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Tech Pulse

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Precise Wavelength Used to Gently Image Lungs of Newborns

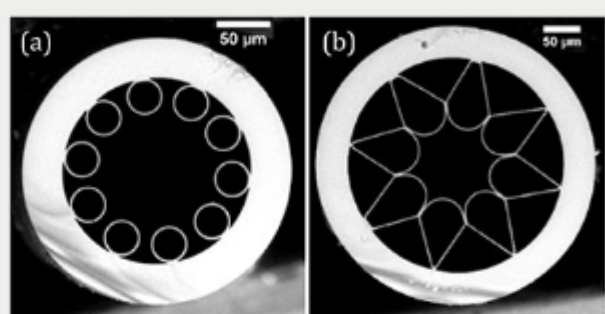
To avoid the harmful radiation resulting from x-rays, near-infrared (NIR) spectroscopy has been used to image oxygen concentrations in the lungs of newborns, a technique that could be used to noninvasively monitor premature babies with underdeveloped lungs and increase survival rates. Emilie Krite Svanberg, an anesthesiologist and researcher at Lund University, reported a spectroscopic method using precisely 760.445-nm light. Both continuous-wave and time-resolved techniques were applied; both were able to determine changes in tissue oxygenation, though the time-resolved technique reported more realistic values with smaller interindividual differences.



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Gas/Fiber Hybrid Laser Achieves Stable MIR Emission

A gas/fiber hybrid laser is capable of pulsed and continuous mid-infrared (MIR) emission between 3.1 and 3.2 μm , a spectral range that has long presented a major challenge for laser developers. The achievement could aid in the development of additional applications for MIR lasers, which are currently used in spectroscopy, environmental sensing and detecting explosives.



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Light Reflectance Spectroscopy Aids Prostate Cancer Surgery

Light-reflectance spectroscopy has been used during prostate cancer surgery to differentiate between malignant and benign tissue with 85 percent accuracy. The finding could enable real-time tissue analysis during the surgery. According to the National Cancer Institute, the most common cancer in men — second only to skin cancer — is prostate cancer. After lung cancer, prostate cancer is the second leading cause of cancer-related deaths in U.S. males.



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Wasp-Inspired Needle Could Advance Spectroscopy for Disease Detection

A robotic surgical system inspired by the anatomy of wood-boring wasps could be used in Raman spectroscopy to detect cancerous and diseased tissue. The prototype needle design is based on female parasitoid wasps, which use a bendable needle-like ovipositor to bore into wood to lay eggs in hiding host larvae. The technology consists of a minimum of three tiny interlocked polymer shafts, which slide alongside one another, mimicking the way the ovipositor works. The segments move in a complex pattern to minimize the needle's impact on surrounding tissue, enabling it to travel along curved paths with dexterity and access hard-to-reach areas deep in tissue.



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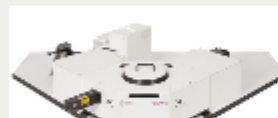


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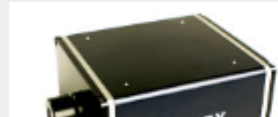


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