

High-Resolution Polarized Proton Scattering at 0° : A New Spectroscopic Tool for Complete $E1$ and $M1$ Strength Distributions*

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High-resolution polarized proton scattering experiments at 0° performed at the RCNP Osaka cyclotron allow to extract complete $E1$ and $M1$ strength functions in an excitation energy region $E_x \approx 5 - 20$ MeV. Two independent methods are utilized for the decomposition of the spectra based on a multipole analysis of the angular distributions and on the measurement of spin transfer observables which allow to distinguish between spinflip and non-spinflip parts of the cross sections. In the doubly magic ^{208}Pb nucleus discussed as a reference case, excellent agreement between both methods is obtained. The $E1$ strength extracted assuming the dominance of semiclassical Coulomb excitation at very small angles agrees favorably with results from (γ, γ') experiments in the region of the pygmy dipole resonance as well as with (γ, xn) experiments in the giant resonance region.

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