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Heating of buried layer targets by 1ω and 2ω pulses using the HELEN CPA laser LEE THORNTON, DAVID HOARTY, Plasma Physics Department, AWE Aldermaston, Reading, UK — Targets of plastic with a buried layer of aluminum at different depths were heated using the HELEN CPA laser which irradiated one surface. The emission spectra from the Al were used to infer the conditions in the target by comparing the measured spectra against those generated by the FLY code (whose input was the temperature and density history calculated by a radiation-hydrodynamics code iterated to achieve the best match to the experimental data). Measurements were taken at both a laser wavelength of 1.06 μm and after conversion to 0.53 μm. The laser irradiance was varied between 2 x 10^{17} - 10^{19} W/cm^2 by altering the laser pulselength, energy and wavelength. The data show the plastic target was heated above 200eV to a depth of about 4μm with 1.06 μm P-polarised light. The FLY comparisons indicate the buried layers heated with 0.53 μm light remained near solid density for the duration of the X-ray emission pulse and achieved a peak temperature of 500$\pm$50eV. In the case where the target was heated with 1.06 μm radiation, the density was an order of magnitude lower and the peak temperature achieved was also lower at 320$\pm$50eV. The depth to which the target was heated was similar at the two wavelengths for 0.5ps pulses. In further measurements using 0.53 μm light at similar energies (but using pulses with a FWHM of 2 ps), heating to greater than 200eV was observed to a depth of 8 μm.

Lee Thornton

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