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Effect of neoclassical toroidal viscosity on error-field penetration thresholds A.J. COLE, C.C. HEGNA, J.D. CALLEN, University of Wisconsin — A model for error-field penetration relevant to ohmic tokamak plasmas is introduced that accounts for both resonant and non-resonant magnetic field perturbations. The non-resonant components produce neoclassical damping of the toroidal flow velocity throughout the plasma volume. For simplicity, a single resonant harmonic is considered which produces an electromagnetic torque localized on a particular resonant magnetic surface. A governing equation for the velocity profile is derived extending a recently developed drift-MHD model for error-field penetration [A. Cole, R. Fitzpatrick, *Phys. of Plasmas*, **13**, 032503 (2006)] by including the neoclassical physics. The model predicts a value for the critical error-field threshold. As in previous theoretical models, extrapolating a scaling of the critical threshold with engineering parameters—such as device major radius, electron density, and toroidal field strength—involves a detailed knowledge of the momentum confinement time scaling in an ohmic plasma discharge.

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