Constraints on Skyrme Force Parameters

P. D. Stevenson

Department of Physics, University of Surrey, Guildford, Surrey, GU2 7XH, United Kingdom

Since its first use in Hartree-Fock calculations in 1972, the Skyrme Force, which includes around ten free parameters to be fitted to data, has undergone many such fitting procedures to different sets of data. To date there have been more than 200 parameter sets published. Since the Skyrme force can be thought of as an expansion of an in principle exact density functional, the Skyrme force has sufficient degrees of freedom that the different parameter sets can differ from each other quite extensively in how they reproduce the properties of nuclei.

We explore some recent work on systematically testing each parameterisation against experimentally-derived nuclear matter properties, and discuss the ability of the (few) parameter sets which pass all constraints to reproduce data in finite nuclei.

References

[1] M. Dutra, O. Lourenço, J. S. Sá Martins, A. Delfino, J. R. Stone and P. D. Stevenson, *P*hys. Rev. C **85** (2012) 035201.
[2] J. R. Stone and P.-G. Reinhard, *P*rog. Part. Nucl. Phys. **58** (2007) 587.