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Category Number and Subject: 5.6.2. DIII-D Tokamak

[ ] Theory [X] Experiment

Neoclassical Toroidal Viscosity for Low-Density Ohmic Plasmas in DIII-D,* A.J. Cole, C.C. Hegna, J.D. Callen, *U. Wisc-Madison*; M.J. Schaffer, R.J. La Haye, *GA* – A recent model [1] for field error penetration that includes resonant and non-resonant perturbed 3D magnetic fields has for the first time obtained quantitative agreement with empirical scaling studies of the error-field penetration threshold with electron density. Relevance of the new model relies on the error-field induced neoclassical toroidal viscosity (NTV) being comparable to cross-field diffusive viscosity near a resonant surface of interest. The strength and harmonic structure of NTV for low-density ohmic plasmas on DIII-D are determined from intrinsic vacuum error-field data. Preliminary analysis has shown that NTV in DIII-D is dominated by non-resonant modes. We neglect the plasma response in this initial investigation. An effective cross-field momentum transport owing to NTV is determined, for future comparison with possible cross-field momentum transport rates in ohmic discharges.

[1] A.J. Cole, *et al.*, "Effect of Neoclassical Toroidal Viscosity on Error-Field Penetration Thresholds in Tokamak Plasmas," to be published in Phys. Rev. Lett. (2007).

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