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Nuclear structure calculations with the projected generator coordinate method

The Generator Coordinate Method (GCM) provides a general framework to give variational solutions to the many-body problem. It is based on the definition of the variational trial wave functions as the linear mixing of different intrinsic configurations defined along the so-called generating coordinates. This beyond-mean-field method can give ground and excitation energies, decay probabilities, and interpretations of the results in terms of collective and single-particle degrees of freedom. In nuclear physics, the most common (and involved) realizations of the GCM formalism nowadays is the mixing of symmetry-restored (particle-number, parity and angular momentum projected) intrinsic quasi-particle states obtained from self-consistent mean-field calculations, the so-called Projected-GCM (PGCM).

In this contribution I will show some recent results obtained with the PGCM method that can be compared with experimental data (shape evolution/coexistence/mixing in atomic nuclei, weak decays nuclear matrix elements, etc.).

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