Sponsors and Organizers
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Welcome Message from the Chair

Dear Colleagues,

This year, the IEEE International Symposium on Applications of Ferroelectrics will be held in Tours (France) from Monday June 27 to Friday July 1. For the occasion and as often, this conference will be joined with those of Piezoresponse Force Microscopy (PFM) and European Conference on Applications of Polar Dielectrics (ECAPD).

“Hopefully in a year the world gets back to some normality”, wrote Sydney 2021 General Chairs Shujun Zhang and John Daniels… It is not yet “normality” but, for a few months now, we have been slowly emerging from the pandemic period and of the restrictions it had entailed. Finally, we will be able to meet to discuss, exchange, but also build new joint research projects. However, some of us still cannot travel in-person… For this reason and under the leadership of Mark Schafer, President of UFFC, we are offering a hybrid version of the conference with face-to-face and online presentations. Q&A sessions will be co-facilitated by the Chairman and a Deputy Chairman so that people online are fully involved in the conference.

Our program is, as usual, of quality. Indeed, high quality researchers (confirmed or in the making) have been selected and invited. For the plenary sessions, we proposed six confirmed researchers. Their names are known to all: Shujun Zhang, Barbara Malic, Sayeef Salahuddin, M. Lourdes Calzada, Gustau Catalan and Syed A. M. Tofail. These leaders will present an overview of their past, current and, perhaps, future research. To these confirmed researchers, we must add 53 researchers selected and invited for the world-renowned quality of their research. On the other hand, we will offer the possibility to 16 young researchers "leaders" in receiving the visibility they deserve. Two poster sessions will complete this program. 122 posters, including 38 online, will be visible during these two days, but also online on the conference website few days before.

It should be noted that, beyond the quality of the research, diversity (women/men, geographical location, etc.) was, for us, an important point in our selection. We can be proud of having managed to give a more realistic representation of our scientific community.

I cannot end this welcome letter without thanking all the people without whom all of this would not have been possible. First of all, I sincerely thank our colleagues from the joint meetings (PFM and ECAPD) who wished to join us. Of course, I associate with these thanks the symposium chairs, the session chairs, the local organizers, the General Chairs, the Technical Program Chairs, the members of the local organizing committee and Conference Catalysts for their enormous efforts to make this hybrid version of conference a reference for the future. Of course, I do not forget the participants for the quality of their contributions which bring this event to life. I would also like to thank the Department of Digital and Multimedia Production at the University of Tours, which does much more than what it was mandated to do. Special mention should go to our sponsors and patrons whose contact details can be found on the conference website. I invite you to contact them for your current or future needs.

Finally, a special mention goes to our President Mark Schafer who carried and supported the proposal of a conference in Hybrid mode. Thank you for this innovative idea which, no doubt, will continue in the years to come.

For participants in person, welcome to Tourraine; this magnificent region that Leonardo da Vinci had chosen for the last years of his life. To those online, thank you for your participation.

Antoine Ruyter - General Chair
IEEE ISAF-PFM-ECAPD 2022 Organizers

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Antoine Ruyter, University of Tours, CRISMAT Lab, Caen, France

ISAF Chair
Nazanin Bassiri-Gharb, Georgia Tech University, USA

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Alexei Gruverman, University of Nebraska, Lincoln, USA

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Student Competition Chair
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Raymond McQuaid, Queen’s University, Belfast, UK

Finance Chair
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ISAF Publications Chair
Julia Glaum, Norwegian University of Science and Technology (NTNU), Trondheim, Norway

Diversity Chair
Nathalie Le Calvez Lemee, Associate Professor at University of Picardie – Amiens, France

Poster Session Coordinator
Ulrike Lüders, CRISMAT, France
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Jérôme Wolfman, CNRS Senior Researcher at GREMAN Lab. – University of Tours – Tours, France

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Brice Gautier, - Professor at INSA – Lyon, France

Nick Barrett, CEA Research Director at IRAMIS Inst. – CEA Saclay, France

Arnaud Fouchet, CRISMAT Lab, Caen, France

Ulrike Luders, CRISMAT Lab, Caen, France

Excursions, Support reception
Antoine Ruyter, University of Tours, CRISMAT Lab, Caen, France

Exhibition Organization
Antoine Ruyter, University of Tours, CRISMAT Lab, Caen, France

Student Events
Marie El Rami, CRISMAT Lab, Caen, France

ISAF Organizing Committee

VP UFFC | Chair of FerroCom
Shujun Zhang, University of Wollongong, Australia

UFFC SYMPOSIA REPRESENTATION
Sandy Cochran, VP for Symposia

PFM Advisory Board

Chair
Andrei Kholkin, University of Aveiro, Portugal

ECAPD Advisory Board

Chair
Barbara Malič, Ljubljana, Slovenija
Technical Program Committees

ISAF Group I - Fundamentals of Ferroelectrics and Related Materials

Chair:
Hajime Nagata

Members:
Fei Li
JP Maria
Xiaoli Tan
Takaaki Tsurumi
Peggy Zhang
Zuo-guang Ye
Soonil Lee
Ho-Yong Lee
Dawei Wang
Yun Liu

ISAF Group II - Processing of Ferroelectric Crystals, Ceramics, Thick and Thin Films

Chair:
Alp Sehirlioglu

Members:
Michelle Dolgos
Brady Gibbons
Joh Ihlefeld
Julia Glaum
Barbara Malic
Ahmad Safari
Shujun Zhang
Daeyong Jeong
Ichiro Fujii

ISAF Group III - Characterization & Properties of Ferroelectrics

Chair:
Marco Deluca

Members:
Nazanin Bassiri-Gharb
John Daniel
Marty Gregg
Satoshi Wada
Hana Ursic
Lynette Keeney
Jiagang Wu
Jun Chen
Wook Jo
ISAF Group IV - Applications of Ferroelectrics, Piezoelectrics and Related Materials

Chair:
Qifa Zhou

Members:
Akira Ando
Sandy Cochran
Junling Wang
Do-Kyun Kwon
Ron Polcawich
Vladimir Shur
Roger Whatmore
Jungho Ryu
Danyang Wang
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Juras Banyš
Sidney Lang
Mario Maglione
Ian M. Reaney
Erling Ringgaard
Jürgen Rödel'
Dennis Meier
Andrew J. Bell

Alexander S. Sigov
Lorena Pardo)
Gustau Catalán
Marco Deluca
Jiří Hlinka
Susan Trolier-McKinstry
Krystian Roleder
Satoshi Wada
Sergey B. Vakhrushev
Marin Alexe
Beatriz Noheda
Dragan Damjanovic

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Plenary Speakers

Shujun Zhang
University of Wollongong

Tuesday, June 28
08:45 – 09:45 CEST

Session Chair: Zuo-Guang Ye (Simon Fraser University)

WHY DOES RELAXOR-PT FERROELECTRIC CRYSTAL HAVE GIANT PIEZOELECTRICITY? - THE ROLE OF ANISOTROPY AND ITS APPLICATIONS

Perovskite ferroelectric materials are at the heart of electromechanical devices, such as medical imaging transducers, industrial nondestructive evaluation, and piezoelectric sensors, to name a few. Relaxor-PbTiO3 (relaxor-PT) ferroelectrics show superior dielectric/piezoelectric properties, far outperforming conventional ferroelectric Pb(ZrxTi1−x)O3 (PZT) ceramics. Why do relaxor-PT single crystals possess giant piezoelectricity? In the last 3 decades, different mechanisms have been proposed in attempts to comprehend its origin, thus benefiting the design of the next generation of ferroelectric materials. Analogous to PZT solid solution ferroelectrics, the morphotropic phase boundary (MPB) separating different ferroelectric phases possesses a flat free energy profile due to the similar free energies of the coexistent phases, which induces structural instability and promotes rotation of the polarization. Meanwhile, the good properties of relaxor-PT based materials are inherently associated with their unique local structural heterogeneity, i.e., the existence of nanoscale heterogeneous regions that coexist with normal ferroelectric domains, where the local energy competition will lead to a greatly flattened local energy profile, which is conducive to the polarization rotation. Both of the above can be categorized as forms of structural instability. In addition to the structural instability, unlike polycrystalline materials, the single crystals possess a strong anisotropic property, where the anisotropic free energy profile determines the easy paths for polarization change and corresponds to the enhanced properties. Depending on the phase and poling direction, the relaxor-PT ferroelectric crystals possess different engineered domain configurations, where the highest piezoelectric coefficient is not along the direction of spontaneous polarization but is contributed by the polarization rotation. All of these factors synergistically contribute to macroscopic dielectric and piezoelectric properties. In this regard, the focus of this presentation is how to understand and take full advantage of the strong anisotropic feature of relaxor-PT ferroelectric crystals as well as exploring their multifunctional coupling phenomena for different applications. As expected, their properties, including piezoelectric and mechanical loss, are orientation dependent, so are based on the engineered domain configuration. Amazingly, the [011] poled rhombohedral relaxor-PT crystals possess many very unique features. Where a large in-plane strain under electric field exists, it opens up a new freedom to tailor numerous functionalities, while their distinct face-shear vibration mode gives these crystals potential for low frequency acoustic transducers and tactile sensors. Of particular interest is that the existing 71o domains in [011] poled rhombohedral relaxor-PT crystal give identical projection of the indicatrix on the (011) and (100) planes, leading to a high transparency of the crystal, while the polarization rotation contributes to a superior electro-optic (EO) coefficient, offering great promise for miniaturization, portability, and ultralow driving voltage of EO devices. All these merits give us a good paradigm of how we can explore the new limits of relaxor-PT ferroelectric crystals in emerging applications, multifunctional coupling, and integration, with the hope that this will guide the design, fabrication, microstructure, properties, and applications of these ferroelectric crystals.
Gustau Catalan  
*ICREA and ICN2-Institut Català de Nanociència i Nanotecnologia*

**Tuesday, June 28**  
13:30 – 14:30 CEST

**Session Chair:** Alexei Gruverman (UNL)

**NOT QUITE FERROELECTRIC**

Over the century that has elapsed since the discovery of ferroelectricity, we have built a considerable body of knowledge around electric polarization and its interaction with external stimuli such as voltage, mechanical stress or light. This entire conference is proof of that. However, along the way we have also learnt that, in the right conditions, polar responses may be elicited from non-polar materials. I would like to dedicate my talk to these not-quite-ferroelectric phenomena. I will start, predictably enough, with flexoelectricity, a phenomenon pervasive in all materials and relevant to any physical response to inhomogeneous fields and/or deformations – a situation that includes, but is not limited to, piezoresponse force microscopy. I will then move on to a different form of not-quite-ferroelectricity, namely antiferroelectricity, and its connection with flexoelectricity, photoelectricity, switching dynamics and the origin of its anomalous electrocaloric effect. Lastly, and depending on time availability, I will outline on-going research on nanomechanics and the ferroelasticity of oxide membranes.

Barbara Malic  
*Jožef Stefan International Postgraduate School*

**Wednesday, June 29**  
08:15 – 09:15 CEST

**Session Chair:** Andrew Bell (Leeds University)

**MICROSTRUCTURE: FINGERPRINT OF PROCESSING, CLUE TO UNRAVELING THE FUNCTIONAL PROPERTIES OF FERROELECTRIC CERAMICS**

Materials’ requirements in the world of electronic devices are rapidly expanding towards their multifunctionality, their integration onto reactive substrates, the use of environmentally friendly raw materials and processes, reduced levels of energy consumption and their high efficiency. This is reflected in the search for ceramic materials with excellent, reproducible and stable functional properties obtained via energy-efficient processing. While chemical composition of perovskite ferroelectrics determines their symmetry and phase transitional behavior, and consequently their physical properties, tuning of properties may be achieved by doping strategies. As revealed decades ago, microstructural design is another critical factor which contributes to tailoring the functional properties of ferroelectrics. The choice of the processing route and related shape – bulk ceramic, multilayer, thick or thin film – contributes to the stoichiometry and defect chemistry, and importantly tailors the microstructural features down to nm-scale. While thermal energy has been for ages the main driving force for consolidation of ceramics, emerging low-temperature routes such as cold sintering and aerosol deposition offer a new perspective on the evolution of the microstructure and defect chemistry in non-equilibrium conditions. The focus of this contribution is on reexamination of classical processing-microstructure-properties relationships for selected ferroelectric and relaxor-ferroelectric ceramic materials. Case studies of sodium potassium niobate-based piezo-/ferroelectrics, and lead-based relaxor-ferroelectrics for electrocaloric applications will be discussed.
The 1990’s trend toward the miniaturization of functional devices driven by the microelectronic industry led to the development of thin film materials integrated with semiconductor substrates (Si-technology), able to use their properties in micro and nanodevices with high integration densities and low operation voltages. However, since the beginning of this century, the electronic industry is demanding cost-efficient, soft- portable and high-tech devices. This has pushed the advance of Flexible Electronics, where the thin film is deposited on cheap flexible substrates (e.g., polymers, paper or textile). These substrates would also meet technological demands difficult to tackle by semiconductor substrates, such as their compatibility with roll- to-roll processing and printing technologies, thus making real applications not possible before. The degradation temperature of flexible substrates is always below 400°C. Therefore, Flexible Electronics is calling for low-temperature thin-film fabrication methods, in addition to materials that can be processed at these temperatures. Hence, organic and amorphous metal oxide semiconductors are the most widely used materials in Flexible Electronics. However, other active layers different from semiconductors are demanded because of the need of enlarging the performance of the forthcoming flexible devices. This is an opportunity for ferroelectric oxide thin films since their intrinsic multifunctionality (e.g., ferroelectric, pyroelectric, piezoelectric, multiferroic or photoferroic) would make possible multiple operations in the flexible device. But, in general, ferroelectric oxide films have to be crystalized at temperatures that exceed by far the thermal stability of the most favorable flexible substrate (i.e., Kapton polyimide). Transference methods can be used to avoid this problem. Here, the film is first processed at high temperatures on a rigid substrate, and then transferred to the flexible substrate. However, these techniques involve complex manufacturing methods and costly equipment. It should be also taken into account that the manufacturing of flexible electronic devices not only calls for low-temperature fabrication processes but also for deposition techniques that scale easily to the large areas required in flexible devices. In this regard, solution deposition methods are the best positioned today to integrate metal oxide thin films with flexible substrates, as a large-area, low-cost, high throughput fabrication technique. This conference presents a snapshot of the challenges for the integration of ferroelectric oxide films with flexible electronics, making emphasis in the development of novel solution synthesis strategies able to achieve the reduction of the processing temperature of the ferroelectric oxide and to permit the direct integration of large-area coatings of these active films with plastic substrates.
Sayeef Salahuddin  
*UC Berkeley*  
**Thursday, June 30**  
08:15 – 09:15 CEST  
**Session Chair:** Clive A. Randall (Pennsylvania State University)  
**ULTRATHIN FERROELECTRICITY AND ITS APPLICATION IN FUTURE LOGIC AND MEMORY DEVICES**

Compared to archetypical perovskites, fluorite HfO2 based ferroelectric materials are process-compatible with advanced CMOS transistors. As a result, they promise to bring ferroelectric technologies into wide-spread applications. At the same time, ferroelectricity in these materials is also different. In conventional perovskites, the polarization becomes weaker as the thickness is decreased due to ‘size effects’. Balking this conventional trend, our recent work has shown that ferroelectricity in HfO2 in fact enhances as the thickness goes down. The ferroelectricity can be demonstrated even in a 1 nm film, which is just two-unit cells! In this presentation I shall discuss these results. In addition, I shall also discuss Negative Capacitance transistors with just 18A thick ferroelectric material- the same thickness of high- dielectric used in today’s advanced transistors. I shall further present ferroelectric tunnel junction results with 1 nm ferroelectric. These results demonstrate that, unlike conventional ferroelectrics, thickness scaling is not a bottleneck for HfO2 based ferroelectrics, paving the way for their integration in the most advanced logic and memory devices.

Syed A. M. Tofail  
*University of Limerick*  
**Thursday, June 30**  
13:30 – 14:30  
**Session Chair:** Marin Alexe (University of Warwick)  
**FERROELECTRICITY IN BIOLOGICAL HIERARCHY**

Switchable spontaneous polarisation is one of the primary criterion of a material to be called ferroelectric. We will provide a critical overview of the developments in the study of ferroelectricity in biological systems and discuss various strengths and pitfalls. We will then try to bridge the current study in ferroelectricity in biological hierarchy with microscopic electrophysiological observations in Piezo 1 and Piezo 2 proteins responsible for mechanical and thermal sensing in biological systems. Since the discovery of piezoelectricity in wood and bone in 1950s, switchable polarisation has been reported in many biological materials both in natural and synthetic forms including organic, inorganic as well as their composite forms. Biological materials cannot avoid water, which is generally considered as deleterious in conventional ferroelectrics. Water can contribute to a leaky capacitive behaviour of biological materials. This leaky nature may be complicated by the observation that the polarisation may not be fully reversible as it would be expected in conventional non-biological ferroelectric materials. Biological building blocks possess chirality, low symmetry, spontaneous charge separation and dipole orientation. They can be found in naturally occurring electret states in their native molecular organisation, hierarchical organisation (e.g. in organelles, cells, tissues and organs) as well as in their mineralised forms. As electrets, such materials exhibit piezoelectricity, pyroelectricity, thermal depolarisation and relaxation, streaming potentials and even switchable polarisation e.g. ferroelectricity. They can also be polarised, depolarised and hyperpolarised using electrophysiological stimulation. We will show that we are probably dealing with similar origin of ferroelectricity in biological hierarchy and electrophysiological response, which, currently are considered as two separate phenomena.
Women in Engineering

Women in ferroelectrics from different corners of the world

Thursday, June 30
12:30 – 14:00 CEST

The four panelists will discuss their experiences studying and working in the different countries that they have come from and/or that they have been to. We will hear about their backgrounds and labs, and then there will be a panel discussion. A light lunch will be provided. Both women and men are invited and encouraged to attend!

Moderators:
Lynette Keeney (Tyndall National Institute)
Hana Uršič (Institut “Jožef Stefan”)

Panelists:
Sylvia Gerbhardt
(Fraunhofer IKTS)
Ilona Zamaraitė
(Vilnius University)

Johanna Nordlander
(Harvard University)
Debismita Dutta
(Tyndall National Institute)
Student Events

Student Social, a chance for students to meet their peers.
Tuesday, June 28, 5:30 – 6:30 PM CEST
This casual social event is designed as an ice breaker event where students get to know their peers and play a ferroelectric themed game.

Student-Professional Networking (+ Mock Interviews), a chance for students to meet people from industry.
Wednesday, June 29, 12:30 – 2:00 PM CEST
We intend to ask professionals to participate and run “Mock interviews” for students. In these, the professionals will speak to students in turn individually, or in small groups, and will “interview” them for a hypothetical job. This would allow students to develop key professional skills and network in a safe and low-risk space. This event will be in collaboration with the Industry Engagement Committee.

Student Pitch Competition, a chance for students to present their research
Wednesday, June 29, 6:00 – 7:00 PM CEST
Students will register beforehand and send in one slide. In turn, each student will present their slide and research in one minute to their peers and a panel of judges. Prizes will be awarded for particularly strong performances.

Student Closing Event
Thursday, June 30, 6:15 – 7:15 PM CEST

All the events will be held in the hybrid format.
Exhibit & Poster Hall

Paper numbers will be indicated on the boards so you know which panel to hang your poster on. You must remove your poster after the day your session takes place, and hang it the morning of your session.

Tuesday, June 28

Wednesday, June 29
Social Events

Monday, June 27
City Hall Social Event
19:30 – 20:30 CEST
Included in registration.

Tuesday, June 28
Welcome Reception
Vinci Congress Center (Level +2)
19:30 – 20:30 CEST
Included in registration.

Thursday, June 30
Gala Dinner & Ferroelectric Awards
Vinci Congress Center (Level +2)
20:00 – 23:30 CEST
Tickets must have been pre-purchased.
Tutorials

Tutorials will be held at Université de Tours on Monday, June 27.

8:45 AM - 10:15 AM CEST

FUNDAMENTALS OF PIEZO-RESPONSE FORCE MICROSCOPY: FROM BASIC CONCEPTS TO THE STATE-OF-THE-ART (Don Evans)

FUNDAMENTALS OF FERROELECTRIC AND MULTIFERROIC MATERIALS (Junling Wang)

10:15 AM CEST

Coffee Break

10:45 AM – 12:15 PM CEST

APPLICATION OF PIEZORESPONSE FORCE MICROSCOPY IN LIQUID (Brian Rodriguez)

FUNDAMENTALS OF FLEXOELECTRICITY (Gustau Catalan)

FERROELECTRICS & PHOTOVOLTAICS (Marin Alexe)

12:15 PM – 1:30 PM CEST

Tutorial Lunch

1:30 PM – 3:00 PM CEST

PIEZOELECTRIC MATERIALS FOR BIOMEDICAL APPLICATIONS (Julia Glaum)

THEORY AND SIMULATIONS OF FERROELECTRICS AND RELATED MATERIALS (Jorge Iniguez)

APPLICATIONS OF PIEZOELECTRIC MATERIALS (Susan Trolier-Mckinstry)

3:00 PM CEST

Coffee Break

3:30 PM – 5:00 PM CEST

EPITAXY OF FERROELECTRIC OXIDE THIN FILMS (Morgan Trassin)

ANTIFERROELECTRICS: PRINCIPLES AND PROPERTIES (Karin Rabe)

TWO-DIMENSIONAL FERROELECTRICS: RECENT DEVELOPMENTS AND FUTURE TRENDS (Alexei Gruverman)
Tutorials

Tramway: line A – Dir. Lycée J. Monet

Duration: 14 (from J. Jaures station) – 20 min

Price: 1.40€ (one way)

Location: Faculté de droit, économie et des sciences sociales

Entrance: the door is behind the tramway stop. In the building, first stairs on the left.

Rooms: B 124, B 101, B 103, B 102
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<thead>
<tr>
<th>Time</th>
<th>Room B 101</th>
<th>Room B 102</th>
<th>Room B 124</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:45</td>
<td>Tutorials Session I</td>
<td>Tutorials Session II</td>
<td>Tutorials Session III</td>
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<tr>
<td></td>
<td>Don Evans</td>
<td>Jun Ling Wang</td>
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<tr>
<td>09:00</td>
<td>Fundamentals Of Piezo-Response Force Microscopy: From Basic Concepts To The State Of The Art</td>
<td>Fundamentals Of Ferroelectric And Multiferroic Materials</td>
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<tr>
<td>10:35</td>
<td>PFM</td>
<td>ISAF fundamentals</td>
<td>Coffee Break</td>
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<tr>
<td>10:45</td>
<td>Coffee Break</td>
<td>Coffee Break</td>
<td>Marin Alexe</td>
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<tr>
<td>10:45</td>
<td>Brian Rodriguez</td>
<td>Gustau Catalan</td>
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<tr>
<td>11:00</td>
<td>Application Of Piezoresponse Force Microscopy In Liquid</td>
<td>Fundamentals of Piezoelectricity</td>
<td>Ferroelectrics and Photovoltaics</td>
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<td>12:15</td>
<td>PFM</td>
<td>Joined ISAF / ECAPD</td>
<td>Joined ISAF / PFM</td>
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<td>12:15</td>
<td>LUNCH BREAK</td>
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<tr>
<td>13:30</td>
<td>Julia Gaum</td>
<td>Jorge Illán</td>
<td>Susan Troller-McInstry</td>
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<tr>
<td>13:30</td>
<td>Piezoelectric Materials for Biomedical Applications</td>
<td>Theory And Simulations Of Ferroelectrics And Related Materials</td>
<td>Applications of Piezoelectric Materials</td>
</tr>
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<td>15:30</td>
<td>Morgan Frassin</td>
<td>Karin Rabe</td>
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<tr>
<td>15:30</td>
<td>Epitaxy Of Ferroelectric Oxide Thin Films</td>
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<td>Two-Dimensional Ferroelectrics: Recent Developments And Future Trends</td>
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<tr>
<td>17:00</td>
<td>ECAND</td>
<td>Joined ISAF / ECAPD</td>
<td>ISAF structure/characterization</td>
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</table>

Informations: Coffee breaks: Patio same floor (1st) - Lunch: Floor 0
FUNDAMENTALS OF PIEZO-RESPONSE FORCE MICROSCOPY: FROM BASIC CONCEPTS TO THE STATE-OF-THE-ART

Donald Evans
University of Augsburg

In our age of electronics and electronic materials, much state-of-the-art research focuses on ferroelectrics, materials that display permanent internal electric fields. One driving force behind this research is the diverse range of potential applications. Ferroelectrics provide opportunities to both enhance existing technology (such as computer memory, capacitors, sensors, optical devices etc) but also to provide next generation applications, like biomedical implants, neuromorphic memories, negative capacitance devices, and domain wall nanoelectronics. For most of these applications, control and knowledge of the orientation of the ferroelectric polarisation vector is critical, with several experimental techniques to image the polarisation now established. Over the last two decades, piezo-response force microscopy (PFM) has emerged as, arguably, the most prolific tool for imaging these microstructures. This success is partly because of its nanoscale resolutions, straightforward implementation on most scanning probe microscopy setups, the ability to image both bulk and thin film sample surfaces in ambient conditions, and minimal sample preparation requirements. Despite this proliferation of the PFM technique, and the relative ease with which domain maps can be obtained, interpretation of the data is seldom straightforward. This tutorial aims to help the participants develop an intuitive understanding of what PFM is, how to use it, and how to optimise it for the collection and interpretation of high-quality images. To achieve this, we will start by building an understanding of what ferro-, piezo and pyro- electrics are, using a cartoon material system made up of a few atoms, to illustrate the key concepts. Before discussing how PFM can detect the polarisation vectors in these systems, and the operational principles it uses to make these maps. From these basic concepts, we will move towards the latest research in the field, including how the principles of PFM can be leveraged to image non-polar materials. The tutorial will finish with methodologies and tips on practical PFM usage, best practices, and pitfalls to be avoided. To foster the participants’ understanding, this tutorial aims to be interactive.

FUNDAMENTALS OF FERROELECTRIC AND MULTIFERROIC MATERIALS

Junling Wang
Department of Physics Southern University of Science and Technology (SUSTech)

Ferroelectric materials are crystals that exhibit spontaneous electric polarizations, which can be switched by an external electric field, below their Curie temperatures. Because of the lack of center of symmetry, they are also piezoelectric where applied stress to the crystal produces electric charges and applied electric field generates strain. Ferroelectricity was first discovered in Rochell salt in 1920. But research activity in the field only took off when perovskite oxide BaTiO3 was found to be ferroelectric in the 1940s. Since then, perovskite ferroelectrics have been widely used in transducers and actuators because of their excellent piezoelectric property. Non-volatile ferroelectric memory that makes use of their spontaneous polarization was also developed. In this tutorial, I will introduce the fundamentals of ferroelectricity, including the basic theory, properties and characterization techniques, as well as applications of ferroelectric materials. During the past 20 years, the field has been greatly enriched by the study of multiferroic materials, in which two or more ferroic orders (ferroelectric, ferromagnetic, ferroelastic and ferrotoroidic) coexist. At present, researchers have focused mostly on multiferroics that possess spontaneous electric and magnetic orders simultaneously, and antiferromagnetism is often included. The coupling between the two order parameters enables electric-field-control of magnetism, which is particular attractive for low-power spintronics. I will also discuss the unique properties and potential applications of multiferroic materials.
APPLICATION OF PIEZORESPONSE FORCE MICROSCOPY IN LIQUID

Brian Rodriguez
University College Dublin


FUNDAMENTALS OF FLEXOELECTRICITY

Gustau Catalan
ICREA and ICN2-Institut Català de Nanociència i Nanotecnologia

The generation of polarization under mechanical stress or, conversely, the generation of deformation in response to a voltage, are a traditional preserve of ferroelectric and piezoelectric materials. Piezoelectricity, however, is not the only electromechanical property of materials. Flexoelectricity, the coupling between polarization and strain gradients, is increasingly being recognized as a very important, sometimes even dominant, electromechanical property. Contrary to piezoelectricity, flexoelectricity is symmetry-allowed in all materials, including of course ferroelectrics, but also centrosymmetric materials. It turns out also that this property even exists in semiconductors and photovoltaic materials, metals, and biomaterials. It is thus truly universal. Moreover, because strain gradients tend to grow in inverse proportion to physical size, flexoelectricity can be the dominant electromechanical coupling at the nanoscale. Additionally, when it coexists with other functional properties (piezoelectricity in ferroelectrics, photovoltaic effects in semiconductors), it generates new functional properties that would not be possible without such coexistence. Understanding flexoelectricity is therefore important and potentially useful if we manage to harness these new flexoelectrically-induced functionalities. The present tutorial will attempt to give a complete overview of flexoelectricity, from its definition and physical principles, to its effect on different materials and the consequences for devices. At every step of the way, the working principles will be
illustrated with examples. The aim is to provide a good foundation for those who are new or curious about flexoelectricity, and perhaps also to inspire new directions of research for those who already primed about it.

FERROELECTRICS & PHOTOVOLTAICS

Marin Alexe
University of Warwick

Two years after the invention of modern solar cells, it was found that a ferroelectric material, BaTiO3, exhibits a photovoltaic effect distinct from that of p-n junctions, later called the bulk photovoltaic (BPV) effect. Under uniform illumination, a homogeneous ferroelectric material gives rise to a current under zero bias, i.e. short-circuit current (ISC), that depends on the polarization state of the incident light, and produces an anomalously large photo-voltage well exceeding the bandgap energy. The effect has been largely forgotten, the entire field of photo-ferroelectrics has been revitalized by the reports of abnormal photovoltaic effect in BiFeO3 (BFO)[i], which is a ferroelectric/multiferroic material with one of the lowest band gap and significant semiconducting properties. The present tutorial will discuss the basics of the photovoltaic effect in both semiconductors and ferroelectrics along with the electronic origin and phenomenological theory of the BPV. We will present the associated effects such as the role of ferroelectric domain walls and photoelectric active sub-band gap levels in the abnormal PVE in BFO as well as persistent photoconductivity.[ii] We will also address the tip-enhanced photovoltaic effect and how light can induce reversible switching of ferroelectric polarization at room temperature in BiFeO3 thin films.[iii] Other effects based on light interaction with the ferroelectries such as photostriction, photorefractive effects or light-enhanced piezoelectric coefficient will also be presented. Finally, we will discuss the interaction of strain field and gradients with matter how the BPV effect into a universal photovoltaic effect. namely flexo-photovoltaic effect, allowed in all semiconductors.[iv] References [i] Yang, S. Y. et al. Above-bandgap voltages from ferroelectric photovoltaic devices. Nature Nanotechnology 5, 143–147 (2010) [ii] Yang, M., Bhatnagar, A. & Alexe, M. Electronic Origin and Tailoring of Photovoltaic Effect in BiFeO3 Single Crystals. Adv. Electron. Mater. 1, 1500139 (2015). [iii] Alexe, M. & Hesse, D. Tip-enhanced photovoltaic effects in bismuth ferrite. Nature Communications 2, 256 (2011). [iv] Yang, M., Kim, D.J, & Alexe, M., Flexo-Photovoltaic Effect, Science 360, 904 (2018).

PIEZOELECTRIC MATERIALS FOR BIOMEDICAL APPLICATIONS

Julia Glaum
Norwegian University of Science and Technology (NTNU)

Piezoelectric materials are commonly used as sensors and actuators, for energy harvesting and vibration control in many industrial and everyday devices. They have established themselves as well in the medical device market as core components in e.g. ultrasound applications and for surgical tools. For in vivo applications, however, piezoelectric materials have not made the jump into clinical usage yet, even though they could enable localized pressure sensing, energy harvesting from muscle motion or stimulation of tissue re-generation after surgery. The main challenge here is that they have to be biocompatible. This is a concept that goes way beyond simple chemical toxicity, but covers all aspects that influence the safe performance of a material at the implant site under the complex conditions that the body imposes. In this tutorial, we will take an in-depth look at the applicability and biocompatibility of piezoelectric materials for in vivo biomedical applications. We will investigate the boundary conditions that the body imposes on implant materials in different applications and how these might impact the functionality and stability of piezoelectric implants. And vice versa we will look into the influence of material properties, such as surface topography, chemical composition and mechanical properties, on the living system. Based on this, we will discuss future application areas for this versatile class of materials in the biomedical realm.
THEORY AND SIMULATIONS OF FERROELECTRICS AND RELATED MATERIALS

Jorge Íñiguez
Luxembourg Institute of Science and Technology

In this tutorial I will introduce the theoretical and simulation methods most frequently employed to investigate ferroelectrics and related materials (polar dielectrics, antiferroelectrics, multiferroics). I will start from the general electronic-structure methods that permit predictive calculations at the atomic scale, and introduce successive simplifications to eventually reach continuum field schemes that give us access to the mesoscale. I will illustrate the specificity and usefulness of the different approaches by presenting, for each of them, one or two classic examples of application. In passing, this will allow me to emphasize the key role that simulation has played in our field, and to touch upon interesting physical properties of these materials. Jorge Íñiguez’s work on ferroelectrics and related materials is mainly funded by the Luxembourg National Research Fund, currently through projects FNR/C18/MS/12705883/REFOX/Gonzalez, INTER/RCUK/18/12601980 and INTER/NWO/20/15079143.

APPLICATIONS OF PIEZOELECTRIC MATERIALS

Susan Trolier-Mckinstry
Pennsylvania State University

Piezoelectric materials are used in a wide variety of applications, timing standards, filters, transducers, actuators, sensors, and energy harvesters, pyroelectrics. This tutorial will discuss key applications of piezoelectric materials, and the structure-property relationships that govern the choice of specific materials. Emphasis will be placed on the use of perovskite and wurtzite compounds for piezoelectric applications, including both lead-based and lead-free piezoelectric ceramics, single crystals, and films. The tutorial will conclude with an introduction to piezoelectric microelectromechanical systems (piezoMEMS).

EPITAXY OF FERROELECTRIC OXIDE THIN FILMS

Morgan Trassin
ETH Zurich

Oxide films with a thickness of just a few atoms can now be grown with a precision matching that of semiconductors. This opens up a whole world of functional device concepts and fascinating phenomena that would not occur in the expanded bulk crystal. Particularly interesting phenomena occur in films showing magnetic or electric order or, even better, both of these (“multiferroics”). Here, I will focus on epitaxy. After a brief introduction to the concept of the epitaxial deposition, I will discuss the growth modes and growth processes involved. The major deposition techniques will be described as well as the main characterization tools to assess the epitaxial nature of oxide thin films. Because of the strong lattice polarization coupling in ferroelectrics, epitaxy is a great tool to engineer polarization in thin films. Epitaxial strain, chemical control on interface atomic termination and charge screening environment tuning are key elements of the ferroelectric domain design. In the ultrathin regime however, the dominating effect of the depolarizing field leads to a suppression of the thin film functionality, i. e. the ferroelectric polarization. Here, I will present such effect and the physics of ultrathin regime and discuss routes towards robust polarization states in the ultrathin form. Furthermore, because most ferroelectric materials are deposited in their ferroelectric phase, in-situ monitoring of polarization is possible. I will present the state of the art dealing with such a capacity and demonstrate how in-situ tracking of ferroelectricity can advance the integration of such functional materials into nanoscale devices.
ANTIFERROELECTRICS: PRINCIPLES AND PROPERTIES

Karin Rabe
Department of Physics and Astronomy, Rutgers University

This tutorial will focus on the physics of antiferroelectric materials. We’ll start by considering the definition of antiferroelectricity in analogy to the definition of ferroelectricity. We will develop a theoretical framework for describing the crystal structures and energy landscape in terms of lattice modes of a high-symmetry reference structure, using space group formalism, Landau expansions, and first-principles calculations of phonon dispersion and total energies. We will learn about electric field switching of antiferroelectrics, which will directly lead into an overview of their functional properties, including piezoelectric, electro-optic and electrocaloric effects associated with switching between the antipolar and polar states, and the resulting technological applications. Throughout, we will illustrate and reinforce the essential concepts by looking at prototypical antiferroelectric materials, including PbZrO3, AgNbO3, Sm:BiFeO3 and thin-film ZrO2, reviewing first-principles studies and experimental synthesis and characterization. We will discuss the design and discovery of new antiferroelectric materials using crystallographic databases, high-throughput first-principles calculations, and data mining. Finally, we will consider the place of antiferroelectrics in the broader context of functional electric-field-switchable polar materials.

TWO-DIMENSIONAL FERROELECTRICS: RECENT DEVELOPMENTS AND FUTURE TRENDS

Alexei Gruverman
University of Nebraska-Lincoln

Advances in fabrication of atomically thin structures coupled with progress in their structural and functional characterization by electron and local probe techniques as well as theoretical modeling led to a strong progress in understanding of the finite-size effects in ferroelectrics. Recent theoretical predictions and experimental demonstration of ferroelectricity in van der Waals materials present exciting possibilities for development of the two-dimensional (2D) ferroelectric semiconducting materials with high mobility, small bandgap and polarization-controlled transport properties for application in scalable low-power advanced electronic devices. This lecture will review the emergence of the stable room-temperature polar ordering in 2D van der Waals materials related to different mechanisms such as structural distortion, intralayer covalent bonding, ionic displacement and surface chemical functionalization. It will be followed by discussion of recent progress in experimental studies of 2D ferroelectric materials by various characterization methods. Novel device concepts based on 2D semiconductor/ferroelectric heterostructures and their applications in modern nanoelectronics devices, such as nonvolatile memories, negative capacitance transistors, neuromorphic structures, and reconfigurable nanodevices will be reviewed. Finally, an outlook for future trends and challenges in 2D ferroelectrics will be presented.
### Welcome Address & Plenary: Shujun Zhang
**08:15:00 AM - 09:45:00 AM CEST**
**Room:** Auditorium Ronsard  
**Chair(s):** Zuo-Guang Ye (Simon Fraser University)

#### 08:15:00 AM
Welcome Address  
*Antoine Ruyter, General Chair*

#### 08:45:00 AM
Why Does relaxor-PT Ferroelectric Crystal Have Giant piezoelectricity? the Role of Anisotropy and its Applications  
*Shujun Zhang*  
*University of Wollongong, Australia*

### 09:45:00 AM – 10:15:00 AM CEST
**Coffee Break**  
*Level +2*

### A2L-A: ISAF 1 - Superlattice
**10:15:00 AM - 12:00:00 PM CEST**  
**Room:** Auditorium Ronsard  
**Chair(s):** Nives Strkalj (University of Cambridge)

#### 10:15:00 AM
**2107: YOUNG INVESTIGATOR (INVITED): Optical Second Harmonic Investigation of Polar Order in Oxide Superlattices**  
*Nives Strkalj*  
*University of Cambridge, United Kingdom*

#### 10:30:00 AM
**2053: Effect of Light on Properties of Ferroelectrics Superlattices: An ab-initio Study**  
*Carmel Dansou*{2}, *Charles Paillard*{1}, *Laurent Bellaiche*{2}  
{1}Laboratoire SPMS, CentraleSupélec, CNRS-UMR8580, Université Paris-Saclay, France; {2}University of Arkansas, United States

#### 10:45:00 AM
**2088: Giant Voltage Amplification from Incipient Ferroelectric States**  
*Mónica Graf*{1}, *Hugo Aramberri*{1}, *Pavlo Zubko*{2}, *Jorge Íñiguez*{1}  
{1}Luxembourg Institute of Science and Technology, Luxembourg; {2}University College London, United Kingdom

### A2L-B: ISAF 2 - Ceramic Processing I
**10:15:00 AM - 12:00:00 PM CEST**  
**Room:** Room 5  
**Chair(s):** Alp Sehirlioglu (Case Western Reserve University)
10:15:00 AM
**2442: INVITED: Influence of the Cold Sintering Process on the Microstructure and Properties of Perovskite Ferroelectrics: BiFeO₃ Case Study**
Mojca Otoničar(3), Samir Salmanov(3), Minghai Yao(1), Brahim Dkhil(5), Tadej Rojac(2), Clive A. Randall(4)  
{1}CentraleSupelec, University Paris Saclay, France; {2}Jožef Stefan Institute, Slovenia; {3}Jožef Stefan International Postgraduate School, Jožef Stefan Institute, Slovenia; {4}Materials Research Institute, Pennsylvania State University, United States; {5}Université Paris-Saclay, CentraleSupélec, CNRS UMR 8580, Laboratoire SPMS, France

10:45:00 AM
**2076: YOUNG INVESTIGATOR (INVITED): Cold Sintering of Functional Materials**
Clive A. Randall(1), Arnaud Ndayishimiye(2), Zane Grady(2), Sun Hwi Bang(2), Zhongming Fan(2)  
{1}Materials Research Institute, Pennsylvania State University, United States; {2}Pennsylvania State University, United States

11:00:00 AM
**2078: Cold Sintering of Potassium Sodium Niobate, K0.5Na0.5NbO3**
Koki Nakagawa(2), Masato Iwasaki(3), Clive A. Randall(1)  
{1}Materials Research Institute, Pennsylvania State University, United States; {2}NGK Spark Plug Co., Ltd, Japan; {3}NGK Spark Plug Co., Ltd., Japan

11:15:00 AM
**2131: Cold Sintering of Sr-Modified (K0.5Na0.5)NbO3**
Samir Salmanov, Danjela Kuscer, Mojca Otoničar  
Jožef Stefan International Postgraduate School, Jožef Stefan Institute, Slovenia

11:30:00 AM
**2449: Cold Sintering of Silver Niobate Ceramics for Energy Storage**
Jack Dylan Leber, Jason Zhang, Ahmad Safari  
Rutgers University, United States

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**A2L-C: ISAF 3 - Structure Characterization & Properties - Ceramics I**
**10:15:00 AM - 12:00:00 PM CEST**
**Room:** Room 3  
**Chair(s):** Doru Lupascu (University of Duisburg-Essen)

10:15:00 AM
**2316: INVITED: Dislocation-Mediated Functionality in Ferroelectrics**
Jürgen Rödel  
Technische Universität Darmstadt, Germany

10:45:00 AM
**2480: INVITED: Structure-Property Relationships in Lead-Free Polar Perovskite Oxides**
Neamul Hayet Khansur  
Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany
11:15:00 AM

2323: Study of Dissipative Phenomena in Ferroelectric Ceramics Under Compressive Mechanical Cyclic Loading Using Full-Field Measurements
Mahmoud Barati{3}, Behnaz Amini{1}, Valentin Segouin{4}, Laurent Daniel{4}, Shabnam Arbab Chirani{1}, Sylvain Calloch{2}
{1}Ecole Nationale d’Ingénieurs de Brest, ENIB, France; {2}IRDL, Ecole Nationale Supérieure de Techniques Avancées Bretagne, France; {3}Université Paris-Saclay, CentraleSupélec, Sorbonne Université, GeePs - IPSA, France; {4}Université Paris-Saclay, CentraleSupélec, GeePs, Sorbonne Université, France

11:30:00 AM

2353: Structure Properties Relationships in Functional Ceramics for Energy Conversion
Manuel Hinterstein{1}, Lucas Lemos Da Silva{2}, David Menne{2}, Ling Fan{1}, Daniel Schneider{1}
{1}Institute of Applied Materials, Karlsruhe Institute of Technology, Germany; {2}Karlsruhe Institute of Technology, Germany

A2L-D: ISAF 3 / ECAPD - Structure Characterization & Properties - Domains
10:15:00 AM - 12:00:00 PM CEST
Room: Room 4
Chair(s): Brian Rodriguez (University College Dublin), Hana Ursic (Jožef Stefan Institute)

10:15:00 AM

2477: INVITED: Intrinsic Properties of Domain Walls of BiFeO3
Lisha Liu
Nanjing University of Science and Technology, China

10:45:00 AM

2219: Ferroelectric Oxide Superlattices with Complex Domain Structures
Yaqi Li{1}, Chunhai Yin{1}, Marios Hadjimichael{2}, Pavlo Zubko{1}
{1}University College London, United Kingdom; {2}University of Geneva, Switzerland

11:00:00 AM

2012: Oxygen Vacancies Nucleate Charged Domain Walls in Ferroelectrics
Urko Petralanda, Mads Kruse, Hugh Simons, Thomas Olsen
Technical University of Denmark, Denmark

11:15:00 AM

2223: Ferroelectric Domain Structure of Epitaxial GeTe Thin Films Unveiled by Means of Second-Harmonic Generation Microscopy and Polarimetry Analysis
Boris Croes{2}, Cédric Voulot{2}, Fabien Cheynis{1}, Olivier Crégut{2}, Kokou Dodzi Dorkenoo{2}, Kumara Cordero-Edwards{3}, Iaroslav Gaponenko{3}, Patrycja Paruch{3}, Frédéric Leroy{1}, Salia Cherifi-Hertel{2}
{1}Centre Interdisciplinaire de Nanoscience de Marseille, France; {2}Université de Strasbourg and CNRS, France; {3}University of Geneva, Switzerland

11:30:00 AM

2290: Neuromorphic Properties of Ferroelectric Domain Wall Memristors
Ahmet Suna{2}, Olivia Baxter{2}, James McConvilie{2}, Amit Kumar{1}, Raymond G.P. McQuaid{1}, J. Marty Gregg{1}
{1}Centre for Nanostructured Media, Queen’s University Belfast, United Kingdom; {2}Queen’s University Belfast, United Kingdom

11:45:00 AM

2326: Simulating Domain Growth Through Phase-Field Models: Achievements and Limitations
Hsu-Cheng Cheng{2}, Louis Hennecart{2}, Laurent Guin{1}, Dennis Kochmann{2}
{1}Ecole polytechnique, France; {2}ETH Zürich, Switzerland
Tuesday, June 28

### A2L-E: PFM / ECAPD - Instrumental Aspects of PFM & Related Techniques
10:15:00 AM - 12:00:00 PM CEST
Room: Room 2
Chair(s): Charlotte Cochard (University of Dundee)

10:15:00 AM
2496: INVITED: BE PFM and BE CRF to Decouple Mechanical and Ferroelectric Properties of BaTiO3 Free-Standing Membranes and Single Crystals
David Pesquera{1}, Marti Checa-Nualart{2}, Christina Stefani{3}, Liam Collins{4}, Kyle P. Kelley{4}, Stephen Jesse{4}, Neus Domingo Marimon{2}
{1}Catalan Institute of Nanoscience and Nanotechnology ICN2, Spain; {2}CNMS Oak Ridge National Laboratory, United States; {3}ICN2 Center for Nanophase Materials Sciences, Oak Ridge National Laboratory, Spain; {4}Oak Ridge National Laboratory, United States

10:45:00 AM
2382: Experimental Discovery of Structure-Property Relationships in Ferroelectric Materials via Active Learning: Polarization Switching and Ferroelectric Nonlinearities
Yongtao Liu{1}, Kyle P. Kelley{1}, Rama K. Vasudevan{1}, Hiroshi Funakubo{3}, Susan Trolier-McKinstry{2}, Maxim Ziatdinov{1}, Sergei V. Kalinin{1}
{1}Oak Ridge National Laboratory, United States; {2}Pennsylvania State University, United States; {3}Tokyo Institute of Technology, Japan

11:15:00 AM
2278: Towards Spatially Resolved Mapping of the Electrocaloric Effect with Nanoscale Resolution Using Scanning Thermal Microscopy
Olivia Baxter{2}, Amit Kumar{1}, J. Marty Gregg{1}, Raymond G.P. McQuaid{1}
{1}Centre for Nanostructured Media, Queen's University Belfast, United Kingdom; {2}Queen’s University Belfast, United Kingdom

11:30:00 AM
2233: Correlative Imaging of Ferroelectric Domain Walls
Iaroslav Gaponenko{3}, Salia Cherifi-Hertel{2}, Ulises Acevedo-Salas{2}, Nazanin Bassiri-Gharb{1}, Patrycja Paruch{3}
{1}Georgia Institute of Technology, United States; {2}Université de Strasbourg and CNRS, France; {3}University of Geneva, Switzerland

11:45:00 AM
2374: Hypothesis-Driven Automated Experiment in Scanning Probe Microscopy: Exploring the Domain Growth Laws in Ferroelectric Materials
Yongtao Liu{3}, Anna Morozovska{2}, Eugene Eliseev{1}, Kyle P. Kelley{3}, Stephen Jesse{3}, Rama K. Vasudevan{3}, Maxim Ziatdinov{3}, Sergei V. Kalinin{3}
{1}Institute for Problems of Materials Science, National Academy of Science of Ukraine, Ukraine; {2}Institute of Physics, National Academy of Science of Ukraine, Ukraine; {3}Oak Ridge National Laboratory, United States

### A2L-F: ECAPD - Multiferroics & Magnetoelectrics I
10:15:00 AM - 12:00:00 PM CEST
Room: Room 1
Chair(s): Raymond McQuaid (Queen's University Belfast, UK), Doru Lupascu (University of Duisburg-Essen)

10:15:00 AM
2500: INVITED: Multiferroic Hexagonal ABO3 Thin Films as a Versatile Quantum Materials Platform
Johanna Nordlander
Harvard University, United States
10:45:00 AM
2354: Influence of Interfaces and Sub-Unit-Cell Defects on Local Chemistry Within Multiferroic Aurivillius Phase Thin Films
Louise Colfer{4}, Nuria Bagués{3}, Eoghan O’connell{2}, Kalani Moore{6}, Michael Schmidt{4}, Brenda Long{5}, Michele Conroy{1}, David McComb{3}, Lynette Keeney{4}
{1}Imperial College London, United Kingdom; {2}Max Planck Institute for the Science of Light, University of Limerick, Ireland; {3}Ohio State University, United States; {4}Tyndall National Institute, Ireland; {5}University College Cork, Ireland; {6}University of Limerick, Direct Electron, Ireland

11:15:00 AM
2070: Weak Ferromagnetism Linked to the High-Temperature Spiral Phase of YBaCuFeO5
Jike Lyu{4}, Mickael Morin{1}, Tian Shang{3}, Maria Teresa Fernández-Diaz{2}, Marisa Medarde{5}
{1}Excelsus Structural Solutions Swiss AG, Switzerland; {2}Institut Laue Langevin, France; {3}Key Laboratory of Polar Materials and Devices, East China Normal University, China; {4}Laboratory for Multiscale Materials Experiments, Paul Scherrer Institut, Switzerland; {5}Laboratory for Multiscale Materials Experiments, Paul Scherrer Institut, 5232 Villigen PSI, Switzerland

11:30:00 AM
2144: Property Tunability Under Effective Negative Pressure by Helium Implantation
Constance Toulouse{2}, Alfredo Blázquez Martinez{1}, Sebastjan Glinšek{1}, Veronika Kovacova{1}, Jean-Nicolas Audinot{1}, Torsten Granzow{1}, Emmanuel Defay{1}, Mael Guennou{2}, Jens Kreisel{2}
{1}Luxembourg Institute of Science and Technology, Luxembourg; {2}University of Luxembourg, Luxembourg

11:45:00 AM
2285: Dielectric Properties of Ca3Mn2O7 Thin Films
{1}CF-UM-UP, Centro de Física da Universidade do Minho e da Universidade do Porto, Portugal; {2}CF-UM-UP, Universidade do Minho, Portugal; {3}CF-UM-UP, Universidade do Minho, Universidade do Porto, Portugal; {4}IFIMUP, University of Porto, Portugal; {5}Institut des Nanotechnologies de Lyon, CNRS UMR5270 ECL INSA Lyon UCBL CPE Lyon, Portugal

12:00:00 PM – 01:30:00 PM CEST
Lunch
Level +2

12:00:00 PM – 01:30:00 PM CEST
Virtual Poster Session

Plenary: Gustau Catalan
01:30:00 PM - 02:30:00 PM CEST
Room: Auditorium Ronsard
Chair(s): Alexei Gruverman (UNL)

Not Quite Ferroelectric
Gustau Catalan
Catalan Institute of Nanoscience and Nanotechnology ICN2, ICREA, Spain
### A4L-A: ISAF 1 - Domains I

**02:45:00 PM - 03:45:00 PM CEST**  
**Room:** Auditorium Ronsard  
**Chair(s):** Charlotte Cochard (University of Dundee), Hajime Nagata (Tokyo University of Science)

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<th>Time</th>
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<tr>
<td>02:45:00 PM</td>
<td><strong>2043: INVITED: Cu-Cl Boracite: An Electrostatic Question Mark</strong></td>
<td>Charlotte Cochard(6), Torsten Granzow(3), Carmen Fernandez-Posada(5), Michael Carpenter(5), Raymond G.P. McQuaid(1), Amit Kumar(1), Joseph Guy(4), Roger Whatmore(2), J. Marty Gregg(1)</td>
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<td>03:15:00 PM</td>
<td><strong>2273: Multi-Scale Modelling of Spontaneously Collapsing Nano-Domains in Barium Titanate Below Curie Temperature</strong></td>
<td>Arne Jan Klomp(2), Ruben Khachatryan(1), Theophilus Wallis(1), Anna Grünebohm(1), Karsten Albe(2)</td>
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<td>03:30:00 PM</td>
<td><strong>2383: Avalanche Criticality in LaAlO₃: the Effect of Aspect Ratio</strong></td>
<td>John Scott(1), Blai Casals(3), King-Fa Luo(1), Atta Haq(2), Davide Mariotti(2), Ekhard Salje(3), Miryam Arredondo(1)</td>
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### A4L-B: ISAF 2 - Ceramic Processing II

**02:45:00 PM - 03:45:00 PM CEST**  
**Room:** Room 5  
**Chair(s):** Barbara Malic (Institute Jozef Stefan), Mojca Otonicar (Institute Jozef Stefan)

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<tr>
<td>02:45:00 PM</td>
<td><strong>2497: INVITED: Recent Development and Understanding of Bismuth-Based High-Tc, High-Performance Piezo-/Ferroelectrics</strong></td>
<td>Zuo-Guang Ye(1), Zenghui Liu(2)</td>
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<tr>
<td>03:15:00 PM</td>
<td><strong>2357: Influence of Sintering Methods on Phase Sequence and Dielectric Properties of K0.5Na0.5NbO3 Ceramics</strong></td>
<td>Mariana Gomes(2), Rui Vilarinho(2), Rui Pinho(1), Ricardo Serrazina(1), Abilio Almeida(2), Ana Senos(1), Elísabete Costa(1), Paula Vilarinho(3), Joaquim Agostinho Moreira(2)</td>
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<td>03:30:00 PM</td>
<td><strong>2360: Piezoelectric Properties of Mechanochemically Processed BiFeO3-BaTiO3 Ceramics</strong></td>
<td>Gianni Ferrero(3), Konstantin Astafiev(3), Rasmus Lou-Møller(3), Erling Ringgaard(3), Leonardo Soares de Oliveira(4), Hugh Simons(4), Bhaskar Reddy Sudireddy(4), Astri Bjørnetun Haugen(4), Katarina Žiberna(1), Barbara Malič(2), Tadej Rojac(1)</td>
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02:45:00 PM

**2462: Study of Microstructure, Optical Behaviors of Rare Earth Doped**

Ba$_{0.85}$Ca$_{0.12}$RE$_{0.03}$Ti$_{0.90}$Zr$_{0.04}$Nb$_{0.042}$O$_3$ Ceramics (Re = Ce$^{3+}$ and Pr$^{3+}$)

Zeineb Raddaoui$^{(1)}$, Marwa Bourguiba$^{(2)}$, Pascal Marchet$^{(1)}$, Jemai Dhahri$^{(2)}$, Moez Chafra$^{(3)}$

$^{(1)}$université de limoges, France; $^{(2)}$University of Monastir, France; $^{(2)}$University of Monastir, Tunisia; $^{(3)}$University of Tunis el Manar, Tunisia

03:00:00 PM

**2429: BaTiO$_3$ Ceramics with Enhanced Properties and Structural Instability Resulted Induced by Composition, Density or Grain Size**

Liliana Mitoseriu, Leontin Padurariu, Cristina Elena Ciomaga, Lavinia Curecheriu, Nadejda Horchidan, Vlad Alexandru Lukacs

Alexandru Ioan Cuza University of Iași, Romania

03:15:00 PM

**2269: Phase Analysis During Calcination of Potassium Sodium Niobate Through in Situ X-Ray Diffraction with Bayesian Full Profile Refinement**

Rachel Broughton, Jacob Jones

North Carolina State University, United States

02:45:00 PM

**2252: Light Induced Polarization Switch Dependence on Imprint Electric Field**

Huan Tan$^{(4)}$, Gustavo Castro-Obregón$^{(1)}$, Jike Lyu$^{(5)}$, Pablo Loza-Alvarez$^{(1)}$, Florencio Sánchez$^{(3)}$, Josep Fontcuberta$^{(3)}$, Ignasi Fina$^{(2)}$

$^{(1)}$ICFO, Barcelona Institute of Science and Technology, Spain; $^{(2)}$Instituto de Ciencia de Materiales de Barcelona ICMAB-CSIC, Spain; $^{(3)}$Instituto de Ciencia de Materiales de Barcelona, Universitat Autònoma de Barcelona, Spain; $^{(4)}$Instituto de Ciencia de Materiales de Barcelona, Universitat Autònoma de Barcelona ICMAB-CSIC, Spain; $^{(5)}$Laboratory for Multiscale Materials Experiments, Paul Scherrer Institut, Switzerland

03:00:00 PM

**2379: Transfer of Photovoltaic Surface Charge Patterns to Passive Dielectric Substrates via Direct Contact with LiNbO$_3$:Fe Ferroelectric Stamps**

Carlos Sebastián-Vicente, Ángel García-Cabanes, Mercedes Carrascosa

Universidad Autónoma de Madrid, Spain

03:15:00 PM

**2146: Linear Electro-Optic Effect in Polycrystalline Bismuth Ferrite Films**

Alfredo Blázquez Martínez$^{(1)}$, Patrick Grysan$^{(1)}$, Stéphanie Girod$^{(1)}$, Veronika Kovacova$^{(1)}$, Sebastjan Glinšek$^{(1)}$, Pranab Biswas$^{(2)}$, Mael Guennou$^{(2)}$, Torsten Granzow$^{(1)}$

$^{(1)}$Luxembourg Institute of Science and Technology, Luxembourg; $^{(2)}$University of Luxembourg, Luxembourg
03:30:00 PM
**2156: Bulk Photovoltaic Effect in Hexagonal LuMnO3 Single Crystals**
Yunwei Sheng{2}, Ignasi Fina{2}, Marin Gospodinov{1}, Aaron Schankler{4}, Andrew Rappe{4}, Josep Fontcuberta{3}
{1}Institute of Solid State Physics, Bulgarian Academy of Sciences, Bulgaria; {2}Instituto de Ciencia de Materiales de Barcelona ICMAB-CSIC, Spain; {3}Instituto de Ciencia de Materiales de Barcelona, Universitat Autònoma de Barcelona, Spain; {4}University of Pennsylvania, United States

**A4L-E: PFM - Nanoelectromechanical Phenomena**
02:45:00 PM - 03:45:00 PM CEST
Room: Room 2
Chair(s): Vincent Garcia (CNRS-Thales)

02:45:00 PM
**2024: Opto-Electro-Mechanical Control of Ferroelectric Domains in Ba- and Ni-Doped KNN**
Gaurav Vats{1}, Yang Bai{3}, Jan Seidel{2}
{1}Katholieke Universiteit Leuven, Belgium; {2}University of New South Wales, Australia; {3}University of Oulu, Finland

03:00:00 PM
**2083: Revealing Nanoscale Mechanical Switching of Ferroelectric Domains in 33-200 nm Thick Sol-Gel-Grown PbZr0.2Ti0.8O3 Films**
Sergio González-Casal{1}, Xiaofei Bai{1}, Kevin Alhada-Laibabi{1}, Sara Gonzalez{1}, Bruno Canut{1}, Bertrand Vilquin{1}, Pedro Rojo-Romeo{1}, Solène Brottet{1}, David Albertini{1}, Damien Deleruyelle{1}, Matthieu Bugnet{2}, Ingrid Cañero Infante{1}, Bric{1}
{1}Institut des Nanotechnologies de Lyon, CNRS UMR5270 ECL INSA Lyon UCBL CPE Lyon, France; {2}Institut des Nanotechnologies de Lyon, CNRS UMR5270 ECL INSA Lyon UCBL CPE Lyon, China

03:15:00 PM
**2329: Enhanced Electromechanical Response in Porous GaN**
Yonatan Calahorra
Technion – Israel Institute of Technology, Israel

03:30:00 PM
**2237: Mechanical Stress Modulation of Resistance in MoS2 Junctions**
Pradeep Chaudhary{2}, Haidong Lu{2}, Michael Loes{2}, Alexey Lipatov{1}, Alexander Sinitskii{2}, Alexei Gruverman{2}
{1}South Dakota School of Mines and Technology, United States; {2}University of Nebraska-Lincoln, United States

**A4L-F: ECAPD - Multiferroics & Magnetoelectrics II**
02:45:00 PM - 03:45:00 PM CEST
Room: Room 1
Chair(s): Johanna Nordlander (Harvard University), Martin Sarott (ETH Zürich)

02:45:00 PM
**2471: INVITED: New Ways to Tune Magneto-Electric Multiferroics**
Tuhin Maity
Indian Institute of Science Education and Research Thiruvananthapuram, India
### 03:15:00 PM

**2060: Enhancing the Functionality of Integrated Magnetoelectric Devices**  
Marvin Müller{1}, Yen-Lin Huang{3}, Saül Vélez{2}, Ramamoorthy Ramesh{3}, Manfred Fiebig{1}, Morgan Trassin{1}  
{1}ETH Zürich, Switzerland; {2}Universidad Autónoma de Madrid, Spain; {3}University of California, Berkeley, United States

### 03:30:00 PM

**2458: Magnetoelectric MEMS Doubly-Clamped Resonators for Vector Magnetic Field Sensing**  
Peter Finkel{1}, Thomas Mion{1}, Margo Staruch{1}, Konrad Bussmann{1}, Samuel E. Lofland{2}  
{1}Naval Research Laboratory, United States; {2}Rowan University, United States

### 03:45:00 PM – 04:15:00 PM CEST

**Coffee Break**

**Level +2**

### A5L-A: ISAF 1 / ECAPD - Domains II

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<tr>
<th>Time</th>
<th>Session</th>
<th>Location / Chair(s)</th>
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| 04:15:00 PM   | **2406: Kinetics of Superfast Domain Walls in Single Crystals of Lithium Niobate Family**  
Andrey Akhmatkhanov, Ilya Kipenko, Alexander Esin, Maria Chuvakova, Vladimir Shur  
Ural Federal University, Russia                                                                 |
| 04:30:00 PM   | **2427: Bulk Heterogeneity in Barium Titanate Above the Curie Temperature**  
Hugh Simons{2}, Jeppe Ormstrup{1}, Thomas Olsen{2}  
{1}Stanford University, United States; {2}Technical University of Denmark, Denmark                                                                 |
| 04:45:00 PM   | **2439: Large Optical and Piezoelectric Effects Induced by Domain Reconfiguration Related to Ferroelectric Phase Transitions**  
|               | {1}Defence Science and Technology Group, Australia; {2}Electrosciences Ltd, United Kingdom; {3}I16 Beamline, United Kingdom; {4}Naval Research Laboratory, United States; {5}Rowan University, United States; {6}University of New South Wales, Australia; {7}University of Arkansas, Australia; {8}University of Sydney, Australia; {9}XMaS Beamline / European Synchrotron Radiation Facility, France                                                                 |

### 05:00:00 PM

**2085: Flexoelectricity at Deformation Twin Boundaries: Asymmetric Ferroelectric Polarization Reversal in LiNbO3 Bicrystal**  
Fangping Zhuo{3}, Enrico Bruder{3}, Bo Wang{2}, Jürgen Rödel{3}, Atsutomo Nakamura{1}, Xuefi Fang{3}  
{1}Osaka University, Japan; {2}Pennsylvania State University, United States; {3}Technische Universität Darmstadt, Germany

### A5L-B: ISAF 2 - Ceramic Processing III

<table>
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<th>Time</th>
<th>Session</th>
<th>Location / Chair(s)</th>
</tr>
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</table>
| 04:15:00 PM   | **A5L-B: ISAF 2 - Ceramic Processing III**  
04:15:00 PM - 05:15:00 PM CEST  
Room: Room 5  
Chair(s): Barbara Malic (Institute Jozef Stefan), Mojca Otonicar (Institute Jozef Stefan) |
Tuesday, June 28

04:15:00 PM
2121: Electrical and Electromechanical Properties of Bi4-xLnxTi3O12 Ceramics
Hiroshi Maiwa
Shonan Institute of Technology, Japan

04:30:00 PM
2202: Electrostrain Characterization and Microstructure Tailoring of Potassium Sodium Niobate - Based Materials
Huiqing Fan, Qifeng Quan, Yuxin Jia, Weijia Wang
Northwestern Polytechnical University, China

04:45:00 PM
2271: Piezoelectric Hardening of Lithium Sodium Niobate Ceramics by Coherent Precipitates
Changhao Zhao{3}, Shuang Gao{3}, Hans-Joachim Kleebe{3}, Xiaoli Tan{2}, Jurij Koruza{1}, Jürgen Rödel{3}
{1}Graz University of Technology, Austria; {2}Iowa State University, United States; {3}Technische Universität Darmstadt, Germany

05:00:00 PM
2426: High Concentration Sol-Gel Synthesis of BaHfxTi1-xO3 to Prepare Ceramics with Significant Piezoelectric Properties
Damien Brault{2}, Philippe Boy{1}, Franck Levassort{2}, Maxime Bavencoffe{2}
{1}CEA DAM, France; {2}GREMAN UMR 7347, University of Tours - CNRS - INSA, France

A5L-C: ISAF 3 - Structure and Properties of Ferroelectric Materials
04:15:00 PM - 05:15:00 PM CEST
Room: Room 3
Chair(s): Jürgen Roedel (Technical University of Darmstadt), Doru Lupascu (University of Duisburg-Essen)

04:15:00 PM
2482: INVITED: Can We Calculate the Electromechanical Coupling Coefficient From First Principles?
Andrew J. Bell, Joseph Hooper, Andrew Scott
University of Leeds, United Kingdom

04:45:00 PM
2380: The Correlation Between Defect Chemistry and Electrical Degradation in KNN Films
Betul Akkopru-Akgun{1}, Shibata Kenji{2}, Susan Trolier-McKinstry{1}
{1}Pennsylvania State University, United States; {2}SCIOCS Co. Ltd., Japan

05:00:00 PM
Yongtao Liu{3}, Anna Morozovska{2}, Eugene Eliseev{1}, Xiaohang Zhang{4}, Ichiro Takeuchi{4}, Maxim Ziatdinov{3}, Sergei V. Kalinin{3}
{1}Institute for Problems of Materials Science, National Academy of Science of Ukraine, Ukraine; {2}Institute of Physics, National Academy of Science of Ukraine, Ukraine; {3}Oak Ridge National Laboratory, United States; {4}University of Maryland, United States
Tuesday, June 28

**A5L-D: ISAF 4 - Optical & Thermal Interactions in Ferroelectrics II**
04:15:00 PM - 05:15:00 PM CEST
Room: Room 4
Chair(s): Laura Stoica (Thales UK), Torsten Granzow (LIST)

04:15:00 PM
**2113: High Rate Photostrictive Strain in Ferroelectrics for Ultrasonic Wave Excitation**
Weng Heng Liew{1}, Yunjie Chen{2}, Kui Yao{2}
{1}IMRE, Agency for Science, Technology and Research, Singapore; {2}IMRE, Agency for Science, Technology and Research A-STAR, Singapore

04:30:00 PM
**2037: Transparent PZT Piezoelectric Membranes for MEMS Applications**
Franklin Pavageau{1}, Christel Dieppedale{1}, Catherine Brunet-Manquat{1}, Christophe Licitra{1}, Antoine Hamelin{1}, Fabrice Casset{1}, Gwenael Le Rhun{2}
{1}CEA-Leti, France; {2}CEA-Leti, Université Grenoble Alpes, France

04:45:00 PM
**2292: Thick-Film PiezoPaint™ Based MRI Compatible Electric Field Sensor**
Lee Bradley{1}, Yusuf Yaras{1}, Dursun Korel Yildirim{3}, Dogangun Uzun{3}, Robert Lederman{3}, Ozgur Kocaturk{2}, Levent Degertekin{1}
{1}G.W. Woodruff School of Mechanical Engineering, Georgia Institute of Technology, United States; {2}Institute of Biomedical Engineering, Bogazici University, Turkey; {3}National Heart Lung and Blood Institute, National Institutes of Health, United States

05:00:00 PM
**2250: High Temperature Ferroelectric Polarization Retention in Thin Film Al0.7Sc0.3N**
Daniel Drury{1}, Keisuke Yazawa{2}, Andriy Zakutayev{2}, Brendan Hanrahan{3}, Geoff Brennecka{1}
{1}Colorado School of Mines, United States; {2}National Renewable Energy Laboratory, United States; {3}U.S. Army Combat Capabilities Development Command - Army Research Laboratory, United States

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**A5L-E: ECAPD - HFO2-based Materials & Devices I**
04:15:00 PM - 05:15:00 PM CEST
Room: Room 2
Chair(s): Giovanna Canu (CNR - Institute of Condensed Matter Chemistry and Technologies for Energy), Ignasi Fina Martinez (ICMAB-CSIC)

04:15:00 PM
**2488: INVITED: A Wholistic View on HfO2/ZrO2-Based Ferroelectric Memory Research**
Tony Schenk
Ferroelectric Memory GmbH, Germany

04:45:00 PM
**2228: Stretchable and Ultra-Flexible Ferroelectric Hf0.5Zr0.5O2 Memory Devices on a Biocompatible Platform**
Anastasia Chouprik, Vitaliy Mikheev, Maxim Spiridonov, Dmitrii Negrov
Moscow Institute of Physics and Technology, Russia

05:00:00 PM
**2232: Calculation of the Retention Loss in HfO2-Based FeRAM Devices**
Ekaterina Kondrat'Yuk, Vitaliy Mikheev, Anastasia Chouprik
Moscow Institute of Physics and Technology, Russia
**Tuesday, June 28**

**A5L-F: ECAPD - Advanced Simulation**

**04:15:00 PM - 05:15:00 PM CEST**

**Room:** Room 1  
**Chair(s):** Jorge Íñiguez (University of Luxembourg)

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**04:15:00 PM**

**2265: INVITED: On the Origin of Polarons in ABO3 Oxide Perovskites: A First-Principles Perspective**

*Philippe Ghosez*

*Physique Théorique des Matériaux, QMAT, CESAM, University of Liège, Belgium*

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**04:45:00 PM**

**2041: Origin of Long-Range Polarization Correlation Disruption in Homovalent and Heterovalent Substituted Barium Titanate: A Theoretical Study**

*Florian Mayer, Maxim Popov, Jürgen Spitaler, Marco Deluca*

*Materials Center Leoben Forschung GmbH, Austria*

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**05:00:00 PM**

**2376: Computation of Flexoelectric Coefficient on a MoS2 Monolayer with a Model of Self-Consistent Distributed Elective Charges and Dipoles**

*Yida Yang, Laurent Hirisinger, Michel Devel*

*FEMTO-ST institute, University Bourgogne Franche-Comté, CNRS, ENSMM, France*

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**05:30:00 PM – 06:30:00 PM CEST**

**Virtual Poster Session**

**Zoom**

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**A6P-G: ECAPD - Posters I**

**Room:** Level +2  
**Chair(s):** Marco Deluca (Materials Center Leoben Forschung GmbH), Giovanna Canu (CNR - Institute of Condensed Matter Chemistry and Technologies for Energy)

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**2018: First-Principle Investigations of Topological Solitons in Multiferroic Cu2OSeO3**

*Houssam Sabri, Igor Kornev*

*Université Paris-Saclay, CentraleSupélec, CNRS UMR 8580, Laboratoire SPMS, France*

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**2138: Magnetoelectric Effect in a Multiferroic Two Phase Composite of Manganese Ferrite Nanoparticles by Coupling with Ferroelectric P(VDF-TrFE) Matrix**

*Sonali Pradhan, Pratik P. Deshmukh, S.K. Majumder, Srinibas Satapathy*

*Raja Ramanna Centre for Advanced Technology, India*

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**2220: Scanning Electron Microscopy Investigations of GaFeO3 Single Crystal**

*Paweł Butkiewicz{2}, Maria Biernacka{2}, Wojciech Olszewski{2}, Dariusz Satuła{2}, Katarzyna Rečko{2}, Piotr Dziawa{1}, Krzysztof Szymański{2}*

*{1}Polish Academy of Sciences, Poland; {2}University of Białystok, Poland*

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**2312: Pulsed Laser Deposition for the Creation of Strontium Titanate Coatings**

*Vadzim Haronin{2}, Sarunas Svirskas{2}, Algirdas Selskis{1}, Robertas Grigalatis{2}, Juras Banys{2}*

*{1}FTMC State Research Institute Center for Physical Sciences and Technology, Lithuania; {2}Vilnius University, Lithuania*
2336: Structural, Ferroelectric and Magnetic Properties of Single Phase Epitaxial (1-x)Pb(Zr,Ti)O3-xPb(Fe,Nb)O3 Thin Films
Lucía Imhoff{3}, Sebastián Barolin{4}, Miguel Rengifo{2}, José Manuel Caicedo{1}, José Santiso{1}, Myriam Aguirre{5}, Marcelo Gabriel Stachiotti{3}
{1}Catalan Institute of Nanoscience and Nanotechnology ICN2, Spain; {2}INMA, Universidad de Zaragoza, Spain; {3}Instituto de Física de Rosario IFIR - Universidad Nacional de Rosario - CONICET, Argentina; {4}Instituto de Física Rosario, IFIR CONICET-UNR, Argentina; {5}Instituto de Nanociencia y Materiales de Aragón, Universidad de Zaragoza-INMA-LMA, Spain

2344: Optimisation of Direct Liquid Injection Chemical Vapour Deposition Parameters for the Growth of Epitaxial Sub-10 nm Aurivillius Phase Thin Films
Debismita Dutta{3}, Louise Colfer{2}, Michael Schmidt{2}, Brendan Sheehan{2}, Jonathan Peters{1}, Lewys Jones{1}, Lynette Keeney{2}
{1}Trinity College Dublin, Ireland; {2}Tyndall National Institute, Ireland; {3}Tyndall National Institute, University College Cork, Ireland

2404: Dielectric Investigations of Multidomain Ferroelectric / Dielectric Superlattices
Mariem Gharbi{2}, Alain Sylvestre{1}, Jean Luc Delliis{2}, Françoise Lemarrec{2}, Nathalie Lemée{2}
{1}G2Elab, Université Grenoble Alpes, France; {2}University of Picardy Jules Verne, France

2410: Predictions of Most Stable Cation Distributions Within Layered Multiferroic Bi6TixFe3-yMnzO18 Systems
Florentino Silva, Mohammad Alam, Lynette Keeney, Michael Nolan
Tyndall National Institute, Ireland

2414: Contactless Local Domain Patterning of [001]c-Poled PMN-39PT Single Crystal by Electron Irradiation
Dmitry Chezganov{1}, Evgenii Vlasov{1}, Lubov Gimadeeva{1}, Elena Pashnina{1}, Pavel Zelenovskiy{1}, Evgeniy Greshnyakov{1}, Xin Liu{2}, Ye Zhao{2}, Qingyuan Hu{2}, Xiaoyong Wei{2}, Vladimir Shur{1}
{1}Ural Federal University, Russia; {2}Xi’an Jiaotong University, China

2417: Formation of Broad Domain Boundary During Ion Beam Irradiation in SBN Single Crystals
Vera Shikhova{2}, Alla Slautina{2}, Dmitry Chezganov{2}, Maxim Nebogatikov{2}, Andrey Akhmatkhanov{2}, Lyudmila Ivleva{1}, Vladimir Shur{2}
{1}Prokhorov General Physics Institute, Russia; {2}Ural Federal University, Russia

2418: First Observation of the Domain Kinetics in Calcium Orthovanadate Single Crystals
Ekaterina Shishkina{2}, Vladimir Yuzhakov{2}, Maria Chuvakova{2}, Andrey Akhmatkhanov{2}, Maxim Nebogatikov{2}, Eduard Linker{2}, Lyudmila Ivleva{1}, Vladimir Shur{2}
{1}Prokhorov General Physics Institute, Russia; {2}Ural Federal University, Russia

2420: Structural and Dielectric Properties of CoFe2O4\BaTiO3 Bilayers Deposited Over Highly Doped Si (001) Substrates
João Oliveira{1}, Bruna Machado Da Silva{2}, Jorge Mendes{1}, Bernardo Almeida{1}
{1}CF-UM-UP, Universidade do Minho, Portugal; {2}CF-UM-UP, Universidade do Minho, Universidade do Porto, Portugal

2435: Effect of Electric Field on the Ferromagnetic/Ferroelectric Interface in Fe/PMN-PT Heterostructures
Michelle Rodrigues{2}, Sergey Basov{2}, Ivan Madarevic{3}, Atefeh Jafari{1}, Ilya Sergeev{1}, Olaf Leupold{1}, Margriet Van Bael{2}, André Vantomme{2}, Kristiaan Temst{2}
{1}Deutsches Elektronen-Synchrotron DESY, Germany; {2}Katholieke Universiteit Leuven, Belgium; {3}Katholieke Universiteit Leuven, imec, Belgium
### A6P-H: ISAF 1 Posters: Fundamentals of Ferroelectrics & Multiferroic Materials

**Room:** Level +2  
**Chair(s):** Shujun Zhang (University of Wollongong)

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| 2004: | Modelling Multiferroic-Metal Superlattices: A Multiscale Approach | Ran Xu{2}, Charles Paillard{1}  
{1}Laboratoire SPMS, CentraleSupélec, CNRS-UMR8580, Université Paris-Saclay, France; {2}SPMS-UMR CNR50-5 CNRS-CentraleSupelec, France |
| 2026: | Indirect and Direct Electrocaloric Effect Studies of (Na0.5Bi0.5)TiO3 - BaTiO3 Perovskite Ceramics Modified by Bi(Mg0.5Ti0.5)O3 | Sobhan Mohammad Fathabad{2}, Vladimir V. Shvartsman{2}, Ekaterina D. Politova{1}, Galina M. Kaleva{1}, Doru C Lupascu{2}  
{1}Semenov Federal Research Center for Chemical Physics, RAS, Karpov Institute of Physical Chemistry, Russia; {2}University of Duisburg-Essen, CENIDE, Germany |
| 2040: | Strain-Modulated Ferroelectricity in SrMnO3 Thin Films via In-Situ Strain Engineering | Seong Min Park{1}, Chang Jae Yoon{1}, Gophinathan Anoop{1}, Yeong Jun Son{1}, Tae Yeon Kim{1}, Young Min Kim{2}, Ji Young Jo{1}  
{1}Gwangju Institute of Science and Technology GIST, Korea; {2}Sungkyunkwan University, Korea |
| 2066: | Probing Band-to-Band Transitions in BiVO4 Single Crystals by Resonant Raman Spectroscopy | Christina Hill{2}, Georgy Gordeev{1}, Stephanie Reich{1}, Mael Guennou{3}  
{1}Freie Universität Berlin, Germany; {2}Luxembourg Institute of Science and Technology, Luxembourg; {3}University of Luxembourg, Germany |
| 2077: | In-Situ Monitoring of Polarization Dynamics During Layered-Ferroelectrics Epitaxial Design | Ipek Efe, Elzbieta Gradauskaite, Manfred Fiebig, Morgan Trassin  
ETH Zürich, Switzerland |
| 2092: | Bulk Photovoltaic Effect of Polar Interfaces of Quantum Paraelectric SrTiO3-Based Heterostructures | Hangbo Zhang, Marin Alexe  
University of Warwick, United Kingdom |
| 2137: | Soft Mode and Low-Frequency Lattice Dynamics of BaZrO3 Single Crystals | Cosme Milesi-Braault{4}, Constance Toulouse{3}, Frédéric Bourdarot{2}, Andrea Piovano{2}, Alexei Bossak{1}, Mael Guennou{3}  
{1}ESRF European Synchrotron Radiation Facility, France; {2}Institut Laue Langevin, France; {3}University of Luxembourg, Luxembourg; {4}University of Luxembourg, Luxembourg |
| 2191: | Anomalous AC-Bias Mediated Ferroelectric Switching Behaviour in Relaxor SBN | Niyorjyoti Sharma{3}, Nathan Black{3}, Eftihia Barnes{2}, Brian J. Rodriguez{4}, J. Marty Gregg{1}, Raymond G.P. McQuaid{1}, Amit Kumar{1}  
{1}Centre for Nanostructured Media, Queen’s University Belfast, United Kingdom; {2}Los Alamos National Laboratory / Kyungpook National University, United States; {3}Queen’s University Belfast, United Kingdom; {4}University College Dublin, Ireland |
| 2229: | Resonant Raman Scattering in SmFeO3 | Georgy Gordeev{1}, Stephanie Reich{1}, Mael Guennou{2}  
{1}Freie Universität Berlin, Germany; {2}University of Luxembourg, Luxembourg |
2261: Improving Bending-Mode Response of Piezoceramic Actuators Under High Electric Field by Modification of Material Parameters
Sumit Sumit{1}, Sanjiv R Kane{3}, Anil Kumar Sinha{1}, Tapas Ganguli{1}, Rahul Shukla{2}
{1}Homi Bhabha National Institute, India; {2}Raja Ramanna Centre for Advanced Technology / Homi Bhabha National Institute, India; {3}Synchrotrons Utilization Section, Raja Ramanna Centre for Advanced Technology, India

2270: Dynamics and Orientations of Water Molecules Linked to Their Low-Temperature Ferroelectric Ordering in the Crystal Lattice of Hydrated Beryl
Filip Kadlec{2}, Martin Adamec{2}, Vojtěch Chlan{1}
{1}Charles University, Czech Rep.; {2}FZU Institute of Physics of the Czech Academy of Sciences, Czech Rep.

2293: Fabrication of Flexible Nanogenerators for Wearable Electronic Applications Based on Bi0.5(Na1-xKx)0.5TiO3 Relaxor Ferroelectric Ceramics
Sam Yeon Cho, Eun-Young Kim, Sang Don Bu
Jeonbuk National University, Korea

2309: Permittivity Boosting in the Nb+X Co-Doped Rutile-Type TiO2 (X = In, Ga, Al)
Shotakakimoto{2}, Hiroto Murata{1}, Koji Kimura{1}, Koichi Hayashi{1}, Kazuhiko Deguchi{2}, Hiroki Taniguchi{2}
{1}Nagoya Institute of Technology, Japan; {2}Nagoya University, Japan

2320: Unusual Features of Lattice Dynamics in Lawsonite Related to its Phase Transitions: A Study Using Broad-Band Dielectric Spectroscopy
Christelle Kadlec, Dmitriy Nuzhnyy, Jan Petzel, Maxim Savinov, Stanislav Kamba, Filip Kadlec
FZU Institute of Physics of the Czech Academy of Sciences, Czech Rep.

2355: Structures and Ferroelectric Properties of Zr- and La- Doped HfO2 Films Deposited Epitaxially on (110)-Oriented Perovskite Substrates
Peijie Jiao, Jiayi Li, Zhongnan Xi, Xiaoyu Zhang, Jian Yang, Yurong Yang, Yu Deng, Di Wu
Nanjing University, China

2367: Growth and Characterization of PMN-PT Thin Films Over Si (100) Substrate Towards MEMS Applications
Arora Diksha, Pradeep Kumar, Davinder Kaur
Indian Institute of Technology, Roorkee, India

2378: Multiferroic Quantum Criticality in (Eu,Ba,Sr)TiO3 System
Dalibor Repček{3}, Petr Proschek{2}, Jiří Pospíšil{2}, Maxim Savinov{3}, Jan Prokleška{2}, Martin Kachlík{1}, Stanislav Kamba{3}
{1}CEITEC-Central European Institute of Technology, Brno University of Technology, Czech Rep.; {2}Charles University, Czech Rep.; {3}FZU Institute of Physics of the Czech Academy of Sciences, Czech Rep.

2390: Anti-Ferroelectric Ordering of Confined Water Molecules
Antonín Klíč
FZU Institute of Physics of the Czech Academy of Sciences, Czech Rep.

2438: An Energy-Based Model for Ferroelectric Ceramics
Chaimae Babori{1}, Mahmoud Barati{2}, Laurent Daniel{3}
{1}Laboratoire de Génie Electrique et Electronique de Paris, France; {2}Université Paris-Saclay, CentraleSupélec, Sorbonne Université, GeePs - IPSA, France; {3}Université Paris-Saclay, CentraleSupélec, GeePs, Sorbonne Université, France
2408: Signatures of Critical Phenomena in Quantum Paraelectric Ensemble of Nano-Confined Polar Water Molecules
{1}Charles University, Czech Rep.; {2}FZU Institute of Physics of the Czech Academy of Sciences, Czech Rep.; {3}Institute of Geology and Mineralogy, Russian Academy of Sciences, Russia; {4}Moscow Institute of Physics and Technology, Russia; {5}Physikalisches Institut, Universität Stuttgart, Germany

2158: Magnetoelectric Response and Internal Friction in Two-Layer Ceramic Composites Based on Mn0.4Zn0.6Fe2O4 Magnetostrictor and PbZr0.53Ti0.47O3 Piezoelectric
Alexandr Kalgin{2}, Valeria Zommer{1}, Andrey Lun{2}
{1}Voronezh State Technical University, Russia; {2}Voronezh State University, Russia

2159: Influence of Interaction Between Layers on Phase Transformations and Dielectric Response in Ferroelectric Superlattices
Boris Darinskii{2}, Alexander Sidorkin{2}, Alexander Sigov{1}, Andrey Lun{2}
{1}MIREA - Russian Technological University, Russia; {2}Voronezh State University, Russia

A6P-J: ISAF 2 - Material Processing
Room: Level +2
Chair(s): Neamul Khansur (Friedrich-Alexander-Universität Erlangen-Nürnberg)

2094: Lead-Free Barium Tin Titanate Based Solid Solutions as Energy Storage Materials
Eva Kröll{1}, Vladimir V. Shvartsman{2}, Doru C Lupascu{2}
{1}University of Duisburg-Essen, Germany; {2}University of Duisburg-Essen, CENIDE, Germany

2096: Phosphate Bonded BaTiO3 – CoFe2O4 Multiferroic Composites: Comparison of 2-2 Vs 3-0 Connectivity
Artjom Plyushch{5}, Daniil Lewin{2}, Aliaksei Sokal{1}, Robertas Grigalaitis{5}, Vladimir V. Shvartsman{3}, Jan Macutkevič{5}, Soma Salamon{2}, Heiko Wende{2}, Konstantin Lapko{1}, Polina Kuzhir{4}, Doru C Lupascu{3}, Juras Banys{5}
{1}Belarusian State University, Belarus; {2}University of Duisburg-Essen, Germany; {3}University of Duisburg-Essen, CENIDE, Germany; {4}University of Eastern Finland, Finland; {5}Vilnius University, Lithuania

2116: Aqueous Deposition of Lead-Free Piezoelectric Thin-Films
Ahmed Mohammed, Stuart R. Burns, Mohsen Mahmoudvand, Michelle Dolgos
University of Calgary, Canada

2197: Optimisation of Uniaxial Hot Pressing Conditions for the Solid State Crystal Growth of PMN-PT
Ashleigh Buck, Andrew J. Bell
University of Leeds, United Kingdom

2275: Morphology and Performance Characterization of Cu-Pt-IPMC Driven by Different Ions
Jiahua Li{2}, Aifen Tian{2}, Xixi Wang{2}, Zhengxin Zhai{2}, Dongsheng Zhang{1}, Huiling Du{2}
{1}Xi’an Jiaotong university, China; {2}Xi’an University of Science and Technology, China

2282: Preparation of Biomorphic IPMC and its Application in Bionic Soft Robot Actuators
Aifen Tian{2}, Jiahua Li{2}, Zhengxin Zhai{2}, Xinrong Zhang{1}, Huiling Du{2}
{1}State Key Laboratory of Road Construction Technology and Equipment, MOE, Chang’an University, China; {2}Xi’an University of Science and Technology, China
2305: Dielectric and Piezoelectric Characterization of Yb-Doped Sodium Bismuth Titnate Thick Films Prepared by Tape-Casting Technique
Tomas Kudrevičius{2}, Artyom Plyushch{2}, Sarunas Svirskas{2}, Marija Dunce{1}, Eriks Birks{1}, Juras Banys{2}
{1}Institute of Solid State Physics, University of Latvia, Latvia; {2}Vilnius University, Lithuania

2333: Effects of Starting Material Nb2O5 for Reaction and Sinterability of (K0.5 Na0.5)NbO3 Ceramics
Shumpei Tomita, Yuka Takagi, Hajime Nagata
Tokyo University of Science, Japan

2364: Study of Mechanical, Piezoelectric and Magnetodielectric Properties of AlN/Ni-Mn-In Heterostructure Towards MEMS Device Applications
Pradeep Kumar{2}, Jitendra Singh{1}, Davinder Kaur{2}
{1}Central Electronics Engineering Research Institute, India; {2}Indian Institute of Technology, Roorkee, India

2401: Epitaxial Growth of Piezoelectric KNbO3 Thin Films Using MOCVD Process
Ishamol Labbaveettil Basheer{4}, Nishant Peddagopu{5}, Francesca Lo Presti{6}, Merieme Oubahaz{3}, Vincent Astié{1}, Jean-Manuel Decams{1}, Samuel Margueron{2}, Graziella Malandrino{6}, Ausrine Bartasyte{4}
{1}Annealsys, France; {2}FEMTO-ST Institute, Université de Bourgogne Franche-Comté, France; {3}FEMTO-ST institute, University Bourgogne Franche-Comté, France; {4}Institut FEMTO-ST, Université de Bourgogne Franche-Comté, France; {5}Universita Catania, and INSTM UdR Catania, Italy; {6}Università Degli Studi di Catania and INSTM UdR Catania, Italy

2416: Formation of Domain Rays in Extremely Low Fields in Lithium Niobate Crystals Modified by Soft Proton Exchange
Evgeniy Savelyev{2}, Andrey Akhmatkhanov{2}, Evgeniy Greshnyakov{2}, Alexander Abramov{2}, Hervé Tronche{1}, Florent Doutre{1}, Tomaso Lunghi{1}, Pascal Baldi{1}, Maksim Neradovskiy{1}, Vladimir Shur{2}
{1}Université Côte d’Azur, France; {2}Ural Federal University, Russia

2430: Investigating the Role of Nanopowders Assembly During the Pressing Step. Comparative Analysis of BaTiO3 Ceramics Produced from Cuboidal and Spherical Nanoparticles
Radu Stefan Stirbu{1}, Leontin Padurariu{1}, Lavinia Curecheriu{1}, Vlad Alexandru Lukacs{1}, Maria Teresa Buscaglia{3}, Oana Condurache{1}, Gabriel Caruntu{2}, Liliana Mitoseriu{1}
{1}Alexandru Ioan Cuza University of Iaşi, Romania; {2}Central Michigan University, United States; {3}CNR ICMATE, Italy; {4}Jožef Stefan Institute, Slovenia

A6P-K: PFM - Domains & Domain walls
Room: Level +2
Chair(s): Brian Rodriguez (University College Dublin)

2124: Investigation of Micro and Nano Objects by Piezoresponse Force Microscopy
Hana Uršič, Darko Makovec, Marjeta Macek, Zouhair Hanani
Institut Jožef Stefan, Slovenia

2295: Exploration of Polar Vortices in Ferroelectric Bi2WO6 Thin Films
Yong-Jun Kwon, Youngki Yeo, Chan-Ho Yang
Korea Advanced Institute of Science and Technology, Korea

2296: Ferroelectric Nanobubble Domains Induced by Dynamic Forces
Jaegyu Kim, Youngki Yeo, Chan-Ho Yang
Korea Advanced Institute of Science and Technology, Korea
2385: Insulating Domain Walls for Colossal Dielectric Constants
Lima Zhou(2), Donald M. Evans(2), Lukas Puntigam(2), Markus Altthaler(2), Dennis Meier(1), István Kézsmárki(2), Stephan Krohns(2)
(1)Norwegian University of Science and Technology, Norway; (2)University of Augsburg, Germany

2409: Periodical Domain Patterning in the Ion Sliced Lithium Niobate Thin Films with Thick Dielectric Layer
Boris Slautin(2), Houbin Zhu(1), Vladimir Shur(2)
(1)Jinan Jingzheng Electronics Co. Ltd., China; (2)Ural Federal University, Russia

2412: Decay of Domains with Charged Walls Created by Local Switching on Nonpolar Cut of MgO Doped LiNbO3 Single Crystal
Yury Alikin, Anton Turygin, Denis Alikin, Mikhail Kosobokov, Vladimir Shur
Ural Federal University, Russia

2419: Evolution of the Domain Shape During Local Switching in Triglycine Sulfate Crystals
Anton Turygin(1), Mikhail Kosobokov(1), Olga Golitsyna(2), Sergey Drozhdin(2), Vladimir Shur(1)
(1)Ural Federal University, Russia; (2)Voronezh State University, Russia
## Technical Program: Wednesday, June 29

### Plenary: Barbara Malic
08:15:00 AM - 09:15:00 AM CEST  
**Room:** Auditorium Ronsard  
**Chair(s):** Andrew Bell (Leeds University)

**Microstructure: Fingerprint of Processing, Clue to Unraveling the Functional Properties of Ferroelectric Ceramics**  
Barbara Malič  
Jožef Stefan International Postgraduate School, Jožef Stefan Institute, Slovenia

### B2L-A: ISAF 1 - Quantum Paraelectrics & Relaxors
09:30:00 AM - 10:30:00 AM CEST  
**Room:** Auditorium Ronsard  
**Chair(s):** Stanislav Kamba (FZU - Institute of Physics of the Czech Academy of Sciences), Elena Buixaderas (Institute of Physics, Czech Academy of Science)

#### 09:30:00 AM

**2190: Thz-Field-Induced Transient Polarization and Magnetization in Quantum Paraelectric KTaO3**  
Christelle Kadlec{1}, Filip Kadlec{1}, André Maia{1}, Sergey Kovalev{2}, Jan-Christoph Deimert{2}, Igor Ilyakov{2}, Stanislav Kamba{1}  
{1}FZU Institute of Physics of the Czech Academy of Sciences, Czech Rep.; {2}Helmholz Zentrum Dresden-Rossendorf, Germany

#### 09:45:00 AM

**2262: Proving Ferroelectricity and Tetragonality in (K,Li)TaO3 Single Crystals by Raman Scattering**  
Elena Buixaderas{1}, Iegor Rafalovskyj{1}, Dalibor Repček{1}, Maxim Savinov{1}, Jan Petzelt{1}, Zbigniew Trybula{2}  
{1}FZU Institute of Physics of the Czech Academy of Sciences, Czech Rep.; {2}Institute of Molecular Physics, Polish Academy of Sciences, Poland

#### 10:00:00 AM

**2264: Disorder, Polarization and Dynamics in Tetragonal Tungsten Bronze SrxBa1-xNb2O6**  
Elena Buixaderas, Petr Ondrejkovič, Marek Pasčiak  
FZU Institute of Physics of the Czech Academy of Sciences, Czech Rep.

### B2L-B: ISAF 2 - Basic Science & New Materials I
09:30:00 AM - 10:30:00 AM CEST  
**Room:** Room 5  
**Chair(s):** Wesley Surta (University of Liverpool), Morgan Trassin (ETH Zürich)

#### 09:30:00 AM

**2467: INVITED: Key Roles of Interface and Domain in BNT Based Lead-Free Piezoelectric Thin Films**  
Gang Niu{2}, Jinyan Zhao{2}, Zhe Wang{2}, Nan Zhang{2}, Zuo-Guang Ye{1}, Wei Ren{2}  
{1}Simon Fraser University, Canada; {2}Xi’an Jiaotong University, China
Wednesday, June 29

10:00:00 AM
2499: YOUNG INVESTIGATOR (INVITED): Maximum Entropy Method for Identifying Disordered Displacements in Relaxors
T. Wesley Surta{2}, John B. Claridge{2}, Andrew J. Bell{1}, Matthew J. Rosseinsky{2}
{1}University of Leeds, United Kingdom; {2}University of Liverpool, United Kingdom

10:15:00 AM
2022: Giant Electrostriction Enhanced by Substitutions in La2Mo2O9 Anionic Conductors
Jiacheng Yu{1}, Abdelali Zaki{3}, Omar Ibder{1}, Nicolas Guiblin{1}, Philippe Lacorre{3}, Pierre-Eymeric Janolin{2}
{1}CentraleSupélec, France; {2}Laboratoire SPMS, CentraleSupélec, CNRS-UMR8580, Université Paris-Saclay, France; {3}University of Le Mans, France

B2L-C: ISAF 3 - Structure Characterization & Properties of Lead-free Ferroelectrics I
09:30:00 AM - 10:30:00 AM CEST
Room: Room 3
Chair(s): Ahmad Safari (Rutgers University)

09:30:00 AM
2011: INVITED: On the Nature of the Critical Compositions of Na0.5Bi0.5TiO3-Based Lead-Free Piezoelectrics
Gobinda Das Adhikary, Rajeev Ranjan
Indian Institute of Science, Bangalore, India

10:00:00 AM
2023: Stress-Temperature Phase Diagram of Lead-Free (1-x)Ba(Zr0.2Ti0.8)O3-x(Ba0.7Ca0.3)TiO3
Ahmed Gadelmawla{1}, David Dobesh{1}, Udo Eckstein{1}, Oliver Grübl{2}, Matthias Ehmke{1}, Rita Cicconi{1}, Neamul Hayet Khansur{1}, Dominique de Ligny{1}, Kyle Grant Webber{1}
{1}Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany; {2}Purdue University, United States

10:15:00 AM
2033: Quantification and Mapping of Ferroelectric/Ferroelastic Nanotwin Variants in the Bulk of (Ba,Ca)(Zr,Ti)O3
Jan Schultheiß{2}, Lukas Porz{4}, Lalitha Kodumudi Venkataraman{4}, Marion Höfling{3}, Can Yildirim{1}, P. Cook{1}, Carsten Detlefs{1}, Semën Gorfman{5}, Jürgen Rödel{4}, Hugh Simons{3}
{1}ESRF European Synchrotron Radiation Facility, France; {2}Norwegian University of Science and Technology, Norway; {3}Technical University of Denmark, Denmark; {4}Technische Universität Darmstadt, Darmstadt, Germany; {5}Tel Aviv University, Israel

B2L-D: ISAF 3 - Structure Characterization & Properties - Relaxor Ferroelectrics I
09:30:00 AM - 10:30:00 AM CEST
Room: Room 4
Chair(s): Kanghyun Chu (EPFL-Goup for Ferroelectrics and Functional Oxides), Ana Gągor (Institute of Low Temperature and Structure Research, Polish Academy of Sciences)

09:30:00 AM
2095: INVITED: Processing of Lead-Free Perovskite Relaxor Materials for High Power Applications
Klaus Reichmann, Christian Maier
Graz University of Technology, Austria

10:00:00 AM
2090: Large Strain Response at Low Driving Field in Ferroelectric/Relaxor Lead-Free Piezoelectric Composite
Ky-Nam Pham, Minh Hai Le
Center for Structures and Materials, Viettel Aerospace Institute - Viettel Group, Vietnam
Wednesday, June 29

10:15:00 AM
2160: In Situ Electric-Field-Induced Transition from Non-Ergodic Relaxor to Ferroelectric State in BiFeO3-xSrTiO3
Leonardo Oliveira{4}, Jeppe Ormstrup{4}, Marta Majkut{1}, Maja Makarovic{2}, Tadej Rojac{2}, Julian Walker{3}, Hugh Simons{4}
{1}ESRF European Synchrotron Radiation Facility, France; {2}Jožef Stefan Institute, Slovenia; {3}Norwegian University of Science and Technology, Norway; {4}Technical University of Denmark, Denmark

B2L-E: PFM - Ionic Conductors & Surface Phenomena
09:30:00 AM - 10:30:00 AM CEST
Room: Room 2
Chair(s): Andrei Kholkin (University of Aveiro)

09:30:00 AM
2493: INVITED: Anisotropic Ionic Conduction in van der Waals Ferroelectrics
Pankaj Sharma
University of New South Wales, Australia

10:00:00 AM
2025: Nanoscale Reduction Phenomena in Perovskite Oxides
Christian Rodenbücher{1}, Kristof Szot{2}, Carsten Korte{1}
{1}Forschungszentrum Jülich GmbH, Germany; {2}University of Silesia, Poland

10:15:00 AM
2218: Probing the Behaviour of Surface Water and Ferroelectric PbTiO3 Thin Films as a Function of Relative Humidity and Temperature
Loïc Musy, Céline Lichtensteiger, Christian Weymann, Iaroslav Gaponenko, Patrycja Paruch
University of Geneva, Switzerland

B2L-F: ECAPD - Piezoelectric & Optical Properties
09:30:00 AM - 10:30:00 AM CEST
Room: Room 1
Chair(s): Lynette Keeney (Tyndall National Institute)

09:30:00 AM
2474: INVITED: Photostrictive PZT Thin Film Based-Microdevices
Sylvia Matzen, Stéphane Gable, Komalika Rani, Loic Guillemot, Thomas Maroutian, Guillaume Agnus, Philippe Lecoeur
Center for Nanoscience and Nanotechnology, Université Paris-Saclay, France

10:00:00 AM
2258: INVITED: Structure and Properties of 2D Piezoelectric Assemblies of Diphenylalanine
Pavel Zelenovskii{4}, Denis Alikin{6}, Konstantin Romanyuk{3}, Vladislav Slabov{3}, Michelle S. Liberato{5}, Wendel A. Alves{2}, Svitlana Kopyl{3}, Andrei Kholkin{1}
{1}CICECO - Aveiro Institute of Materials, University of Aveiro, Ural Federal University, Portugal; {2}Federal University of ABC, Brazil; {3}University of Aveiro, Portugal; {4}University of Aveiro and Ural Federal University, Portugal; {5}University of São Paulo, Brazil; {6}Ural Federal University, Russia

10:30:00 AM – 11:00:00 AM CEST
Coffee Break
Level +2
### B3L-A: ISAF 1 - Defect Engineering
**11:00:00 AM - 12:30:00 PM CEST**

**Room:** Auditorium Ronsard  
**Chair(s):** Stanislav Kamba (FZU - Institute of Physics of the Czech Academy of Sciences), Elena Buixaderas (Institute of Physics, Czech Academy of Science)

#### 11:00:00 AM
**2050: Origin of Relaxor Behavior in Barium Titanate-Based Perovskites**
Marco Deluca{4}, Vignaswaran Veerapandiyan{4}, Maxim Popov{4}, Florian Mayer{4}, Jürgen Spitaler{4}, Sarunas Svirskas{7}, Vidmantas Kalendra{7}, Jonas Lins{6}, Giovanna Canu{1}, Maria Teresa Buscaglia{1}, Klaus Reichmann{3}, Marek Pasčiak{2}, Juras Banys{1}  
{1}CNR ICMATE, Italy; {2}FZU Institute of Physics of the Czech Academy of Sciences, Czech Rep.; {3}Graz University of Technology, Austria; {4}Materials Center Leoben Forschung GmbH, Austria; {5}Technical University Delft, Netherlands; {6}Technische Universität Darmstadt, Germany; {7}Vilnius University, Lithuania

#### 11:15:00 AM
**2222: Induced and Innate Defects in Ferroelectrics and Their Effects on Switching Dynamics**
Ralph Bulanadi{3}, Kumara Cordero-Edwards{3}, Philippe Tückmantel{3}, Sahar Saremi{1}, Giacomo Morpurgo{3}, Qi Zhang{4}, Lane W. Martin{2}, Valanoo Nagarajan{4}, Patrycja Paruch{3}  
{1}University of California, Berkeley, United States; {2}University of California, Berkeley, Lawrence Berkeley National Laboratory, United States; {3}University of Geneva, Switzerland; {4}University of New South Wales, Australia

#### 11:30:00 AM
**2009: Improving Ferroelectrics by Stable Defect Dipoles**
Zechao Li{2}, Charles Paillard{3}, Pascal Chretien{2}, Mariana Stefan{1}, Pierre-Eymeric Janolin{3}  
{1}Atomic Structures and Defects in Advanced Materials Laboratory, Romania; {2}CentraleSupélec, France; {3}Laboratoire SPMS, CentraleSupélec, CNRS-UMR8580, Université Paris-Saclay, France

#### 11:45:00 AM
**2362: A New Phase-Field Model for Polycrystalline Ferroelectricity with Phase-Coexistence**
Ling Fan, Walter Werner, Daniel Schneider, Manuel Hinterstein, Swen Subotić, Britta Nestler  
Institute of Applied Materials, Karlsruhe Institute of Technology, Germany

### B3L-B: ISAF 2 - Basic Science & New Materials II
**11:00:00 AM - 12:30:00 PM CEST**

**Room:** Room 5  
**Chair(s):** Wesley Surta (University of Liverpool), Morgan Trassin (ETH Zürich)

#### 11:00:00 AM
**2058: YOUNG INVESTIGATOR (INVITED): Interfacial Stabilization of Homochiral Ferroelectric Domain Walls in BiFeO3**
Elzbieta Gradauskaitė{1}, Quintin Meier{3}, Natascha Gray{1}, Marco Campanini{2}, Marta Rossell{2}, Manfred Fiebig{1}, Morgan Trassin{1}  
{1}ETH Zürich, Switzerland; {2}Swiss Federal Laboratories for Materials Science and Technology EMPA, Switzerland; {3}Université Grenoble Alpes, CEA, France
Wednesday, June 29

11:15:00 AM

**2405: Structure-Property Relationships for Piezoelectricity in Zn/Cd Metal Organic Frameworks**

Srinidhi Mula{1}, Lorenzo Dona{2}, Bartolomeo Civalleri{2}, Monique van der Veen{1}

{1}Technical University Delft, Netherlands; {2}University of Torino, Italy

11:30:00 AM

**2324: Anhysteretic Measurements of Polarization and Strain in Soft PZT Ceramic**

Mahmoud Barati{1}, Valentin Segouin{2}, Laurent Daniel{2}

{1}Université Paris-Saclay, CentraleSupélec, Sorbonne Université, GeePs - IPSA, France; {2}Université Paris-Saclay, CentraleSupélec, GeePs, Sorbonne Université, France

11:45:00 AM


Andrei Ushakov{2}, Qingyuan Hu{3}, Xin Liu{1}, Zhuo Xu{1}, Xiaoyong Wei{3}, Vladimir Shur{2}

{1}Electronic Materials Research Laboratory, Key Lab of Education Ministry, Xi’an Jiaotong University, China; {2}Ural Federal University, Russia; {3}Xi’an Jiaotong University, China

12:00:00 PM

**2514: INVITED: Nanostructural Design for New Bulk Photovoltaic Materials Beyond Conventional Ferroelectricity**

Yun Liu

The Australian National University, Australia

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**B3L-C: ISAF 3 - Structure Characterization & Properties of Lead-free Ferroelectrics II**

11:00:00 AM - 12:30:00 PM CEST

**Room:** Room 3

**Chair(s):** Klaus Reichmann (Graz University of Technology), Mojca Otonicar (Institute Jozef Stefan)

11:00:00 AM

**2117: YOUNG INVESTIGATOR (INVITED): Structural Mechanisms Governing Thermal Depoling in Lead-Free Na0.5Bi0.5TiO3-Based Piezoceramics**

Gobinda Das Adhikary, Rajeev Ranjan

Indian Institute of Science, Bangalore, India

11:15:00 AM

**2153: The Effect of Magnesium Doping on Barium Titanate - Sodium Niobate Solid Solutions**

Yongbo Fan, Ge Wang, Xinzhen Wang, Ian Reaney

University of Sheffield, United Kingdom

11:30:00 AM

**2086: High-Temperature Plastic Deformation of BaTiO3 Single Crystals**

Marion Höfling{3}, Fangping Zhuo{4}, Shuang Gao{4}, Lukas Porz{2}, Michael Scherer{4}, Jurij Koruza{1}, Hugh Simons{3}, Jürgen Rödel{4}

{1}Graz University of Technology, Austria; {2}Norwegian University of Science and Technology, Norway; {3}Technical University of Denmark, Denmark; {4}Technische Universität Darmstadt, Germany

11:45:00 AM

**2061: Nanodomain Structure and Charged Domain Walls in Single Crystal BiFeO3**

Wanbing Ge, Richard Beanland, Marin Alexe, Ana M. Sanchez

University of Warwick, United Kingdom
Wednesday, June 29

B3L-D: ISAF 3 - Structure Characterization & Properties - Relaxor Ferroelectrics II
11:00:00 AM - 12:30:00 PM CEST
Room: Room 4
Chair(s): Kanghyun Chu (EPFL-Goup for Ferroelectrics and Functional Oxides), Ana Gągor (Institute of Low Temperature and Structure Research, Polish Academy of Sciences)

11:00:00 AM
2188: Influence of Quenching on the Relaxor-Ferroelectric Transition in Na1/2Bi1/2TiO3-BaTiO3
Andreas Wohninsland{2}, Ann-Katrin Fetzer{2}, Rachel Broughton{1}, Jacob Jones{1}, K. V. Lalitha{2}
{1}North Carolina State University, United States; {2}Technische Universität Darmstadt, Germany

11:15:00 AM
2055: Composition-Dependent Dielectric, Ferroelectric, and Piezoelectric Properties of Lead-Free (Ba0.85Ca0.15)(Ti0.92-xSnx)Zr0.08)O3
Tasmia Zaman, Pramod Koshy, John E. Daniels, Charles Christopher Sorrell
University of New South Wales, Australia

11:30:00 AM
2212: Local Investigation of Ferroelectric Magnetite
Samuel D. Seddon, Thomas P. A. Hase, Marin Alexe
University of Warwick, United Kingdom

11:45:00 AM
2056: A Study of Nano-Electromechanics and Effective Piezoelectric Coefficient Distribution of Alkali-Deficient Potassium Sodium Niobate (KNN) Thin Films by Quantitative Piezoresponse Force Microscopy (PFM)
Yunjie Chen, Jianwei Chai, Tiang Teck Tan, Rong Ji, Sean J O’shea, Kui Yao
IMRE, Agency for Science, Technology and Research A-STAR, Singapore

B3L-E: PFM - Multiferroic Phenomena at Nanoscale
11:00:00 AM - 12:30:00 PM CEST
Room: Room 2
Chair(s): Andrei Khoklin (University of Aveiro)

11:00:00 AM
2369: INVITED: Insights Into Antiferromagnetic Spin Textures in Multiferroic BiFeO3
Vincent Garcia
UMR CNRS-Thales Université Paris-Saclay, France

11:30:00 AM
2495: INVITED: Flexoelectric Polarizing and Control of a Ferromagnetic Metal
Daesu Lee
Pohang University of Science and Technology POSTECH, Korea

12:00:00 PM
2205: Deterministic Dual Control of Phase Competition and Functionality in Strained BiFeO3: A Multiparametric Structural Lithography Approach
{1}Centre for Nanostructured Media, Queen's University Belfast, United Kingdom; {2}Queen’s University Belfast, United Kingdom; {3}University College Dublin, Ireland; {4}University of St Andrews, United Kingdom

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**Wednesday, June 29**

12:15:00 PM  
**2392: Nanoscale Ferroelectricity in Innovative Ln$_2$WO$_6$ (Ln = Lanthanide) Lead-Free Thin Films**  
Rachel Desfeux, Marie-Hélène Chambrier, Mégane Lheureux, Antonio Da Costa, Anthony Ferri  
Université d’Artois, France

<table>
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<tr>
<th>B3L-F: ECAPD - Advanced Characterization I</th>
<th>11:00:00 AM - 12:30:00 PM CEST</th>
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<tbody>
<tr>
<td>Room: Room 1</td>
<td>Chair(s): Hana Ursic (Jozef Stefan Institute)</td>
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11:00:00 AM  
**2490: INVITED: Electron Microscopy of Ferroelectric Incommensurate Spin Crystals**  
Dorin Rusu, Richard Beanland, Thomas P. A. Hase, Samuel D. Seddon, Jonathan J. P. Peters, James Gott, Marin Alexe, Ana M. Sanchez  
University of Warwick, United Kingdom

11:30:00 AM  
**2097: Atomistic Insight Into the Reversibility of the Field-Induced Phase Transition in Sodium Niobate Ceramics**  
Hui Ding, Niloofar Hadaeghi, Tian-Shu Jiang, Leif Carstensen, Mao-Hua Zhang, Hans-Joachim Kleebe, Leopoldo Molina-Luna  
Technische Universität Darmstadt, Germany

11:45:00 AM  
**2015: Atomic Scale Analysis of Homovalent and Heterovalent BaTiO$_3$-Based Relaxor Thin Films**  
Jorge Sanz Mateo(2), Daniel Kiener(4), Federica Benes(3), Daniel Knez(1), Judith Lammer(1), Werner Grogger(1), Marco Deluca(3)  
{1}Graz University of Technology, Austria; {2}Materials Center Leoben, Austria; {3}Materials Center Leoben Forschung GmbH, Austria; {4}Montanuniversität Leoben, Austria

12:00:00 PM  
**2145: In-Situ TEM Studies of Ferroelectrics: the Effect of Chemical Environment**  
Tamsin O’reilly(1), Kristina Holsgrove(1), Iaroslav Gaponenko(2), Patrycja Paruch(2), Miryam Arredondo(1)  
{1}Queen’s University Belfast, United Kingdom; {2}University of Geneva, Switzerland

12:15:00 PM  
**2173: Imaging Emergent Functionality in the Bulk**  
Trygve Magnus Ræder, Mads Allerup Carlsen, Hugh Simons  
Technical University of Denmark, Denmark

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<th>12:30:00 PM – 02:00:00 PM CEST</th>
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<td>Lunch</td>
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<th>12:30:00 PM – 02:00:00 PM CEST</th>
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<tr>
<td>Virtual Poster Session</td>
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Plenary: M. Lourdes Calzada  
02:00:00 PM - 03:00:00 PM CEST  
Room: Auditorium Ronsard  
Chair(s): Barbara Malic (Institute Jozef Stefan)
Towards the Integration of Ferroelectric Oxide Films in Flexible Electronics by low-Temperature Solution Methods
María Lourdes Calzada
Instituto de Ciencia de Materiales de Madrid ICMM-CSIC, Spain

B5L-A: ISAF 1 - Switching Dynamics and Electromechanical Responses
03:15:00 PM - 04:15:00 PM CEST
Room: Auditorium Ronsard
Chair(s): Yuri Genenko (Technical University of Darmstadt, Germany), Marios Hadjimichael (University of Geneva)

03:15:00 PM
2486: INVITED: Beyond Up and Down: Electric-Field-Switchable Functional Materials from First Principles
Karin Rabe{2}, Yubo Qi{2}, Michele Kotiuga{1}
{1}École Polytechnique Fédérale de Lausanne, Switzerland; {2}Rutgers University, United States

03:45:00 PM
2036: Scaling Properties of Multistep Electromechanical Response in Ferroelectrics
Yuri Genenko{2}, Sergey Zhukov{2}, Mao-Hua Zhang{2}, Ke Wang{3}, Jurij Koruza{1}
{1}Graz University of Technology, Austria; {2}Technische Universität Darmstadt, Germany; {3}Tsinghua University, Germany

04:00:00 PM
2210: Generalized Relation Between Electromechanical Responses at Fixed Voltage and Fixed Electric Field
Daniel Bennett{2}, Daniel Tanner{2}, Philippe Ghosez{2}, Pierre-Eymeric Janolin{1}, Eric Bousquet{2}
{1}Laboratoire SPMS, CentraleSupélec, CNRS-UMR8580, Université Paris-Saclay, France; {2}Physique Théorique des Matériaux, QMAT, CESAM, University of Liège, Belgium

B5L-B: ISAF 2 - Thin Film Processing including Lead Free Materials I
03:15:00 PM - 04:15:00 PM CEST
Room: Room 5
Chair(s): Nives Strkalj (University of Cambridge), Tony Schenk (Ferroelectric Memory Company)

03:15:00 PM
2375: INVITED: Advances in Development and Applications of Pb-Free Ferroelectric, Antiferroelectric and Piezoelectric Materials
Ahmad Safari
Rutgers University, United States

03:45:00 PM
2128: Integration of Lead Free KNN Thin Films on 200 mm Si Wafer for Piezoelectric MEMS Applications
Hugo Kuentz{4}, Alain Campo{1}, Christel Dieppedale{2}, Christophe Poulain{3}, Kazutoshi Watanabe{5}, Kenji Shibata{5}, Maryline Guilloux-Viry{6}, Gwenaël Le Rhun{3}
{1}CEA, France; {2}CEA-Leti, France; {3}CEA-Leti, Université Grenoble Alpes, France; {4}CEA-Leti, Université Grenoble Alpes / Rennes Institute of Chemical Sciences - Université de Rennes 1, France; {5}Hitachi Cable, Japan; {6}Rennes Institute of Chemical Sciences - Université de Rennes 1, France
Wednesday, June 29

04:00:00 PM  
2149: *Ba(Zr,Ti)O3-(Ba,Ca)TiO3* Ferroelectric Thin Films from Ethylene Glycol-Based Solutions  
   Sabi William Konsago{2}, Katariina Ziberna{2}, Brigita Kmet{2}, Andreja Benčan Golob{2}, Hana Uršič{1}, Barbara Malič{3}  
   {1}Institut Jožef Stefan, Slovenia; {2}Jožef Stefan Institute, Slovenia; {3}Jožef Stefan International Postgraduate School, Jožef Stefan Institute, Slovenia

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<td>B5L-C: ISAF 3</td>
<td>Structure Characterization &amp; Properties of Ferroelectric Materials I</td>
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<td>03:15:00 PM - 04:15:00 PM CEST</td>
<td>Room: Room 3</td>
<td>Chair(s): Hugh Simons (DTU), David Cann (Oregon State University)</td>
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03:15:00 PM  
2195: INVITED: Stabilization of Ferroelectric Domains by Microstructure Design  
   Jurij Koruza{1}, Mihail Slabki{2}  
   {1}Graz University of Technology, Austria; {2}Technische Universität Darmstadt, Germany

03:45:00 PM  
2052: Electrical Induced Cracking of PZT Films and its Effect on Electrical Properties of Piezoelectric Capacitors  
   Hugo Kuentz{2}, Baba Wagué{3}, Nicolas Vaxelaire{1}, Valérie Demange{4}, Christophe Poulain{1}, Maryline Guiloux-Viry{4}, Gwenael Le Rhun{1}  
   {1}CEA-Leti, Université Grenoble Alpes, France; {2}CEA-Leti, Université Grenoble Alpes / Rennes Institute of Chemical Sciences - Université de Rennes 1, France; {3}CEA-Leti, Université Grenoble Alpes, CNRS, France; {4}Rennes Institute of Chemical Sciences - Université de Rennes 1, France

04:00:00 PM  
2134: Relaxation Currents in PZT Ferroelectric Capacitors  
   Yury Podgorny, Alexander Sigov, Vladislav Storonkin, Konstantin Vorotilov  
   MIREA - Russian Technological University, Russia

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<td>B5L-D: ISAF 4</td>
<td>Ferroelectrics for Dielectric, Capacitor &amp; Memory Applications I</td>
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<td>03:15:00 PM - 04:15:00 PM CEST</td>
<td>Room: Room 4</td>
<td>Chair(s): Clive A. Randall (Pennsylvania State University), Laurent Vila (Université Grenoble Alpes)</td>
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03:15:00 PM  
2411: Ferroelectric Control of the Spin-Charge Conversion for Ultralow Power Spintronics  
   Paul Noel{5}, Sara Varotto{3}, Aurélie Kandazoglou{5}, Maxen Cosset-Chéneau{5}, Paolo Sgarro{2}, Salvatore Teresi{4}, Riccardo Bertacco{1}, Christian Rinaldi{1}, Manuel Bibles{3}, Jean-Philippe Attané{5}, Laurent Vila{6}  
   {1}Politecnico di Milano, Italy; {2}SPINTEC, CEA, CNRS, Université Grenoble Alpes, G-INPEA, IRIG, France; {3}UMR CNRS-Thales Université Paris-Saclay, France; {4}Université Grenoble Alpes / CEA / IRIG / SPINTEC, CNRS / G-INPEA, France; {5}Université Grenoble Alpes / CEA / IRIG/ SPINTEC, France; {6}Université Grenoble Alpes / CEA / IRIG/ SPINTEC / CNRS / G-INPEA, France

03:30:00 PM  
2346: Non-Volatile Field-Effect Transistor with a SrTiO3-Based 2D Electron Gas for Channel  
   Aurélie Kandazoglou{4}, Cécile Grezes{6}, Maxen Cosset-Chéneau{4}, Paolo Sgarro{1}, Salvatore Teresi{3}, Stéphane Auffret{6}, Ariel Brenac{6}, Manuel Bibles{2}, Jean-Philippe Attané{4}, Laurent Vila{5}  
   {1}SPINTEC, CEA, CNRS, Université Grenoble Alpes, G-INPEA, IRIG, France; {2}UMR CNRS-Thales Université Paris-Saclay, France; {3}Université Grenoble Alpes / CEA / IRIG / SPINTEC / CNRS / G-INPEA, France; {4}Université Grenoble Alpes / CEA / IRIG/ SPINTEC, France; {5}Université Grenoble Alpes / CEA / IRIGV / SPINTEC / CNRS / G-INPEA, France; {6}Université Grenoble Alpes /CEA/IRIG/ SPINTEC, France
Wednesday, June 29

03:45:00 PM
2030: INVITED: New Materials for Three Dimensional Ferroelectric Microelectronics
Susan Trolier-McKinstry
Pennsylvania State University, United States

B5L-E: PFM - Piezoelectricity & Pyroelectricity at Nanoscale
03:15:00 PM - 04:15:00 PM CEST
Room: Room 2
Chair(s): Gustau Catalan (ICREA and ICN2-Institut Català de Nanociència i Nanotecnologia)

03:15:00 PM
2498: INVITED: Interface Piezoelectric and Pyroelectric Effects
Ming-Min Yang
University of Warwick, United Kingdom

03:45:00 PM
2177: Observation of Negative Piezoelectricity in HfO2-Based Thin Film Capacitors
Pratyush Buragohain(6), Sangita Dutta(5), Haidong Lu(6), Sebastian Glinšek(1), Hugo Aramberri(1), Claudia Richter(2), Terrence Mittmann(2), Pamenas Kariuki(2), Takanori Mimura(4), Takao Shimizu(3), Hiroshi Funakubo(4), Uwe Schroeder(2), Emmanuel Defay(1),
{1}Luxembourg Institute of Science and Technology, Luxembourg; {2}NaMLab gGmbH, Technische Universität Dresden, Germany; {3}Research Center for Functional Materials, NIMS, Tokyo Institute of Technology, Japan; {4}Tokyo Institute of Technology, Japan; {5}University of Luxembourg, Luxembourg; {6}University of Nebraska-Lincoln, United States

04:00:00 PM
2167: Exploring Charged Defects in Ferroelectrics by the Switching Spectroscopy Piezoresponse Force Microscopy
Denis Alikin(5), Alexander Abramov(5), Anton Turygin(5), Anton V. Ievlev(2), Victoria Pryakhina(5), Dmitry Karpinsky(3), Qingyuan Hu(6), Li Jin(6), Vladimir Shur(5), Alexander Tselev(4), Andrei Khoklin(1)
{1}CICECO - Aveiro Institute of Materials, University of Aveiro, Ural Federal University, Portugal; {2}Oak Ridge National Laboratory, United States; {3}Scientific-Practical Materials Research Centre of NAS of Belarus, Belarus; {4}University of Aveiro, Portugal; {5}Ural Federal University, Russia; {6}Xi'an Jiaotong University, China

B5L-F: ECAPD - Materials for Energy Harvesting & Conversion
03:15:00 PM - 04:15:00 PM CEST
Room: Room 1
Chair(s): Hamideh Khanbareh (University of Bath)

03:15:00 PM
2370: INVITED: Tunable Structures “Ferroelectric Film/Silicon Carbide” for High Power Microwave Applications
Andrei Tumarkin, Andrei Altyannikov, Roman Platonov, Alexander Gagarin, Evgeny Saegree
Electrotechnical University, Russia

03:45:00 PM
2437: Design and Fabrication of a Piezoelectric MEMS for Vibrational Energy Harvesting
Meriem Ouhabaz(4), Djaffar Belharet(2), Giacomo Clementi(2), Gabriel Barrientos(8), Samuel Margueron(3), Carlo Trigona(6), Laurent Robert(2), Florent Bassignot(1), Ludovic Gautier-Manuel(2), Bernard Dumet(2), Graziella Malandrino(7), Ausrine Bartasyte(5)
{1}FEMTO Engineering, France; {2}FEMTO-ST Institute, France; {3}FEMTO-ST Institute, Université de Bourgogne Franche-Comté, France; {4}FEMTO-ST institute, University Bourgogne Franche-Comté, France; {5}Institut FEMTO-ST, Université de Bourgogne Franche-Comté, France; {6}Università Degli
Wednesday, June 29

Studi di Catania, Italy; {7}Università Degli Studi di Catania and INSTM UdR Catania, Italy; {8}Università Degli Studi di Catania, INSTM UdR Catania, Italy

04:00:00 PM

2337: Simple and Accurate Estimation of Electromechanical Energy Conversion Performance of Ferroelectric and Paraelectric Phase Ferroelectric Materials
Nguyen Thanh Tung{2}, Gaspard Taxil{5}, Nguyen Hoang Hung{3}, Benjamin Ducharme{2}, Mickael Lallart{5}, Elie Lefeuvre{1}, Hiroki Kuwano{4}, Gael Sebald{2}
{1}Centre for Nanoscience and Nanotechnology, University of Paris-Saclay - CNRS, France; {2}ELyTMaX IRL3757, CNRS, Université Lyon, INSA Lyon, Centrale Lyon, Tohoku University, Japan; {3}New Industry Creation Hatchery Center NICHe, Tohoku University, Japan; {4}Tohoku University, Japan; {5}Université Lyon, INSA-Lyon, LGEF EA682, F-69621, France

04:15:00 PM – 04:45:00 PM CEST
Coffee Break
Level +2

B6L-A: ISAF 1 - Thin Films & 2D Systems I
04:45:00 PM - 05:45:00 PM CEST
Room: Auditorium Ronsard
Chair(s): Geoff Brennecka (Colorado School of Mines), Jon Ihlefeld (University of Virginia)

04:45:00 PM

2008: Thermal Stress Accommodation in Dip Cast Lead Zirconate-Titanate Ferroelectric Films on Flexible Substrates
Travis Peters{1}, Christopher Cheng{1}, George A. Rossetti Jr.{2}, Shad Roundy{3}, Susan Trolier-McKinstry{1}
{1}Pennsylvania State University, United States; {2}University of Connecticut, United States; {3}University of Utah, United States

05:00:00 PM

2235: Switching Dynamics of Ferroelectric AlScN and AlBN Films
Keisuke Yazawa{2}, Daniel Drury{1}, Andriy Zakutayev{2}, Geoff Brennecka{1}
{1}Colorado School of Mines, United States; {2}National Renewable Energy Laboratory, United States

05:15:00 PM

2298: Coupling Incompatible Order Parameters in Two-Dimensional Ferroelectrics
Shi Liu
Westlake University, China

05:30:00 PM

2306: Piezoelectric and Electrical Property of CuInP2S6
Tingting Jia
Shenzhen Institute of Advanced Technology, CAS, China

B6L-B: ISAF 2 - Thin Film Processing including Lead Free Materials II
04:45:00 PM - 05:45:00 PM CEST
Room: Room 5
Chair(s): Hiroko Yokota (Chiba University)

04:45:00 PM

2365: Pulsed Laser Deposited SrVO3 as a Template for Highly Oriented (001) PZT Thin Film
Asriful Haque, Antony Jeyaseelan A, Shankar Kumar Selvaraja, Srinivasan Raghavan
Indian Institute of Science, Bangalore, India
05:00:00 PM
2366: Heteroepitaxial Growth of Lithium Niobate Thin Films on Sapphire Substrates with Different Orientations by Pulsed-Laser Deposition
Ihor Pershukov{2}, Elisa Soulat{2}, Marie Bousquet{2}, Florian Dupont{2}, Bertrand Vilquin{1}
{1}Institut des Nanotechnologies de Lyon, CNRS UMR5270 ECL INSA Lyon UCBL CPE Lyon, France; {2}Université Grenoble Alpes, CEA-Leti, France

05:15:00 PM
2288: Lead-Free KNN-Based Thin Films Obtained by Pulsed Laser Deposition
Brenda Carreño Jiménez{1}, José Luis Benítez-Benítez{2}, Mónica Acuautla{4}, Rosalba Castañeda-Guzmán{3}, Rigoberto López-Juárez{3}
{1}Engineering and Technology Institute Groningen, University of Groningen, Netherlands; {2}Universidad Juárez Autónoma de Tabasco, Mexico; {3}Universidad Nacional Autónoma de México, Mexico; {4}University of Groningen, Netherlands

B6L-C: ISAF 3 - Structure Characterization & Properties of Ferroelectric Materials II
04:45:00 PM - 05:45:00 PM CEST
Room: Room 3
Chair(s): Jan Schultheiß (Norwegian University of Science and Technology), Kristine Bakken (Materials Center Leoben Forschung GmbH)

04:45:00 PM
2067: Stabilization of the Epitaxial Rhombohedral Ferroelectric Phase in ZrO2 by Surface Energy
Ali El Boutaybi{3}, Thomas Maroutian{1}, Ludovic Largeau{2}, Sylvia Matzen{1}, Philippe Lecoeur{1}
{1}Center for Nanoscience and Nanotechnology, Université Paris-Saclay, France; {2}Centre de Nanosciences et de Nanotechnologies C2N, France; {3}Centre de Nanosciences et de Nanotechnologies, Université Paris-Saclay, France

05:00:00 PM
2099: Synthesis and Properties of Tetragonal Tungsten Bronzes Ba4A2Nb10O30 (A = Na, K, Rb)
Nora Statle Løndal, Julian Walker, Mari-Ann Einarsrud, Tor Grande
Norwegian University of Science and Technology, Norway

05:15:00 PM
2112: Ultrafast Optically Induced Perturbation of Oxygen Octahedral Rotation Order in Multiferroic BiFeO3 Thin Films
{1}Aix Marseille Université, France; {2}Argonne National Laboratory, United States; {3}Cornell University, United States; {4}DePaul University, United States; {5}Deutsches Elektronen-Synchrotron DESY, Germany; {6}Gwangju Institute of Science and Technology GIST, Korea; {7}Pohang Accelerator Laboratory, Korea; {8}University of Michigan, United States; {9}University of Wisconsin-Madison, United States
### B6L-D: ISAF 4 - Ferroelectrics for Dielectric, Capacitor & Memory Applications II
04:45:00 PM - 05:45:00 PM CEST  
**Room:** Room 4  
**Chair(s):** Hana Ursic (Jozef Stefan Institute), Laurent Vila (Université Grenoble Alpes)

04:45:00 PM  
**2075:** Fundamental Study of Defect Migration Under Burn-In Conditions for High Reliability in Multilayer Ceramic Capacitors  
Clive A. Randall{1}, Pedram Yousefian{2}  
{1}Materials Research Institute, Pennsylvania State University, United States; {2}Pennsylvania State University, United States

05:00:00 PM  
**2476:** INVITED: Epitaxial Ferroelectric Tellurides for the Non-Volatile Control of the Rashba Effect  
Stefano Cecchi  
University of Milano-Bicocca, Italy

05:30:00 PM  
**2057:** YOUNG INVESTIGATOR (INVITED): The Interface Modification Design for a Greatly Improved Dielectric Strength and Temperature Stability in the Ferroelectric Thin Films and the Thin-Film Capacitor Application  
Xiaoyang Chen, Ping Yu  
Sichuan University, China

### B6L-E: ECAPD - Ferroelectric Memories & Devices
04:45:00 PM - 05:45:00 PM CEST  
**Room:** Room 2  
**Chair(s):** Morgan Trassin (ETH Zürich), Tony Schenk (Ferroelectric Memory Company)

04:45:00 PM  
**2483:** INVITED: Aluminum Scandium Nitride Ferroelectric Materials and Devices  
Roy Olsson Ill  
University of Pennsylvania, United States

05:15:00 PM  
**2199:** Ferroelectric Multi-Level Memory Based on Highly Conductive, Nominally Neutral 180°-Domain Walls  
Felix Risch, Igor Stolichnov, Sadegh Kamaei, Adrian Ionescu  
École Polytechnique Fédérale de Lausanne, Switzerland

05:30:00 PM  
**2049:** Phase Structural Modification of Solution-Processed Barium Titanate/Polysiloxane Nanocomposite for Memory Application  
Aimi Syairah Safaruddin{2}, Juan Paolo Bermundo{2}, Mutsumori Uenuma{2}, Atsuko Yamamoto{1}, Yukiharu Uraoka{2}  
{1}MERCK, Japan; {2}Nara Institute of Science and Technology, Japan

### B6L-F: ECAPD - Domains & Domain Walls I
04:45:00 PM - 05:45:00 PM CEST  
**Room:** Room 1  
**Chair(s):** Marios Hadjimichael (University of Geneva), Lukas Puntigam (University of Augsburg)
Wednesday, June 29

04:45:00 PM
2455: INVITED: Probing the Atomic-Scale Internal Structure of Mutiliferroic Domain Walls During Dynamics with the Electron Beam
Michele Conroy{1}, Eoghan O’connell{3}, Kalani Moore{7}, Ursel Bangert{6}, Lewys Jones{5}, Quentin Ramasse{4}, Colin Ophus{2}
{1}Imperial College London, United Kingdom; {2}Lawrence Berkeley National Laboratory, United States; {3}Max Planck Institute for the Science of Light, University of Limerick, Germany; {4}SuperSTEM Laboratory and University of Leeds, United Kingdom; {5}Trinity College Dublin, Ireland; {6}University of Limerick, Ireland; {7}University of Limerick, Direct Electron, United States

05:15:00 PM
2384: Surface Band Gap Narrowing in Ferroelastic Twin Walls in CaTiO3 (001)
Grégoire Magagnin{3}, Qiang Wu{3}, Dominique Martinotti{3}, Ekhard Salje{4}, Christophe Lubin{3}, Charles Paillard{2}, Gregory Geneste{1}, Nicholas Barrett{3}
{1}CEA, DAM, DIF, F-91297 Arpajon & Université Paris-Saclay, CEA, LMCE, France; {2}Laboratoire SPMS, CentraleSupélec, CNRS-UMR8580, Université Paris-Saclay, France; {3}SPEC, CEA, CNRS, Université Paris-Saclay, CEA Saclay, France; {4}University of Cambridge, United Kingdom

05:30:00 PM
2071: Polar Chirality Emerging from Periodic Domain Walls in BiFeO3 Thin Films
Stéphane Fusil{4}, Jean-Yves Chauleau{2}, Xiaoyan Li{1}, Johanna Fischer{4}, Pauline Dufour{4}, Cyril Léveillé{3}, Cécile Carrétéro{4}, Nicolas Jaouen{3}, Michel Viret{2}, Alexandre Gloter{1}, Vincent Garcia{4}
{1}Laboratoire de Physique des Solides, CNRS, Université Paris-Saclay, France; {2}SPEC, CEA, CNRS, Université Paris-Saclay, CEA Saclay, France; {3}Synchrotron SOLEIL, France; {4}UMR CNRS-Thales Université Paris-Saclay, France

06:00:00 PM – 07:00:00 PM CEST
Virtual Poster Session
Zoom

B7P-G: ISAF 3 - Structure Characterization & Properties - Poster I
Room: Level +2
Chair(s): Hana Ursic (Jožef Stefan Institute), Stanislav Kamba (FZU - Institute of Physics of the Czech Academy of Sciences)

2017: Light Induced Strain in Ferroelectrics: Experimental Insights Using Michelson Interferometry
Gaëlle Vitali-Derrien{2}, Thomas Antoni{1}, Pierre-Eymeric Janolin{3}, Charles Paillard{3}
{1}Laboratoire LuMIn, CentraleSupélec, CNRS- FRE 2036, France; {2}Laboratoire SPMS, CentraleSupélec, CNRS-UMR8580, France; {3}Laboratoire SPMS, CentraleSupélec, CNRS-UMR8580, Université Paris-Saclay, France

2035: Epitaxial Semiconductor-Metal-Ferroelectric-Metal Stacks for Improved Switching Performance of Sub-50 nm Thick Al0.73Sc0.27N Films
Md Redwanul Islam{1}, Georg Schönweger{3}, Niklas Wolff{1}, Simon Fichtner{2}, Lorenz Kienle{1}
{1}Institute for Material Science, Kiel University, Germany; {2}Institute for Material Science, Kiel University, Fraunhofer Institute for Silicon Technology ISIT, Germany; {3}Institute of Electrical and Information Engineering, Kiel University, Germany

2063: Preparation of Multicaloric Composites Using Aerosol Deposition Method
Victor Regis{1}, Matej Sadi[2], Hana Uršič{1}
{1}Institut Jožef Stefan, Slovenia; {2}Jožef Stefan Institute, Slovenia
Wednesday, June 29

2064: Influence of Strain on the Structural and Functional Properties of Epitaxial Ba0.7Sr0.3TiO3 Thin Films
Jonas Wawra, Kornelius Nielsch, Ruben Hühne
Leibniz IFW Dresden, Technische Universität Dresden, Germany

2081: Temperature Dependent Piezoelectric and Pyroelectric Response of Nb Doped (Na0.41K0.09Bi0.5)TiO3 Ceramics
Ankur Sharma, Pinki Yadav, B.K. Sahij, Rajeev Bhatt, Indranil Bhaumik, Gurvinderjit Singh, Rakesh Kaul
Raja Ramanna Centre for Advanced Technology, India

2082: Understanding the Piezoelectric Response of Eu3+ Doped (Na0.41K0.09Bi0.5)TiO3: A Lead-Free Piezo-Luminescent Material
Pinki Yadav, Ankur Sharma, Gurvinderjit Singh, Indranil Bhaumik, Rakesh Kaul
Raja Ramanna Centre for Advanced Technology, India

2098: Birefringence Imaging of Field-Induced Phase Transition in Transparent PbZr0.95Ti0.05O3 Film on Glass
Pranab Biswas{2}, Cosme Milesi-Brault{3}, Veronika Kovacova{1}, Alfredo Blázquez Martinez{1}, Naveen Aruchamy{1}, Sebastian Glinšek{1}, Emmanuel Defay{1}, Torsten Granzow{1}, Mael Guennou{2}
{1}Luxembourg Institute of Science and Technology, Luxembourg; {2}University of Luxembourg, Luxembourg; {3}University of Luxembourg, Luxembourg Institute of Science and Technology, Luxembourg

2100: Exploring the Role of Bi 6s Lone Pair in Tetragonal Tungsten Bronzes A4Bi2Nb10O30 (ABN, A= Na, K, Rb)
Caren Regine Zeiger{1}, Inger-Emma Nylund{1}, Ding Peng{1}, Per Erik Vullum{2}, Julian Walker{1}, Mari-Ann Einarsrud{1}, Tor Grande{1}
{1}Norwegian University of Science and Technology, Norway; {2}Norwegian University of Science and Technology, SINTEF, Norway

2136: Polar Phonon Modes in Ferroelastic BiVO4
Mael Guennou{2}, Constance Toulouse{2}, Robert Oliva Vidal{2}, Marine Verseils{1}, Jean-Blaise Brubach{1}, Pascale Roy{1}
{1}Synchrotron SOLEIL, France; {2}University of Luxembourg, Luxembourg

2157: Kinetics of the Induced Phase Transition in Some Lead-Containing Relaxors
Liudmila Kamzina
Ioffe Physical-Technical Institute of the Russian Academy of Sciences, Russia

2168: Piezoelectric Properties of Doped BCTZ Thin Films Grown by Pulsed Laser Deposition
Nazir Jaber{2}, Jerome Wolfman{2}, Fabien Giovannelli{2}, Claire Bantignies{4}, Bogdan Rosinski{4}, Jean Louis Longuet{1}, Pascal Andreaux{3}, Beatrice Neuglescu{2}
{1}CEA Ripault, France; {2}GREMAN UMR 7347, University of Tours - CNRS - INSA, France; {3}ICMN laboratory, CNRS, Université d’Orléans, France; {4}Vermon SA Tours, France

2169: Vibrational and Magnetic Properties of MnZn1-xPS3 Revealed by Low-Temperature Raman Spectroscopy
Robert Oliva Vidal{2}, Faris Horani{1}, Esther Ritov{1}, Efrat Lifshitz{1}, Mael Guennou{2}
{1}Technion – Israel Institute of Technology, Israel; {2}University of Luxembourg, Luxembourg

2182: Texture Evolution of Ferroelectric AIscN Films on Metal Under-Layers
Minghua Li{1}, Huamao Lin{1}, Ping Luo{2}, Kan Hu{1}, Chen Liu{1}, Li Chen{1}, Yao Zhu{1}
{1}IME, Agency for Science, Technology and Research A-STAR, Singapore; {2}IMRE, Agency for Science, Technology and Research A-STAR, Singapore
2193: Pressure-Induced Structural Transformations in (1-x)Na0.5Bi0.5TiO3-xBaTiO3 at the Morphotropic Phase Boundary
Constanze Rösche(2), Tiziana Boffa-Ballaran(1), Boriana Mihailova(2)
{1}Universität Bayreuth, Germany; {2}Universität Hamburg, Germany

2227: Effect of Synthesis Technique on Electrical Properties in Sn2P2S6 Single Crystals
Ilona Zamaraite(2), Andrius Dziaugys(2), Yulian Vysochanskii(1), Juras Banys(2)
{1}Uzhgorod University, Ukraine; {2}Vilnius University, Lithuania

2230: Further Insights Into Polarization Switching Phenomena of CuInP2Se6 Single Crystal
Juraz Banys(2), Ilona Zamaraite(2), Andrius Dziaugys(2), Yulian Vysochanskii(1)
{1}Uzhgorod University, Ukraine; {2}Vilnius University, Lithuania

B7P-H: ISAF 3 - Structure Characterization & Properties - Poster II
Room: Level +2
Chair(s): Marco Deluca (Materials Center Leoben Forschung GmbH), Elena Buixaderas (Institute of Physics, Czech Academy of Science)

2016: Flexoelectricity Induced from Interfacial Polarization in Truncated Pyramids
Travis Peters(3), Liam Collins(2), Nina Balke(1), Susan Trolter-McKinstry(3)
{1}North Carolina State University, United States; {2}Oak Ridge National Laboratory, United States; {3}Pennsylvania State University, United States

2231: Ferroelectric Capacitors with Rare-Earth Nickelate Electrodes
Evgenios Stylianidis(1), Chunhai Yin(2), Yaqi Li(2), Pavlo Zubko(2)
{1}London Center for Nanotechnology, University College London, United Kingdom; {2}University College London, United Kingdom

2241: Ferroelectric Property Measurements of K1-x NaxNbO3 Thin Films Synthesized Through Aqueous Solution Deposition
Mohsen Mahmoudvand, Stuart R. Burns, Ahmed Mohammed, Michelle Dolgos
University of Calgary, Canada

2248: Novel Lead-Lite Piezoelectric Ceramic with a Morphotropic Phase Diagram
Brooke Richtik, Thomas Rowe, Michelle Dolgos
University of Calgary, Canada

2277: Elaboration and Characterization of Molecular Lead Free Ferroelectrics
Gwenn Morvézen(4), Nicolas Bréfuel(2), Benoit Poyet(1), Daniel Bourgault(3), Hervé Guillou(3), Alain Sylvestre(2)
{1}G2Elab, France; {2}G2Elab, Université Grenoble Alpes, France; {3}Néel Institute, France; {4}Université Grenoble Alpes, CNRS, Grenoble INP, G2Elab, Neel institute, France

2294: Local Structural Heterogeneity with Improved Ferroelectric in Lead-Free Relaxor Ferroelectric BNKT-CT Ceramics
Sam Yeon Cho, Seung-Hun Han, Sang Don Bu
Jeonbuk National University, Korea

2304: Broad-Band Dielectric Spectroscopy of the Ferroelectric Phase Transitions in K1-xLixTaO3 (x = 0.043, 0.08) Crystals
Dmitry Nuzhnyy(1), Jan Petzelt(1), Viktor Bovtun(1), Maxim Savinov(1), Martin Kempa(1), Stanislav Kamba(1), Zbigniew Trybula(2)
{1}FZU Institute of Physics of the Czech Academy of Sciences, Czech Rep.; {2}Institute of Molecular Physics, Polish Academy of Sciences, Poland
2308: New Insights Into the Average and Local Structure of (PbMg1/3Nb2/3O3)1-x-(PbTiO3)x Around its Morphotropic Phase Boundary
Tal Zaharoni{4}, Arik Kreisel{2}, Igor Levin{1}, Semën Gorfman{3}
{1}National Institute of Standards and Technology, United States; {2}SARAF, Soreq Nuclear Research Center, Israel; {3}Tel Aviv University, Israel; {4}Tel Aviv University, SARAF, Soreq Nuclear Research Center, Israel

2310: Structure and Dielectric Properties of Modified Lead-Free Sodium-Potassium Niobate Ceramics
Ekaterina D. Politova{3}, Galina M. Kaleva{3}, Alexander Mosunov{2}, Sergey Stefanovich{2}, Nataliya Sadovskaya{1}, Vladimir Shavartsman{4}
{1}FSRC “Crystallography and Photonics” RAS, Russia; {2}Moscow State University, Russia; {3}Semenov Federal Research Center for Chemical Physics, RAS, Karpov Institute of Physical Chemistry, Russia; {4}University of Duisburg-Essen, Germany

2314: Full Matrix and Uniaxial-Compressive-Stress-Dependence of Electromechanical Properties for Textured Pb(In1/2Nb1/2)O3-Pb(Sc1/2Nb1/2)O3-PbTiO3 Ceramic
Shuai Yang, Liao Qiao, Mingwen Wang, Jinjing Zhang, Jie Wu, Jinglei Li, Xiangyu Gao, Zhuo Xu, Fei Li
Electronic Materials Research Laboratory, Key Lab of Education Ministry, Xi’an Jiaotong University, China

2350: Enhanced Piezoelectric Properties and Improved Property Uniformity in Nd-Doped PMN-PT Relaxor Ferroelectric Single Crystals
Qian Li{2}, Yangbin Liu{2}, Jinfeng Liu{2}, Kexin Song{2}, Haisheng Guo{2}, Fei Li{1}, Zhuo Xu{1}
{1}Electronic Materials Research Laboratory, Key Lab of Education Ministry, Xi’an Jiaotong University, China; {2}Xi’an Jiaotong University, China

2396: Anisotropy of Attenuation of Acoustic Waves in Pure and Doped LiNbO3 Crystals
Farkhad Akhmedzhanov{1}, Jakhongir Kurbanov{1}, Jamoliddin Nazarov{2}
{1}Institute of Ion-plasma and Laser Technologies of the Academy of Sciences of Uzbekistan, Uzbekistan; {2}Navoi State Mining Institute, Uzbekistan

2400: Functional Properties Relationship of Annealed Free-Standing Thick Films
Juliana Maier, Neamul Hayet Khansur, Kyle Grant Webber
Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany

2407: Comparative Study of Phase Composition and Properties of Ba0.85Ca0.15Ti0.9Zr0.1O3 Ceramics Prepared by Different Synthesis Methods
Cristina Elena Ciomaga{1}, Lavinia Curecheriu{1}, Vlad Alexandru Lukacs{1}, Nadejda Horchidan{1}, Mégane Lheureux{2}, Marie-Hélène Chambrier{2}, Liliana Mitoseriu{1}
{1}Alexandru Ioan Cuza University of Iaşi, Romania; {2}Université d’Artois, France

B7P-J: ISAF 4 - Applications of Ferroelectrics, Piezoelectrics & Related Materials - Poster
Room: Level +2
Chair(s): Tony Schenk (Ferroelectric Memory Company), Sebastian Glinsek (Luxembourg Institute of Science and Technology)

2179: Structural and Pyroelectric Studies of Nd2Ti2O7 for Temperature-Based Sensing Application
Manish Chandra Joshi, Bidesh Mahata, Ranjith Ramadurai
Indian Institute of Technology Hyderabad, India

2200: Porous Silicon Based Bulk Acoustic Resonator Using Barium Strontium Titanate Thin Film
Shivakumar Chedurupalli, Bhanu Prakash S, Akhilraman T S, Kanaka Ravi Kumar, James Raju K C
University of Hyderabad, India
2221: Electrocaloric Coolers, a Plausible Alternative to Current Cooling Systems?
Alvar Torelló Massana, Emmanuel Defay
Luxembourg Institute of Science and Technology, Luxembourg

2236: Magneto-Optic Imaging of Coupled Domains in BaTiO3(111)/CoFeB Heterostructures
Robbie Hunt, Kevin Franke, Philippa Shepley, Andrew J. Bell, Thomas Moore
University of Leeds, United Kingdom

2247: Electrospinning-Derived Polymer-Ceramic Film on Aluminum Electrode for Flexible Vibration Energy Harvester
Ryota Yamamoto{2}, Andreas Hegendörfer{1}, Julia Mergheim{1}, Ken-Ichi Kakimoto{2}
{1}Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany; {2}Nagoya Institute of Technology, Japan

2315: BiFeO3 Nanoparticles for Efficient and Versatile Photocatalysis
Wafa Amdouni{2}, Mojca Otoničar{1}, Pascale Gemeiner{4}, Brahim Dkhil{3}, Hager Maghraoui-Mehrez{2}
{1}Jožef Stefan International Postgraduate School, Jožef Stefan Institute, Slovenia; {2}Université de Tunis El-Manar, Faculté des Sciences de Tunis, Tunisia; {3}Université Paris-Saclay, CentraleSupélec, CNRS UMR 8580, Laboratoire SPMS, France; {4}Université Paris-Saclay, CentraleSupélec, SPMS, CNRS-UMR8580, France

2340: Utilizing Ti Thin Interfacial Layer to Improve the Endurance of Antiferroelectric Mo/Hf0.3Zr0.7O2/Si Capacitor
Se Hyun Kim, Geun Taek Yu, Geun Hyeong Park, Dong Hyun Lee, Ju Yong Park, Kun Yang, Min Hyuk Park
Seoul National University, Korea

2345: Effects of Electrode Materials on Polarization Switching Kinetics of Ferroelectric Hf0.5Zr0.5O2 Thin Films
Dong Hyun Lee, Kun Yang, Geun Taek Yu, Ju Yong Park, Geun Hyeong Park, Se Hyun Kim, Min Hyuk Park
Seoul National University, Korea

2356: PVDF-Based Materials for Multiphysic Energy Harvesting
Matthieu Fricaudet{4}, Sharath Kattemane Chandrashekar{4}, Thierry Martin{4}, Delong He{4}, Katarina Žiberna{1}, Maja Koblar{1}, Tadej Rojac{1}, Mojca Otoničar{2}, Brahim Dkhil{3}, Pierre-Eymeric Janolin{3}, Andraz Bradesko{4}
{1}Jožef Stefan Institute, Slovenia; {2}Université de Tunis El-Manar, Faculté des Sciences de Tunis, Tunisia; {3}Université Paris-Saclay, CentraleSupélec, CNRS UMR 8580, Laboratoire SPMS, France; {4}Université Paris-Saclay, CentraleSupélec, SPMS, CNRS-UMR8580, France

2387: Spin-Dependent Transport in Ferroelectric Spin-Orbit Devices Studied by Finite Element Method Simulation
Paolo Sgarro{2}, Maxen Cosset-Chéneau{4}, Aurélie Kandazoglou{4}, Salvatore Teresi{3}, Lorena Anghel{1}, Pablo Ilha Vaz{1}, Alain Marty{1}, Laurent Vila{5}, Guillaume Prenat{1}, Jean-Philippe Attané{4}
{1}SPINTEC, CEA, CNRS, UGA, G-INPEA, France; {2}SPINTEC, CEA, CNRS, Université Grenoble Alpes, G-INPEA, IRIG, France; {3}Université Grenoble Alpes / CEA / IRIG / SPINTEC / CNRS / G-INPEA, France; {4}Université Grenoble Alpes / CEA / IRIG / SPINTEC, France; {5}Université Grenoble Alpes / CEA / IRIGV / SPINTEC / CNRS / G-INPEA, France
Wednesday, June 29

2394: Ultrahigh Focal Sensitivity in Relaxor Ferroelectric Crystals Based Piezoelectric Adaptive Lens  
Liao Qiao, Xiangyu Gao, Zhuo Xu, Fei Li  
Electronic Materials Research Laboratory, Key Lab of Education Ministry, Xi’an Jiaotong University, China

2456: Piezoelectric Composite Fabricated by Additive Manufacturing for Energy Harvesting Application  
Yushun Zeng, Yong Chen, Qifa Zhou  
University of Southern California, United States

2459: Flexible Ultrasound-Induced Retinal Stimulating Piezo-Arrays for Biomimetic Visual Prostheses  
Laiming Jiang, Gengxi Lu, Yushun Zeng, Qifa Zhou  
University of Southern California, United States

B7P-K: PFM - Soft Materials & Nanoparticles by PFM  
Room: Level +2  
Chair(s): Kumara Cordero-Edwards (University of Geneva)

2031: Rare-earth Doped Ferroelectrics Towards All-optical Temperature Sensors  
Jingye Zou{3}, Shenglan Hao{4}, Pascale Gemeiner{3}, Nicolas Guiblin{3}, Charles Paillard{1}, Brahim Dkhil{2}  
{1}Laboratoire SPMS, CentraleSupélec, CNRS-UMR8580, Université Paris-Saclay, France; {2}Université Paris-Saclay, CentraleSupélec, CNRS UMR 8580, Laboratoire SPMS, France; {3}Université Paris-Saclay, CentraleSupélec, SPMS, CNRS-UMR8580, France; {4}Université Paris-Saclay, ENS Paris-Saclay, LIMn, CNRS, France

2106: Ferroelectricity in Doped Bismuth Ferrite Nanoparticles  
Astita Dubey{1}, Syaidah Ibrahim{1}, Marianela Escobar C{1}, Vladimir V. Shvartsman{2}, Doru C Lupascu{2}  
{1}University of Duisburg-Essen, Germany; {2}University of Duisburg-Essen, CENIDE, Germany

2224: Mechanically Soft and Flexible Ferroelectrics Based on PVDF-TrFE  
Ralph Bulanadi, Laura Marcheron, Iaroslav Gaponenko, Patrycja Paruch  
University of Geneva, Switzerland

2301: Unveiling the Structure-Property Relationship of Ferroelectric P(VDF-TrFE) Using Machine Learning  
Soyun Joo, Jiwon Yeom, Jingshu Zhang, Seungbum Hong  
Korea Advanced Institute of Science and Technology, Korea; Korea Advanced Institute of Science and Technology, China

B7P-L: ECAPD - Posters II  
Room: Level +2  
Chair(s): Lynette Keeney (Tyndall National Institute), Raymond McQuaid (Queen's University Belfast, UK)

2021: Conductive Oxide Electrodes for Ferroelectric Capacitor Devices  
Martina Angermann{2}, Kristine Bakken{2}, Federica Benes{2}, Lisa Mitterhuber{1}, Marco Deluca{2}  
{1}Materials Center Leoben, Austria; {2}Materials Center Leoben Forschung GmbH, Austria

2028: Bi0.5Na0.5TiO3-BaTiO3-Based Thin Films for Energy Storage Capacitor Devices from Chemical Solution Deposition  
Herbert Kobald, Alexander Kobald, Federica Benes, Kristine Bakken, Marco Deluca  
Materials Center Leoben Forschung GmbH, Austria
Wednesday, June 29

2029: BaTiO3-NaNbO3 Thin Films for Energy Storage from Chemical Solution Deposition
Alexander Kobald, Herbert Kobald, Federica Benes, Kristine Bakken, Marco Deluca
Materials Center Leoben Forschung GmbH, Austria

2069: Electrical Alignment of Single-Walled CNTs in P(VDF-TrFE)-Single-Walled CNT Composite Films for High Thermoelectric Performance
Hyunjin Joh{1}, Gophinathan Anoop{1}, Hye Jeong Lee{2}, Ji Young Jo{1}
{1}Gwangju Institute of Science and Technology GIST, India; {2}Gwangju Institute of Science and Technology GIST, Korea; {2}Korea Advanced Institute of Science and Technology, Korea

2152: Energy Harvesting from Water Flow by Using Piezoelectrics: Current Status, Challenges, and Perspectives
Zhe Li, Chris Bowen
University of Bath, United Kingdom

2183: Ba0.85Ca0.15Zr0.1Ti0.9O3 (BCZT)/ 0.94(Na0.5Bi0.5)TiO3-0.06BaTiO3(NBT-BT) Heterostructures for Vibration Sensing and Energy Harvester
Sabarigresan Murugan, Anantha P Bhat, Ranjith Ramadurai
Indian Institute of Technology Hyderabad, India

2334: Effects of MnO Addition on Structure and Electrical Properties of Lead-Free Antiferroelectric 0.96NaNbO3 – 0.04CaZrO3 Ceramics
Hiroshi Maiwa, Atsushi Sakurai, Yugeng Liu, Ko Cho
Shonan Institute of Technology, Japan

2338: Effect of Field Cycling and Polarization Reversal on Oxygen Vacancies and Interface Electronic Structure of La Doped Hf0.5Zr0.5O2 Ferroelectric Capacitors
Wassim Hamouda{5}, Christophe Lubin{5}, Yoshiyuki Yamashita{4}, Shigenori Ueda{4}, Olivier Renault{6}, Sylvia Matzen{1}, Thomas Mikolajick{3}, Furqan Mehmood{2}, Uwe Schroeder{3}, Nicholas Barrett{5}
{1}Center for Nanoscience and Nanotechnology, Université Paris-Saclay, France; {2}GlobalFoundries, Germany; {3}NaMLab gGmbH, Technische Universität Dresden, Germany; {4}National Institute for Materials Science, Japan; {5}SPEC, CEA, CNRS, Université Paris-Saclay, CEA Saclay, France; {6}Université Grenoble Alpes, CEA-Leti, France

2460: Optimization of Memristor Based Ultrasonic Transducers for Mesoscopic Characterization of Biomaterials
Serge Dos Santos{1}, Parnian Hemmati{2}, Sadataka Furui{3}
{1}INSA Centre Val de Loire - Inserm iBrain, France; {2}Sharif University of Technology, Iran; {3}Teikyo University, Japan

2140: Dark-Field X-Ray Microscopy for the Determination of Oxygen Vacancies
Antonella Gayoso Padula, Trygve Magnus Raeder, Hugh Simons
Technical University of Denmark, Denmark

2331: Peculiarities of Polarization and Piezoelectric Properties of Perforated Ferroelectric Films
Natalia Sherstyuk{1}, Maxim Ivanov{2}, Elena Mishina{1}
{1}MIREA - Russian Technological University, Russia; {2}University of Aveiro, Portugal

2395: Study of Crystallographic Parameters of Spherulitic Structures in Ferroelectric Film by Nonlinear Optical Technique
Andrey Elshin{2}, Igor Pronin{1}, Stanislav Senkevich{1}, Elena Mishina{2}
{1}Ioffe Physical-Technical Institute of the Russian Academy of Sciences, Russia; {2}MIREA - Russian Technological University, Russia
Wednesday, June 29

2461: Modeling of the Phase Superposition in Barium Titanate- Based Ceramics by Landau-Devonshire Theory
Leontin Padurariu, Nadejda Horchidan, Mirela Airimioaei, Lavinia Curecheriu, Cristina Elena Ciomaga, Liliana Mitoseriu
Alexandru Ioan Cuza University of Iași, Romania
### Technical Program: Thursday, June 30

#### Plenary: Sayeef Salahuddin
**08:15:00 AM - 09:15:00 AM CEST**  
**Room:** Auditorium Ronsard  
**Chair(s):** Clive A. Randall (Pennsylvania State University)

**Ultrathin Ferroelectricity and its Application in Future Logic and Memory Devices**  
*Sayeef Salahuddin*  
*University of California, Berkeley, United States*

#### C2L-A: ISAF 1 - Thin Films & 2D Systems II
**09:30:00 AM - 10:30:00 AM CEST**  
**Room:** Auditorium Ronsard  
**Chair(s):** Jon Ihlefeld (University of Virginia), Geoff Brennecka (Colorado School of Mines)

**09:30:00 AM**  
**2143: Quantifying the Electrode Clamping Effect’s Role on Phase Stability in Ferroelectric Hafnium Zirconium Oxide**  
*Jon Ihlefeld{4}, Shelby Fields{4}, Truong Cai{1}, Samantha Jaszewski{4}, Kyle P. Kelley{2}, Helge Heinrich{4}, David Henry{3}, Sergei V. Kalinin{2}, Brian Sheldon{1}  
{1}Brown University, United States; {2}Oak Ridge National Laboratory, United States; {3}Sandia National Laboratories, United States; {4}University of Virginia, United States*

**09:45:00 AM**  
**2433: Influence of Oxygen Content on the Coercive Field for Polarization Switching in HfO2 from Density Functional Theory**  
*Luis Azevedo Antunes, Richard Ganser, Alfred Kersch*  
*Munich University of Applied Sciences, Germany*

**10:00:00 AM**  
**2421: Accurate Modeling of the Low Temperature Pyroelectric Coefficient in ZrO2**  
*Richard Ganser, Luis Azevedo Azevedo, Alfred Kersch*  
*Munich University of Applied Sciences, Germany*

#### C2L-B: ISAF 2 - Thin Film Processing including Lead Free Materials III
**09:30:00 AM - 10:30:00 AM CEST**  
**Room:** Room 5  
**Chair(s):** Sebastian Glinsek (Luxembourg Institute of Science and Technology), Gabriele De Luca (Catalan Institute of Nanoscience and Nanotechnology)

**09:30:00 AM**  
**2363: Reduced Hysteresis Loss and Enhanced Energy-Storage Properties of Aerosol Deposited Mn-Doped PLZT 7/82/18 Anti-Ferroelectric Thick Films**  
*Ajeet Kumar, Geon Lee, Jungho Ryu*  
*Yeungnam University, Korea*
Thursday, June 30

09:45:00 AM
2381: (Pb,Sr)TiO3 Films on SrTiO3 (100) Substrates Grown by Liquid Phase Epitaxy
Laura Wollesen(3), Paul-Antoine Douissant(2), Ingrid Cañero Infante(4), Jérémy Margueritl(5), Thierry Martin(1), Christophe Dujardin(5)
{1}ESRF - European Synchrotron Radiation Facility, France; {2}ESRF European Synchrotron Radiation Facility, France; {3}ESRF European Synchrotron Radiation Facility, Université Lyon, CNRS, UCBL, Institut Lumiére Matiére, France; {4}Institut des Nanotechnologies de Lyon, CNRS UMR5270 ECL INSA Lyon UCBL CPE Lyon, France; {5}Université Lyon, CNRS, UCBL, Institut Lumiére Matiére, France

10:00:00 AM
2468: INVITED: Principle of Aerosol Deposition Method and its Application to Dielectric / Ferroelectric Thick Films
Jun Akedo
National Institute of Advanced Industrial Science & Technology, Japan

C2L-C: ISAF 3 - Structure Characterization & Properties of Ferroelectric Materials III
09:30:00 AM - 10:30:00 AM CEST
Room: Room 3
Chair(s): Marco Deluca (Materials Center Leoben Forschung GmbH), Giovanna Canu (CNR - Institute of Condensed Matter Chemistry and Technologies for Energy)

09:30:00 AM
2180: Heterogeneous Design for Ferroic Oxide Membranes
Kyeong Tae Kang(1), Joon Woo Lee(6), Zachary J Corey(5), Yogesh Sharma(2), Binod Paudel(3), Pinku Roy(5), Liam Collins(4), Xuejing Wang(2), Yeonhoo Kim(2), Jinkyung Yoo(2), Yoon Seok Oh(6), Aiping Chen(2)
{1}Kyungpook National University, Korea; {2}Los Alamos National Laboratory / Kyungpook National University, United States; {3}New Mexico State University, United States; {4}Oak Ridge National Laboratory, United States; {5}State University of New York at Buffalo, United States; {6}Ulsan National Institute of Science and Technology, Korea

09:45:00 AM
2216: Direct Electrocaloric Measurements of Flexible Pb(Mg1/3Nb2/3)O3–PbTiO3 Ceramic Films
Uroš Prah(3), Matej Šadl(2), Veronika Kovacova(3), Pierre Lheritier(3), Youri Nouchokgwe(3), Alvar Torelló Massana(3), Hana Uršič(1), Emmanuel Defay(3)
{1}Institut Jožef Stefan, Slovenia; {2}Jožef Stefan Institute, Slovenia; {3}Luxembourg Institute of Science and Technology, Luxembourg

10:00:00 AM
2068: Structure and Piezoelectric Properties of Electrospun PLLA Fibers
Yasmin Mohamed Yousry, Ji Rong, David Lim Boon Kiang, Kui Yao
IMRE, Agency for Science, Technology and Research A-STAR, Singapore

C2L-D: ISAF 4 - Ferroelectrics for Acoustics & Ultrasonics Applications I
09:30:00 AM - 10:30:00 AM CEST
Room: Room 4
Chair(s): Lixiang Wu (Silicon Inc.), Laura Stoica (Thales UK)

09:30:00 AM
Laura Stoica
Thales UK, United Kingdom
Thursday, June 30

10:00:00 AM
2446: Analyses of a Fully Printed PVDF Transducer Using an Adapted Mason Model
Christoph Leitner{1}, Kirill Keller{1}, Stephan Thurner{1}, Francesco Greco{2}, Jörg Schröttner{1}
{1}Graz University of Technology, Austria; {2}University Sant’Anna Pisa, Italy

10:15:00 AM
2174: Longitudinal and Torsional Ultrasonic Transducers Made of Thermal Sprayed Potassium Sodium Niobate-Based Piezoelectric Ceramic Coating
Jie Yin{1}, Shuting Chen{1}, Voon-Kean Wong{1}, Shifeng Guo{1}, Siao Li Liew{1}, Kui Yao{2}
{1}Agency for Science, Technology and Research, Singapore; {2}IMRE, Agency for Science, Technology and Research A-STAR, Singapore

C2L-E: PFM - Nanoscale Domain Structures
09:30:00 AM - 10:30:00 AM CEST
Room: Room 2
Chair(s): Michele Conroy (Imperial College London)

09:30:00 AM
2319: INVITED: Novel Functionalities at Twin Domain Crossings
Kumara Cordero-Edwards{3}, Philippe Tückmantel{3}, Iaroslav Gaponenko{3}, Sahar Saremi{1}, Lane W. Martin{2}, Patrycja Paruch{3}
{1}University of California, Berkeley, United States; {2}University of California, Berkeley, Lawrence Berkeley National Laboratory, United States; {3}University of Geneva, Switzerland

10:00:00 AM
2343: Asymmetric Tribology of Symmetric Ferroelectric Polar Domains
{1}Catalan Institute of Nanoscience and Nanotechnology ICN2, ICREA, Spain; {2}Korea Advanced Institute of Science and Technology, Korea; {3}Universitat Politècnica de Catalunya, Spain; {4}University of Geneva, Switzerland

10:15:00 AM
2161: Extraordinary Conduction in Ubiquitous a- and C-Domain Walls in Tetragonal PZT Revealed by Scanning Probe Microscopy
Igor Stolichnov{1}, Felix Risch{1}, Igor Lukyanchuk{2}, Yuri Tikhonov{2}, Adrian Ionescu{1}
{1}École Polytechnique Fédérale de Lausanne, Switzerland; {2}University of Picardie Jules Verne, France

C2L-F: ECAPD - Materials for Photovoltaics
09:30:00 AM - 10:30:00 AM CEST
Room: Room 1
Chair(s): Sylvia Matzen (Universite Paris Saclay), Hangbo Zhang (Warwick University)

09:30:00 AM
2475: INVITED: Organic-Inorganic Lead Halides Based on Methylhydrazinium, Structure-Property Relations
Anna Gągor{1}, Mirosław Mączka{1}, Jan Zaręba{2}, Dagmara Stefańska{1}, Dawid Drozdowski{1}, Adam Sieradzki{2}
{1}Institute of Low Temperature and Structure Research, Polish Academy of Science, Poland; {2}Wrocław University of Science and Technology, Poland
Thursday, June 30

10:00:00 AM  
**2452: The Outstanding Role of Dielectricity in Hybrid Solar Cell Absorbers**  
Doru C Lupascu{2}, Andrei Karabanov{1}, Young Jin{1}, Kristina Winkler{1}, Niels Benson{1}, Astita Dubey{1}, Vladimir V. Shvartsman{2}, Marianela Escobar C{1}  
{1}University of Duisburg-Essen, Germany; {2}University of Duisburg-Essen, CENIDE, Germany

10:15:00 AM  
**2194: Determination of Thermodynamic Properties from Molecular Dynamics Simulations: Application to Hybrid Organic-Inorganic Perovskites**  
Carlos Escorihuela-Sayalero, Claudio Cazorla Silva  
Universitat Politècnica de Catalunya, Spain

10:30:00 AM – 11:00:00 AM CEST  
Coffee Break  
Level +2

11:00:00 AM  
**C3L-A: ISAF 1 / ECAPD - Multiferroics, Magnetoelectrics & Photovoltaics**  
Room: Auditorium Ronsard  
Chair(s): Charles Paillard (CentraleSupélec)

11:00:00 AM  
**2103: YOUNG INVESTIGATOR (INVITED): Photo-Induced Effects in Ferroelectrics & Multiferroics: Opportunities and Challenges**  
Charles Paillard{3}, Shenglan Hao{1}, Brahim Dkhil{4}, Zhijun Jiang{6}, Hongjun Xiang{2}, Laurent Bellaiche{5}  
{1}CentraleSupélec, France; {2}Fudan University, China; {3}Laboratoire SPMS, CentraleSupélec, CNRS-UMR8580, Université Paris-Saclay, France; {4}Université Paris-Saclay, CentraleSupélec, CNRS UMR 8580, Laboratoire SPMS, France; {5}University of Arkansas, United States; {6}Xi’an Jiaotong University, China

11:15:00 AM  
**2246: Ultrafast Light-Induced Strain and Symmetry Breaking in Multiferroic BiFeO3**  
Ruizhe Gu{1}, Vincent Juvé{1}, Aurélie Poirier{1}, Gwenaëlle Vaudel{1}, Mads Weber{1}, Stéphane Fusil{6}, Vincent Garcia{6}, Daniel Sando{8}, Charles Paillard{3}, Vitali Gusev{4}, Houssny Bouyanfif{2}, Brahim Dkhil{7}, Claire Laulhé{5}, Pascal Ruello{1}  
{1}IMMM Le Mans Université, France; {2}Laboratoire Physique Matière Condensée, Université Jules Vernes Picardie, France; {3}Laboratoire SPMS, CentraleSupélec, CNRS-UMR8580, Université Paris-Saclay, France; {4}LAUM Le Mans Université, France; {5}Synchrotron SOLEIL, Université Paris Saclay, France; {6}UMR CNRS-Thales Université Paris-Saclay, France; {7}Université Paris-Saclay, CentraleSupélec, CNRS UMR 8580, Laboratoire SPMS, France; {8}University of New South Wales, Australia

11:30:00 AM  
**2105: Lattice Dynamics and Soft-Mode Driven Ferroelectricity in Multiferroic BiMn3Cr4O12**  
André Maia{1}, Christelle Kadlec{1}, Maxim Savinov{1}, Rui Vilarinho{2}, Joaquim Agostinho Moreira{2}, Jiří Kaštél{1}, Alexei Belik{3}, Stanislav Kamba{1}  
{1}FZU Institute of Physics of the Czech Academy of Sciences, Czech Rep.; {2}IFIMUP, University of Porto, Portugal; {3}National Institute for Materials Science, Japan

11:45:00 AM  
**2358: Determining the Structural Phase and Origin of its Modulation in Room-Temperature Multiferroic Bi0.7La0.3FeO3**  
Mariana Gomes{1}, Teresa Carvalho{1}, Balagopalan Manjunath{1}, Rui Vilarinho{1}, Alexandra Gibbs{2}, Kevin Knight{2}, José Paixão{3}, Pedro Tavares{4}, Abílio Almeida{1}, Joaquim Agostinho Moreira{1}
Thursday, June 30

2244: Charged Domain Walls and Strong Magnetoelectric Coupling in a Magnetic Hybrid Improper Ferroelectric
Mads Weber{2}, Yannik Zemp{1}, Morgan Trassin{1}, Arkadiy Simonov{1}, Jakob Schaab{1}, Bin Gao{3}, Sang-Wook Cheong{3}, Thomas Lottermoser{1}, Manfred Fiebig{1}
{1}ETH Zürich, Switzerland; {2}IMMM Le Mans Université, France; {3}Rutgers University, United States

2335: Significant Power Enhancement of Magneto-Mechano-Electric Generators by Magnetic Flux Concentration
Deepak Patil, Jungho Ryu
Yeungnam University, Korea

C3L-B: ISAF 2 & 4 - Processing for HfO2 & Similar Systems
11:00:00 AM - 12:30:00 PM CEST
Room: Room 5
Chair(s): Sebastian Glinsek (Luxembourg Institute of Science and Technology), Gabriele De Luca (Catalan Institute of Nanoscience and Nanotechnology)

11:00:00 AM
2126: Optimizing Nucleation Layers for the Integration of Ferroelectric HZO on CVD-Grown Graphene
Suzanne Lancaster{2}, Iciar Arnay{1}, Ruben Guerrero{1}, Adrian Gudin{1}, Thomas Mikolajick{2}, Paolo Perna{1}, Stefan Slesazeck{2}
{1}IMDEA Nanoscience Institute, Spain; {2}NaMLab gGmbH, Technische Universität Dresden, Germany

11:15:00 AM
2139: Epitaxial Zirconia Films on Fluorite Substrates
Gabriele De Luca{1}, Saptam Ganguly{1}, Jessica Padilla{1}, José Manuel Caicedo{1}, José Santiso{1}, Gustau Catalan{2}
{1}Catalan Institute of Nanoscience and Nanotechnology ICN2, Spain; {2}Catalan Institute of Nanoscience and Nanotechnology ICN2, ICREA, Spain

11:30:00 AM
2284: Direct Epitaxial Growth of Polar Hf0.5Zr0.5O2 Films on Al2O3
Eduardo Barriuso Fernández{4}, Panagiotis Koutsogiannis{3}, David Serrate{3}, Javier Herrero-Martin{1}, Ricardo Jiménez{2}, César Magén{3}, Miguel Alguero{2}, Pedro Antonio Algarabel{3}, José Ángel Pardo{3}
{1}ALBA Synchrotron, Spain; {2}Instituto de Ciencia de Materiales de Madrid ICMM-CSIC, Spain; {3}Instituto de Nanociencia y Materiales de Aragón, Universidad de Zaragoza-CSIC, Spain; {4}Instituto de Nanociencia y Materiales de Aragón, Universidad de Zaragoza-INMA-CSIC, Spain

11:45:00 AM
2141: Giant Piezoelectricity in Centerosymmetric Oxides
Daesung Park, Mahmoud Hadad, Paul Muralt, Dragan Damjanovic
École Polytechnique Fédérale de Lausanne, Switzerland

12:00:00 PM
2171: Towards Simpler, Greener, and More Economic Fabrication Methods for HfO2 Ferroelectric Devices
Miguel Badillo, Sepide Taleb, Beatriz Nocheda, Mónica Acuautla
University of Groningen, Netherlands
Thursday, June 30

12:15:00 PM
2447: High-Q Hafnia-Zirconia Lamb-Wave Resonators with Lithographically Scalable Frequency Over 0.4 GHz to 1.4 GHz
Troy Tharpe, Roozbeh Tabrizian
University of Florida, United States

| C3L-C: ISAF 3 / ECAPD - Structure Characterization & Properties of Ferroelectric Materials IV |
| 11:00:00 AM - 12:30:00 PM CEST |
| Room: Room 3 |
| Chair(s): Hugh Simons (DTU), Kyeong Tae Kang (Kyungpook National University) |

11:00:00 AM
2122: Reversible Control of the Properties of BiFeO3-Based Ferroelectric Ceramic with High Curie Temperature by Quenching and Tempering
Anton Tuluk, Sybrand van der Zwaag
Delft University of Technology, Netherlands

11:15:00 AM
2213: Electrocaloric Entropy Change in Lead Scandium Tantalate Multilayer Capacitors Using a Differential Scanning Calorimeter and Clausius-Clapeyron Equation
Youri Nouchokgwe{1}, Pierre Lheritier{1}, Tomoyasu Usui{2}, Alvar Torelló Massana{1}, Uros Prah{1}, Veronika Kovacova{1}, Sakyo Hirose{2}, Emmanuel Defay{1}
{1}Luxembourg Institute of Science and Technology, Luxembourg; {2}Murata Manufacturing Co. Ltd., Japan

11:30:00 AM
2164: Electrical and Optical Tuning of mm-Wave Dielectric Permittivity of Solution-Deposited Lead Zirconate Titanate Films
Torsten Granzow{1}, Suraj Manikandan{2}, Lucas Allirol{1}, Naveen Aruchamy{1}, Stéphanie Girod{1}, Sebastjan Glinšek{1}, Emmanuel Defay{1}
{1}Luxembourg Institute of Science and Technology, Luxembourg; {2}Technical University of Denmark, Denmark

11:45:00 AM
2074: Reversible Polarization Fatigue and Recovery in PZT Thin Film Capacitors via Electric Field
Somnath Kale{1}, Adrian Petraru{2}, Hermann Kohlstedt{2}, Rohit Soni{1}
{1}Indian Institute of Science Education and Research Berhampur, India; {2}Institute of Electrical and Information Engineering, Kiel University, Germany

12:00:00 PM
2123: Grain Size Effects on the Electromechanical Properties of Ba0.85Ca0.15Ti0.9Zr0.1O3 Down to the Verge of the Submicron Scale
Miguel Algueró{1}, José E. García{4}, Diego A. Ochoa{4}, Pablo Ramos{2}, Michel Venet{3}, Alicia Castro{1}, Harvey Amorín{1}
{1}Instituto de Ciencia de Materiales de Madrid ICMM-CSIC, Spain; {2}Universidad de Alcalá, Spain; {3}Universidade Federal de São Carlos, Brazil; {4}Universitat Politècnica de Catalunya - BarcelonaTech, Spain
Thursday, June 30

**C3L-D: ISAF 4 - Ferroelectrics for Acoustics & Ultrasonics Applications II**
11:00:00 AM - 12:30:00 PM CEST
Room: Room 4
Chair(s): Lixiang Wu (Silicon Inc.), Laura Stoica (Thales UK)

11:00:00 AM
**2473: INVITED: Piezoelectric MEMS for Acoustic and Ultrasonic Applications**
Lixiang Wu, Tingzhong Xu, Javad Abbaszadeh, Mohssen Moridi
Silicon Austria Labs GmbH, Austria

11:30:00 AM
**2256: Intrinsically Switchable GHz Ferroelectric ScAlN SAW Resonators**
Ved Gund, Kazuki Nomoto, Huili Grace Xing, Debdeep Jena, Amit Lal
Cornell University, United States

11:45:00 AM
**2448: Intrinsically Switchable Ferroelectric Hafnia-Zirconia Bulk Acoustic Resonators**
Troy Tharpe, Roozbeh Tabrizian
University of Florida, United States

12:00:00 PM
**2209: High Overtone Bulk Acoustic Resonator with Improved Effective Coupling Coefficient**
Shivakumar Chedurupalli, Karthik Reddy K, Akhilram T S, James Raju K C
University of Hyderabad, India

12:15:00 PM
**2255: Piezoelectric Retention and Sensitivity of Ultrasonic Sensors on Buckled MEMS Diaphragm Structures**
Tomoya Suetaka, Riho Kondo, Kaoru Yamashita
Kyoto Institute of Technology, Japan

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**C3L-E: PFM - Phase transitions and disordered ferroelectrics by PFM**
11:00:00 AM - 12:30:00 PM CEST
Room: Room 2
Chair(s): Raymond McQuaid (Queen's University Belfast, UK)

11:00:00 AM
**2013: Complete Spatially-Resolved Switching Dynamics in Perovskite and Fluorite Ferroelectrics by First-Order Reversal Curves**
Chenxi Wang(2), Yeehyun Park(2), Seunghun Kang(2), Myeongseop Song(1), Seungchul Chae(1), Yunseok Kim(2)
{1}Seoul National University, Korea; {2}Sungkyunkwan University, Korea

11:15:00 AM
**2114: YOUNG INVESTIGATOR (INVITED): Topological Transitions in Epitaxial Ultrathin Ferroelectric Heterostructures**
Vivasha Govinden(2), Suyash Rijal(1), Qi Zhang(2), Sergei Prokhorenko(1), Yousra Nahas(1), Laurent Bellaiche(1), Nagarajan Valanoor(2)
{1}University of Arkansas, United States; {2}University of New South Wales, Australia

11:30:00 AM
**2501: YOUNG INVESTIGATOR (INVITED): Emergence of Isotropy at Morphotropic Phase Boundary of Relaxor Ferroelectrics**
Kanghyun Chu, Lukas Riemer, Dragan Damjanovic
École Polytechnique Fédérale de Lausanne, Switzerland
Thursday, June 30

11:45:00 AM
2245: Biomolecular Ferroelectric Materials: From Amino Acids to Self-Organized Peptides
Andrei Kholkin
CICECO - Aveiro Institute of Materials, University of Aveiro, Ural Federal University, Portugal

<table>
<thead>
<tr>
<th>Time</th>
<th>Session Title</th>
<th>Speaker(s)</th>
<th>Institution(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>11:00</td>
<td>C3L-F: ECAPD - Materials for Energy Storage</td>
<td>Lourdes Calzada (ICMM-CSIC), Marin Alexe (University of Warwick)</td>
<td>Room 1, Chair(s): Lourdes Calzada (ICMM-CSIC), Marin Alexe (University of Warwick)</td>
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<tr>
<td>11:00</td>
<td>2472: INVITED: Antiferroelectric Capacitors for Power Electronics</td>
<td>Sylvia E. Gebhardt, Christian Molin, Holger Neubert</td>
<td>Fraunhofer Institute for Ceramic Technologies and Systems IKTS, Germany</td>
</tr>
<tr>
<td>11:30</td>
<td>2019: BaZrxTi1-xO3 Thin Films for Energy Storage Devices</td>
<td>Kristine Bakken, Theresa Gindel, Martina Angermann, Federica Benes, Marco Deluca</td>
<td>Materials Center Leoben Forschung GmbH, Austria</td>
</tr>
<tr>
<td>11:45</td>
<td>2154: Energy Storage Pb(Mg1/3Nb2/3)O3–PbTiO3 Thick Films Integrated by Aerosol Deposition on Metal and Polymer Substrates</td>
<td>Matej Šadl, Oana Condurache, Andreja Benčan Golob, Mirela Dragomir, Barbara Malić, Udo Eckstein, Neamul Hayet Khansur, Kyle Grant Webber, Andrej Lebar, Josko Valentincic, Kevin Nadaud, Micka Bah, Franck Levassort, Ha Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany; GREMAN UMR 7347, University of Tours - CNRS - INSA, France; Institut Jožef Stefan, Slovenia; Jožef Stefan Institute, Slovenia; University of Ljubljana, Slovenia</td>
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<td>12:00</td>
<td>2453: Electrolyte Dependence on Solid Electrolyte Interface (SEI) Formation in BaTiO3 Supported Lithium Ion Thin Film Batteries</td>
<td>Shintaro Yasu, Daigo Nanasawa, Sou Yasuhara, Ayumi Itoh, Yoshinao Kobayashi, Takashi Teranishi, Ha Okayama University, Japan; Tokyo Institute of Technology, Japan</td>
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<tr>
<td>12:30</td>
<td>Lunch</td>
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</table>

Plenary: Syed A. M. Tofail
02:00:00 PM - 03:00:00 PM CEST
Room: Auditorium Ronsard
Chair(s): Marin Alexe (University of Warwick)

Ferroelectricity in Biological Hierarchy
Syed A. M. Tofail
University of Limerick, Ireland
Thursday, June 30

Awards
Student Poster Competition & Student Pitch Competition
03:00:00 PM - 03:30:00 PM CEST
Room: Auditorium Ronsard

C5L-A: ISAF 1 & 4 - Ferroelectrics for Biomedical Applications I
03:45:00 PM - 04:45:00 PM CEST
Room: Auditorium Ronsard
Chair(s): Julia Glaum (Norwegian University of Science and Technology), Jennifer Andrew (University of Florida)

03:45:00 PM
2436: INVITED: Ferroelectrics for Biomedical Applications: New Boundary Conditions, New Challenges
Julia Glaum
Norwegian University of Science and Technology, Norway

04:15:00 PM
2129: YOUNG INVESTIGATOR (INVITED): Biomolecular Piezoelectric Materials and Energy Generator
Ju-Hyuck Lee
Daegu Gyeongbuk Institute of Science and Technology, Korea

04:30:00 PM
2020: Relaxor Ferroelectrics for Mimicking Biological Synapses
Long Cheng{2}, Brahim Dkhil{2}, Bobo Tian{1}
{1}East China Normal University, China; {2}Université Paris-Saclay, CentraleSupélec, CNRS UMR 8580, Laboratoire SPMS, France

C5L-B: ISAF 2 & 4 Thin Film Applications
03:45:00 PM - 04:45:00 PM CEST
Room: Room 5
Chair(s): Kristine Bakken (Materials Center Leoben Forschung GmbH)

03:45:00 PM
2165: INVITED: Processing of Piezoelectric Films for Haptic Applications
Sebastjan Glinšek{1}, Longfei Song{2}, Emmanuel Defay{1}
{1}Luxembourg Institute of Science and Technology, Luxembourg; {2}Luxembourg Institute of Science and Technology and University of Luxembourg, Luxembourg

04:15:00 PM
2002: Novel Tunable Equalizers with Ferroelectric BST Tunable Capacitors to Improve Signal Integrity
Dubari Borah{2}, Aarushi Gupta{2}, Ken Miller{1}, Thottam Kalkur{2}
{1}Keysight Inc., United States; {2}University of Colorado Colorado Springs, United States

04:30:00 PM
2162: A Capacitor Consisting of Metal Foam, ALD-Dielectric, and Liquid Metal
Brendan Hanrahan{3}, Asher Leff{2}, Michael Fish{3}, Nicholas Strnad{3}, Alexis Payne{1}
{1}Air Force Research Laboratory, United States; {2}General Technical Services, United States; {3}U.S. Army Combat Capabilities Development Command - Army Research Laboratory, United States
### C5L-C: ISAF 3 - Structure Characterization & Properties of Ferroelectric Materials V

- **Time:** 03:45:00 PM - 04:45:00 PM CEST
- **Room:** Room 3
- **Chair(s):** Kyeong Tae Kang (Kyungpook National University), Geoff Brennecka (Colorado School of Mines)

#### 2039: Bipolar and Unipolar Cycling Behavior in Ferroelectric Scandium-Doped Aluminum Nitride

Li Chen, Chen Liu, Minghua Li, Wendong Song, Weijie Wang, Zhixian Chen, Subhranu Samanta, Hock Koon Lee, Yao Zhu
IME, Agency for Science, Technology and Research A-STAR, Singapore

#### 2065: Impact of Epitaxy on the Structural and Ferroelectric Properties of Al1-xScxN Deposited by Sputter-Epitaxy

Georg Schönweger{4}, Adrian Petraru{4}, Md Redwanul Islam{2}, Niklas Wolff{2}, Benedikt Haas{5}, Adnan Hammud{1}, Christoph Koch{5}, Lorenz Kienle{2}, Hermann Kohlstedt{4}, Simon Fichtner{3}

{1}Fritz-Haber Institute of the Max-Planck Society, Germany; {2}Institute for Material Science, Kiel University, Germany; {3}Institute for Material Science, Kiel University, Fraunhofer Institute for Silicon Technology ISIT, Germany; {4}Institute of Electrical and Information Engineering, Kiel University, Germany; {5}Institute of Physics & IRIS Adlershof, Humboldt-Universität zu Berlin, Germany

### C5L-D: ISAF 4 - Ferroelectrics for Sensors, Actuators & MEMS I

- **Time:** 03:45:00 PM - 04:45:00 PM CEST
- **Room:** Room 4
- **Chair(s):** Laurent Vila (Université Grenoble Alpes), Ignasi Fina Martínez (ICMAB-CSIC)

#### 2502: INVITED: Advances in Piezo MEMS Technology - Enablers for a New Wave of Sensors and Actuators

Anton Hofmeister, Marco Ferrera, Fabio Quaglia, Domenico Giusti
STMicroelectronics, Italy

#### 2045: Fully Inkjet-Printed Piezoelectric Haptic Device

Longfei Song{2}, Sebastjan Glinšek{1}, Veronika Kovacova{1}, Emmanuel Defay{1}

{1}Luxembourg Institute of Science and Technology, Luxembourg; {2}Luxembourg Institute of Science and Technology and University of Luxembourg, Luxembourg

#### 2038: Waveform Dependence of Self-Heating of Thin Film PZT Based Devices

Peter Mardilovich{1}, Charalampos Fragkiadakis{1}, Thorsten Schmitz-Kempen{1}, Mani Sivaramakrishnan{2}, Susan Troller-McKinstry{3}

{1}aixACCT Systems GmbH, Germany; {2}ARNDIT LLC, United States; {3}Pennsylvania State University, United States
Thursday, June 30

C5L-E: ECAPD - Domains & Domain Walls II  
03:45:00 PM - 04:45:00 PM CEST  
Room: Room 2  
Chair(s): Marco Deluca (Materials Center Leoben Forschung GmbH)

03:45:00 PM  
2203: INVITED: Domain-Wall Contributions to Piezoelectric Response: Relaxor Versus Normal Lead-Based Ferroelectric Ceramics  
Tadej Rojac{1}, Mirela Dragomir{1}, Mojca Otoničar{2}  
{1}Jožef Stefan Institute, Slovenia; {2}Jožef Stefan International Postgraduate School, Jožef Stefan Institute, Slovenia

04:15:00 PM  
2321: Stabilizing Factors of Ferroelectric Charged Domain Walls in BaTiO3 Single Crystals  
Petr Bednyakov, Jiří Hlinka  
FZU Institute of Physics of the Czech Academy of Sciences, Czech Rep.

04:30:00 PM  
2091: Ordered Cellular Flux-Closure Arrays in Tensile-Strained PbTiO3 Thin Films  
Marios Hadjimichael{3}, Céline Lichtensteiger{3}, Edoardo Zatterin{1}, Jean-Yves Chauleau{2}, Michel Viret{2}, Steven Leake{1}, Jean-Marc Triscone{3}  
{1}ESRF European Synchrotron Radiation Facility, France; {2}SPEC, CEA, CNRS, Université Paris-Saclay, CEA Saclay, France; {3}University of Geneva, Switzerland

C5L-F: ECAPD - Advanced Characterization II  
03:45:00 PM - 04:45:00 PM CEST  
Room: Room 1  
Chair(s): Ana Sanchez (University of Warwick), Andrew Bell (Leeds University)

03:45:00 PM  
2470: INVITED: Phase Transitions in Improper and Incommensurate Ferroelectrics  
Finlay Morrison  
University of St Andrews, United Kingdom

04:15:00 PM  
2268: INVITED: Characterization and Control of Polar Dielectrics Using Ultrashort Laser Pulses  
Elena Mishina, Alexander Sigov  
MIREA - Russian Technological University, Russia

04:45:00 PM – 05:15:00 PM CEST  
Coffee Break  
Level +2

C6L-A: ISAF 1 & 4 - Ferroelectrics for Biomedical Applications II  
05:15:00 PM - 06:15:00 PM CEST  
Room: Auditorium Ronsard  
Chair(s): Julia Glaum (Norwegian University of Science and Technology), Jennifer Andrew (University of Florida)

05:15:00 PM  
2226: INVITED: Magnetoelectric Nanowires: Synthesis, Assembly, and Applications in Electronics and Biomedicine  
Noah Ferson, John Ganiban, Jennifer Andrew  
University of Florida, United States
Thursday, June 30

05:45:00 PM
2148: Ferroelectric Microelectrodes for Bioelectronic Applications
Maximilian Becker
University of Cambridge, United Kingdom

06:00:00 PM
2281: 3D Printed BCZT Based Composites for Antibacterial and Tissue Engineering Applications
Zois Michail Tsikriteas{3}, Swati Jindal{1}, Rachel A. Heylen{2}, Elena Mancuso{1}, Hamideh Khanbareh{3}
{1}Ulster University, United Kingdom; {2}University of Bath, United Kingdom; {3}University of Bath, United Kingdom

C6L-B: ISAF 3 - Structure Characterization & Properties of Hafnia-based Ferroelectrics I
05:15:00 PM - 06:15:00 PM CEST
Room: Room 5
Chair(s): Alex Hsain (North Carolina State University)

05:15:00 PM
2101: YOUNG INVESTIGATOR (INVITED): Multiferroic Tunnel Junctions with Rhombohedral Hafnia-Based Barriers
Yingfen Wei{2}, Sylvia Matzen{1}, Pavan Nukala{3}, Beatriz Noheda{4}
{1}Center for Nanoscience and Nanotechnology, Université Paris-Saclay, France; {2}École Polytechnique Fédérale de Lausanne, Switzerland; {3}Indian Institute of Science, Bangalore, India; {4}University of Groningen, Netherlands

05:30:00 PM
2207: The Effect of Mechanical Stress on the Piezoelectric Coefficient of a Hf0.5Zr0.5O2 Film
Elizaveta Guberna, Anastasia Chouprik, Evgeny Korostylev, Dmitrii Negrov
Moscow Institute of Physics and Technology, Russia

05:45:00 PM
2204: Raman Spectroscopy to Differentiate the Orthorhombic Phase in Thin Ferroelectric ALD Deposited HfxZr1-xO2-Based Films
Ridham Sachdeva{3}, Monica Materano{3}, Patrick D. Lomenzo{3}, Mahmoud Madian{3}, Maxim Popov{1}, Marco Deluca{1}, Alfred Kersch{2}, Thomas Mikolajick{3}, Uwe Schroeder{3}
{1}Materials Center Leoben Forschung GmbH, Austria; {2}Munich University of Applied Sciences, Germany; {3}NaMLab gGmbH, Technische Universität Dresden, Germany

06:00:00 PM
2214: Evaluating Switching Dynamics in Epitaxial Hf0.5Zr0.5O2 Films
Tingfeng Song{1}, Florencio Sánchez{2}, Ignasi Fina{1}
{1}Instituto de Ciencia de Materiales de Barcelona ICMAB-CSIC, China; {1}Instituto de Ciencia de Materiales de Barcelona ICMAB-CSIC, Spain; {2}Instituto de Ciencia de Materiales de Barcelona, Universitat Autònoma de Barcelona, Spain
Thursday, June 30

C6L-C: ISAF 3 - Thermal Phenomena
05:15:00 PM - 06:15:00 PM CEST
Room: Room 3
Chair(s): Laura Stoica (Thales UK), Ming-Ming Yang (University of Warwick)

05:15:00 PM
2266: Infrared Imaging of the Electrocaloric Effect in Polymer Films Supported on a Flexible Substrate
Ashwath Aravindhan{2}, Pierre Lheritier{2}, Fabrice Domingues Dos Santos{1}, Xavier Chevalier{1}, Youri Nouchokgwe{2}, Alvar Torelló Massana{2}, Uros Prah{2}, Asmaa El Moul{2}, Emmanuel Defay{2}, Veronika Kovacova{2}
{1}Arkema Piezotech, France; {2}Luxembourg Institute of Science and Technology, Luxembourg

05:30:00 PM
2283: Electrocaloric Enhancement Induced by Cocrystallization of Vinylidene Difluoride-Based Polymer Blends
Florian Le Goupil{1}, Francesco Coin{2}, Naser Pouriamanesh{2}, Guillaume Fleury{2}, Georges Hadziioannou{2}
{1}Laboratoire de Chimie des Polymres Organiques, Université de Bordeaux, France; {2}LCPO, Université de Bordeaux, France

05:45:00 PM
2325: Measuring Spatially Resolved Nanoscale Heat Flow in Ferroelectric Materials
Rebecca Kelly{3}, Fran Kurnia{2}, Amit Kumar{1}, J. Marty Gregg{1}, Raymond G.P. McQuaid{1}
{1}Centre for Nanostructured Media, Queen's University Belfast, United Kingdom; {2}Hanbat National University, Korea; {3}Queen’s University Belfast, United Kingdom

06:00:00 PM
2415: Remarkable Large Thermal Hysteresis in Single Component Organic Ferroelectric Crystals
Rekha Kumari, T. N. Guru Row
Indian Institute of Science, Bangalore, India

C6L-D: ISAF 4 - Ferroelectrics for Sensors, Actuators & MEMS II
05:15:00 PM - 06:15:00 PM CEST
Room: Room 4
Chair(s): Laurent Vila (Université Grenoble Alpes)

05:15:00 PM
2007: INVITED: Design of Actuators Based on Relaxor-Ferroelectric Crossover
Sanu Gupta{2}, David Cann{2}, Peter Mardilovich{1}, Brady Gibbons{2}
{1}aixACCT Systems GmbH, Germany; {2}Oregon State University, United States

05:45:00 PM
2186: A Robust, Low-Voltage Driven Millirobot Based on Transparent Ferroelectric Crystals
Xiangyu Gao{1}, Liao Qiao{1}, Lin Zhang{2}, Shujun Zhang{4}, Shuxiang Dong{3}, Zhuo Xu{1}, Fei Li{1}
{1}Electronic Materials Research Laboratory, Key Lab of Education Ministry, Xi’an Jiaotong University, China; {2}MIT Media Lab, Massachusetts Institute of Technology, United States; {3}Peking University, China; {4}University of Wollongong, Australia

06:00:00 PM
2046: Pyroelectric IR Detection of Wildfires
Roger Whatmore{1}, John Phair{3}, Matthias Jäger{4}, Alex Hudson{4}, Farrer Owsley-Brown{2}, Mark Grosvenor{2}, Martin Wooster{2}
{1}Imperial College London, United Kingdom; {2}Kings College London, United Kingdom; {3}Pyreos Ltd, United Kingdom; {4}Tethir Ltd, United Kingdom
Thursday, June 30

C6L-E: ECAPD - Domains & Domain Walls III
05:15:00 PM - 06:15:00 PM CEST
Room: Room 2
Chair(s): Nathalie Lemee (University of Picardie)

05:15:00 PM
2014: Strain-Driven Domain Wall Conduction in a Narrow-Gap Mott Insulator
Lukas Puntigam, Markus Altthaler, Somnath Ghara, Lilian Prodan, Vladimir Tsurkan, Stephan Krohns, István Kézsmárki, Donald M. Evans
University of Augsburg, Germany

05:30:00 PM
2104: High Room Temperature Carrier Mobility at Conducting Ferroelectric Domain Walls Measured by Geometric Magnetoresistance
Conor McCluskey{2}, Matthew Colbear{2}, James McConville{2}, Raymond G.P. McQuaid{1}, J. Marty Gregg{1}
{1}Centre for Nanostructured Media, Queen’s University Belfast, United Kingdom; {2}Queen’s University Belfast, United Kingdom

05:45:00 PM
2242: Tailoring the Internal Structure of Ferroelectric Domain Walls
Ulises Acevedo-Salas, Cédric Voulot, Yide Zhang, Olivier Crégut, Kokou Dodzi Dorkenoo, Riccardo Hertel, Salia Cherifi-Hertel
Université de Strasbourg and CNRS, France

06:00:00 PM
2371: Avalanche Criticality During Ferroelectric Switching
Blai Casals, Guillaume Nataf, Ekhard Salje
University of Cambridge, United Kingdom

C6L-F: ECAPD - Ferroelectrics & Antiferroelectrics for Energy Applications
05:15:00 PM - 06:15:00 PM CEST
Room: Room 1
Chair(s): Sylvia Gebhardt (Fraunhofer IKTS), Klaus Reichmann (Graz University of Technology)

05:15:00 PM
2087: INVITED: Optimization of Artificial Antiferroelectrics from Atomistic Simulations
Jorge Íñiguez
Luxembourg Institute of Science and Technology, Luxembourg

05:45:00 PM
2127: Antiferroelectric NaNbO3 Thin Films
Thorsten Schneider, Juliette Cardoletti, Mao-Hua Zhang, Hui Ding, Leopoldo Molina-Luna, Philipp Komissinskiy, Lambert Alff
Technische Universität Darmstadt, Germany

06:00:00 PM
2398: Quenched Defect Thermodynamics in SrSnO3-Doped NaNbO3
Lorenzo Villa, Elaheh Ghorbani, Karsten Albe
Technische Universität Darmstadt, Germany
D1L-A: ISAF 2 / ECAPD - Processing for Devices & Applications I  
08:15:00 AM - 10:00:00 AM CEST  
Room: Auditorium Ronsard  
Chair(s): Ying Liu (ICN2), James I. Roscow (University of Bath)

08:15:00 AM  
2318: Optimization of Fine-Scale 1-3 Piezocomposites for High Frequency Ultrasonic Transducers and Fabrication of a 20 MHz Linear Array Ultrasonic Probe  
Paul A. Günther{1}, Jan Kunzmann{2}, Holger Neubert{1}, Sylvia E. Gebhardt{1}  
{1}Fraunhofer Institute for Ceramic Technologies and Systems IKTS, Germany; {2}Smart Material GmbH, Germany

08:30:00 AM  
2368: Ultrasonic Transducers Made from Freeze-Cast Porous Piezoceramics  
James I. Roscow  
University of Bath, United Kingdom

08:45:00 AM  
2441: Structured Porous Ferroelectrics for Enhanced Energy Harvesting Performance  
Holly K. Pearce{2}, James I. Roscow{2}, Yan Zhang{1}, Chris R. Bowen{1}, Hamideh Khanbareh{2}  
{1}Central South University, China; {2}University of Bath, United Kingdom

09:00:00 AM  
2451: A Passive Tuning Technique to Enhance Haptic Feedback  
Surupa Shaw{2}, Anurupa Shaw{1}  
{1}Kelly OCG, France; {2}Texas A&M University, United States

09:15:00 AM  
2102: Simulating the Behavior of Robocasted Textured Piezoelectric Materials  
Andrea Roberto Insinga{1}, Thierry Désiré Pomar{1}, Vincenzo Esposito{1}, Jacob Ross Bowen{2}, Astri Bjørnetun Haugen{1}  
{1}Technical University of Denmark, Denmark; {2}Xnovo Technology ApS, Denmark

09:30:00 AM  
2133: Feasibility of Fabrication of Multilayer Capacitors from NBT-Based Ceramics  
Hamed Salimkhani, Maximilian Gehringer, An-Phuc Hoang, Till Frömling  
Technische Universität Darmstadt, Germany

09:45:00 AM  
2313: Polycrystalline YMnO3 Films for Reconfigurable Energy-Efficient Devices  
Rong Wu, Sebastian Schmitt, Veeresh Deshpande, Catherine Dubourdieu  
Helmholtz-Zentrum Berlin, Germany

D1L-B: ISAF 3 - Structure Characterization & Properties of Hafnia-based Ferroelectrics II  
08:15:00 AM - 10:00:00 AM CEST  
Room: Room 5  
Chair(s): Jon Ihlefeld (University of Virginia)
2130: Large Enhancement of Ferroelectric Polarization in Hf0.5Zr0.5O2 Films by Low Plasma Energy Pulsed Laser Deposition

Tingfeng Song{1}, Raúl Solanas{1}, Mengdi Qian{1}, Ignasi Fina{1}, Florencio Sánchez{2}
{1}Instituto de Ciencia de Materiales de Barcelona ICMAB-CSIC, Spain; {2}Instituto de Ciencia de Materiales de Barcelona, Universitat Autònoma de Barcelona, Spain


Alex Hsain{2}, Younghwan Lee{2}, Monica Materano{1}, Ruben Alcalá{1}, Bohan Xu{1}, Thomas Mikolajick{1}, Uwe Schroeder{1}, Gregory Parsons{2}, Jacob Jones{2}
{1}NaMLab gGmbH, Technische Universität Dresden, Germany; {2}North Carolina State University, United States

2155: Decoupling Microstructure and Oxygen Vacancy Impacts to Phase Stability in Pure Hafnium Oxide Thin Films

Samantha Jaszewski{3}, Eric Hoglund{3}, Anna Costine{3}, Marc Weber{4}, Shelby Fields{3}, Alejandro Salanova{3}, David Henry{2}, Jon-Paul Maria{1}, Petra Reinke{3}, James Howe{3}, Jon Ihlefeld{3}
{1}Pennsylvania State University, United States; {2}Sandia National Laboratories, United States; {3}University of Virginia, United States; {4}Washington State University, United States

2192: Ferroelectric La-Doped HfO2 Epitaxial Thin Films

Tingfeng Song{3}, Huan Tan{5}, Romain Bachelet{2}, Guillaume Saint-Girons{2}, Nico Dix{1}, Ignasi Fina{3}, Florencio Sánchez{4}
{1}Institut de Ciència de Materials de Barcelona ICMAB-CSIC, Spain; {2}Institut des Nanotechnologies de Lyon, CNRS UMR5270 ECL INSA Lyon UCBL CPE Lyon, France; {3}Instituto de Ciencia de Materiales de Barcelona ICMAB-CSIC, Spain; {4}Instituto de Ciencia de Materiales de Barcelona, Universitat Autònoma de Barcelona, Spain; {5}Instituto de Ciencia de Materiales de Barcelona, Universitat Autònoma de Barcelona ICMAB-CSIC, Spain

2217: Structural and Electrical Characterization of Rhombohedral Epitaxial Doped HfO2 Ferroelectric Films Deposited on Various Substrates

Adrian Petraru{1}, Ravi Droopad{2}, Hermann Kohlstedt{1}
{1}Institute of Electrical and Information Engineering, Kiel University, Germany; {2}Texas State University, United States

2322: A Study of the Influence of Crystallographic Texture on Properties of Ferroelectric Hf0.5Zr0.5O2

Younghwan Lee{1}, Rachel Broughton{1}, Alex Hsain{1}, Dong Hyun Lee{2}, Seung Keun Song{1}, Gregory Parsons{1}, Min Hyuk Park{2}, Jacob Jones{1}
{1}North Carolina State University, United States; {2}Seoul National University, Korea
Friday, July 1

09:45:00 AM

2302: Study of Polarisation and Conduction Mechanisms in Ferroelectric Hf0.5Zr0.5O2 Down to Deep Cryogenic Temperature 4.2 K
{1}INL CNRS UMR5270 ECL INSA Lyon UCBL CPE Lyon, Ecole Centrale de Lyon, France; {2}Institut des Nanotechnologies de Lyon, CNRS UMR5270 ECL INSA Lyon UCBL CPE Lyon, France; {3}Institut Interdisciplinaire d’Innovation Technologique, Université de Sherbrooke, Canada; {4}Institute of Electronics, Microelectronics and Nanotechnology, Université de Sherbrooke, France; {5}Université de Lyon, INSA de Lyon, Institut des Nanotechnologies de Lyon, CNRS UMR5270, France

D1L-C: ISAF 3 - Structure Characterization & Properties - Thin Films I
08:15:00 AM - 10:00:00 AM CEST
Room: Room 3
Chair(s): Barbara Malic (Institute Jozef Stefan)

08:15:00 AM

2328: INVITED: A Multiscale Study of the Structure, Chemistry and Ferroelectric Properties of Epitaxial Sol-Gel PbZr0.2Ti0.8O3 Films for Nanomechanical Switching
Ingrid Cañero Infante{1}, Sergio González-Casal{1}, Xiaofei Bai{1}, Kevin Alhada-Lahbabi{1}, Sara Gonzalez{1}, Bertrand Vilquin{1}, Pedro Rojo-Romeo{1}, David Albertini{1}, Damien Deleruyelle{1}, Nicolas Baboux{1}, Solène Brottet{1}, Bruno Canut{1}, Jean{-1}Institut des Nanotechnologies de Lyon, CNRS UMR5270 ECL INSA Lyon UCBL CPE Lyon, France; {2}MATEIS, CNRS UMR 5510 INSA Lyon UCBL, France; {3}Université Grenoble Alpes, CEA-Leti, France

08:45:00 AM

2434: Orientation Control and Properties of Epitaxial LiNbO3 Films on Sapphire
Quentin Micard{2}, Léa La Spina{2}, Samuel Margueron{3}, Vincent Astié{1}, Jean-Manuel Decams{1}, Alexis Mosset{2}, Vincent Laude{2}, Ausrine Bartasyte{4}
{1}Annealsys, France; {2}FEMTO-ST Institute, France; {3}FEMTO-ST Institute, Université de Bourgogne Franche-Comté, France; {4}Institut FEMTO-ST, Université de Bourgogne Franche-Comté, France

09:00:00 AM

2445: Exploring Nanoscale Properties Across the Morphotropic Phase Boundary in K1-xNaxNbO3 Thin Films Fabricated Through Aqueous Solution Deposition
Stuart R. Burns{3}, Ahmed Z. Rashad{3}, Mohsen Mahmoudvand{3}, Rama K. Vasudevan{2}, Michele Conroy{1}, Michelle Dolgos{3}
{1}Imperial College London, United Kingdom; {2}Oak Ridge National Laboratory, United States; {3}University of Calgary, Canada

09:15:00 AM

2299: Structural Characterization of Orientation-Controlled Epitaxial PbTiO3 Films Deposited Below Curie Temperature by Hydrothermal Method
Yuxian Hu, Rurika Kubota, Takahisa Shiraishi, Hiroshi Funakubo
Tokyo Institute of Technology, Japan

09:30:00 AM

2300: Domain Structure of Epitaxial Tetragonal (Bi,K)TiO3 Films Grown Below Curie Temperature by Hydrothermal Method
Rurika Kubota{2}, Yoshitomo Ito{1}, Akinori Tateyama{2}, Takahisa Shiraishi{2}, Minoru Kurosawa{2}, Hiroshi Funakubo{2}
{1}Nihon University, Japan; {2}Tokyo Institute of Technology, Japan
## Friday, July 1

### 09:45:00 AM

**2377: The Impact of Tensile Strain on the Charge Transport Mechanisms in PZT Thin Films**
Betul Akkopru-Akgun{2}, Kathleen Coleman{1}, Susan Trolier-McKinstry{2}
{1}Army Research Laboratory, United States; {2}Pennsylvania State University, United States

### D1L-D: ISAF 4 / ECAPD - Ferroelectrics & Dielectrics for Energy Harvesting & Storage

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
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<tbody>
<tr>
<td>08:15:00 AM</td>
<td><strong>D1L-D: ISAF 4 / ECAPD - Ferroelectrics &amp; Dielectrics for Energy Harvesting &amp; Storage</strong></td>
</tr>
<tr>
<td>Room: Room 4</td>
<td>Chair(s): Jan Schultheiß (Norwegian University of Science and Technology), Duk-Hyun Choe (Samsung Advanced Institute of Technology (SAIT))</td>
</tr>
</tbody>
</table>

#### 08:15:00 AM

**2413: Energy Balance Numerical Study in ZnO Nanowire Based Nanogenerator**
Emmanuel Dumons, Louis Pascal Tran-Huu-Hue, Guylaine Poulin-Vittrant
GREMAN UMR 7347, University of Tours - CNRS - INSA CVL, France

#### 08:30:00 AM

**2189: Energy Harvesting from a Piezo Buzzer with Schottky Diode and Complementary MOSFET Full-Bridge Rectifiers**

Niharika Gogoi, Jens Kirchner, Georg Fischer
Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany

#### 08:45:00 AM

**2170: Broad-Band Piezoelectric Energy Harvesters Using PVDF Copolymers**

Veronika Kovacova, Olivier Bouton, Torsten Granzow, Emmanuel Defay
Luxembourg Institute of Science and Technology, Luxembourg

### 09:00:00 AM

**2260: Fast Li Transport via Dielectric Nanocube Interface**

Takashi Teranishi{2}, Ryoji Yamanaka{2}, Ken-Ichi Mimura{1}, Kazumi Kato{1}, Shinya Kondo{2}, Akira Kishimoto{2}
{1}National Institute of Advanced Industrial Science and Technology, Japan; {2}Okayama University, Japan

#### 09:15:00 AM

**2150: Broadband Dielectric Spectroscopy on Lithium-Salt- and Choline-Chloride-Based DESs**

Arthur Schulz, Peter Lunkenheimer, Alois Loidl
University of Augsburg, Germany

### D1L-E: ECAPD - Domains & Domain Walls IV

<table>
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<th>Time</th>
<th>Session</th>
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<tr>
<td>08:15:00 AM</td>
<td><strong>D1L-E: ECAPD - Domains &amp; Domain Walls IV</strong></td>
</tr>
<tr>
<td>Room: Room 2</td>
<td>Chair(s): Juras Banys (Institute of Applied Electrodynamics and Telecommunications, Vilnius University)</td>
</tr>
</tbody>
</table>

#### 08:15:00 AM

**2198: INVITED: The Observations of Polar Domain Boundaries in Ferroics**

Hiroko Yokota{2}, Kyomaru Kurihara{1}, Nozomu Hasegawa{1}
{1}Chiba University, Japan; {2}Chiba University, JST PRESTO, Japan

#### 08:45:00 AM

**2111: Domain Structures in PbTiO3/SrTiO3 Superlattices on DyScO3**

Chunhai Yin{3}, Edoardo Zatterin{1}, Evgenios Stylianidis{2}, Yaqi Li{3}, Marios Hadjimichael{4}, Pavlo Zubko{3}
Friday, July 1

09:00:00 AM
2402: Creation of Quasi-Regular Nanodomain Structures in Lithium Tantalate Using Multiple Scanning by IR Laser
Vladimir Shur, Mikhail Kosobokov, Andrey Makaev, Dmitry Kuznetsov
Ural Federal University, Russia

09:15:00 AM
2267: Specific Dielectric Characterization for Ferroelectric and Antiferroelectric Materials
Caroline Borderon(2), Kevin Nadaud(1), Raphaël Renoud(2), Micka Bah(1), Stéphane Ginestar Ginestar(2), Hartmut W. Gundel(2)
(1)GREMAN UMR 7347, University of Tours - CNRS - INSA, France; (2)Nantes Université, IETR, France

09:30:00 AM
2279: Beyond PFM and c-AFM: Novel Scanning Probe Investigations of Domains and Domain Walls in Lithium Niobate
Jesi Maguire(2), Hamza Waseem(2), Charlotte Cochard(3), Raymond G.P. McQuaid(1), Amit Kumar(1), J. Marty Gregg(1)
(1)Centre for Nanostructured Media, Queen’s University Belfast, United Kingdom; (2)Queen’s University Belfast, United Kingdom; (3)University of Dundee, United Kingdom

09:45:00 AM
2397: Physics and Application of Ferroelectric Domains
Vladimir Shur
Ural Federal University, Russia

D1L-F: ECAPD - Ultrathin films & Low-dimensional Nanostructures
08:15:00 AM - 10:00:00 AM CEST
Room: Room 1
Chair(s): Pavlo Zubko (University College London)

08:15:00 AM
2311: Fabrication of Barium Titanate Nanopillars by Neon Ion Milling
Israel Ibukun Olaniyi(3), Sebastian Schmitt(3), Javier Garcia Fernandez(2), Jürgen Albert(3), Veeresh Deshpande(3), Robin Cours(1), Cecile Marcelot(2), Nikolay Cherkashin(2), Sylvie Schamm-Schardon(1), Catherine Dubourdieu(3)
(1)CEMES laboratory CNRS and Université de Toulouse, France; (2)Center for Materials Elaboration and Structural Studies CEMES, France; (3)Helmholtz-Zentrum Berlin, Germany

08:30:00 AM
2166: Band Structure and Polar Distortion Tuning at (La,Sr)MnO3 / (Ba,Sr)TiO3 Interface
Jerome Wolfman(3), Antoine Ruyter(3), Beatrice Negulescu(3), Pascal Andreazza(4), Xavier Wallart(5), Sylvie Schamm-Chardon(1), Robin Cours(1), Teresa Hungria(2), Cécile Autret-Lambert(3)
(1)CEMES laboratory CNRS and Université de Toulouse, France; (2)Centre Raimond Castaing, Université de Toulouse, France; (3)GREMAN UMR 7347, University of Tours - CNRS - INSA, France; (4)ICMN laboratory, CNRS, Université d'Orléans, France; (5)Université Lille, CNRS, Centrale Lille, ISEN, Université Valenciennes, France

08:45:00 AM
2431: Strain Relaxation Defects in Multidomain Ferroelectric / Dielectric Superlattices
Mariem Gharbi(2), Carine Davoisne(2), Alain Sylvestre(1), Loic Dupont(2), Françoise Lemarrec(2), Nathalie Lemée(2)
(1)G2Elab, Université Grenoble Alpes, France; (2)University of Picardy Jules Verne, France
09:00:00 AM
**2440: Growth and Characterization of Multiferroic Heterostructures: Ultra-Thin 56/57Fe Layers on Pb(Mg,Nb)0.77Ti0.33 Substrates**
Sergey Basov{1}, Michelle Rodrigues{1}, Ivan Madarevic{2}, Vincent Joly{1}, Renan Villareal{1}, Pin-Cheng Lin{1}, Harsh Bana{1}, Margriet Van Bael{1}, André Vantomme{1}, Kristiaan Temst{1}
{1}Katholieke Universiteit Leuven, Belgium; {2}Katholieke Universiteit Leuven, imec, Belgium

09:15:00 AM
**2135: Piezoelectric and Flexoelectric Effects of DNA Film Adsorbed on Microcantilever**
Yuan Yang, Neng-Hui Zhang
Shanghai University, China

09:30:00 AM
**2342: Charge Injection and Ferroelectric Domain State Stability in La-Doped Hf0.5Zr0.5O2 Thin Film**
Natalia Alyabyeva{3}, Wassim Hamouda{3}, Christophe Lubin{3}, Furqan Mehmood{1}, Thomas Mikolajick{2}, Uwe Schroeder{2}, Nicholas Barrett{3}
{1}GlobalFoundries, Germany; {2}NaMLab gGmbH, Technische Universität Dresden, Germany; {3}SPEC, CEA, CNRS, Université Paris-Saclay, CEA Saclay, France

09:45:00 AM
**2042: Low Power Ferroelectric HZO Memristors for Neuromorphic Technologies**
Christina Zacharaki, Nikitas Siannas, Polychronis Tsipas, Athanasios Dimoulas
National Centre for Scientific Research Demokritos, Greece

10:00:00 AM - 10:30:00 AM CEST
Coffee Break
Level +2

<table>
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<th>Room: Auditorium Ronsard</th>
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<tr>
<td>Chair(s): Ying Liu (ICN2), James I. Roscow (University of Bath)</td>
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10:30:00 AM
**2263: Morphotropic Phase Boundary BiFeO3-PbTiO3 Ferroelectric Thin Films on Ni Substrates for Multifunctional MEMS**
Ricardo Jiménez, Harvey Amorin, Íñigo Bretos, Maria Lourdes Calzada, Miguel Algueró
Instituto de Ciencia de Materiales de Madrid ICMM-CSIC, Spain

10:45:00 AM
**2187: Increased Fatigue Resistance in PZT Thin Films with Interdigitated Electrodes**
Naveen Aruchamy, Stéphanie Girod, Sebastjan Glinšek, Emmanuel Defay, Torsten Granzow
Luxembourg Institute of Science and Technology, Luxembourg

11:00:00 AM
**2428: Improving the Dielectric and Piezoelectric Harvesting Response of PVDF-Based Flexible Composites by Using Ag Nanoparticles Onto BaTiO3 Filler**
Cristina Elena Ciomaga{1}, Nadejda Horchidan{1}, Lavinia Curecheriu{1}, Leontin Padurariu{1}, George Stoian{4}, Lucian Pintilie{3}, Florin Mihai Tufescu{2}, Aurelian Rotaru{5}, Liliana Mitoseriu{1}
{1}Alexandru Ioan Cuza University of Iași, Romania; {2}GRADIENT Srl., Romania; {3}National Institute of Materials Physics, Romania; {4}National Institute of Research and Development for Technical Physics, Romania; {5}Stefan Cel Mare University, Romania
11:15:00 AM

**2225: YOUNG INVESTIGATOR (INVITED): Giant Room Temperature Compression and Bending in Ferroelectric Oxide Pillars**

Ying Liu{1}, Xiangyuan Cui{4}, Ranming Niu{4}, Shujun Zhang{5}, Xiaozhou Liao{4}, Scott D. Moss{2}, Peter Finkel{3}, Magnus Garbrecht{4}, Simon Ringer{4}, Julie M. Cairney{4}

{1}Catalan Institute of Nanoscience and Nanotechnology ICN2, Spain; {2}Defence Science and Technology Group, Australia; {3}Naval Research Laboratory, United States; {4}University of Sydney, Australia; {5}University of Wollongong, Australia

11:30:00 AM

**2196: A Sustainable Self-Induced Solution Seeding Approach for Multipurpose BiFeO3 Active Layers in Flexible Electronic Devices**

Óscar Barrios, Ricardo Jiménez, Jesús Ricote, Pedro Tartaj, María Lourdes Calzada, Íñigo Bretos

Instituto de Ciencia de Materiales de Madrid ICMM-CSIC, Spain

11:45:00 AM

**2361: BaTiO3-Based Ferroelectric Transistors for Memristive Applications**

Ruben Hamming-Green{2}, Eric Brand{2}, Laura Begon-Lours{1}, Bert Offrein{1}, Beatriz Noheda{2}

{1}IBM Research Zurich, Switzerland; {2}University of Groningen, Netherlands

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D2L-B: ISAF 3 - Local Structure Characterization

**10:30:00 AM - 12:00:00 PM CEST**

**Room:** Room 5

**Chair(s):** Mojca Otonicar (Institute Jozef Stefan)

10:30:00 AM

**2466: INVITED: A Peculiar Phase Transition at the Antiferroelectric-Ferroelectric Boundary in PZT**

Nan Zhang{3}, Zheyi An{3}, Shanshan Xie{3}, Marek Paściak{1}, Mike Glazer{2}

{1}FZU Institute of Physics of the Czech Academy of Sciences, Czech Rep.; {2}University of Oxford, United Kingdom; {3}Xi’an Jiaotong University, China

11:00:00 AM

**2465: INVITED: Domain Percolation in Polycrystalline Ferroelectrics**

John E. Daniels{1}, Sukriti Mantri{2}

{1}University of New South Wales, Australia; {2}University of New South Wales, University of Arkansas, Australia

11:30:00 AM

**2463: Nanoscale-Correlated Octahedral Rotations in BaZrO3**

Igor Levin{3}, Myung-Geun Han{1}, Helen Playford{2}, Victor Krayzman{3}, Yimei Zhu{1}, Russell Maier{3}

{1}Brookhaven National Laboratory, United States; {2}ISIS, Rutherford Appleton Laboratory, United Kingdom; {3}National Institute of Standards and Technology, United States

11:45:00 AM

**2339: Recognition of Coherent Twin Relationship in Ferroelectrics Using High-Resolution X-Ray Diffraction**

Semën Gorfman{2}, David Spirito{2}, Guanjie Zhang{3}, Carsten Detlefs{1}, Nan Zhang{3}

{1}ESRF European Synchrotron Radiation Facility, France; {2}Tel Aviv University, Israel; {3}Xi’an Jiaotong University, China
Friday, July 1

D2L-C: ISAF 3 / ECAPD - Structure Characterization & Properties - Thin Films II
10:30:00 AM - 12:00:00 PM CEST
Room: Room 3
Chair(s): Ingrid Canero Infante (CNRS/Institut des Nanotechnologies de Lyon France), Pavlo Zubko (University College London)

10:30:00 AM
2327: X-Ray Spectroscopy Analysis of the Chemical and Electronic Structure of BaTiO3 Ultrathin Films
Sara Gonzalez{1}, Pedro Rojo-Romeo{1}, Matthieu Bugnet{3}, Patrick Schöffmann{4}, Edwige Otero{4}, Bertrand Vilquin{1}, Nicolas Baboux{1}, Brice Gautier{1}, Guillermo Herrera-Huerta{2}, Olivier Boisron{2}, Damien Le Roy{2}, Florent Tournus{2}, Philippe Oh
{1}Institut des Nanotechnologies de Lyon, CNRS UMR5270 ECL INSA Lyon UCBL CPE Lyon, France; {2}Institut Lumière Matière, CNRS UMR 5306, Université Claude Bernard Lyon 1, France; {3}MATEIS, CNRS UMR 5510 INSA Lyon UCBL, France; {4}Synchrotron SOLEIL, CNRS-CEA, France

10:45:00 AM
2443: Effect of Substrate and Bottom Electrode Material on the Thickness Dependent Properties of Ferroelectric Al1-xBxN Sputtered Thin Films
John Hayden, Jon-Paul Maria
Pennsylvania State University, United States

11:00:00 AM
2399: Structural Analysis of Mn-Doped BiFeO3 Thin Films Under Electric Fields by X-Ray Fluorescent Holography
Seiji Nakashima{4}, Ren Kato{4}, Hironori Fujisawa{4}, Koji Kimura{2}, Ang Roquero{3}, Naohisa Hoppo{1}, Tatsuya Kato{2}, Yuta Yamamoto{2}, Koichi Hayashi{2}
{1}Hiroshima City University, Japan; {2}Nagoya Institute of Technology, Japan; {3}Toyota Technological Institute, Japan; {4}University of Hyogo, Japan

11:15:00 AM
2454: Frequency Dependence of Al0.7Sc0.3N Thin Film Ferroelectric Properties on Different Bottom Metals
Shuai Shao{2}, Zhifang Luo{2}, Ran Nie{2}, Xiaoxu Kang{1}, Tao Wu{2}
{1}International Center for Religion and Diplomacy, China; {2}ShanghaiTech University, China

11:30:00 AM
2444: Tunable Microwave Conductance of Nanodomains in Ferroelectric PbZr0.2Ti0.8O3 Thin Film
Stuart R. Burns{3}, Alexander Tselev{2}, Anton V. Ievlev{1}, Joshua C. Agar{4}, Lane W. Martin{5}, Sergei V. Kalinin{1}, Daniel Sando{6}, Petro Maksymovych{1}
{1}Oak Ridge National Laboratory, United States; {2}University of Aveiro, Portugal; {3}University of Calgary, Canada; {4}University of California, Berkeley, United States; {5}University of California, Berkeley, Lawrence Berkeley National Laboratory, United States; {6}University of New South Wales, Australia
Friday, July 1

10:30:00 AM
2512: YOUNG INVESTIGATOR (INVITED): Understanding Atomic Scale Electronic and Physical Properties in Polar Topologies in Oxide superlattices
Susarla Sandhya
Lawrence Berkeley National Laboratory, United States

10:45:00 AM
2253: Electrocaloric Effects in Lead-Free BaTiO3 Multilayer Capacitors
Junning Li{1}, Alvar Torelló Massana{1}, Veronika Kovacova{1}, Sakyo Hirose{2}, Emmanuel Defay{1}
{1}Luxembourg Institute of Science and Technology, Luxembourg; {2}Murata Manufacturing Co. Ltd., Japan

11:00:00 AM
2044: Investigation of Sintering Behavior of Modified Ba0.82Sr0.18Sn0.065Ti0.935O3 for Preparation of Electrocaloric Multilayer Components
Zhenglyu Li, Christian Molin, Sylvia E. Gebhardt
Fraunhofer Institute for Ceramic Technologies and Systems IKTS, Germany

11:15:00 AM
2034: YOUNG INVESTIGATOR (INVITED): Charged Ferroelectric Domain Walls for Deterministic A.C. Signal Control
Jan Schultheiß{3}, Erik Lysne{3}, Lukas Puntigam{4}, Zewu Yan{1}, Edith Bourret{2}, Stephan Krohns{4}, Dennis Meier{3}
{1}ETH Zürich, Switzerland; {2}Lawrence Berkeley National Laboratory, United States; {3}Norwegian University of Science and Technology, Norway; {4}University of Augsburg, Germany

11:30:00 AM
2181: YOUNG INVESTIGATOR (INVITED): Atomic-Level Understanding of HfO2-Based Ferroelectrics and Their Ultrafast Polarization Switching
Duk-Hyun Choe
Samsung Advanced Institute of Technology, Korea

11:45:00 AM
2185: Enhanced Ferroelectricity and Improved Wake-Up Effect of Ferroelectric (Hf,Zr)O2 Thin Films by Interfacial Engineering
Kun Yang, Se Hyun Kim, Geun Taek Yu, Min Hyuk Park
Seoul National University, Korea

D2L-E: ECAPD - HFO2-based Materials & Devices II
10:30:00 AM - 12:00:00 PM CEST
Room: Room 2
Chair(s): Lynette Keeney (Tyndall National Institute), Uwe Schroeder (Namlab GmbH)

10:30:00 AM
2389: Role of Processing Conditions on the Chemistry of Interfaces, Crystallinity and Ferroelectric Polarization of Hf0.5Zr0.5O2 Films
Zora Chalkley{3}, Ines Haeussler{4}, Florian Maudet{3}, Marco Holzer{3}, Keerthana S. Nair{3}, Adnan Hammud{2}, Christoph Schlüter{1}, Christoph Koch{5}, Veeresh Deshpande{3}, Catherine Dubourdieu{3}
{1}Deutsches Elektronen-Synchrotron DESY, Germany; {2}Fritz-Haber Institute of the Max-Planck Society, Germany; {3}Helmholtz-Zentrum Berlin, Germany; {4}Humboldt-Universität zu Berlin, Germany; {5}Institute of Physics & IRIS Adlershof, Humboldt-Universität zu Berlin, Germany

10:45:00 AM
2352: Impact of Dielectric Capping Layer on Electroresistance Endurance of Ultrathin Ferroelectric Hf0.5Zr0.5O2 Tunnel Barriers
Friday, July 1

Xiao Long{1}, Huan Tan{4}, Saúl Estandía{1}, Jaume Gazquez{1}, Florencio Sánchez{3}, Ignasi Fina{2}, Josep Fontcuberta{3}

{1}Institut de Ciència de Materials de Barcelona ICMAB-CSIC, Spain; {2}Instituto de Ciencia de Materiales de Barcelona ICMAB-CSIC, Spain; {3}Instituto de Ciencia de Materiales de Barcelona, Universitat Autònoma de Barcelona, Spain; {4}Instituto de Ciencia de Materiales de Barcelona, Universitat Autònoma de Barcelona ICMAB-CSIC, Spain

11:00:00 AM

2287: Comparative Study of sub-8 nm HZO-Based Ferroelectric Tunnel Junctions with Enhanced Ferroelectricity

{1}INL CNRS UMR5270 ECL INSA Lyon UCBL CPE Lyon, Ecole Centrale de Lyon, France; {2}Institut des Nanotechnologies de Lyon, CNRS UMR5270 ECL INSA Lyon UCBL CPE Lyon, France; {3}MATEIS, CNRS UMR 5510 INSA Lyon UCBL, France; {4}RMIT University, Australia; {5}STMicroelectronics, France; {6}Université de Lyon, INSA de Lyon, Institut des Nanotechnologies de Lyon, CNRS UMR5270, France

11:15:00 AM

2234: Wake-Up Effect and Retention Evolutions of Hf0.5Zr0.5O2 Capacitor by Nanostructuration Engineering
Jordan Bouaziz{3}, Greta Segantini{1}, Benoît Manchon{4}, Rabei Barhoumi{2}, Ingrid Cañero Infante{2}, Damien Deleruyelle{2}, Nicolas Baboux{2}, Pedro Rojo-Romeo{2}, Bertrand Vilquin{2}

{1}INL CNRS UMR5270 ECL INSA Lyon UCBL CPE Lyon, Ecole Centrale de Lyon, France; {2}Institut des Nanotechnologies de Lyon, CNRS UMR5270 ECL INSA Lyon UCBL CPE Lyon, France; {3}Swiss Federal Laboratories for Materials Science and Technology EMPA, Switzerland; {4}Université de Lyon, INSA de Lyon, Institut des Nanotechnologies de Lyon, CNRS UMR5270, France

11:30:00 AM

2280: TiN/HZO Interface Engineering: Toward Reliability Improvement of New Generation Ferroelectrics
Anna Chernikova, Roman Khakimov, Aleksandra Koroleva, Dmitrii Kuzmichev, Andrey Markeev
Moscow Institute of Physics and Technology, Russia

D2L-F: ECAPD - Ultra-thin Films, Low Dimensional Nanostructures, Domain Scaling

10:30:00 AM - 12:00:00 PM CEST
Room: Room 1
Chair(s): Michele Conroy (Imperial College London), Louise Colfer (Tyndall National institute, University College Cork)

10:30:00 AM

2487: INVITED: Free-Standing Ferroelectric Superlattices
Yagi Li{9}, Edoardo Zatterin{2}, Michele Conroy{4}, Anastasiia Pylypets{5}, Fedir Borodavka{5}, Alexander Björling{6}, Dirk J. Groenendijk{1}, Edouard Lesne{1}, Adam J. Clancy{9}, Marios Hadjimichael{10}, Demie Kepaptsoglou{8}, Quentin Ramasse{7}, Andrea

{1}Delft University of Technology, Netherlands; {2}Delft University of Technology, Taiwan; {3}ESRF European Synchrotron Radiation Facility, France; {4}FZU Institute of Physics of the Czech Academy of Sciences, Czech Rep.; {5}Imperial College London, United Kingdom; {6}Institute of Physics of the Czech Academy of Sciences, Czech Rep.; {7}MAX IV Laboratory, Sweden; {8}SuperSTEM Laboratory and University of Leeds, United Kingdom; {9}SuperSTEM Laboratory, University of York, United Kingdom; {10}University College London, United Kingdom; {11}University of Limerick, Ireland

11:00:00 AM

2054: Continuous Polarization Control at Nanoscopic Dimensions
**Friday, July 1**

*Martin Sarott{1}, Marta Rossell{2}, Manfred Fiebig{1}, Morgan Trassin{1}*

{1}ETH Zürich, Switzerland; {2}Swiss Federal Laboratories for Materials Science and Technology EMPA, Switzerland

11:15:00 AM  
**2142: Domain Scaling and Coupling of Structural Distortions in Tensile-Strained PbTiO3 Heterostructures**  
Céline Lichtensteiger, Marios Hadjimichael, Ludovica Tovaglieri, Jean-Marc Triscone  
University of Geneva, Switzerland

11:30:00 AM  
**2489: INVITED: Symmetry Breaking in Electromechanical Materials**  
Nini Pryds  
Technical University of Denmark, Denmark

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<td>A6P-G ECAPD - Posters I (13 papers) Chr: Marco Deluca, Giovanna Canu Track: 3</td>
<td>A6P-H ISAF 1 Posters: Fundamentals of Ferroelectrics &amp; Multiferroic Materials (22 papers) Chr: Shujun Zhang Track: 1</td>
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<td>B7P-H ISAF 3 - Structure Characterization &amp; Properties - Poster II (14 papers) Chr: Marco Deluca, Elena Buixaderas Track: 1</td>
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<td>B7P-K PFM - Soft Materials &amp; Nanoparticles by PFM (4 papers) Chr: Kumara Cordero-Edwards Track: 2</td>
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