P6-8

Development and implementation of the automation system of the ion source for BNCT

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The source of epithermal neutrons [1], designed for Boron Neutron Capture Therapy (BNCT) [2] of cancer in oncology clinic, was proposed and developed in Budker Institute of Nuclear Physics. This method of treatment is effective against several currently incurable radioresistant tumors, such as brain glioblastoma and melanoma metastases. The neutron source includes an accelerator-tandem with vacuum insulation, lithium neutron generating target and neutron beam shaping assembly. Current accelerator produces a stationary 5 mA proton beam with 2 MeV energy. For clinical use, the current should be increased to 10 mA, energy up to 2.3 MeV. To solve this problem it is necessary to develop and apply a new source of negative hydrogen ions with high current. A new power rack for the ion source and an automatization system developed and created. The report summarizes results of the development and implementation of new power rack, with remote control and data acquisition, to reach 10 mA beam current. This system will increase the proton beam current and, as a result, the neutron yield, that is needed to heal people.

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