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Magnetic field impact on the temperature distribution in MagLIF laser heating[1] KYLE CARPENTER, ROBERTO MANCINI, University of Nevada, Reno, ERIC HARDING, ADAM HARVEY-THOMPSON, MATTHIAS GEISSEL, MATTHEW WEIS, STEPHANIE HANSEN, KYLE PETERSON, Sandia National Laboratories — Laser-only experiments have been performed at Z with beryllium liners filled with argon-doped deuterium to investigate the laser preheat stage of Magnetized Liner Inertial Fusion (MagLIF). Time integrated, axially-resolved spectra of the Ar K-shell emission were recorded. The spectra are sensitive to electron temperature T_e and contain line emission from the Heα and intercombination line in He-like Ar, as well as associated Li-like satellites. Via the individual analysis of the spatially resolved spectra, axially resolved temperature distributions $T_e(z)$ were extracted for multiple experiments. Changes to the laser beam profile and entrance window thickness were reflected in the magnitude and shape of the extracted profiles. The results from two identical experiments, with and without an external magnetic field, show that the inclusion of the magnetic field increased both T_e and the axial extent of the laser heated region. Radiation hydrodynamic simulations of these experiments were performed and post-processed. Analysis of the modeled spectra revealed that the simulations under-predicted T_e and the differences were larger for the magnetized case[2].

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[2]K. R. Carpenter et al., Phys. Plasmas, Submitted for publication

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