

This Week in PHOTONICS



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Top Stories

Argonne's Advanced Photon Source Upgrade Underway

Argonne National Laboratories' Advanced Photon Source (APS) has begun its long-scheduled comprehensive upgrade. The process will see the electron storage ring at the heart of the facility removed and replaced with a state-of-the-art storage ring that will grant the synchrotron a 500-fold boost in brightness.

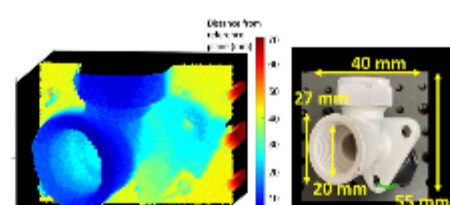
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Fully Submerged Quantum Lidar Device Acquires 3D Images

Researchers in the U.K. have demonstrated a lidar system that uses quantum detection technology to acquire 3D images while submerged underwater. According to research team member Aurora Maccarone, a Royal Academy of Engineering research fellow at Heriot-Watt University, the technology has a broad range of applications, including inspection of installations such as underwater wind farm cables and the submerged structure of the turbines.

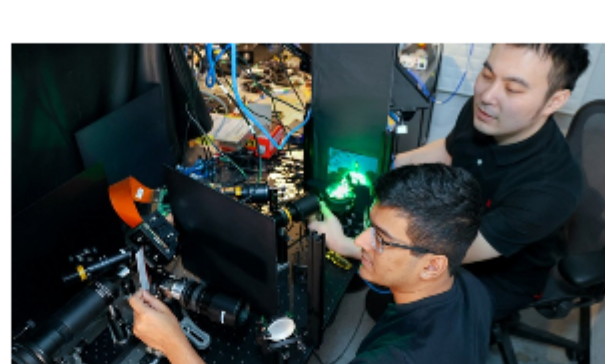
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Optical Neural Nets Speed Image Processing Without Compromise to Accuracy

Researchers at Cornell University have developed an optical neural network (ONN) that can filter relevant information from a scene before the visual image is detected by a camera. The method will enable faster, smaller, and more energy-efficient image sensors. The researchers demonstrated ONN pre-processors that achieved compression ratios of up to 800 to 1 — the equivalent of compressing a 1600-pixel input to just 2 pixels — while still enabling high accuracy across several representative computer vision tasks.

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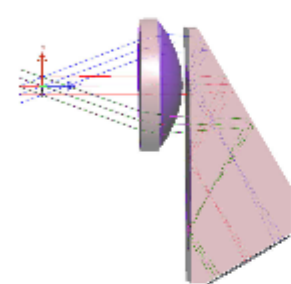
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HyperFine Brillouin Spectrometer

LightMachinery Inc.

The great challenge with Brillouin spectroscopy is that the scattered signal from the un-shifted wavelength of the laser can overwhelm the small Brillouin shifted return signal. LightMachinery has combined its leading-edge HyperFine spectrometer with a very narrow band tunable filter to suppress the bright un-shifted laser frequency.

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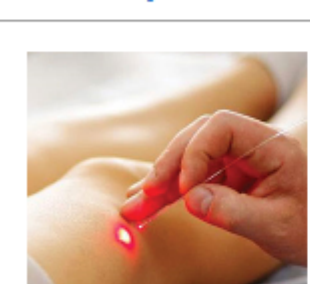
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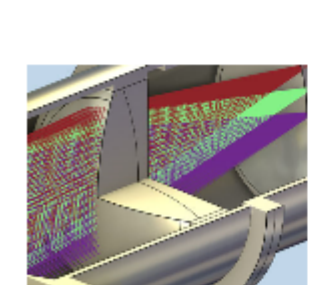
Medical Laser Applications: Defining Measurement Solutions That Keep the Process on Track

Wed, May 17, 2023 11:00 AM - 12:00 PM EDT

As with any precision process, laser-based medical applications demand tight control of a laser's behavior to keep the process on track but how is this implemented in applications? Mark Slutzki of Ophir, in addition to presenting interesting medical laser applications, maps out the process for

identifying and configuring the appropriate monitoring and measurement solutions as well as the most intelligent approaches to implementation. This is often not a trivial task but the result is a model that can be used equally well in other laser applications. Slutzki shares how to define a laser process monitoring and controlling solution, using the medical field as a reference application but also considering the elements that are common to all laser-based applications. Presented by Ophir.

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STOP Analysis with COMSOL Multiphysics®

Wed, May 31, 2023 2:00 PM - 3:00 PM EDT

Optical systems often need to operate in harsh environments, including high altitudes, in space, and under water, where they are subjected to structural loads and extreme temperatures. Similarly, optical devices in high-powered laser and nuclear applications are also subjected to extreme conditions. The most accurate way to fully capture these environmental effects is through numerical simulation using

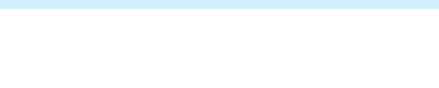
structural-thermal-optical performance (STOP) analysis. This is a quintessential multiphysics problem. With STOP analysis, thermal expansion and the refractive index distribution can be fully coupled with changes to the ray optical trajectories, which is essential for laser-based manufacturing and the like. This presentation shares how to use COMSOL Multiphysics® and the Ray Optics Module to combine ray tracing simulations with structural and thermal analyses to form fully self-consistent STOP models. The webinar includes a live demo and time for questions. Presented by COMSOL.

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