

## Exploring isospin symmetry breaking effects in the upper fp shell

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Isospin symmetry, a fundamental symmetry in nuclear physics arising from the identical behaviors of protons and neutrons. The symmetry violation is usually explained as isospin non-conserving (INC) forces and continuum effect. In experiments, plenty of efforts are made in mass and decay spectroscopy.

Hence, to extend this study into the heavier nuclei for the upper  $fp$  shell, we propose to measure the masses of  $^{57}\text{Zn}$ ,  $^{61}\text{Ge}$ ,  $^{65}\text{Se}$ , and  $^{69}\text{Kr}$  together with the  $\beta$ -decay spectroscopy of  $^{63}\text{Se}$  simultaneously, by employing the complex of the Multiple-Reflection Time-of-Flight Mass Spectrometer (MRTOF-MS) and EURICA decay station at the ZeroDegree.

New mass data could be utilized to study the effects of isospin-nonconserving (INC) force in higher isospin multiples through determining the Coulomb displacement energy (CDE), in which a reduction of staggering in CDE is anticipated in theory.

Decay spectroscopy of  $^{63}\text{Se}$  is critical for studying the ground-state mirror asymmetry, since the  $T=5/2$  nuclei  $^{63}\text{Se}/^{63}\text{Cu}$  could be another promising candidate to observe the violation of the ground state in the mirror system, of which the ground state feeds to unbound  $^{63}\text{As}$ , similar to  $^{73}\text{Sr}/^{73}\text{Br}$ .

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