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Ion Particle Transport in DIII-D H-Mode Plasmas[1] KIERA MCKAY, SASKIA MORDIJCK, William Mary, DIII-D TEAM — This paper investigates ion particle transport as a function of turbulence using a perturbative deuterium gas puff modulation in DIII-D H-mode plasmas. The carbon6+ impurity response to the modulation is analyzed using the charge exchange recombination (CER) spectroscopy diagnostic system. From this data, we can extract perturbative transport coefficients for the carbon ions and compare them to prior results looking at electron transport in Ion Temperature Gradient (ITG) versus Trapped Electron Mode (TEM) turbulence regimes (S. Mordijck et al 2015 Nucl. Fusion 55 113025). Theoretical models predict turbulent transport should be larger for ions than electrons in the ITG regime, while the opposite is true in the TEM regime (C. Bourdelle et al 2018 Nucl. Fusion 58 076028). The calculated transport coefficients from carbon6+ measurements partially agree with this model; coefficients are smaller for ions than electrons in the TEM discharge, however the ion coefficients were smaller for the ITG discharge as well. STRAHL simulations will be performed to evaluate how closely the perturbative analysis method approaches steady state expectations for transport, and NEO simulations will be performed to compare the neoclassical contributions to turbulent contributions in carbon6+ transport.

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