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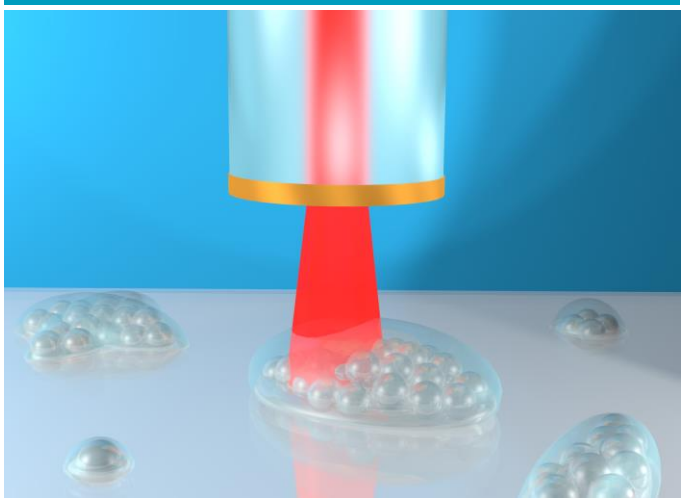
Technology for Licence

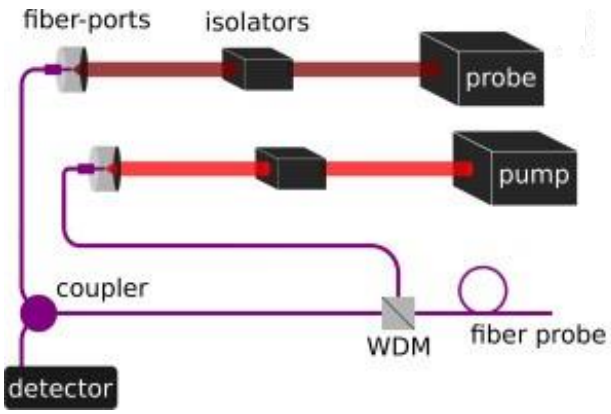
Fibre-optic ultrasonic imaging probe

In brief

Researchers have developed a single ultrasonic imaging fibre, capable of simultaneously accessing 3D spatial information and mechanical properties from microscopic objects. The device can perform label-free and non-contact imaging with a high resolution.



The novel measurement system consists of two ultrafast lasers that excite and detect high-frequency ultrasound from a nano-transducer fabricated onto the tip of a single-mode optical fibre. A signal processing technique extracts nanometric in-depth spatial measurements from GHz frequency acoustic waves, while still allowing Brillouin spectroscopy in the frequency domain.



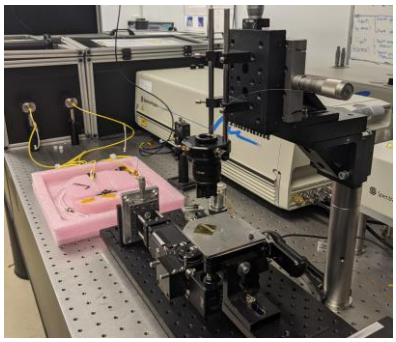
Key benefits:

- Optical fibre technology: only 125 µm diameter and 1–10+ m in length
- High-resolution: lateral resolution 2.5 µm, depth resolution 300 nm
- Can measure height and stiffness of objects in 3D, including sub-surface
- No need for vacuum and can be integrated into a range of equipment for different applications

To date, the prototype device has been tested with biological cells and organisms. Its small diameter and non-contact method offer particular benefits in this field.

However, this technology has much wider applications in non-destructive evaluation, force microscopy, and profilometry. The single fibre can be extrapolated to tens of thousands of fibres in an imaging bundle.

We are seeking industrial partners interested in this licensing opportunity.



Further reading:

Light: Science & Applications paper (2021)
Optics Express paper (2019)
University of Nottingham press release (2021)
Phys.org article (2021)

Enquiries

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