KITP Conference: Frontiers of Quantum Metrology: Fundamental Physics, Unexpected Connections, and Novel Applications
(Oct 9-12, 2023)
Coordinators: Klemens Hammerer, Klaus Mølmer and Marianna Safronova

Monday, Oct 9, 2023

8:50am Lars Bildsten (KITP)
Welcome[Video][CC]
9:00am Jun Ye (U Boulder)
Precise engineering of quantum many-body states for atomic clocks and fundamental physics[Video][CC]
9:45am Shimon Kolkowitz (UC Berkeley)
Testing relativity in the lab with a miniature clock network[Slides][Video][CC]
10:30am
Morning Break
11:00am Tanja Mehlstäubler (PTB)
Precision Spectroscopy in Many-Body Ion Systems[Slides][Video][CC]
11:45am Murray Barrett (CQT Singapore)
A 176Lu+ frequency reference[Slides][Video][CC]
12:30pm
Lunch Break

Tuesday, Oct 10, 2023

9:00am Elina Fuchs (Uni. Hannover)
Searches for light new physics and high-frequency gravitational waves with atomic clocks (remote)[Slides][Video][CC]
9:45am Morgan Mitchell (ICFO)
Quantum limits of field sensing with ordinary and ultracold matter (remote)[Video][CC]
10:30am
Morning Break
11:00am John L. Callas (JPL)
Mike Robinson (NASA)
Marianna Safronova (Delaware)
FunPAG 2: 2nd Meeting of the Fundamental Physics Program Analysis Group[Video][CC]
12:30pm
Lunch Break

Wednesday, Oct 11, 2023

9:00am Saïda Guellati-Khelifa (LKB - Sorbonne)
Accurate determination of the fine-structure constant using atom interferometry[Video][CC]
9:45am Tim Kovacey (Northwestern)
Probing Fundamental Physics with Long-Baseline Atom Interferometry[Slides][Video][CC]
10:30am
Morning Break
11:00am James Thompson (CU Boulder)
Hamiltonian Engineering in Matter wave Interferometers: QND, 1-Axis Twisting, 2-Axis Twisting, and Mossbauer-like Collective Recoil[Video][CC]
11:45am Naceur Gaaloul (U Hannover)
Precision Atom Interferometry with Quantum Gases[Video][CC]
12:30pm
Lunch Break

Gravity, Chair: Tim Kovachy (Northwestern)
2:00pm Igor Pikovski (Stevens Institute)
Detecting single gravitons with quantum sensing[Video][CC]
2:45pm Daniel Carney (LBNL)
Experiments in quantum gravity: a biased overview[Video][CC]
3:30pm
Afternoon Break
4:00pm Guglielmo Tino (Unifi and INFN)
Science opportunities and quantum challenges of precision measurements in space[Video]
<table>
<thead>
<tr>
<th>Time</th>
<th>Speaker</th>
<th>Title</th>
<th>Video/Slides</th>
<th>CC</th>
</tr>
</thead>
<tbody>
<tr>
<td>6:00pm</td>
<td>8:00pm</td>
<td>SPECIAL EVENTS DINNER</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8:00pm</td>
<td>8:00pm</td>
<td>SHUTTLE TO BWSCI</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9:00am</td>
<td>Monika Schleier-Smith (Stanford)</td>
<td>Optical Control of Entanglement in Arrays of Atomic Ensembles</td>
<td>[Video][CC]</td>
<td></td>
</tr>
<tr>
<td>9:45am</td>
<td>Lorenza Viola (Dartmouth)</td>
<td>Quantum frequency estimation in spatiotemporally correlated noise environments</td>
<td>[Slides][Video][CC]</td>
<td></td>
</tr>
<tr>
<td>10:30am</td>
<td></td>
<td>Morning Break</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11:00am</td>
<td>Luca Pezze (CNR)</td>
<td>Advantages of multiparameter distributed quantum sensing</td>
<td>[Video][CC]</td>
<td></td>
</tr>
<tr>
<td>11:45am</td>
<td>Augusto Smerzi (LENS/U. Florence)</td>
<td>Hierarchies of Bounds for Quantum Metrology: From Cramer-Rao to Barankin</td>
<td>[Video][CC]</td>
<td></td>
</tr>
<tr>
<td>12:30pm</td>
<td></td>
<td>Lunch Break</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Future Application of Quantum Metrology, Chair: Tanja Mehlstäubler (PTB)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2:00pm</td>
<td>John Howell (Chapman)</td>
<td>Doppler Gyros and Super Radar</td>
<td>[Video]</td>
<td></td>
</tr>
<tr>
<td>2:45pm</td>
<td>Mankei Tsang (National U of Singapore)</td>
<td>Quantum waveform estimation, detection, and noise spectroscopy</td>
<td>[Slides][Video]</td>
<td></td>
</tr>
<tr>
<td>3:30pm</td>
<td></td>
<td>CONFERENCE END, SHUTTLE TO BWSCI *Also available to SB Airport and SB Airbus, Goleta location (See Registration Desk BEFORE THURSDAY to sign up.)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>