

DISTANCE AND MASS CORRECTION ON LOGARITHMIC METRICS FOR HIGH Z's, DUE TO THE NON-CERO ANGULAR MOMENTUM IN AN ISOTROPIC ROTATIONAL UNIVERSE HYPOTHESIS

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Abstract

Dark can't be on the same sentence of a Hypothesis. Let's surmise here an alternative model in which the time turn around the space with non-zero angular momentum. Then, there should be a center and we may observe anisotropies, and indeed although they are not explicit in space, but are observed over time, and we identify a beginning and an arrow-of-time. If so, to preserve the metrics invariance through scale, estimated distances to deep galaxies may be corrected by replacing the FLRW metrics by another logarithmic based, according to now a days observations in supernovae Ia range up to $0.2 < Z < 2$, predicting how much further over brightness adjustment might be. Universe may seems to accelerate its expansion because the assumptions, not because the Ghost Energy and as corollaries either G , c , h , α or H_0 , seems to be from our point of view as observers, logarithmic variable in look-back-time. That means that together with the isotropy in the metric expansion of space-time, it requires a $\times 5,75$ measurement of the mass in CMB, as observed, the near "keplerian" velocity distribution in very ancient galaxies, and a non-dependent on the radius distribution of the velocities of stars and galaxies in our locality, with enough time and appropriate normalization. As corollaries it may explain the weakness of gravity relative to the other forces; the Horizon Problem; simultaneity; baryonic asymmetry; the homogeneity and granularity of the CMB; the extra large size of the galactic black holes; the very fast configuration and the narrow range of dimension of the mass of galaxies and stars; the absence of small G , K , M , L , T , orange and red stars from Population III; the age of quasars; the highest density than expected of stars and heavy metals in the very deep space; the lowest density than expected of brown and black dwarfs; the absence of slow neutron stars; the decreasing change of the critical mass for black holes and its progressive deactivation; that the Universe is younger and older than estimated -according to the observer-; and alternative descriptions to Hyperinflation, Big Bang -it was a long boring and non forceful process-;...GR and QM are deterministic and needs urgently an upgrade to irreversibility.

Facts: entropy is not isotropic; Universe is expanding; everything orbits and rotates; there is much more matter than anti-matter; and reality is mostly not linear. Not too much restrictions to start. The following will be structured in two sub papers. Further details justifying this Bartolo's Conjecture, circumstantial evidences of Lateralization, and development of the conclusions can be found in "Eppur si Muove": www.bartolo.com.es/fisiblog.htm and a contextualization of the questions in a wider frame, in "Todología": www.pi2edicions.com

Keywords: *6D twistor space-time, rotation of the Universe, logarithmic decelerating expansion, hypersphere space-spindle time-spins, over-redshift and over-rotational&virial speed, alternative hypotheses to the Big Bang, Universe rotates, VSL, MOG.*

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GHOST ENERGY?

We will develop the following from the reinterpretation of the Accelerated Expansion of the Universe, based on the measurements of supernovae Ia, with the apriorism of a constant and isotropic metric; from the alternative assumption of Decelerated Expansion -so that matter and energy will add 0-, and compare it with several non-linear metrics that may make the measured values compatible. With this alternative approach the result is a logarithmic scale, which can also afford temporary covariance -and though the energy conservation-, but requires anisotropy that is not observed in space... unless an additional space-time dimension is conceived. Then, if we assume a metric that does not need dark energy and preserve the classic first principle of thermodynamics, the logarithmic metric with isotropic space, implies a multiple rotational time coordinates. Neither GR nor QM are compatible but they both are deterministic, and this is enough to ensure that at some scale, they are false. If $c dt$ changes by $dt/\ln(t)$, then GR evolves in confluence with the non-linear and irreversibility paradigm.

Modern stochastic-chaotic-dissipative paradigm contemplates linearity as an exception, and the GR or QM have not been adapted to upgrade them to norm: neither to non-equilibrium, nor to irreversibility, nor to non-ergodicity. By Lyapounov, space and time do not have pair evolution; while by Poincaré, the recurrence may be in conservative systems. Birkhoff summarized it: only in linear relations, space and time comply with ergodic property. The evolution of complex systems in space, is exponential in time and what for Relativity is a minus sign, for non-linearity is an exponential relationship. Adding a second temporal coordinate, incorporates non-linearity into the GR and transforms the light cones into hyperboloids of revolution, and following this path, through singularities, chaos, stochastic and irreversibility. To suppose that a divine observer would understand the temporal dimensions of different nature as spatial dimensions by their properties of symmetry, is a hypothesis as valid as the opposite, which has the disadvantage of not being able to play the dice.

Adding spatial dimensionality doesn't change the symmetry group or the flatness, but adding a single temporal dimension changes the properties of curvature -and though of gravity- in the very beginning and the future as changes the path of the proper time (even the constancy of Λ). Space and time are both coordinates, and while they have different sign on flat, GR doesn't know anything about the irreversibility of the arrow: GR needs to play dice. They are more different indeed: we ride into space but on top of time. Space is the landscape and time the horse. The hypothesis brings a way to solve the Cauchy problem in a 4D deterministic space-time [62]. Odds are apparently against: [61].

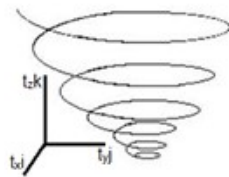
Campbell's Theorem states that any analytical solution of the Einstein field equations in N dimensions can be locally embedded in a Ricci-flat manifold in $(N+1)$ dimensions. A circumference of two-spatial and one-time dimensions $(2+1)$, spins around a point. A sphere turns around a one-dimensional axis. A 5-dimensional hypersphere rotates over a symmetric three-dimensional space, presented as a dual space manifold or in a space-time of 6 dimensions. If the hypersphere expands and spins, dimensions might grow in logarithm rate to preserve the

invariance to scale and to describe the different nature of the axis and hypersphere, we'll call the non-isotropic dimensions different because their symmetry properties: time.

The number of arbitrary constants sizes the distance of a model to the fundamental reality. If the universe has a conservative non-zero momentum, a model considering this Λ as constant, would not be fundamental. If time is another coordinate like space, expands as any other spatial dimension and spins, there might be more non-isotropic dimensions than a single one and nor the speed of light and the gravitational constant,... and hardly no constant, are arbitrary, but only their relations in units changing in each moment of time. G and c remain constant in every observation, for every observer, in every time, in all space -“soft cosmological principle”-, but an observer measuring them in other epoch will use his clock, not the clock he would use at that time. The isotropy will be in space and the anisotropy in time, but maybe some lateralization clues, beyond the arrow of time, would be identified [23] [24] [25] [26] [54] [55].

GR equations do not show any preference for any particular shape, scale or metrics. A universe in which everything, including elementary particles, is twice as large (or small) as in our universe and in which the duration of a second is twice (or half) as long, would be completely equivalent to our universe. If the expansion is linear or logarithmic, the metrics would be different, but laws of physics would be the same. [42] If the Universe twists around a 3D-space axis (with the remaining inertia Λ -conserves the momentum-, after the particle generation, η), the three-dimensional space axis expands isotropically with an also expanding revolution time-surface related both to the spin, where the radius represents one dimension of time $-t_r-$: *Figure 1*. For an outsider observer any distance and any time grows on a logarithmic scale and dimensions do not have the same real or imaginary nature than a human insider observer. Maybe a new perspective about Bergson & Einstein 1922 time conception could fit here (time as itself or proper, as a path on a dimensional time dimensionality) [58].

Figure 1



$$(t_x, t_y, t_z, t_{au}, t_{e})$$

Lanczos 1924 [59], Gamow 1946 [32] or Gödel 1949 [16], ventured a Universe with non-zero momentum, and from time to time, some body tries to rescue the hypothesis [45] [46] [47] [48] [49] [50] [51] [52]. If we could measure the tangential speed of the temporal spiral $-t_a-$ from our inertial reference, it would be as a stone at the end of a "temporary sling" growing 3D space in proportional volume to the cube of the radial time (t_r) increase. Expansion would be related to the down speed of radial time, t_r' , apparently against our experience which feels time as constant and measures an accelerating growth. An outsider observer may "see" it that way, but the human

sizing would be determined by its limitation in the embedding dimensional perception, that makes the clock seem to have constant speed.

For Abbot's Flatland citizens embedded in our reality, if their time could be represented as our third space dimension, we would see all their time as a dimension and we should maybe seem to be for them Chiral Gods. They would describe us as our own projections on their space. A drawing of a right hand can be switched for the left hand -reflection- only with in a lower group of transformations -rotation- if we access to extra dimensional spaces. So, one extradimension repairs one symmetry, and their asymmetric time would be for us their destiny seen as a hole. Any broken symmetry can be restored from the point of view of an "growing block" observer living in more dimensions and with no esoteric purposes. A Chiral God would improve invariance from a complete Hilbert space-time with one or more dimensions, and tensor-geometrical description in a manifold is only a transport of the references from the n D to the $(N-1)$ D hypersurface with $N-1$ free degrees. So asymmetries that configure our reality can be restored to the Nothing, considering more dimensions, which may not be folded up in our reality, but projected. Recovering J.L. Borges poetry -"God moves the player and the player plays the chess,/ which God behind which God began the game?"-, we'll qualify this hypothetic outsiders as chiral and ergodic divinities and ourselves as mortal enantiomers.

GR is preserved with a soft principle of constant c : while c remains as a constant relation, not necessarily as an absolute value. Divine observer would measure the variability of speed of causality and mortal observer would size the expansion, both exegeses because their own references, but they would not agree about which one is constant. For a divine observer all 6 would be orthogonal dimensions, but from the human point of view inside the manifold shape of the space-time, the perspective is limited in representation 3 perpendicular contravariants referring to a fourth frame -time- taken as constant, distinguished from the others because it only happens in a non-commutative sense, but it's a summary of 3 time covectors (time is an obvious anisotropy of space-time).

For an outsider observer, in this simulation, classical mechanics applies to what we call surface of temporal dimensions deemed for description purposes as spatial euclidean dimensions, some of them symmetric and some anti-symmetric, (as a simplification we model a cylinder rotating and expanding). As we measure identical expansion in all dimensions of the axis -distance/time-, we do not need more than one space dimension to emulate mathematically the divine observer perspective in his conceptual reference to our space. A single space-dual time diagram model of a single real dimension -isotropic spindle- and two imaginary dimensions -temporal surface- all transformed into real, and all referred to a time frame.

$$ds^2 = -cdt^2 - dt_a^2 + dx^2 + dy^2 + dz^2 \equiv -\phi d\tau^2 + dx^2 \quad (1.1)$$

In other words, to simplify the simulacrum 2 symmetric-spatial dimensions will be replaced by 2 anti-symmetric-temporal dimensions, with no need of the complexity of far beyond twistor

algebras (3,3) or (4,4) if we consider also scale and Λ , as dimensions [01]. This closed and axisimétrical model (isotropic for a resident in 1D spindle-space), describes a universe that emulates ours as a resident observer would assume if he lives in 6D.

In this spacetime diagram simulation, time perceived by the mortal observer as constant, is the spiral path of time: the vector addition of temporary increases,

$$dt_r + dt_a = (t_r + t'_r)(\text{sen}\omega + \text{cos}\omega). \quad (1.2)$$

To the mortal enantiomeric observer resident in that single spatial dimension, t' -the rate of progression of time- would be constant, but not for the outsider. In the beginning, the difference was important, but it happens that hundreds of billions of years later, $\text{sen}\omega$ long ago is negligible in relation to $\text{cos}\omega$, and for both observers $t' = t_r$.

Different masses, like different t'_a , generates different never-crossing spiral paths, and no mass will have as its path just the radius itself. As the interpretation for rotation is spatial, Hawking 1969: “These models could well be a reasonable description of the universe that we observe, however observational data are compatible only with a very low rate of rotation” [46]. But is not if the time spins, not the space.

The incorporation of Hyperinflation and Dark Energy to the models to fit the observations results a Hubble “roller coaster” function, -Hubble Flux, $H_0(t)$ -, with bizarre loops, accelerations, decelerations, to avoid resignation of the Conservation of Energy Law -inflatons?-. If the Universe as a whole in its rotation preserves the angular momentum (Λ , Cosmological Constant), it would be a very fundamental configuration parameter of reality. Taking the classic descriptive rotational deterministic model, the areal velocity may be kept:

$$\pi\omega r^2 = \Lambda, \quad (1.3)$$

and the tangential speed of time would be

$$t'_a = \omega t_r = \sqrt{(Gm^2/8t_r^3)}. \quad (1.4)$$

To preserve momentum, the angular time speed of growth decreases faster than the growth of t_r ; and the ratio between the derivatives of both time dimensions is not constant. Therefore, at least a divine observer, in any way won't conceptualize this rotating speed, -perceived time-, as constant. In the Beginning it would be very obvious for any observer, but now even Him/Her should be very accurate in assessing the decline, and we can compromise that $t' = t_r$ in current universal scale,... but not at the first moments of time, near the Big Bang. From a divine outsider observer measuring the expansion in a n-dimensional euclidean geometry and angular time would decrease faster than the radial expansion. As the ice dancer extends his arms, -Figure 2-,

from the audience perspective, rotates more slowly than he "expands" the length of his arms. Assuming Λ & m as constants, the angular velocity

$$\omega \propto \sqrt{G/t_r^3}; \quad (1.5)$$

and the total amount of gravity would be time-dependent and may be constant only in the space dimensions:

$$G = (8\Lambda^2/\pi^2 m^2)/t_r \quad (1.6)$$

Figure 2



$G \propto 1/t_r!$

From an unimaginable divine existence in 6 or 8 dimensions (quaternions + Λ & h ?) [28], all of them are perpendicular, but some are symmetrical -axis- and other -rotating- are not, depending if they are spinning or not. From another limited perspective, if we conceptualize this model as a single dimension space which the finger imaginatively draws in the air -curvature $\Omega_k = 1/t_r$ -, it'll expand, but more slowly. The growth of the one-dimensional simulated space, with a single degree of freedom: up or down-, would be the maximum for any movement of an impossible inhabitant living in this "needle on the vinyl record" (analogy to explain that asymmetrical time dimensions twist rigidly in a path depending of the mass) because in case of being overtaken the ant could jump forward to the expansion itself. In a dynamic system paths can't cross out the attraction of "fixed point", and that limitation holds the causality maximum speed: c .

The ant in the dancer finger (resident in the axis+spiral time), which also gets weight while the dancer extends his arm (perceiving the time and the strength from a one-dimensional space), can't go further than the finger and can't spin faster, but has its legs inevitably attached to the end of the nail and only investing energy he could break against the centrifugal acceleration and walk to the center, drawing a different spiral path

$$t_r'' = 2\omega^3 t_r, \quad (1.7)$$

which is obviously the same as saying that

$$t_r'' = t_a'^2/t_r \text{ or } t_r'' = 2\Lambda^2/\pi^2 t_r^3. \quad (1.8)$$

For a divine observer either space and time expands alike in its three coordinates, allowing mathematically replace and integrate in reference to radial time, and for the divine observer the speed of expansion will be $\alpha l / t_r^2$. In our role of divinity for the ant at the end of the finger of a dancer, Expansion has proportional growth to the radial space-time

$$2 \times \pi x t' (2\pi r') \quad (1.9)$$

locally, but for an observer resident in the one-dimensional space. For us a unit of time is always the same unit of time, i.e., the dancer turns spinning down for the public sitting in the stands of Olympus. The ant in his nail rides on t_r , and imposes its reference measuring constant H_0 , to what divine observer consider only as relations between spatial dimensions units relative to units of temporal dimensions, c . This makes mortal observer perspective "see" movement with the assumption that time is linear (as watching the landscape moving from inside a train) $\alpha l / t_r$, and clears out from the equation

$$\tau H_{0tr} = 4c\Lambda^2. \quad (1.10)$$

The relation between time of the observers keeps a transformation and c must decrease $\alpha l / t_r$, from the point of view of an observer that has a different clock. But, from the outsider observer point of view, if c is constant, $H_0 \alpha l / t_r$!

In this model any particle with mass is time-dimensional: since its creation has a past and though is not a point but a temporary spiral path. So analogous a photon would be a perpendicular dimensional particle in space, not in time: simultaneous in each sincronized manifold, with no past and no future. Two space like points in the hypersurface of the present are each outside of the light-cone of the other, so each one has access only to the past of the other: to preserve causality, a simultaneous photon broadcast may not be seen by the other. If we "see" a photon is because our cone intersects with another cone in a hole trazoid manifold and cross to the time like zone. (Figure 3). Not near of a hudge mass, cones grows parallel and as time goes on, the points in space-time tends to be not linear but hyperbolically related in causality between them. So, the causality relation draws a null hypersurface between simultaneous coordinates.

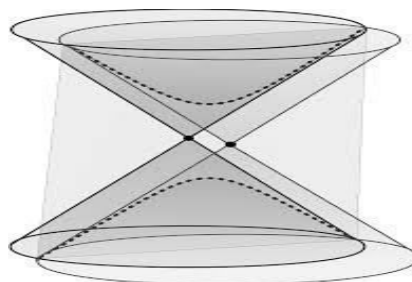


Figure 3

A photon dilutes linearly with Expansion, and the speed of causality $-c-$ would be the expansion from our point of view (the speed of the landscape from the perspective of the traveler). The

speed of light for a divine observer, would be only the expansion ratio between space and time units, that is, adjusting the system measures a matter of scale (1sg always equivalent to $4,775 \cdot 10^9$ m to the outsider observer). Why there should be a "speed of light" if it's only a convention of units of measurement? It's just a way to express our perception of expansion from the perspective of an observer measuring from inside the Universe with a clock that measures a non-constant time.

$$G, T, P, c, \alpha \propto 1/t_r!$$

Time is a length derivative for a photon and its emission would be simultaneous to observation, but both paths, photon and mass-observer, have not the same invariance axis. The point of emission of a photon follows a temporal spiral path increasing both temporal and angular time, but the space where the photon expands follows only temporal time. In the next instant other spinning paths -stories- will intersect with expanding paths -movements-, but would never meet again. The divine observer "sees" a spatial dimension that expands homogeneously and only conceives the speed of time expansion. For the mortal enantiomeric observer who does not "see" that space and time are expanding together with him inside, the speed of Causality is the increase of radial distance in time, rather than the expansion rate.

Acceleration could be as well represented as a temporary vector. If we measure the space in terms of our clock, it would be as if the ant moves to a temporary lower pitch spiral, where finds a past field and share the reality with other ants which remained at rest to us some time ago (being reality the full path since the beginning of time to now, and therefore radially remembered). Our apparent c , inversely proportional to radial time, mathematically re-integrating, results a model with logarithmic scale factor:

$$a(t) = \ln(t_r). \quad (1.11)$$

That is, as it was said by Teller 1949 [34], from the equations of a rotating system, the space-time expands at logarithmic scale.

If we change the metric considering the time as a variable according to $a(t)$, so that the speed of causality is constant from the perspective of a divine observer, our measure of c can't be constant, and we would measure the distance to an object in light years variables regarding this scale factor (each megaparsec -cosmological correction-, but also every second would be smaller in look-back-time, retaining the ratio, while older). We measure distances calibrated on the brightness according to the parameters of Cepheid in six galaxies, applying to larger scales what it works in our galactic environment, assuming the metric in which the time -and thus the speed of light with "mortal" references- remains constant. If the Universe preserves a non-zero angular momentum, to be spatial-isotropic but temporal-anisotropic, while angular time remains negligible to radial time, a logarithmic metric would be finest than a Friedmann metric.

In the absence of a reference step that affirms or denies, beyond the local super cluster of galaxies, a distance expressed in current light-years admit the vagary of increase with the average speed of light ϕ , corrected by the scaling factor, as we would have considered the cosmological expansion, but not temporary expansion. Expressed in relation to our present time $t_{r0}=1$, taking it as a unit:

$$D_c = D_L \ln(1/t_r)/(1-t_r) = D_L \phi. \quad (1.12)$$

D_c, proper distance corrected.

D_L, proper distance estimated under the assumption of constant time.

ϕ, average of c over the logarithmic scale

Standard candles supernovae Ia distances estimation, may include other variables like metallicity -more luminosity with less heavy particles, that may be more common the more further they are-; and needs a better knowledge of the processes. According metrics normally in use the $Z=1$, is given in $t_{r0}/2$, but according to a metric in which the time is also affected by the scale factor, radial time would be transported to an axis as

$$\ln(t_r) = 1/(Z+1), \quad (1.13)$$

and would also apply the above D_c correction, plus a correction of the time scale transporting an axis with a linear scale -cdt- by

$$t_r = e^{1/Z+1} / e = e^{-Z/Z+1}. \quad (1.14)$$

According to this metrics the speed of light at every moment of the past seems inversely proportional to the time, because it's referenced to constant time, but still remains constant for a divine observer, as the relation between t_r and D_c : 2π is constant.

If the assumptions were correct and model fits with the choice of what is relevant, regardless of the values of Λ , m , c and H_0 , we should be measuring a redshift corresponding to the difference between D_c in each metric with its cosmological correction of its proper distance dependent on the above parameters. The question is: regarding what model applies the correction? Linear, de Sitter, Λ CDM, Benchmark,...?

It happens that when calculating the distance correction

$$\int_z^0 c dt/a(t) \text{ for } c=1/t_r \text{ and } a(t)=e^{1/1+Z}, \quad (1.15)$$

is identical result in the model of linear expansion, ($m=0$, $\Lambda=0$, with c constant and $a(t)=t/t_0$) and the logarithmic simulation; i.e., in both cases proportional to $\ln(1+Z)$. So if we compare them both, *Table1*, we can save mathematical rhyme and verse and ignore at purposes of apportioning

the cosmological correction. By the way, we can save relativistic corrections because the comparison of measurement criteria has nothing to do with distance themselves in absolute terms, or the use recessional velocities.

Table 1
Over redshift

Z	0,5	1	2	3	5	10
t lineal	0,67	0,5	0,33	0,25	0,17	0,09
DL	1,21	1,39	1,65	1,85	2,13	2,64
t log	0,71	0,61	0,51	0,47	0,43	0,4
Dc	1,18	1,27	1,37	1,42	1,48	1,53
% over	3	12	28	43	71	112

To reach those conclusions, we have not needed any parameters or any universal constant! Below $Z=0.2$, in the few billions of light-years closer, but beyond the reach of the methods of direct estimation of distances, the difference is less than 1%, so the metric models FLWR would gain an application limit, being optimistic about the ability of future predictable astronomical techniques, $Z<0.2$.

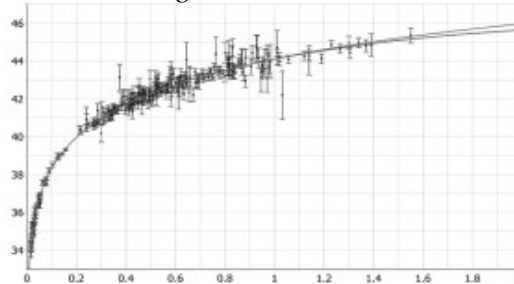
“%overZ” means the extra-redshift, i.e. we'll overestimate in 12% the distance at $Z=1$ vs a linear no-matter model. Any other Z may have to be correct with a precise ratio.

Up to here, we have assumed that Λ is a fundamental constant and precisely that invariance fixes a limit in the application of the logarithmic scale, and may not happen when ω begin unless negligible compared to t_r . Then we could speculate a reformulation of a more complex metric in the same time dimensional basis, wherein the reference time considers ω . Mikowski space-time will increase dimensions and split dt in dt_r & dt_a , then c would not be constant for all observers, even for divine, and other constants are treated as what they are: variables. The implications of non-conservative magnitude would be deep: Noether asymmetry. From Sato 1990 [39] to Kochanek 1996 [53] and Belinchón 2014 [35], some $\Lambda(t)$ variable anisotropic models has been proposed as maths jokes, meaning also α , c o G . In any case, the logarithmic scale has not much observational sense above $Z=11.1$ [09], unless maybe could apply until $Z> 1,089$, although to guess and follow a dark path until another better model.

Following the example of $Z=1$, what we believe according to Friedmann-Lemâitre metrics it happened in $0,5t_r$ (without cosmological correction), it was less time ago according to the way

we measure it now: $0,61t_r$ (also without correction of D_c). When we measure the brightness of supernovae Ia $0,5t_r$, they seem to be further than we expect because in fact they are further away than where they might be. It can't balance because the metric used as implicit assumption applies a bias. In $0,5t_r$, we assume from the equations above the distance is 1.27 times estimated when it is 1.39 times, up 12%. In both cases it was considered c constant from our perspective: elongating the wavelength, but not the time in which it happens; and having no direct references we can't know but in relative terms, how distant supernovae are in each Z , or its youth, but about what we assume on them.

Figure 4



Amanullah's 2010 Compilation [02]

While W-Virginis were not identified, the Universe was much younger than the Earth itself, and it is a good starting point to think about the supernovae Ia critical mass is well known even at high Z 's, but maybe that means digging in our heels. Up to $Z=2$ (max. 1,914) this simulation is consistent with measurements from Perlmutter, Riess, Schmidt, which has been used to predict an accelerated expansion, as the metric has been taken for granted -Figure 4-. The current mainstream explanation of the paradox of the bizarre behavior of the expansion brings us to a bigger and darker problem than the one that is trying to solve: the "fifth-column" Constant Λ , or the Quintessence scalar field $\Lambda(t)$. Perhaps the convergence of the results is a fluke, perhaps a Confirmation Bias, but can also be considered an argument for upgrading the Conjecture of an spinning universe to Hypotheses -since has been deduced from an isotropic Universe with non-0 Angular Momentum-, and maybe in the future, with better tools like DES, it will refine and measuring older Z 's, eventually confirm or reject this drill.

It means not only that the expansion is decelerating, but also that Transparency corresponding to $Z=1089$ would be in a younger age of the universe expressed in current seconds although a larger distance, which means nothing because the units of space and time are conditioned by our observation criteria. From the perspective of an outsider observer with metric in which the time jointly expands as the space, look back time tends to infinity

$$(Z+1) (\ln (Z+1)-1) \quad (1.16)$$

and time of the first phase of the expansion was immeasurably large (although sized in very tiny units). It has probably taken longer to reach from the Beginning to Decoupling, -in this

diminishing space-time metric referring to our time units- that from that Era to us (in a clock running from there to now). Then h is also variable as the scale factor:

$$\alpha \ln(t_r). \quad (1.17)$$

From our metric we interpret as explosive a process that a divine observer or an observer who lived in those first seconds and years of life of the Universe, would understand as a very peaceful and progressive development, and would not have any sense to set out a Problem of Isotropy or Hyperinflation, because there is no Problem to fix. Calling the process Big Bang is just a bias in the criteria of the observer: it seems explosive to us because we compress in our clock that huge time... as we show an entire dramatic series concentrated in a split of a second... we would not understand the history and all would seem dizzying to us. According to our patterns the Universe would be 37% younger and 58% larger, taking as reference the age that we date today: 13,720 billion years (the radius with the Guth 1981 Hypothesis would be $\times 3$ [15]). Nothing burst and we are not only slowing, but almost stopping!

So, while the very long decoupling era ± 115.000 our-years-, an observer from then had time to extend the poly-tropic star model to the hole Universe it self. He could model an adiabatic expansion of a ionized and degenerated plasma with high specific heat in thousand degrees magnitude, as it might be just beyond CMB. We would expect to identify some kind of pattern similar to the surface of the Sun: convective bubbles in the transition phase from convection to conduction in transparency, and explain the slight inhomogeneity and its rotational nature. We know the size of central galactic singularities can't be explained by the same process of massive stars collapse, because the Eddington limit, unless then that limit was then 3 to 5 times larger... as it's obvious from this hypothesis perspective. Then the galaxies birth from the inhomogeneity of a convection surface would be easy and natural, with stars not hundreds but millions times more massive. The same reason would explain the why the IMF modeling doesn't apply to the early youth and we are not able to find any orange, red or brown Population III small stars with clean spectrum.

EXOTIC MATTER?

The overlap between predictions of the Bariogenesis and calculations by the resonant analysis of the cosmic background radiation, estimations by virial theorem, by rotational speeds in super clusters and galaxies, by X-rays pressure gradients in hydrostatic equilibrium of hot gas, by spectrography of rotational gas in superclusters, by computer simulation of the rate of formation of structures (Sachs&Wolfe), soft&strong gravitational lensing, by Siuyaez&Zeldovich Effect in the CMB, Boomerang project [... provides consistency to the hypothesis of dark matter, but can a hypothesis be called theory containing the word "dark"? Maybe we may think otherwise: change the paradigm, as we bury the geocentrism, heliocentrism, the estate of rest, the linear motion, determinism,... and also bury anthropocentric, mathematical totalitarian, fine adjustment, conservation information principles,... The best argument for darkness is do not find a better explanation.

Dark Matter includes cold and relativistic baryon components (intergalactic gas, gaseous filaments, neutrinos, planets, planetoids and belts, brown dwarfs, black dwarfs, neutron stars, "strange" stars, black holes, halo, hydrogen, water,...) which existence is observable and extensible by the Cosmological Principle, where we do not observe them (OGLE & MACHO surveys). Although is difficult to "weigh" and if so, with a significant margin of error, even in the best estimation, baryonic matter is not enough to explain the measurements obtained. Mainstream solves the "dark matter problem" with a more complex hypothesis that the question: implicit assumption that if the measurement is correct, there must be exotic matter that interacts only gravitationally. Another alternative option would be that the implicit Friedmann Metric of constant time, distorts measurements, and will be the approach here...

We do not know how much mass contains the black holes of Population III, we did not even know the existence of dwarf galaxies like Segue1, with apparently 3400 times more invisible matter than visible. What part of dark matter is unknown matter for the resolution of our devices? What incredible things will we find when we watch the Universe with neutrinos or gravitational waves telescopes? Extrapolating the models to the early Universe, there should be more massive and far-flung protoplanetary belts and halos than we assume in our solar system, more black dwarfs, many more brown dwarfs (IMF), much many more slow neutron stars, and who knows if much many, many, many more black holes (because the massive gap between the center of the galaxies and binary systems and because the unnova silent decay modeling).

No margin for exotic matter remain in Nucleogenesis. The question is not whether or not dark matter exists, but what's the nature of the exotic matter, whether it is cold or relativistic, and which is its distribution and how decays on time. On one side, baryonic matter may spread out (neutrinos, gas, ...), but in any case also with higher density as close it is to the center (black holes, brown and black dwarfs, orphans exoplanets, neutral hydrogen,...). Dark matter hypotheses leads to bizarre distribution of exotic matter: "profile NPW" [03] or other non-singular isotherm distribution. La Silla Observatory, has mapped the orbits of more than 400 stars in a volume four times greater up to now in more than 13,000 light years from the Sun. "The amount of mass fits

well with what we see -stars, dust and gas-. This leaves a narrow room for extra matter -dark matter- that we expected find. Our calculations show that should have been clearly seen in our measurements, but simply, it wasn't there!", says the team leader Bidin et al. 2014 [27].

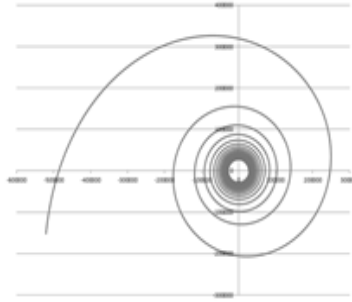
There are clear evidences of galactic halos. Observing Bullet clusters collision occurred 150 million years ago [04], dark matter would be associated with normal matter and not with gas, and measuring the deflection by gravitational lensing, halo is left behind after rubbing, which limits to the inner visible galaxy the presence of dark matter. Other measurements such as MACS J0025.4-1222 reconfirm the effect [05], although estimates its gravitational collapse limit their mass, and it's not enough to explain gravity effects. If massive halos would be really associated with faster rotational discs, therefore with brighter galaxies, we may expect a correlation between the speed of a satellite galaxy to the main galaxy and its disk rotation speed.

The dwarf galaxies Fornax and Sculptor, describes a uniform distribution of dark matter. Nor gaseous filaments justify the peculiar distribution needed to explain dark matter (in 2008, AEE, XMM-Newton telescope) [11]. With our sizing hardware most part of Dark Matter seems to be exotic and bizarre... but more than this: strange. In every new approach we find new hidden mass: the very old Segue1 does not have 5 or 6 times more dark than visible matter, but x3.400 [60]. It seems that the most of the stars are older out of the main sequence, the more dark matter referred in older galaxies.

We start from the prejudice of seeing galaxies as gravitationally consistent systems, not aware about intergalactic expansion. The problem of rotational or virial speeds ceases to exist as such, accepting stars and galaxies are in fact escaping from their gravitational systems at lower speeds than recessional -*Figure 4*-, following a hyperbolic, logarithmic, golden or other runaway spiral path pattern, still remaining tens, hundreds, or thousands of galactic orbits, before dispersion is evident in some tail as a comet.

According to constant-time metrics, since the formation of the very first galaxies the Sun has completed about 50 orbits to the Milky Way -70 or 80 in logarithmic metric-, so maybe it's not that the rotational speeds require dark matter for justify why stars remain in galaxies, but are simply escaping in elliptical orbits. Something holds but not kidnap them, and there is not enough time to scatter through intergalactic space, which expands faster together than dispersed locally. This would implies that the recessional velocity measures apparent expansion speed, which is unlike what intergalactic space-time relative to intragalactic expands, resulting in a younger universe than estimated, which may be consistent with the previous argument that estimates 1/3 less age.

Figure 5



I. Azcorra proposes a model in which tangential velocity of rotation adds to H_0 expansion. Accepting that the galaxy is fading, he estimates that the Sun will remain "only" 20,000 million years of being in the Milky Way, which far exceeds their life expectancy and is more than the "official" age of the universe up to now. [19].

Mainstream means that galaxies are gravitationally bounded systems: do not change their volume with expansion. Is a cluster a gravitationally bounded system? and so is a super cluster?... even wider filamentary structures and walls, with no graduality? The theoretical effect of expansion in the Sun-Earth system is 44 orders of magnitude smaller than the internal system gravitational forces. Applied to the solar orbit around the galactic center, the effect is 11 orders of magnitude less than the acceleration due to own gravitational effects of ligation. Even at giant galaxy cluster scales, the effect of the expansion is 7 orders of magnitude smaller than the acceleration due to internal self-gravitation of the cluster itself ... but this is today! If G depends on the inverse of time, the effect of modification of the gravitational ligation should be noted in high Z 's,... and also in the fine estructure.

The "problem of the big numbers" -strange coincidences in the power of 10 in the macro and micro constants- led the terse Dirac 1937 to speculate on the variability of G as the inverse of the time [13] and proposed the LNH, describing its incompatibility with FLRW. He was criticized by Zwicky 1939 [33] and also supported by Chandrasekhar 1939 [31]. Sciama 1953 [38], and later Brans & Dicke 1961 with an scalar-tensor VSL theory [37], developed the conjecture including the Mach Principle. Gamow 1946 first derided, and later call the hypothesis smart [32], and proposed to verify Sommerfeld's constant [48]. The alternative chosen by the Mainstream has been the "teleological principle" or "petitio principii" as usual: rescuing the Boltzmann rectification (which maybe delayed physics some decades), updated with Guth 1981 [15] and reformulating hypothesis following the geocentrism and denying de Natural Selection or the Coase Theorem about scarcity: Anthropic Principle. We want to feel special.

Why gravity would be related to inverse to the square of the distance –conceptually, a surface- and not to distance -proportional- or volume -cubed-? Newton did not know the value of G , but $G \times M$, and according to this hypothesis, G outstanding decreases linearly, but may only be measurable from $Z > 0.2$. Inevitable but consciously influenced by the narrative confirmation bias, considering the metric logarithmic time, gravitational density has been diluted

$$(\alpha l / t r^3 \propto (Z+1)^3) \text{ "pari passu" to the photon density } (\alpha T^3). \quad (2.1)$$

Considering these factors, is not in super symmetric particles, right-handed antineutrinos, axions or WIMP's, where we find the explanation about exotic matter. In look-back-time, the apparent gravity would be

$$\alpha G / t r^3, G(Z+1)^{1/3} = (Z+1)^{1/4} \quad (2.2)$$

higher than its projection to our time, that means 5,746 times more from the Detachment to today, coinciding with the proportion of exotic matter calculated with the resonant CDM model.

If so, galaxies should be larger and increasingly less dense in relation $\propto (Z+1)^{1/3}$, because intragalactic expansion is maybe less but anyway expanding like intergalactic space-time itself, and because in fact they are in runaway spirals. On a sample in $Z \sim 4$, Ferguson 2003 notes that galaxies were smaller, irregular and more massive than our days. In the same way, comparing large galaxies in SDSS, between $Z=0.2$ and $Z=1$, those with more than 1.5 kpc radius multiplied by 500 [43]. Sizing galaxies with dispersion speeds $-\sigma$, Osiris have found 6 times higher densities than current average (slightly less than expectable $(Z+1)^3$), in four elliptical galaxies in $Z \sim 1$, half of size ("a bit larger" than expected $Z+1$) and only an increase of 1.8σ (slightly less than $Z+1$ expectable, if the space intragalactic expands similar to intergalactic) [44]. GN-Z11 is 25 times smaller with a 1% of the stellar mass of our Milky Way.

Brightness is more or less on the fourth power of maximum speed (Tully-Fisher) or stellar velocity dispersion (Faber- Jackson): "grosso modo" its squared mass. With the I band specter, we can estimate distance (we have already analyzed its bias) and weight. The mass calculated by the virial theorem depends on the radius of the cluster, the square of the velocity dispersion and inversely to G , but we have seen that both G and radius are linearly dependent to radial time. As their dependence is canceled one against the other, it would be proportional to $\Delta \sigma^2$, which for the above example $Z=1$, means a mass of 3.24 times over-estimated. In any case virial weighing of galaxies should include a further decrease $(Z+1)^{1/3}$ of baryon/exotic ratio, which reaches to 4:1.

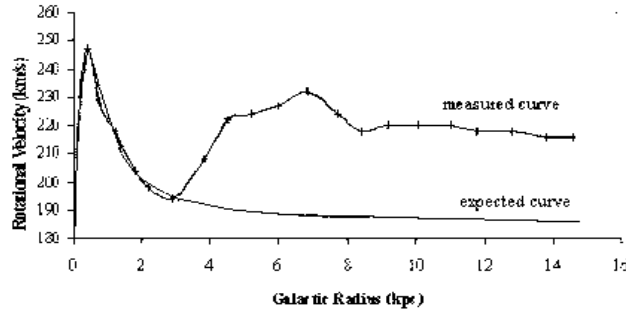
Distribution of stellar rotational speed in the Milky Way, is observed as expected p^2/r^3 by the keplerian laws up to 10,000 light-years -on the same order of magnitude as its thickness-, Figure 6, while mass distributed further than 20% of its radius is "running away", followed for an increase according to the expected for a spiral orbit escape, but it still remains 2/3 radius with approximately constant rotational speeds, when according to the classical model should be decreasing ... if we did not consider the Expansion! In a deep galaxy far away, rotational speed $-v_t-$ won't be proportional to $1/\sqrt{r}$ but

$$v_t \propto l / \sqrt{(rc/\phi)}, \quad (2.3)$$

which makes them dependent on the distance of the galaxy -further- and the reference radius for measuring -smaller-. Four articles in 2017 based on the European telescope in Chile -ESO- point to fit in more "Keplerian" velocity curves in distant galaxies, [63], just as it is expected to be

following the present hypothesis, and it is waiting to expand data with the VLT and JWST telescopes.

Figure 6



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A unit of length taken by an observer with straightedge billions of years ago, was shorter if we measure according to the straightedge of our clock, but it was "the same" for the rules of physics then, if we transport then our space-time metric. Although most of the mass of the galaxy is in spiral orbit not enough to be retained by gravity, while the expansion exceeds "the runaway spiral", the distance of the peripheral mass grows but less, than the grew of the length-unit taken as a standard at every moment of the life of the Universe.

If so, the rotational speeds should be kept by expanding space-time as they were billions years ago, being the distribution according to Kepler's third law a brake, but may not be the model. We assume centripetal force $F_g = GMm/r^2$ must be balanced with the centrifugal "force"

$$F_c = 2mr\dot{\omega}^2 = 2mv_t^2/r, \quad (2.4)$$

and then we define the Kepler's rotational speeds expected. What if the measure did not apply constant time metrics? r could not be canceled on both sides of the equation at different times in history, $r_c \neq r_g$. "Dark matter had less influence on the early universe. Observations of distant galaxies carried out with the VLT suggest that they were dominated by ordinary matter". (ESO 1709). Rotational speeds distribution would be a fossil record of the maximum speeds, corrected by logarithmic metric

$$r_c/r_g = c_r/c = Z+1. \quad (2.5)$$

which provides graduality and fits with the near "keplerian" velocities distributions in very far away galaxies $-0,6 < Z < 2,6$. [63] Extrapolating in look back time, exotic matter should become more and more exotic. Does baryonic matter decay in exotic matter or is it created?

We could say the same for the virial speed in super clusters. The outline of a galaxy is fuzzy and to adjust r_c to $\ln(t_r)$ on the same axis and system of units, we need a common reference -normalization-: a galactic radius R such as holds horizontal line

$$v_t \propto \sqrt{(1+Z)/R}. \quad (2.6)$$

If intragalactic behaves metrically the same as intergalactic space-time, gravity can't be a brake dependent of the distance between mass, which is only possible if G decreases with distance (in fact decreases with time all over the space the same), closing the argumentative circle. As an example, in $0,61t_r$, when the space-time units were half of our time, the velocity distribution curve of the Milky Way was "keplerian" to 6 kpc (twice than in our time). In other words: an outer star in our galaxy has the same v_t than when it was at 13,000 million light years away, and covers the same amount of space units per unit of time, but both have grown proportionately and in fact it escapes following a spiral path.

If G decreases as so, the Chandrasekhar limit may increase in look-back-time arrow, and with enough time single white dwarfs would decay beyond the electronic exclusion pressure even without feeding, and maybe before their evolution to "diamond" black dwarf. In high Z 's, that adds another correction to the distance estimated by supernovae, because then the critical mass was higher (i.e. $Z=0,5$, x 1,67; $Z=1$, x2,1; or $Z=2$, x2,75); and so was the luminosity, but not its spectrum. In any case, fit the correction because the variability of G , c or h , is beyond the scope of this paper.

The constant $8\pi G/c^4$, -which relates the second derivative of the metric tensor $G^{\mu\nu}$, to the relativistic energy-momentum tensor, $T^{\mu\nu}$ -, would be dependent on the volume of the Universe: as the Universe Expands, less mass is needed for the same effect in curvature. Galaxies configuration around a black hole were built in a size according to the change in the order of magnitude of the Eddington limit: central galaxy mass versus stellar black holes mass may have grown per millions due to the proportionality of the critical mass to the volume, $\propto t^3$, and its multiple stellar origin intercollision and migration, is not a reasonable hypothesis.

History left us its footsteps on distribution: peaks during hunger activity periods of its central black hole (the more outward the more frequent should be, we must appreciate even a tendency to increase v_t with the radius); the more pronounced valleys, the more closer near the center (decelerating expansion $\propto 1/t^2$, gravity may force the curve to the classical $\propto 1/\sqrt{r}$, escaping the rest of stars as the tale of a comet); and for the same reason above, these "fossil peaks" will be lower (it will not split on the radius, but as the movement of a whip), being consistent to those observed without the need of non-baryonic Dark Matter. So, G is comover, not proper.

Parallel groups in Moscow, Otago, Wuppertal and Washington sizes slight approach in G 's, between $-0,1\%$ y el $+0,7\%$. $G'(t_r)$ may decrease if Expansion is decreasing. There has not been evidences with frequencies of atomic clocks or decreases in the rotation speeds of the bodies (although and beyond its "relativity" gravitational interpretation) or orbital decay (LLR, with

mirrors on the Moon); but also alternative scenarios (if the brightness depends on G and radius of $1/G$, temperatures may boil the ocean few hundred years ago, [34]). Jordan 1971 even proposed Relativity modifications [36], but had not impact either. Belinchón 2014 collects different methodologies of rotational transformations, in a Bianchi IX categories frame [35].

Kaluza & Klein related for any extra-dimension the color of light with G :

$$\alpha \sim G/\mathcal{A}^2, \quad (2.7)$$

So, being the Sommerfeld constant $\alpha 1/\epsilon hc$, as $h\alpha 1/t$ and $c\alpha 1/t$, we may either size very small direct variations (depending if h variation is or is not “pari passu” with c), or try to interpret indirect observations. Since then observational astrophysics has tried to verify the hypothesis of the constancy of G through the constancy of fine structure constant, α , -DEEP2 confirms the color of oxygen up to $Z=0,7-0,9$ [40]-. Color modification depends on the electron's charge, e , on the permittivity ϵ , on the Planck constant, h , and on the speed of causality, c , $-\alpha e/\epsilon hc$; if it would not be so, either Cosmological Principle is wrong at large scale, or charges, or h or c , changes with time and expansion. In this hypotheses, h changes with the scale factor $\ln(t_r)=1/(Z+1)$, and c with the inverse of radial time, so

$$\alpha t_r/\ln(t_r) \sim 1-(e^{z/z+1}/(Z+1)). \quad (2.8)$$

The effects of G' in the gravitational dynamics, in stellar behavior, in the light of stars, in the rotation of binary pulsars, or the Hubble constant itself, may be less than 1% variability on color spectrum in the last 1.5 billion years, $Z\sim 0,35$; and in $0,5<Z<1$, so we may be able to observe $7\%<|G'/G|<18\%$, which means less than 10^{-11} or 10^{-12} per year. [61]. Analyzing the Oklo natural reaction, Shlyakhter 1982 [29] supports a change even less than 10^{-17} per year, over the last two billion years. Lamoreaux 1994 found a 4,5 parts in 10^8 , decreasing of α , [41]. J.Webb et al, from 1997 to 2011 edit several papers [14] analyzing the changes of the spectrum of light from distant quasars, through metal clouds, with a so slight effect that it would only be clear to Z 's high $-\Delta 1/100.000-$, in a consistent range with in this Conjecture and with differences depending on the direction, which may indicate laterality.

Einstein 1911: “The principle of the constancy of the speed of light can be kept only when one restricts oneself to space-time regions of constant gravitational potential”. All this sounds familiar to the STM [42] or MOND [07] and its relativistic expansion TeVeS, but much more fits with the MOG [09] or STVG [08] models: assuming G/c as a constant; not by its possibilism, but because both depend analogously on $1/t_r$,

$$1+Z=c_r/c. \quad (2.9)$$

Interaction between mass is not given by its proper distance, which depends on c and $a(t)$, and therefore excluding expansion. Gravitational force at large scale changes to comoving criteria. Relationships between variables that depend alike proportional to time would be constant, T/G ,

$P/T, c/G, c/T, \dots \Lambda/\eta(?) \dots$ because their values are only adjustment of units. If G is inversely proportional to the radial time, rewinding the film looking back in time, gravity was in the same order of magnitude as the other interactions almost a trillionth of a trillionth of what, in terms of our measurement prejudices, was the first second.

This alternative interpretation to the exotic Dark Matter leads us to reconsider the acting distances of "Newtonian" forces as "comovers" and the geometrical measuring depending of c , as "proper" length. From our point of view the gravitational constant weakens with the Expansion, but from the "comoving" point of view, it doesn't. It doesn't matter how much energy will increase the hadron colliders: they will simulate a very partial view about what happened on these temperature ranges in terms of GTU theories, because particles behavior would not be only a matter of temperature, but also depends on the space-time density forces range and the angular speed.

If Dark Energy were the answer, it would be split to the different questions: Initial Hyperinflation, Acceleration of constant or variable Expansion with respect to volume or to time, in its vacuum or scalar versions. $\Lambda'(t)$. How the universe conserves energy? Is the amount of dark energy related to the amount of dark matter? If Dark Matter grows with time, does Dark Energy grows in look back time? Granularity of the CMB draw typical boiling emerging patterns of auto-similar structures of 1° and frequency around 200, compatible with flat curvature and null critical density (as a condition for the energy-matter balance to be null).

From Statistical Mechanics, Dark Matter comes from the incompatibility with the Virial Theorem. From Classical Mechanics, from it comes from the incompatibility with Kepler's Laws. From General Relativity, it is the focus of gravitational lens, but with tremendous variance. From Electromagnetism, it is an interpretation of the harmonic analysis of inhomogeneities in the CMB. From Quantum Mechanics, it is an alternative explanation of the missed mass that for CP asymmetry and arbitrary mass values balance. From the Numerical Calculus, it is the output of the tautological adjustment of the galactic genesis. From Special Relativity, the Dark Energy (Cosmological), comes from the incompatibility with the limit of the rate of causality, c . From Thermodynamics, different versions deals with the compatibility of Increasing Expansion with Energy Conservation Law.

If the Dark Matter is the answer, it would not be neither the same "Dark Matter", with different properties to the different questions: each drill needs its own "matter". To explain the rotational speed in galaxies we need a profile distribution inverse to the baryonic matter, but in a cluster it seems to be associated to baryonic matter. There are different proportions according to the method of weighing used and the object analyzed (they measure three orders of magnitude between $\times 3,5$ as a minimum measurement by gravitational lens and $\times 3.400$ of Segue1) [60]. The oldest galaxies have velocity distributions "keplerians" alike, and means that exotic itself would be of baryonic origin, so we more task: find exotic matter, find the why and how migrates to the halo, while the halo has to decrease its radius to increase its effect, and how it decay the one in the other; in another roller coaster "deus ex machina"[63]. If so, the decay may release energy,

the fragmentation modeling with $4/5$ of dark matter does not fit, and the CMB would not contain that much of darkness from Zeldovich harmonic analysis.

It is not the same Dark Matter to justify masses of galactic holes, stellar mass distributions or B-modes. The distribution, proportion and decay are not compatible to justify masses of galactic holes, distributions of stellar masses, B-Mode and simulations of galactic genesis. We need two or three types of dark energy and even some more dark matter forms, we need non-gravitational migration dynamics to the halo and decays from baryonic to non-baryonic, which are also incompatible with each one arbitrary evolution without an identifiable pattern. They are so dark that darkness does not allow to see anything, like ether, at all. It might be one of the worse theory ever announced. Science never proves the certainty of a hypothesis, but its falsity, and the "darkness" is as "false" and empty as the ether.

We don't need exotic and bizarre distributed matter to balance equations, no ghost forces, not even constants, not anthropocentric principles, beyond the fact that has been so many years without appearing in the detectors, even with restrictions of interacting only with weak WZ particles. Although the rotational speeds are apparently running away, Expansion will always be faster and galaxies will evolve while they get away one from another, decreasing its density and increasing its size until fuzzy star clouds, increasingly distances one from each other, switching off, leaving a tail of stars and dust in its track. Sad and dull destination... or maybe there is another way...

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