Re: How can light travel without losing energy?

Source: http://sci.tech−archive.net/Archive/sci.physics.research/2005−09/msg00302.html

- *From*: Einar Andreas Rødland <e.a.rodland@xxxxxxxxxxxxx>

- *Date*: Sat, 17 Sep 2005 18:09:41 +0000 (UTC)

Nick Maclaren wrote:

> In article <dfsahtqlc1@xxxxxxxxxxxx>,
> Einar Andreas RÃ¸dland <e.a.rodland@xxxxxxxxxxxxx> writes:
> |> |> The suggestion you put forward, that light might interact with |> something producing more photons but with less energy each, would |> cause the light to be spread so we would see distant objects as |> blurred at best.
>
> (a) I didn't say that and

[snip]

I'm sorry if I missunderstood, so I would appreciate that you clearify what you meant by:

> Then there is the situation of the energy of the vacuum, the creation of particle/antiparticle pairs and all that. One would expect such particles to behave normally, wouldn't one? And many of them DO interact with light, so one can reasonably speculate that this might cause absorption and retransmission of multiple photons at lower energies.

Do you also have an explanation of how this might explain the observed red shift and CMB?

> |> Thus, when one small assumption−−−that distant objects are receeding |> from us−−−is able to explain a large number of observations without |> having to rewrite known laws, it seems like a good explanation: it is |> one that is likely be enable us to generalise and make predictions.
>
> That is seriously wrong. It isn't one small assumption − it is a good many, some of which are major. For example, most of the evidence is based on the assumption that the laws of physics and the values of physical constants are essentially constant over time and space. This is DESPITE the (leading, if not established)

> theories of the big band that say that such laws were created or changed as it occurred.

Well, it's a fundamental assumption of all of physics that there are universal laws, and that our ability to describe nature is derived from finding those laws or good approximations thereof. That's not specific to the Big Bang theory. This assumption is certainly not provable, though it may be argued to have been highly successful, and you may well call it a dogma if you please.

Another more scientific question, which I suspect is more in line with what you are getting at, is the question of under what circumstances our understanding of the laws of physics are adequate: to what extent we can reasonably generalise what we know to other times, places and situations.

First, it is well recognized that at the very early time of the Big Bang, a combination of quantum mechanics and general relativity is needed that we don't as of now have; also, a unification of the strong and the electro−weak interactions is lacking. However, it is also reasonably well understood at what point such unifications are needed.

A second issue I know has been investigated is that of physical constants being truely constant or not: essentially, if the fine−structure constant may vary over time and space. I recall having seen some reports on this: some were arguing that it may have changed over time, but my impression what that it was not conclusive and that these studies have put strong bounds on how much it may have changed.

Einar

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