TITLE

Experimental activities at the TUD-NG 14 MeV neutron generator facility in support of the European fusion technology program

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PAPER

The neutron laboratory of Technical University of Dresden has been involved in the European fusion technology program for many years. Experimental activities comprise mock-up and material activation experiments to provide a database for checking nuclear data used in radiation transport and dose rate calculations. Recently focus has shifted to the development and testing of neutronics instrumentation for the European test blanket modules (TBM) for ITER. We present a technical description of the neutron generator of the laboratory, its accelerator, tritium target assembly and monitoring system. The neutron source is a solid-type water-cooled tritium target based on a titanium matrix on a copper carrier. The neutron yield at a typical deuteron beam current of 1 mA is of the order of 10^{11} n/s in 4π.
A pneumatic sample transport system is available for TBM neutronics instrumentation development and nuclear cross section measurements.
A standard tool for the analysis of these experiments is the MCNP code. Previously a tabulated neutron source descriptions in the MCNP input file was used, however, this approach is not flexible if beam parameters etc. change. We have therefore investigated and compared the application of a MCNP extension for the description of the DT neutron source developed at FNG of ENEA Frascati as well as the application of the MCUNED extension to MCNPX. For the latter, deuterium cross section data for the d-d and d-t reactions from the ENDF/B-7.1 library have been processed into an ACE file at KIT. Calculational results have been checked with experimental data from dsimetry foil irradiations at different angles with respect to the deuterium beam of the neutron generator. Reasonable agreement has been found, however some improvement is still underway.