



PHYSIKALISCHES KOLLOQUIUM

Vortrag: **Prof. Michèle Heurs**
Leibniz Universität Hannover



Thema: **In space, no one can hear you scream: Gravitational Waves – news from the Universe**

Zeit und Ort: Dienstag, 28.6.2022, 16:40 Uhr - Hybride Veranstaltung
Vortrag vor Ort in REC/C213

Online Teilnahme möglich:

Zoom-Meeting: Meeting-ID: 677 2950 4423 / Kenncode: PK-22!-MH

<https://tu-dresden.zoom.us/j/67729504423?pwd=Rm1kcklML3ZvNXh5SRWVKTjMyOEE5QT09>

Leitung: Dr. Uta Bilow

Kurzfassung: Since the first direct detection of gravitational waves in 2015, we have gained an entirely new observation window to the universe – now, we not only have electromagnetic telescopes and neutrino detectors to view astrophysical events, but we can also listen to the cosmos using interferometric gravitational wave detectors. The sensitivity of these interferometers is so incredible that quantum effects of the employed light have already become limiting. Ultra-precisely stabilised lasers do not suffice; non-classical (fixed-quadrature squeezed) light is already routinely employed in the current (second) generation gravitational wave detectors (such as aLIGO and AdVirgo). Other noise sources, such as seismic and thermal noise, pose further challenges for next-generation detectors. To achieve ever-higher detection rates for meaningful gravitational wave astronomy, ever-greater detection sensitivity is required. In this talk, I will introduce the principle of interferometric gravitational wave detection and highlight some of the advanced technologies employed in Advanced LIGO. I will conclude my talk by showing some recent results and further possibilities, as well as options for quantum noise reduction in laser interferometry and the broader field of quantum optics.

Biographie: Born in 1975, Michèle studied physics in Hannover (diploma thesis at the „Institut für Atom- und Molekülphysik, Abteilung Spektroskopie“ on the topic of „Long-term frequency stabilisation of a Nd:YAG laser system for GEO600“). She defended her PhD in Dec. 2004 at the Institute for Gravitational Physics on „Gravitational waves in a new light: novel stabilisation schemes for solid state lasers“ and was a PostDoc at the Max Planck Institute for Gravitational Physics from 2005 to 2007. From 2007 to 2010, she was a PostDoc at the University of New South Wales (Australia) in the group of Elanor Huntington. In July 2010, she returned to Hannover to take up a junior

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professorship on „Fundamental Noise Sources in Laser Interferometers“ within the Centre of Excellence QUEST (Quantum Engineering and Space-Time Research). Since 2016 she is a professor of experimental physics at Leibniz Universität Hannover (LUH) and works in the field of „Non-classical laser interferometry“ and “Quantum Control”. In 2017 she received the teaching award of LUH (and the faculty of Mathematics and Physics). Michèle is a long-time member and, since 2015, a council member of the LIGO Scientific Collaboration (LSC). She is Dean of QUEST Leibniz Forschungsschule, an interdisciplinary faculty at LUH, and principal investigator in two Centres of Excellence, PhoenixD and QuantumFrontiers. Her research interests are non-classical light sources („squeezed light“), in particular at high frequencies, quantum radiation pressure noise reduction techniques (such as Coherent Quantum Noise Cancellation), quantum optomechanics, precision metrology, and novel laser stabilisation techniques, metamaterials, as well as high-bandwidth high-efficiency photodetection and controls.

Get-Together

Im Anschluss an das Kolloquium (18:00 Uhr) sind Studierende und Mitarbeitende eingeladen zu einem Get-Together mit Michèle Heurs, um mit der Referentin persönlich ins Gespräch zu kommen und sich über weibliche Perspektiven auf Herausforderungen in Studium und Berufsleben auszutauschen. Das Get-Together findet im Raum REC/B101 statt, zusätzlich ist eine online-Teilnahme möglich.

<https://cern.zoom.us/j/64907669855?pwd=aGtsU3haSWpQVkwzVXcyMzITSzJaUT09>

Meeting ID: 649 0766 9855 / Passcode: 833071

(Dieser Zugang ist nur für das Get-Together, nicht für den Kolloquiumsvortrag)