Development of a Buried Layer Platform at the OMEGA laser to Study Coronal (nonLTE) Plasmas

M. B. SCHNEIDER, E. V. MARLEY, G. V. BROWN, R. F. HEETER, M. A. BARRIOS, M. E. FOORD, W. J. GRAY, L. C. JARROTT, D. A. LIEDAHL, C. W. MAUCHE, K. WIDMANN, Lawrence Livermore Natl Lab — A buried layer platform is being developed at the OMEGA laser to study the radiative properties of coronal (non-LTE) plasmas (ne ~ few 10^21 /cm^3, Te ~ 1 – 2 keV) of mid to high Z materials. In the current study, the target was a 200 μm square with equal atomic mixes of gold/iron/vanadium in the center of a 600 μm diameter, 10 μm thick beryllium tamper. The thickness of the buried layer was either 1200 A or 1800 A. Lasers heat the target from both sides for up to 4 ns. The size of the microdot vs time was measured with x-ray imaging (face-on) and x-ray spectroscopy (side-on). The radiant x-ray power was measured with a low-resolution absolutely calibrated x-ray spectrometer (DANTE). The temperature was measured from the Fe and V helium-beta complexes. The use of these measurements to deduce emissivity of the target in the 2-3 keV x-ray range and improvements for future experiments are discussed.

This work was performed under the auspices of the U.S. Department of Energy by LLNS, LLC, under Contract No. DE-AC52-07NA27344.