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Ion Particle Transport in DIII-D H-Mode Plasmas[1] KIERA MCKAY, SASKIA MODIJCK, College of William Mary, DIII-D TEAM — This paper will look at ion particle transport in the presence of a perturbative gas puff modulation in DIII-D H-mode plasmas. The deuterium ion response to the modulation is analyzed using the charge exchange recombination (CER) diagnostic system. With this data, we can extract perturbative transport coefficients for the ions and compare them to prior results looking at the electron transport in various turbulence regimes (S. Mordijck et al 2015 Nucl. Fusion 55 113025). Theoretical models suggest ion and electron transport are not identical; the ion turbulent transport is significantly larger than the electron turbulent transport in the ion temperature gradient (ITG) regime, while the opposite is true in the trapped electron mode (TEM) regime (C. Bourdelle et al 2018 Nucl. Fusion 58 076028). Large ion particle transport coefficients imply that the ion density profiles are uncorrelated to the corresponding ion source, thus providing confidence that experimentally measured peaked ion profiles are the result of an inward pinch, not a core source of particles. By analyzing the changes in the modulation of the ion channel, we can assess the validity of such theoretical models in various turbulence regimes in H-mode plasmas.

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