

The different theories of Special Relativity: Poincare's theory

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There are two ways of looking at Poincare's theory as (1) the true theory of relativity instead of Einstein 1905 theory, with Einstein 1905 theory needing correcting or (2) as a different theory to Einstein 1905 theory.

When I have talked to people pro and anti Einstein's relativity, there has been a great deal of confusion over what special relativity 'is.' In the teaching of special relativity this difference is glossed over and it can easily be taught to students that special relativity is Poincare's theory without explicitly stating to students that is what they have been taught and instead letting them be deceived that they have been taught Einstein's theory.

(1) First look at Poincare's theory as being the true theory of special relativity instead of Einstein 1905 theory, with Einstein needing to be corrected:

There has been long dispute over who should get credit for relativity theory, namely in regards to Einstein's theory of 1905 special relativity.

As Yves Gingras [1] points out: “ in 1953 of the second volume of E. T. Whittaker’s A History of the Theories of Aether and Electricity—in which the British mathematician strongly argued against Einstein’s “paternity” of relativity, which he christened the “Poincare’-Lorentz theory”—the debate did not really hit the newspapers and register with the general public until 2005, when it was suggested that Einstein had in fact “plagiarized”Poincare’.”

It might then be that revision to our history books should be made and what is credited to Einstein in 1905 should go to Poincare.

Gingras says [1] : “As to the probable outcome of that struggle, it is not impossible that future physics textbooks will raise Poincaré to the level of Einstein and—at least in France—relabel what is now known as “relativity theory” the “Einstein-Poincaré theory,” or the “Poincaré-Lorentz theory,” as Whittaker suggested, or even, in a more ecumenical fashion, the “Lorentz-Poincaré-Einstein theory”

One of the things that the Poincaré theory or Poincaré-Lorentz theory or Poincaré-Einstein theory brings to prominence is conventionalism.

Conventionalism

According to Scott [2] : “.....philosophers of science credit Poincaré with one of the principal theories of the foundations of scientific knowledge, known as conventionalism, and presented in the volume *Science and Hypothesis* (1902).”

Scott picking upon conventionalism [3] : “According to the conventionalist doctrine of space elaborated by the French philosopher-scientist Henri Poincaré in the 1890s, the geometry of physical space is a matter of definition, not of fact. Poincaré’s Hertz-inspired view of the role of hypothesis in science guided his interpretation of the theory of relativity (1905), which he found to be in violation of the axiom of free mobility of invariable solids. In an effort to save the Euclidean geometry that relied on this axiom, Poincaré extended the purview of his doctrine of space to cover both space and time. The centerpiece of this new doctrine is what he called the “principle of physical relativity,” which holds the laws of mechanics to be covariant with respect to a certain group of transformations. For Poincaré, the invariance group of classical mechanics defined physical space and time (Galilei space-time), but he admitted that one could also define physical space and time in virtue of the invariance group of relativistic mechanics (Minkowski space-time). Either way, physical space and time are the result of a convention.”

Now all those issues are confused mess if we go by Einstein 1905 theory and ignore what was before. The priority dispute over relativity theory spills over to how to understand the theory. Far as I am concerned a bit of manipulation and can do by either convention of light-speed in vacuum constancy or universal time. Thus those who too rigidly stick to Einstein don't understand the theory as it is supposed to be understood, and refuse to accept many of Einstein's mistakes.

Poincaré's theory is more correct than Einstein's theory. Einstein’s theory is full of mistakes which need to be stripped away to get us back to Poincaré.

Einstein's mistakes are mainly mathematical. Einstein's maths teacher was Minkowski, and Minkowski was claiming superiority in maths over Einstein in a 1907 lecture as Scott says [4]: “In October 1907, Minkowski wrote to Einstein to request an offprint of his *Annalen* article on the electrodynamics of moving bodies, for use in his seminar on the partial differential equations of physics, jointly conducted by Hilbert. During the following Easter vacation, he gave a short series of lectures on “New Ideas on the Basic Laws of Mechanics” for the benefit of science teachers. In what seem to be notes to these holiday lectures, Einstein’s knowledge of mathematics was subject to criticism. Minkowski reminded his audience that he was qualified to make this evaluation, since Einstein had him to thank for his education in

mathematics. From Zurich Polytechnic, Minkowski added, a complete knowledge of mathematics could not be obtained.”

i.e. Einstein's maths mistakes and Minkowski as maths teacher of Einstein claimed authority of being qualified enough to deal with them.

Einstein nowadays has so much esteem with his fans, that many of his fans refuse to accept Einstein's maths mistakes; such is corrupting effect of those hero worshipping.

Scott continues [4]: “This frank assessment of Einstein’s skills in mathematics, Minkowski explained, was meant to establish his right to evaluate Einstein’s work, since he did not know how much his authority carried with respect to “the validity of judgements in physical things,” which he wanted “now to submit.””

i.e. Minkowski was an authority in maths but not in physics.

Scott [4]: “A pattern was established here, in which Minkowski would first suggest that Einstein’s work was mathematically incomplete, and then call upon his authority in mathematics in order to validate his judgements in theoretical physics.”

The “mathematically incomplete” is just a fancy way of saying Einstein's maths was a bit messed up.

Scott [4] : “While Minkowski implicitly recognized Einstein’s competence in questions of physics, he did not yet appreciate how much Europe’s leading physicists admired the work of his former student. Even in his fief of Gottingen, Minkowski knew he could not expect any authority to be accorded to him in theoretical physics, yet this awareness of his own lack of credentials in physics did not prevent him from lecturing on the principle of relativity.”

The lecture was 1907, two years after Einstein published his 1905 paper on special relativity, I would not think Einstein had too much authority in physics community at that time, he was only just starting his meteoric rise to stardom.

Now look at it the other way:

(2) Second way of looking at it is as Poincare's theory is not Einstein 1905 theory:

Example now being looked at of claim that Poincare's theory is not the true theory of relativity:

Katzir tells us [5]: “Although Poincaré’s aim and theory were similar to those of Albert Einstein (1879–1955) in creating his special theory of relativity, Poincaré’s relativistic physics should not be seen as an attempt to achieve Einstein’s theory but as an independent endeavor.”

Katzir opinion is: “I believe, by contrast, that Poincaré’s work should not be seen as an attempt to formulate special relativity, but as an independent attempt to resolve

questions in electrodynamics. The superiority of Einstein's theory over Poincaré's was not evident around 1905."

So even though Poincaré's theory is deemed similar to Einstein's SR (special relativity), Katzir does not want to see Poincaré's theory as SR, and also mistakenly think Einstein 1905 theory is superior; this is because of all the propaganda around Einstein promoting him as a genius, so any evidence contrary to the propaganda - a believer (in that propaganda) wants to dismiss.

My articles have dealt with the many mistakes made by Einstein; now Poincaré with his similar theory to Einstein's had less mistakes and hence be a better formed theory. So the real difference might be that both Poincaré and Einstein had the same theory, but Einstein had lots more of the mistakes.

Now Katzir points out a contrary opinion to his, which was dealt with in the first part of this article:

Katzir: "Edmund T. Whittaker opened the debate about Poincaré's contribution to special relativity with his provocative claim that special relativity had been discovered by Poincaré and Hendrik A. Lorentz (1853–1928) already in 1904."

So if SR is really due to Poincaré and Lorentz, then Einstein's version of it might just be a corruption of their work. (And that is my proposal – based on studying Einstein – he got a lot of things wrong. Einstein did not cite the sources he was working from, so it seems likely he was working on Poincaré-Lorentz theory then he might have got a lot wrong which was not in the original theory.)

Katzir: "A decade later, Gerald Holton analyzed Poincaré's theory, pointing out the thematic differences between Poincaré's and Einstein's work that had prevented Poincaré from creating special relativity."

Those "differences" most likely being the things that Einstein got wrong. So Holton is looking at Einstein's theory as SR with Poincaré not achieving SR, but what Einstein did to get to SR was just make mistakes.

Katzir point out: "Stanley Goldberg and Camillo Cuvaj followed Holton in identifying differences between Poincaré's and Einstein's concepts and advancing further reasons for Poincaré's failure to create special relativity."

If we look at it as Poincaré's theory was better than Einstein's then really it was Einstein's failure. But of course all these believers in the Einstein propaganda want to not look at it that way. The result then being total corruption in the handling of special relativity as taught to physics students leading then to total confusion in the handling of relativity between those arguing over it.

References

[1] Henri Poincaré: The Movie The Unintended Consequences of Scientific Commemorations By Yves Gingras

[2] Henri Poincaré's scientific outlook, Scott Walter, Henri Poincaré Archives (CNRS, UMR 7117) University of Nancy

[3] Hypothesis and Convention in Poincaré's Defense of Galilei Spacetime
Scott Walter
<http://www.univ-nancy2.fr/DepPhilo/walter/papers/2009hypothesis.pdf>

[4] Minkowski, Mathematicians, and the Mathematical Theory of Relativity
Scott Walter, Published in H. Goenner, J. Renn, J. Ritter, T. Sauer (eds.), *The Expanding Worlds of General Relativity* (Einstein Studies, volume 7), pp. 45–86. Boston/Basel: Birkhauser, 1999.

[5] Poincaré's Relativistic Physics: Its Origins and Nature, by Shaul Katzir
Phys. perspect. 7 (2005) 268–292, 1422-6944/05/030268–25
DOI 10.1007/s00016-004-0234-y Shaul Katzir Vol. 7 (2005) Poincaré's Relativistic Physics

Appendix : Poincare's philosophy

From Science and Hypothesis by Poincare, we have his views on space, geometry etc:

He says: “Space is another framework which we impose on the world. Whence are the first principles of geometry derived ? Are they imposed on us by logic ? Lobatschewsky, by inventing non-Euclidean geometries, has shown that this is not the case. Is space revealed to us by our senses ? No ; for the space revealed to us by our senses is absolutely different from the space of geometry. Is geometry derived from experience ? Careful discussion will give the answer no ! We therefore conclude that the principles of geometry are only conventions ; but these conventions are not arbitrary, and if transported into another world (which I shall call the non-Euclidean world, and which I shall endeavour to describe), we shall find ourselves compelled to adopt more of them. In mechanics we shall be led to analogous conclusions, and we shall see that the principles of this science, although more directly based on experience, still share the conventional character of the geometrical postulates.”

And he later goes on to say: “1. There is no absolute space, and we only conceive of relative motion ; and yet in most cases mechanical facts are enunciated as if there is an absolute space to which they can be referred.

2. There is no absolute time. When we say that two periods are equal, the statement has no meaning, and can only acquire a meaning by a convention.

3. Not only have we no direct intuition of the equality of two periods, but we have not even direct intuition of the simultaneity of two events occurring in two different places. I have explained this in an article entitled " Mesure du Temps."

4. Finally, is not our Euclidean geometry in itself only a kind of convention of language ?

Mechanical facts might be enunciated with reference to a non-Euclidean space which would be less convenient but quite as legitimate as our ordinary space ; the enunciation would become more complicated, but it still would be possible.

Thus, absolute space, absolute time, and even geometry are not conditions which are imposed on mechanics. All these things no more existed before mechanics than the French language can be logically said to have existed before the truths which are expressed in French. We might endeavour to enunciate the fundamental law of mechanics in a language independent of all these conventions; and no doubt we should in this way get a clearer idea of those laws in themselves.”

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