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Supersonic gas jet fueling efficiency studies in NSTX.* D.P. LUNDBERG, Princeton U., V.A. SOUKHANOVSKII, LLNL, M.G. BELL, R.E. BELL, R. KAITA, H.W. KUGEL, B.P. LEBLANC, J.E. MENARD, A.L. ROQUEMORE, D.P. STOTLER, PPPL, R. MAINGI, ORNL, R. RAMAN, U. Washington — Electron and carbon inventory analysis is used to infer the fueling efficiency (FE) of a pulsed high-pressure supersonic D_2 jet, produced by a low field side supersonic gas injector (GI) at a flow rate $3 - 9 \times 10^{21}$ s^{-1} at distance 5-15 cm from the plasma. In ohmic and 2-6 MW NBI-heated L- and H-mode plasmas, the FE of the Mach 4 jet is found to be in the range 0.1-0.4, higher than FE of a conventional GI. During supersonic GI pulses, the pedestal density increases by 5-40 % suggesting that particles are deposited mainly in the pedestal region. A "single particle" model of lower-end pressure supersonic GI fueling is developed using the DEGAS 2 neutral transport code. Details of high-pressure jet interaction with background plasma are not included in the model. The modeling suggests that adding a directed velocity does not guarantee a FE improvement. While the supersonic GI does focus the molecules towards the core, there is a reduction in the number of dissociation product atoms that provide much of the transport for the conventional puff, resulting in comparable FE's of a supersonic and a conventional GI's. *Supported by U.S. DOE under Contracts W-7405-Eng-48 and DE-AC02-76CH03073.

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