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## P2.108 Fracture mechanics analyses of divertor vertical target under thermal loading conditions

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In-vessel plasma facing components such as first-wall, blanket and divertor modules should withstand harsh design conditions. In particular, since the divertor module undergoes extreme thermal loads, several tests for mono- and multi-block mock-ups as well as lots of stress analyses for the mock-ups and module themselves have been carried out. However, there were a little fracture mechanics studies limited on cracked simple geometries subjected to sudden severe thermal loads during micro-seconds period due to edge-localized mode (ELM). In this study, parametric linear elastic fracture mechanics assessment was conducted to determine critical crack lengths (CCLs) of ITER divertor vertical target. Typical heat fluxes under normal steady-state and ELM conditions were applied to the target with a postulated semi-elliptical surface crack on the tungsten blocks. Systematic finite element analyses were performed by changing crack locations, orientations and depths with a constant aspect ratio of 3. Stress intensity factors (SIFs) were computed and compared with the corresponding plane strain fracture toughness in ITER SDC-IC. Effects of crack features and heat fluxes on CCLs of the divertor vertical target were fully discussed.

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