

# PAUL FULDA

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**Date of birth** 19 August 1985

**Nationality** British

## Employment

**2012 - Current** University of Florida, Postdoctoral Research Associate.

## Education

**2008 - 2012** University of Birmingham, Doctoral studies in Physics. GWIC Thesis prize 2012.  
*Precision interferometry in a new shape:  
Higher-order Laguerre-Gauss modes for gravitational wave detection.*

**2004 - 2008** University of Birmingham, MSci in Physics and Space Research, 1st class Honours.  
Undergraduate physics prizes 2005, 2006, 2007.

**2001 - 2003** Latymer Sixth Form College, A-levels in Maths (A), Physics (A) and Biology (A)  
As-level in Chemistry (A).

**1996 - 2001** Latymer Upper School, 9 GCSEs at A or A\* level.

## Research experience

**2012 - 2013** Testing adaptive optics for potential use in Advanced LIGO as mode matching actuators.

**2012 - 2013** Commissioning the Advanced LIGO input mode cleaners at the LIGO Hanford Observatory and LIGO Livingston Observatory, including simulation support using FINESSE software.

**2010 - 2012** Designed and installed a Laguerre-Gauss (LG) mode conversion path for the input optics bench at the Glasgow 10 m prototype, and made several visits to aid the subsequent experimental work.

**2011** Characterised optical levers, and developed software tools for optimisation of the associated control loops at the California Institute of Technology 40 m prototype over 2 weeks.

**2010** Assisted in the design of a LG<sub>33</sub> mode conversion and analysis path for the Hannover Albert Einstein Institut für Gravitationsphysik high power laser table.

**2009 - 2010** Planned, built and carried out a table top experiment to make the first demonstration of mode cleaning higher order LG laser modes with a linear optical resonator.

**2009** Scientific monitor shifts at the LIGO Livingston detector.

**2008** Supported the setup for a proof of principle tabletop experiment to demonstrate a novel method for ‘displacement noise free’ interferometry.

## Teaching and outreach experience

- 2008 - 2011** Tutored 34 year 2 undergraduate physics students.
- 2009 - 2011** Demonstrated in year 1 C++ lab for two academic terms.
- 2009 - 2011** Demonstrated in year 3 C++ lab for one academic term.
- 2008 - 2011** Demonstrated in Physics and Communication skills for three academic terms.
  - 2010** Helped to design, organise and carry out the ‘Looking for Black Holes with Lasers’ exhibition for the British Science Festival.
  - 2010** Provided the artwork for the outreach game ‘Space-time Quest’.

## Refereed journal publications

- Z. Liu, P. Fulda, M. Arain, L. Williams, G. Mueller, D. B. Tanner, D. H. Reitze, “Feedback control of optical beam spatial profiles using thermal lensing”, Accepted for publication in Applied Optics, July (2013).
- L. Carbone, C. Bogan, P. Fulda, A. Freise, B. Willke, “Generation of high-purity higher-order Laguerre-Gauss beams at high laser power”, Physical Review Letters, vol. 110, id. 251101 (2013).
- B. Sorazu, P. Fulda, B. W. Barr, A. S. Bell, C. Bond, L. Carbone, A. Freise, S. Hild, S. H. Huttner, J. Macarthur, K. A. Strain, “Experimental test of higher-order Laguerre-Gauss modes in the 10 m Glasgow prototype interferometer”, Classical and Quantum Gravity, vol. 30, id. 035004 (2013)
- C. Bond, P. Fulda, L. Carbone, K. Kokeyama, A. Freise, “Higher order Laguerre-Gauss mode degeneracy in realistic, high finesse cavities”, Physical Review D, vol. 84, id. 102002 (2011).
- P. Fulda, K. Kokeyama, S. Chelkowski, A. Freise, “Experimental demonstration of higher-order Laguerre-Gauss mode interferometry”, Physical Review D, vol. 82, id. 012002 (2010).
- P. Fulda, C. Bond, D. Brown, F. Brückner, L. Carbone, S. Chelkowski, S. Hild, K. Kokeyama, M. Wang, A. Freise, “Review of the Laguerre-Gauss mode technology research program at Birmingham”, Journal of Physics: Conference Series, vol. 363, id. 012010 (2012).
- C. Bond, P. Fulda, L. Carbone, K. Kokeyama, A. Freise, “The effects of mirror surface distortions on higher order Laguerre-Gauss modes”, Journal of Physics: Conference Series, vol. 363, id. 012005 (2012).
- D. Lodhia, F. Brückner, L. Carbone, P. Fulda, A. Freise, “Phase effects in Gaussian beams on diffraction gratings”, Journal of Physics: Conference Series, vol. 363, id. 012014 (2012).
- L. Carbone, C. Bond, D. Brown, F. Brückner, K. Grover, D. Lodhia, C. M. F. Mingarelli, P. Fulda, R. J. E. Smith, R. Unwin, A. Vecchio, M. Wang, L. Whalley, A. Freise, “Computer games for gravitational wave science outreach: Black Hole Pong and Space Time Quest”, Journal of Physics: Conference Series, vol. 363, id. 012057 (2012).
- P. Fulda, S. Chelkowski, S. Hild, A. Freise, “Laguerre-Gauss beams for future gravitational wave detectors”, Proceedings of the 12th Marcel Grossman meeting on General Relativity, World Scientific, p.1679 (2012).

## Refereed journal publications as a member of a collaboration

- J. Aasi *et al*, “Einstein@Home all-sky search for periodic gravitational waves in LIGO S5 data”, Physical Review D, vol. 87, Issue 4, id. 042001 (2013).
- J. Aasi *et al*, “Search for gravitational waves from binary black hole inspiral, merger, and ringdown in LIGO-Virgo data from 2009-2010”, Physical Review D, vol. 87, Issue 2, id. 022002 (2013)

- J. Abadie *et al*, “Search for gravitational waves associated with gamma-ray bursts during LIGO science run 6 and Virgo science runs 2 and 3”, *The Astrophysical Journal*, vol. 760, id. 12 (2012).
- P. A. Evans *et al*, “SWIFT follow-up observations of candidate gravitational wave transient events”, *The Astrophysical Journal Supplement Series*, vol. 203, id. 28 (2012).
- J. Aasi *et al*, “The characterization of Virgo data and its impact on gravitational-wave searches”, *Classical and Quantum Gravity*, vol. 29, Issue 15, id. 155002 (2012).
- J. Abadie *et al*, “All-sky search for gravitational-wave bursts in the second joint LIGO-Virgo run”, *Physical Review D*, vol. 85, Issue 12, id. 122007 (2012).
- J. Abadie *et al*, “Search for gravitational waves from intermediate mass binary black holes”, *Physical Review D*, vol. 85, Issue 10, id. 102004 (2012).
- J. Abadie *et al*, “Implications for the origin of GRB 051103 from LIGO observations”, *The Astrophysical Journal*, vol. 755, id. 2 (2012).
- J. Abadie *et al*, “Upper limits on a stochastic gravitational-wave background using LIGO and Virgo interferometers at 6001000 Hz”, *Physical Review D*, vol. 85, Issue 12, id. 122001 (2012).
- J. Abadie *et al*, “First low-latency LIGO+Virgo search for binary inspirals and their electromagnetic counterparts”, *Astronomy and Astrophysics*, vol. 541, id. A155 (2012).
- J. Abadie *et al*, “Search for gravitational waves from low mass compact binary coalescence in LIGOs sixth science run and Virgos science runs 2 and 3”, *Physical Review D*, vol. 85, Issue 8, id. 082002 (2012).
- J. Abadie *et al*, “All-sky search for periodic gravitational waves in the full S5 LIGO data”, *Physical Review D*, vol. 85, Issue 2, id. 022001 (2012).
- J. Abadie *et al*, “Implementation and testing of the first prompt search for gravitational wave transients with electromagnetic counterparts”, *Astronomy and Astrophysics*, vol. 539, id. A124 (2012).
- J. Abadie *et al*, “Directional limits on persistens gravitational waves using LIGO S5 science data”, *Physical Review Letters*, vol. 107, Issue 27, id. 271102 (2011).
- J. Abadie *et al*, “A gravitational wave observatory operating beyond the quantum shot-noise limit”, *Nature Physics*, vol. 7, Issue 12, id. 962-965 (2011).
- J. Abadie *et al*, “Beating the spin-down limit on gravitational wave emission from the Vela pulsar”, *The Astrophysical Journal*, vol. 737, id. 93 (2011).
- J. Abadie *et al*, “Search for gravitational waves from binary black hole inspiral, merger, and ringdown”, *Physical Review D*, vol. 83, Issue 12, id. 122005 (2011).
- J. Abadie *et al*, “Search for gravitational wave bursts from six magnetars”, *The Astrophysical Journal Letters*, Volume 734, Issue 2, article id. L35 (2011).
- S. Hild *et al*, “Sensitivity studies for third-generation gravitational wave observatories”, *Classical and Quantum Gravity*, Volume 28, Issue 9, pp. 094013 (2011).
- J. Abadie *et al*, “Search for gravitational waves associated with the August 2006 timing glitch of the Vela pulsar”, *Physical Review D*, vol. 83, Issue 4, id. 042001 (2011).
- J. Abadie *et al*, “Calibration of the LIGO gravitational wave detectors in the fifth science run”, *Nuclear Instruments and Methods in Physics Research Section A*, Volume 624, Issue 1, p. 223-240 (2010).
- J. Abadie *et al*, “Search for gravitational waves from compact binary coalescence in LIGO and Virgo data from S5 and VSR1”, *Physical Review D*, vol. 82, Issue 10, id. 102001 (2010).
- M. Punturo *et al*, “The Einstein Telescope: a third-generation gravitational wave observatory”, *Classical and Quantum Gravity*, Volume 27, Issue 19, pp. 194002 (2010).
- J. Abadie *et al*, “First Search for Gravitational Waves from the Youngest Known Neutron Star”, *The Astrophysical Journal*, Volume 722, Issue 2, pp. 1504-1513 (2010).

- J. Abadie *et al*, “TOPICAL REVIEW: Predictions for the rates of compact binary coalescences observable by ground-based gravitational-wave detectors”, *Classical and Quantum Gravity*, Vol. 27, Issue 17, pp. 173001 (2010).
- J. Abadie *et al*, “Search for Gravitational-wave Inspiral Signals Associated with Short Gamma-ray Bursts During LIGO’s Fifth and Virgo’s First Science Run”, *The Astrophysical Journal*, Volume 715, Issue 2, pp. 1453-1461 (2010).
- J. Abadie *et al*, “All-sky search for gravitational-wave bursts in the first joint LIGO-GEO-Virgo run”, *Physical Review D*, vol. 81, Issue 10, id. 102001 (2010).
- M. Punturo *et al*, “The third generation of gravitational wave observatories and their science reach”, *Classical and Quantum Gravity*, Volume 27, Issue 8, pp. 084007 (2010).

### Research talks

2013	“LG laser mode research for gravitational wave detectors”	Amaldi 10, Warsaw.
2013	“Adaptive optics and electro-optic beam deflectors”	LVC meeting, Bethesda.
2012	“LG modes for thermal noise reduction in gravitational wave detectors”	Seminar, Gainesville.
2011	“Experimental work on higher-order LG modes”	LVC meeting, Gainesville.
2011	“LG modes for thermal noise reduction”	GWADW, Elba.
2010	“Interferometric sensing and control with LG modes”	GEO ISC, Hannover
2010	“LG modes in future gravitational wave detectors”	LVC meeting, Krakow.
2010	“Experimental LG mode interferometry”	GWADW, Kyoto.
2009	“LG modes for future gravitational wave detectors”	MG12, Paris.

### Grants

2011	Royal Astronomical Society student travel grant	£538
2011	IOP Grant to fund links between university departments and schools	£750
2011	University of Birmingham Moreton travel award	£630
2011	IOP Gravitational physics group research student conference fund	£250

### Memberships

LIGO Scientific Collaboration  
Einstein Telescope Science Team  
American Physical Society  
APS Topical Group in Gravitation  
Royal Astronomical Society  
Institute of Physics  
IOP Gravitational Physics Group