

KINETIC ENERGY AND THE RELATIVISTIC SYMMETRY PRINCIPLE

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ABSTRACT

According to the Special Theory of Relativity (STR), the rates of clocks and energies of objects should change in direct proportion as their state of motion is varied. The rates of clocks should slow down by a factor of $\gamma = (1-v^2/c^2)^{-0.5}$ when they reach a speed of v relative to the observer (c is the speed of light in a vacuum) and the energies and inertial masses of objects should increase by the same factor. There is ample experimental evidence for both predictions of STR, but there is another aspect of the theory that has yet to be verified. According to the Lorentz transformation (LT) of STR, a symmetry principle must exist whereby two observers in relative motion each think that it is the other's clock that has slowed down or that it is objects in the other's rest frame whose energy has increased. Measurements of the rates of clocks onboard airplanes are not consistent with this principle, however, and one is forced on this basis to eliminate the LT as a valid space-time transformation. To fill this void, an alternative transformation (GPS-LT) is presented that eschews the LT symmetry principle while still satisfying Einstein's two postulates of relativity, and is also consistent with the principles of absolute simultaneity of events and the rationality and objectivity of measurement.

KEYWORDS: *Lorentz Force, Maxwell Equations, Uniform Scaling, Global Positioning System (GPS), Lorentz Transformation (LT), Global Positioning System-Lorentz Transformation (GPS-LT)*

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