Abstract Submitted
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Correlated enhancement of momentum and stochastic energetic ion transport due to multi-helicity tearing modes on DIII-D[1] B. TOBIAS, N. FERRARO, S. JARDIN, G. KRAMER, PPPL, T. EVANS, GA, C.W. DOMIER, N.C. LUHMANN, JR., UC Davis — The onset of energetic particle stochasticity has been correlated with the transition to a hollow rotation profile by scaling linear tearing modes from M3D-C1 to ECEI data and following energetic particles in the SPIRAL code. The superposition of two tearing modes of different n-number increases magnetic field line stochasticity by generating tertiary magnetic islands, even when the flux perturbation is composed of only two linearly independent solutions. Furthermore, particle orbit stochasticity increases with particle energya mechanism for non-ambipolar transport that modifies fluid rotation in a regime relevant to the saturated island widths, neutral beam injection energies, and physical dimensions of DIII-D. This demonstrates that energy-dependent stochastic effects operate alongside nonlinear MHD coupling and neoclassical toroidal viscosity to determine the dynamics of non-axisymmetric and tearing-unstable systems, including disruptive tokamak discharges.

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B. Tobias
Princeton Plasma Physics Laboratory

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