

# PHOTONICS spectra®

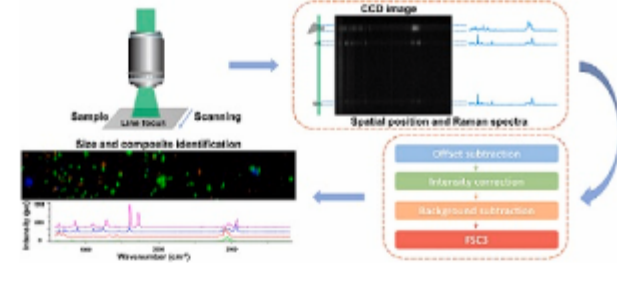
## SPECTROSCOPY NEWSLETTER

The latest news, features, and product developments in spectroscopy technology – brought to you by Photonics Media.  
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### Line-Scan Raman Spectroscopy Detects Micro- and Nanoplastics

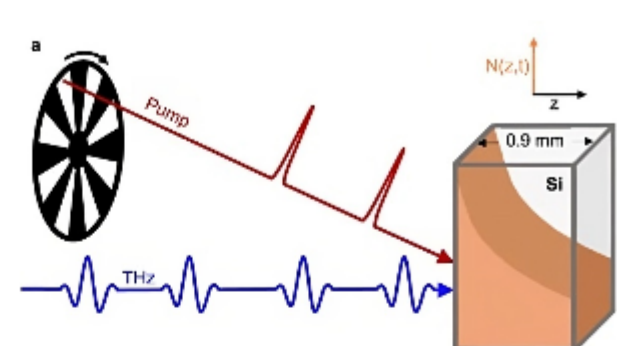
A line-scan Raman spectroscopy method developed by the Chinese Academy of Sciences and Cardiff University significantly boosts detection speed for both micro- and nanoplastics. The researchers reported a line-scan Raman microspectroscopy system capable of rapid imaging and chemical identification of microplastics down to 2000 nm in size, and capable of imaging a 40- × 10-µm particle in 10 s, representing a speed improvement by about two orders of magnitude compared to confocal imaging.



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### Time-Resolved Spectroscopy Peers in on Irreversible Phenomena

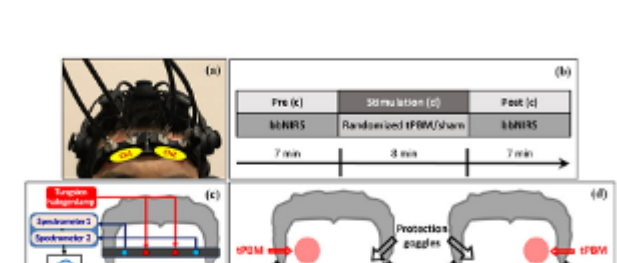
A team of researchers at the University of Ottawa developed a terahertz (THz) spectroscopy technique for recording movies in real time at 50,000 fps. High-speed video captures and slow-motion movies allow scientists to observe the mechanical dynamics of complex phenomena in detail. When the images in each frame are replaced by THz waves, the movies make it possible to monitor low-energy resonances and fast structural and chemical transitions in sample materials. As a result, the THz spectroscopy system, developed in collaboration with researchers from the Max Planck Institute for the Science of Light, could become a powerful tool for observing phenomena that are currently impossible to investigate because they are too fast, nonreproducible, or both.



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### Near-Infrared Wavelength Specificity Yields Phototherapy Insights

Transcranial photobiomodulation (tpBM) is an emerging form of light therapy that uses LEDs or low-intensity lasers that emit near-infrared light to stimulate the brain. Although tpBM is in the early stages of development, it shows promise as a potential therapy for enhancing cognitive function and treating neurophysiological disorders. To deepen scientific understanding of tpBM, researchers at The University of Texas at Arlington investigated its effects on the hemodynamic and metabolic activities of the prefrontal cortex in 26 healthy young adults.



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## :: Featured Products & Services



[Lasers and Component Spectrometers](#)

#### m-oem

Metrohm has opened a new webshop for lasers, component spectrometers, and Raman spectroscopy sampling solutions. The new m-oem brand includes four Metrohm companies: Innovative Photonic Solutions (IPS), B&W Tek, DropSens, and Metroglas. Over 500 products are available for easy ordering.

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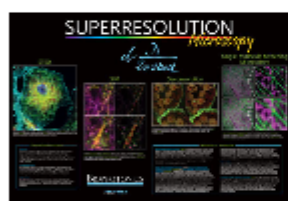
[The New Varius™ Spectrometer](#)

#### Avantes BV

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[Superresolution Microscopy Poster](#)

#### Photonics Media

This superresolution

microscopy poster features visually stunning, high-resolution images that reveal never-before-seen worlds at the sub-cellular level, illustrating the value of the techniques. Useful, at-a-glance definitions make this poster a great resource.

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[IR Filters for Thermal Imaging and Gas Detection](#)

#### Spectrogon US

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## :: More News

### Microscopy Method Uses Infrared Light to Image Molecules with Vibrational Contrast

The complementary strengths of fluorescence and vibrational microscopy are combined in a new technique developed at Caltech, called bond-selective fluorescence-detected infrared-excited spectro-microscopy (BonFIRE). BonFIRE will benefit biological investigations by providing researchers with rich chemical information as well as single-molecule sensitivity. “With our new microscope, we can now visualize single molecules with vibrational contrast, which is challenging to do with existing technologies,” researcher Dongkwan Lee said.

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### LITE Spectroscopy Resists Light Sources with Phase Demodulation

A team at Harbin Institute of Technology led by professor Yufei Ma introduced an approach to phase demodulation of heterodyne light-induced thermoelastic spectroscopy (H-LITES) that uses a Fabry-Pérot interferometer (FPI). Compared with traditional intensity demodulation systems, the new phase demodulation method is structurally simple and is resistant to interference from light sources and the surrounding environment when the LITES technique is used.

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### Precise Measuring Tool for Light Source Could Advance Chipmaking

To improve the quality of microchips and make the chipmaking process more efficient, researchers at the University of Twente’s MESA+ Institute of Nanotechnology developed an extreme ultraviolet (EUV) broadband imaging spectrometer. The new spectrometer simultaneously measures the size and color of the light emitted by a plasma source.

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### Amplitude-Only Light Modulator Could Improve Photonic Device Efficiency

A thin-film, amplitude-only spatial light modulator made from phase-change-based material was developed by researchers at the University of Exeter and the Institute of Optics in Madrid. The device operates in reflection and modulates the amplitude of light incident on its surface with virtually no changes to the optical phase. When the phase-change material is switched between its amorphous and crystalline states, there is no effect on optical phase.

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### Spectroscopy, Machine Learning Pair to Ease Recyclables Sorting

Researchers at Hefei University of Technology have demonstrated the use of laser-induced breakdown spectroscopy (LIBS) to automatically identify, classify, and subclassify recyclable waste in real time. The resource re-use application enabled the researchers to identify and sort samples, based on material composition, into six consumer-level categories: paper, plastic, glass, metal, textile, and wood.

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## :: Upcoming Webinars

### Lock-in Amplifier or Boxcar Averager? Choosing the Right Measurement Tool for Periodic Signals

Thu, Nov 2, 2023 10:00 AM - 11:00 AM EDT

When it comes to analyzing periodic signals, selecting the appropriate measurement tool is crucial for achieving accurate and meaningful results. Gustavo Ciardi of Zurich Instruments delves into the theory behind two powerful techniques, lock-in amplification and boxcar averaging, to help individuals make informed decisions in their measurement endeavors. Additionally, he shares how to gain a deeper understanding of the techniques’ strengths, weaknesses, and the scientific contexts in which they excel. He aims to empower attendees with the knowledge needed to maximize signal-to-noise ratio, ensuring the highest precision in measurements. Presented by Zurich Instruments.

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