RESEARCH ARTICLE

A New Solution for Dark Matter and a Better Understanding of Quantum Mechanics

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ABSTRACT

Time is not a simple subject. A complete description of time remained anunsolved problem for many decades. In this work, we propose the hypothetical existence of invisible unusual stuff, named "Zaman", responsible for the variations of time. We explain how this new geometrical model of Zaman creates a kind of strong lensing effect: We can get two images, three images, or more, of the same object. We then conclude how Zaman offers a good solution to the Dark Matter problem. Moreover, this unusual stuff can explain the superposition principle of quantum mechanics. This new vision of time helps us understand better our physical universe, on tiny scales and on large scales.

INTRODUCTION

Time remained really a mystery that has always troubled scientists [1-5]. Despite great advances in trying to understand the general meaning of time physicists have made no progress in uncovering the physical nature of time itself. However, time remains useful in almost all physical laws [1] and in our usual life. We use it, but we do not know anything about its true origin. Time is usually defined by its measurement: it is simply what clocks measure. In classical physics, with Newton's laws, the traditional concept of time generally used is that of Galilean absolute and global mathematical real variable. Time with Minkowski is no more global, it became a malleable variable and one dimension in a four-dimensional space-time manifold. Unfortunately, the time of General Relativity and the time of ordinary Quantum theory are mutually incompatible notions. As we know, Ordinary Quantum Mechanics (QM) is governed by the Schrödinger equation,

$$i\hbar \frac{\partial \psi}{\partial t} = \hat{H}\psi, \quad (1)$$

where the parameter t is the Newton's absolute time, indicated by a "classical" clock in the laboratory.

In Canonical Quantum Gravity, the Schrödinger equation (1), is replaced by the "Wheeler–DeWitt equation":

$$H = 0. \quad (2)$$

External Newton time has disappeared from the picture, leading to a number of problems [3, 6]. But, despite the absence of an external time, one can define an intrinsic time like variable from the structure of the kinetic term in equation (2) [6].

Today, almost everything we know about the physical aspects of our universe can beexplained by either general relativity, Newtonian physics, or quantum mechanics. The first is very successful in describing the gravitational interaction and the structure of space-time while dealing with cosmological scales, while the latter is needed to try to understand the world of chance and intrinsic uncertainties for the small-scale behavior.

Many different facets in the use of time pushed some scientists think time is just a creation of our intellect, open to interpretations, without corresponding to any real physical thing [7].

So, we can eliminate it completely [8]. Motion is described just by giving the orbits. Either in a chosen reference system, the space coordinates and the time coordinate do not play the same role, internal time can emerge as an implicit variable (parameter) in term of which the motion may be described [8,9]:

$$t_{JBB} = t_{JB}(0) + \int ds/\sqrt{E-V}, \quad (3)$$

(ds is the configuration space line element, V is the potential energy and E the total energy). Internal time can also emerge from entanglement [10]. We know that space-time exists. We know our need to measure in the three-dimensional space the lengths. Scientists have chosen a graduated ruler as an instrument and the meter as a standard unit to measure small lengths. Similarly, scientists have chosen the clock as an instrument and a standard unit (seconds) to measure time in our usual use. This clock time given by our clocks is a real variable used in almost all the physical formulas. But, what about the physical phenomenon that causes clocks tick in different manner when placed in different places?

Without flow of time, there is no motion: Newton's apple will not fall. Positive charges will not attract negative ones. Light cannot reach us. The energy cannot change, and consequently the mass couldn't be acquired to a particle. It is not simply a question of past, present and future [7], or a real or complex mathematical fourth variable. It is deeper than that. It is a question of transmutation: With flow of time, we grow up and get older. With flow of time, a grain transforms to a tree that gives apples. With flow of time, eggs transform to chickens, a unique cell transforms to fetus. Time is sorcery. It metamorphoses everything. These many arguments push us to revise our thinking about time. I suggest that time should have, despite the many different interpretations given by different authors [3], two fundamental meanings:

1. The clock-time or c-time: it is simply the readout of a chosen physical clock instrument. We can chose "second" as a standard unit to measure the variation of time in our usual life. But we can also chose another type of clocks and another unit of time.

2. The Z-time: a physical natural phenomenon that causes clocks tick in different manner when placed in different places. We use any clock instrument to measure Z-time variations, as will be explained in this paper.

What is the Z-time? Since time affects everything, it must be everywhere. Besides, time is strictly related to motion. Without time, there is no motion. But, also, without motion there is no feeling of time. To understand Z-time, we need to introduce a new concept. In the second section, we propose the hypothetical existence of an unusual kind of stuff called "Zaman" that causes Z-time variations when it flows in circular orbits. We propose a new geometrical model. In section 3, we deduce some experiments that explain how can we get many places occupied by a same object at the same time. In section 4 and 5, we outline some known effects related to strong gravitational lensing, used to reconstruct the lens mass distribution, and then conclude on the Dark Matter distribution inside that lens. Finally, using the previous sections, we conclude on the existence of our hypothetical Zaman stuff and

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its relation to Dark matter.

THE ZAMAN. A NEW GEOMETRICAL MODEL

Our understanding of time has repeatedly deepened in the course of the years. For Aristotle, time was just a way to count what happens, but it became an autonomous real variable for Newton and is then reinterpreted by Einstein as one of the fundamental features of gravitational field. In all the physical theories, time is used as a parameter. The interpretation of that parameter changes from one theory to another. One could have naively expected that a more careful description of time would be required

Definition

The "Zaman" is an unseen unusual stable elastic stuff that fills and permeates all types of matter, from infinitesimally small, to astronomically big. It is not made of "classic" baryonic matter. Zaman cannot be created by any process, nor annihilated, nor transformed in any of our laboratories (like Large Hadron Collider). It can only be deviated. It is responsible by its dynamical motion (rotation) for the variations of Z-time as we will try to explain in the next paragraph. The Zaman stuff and the space matter are completely distinct, but they occupy the same volume and interact with each other gravitationally.

Relation between Zaman flow and Z-time variations

In this paragraph, we try to understand the relation between Zaman flow and Z-time variations inside any spherical body U. We suppose that the clock is placed inside a sphere where Zaman does not flow. We use the notation c-time for time as given by the chosen clock.

Definition. U is said to be a 'closed halo' if it is a sphere of rotating Zaman.

For simplicity, during this work, we suppose U has a solid body rotation (which is not the general case). The case of the differential rotation will be treated in a book in preparation entitled : "The mystery of time". Let U be a "closed halo" of radius R. Suppose O is the center of U and U is rotating about a fixed axis (Oz) in a positive direction (a privileged direction). Let us consider a non-rotating right-handed reference system (O,x,y,z). The position of each point inside U can be given by the known Spherical coordinates (r, θ, φ) represented in Figure 1, where r is the radial distance, θ the azimuthal angle, and φ the polar angle (colatitude).

A new geometrical modal: U-space-time referential as measured by a chosen clock

Suppose it takes T units of c-time for U to complete one rotation (in the positive direction) around its axis (uniform and constant rotation period), relative to its non-rotating initial state UI.

We shall explain how the flow of Zaman inside UI will cause the variation of Z-time inside UI.

Definition.

If the rotational speed of U is constant and repeatable, then, T will measure the length of the day inside U, called U-day or UI-day or Z-day. The length of the U-day is based on our chosen clock measurement (c-time).

Each semi-disc of UI bounded by the axis of rotation and a meridian will be called isotime-disc (Figure 2). Evidently, Z-time will be the same over each semi-disc (for a solid body rotation. This is the Newtonian view). Let us chose the isotime-disc contained in the plane (Oxz) as the semi-disc of Z-time T

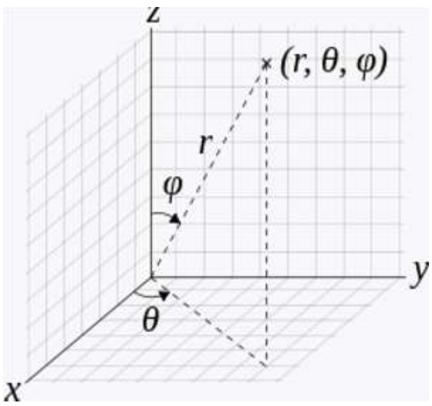

Figure 1) *Spherical Coordinates.*

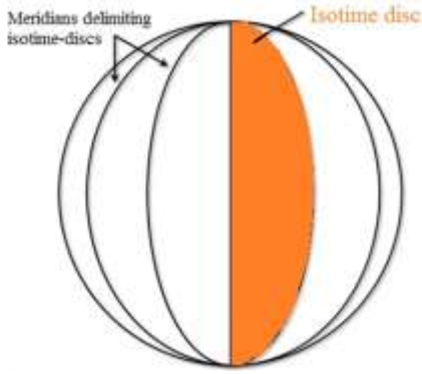

Figure 2) *Isotime-discs.*

(just a choice), then, any given coordinates (r, θ, φ) of any chosen point P in UI indicates simultaneously the space position (r, θ, φ), and the Z-time variation with respect to

T: $t = T - \frac{T}{360}\theta$ units of time (from 0 to T). This is how Z-time varies inside UI, using the length of the day determined by our chosen clock. The Z-time difference between two points in UI is calculated based on the longitude difference as follows: $\Delta t = -\frac{T}{360}\Delta\theta$ (It is important to respect the chosen orientation).

Evidently, in each isotime-disc, we can use the same clock to measure the variations of Z-time, so the Newtonian laws remain valid. But, it is meaningless to use the same fixed clock to measure the variations of Z-time inside the entire sphere U: if a point P is fixed to the Zaman flow, after c-time T, it will have the same Z-time (no variations), but never 2 the same c-time as measured by the previously chosen clock. That is why we need to adjust the time as previously explained.

Evidently, the clock is used just to fix the length of the day. The Z-time is the time that should replace the clock time for accurate measurements inside U. That is why in some new quantum theories, we no more speak about c-time, but about the internal time, related to the Z-time, or about the spin (also related to Z-day). This will be more detailed in future works.

Evidently, Z-time does not change for any point moving with U; that means, Z-time does not change for any point that moves with Zaman flow. But, if a particle P is placed at the space position (r, θ, φ) at a certain Z-time t (between 0 and T), and remains fixed in the space UI, then after one half U-day, the particle will remain in the same space position, but, the Z-time will be congruent to

$t+\frac{T}{2}$ (P is fixed in space, but, in motion with respect to Zaman flow). Evidently, Z-time variations inside U depend only on the Zaman flow inside the halo U, and is not affected by the Zaman flow outside U. That is why in QM, measurability of time variation must be recorded by an observer inside our closed halo [11] Thus, any closed halo should have its own natural Z-time emergent from its Zaman flow. We propose one fundamental postulate:

Postulate

The impact of the Zaman flow (aging) on any particle P (or group of particles) inside a closed halo U, depends only on the flow of Zaman inside U and does not depend on the flow of Zaman outside U. As a consequence of this postulate, in QM, the observed dynamic evolution of a closed system can be described entirely as a dependence upon internal time flow measured by an internal observer. The external observer can see a time-independent global state of the system in the experiment time-scale [12,13].

Example

Let us consider three rotating closed halos: $Ur \subset U\rho \subset UR$ with radius r <<ρ<< R, respectively. Each of these balls has its inner time depending on its rate of rotation as explained above.

If a particle lives in , we know, time will be automatically Ur time.

If a particle lives in , outside Ur, we know, time will be automatically $U\rho$ time.

If a particle lives in Ur for a certain period $p1$, then leaves Ur to stay in $U\rho$ for another period $p2$, evidently, time will not be the same for the two periods.

If a theory is valid inside $U\rho$, that does not mean it breaks down inside , but it means that we have to take care about the difference between $U\rho$time and Urtime in our mathematical formulas. Similarly, if a theory is valid inside U,that does not mean it breaks down inside $U\rho$

CONSEQUENCES OF THE MODEL

Zaman lensing effect. Collapse. Superposition

Let us consider a uniformly rotating closed halo U around a fixed axis. We know that we have the same Z-time inside each isotime-disc inside UI. If an isotime-disc D is rotated around the axis of the closed halo U with the sphere U, then, Z-time remains unchanged for that surface D. If at the Z-time t0, D occupies the space surface S in the fixed space UI, then, after a quarter U-day, D will be at the same Z-time t0, but, will occupy another space position, and after a half U-day, D will occupy the symmetric of S with respect to the U-axis of rotation.

In all the next experiments, we suppose U has a solid body rotation, with a rotation period T units of time (T is the length of the U-day as taken by a chosen clock). Differential rotation will be treated in future works.

Zaman Ring

Suppose a particle P is fixed to the rotating sphere U (P moves with Zaman flow). If at a certain Z-time t (between 0 and T), P occupies the Cartesian coordinates $(\frac{R}{3}, 0, 0)$,then, in the course of one complete revolution (one U-day), the particle remains in the same Z-time (fixed with respect to the rotating Zaman), but has drawn a circle in the space UI, in the course of the U-day. So, the particle trajectory at Z-time t consists of the entire circle as shown in Figure 3. In reality, this is due to the flow of Zaman with respect to space. This is the Zaman lensing effect. It indicates the intersection of the trajectory of the particle P (the trajectory is a fixed curve in space) with the rotating t-isotime surface.

So, a particle can remain fixed in Z-time (fixed with respect to Zaman flow), but, in motion in space (with respect to UI), and vice-versa.

Superposition with two images

Suppose we have a particle P, placed inside U, which revolves around the axis (Oz) uniformly at a rate of 3 revolutions per U-day. If P occupies the space position M with Cartesian coordinates $(\frac{2}{3}R, 0,0)$ at Z-time t, then - after U-day, it will be collapsed at the point $(\frac{2}{3}R,0,0)$ where Z-time is the same, t, and after 1 U-day, it will be at its first space position

$(\frac{2}{3}R,0,0)$ So, at the same Z-time t, P occupied the two different space positions:$(\frac{2}{3}R,0,0)$

and$(\frac{2}{3}R,0,0)$ as shown in Figure 4.

Now, suppose reciprocally the trajectory of P at the Z-time t is given by Figure 4. Suppose P revolves around the axis (Oz) uniformly at a certain rate. Then we can conclude that P revolves at a rate of 3 revolutions per 1 U-day.

Superposition with three images

Suppose we have a particle P, placed inside U, which revolves around the axis (Oz), uniformly at a rate of 4 revolutions per 1 U-day. If P occupies the space position M with Figure 5.

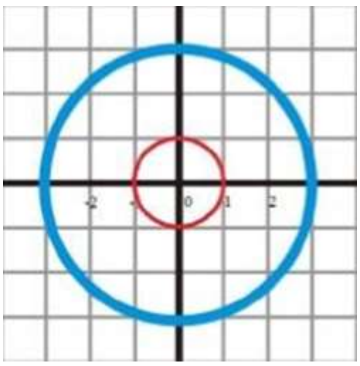

Figure 3) *A ring: The red circle represents the trajectory of P at Z-time t.*

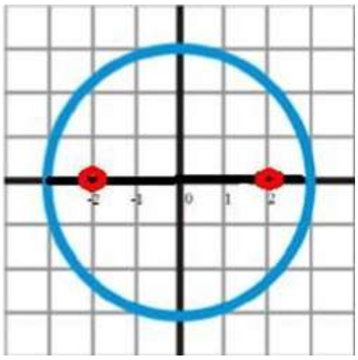

Figure 4) *Superposition: Positions occupied by P at Z-timet.*

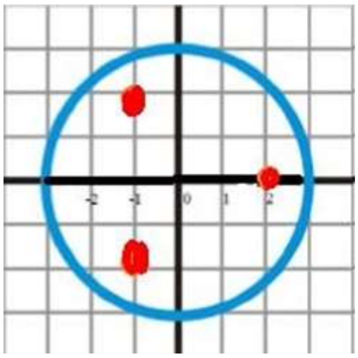

Figure 5) *Superposition: positions occupied by P, at Z-timet.*

Cartesian coordinates $(\frac{2}{3}R, 0,0)$ at Z-time t, then, after $\frac{1}{3}$U-day, P will be at the point $(\frac{2}{3}Rcos(\frac{2}{3}\pi); \frac{2}{3}Rsin(\frac{2}{3}\pi);0)$ with the same Z-time t, after $\frac{2}{3}$U-day, P will be at $(\frac{2}{3}Rcos(\frac{4}{3}\pi); \frac{2}{3}Rsin(\frac{4}{3}\pi);0)$ with the same Z-time t, and after 1 U-day, P will be at its first space position $(\frac{2}{3}R, 0,0)$. So, at the same Z-time t, P occupied three different space positions as represented by Figure 5.

Superposition with four images

with Cartesian coordinates $(\frac{2}{3}R, 0,0)$, at Z-time t, then, after $\frac{1}{4}$U-day, P will be at the point $(0; \frac{2}{3}R;0)$ with the same Z-time t, after $\frac{1}{2}$U-day, P will be at $(-\frac{2}{3}R;0;0)$ with the same Z-time t, after $\frac{3}{4}$U-days, P will be at $(0;-\frac{2}{3}R;0)$ with the same Z-time t, and after 1 day, P will be at its first space position $(\frac{2}{3}R, 0,0)$. So, at the same Z-time t, P occupied the four different space positions: $(\frac{2}{3}R, 0,0)$, $(0;\frac{2}{3}R;0)$, $(-\frac{2}{3}R;0;0)$ and $(0;-\frac{2}{3}R;0)$, as shown in Fig.6.

Superposition with five images

Suppose we have a particle P, placed inside U, that revolves around the axis (Oz) uniformly at a rate of 6 revolutions per 1 U-day Figure 7. If P occupies the space position M

with Cartesian coordinates $(\frac{2}{3}R, 0,0)$, at the Z-time t, then, after $\frac{2}{5}$U-day, P will be at the point $(\frac{2}{3}Rcos(\frac{4}{5}\pi); \frac{2}{3}Rsin(\frac{4}{5}\pi);0)$ with the same Z-time t, after $\frac{2}{5}$U-day, P will be at $(\frac{2}{3}Rcos(\frac{8}{5}\pi); \frac{2}{3}Rsin(\frac{8}{5}\pi);0)$, after $\frac{3}{5}$U-day, P will be at $(\frac{2}{3}Rcos(\frac{2}{5}\pi); \frac{2}{3}Rsin(\frac{2}{5}\pi);0)$ with the same Z-time t, after $\frac{4}{5}$U-day, P will be at $(\frac{2}{3}Rcos(\frac{6}{5}\pi); \frac{2}{3}Rsin(\frac{6}{5}\pi);0)$, after 1 U-day, P will be at its first space position $(\frac{2}{3}R, 0,0)$. So, at the same Z-time t, P occupied five different space positions as shown in Figure 7.

More generally, Suppose we have a particle P, placed inside U, that revolves around the axis (Oz) uniformly at a rate of (n+1) revolutions per 1 U-day. If at the U-time t, P occupies a certain space position inside U, then, in the course of the U-day, at the same Z-time t, P occupies n different space positions. This is the principle of superposition. It is not a probability. It is a reality.

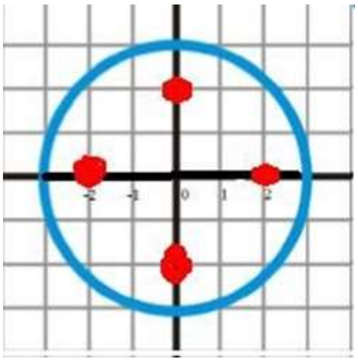

Figure 6) *Positions occupied by P, at Z-timet.*

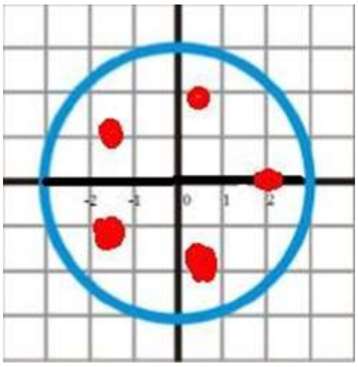

Figure 7) *Positions occupied by P, at Z-timet.*

Sixth experience

Suppose a particle P traverses the rotating sphere U. If the intersection of the trajectory of the particle with the rotating t0-isotime surface is empty, then at that time, the particle does not occupy any point in the space inside U.So, we can explain the reality of the relic photons that escape our telescopes (Wheeler,17 1977).

Last experience

Suppose a particle P is born at the space position Mwith Cartesian coordinates $(\frac{2}{3}R, 0,0)$, at Z-time t, and dies at the point $(-\frac{1}{3}R;0;0)$ as shown in Figure 3, after $\frac{1}{4}$U-day. Then, the time death of the particle is $t-\frac{T}{2}+\frac{T}{4}=t-\frac{T}{4}<t$. So, the time death of the particle comes before it is born.

DARK MATTER AND STRONG GRAVITATIONAL LENSING EFFECT

Dark Matter

One of the major scientific discoveries of last century was that most matter in the universe is far from being ordinary matter. However, it is a different form of matter that interacts with classical matter only with its gravitational effect. Scientists called this unknown stuff “Dark matter” (DM). The nature and physical properties of DM are still unclear [14]. Existence of DM was a necessary hypothesis added to solve the lack of a power needed to equilibrate gravitational effects necessary for the formation of astronomical objects, without being pulled apart, despite their fast spin in our universe [15,16]. The first evidence for existence of DM was furnished in 1937 by Zwicky [17],

who verified, using the known virial theorem of classical mechanics to the Coma cluster of galaxies, that, most of the matter in this cluster was not visible. With continuous numerous observations in various astronomical systems, in the early 1980s [15,18,19], the astrophysical community was convinced that the gravitational force needed to hold together galaxies and clusters of galaxies are due to sightless supplementary masses [20]. The observed astronomical bodies must be embedded in ‘dark matter haloes’[14]:approximately spherical systems composed of some kind of distributed matter that does not interact significantly with radiation but which does generate and respond to gravitational forces, so we can apply the virial theorem:

$$\frac{V_m(r)^2}{r}=G_N\frac{M_{s+h}(r)}{r^2}$$

Then, it is not difficult to see that the highest is the velocity, the densest is our spherical body. We understand how the Dark Matter (DM) is related to the kinetic energy of the halo [21] and the mass of visible matter. The DM energy density exceeds five times the baryonic matter energy density. Many laboratories were designed for a direct search for particle dark matter [22-25]. Despite the significant abundance of dark matter, and the sensitivity of the detectors, these laboratories failed to detect any signal [26]. Many proposed candidates have been ruled

out [14,27-29]. In the last paragraph of the section, I will explain how all these failure experiments to detect DM could be replaced by very simple successful ones, by just using hydrogen atoms. The “Novel Ideas for Dark Matter 2019” workshop at Princeton University decided that: The extra mass DM is not in any form of the known matter found in terrestrial laboratories. It carries no electric or color charges. It does not emit nor absorb light. The best way to study dark matter remains via its gravitational influence on visible particles. Although astronomers cannot see dark matter, they can detect its influence by observing how the gravity of massive cluster of astronomical objects, which contain dark matter, distorts the light (images) of more distant astronomical objects located behind the clufster. This gravitational lensing effect is the best currently known source to provide constraints on the mean density of dark matter [30]. In fact, the gravitational lensing technique is a trustworthy way of measuring masses regardless the nature or dynamical state of the matter [31-34]. An accurate distribution of Dark Matter can then be deduced by subtraction [16,30].

Strong Gravitational Lensing effect

When light rays from a distant background astronomical source traverse an intervening foreground astronomical object (generally referred to as lens), they can be affected and take different paths to the observer and some effects different from than the expected image of the background source can appear. Strong lensing is said to take place when multiple images of the source appear to the observer. The strong-lensed images can take many forms of images of the same single background object. We can see arcs [31], or partial or complete rings [35]. These rings, like the one shown in Figure 8, are commonly known as Einstein rings. In more complex lens systems, multiple Einstein rings may arise [36].

The doubly-imaged quasar Q0957+561 was the first confirmed example of strong gravitational lensing [37]. After a debate, the chosen interpretation of the two point-like similar copies was (and still is) two lensed images of the same unique source. Strong lenses can also generate triple images from a single source, quadruple images [38], as shown in Figure 9, quintuple and either more [39,40]

When multiple images are formed, the light-travel-time along light pathscorresponding to different images is generally not the same. Photons contributing to differentstrong field images take different times to reach the observer. The time delay betweenimages is proportional to the difference in the absolute lengths of the light paths. Thistime delay can vary from few seconds [41] or less, toyears. The strong gravitational lensing effect is presently the most direct andextremely powerful tool to accurately model the total inner mass distribution of thelensing astronomical object [31,32,34]. Indeed, after computation of the luminous matterin these systems through observations, the method is efficient to deduce the distributionof DM in the lens[40,42]. The lens can, in many cases, be mostly composed of DM [43]. But, sometimes, thelens is lucking DM[44].

Figure 8) *Lens SDSS J162746.44-005357.5. (NASA)* (http://www.spacetelescope.org/images/opo0532g/).

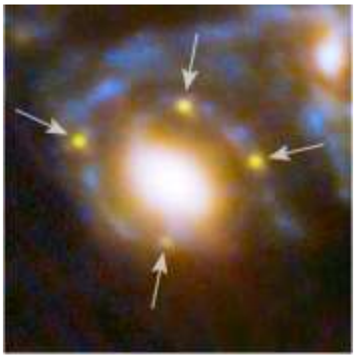

Figure 9) *A background cluster creates four images of the same distant supernova.* (https://apod.nasa.gov/apod/ap150309.html).

Dark Matter inside a hydrogenatom

The image of one electron is lensed in –a cloud-of electron images, centered by one nucleus image. [45] In reality the strong gravitational lensing is also clearly seen in smaller scales. In infinitesimal scales, an atom is a lens that causes the distortion of the image of an electron to be seen as a cloud, as shown in Figure 10, taken from [45]. Evidently, the previous explanation of Dark matter must be valid. The Dark matter density inside an atom is huge. The radial probability distribution of the lensed electron (cloud) can be theoretically calculated through the wave function that satisfies the time-dependent Schrödinger equation (1). So, the same method used for astronomical lenses [16,30] can perhaps be adopted to deduce DM density inside an atom.

DISCUSSION. EXISTENCE OF ZAMAN AND ITS RELATION TO DM

To simplify the idea, I will not speak about Refraction. Suppose we have two closed halos: $U\rho\subset UR$. From the previously presented Zaman lensing effect, if a particle P (that can be photon, electron,..) from UR penetrates inside $U\rho$ at a certain $U\rho$-time t, at a certain point $P1$ (far from the $U\rho$-axis). Suppose the particle has an helical trajectory, given by Figure 11, and revolves around the $U\rho$-axis uniformly at a rate of (n+1) revolutions per 1 $U\rho$-day before leaving the $U\rho$-sphere after exactly 1 $U\rho$-day. P in its trajectory inside $U\rho$ traverses the t-$U\rho$ -isotime rotating semi-disc (see subsection 3.2.) at n different points:1 (the first point), $P2, \dots, Pn$ (the last one). Suppose Pn is at the boundary of $U\rho$. The projection of these points into the $U\rho$-equatorial plane is given by Figures 4-7, in the case n=2-3-4-5 (simultinuously). When seen from a point O inside U, aligned with the $U\rho$-axis, if we admit the

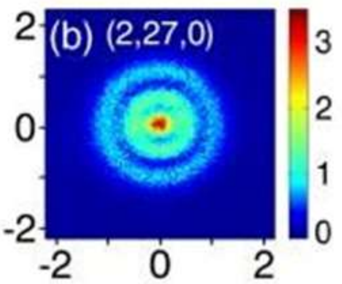

Figure 10) *Strong lensing effect of an excited hydrogen atom.*

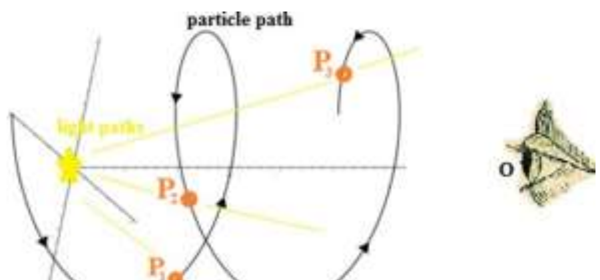

Figure 11) *A simplified figure of a unique real particle curved path with manylight paths.*

celerity of the particle does not exceed the celerity of light, the observer O will see $P1$, then $P2$, and finally Pn .

The time delay in observing these images arises from the different trajectories taken by: the particle until the point P, then light until the observer. If the time delay is below a certain critical time, we do not see any delay, we just see the superposition of the n points. The last point Pn seen by the observer is the only real particle. All the other seen point Pi' are virtual, since they correspond to the light image and not the particle image itself. These n images observed of the same particle is a kind of Strong Gravitational Lensing (SGL) effect. If we can catch the particle at the position $P1$, then we cannot see more than one image: this is quantum decoherence. No more superposition of states is seen. The quantumness has been lost. If we can catch the particle at the position $P2$, then we can only see two asymmetric images: this is a symmetry breaking. if a particle P (that can be light particle, electron,..) from UR penetrates inside $U\rho$ at a certain $U\rho$-time t, at a certain point $P1$(far from the $U\rho$-axis), suppose the particle has an helical trajectory and revolves around the $U\rho$-axis at the same rate of $U\rho$ before leaving the $U\rho$-sphere after exactly 1 $U\rho$-day. The intersection of the trajectory of P inside $U\rho$ with the t-$U\rho$-isotime rotating semi-disc is helical. The projection of this trajectory intothe $U\rho$-equatorial plane is given by the Einstein ring presented by Figure 3. Since SGL is used to reconstruct the distribution of all kinds of matter, including dark matter, and the unique cause of SGL in our $U\rho$-halo is the Zaman flow, I think we can guess without any doubt that the existence of Dark Matter is the best proof of the existence of a flowing Zaman, that causes Z-time variations and multi-images or rings of the same background. More the the rotation is faster, more the DM density is heigher. Without rotation, there is no DM detection. But, Zaman is always there. Cloks always tick inside fixed Zaman, with a minimal rate. More the rotation is faster, more Cloks tick faster. There must be many different rates of rotation for Zaman (many times),which explains why Cosmic microwave background photons on their long journey through the Space might be frequently redshifted (time shrink) and blue shifted (time delay).We can now understand the meaning of the probability distribution in quantum mechanics, and conclude that the flow of Zaman and celerity of an electron inside an atom must be relativistic. We see how the nucleus has only one image in Figure 10, simply because it does not change place. An electron passes through many ‘possible’ values in its itinerary around the nucleus. Evidently, if we catch an electron, we catch it at one position with one momentum. Technically, we are not able to measure the difference in time of the outcome. Not like an astronomical halo where the different images come out at different measurable times. It is now clear how Zaman flow is the only responsible to decide whether we have a particle or an anti-particle (matter antimatter) and not Dark energy as proposed by some authors [46]. Now, scientists are convinced with a born right-handed rotating spherical universe idea. A best proof is given by the author [47]. We live in a right-handed rotating spherical universe, where only matter can live, antimatter annihilates. In a left-handed rotating anti-universe, only antimatter can live, matter annihilates.

This Zaman invisible staff that imbues particles with mass, can explain well the idea of Higgs field proposed by the Scottish theoretical physicist Peter Higgs. In a non-rotating halo, the Higgs field’s and DM average values must be zero and a mass particle will be at its minimum. A clock must also tick at its minimum. Higgs field’s average value can be zero, also DM, but Zaman is always there. Particles mix with Zamn stuff, and through this mixing they acquire mass. The impact of the rate of rotation (rotating Zaman) on star masses and their age estimate is well known [48].

Now, with the understanding of the Zaman staff, we no more need the introduction of DM nor to the Higgs field. We just need understand Zaman (“time”) impact on matter.

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