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Study of the K quantum number of pygmy states in 154Sm

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This work focuses on exploring the Pygmy Dipole Resonance (PDR) in the deformed ^{154}Sm nucleus. The study employs the $(\vec{\gamma},\vec{\gamma}')$ reaction to probe dipole states in the energy range of 3.5 MeV to 7.05 MeV, approaching the neutron separation energy at 8 MeV. Measurements were conducted at the HIγS facility of the Triangle Universities Nuclear Laboratory using the Clover Array. The facility provides a polarised photon beam, which enables measurements via the asymmetry method, allowing for the differentiation between 1^- and 1^+ states. Additionally, the high-resolution beam mode (with an energy spread below 2%) allows for the determination of decay branching ratios to the first 2^+ state, thereby enabling the identification of the K quantum number for the excited states. Since the Alaga rules have so far been investigated in the PDR region only for ^{150}Nd, the present study aims to extend this investigation to the case of ^{154}Sm. We present preliminary results and outline prospects for future analysis.

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