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Séminaire

PHYSIQUE NUCLÉAIRE
NUCLEAR PHYSICS

Study of the *N* = 82 magic number below ^{132}Sn with the ISOLTRAP mass spectrometer

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Nuclear “magic” numbers are foundational concepts for our microscopic description of atomic nuclei and systems with magic number of protons or neutrons represent benchmark cases for state-of-the-art nuclear models.

Nowadays, one the major aims of nuclear-structure research at radioactive ion-beam facilities is to trace the evolution of the experimental signatures of magic numbers across the nuclear chart. Among the most common signatures is the appearance of gaps in the trends of nucleon separation energies computed from atomic masses, which makes mass spectrometers some of the most prominent experimental techniques in this research. Previous findings showing a weakening of the signatures for magic numbers in neutron-rich systems or the potential emergence of new ones have triggered numerous theoretical developments.

In this work, I will present the results of a recent study of the *N* = 82 magic number performed by mass measurements of neutron-rich cadmium isotopes with the ISOLTRAP mass spectrometer at ISOLDE/CERN. A combination of all available experimental techniques has allowed determining the first value of the two-neutron empirical shell gap for *N* = 82 below the doubly magic ^{132}Sn, as well as a first-order trend of empirical single-particle energies. The results are discussed in comparison to state-of-the art nuclear models from both the beyond-mean-field and *ab initio* families and show that the evolution of *N* = 82 towards the neutron dripline remains an interesting open question.