

# Symposium Novel Functionality and Topology-Driven Phenomena in Ferroics and Correlated Electron Systems (SYCE)

jointly organized by  
 the Dielectric Solids Division (DF),  
 the Magnetism Division (MA),  
 the Crystallography Division (KR),  
 the Microprobes Division (MI),  
 the Low Temperature Physics Division (TT), and  
 the Thin Films Division (DS)

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Exotic states of matter and new functional properties arise due to the formation of topological structures in solid state systems. Prime examples are ferroic domain walls and skyrmions, which bear great potential as functional 2D materials for nanotechnology and information carriers in next-generation spintronics devices, respectively. The exploration of such topological structures and related functionality, however, is just beginning and their physics still fall into largely uncharted territory.

This symposium will explore the nature of emergent topological phenomena in condensed matter. Of special interest are the ways in which spin, charge, orbital and lattice degrees of freedom cooperate, compete and reconstruct when forming 1D and 2D nano-objects with non-trivial topology in ferroics and strongly correlated electron materials.

The symposium will provide a forum to discuss recent developments in first principles theory, synthesis and characterization; it will bring together scientists with complementary backgrounds in magnetism, dielectrics and multiferroics, thus unifying different communities with the aim of covering present challenges and identifying future key direction in functional topological materials.

## Overview of Invited Talks and Sessions

(Lecture room HSZ 02)

### Invited Talks

SYCE 1.1	Mon	15:00–15:30	HSZ 02	<b>Ferroelectric domain walls: from conductors to insulators and back again</b> — ●PETRO MAKSYMOVYCH
SYCE 1.2	Mon	15:30–16:00	HSZ 02	<b>Zoology of skyrmions and the role of magnetic anisotropy in the stability of skyrmions</b> — ●ISTVAN KEZSMARKI, SANDOR BORDACS, JONATHAN WHITE, VLADIMIR TSURKAN, ALOIS LOIDL, PETER MILDE, HIROYUKI NAKAMURA, ANDREY LEONOV
SYCE 1.3	Mon	16:00–16:30	HSZ 02	<b>Magnetic imaging of topological phenomena in ferroic materials</b> — ●WEIDA WU
SYCE 1.4	Mon	17:00–17:30	HSZ 02	<b>Topological skyrmion textures in chiral magnets</b> — ●MARKUS GARST
SYCE 1.5	Mon	17:30–18:00	HSZ 02	<b>Learning through ferroelectric domain dynamics in solidstate synapses</b> — SÖREN BOYN, GWENDAL LECERF, STÉPHANE FUSIL, SYLVAIN SAÏGHI, AGNÈS BARTHÉLÉMY, JULIE GROLLIER, VINCENT GARCIA, ●MANUEL BIBES

### Sessions

SYCE 1.1–1.5	Mon	15:00–18:00	HSZ 02	<b>Novel Functionality and Topology-Driven Phenomena in Ferroics and Correlated Electron Systems (DF with MA, KR, MI, TT and DS)</b>
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