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# The influence of ELMs on low cycle fatigue behavior of ITER-like divertor target

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The high confinement mode have been considered as a major operation mode of ITER because of it's many advantages. However, in this case there will be severe shocks at the plasma boundary, called the edge localized modes (ELMs). It is significant and necessary to research the coupled mechanism of fatigue by both transient and periodic heat loads on PFC components. A FE model of typical monoblock divertor is established to investigae the coupled effects of ELMs on fatigue life. Different ELMs loads are coupled with the basic periodic high heat flux (HHF) loads , and the combined non-linear isotropic and kinematic hardening law was adopted to compute the thermal-mechnical effects. It is founded that: (1) Although the direct increase of damage induced by ELM transient loading is very limited in each cycle, the final damage increase at the end of HHF loading is times of previous value, indicating a nonlinear coupling effects of HHF loading and ELM transient loading. (2) Under the same HHF loading situation, The fatigue life time of target model is decreasing nonlinearly with increase of ELM heat loads magnitude. (3) Under the same ELM loading case, with the increasing of HHF loading magnitude, The fatigue life time of first wall is decreasing more dramasticlally than previous low HHF loading magnitude, which means a more intensed coupled effects of damages.

## Eligible for student paper award?

Yes

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