Holographic Permanent Cosmology in Quantized Absolute Space-Time

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Using the electron wavelength as unity, and writing the Large Number Correlation in a micro-macro-physics symmetric way, this leads to the Topological Axis, showing the string characteristic series n = 2 + 4p exhibiting the Cartan-Bott periodicity connecting gauge bosons. This permits to observe very precise (10^{-6}) *relations involving basic free-parameters of Particle Physics, tied to the Kotov's period. The associated time to the point n = 30 is observed to be directly related to the time defined from the mean cosmic mass density and the Fermi constant, which is directly related to the Kotov's period and the Monster order. This time 5.48 × 10^{57} s could be a large cosmic period. This lacking point n = 30 would correspond to a symmetry between a holon, a gauge boson with the Universe mass, and the Holographic Grandcosmos: string theory could be revisited on this basis with a quantified time* 10^{61} *smaller than the Planck time. The Holic Principle, the arithmetical form of Holography, applies to cosmology. This means the ultimate physics laws are arithmetic, in a quantized absolute Space-Time.*

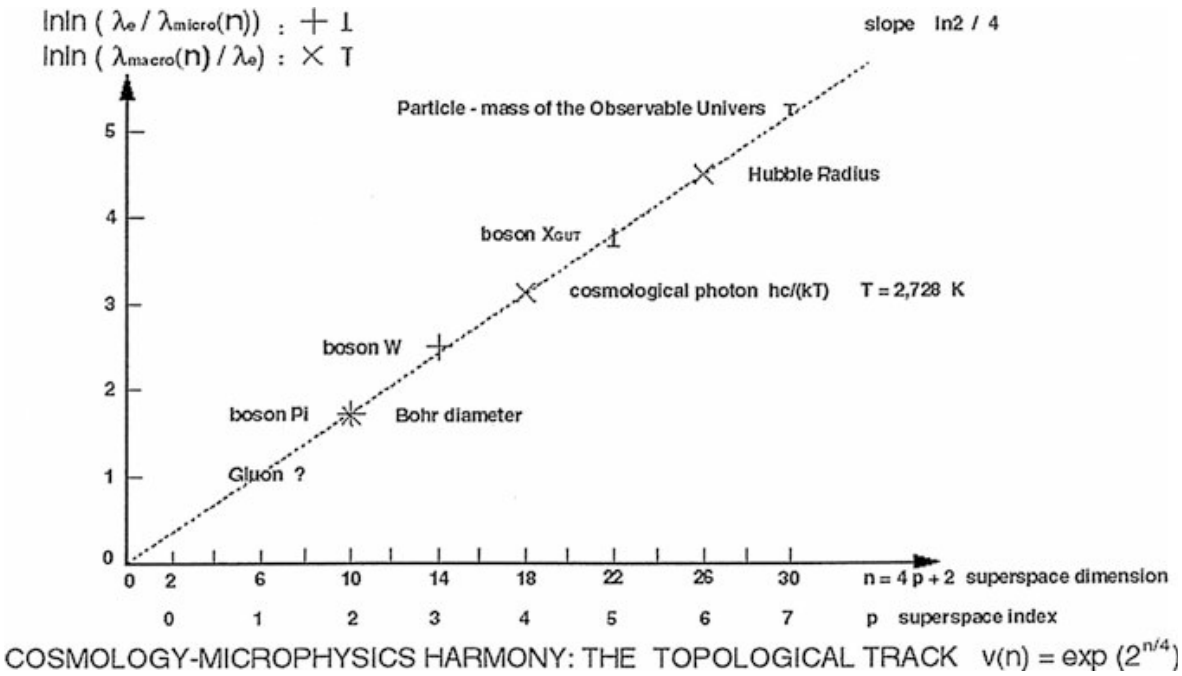
Introduction

It is widely believed that the string theory shows no correspondence with the real world. However, this article recalls how, using the electron wavelength as unity, and writing the Large Number Correlation in a micro-macrophysics symmetric way, this leads to the Topological Axis, where appears the string characteristic series [2] n = 4p + 2, see Fig (1). This means there is a tight connexion of main microphysical and cosmical quantities with the "topologic function" f{n} = e^(2^n/4).

It was discovered in 1998, but blocked for publication with the argument 'The Big Bang is proved'. It was finally presented in College de France in February 2004, and published in 2006 [1], and detailed in 2017 [2].

Indeed, the Topological Axis may be pertinent only in the frame of the steady-state cosmology [4][5] where the Hubble radius (n = 26, the bosonic string value) and the CMB temperature (n = 18) are *time-invariant*. The super-string value *n* = 10 corresponds to a symmetry Pion-Hydrogen Atom. The Cartan-Bott periodicity [3] Δn = 8 appears as relating the intermediate boson (*n* = 14) to the GUT one (n = 22), which are both gauge bosons, while the first value n = 14 - 8 = 6 would define a *massive* gluon (about 16 m_e).

This article shows the importance and gives an interpretation to the lacking cosmic point n = 22 + 8 = 30, predicted [2] to be of central importance, Fig (1).



The Holographic Cosmology

The steady-state cosmology, as well as the Eddington Fundamental Theory [6] have predicted the critical universe condition, tying the mean cosmic matter density to the Hubble Constant *H. This is now admitted* [7], but *H* being a true constant, the standard notation H_0 is obsolete:

$$\rho = 3H^2/8\pi G \quad (1)$$

and $\tau = 1/H$ is the invariant *time constant of the exponential galactic recession* in a no-age eternal Universe.

The *predicted* acceleration of recession has been indeed observed [8]. But standard cosmology attributes it to a mysterious 'black energy' of relative density 0.692(12)[9]. It is simpler to admit that gravitation has a correction repulsive term proportional to distance which exceed standard attractive gravitation between galaxies after a distance of about 1 million light years [2], typical of a galaxy group and of the redshift periodicity 72 km/s [10]. It is recalled that there is no so-called 'space expansion' inside our galaxy group, whose speed has been measured, by respect to the Cosmic Microwave Radiation, to be 627(22) km/s [7].

This repulsive force corresponds to the "cosmological constant" that Einstein added to the General Relativity equations, but in the Hoyle cosmology [5], it is a true constant $1/R^2$, where $R = c\tau = 2GM/c^2$ is the Schwarszchild horizon radius of a black hole [11] having the above mean density ρ, and M is the total equivalent mass in the horizon sphere of radius R. Such an *homogeneous* sphere has the gravitational energy

$$(3/5)GM^2/R = (3/10)Mc^2 \quad (2)$$

so the observation of real matter in the proportion 3/10, letting apart the fraction 7/10, compatible with the above black energy relative density, is not surprizing. This means that the concept of black energy is unnecessary. Moreover, the non-relativist kinetic energy of a spherical volume of radius r and width dr is $3Mc^2r^4dr/2R^5$, whose sum is precisely $(3/10)Mc^2$. This means that Relativity Theories are only local, and must not be applied in Cosmology. Indeed, as explained below, there is a come back of either absolute time and absolute Space.

Assuming Eddington's Theory, and that black matter is composed of standard particles, but oscillating in *phase quadrature* by respect to the ordinary matter-antimatter 10^{104} Hz oscillation [2], the number of neutrons (the Hoyle's regenative particle [5]) in the equivalent mass M would be (10/3) N_{Ed}, where $N_{ed} = 136 \times 2^{256}$ is the Eddington Number [6]. By comparing this value of M with the result of the gravitational Hydrogene Molecule model [2], one gets:

$$M = m_P^4/m_e m_p m_H \approx (10/3)\, N_{Ed}\, m_n\, m_H/m_p \quad (3)$$

precise to 40 ppm with our optimized value [2] $G \approx 6.67545 \times 10^{-11}$ $kg^{-1}m^3s^{-2}$. This corresponds to:

$$\tau = 2\hbar^2/Gcm_e m_p m_H \approx 13.8123 \text{ billion years} \quad (4)$$

i.e. H = 70.790 km/sMpc, This is a value intermediate between the Novea direct measurement [8] and the Planck mission value [9], which, being separated by 9%, spoils the standard '1% precision cosmology' claim. Cosmology becomes the simplest scientific domain : the only one 'free parameter' is given by elementary *c-free* dimensional analysis : in Eq (4), c eliminates in the horizon $R = c\tau$, which is precisely the direct measured quantity in the galactic recession.

Now, *the horizon radius R being a constant, one may apply the Holographic Principle*: this introduces the Holographic Permanent Cosmology. Indeed, the above critical condition writes as the holographic correspondance 2D-1D for the Bekeinstein-Hawking entropy [12], with the Universe wavelength $\lambda\!\!\!^{-}_M = \hbar/Mc \approx 3.9989 \times 10^{-11}$ m ('holon' particule of mass M), where $l_P^2 = \hbar G/c^3$ is the Planck area:

$$\pi(R/l_P)^2 = 2\pi R/\lambda\!\!\!^{-}_M = 2\pi R_{GC}/x^2 l_P \quad (5)$$

with the equivalent number of neutrons $M/m_n = N_n = 10m_H/3m_p$, this holography extends to

$$\pi(R/l_P)^2 = 2\pi R/\lambda\!\!\!^{-}_M = N_n 2\pi R/\lambda\!\!\!^{-}_n \quad (6)$$

this is a quasi-3D term, produced by the *sweeping of the enormous number N_n of circles*. This is the justification of the vastness of the Universe: *a large number permits to approach continuity*. Now $\lambda\!\!\!^{-}_M$ is about $10^{-61}l_P$: indeed, the Gamma Ray Burst observations [13] seems to exclude the Planck length l_P as a space quantum, an assumption of several theories. Holographic Cosmology assumes there exist tachyons, but with

a maximal speed value C about $10^{61}c$, explaining at last the 10^{122} discrepancy between the vacuum quantum energy and the Universe one [2]. It has also been shown that, inside the circle R, the planar spiraling of a single electron is tight to the atomic radius $a\lambda\!\!\!^{-}_n$, with $a \approx 137.036$ [2]. So, *the whole Universe would be made of a single couple electron-positron*. This confirms the central role of the Topological Axis, and enlights the fact that the Large Number Correlation writes in the form, where $m_e' = m_e\, m_p/m_H$ is the effective electron mass in the Hydrogen atom of mas m_H (m_p is the proton mass):

$$\hbar c/Gm_e m_p = (R/2\lambda\!\!\!^{-}_H) = \sqrt{(M/m_e')} \tag{7}$$

So the Eddington's 'comparison particule' [6] is nothing else than the electron. Eddington could not have realised this, because, at his epoch, the estimation of the Hubble Constant was false by an order ot magnitude. This corresponds about to the microphysics term n = 30, up-side of the Topological Axis, (Fig. 1), which connect with the GUT boson with mass $m_X = m_P^2/m_p$, where $m_P = \sqrt{(\hbar c/G)}$ is the Planck mass, and prolongates to the mean intermediate boson, compatible with the imprecision on the W boson. Now, one observes that in this Cartan-Bott series, corresponding to the powers 4, 16 and 64, the superstring term n = 10 (power 32) shows a double determination involving the Fermi wavelength $\lambda\!\!\!^{-}_F$:

$$4\lambda\!\!\!^{-}{}'_e/\lambda\!\!\!^{-}_M \approx 4(\lambda\!\!\!^{-}{}'_e/\lambda\!\!\!^{-}_X)^4 \approx (\lambda\!\!\!^{-}{}'_e/\lambda\!\!\!^{-}_{int})^{16} \approx (\lambda\!\!\!^{-}{}'_e\, 2/x\lambda\!\!\!^{-}_{Pion} \approx x\lambda\!\!\!^{-}_H/\lambda\!\!\!^{-}_F)^{32} \approx (\mu H/a^2 \approx \tau\xi(3)/\mu)^{64} \tag{8}$$

$$(\mathrm{f}\{30\})^{1/64} = \mathrm{f}\{6\} \approx \tau/\mu \tag{9}$$

where μ is the Muon/Electron mass ratio, and τ the Tau/Electron mass ratio. Note that this precises the known relation [14] relating a gravitational coefficient with the height power of the W mass. In Eq. (8) the 'resolving parameter' appears to be $x = R'/R = pH/a^3$, the ratio of the holo-trace R' of the Grandcosmos of radius R_{GC} on the visible Universe radius R. We recall that $R_{GC} = R'^2/2l_P = RC/c$ is defined by the monochromatic 2D-1D holographic reduction [2]:

$$\pi(R'/l_P)^2 = 2\pi R_{GC}/l_P \tag{10}$$

where $R'/2 = r^3/l_P^2$ is the distance defined by the elimination of c between the classical radius electron r and the Planck length l_P. It corresponds to the *c-free* formula $R'/2 = \hbar^2/Gm_N^3$, where $m_N = am_e$ is the Nambu mass [15], of central importance in Particle Physics. *In this sense, the Grandcosmos is simpler than the visible Universe.*

The elimination of x in Eq. (8) leads to the following double relation *in the ppm range*, implying F, the Fermi/electron mass ratio, p the Proton/Electron mass ratio, H the Hydrogen/electron mass ratio and t_{cc}, the Kotov's period 9600.61(1) s [16], by far *the best measured cosmical quantity,* in liaison with the Planck time t_P and the electron time t_e:

$$\mu^2/a \approx F/\sqrt{(pH)} \approx t_P\, t_{cc}/t_e^2 \tag{11}$$

while the following relations are also deduced, deserving further study:

$$\mu^2/a \approx \xi(3)\, a\tau/p \tag{12}$$

$$\lambda\!\!\!^{-}_H/\lambda\!\!\!^{-}_F \approx (\lambda\!\!\!^{-}_{Pion}/2\lambda\!\!\!^{-}_{int})^4 \tag{13}$$

Note that $\xi(3)$, the 'Apery constant' appears directly in the Planck law, as shown below.

Now, the Eq. (8) represents the microphysics up-side of the Topological Axis, where the macroscopic lengths R and $\lambda\!\!\!^{-}_{CMB}$ has been eliminated in relations of type $\lambda\!\!\!^{-}_e/\lambda\!\!\!^{-}_{micro} = (\lambda\!\!\!^{-}_{macro}/\lambda\!\!\!^{-}_e)^2$, or $(\lambda\!\!\!^{-}_{macro}/\lambda\!\!\!^{-}_{micro})^2 = (\lambda\!\!\!^{-}_e/\lambda\!\!\!^{-}_{micro})^3$ which is the simplest form of a Diophantian Equation (time ratio)^2 = (length ratio)^3 = n^6, which is the third Kepler law, leading to the atomic spectra : length ratio = n^2. This have been extended to form the Holic Principle [17], by adding a (mass ratio)^5 and a (field ratio)^7, to obtain a resolution term n^{210}. Now :

$$t_{cc}/t_e \approx (2/x)\, x^{210} \tag{14}$$

$$\tau/t_e \approx (2/x)^{210} \tag{15}$$

$$(t_{cc}/t_e)\,(\tau/t_e) \approx (2/x)\, 2^{210} \sim (t_{CMB}/t_P)^2 \sim \pi^{128} \tag{16}$$

where appears the characteristic CMB time and the Planck time t_P. Considering the Wien CMB wavelength :

$$\lambda\!\!\!^{-}_{WCMB}/l_P \approx \pi^{64} \tag{17}$$

the precision is 0.1%. So π is a cosmic calculation basis, as in the even Rieman series.

Now an essential parameter is the ratio of the total energy to the energy of CMB with wavelength $\lambda\!\!\!^{-}_{CMB} = \hbar c/k_B\theta_{CMB}$, with $\theta_{CMB} \approx 2.72582$ Kelvin [2]. This ratio is:

$$E/E_{CMB} = u_{cr}/u_{CMB} = (45/8\pi^3)\, \lambda\!\!\!^{-}_{CMB}{}^4/R^2 l_P^2 \approx (142.318)^2 \tag{18}$$

where $u_{cr} = \rho c^2$ is the critical energy density. Now, a central term in the Planck radiation formula is $e^{\beta} - 1 \approx 142.325$, where $\beta = \lambda/\lambda\!\!\!^{-}_{Wien} = hc/k_B\theta = 5(1\text{-}e^{-\beta}) \approx 4.96511$ is the reduced Wien constant. By analogy with the Eddingtonian formulation, Eq. (7), this must be compared to the *square root* of the ratio between the density population of photon $n_{CMB} = 16\pi\xi(3)/\lambda_{CMB}{}^3 \approx 410.87 \times 10^6$ m^{-3} by respect to the atomic density $n_H = \rho/m_H \approx 5.624$ m^{-3}. One obtains, taking account the 2 polarization factor

$$\sqrt{(2n_{CMB}/n_H)} \approx (E/E_{CMB})\,(1/1.675) \tag{19}$$

Now, in the 3-families statistical theory, the ratio of energies between the total field (photons + neutrino) and the bare photon field is $1 + 3(7/8)(4/11)^{4/3} \approx 1.681$. So the Cosmic Neutrino Field would really exists, and satisfies :

$$\sqrt{(2n_{CMB}/n_H)} \approx E/E_{CMB+CNB} \tag{19}$$

this is consistent by considering the Permanent Cosmology as a Bang oscillation between matter and anti-matter [18]. Considering a super-symmetric boson with the Hydrogene mass, it would correspond to an energy density $u_{sH} = (\pi^2/15)/\lambda\!\!\!^{-}_H{}^4$, so would be larger than u_{CMB} in the ratio $(\lambda\!\!\!^{-}_{HCMB}/\lambda\!\!\!^{-}_H)^4$. Now $\lambda\!\!\!^{-}_{HCMB}/\lambda\!\!\!^{-}_H$ is very close to $(e^{\beta} - 1)(\lambda\!\!\!^{-}_e/\lambda\!\!\!^{-}_{int})^2$, so from Eqs. (8) and (18):

$$R/\lambda\!\!\!^{-}_H \approx u_{CMB}\, u_{sH}\, /u_{cr}^2 \tag{20}$$

precise to 1%, once more a refutation of the Primordial Bang model.

The lacking n = 30 cosmic point

The macro-physical side of n = 30 was left empty, but its central importance was predicted [2]: indeed it would correct a dissymetry in the Topological Axis, suggesting directly the existence of the Grandcosmos, which would give an interpretation for the Cosmic Background Radiation. Indeed, a 'Permanent Thermostat' is a far better interpretation than the standard one, since the trace of an explosion cannot have a so good thermal equilibrium distribution. Recall that one of the three Sakharov conditions [19] for antimatter to disappear in Primordial Big Bang theory is precisely the absence of thermal equilibrium. Moreover, General Relativity is unable to define what is a 'Galilean frame', so, as Poincaré predicted, differential equations are only local, and cannot be applied to a single-Universe cosmology [2]. The Multiverse hypothesis [14] appears to be unnecessary.

Now, we recently realize that f{30} appears in the following *c*-free time, obtained through *two independent c-free formulas*. The first one is the time defined by $\hbar$, ρ and the very precise Fermi constant $G_F \approx 1.4358509(7) \times 10^{-62}$ kg m^5 s^{-2}, while the second one use $\hbar$, G and the above mass $m_0 = (m_e m_p m_H)^{1/3}$ in Eq. (3):

$$T = \hbar^4/G_F^{5/2}\rho^{3/2} \approx \hbar^2/G^2 m_0^5 \approx t_e\, f\{30\} \approx t_{cc}\, O_M/\sqrt{2} \approx 5.48235 \times 10^{57} \text{ s} \quad (21)$$

Moreover, this time connects with $t_{cc} \approx 9600.61(1)$ s, and with O_M the monster order [20], corresponding to $\tau \approx 4.3594 \times 10^{17}$s, nearly compatible ($1.5 \times 10^{-4}$) with the above value in Eq. (4). Independently, the importance of O_M in physics has been predicted [21] .

Interpretation

This time T must be a central parameter in Holographic Coherent Cosmology. Introducing the *c-free* time given by $\hbar, G, G_F$:

$$t_0 = G_F^{5/4}/\hbar^2 G^{3/4} \approx 0.01913 \text{ s} \quad (22)$$

and eliminating the common term $G_F^5/\hbar^8$ in Eq.(9), one gets $(T\, t_0{}^2)^2 = (G\rho)^{-3} = (8\pi t^2/3)^3$, so

$$T\, t_0^2/\tau^3 = (8\pi/3)^{3/2} \approx a/4\sqrt{2} \quad (23)$$

meaning a quasi-holographic relation. The above factor $\sqrt{2}$ receives the beginning of an explanation, in liaison with a probable geometric origin of $a \approx 137.036$. So, the simplest interpretation for T is a Cosmic Large Period, directly tied to the times τ and t_0. An analogous relation have been observed, relating τ and t_{cc} with the solar 11 years periodicity $t_{sol} \approx (t_{cc}{}^2\tau)^{1/3}$ predicting its cosmic origin [1]. This has been recently confirmed by Kotov, on the basis of a sharp time evolution, inexplicable by dynamo theory [22].

Connexions between the Holographic Grandcosmos [1] and T have been found, and will be published later. The simplest interpretation is that the *holon*, the particle with the mass M of the Universe is a gauge boson of the Grandcosmos, prolonging the Cartan-Bott series to n = 30 = 22 + 8.

Conclusion

It was often noted that the about 20 'free parameters' of Particle Physics, are connected by a mysterious 'fine tuning'. This article shows new very precise relations (10^{-6}), deduced from *a cosmic point of view*, where the Kotov absolute clock has a central place, in the frame of String Theory. But the later could be revisited by introducing the 'chronon' time quantum $\hbar/Mc^2 \approx 10^{-104}$ s and C-limited tachyons, and replacing the standard bosonic central dimension 26 = 24 + 2, where 24 is the number of transverse dimensions, by a new central role given to n = 26 + 4 = 30, where the bosonic 26 dimensions becomes the hidden dimensions. Also, there must be a liaison with Eddington's Theory which indeed introduced Clifford Algebra in 8 and 9 dimensions [23].

It is now checked that the Holic Principle, the arithmetical form of Holography, applies to Cosmology. This means the ultimate physics laws are arithmetic, *in a absolute but discrete Space-Time*.

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