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The Great NEUTRINO Muddle

by Miles Mathis

I began getting swamped with emails several days ago on the neutrino problem. I didn't take it too seriously, because I intuitively felt that this was a minor problem of math, not the gigantic physics-ending problem it was being sold as. After looking at the paper at ArXiv for about ten minutes, my intuition was proven correct.

The problem was reported by researchers at the OPERA experiment in the Gran Sasso laboratories, in collaboration with CERN. These researchers reported an average neutrino speed 100.00248% that of c, which is about 7,440m/s *over* c. This corresponds to a margin of error from expectations of $(v - c)/c = 2.48 \times 10^{-5}$, or about 1 part in 40,300. We are told that is outside, or larger than, the margin of error of the experiment (by almost a hundred times!), and alarm bells were set off all over the world.

But it *isn't* outside the margin of error of the experiment. I could see this by paragraph 4 of the introduction (in a paper of about 55 paragraphs, 23 pages, 22 fancy figures and tables, **and 175 co-authors**). The key numbers are here:

The measurement also relies on a high-accuracy geodesy campaign that allowed measuring the 730 km CNGS baseline with a precision of 20 cm.

That is your cause of error, right there, although no one seems to realize it. No one appears to know how velocity, distance, and time relate to one another, so no one knows how to calculate the margin of error here. So I will do it for you. What they have done, no doubt, is divide the first number by the second, to get 3,650,000. The CNGS measurement is correct to one part in 3,650,000, right? The neutrino over-measurement is a lot bigger than that, therefore we have a major problem. But the neutrino measurement is a velocity and the CNGS measurement is a distance. Therefore you can't directly compare the margins of error. Why? Because velocity depends on measuring BOTH time and distance, and you can't measure them both at the same time. As a simple matter of operation, you have to be given a distance from a previous experiment in order to calculate a velocity. We can see that here. We have two measurements, one by CNGS, one by OPERA. One is the distance measurement, one is the velocity measurement. OPERA can't measure the distance and the velocity at the same time, in the same experiment, can they? Think about it.

The velocity is actually a *calculation*. What OPERA is actually *measuring* is the time. They then use the number from CNGS to calculate a velocity. Why is this important? Because it means the margin of error is entering the experiment twice, in two different places. Both the time and the distance have the margin of error, not just the distance.

I will be told that these researchers were using atomic clocks of some sort, with negligible margins of error, but that is to miss the point of how the time of the experiment is actually measured. Even if the clocks have zero margin of error themselves, the clocks are being *used* to measure a distance gap. The distance gap has the margin of error exclusive of any margin of error in the timepieces.

Think of it this way: how do you synchronize perfect clocks that are 730km apart? You have to send something over and back to synchronize them, probably a series of photons. Either that or you just *assume* they are synchronized because they were synchronized when they were together. Either way, your margin of error creeps back in. The assumption is unscientific, and the photon going over obviously brings the margin of error back in.

This means that the margin of error when calculating a velocity in this experiment is not $1/3{,}650{,}000 = 2.73 \times 10^{-7}$. It is $1/\sqrt{3{,}650{,}000} = 5.23 \times 10^{-4}$, or about one part in 1,910. Since that is larger than 2.48×10^{-5}, we have no problem here. The calculation of the velocity is well within the margin of error.

In conclusion, we see that the 175 co-authors of this paper don't know how to do basic math or physics. This muddle stands as perfect proof of my assertion over the past decade that physics is in serious crisis. It is in crisis not because it has bumped up against insoluble problems, but because it has detached itself from mechanics and from basic math. It has been diverted into mysticism and cloaking math since at least the time of Bohr, and probably since the time Maxwell embraced quaternions, more than 150 years ago. No, we can set that back even further, to the time of Laplace and Lagrange, since I have shown precisely how they ignored mechanics and hid in big equations. I have shown hundreds of instances of top physicists hiding behind esoteric maths, these same physicists unable to do college or even highschool level mechanics and algebra. This is just one more case to add to the already long list.

Also notice how this paper proves my other recent assertion about hiding behind numbers. 175 co-authors? Guys, the only way to really avoid personal scrutiny is to publish anonymously. You might want to run that idea by peer review. I am sure the "peers" will love it, since they already get to review anonymously.

But don't expect my paper to get much traction. The mainstream has been ignoring me on purpose for many years. My readers, after seeing my simple solution, have said, "Oh, these guys will have egg on their faces!" Not likely. Contemporary physicists don't want real solutions, and they want the simple solutions the least. They exist on these big manufactured controversies and the fake temporary jerry-rigged solutions to them. No one is chagrined here, and no one is likely to be. It is all part of the plan to generate continued interest in physics, just like the manufactured dark matter controversy that you see on the cover of every magazine. Notice how well it has worked. Emails are flying all over the world, the internet is buzzing. No one has the time or inclination to read one of my papers, but they have time to waste on this non-problem, with committees working on it for months and months. That is no accident. These committees get paid for working on problems. They don't get paid for solving them.

Which is precisely why I don't bother couching this solution in cuddly language. My goal is not to be accepted by the *status quo*, but to drive around it altogether. I have no interest in being hired as some kind of trouble-shooter for these committees of the inept. When top committees of physicists can't even calculate a margin of error, it is time to close up shop and start over. We have to re-educate a whole new generation of physicists, starting from the ground floor.

That's right. Although my solution proves this miscalculation does not require any revolution in c, physics should not think itself safe from revolution. The revolution has already taken place, although few have heard the news. Like a star exploding in the far reach of the galaxy, the event and the knowledge of the event here on Earth are two different things.

Addendum, 9/26/2011: As I expected, this paper is already being dismissed because "the clocks used were correct to within billionths of a second." Meaning, the mainstream once again can't understand simple logic. If you want to see another glaring example of this, visit my paper on the Galilean transformation, where both the jurors and the editors at AJP couldn't see my point though it was a truism of first-year physics.

Here, what is not understood is that the clocks are not only measuring a time, they are measuring a distance. In measuring the time, yes, they may be nearly absolutely correct, and therefore they don't add to the margin of error of the velocity calculation. But in measuring the distance, they must include the original margin of error once again. To try to make you see this, let me ask you this: "Let us just assume you have the two clocks synchronized, at the beginning and end of the experiment. I won't even ask how you synchronized them. We will let that go for now. But where are the clocks? You have to have them very close to the actual release and capture of the neutrinos, or problems arise, right? You will say, 'Of course, we have the timers tripped by the neutrinos directly,' or something like that. But even so, I can ask, 'OK, how far apart are the clocks?' You either say, 'They are 730km apart,' in which case I have you; or you say, 'It doesn't matter.' If you say it doesn't matter, then I assume you are saying that the clocks could be placed anywhere along the line. They could be hundreds of kilometers away from the release and capture points. But if that is the case, then I can point out that knowledge of the end event must travel from the point of the event to the clock, and that takes time. Photons would have to travel that distance to the clock. Even if you took that into account, you would still have to know how far the photons traveled between end event and end clock, and we would be back to question one. I would have you.

Or, think of it another way. Velocity is distance over time. V=D/T. The velocity calculated for the neutrinos requires that we fill in both the numerator and the denominator, correct? We know the distance from CNGS, so that is one experiment, and one margin of error. Total margin of error so far, 2.73×10^{-7}. That margin of error belongs to the CNGS experiment, not to the OPERA experiment. That margin of error now *pre-exists*, even before we start the OPERA experiment. Now we need the time. That is the OPERA experiment. Second experiment. In measuring the time, we have to know the distance again, since we have to know how far apart our clocks are. Time is just a second measurement of distance, so that we can create a ratio and calculate a velocity [see my paper on time and velocity.] *Each experiment* has a margin of error, due to the distance, and we have two experiments. In the equation V=D/T, *both* the numerator and the denominator have a margin of error. Because a velocity requires two separate measurements, *any* velocity will contain two margins of error. And since we multiply margins of error, not add, the actual margin of error in the OPERA experiment is 5.23×10^{-4}.*

Some still won't get it. They will say something like, "What do you mean the clocks are measuring the distance? The clocks are measuring the time and we are given the distance. Clocks don't measure distance, you ninny! Yes we have the margins of error in the numerator and denominator, but the error in the denominator is negligible." Stated with enough surety, that almost sounds convincing, which is why a lot of top physicists can't see the truth here, I guess. So I remind everyone that one clock is not the same as two clocks separated by a distance. Yes, if we had one atomic clock in the OPERA experiment, at no distance from the experiment, the margin of error in the time would be near zero. But you cannot measure neutrinos going 730km with one clock, can you? Those who say this are refusing to study the actual operation of measurement of time. You have two clocks separated by a specific distance, and that distance of separation matters. Not for reasons of relativity, but for reasons of operation. It matters that the clocks are 730km apart, and not any other distance, because if they were at any other distance *they could not measure the time of the experiment*. In this way, the distance

between them enters the margin of error in the denominator. The margin of error enters the calculation of the velocity *twice*.

One final way, different from the rest. I will use calculus-talk to try to explain it. Velocity is the rate of change of distance, right? It is the derivative of the distance. If we used primed variables to mark our parameters, the distance is unprimed, the velocity is single primed (and acceleration would be double primed). Well, the only time variables can be compared as regards margins of error is if the variables have the same priming. When we are talking margins of error, you can compare distances to distances and velocities to velocities, but you cannot compare distances to velocities. Why? Because if you compare a velocity to a distance, you are ignoring a level of dependence. Calculus requires dependent variables, remember? They are called functions. Velocity is a function of distance, and a rate of change of distance, and both are telling us the velocity is one step more complex than distance. How? The velocity also has a time dependence that distance does not have. More complexity in a variable automatically tells us it has multiple margins of error. Just as a velocity has two margins of error embedded in it, an acceleration has three. A cubed acceleration has four. Every distance or time constituent in a variable implies another margin of error, since each constituent must be *measured* separately.

Now, admittedly, this last part is not common knowledge, and I shouldn't expect everyone to know it. I was not taught it and I am not aware that it is taught at all. But even without that, scientists should know, as a simple matter of logic, that two experiments imply two margins of error. This late in the history of experiments, things like this should be known. It is incredible they aren't known.

Update, November 22, 2011: We are now told that a new experiment confirms the first one, although some scientists are saying no. I won't get into the arguments, since no one knows what they are talking about anyway. But this new argument gives me a good way to show you what the neutrino is and why it doesn't diminish as much as a photon as it travels through the charge field. To see the full explanation, see my newest paper on the neutrino.

Update, March 30, 2012: Well, my readers were right, these guys do have egg on their face now. The head of the Opera group at Gran Sasso, Prof Antonio Ereditato, just resigned. They have now admitted that the experiment was wrongly interpreted and that the neutrinos were *not* going faster than light. However, the reason they are giving is an absurd misdirection. They are telling the media that a poorly plugged fiber optic cable was the cause. Right. I guess that is better than admitting they don't know how to do highschool algebra. The first is only ridiculous, the second is pathetic.

*Please don't ask me why the margin of error is not 2.73×10^{-7} squared. I have done all the remedial math I am going to do in this paper.