



This Workshop is a joint meeting of two projects: The Horizon Europe project **EuRyQa** (GA 101070144) "European Infrastructure for Rydberg Quantum Computing" and DFG-Forschergruppe **QUSP** (FOR 5413) "Long-range interacting quantum spin systems out of equilibrium: Experiment, theory and mathematics".

The main topics of the Workshop are understanding, controlling and exploiting quantum systems exhibiting strong, long-range interactions, such as Rydberg atoms, to advance quantum technologies and realize scalable quantum information processing, quantum enhanced metrology and sensing.

URL: <https://qesm2024.eventsadmin.com/Home/Welcome>

Location:



Funding:



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Program

Monday, 7 October

14:00-19:00

EuRyQa Project Meeting

Ariadni Hall, Astoria Capsis Hotel

Tuesday, 8 October

8:50 Bus to FORTH (from Astoria)

09:30-10:00 *David, Guido, Igor* - Opening

10:00-10:50 *Mark Saffman*

Towards fast implementation of non-local gates and codes for tackling the connectivity challenge

10:50-11:20 *Florian Meinert*

Circular Rydberg states for quantum simulation

Coffee Break

12:00-12:30 *Sebastian Slama*

Pattern retrieval in a driven-dissipative ensemble of multi-level atoms in a two-mode cavity

12:30-13:00 *Marc Nairn*

Spin-self-organization in an optical cavity facilitated by inhomogeneous broadening

Lunch

14:00-14:30 *François-Marie Le Régent*

Building Scalable Neutral-Atom Quantum Processors with Error Correction

14:30-15:00 *Katharina Brechtelsbauer*

Measurement-Free Quantum Error Correction with Biased Noise

15:00-15:30 *Gabriel Almeida*

Quantum walks with Rydberg Atoms

Coffee Break

16:00-16:30 *Dominik Jakob*

Elimination of Stark Shift Induced by Electric Fields near Superconducting Surfaces

16:30-17:00 *Mahdi Rouhbakhshnaba*

Semi-Classical Method for Calculating Quantum Fisher Information

17:20 Bus to Astoria (from FORTH)

Wednesday, 9 October

8:50 Bus to FORTH (from Astoria)

09:30-10:20 *Clément Sayrin*
Interacting laser-trapped circular Rydberg atoms

10:20-10:50 *Bjoern Sbierski*
Diagrammatic approach to quantum spin systems

10:50-11:20 *Albert Cabot*
Continuous Sensing and Parameter Estimation with the Boundary Time Crystal

Coffee Break

12:00-12:30 *Christian Groß*
Hamiltonian engineering in tweezer arrays

12:30-13:00 *Chris Nill*
Avalanche Terahertz Photon Detection in a Rydberg Tweezer Array

Lunch

14:00 Bus from FORTH

Excursion to Elounda, Spinalonga



Dinner at Plaka

Thursday, 10 October

8:50 Bus to FORTH (from Astoria)

09:30-10:20 *Sebastian Hofferberth*
Rydberg Quantum Optics with Ultracold Ytterbium

10:20-10:50 *Hugo Perrin*
Surface code-based quantum error correction in neutral atom systems with atom losses

10:50-11:20 *Laura Pecorari*
High-rate quantum LDPC codes for long-range-connected neutral atom registers

Coffee Break

12:00-12:30 *Robert Spreeuw*
Optical tweezers in atom arrays and ion crystals

12:30-13:00 *Christian Lubich*
Time integration of tree tensor networks

Lunch

14:00-14:30 *Madhav Mohan*
Parametrized multiqubit gates for neutral atom quantum computer

14:30-15:00 *Georgios Doultinos & Antonis Delakouras*
Multi-qubit gates between distant atoms in Rydberg quantum computers

15:00-15:30 *Arianna Bertoluzza*
Non-equilibrium dynamics of long-range interacting quantum systems and their applications to quantum metrology

Coffee Break

16:00-16:30 *Jasper Postema*
Geometrical Approach to Logical Qubit Fidelities of Neutral Atom CSS Codes

16:30-17:00 *Yuri van der Werf*
A quantum processing unit based on ^{85}Rb neutral atom qubits

17:20 Bus to Astoria (from FORTH)

Participants

Invited

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Accompanying

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