Note added to paper «THE PHARAO/ACES MISSION AND THE ALLAIS EFFECT»

Russell Bagdoo
rbagdoo@yahoo.ca
Russellbagdoo@outlook.com

Since we submitted this paper [1], significant information concerning the Allais eclipse effect was provided to one of our Internet correspondents by the direction of the "Pharao project".

In 2012, we published in electronic journals the paper "MISSION PHARAO / ACES AND EFFECT ALLAIS" in which we asked to scientific authorities in charge of the PHARAO project to carefully consider the Allais eclipse effect. Thanks to a suggestion Amar Djema – researcher and Internet correspondent – we had then adduced that the best way of making sure that the Allais effect was verifiable consisted in discovering it with the spatial clock Pharao. He would have recently received an appreciative response from the director of Pharao project.

The Allais eclipse effect refers to a physical phenomenon, which is sometimes observed during a solar eclipse and which is related to disturbance of movement of pendulums or gravitational measurement instruments. The anomaly was first observed by serendipity by Maurice Allais during the eclipse of June 30, 1954, by making measurements of the azimuth of the plan of oscillation of a paraconic pendulum. He reported another observation of the effect during the solar eclipse of October 2, 1959 [2]. M. Allais, Nobel Prize in Economics in 1988, had built a different version of the Foucault pendulum in order to repeat the proof of the rotation of the Earth. With its paraconic pendulum, whose plane of oscillation is free to turn in all directions at once, he will observe that there is a modification of the gravific attraction during solar eclipses. Since there is no consensus in the scientific community about the existence of the phenomenon and its interpretation, scientists must first determine the issue of whether a pendulum actually acts differently during a solar eclipse and if there is an anomalous gravitational behavior.

As has been pointed out in the paper, the contribution of A. Djema has been to perceive the possibility of obtaining experimental results of cold atom clocks, quite similar, or even superior, to those of pendulums.

The cold atomic clock, PHARAO, is a cesium clock with innovative technology that will be installed on the International Space Station ACES / PHARAO, the fruit of a collaboration between several bodies and European laboratories, of which the CNES. The space program of ESA ACES / PHARAO has been initiated in order to test the principle of the atomic fountain in space. Among the main objectives: use these instruments to make comparisons of time and frequency with unequalled resolutions, study the space-time from these data of comparisons, search for instabilities on the fundamental constants of physics in time and space, test the effects predicted by General Relativity [3, 4].

The suggestion of the searcher concerning the solar eclipse was described in this way in the paper: «Since the ultra-stable atomic clocks on-board the International Space Station are compared to a network of ground clocks through a high performance two-way time transfer system, it would be possible to synchronize two atomic clocks on the ground using laser cooled atoms (one witness) with Pharao, and check again the synchronization after the passage of a solar eclipse. A difference in the Earth gravitational potential at this moment could indicate a temporal variation of the fundamental constant *G* and thus physics beyond the Standard Model».

It appears that A. Djema went further by continuing to communicate with the relevant authorities. In an online group [5], he declared: «For several years, I started to submit these experience opportunities, but recently I received a promising response from the direction of Pharao. In 2017, when the clock orbiting will be operational, PHARAO should be almost in constant exchange time with several high-performance atomic clocks everywhere on Earth, including the United States, I think of the great eclipse of 2017. So if there would be measurable differences, they will be observed. It is no longer necessary to have a separate or specific logistics or experience for these experiments. As you know, the United States will send a clock in orbit and develop high-performance cold atoms clocks».

Some might, however, be shocked when he utters «it is no longer necessary to have a logistics or separate or specific experiences for these experiments». It is understood that this may well displease the pendulum experimenters who tried to redo the Allais experiment and have not found the same result. They must conclude to the imperfection of their instruments. This is something to cause controversy and strong reactions. As long as experimenters, especially those of the pendulum grouped into feudal chapel, will be satisfied of justifying their experiments in invoking some innovative pendulums of their own and, sometimes, in accusing Allais of a lack of rigor – rather than performing credibly full recovery of the Allais experiment that would advance scientific interest – they can hardly ignore or blame those who wish to remake the experiment with higher stringency that the contemporary technology offers..

The correspondent is as delighted as us by this favourable answer from the direction of Pharao. Recall that the Allais effect is an intriguing anomaly that contradicts the theory of relativity and it becomes urgent to appeal to scientists who are experts in technical ingenuity − as those that are part of the Pharao/Aces − to perform experiments that will lead to a direct validation of the Allais effect. Or its invalidation, to put an end!

*

[1] Russell Bagdoo, *THE PHARAO/ACES MISSION AND THE ALLAIS EFFECT*, The General Science Journal (2012), viXra (2013) org/abs/1301.0185, RESEARCHGATE (2013).
[2] Maurice Allais, *L'Anisotropie de l'Espace*, Edition Clément Juglar, p.162, 166 (1997).
[3] https://syrte.obspm.fr/tfc/pharao.php
[4] http://smsc.cnes.fr/PHARAO/
[5] Amar Djema, Yahoo, *GravitationalAnomalies*, August 14, 17, (2014).