

Ion accelerator based neutron source at HZDR

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Abstract

The Ion Beam Center (IBC) at the Helmholtz-Zentrum Dresden-Rossendorf (HZDR) is a unique user facility with decades of experience in materials research using ion beams of nearly all stable elements in a wide energy range from some eV up to 60 MeV. The IBC operates several electrostatic ion accelerators, ion implanters, low energy, highly charged, and fine focused ion beam systems including helium ion microscope (Fig. 1). The IBC provides experimental equipment for materials modification via ion implantation and irradiation, all types of ion beam analysis of materials, surface processing by low-energy, highly-charged and focused ion beams, as well as for accelerator mass spectrometry (AMS). Continuous access to the IBC is provided via an online proposal procedure [1].

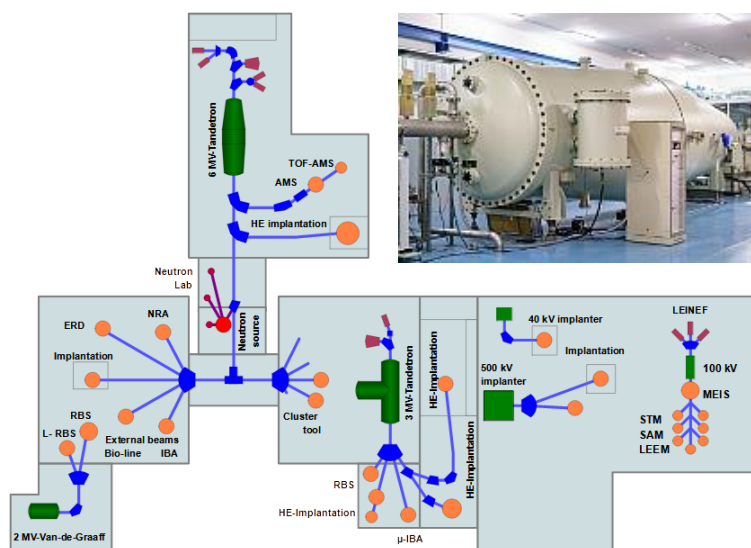


Fig. 1. An overview of ion accelerators at IBC and a photo of the 6 MV tandem accelerator.

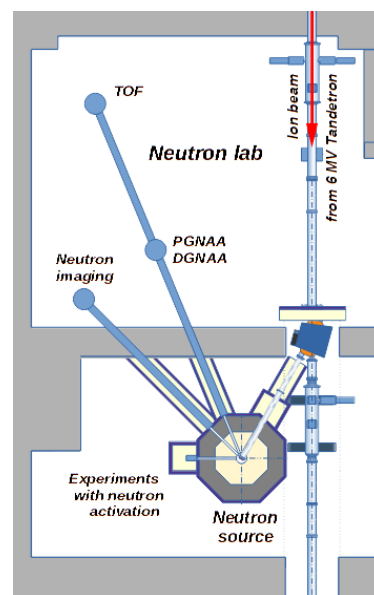


Fig. 2. The layout of the planned beamline with the neutron source.

A new beamline with a neutron source will be installed at the 6 MV Tandem (Fig. 2). 12 MeV protons and 18 MeV helium ions can be used for production of neutrons using beryllium or vanadium targets. Neutrons provide information that cannot be obtained with other methods and open new opportunities for material analysis at IBC like imaging and 3D tomography with fast and thermal neutrons, prompt and delayed gamma neutron activation analysis (PGNAA & DGNA), neutrons can be used in investigations of radionuclides production for radiopharmacology and in many other experiments and measurements.

References

- [1] <https://www.hzdr.de/db/Cms?pNid=3249>

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