DYNAMICS AND PROCESSES IN CRYSTALLINE MATERIALS

Time resolved electron and X-ray studies

AUGUST 31 – SEPTEMBER 02, 2022 | BERLIN | GERMANY

On the topic

Dynamics and Processes in Crystalline Materials | Time resolved electron and X-ray studies

Advances in experimental instruments and techniques have paved the way for the investigation of functional materials in-situ and under operando conditions. A big step forward is the ability to study the transient state of crystalline materials in "realistic" conditions, such as under optical excitation, electric/magnetic fields or high temperature. These insights lead to a better understanding of non-equilibrium processes in materials and enable their optimization for highly efficient, stable and sustainable future technologies.

This year's IKZ Summer School sets the focus on a selection of the method developments with a high priority for the investigation of structural dynamics in crystalline materials in the fields of Transmission Electron Microscopy (TEM) and X-Ray Diffraction / Imaging (XRD). Common to these methods is the ability to capture phenomena on a broad range of time and length scales stretching from few nanometers (nm) to millimeters (mm) and picoseconds (ps) to milliseconds (ms). We discuss potentials and limitations of the techniques in context of selected, recent applications in materials science. A special focus is set on ferroic correlations, phase transitions and domain dynamics in complex systems.

Organization

The Leibniz-Institut für Kristallzüchtung (IKZ)

is a research institution that is unique in Europe. Our mission is to explore the scientific and technological fundamentals of crystal growth, from basic research to pre-industrial development.

Furthermore, we provide scientific services for research institutions and industry. This includes, in particular, the growth of specific crystals for research purposes, the characterization of crystalline materials or industry-oriented technology development.

Details
www.ikz-berlin.de/14-ikz-summer-school

Registration
Please send an email with details of your institution and position to
summer.school@ikz-berlin.de
Summer School participation is free of charge.
Participants are asked to organize their accommodation by themselves.

Registration deadline: 30-08-22
As the number of participants is limited early registration is recommended.

Poster session
All participants are encouraged to present their own research at the poster session to profit from a lively exchange with all speakers and participants of the workshop.
Please submit a short (~200 words) abstract with your registration.

Venue
Max-Born-Saal
Max-Born-Str. 2a
12489 Berlin, Germany

Organization | Contact
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Schedule

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Wednesday, August 31

11:45am – 1:30pm	***Registration & Welcome by the Organizers***
1:30pm – 2:30pm	***Observations of the dynamic microstructural evolution of complex alloys by in situ S/TEM*** *Dr. Christian LIEBSCHER* *Group Leader Advanced Transmission Electron Microscopy,* *Structure and Nano-/Micromechanics of Materials, Max-Planck-Institut für Eisenforschung GmbH*
2:30pm – 2:40pm	***Coffee break***
2:40pm – 3:40pm	***X-ray nanobeams in materials structure and dynamics*** *Prof. Paul G. EVANS* *Department of Materials Science and Engineering, University of Wisconsin-Madison*
3:40pm – 4:00pm	***Coffee break***
4:00pm – 5:00pm	***X-ray photon correlation spectroscopy at the ESRF extremely brilliant source: the perfect match*** *Dr. Federico ZONTONE* *Beam Line Operations Manager, Experiments Division, ESRF, Grenoble*
from 5:00pm	***Poster session***

Thursday, September 1

9:15am – 10:30am	***Time-resolved X-ray crystallography*** *Dr. Semën GORFMAN* *Senior Lecturer, Department of Materials Science and Engineering, Tel-Aviv University*
10:30am – 10:45am	***Coffee break***
10:45am – 11:45am	***Revealing nanoworld dynamics with liquid and gas phase TEM*** *Dr. Damien ALLOYEAU* *Directeur de recherche CNRS, Directeur du GDR NANOPERANDO,* *Laboratoire Matériaux et Phénomènes Quantiques, UMR Université Paris Cité-CNRS*
11:45am – 1:30pm	***Lunch break***
1:30pm – 2:30pm	***How martensitic transitions make materials smart*** *Dr. Klara LÜNSER* *PostDoc at Helmholz-Zentrum Dresden Rossendorf*
2:30pm – 2:40pm	***Coffee break***
2:40pm – 3:40pm	***Ultrafast dynamics in solids: an X-ray view*** *Dr. Urs Staub* *Group Leader Microscopy and Magnetism; Swiss Light Source; Paul Scherrer Institut*
4:00pm – 5:00pm	***In-Operando Investigation of the Ferroelectric Switching Dynamics of $Pb(Zr,Ti)O_3$ Thin Film Capacitors Using Time-Resolved X-Ray Diffraction*** *Dr. Matthias RÖSSLE* *Helmholtz-Zentrum für Materialien und Energie Berlin*
from 7:00pm	***Conference dinner***

Friday, September 2

9:00am – 10:30am	***Probing the dynamics of multiferroic interfaces by in situ electron microscopy and spectroscopy*** *Prof. Xiaoqing PAN* *Henry Samueli Endowed Chair in Engineering, Professor, Materials Science and Engineering,* *Professor, Physics & Astronomy, University of California - Irvine*
10:30am – 10:45am	***Coffee break***
10:45am – 11:45am	***4DSTEM and electrochemical liquid TEM experiments to study lithiation dynamics process in Li-ion battey materials*** *Dr. Arnaud DEMORTIERE* *Chargé de Recherche CNRS, Responsable de la plateforme de microscopie RS2E, Amiens*
11:45am – 1:30pm	***Lunch break***
1:30pm – 2:30pm	***in-situ TEM observations of ferroelectric domains: lessons learned so far*** *Dr. Miryam ARREDONDO* *Senior Lecturer, Centre for Nanostructured Media, Queen's University Belfast*