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Octupole collectivity in 74,76Kr studied with inelastic proton scattering in inverse kinematics

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Atomic nuclei close to ⁷²Kr are expected to feature enhanced octupole correlations since both proton and neutron single-particle levels are close to the Fermi surface, which differ by Δj = Δl = 3. Previous QRPA calculations predicted only small electric octupole strength in this mass region, which is at odds with the experimental systematics gathered in the stable Kr isotopes and other isotopic chains. At the same time, these calculations underlined that the strength fragmentation is intimately connected to the type of quadrupole ground-state deformation. During the last two decades, the latter has been accessed in various experimental studies which revealed a delicate interplay between prolate and oblate configurations at low excitation energies challenging theoretical models.
Inelastic proton scattering experiments in inverse kinematics were performed at the National Superconducting Cyclotron Laboratory (NSCL) at Michigan State University using GRETINA, the S800 spectrograph and the URSINUS/NSCL Liquid Hydrogen Target to study octupole collectivity in a region of developing deformation and shape coexistence. Besides low-spin positive-parity states, the first and second 3⁻ states of ^{74,76}Kr were populated and their previously unknown B(E3) strengths determined. Results will be presented.

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