

## **Error in Einstein's 1911 paper missed for over a hundred years**

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

There is an error in the paper by Einstein: "On the Influence of Gravitation on the Propagation of Light" *Annalen der Physik*, 35, pp. 898-908, 1911, it has for equation (3):

$$c = c_0 (1 + \Phi/c^2)$$

when it should be:

$$c = c_0 (1 + \Phi/c_0^2)$$

I checked with Michael D. Godfrey [1] and he confirmed this is correct observation by me. He has placed the paper by Einstein on the Internet and says: "There are two translations of this paper that I know of: 1. In *The principle of relativity, a collection of original memoirs on the special and general theory of relativity*, by H. A. Lorentz, A. Einstein, H. Minkowski and H. Weyl, with notes by A. Sommerfeld, tr. by W. Perrett and G. B. Jeffery, Dover Publications, Inc., 1923. This paper appears on pp. 97-108. 2. In *The Collected Papers of Albert Einstein, Volume 3: The Swiss Years: Writings, 1909-1911*, Albert Einstein, vol. 3 edited by Martin J. Klein, A. J. Kox, Jürgen Renn, and Robert Schulmann, Series ed. John Stachel, Princeton University Press, 1987....."

It appears that the error I noticed has been missed for over a hundred years in these publications, and been repeated continuously in republications. Presumably there is some sort of typo error in the original.

Various places such as "Relativity Resources" [2] repeat the error.

While such publications as "Relativity, Gravitation, and Cosmology A basic introduction" by Ta-Pei Cheng [3] does have the correct equation, and therefore must have worked through the mathematics to get that equation instead of merely just using the equation from Einstein's paper. (i.e. Cheng's equation (3.39) is Einstein's equation (3), bearing in mind he uses different notation.)

So, it is the republications of Einstein's 1911 paper that has the error, and in its republications just keeps getting missed from being corrected. Even Hawking's book "On the Shoulders of giants" [4] repeats the error.

I of course am just highlighting this as just one of numerous errors in the relativity literature, and have many bugbears on other issues such as what I perceive as the lack of care they demonstrate with calculus. This equation (3) was in 1911 when Einstein was on his path to creating general relativity in 1915/1916, in my view that path of development is an unholy mess.

There is just a lack of diligence by the mainstream on correcting these type of errors, and they just allow them to persist and be repeated in numerous of their publications.

#### References

[1] Michael D. Godfrey's pdf:

[https://www.relativitycalculator.com/pdfs/On the influence of Gravitation on the Propagation of Light English.pdf](https://www.relativitycalculator.com/pdfs/On%20the%20influence%20of%20Gravitation%20on%20the%20Propagation%20of%20Light%20English.pdf)

Last time looked on 5 Jan 2017, the error had not been corrected.

See also: <https://www.math.ku.edu/~lerner/GR/EinsteinGravAndLight.pdf>

[2] Relativity resources 5 Jan 2017 has:

[http://www.relativitybook.com/resources/Einstein\\_gravity.html](http://www.relativitybook.com/resources/Einstein_gravity.html)

[3] Relativity, Gravitation, and Cosmology, A basic introduction, TA-PEI CHENG, University of Missouri—St. Louis

[4] On the Shoulders of giants, Stephen Hawking, Running Press, isbn 0-7624-1348-4 p. 1199

c.RJAnderton5Jan2017