Abstract Submitted for the DPP13 Meeting of The American Physical Society

Analysis of different responses of ion and electron in six-field twofluid ELM simulations¹ CHENHAO MA, PKU/LLNL, XUEQIAO XU, LLNL — We report simulation results of a Landau-Fluid (GLF) extension of the BOUT++ six-field two-fluid Braginskii model which contributes to increasing the physics understanding of ELMs. Landau-Fluid closure can fill the gap for parallel dynamics between hot, collisionless pedestal region and cold, collisional SOL region in Hmode plasmas. Our goal is extending the classical parallel heat flux with Landau-Fluid closures and making comparisons with other closure models. Our simulations show that for weakly collisional pedestal plasmas, the calculated growth rate with Landau-Fluid closure introduces more effective damping on the peeling-ballooning modes than that with the classical thermal diffusivity. Further nonlinear simulation shows that ELM size with Landau-Fluid Closure is smaller than that with classical thermal diffusivity. We find an ELM crash has two phases: fast initial crash of ion temperature perturbation on the Alfven time scale and slow turbulence spreading. Turbulence transport phase is a slow encroachment of electron temperature perturbation due to the ELM event into pedestal region which is due to a positive phase shift around $\pi/2$ between electron temperature and potential on pedestal region while ion temperature is in-phase with potential.

¹This work was performed under the auspices of the U.S. DoE by LLNL under Contract DE-AC52-07NA27344 and also supported by the China Scholarship Committee under contract N0.2011601099.

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Date submitted: 11 Jul 2013

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