

An overview of the Symmetry Conserving Configuration Mixing description of odd- and even- A nuclei with the Gogny force

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Abstract

Classically, effective forces like Skyrme, Gogny or relativistic interactions have been used in basic mean-field approaches to describe with great success bulk properties of ground states of atomic nuclei, such as masses, quadrupole moments, radii, etc. In the last years, the consideration of angular-momentum and particle-number projection together with the incorporation of additional correlations, through the Generator Coordinate method, has allowed to provide high-quality nuclear spectroscopy with these interactions. These are the so-called Symmetry Conserving Configuration Mixing (SCCM) approaches, see Ref. [1] for the particular case of the Gogny force. In this talk, I will present an overview of calculations recently performed for odd- and even- A nuclei, Refs. [2]- [5].

In particular, I will discuss bulk and spectroscopic properties of the Magnesium isotopes. Exceptional attention will be given to the paradigmatic nucleus ^{25}Mg to show that the SCCM approach provides a good description of the experimental energies of the excited bands as well as of the transition probabilities. Finally, high-spin spectroscopy of the Titanium isotopes will be discussed.

References

- [1] J. L. Egidio, *Phys. Scr.* **91** (2016) 073003.
- [2] J. L. Egidio, M. Borrajo and T. R. Rodriguez, *Phys. Rev. Lett.* **116** (2016) 052502.
- [3] M. Borrajo and J. L. Egidio, *Phys. Lett. B* **764** (2017) 328334.
- [4] M. Borrajo and J. L. Egidio, *Phys. Rev. C* **98** 044317 (2018).
- [5] J. L. Egidio, to be published.