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标题: The importance of scattering, surface potential, and vanguard counter-potential in terahertz emission from gallium arsenide

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摘要: It is well established that under excitation by short (<1 ps), above-band-gap optical pulses, semiconductor surfaces may emit terahertz-frequency electromagnetic radiation via photocarrier diffusion (the dominant mechanism in InAs) or photocarrier drift (dominant in GaAs). Our three-dimensional ensemble Monte Carlo simulations allow multiple physical parameters to vary over wide ranges and provide unique direct insight into the factors controlling terahertz emission. We find for GaAs (in contrast to InAs), scattering and the surface potential are key factors. We further delineate in GaAs (as in InAs) the role of a vanguard counter-potential. The effects of varying dielectric constant, band-gap, and effective mass are similar in both emitter types. (C) 2012 American Institute of Physics. [<http://dx.doi.org/10.1063/1.4730954>]

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