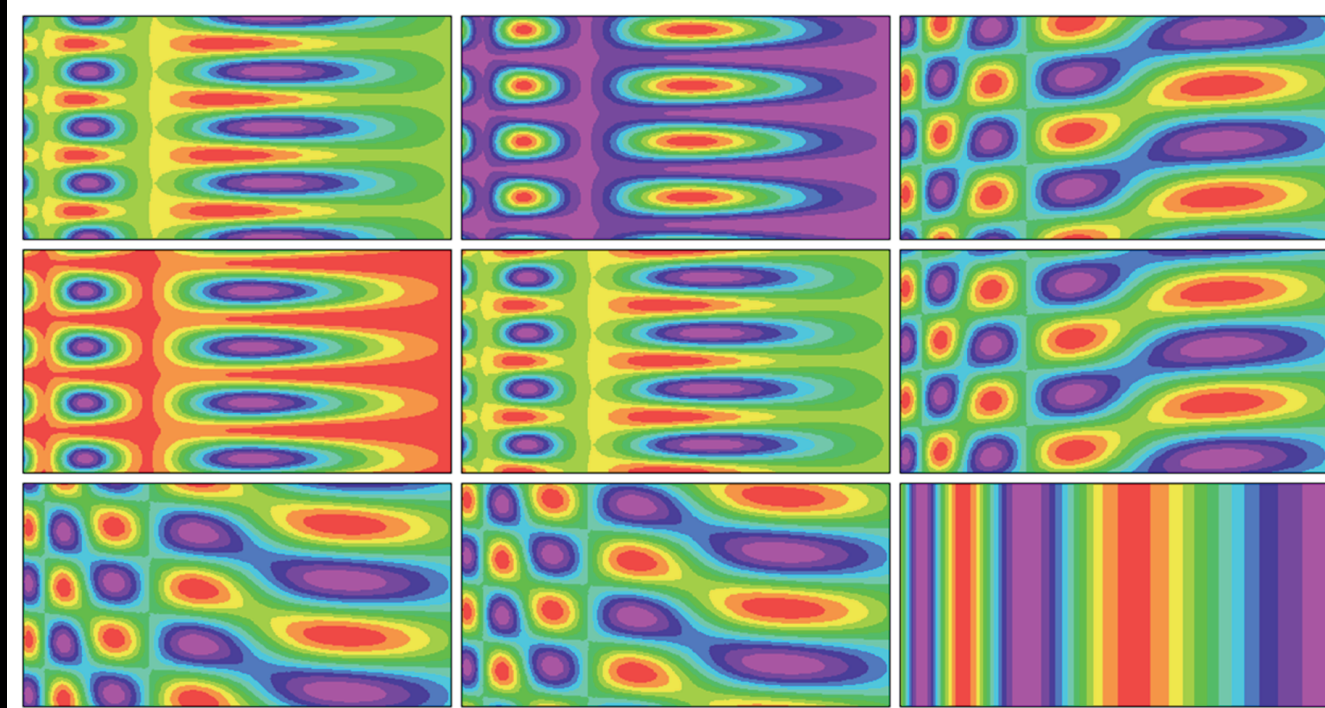


# ADVANCED OPTICAL TECHNOLOGIES



## TOPICAL ISSUE ELLIPSOMETRY

### GUEST EDITORS

*Rüdiger Schmidt-Grund*

*Chris Sturm*

*Andreas Hertwig*

### EDITOR-IN-CHIEF

*Michael Pfeffer*

THOSSMEDIA

# ADVANCED OPTICAL TECHNOLOGIES

## EDITOR-IN-CHIEF

Michael Pfeffer, *Weingarten, Germany*

University of Applied Sciences Ravensburg-Weingarten, Germany

## ASSOCIATE EDITOR

Allen Yi, *The Ohio State University, USA*

## EDITORIAL BOARD

Stefan Bäumer, *TNO Delft, Netherlands*

Jörn Bonse, *Bundesanstalt für Materialforschung und –prüfung, Germany*

Robert Brunner, *Ernst-Abbe-Hochschule, Jena, Germany*

Jan Burke, *Fraunhofer IOSB, Germany*

Andreas Erdmann, *Fraunhofer IISB, Germany*

Donis Flagello, *Nikon RCA, USA*

Michael Golub, *Tel Aviv University, Israel*

Norbert Kerwien, *Carl Zeiss AG, Germany*

Markus Krutzik, *Humboldt Universität zu Berlin, Germany*

Yanqiu Li, *Beijing Institute of Technology, China*

Irina Livshits, *St. Petersburg National Research University, Russia*

Peter Loosen, *Fraunhofer ILT, Germany*

Douglas McCarter, *McCarter Machine Inc., USA*

Cornelius Neumann, *KIT Karlsruhe, Germany*

Andrew Rakich, *GMTO, Germany*

Jan van Schoot, *ASML Netherlands BV, The Netherlands*

Stefan Sinzinger, *Technical University Ilmenau, Germany*

Guohai Situ, *Shanghai Institute of Optics and Fine Mechanics, China*

Koji Sugioka, *RIKEN Center for Advanced Photonics, Japan*

Hugo Thienpont, *Vrije Universiteit Brussel, Belgium*

Hans Dieter Tholl, *Diehl Defence GmbH & Co. KG, Germany*

Michael Totzeck, *Carl Zeiss AG, Germany*

Hexin Wang, *Carl Zeiss Shanghai Co. Ltd., China*

## MANAGING EDITOR

Holger Kleessen, *De Gruyter, Berlin, Germany*

## FOUNDING PUBLISHER

Andreas Thoss, *THOSS Media GmbH, Berlin, Germany*

**DE GRUYTER**

Advanced Optical Technologies is a strictly peer-reviewed scientific journal. The major aim of Advanced Optical Technologies is to publish recent progress in the fields of optical design, optical engineering, and optical manufacturing. Advanced Optical Technologies has a main focus on applied research and addresses scientists as well as experts in industrial research and development.

Advanced Optical Technologies partners with the European Optical Society (EOS). All its 4.500+ members have free online access to the journal through their EOS member account.

**ABSTRACTED/INDEXED IN** Astrophysics Data System (ADS) · Baidu Scholar · Chemical Abstracts Service (CAS): CAlplus; SciFinder · CNKI Scholar (China National Knowledge Infrastructure) · CNPIEC: cnpLINKer · Dimensions · EBSCO (relevant databases) · EBSCO Discovery Service · Engineering Village · Genamics JournalSeek · Google Scholar · Inspec · Japan Science and Technology Agency (JST) · J-Gate · JournalGuide · JournalTOCs · KESLI-NDSL (Korean National Discovery for Science Leaders) · Microsoft Academic · MyScienceWork · Naver Academic · Naviga (Softweco) · Paperbase · Polymer Library · Primo Central (ExLibris) · ProQuest (relevant databases) · Publons · QOAM (Quality Open Access Market) · ReadCube · Reaxys · SCImago (SJR) · SCOPUS · Semantic Scholar · Sherpa/RoMEO · Summon (ProQuest) · TDNet · TEMA Technik und Management · Ulrich's Periodicals Directory/ulrichsweb · WanFang Data · Web of Science: Emerging Sources Citation Index · WorldCat (OCLC) · Yewno Discover

ISSN 2192-8576 · e-ISSN 2192-8584

All information regarding notes for contributors, subscriptions, Open access, back volumes and orders is available online at [www.degruyter.com/aot](http://www.degruyter.com/aot)

**EDITOR-IN-CHIEF** Michael Pfeffer, Weingarten, Germany, University of Applied Sciences Ravensburg-Weingarten, Germany, Hochschule Ravensburg-Weingarten, Doggenriedstrasse, Postfach 1261, 88241 Weingarten, Germany, Tel.: +49 (0)751 501 9539, Fax: +49 (0)751 501 9874, Email: [michael.pfeffer@hs-weingarten.de](mailto:michael.pfeffer@hs-weingarten.de)

**MANAGING EDITOR** Holger Kleessen, De Gruyter, Genthiner Straße 13, 10785 Berlin, Germany, Tel.: +49 (0)30 260 05-348, Fax: +49 (0)30 260 05-250, Email: [holger.kleessen@degruyter.com](mailto:holger.kleessen@degruyter.com)

**FOUNDING PUBLISHER** Andreas Thoss, THOSS Media GmbH, Wolfshagener Str. 56, 13187 Berlin, Germany, Email: [th@thoss-media.com](mailto:th@thoss-media.com)

**RESPONSIBLE FOR ADVERTISEMENTS** Markus Kügel, De Gruyter, Rosenheimer Str. 143, 81671 München, Germany, Tel.: +49 89 76 902-424, Email: [anzeigen@degruyter.com](mailto:anzeigen@degruyter.com)

© 2022 Walter de Gruyter GmbH, Berlin/Boston and THOSS Media GmbH

**TYPESETTING** TNQ Technologies, Chennai, India

**PRINTING** Franz X. Stücker Druck und Verlag e.K., Ettenheim

**COVER IMAGE** Rotational MMSE data in transmission at normal incidence for a twisted linear retarder (showing only the “retarder” section of the MM). The wavelength range is 300 to 1000 nm. For more information see article “Mueller matrix spectroscopic ellipsometry” by James N. Hilfiker, Nina Hong and Stefan Schoeche on page 59.



# Contents

## Community

News — 47

EOS news — 51

Conference calendar — 52

## Topical Issue: Ellipsometry

Guest Editors: Rüdiger Schmidt-Grund, Chris Sturm and Andreas Hertwig

## Views

Andreas Furchner and Karsten Hinrichs

**Mid-infrared laser ellipsometry: a new era beyond FTIR — 55**

## Editorial

Rüdiger Schmidt-Grund, Chris Sturm and Andreas Hertwig  
**Ellipsometry and polarimetry – classical measurement techniques with always new developments, concepts, and applications — 57**

## Tutorial

James N. Hilfiker, Nina Hong and Stefan Schoeche

**Mueller matrix spectroscopic ellipsometry — 59**

## Review Articles

Dmitriy V. Likhachev

**Certain topics in ellipsometric data modeling with splines: a review of recent developments — 93**

Stefan Zollner, Farzin Abadizaman, Carola Emminger and Nuwanjula Samarasingha

**Spectroscopic ellipsometry from 10 to 700 K — 117**

## Research Article

René Sachse, Vasile-Dan Hodoroaba, Ralph Kraehnert and Andreas Hertwig

**Multilevel effective material approximation for modeling ellipsometric measurements on complex porous thin films — 137**