Michael Morrissey
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Physics (Quantum optics)
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Ireland

I am an experimentalist in the field of quantum optics specialising in cold- and ultra-cold atom physcs. In 2009 I completed my PhD with the Quantum Optics Group, Cork, Ireland creating Ireland's first Magneto-Optical Trap (MOT) and combining this field with tapered optical nanofibre (TONF). After this I became a postdoctoral research at IESL-FORTH, Crete, Greece. During this time I build built a Bose-Einstein Condensation (BEC) experiment to study the coherence properties of such a state of matter. In 2011, I took a postdoctoral position at UKZN, Durban, SA where I am currently building Africa's first BEC experiment.

CURRENT RESEARCH

Topic

Development of cold and ultracold atoms.

Methodology

These experiments require ultra-high vacuum (UHV) technology, laser frequency stabilisation, high quantum efficiency imaging systems, high power magnetic coils, a sophisticated timing system as well as the associated state-of-the-art electronics. The basic sequence:

Laser cooling and trapping, magnetic trapping, evaporative cooling, BEC

Application

Quantum mechanical effects observed in a BEC can play a crucial role in the development and understanding of future technologies governed by quantum rules.

UKZN main Publications

1. M. J. Morrissey, K. Deasy, M. Frawley, R. Kumar, E. Prel, L. Russell, V. G. Truong and S. Nic Chormaic, "*Spectroscopy, Manipulation and Trapping of Neutral Atoms, Molecules, and Other Particles using Optical Nanofibers: A Review*", Sensors, 13. (2013)
2. V. Bolpasi, M. J. Morrissey, W. von Klitzing, "*Atom lasing by time dependent adiabatic potentials* ", New Journal of Physics, Submitted June 2013.
3. V. Bolpasi, J. Gruker, M. J. Morrissey, W. von Klitzing, "*A gradient and offset compensated Ioffe-Pritchard trap for Bose-Einstein Condensation experiments*", J. Phys. B: *At. Mol. Opt. Phys.* **45** (2012)

Past Research

1. **Sept 2009 – Oct 2011**: IESL-FORTH, Crete, Greece**. Position: Postdoctoral Researcher in the Cretan Matter Wave Group**. Research aims: to successfully construct a BEC experiment to study, for the first time, the time-evolution of the phase of BECs. (Group Leader: Dr. Wolf von Klitzing).
2. **2004 – 2009:** Tyndall National Institute & Cork Institute of Technology, Cork, Ireland. **Position: PhD student in Quantum Optics**. Thesis Title: Manipulation schemes for laser-cooled atoms: Ultrathin fibre optics and magnetic diffraction gratings. Supervisor: Prof. Síle Nic Chormaic (University College Cork)

Future Interests

1. Quantum Optics: Techniques involved in creating cold and ultra-cold ensembles of neutral atoms.
2. Cold atom Physics: quantum coherence, atoms-optics, atoms-lasers.
3. Laser Technology: Development of technology to manufacture & construct various types of lasers.

Extra Interests

Sports: Soccer, squash, running, thai-boxing, badminton,

Other interests: Reading, movies, internet