

**Tentative schedule for the talks**  
**Testing Quantum Aspects of Gravity in a Laboratory 2022**  
28 March - 1 April

**Time: 14:00 CEST**

**(All Time in CEST) All Talks are for 20+5 minutes, abundant time for panel discussions**

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**Session notes will be taken by:**

**Martine Schut, Marko Toros, Ryan Marshman, Yue Ma, Julen Pedernales**

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**Monday [Chair: Anupam Mazumdar, Julen Pedernales]**

14:00 - 14:20 Introduction & chaired by **Anupam Mazumdar + Lorentz Centre**  
Chair: Julen Pedernales

14:20 - 14:45 Ron Folman *Stern-Gerlach Interferometry with massive objects*

14:45- 15: 10 Carlo Rovelli

5 Minutes break

15:15 - 15:35 Peter Barker *Electrodynamic levitation for measurement of small forces.*

15:35 - 16:05 Panel Discussion (20 min) + break

**[Chair: Daniel Carney, Martine Schut ]**

16:05 - 16:30 Vlatko Vedral

16:30 - 16:55 Angelo Bassi *"Seven non-standard models coupling quantum matter and gravity"*.

5 Minutes break

17:00 - 17:25 Gary Steele *"Prospects for testing quantum and gravity using superconducting electromechanics"*

17:25 - 18:25 Panel Discussion [ **Lead by Daniel Carney, Anupam Mazumdar, Julen Pedernales, Martine Schut** ]

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**Tuesday [Chair: Martin Plenio, Yue Ma]**

**14:00 - 14:10 Summary presentation of the first day meeting**

14:10 - 14:35 Hendrik Ulbricht: *'Classical and quantum aspects of gravity probed by levitated mechanical systems'*

14:35 - 15:00 Igor Pikovski *Prospects for interference of gravitational time dilation.*

5 Minutes break

15:05 - 15:30 Mauro Paternostro *Quantum neuromorphic approach for sensing gravity-induced entanglement*

15:30 - 16:00 Panel Discussion (20 min) + break

**[ Chair: Sougato Bose, Chiara Marletto ]**

16:00 - 16:25 Brian D'Urso *Approaching the Standard Quantum Limit of Image-Based Pulsed Position Measurements*

16:25 - 16:50 Marko Toros *Mechanism for the quantum natured gravitons to entangle masses*

5 Minutes break

16:55 - 17:25 Daniel Carney *Comments on locality in gravitational entanglement experiments*

17:25 - 18:25 Panel Discussion [ **Lead by Martin Plenio, Sougato Bose, Yue Ma, Martine Schut** ]

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**Wednesday [ Chair: Myungshik Kim, Marko Toros ]**

**14:00 - 14:10 Summary presentation of the second day meeting**

14:10 - 14:35 Ryan Marshman *Probing for new forces with entanglement.*

14:35 - 15:00 Chiara Marletto

5 Minutes break

15:05 - 15:30 Julen Pedernales *Enhancing Gravitationally Mediated Entanglement*

15:30 - 16:00 Panel Discussion (20 min)/Coffee break (10 min)

**[ Chair: Peter Barker, Chiara marletto ]**

16:00 - 16:25 Andy Geraci *Precision sensing with levitated nano-objects: from surface forces to gravitational wave detection*

16:25 - 16:50 Tong Cang Li *"Casimir effects and torque detection with an optically levitated nanoparticle near a surface."*

5 Minutes braek

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## Testing Quantum Aspects of Gravity in a Laboratory 2022

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16:55 - 17:25 Ivette Fuentes *Exploring the unification of quantum theory and general relativity with a Bose-Einstein condensate*

17:25 - 17:50 Gavin Morley *Towards a spatial superposition of a levitated microdiamond*

17:50 - 18:35 Panel Discussion [**Lead by Peter Barker, Myungshik Kim, Chiara Marletto, Marko Toros**]

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#### Thursday [ Chair: Ulbricht Hendrik, Ryan Marshman ]

**14:00 - 14:10 Summary presentation of the third day meeting**

14:10 - 14:35 Catalina Curceanu *Underground tests of Quantum Mechanics Collapse models and Pauli Exclusion Principle*

14:35 - 15:00 Magdalena Zych *Can gravity be a Local Classical Channel? Insights from atom interference experiments.*

5 Minutes break

15:05 - 15:30 Lucia Hackermuller *Experimental limits of massive BECs – are they suitable candidates to probe Quantum gravity?"*

15:30 - 16:00 Panel Discussion (20 min)/Coffee break (10 min)

#### [ Chair: Gary Steele, Ivette Fuentes ]

16:00 - 16:25 Alex Grinin *"Towards matter-wave interferometry with virus-sized objects".*

- 16:25 - 16:50 Oriol Romero-Isart *Towards Large Quantum Delocalization of a Nanoparticle*

5 Minutes break

16:55 - 17:25 Christian Panda *Probing gravity with trapped atoms: the optical lattice atom interferometer*

17:25 - 18:25 Panel Discussion [**Lead by Gary Steele, Hendrik Ulbricht, Ryan Marshman, Ivette Fuentes** ]

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#### Friday [ Chair: Ron Folman, Marko Toros ]

**14:00 - 14:10 Summary presentation of the fourth day meeting**

14:10 - 14:35 Gerard Milburn *Photonic tests of gravitational decoherence*

14:35 - 15:00 Dirk Boumeester

5 Minutes break

15:05 - 15:30 Yue Ma *Limits on inference of gravitational entanglement*

15:30 - 16:00 Panel Discussion (20 min)/Coffee break (10 min)

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16:00 - 16:10 Martin Plenio

16:10 -16:20 Myungshik Kim

16:20 - 16:30 Sougato Bose

16:30 - 16:40 Anupam Mazumdar