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Title:Gain enhancement in graphene terahertz amplifiers with resonant structures
Authors:Takatsuka, Yuya (1); Takahagi, Kazuhiro (1); Sano, Eiichi (1); Ryzhii, Victor (2); Otsuji, Taiichi (2)
Author affiliation:(1) Research Center for Integrated Quantum Electronics, Hokkaido University, Sapporo 060-8628, Japan; (2) Japan Science and Technology Agency, Core Research for Evolutional Science and Technology, Chiyoda, Tokyo 102-0075, Japan; (3) Computational Nano-Electronics Laboratory, University of Aizu, Aizu-Wakamatsu, Fukushima 965-8580, Japan; (4) Research Institute of Electrical Communication, Tohoku University, Sendai 980-8577, Japan
Corresponding author:Takatsuka, Y.
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Abstract:Terahertz (THz) devices have been investigated over the last decade to utilize THz waves for non-destructive sensing and high-speed wireless communications. Graphene with gapless and linear energy spectra is expected to exhibit population inversion and has negative dynamic conductivity in the THz range when it is illuminated by infrared light. We analyze a THz amplifier utilizing this negative dynamic conductivity combined with electric field enhancements due to surface plasmon polaritons induced on a metal mesh and with a resonant structure. We evaluate its characteristics through finite-difference time-domain electromagnetic simulations. The amplifier is expected to remarkably enhance THz emissions compared with amplifiers without the resonant structure. © 2012 American Institute of Physics.
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