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Beta decay properties calculated with the projected generator coordinate method

Beta-decay rates are key quantities to understand both nuclear structure properties as well as the dynamics of nucleosynthesis processes. However, microscopic calculations based on the evaluation of nuclear matrix elements using eigenstates of the mother and daughter nuclei separately are scarce.
From a beyond-mean-field point of view, one of the main problems is the evaluation of the structure of nuclei with an odd number of particles because it involves the implementation of the full-blocking technique. Hence, the breaking of the time-reversal symmetry inherent to the blocking increases the complexity of the calculation.
In this contribution we will present a novel method based on the projected generator coordinate method (PGCM) to compute single-beta-decay nuclear matrix elements. This method includes the mixing of particle number and angular momentum projected intrinsic (blocked) wave functions that are used both to compute the spectra of the mother and daughter nuclei as well as the transition probabilities between the different states. We will show a first benchmark of the method by comparing B(GT) values calculated with exact diagonalizations and with the PGCM method in the sd-shell with the USD interaction.

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