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Transition Dynamics and Hysteresis of Plasma Edge Transport in a Flux-driven System XUEYUN WANG, CHUANKUI SUN, AO ZHOU, DIANJING LIU, BO LI, Peking Univ, XIAOGANG WANG, Harbin Institute of Technology — Transition of low to high confinement regimes due to competition between interchange turbulence and mean shear flow in edge plasmas are explored. We find that two regimes with different transport levels exist during the nonlinear evolution of the interchange mode. In the first (L-) regime, the large-scale turbulent eddies dominate with the high level of transport. By increasing the input heat flux above a certain threshold, the transition to the second (H-) regime occurs, in which strong mean $\mathbf{E}\times\mathbf{B}$ shear flows are generated. The large-amplitude oscillations which form both clockwise and counter-clockwise cycles in the phase space of turbulence intensity and mean flow energy during a transition are demonstrated by the nonlinear energy transfer. We show that the open field line region is critical to the formation of Reynolds stress gradients, which produces the mean shear flows localized in the edge through the turbulent momentum transport. The back transition to the L-regime is studied by reducing the input heat flux to a level much lower than the threshold for the forward transition, indicating a significant hysteresis.

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