

A Critique of the Theory of Relativity: The Hafele - Keating Experiment as a Case Study

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Abstract

This article will critique certain aspects of Einstein's theory of relativity. It is a commentary on the previously published article "Critique of the Theory of Relativity." This article presents critical remarks about the Hafele-Keating experiment. This experiment was originally intended to prove the truth of general and special relativity. There are no criticisms of the experiment itself, but the conclusions drawn from it favor the theory of relativity, to the benefit of this theory and its author. In other words, the experimenters engaged in fraud.

Keywords: Theory of relativity, Calculation scheme, Earth's magnetic field, Time dilation

Introduction

It seemed that there were plenty of critical articles on Einstein's theory of relativity even in the time of its author, Lorentz, Poincaré, Rutherford, and modern scholars [1, 2]. It seemed that the theory's controversial nature should have relegated it to the status of a hypothesis, a pseudo-theory. However, today, the collective mind presents this theory as dominant. Accordingly, the proposed criticism is addressed primarily to this collective mind. There is a generally accepted framework for the development of scientific knowledge. The basic principles of scientific development can be divided into several aspects, ranging from fundamental principles to applied research. At the core of science lies the pursuit of objective knowledge of the world, the use of experiment and observation, and the logical justification of conclusions. The development of science can be viewed as a movement from fundamental research aimed at understanding the fundamental laws of nature and society to applied research that uses this knowledge to solve specific problems. The passions surrounding this theory have reached extreme levels – from complete enthusiasm and admiration to complete rejection and denial. Official science considers this theory to be the dominant criterion of truth. Opponents of this theory, however, portray this enthusiasm as mass insanity. Supporters of this theory are obsessed with the constant search for proof of its existence. There is no third party capable of resolving this entire debate. Only physicists can and should understand physics. For example, Max Born, in his work [3], noted the assumption that compression along the X-axis is illusory. Unfortunately, he did not develop this topic further. This article aims to prove that Einstein's theory of relativity is a pseudo-theory. It proposes a way to resolve the debate over the truth or falsity of this theory. Naturally, if the theory is proven false, the enthusiasm surrounding it could be classified as mass insanity and even obscurantism [4,5]. Obscurantism includes the denial of criticism of the theory, the issuance of all sorts of decrees, refusals to publish critical articles, refusals to participate in scientific conferences, and so on.

Main Part

A. Calculation scheme based on the Hafele-Keating experiment

The calculation scheme for the Hafele-Keating experiment [6,7] is shown in Fig. 1 on the left. It must be acknowledged that this calculation scheme is entirely consistent with Einstein himself and his concepts. If Einstein's theory is accepted as true, then there are no questions about this scheme. This scheme even includes the velocity addition rule. According to the conclusions of the experiment, the radial velocity of the Earth and the aircraft velocity are added. It is the difference in the total velocities that forms the basis for the conclusions, namely $(V_0 + V_1) > (V_0 - V_2)$. It is this difference that is presented as the reason for the discrepancy in the readings of the experimental clocks. And, the discrepancy in the readings of the clocks is presented as proof of Einstein's theory of relativity. The experimenters are not even bothered by the flawed calculation scheme. The calculation scheme is straightforward; in this scheme, the aircraft's movement has only a phase of separation between the experimental clocks and the control clock, although in reality there is a separation phase, a stationary phase, and an approach phase. If the experiment's authors had graphically depicted this diagram, it's quite possible they would have questioned its correspondence to the actual process. Here, too, the experiment's authors followed in the footsteps of their guru, drawing their conclusions theoretically. It's also important to note that theoretical experiments are only permissible for relativists; other theoretical experiments and experimenters are rejected if they contradict the theory of relativity.

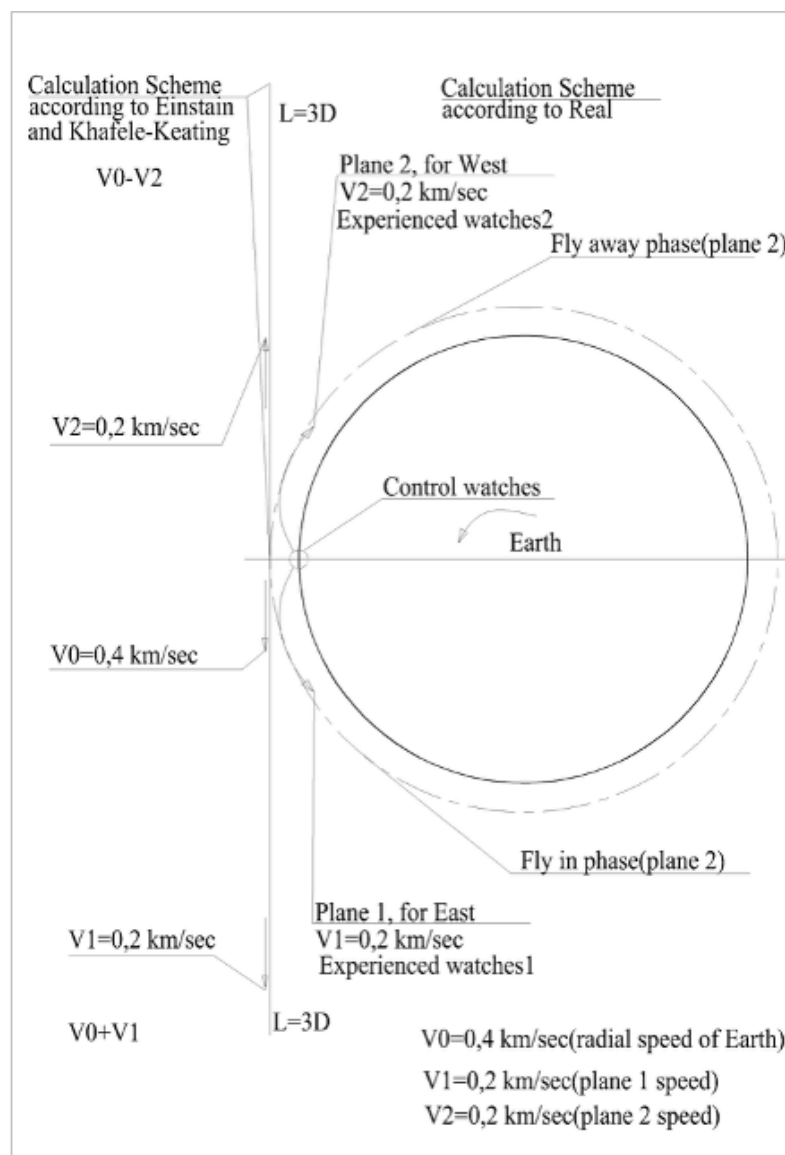


Fig.1 Calculation scheme

According to the results and conclusions of the experiment, the mere fact of the difference in the clock readings was sufficient proof of the theory of relativity. The difference in the readings of the control and experimental clocks is proof of the truth of the theory of relativity.

The results were published in “Science” in 1972,

	nanoseconds gained, predicted			nanoseconds gained, measured	difference
	gravitational (general relativity)	kinematic (special relativity)	total		
eastward	+144 ±14	-184 ±18	-40 ±23	-59 ±10	0.76 σ
westward	+179 ±18	+96 ±10	+275 ±21	+273 ±7	0.09 σ

Table 1. Results of measurements according to the Hafele-Keating experiment

The table shows very revealing kinematic measurements. The eastward readings are (-184) nanoseconds, while the westward readings are (+96) nanoseconds. Figure 1 shows the calculation diagram on the left. The diagram is presented without taking into account the aircraft's circling motion, as was the case in reality. Aircraft in both directions were merely moving away from the reference clock. One way or another, the difference in clock readings was recorded.

This difference is a manifestation of the relativistic effect, meaning that the theory of relativity is correct. The same story applies to satellite navigation. Ronald Ray Hatch tried to reason with the scientific community, but to no avail. Relativists reject the idea that the difference in clock readings is a change in the clock's rate due to external influences, but not a change in time itself. Let's return to the calculation scheme. So, the experimenters took the radial velocity of the Earth's surface into account. This velocity is, in a physical sense, a translational velocity, comparable to the speed of an airplane. This raises the question: why wasn't another translational velocity taken into account - the Earth's orbital velocity, $V = 30 \text{ km/sec}$? This velocity is two orders of magnitude higher than all other velocities. Taking this velocity into account, all other velocities are just treading water. Relativists can counter that this velocity has the same effect on all clocks. It turns out that when it's advantageous for relativists, they take translational velocity into account, and when it's disadvantageous, they ignore it. It seemed that the velocity itself was important for the relativistic effect.

There are no questions about the experiment itself; we will assume that all measurements are reliable. The experiment itself is quite revealing.

B. Movement of objects in the Earth's magnetic field

Thus, based on the Hafele-Keating experiment, the very fact of the difference in clock readings is accepted as proof of the theory of relativity. The theoretical calculation scheme remains merely theoretical, not specifically documented anywhere, much less supported by any calculations. In reality, the experiment shows the movement of the experimental clocks in the Earth's magnetic field (Fig. 2). It must be understood that in such a scheme, any movement in a magnetic field (across the lines of magnetic intensity B) in any material body causes an electromagnetic effect, especially since the magnetic field itself is unstable. This electromagnetic effect, electromagnetic induction, can be easily considered an external influence. The Earth's magnetic field is tied to the Earth itself and rotates in response to the Earth's rotation. The experimental clocks move relative to the magnetic field at a speed of 0.2 km/sec, while the control clocks move at a speed of 0 km/sec. It is entirely possible that movement from East to West affects the clock's rate with a positive sign, and vice versa. This is precisely the result obtained in the experiment. A similar picture arises in satellite navigation. Here, speeds are an order of magnitude higher, and the solar wind's effect on the Earth's magnetic field and its fluctuations is noticeable.

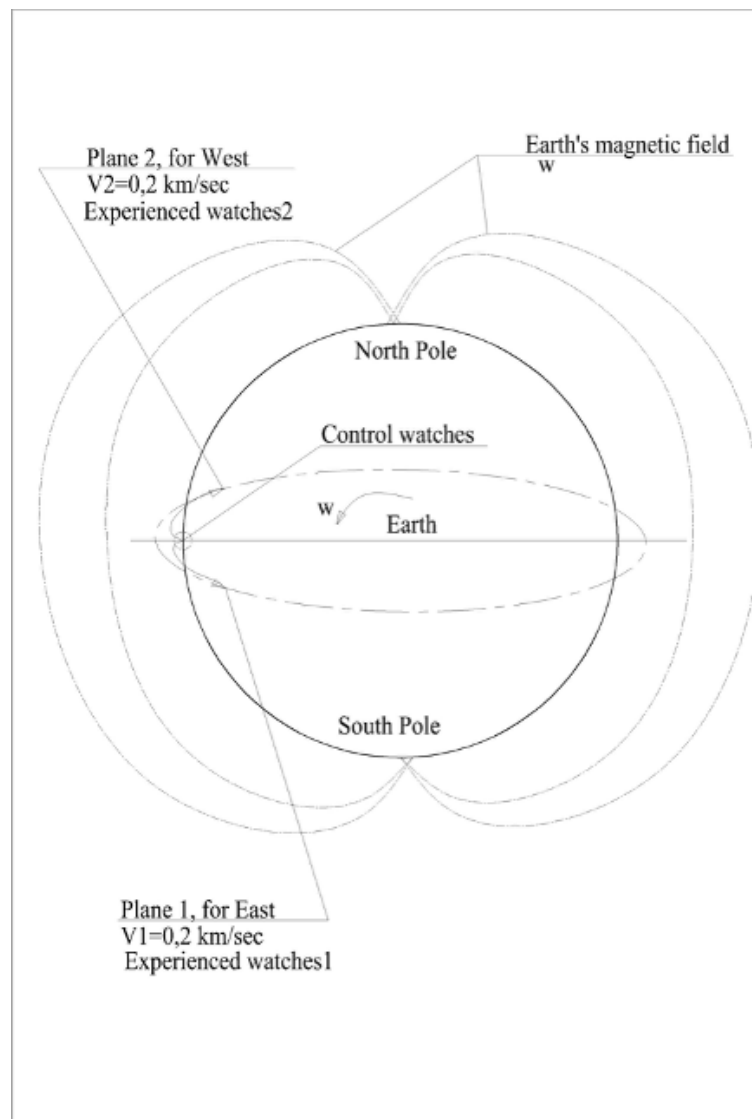


Fig.2 Movement of objects in the Earth's magnetic field

The experts' conclusion is clear: there is a discrepancy in the clock readings, which means the theory of relativity is correct!

Conclusions

The main conclusion should be the scientific community's recognition that the Hafele-Keating experiment was performed correctly, but the conclusions drawn from it were falsified by its authors. The conclusions were falsified in order to obtain "proof" of Einstein's theory of relativity.

Another key conclusion of this article is that it is crucial to draw appropriate conclusions from any experiment. We will attempt to draw appropriate conclusions from the content of this article.

In scientific circles, such words as obscurantism are not customary. However, the theory of relativity fits this definition perfectly. Thanks to this theory, physics was divided into theoretical and applied. At first glance, there is nothing objectionable about this. However, in the relationship between these physicists, theoretical physics is the highest rank, while applied physics is second-rate. A representative of the second rank, Ronald Ray Hatch, attempted to criticize the theory of relativity – the result was "0." The Max Planck Institute was renamed the Albert Einstein Institute. This institute comprises four independent research groups. It would seem these groups would advance alternative ideas in the field of gravity. But no, they offer nothing but praise for the theory of relativity, in keeping with the institute's name (nothing to complain about). Furthermore, any -

outside criticism is completely rejected. Einstein's theory of gravity presupposes the significance of certain curved spaces in the physics of gravity. Fortunately, in topology, the number of curved spaces is unlimited, and the author did not deny the many such possibilities. This leaves room for creativity, allowing for the creation of an unlimited number of research groups.

In the experiment, the calculation scheme is presented theoretically. In this article, the scheme is presented graphically. The graphical form of the scheme clearly demonstrates that the calculation scheme does not correspond to the actual reality of aircraft flight. In reality, there is a phase of fly-away from the control clock, a stagnation phase, and a fly-in phase.

At a minimum, this article calls into question the conclusions of the Hafele-Keating experiment. A definitive conclusion based on the results of this experiment requires testing the effects of magnetic fields on the clock's operation.

Table 1 shows the time measurements as a function of flight altitude. The experiment's authors interpreted these changes as a gravitational relativistic effect. These changes can be explained by the different characteristics of the Earth's magnetic field depending on altitude above the Earth's surface.

Note: A problem for relativists.

A spacecraft is moving through space. For an Earthling, it moves at one speed, and for a Martian, at another - in magnitude and direction.

Question: How should this spacecraft be flattened, and how should time slow down within it?

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