The Role of Nuclear Data for Fusion Nuclear Technology

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Neutronics simulations play a fundamental role for the design and optimisation of Fusion Nuclear Technology (FNT) systems, the evaluation and verification of their nuclear performance. Accurate data need to be provided to predict the tritium breeding capability, assess the shielding efficiency, estimate the nuclear power generated in the system, and produce activation and radiation damage data for the irradiated materials/components. Likewise this applies for the radiation dose fields to be provided after shut-down or during maintenance periods. The availability of high quality nuclear data is thus a pre-requisite for reliable design calculations affecting the nuclear design and performance of the system/facility, as well as safety, licensing, waste management and decommissioning issues.

Accordingly, a dedicated transversal activity on the development of nuclear data was implemented in the European Power Plant Physics and Technology (PPPT) programme of EUROfusion to address the needs of the integrated projects including PMI (Plant Management and Integration), BB (Breeder Blanket), SAE (Safety and Environment), MAT (Materials) and ENS (Early Neutron Source).

This paper details the new PPPT nuclear data development activities. The status of nuclear data is reviewed, needs for design, shielding, activation and radiation dose calculations are discussed, deficiencies are identified, and recommendations are given to further improve and qualify, also by means of dedicated experiments, the nuclear data base as needed for the PPPT programme.

Keywords: Neutronics, nuclear data, shielding, activation

Topic Category	Models and Experiments for FNT
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