

The Notion of What Time Is

José Luís Pereira Rebelo Fernandes, Eng.

Independent researcher since 2005, Engineer
Graduated from the University of Porto

E-mail: rebelofernandes@sapo.pt

ABSTRACT

In a careful analysis of the interrelationship between relativity and quantum mechanics, we will try to understand what time is. After the analysis was carried out, we are of the opinion that time is a property of matter.

(Keywords: *theoretical physics, quantum mechanics, general relativity, time, matter*)

INTRODUCTION

What is said today about time in physics? We all know how much humanity has speculated about the nature of time. After writing the initial draft of this article, a physicist drew my attention to the articles below, about which I had no previous information.

The work is by Pons, Pons, and Pons (2013). "Time: An Emergent Property of Matter". *Research in Applied Physics*; Vol. 5, No. 6 and Mainzer (2010) "The Emergence of Temporal Structures in Dynamical Systems", *Fundamentals of Physics*, 40.

As can be seen from the title, they also talk about the hypothesis that time is a property of matter. After reading these important works, I realized that my perspectives on this subject had nothing to do with these articles, so I will maintain my initial reasoning.

THE NOTION OF TIME

Let's try to make a contribution to clarify this notion. Time is constant in a constant reference frame.

We can observe that two different clocks placed in the same place will show the same time and that the same clocks placed in different places, for

example, at different altitudes or latitudes, will show different times.

This difference has to do with the conditions of the reference frame in which it is located, the speed with which they move and the universal potential energy density in which it is submerged, I mean "altitude".

Time will be a property of matter, which reacts differently by changing the frequency and therefore, its period.

THE TIME AND PERIOD OF MATTER

From quantum mechanics we already know the relationship between energy and its associated frequency. Let's try to find out whether through relativity and quantum mechanics we can perceive the phenomenon.

For Similar Mass

From quantum mechanics we will have:

$$E = h \nu \quad (1)$$

$$mC^2 = h \nu \quad (2)$$

From Relativity

Considering two different frames of reference, a and b.

$$E_a t_a = E_b t_b \quad (3)$$

$$E t = k \quad (4)$$

$$mC^2 t = k \quad (5)$$

From Equation 2:

$$h \sqrt{t} = k \quad (6)$$

$$h \frac{t}{T} = k \quad (7)$$

$$t = \frac{K}{h} T \quad (8)$$

THE MASS UNIT THUS GENERATES UNIT FREQUENCY AND TIME.

For the same mass, the unit of time will always be proportional to the period. In the same reference frame, all masses will be within the same energy level. For time in the same frame of reference to be constant, it must have the same frequency per unit mass.

We can thus obtain the unit frequency, that is, the frequency per unit of mass.

$$C^2 = h \frac{\sqrt{t}}{m} \quad (9)$$

$$\frac{\sqrt{t}}{m} = \sqrt{t_0} \quad (10)$$

$$C^2 = h \sqrt{t_0} \quad (11)$$

$$C^2 = \frac{h}{T_0} \quad (12)$$

From Equation 6, we will have:

$$h \sqrt{t_0} t = C^2 \quad (13)$$

$$t = \frac{C^2}{h \sqrt{t_0}} \quad (14)$$

$$t = \frac{C^2}{h} T_0 \quad (15)$$

$$t = 1,3564 \times 10^{50} T_0 \quad (16)$$

$$t = 1,3564 \times 10^{50} mT \quad (17)$$

Or:

$$t = 1,3564 \times 10^{50} \frac{1}{\sqrt{t_0}} \quad (18)$$

$$t = 1,3564 \times 10^{50} \frac{m}{\sqrt{t_0}} \quad (19)$$

TIME IS A PROPERTY OF MATTER

With increasing speed and as we approach the surface of a significant mass, energy increases:

V – Velocity
L – Location

$$\frac{E_{V,L}}{E_0} = \frac{h\sqrt{V,L}}{h\sqrt{V_0}} \quad (20)$$

As energy increases, the frequency of matter also increases.

$$\sqrt{V,L} = \sqrt{V_0} \frac{t_0}{t_{V,L}} \quad (21)$$

$$t_{V,L} = 1,3564 \times 10^{50} \frac{m}{\sqrt{V,L}} \quad (22)$$

The increase in energy equates to an increase in frequency, which will reduce time.

The variation of time is the response of matter to the variation of energy and proportional to its period, as such, time is nothing more than a property of matter.

CONCLUSION

Now we really know what time is and why it expands or contracts. Whenever the energetic state of matter changes, its unit frequency changes, its time changes.

Time is inversely proportional to frequency per unit mass, the time varies with the energy/frequency of the matter.

Since the sum of frequency per unit mass is always increasing and never decreasing, then time, although inverse, will also always be adding and increasing. Traveling to the past and future will be completely impossible.

An increase in energy corresponds to time dilation because the period/time is the inverse of its frequency and vice versa.

Time is a property of matter. Time is how matter reacts to the energy level for which it is present.

We have a sense of time because we are matter, our basic nature, we also have consciousness and memory.

Time in a reference frame expands with increasing speed and increasing potential energy density to which it is subjected.

Time in black holes tends to stop. Matter as we know it will likely be dismantled, and time will no longer exist.

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