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Laser heating and temperature distribution in MagLIF experiments[1] K.R. CARPENTER, R.C. MANCINI, Physics Department, University of Nevada, Reno, E.C. HARDING, A. HARVEY-THOMPSON, M. GEISSEL, K. PETERSON, Sandia National Laboratories — In a series of MagLIF laser heating experiments performed at Z, the deuterium gas fill was doped with a trace amount of argon for spectroscopy diagnostics. A germanium spherical crystal spectrometer was employed to observe time-integrated argon K-shell line emission spatially resolved along the axis of the gas cylindrical volume. Simultaneously, an x-ray imager was fielded to record narrow band images centered on selected argon lines. The He-like argon resonance and intercombination lines and their associated satellite transitions in Li-like Ar are observed in the spectra and were recorded with high spectral resolution power. No H-like argon Lyα line emission was observed. Also, narrow band images of the intercombination line were obtained. The spectrum is temperature sensitive and the availability of spatially resolved spectra and image data affords a two-objective analysis that produces the electron temperature distribution spatially resolved along the axial and radial directions. In turn, this information permits us to assess the spatial distributions of heat flow and inverse Bremsstrahlung absorption in the plasma.

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