

Accepted Manuscript

Density of optical states in rolled-up photonic crystals and quasi crystals

Ehsan Saei Ghareh Naz, Matthew R. Jorgensen, Oliver G. Schmidt

PII: S0010-4655(16)30389-7

DOI: <http://dx.doi.org/10.1016/j.cpc.2016.12.010>

Reference: COMPHY 6109

To appear in: *Computer Physics Communications*

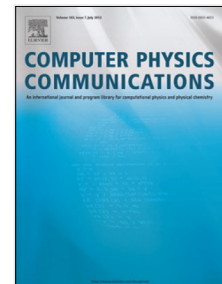
Received date: 6 December 2015

Revised date: 21 July 2016

Accepted date: 9 December 2016

Please cite this article as: E.S. Ghareh Naz, M.R. Jorgensen, O.G. Schmidt, Density of optical states in rolled-up photonic crystals and quasi crystals, *Computer Physics Communications* (2016), <http://dx.doi.org/10.1016/j.cpc.2016.12.010>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



Density of optical states in rolled-up photonic crystals and quasi crystals

Ehsan Saei Ghareh Naz^{1,2*}, Matthew R. Jorgensen¹, Oliver G. Schmidt^{1,2}

¹*Institute for Integrative Nanosciences, IFW Dresden, Helmholtzstr. 20, 01069 Dresden, Germany*

²*Material Systems for Nanoelectronics, Chemnitz University of Technology, Reichenhainer Str. 70, 09107 Chemnitz, Germany*

*Corresponding author: E. Saei Ghareh Naz (e.saei.ghareh.naz@ifw-dresden.de)

Abstract

We describe the local density of optical states (LDOS) and the density of optical states (DOS) in three dimensional (3D) finite size rolled-up photonic crystals and quasi crystals calculated using optimized code based on finite difference time domain (FDTD) techniques. Because the Bloch-Floquet theorem is not used in these calculations, the code can be applied to any dielectric structures that lack discrete translational symmetry, making it ideal for experimentally fabricated structures that are finite in size and include defects. Our software can be used for either LDOS or DOS calculations, is parallelized using standard message passing interface (MPI) protocols, and is freely available at www.fpspackage.com.

Keywords: Photonic crystal and quasi crystals, Local density of optical states, Density of optical states, FDTD

PROGRAM SUMMARY

Manuscript title: Density of optical states in rolled-up photonic crystals and quasi-crystals

Authors: Ehsan Saei Ghareh Naz, Matthew R. Jorgensen, Oliver G. Schmidt

Program title: FPS.

Licensing provisions: GNU General Public License 3.

Programming language: C++.

Computer(s) for which the program has been designed: PCs and distributed memory machines.

Operating system(s) for which the program has been designed: Linux, Unix.

RAM required to execute with typical data: Depending on the problem; gigabytes.

Has the code been vectorized or parallelized?: Yes; parallelized using message passing interface.

Number of processors used: The user can declare the number of processes.

Keywords: Photonic crystal and quasi crystals, Local density of optical states, Density of optical states, FDTD

CPC Library Classification: 10.

External routines/libraries used: Minimum: MPI; [1] fftw3; [2] optional: hdf5-tools. [3]

Nature of problem: The aim of FPS is to provide a fast and easy-to-use package for studying local density of optical states and density of optical

Download English Version:

<https://daneshyari.com/en/article/4964439>

Download Persian Version:

<https://daneshyari.com/article/4964439>

[Daneshyari.com](https://daneshyari.com)