Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

Gyrokinetic simulation of I-mode C-Mod pedestal using GENE[1]

XING LIU, H DAVID, M KOTSCHENREUTHER, S MAHAJAN, University of Texas at Austin, J HUGES, A HUBBARD, Massachusetts Institute of Technology, P VALANJU, University of Texas at Austin — Naturally stable to ELMs, and with widths larger than EPED predictions, the I-modes are an excellent laboratory for investigating the role of drift microinstabilities in pedestal formation since I-mode pedestal are not "limited" by MHD instabilities—Peeling Ballooning or the Kinetic Ballooning. Because the Weakly Coherent Mode (WCM) is shown to be correlated, primarily, to particle transport, the pedestal heat transport, in some sense, must be controlled by drift-type modes. We present here a study based on gyrokinetic simulations (using GENE) to model heat transport in the I-mode pedestals in C-Mod. Nonlinear ETG simulations, found to be streamer-dominated, can match experimental heat flux with profile adjustment well within experimental error bars. The ETG simulations reveal very notable fine-scale structure (in the parallel direction) of the eigenfunctions in both linear and nonlinear simulations. Simulations, varying impurity level (Zeff) and temperature and density profiles (within experimental error bars), are used to probe the sensitivity of ETG heat transport to the most important input parameters. Efforts to identify an instability corresponding to the WCM will also be discussed.

[1]Work supported by USDOE grant DE-FG02-04ER54742.

Mike Kotschenreuther
University of Texas at Austin

Date submitted: 15 Jul 2016 Electronic form version 1.4