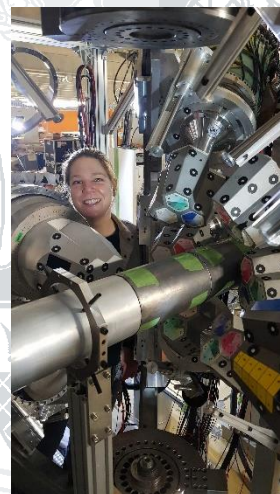


Großes Physikalisches Kolloquium an der Universität zu Köln



Prof. Dr. Kathrin Wimmer

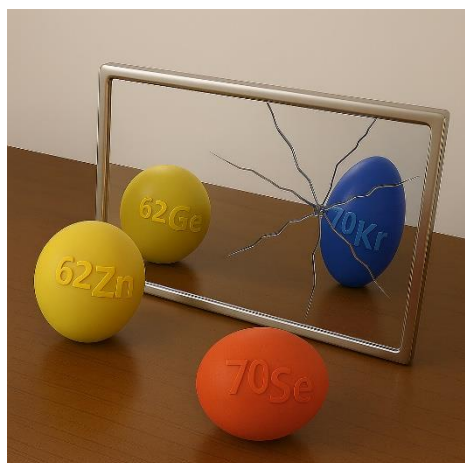
Institut für Kernphysik, Universität zu Köln, Köln

Testing Symmetry in the Nuclear Mirror: Probing the Shape and Structure of Mirror Nuclei

27.01.2026
16³⁰ Uhr
HS III

The atomic nucleus is governed by a subtle, almost perfect symmetry: the near-interchangeability of protons and neutrons, called isospin symmetry. Conserving isospin, the physics of mirror nuclei, pairs where the numbers of protons and neutrons are swapped, would be identical. However, the small electromagnetic force and other subtle effects break this symmetry, offering a window into the inner workings of the nucleus.

In this talk, I will present recent experimental studies that use electromagnetic transition rates as a stringent and model-independent test of isospin symmetry. We observed a striking breakdown of this symmetry in the mirror nuclei with mass number 70: instead of being identical, ^{70}Kr is significantly more deformed than its mirror ^{70}Se . In stark contrast, a second study of the lighter $A=62$ nuclei shows perfect agreement with isospin symmetry predictions, making it the most precise test of its kind to date.



These results illustrate how small symmetry violations can result in large nuclear structure changes and dramatically different deformations. I will also discuss future directions for improving these measurements, including new instrumentation that will enable even higher-precision studies in more exotic systems.