Abstract Submitted
for the APR13 Meeting of
The American Physical Society

Higher-dimensional oscillations of quantum particles ERIC HEDIN, Ball State University — A theoretical framework is developed in which elementary particles have a component of their wave function extending into higher spatial dimensions, based on an extension of the Schrödinger equation to include 4^{th} and 5^{th} spatial components [E. R. Hedin, Physics Essays **25**, 2 (2012)]. A higher-dimensional harmonic oscillator confining potential localizes particles into 3-d space (characterizing the "brane tension" which confines Standard Model particles to the sub-manifold). Several consistency checks of this model are: a match with the quantum phenomenon of "*zitterbewegung*"; the predicted intrinsic spin angular momentum is of order $h/2\pi$; the magnetic moment of the electron is determined (with a gyromagnetic ratio of 2); the nuclear force "hard core" radius is accurately predicted; the ratio of quark masses (of the up and down quarks) is found to be consistent with QCD theory; and possible explanations of the Planck mass and Planck length. An application of higher-dimensional particle effects to the astrophysics of stars shows that radical physical inconsistencies are not evident. Finally, this model suggests a possible explanation of dark matter as the fractional probability manifestations of a ladder of the higher-dimensional symmetric excited states of ordinary particles.

Eric Hedin
Ball State University

Date submitted: 08 Jan 2013 Electronic form version 1.4