

CHARACTERISTICS OF DETECTORS OF GAMMA RAYS AND NEUTRONS

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At Joint Institute for Nuclear Research (JINR, Dubna, Russia), in the framework of the project TANGRA (TAGged Neutrons and Gamma RAys) [1], we continued the experiments for studying the inelastic scattering of fast neutrons on some important for nuclear science and technology isotopes [2]. We are using several different types of gamma-detectors, such as: NaI(Tl), BGO, Stilbene, HPGe, Plastic scintillators and LaBr₃ [3-5]. The design of the experimental setup that includes a ring of gamma-detectors and a neutron generator, allows us to measure the angular distribution of gamma quanta with a good accuracy. A single HPGe gamma-detector and an ING-27 neutron generator we are using to determinate the cross-section of the inelastic neutron scattering reactions. The information about the gamma-ray energy and angular distributions, and cross-sections, makes it possible to test different models, describing neutron-nuclear reactions, and to improve the accuracy of the fast neutron elemental analysis.

The aim of this work is to determine the main characteristics of the experimental setups, such as: gamma and neutron efficiencies, energy and time resolutions, at different source-detector geometries and PMT's high-voltages, for which point-type standar ¹³⁷Cs and ⁶⁰Co gamma-ray sources and 14.1MeV neutrons were used.

References

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