

Isospin-symmetry breaking in nuclei and applications

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Isospin symmetry is known to be a very useful, but approximate symmetry of atomic nuclei, violated by electromagnetic interactions between nucleons. Modern experiments exploring structure and decay of neutron-deficient nuclei and nuclei along $N=Z$ line continue to bring new information on various features related to isospin-symmetry breaking. In this talk we will review the current status of the isospin non-conserving shell model and its capacities to describe isospin-symmetry breaking using phenomenological or microscopic effective interactions. We will point out possible limitations of purely theoretical determination of isospin mixing and needs for experimental constraints, as well as we discuss beta-delayed proton-gamma emission as a novel tool to probe isospin impurities. Important consequences will be stressed for calculation of astrophysical radiative proton capture reactions. Finally, we will present recent progress in theoretical computations of isospin-symmetry breaking corrections for superallowed beta decay, crucial for the Standard Model tests.

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