Electrodynamics and "relativity" Wiki

Main article: Lorentz ether theory

In 1892, with the attempt to explain the Michelson-Morley experiment, Lorentz proposed that moving bodies contract in the direction of motion (see length contraction; George FitzGerald had already arrived at this conclusion, see FitzGerald-Lorentz Contraction). Lorentz worked on describing electromagentic phenomena (the propagation of light) in reference frames that moved relative to each other. He discovered that the transition from one to another reference frame could be simplified by using a new time variable which he called *local time*. The local time depended on the universal time and the location under consideration. Lorentz publications (of 1895[1] and 1899) [2] made use of the term local time without giving a detailed interpretation of its physical relevance. In 1900, Henri Poincaré called Lorentz's local time a "wonderful invention" and illustrated it by showing that clocks in moving frames are synchronized by exchanging light signals that are assumed to travel at the same speed against and with the motion of the frame.[3]

In 1899, and again in 1904,[4] Lorentz added time dilation to his transformations and published what Poincaré in 1905 named Lorentz transformations. It was apparently unknown to Lorentz that Joseph Larmor had used identical transformations to describe orbiting electrons in 1897. Larmor's and Lorentz's equations look somewhat unfamiliar, but they are algebraically equivalent to those presented by Poincaré and Einstein in 1905. [5] Lorentz' 1904 paper includes the covariant formulation of electrodynamics, in which electrodynamic phenomena in different reference frames are described by identical equations with well defined transformation properties. The paper clearly recognizes the significance of this formulation, namely that the outcomes of electrodynamic experiments do not depend on the relative motion of the reference frame. The 1904 paper includes a detailed discussion of the increase of the inertial mass of rapidly moving objects. In 1905, Einstein would use many of the concepts, mathematical tools and results discussed to write his paper entitled electrodynamik known today as the theory of special relativity. Because Lorentz laid the fundaments for the work by Einstein, this theory was called the *Lorentz-Einstein theory* originally.

http://en.wikipedia.org/wiki/Hendrik_Lorentz

What is now called **Lorentz Ether theory** ("LET") has its roots in Lorentz'**s**

"Theory of electrons", which was the final point in the development of the classical "aethr theories" at the end of the 19th and at the beginning of the 20th century. An extension of the theory was developed in particular by Henri Poincaré, who coined the name "The New Mechanics". One of its features was to explain why no experiments had been able to detect any motion relative to an *immobile* aether, which was done by introducing the Lorentz transformation. Many aspects of Lorentz's theory were incorporated into special relativity (SR) with the works of Albert Einstein and Hermann Minkowski.

Today LET is often treated as some sort of "Lorentzian" or "neo-Lorentzian" interpretation of special relativity. Introducing the effects of length contraction and time dilation in a "preferred" frame of reference leads to the Lorentz transformation and therefore it is not possible to distinguish between LET and SR by experiment. However, in LET the existence of an *undetectable* ether is assumed and the validity of the relativity principle seems to be only coincidental, which is one reason why SR is commonly preferred over LET.

http://en.wikipedia.org/wiki/Lorentz_ether_theory