

PROCEEDINGS OF SPIE

Nanoimaging and Nanospectroscopy II

**Prabhat Verma
Alexander Egnér**
Editors

**17–19 August 2014
San Diego, California, United States**

Sponsored and Published by
SPIE

Volume 9169

Proceedings of SPIE 0277-786X, V. 9169

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

Nanoimaging and Nanospectroscopy II, edited by Prabhat Verma, Alexander Egnér, Proc. of SPIE
Vol. 9169, 916901 · © 2014 SPIE · CCC code: 0277-786X/14/\$18 · doi: 10.1117/12.2081260

Proc. of SPIE Vol. 9169 916901-1

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 *Nanoimaging and Nanospectroscopy II*, edited by Prabhat Verma, Alexander Egner, Proceedings of SPIE Vol. 9169 (SPIE, Bellingham, WA, 2014) Article CID Number.

ISSN: 0277-786X

ISBN: 9781628411966

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 © 2014, 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 \$18.00 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/14/\$18.00.

Printed in the United States of America.

Publication of record for individual papers is online in the SPIE Digital Library.



SPIDigitalLibrary.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 as 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

- v *Authors*
vii *Conference Committee*

SUPER RESOLUTION TECHNIQUES

- 9169 05 **Conical diffraction as a versatile building block to implement new imaging modalities for superresolution in fluorescence microscopy [9169-4]**

SURFACE-ENHANCED SPECTROSCOPY I

- 9169 06 **Correlation studies between localized surface plasmons and surface-enhanced Raman scattering of Gold-Silver NanoDumbbells (GSNDs) at the single-particle and single-molecule level (Invited Paper) [9169-5]**
- 9169 08 **Residual pesticide detection on food with particle-enhanced Raman scattering [9169-7]**

SUPER RESOLUTION MICROSCOPY I

- 9169 0E **Using optical lattice for STED parallelization [9169-13]**

TIP-ENHANCED SPECTROSCOPY/MICROSCOPY

- 9169 0F **Plasmon-assisted chemical reactions revealed by high-vacuum tip-enhanced Raman spectroscopy (Invited Paper) [9169-14]**
- 9169 0G **Extending the functions of scanning near-field optical microscopy (Invited Paper) [9169-20]**

SUPER RESOLUTION MICROSCOPY II

- 9169 0N **Nanoscale imaging of neurotoxic proteins (Invited Paper) [9169-22]**
- 9169 0P **High speed fluorescence photoactivation localization microscopy imaging [9169-24]**

SURFACE-ENHANCED SPECTROSCOPY II

- 9169 0T **Control over plasmon enhanced Raman and fluorescence from quasi free-standing Au nanorod arrays [9169-27]**

OTHER SPECTROSCOPIES AT NANOSCALE

9169 0Z **Gas-metallic nanoparticle surface interaction characterized with in-situ electron energy loss spectroscopy [9169-34]**

Authors

Numbers in the index correspond to the last two digits of the six-digit citation identifier (CID) article numbering system used in Proceedings of SPIE. The first four digits reflect the volume number. Base 36 numbering is employed for the last two digits and indicates the order of articles within the volume. Numbers start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B...0Z, followed by 10-1Z, 20-2Z, etc.

Braitbart, Philippe O., 05	Xu, Hongxing, 0F
Braun, K., 0G	Yang, Bin, 0E
Caron, Julien, 05	Zhang, D., 0G
Damm, Signe, 0T	Zhang, Zhenglong, 0F
Fallet, Clément, 05	Zheng, Hairong, 0F
Gunewardene, Mudalige S., 0P	
Hess, Samuel T., 0P	
Horneber, A., 0G	
Huang, LiChuan, 08	
Jin, Seung Min, 06	
Kaminski Schierle, Gabriele S, 0N	
Kaminski, Clemens F., 0N	
Kohoutek, John M., 0Z	
Lee, Haemi, 06	
Lee, Jung-Hoon, 06	
Lezec, Henri, 0Z	
Lin, Pin Ann, 0Z	
Lordan, Frances, 0T	
Lounis, Brahim, 0E	
Lu, Shuaicheng, 0F	
Masui, Kyoko, 08	
McMillen, Mark, 0T	
Meixner, A. J., 0G	
Meixner, M., 0G	
Mestre, Michael, 0E	
Michel, Claire H., 0N	
Moisan, Lionel, 05	
Murphy, Antony, 0T	
Nam, Jwa-Min, 06	
Nelson, Andrew J., 0P	
Oddos, Stephane, 05	
Pinotsi, Dorothea, 0N	
Pollard, Robert, 0T	
Przybilla, Frédéric, 0E	
Ranjan, Bikas, 08	
Rice, James H., 0T	
Rogalski, J., 0G	
Saito, Yuika, 08	
Sharma, Renu, 0Z	
Sheng, Shaoxiang, 0F	
Shorte, Spencer L., 05	
Sirat, Gabriel Y., 05	
Suh, Yung Doug, 06	
Swider, K., 0G	
Tinevez, Jean-Yves, 05	
Trebbia, Jean-Baptiste, 0E	
van den Berg, M., 0G	
Verma, Prabhat, 08	
Winterstein, Jonathan, 0Z	

Conference Committee

Symposium Chairs

Satoshi Kawata, Osaka University (Japan)
Manijeh Razeghi, Northwestern University (United States)

Symposium Co-chairs

David L. Andrews, University of East Anglia Norwich (United Kingdom)
James G. Grote, Air Force Research Laboratory (United States)

Conference Chairs

Prabhat Verma, Osaka University (Japan)
Alexander Egner, Laser-Laboratorium Göttingen e.V. (Germany)

Conference Program Committee

Joerg Bewersdorf, Yale School of Medicine (United States)
Alberto Diaspro, Istituto Italiano di Tecnologia (Italy)
Christian Eggeling, University of Oxford (United Kingdom)
Joerg Enderlein, Georg-August-Universität Göttingen (Germany)
Katsumasa Fujita, Osaka University (Japan)
Stefan W. Hell, Max-Planck-Institut für Biophysikalische Chemie (Germany)
Samuel Hess, University of Maine (United States)
Bo Huang, University of California, San Francisco (United States)
Satoshi Kawata, Osaka University (Japan)
Alfred J. Meixner, Eberhard Karls Universität Tübingen (Germany)
Peter Nordlander, Rice University (United States)
Bruno Pettinger, Fritz-Haber-Institut der Max-Planck-Gesellschaft (Germany)
Markus B. Raschke, University of Colorado at Boulder (United States)
Bin Ren, Xiamen University (China)
Vahid Sandoghdar, Max-Planck-Institut für die Physik des Lichts (Germany)
Markus Sauer, Julius-Maximilians-Universität Würzburg (Germany)
Yung Doug Suh, Korea Research Institute of Chemical Technology (Korea, Republic of)
Din Ping Tsai, National Taiwan University (Taiwan)
Renato Zenobi, ETH Zürich (Switzerland)
Xiaowei Zhuang, Harvard University (United States)

Session Chairs

- 1 Super Resolution Techniques
Alexander Egner, Laser-Laboratorium Göttingen e.V. (Germany)
- 2 Surface-Enhanced Spectroscopy I
Prabhat Verma, Osaka University (Japan)
- 3 Super Resolution Microscopy I
Thomas A. Klar, Johannes Kepler Universität Linz (Austria)
- 4 Tip-Enhanced Spectroscopy/Microscopy
Haemi Lee, Korea Research Institute of Chemical Technology
(Korea, Republic of)
- 5 Super Resolution Microscopy II
Peter Nordlander, Rice University (United States)
- 6 Surface-Enhanced Spectroscopy II
Prabhat Verma, Osaka University (Japan)
Alexander Egner, Laser-Laboratorium Göttingen e.V. (Germany)
- 7 Super Resolution Microscopy III
Clemens Kaminski, University of Cambridge (United Kingdom)
- 8 Other Spectroscopies at Nanoscale
Katsumasa Fujita, Osaka University (Japan)