

Abstract Submitted  
for the MAR11 Meeting of  
The American Physical Society

**Mass-Energy Relationship Must Include Factors For Vibrational  
and Rotational Kinetic Energies as Well as Various Potential Energies**

STEWART BREKKE, Northeastern Illinois University (former grad student) — Einstein proposed that at low speeds  $E = M_0c^2 + 1/2M_0v^2$ . However, a mass may also have vibrating and rotating kinetic energies and may also have various potential energies such as gravitational, electric and magnetic potential energies which must be part of the total mass-energy equivalence. Therefore, the basic equation for the mass-energy equivalence should be  $E = M_0c^2 + 1/2M_0v^2 + 1/2I\omega^2 + 1/2kx^2 + (GM_0M_2)/r + (KQ_0Q_2)/r + (Um_0m_2)/r$  where the last three terms are the gravitational, electrostatic and magnetic potential energies of the mass and the second, third and fourth terms are the linear, rotational and vibrational kinetic energies of the mass. Also, Einstein did not include the rotational and vibrational kinetic energies in his relationship for relativistic kinetic energy and therefore the kinetic energy  $T$  cannot equal  $(E - E_0) = 1/2M_0v^2$ , but rather must equal  $T = 1/2M_0v^2 + 1/2I\omega^2 + 1/2kx^2$  including the vibrational and rotational kinetic energies besides the linear kinetic energy alone.

Stewart Brekke  
Northeastern Illinois University (former grad student)

Date submitted: 23 Aug 2010

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