Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

Microtearing Turbulence Limiting the JET-ILW Pedestal[1]
DAVID HATCH, MICHAEL KOTSCHENREUTHER, SWADESH MAHAJAN, PRASHANT VALANJU, XING LIU, University of Texas at Austin, TOBIAS GOERLER, Max Planck Institute for Plasma Physics, FRANK JENKO, DANIEL TOLD, University of California Los Angeles — The gyrokinetic GENE code is used to model instabilities and transport in the JET-ILW (ITER like wall) pedestal. Local GENE simulations identify microtearing modes (MTM) as the dominant low-k_y instability across most of the pedestal, with KBM unstable in a narrow region near the separatrix. Global simulations find that MTM growth rates are decreased by ExB shear, but to a lesser extent than electrostatic ITG/TEM-type modes, so that the MTM becomes relatively more prominent in the presence of ExB shear. A β scan demonstrates local KBM to be unstable across the pedestal at lower β (60 % of the experimental value). As β approaches and surpasses the experimental value, the KBM become more stable, and are limited to progressively narrower regions of the pedestal (consistent with the concept of second stability), while the MTM becomes more unstable and spans most of the pedestal. The absence of KBM is even more pronounced in global simulations. Nonlinear simulations of MTM turbulence using the experimental profiles produce transport levels that are comparable to experimental expectations, establishing the MTM as the likely mechanism limiting pedestal profile evolution in JET-ILW pedestals.

[1]This work was supported by U.S. DOE Contract No. DE-FG02-04ER54742.

David Hatch
University of Texas at Austin

Date submitted: 24 Jul 2015 Electronic form version 1.4