125.

Accession number:20113214215577

Title:Broadly tunable quasi-phase-matching in nonlinear metamaterials

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Source title: Physical Review A - Atomic, Molecular, and Optical Physics

Abbreviated source title:Phys Rev A

Volume:84

Issue:1

Issue date:July 21, 2011

Publication year:2011

Article number:013823

Language:English

ISSN:10502947

E-ISSN:10941622

CODEN:PLRAAN

Document type: Journal article (JA)

Publisher: American Physical Society, One Physics Ellipse, College Park, MD 20740-3844, United States

Abstract:The ability to tune the quasi-phase-matching (QPM) frequency is a highly desirable though lacking feature of many nonlinear devices. To this end, we consider QPM in a special class of active nonlinear metamaterials (MMs), whose properties can be controlled postfabrication. By application of a tunable, periodic perturbation in the linear susceptibility (magnetic or electric) of a MM, a single nonlinear device can be constructed to operate over an exceedingly broad bandwidth. We propose a nonlinear MM for QPM second-order harmonic generation at terahertz frequencies, predicted to have a tunable bandwidth of over 100%. © 2011 American Physical Society.