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**Measurements of Impurity Particle Transport Associated with Drift-Wave Turbulence in MST** TAKASHI NISHIZAWA, MARK NORNBERG, JOHN BOGUSKI, University of Wisconsin, Madison, DARREN CRAIG, Wheaton College, IL, DANIEL DEN HARTOG, M.J. PUESCHEL, JOHN SARFF, PAUL TERRY, ZACH WILLIAMS, ZICHUAN XING, University of Wisconsin, Madison — Understanding and controlling impurity transport in a toroidal magnetized plasma is one of the critical issues that need to be addressed in order to achieve controlled fusion. Gyrokinetic modeling shows turbulence can drive impurity transport, but direct measurements of the turbulent flux have not been made. Particle balance is typically used to infer the presence of turbulent impurity transport. We report, for the first time in a toroidal plasma, direct measurements of turbulence-driven impurity transport. Trapped electron mode (TEM) turbulence appears in MST plasmas when MHD tearing fluctuations are suppressed. Impurity ion-Doppler spectroscopy is used to correlate impurity density and radial velocity fluctuations associated with TEM. Small Doppler shifts associated with the radial velocity fluctuations (rms 1km/s) are resolved with the use of a new linearized spectrum correlation analysis method, which improves the rejection of Poisson noise. The method employs frequency-domain correlation analysis to expose the fluctuation and transport spectrum. The $C^+2$ impurity transport velocity driven by turbulence is found to be 48m/s (inward), which is sufficiently large to impact an impurity flux balance in MST improved-confinement plasmas. This work is supported by the US DOE.

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