Abstract Submitted
for the DPP14 Meeting of
The American Physical Society

Gyrokinetic particle simulations of kinetic ballooning mode in tokamak pedestal[1] IHOR HOLOD, Univ of California - Irvine — The pedestal height and width in tokamak H-mode operation are widely believed to be constrained by mesoscale peeling-ballooning modes and microscopic kinetic ballooning modes (KBM). However, direct evidences of the KBM turbulence in pedestal are very limited. The role of the drift-Alfvenic microturbulence during the pedestal recovery period is not clear. Here we use gyrokinetic toroidal code (GTC) to study the edge instability of a DIII-D discharge #131997 using realistic geometry and plasma profiles and focusing on the pedestal region with steep pressure gradient. First, electrostatic simulations find a reactive trapped electron mode with an unusual eigenmode structure, which peaks at the poloidal angle $\theta = \pm\pi/2$. The electron collisions decrease the growth rate by about one-half. Next, the plasma pressure is scanned in GTC electromagnetic simulations to identify the boundary for the KBM onset. At the finite electron beta an electromagnetic instability is found with KBM characteristics. The linear growth rate increases with β_e and the mode propagation is in the ion diamagnetic direction. Nonlinear simulations of the KBM turbulence will also be presented.

[1]Work supported by DOE grant DE-SC0010416, and in collaborations with GTC team.

Ihor Holod
Univ of California - Irvine

Date submitted: 10 Jul 2014 Electronic form version 1.4