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Transport of light, trace impurities in Alcator C-Mod[1] W.L. ROWAN, I.O. BESPAMYATNOV, K.T. LIAO, W. HORTON, X.R. FU, Institute for Fusion Studies, The University of Texas at Austin, J.W. HUGHES, MIT PSFC
— Light impurity profiles for boron were measured in ITB, H-mode, L-mode, and I-mode discharges in Alcator C-Mod. Within this wide range of modes, the profiles varied from peaked to hollow to flat. Specifically, hollow profiles are often observed in H-mode, while ITBs produce strong peaking, and L-mode produces moderate peaking. I-mode discharges are characterized by flat impurity profiles. For the study reported here, the profiles were measured with charge exchange recombination spectroscopy. The dependences of Rv/D were sought on dimensionless quantities including ion density scale length, effective charge, collisionality, and temperature scale length. We find that neoclassical transport consistently underestimates the measured transport. The excess measured transport is assumed to be turbulent. The strongest dependence of Rv/D is with temperature scale length. In addition, the measured transport was compared with the prediction of an analytical theory of drift wave turbulence that identifies transport implications for drift waves driven by ion and impurity density gradients.

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W.L. Rowan
Institute for Fusion Studies, The University of Texas at Austin

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