

# **Microstructure, Magnetic and Electronic Ordering: Interplay and Interactions**

**784. WE-Heraeus-Seminar**

**16 - 19 April 2023**

**at the Physikzentrum Bad Honnef, Germany**

**WILHELM UND ELSE  
HERAEUS-STIFTUNG**



# Program

**Sunday, 16 April 2023**

17:00 – 21:00    Registration

18:00            *BUFFET SUPPER and informal get-together*

***Welcome, Evening session***

19:30 – 19:40    Gabi Schierning            **Common motifs in displacive phase transitions**

19:40 – 19:50    Andreas Hütten            **Imaging microstructural impact on magnetic behavior**

19:50 – 20:00    Kai Rosnagel            **Notes on charge density waves**

20:00 – 20:45    Anna Böhmer            **Electronically driven structural distortion in iron-based superconductors: a model case of nematicity in crystalline solids**

# Program

Monday, 17 April 2023

07:30            *BREAKFAST*

***Session 1: Microstructures and advanced characterization***

08:30 – 09:10    Inga Ennen            **Interplay of microstructure and phase transition in shape memory alloys**

09:10 – 09:50    Knut Müller-Caspary    **Electrical and structural characterisation of nanostructures by four-dimensional STEM**

09:50 – 10:30    Stephen McVitie        **Lorentz transmission electron microscopy investigations chiral synthetic ferromagnetic and antiferromagnet systems**

10:30 – 11:00    *COFFEE BREAK*

***Session 2: Ultrafast dynamics***

11:00 – 11:40    Claus Ropers            **Probing charge-density wave phase transitions and metastable states with ultrafast electron diffraction and microscopy**

11:40 – 12:20    Juras Banys             **Microwave and THz characterization of materials**

12:20 – 12:30    **Conference Photo** (in the front of the main entrance)

12:30            *LUNCH*

# Program

Monday, 17 April 2023

## *Session 3: CDW transitions*

14:00 – 14:40	Michelle Johannes	<b>The Fermi surface and the CDW phase transition</b>
14:40 – 15:20	Ion Errea	<b>First-principles calculations of charge-density wave transition temperatures: lessons learnt on transition-metal dichalcogenides</b>
15:20 – 16:00	Vladimir Strocov	<b>Materials physics with soft X-Ray ARPES: From bulk materials to heterostructures and impurities</b>
16:00	<i>COFFEE BREAK</i>	
16:00 – 18:00	<b>Poster Session</b>	
19:00	<i>DINNER</i>	

# Program

Tuesday, 18 April 2023

07:30            *BREAKFAST*

***Session 4: CDW transitions, continued***

08:30 – 09:10    David Johnson            **Charge density waves, interlayer interactions, and magnetic constituents in designed heterostructures**

09:10 – 09:50    Christopher Renner        **Insight into the electronic structure of charge density waves from topographic STM images**

09:50 – 10:30    Jasper van Wezel        **Chiral charge ordered domains in 1T-TaS<sub>2</sub>**

10:30 – 11:00    *COFFEE BREAK*

***Session 5: Ferroelectrics***

11:00 – 11:40    Dennis Meier            **Emergent functional properties and advanced characterization of ferroelectric domain walls**

11:40 – 12:20    Anna Grühnebohm        **Interplay of ferroelectric phase transitions domain structure and functional responses**

12:20            *LUNCH*

# Program

**Tuesday, 18 April 2023**

## **Session 6: Shape memory alloys and multi-caloric materials**

- |               |   |  |
|---------------|---|--|
| 14:00 – 14:40 | Jan Frenzel   | <b>Electronic and microstructural aspects of NiTi-based shape memory alloys</b>          |
| 14:40 – 15:20 | Eckhart Quandt  | <b>The role of compatibility in shape-memory oxide ceramics</b>                          |
| 15:20 – 16:00 | Konstantin Skokov   | <b>Dissecting complexity of first-order phase transitions in multi-caloric materials</b> |
| 16:00         | <i>COFFEE BREAK</i>   |  |
| 16:00 – 17:15 | <b>Poster Session, continued</b>  |  |
| 17:15         | <b>Appreciation of the WE-Heraeus-Poster awards</b><br>About the WE-Heraeus-Foundation    |  |
| 18:30         | <i>HERAEUS DINNER</i><br>(social event with cold & warm buffet with complimentary drinks) |  |

# Program

Wednesday, 19 April 2023

07:30            *BREAKFAST*

## *Session 7: Advanced theory*

08:30 – 09:10    Frank Lechermann      **Metal-to-metal transitions in correlated materials**

09:10 – 09:50    Georg Madsen            **Computational phase diagrams with neural-network backed effective harmonic potentials. The case of HfO<sub>2</sub>**

09:50 – 10:30    *COFFEE BREAK*

## *Session 8: Advanced measurement techniques*

10:30 – 11:10    Josef Freudenstein      **Attosecond shifts in the dynamics of interacting Bloch electrons**

11:10 – 11:50    Toni Helm                **High-field superconductivity in UTe<sub>2</sub>**

11:50 – 12:00    Gabi Schierner  
                      Andreas Hütten  
                      Kai Rossnagel            **Closing remarks**

12:15            *LUNCH*

*End of the seminar and departure*

***NO DINNER for participants leaving on Thursday; however, a self-service breakfast will be provided on Thursday morning***