



# PhD Projects at ACQAO

## EXPERIMENTAL

### About ACQAO

The Australian Centre for Quantum-Atom Optics (ACQAO) was formed in 2003 as one of the recently established Australian Research Council Centres of Excellence. It involves collaboration between the Australian National University in Canberra, the University of Queensland in Brisbane, and the Swinburne University of Technology in Melbourne.

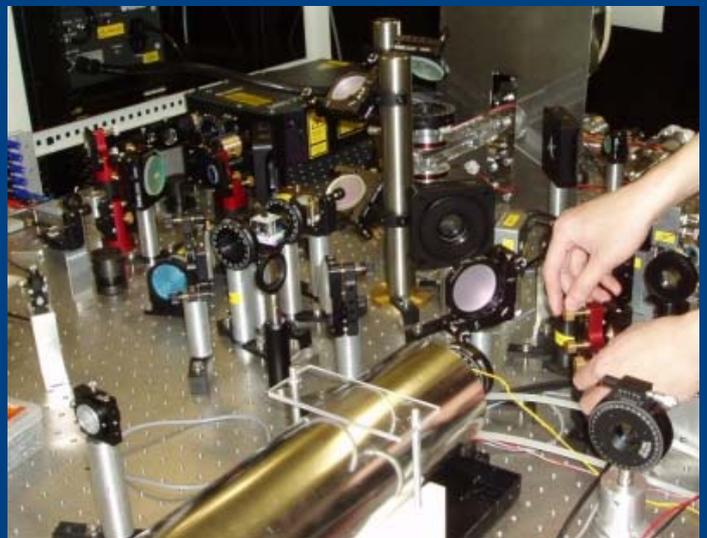
The aim of ACQAO is to carry out strategic fundamental research, which combines the ideas of quantum optics, such as squeezing and entanglement, and the techniques of atom optics, such as Bose-Einstein condensation and atom lasers.

## ATOM-LIGHT ENTANGLEMENT

A full quantum network could be a future application of quantum optics. One crucial component missing to date is a memory or storage of quantum information. This research goal is followed by leading groups internationally and here at ACQAO.

The crucial tool we require is the ability to transfer quantum information from light to atoms and vice versa. We are already testing this by slowing light in a Rb vapour, using EIT, and by investigating how well quantum information can be delayed in time. For the first time we can show the quality of modulation in all quadratures before and after the Rb vapour. All these measurements can be done close to the quantum noise limit, and we are exploring qualities as signal bandwidth and delay time.

The project involves the design and building of better storage devices, combining ultra-cold atoms, Ti-sapphire laser, squeezed light sources and quantum noise limited detection. This project links new ideas, from across the Centre, with state of the art experimental technology. You will be joining a team of students and staff bringing experiences from different countries (France, Germany, US, ...) and you will work with a rapidly expanding team.



### Supervisors

**ANU** Dr Ping Koy Lam <ping.lam@anu.edu.au>

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### Scholarships and further information

For further details about the research project please contact one of the prospective supervisors. Information about PhD scholarships at ANU can be found at:

<http://www.anu.edu.au/sas/scholarships/>