Abstract Submitted
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Laser Heating of Solid Matter by Light Pressure-Driven Shocks at Ultra-Relativistic Intensities[1] K.U. AKLI, R.B. STEPHENS, General Atomics, A.J. MACKINNON, P.K. PATEL, M.H. KEY, S.B. HANSEN, A.J. KEMP, Lawrence Livermore National Lab., R.R. FREEMAN, D. CLARK, K. HIGHBERGER, N. PATEL, L. VAN WOERKOM, R. WEBER, The Ohio State U., F. BEG, T. MA, UCSD, D. HEY, UC-Davis, K. LANCASTER, Rutherford Appleton Lab., C. STOECKEL, M. STORM, W. THEOBALD, U. Rochester-LLE — Heating by irradiation of a solid surface in vacuum with 5×10^{20} Wcm^{-2}, 0.8 ps, 1.05 micron wavelength laser light is studied by x-ray spectroscopy of the K-shell emission from thin layers of Ni, Mo and V. A surface layer is heated to ~5 keV with an axial temperature gradient of 0.6 μm scale length. Images of Ni Lyα show the hot region has a ~25 μm diameter. Collisional particle-in-cell simulations based on density profiles from hydro-models suggest that light pressure compresses the preformed plasma and drives a shock into the solid.

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R.B. Stephens
General Atomics

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