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Scalings of nonlinear transfer processes in the edge plasma and their connection to[1] ISTVAN CZIEGLER, UC San Diego, ERIC EDLUND, PPPL, AMANDA HUBBARD, JERRY HUGHES, JIM IRBY, JIM TERRY, MIT, CHRISTIAN THEILER, EPFL, GEORGE TYNAN, UC San Diego — Nonlinear transfer processes between large-scale edge flows and the ambient broadband fluctuations have been shown to play a significant role in the dynamics of edge turbulence, including spreading power from coherent modes and suppressing turbulence at the formation of edge transport barriers. In order to predict thresholds of confinement regimes, both the transition dynamics and the scalings of nonlinear transfer must be studied. Since the expected flow damping terms depend on ion collision rates and local safety factor, recent experiments on Alcator C-Mod explored the nonlinear drive at various values of the plasma current, density and auxiliary heating power. Nonlinear interactions of zonal flows in L-mode and both zonal flows and geodesic-acoustic modes in I-mode are estimated using bispectral as well as time-resolved methods based on gas-puff-imaging. Experiments were run in both H-mode-favorable and unfavorable geometries to compare threshold physics in L-H and L-I-H transitions.

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