

The role of the tensor force within the Skyrme Hartree-Fock model for deformed systems

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Abstract

The role of the zero-range tensor components of the effective nucleon-nucleon interaction on the bulk and single-particle properties of nuclei is studied within the framework of the Skyrme Hartree-Fock (SHF) plus pairing model^[1]. Expressions for the Skyrme potential and energy density have been derived for the most general case and calculations performed using deformed SHF + BCS codes. In the absence of restrictions such as spherical symmetry or time-reversal invariance, there are extra contributions to the spin-current (J^2) and time-odd local densities in the mean-field that have a direct impact on deformation properties through modifications to the single-particle levels^[2]. The effect of these terms in the presence of deformation is therefore studied in the context of the evolution of shell structure and potential energy surfaces around the light neutron-rich region.

References:

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- [2] E. Perlinska, S.G. Rohozinski, J. Dobaczewski and W. Nazarewicz, Phys. Rev. **C69**, 014316 (2004).