

Einstein's Light Speed Postulate is Illogical

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Einstein postulated in his 1905 article that light speed is isotropic in all inertial frames in order to derive the Lorentz Transformations. But the light speed postulate is logically wrong for the following reason: suppose, a short light pulse is emitted from a source mounted, say, in the origin of the coordinate system K, which is at rest. A coordinate system K' is moving at v in the x -direction. At the moment, when the origins of both K and K' are coinciding, one spherical wave front is launched at the origin of K. This means that there will be one spherical wave-front expanding around the origin of K, because the origin of K' moves away at v . But the Lorentz Transformations transform this pulse (launched in K) into a wave-front spherically expanding in K', although there cannot be such a spherically expanding wave-front around the origin of K'. How could there be one, as only one spherically expanding wave-front was generated around the origin of K, where the emitter is mounted! K' moves away at v , without carrying with it a spherically expanding wave front at the origin of K'. But the Lorentz transformation equations are predicting that! This cannot be correct! It is logically impossible!

1. Introduction

In textbooks on special relativity the derivation of the Lorentz transformation equations is based on Albert Einstein's [1][2] light speed postulate which assumes that wave-fronts expand spherically in all inertial reference frames according to the equations

$$x^2 + y^2 + z^2 - c^2t^2 = 0 \quad (1)$$

and
$$x'^2 + y'^2 + z'^2 - c^2t'^2 = 0 \quad (2)$$

Eq. (1) describes a spherical wave-front expanding in the frame K (let's call it rest frame), and Eq. (2) describes a spherically expanding wave-front in the frame K', which is in relative motion at v with respect to K. Both equations correspond to wave-fronts emitted from the origins of the two frames. The Lorentz transformation equations have been derived from these two equations as is well known and need not be repeated here.

2. The Meaning of These Two Equations

In [1] as well as in many textbooks [2] it is clearly stated that the two equations (1) and (2) should be interpreted as follows: a wave-front (1) is emitted at the origin of K in the moment $t = t' = 0$ when the origin of K' is passing by at the origin of K. K' is assumed to move in the x -direction. The question then arises which shapes the radiation patterns assume when measured in K and in K' as a function of time. The answer is very simple for the measurement in K since the transmitter has been assumed to be mounted at the origin of reference frame K. Thus the radiation pattern would certainly correspond to Eq. (1). It is not so easy to find out the radiation pattern measured at the origin of the moving frame K'. It seems plausible to assume that the engineer doing the measurement in the vicinity of the origin of K' a spherically expanding wave front receding at $-v$ in the negative x -

direction will be measured. As time evolves the distance between the spherical wave-fronts emitted at the origin of K will get bigger and bigger simply because the distance between the origins increases. However, when the Lorentz transformation equations are applied to Eq. (1), Eq. (2) will be obtained. This would mean that the engineer measuring in K' measures a spherical wave-front moving with him as though a second spherically expanding wave-front had been generated around the origin of his frame K' which is moving away at v . Thus there are now two identical expanding radiation patterns both being attached to their origins, one (in K) appearing to be "stationary", the other one seems to move with K' away at v . The first originally generated wave-front is still expanding around the origin of K. This author claims that the pattern predicted by the Lorentz transformations cannot be real. The situation is logically impossible or, in other words, the Lorentz Transformation Equations must not be applied as they are yielding unrealistic (contradictory) results.

3. Conclusion

It has been shown that Einstein's [1] light speed postulate is illogical and yields contradictory results in conjunction with the Lorentz transformation equations, when two inertial frames of reference are considered with a single light pulse generated at the origin of one frame at the moment when the origin of this frame coincides with the origin of an other (moving) frame.

References

- [1] A. Einstein, "Zur Elektrodynamik bewegter Körper", Ann. Phys., vol.17 (1905).
- [2] A. Einstein, "Grundzüge der Relativitätstheorie", Springer Berlin, Heidelberg, New York, 6th.edition, ISBN 3-540-43512-3 (2002).