GiRyd Status Workshop, 27 February – 03 March 2023

Programme

Hosted by:
Eberhard Karls Universität Tübingen

Workshop Venues:

PhD Networking Session (Monday):
Room N4, Hörsaalzentrum Morgenstelle, Auf der Morgenstelle 16, 72076 Tübingen

Main Workshop (Tuesday 9 AM – Thursday 12 PM):
Alte Aula, Münzgasse 30, 72070 Tübingen, Germany

Pair Interaction Satellite Workshop (Thursday 2:00 PM – Friday 3:00 PM):
Room N4, Hörsaalzentrum Morgenstelle, Auf der Morgenstelle 16, 72076 Tübingen

All information as of 23 February 2023

Invited talks: 30 min. talk + 15 min discussion
GiRyd status talks: 15 min. talk + 5 min. discussion
**Monday, 27 February 2023**

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tr>
<td>1:00 PM</td>
<td><strong>PhD Networking Session</strong> for PhD candidates/students followed by pubcrawl</td>
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<tr>
<td></td>
<td>• Introduction</td>
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<td>• Discussion on techniques and challenges 1: <strong>Edward Braun</strong> (Uni Heidelberg) and <strong>Xintong Su</strong> (Uni Tübingen)</td>
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<td>• Invited speaker: <strong>Valentin Walther</strong> (Purdue University): Perspectives for Rydberg excitons in quantum (information) science</td>
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<td>• Discussion on techniques and challenges 2: <strong>Chris Nill</strong> (Uni Tübingen) and <strong>Yeelai Chew</strong> (NINS Japan)</td>
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**Tuesday, 28 February 2023**

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>8:30 AM – 9:00 AM</td>
<td>Registration and check-in</td>
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<tr>
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<td><strong>Session Chair: Christian Groß</strong></td>
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<tr>
<td>9:00 AM</td>
<td>Welcome and Workshop Opening</td>
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<tr>
<td></td>
<td>• <strong>Hannes Bernien</strong>: Error mitigation and interactions in a dual-species atom array</td>
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<td></td>
<td>• <strong>Dominik Schäffer</strong>: Microlens-based tweezer arrays for Rydberg-interacting atoms</td>
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<td>• <strong>Pascal Weckesser</strong>: Stroboscopic Rydberg dressing in a Bose-Hubbard ladder</td>
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<td>10:30 AM</td>
<td>Coffee Break</td>
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<td><strong>Session Chair: Johannes Zeiher</strong></td>
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<tr>
<td>11:00 AM</td>
<td>• <strong>Hannah Williams</strong>: Diatomic molecules for quantum science *with added Rydbergs</td>
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<td>• <strong>Arno Trautmann</strong>: Playing with s and p Rydberg states: Facilitation dynamics in tweezer arrays.</td>
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<td>• <strong>Matteo Magoni</strong>: Coupled spin-phonon dynamics in Rydberg tweezer arrays</td>
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<tr>
<td>12:30 PM</td>
<td>Lunch Break at Menza &amp; Cafeteria Prinz Karl, Hafengasse 6</td>
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<td><strong>Session Chair: Richard Schmidt</strong></td>
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<td>2:00 PM</td>
<td>• <strong>Hannes Busche</strong>: Waveguide QED with cascaded Rydberg superatoms</td>
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<td>• <strong>Kevin Kleinbeck</strong>: Creation of non-classical states of light in a chiral waveguide</td>
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<td>• <strong>Stephan Dürr</strong>: Schrödinger-Cat States of Optical Photons</td>
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<td>• <strong>Christiane Koch</strong>: Rydberg atom-enabled spectroscopy of polar molecules via Förster resonance energy transfer</td>
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<tr>
<td>3:30 PM</td>
<td>Coffee Break</td>
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<td>Session Chair: Hendrik Weimer</td>
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<td>4:00 PM</td>
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<td>• <strong>Felix Mouttsilis</strong>: On-demand single-photon source based on a strongly interacting gas</td>
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<td>• <strong>Daniel Häupl</strong>: Towards Rydberg physics in newly developed all-glass cells</td>
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<td>• <strong>Gerhard Zuer</strong>: Does an isolated disordered quantum spin system thermalize?</td>
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<td>• <strong>Marcel Wagner</strong>: Rydberg Excitations as Probe of Quantum Matter</td>
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<td>6:00 PM</td>
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<td>Poster Session and Finger Food</td>
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**Poster Contributions by:**
Abraham, Neethu
Anasuri, Viraatt Sai Vishwakarma
Blättner, Richard
Braun, Eduard Jürgen
Busche, Hannes
Chew, Yeelai
Cieslik, Jonas
Bosworth, Daniel
Das, Bankim Chandra
Durst, Aileen
Egenlauf, Patrick
Franco, Roberto
Gievers, Marcel
Glaser, Conny
Götzelmann, Aaron
Hegels, Hendrik
Hornung, Moritz
Ilzhöfer, Philipp
Kübler, Harald
Main, Jörg
Meinert, Florian
Mink, Christopher
Mischke, Patrick
Morawetz, Florian
Mukherjee, Rick
Munkes, Fabian
Pagano, Alice
Panda, Binodbihari
Schäffner, Dominik
Schmale, Tobias
Schulze-Makuch, Alexander
Srakaew, Kritsana
Srikumar, Rohan
Steinert, Lea-Marina
Trautmann, Martin
Wang, Yimeng
Weber, Sebastian
Wojciechowska, Agata
Zeybek, Zeki
### Wednesday, 01 March 2023

**Session Chair: Igor Lesanovsky**

<table>
<thead>
<tr>
<th>Time</th>
<th>Topics</th>
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<tr>
<td>9:00 AM</td>
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- **Tilman Pfau**: GiRyd Coordination Session |
| 10:00 AM |  

- **Manuel Kaiser**: Coupling Rydberg atoms to a superconducting coplanar waveguide resonator  
- **Han Bao**: Entangling scheme for Rydberg ion crystals using electric kicks in radial direction |
| 10:30 AM | Coffee Break |

**Session Chair: Christiane Koch**

<table>
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<tr>
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<tr>
<td>11:00 AM</td>
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- **Hannes Pichler**: tbc  
- **Michael Buchhold**: Measurement-Induced Phase Transitions: Phenomenology, Effective Theory and Strategies to Reveal Them  
- **Hendrik Weimer**: Driven-dissipative Rydberg blockade in optical lattices |
| 12:30 PM | Lunch Break at Mensa & Cafeteria Prinz Karl, Hafengasse 6 |

**Session Chair: Peter Schmelcher**

<table>
<thead>
<tr>
<th>Time</th>
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<tr>
<td>2:00 PM</td>
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- **Julian Heckötter**: Rydberg excitons and charged ions in cuprous oxide  
- **Florian Morawetz**: Many-body simulation of Rydberg exciton interaction  
- **Jan Ertl**: Semiclassical approaches to Rydberg excitons in cuprous oxide |
| 3:30 PM  | Lab tours Morgenstelle / Free time to explore Tübingen |
| 6:30 PM  | Networking and discussion of joint research activities with warm finger food at “Alte Aula” |

### Thursday, 02 March 2023

**Session Chair: József Fortágh**

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<tr>
<th>Time</th>
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<tr>
<td>9:00 AM</td>
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- **Daniel Brady**: Self-Organized Criticality and Griffith’s Effects  
- **Martin Trautmann**: Formation of ion-pair states via longrange Rydberg molecules: status update  
- **Markus Deiß**: A hollow core optical fibre for transmission of UV light  
- **Markus Exner**: Three-Photon Photoassociation of Rydberg Trilobite Molecules |
| 10:30 AM | Coffee Break |

**Session Chair: Herwig Ott**

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<tr>
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</table>

- **Peter Schmelcher**: Vibronic coupling effects in ultralong-range molecules  
- **Moritz Berngruber**: Observation of vibrational dynamics in an ion-Rydberg molecule by a high-resolution ion microscope  |
| 12:00 PM | Optional lunch break: Mensa & Cafeteria Prinz Karl, Hafengasse 6 |

**Departure**: Satellite Workshop “Rydberg Pair Interaction”
### Optional Satellite Workshop: Rydberg Pair Interaction

**Thursday, 02 March 2023**

<table>
<thead>
<tr>
<th>Time</th>
<th>Session Details</th>
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<tbody>
<tr>
<td>2:00 PM</td>
<td>Welcome and Opening of the Satellite Workshop</td>
</tr>
<tr>
<td></td>
<td>- <strong>Sylvain de Léséleuc</strong>: Rydberg Interaction Calculators: The Experimentalists Guides to the Rydberg Galaxy</td>
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<td></td>
<td>- <strong>Simon Hollerith</strong>: Precision benchmarking Rydberg interactions via marodimer spectroscopy</td>
</tr>
<tr>
<td>3:30 PM</td>
<td>Coffee Break</td>
</tr>
<tr>
<td>4:00 PM</td>
<td>- <strong>Jonathan Bass</strong>: Rydberg atom interactions in blue detuned optical potentials</td>
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<td>- <strong>Henri Menke, Sebastian Weber</strong>: Tutorial on efficient calculation of Rydberg pair interactions</td>
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<td>5:00 PM</td>
<td>Discussion between users and developers</td>
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**Friday, 03 March 2023**

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<thead>
<tr>
<th>Time</th>
<th>Session Details</th>
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<tbody>
<tr>
<td>9:00 AM</td>
<td>- <strong>Mark Saffman</strong>: Controlling Rydberg interactions on the road to entanglement</td>
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<td>- <strong>Robert Potvliege</strong>: Two-electron pair-interaction software at Durham</td>
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<tr>
<td>10:30 AM</td>
<td>Coffee Break</td>
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<tr>
<td>11:00 AM</td>
<td>Plenum Discussion</td>
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<tr>
<td>12:30 PM</td>
<td>Lunch Break at Mensa Morgenstelle, Auf der Morgenstelle 26</td>
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<tr>
<td>2:00 PM</td>
<td>Optional Coding Session</td>
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