Programme - 2021 Lecture Week 2, October 4-8, 2021 in AEI seminar room 103.

	4th (Mon)	5th (Tue)	6th (Wed)	7th (Thr)	8th (Fri)
10:00	LI 6: Ifo and DC Readout **K.Danzmann**	10m prototype Laboratory visit in AEI **Matteo Carlassara**	LI 7: Phase Modulation, PDH technique and EOM **B.Willke**	QM 4: Quantum computing 2 **Peter Schupp**	LI 8: Ifo noise source **B.Willke** **Seminar room 309 Schneiderberg 50**
11:30	**Pause**		**Social Lunch at AEI**	**Pause**	
12:00	Rel.Geo 3: Space gravity observations for Ocean Climate studies **M.Weigelt**	Rel.Geo 4: Relativistic Geodesy **C.Lämmerzahl**		Science Communication workshop 1 **Milde Marketing**	Science Communication workshop 2 **Milde Marketing**
13:00			Visit to GEO600 by Shuttle		
13:30	**Social Lunch at AEI**		GEO600 Lab Tour **GEO600 team** Return to AEI by Shuttle	**Social Lunch at AEI Students Presentation** Please bring your lunch to the seminar room 103.	**Social Lunch at AEI**
15:00	Questions and Answers and Students Presentations	QM 3: Quantum computing 1 **Peter Schupp**		Science Communication workshop 1 **Milde Marketing**	Science Communication workshop 2 **Milde Marketing**
16:30	**Pause**				
17:00	End of the day	Dinner (private, not organized)	End of the day	End of the day	City Tour Hannover **K.Danzmann**

Contents of Relativistic Geodesy lectures:

Lecture 3 : Space Gravity Observations for ocean climate studies (Matthias Weigelt, LUH)

- Introduction to space gravity observations
- Observation concepts of CHAMP, GRACE and GOCE
- Geometry of the GRACE system
- Solution strategies
- Applications in Geosciences

Lecture 4 : General Relativistic Geodesy (Claus Lämmerzahl, Uni Bremen/ ZARM)

- Introduction to General Relativity
- Observables
- Theory of congruences, modelling bodies
- The general relativistic gravitational field
- Decomposition of the relativistic gravitational field
- Measuring the gravitational field

Contents of Laser Interferometry Lectures

Lecture 6 : Ifo and DC Readout (Karsten Danzmann, AEI)

- Phase relations at beamsplitter
- Electrical field at ifo output
- Bright, mid, dark fringe detection
- Error signal generation with local oscillator
- Schnupp, external, internal modulation
- DC readout

Lecture 7 : Phase Modulation, PDH technique and EOM (Benno Willke, AEI)

- Phase relations in plane-plane Fabry Perot
- Converging infinite series, resonance
- Overcoupling, undercoupling, matching
- Phase response in reflection and transmission
- Finesse, FSR, storage time
- Pound-Drever-Hall detection
- Electro-optic modulators

Lecture 8: Ifo noise source (Benno Willke, AEI)

- Optical transfer function
- Generic sensitivity curve
- Noise projections
- Seismic noise, vibration isolation
- Control system noise
- Thermal noise
- Shot noise
- Laser noise

Contents of Quantum Mechanics Lectures

Lecture 3 : Quantum computing 1 (Peter Schupp, JU Bremen/Models of Gravity)

- Quantum Mechanics background
- Qubits, quantum entanglement, and quantum parallelism
- Deferred and implicit measurement
- Quantum gates and quantum circuits

Lecture 3 : Quantum computing 2 (Peter Schupp, JU Bremen/Models of Gravity)

- Quantum algorithms overview
- Applications, actual implementations
- Alternative approaches

Information about non-lecture programmes.

Please fill in your travel request at your own institute. For GEO600 visit, all participants including ones who work at AEI need to fill in the travel request.

For LUH people please fill in : https://www.intern.uni-hannover.de/nocache/de/vademecum/detail/652/

For Max Planck people please fill in one with IMPRS

For others please fill in a travel form at your institute.

Students Presentations on 4th of October, in 15:00 - 16:30

- PhD students make 5-minute presentations about their research with slides.

  → **Please prepare your talk slides.**

Social Lunch at AEI

- Lunch will be provided for everyone to get together at the AEI.

Visit to 10m Prototype Laboratory visit in AEI on 5th of October, 10:00 - 11:30

- Guided tour by Matteo Carlassara.

- 10m Prototype Laboratory is 50 meters away from the seminar room 103.
- Meeting point for all: Seminar room 103 at 10:00
- there are three groups for the 10m prototype tour as we decided today.

    - Group 1:
    - Start: 10:00
    - Members: Marlin, Andreas, Jasper, Alexey, Martin, Rahul, Megha

    - Group 2:
    - Start: 10:30
    - Members: Tim, Malte, Pascal, Merle, Pablo, Nicole

    - Group 3:
    - Start: 11:00
    - All the rest

Dinner (private, not organized) visit on 5th of October after lectures

- We have a chance to eat with our guest lecturer.
- It is not organized by the lecture week.

→ **People who want to eat together get together and self organize this dinner.**

Visit to GEO600 on 6th of October starting on 13:00

- Guided tour is given by the GEO600 scientist.
- Participants travel to GEO600 site as a group.
- Details will follow.

Science Communication Workshops on 7th and 8th of October afternoon

- Trainers: Susanne Milde and Sascha Rieger from Milde Marketing
- Participants of the lecture week 2 receive a series of science communication workshop by a professional trainer.
- Programme

  7.10. 12:00 - 13:30:

  - Introduction to Science Communications
  - Exercise: Science Communications for your research - developing ideas

  7.10. 15:00 - 16:30

  - Best practice & examples
  - Exercises in working groups according to the participant´s interests: e.g. developing press work, social media activities, a public lecture, a real and/or virtual exhibit, graphics & animations, a film
  - Wrap up

  8.10. 12:00 - 13:30:

  - Continuing exercises in working groups according to the participant´s interests: e.g. developing press work, social media activities, a public lecture, a real and/or virtual exhibit, graphics & animations, a film

  8.10. 15:00 - 16:30

  - Presentation of results and discussion

City Tour Hannover (Subject to weather conditions)

- Karsten Danzmann leads the tour through Hannover.
- All participants are welcome to join.
- How the home city of the AEI has been developed will be described with pictures.