Validation of BOUT++ Nonlinear ELM Simulations Using Fast Measurements from DIII-D,* M.E. Fenstermacher, X. Xu, I. Joseph, C.J. Lasnier, W.H. Meyer, Lawrence Livermore National Laboratory; B.J. Tobias, Princeton Plasma Physics Laboratory; L. Zeng, University of California-Los Angeles — Nonlinear edge localized mode (ELM) simulations have now been carried out with BOUT++ [1] at low experimental collisionality using a hyper-resistivity model to allow reconnection and ELM crash without formation of unphysically thin current sheets. Multiple fast diagnostic measurements of ELM dynamics are available from DIII-D [2,3] to validate these BOUT++ simulations. Using kinetic plasma and $E_n$ profiles averaged over the last 20% of multiple ELM cycles, BOUT++ linear and nonlinear simulations of a large Type-I ELM in DIII-D were performed. Multiple synthetic diagnostics applied to the BOUT++ output (e.g. ELM energy loss, pedestal pressure drop, target heat flux, ECE imaging etc.) will be compared with fast magnetics, Thomson scattering, IRTV, ECE-I and other measurements of the ELM dynamics.


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