

Neutrinoless Double-Beta Decay & Realistic Shell Model

I'll report on the calculation of the nuclear matrix element for the neutrinoless double- β decay process using the realistic shell model.

In this approach, we start from a realistic nucleon-nucleon potential and then derive the effective shell-model Hamiltonian and $0\nu\beta\beta$ decay operator within the many-body perturbation theory.

I'll focus my attention on a few candidates for the $0\nu\beta\beta$ decay detection, in a mass interval ranging from $A = 76$ up to $A = 136$.

To validate the reliability of the approach, the calculated spectroscopic properties and spin- and spin-isospin-dependent decay properties of the nuclei under investigation will be compared with the available experimental data.

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