Abstract Submitted
for the DPP08 Meeting of
The American Physical Society

Study of effects of non-thermal particles on kinetic H-mode pedestal evolution A.Y. PANKIN, G. BATEMAN, F.D. HALPERN, A.H. KRITZ, T. RAFIQ, Lehigh U., C.S. CHANG, S. KU, G. PARK, NYU, D.C. MCCUNE, PPPL — Effects of non-thermal particles on the evolution of the plasma edge in tokamaks are investigated using the self-consistent kinetic XGC0 code. The beam geometry package from the NTCC NUBEAM module has recently been implemented in the XGC0 code. The NTCC Plasma State module is used to interface the kinetic XGC0 code and NUBEAM module. Neutrals in the beam geometry package are started at the injector plate with random angles and subsequently tracked to the tokamak plasma edge. Once the neutrals enter the plasma, their behavior is governed by a model for neutrals in the XGC0 code and the dynamic evolution of the plasma edge is computed in self-consistent simulations. These simulations include the formation of sheared velocity flows and the effects of $\mathbf{E}\times\mathbf{B}$ flow shear, turbulence transport suppression, and formation of the H-mode pedestal, up to the triggering of an ELM crash. The dependence of pedestal parameters on the additional torque that is introduced by the neutral beam and non-thermal particles is investigated. Neutral beam effects on triggering ELM crashes are also studied.

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Date submitted: 22 Jul 2008 Electronic form version 1.4