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Dipole Polarizabilities from Nuclear Photoabsorption with NEPTUN@S-DALINAC

Dipole polarizabilities are one of several complementary ways to put more narrow constraints on the symmetry energy slope parameter of the nuclear equation of state. Also, precise measurements of dipole polarizabilities present a sensitive benchmark for modern nuclear theory calculations.
In order to derive experimental dipole polarizabilities, nuclear photoabsorption cross sections are needed.
The low-energy photon tagger NEPTUN at the superconducting electron accelerator S-DALINAC uses tagged bremsstrahlung for photonuclear experiments. It features a photoabsorption setup that allows for direct transmission measurements of stable nuclei using a single zero-degree detector and a high-precision rapid target changer. The tagged photons span an energy range of about 25 MeV, covering the region of the giant dipole resonance for many nuclei.
Photoabsorption measurements have been performed in the energy range from 2 to 27 MeV for Sn-112,116,120 and 124, as well as for Ca-40 and Ca-48. The resulting photoabsorption cross sections will be presented along with their interpretation in respect to the corresponding dipole polarizabilities.
The experimental technique of direct photoabsorption measurements at NEPTUN and the data analysis methods will be discussed, especially concerning the treatment of the dominating atomic background.
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