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## Review of Recent Activities on the Tagged Neutron Method at FLNP JINR

*Monday, 26 May 2025 14:00 (30 minutes)*

The tagged neutron method (TNM) is currently being implemented at the Frank Laboratory of Neutron Physics, Joint Institute for Nuclear Research, for neutron-nuclear physics research. This method utilizes the reaction  $d+t \rightarrow \alpha+n$  to produce neutrons with an energy of approximately 14 MeV, which are emitted simultaneously with  $\alpha$ -particles in nearly opposite directions. Neutron tagging is achieved through detecting the associated  $\alpha$ -particles. The ING-27 neutron generator, equipped with a built-in position-sensitive  $\alpha$ -particle detector consisting of 9, 64, or 256 pixels, serves as a source of tagged neutrons. These generators are manufactured by the Dukhov All-Russia Research Institute of Automatics (VNIIA).

The report will outline various experimental setups developed at FLNP for experiments involving tagged neutrons. It will also provide an overview of the results obtained, including the determination of differential cross-sections for elastic and inelastic neutron scattering on atomic nuclei, measurement of angular correlations between neutrons and gamma-rays, non-destructive elemental analysis utilizing the TNM, and its application for determining carbon content in soil.

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