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Gyrokinetic Simulation of Energetic Particle Turbulence and Transport ZHIHONG LIN, University of California, Irvine, SCIDAC GSEP TEAM TEAM — The confinement of energetic particles (EP) is a critical issue in ITER burning plasmas. The fully self-consistent simulation of the EP turbulence and transport in ITER must incorporate three new physics elements: kinetic effects of thermal particles at the thermal ion gyroradius (*micro* scale), nonlinear interactions of many *meso* scale (energetic particle gyroradius) shear Alfven waves (SAW) induced by the kinetic effects at the *micro* scale, and *meso-micro* couplings of the microturbulence and SAW turbulence. The large dynamical ranges of spatial-temporal processes further require global simulation codes that are efficient in utilizing massively parallel computers at the petascale level and beyond. This paper reports the progress of the gyrokinetic simulation of the EP turbulence and transport in tokamaks using GTC code. Work supported by DOE fusion SciDAC GSEP Center.

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