

# **ERC FASTCORR Half-time workshop**

## **Report of Contributions**

Contribution ID: 1

Type: **not specified**

## Arrival and check-in

*Friday, 2 February 2024 13:30 (4 hours)*

Contribution ID: 2

Type: **not specified**

# Welcome

*Saturday, 3 February 2024 13:00 (20 minutes)*

Chair: Oscar Grånäs

Contribution ID: 3

Type: **not specified**

## **Local and nonlocal electron and spin dynamics at Au/Fe/MgO(001) heterostructures**

*Saturday, 3 February 2024 13:20 (40 minutes)*

**Presenter:** BOWENSIEPEN, Uwe (Universität Duisburg-Essen)

Contribution ID: 4

Type: **not specified**

# Spin fluctuation induced anomalous-Hall effect

*Saturday, 3 February 2024 14:00 (40 minutes)*

**Presenter:** FORSLUND, Ola (University of Zurich)

Contribution ID: 5

Type: **not specified**

## **Intriguing magnetic phenomena in 2D Fe<sub>5</sub>GeTe<sub>2</sub> high temperature magnet with Co and Ni doping**

*Saturday, 3 February 2024 14:40 (40 minutes)*

**Presenter:** SANYAL, Biplab (Uppsala University)

Contribution ID: 6

Type: **not specified**

## Information on discussion sessions

*Saturday, 3 February 2024 15:20 (20 minutes)*

Contribution ID: 7

Type: **not specified**

## **XAS of tailored nanoscale transition metal oxides**

*Saturday, 3 February 2024 16:40 (40 minutes)*

Chair: Danny Thonig

**Presenter:** SCHMITZ-ANTONIAK, Carolin (Technische Hochschule Wildau)



Contribution ID: 8

Type: **not specified**

## Many-body quantum sign structures

*Saturday, 3 February 2024 17:20 (20 minutes)*

**Presenter:** BAGROV, Andrey (Radboud University)

Contribution ID: 9

Type: **not specified**

# **Ab-initio approach for laser-induced domain wall dynamics**

*Saturday, 3 February 2024 17:40 (20 minutes)*

**Presenter:** ELHANOTY, Mohamed (Uppsala University)

Contribution ID: **10**

Type: **not specified**

# **Topological magnetism in B20 multilayers from first principles**

*Saturday, 3 February 2024 18:00 (20 minutes)*

**Presenter:** BORISOV, Vladislav (Uppsala University)

Contribution ID: 11

Type: **not specified**

## **Magnetic textures and spin dynamics in low-dimensional materials**

*Sunday, 4 February 2024 09:00 (40 minutes)*

Chair: Hugo Strand

**Presenter:** DELIN, Anna (KTH Royal Institute of Technology)

Contribution ID: 12

Type: **not specified**

## **Structure-driven topological phase transition in a quasi-1D ferromagnetic Weyl semi-metal**

*Sunday, 4 February 2024 09:40 (40 minutes)*

**Presenter:** ONG, Chin Shen (Uppsala University)

Contribution ID: 13

Type: **not specified**

# **Dynamical correlations and order in twisted bilayer graphene**

*Sunday, 4 February 2024 10:20 (20 minutes)*

**Presenter:** RAI, Gautam (University of Hamburg)

Contribution ID: 14

Type: **not specified**

## Superconductivity in the pressurized nickelate $\text{La}_3\text{Ni}_2\text{O}_7$ in the vicinity of a BEC-BCS crossover

*Sunday, 4 February 2024 11:00 (40 minutes)*

**Abstract:** Ever since the discovery of high-temperature superconductivity in cuprates, gaining microscopic insights into the nature of pairing in strongly correlated, repulsively interacting fermionic systems has remained one of the greatest challenges in modern condensed matter physics. Following recent experiments reporting superconductivity in the bilayer nickelate  $\text{La}_3\text{Ni}_2\text{O}_7$  (LNO) with remarkably high critical temperatures of  $T_c = 80$  K, it has been argued that the low-energy physics of LNO can be described by a strongly correlated, bilayer t-J model. In this talk, I present our recent investigations of this bilayer system, where we utilize density matrix renormalization group techniques to establish a thorough understanding of the model and the magnetically induced pairing through comparison to the perturbative limit of dominating inter-layer spin couplings. In particular, this allows us to explain appearing finite-size effects, firmly establishing the existence of long-range pairing order in the thermodynamic limit. As the effective model in the perturbative limit is known to show linear resistivity above the superconducting transition temperature, we propose a pair-based interpretation of the extended strange metal phase observed in LNO. By analyzing binding energies, we predict a BEC-BCS crossover as a function of the Hamiltonian parameters, whereas LNO is anticipated to lie on the BCS side in vicinity of the transition. Lastly, I discuss how binding energies in the system are of the order of the inter-layer coupling, which suggest strikingly high critical temperatures of the Berezinskii-Kosterlitz-Thouless transition and raise the question whether nickelate superconductors possibly facilitate critical temperatures above room temperature.

**Presenter:** SCHLOEMER, Henning (University of Munich)

Contribution ID: 16

Type: **not specified**

## **MAX IV, opportunities for strongly correlated materials**

*Sunday, 4 February 2024 16:40 (40 minutes)*

Chair: Andrey Bagrov

**Presenter:** ROBERT, Aymeric (MAX IV Laboratory)



Contribution ID: 17

Type: **not specified**

## **Effect of magnetic excitations on electron dynamics in the vicinity of the Mott transition**

*Sunday, 4 February 2024 17:20 (20 minutes)*

**Presenter:** STEPANOV, Evgeny (Ecole Polytechnique)

Contribution ID: **18**

Type: **not specified**

## **Non-local spin and lattice damping from first principles**

*Sunday, 4 February 2024 17:40 (20 minutes)*

**Presenter:** THONIG, Danny (Örebro University)

Contribution ID: **19**

Type: **not specified**

# Charge-density waves in transition metal dichalcogenides

*Sunday, 4 February 2024 18:00 (20 minutes)*

**Presenter:** VAN LOON, Erik (Lund University)

Contribution ID: 20

Type: **not specified**

## **Photoelectron microscopy and spectroscopy using femto- and attosecond lasers.**

*Monday, 5 February 2024 09:00 (40 minutes)*

Chair: Heike Herper

**Presenter:** MIKKELSEN, Anders (Lund University)

Contribution ID: 21

Type: **not specified**

# **Analyzing electronic correlations and electron-phonon interaction during non-equilibrium with femtosecond time-resolved x-ray spectroscopy**

*Monday, 5 February 2024 09:40 (40 minutes)*

**Presenter:** ESCHENLOHR, Andrea (University Duisburg-Essen)

Contribution ID: 22

Type: **not specified**

## **Screening induced crossover between phonon and plasmon-mediated pairing in layered superconductors**

*Monday, 5 February 2024 10:20 (20 minutes)*

**Presenter:** IN 'T VELD, Yann (Radboud University)

Contribution ID: 23

Type: **not specified**

# Experimental ultrafast magnetization dynamics

*Monday, 5 February 2024 11:00 (40 minutes)*

**Presenter:** KNUT, Ronny (Uppsala University)

Contribution ID: 24

Type: **not specified**

## **Coupled atomistic spin-lattice simulations of ultrafast demagnetization in 3d ferromagnets**

*Monday, 5 February 2024 11:40 (20 minutes)*

**Presenter:** PANKRATOVA, Maryna (Uppsala University)



Contribution ID: **28**

Type: **not specified**

## Check-out and departure

*Tuesday, 6 February 2024 10:00 (2 hours)*

Contribution ID: 29

Type: **not specified**

## **Mottism and Magnetism in Frustrated Cluster Magnets Nb<sub>3</sub>X<sub>8</sub> (X=Cl, Br, and I)**

*Monday, 5 February 2024 17:20 (20 minutes)*

**Presenter:** GRYTSIUK, Sergii (Radboud University)

Contribution ID: **30**

Type: **not specified**

# **Magnetism of lead-free halide double perovskites**

*Monday, 5 February 2024 17:40 (20 minutes)*

**Presenter:** SIMAK, Sergei (Linköping University)

Contribution ID: 31

Type: **not specified**

# Phase-Space methods for Fermi-Hubbard model

*Saturday, 3 February 2024 18:20 (20 minutes)*

**Presenter:** ROUSSE, François (Uppsala University)

Contribution ID: 32

Type: **not specified**

## Fun wildlife presentation

*Saturday, 3 February 2024 19:40 (20 minutes)*

**Presenter:** SANYAL, Biplab (Uppsala University)

Contribution ID: 33

Type: **not specified**

# Theory of X-ray absorption spectroscopy for ferrites

*Monday, 5 February 2024 16:40 (20 minutes)*

Chair: Andrey Bagrov

**Presenter:** SORGENFREI, Felix (Uppsala University)

Contribution ID: 34

Type: **not specified**

# Heat and work in quantum thermodynamics: a cybernetic approach

*Monday, 5 February 2024 17:00 (20 minutes)*

**Presenter:** RUPUSH, William (Uppsala University)

Contribution ID: 36

Type: **not specified**

## **Plasmons in spatially inhomogeneous 2d media: semiclassical results and perspectives**

*Sunday, 4 February 2024 11:40 (20 minutes)*

**Presenter:** REIJNDERS, Koen (Radboud University)



Contribution ID: 37

Type: **not specified**

## Final words

*Monday, 5 February 2024 18:00 (20 minutes)*