

FEM ANALYSES OF THE BLANKET SHIELD MODULE WITH RESPECT TO SURFACE AND NUCLEAR HEAT LOADS

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The Blanket Shield Module (BSM) is a plasma facing component located at the tip of ITER's four Electron Cyclotron Heating and Current Drive (EC H&CD) Upper Launchers (UL). Its structure consists of a first wall panel (FWP) and a shell, both with embedded cooling channels. A flange on the rear part allows the BSM to be connected by bolts to the main frame of the UL. Being a plasma facing component, the BSM is subjected to severe heat loads due to both thermal and nuclear irradiation. The current baseline value of surface heat load during normal plasma operation is 0.5 MW/m^2 , while the volumetric nuclear heating is responsible for a total generation of about 160kW.

The surface heat load is applied to the first wall panel as a constant flux. The nuclear loads, instead, were assessed by MCNP calculations and are provided by means of a mesh tally with a grid step of 1 cm. The temperature gradients resulting from the abovementioned heat loads have been assessed by FEM analyses. The temperature distributions are then transferred to a structural model for calculation of the induced thermal stresses.

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Collaborations: JAEA/NAKA Effects of mm-waves misalignment on diamond discs.