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P4.188 Neutronics design analyses of helium cooled ceramic breeder blanket for CFETR phase 1

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China Fusion Engineering Test Reactor (CFETR) is proposed to be the next generation fusion device of China. The conceptual design of CFETR has been completed and the engineering design is about to start. This work gives an overview of neutronics design analyses of helium cooled ceramic breeder blanket at institute of plasma physics Chinese academy of sciences (ASIPP), for CFETR phase 1 with the major radius of 5.7m and the minor radius of 1.6m. The effort involves 3 three different design schemes of helium cooled ceramic breeder blankets: the Breeding Unite scheme, the S-shaped cooling plate scheme and the U-shaped breeder tube scheme, the neutronic studies of which were all based on 3-D Monte Carlo simulation by MCNP and FENDL library. The tritium breeding ratios were shown to achieve the requirement, and the shielding performance was considered to be adequate to protect the superconducting toroidal field coil in inboard mid-plane, for all the 3 design schemes.

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