

# **Multiphoton Physics in the X-ray Domain**

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The Linac Coherent Light Source (LCLS), the world's first x-ray free-electron laser, will become available for experiments in the fall of 2009. Assuming LCLS design parameters for photon energies near 1 keV and focusing on processes that are expected to dominate, calculations on the prototypical neon atom will be presented. Topics that will be discussed include valence stripping; double-core-hole formation; the resonant Auger effect; and the impact of SASE-FEL pulse structure. In addition, calculations on x-ray two-photon absorption by the organic molecule para-aminophenol will be presented.