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P4.004 Characterization of JET neutron field for radiation studies in DD DT and TT plasmas

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A new Deuterium-Tritium campaign (DTE2) is planned at JET in 2019/20, with a proposed 14 MeV neutron budget nearly an order of magnitude higher than any previous DT campaigns. With this proposed budget, the achievable neutron fluence on the first wall of JET will be up to about $10E20$ n/m², comparable to that occurring in ITER at the end of life in the rear part of the port plug, where several diagnostic components are located. The DT operation of JET will be preceded by a campaign with a tritium plasma.

The purpose of the present work is to characterize the neutron and gamma ray field inside the JET device. An analysis of the neutron/gamma ray flux, energy spectrum and dose rate levels is performed at selected irradiation locations, such as the neutron activation irradiation ends, the long term irradiation stations located inside the vessel and inside a circular horizontal port, where samples would be exposed to the maximum neutron flux or fluence. The calculations at the selected irradiation positions are performed for the case of a DD, DT and TT plasma and compared.

Calculations are performed with the use of the MCNP code in combination with the variance reduction code ADVANTG, enabling superior statistical results to previous calculations and allowing a good comparison of the spectra and fluence between individual locations for all three types of plasma.

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