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Transport Studies of L-mode Edge Radiating Mantle Discharges with Confinement Improvement in DIII-D[1] M. MURAKAMI, M.R. WADE, Oak Ridge National Laboratory, T.E. EVANS, G.L. JACKSON, H.E. ST. JOHN, G.M. STAEBLER, General Atomics, J.E. KINSEY, Lehigh University, G.R. MCKEE, University of Wisconsin, AND THE DIII-D TEAM — Significant confinement improvements are observed with impurity injection into L–mode-edge beam-heated discharges in DIII–D. The global energy confinement increased by a factor of up to 2, with an increasing quantity of injected impurity. Neon injection produced the strongest effect in the plasma, compared with argon and krypton. Reduction of observed turbulence is correlated well with the confinement improvement. Transport coefficients decreased in all transport channels, with ion thermal diffusivity reduced to near neoclassical values. Both gyro-kinetic and gyro-fluid simulations with $E \times B$ shearing indicate that the turbulence linear stability growth rate is reduced for ion temperature gradient turbulence as a result of the impurity density gradient and dilution effects on main ion turbulence and the $E \times B$ shear suppression.

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[X] Prefer Oral Session
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