

The fine parameters of the universe by ξ - α arising from the infinite potential of random tests

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Abstract

Beyond the Standard Model, DUO5 theory relies on the inevitable physical consequences of the inertial paradox $\{\#m > 0; \#m \equiv 0\}$ [1]. This paradox justifies the state of a stochastic and steady-state universe, which is the origin of the state of the observable universe. The existence of the dipolar preon is forced by this paradox to obtain an indispensable algebraic zero of the type $\{\Delta m_{l \rightarrow} + \Delta m_{l \leftarrow} \equiv 0\}$, failing the impossibility of absolute zero. The preon is the elementary particle common to spacetime and matter, as proposed by John Wheeler [2]. The stochastic and steady-state has no {mass-spacetime} continuum. The non-flow of time makes possible a near-infinite potential of {entropy \leftrightarrow negentropy} cycles of an informational type [1]. The non-flow of time allows for an almost infinite number of mostly sterile random trials. Statistically, there is a non-zero probability of obtaining a fruitful result through the fine parameters ξ - α that characterize the observable universe. It is shown here how the ξ - α duality operates at all scales. Several verifiable and falsifiable relationships account for the numerical value of ξ while indicating its physical role arising from the inertial paradox.

1. Introduction

The Standard Model does not explain how the fine parameters that govern the proper functioning of the universe arose. Since the Copenhagen school, the standard approach has been to model experimental effects locally in an attempt to discover their causes. Numerous tests show that without taking into account the duality of locality, one can only collect puzzles. Defining quantum theory on a purely local basis is largely insufficient, because the original inflation is not reproducible in the laboratory. The DUO5 theory relies on the inevitable physical premise of the inertial paradox $\{\#m > 0; \#m \equiv 0\}$ [1], thus avoiding

speculations of the "singularity" or "Fiat Lux" type. The inertial paradox justifies the existence of the state of a permanent and stochastic universe in the form of dipolar preons $\{\Delta m_{\ell \rightarrow} + \Delta m_{\ell \leftarrow} \equiv 0\}$, which offer a natural solution to replace the impossible absolute zero. The informational-type $\{\text{entropy} \leftrightarrow \text{negentropy}\}$ cycle [1] forms a BEC by synchronizing a portion of the dipolar preons. The DUO5 theory implies 5 fundamental dualities of nature, which are the direct consequences of the original inertial paradox: 1) the duality of universe state $\{\text{stochastic permanent} \leftrightarrow \text{synchronized in expanding BECs}\}$; 2) the duality of the preon of the type $\{\Delta m_{\ell \rightarrow} + \Delta m_{\ell \leftarrow} \equiv 0\}$, which produces an algebraic zero in its "preon" frame of reference, to compensate for the impossibility of absolute zero; 3) the duality of locality, via the $\{\text{quantum}(v=c) \leftrightarrow \text{subquantum}(v=c_{oo})\}$ scales, at the origin of wave/particle duality, the EPR paradox, wave function collapse, indeterminacy, etc.; 4) the duality of the ξ - α pair which generates the two states of the preon: 1) dipolar for spacetime; 2) monopolar (by causal separation), for matter; 5) the duality of the coupling between matter and dipolar preons of spacetime. The informational $\{\text{entropy} \leftrightarrow \text{negentropy}\}$ cycle [1] produces the synchronization of a subset of stochastic preons to form the BEC-fossil [3]. Among a very large number of random tests to obtain the fine parameters of the observable universe, there is a non-zero probability of approaching them, since time does not flow in the steady state of the stochastic universe. This means that there is a near-infinite potential to obtain the factor $\xi = 1.54581979001399 \times 10^{11}$, essential for the equilibrium of the observable universe. This factor ξ is measurable by different means. DUO5 theory shows that the factor $\alpha = 137.035999177$ was randomly determined by the inevitable error rate related to the quality of the synchronization, forming the BEC-fossil. This error rate contributes to the refinement of the parameters that made the observable universe so rich. This error rate manifests as a sphericity defect in the fossil BEC, still observable today. This defect of intensity α^2 saved a portion of the potential masses from primordial annihilation [3]. It has been shown that primordial annihilation triggered the expansional mitosis (in 5 phases) of the fossil BEC. In the DUO5 theory, inflation is no longer a hypothesis to resolve a causal link, but stems directly from the inertial paradox. The expansional mitosis, governed by the ξ - α pair, has strictly fixed all the observable of this expanding universe. The relationships that follow are measurable and falsifiable. The DUO5 theory does not merely describe the effects, but explains their causes.

2. The five fundamental fine parameters: ξ - α and $m_e \lambda_e t_e$

The ξ - α duality is linked to the three fundamental parameters of the electron. The diagram below summarizes the universe cycle with its infinite potential for fruitless random tests, relative to the stochastic state of the universe. Among the infinite potential for random tests, there is a non-zero probability of a fruitful test, characterized by the precise value of the factor ξ . Its measurement by various methods is given as $\xi = 1.54581979001399$. It exhibits a fundamental duality with the factor $\alpha = 137.035999177$, called the fine-structure constant. The physical cause of this constant is revealed below.

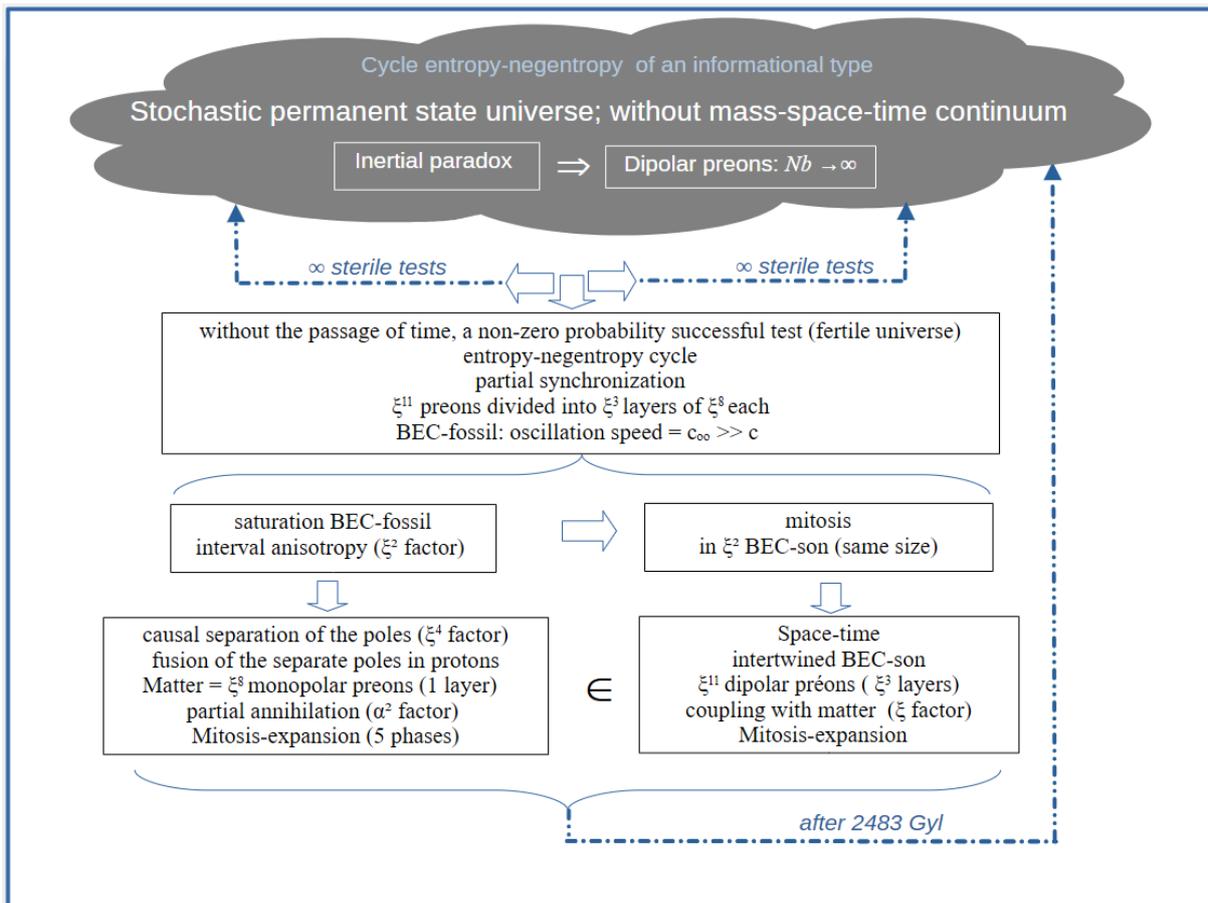


Fig 1: the universe cycle has a non-zero probability of randomly possessing a pair ξ - α , sufficiently precise to materialize the fine parameters of the observable universe.

3. The first two tests of the link between: ξ - α et $m_e \lambda_e t_e$

While the constant α is well integrated into the Standard Model, this is not the case for the factor ξ . Yet, it is perfectly measurable by about ten independent methods. There is, for example, the ratio of the Coulomb force to the gravitational force acting on an electron-positron pair:

$$\xi^4 = \frac{\lambda_e^2}{\ell_p^2} = 5,7099913695277 \times 10^{44}, \quad (2)$$

By replacing e^2 with its true origin; $e^2 = f(m_e \lambda_e)$, relation (1) can be written without the artifice of the elementary charge, as follows:

$$\xi^4 = \frac{m_e \lambda_e c^2}{G m_e^2} = 5,7099913695277 \times 10^{44}, \quad (3)$$

It is very important to note that rewriting relation (1) as (3) expresses the gravitational force in the same terms as the Coulomb force. The gravitational force is a Coulomb force reduced by the factor ξ^4 due to causal separation. This force is not typically attractive, as it was previously repulsive during the causal separation caused by inflation. This cycle is inherited from the preon $\{\Delta m \ell \rightarrow + \Delta m \ell \leftarrow \equiv 0\}$, for which the inertial paradox requires the inseparability of the two poles. This cycle is governed by the fundamental law $\Delta m \cdot \Delta \ell \equiv Cte$, from the preon, inherited by all things. The reduction of mass to the "zero point" results in a large spatial potential ℓ_o (or indeterminacy) for one pole. Then, the reduction of the spatial potential: $\ell_o - \Delta \ell$ results in an increase Δm . The growth of inertial mass causes the attractive force, which completes the cycle. The contraction phase of the "corpuscular" state towards the common zero point (CZP) resembles a gentle annihilation. Then its spatial indeterminacy is of the "wave" type. Here we find the origin of wave-particle duality. The law $\Delta m \cdot \Delta \ell = \text{constant}$ can also be written $\Delta m / \Delta \ell \equiv Cte$. It is measurable and falsifiable everywhere, notably in relation (3), in the form: $\lambda_e / m_e \equiv Cte$. Relation (1) shows that the factor ξ^4 represents the radial causal separation ratio of the poles of each preon. This was generated by inflation, which represented the last oscillation of one of the ξ^3 2D layers of preons, whose poles merged on the area of the fossil BEC. The cause of this fusion is the reduction by factor ξ of the tangential elementary interval. Mitosis-expansion was triggered by the anisotropy of the intervals between preons. On the BEC-fossil area, the radial interval is λ_e , while the synchronizing flux reduced the tangential interval to: $\lambda_e / \xi = \lambda_o$. This reduction caused inter preon fusions, which masked the charges and broke the radial bond. The separated poles (no longer annihilating each other) became stable electron-positron pairs with apparent mass. This stability differs from locally extracted pairs, which are unstable because, by definition, they do not undergo causal separation. It is important to note that equation (3) no longer includes the factor α present in (1). Since this factor α represents the annihilation rate (1D), this implies that it was produced by the breaking of radial symmetry. The "soft" annihilation described earlier transformed into a brutal annihilation of the de/dt^2 type. However, the sphericity defect saved $1/\alpha^2$ of the potential masses. This means that the defect resulted in bumps whose radii

exceeded the causal annihilation distance. All the material covering the BEC area was "pierced" with holes, the surviving masses of which appear as filaments. The major error is to focus on the architecture of the filaments, when the question concerns the cause of the presence of these "holes." After the perturbations of the expansion, the following figure shows that the average ratio between the diameter of the holes and the average thickness of the filaments is on the order of α .

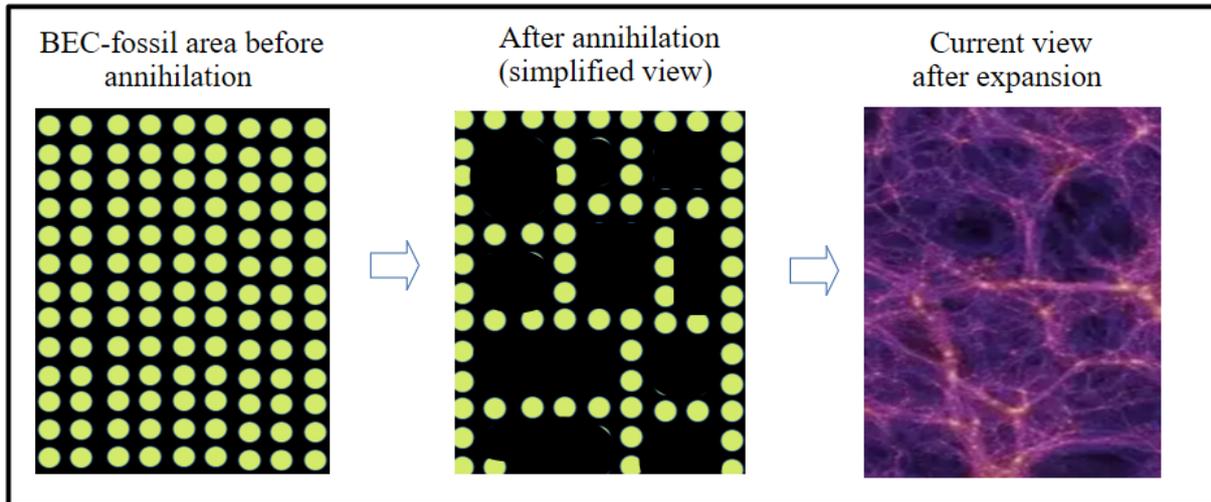


Fig 2 : Ci-dessus, l'évolution des vides laissés par l'annihilation primordiale. Le facteur α représente la moyenne des ratios {vides / épaisseur de filaments}.

Contrary to the common interpretation, it is futile to look for a natural architecture such as a filamentary structure. Figure 2 shows an original homogeneous distribution that has been "perforated" by the annihilation of a majority of elementary masses. This results from the abrupt masking of radial charges (de/dt^2) caused by widespread mergers. This is the causal and radial separation of each preon pole. Merging revealed the mass by breaking the radial bond that had been masking the masses. The filaments represent the surviving galaxies after the perturbations of expansion.

4. Third test for ξ - α and $m_e \lambda_e t_e$

The third test relies on the 5-phase fractal mitosis of the BEC-fossil [3]. The interval anisotropy ratio ξ^2 (2D) was resolved by the ξ^2 mitosis of BEC-sons of the same size. The 5-phase annihilation by the two factors ξ - α , from random sources, required an adjustment parameter, namely the proton expressed in electron units at: 1836.152673346(81) [4].

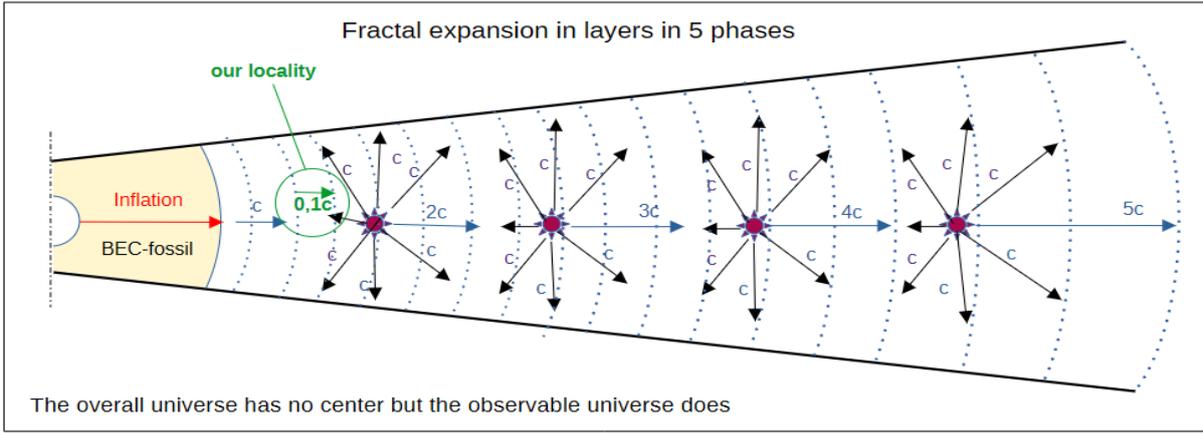


Fig 3: The 5 phases of fractal mitosis form layers of matter whose local density ρ decreases by a factor of 5/8 (see chapter 10). At the end of the process, the convergence between ξ and α is established thanks to the adjustment parameter, which determines the existence of the proton. This mode of expansion is consistent with observations (anisotropy, decreasing acceleration). While the stochastic universe state has no center, the observable state does. This is fossil BEC.

$$P = \frac{\lambda_e}{r_o} \frac{(\alpha^2)^5}{\xi^2} \frac{4\pi}{3} \frac{\xi^3}{(\alpha^3)^5} = \frac{4\pi\xi}{3\alpha^4} = 1836,15267342, \quad (4)$$

Equation (4) shows from left to right: 1) the triggering by radial annihilation 1D = α which enlarges the classical radius r_o to the Compton length of the electron; 2) in 2D, the 5 phases $(\alpha^2)^5$ are compared to the mitosis rate ξ^2 resulting from the anisotropy of the elementary intervals; 3) in 3D the form $\xi^3 / (\alpha^3)^5$ finalizes the convergence between the two factors ξ - α .

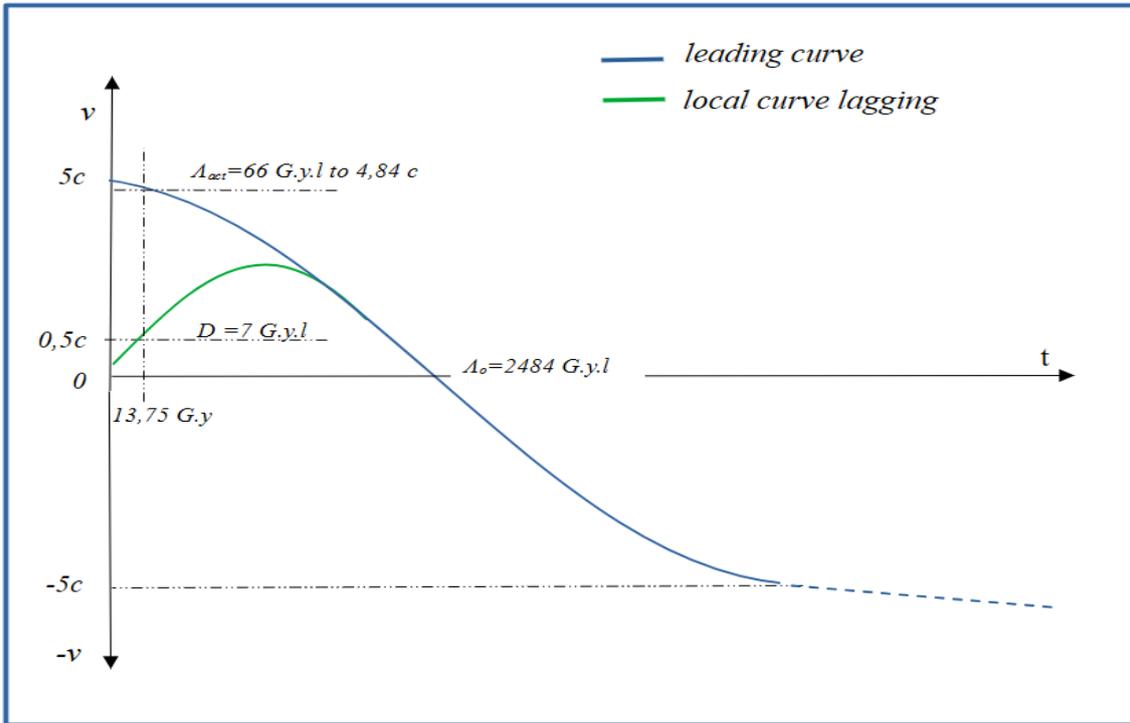


Fig. 4: As recently measured [5], the acceleration of the expansion of our (cosmic) locality is being reduced. The values shown (Λ_{act} and Λ_o) are explained in Chapter (10).

5. Fourth test for ξ - α and $m_e \lambda_e t_e$

The DUO5 theory resolves the EPR paradox by stating that the spin of a particle is shared with the subquantum and superluminal preon with which it is coupled. The following relation gives the subquantum origin of the anomaly in the electron's magnetic moment, measured at 1.00115965218085(76) [6]. The accuracy of the numerical result is 7σ :

$$\alpha_1 = \frac{1}{\alpha \pi} = 0,00232281946419(52) \quad (5)$$

with α_1 , the standard factor, we obtain the numerical value with only 3 correction terms, which take into account the parameter ξ , relating to the coupling between the electron and the preon:

$$\alpha_e = \frac{\alpha_1}{2} - \frac{2}{3\sqrt{\xi}} - \frac{1}{2\pi\alpha^3} - \frac{4\pi}{\xi} = 0,0011596521811(52) \quad (6)$$

The factor $\sqrt{\xi}$ relates to the coupling between the 1D subquantum scale and the 2D quantum scale, as seen in the following paragraph.

6. Fifth and sixth tests for ξ - α and $m_e \lambda_e t_e$

The calculation of the mass of the W boson by the following relation, confirms the last measurement made by the LHC in 2024 [7] which is: 80.360(9.9) GeV.

$$W = \frac{2}{5} \sqrt{\xi} = 1,572676592317 \times 10^5 uel = 80,3636088505 GeV, \quad (7)$$

With the principal numbers (2, 5) of the Fibonacci sequence, related to fractal mitosis. The mass of the Higgs boson [8], measured at: 125.22(14) GeV, is given by:

$$H^\circ = \frac{5}{8} \frac{\sqrt{\xi}}{\sigma_p} = 2,4508371209 \times 10^5 uel = 125,234519722 GeV, \quad (8)$$

with the coupling ratio between the proton and the preons, fixed at:

$$\sigma_p = \frac{1841}{P} = 1 + \alpha_1 + \frac{2\mathcal{E}}{\alpha^2} - \frac{2\mathcal{E}}{\alpha^3} - \frac{7\mathcal{E}}{\alpha^4} + \frac{4}{\alpha^5} = 1,00263993656 \quad (9)$$

with $\mathcal{E} = 3$, the relationship indicates the degree of coupling between the proton and the subquantum scale [9]. According to the extensions of the KOIDE law, the proton is composed of 1840 electrons and positrons whose charges are masked and 1 unpaired positron which gives it its charge.

7. Seventh test of ξ - α with cosmic rays

Superpowerful cosmic rays are measured up to: $w_{\max} = 3.2 \times 10^{20}$ eV [10]. The following relationship confirms this with the factor ξ :

$$w_{\max} = \frac{11}{5} \xi P = 6,24439 \times 10^{14} \text{ ue} = 3,19088 \times 10^{20} \text{ eV}, \quad (10)$$

According to DUO5 theory, such energy is related to the extraction of 1841 preon poles [11] [9] from the core of a galactic black hole. The density is sufficient to contract the elementary intervals of preons in spacetime, to the point where the poles merge with their neighbors, thus breaking the radial bond of the preons.

8. Eighth test for ξ - α on a cosmic scale

Current estimates of the number of galaxies in the observable universe are close to ξ , or (1.54×10^{11}). This number is also the number of stars in galaxies, making ξ^2 stars (10^{23}) in total. However, according to DUO5, these figures represent primordial stars, which are 330 times more massive than the Sun. The total mass of the universe corresponds to ξ^8/α^2 electrons, or $\Sigma m = 10^{55}$ kg. This is about 10 times greater than the standard estimate. According to DUO5, the intergalactic component of DM is about 50 times greater than the visible mass. This results from a weak overlap gradient of the poles separated by inflation. According to DUO5, galaxy collisions are responsible for a slight alteration of the electron-positron pairs that make up protons. This causes a disruption of the fine parameters that structure the proton. They then become dark matter that no longer emits the hyperfine transition at 21 cm. According to DUO5, dark stars exist (clusters of degenerate electron-positron pairs). These conveniently serve as gravitational zooms [12]. The hyperfine transition frequency of atomic hydrogen is measured with high precision at $\nu_o = 1.42040575163(63)$ GHz [13]. By setting:

$$\nu_{o1} = \frac{2}{5} \frac{c}{\lambda_e \xi \sqrt{2}} = 1,4204971657 \text{ GHz} \quad (12)$$

We obtain this precise agreement with the measurement, with $\mathcal{E}=3$:

$$\nu_o = \frac{\nu_{o1}}{5/4\alpha^2 - 2\mathcal{E}/\alpha^3 + 5\mathcal{E}^2/\alpha^4 - 5!/ \alpha^5 + 1} = 1,42040575164 \text{ GHz}, \quad (13)$$

9. ξ - α test with Pioneer 11 abnormal deceleration

Pioneer 11 exhibits an anomalous deceleration [14] of: $-8.74(1.33) \times 10^{-10}$ m/s². It is moving away from the Sun, which is at the center of the local BEC. As it moves away from the Sun, it experiences the weak quantum effect of the subquantum deceleration of preons moving away

from the common zero point, located at the center. This constant gamma ray goes unnoticed at Earth's level, compared to that related to gravity, which is $-5.9 \times 10^{-3} \text{ m/s}^2$. But with the distance of Pioneer 11, estimated at $12 \times 10^{12} \text{ m}$, the Newtonian gamma ray is on the order of: $-9 \times 10^{-7} \text{ m/s}^2$. The measured anomaly corresponds to:

$$\gamma_{Pioneer} = -\frac{5}{6} \frac{c^2 \alpha^3}{\xi R_{BEC}} = -8,7402 \times 10^{-10} \text{ m s}^{-2} \quad (14)$$

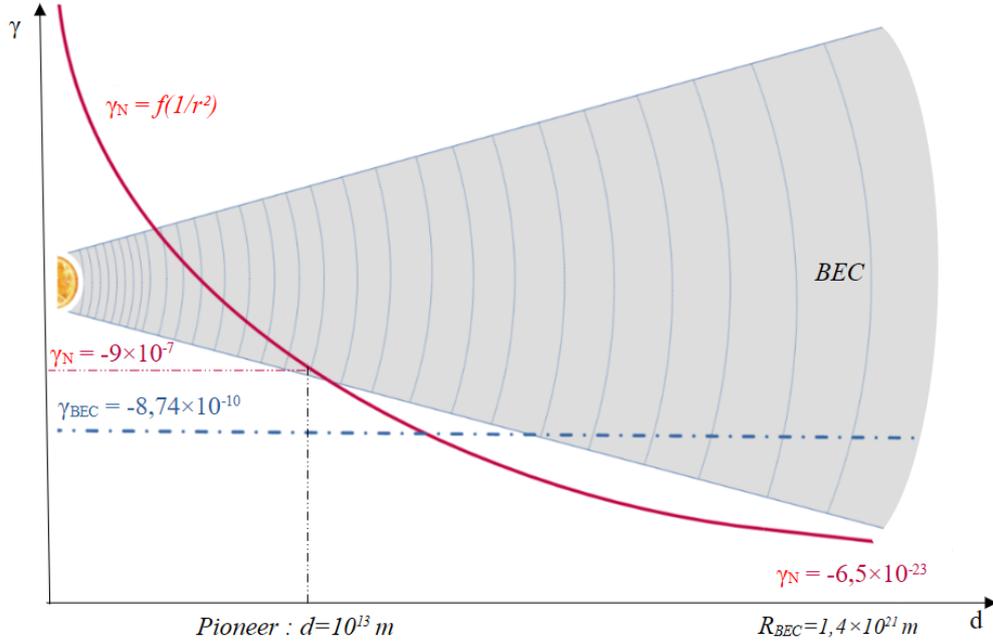


Fig 5: Comparison between Newton's gravitational gamma and the constant gamma specific to the BEC. It is this same gamma that links intergalactic BECs together.

This constant gamma differs from the MOND model, which proposed a hypothesis to replace dark matter. This constant gamma is not a speculation intended to replace dark matter, which MOND considers speculative. The DUO5 theory derives the constant gamma from a BEC, whose operation is a natural consequence of the inertial paradox. Furthermore, galaxy halos are entangled BECs into which dark matter migrates. This migration arises from the weaker coupling of dark matter (altered matter) with preons. According to DUO5, dark matter mirrors the causal separation, as it results from partial overlaps related to collisions between galaxies.

10. Maximum and current expansion

According to DUO5, the expansion is not a stretching of spacetime but the unraveling of intergalactic BECs. It is necessary to verify that the gamma of the expansion is greater than the gamma of the binding between BECs. But it is also necessary to verify that the galactic

BECs do not participate in the expansion, as can be observed. The original expansion velocity (5c) reduces to the velocity c , for the radius: $\Lambda_o = 2484$ G.y.l, according to:

$$\Lambda_o = \frac{G \Sigma m_o}{c^2} = 2,3483486 \times 10^{28} m \quad (15)$$

This constant is confirmed according to:

$$\Lambda_o = \frac{\hbar^2 c^2}{G m_e^3 \alpha^2 c^2} = 2,3483486 \times 10^{28} m \quad (16)$$

The standard model estimates the current radius of the universe at $\Lambda_{act} = 46.5$ G.y.l. But by comparing the number of photons $N_{phot} = \xi^8$, born from the original annihilation, with the photon density ($\rho_{phot} = 4.1072 \times 10^8 u/m^3$) [15], we obtain $\Lambda_{act} = 66.86$ G.y.l, according to:

$$\Lambda_{act} = \sqrt[3]{\frac{N_{phot}}{\pi \rho_{phot}}} = 6,3220055 \times 10^{26} m \quad (17)$$

According to the entropic cycle [1], the original mass Σm_o must disappear after the contraction of the radius $\Lambda_o = 2484$ G.y.l. This disappearance is gradual, as it is linked to the production of DM by galaxy collisions [3], as seen in chapter (7). According to figures (3, 4), the acceleration of the expansion is not an absolute value but relative to our locality [3], which lags behind the maximum expansion rate at $5c$. Figure (4) shows the local curve whose acceleration is being reduced, in agreement with the recent measurement [5]. Another method of exploiting the original number of photons ($N_{phot} = \xi^8$) consists of comparing the temperature of electron annihilation ($T_e = 5.93 \times 10^9$ K) with the temperature of the background: $T_{dif} = 2.72$ K, to deduce an estimate of the distance D_{act} separating us from the immense hole left by the fossil BEC (cold spot in the direction of Eridanus and with a diameter of 1.8 G.y.l).

$$D_{act} = R_{BEC} \sqrt[2]{\frac{T_e}{T_{dif}}} = 6,66 \times 10^{25} m = 7,04 \text{ Gyl} \quad (18)$$

From this, we can deduce an approximation of the local expansion rate after 13.75 G.y:

$$v_{exp} = \frac{D_{act}}{13,75} = 0,51 c \quad (19)$$

If at level Λ_o , the velocity is reduced to c , (with a linear approximation of the variation of the expansion gamma), we obtain for Λ_{act} : $v_5 = 5c - (\Lambda_{act} / \Lambda_o) / 2 = 4.84 c$ (fig. 3). This confirms relation (17).

$$\Lambda_{act} = D_{act} \frac{4,84 c}{0,512 c} = 66,73 \text{ Gyl} \quad (20)$$

According to figure (3), the density of the material layers decreases with the expansion rate by a factor of 5/8. Thus the local inertial influence for $v_5 = 4.84 c$ is given at: $M_5 = 5/8 \Sigma m$.

$$\Lambda_{act} = \frac{2GM_5}{v_5^2} = 66,73 Gyl \quad (21)$$

Equation (21) confirms relations (17 and 20). These multiple coherences clearly indicate that the separated pole pair of the preon gave rise to the only elementary pair of matter, namely the electron-positron pair. As imagined by John Wheeler, the preon is the single elementary particle common to spacetime and matter.

11. The expansion acts only on intergalactic BECs

Equation (14) indicates that the anomalous gamma of Pioneer 11 reveals the deceleration of preon poles moving away from the center of the BECs. It is necessary to verify whether the expansion gamma dominates this gamma in order to disentangle the BECs.

$$\gamma_{exp} = -\frac{v_t^2}{2\Lambda_{act}} = 1,6623 \times 10^{-9} m s^{-2} \quad (22)$$

Equation (22) verifies that expansion is possible according to: $\gamma_{exp} > \gamma_{BEC}$. However, in the Galaxy, the internal force is greater because the gravitational effect is added. For a radius $R = 5 \times 10^{19} m$ and a mass $M = 1.2 \times 10^{42} kg$, we obtain a gamma much greater than that of the expansion, according to:

$$\gamma_{Gal} = -\frac{GM}{R_{Gal}^2} = -6,44 \times 10^{-8} m/s^2 \quad (23)$$

This explains why galaxies do not participate in expansion. However, cosmic rays (Chapter 7) cause a slow exodus of galactic matter. This exodus—in the form of DM—leads to "dark" BECs that feed intergalactic space. The inertial paradox requires that the contraction following expansion will completely reverse the causal separations that had revealed the masses. This is consistent with the informational entropy-negentropy cycle. There is a universal law that limits the infinite potential of informational entropy of a nearly infinite number N_∞ of stochastic and permanent elements by the existence of a small number of synchronized elements (n_{syn}) that are then temporarily endowed with inertial aptitude.

$$\frac{N_\infty}{n_{syn}} = Cte \quad (24)$$

There is a fundamental duality between the domain of information and that of inertia. Inertia is the bulwark against the impossible infinite informational entropy.

12. Table of fine parameters of the universe (ξ - α)

ξ		<i>Universal factor resulting randomly from synchronization of a portion of stochastic preons</i> $\xi = 1,5481979001 \times 10^{11}$
	α	<i>Fine-structure constant derived from the primordial annihilation factor :</i> $\alpha = 137,035999177$
$\sqrt{\xi}$	α^0	<i>Factor between 1D préon and 2D particle (gauge bosons)</i>
ξ	α^0	<i>1) préon pole extraction factor (max cosmic rays = $3,19 \times 10^{20}$ eV); 2) Nb primordial galaxies; 3) saturation by anisotropy of elementary intervals between preons in the Fossil BEC: tangential reduction : $\lambda_e \rightarrow \lambda_o$, compared to radial interval = λ_e.</i>
ξ^2	α^0	<i>1) ratio electron / Planck ; 2) Nb stars = 10^{22} ; 3) 2D anisotropy 2D anisotropy of elementary areas between preons in the Fossil BEC.</i>
ξ^3	α^0	<i>1) radial factor : R_{BEC} / λ_e ; 2) Nb of layer of preon in the BEC; 3) ratio speed subquantum / quantum</i>
ξ^4	α^{-1}	<i>1) Nb of preons on the half circumference of the fossil BEC = ratio : tangential factor : {Coulomb / Gravitation} for an electron-positron pair.</i>
ξ^5	α^0	<i>1) R_{BEC} / ℓ_p = preon amplitude in the BEC / preon thickness</i>
ξ^6	α^{-2}	<i>primordial mass of stars, expressed in electron units = $7.10^{21} = 6,6 \times 10^{21}$ kg.</i>
ξ^7	α^{-2}	<i>primordial mass galaxies = 10^{24} kg.</i>
ξ^8	α^{-2}	<i>total mass of the expanding universe: = $1,58 \times 10^{22}$ kg (DM included).</i>
ξ^9	α^0	<i>preons number in a star halo</i>
ξ^{10}	α^{-2}	<i>preons number in the galaxy halo : (radius = 200 000 y-l (observed) \rightarrow space-time</i>
ξ^{11}	α^0	<i>Nb of preons in the universe</i>
$\xi^{-\infty}$		<i>Nb dipolar préons in the stochastic universe, without mass-space-time, whose existence and permanence are justified by the inertial paradox.</i> $\{\exists m > 0 ; \exists m \equiv 0\} \rightarrow \{\Delta m \ell' + \Delta m \ell'' \equiv 0\}$

Tab 6: The fine parameters ξ - α characterize one of the BECs forming spacetime.

According to DUO5, the Planck mass m_p is an application of the law: $\Delta \ell \cdot \Delta m \equiv Cte$. At first glance, if ℓ_p is the Planck length, then m_p is the Planck mass, which is equal to ξ^2 times the mass of the electron. But this enormous mass does not exist, because its justification $f(1/\ell_p)$ is based on a hypothetical Planck particle. In reality, the length aspect is the amplitude (or uncertainty) potential of the preon. This potential is ξ^4 times greater than ℓ_p . Thus, the true Planck mass (m_{p0}) is ξ^2 times smaller than that of the electron. It is that of a pole located at the PZC of a BEC. It therefore possesses an immense uncertainty potential that decreases as the pole approaches the cusp. At this point, the potential is reduced to λ_e , which justifies m_e , the mass of the electron, by: $\lambda_e m_e = Cte$. It is significant that the origin of the electron mass is that of the preon (m_{p0}) at the PZC, increased when it is located on the surface of the BEC.

$$m_e \equiv m_{p0} \frac{R_{BEC}}{R_{PZC}} \quad (25)$$

The volume of the inner sphere of the PZC, of radius λ_e , contains the equivalent of a layer of ξ_6 preon poles, if their radius is reduced to: $\ell_o = \ell_p / \xi = \lambda_e / \xi^3$.

13. Conclusion

The existence of a steady-state, stochastic universe is justified by the inertial paradox $\{\nexists m > 0; \nexists m \equiv 0\}$, which produces a near-infinite number of dipolar preons $\{\Delta m \ell^{\rightarrow} + \Delta m \ell^{\leftarrow} \equiv 0\}$. This set lacks: 1) a mass-space-time continuum; 2) a center; and 3) the flow of time. This lack of flow opens up a near-infinite potential for random synchronization tests. This near-infinite potential justifies obtaining the fine parameters (ξ - α) that have made the observable universe fruitful. The amplitude of the synchronized preons (R_{BEC}) has a ratio of ξ^5 to their thickness, which is fixed at the Planck length. DUO5 theory does not have the status of a mathematical model, in which the absence of a foundational premise results in free parameters. The DUO5 theory elaborates on the physical consequences of the inertial paradox and the preon, whose dipolar structure allows for an algebraic zero capable of resolving the inertial paradox. The entropic cycle includes a synchronization phase in a BEC in which the preon layers oscillate at a speed compatible with the inflation proposed by Alan Guth. This inflation is precisely the last superluminal cycle of the fossil BEC, before the causal separation of the preon poles and mitosis into daughter BECs. The derivation of the inertial paradox resolves 72 puzzles [3] of the Standard Model. Among these puzzles, the antimatter crisis is resolved, since the electron-positron pair, inherited from the separated poles of a preon, is strictly symmetrical in number within a hydrogen atom. The EPR paradox sparks debate in the scientific community, as the correlation between two entangled and distant particles is undeniable. The underlying cause of the "phantom link" is that the spin state is shared between the particle and the subquantum and superluminal preon with which it is intimately coupled. The link (not naively instantaneous) propagates at the speed $c_{\infty} \gg c$, from the preon poles. Locally, it is impossible to create a stable particle. In no case can it represent the original causal separation leading to the stable matter of the universe. It is on this misleading basis that the possibility of stable electron-positron pairs has historically been excluded. The single particle proposed by John Wheeler makes perfect sense with the idea that nature favors symmetry and simplicity [16]. The curve in Figure (4) is consistent with Professor Lee's measurement, who states[5]: *"Within the framework of the DESI project... which allowed us to conclude that while the universe will slow down in the future, it is still accelerating now."* The duality of locality plays an essential role in all areas of the physics of the universe, and especially in the context of the accelerating expansion. What Lee measured is a local reality, which is certainly not absolute. Three space telescopes (XMM-Newton (ESA), CHANDRA (NASA), and ROSAT

X (Germany)) indicate that this acceleration vector (opposite to the BEC-fossil) exhibits anisotropy with the tangential acceleration. A recent measurement by Professor Lee [5] indicates a slight decrease in this expansion acceleration. All these measurements can only be explained by the DUO5 theory, which materializes the expansion in velocity layers generated by the fractal mitosis of the BEC-fossil. The anisotropy of the expansion can no longer be denied by reading these latest observations, which clearly define the criterion of locality. [17].

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Conflicts of Interest

The author declares that this paper is not subject to any conflict of interest.

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