

Modeling Experimental Conditions at the LINAC-200 Electron Accelerator in Geant4

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In 2025, as part of the commissioning activities at the LINAC-200 linear electron accelerator, experiments are planned to study neutron generation processes using various converter targets. An electron beam with an energy of up to 20 MeV will be directed at targets made of different materials. The goal of the planned experiments is to create an experimental setup based on the linear accelerator for testing methods of neutron resonance spectroscopy and developing detectors designed to operate within the neutron spectral range of 0.5 eV to 18 MeV. At the first stage of the study, the selection of the optimal neutron-generating target is planned. For this purpose, simulations of neutron generation processes in targets made of tantalum, zinc, and cadmium were conducted in GEANT4 to evaluate their characteristics as neutron sources. For each target, the primary reactions responsible for neutron production were identified, the total neutron yield from the target surface in the direction of the electron beam propagation was determined, and a detailed list of isotopes formed in the target materials under specific irradiation exposure was compiled. Neutron energy spectra for each target within the specified energy range were also obtained.