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Impact of finite beta on kinetic ballooning modes and turbulent transport[1] CHENHAO MA, Peking University, XUEQIAO XU, Lawrence Livermore National Laboratory, XIAOGANG WANG, Peking University — We report simulation results of a 3+1 gyro-Landau-Fluid (GLF) model in BOUT++ framework, which contributes to increasing the physics understanding of the edge turbulence. We find that there is no second stable region of kinetic ballooning modes (KBM) in the concentric circular geometry. The unstable threshold of KBM decreases below the ideal ballooning mode threshold with increasing η_i. In order to study the KBM in the real equilibrium, we find that the approximation of shifted circular geometry ($\beta \ll \varepsilon^2$) is not valid for a high β global equilibrium near the second stable region of KBM. Thus we calculate a series of real equilibrium from a global equilibrium solver Corsica, including both Shafranov shift and elongation effects. In these real equilibria, the second stable region of KBM are observed in our global linear simulations. The most unstable mode for different β are the same while the mode number spectrum near the second stable region is wider than the case near the first stable region. The impact on the KBM turbulence and transport will be presented based on these equilibria.

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Chenhao Ma
Peking University

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