

379.

Accession number:13029146

Title:Nonperturbative Interband Response of a Bulk InSb Semiconductor Driven Off Resonantly by Terahertz Electromagnetic Few-Cycle Pulses

Authors:Junginger, F. (1); Mayer, B. (1); Schmidt, C. (1); Schubert, O. (1); Ma&uml;hrlein, S. (1); Leitenstorfer, A. (1); Huber, R. (1); Pashkin, A. (1)

Author affiliation:(1) Dept. of Phys., Univ. of Konstanz, Konstanz, Germany

Source title:Physical Review Letters

Abbreviated source title:Phys. Rev. Lett. (USA)

Volume:109

Issue:14

Publication date:5 Oct. 2012

Pages:147403 (5 pp.)

Language:English

ISSN:0031-9007

CODEN:PRLTAO

Document type:Journal article (JA)

Publisher:American Physical Society

Country of publication:USA

Material Identity Number:FB81-2012-040

Abstract:Intense multiterahertz pulses are used to study the coherent nonlinear response of bulk InSb by means of field-resolved four-wave mixing spectroscopy. At amplitudes above 5 MV/cm the signals show a clear temporal substructure which is unexpected in perturbative nonlinear optics. Simulations based on a model of a two-level quantum system demonstrate that in spite of the strongly off-resonant character of the excitation the high-field few-cycle pulses drive the interband resonances into a nonperturbative regime of Rabi flopping. The rotating wave approximation breaks down in this case and the system reaches a complete population inversion.

Number of references:27

Inspec controlled terms:III-V semiconductors - indium compounds - multiwave mixing - population inversion - terahertz wave spectra

Uncontrolled terms:nonperturbative interband response - terahertz electromagnetic few-cycle pulses - intense multiterahertz pulses - field-resolved four-wave mixing spectroscopy - temporal substructure - perturbative nonlinear optics - two-level quantum system - strongly off-resonant character - high-field few-cycle pulses - Rabi flopping - rotating wave approximation - population inversion - InSb

Inspec classification codes:A7870G Microwave and radiofrequency interactions with condensed matter - A4265M Multiwave mixing - B4340F Optical phase conjugation and multiwave mixing

Chemical indexing:InSb/bin In/bin Sb/bin

Treatment:Experimental (EXP)

Discipline:Physics (A); Electrical/Electronic engineering (B)

DOI:10.1103/PhysRevLett.109.147403

Database:Inspec

IPC Code:G02F1/35Copyright 2012, The Institution of Engineering and Technology