Does Michelson-Morley experiment conclusively eliminate the existence of a generic space tension field?

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Abstract
Suggested section: Spacetime

The running time "t" is not an intrinsic physical parameter of any object in this universe. It is an extremely useful, pragmatic and clever parameter defined by human minds. We derive a temporal period as the inverse of the intrinsic physical parameter, the *frequency*, of diverse kinds of natural and man-made harmonic rotators or oscillators, classical and quantum mechanical. Therefore, we can physically "dilate" and "contract" the frequency of oscillations of almost any and all oscillators by changing the influencing physical environment. However, we have not invented any means of dilating or contracting the running time, as it is not a physical parameter of any object. Accordingly, we want to re-visit the foundational Michelson-Morley experiment that gave birth to this purely mathematical Space-time four-dimensional concept and help re-anchor the progress of physics determined more rigorously through proper experiments.

Michelson-Morley type of experiments have conclusively eliminated the existence of the old ether tension field, since ether supports only the propagation of EM waves as $c^2 = (\varepsilon_0^{-1} / \mu)$, while leaving behind particles as built out of *something else*. However, major successful theories of physics, like Maxwell's electromagnetism, General Relativity, Quantum Field Theory, etc., all are forced to accept that the cosmic space is a physically rich medium. Then it is worth redefining the space as a Complex Tension Field (CTF) *that accommodates the emergence of both the EM waves and the particles out of this single unified field*. In a separate paper in this conference, "A pragmatic approach to define a unifying field using evidence-congruent logics", we have defined the logical emergence of particles out of CTF as diverse types of torus-like self-looped and resonant harmonic oscillations, $\exp(-i2\pi f_{pr} t)$ with energies hf_{pr}. In this paper, we proposes two space-based optical experiments to interrogate directly the existence of CTF, exploiting the following two optical properties of EM waves that are facilitated (empowered) by CTF. (i) The Poynting vector, $\vec{S} = \vec{E} \times \vec{H}$, is the intrinsic wave guiding property of the *physical electromagnetic tension field* (here, CTF), which perpetually *pushes* the waves at the velocity, $c = (\varepsilon_0^{-1} / \mu_0)^{1/2}$. Here ε_0^{-1} is the electric tension and μ_0 is the magnetic restoring tension, held by CTF. (ii) The optical Doppler Effect, as originally proposed by Doppler, consists of two separately identifiable components. First, the real physical shift of the optical frequency when the source is moving with respect to the medium that facilitate the light propagation. Second, the apparent measured frequency shifts, when various detectors, moving with different velocities with respect to the medium, try to detect the same propagating wave of the same frequency (in the medium).

Construction of the first experiment is relatively simpler compared to the second. A meter-long rigid C-clamp-like structure holds a pico second pulse diode at one end of the C-clamp. A single pulse is emitted by the diode, which is sharply imaged on the center of a detector array held on the other end of the C-clamp, while the system is stationary in air. Now the air determines the Poynting vector of light propagation. Imagine that I am able to give the rigid C-clamp a sufficiently high velocity, orthogonal to the optical axis (Poynting vector) without creating any air turbulence. The light pulse will arrive laterally shifted on the

detector array. We believe that, in deep space, the stationary CTF will play the role of stationary air on earth. A satellite, moving with high velocity in deep space, can carry out this experiment precisely without inevitable turbulence of air on earth. This will validate the existence of the stationary CTF.

The second experiment is more complex. One needs to keep measuring the changing Doppler shift in a specific spectral line from a suitable star in our galaxy, while continuously looking at the star. When the relative velocity vector between the star and the satellite is exactly zero, the Doppler shift will also be zero. The relative velocity-vector of the satellite with respect to the Sun, at this moment, is the exact velocity vector of the Star. In principle, one can extend this measurement to all starts and all galaxies and determine their relative velocity with respect to the Sun. This is because all cosmic objects are moving relative to the stationary CTF. This is also because the laws of physics are same everywhere in the universe, which is logically obvious since all atoms, assemblies of electrons and protons, are assemblies of torus-like oscillation of the same CTF everywhere in the universe.

We can now appreciate that the two basic postulates of Special Relativity emerge naturally because observable particles and waves are *emergent excited states of the same and stationary CTF*. The proposed experiments to directly validate the existence of the stationary CTF will be remarkably cheaper and very decisive compared to many of the ongoing "fundamental physics experiments" on ground and in space.

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