

Abstract Submitted  
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**Relativistic Coupling between the Center of Mass and Internal Dynamics of a System**<sup>1</sup> INBUM LEE, DENNIS KRAUSE, Wabash College — Einstein's well-known equation  $E = mc^2$  suggests that the internal energy of a system should be included in the mass of the system. Pursuing this idea yields the coupling between the center of mass motion and the internal dynamics of the system, and its effects are examined through two examples, a spring-mass oscillator in a rocket and a two-level atom bound in an infinite potential well. As a result, it is revealed that the coupling causes time dilation of the internal dynamics and, in the quantum case, a loss of interference due to entanglement.

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