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Title:Terahertz amplifiers based on multiple graphene layer with field-enhancement effect
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Abstract:Terahertz (THz) devices have been developed over the last decade to utilize THz waves for non-destructive sensing and high-speed wireless communications. Ryzhii et al. theoretically demonstrated the feasibility of THz lasing in optically pumped multiple graphene layer (MGL) structures and proposed THz laser structures [V. Ryzhii et al.: J. Appl. Phys. 106 (2009) 084507]. In addition, metallic sheets perforated with a periodic array of holes (metal mesh) have been used for band-pass filters with resonant transmittance of unity. In these periodic structures, induced surface plasmon polaritons (SPPs) enhance the electric field near the holes. We investigated THz amplifiers composed of MGL and metal mesh structures using finite difference time domain (FDTD) electromagnetic simulation. A remarkable increase in the transmittance for the metal mesh structure with MGL was observed.
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