Abstract Submitted
for the DPP11 Meeting of
The American Physical Society

Tightly Coupled Kinetic-MHD Simulations of ELM Effects on Divertor Heat Loads JULIAN CUMMINGS, California Institute of Technology, C.S. CHANG, Princeton Plasma Physics Laboratory, GUNYOUNG PARK, National Fusion Research Institute, Korea, LINDA SUGIYAMA, MIT Plasma Science & Fusion Center, CPES TEAM — The behavior of divertor heat load profiles during discharges with Type I ELMs is under investigation in present-day tokamak experiments such as DIII-D and NSTX. We present here simulations of ELM activity and associated divertor heat loads in which we couple the discrete guiding-center neoclassical transport code XGC0 with the nonlinear extended MHD code M3D. XGC0 starts from the equilibrium reconstruction of a specific discharge, just before the onset of a Type I ELM. M3D models the fast ELM event and sends updates of the electrostatic potential and magnetic field perturbations on the Alfvén time scale to XGC0. The XGC0 code tracks ion and electron dynamics within these perturbed fields and collects divertor particle and energy flux statistics over several time intervals before and during the nonlinear ELM. In addition, XGC0 computes kinetic plasma response in the form of the anisotropic CGL pressure tensor and sends this data back to M3D as the ELM simulation proceeds. Building upon our previously reported coupled kinetic-MHD simulations, we now demonstrate a two-way coupling capability and discuss results for a selection of discharges from the 2010 JRT studies.

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Date submitted: 27 Jul 2011 Electronic form version 1.4