

# SPECTROSCOPY

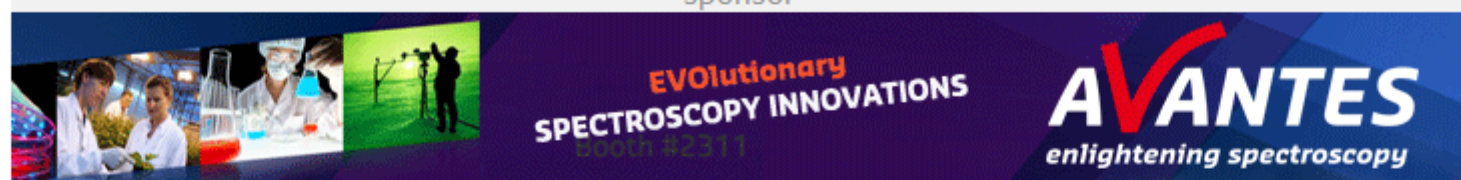
## Tech Pulse



February 2016

Spectroscopy Tech Pulse is a special edition newsletter from Photonics Media covering key developments in spectroscopy technology.

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### NIR Spectroscopy Aids Diagnosis of Neonatal Brain Injury

A near-infrared (NIR) spectroscopy system has been used to measure cerebral changes and oxygen utilization in vivo, offering a noninvasive diagnostic technique for neonatal brain injury. The system included the Acton series LS-785 lens-based spectrograph and the PIXIS:512F scientific CCD camera from Princeton Instruments of Trenton, N.J.



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### QCL Features Higher Power, Wider Tuning Range

Combining a tunable laser with an on-chip amplifier has enabled a versatile and powerful tool for spectroscopy and other applications. A team from Northwestern University demonstrated a single-mode quantum cascade laser (QCL) emitting at a wavelength near 4.8  $\mu\text{m}$  by integrating an asymmetric sampled grating distributed feedback tunable laser with an optical amplifier.

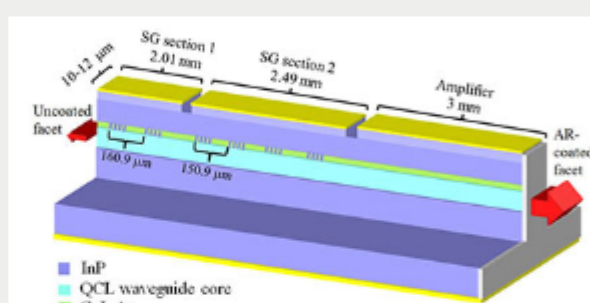


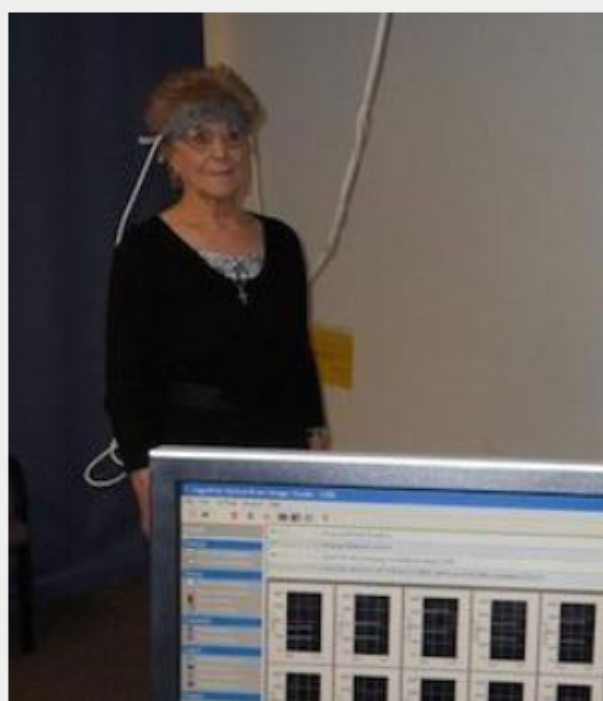
FIG. 1. Schematic diagram of SGDFB MOPA.

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### Functional NIR Spectroscopy Offers Insight into Parkinsonian Syndromes

A portable near-infrared brain imaging device has been used to compare healthy brain activity and stability with that of people with Parkinsonian syndromes. The findings highlight the role of the prefrontal cortex in balance control, and may aid in the detection and treatment of Parkinsonian symptoms in the elderly.

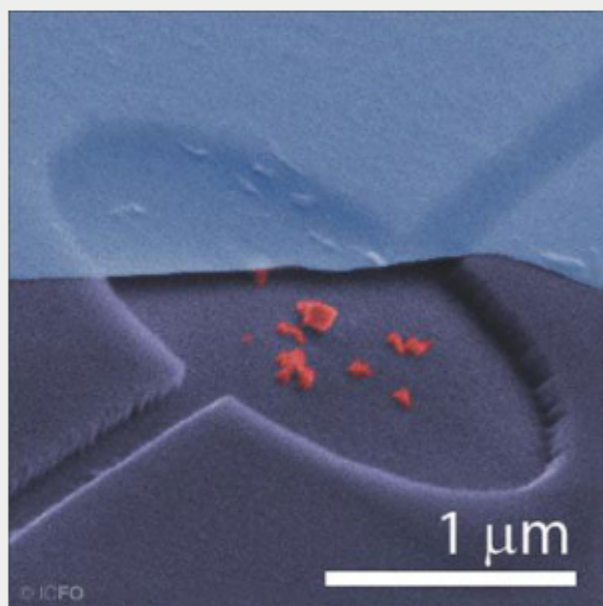


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### Graphene Enables Nanoelectromechanical Systems Integration

Combining nanoelectromechanical (NEMS) systems with on-chip optics holds promise as a method to actively control light at the nanoscale, and now a hybrid system has overcome the challenges of integrating such nanoscale devices with optical fields thanks to the material graphene. These advancements hold promise for selective control of emitter arrays on-chip, optical spectroscopy of individual nano-objects, and integrated optomechanical information processing.



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