# Quantum Simulation with Ultracold Atoms

## Italian-German WE-Heraeus-Seminar

30 September - 02 October 2024

at the Galileo Galilei Institute,
Florence, Italy

WILHELM UND ELSE
HERAEUS-STIFTUNG

# Program

## Sunday, 29 September 2024

**Individual Travel to Florence**

## Monday, 30 September 2024

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|---|---|---|
| 08:00– 09:10 | ***REGISTRATION*** | |
| 09:10 - 09:20 | Immanuel Bloch, Giovanni Modugno | **Welcome words** |
| 09:20 – 10:10 | Francesca Ferlaino | **Rotating dipolar quantum gases** |
| 10:10 – 11:00 | Alessio Recati | **Sound propagation and Doppler effect in Supersolid Dipolar gases** |
| 11:00 – 11:20 | *COFFEE BREAK* | |
| 11:20 – 12:10 | Giacomo Roati | **Vortex matter in strongly-correlated superfluids** |
| 12:10 – 13:00 | Giulia Semighini | **Towards new frontiers of quantum science with dual-species atom arrays** |
| 13:00 – 14:00 | *LUNCH* | |
| 14:00 - 14:50 | Ralf Klemt | **Sound and amplitude modes in trapped dipolar supersolids** |
| 14:50 – 15:40 | Tommaso Calarco | **Quantum firmware: optimal control for quantum simulators** |
| 15:40 – 16:30 | Marcello Dalmonte | **Data mining quantum simulators** |

# Program

## Monday, 30 September 2024

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|---|---|---|
| 16:30 – 17:00 | *COFFEE BREAK* | |
| 17:00 – 17:50 | Annabelle Bohrdt | **How to explore high-temperature superconductivity in optical lattices** |
| 17:50 – 18:40 | Christian Groß | **Exploring pathways to lower temperatures for ultracold fermions** |
| 19:00 | *End of the scientific program* | |
| | *Open Dinner (**self-organized by the participants**)* | |

# Program

## Tuesday, 01 October 2024

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|---|---|---|
| 08:30 – 09:20 | Markus Oberthaler | **Quantum Field Simulator: Connecting Cosmology and Supersolidity** |
| 09:20 – 10:10 | Gabriele Ferrari | **False vacuum decay via bubble formation in ferromagnetic superfluids** |
| 10:10 – 11:00 | Christof Weitenberg | **A phase microscope for quantum gases** |
| 11:00 – 11:20 | *COFFEE BREAK* | |
| 11:20 – 11:35 | Stefan Jorda | **About the Wilhelm and Else Heraeus Foundation** |
| 11:35 – 12:25 | Andrea Bergschneider | **Enhancing pair tunneling with Floquet engineering** |
| 12:25 – 13:15 | Francesco Scazza | **Fermionic ytterbium atoms for quantum simulations beyond the Hubbard model** |
| 13:15 – 13:20 | *CONFERENCE PHOTO* | |
| 13:20 – 14:15 | *LUNCH* | |
| 14:15 – 16:30 | **POSTER SESSION** | |
| 16:30 – 17:00 | *COFFEE BREAK* | |
| 17:00 – 17:50 | Monika Aidelsburger | **Quantum simulation of Floquet topological phases with cold atoms** |
| 17:50 – 18:40 | Luca Tanzi | **Exploring the supersolid phase of matter with an atomic quantum simulator** |
| 18:40 – 20:00 | *Visit of Galileo's villa* | |
| 20:00 – 22:00 | *CONFERENCE DINNER* | |

# Program

## Wednesday, 02 October 2024

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|---|---|---|
| 08:30 – 09:20 | Leonardo Fallani | **Strongly interacting lattice fermions: flavour-dependent Mott localization and universal Hall response** |
| 09:20 – 10:10 | Richard Schmidt | **Strongly interacting Bose-Fermi mixtures in cold atoms and two-dimensional materials** |
| 10:10 – 11:00 | Timon Hilker | **Hole-hole attraction mediated by magnetism in the doped Fermi Hubbard Model** |
| 11:00 – 11:20 | *COFFEE BREAK* | |
| 11:20 – 12:10 | Silke Ospelkaus | **Understanding and controlling collisions in quantum gases of polar molecules** |
| 12:10 – 13:00 | Simone Montangero | **Tensor network algorithms for quantum simulations** |
| 13:00 – 14:00 | *LUNCH* | |
| 14:00 – 17:00 | ***Transfer to town and visit of LENS laboratories*** | |
| 17:00 | **End of the seminar and departure** | |