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Non-linear MHD Simulation of ELMs including Pellet Triggered ones for KSTAR tokamak HYUNSUN HAN, National Fusion Research Institute(NFRI), Daejeon 305-333, Korea, G. PARK, NFRI, H. STRAUSS, HRS Fusion, West Orange, New Jersey 07052, J.Y. KIM, NFRI — Three-dimensional non-linear MHD simulations have been conducted to investigate the qualitative characteristics of ELM(Edge Localized Mode)s including pellet induced ones using the M3D code [1]. A linearized velocity perturbation of initial equilibrium is employed to trigger the ELM instability for the simulation of natural ELM, while a density blob, which represents the ionized pellet ablation and is located within the edge pedestal, is adopted in an adiabatic condition for that of pellet induced one. The initial equilibrium is constructed based on a H-mode plasma of KSTAR(Korea Superconducting Tokamak Advanced Research) device. It is found that characteristics of natural ELM simulation are in qualitative agreement with the experimental observations including that density perturbation is much larger than temperature one during ELM instability. Regarding the pellet induced ELM, it is observed that the locally increased pressure due to the fast parallel heat conduction compared to the spread of density perturbation triggers the peeling-ballooning instability resulting in ELM-like relaxation. Detailed results will be presented in the discussion of underlying mechanism and application to KSTAR tokamak.

[1] H. Strauss et al., Phys. Plasmas 7, 250 (2000)

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