Linear, Rotational and Vibrational Kinetic Energies Must Be Included in Mass-Energy Calculations

STEWART BREKKE, Northeastern Illinois University (former grad student) — All bodies have no motion, have linear, rotational and/or vibrational motion, singly or in some combination. Curvilinear motion is linear motion influenced by an external force field. The total energy of a body therefore must include the linear rotational and vibrational kinetic energies if present besides just the mass-energy conversion which may reconcile experimental data with theory even though these extra energies may be very small in comparison. If k is a force constant, x is the amplitude of vibration and omega is the angular speed, the formula for $E_0$ is as follows.

$$E_0 = m_0 c^2 + 1/2m_0 v^2 + 1/2I \omega^2 + 1/2 k x_0^2$$