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THE DEPENDENCE OF SPATIAL LOCATION AND SIZE OF NEUTRON FLUX ON THE MAXIMUM NEUTRON ENERGY

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The spatial distribution of neutrons with the maximum energies from 3.3 to 5.3 MeV was investigated using a two-coordinate 10B detector. The detector was located at the 119 cm distance from the 1000 cm3 beryllium target at the output of on electron accelerator based photoneutron source. Between the 10B detector and the target the collimator of 3 cm diameter was located. The contribution of slow neutrons was suppressed by 0.5 cm thickness cadmium filter. The 3He counter behind the 10B detector was used to take into account the contribution of the background of slow neutrons. From the kinematics of the 9Be (γ, n) γ, n) 8Be reaction it follows that an increase in gamma-ray energy by 1 MeV entails an increase in neutron energy by 0.9 MeV.
The maximum intensity of the neutron flux measured along the horizontal axis shifts back relative to the direction of the primary electron beam with increasing electron energy and, accordingly, with the maximum neutron energy, as shown in Fig. 1. The position of the maximum intensity of neutrons distribution is associated with a maximum of neutron energy in the flux. In addition, one may note that the width of the neutron intensity distribution in the flux increases with increasing maximum neutron energy. It is possible that these effects can be used to control the maximum neutron energy in the stream at the output of the source collimator.

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