# Photonic and Phononic Properties of Engineered Nanostructures XIII 

Ali Adibi<br>Shawn-Yu Lin<br>Axel Scherer<br>Editors

30 January - 2 February 2023
San Francisco, California, United States

Sponsored and Published by SPIE

The papers in this volume were part of the technical conference cited on the cover and title page. Papers were selected and subject to review by the editors and conference program committee. Some conference presentations may not be available for publication. Additional papers and presentation recordings may be available online in the SPIE Digital Library at SPIEDigitalLibrary.org.

The papers reflect the work and thoughts of the authors and are published herein as submitted. The publisher is not responsible for the validity of the information or for any outcomes resulting from reliance thereon.

Please use the following format to cite material from these proceedings:
Author(s), "Title of Paper," in Photonic and Phononic Properties of Engineered Nanostructures XIII, edited by Ali Adibi, Shawn-Yu Lin, Axel Scherer, Proc. of SPIE 12431, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 0277-786X
ISSN: 1996-756X (electronic)
ISBN: 9781510659674
ISBN: 9781510659681 (electronic)
Published by
SPIE
P.O. Box 10, Bellingham, Washington 98227-0010 USA

Telephone +13606763290 (Pacific Time)
SPIE.org
Copyright © 2023 Society of Photo-Optical Instrumentation Engineers (SPIE).
Copying of material in this book for internal or personal use, or for the internal or personal use of specific clients, beyond the fair use provisions granted by the U.S. Copyright Law is authorized by SPIE subject to payment of fees. To obtain permission to use and share articles in this volume, visit Copyright Clearance Center at copyright.com. Other copying for republication, resale, advertising or promotion, or any form of systematic or multiple reproduction of any material in this book is prohibited except with permission in writing from the publisher.

Printed in the United States of America by Curran Associates, Inc., under license from SPIE.

Publication of record for individual papers is online in the SPIE Digital Library.


Paper Numbering: A unique citation identifier (CID) number is assigned to each article in the Proceedings of SPIE at the time of publication. Utilization of CIDs allows articles to be fully citable as soon as they are published online, and connects the same identifier to all online and print versions of the publication. SPIE uses a seven-digit CID article numbering system structured as follows:

- The first five digits correspond to the SPIE volume number.
- The last two digits indicate publication order within the volume using a Base 36 numbering system employing both numerals and letters. These two-number sets start with 00, 01, 02, 03, 04, $05,06,07,08,09,0 A, O B \ldots$, OZ, followed by $10-1 Z, 20-2 Z$, etc. The CID Number appears on each page of the manuscript.


## Contents

## vii Conference Committee

NOVEL MATERIALS AND PHENOMENA IN ENGINEERED NANOSTRUCTURES

1243102 Vibration localization in elastic hyperbolic lattices (Invited Paper) [12431-5]

NANOPHOTONIC STRUCTURES FOR SENSING AND SPECTROSCOPY

1243103 Combined Brillouin and Raman scattering spectroscopy in 2PP printed structures [12431-11]

1243104 Integrated optical sensing system on glass substrate [12431-12]

PHOTONIC CRYSTAL STRUCTURES

1243105 Creating structured space-time light with nanophotonics (Invited Paper) [12431-13]

1243106 H1 hexapole photonic crystal nanocavities with theoretical and measured quality factors exceeding $10^{8}$ and $10^{6}$ [12431-14]

QUANTUM NANOSTRUCTURES

1243107 Quantum meta-photonics (Invited Paper) [12431-18]

METAPHOTONIC STRUCTURES: MATERIALS AND DEVICES I

1243108 Overcoming intensity saturation in second harmonic nonlinear intersubband polaritonic metasurfaces using two-level systems [12431-23]

METAPHOTONIC STRUCTURES: MATERIALS AND DEVICES II

1243109 High transmission efficiency colour filters based on hybrid metal-dielectric metasurfaces [12431-27]

| 124310 A | Functionalisation of 20 nm citrate-coated gold nanoparticles using perfluorodecanethiol [12431-34] |
| :---: | :---: |
|  | RECONFIGURABLE NANOPHOTONICS USING PHASE-CHANGE MATERIALS |
| 12431 OB | Learning from failure: boosting cycling endurance of optical phase change materials (Invited Paper) [12431-36] |
|  | NANOPHOTONIC DESIGN APPROACHES BASED ON ARTIFICIAL INTELLIGENCE |
| 12431 OC | Inverse design of two-dimensional freeform metagrating using an adversarial conditional variational autoencoder [12431-41] |
|  | MODELING, SIMULATION, AND DESIGN OF NANOPHOTONIC STRUCTURES |
| 12431 OD | Engineering band-edge dynamics of photonic filters via topology optimization [12431-47] |
|  | RESONANCE-BASED NANOPHOTONIC DEVICES |
| 12431 OE | Enhancing nonlinear performance of resonant cavities using nonlinear organic monolayers (Invited Paper) [12431-49] |
|  | NONLINEAR PHOTONIC NANOSTRUCTURES II |
| 12431 OF | Controlling the magnetic response in dielectrics via near-field interactions [12431-59] |
|  | POSTER SESSION |
| $124310 G$ | Polarization-independent $\mathrm{VO}_{2}$ metagrating for broadband optical transmittance modulation [12431-61] |
| 124310 H | Enhanced light emission collection from InGaN quantum wells using plasmonic metasurfaces [12431-63] |

12431 OI Photonic-crystal surface-emitting lasers in red wavelength range [12431-17]

