Abstract Submitted
for the APR12 Meeting of
The American Physical Society

Gyrokinetic Simulation of Reverse Shear Alfven Eigenmodes in DIII-D Plasmas YANG CHEN, SCOTT PARKER, University of Colorado at Boulder, GUO-YONG FU, Princeton Plasma Physics Lab — We present simulation results of the beam driven Reverse Shear Alfven Eigenmodes (RSAE) observed in DIII-D discharge 142111 using the Particle-in-Cell gyrokinetic code GEM [1]. Bulk ions and energetic particles are gyrokinetic, but electrons are described by a massless fluid model. Two schemes for obtaining the electric potential are implemented, one by solving the gyrokinetic Poisson equation for ϕ directly, the other by solving the gyrokinetic moment (GKM) equation for $\partial\phi/\partial t$ and then integrating in time. The GKM approach is found to be more robust for linear simulations (allowing larger time steps) but less robust for nonlinear simulations. Previous simulations reproduced the chirping in frequency as seen in the experiment. Recently it has been reported by other simulation codes (GTC, GYRO and TAEFL) that the shearing direction of the mode structure in the poloidal plane disagrees with observation. We found that the mode structure, including the shearing in the poloidal plane, is in general sensitive to the beam distribution. By changing the radial profile of the beam density while keeping the velocity dependence fixed, both shearing directions can be produced in the simulation.

[1] Y. Chen and S. E. Parker, J. Comp. Phys. 220, 839 (2007)

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Date submitted: 10 Jan 2012 Electronic form version 1.4