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K-edge shift and XANES investigation of laser driven reshock-compressed Aluminum ALESSANDRA BENUZZI-MOUNAIX, ALESSANDRA RAVASIO, MICHEL KOENIG, FLORIANE FESTA, NOUROU AMADOU, ANNA LEVY, ERIK BRAMBRINK, LULI, France, FABIEN DORCHIES, OLIVIER PEYRUSSE, CELIA, France, STÉPHANE MAZEVET, VANINA RECOULES, CEA, France, TOM HALL, U. of Essex, UK — The physical properties of warm dense matter, specially their structural properties, are still poorly known. In this work, K-edge shift and X-ray Absorption Near Edge Spectroscopy (XANES) of reshocked Aluminum have been investigated with the aim of bringing information on the evolution of its electronic structure. The experiment was performed at LULI where we used one long pulse (500 ps, $I_L \approx 8\ 10^{13}$ W/cm^2) to create the shock and a second picosecond beam ($I_L \approx 10^{17}$ W/cm^2) to generate an ultra-short broadband X-ray source near the Al K-edge. The spectra were registered by using two conical KAP Bragg crystals. By changing the delay between the two beams, we have been able to observe the modification of absorption spectra for different and extreme Al conditions, up to now unexplored ($\rho \leq 3\ \rho_0$ and T ≤ 8 eV). The hydrodynamical Al conditions were measured by using VISARs interferometers and self-emission diagnostic. Experimental data are compared to various calculations.

Alessandra Benuzzi-Mounaix
LULI, France

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