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Accession Number

12394317

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Author Unabbreviated

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Title

Temperature dependence of nonequilibrium transport time of electrons in bulk GaAs investigated by time-domain terahertz spectroscopy

Source

Applied Physics Letters, vol.99, no.2, 11 July 2011, 022111 (3 pp.). Publisher: American Institute of Physics, USA.

Abstract

By using free space terahertz electro-optic sampling technique, the terahertz (THz) waveforms emitted from intrinsic bulk GaAs photoexcited by femtosecond laser pulses under strong bias electric fields at various temperatures were recorded. We clearly observe the velocity of electrons exhibits a pronounced overshoot behavior. The nonequilibrium transport time of electrons,  $\tau_{neq}$ , has been obtained from the THz waveforms. From the temperature dependence of  $\tau_{neq}$ , we find that  $\tau_{neq}$  is governed by the polar scattering process of electrons in  $\Gamma$  valley via longitudinal optical phonon emissions. (17 References).