PROCEEDINGS OF SPIE

Integrated Optics: Devices, Materials, and Technologies XIV

Jean-Emmanuel Broquin
Christoph M. Greiner
Editors

25–27 January 2010
San Francisco, California, United States

Sponsored and Published by
SPIE

Volume 7604

Proceedings of SPIE, 0277-786X, v. 7604

The papers included 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. The papers published in these proceedings 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 this book:
Author(s), "Title of Paper," in *Integrated Optics: Devices, Materials, and Technologies XIV*, edited by Jean-Emmanuel Broquin, Christoph M. Greiner, Proceedings of SPIE Vol. 7604 (SPIE, Bellingham, WA, 2010) Article CID Number.

ISSN 0277-786X
ISBN 9780819480002

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

Printed in the United States of America.

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, with papers published first online and then in print and on CD-ROM. Papers are published as they are submitted and meet publication criteria. A unique, consistent, permanent citation identifier (CID) number is assigned to each article at the time of the first publication. Utilization of CIDs allows articles to be fully citable as soon they are published online, and connects the same identifier to all online, print, and electronic versions of the publication. SPIE uses a six-digit CID article numbering system in which:

- The first four 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. The complete citation is used on the first page, and an abbreviated version on subsequent pages. Numbers in the index correspond to the last two digits of the six-digit CID number.

Contents

POSTER SESSION

Conference Committee

Symposium Chair

E. Fred Schubert, Rensselaer Polytechnic Institute (United States)

Symposium Cochairs

Liang-Chy Chien, Kent State University (United States)
James G. Grote, Air Force Research Laboratory (United States)

Program Track Chair

Yakov Sidorin, Quarles Brady LLP (United States)

Conference Chairs

Jean-Emmanuel Broquin, Institut de Microélectronique Électromagnétisme Photonique/Laboratoroire d'Hyperfréquence et Caractérisation (France)
Christoph M. Greiner, LightSmyth Technologies, Inc. (United States)

Conference Cochairs

Gualtiero Nunzi Conti, Istituto di Fisica Applicata Nello Carrara (Italy)
Christoph A. Wächter, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany)

Program Committee

Pierre Berini, University of Ottawa (Canada)
Pavel Cheben, National Research Council Canada (Canada)
Xudong Fan, University of Missouri, Columbia (United States)
Helmut Heidrich, Fraunhofer-Institut für Nachrichtentechnik Heinrich-Hertz-Institut (Germany)
Andrea Melloni, Politecnico di Milano (Italy)
Robert L. Nelson, Air Force Research Laboratory (United States)
Jens H. Schmid, Canadian Photonics Fabrication Centre (Canada)
Frank Schmidt, JCMwave GmbH (Germany) and Zuse Institute Berlin (Germany)
Yakov Sidorin, Quarles Brady LLP (United States)
Stefano Taccheo, Swansea University (United Kingdom)

Session Chairs

1 Waveguide Engineering I
Gualtiero Nunzi Conti, Istituto di Fisica Applicata Nello Carrara (Italy)

2 Amplifiers and Lasers
Jean-Emmanuel Broquin, Institut de Microélectronique Électromagnétisme Photonique/Laboratoroire d'Hyperfréquence et Caractérisation (France)

3 Modelling
Christoph A. Wächter, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany)

4 Photonic Integration
Stefano Taccheo, Swansea University (United Kingdom)

5 Subwavelength/Diffractive Photonics
Christoph M. Greiner, LightSmyth Technologies, Inc. (United States)

6 Non-Linear Devices and Modulators
Jens H. Schmid, Canadian Photonics Fabrication Centre (Canada)

7 Waveguide Engineering II
Yakov Sidorin, Quarles Brady LLP (United States)

8 Sensing
Xudong Fan, University of Missouri, Columbia (United States)

9 Plasmonics I
Pierre Berini, University of Ottawa (Canada)

10 Plasmonics II
Robert L. Nelson, Air Force Research Laboratory (United States)

Introduction

Since the concept of Integrated Optics was introduced by Miller in 1969, this field of research has kept evolving year after year, renewing itself constantly and, sometimes, surprisingly. Indeed, though the telecom bubble exploded, Integrated Optics kept on moving, finding applications in sensors and bio-chips but also in fields that may appear unlikely upon first glance, such as Astronomy.

This wealth of Integrated Optics applications is accompanied by a great breadth of technological and design approaches. From the well-known "Silica-on silicon" based waveguides to new plasmonic devices, from microresonators to diffractive devices, the conference Integrated Optics: Devices, Materials, and Technologies has been trying to reflect the vitality and the diversity of this field. In these proceedings, the reader will therefore see new advanced work on diamond waveguides and mid-infrared waveguides, as well as the "re-invention" of Lithium Niobate devices thanks to the use of ion-slicing.

The reader will find articles written by students, who quite often gave their first international talk at this conference, together with papers from renowned scientists of the field. It is indeed because today's students are tomorrow's scientific leaders that our conference has a long-standing tradition of promoting their participation and will keep on doing so, enabled by the generous SPIE student grant policy.

If Integrated Optics: Devices, Materials, and Technologies is now one of the oldest conferences of the SPIE Optoelectronics symposium, it is, on one hand, due to the high quality of the scientific work that has been presented throughout the years, and, on the other hand, it is also due to the dedication of its program committee members who willingly spend part of their summertime building the conference and finding the exciting invited talks that we see every year. To them, to the speakers and authors, and to the SPIE staff that makes the logistics run so smoothly, we would like to express our gratitude. We are looking forward to seeing you next year!

Jean-Emmanuel Broquin
Christoph M. Greiner