PROCEEDINGS OF SPIE

Quantum Nanophotonic Materials, Devices, and Systems 2024

Cesare Soci Matthew T. Sheldon Igor Aharonovich Editors

20–21 August 2024 San Diego, California, United States

Sponsored and Published by SPIE

Volume 13120

Proceedings of SPIE 0277-786X, V. 13120

SPIE is an international society advancing an interdisciplinary approach to the science and application of light.

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 *Quantum Nanophotonic Materials, Devices, and Systems 2024*, edited by Cesare Soci, Matthew T. Sheldon, Igor Aharonovich, Proc. of SPIE 13120, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510679009

ISBN: 9781510679016 (electronic)

Published by

SPIE

P.O. Box 10, Bellingham, Washington 98227-0010 USA Telephone +1 360 676 3290 (Pacific Time)

SPIE.org

Copyright © 2024 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, 0A, 0B ... 0Z, followed by 10-1Z, 20-2Z, etc. The CID Number appears on each page of the manuscript.

Contents

v Conference Committee

	QUANTUM SYSTEMS I
13120 02	Vector magnetometry using optically pumped quantum centers in 6H silicon carbide [13120-2]
	QUANTUM DEVICES I
13120 03	Quantum sensing with multiple optically addressable spin defects in hexagonal boron nitride [13120-5]
	QUANTUM SYSTEMS II
13120 04	Directionally unbiased nanophotonic waveguide multiports for integrated quantum photonics applications [13120-9]
	POSTER SESSION
13120 05	Single electron states and intraband absorption in GaAs biconical quantum dot [13120-21]
13120 06	Quantum optical scatterings applied to photonics [13120-22]
	DIGITAL POSTER SESSION
13120 07	Bright heralded source based on SWFM reaching theoretical single-photon purity [13120-8]

Conference Committee

Symposium Chairs

Sonja Franke-Arnold, University of Glasgow (United Kingdom) **Giovanni Volpe**, Göteborgs Universitet (Sweden)

Symposium Co-chairs

Cornelia Denz, Physikalisch-Technische Bundesanstalt (Germany) **Gennady Shvets**, Cornell University (United States)

Conference Chairs

Cesare Soci, Nanyang Technological University (Singapore) **Matthew T. Sheldon**, University of California, Irvine (United States) **Igor Aharonovich**, University of Technology Sydney (Australia)

Conference Program Committee

Mario Agio, Universität Siegen (Germany) and CNR-INO (Italy)

Vikas Anant, Photon Spot, Inc. (United States)

Alex Clark, University of Bristol (United Kingdom)

Jennifer A. Dionne, Stanford University (United States)

Andrei Faraon, California Institute of Technology (United States)

F. Javier García de Abajo Sr., ICFO - Institut de Ciències Fotòniques (Spain)

Stephan J. Goetzinger, Max-Planck-Institut für die Physik des Lichts (Germany)

Mohammad Hafezi, Joint Quantum Institute (United States)

Zubin Jacob, Purdue University (United States)

Je-Hyung Kim, Ulsan National Institute of Science and Technology (Korea, Republic of)

Laura Kim, University of California, Los Angeles (United States)

Sejeong Kim, The University of Melbourne (Australia)

Mark Lawrence, Washington University in St. Louis (United States)

Chao-Yang Lu, University of Science and Technology of China (China)

Patrick Maletinsky, Universität Basel (Switzerland) and Qnami (Switzerland)

Maiken H. Mikkelsen, Duke University (United States)

Kae Nemoto, Okinawa Institute of Science and Technology Graduate University (Japan)

Teri W. Odom, Northwestern University (United States)

Dan Oron, Weizmann Institute of Science (Israel)

Matthew A. Pelton, University of Maryland, Baltimore County (United States)

Marina Radulaski, University of California, Davis (United States)
Kartik Srinivasan, National Institute of Standards and Technology
(United States)

Daniel L. Stick, Sandia National Laboratories (United States)

Mark Tame, Stellenbosch University (South Africa)

Ewold Verhagen, AMOLF (Netherlands)

Ulrike Woggon, Technische Universität Berlin (Germany)

Valery Zwiller, KTH Royal Institute of Technology (Sweden)