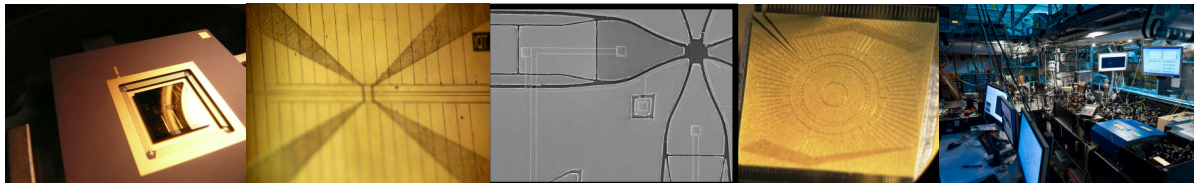


PhD position in quantum technologies with trapped ions: Microchip architectures, University of Sussex, Brighton, UK

A 3.5 year PhD position is available in the Ion Quantum Technology Group in the Department of Physics & Astronomy at the University of Sussex. The position consists of current UK/EU fees, a yearly stipend of £ £13,863 which can be supplemented by tutoring. The position includes a yearly travel allowance. You should have a physics or related degree.

Application deadline: Please apply preferentially by 1 August 2014. A second round of applications may be considered until September 1, 2014 for an additional position.

Research in novel quantum technologies will likely lead to step changing innovations which will affect many areas of modern sciences. Implementing such technologies with trapped ions quantum bits has been widely accepted as one of the most promising pathways. The aim of this studentship is to produce advanced nano-fabricated ion micro-chips for quantum technologies with trapped ions and to carry out experiments for quantum information processing and sensing.



The development of chip traps allows for scalable architectures of large numbers of trapped ion quantum bits. The use of various state-of-the-art nanotechnologies and photolithography allows for the fabrication of truly scalable structures. These chips will allow for one, two and three dimensional ion trap arrays. In addition to hosting a large number of quantum bits we will also focus on the implementation of advanced on-chip features such as signal processing, cavities, fibres and on-chip electronics. In the Ion Quantum Technology group at the University of Sussex we are focussing to build a full architecture for an ion trap quantum computer along with powerful quantum sensing devices. This project is on the interface of atomic physics, quantum information processing and nanoscience. You will participate in the construction of a fully scalable ion-trap quantum computer demonstrator device along with a portable quantum sensor.

You will learn all the experimental skills and theoretical background needed in this emerging field of science. Some of the skills you will acquire include nano-fabrication, lasers and optics, ultra-high vacuum techniques, quantum information science, electronics and many other skills. You will spend your first year primarily at Sussex where you will become an expert in ion trapping. Following that you will spend some periods of time at world-leading clean room facilities carrying out microfabrication and studies in nano-science along the design and fabrication of integrated quantum microchips.

The city of Brighton & Hove has everything - sun, sea, brilliant clubs, great places to eat, fabulous shops, a truly cosmopolitan vibe and is located only 50min from central London. Located on the beach, Brighton boasts beautiful seaside views and beaches, boating, sports and beach activities. The South Downs provide breathtaking views, tranquil walks and plenty of opportunities for mountain biking, hiking or picnics.

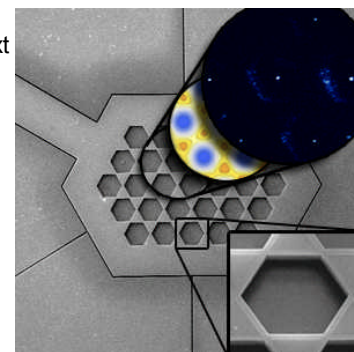
You can find out more about the group here (including a BBC documentary about our research group):

<http://www.sussex.ac.uk/physics/iqt/>

The 'Research' section of the website features specific information for prospective PhD students. You can also take a virtual lab tour.

Detailed reading about some of our research directions can be found here (full text available here: <http://www.sussex.ac.uk/physics/iqt/publications.html>):

- Microfabricated Ion Traps, Marcus D. Hughes, Bjoern Lekitsch, Jiddu A. Broersma and Winfried K. Hensinger, Contemporary Physics 52, 505 (2011)
- Microwave ion-trap quantum computing, Winfried K. Hensinger, Nature 476, 155 (2011)
- Fabrication and operation of a two-dimensional ion-trap lattice on a high-voltage microchip, R. C. Sterling, H. Rattanasonti, S. Weidt, K. Lake, P. Srinivasan, S. C. Webster, M. Kraft & W. K. Hensinger, Nature Communications 5:3637 (2014)



For more information, please email the head of group,

Dr Winfried Hensinger

(Reader in Quantum, Atomic and Optical Physics)

w.k.hensinger@sussex.ac.uk.

To apply please email a CV, and your degree results **preferentially before 1/8/2014 or the latest by 1/9/2014** to the email address above. Note in order to qualify for this position you must have resided in the UK or Europe for three years prior to the start of the position. If you are from outside Europe, you may apply for a non-funded position in the group, however, you will need to have a funding source for tuition fees and living expenses.

