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Investigating structural characteristics of deformed, odd-odd nuclei in the $A \sim 100$ mass region

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Neutron-rich nuclei around $A \sim 100$ present intriguing cases in nuclear structure due to their significant deformation and complex shapes, including predicted triaxiality as well as rare oblate-deformed ground states. These features pose challenges for theoretical models, especially in describing the abrupt shape transitions observed between $N = 58$ and 60 . Even-even nuclei in this region exhibit low-lying excited states characteristic of collective rotational behavior, where both axial symmetry and triaxiality are essential to understanding their structural evolution. For example, Coulomb-excitation studies on ^{110}Ru indicate pronounced triaxiality, whereas decay spectroscopy on $^{106,108}\text{Mo}$ suggests a more axially symmetric shape.

In contrast, odd-odd nuclei remain less well understood due to limited experimental data on spin and parity. The Gallagher–Moszkowski (GM) rule is relevant for describing energetically favoured nucleon spin couplings; however, many nuclei have uncertain or inconsistent assignments. For example, recent work on ^{106}Nb has revised long-standing ground-state properties, with unpublished data suggesting similar cases are widespread.

To address these uncertainties, detailed γ -ray and conversion-electron coincidence measurements are essential for establishing level schemes and constraining spin-parity assignments. An experiment was conducted in June 2025 at the LOHENGRIN recoil mass spectrometer at the Institut Laue–Langevin, Grenoble, using neutron-induced fission of ^{241}Pu . Fission fragments were detected with Clover HPGe and silicon detectors, enabling high-resolution spectroscopy well suited to these studies.

Preliminary results from this experiment will be presented, including newly identified transitions and updated level schemes for nuclei in the $A = 100\text{--}104$ mass region. These data provide new insights into nuclear structure and proton–neutron coupling in deformed, odd-odd systems in this region.

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