

New theories emerge to disprove OPERA faster-than-light neutrinos claim

6 October 2011, by Bob Yirka



Schematic view of the Opera Detector

(PhysOrg.com) -- It's been just two weeks since the Oscillation Project with Emulsion-tRacking Apparatus (OPERA) team released its [announcement](#) claiming that they [have been measuring](#) muon neutrinos moving faster than the speed of light, causing an uproar in the physics community. Since that time, many papers (perhaps as many as 30 to the preprint server *arXiv* alone) have been published seeking ways to discredit the findings. Thus far though, only two seem credible.

[The first](#) is by Carlo Contaldi of Imperial College London. He says that it's likely the OPERA team failed to take gravity into their math equations and its effect on the clocks used to time the experiment. This because the degree of gravity at the two stations involved in the experiment (Gran Sasso National Laboratory in Italy and the CERN facility in Geneva) were different, thus one of the clocks would have been running slightly faster than the other, resulting in faulty timing. If this turns out to be the case, the OPERA team will most certainly be embarrassed to have overlooked such a basic problem with their study.

[The second](#) is by Andrew Cohen and Sheldon Glashow, who together point out that if the [neutrinos](#) in the study were in fact traveling as fast

as claimed, they should have been radiating particles as they went, leaving behind a measurable trail; this due to the energy transfer that would occur between particles moving at different speeds. And since the OPERA team didn't observe any such trail (or at least didn't report it) it follows that the neutrinos weren't in fact traveling as fast as were claimed and the resultant speed measurements would have to be attributed to something else.

Neither of these papers actually disproves the results found by the OPERA team of course, the first merely suggests there may be a problem with the way the measurements were taken, the second takes more of a "it can't be true because of…" approach which only highlight the general disbelief in the physics community regarding the very possibility of anything, much less the speed of neutrinos traveling faster than the [speed of light](#), messing with Einstein's most basic theories. The first can be addressed rather easily by the OPERA team if it so desires, and the second, well, if the neutrinos did in fact travel faster than the speed of light and did so without leaving a trail, a lot of physics theory will have to be rethought. Though that may not necessarily be a bad thing, physics is supposed to be about finding answers to explain the natural world around us after all, even if it means going back to the drawing board now and then.

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