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Luminescence of the lithium neutron generating target under proton beam irradiation

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In the Budker Institute of Nuclear Physics an accelerator-based epithermal neutron source is used, among other things, to generate neutrons for BNCT. The neutron beam is generated according to the $^{7}Li(p,n)^{7}Be$ reaction while the proton beam hits the solid lithium target. On the facility the luminescence of the lithium layer under proton beam irradiation was observed using video camera, mounted on a fused quartz glass window. The lithium lines in the luminescence spectrum were determined with a spectrometer. The spectral lines of transitions in lithium correspond to 610,3 nm and 670,7 nm. Hα - hydrogen line with 656,3 nm wavelength was also detected in the luminescence spectrum. As a result of this study the new online diagnostics of a proton beam position on a surface of the solid lithium target was developed and put into operation. The diagnostics is radiation resistant and can be applied in the neutron generation regime.

Keywords:
lithium target, luminescence, accelerating epithermal neutron source

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