

Quantum Technology

A consortium led by physicists at the University of Birmingham has been awarded a multi-million-pound UK Quantum Technology Hub to explore technology to help industry solve multiple challenges. Scientists of the Cold Atoms group in Birmingham are leading the UK National Quantum Technology Hub in Sensors and Metrology with the aim of exploiting the exceptional properties of quantum matter to realise real-world applications.



These range from: mapping pipework and cabling under the road surface before digging takes place, thus reducing disruption and traffic delays; to monitoring water levels in aquifers in drought-prone areas; and providing a non-invasive way of measuring brain activity to further research into dementia.

Expertise

- Quantum sensors
- Laser cooling
- Atom interferometry

Success and impact

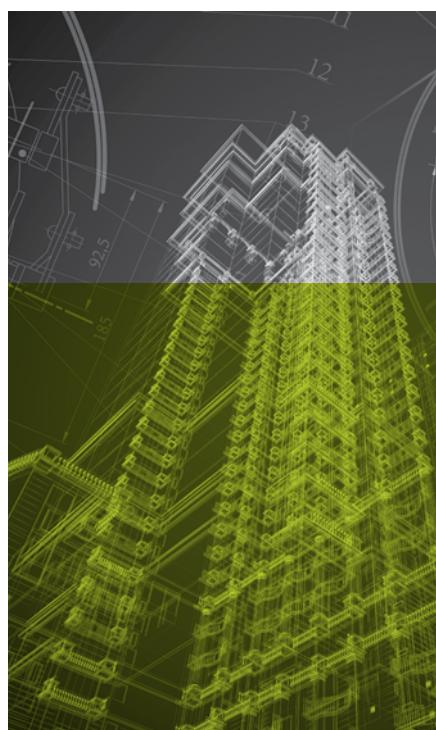
- The UK Quantum Technology Hub, has a total EPSRC, University and industry contribution exceeding £80 million to translate their work in quantum sensors into technology that could help industry.
- The hub has secured over £44 million in collaborative partnership projects with over 50 industry partners.
- Our extensive network comprises of over 120 companies forming a quantum technology ecosystem around the hub.
- Professor Kai Bongs received the Josiah Mason award for Business Advancement in recognition of his leadership of the Quantum Technology Hub, which has successfully developed large-scale industrial engagement.

Key projects

Quantum clocks: Developing optical clocks and precision inertial sensors by researching the sensitivity of atomic clocks, to increase

their accuracy. Such technology will have wide applications in navigation, radar, communications and banking. The results of this research will have a dramatic impact on the increasingly fast high-frequency trading in financial markets, where the accurate measurement of time will be crucial to determine who bids first. These devices are so sensitive, that they also allow a new way to measure absolute geodetic height, which is important in large infrastructure projects and oil exploration.

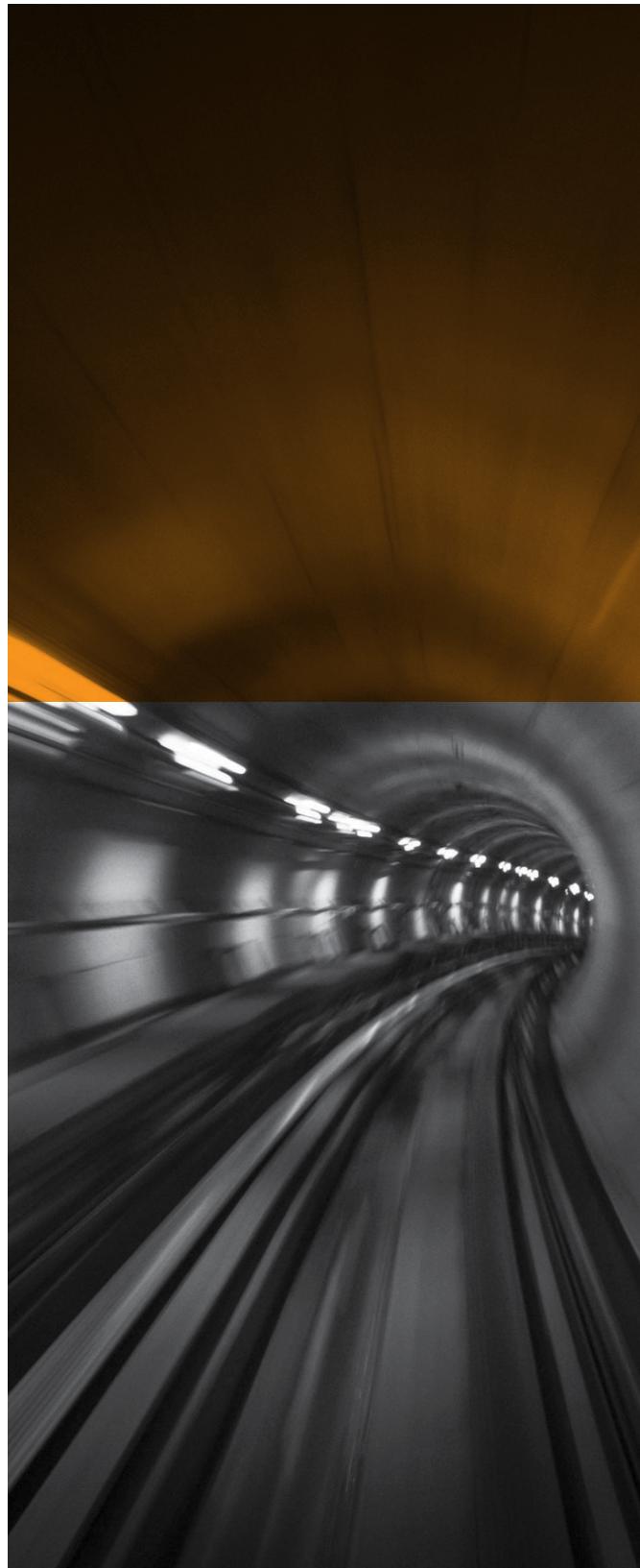
Quantum Technology makes the underground visible: Scientists at Birmingham are collaborating to bring a new capability to underground sensing through quantum technology (QT). Using a technique called atom interferometry, they are able to measure a gravity gradient rather than an absolute value. This innovative technology can be exploited to benefit industry, by enabling them to survey underground and reduce the engineering risks, leading to sustainable urban environments.



Quantum light sources: Birmingham researchers have developed the world's first portable quantum light source, which emits ordered light particles both along and across the light beam. Such devices promise ultrasensitive measurements in biological systems, detection of space debris and Quantum LIDAR, the optical version of Quantum Radar.

**THE UNIVERSITY
OF BIRMINGHAM
HEADS AN £80
MILLION QUANTUM
TECHNOLOGY HUB**

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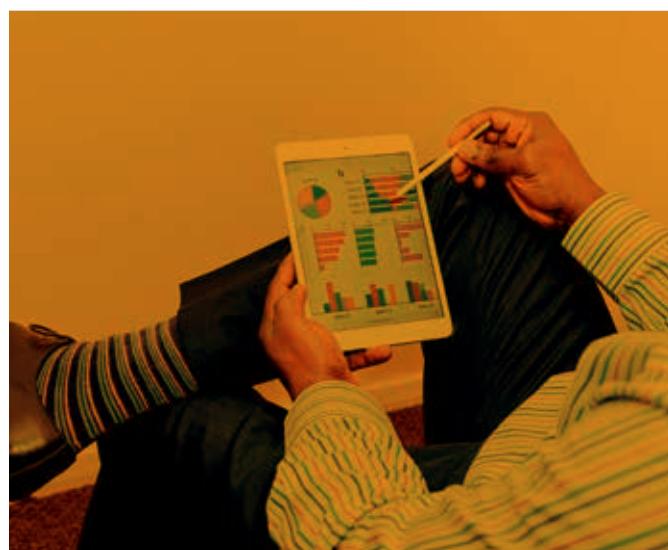


THE UK NATIONAL QUANTUM TECHNOLOGIES PROGRAMME AIMS TO CONVERT THE NEXT GENERATION OF QUANTUM TECHNOLOGIES FROM LABORATORY SCIENCE INTO INNOVATIVE AND MARKETABLE PRODUCTS

Getting in touch

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