Contribution ID : **304** Type : **Poster**

Neutron response function of CeBr3 detector for 1.25-5.75 MeV neutron energy range.

Tuesday, 22 October 2024 17:05 (115)

Neutron response function of CeBr3 detector for

1.25-5.75 MeV neutron energy range.

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The results of measurements of neutron detection efficiency ε(En), En ≈ 1.25 ÷ 5.75 MeV for

scintillation CeBr3 detector of MULTI setup [1] are presented. The measurements of the energy dependence of efficiency ε(En) were carried out by tagged neutron method using 239Pu/9Be n-γ source.

Trigger-detector was used for registering γ-quanta Eγ = 4.44 MeV accompanied by ˜60% of events of neutron emission from source 239Pu/9Be. Neutron energy values was taken from the time of flight (TOF) measurements.

The ε(En) measurements have shown that CeBr3 detector have a relatively high neutron detection efficiency which is weakly dependent on the energy values in the region En≈1.25÷5.75 MeV. For example, efficiency is ε(En)≈24,6% in energy range En=1.25÷5.75 MeV at the threshold 60 keV for CeBr3 detector (5×5×5 cm3). It was found that efficiency have strong dependence on threshold values, see Fig 1. The mean efficiency <ε> as a function of threshold values is presented in Fig 1.

In comparison stilbene detectors that are often used for neutron detection have good n-γ pulse shape separation, but sharp energy dependence of the efficiency ε(En).

This research was funded by the Russian Science Foundation, project No. 24-22-00117.

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Session Classification : Poster session

Track Classification : Facilities and advanced detector technologies