No More Twin Paradox

Saoussan Kallel-Jallouli

Université de Tunis El Manar, LR03ES04, Faculté des Sciences de Tunis, 2092 , Tunis, Tunisia

ID:0000-0002-2873-698X

DOI: https://doi.org/10.51584/IJRIAS.2024.90308

Received: 12 February 2024; Accepted: 27 February 2024; Published: 28 March 2024

ABSTRACT

"Time" is not a simple subject. The description of time remained an unsolved problem for many decades, until the new idea that succeeded to demonstrate the existence of an unusual staff called "Zaman" responsible for the variations of "time" by its spin. We conjecture in this work that the impact of a "day" on matter does not depend on the length of that day. This will help solving many related problems.

Keywords: Time, dark matter, Zaman

INTRODUCTION

Time remained a mystery for decades [Anderson, 2012] [Barbour, 2000] [DeWitt, 1967] [Earman, 1989] [Gryb & Thébault, 2016] [Isham, 1993)] [Kuchr, 1999] [Magueijo & Smolin, 2018] [Merali, 2013] [Rovelli, 1991] [Rovelli, 2004] [Smolin, 2014] [Wheeler, 1968]. Physicists have made no progress in uncovering the nature of time, although it remains very useful in our physical laws [Anderson, 2012]. Most of scientists use time as simply what clocks measure [Burnham, 2006] [Ivey & Hume, 1974], and think it is just a creation of our intellect [McTaggart, 1908] [Rovelli, 2004] [Rovelli, 2018], that we can interpret in different manners, and perhaps can omit [Barbour, 2001] [Smolin, 2001] [Magueijo & Smolin, 2018].

The problem of time remained unsolved for decades despite its importance, until the new revolutionary idea proposed by Kallel [Kallel-Jallouli, 2018, 2021]. She believed time is not simply a question of order of events [Rovelli, 2018], or a real or complex variable [Hawking, 1988]. It is deeper than that: with time we grow up and get older, grains transform to trees, eggs transform to chickens, unique cells transform to human bodies. Time is sorcery, it metamorphoses everything. The author suggested that time should have at least a double meaning:

1. A clok-time or c-time: given by a chosen clock, an instrument for measuring time.
2. A Z-time: a physical natural phenomenon, related to the spin. Z-time variations can be measured by a chosen clock instrument [Kallel-Jallouli, 2023a, b].

She proved, using the Dark Matter strong lensing effect, the existence of an unusual kind of unseen matter called "Zaman" that causes "Z-time variations" by its "spin" [Kallel-Jallouli, 2021a, b, c, d]. Evidently this Z-time variation can be measured using any chosen clock instrument. By a chosen clock, we can measure the length of the day (and know the spin) corresponding to the time it takes for one complete revolution of U.

Spinning Zaman is the only responsible for Z-time variations.

The set of Zaman matter and the set of seen matter are completely disjoint and can never exchange matter,

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume IX Issue III March 2024

either they occupy the same volume and mutually influence each other.

If for example the rate of rotation of a uniformly rotating sphere of Zaman (in the positive direction) is T units of time as measured using a chosen clock, then the length of the Z-day inside that sphere is T units of time. We can call a Zaman sphere as “halo” or as “universe”. It can be so small such as an atom or so big such as our classical universe.

The idea proposed in the author’s new theory about the Big Bang [Kallel-Jallouli, 2018, 2024c] is very interesting and helps scientists get a better understanding of our physical universe. We shall see how, using our new definition of time, things are more rigorous.

FUNDAMENTAL CONJECTURES

Conjecture 1

The impact of the flow of Zaman on any particle P (or group of particles) inside a closed halo U (a closed system by definition interacts only with itself), 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 Quantum Mechanics, the observed dynamic evolution of a closed system can be described entirely as a dependence upon internal clock readings, not on an external coordinate time [Page and Wootters, 1983]. The internal observer that measures the position can track the flow of the internal time, while the external observer sees a time-independent global state of the system.

Conjecture 2

The impact (Zaman impact) of one Z-day on any particle (or group of particles) inside any closed spherical halo does not depend on the length T of the day (is the same either T is small or large).

That is why we can omit the external time from some theories [Barbour, 2001] [Barbour, 1994]

So, physical laws inside U must not depend on c-time, but on Z-time (especially on the number of Z-days)

Definition.

Two particles are said to be U- entangled, if U is the smallest closed halo that contains the two particles.

As a consequence, we can use the way a pair of U-entangled particles evolve as a kind of clock that can measure time inside U [Page and Wootters, 1983], not outside evidently. Some experiments with entangled photons show how a global static (seen from a super-observer that does not belong to U) U-entangled state of two photons can be seen as evolving by an internal observer that uses the readings of one of the two photons as a clock to measure the time-evolution of the other photon, and then can track the flow of time inside U, and deduce the evolution of the subsystems relative to each other [Moreva et al., 2014]. Observers, themselves, are subsystems of the “universe” and become entangled with the clock systems so that they see an evolving universe. However, an “external” observer that only observes global properties of the two photons can show that the global entangled state does not evolve with time in the experiment time-scale. He sees a static “universe” [Moreva et al. 2013] [Moreva et al., 2017]. In this stationary state, therefore, the clock-time evolution of the system is not being dictated by the usual law of evolution, but rather is determined by correlations between the clock and the rest of the system [Page and Wooters, 1983].

Since a closed system by definition interacts only with itself, any observations must be done entirely within the system, so the system must include all its observers. The smallest closed system we observe appears to

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume IX Issue III March 2024

be astronomically large and is generally known as a “Universe”. An observer cannot be allowed to read clocks outside his own closed system [Page and Wooters, 1983]. A static system may describe an evolving “universe” from the point of view of the internal observers [Page and Wootters]. Energy-entanglement between a “clock” system and the rest of the “universe” can yield a stationary state for an (hypothetical) external observer that is able to test the entanglement vs. abstract coordinate time. The same state will be, instead, evolving for internal observers that test the correlations between the clock and the rest [Page and Wootters, 1983]. [Wootters, 1984] [Page, 1993] [Gambini et al. 2009] [Peres, 1980] [Rovelli, 1996]. Thus, time can be seen as an emergent property of subsystems of the “universe” deriving from their entangled nature.

Is gravity an emergent phenomenon [Moreva, 2014]? This will be discussed in detail in future works [Kallel-Jallouli, 2024a]

CONSEQUENCES

Let us begin by a popular experiment known as the twin paradox.

i. No More Twin Paradox

Suppose we have two disjoint rotating closed halos U_1, U_2, located inside a third one U. We suppose each of these three spheres has a uniform and constant rotation period (in the same positive direction). Let T (rep. T_1, T_2) be the rotation period of U (rep. U_1, U_2), as measured by a chosen clock.

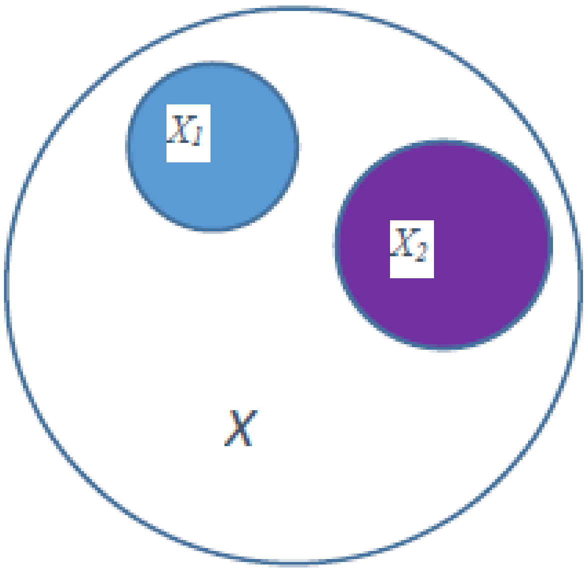

Fig.1. The twin experiment.

If three twins X, X_1, X_2 are born in U at a same date, X_1 is born inside U_1 and X_2 is born inside U_2 (see fig.1). Suppose T_2=2T_1 and 3T_1= T, then, when X will be 10 years old, X_1 will be 30 years old, and X_2 will be 15 years old. If at that moment X_1 change place X_2. Now X_1 is inside U_2 and X_2 is inside U_1. When X will be 20 years old, X_1 and X_2 will be each 45 years old.

ii. The Radiometric Dating

No one can ever deny the impact of time on bodies. That is why it is possible to estimate the ages of rocks or trees using some known techniques. Since we cannot deny its impact, we cannot deny its existence. The idea proposed by the author [Kallel-Jallouli, 2018, 2021] seems to be consistent.

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume IX Issue III March 2024

For example, we can use a technique called "radiometric dating" to estimate the ages of rocks or fossils. Some isotopes of certain elements can spontaneously change into another kind of atom in a process called "radioactive decay." In this process, the rate of decay is known. Scientists attempt to use this natural phenomenon as a "clock" for radiometric dating. The dating method is usually applied for dating fossils using carbon, or dating rocks using uranium, potassium and other radioactive atoms.

Radiocarbon dating is a method to estimate the age of an object containing organic materials [Wendland & Donley, 1971] [Taylor, 2014]. The technique is applicable to determine ages ranging from about 300 years to 75,000 years [Taylor, 1987] [Taylor, *2001*] [Arnold & Libby, 1949]. The technique is based on measuring the ratio of ^{14}C to ^{12}C in the fossil. Before death, they are at constant proportions in the living body. Because ^{12}C is a stable isotope of carbon, it will remain constant over time, while the amount of ^{14}C will decrease after death, and transform to nitrogen (^{14}N). The dating process begins the day of death of the plant or the animal. The ^{14}C decays with a half-life of about 5,730 years [Engelkemeir et al., 1949]. The ratio of ^{14}C to ^{12}C in the fossil help us determine its age, using the formula:

$$N(t) = N(t_0)e^{\frac{t_0-t}{\tau}ln2}$$

Where is half -life of carbon 14, N(t) the population at time t.

Uranium–lead (U–Pb) dating, is one of the oldest [Boltwood, 1907] radiometric dating clock. It can be used to determine the age of rock-minerals [Schoene, 2014] [Holmes, 1911] from about 1 million years to over 4.5 billion years [Parrish & Noble, 2003].

There exist two uranium-lead decay chains, with a half-life of 4.47 billion years for the ^{238}U to ^{206}Pb decay, and a half-life of 710 million years for the ^{235}U to ^{207}Pb decay. [Romer, 2003] [Bateman, 1910] [Barrell, 1917] [Holmes & Lawson, 1927]. The decreasing ratio of uranium to lead in the mineral can be used to determine its age.

iii. Alchemical Transmutator

Scientists succeeded transmutation of some elements in laboratories. In 1927, By varying the magnetic intensities and their angular relationships, W. Russell successfully obtained more than 15 different elements from water vapor, during the experiments that took place at the Westinghouse Lamp Co. production facilities in Bloomfield, NJ. [Russell, 1926]. He reported the formation of nitrogen [Russell, 1989].

In 1991-1992, using the magnetic fields that W. Russel described in [Russell, 1989], RSR Colorado Team detected the formation of Fluorine From water vapor [Binder et al., 19991] [Binder, 1993]

More recently, XENOT1T was built to track Dark Matter. Scientists, in their way to search for DM, accidently transmuted Xenon [Aprile et al., 2019]. The experiment was carried to track Dark Matter particles, but they failed to detect any particle as they commented. For me, it is a good experiment that proves the existence and the role of Z-time. In their way to search for DM, they succeeded transmutation of ^{124}Xe, ^{238}U, ^{85}Kr, ^{39}Ar and other elements [Gavriljuk et al., 2018] [Ajaj et al., 2019] [Wang et al., 2017]

We know that the best natural transmutator is inside stars, since Hydrogen can transform to Helium then to Carbon, etc.…, in a runaway process [Burbidge et al., 1957].

Since rate of rotation of Zaman inside a closed halo is the only responsible of Z-time variations, we do not need more than 6000 years inside a star to completely transform Carbon [Burbidge et al., 1957], while we need some ten million years outside a star (https://media4.obspm.fr/public/AMC/pages_nucleoprim/impression.html). In stars with high angular velocities, the synthesis of elements is more rapid. An empirical relation between the age of a star and its rotation period was established by Barnes [Barnes, 2007; Chaname & Ramírez 2012; Skumanich 1972; Meibom et al. 2009; Epstein & Pinsonneault 2014]. So, surface rotation can be used to infer ages of cool stars [Barnes 2009; Meibom et al. 2011].

So, spinning Zaman is needed in the transformation of anything: a grain into tree, an egg into chicken, Hydrogen into Helium etc… Now, I think, no one can deny the existence of Z-time and its impact on particles in all levels. Since we have understood time, we know it depends on the rate of rotation of the closed halo where the particle lives, we must now review all physical laws, using this rate of rotation (spin) as new concept of time. This will be explained in detail in future work.

If we have a decelerating halo, since the length of the day is changing from the interior to the exterior of the sphere, this means that the rate of the flow of Zaman is changing inside the same halo [Kallel-Jallouli, 2024]. If we hope to get accurate laws that does not change either the length of the day changes, we must take into account in our laws of Z-time variations. That is why scientists used the notion of “time delay” when time passes longer than classical time, and “time acceleration” when time passes quicker then classical time. This needs to be explained in more details in future works.

CONCLUSION

Decay of known particles inside U can act as good clocks, if we use our new conjecture, the Z-time convention, related to the U-spin, and not the clock time. If we need n days for a particle to decay inside U, the length of the U-day is not important. So, if the particle is placed inside a halo U where the length of the Z-day is T as measured by a chosen accurate clock, the particle will decay with a c-time nT that will evidently vary depending on T. So, it is meaningless to speak about lifetime of a particle using c-time if we know the length T of the day is varying. That is why some scientists tried to use time dilation [Bailey et al., 1977], others found it is necessary to speak about correlation between the system itself and another physical entity, which acts as a clock [Ruiza et al., 2017], and found a clock in regions of space-time will not work in the same way [Anderson & James, 1999].

Finally, if we hope to find accurate physical laws that can apply in all levels, we must use Z-time instead of c-time. Thus, any isolated system, that can be an atom or the whole universe, should have its own natural clock emergent from the dynamics [Gryb and Thébault 2011]. But, even inside the same halo U, if we no more have a solid body rotation, but, a differential rotation, then, Z-time will vary inside U. Even with a chosen clock inside U, there will be some places where time will be delayed, and other places where time will be accelerated, depending on the Zaman rate of rotation.

When particles, inside U, try to move through Zaman, they interact with Zaman and feel a resistance to not fly at the light celerity, causing the known energy at rest: E=m, from which we can deduce the mass: m=, where c is the celerity of light inside U. There is no need for the Higgs field, the theoretical field of energy that permeates the universe. Zaman plays the role of the Higgs field.

In our next work, using our new “Zaman” solution for Dark Matter, we shall try to find out the Hubble’s law and study the orbits of test particles inside U [Kallel-Jallouli, 2024a, 2024b]. A relation between Dark Matter and Dark energy will be established.

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