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Sankar Hajra

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Sankar Hajra

Email: sankarhajra@yahoo.com

Abstract: Recently, LIGO and VIRGO have claimed that they have adequately detected gravitational waves. This article shows that the process of detecting gravitational waves by LIGO and VIRGO does not have any scientific foundation.

Recently, scientists working in LIGO and VIRGO have claimed that they have adequately detected gravitational waves by using Michelson interferometers. Scientists believe that gravitational waves cause space *itself* to stretch in one direction and simultaneously compress in a perpendicular direction. This causes one arm of the Michelson interferometer to get longer while the other gets shorter, and then *vice versa*, back and forth as long as the wave is passing.

As the lengths of the arms change during the propagation of gravitational waves, so too do the distances traveled by each laser beam. A beam in a shorter arm will return to the beam splitter before a beam in a longer arm. Then, the situation reverses. Over time, the arms oscillate between being longer and being shorter. Arriving at different times, the waves of light no longer meet up nicely when recombined at the beam splitter. Instead, they shift in and out of alignment, or 'phase', as they merge while the wave is causing the arm lengths to oscillate [1].

So, when a gravitational wave passes through the Michelson Interferometer, its detector will register a fringe shift that should be the measure of the strength of the passing gravitational wave.

The LIGO-VIRGO scientists assume that the speed of light in *both* the space that is steadily stretching *and* the space that is steadily compressing is the same, *c* as that of light in free space.

a) According to Maxwell, the speed of light inside a normal dielectric is V= $1/\sqrt{\varepsilon\mu}$, with ε being the permittivity and μ being the permeability of the dielectric.

Now, if the length of the dielectric is stretched by the factor f, the speed of light in that medium becomes $V^{/} = 1/\sqrt{\varepsilon^{/}\mu^{/}}$, $\varepsilon^{/}$ being the permittivity and $\mu^{/}$ being the permeability of the stretched dielectric.

b) Similarly, the speed of light in free space is c= $1/\sqrt{\varepsilon_0\mu_0}$, with ε_0 being the permittivity and μ_0 being the permeability of space. If that space is stretched by factor *f*, then the speed of light in the stretched space is $c^{/}$= $1/\sqrt{\varepsilon_0{}^{/}\mu_0{}^{/}}$ with $\varepsilon_0{}^{/}$ and $\mu_0{}^{/}$ being the permittivity and permeability of that stretched space.

The electric and magnetic properties of the dielectrics that are steadily stretching or steadily compressing should steadily change in a way such that the speed of light in those dielectrics also changes concurrently.

Therefore, the speed of light could not be the same in *both* the steady-stretching dielectric *and* the steady-compressing dielectric.

The same holds true for light beams when they move in free space and in distorted spaces. In the given experiment, light will not always traverse a given distance at the same time if that space is alternating between stretching and compressing.

The present analysis contradicts LIGO-VIRGO's perception of the experiment and challenges the theoretical foundation of its detection process. To justify the theoretical foundation of the LIGO-VIRGO experiments, LIGO-VIRGO experts should prove, through an independent experiment, that the speed of light is indeed the same '*c*' in those steadily stretching and compressing spaces, just as it is in free space. They have not done this yet.

Reference

[1] LIGO Lab | Caltech: What is an Interferometer? https://www.ligo.caltech.edu/page/what-is-interferometer