

Nuclear data relevant to the radiological safety for 100 MeV Proton Linac of the PEFP

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Nuclear data play an important role in assessing the radiological environmental impact of a proton accelerator, such as prompt radiation fields during the operation, radionuclides produced in the air, soil and groundwater as well as in the component of the accelerator, and their possible migration into the environment. In this work, a review and some benchmarks were performed for the safety assessment of the high energy accelerator with currently available nuclear data libraries, namely the ENDF/B High Energy Library (ENDF/B-HE) and JENDL High Energy File (JENDL-HE), and several physics models implemented in the MCNPX code. As for the assessment of the prompt radiation field, Several benchmarks calculations were performed using the MCNPX code with different data libraries and physics models. As for the assessment of the radiological impact of the accelerator to the environment, relevant nuclear reaction cross sections such as tritium and activation of the accelerator structure, ground water, earth, and air. were roughly estimated with simple balance models and corresponding nuclear reaction cross sections.