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O 18: Poster Focus Session Ultrafast Electron Microscopy at the Space-Time Limit

Time: Monday 18:00–20:00 Location: P2

O 18.1 Mon 18:00 P2

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O 18.4 Mon 18:00 P2

Towards the Investigation of Spin Systems With Electron Microscopy Tools — Antonín Jaroš[1,2], Johann Toyfl[1,2], Benjamin Czasch[1,2], •Michael Stanislaus Seifner[1,2], Isobel Claire Bicket[1,2], and Philipp Haslinger[1,2] — [1]Vienna Center for Quantum Science and Technology, Atominstitut, TU Wien, Stadionallee 2, 1020 Vienna, Austria — [2]University Service Centre for Transmission Electron Microscopy, TU Wien, Stadionallee 2, 1020 Wien, Austria

Electron spin resonance (ESR) spectroscopy is a method for studying unpaired electrons in various samples with applications in medicine, biology, chemistry, and physics. Typically, the spatial resolution of classical ESR is limited to a few micrometers preventing studying spin systems and their dynamics at the atomic level. To obtain a better understanding of such dynamics, this project aims to develop an ESR setup inside a transmission electron microscope by using the magnetic field created by the objective lens of the microscope to generate energetically separated spin states. A specially designed microcoil integrated into a standard specimen holder allows for exciting spin systems, and various approaches for measuring the resulting resonances are presented. Our results point out potential ways of investigating spin dynamics with sub-nanometer spatial resolution and high temporal resolution. The developed setup will enrich the field of electron microscopy by providing a non-invasive tool to investigate spin systems as well as certain electron beam-induced sample damage.

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