## PROCEEDINGS OF SPIE

## **Optical Sensors 2021**

Francesco Baldini Jiri Homola Robert A. Lieberman Editors

19–23 April 2021 Online Only, Czech Republic

Sponsored by SPIE

Cooperating Organisations ELI Beamlines (Czech Republic) Laserlab Europe European Optical Society HiLASE Centre (Czech Republic)

Published by SPIE

Volume 11772

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 Optical Sensors 2021, edited by Francesco Baldini, Jiri Homola, Robert A. Lieberman, Proc. of SPIE 11772, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510643789

ISBN: 9781510643796 (electronic)

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

Copyright © 2021 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

	ADVANCED COMPONENTS FOR SENSING
11772 06	A monolithically integrated micro fluidic channel in a silicon-based photonic-integrated-circuit technology for biochemical sensing [11772-3]
11772 07	Stabilizing Brillouin fiber laser for applications in distributed BOTDA sensing [11772-4]
11772 OB	3D depth sensing of active structured light field based on EPI [11772-8]
	CHEMICAL SENSING
11772 0C	Micro-opto-fluidic platform for spectroscopic identification of water-based fluids [11772-9]
11772 OE	Nanoporous silver films produced by solid-state dewetting for SERS applications [11772-11]
11772 01	Detection of copper by localized surface Plasmon resonance based fiber optic technique [11772-15]
	PHYSICAL SENSING
11772 OJ	PHYSICAL SENSING  Geo-localization using indoor visible light communication [11772-16]
11772 OJ 11772 OK	
	Geo-localization using indoor visible light communication [11772-16]
11772 OK	Geo-localization using indoor visible light communication [11772-16]  Vehicular visible light communication in a traffic controlled intersection [11772-17]  Determination of Stokes velocities and sedimentation rate by a photonic resonant surface
11772 OK	Geo-localization using indoor visible light communication [11772-16]  Vehicular visible light communication in a traffic controlled intersection [11772-17]  Determination of Stokes velocities and sedimentation rate by a photonic resonant surface
11772 OK	Geo-localization using indoor visible light communication [11772-16]  Vehicular visible light communication in a traffic controlled intersection [11772-17]  Determination of Stokes velocities and sedimentation rate by a photonic resonant surface signal [11772-18]
11772 OK 11772 OL	Geo-localization using indoor visible light communication [11772-16]  Vehicular visible light communication in a traffic controlled intersection [11772-17]  Determination of Stokes velocities and sedimentation rate by a photonic resonant surface signal [11772-18]  FIBER OPTIC SENSORS  Fibre Bragg grating inscription into a seven core fibre and its application as a vector bending

11772 OR	Lab-on-fiber SERS optrodes for biomedical applications [11772-24]
11772 OS	TFBG-assisted fiber optic sensors for environmental monitoring [11772-25]
11772 OT	High sensitivity optical fiber microring sensor based on Whispering-Gallery mode for water analysis [11772-26]
11772 OU	Multi U-bent cladded POF sensors for refractive index measurement [11772-27]
11772 0V	Optimization of the geometries of palladium-coated single mode tapered fiber hydrogen sensors for improving sensitivity [11772-28]
	NOVEL CONCEPTS IN OPTICAL SENSING
11772 0Y	Ultrasensitive surface refractive index imaging in all-dielectric structures (Invited Paper) [11772-31]
11772 OZ	Nanometer-scale cavities for mid-infrared light based on graphene plasmons [11772-32]
11772 10	Surface-enhanced sensitivity from tunable plasmonic nanostructures arrays [11772-33]
11772 12	A feasibility study for self-heterodyne earth satellite dual-comb spectroscopy [11772-35]
11772 13	Pore size assessment of nanoporous alumina using absorption of laser light [11772-36]
11772 14	Temperature tunable whispering gallery modes laser based on a capillary tube [11772-37]
11772 15	Phase-frequency time-gated reflectometry for absolute measurements [11772-38]
11772 17	Mid-infrared laser-based detection of benzene [11772-40]
	POSTER SESSION
11772 18	Innovation of detecting optimized intensity of light via three-dimensional material rendering [11772-41]
11772 19	A simple and reliable counting and display circuit for laser rangefinder [11772-42]
11772 1C	Electro-optical measuring system for quality assurance of novel nanowire surfaces [11772-45]
11772 1D	Diagnostics of the combustion process of gaseous hydrocarbon fuel by methods of applied optical spectroscopy [11772-46]

11772 1E	Monitoring of polarization-based effects in fiber-optic transmission link caused by environmental variations [11772-47]
11772 1G	Chromium-doped borate glass ceramics for optical temperature sensors [11772-49]
11772 1H	Towards Czech national research infrastructure for Clock Network Services [11772-50]
11772 1J	Optical spectral device based on an acoustooptic tunable filter with a frequency-hopping change of the control signal [11772-52]
11772 1L	Numerical analysis of CZTSSe solar cell with different BSF layers for performance improvement [11772-54]
11772 1M	Temperature effect on spectral properties of cesium lead bromide perovskite nanocrystals in borogermanate glass [11772-55]
11772 10	Principles of experimental research of sensitivity inhomogeneity of matrix sensors [11772-57]
11772 1S	Single-particle sensing capabilities of cylindrical microresonators based on optical fibers [11772-61]
11772 1V	Location and wayfinding services through visible light in crowded buildings [11772-64]
11772 1W	On-board two-position optical system of classification and determination of trajectory coordinates of objects in video stream [11772-65]
11772 1Z	An ultra-broadband frequency response fiber vibration sensor based on single-mode-few-mode fiber coupler [11772-68]
11772 20	The evaluation of various designs for ytterbium-doped fiber-based superfluorescent source at 1µm wavelength [11772-69]
11772 21	Raman spectroscopy to investigate gallium nitride light emitting diodes after assembling onto copper substrates [11772-70]
11772 22	Polarization-OTDR-based optical fibre sensor for plasma current measurement in ITER: effect of fibre bending, twisting and temperature dependence of Verdet constant on the measurement accuracy [11772-71]
11772 23	High-speed sampling strategy for photoacoustic tomography using ROMP compressed sensing algorithm [11772-72]
11772 24	Analysis of the shaft behaviour in aircraft engines using tip clearance data and custom designed laser sensors [11772-73]
11772 26	Research of UV radiometer based on fiber spectroradiometer [11772-75]
11772 27	Design of the optical system for 171-ytterbium single-ion optical clock [11772-77]

- Plasmon polarized spectra on gold films modified with femtosecond laser induced surface structures [11772-79]
- Fast-detection photoacoustic tomography platform based on GPSR compressed sensing [11772-81]