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Theory Experiment

Complete Physics for the Trapped Gyro-Landau Fluid Equations,* G.M. Staebler, R.E. Waltz, GA, J.E. Kinsey, *Lehigh U* — A new system of equations for the fluid moments of the gyrokinetic equation has been recently developed which unifies trapped and passing particles. This new TGLF system adds trapped particle physics to the previously developed gyro-Landau fluid (GLF) equations. In the TGLF system a single set of moment equations is valid over the full range of drift-waves from low frequency trapped ion modes all the way up to electron temperature gradient modes. The linear growth rates of the TGLF system have been shown to be quite accurate (11% average deviation) compared to gyrokinetic linear growth rates over a wide range of parameters. This benchmarking was done with limited physics however (shifted circle geometry, electrostatic, collisionless). The physics has now been extended to general geometry. Collisions and electromagnetic terms have also been added. Comparison of the linear stability results for the TGLF system with exact gyrokinetic results with the new physics will be reported.

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