

# Curriculum Vitae

Mark Baker  
154 Didbrook Street  
Robertson, QLD  
Australia 4109

**Tel:** +61 7 3344 3986 (Home)  
+61 7 3735 3758 (work)  
+61 401 289 331(Mobile)

**Fax:** +61 7 3735 7656

**Email:** M.Baker@griffith.edu.au

**Date of Birth:** 1<sup>st</sup> December, 1978

**Place of Birth:** Brisbane, Australia

**Citizenship:** Australian

## Research Interests

Optical and magnetic manipulation of atomic and molecular systems. My PhD work has been the development of a laser cooled metastable beam apparatus for atom lithography.

## Academic Qualifications

Currently completing Doctor of Philosophy, Griffith University, Australia (Supervisors: Robert Sang, William MacGillivray)

- Thesis Title: Metastable atomic beam lithography (expected submission date May 2006)

BSc (Hons) University of Western Australia, Australia

- IIA Honours awarded, conferred July 2000
- Thesis Title: Low loss suspension systems for gravitational wave interferometric detectors

BSc University of Queensland, Australia

- Major in physics, conferred 14<sup>th</sup> December 1998
- Griffith University Postgraduate Research Award (GUPRA) (2001-2004)
- Griffith University International Travel Grant (2004)
- Conference on Optoelectronic and Microelectronic Materials and Devices (COMMAD 2004), Student Prize winner

## Academic Awards and Distinctions

## Employment History

Griffith University, Brisbane QLD, (2001-2005)

- Physics laboratory demonstrator for 1<sup>st</sup> and 3<sup>rd</sup> year subjects.
- Tutor for 1<sup>st</sup> year physics, mathematics, computing, and statistics subjects

- Employed to revise and improve 3<sup>rd</sup> year undergraduate experiments, particularly the Hanbury-Brown-Twiss spatial correlations experiment, incorporating LabVIEW™ DAQ control and signal processing for the experiment.

University of Western Australia, Perth WA, Australia (Jan 1999 – June 1999)

- Employed as research assistant for six months on the AIGO (Australian International Gravitational Observatory) project, developing novel high Q-factor suspension techniques applied to sapphire test masses for application in laser interferometric gravitational wave detection.

## Skills

- High proficiency with the design and use of a range of vacuum equipment and components, including rotary, turbomolecular, diffusion and ion pumps, and helium leak detectors.
- Proficiency with large number of electronic measurement systems and devices, including oscilloscopes, current supplies, high voltage electronics, multi channel analysers, and channeltron electron multipliers.
- High proficiency with gas and dye laser systems (completed laser safety training course) and associated techniques such as saturated absorption spectroscopy,
- Thorough knowledge of optical components and systems, including fibre optics.
- Experience with a multitude of surface analysis techniques, including SEM, AFM, XPS, ellipsometry and contact angle measurements. This has included the construction of a specialised computer controlled ellipsometer to measure thin film quality and coverage on various substrates.
- Implementation of experiment automation, including stepper motor control, signal processing, TTL logic and control, using LabVIEW™ and associated data acquisition hardware.
- Proficient with a number of programming languages, including Matlab, LabVIEW, Mathematica, C/C++.
- Proficient in a number of software packages including AutoCAD, Solid Edge, LaTeX, SPSS, Microcal Origin.
- Well developed skills in supervision of undergraduate and postgraduate students.

## Journal Articles

- *Towards creation of iron nanodots using metastable atom lithography*, A.J. Palmer, M. Baker, R.T. Sang, *Nanotechnology* **17** (4) 1166-1170 (2006).
- *Quantitative comparison of rare-gas cold cathode discharge metastable atomic beam sources*, A.J. Palmer, M. Baker, and R.T. Sang, *Rev. Sci. Instrum.* **75** (11) 5056-5058 (2004).
- *Lithographic pattern formation via metastable state rare gas atomic beams*, M. Baker, A.J. Palmer, W.R. MacGillivray, R.T. Sang, *Nanotechnology* **15** (9) 1356-1362 (2004).
- *A high flux metastable atomic discharge source with three-dimensional translation*, M. Baker, A.J. Palmer, R.T. Sang, *Meas. Sci. Technol.* **14** (4) N5-N8 (2003).
- *The Q-factor of flexure membranes (for gravitational wave detectors)*, M. Baker, L. Ju, D.G. Blair, *Meas. Sci. Technol.* **12** (10) 1666-1671 (2001).
- *High-Q niobium membrane flexure pendulum*, L. Ju, M. Baker, D.G. Blair, *Phys. Lett. A* **280** (4) 182-184 (2001).

## Conference Proceedings

- *Nanofabrication using optical masks for metastable atom lithography*, M. Baker, A.J. Palmer, R.T. Sang, 2004 Conference on Optoelectronic and Microelectronic Materials and Devices. COMMAD 2004 Proceedings (accepted, awaiting publication).
- *Progress towards the creation of iron nanodots using atom lithography*, A.J. Palmer, M. Baker, R.T. Sang, 2004 Conference on Optoelectronic and Microelectronic Materials and Devices. COMMAD 2004 Proceedings (accepted, awaiting publication).
- ***Contamination resists in metastable atom lithography***, M. Baker, A.J. Palmer, R.T. Sang, 2002 Conference on Optoelectronic and Microelectronic Materials and Devices. COMMAD 2002. Proceedings (Cat. No.02EX601) 201-204 (2002).
- *Second-generation laser interferometry for gravitational wave detection: ACIGA progress*, D.E. McClelland, S.M. Scott, M.B. Gray et al, Third International LISA Symposium, Max-Planck-Institute for Gravitational Physics, Classical and Quantum Gravity **18** (19) 4121-4126 (2001).
- *Status of the Australian consortium for interferometric gravitation astronomy*, D.E. McClelland, M.B. Gray, D.A. Shaddock et al, Gravitational Waves - Third Eduardo Amaldi Conference, AIP Conference Proceedings No. **523** 140-149 (2000).

## Conference Seminars

- *Nanofabrication using standing wave optical masks for metastable atom lithography*, M. Baker, A.J. Palmer, R.T. Sang, AIP National Congress, Canberra (2005), Book of abstracts p101.
- *Metastable atomic beam lithography*, M. A. Baker, A.J. Palmer, R.T. Sang, Australasian Conference on Optics, Lasers and Spectroscopy (ACOLS), Brisbane (2001), Book of abstracts p89.
- *Comparison of the intrinsic losses of metal membranes for test mass pendulums*, International Centre for Relativistic Astrophysics, ICRA Workshop, Perth (2000).

## Poster Presentations

- *Nanofabrication with a metastable atomic beam*, M. Baker, A.J. Palmer, R.T. Sang, Australasian Conference on Optics Lasers and

## Interests

- Sport (Football, Rugby, Cricket)
- Music (10 years piano/keyboard tuition)
- Media and Politics

## References

- Dr Robert Sang  
Centre for Quantum Dynamics, Griffith University,  
Nathan, Queensland  
Australia, 4111  
Telephone: +61-7-37353848  
Email: [R.Sang@griffith.edu.au](mailto:R.Sang@griffith.edu.au)
- Professor William MacGillivray  
Dean (Faculty of Sciences)  
University of Southern Queensland  
Toowoomba, Queensland  
Australia, 4350  
Telephone: +61-7-46312721  
Email: [macgilli@usq.edu.au](mailto:macgilli@usq.edu.au)
- Professor Birgit Lohmann  
Centre for Quantum Dynamics, Griffith University,  
Nathan, Queensland  
Australia, 4111  
Telephone: +61-7-37357279  
Email: [B.Lohmann@griffith.edu.au](mailto:B.Lohmann@griffith.edu.au)