

FINITE-RANGE SEPARABLE PAIRING INTERACTION WITHIN NEW N³LO DFT APPROACH

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For over four decades, the Skyrme functional within various parametrizations has been used to calculate nuclear properties. In the last few years there was a number of attempts to improve its performance and introduce generalized forms. In particular, the most general phenomenological quasi-local energy density functional, which contains all combinations of density, spin-density, and their derivatives up to the sixth order (N³LO), was proposed in reference [1]. Since in the phenomenological functional approaches the particle-particle (pp) interaction channel is treated independently from the particle-hole (ph) channel, there remains a question of what pairing interaction is suitable to use within the N³LO energy functional. In our study, we use the separable, finite-range, translationally invariant form given in [2], which we generalize to the arbitrary angular momentum channel. We discuss the application of this pairing interaction within the N³LO energy functional.

- [1] B. G. Carlsson, J. Dobaczewski, M. Kortelainen, Phys. Rev. C **78**, 044326 (2008)
[2] Y. Tian, Z.Y. Ma, P. Ring, Phys. Lett. B **676**, 44 (2009)