

ARE ROTATIONS ABSOLUTE OR RELATIVE MOTIONS?

A historical question with a confusing contemporary answer

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Abstract. -For contemporary physics, the debate on the absolute or relative nature of rotational motions has been settled in favor of their relative nature. But here I give the reasons why that debate should remain open. To do so, I use the (always official) answers of two artificial intelligences that confirm this hegemonic relativism of contemporary physics. These artificial answers are briefly addressed. The article also includes a very simple argument (already published by the author) that demonstrates the absolute nature of all rotational motions of all celestial bodies.

Keywords: Newton-Leibniz debate, rotational motion, relative motion, absolute motion.

1. A classic debate that has yet to be properly resolved

The well-known classic debate between I. Newton and S. Clarke on one side and G. W. Leibniz on the other, with the intervention of E. Mach and A. Einstein in its penultimate phase, is not properly closed [1, p. 43-108], although it may seem otherwise. It is one of the most important debates in the history of physics, and not only because of the relevance of its protagonists. It is one of the most important because of the relevance of the physical concept that fuels it: the absolute or relative nature of motion. Particularly rotational motion, which involves practically all physical objects in the observable universe.

Until the early 20th century, the position of I. Newton and S. Clarke in favor of the absolute nature of motion clearly dominated in physics, but since then the situation has changed radically: from those early years of the 20th century to the present day, the dominance of relativism in physics has been and remains "absolute". So absolute that it is now practically impossible to publish articles critical of this relativism, except in journals that are very open to all positions, as is the case with this one. Consequently, the debate on the absolute or relative nature of motion is officially closed in favor of relativistic principles and their formal consequences.

The author has published several works in which special relativity is reinterpreted in terms of appearances, especially [2], but without any audience in the (relativist) scientific community, which no longer admits discussions about the absolute or relative nature of motion: all motions are relative; physical objects only move relative to each other; and they do so in a spacetime continuum that, for most physicists, is not a real physical object, but rather a convenient fiction for expressing the equations of motion in mathematical terms. But if this spacetime continuum were real, it would have to be admitted that all physical objects are actually moving THROUGH this real and absolute physical space. And it would be their different absolute motions THROUGH this real physical space that give rise to their different relative motions, which are the only ones that can be observed.

In this regard, and since 2015, a new element must be considered in the debate on the absolute or relative nature of motion. This new element is the actual physical nature of physical space. Indeed, the empirical detection of gravitational waves demonstrates in an empirical and conclusive way the reality of physical space: what does not exist cannot vibrate, nor can it be the medium for transmitting its vibrations, nor can it interact with the scientific instruments that detect and measure its vibrations (interferometers). It is surprising, then, that 10 years later and after nearly 100 new detections, physics has not yet explicitly and unequivocally declared the physical reality of space.

Although we cannot, at least not yet, observe the reality of physical space, an immediate con-

sequence of its physical and objective reality is that all the motions of all celestial bodies, from subatomic particles to planets, stars, galaxies, etc., occur THROUGH the same physical space. This conclusion at least partially favors the positions that defended the absolute nature of motion (I write defended rather than defend because the relativistic thesis is absolutely hegemonic in contemporary physics). Therefore, in addition to the motion of one object relative to another, we can begin to talk about the motion of both objects THROUGH THE SAME REAL PHYSICAL SPACE.

2. New agents reveal the ongoing debate on rotational motions

A new and efficient way to find out the prevailing opinion among contemporary scientists on almost any topic is to ask artificial intelligences the right questions, because they can process an overwhelming amount of information based on scientific publications almost instantly. In relation to the content of this article, I have asked two questions to Gemini 3 and ChatGPT 5.2, whose answers I reproduce below and which will be immediately commented on by the author.

Q1: Are there absolute motions in the observable universe, or are all motions relative? Please give me a brief answer.

Gemini 3: According to the Theory of Special Relativity, there are no absolute motions because there is no universal fixed point in space; all motion is defined in relation to another object or reference system. However, on a cosmological scale, scientists use Microwave Background Radiation (the echo of the Big Bang) as a "privileged" reference system to measure the speed of the Earth and galaxies relative to the universe as a whole.

ChatGPT 5.2: In the observable universe, there are no absolute motions in the physical sense; all motions are relative. There is no "resting cosmos" with which to compare velocities. Special and general relativity make this clear: only relative velocities and accelerated motions have physical meaning (the latter can be detected without external references, due to their effects). Plain translation? You can tell if you are accelerating, but not if you are "really moving" with respect to the Universe with a capital U. Absolute motion is a comfortable intuition... and scientifically dispensable.

Q2: Are the rotational motions of celestial bodies relative motions or absolute motions? Please give me a brief answer.

Gemini 3: Unlike linear motion (which requires a reference point), rotation generates measurable physical effects internally -such as centrifugal force or pole flattening- that demonstrate that the body is rotating without the need to compare it to another external object.

ChatGPT 5.2: Rotational motions are not purely relative. They have an absolute character in their physical effects. To put it bluntly: even if you describe rotation relative to other bodies, rotation reveals itself. It produces real inertial forces (centrifugal, Coriolis), flattening of planets, internal stresses, precession... All this happens even if you don't look at any other object in the universe. A classic example: a spinning bucket of water. The water curves even if the rest of the cosmos were turned off. Spoiler alert: the water does not need witnesses. Forward-looking conclusion: Translation is relative. Rotation is not entirely so. Modern physics is clear on this, even if the language sometimes obscures it.

Consequently, we can summarize the state of the art regarding the nature of motion in contemporary physics by stating that all motions are relative, although not all motions are entirely relative, as seems to be the case with rotations. The problem is to explain how rotations can be only partially relative. What is the non-relative part of these motions like? Are they absolute? Or what is the motion of an object relative to the universe as a whole like?

Note, furthermore, that neither of the two AIs questioned refers to the physical reality of space or the motion of all objects THROUGH THAT REAL PHYSICAL SPACE. Motion is always defined "with

respect to,” never ‘around of’ or “through of.” Confusion reigns, and the debate on the nature of motion, particularly of the rotational motions, is not properly settled, even though to assert this is anathema to contemporary physics.

3. A simple argument that is surprisingly absent from contemporary physics

I think it is appropriate to conclude this brief reflection on the absolute or relative nature of rotational motions with the following text published by the author in 2024. [4]:

Practically all objects in the observable universe are subject to complex motions that can be broken down into simpler ones, most of which are rotations AROUND an internal axis. This is the case for all the planets in the solar system (and for the vast majority of cosmic objects). From each of these planets it is the Sun that seems to rotate around each of them. But obviously this is impossible: the Sun cannot rotate at the same time around different centers of rotation (the center of each of the planets). The rotation of the Sun around each planet is an apparent rotation, but as such appearance, the appearance is real, observable and measurable. From which we can deduce the reality of each of these planetary rotations. To deduce the absolute nature of these rotations, we must consider some of the parts of the object subjected to this rotation. We will analyze the rotations of the Earth, although billions of other cosmic objects could serve.

In the case of the Earth, the first rotation to be considered is its rotation around an internal axis (the Earth’s rotation axis). It is a real rotation because it produces observable and measurable effects: the apparent rotation of the Sun and the rest of the cosmic objects around the Earth. In each rotation of the Earth around its internal axis of rotation, each of its points describes a unique circle, with a unique center of rotation that will be a unique point on the unique Earth’s rotation axis. And since in a single rotation a point cannot rotate at the same time around two different centers of rotation without being in different places at the same time, the motion of rotation of each of the points of the Earth around its corresponding center of rotation is unique and can only be referred to that unique center of rotation, which will therefore be an absolute center of absolute rotation. And this is true for every point of the planet. The rotation of the Earth around its internal axis of rotation is, therefore, a real and absolute rotation. Although, as we shall see, that absolute internal axis of absolute rotation is in turn rotating around other centers of absolute rotation external to the planet.

Instead of considering the points of the Earth, let us now consider the Earth as a whole, the Earth as a planet. The planet Earth, as a whole, now rotates in an elliptical orbit around the Sun (which occupies one of the two foci of the ellipse). That (so-called) translational motion of the Earth around the Sun also produces apparent motions in the rest of the cosmic objects. And although they are apparent, not real, appearances as such appearances are real: they are observable and measurable. And for the same reason as in the case of the points in the rotation of the Earth around its absolute internal axis of absolute rotation, the elliptical orbit of the Earth is also a unique orbit around its two unique foci (although it is not stable and in time may oscillate with respect to certain equilibrium positions). So, also in this case, the rotation of the Earth around the Sun is a real and unique motion that can only be referred to the absolute geometrical elements of its unique absolute elliptical orbit (its two foci). It is therefore another real and absolute motion.

According to everything we know about the observable universe, the vast majority of its trillions of physical objects are subject to rotational motions (from one revolution every 100 quadrillion years in the case of some galaxies, to one quadrillion revolutions

per second in the case of electrons). And the above argument applies to all of them. Therefore cosmic objects do not rotate WITH RESPECT to the sphere of fixed stars, as advocated by E. Mach. [5, p. 83-84] [6, p. 45] and many contemporary physicists, but each of their rotations is a motion AROUND a unique and absolute axis, or center/foci, of rotation. They are, therefore, real absolute rotations, real absolute motions [3]. Thus, the vast majority of motions in the observable universe are absolute, not relative.

Naturally, the above argument about circular and elliptical motions also applies to hyperbolic and parabolic motions. That is, to the vast majority of real physical motions of almost all real physical objects in the observable universe. I find it truly surprising that such simple and meaningful arguments are absent from contemporary physics.

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