Poster Abstract Submission

Conference	Multiphoton Processes
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Title	Electromagnetically induced transparency in laser-dressed atoms probed by x rays
Abstract	We present an ab initio theory for the absorption and the refraction of x rays by atoms in the field of a moderately intense optical laser (Ti:Sapphire: 800 nm, 10^13 W cm^2), a so-called two-color problem. The strong interaction of the atom with the linearly polarized laser is treated by diagonalizing a Floquet-type matrix; the weak coupling between the linearly polarized x rays and the atom is described by non-Hermitian perturbation theory. We obtain the atomic polarizability and the absorption cross section from which we determined the complex index of refraction of a gas sample. We apply our theory to laser-dressed neon, argon, and krypton atoms which are probed near the respective K edge. A pronounced modification of the cross section is found in the presence of the optical laser. This modification is interpreted in terms of the electromagnetically induced transparency (EIT) for x rays effect. The novel effect opens up opportunities for ultrafast x-ray pulse shaping and ultrashort all x-ray pump-probe experiments.
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