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First-time Investigation of Low-Lying Level Structures in V63, V59, and V61 Nuclei

Tuesday, 1 August 2023 15:50 (25 minutes)

In this presentation, we will discuss two publications that explore the low-lying level structures of V63, V59, and V61 nuclei. In the first study, the level structure of V63 was investigated using inelastic proton scattering and proton knock-out reactions in inverse kinematics. Comparing the observed γ-ray transitions with shell-model calculations, two excited states corresponding to the first 11/2− and 9/2− levels were established. Analysis of the (p,p′) excitation cross sections revealed large deformation parameters, placing V63 in the island of inversion below Ni68.
The second study focused on V59 and V61, where the low-lying level structures were explored using neutron knockout reactions and inelastic proton scattering. Several new transitions were identified for both isotopes and through comparison with shell-model calculations, three γ-rays in each isotope could be placed in the level scheme and assigned to the decay of the first 11/2− and 9/2− levels. The (p,p') excitation cross sections of V61 were analyzed, considering quadrupole plus hexadecapole deformations. However, due to the role of the hexadecapole deformation, the placement of V61 on the island of inversion remained ambiguous.

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