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Gas-Filled Targets to Study Laser Backscatter on the National Ignition Facility[1] R.A. LONDON, E.A. WILLIAMS, D.E. HINKEL, J.D. MOODY, L.J. SUTER, Lawrence Livermore National Laboratory — To achieve indirect drive fusion at the National Ignition Facility (NIF), laser beams must propagate through several millimeters of high-density plasma to reach the hohlraum walls. Stimulated Brillouin and Raman backscatter could create problems with energetics and/or symmetry. Laser backscatter at NIF will be diagnosed with full aperture backscatter systems (FABS) and near backscatter imagers (NBI). Several gas-filled targets ("gas pipes") have been designed to provide backscatter sources to commission the diagnostics. The 7-mm long gas pipes are filled with various gases, including C_5H_{12} and CO_2, and are irradiated by a NIF quad with 16 kJ of energy in 2-4 ns pulses. We describe the design of the gas pipes using hydrodynamics and laser-plasma-interaction computer codes. The relationship between the design parameters (gas composition and density and laser pulse shape) and the character of the backscatter (Brillouin versus Raman and narrow versus broad angle) are discussed. Comparisons of predicted and measured backscatter distributions and levels are discussed.

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