

Review of: "Sfarti's Reply to Dingle's Clock Puzzle "Disproof""

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I am in broad agreement with many of the points made by Gianfranco Spavieri about David Derbes paper "Sfarti's Reply to Dingle's Clock Paradox "Disproof"" and wish to make a few comments of my own. Derbes says "The evidence in support of relativity is beyond doubt." and goes on to state that "within the physics community, to attack relativity as wrong, particularly on the basis of easily refuted arguments, marks one as belonging to the fringe." Regarding the supporting evidence, I wish to point out that the Michelson-Gale experiment is a case that cannot be explained by special relativity. This theory requires constant light speed in the arms of the apparatus (just as in the Michelson-Morley experiment) and therefore predicts a null result contrary to observation. It is therefore rarely if ever found in the special relativity textbooks and general relativity has to be invoked in order to analyse it. Regarding those who disagree, I wish to remind the author that apart from Dingle, some of the many critics of special relativity include Michelson, Lorentz, Sagnac, (all eminent contemporaries of Einstein), Ives (co-author of Ives-Stillwell experiment), Essen (inventor of the atomic clock), Waldron, Beckmann, Marmet, Kelly and McCausland (all accomplished researchers). None in this group can be considered as belonging to the "fringe".

In defence of special relativity, the author argues that "two clocks can run slowly with respect to each other" as contained in his equations (38) and (39), and goes through an extensive and sometimes difficult-to-follow discussion in an attempt to demonstrate that what seems contradictory to many is actually true. Well, what is not generally recognized by the physics community is that the advent of the GPS with its synchronized clocks enables the testing of this and other predictions by special relativity. Thus ignoring gravity, it is observed that satellite clocks always run slow relative to clocks that are stationary in the ECI frame (center of the Earth). Clocks stationary in the ECI frame are never observed to run slow relative to satellite clocks as the theory demands.

The author's analysis also includes a rule that "If two clocks in the same frame, synchronized and separated by a horizontal distance L , are observed by someone moving horizontally with a speed v , she will observe that the leading clock is delayed". This rule summarized as "Leading clocks lag" can be found in Mermin's book [1, p68] and can also be tested by the GPS clocks. Consider two synchronized clocks that are stationary and separated by distance L in the frame of a GPS satellite. Then in a second frame in which they are moving with speed v along the line joining them such as the ECI frame, clock lag should be observed on one of the satellite clocks relative to the other which would necessitate a correction so that the satellite clocks stay synchronized with each other and with the clocks stationary in the ECI frame. No such time lag is ever observed and no associated correction is ever necessary in any GPS satellite clocks. It should

also be noted that on the basis of the **principle of relativity**, if the separated clocks are synchronized for an observer in the frame where they are at rest, then they cannot become desynchronized (one lagging the other) for an observer in a uniformly moving frame since this effect would allow the identification of the frame where the clocks are synchronized contrary to the principle of relativity.

Finally, the author states “Whatever a replacement theory might look like, it must reproduce all the many successful predictions of relativity, and presumably will reduce to Einstein's theory as a special case.” I believe on good grounds that such a replacement theory does exist but will leave that for another discussion.

1. Mermin, N.D., It's About Time: Understanding Einstein's Relativity, Princeton University Press, New Jersey, 2005.