Abstract Submitted
for the DPP11 Meeting of
The American Physical Society

Magnetic stochasticity due to the excitation of subdominant tearing modes D.R. HATCH, M.J. PUESCHEL, F. JENKO, IPP Garching, W.M. NEVINS, LLNL, P.W. TERRY, UW Madison, H. DOERK, IPP Garching, E. WANG, LLNL — Recent studies have shown that magnetic stochasticity is near-ubiquitous in electromagnetic gyrokinetic simulations scanning the plasma beta. At higher beta values, the associated electron electromagnetic heat flux can become comparable to the transport in the electrostatic channels. This is in spite of the fact that the dominant instabilities are not characterized by tearing parity. In this study we demonstrate that the stochasticity and transport are produced by the nonlinear excitation of subdominant tearing modes. Proper orthogonal decomposition is used to extract mode structures from nonlinear fluctuation data. Using this technique, it is shown that the electron electromagnetic heat transport can be explained as a superposition of an inward heat flux associated with the ITG modes and an outward heat flux associated with the magnetic stochasticity caused by the excitation of subdominant tearing modes. The mechanism for the nonlinear excitation of these tearing modes will also be discussed.

David Hatch
IPP Garching

Date submitted: 20 Jul 2011 Electronic form version 1.4