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First Results from Laser-Driven MagLIF Experiments on OMEGA: Backscatter and Transmission Measurements of Laser Preheating J.R. DAVIES, D.H. BARNAK, R. BETTI, P.-Y. CHANG, Fusion Science Center and Laboratory for Laser Energetics, U. of Rochester — A laser-driven version of MagLIF (magnetized liner inertial fusion) is being developed on the OMEGA laser. In the first experiment, laser preheating with a single OMEGA beam was studied. Laser energies of 60 to 200 J in 2.5-ns-long pulses were used, with a distributed phase plate giving a Gaussian intensity profile with a 96 μm full width at half maximum. We report on backscatter measurements from gas-filled cylinders and both backscatter and transmission measurements from the 1.84-μm-thick polyimide foils used for the laser entrance windows. Backscatter spectra and energies from both cylinders and foils alone were very similar. Approximately 0.5% of the total incident laser energy was backscattered. Backscattering lasted for little more than 0.5 ns. The fraction of laser energy transmitted through foils within the original beam path increased from 50% to 64% as the laser energy was increased from 60 to 200 J. Up to 10% of the laser energy was sidescattered as the foil started to transmit. Sidescattering of transmitted light lasted $\sim$0.5 ns. The sidescattering might be avoided by using a short prepulse at least 0.5 ns prior to the main pulse. This material is based upon work supported by the Department of Energy National Nuclear Security Administration under Award Number DE-NA0001944 and by DE-FG02-04ER54786 and DE-FC02-04ER54789 (Fusion Science Center).

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