EPSRC Industrial CASE PhD studentship in microfabricated ion trap chips for atomic quantum technology

Microfabricated devices for confining atomic particles are set to feature as essential core components in a range of quantum-enabled instrumentation during the coming years. Applications of these devices are in instruments such as atomic clocks and sensors, for use in precision positioning, navigation and timing. Additionally, these chip-scale devices will also be used in quantum information science and technology, for example as a processor or a node in a quantum network. Overall, applications range from laboratory research in fundamental science to practical quantum instruments.

The UK's National Physical Laboratory has developed novel chip-scale ion traps and atom traps, which are made using advanced microfabrication techniques. A second generation of superior devices with added functionality is being tested now; these will be used, together with a range of techniques in the coherent control of trapped ions, to research entangled systems and their application to quantum metrology.

In partnership with the Department of Physics at the University of Strathclyde, we are offering a 3.5-year, EPSRC-funded, Industrial CASE PhD studentship in this area of research. We are looking for a highly-motivated and talented person who has recently completed degree-level studies. The ideal candidate must show enthusiasm to achieve impact in the quantum technology arena and display an aptitude for conceptual thinking and problem solving.

The studentship will focus on coherent control and quantum entanglement of ions in chip-scale microtraps. It sits at a multidisciplinary interface involving quantum physics, photonics and microfabrication, with immediate applications in quantum technology. The student will contribute directly to funded research programmes and benefit from access to state-of-the-art, well-equipped, laboratory facilities at NPL. The studentship is funded by EPSRC's Industrial CASE programme, and provides for UK/EU tuition fees and stipend, and is available from October 2015. Applicants should have a physics or related degree, and in the first instance should submit an application letter and CV to Alastair Sinclair at NPL (alastair.sinclair@npl.co.uk) before 3 July.

For additional information on the research, see:

G. Wilpers, P. See, P. Gill and A. G. Sinclair, "A monolithic array of three dimensional ion traps fabricated with conventional semiconductor technology", *Nature Nanotechnology*, 7, 572 (2012).

C. C. Nshii, M. Vangeleyn, J. P. Cotter, P. F. Griffin, E. A. Hinds, C. N. Ironside, P. See, A. G. Sinclair, E. Riis and A. S. Arnold, "A surface-patterned chip as a strong source of ultracold atoms for quantum technologies", *Nature Nanotechnology* 8, 321 (2013).