constructed from physical constants ($c = (\mu_0 \varepsilon_0)^{-1/2}$) which observers came to identify with the speed of light. A quantity constructed from physical constants should be value invariant between inertial frames - but the Galilean transformation allows non invariant velocities. Another problem was with the Lorentz force law - $F = q(E + v \times B)$ it is a velocity dependent force law and is too not invariant under the Galilean transformation.

Einstein reconciled the principle of relativity and electromagnetism with his special theory of relativity in 1905, though much of Newtonian theory had to be modified. The special theory was based on two postulates

1) The laws of physics take the same form in all inertial frames, with physical constants retained.

2) The speed of light takes the same value for all observers

Einstein's theory was revolutionary but the invariance of the speed of light had already been implied by the Michelson Morley experiment, and later observations by De Sitter on binary stars and experiments by Kennedy & Thorndyke supported this. Today we can measure the speed of light emitted by pions travelling at speeds close to c, and we find it to move with speed c.