

Nano-Optics Group
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Education	Ph.D. Physics, Heriot-Watt University, Edinburgh, UK Exciton-Photon Hybridisation in ZnSe Based Microcavities. Supervisors: Prof. R J Warburton and Dr A K Kar	May 2008
	MPhys in Physics, Heriot-Watt University, Edinburgh, UK Upper Second Class	Jun 2003
Research	Postdoctoral Research Associate Nano-Optics (Warburton) Group Heriot-Watt University, Edinburgh, UK	May 2008 - present
	Student Research Assistant Heriot-Watt University, Edinburgh, UK Area of Research: Experimental investigation of a single sonoluminescing bubble.	Jun - Oct 2003
	MPhys in Physics Undergraduate Project Heriot-Watt University, Edinburgh, UK Area of Research: Single bubble sonoluminescence. Awarded J. H. Murray Best Optics Project Award.	Oct 2002 - Mar 2003

Awards & Highlights

- 2007 First demonstration of cavity polariton bottleneck in the ZnSe material system.
- 2007 Semicond. Sci. Technol. **22**, 1189 (2007) highlighted by the Institute of Physics for novelty, significance and potential impact on future research.
- 2005 Cover story in III-Vs Review. The Advanced Semiconductor Magazine. **18** 30 (2005).
- 2003 First observation of single bubble sonoluminescence driven at 67 kHz.
- 2003 Awarded best Mphys project in optics at Heriot-Watt University (J. H. Murray Award).

Current Research

Current research activities focus on light matter interactions on a nanometer scale. With expertise in single quantum dot laser spectroscopy, combined with a novel tunable microcavity, the interaction of photonic modes with excitonic transition in III-V and II-VI quantum structures are explored and manipulated.

Relevant Experience

Design and fabrication of a variety semiconductor microcavities.
Optical spectroscopy techniques, ensemble and micro- photoluminescence.
Computational simulations of quantum and classic systems.

Additional Academic Experience

Tutoring in nanophysics, optoelectronics and semiconductor physics.
Laboratory and tutorial demonstrator for MSc in Optoelectronic and MSc in Nanophysics.
Training of 1st year Ph.D. students.

Journal articles

R T Moug, C Bradford, A Curran, F Izdebski, I Davidson, K A Prior and R J Warburton. Development of an epitaxial lift-off technology for II-VI nanostructures using ZnMgSSe alloys. Microelectronics Journal. *in press*

R T Moug, C Bradford, D Thuau, A Curran, R J Warburton and K A Prior. MBE Growth and characterization of MgS-rich zincblende $\text{Zn}_x\text{Mg}_{1-x}\text{S}_{1-y}\text{Se}_y$ alloys. J. Korean Phys. Soc. *in press*

C Bradford, R T Moug, A Curran, D Thuau, R J Warburton and K A Prior. Growth and characterization of ZnMgS grown by MBE on GaAs(100). J. Korean Phys. Soc. *in press*

R T Moug, C Bradford, F Izdebski, I Davidson, A Curran, R J Warburton, K A Prior, A Aouni, F M Morales, S I Molina. A comparison of ZnMgSSe and MgS wide bandgap semiconductors used as barriers: growth, structure and luminescence properties. J. Crystal Growth. *in press*

A Curran, R J Barbour, J K Morrod, K A Prior, A K Kar and R J Warburton. ZnSe Hybrid Microcavities Fabricated Using a MgS Release Layer: Strong & Weak Exciton-photon Coupling. J. Korean Phys. Soc. **53**, tba (2008).

A Curran, J K Morrod, K A Prior, A K Kar and R J Warburton. Exciton-photon coupling in a ZnSe based microcavity fabricated using epitaxial liftoff. Semicond. Sci. Technol. (*IOP Select*). **22**, 1189 (2007).

T C M Graham, A Curran, X Tang, J K Morrod, K A Prior and R J Warburton. Direct and exchange Coulomb energies in CdSe/ZnSe quantum dots. Phys. Stat. Sol. B. **243**, 782 (2006).

C Bradford, A Curran, A Balocchi, B C Cavenett, K A Prior and R J Warburton. Epitaxial lift-off of MBE grown II-VI heterostructures using a novel MgS release layer. J. Crystal Growth. **278**, 325 (2005).

A Balocchi, A Curran, T C M Graham, C Bradford, K A Prior and R J Warburton. Epitaxial lift-off of ZnSe-based heterostructures using a II-VI release layer. Appl. Phys. Lett. **86**, 011916 (2005).

R Szveda. Cover article featuring the works of A Curran *et. al.* ELO MBE of II-VIs at Heriot-Watt. III-Vs Review. The Advanced Semiconductor Magazine. **18**, 30 (2005).

Confereneeces

Talk: A Curran, R J Barbour, C Bradford, J K Morrod, R Moug, K A Prior and R J Warburton. Light-matter hybridisation in wide-bandgap ZnSe-based microcavities. UK Semiconductor 2008, Sheffield, U.K. (Jul 2008)

Poster: A Curran, R J Barbour, J K Morrod, K A Prior, A K Kar and R J Warburton. ZnSe hybrid microcavities fabricated using a MgS release layer: Strong and weak exciton-photon coupling. 13th International Conference on II-VI Compounds, Jeju, South Korea (Sept 2007).

Talk: A Curran, J K Morrod, K A Prior, A K Kar and R J Warburton. ZnSe-based microcavity fabricated using epitaxial liftoff. 7th Pacific Rim Conference on Lasers and Electro-Optics (CLEO PS), Seoul, South Korea (Aug 2007).

Talk: A Curran, J K Morrod, R J Barbour, I Weidle, R Moug, C Bradford, K A Prior, A K Kar and R J Warburton. Angle resolved transmission spectroscopy of ZnSe-based microcavities fabricated using epitaxial liftoff technique. Conference on Lasers and Electro-Optics (CLEO), Baltimore, Maryland U.S.A. (May 2007).

Poster: C Bradford, A Curran, A Balocchi, B C Cavenett, K A Prior and R J Warburton. Epitaxial lift-off of MBE grown II-VI heterostructures using a novel MgS release layer. 11th International Conference on II-VI Compounds, Edinburgh, U.K. (2004).

Referees

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