Abstract Submitted
for the DPP08 Meeting of
The American Physical Society

Investigation of Finite Amplitude Growth Rates in Microturbulence Simulations DAVID HATCH, PAUL TERRY, VARUN TANGRI, University of Wisconsin, BILL NEVINS, LLNL — Microturbulence properties are generally framed in terms of the linear growth rate of the most unstable mode. However, the nonlinear growth rate (the rate of energy input or damping at *finite* amplitude) can be quite different from the linear growth rate in both amplitude and wavenumber dependence. This is because the nonlinear growth rate can be constructed from a superposition of the effects of all (stable and unstable) accessible linear eigenmodes. It has been shown that stable eigenmodes are excited to levels sufficient to significantly affect saturation and transport in both simple fluid models and gyrokinetic models. We describe a nonlinear growth rate diagnostic for GYRO. This will be used to better understand the dynamics of finite amplitude energy input and the effects of damped eigenmodes in gyrokinetic simulations. Comparisons of linear and nonlinear growth rates will be presented. In addition, special attention is given to zonal (k_y=0) fluctuations, which are comprised of linearly undamped zonal flows and other modes which are linearly damped and are potentially a potent energy sink.

David Hatch
University of Wisconsin

Date submitted: 14 Aug 2008 Electronic form version 1.4