

Example of Contradiction in Einstein's relativity from Wikipedia

Roger J Anderton
R.J.Anderton@btinternet.com

Using Wikipedia to highlight an example of contradiction in Einstein's relativity in large part due to problem of translation of Einstein from German into English.

Wikipedia article as at 10 May 2020. [1] (A problem with Wikipedia is that it continually gets updated, so what is referred to is ephemeral.

Going through the relevant part of the article:

Quote: While Einstein first mentioned a variable speed of light in 1907,^[1] he reconsidered the idea more thoroughly in 1911.^[2] In analogy to the situation in a medium, where a shorter wavelength λ , by means of $c = v \lambda$, leads to a lower speed of light, Einstein assumed that clocks in a gravitational field run slower, whereby the corresponding

frequencies are influenced by the gravitational potential (eq.2, p. 903):

$$v_1 = v_2 \left(1 + \frac{GM}{rc^2} \right)$$

Einstein commented (pages 906–907):

"Aus dem soeben bewiesenen Satze, daß die Lichtgeschwindigkeit im Schwerefelde eine Funktion des Ortes ist, läßt sich leicht mittels des Huygensschen Prinzipes schließen, daß quer zum Schwerefeld sich fortpflanzende Lichtstrahlen eine Krümmung erfahren müssen." ("From the just proved assertion, that the speed of light in a gravity field is a function of position, it is easily deduced from Huygens's principle that light rays propagating at right angles to the gravity field must experience curvature.")

Endquote

The German word "Lichtgeschwindigkeit" is being translated as "speed of light". The problem with this - the German word "geschwindigkeit" can be translated into English as either "velocity" or "speed". (I think I have pointed this out in previous articles.)

Wiki continues:

Quote: In a subsequent paper in 1912,^[3] he concluded that:

“Das Prinzip der Konstanz der Lichtgeschwindigkeit kann nur insofern aufrechterhalten werden, als man sich auf für Raum-Zeitliche-Gebiete mit konstantem Gravitationspotential beschränkt.“ (“The principle of the constancy of the speed of light can be kept only when one restricts oneself to space-time regions of constant gravitational potential.”)

Endquote.

The same problem occurs again with the German word “geschwindigkeit”, Wiki has twice translated it as “speed” but it is open to translation of “velocity”, so Einstein can be read as either talking about “velocity of light” or “speed of light”. Einstein becomes ambiguous when translated from German into English.

The next paragraph is not relevant; see below in references if interested.[2]

So, onto the next relevant paragraph under title “Einstein’s updated proposals (1905 -1915):

Quote: Albert Einstein went through several versions of light speed theory between 1905 and 1915, eventually concluding that light speed is constant when gravity does not have to be considered^[5] but that the speed of light cannot be constant in a gravitational field with variable strength. In the same book Einstein explained that he intended light speed to be a vector when it was described by coordinates in a reference frame.^[6]

Endquote

The problem with this is that it is referring to an English translation of Einstein’s work (the book: *Einstein, Albert (1961). [Relativity - The Special And The General Theory](#) (15th reprint from 1952 ed.). New York: Bonanza. p. 76. ISBN 978-0-517-029619.*) I suspect that if went back to the original German that the problem would still be there of velocity versus speed. So, refers to “speed of light” but really might have been “velocity of light”.

The conflict of velocity versus speed is highlighted in what Wiki next says:

Quote: Einstein was not explicit about whether the speed of light would change in a gravity field, or whether just the direction of the vector would change;

Endquote

That is the conflict of whether Einstein is talking about velocity of light * or not. If talking about a scalar then that is magnitude and is “speed”, if talking about a vector then have magnitude and direction and is “velocity.”

However, Wiki tries to solve the issue and explains that if look at the mathematics presented then can decide “speed” meant and not “velocity.”

Wiki says:

Quote: this can be clarified from the text implicitly, however.^[7] A calculation of alpha (α) follows equation 107 and makes an unambiguous use of variable scalar light velocity (L) both

as the argument of a partial differential function (proving a variable) and as the denominator in a fraction (proving not a vector) both in the same integrated quantity. Division of a scalar by a vector is not defined, so there is no other way to interpret the velocity of light in this usage except as a variable scalar speed.

In this calculation $L = c/c_0$ where c_0 is light speed in flat space.

$$\alpha = \int_{-\infty}^{+\infty} \frac{1}{L} \left(\frac{\partial L}{\partial x_1} \right) dx_3$$

Endquote

So, the problem seems to be solved as - Einstein had lightspeed as variable when there was gravity (that is - seems to be when he was thinking of General relativity).

However, it is now that the problem gets worse, as Wiki continues:

Quote: Peter Bergmann did not agree with Einstein, but left the dispute out of his earlier book^[8] in 1942 to get Einstein's endorsement. After Einstein died Bergmann wrote a new book^[9] in 1968 claiming that vector light velocity could change direction but not speed.

Endquote

This – Peter Bergmann sounds a shyster; he wanted Einstein to endorse him so agreed with Einstein to get that, and later decides to say different.

Wiki continues:

Quote: This has become a prevailing opinion in science, but not in agreement with Einstein's unambiguous math.

Endquote

This “prevailing opinion in science” most likely means that what is taught is as per Bergmann, namely of lightspeed as constant in gravity and contrary to what Einstein was saying of lightspeed variable in gravity. That then means there is at least two different versions of General relativity – the one that is taught (going by Bergmann) versus Einstein version.

What is meant by it is - that different interpretations are being imposed on the maths of general relativity, and that is making it ambiguous.

Wiki continues:

Quote: Bergman did acknowledge that the apparent speed of light would change in a gravity field and go to zero at an event horizon as viewed by a distant observer.^[10]

Endquote

That just makes things worse; we now have “apparent speed of light” how is that then supposed to be different to “speed of light” that is not apparent; its just creating more ambiguity with how terms are defined.

Wiki then goes onto mention that Max Born and Richard Tolman agreed with Einstein. But that does not help – the damage is done, if what is being taught is something different!

References

[1] https://en.wikipedia.org/wiki/Variable_speed_of_light 10 May2020

[2] Next paragraph is: “However, Einstein deduced a light deflection at the [Sun](#) of “almost one arcsecond” which is just one-half of the [measured value](#) later derived by his theory of [general relativity](#). The measured value was provided by [Eddington](#) in 1919. The accuracy of this value was improved by measurements done by Donald Bruns during the 2017 total eclipse of the sun ^[4].”

c.RJAnderton11May2020

correction:14 June2020

* typo correction 14 June2020 wrote: “speed” when meant “light”