381.Accession number:13018090
Title:Radiation effects on the electronic properties of bilayer graphene
Authors:Sua´rez Morell, E. (1); Torres, L.E.F.F. (2)
Author affiliation:(1) Dept. de Fis., Univ. Tec. Federico Santa Maria, Valparaiso, Chile; (2) Inst. de Fis. Enrique Gaviola, Univ. Nac. de Cordoba, Cordoba, Argentina
Source title:Physical Review B (Condensed Matter and Materials Physics)
Abbreviated source title:Phys. Rev. B, Condens. Matter Mater. Phys. (USA)
Volume:86
Issue:12
Publication date:15 Sept. 2012
Pages:125449 (5 pp.)
Language:English
ISSN:1098-0121
CODEN:PRBMDO
Document type:Journal article (JA)
Publisher:American Physical Society by AIP
Country of publication:USA
Material Identity Number:DQ91-2012-035
Abstract:We report on the effects of laser illumination on the electronic properties of bilayer graphene. By using Floquet theory combined with Green's functions, we unveil the appearance of laser-induced gaps not only at integer multiples of ℏΩ/2 but also at the Dirac point with features which are shown to depend strongly on the laser polarization. Trigonal warping corrections are shown to lead to important corrections for radiation in the terahertz range, reducing the size of the dynamical gaps. Furthermore, our analysis of the topological properties at low energies reveals that, when irradiated with linearly polarized light, ideal bilayer graphene behaves as a trivial insulator, whereas circular polarization leads to a nontrivial insulator per valley.
Number of references:43
Inspec controlled terms:graphene - Green's function methods - laser beam effects - light polarisation - multilayers - topological insulators
Uncontrolled terms:bilayer graphene - radiation effects - electronic properties - laser illumination effects - Floquet theory - Green's functions - laser-induced gaps - Dirac point - laser polarization - trigonal warping corrections - terahertz range - topological properties - trivial insulator - circular polarization - C
Inspec classification codes:A7125X Electronic structure of fullerenes and fullerene-related materials; intercalation compounds - A7320D Electron states in low-dimensional structures - A7115P General mathematical techniques in electronic structure calculations (condensed matter) - A7320A Surface states, band structure, electron density of states - A7920D Laser-surface impact phenomena
Chemical indexing:C/el
Treatment:Theoretical or Mathematical (THR)
Discipline:Physics (A)
DOI:10.1103/PhysRevB.86.125449
Database:Inspec