

PROCEEDINGS OF SPIE

Broadband Access Communication Technologies XV

Benjamin B. Dingel
Katsutoshi Tsukamoto
Spiros Mikroulis
Editors

6–11 March 2021
Online Only, United States

Cosponsored by
Corning Incorporated (United States)
NTT Electronics America, Inc. (United States)

Published by
SPIE

Volume 11711

Proceedings of SPIE 0277-786X, V. 11711

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 *Broadband Access Communication Technologies XV*, edited by Benjamin B. Dingel, Katsutoshi Tsukamoto, Spiros Mikroulis, Proceedings of SPIE Vol. 11711 (SPIE, Bellingham, WA, 2021) Seven-digit Article CID Number.

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510642577

ISBN: 9781510642584 (electronic)

Published by

SPIE

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

Telephone +1 360 676 3290 (Pacific Time) Fax +1 360 647 1445

SPIE.org

Copyright © 2021, Society of Photo-Optical Instrumentation Engineers.

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 copying fees. The Transactional Reporting Service base fee for this volume is \$21.00 per article (or portion thereof), which should be paid directly to the Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, MA 01923. Payment may also be made electronically through CCC Online 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. The CCC fee code is 0277-786X/21/\$21.00.

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

SPIEDigitalLibrary.org

Paper Numbering: *Proceedings of SPIE* follow an e-First publication model. A unique citation identifier (CID) number is assigned to each article 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

EMERGING AND ENABLING TECHNOLOGIES FOR 5G OPTICAL FRONTHAUL

- 11711 05 **Plasmonic modulators and photodetectors for communications (Invited Paper)** [11711-2]
- 11711 08 **Enabling technologies and innovations for 5G-oriented optical access networks (Invited Paper)**
[11711-5]

OPTICAL-WIRELESS COMMUNICATIONS FOR BROADBAND ACCESS

- 11711 09 **High-speed visible laser light communication: devices, systems and applications (Invited Paper)** [11711-6]
- 11711 0B **Transmission performance of FSO using 2 μ m wavelength laser** [11711-8]

BROADBAND ACCESS AND INDUSTRIAL APPLICATIONS

- 11711 0D **Modified DSP with reduced complexity in adaptive equalization for DCI systems (Invited Paper)**
[11711-10]
- 11711 0E **Full-duplex coherent optical system based on optical injection locking and optical frequency comb (Invited Paper)** [11711-11]
- 11711 0F **A disaggregated laser architecture enabling sub-nanosecond wavelength tuning time (Invited Paper)** [11711-12]

WIRELESS, RADIO OVER FIBER, AND MICROWAVE PHOTONICS

- 11711 0H **Photonic true-time delay beamforming assisted by multi-core fiber for 5G wireless communications (Invited Paper)** [11711-14]
- 11711 0I **A quantum dash mode-locked laser-based photonic aided broadband multi-Gb/s wireless signal delivery system at 5G NR (Best Student Paper)** [11711-15]
- 11711 0J **Sub-THz wireless system with electronic and optoelectronic transmitters (Invited Paper)**
[11711-16]
- 11711 0K **Minimalist-design folded-back architecture-based linear optical frequency discriminator (LOFD) for microwave photonics link (MPL)** [11711-17]

11711 OL **Exploiting wireless interference in heterogeneous networks** [11711-20]

POSTER SESSION

11711 OM **Design of variable link length indoor visible light communication system using focus tunable liquid lens** [11711-18]

11711 ON **Multicore fiber-assisted photonic sub-THz generation for full-duplex wireless transmission** [11711-19]