

## Postdoc position: Fibre Coupled Ion-Photon Interface

Wed, 2012-11-07 10:52 - [Matthias Keller](#) [1] **At:** ITCM-Group, University of Sussex

**Deadline:** 31 January, 2013

### Location

University of Sussex Pevensey 2  
Brighton BN1 9QH United Kingdom

Phone: +44 1273 877673

50° 43' 10.1172" N, 1° 46' 5.7612" W

See map: [Google Maps](#) [2]

Applications are invited for a Post Doctoral Research Assistant position in the group of Dr. Matthias Keller (Department of Physics and Astronomy, University of Sussex (UK))

The project unites two distinct areas of quantum information processing, single ions stored in radio-frequency traps, and single photons in optical fibres. In both fields, there have been spectacular advances recently. Strings of ions are presently the most successful implementation of quantum computing, with elementary quantum algorithms and quantum simulations realised. Photons are used to distribute entanglement over ever increasing distances. The principal challenge in the field is to enhance the quantum processing power by scaling up current devices to larger quantum systems. We pursue one of the most promising strategies, distributed quantum computation, in which multiple small-scale ion processors are interlinked by exchanging photonic quantum bits via optical fibres. This requires a coherent quantum interface between ions and photons, mapping ionic to photonic quantum states and vice versa. To maximise fidelity and the success rate of the scheme, the interaction of ions and photons must take place in a microscopic optical cavity with high finesse, a technology in which the ITCM group at Sussex has extensive experience.

By tightly integrating the fibre cavity into the electrode structure, we are able to couple the ion reliably to an optical fibre cavity with a length of less than 400um and a finesse of about 60,000. The postdoc will investigate schemes to reliably map the quantum state of the trapped ions onto a single photon as well as the reverse process in order to establish a fibre coupled interface between ions and photons.

The position is offered for 3 years with a starting salary between £30,122 and £32,901 per year, depending on level of experience.

For enquiries and further particulars of the postdoctoral post please contact Dr. Matthias Keller (m [dot] k [dot] keller [at] sussex [dot] ac [dot] uk).

- [Postdoc](#) [3]

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### Links:

[1] <http://qurope.eu/users/matthias-keller>

[2] <http://maps.google.co.uk?q=Pevensey+2%2C+Brighton%2C+BN1+9QH%2C+uk>

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