392
Accession number:12977018
Title:Coherent photocurrent control in graphene in a magnetic field
Authors:Rao, K.M. (1); Sipe, J.E. (1)
Author affiliation:(1) Dept. of Phys.technique, Univ. of Toronto, Toronto, ON, Canada
Source title:Physical Review B (Condensed Matter and Materials Physics)
Abbreviated source title:Phys. Rev. B, Condens. Matter Mater. Phys. (USA)
Volume:86
Issue:11
Publication date:15 Sept. 2012
Pages:115427 (10 pp.)
Language:English
ISSN:1098-0121
CODEN:PRBMDO
Document type:Journal article (JA)
Publisher:American Physical Society
Country of publication:USA
Material Identity Number:DQ91-2012-034
Abstract:We consider theoretically the coherent optical control of a graphene sheet in a perpendicular magnetic field. When a two-color optical beam is applied, rotating photocurrents of electrons and holes are generated through interference between one- and two-photon processes which place electrons or holes in adjacent Landau levels. These oppositely rotating currents contain multiple frequency components in the terahertz range due to the unequal Landau level spacing combined with the finite pulse bandwidths. The overall current oscillates in a direction determined by the pulse polarization, and the phase of oscillation can be tuned through a relative phase parameter of the pulses. The magnitude of the current is predicted to be comparable to that already detected in the absence of a magnetic field, so these effects should be observable.
Number of references:23
Controlled terms:graphene - Landau levels - photoconductivity
Uncontrolled terms:coherent photocurrent control - perpendicular magnetic field - graphene sheet - two color optical beam - rotating photocurrent - Landau level - pulse polarization - C
Classification codes:A7865V Optical properties of fullerenes and related materials (thin films/low-dimensional structures) - A7240 Photoconduction and photovoltaic effects; photodielectric effects - A7145 Collective effects (condensed matter electronic structure)
Chemical indexing:C/el
Treatment:Theoretical or Mathematical (THR)
Discipline:Physics (A)
DOI:10.1103/PhysRevB.86.115427
Database:Inspec