A Promising Neutron Source Based on the EG-5 Accelerator at FLNP JINR

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In FLNP the project of modernization of the accelerator EG-5 and its experimental infrastructure implement (2024-2026). The purpose of the project: to provide technical feasibility for the implementation of the scientific program of the PTP JINR on the study of reactions with fast quasi-monoenergetic neutrons, the processes of interaction of accelerated charged particles with matter, the development of nuclear-physical methods for studying the elemental composition (Ion-Beam Analysis), inelastic interaction of neutrons with substances, solution of the problems of neutron radiation materials science, implementation of practical applications of neutron physics; provision of technical feasibility for the implementation of a tunable high-power quasi-monoenergetic neutron generator for two energy ranges (12-800 keV; 3.3-5.1 MeV). A relatively intense ion beam (up to 250 μA) will make it possible to obtain relatively intense neutron fluxes (over 10^8 particles/s cm^2) on a solid-phase lithium target. The use of moderators will make it possible to obtain thermal neutrons. Neutron activation analysis methods are planned to be developed in the EG-5 facility group. With the use of powder nanotechnologies, it is planned to develop portable active neutron optics (bandpass reflectors, tunable notch filters). Neutron fluxes are planned to be used for the needs of reactor materials science. Imitation of atmospheric neutrons (1-5 MeV) will be used to study the mechanisms of radiation mutagenesis of Earth biological forms and the electronics industry (study of the radiation resistance of electronic devices to fast neutron fluxes, equipment calibration).