Theoretical description of beta-delayed proton emission of proton-rich *sd*- and *pf*- shell nuclei

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The study on beta (β) -delayed decay of nuclei near the proton drip line provides a powerful tool to understand the role of isospin-symmetry breaking in the structure of proton-rich nuclei. A β-delayed process involves first a β-decay of a precursor, with a large superallowed branch populating the isobaric analogue state (IAS), followed by emission of particles (protons, diprotons, alpha particles, clusters) or gamma radiation. The typical *Q* value systematics of these decays is such that the second-stage proton (or multi-particle) emission from the IAS is isospin-forbidden, whereas decay from Gamow-Teller populated states is consistent with the isospin-symmetry limit. With some recent experimental data on isospin-forbidden decay branching ratios we can test the robustness of the newly constructed isospin non-conserving (INC) models. In this contribution, we present the shell-model study of partial decay schemes of some very neutron deficient silicone isotopes, e.g., ^{22}Si, ^{23}Si, ^{24}Si, ^{25}Si, as well as some *pf*-shell precursors. The microscopic INC Hamiltonian accounts for the isospin-symmetry breaking consistently in all physics processes within the whole β-delayed decay scheme, namely, β-decay, proton emission and electromagnetic de-excitation. Our results show an excellent agreement with the available experimental data.