

Abstract Submitted
for the DPP09 Meeting of
The American Physical Society

Electronic Structure of a Photo-Generated Solid-Density Aluminum Plasma SAM VINKO, University of Oxford, PEAK BRIGHTNESS COLLABORATION — Using high intensity radiation from the FLASH free electron XUV laser, we have created highly excited exotic states of matter in solid-density aluminum samples on time scales short compared with ion motion. The XUV intensity is sufficiently high to eject an inner-shell electron from every atom in the focal region. As the photo-excited electrons in this plasma recombine, the associated fluorescence signal provides information on the shape of the electronic density of states in the valence band, as well as the electron temperature. We demonstrate that the combination of normal and photo-ionized Al ion-cores alter the density of states in a very similar manner to that which would be expected in a binary alloy. Detailed calculations of the electronic structure, based on density functional theory, are in good agreement with the observed emission spectra.

Justin Wark
University of Oxford

Date submitted: 16 Jul 2009

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