Title –

The neutrino and the photon: hyper-fast travel within general relativity

Author –

Rodney Bartlett

Abstract –

The recent European experiment in which neutrinos apparently travel faster than light does not violate general relativity. However, the explanation of this phenomenon lies in another experiment (the latter being in electrical engineering in 2009).

Content -

A couple of months ago, physicists at the European Organization for Nuclear Research (CERN) claimed they had found a fatal flaw in Einstein's theory of relativity. The results came from an experiment called the Oscillation Project with Emulsion Racking Apparatus (OPERA) - a scientific experiment for detecting tau neutrinos from muon neutrino oscillations. It is a collaboration between CERN in Geneva, Switzerland, and the Laboratori Nazionali del Gran Sasso (LNGS) in Gran Sasso, Italy; and uses the CERN Neutrinos to Gran Sasso (CNGS) neutrino beam. Their findings immediately lit up the Internet with activity, created worldwide debate and shook the foundations of physics. These physicists were essentially putting a noose around the neck of relativity. Originally, they found that 15,000 neutrinos outraced a beam of light, reaching the finish line 60 feet ahead of a light beam, over a distance of about 450 miles. One criticism lodged against this experiment was that the beam of neutrinos was not precise, spread out over 10,000 billionths of a second. Now, they have done the experiment again, with a beam spread out over 3 billionths of a second and they still find the neutrino beam outracing the light beam. If you aren't aware already -- this is extremely bad news for relativity. According to Einstein, nothing can go faster than light, so a neutrino beam cannot possibly outrace a light beam! If this is the case, time goes backwards and all of modern physics has to essentially be redone.

In July 2009, electrical engineer Hong Tang and his team at Yale University in the USA demonstrated that, on silicon chip-and transistor-scales, light can attract and repel itself like electric charges/magnets. This is the “optical force”, a phenomenon that theorists first predicted in 2005 (this time delay is rather confusing since James Clerk Maxwell showed that light is an electromagnetic

disturbance approx. 150 years ago). ProfessorTang proposes that the optical force could be exploited in telecommunications. For example, switches based on the optical force could be used to speed up the routing of light signals in fibre-optic cables, and optical oscillators could improve cell phone signal processing.

Since nothing can go faster than light, a neutrino beam cannot possibly outrace a light beam (if they both move in an exclusively forward direction). Since neutrinos have no electrical charge, they rarely interact with other particles and do move exclusively forwards. They arrive before the photons because, on microscopic scales, light can attract and repel itself like electric charges/magnets – and thus has interactions. This attraction and repulsion results in a “photo-photonic effect” where photons sometimes follow a path approximately perpendicular to the electromagnetic wave’s line of propagation i.e. individual particles of light sometimes bounce up and down instead of travelling forwards all the time. These interactions slow light’s forward motion relative to that of the neutrinos (and could give the impression that light’s seeming “slowness” means photons are more massive than neutrinos). Even if travelling through a vacuum, a single photon might interact with so-called virtual particles (the existence of pulses of electromagnetic energy * filling empty space, which Einstein’s E=mc^2 says are equivalent to mass), and slow down.

* Pulsed EM energy is possibly due to pulsed binary digits in the form of on and off, or 1 and 0.

References

[1] *Nature Photonics* **3**, 484 (2009) doi:10.1038/nphoton.2009.136

[2] [9] W. Dittrich and H. Gies, Probing the quantum vacuum, Springer (2000).

[3] G.M. Shore, ’faster than light’ photons in gravitational fields: causality, anomalies and horizons, Nucl. Phys. B 460 (1996) 379 [gr-qc/9504041]

[4] T.J. Hollowood and G.M. Shore, Causality and micro-causality in curved spacetime, Phys. Lett. B 655 (2007) 67 [arXiv:0707.2302]

[5] V.I. Ritus, On the relation between the quantum electrodynamics of an intense field and the quantum electrodynamics at small distances (in russian), Zh. Eksp. Teor. Fiz. 73 (1977) 807

[6] C. Schubert, Perturbative quantum field theory in the string-inspired formalism, Phys. Rept. 355 (2001) 73 [hep-th/0101036].

[7] Alcubierre, Miguel (1994). "The warp drive: hyper-fast travel within general relativity". *Classical and Quantum Gravity* 11 (5): L73–L77.arXiv:gr-qc/0009013. Bibcode 1994CQGra..11L..73A. doi:10.1088/0264-9381/11/5/001.

[8] Discover magazine's "Top 100 Stories of 2009 #83: Like Magnets, Light Can Attract and Repel Itself" by Stephen Ornes, from the January-February 2010 special issue; published online December 21, 2009

[9]"Update on the 15,000 Neutrinos That Seemed to Outrace a Beam of Light" - blog entry in "Dr. Kaku's Universe", Michio Kaku on November 1, 2011

[10] TOMORROW'S SCIENCE TODAY by R. Bartlett (a FREE ebook intended for popular reading which is an ***introduction*** to my own approach to verifying Einstein's Unified Field Theory) – **viXra:1201.0106 [pdf]** *submitted on 2012-01-27 07:01:20*

[11] Faster Than the Speed of Light: The Story of a Scientific Speculation by Joao Magueijo - http://www.amazon.com/Faster-Than-Speed-Light-Speculation/dp/B000EXYZLI/ref=sr_1_3?s=books&ie=UTF8&qid=1327891370&sr=1-3