Contribution ID: **71** Type: **Oral**

Systematics of the dipole polarizability

Thursday, 20 July 2023 18:15 (15 minutes)

The electric dipole polarizability is a key observable to set constraints to the symmetry energy parameters of the equation of state and the neutron skin thickness of nuclei. The electric dipole response of a nucleus can be probed with inelastic proton scattering at very forward angles and intermediate proton beam energies, where relativistic Coulomb excitation dominates (1). This kinematics is furthermore suited to measure the isovector spin-flip M1 resonance.
Over the last decade the electric and magnetic dipole response in numerous nuclei has been measured with inelastic proton scattering at the Research Center for Nuclear Physics in Osaka, Japan. Proton beam energies of 295 MeV were used and scattered protons were measured with the Grand Raiden (GR) magnetic spectrometer. With the GR placed at 0°, measurement of scattered protons at extreme forward angles can be realized (2). Measured spectra are deconvoluted into contributions of different multipolarities by performing a multipole decomposition analysis based on DWBA calculations.
In this talk new results about the dipole response and dipole polarizability of ^{58}Ni and ^{90}Zr will be presented. Forthermore the now available systematics of the dipole polarizability will be discussed: from light and medium-mass to heavy nuclei, as well as the evolution within isotopic chains (3,4,5,6).

(1) P. von Neumann-Cosel and A.Tamii, Eur. Phys. J. A55, 110 (2019).
(2) A.Tamii *et al.*, Nucl. Instrum. Meth. A 605, 326 (2009).
(3) A.Tamii *et al.*, Phys. Rev. Lett. 107, 062505 (2011).
(4) J.Birkhan *et al.*, Phys. Rev. Lett. 118, 252501 (2017).
(5) S.Bassauer *et al.*, Phys. Lett. B 810, 135804 (2020).
(6) R. Fearick *et al.*, to be published (2023).

Supported by the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) - Project-ID 279384907, SFB 1245.

Primary authors: Mrs BRANDHERM, I. (Institut für Kernphysik, Technische Universität Darmstadt, Germany); Dr KLAUS, T. (Institut für Kernphysik, Technische Universität Darmstadt, Germany); Dr MATSUBARA, H. (Research Center for Nuclear Physics, Osaka University, Japan); Prof. VON NEUMANN-COSEL, P. (Institut für Kernphysik, Technische Universität Darmstadt, Germany); Prof. PIETRALLA, N. (Institut für Kernphysik, Technische Universität Darmstadt, Germany); Prof. TAMII, A. (Research Center for Nuclear Physics, Osaka University, Japan)

Presenter: Mrs BRANDHERM, I. (Institut für Kernphysik, Technische Universität Darmstadt, Germany)

Session Classification: Session 13A

Track Classification: Experimental Nuclear Structure