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Gaseous detector with boron-coated blades in multi-grid configuration for fast neutron detection in homeland security and waste monitoring applications

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In this presentation we report on the construction and performance of a gaseous detector with boron-coated blades in multi-grid configuration for fast neutron detection. The aim of this project is to adapt a solution originally designed for neutron scattering experiments[1] and use it for detection of fast neutrons by adding appropriate polyethylene (PE) shielding. Multi-grid configuration of thin layers covered with ^{10}B enriched material was proposed as an alternative to ^{3}He neutron counters due to rise of ^{3}He price and limited accessibility. In the course of this study we characterize the performance of a small size evaluation kit detector equipped with sets of aluminum blades covered with ^{10}B nanoparticles manufactured by Lubrina company (Lodz, Poland)[2]. In addition, a ^{3}He neutron counter was used in the same experimental conditions for comparison. The results of the laboratory tests were used to evaluate the size and to design a full scale detection system that will fulfill requirements for neutron detection system in homeland security and waste monitoring applications.

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