



# FLEET

ARC CENTRE OF EXCELLENCE IN  
FUTURE LOW-ENERGY  
ELECTRONICS TECHNOLOGIES

## FLEET SEMINAR

# Quantum hydrodynamics of cold exciton gases & ultrafast Rabi-oscillating vortices in exciton-polariton condensates

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**Abstract:** Excitons and exciton-polaritons are bosonic quasiparticles that can demonstrate high degree of spatial coherence and quantum properties, and at the same time the ability to propagate on macroscopic distances, thus presenting a perfect solid-state platform for studying many-body effects.

On top of that, their intrinsic non-equilibrium driven-dissipative nature allows observing unique effects that can be far from reach in ultracold atoms and other conservative systems.

This talk combines several recent research results, including the prediction of the possibility to observe superfluid state and Bose-Einstein condensation in a gas of two-dimensional direct excitons at elevated temperatures, as well as the analysis of the Berezinskii-Kosterlitz-Thouless crossover in this system.

**About the Speaker:** Nina S. Voronova graduated from Moscow Physical Engineering Institute (State University) in 2006. During her post-graduate study (2006 to 2009) under supervision of Prof. Dr. Yu. E. Lozovik, started to work on collective excitations in low-dimensional systems.

Received the Ph.D. degree in 2012 in Nanostructures Spectroscopy Lab, Institute of Spectroscopy, Russian Academy of Sciences. Since 2009, works at National Research Nuclear University MEPhI (Moscow Engineering Physics Institute), currently as Associate Professor of the Theoretical physics department. In the end of 2015, joined the theoretical group of Prof. Alexey Kavokin in the group of Quantum Polaritonics at Russian Quantum Center. Her area of scientific interests is excitons, exciton-polaritons, multicomponent Bose condensates, topological defects, low-temperature physics, superfluidity and superconductivity bosonic Josephson phenomena.

**DATE:** Thursday 23 January 2020

**TIME:** 11:00AM–12:00midday

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