

# Eleanor Chalkley

---

Email: eleanor.chalkley@gmail.com

## Employment Experience

### Postdoctoral Research Fellow

Department of Physics and Astronomy, University of Birmingham, November 2009 - January 2012 (Line Manager: Prof. C.C. Speake)

- Member of a team developing an instrument based upon a superconducting torsion balance capable of measuring torques due to gravitational attraction between plates with very small separations.
- Developed techniques to construct and experimentally verify stress-balanced low-temperature macroscopic thin-film systems and delicate cryogenically compatible silica assemblies.
- Liaised with international collaborators in microfabrication partnership EUMINAFab - organising meetings, telecons and maintaining progress towards final deliverables in an international group of micro- and nano-fabrication experts.
- Modelled the forces in a large multi-material thin-film system, using analytical strength-of-materials approaches based upon integrated circuit packaging techniques to model the internal stresses.

### Doctoral Researcher

Institute for Gravitational Research, University of Glasgow, October 2005- October 2009 (Supervisor: Prof. S. Rowan)

- Precision measurement of the mechanical dissipation of bulk optical materials and high-quality coating materials between 10K-300K in order to survey the activation energies of the microscopic dissipation mechanisms.
- Performed metrology, including building interferometers and optical sensing circuitry.
- Studied thermomechanical properties and thermal noise in materials for precision optics.

## Skills and Techniques

- Cryogenic and high vacuum system experimental design, commissioning and maintenance
- Wyko, Veeco and Zygo optical profiling instruments
- Mitutoyo CMM for precision measurement of components
- Film deposition by evaporation and sputtering and photolithography and etching of silicon
- Solidworks 3D CAD for production of technical drawings and generation of geometry information
- ANSYS FEA for mechanical, modal, harmonic and thermal analysis of complex geometries
- Programming in Matlab, IDL, Python and Mathematica
- Automation of experimental instrumentation with LabView
- Presentation with Powerpoint and Keynote (international conferences, seminars, group meetings)
- Scientific report and document preparation in L<sup>A</sup>T<sub>E</sub>X and MS Office

## Education

### PhD in Experimental Physics (09/2005 - 09/2009)

Institute for Gravitational Research, University of Glasgow

Thesis title: 'Investigations of the properties of materials for the optics and suspensions of future gravitational wave detectors'

### MSci in Physics and Space Research. (10/2001 - 06/2005)

Awarded degree classification 2:1

School of Physics & Astronomy, University of Birmingham

## Selected Publications

### Chalkley, Aston, Collins, Nelson, Speake

Testing The Inverse Square Law Of Gravitation At Short Range With A Superconducting Torsion Balance. Proceedings of 46th Rencontres de Moriond (in review)

### Abernathy, Reid, Chalkley, Bassiri, Martin, Evans, Fejer, Gretarsson, Harry, Hough, MacLaren, Markosyan, Nawrodt, Penn, Route, Rowan, Seidel

Cryogenic Mechanical Loss Measurements of Heat-treated Hafnium Dioxide ( $\text{HfO}_2$ )

Class. Quantum Grav. 28 195017

### Martin, Chalkley, Nawrodt, Armandulab, Bassiri, Comtet, Fejer, Gretarsson, Harry, Heintert, Hough, MacLaren, Michel, Montorio, Morgado, Penn, Reid, Route, Rowan, Schwarz, Seidel, Vodel, Woodcraft

Comparison of the temperature dependence of the mechanical dissipation in thin films of  $\text{Ta}_2\text{O}_5$  and  $\text{Ta}_2\text{O}_5$  doped with  $\text{TiO}_2$ . Class. Quantum Grav. 26 (2009)

## Conference Talks, Seminars and Poster Presentations

08/2011	The Gravitational Inverse Square Law: Why We Keep Measuring It	Cardiff University
07/2011	Exploring Extra Dimensions	VU, Amsterdam
03/2011	Large Extra Dimensions and the Superconducting Torsion Balance	Rencontres de Moriond
07/2009	Mechanical Loss in Optical Materials for Gravitational Wave Detectors	University of Birmingham
06/2008	Aspects Of Optical Materials For Use In Gravitational Wave Detectors (Third Year Talk Prize: Winner)	University of Glasgow
03/2008	The Mechanical Loss of Thin-Film Hafnia As A Function Of Temperature	Advanced Optical Materials Workshop, Caltech
06/2007	Silicon for Future Gravitational Wave Detectors	7th Amaldi Meeting, Sydney

## Personal Projects and Interests

Fibre arts:

- Making and designing knitted and crocheted garments
- Dressmaking and embroidery
- Developing knitwear design tools in Python

Self-directed study:

- Using open learning tools to study topics in history, environmental science and applied physics
- Visiting places of historical importance, including castles, cathedrals and sites connected to the Industrial Revolution.

Performance skills: songwriting, musical performance and dance