Int. Workshop “Shapes and Dynamics of Atomic Nuclei: Contemporary Aspects”
ed. Nikolay Minkov, Heron Press, Sofia 2021

# A unified description of spectra of different configurations, deformation and energy regions

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## Abstract

The multiconfigurational dynamical symmetry (MUSY) [1] is able to unify the description of different sections of nuclear spectra. They are known from experimental studies of various reactions, and are distributed in a large range of excitation energy and deformation. This unifying feature is a consequence of the fact that MUSY connects the shell, collective and cluster models.

In this contribution I present specific applications to light nuclei, which typically include low-lying states, alpha-cluster configurations and exotic clusterizations including $^{12}$C or $^{16}$O clusters. The excitation energy involves tens of MeV, and the elongation may go up to hyperdeformation.

A unified classification scheme is provided by the microscopic model space, and a simple phenomenological Hamiltonian is used.

The gross features of the spectra are reproduced reasonably well in several cases by the MUSY [2, 3], and sometimes even predictions are possible for the high-lying cluster spectra from the low-lying shell states [4, 5]. These facts indicate that the multiconfigurational dynamical symmetry is valid to a good approximation.

The extension of these considerations to heavy nuclei may be possible based on the pseudo- or proxy-SU(3) schemes [6].

## References

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