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Simulations of High Intensity X-ray Free-Electron Laser Interactions with Matter by use of the SCFLY Code JUSTIN WARK, ORLANDO CIRICOSTA, SAM VINKO, University of Oxford, HYUN-KYUNG CHUNG, IAEA, Vienna, RICHARD LEE, LLNL/LCLS — The last few years has seen a revolution in FEL technology such that multi-keV X-ray beams with focussed intensities in excess of 10^{18} Wcm^{-2} can routinely be produced. An understanding of how such radiation interacts with matter requires atomic kinetics codes with the capabilities to model large numbers of configurations, the inclusion of exotic (e.g. double core-hole) states, as well as treating the X-ray heating consistently. We report here on the use of a modified version of the SCFLY[1] code to model experiments where the LCLS beam interacted with in a low density Neon gas,[2,3] as well as more recent work where the LCLS beam was focused onto solid aluminum targets. We further demonstrate that at high photon energies the LCLS beam can be used as a non-perturbative probe of pre-exisiting charge states.

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