

# New Opportunities in Diffraction Microscopy

## ESRF - Grenoble - France

8 - 9 - 10 - 11 January 2024



<b>MONDAY 8 JANUARY</b>		
<b>13:00 - 13:45</b>	<b>Registration and Welcome coffee</b>	<b>ESRF Central Building Entrance Hall</b>
<b>SESSION 1 - Metallurgy I (Chair: Carsten Detlefs)</b>		
<b>13:45-14:00</b>	Welcome and scopes and objectives of the workshop	<b>Gema Martínez-Criado</b> Director of research, ESRF
<b>14:00-14:40</b>	<b>Invited</b> - Critical demand of full field microstructural characterization for recrystallization and grain growth	<b>Yubin Zhang</b> DTU
<b>14:40-15:00</b>	Diffraction imaging on creep-resistant self-healing alloys	<b>Haixing Fang</b> ESRF
<b>15:00-15:20</b>	Non-destructive multimodal 3D quantification of recrystallization nucleation	<b>Dorte Juul Jensen</b> DTU
<b>COFFEE BREAK</b>		
<b>SESSION 2 - Phase Transformations I (Chair: Jon Wright)</b>		
<b>15:40-16:20</b>	<b>Invited</b> - Studying martensitic phase transformations and deformation twinning with in-situ DFXM and topotomography	<b>Ashley Bucsek</b> University of Michigan
<b>16:20-16:40</b>	Grain-level effects on in-situ deformation-induced phase transformations in a complex-phase steel using 3DXRD and EBSD	<b>James Ball</b> ESRF
<b>16:40-17:00</b>	3DXRD operando study of the nucleation and growth dynamics of multiple Fe intermetallic phases of Al alloys in the solidification processes	<b>Jiawei Mi</b> University of Hull
<b>18:00</b>	<b>POSTER SESSION</b>	<b>ESRF Central Building Entrance Hall</b>

## TUESDAY 9 JANUARY

### SESSION 3 - Industrial Applications (Chair: Henning F. Poulsen)

08:50-09:30	<b>Invited</b> - Unveiling the Impact of Intragranular Strain Localization on the Functional Response of Technological Components: Insights from a DFXM Perspective	<b>Jozef Keckes</b> University of Leoben
09:30-09:50	Revealing the Full Strain Tensor in microelectronic devices by Nanobeam Scanning X-ray Diffraction Microscopy	<b>Cedric Corley-Wiciak</b> IHP Microelectronics
09:50-10:10	High resolution reciprocal space mapping at the Swedish Materials Science beamline P21.2 at PETRA III	<b>Ulrich Lienert</b> DESY
10:10-10:30	High-resolution spatio-temporal strain imaging reveals loss mechanisms in surface acoustic wave device	<b>Tobias Schulli</b> ESRF

### COFFEE BREAK

### SESSION 4 - Metallurgy II (Chair: Can Yildirim)

10:50-11:30	<b>Invited</b> - New Insights Into Hierarchical Microstructure Formation During Green Ironmaking With Hydrogen	<b>Yan Ma</b> Max Planck MPIE
11:30-11:50	Three-dimensional stress localizations and grain yielding under elastoplastic axial-torsional loading	<b>Jerard Gordon</b> University of Michigan
11:50-12:10	Improvements in 6D Reconstruction for Diffraction Contrast Tomography and Topo-tomography	<b>Zheheng Liu</b> INSA Lyon

### LUNCH BREAK

### SESSION 5 - Deformation, Fatigue, Creep, Aging (Chair: Wolfgang Ludwig)

13:40-14:20	<b>Invited</b> - Correlative Diffraction Microscopy Imaging experiments to investigate crystal plasticity	<b>Henry Proudhon</b> MINES ParisTech
14:20-14:40	In-situ investigation of elastic strain and stress during brittle rock failure using scanning 3D X-Ray Diffraction	<b>Jean-Baptiste Jacob</b> University of Oslo
14:40-15:00	Resolving intragranular orientation and stress fields in plastically deformed titanium using scanning 3D X-ray diffraction	<b>Wenxi Li</b> University of Michigan

### COFFEE BREAK

### SESSION 6 - Semiconductors (Chair: Tobias Schulli)

15:20-16:00	<b>Invited</b> - On the opportunities offered by X-ray microscopies for the advanced characterization of microelectronic components	<b>Patrice Gergaud</b> CEA Grenoble
16:00-16:20	Evidence of Strain localization at high angle grain boundaries in CdTe solar cell using Scanning 3D X-ray diffraction microscopy	<b>Aditya Shukla</b> DTU
16:20-16:40	In situ observation of plastic relaxation dynamics in In <sub>x</sub> Ga <sub>1-x</sub> N thin films by full-field X-ray diffraction microscopy	<b>Carsten Richter</b> Leibniz Institute for Crystal Growth (IKZ)

## WEDNESDAY 10 JANUARY

### SESSION 7 - Modelling (Chair: Henry Proudhon)

08:50-09:30	<b>Invited</b> - The Neper/FEPX Framework and its Application to the Study of Intra-grain Orientation Distributions in Deformed Aluminium	<b>Romain Quey</b> CNRS St. Etienne
09:30-09:50	Advances in DFXM Simulations for Comprehensive Dislocation Analysis	<b>Henning Friis Poulsen</b> Technical University of Denmark
09:50-10:10	Full-Field Crystal Plasticity and Phase Field Modelling of elasto plastic damage behaviour of ice	<b>Soroush Motahari</b> Max Planck MPIE
10:10-10:30	The evolution of grain scale stresses: 3D-XRD vs CPFЕ	<b>Hamidreza Abdolvand</b> Uni. of Western Ontario

### GROUP PHOTO & COFFEE BREAK

### SESSION 8 - Deformation, Fatigue, Creep, Aging II (Chair: Christoph Kirchlechner)

10:50-11:30	Pushing the Deformation Limit of the ID11 Scanning 3DXRD Microscope	<b>Axel Henningsson</b> Lund University
11:30-11:50	Femto-second laser induced sub-surface hardening in metals	<b>Andras Borbely</b> MINES St. Etienne
11:50-12:10	DFXM Imaging of Dislocation Dynamics in in-situ Deformed Aluminum	<b>Felix Tristan Frankus</b> DTU

### LUNCH BREAK

### SESSION 9 - Phase Transformations II (Chair: Jozef Keckes)

13:40-14:20	<b>Invited</b> - Probing electronic phase separation in highly correlated systems through 3DXRD	<b>Mark Senn</b> University of Warwick
14:20-14:40	Diffraction and Imaging studies of Neuron-Mimicking Devices and Their Environments	<b>Elliot Kisiel</b> University of California SD
14:40-15:00	3D Grain Growth in electrical steel sheet studied by laboratory DCT	<b>Masato Yasuda</b> Nippon Steel

### COFFEE BREAK

### SESSION 10 - Emerging Methods, Software and Instrumentation I (Chair: Andras Borbely)

15:20-16:00	<b>Invited</b> - Future of High Energy Diffraction Microscopy: Going towards more complex specimens and environments and Diffraction Microscopy Developments at the Advanced Photon Source	<b>Peter Kenesei (Remote)</b> Argonne National Laboratory
16:00-16:20	Real-time imaging of acoustic waves in bulk materials with X-ray Microscopy	<b>Theodor Holstad</b> DTU

16:20-16:40

Wide Angle X-ray Scattering Tensor Tomography

**Mads Carlsen**  
PSI

**SESSION 11 - Facility update ID03 - ID11**

16:40-17:00

ID03

**Carsten Detlefs**  
ESRF

17:00-17:20

ID11

**Jon Wright**  
ESRF

19:00

**WORKSHOP DINNER**

**ESRF Central Building**  
Entrance Hall

**THURSDAY 11 JANUARY**

**SESSION 12 - Ceramics (Chair: Raquel Rodriguez Lamas)**

08:50-09:30

**Invited** - Texture tomography for polycrystalline materials:  
Principle and first results

**Moritz Frewein**  
Institute Fresnel

09:30-09:50

Study of CSTZ ceramics plasticity with synchrotron light  
and correlative characterizations

**Marcelo Demetrio de  
Magalhaes**  
INSA

09:50-10:10

Can residual stresses disrupt the energy storage functionality of  
antiferroelectric NaNbO<sub>3</sub> ceramics?

**Leonardo Soares de Oliveira**  
DTU

**COFFEE BREAK**

**SESSION 13 - Emerging Methods, Software and Instrumentation II (Chair: Alexander Rack)**

10:30-11:10

**Invited** - Fast and ultrafast: stroboscopic DF-XRM

**Trygve Magnus Ræder**  
DTU

11:10-11:30

Neural networks for rapid phase quantification of  
Cultural Heritage X-ray powder diffraction data

**Victor Poline**  
UGA

11:30-11:50

Laue Microscopy

**Jean-Sébastien Micha**  
ESRF

11:50-12:10

Closing Remarks

**LUNCH BREAK**

**EXECUTIVE SESSION**