

Translation into English: [Chapter 2 - Catalogue of Errors for Both Theories of Relativity](#)

from the German documentation of G.O. Mueller

"On the Absolute Magnitude of the Special Theory of Relativity - A Documentary Thought Experiment on 95 Years of Criticism (1908-2003) with Proof of 3789 Critical Works" - Text Version 2.1 - June 2004
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D: Time / Error No. 7

The atomic-clock transportation of Hafele / Keating in 1972 is said to have given proof of a time delay

The transportation of 2 pairs of atomic clocks around the earth in jet planes, in an east-west and in a west-east direction, for a total of five days, has given rise to the following results, according to the report by Hafele and Keating in 1972 (a critical summary in keeping with Louis Essen, 1978). The authors have not disclosed all of the data, have given only average values for an average clock instead of individual data and have made use of only a non-stipulated selection of the data. Pairs of clocks were transported in each case in order to identify running differences. These accounted for up to approx. 300 nanoseconds between the individual clocks of a pair (i.e. on the same flight!). The raw data disclosed by Hafele/Keating for an average clock accounts for a time loss of 132 nanoseconds on the west-east journey and a time increase of 134 nanoseconds on the east-west journey. After corrective calculations by Hafele/Keating the average clock is said to have lost 59 nanoseconds on the flight in the easterly direction and to have gained 273 nanoseconds on the flight in the westerly direction, thereby being in close agreement with the predicted values.

L. Essen evaluates the result as being unconvincing, because the disclosed measurements are only average values and, on top of this, they are smaller than the running differences of the pairs of clocks.

According to Galeczki/Marquardt (1997, pp 114-115), Hafele/Keating personally adjusted and synchronized their clocks during the journey. Their data is therefore completely worthless and falls under the category "wishful thinking" (according to Wesley, 1983, pp 171-172).

J. P. Wesley discusses the purpose of the experiment. Hafele/Keating assume that the velocity of the journey has an effect on the clocks in the sense of the alleged time dilation of the STR. However, the authors have not given any theoretical justification for the assumption that the relative velocity of the clocks, with respect to the surface of the earth, run more slowly on the one hand and more quickly on the other.

Another aspect is also unclear; the validity of any results from an atomic-clock transportation around the earth. The several-day journey is no constant rectilinear journey but, due to the curvature of the flight path, is a continuously accelerated motion, i.e. it does not fall under the stipulated field of the STR (for which the result, however, is supposedly so decisive!). The several-day journey through the irregular gravitational field of the earth and through the irregular magnetic field of the earth could at best fall under the competence of the GTR, from which no interpretation is mentioned in the critical literature.

The difference in both directions of travel alleged by Hafele/Keating can also not be explained in the context of the STR because according to the principle of relativity the directions of relative motion play no role.

When two convinced relativists conduct an experiment alone and uncontrolled, official school physics need not worry about the result of the experiment. The non-disclosure of all of the relevant individual data, the summary in terms of the average values of "average clocks" (where on earth can you find an average clock?) and above all the personal adjustment eliminating the running differences of the pairs of clocks should serve to ensure that the world of relativity suffers no evil. But all of the precautionary measures have proved useless. Hafele/Keating have still said too much.

When one knows who Louis Essen was, one reads his report with pleasure: he is the "father" (or one of the fathers) of the atomic clock and he understands what the experimenters have done with "his" clocks.

J. C. Hafele, R. E. Keating: Around-the-world atomic clocks : observed relativistic time gains. In: Science. 177. 1972, pp 166-168; 168-70. - Essen, Louis: Relativity and time signals : "The theory is so rigidly held that young scientists dare not openly express their doubts". In: Wireless world. 84. 1978, October, pp 44-45. - Wesley, James Paul: Causal quantum theory. Blumberg, BR: Benjamin Wesley, 1983. 405 pages - G. Galeczki, P. Marquardt: Requiem für die Spezielle Relativität / Georg Galeczki, Peter Marquardt. Frankfurt a. M.: Haag u. Herchen, 1997. 271 pages.