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Title:Inducing an incipient terahertz finite plasmonic crystal in coupled two dimensional plasmonic cavities
Authors:Dyer, G.C. (1); Aizin, G.R. (2); Preu, S. (3); Vinh, N.Q. (3); Allen, S.J. (3); Reno, J.L. (1); Shaner, E.A. (1)
Author affiliation:(1) Sandia National Laboratories, Post Office Box 5800, Albuquerque, NM 87185, United States; (2) Kingsborough College, City University of New York, Brooklyn, NY 11235, United States; (3) Institute for Terahertz Science and Technology, UC Santa Barbara, Santa Barbara, CA 93106, United States; (4) Materials Department, UC Santa Barbara, Santa Barbara, CA 93106, United States; (5) Department of Applied Physics, University of Erlangen-Nuremberg, 91058 Erlangen, Germany; (6) Department of Physics, Virginia Tech., Blacksburg, VA 24061, United States
Corresponding author:Dyer, G.C.(gcdyer@sandia.gov)
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Abstract:We measured a change in the current transport of an antenna-coupled, multigate, GaAs/AlGaAs field-effect transistor when terahertz electromagnetic waves irradiated the transistor and attribute the change to bolometric heating of the electrons in the two dimensional electron channel. The observed terahertz absorption spectrum indicates coherence between plasmons excited under adjacent biased device gates. The experimental results agree quantitatively with a theoretical model we developed that is based on a generalized plasmonic transmission line formalism and describes an evolution of the plasmonic spectrum with increasing electron density modulation from homogeneous to the crystal limit. These results demonstrate an electronically induced and dynamically tunable plasmonic band structure. © 2012 American Physical Society.
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Main heading:Plasmons
Controlled terms:Absorption spectroscopy - Antennas - Field effect transistors - Two dimensional
Uncontrolled terms:Antenna-coupled - Current transport - Density modulation - Device gate - GaAs/AlGaAs - Plasmonic - Plasmonic crystals - Tera Hertz - Terahertz absorption spectrum - Theoretical models - Two-dimensional electron channel

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