

Review of: "Light Speeds in Stretching and Compressing Spaces"

Nadja Simao Magalhaes¹

¹ Universidade Federal de São Paulo

Potential competing interests: No potential competing interests to declare.

The paper aims at showing that the process of detecting gravitational waves (GW) by LIGO and VIRGO does not have any scientific foundation. However, its arguments are not scientifically robust.

The article lacks bibliographical review and scientific references, as in: "...scientists working in LIGO and VIRGO have claimed that they have adequately detected gravitational waves by using Michelson interferometers."; and: "Scientists believe that gravitational waves cause space itself to stretch in one direction and simultaneously compress in a perpendicular direction". There are other instances in which references are needed to adequately scientifically support the sentences presented.

Some of the vocabulary is loose when it should be scientifically sound, as in "...meet up nicely...", "...shift in and out of alignment..." ("phase" is indeed better), "...merge while..." (here "interfere" would be better).

In "a fringe shift that should be the measure of the strength of the passing gravitational wave", the phase shift is not the measure of a GW's properties. Some calculation must be performed with that shift in order to yield conclusions about the wave (Maggiore, M. "Gravitational waves. Theory and experiments". Oxford: Oxford U. Press. 2008).

When gravitational waves are present in space (it is not clear if he meant spacetime), the author assumes that the speed of light is different from that in undisturbed free space (it is not clear if he was referring to Minkowski spacetime). The author then mentions light traveling through material media. However, spacetime should not be mistaken with material media, as the studies on the luminiferous ether indicated long ago. The paper lacks a proper revision on the ether theory if it intends to revisit it.

If the author is not considering the ether as the propagation medium for gravitational waves, then a study considering spacetime (instead of just space) should be presented, defining permittivity etc., for this case. Here, a bibliographical review should be presented as well, since it seems likely that others may already have investigated this approach.

Therefore, the claim "...the speed of light could not be the same in both the steady-stretching dielectric and the steady-compressing dielectric" is not scientifically sound with the arguments presented in the paper. The same foundation is lacking for the claim "...light will not always traverse a given distance at the same time if that space is alternating between stretching and compressing".

The author encourages experts to prove, with an independent experiment, that the speed of light is constant in "steadily

stretching and compressing spaces, just like in free space". In general relativity spacetime (not just "space") is not a medium, but a geometric description of what happens with the trajectories of light as a function of gravity. To motivate the proposed experiment, a theory describing the GW propagating medium assumed by the author should be developed first.