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Theory of x-ray absorption by laser-dressed atoms[1]

CHRISTIAN BUTH, ROBIN SANTRA, Argonne National Laboratory, Argonne, Illinois 60439, USA — We present an *ab initio* theory for the x-ray photoabsorption cross section of atoms in the field of a moderately intense optical laser (800 nm, 10^{13} $\frac{\mathrm{W}}{\mathrm{cm}^2}$). The laser dresses the core-excited atomic states, which introduces a dependence of the cross section on the angle between the polarization vectors of the two linearly polarized radiation sources. The strong interaction due to the laser-dressing is treated by diagonalization of a Floquet-type matrix; the weak coupling between x-rays and the atom is described by non-Hermitian perturbation theory. We apply our theory to study the photoabsorption cross section of neon and krypton atoms near the K edge. A pronounced modification of the cross section is found in the presence of the optical laser — **reference:** arXiv:physics/0611122.

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