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Picosecond Streaked K-Shell Spectroscopy of Near Solid-Density Aluminum Plasmas C.R. STILLMAN, P.M. NILSON, S.T. IVANCIC, C. MILEHAM, D.H. FROULA, Laboratory for Laser Energetics, U. of Rochester, I.E. GOLOVKIN, Prism Computational Sciences — The thermal x-ray emission from rapidly heated solid targets containing a buried-aluminum layer was measured. The targets were driven by high-contrast 1ω or 2ω laser pulses at focused intensities up to $1 \times 10^{19}\,\mathrm{W/cm^2}$. A streaked x-ray spectrometer recorded the Al He_α and lithium-like satellite lines with 2-ps temporal resolution and moderate resolving power ($E/\Delta E \approx 700$) . Time-integrated measurements over the same spectral range were used to correct the streaked data for variations in photocathode sensitivity. Line widths and intensity ratios from the streaked data were interpreted using a collisional radiative atomic model to provide the average plasma conditions in the buried layer as a function of time. It was observed that the resonance line tends toward lower photon energies at high electron densities. The measured shifts will be compared to predicted shifts from Stark-operator calculations at the inferred plasma conditions. This material is based upon work supported by the Department of Energy National Nuclear Security Administration under Award Number DE-NA0001944, the office of Fusion Energy Sciences Award Number DE-SC0012317, and the Stewardship Science Graduate Fellowship Grant Number DE-NA0002135.

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