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Electric and magnetic dipole response in ^{58}Ni from inelastic proton scattering

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Inelastic proton scattering at very forward angles is an excellent tool for studying the dipole response in nuclei [1]. Reactions with intermediate proton energies of a few hundred MeV and scattering angles close to 0° are particularly suited to investigate the isovector spin-flip M1 resonance due to the strong spin-isospin dependent part of the effective proton-neutron interaction in this kinematics. Furthermore, the electric dipole response can be measured over a wide excitation energy range. This provides information about the electric dipole polarizability which is related to the neutron-skin thickness and the density dependence of the symmetry energy parameter [2,3].
An inelastic proton scattering experiment with a 295 MeV proton beam on a ^{58}Ni target was performed at the Reserach Centre for Nuclear Physics (RCNP) in Osaka. A high energy resolution of $\approx$ 20 keV FWHM could be achieved. Electric and magnetic dipole contributions to the cross section were obtained by a multipole decomposition analysis based on DWBA calculations. The dipole strength distribution of ^{58}Ni has been extensively measured with nuclear resonance fluorescence [4,5] and inelastic electron scattering [6]. A comparison of the different methods sheds light on various features of nuclear structure such as spin and orbital contributions to the magnetic dipole strength and the nature of low-energy electric dipole transitions.

[1] P. von Neumann-Cosel and A. Tamii, Eur. Phys. J. A 55, 110 (2019).
[2] A. Tamii et al., Phys. Rev. Lett. 107, 062502 (2011).
[3] J. Birkhan et al., Phys. Rev. Lett. 118, 252501 (2017).
[4] M. Scheck et al., Phys. Rev. C 88, 044304 (2013).
[5] J. Sinclair, priv. com. (2019).
[6] W. Mettner et al., Nucl. Phys. A473, 160 (1987).
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