"An Elementary Fact Worth Remembering" - Discussion

Post by “Cassius” of January 21, 2025 at 6:18 PM

https://www.youtube.com/watch?v=UvI9W-Of1zA

Post by “Bryan” of January 22, 2025 at 2:25 PM

Light pushes and light has weight. Light has mass.

We can make innumerable mathematical models that work for (1) light having mass, (2) light not having mass, or even (3) light not existing at all. The idea that light is massless will be thrown away eventually along with the rest of Einstein's magic tricks.

Post by “Cassius” of January 22, 2025 at 2:36 PM

I hope you'll keep notes and eventually find time to prepare something on some of these physics issues Bryan. I just posted Don's "Bread and Water" as a separate podcast episode and I think a shorter focused talk format works very well - as it would for some focused physics issues.

Post by “Martin” of January 26, 2025 at 5:51 AM

> Quote
>
> The idea that light is massless will be thrown away eventually along with the rest of Einstein's magic tricks.

According to the model which is the most consistent with observations, light has mass while the elementary particle which makes up light, the photon, has a nominal rest mass of zero. While we can carry out experiments in which it appears that light is slowed down or photons are trapped, a single photon cannot actually be at rest. In every frame of reference except for its own, it moves with the speed of light throughout its existence.

It might happen that in future, a photon rest mass of more than zero is discovered. The current model can accommodate this by separating the speed of light from the maximum speed of information transport, which would then be slightly higher than the speed of light, and which would then be used instead of the speed of light in the Lorentz transforms and some other formulas. However, a photon rest mass of more than zero would certainly motivate the search for a superior model.

Although from a theoretical perspective, Einstein's theories and quantum mechanics have replaced Newton's theory of gravity/mechanics, in actual practice, Newton's theory is still far more often applied than the newer theories because Newton's mechanics is accurate enough and more efficient to use for problems which are within its limits. Therefore, Newton's mechanics has never been thrown away. Similarly, it appears unlikely, that Einstein's "magic tricks" will be thrown away, because they do work well. We just do not know whether they have a range beyond which they become inadequate.

Post by “Bryan” of January 26, 2025 at 8:19 AM

> Quote from Martin
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> light has mass while the elementary particle which makes up light, the photon has a nominal rest mass of zero

Thank you Matin. Even if photons are only considered "massless" when they are not moving — Given, in the real world, light is never not moving, why should we follow Einstein and take the basis of our considerations something that does not exist: "massless and motionless elementary particles of light"?

> Quote from Martin

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Does not this mean there is a separation between our theory and our practice? If Newton works in the real world, perhaps he is mostly all we need.

Post by “Don” of January 26, 2025 at 9:12 AM

> Quote from Bryan
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> Does not this mean there is a separation between our theory and our practice? If Newton works in the real world, perhaps he is mostly all we need.

Wading into an area in which I have no expertise...

It seems to me that Newton handles the big picture, Einstein allowed us to see the relative nature of the cosmos, and quantum physics handles the cosmos at the submicroscopic world in all its weirdness. My understanding is that Newton, Einstein, and quantum mechanics all explain the realms that they intend to explain. Heisenberg's Uncertainty Principle doesn't break through into the macro world but that doesn't mean it's not operating.