

Abstract Submitted
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Ionization Potential Depression in Strongly Coupled Plasmas

JUSTIN WARK, ORLANDO CIRICOSTA, SAM VINKO, University of Oxford, BASIL CROWLEY, University of Oxford and AWE Aldermaston — The focusing of the output of 4th generation femtosecond X-ray sources to ultra-high intensities has enabled the creation of hot (close to 200-eV) aluminum plasmas at exactly solid density. [1] Tuning of the X-ray FEL energy that produces the plasma, and observation of the subsequent K- α fluorescence from the highly charged ions allows direct measurements of the K-edges, and hence ionization potential depression (IPD). [2] The results of these experiments show far higher depressions than those predicted by the frequently-used Stewart-Pyatt model, but appear to be in contradiction with laser-plasma experimental data at similar densities, but with hotter, less strongly-coupled plasmas. [3] We present here new calculations of the IPD, both *ab initio* and analytic, and discuss the relevance of the coupling parameter to the IPD. We further explore what constitutes our understanding of the physics of IPD, and how it should be modelled.

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

[2] O. Ciricosta *et al.*, Phys. Rev. Lett. **109**, 065002 (2012).

[3] D. Hoarty *et al.*, Phys. Rev. Lett. **110**, 265003 (2013).

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