

Gyrokinetic theory and simulation of turbulent energy exchange

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Abstract

A previous gyrokinetic theory of turbulent heating [F.L. Hinton and R.E. Waltz, Phys. Plasma **13**, 102301 (2006)] is simplified and extended to show that the *local radial average* of terms in the gyrokinetic turbulent *heating* (which survive in the drift kinetic limit) are actually closer to an turbulent *energy exchange* between electrons and ions. The integrated flow for the local exchange is simulated with the GYRO [J. Candy and R.E. Waltz, J. Comp. Phys. **186**, 545 (2003)] delta-f gyrokinetic code and found to be small in a well studied DIII-D [M.A. Mahdavi and J.L. Luxon, “DIII-D tokamak special issue” Fusion Sci. Technol. **48**, 2 (2005) L-mode discharge.

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