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# Evolution of collectivity in the N=50 isotones towards 100Sn

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We propose to measure the reduced transition probabilities B(E2; 0+g.s.⟶2+1) of 96Pd and 98Cd by means of inelastic scattering at intermediate energies. The radioactive 96Pd and 98Cd beams are produced by fragmentation of a 345 MeV/u 124Xe beam on a 9Be target. The isotopes of interest are selected and identified with the BigRIPS separator, then impinged on the secondary target. A Au and a Be secondary targets are used for the inelastic scattering. The gamma-rays emitted from the excited states are measured with the DALI2+ array, and the outgoing particles are identified with the ZeroDegree Spectrometer. The cross sections populating to the 2+1 states on the Au and the Be targets are extracted from the observed gamma-ray intensities. The excitation of the 2+1 state is caused by both the electromagnetic and the nuclear interaction between target and projectile. To extract the reduced transition probability B(E2), reaction model calculations will be performed and the nuclear deformation length and B(E2) value for the projectile nucleus will be adjusted to reproduce simultaneously the measured cross sections on the Au and the Be targets.

The 96Pd and 98Cd are only 4 and 2 valence protons below the doubly magic 100Sn. The measurement of this experiment will allow for a detailed comparison of the nuclear structure between the 56-78Ni (Z=28) isotopes versus the 78Ni-100Sn (N=50) isotonic chain, both regions sharing the same p3/2, f5/2, p1/2 and g9/2 orbitals for valence neutrons and protons, respectively. The shell model calculations in the f5/2, p, g9/2 model space in Ref.[1] predict a decrease of collectivity towards the complete occupation of the g9/2 orbitals, with B(E2; 2+1⟶0+g.s.) value of about 150 e2fm4 for 98Cd. Nevertheless, it is well known that the single-particle d5/2 orbital above the magic number 50 for neutrons and protons, together with the quasi-SU3 partner g9/2 can give rise to collectivity [2]. In Ref.[2], it is suggested that the findings of B. Cederwall and collaborators in 92Pd [3] indicates the necessity to consider the d5/2 orbital above the magic number 50 to describe the nuclei in this region. With the B(E2) measurements of this experiment, the role of the d5/2 orbital in the structure of the nuclei approaching 100Sn will be explored.

[1] R. M. Pérez-Vidal, et al., Phys. Rev. Lett. **129**, (2022) 112501
[2] A. P. Zuker, et al., Phys. Rev. C **92**, (2015) 024320
[3] B. Cederwall, et al., Nature (London) **469**, (2011) 69

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