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Gyrokinetic Turbulent Heating,* F.L. Hinton and R.E. Waltz, *GA* – Expressions for turbulent energy transport and heating are derived, which are consistent with the drift-kinetic or gyrokinetic approximations for the turbulent fluctuations. The mean distribution function is the solution of a drift-kinetic equation that is the Hazeltine (1973) equation with additional terms containing the turbulent fluctuations. In the variables u,μ (where u is parallel velocity and μ is magnetic moment), Liouville's theorem is satisfied, so the equation can be written exactly in conservative form. The energy flux and heating rate are identified from the energy moment of the mean drift-kinetic equation. The heating includes the energy moment of the parallel nonlinearity, which appears in the drift-kinetic equation for the fluctuations (which is appropriate for electrons). We also obtain new turbulent heating terms that depend on finite gyroradius. These are negligible for electrons, but could be significant for ions. Preliminary evaluations with GYRO DIII-D simulations suggest that the new turbulent heating terms, when radially integrated, represent no more than 5-10\% of the usual gyrokinetic power flows.

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