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Simulations of EP transport due to RSAE and EP coupling with microturbulence.[1] PENGFEI LIU, University of California, Irvine, HONGYU WANG, Peking University, ZHIHONG LIN, University of California, Irvine — Linear gyrokinetic simulations DIII-D discharge #159243 find unstable reversed shear Alfven eigenmodes (RSAE) excited by fast ions with significant growth rate for toroidal mode number n=3-12 and strong driftwave instability excited by thermal plasma pressure gradients with significant growth rate n=10-32. Nonlinear simulations of microturbulence and AE have been first carried out separately to understand the numerical properties and physical dynamics of microturbulence and AE, respectively. The zonal flows are found to dominate the RSAE saturation process. Nonlinear coupling of multiple toroidal modes further reduces the RSAE turbulence intensity and EP diffusivity, and suppresses the intermittency. Nonlinear simulations of high-n driftwave instabilities find that turbulence is regulated by zonal flows and that turbulence spreads from edge to core. Nonlinear GTC simulations including both high-n microturbulence and low-n RSAE on the same footing are been carried out to study their nonlinear interactions and effects on EP transport.

[1]Simulations of EP transport due to RSAE and EP coupling with microturbulence

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