817. 标题: Nonlinear propagation of strong-field THz pulses in doped semiconductors
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摘要: We report on nonlinear propagation of single-cycle THz pulses with peak electric fields reaching 300 kV/cm in n-type semiconductors at room temperature. Dramatic THz saturable absorption effects are observed in GaAs, GaP, and Ge, which are caused by the nonlinear electron transport in THz fields. The semiconductor conductivity, and hence the THz absorption, is modulated due to the acceleration of carriers in strong THz fields, leading to an increase of the effective mass of the electron population, as the electrons are redistributed from the low-momentum, low-effective-mass states to the high-momentum, high-effective-mass states in the energy-momentum space of the conduction band. Further, we observe the typical accompanying effects of saturable absorption on the THz pulses, such as an increase of the group delay, as the peak electric field of the pulse increases. In this paper we present the results of nonlinear THz time-domain spectroscopy, and of THz pump - THz probe spectroscopy.
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