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Gyrokinetic Simulations of ETG and ITG Turbulence[1] A.M. DIMITS, W.M. NEVINS, D.E. SHUMAKER, Lawrence Livermore National Laboratory, J.N. LEBOEUF, University of California, Los Angeles — We have previously found that the radial shear in the flux- surface-averaged flow in the late-time quasi-steady phase of ITG turbulence is driven mostly by the Reynolds' stress, and dissipated mostly by the linear (transit-time) damping. Here, the driving and damping are further resolved into contributions to the steady zonal and damped geodesic-acoustic (GAM) eigenmodes. In particular the temporal dependence of the Reynolds stress and its ability to drive the GAMs is examined. Various aspects of ETG turbulence are examined: (1) It is found that the presence of zonal flows in ETG turbulence, which occur at levels small compared with those in analogous ITG turbulence, can either enhance or suppress the turbulence. The mechanisms of enhancement are examined. (2) The effects of spatial resolution, system size, and particle number on delta-f gyrokinetic simulations of ETG turbulence are examined. Our results confirm that in addition to too much particle noise, insufficient spatial resolution can also result in saturated states with artificial steadiness and low levels of thermal transport.

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