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Application of Micropattern Detectors from High-Energy Physics for Neutron Detection

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The work presents application of the particle detection techniques developed in the field of High-Energy Physics (HEPh) to neutron detection. This area has been growing rapidly over the past decade due to ongoing developments at CERN, JINR and other research centers.

Mictro-Pattern Gaseous Detectors (MPGD), such as GEMs, or Gas Electron Multiplier, Micro-Megas, micro-RWELL, micro-GROOVE, are being produced at CERN and became available for other laboratories. They are used for charged particle detection, operate with the gas gain of about 10,000 and provide good spatial and time resolution. An MPGD detector, which has the entrance window made of a thin neutron-convering foil, turns into a unique detector which is sensitive not only to charged particle, but also to neutrons.

JINR develops the coating technique which allows a thin metalized maylar foil to be covered with a thin layer of B4C. The coating can be done for a large area with extremely high precision. Depending on the application, the thickness of the B4C layer can be between 50 nm and 1 um with a variation of about few nanometers over the whole foil area.

Neutron detection capability of a triple GEM with a B4C-covered entrance window is presented in the talk.

Primary author: ENIK, Temur (JINR)

Presenter: ENIK, Temur (JINR)

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