

TEST OF THE BRINK - AXEL HYPOTHESIS WITH GAMMA STRENGTH FUNCTIONS FROM FORWARD ANGLE INELASTIC PROTON SCATTERING

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Inelastic proton scattering at energies of a few 100 MeV and forward angles including 0° provides a novel method to measure the Gamma Strength Functions (GSF) in nuclei in an excitation energy range of about 5 – 25 MeV. The experiments provide not only the E1 but also the M1 part of the GSF. The latter is poorly known in heavy nuclei. Comparison with the GSF deduced from compound-nucleus gamma decay (e.g. from the Oslo method) in the same nuclei allows to test the generalized Brink-Axel hypothesis for the energy region of the pygmy dipole resonance central to the modeling of reaction rates with photons in the entrance or exit channel in astrophysical environments. A fluctuation analysis of the high-resolution data also provides a direct measure of level densities in the energy region well above the neutron threshold, where hardly any experimental information is available.