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EX/P7-11: Study of ELMy H-mode Plasmas and BOUT++ Simulation on EAST

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Stationary edge localized modes (ELM) H-mode plasmas have been achieved on Experimental Advanced Superconducting Tokamak (EAST) by Low Hybrid Wave (PLHW ~ 1 MW at 2.45 GHz) in 2010. This kind of ELMy H-mode has been studied. Threshold power increases with plasma density, and decreases with the distance between the X-point and the divertor surface on EAST. The minimum threshold power is about $0.9 \text{ MW at } 2 \times 10^{19} \text{ m}^{-3}$. Experimental energy confinement time during H-mode discharges is much higher than L-mode discharges, and the H-factor in H-mode is between 0.5 and 1. EAST experiment results including magnetic geometry data, experimentally measured pressure and calculated current from the pressure are used to investigate the physics of ELM with BOUT++ simulation code. The linear simulation results show that the ELMs in EAST are dominated by resistive ballooning mode. When the Lundquist Number (dimensionless ratio of the resistive diffusion time to the Alfvén time) is equal or less 10^7 , it is resistive unstable in the ELMy H-mode.

Country or International Organization of Primary Author

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Collaboration (if applicable, e.g., International Tokamak Physics Activities)

LLNL

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