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Saturable Absorption of an X-Ray Free-Electron-Laser Heated Solid-Density Plasma J.S. WARK, D.S. RACKSTRAW, O. CIRICOSTA, S.M. VINKO, University of Oxford, UK, T. BURIAN, J. CHALUPSKY, V. HAJKOVA, L. JUHA, IOP, Prague, Czech Republic, B. BARBREL, K. ENGELHORN, LBNL, B.-I. CHO, GIST, Republic of Korea, H.-K. CHUNG, IAEA, Vienna, Austria, G. DAKOVSKI, J. KRZYWINSKI, P. HEIMANN, M. HOLMES, J. TURNER, SLAC, R.W. LEE, UC Berkeley, S. TOLEIKIS, DESY, Germany, U. ZASTRAU, XFEL, Germany — High-intensity $\approx 10^{17}$ Wcm^{-2}, short duration (100 fsec) x-ray pulses from the LCLS x-ray free-electron laser, with photon energies ranging from below to above the K-edge of cold Al (1560 eV), are used to generate and probe a solid-density aluminum plasma. The photon-energy-dependent transmission of the heating beam is studied through the use of a photodiode. Saturable absorption is observed, with the resulting transmission differing significantly from the cold case, with the increased transmission being due to the K-edge energy of the dominant ion species shifting in time as the solid-density target is heated, in good agreement with atomic-kinetics simulations [1].

[1] D.S. Rackstraw *et al.*, Phys. Rev. Lett., 114, 015003 (2015)

J.S. Wark
University of Oxford, UK

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