MEASUREMENTS OF GAMMA-RAY YIELDS AND ANGULAR CORRELATIONS FROM REACTIONS INDUCED BY 14.1 MEV NEUTRONS USING TAGGED NEUTRON METHOD

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Fast neutrons with the energy of ~ 14 MeV can be produced by the D(T,α)*n* nuclear reaction where deuterons are accelerated up to ~ 100 keV toward tritium target. In this process, both neutrons and α-particles are emitted into 4π. It has been shown long time ago (e.g., [1]) that the neutrons can be "tagged" by detecting the associated 3.5 MeV alpha-particle, which is emitted at opposite direction to the neutron (in c.m. system). These "tagged" neutrons interact with the investigated target and can produce γ quanta in (*n*, *n*'γ) or other reactions. The use of the tagged neutron method (TNM) gives the information about the time of emission and the direction of the corresponding neutron and leads to a significant reduction of the background in the experimental data.

We used the TNM technique to measure angular distributions and yields of the γ-rays emitted from the reactions of 14.1 MeV neutrons with various nuclei. As a source of tagged neutrons we used the portable neutron generator ING-27 produced by VNIIA (Moscow). The 3.5 MeV α-particles were registered by a built-in 64-pixel Si charged particle detector. The gamma-rays from the interaction of neutrons with the sample we registered by an array of 18 BGO scintillator detectors placed at different angles to measure the angular correlations. A dedicated series of measurements with the same targets was performed using an HPGe detector giving the information about the relative yields of gamma-lines for each investigated sample.

We report the results of measurements in comparison with the available data from other authors.

1. V.Valkovic *et al.* // Nucl. Instr. Meth. 1969. V.76. P.29.