Thursday, November 24, 2022

This Week in PHOTONICS
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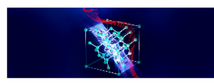
.: Top Stories

Researchers Unlock Light-Matter Interactions on Subnanometer Scales



Researchers at Purdue University have discovered waves with picometer-scale spatial variations of electromagnetic fields that can propagate in semiconductors like silicon. The findings demonstrate that natural media host a variety of light-matter interaction phenomena at the atomistic level. The use of picophotonic waves in semiconducting materials may lead researchers to design new, functional, optical devices, allowing for applications in quantum technologies.

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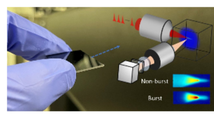
Light Burst Opens Path to On-Board 3D Processing in Semiconductor Chips



Because semiconductors serve as the backbone of modern technologies including cellphones, cars, robots, and other devices, the continuous need for miniaturized and powerful chips is placing increased pressure on semiconductor manufacturing technologies. The dominant technology, lithography, is limited in its ability to address these challenges, given its surface-processing nature. When intense light from ultrafast lasers is focused inside a semiconductor, highly efficient nonlinear ionization along the beam path creates an opaque plasma that prevents reaching enough energy localization near focus for material writing.

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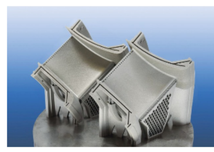
Project IDEA Shows Path Forward for Industrial Scale 3D Printing



Following completion of a multiyear project, collaborators on an initiative of the German Federal Ministry of Education and Research have reported their demonstration of a production approach they believe will enable large corporations, as well as SMEs (small- and medium-size companies), to additively manufacture individualized components in medium batch sizes economically.

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.: Upcoming Webinars

A User Guide to Image Quality Assessment for Artificial Intelligence

Tue, Nov 29, 2022 10:30 AM - 11:30 AM EST

Dotphoton's Arianne Bercowsky, Ph.D., presents insights into recent work involving standardization and image quality assessment to help future-proof image data. She also demonstrates Jetraw high-performance raw image compression technology, as a software for biomedical and pharma, followed by her colleague Bruno Sanguinetti, Ph.D. who demonstrates its field-programmable gate array (FPGA) implementation for camera manufacturers. Bercowsky and Sanguinetti are joined by Gerhard Holst, from one of Dotphoton's partners, Excelitas PCO. Holst presents a case study performed by the Imperial College London on the outcome of applying Jetraw compression to light-sheet microscopes using PCO cameras. Presented by Dotphoton.

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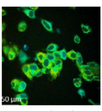

Fluorescence Lifetime Microscopy for Label-Free Imaging of Cellular Metabolism and Heterogeneity

Wed, Nov 30, 2022 1:00 PM - 2:00 PM EST

Alex Walsh, of Texas A&M University, shares on how cellular metabolism is dysregulated in many diseases and pathologies. Current biochemical assays for metabolism are limited to either cell-destructive protocols. Fluorescence lifetime imaging of the metabolic coenzymes, reduced nicotinamide adenine (phosphate) dinucleotide (NAD(P)H) and oxidized flavin adenine dinucleotide (FAD), provides a label-free method to interrogate cellular metabolism. Single-cell segmentation and analysis of fluorescence lifetime images allows metabolic measurements at the cellular level. To facilitate cell-level analysis of fluorescence images, researchers are developing automated segmentation algorithms. Additionally, they are creating and testing models for predicting cell phenotypes from fluorescence lifetime metrics.

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