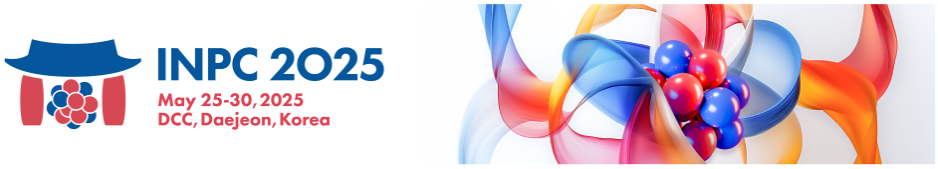

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Isospin-Symmetric Island of Inversion

Thursday, 29 May 2025 17:40 (25 minutes)

Protons and neutrons in nuclei are arranged in orbitals that follow a shell structure, with energy gaps at specific magic numbers. Experiments using radioactive beams have shown that these magic numbers vanish in some neutron-rich isotopes. This results in unusual arrangements, where configurations with nucleons scattered to higher energy orbitals are the most bound, forming what has been called "Islands of Inversion" [1]. These Islands of Inversion (IOI) have been explained through the shell model with variants of dynamical SU(3) symmetry [2].
The lifetime of the first 2^+ states in ^{84}Mo and ^{86}Mo was measured in an experiment performed at the NSCL, Michigan State University. We discovered a dramatic structural change between the two isotopes from the experimental results. This has been understood as the boundary of an "Isospin-Symmetric Island of Inversion," where both proton and neutron excitations play an equal role and the evolution of collectivity is governed by three-nucleon forces.

References

[1] F. Nowacki, A. Obertelli and A. Poves, Prog. Part. Nucl. Phys. 120, 103866 (2021).
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