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Solution of Hartree-Fock equations in coordinate space for axially symmetric nuclei

Pervez Hoodbhoy, J.W. Negele ¹ [Eagledagger](#)

Laboratory for Nuclear Science and Department of Physics, Massachusetts Institute of Technology, Cambridge, Massachusetts 02139 U.S.A.

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Abstract

As an alternative to the conventional deformed harmonic oscillator basis expansion, a method is developed in which the coupled integro-differential Hartree-Fock equations are solved directly in coordinate space for a simple effective interaction. The single particle wave functions are obtained on a finite mesh by minimizing a discretized energy functional and solving the resulting finite difference equations using the Lanczos algorithm. Expressions to correct the total energy to second order in the mesh spacing are derived, and the accuracy of the method is demonstrated by numerical comparison with spherical results. Applications and advantages of this new technique are briefly discussed.

There are no figures or tables for this document.

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