Holography and Cosmology

F. M. Sanchez, M. Grosmann

A Fundamental Holographic Principle is applied to Grandcosmology, for which the horizon radius of the visible Universe is invariant. The Fundamental Eddington Theory is rehabilitated, while Primordial Bang model and anthropic principles are refuted. The sweeping of a single electron-positron couple in a tachyonic bath explains at last the 10^122 discrepancy between quantum world and the visible Universe.

Introduction

Dualities between spaces of different dimensions have been coined 'Holographic Relations' by several theorists [1]. Strictly speaking, this is of course a misuse of language since usual holography is a 2D-2D wave transformation, the restitution of volume being only a visual impression. For a total 4π holography, a whole volume *area*-information is stored on another 2D surface (the hologram). The number of informations is roughly equal to the ratio of the scene *area* to the square of the wavelength. In particular, a black-hole entropy $\pi(R_{hor}/l_P)^2$ has been defined, playing a central role in the black hole thermodynamics, where R_{hor} is the horizon radius and $l_P \equiv (\hbar G/c^{-3})^{1/2} \approx 1.6164 \times 10^{-35}$ m is the Planck length.

The Fundamental Holographic Principle

Albeit the critical condition in standard cosmology is the same as in a M-massive black hole: $R/2 = GM/c^2$, the above Bekeinstein-Hawking entropy cannot be applied to the Universe horizon R, because *in standard cosmology,* it is a variable length.

Now, *the horizon radius being a constant* in Grandcosmology [2] (for which the background radiation is supposed to be an invariant field coming from a Grandcosmos)*, one may postulate the following Fundamental Holographic Principle*. With the Universe wavelength $\lambda\!\!\!^{-}_M = \hbar/Mc \approx 3.9989 \times 10^{-11}$ m ('holon' particle of mass M), the above critical condition writes as the holographic correspondence 2D-1D for the Bekeinstein-Hawking entropy, where $l_P^2 = \hbar G/c^3$ is the Planck area:

$$\pi(R/l_P)^2 = 2\pi R/\lambda\!\!\!^{-}_M \qquad (1)$$

With the equivalent number of neutrons $M/m_n = N_n = (10m_H/3m_p,)N_{Ed}$, where $N_{Ed} = 136 \times 2^{256}$ is the Eddington's Number [3], this holographic number extends to :

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

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* (the standard explanation involves a 10^{-120} precision in initial conditions, and is called 'strong anthropic principle'). Now $\lambda\!\!\!^{-}_M$ is about $10^{-61} l_P$: indeed, the Gamma Ray Burst observations [4] seem to exclude the Planck length l_P as a space quantum, a common assumption of several theories. Grandcosmology assumes that tachyons exist, 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].

This means the visible Univers is a tiny part 10^{-122} of what is really occurring : the emptiness of Space is only an illusion, hiding a tachyonic active world, *which make Coherent the Universe* (the old signification of a *Kosmos*). In particular, it is shown that, inside the circle R, the mean planar spiraling radius of a single electron is tight to the atomic radius $a\lambda\!\!\!^{-}_e$, with $a \approx 137.036$ [2]. So, *the whole Universe would be made of a single couple electron-positron, in a tachyonic bath*. This confirms the central role of the Topological Axis, which rehabilitates String Theory, and en-lights 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):

$$\hbar c/Gm_e m_p = (R/2\lambda\!\!\!^{-}_H) = \sqrt{(M/m_e')} \qquad (3)$$

So the Eddington's 'comparison particle' [3] is nothing else than the electron. Eddington could not have realized this, because, at his epoch, the estimation of the Hubble Constant was false by an order ot magnitude. This is the definitive refutation also of the *weak* Anthropic Principle [5], tying a *so-called universe age* to the necessary time to produce carbon.

Conclusion

Poincaré has predicted that differential equations will be unadapted to cosmology [2]. So, they must be replaced by global equations, in particular holographic ones, but with the inevitable consequence that *the Primordial Bang model is out*. This standard model was only sustained by the censoring of controversial observations [2]. Also, Eddington's Fundamental Theory is rehabilitated. Indeed, it has predicted parity violation and Clifford algebras in height and nine dimensions, which appear now in String Theory [6]. Eddington has also predicted the Tau particle (he called 'Heavy Mesotron'), 35 years before its surprising discovery.

References

[1] Bousso R., "*The Holographic Principle*", Review of Modern Physics, vol 74, p.834 (2002).

[2] F.M. Sanchez. *Grancosmology* Vixra.org,1601.0011. Springer International Publishing AG 2017. A. Tadjer et al. (eds.), *Quantum Systems in Physics, Chemistry, and Biology*, Progress in Theoretical Chemistry and Physics 30, pp. 375-407. DOI 10.1007/978-3-319-50255-7_23.

[3] Eddington A.S., *The Fundamental Theory* (Cambridge, 1946)

[4] Ackermann M. The Astrophysical Journal, 716:1178–1190, 2010 June Fermi Observations of GBR 090510

[5] Carr B.J. and Rees M. J. , "*The anthropic principle and the structure of the physical world*", Nature 278, 605-612 (1979).

[6] Salingaros N., Some Remarks on the Algebra of Eddington's E Numbers. Foundations of Physics, June 1985, Volume 15, 6, pp 683–691.