

Relativistic Dynamic Detection through Electron Acceleration

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Classical and relativistic mechanics differ in their predictions of how the momentum and energy of particles depend on their velocity. By accelerating electrons emitted from an Sr^{90} source through a magnetic field, we are able to measure these momentum and energy relations for the electrons. Using this, we are able to conclude that the relativistic theory more accurately predicts the trends measured. Fitting this relation also allows us to calculate the electron charge to mass ratio, e/m .

I. INTRODUCTION

Albert Einstein's 1905 paper, "On the Electrodynamics of Moving Bodies," was one of the foundational papers to developing the theory of special relativity. This theory was intended to reconcile inconsistencies with classical mechanics, electrodynamics, and observed phenomena. In his paper, Einstein postulated that the speed of light is a constant value in all reference frames, contradicting the classical prediction that light travels faster or slower depending on one's speed relative to the light. This postulate, along with the additional assumption that the laws of physics are the same in all reference frames, leads to a new theory of dynamics, with different predictions than classical mechanics.

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