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Gold Charge State Distributions in Highly Ionized, Low-Density Beam Plasmas M. MAY, LLNL, S. HANSEN, SNL, M. SCHNEIDER, J. SCOFIELD, K. WONG, P. BEIERSDORFER, LLNL — The gold charge state distribution (CSD) has been experimentally inferred from Livermore electron beam ion traps EBIT-I and EBIT-II plasmas. Non-local thermodynamic equilibrium monoenergetic electron beams were created with E_{BEAM} = 2.66, 2.92, 3.53 and 4.54 keV. Collisionally excited x-ray 5f→3d and 4f→3d line transitions from Ni-like to Kr-like Au having photon energies of 2 to 4 keV were recorded with a flat-crystal spectrometer. Radiative recombination spectra as well as collisionally excited 4f→3d to 7f→3d x-ray transitions were recorded from the beam plasmas with a photometrically calibrated x-ray microcalorimeter. The charge state distributions were inferred by fitting the measured lines in each spectral range with synthetic spectra. The SCRAM atomic physics code using atomic data from the flexible atomic code (FAC) was employed to calculate the CSD for each of the monoenergetic beam plasmas. These calculations significantly improved on previous calculations when dielectronic recombination states with high n ($8 \leq n \leq 20$) were included in the models. These high-n DR states were critical in correctly predicting the experimentally determined CSDs. This work performed under the auspices of the US DoE by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344.

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