International Lecture Week on Gravitational Waves - Bridging Engineering and Physics

Monday 16 September 2024 - Friday 20 September 2024

Scientific Programme

ET Science

Prof. Dr. Achim Stahl
RWTH Aachen University, III. Physical Institute B

Power Spectral Density

Prof. Dr. Karsten Danzmann
Leibniz Universität Hannover (Institut für Gravitationsphysik) and
Max Planck Institute for Gravitational Physics (Albert Einstein Institute)

• Fourier transform
• Cross correlation , convolution
• Auto correlation
• Power spectrum, PSD
• One□sided linear spectral density
• Convergence Periodogram to PSD, averaging
• Spectrum Analyser, FFT Analyser

Geology

Prof. Dr. Florian Wagner
RWTH Aachen University, Geophysical Imaging and Monitoring Teaching and Research Unit

Nils Chudalla, M.Sc.
RWTH Aachen University, Chair of Computational Geoscience, Geothermics and Reservoir Geophysics

• Earth activity including seismology

Seismic Isolation Theory and Practice

Nathan Holland

• Seismic isolation with pendulum
• Introduction of seismic attenuation system used in GW detectors

IceCube Observatory

Prof. Dr. Christopher Wiebusch
RWTH Aachen University, III. Physical Insitute B, Experimental Physics Teaching and Research Area

• Introduction and overview

Quantum Gravimetry

Dr. Dorothee Tell
Leibniz Universität Hannover
Institut für Quantenoptik

• Gravity sensing with cold atoms
• Concepts
• Visions
• Very Long Baselines

ET Pathfinder

Prof. Dr. Stefan Hild
Maastricht University, Faculty of Science and Engineering

• Introduction and Overview

Thermal Noise

Dr. Alex Amato
Ass. Prof. Jessica Steinlechner

• Fluctuation – Dissipation Theorem
• Viscous damping
• Brownian noise
• Thermo□elastic noise
• Thermo□refractive noise
• Coating noise
• Suspension noise
• Cooling and Cryogenics

Test of Fundamental Physics

Prof. Dr. Claus Lämmerzahl
ZARM, University of Bremen

• Galileo satellites, clocks, gravitational redshift and further clock effects
• GNSS clock and orbit products
• Standard relativistic corrections in GNSS
• Refinement of relativistic corrections
• Testing relativity with Galileo satellites

Squeezed Laser Source

Apl.Prof.Dr. Benno Willke
Leibniz Universität Hannover (Institut für Gravitationsphysik) and
Max Planck Institute for Gravitational Physics (Albert Einstein Institute)

• Quasi□probabilities
• Squeezing and displacement operators
• Minimum uncertainty states
• Squeezing by non□linear processes
• Measurements with squeezed states
• Turning of squeezing ellipse

Gravitational waves in other frequency bands

Dr. Huanchen Hu
Max-Planck-Institut für Radioastronomie

• LISA
• Pulser timing arrays
• Experimental approaches to the gaps

Cosmology and the evolution of the universe

Prof. Dr. Julien Lesgourgues
RWTH Aachen University, Institute for Theoretical Particle Physics and Cosmology

• What are the dark ages
• What created the reionization
• Structure formation and stochastic GW background
• Supernovae and GW

Social Event

Vogelsang IP International Place
Eifel National Park

• 16:00 Start from the hotel
• 16:30 Arrival at the Vogelsang
• 17:00 Tour of Vogelsang
• 20:00 Return to hotel and BBQ dinner