



Nuclear Physics in Astrophysics

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Complete dipole strength distributions from high-resolution polarized proton scattering at 0°

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Small-angle polarized proton scattering including 0° at incident energies of a few 100 MeV/nucleon is a new spectroscopic tool for the study of E1 and M1 strength distributions. Experiments of this type have been realized recently at RCNP, Osaka, Japan and iThemba LABS, Somerset West, South Africa, with high energy resolution of the order 25 - 30 keV (FWHM). Using ^{208}Pb as an example, the physics potential of such data and their possible impact on nuclear astrophysics is presented. It includes information on the properties of the Pygmy Dipole Resonance, which provides insight into the density dependence of the symmetry energy, but also on complete E1 and M1 strength distributions and thus the gamma strength function. The polarizability can be extracted with a precision $< 5\%$ providing important experimental constraints on the neutron skin thickness in ^{208}Pb . Finally, level densities can be extracted from the fine structure of the GDR.

Content :

Small-angle polarized proton scattering including 0° at incident energies of a few $
100$ MeV/

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