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标题: Terahertz generation by quantum-dot miniband superlattices in the absence of electric field domains
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摘要: We theoretically study terahertz power generation by a quantum-dot miniband superlattice operating in the limited space-charge accumulation regime, where the growth of electric field domains is suppressed. By applying a voltage along the growth direction, the steady-state and transient electron properties are investigated using a balance equation approach. Damped Bloch oscillation is observed with an onset electric field in the order of 10(5) V/m. The generated terahertz power density and generation efficiency are numerically evaluated. It is shown that the generation efficiency can be as high as 35% at a moderate dc electric field. The generated power density at room temperature is in the range of one tenth microwatt per micron. Quantum-dot miniband superlattice operating in the limited space-charge accumulation regime provides a promising mechanism for the purpose of terahertz generation. (C) 2012 American Institute of Physics. [http://dx.doi.org/10.1063/1.3693539]
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