

Measurement of the timing resolution of scintillation detectors samples of a future time-of-flight neutron detector for the BM@N experiment

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A new compact time-of-flight neutron detector is planned to be developed and produced. This detector will identify and measure the energies of neutrons produced in nucleus-nucleus collisions at energies up to 4 AGeV in the BM@N experiment at the Nuclotron (JINR, Dubna). The detector will be used to measure neutron yields and azimuthal neutron flows, which should be sensitive to the equation of state of dense nuclear matter and to the energy of symmetry, as it is shown in various theoretical models.

The novelty of the proposed neutron detector is the usage of small scintillators with an area of about 10-20 cm² and a thickness of 25 mm as sensitive elements for the active layers of the detector. One silicon multipixel photon counter with a sensitive area of 6 x 6 mm² is proposed to perform light readout from one of the sides of each of these scintillators. To achieve the required neutron energy resolution, the detector timing resolution of 100-150 ps is required.

The concept of the proposed time-of-flight neutron detector, the possibilities of its layout on the BM@N, as well as the results of the timing resolution measurements of the samples of scintillation detectors on cosmic muons for different types of scintillators, sizes, reflectors and photon counters are discussed.

The speaker is a student or young scientist

Yes

Section

1. Intermediate and high energies, heavy ion collisions

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