

Abstract Submitted
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Mechanisms for Reduction of Ion Transport and Turbulence with Impurity Injection in DIII-D¹ M. MURAKAMI, G.L. JACKSON, G.R. MCKEE, G.M. STAEBLER, D.R. ERNST, T.E. EVANS, J.E. KINSEY, C.L. RETTIG, D.W. ROSS, H.E. ST. JOHN, DIII-D National Fusion Facility — Clear reduction of ion thermal diffusivity (factor of ≤ 5) and simultaneous reductions of long-wavelength turbulence have been observed in L-mode edge discharges in DIII-D which are directly correlated with external impurity injection under several different operating conditions. Gyro-kinetic analysis based on time-evolving measured profiles shows that growth rates of long-wavelength drift wave turbulence is reduced promptly with impurity injection, which facilitates continuous increase of $E \times B$ shearing rate above the maximum growth rate. Gyro-fluid code predictions are favorably compared with measured turbulence and transport levels. Predictive analysis based on the GLF23² code is tested with time evolution of plasma parameters. How these stabilization schemes interplay under different operating conditions, particularly, change in toroidal field will also be discussed.

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²R.E. Waltz *et al.*, Phys. Plasmas **4**, 2487 (1997).

- Prefer Oral Session
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