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Highlights from the **October 2013** issue of Photonics Spectra



Excimer-Laser Metrology Improves Lithography Process Control

As Moore's law marches on, semiconductor manufacturers rely on advances in photolithography - the use of 193-nm ArF excimer lasers, for example, coupled with optical and process techniques to improve resolution and reduce patterning variations. Recent examples of such technologies include advanced reticle designs that correct for optical proximity effects, use of double- or multiple-patterning exposure methods, computational techniques that achieve source-mask optimization and free-form scanner illumination technologies. These techniques all require increasing stability and control of the excimer laser performance.

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Optics for DPSS Lasers: Finding a Balance

Building efficient diode-pumped solid-state lasers requires a careful balance between price, performance and stability of the cavity optics. In particular, a number of optical components critically affect laser operating and output characteristics, and their specifications must therefore be properly understood and managed. We will discuss the most important of these, specifically for DPSS lasers operating at their fundamental wavelength, and in which ones damage due to high peak powers is not a significant concern.

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How Wedge and Decenter Affect Aspheric Optics

Driven by the ever-increasing resolution and field size of focal plane arrays as well as the need for smaller, lighter-weight systems and lower manufacturing costs, aspheric lens elements are now ubiquitous in nearly every market from aerospace to consumer electronics. For years, manufacturing advances have focused on techniques and tools to improve surface figures, but many designers and system integrators now understand that the relationship between front-side and back-side geometries can be just as important, especially in controlling off-axis aberrations.

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GDD Measurements Boost Ultrafast Laser Performance

"Dude, where's my pulse width?!" Anybody working with an ultrafast laser has probably uttered these (or similar) words at some point. Symptoms of pulse width problems can come in the form of lower conversion efficiencies, fainter microscope images or lower signal-to-noise ratio (SNR) for a given experiment. Easy group delay dispersion measurements improve results in applications such as laser amplifiers, optical coatings, harmonic generation, bioimaging and microscopy.

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MicroLED Sources Enable Diverse Ultralow-Power Applications

A brush with the second law of thermodynamics can increase a product's on-shelf appeal - and more. The drive toward LED-based lighting has resulted in the development of devices with ever-increasing light output and color performance. The lumen-per-dollar total is now the figure of merit often used to judge competing LEDs. To enable market uptake, the focus has shifted from efficiency to cost. However, other applications based on LEDs are striving for smaller sizes and more efficient solutions - such as thinner screens or more portable detection systems.

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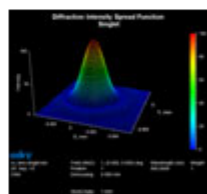


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