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Precise measurement of the parity violating asymmetry in the ^{139}La(n,γ)^{140}La^{*} reaction

“The P-violating effect in compound nuclear states in medium heavy nuclei is amplified by up to approximately 10^{6} times compared to nucleon-nucleon scattering. This phenomenon is observed when the p-wave resonance lies at the tail of the s-wave resonance. It arises from the mixing of two resonant states with different parity in a compound nuclear state due to weak interactions (s-p mixing model).
This study aims to improve the precision of the asymmetry A_{L} of emitted γ-ray counts with respect to neutron helicity in (n,γ) reactions, which serves as fundamental data for verifying the s-p mixing model. In April 2025 at J-PARC MLF ANNRI (BL04), we measured the final state dependence of A_{L} in the ^{139}La(n,⊠)^{140}La^{*} reaction using a neutron polarization device (^{3}He spin filter) and a large solid angle Ge detector. We will report on the measurement results of A_{L} for each final state.
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