Research Fellow in Portable Atomic Clocks

At: University of Sussex
Deadline: 1 March, 2018

The aim of the project is to develop and implement technologies to build a portable atomic clock based on trapped calcium ions. Utilizing the advances in fibre optics and laser technology, an all-fibre system will be set up and tested. Integrating optical fibres into the ion trap structure for fluorescence collection and light delivery as well as an all-fibre laser system ensures the stability and compact size of the optical clock.

The project includes developing a compact laser system for generating, cooling, and interrogating the ions, integrating all optical components into the ion trapping structure, building the required electronic control system as well as designing of the vacuum system. The heart of the clock is an ultra-stable laser (clock laser) which will be developed in collaboration with the National Physical Laboratory.

After successful testing the portable clock system, the project aims to explore the possibility to eliminate systematic frequency shifts due to electric and magnetic fields through quantum superpositions. Finally, the clocks performance will be evaluated by comparing its stability with primary and secondary frequency standards at the NPL.

The project is within the Quantum Technology Hub for Sensors and Metrology and in collaboration with the National Physical Laboratory.

As part of the National Quantum Technology Programme to commercialize quantum technologies, the project includes the investigation of potential commercialization pathways for the atomic clock system and its components.

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