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On the possibility of control the maximum energy of fast neutrons by the pulse height spectra of the ^{10}B-detector

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The possibility of control the maximum energy in the neutron flux by analyzing the pulse height spectra of the ^{10} B-detector [1] was investigated. Two possible nuclear reactions were considered: direct reaction and reaction throuh the exited ^{11}B* nucleus with the production of ^{4}He and ^{7}Li. The ionization losses of nuclei in two detector gaps were calculated. A change in the ionization loss spectrum of the ^{4}He, ^{7}Li nuclei and their sum, depending on the neutron energy and the detection threshold in the second sensitive ionization gap of the ^{10}B detector was found.

The measurements were performed at the output of the collimated channel of a compact neutron source based on the electron accelerator at several energies from 5 to 9 MeV. By increasing the detection threshold in the second gap of the detector, the signal of which served as the trigger, the contribution of events with the registration of the ^{4}He nuclei can be suppressed in comparison with the contribution of the ^{7}Li. The position of the maximum in the pulse height spectrum from the first gap of the detector and in the calculated spectra of ionization losses shifts with increasing of electron energy, the boundary energy of γ-quanta, and the maximum neutron energy. It is possible that this fact can be used to control the maximum neutron energy in the flux.

1.S.Potashev *et al.* // The 3rd Int. Conf. Part. Phys. Astr. (2018). KnE Energy & Physics. 2018. P. 115.

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