

Development of Accelerator Based Fast Neutron Source and Concept of Very Compact AB-BNCT Facility

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In the Budker Institute of Nuclear Physics it was suggested [1] and now is under start-up and commissioning works high-voltage power supply VITamin [2]. This power supply aimed for achieving 500 kV with current load 10 mA. Since it will be used for feeding Vacuum Insulated Tandem Accelerator (VITA) [3], the expected deuteron beam parameters will be 1 MeV energy with 5 mA current. These beam parameters are enough for fast neutron generation with total yield up to $2 \cdot 10^{12} \text{ n} \cdot \text{s}^{-1}$ for various applications in the field of perspective materials radiation testing [4]. Simultaneously, the concept of a very compact accelerator neutron source for BNCT is being developed. In this case, the number of Cockroft-Walton sections as well as the high-voltage operating frequency should be doubled, and the input voltage for VITamin should be increased by 1.2 times. These changes will allow to achieve 1.135 MV output voltage with current load 16 mA, so the proton beam energy will be up to 2.3 MeV with beam current up to 8 mA. These parameters are enough for providing epithermal neutron yield for BNCT. In the paper, the status of the VITamin will be discussed and the concept of the very compact AB-BNCT facility will be presented.

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References

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