (figure **??**).

Extrapolating the above simplest Diophantine equation with the prime numbers 5 and 7 which follow the basic prime couple 2,3, the Holic Principle proposes the exponent 5 for a mass ratio, and 7 for a field ratio (note that the lifetime of a particle depends effectively to the power 5 of its mass):

$$T^2 = L^3 = M^5 = F^7 = n^{210} \tag{13}$$

Note that the primes 2,3,5,7 are the terms of the two simplest solutions of the Pell-Fermat equation, which has been connected with the metric equation 35).

Indeed, the Hubble radius "holic key" is singular, to 15 ppm, while the base 2 is confirmed to 0.3 ppm, and the base 3 to 60 ppb :

$$\begin{cases} (R/\lambda_e)^{1/210} \approx 2R/R_e = p_G/Hg_0 \\ (P^2/a_w)^2/p)^{1/210} \approx 2 \\ ((p_G/2an_t)R_C/\lambda_p)^{1/210} \approx 3 \end{cases} \tag{14}$$

with $p$ the proton-electron mass ratio and $n_t$ the proton-electron mass ratio.

*Note that 3 is the optimal integer base, the closest integer to e* [22].

8

Table 6: PHOB cosmology (Eq.(12))

| $m_G$ | $m_\hbar$ | $r_1 = \hbar^2/Gm_Gm_\hbar^2$ | Precision | Arithmetic Property |
|---|---|---|---|---|
| $m_e$ | $m_P$ | $\lambda_e$: Electron reduced wavelength | exact | |
| $m_e^{(red)}$ | $m_P/\sqrt{a}$ | $r_H$: Bohr's radius | exact | $r_H/\lambda_e \approx 137 = 2^7 + 2^3 + 2^0$ |
| $m_N^{(0)}$ | $m_N^{(0)}$ | $R_e/2$: half cosmos reduced holographic radius | exact | $R_N/\lambda_e \approx (3^3)^{3^3}$ |
| $m_{bc}^{(0)}$ | $m_{bc}^{(0)}$ | $2l_{cc}$: double non-local length | $-6.3 \times 10^{-3}$ | $l_{cc}/\lambda_e \approx \pi^{50}$ |
| $m_P a^3$ | $\sqrt{m_p m_H}$ | $\lambda_{Wn}$: Wien CMB wavelength (background thermal radiation) | $-3.2 \times 10^{-4}$ | $\lambda_{Wn}/l_P \approx \pi^{64}$ |
| $m_e$ | $\sqrt{m_p m_H}$ | $R/2$: half Universe radius | exact | $R/\lambda_e \approx g(6) \approx 2^{2^7} \approx (2R/R_N)^{210}$ |
| $m_{bc}^{(0)}R_e/R$ | $\sqrt{m_{ph}m_{gr}}$ | $R_C$: Cosmos radius $= RC/c = (R/2)m_N^3/m_{bc}m_{ph}m_{gr}$ | $4.7 \times 10^{-4}$ | $R_C/\lambda_e \approx e^{e^{2e}} \approx 6^{2^7} \approx (2R/R_N)^{64a_s}$ |
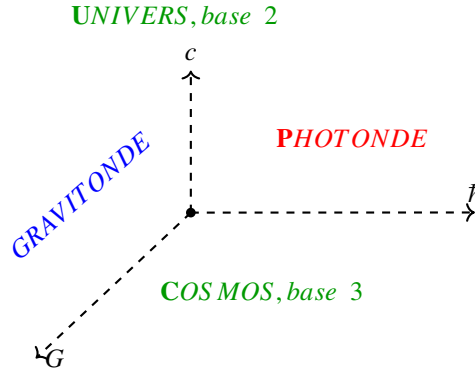


Figure 2: The Trihedra of Constants $\hbar Gc$. The $c$-local visible Universe is a Cosmos bosonic "immergence"

## 4 The DNA bi-codon

By respect to the hydrogen mass $H$, the masses of the 4 DNA nucleotides are, using the main isotopes: $^1_1H^{(0)} = H$, $^6_{12}C = C^{(0)}$, $^7_{14}N = N^{(0)}$, $^8_{16}O = O^{(0)}$, $^{15}_{31}P = P^{(0)}$ [23], close to the Fermi mass ratio: $\sqrt{a_w/pH} \approx 311.9846$

$$\begin{cases} Cytosine: & C_9^{(0)} H_{12}^{(0)} N_3^{(0)} O_6^{(0)} P^{(0)} \ (150 \ pr. + 139 \ nt.): \ C_y^{(0)} \approx 286.8021362 \approx 495(a^3/n_t^2)^2 \approx WH/4an_t \\[2mm] Thymine: & C_{10}^{(0)} H_{13}^{(0)} N_2^{(0)} O_7^{(0)} P^{(0)} \ (158 \ pr. + 146 \ nt.): \ T_h^{(0)} \approx 301.68553403 \approx \sqrt{a_w}\, \Pi_0/H\Pi_+ \\[2mm] Adenine: & C_{10}^{(0)} H_{12}^{(0)} N_5^{(0)} O_5^{(0)} P^{(0)}: \ (162 \ pr. + 151 \ nt.): \ A_d^{(0)} \approx 310.6269397 \approx \sqrt{a_w}/pd_e^4 \\[2mm] Guanine: & C_{10}^{(0)} H_{12}^{(0)} N_5^{(0)} O_6^{(0)} P^{(0} \ (170 \ pr. + 159 \ nt.): \ G_u^{(0)} \approx 326.4976654 \approx 495(137a/\beta)^{1/2}/\mu d_e^4 \approx Zp/2H\Pi_+ \end{cases}$$
(15)

The mean masses of the effective couples are close to $H/3 \approx 612.3842155$:

$$\begin{cases} Couple \ AT: & A_d^{(0)} + T_h^{(0)} = o_1 \approx 612.312280 \\[2mm] Couple \ GC: & G_u^{(0)} + C_y^{(0)} = o_2 \approx 613.299802 \end{cases}$$
(16)

The bi-codon minimal mass uses the three couples AT, so is very close to $Hm_H$. Since $o_2 \approx o_1 + 1$, the other masses are of type $(H + n)m_H$, with n = 1, 2 or 3: *the DNA seems a base 3 computer, like the Cosmos.*

The mean nucleotide mass is $(o_1 + o_2)/4 \approx 306.4032199$, close to $\pi^5 \approx 306.02$. The mean DNA bi-codon mass is $m_{bc}^{(0)}/m_H = (6/4)(o_1 + o_2) \approx 1838.418122$, close to $p_W = 6\pi^5$, the Lenz-Wyler proton-electron mass ratio [28]. Note that the Wyler formula $6\pi^5$ shows a geometric property: it is the product of the area by the volume of a cube of side $\pi$. More precisely, with $n_t/p$ the neutron-proton mass ratio, $d_e$ the electron magnetic excess, and $f(16) = e^{16}$, the central term of the Topological Axis (150 ppb and 55 ppb):

$$\begin{cases} m_{bc}^{(0)}/m_H \approx H(n_t/p)^{1/2} \\ \\ f(16) \approx 2(d_e m_{cd}^{(0)}/m_e)^2/a^3 \end{cases} \tag{17}$$

*In addition, the central value $f(16)$ establishes the lacking connection (0.1 ppm) between the Topological Axis and the main masses: electron, proton, Hydrogen, neutron.* It shows also the following Keplerian holic relation, implying the leptons ratios:

$$e^{16} = f(12)^2 \approx (f(4(1 + \sqrt{2}))^3 \quad \rightarrow f(4(1 + \sqrt{2}) \approx \mu \quad f(12) = e^8 \approx 6\tau/7 \tag{18}$$

where $1 + \sqrt{2}$ is the Pell-Fermat generator. Since $a^{1/32} \approx 7/6$ this implies the terminal term $e^{16} = f(32)$ of the Topological Axis. The analysis shows, to 4 ppm:

$$(\tau - 1)^{32}/f(32) \approx a^2/137 \tag{19}$$

*So, the terminal dimension 32 of the Topological Axis is associated to $\tau$, the terminal lepton. The number three of particle families is therefore confirmed.*

One notes the direct correlation implying *the product* of the nucleotide mass ratios:

$$4d_e G_u^{(0)} C_y^{(0)} \approx 4d_e A_d^{(0)} T_h^{(0)} \approx (H/3)^2 \approx H^{(0)}/g_0 = H^{(0)} + Z^2/H^{(0)} \tag{20}$$

This induces the symmetrical relation implying $s_0 = 1848$, the last Euler number:

$$\begin{cases} H^{(0)} + Z^2/H^{(0)} \approx (H/3)^2 \\ H^{(0)} + W^2/H^{(0)} \approx (s_0/\pi)^2 \end{cases} \tag{21}$$

# 5   The Multi-Dimensional Crystallography

The main problem of string theory is the connection between the usual 4D time-space with the favored theoretical dimensions: 26 for the bosonic theory, 24 for the transverse dimensions, 10 for the superstring theory, 11 for the supergravity.

As recalled above, *conservation is tied to both symmetry and computation.* So, this section is devoted to connections between the Multi-Dimensional Crystallography and the main particle mass ratios.

Carl Hermann [24] calculated the number of crystallographic point symmetries $N_d$ for dimensions from 1 to 8. *This number $N_d$ is the number of monic polynomials (i.e. first term $1x^d$) with roots on the unit cercle.*

The Weigel team [25] (Table 5) extended this calculation for higher dimensions, up to $d = 70$, focusing on *the positive symmetry number*, noted $K_d$, which defines $N_d$ via:

$$\begin{cases} N_{2n+1}/2 = K_{2n+1} = K_{2n} \\ \\ N_{2n} = K_{2n} + K_{2n-2} \end{cases} \tag{22}$$

These recurrence rules are non sufficient to defines the series. This implies to look for specific recurrences.

## 5.1   The *Positive Crystallographic Function* and the Scalar Boson

The method of least square leads to the following polynomial, where the coefficients clearly correlate with the physical parameters, with emphasis to the scalar boson - electron mass ratio $H^{(0)} = 495^2$ predicted by the Topological Axis and the Atiyah constant $\Gamma = \gamma a/\pi$ (Table 1).

| $E_d$ | $E_1$ | $E_2$ | $E_3$ | $E_4$ | $E_5$ | $E_6$ | $E_7$ | $E_8$ | $E_9$ | $E_{10}$ | $E_{11}$ | $E_{12}$ | $E_{13}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $N_d$ | 2 | 6 | 10 | 24 | 38 | 78 | 118 | 224 | 330 | 584 | 838 | 1420 | 2002 |
| $K_d$ (positive $PSO_{Cr}$) | 1 | 5 | 5 | 19 | 19 | 59 | 59 | 165 | 165 | 419 | 419 | 1001 | 1001 |
| $q_d = \binom{3+d}{4}$ (pentapope nbr) | 1 | 5 | 15 | 35 | 70 | 126 | 210 | 330 | 495 | 715 | 1001 | 1365 | 1820 |
| $Q_d = q_d + d$ (extended $q_d$) | 5 | 10 | 21 | 42 | 78 | 135 | 220 | 341 | 507 | 728 | 1015 | 1380 | 1836 |
| $S_d = \Sigma_1^d(N_d/2)$ | 1 | 4 | 9 | 21 | 40 | 79 | 138 | 250 | 415 | 707 | 1126 | 1836 | 2837 |
| $T_d = \sum_{d-1}^{d+1} K_d$ | 7 | 11 | 29 | 43 | 97 | 137 | 283 | 389 | 749 | 1003 | 1839 | 2421 | 4259 |

Table 5 : Number of Crystallographic Ponctual Symmetry operations $PSO_{Cr}$

$$\begin{cases} d \approx (lnN_d)^2/A + BlnN_d + 1/C \\ \\ A \approx 11.4672 \approx 2 \times 137\sqrt{6}/5\sqrt{a} \approx 137a495/\sqrt{2a_w} \approx 2\pi^2 WZ/a^5 \\ B \approx 1.1812 \approx 495/K_{10} \approx N_{10}d_e/495 \\ C \approx 43.9290 \approx 495^2 \sin\theta/\sqrt{2} \times 9\mu \approx 495^2 \cos\theta/\sqrt{2} \times \tau \end{cases} \quad (23)$$

Here $\mu$ and $\tau$ are the leptons relative masses, $\cos\theta = W/Z$, and $d_e \approx 1.00116$ is the electron magnetic excess.

*The two fist terms are close for d = 32, which specifies the Topological Axis symmetry, from k = 0 to k = 7, and the characteristics of the string group SO(32), whose dimension is the third perfect number 496:*

$$d_k + d_{7-k} = 32 \qquad d(SO(32)) = \binom{32}{2} = 496 \quad (24)$$

From the above double relation for B, the following property of the scalar boson emerges, showing a special recurrence relation between the dimensions 10 and 9, showing also a connection with $S_{26} = 381540$, to 48 ppm:

$$\begin{cases} H^{(0)} = 495^2 = K_9\mathbf{N}_9 = K_{10}N_{10} + N_9 - 1 \approx \sqrt{WS_{26}} \\ \\ 495 = \binom{12}{4} = \binom{11}{3} + \binom{11}{4} = 3\binom{11}{3} = 3K_9 = \binom{32}{2} - 1 = 496 - 1 \end{cases} \quad (25)$$

where $\mathbf{N}_9 = 9K_9$ is the total number of positive zeros on the unit circle for the central string reduction dimension 9, and $N_9 - 1$ the number of non-trivial 9D symmetries. This is clearly related to the fact that $q_8 = N_9$, $q_{11} = K_{12}$, $q_9 \approx \sqrt{K_{10}N_{10}}$, showing a kind of symmetry between $N$ and $K$. Note that 495 is the odd part of the first Mathieu group order $16 \times 495$, and the couple 495- 496 is the third perfect couple. In such a couple, the first number is the sum of the *non-trivial* divisors of the second. Since $496 = \binom{32}{2}$ is the dimension number of the group SO(32), and $495 = \binom{12}{4}$ *, this leads to the conjecture : *the third co-perfect number 495 could be the single one being a non-trivial binomial number.*

The most striking fact is the following connection between the Guanine and the couple $N_9 = 2K_9$, the factor 2 being identified to the duality proton-neutron, and the following factor 3 to a symmetry proton-neutron-electron, meaning that what counts is the number of particle, independently of their nature: this number is 499 in the Guanine molecule, which means $495 + 4$, the latter 4 attributed to the Helium atom:

$$\begin{cases} N_9 = 330 = n_{Gu}^{(nucl)} + 1 \\ (3/2)N_9 = 495 \end{cases} \quad (26)$$

Note that $N_9$ and $K_9 = N_9/2$, as well as $210 = \binom{10}{4}$ are Euler suitable numbers, whose pertinence is confirmed below.

The associated nucleotide to the Guanine is the Cytosine, which is clearly associated with the topological function f(10), giving rise to a formula in the Hubble Table. The other couple (AT), as shown before, is associated to the Fermi constant.

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*Number of groups of 4 elements taken among 12 ones.

## 5.2 The Proton-Electron mass ratio and the Euler maximal suitable number

The equivalent relation for dimension 4, implying $N_4 = 4K_4$ shows up a relation between the brute proton-electron mass ratio 1836 with the Euler maximal suitable number $s_0 = 1848 = 43^2 - 1 \approx (4\pi)^2 \sqrt{137}$:

$$N_4(N_4 + 1/2) = (K_4 + N_4)^2 - 1 - N_4/2 = s_0 - 12 = 1836 \tag{27}$$

*This shows up a kind of symmetry between the additive and multiplicative operations in the 4D space.* The maximal Euler's suitable number is very close to the Eddingtons's prediction [11] for the proton/electron mass ratio, $p_E \approx 1847.599459$, as the ratio of the roots of the equation $10x^2 - 136x + 1 = 0$. Note that to $10^{-4} and 23 ppm$:

$$\tau \approx p_E(2 - g_1^2) \approx (2 - 1/a_s)(4\pi)^2 \sqrt{137} \tag{28}$$

While $a_s$ is tied to the SU(3) group, this shows a tight liaison with the U(1) group, which is rather logical for the lepton tau. *Moreover, this confirms the Eddington's prediction of the tau fermion, 35 years before its surprising discovery as an "heavy mesotron", based on a non-standad proton-tau symmetry* [11]. *This could unlock the, presently sterile, supersymmetry partner research.*

The total number of particles (protons + neutrons + electrons) involved in the four nucleotides is $1863 = 9 \times 207$, where 207 is the second approximation for $\mu$ in the bit-string model [17]. After separating the $4 \times 4$ trivial ones from Helium, this reduces to $1847 = 435 + 446 + 471 + 495$, at one unity from $s_0$. The presence of 495 for the Guanine could not be due to hasard. Indeed while its atomic massis is 329, at one unity from $N_6 = 330$, its number of particles is about $(3/2) \times 330 = 495$, *due to the electrical neutrality*, so *the factor 3/2 in the Table 5 is justified.* In the four nucleotides, counting the elementary particles (electrons + quarks) leads to $1863 \times 7/3 = 3 \times 7 \times 207 \approx 5\tau/4$, to 45 ppm, leading to further research.

In the Particle standard model, the scalar boson is necessary to explain the non-Zero mass of particles. Indeed, in the above procedure, the connexion between the scalar boson and the 9D crystallography is clear, while it is not so for the above decisive 4D relation. But the first one has induced the latter one by analogic induction. *Thus the central role of the scalar boson is confirmed, and the mass concept is tied to a number of cristallographic symmetries.*

There is another connection between 1836 and 1848 : they are both the area of a integer-sided triangle which is 6 times its perimeter, opening new further study. The connection with the pentapope number $q_{13}$ is immediate:

$$q_{13} + 16 = \binom{16}{4} + 16 = 1836 \tag{29}$$

meaning that 1836 is the sum of crossings from 16 points, *including those points*. Note the parallel with the defition of 137, the maximal number of zones defined by 16 straight lines in a plane, as recalled below.

Moreover with $\Pi_0$, the neutral Pion-electron mass ratio, and the associated term $\Pi_+$ for the charged Pion, $p_{hol} = (4(r_H/\lambda_e)^3/3)^{1/2}$ and the $137^{th}$ Fibonacci (prime) number:

$$\begin{cases} \Pi_+\Pi_0 \approx 1838^2/4 \sqrt{a} \approx (2\pi)^2 m_{cd}/m_e \\ s_0 + 1/2 \approx (4\pi)^2 \sqrt{a} \approx F_{137}/96a_w^2 \approx (q^2a/4)^2 H^{(0)}/p_{hol} \\ (s_0 + 1/2)/2 = \binom{12}{6} + 1/4 \approx (210^{210}/\mu^\mu)^{1/3} \end{cases} \tag{30}$$

The last formula is deduced from the relation with the Monster Group (section 5.7) confirming the connection $\mu \approx 210$. The $+1/2$ term comes from taking account of the dimension 0 in the half sum of symmetry numbers, as confirmed below. The involved precise value for $\pi$ is very particular, opening further study.

This number $s_0$ enters the correlations:

$$s_0/2\pi \approx 8\pi \sqrt{a} \approx (R_e/R)^{1/21} \tag{31}$$

Comparing this with the above holic relation $R/\lambda_e \approx (2R/R_e)^{210}$, this leads to $R/\lambda_e \approx (2^{18}/\pi \sqrt{a})^{10}$ which is also, according to the tabulated holographic relation: $R/\lambda_e \approx (2\pi^2 a^3)^5$. Their ratio involves $a/137$, leading to:

$$\begin{cases} 137/\pi^4 \approx (a/2^7)^5 \approx \sqrt{2} \\ (ad_e/2^7)^{10} \approx 1 + d_e \end{cases} \tag{32}$$

where $2^7$ is the combinatorial brute value of 137, and also the effective value for $a$ at Fermi energy. *This shows that the $10^{th}$ root of 2 is implied.*

*It is shown [29] that a single Euler suitable number could exist beyond $s_0$, and if not, i.e. if $s_0$ is really the maximal one, then the generalized Riemann conjecture would be confirmed. So the proton-electron ratio is at the heart of Number Theory.*

Thus the string canonical 9$D$ dimension reduction is identified with the 9$D$ crystallographic symmetries. This implies the elimination of the continuum in theoretical physics, in conformity with the Computing Principle. This could unlock the present dilemma of string theories which lead to an enormous number $10^{500}$ of solutions for dimension reduction, an anomaly which is claimed to sustain the unscientific Multiverse model.

With the electric charge $q = W\sin\theta/H^{(0)}$, the computer shows up the following relations, in the ppb domain:

$$\tau\sqrt{a_w}/Wq \approx K_3 K_5 K_9/3 \tag{33}$$

Note that $1 + K_3 K_5/3K_9 = 4181 \approx a_w^{1/2}/a$, showing the $19^{th}$ term of the Fibonacci series, the first non prime number of order prime. Moreover, the U(1) coupling $g_1 = Z\sin\theta/H^{(0)}$ is confirmed in the ppb domain by:

$$f(26) = f(2)^{32} \approx (H/p)(2/g_1^2 d_e)^{16} \tag{34}$$

This confirms the central role of the string dimension 26.

### 5.3   The Eddington-Atiyah's inverse brute electric coupling 137

The number 137 is the Eddington's inverse brute electric coupling, and has been unambigously connected with the Lucas-Lehmer series [7]. Atiyah recently associated this number with three algebra: the octonion, quaternion and real ones, associated to the number $273 \approx m_{\Pi_+}/m_e$ is again one of the Euler's suitable numbers:

$$137 = 2^7 + 2^3 + 2^0 \qquad 2 \times 137 - 1 = 273 = 2^8 + 2^4 + 2^0 \tag{35}$$

Strangely enough, it seems that nobody have looked for the prime numbers that appear in the harmonic series, which is the single pole of the Rieman series, precisely known to inform about the distribution of prime numbers. The six first prime numbers appearing are the following, showing a symmetry of 11 around 137, showing the 11 supergravity dimensions and the usual 4 ones:

$$3; 11; 5; 137; 7; 11 \qquad \Rightarrow 137 = 11^2 + 4^2 \tag{36}$$

Note that, while $137 = l_{16}$, the $16^{th}$ Lazy Caterer number (maximal number of zones in a plane defined by n straight lines), $11 = l_4$ and $4 = l_2$. The corresponding Pythagorean triangle has the sides 8,105,137, i.e. the number of partitions with elements greater than 1 of 18, 19 and 20. Its perimeter is $K_9$ and the area 10 $s_0$:

$$\begin{cases} P_{137} = K_9 = 330 = 137 + 105 + 88 \\ A_{137} = 14P_{137} = 10s_0 \end{cases} \tag{37}$$

*This connects the 9D crystallography with the maximal Euler number $s_0 = 1848$.* The above triangle has a radius 28 for the internal circle, while $a \approx 137 + 1/28$. The next term in the development is 3511, the second Fermat-Wieferich number: [30]

$$a \approx 137 + 1/28 + 1/3511 \tag{38}$$

*This defines a in its 0.15 ppb indetermination.*

One notes *a 0.1 ppm relation between $p_{M2}$ and the supersymmetric electron-proton-neutron triplet*:

$$\begin{cases} p_{W1}p_{W2} \approx e^7 \times e^{3e} \approx e^{e^e} = E \\ p_{M2} = (K_{pM1} + K_{pM1-1} + K_{pM1-2})^2 - 6 \approx 4a\sqrt{p_r n_t/d_e} \approx 4p_{W1}p_{W2}/ln(p_{W1}p_{W2}) \end{cases} \tag{39}$$

*proving the pertinence of the basic economic number E.*

The definition of the first Mirimanoff number 11 is that $3^{11-1} - 1$ is a multiple of $11^2$. This recalls that [21]:

$$3^{10} \approx \pi a^2 \approx \Phi^{137/6} \approx (l_{phCMB}/\lambda_e)^{1/2} \tag{40}$$

involving the Golden ratio in the old chinese musical scale of 60 notes per octavus. The lenth $l_{phCMB}$ is the side of a cube containing a single CMB photon. The total number of photons in the Hubble sphere and in the Cosmos shows dramatic particularities (190 and 4 ppm):

$$\begin{cases} n_{phCMB} = (4\pi/3)((R/l_{phCMB})^3 \approx 2(R/(\pi^2 a^4 \lambda_e)^{3/2} exp(e^6/4) \\ (4\pi/3)((R_c/(\pi^2 a^4 \lambda_e)^3 \approx (a/137)\pi \sqrt{g_0}(R/\lambda_e)^7 \end{cases} \tag{41}$$

*This direct liaison with the Number Theory confirms that the c-Universe acts as a Cosmic gauge boson, acting by the seventh power, in conformity with the Holic Principle.*

This "arithmetic monster" 137 appears twice in the Crystallographic Table 5:

$$137 = \sum_6^8 K_d = \sum_1^7 (N_d/2) - 1 \quad \Rightarrow \quad \sum_1^4 K_d = (K_7 + 1)/2 = d_7 \tag{42}$$

This identifies the 4D term $\sum_1^4 K_d = d_7 = 30$ in the brute U(1)-SU(2) gauge partition $137 = 107 + 30$ [26]. Extrapolating to the superstring dimensions 10 and 11, this connects with the holic term 210, itself connecting with $26 = d_6$:

$$\begin{cases} (K_7 + 1)/2 = d_7 = 2 \times 3 \times 5 = 30 \\ (K_{11} + 1)/2 = d_{2d_6} = 2 \times 3 \times 5 \times 7 = 210 \end{cases} \tag{43}$$

*This connects the main dimension 30 of the Topological Axis with the dimension 210 of the Holic principle.*

Note that 137 shows another striking arithmetic property: it is the number of partitions of 20 with integers superior to 1. This seems connected to the Golden ratio $\Phi$ through:

$$\begin{cases} \sqrt{a}/2 \approx (1 + 2cos\theta)/sin\theta \approx (a/20) - 1 \approx \Phi^4 - 1 \\ (1 + 2cos\theta) \approx (4p_t/n_t)^{1/2} g_2 g_3 \approx (cos\theta/2e)(137/sin\theta)^{1/2} \end{cases} \tag{44}$$

which implies the sum $Z + W_+ + W_- = Z + 2W$, *showing another non-standard particle symmetry.*

### 5.4   The *precise* U(1)-SU(2) gauge partition

Taking account of the dimension zero, the above sum becomes $S_{12} = 1836.5$, close to the mean proton-Hydrogen mean, and the gauge separation could imply rather $n_7 + 1/2 = 30.5$, which is close to 196 ppm with the real U(1)-SU(2) gauge partition term $a(sin\ \theta)^2 \approx 30.505983$, and more precisely:

$$d_7 + 1/2 \approx 137^2/ad_e - (a_w^2)/Z^4 \approx a_w^{1/2}/a^2 \tag{45}$$

Moreover, this number connects again with the holic term 210:

$$2(d_7 + 1/2)^2 = 9 \times 210 - (d_7 - 1/2) \tag{46}$$

The above proximity between $\mu$ and 210 materializes in the following 44 ppb determination of $\mu$, with a 23 ppm correlation with $\tau$ :

$$(a/137)(2(137^2/(ad_e - (a_w^2)/Z^4)^2)) \approx 9\,\mu \approx \tau\ tg\theta \tag{47}$$

*So the U(1)-SU(2) gauge partition is at the heart of the optimal computation process.*

## 5.5   The String dimension partition 26 = 22 + 4

In the string theory, the 26 dimensions reduce to the usual 4D by separating 22 hidden dimensions. Indeed, one observes:

$$N_{22} = K_{20} + K_{22} = (20 \times 22) \times 137 \tag{48}$$

where 137 is the above Eddington value for the electric coupling. The same relation applies also to the 4D usual space:

$$N_4 = K_2 + K_4 = (2 \times 4) \times 3 \tag{49}$$

The computer shows up another case, which involves in a symmetrical way, the four usual dimensions d = 1, 2, 3, 4:

$$N_{13} = 2K_{11} = (2 \times 11 \times 13) \times 7 = N_6 N_8 N_9 / N_1 N_2 N_3 N_4 \tag{50}$$

The sum of the implied dimensions is the same: 23 = 1+2+3+4+13 = 6+8+9.

The other string partition is 26 = 10 + 16. One observes the following precise relations with the 3 couplings, electric, electroweak and gravitational (1 ppb and 10 ppb):

$$K_{10}/(K_{10} - 2) \approx a_w^{5/2}/Pa^3 \approx e^{1/(210-1)} \tag{51}$$

This could be tied to the two trivial symmetries, identity and point inversion.

## 5.6   The Connections with the Periodic Table

The string dimensions special series $d = 2+4k$ identifies both with the Topological Axis one and with the spectroscopic one, *so, the string dimension 2 identifies with the spin 1/2 degeneracy, where k identifies with the orbital number, running in the octonion series, between 0 and 7.*

The theoretical total number of elements untill the $n^{th}$ raw, where $n$ is the principal quantum number is:

$$n_n = \sum_{j=1}^{n} \sum_{k=0}^{k=j-1} = 2 \sum_{j=1}^{n} n^2 \tag{52}$$

There is a particularity for the $7^{th}$ row, due to the association symmetry-computation where the central dimension is 16: indeed $2 \times 16 = 32 = 2 + 30 = 6 + 26 = 10 + 22 = 14 + 18$:

$$\sum_{k=0}^{k=7} d_k = 2^7 \quad \Rightarrow \quad \sum_{k=0}^{k=7} d_k + \sum_{0}^{1} d_k + 1 = 137 \tag{53}$$

where the term 137-127 = 3 + 7 shows the first terms of the Combinatorial Hierarchy [12]. The height numbers are all of the form "prime - 1", except $d_i = 14$ and 26, the later being the critical dimension which verifies: $d_{26} = d_{d_6} = 106$, so justifying the "reduced" Atiyah sum, with the octonion term ($2^7$) and the quaternion one ($2^3$). This identifies with the reduced U(1)-SU(2) gauge partition, where 136 is the initial Eddington's electric coupling, the number of elements in the symmetrical matrix $16 \times 16$:

$$\sum_{k=0}^{k=7} (d_k + 1) = 2^7 + 2^3 = 136 = 30 + 106 = d_7 + d_{d_6} \tag{54}$$

There is a particularity for the $4^{th}$ row which is effectively used in the Periodic Table, corresponding to the famous spectroscopic numbers, called by Friedrich Hund "sharp" ($s = 2$), "principal" ($p = 6$), "diffuse" ($d_i = 10$) and "fundamental" ($f = 14$). The $7^{th}$ row of the Periodic Table terminates in the Oganesson, recently synthetised [31], of atomic number 118, *which is precisely the Herman number for d = 7.* The involved coefficients, ruling the *symmetrical* distribution of the spectroscopic groups $s, p, d_i, f$ are the following:

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$$\sum_{k=0}^{k=3} c_k d_k = 118 \quad \rightarrow c_k = (7, 6, 4, 2) \tag{55}$$

The above variation of one unity, connected to prime numbers, leads to

$$\sum_{k=0}^{k=3} c_k(d_k + 1) = 137 = 2^7 + 2^3 + 2^0 = 107 + 30 \tag{56}$$

which recovers the complete Atiyah sum, including the "real algebra" term $2^0$, and, since the last "fundamental" term is $2 \times 15 = 30$, coming back to the above brute U(1)-SU(2) gauge partition.

This Atiyah series presents an imperfection: the absence of the term $2^1$, corresponding to the complex algebra. One observes that the total sum taking account of the four algebra is $139 \approx i^{\pi/i} = e^{\pi^2/2}$. So the origin of 137 would be the mean between 139 and 135, the latter being the product of the two co-perfect numbers 5 and $3^3$, very close to $16a_s$. Indeed, one oberves, in the ppb domain:

$$137 = (16a_s + i^{\pi/i})/2 - 1/d_e + 2^0 \tag{57}$$

So the optimized value of $a_s \approx a_w/2\pi(pH)^{3/2}$ is confirmed in the ppb domain. This tight connection with the electron excess magnetic moment $d_e \approx 1.001159652$, which is the best confirmation of the quantum theory, opens future research.

## 6 The Sporadic Groups Connections

The 26 sporadic groups include 20 "happy" groups tied to the Monster, and 6 "pariah" groups. Many relations with the physical parameters was published [7], two of them implying formula for $R$ and $R_c$ (Tables 2 and 3). One observes the relations tying the electric, strong and weak couplings $a, a_s, a_s a_w$, to 7, 150 and 300 ppm :

$$\sqrt{a_w}/aa_s \approx 495 \times 2^{1/(24 \times 20)} \approx K_{26}/f(10) \approx O_M^{1/20} \tag{58}$$

with $K_{26} = 141877$. Now $f(10)^{10} \approx l_{nl}/\lambda_e$ and $K_{26}^{20}$ is of order $R_C/\lambda_e$. This implies again a pertinence for the canonic string dimensions 26 and 10, calling for further study.

The order of the Monster group connects with the Lepton masse ratios:

$$O_M^9 \approx \tau^{137} \approx \mu^\mu s_0^2/\sqrt{2} \approx 4\sqrt{2}\, 210^{210}/s_0 \tag{59}$$

This implies the above Eq.(32) proving that $\mu_0 = 2 \times 3 \times 5 \times 7 = 210$ is the pertinent arithmetic approximation of $\mu$. With the symmetric approximation $\tau_0 = (2 + 3 + 5 + 7) \times 2 \times 3 \times 5 \times 7$:

$$(p/n_t d_e)(\tau/\tau_0)^{137} \approx \sqrt{2}p^3/a_s^2 H^2(H - p) \approx \pi^\pi \tag{60}$$

confirming to the ppb range the Koide tau value [13], where $n_t/p$ is the mass ratio neutron-proton.

*So the sporadic groups are at the heart of the overall unification.*

## 7 Conclusions and Predictions

The Topological Axis, with its *invariant* Hubble radius is a key for debunking theoretical physics. It permits to connect the main "free" physical parameters with different domains of the Number Theory, with emphasis on the multi-dimensional crystallography. It rehabilitates several discarded physical theories: those of Eddington [11], Noyes [17], Wyler [28] and Atiyah [27]. It is inferred that these parameters are calculation basis in the computing Cosmos. Indeed high powers of them appear in the Hubble and Cosmos tables, in formula for both the Hubble radius, with special importance of the holic power 210, confirming the pertinence of the Holic Principle.

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The tachyonic character of the Cosmos is of paramount importance, interpreting at last the non-Doppler quasar power oscillation, rehabilitating the string bosonic theory and integrating at last the "quantum holism", the manifestation of quantum non-locality by introducing a super-celerity $C$. Considering the visible *universe as a quantum entity, the simple consideration of its wavelength leads to the Toponic Holography, which breaks down the Planck wall by the factor C/c, explaining at last the giant factor ($10^{120}$) for the vacuum quantum energy. *Instead of ignoring such an "incomprehensible" non-Doppler phenomena, the astrophysicists ought to study this intensively, specially the phase differences fram a quasar to the other, with emphasis on the determination of the tachyon celerity C or its intermediate gravitational value $C/P \approx 10^{38}c$* [7].

The String Theory connects at last with Reality, but it must be entirely reconsidered, by replacing the continuum by a "quantinuum", based on the "Topon", the reduced wavelength of the Universe, and adopting a *massive* string, as predicted by the Topological Axis. Also *massive* gluons, photon and graviton must be included in the Particle standard model. The latter must also include *the Eddington's proton-tau supersymmetry* and the elegant *Koide formula*, whose associated leptons masses $\mu$ and $\tau$ connect so precisely with the other data.

The Cosmology must be completely re-interpreted, with the unifying concept of "Permanent Holographic Oscillation Bang Matter-Antimatter". The future giant telescopes must observe an invariant background (CMB) temperature, as well as an invariant value 3/10 for the baryon+dark matter density, the latter being an anti-phase oscillation of normal baryons.

The DNA bi-codon mass is central in the Cosmos, confirming again, and with high dedgree of precision, the pertinence of the dimension 16, showing how the Topological Axis has been predictive. Thus, the DNA molecule would be more than just a simple memory as anticipated by Schrödinger [32]. It must be a bio-computer, probably activated by real holography. Indeed, electric current is observed in DNA [33]. So physical laws are identical to biological ones, again ruling out the Multiverse model.

So, the relation, for k = 4, between the cosmic temperature and the mammal one $T_{mam} \approx j T_{CMB}$, where $j = 8\pi^2/ln2$ is the scale constant [7] takes a renewed importance, as well as the relations with the triple points of Hydrogen, Oxygen and Water. It is foreseen that future theory will be able to calculate these triple points, a task nowadays impossible.

The overwhelming connections between the HVW crystallographic series, the string theory, and the sporadic groups confirms that *the pure mathematics must now pursue unification, by concentrating on the mathematical properties of physical parameters, looking for the connection with the generalized Riemann hypothesis through the maximal Euler suitable number*.

# 8   Acknowledgements

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