

Abstract Submitted  
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**A nucleon-nucleon central potential derived from a higher-dimensional model** ERIC HEDIN, Ball State University — A simple model of a nucleon-nucleon (NN) central potential has been derived [E. R. Hedin, *Frontiers of Physics*, **9**(2), 226 (2013)] which quantitatively reproduces the radial profile of leading models, without adjusting any free parameters. This model is based on a theory of extra dimensional confinement of quantum particles [E. R. Hedin, *Physics Essays* **25**, 2 (2012)]. Producing an effect identical with the relativistic quantum phenomenon of *zitterbewegung*, the higher-dimensional oscillations of amplitude  $h/2\pi mc$  can be viewed as a localized curvature of 3-d space. Minimizing the overlapping curvature (proportional to the energy) of two particles in proximity to each other, subject to the constraint that for the two particles to occupy the same spatial location one of them must be excited into the 1<sup>st</sup> excited state of the harmonic potential well, gives the desired NN potential. Specifying the nucleon masses, the resulting potential well and repulsive core reproduces the radial profile of other NN central potential models. In addition, the predicted height of the repulsive core, when used to estimate the maximum neutron star mass, matches well with the best estimates from relativistic theory incorporating standard nuclear matter equations of state.

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