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Five-field peeling-ballooning modes simulation with BOUT++ code[1] T.Y. XIA, IPP-CAS, LLNL, X.Q. XU, LLNL, J.G. LI, IPP-CAS — The fast-reconnection simulation of ELMs in high-confinement mode tokamak discharges has been reported by Xu, et al with a minimum set of three-field two-fluid equations (Xu, et al., PRL, V.105, 175005 (2011)). Here we improve the simulation by separating the pressure into ion density, ion and electron temperature equations, to describe the pedestal collapse with the BOUT++ code. For the same equilibrium pressure profiles and different constant equilibrium density n_0, the normalized growth rate of peeling-ballooning modes is independent of n_0, the same as the previous three-field results. For constant temperature, when the inhomogeneous equilibrium density effects are considered, the linear growth rate becomes larger than the constant n_0 cases, increased around 6.2%. The growth rate is also decreased by the diamagnetic effects, especially for high toroidal mode number. This is also the same as the previous results. The stabilizing effects are more effective for smaller n_0. The nonlinear simulation, the effects of thermal conductivities, and simulations for new EAST superconducting tokamak ELM experiments will be reported.

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