

Volume 51 • Issue 6 | February 20, 2012

1962-2012  
**50**<sup>th</sup>  
ANNIVERSARY

# applied optics

APPLICATIONS-CENTERED RESEARCH IN OPTICS



**OSA**<sup>®</sup>  
The Optical Society

ISSN: 1559-128X

[ao.osa.org](http://ao.osa.org)



# Applied Optics

Volume 51  
Number 6  
20 February 2012

www.osa.org

## Information Pages

Feature Calendar v  
Information for Contributors vii

## Cover

The 3D omnifocus video camera has an unlimited depth of field. The stereogram taken by this camera generates a phenomena sensation. This investigation has ramifications for the future of the 3D movie industry. For details see Iizuka, pp. 763–770.

## OPTICAL TECHNOLOGY

### Holography

Holographic polymer dispersed liquid crystal enhanced by introducing urethane trimethacrylate

Nahid Hosein Nataj,  
Ezeddin Mohajerani, Hossein Jashnsaz,  
and Ali Jannesari 697

High-efficiency holograms fixed in lithium niobate after recording using a digital fringe stabilization system

Luis Arizmendi and Emilio J. Ambite 713

### Instrumentation, Measurement, and Metrology

Rotation angle measurement based on white-light interferometry with a standard optical flat

Hyo Geun Yun, Seung Hwan Kim,  
Heung Sun Jeong, and  
Kyong Hon Kim 720

Rangeability extension of fiber-optic low-coherence measurement based on cascaded multistage fiber delay line

Shuguang Li, Xinwan Li, Weiwen Zou,  
and Jianping Chen 771

### Sensors

Current measurement by Faraday effect on GEPOPU

Noemí Correa, Hernán Chuaqui,  
Edmund Wyndham, Felipe Veloso,  
Julio Valenzuela, Mario Favre, and  
Heman Bhuyan 758

### Spectroscopy

Narrow bandpass tunable terahertz filter based on photonic crystal cavity

Jinglong He, Pingan Liu, Yalan He,  
and Zhi Hong 776

## INFORMATION PROCESSING

### Coherence and Statistical Optics

Improved white-light interferometry on rough surfaces by statistically independent speckle patterns

Bernhard Wiesner, Ondrej Hybl, and  
Gerd Häusler 751

### Fourier Optics and Signal Processing

Optical image hiding with silhouette removal based on the optical interference principle

Xiaogang Wang and Daomu Zhao 686

### Image Processing

Super deep 3D images from a 3D omnifocus video camera

Keigo Iizuka 763

## Officers of the Society

TONY F. HEINZ,  
President  
*Columbia University*  
DONNA T. STRICKLAND,  
President-Elect  
*University of Waterloo*  
PHILIP BUCKSBAUM  
Vice President  
*Stanford University*  
J. CHRISTOPHER DAINTY,  
Past President  
*National University of Ireland,  
Galway*  
STEPHEN D. FANTONE,  
Treasurer  
*Optikos Corporation*  
ELIZABETH ROGAN,  
CEO

## OSA Staff

Christopher Videll  
Associate Director, Production &  
Technology  
Joseph Richardson  
Feature Proposals Manager  
M. Scott Dineen  
Deputy Senior Director,  
Publications  
Kelly Cohen  
Publisher  
Daniel Dawes  
Production Editor  
Stu Griffith  
Publications Senior Production  
Manager  
Carlos X. Izurieta  
Production Assistant  
Chastee Lim  
Journals Assistant  
Ruth Serinas  
Journals Assistant

## Peer Review

Carmelita Washington  
Applied Optics Coordinator  
Keith Jackson  
Journal Assistant

## Rights and Permissions

Hannah Bembia  
Copyright Permission Requests

Elizabeth Nolan  
Chief Publishing Officer

## Nonlinear Optics for Functional Devices and Applications

Projection approach to complexity reduction  
in tomographic alignment of extremely large  
telescopes  
*Piotr Piatrou and Gary Chanan* 704

## Optical Data Storage

Quantitative security evaluation of optical  
encryption using hybrid phase- and  
amplitude-modulated keys  
*Tamás Sarkadi and Pál Koppa* 745

## Scattering

Mueller matrix roots depolarization parameters  
*Hannah D. Noble,*  
*Stephen C. McClain, and*  
*Russell A. Chipman* 735

# LASERS, PHOTONICS, AND ENVIRONMENTAL OPTICS

## Fiber Optics and Optical Communications

Assessment of linear semiconductor amplifiers  
for upgrading WDM-PONs with  
wavelength reuse  
*Juan José Martínez, Noemi Merayo,*  
*Asier Villafranca, and*  
*Ignacio Garcés* 692

## Optoelectronics

Thermal-structural modeling of polymer Bragg  
grating waveguides illuminated by a light  
emitting diode  
*Kyoung Joon Kim,*  
*Avram Bar-Cohen, and*  
*Bongtae Han* 726

**Copyright © 2012, Optical Society of America.** Copying of material in this journal is subject to payment of copying fees. The code that appears on the first page of each article in this journal gives the per-article copying fee for each copy of the article made beyond the free copying permitted under Sections 107 and 108 of the U.S. Copyright Law. This fee should be paid through the Copyright Clearance Center, Inc., 222 Rosewood Drive, Danvers, Mass. 01923. The same fees and procedures apply to articles published in previous volumes of this journal. Permission is granted to quote excerpts from articles in this journal in scientific works with the customary acknowledgment of the source, including the author's name and the journal name, volume, page, and year. Reproduction of figures and tables is likewise permitted in other articles and books, provided that the same information is printed with them, permission of one of the original authors is obtained, and notification is given to the Optical Society of America. Republication or systematic or multiple reproduction of any material (including electronic publication or reproduction) in this journal (including abstracts) is permitted only under license from the Optical Society of America; in addition, the Optical Society may require that permission also be obtained from one of the authors. Address inquiries and notices to the Director of Publications, Optical Society of America, 2010 Massachusetts Avenue, NW, Washington, DC 20036-1023. In the case of articles whose authors are employees of the United States Government or its contractors or grantees, the Optical Society of America recognizes the right of the United States Government to retain a nonexclusive, royalty-free license to use the author's copyrighted article for United States Government purposes. *Applied Optics* (ISSN 0003-6935) is published three times a month by the Optical Society of America, 2010 Massachusetts Avenue, NW, Washington, DC 20036-1023. CODEN: APOPAL. USPS Publication No. 879520. 2012 subscription rates (domestic) per year (print plus online): \$273.00 for OSA members; nonmember and library subscriptions \$4987.00. Periodicals postage paid at Washington, DC 20066-9998 and at additional mailing offices. POSTMASTER: Send address changes to *Applied Optics*, 2010 Massachusetts Avenue, NW, Washington, DC 20036-1023. **Subscriptions, missing copies, and change of address:** Optical Society of America, Fulfillment Services, 2010 Massachusetts Avenue, NW, Washington, DC 20036-1023; (202) 416-1907; FAX (202) 416-6130. Back number, single-issue, and foreign rates available on request. *Applied Optics*® is a registered trademark of OSA.