BETA DECAY STUDY IN N≈Z NUCLEI USING DFT-ROOTED MODELS WITH ISOSPIN SYMMETRY RESTORATION

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Multireference Density Functional Theory (MRDFT) allows for rigorous treatment of fundamental and approximate symmetries and, in turn, to calculate transition rates for various nuclear reactions. The scheme can be further extended to include correlations from relevant (multi)particle-(multi)hole excitations by performing configuration-interaction (CI) calculations.

The aim of this presentation is to introduce MRDFT model involving angular momentum and isospin projections and its extension to the no-core CI (NCCI) scheme developed by our group. We shall present applications of MRDFT and NCCI models to the structure of selected nuclei focusing on the capability to describe Gamow-Teller (GT) beta decay matrix elements (MEs) in N ≈ Z nuclei ranging from A = 6 up to A = 100.

Among others, we shall address: (i) the influence of core polarization on the quenching of GT MEs by comparing the NCCI results with the state-of-the-art shell model results in *sd*- and lower *pf*-shells, (ii) the isospin symmetry breaking (ISB) corrections to the Fermi decay branch in T=1/2 mirrors which are needed to study the CVC hypothesis and the CKM matrix, and, for the very first time, (iii) the differences between MEs for mirror GT decays within isospin triplets $(T=1,T_z=-1)\longrightarrow (T_z=0)$ and $(T=1,T_z=1)\longleftrightarrow (T_z=0)$ which probe ISB effects.