

52nd ANNUAL LASER DAMAGE SYMPOSIUM
Proceedings

**SPIE. LASER
DAMAGE**

**LASER-INDUCED DAMAGE
IN OPTICAL MATERIALS 2020**

**15–18 September 2020
Online Only, United States**

Editors

Christopher Wren Carr, Vitaly E. Gruzdev, Detlev Ristau, Carmen S. Menoni

Organized by
SPIE

Cosponsored by

Spica Technologies, Inc. (United States)
Optimax Systems, Inc. (United States)
Ultrafast Innovations GmbH (Germany)
Lawrence Livermore National Laboratory (United States)
Plymouth Grating Laboratory (United States)

Cooperating Organizations

CREOL & FPCE, College of Optics and Photonics, University of Central Florida (United States)
Colorado State University (United States)
Laser Zentrum Hannover e.V. (Germany)
The University of New Mexico (United States)

Founding Organizers

Arthur H. Guenther and Alexander J. Glass

Published by
SPIE

Proceedings of SPIE, 0277-786X, v. 11514

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

Laser-induced Damage in Optical Materials 2020, edited by Christopher Wren Carr, Vitaly E. Gruzdev, Detlev Ristau, Carmen S. Menoni, Proc. of SPIE Vol. 11514, 1151401 · © 2020
SPIE · CCC code: 0277-786X/20/\$21 · doi: 10.1117/12.2584397

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 *Laser-induced Damage in Optical Materials 2020*, edited by Christopher W. Carr, Vitaly E. Gruzdev, Detlev Ristau, Carmen S. Menoni, Proceedings of SPIE Vol. 11514 (SPIE, Bellingham, WA, 2020) Seven-digit Article CID Number.

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510638334

ISBN: 9781510638341 (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 © 2020, 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/20/\$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

MATERIALS AND MEASUREMENTS II

- 11514 0E **Damage probability versus damage density: analysis from tests using small beams versus large beams**
[11514-5]

MATERIALS AND MEASUREMENTS III

- 11514 0G **Dealing with LMJ final optics damage: post-processing and models** [11514-7]
11514 0L **532-nm, nanosecond laser mirror thin film damage competition** [11514-21]

SURFACES, MIRRORS, AND CONTAMINATION II

- 11514 19 **Fabrication of antireflection microstructure on GaSe crystal surface by single-pulse femtosecond laser ablation** [11514-32]
11514 1C **Multiple pulse picosecond laser induced damage threshold on hybrid mirrors** [11514-35]

MINI-SYMPOSIUM ON OPTICAL CERAMICS AND GLASSES I

- 11514 1F **Continuous wave laser induced damage threshold of AMTIR-1, 2, 5 and 7 chalcogenide windows at 1.07 microns** [11514-13]

POSTER SESSION: MATERIALS AND MEASUREMENTS

- 11514 1Q **213 nm Nd-YAG pulsed laser damage of non-loaded and hydrogen-loaded silica-based fibers** [11514-68]

POSTER SESSION: THIN FILMS

- 11514 1T **2D dynamic ionization simulation from ultrashort pulses in multilayer dielectric interference coatings**
[11514-40]
11514 1U **1030-nm nanosecond LIDT of dielectric coatings on yttrium aluminium garnet** [11514-41]

