

Friday, 28.06.2024, 1:15 p.m.
in Lecture Hall I of the Physics Institute



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**„Novel Non-equilibrium Phenomena
in Quantum Fluids of Light”**

Driven-dissipative quantum fluids of light, realised in semiconductor microcavities, circuit or cavity QED systems, provide a unique testbed to explore non-equilibrium quantum phenomena. I will review recent progress in this field. We show [1] that photonic quantum fluid exhibits a non-equilibrium order, where superfluidity is accompanied by stretched exponential decay of correlations -- the celebrated Kardar-Parisi-Zhang (KPZ) phase, as well as other unconventional orders [2] and display flow properties connected but distinct from conventional superfluidity [3]. When placed in strained honeycomb lattice, polaritons condense into a rotating state, the lowest Landau level, breaking time reversal symmetry [4]. Describing quantum correlations in open systems in 2D is a numerical challenge. I will present our attempts at developing methods, based on stochastic and tensor network approaches [5].

[1] A. Zamora et al, PRX 7, 041006 (2017); PRL 125, 265701 (2020); A. Ferrier et al, PRB 105, 205301 (2022).

[2] G. Dagvadorj et al, PRL 130, 136001 (2023); PRB 104, 165301 (2021).

[3] R. T. Juggins et al, Nature Comms. 9, 4062 (2018); I. Timofeev et al, PRB 108, 214513 (2023).

[4] C. Lledo et al, SciPost 12, 068 (2022).

[5] C. Mc Keever et al, PRX 11, 021035 (2021); P. Deuar et al, PRX Quantum, 2, 010319 (2021).

Everybody is welcome, especially students of all semester

