
NUCLEAR DATA FOR FUSION ENERGY TECHNOLOGIES: REQUESTS, STATUS AND DEVELOPMENT NEEDS

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The worldwide efforts in fusion energy technology aim at developing, on the long-term, power reactors which can contribute substantially to the supply of electricity. The construction and operation of the experimental fusion device ITER (“International Thermonuclear Experimental Reactor”) and the intense neutron source facility IFMIF (“International Fusion Material Irradiation Facility”) are considered as important next steps towards this long-term goal. The layout and development of these facilities and their nuclear components relies to a large extent on data provided by neutronics design calculations. The availability of qualified computational tools and nuclear data for the neutron transport simulation and the calculation of relevant nuclear responses is thus a prerequisite to enable reliable design calculations for these facilities. Related international efforts currently focus on the development of qualified nuclear data to serve the specific needs of the ITER and the IFMIF projects.

The paper provides a brief outline of the current fusion technology long-term strategy with the near term focus on ITER and IFMIF and presents an overview of the nuclear data required for related design calculations. The status of the available nuclear data is reviewed and future development needs are identified with regard to nuclear data for neutron and photon transport, radiation damage, sensitivity/uncertainty and activation/transmutation calculations.