Low-order harmonics generation of intense laser pulses in atomic and molecular gases in static electric field

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In this work, we present an overview of our results on the study of low-order harmonics generation during the interaction of the femtosecond laser pulse with atomic and molecular gases in the presence of the static electric field. The topicality of this research is connected with the possibilities for using time-delay measurements of even-harmonic yield for coherent detection of terahertz and mid-infrared pulses. We develop analytical models that describe the ionization-induced generation of low-order harmonics for laser pulses with small ellipticity and circular polarization. We show the possibility of using linear and circular polarization to efficiently generate the second harmonic with the amplitude linearly dependent on the static field. The analytical results are compared with the numerical solution of the time-dependent Schrödinger equation for helium atom and time-dependent Kohn–Sham equations for oriented HCl and CO molecules [1–3].
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