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Professor Andreas Freise BSc, Dipl.-Phys., Dr. rer. nat.

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About

Professor Freise leads a small research team in the Gravitational Wave Group, working on new technologies and instrumentation for high-precision experiments.

Professor Freise also has a leading role in the optical design of new gravitational wave detectors. For several years, he chaired the optical design working groups of the international projects Advanced Virgo and the Einstein Telescope, and is currently chairing the simulation group of the GEO 600 collaboration. Furthermore, Freise has developed and maintains the software package Finesse, which is used world-wide for the design of interferometer systems.

Freise is a co-author on 142 peer-reviewed research papers (with an H-index of 46) in the field of gravitational wave research, and actively engaged in utilising new media for outreach and education. As such, Freise has recently created a**dedicated web portal. (http://www.gwoptics.org)**

Qualifications

- Dr. rer. nat. (Doctoral Studies in Physics) Universitaet Hannover 2003
- Diplom Physik, Universitaet Hannover 1998
- BSc Hons, Applied Physics with Microcomputing, Napier University 1995

Biography

Andreas Freise obtained his PhD in 2003 from the University of Hannover for developing new optical simulations and for significant contributions to the experimental realisation of the German-British gravitational wave detector GEO 600. He then became the first post-doctoral researcher at the newly established European Gravitational Observatory in Pisa to work on the Virgo detector, continuing his work to bring the first generation of gravitational wave detectors online. In 2005 Freise became a member of permanent academic staff in the School of Physics and Astronomy at the University of Birmingham, initiating a research activity on new technologies for high-precision experiments. The focus of his current research is on optics and interferometry for the Advanced LIGO project, the Einstein Telescope and future gravitational wave detector.

After having worked on both European detector sites, he actively supported the formation of a joint European community from the GEO and Virgo gravitational wave collaborations, which led to the successful FP7 design study for a future European research infrastructure, the Einstein Telescope.

Teaching

- Yr3 Numerical Modelling of Physical Systems [laboratory, in charge]
- Yr3 Photonics Laboratory [in charge]
- Yr4 Lasers and Interferometers
- Yr4 Project supervision

Postgraduate supervision

- Supervision of research PhDs in gravitational wave research and advanced optics.
- See the **project descriptions (http://www.sr.bham.ac.uk/~adf/space/phd.php)** for currently available PhD projects.

Research

RESEARCH THEMES

- Gravitational wave research
- Optical instrumentation for precision experiments
- Numerical modelling of optical systems

For more information and links, visit the **research overview (http://www.sr.bham.ac.uk/~adf/space/research.php)** page.

Other activities

- Member of the STFC oversight committee for CTA [2012]
- Founder and Editor in Chief of the LIGO Magazine, **www.ligo.org/magazine (http://www.ligo.org/magazine)** [2012 - to date]
- Council member of the LIGO Scientific Collaboration [2011 - to date]
- External reviewer of the Large-scale Cryogenic Gravitational wave Telescope (KAGRA, was LCGT) project, Japan [2011 - to date]
- Member of the Gravitational Waves Advanced Detectors Workshop (GWADW) Programme/Advisory committee [2011 - to date]
- Work package manager 'sensor noise model' of the Gravity Gradient - Technologies and Opportunities Programme [2011 - to date]
- Curator of the simulation-related page on the Gravitational Wave International Committee (GWIC) online presence [2011 - to date]
- Visiting Researcher at the National Astronomical Observatory of Japan [2011]
- Member of the Executive Board and the Governing Council of the international FP7 design study `Einstein Telescope' [2008 - 2011]
- Chair of the Interferometer Topology Work Package of the FP7 design study `Einstein Telescope' [2008 - 2011]
- Chair of the GEO 600 simulation working group [2006 -]
- Deputy Project Manager of the Birmingham LISA Pathfinder project [2006 - 2011]
- Member of the STFC Project Peer Review Panel [2008 - 2010]
- Invited observer on the international Virgo Steering Committee [2007 - 2009]
- System Manager `Optical Simulation and Design' of the international Advanced Virgo project [2007 - 2009]
- External reviewer of the 'Virgo+' project [2009]
- Chair of the Virgo Alignment Sensing and Control group [2004 - 2005]
- Member of the LIGO Scientific Collaboration [1999 - 2003, 2005 -]
- Member of the GEO 600 Collaboration [1999 - 2003, 2005 -]
- Member of the Virgo Collaboration [2003 - 2005]
- Member of the Gravitational Physics Committee, Institute of Physics UK [2006 - 2010]
- Member of the Commissioning Working Group, FP6 ILIAS N5 network [2005 - 2009]

Publications

- T. Accadia et al. including Freise (Virgo Collaboration): 'Virgo: a laser interferometer to detect gravitational waves', Journal of Instrumentation, Volume 7, Issue 03, pp. 3012 (2012)
- Freise, A. et al `Optical detector topology for third-generation gravitational wave observatories', General Relativity and Gravitation, Volume 43, Issue 2, pp.537-567 (2011)
- J. Abadie et al. including Freise (LIGO Scientific Collaboration): 'A gravitational wave ob- servatory operating beyond the quantum shot-noise limit', Nature Physics, Volume 7, Issue 12, pp. 962-965 (2011)
- Fulda, P., Kokeyama, K.,Chelkowski, S., Freise, A. `Experimental demonstration of higher-order Laguerre-Gauss mode interferometry', Physical Review D, vol. 82, Issue 1, id. 012002 (2010)
- M. Punturo et al. including Freise (ET Science team): 'The third generation of gravitational wave observatories and their science reach', Classical and Quantum Gravity, Volume 27 (084007)
- Freise, A. et al `Triple Michelson interferometer for a third-generation gravitational wave detector', Classical and Quantum Gravity, Volume 26, Issue 8, pp. 085012 (2009)
- Freise, A. (2010) gwoptics webpage, **www.gwoptics.org (http://www.gwoptics.org)**

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