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Nuclear Physics Experiments at the Bremsstrahlung Facility γELBE

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Photon-induced reactions are interesting tools for nuclear-structure and nuclear-astrophysics experiments. In particular, the photon-scattering or nuclear-resonance-fluorescence method can gain unique information about nuclear excitations with low spin. Excitations close to the neutron-separation energy attract growing interest because they may reveal information about new excitation modes and because they are of relevance for the astrophysically important photodissociation. In order to study such excitations, photon-scattering experiments with beams of high intensity at electron energies greater than 10MeV are necessary. Such beams are available at the γELBE facility at Helmholtz-Zentrum Dresden-Rossendorf. The superconducting electron accelerator ELBE delivers an electron beam of tunable energy between 7 and 18 MeV with a continuous-wave repetition rate of 13 MHz and a mean current of up to 1 mA which is used to produce high intensity bremsstrahlung of variable endpoint energy. The γELBE beam line and the experimental area were designed such that the production of neutrons and the scattering of photons from surrounding materials are minimized. A dedicated experimental setup of large volume HPGe detector has been build to enable high resolution γ-ray detection.
Therefore, γELBE offers outstanding possibilities for nuclear-structure studies up to and beyond the particle-separation energies and for the investigation of astrophysical problems.

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