

## PhD position in Molecular Physics and Physical Chemistry

Thu, 2016-04-21 19:36 - [Matthias Keller](#) [1] **At:** University of Sussex  
**Deadline:** 30 June, 2016

### Location

University of Sussex Brighton United Kingdom  
50° 49' 21.108" N, 0° 8' 13.7868" W  
See map: [Google Maps](#) [2]

### PhD position in Molecular Physics and Physical Chemistry

A 3.5 year PhD position is available in the Ion Trap Cavity-QED and Molecular Physics (ITCM) Group in the Department of Physics & Astronomy at the University of Sussex.

The positions come with an annual stipend of £14,057 which can be supplemented by tutoring. The position includes an additional yearly travel allowance for conferences and workshops.

Applicants should have an undergraduate degree in physics or similar.

For more information please contact Dr Matthias Keller (m [dot] k [dot] keller [at] sussex [dot] ac [dot] uk) and visit the group's web page at [www.itcm-sussex.com](http://www.itcm-sussex.com) [3]

The laws of physics are governed by a set of fundamental constants which determine the structure of the universe from sub-atomic particles to large galaxy clusters. Many theories which aim to unify all fundamental forces and cosmological models predict that fundamental constants change in time. Two particularly interesting constants are the fine structure constant and the proton-to-electron mass ratio. At the ITCM group at Sussex, we have set up an experiment which aims to measure how the proton-to-electron mass ratio changes with time to a higher accuracy than currently possible by employing high resolution spectroscopy of molecular ions. By using **quantum logic spectroscopy** the state of the molecule is transferred to a co-trapped atomic ion via the ions' joint motion in the trapping potential through the phononic quantum bus. In this way the ion's quantum state is measured without destroying it. This method can also be employed to entangle the quantum state of the molecule and atom to enhance the accuracy.

The PhD project will include the investigation of multi-photon ionisation of various molecular species, implementation of destructive and non-destructive molecular state detection and the development and implementation of sophisticated techniques to manipulate the internal molecular state. **The project is part of an interdisciplinary collaboration between the ITCM research group at Sussex and the research of Prof Tim Softley (University of Birmingham).**

- [PhD](#) [4]

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