

Neutron deficient exotic nuclei and the Physics of the "proton rich side" of the nuclear chart



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Aligned neutron-proton pairs in $N=Z$ nuclei

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It is shown that the aligned neutron-proton pair with angular momentum $J=9$ and isospin $T=0$ plays a central role in the low-energy spectroscopy of the $N=Z$ nuclei approaching 100Sn . This observation is made in the context of the spherical shell model on the basis of several realistic two-nucleon interactions. Shell-model results are analyzed in terms of a variety of two-nucleon pairs corresponding to different choices of their coupled angular momentum J and isospin T . The analysis is performed exactly for four holes (96Cd) and carried further for six and eight holes (94Ag and 92Pd) by means of a mapping to an appropriate version of the interacting boson model.

On the basis of these results one concludes that a realistic model can be formulated in terms of s (with $J=0$) and b (i.e., aligned $J=9$) bosons. Due to its simplicity, such a model could be of use to elucidate the main structural features of $N=Z$ nuclei in this mass region. Examples of simple predictions of such a model will be given.

Summary

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