LARGE NUMBER CORRELATIONS AND MUSICAL SCALES

Francis M. Sanchez

It is shown that the Large Number correlations are dramatically tied to the main musical scales of Jeans classification, which implies that the physical parameters are calculation bases in a Computing Arithmetical Cosmos.

The traditional method in physics is firstly to characterize a phenomena by measurements, and, secondly to compare them to the ones given by Length-Mass-Time dimensional analysis, using the 3 most pertinent universal constants of the considered physical domain.

It is generally believed that only one choice is pertinent for whole Physics, the so-called Planck's Length, Mass and Time, defined from the constants c,G, $\hbar$.

Now a whole centuty of cosmologists not only applied a *local* theory (GR) to define a cosmology, but also writes $c = 1$, i.e. unifying time and length, thus excluding the above 'formulation analysis'.

We show here that this forgetting of the traditional Physical Method is one main reason for the present general failure of cosmology and theoretical physics. In particular, being incapable to justify about 30 mysterious physical parameters, they deduce that their values are distibuted randomly in a plurality of universes (Multiverse).

In particular, the Large Number Correlation is justfied by an 'anthropic principle', according to which we must live in a special epoch, *of order* a star lifetime. But this rough interpretation is refuted since cosmological parameters are now defined in the percent range, for which the correlations remain, as recalled here.

It was long noted that the number 10^40 appear in three occurences: firstly the ratio (electric-gravitational) of the forces in the Hydrogen Atom, secondly the ratio between the Hubble length and the nuclear radius, and thirdly the square root of the number of atoms in the visible Universe.
Dirac, arguing that mathematical constants are only small numbers, supposed that this large number is tied to the Universe age, so he introduced a temporal variation of the Newton constant G. But this variation was refuted as well as any variation of the other constants of physics. This constancy was checked by observing far astrophysical objects: indeed, due to the slowness of the light speed, looking far away is observing the past of the Universe.

So, the right question is the following : is 10^40 close to economic numbers of the form x^(y^z) , with x, y and z small integers ? Indeed, by taking the successive roots of 10^40, it is immediatly seen that

the seven 'square root' is close to 2
the fourth 'third root' is close to 3
the second 'seventh root' is close to 7

Comparing 2^(2^7) with (3^3)^(3^3), it is found that their ratio is about 4/3, implying a relation between powers of 2 and 3 which is known in musical theory: 2^(1/41) about 3^(1/65), the third musical scale in the Jeans classification [1], listing the optimal divisions of the octave: 5, 12, 41, 53, 306..

Now, it is a length which is measured in the proportionality of distance with redshifts, the later being pure ratio. So one *must* consider the length given by c-free formulation analysis, since the speed c is local, replacing it by $\hbar$, because quantum physics is known to be 'non-local'. One gets $L = \hbar^2/Gm\text{^}3$. By comparing this length with the reduced electron wavelength $\lambda\!\!\!^{-}_e = \hbar/m_e c$, one gets a large number, which must be compared with the above economic ones. It is immediately found that: $2L'/\lambda\!\!\!^{-}_e$ = (3^3)^(3^3) is nearly (0.03%) obtained with the Nambu mass $137m_e$, central in particle physics, while $2L/\lambda\!\!\!^{-}_e$ = 2^(2^7) is obtained with $m\text{^}3$ nearly equal (0.6%) to the product of the masses of the three main particles in atomic physics: electron, proton and neutron. The corresponding value $R = 2\hbar^2/Gm_e m_p m_n$ is then 13.801 gigalightyears, while the standard cosmology

find an 'Universe age' of 13.81(5) gigayears. So this cannot be any 'âge', and the Primordial Big Bang interpretation of official cosmology is refuted. Of course, standard 'physicists' consider it is only chance, but they prove only their lack of knowledge of the true scientific method. In fact this result was found by the author, after 3 first minutes of reappraisal of cosmology, in September 1997, but was refused by the French Academy of Science, under the argument that the Primordial Big Bang is certain ! A closed draft was posted in the Academy Archivs (March 1998), and will be opened soon. It was the prediction of the correct so-called Universe age, 15 years before its accession to the % range measurement.

The forth musical scale, corresponding to the Indian music, can be written

$$2^{1/53} \approx 3^{1/84} \approx 6^{1/137} \approx (9/8)^{1/9}$$

where the famous Eddington Number 137 appears. This means that the 137ième comma is close to 6. So the number 137 is implicitely contained in a natural keyboard, based on the tone 9/8. In fact, for the common tempered keyboard : 2^(1/12) ≈ 3^(1/19) ≈ 6^(1/(π^3)). Moreover, the large number implied by the fifth scale shows the following singularity:

$$2^{485} \approx 3^{306} \approx 137^{137/2} \qquad (8.4.5)$$

this writes:

$$3^{1836/3} \approx 137^{137} \qquad (8.4.6)$$

where 137 and 1836 are the integer values of *a* and *p,* the proton-electron mass ratio. This is an obvious approximation of the formula giving the optimal base *e,*

$$x^{1/x} \text{ maximal} \quad => \quad x = e \qquad (8.4.7)$$

for *e* approximated by 3, which is so the best integer base (a known result of computer theory). The fact that the physical parameters are connected to theses fundamental bases means the Universe seems to be an optimal computer. Moreover, the implication of the musical scales implies that the human brain is also a computer using the same multi-base process as the Universe one. *This is an inversion of the Anthropic Principle*: the Cosmos uses human to follows its computer program. The usual Anthropic Principle states that the Cosmos serves the human, and it is known that it is an inversion of correct scientific way.

Now is the form 7^(7^2) significant ? It is close to 2^137, close to the commun large number corresponding to the synthetic formulation implying both the above formula, melting proton and neutron masses $R = 2\hbar^2/Gm_em_p^2$, and the standard critical formula $R = 2GM/c^2$

$$R/2\lambda\!\!\!^{-}_{p} \approx \hbar c/Gm_em_p \approx \sqrt{(M/m_e)}$$

This conforms with the original statement of the Large Number correlation. Indeed it appears shows the force ratio between the formalist quantum one $\hbar c/r^2$ and the gravitational one in the Hydrogen atom. So the Large Number Correlation is specified to 0.3%. *This confirms that physics is based on arithmetics* [2].

Note that the above forth musical scale, writes also

$$6^{128} \approx (16/3)^{137} \approx (1+1/\sqrt{2})R_{GC}/\lambda\!\!\!^{-}_{e}$$

where R_{GC} is the Grandcosmos radius [2].

[1] J. Jeans. *Science and Music*, p. 188, Dover, 1968.

[2] Francis M. Sanchez, Valery A. Kotov. *From Coherent Cosmic Oscillations to the Steady-State Cyclic Ultrafast-Reconstructing Universe*. **viXra:1401.0228** To be published in Galilean Electrodynamics in winter 2015.