

20



64



82

Departments & Columns

10 EDITORIAL

16 LIGHT SPEED

Business and Markets

- Same economy bears different results
- Turbulence predicted for LED front-end equipment market

20 TECH PULSE

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:

- New class of 3-D optical cavities demonstrated
- I can't see the rain ... against my headlights
- Terabits transmitted by twisted light

60 LASERS IN USE

by Ken Barat, Certified Laser Safety Officer, Lawrence Berkeley National Laboratory
Designing a Laser Lab: What to Do – and What Not to Do

64 SPECIAL LIGHT

Laser probes pollution particles
Silicone eyed for extending solar cell lives

70 NEW PRODUCTS

79 HAPPENINGS

81 ADVERTISER INDEX

82 LIGHTER SIDE

by Caren B. Les
Fiber optic sensors set sail

THE COVER

Shown is a spark emitted from a laser spark plug at the National Energy Technology Laboratory. Design by Senior Art Director Lisa N. Comstock. Image courtesy of NETL.



PHOTONICS SPECTRA ISSN: 0731-1230, (USPS 442670) IS PUBLISHED MONTHLY BY Lewis Publishing Co., Inc., Berkshire Common, PO Box 4949, Pittsfield, MA 01202, +1 (413) 499-0514; fax: +1 (413) 642-3180; e-mail: photonics@photonics.com. TITLE reg. in US Library of Congress. Copyright © 2012 by Laura Publishing Co. Inc. All rights reserved. Copies of Photonics Spectra on microfilm are available from University Microfilms, 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 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.

PHOTONICS: The technology of generating and harnessing light and other forms of radiant energy whose quantum is the photon. The range of applications of photonics extends from energy generation to detection to telecommunications and information processing.

Le 23 OCT. 2012

Features

35 ISSUE FOCUS: TRANSPORTATION

Fuel efficiency and safety drive photonics innovation.

36 HEAD-UP DISPLAYS KEEP SPEED AND MORE IN SIGHT

by Hank Hogan, Contributing Editor
Although head-up displays have been around for decades, cost and design challenges have slowed their penetration of the market.

40 LASER CAR IGNITION DREAM SPARKS MULTIPLE APPROACHES

by Laura S. Marshall, Managing Editor
Conventional spark plugs could someday be replaced by laser-based ignition systems, which would save energy and reduce auto emissions.

44 NEW SMART CAMERAS PROVIDE QUALITY CONTROL IN A BOX

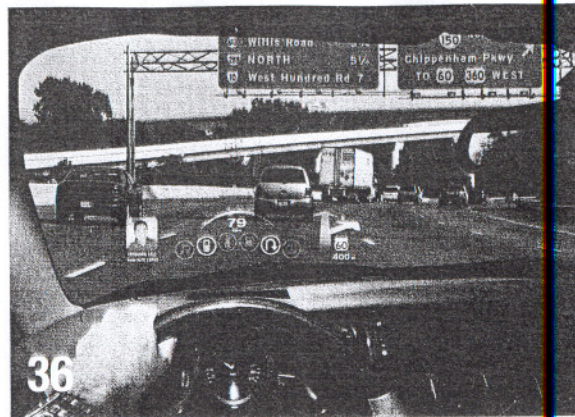
by Max Larin, Ximea GmbH
These compact machine vision systems offer most of the functionality of a personal computer, including a full operating system.

50 DPSS LASERS OVERCOME GLASS PROCESS CHALLENGES

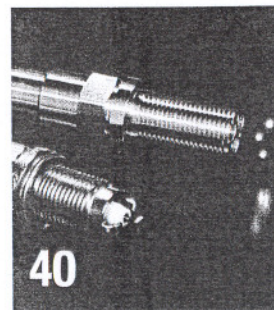
by Jim Bovatsek and Dr. Rajesh S. Patel, Spectra-Physics
Thanks to these devices, laser glass processing is becoming a feasible solution for a growing number of industrial applications.

56 DLC COATINGS ENHANCE IR CAMERAS

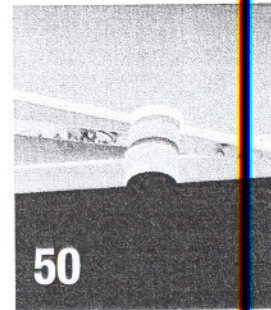
by Dr. Mordechai Gilo, Ophir Optonics Ltd.
The Narcissus effect on infrared lens assemblies can be reduced with diamondlike carbon multiple-layer coatings.



36



40



50

