

Isospin mixing phenomena in the vicinity of $N=Z$ line*

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In the talk, we shall report on a development of new theoretical tool which allows for the isospin and angular momentum projections after variation from symmetry-unrestricted Slater determinants and subsequent re-diagonalization of the total nuclear Hamiltonian including Coulomb interaction in order to incorporate only physical isospin-mixing effects [1]. Short overview of main theoretical building blocks of the formalism [2] will be followed by specific applications pertaining to isospin-mixing effects: (i) in ground states of $N=Z$ and $N\neq Z$ nuclei, (ii) in particle-hole excitations and odd-odd $N=Z$ nuclei, (iii) in superdeformed rotational bands in ^{56}Ni (iv) at band termination in $N = Z$, $A = 44$ nuclei. Particular attention will be devoted to calculation of the isospin mixing correction δ_C to the Fermi matrix element for the set of nuclei undergoing the superallowed $0^+ \rightarrow 0^+$ beta decay [3,4]. First systematic results on δ_C obtained from isospin and angular-momentum projected Hartree-Fock calculations will be presented.

[1] J. Dobaczewski *et al.*, Comput. Phys. Comm. **180**, 2361 (2009).

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[3] I.S. Towner and J.C. Hardy, Phys. Rev. **C77**, 025501 (2008).

[4] J.C. Hardy and I.S. Towner, Phys. Rev. **C79**, 055502 (2009).

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