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Collectivity in ^{142}Xe

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The neutron-rich ^{142}Xe lies north-east of the doubly-magic ^{132}Sn, in a region that is not only describable by nuclear theory with single-particle and mean-field approaches, but also became accessible in experiments in recent times.

Since the r-process is expected to pass through the region, knowledge on the nuclear structure of the nuclides therein may impact the theoretical description of the r-process as well as the observed peak at A $\approx$ 130 in the solar elemental abundances.

An interesting feature in the region are enhanced octupole correlations, e.g., reported for ^{132}Sn and peaking at ^{144}Ba. ^{142}Xe lies just two protons below ^{144}Ba, making it a perfect candidate for further investigation.

An excellent tool for the exploration of low-lying states in the nucleus is Coulomb excitation. The method gives direct access to reduced transition strengths and spectroscopic quadrupole moments, therefore probing the collectivity of nuclear excitations as well as nuclear shapes.

To gain understanding of the nuclear structure of ^{142}Xe, a Coulomb excitation experiment was carried out at HIE-ISOLDE. After undergoing "safe" Coulomb excitation, beam and target nuclei were detected with C-REX, an array of segmented Si detectors, which covers both forward and backward angles. The MINIBALL spectrometer was used to detect the emitted γ rays in coincidence.

Several reduced transition strengths of low-lying transitions along with the spectroscopic quadrupole moments of the respective states could be determined. Additionally, new low-spin low-energy states, interpreted as part of a γ band, demonstrated for the first time in this isotope, could be identified, and the location of the 3_1^- state supported.

The final results are presented and compared to SCCM and LSSM calculations.

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