Abstract Submitted
for the DPP13 Meeting of
The American Physical Society

Gyrokinetic characterization of PPCD plasmas D. CARMODY, M.J. PUESCHEL, J.K. ANDERSON, P.W. TERRY, University of Wisconsin - Madison — A series of linear and nonlinear gyrokinetic simulations were performed with the GENE code to model experimental discharges in the MST reversed field pinch and identify the dominant instabilities. These studies focus on the characteristics of microinstabilities in pulsed poloidal current drive (PPCD), a current profile control technique that results in reduced large scale tearing activity and improved confinement. The equilibria are modeled using a modified version of GENE's circular equilibrium model and experimental measurements of density, temperature, and magnetic field. A variety of PPCD discharges are studied encompassing different plasma currents and relative strengths of density and temperature gradients, and the dominant linear instabilities are found to be ITG and TEM. The critical gradients for these modes are found at different radial locations and compared with the experimental gradients. The dependence of these instabilities on various parameters such as plasma β and collisionality is also investigated. Nonlinearly, a strong upshift of the critical gradients is found and the nonlinear mechanisms responsible are discussed. Work supported by US DOE Grant No. DE-FG02-85ER53212.

Daniel Carmody
University of Wisconsin - Madison

Date submitted: 10 Jul 2013 Electronic form version 1.4