

Abstract Submitted
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Direct Measurements of the Ionization Potential Depression in a Dense Plasma JUSTIN WARK, ORLANDO CIRICOSTA, SAM VINKO, DAVID RACKSTRAW, University of Oxford, HYUN-KYUNG CHUNG, IAEA, Vienna, Austria, BYOUNG-ICK CHO, PHILIP HEIMANN, LBNL, HAE-JA LEE, BOB NAGLER, RICHARD LEE, LCLS, SLAC, JAROMIR CHALUPSKY, IOP, Czech Republic — We have used the Linac Coherent Light Source to generate solid-density aluminum plasmas at temperatures of up to 180 eV [1]. By varying the photon energy of the X-rays that both create and probe the plasma, and observing the K- α fluorescence, we can directly measure the position of the K-edge of the highly-charged ions within the system. The results are found to disagree with the predictions of the extensively used Stewart-Pyatt (SP) model, but are consistent with the earlier model of Ecker and Kröll, which predicts significantly greater depression of the ionization potential [2]. The results are of interest, as the ionization potential depression can significantly impact the equation of state and opacity, yet the SP model is widely used in astrophysical and ICF simulations. (N.B. The full author list of this paper includes all authors of [1] and [2]).

[1] S.M. Vinko *et al.*, Nature (London) **482**, 59 (2012).

[2] O. Ciricosta *et al.*, Phys. Rev. Lett. (to be published).

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