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## **Application of Tagged Neutron Technology for Applied and Fundamental Nuclear Problems**

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A nanosecond tagged neutron technology (NTNT) is based on the space-time analysis of events produced by the 14 MeV neutrons which time of escape, energy, and direction of movement is known by the recording of the accompanying alpha-particle. The development by FSUE VNIIA of the high-intensity generator of tagged neutrons promoted the extension of the applications of tagged neutrons. Currently, the NTNT is used for the neutron activation analysis as well as for applied and fundamental nuclear problems due to the following advancements:

• Measuring the neutron flux with the absolute inaccuracy less than 5% and relative inaccuracy less than 1% in the high range of neutron generator intensity.

• Directional reading of the angle of the tagged neutron escape with the accuracy up to 0.02 rad, and measuring the coordinates of nuclear reactions stipulated by tagged neutrons.

• High effect/background ratio provided by the space-time discrimination of events stipulated by interaction of "untagged" neutrons and secondary radiation with the matter.

• Possibility of gamma-detector calibration while measurement by special object-calibrators when tagged neutrons are passing through them, the emitted gamma-lines can be easily interpreted on the NTNT spectrum (alpha-gamma coincidences);

• Possibility of gamma-detector calibration while measurement by reference isotope sources, the gamma-lines can be defined by the gamma-spectrum without coincidences and they practically do not affect the NTNT spectrum.

The several applications of NTNT are considered in the report:

- Precise 14 MeV neutron flux generation for nuclear detector calibration;
- Determination of gamma-detectors response to 14 MeV neutrons;
- Measuring the angle distribution and Doppler effect of gamma-rays emitted at the inelastic neutron scattering.

The experimental technique and results are considered. The obtained data are in a good agreement with the numerical calculations and experimental data by other authors.

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