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First Results from Laser-Driven MagLIF Experiments on OMEGA: Time Evolution of Laser Gas Heating Using Soft X-Ray Diagnostics D.H. BARNAK, R. BETTI, P.-Y. CHANG, J.R. DAVIES, Fusion Science Center and Laboratory for Laser Energetics, U. of Rochester — Magnetized liner inertial fusion (MagLIF) is a promising inertial confinement fusion scheme comprised of three stages: axial magnetization, laser heating of the deuterium−tritium gas fill, and compression of the gas by the liner. To study the physics of MagLIF, a scaled-down version has been designed and implemented on the OMEGA-60 laser. This talk will focus primarily on the heating process of a MagLIF target using a 351-nm laser. A neon-doped deuterium gas capsule was heated using a 2.5-ns square pulse delivering 200 J of laser energy. Spectral analysis of the x-ray emission from the side and the laser entrance hole of the capsule is used to infer the time evolution of the gas temperature. The x-ray spectra for a grid of possible gas temperatures and densities are simulated using *Spect3D* atomic modeling software. The simulation results are then used to deconvolve the raw signals and obtain density and temperature estimations. A gas temperature lower bound of 100 eV at 1.3 ns after the start of the laser pulse can be inferred from these estimations. The estimations are then compared to 2-D hydrocode modeling. 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).

D.H. Barnak
Fusion Science Center and Laboratory for Laser Energetics, U. of Rochester

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