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Initial transport validation studies using NSTX-U L-mode plasmas WALTER GUTTENFELDER, D. BATTAGLIA, R.E. BELL, M.D. BOYER, PPPL, N. CROCKER, UCLA, A. DIALLO, N. FERRARO, S.P. GERHARDT, S.M. KAYE, B.P. LEBLANC, PPPL, D. LIU, UC-Irvine, J.E. MENARD, D. MUELLER, C. MYER, M. PODESTA, PPPL, R. RAMAN, U-Washington, Y. REN, PPPL, S. SABBAGH, Columbia, D. SMITH, UW-Madison — A variety of stationary L-mode plasmas have been successfully developed in NSTX-U for physics validation studies. The plasmas span a range of density (1-4$\times 10^{19}$ m^{-3}), plasma current (0.65-1.0 MA), and neutral beam heating power ($\leq$4 MW), taking advantage of new, more tangential neutral beam sources to vary rotation profiles. Transport analysis (TRANSP) and turbulence measurements (BES, reflectometry) of these plasmas will be illustrated and compared with initial microstability and transport predictions. In particular, the normalized beta of these L-modes range between β_N =1-2, providing a valuable bridge in parameter space between (i) H-modes at comparable beta in conventional tokamaks (R/a$\sim$3, β_N $\sim$2), where transport models have been largely developed and tested, and (ii) low-aspect-ratio H-modes at higher beta (R/a$\sim$1.5-1.7, β_N $\sim$5), where transport models are less tested and challenged by stronger electromagnetic and equilibrium effects. This work is supported by US DOE contract DE-AC02-09CH11466.

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