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High-Granular Time-of-Flight Neutron Detector HGND for the BM@N experiment

Friday 5 July 2024 11:30 (30 minutes)

A new high-granular time-of-flight neutron detector HGND (High Granural Neutron Detector) is being developed and constructed in order to measure azimuthal neutron flow in nucleus-nucleus interactions within at the BM@N experiment (JINR). The detector consists of alternating layers of copper absorber plates and matrices of scintillation cells with individual light readout by silicon photomultipliers. The HGND detector will be used in the fixed target BM@N experiment to identify neutrons and to measure their energy in heavy-ion collisions with energies up to 4 GeV per nucleon. The ratios of direct and elliptic azimuthal neutron flow to the corresponding proton flow, which can be measured by the magnetic spectrometer of the BM@N facility, should be sensitive, as shown in a number of models, to the symmetry energy in the equation of state (EoS) of high dense nuclear matter. Measuring these ratios is also important in astrophysics for understanding the structure of neutron stars, processes during supernova explosions and merging of double neutron stars.
The performance studies based on the results of simulations of the new HGND detector at the BM@N experiment will be presented. Results of time resolution measurements of scintillation cells will be shown.

Section

Design of new experimental facilities

Primary author: MOROZOV, Sergey (Institute for Nuclear Research RAS)

Co-authors: ZUBANKOV, Aleksandr (Institute for Nuclear Research of the Russian Academy of Sciences); SHABANOV, Arseniy (INR RAS); GUBER, Fedor (INR RAS, Moscow); GOLUBEVA, Marina (INR RAS); KARPUSHKIN, Nikolay (INR RAS); VOLKOV, Vadim (INR RAS)

Presenter: MOROZOV, Sergey (Institute for Nuclear Research RAS)

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