

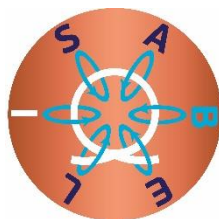
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## ISABEL

### Improving the sustainability of the European Magnetic Field Laboratory

#### DELIVERABLE 2.3

#### LECTURE NOTES EMFL SCHOOL



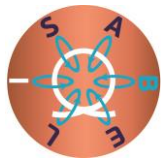
**Start date of the project:** 1<sup>st</sup> November 2020

**Duration:** 60 months

**Project Coordinator:** Geert Rikken – CNRS LNCMI (P1 - CNRS)

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Version	Modifications	Date	Authors
1.0	First draft	27/09/2024	Jochen Wosnitza
2.0	Final version	14/10/2024	Jochen Wosnitza



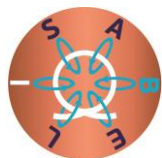
## DOCUMENT ABSTRACT

This deliverable 2.3 “Lecture notes EMFL school” is part of WP2 “Community building and membership enlargement”. The deliverable will focus on the dissemination and content of the EMFL school, which took place from 15 to 19 April 2024 in Dresden (Germany).

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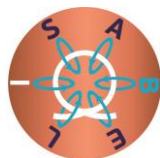
## 1. Introduction and program



Following a two-year interval, we revived the tradition of the EMFL School to motivate and inspire the next generation of the high magnetic field community in Europe. This event took place at the Penck Hotel, a modern art venue nestled in the historic neighborhood of Dresden, Germany, from April 15-19, 2024.

The 2024 program focused on both fundamental and applied aspects of solid-state research. Renowned speakers covered a wide range of topics including low-dimensional semiconductors, topological matter, strongly correlated electron systems, magnetism, superconductivity, and high magnetic field technology. Additionally, the school's agenda featured a variety of interactive elements: a pitch session where each participant had two minutes to showcase their posters; a poster session for more detailed discussions; a fireside chat that delved into the personal aspects of a scientific career; and a group activity that honed participants' skills in scientific storytelling.

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The event attracted significant interest, with 59 applicants out of 66 applications accepted. Ultimately, 52 participants from 17 different countries actually attended the event. This week-long inspiring experience sparked the interest of the newcomers in high magnetic field research and, for the others, provided the tools and knowledge needed to advance their research in the realm of high magnetic fields.

Please find below the general information of the event (program, organizers and speakers):

## • Program

	15 April	16 April	17 April	18 April	19 April
7:30 – 9:00		Breakfast at the Hotel	Breakfast at the Hotel	Breakfast at the Hotel	Breakfast at the Hotel
09:00 - 10:15		Cyril Proust	Klaus von Klitzing	Christian Pfleiderer	Amalia Patane
10:15 - 10:45		Coffee Break	Coffee Break	Coffee Break	Coffee Break
10:45 - 12:00		Gertrud Zwicknagl	Ilya Eremin	Jairo Sinova	Steffen Wiedmann
12:00 - 12:20	Arrival and Lunch	Lunch Buffet	Lunch Buffet	Lunch Buffet	Closing Remarks
12:20 - 13:30					Lunch Buffet
13:30 - 14:00	Welcome and Introduction	Pitch Session #2			
14:00 - 15:15	Roderich Moessner	Stephen Blundell	Alix McCollam	Ana Akrap	
15:15 - 15:45	Coffee break	Coffee Break	Coffee Break	Coffee Break	
15:45 - 16:00	Konstantin Skokov	Pitch Session #3	HLD Lab visit	Team Building Activity	
16:00 - 16:15					
16:15 - 17:00		Dresden City tour			
17:00 - 18:00	Pitch Session #1				
18:00 - 19:30	Dinner at the Hotel	Dinner at the Hotel	Dinner at the Hotel	Dinner at the Hotel	
19:30 - 22:00	Pub quiz/ice breaker	Poster Session	Cultural Event	Failure Slam	

## • HLD-HZDR Organizing committee

- Jochen Wosnitza
- Tino Gotschall
- Toni Helm
- Lakshmi Bhaskaran

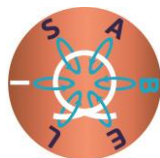
## • Invited Speakers

### ○ Ana Akrap (University of Fribourg, Switzerland)

Lecture Title: Magneto-optical investigation of semimetals and semiconductors

### ○ Stephen Blundell (University of Oxford, UK)

Lecture Title: High magnetic fields and muon spin rotation



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- **Ilya Eremin** (Ruhr University Bochum, Germany)

Lecture Title: Unconventional Superconductivity Entering the Nickel Age

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- **Konstantin Skokov** (Technical University of Darmstadt, Germany)

Lecture Title: Permanent magnets and magnetocaloric materials - from fundamentals to energy applications.

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- **Klaus von Klitzing** (Max Planck Institute for Solid State Research, Germany)

Lecture Title: My life with strong magnetic fields- 50 years of quantum Hall effect

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- **Alix McCollam** (University College Cork, UK)

Lecture Title: Quantum oscillations in quantum materials: the joy and the pain

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- **Roderich Moessner** (Max Planck Institute for the Physics of Complex Systems, Germany)

Lecture Title: Fractionalisation and fractals in spin ice

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- **Amalia Patane** (University of Nottingham, UK)

Lecture Title: Semiconductors in magnetic fields

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- **Christian Pfleiderer** (Technical University of Munich, Germany)

Lecture Title: Landau quantization phenomena in topological systems

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- **Cyril Proust** (Laboratoire National des Champs Magnétiques Intenses, France)

Lecture Title: The Remarkable Underlying Ground States of Cuprate Superconductors

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- **Jairo Sinova** (Johannes Gutenberg University Mainz, Germany)

Lecture Title: Unconventional magnetism in spintronics: the emergence of altermagnetism and its new variants

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- **Steffen Wiedmann** (Radboud University, Netherlands)

Lecture Title: Semimetals, Topology, Quantum oscillations

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- **Gertrud Zwicknagl** (Technical University of Braunschweig, Germany)

Lecture Title: The utility of band theory in strongly correlated electron systems

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## 2. Event communication and dissemination

All information on the event are available on the EMFL website: <https://emfl.eu/emfl-spring-school-2024/>. We shared the event announcement with the EMFL staff, the EMFL user community, collaborators, posted it on EMFL social media channels, and distributed it within various existing networks. The event flyer is shown below:





# EMFL SCHOOL 2024

**Date:** 15 - 19 April

**Location:** Penck hotel Dresden, Germany

Open to young scientists, master and doctoral students, and postdoctoral researchers. Renowned speakers will deliver lectures covering fundamental and applied aspects of condensed-matter research.

Register here!



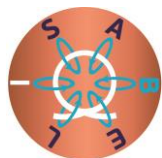
**Please register by 16 February 2024!**

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The presentations of the speakers are available on HZDR cloud and can be made available to the commission upon request: <https://cloud.hzdr.de/s/TnkAsCp4sjoEiSL>

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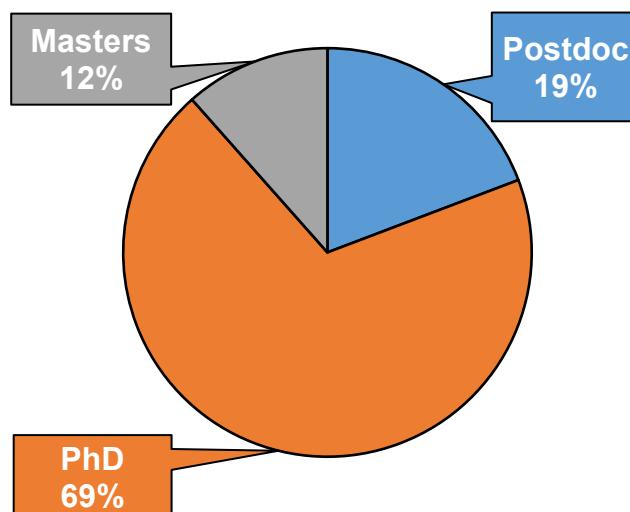


### 3. Participant statistics

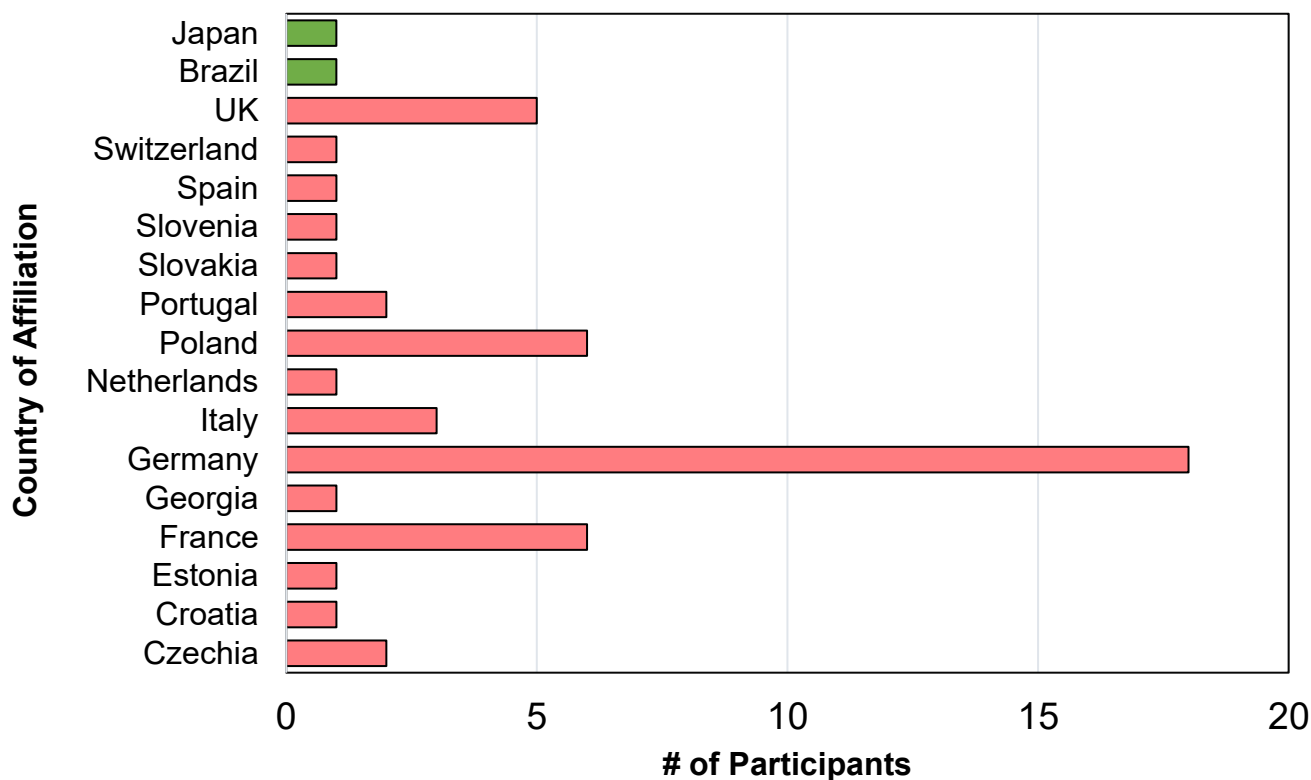
At the EMFL spring school 52 young researchers from 17 countries participated and the following figures shows the distribution of the participants.

**Degree of the Participants**

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**Country Distribution of the Participants**



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