

PROCEEDINGS OF SPIE

Quantum Computing, Communication, and Simulation II

Philip R. Hemmer
Alan L. Migdall
Editors

22–27 January 2022
San Francisco, California, United States

20–24 February 2022
ONLINE

Sponsored and Published by
SPIE

Volume 12015

Proceedings of SPIE 0277-786X, V. 12015

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 SPIDigitalLibrary.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 Computing, Communication, and Simulation II*, edited by Philip R. Hemmer, Alan L. Migdall, Proc. of SPIE 12015, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510649019

ISBN: 9781510649026 (electronic)

Published by

SPIE

P.O. Box 10, Bellingham, Washington 98227-0010 USA

Telephone +1 360 676 3290 (Pacific Time)

SPIE.org

Copyright © 2022 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.

**SPIE. DIGITAL
LIBRARY**

SPIDigitalLibrary.org

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 COMPUTING I

12015 03 **Design of integrated photonic controlled-phase gate with programmable phase for quantum applications** [12015-4]

12015 04 **High-density single-mode laser arrays for quantum systems** [12015-5]

QUANTUM SIMULATION II

12015 05 **A throughput optimal scheduling policy for a quantum switch (Invited Paper)** [12015-22]

TRANSDUCTION II

12015 06 **Frequency down-conversion for efficient, low-noise quantum frequency converters** [12015-28]

12015 08 **Microwave to optical quantum conversion (Invited Paper)** [12015-31]

TRANSDUCTION III

12015 09 **A room-temperature field-deployable quantum memory for quantum repeater schemes (Invited Paper)** [12015-36]

QUANTUM REPEATERS

12015 0A **QKD field-trial in Padua: a resource-effective implementation with the iPOGNAC encoder** [12015-47]

QUANTUM COMMUNICATIONS AND NETWORKING I

12015 0B **Engineering Kerr-cat qubits for hardware efficient quantum error correction (Invited Paper)** [12015-54]

QUANTUM COMMUNICATIONS AND NETWORKING II

12015 0C **Fiber-based Sagnac interferometer for active polarization entangled photon-pair source**
[12015-58]

QUANTUM COMMUNICATIONS AND NETWORKING III

12015 0D **Compact entanglement sources for portable quantum information platforms** [12015-61]

12015 0E **Long-baseline interferometry using single photon states as a non-local oscillator** [12015-62]

POSTER SESSION

12015 0F **Resource optimization for the quantum Internet** [12015-71]