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# Program

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# **FINESS 2022**

## **St. Martin, Germany**

### **May 2-6, 2022**



#### **Monday, May 2**

- 14:00-16:00           Arrival and registration
- 16:00-17:30           Jean Dalibard (Paris, France):
- Quantum gases in low dimension: from scale invariance to Quantum Hall physics*
- Live streaming of Physics Colloquium in Kaiserslautern via Zoom
- Meeting ID: 699 4140 4654, Passcode: PhyKo#2022
- 18:30-20:00           Dinner
- 20:00-22:00           Meet and greet

#### **Tuesday, May 3**

- 08:30-08:40           Michael Fleischhauer (Kaiserslautern, Germany):
- Opening*

#### **Session 1:           Driven superfluid systems**

- 08:40-09:20           Matthew Davis (Brisbane, Australia): online
- Transport in a one-dimensional chain of multimode Bose-Einstein condensates*
- 09:20-10:00           Olivier Bleu (Melbourne, Australia):
- Bogoliubov excitations of a polariton condensate in dynamical equilibrium with an incoherent reservoir*
- 10:00-10:20           David Snoke (Pittsburgh, USA):
- Dissipation in a polariton superfluid*
- 10:20-11:00           Coffee break

#### **Session 2:           Hybrid systems**

- 11:00-11:40           Atac Imamoglu (Zurich, Switzerland):
- Strongly correlated electrons in atomically thin semiconductors*
- 11:40-12:20           Michael Thorwart (Hamburg, Germany):
- Nonequilibrium quantum phases in driven cavity hybrid quantum systems*

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12:20-13:00 Sebastian Hofferberth (Bonn, Germany):  
*Waveguide QED with Rydberg superatoms*

13:00-14:00 Lunch

14:00-15:50 Free time

15:50-16:30 Coffee break

### **Session 3: Atomtronics**

16:30-17:10 Wolf von Klitzing (Heraklion, Greece):  
*Manipulating matterwaves in atomtronic waveguides*

17:10-17:50 Verònica Ahufinger (Barcelona, Spain):  
*Dynamics of Bose-Einstein condensates carrying orbital angular momentum trapped in two stacked rings*

17:50-18:10 Giulia Del Pace (Sesto Fiorentino, Italy):  
*Controlling persistent currents in fermionic rings via phase imprinting*

18:30-20:00 Dinner

### **Session 4: Poster session I**

20:00-22:00 Posters with odd numbers

## **Wednesday, May 4**

### **Session 5: Photonic superfluids**

08:40-09:20 Julian Schmitt (Bonn, Germany):  
*Compressibility and the equation of state of an optical quantum gas in a box*

09:20-10:00 Natalia Berloff (Cambridge, United Kingdom):  
*Unconventional computing with superfluid systems*

10:00-10:40 Iacopo Carusotto (Trento, Italy):  
*Quantum superfluids of atoms and of light as analog models of gravity: a fruitful synergy of gravity and quantum optics*

10:40-11:20 Coffee break

# FINESS 2022

## St. Martin, Germany

### May 2-6, 2022



11:20-11:40

Simon Jäger (Kaiserslautern, Germany):

*Dynamical superradiant phases of a thermal atomic beam interacting with an optical cavity*

11:40-12:00

Michiel Wouters (Antwerpen, Belgium):

*Berezinskii-Kosterlitz-Thouless transition in photon condensates*

#### Session 6:

#### Interferences and fluctuations

12:00-12:20

Simon Gardiner (Durham, United Kingdom):

*Dressed state approach to creating narrow barriers for soliton interferometry*

12:20-12:40

Duncan O'Dell (Hamilton, Canada):

*Caustics in the dynamics of two coupled superfluids following a quench*

12:40-13:00

Kazimierz Rzażewski (Warsaw, Poland):

*Fluctuations of Bose-Einstein condensate revisited*

13:00-14:00

Lunch

#### Session 7:

#### Plenary discussion

14:00-14:40

Planning next FINESS conference

14:40-15:30

Free time

15:30-18:30

Wine tasting

18:30-20:00

Dinner

#### Session 8:

#### Evening lecture

20:00-21:00

Nathan Lundblad (Lewiston, USA):

*Ultracold bubbles in space: atomic physics aboard the International Space Station*

## Thursday, May 5

#### Session 9:

#### Supersolidity

08:40-09:20

Sandro Stringari (Trento, Italy): online

*Sound propagation and superfluid density of ultra-cold quantum gases*

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## **St. Martin, Germany**

### **May 2-6, 2022**



- 09:20-10:00 Tim Langen (Stuttgart, Germany):  
*Supersolidity in dipolar Bose-Einstein condensates*
- 10:00-10:40 Lauriane Chomaz (Heidelberg, Germany):  
*Novel many-body states in dipolar quantum gases*
- 10:40-11:20 Coffee break
- 11:20-12:00 Thomas Pohl (Aarhus, Denmark):  
*Supersolidity in long-range interacting quantum fluids*
- 12:00-12:20 Giulia De Rosi (Barcelona, Spain):  
*Thermal instability, evaporation, and thermodynamics of one-dimensional liquids in weakly interacting Bose-Bose mixtures*
- 12:20-12:40 Xin-Yu Luo (Munich, Germany):  
*A dipolar gas of molecules in the deeply degenerate regime*
- 12:40-13:00 Marco Fedele Di Liberto (Innsbruck, Austria):  
*Topological phonons in arrays of ultracold dipolar particles*
- 13:00-14:00 Lunch
- 14:00-15:50 Free time
- 15:50-16:30 Coffee break
- Session 10: Quantum turbulence**
- 16:30-17:10 Giacomo Roati (Sesto Fiorentino, Italy):  
*A quantum vortex collider*
- 17:10-17:50 Robert Smith (Oxford, United Kingdom):  
*Characterising far from equilibrium states in a Bose gas*
- 17:50-18:10 Maximilian Prüfer (Vienna, Austria):  
*From a non-thermal fixed point to thermal equilibrium with one-dimensional Bose gases*
- 18:30-20:00 Dinner

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**Session 11:**            **Poster session II**  
20:00-22:00            Posters with even numbers

## **Friday, May 6**

**Session 12:**            **Strong correlations**  
08:40-09:20            Giuliano Orso (Paris, France):  
*Pairing in one dimension: from Bose-Fermi mixtures to flat bands*

09:20-10:00            Christopher Vale (Melbourne, Australia): online  
*Dynamics in Fermi gases quenched to unitarity*

10:00-10:40            Andrew Daley (Glasgow, United Kingdom):  
*Quantum state diffusion for strongly interacting non-Markovian systems*

10:40-11:20            Coffee break

## **Session 13:**            **Polaron physics and disorder**

11:20-11:40            Sebastiano Peotta (Aalto, Finland):  
*Universal suppression of the superfluid weight by disorder independent of quantum geometry and band dispersion*

11:40-12:20            Artur Widera (Kaiserslautern, Germany):  
*Nonequilibrium dynamics of interacting quantum gases after disorder quenches*

12:20-13:00            Richard Schmidt (Aarhus, Denmark):  
*Chemistry of an impurity in a Bose-Einstein condensate and finite temperature effects*

13:00-14:00            Lunch

14:00                    Departure

## Poster Overview

- 1 Adriano Angelone**  
Out-of-equilibrium superglass and glass states in cluster-forming models
- 2 Andrea Barresi**  
Dipole collision and energy dissipation in 2D Fermi gases
- 3 Erik Bernhardt**  
Ultracold quantum gases in spatially and temporally engineered environments
- 4 Giacomo Bighin**  
An impurity in a heteronuclear two-component Bose mixture
- 5 Russel Bisset**  
2D supersolid formation in dipolar condensates
- 6 Moritz Breyer**  
Dynamics following an interaction quench in the BEC-BCS crossover and machine-learning the phase diagram
- 7 Fabio Caleffi**  
Collective excitations of a strongly-correlated photon fluid stabilized by incoherent drive and dissipation
- 8 Charles Creffield**  
Non-equilibrium superfluidity from Floquet engineering
- 9 Piotr Deuar**  
Full quantum dynamical description of a class of large driven dissipative Bose Hubbard models
- 10 Moritz Drescher**  
Non-equilibrium dynamics of the Bose polaron at zero and non-zero temperatures
- 11 Romain Dubessy**  
Fast rotating superfluid on a curved surface
- 12 Tilman Enss**  
Universal scaling at a pre-thermal dark state
- 13 Giovanni Ferioli**  
Subradiance and superradiance in dense atomic cloud
- 14 Lennart Fernandes**  
Gaussian trajectory description of fragmentation in an isolated spinor condensate
- 15 Elmar Haller**  
Floquet solitons and dynamics of periodically driven matter waves in optical lattices
- 16 Philipp Heinen**  
Simulating Bose gases with the complex Langevin method
- 17 Tanausú Hernández Yanes**  
One- and two-axis squeezing via laser coupling in an atomic Fermi-Hubbard model
- 18 Tim Keller**  
Self-pinning transition of a Tonks-Girardeau gas in a Bose-Einstein condensate
- 19 Ayan Khan**  
Effect of harmonic trapping on quantum droplets
- 20 Maciej Kruk**  
Stationary and thermal properties of flattened and elongated quantum droplets
- 21 Stefan Lannig**  
From vector solitons to universal dynamics in a spinor Bose-Einstein condensate
- 22 Rodrigo Lima**  
Out of equilibrium dynamical properties of Bose-Einstein condensates in ramped up weak disorder
- 23 Manfred Mark**  
Supersolidity in dipolar quantum gases

- 24 Christopher Mink**  
Continuous versus discrete truncated Wigner approximation for driven, dissipative spin systems
- 25 Suman Mondal**  
Topological charge pumping in the phonon coupled Rice-Mele model
- 26 King Lun Ng**  
Fate of the False Vacuum: A finite temperature stochastic model for the simulated early universe in BEC
- 27 David Petrosyan**  
On the quasi-adiabatic preparation of antiferromagnetic-like state of Rydberg excitations of atoms in a lattice
- 28 Ulli Pohl**  
Out-of-equilibrium dynamics of bosons on a 2D Hubbard lattice
- 29 Ville Pyykkönen**  
Non-equilibrium normal and superfluid transport through the flat band states of a finite-sized sawtooth lattice
- 30 Niklas Rasch**  
Wilsonian renormalization in the symmetry-broken polar phase of a spin-1 Bose gas
- 31 Sayak Ray**  
Non-local correlation and entanglement of ultracold bosons in the two-dimensional Bose-Hubbard lattice at finite temperature
- 32 Ido Siovitz**  
Instantons and self-similar scaling in a 1D spin-1 Bose gas far from equilibrium
- 33 Renan da Silva Souza**  
Green's function approach to the Bose-Hubbard model with disorder
- 34 Enrico Stein**  
Quantum mechanical description of thermo-optic interaction in photon BECs
- 35 Mohsen Talebi**  
Observation of fermionic superfluid current through a dissipative quantum point contact
- 36 Marek Tylutki**  
One-dimensional quantum droplets
- 37 Kirankumar Karkihalli Umesh**  
Photon gases in microstructured potentials: From 1D to 2D
- 38 Etienne Wamba**  
Using a space-time mapping for probing heating suppression in periodically driven many-body quantum systems: a mean-field example with Bose gases
- 39 Martin Will**  
Mobile dissipative impurities in one-dimensional Bose gases
- 40 Kali Wilson**  
Using vortices as probes of quantum many-body systems
- 41 Gabriel Wlazłowski**  
Quantum turbulence in ultracold Bose and Fermi gases: similarities and differences
- 42 Alexander Wolf**  
Shell-shaped dual-component BEC mixtures
- 43 Louise Wolswijk**  
Measurement of the order parameter and its spatial fluctuations across Bose-Einstein condensation
- 44 Klejdja Xhani**  
Decay of supercurrent in homogeneous atomic superfluids
- 45 Tomasz Zawiślak**  
Exotic structures in spin-imbalanced unitary Fermi gas