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Measurements of the L-shell emission of a Laser–Heated Halfraum Using High-Resolution X-ray Spectroscopy[1] KLAUS WIDMANN, MARILYN SCHNEIDER, MARK MAY, HYUN CHUNG, DENISE HINKEL, GREG BROWN, LYNN JAMES, JIM EMIG, PETER BEIERSDORFER, LLNL, CARMEN CONSTANTIN, HECTOR BALDIS, UC Davis — State–of–the–art 2D LASNEX simulations of the interaction between high–energy (kJ) laser pulses (ns) and gold halfraums predict plasma conditions with T_e above 15 keV at $n_e \sim 10^{22}$ cm^{-3}. At such temperatures the charge state distribution (CSD) of gold ions contains a significant fraction of Ne–like Au69+ ions. Survey spectra from highly charged gold ions which have been measured at the Livermore SuperEBIT facility show that the emission lines from Au69+ and its subsequent ionization stages are separated by 40 eV or more. Thus, the CSD can be determined spectroscopically by measuring the relative line intensities. We have developed a high–resolution transmission crystal spectrometer to observe the x–ray emission in the vicinity of the $3d_{5/2}$ — $2p_{3/2}$ transition of Au69+ (10.5 keV), i.e., 1000 eV spectral range around 10.2 keV. We present survey spectra obtained at SuperEBIT/LLNL and x–ray emission spectra from a laser–heated halfraum experiment performed at OMEGA/LLE.

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