# Generation of harmonics of intense laser radiation in gases in the presence of lower-frequency field

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This paper is devoted to investigating the mechanisms of high-order and low-order harmonic generation during the interaction of the femtosecond laser eld with atomic and molecular gases in the presence of lower-frequency electric field. Based on the numerical solution of the time-dependent Schrödinger equation and wave equation in atomic hydrogen and in a gas consisting of oriented asymmetric molecules, we calculate the spectra of generated radiation in a wide range of parameters of the laser pulse co-propagating with weak mid-infrared field. We find the ranges of parameters (intensity and wavelength) of the laser pulse and ranges of the harmonic numbers, corresponding to different mechanisms of harmonic generation: the response of bound electrons, the response of free electrons, or recombination of freed electron with the emission of an energetic photon. The possibilities for using time-delay measurements of even-harmonic yield to visualize (reconstruct the waveform) of terahertz or mid-infrared pulses are discussed. This work was supported by the Russian Science Foundation (Grant No. 20-72-00131).