

Updated thermal-mechanical analysis of DFLL-TBM for ITER

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Abstract.

The Dual Functional Lithium Lead - Test Blanket Module (DFLL-TBM) was developed by China as one of candidate concepts which are expected to be installed and operated in half of an ITER equatorial port. This paper is focused on assessment of thermal-mechanical performance under integrated load, such as thermal, pressure, and electromagnetic load. The latest 3D finite element model slice for DFLL-TBM was developed. The steady state and transient state thermal-mechanical analyses were performed under the normal plasma operational and plasma disruption scenario, respectively. The stress for different load case were linearized along several the supporting line segments pre-defined and evaluated according to Structural Design Criteria for ITER In-vessel Components (SDC-IC) . It was concluded that the primary plus secondary stress were satisfied with material limit of DFLL-TBM under normal operation conditions. But the stress margin was lower. The results for plasma disruption scenario can not cause the structure damage of DFLL-TBM. The possible recommendations for DFLL-TBM optimization will be discussed and proposed.

Topic:

H: Fuel Cycle and Breeding Blankets