Abstract Submitted
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Self-Consistent Frequency Sweeping of TAE mode GE WANG, IFS, University of Texas at Austin — We have extended our intuitive Toroidal Alfven Wave (TAE) model [1] for describing spontaneous frequency sweeping by a destabilizing component of energetic particles. Now a fully developed self-consistent description for frequency sweeping of an isolated TAE mode has been developed. As in [1], we use the Rosenbluth, Berk,Van Dam tip theory [2], valid for low beta, large aspect ratio, circular tokamaks, to describe the evolution of the TAE wave equation. The wave is coupled to the particle dynamics that uses the Berk, Breizman, Ye map model [3] to construct the particle/wave Lagrangian associated with a phase space dependent mode structure. Then together with the appropriate Vlasov equation for describing the particle dynamics, a set of equations determining the dynamics of the system has been formulated. Adiabatic solutions have been obtained and work is underway in simulating the exact nonlinear dynamics. A status report of our results will be given at the meeting.

[1] G. Wang and H. L. Berk, Communication in Nonlinear Science and Numerical Simulation **17**, 2179 (2012)
[2] M. N. Rosenbluth,; H. L. Berk, J. Van Dam and D. M. Lingberg, Phys. Rev. Lett. **68**, 596 (1992).
[3] Berk**,** H.L.; Breizman, B.N.; Ye, H. *In:* Physics of Fluids B 51993, 1506 (1993)

Ge Wang
IFS, University of Texas at Austin

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