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Intention Cosmology: Resolving the discrepancy between direct and inverse cosmic distance ladder through a New Cosmological Model

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ABSTRACT

A new cosmological model is presented, which derives from a new physics within a theory of everything. It introduces, beyond radiation and baryonic matter, a unique and new ingredient, which is the substance of the universe, and which can be assimilated to the cold dark matter of the standard cosmology. The new model, although profoundly different from the ΛCDM model, exhibits the same metric and an almost identical distance scale. So it shares the same chronology and the same theory of nucleosynthesis, but solves the problem of the horizon, the flatness of space and the homogeneity of the distribution of matter in a natural way, without having to resort to an additional theory like that of inflation and without dark energy. Eventually it resolves the tension between the direct and the inverse cosmic distance ladder.

Keywords: Meaning of symbols: $^\diamond$ and $_\blacklozenge$ indicate both a length or an angle or an operator on a path of light; R° and $R_\bullet$ indicate respectively the electrical and the gravitational Radius.

1. INTRODUCTION

The standard Big-Bang model of cosmology provides a successful framework in which to understand the thermal history of our Universe and the growth of cosmic structure, but it is essentially incomplete. It requires very specific initial conditions. It postulates a uniform cosmological background, described by a spatially-flat, homogeneous and isotropic Robertson-Walker (RW) metric, with scale factor R(t). Within this setting, it also requires an initial almost scale-invariant distribution of primordial density perturbations as seen, for example, in the cosmic microwave background (CMB) radiation, on scales far larger than the causal horizon at the time the CMB photons last scattered. To overcome the aforementioned requirements, it is necessary the introduction of the ad hoc hypothesis of inflation. Furthermore, according to the model, only few percent of the density in the Universe is provided by normal baryonic matter. The ΛCDM model requires two additional ad hoc components: a non-baryonic cold dark matter (CDM)and an even more mysterious dark energy, which makes up the rest.

The problem is that the crucial function of theories such as dark matter, dark energy and inflation each in its own way tied to the big bang paradigm is not to describe known empirical phenomena but rather to maintain the mathematical coherence of the framework itself while accounting for discrepant observations.

The model, which is remarkably successful on scales larger than a few Megaparsecs, faces challenges on smaller scales. The most difficult ones are related with the rotation in the inner parts of spiral galaxies. In recent months, new measurements of the Hubble constant, the rate of universal expansion, suggested major differences between two

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independent methods of calculation which have huge implications for the validity of cosmology's current standard model at the extreme scales of the cosmos.

The new model, presented here, which is profoundly different from the standard one, presumes to keep all the successes of the standard model and to solve all its failures in a natural way. It is extremely simple since all its properties derive from a simple geometric scheme. Nevertheless it is extremely difficult since it imposes a complete change of paradigm and concepts.

2. THE INTENTION PHYSICS

The new cosmology originates from a new physics within a Theory of Everything (see Peluso V. 2019) which we will briefly summarize in this section.

We define Intention the unique and universal Interaction between two Individuals which is composed by the cyclical alternation of two moments. In the Consummative moment, as result of a decision, the individual donates/receives a part of self to/from its other, which is its universal. In the Mirroring moment, which is the potentiality period between two Consummative acts, the individual mirrors in itself and is mirrored by its other.

Every individual is characterized by only a radius R (its own Schwarzschild radius $R_\bullet$ and the electrical radius R°, reflex of the gravitational radius of the conjoined other $R^\circ_A = R^{-1}_{\bullet_B}$), which represents all the energy that has and can donate, and that turns in a spin ω, such that $\omega \equiv 1/R$, in a finite three dimensional space that represents all the potency of the relation, whose period depends on the distance between the two conjoined individuals, according to the schema of fig. 5.

The decision, which lies in the live true time, is the only jump from a state to a new state, the only newness that changes the world. Now, since all that exists, it exists in the intention, and the nesting of intentions gives place to new reflective intentions of higher level, the sole principle of intention physics is not limited to the bottom intentions, but it extends to whichever intention to whichever reflective level it could emerge. Indeed, no one only process of our everyday life is not governed by it.

At the foundation there is the relation. There are two kind of relationships: the "Part of" or Communion, among the individuals who are members and the emerging universal individual, and the "peer to peer" or Dialogue, between two individuals child of a same universal. The individuals exist only in the relationship where, in the period of potency, turns into a reference triad at the center of their own finite three-dimensional space, synthesized by a finite quantity, the radius, which represents the unit of measure or the grain that forms the lattice of the real, since what is actualized, emerging from potency and becoming real for an instant, does so only on the edges of the lattice. Time is not a fourth dimension, different and beyond the three spatial, but it is itself also space as space is also time and distance $\equiv$ period. In the relationship each radius is contaminated by the other and each space, though separated by a contingent distance, become the mirror of the other. Mirroring is the only operator of the relationship. Physics is founded on reflection. Mirroring [1] is before reflection and is its foundation. Mirroring is a priori, it is represented by a limited set of mathematical operators. It is therefore the set of mathematical operators at the foundation of physics and of mathematics. Physics is based on mechanism and memory, and both are reflective. Indeed the mechanism is the logic actualization of the laws or principles through reflection, and the principle is the intention mirroring and the logic is the emerging form of its space of potency.

We call Reflection what emerges as a new and higher layer which takes form quantitatively from the huge number of consummative acts below. Reflection flourishes from Consummation and gives place to a new level of reality and so on since the individuals of every new level too relate each other through consummation.

Each individual is in relation with each other individual and the nesting of relations gives place to emergent reflective individuals of higher level. Each individual is part of another individual more complex, in it finds its own place and a role, and so on until the universe, which is itself an individual.

Just as the reflection is opposed to consummation, so the historical time (which is spatial in nature and all present in the photo of an instant) is opposed to the true living time that flows. The physics of intention presupposes consummation, but it is outside it. The consummation in se, that takes place in the living true time, is an existential and is therefore outside the range of physics. Indeed all the datum is in the snapshot of a single instant of an individual (in

[1] electrical radius is the mirror of gravitational radius, each individual -reference triad- is the mirror of the other in the intention scheme (see fig. 5), the internal area ($r < R_{ind}$) is the mirror of the external area ($r > R_{ind}$) (see tab. 1) and consequently weak intearction is te mirror of the Coulomb interaction

the act of receiving or in the act of donating). It contains the totality of the potency of the present and the totality of the memory. We have nothing else but what is given in the present instant. The previous instant and the next instant are not given.

The point of view of classical Physics is that of a generic external observer abstract from any particular intention. Abstract from its natural seat, time must be the time external and common to all possible or real relations and then per se and continuum, and analogously space. They become two separate dimensions of a same reflective spacetime which is not, anymore, an attribute of a particular intention but acquires an artificial identity in self, it becomes the scenario of the independent events.

The point of view of Intention Physics is consummative, that of the relation of a concrete individual with its other, characterized by the cyclical instantaneous exchange of energy, which describes all the past and the future as it appears mirrored in the present instant. Limited to the scope of a concrete intention, all present in an instant, there are not events neither therefore the continuum of the spacetime but only two conjoined individuals and the nesting of exchange of their substances which link them forming a geometrical progression originated from the frequency of intention. The metric is consequently linear, the disentangling of a unique path. The instantaneousness of exchange and the angle between the temporal axes of two conjoined individuals in intention shrinks the world (the potency) in a receiving and a donating side.
The Uncertainty principle springs from the lack of memory in the primitive intentions. Indeed, physics is based on memory. Now memory is reflective. Yet reflection has not place in a primitive intention, not therefore memory.

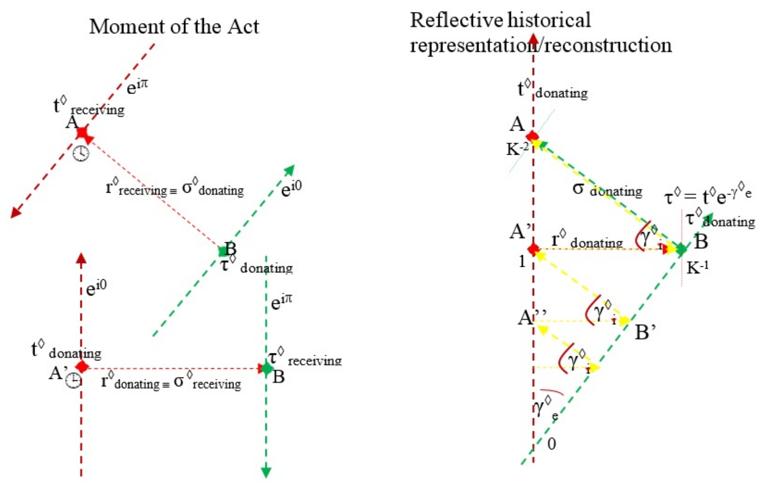


Figure 1. Uncertainty principle: In a measurement, while the measuring instrument A is necessarily classic and therefore reflective, so we know $P^{\diamondsuit} = t^{\diamondsuit}_{A_i} - t^{\diamondsuit}_{A_{i-1}}$, the measured B could be non-classic, therefore we would not know the time $t^{\diamondsuit}_{B_i}$ and therefore we would not know $\cos\gamma^{\diamondsuit} = \frac{t^{\diamondsuit}_{B_i} - t^{\diamondsuit}_{A_{i-1}}}{t^{\diamondsuit}_{A_i} - t^{\diamondsuit}_{B_i}}$.

In the intention, we have the period of potentiality, which is imaginary, and the moment of the act, which is real.
In every moment, the individual is suspended between the previous act and the next in the space of potency. All the nesting of spatial path of the myriads of previous acts is only a reflective reconstruction, which give place to the memory and to the image of present context where mature the decision. In this suspension is the flow of existential time.

$$\Psi(x,t) = Ae^{\frac{i}{\hbar}(px-Et)} = Ae^{i2\pi\left(\frac{x}{\lambda^{\diamondsuit}} - \frac{t}{T^{\diamondsuit}}\right)} \quad \text{where} \quad \lambda = hR^{\circ}/V \quad \text{or} \quad \lambda = hR^{\circ}/v$$

in the physics of intention the speed and the potential are unified [2] $v^{\diamondsuit} = V^{\diamondsuit} = \sin\gamma^{\diamondsuit}$. The only difference is that the potential has a constraint in the radius and therefore varies with the variation of the distance according to the scheme of fig. 5, the speed does not and is therefore constant.

[2] the general relation of the intention scheme, (see fig. 5) is $\frac{R}{r} = \frac{r}{t}$ or $V^{\diamondsuit} = v^{\diamondsuit}$

The donor and the receiver must be synchronized to have same period but opposite phase in the moment of the act. To know position and moment of the other in a given time, we must know the angle γ of the relation which is formed of the time of donating, or of receiving, of both individuals. Yet, in the act, we have never this case but, on the contrary, the receiving side of the one face the parallel and opposite donating side of the other and viceversa.
We can partially reduce this inherent lack of knowledge by putting the measuring individual as reflective but, differently from classical physics, in the quantum physics the measured individual is not reflective and therefore, if we can know its distance, we can't read its time too and therefore we can't know the $\gamma_e^\diamondsuit$ angle of relation. This is the origin of uncertainty principle.In other words, the period of potency (between the act of receiving and the act of donation) of an elementary (electric) individual lasts $\Delta T = R^\circ = (\Delta E)^{-1}$, and this is the discrete unit of measure of the time of the individual. Therefore $\Delta T \Delta E \geq 1$.
In other words, in every instant the receiving side of an individual face the parallel donating side of the other and, therefore, the intention schema, composed from the juxtaposing of homologue sides of the two conjoined individuals, is only a construction for needs of knowledge representation. It is the begin of reflective knowledge which demands the determination of the angle γ of the relation given by the homologue side time of both individuals.

Because the observer and the observed as individuals are mirrors, each one reflects and is reflected by the other recursively.
On the path of light, at every reflection, we have an increment of the scale factor exponent:

$$s_n^\diamondsuit = k s_{n-1}^\diamondsuit$$

From the image present in the snapshot of an instant, it is therefore possible recognize a geometrical progression n ..,., 1, K, K^2 , .,..

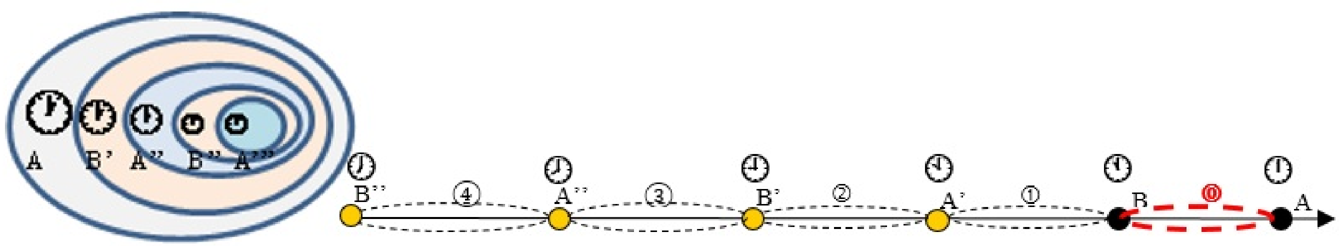


Figure 2. Recursive mirroring: two mirrors facing each other are reflected recursively. If there is a clock on each of them, from the reflected image present in every instant it is possible to reconstruct distances historically and therefore the velocities and accelerations over time, as far as the reflection allows.

Indicating with s_0 the distance now on the spatial axis between A and B we have that:

$$T_a^\diamondsuit = \frac{s_0^\diamondsuit}{1-k} = s_0^\diamondsuit \left(1 + k + k^2 + k^3 + ...\right) = s_0^\diamondsuit + s_1^\diamondsuit + s_2^\diamondsuit + s_3^\diamondsuit + ...$$

Therefore

$$\Delta\lambda^\diamondsuit = T^\diamondsuit - T_{-1}^\diamondsuit \quad \text{and} \quad V^\diamondsuit = \frac{\Delta\lambda^\diamondsuit}{T^\diamondsuit} = \frac{\overline{AB}}{\overline{0A}} = 1 - k$$

Since the act is instantaneous, the speed of light is instantaneous and the intention gives rise to a linear space-time metric characterized by $\sin^\diamondsuit x + \cos^\diamondsuit x = 1$.
It is the geometry of the act where time is spatialized: *time* $\equiv$ *space*. Later we will show also that *space* $\equiv$ *mass*.

In referring to the linear space-time plane, where the linear geometry applies, we will adopt the convention of using the symbols: $^\diamondsuit$ and $_\blacklozenge$ which can be placed indifferently on the operator and on the angle, or only on the operator or only on the angle: $\cos^\diamondsuit \gamma^\diamondsuit \equiv \cos^\diamondsuit \gamma \equiv \cos \gamma^\diamondsuit$.
The relations between quadratic (without $^\diamondsuit$ and $_\blacklozenge$) and linear trigonometric functions are:

$$\begin{bmatrix} \cos\gamma^\diamondsuit = \cos\gamma & \sin\gamma^\diamondsuit = 1 - \cos\gamma^\diamondsuit = 1 - \cos\gamma \\ \cos\gamma_\blacklozenge = 1 - \sin\gamma_\blacklozenge = 1 - \sin\gamma & \sin\gamma_\blacklozenge = \sin\gamma \end{bmatrix} \tag{1}$$

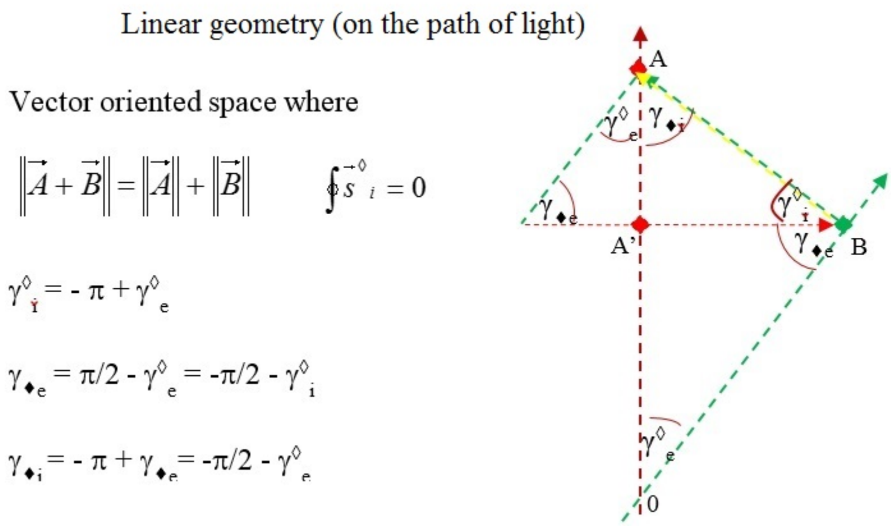


Figure 3. Linear spacetime of the act (on the path of instantaneous light): It is a Linear vector oriented space. The angles are γ_e between two vectors in concordant direction, vice versa γ_i, and they alternate each other.

$$\begin{bmatrix} \frac{d\left(1-\cos\gamma^{\diamondsuit}\right)}{d\gamma^{\diamondsuit}} = \left(1-\cos\gamma^{\diamondsuit}\right) & \frac{d\cos\gamma^{\diamondsuit}}{d\gamma^{\diamondsuit}} = -\left(1-\cos\gamma^{\diamondsuit}\right) \\ \frac{d(1-\sin\gamma_{\blacklozenge})}{d\gamma_{\blacklozenge}} = (1-\sin\gamma_{\blacklozenge}) & \frac{d\sin\gamma_{\blacklozenge}}{d\gamma_{\blacklozenge}} = -(1-\sin\gamma_{\blacklozenge}) \end{bmatrix} \tag{2}$$

In Intention physics the time is defined only in the points of act A,B,A',B', ...since, between a point of act and the next one, the period of potency extends. Analogously space is defined only on the segments AB ecc.
These points and these segments are the only in act, the only real, and therefore absolute, and therefore are the only one that must have an equivalent representation (isomorphic) in whichever representation of the reality (isomorphism).
We can therefore represent the recursive mirroring between A and B in the schema on the right and compare it with Minkowski schema used by relativistic physic on the left (see fig. 4).
It is necessary to pay attention to the suffix $_e$ (between two vectors in concordant direction) and $_i$ (between two vectors in discordant direction) of the linear angles, which alternate each other in the scheme:

$$\overline{AB} \equiv \sigma^{\diamondsuit} = t^{\diamondsuit} - \tau^{\diamondsuit} = t^{\diamondsuit}(1-\cos\gamma^{\diamondsuit}) \quad \text{or} \quad V_e = \sin\gamma^{\diamondsuit}_e = 1-\cos\gamma^{\diamondsuit}_e = 1-\cos\gamma^{\diamondsuit}$$
$$\overline{AA'} \equiv t^{\diamondsuit} - t'^{\diamondsuit} = \sigma^{\diamondsuit} + r^{\diamondsuit} = \sigma^{\diamondsuit}(1+\cos\gamma^{\diamondsuit}) \quad \text{or} \quad V_i = \sin\gamma^{\diamondsuit}_i = 1-\cos\gamma^{\diamondsuit}_i = 1+\cos\gamma^{\diamondsuit}$$

We can see that, since $\tau = \tau^{\diamond}$, it is possible an isomorphic representation of the reality, represented by the intention schema, defining $t \equiv t^{\diamond} - d$ and $d \equiv (\sigma^{\diamond} + r^{\diamond})/2$ so that to the linear metric of the intention physics corresponds the vectorial metric in the Minkowski spacetime of classic physics.

$$\begin{cases} \text{RELATIVISTIC MINKOWSKI SPACETIME} \\ i\vec{\tau} = i\vec{t} + \vec{d} \end{cases} \leftrightarrow \begin{cases} \text{LINEAR INTENTION SPACETIME} \\ t^{\diamondsuit} = t + d = \tau^{\diamondsuit}/\cos\gamma^{\diamondsuit} \\ t'^{\diamondsuit} = t - d = \tau^{\diamondsuit}\cos\gamma^{\diamondsuit} \end{cases}$$

Or

$$i\tau\cosh\gamma\hat{t} + \tau\sinh\gamma\hat{d} = i\tau\hat{\tau} \quad \leftrightarrow \quad \begin{cases} \tau\cosh\gamma - \tau\sinh\gamma = \tau\cos\gamma^{\diamondsuit} \\ \tau\cosh\gamma + \tau\sinh\gamma = \tau/\cos\gamma^{\diamondsuit} \end{cases} \tag{3}$$

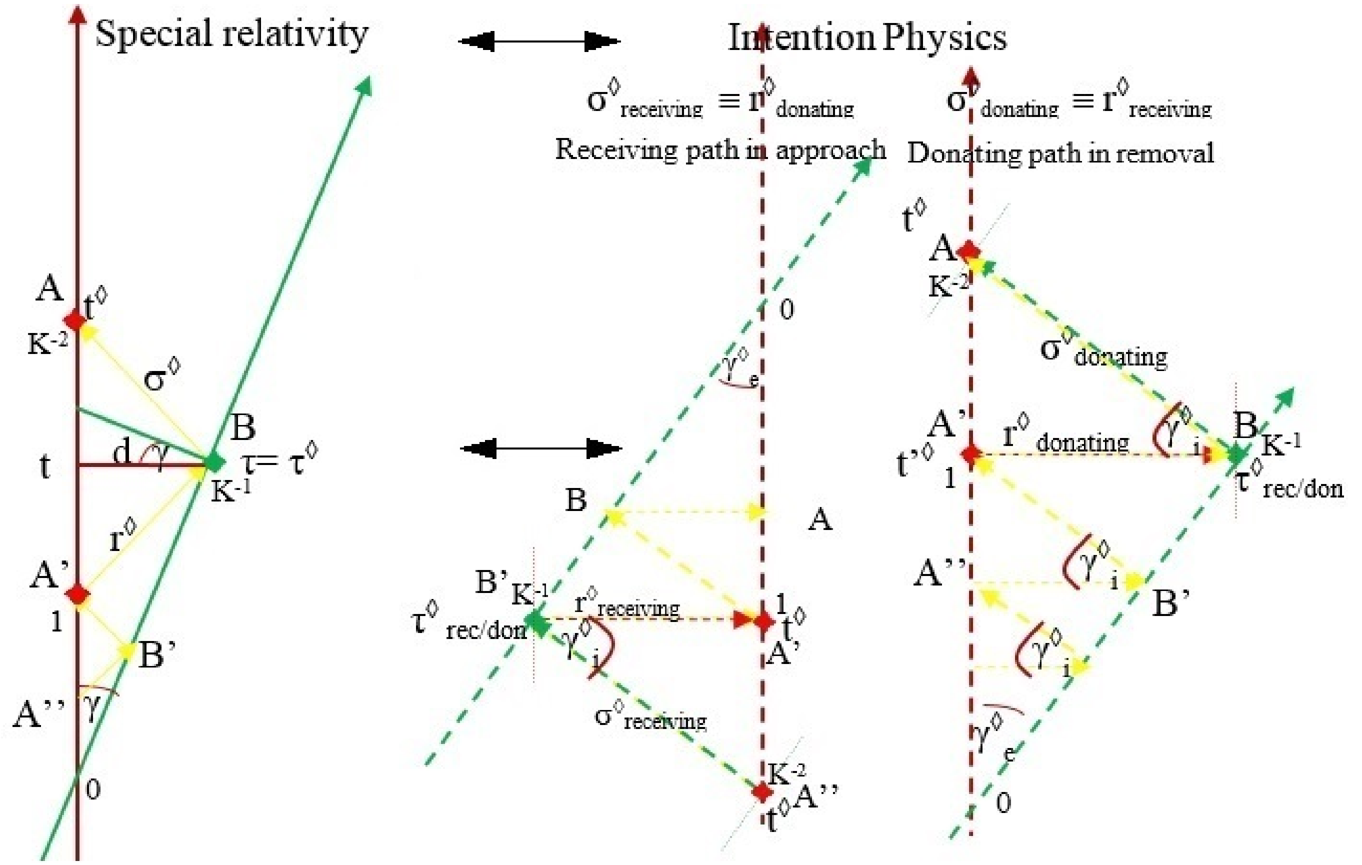


Figure 4. isomorphism: the representation of the temporal and spatial distances between the real points A,B,A',B',A",B", ... in the Minkowski spacetime, on the left, is equivalent to the representation in the Intention historical plane, on the right, with the conversion $v = \tanh\gamma \to V = 1 - \cos\gamma^\diamond$ and $e^{-\gamma} \to \cos\gamma^\diamond$. The difference is that while the Intention historical plane defines only these points as the unique real, and the spatial distances, therefore, represent the corrispondence between $t^\diamond$ and $\tau^\diamond$ that are therefore joined instantly at every act of donation/receiving, the Minkowski spacetime defines all the intermediate points too (that are in potency and therefore not real in the intention) and establishes a correspondence between each point on t axis and τ axis (be it real or imaginary) making the speed of light finite and traveling in the spacetime. As it is shown in (Peluso 13 jan 2019 (see Peluso V. 2019)) the Intention historical plane is the primitive space where General Theory of Relativity and Quantum Mechanics are reconciled.

and

$$e^{-\gamma} \quad \leftrightarrow \quad \cos\gamma^\diamond \tag{4}$$

Replacing $\tau^\diamond$ with the mass m, it's easy to identify the vectorial sum on the left with the Dirac's free particle Equation, and the linear sum on the right with the definition of sinh and cosh since $\cos\gamma^\diamond \leftrightarrow e^{-\gamma}$.
The metric of reality, in other words the unique absolute metric, must depend only on geometry and therefore only on angles and distances. Both an inertial relationship and an intention relationship must be equally characterized by distances and angles: the relative velocity v for the first and the potential V for the other.

The Absolute Metric must, therefore, be founded on the Lorentz transformation where the angles are fixed and vary only the distances:

$$\begin{cases} x_1' = x_1\cos\gamma - x_4\sin\gamma \\ x_4' = x_1\sin\gamma + x_4\cos\gamma \end{cases} \leftrightarrow \begin{cases} x^\diamond = \sigma^\diamond(1 - V_i) - t_e^\diamond V_e \\ \tau_e^\diamond = -\sigma^\diamond V_i + t_e^\diamond(1 - V_e) \end{cases}$$

In the inertial reflection, where space and time are independent variables,
Setting $x_1 = x$ and $x_4 = ict$ and $v = \tanh\gamma = \sqrt{1 - \frac{1}{\cosh^2\gamma}}$ we have:

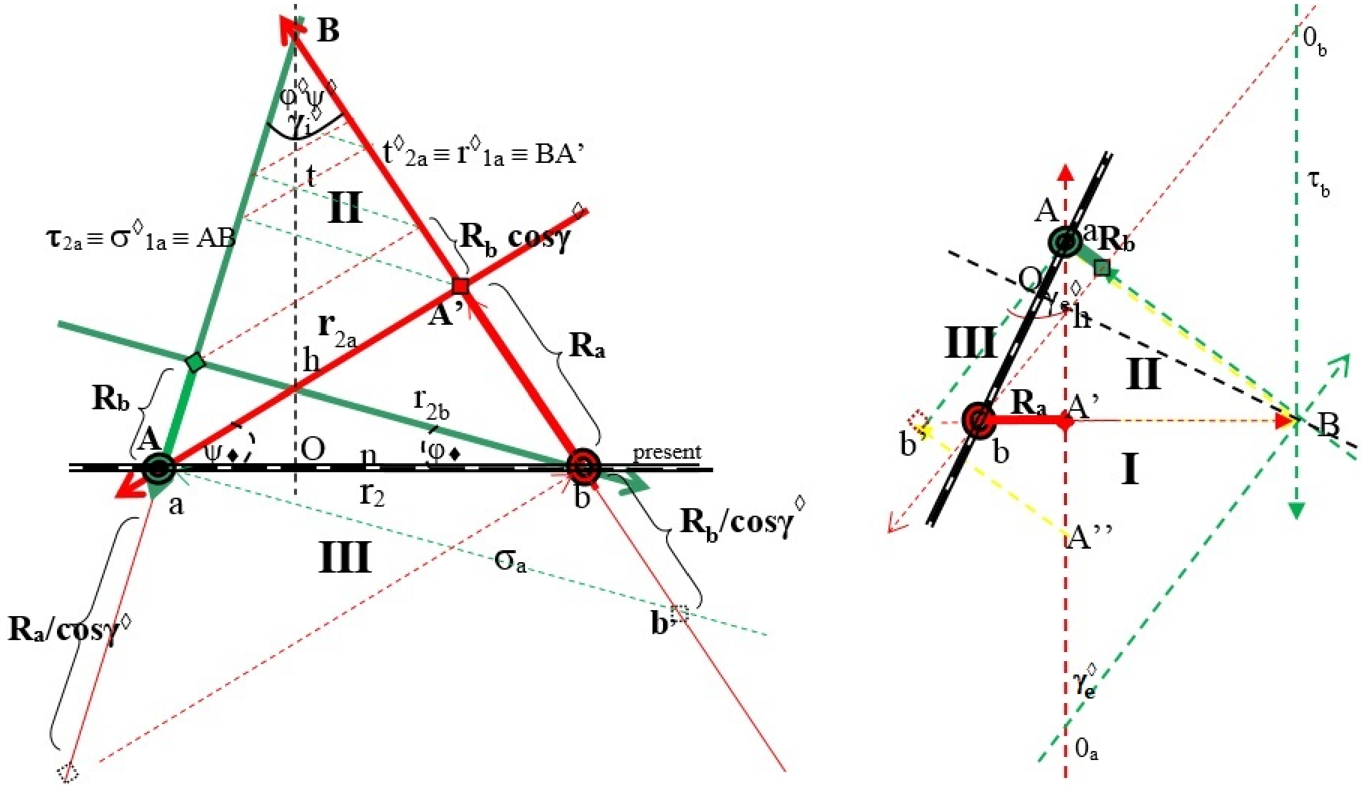


Figure 5. The whole relation is enfolded and unfolds from the Radii of the two conjoined individuals. The schema of intention is recursive since to every angle follows its opposite. Each side of the fig. is the sum of a geometric series $\sum_{i=0}^{n} Rf^i\left(\gamma^\diamondsuit\right) = \sum R\left\{1 + f\left(\gamma^\diamondsuit\right) + f^2\left(\gamma^\diamondsuit\right) + f^3\left(\gamma^\diamondsuit\right) + ...\right\}$ where R is the total radius of the individual $R_{Tot_a} = R_a \cos\gamma^\diamondsuit + R_b$ and $R_{Tot_b} = R_b \cos\gamma^\diamondsuit + R_a$.
Therefore $l_a = R_{Tot_a} \sum_{i=1}^{n} k^{i-1} = R_{Tot_a} \frac{1-k^n}{1-k}$ and since from the point of view of the barycenter $R_{Tot} = R_a + R_b = \frac{R_{Tot_a} + R_{Tot_b}}{1+\cos^\diamondsuit\gamma}$, we have, from the point of view of the barycenter: $l = \frac{l_a + l_b}{1+\cos^\diamondsuit\gamma}$ and $\frac{l_{1_a}}{l_{2_a}} = \frac{l_{1_b}}{l_{2_b}} = \frac{l_1}{l_2}$
It’s at last easy to show that :
$r = \frac{r^\diamondsuit_{2_a} + r^\diamondsuit_{2_b}}{1+\cos^\diamondsuit\gamma} (= \sigma^\diamondsuit_{1_a} + \sigma^\diamondsuit_{1_b}) = \frac{R_{Tot}}{1-\cos\gamma^\diamondsuit}$
$t = \frac{t^\diamondsuit_{1_a} + t^\diamondsuit_{1_b}}{1+\cos^\diamondsuit\gamma} = \frac{r}{V} = \frac{R_{Tot}}{\left(1-\cos\gamma^\diamondsuit\right)^2}$
$V_e{}^\diamondsuit = \frac{R_{Tot_a}}{r^\diamondsuit_{2_a}} = \frac{R_{Tot_b}}{r^\diamondsuit_{2_b}} = \frac{r}{t} = \frac{R_{Tot}}{r}$
and therefore that with respect to the barycenter, $R_{Tot} : r = r : t$ which is the general relation of the intention scheme.
In the case of inertial evolution, it’s easy to find that the only constraint is $\gamma^\diamondsuit$ constant. Vice versa, in the intention, the angle $\gamma^\diamondsuit$ varies, but we know from Newton law that $V = \sin\gamma^\diamondsuit = \frac{M}{r} = \frac{R_\bullet}{r_2}$, were $R_\bullet$ is the Schwarzschild radius and r corresponds to $\frac{1}{2}r_2$. The Intention Schema, which emerges reflectively, represents all the possible knowledge on the relation and it is just a knowledge representation. Indeed, contrarily to the above schema, in every instant the receiving side of an individual face the parallel donating side of the other. Therefore, the intention schema, composed from the juxtaposing of homologue sides (donating-donating or receiving-receiving) of the two conjoined individuals, is only a construction for needs of knowledge representation. It is the begin of reflective knowledge which demands the determination of the angle γ of the relation given by the homologue side time of both individuals.

$$\begin{cases} \sigma = \frac{x - vt}{\sqrt{1-v^2}} \\ \\ \tau = \frac{t - vx}{\sqrt{1-v^2}} \end{cases} \leftrightarrow \begin{cases} \sigma^\diamondsuit = \frac{x^\diamondsuit + V_e t_e^\diamondsuit}{1 - V_i} \\ \\ \tau_e^\diamondsuit = (1 - V_e) t_e^\diamondsuit - V_i \sigma^\diamondsuit \end{cases}$$

And the metric:

$$d\tau^2 - d\sigma^2 = dt^2 - dx^2 \quad \leftrightarrow \quad d\tau^\diamondsuit - dx^\diamondsuit = dt^\diamondsuit - d\sigma^\diamondsuit$$

Still, since $x = v_{translation} t + r$ we can equally put

$$\begin{cases} \sigma = \frac{r}{\sqrt{1-v^2}} \\ \\ \tau = \sqrt{1-v^2}t - v_{translation}\sigma \end{cases} \leftrightarrow \begin{cases} \sigma^{\diamondsuit} = \frac{r^{\diamondsuit}}{1-V_i} \\ \\ \tau_e^{\diamondsuit} = (1-V_e)t_e^{\diamondsuit} - V_i\sigma^{\diamondsuit} \end{cases}$$

While in the inertial case the $v\sigma$ term is variable and doesn't cancel in the differentials, in the Intention it is constant and therefore cancels differentiating.
In other words, differently from the inertial system, in the intention, the relation's time and distances are indeed constant, since the geometrical configuration of the relation depends only on R, which is constant, and on V, which is constant since dV must cancel in the immediate vicinity of the individuals.
Therefore, the relational time t or τ, being constant, does not depend on spatial distance but only on angles.
In the immediate vicinity of the individuals, since $dd = (v_{translation}d\sigma) = 0$, $d\tau/dt$ becomes equal to $d\tau^{\diamondsuit}/dt^{\diamondsuit}$ and therefore $d\sigma/dr = d\sigma^{\diamondsuit}/dr^{\diamondsuit}$.

$$\begin{cases} \text{GENERAL RELATIVITY} \\ \\ d\sigma = \frac{dr}{\cos\gamma^{\diamondsuit}} \\ \\ d\tau = dt\cos\gamma^{\diamondsuit} \end{cases} \leftrightarrow \begin{cases} \text{INTENTION RELATIONSHIP} \\ \\ d\sigma^{\diamondsuit} = \frac{dr^{\diamondsuit}}{\cos\gamma^{\diamondsuit}} \\ \\ d\tau^{\diamondsuit} = dt^{\diamondsuit}\cos\gamma^{\diamondsuit} \end{cases} \tag{5}$$

In other words, in the intention relationship, the time measurements and the spatial measurements are independent of each other since, given the radius R, they depend only on the angle γ which is assumed, by definition, constant in the measurement.
Therefore, whichever distance, must be decomposed in a pure time distance and a pure spatial distance. The metric in the Minkowski spacetime, which is quadratic, extends artificially to the non real points too.
The relation manifests itself according to the scheme of fig. 5. We can identify the potential V with $\sin\gamma_e^{\diamondsuit}$, so that $Vr_2^{\diamondsuit} = Vr = R_{Tot}$ must be a constant of the intention, and where $V = \sin\gamma_e^{\diamondsuit} = 1-\cos\gamma^{\diamondsuit}$.
Since the sole universe thread is sequential, without loops, the time axes of different individuals never intersect each other. Therefore, in the intention relationship, the $r_x t_x$ planes of two any individuals are never parallel. The axis of the nodes r is the intersection of the $r_x t_x$ planes of the two individuals.
Perpendicular to the r axis of nodes, there is the time axis t along the local direction of the temporal axis t in the universe.
In the space of the relationship, therefore, we can identify an rt plane of the relation with respect to which the $r_x t_x$ planes of the two individuals are rotated respectively by an angle φ e ψ where $\varphi^{\diamondsuit} +^{\diamondsuit} \psi^{\diamondsuit} = \gamma^{\diamondsuit}$
The two reference frames must moreover twist around the axis of the nodes r forming the two angles of nutation ϑ_a and ϑ_b where $\vartheta_a^{\diamondsuit} +^{\diamondsuit} \vartheta_b^{\diamondsuit} = \vartheta^{\diamondsuit}$ according to the fig. 6,

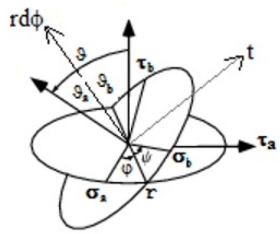


Figure 6. Torsion: Since the sole universe thread is sequential, without loops, the time axes of different individuals never intersect each other. Therefore, the two reference frames must moreover twist around the axis of the nodes r forming the two angles of nutation ϑ_a and ϑ_b where $\vartheta_a^{\diamondsuit} +^{\diamondsuit} \vartheta_b^{\diamondsuit} = \vartheta^{\diamondsuit}$

where:

$$\sin^{\diamondsuit}\vartheta = \frac{\overline{hO}^{\diamondsuit}}{\overline{0O}^{\diamondsuit}} = \frac{\mu}{\tau+\mu} = \frac{\mu}{\frac{(R_{tot})(1-\sin\gamma^{\diamondsuit})}{\sin^2\gamma^{\diamondsuit}}+\mu} = \frac{\frac{\mu}{R_{tot}}\sin^2\gamma^{\diamondsuit}}{(1-\sin\gamma^{\diamondsuit})+\frac{\mu}{R_{tot}}\sin^2\gamma^{\diamondsuit}} \tag{6}$$

where $\overline{hO}^{\diamondsuit} \equiv \mu = \frac{R_a R_b}{R_a + R_b}$ is an invariant of the relation. The torsion, doesn't affect the metric but the charge of individuals in the strong interaction and the configuration of the relation.
Inside the baryon, the $\sin^{\diamondsuit}\vartheta$ potential corresponds to a kind of V_{Yukawa} potential with the origin translated on the circle $r_c = R^{\circ}_{\epsilon}$. The $\sin^{\diamondsuit}\vartheta$ potential, otherwise negligible, grows up asymptotically on $r \simeq R^{\circ}_{\epsilon}$ and constitutes, in concomitance with the Pauli exclusion principle, the cause of the formation of baryons from three homologous individuals. Inside the Universe, viceversa, the torsion of the radiation energy is the seat of the Big-Bang nucleosynthesis.

The linear geometry of the act (consummation) must be fused and harmonized with the quadratic (elliptical, Euclidean, hyperbolic) geometry of space of potentiality in a global metric. To merge the historical plan of act (consummation) with the spatial plan of potentiality (evolution), we must resort to isomorphism between the historical plan of consummation and the Minkowski space-time, defining the metric in the latter. The metric is therefore defined in the Minkowski space-time : Therefore, the metric of universe is

$$-id\tau\vec{\tau} \equiv \frac{\overrightarrow{\mathrm{r}}dr}{V_i - 1} + \overrightarrow{\mathrm{t}}\left\{-idt\left(1 - V_e\right)\cos\vartheta + rd\phi\sin\vartheta\right\} + \overrightarrow{\mathrm{L}}\left\{idt\left(1 - V_e\right)\sin\vartheta + rd\phi\cos\vartheta\right\} \tag{7}$$

Where $\overrightarrow{\mathrm{r}}$, $\overrightarrow{\mathrm{t}}$ and $\overrightarrow{\mathrm{L}}$ are the versor of the local proper distance, proper time and orthogonal axis. The torsion, which becomes appreciable when $\gamma \simeq \pi/2$ in the radiation era, doesn't affect the distances The norm is therefore all the same:

$$-d\tau^2 = -dt^2\left(1 - V_e\right)^2 + \frac{dr^2}{\left(V_i - 1\right)^2} + r^2 d\phi^2 \tag{8}$$

The relation between gravitation and electricity is that they are each the mirror of the other: $R^{\circ}{}_a = 1/R_{\bullet b}$.
The Intention demands that the period of the two individuals in intention be the same (see fig. 5).
From the De Broglie relation $\lambda = h/p$
Imposing $p_a = p_b$ and then $\lambda_a = \lambda_b$ we have:

$$\begin{aligned} \lambda_a = \; & 2\pi\frac{R^{\circ}{}_b}{\sin_{\blacklozenge}\varphi} = \lambda_b = 2\pi\frac{R^{\circ}{}_a}{\sin_{\blacklozenge}\psi} = 2\pi r \quad \text{(from intention schema)} \\ \lambda_a = \; & 2\pi\frac{\alpha^{-1}}{p_a} = \lambda_b = 2\pi\frac{\alpha^{-1}}{p_b} = 2\pi r \quad \text{(from De Broglie relation)} \end{aligned} \tag{9}$$

And therefore (the term α^{-1} depends on the unit of measure adopted see. eq. 10 and 11) :

$$p_a = m_a \sin_{\blacklozenge}\varphi = R^{\circ}{}_b^{-1}\sin_{\blacklozenge}\varphi \quad \text{or} \quad R_{\bullet a} = R^{\circ}{}_b^{-1}$$

$$p_b = m_b \sin_{\blacklozenge}\psi = R^{\circ}{}_a^{-1}\sin_{\blacklozenge}\psi \quad \text{or} \quad R_{\bullet b} = R^{\circ}{}_a^{-1}$$

What's more, from the schema of the universal relation we have $\frac{\sin_{\blacklozenge}\psi}{\sin_{\blacklozenge}\varphi} = \frac{R_a}{R_b}$. if the relationship is universal, then the radius R must be able to represent both the gravitational radius $R_{\bullet}$ and the electric radius R°
Therefore we must have:

$$\frac{R_{\bullet b}}{\sin_{\blacklozenge}\psi} = \frac{R_{\bullet a}}{\sin_{\blacklozenge}\varphi} \quad \text{in the gravitational case}$$

$$\frac{R^{\circ}{}_b}{\sin_{\blacklozenge}\psi} = \frac{R^{\circ}{}_a}{\sin_{\blacklozenge}\varphi} \quad \text{in the electrical case}$$

More precisely, the gravitational radius mirror itself in the other as $R^{\circ} = 1/R_{\bullet}$. In the same location where is placed the individual A, we have therefore the gravitational radius $R_{\bullet a}$, corresponding to the energy that the individual has and can donate, and the electrical radius $R^{\circ}{}_a = 1/R_{\bullet b}$, corresponding to the energy that the individual can receive. Exactly, we affirm that the unification of gravitational and electromagnetic interactions, always joined and each mirror of the other, passes through the unification of mass and electric charge, being both reducible to a length.
The law of the equality of the inertial and gravitational mass is equivalent to the assertion that the acceleration imparted to a body by a gravitational field is independent of the nature of the body. A ball of iron and a ball of lead fall with the same acceleration on the earth, but the acceleration is different to varying of the planet Earth or Jupiter. In overturned way, an electron and a muon fall with different accelerations on a same ion, but for everyone

the acceleration is the same to varying of the ion, be it iron or lead. This overturned parallelism is the same between $R_\bullet$ and its mirror on other R°. While in the gravitation the mass appears where it lays, in the electricity it appears as the reciprocal and reflected in the other so the barycentre of electricity and gravitation is the same. The electrical radius is therefore the reflex on other of the gravitational radius and both relationships share the same intention schema that emanates from the radius.

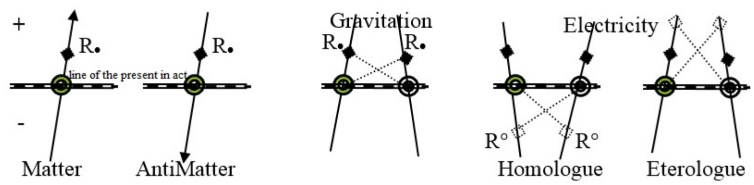


Figure 7. The sign of acceleration: The $R_\bullet$ is advanced and therefore positive for matter. The mirror R°, being reflected on other, appears on the opposite side if the two conjugated individuals in the intention are homologue, on the same side elsewhere. Therefore, from the matter point of view, the acceleration is always attractive (polar axes converge toward the future) for gravitation, while repulsive or attractive depending on the sign of the polar axes for electromagnetism. All is reversed from the negative matter point of view

In the intention absolute system of measures, which contemplates as only measure the distance, it's advantageous to introduce the two constants:

$$\Theta = \frac{Qc^2}{(4\pi\varepsilon_0 G)^{1/2}} = 1.671001..\mathrm{x}10^{08} \text{ joule} \quad \text{and} \quad K = \Theta 2\frac{G}{c^4} = 2.761312..\mathrm{x}10^{-36}\, meters \tag{10}$$

whence

$$K\Theta = 2\frac{Q^2}{4\pi\varepsilon_0} \quad \text{and} \quad \frac{K}{\Theta} = 2\frac{G}{c^4}$$

and to impose $K = \Theta = 1$ i.u (where i.u. is the **i**ntention **u**nit measure), so that, at last, we get the universal relation:

$$R_\bullet R^\circ = -K^2 = -1 i.u.^2 \quad (\, 2\alpha \text{ in Planck Unit}) \tag{11}$$

Consequently it follows that $c = 1$, $G = 1/2$ and $\hbar = 1/2\alpha^{-1}\mathbf{i.u.}^2$.
We can recognize that $K = 2\alpha^{1/2} l_p$ and $\Theta = \alpha^{1/2} m_p c^2$ and $Q = \sqrt{\alpha/2}q_p$ where l_p , m_p and q_p are the Planck length, mass and charge.

3. SUMMARY OF THE PHYSICS OF THE INTENTION

The Intention physics is based on the following Axioms:

1. The principle, the building block of all, is the relationship. The relationship involves and merges two individuals or two three-dimensional spaces, since what appears as an individual in the moment of the act, appears as a three-dimensional space in the moment of the potency. There are two types of relationships:

   (a) "Peer to peer" (dialogue), between two individuals, children of the same universal

   (b) "Part of" (Communion), between the individual child member and the emerging universal individual

   In the relation, every individual is characterized by only a radius R (the Schwarzschild radius), which represents the energy that has and can donate, and that turns in a spin $\omega = R^{-1}$.
   The gravitational radius mirror itself in the other as $R^\circ = 1/R_\bullet$. In the same location where is placed the individual A, we have therefore the gravitational radius $R_{\bullet a}$, corresponding to the energy that the individual has and can donate, and the electrical radius $R^\circ{}_a = 1/R_{\bullet b}$, corresponding to the energy that the individual can receive.

   The relationship, in its immediate form, takes place according to the scheme of fig. 1, in which, at each instant, the receiving side of an individual faces the parallel donor side of the other. However, it is more conveniently

represented, for the sake of knowledge representation, according to the scheme of fig. 5, composed of the juxtaposition of the homologous sides (giving-giving or receiving-receiving) of the two conjoint individuals and representing all possible knowledge and memory.
It is functional to a donation of substance (consummation) among the individuals involved. The donation, fruit of a decision (immediate and therefore primitive):

(a) is the only novelty or variation of the global state of the universe

(b) is instantaneous (in act) and the energy received brings the new picture of the universe, corresponding to the new state of relationships, where the radii R and the interdistances of the individuals in relation have changed.

(c) its frequency depends on the distance between the two conjoined individuals. Between one exchange and another, the period of the potency of the relationship opens (not real, imaginary numbers).

(d) its thread links the present in act of one conjoined individual with the past R of the other. Since all the existent, exists because in relation, the distance, or the length of the thread between the two conjoined individuals in act, is never $dl^2 = d\tau^2 - d\sigma^2 = 0$ but always $i\vec{\tau} - \vec{\sigma} - \vec{R} = 0$ or :

$$id\vec{\tau} - d\vec{\sigma} = \frac{d\vec{l}}{\vec{l}}\vec{R} = \rho dV \frac{d\vec{l}}{|dl|} \quad \text{or} \quad R_{\mu\nu} - \frac{1}{2}g_{\mu\nu}R = \frac{8\pi G}{c^4}T_{\mu\nu} \tag{12}$$

where $\vec{R} = \vec{l}$ is the gravitational radius $R_{\bullet a}$ or the electrical radius $R_a^\circ = R_{\bullet b}^{-1}$, and which is the basis of the Dirac equation and of general relativity. Indeed it's equivalent to:

$$\pm i\vec{\mathrm{k}}E \pm \vec{\mathrm{i}}p + \vec{\mathrm{j}}m = 0 \quad \text{or} \quad \left|\frac{d\vec{l}}{\vec{l}}\vec{R}\right|^2 = c^2 g_{00}dt^2 - g_{rr}dr^2 - r^2 d\theta^2 - r^2 \sin^2\theta d\psi^2$$

which corresponds to the Dirac equation and viceversa. Whatever is real, therefore, is isomorphic to, and must be described by, the Dirac equation. In the isomorphic Minkowsky spacetime scenario, the same potency enfolded in (and which unfolds from) the radius R, appears as a deformation in general relativity, where space and time are locally measurable with an external probe, as a wavefunction in quantum Mechanics, where the probe and the probed are the same thing.

(e) there are only two elementary individuals: the Universe R_ω and the Electron R_ϵ° and both come in three forms, one for each axis constituting the space of the relationship: the axis of the baryonic individual, the axis of the distance and the orthogonal axis of the other. These components correspond to the cold dark matter, baryonic matter and radiation in the universe and give place to the three generations of matter (fermions). Indeed there is a torsion between the time axes of every two conjoined individuals :

$$\sin^\diamond\vartheta = \frac{\overline{hO}^\diamond}{\overline{0O}^\diamond} = \frac{\mu}{\tau+\mu} = \frac{\frac{\mu}{R_{tot}}\sin^2\gamma^\diamond}{(1-\sin\gamma^\diamond) + \frac{\mu}{R_{tot}}\sin^2\gamma^\diamond} \quad \text{and} \quad \cos^\diamond\vartheta = 1 - \sin^\diamond\vartheta = \frac{\tau}{\tau+\mu} \tag{13}$$

Indeed the torsion or $\sin^\diamond\vartheta$ potential, otherwise negligible, grows up asymptotically on $r \simeq R_\epsilon^\circ$ and constitutes, in concomitance with the Pauli exclusion principle, the cause of the formation of baryons from three homologous individuals (quarks). Inside the Universe, analogously, the torsion of the radiation energy is the seat of the Big-Bang nucleosynthesis.

(f) At last, since from the intention schema follows the general relation:

$$V = \frac{\vec{R}}{\vec{r}} = \frac{\vec{r}}{\vec{t}} \tag{14}$$

and since the radius is the sum of three heterogeneous components:

$$\vec{R} = \sum_{i=1}^{3}\vec{R}_i$$

we have equivalently:

$$V_j = \frac{R_j}{r_j} = \frac{r_j}{t} \qquad \text{and at last} \qquad r_j = \sqrt{R_j t} = \sqrt{\frac{R_j}{R}} r \tag{15}$$

where

$$R_j = \cos^{\diamondsuit} \vartheta_j R_{\bullet j} \qquad \text{and} \qquad R = \sum_{i=1}^{3} R_i \qquad \text{outside the Radius: } r \geq R_{ind}$$

$$R_j = \left(\sin^{\diamondsuit} \vartheta_j R_{\bullet j}\right)^{-1} \qquad \text{and} \qquad R^{-1} = \sum_{i=1}^{3} R_i{}^{-1} \qquad \text{inside the Radius: } r \leq R_{ind}$$

therefore:

$$r_j = \sqrt{\frac{\cos^{\diamondsuit} \vartheta_j R_{\bullet j}}{\sum_{i=1}^{3} \cos^{\diamondsuit} \vartheta_i R_{\bullet i}}} \cdot r \qquad \text{and} \qquad r^2 = \sum_{i=1}^{3} r_i^2 \qquad \text{outside the Radius: } r \geq R_{ind}$$

$$r_j = \sqrt{\frac{\sum_{i=1}^{3} \sin^{\diamondsuit} \vartheta_i R_{\bullet i}}{\sin^{\diamondsuit} \vartheta_j R_{\bullet j}}} \cdot r \qquad \text{and} \qquad r^{-2} = \sum_{i=1}^{3} r_i^{-2} \qquad \text{inside the Radius: } r \leq R_{ind}$$

At last, from the 15, for $t \to R_\omega$ and therefore $r_k \to r_{k_{max}} = \sqrt{R_K R_\omega}$, we get the "part of" relationship:

$$\frac{R_{part}}{R_{whole}} = \frac{R_{whole}}{R_\omega} \tag{16}$$

r	γ	V	R	$t = 1/a$	$U = m_b V$	ΔE
$\geq R_{ind}$	$\leq \frac{\pi}{2}$	$\frac{R_a}{r}$	R_a	$t(r) = \frac{r^2}{R_a} = \frac{R_a}{V^2}$	$\frac{1}{r}$	$\Delta U = \Delta \frac{1}{r}$
$\leq R_{ind}$	$\geq \frac{\pi}{2}$	$\frac{r}{R_{ind}}$	$R(r) = \frac{r^2}{R_{ind}} = R_{ind} V^2$	R_{ind}	r	$\frac{1}{\Delta U} = \frac{1}{\Delta r}$

Table 1. Here $m_b R_a$ is equal to $m_b m_b$ in the gravitational relation, to $R_{\bullet a} R^{\circ}{}_a = 1$ in the electrical one, and R_{ind} is equal to R_ω in the gravitational relation, R_ϵ° in the electrical one.
It descends from the fundamental proportion of the intention schema $V = R : r = r : T$ where the first ratio governs the potential inside the radius while the second ratio governs the potential outside the radius. The inside ($r < R_{ind}$) and the outside ($r > R_{ind}$) are respectively the seats of weak and Coulomb/Newton interactions, while the ($r \simeq R_{ind}$) is the seat of strong interactions. Note how in the same schema, in the transition from outside to inside, the new emergent internal local radius $R(r)$ takes the place of the constant Radius of the elementary individual R_{ind} which, in turn, changes from being the Radius (the quantum -unit of measure- of the external relation) to being the now constant time t (the roof -the maximum- of the internal relation). At last energy, equal to distance r in the inside, reverse as $1/r$ in the outside.

In the relation, therefore, we have the the cyclical alternation of:

reflection	$\leftrightarrow$	*consummation*
potency	$\leftrightarrow$	*act*
universal	$\leftrightarrow$	*instance*
period	$\leftrightarrow$	*instant*
space	$\leftrightarrow$	*point*
wave	$\leftrightarrow$	*particle*
complex number	$\leftrightarrow$	real number

The intention schema, by keeping constant one variable at a time, covers all the relations:

1. By keeping constant the angle γ, it describes the relation of approaching or moving away between two individuals in an inertial space
2. By keeping constant the radius $R_\bullet$ or R°, it describes the gravitational or electrical relation between two individuals outside the radius.
3. By keeping constant the time $t = R_\epsilon$ or R_ω, it describes the relation between individuals inside the radius in the Weak ($r << R_{ind}$) and Strong ($r \simeq R_{ind}$) interaction or in the Universe.

4. THE INTENTION COSMOLOGY

The mirroring function $\mathrm{Re}(R) = 1/R$, where $R^\circ = 1/R_\bullet$, is the condition necessary and sufficient for the equilibrium of a mirroring universe, i.e. a universe where every individual makes itself mirror of whichever other, be it simple or composed in every way, and all the universe mirrors itself in every individual and every individual mirror itself in the entire universe. The Universe R_ω has a mirror, we name it the Amorone R_α. Since the universe is the maximum, the amorone is the minimum. Indeed, the amorone, being the conjugated of the Universe, verify $R_\alpha R_\omega = -1$, and mirrors all the Universe which reflects in it. The amorone is the unit of measure of universe.

The frequency of consummations between Universe and Amorone is R_ω^2. Indeed it happens $\frac{R_\omega}{R_\alpha}$ times during the apparent age of the Universe R_ω .

The interaction between the Universe and the Amorone is the union of gravitation and electricity since the Universe coincides with the mirror of the Amorone in it and equally the Amorone coincides with the mirror of the Universe in it. The Amorone consummates with a period R_ω (i.e. the age of the universe); the Universe, vice-versa, consummates with a period R_α. In the period of a single Amorone, therefore, the Universe consummates $\aleph = \frac{R_\omega}{R_\alpha} = R_\omega^2$ times, keeping in existence all the $\aleph = R_\omega^2$ amoroni. The amoroni are therefore all in potency except one at a time.

The physics of Universe is the physics of the interior of a black hole and of whichever simple particle as electrons. From tab. 1, or equivalently from the part of relation 16, inside an elementary individual, i.e. the Universe, arises a Radius $R_I = \frac{r^2}{R_\omega}$ The substance of this Radius can be assimilated to the cold dark matter, and consists of amoroni. Indeed $R_I = \sum U_i = \sum V_i m_i = \int_{r=A}^{B} \frac{r}{R_\omega} dr = \int_{r=A}^{B} V dr$, is the work performed by the local potential $V(r)$ along the distance r due to an acceleration $1/t = 1/R_\omega$ constant and directed between the two points A and B. The above formulas show that $m_I = r = \sum_{r=A}^{B} R_\alpha$ while $R_I = m_I V$. We find, at last, that in the lineaar spacetime metric of universe $Space \equiv Time \equiv Mass$.

While the Dialogue is the relation between two individuals, the Communion is the relation "part of" between each part and the emergent composite individual.
The amorone $R_\alpha = R_\omega^{-1}$ is the unique elementary individual and the communion of amoroni gives rise to only two emergent compound individuals: the Electron and the Universe.
Indeed, amoroni attract each other immensely because each one sees in the other the entire universe, until the resulting agglomerate, which is the electron, is such that its reflection in every single amorone member, added for the number of all the members, equals the energy of the universe R_ω.

$$R_\omega : R_\epsilon{}^\circ = R_\epsilon{}^\circ : R_{\bullet\epsilon} = R_{\bullet\epsilon} : R_\alpha \tag{17}$$

All the gravitation and the mirroring is between and by means of amoroni. The composite (gravitationally) elementary (electrically) individual R_ϵ is the sole individual that is in equilibrium with universe. Indeed, it is the sole individual whose gravitational radius corresponds to the $R_\bullet$ which emerges from the space enclosed by its electrical radius and vice versa. It is the sole stable individual. To enlarge the electrical radius implies to enlarge the emergent gravitational radius $R_\bullet = \frac{R^{\circ 2}}{R_\omega}$ but this is in contradiction with the smaller gravitational radius requested by $R_\bullet = 1/R^\circ$ and vice versa.
Every relation finds its place inside an individual more complex of which it is a part of.
Therefore, apart from leptons and universe, the proportion $R_\omega : R_{whole} = R_{whole} : R_{part}$, starting from $R_{part} = R_\epsilon^\circ$, applies recursively through $R_{whole} \rightarrow R_{part}$, providing all the mirroring universe scale giving rise to stars $R_{\bullet s}$ and galaxies $R_{\bullet g}$ and clusters and so on.
The principle of reason claims that the present is based on the historical reconstruction of the past up to a starting point started R_ω years ago, this starting point is what we known as the Big Bang (see fig. 8). However, the radius

and therefore the age of the universe is constant, and therefore the Big Bang is not an event, but it is a part of a continuous process (see fig. 9). In every instant the universe, looks like as, and is, the result of a Big bang that took place R_ω years ago.

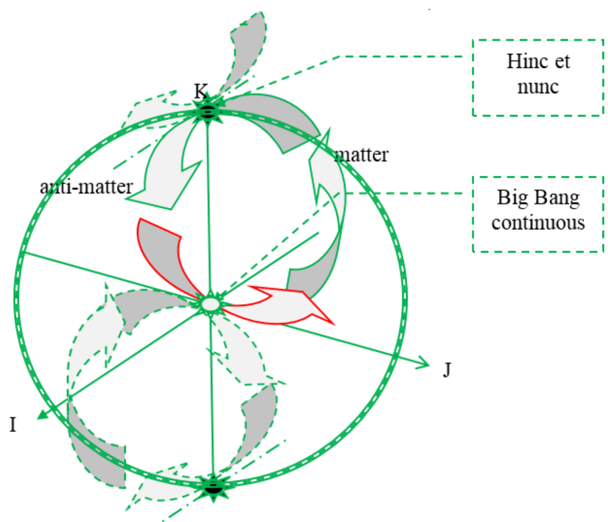


Figure 8. The Big Bang continuous: The radius and therefore the age of the universe is constant, and the Big Bang is not an event, but it is a pat of a continuous process. The principle of reason claims that the present is based on the historical reconstruction of the past up to a starting point known as the Big Bang. The line of the present, on the opposite side, is the set of the points where matter coming from the Big Bang, after a travel lasted R_ω years, reverses and begins his return journey as antimatter. The line of the present is the place where matter meets anti-matter and forms the baryonic matter (ordinary matter). The center of the line of the present, on the opposite side, is the point where all energy meets the anti-energy and gives rise to the Big Bang.
Therefore, inside the universe, the total amount of energy is positive and equal to R_ω , while all matter is exactly canceled out by antimatter.

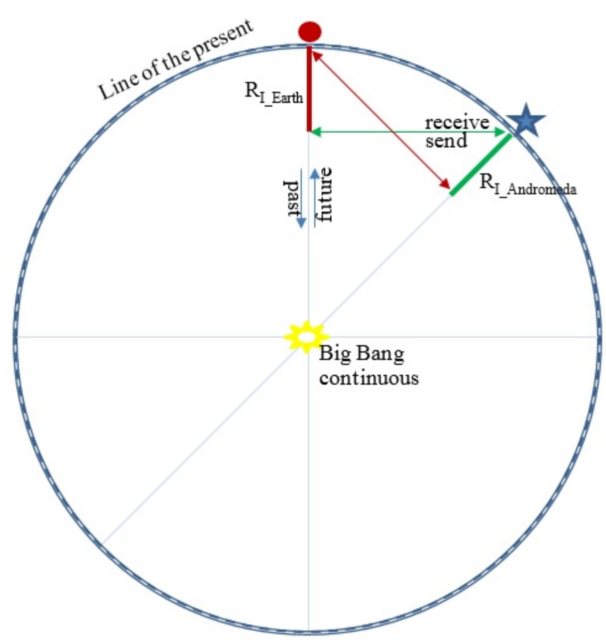


Figure 9. Intention Earth-Andromeda: The present, which comes from the Big Bang continuous as an approaching future, as soon as it surfaces, it submerge as past (antimatter) that move away to go towards the continuous Big Bang, and in this descent informs of itself the future (matter) that ascend in the opposite direction. In this way the past does not vanish but endures as it forms the future.

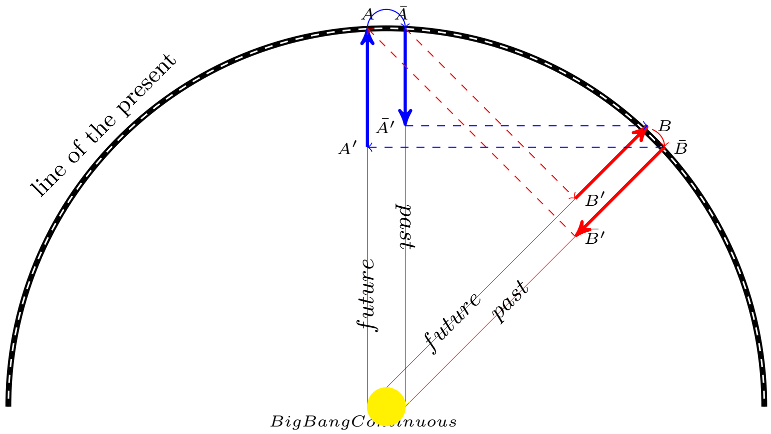


Figure 10. The path of universe intention: The cosmological intention between two individual A and B consists of two overlapping paths (in the figure they were separated to highlight each of them). The path of the present of A: 1) $\bar{B}' \to A$, 2) $Ae^{i0} \to e^{i\pi}\bar{A}$, 3) $\bar{A} \to \bar{B}'$, 4) $\bar{B}' \to B$, 5) $Be^{i0} \to e^{i\pi}\bar{B}$, 6) $\bar{B} \to \bar{B}'$. Analogously for the path of the present of B. Note that only on the line of the present and in the Big Bang the matter converts in antimatter. In the intention, the sending and receiving take place from the present of the individual who sends/receives, not to the present of the other individual, but to his embryonic potentiality (which approaches ascending from the Big Bang). This is why we, on the Earth, cannot communicate with distant alien civilizations. In fact we can not receive from (see) the present in which only they live and act, but from the embryonic potentiality. Equally we can not send to their present in act, but only to the embryonic potentiality of their future present.

The present, on the opposite side, is the point where matter coming from the Big Bang, after a travel lasted R_ω years, reverses and begins his return journey as antimatter. The present is the place where matter meets anti-matter and forms the baryonic matter (ordinary matter). The age and the radius of universe is constant.
Therefore, inside the universe, the total amount of energy is positive and equal to R_ω, while all matter is exactly canceled out by antimatter.
The three ingredients of universe are: Cold Dark Matter (Amoroni), baryonic matter and radiation. Each of them is both a radius and a dimension. We define:

$R_{\omega\parallel} = c/H_0$	Cold Dark Matter (Amoroni) Radius
$R_{\omega\perp} = 2\pi c/H_0$	baryonic matter Radius
$R_{\omega\dagger} = \alpha^{-1}c/H_0$	radiation Radius

and therefore, for the Universe Radius R_ω, depending on the kind of motion between the two conjoined individuals we have $A_\omega = 1/R_\omega$ or, equivalently, $R_I = r^2/R_\omega$ where :

1. $R_\omega = R_{\omega\parallel}$ for radial motion in the quadratic spatial plane;
2. $R_\omega = R_{\omega\perp}$ for tangential motion in the quadratic spatial plane;
3. $R_\omega = R_{\omega\dagger}$ for temporal motion in the linear time-space;

From 17, we have $\frac{R_\epsilon{}^\circ}{R_{\bullet\epsilon}} R_\epsilon{}^\circ = \left|R_\epsilon{}^{\circ 3}\right| mt = 7.5719..10^{(26)}mt \simeq R_{\omega\perp}$
where $R_\epsilon{}^\circ = \frac{R^\circ{}_{electron}}{\pi} = 1.794..10^{-15}mt$ or $R_{\bullet\epsilon} = \pi R_{\bullet electron}$.

Therefore it arises an electron every $\pi R_\epsilon^{\circ 2}$ area uniformly distributed on the surface of universe $\pi R_{\omega\perp}^2$. The baryonic matter is therefore $m_b = \frac{\pi R_{\omega\perp}^2}{\pi R_\epsilon^{\circ 2}} \cdot R_{\bullet\epsilon} = \frac{R_{\omega\perp}^2}{R_{\omega\perp}} = R_{\omega\perp}$.
The present-day densities, when $t = t_0$, are:

$$\rho_{cdm} = \frac{1/2R_{\omega\parallel}}{4/3\pi R_{\omega\parallel}^3} = \frac{3}{8\pi R_{\omega\parallel}^2} \tag{18}$$

$$\rho_b = \frac{R_{\omega\perp}}{4/3\pi R_{\omega\perp}^3} = \frac{3}{4\pi R_{\omega\perp}^2} \tag{19}$$

$$\rho_r = \frac{1/2R_{\omega\dagger}}{4/3\pi R_{\omega\dagger}^3} = \frac{3}{8\pi R_{\omega\dagger}^2} \tag{20}$$

while the critical density is $\rho_{crit} = \frac{3}{8\pi R^2_{\omega\parallel}}$.
The present-day dimensionless ratio of density components of universe are at last :

$$\Omega_{cdm} = \frac{\rho_{cdm}}{\rho_{crit}} = \frac{R^2_{\omega\parallel}}{R^2_{\omega\parallel}} = 1 \tag{21}$$

$$\Omega_b = \frac{\rho_b}{\rho_{crit}} = \frac{2R^2_{\omega\parallel}}{R^2_{\omega\perp}} = \frac{1}{2\pi^2} \tag{22}$$

$$\Omega_r = \frac{\rho_r}{\rho_{crit}} = \frac{R^2_{\omega\parallel}}{R^2_{\omega\dagger}} = \alpha^2 \tag{23}$$

In parallel, each of these ingredients corresponds to a component of the spatial distance $r = \sqrt{r_i^2 + r_k^2 + r_j^2}$ and the radii R_I, R_K and R_J in the usual general relativity coordinate system (τ, σ, t, r) .
Analogously each of these ingredients corresponds to a component of the spatial distance $D_M = \sqrt{D^2_{M_{cdm}} + D^2_{M_b} + D^2_{M_r}}$ and of the density ρ_{cdm}, ρ_b and ρ_r in the cosmic coordinate system (T, D_M).
In the next three sections we will analyze in sequence:

1. the case of a universe composed of only cold dark matter $r = r_i$;
2. the case of a large-scale aggregate of matter, such as galaxies and clusters and filaments, etc., where cold dark matter plays an important role $r = \sqrt{r_k^2 + r_i^2}$;
3. In the third case we will finally analyze the case of the universe without neglecting any ingredient.

4.1. *First approximation: The pure Dark Matter metric*

The study of the pure Dark Matter Intention model is preparatory to the study of the complete model. Hereafter we will see that, in the era dominated by matter, even neglecting baryonic matter and radiation, the spatial and temporal distances scale of the pure dark matter Intention model are a good approximation of the complete Intention model and of the standard ΛCDM model too.
This will give us the opportunity to analyze the impact of dark matter, the most important component of the universe, in the simplest way possible. Indeed, since radiation and baryonic matter generate a torsion of the Radius of the universe R_ω, their role, primary in the age of radiation, are negligible in that of matter.

Hereafter we shall use both the usual general relativity coordinate system (τ, σ, t, r), observer dependent, which correspond to an accelerated frame, like that of an observer held at a fixed spatial point in the surrounding spacetime, that the cosmic coordinate system (T, D_M), universal, which correspond to the frame of an observer falling freely. In a pure matter universe, we have $cd\tau(a) = R_\omega da$ and therefore $c\tau = aR_\omega$.
The relation has an absolute limit in the Universe Radius R_ω (see fig. 11).
While outside the radius of an elementary individual the $\gamma^\diamondsuit$ angle extends between $\pi/2$, in the immediate vicinity of the Whole, to 0 toward the most large distance, inside the radius, vice-versa, the $\gamma_\blacklozenge$ angle extends between 0, in the immediate vicinity of the part (i.e. the observer), to $\pi/2$ toward the most large distance (i.e. the Big Bang).
In the communion, therefore, we have $V_e = \sin_\blacklozenge \gamma = \sin\gamma$ and $V_i = 2 - V_e$.

Furthermore, the intention relationship and the constancy of $t_1 = R_\omega$ constrain directly the matter of the Universe.
Below, since in the universe of pure cold dark matter $r_i = r$, for brevity we will omit the suffix $_i$ which must therefore, only in this section, be considered implied.
From $M_v(r) = \int 4\pi r^2 \rho_{v(r)} dr \equiv \frac{c^2}{G}\frac{r^2}{R_\omega}2$ we derive $\rho_{v(r)} = \frac{c^2}{8\pi G}2\left(\frac{4}{rR_\omega}\right)$
and since $p_\nu = \frac{M_v A}{4\pi r^2}$ where $A = c^2\frac{dV}{dr} = c^2\frac{1}{R_\omega}$ we have $p_\nu = \frac{c^4}{8\pi G}2\frac{1}{R^2_\omega}$

$$T^{ik} = \begin{pmatrix} \rho_\nu & 0 & 0 & 0 \\ 0 & p_\nu & 0 & 0 \\ 0 & 0 & p_\nu & 0 \\ 0 & 0 & 0 & p_\nu \end{pmatrix} = \begin{pmatrix} \frac{c^4}{8\pi G}2\frac{4}{rR_\omega} & 0 & 0 & 0 \\ 0 & \frac{c^4}{8\pi G}2\frac{1}{R^2_\omega} & 0 & 0 \\ 0 & 0 & \frac{c^4}{8\pi G}2\frac{1}{R^2_\omega} & 0 \\ 0 & 0 & 0 & \frac{c^4}{8\pi G}2\frac{1}{R^2_\omega} \end{pmatrix}$$

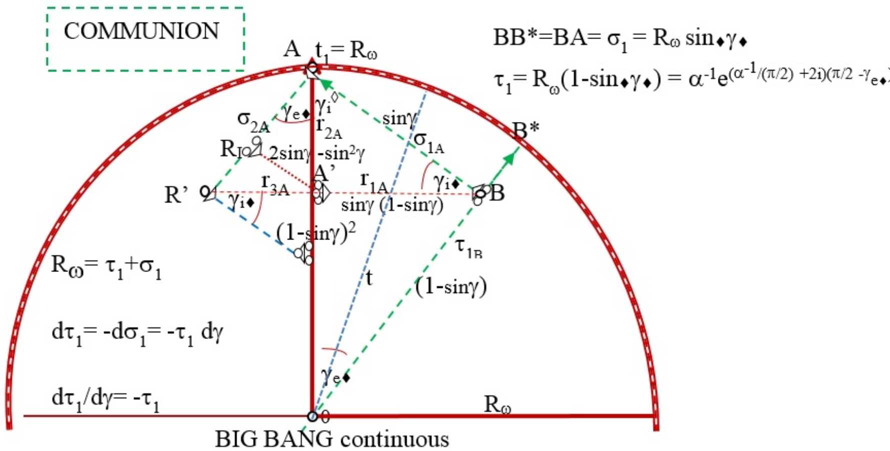


Figure 11. Communion: the relation has an absolute limit in the Universe Radius R_ω

since $T_i^i = \rho - 3p$ then $T = \frac{c^4}{8\pi G} 2 \frac{4}{rR_\omega} - 2\frac{c^4}{8\pi\ G}\frac{3}{R_\omega^2}$ and therefore

$$T_0^{0*-} = T_0^0 - \frac{1}{2}T = \frac{c^4}{8\pi G}\frac{4}{rR_\omega} - 3\frac{c^4}{8\pi\ G}\frac{1}{R_\omega^2}$$

$$T_1^{1*} = T_1^1 - \frac{1}{2}T = -\frac{c^4}{8\pi G}\frac{4}{rR_\omega} + 3\frac{c^4}{8\pi\ G}\frac{1}{R_\omega^2}$$

To find the universe metric, we put initially $d\theta = 0$ $d\phi = 0$ and start from:

$$ds^2 = e^\nu c^2 dt^2 - r^2\left(d\theta^2 + \sin^2\theta d\phi^2\right) - e^{-\lambda}dr^2$$

which gives:

$$\begin{cases} e^{-\lambda}\left(\frac{\nu'}{r} + \frac{1}{r^2}\right) - \frac{1}{r^2} = \frac{8\pi G}{c^4}T_1^{1*} \\ e^{-\lambda}\left(\frac{\lambda'}{r} - \frac{1}{r^2}\right) + \frac{1}{r^2} = \frac{8\pi G}{c^4}T_0^{0*} \\ \dot{\lambda} = 0 \end{cases}$$

Since $\lambda = -\nu$ and $T_0^{0*} = -T_1^{1*}$ we reduce to the only equation:

$$e^{-\lambda}\left(\frac{\lambda'}{r} - \frac{1}{r^2}\right) + \frac{1}{r^2} = \frac{4}{rR_\omega} - \frac{3}{R_\omega^2} \tag{24}$$

which admits one solution $e^{-\lambda} = \left(1 - \frac{r}{R_\omega}\right)^2$

Therefore, the metric of universe in the usual general relativity coordinate system (τ, σ, t, r), observer dependent, which correspond to an accelerated frame, like that of an observer held at a fixed spatial point in the surrounding spacetime, is:

$$dl^2 = \left(1 - \frac{r}{R_\omega}\right)^2 c^2dt^2 - \frac{dr^2}{\left(1 - \frac{r}{R_\omega}\right)^2} - r^2d\theta^2 - r^2\sin^2\theta\ d\phi^2 \tag{25}$$

Or, since $R_I/r = r/R_\omega$

$$dl^2 = \left(1 - \frac{R_I}{r}\right)^2 c^2dt^2 - \frac{dr^2}{\left(1 - \frac{R_I}{r}\right)^2} - r^2d\theta^2 - r^2\sin^2\theta\ d\phi^2 \tag{26}$$

The above equations, in cosmology, besides being unsuitable given that they take the point of view of an observer in a very distant and inertial reference system, are moreover only very poor approximations since they consider the thread dl as a pure reflection and don't take care of the emerging radius R_I.

In the free fall reference system, instead, where we have to consider the left side of the thread equation corresponding to the proper time and proper distance of the observer, we correct this error using the "thread relation" 12 which is never reflection (which is only an abstraction), but always consummation:

$$d\vec{l} = cd\vec{\tau} - d\vec{\sigma} = d\vec{R_{I_\sigma}} \quad \text{or} \quad d\vec{s} = cd\vec{\tau} - d\vec{\sigma}(1+\sin_\blacklozenge \gamma)$$

Since $d\sigma = \frac{dr}{1-\sin_\blacklozenge \gamma}$ and $dr = dR_\omega \sin_\blacklozenge \gamma = R_\omega\,(1-\sin_\blacklozenge \gamma)\,d\gamma$ it follows $d\sigma = R_\omega d\chi$.

Denoting with:

$$b\,(\gamma) = \frac{1+2z}{1+z} = 2 - \frac{\tau}{R_\omega} = \left(1 + \frac{R_I}{r}\right) = \left(1 + \frac{r}{R_\omega}\right) = (1+\sin_\blacklozenge \gamma)$$

where the distance factor $b(\gamma)$ depends only on the distance between sender and receiver,

$$d\vec{s} = cd\vec{\tau} - d\vec{\sigma} - d\vec{R_{I_\sigma}} = cd\vec{\tau} - b(\gamma)d\vec{\sigma}$$

or more generally $d\vec{s} = cd\vec{\tau} - b(\gamma)d\vec{\Sigma}$
where $d\Sigma^2 = d\sigma^2 + \sigma^2 d\theta^2 + \sigma^2\sin^2(\theta)d\phi^2 = R_\omega^2[d\chi^2 + \chi^2(d\theta^2 + \sin^2(\theta)d\phi^2)]$
and at last the universe metric, expressed in the cosmological coordinate system (T, D_M), universal, which correspond to the frame of an observer falling freely, becomes :

$$ds^2 = c^2 d\tau^2 - b\,(\gamma)^2\left(R_\omega^2 d\chi^2 + R_\omega^2\chi^2 d\theta^2 + R_\omega^2\chi^2\sin^2\theta d\phi^2\right) \tag{27}$$

Or, introducing the scale factor

$$a\,(t) = \frac{1}{1+z} = \frac{\tau}{R_\omega} = \left(1 - \frac{R_I}{r}\right) = \left(1 - \frac{r}{R_\omega}\right) = (1-\sin_\blacklozenge \gamma)$$

and denoting with $dT = a\,(t)\,d\tau$ and with $dD_{M_{cdm}} = b\,(\gamma)\,R_\omega d\chi$

$$ds^2 = c^2\frac{dT^2}{a\,(t)^2} - \left(dD_{M_{cdm}}^2 + D_{M_{cdm}}^2 d\theta^2 + D_{M_{cdm}}^2\sin^2\theta d\phi^2\right) \tag{28}$$

Now, (see fig. 12), every point of the linear spacetime of the observer represents a spherical surface in the quadratic threedimensional space.
With $\frac{c}{H_0} \equiv R_\omega$ and since $\gamma = \arcsin\left(\frac{z}{1+z}\right)$ we have $d\gamma = \dfrac{1}{(z+1)^2\sqrt{1-\frac{z^2}{(z+1)^2}}}dz$
or since $z = \frac{\sin\gamma}{1-\sin\gamma}$ we have $dz = \dfrac{\cos\gamma}{(1-\sin\gamma)^2}d\gamma$.

Therefore we have:

$$D_{M_{cdm}} = (1+\sin\gamma)\int_0^\gamma R_\omega d\chi = \frac{c}{H_0}\cdot(1+\sin\gamma)\,\gamma \qquad = \frac{c}{H_0}\cdot\left(1+\frac{z}{z+1}\right)\arcsin\left(\frac{z}{z+1}\right) \tag{29}$$

$$D_{A_{cdm}} = aD_{M_{cdm}} = \frac{c}{H_0}\cdot\left(1-\sin^2\gamma\right)\gamma \qquad = \frac{c}{H_0}\cdot\frac{(2z+1)}{(z+1)^2}\arcsin\left(\frac{z}{z+1}\right) \tag{30}$$

$$D_{L_{cdm}} = \frac{D_{A_{cdm}}}{a^2} = \frac{c}{H_0}\cdot\frac{1+\sin\gamma}{1-\sin\gamma}\gamma \qquad = \frac{c}{H_0}\cdot(2z+1)\arcsin\left(\frac{z}{z+1}\right) \tag{31}$$

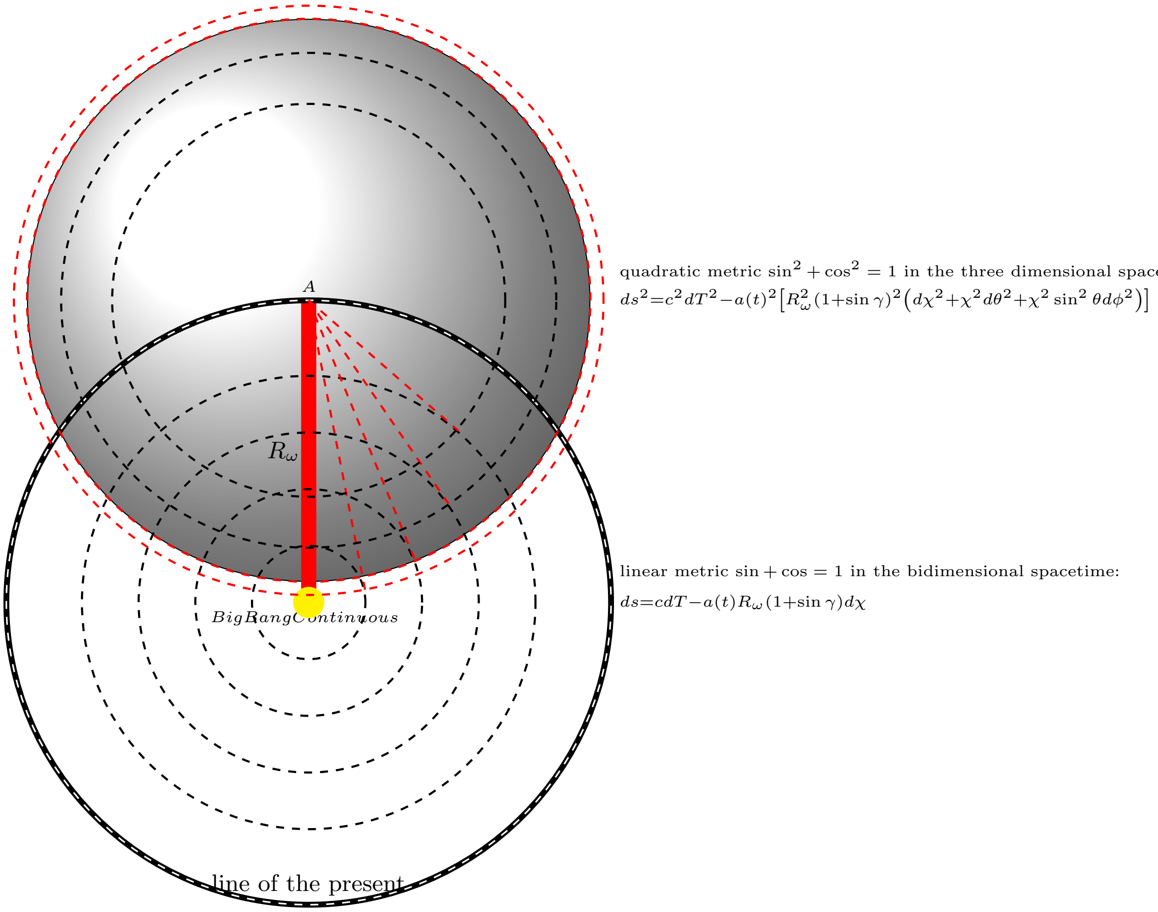


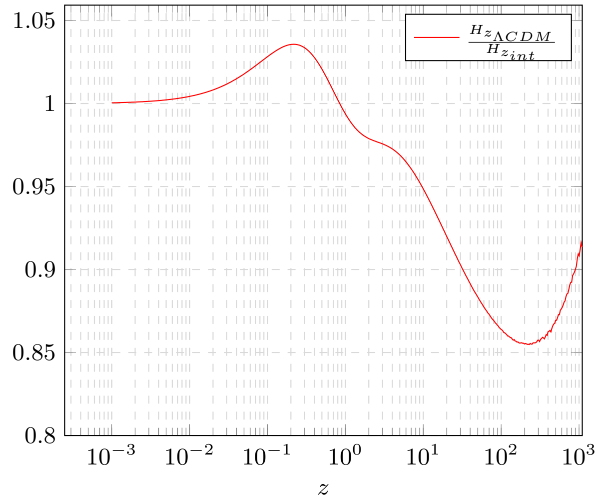
Figure 12. each individual on the line of the present has his own point of view on the universe Radius R_ω. For each individual, every point in the universe Radius R_ω represents a distance $\sigma + \tau = R_\omega$ in the linear spacetime that turns in the isomorphic spherical surface of equidistant points in the three-dimensional quadratic space of potentiality. The space of potentiality, interposed between the big bang and the line of the present in progress, is three-dimensional and flat.In the present model all space-time is in potency, with the exception of the Big Bang and the line of the present in act, and every instant is all new and all present. Every instant the whole universe recurs unfolding itself from the Radius all interconnected.

$$\Omega_{cdm} = \sin^{\diamondsuit}{}_{cdm} = \frac{(1+\sin\gamma)}{(1+\sin\gamma+\gamma\cos\gamma)^2} = \frac{\left(1+\dfrac{z}{z+1}\right)}{\left(1+\dfrac{z}{z+1}+\arcsin\left(\frac{z}{z+1}\right)\sqrt{1-\frac{z^2}{(z+1)^2}}\right)^2} \tag{32}$$

$$H_{cdm}(z) = \frac{dz}{dD_{M_{cdm}}} = H_0 E_{cdm}(z) = H_0 \cdot \frac{\cos\gamma}{(1-\sin\gamma)^2(1+\sin\gamma+\gamma\cos\gamma)} = H_0 \cdot \sqrt{\sin^{\diamondsuit}{}_{cdm} a^{-3}} \tag{33}$$

$$T_\omega = \int_0^\gamma \frac{a}{H_{cdm}(z)} dz = \frac{1}{H_0} \cdot \frac{\cos\gamma(\sin\gamma+4) - 2\gamma(\sin\gamma-1)^2 + 5\gamma}{4}$$
$$= \frac{1}{H_0} \cdot \left(\arcsin\sqrt{\frac{z+1/2}{z+1}} - \frac{\pi}{4} + \frac{\left(3z^2+6z+1\right)\arcsin\left(\frac{z}{z+1}\right) + \sqrt{2z+1}\,(5z+4)}{4\,(z+1)^2}\right) \tag{34}$$

From above we see that the $D_{M_{cdm}}$ depends on the dark matter R_I. Now, we have that, given an intermediate point C between two points A and B, $D_{M_{cdm}}(A \to B) \neq D_{M_{cdm}}(A \to C) + D_{M_{cdm}}(C \to B)$ since $R_I(A \to B) \neq R_I(A \to C) + R_I(C \to B)$.



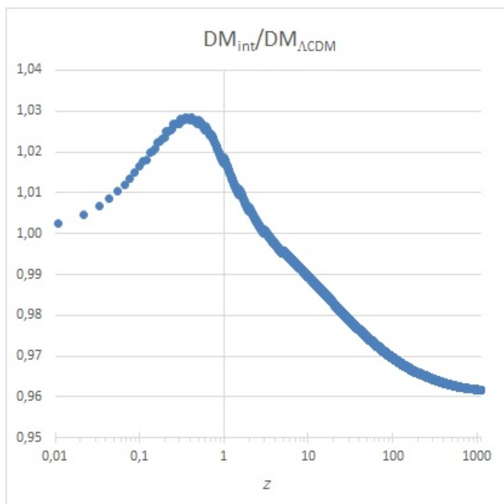


Figure 13. in the plot a comparison of H and D_M between the ΛCDM (with $\Omega_\Lambda \simeq 0.69933$ and $\Omega_m \simeq 0.30067$) and the present model.

Now, for the age of the universe, we have

$$T_{\omega_{age}} = \lim_{z\to\infty} T_\omega - \lim_{z\to 0} T_\omega = \left(\frac{5\pi}{8} - 1\right)\frac{1}{H_0}$$

On the other hand, in the minimal 6-parameter Lambda-CDM model, where it is assumed that curvature Ω_k is zero and $w = -1$, neglecting the radiation density ($\Omega_{\text{rad}} \sim 10^{-4}$), we have, for the Age of universe

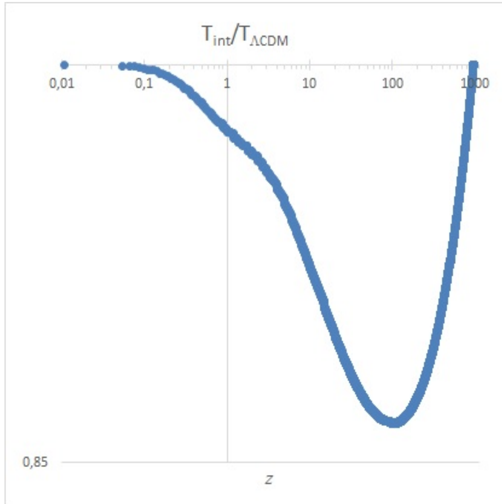
$$T_{\omega_{age}\Lambda CDM} = \frac{2}{3H_0\sqrt{\Omega_\Lambda}} \operatorname{arsinh} \sqrt{\left(\frac{\Omega_\Lambda}{\Omega_m}\right)}$$

Therefore, equating the two limits, we have that $T_{\omega_{age}} = T_{\omega_{age}\Lambda CDM}$ when $\Omega_\Lambda \simeq 0.69933$ and $\Omega_m \simeq 0.30067$. These are in fact the best values that fit the experimental data.

The above distances agree very well with the experimental data of observations (see Fig. 13 , 14, 15).

4.1.1. *Gravitation between complex individuals*

The study of gravitation between complex individuals is also preparatory to the study of the complete model of the universe. It gives us the possibility to introduce the difference between the gravitational and the cosmological component of distance.



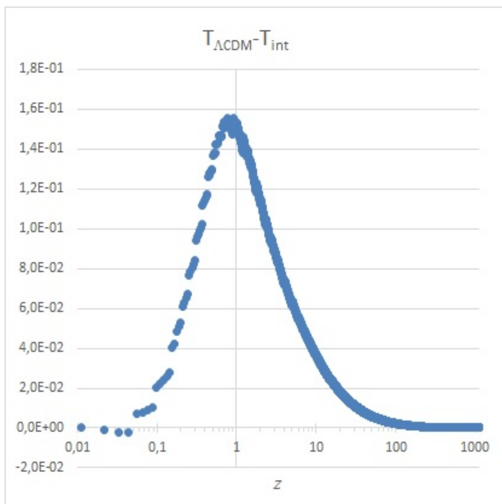


Figure 14. in the plot a comparison between $T_{\Lambda CDM}$ and T_{int}.

Analogously, in the gravitational intention between two individuals, we have a limit $t_{1Max} = R_\omega$ (see fig. 16)

From Tab. 1 we have

$$t_{max} = R_\omega = \frac{r_{k_{max}}^2}{R_K} \quad \text{or equivalently} \quad r_{k_{max}} = \sqrt{R_\omega R_K} \tag{35}$$

where we denote with R_K the gravitational mass and with r_k the gravitational distance. Now, t has a limit in R_ω, therefore $r_k = \sqrt{R_K t}$ has a limit in $r_{k_{max}} = \sqrt{R_K R_\omega}$. In other words, the gravitational mass of the individual delimits its space to an $r_{k_{max}} = \sqrt{R_K R_\omega}$. This is the space of Newton law and of general relativity. Nevertheless the measured distance, using light flux or angles etc., is r. Therefore, in the Dialogue relation ($\pi/2 > \gamma^\diamondsuit > 0$), it holds the equation:

$$r^2 = r_k^2 + r_i^2 \tag{36}$$

, where r_k is the gravitational component of the distance while r_i is the cosmological one.
To find the metric outside a massive body in the gravitational space, we start from:

$$ds^2 = e^\nu c^2 dt^2 - r_k^2 \left(d\theta^2 + \sin^2\theta d\phi^2\right) - e^{-\lambda} dr_k^2$$

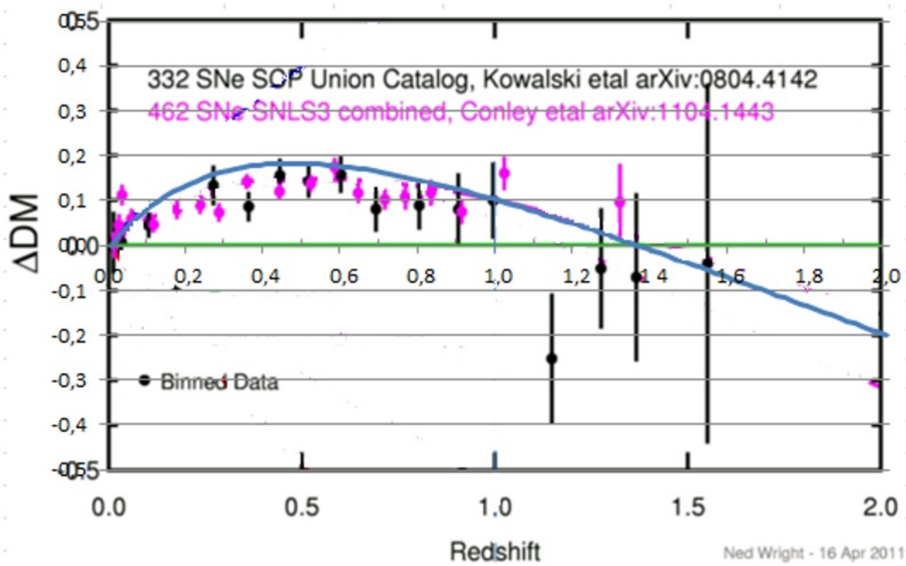


Figure 15. In the figure above, the brightness or faintness of distant supernovae relative to the empty Universe model is plotted vs redshift. Here, $\Delta(D_M) = 5\log_{10}\left(\frac{D_L}{R_\omega z\left(1+\frac{z}{2}\right)}\right)$ is the difference between the distance modulus determined from the computed flux D_L (see eq. 31) and the distance modulus computed from the redshift in the empty Universe model, and sigma is the standard deviation of the $\Delta(D_M)$. The result are in good agreement with the observed data.

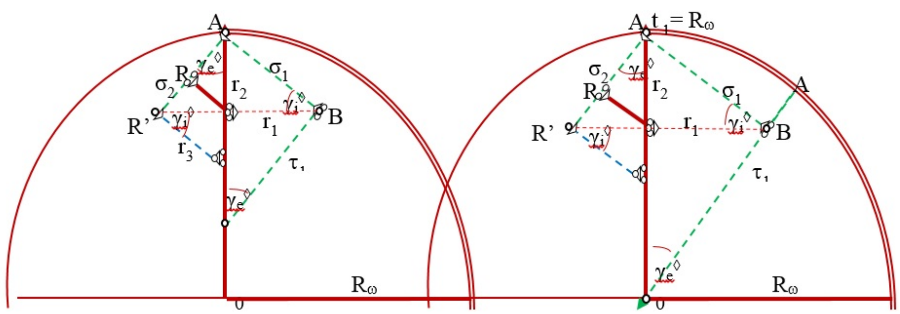


Figure 16. in the gravitational intention between two individuals, we have a limit $t_{1Max} = R_\omega$

which gives:

$$\begin{cases} e^{-\lambda}\left(\frac{\nu'}{r_k}+\frac{1}{{r_k}^2}\right)-\frac{1}{{r_k}^2} = -\frac{8\pi G}{c^4}\left[T^1_{b1}+T^1_{v1}\right] \\ e^{-\lambda}\left(\frac{\lambda'}{r_k}-\frac{1}{{r_k}^2}\right)+\frac{1}{{r_k}^2} = \frac{8\pi G}{c^4}\left[T^0_{b0}+T^0_{v0}\right] \\ \dot{\lambda} = 0 \end{cases}$$

Where T_b is the baryonic mass while T_v is the residual intention energy in the vacuum.
Now, in the case of central symmetry in the vacuum, T_b cancels but T_v does not.

$$\begin{cases} e^{-\lambda}\left(\frac{\nu'}{r_k}+\frac{1}{r_k^2}\right)-\frac{1}{r_k^2} = \frac{8\pi G}{c^4}T^{1*}_1 \\ e^{-\lambda}\left(\frac{\lambda'}{r_k}-\frac{1}{r_k^2}\right)+\frac{1}{r_k^2} = \frac{8\pi G}{c^4}T^{0*}_0 \end{cases}$$

Letting $\lambda = -\nu$ and $T^{0*}_0 = -T^{1*}_1 = \frac{c^4}{8\pi G}\left(\frac{4}{rR_\omega}-\frac{3}{R_\omega^2}\right)$ we reduce to the only equation:

$$e^{-\lambda}\left(\frac{\lambda'}{r_k}-\frac{1}{{r_k}^2}\right)+\frac{1}{{r_k}^2} = \frac{4}{rR_\omega}-\frac{3}{R_\omega^2} \tag{37}$$

Therefore, outside r_{kmax}, in the vacuum, $r = R_\omega$ and

$$e^{-\lambda}\left(\frac{\lambda'}{r_k}-\frac{1}{r_k^2}\right)+\frac{1}{r_k^2} = \frac{1}{(R_\omega)^2} \tag{38}$$

which admits two solutions:

$$e^{-\lambda} = \left(1 - \frac{k_0}{r_k}\right)^2 \quad and \quad e^{-\lambda} = 1 - \left(\frac{k_0}{r_k}\right)^2 \tag{39}$$

for both we get :

$$\frac{k_0^2}{r_{k\,\max}^4} = T_0^0 = \frac{1}{R_\omega^2} \tag{40}$$

where replacing k_0 with R_K, we have

$$c^2 d\tau^2 = \left(1 - \frac{R_K}{r_k}\right)^2 c^2 dt^2 - \frac{dr_k^2}{\left(1 - \frac{R_K}{r_k}\right)^2} - r_k^2 d\phi^2 \tag{41}$$

And

$$\frac{R_K^2}{r_{k\,\max}^4} = \frac{1}{R_\omega^2} \quad \text{from which} \quad r_{k\,\max} = \sqrt{R_K R_\omega} \tag{42}$$

To find the relation between the terms of the equation $r_k^2 + r_i^2 = r^2$, we can set, as well as $t = \frac{r_k^2}{R_K}$, the analogous equation $t = \frac{r_i^2}{R_I} = \frac{r_i^2}{r^2} R_\omega$ and therefore:

$$t = \frac{r_k^2}{R_K} = \frac{r_i^2}{r^2} R_\omega \qquad \text{or} \qquad \frac{r_k^2}{R_K} - \frac{r_i^2}{r^2} R_\omega = 0$$

$$\text{or} \qquad \frac{r_k^2}{R_K} - \frac{r^2 - r_k^2}{r^2} R_\omega = 0 \qquad \text{or} \qquad \frac{1}{R_K} + \frac{1}{R_I} = \frac{R_\omega}{r_k^2}$$

$$\text{and at last} \qquad r_k = \sqrt{\frac{R_K}{R_K + R_I}} r \qquad \text{and} \qquad r_i = \sqrt{\frac{R_I}{R_K + R_I}} r$$

and defining $\sin\xi = \sqrt{\frac{R_K}{R_K+R_I}} = \frac{\sqrt{\rho_b}}{\sqrt{\rho_b+\rho_{cdm}}}$ and $\cos\xi = \sqrt{\frac{R_I}{R_K+R_I}} = \frac{\sqrt{\rho_{cdm}}}{\sqrt{\rho_b+\rho_{cdm}}}$ we have:

$$r_k = r\sin\xi \quad \text{and} \quad r_i = r\cos\xi$$

Therefore $A = A_K = \frac{R_K}{r_k^2} = A_I = \frac{R_I}{r_i^2} = A_K \sin^2\xi + A_I \cos^2\xi = \frac{R_K+R_I}{r^2}$

At last, since $A_{K\_centrifugal} = \frac{v_{centrifugal}^2}{r_k} = A_{K\_gravitational} = \frac{R_K}{r_k^2} = \frac{R_K+R_I}{r^2} = \frac{R_K}{r^2} + \frac{1}{R_\omega}$

We have

$$v_{centrifugal} = \sqrt{V_K} = \sqrt[4]{\frac{R_K + R_I}{r^2} R_K} \tag{43}$$

and the limits

$$r_{K_\infty} = \lim_{r\to\infty} \sqrt{\frac{R_K}{R_K + R_I}} r = \sqrt{R_K R_\omega} \qquad v_\infty = \lim_{r\to\infty} \sqrt[4]{\frac{R_K + R_I}{r^2} R_K} = \sqrt[4]{\frac{R_K}{R_\omega}}$$

On radial orbits, stars plunging in and out of the galactic center, $R_\omega = cH_0^{-1}$, while on circular orbit $R_\omega = 2\pi c H_0^{-1}$. In motion of satellite galaxies around normal galaxies at distances 50-500 kpc (see Klypin, A., Prada, F. 2009), the rotation curves are considerably affected by the radial component of the motion which gradually decreases as moving away from the host galaxy. The the maximum speed $v_\infty = \sqrt[4]{\frac{R_K}{R_\omega}}$ consequently decreases as $^{-}\sqrt[4]{2\pi}$ as the initial radial speed turns into tangential speed moving away from the host galaxy consistently with the experimental results.
The radial component is instead usually negligible in the galaxy rotation curves of stars.

We find that the predictions for the galaxy rotation curves from Intention physics, MSTG and Milgrom's Mond agree remarkably for all of the 101 galaxies reported in J.R.Brownstein and J.W.Moffat 2005 (see J. R. Brownstein and J. W. Moffat 2005). In particular, we adopted the mass distribution model $R_K(r) = R_{K_{Tot}} \left(\frac{r}{r_c+r}\right)^{3\beta}$ of a spherically symmetric galaxy, where r_c is the inner core and $\beta = 1$ for HSB galaxies and 2 for LSB and Dwarf galaxies, and used the $R_{K_{Tot}}$ and r_c of the MSTG solution, with no need of any further parameter. It is relevant that the Newton velocity, once replaced the total distance r with the distance r_k along the K axis, are consistent with the experimented values everywhere. In the figure 17 and figure 18 below, we have $r_k = f(r)$ where r_k, at first close to r, approaches asymptotically $r_{k_{max}}$ increasing r.

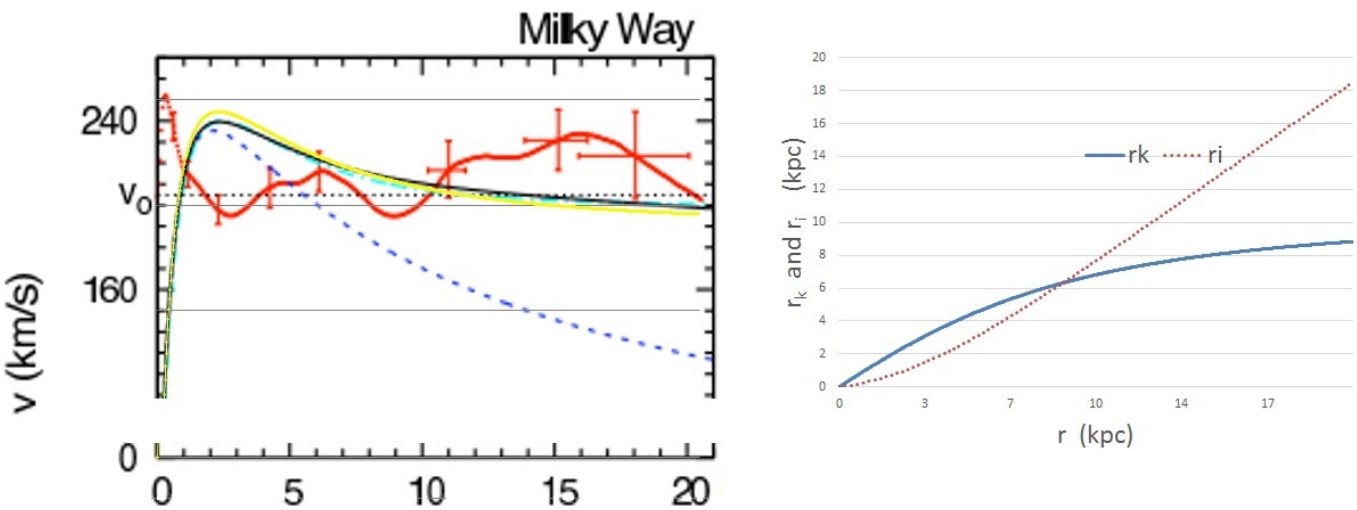


Figure 17. Rotation curve for the Milky Way. The red points (with error bars) are the observations. The solid yellow line is the rotation curve determined by Intention Physics (eq. 43), the short dashed blue line is the Newtonian galaxy rotation curve. Both rotation curves are the best fit to a parametric mass distribution (independent of luminosity observations) a two parameter fit to the total galactic Mass, $M = 9.12\ 10^{10}\ M_{\odot}$, and a core radius $r_c = 1.04$ kpc and $\beta = 1$. On the right the trend of r_k and r_i

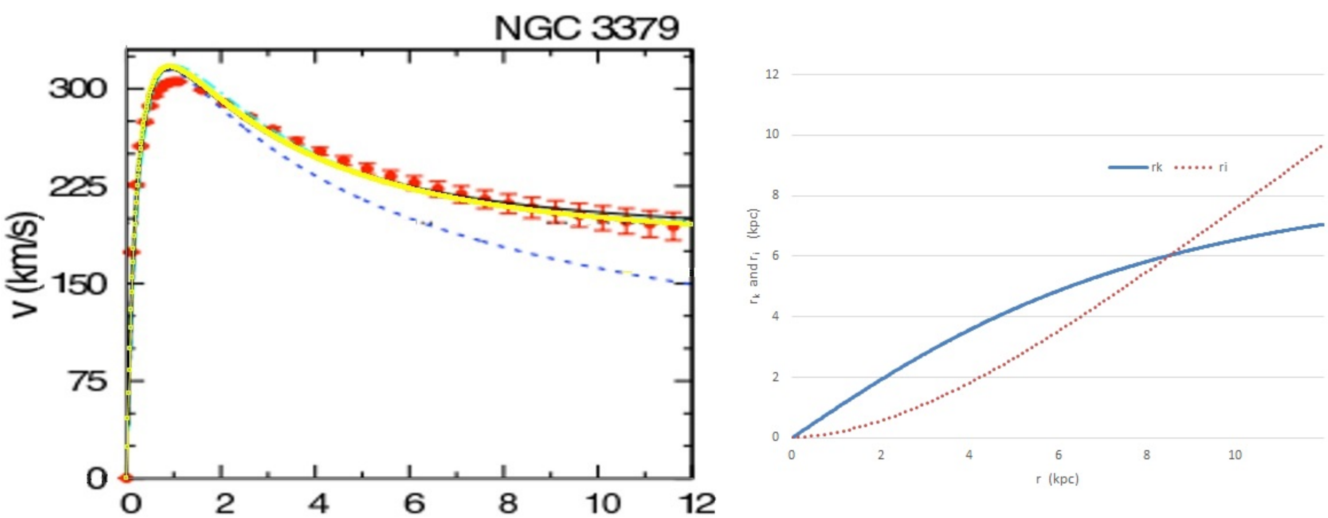


Figure 18. Rotation curve for the elliptical galaxy NGC 3379. The red points (with error bars) are the observations. The solid yellow line is the rotation curve determined by Intention Physics (eq. 43), the short dashed blue line is the Newtonian galaxy rotation curve. Both rotation curves are the best fit to a parametric mass distribution (independent of luminosity observations) a two parameter fit to the total galactic Mass, $M = 6.99\ 10^{10}\ M_{\odot}$, and a core radius $r_c = 0.45$ kpc and $\beta = 1$. On the right the trend of r_k and r_i

At last, since

$$V_K = \frac{R_K}{r_k} = \frac{R_K}{r}\frac{1}{\sqrt{\frac{R_K}{R_K+R_I}}} = \frac{R_K}{r}\sqrt{1+\frac{R_I}{R_K}} = \frac{R_K}{r}\sqrt{1+\frac{r^2}{r_{k_{max}}^2}} \tag{44}$$

and therefore

$$L = g_{00} = (1 - V_K)^2 \tag{45}$$

the dark matter R_I gives reason of orbital velocity in galaxies and lensing.
Very interesting is the determination of the barycentre. From

$$\sum_{i=1}^{n} (M_{K_i} \ddot{r}_{k_i}) = M_{K_{Tot}} \ddot{r}_k$$

we have the barycentre coordinates:

$$r_k = \frac{\sum_{i=1}^{n} M_{K_i} r_{k_i}}{M_{K_{Tot}}} = \frac{\sum_{i=1}^{n} \frac{M_{K_i}^{3/2}}{\sqrt{M_{K_i} + \frac{r_i^2}{R_\omega}}} r_i}{M_{K_{Tot}}} = \sum_{i=1}^{n} \frac{M_{K_i} r_{k_{max_i}}}{M_{K_{Tot}}} \frac{r_i}{\sqrt{r_{k_{max_i}}^2 + r_i^2}} \tag{46}$$

Where the barycenter, outside the $r_{k_{max}}$ perimeter of any attractor, where the Acceleration becomes constant and equal to $1/R_\omega$, reduces to a gradient which emerges from and reveals a contour plane.
A huge quantity of mass, fractioned in little parts far away, is negligible with respect to a much smaller quantity of mass concentrated in bigger parts.

At last, the presumed direct proof of Dark matter [*Clowe et al. 2006*] , given by the recent observed collision of two clusters of galaxies (”bullet cluster” 1E0657-56), where it is shown that the sources of gravity in the cluster are not located where the ordinary matter is located, can be explained by the correct determination of the barycentre. Intention physics, indeed, predicts the irrelevance of the huge quantity of dominant tiny matter component, that is the X-ray plasma clouds, with respect to the very more large masses constituted by the galaxy clusters.The barycentre gives reason also of the large structure of universe.

4.2. *The complete Universe metric*

We are now ready to analyze the complete Universe metric, that is dark matter with the add on of baryonic matter and radiation. Normalizing the present-day dimensionless ratio of density components of universe we have:

$$\Omega_{cdm} = \frac{\Omega_{cdm}}{\Omega_{Tot}} = \frac{1}{1 + (2\pi^2)^{-1} + \alpha^2} = 0.951734 \tag{47}$$

$$\Omega_b = \frac{\Omega_b}{\Omega_{Tot}} = \frac{(2\pi^2)^{-1}}{1 + (2\pi^2)^{-1} + \alpha^2} = 0.048215 \tag{48}$$

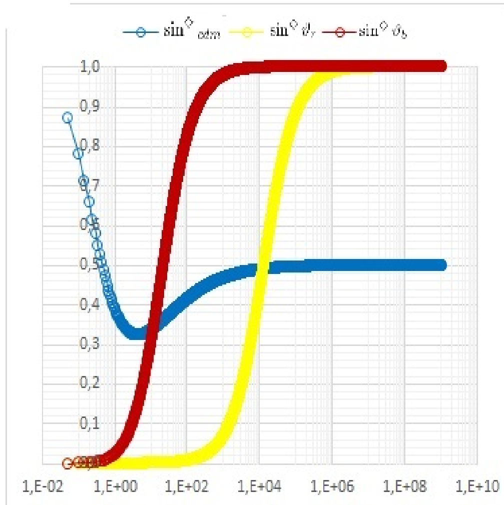
$$\Omega_\gamma = \frac{\Omega_\gamma}{\Omega_{Tot}} = \frac{\alpha^2}{1 + (2\pi^2)^{-1} + \alpha^2} = 0.0000506811 \tag{49}$$

As usual, the radiation density parameter, Ω_r, is the sum of photons and relativistic neutrinos $\Omega_r = \Omega_\gamma(1{+}0.2271 N_{eff})$ where N_{eff} is the effective number of neutrino species (the standard value is $N_{eff} = 3.046$) .
While in the external gravitational interaction between two individuals and far from the Radius we have neglected the torsion, this can no longer be neglected in cosmology. Therefore we have to generalize the pure dark matter metric of sec. 4.1 taking into account the torsion potentials for radiation and baryonic matter with respect to dark matter.
The whole universe is enfolded and unfolds from the radius R_ω . In it are enfolded and from it unfold amorones (dark matter), baryonic matter and radiation. For any component, radiation and baryonic matter components, it is as if its radius $R_\omega(a) = \tau(a)$ had grown from zero, at the time of the Big Bang, to its current value R_ω, twisting gradually (ϑ torsion) around the barycenter:

$$\Omega_r(\vartheta) = \Omega_r \sin^\diamondsuit \vartheta_r \tag{50}$$

$$\Omega_b(\vartheta) = \Omega_b \sin^\diamondsuit \vartheta_b \tag{51}$$

$$\Omega_{cdm}(\vartheta) = \left(\Omega_{cdm} + \Omega_r \cos^\diamondsuit \vartheta_r + \Omega_b \cos^\diamondsuit \vartheta_b\right) \sin^\diamondsuit{}_{cdm} \tag{52}$$



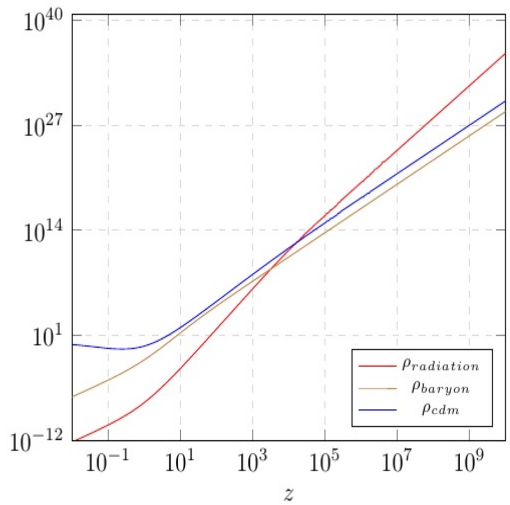


Figure 19. on the left panel the trend of the sin of the cosmic torsion angle for radiation and baryon matter and of the sin of the cosmic angle for CDM. On the right panel the trend of the density for radiation, baryon matter and CDM.

where, from eq. (32), $\sin^{\diamond}{}_{cdm} = \frac{(1+\sin\gamma)}{(1+\sin\gamma+\gamma\cos\gamma)^2}$, and, from the eq. (13),

$$\sin^{\diamond}\vartheta_r = \frac{\frac{\mu_r}{R_{tot}}\sin^2\gamma}{(1-\sin\gamma)+\frac{\mu_r}{R_{tot}}\sin^2\gamma} = \frac{\frac{\mu_r}{R_{tot}}\left(z/(1+z)\right)^2}{1/\left(1+z\right)+\frac{\mu_r}{R_{tot}}\left(z/(1+z)\right)^2} \tag{53}$$

$$\sin^{\diamond}\vartheta_b = \frac{\frac{\mu_b}{R_{tot}}\sin^2\gamma}{(1-\sin\gamma)+\frac{\mu_b}{R_{tot}}\sin^2\gamma} = \frac{\frac{\mu_b}{R_{tot}}\left(z/(1+z)\right)^2}{1/\left(1+z\right)+\frac{\mu_b}{R_{tot}}\left(z/(1+z)\right)^2} \tag{54}$$

with $\frac{\mu_r}{R_{tot}} = \Omega_r\left(1-\Omega_r\right)$ and $\frac{\mu_b}{R_{tot}} = \Omega_b\left(1-\Omega_b\right)$ and $\cos^{\diamond}\vartheta = 1-\sin^{\diamond}\vartheta$

Since from $H(a) \equiv \frac{\dot{a}}{a}$ we have $d\tau(a) = \frac{c}{H(a)}\frac{da}{a}$, we arrive at last to:

$$H(z) = H_0\sqrt{\Omega_r(\vartheta)\,(1+z)^4 + \Omega_b(\vartheta)\,(1+z)^3 + \Omega_{cdm}(\vartheta)\,(1+z)^3} = H_0 E(z) \tag{55}$$

$$D_M = \int\limits_0^z \frac{dz}{H(z)} \tag{56}$$

$$T_\omega = \int\limits_\infty^z \frac{a}{H(z)}dz \tag{57}$$

and

$$\cos\xi = \frac{\sqrt{\Omega_{cdm}(\vartheta)\,(1+z)^3}}{E(z)} \tag{58}$$

$$\sin\xi_b = \frac{\sqrt{\Omega_b(\vartheta)\,(1+z)^3}}{E(z)} \tag{59}$$

$$\sin\xi_r = \frac{\sqrt{\Omega_r(\vartheta)\,(1+z)^4}}{E(z)} \tag{60}$$

at last since $D_M^{-2} = D_{M_{cdm}}^{-2} + D_{M_b}^{-2} + D_{M_r}^{-2} = D_M^{-2}\left(\cos^2\xi + \sin^2\xi_b + \sin^2\xi_r\right)$

$$D_{M_{cdm}} = D_M/\cos\xi \tag{61}$$

$$D_{M_b} = D_M/\sin\xi_b \tag{62}$$

$$D_{M_r} = D_M/\sin\xi_r \tag{63}$$

In particular, in the radiation era, the radiation component produces an almost identical distance scale to that of the ΛCDM model. Since radiation (and baryonic matter) generates a torsion of the Radius of the universe R_ω, its role, primary in the age of radiation, is negligible in that of matter. We must distinguish between:

1. the radiation-dominated era, when $\rho_r >> \rho_b + \rho_{cdm}$ where the time and distances scales with the redshift are indistinguishable from the ΛCDM model and likewise all epochs except that of inflation, unnecessary in the present model ,

2. and the matter-dominated epoch, when $\rho_b + \rho_{cdm} >> \rho_r$, which includes all the remaining eras of the ΛCDM model. The time and distances scale with the redshift of the ΛCDM model and of the present model are only very slightly different.

4.2.1. *The Radiation-dominated era*

In the Radiation-dominated epoch, where takes place the Big-Bang nucleosynthesis (BBN), we have $cd\tau(a) \simeq R_\omega \frac{ada}{\sqrt{\Omega_r}\sin\vartheta_r}$ and therefore $c\tau \simeq \frac{R_\omega}{\sqrt{\Omega_r}}\int\frac{ada}{\sqrt{\sin\vartheta_r}}$ where $\sin^\diamond\vartheta_r \simeq 1$. The ΛCDM model and the present model are indistinguishable in this era. The present model therefore shares the same nucleosynthesis theory as the ΛCDM model.

4.2.2. *The Matter-dominated era*

The time and distances scale with the redshift of the ΛCDM model and of the present model are only very slightly different in the matter-dominated era. Therefore, as in the ΛCDM model we have $r_{s_{drag}} = \int_z^\infty \frac{c_s(z)}{H(z)}dz$, where $c_s(z)$ is the sound speed,

$$c_s\,(z) = \frac{c}{\sqrt{3}}\frac{1}{\sqrt{1+\frac{3\Omega_b}{4\Omega_\gamma}a}}$$

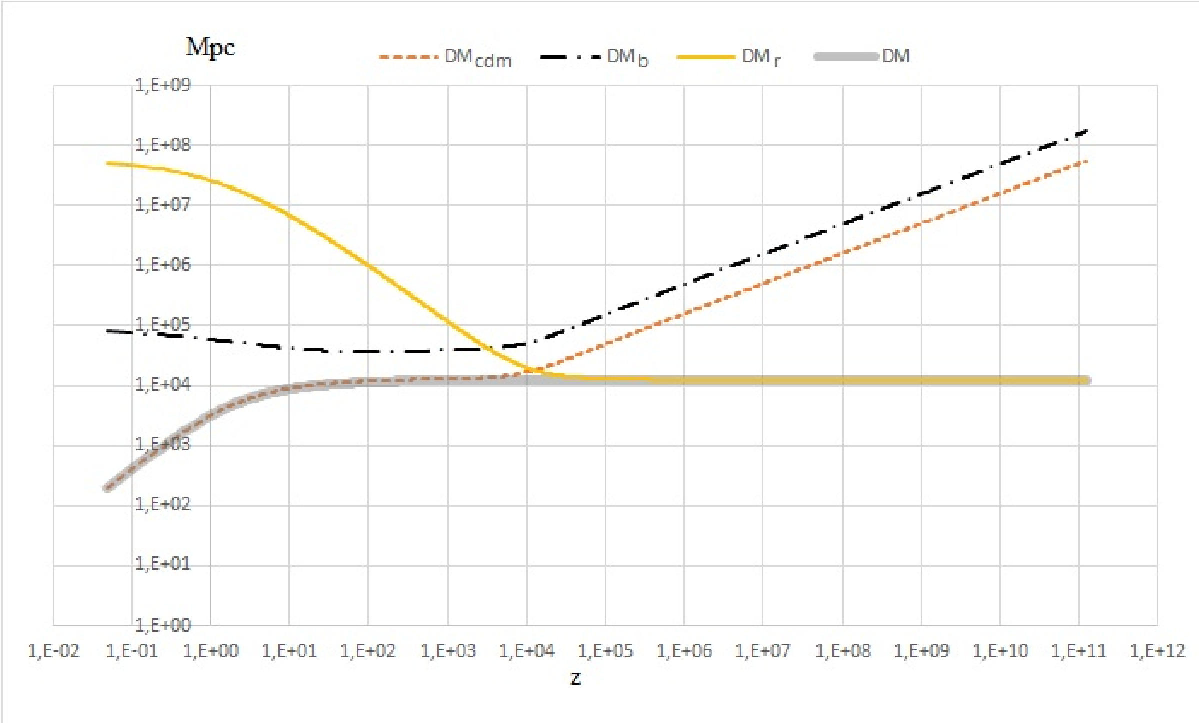


Figure 20. in the plot the trend of the D_M components with redshift.

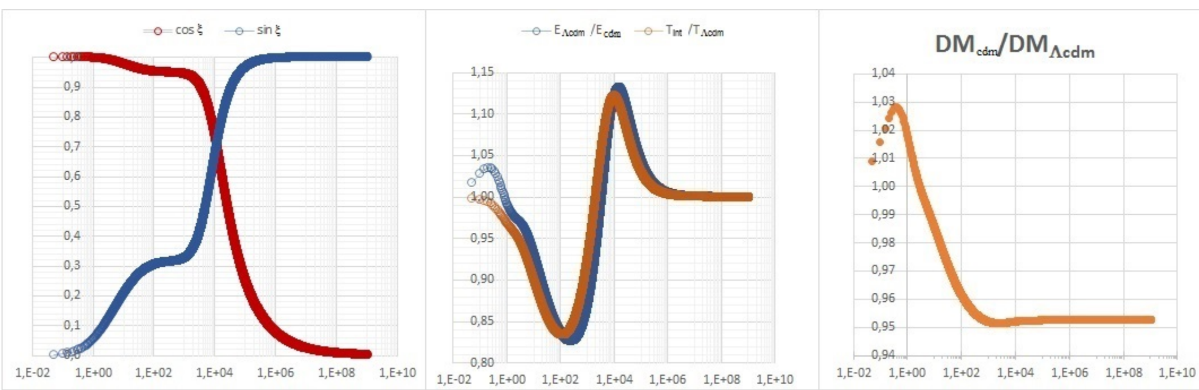


Figure 21. in the plot a comparison between time and distances in the ΛCDM model and the present model.

The acoustic oscillations in l seen in the CMB power spectra correspond to a sharply-defined acoustic angular scale on the sky, given by:

$$\theta_* = \frac{r_s^*}{D_M} \quad \text{(with the metric of the standard model)}$$

$$\theta_* = \frac{r_s^*}{D_{M_{cdm}}} = \frac{r_s^* \cos\xi}{D_M} \quad \text{(with the metric of the present model)}$$

where r_s^* is the comoving sound horizon at recombination quantifying the distance the photon-baryon perturbations can influence, D_M is the comoving angular diameter distance that maps this distance into an angle on the sky, $\cos\xi \simeq 0.94311 + (1090 - z) \cdot 0.00001$ in the neighbourhood of Z=1090, represents the cosmic component (without the baryonic one) of the D_M. *Planck* measures:
$100\theta_* = 1.04109 \pm 0.00030$ (68%, TT,TE,EE+lowE), a measurement with 0.03% precision.

It is the CMB analogue of the transverse baryon acoustic oscillation scale r_{drag}/D_M measured from galaxy surveys, where r_{drag} is the comoving sound horizon at the end of the baryonic-drag epoch. The BAO measurement constraint can be expressed as a approximate relation between r_{drag} and h as:

$$\left(\frac{r_{drag}h}{\text{Mpc}}\right)\left(\frac{0.3}{\Omega_m}\right)^{0.4} = 101.056\pm 0.036 \quad \text{(with the scale ladder of the standard model see. (see Planck Collaboration, N. Aghanim}$$

$$\left(\frac{r_{drag}h}{\text{Mpc}}\right) = 101.766 \pm 0.036 \quad \text{(with the scale ladder of the present model)}$$

Therefore from the two constraints:

$$\frac{r_s^* \cos\xi}{D_M} = \theta_* \simeq 0.0104109 \tag{64}$$

$$r_{s_{drag}} h \simeq 101.766 Mpc \tag{65}$$

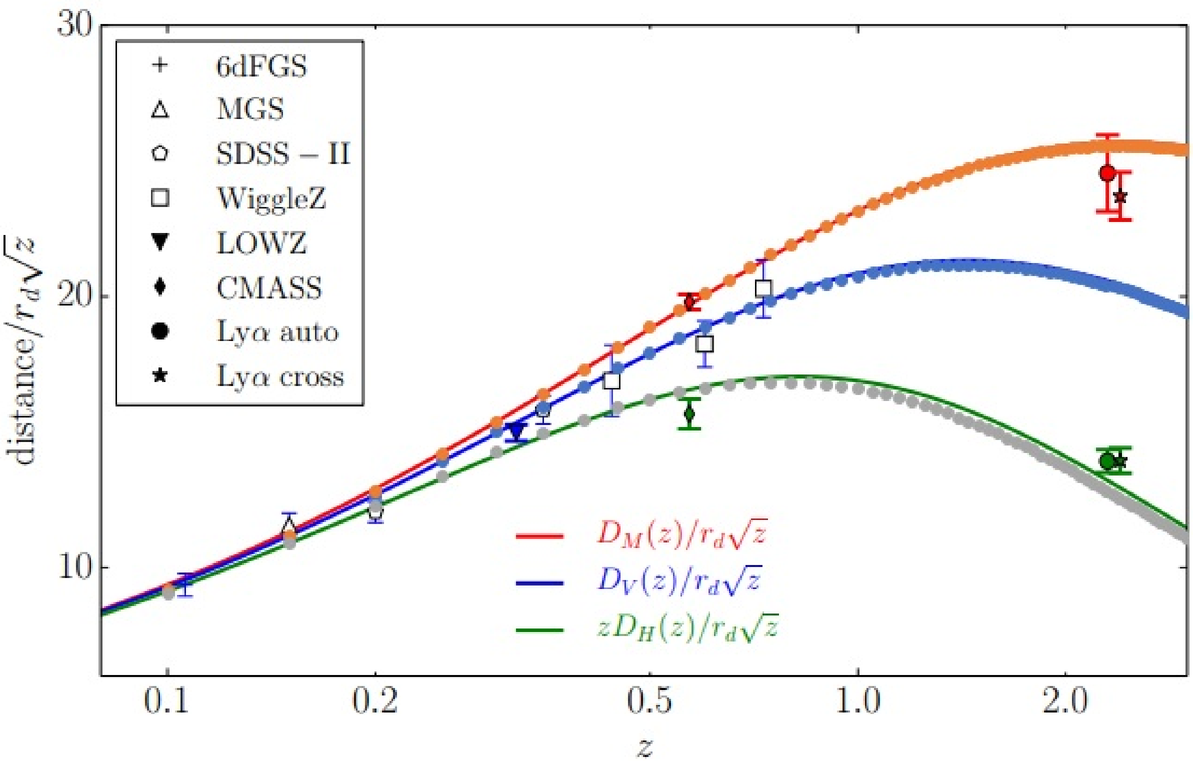


Figure 22. The BAO "Hubble diagram" (Aubourg . et al. 2014 (see Aubourg . et al. 2014)) from a world collection of detections. Blue, red, and green points show BAO measurements of D_V/r_d, D_M/r_d, and zD_H/r_d, respectively, from the sources indicated in the legend. These can be compared to the correspondingly colored lines, which represents predictions of the fiducial Planck ΛCDM model (with $m = 0.3183$, $h = 0.6704$) and the prediction of the Intention model (dotted line) when $r_{s_{drag}} = 101.766/h$ Mpc. The scaling by $\sqrt{z}$ is arbitrary, chosen to compress the dynamic range sufficiently to make error bars visible on the plot. Filled points represent BOSS data, which yield the most precise BAO measurements at $z < 0.7$ and the only measurements at $z > 2$. For visual clarity, the $Ly\alpha$ cross-correlation points have been shifted slightly in redshift; auto-correlation points are plotted at the correct effective redshift.

and the scale ladder of the present model, we find the following useful approximate formulas:

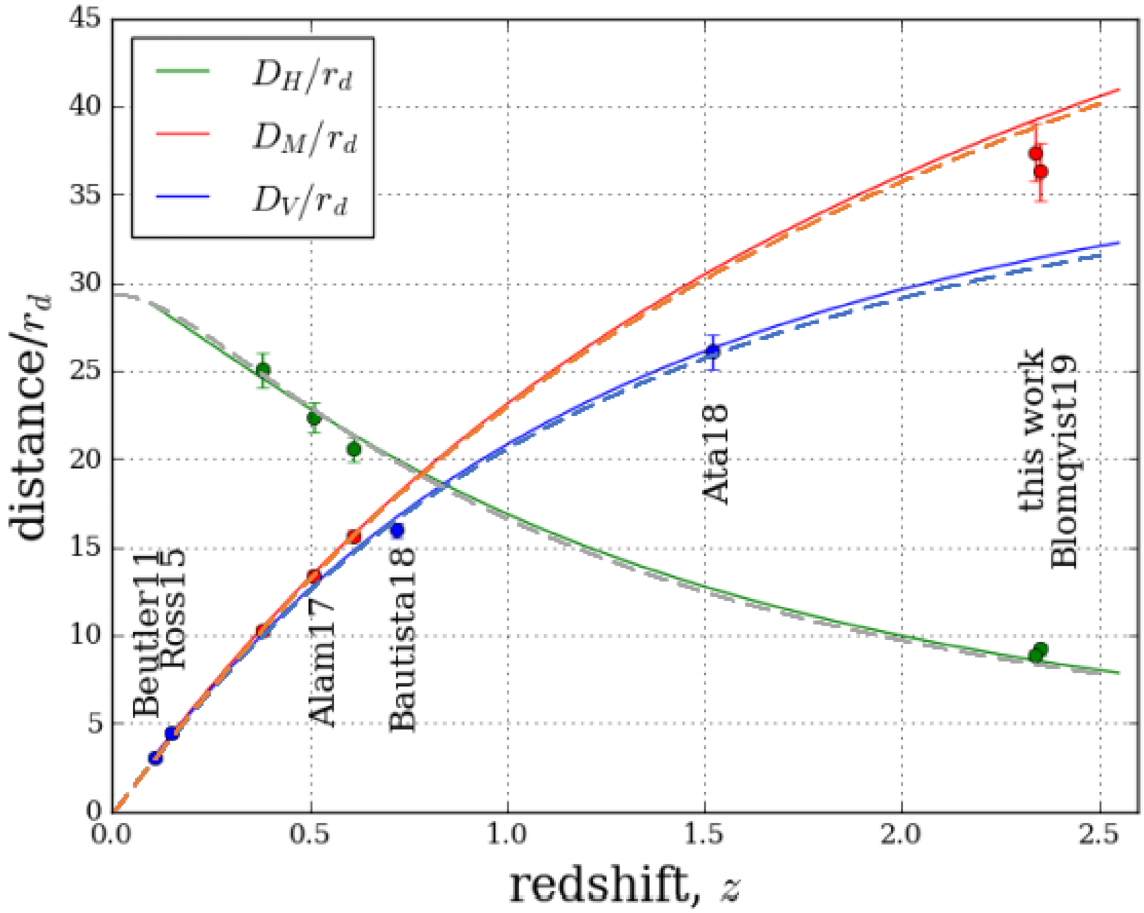


Figure 23. BAO measurement (Agathe VS. et al. 2019(see Agathe VS. et al. 2019)) of D_H/r_d andD_M/r_d using BOSS galaxies (Alam et al. 2017), $Ly\alpha$ absorption in BOSS-eBOSS quasars (Agathe et al. 2019) and correlation between BOSS-eBOSS quasars and $Ly\alpha$ absorption (Blomqvist et al. 2019). Other measurements give D_V/r_d, with $D_V = D_M^{2/3}(zD_H)^{1/3}$, using galaxies (Beutler et al. (2011), Ross et al. (2015), Bautista et al. (2018)) and BOSS-eBOSS quasars (Ata et al.2018). Solid lines show the Pl2015 values (Planck Collaboration et al.2016). These can be compared to the correspondingly colored lines, which represents predictions of the fiducial Planck ΛCDM model (with $m = 0.3183$, $h = 0.6704$) and the prediction of the Intention model (dashed lines) when $r_{s_{drag}} = 101.766/h$ Mpc.

$$r_s^* \simeq \frac{100.13}{h} Mpc \tag{66}$$

$$r_{s_{drag}} \simeq \frac{101.766}{h} Mpc \tag{67}$$

$$z^* \simeq 1126.002 - 6336\Omega_b + 379.5h \tag{68}$$

$$z_{drag} \simeq 1099.956 - 5140\Omega_b + 293h \tag{69}$$

and by imposing the two further constraints:

$$z^* \simeq 1090$$

$$z_{drag} \simeq 1060$$

we find the approximate

$$\Omega_b \simeq 0.0056 + 0.06h \tag{70}$$

Since the radiation density is:

$$\Omega_r = \Omega_\gamma \left(1 + 0.2271 N_{eff}\right) = 2.469 \times 10^{-5} h^{-2} \left(1 + 0.2271 N_{eff}\right) \text{ for } T_{cmb} = 2.725 \text{ K} \tag{71}$$

the above eq. (70) alone, given the eq. (71), guarantees that the scale ladder of the present model fits the BAO measurements (see fig.22 and fig.23) on $z_{drag} \simeq 1060$ and matches the acustic angular scale on $z^{*} \simeq 1090$.

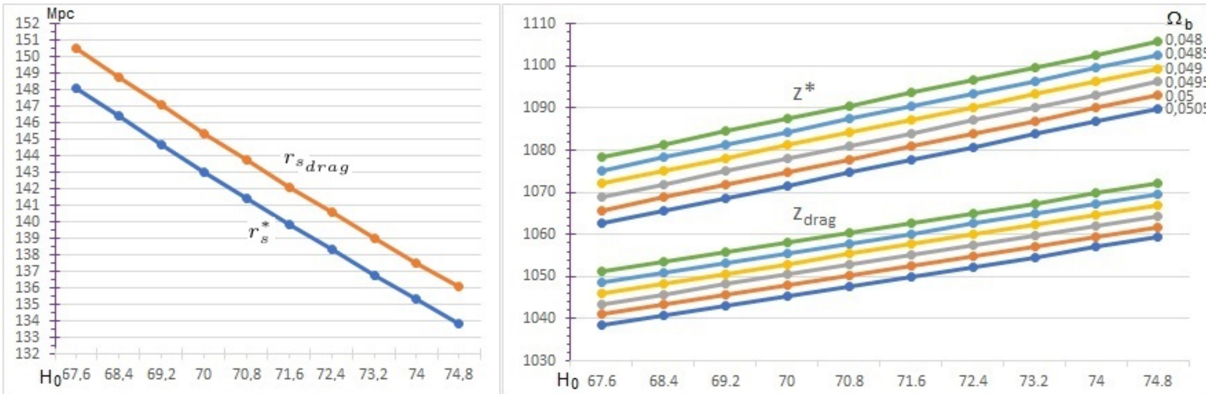


Figure 24. Sound Horizon: in the plot the comoving sound horizon at recombination r_s^* and the comoving sound horizon at the baryon drag epoch with the relative redshifts

At last we find that the equation (49) ($\Omega_\gamma = 5.068 \times 10^{-5}$) determine

$$H_0 = \sqrt{\frac{2.469 \times 10^{-5}}{5.06811 \times 10^{-5}}} \times 100 = 69.8 \pm 0.01 \tag{72}$$

and the age of the Universe $= 13.464 \pm 0.003$ Gyr and that this result, together with the equation (48) ($\Omega_b = 0.048215$), satisfies the eq.(70) .

5. CONCLUSION

In the present cosmology, the Big Bang is part of a continuous process where all space-time is in potency, with the exception of the Big Bang and of the line of the present in act, and every instant is all new and all present. Every instant the whole universe recurs unfolding itself from the all interconnected Radius. It naturally provides the very specific initial conditions which, in the standard model, make the ad hoc hypothesis of inflation necessary. The Amoroni, indeed, in se indistinguishable from each other, all in potency, are the substance of the Radius $R_\omega \equiv Time \equiv Space \equiv Matter$ of the universe and are the foundation of the uniform cosmological background and of the initial almost scale-invariant distribution of primordial density perturbations as seen, for example, in the cosmic microwave background (CMB) radiation, on scales far larger than the causal horizon at the time the CMB photons last scattered.

The present model, which exhibits an identical distance scale of the ΛCDM model in the radiation era, and an almost identical distance scale in the following ones, shares its successes and corrects its mistakes solving the problem of the rotation in the inner parts of spiral galaxies and the problem of the discrepancy between inverse and direct BAO Calibration and H_0 measurement between these two opposite approaches.

In summary it explains:

1. Homogeneity problem: The Amoroni, in se indistinguishable from each other, all in potency, are the substance of the Radius $R_\omega \equiv Time \equiv Space \equiv Matter$ of the universe and are the foundation of the uniform cosmological background and of the initial almost scale-invariant distribution of primordial density perturbations. Furthermore, from the "part of relationship" (16), it arises an electron every $\pi R_\epsilon^{\circ 2}$ area and the matter rises uniformly distributed in the universe.

2. Isotropy problem: in the matter formation process, every direction is equivalent.

3. Horizon problem: it is not a problem since the entire Universe is a manifestation of the point of the Radius which, from time to time, is enacted through the Big Bang manifesting itself in the entire Universe.

4. Flatness problem: depends on the metric adopted. In the FLRW metric, which adopts the point of view of a reference system in free fall, the acceleration vanishes and the universe is flat. In the Schwarzschild metric, which adopts the point of view of a fixed reference system in a gravitational field, the universe is closed, has a radius equal to R_ω.

5. matter-antimatter asymmetry problem: the asymmetry matter-antimatter is only apparent. It is the same as the arrow of time. The matter emerges on the line of the present in act and then recedes as antimatter. In the conversion, which takes place only on the line of the present in act and in the Big Bang, we have the coexistence between matter and antimatter.

6. total mass problem: the matter horizon coincides with the cosmic horizon ad therefore all the matter of universe is observable and must be $R_\omega \simeq \alpha^{-1} e^{\alpha^{-1}}$

7. Structure formation problem: the extra energy R_I and the barycenter favors the formation of large structure. Furthermore, apart from leptons and universe, the proportion defined by eq. (16) $R_\omega : R_{whole} = R_{whole} : R_{part}$, starting from $R_{part} = R_\epsilon^\circ$, applies recursively through $R_{whole} \to R_{part}$, providing all the mirroring universe scale giving rise to stars $R_{\bullet s}$ and galaxies $R_{\bullet g}$ and clusters and so on.

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