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Gamma–ray Angular Correlation Measurements in 74Zn: Further Hints of Shape Coexistence Towards the Doubly Magic 78Ni

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Understanding nuclear structure near 78Ni is crucial to infer how chemical elements originate in the Universe. State-of-the-art shell model calculations agree with observations from recent experiments regarding the persistence of the N = 50 shell closure in neutron-rich nuclei. How collectivity manifests and evolves in this region of the Segr´e chart is still an open question, particularly concerning phenomena such as vibrational modes, triaxiality and shape coexistence. This is especially true in the Zn isotopic chain in the neutron-rich region beyond the valley of stability, in which even definitive spin assignments are unavailable except for the very low-lying states.
In this talk, results of an experiment aimed to study 74Zn (performed in August of 2019 at TRIUMF) will be presented. Excited states in this isotope were populated from the β-decay of 74Cu, and de-exciting γ rays were detected with the GRIFFIN spectrometer. With the use of γ − γ angular correlation measurements, definitive spin assignments of key states have been determined for the first time. The observed excitations have been placed in the context of the systematics in the Ni-Zn-Ge isotopic chains and considering collective and microscopic models. The structure of 74Zn will be discussed including the evidence for possible shape coexistence.

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Please select: Experiment or Theory

Experiment

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