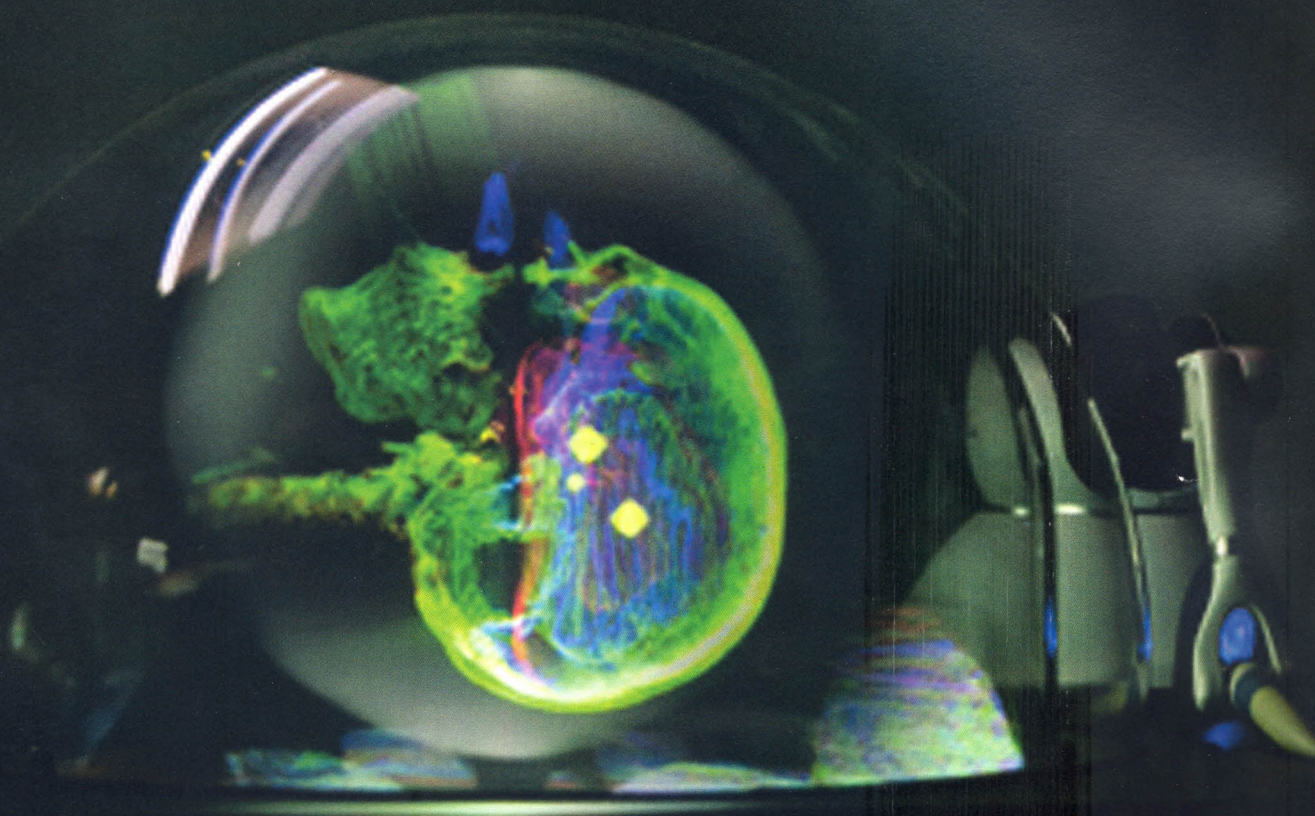
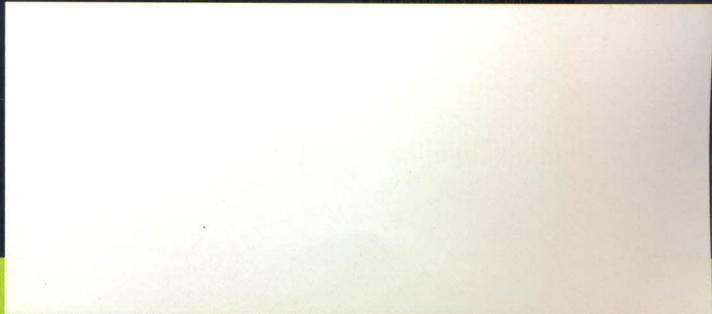


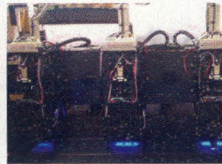
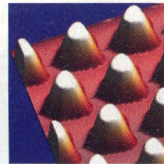
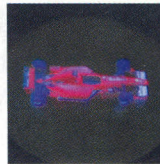
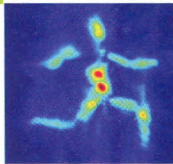
3-D Displays Eliminate Need for Glasses



Also in this issue:
Time Delay Integration
Speeds Up Imaging

Wafer-Etching Process
Brightens Future for LEDs





NEWS & ANALYSIS

16 | TECH NEWS

Photonics Spectra editors curate the most significant photonics research and technology headlines of the month – and take you deeper inside the news. Featured stories include:

- Supercapacitors created from laser-scribed graphene
- Hidden 3-D objects imaged
- Star comb aids search for exoplanets

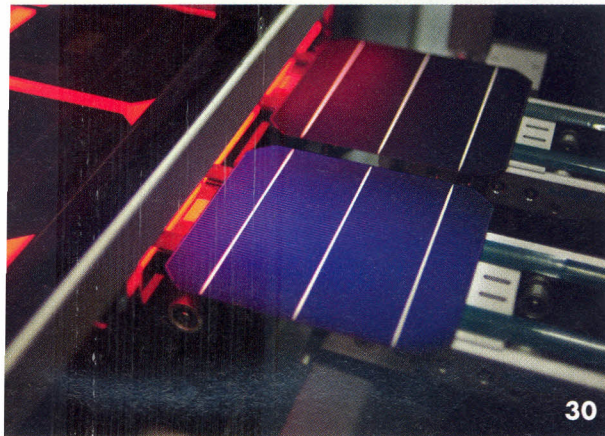
30 | FASTTRACK

Business and Markets

Impact of PV panel penalties pondered

39 | GREENLIGHT

Full spectrum boosts solar cell power



COLUMNS

10 | EDITORIAL

41 | LASERS IN USE

by Antonio Triventi, CHP, CLSO, National Institute for Laser Safety Officers and Health Physicists

How to Develop a Laser Safety Culture

82 | PEREGRINATIONS

Alexander Graham Bell, we can hear you now

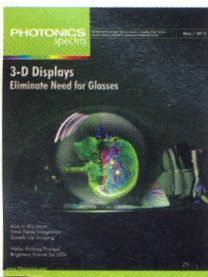


DEPARTMENTS

70 | BRIGHT IDEAS

79 | HAPPENINGS

81 | ADVERTISER INDEX



THE COVER

Developments in autostereoscopic displays are discussed by Gregg Favalora of Optics for Hire, beginning on page 44. Design by Senior Art Director Lisa N. Comstock.

FEATURES



44 | HITTING EVERY ANGLE WITH AUTOSTEREOSCOPIC 3-D DISPLAYS

by Gregg Favalora, *Optics for Hire*

Autostereoscopic display – creating imagery that looks 3-D without special glasses – is moving forward, thanks to advances in lens arrays, electro-optics, diffusers and software.

50 | TIME DELAY INTEGRATION SPEEDS UP IMAGING

by Xing-Fei He and Nixon O, *Teledyne Dalsa Inc.*

The flat panel display industry depends on this line-scan technology for high-speed inline automatic optical inspection under light-starved conditions.

56 | WAFER-ETCHING PROCESS BRIGHTENS FUTURE FOR LEDs

by Derek Mendes, *Imtec Acculine LLC*

Faster and less costly than dry etching, high-temperature wet etching holds promise for scalable manufacturing of energy-efficient LEDs.

60 | 193-nm LITHOGRAPHY OPENS DOORS FOR DIFFRACTIVE MICRO-OPTICS

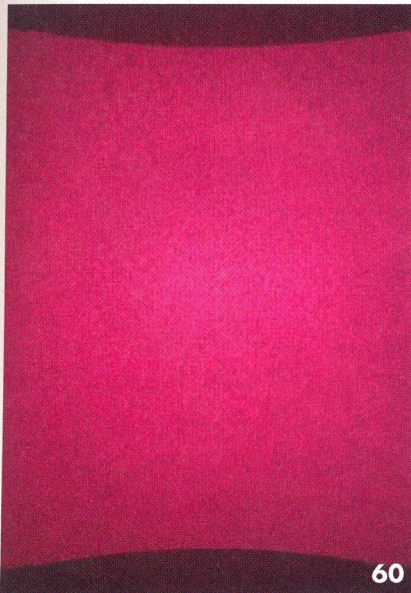
by Marc D. Himel and Jim Morris, *DigitalOptics Corporation*

Upgrades in tools for manufacturing diffractive optics have enabled new applications in the visible and near-IR regimes requiring large angular distributions.

65 | VISION SOFTWARE ENABLES NASA ROBONAUT TO SEE

by Dr. Lutz Kreuzer, *MVTec Software GmbH*

The first robotic humanoid to visit the International Space Station uses sophisticated software and a multiple-sensor stereovision system to recognize complex patterns.



PHOTONICS SPECTRA ISSN-0731-1230, (USPS 448870) IS PUBLISHED MONTHLY BY Laurin Publishing Co. Inc., Berkshire Common, PO Box 4949, Pittsfield, MA 01202, +1 (413) 499-0514; fax: +1 (413) 442-3180; e-mail: photonics@photonics.com. TITLE reg. in US Library of Congress. Copyright © 2012 by Laurin Publishing Co. Inc. All rights reserved. Copies of Photonics Spectra on microfilm are available from University Microfilm, 300 North Zeeb Road, Ann Arbor, MI 48103. Photonics Spectra articles are indexed in the Engineering Index. POSTMASTER: Send form 3579 to Photonics Spectra, Berkshire Common, PO Box 4949, Pittsfield, MA 01202. Periodicals postage paid at Pittsfield, MA, and at additional mailing offices. **CIRCULATION POLICY:** Photonics Spectra is distributed without charge to qualified scientists, engineers, technicians, and management personnel. Eligibility requests must be returned with your business card or organization's letterhead. Rates for others as follows: \$122 per year, prepaid. Overseas postage: \$28 surface mail, \$108 airmail per year. Inquire for multiyear subscription rates. Publisher reserves the right to refuse nonqualified subscriptions. **ARTICLES FOR PUBLICATION:** Scientists, engineers, educators, technical executives and technical writers are invited to contribute articles on the optical, laser, fiber optic, electro-optical, imaging, optoelectronics and related fields. Communications regarding the editorial content of Photonics Spectra should be addressed to the managing editor. Contributed statements and opinions expressed in Photonics Spectra are those of the contributors – the publisher assumes no responsibility for them.

