Failure of Einstein's theory of relativity. I. Refutation of the theory of special and general relativity by an empirical experiment and by an epistemological analysis

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(Received 31 October 2018; accepted 17 April 2019; published online 1 May 2019)

Abstract: In the experiments concerning time-dilation effects, physicists compare always only two atomic clocks, one that is stationary and one that moves or is within another position with respect to the gravitational potential. Using only two clocks, respectively, two physical states, the contradictions of relativistic physics are hidden. If more than two clocks are examined in an experiment, there result a lot of contradictions, as explained in the article. The presented empirical experiment proves that Einstein's theory of relativity is wrong. According to epistemological criteria, the theory of relativity has therefore to be considered obsolete and has to be replaced by another theory that has not yet been falsified. To accept this is not easy because the theory of relativity provides quantitatively very correct values. These quantitative values entered into computers, allow a very good applicability in physics and astrophysics. But on the one hand computers do not ask whether the quantitative values used were conclusively derived and on the other hand most physicists do not question relativistic physics anymore because of its great successes.
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Résumé: Lors des expériences portant sur les effets de la dilatation du temps, les physiciens procèdent toujours à la comparaison de deux horloges atomiques uniquement. L'une est fixe et l'autre est mobile ou se trouve à une autre position par rapport au potentiel gravitationnel. L'utilisation de deux horloges (deux états physiques) permet de masquer les contradictions de la physique relativiste. Si une expérience porte sur plus de deux horloges, cela entraîne de nombreuses contradictions. L'expérience empirique présentée prouve que la théorie de la relativité d'Einstein est fausse. Selon des critères épistémologiques, la théorie de la relativité doit donc être considérée comme obsolète et doit être remplacée par une autre théorie non encore falsifiée. L'acceptation de ce fait n'est pas facile car la théorie de la relativité fournit des valeurs quantitativement très correctes. Ces valeurs quantitatives entrées dans les ordinateurs permettent une très bonne applicabilité en physique et en astrophysique. Mais, d'une part, les ordinateurs ne se demandent pas si les valeurs quantitatives utilisées ont été dérivées de manière concluante et, d'autre part, la plupart des physiciens ne remettent plus en question la théorie de la relativité en raison de ses grands succès.

Key words: Special Relativity; General Relativity; Theory of Relativity; Gravitational Time Dilatation; Gravitational Redshift/Blueshift; Time Dilatation; Four-Dimensional Space-Time; Hafele-Keating Experiment; Atomic Clocks and Relativity; Binary Pulsars and Relativity.

I. INTRODUCTION

Einstein's theory of special relativity changed our concepts of reality concerning space and time. Special relativity describes objects that are moving with respect to inertial frames of reference in a state of uniform motion with respect to one another such that one cannot distinguish one from the other. That means that each observer will always measure the same proper time ("Eigenzeit"), independent from the velocity of the inertial system. However, when viewed from a distance, observers in inertial systems at different speeds must measure different times for the other observer, if comparing their times. The theory of general relativity describes objects that are or move within different strengths of gravitational potentials. Einstein writes in one of his original articles with respect to his thoughts about general relativity:[1] "Let v_0 be the oscillation of two elementary light generators measured with a clock U at the same place. This oscillation is then independent of where the light generators together with the clocks are set up. We want to think both to be disposed at the surface of the Sun (S2). From the light emitted there, a part of the light reaches the Earth (S1), where we measure the frequency of the incoming light with a clock U of exactly the same nature as the one just mentioned, so that we get for the measured frequency on Earth:

$$v = v_0 \times \left(1 + \frac{\Phi}{c^2}\right), \tag{1}$$

whereby ϕ is the (negative) gravitational potential between the surface of the Sun and the Earth." This means that

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independent from the strength of a certain gravitational potential the measured oscillation of a light beam, respectively, the measured proper time, must also always be the same, so that each observer will not be able to distinguish one from the other. However, distant observers within different gravitational potentials must measure a different oscillation of the light beams, respectively, a different time, if they compare their times with each other. Simplified one can say that according to Einstein's theory of relativity locally there must be always measured the same proper time ("absolute time") because the velocity of light is postulated to be a constant and a natural law. If time measurements within inertial frames at different velocities or within different gravitational potentials are compared with each other from a distance, there must be measured different times ("relative times").

In the experiments concerning time-dilation effects, physicists compare always only two atomic clocks, one that is stationary and one that moves or is within another position with respect to the gravitational potential. Using only two clocks, respectively, two physical states, the contradictions of relativistic physics are hidden. If more than two clocks are examined in an experiment, there result a lot of contradictions. Let us for example take the global positioning system (GPS). The clocks in the GPS satellites have gravitational and motional frequency shifts which are so large that, without carefully accounting for numerous relativistic effects, the system would not work. That is right, but what does it really mean applying Einstein's theory of relativity to the GPS satellites? According to Einstein, the GPS satellites measure for themselves their unchangeable and always equal proper time. All would be alright and no problem, but because of the constant velocity c of light within every inertial frame it is necessary that a clock of a satellite (although all clocks measure the same proper time) must measure a different time for the clocks in the other satellites. Why should it be necessary to adjust the correct (proper) time of a certain clock? This means that for a certain clock itself the time adjustment is not necessary, but for all other clocks. How is it possible to adjust the time of a clock in a certain GPS satellite and simultaneously not to adjust the time in this clock? This is only one of many contradictions of relativistic physics that require a meticulous epistemological examination. At the end of this article, everybody will be able to understand, why Einstein's theory of relativity cannot be the correct explanation for the quantitative differences we measure against the Newtonian theory of gravity.

II. AN EMPIRICAL EXPERIMENT THAT FALSIFIES EINSTEIN'S THEORY OF SPECIAL AND GENERAL RELATIVITY

In the year 2010, Chou *et al.* published in the journal "Science" an article: "Optical Clocks and Relativity."[2] With optical atomic clocks they observed gravitational time dilatation due to a change in height near Earth's surface of less than 1 m and time dilatation from relative speeds of 10 m/s (36 km/h). Two Al^+ optical atomic clocks were located in separate laboratories and the measured times were compared by transmitting the stable clock signal from the mobile clock to the room of the stationary clock through a 75-m length phase-stabilized optical fiber. When the two clock signals were compared in the room where the stationary clock was located, the measurements carried out by the mobile clock verified the quantitative values predicted by general and special relativity. When the researchers elevated the optical atomic clock mounted on a platform by just 33 cm and compared the time of this clock with the time measured by the stationary atomic clock, they found out that the time measured by the elevated clock went faster and they measured a fractional frequency change ($\Delta f/f_0$) of about $+4.1 \times 10^{-17}$. When the researchers moved the optical atomic clock mounted on a platform by a velocity of 10 m/s (36 km/h) against the stationary optical atomic clock and compared the measured times of both clocks, they found out that the time measured by the clock in motion went slower and they measured a fractional frequency change ($\Delta f/f_0$) of about -0.6×10^{-15}. The quantitative values corresponded with the predictions of general and special relativity so that the researchers stated that the theory of relativity has been verified again.

Superficially this seems correct, but an epistemological analysis yields the opposite. According to Einstein's theory of relativity, each atomic clock must always measure the same proper time, because the speed of light is considered a natural law and natural laws shall be the same for any observer. If a distant observer compares his proper time with the time of another observer, time shall pass differently. Frequencies are measured in Hertz (Hz)

$$\mathrm{Hz} = \frac{1}{\mathrm{s}}. \tag{2}$$

Formally, one would think that the frequency changes inversely proportional to time. Because the frequency of a light beam changes only indirectly by time, this is not right. If time is going faster, electromagnetic waves are emitted more rapidly in succession by a radiation source, so that there results a shorter wavelength of the electromagnetic wave. If time is going slower, electromagnetic waves are emitted slower in succession by a radiation source, so that there results a longer wavelength of the electromagnetic wave. With other words: If time increases, the wavelength decreases. If time decreases, the wavelength increases. This means that time and wavelengths change reversely proportional

$$t \sim \frac{1}{\lambda}. \tag{3}$$

Also frequencies and wavelengths are reversely proportional

$$f \sim \frac{c}{\lambda} \rightarrow f \sim \frac{1}{\lambda}. \tag{4}$$

This means that the frequency of an electromagnetic wave must be proportional to time, so that you can also define

$$f_0 = t_0, \tag{5}$$

whereby t_0 shall be the so-called proper time. Even though the researchers compared the measured times of the mobile atomic clock and the stationary atomic clock from the distance because the time signal of the mobile clock was sent through a 75-m length phase-stabilized optical fiber, it is very strange that the mobile atomic clock should not have measured its own proper time, but the time the distant observer at the stationary clock would expect for the mobile clock according to the theory of relativity.

As most of today's physicist cannot imagine that the theory of relativity might be wrong, the researchers did not think about it and did not make a counter test. According to relativistic physics there happen strange things: If you cut the optical fiber, the mobile clock must again measure the proper time t_0, as now it is not compared with the stationary clock. And what result would we expect, if we elevated the stationary atomic clock to the same height as the mobile atomic clock? In this case, according to relativistic physics, the stationary clock must still measure its proper time, as the proper time is always equal, independent from the gravitational potential or movement. Both atomic clocks are now at the same height within the same gravitational potential, and we cannot see any reason, why the times measured by both clocks should be different, although the comparison of the measured times happens from the distance via an optical fiber. The mobile atomic clock has not changed its position in this case! Why should the mobile atomic clock now measure another time than before? According to relativistic physics the stationary clock (1) and the mobile clock (2) must always measure the same proper time (t_0), independent of the gravitational potential, if their times are not compared with each other. When the times measured by the clocks are compared and the clocks are at the same height (same gravitational potential), although if elevated from the ground to a height of 0.33 m, both clocks should still measure the same times as before, otherwise the change of time would be an absolute change, see Fig. 1.

As the clock signal is sent from the mobile clock (2) to the stationary clock (1), but not contrariwise, the mobile clock cannot have any information about the position of the stationary clock. The experiment of Chou proves that the elevation of the mobile clock (2) without an elevation of the stationary clock (1) causes that the mobile clock (2) sends a time signal to the stationary clock that is different from the former proper time of both clocks, even though the mobile clock cannot have any information about the changed position of the stationary clock, see Fig. 2.

How should the mobile clock (2) know that in the first case it has to send a clock signal representing the unchanged proper time, when both clocks are elevated to a height of 0.33 m, and in the second case another clock signal different from the former clock signal of the proper time, when only the mobile clock is elevated to a height of 0.33 m? The contradiction of the relativistic imagination gets clear, if we disconnect the mobile atomic clock (2) and the stationary atomic clock (1), which shall now just measure their proper times for control, see Fig. 3. Then we put another atomic clock (1′) at a height of 0.33 m and another atomic clock (2′) at 0 m, whereby the atomic clock (1′) sends its clock signal to the atomic clock (2′). As the atomic clocks (1) and (2) now measure again the (according to relativistic physics) equal proper times, there results a contradiction, see Fig. 3.

The only logical explanation is that the proper times are not equal but change absolutely with respect to the different strengths of the gravitational potentials within the

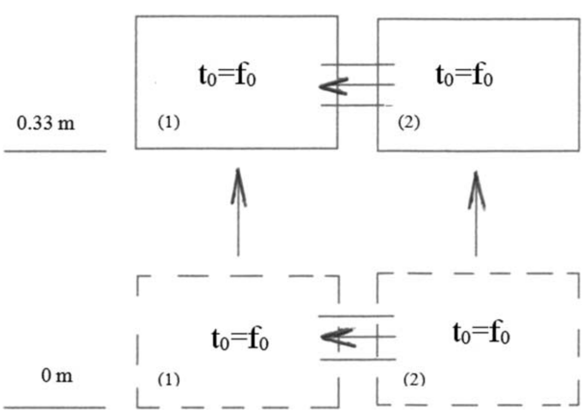

FIG. 1. If the clocks are located at the same height, according to relativistic physics the stationary clock (1) and the mobile clock (2) must measure the same proper time.

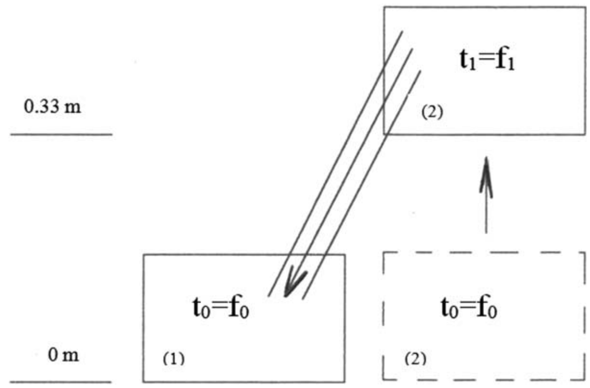

FIG. 2. The experiment of Chou proves that the elevated mobile clock (2) sends a time signal to the stationary clock (1) that is different from the former proper time of both clocks.

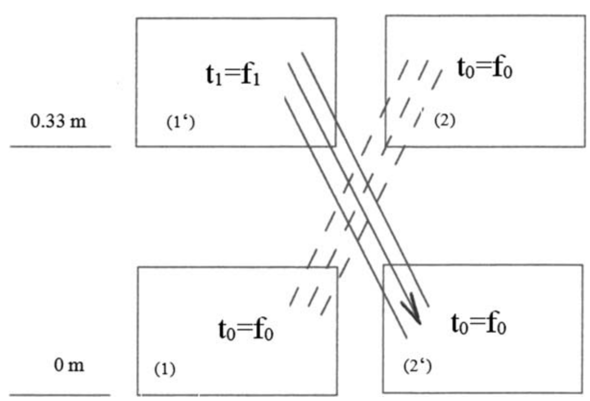

FIG. 3. The disconnected mobile clock (2) and stationary clock (1) measure the proper time again. If we put another clock (1′) at a height of 0.33 m and another clock (2′) at 0 m, the clock (1′) sends a clock signal to the clock (2′) that is different from the proper time.

gravitational field of the Earth, see Fig. 4. Further considerations can help to describe the contradictions of Einstein's theory of relativity. Let us imagine seven atomic clocks at different heights in a thought experiment, two on the ground, two at a height of 0.33 m, and three atomic clocks at a height of 0.66 m. According to relativistic physics each of the seven atomic clocks must measure the same so-called proper time t_0, independent from the position within the gravitational field of the Earth. See about this in Fig. 5.

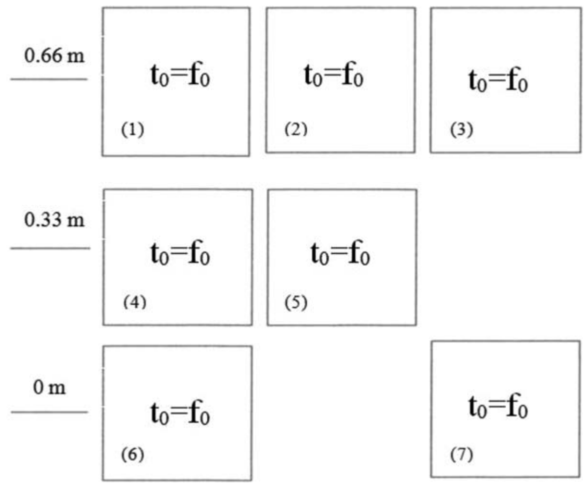

FIG. 5. According to relativistic physics each of the seven atomic clocks at different heights measure the same so-called proper times, as long as they do not compare their times.

If the times of the atomic clocks are compared, from the result of the experiment we know that the difference in height of 0.33 m causes a difference in time, respectively, frequency ($\Delta f/f_0$), of about $+4.1 \times 10^{-17}$. This means that, if the proper time t_0 has the relative value 1 at a height of 0 m, the time t_1 of a clock at a height of 0.33 m must have compared with the clock on the ground the relative value $1 + 4.1 \times 10^{-17}$, the time t_2 of a clock at the height of 0.66 m must have compared with the clock on the ground the relative value $1 + 8.2 \times 10^{-17}$. Stable clock signals shall now be send via cable from clock (2) to clock (1) and to clock (5), from clock (3) to clock (2) and to clock (7), from clock (4) to clock (6), see about this in Fig. 6. According to the theory of general relativity, atomic clocks at different heights measure different times, if the times of the atomic clocks are compared with each other, but for themselves they still measure the so-called proper time t_0. As you can see, each clock must on the one hand measure its proper time t_0, but on the other hand clock (2) must additionally be able to measure the time t_1 for clock (5) and the time t_0 for clock (1), clock (3) must be able to measure the time t_2 for clock (7) and the time t_0 for clock (2), clock (4) must also be able to measure the time t_1 for the clock (6).

According to general relativity, one atomic clock (observer) must be able to measure different times for different atomic clocks (observers) at the same time, which are positioned at different heights within the gravitational field of the Earth. Or with other words a clock connected with more than one clock by an optical fiber must be able to send different time signals through each cable, respectively, optical fiber. This is not possible! The same problem we get in the case of atomic clocks moving with different velocities. At first we imagine three atomic clocks with different velocities within the gravitational field of the Earth, one stationary atomic clock (0 km/h), one atomic clock moving at the velocity of 10 km/s to the right and another atomic clock moving at the velocity of 20 km/s to the left. So that the rotation of the Earth around its axis cannot play a role the atomic clocks shall run in north-south direction, respectively, in south-north direction. According to relativistic physics, each of the three atomic clocks must measure for themselves the so-called proper time t_0, independent from their velocity. The three clocks shall move at the same height from the ground. See about this in Fig. 7.

If the times of the atomic clocks are compared, from the result of the experiment we know that the difference of the velocity of 10 m/s (36 km/h) causes a difference in time, respectively, frequency ($\Delta f/f_0$), of about -0.6×10^{-15}. This means that, if the proper time t_0 of the stationary clock has the relative value 1, the time t_1 of a clock at the relative velocity of 10 km/h against the stationary clock must have compared with the stationary clock the relative value

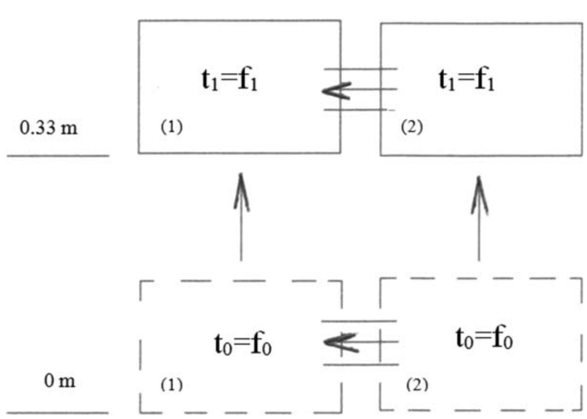

FIG. 4. The mobile clock (2) has no information about the position of the stationary clock (1). Therefore, the elevation of both clocks must result in an absolute change of their proper times.

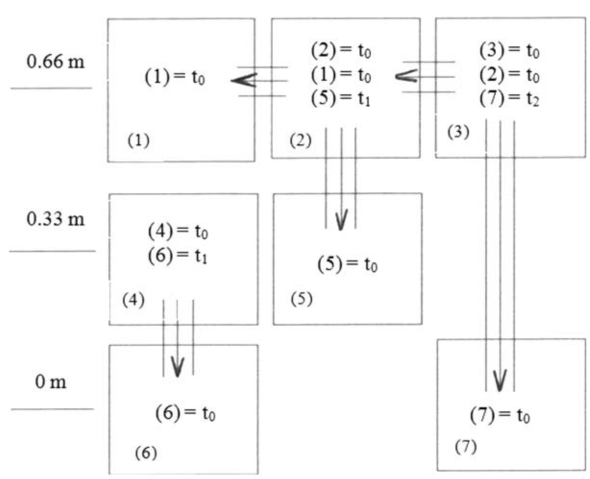

FIG. 6. According to the theory of general relativity, atomic clocks at different heights measure different times at the same time, if the times of the atomic clocks are compared, but for themselves they still measure the so-called proper time t_0.

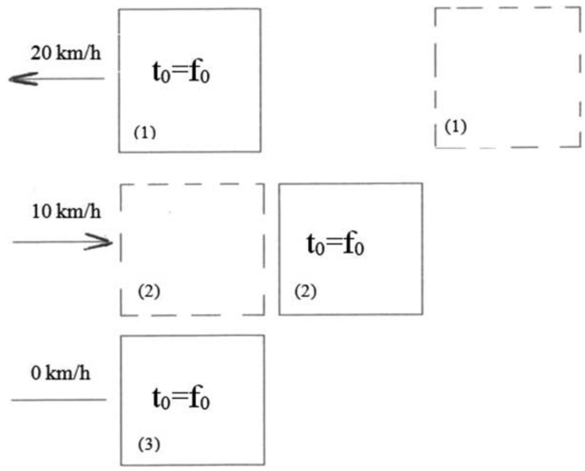

FIG. 7. According to the theory of special relativity, each of the three atomic clocks moving with different velocities measure the same so-called proper times, as long as their times are not compared with each other.

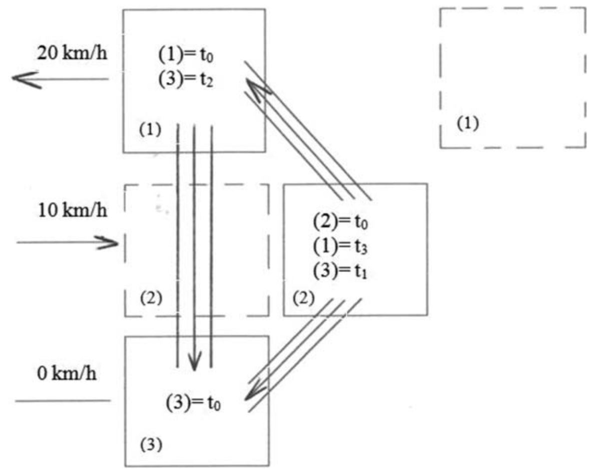

FIG. 8. According to the theory of special relativity, the three atomic clocks moving with different relative velocities must measure different times at the same time, if their times are compared, but for themselves they still measure the so-called proper time t_0.

$1 - 0.6 \times 10^{-15}$, the time t_2 of a clock at the relative velocity of 20 km/h against the stationary clock must have compared with the stationary clock the relative value $1 - 1.2 \times 10^{-15}$, the direction does not play a role in this case. But as the clock (2) moves with a relative velocity of 30 km/h against the atomic clock (1), it must measure for the clock (1) the time t_3 with the relative value $1–1.8 \times 10^{-15}$.

According to the theory of general relativity atomic clocks moving with different velocities measure different times, if the times of the atomic clocks are compared with each other, but for themselves they still measure the so-called proper time t_0. Stable clock signals shall now be sent via cable from clock (1) to clock (3), from clock (2) to clock (1) and to clock (3), see about this in Fig. 8.

As you can see, each clock must on the one hand measure its proper time t_0, but on the other hand clock 1 must additionally be able to measure the time t_2 for clock (3), clock (2) must also be able to measure the time t_3 for clock (1) and t_1 for clock (3).

According to the theory of special relativity, one atomic clock (observer) must be able to measure different times for different moving atomic clocks (observers) at the same time. Or with other words a clock connected with more than one clock by a cable or by an optical fiber must be able to send different time signals through each cable, respectively, optical fiber. Let us return to the experiment of Chou. How does the mobile clock know that it shall not send the clock signal of its proper time to the stationary clock, but the clock signal of another time? If both clock signals, the proper time signal and another time signal are transmitted from the mobile clock to the stationary clock, how is the stationary clock able to decide that it has to compare the clock signal of the other time instead of the clock signal of the proper time coming from the mobile clock? If the optical fiber is disconnected from the stationary clock, the clock signals would nevertheless be transmitted through the optical fiber anyway by the mobile clock. In this case, merely raising the end of the optical fiber must cause the mobile clock to transmit another clock signal than before, if not only the proper time is sent through the optical fiber. How does the mobile clock know in this case that it has to change the measured time and send another clock signal through the optical fiber, even though the mobile clock did not change its position within the gravitational field of the Earth? Many questions that nobody can answer!

The epistemological analysis of the experiment shows that, although the theory of special and general relativity enables the physicists to calculate correct quantitative values, which play a role in our physical world, the quality of the derivation of the quantitative predictions of the theory of relativity is contradictory and cannot represent reality. If we do not want to base the explanation of the experiment on contradictions and inexplicable physical processes, we must conclude the following from the experiment of Chou *et al.*:

1. Chou's experiment provides the confirmation that there is a time dilation depending on different velocities of atomic clocks within the gravitational field of the Earth and on different positions within the gravitational potential of the Earth.
2. The theory of relativity provides the possibility to predict the quantitative values for the time dilation depending on different velocities of atomic clocks within the gravitational field of the Earth and within different gravitational potentials, which can actually be detected in nature.
3. Contrary to the theory of special and general relativity the experiment proves that the so-called proper times must be different, which contradicts the theory of relativity.
4. If the proper times differ, the proper times must differ in an absolute sense with respect to different velocities or positions within the gravitational field of the Earth, while the theory of relativity postulates that time dilatation is just a relative phenomenon.
5. Chou's experiment thus refutes the special and general theory of relativity.
6. The researchers nevertheless claim, as also other physicists who performed similar experiments, that the theory

of relativity has been confirmed by their experiment, because they just rely on the quantitative values measured. But a precise measurement alone cannot replace a thorough epistemological analysis.

7. The researchers do not realize that the relativistic derivation of the quantitative values for the two types of time dilations by the theory of relativity must be wrong.

If someone still believes that relativistic physics might be right, I propose a thought experiment that could be performed as a real experiment in order to disprove Einstein's theory of relativity: Let us put three cesium atomic clocks in a single room, one standing on the ground, one at a height of one meter, and another at a height of two meters. Each clock shall have a display showing the time measured by the respective atomic clock. One meter in front of the display of each atomic clock a camera shall be set up at the same height as the respective atomic clock, which is connected to the corresponding atomic clock via a cable of the same length. The starting impulse for the measurement of time the three atomic clocks shall get via a cable from another cesium atomic clock at a height of 1 m from the ground, which can be located in another room. As according to Einstein, every clock must measure the same proper time t_0, independent from the gravitational potential (or movement), we could also have positioned this clock at another height from the floor. The atomic clock that starts and stops the time measurement of the three other atomic clocks positioned at different heights from the floor shall be connected with each of the three atomic clocks by a separate cable of the same length. After a time of 100 days, the cameras in front of each of the three atomic clocks shall take a picture of each display and record the time. According to Einstein, each clock measures the same so-called proper time t_0, independent of the gravitational potential (or a certain speed of the clocks). If the cameras take a picture after 100 days, the cameras should therefore record that each atomic clock displays that 100 days have passed. Then the camera on the ground shall be turned to the atomic clock at a height of 1 m, in order to be able to take a picture of the display of the middle clock, while the camera at a height of 2 m shall be turned to the atomic clock at a height of 1 m, in order to take a picture of the display of the middle clock. To avoid systematic errors, the camera in front of the middle clock must now be positioned $2^{1/2}$ meters from the display of the middle atomic clock, so that all three cameras have the same distance from the display of the middle atomic clock. Again the three atomic clocks shall get an impulse to start the measurement of 100 days. After 100 days the three cameras take a picture again, but now only of the display of the middle atomic clock. According to Einstein, the picture of the display of the middle atomic clock at a height of 1 m taken by the camera on the ground must now show a number, which must be larger than 100 days, as the middle clock goes faster than the clock on the ground, where the camera is positioned. According to Einstein, the picture of the display of the middle clock at a height of 1 m taken by the camera at a height of 2 m must show a number, which must be smaller than 100 days, as the middle clock goes slower than the clock at a height of 2 m, where the camera is positioned. According to Einstein, the three pictures of the display of the middle atomic clock taken by the three cameras must in this case show three different numbers, the picture of the middle camera must show the proper time t_0 of 100 days, the picture taken by the camera on the ground must show a time longer than 100 days (t_1) and the picture taken by the camera at a height of 2 m must show a time shorter than 100 days (t_2).

That one clock shall be able to measure and display different times at the same time is the miracle of relativistic physics that must be believed in, if one goes from the imagination that Einstein's theory of relativity is right. Relativistic physicists believe in this miracle and even claim that those, who do not, are too ignorant to grasp the correctness of Einstein's theory of relativity. As I do not believe in miracles, I postulate that an atomic clock is only able to measure one time, namely, the proper or local time. There is only one reasonable explanation of the experiment of Chou: The measured proper times of the optical atomic clocks are different, which correspond with a refutation of Einstein's theory of relativity because according to relativistic physics the proper times t_0 must always be equal, respectively, constant because the velocity of light is postulated to be "a constant." The experiment of Chou *et al.* therefore falsifies Einstein's theory of relativity, but the researchers claimed in their article that the experiment verified the theory of relativity because the quantitative values predicted by Einstein's theory of relativity could be measured. Although the measured time dilatation signals were sent into the room of the stationary clock, where they were compared with the time registered by the stationary clock, the measurement of a changed time was carried out by the mobile clock. If the changed time is measured by the mobile clock (moving observer) and the comparison of the changed time can also be registered at the stationary clock (stationary observer), this means that the time dilatation caused by different gravitational potentials or velocities has changed in an absolute sense and not just in a relative sense, as it is postulated by relativistic physics. Many physicists claim to have verified Einstein's theory of relativity by their experimental results! How can this be possible, if relativistic physics is wrong? To test the time-dilation effects, physicists compare always only two atomic clocks, one that is stationary and one that moves or one that is within another position with respect to the gravitational potential.[3–6]Using only two clocks, respectively, two physical states, the contradictions of relativistic physics are hidden. Nevertheless the physicists uncritically accept the imagination of Einstein that one atomic clock can measure its proper time and at the same time another time for another observer, respectively, infinite different times for an infinite number of other observers. Because the quantitative results of the experiments agree with the quantitative predictions of Einstein's theory of relativity, the experiments just seemingly verify the theory of relativity.

In the twentieth century, the epistemologist Popper requested scientists not to perform experiments with the aim to verify a certain theory, but to falsify this theory because this is the only way to clarify whether a theory can be correct.

A simple experimental design could be realized to falsify Einstein's theory of relativity by putting three cesium atomic clocks in one room, one on the ground, the second at a height of 1 m and the third at a height of 2 m. The second atomic clock at a height of 1 m shall only be used to send a start signal and a stop signal to the two other clocks via a cable. Let us again chose a time between the start signal and the stop signal of 100 days. Afterward we look on the display of the atomic clock on the ground and on the display of the atomic clock at a height of 2 m. If the displays show the same time, the proper times are equal and therefore have not changed absolutely with respect to the different gravitational potentials: The theory of relativity is not falsified. If the displays of the two clocks show a different time, the proper times are different and therefore the times must have changed absolutely with respect to different gravitational potentials: The theory of relativity is falsified.

Such an experimental design sometimes has been chosen already, but the physicists did not thoroughly analyze the experimental results. The Hafele-Keating experiment performed in 1971 was such an experiment.[7] The researchers took four cesium atomic clocks in an aircraft and flew twice around the world, first eastward, then westward at a height of 10 000 m for 50 h and measured the proper time in the aircraft. Other atomic clocks were located stationary on the ground at the United States Naval Observatory in Washington D.C. and measured the proper time on the ground. After the flight the mobile and stationary clocks compared their proper times. The proper times were different, what corresponds with a falsification of Einstein's special and general theory of relativity because the difference was an absolute one, as the difference was seen by all observers, the observers in the aircraft and the observers on the ground. According to Albert Einstein the difference is just a relative one. This means that the change of time within the aircraft can only been seen by the stationary observers on the ground. Because the quantitative values measured suited so well the quantitative values predicted by special and general relativity, the researchers just interpreted the absolute measurements as relative measurements, as it is required for relativistic physics. Because absolute changes can also relatively be compared with each other, the physicists did not notice their fault. Obviously the precise quantitative results confused the physicists so much, that they interpreted the absolute changes as just relative changes and assumed that their experiment proved that Einstein's theory of relativity is right. This is the common accepted interpretation of the experimental results to this day. Concretely, we have to imagine the experimental process according to the common interpretation of the Hafele-Keating experiment as follows: The researchers who flew with the aircraft observed the atomic clocks in the aircraft during the flight not with their own visual apparatus, but with an visual apparatus from the ground, which means that their visual apparatus was on the ground during the flight. After landing on the ground the observers reunited with their visual apparatus again and they saw, as already during the flight from the distance, while their visual apparatus was on the ground, the same different times as the observers on the ground for the flying atomic clocks in comparison to the stationary atomic clocks on the ground. To believe this, one must be either very uncritical or very positively biased toward the theory of relativity.

Already the fact that the rotation of the Earth around its axis had once to be subtracted and once to be added from the time change proven shows that the time change was happening in an absolute sense, not just in a relative, respectively, in a relativistic sense. (Because the gravitational field does not rotate against the Earth's surface, it can be assumed that the velocity of light is orienting at the gravitational field of the Earth.)

L. Essen, the inventor of the cesium atomic clock, criticized the low accuracy and reliability of the experiments claimed to support Einstein's theory of relativity. "The effects are on the border line of what can be measured. The authors tend to get the result required by the manipulation and selection of results. This was so with Eddington's eclipse experiment, and also in the more resent results of Hafele and Keating with atomic clocks."[8] Since then similar experiments were carried out several times, which confirmed the quantitative predictions of Einstein's more precisely, but the epistemological shortcomings of the theoretical interpretation of these experiments were unfortunately not clarified. Misinterpretations of experiments often happened in the history of relativistic physics, as pointed out in my last article.[9]

A similar experiment was conducted from 1975 to 1976 by researchers from the University of Maryland, USA.[10] Three cesium atomic clocks were transported by airplane to Chesapeake Bay, Maryland, at an altitude of about 10 000 m, and three atomic clocks were on the ground. Turboprop engines were used, reaching only about 500 km/h to keep the speed effect small. The aircraft was on a fixed course and was constantly monitored by radar. The time difference was measured by direct clock comparison on the ground before and after the flight for about 20 h. During the flight laser light pulses of 0.1 ns were sent to the aircraft, which were reflected by it and picked up again at the ground station in order to measure the time differences. The proper times measured by the three atomic clocks on the ground and the three atomic atom clocks in the aircraft were different. According to epistemological criteria Einstein's theory of relativity was refuted. But the physicists instead asserted that Einstein's theory of relativity was verified again because compared with the atomic clocks on the ground the atomic clocks in the aircraft were constantly faster due to the gravitational effect. A deviation of 47.1 ± 1.5 ns was observed, consisting of -5.7 ns deceleration caused by the velocity effect and 52.8 ns due to the gravitational effect. This agreed very well with the value of 47.1 ± 0.25 ns, which the theory of relativity predicted for the gravitational effect.

In 1976, Briatore and Leschiutta compared two cesium atomic clocks, one atomic clock located in Turin at 250 m and a second atomic clock located at Plateau Rosa at 3500 m above sea level.[11] Einstein's theory of general relativity predicted a difference of 30.6 ns per day for the different heights. The researchers measured a difference of 33.8 ± 6.8 ns/d and 36.5 ± 5.8 ns/d. As the proper times in different heights were different, according to epistemological criteria Einstein's theory of general relativity was refuted by the experiment. But as the measured quantitative values suited quite well the predicted values, the researchers asserted that the Einstein's theory of relativity was verified again. The comparison of the cesium atomic clocks was done by radio waves. Every observer at different heights in this region could have had received the same time differences between the clocks in Turin and at Plateau Rosa by the emitted radio waves. This contradicts the theory of relativity, according to which, each observer located at a different height must receive different time signals, while the clocks in Turin and at Plateau Rosa should measure the same proper time. Latter contradiction remains hidden, if one compares only two different heights. The only rational explanation is that all observers can see the same time difference on the displays of the atomic clocks. It is not possible that for all observers at different heights in that region the atomic clocks in Turin and on the Plateau Rosa can display different times, respectively, numbers, like Einstein and the relativistic physicists try to make us believe it. This means that time must change absolutely depending on the height within the gravitational field of the Earth.

In an article Crothers pointed out that clock-synchronized stationary systems of observers are inconsistent with the Lorentz Transformation.[12] He writes in his conclusions: …"Special Relativity" is thereby invalid due to an insurmountable logical contradiction. Systems of clock-synchronized stationary observers are Galilean (transformations). Einstein defined time by means of his clocks. However, time is no more defined by a clock than pressure is defined by a pressure gauge, speed by a speedometer, heat by a thermometer, or gravity by a spring. Measuring instruments are invented to measure something other than themselves. Einstein's clocks measure only themselves. By defining 'time' by his clocks, Einstein detached time from physical reality."[13] In another article Crothers writes: "…Systems of clock-synchronized stationary observers consistent with Lorentz Transformation cannot be constructed. Einstein's tacit assumption that such systems of observers can be constructed is false. The Special Theory of Relativity is therefore logically inconsistent: It is therefore false. The standard wave equation is not form invariant under Lorentz Transformation, except for one privileged observer, contrary to the requirements of Special Relativity."[14]

Like the Ptolemaic cosmology was used to explain the movement of planets, as long as we did not understand the reality of the underlying physics, till now physicists use relativistic physics to apply it for the observation of physical phenomena. We should notice that the reality of the underlying physics of the observed phenomena is very different from the interpretation of these phenomena by relativistic physics. Once accepted by scientists and the public that falsifications can be interpreted as verifications of Einstein's theory of relativity, an objective scientific discussion about so-called relativistic phenomena is very difficult and precludes an empirical refutation of the theory of relativity, as a thorough epistemological examination of the experiments is usually not done by relativistic physicists. So far many misinterpretations of experiments performed to verify the special and general theory of relativity (which indeed refuted these theories) are tolerated by relativistic physics because quantitative correct predictions can be measured by the experiments.

III. DISCUSSION

Qualitatively I have refuted the theory of relativity in this article, but what is about the many precise quantitative confirmations of the theory of relativity? Here I have to disappoint the physicists, who claim to have verified the theory of relativity with their experiments. As in the experiments are used only two atomic clocks (or two physical states) that are compared, one stationary clock and one mobile clock, nobody is able to decide, if the time signal of the mobile clock compared with the stationary clock was measured by the mobile clock in an absolute sense, or if the mobile clock has measured its unchanged proper time and sent only a relatively different time signal to the stationary clock. Latter corresponds with Einstein's theory of relativity. If nobody can decide by the result of the experiments, which one of the two possibilities is right, the experiments are not able to refute Einstein's theory of special or general relativity. An experiment that is not able to falsify a certain theory, in this example the theory of relativity, can also not verify this theory. Therefore, the results of these experiments are from an epistemological point of view pseudo-verifications that are taken by the physicists as real verifications.

Also the "verifications" of the relativistic explanation of the gravitational redshift of electromagnetic radiation emitted by distant stars, for example, the relativistic gravitational redshift of the star Sirius B, are only pseudo-verifications:[15] "Einstein's general theory of relativity predicts that the light from stars will be gravitationally shifted to longer wavelengths.…We measure a gravitational redshift of $80.65 \pm 0.77\,\mathrm{km\,s^{-1}}$." Nobody is able to decide, if the longer wavelengths of electromagnetic waves coming from a distant star have been emitted by the star already with the longer wavelength in an absolute sense, or if the wavelengths have been emitted by the star unchanged, and we only observe that the wavelengths got longer in a relativistic sense. Because we are not able to distinguish between these two possibilities, as no observer is able to travel to the star and measure the wavelength at the position of the star, Einstein's theory of relativity can neither be falsified, nor be verified by such experiments. The considerations of the presented article allow only one conclusion in this context: Electromagnetic radiation that is emitted by a star is absolutely redshifted by the gravitational field of the star and not only in a relative sense. If Einstein was right, the star would be able to emit infinite different redshifted electromagnetic waves, depending on the strength of the gravitational potential at the position of the observers. But what about the celebrated detection of so-called relativistic phenomena observed at binary pulsars? The binary pulsar PSR 1913 + 16 was the first binary pulsar to be discovered. It was discovered by R. A. Hulse and J. H. Taylor, Jr., of the University of Massachusetts Amherst in 1974.[16,17] Their discovery of the system and analysis of it earned them the 1993 Nobel Prize in Physics: For the discovery of a new type of pulsar, a discovery that has opened up new possibilities for the study of gravitation." During the movement on their orbits, the stars move more slowly when they are at the apastron, than when they are at the periastron. The velocity of the stars varies from a minimum of 75 km/s to a maximum of 300 km/s. The median velocity of the stars is 187.5 km/s. In quantitative terms, the observations precisely confirmed the theory of relativity again. But neither in the calculations of Hulse and Tayler nor in later examinations of other binary pulsars the researchers had to consider the changing velocity of the Earth around the Sun. Although the difference of the velocity of the Earth against a certain binary pulsar can maximally be 60 km/s during one year, if the Earth once moves at a velocity of about 30 km/s toward and once at a velocity of 30 km/s away from this binary pulsar, the measured values were always independent from the movement of the Earth around the Sun. If the theory of relativity was correct, the values would have to fluctuate, depending on the Earth's motion around the Sun, but the values did not fluctuate. Therefore, the observed phenomena in the binary pulsars have to be considered absolute orbital changes that are the same for all observers, while, according to the theory of relativity, the phenomena are only relative orbital changes that must fluctuate in dependence on different relative velocities. This again falsifies Einstein's theory of relativity, although the predicted quantitative values coincide with the observed quantitative orbital changes. If Einstein was right, the binary pulsars would be able to show infinite different orbital changes, depending on the relative velocities of observers against the binary pulsar and depending on the strength of the gravitational potential at the positions of the observers.

When in history an experimental setting had been able to falsify the theory of relativity, as for example the Hafele-Keating experiment, the refuting results were just presented as a proof of Einstein's theory of relativity. It is often argued that the GPS would not work, if relativistic physics was not right. The GPS satellites fly around the Earth at almost 14 000 km/h. At the equator, a person turns around the Earth's axis at a speed of 1667 km/h, at a location of medium latitude like Stuttgart at a speed 1100 km/h, at the poles the speed is zero. Because the satellite clocks move faster toward us, according to the special theory of relativity, they are about seven millionths of a second slower than those on Earth (time dilation by motion). The latitude-dependent correction does not exceed two percent. Since gravity is weaker at 20 000 km from the Earth's surface than at ground level, time in the satellites "ticks" faster, by 46 millionths of a second per day (gravitational time dilatation). In the case of satellite clocks, the effect of gravity predominates. Overall, the clocks on board run faster by 39 millionths of a second per day than on the Earth's surface. Without Einstein's corrections, the error would be about eleven kilometers a day.

Ashby writes in an article 2003:[18] "The Global Positioning System (GPS) uses accurate, stable atomic clocks in satellites and on the ground to provide world-wide position and time determination. These clocks have gravitational and motional frequency shifts which are so large that, without carefully accounting for numerous relativistic effects, the system would not work. This paper discusses the conceptual basis, founded on special and general relativity, for navigation using GPS. Relativistic principles and effects which must be considered include the constancy of the speed of light, the equivalence principle, the Sagnac effect, time dilation, gravitational frequency shifts, and relativity of synchronization…" What does it really mean applying Einstein's theory of relativity to the GPS satellites? According to Einstein, the GPS satellites measure for themselves their unchangeable and always equal and correct (proper) time. All would be alright and no problem, but because of the constant velocity c of light within every inertial frame it is necessary that a clock of a satellite (although all clocks measure the same proper time), must measure a different time for the clocks in the other satellites. Why should it be necessary to adjust a correct (proper) time of a certain clock? This means that for a certain clock itself the time adjustment is not necessary, but for all other clocks. According to this, the technicians would have the task to adjust the time of a clock in a certain GPS satellite not for this clock, but only for the other clocks in the other satellites. How is it possible to adjust the time of a clock in a certain GPS satellite and simultaneously not to adjust the time in this clock? It is not possible! When the technicians adjust a certain clock, they adjust this clock directly and in an absolute sense, for all other clocks of course indirectly and in a relative sense. This means that the clocks in the satellites are adjusted absolutely, depending on their state of motion and distance from the Earth's surface. Already these simple considerations refute Einstein's theory of relativity, because according to Einstein all clocks in all satellites measure always the same time, but nevertheless relatively different times, respectively, relativistically different times for all other clocks.

The only correct logical conclusions must be:

1. Einstein's theory of relativity provides the quantitative values that are needed to correct the GPS signals.
2. Einstein's derivation of the needed quantitative values is inconsistent.
3. The so-called verification of Einstein's theory of relativity by GPS is like all other so-called verifications of his theory only a pseudo-verification.
4. The time in the GPS satellites must change absolutely and in comparison relatively.
5. It is wrong that time in the GPS satellites changes only relatively and in comparison relativistically.
6. Another theory has to be found, which is in contrast to the theory of relativity logical, providing the same values needed for the correction of the GPS signals.
7. The postulation of relativistic physics that the constancy of the velocity of light depends on inertial frames cannot be real.
8. The experiments and the explained problem of the GPS clocks indicate that the constancy of the velocity of light must depend on the gravitational field of the Earth.
9. Generally speaking, this means that the velocity of light must be orienting on the predominating gravitational field.

More precisely this means that with respect to the sum vector of the velocity vectors given by the direction of radiation with respect to the light source and the direction of the movement of the light source itself in the gravitational field of the Earth, which represents a fixed frame with respect to the Earth's rotation (around its axis and around the Sun), must be always c. If the light source does not move, as for example in the Michelson-Morley experiment, a light beam has of course the velocity c only in the direction of the radiation with respect to the light source. That the velocity of light must orient on predominating gravitational fields I explained by the minimum energy principle in one of my former articles.[19]

Repeatedly it happened in history that scientists were able to apply quantitative values that they calculated by a wrong theory, just think of Ptolemy, who was also able to predict the orbit of Mars very well. There is no doubt that the quantitative corrections of the atomic clocks are founded on special and general relativity and that they are needed for a correct function of GPS. The quantitative corrections needed for the atomic clocks can correctly be predicted and calculated by relativistic physics. But nevertheless Einstein's theory of relativity must be false and must be replaced by an alternative theory. Epistemologically the situation is clear: Einstein's special and general theory of relativity does not correspond with our physical reality, so that we need a new theory that can explain the so-called relativistic phenomena not only quantitatively correct, but also qualitatively correct in a nonrelativistic way. In a second article on the failure of Einstein's theory of relativity, the propagation characteristics of light within gravitational fields are put on a new foundation, and in a third article on the failure of Einstein's theory of relativity I will propose a simple theory that combines Newton's theory of gravity with quantum physics, which is able to replace Einstein's theory of relativity.

IV. FINAL REMARKS

Physicists use physical processes to measure time. A change of time is measured by the velocity of a physical process, but according to relativistic physics the underlying physical process is not allowed to change. Formerly something like this would have been called a miracle. Einstein's light clock shall be able to measure indefinite different times, depending on the movement of observers or their position within different gravitational potentials. At the beginning of the 20th century still many scientists resisted this miracle of Einstein's theory of relativity. Because the physicists measured a constant velocity of light on Earth, the velocity of light was defined as the natural constant. Nobody could imagine this strange behavior of light, as well as the fact that a light clock can measure many different times. Both appeared as some kind of miracle, but as the constancy of the velocity of light with respect to any inertial frame seemed scientifically verified, the miracle of Einstein's light clocks was finally accepted. After many quantitative verifications of Einstein's theory of relativity by observable astronomical phenomena the miracle of relativistic physics entered into the collective consciousness of humanity and Einstein was celebrated as a genius because he was the founder of this "miraculous" theory of relativity.

By the imagination of a light clock that can measure infinite different times for infinite different observers one may be led astray, but not by the assertion that the display of an atomic clock shall be able to show different numbers, respectively, times. When explaining an Einstein light clock, today's scientists do not think of a miracle, but assume that Einstein's ideas represent a great achievement of science. As far as scientific applications are concerned, Einstein's theory has advanced physics and astrophysics. In terms of epistemology Einstein's theory of relativity has thrown physics and astrophysics back to the past. From a philosophical point of view, the proof of the inconsistency of the theory of relativity is a catastrophe for relativistic physics, but presumably not for relativistic physics itself. Relativistic physics is a mathematically oriented science and the mathematics of relativistic physics works perfectly. By Einstein's theory of relativity one can predict very precise what can quantitatively be measured. The relativistic physicists are proud of it and each "proof" of a precisely observable "relativistic" value is celebrated in public. The physicists have made great efforts to apply tensor calculations, which are difficult to understand what they are admired for. Should they give up all this and admit that for decades they have been deceived by a chimera and that they have no idea, how the so-called relativistic phenomena can be explained otherwise? The answer is no! That's why Einstein's theory of relativity will probably forever determine our cosmological imaginations, although it is false.

From an epistemological point of view, Einstein's theory of relativity is a very intelligent theory, using higher mathematics in the case of general relativity and providing correct quantitative physical values, but without any relation to reality. Because of the precise quantitative predictions gained by the theory of relativity, many scientists think that Einstein provided us the "real reality" of our physical world that we aren't able to recognize with our mind. This is the reason, why Einstein is considered to be a genius. But he was a genius because with his theory, although it has no relation to reality, he was able to gain quantitatively correct physical values that obviously play a role in nature.

I think there will be no chance to convince the elite of relativistic physics that Einstein's theory is wrong. But there remains the hope that there are physicists, who remember that at the beginning of science the search for truth made people think about the world, and also that scientific fields undergo periodic paradigm shifts rather than solely progressing in a continuous way. These paradigm shifts open up new approaches to understanding what scientists would never have considered valid before. If the necessary paradigm shift is prevented in physics, the theory of relativity means the end of physics as science, at least in important parts. Follow-up theories based on the theory of relativity, as they are already used today, take over the mistakes of the theory of relativity. They may be mathematically stringent, so that there will be no chance to refute them, what was already difficult in the case of Einstein's theory of relativity, but nevertheless they must be false. The basis of science is the methods of logic. With the emergence of the theory of relativity with its four-dimensional space-time and later quantum mechanics that obviously contradicted our logic, logic lost its meaning. Complex mathematical theories arose, such as the so-called string theory. Quantitative correctly predicted physical values were accepted as a proof for the correctness of a theory, even when the theory was, like the theory of relativity, logically contradictory. That this must lead astray I have explained at the example of Einstein's theory of special and general relativity in this article.

People can feel that the theory of relativity contradicts their logic. They admire the physicists of relativistic physics because they obviously understand the logic of the theory of relativity, thanks to their higher intelligence. That it is just the opposite, namely, that people are right with their logic and that the experts are wrong, nobody can imagine. The ability to apply complex mathematical methods is not enough to describe the physical reality. It is therefore necessary to emphasize the importance of basic scientific skills again, especially the ability to apply the laws of logic. But I'm afraid relativistic physicists will hardly be able to think out of their "relativistic box." Relativistic physicists usually do not read critical articles about their specialty, but if one of them reads this article, I am quite sure he will defend his relativistic box by putting up "mathematical smokescreens". The relativistic physicists argue that in the case of the theory of relativity they are allowed to neglect logical contradictions because the predictions of Einstein's theory are so precise that they cannot be wrong. But the relativistic physicists have never sought for an alternative explanation and also refuse to include consistent alternative explanations in the discussion. An alternative theory using a quantized gravitational theory I introduced already 2011 in Physics Essays ("On the new theory of Gravitation"),[19] which I improved in another article 2016 ("Unification of the four fundamental forces of nature by a binary quantum model").[20] With the "New Theory of Gravitation" (NGT) it was easily possible to calculate the correct value for the perihelion precession of Mercury,[21] as well as for the seemingly "relativistic phenomena" at the binary star system PSR B1913 + 16 (Refs. 16 and 17), but within usual three-dimensional space, by advancing Newton's theory of gravitation by quantized gravitational motion effects. The observations at the binary star system PSR B1913 + 16 were celebrated as the first indirect proof of gravitational waves. By the "New theory of gravitation" also the so-called seemingly relativistic "mass increase" could be derived, as well as the correct value for the deflecting of light at the Sun and other so-called relativistic phenomena.[19,20]

A scientific discipline that disregards the laws of logic is per epistemological definition no science, but pseudoscience, despite the very precise predictions of the theory of relativity. If physicists feel offended by my article, I apologize for having called a spade a spade. In opposition to the prevailing relativistic beliefs I say: "And yet the Earth moves around the Sun and around its axis in an absolute way, not only in a relative, respectively, in a relativistic way."

In one case Einstein was certainly right: "Science without (sufficient) Epistemology is—in so far as it is thinkable at all—primitive and muddled."[22]

How can such a misjudgment of the theory of relativity by relativistic experts be possible? As the physicists, who deal with relativistic physics, are very intelligent, this can only be explained psychologically. The phenomenon of selective perception is not only a visual, but also a cognitive problem. Everyone is affected by it. In the case of selective cognitive processing, there is a great danger that we always want to confirm our existing judgments and ideas and thereby no longer check possible false conclusions. We try to interpret or combat new insights that contradict our cognitive stereotypes, until they no longer bother us. "What does not fit is made to fit." In addition, the relativistic physicists are so much focused on the complicated mathematics of the general theory of relativity that they don't recognize the simple logical contradictions of the theory of general relativity. Another aspect is the introspection illusion.[23] The introspection illusion is a cognitive bias in which people wrongly think they have direct insight into the origins of their mental states, while treating others' introspections as unreliable. When people mistake unreliable introspection for genuine self-knowledge, the result can be an illusion of superiority over other people, for example, when each person thinks they are less biased than the rest of the group. In experiments, subjects had to make judgments about themselves and about other subjects. They displayed standard biases, for example, rating themselves better than the others on desirable qualities (illusory superiority). The experimenters explained cognitive bias, and asked the subjects how it might have affected their judgment. The subjects rated themselves as less susceptible to bias than others in the experiment (bias blind spot). When they had to explain their judgments, they used different strategies for assessing their own and others' bias. When assessing whether or not they themselves are biased, people look inward, searching their own thoughts and feelings for biased motives. Since biases operate unconsciously, these introspections do not help, but people wrongly treat them as reliable thinking that they themselves, unlike other people, are immune to bias. When subjects were explicitly told to avoid relying on introspection, their assessments of their own bias became more realistic.[24]

If the physicists, who are convinced of Einstein's theory of relativity, do not think about their own possible psychological dysfunctions, they will not be able to accept criticism of the theory of relativity and will not be able to think outside their relativistic box. Nor will they be able to develop a realistic assessment of the so-called relativistic phenomena. This is the real paradox of relativistic physics that the physicists, who should explain the physical reality to us, obstruct our view on physical reality. The problem of the twin paradox, however, about which generations of physicists have puzzled their heads, does not exist in reality.

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