

Re: LIGO.

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- *From:* "Martin Hogbin" <goatREMOVETHIS123@xxxxxxxxxx>
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"cliff wright" <c.c.wright@xxxxxxxxxxxxxxxx> wrote in message [news:45cdc049\\$1@xxxxxxxxxxxxxxxx](mailto:news:45cdc049$1@xxxxxxxxxxxxxxxx)

Martin Hogbin wrote:

"cliff wright" <c.c.wright@xxxxxxxxxxxxxxxx> wrote in message [news:45cd6bab\\$1@xxxxxxxxxxxxxxxx](mailto:news:45cd6bab$1@xxxxxxxxxxxxxxxx)

Well this is all very interesting but we still appear to have a non functional, very expensive apparatus here!

Not yet functional! You have not responded to my latest post about our bet. I want to place a serious bet. We need to agree some basis on which the winner is decided otherwise it could end up as an argument as to who has won. I will not pay up unless I am sure that you would have paid up had you lost.

Do you want to place a serious bet or shall we cal it off?

Michelson and Morley used an old cellar and a realtively simple optical interfernometer, in fact they had to cut their programme short because someone else needed the cellar. Perhaps, it being in Dublin, a Guinness delivery was expected. Strange, I always thought that Semantics were to do with the meaning of language, but I suppose that mathematicians are running out of mames for ever more abstruse calculations and logical operations. None of this however more than partially answers my original question.

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Though I see someone has phrased it quite well– In effect what are you actually measuring and how does propagation speed enter the equation?
Electromagnetism had Maxwell, but can Einstein now join his illustrious company or not?

Tom has carefully answered your question using the correct technical language because that is the easiest way to do so. Many words (such as 'energy' or 'momentum') have much more precisely defined meanings in technical usage than in everyday speech. You need to find out what the terms Tom has used mean in order to get your answers.

Maxwell of course had the advantage of already knowing the approximate velocity of electromagnetic radiation he did not have to assume it.
BTW how is the nature of the "space/time" positioning of the light paths determined? Or is it assumed that space is substantially "flat" and unstressed around the mirrors?
I presume that ant "directional" information depends on the time delay of signals and therefore the velocity of propagation, but I stand to be corrected on that.

You are falling into the trap of expecting distance to be a 'real' pre-defined thing. We can ultimately only define distance by how we would measure it. Historically, different methods have been used. In 1889 one metre was defined as the distance between two marks on a platinum alloy bar kept in Paris (this is the constant spacelike proper distance Tom referred to). On this basis, LIGO would measure a variation in the speed of light.

However, today one meter is defined as the distance travelled by light in a specified time. In free space, away from gravitation and other influences, this gives exactly the same result as using the metal bar would. In the case of LIGO, because the speed of light is now defined as a constant, we would now say that the length of metalwork changes. It all depends on how you choose to define

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'distance'.

I fully understand that Einstein's original work as regards "gravitational radiation" has been much "worked on " since his death 50 years ago, but his name keeps coming up.

An quite rightly so. It is still his theory, unchanged, that is used. It is just that more details have been worked out.

Martin Hogbin

Ok Martin. How about this? If both LIGO's can produce a signal which correlates with the observation (using radio or optical techniques) of some phenomenon. For example an especially close or powerful gamma ray burst or supernova event. Then I will gladly stand corrected and pay you the \$50 US (about \$74 NZ). However if by the end of 2011, an extra year please note, no correlated signal which can be independently checked is received then you owe me \$50. The correlated event is required based on the alleged signals detected by Weber (or was it Wagner) back in the 1970's which turned out to be unrepeatable. Does that seem fair to you?

I would prefer a generally accepted statement from the scientific community that gravity waves have been detected. That I why I suggest that we find an independent referee.

Actually you know I have quite a lot of background in practical Physics even though my degree was in the history of Technology. I spent most of my career as an electronics design engineer, and I am an active Amateur astronomer.

I have most definitely tried NOT to fall into the "trap of distance" problem. However since Einstein and Quantum mechanics fail to agree on so many points I get a definite inkling that this whole experiment might be falling into difficulties because of the difference between "macro" real world conditions and the behaviour of the universe at a quantum level. At a macroscopic level it is patently absurd to suggest that distance is not "real".

Perhaps 'real' is not the right term to use. What I am saying is that, at any scale, we must define what we mean by distance before we can argue about it. The best way to define exactly what we mean is

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say how we would measure it. In 1889 the meter was defined one and today it is defined another.

From my reading it appears that the hypothetical "gravity wave" will have a longer wavelength than most EM radiation used today and this necessitates very large (Km size) detectors.
If that isn't Macroscopic what is?

Agreed, but we must still define what we mean by 'distance'.

I must confess though Martin that as an old time practical experimental type I still have reservations about the apparent inability of many theoreticians to explain the basics of their ideas by analogy or some form of modelling.

Who are these people who cannot explain their ideas?
Einstein's theory of general relativity has been explained in many ways by many different people.

If they can't visualise what is happening well enough to explain it to someone with say basic University level Physics and a reasonable education background then I am always left with a "emperor's new clothes" suspicion.

Firstly, I am not sure how you can tell if someone else is visualising what is happening.

Secondly GR is not easy to visualise because it takes place in 4-dimensional spacetime. Imposing a 3-dimensional Euclidean space on the subject and then trying to visualise what happens is doomed to failure.

In my 40 years at university I have attended lectures by many visiting scientists well known internationally in their fields of Physics, Astronomy and Cosmology and have found that those who can do useful work can usually come up with a very good explanation of it to a good general audience.

Total theoreticians were another breed however and only exceptional individuals seemed to be able to communicate their ideas.

A bit of Latin is in order here "Quis Custodiet Ipsos Custodias" (roughly "Who Guards these Guardians").

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Oh dear. I hope you are not going to turn out to be one of those who claim that science is a great conspiracy to defraud the public.

In a field which I did a lot of work, Acoustics I came across an instance where the "scientific establishment" refused grants on the basis of "bad science" to projects which are now in general use. Look up electronic noise cancellation, otherwise known as "Essex Noise Reduction" sometime. Experiences like that shake one's faith in the judgement of some members of the scientific community for good.

Nobody claims to get everything right all of the time but GR has been subject to nearly 100 years of scrutiny and passed all tests so far with flying colours.

I really hope this produces some result for us. If they can detect "something" when something big goes "bump" then it will be well worth the money.

Yes, I hope something happens.

Martin Hogbin