Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

Impact of Divertor Closure on Nitrogen Seeded Super-H mode Plasmas in DIII-D[1] T.M. WILKS, MIT-PSFC, P.B. SNYDER, D. ELDON, A. HYATT, General Atomics, M. KNOLKER, ORAU, F. LAGGNER, PPPL, C. PAZ-SOLDAN, General Atomics, J.W. HUGHES, MIT-PSFC, B. GRIERSON, PPPL, A. JARVINEN, LLNL, DIII-D TEAM — Integration of a high pressure pedestal and high performance core with a radiative divertor is assessed in DIII-D Super H-mode (SH) plasmas. SH is a promising regime for future devices due to the high pedestal pressures able to be obtained via increased shaping and density. The peeling limited pedestal in the SH regime allows for high densities in the scrape of layer and pedestal foot, without degradation of the pedestal height. Previous DIII-D experiments have shown significant temperature reduction at the divertor plate and near-detachment conditions with nitrogen seeded SH-modes in an open divertor. In this poster, similar plasmas are compared with a flipped shape in the upper, more closed, divertor configuration in DIII-D. Advances in feedback on nitrogen radiation in the upper divertor using bolometry allow for control over the level of radiative power, and by proxy, the heat flux to the divertor plate. The impact on global confinement and correlation with edge profiles and stability, along with divertor radiated power, temperatures, densities, and heat flux are analyzed and compared between divertor configurations. The EPED model is used to compare experimental conditions with theoretical predictions of access to the super H-mode channel.

[1]Work supported by US DOE under DE-FC02-04ER54698, DE-SC0019352, DE-FG02-08ER54984, DE-AC02-09CH11466, and DE-AC52-07NA27344

Theresa Wilks
Massachusetts Institute of Technology

Date submitted: 27 Jun 2019 Electronic form version 1.4