Realistic shell model and nuclei around ^{132}Sn

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In the last ten years or so, nuclei in the mass region around ^{132}Sn have become accessible to experimental studies thanks to new radioactive ion beam facilities and the development of sophisticated detection techniques. These nuclei represent a crucial opportunity to test the main ingredients of the nuclear-shell model and investigate the evolution of the shell structure when going far from stability valley in heavy-mass nuclei.
In the light- and medium-mass regions, structural changes have been evidenced for nuclei with a large excess of neutrons, leading to the breakdown of the traditional magic numbers and the appearance of new ones. These findings have driven a great theoretical effort to understand the microscopic mechanism underlying the shell evolution, with special attention to the role of the different components of the nuclear force (see, for instance, [1]).
The available experimental data for nuclei around ^{132}Sn, which are, however still scarce especially for systems with N>82, have shown peculiar properties although no clear signatures of modifications in the shell structure.
In this contribution, I shell focus on some selected results for nuclei with a few valence particles and/or holes with respect to ^{132}Sn, that have been obtained within the shell-model framework by using a microscopic effective interaction [2].
Calculations have been carried out by assuming a closed ^{132}Sn core and including the $0g_{9/2}1d2s0h_{11/2}$ and $0h_{9/2}1f2p0i_{13/2}$ orbitals for proton particles/neutron holes and neutron particles, respectively. A unique shell-model Hamiltonian is adopted, with the single-particle(hole) energies taken from experiment and the two-body effective interaction derived by means of the many-body perturbation theory [3] from the CD-Bonn nucleon-nucleon potential [4] renormalized by means of the $V_{\text{low-k}}$ approach [5].
Results are compared with experiments, and predictions that may provide guidance to future experiments are also discussed.

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