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Inter-ELM Recovery and Pedestal Fueling from Main-ions and Impurities in Low Frequency ELMy H-mode Discharges in DIII-D[1] B.A. GRIERSON, S.R. HASKEY, PPPL, R.J. GROEBNER, GA — Time-dependent, ELM-synchronized analysis of the inter-ELM buildup of the electron density pedestal in DIII-D has quantified the role of fueling from main-ions (deuterium) and the dominant impurity (carbon) in a low ELM frequency DIII-D discharge. The inter-ELM density pedestal recovery can be dominated by impurity influx and impurity ionization, with more electrons from C than D, and must be included when assessing electron particle transport in the H-mode pedestal. Establishment of the main-ion density profile may precede the impurity influx, consistent with onset of a neoclassical impurity pinch very early in the ELM cycle, which then fuels the pedestal by impurity ionization. Temporally resolved profiles show a factor or two increase in the electron and impurity density, with temperature and rotation displaying rapid profile establishment. These observations are expected from considerations of thermal transport being driven largely from the core outwards, whereas the particle transport is dominantly driven from the edge inwards by strong fueling sources. Inclusion of the impurity ionization source may help determine if there is an inward pinch of electrons in the formation of the edge particle transport barrier.

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