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Nonlinear Extended MHD Simulations of Turbulent CITM in 2D Slab for a Study of Transport at Edge-plasma SOL WENDELL HORTON, University of Texas at Austin, HIDEAKI MIURA, National Institute for Fusion Science, LINJIN ZHENG, University of Texas at Austin — Nonlinear simulations in a 2D slab based on the extended MHD model with Hall and FLR terms are carried out for studying a growth of the Current Tearing Interchange Modes (CITM) interacting with turbulent drift flows at edge-plasma SOL. The current diffusivity model [Miura et al., Phys. Plasmas 2017] enforces saturation of the current at a low in the SOL region as well as a current jump across the Last Closed Flux Surface (LCFS), in order to simulate open magnetic fields terminating on the divertor plates outside the LCFS. In the CITM, interchange mode under magnetic shear transforms into tearing modes, as has been shown in our single-fluid MHD simulations. The new extended MHD simulations with the Hall and FLR effects show that the CITM can grow even through interaction with turbulence originated from diamagnetic drift flow. The growth is insensitive to arbitrary parameters included in the current diffusivity model. Effects of the growth of the CITM on the heat transport under the presence of turbulence shall be discussed.

Hideaki Miura, Linjin Zheng, and Wendell Horton,Numerical simulations of interchange/tearing instabilities in 2D slab with a numerical model for edge plasma, Phys. of Plasmas 24, 092111 (2017)

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