Contribution ID: **504** Type: **Poster**

Steady State and Transient Thermal Analysis of the Updated Helium Cooled Solid Breeder Blanket for CFETR

Wednesday 7 June 2017 13:40 (2 hours)

This paper presents the results of the steady state and transient thermal analysis of the updated helium cooled solid breeder blanket for Chinese Fusion Engineering Test Reactor (CFETR). The updated design of the helium cooled solid breeder blanket for CFETR has been described. The commercial finite element method code ANSYS is used for the thermal analysis in this work. Steady state thermal analysis of the updated blanket has been performed, showing that the temperatures of different materials of the blanket module are below the corresponding temperature limits. The three dimensional transient thermal analysis of the updated helium cooled solid breeder blanket for CFETR under normal pulsed operation has been conducted. The temperature of different components during flat-top burning time calculated by transient thermal analysis matches well with that of steady state thermal analysis. Furthermore, the transient thermal analsyis of the blanket under LOFA, in-box LOCA and ex-vessel LOCA conditions are also performed and critically discussed.

Eligible for student paper award?

No

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Session Classification: W.POS: Poster Session W

Track Classification: Blankets and tritium breeding