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Title:Terahertz emission from cubic semiconductor induced by a transient anisotropic photocurrent
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Abstract:Terahertz emission from the surfaces of narrow-gap semiconductors excited by femtosecond laser pulses was described in terms of a transient interband photoconductivity. It has been found that the nonparabolicity of the electron dispersion law as well as the optical alignment of the photoexcited carrier momenta result in anisotropic photocurrent with a component perpendicular to the surface dc electric field even in semiconductors with a cubic symmetry. This lateral transient photocurrent component is the strongest during the first few hundreds of femtoseconds after the photoexcitation and causes the emission of terahertz radiation pulses with an amplitude dependent on the angle between the optical field and the crystallographic axes. In the case of InAs the contribution of this component explains experimental results of both the azimuthal anisotropy of the emitted terahertz pulse amplitude and its dependence on the exciting photon energy. © 2012 American Institute of Physics.
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