

Novosibirsk accelerator neutron source

Sergey Taskaev^{1,2}, Timofey Bykov^{1,2}, Marina Bikchurina^{1,2}, Alexandr Ivanov^{1,2}, Dmitrii Kasatov^{1,2}, Anna Kasatova^{1,2}, Iaroslav Kolesnikov^{1,2}, Alexey Koshkarev^{1,2}, Alexandr Makarov^{1,2}, Ivan Shchudlo^{1,2}, Evgeniia Sokolova^{1,2}, Igor Sorokin^{1,2}

¹ *Budker Institute of Nuclear Physics, Novosibirsk, Russia*

² *Novosibirsk State University, Novosibirsk, Russia*

E-mail: taskaev@inp.nsk.su

The Novosibirsk accelerator neutron source is a state-of-the-art device comprised of i) the Vacuum Insulation Tandem Accelerator (VITA) designed to provide up to 2.3 MeV, 10 mA proton beam, ii) an advanced solid lithium target with superior resistance to blistering, and iii) a neutron Beam Shaping Assembly. As a result of a comprehensive accelerator improvement program conducted in collaboration with TAE Life Sciences, Inc. and TAE Technologies (California, USA), the proton beam current in the accelerator has been increased from 1 mA to 9 mA. A thorough study of metal blistering induced by proton implantation was carried out, which informed the improvement of a lithium target design. In a recently established facility for pre-clinical BNCT research, successful in-vitro and in-vivo experiments were preformed jointly with the University of Tsukuba, and curing mice of grafted human glioblastoma was demonstrated.

The extension of funding from the Russian Science Foundation, which the Novosibirsk BNCT team secured in 2018, will enable the establishment of a BNCT therapy facility, with the ultimate goal of conducting human trials by 2022. This report describes the status of the Novosibirsk accelerator neutron source, the latest research results, and development plans. An overview of the contributions by young researchers from the Novosibirsk team is provided. We also outline the scientific program of the 1st All-Russian BNCT Conference combined with the Young Scientists BNCT School, which will be held in Novosibirsk on October 22-25, 2019.

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