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Study of forbidden β decays within the realistic shell model

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The understanding of the renormalization mechanisms of electroweak currents is nowadays a cornerstone of the nuclear structure research. It is motivated by the need of calculating reliable nuclear matrix elements for the neutrinoless double-β decay. Our approach to the problem is the realistic nuclear shell model. It provides a consistent framework to derive effective Hamiltonians and decay operators, the only parameter that is involved being the nuclear force one starts from.
We have successfully employed this approach to study the two-neutrino double-β decay of ^{48}Ca, ^{76}Ge, ^{82}Se,^{100}Mo, ^{130}Te, and ^{136}Xe, and then extended it to predict the nuclear matrix elements of their neutrinoless double-β decay. Now, with the goal to further validate our approach in predicting β-decay observables, I will present recent results on the sensitivity to the renormalization of shell-model forbidden β-decay operators describing the energy spectra of the emitted electrons of the second-forbidden β-decays of ^{94}Nb and ^{99}Tc as well as the fourth-forbidden β-decays of ^{113}Cd and ^{115}In.

session

I. Nuclear Structure and Reactions

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