The intensive DT neutron generator of the Technical University of Dresden

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The neutron laboratory of Technical University of Dresden provides an accelerator based neutron generator, TUD-NG, with a peak source intensity of 5×10^{11} neutron/s at 14 MeV neutron energy and approximately 5×10^{9} neutron/s at 2.5 MeV. It utilizes the T(d,n)α and the $D(d,n)^3He$ reactions for neutron generation. The neutron generator can be operated in continuous and pulsed mode. Deuterons are accelerated up to an energy of 325 keV and bombard a water-cooled solid target containing tritium or deuterium. The maximum beam current is approximately 8 mA at the target. The laboratory was originaly designed for conducting experiments concerning research for controlled thermonuclear fusion and went into operation in 2004/2005. In this framework, measurements were done on mock-ups of the European Helium-Cooled Lithium-Lead Test Blanket Module and the Helium-Cooled Pebble-Bed Test Blanket Module of the experimental fusion reactor ITER as well as activation experiments on fusion reactor relevant materials to check evaluated nuclear data files. Recently focus has shifted to the development and testing of neutronics instrumentation for the European Test Blanket Modules for ITER such as self-powered neutron detectors, detectors based on wide band gap materials and a neutron activation system. For the latter, a pneumatic sample transport system was constructed with the aim to investigate suitable measurement regimes for the ITER Test Blanket Modules. However, the pneumatic transport system is also available for general investigations of short-living activaties induced by DT/DD neutrons in samples. Over the years, several other research activities have been undertaken in scientific collaborations with European universities and research centers as well as companies. These encompassed cross section measurements for astrophysical application, support for several experiments related to the search for double beta decay and development of neutron detectors for harsh environments such as in geologic exploration and fission reactors. We show the characteristics of the neutron generator and the available research infrastructure in the laboratory. An upgrade of the tritium target assembly is underway, and a recent characterization of the neutron spectrum in comparison with MCNP based model calculations will be presented. We also describe current research activities.