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BNCT clinical facility neutron moderation system design and materials characterization

The PNC-PNRR ANTHEM project aims at building a Boron Neutron Capture Therapy clinical facility in Caserta. A RFQ proton accelerator with 5 MeV Energy and 30 mA current will be coupled to a Beryllium target, thus obtaining neutrons with energy up to 3 MeV. Both the RFQ accelerator and the Be target have been designed and developed by the INFN Legnaro National Laboratories. Spoke 4, Pilot 4.9 of the project focused on the design and optimization of the neutron moderation to obtain a clinically efficient spectrum with a peak in the epithermal region. The Beam Shaping Assembly has been simulated to obtain the best neutron spectrum for patient treatments. The materials used in the BSA have been sinterized with the TT_Sinter machine designed and built by the mechanical workshop of the INFN Unit of Pavia. The materials have been characterized at the neutron beam of the Rutherford Appleton Laboratory (UK).

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