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Progress in Gyrokinetic Particle Simulation of Electron Transport in Fusion Plasmas[1] ZHIHONG LIN, University of California, Irvine — Electron thermal transport driven by electrostatic drift-wave turbulence in tokamak plasmas is studied using full device gyrokinetic particle simulations. Trapped electrons are found to enhance ion temperature gradient (ITG) turbulence by mostly not responding to the ITG modes and thus induce relatively low level of electron transport. On the other hand, resonant excitation of trapped electron mode (TEM) turbulence leads to large electron thermal and particle transport. TEM modes have much broader linear spectrum and the nonlinear saturation is characterized by two-step processes. Shorter wavelength modes saturate first and induce high electron thermal transport but relatively small ion transport; longer wavelength modes saturate later and induce higher ion thermal and particle transport.

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