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Time-Resolved K-shell Photoabsorption Edge Measurement in a Strongly Coupled Matter Driven by Laser-converted Radiation YANG ZHAO, Research Center of Laser Fusion, China Academy of Engineering Physics, Mianyang 621900 People's Republic of China, JIA-MIN YANG, JI-YAN ZHANG, GUO-HONG YANG, GANG XIONG, MIN-XI WEI, TIAN-MING SONG, ZHI-YU ZHANG, Research Center of Laser Fusion, China Academy of Engineering Physics —
A time-resolved K edge absorption measurement of warm dense KCl was performed on Shenguang II laser facility. The x-ray radiation driven shocks were adopted to take colliding shocks compression. By using Dog bone hohlraum the CH/KCl/CH sample was shielded from the laser hitting point to suppress the M band preheating and enhance the compressibility. Thus, an unexplored and extreme region of the plasma state with the maximum 5 times solid density and temperature lower than 3 eV (with coupling constant Γ_{ii} around 100) was first obtained. The photoabsorption spectra of chlorine near the K-shell edge have been measured with a crystal spectrometer using a short x-ray backlighter. The K edge red shift up to 11.7eV and broadening of 15.2eV were obtained for the maximum compression. The electron temperature, inferred by Fermi-Dirac fit of the measured K-edge broadening, was consistent with the hydrodynamic predictions. The comparison of the K edge shift with a plasma model, in which the ionization effect, continuum lowering and partial degeneracy are considered, shows that more improvements are desired to describe in details the variation of K edge shift. This work might extend future study of WDM in extreme conditions of high compression.

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