20th '11

ISAF-PFM

Vancouver

The 20th IEEE International Symposium on Applications of Ferroelectrics
International Symposium on Piezoresponse Force Microscopy & Nanoscale Phenomena in Polar Materials
July 24-27, 2011, Vancouver, Canada

IEEE

UFFC

The 20th IEEE International Symposium on Applications of Ferroelectrics

International Symposium on Piezoresponse Force Microscopy & Nanoscale Phenomena in Polar Materials

July 24th-27th, 2011, Vancouver, Canada

ISAF-PFM-2011 Welcome Message

Welcome to Canada, Bienvenue au Canada!

On behalf of the Ultrasonics, Ferroelectrics and Frequency Control Society (UFFC) of the IEEE, the UFFC Ferroelectrics Standing Committee, the PFM International Advisory Board, and the Organizing Committee, it is our great pleasure to welcome all of the participants and their guests to Vancouver, British Columbia, Canada, for the 20th IEEE International Symposium on Applications of Ferroelectrics (ISAF) and the International Symposium on Piezoresponse Force Microscopy on Nanoscale Phenomena in Polar Materials (PFM), ISAF-PFM-2011.

ISAF is a series of international conferences administrated by the UFFC. It is aimed at providing a forum to present and discuss the state-of-the-art developments in the field of ferroelectrics and related materials and their applications, including theory and modeling, materials preparation and characterization, and device physics and processing. PFM is a relatively new series of symposia focusing on the theoretical background and recent developments of piezoresponse force microscopy and related characterization techniques, and their applications to the studies of nanoscale phenomena in ferroelectrics, multiferroics, biological media and other polar materials.

This is the first time in their history that ISAF and PFM are holding a joint conference and the timing could not be better. Nanoscale ferroelectrics and multiferroics are currently becoming the main focus of electronics, data storage and MEMS/NEMS. Applications of these ferroic materials in nano-, micro- and even macroscopic devices require the capability of probing electromechanical (piezoelectric and electrostrictive) responses, static and dynamic domain configurations, polarization switching and degradation mechanisms on the nanoscale, as well as understanding the role of defects and structural confinement. This joint ISAF-PFM-2011 conference provides an ideal platform to foster scientific interactions and intellectual exchanges among the researchers of both communities. It expands the scopes of ISAF to the studies of conduction, defects, domains and other nanoscale phenomena inherently important to ferroelectrics, while enhancing the impact of PFM and other nanoimaging techniques and promoting their applications to the broader issues of ferroic materials and devices in general.

Over 580 abstracts have been received from 37 countries, covering all 17 topics of ISAF-PFM-2011. Such an overwhelming response has been encouraging and reaffirms our belief that joining these two symposia will significantly and positively impact the development of the field of ferroelectrics. It is particularly motivating to see that a large number of young researchers have responded positively to our invitations or have submitted high-quality contributed papers. We hope this trend will become customary of this series of symposia, which is vital to the future of our field.

We are fortunate to have Dr. Akira Ando **(**Murata Manufacturing Company, Japan), Professor F. Stuart Foster (University of Toronto, Canada), Dr. Stephen J. Pennycook (Oak Ridge National Lab., USA), Professor Ramamoorthy Ramesh (University of California, Berkeley, USA), Professor Alexander Tagantsev (Ecole Polytechnique Fédérale, Switzerland), and Zhong Lin Wang (Georgia Institute of Technology, USA) as the plenary speakers, and Professor Dragan Damjanovic (Ecole Polytechnique Fédérale, Switzerland) as the IEEE Distinguished Lecturer, of this conference. We will all be enlightened by their talks.

There is much to do in this award winning city of Vancouver and in the beautiful province of British Columbia, both independently and as part of the ISAF-PFM-2011 Program. We hope you will be able to join us for the Welcome Reception on Sunday, July 24 and the Gala Dinner on Tuesday, July 26.

We acknowledge our sponsors for their generous support of our conference. They have allowed us to offer you an exciting and rewarding program.

All of the members of the Organizing Committee of ISAF-PFM-2011, in particular the members of the Local Arrangements Committee from Simon Fraser University, Burnaby, B.C., have been working hard preparing for this conference to make it the best possible. We are excited about the outcome and we wish you a superb conference experience and a memorable stay in Vancouver!

Sincerely,

Zuo-Guang Ye
General Chair
Simon Fraser University, Canada

Andrei Kholkin
General Chair
University of Aveiro, Portugal

ISAF-PFM-2011 Organizing Committee

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Jenny Wong, Jessica Wong, Rebecca Xie, Annie You

Website/Database: **Annie You**

Conference Venue: **The Westin Bayshore Hotel, Vancouver**

On-line Registration: **Meeting, Event & Conference Services,**
Simon Fraser University, Canada

Sponsors

We thank the following sponsors for their generous support of ISAF-PFM-2011. They have allowed us to offer you an exciting and rewarding program.

Elite

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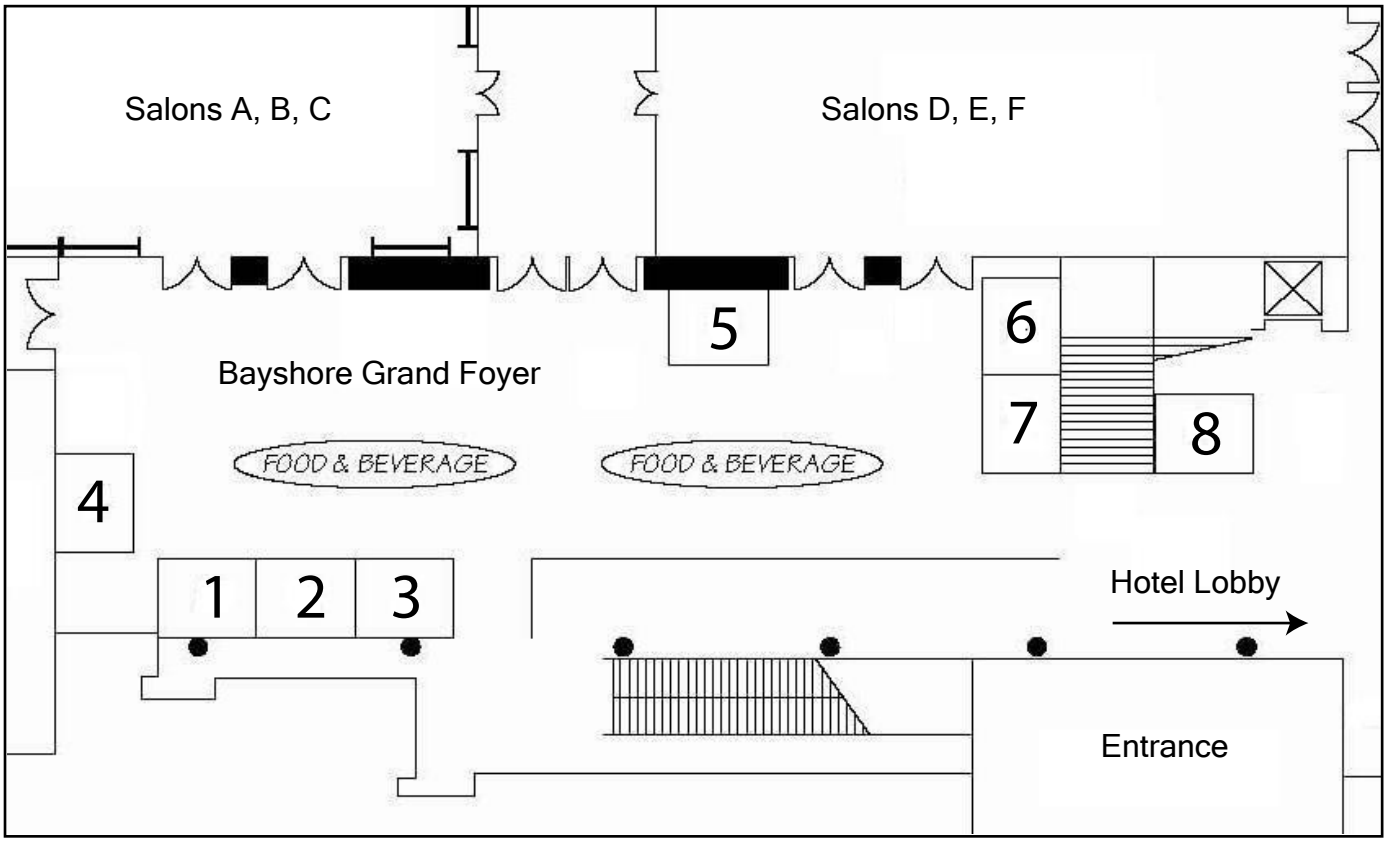
ISAF - PFM - 2011 Exhibition

Sunday July 24: 13:00 - 18:00
Monday July 25: 09:30 - 21:30
Tuesday July 26: 09:30 - 18:00
Wednesday July 27: 09:30 - 16:00

List of Exhibitors

Company	Booth	
Park AFM	1	www.parkafm.com
Radiant Technologies	2	www.ferrodevices.com
4D Labs	3	www.4dlabs.com
Asylum Research	4	www.asylumresearch.com
NT-MDT	5	www.ntmdt.com
PZ-Flex	6	http://www.pzflex.com/
AixACCT	7	www.aixacct.com
Journal of Advanced Dielectrics	8	http://www.worldscinet.com/jad/



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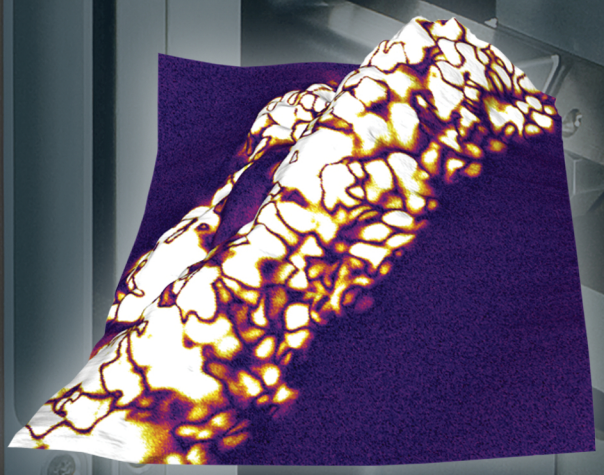
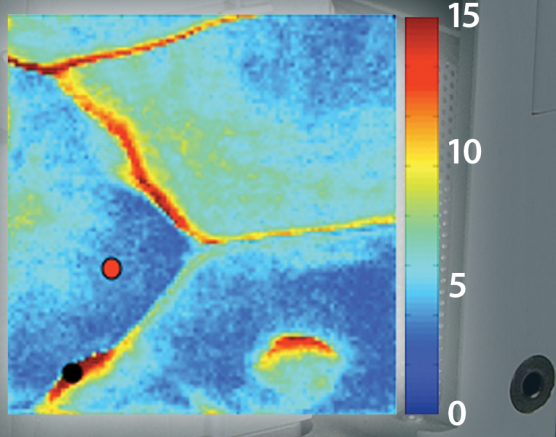


PFM of multiferroic $BiFeO_3$ nanofibers. 1µm scan.

New



ESM map of displacement due to Li-ion relaxation following 30ms, -18V pulse. 1µm scan.

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COMPANY

H. C. Materials Corporation (HCMC) is a leader in the development and manufacture of high-performance piezoelectric single crystals, specializing in lead magnesium niobate - lead titanate (PMN-PT) based piezocrystals. Founded in 1995, HCMC is a rapidly expanding R&D and manufacturing company, that has fulfilled customer's expectations, performance requirements, delivery, value, quality and service by implementing superior technologies, responsive engineering, and efficient production methods, for the defense and ultrasonic industries.

TECHNOLOGY

HCMC has a *proprietary* crystal growth method (US Patent 6,972,730 B2) based on a multi-crucible Bridgman growth approach with zone-leveling modifications. The technique enables the growth of high quality PMN-PT single crystals with diameter up to 4 inches by <001> seeding (Fig. 1).

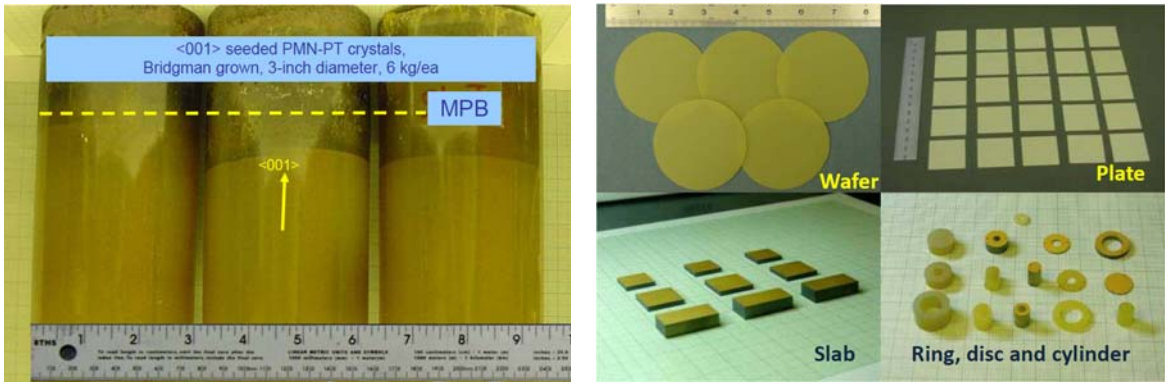

Fig. 1. Crystal boules (left) and selected crystal products (right)

PRODUCTS AND CAPACITY

A variety of PMN-PT based crystal products (Fig. 1) can be supplied. Customer's specifications are welcome. Crystal elements supplied to customer specifications, including cut direction, vibration mode, piezoelectric properties and dimensions. Crystal elements are usually electroded and poled, with data sheets.

Over the past few years HCMC has supplied over 160,000 PMN-PT crystal elements to clients for defense and commercial applications. We are capable of producing PMN-PT crystal products at a rate of thousands of crystal elements per month. Production planning, scheduling, inventory control, quality assurance, and accounting methods are established and certified.

APPLICATIONS

The superior properties of PMN-PT based crystals (Tables 1, 2) lead to the following benefits for piezoelectric applications: broad bandwidth, high source level, high signal to noise ratio and size reduction. Examples of successful applications for PMN-PT crystals include medical ultrasound imaging, sonar, accelerometer, acoustic vector sensors, non-destructive detection, hydrophones (Ocean mining-oil & gas), adaptive optics (deformation mirror), and non-linear optics (tunable harmonic generation).

QUALITY CONTROL

HCMC maintains ISO 9001:2008 certifications and operate in a culture of continuous quality improvement. We also follow the principles of responsible care, striving to address the issues of safety, health and the environment.

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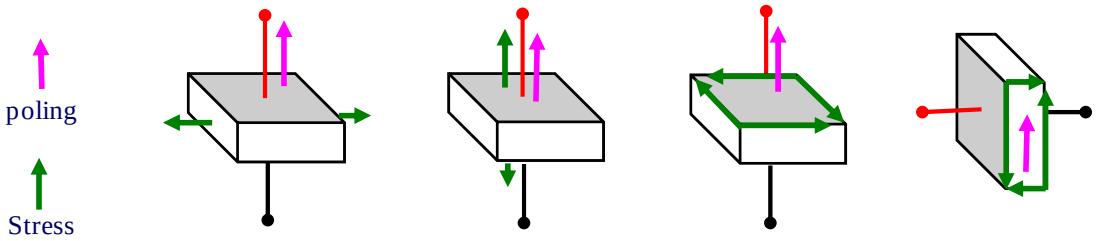
Choice of vibration mode with poling direction



	TE	LE	LS	TS
<001> poling	d_{31}, d_{32} -800 ~ -1000 pC/N k_{31} > 0.80	d_{33} 2000 ~ 3000 pC/N k_{31} > 0.90	d_{36} n/a	d_{15}, d_{24} < 100 pC/N
<011> poling	d_{31} -1200 ~ -1800 pC/N k_{31} ~ 0.84-0.90	d_{33} ~ 1000 pC/N	d_{36} 2500 pC/N k_{36} > 0.90	d_{15}, d_{24} 2000 ~ 3500 pC/N K_{15} > 0.90
<111> poling	d_{31}, d_{32} < 150 pC/N	d_{33} < 200 pC/N	d_{36} n/a	d_{15}, d_{24} 4000 ~ 7000 pC/N K_{15} > 0.95

TE: Transverse Extension; LE: Longitudinal Extension; LS: Longitudinal Shear; TS: Transverse Shear.

Table 1. Selected piezoelectric properties for <001>-poled and <011>-poled PMN-PT crystals.

<001> - poled 33-mode				<011> - poled 31-mode			
Property	**Unit**	**Type A**	**Type B**	**Property**	**Unit**	**Type A**	**Type B**
K_{33}^T		5000	6500	K_{33}^T		3200	4600
tan δ		0.0040	0.0060	*tan* δ		0.0035	0.0024
d_{33}	pC/N	1400	2500	d_{31}	pC/N	-1100	-1750
d_{31}	pC/N	-580	-900	d_{32}	pC/N	301	564
k_{33}		0.88	0.92	k_{31}		0.69	0.90
s_{33}^E	10^{-12} m^2/N	38	60	s_{11}^E	10^{-12} m^2/N	53	84
s_{33}^D	10^{-12} m^2/N	9.8	12	s_{11}^D	10^{-12} m^2/N	26	30
g_{33}	10^{-3}Vm/N	32	37	g_{31}	10^{-3}Vm/N	-34	-38
E_C Coercive	kV/cm	2.5	2.3	**E_C Coercive**	kV/cm	4.5	4.0
De-poling	˚C	93	85	**De-poling**	˚C	95	85
Acoustic imp. <001>	mrayl	28	27	**Acoustic imp. <001>**	mrayl	32	30

Table 2. Selected property comparison between PMN-PT and PIN-PMN-PT crystals, <001>-poling.

Property	Unit	PMN-PT	PIN-PMN-PT
K_{33}^T		4500~7000	3500~6000
tan δ		0.0040	0.0050
d_{33}	pC/N	1400~2500	1200~2000
d_{31}	pC/N	-580~-900	-500~ -900
k_{33}		0.88 ~ 0.92	0.86-0.92
s_{33}^E	10^{-12} m^2/N	42	47
s_{33}^D	10^{-12} m^2/N	11	12
g_{33}	10^{-3}Vm/N	34	39
E_C Coercive	kV/cm	2.4	5~6
De-poling	˚C	85~93	100~135

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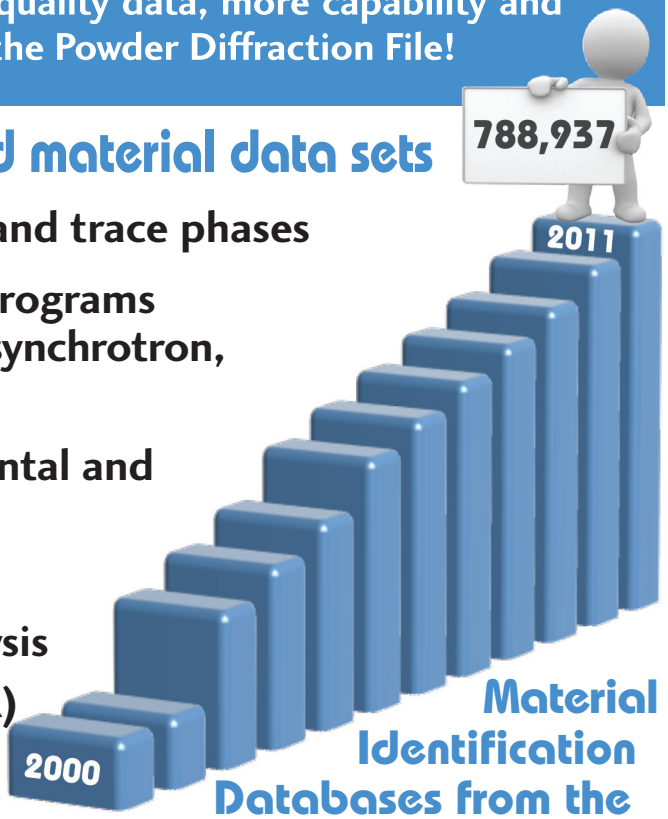

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The Powder Diffraction File

PDF-2 Release 2011	243,911	material data sets
PDF-4+ 2011	316,291	material data sets
PDF-4/Minerals 2011	37,642	material data sets
PDF-4/Organics 2011	436,901	material data sets

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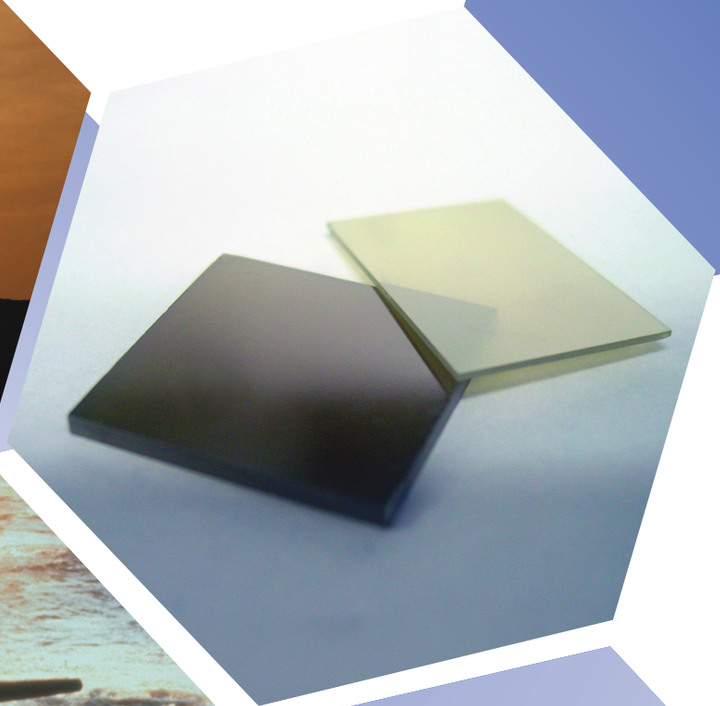

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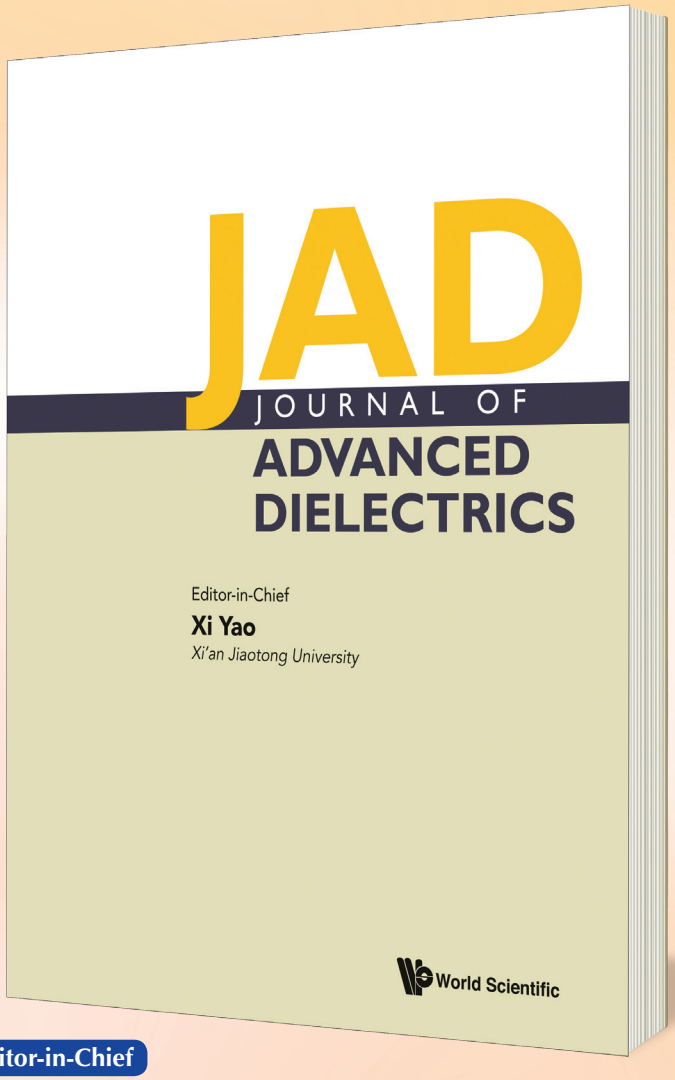
JOURNAL OF ADVANCED DIELECTRICS (JAD)



Aims & Scope

The Journal of Advanced Dielectrics is an international peer-reviewed journal for original contributions on the understanding and applications of dielectrics in modern electronic devices and systems. The journal seeks to provide an interdisciplinary forum for the rapid communication of novel research of high quality in, but not limited to, the following topics:

- Fundamentals of dielectrics (ab initio or first-principles calculations, density functional theory, phenomenological approaches).
- Polarization and related phenomena (spontaneous polarization, domain structure, polarization reversal).
- Dielectric relaxation (universal relaxation law, relaxor ferroelectrics, giant permittivity, flexoelectric effect).
- Ferroelectric materials and devices (single crystals and ceramics).
- Thin/thick films and devices (ferroelectric memory devices, capacitors).
- Piezoelectric materials and applications (lead-based piezo-ceramics and crystals, lead-free piezoelectrics).
- Pyroelectric materials and devices
- Multiferroics (single phase multiferroics, composite ferromagnetic ferroelectric materials).
- Electrooptic and photonic materials.
- Energy harvesting and storage materials (polymer, composite, super-capacitor).
- Phase transitions and structural characterizations.
- Microwave and milimeterwave dielectrics.
- Nanostructure, size effects and characterizations.
- Engineering dielectrics for high voltage applications (insulation, electrical breakdown).
- Modeling (microstructure evolution and microstructure-property relationships, multiscale modeling of dielectrics).

JAD was sponsored by International Center for Dielectric Research (ICDR), Xi'an Jiaotong University, China.

AD/ES/05/11/05/HC

Contents

General Program Summary / Business Meetings / Events

Saturday, July 23

14:00-17:00	**UFFC Meeting**	**Cowichan Room**
18:00-22:00	**UFFC Meeting**	**Prospect Room**

Sunday, July 24

08:00-08:30	**Short Courses Registration**	**Cypress Room**
08:30-18:00	**Short Courses**	**Cypress Room**
08:00-17:00	**UFFC AdCom Meeting**	**Oak Room**
09:30-18:00	**Exhibition Set-up**	**Bayshore Grand Foyer**
12:00-18:00	**PiezoCrystals Workshop**	**Mackenzie Room**
15:00-20:30	**Registration**	**Registration Desk/Foyer**
18:30-20:00	**Welcome Reception**	**Currents Restaurant/ Pool-Garden Area**

Monday, July 25

07:00-07:50	**Breakfast**	**Bayshore Grand Foyer**
07:30-12:00	**Registration / Manuscript Submission**	**Registration Desk/Foyer**
07:50-08:10	**Opening / UFFC Society Awards**	**Salon ABC**
08:10-08:55	**Plenary PL-1, F. Stuart Foster**	**Salon ABC**
08:55-09:40	**Plenary PL-2, Zhong Lin Wang**	**Salon ABC**
09:40-10:00	**Morning Break**	**Bayshore Grand Foyer**
09:30-21:00	**Exhibition**	**Bayshore Grand Foyer**
10:00-12:15	**Technical Sessions A – E**	**Salon D, E, F, Seymour Room Mackenzie Room**
12:15-13:30	**Lunch**	**Salon ABC**
12:30-13:20	**TUFFC Publication Seminar**	**Mackenzie Room**
13:30-20:00	**Registration / Manuscript Submission**	**Registration Desk/Foyer**

General Program Summary / Business Meetings / Events

13:30-15:00	**Technical Sessions A – E**	**Salon D, E, F, Seymour Room Mackenzie Room**
15:00-15:30	**Afternoon Break**	**Bayshore Grand Foyer**
15:30-17:30	**Technical Sessions A – E**	**Salon D, E, F, Seymour Room Mackenzie Room**
17:30-18:00	**Poster Set-up**	**Salon ABC**
18:00-21:00	**Poster Session**	**Salon ABC**
18:00-21:00	**Snacks**	**Bayshore Grand Foyer**
18:30-20:00	**Ferroelectrics Committee Meeting**	**Prospect Room**
20:00-21:30	**UFFC President's Reception (by invitation)**	**Currents Restaurant**

Tuesday, July 26

07:00-08:00	**Breakfast**	**Bayshore Grand Foyer**
07:30-12:00	**Registration / Manuscript Submission**	**Registration Desk/Foyer**
08:00-08:45	**Plenary PL-3, Stephen Pennycook**	**Salon ABC**
08:45-09:30	**Plenary PL-4, Alexander Tagantsev**	**Salon ABC**
09:30-10:00	**Morning Break**	**Bayshore Grand Foyer**
09:30-21:00	**Exhibition**	**Bayshore Grand Foyer**
10:00-12:15	**Technical Sessions A – E**	**Salon D, E, F, Seymour Room Mackenzie Room**
12:15-13:30	**Lunch**	**Salon ABC**
12:15-13:30	**Women in Engineering Lunch Meeting**	**Prospect Room**
	PFM International Advisory Board Meeting	**Fraser Room**
13:30-20:00	**Registration / Manuscript Submission**	**Registration Desk/Foyer**

General Program Summary / Business Meetings / Events

13:30-15:00	**Technical Sessions A – E**	**Salon D, E, F, Seymour Room Mackenzie Room**
15:00-15:30	**Afternoon Break**	**Bayshore Grand Foyer**
15:30-18 :00	**Technical Sessions A - E**	**Salon D, E, F, Seymour Room Mackenzie Room**
18:30-21:00	**Gala Dinner / Ferroelectrics Awards/ Poster Awards**	**Salon ABC**

Wednesday, July 27

07:00-08:00	**Breakfast**	**Bayshore Grand Foyer**
07:30-12:00	**Registration**	**Registration Desk/Foyer**
08:00-08:45	**Plenary PL-5, Ramamoorthy Ramesh**	**Salon ABC**
08:45-09:30	**Plenary PL-6, Akira Ando**	**Salon ABC**
8:00-17:00	**UFFC History Interviews**	**Capilano Room**
09:30-10:00	**Morning Break**	**Bayshore Grand Foyer**
09:30-17:00	**Exhibition**	**Bayshore Grand Foyer**
10:00-12:15	**Technical Sessions A – E**	**Salon D, E, F, Seymour Room Mackenzie Room**
12:15-13:30	**Lunch**	**Salon ABC**
13:30-15:45	**Technical Sessions A - E**	**Salon D, E, F, Seymour Room Mackenzie Room**
15:45-16:00	**Afternoon Break**	**Bayshore Grand Foyer**
16:00-16:45	**Plenary PL-7, IEEE Distinguished Lecture, Dragan Damjanovic**	**Salon ABC**
16:45-17:00	**Closing**	**Salon ABC**

Technical Program Guidelines

- **Legends:**
  - PL = Plenary Lecture
  - M-AM-A-2-I (114) = Monday, AM, Session A, 2nd Talk, Invited (AR#)
  - W-PM-D-4-O (325) = Wednesday, PM, Session D, 4th talk, Oral (AR#)
  - PC = Student Poster Competition
  - P = Poster
  - AR# = Abstract Receiving Number

- **Length of Oral Presentations:**
  - Plenary Lectures are for 45 min.
  - Invited talks are for 30 min. including a 5 min. questions period.
  - Oral presentations are for 15 min. including a 3 min. questions period.

- **AV Equipment:**
  - A standard laptop (PC) and a LCD projector are provided in each room.
  - Speakers are required to upload their PowerPoint files prior to the start of their session.

- **Poster Session:**
  - The Poster Session takes place on Monday, July 25, from 6:00 PM - 9:00PM, in Salon ABC
  - Presenters are required to stay at posters.
  - The dimensions of the posters must not exceed 1.2 m (4 feet) wide (horizontal), and 1.5 m (5 feet) long (vertical).
  - Posters must be taken down by 9:00pm on July 25.

- **Short Courses**:
  - The Short Courses on Piezo-/Ferroelectrics and Piezoresponse Force Microscopy will take place on Sunday, July 24, from 8:30am – 6:00pm, in Cypress Room.
  - On-site PFM demonstration and sample testing are available to the course attendants.

- **Workshop on Piezoelectric Single Crystals:**
  - The Workshop on Piezoelectric Single Crystals will be held on Sunday July 24, from 12:00 noon to 6:00pm, in Mackenzie Room.

- **Abstracts**
  - All the abstracts can be found in the complimentary ISAF-PFM-2011 USB memory stick.

ISAF-PFM-2011

The Westin Bayshore Hotel, Vancouver, B.C., Canada

Technical Program / Schedule

Sunday, July 24, 2011

8:30-18:00	Short Courses (Cypress Room)
12:00-18:00	PiezoCrystals Workshop (Mackenzie Room)
18:30-20:00	Welcome Reception (Currents Restaurant/Pool-Garden Area)

Monday, July 25, 2011, AM

7:50 -8:10	Opening / UFFC Society Awards (Salon ABC)				
8:10 - 8:55	Plenary PL-1 (Salon ABC)	F. Stuart Foster	*From Ferroelectricity To Mice To People*		
8:55 - 9:40	Plenary PL-2 (Salon ABC)	Zhong Lin Wang	*Nanogenerators And Piezotronics*		
9:40 - 10:00	Morning Break/Exhibition (Bayshore Grand Foyer)				

	Session M-AM-A Salon D *Applications/Materials*	Session M-AM-B Salon E *Bulk/Piezo-/Ferroelectrics*	Session M-AM-C Salon F *Conduction/Point Defects*	Session M-AM-D Seymour Room *Dielectrics/Ferroelectrics*	Session M-AM-E Mackenzie Room *Domain Engineering*
10:00 - 10:30	M-AM-A-1-I (393) Harold C. Robinson	M-AM-B-1-I (139) Catherine Elissalde	M-AM-C-1-I (106) Cheol Seong Hwang	M-AM-D-1-I (128) Hong Wang	M-AM-E-1-I (198) Beatrix Noheda
	Single Crystal Projectors For Compact, Broadband Sonar	*Control Of Interfaces At Different Scales In Functional Oxides Sintered By Spark Plasma Sintering*	*Collective Motion Of Nano-Filaments In Pt/N-Type TiO_2 /P-Type NiO/Pt Stacked Resistance Switching Memory*	*Novel Dielectric Materials For Microwave Passive Integration*	*Leakage Currents At Domain And Domain Walls Of $BiFeO_3$ Thin Films*
10:30 - 11:00	M-AM-A-2-I (114) Laurent Lebrun	M-AM-B-2-I (125) James Rondinelli	M-AM-C-2-I (111) Jan Seidel	M-AM-D-2-I (174) Dokyun Kwon	M-AM-E-2-I (184) Xiaoqing Pan
	Bulk Electroactive Materials For Actuation And Energy Harvesting	*Designer Ferroelectrics: Engineering Polar Perovskites From Centric Polyhedral Rotations*	*Domain Wall Functionality In Complex Oxides*	*Temperature Stable High Energy Density Capacitors Using Complex Perovskite Thin Films*	*Real-Time Studies Of Ferroelectric Switching And Polarization Vortices*

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11:00 - 11:15	**M-AM-A-3-O (340)** **Markus Floessel**	**M-AM-B-3-O (762)** **Tim Stevenson**	**M-AM-C-3-O (387)** **Maryam Abazari**	**M-AM-D-3-O (281)** **Satoshi Wada**	**M-AM-E-3-O (187)** **Yanfeng Chen**
	Investigation On LTCC/PZT Interface In A Novel Sensor-Actuator-Module For Metal Die Casting	***Strain Dependent Crystallographic Properties Of Bismuth Ferrite Lead Titanate Ceramics***	***Leakage Current Behavior In Lead-Free Ferroelectric KNN-LT-LS Thin Films***	***Preparation Of Barium Titanate / Strontium Titanate Nano-Complex Ceramics Using Nanocube Substrates***	***Acoustic Superlattice Made Of Ordered Multidomain Ferroelectrics***
11:15 - 11:30	**M-AM-A-4-O (306)** **Natchpong Hatti**	**M-AM-B-4-O (169)** **Tomoaki Yamada**	**M-AM-C-4-O (162)** **Sergei V. Kalinin**	**M-AM-D-4-O (207)** **Freedy Ponchel**	**M-AM-E-4-I (170)** **Kenji Kitamura**
	PZT Energy Harvesting And Management Circuits For Prosthetic Legs	***Novel Tetragonal Ferroelectric Materials For Morphotropic Phase Boundaries***	***Topological defects in ferroelectrics: Manipulation and characterization***	***Comparison Of The Tunability Performances And Loss Factor Up To 60 GHz Of Some Ferroelectric Materials: Bst And Doped BST, PST, Hetero Structures BST/BZN***	***Applications Of Surface Potentials On Domain-Engineered Lithium Niobate Template***
11:30 - 11:45	**M-AM-A-5-O (390)** **S. Trolier-McKinstry**	**M-AM-B-5-O (220)** **Alp Sehirlioglu**	**M-AM-C-5-O (210)** **Herbert Schroeder**	**M-AM-D-5-O (743)** **Natthaphon Raengthon**	
	PZT Microelectromechanical Systems For Inkjet Printing	***Ternary Morphotropic Phase Boundaries For High Temperature Piezoelectrics***	***Leakage Current Simulation***	***Dielectric Relaxations In $BaTiO_3$ – $Bi(Zn_{1/2}Ti_{1/2})O_3$ Ceramics For High Temperature Capacitor Applications***	
11:45 - 12:00	**M-AM-A-6-I (154)** **Sorah Rhee**	**M-AM-B-6-0 (721)** **Silke Schaab**	**M-AM-C-6-O (758)** **Amit Kumar**	**M-AM-D-6-O (345)** **Christopher DiAntonio**	**M-AM-E-5-I (190)** **Vladimir Shur**
	Ultrasonic Tools For Surgery	***Phase Identity And Its Thermal Evolution Of BNT-6BT Piezoceramics***	***Role Of Electrochemical Phenomena On Local Polarization-Controlled Electronic Transport In Ferroelectric Thin Films***	***Dielectric And Ferroelectric Analysis Of Nanoparticle-Nanocrystalline Barium Titanate And PLZT***	***Domain Nanotechnology In Lithium Niobate And Lithium Tantalate Single Crystals***
12:00 - 12:15		**M-AM-B-7-O(299)** **Ana. C. Lopes**	**M-AM-C-7-O (324)** **Kambiz Kalantari**	**M-AM-D-7-O (380)** **Minoru Osada**	
		Nucleation Of Electroactive β–Phase And Enhancement Of Optical Transparency In Poly(Vynilidene)/Clay Composites	***Ti Doped $Bi_{1-x}Nd_xFeO_3$ Ceramics***	***New Perovskite Nanomaterials And Their Integration Technologies To High-K Devices***	
12:15 - 13:30	**Lunch (Salon ABC) / Exhibition (Bayshore Grand Foyer)**				
12:30 - 13:20	**TUFFC Publication Seminar, Dr. Marjorie Passini Yuhas, *IEEE Transactions on Ultrasonics, Ferroelectrics and Frequency Control***				

Monday, July 25, 2011, PM

	Session M-PM-A Salon D *Novel Characterizations*	Session M-PM-B Salon E *Multiferroics*	Session M-PM-C Salon F *Piezo/MEMS/Films*	Session M-PM-D Seymour Room *FE/AFE/Energy Applications*	Session M-PM-E Mackenzie Room *Nanoscale Materials & Phenomena*
13:30 - 14:00	M-PM-A-1-I (134) Alexei Gruverman	M-PM-B-1-I (141) Stanislav Kamba	M-PM-C-1-I (110) Chang-Beom Eom	M-PM-D-1-I (135) Keisuke Kageyama	M-PM-E-1-I (147) Guozhong Cao
	Advanced Piezoresponse Force Microscopy: Switching And Electronic Properties Of Nanoscale Ferroelectric Structures	*Review Of Spin-Phonon Coupling In Cubic $SrMnO_3$, $EuTiO_3$ And Hexagonal $YMnO_3$ Antiferromagnets: Radiofrequency, THz And Infrared Studies*	*Giant Piezoelectricity On Silicon For Hyper-Active MEMS*	*Monolithic Micro Thermoelectric Generators Based On Multilayer Cofired Ceramic Technology*	*Hydrothermal Growth Of Single Crystal PZT Submicrosized Particles With Controlled Size*
14:00 - 14:30	M-PM-A-2-I (99) Seungbum Hong	M-PM-B-2-I (193) John Burton	M-PM-C-2-I (172) Paul Muralt	M-PM-D-2-I (136) Kui Yao	M-PM-E-2-I (159) Tomoaki Yamada
	Development And Application Of Angle-Resolved Piezoresponse Force Microscopy	*Giant Interface Magnetoelectric Effect On Transport In A Complex Oxide Ferroelectric Tunnel Junction*	*Energy Harvesting With Piezoelectric Thin Film Micro Structures: Status And Promises*	*Vinylidene Fluoride Oligomer Based Thin Films From Solution Coating Approach*	*An Approach For Self-Assembled Epitaxial $Pb(Zr,Ti)O_3$ Nanorod-Array Toward Enhanced Piezoelectric Responses*
14:30 - 14:45	M-PM-A-3-O (554) H. Y. Guo	M-PM-B-3-I (126) Chishun Tu	M-PM-C-3-O (327) Ronald Polcawich	M-PM-D-3-O (726) David Hall	M-PM-E-3-O (386) Nazanin Bassiri-Gharb
	Piezoresponse Force Microscopic Studies Of Ferroelectic $(1–X)Pb(Sc_{1/2}Nb_{1/2})O_3–xPbTiO_3$ Single Crystals	*Origin Of Low-Frequency Dielectric Permittivity In Multiferroic $BiFeO_3$ Ceramics*	*PiezoMEMS Enabled MM-Scale Robotics*	*Nucleation Of The Antiferroelectric Phase In PZT Ceramics By An Alternating Electric Field*	*Arbitrary-Shaped Ferroelectric Nanostructures Patterned Via Thermochemical Nanolithography*
14:45 -15:00	M-PM-A-4-O (337) Ilkyu Yang		M-PM-C-4-O (255) Daniel Potrepka	M-PM-D-4-O (191) Youlong Xu	M-PM-E-4-O (707) Mi-Ri Joung
	PFM And EFM Study On Ferroelectric $LuFe_2O_4$ Single Crystals		*Pt/TiO_2 Growth Templates For Enhanced PZT Films And MEMS Devices*	*Preparation And Characterization Of High-E Nanocomposite Films For Aluminum Electrolytic Capacitors*	*Growth Mechanism And Piezoelectric Properties Of $KNbO_3$ Nanowires Grown By Hydrothermal Method*

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15:00 - 15:30	**Afternoon Break/Exhibition (Bayshore Grand Foyer)**				
15:30 -15:45	**M-PM-A-5-I (131)**	**M-PM-B-4-O (231)**	**M-PM-C-5-I (112)**	**M-PM-D-5-O (247)**	**M-PM-E-5-I (156)**
	Susan Trolier-McKinstry	**Dmitri Tenne**	**Tae Won Noh**	**Florian LeGoupil**	**Dawn Bonnell**
	Local Behavior Of Piezoelectric Films For MEMS Applications	***Ultraviolet Raman Spectroscopy Of Strained $BiFeO_3$ Films: Rhombohedral-Orthorhombic And Rhombohedral-Tetragonal Phase Transitions***	***Polarity Control Of Ferroelectric $BiFeO_3$ /Metal Interfaces For Switchable Diode And Photovoltaic Effect***	***Direct Electrocaloric Measurements In Polar Materials***	***Strain, Internal Electric Fields And Domain Morphology In Ferroelectric Superlattices***
15:45 - 16:00		**M-PM-B-5-O (709)**		**M-PM-D-6-O (244)**	
		Meghdad Palizdar		**Zdravko Kutnjak**	
		Influence Of Secondary Phase On Multiferroic Properties Of $Bi_5Co_{0.5}Fe_{0.5}Ti_3O_{15}$ Ceramics Made From Molten Salt Method		***Enhancement Of The Electromechanical And Electrocaloric Effects Near The Critical Point In Ferroelectric Relaxor Materials***	
16:00 -16:15	**M-PM-A-6-O(769)**	**M-PM-B-6-O (97)**	**M-PM-C-6-O (321)**	**M-PM-D-7-O (765)**	**M-PM-E-6-I (164)**
	Alexei A. Bokov	**Jia-Mian Hu**	**Hammad Nazeer**	**Lucas Eng**	**Jin Wang**
	Piezoresponse Force Microscopy Of Relaxor Ferroelectrics	***Multi-Scale Modeling Of The Converse Magnetoelectric Effect In Ferromagnetic/Ferroelectric Layered Heterostructures***	***Pulsed Laser Deposited $Pb(Zr,Ti)O_3$ Thin Films With Excellent Piezoelectric And Mechanical Properties***	***Low Voltage Ferroelectric Electron Emission From Bulk And Thin Film Ferroic Samples***	***PZT Nanowires: Processing, Characterisation, And Modeling***
16:15 - 16:30	**M-PM-A-7-O (258)**	**M-PM-B-7-O (371)**	**M-PM-C-7-O (206)**	**M-PM-D-8-O (625)**	
	Gunnar Suchaneck	**Zhongqiang Hu**	**Rudeger Wilke**	**Jani Perantie**	
	Evaluation Of Polarization Of Embedded Piezoelectrics By The Thermal Square Wave Method	***Effects Of B-Site Doping On The Electrical And Magnetic Properties Of Multiferroic $Bi_{0.85}Nd_{0.15}FeO_3$ Thin Films***	***PZT Piezoelectric Films On Glass For Gen-X Imaging Systems***	***Temperature And Polarization Behavior In <001>-Oriented $Pb(Mg_{1/3}Nb_{2/3})O_3$-$PbTiO_3$ Single Crystal During Electric-Field-Induced Phase Transition***	

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16:30 - 16:45	**M-PM-A-8-O (760)** **Rama Vasudevan**	**M-PM-B-8-O (323)** **Lynette Keeney**	**M-PM-C-8-O (382)** **Hyun-Cheol Song**	**M-PM-D-9-O (316)** **Rahul Shukla**	**M-PM-E-7-O (360)** **Baowen Li**
	Using Cantilever Frequency Shift To Map The Tetragonal-Rhombohedral Phase Transition In Strain-Engineered $BiFeO_3$	***Room Temperature Multiferroic Investigations Of Aurivillius Phase $Bi_5Ti_3Fe_{1-X}Co_xO_{15}$ Thin Films***	***Flexible Power Generator Using Laser Transferred Piezoelectric Ribbons On Plastic Substrates***	***A Novel Concept Of Harvesting Ultra Low Frequency Vibrational Energy Using Piezoelectric Effect***	***Ferroelectricity In Artificial Superlattices Of Perovskite Nanosheets***
16:45 - 17:00	**M-PM-A-9-O(282)** **Haijun Wu**	**M-PM-B-9-O (278)** **Jincang Zhang**	**M-PM-C-9-O (701)** **Ruud Steenwelle**	**M-PM-D-10-O (351)** **Kanokvate Tungpimolrut**	**M-PM-E-8-O (724)** **Brian Smith**
	Nano-scale domain structure at MPB and the associated high properties in PMN-PT	***Study Of Magnetism And Specific-Heat Properties For Multiferroic $YCrO_3$ Chromites***	***Strain Effects On Rotational Electromechanical Coupling In $Pb(Zr,Ti)O_3$ Films***	***Design Of Energy Harvester Circuit For A MPC Piezoceramic Based On Electrical Circuit Model Optimization***	***$PbTiO_3$ Thin Films Grown On Epitaxial Single Crystal $SrRuO_3$ Nanowires***
17:00 - 17:15	**M-PM-A-10-I (196)** **Catalin Harnagea**	**M-PM-B-10-I (143)** **Igor Stolichnov**	**M-PM-C-10-O (243)** **Michael Wegener**	**M-PM-D-11-O (752)** **Younghun Jeong**	**M-PM-E-9-I (95)** **Venkatraman Gopalan**
17:15 - 17:30	***Insights Into Friction Phenomena Using Piezoresponse Force Microscopy***	***Magnetism, Ferroelectricity And Semiconductor Functionalities Brought Together: Thin (Ga,Mn)As Under Ferroelectric Control***	***Optimisation Of Ultrasonic And Piezoelectric Properties Of Cellular Polypropylene Ferroelectrets***	***Performance Of Piezoelectric Bimorph Generator Supported By Spiral Spring***	***Local Structure And Dynamics Of A Single Ferroelectric Domain Wall***
			M-PM-C-11-O (234) **Raegan Johnson-Wilke**	**M-PM-D-12-O (753)** **Sushma Kotru**	
			Tilt Transitions In $Ag(Ta_xNb_{1-x})O_3$ Thin Films	***The Effect Of Ferroelectric/ Metal Interfaces On Photo-Voltaic Characteristics Of $Pb_{0.95}La_{0.05}Zr_{0.54}Ti_{0.46}O_3$ Thin Film***	
17:30 -18:00	**Break / Poster Set-up**				
18:00 - 21:00	**Poster Session (Salon ABC: All the other papers)/Exhibition (Bayshore Grand Foyer)**				

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8:00 - 8:45	**Plenary PL-3 (Salon ABC)**	**Stephen Pennycook**	***Probing Ferroelectric Functionality Cell-By-Cell By Aberration-Corrected Stem***		
8:45 - 9:30	**Plenary PL-4 (Salon ABC)**	**Alexander Tagantsev**	***Flexoelectricity***		
9:30 - 10:00	**Morning Break/Exhibition (Bayshore Grand Foyer)**				
	Session T-AM-A	**Session T-AM-B**	**Session T-AM-C**	**Session T-AM-D**	**Session T-AM-E**
	Salon D	**Salon E**	**Salon F**	**Seymour Room**	**Mackenzie Room**
	Applications/ Materials	***Thin & Thick Films***	***Nanoscale Stucture & Phenomena***	***Relaxors***	***Fundamentals/Theory/ Modeling***
10:00 - 10:30	**T-AM-A-1-I (121)**	**T-AM-B-1-I (107)**	**T-AM-C-1-I (166)**	**T-AM-D-1-I (137)**	**T-AM-E-1-I (89)**
	Helen Chan	**Wanda Wolny**	**Chunlin Jia**	**Jae-Hyeon Ko**	**Long-Qing Chen**
	Fabrication And Characterization Of Radial Array Endoscopic Ultrasound Transducers	***Piezoelectric Thick Film Technology Facilitating Easy Integration And Miniaturisation Of Smart Systems For Medical And Industrial Applications***	***Atomic-Scale Study Of Dipole Moments In Oxide Ferroelectrics***	***Brillouin Scattering Studies Of Pb-Based Relaxor Ferroelectrics***	***Phase-Field Modeling Of Ferroelectric Domain Structures***
10:30 - 11:00	**T-AM-A-2-I (185)**	**T-AM-B-2-I (101)**	**T-AM-C-2-I (155)**	**T-AM-D-2-I (163)**	**T-AM-E-2-I (146)**
	Shuxiang Dong	**Weiguang Zhu**	**Robert Klie**	**Guangyong Xu**	**Jiangyu Li**
	A Piezoelectric Single-Crystal Ultrasonic Micro-Actuator For Driving Optics	***Multifunctional Epitaxial Thin Films By Laser Molecular Beam Epitaxy***	***Atomic-Scale Characterization Of Oxide Interfaces Using Aberration-Corrected In-Situ Scanning Transmission Electron Microscopy***	***Probing Local Polar Structures In PZN-xPT And PMN-xPT Relaxor Ferroelectrics Using Neutron And X-Ray Scattering***	***Nanoscale Electromechanics Of Piezoresponse Force Microscopy***
11:00 - 11:15	**T-AM-A-3-O (339)**	**T-AM-B-3-O (344)**	**T-AM-C-3-O (275)**	**T-AM-D-3-O(405)**	**T-AM-E-3-O (245)**
	Jaehyuk Park	**Dirk Kaden**	**Alexei Gruverman**	**Jean-Michel Kiat**	**Simone Sanna**
	Deveoplment Of Piezoelectric-Actuated Metal-Based Optical Scanning Mirror Devices	***Influence Of Platinum Bottom Electrode On The Piezoelectric Performance Of Hot Rf Sputtered PZT Films***	***Interface Engineering For Polarization Stability In Ultrathin $BaTiO_3$ Heterostructures***	***Nano-Particles, Nano-Ceramics And Nanocomposites Of Ferroelectric, Relaxors And Quantum-Paraelectric Perovskites***	***Ferroelectric Transition In $BaTiO_3$ And $LiNbO_3$ Calculated From First Principles***

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11:15 - 11:30	**T-AM-A-4-O (113)** **Fei Li**	**T-AM-B-4-O (335)** **Takashi Iijima**	**T-AM-C-4-O (705)** **Tim Burnett**	**T-AM-D-4-O (237)** **Kenji Ohwada**	**T-AM-E-4-O (350)** **Yasothorn Sapsathiarn**
	Shear Piezoelectric Response In Ferroelectric Crystals And Polycrystalline Ceramics	***Evalation Of Longitudinal And Lateral Displacement For Lead Zirconate Titanate Thick Films Deposited On Silicon Substrate***	***Domain Dynamics In $BaTiO_3$ Single Crystals Within A Few Degrees Of The Ferroelectric-Paraelectric Transition***	***Dynamics Of Antiferroelectric/Relaxor $Pb(In_{1/2}Nb_{1/2})O_3$***	***Modeling Of Hydrogen Diffusion In Piezoceramics With Temperature Gradient***
11:30 - 11:45	**T-AM-A-5-O (740)** **Richard Fu**	**T-AM-B-5-O (748)** **Luz Sanchez**	**T-AM-C-5-O (713)** **Vladimir Shur**	**T-AM-D-5-O (326)** **Alexei Bosak**	**T-AM-E-5-O (315)** **Daniel Franzbach**
	Fully-Integrated, Thin-Film Piezoelectric Sensors For Wireless, Non-Destructive Evaluation Of Aging Structures	***Improving PZT Thin Film Texture Through PT Metallization And Seed Layer***	***Formation Of Nanodomain Structures In Lithium Niobate With Surface Layer Modified By Ion Implantation***	***A New Model Of Correlated Disorder In Relaxor Ferroelectrics***	***The Effects Of Polarization Dynamics And Domain Switching Energies On Field Induced Phase Transformations***
11:45 - 12:00	**T-AM-A-6-O (213)** **Thottam Kalkur**	**T-AM-B-6-I (96)** **Bruce Tuttle**	**T-AM-C-6-I (142)** **Arthur Baddorf**	**T-AM-D-6-O (310)** **Masato Matsuura**	**T-AM-E-6-O (742)** **Pavel Mokry**
	Tunable RF Filters With Graded-Composition, Mocvd-Deposited BST Capacitors	***PLZT Thin Film Phase Evolution, Quantitative Microstructure Analysis And Electrical Property Development***	***The Influence Of Interfaces On Polarization In Thin Films***	***Direct Evidence Of A Flat Free Energy Surface Connecting Tetragonal And Rhombohderal Phases In Relaxor Ferroelectrics Near Morphotropic Phase Boundary***	***Domain Back-Switching Due To The Free Charge Injection Under The AFM Tip Studied By Phase Field Simulations***
12:00 - 12:15	**T-AM-A-7-O (282)** **Haijun Wu**			**T-AM-D-7-O (218)** **Andreja Erste**	**T-AM-E-7-O (276)** **Yusuke Tomita**
	Nano-Scale Domain Structure At MPB And The Associated High Properties In PMN-PT			***Dielectric Investigations Of A New Class Of Relaxor Polymer***	***Numerical Study Of $Pb(In_{1/2}Nb_{1/2})O_3$ By Spin Model***
12:15-13:30	**Lunch (Salon ABC) / Exhibition (Bayshore Grand Foyer)**				
12:15-13:30	**Women in Engineering Lunch Meeting (Prospect Room)**				
	PFM International Advisory Board Meeting (Fraser Room)				

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	Session T-PM-A Salon D *Applications/Materials*	Session T-PM-B Salon E *Thin & Thick Films*	Session T-PM-C Salon F *Lead-Free Piezo-/Ferroelectrics*	Session T-PM-D Seymour Room *Relaxors*	Session T-PM-E Mackenzie Room *Conduction/Defects/ Nano-Phenomena*
13:30 - 14:00	**T-PM-A-1-I (080)** **Jun Luo**	**T-PM-B-1-I (176)** **Jun Akedo**	**T-PM-C-1-I (152)** **Eric Cross**	**T-PM-D-1-I (144)** **Peter Gehring**	**T-PM-E-1-I (194)** **Niall Donnelly**
	Characterization And Applications Of Advanced Binary And Ternary Piezoelectric Crystals	***Progress Of Aerosol Deposition Process On Piezoelectric Materials And Application To Optical Micro Scanner***	***Flexoelectric Composites – The Cutting Edge For New Lead-Free Piezoceramics***	***A Comparison Of Complex Lead-Oxide Perovskites In The Limits Of Weak And Strong Random Electric Fields: PZT Versus PMN***	***Impedance Spectroscopy Of PZT Ceramics - Measuring Diffusion Coefficients, Mixed Conduction And Pb Loss***
14:00 -14:30	**T-PM-A-2-I (081)** **Yohachi (John) Yamashita**	**T-PM-B-2-I (165)** **Tohru Suzuki**	**T-PM-C-2-I (115)** **Hajime Nagata**	**T-PM-D-2-I (140)** **Sergey Vakhrushev**	**T-PM-E-2-I (118)** **Kazutaka Fujiwara**
	History And Future Prospective Of Relaxor Single Crystal Materials And Application	***Highly Controlled Orientation Of Piezoelectric Ceramics Using Both Platelet Particles And Strong Magnetic Field***	***Piezoelectric Properties Of Lead-Free Ferroelectric Ceramics Under Some Specifc Conditions***	***Diffuse Scattering In Functional Perovskites***	***Control Of Electrical Properties On R (Cr, Mn) O_3 (R=La, Y And Rare Earth Element) For High Temperature Sensor Applications***
14:30 - 14:45	**T-PM-A-3-O (728)** **Katerina Novakova**	**T-PM-B-3-O (203)** **Flavio Griggio**	**T-PM-C-3-O (357)** **Elena Aksel**	**T-PM-D-3-O (226)** **Shigeo Mori**	**T-PM-E-3-O (208)** **Lukas Andrejs**
	Application Of Piezoelectric Macro-Fiber-Composite Actuators For The Suppression Of Noise Transmission Through Curved Glass Shells	***Local Piezoelectric Nonlinearity In Lead Nickel Niobate – Lead Zirconate Titanate Thin Films***	***Structure And Property Transitions In Fe-Doped Sodium Bismuth Titanate***	***Microstructural Study Of $Pb(In_{1/2}Nb_{1/2})O_3$ With The Perovskite B-Site Randomness***	***Resistance Degradation In Donor-Doped PZT Under Electrical Field: Identification Of Conductive Paths And Mechanism***
14:45 -15:00	**T-PM-A-4-O (745)** **Joe Evans**	**T-PM-B-4-O (211)** **Seiji Yamazoe**	**T-PM-C-4-O (256)** **Ahmad Safari**	**T-PM-D-4-O (204)** **Francois Bauer**	**T-PM-E-4-O (167)** **Andrei Kholkin**
	Unpowered Event Detection With An Autonomous Ferroelectric Capacitor Circuit	***Observation Of Domain Structures In $NaNbO_3$ Thin Films By Laser Beam Scanning Microscope And Piezoresponse Force Microscope***	***Lead-Free BNT-BKT-BT Thin Films By Pulsed Laser Deposition Process***	***Advances In Relaxor Ferroelectric Terpolymer: New Applications***	***Diphenylalanine And Peptide Nanotubes Computational Modeling And Properties At The Nanoscale***

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15:00 - 15:30	**Afternoon Break/Exhibition (Bayshore Grand Foyer)**				
15:30 - 16:00	**T-PM-A-5-I (195)** **Christian Hoffmann**	**T-PM-B-5-I (150)** **Qifa Zhou**	**T-PM-C-5-I (83)** **Pam Thomas**	**T-PM-D-5-I (158)** **Muhetaer Aihaiti**	**T-PM-E-5-I (100)** **Ethan Crumlin**
	PZT-Based Multilayer Actuators	***$Pb(Mg_{1/3}Nb_{2/3})O_3$-$PbTiO_3$ Films For High Frequency Ultrasound Transducer Applications***	***Sodium Bismuth Titanate, $Na_{0.5}Bi_{0.5}TiO_3$ (NBT), And Related Lead-Free Piezoelectric Materials: Domains, Disorder And Disagreements***	***Pressure-Composition Phase Diagram Of The $Pb(Mg_{1/3}Nb_{2/3})O_3$-$xPbTiO_3$ Solid Solutions***	***A Model System Approach To Investigate And Improve SOFC Cathode Materials***
16:00 - 16:15	**T-PM-A-6-I (149)** **Kenneth Liang**	**T-PM-B-6-O (368)** **Kim-Anh Buithi**	**T-PM-C-6-I (188)** **Rintaro Aoyagi**	**T-PM-D-6-I (105)** **Seiji Kojima**	**T-PM-E-6-I (175)** **Donovan Leonard**
16:15 - 16:30	***Applications Of Piezoelectric Materials In Oilfield Services***	***Structural And Ferroelectric Properties Of <011>-Oriented PMN-PT Thin Films*** **T-PM-B-7-O (722)** **Aaron Welsh** ***Microcontact Printing Of PZT For MEMS Applications***	***Temperature Dependences Of Electrical Properties In $(Li,Na)NbO_3$ Lead-Free Piezoelectric Ceramics***	***Broadband Inelastic Scattering Of Lead-Free Perovskite Ferroelectrics***	***In Situ And Post Mortem Observation Of Oxygen Vacancy Ordering And Bias Cycling Effects In $La_{0.8}Sr_{0.2}CoO_3$ Thin Films***
16:30 - 16:45	**T-PM-A-7-I (171)** **Marcias Martinez**	**T-PM-B-8-O (313)** **Krishna Nittala**	**T-PM-C-7-O (249)** **Xiaoli Tan**	**T-PM-D-7-O (768)** **Akitoshi Koreeda**	**T-PM-E-7-1(334)** **Gabriel Caruntu**
16:45 - 17:00	***Piezoelectric Sensing Element For Hydrostatic Pressure Measurements In Biomedical Applications***	***Nucleation And Growth In Solution Deposited PZT Thin Films: Effect Of Heating Rate*** **T-PM-B-9-O (238)** **Seok-Jin Yoon** ***Low-Temperature Process OF $Ba_{0.6}Sr_{0.4}TiO_3$ Thin Film By Multi-Layer Excimer Laser Annealing***	***Structure-Property Relationship In Unpoled $(1-x)(Bi_{1/2}Na_{1/2})TiO_3$-$xBaTiO_3$ Ceramics*** **T-PM-C-8-O (320)** **Eva Sapper** ***Field-Induced Shift Of The Depolarization Temperature In Lead-Free BNT-xBT***	***Self-Similarity Of The Central Peak Observed In PMN And PMN-0.27PT*** **T-PM-D-8-O 168)** **Pierre-Eymeri Janolin** ***Relaxors Under Stress: The Case Of PSN***	***Ferroelectric Monodisperse Cube-Like $BaTiO_3$ Colloidal Nanocrystals As Building Blocks For The Design Of Multiferroic Nanocomposites***

Tuesday, July 26, 2011, PM

17:00 - 17:15	**T-PM-A-8-I (119)** **Scott Smith**	**T-PM-B-10-O (307)** **Faye Bygrave**	**T-PM-C-9-O (284)** **Michael Naderer**	**T-PM-D-9-O (242)** **Lin Xie**	**T-PM-E-8-O (330)** **Nagarajan Valanoor**
		Interdiffusion At The Substrate-Film Interface Of $BiFeO_3$-$PbTiO_3$ Thin Films On Pt/Si	***Microprobe Analysis Of (1-x)BNT-xBKT***	***Direct Observation Of Static Polar Clusters In The Precursor Of Ferroelectric And Relaxor $Ba(Ti_{1-X}Sn_x)O_3$ Above The Freezing Temperature T_{vf}***	***Exploring Topological Defects In Epitaxial $BiFeO_3$ Thin Films***
17:15 - 17:30	***Piezoelectrics In Medical Ultrasound***	**T-PM-B-11-O (629)** **Ling Chen**	**T-PM-C-10-O (331)** **Ichiro Fujii**	**T-PM-D-10-O (212)** **Jianjun Yao**	**T-PM-E-9-O (271)** **Tae-Heon Kim**
		Structural, Electrical And Magnetic Properties Of 0.9 $BiFeO_3$ -0.1 $DyFeO_3$ Multiferroic Thin Films Prepared By Pulsed Laser Deposition	***Structural, Dielectric, And Piezoelectric Properties Of $BaTiO_3$-$Bi(Mg_{1/2}Ti_{1/2})O_3$- $BiFeO_3$ Ceramics***	***Study Of Domain And Local Structure Of Lead-Free $Na_{1/2}Bi_{1/2}TiO_3$-$BaTiO_3$ Crystals***	***Polarity Dependence And Interfacial Effect In Polarization Reversal Of $BiFeO_3$ Films***
17:30 - 17:45	**T-PM-A-9-I (82)** **Nico de Jong**	**T-PM-B-12-O (248)** **Mark Twigg**	**T-PM-C-11-I (116)** **Xiaobing Ren**	**T-PM-D-11-I (183)** **Jose-Antonio Eiras**	**T-PM-E-10-I (90)** **Jak Chakhalian**
		Extended Defects In Sputter-Deposited $BaSrTiO_3$ Films And The Influence Of Oxygen Partial Pressure And Vacancies			
17:45 - 18:00	***Dual Frequency Phased Array For Improved Cardiac Imaging***	**T-PM-B-13-O (225)** **Afzal Khan**	***High-Performance Pb-Free Piezoelectric Ceramics With $d_{33} > 600$ pC/N***	***Relationship Between Structural Characteristics And Influence Of Doping On The Dielectric Dispersion Of Relaxors***	***Strongly Correlated Electrons And Polar Compensation In Heterostructures Of Rare-Earth Nickelates***
		Synthesis Of* Ba-*Doped* $SrCu_2O_2$ *AS A P-Type Transparent Conducting Oxide Thin Film By MOCVD			
18:00- 18:30	**Break**				
18:30 - 20:30	**Gala Dinner/Ferroelectrics Awards/Poster Awards (Salon ABC)**				

Wednesday, July 27, AM

8:00 - 8:45	Plenary PL-5 (Salon ABC)	Ramamoorthy Ramesh	*ELECTRIC FIELD CONTROL OF MAGNETISM USING MULTIFERROICS*
8:45 - 9:30	Plenary PL-6 (Salon ABC)	Akira Ando	*RECENT PROGRESS ON FERROELECTRIC CERAMICS*
9:30 - 10:00	Morning Break/Exhibition (Bayshore Grand Foyer)		

	Session W-AM-A Salon D *Applications/Materials*	Session W-AM-B Salon E *Multiferroics*	Session W-AM-C Salon F *Piezo-/FE/Single Crystals*	Session W-AM-D Seymour Room *New Characterizations*	Session W-AM-E Mackenzie Room *Fundamnetals/Structures/ New Advances*
10:00 - 10:30	W-AM-A-1-I (87) Ed Alberta *Ferroelectric Materials For Explosively Driven Pulsed Power Systems*	W-AM-B-1-I (130) Brahim Dkhil *Phase Transitions In Multiferroic $BiFeO_3$ Thin Films*	W-AM-C-1-I (160) Yuji Noguchi *Ferroelectric And Piezoelectric Properties Of $(Bi_{1/2}K_{1/2})TiO_3$-$(Bi_{1/2}Na_{1/2})TiO_3$ Single Crystals*	W-AM-D-1-I (138) Naoya Shibata *Novel Atomic Resolution Scanning Transmission Electron Microscopy For Oxide Materials*	W-AM-E-1-I (91) Lukas Eng *Near-Field Superlensing Based On Layered Perovskite Structures*
10:30 - 11:00	W-AM-A-2-I (189) Matthijn Dekkers *All-Oxide Piezomems Devices By Large Area Pulsed Laser Deposition*	W-AM-B-2-I (717) Alain Pignolet *Bi_2FeCrO_6 Nanostructures Multiferroic At Room Temperature*	W-AM-C-2-I (108) Shujun Zhang *Evaluation Of PIN-PMN-PT Crystals For Various Applications*	W-AM-D-2-I (161) Jacob Jones *Diffraction Of Ferroelectrics During Electric Field Application: New Approaches Yield New Insight*	W-AM-E-2-I (706) Andrew Bell *Impedance Spectroscopy And Dielectric Modelling Of $(K_xNa_{1-x})_{1/2}Bi_{1/2}TiO_3$*
11:00 - 11:15	W-AM-A-3-O (749) George Saddik *An L-Section DC Electic Field Switchable Bulk Acoustic Wave Solidly Mounted Resonator Filter Based On $Ba_{0.5}Sr_{0.5}TiO_3$*	W-AM-B-3-O (122) Kan Yi *Dielectric, Magnetic, Multiferroicic Properties In Garnet $Re_3Fe_5O_{12}$ Ceramics*	W-AM-C-3-O (254) Nevin Sherlock *Nonlinear Response In Relaxor-Pt Single Crystals For High Power Sonar Transducers*	W-AM-D-3-O (333) Rattikorn Yimnirun *Investigation Of Local Structure In Multifunctional Oxide Materials With Synchrotron X-Ray Absorption Spectroscopy*	W-AM-E-3-O (755) Dean Keeble *Studying The Local Structure Of Ferroelectrics Using Nuclear Magnetic Resonance*

Wednesday, July 27, AM

11:15 - 11:30	**W-AM-A-4-I (120)** **Hidesada Natsui**	**W-AM-B-4-O (103)** **Igor Raevski**	**W-AM-C-4-O (259)** **Peter Finkel**	**W-AM-D-4-O (389)** **Tim Burnett**	**W-AM-E-4-O (228)** **Xianran Xing**
	Effect Of Mn And V Valences For The Reliability Of $BaTiO_3$ Based Mlccs	***The Effect Of A-Site And B-Site Ion Substitutions On The Temperatures Of Ferroelectric And Magnetic Phase Transitions In Multiferroic $PbFe_{0.5}Nb_{0.5}O_3$***	***Large Displacement Acoustic Source Using Phase Transition In Relaxor-Ferroelectric $Pb(In_{1/2}Nb_{1/2})O_3$–$Pb(Mg_{1/3}Nb_{2/3})O_3$–$PbTiO_3$ Single Crystals***	***In-Situ Real Time Structural Response Of A Ferroelectric To An Applied External Electric Field Of Varying Frequency***	***Multiferroics And High Mechanical Performance In $(1-x-y)PbTiO_3$-$xBi(Ni_{1/2}Ti_{1/2})O_3$-$yBiScO_3$***
11:30 - 11:45		**W-AM-B-5-O (719)** **Clare Cambridge**	**W-AM-C-5-O (232)** **Zdravko Kutnjak**	**W-AM-D-5-O (227)** **Jun Chen**	**W-AM-E-5-O (293)** **Yuri Genenko**
		Growth And Characterization Of High Quality $BiFeO_3$- $PbTiO_3$ Single Crystals	***Enhancement Of The Electromechanical Effect Near The Critical Point In Ferroelectric Relaxor Material***	***Structure Studies Of High-T_C Piezoelectrics $PbTiO_3$ -$BiMeO_3$ In The Tetragonal Phase (Me=Fe, $Zn_{1/2}Ti_{1/2}$, AND Sc)***	***Direct Extraction Of The Switching Time Distribution From Polarization Reversal Data Of Virgin And Fatigued Ferroelectric Ceramics: An Inhomogeneous Field Mechanism Approach***
11:45 - 12:00	**W-AM-A-5-I (157)** **Roger Steinsiek**	**W-AM-B-6-I (129)** **Vladimir Shvartsman**	**W-AM-C-6-I (153)** **Akira Yoshikawa**	**W-AM-D-6-I (199)** **Paul Evans**	**W-AM-E-6-O (541)** **Hamel Tailor**
12:00 - 12:15	***Ultrasonic Transducer Array Sensor For Borehole Imaging Of Fractures At 300 ° C***	***Higher Order Magnetoelectric Coupling In Disordered Multiferroics***	***Shaped Crystal Growth Of Langasite-Type Piezoelectric Single Crystals And Their Physical Properties***	***Structural Consequences Of Ferroelectric Nanolithography***	***Dielectric and Ferroelectric Characterizations of $(1-x)PbTiO_3$- $xBi(Zn_{1/2}Ti_{1/2})O_3$ Single Crystals Grown by a Top Cooled High Temperature Solution Method***
					W-AM-E-7-O (727) **Fangyuan Zhu**
					$(Na_{0.5}K_{0.5})NbO_3$- $LiTaO_3$ Lead-Free Piezoelectric Ceramics Modified with $BiScO_3$
12:15 - 13:30	**Lunch (Salon ABC) / Exhibition (Bayshore Grand Foyer)**				

Wednesday, July 27, 2011, PM

	Session W-PM-A Salon D *Applications/Films*	Session W-PM-B Salon E *Multiferroics*	Session W-PM-C Salon F *Lead-Free Piezo-/Ferroelectrics*	Session W-PM-D Seymour Room *Piego-/Pyro-/Ferroelectrics*	Session W-PM-E Mackenzie Room *New Advances/PZT-Related*
13:30 -14:00	W-PM-A-1-I (181) Dmitri Strukov	W-PM-B-1-I (102) Yoshiaki Uesu	W-PM-C-1-I (123) Masahiko Kimura	W-PM-D-1-I (93) Mitra L. Taheri	W-PM-E-1-I (178) Jiri Hlinka
	Memristive Devices And Circuits	*Ferroelectricity And Ferrimagnetism Of Thin-Film Stabilized Hexagonal $YbFeO_3$*	*Study Of Nickel Inner Electrode Lead-Free Piezoelectric Ceramics*	*Direct Observation And Quantitative Analysis Of Ferroelectric Domain Switching Behavior Using In Situ Tem Techniques*	*Inelastic Scattering Studies Of PZT Single Crystals*
14:00 - 14:30	W-PM-A-2-I (197) Dillon Fong	W-PM-B-2-I (145) Nagarajan Valanoor	W-PM-C-2-I (186) Wei Ren	W-PM-D-2-I (173) Takaaki Tsurumi	W-PM-E-2-I (92) Alexei A. Bokov
	In Situ Studies On The Effect Of Oxygen Partial Pressure On The Properties Of Ferroelectric Thin Films	*Nanoscale Chemical, Structural And Electromechanical Properties Of Rare-Earth Substituted $BiFeO_3$ Epitaxial Thin Films*	*$K_{0.5}Na_{0.5}NbO_3$ Based Lead-Free Thick Films: Preparation, Characterization And Applications*	*Reconstruction Of Fundamental Equations For Piezoelectric Response*	*Critical Behaviour At Ferroelectric Phase Transitions*
14:30 - 14:45	W-PM-A-3-O (222) Masafumi Kobune	W-PM-B-3-O (341) Fei Fang	W-PM-C-3-O (365) Eva Maria Anton	W-PM-D-3-O (236) Tongqing Yang	W-PM-E-3-O (314) Semen Gorfman
	Ferro- And Piezoelectric Properties Of $(Bi_{3.25}Nd_{0.75})Ti_3O_{12}$ Nanoplates Epitaxially Grown On $Nb:TiO_2$ (101) Substrate By Sputtering	*Microstructural Effects On Magnetoelectric Coupling For Terfenol-D/P(VDF-TRFE)/Terfenol-D Laminates*	*Structural Study And Phase Transitions Of Lead-Free $Bi_{1/2}Na_{1/2}TiO_3$-$Bi_{1/2}K_{1/2}TiO_3$-$(K_{0.5}Na_{0.5}NbO_3)$ Ceramics*	*Pyroelectric And Eletrocaloric Effect In $(Pb,La)(Zr,Sn,Ti)O_3$ Antiferroelectric Ceramics*	*High Resolution X-Ray Diffraction Study Of Single Crystals Of Lead Zirconate Titanate*

Wednesday, July 27, 2011, PM

14:45 - 15:00	**W-PM-A-4-O (205)** **Marc Lethiecq**	**W-PM-B-4-I (104)** **Ying Hao Chu**	**W-PM-C-4-O (355)** **Meredith Rogers**	**W-PM-D-4-O (338)** **Sebastjan Glinsek**	**W-PM-E-4-O (388)** **Nichola Middleton-Stewart**
	Non-Planar Pad-Printed Thick-Film Focused High Frequency Ultrasonic Transducers For Imaging And Hifu Applications	***Functionality Design And Misorientation Control In Self-Assemble Perovskite-Spinel Hetero-Eptaxial Nanostructures***	***Domain Wall Motion In Lead-Free Piezoelectric Ceramics***	***Induced Ferroelectricity In Polycrystalline $KTaO_3$ Thin Films***	***In Situ XRD Study Of The Electric Field Induced Antiferroelectric – Ferroelectric Phase Transformation In PZT***
15:00 - 15:15	**W-PM-A-5-O (750)** **Sushma Kotru**		**W-PM-C-5-O (300)** **Kyle Webber**	**W-PM-D-5-O (398)** **Jaeho Choi**	**W-PM-E-5-O (379)** **Hiroko Yokota**
	Csd-Prepared Pb_xTiO_3 Seed Layer For {100}-Textured PZT Films: Composition And Concentration Effects		***The Temperature-Dependence Of Phase Transitions In Lead-Free Ferroelectrics Under Uniaxial Stress***	***Electron Radiation Enhancement By Radiation Heat***	***Structural Investigations Of Pb(Zr, Ti) O_3***
15:15 - 15:30	**W-PM-A-6-O (349)** **Ali B. Alamin Dow**	**W-PM-B-5-I (148)** **Alexander Sigov**	**W-PM-C-6-I (177)** **Eberhard Hennig**	**W-PM-D-6-I (325)** **Jianguo Zhu**	**W-PM-E-6-I (179)** **Andreas Schoenecker**
	Analysis And Modeling Of Aln Bimorph Piezoelectric Autonomous Microgenerator Stimulated By β-Emitting Radioisotopes	***Multiferroic Effects In Perovskite Multilayers: Nonlinear-Optical Studies***	***Lead-Free Piezoceramic Materials For Industrial Applications***	***Effect Of Mn-Y Codoping On The Intrinsic Pyroelectric Property Of BST Ceramics***	***Investigation Of Domain Switching Of PZT And KNN – Based Ceramics On Macro And Micro Scale***
1530 - 15:45	**W-PM-A-7-O (366)** **Kirsten Brookshire**				
	Unipolar Fatigue In $Pb(Zr,Ti)O_3$ Thin Films				
15:45 - 16:00	**Afternoon Break/Exhibition (Bayshore Grand Foyer)**				
16:00 - 16:45	**Plenary PL-7 (Salon ABC)** **IEEE Distinguished Lecture**	**Dragan Damjanovic**	***On The Origins of Electromechanical Coupling In Complex Materials***		
16:45 - 17:00	**Closing**				

ISAF-PFM-2011

Short Courses Schedule

The Westin Bayshore Hotel, Vancouver, B.C.

Sunday, July 24, 2011, 8:30AM–6:00 PM, Cypress Room

	Instructor	Courses
8:30 - 10:00	**Dr. Susan Trolier-McKinstry** Penn State University	**Fundamentals of Piezo-/Ferroelectrics**
10:00 - 10:15	Morning Break	
10:15 - 11:45	**Dr. Paul Reynolds** Weidlinger Associates, Inc.	**Finite Element Modelling of Piezoelectric Devices**
11:45 - 13:00	Lunch/PFM Demos	
13:00 - 14:30	**Dr. Alexei Gruverman** University of Nebraska-Lincoln	**Introduction to PFM**
14:30 - 14:45	Afternoon Break I/PFM Demos	
14:45 - 16:15	**Dr. Arthur P. Baddorf** Oak Ridge National Laboratory	**Topological Size Effects in Electron Transport through Ferroelectric Surfaces**
16:15 - 16:30	Afternoon Break II/PFM Demos	
16:30 - 18:00	**Dr. Sergei V. Kalinin** Oak Ridge National Laboratory	**Novel Dynamics mode of Piezoresponse Force and Electrochemical Strain Microscopy**

List of Session Chairs

Monday July 25, 2011

08:10-09:40	**Session Plenary PL -1, 2**	**Thomas Shrout**
10:00-12:15	**Session M-AM-A**	**Helen Chan**
	Session M-AM-B	**Nazanin Bassiri-Garb**
	Session M-AM-C	**Dragan Damjanovic**
	Session M-AM-D	**Xiaoli Tan**
	Session M-AM-E	**Tae Won Noh**
13:30-17:30	**Session M-PM-A**	**Andrei Kholkin/Sergei Kalinin**
	Session M-PM-B	**Yoshiaki Uesu/Andrew Bell**
	Session M-PM-C	**Beatriz Noheda/Xiaoqing Pan**
	Session M-PM-D	**Yuji Noguchi/Haosu Luo**
	Session M-PM-E	**Catherine Elissalde/Ahmad Safari**
18:00-21:00	**Session Poster**	**Xiaoli Tan/Alexei A. Bokov/Hamel Tailor**

Tuesday July 26, 2011

08:00-09:30	**Session Plenary PL-3, 4**	**Sergei Kalinin**
10:00-12:15	**Session T-AM-A**	**Sorah Rhee**
	Session T-AM-B	**Wei Ren**
	Session T-AM-C	**Jacob Jones**
	Session T-AM-D	**Peter Gehring**
	Session T-AM-E	**Alexander Tagantsev**
13:30-18:00	**Session T-PM-A**	**Harold Robinson/Shujun Zhang**
	Session T-PM-B	**Paul Muralt/Kui Yao**
	Session T-PM-C	**Nava Setter/Satoshi Wada**
	Session T-PM-D	**Kenji Ohwada/Guangyong Xu**
	Session T-PM-E	**Lukas Eng/Takaaki Tsurumi**

List of Session Chairs

Wednesday, July 27, 2011

08:00-09:30	**Session Plenary PL-5, 6**	**Andrei Kholkin**
10:00-12:15	**Session W-AM-A**	**Laurent Lebrun**
	Session W-AM-B	**Stanislav Kamba**
	Session W-AM-C	**Yohachi John Yamashita**
	Session W-AM-D	**Susan Trolier-McKinstry**
	Session W-AM-E	**Vladimir Shur**
13:30-15:45	**Session W-PM-A**	**Jun Akedo**
	Session W-PM-B	**Brahim Dkhil**
	Session W-PM-C	**Tadashi Takenaka**
	Session W-PM-D	**Hong Wang**
	Session W-PM-E	**Pam Thomas**
16:00-16:45	**Session Plenary PL-7**	**Zuo-Guang Ye**

Dr. F. Stuart Foster is currently a senior scientist at Sunnybrook Health Sciences Centre and Professor and Canada Research Chair in Ultrasound Imaging, Department of Medical Biophysics, University of Toronto. His current research centres on the development of high frequency clinical and preclinical imaging systems, array technology, intravascular imaging, and molecular imaging. Stuart is a fellow of the American Institute of Ultrasound in Medicine. He is the founder and CSO of VisualSonics Inc., a company aimed at preclinical imaging. Dr. Foster co-founded the Mouse Imaging Centre (MICe) now at the Toronto Centre for Phenogenomics. He has served on the Board of Directors of the National Cancer Institute of Canada and as Chairman of its Advisory Committee on Research (ACOR). He has previously been the recipient of the Eadie Medal for major contributions to engineering in Canada and has recently been the recipient of the Queen's Golden Jubilee Medal, the Manning Award of Distinction for Canadian Innovation and the Ontario Premier's Discovery Award. He serves on numerous advisory bodies and is currently on the editorial boards of *Ultrasonic Imaging* and *Ultrasound in Medicine and Biology*. Dr. Foster was the recipient of the 2010 Rayleigh Award from IEEE.

FROM FERROELECTRICS TO MICE TO PEOPLE

Stuart Foster

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Over the past decade, non-invasive pre-clinical imaging has emerged as an important tool to facilitate biomedical discovery. Not only have the markets for these tools accelerated but the numbers of peer reviewed papers in which imaging end points and biomarkers have been used have grown dramatically. High frequency "micro-ultrasound" has steadily evolved in the post genomic era as a rapid, comparatively inexpensive imaging tool for studying normal development and models of human disease in small animals. One of the fundamental barriers to this development was the technological hurdle associated with high frequency array transducers. Recently, new approaches have enabled the upper limits of linear and phased arrays to be pushed from about 20 MHz to over 50 MHz enabling a broad range of new applications. The innovations leading to the new transducer technology and scanner architecture are reviewed. Applications of preclinical micro-ultrasound are explored for developmental biology, cancer, and cardiovascular disease. With respect to the future, the latest developments in high frequency ultrasound imaging will be described.

Dr. Zhong Lin (ZL) Wang is the Hightower Chair in Materials Science and Engineering, Regents' Professor, Engineering Distinguished Professor and Director, Center for Nanostructure Characterization, at Georgia Tech. Dr. Wang is a foreign member of the Chinese Academy of Sciences, member of the European Academy of Sciences, fellow of the American Physical Society, fellow of AAAS, fellow of the Microscopy Society of America and fellow of the Materials Research Society. He has received the 2001 S.T. Li prize for Outstanding Contribution in Nanoscience and Nanotechnology, the 1999 Burton Medal from Microscopy Society of America, and the 2009 Purdy award from American ceramic society. Dr. Wang has made original and profound contributions to the synthesis, discovery, characterization and understanding of fundamental physical properties of oxide nanobelts and nanowires, as well as applications of nanowires in energy sciences, electronics, optoelectronics and biological science. He invented and pioneered the *in-situ* technique for measuring the mechanical and electrical properties of a single nanotube/nanowire inside a transmission electron microscope (TEM). His breakthroughs in developing nanogenerators establish the principle and technological road map for harvesting mechanical energy from environmental and biological systems for powering personal electronics. Dr. Wang is in the world's top 5 most cited authors in nanotechnology and materials science. His publications have been cited over 38,000 times. The H-index of his citations is 93.

NANOGENERATORS AND PIEZOTRONICS

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Developing wireless nanodevices and nanosystems is of critical importance for sensing, medical science, environmental/infrastructure monitoring, defense technology and even personal electronics. It is highly desirable for wireless devices to be self-powered without using battery. This is a new initiative in today's energy research for micro/nano-systems in searching for sustainable self-sufficient power sources [1]. We have invented an innovative approach for converting nano-scale mechanical energy into electric energy by piezoelectric zinc oxide nanowire arrays [2]. As today, a gentle straining can output 1-3 V from an integrated nanogenerator, using which a self-powered nanosensor has been demonstrated. A commercial LED has been lid up [3-5].

Due to the polarization of ions in a crystal that has non-central symmetry, a piezoelectric potential *(piezopotential)* is created in the crystal by applying a stress. The effect of piezopotential to the transport behavior of charge carriers is significant due to their multiple functionalities of piezoelectricity, semiconductor and photon excitation. Electronics fabricated by using inner-crystal piezopotential as a "gate" voltage to tune/control the charge transport behavior is named *piezotronics [6,7].Piezo-phototronic effect* is a result of three-way coupling among piezoelectricity, photonic excitation and semiconductor transport, which allows tuning and controlling of electro-optical processes by strain induced piezopotential [8, 9].

Ref.: [1] Z.L. Wang, *Scientific American*, 298 (2008) 82-87; [2] Z.L. Wang and J.H. Song, *Science*, 312 (2006) 242-246; [3] R.S. Yang, Y. Qin, L.M. Dai and Z.L. Wang , *Nature Nanotechnology*, 4 (2009) 34-39; [4] S. Xu, Y. Qin, C. Xu, Y.G. Wei, R.S. Yang, Z.L. Wang, *Nature Nanotechnology*, 5 (2010) 366; [5] G. Zhu, R.S. Yang, S.H. Wang, and Z.L. Wang , Nano Letters, 10 (2010) 3151; [6] Z.L. Wang, *Adv. Mater*., 19 (2007) 889-992; [7] W.Z. Wu, Y.G. Wei and Zhong Lin Wang , Adv. Materials, DOI: adma.201001925; [8] Y.F. Hu, Y.L. Chang, P. Fei, R.L. Snyder and Z.L. Wang, *ACS Nano*, *4* (2010) 1234–1240; [9] Research supported by DARPA, DOE, NSF, Airforce, NIH, Samsung.
For details: http://www.nanoscience.gatech.edu/zlwang/

Dr. Stephen J. Pennycook is a Corporate Fellow in the Materials Science and Technology Division at Oak Ridge National Laboratory and leader of the Scanning Transmission Electron Microscopy Group. He also holds the position of Professor in the Dept. of Physics and Astronomy, Vanderbilt University and the Dept. of Materials Science and Engineering, University of Tennessee. He received his PhD in physics from the Cavendish Laboratory, University of Cambridge in 1978, moving to Oak Ridge in 1982. For the development and application of Z-contrast scanning transmission electron microscopy he received a Research and Development R&D 100 Award in 1990, the Microbeam Analysis Society Heinrich Award in 1992, the Materials Research Society Medal in 1992 and the Institute of Physics Thomas J. Young Medal and Award in 2001. Pennycook is a Fellow of the American Physical Society, the American Association for the Advancement of Science, the Microscopy Society of America and the Institute of Physics. His research interests focus on the development of *Z*-contrast scanning transmission electron microscopy and electron energy loss spectroscopy with sub-Angstrom resolution, and applications to materials science, catalysis and nanoscience. He has over 350 publications in refereed journals and has given over 180 invited presentations on the development and application of atomic resolution Z-contrast microscopy and electron energy loss spectroscopy.

PROBING FERROELECTRIC FUNCTIONALITY CELL-BY-CELL BY ABERRATION-CORRECTED STEM

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The recent introduction of next-generation aberration correctors has propelled the capabilities of the scanning transmission electron microscope (STEM) to a whole new level of sensitivity. The resolution has increased to well below 1 Å, allowing atomic column positions to be extracted with unprecedented precision, and making possible the mapping of ferroelectric displacements on a unit cell by unit cell basis. Furthermore, the STEM allows multiple, simultaneous images to be acquired, Z-contrast images, dominated by the heavy cation columns can be obtained with either bright field images (sensitive to oxygen column positions) or electron energy loss signals (allowing mapping of elemental composition, electronic structure and dielectric properties. Correlating these signals at atomic resolution across interfaces enables new insights into screening mechanisms and the role of lattice constraints, such as suppression of octahedral rotations.

As a case study several examples will be shown of $BiFeO_3$, mapping polarization direct from a Z-contrast image [1], mapping octahedral rotations across interfaces with electrodes, the observation of an induced dielectric anomaly, the influence of vacancy ordering on polarization and the use of column shape analysis to locate and identify domain walls [2]. Experimental results will be complemented by model theoretical studies [3].

[1] A. Y. Borisevich et al., Phys. Rev. Lett. **105**, 087204 (2010).
[2] A. Y. Borisevich et al., ACS Nano, **4**, 6071 (2010).
[3] J. He at al., Phys. Rev. Lett., **105**, 227203 (2010).

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Dr. Alexander Tagantsev received his B.S degree from St. Petersburg State University, in 1974, and Ph.D. degree from Ioffe Physico-Technical Institute, St. Petersburg, Russia, in 1982 in solid state physics. Before 1993, he worked in Ioffe Physico-Technical Institute, (1991-1993, head of laboratory), and St. Petersburg State Technical University (1991-1993, professor). He joined the ceramics laboratory of the Swiss Federal Institute of Technology (EPFL), Lausanne, Switzerland in 1993. Presently he is a professor at EPFL, heading the section 'Modeling and Theory of Electroceramics' at the ceramics laboratory. Tagantsev is a theoretician of a broad domain of expertise from ferroelectricity and phonon physics to electrodynamics of superconductors. He is the author of key results on the theory of microwave materials, dielectric polarization in crystalline materials, and relaxor ferroelectricity. He is also known in the field of ferroelectric thin films for elucidating works on the polarization switching and degradation in these systems. He authored or co-authored more than 200 articles (cited some 6000 times) and a comprehensive book on ferroic domains.

FLEXOELECTRICITY

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The flexoelectric coupling, defined as a linear coupling between the strain gradient and dielectric polarization, has been taken into account in the theory of crystalline solids more than 50 years ago. Originally, this coupling was recognized to be important for the interaction between acoustic waves and electrons in semiconductors as well as for the lattice dynamics of solids. Further theoretical studies have revealed a number in interesting effects related to this coupling. Recent experimental studies of the direct flexoelectric effect (a linear polarization response to the strain gradient) by professor Cross with coworkers have revealed its high potential for technical applications. Presently, essentially inspired by this work, the flexoelectric effect becomes an object of extended experimental and experimental studies. This paper provides an overview of the current knowledge developed on the flexoelectric effect in crystalline solids, which covers the theory, experiment, and applications.

Professor Ramesh graduated from the University of California, Berkeley with a Ph. D. in 1987. He returned to Berkeley in 2004 and is currently the Plato Malozemoff Chair Professor in Materials Science and Physics. Prior to that he was Distinguished University Professor at the University of Maryland College Park. From 1989-1995, at Bellcore, he initiated research in several key areas of oxide electronics, including ferroelectric nonvolatile memories. His landmark contributions in ferroelectrics came through the recognition that conducting oxide electrodes are the solution to the problem of polarization fatigue, which for 30 years, remained an enigma and unsolved problem. In 1994, in collaboration with S. Jin (Lucent Technologies), he initiated research into manganite thin films and they coined the term, Colossal Magnetoresistive (CMR) Oxides. At Berkeley, he continues to pursue key scientific and technological problems in complex multifunctional oxide thin films, nanostructures and heterostructures. His group demonstrated the existence of a large ferroelectric polarization in multiferroic $BiFeO_3$ films, in agreement with first principle predictions; they also demonstrated electric field control of antiferromagnetism as well as ferromagnetism, a critical step towards the next generation of storage and spintronics devices that are completely electric field controlled. His current research interests include thermoelectric and photovoltaic energy conversion in complex oxide heterostructures. He has published extensively on the synthesis and materials physics of complex oxide materials. He received the Humboldt Senior Scientist Prize and Fellowship to the American Physical Society (2001). In 2005, he was elected a Fellow of American Association for the Advancement of Science as well as the David Adler Lectureship of the American Physical Society. In 2007, he was awarded the Materials Research Society David Turnbull Lectureship Award and in 2009, he was elected Fellow of MRS. He was also the recipient of the 2010 APS McGroddy New Materials Prize.

CONTROLLING AND MANIPULATING FERROMAGNETISM WITH AN ELECTRIC FIELD USING MULTIFERROIC OXIDE HETEROSTRUCTURES

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Complex perovskite oxides exhibit a rich spectrum of functional responses, including magnetism, ferroelectricity, highly correlated electron behavior, superconductivity, etc. The basic materials physics of such materials provide the ideal playground for interdisciplinary scientific exploration. Over the past decade we have been exploring the science of such materials (for example, colossal magnetoresistance, ferroelectricity, etc) in thin film form by creating epitaxial heterostructures and nanostructures. Among the large number of materials systems, there exists a small set of materials which exhibit multiple order parameters; these are known as multiferroics. Using our work in the field of ferroelectric and ferromagnetic oxides as the background, we are now exploring such materials, as epitaxial thin films as well as nanostructures. A particularly interesting problem is that related to electric field control and manipulation of ferromagnetism. In this talk I will describe to you some aspects of such materials as well as the scientific and technological excitement in this field. Finally I will share my ideas on the most exciting open problems and emerging directions in multiferroics and beyond into the realm of energy.

Dr. Akira Ando is a general manager of the material development department of Murata Mfg. Co., Ltd. He joined Murata Mfg. Co., Ltd. soon after he graduated from Hiroshima University in 1983. He received his doctoral degree from Tokyo Institute of Technology in 2003. He is in charge of research and development in new material technologies. Ando's expertise is research and development on functional ceramics such as piezoelectric or other ferroelectric materials and applications. He received the Richard Fulrath award from the American ceramic society (2002), and the academic award from the ceramic society of Japan (2009).

RECENT PROGRESS ON FERROELECTRIC CERAMICS

Akira Ando

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Ferroelectric ceramic components such as multilayer ceramic capacitors (MLCC), piezoelectric resonators have played important roles in evolution of advanced electronics. Size reductions of these components have allowed highly integrated functional electronic devices such as cellular phones. Size reduction of an MLCC has resulted in an electric field increase applied to each layer. High resistance to higher electric field is eagerly required for the MLCC more than before.

On the other hand, ferroelectric ceramics have been widely used also in various electromechnical devices, sensor or actuator devices as so-called human-machine interfaces. Piezoelectric ceramic components have been key materials there, however, typical piezoelectric ceramics are Pb-based ones which are preferably alternated by Pb-free materials.

The demands for further integrated functional devices will necessitate higher reliability against applied electric fields, environmentally safe compositions, and so on, as well as higher performances or functionalities to the ferroelectric ceramic materials used for both bulks and thin films. In this paper, we give a review of current status of ferroelectric materials R&D trends, and their future perspectives.

Dr. Dragan Damjanovic received his BSc degree in physics (summa cum laude) at the University of Sarajevo in 1980 and PhD in ceramics science (Philips Fellowship) in 1987 at the Pennsylvania State University. He worked as a research associate at Materials Research Laboratory at PSU from 1988 to 1991 on pyroelectric properties of synthetic polypeptides, piezoelectric properties of relaxor ferroelectrics, and ceramics-polymer composites. In 1991 he joined the Ceramics Laboratory, Institute of Materials, at the Swiss Federal Institute of Technology in Lausanne-EPFL where he is now a professor. He works in the field of the piezoelectric, dielectric and ferroelectric properties of ceramics, single crystals, thick and thin films, and their applications. He teaches undergraduate and graduate courses on electrical properties of materials. He has co-authored more than 170 publications. In the last ten years he participated in and directed a dozen of Swiss and European projects. He was awarded ISIF outstanding achievement award in 2007, Ferroelectrics Recognition Award of the IEEE UFFC Society in 2009, was elected a Fellow of IEEE in 2009, and serves as a distinguished lecturer of the IEEE Ultrasonics, Ferroelectrics and Frequency Control Society in 2010/11.

ON ORIGINS OF ELECTRO-MECHANICAL COUPLING IN COMPLEX MATERIALS

Dragan Damjanovic

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Electro-mechanical coupling takes many forms including electrostriction, flexoelectricity, piezoelectricity, processes that involve field induced phase transitions, and motion of interfaces. Each kind of coupling is dependent on parameters such as crystal structure, structural instabilities, defects and microstructure of material. In complex systems such as ferroelectric ceramics all these forms of coupling often take place simultaneously and their understanding and separation, essential for engineering of properties, is in most cases difficult. These difficulties are obvious in particular with present efforts to develop new high-performance lead-free substitutes for $Pb(Zr,Ti)O_3$-based piezoelectrics.

In this presentation recent results in the field will be discussed within such general framework. The emphasis will be on contributions to electro-mechanical coupling from motion of domain walls, their configuration and interaction with defects and the nature of the morphotropic phase boundary.

It will be demonstrated that structural (in)stabilities are probably the most important characteristic of morphotropic phase boundaries. The role of “bridging phases” in the morphotropic region will be discussed within the same approach. It will be shown how understanding of structural instabilities can lead to engineering of better properties in practical materials.

The contributions of motion and presence of domain walls on electro-mechanical properties are discussed in light of recent results on (i) ceramics and crystals with engineered domain wall configuration and on (ii) frequency and field dependence of material parameters. Evidence will be presented that domain wall displacement appears to have a more complex role in controlling properties of ferroelectrics than previously thought. Understanding of domain-wall related processes to the electro-mechanical coupling may be one of the keys for developing new high performance materials.

Finally, several examples of unexpected electro-mechanical coupling will be presented.

07:50-08:10 **Opening/UFFC/ Society Awards (Salon ABC)**

08:10-08:55 **Plenary PL-1**
F. Stuart Foster: ***FROM FERROELECTRICITY TO MICE TO PEOPLE***

08:55-09:40 **Plenary PL-2**
Zhong Lin Wang : ***NANOGENERATORS AND PIEZOTRONICS***

Salon ABC **Session Chair: Thomas Shrout**

09:40-10:00 **Morning Break /Exhibition (Bayshore Grand Foyer)**

Session M-AM-A, Applications/Materials
Salon D
Session Chair: Helen Chan

10:00-10:30 **M-AM-A-1-I, AR393**

SINGLE CRYSTAL PROJECTORS FOR COMPACT, BROADBAND SONAR
Harold C. Robinson
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10:30-11:00 **M-AM-A-2-I, AR114**

BULK ELECTROACTIVE MATERIALS FOR ACTUATION AND ENERGY HARVESTING
Laurent Lebrun[1], Benoît Guiffard[1], Sébastien Pruvost[1], Daniel Guyomar[1] and Shujun Zhang[2]
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11:00-11:15 **M-AM-A-3-O, AR340**

INVESTIGATION ON LTCC/PZT INTERFACE IN A NOVEL SENSOR-ACTUATOR-MODULE FOR METAL DIE CASTING
Markus Flössel[1], Sylvia Gebhardt[2], Andreas Schönecker[2] and Alexander Michaelis[1]
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11:15-11:30 **M-AM-A-4-O, AR306**

PZT ENERGY HARVESTING AND MANAGEMENT CIRCUITS FOR PROSTHETIC LEGS

N. Hatti[1], K. Tungpimolrut[1], J. Phontip[1] , K. Pechrach[2] , K. Komoljindakul[3] and P. Manoonpong[4]
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Phahonyothin Road, Klong 1, Klong Luang, Pathumthani 12120, Thailand
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11:30-11:45 **M-AM-A-5-O, AR390**

PZT MICROELECTROMECHANICAL SYSTEMS FOR INKJET PRINTING

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152 Materials Research Laboratory, University Park, PA 16802 USA
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e-mail: swk10@psu.edu

11:45-12:15 **M-AM-A-6-I, AR154**

ULTRASONIC TOOLS FOR SURGERY

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Ethicon Endo-Surgery, 4545 Creek Road, Cincinnati, Ohio 45242, USA
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12:15-13:30 **Lunch Break (Salon ABC) /Exhibition (Bayshore Grand Foyer)**

12:30-13:20 **Mackenzie Room** **TUFFC Publication Seminar, Dr. Marjorie Passini Yuhas, *IEEE Transactions on Ultrasonics, Ferroelectrics and Frequency Control***

Session M-AM-B, Bulk/Piezo-/Ferroelectrics
Salon E
Session Chair: Nazanin Bassiri-Garb

10:00-10:30 **M-AM-B-1-I, AR139**

CONTROL OF INTERFACES AT DIFFERENT SCALES IN FUNCTIONAL OXIDES SINTERED BY SPARK PLASMA SINTERING

C. Elissalde[1], U.C. Chung[1], S. Mornet[1], C. Estournès[2], J. Majimel[1], D. Bernard[1], A. Artemenko[1,3] and M. Maglione[1]
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10:30-11:00 **M-AM-B-2-I, AR125**

DESIGNER FERROELECTRICS: ENGINEERING POLAR PEROVSKITES FROM CENTRIC POLYHEDRAL ROTATIONS

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11:00-11:15 **M-AM-B-3-O, AR762**

STRAIN DEPENDENT CRYSTALLOGRAPHIC PROPERTIES OF BISMUTH FERRITE LEAD TITANATE CERAMICS

Tim Stevenson, Tim Comyn, Andrew Bell
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11:15-11:30 **M-AM-B-4-O, AR169**

NOVEL TETRAGONAL FERROELECTRIC MATERIAL FOR MORPHOTROPIC PHASE BOUNDARIES

Hiroshi Funakubo[1], **Tomoaki Yamada**[1, 2], Shintaro Yasui[1], Keisuke Yazawa[1], Jun-ichi Nagata[1], Masaaki Matsushima[1], Hitoshi Morioka[3], Osami Sakata[4], Hiroshi Uchida[5], Takashi Iijima[6]
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11:30-11:45 **M-AM-B-5-O, AR220**

TERNARY MORPHOTROPIC PHASE BOUNDARIES FOR HIGH TEMPERATURE PIEZOELECTRICS

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11:45-12:00 **M-AM-B-6-O, AR721**

PHASE IDENTITY AND ITS THERMAL EVOLUTION OF BNT-6BT PIEZOCERAMICS

Wook Jo[1], **Silke Schaab**[1], Eva Sapper[1], Ljubomira A. Schmitt[1], Hans-Joachim Kleebe[1], Andrew J. Bell[2] and Jürgen Rödel[1]
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12:00-12:15 **M-AM-B-7-O, AR299**

NUCLEATION OF ELECTROACTIVE β–PHASE AND ENHANCEMENT OF OPTICAL TRANSPARENCY IN POLY(VYNILIDENE)/CLAY COMPOSITES

A. C. Lopes[1, 2], C. M. Costa[1], A. M. Fonseca[2], I. C. Neves[2] and S. Lanceros-Mendez[1]
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12:15-13:30 **Lunch Break (Salon ABC) /Exhibition (Bayshore Grand Foyer)**

12:30-13:20 **Mackenzie Room**

TUFFC Publication Seminar, Dr. Marjorie Passini Yuhas
IEEE Transactions on Ultrasonics, Ferroelectrics and Frequency Control

Session M-AM-C, Conduction/Point Defects
Salon F
Session Chair: Dragan Damjanovic

10:00-10:30 **M-AM-C-1-I, AR106**

COLLECTIVE MOTION OF NANO-FILAMENTS IN Pt/N-TYPE TiO_2/P-TYPE NiO/Pt STACKED RESISTANCE SWITCHING MEMORY

Cheol Seong Hwang[1], Kyung Min Kim[1], Seul Ji Song[1], Gun Hwan Kim[1], Jun Yeong Seok[1], Min Hwan Lee[1], Jung Ho Yoon[1], and Jucheol Park[2]
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10:30-11:00 **M-AM-C-2-I, AR111**

DOMAIN WALL FUNCTIONALITY IN COMPLEX OXIDES

Jan Seidel
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11:00-11:15 **M-AM-C-3-O, AR387**

LEAKAGE CURRENT BEHAVIOR IN LEAD-FREE FERROELECTRIC KNN-LT-LS THIN FILMS

M. Abazari and A. Safari
Glenn Howatt Electroceramics Laboratories, Department of Materials Science and Engineering, Rutgers, The State University of New Jersey, NJ 08854, USA
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11:15-11:30 **M-AM-C-4-O, AR162**

TOPOLOGICAL DEFECTS IN FERROELECTRICS: MANIPULATION AND CHARACTERIZATION

Nina Balke, **Sergei V. Kalinin**
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11:30-11:45 **M-AM-C-5-O, AR210**

LEAKAGE CURRENT SIMULATION FOR MIM STACKS WITH THIN HIGH-K DIELECTRICS

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11:45-12:00 **M-AM-C-6-O, AR758**

ROLE OF ELECTROCHEMICAL PHENOMENA ON LOCAL POLARIZATION-CONTROLLED ELECTRONIC TRANSPORT IN FERROELECTRIC THIN FILMS

A. Kumar, D. Leonard, A. Borisevich, M. Biegalski, S. Jesse, S. V. Kalinin
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12:00-12:15 **M-AM-C-7-O, AR324**

Ti DOPED $Bi_{1-X}Nd_XFeO_3$ CERAMICS

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12:15-13:30 **Lunch Break (Salon ABC) /Exhibition (Bayshore Grand Foyer)**

12:30-13:20 **Mackenzie Room**

TUFFC Publication Seminar, Dr. Marjorie Passini Yuhas
IEEE Transactions on Ultrasonics, Ferroelectrics and Frequency Control

Session M-AM-D, Dielectrics/Ferroelectrics
Seymour Room
Session Chair: Xiaoli Tan

10:00-10:30 **M-AM-D-1-I, AR128**

NOVEL DIELECTRIC MATERIALS FOR MICROWAVE PASSIVE INTEGRATION

Hong Wang
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10:30-11:00 **M-AM-D-2-I, AR174**

TEMPERATURE STABLE HIGH ENERGY DENSITY CAPACITORS USING COMPLEX PEROVSKITE THIN FILMS

Do-Kyun Kwon and Min Hyuk Lee
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11:00-11:15 **M-AM-D-3-O, AR281**

PREPARATION OF BARIUM TITANATE / STRONTIUM TITANATE NANO-COMPLEX CERAMICS USING NANOCUBE SUBSTRATES

Satoshi Wada[1], Takayuki Goto[1], Shogo Iwatsuki[1], Masatoshi Kera[1], Ichiro Fujii[1], Kouichi Nakashima[1] and Yoshihiro Kuroiwa[2]
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11:15-11:30 **M-AM-D-4-O, AR207**

COMPARISON OF THE TUNABILITY PERFORMANCES AND LOSS FACTOR UP TO 60 GHz OF SOME FERROELECTRIC MATERIALS: BST AND DOPED BST, PST, HETERO STRUCTURES BST/BZN.

D. Rémiens[1], **F. Ponchel[1]**, J.F. Légier[1], C. Soyer[1], T. Lasri[1], L. Yang[2], X.L. Lei[2], G. Wang[2] and X. Dong[2]
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11:30-11:45 **M-AM-D-5-O, AR743**

DIELECTRIC RELAXATIONS IN $BaTiO_3 – Bi(Zn_{1/2}Ti_{1/2})O_3$ CERAMICS FOR HIGH TEMPERATURE CAPACITOR APPLICATIONS

Natthaphon Raengthon and David P. Cann
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Oregon State University, Corvallis, OR, 97331, USA
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11:45-12:00 **M-AM-D-6-O, AR345**

DIELECTRIC AND FERROELECTRIC ANALYSIS OF NANOPARTICLE-NANOCRYSTALLINE BARIUM TITANATE AND PLZT

Christopher B. DiAntonio[1], Todd Monson[1], Michael R. Winter[2] and Tom Chavez[2]
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12:00-12:15 **M-AM-D-7-O, AR380**

New Perovskite Nanomaterials and Their Integration Technologies to High-k Devices

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12:15-13:30 **Lunch Break (Salon ABC) /Exhibition (Bayshore Grand Foyer)**

12:30-13:20 **TUFFC Publication Seminar, Dr. Marjorie Passini Yuhas**
Mackenzie Room ***IEEE Transactions on Ultrasonics, Ferroelectrics and Frequency Control***

Session M-AM-E, Domain Engineering
Mackenzie Room
Session Chair: Tae Won Noh

10:00-10:30 **M-AM-E-1-I, AR198**

LEAKAGE CURRENTS AT DOMAIN AND DOMAIN WALLS OF $BiFeO_3$ THIN FILMS

Beatriz Noheda and Saeedeh Farokhipoor
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10:30-11:00 **M-AM-E-2-I, AR184**

REAL-TIME STUDIES OF FERROELECTRIC SWITCHING AND POLARIZATION VORTICES

Xiaoqing Pan[1], Chris Nelson[1], Yi Zhang[1.2], Benjamin Winchester[3], Alexander Melville[4], Carolina Adamo[4], Chad Folkman[5], Chang-Beom Eom[5], Darrell Schlom[4], and Long-Qing Chen[3]
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11:00-11:15 **M-AM-E-3-O, AR187**

ACOUSTIC SUPERLATTICE MADE OF ORDERED MULTIDOMAIN FERROELECTRICS

Yan-Feng Chen
National Laboratory of Solid-State Microstructures & Department of Materials Science and Engineering, Nanjing University, Nanjing 210093, China

11:15-11:45 **M-AM-E-4-I, AR170**

APPLICATIONS OF SURFACE POTENTIALS ON DOMAIN-ENGINEERED LITHIUM NIOBATE TEMPLATE

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11:45-12:15 **M-AM-E-5-I, AR190**

DOMAIN NANOTECHNOLOGY IN LITHIUM NIOBATE AND LITHIUM TANTALATE SINGLE CRYSTALS

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12:15-13:30 **Lunch Break (Salon ABC) /Exhibition (Bayshore Grand Foyer)**

12:30-13:20 **Mackenzie Room**

TUFFC Publication Seminar, Dr. Marjorie Passini Yuhas
IEEE Transactions on Ultrasonics, Ferroelectrics and Frequency Control

Session M-PM-A, Novel Characterizations
Salon D
Session Chairs: Andrei Kholkin/Sergei Kalinin

13:30-14:00 **M-PM-A-1-I, AR134**

ADVANCED PIEZORESPONSE FORCE MICROSCOPY: SWITCHING AND ELECTRONIC PROPERTIES OF NANOSCALE FERROELECTRIC STRUCTURES

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14:00-14:30 **M-PM-A-2-I, AR099**

DEVELOPMENT AND APPLICATION OF ANGLE-RESOLVED PIEZORESPONSE FORCE MICROSCOPY

Seungbum Hong[1], Moonkyu Park[1,2], Ramesh Nath[1,3], Kwangsoo No[2], Ram S. Katiyar[3], Orlando Auciello[1,4]
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[2]Department of Materials Science and Engineering, KAIST, Daejon, Korea
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14:30-14:45 **M-PM-A-3-O AR554**

PIEZORESPONSE FORCE MICROSCOPIC STUDIES OF FERROELECTIC $(1-x)Pb(Sc_{1/2}Nb_{1/2})O_3-xPbTiO_3$ SINGLE CRYSTALS

H. Y. Guo, Y. H. Bing and Z.-G. Ye
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14:45-15:00 **M-PM-A-4-O, AR337**

PFM AND EFM STUDY ON FERROELECTRIC $LuFe_2O_4$ SINGLE CRYSTALS

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15:00-15:30 **Afternoon Break /Exhibition (Bayshore Grand Foyer)**

15:30-16:00 **M-PM-A-5-I, AR131**

LOCAL BEHAVIOR OF PIEZOELECTRIC FILMS FOR MEMS APPLICATIONS

Susan Trolier-McKinstry, Flavio Griggio[1], A. Kumar,[2] Stephen Jesse[2] and Sergei Kalinin[2]
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16:00-16:15 **M-PM-A-6-O, AR769**

PIEZORESPONSE FORCE MICROSCOPY OF RELAXOR FERROELECTRICS

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16:15-16:30 **M-PM-A-7-O, AR258**

EVALUATION OF POLARIZATION OF EMBEDDED PIEZOELECTRICS BY THE THERMAL SQUARE WAVE METHOD

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16:30-16:45 **M-PM-A-8-O, AR760**

USING CANTILEVER FREQUENCY SHIFT TO MAP THE TETRAGONAL-RHOMBOHEDRAL PHASE TRANSITION IN STRAIN-ENGINEERED $BiFeO_3$

V. Nagarajan[1], **R.K. Vasudevan[1]**, Y.-H. Chu[2], W.-I.Liang[2], A. Kumar[3], S, Jesse[3], and S.V. Kalinin[3]
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16:45-17:00 **M-PM-A-9-O AR282**

NANO-SCALE DOMAIN STRUCTURE AT MPB AND THE ASSOCIATED HIGH PROPERTIES IN PMN-PT

Haijun Wu[1,2], Jinghui Gao [1,2], Chao Zhou[1], Duchao Lv[1], Shengwu Guo[1], Xiaobing Ren [1,2]
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17:00-17:30 **M-PM-A-10-I, AR196**

INSIGHTS INTO FRICTION PHENOMENA USING PIEZORESPONSE FORCE MICROSCOPY

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17:30-18:00 **Break/Poster Set up**

18:00-21:00 **Poster Session (Salon ABC)**
Session Chairs: Xiaoli Tan/Alexei A. Bokov/Hamel Tailor

Session M-PM-B, Mutilferrorics
Salon E
Session Chairs: Yoshiaki Uesu/Andrew Bell

13:30-14:00 **M-PM-B-1-I, AR141**

REVIEW OF SPIN-PHONON COUPLING IN CUBIC $SrMnO_3$, $EuTiO_3$ AND HEXAGONAL $YMnO_3$ ANTIFERROMAGNETS: RADIOFREQUENCY, THz AND INFRARED STUDIES

S. Kamba,[1] V. Goian,[1] V. Skoromets,[1] C. Kadlec,[1] P. Kužel,[1] A. Belik,[2] J.H. Lee[3] and K.M. Rabe[3]
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14:00-14:30 **M-PM-B-2-I, AR193**

GIANT INTERFACE MAGNETOELECTRIC EFFECT ON TRANSPORT IN A COMPLEX OXIDE FERROELECTRIC TUNNEL JUNCTION

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14:30-15:00 **M-PM-B-3-I, AR126**

ORIGIN OF LOW-FREQUENCY DIELECTRIC PERMITTIVITY IN MULTIFERROIC $BiFeO_3$ CERAMICS

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15:00-15:30 **Afternoon Break / Exhibition (Bayshore Grand Foyer)**

15:30-15:45 **M-PM-B-4-O, AR231**

ULTRAVIOLET RAMAN SPECTROSCOPY OF STRAINED $BiFeO_3$ FILMS: RHOMBOHEDRAL-ORTHORHOMBIC AND RHOMBOHEDRAL-TETRAGONAL PHASE TRANSITIONS

D. A. Tenne[1], A. K. Farrar[1], G. Molino[1], C. Heikes[2], C. Adamo[2], J. H. Lee[2], A. Melville[2], D. G. Schlom[2], G. Sheng[3], L. Q. Chen[3], Y.-H. Chu,[4] Q. He[5], and R. Ramesh[6]
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15:45-16:00 **M-PM-B-5-O, AR709**

INFLUENCE OF SECONDARY PHASE ON MULTIFERROIC PROPERTIES OF $Bi_5Co_{0.5}Fe_{0.5}Ti_3O_{15}$ CERAMICS MADE FROM MOLTEN SALT METHOD

Meghdad Palizdar[1], Tim P Comyn[1], Mike Ward[1] , John Harington[1],Andrew Brown [1] , Andrew J Bell[1] , Santosh Kulkarni[2], Lynette Keeney[2] , Saibal Roy[2], Martyn Pemble[2], Roger W Whatmore[2], Sue Kilcoyne[3]and Christopher Quinne[3]

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16:00-16:15 **M-PM-B-6-O, AR097**

MULTI-SCALE MODELING OF THE CONVERSE MAGNETOELECTRIC EFFECT IN FERROMAGNETIC/FERROELECTRIC LAYERED HETEROSTRUCTURES

Jia-Mian Hu[1,2], G. Sheng[2], J. X. Zhang[2], L. Q. Chen[2] and C. W. Nan[1]

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16:15-16:30 **M-PM-B-7-O, AR371**

EFFECTS OF B-SITE DOPING ON THE ELECTRICAL AND MAGNETIC PROPERTIES OF MULTIFERROIC $Bi_{0.85}Nd_{0.15}FeO_3$ THIN FILMS

Zhongqiang Hu[1,2], Meiya Li[1,2], Jing Wang[1,2], Xiaolian Liu[1,2], Yongdan Zhu[1,2] and Xingzhong Zhao[1,2]

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16:30-16:45 **M-PM-B-8-O, AR323**

ROOM TEMPERATURE MULTIFERROIC INVESTIGATIONS OF AURIVILLIUS PHASE $Bi_5Ti_3Fe_{1-x}Co_xO_{15}$ THIN FILMS

Lynette Keeney[1], Santosh Kulkarni[1], Deirdre Kelleher[2], Saibal Roy[1], Martyn E. Pemble[1], Roger W. Whatmore[1]

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16:45-17:00 **M-PM-B-9-O, AR278**

STUDY OF MAGNETISM AND SPECIFIC-HEAT PROPERTIES FOR MULTIFERROIC $YCrO_3$ CHROMITES

Yuling SU[1,2], Li LI[1], Zhijiu XING[1], Zhenjie FENG[1], Dongmei DENG[1], Baojuan KANG[1], Shixun CAO[1], and **Jincang ZHANG**[1]

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17:00-17:30 **M-PM-B-10-I, AR143**

MAGNETISM, FERROELECTRICITY AND SEMICONDUCTOR FUNCTIONALITIES BROUGHT TOGETHER: THIN (Ga,Mn)As UNDER FERROELECTRIC CONTROL

I. Stolichnov[1], S.W.E. Riester[1], E. Mikheev[1], N. Setter[1], A.W. Rushforth[2], K.W. Edmonds[2], R.P. Campion[2], C.T. Foxon[2], B.L. Gallagher[2], T. Jungwirth[3] and H.J. Trodahl[4]
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17:30-18:00 **Break/Poster Set up**

18:00-21:00 **Poster Session (Salon ABC)**
Session Chairs: Xiaoli Tan/Alexei A. Bokov/Hamel Tailor

Session M-PM-C, Piezo/MEMS/Films
Salon F
Session Chairs: Beatriz Noheda/Xiaoqing Pan

13:30-14:00 **M-PM-C-1-I, AR110**

GIANT PIEZOELECTRICITY ON SILICON FOR HYPER-ACTIVE MEMS

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14:00-14:30 **M-PM-C-2-I, AR172**

ENERGY HARVESTING WITH PIEZOELECTRIC THIN FILM MICRO STRUCTURES: STATUS AND PROMISES

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14:30-14:45 **M-PM-C-3-O, AR327**

PIEZOMEMS ENABLED MM-SCALE ROBOTICS

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14:45-15:00 **M-PM-C-4-O, AR255**

Pt/TiO_2 Growth Templates for Enhanced PZT films and MEMS Devices

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15:00-15:30 **Afternoon Break / Exhibition (Bayshore Grand Foyer)**

15:30-16:00 **M-PM-C-5-I, AR112**

POLARITY CONTROL OF FERROELECTRIC $BiFeO_3$/METAL INTERFACES FOR SWITCHABLE DIODE AND PHOTOVOLTAIC EFFECT

T. W. Noh[1], D. Lee[1], S. H. Baek[2], T. H. Kim[1], J.-G. Yoon[3], C. M. Folkman[2] and C. B. Eom[2]
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16:00-16:15 **M-PM-C-6-O, AR321**

PULSED LASER DEPOSITED $Pb(Zr,Ti)O_3$ THIN FILMS WITH EXCELLENT PIEZOELECTRIC AND MECHANICAL PROPERTIES

H. Nazeer[1], M.D. Nguyen[1], G. Rijnders[1], L.A. Woldering[1], L. Abelmann[1] and M.C. Elwenspoek[1,2]
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16:15-16:30 **M-PM-C-7-O, AR206**

PZT PIEZOELECTRIC FILMS ON GLASS FOR GEN-X IMAGING SYSTEMS

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16:30-16:45 **M-PM-C-8-O, AR382**

FLEXIBLE POWER GENERATOR USING LASER TRANSFERRED PIEZOELECTRIC RIBBONS ON PLASTIC SUBSTRATES

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16:45-17:00 **M-PM-C-9-O, AR701**

STRAIN EFFECTS ON ROTATIONAL ELECTROMECHANICAL COUPLING IN $Pb(Zr,Ti)O_3$ FILMS

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17:00-17:15 **M-PM-C-10-O, AR243**

OPTIMISATION OF ULTRASONIC AND PIEZOELECTRIC PROPERTIES OF CELLULAR POLYPROPYLENE FERROELECTRETS

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17:15-17:30 **M-PM-C-11-O, AR234**

TILT TRANSITIONS IN $Ag(Ta_xNb_{1-x})O_3$ THIN FILMS

Raegan Johnson-Wilke,[1] D. Tinberg,[1] C. Yeager,[1] S. Trolier-McKinstry,[1] Y. Han,[2] I. Reaney,[3] I. Levin,[4] D. D. Fong,[5] T. Fister,[5] and S. Streiffer[6]
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17:30-18:00 **Break/Poster Set up**

18:00-21:00 **Poster Session (Salon ABC)**

Session Chairs: Xiaoli Tan/Alexei A. Bokov/Hamel Tailor

Session M-PM-D, FE/AFE/Energy Applications
Seymour Room
Session Chairs: Yuji Noguchi/Haosu Luo

13:30-14:00 **M-PM-D-1-I, AR135**

MONOLITHIC MICRO THERMOELECTRIC GENERATORS BASED ON MULTILAYER COFIRED CERAMIC TECHNOLOGY

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14:00-14:30 **M-PM-D-2-I, AR136**

VINYLIDENE FLUORIDE OLIGOMER BASED THIN FILMS FROM SOLUTION COATING APPROACH

Kui Yao[1], Shuting Chen[1,2], Mojtaba Rahimabady[1,2], Francis Eng Hock Tay[2], and Li Lu[2]
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14:30-14:45 **M-PM-D-3-O, AR726**

NUCLEATION OF THE ANTIFERROELECTRIC PHASE IN PZT CERAMICS BY AN ALTERNATING ELECTRIC FIELD

D.A. Hall[1], J.D.S. Evans[2], A.M. Paradowska[3], N. Middleton-Stewart[1], P.J. Withers[1] and T. Mori[1]
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14:45-15:00 **M-PM-D-4-O, AR191**

PREPARATION AND CHARACTERIZATION OF HIGH-ε NANOCOMPOSITE FILMS FOR ALUMINUM ELECTROLYTIC CAPACITORS

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15:00-15:30 **Afternoon Break /Exhibition (Bayshore Grand Foyer)**

15:30-15:45 **M-PM-D-5-O, AR247**

DIRECT ELECTROCALORIC MEASUREMENTS IN POLAR MATERIALS

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15:45-16:00 **M-PM-D-6-O, AR244**

ENHANCEMENT OF THE ELECTROMECHANICAL AND ELECTROCALORIC EFFECTS NEAR THE CRITICAL POINT IN FERROELECTRIC RELAXOR MATERIALS

Zdravko Kutnjak[1], Brigita Rožič[1], Barbara Malič[1], Hana Uršič[1], Janez Holc[1], Marija Kosec[1], R. Pirc[1], Sheng-Guo Lu[2] and Q. M. Zhang[2]
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16:00-16:15 **M-PM-D-7-O, AR765**

LOW VOLTAGE FERROELECTRIC ELECTRON EMISSION FROM BULK AND THIN FILM FERROIC SAMPLES

Lukas M. Eng[1], Jana Becherer[1], Vinay Shankar Vidyarthi[2], Gerald Gerlach[2], and Oliver Mieth[1]
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16:15-16:30 **M-PM-D-8-O, AR625**

TEMPERATURE AND POLARIZATION BEHAVIOR IN <001>-ORIENTED $Pb(Mg_{1/3}Nb_{2/3})O_3$-$PbTiO_3$ SINGLE CRYSTAL DURING ELECTRIC-FIELD-INDUCED PHASE TRANSITION

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16:30-16:45 **M-PM-D-9-O, AR316**

A NOVEL CONCEPT OF HARVESTING ULTRA LOW FREQUENCY VIBRATIONAL ENERGY USING PIEZOELECTRIC EFFECT

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16:45-17:00 **M-PM-D-10-O, AR351**

DESIGN OF ENERGY HARVESTER CIRCUIT FOR A MFC PIEZOCERAMIC BASED ON ELECTRICAL CIRCUIT MODEL OPTIMIZATION

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17:00-17:15 **M-PM-D-11-O, AR752**

PERFORMANCE OF PIEZOELECTRIC BIMORPH GENERATOR SUPPORTED BY SPIRAL SPRING

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17:15-17:30 **M-PM-D-12-O, AR753**

THE EFFECT OF FERROELECTRIC/ METAL INTERFACES ON PHOTO-VOLTAIC CHARACTERISTICS OF $Pb_{0.95}La_{0.05}Zr_{0.54}Ti_{0.46}O_3$ THIN FILM

Sushma Kotru and Harshan V Nampoori
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17:30-18:00 **Break/Poster Set up**

18:00-21:00 **Poster Session (Salon ABC)**
Session Chairs: Xiaoli Tan/Alexei A. Bokov/Hamel Tailor

Session M-PM-E, Nanoscale Materials & Phenomena
Mackenzie Room
Session Chairs: Catherine Elissalde/Ahmad Safari

13:30-14:00 **M-PM-E-1-I, AR147**

HYDROTHERMAL GROWTH OF SINGLE CRYSTAL PZT SUBMICROSIZED PARTICLES WITH CONTROLLED SIZE

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14:00-14:30 **M-PM-E-2-I, AR159**

AN APPROACH FOR SELF-ASSEMBLED EPITAXIAL $Pb(Zr,Ti)O_3$ NANOROD-ARRAY TOWARD ENHANCED PIEZOELECTRIC RESPONSES

Tomoaki Yamada[1,2,3], Hidenori Tanaka[3], Hiroshi Funakubo[3], Yumiko Kodama[4], Takanori Kiguchi[4], Toyohiko J. Konno[4], Masahito Yoshino[1], and Takanori Nagasaki[1]
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14:30-14:45 **M-PM-E-3-O, AR386**

ARBITRARY-SHAPED FERROELECTRIC NANOSTRUCTURES PATTERNED VIA THERMOCHEMICAL NANOLITHOGRAPHY

Nazanin-Bassiri-Gharb[1], Yaser Bastani[1], Suenne Kim[2], Elisa Riedo[2], Haidong Lu[3], and Alexei Gruverman[3]
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14:45-15:00 **M-PM-E-4-O, AR707**

GROWTH MECHANISM AND PIEZOELECTRIC PROPERTIES OF $KNbO_3$ NANOWIRES GROWN BY HYDROTHERMAL METHOD

Mi-Ri Joung[1], In-Tae Seo[1], Jin-Seong Kim[1], Sahn Nahm[1,*] Seok-Jin Yoon[2], Chong-Yun Kang[2]
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15:00-15:30 **Afternoon Break / Exhibition (Bayshore Grand Foyer)**

15:30-16:00 **M-PM-E-5-I, AR156**

STRAIN, INTERNAL ELECTRIC FIELDS AND DOMAIN MORPHOLOGY IN FERROELECTRIC SUPERLATTICES

Dawn A. Bonnell[1], Kendra Kathan[1], Pingping Wu[2,] Long-Qing Chen, Arsen Soukiassian, Siaoxing Xi, and Darrell Schlom'
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16:00-16:30 **M-PM-E-6-I, AR164**

PZT NANOWIRES: PROCESSING, CHARACTERISATION, AND MODELING

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16:30-16:45 **M-PM-E-7-O, AR360**

FERROELECTRICITY IN ARTIFICIAL SUPERLATTICES OF PEROVSKITE NANOSHEETS

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16:45-17:00 **M-PM-E-8-O, AR724**

$PbTiO_3$ THIN FILMS GROWN ON EPITAXIAL SINGLE CRYSTAL $SrRuO_3$ NANOWIRES

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17:00-17:30 **M-PM-E-9-I, AR095**

LOCAL STRUCTURE AND DYNAMICS OF A SINGLE FERROELECTRIC DOMAIN WALL

Venkatraman Gopalan[1], Vasudeva Rao Aravind[1], A. N. Morozovska[2], S. Jesse[4], S. Bhattacharyya[1], D. Lee[3], E. A. Eliseev[2], S. R. Phillpot[3], L. Q. Chen[1] and S. V. Kalinin[4]

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17:30-18:00 **Break/Poster Set up**

18:00-21:00 **Poster Session (Salon ABC)**

Session Chairs: Xiaoli Tan/Alexei A. Bokov/Hamel Tailor

08:00-08:45 **Plenary PL-3**
Stephen Pennycook: ***PROBING FERROELECTRIC FUNCTIONALITY CELL-BY-CELL BY ABERRATION-CORRECTED STEM***

08:45-09:30 **Plenary PL-4**
Alexander Tagantsev: ***FLEXOELECTRICITY***

Salon ABC **Session Chair: Sergei Kalinin**

09:30-10:00 **Morning Break /Exhibition (Bayshore Grand Foyer)**

Session T-AM-A, Applications/Materials
Salon D
Session Chair: Sorah Rhee

10:00-10:30 **T-AM-A-1-I, AR121**

FABRICATION AND CHARACTERIZATION OF RADIAL ARRAY ENDOSCOPIC ULTRASOUND TRANSDUCERS

Dan Zhou, K.F. Cheung, Jiyan Dai and **Helen L.W. Chan**
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10:30-11:00 **T-AM-A-2-I, AR185**

A PIEZOELECTRIC SINGLE-CRYSTAL ULTRASONIC MICRO-ACTUATOR FOR DRIVING OPTICS

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11:00-11:15 **T-AM-A-3-O, AR339**

DEVEOPLMENT OF PIEZOELECTRIC-ACTUATED METAL-BASED OPTICAL SCANNING MIRROR DEVICES

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11:15-11:30 **T-AM-A-4-O, AR113**

SHEAR PIEZOELECTRIC RESPONSE IN FERROELECTRIC CRYSTALS AND POLYCRYSTALLINE CERAMICS

Fei Li[1,2], Shujun Zhang[2], Zhuo Xu,[1] Zhenrong Li,[1] Jun Luo,[3] Linghang Wang[1] and Thomas R. Shrout[2]
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11:30-11:45 **T-AM-A-5-O, AR740**

FULLY-INTEGRATED, THIN-FILM PIEZOELECTRIC SENSORS FOR WIRELESS, NON-DESTRUCTIVE EVALUATION OF AGING STRUCTURES

Richard X. Fu[1], Ryan C. Toonen[2], Mathew P. Ivill[2], S. Gary Hirsch[2], Nagid Brown[3], and Melanie W. Cole[2]
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11:45-12:00 **T-AM-A-6-O, AR213**

TUNABLE RF FILTERS WITH GRADED-COMPOSITION, MOCVD-DEPOSITED BST CAPACITORS

T.S. Kalkur[1], Nick Sbrockey [2] , M. Luong [2] M. W. Cole[3] and G.S. Tompa [2]
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12:00-12:15 **T-AM-A-7-O, AR735**

A DISCRETE THIN-PZT-FILM CAPACITOR FOR COMMERCIAL APPLICATIONS

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12:15-13:30 **Lunch Break / Exhibition (Bayshore Grand Foyer)**

12:15-13:30 **Women in Engineering Lunch Meeting (Prospect Room)**
PFM International Advisory Board Meeting (Fraser Room)

Session T-AM-B, Thin & Thick Films
Salon E
Session Chair: Wei Ren

10:00-10:30 **T-AM-B-1-I, AR107**

PIEZOELECTRIC THICK FILM TECHNOLOGY FACILITATING EASY INTEGRATION AND MINIATURISATION OF SMART SYSTEMS FOR MEDICAL AND INDUSTRIAL APPLICATIONS

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10:30-11:00 **T-AM-B-2-I, AR101**

MULTIFUNCTIONAL EPITAXIAL THIN FILMS BY LASER MOLECULAR BEAM EPITAXY

Z. Yang, C. Ke, Y. Zhu, and **W. Zhu**
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11:00-11:15 **T-AM-B-3-O, AR344**

INFLUENCE OF PLATINUM BOTTOM ELECTRODE ON THE PIEZOELECTRIC PERFORMANCE OF HOT RF SPUTTERED PZT FILMS

Dirk Kaden[1], Martin Kratzer[2] , Hans-Joachim Quenzer[1], Bernhard Wagner[1], Lorenzo Castaldi[2], Bernd Heinz[2] and Robert Mamazza[2]
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11:15-11:30 **T-AM-B-4-O, AR335**

EVALATION OF LONGITUDINAL AND LATERAL DISPLACEMENT FOR LEAD ZIRCONATE TITANATE THICK FILMS DEPOSITED ON SILICON SUBSTRATE

Takashi Iijima[1], Yuta Kashiwagi[2], Soichro Okamura[2], Toru Aiso[3], Hiroshi Funakubo[4], Ken Nishida[5] and Takashi Yamamoto[5]
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11:30-11:45 **T-AM-B-5-O, AR748**

IMPROVING PZT THIN FILM TEXTURE THROUGH PT METALLIZATION AND SEED LAYER

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11:45-12:15 **T-AM-B-6-I, AR096**

PLZT THIN FILM PHASE EVOLUTION, QUANTITATIVE MICROSTRUCTURE ANALYSIS AND ELECTRICAL PROPERTY DEVELOPMENT

Bruce A. Tuttle[1], Geoffrey L. Brennecka[1], Krishna Nittala[2], Jacob L. Jones[2], and Chad M. Parish[3]
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12:15-13:30 **Lunch Break / Exhibition (Bayshore Grand Foyer)**

12-15-13-30 **Women in Engineering Lunch Meeting (Prospect Room)**
PFM International Advisory Board Meeting (Fraser Room)

Session T-AM-C, Nanoscale Phenomena, Salon F

Session Chair: Jacob Jones

10:00-10:30 **T-AM-C-1-I, AR166**

ATOMIC-SCALE STUDY OF DIPOLE MOMENTS IN OXIDE FERROELECTRICS

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10:30-11:00 **T-AM-C-2-I, AR155**

ATOMIC-SCALE CHARACTERIZATION OF OXIDE INTERFACES USING ABERRATION-CORRECTED IN-SITU SCANNING TRANSMISSION ELECTRON MICROSCOPY

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11:00-11:15 **T-AM-C-3-O AR275**

INTERFACE ENGINEERING FOR POLARIZATION STABILITY IN ULTRATHIN $BaTiO_3$ HETEROSTRUCTURES

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11:15-11:30 **T-AM-C-4-O, AR705**

DOMAIN DYNAMICS IN $BaTiO_3$ SINGLE CRYSTALS WITHIN A FEW DEGREES OF THE FERROELECTRIC-PARAELECTRIC TRANSITION

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11:30-11:45 **T-AM-C-5-O, AR713**

FORMATION OF NANODOMAIN STRUCTURES IN LITHIUM NIOBATE WITH SURFACE LAYER MODIFIED BY ION IMPLANTATION

V.Ya. Shur[1], D.O. Alikin[1], M.F. Sarmanova[1], M.A. Dolbilov[1], A.V. Ievlev[1], M.S. Nebogatikov[1] and N. V. Gavrilov[2]
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11:45-12:15 **T-AM-C-6-I, AR142**

THE INFLUENCE OF INTERFACES ON POLARIZATION IN THIN FILMS

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12:15-13:30 **Lunch Break / Exhibition (Bayshore Grand Foyer)**

12:15-13:30 **Women in Engineering Lunch Meeting (Prospect Room)**
PFM International Advisory Board Meeting (Fraser Room)

Session T-AM-D, Relaxors
Seymour Room
Session Chair: Peter Gehring

10:00-10:30 **T-AM-D-1-I, AR137**

BRILLOUIN SCATTERING STUDIES OF Pb-BASED RELAXOR FERROELECTRICS

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10:30-11:00 **T-AM-D-2-I, AR163**

PROBING LOCAL POLAR STRUCTURES IN PZN-xPT AND PMN-xPT RELAXOR FERROELECTRICS USING NEUTRON AND X-RAY SCATTERING

Guangyong Xu[1], Zhijun Xu[1], Jinsheng Wen[1], C. Stock[2] and P. M. Gehring[2]
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11:00-11:15 **T-AM-D-3-O, AR405**

NANO-PARTICLES, NANO-CERAMICS AND NANOCOMPOSITES OF FERROELECTRIC, RELAXORS AND QUANTUM-PARAELECTRIC PEROVSKITES

M. Anoufa[1], **J.M. Kiat**[1,2], C. Bogicevic[1], P.Gemeiner[1], F. Karolak[1], I. Kornev[1], F.Porcher[2]

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11:15-11:30 **T-AM-D-4-O, AR237**

DYNAMICS OF ANTIFERROELECTRIC/RELAXOR $Pb(In_{1/2}Nb_{1/2})O_3$

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11:30-11:45 **T-AM-D-5-O, AR326**

A NEW MODEL OF CORRELATED DISORDER IN RELAXOR FERROELECTRICS

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11:45-12:00 **T-AM-D-6-O, AR310**

DIRECT EVIDENCE OF A FLAT FREE ENERGY SURFACE CONNECTING TETRAGONAL AND RHOMBOHDERAL PHASES IN RELAXOR FERROELECTRICS NEAR MORPHOTROPIC PHASE BOUNDARY

Masato Matsuura[1], H. Endo[2], and Kazuma Hirota[3]

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12:00-12:15 **T-AM-D-7-O, AR218** ***DIELECTRIC INVESTIGATIONS OF A NEW CLASS OF RELAXOR POLYMER***

Andreja Eršte[1], Xian-Zhong Chen[2], Cheng-Liang Jia[2], Qun-Dong Shen[2] and Vid Bobnar[1]
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12:15-13:30 **Lunch Break / Exhibition (Bayshore Grand Foyer)**

12:15-13:30 **Women in Engineering Lunch Meeting (Prospect Room)**
PFM International Advisory Board Meeting (Fraser Room)

Session T-AM-E, Fundamentals/Theory/Modeling
Mackenzie Room
Session Chair: Alexander Tagantsev

10:00-10:30 **T-AM-E-1-I, AR089** ***PHASE-FIELD MODELING OF FERROELECTRIC DOMAIN STRUCTURES***

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10:30-11:00 **T-AM-E-2-I, AR146** ***NANOSCALE ELECTROMECHANICS OF PIEZORESPONSE FORCE MICROSCOPY***

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11:00-11:15 **T-AM-E-3-O, AR245** ***FERROELECTRIC TRANSITION IN $BaTiO_3$ AND $LiNbO_3$ CALCULATED FROM FIRST PRINCIPLES***

Simone Sanna and Wolf Gero Schmidt
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11:15-11:30 **T-AM-E-4-O, AR350** ***MODELING OF HYDROGEN DIFFUSION IN PIEZOCERAMICS WITH TEMPERATURE GRADIENT***

Y. Sapsathiarn[1], R.K.N.D. Rajapakse[1]and D. Mumford[2]
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11:30-11:45 **T-AM-E-5-O, AR315**

THE EFFECTS OF POLARIZATION DYNAMICS AND DOMAIN SWITCHING ENERGIES ON FIELD INDUCED PHASE TRANSFORMATIONS

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11:45-12:00 **T-AM-E-6-O, AR742**

DOMAIN BACK-SWITCHING DUE TO THE FREE CHARGE INJECTION UNDER THE AFM TIP STUDIED BY PHASE FIELD SIMULATIONS

Pavel Mokrý[1], Kateřina Nováková[1], and Tomáš Sluka[2]
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12:00-12:15 **T-AM-E-7-O, AR276**

NUMERICAL STUDY OF $Pb(In_{1/2}Nb_{1/2})O_3$ BY SPIN MODEL

Yusuke Tomita
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12:15-13:30 **Lunch Break / Exhibition (Bayshore Grand Foyer)**

12:15-13:30 **Women in Engineering Lunch Meeting (Prospect Room)**
PFM International Advisory Board Meeting (Fraser Room)

Session T-PM-A, Applications
Salon D
Session Chairs : Harold Robinson /Shujun Zhang

13:30-14:00 **T-PM-A-1-I, AR080**

CHARACTERIZATION AND APPLICATIONS OF ADVANCED BINARY AND TERNARY PIEZOELECTRIC CRYSTALS

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[2] Material Research Institute, Pennsylvania State University, PA16801
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14:00-14:30 **T-PM-A-2-I, AR081**

HISTORY AND FUTURE PROSPECTIVE OF RELAXOR SINGLE CRYSTAL MATERIALS AND APPLICATION

Yohachi (John) Yamashita
Toshiba Research Consulting Corp., Kawasaki 212-8582,Japan
email: yohachi.yamashita@nifty.ne.jp

14:30-14:45 **T-PM-A-3-O, AR728**

APPLICATION OF PIEZOELECTRIC MACRO-FIBER-COMPOSITE ACTUATORS FOR THE SUPPRESSION OF NOISE TRANSMISSION THROUGH CURVED GLASS SHELLS

K. Nováková[1], P. Mokrý[1], J. Václavík[1] and V. Lédl[2]
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14:45-15:00 **T-PM-A-4-O, AR745**

UNPOWERED EVENT DETECTION WITH AN AUTONOMOUS FERROELECTRIC CAPACITOR CIRCUIT

Joe T. Evans, Jr[1], Bobby C. Howard[1], and Spencer Smith[2]
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e-mail: radiant@ferrodevices.com

15:00-15:30 **Afternoon Break / Exhibition (Bayshore Grand Foyer)**

15:30-16:00 **T-PM-A-5-I, AR195**

PZT-BASED MULTILAYER ACTUATORS

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TDK-EPC Piezo and Protection Device Business Group, Siemensstrasse 43, 8530 Deutschlandsberg, Austria
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16:00-16:30 **T-PM-A-6-I, AR149**

APPLICATIONS OF PIEZOELECTRIC MATERIALS IN OILFIELD SERVICES

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16:30-17:00 **T-PM-A-7-I, AR171**

PIEZOELECTRIC SENSING ELEMENT FOR HYDROSTATIC PRESSURE MEASUREMENTS IN BIOMEDICAL APPLICATIONS

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email: Marcias.Martinez@nrc-cnrc.gc.ca

17:00-17:30 **T-PM-A-8-I, AR119**

PIEZOELECTRICS IN MEDICAL ULTRASOUND

L. Scott Smith, Prabhjot Singh
General Electric Global Research, One Research Circle, Niskayuna, NY USA
e-mail: smithls@ge.com

17:30-18:00 **T-PM-A-9-I, AR082**

DUAL FREQUENCY PHASED ARRAY FOR IMPROVED CARDIAC IMAGING

Nico de Jong[1], Mikhail Danilouchkine[1], Frits Mastik[1], Robert Beurskens[1], Paul van Neer[1], Guillaume Matte[1], Wim Vletter[2], Christian Prins[3], Folkert ten Cate[2], Johan Bosch[1] and Antonius van der Steen[1]
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18:00-18:30 **Break**

18:30-20:30 **Gala Dinner/Ferroelectrics Awards/Poster Awards (Salon ABC)**

Session T-PM-B, Thin & Thick Films
Salon E
Session Chairs: Paul Muralt/Kui Yao

13:30-14:00 **T-PM-B-1-I, AR176**

PROGRESS OF AEROSOL DEPOSITION PROCESS ON PIEZOELECTRIC MATERIALS AND APPLICATION TO OPTICAL MICRO SCANNER

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14:00-14:30 **T-PM-B-2-I, AR165**

HIGHLY CONTROLLED ORIENTATION OF PIEZOELECTRIC CERAMICS USING BOTH PLATELET PARTICLES AND STRONG MAGNETIC FIELD

T. S. Suzuki[1], Y. Miwa[2], M. Kimura[2], S. Kawada[2], T. Uchikoshi[1] and Y. Sakka[1]
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14:30-14:45 **T-PM-B-3-O, AR203**

LOCAL PIEZOELECTRIC NONLINEARITY IN LEAD NICKEL NIOBATE – LEAD ZIRCONATE TITANATE THIN FILMS

F. Griggio[1], P. Bintachitt,[1] S. Jesse[2], A. Kumar[2], D. S. Tinberg[1], S. Kalinin[2], S. Trolier-McKinstry[1]
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e-mail: fxg14@psu.edu

14:45-15:00 **T-PM-B-4-O, AR211**

OBSERVATION OF DOMAIN STRUCTURES IN $NaNbO_3$ THIN FILMS BY LASER BEAM SCANNING MICROSCOPE AND PIEZORESPONSE FORCE MICROSCOPE

Seiji Yamazoe[1], Akihiro Kohori[1], Hiroyuki Sakurai[1], Yuuki Kitanaka[2], Yuji Noguchi[2], Masaru Miyayama[2] and Takahiro Wada[1]
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15:00-15:30 **Afternoon Break / Exhibition (Bayshore Grand Foyer)**

15:30-16:00 **T-PM-B-5-I, AR150**

$Pb(Mg_{1/3}Nb_{2/3})O_3$-$PbTiO_3$ FILMS FOR HIGH FREQUENCY ULTRASOUND TRANSDUCER APPLICATIONS

Qifa Zhou[1], Xiang Li[1], Benpeng Zhu[1], Xiabing Zhang[1], Wei Wu[2], Youngsoo Chung[2], Wan Y. Shih[3], Wei-Heng Shih[2], Yuhong Huang[4], and K. Kirk Shung[1]
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16:00-16:15 **T-PM-B-6-O, AR368**

STRUCTURAL AND FERROELECTRIC PROPERTIES OF <011>-ORIENTED PMN-PT THIN FILMS

Kim-Anh Bui-Thi[1,2], Rene Bisaro[1], Philippe Lecoeur[2], Mai Pham-Thi[1] and Guy Garry[1]
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[2]Institut d'Electronique Fondamental, Université Paris-Sud Orsay, France
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16:15-16:30 **T-PM-B-7-O, AR722**

MICROCONTACT PRINTING OF PZT FOR MEMS APPLICATIONS

A. J. Welsh and S. Trolier-McKinstry
Pensylvania State University, 161 MRL Building, University Park, USA
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16:30-16:45 **T-PM-B-8-O, AR313**

NUCLEATION AND GROWTH IN SOLUTION DEPOSITED PZT THIN FILMS: EFFECT OF HEATING RATE

Krishna Nittala[1], Geoff L. Brennecka[2], Jon F. Ihlefeld[2], Bruce A. Tuttle[2], Douglas S. Robinson[3], and Jacob L. Jones[1]
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[3]Advanced Photon Source, Argonne National Laboratory, Argonne, Illinois, USA 60439
e-mail: k.nittala@ufl.edu

16:45-17:00 **T-PM-B-9-O, AR238**

LOW-TEMPERATURE PROCESS OF $Ba_{0.6}Sr_{0.4}TiO_3$ THIN FILM BY MULTI-LAYER EXCIMER LASER ANNEALING

Seok Jin Yoon[1], Min Gyu Kang[1,2], Young Ho Do[1], Seung Min Oh[1,2], Sahn Nahm[2], and Chong Yun Kang[1]
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17:00-17:15 **T-PM-B-10-O, AR307**

INTERDIFFUSION AT THE SUBSTRATE-FILM INTERFACE OF $BiFeO_3$-$PbTiO_3$ THIN FILMS on Pt/Si

Faye Bygrave, Tim P Comyn, Andrew J Bell
Institute for Materials Research, School of Process, Environmental and Materials Engineering, University of Leeds
e-mail: pre4fb@leeds.ac.uk

17:15-17:30 **T-PM-B-11-O, AR377**

STRUCTURAL, ELECTRICAL AND MAGNETIC PROPERTIES OF $0.9BiFeO_3$-$0.1DyFeO_3$ MULTIFERROIC THIN FILMS PREPARED BY PULSED LASER DEPOSITION

Ling Chen,[1,2] Wei Ren,[1,2] Zuo-Guang Ye,[3] Peng Shi,[1,2] Xiaofeng Chen,[1,2] Xiaoqing Wu,[1,2] and Xi Yao[1,2]
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17:30-17:45 **T-PM-B-12-O, AR248**

EXTENDED DEFECTS IN SPUTTER-DEPOSITED $BaSrTiO_3$ FILMS AND THE INFLUENCE OF OXYGEN PARTIAL PRESSURE AND VACANCIES

M. E. Twigg, L. M. B Alldredge, W. Chang, S. W. Kirchoefer, and J. M. Pond
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17:45-18:00 **T-PM-B-13-O, AR225**

SYNTHESIS OF Ba-DOPED $SrCu_2O_2$ AS A P-TYPE TRANSPARENT CONDUCTING OXIDE THIN FILM BY MOCVD

Afzal Khan[1], Odette Chaix[2], Carmen Jimenez[2], Herve Roussel[2], Laetitia Rapenne[2], Jean-luc Deschanvers[2]
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18:00-18:30 **Break**

18:30-20:30 **Gala Dinner /Ferroelectrics Awards/Poster Awards (Salon ABC)**

Session T-PM-C, Lead-Free Piezo-/Ferroelectrics
Salon F
Session Chairs: Nava Setter/Satoshi Wada

13:30-14:00 **T-PM-C-1-I, AR152**

FLEXOELECTRIC COMPOSITES – THE CUTTING EDGE FOR NEW LEAD-FREE PIEZOCERAMICS

L.E. Cross, B. Chu, W. Zhu, and N. Li
Materials Research Institute, The Pennsylvania State University
University Park, PA 16802

14:00-14:30 **T-PM-C-2-I, AR115**

PIEZOELECTRIC PROPERTIES OF LEAD-FREE FERROELECTRIC CERAMICS UNDER SOME SPECIFC CONDITIONS

Hajime Nagata, and Tadashi Takenaka
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14:30-14:45 **T-PM-C-3-O, AR357**

STRUCTURE AND PROPERTY TRANSITIONS IN Fe-DOPED SODIUM BISMUTH TITANATE

Elena Aksel[1], Benjamin Kowalski[1], Jennifer Forrester[1], Marco Deluca[2,3], Rüdiger Eichel[4] and Jacob L. Jones[1]
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14:45-15:00 **T-PM-C-4-O, AR256**

LEAD-FREE BNT-BKT-BT THIN FILMS BY PULSED LASER DEPOSITION PROCESS

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15:00-15:30 **Afternoon Break / Exhibition (Bayshore Grand Foyer)**

15:30-16:00 **T-PM-C-5-I, AR083**

SODIUM BISMUTH TITANATE, $Na_{0.5}Bi_{0.5}TiO_3$ (NBT), AND RELATED LEAD-FREE PIEZOELECTRIC MATERIALS: DOMAINS, DISORDER AND DISAGREEMENTS

Pam Thomas, Richard Beanland, Semen Gorfman, Aoife O'Brien, David Woodward
Department of Physics, University of Warwick, Coventry CV4 7AL

16:00-16:30 **T-PM-C-6-I, AR188**

TEMPERATURE DEPENDENCES OF ELECTRICAL PROPERTIES IN $(Li,Na)NbO_3$ LEAD-FREE PIEZOELECTRIC CERAMICS

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16:30-16:45 **T-PM-C-7-O, AR249**

STRUCTURE-PROPERTY RELATIONSHIP IN UNPOLED $(1-x)(Bi_{1/2}Na_{1/2})TiO_3$-$xBaTiO_3$ CERAMICS

Xiaoli Tan, and Cheng Ma
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Ames, Iowa, 50011, USA
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16:45-17:00 **T-PM-C-8-O, AR320**

FIELD-INDUCED SHIFT OF THE DEPOLARIZATION TEMPERATURE IN LEAD-FREE BNT-xBT

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17:00-17:15 **T-PM-C-9-O, AR284**

MICROPROBE ANALYSIS OF (1-x)BNT-xBKT

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17:15-17:30 **T-PM-C-10-O, AR331**

STRUCTURAL, DIELECTRIC, AND PIEZOELECTRIC PROPERTIES OF $BaTiO_3$-$Bi(Mg_{1/2}Ti_{1/2})O_3$-$BiFeO_3$ CERAMICS

Ichiro Fujii[1], Ryuta Mitsui[1], Kouichi Nakashima[1], Nobuhiro Kumada[1], Satoshi Wada[1], Yoshihiro Kuroiwa[2], Mikio Shimada[3], Takayuki Watanabe[3], Jumpei Hayashi[3], Hisato Yabuta[3], Makoto Kubota[3], and Tetsuro Fukui[3]
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17:30-18:00 **T-PM-C-11-I, AR116**

HIGH-PERFORMANCE Pb-FREE PIEZOELECTRIC CERAMICS WITH d_{33}>600pC/N

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18:00-18:30 **Break**

18:30-20:30 **Gala Dinner/Ferroelectrics Awards/Poster Awards (Salon ABC)**

Session T-PM-D, Relaxors
Seymour Room
Session Chairs: Kenji Ohwada/Guangyong Xu

13:30-14:00 **T-PM-D-1-I, AR144**

A COMPARISON OF COMPLEX LEAD-OXIDE PEROVSKITES IN THE LIMITS OF WEAK AND STRONG RANDOM ELECTRIC FIELDS: PZT VERSUS PMN

P.M. Gehring[1], D. Phelan[1], C. Stock[2], X. Long[3], Y. Xie[3], A. A. Bokov[3], and Z.-G. Ye[3]
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14:00-14:30 **T-PM-D-2-I, AR140**

DIFFUSE SCATTERING IN FUNCTIONAL PEROVSKITES

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14:30-14:45 **T-PM-D-3-O, AR226**

MICROSTRUCTURAL STUDY OF $Pb(In_{1/2}Nb_{1/2})O_3$ WITH THE PEROVSKITE B-SITE RANDOMNESS

S. Mori[1], K. Kurushima[2], H. Ohwa[3], H. Yasuda[3] and K. Ohwada[4]
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14:45-15:00 **T-PM-D-4-O, AR204**

ADVANCES IN RELAXOR FERROELECTRIC TERPOLYMER: NEW APPLICATIONS

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15:00-15:30 **Afternoon Break / Exhibition (Bayshore Grand Foyer)**

15:30-16:00 **T-PM-D-5-I, AR158**

PRESSURE-COMPOSITION PHASE DIAGRAM OF THE $Pb(Mg_{1/3}Nb_{2/3})O_3$-$xPbTiO_3$ SOLID SOLUTIONS

Muhetaer Aihaiti[1], Zuo-Guang Ye[2], R. E. Cohen[1], and Russell J. Hemley[1]
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16:00-16:30 **T-PM-D-6-I, AR105**

BROADBAND INELASTIC SCATTERING OF LEAD-FREE PEROVSKITE FERROELECTRICS

Seiji Kojima
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16:30-16:45 **T-PM-D-7-O, AR768**

SELF-SIMILARITY OF THE CENTRAL PEAK OBSERVED IN PMN AND PMN-0.27PT

Akitoshi Koreeda[1,2], Hiroki Taniguchi[3], Mitsuru Itoh[3], Desheng Fu[4], and Shigeo Mori[5]
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16:45-17:00 **T-PM-D-8-O, AR168**

RELAXORS UNDER STRESS: THE CASE OF PSN

P.-E.Janolin[1], J.-M. Kiat[1, 2], N. Pertsev[3], L. Bellaiche[4], Y. Uesu[5], I. Kornev[1,] and A. Bataille[2]
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17:00-17:15 **T-PM-D-9-O, AR242**

DIRECT OBSERVATION OF STATIC POLAR CLUSTERS IN THE PRECURSOR OF FERROELECTRIC AND RELAXOR $Ba(Ti_{1-x}Sn_x)O_3$ ABOVE THE FREEZING TEMPERATURE T_{VF}

Jing Zhu and **Lin Xie**
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Department of Materials Science and Engineering, the State Key Laboratory of New Ceramics and Fine Processing, Laboratory of Advanced Materials, Tsinghua University, Beijing 100084, China
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17:15-17:30 **T-PM-D-10-O, AR212**

STUDY OF DOMAIN AND LOCAL STRUCTURE OF LEAD-FREE $Na_{1/2}Bi_{1/2}TiO_3$-$BaTiO_3$ CRYSTALS

Jianjun Yao[1], Wenwei Ge[1], Qinhui Zhang[2], Haosu Luo[2], Jiefang Li[1] and D. Viehland[1]
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[2]Shanghai Institute of Ceramics, Chinese Academy of Sciences, 215 Chengbei Road, Jiading, Shanghai 201800, China
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17:30-18:00 **T-PM-D-11-I, AR183**

RELATIONSHIP BETWEEN STRUCTURAL CHARACTERISTICS AND INFLUENCE OF DOPING ON THE DIELECTRIC DISPERSION OF RELAXORS

José Antonio Eiras
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18:00-18:30 **Break**

18:30-20:30 **Gala Dinner/Ferroelectrics Awards/Poster Awards (Salon ABC)**

Session T-PM-E, Conduction/Defects/Nano-Phenomena
Mackenzie Room
Session Chairs: Lukas Eng/Takaaki Tsurumi

13:30-14:00 **T-PM-E-1-I, AR194**

IMPEDANCE SPECTROSCOPY OF PZT CERAMICS - MEASURING DIFFUSION COEFFICIENTS, MIXED CONDUCTION AND Pb LOSS

Niall J. Donnelly* and Clive A. Randall
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14:00-14:30 **T-PM-E-2-I, AR118**

CONTROL OF ELECTRICAL PROPERTIES ON R (Cr, Mn) O3 (R=La, Y AND RARE EARTH ELEMENT) FOR HIGH TEMPERATURE SENSOR APPLICATIONS

Kazutaka Fujiwara, Toshiaki Fujita, Takashi Yamaguchi
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14:30-14:45 **T-PM-E-3-O, AR208**

RESISTANCE DEGRADATION IN DONOR-DOPED PZT UNDER ELECTRICAL FIELD: IDENTIFICATION OF CONDUCTIVE PATHS AND MECHANISM

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14:45-15:00 **T-PM-E-4-O, AR167**

DIPHENYLALANINE AND PEPTIDE NANOTUBES: COMPUTATIONAL MODELINGAND PROPERTIES AT THE NANOSCALE

I. Bdikin[1], A. Heredia[2], S. Kopyl[1], J. Gracio[1], E. Bosne[3], V. Bystrov[2] and **A. L. Kholkin[2]**

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15:00-15:30 **Afternoon Break /Exhibition (Bayshore Grand Foyer)**

15:30-16:00 **T-PM-E-5-I, AR100**

A MODEL SYSTEM APPROACH TO INVESTIGATE AND IMPROVE SOFC CATHODE MATERIALS

Ethan J. Crumlin[1], Eva Mutoro[1], Mike Biegalski[2], Hans Christen[2], Donovan Leonard[2], Albina Borisevich[2], Marcus Rohnke[3], Juergen Janek[3], Yang Shao-Horn[1]

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16:00-16:30 **T-PM-E-6-I, AR175**

IN SITU AND POST MORTEM OBSERVATION OF OXYGEN VACANCY ORDERING AND BIAS CYCLING EFFECTS IN $La_{0.8}Sr_{0.2}CoO_3$ THIN FILMS

D.N. Leonard[1], A. Kumar[1], S. Jesse[1], S. Kalinin[1], Y. Shao-Horn[2], E. Crumlin[2], E. Mutoro[2], M. Biegalski[1], H.M. Christen[1], S.J. Pennycook[1], A.Y. Borisevich[1]

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16:30-17:00 **T-PM-E-7-I, AR334**

FERROELECTRIC MONODISPERSE CUBE-LIKE $BaTiO_3$ COLLOIDAL NANOCRYSTALS AS BUILDING BLOCKS FOR THE DESIGN OF MULTIFERROIC NANOCOMPOSITES

Gabriel Caruntu[1], Shiva Adireddy[1], Amin Yourdkani[1], Stephanie H. Johnson[2] and Jonathan Spanier[2]

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17:00-17:15 **T-PM-E-8-O, AR330**

EXPLORING TOPOLOGICAL DEFECTS IN EPITAXIAL $BiFeO_3$ THIN FILMS

R.K. Vasudevan[1], Y.-C. Chen[2], H.-H.Tai[2], N. Balke[3], P.P. Wu[4], S. Bhattacharya[4], L.Q. Chen[4], Y.-H. Chu[5], I.-N. Lin[6], **V. Nagarajan[1]** and S.V. Kalinin[3]

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17:15-17:30 **T-PM-E-9-O, AR271**

POLARITY DEPENDENCE AND INTERFACIAL EFFECT IN POLARIZATION REVERSAL OF $BiFeO_3$ FILMS

Tae Heon Kim[1], S. H. Baek[2], B. C. Jeon[1], S. M. Yang[1], D. Lee[1], S. Y. Jang[1], T. Y. Min[1], J.-S. Chung[3], C. B. Eom[2], J.-G. Yoon[4], and T. W. Noh[1]

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17:30-18:00 **T-PM-E-10-I, AR090**

STRONGLY CORRELATED ELECTRONS AND POLAR COMPENSATION IN HETEROSTRUCTURES OF RARE-EARTH NICKELATES

Jak Chakhalian

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18:00-18:30 **Break**

18:30-20:30 **Gala Dinner /Ferroelectrics Awards/Poster Awards (Salon ABC)**

08:00-08:45 **Plenary PL-5**
Ramamoorthy Ramesh: ***ELECTRIC FIELD CONTROL OF MAGNETISM USING MULTIFERROICS***

08:45-09:30 **Plenary PL-6**
Akira Ando: ***RECENT PROGRESS ON FERROELECTRIC CERAMICS***

Salon ABC **Session Chair: Andrei Kholkin**

09:30-10:00 **Morning Break /Exhibition (Bayshore Grand Foyer)**

Session W-AM-A, Applications
Salon D
Session Chair: Laurent Lebrun

10:00-10:30 **W-AM-A-1-I, AR087**

FERROELECTRIC MATERIALS FOR EXPLOSIVELY DRIVEN PULSED POWER SYSTEMS

E.F. Alberta[1], W.S. Hackenberger[1], L. L. Altgilbers[2], A. H. Stults[3], S. Shkuratov[4], J. Baird[4], and B. Freeman[5]
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[5]KTECH Corp, Albuquerque, NM, USA

10:30-11:00 **W-AM-A-2-I, AR189**

ALL-OXIDE PIEZOMEMS DEVICES BY LARGE AREA PULSED LASER DEPOSITION

Guus Rijnders[1,2], **Matthijn Dekkers**[1,2]
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11:00-11:15 **W-AM-A-3-O, AR749**

AN L-SECTION DC ELECTIC FIELD SWITCHABLE BULK ACOUSTIC WAVE SOLIDLY MOUNTED RESONATOR FILTER BASED ON $Ba_{0.5}Sr_{0.5}TiO_3$

George N. Saddik, and Robert A. York
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11:15-11:45 **W-AM-A-4-I, AR120**

EFFECT OF Mn AND V VALENCES FOR THE RELIABILITY OF $BaTiO_3$ BASED MLCCs

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11:45-12:15 **W-AM-A-5-I, AR157**

ULTRASONIC TRANSDUCER ARRAY SENSOR FOR BOREHOLE IMAGING OF FRACTURES AT 300 ° C

Anjani Achanta, **Roger Steinsiek**, Steve Morris and Jim Leggett
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12:15-13:30 **Lunch (Salon ABC) / Exhibition (Bayshore Grand Foyer)**

Session W-AM-B, Multiferroics
Salon E
Session Chair: Stanislav Kamba

10:00-10:30 **W-AM-B-1-I, AR130**

PHASE TRANSITIONS IN MULTIFERROIC $BiFeO_3$ THIN FILMS

B. Dupé[1], I. C. Infante[1,2], S. Lisenkov[3,4], S. A. Prosandeev[3], H. Toupet[5], M. Bibes[2], S. Fusil[2], E. Jacquet[2], P.-E. Janolin[1], G. Geneste[1], F. Le Marrec[5], L. Bellaiche[3], A. Barthélémy[2], and **B. Dkhil[1]**
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10:30-11:00 **W-AM-B-2-I, AR717**

Bi_2FeCrO_6 NANOSTRUCTURES MULTIFERROIC AT ROOM TEMPERATURE

R. Nechache, C.V. Cojocaru; C. Harnagea, C. Nauenheim, M. Nicklaus, A. Ruediger, F. Rosei and **Pignolet Alain**
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11:00-11:15 **W-AM-B-3-O, AR122**

DIELECTRIC, MAGNETIC, MULTIFERROICIC PROPERTIES IN GARNET $Re_3Fe_5O_{12}$ CERAMICS

Presenting by Kan Yi, Su Jie, Wu Xiaobo, Zhang Junting, Sun Hui , Lu Xiaomei, and Zhu Jinsong
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11:15-11:30 **W-AM-B-4-O, AR103**

THE EFFECT OF A-SITE AND B-SITE ION SUBSTITUTIONS ON THE TEMPERATURES OF FERROELECTRIC AND MAGNETIC PHASE TRANSITIONS IN MULTIFERROIC $PbFe_{0.5}Nb_{0.5}O_3$

I.P. Raevski, S.P. Kubrin, S.I. Raevskaya, S.A. Prosandeev, M.A. Malitskaya, Yu.N.Zakharov, A.G. Lutokhin, V.V. Titov, D. A. Sarychev, E.I.Sitalo, A.V. Blazhevich, and I.N. Zakharchenko
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11:30-11:45 **W-AM-B-5-O, AR719**

GROWTH AND CHARACTERIZATION OF HIGH QUALITY $BiFeO_3$-$PbTiO_3$ SINGLE CRYSTALS

Clare G. Cambridge, Timothy P. Comyn and Andrew J. Bell
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11:45-12:15 **W-AM-B-6-I, AR129**

HIGHER ORDER MAGNETOELECTRIC COUPLING IN DISORDERED MULTIFERROICS

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12:15-13:30 **Lunch (Salon ABC) / Exhibition (Bayshore Grand Foyer)**

Session W-AM-C, Piezo-/FE/Single Crystals
Salon F
Session Chair: Yohachi (John) Yamashita

10:00-10:30 **W-AM-C-1-I, AR160**

FERROELECTRIC AND PIEZOELECTRIC PROPERTIES OF $(Bi_{1/2}K_{1/2})TiO_3$-$(Bi_{1/2}Na_{1/2})TiO_3$ SINGLE CRYSTALS

Yuji Noguchi[1], Akifumi Morishita[1], Ken Yanai[1], Hiroaki Onozuka[1], Yuuki Kitanaka[1], Masaru Miyayama[1], Shuki Torii[2] and Takashi Kamiyama[2]
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10:30-11:00 **W-AM-C-2-I, AR108**

EVALUATION OF PIN-PMN-PT CRYSTALS FOR VARIOUS APPLICATIONS

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11:00-11:15 **W-AM-C-3-O, AR254**

NONLINEAR RESPONSE IN RELAXOR-PT SINGLE CRYSTALS FOR HIGH POWER SONAR TRANSDUCERS

Nevin P. Sherlock[1], Lauren M. Garten[1], Shujun R. Zhang[2], Thomas R. Shrout[2], Pascal Mosbah[3], and Richard J. Meyer, Jr.[1]
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11:15-11:30 **W-AM-C-4-O, AR259**

LARGE DISPLACEMENT ACOUSTIC SOURCE USING PHASE TRANSITION IN RELAXOR-FERROELECTRIC $Pb(In_{1/2}Nb_{1/2})O_3$–$Pb(Mg_{1/3}Nb_{2/3})O_3$–$PbTiO_3$ SINGLE CRYSTALS

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11:30-11:45 **W-AM-C-5-O, AR232**

ENHANCEMENT OF THE ELECTROMECHANICAL EFFECT NEAR THE CRITICAL POINT IN FERROELECTRIC RELAXOR MATERIAL

Nikola Novak, Robert Blinc and **Zdravko Kutnjak**
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11:45-12:15 **W-AM-C-6-I, AR153**

SHAPED CRYSTAL GROWTH OF LANGASITE-TYPE PIEZOELECTRIC SINGLE CRYSTALS AND THEIR PHYSICAL PROPERTIES

Akira Yoshikawa[1,3], Yuui Yokota[1], Masato Sato[1,2], Kazushige Tota[2], Yoshisuke Futami[1], Akihiro Yamaji[1], Takayuki Yanagida[3] and Ko Onodera[2]
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12:15-13:30 **Lunch (Salon ABC) / Exhibition (Bayshore Grand Foyer)**

Session W-AM-D, New Characterizations
Seymour Room
Session Chair: Susan Trolier-McKinstry

10:00-10:30 **W-AM-D-1-I, AR138**

NOVEL ATOMIC RESOLUTION SCANNING TRANSMISSION ELECTRON MICROSCOPY FOR OXIDE MATERIALS

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10:30-11:00 **W-AM-D-2-I, AR161**

DIFFRACTION OF FERROELECTRICS DURING ELECTRIC FIELD APPLICATION: NEW APPROACHES YIELD NEW INSIGHT

Jacob L. Jones[1], John E. Daniels[2], Abhijit Pramanick[3], Jun Chen[4], Binzhi Li[5], Shruti Banavara Seshadri[1], Elena Aksel[1], Anderson Prewitt[1], Tedi-Marie Usher[1], Goknur Tutuncu[1], and Jennifer S. Forrester[1]
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11:00-11:15 **W-AM-D-3-O, AR333**

INVESTIGATION OF LOCAL STRUCTURE IN MULTIFUNCTIONAL OXIDE MATERIALS WITH SYNCHROTRON X-RAY ABSORPTION SPECTROSCOPY

Rattikorn Yimnirun[1], Jaru Jutimoosik[1], Atipong Bootchanont[1], Sujittra Chandarak[2], Kanokwan Khanchiang[3,4], Teerawat Monnor[1,4], Muangjai Unruan[1], Yongyut Laosiritaworn[3,4], Santi Meansiri[1,4], and Saroj Rujirawat[1,4,5]
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11:15-11:30 **W-AM-D-4-O, AR389**

IN-SITU REAL TIME STRUCTURAL RESPONSE OF A FERROELECTRIC TO AN APPLIED EXTERNAL ELECTRIC FIELD OF VARYING FREQUENCY

M G Cain[1], S Ryding[2], R Cernik[2], P Thompson[3], **Tim Burnett[1]**, M Stewart[1]
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11:30-11:45 **W-AM-D-5-O, AR227**

STRUCTURE STUDIES OF HIGH-T_C PIEZOELECTRICS $PbTiO_3$-$BiMeO_3$ IN THE TETRAGONAL PHASE (Me=Fe, $Zn_{1/2}Ti_{1/2}$, AND Sc)

Jun Chen[1], Jinxia Deng[1], Ranbo Yu[1], Yuntao Liu[2], Krishna Nittala[3], Jacob L. Jones[3] and Xianran Xing[1]
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11:45-12:15 **W-AM-D-6-I, AR199**

STRUCTURAL CONSEQUENCES OF FERROELECTRIC NANOLITHOGRAPHY

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12:15-13:30 **Lunch (Salon ABC) / Exhibition (Bayshore Grand Foyer)**

Session W-AM-E, Fundamentals/ Structures/New Advances
Mackenzie Room
Session Chair: Vladimir Shur

10:00-10:30 **W-AM-E-1-I, AR091**

NEAR-FIELD SUPERLENSING BASED ON LAYERED PEROVSKITE STRUCTURES

Lukas M. Eng[1], S.C. Kehr[2], M.-T. Wenzel[1], H.-G. von Ribbeck[1], R. Jacob[3], M. Helm[3], Y.M. Liu[4], L.W. Martin[4], P. Yu[4], M. Gajek[4], S.-Y. Yang[4], C.-H. Yang[4], X. Zhang[4], and R. Ramesh[4]
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10:30-11:00 **W-AM-E-2-I, AR706**

IMPEDANCE SPECTROSCOPY AND DIELECTRIC MODELLING OF $(K_xNa_{1-x})_{1/2}Bi_{1/2}TiO_3$

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11:00-11:15 **W-AM-E-3-O, AR755**

STUDYING THE LOCAL STRUCTURE OF FERROELECTRICS USING NUCLEAR MAGNETIC RESONANCE

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11:15-11:30 **W-AM-E-4-O, AR228**

MULTIFERROICS AND HIGH MECHANICAL PERFORMANCE IN (1-x-y) $PbTiO_3$-$xBi(Ni_{1/2}Ti_{1/2})O_3$-$yBiScO_3$

Penghao Hu, Jun Chen, Ziyou Yu, Lili Zhou, Jinxia Deng, and **Xianran Xing**
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11:30-11:45 **W-AM-E-5-O, AR293**

DIRECT EXTRACTION OF THE SWITCHING TIME DISTRIBUTION FROM POLARIZATION REVERSAL DATA OF VIRGIN AND FATIGUED FERROELECTRIC CERAMICS: AN INHOMOGENEOUS FIELD MECHANISM APPROACH

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11:45-12:00 **W-AM-E-6-O, AR541**

DIELECTRIC AND FERROELECTRIC CHARACTERIZATIONS OF (1-x)$PbTiO_3$- x$Bi(Zn_{1/2}Ti_{1/2})O_3$ SINGLE CRYSTALS GROWN BY A TOP COOLED HIGH TEMPERATURE SOLUTION METHOD

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12:00-12:15 **W-AM-E-7-O, AR727**

($Na_{0.5}K_{0.5}$)NbO_3- $LiTaO_3$ LEAD-FREE PIEZOELECTRIC CERAMICS MODIFIED WITH $BiScO_3$

Fangyuan Zhu, Thomas Skidmore, Michael Ward, Timothy Comyn, Andrew Bell, Steven Milne
Institute for Materials Research, University of Leeds, Leeds, United Kingdom, LS2 9JT
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12:15-13:30 **Lunch (Salon ABC) / Exhibition (Bayshore Grand Foyer)**

Session W-PM-A, Applications/Films
Salon D
Session Chair: Jun Akedo

13:30-14:00 **W-PM-A-1-I, AR181**

MEMRISTIVE DEVICES AND CIRCUITS

Dmitri Strukov and Fabien Alibart
ECE Department, UCSB, Santa Barbara, USA
e-mail: strukov@ece.ucsb.edu

14:00-14:30 **W-PM-A-2-I, AR197**

IN SITU STUDIES ON THE EFFECT OF OXYGEN PARTIAL PRESSURE ON THE PROPERTIES OF FERROELECTRIC THIN FILMS

D.D. Fong, C.M. Folkman, M.J. Highland, T.S. Santos, S.K. Kim, P.M. Baldo, P.H. Fuoss, Carol Thompson, J.A. Eastman, S.K. Streiffer, and G.B. Stephenson
Argonne National Laboratory, Materials Science Division, 9700 S. Cass Ave., Argonne, IL 60439, USA
e-mail: fong@anl.gov

14:30-14:45 **W-PM-A-3-O, AR222**

FERRO- AND PIEZOELECTRIC PROPERTIES OF ($Bi_{3.25}Nd_{0.75}$)Ti_3O_{12} NANOPLATES EPITAXIALLY GROWN ON Nb:TiO_2(101) SUBSTRATE BY SPUTTERING

Masafumi Kobune[1], Akihiro Tamura[1], Kazuki Imagawa[1], Ryo Kishimoto[1], Hiroshi Nishioka[1], Hironori Fujisawa[1], Masaru Shimizu[1], Hideshi Yamaguchi[2] and Koichiro Honda[2]
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e-mail: kobune@eng.u-hyogo.ac.jp

14:45-15:00 **W-PM-A-4-O, AR205**

NON-PLANAR PAD-PRINTED THICK-FILM FOCUSED HIGH FREQUENCY ULTRASONIC TRANSDUCERS FOR IMAGING AND HIFU APPLICATIONS

Marc Lethiecq[1], Rasmus Lou–Moeller[2], Jeffrey A. Ketterling[3], Franck Levassort[1], Louis Pascal Tran-Huu-Hue[1], Erwan Filoux[3], Ronald H. Silverman[4] and Wanda W. Wolny[2].
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15:00-15:15 **W-PM-A-5-O, AR750**

CSD-PREPARED Pb_xTiO_3 SEED LAYER FOR {100}-TEXTURED PZT FILMS: COMPOSITION AND CONCENTRATION EFFECTS

Sushma Kotru [1,2], Jian Zhong [1,2], Hui Han [3], Raghvendra K. Pandey [1-4]
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15:15-15:30 **W-PM-A-6-O, AR349**

ANALYSIS AND MODELING OF AlN BIMORPH PIEZOELECTRIC AUTONOMOUS MICROGENERATOR STIMULATED BY β-EMITTING RADIOISOTOPES

Ali B. Alamin Dow[1], Hasan Al-Rubaye[1], U. Schmid[2] and Nazir P. Kherani[1]
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15:30-15:45 **W-PM-A-7-O, AR366**

UNIPOLAR FATIGUE IN $Pb(Zr,Ti)O_3$ THIN FILMS

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15:45-16:00 **Afternoon Break / Exhibition (Bayshore Grand Foyer)**

Session W-PM-B, Multiferroics
Salon E
Session Chair: Brahim Dkhil

13:30-14:00 **W-PM-B-1-I, AR102**

FERROELECTRICITY AND FERRIMAGNETISM OF THIN-FILM STABILIZED HEXAGONAL $YbFeO_3$

Y.Uesu[1], H.Iida[1], T.Koizumi[1], Kay Kohn[1], T.Ikada[2], S.Mori[3], R.Haumont[4] and J.M.Kiat[5]
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14:00-14:30 **W-PM-B-2-I, AR145**

NANOSCALE CHEMICAL, STRUCTURAL AND ELECTROMECHANICAL PROPERTIES OF RARE-EARTH SUBSTITUTED $BiFeO_3$ EPITAXIAL THIN FILMS

Valanoor Nagarajan[1], Ching-Jung Cheng[1], Albina Y Borisevich[2], V. Anbusathiah[1,3], Daisuke Kan[3,4] and Ichiro Takeuchi[3]
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14:30-14:45 **W-PM-B-3-O, AR341**

MICROSTRUCTURAL EFFECTS ON MAGNETOELECTRIC COUPLING FOR TERFENOL-D/P(VDF-TRFE)/TERFENOL-D LAMINATES

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14:45-15:15 **W-PM-B-4-I, AR104**

FUNCTIONALITY DESIGN AND MISORIENTATION CONTROL IN SELF-ASSEMBLE PEROVSKITE-SPINEL HETERO-EPTAXIAL NANOSTRUCTURES

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15:15-15:45 **W-PM-B-5-I, AR148**

MULTIFERROIC EFFECTS IN PEROVSKITE MULTILAYERS: NONLINEAR-OPTICAL STUDIES

M.S. Ivanov[1], E.D. Mishina[1], N.Yu. Firsova[1], V.G. Morozov[1], **A.S. Sigov**[1] and V. Moshnyaga[2]
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15:45-16:00 **Afternoon Break / Exhibition (Bayshore Grand Foyer)**

Session W-PM-C, Lead-Free Piezo-/Ferroelectrics
Salon F
Session Chair: Tadashi Takenaka

13:30-14:00 **W-PM-C-1-I, AR123**

STUDY OF NICKEL INNER ELECTRODE LEAD-FREE PIEZOELECTRIC CERAMICS

Masahiko Kimura, Shinichiro Kawada, Koji Ogiso, Takehiro Konoike and Hiroshi Takagi
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14:00-14:30 **W-PM-C-2-I, AR186**

$K_{0.5}Na_{0.5}NbO_3$ BASED LEAD-FREE THICK FILMS: PREPARATION, CHARACTERIZATION AND APPLICATIONS

Wei Ren, Lingyan Wang, Hongfen Ji, Peng Shi, Xiaoqing Wu, Xiaofeng Chen, and Xi Yao
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14:30-14:45 **W-PM-C-3-O, AR365**

STRUCTURAL STUDY AND PHASE TRANSITIONS OF LEAD-FREE $Bi_{1/2}Na_{1/2}TiO_3$-$Bi_{1/2}K_{1/2}TiO_3$-($K_{0.5}Na_{0.5}NbO_3$) CERAMICS

Eva-Maria Anton[1], Wook Jo[1], Ljubomira Ana Schmitt[2], Hans-Joachim Kleebe[2], Jacob L. Jones[3], Joe Trodahl[4], J. Pokorny[5], S.Miao[5], Ian M. Reaney[5] and Jürgen Rödel[1]
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e-mail: anton@ceramics.tu-darmstadt.de

14:45-15:00 **W-PM-C-4-O, AR355**

DOMAIN WALL MOTION IN LEAD-FREE PIEZOELECTRIC CERAMICS

Meredith Rogers, Chris Fancher, Binzhi Li, John E. Blendell and Keith J. Bowman
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15:00-15:15 **W-PM-C-5-O, AR300**

THE TEMPERATURE-DEPENDENCE OF PHASE TRANSITIONS IN LEAD-FREE FERROELECTRICS UNDER UNIAXIAL STRESS

Florian H. Schader and **Kyle G. Webber**
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15:15-15:45 **W-PM-C-6-I, AR177**

LEAD-FREE PIEZOCERAMIC MATERIALS FOR INDUSTRIAL APPLICATIONS

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15:45-16:00 **Afternoon Break / Exhibition (Bayshore Grand Foyer)**

Session W-PM-D, Piezo-/Pyro-/Ferroelectrics
Seymour Room
Session Chair: Hong Wang

13:30-14:00 **W-PM-D-1-I, AR093**

DIRECT OBSERVATION AND QUANTITATIVE ANALYSIS OF FERROELECTRIC DOMAIN SWITCHING BEHAVIOR USING IN SITU TEM TECHNIQUES

Mitra L. Taheri[1], Christopher R. Winkler[1], Lane W. Martin2, Andrew M. Rappe[3], Ilya Grinberg[3], Steven R. Spurgeon[2] and Jennifer D. Sloppy[1]
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14:00-14:30 **W-PM-D-2-I, AR173**

RECONSTRUCTION OF FUNDAMENTAL EQUATIONS FOR PIEZOELECTRIC RESPONSE

Takaaki Tsurumi, Manabu Hagiwara, Tomohiro Yoshimura, Tatsuya Izumi, Takuya Hoshina and Hiroaki Takeda
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14:30-14:45 **W-PM-D-3-O, AR236**

PYROELECTRIC AND ELETROCALORIC EFFECT IN (Pb,La)(Zr,Sn,Ti)O_3 ANTIFERROELECTRIC CERAMICS

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14:45-15:00 **W-PM-D-4-O, AR338**

INDUCED FERROELECTRICITY IN POLYCRYSTALLINE $KTaO_3$ THIN FILMS

Sebastjan Glinšek[1,2], Vladimir Skoromets[3], Dmitry Nuzhnyy[3], Viktor Bovtun[3], Petr Kužel[3], Stanislav Kamba[3], Jan Petzelt[3], Zdravko Kutnjak[1], Cene Filipič,[1] Barbara Malič[1,2] and Marija Kosec[1]
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15:00-15:15 **W-PM-D-5-O, AR398**

ELECTRON RADIATION ENHANCEMENT BY RADIATION HEAT

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15:15-15:45 **W-PM-D-6-I, AR325**

EFFECT OF Mn-Y CODOPING ON THE INTRINSIC PYROELECTRIC PROPERTY OF BST CERAMICS

Guo Liu, Xuedong Li, Hong Liu, Dingquan Xiao and **Jianguo Zhu**
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15:45-16:00 **Afternoon Break / Exhibition (Bayshore Grand Foyer)**

Session W-PM-E, New Advances/PZT-Related
Mackenzie Room
Session Chairs: Pam Thomas

13:30-14:00 **W-PM-E-1-I, AR178**

INELASTIC SCATTERING STUDIES OF PZT SINGLE CRYSTALS

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14:00-14:30 **W-PM-E-2-I, AR092**

CRITICAL BEHAVIOUR AT FERROELECTRIC PHASE TRANSITIONS

Alexei A. Bokov and Zuo-Guang Ye
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14:30-14:45 **W-PM-E-3-O, AR314**

HIGH RESOLUTION X-RAY DIFFRACTION STUDY OF SINGLE CRYSTALS OF LEAD ZIRCONATE TITANATE

S Gorfman[1], D Keeble[1], AM Glazer[2], Z.G. Ye[3], P.A. Thomas[1]
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14:45-15:00 **W-PM-E-4-O, AR388**

IN SITU XRD STUDY OF THE ELECTRIC FIELD INDUCED ANTIFERROELECTRIC – FERROELECTRIC PHASE TRANSFORMATION IN PZT

N Middleton-Stewart[1], D.A. Hall[1], T. Mori[1] and J.D.S. Evans[2]
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15:00-15:15 **W-PM-E-5-O, AR379**

STRUCTURAL INVESTIGATIONS OF Pb(Zr, Ti) O_3

Hiroko Yokota[1,2], Nan Zhang[2], Pam Thomas[3] and Mike Glazer[2]
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15:15-15:45 **W-PM-E-6-I, AR179**

INVESTIGATION OF DOMAIN SWITCHING OF PZT AND KNN – BASED CERAMICS ON MACRO AND MICRO SCALE

Andreas Schönecker[1], Falko Schlenkrich[1], Thomas Rödig[1], Tillmann Henschke[2] and Stefan Uhlig[2]
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15:45-16:00 **Afternoon Break / Exhibition (Bayshore Grand Foyer)**

16:00-16:45
Salon ABC

Plenary PL-7, IEEE Distinguished Lecture
Dragan Damjanovic: *ON THE ORIGINS OF ELECTROMECHANICAL COUPLING IN COMPLEX MATERIALS*

Session Chair: Zuo-Guang Ye

16:45-17:00 **Closing**

Student Poster Competition Monday, July 25, 18:00-21:00, Salon ABC

PC1, AR607 **Gao, Zeliang**

DESIGN AND PROPERTIES OF PIEZOELECTRIC RESONATORS BY USING A NOVEL SINGLE CRYSTAL $BaTeMo_2O_9$

Zeliang Gao, Xin Yin, Weiguo Zhang, and Xutang Tao
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PC2, AR612 **Sobocinski, Maciej**

PIEZOELECTRIC ACTIVE MIRROR SUSPENSION EMBEDDED INTO LOW TEMPERATURE CO-FIRED CERAMIC

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PC3, AR619 **Chang, WeiTsai**

LIQUID SENSOR USING C-AXIS TILTED ZnO THIN FILM BULK ACOUSTIC RESONATOR

Wei-Tsai Chang[1], Ying-Chung Chen[1], Kuo-Sheng Kao[2], Jia-Ming Jiang[1] and Chien-Chuan Cheng[3]
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PC4, AR620 **Li, Kai**

A NEW METHOD OF ULTRASONIC FEATURED-SCAN FOR COMPOSITE MATERIALS

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PC5, AR621 **KANDIRAJU, ANVITHA**

GRAVITATIONAL TRAFFIC POWER GENERATORS

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PC6, AR618 **Belan, Reagan**

OPTIMIZED GROWTH AND PIEZO-/FERROELECTRIC PROPERTIES OF $Pb(Mg_{1/3}Nb_{2/3})O_3$-$PbTiO_3$-$Bi(Zn_{1/2}Ti_{1/2})O_3$ TERNARY SINGLE CRYSTALS

Reagan Belan, Hamel Tailor, and Zuo-Guang Ye
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Student Poster Competition Monday, July 25, 18:00-21:00, Salon ABC

PC7, AR622 **Palizdar, Meghdad**

SYNTHESIS OF ORIENTED $BiFeO_3$-$PbTiO_3$ BY MOLTEN SALT METHOD

Meghdad Palizdar, Tim P Comyn and Andrew J Bell
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PC8, AR623 **Wong, Jenny**

SYNTHESIS AND PHASE ANALYSIS OF THE (1-x)($K_{0.5}Na_{0.5}$)NbO_3-x$BaTiO_3$ SINGLE CRYSTALS

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PC9, AR614 **Yanai, Ken**

GROWTH AND CHARACTERIZATION OF HIGH-QUALITY ($Bi_{0.5}Na_{0.5}$)TiO_3 FERROELECTRIC SINGLE CRYSTSLS

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PC10, AR608 **Wan, Yuhui**

DIELECTRIC AND PIEZOELECTRIC PROPERTIES OF LEAD INDIUM NIOBATE-LEAD MAGNESIUM NIOBATE-LEAD TITANATE CRYSTAL ALONG GROWTH DIRECTION

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PC11, AR739 **Shay, Dennis**

$Sr_yCa_{1-y}(Ti_xZr_{1-x})O_3$ DIELECTRICS FOR HIGH ENERGY DENSITY, HIGH TEMPERATURE MLCCS

Dennis P. Shay, Elizabeth C. Dickey, and Clive A. Randall
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PC12, AR604 **Yeager, Charles**

MEMS PIEZOELECTRIC ENERGY HARVESTING SYSTEM

C. Yeager[1], S. Trolier-McKinstry[1], P. Jousse[1] and K. Wasa[2]
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PC13, AR602 **Park, MinHyuk**

NOVEL DIODE-EMBEDDED FERROELECTRIC RESISTIVE MEMORY FOR CROSSBAR ARRAY APPLICATION

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WCU Hybrid Materials Program, Department of Material Science & Engineering and Inter-university Semiconductor Research Center, Seoul National University, Seoul 151-744, Korea
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PC14, AR605 **Xing, Zhijiu**

EFFECT OF DIVALENT Ca IONS SUBSTITUTION ON STRUCTURE AND PROPERTIES IN MULTIFERROIC $YbCrO_3$ CHROMITES

Zhijiu Xing, Li Li, Yuling Su, Dongmei Deng, Zhenjie Feng, Shixun Cao, and Jincang Zhang*
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PC15, AR629 **Chen, Ling**

STRUCTURAL, ELECTRICAL AND MAGNETIC PROPERTIES OF $0.9BiFeO_3$-$0.1DyFeO_3$ MULTIFERROIC THIN FILMS PREPARED BY PULSED LASER DEPOSITION

Ling Chen,[1,2] Wei Ren,[1,2] Zuo-Guang Ye,[3] Peng Shi,[1,2] Xiaofeng Chen,[1,2] Xiaoqing Wu,[1,2] and Xi Yao[1,2]
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PC16, AR633 **Hu, Jiamian**

PHASE-FIELD SIMULATION OF ELECTRIC-FIELD-INDUCED MAGNETIC DOMAIN SWITCHING IN MAGNETIC/FERROELECTRIC HETEROSTRUCTURES

Jia-Mian Hu[1,2], G. Sheng[2], J. X. Zhang[2], C. W. Nan[1] and L. Q. Chen[2]
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PC17, AR611 **Li, Qian**

PFM STUDIES ON DOMAIN STRUCTURES AND LOCAL SWITCHING BEHAVIOURS OF $Pb(In_{1/2}Nb_{1/2})O_3$-$Pb(Mg_{1/3}Nb_{1/3})O_3$-$PbTiO_3$ SINGLE CRYSTALS

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PC18, AR624 **Salazar, Ulises**

TRANSMISSION X-RAY DIFFRACTION STUDIES ON $Bi_4Ti_3O_{12}$ SINGLE CRYSTALS

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PC19, AR630 **Xie, Yujuan**

OPTICAL AND ELECTRICAL CHARACTERIZATION OF $PbZr_{1-x}Ti_xO_3$ SINGLE CRYSTALS NEAR THE MORPHOTROPIC PHASE BOUNDARY

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PC20, AR627 **Ren, Zihe**

STUDY OF RHOMBOHEDRAL TO MONOCLINIC TO CUBIC PHASE TRANSITIONS IN PIN-PMN-PT TERNARY PIEZO-CRYSTALS

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PC21, AR113 **Li, Fei**

SHEAR PIEZOELECTRIC RESPONSE IN FERROELECTRIC CRYSTALS AND POLYCRYSTALLINE CERAMICS

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PC22, AR235 **Lee, Hyeongjae**

1-3 PIEZOELECTRIC COMPOSITE TRANSDUCERS WITH IMPROVED HIGH POWER CHARACTERISTICS

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PC23, AR603 **Marincel, Daniel**

NONLINEARITY OF SINGLE GRAIN BOUNDARIES IN THIN FILM PIEZOELECTRICS

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PC24, AR609 **Borodavka, Fedir**

STUDY OF LOCAL DOMAIN STRUCTURE IN $LiTa_xNb_{1-x}O_3$ AND VTE-TREATED $LiTaO_3$ CRYSTALS BY BIREFINGENCE IMAGING, RAMAN SPECTROSCOPY AND PIEZO FORCE MICROSCOPY

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PC25, AR613 **Bassignot, Florent**

NEW ACOUSTIC RESONATOR BASED ON PERIODICALLY POLED TRANSDUCER IN LITHIUM NIOBATE OR TANTALATE

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PC26, AR615 **Hagiwara, Manabu**

EXPERIMENTAL VALIDATION OF PIEZOELECTRIC EQUATIONS DESCRIBING NONLINEAR AND DISSIPATION EFFECTS

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PC27, AR626 **Lee, SunYoung**

FERROELECTRIC PROPERTIES OF $(K_{0.5}Na_{0.5})(Mn_xNb_{1-x})O_3$ THIN FILMS OF VARYING THICKNESS

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PC28, AR346 **Dittmer, Robert**

THE EFFECT OF MIXED B-SITE OCCUPATION ON STRUCTURAL AND ELECTRICAL PROPERTIES OF BISMUTH BASED LEAD-FREE MATERIALS - A CASE STUDY ON $Bi_{1/2}Na_{1/2}TiO_3$-$Bi_{1/2}K_{1/2}TiO_3$-$Bi(Zn_{1/2}Ti_{1/2})O_3$

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PC29, AR625 **Perantie, Jani**

TEMPERATURE AND POLARIZATION BEHAVIOR IN <001>-ORIENTED $Pb(Mg_{1/3}Nb_{2/3})O_3$-$PbTiO_3$ SINGLE CRYSTAL DURING ELECTRIC-FIELD-INDUCED PHASE TRANSITION

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PC30, AR632 **Yan, Xingwei**

THE SUBSTRATE DEFORMATION ON THE MEASURED DISPLACEMENT OF PIEZOELECTRIC FILM IN A LASER INTERFEROMETER MEASUREMENT

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PC31, AR496 **Yao, Shanshan**

EFFECT OF OXYGEN PRESSURE ON STRUCTURE AND PROPERTIES OF $Ba(Ti_{0.8}Zr_{0.2})O_3$-$x(Ba_{0.7}Ca_{0.3})TiO_3$ THIN FILMS PREPARED BY PULSED LASER DEPOSITION

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PC32, AR601 **Kobata, Takashi**

STRUCTURAL INVESTIGATIONS OF $LiNbO_3$/$LiTaO_3$ SUPERLATTICE THIN FILMS BY FIELD EFFECT SCANNING TRANSMISSION ELECTRON MICROSCOPY EQUIPPED WITH ENERGY DISPERSIVE X-RAY SPECTROMETRY (FESTEM-EDX)

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PC33, AR606 **Imamiya, Yuji**

MULTILAYER THIN-FILM CAPACITORS FABRICATED BY RF MAGNETRON SPUTTERING

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PC34, AR610 **Arredondo, Miryam**

CHEMISTRY OF RUDDLESDEN-POPPER PLANAR FAULTS AT A FERROELECTRIC-FERROMAGNET PEROVSKITE INTERFACE

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PC35, AR616 **Gervacio, Jose**

CHARACTERIZATION OF LOCAL PIEZOELECTRIC BEHAVIOR OF FERROELECTRIC GESBTE THIN FILMS

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PC36, AR617 **Harun, AhmadMukifza**

PREPARATION AND CHARACTERIZATION OF $LiNbO_3$ PVDF COMPOSITE THIN FILM

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PC37, AR628 **Bastani, Yaser**

STRUCTURE AND PROPERTIES OF EPITAXIAL-LIKE POLYCRYSTALLINE PZT SUPERLATTICES PROCESSED BY CHEMICAL SOLUTION DEPOSITION

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PC38, AR631 **Ji, Hongfen**

ELECTRICAL PROPERTIES OF $Na_{0.5}Bi_{0.5}TiO_3$ FERROELECTRIC THICK FILMS PREPARED BY SOL-GEL METHOD

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PC39, AR634 **Zhu, Wanlin**

EFFECT OF PREFERRED-ORIENTATION ON DOMAIN WALL MOTION IN ACCEPTOR-DOPED $PbZr_{0.52}Ti_{0.48}O_3$ FILMS

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PC40, AR312 **Bygrave, Faye**

STRAIN INDUCED AT THE SUBSTRATE-FILM INTERFACE IN $BiFeO_3$-$PbTiO_3$ THIN FILMS PREPARED BY PULSED LASER DEPOSITION

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1. Applications

P1, AR505 ***PIEZOTRANSFORMER WITH RING-DOT-SHAPE FOR EASY HEAT RADIATION AND HIGH EFFICIENCY POWER***

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P2, AR531 ***LOW-FREQUENCY REINFORCED FERROELECTRIC ACOUSTIC ACTUATORS***

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P3, AR434 ***FATIGUE AND OPERATIONAL LIFETIME INVESTIGATION OF THE BFPT SYSTEM IN A MULTILAYER CONFIGURATION***

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P5, AR720 ***ENERGY LOSS IN PIEZOELECTRIC ENERGY HARVESTING CANTILEVERS***

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P6, AR543 ***SENSITIVITY ENHANCEMENT OF TUNABLE ULTRASONIC MICROSENSORS INDUCED BY CONVERSE-PIEZOELECTRIC STRESS ON PZT DIAPHRAGMS***

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P7, AR461 ***PRINCIPLES OF DESIGNING CONTAINERS FOR THERMO-CHEMICAL TREATMENT OF HIGH PURITY COMPOUNDS***

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P8, AR127 ***ELECTROACTIVE POLYMERS FOR BIOMEDICAL APPLICATIONS***

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P9, AR479 ***FABRICATION AND CHARACTERIZATION OF DISK -TYPE TRANSFORMERS BY USING (Bi, La)FeO_3-$PbTiO_3$ PIEZOELECTRIC CERAMICS***

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P10, AR469 ***ACOUSTIC BIOSENSORS FOR MEDICAL AND ENVIRONMENTAL PURPOSES***

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P11, AR545 ***DIELECTRIC PROPERTIES OF Ag-DOPED ($Ba_{0.6}Sr_{0.4}$)TiO_3 THIN FILMS USING SOL-GEL METHOD FOR RF APPLICATION***

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P12, AR510 ***A NOVEL VISCOMETER BASED ON PIEZOELECTRIC VIBRATIING MEMBRANE***

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2. Bulk Materials

P13, AR485 ***EFFECT OF TWO-STAGE SINTERING TECHNIQUE ON PHASE FORMATION, DENSIFICATION AND MICROSTRUCTURE OF $Zn_3Nb_2O_8$ CERAMICS***

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P14, AR202 ***FERROELECTRIC AND STRUCTURAL PROPERTIES OF (1-x)$BiFeO_3$-($K_{0.5}Bi_{0.5}$)TiO_3 PIEZOELECTRIC CERAMIC SYSTEM***

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P15, AR391 ***DOMAIN ALIGNMENT AND PHASE STABILITY IN LEAD FREE PIEZOELECTRICS***

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P16, AR353 ***CHARACTERIZATION OF NOVEL CRYSTAL $Na_5Bi(WO_4)_2(MoO_4)_2 : Yb^{3+}$***

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P17, AR535 ***POWDER X-RAY DIFFRACTION STUDY OF $LiNb_{1-x}Ta_xO_3$***

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P18, AR363 ***FERROELECTRIC PROPERTIES AND DOMAIN CLAMPING IN HIGH-QUALITY $Bi_4Ti_3O_{12}$ SINGLE CRYSTALS GROWN UNDER HIGH-PRESSURE OXYGEN ATMOSPHERE***

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P19, AR214 ***CRYSTAL SYMMETRY DEPENDENT DEFORMATION IN $Pb(Zr_xTi_{1-x})O_3$ CERAMICS***

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P20, AR410 ***PREPARATION OF NEEDLE- AND PLATE-LIKE $NaTaO_3$ CRYSTALS BY MOLTEN-NaOH METHOD***

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P21, AR553 ***PREPARATION OF $Na_{0.5}Bi_{0.5}TiO_3$ POWDER BY NOVEL SOLUTION METHO***D

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P22, AR420 ***VARIATION OF DI-/PIEZOELECTRIC PROPERTIES OF PIN-PMN-PT CRYSTALS NEAR MORPHOTROPIC PHASE BOUNDARY ALONG THE GROWTH DIRECTION***

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P23, AR444 ***SHAPE-CONTROLLED CRYSTAL GROWTH OF $Sr_3NbGa_3Si_2O_{14}$ AND $Sr_3TaGa_3Si_2O_{14}$ PIEZOELECTRIC SINGLE CRYSTALS BY MICRO-PULLING-DOWN METHOD***

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P24, AR723 ***LOW-TEMPERATURE MICROWAVE DIELECTRIC PROPERTIES OF (1-x) TiO_2 – x $Ca(Fe_{0.5}Nb_{0.5})O_3$ CERAMICS***

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P25, AR537 ***PFM CHARACTERIZATION OF $(K_{0.5}Na_{0.5})_{0.95}La_{0.05}(Nb_{0.9}Ti_{0.05})O_{2.9}$ CERAMICS LEAD FREE***

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P26, AR548 ***A VARIABLE TERMPERATURE PAIR DISTRIBUTION FUNCTION STUDY OF THE DISORDER IN $Na_{0.5}Bi_{0.5}TiO_3$***

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P27, AR436 ***PMN-PZT RELAXOR FERROELECTRIC TRANSPARENT CERAMICS***

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P28, AR541 ***DIELECTRIC AND FERROELECTRIC CHARACTERIZATIONS OF (1-x)$PbTiO_3$-x$Bi(Zn_{1/2}Ti_{1/2})O_3$ SINGLE CRYSTALS GROWN BY A TOP COOLED HIGH TEMPERATURE SOLUTION METHOD***

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P29, AR472 ***EFFECT OF THICKNESS ON THE PROPERTIES OF BARIUM STRONTIUM TITANATE (BST) CERAMICS***

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P30, AR230 ***ELECTRICAL TRANSPORT PROPERTIES AND THEIR APPLICATIONS OF $BiFeO_3$ FILMS***

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3. Conduction Phenomena, Point Defects & Nanoionics

P31, AR465 ***FORMATION OF ANODIC PRECIPITATES ON THE SURFACE OF PZT LAYERS WITH Ag/Pd ELECTRODES***

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P32, AR241 ***Strong ferromagnetism induced by point defects in α-Fe_2O_3***

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4. Dielectrics

P33, AR751 ***DEVELOPMENT OF $MgCaSi_2O_6$ DIOPSIDE GLASS-CERAMICS AS MICROWAVE DIELECTRIC MATERIALS***

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P34, AR269 ***EFFECTS OF BARIUM SUBSTITUTION ON THE PROPERTIES OF $Ca_2Nb_2O_7$ FERROELECTRIC CERAMICS***

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P35, AR343 ***A NEW $SrBi_4Ti_4O_{15}/CaBi_4Ti_4O_{15}$ THIN FILM CAPACITOR FOR EXCELLENT ELECTRIC STABILITY***

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P36, AR743 ***DIELECTRIC RELAXATIONS IN $BaTiO_3 – Bi(Zn_{1/2}Ti_{1/2})O_3$ CERAMICS FOR HIGH TEMPERATURE CAPACITOR APPLICATIONS***

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P37, AR488 ***TIME-DEPENDENT DIELECTRIC AND FERROELECTRIC BEHAVIOR IN HYBRID-DOPED BT-BASED CERAMICS***

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P39, AR440 ***STUDY ON DISCHARGE CURRENT IN TIME DOMAIN OF BARIUM TITANATE BASED FERROELECTRICS***

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P40, AR336 ***STUDY ON STRUCTURES AND DIELECTRIC PROPERTIES OF $(Li_xNb_{1-x})_{0.25}Ti_{0.75}O_2$ BASED ON MOLECULAR SIMULATION***

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P41, AR352 ***RESEARCH ON DIELECTRIC PROPERTY OF POLYETHYLENE WITH DEFECTS BASED ON MOLECULAR DYNAMICS***

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P42, AR547 ***MICROSTRUCTURAL EVOLUTION AND ELECTRIC PROPERTIES OF BASE-METAL ELECTRODED $BaTi_4O_9$ MATERIALS WITH Ba-B-Si-Zn-O GLASS SYSTEM***

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P43, AR395 ***PROTOTYPE CAPACITOR PRODUCED BY FREEZE TAPE-CASTING***

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P44, AR265 ***THE EFFECT OF HAFNIUM SUBSTITUTION ON DIELECTRIC AND IMPEDANCE BEHAVIOR OF LEAD-FREE $Bi_{0.5}(Na_{0.78}K_{0.22})_{0.5}TiO_3$ CERAMICS***

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P45, AR463 ***MICROSTRUCTURE AND ELECTRICAL PROPERTIES OF $(Bi_{0.5}Na_{0.5})Zr_{1-x}Ti_xO_3$ DIELECTRIC CERAMICS***

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P46, AR708 ***INVESTIGATIONS OF STRUCTURAL, DIELECTRIC AND ELECTRICAL BEHAVIOUR OF $Ba_4CaRTi_3Nb_7O_{30}$ (R = Eu, Dy) FERROELECTRIC CERAMICS***

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P47, AR730 ***EFFECT OF MECHANICAL ACTIVATION AND MICROWAVE SINTERING ON THE CHARACTERISTICS OF NON STOICHIOMETRIC SBT FERROELECTRIC CERAMICS***

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P48, AR731 ***PIEZOELECTRIC AND PYROELECTRIC PROPERTIES OF BARIUM ZIRCONATE TITANATE FERROELECTRIC CERAMICS***

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P49, AR528 ***DIELECTRIC PROPERTIES AND ELECTRICAL CONDUCTIVITY STUDIES ON SOME GRANITES***

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P50, AR546 ***IMPROVEMENT OF DIELECTRIC AND TUNABILITY PROPERTIES IN HETEROLAYERED STRUCTURE OF $(Pb_{0.1},Sr_{0.9})TiO_3$ / $(Pb_{0.9},Sr_{0.1})TiO_3$ THIN FILMS***

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P51, AR518 ***DIELECTRIC AND FERROELECTRIC PROPERTIES OF LEAD-FREE BISMUTH SODIUM TITANATE ZIRCONATE CERAMICS***

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P52, AR520 ***A STUDY ON THE STRUCTURAL AND ELECTRICAL PROPERTIES OF Sb, Mn CO-DOPED $NaKNbO_3$ CERAMICS***

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P53, AR209 ***EFFECTIVE MASS AND DIRECTION DEPENDENT RICHARDSON CONSTANT CALCALATED FROM AB-INITIO BAND STRUCTURE FOR $SrTiO_3$***

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P54, AR512 ***DIELECTRIC RELAXATION AND CONDUCTIVITY IN LEAD-FREE SODIUM BISMUTH TITANATE CERAMICS***

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P55, AR201 ***DIELECTRIC AND ELECTRICAL PROPERTIES OF POTASSIUM NITRATE: POLY (VINYL ALCOHOL) COMPOSITE FILMS***

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5. Domain Engineering

P56, AR556 ***FERROELASTIC DOMAIN DYNAMICS IN PZT THIN FILMS***

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P57, AR332 ***CONFIGURATION AND STRUCTURE INFLUENCED DOMAIN STABILITY IN LiNbO3 CRYSTALS STUDIED BY PIEZORESPONSE FORCE MICROSCOPY***

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P59, AR714 ***DOMAIN KINETICS IN LITHIUM NIOBATE AND LITHIUM TANTALATE SINGLE CRYSTALS AT ELEVATED TEMPERATURE***

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P60, AR408 ***REALIZATION AND MANIPULATION OF DOMAIN STRUCTURES IN STRAINED BFO FILMS***

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P61, AR495 ***FERROELECTRIC DOMAIN MORPHOLOGY AND DISTRIBUTION IN ORTHORHOMBIC $(Li_{0.02}K_{0.441}Na_{0.539})NbO_3$ CERAMICS***

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6. Ferroelectrics & Antiferroelectrics for Energy Applications

P62, AR514 ***PHOTOVOLTAIC EFFECT OF $(K_{0.5}Na_{0.5})NbO_3$-BASED THIN FILMS***

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P63, AR250 ***CAN ELECTRIC FIELD INDUCE AN ANTIFERROELECTRIC PHASE OUT OF A FERROELECTRIC PHASE?***

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P64, AR487 ***MPB PHASE DIAGRAM AND FERROELECTRIC PROPERTIES OF $(1-x)(Bi_{0.97}La_{0.03})(Fe_{0.95}Ga_{0.05})O_3$-$xPbTiO_3$ CERAMICS BY SOL–GEL PROCESS***

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P65, AR490 ***DIELECTRIC AND PIEZOELECTRIC PROPERTIES OF THE Cu DOPED $0.7(Bi_{0.97}La_{0.03})FeO_3$-$0.3PbTiO_3$ CERAMICS BY SOL–GEL PROCESS***

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P66, AR424 ***MICROSTRUCTURE AND DIELECTRIC PROPERTIES OF $(Sr_{1-1.5x}Bi_x)TiO_3$-$BaTiO_3$ CERAMICS***

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P67, AR373 ***STRUCTURAL DISORDER AND HIGH STRAIN BEHAVIOUR IN BISMUTH SODIUM TITANATE-BARIUM TITANATE CERAMICS***

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P68, AR522 ***CRYSTALLINE PROPERTIES DEPANDENCE OF DIELECTRIC AND FERROELECTRIC PROPERTIES OF POLY (VINYLIDENE FLUORIDE- TRIFLUOROETHYLENE)***

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P69, AR725 ***X-POD: A NOVEL SMALL FOOTPRINT MULTI-LEGGED PIEZOELECTRIC SINGLE CRYSTAL ACTUATOR***

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P70, AR441 ***DIELECTRIC AND ELECTRIC FIELD-INDUCED PYROELECTRIC BEHAVIOUR OF $(Pb_{0.87-0.07x}Ba_{0.10+0.7x})La_{0.02}(Zr_{0.7}Sn_{0.15}Ti_{0.15})O_3$ CERAMICS***

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7. Ferroelectric Memory Materials & Devices

P72, AR503 ***THE TUNNEL SWITCHING BEHAVIOR IN $SiO_2/Pb(Zr,Ti)O_3$ Bi -LAYER CAPACITORS***

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P73, AR453 ***DIODE AND PHOTOCURRENT EFFECT IN FERROELECTRIC $BaTiO_3$ THIN FILMS***

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P74, AR454 ***POLARIZATION DIRECTION DEPENDENT DIODE AND PHOTOCURRENT EFFECT IN $BaTiO_{3-\delta}$***

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P75, AR539 ***MULTIPLE SWITCHING AT ULTRA-THIN FERROELECTRIC FILMS***

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P76, AR459 ***APPLICATION OF FERROELECTRIC $LiNbO_3$ SINGLE CRYSTALS CONTAINING INACTIVE PHOTOVOLTAIC DOPANTS FOR RECORDING INFORMATION***

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P77, AR257 ***SWITCHING KINETICS OF THE FERROELECTRIC POTASSIUM NITRATE: POLY (VINYL ALCOHOL) COMPOSITE FILMS***

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P78, AR451 ***STRUCTURE–PROPERTIES RELATIONS OF CO–DOPED BISMUTH LAYER–STRUCTURED $Bi_{3.25}La_{0.75}(Ti_{1-x}Mo_x)_3O_{12}$ CERAMIC***

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P79, AR489 ***THICKNESS DEPENDENCE OF $0.7BiFeO_3$-$0.3PbTiO_3$ FILMS PREPARED BY SOL-GEL METHOD***

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P80, AR530 ***LOW-TEMPERATURE CRYSTALLIZATION OF PZT THIN FILMS INDUCED BY HIGH OXYGEN-PRESSURE ANNEALING***

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8. Multiferroics and Magnetoelectric Effects

P81, AR704 ***STRAIN DEPENDENT PROPERTIES OF BISMUTH FERRITE LEAD TITANATE PROBED BY PIEZORESPONSE FORCE MICROSCOPY***

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P82, AR480 ***SOLUTION-BASED FABRICATION OF MAGNETOELECTRIC SPINEL-PEROVSKITE BILAYERED NANOSTRUCTURES BY LIQUID PHASE DEPOSITION***

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P83, AR445 ***MULTIFERROICITY AND MAGNETOELECTRIC COUPLING IN FERRITE–FERROELECTRIC PARTICULATE CERAMICS***

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P84, AR764 ***MICRO- AND NANOSCOPIC INVESTIGATIONS OF STRAIN-MEDIATED COUPLING IN MAGNETO-ELECTRIC Ni/$BaTiO_3$-SAMPLES***

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P85, AR756 ***MAGNETIC FIELD DEPENDENCE OF DIELECRIC PROPERTIES IN $CoFe_2O_4$-$BaTiO_3$ COMPOSITE***

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P86, AR509 ***MULTEFERROIC PROPERTIES OF $Bi_{1-x}Sm_xFeO_3$ SOLID SOLUTIONS NEAR A MORPHOTROPIC PHASE BOUNDARY***

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P87, AR414 ***EFFECTS OF (Gd,Mn)-DOPING ON FERROELECTRIC PROPERTIES OF $BiFeO_3$ THIN FILMS PREPARED USING CHEMICAL SOLUTION DEPOSITION***

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P88, AR415 ***$EuMnO_3$ EFFECTS ON STRUCTURE AND ELECTRICAL PROPERTIES OF CHEMICAL SOLUTION DEPOSITED $BiFeO_3$ THIN FILMS***

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P89, AR481 ***PIEZOELECTRIC RESPONSE OF NOVEL MULTIFERROIC MICROCANTILEVERS***

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P90, AR437 ***MAGNETOELECTRIC PROPERTIES OF $Ni_{0.5}Zn_{0.5}Fe_2O_4$/POLY(VINYLIDENE FLUORIDE-TRIFLUOROETHYLENE) NANOCOMPOSITES***

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P91, AR439 ***AN ANALYTICAL NONLINEAR MODEL FOR MULTIFERROIC COMPOSITES REPRODUCING THE DC-MAGNETIC-BIAS DEPENDENT MAGNETOELECTRIC PROPERTIES***

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P92, AR383 ***STRUCTURAL AND FERROELECTRIC PROPERTIES OF $BiFeO_3$ THIN FILMS PREPARED BY DUAL ION BEAM SPUTTERING PROCESS***

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P93, AR710 ***REACTIVE TEMPLATE GRAIN GROWTH OF BiFeO3-PbTiO3 BY USING Bi4Ti3O 12 AND $PbBi_4Ti_4O_{15}$ AS TEMPLATE***

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P94, AR524 ***FERROELECTRIC AND PIEZOELECTRIC PROPERTIES OF POLYCRYSTALLINE $BiFeO_3$ THIN FILMS PREPARED PULSED LASER DEPOSITION UNDER MAGNETIC FIELD***

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P95, AR438 ***SUPERPARAMAGNETISM INDUCED BY POLAR NANOREGIONS IN RELAXOR FERROELECTRICS HAVING MAGNETIC IONS***

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P96, AR417 ***MULTIFERROICITY OF HEXAGONAL $RFeO_3$（R=Yb, Lu）THIN FILMS***

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P97, AR329 ***ORIENTATIONAL DEPENDENCE OF MULTIFERROIC BEHAVIORS IN La AND Mn MODIFIED $BiFeO_3$ THIN FILMS***

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P98, AR511 ***ACOUSTIC PROPERTIES OF MULTIFERROICS $PbFe_{1/2}Ta_{1/2}O_3$ AND $BiFeO_3$ AT NEEL TEMPERATURE***

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P99, AR476 ***THE FERROELECTRIC AND FERROMAGNETIC CHARACTERIZATION OF $CoFe_2O_4/Pb(Mg_{1/3}Nb_{2/3})O_3$-$PbTiO_3$ MULTILAYERED THIN FILMS***

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P100, AR267 ***STRUCTURAL, MAGNETIC AND FERROELECTRIC PROPERTIES OF $Bi_5FeTi_3O_{15}$ AND $Bi_5Fe_{0.5}Co_{0.5}Ti_3O_{15}$ CERAMICS***

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P101, AR268 ***DOPING EFFECTS OF $BiFe_{1-x}Co_xO_3$(x = 0.2~0.8) IN LAYERED PEROVSKITE $Bi_4Ti_3O_{12}$***

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P102, AR473 ***PHASE TRANSFORMATION OF STRAIN DRIVEN MORPHOTROPIC PHASE BOUNDARIES IN $BiFeO_3$ THIN-FILMS***

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P103, AR384 ***ENAHANCED RESONANT MAGNETOELCTRIC COUPLING IN FREQUENCY-TUNABLE COMPOSITE MULTIFERROIC BIMORPH STRUCTURES***

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P104, AR499 ***INFLUENCE OF Ti ON THE MULTIFERROIC PROPERTIES OF $Bi_{0.8}Ba_{0.2}Fe_{1-x}Ti_xO_3$ CERAMICS***

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P105, AR261 ***PHASES CO-EXISTENCE CONTROL IN $BiFeO_3$ FILMS***

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P106, AR754 ***STRUCTURAL AND DIELECTRIC STUDIES OF MAGNETIC ION SUBSTITUTED $BaTiO_3$ CERAMICS***

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P107, AR295 ***PREPARATION, STRUCTURE AND PHASE TRANSITIONS IN A_3TeO_6-BASED OXIDES WITH A=Mn, Co, Ni, Cu***

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P108, AR521 ***INVESTIGATION OF ELECTRICAL AND MAGNETIC PROPERTIES OF $Bi_{1-x-y}Dy_xBa_yFe_{1-y}Ti_yO_3$ CERAMIC SYSTEM***

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P109, AR525 ***PHOTOVOLTAIC EFFECT IN MULTIFERROIC $BiFeO_3$ CERAMICS***

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P110, AR494 ***A-SITE ION SUBSTITUTIONS EFFECT IN MULTIFERROIC $BiFeO_3$ CERAMICS***

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P111, AR229 ***MULTIFERROIC $CoFe_2O_4$-$Pb(Zr_{0.52}Ti_{0.48})O_3$ CORE-SHELL NANOFIBERS AND THEIR MAGNETOELECTRIC COUPLINGS***

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P112, AR551 ***NANO SCALE MULTIFERROIC PROPERTIES OF $La_{1-x}Ca_xMnO_3$ ($0.4 \le x \le 0.5$) CERAMIC MANGANITES***

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P113, AR552 ***STRUCTURAL, MORPHOLOGICAL, MAGNETIC AND PIEZORESPONSE STUDIES OF $Bi_{0.9}Pr_{0.1}Fe_{1-x}Sc_xO_3$ ($0 \le x \le 0.07$) CERAMICS***

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9. Nanoscale Phenomena

P114, AR767 ***LOW TEMPERATURE LOCAL PIEZOELECTRIC PROPERTIES OF $SrTiO_3$ CERAMICS***

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P115, AR558 ***LOCAL PIEZOELECTRICITY IN $SrTiO_3$-$BiTiO_3$ CERAMICS***

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P116, AR274 ***DISORDER AND DOMAIN SWITCHING IN FERROELECTRIC POLYMERS***

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P118, AR534 ***FERROELECTRICITY IN ONE-DIMENSIONAL NANO- AND MICRO-OBJECTS***

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P119, AR468 ***NANOPARTICLE SIZE AND CONTENT EFFECTS IN THE OPTICAL AND DIELECTRIC PROPERTIES OF POLY(VINYLIDENE FLUORIDE / SILVER AND GOLD NANOCOMPOSITES***

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P120, AR418 ***FABRICATION AND PIEZO- AND FERROELECTRIC PROPERTIES OF $Pb(Zr,Ti)O_3$ NANORODS AND NANOTUBES BY MOCVD***

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P121, AR540 ***FERROELECTRIC-PARAELECTRIC PHASE TRANSITION IN TGS SINGLE CRYSTALS BY PFM***

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P122, AR458 ***THERMAL DIFFUSION IN ALUMINUM NANOPOWDER SUBJECT TO LOADING***

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P123, AR532 ***HYDROTHERMAL SYNTHESIS AND CHARACTERIZATION OF $Bi_{4-x}Nd_xTi_3O_{12}$ NANOPLATES***

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P124, AR533 ***COMPARATIVE STUDY OF DOMAIN RELATED TOPOGRAPHY FORMATION DURING CHEMICAL MECHANICAL POLISHING OF LEAD-FREE AND LEAD CONTAINING FERROELECTRIC CERAMICS***

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10. New Characterization Techniques

P125, AR549 ***SCANNING PROBE MICROSCOPIC STUDIES OF Pr AND Co SUBSTITUTED BISMUTH FERRITE THIN FILMS***

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P126, AR554 ***PIEZORESPONSE FORCE MICROSCOPIC STUDIES OF FERROELECTIC $(1–x)Pb(Sc_{1/2}Nb_{1/2})O_3–xPbTiO_3$ SINGLE CRYSTALS***

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P127, AR425 ***THE PREPARATION OF CERIA COLLOIDS DISPERSED BY POLYVINYL ALCOHOL***

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P128, AR273 ***ELECTRODE SIZE EFFECT UNDER PFM CHARACTERIZATION OF PZT-FILM ON SILICON STRUCTURES WITH MICRO- AND NANOMETRIC TOP ELECTRODES***

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P129, AR729 ***THE FEATURES OF THERMAL NOISE METHOD APPLICATION FOR STUDY OF FERROELECTRICS***

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P130, AR450 ***STUDY ON FREQUENCY DYNAMICS OF ACOUSTIC MODE AND THERMAL MODE MICROSCOPY BASED ON ATOMIC FORCE MICROSCOPE***

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11. Novel Advances in Ferroelectrics

P133, AR215 ***HIGH-T_C $BaTiO_3$ PRODUCED BY AN ENERGETIC PLASMA PROCESS***

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P134, AR759 ***RELAXATION IN FERROELECTRIC HYSTERESIS LOOPS : A TOOL TO DIFFERENTIATE THERMODYNAMIC AND KINETICS CONTROLLED PROCESSES***

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12. Optical Phenomena

P135, AR542 ***CHARACTERISTIC PHOTOLUMINESCENCE IN A AND/OR B SITE DOPED PZT CERAMICS***

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13. Piezoelectricity

P136, AR538 ***HIGH TEMPERATURE PIEZOELECTRIC MATERIALS BASED ON $PbTiO_3$-$BiScO_3$-$Bi(X_{0.5}Ti_{0.5})O_3$, WHERE X = Mg AND Zn***

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P137, AR536 ***ACOUSTIC WAVE FILTER BASED ON PERIODICALLY POLED LITHIUM NIOBATE***

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P138, AR378 ***UNIAXIAL PRESSURE INDUCED PHASE SWITCHING IN THE PIEZOELECTRIC KBT-NBT***

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P140, AR251 ***INTEGRATED PIEZOELECTRIC AND FERROELECTRIC THIN FILMS FOR PASSIVE TELEMETRIC TRANSPONDERS***

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P141, AR416 ***THE HYDROSTATIC PIEZOELECTRICITY AND ITS PRESSURE DEPENDENCE FOR SEVERAL KINDS OF CONVENTIONAL PIEZOCERAMICS AND PIEZOCRYSTALS***

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P142, AR305 ***ANALYSIS OF THE ADMITTANCE OF SYMMETRICAL TRIPLE LAYER PIEZOELECTRIC VIBRATOR***

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P143, AR396 ***EVALUATION OF THE PIEZOELECTRIC ELECTROMECHANICAL COUPLING CONSTANT k_{31} USING VARIOUS METHODS***

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P144, AR736 ***DOMAIN TEXTURE AND PIEZOELECTRIC PERFORMANCE OF SOFT AND HARD PZT DEPENDING ON ELECTRICAL AND MECHANICAL HISTORY***

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P145, AR741 ***BROAD-BAND DIELECTRIC RESPONSE OF LEAD-FREE CERAMICS $Ba(Ti_{0.8}Zr_{0.2})O_3$-$(Ba_{0.7}Ca_{0.3})TiO_3$ AND $Na_{0.5}Bi_{0.5}TiO_3$-$BaTiO_3$ COMPARED WITH PZT***

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P146, AR470 ***GIANT STRAIN IN LEAD-FREE $Bi_{0.5}(Na_{0.82}K_{0.18})_{0.5}TiO_3$ CERAMICS***

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P148, AR516 ***ELECTRICAL PROPERTIES AND ENHANCED ELECTRIC FIELD-INDUCED STRAIN IN $K_{0.5}Na_{0.5}NbO_3$-MODIFIED $Bi_{0.5}(Na_{0.78}K_{0.22})_{0.5}TiO_3$ LEAD-FREE PIEZOELECTRIC CERAMICS***

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P149, AR517 ***LARGE ELECTRIC-FIELD-INDUCED STRAIN IN THE TEXTURED $Bi_{0.5(}Na,K)_{0.5}TiO_3$–$BiAlO_3$ CERAMICS***

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P151, AR392 ***HIGH T_c $BiInO_3$-$PbTiO_3$ PIEZOELECTRIC FILMS DEPOSITED BY PULSED LASER ABLATION***

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P152, AR240 ***HIGH PERFORMANCE APPLICATIONS BASED ON PMN-PT SINGLE CRYSTAL***

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P153, AR471 ***COMPARISON BETWEEN MICROWAVE AND CONVENTIONAL SINTERING OF MODIFED POTASSIUM SODIUM NIOBATE PIEZOELECTRIC CERAMICS***

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P154, AR419 ***FERROELECTRIC DOMAIN STRUCTURES IN $(Ba_{1-x}Ca_x)TiO_3$***

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P155, AR738 ***PROPERTIES OF Sc DOPED AlN THIN FILM BULK ACOUSTIC WAVE RESONATORS***

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P156, AR732 ***A DIGITAL HOLOGRAPHIC METHOD FOR THE MEASUREMENTS OF PIEZOELECTRIC TRANSFORMER VIBRATIONS***

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P158, AR515 ***STRUCTURE AND ELECTRICAL PROPERTIES OF $(K_{0.48}Na_{0.48}Li_{0.04})(Nb_{0.995-x}Mn_{0.005}Ta_x)O_3$ LEAD-FREE FERROELECTRIC THIN FILMS***

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P160, AR431 ***IMPLEMENTATION OF PIEZOELECTRIC POLYMER TRANSDUCER INTO DIFFERENT SUBSTRATES AND MICROSYSTEMS BY USING MULTI-COMPONENT INJECTION MOULDING TECHNOLOGY***

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P161, AR412 ***PIEZOELECTRIC ENERGY HARVESTING FOR DC-DC CONVERTER APPLICATION***

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P162, AR501 ***PIEZOELECTRIC AND DIELECTRIC PROPERTIES OF NLBT-MODIFIED $(Na_{0.5}K_{0.5})_{0.97}(Nb_{0.96}Sb_{0.04})O_3$ LEAD-FREE PIEZOELECTRIC CREAMICS***

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P163, AR502 ***DIELECTRIC AND PIEZOELECTRIC PROPERTIES OF $(Na,K)NbO_3$ LEAD-FREE CERAMICS ACCORDING TO $(Bi,Na)TiO_3$-SUBSTITIUTION***

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P164, AR219 ***CHARACTERIZATION OF LOCAL STRUCTURE IONS Fe^{3+} IN SOLID SOLUTION $PbTi_{1-x}Zr_xO_3$ AND THEIR INFLUENCE ON THE ELECTROPHYSICS PARAMETERS OF PIEZOCERAMIC BY EPR SPECTROSCOPY***

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P165, AR403 ***THE EFFECT OF TEMPLATE MORPHOLOGIES ON MICROSTRUCTURE AND PROPERTIES OF TEXTURED $K_{0.5}Na_{0.5}NbO_3$ CERAMICS BY RTGG METHOD***

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P166, AR402 ***Ag_2O DOPED $(K_{0.5}Na_{0.5})NbO_3$-$LiNbO_3$ LEAD-FREE PIEZOELECTRIC CERAMICS***

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P167, AR504 ***DIELECTRIC AND PIEZOELECTRIC PROPERTIES OF THE Mn DOPED $0.6(Bi_{0.97}La_{0.03})FeO_3$-$0.4PbTiO_3$ CERAMICS BY SOL–GEL PROCESS***

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P168, AR302 ***THERMAL STABILITY OF ELECTRIC-FIELD-INDUCED STRAIN IN LEAD-FREE BISMUTH PEROVSKITE CERAMICS***

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P169, AR447 ***DIELECTRIC AND PIEZOELECTRIC PROPERTIES OF $CaZrO_3$-MODIFIED $Bi_{0.5}(Na_{0.78}K_{0.22})_{0.5}TiO_3$ CERAMICS***

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P170, AR462 ***FABRICATION AND CHARACTERIZATION OF LEAD-FREE $(Bi_{0.487}Na_{0.487}La_{0.017})TiO_3$-$(Ba_{0.7}Sr_{0.3})TiO_3$ PIEZOELECTRIC CERAMICS***

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P171, AR446 ***DESIGN AND FABRICATION OF PIEZOELECTRIC TRANSFORMERS USING LEAD-FREE CERAMICS***

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P172, AR252 ***SYNTHESIS OF RELAXOR BINARY AND TERNARY PIEZOELECTRIC CRYSTALS BY THE BRIDGMAN METHOD***

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P173, AR734 ***DIELECTRIC AND PIEZOELECTRIC PROPERTIES OF LEAD FREE $(Ba_{0.85}Ca_{0.15})(Ti_{1-x}Zr_x)TiO_3$ CERAMICS PREPARED BY SOLUTION BASED AUTOCOMBUSTION METHOD***

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P174, AR500 ***DIELECTRIC AND PIEZOELECTRIC PROPERTIES of $(K_{0.5}Na_{0.5})$ $(Nb_{0.97}Sb_{0.03})O_3$ CERAMICS DOPED WITH Bi_2O_3***

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P175, AR449 ***DIELECTRIC AND PIEZOELECTRIC PROPERTIES OF $Li_{0.02}(Na_{0.55}K_{0.45})_{0.98}[(Nb_{0.77}Ta_{0.18}Sb_{0.05})_{1-2x/5}Cu_x]O_3$ CERAMICS***

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P176, AR294 ***FERROELECTRIC PHASE TRANSITIONS AND PIEZOELECTRIC PROPERTIES OF BISMUTH-BASED CERAMICS WITH PEROVSKITE AND LAYERED STRUCTURES***

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P177, AR221 ***PIEZOELECTRIC TRANSDUCER BASED DEVICES FOR DEVELOPMENT OF A SUSTAINABLE MACHINING SYSTEM – A REVIEW***

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P178, AR422 ***STRUCTURAL, ELECTRICAL AND LUMINOUS PROPERTIES OF $BaTiO_3$-$CaTiO_3$-$SrTiO_3$ CERAMICS***

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P179, AR280 ***LARGE PIEZOELECTRIC EFFECT IN THE Pb-FREE POLYCRYSTALLINE SYSTEM $Ba(Ti,Sn)O_3$-$x(Ba,Ca)TiO_3$: A COMPARISON BETWEEN MORPHOTROPIC AND POLYMORPHIC PHASE BOUNDARY***

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P181, AR460 ***IMPROVING THE PIEZOELECTRIC PROPERTIES BASED ON MICROSTRUCTURE CHANGE IN PZT-CARBON NANOTUBE/POLYVINYLIDENE FLUORIDE THREE PHASE COMPOSITES***

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P182, AR348 ***DIELECTRIC, PIEZOELECTRIC, PYROELECTRIC AND MOSSBAUER STUDIES OF $Pb(Fe_{1/2}Nb_{1/2})O_3$ AND $Pb(Fe_{1/2}Ta_{1/2})O_3$ MULTIFERROICS***

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P183, AR303 ***A LANDAU-TYPE MODEL FOR MORPHOTROPIC PHASE BOUNDARY IN FERROIC SYSTEMS***

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14. Pyroelectric Materials and Devices

P184, AR452 ***CHARACTERIZATION OF PIEZOELECTRIC BISMUTH-BASED COMPOSITE MATERIALS***

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P185, AR372 ***LARGE PYROELECTRIC EFFECT IN LITHIUM NIOBATE INDUCED BY A HIGH-POWER SHORT-PULSE LASER***

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P186, AR716 ***PYROELECTRIC FIELD INFLUENCE ON RAMAN SPECTRA OF LITHIUM NIOBATE***

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P187, AR270 ***HIGH PYROELECTRIC PROPERTIES OF $(Pb_{0.87}La_{0.02}Ba_{0.1})(Zr_{0.75}Sn_{0.25-x}Ti_x)O_3$ CERAMICS NEAR AFE/RFE PHASE BOUNDARY UNDER DC BIAS FIELD***

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15. Relaxor Ferroelectrics/Dielectrics

P188, AR557 ***DIELECTRIC STUDIES OF $Ba_2Pr_xNd_{1-x}FeNb_4O_{15}$ RELAXOR CERAMICS***

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P189,AR223 ***RELAXOR FLUORINATED POLYMERS: NOVEL APPLICATIONS AND RECENT DEVELOPMENTS***

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P190, AR763 ***DIELECTRIC PROPERTIES OF (111)-ORIENTED EPITAXIAL $BaTiO_3$-$Bi(Mg_{1/2},Ti_{1/2})O_3$ FILMS***

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P191, AR272 ***THE CRITICAL HIGH TEMPERATURES T_{Burns} and T* IN RELAXORS: ORIGIN AND NATURE***

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P192, AR421 ***EFFECT OF BIREFRINGENCE ON THE SHG POLAR DIAGRAM MAPPING***

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P193, AR404 ***STRUCTURAL PROPERTIES AND DIELECTRIC RELAXATION IN Li-DOPED $KTaO_3$ STUDIED BY AB-INITIO AND KINETIC MONTE CARLO***

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P194, AR409 ***LOW-FREQUENCY RAMAN SCATTERING STUDY OF SODIUM POTASIUM NIOBATE CRYSTALS***

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P195, AR413 ***NANOSCALED DOMAIN STRUCTURES AROUND THE MPB REGION IN PMN-PT***

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P196, AR407 ***NUCLEATION OF DOMAINS IN THE FERROELECTRIC $Ba_5Ti_2O_7Cl_4$ BY MECHANICAL POLISHING***

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P197, AR715 ***DECAY OF AS-GROWN DOMAIN STRUCTURE AND DOMAIN GROWTH IN RELAXOR SBN SINGLE CRYSTALS***

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P198, AR428 ***NEW LEAD-FREE PEROVSKITE RELAXOR CERAMICS DERIVED FROM $BaTiO_3$ AND CONTAINING SCANDIUM***

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P199, AR513 ***THE EFFECT OF POLING AND DEPOLING ON THE DIELECTRIC AND PIEZOELECTRIC PROPERTIES OF RELAXOR FERROELECTRIC SOLID SOLUTION SINGLE CRYSTAL OF 24Pb($In_{1/2}Nb_{1/2}$)O_3-46Pb($Mg_{1/3}Nb_{2/3}$)O_3-30$PbTiO_3$***

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P200, AR507 ***DIELECTRIC RELAXATION AND ELECTRICAL PROPERTIES OF $Na_{0.5}Bi_{0.5}TiO_3$ (NBT) AND ($Na_{0.5}K_{0.5}$)NbO_3 (NKN) BASED ERROELECTRIC CERAMICS WITH MPRPHOTROPHIC PHASE BOUNDARY***

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16. Theory and Modelling

P201, AR286 ***FIRST PRINCIPLES STUDY OF ELECTRONIC STRUCTURE AND MAGNETISM of $EuTiO_3$***

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P202, AR464 ***DEPOLARIZATION FIELDS OF A STRIPE DOMAIN STRUCTURE IN A SEMICONDUCTOR MODEL OF FERROELECTRICS***

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P204, AR370 ***STABILIZATION AND THICKNESS DEPENDENCE OF DEPLETION CHARGE INDUCED DOMAINS IN FERROELECTRIC NANO CAPACITORS***

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P205, AR477 ***LINEAR AND NON-LINEAR OPTICAL PROPERTIES OF LITHIUM NIOBATE***

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P206, AR478 ***ADSORPTION OF METHANOL ON LITHIUM NIOBATE (0001)***

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P207, AR433 ***POLARIZATION-DEPENDENT H_2O ADSORPTION AT $LiNbO_3$ (0001)***

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P208, AR555 ***ROLE OF FERROELECTRICS (TRIGLYCINE SULPHATE CRYSTAL) IN COMPUTING TECHNOLOGY***

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P209, AR361 ***THEORETICAL STUDY OF THERMAL PROPERTIES OF $Ba_{1-x}Ca_xTiO_3$ MIXED FERROELECTRIC PEROVSKITES***

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17. Thick & Thin Films

P211, AR266 ***FABRICATION OF $(K,Na)NbO_3$ THIN FILMS ON SI SUBSTRATE BY PULSED LASER DEPOSITION***

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P213, AR443 ***SYNTHESES OF $(Pb\text{-}Sn\text{-}Ti)O_3$ THIN FILMS BY PLD METHOD AND THEIR STRUCTURAL AND FERROELECTRIC PROPERTIES***

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P214, AR358 ***SHEAR PIEZOELECTRIC COEFFICIENT d_{15} OF C-AXIS ORIENTED EPITAXIAL $Pb(Zr,Ti)O_3$ FILMS***

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P215, AR411 ***OBSERVATION OF DOMAIN STRUCTURE IN $NaNbO_3$ FILMS DEPOSITED ON (001), (110), AND (111) $SrTiO_3$ SUBSTRATES BY LASER BEAM SCANNING MICROSCOPY***

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P216, AR529 ***IN-SITU LARGE SCALE DEPOSITION OF PZT FILMS BY RF MAGNETRON SPUTTERING***

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P217, AR491 ***INTERFACE EFFECT OF HIGH-K $SrTa_2O_6$/ GATE ELECTRODE ON THE CHARACTERISTICS OF SOLUTION PROCESSED THIN FILM TRANSISTORS***

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P219, AR426 ***LEAD-FREE $(K_{0.48}Na_{0.52})NbO_3$ THIN FILMS DERIVED FROM PVAC-MODIFIED PRECURSOR SOLUTION***

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P220, AR435 ***SOFT MODE BEHAVIOR IN STRAINED $SrTiO_3$ THIN FILM***

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P221, AR475 ***EFFECT OF DIFFERENT ANNEALING METHODS ON THE FERROELECTRIC PROPERTIES OF $0.95Pb(Sc_{0.5}Ta_{0.5})O_3$-$0.05PbTiO_3$ THIN FILMS***

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P222, AR747 ***ELECTRICAL PROPERTIES OF BISMUTH SODIUM TITANATE CERAMIC FILMS DEPOSITED BY AEROSOL DEPOSITION METHOD***

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P223, AR304 ***HYPER FREQUENCY DIELECTRIC PROPERTIES OF PZT THIN FILMS PROCESSED BY SOL-GEL METHOD ON 3-INCHES Si WAFERS***

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P224, AR527 ***HIGH TEMPERATURE X-RAY ANALYSIS OF EPITAXIAL $BiFeO_3$-$PbTiO_3$ THIN FILMS***

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P225, AR406 ***INFLUENCE OF Ar/O_2 RATIO AND POST ANNEALING ON THE STRUCTURES AND PROPERTIES OF RF SPUTTERED $Bi_{1.5}Zn_{1.0}Nb_{1.5}O_7$ PYROCHLORE THIN FILMS***

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P226, AR474 ***POLARIZATION SWITCHING IN BST FERROELECTRIC THIN FILMS: THICKNESS AND FREQUENCY DEPENDENCES***

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P227, AR467 ***LEAD-FREE BISMUTH ALUMINATE ($BiAlO_3$) THIN FILMS: STRUCTURAL AND ELECTICAL PROPERTIES***

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P228, AR298 ***FERROELECTRICITY IN $LiNbO_3$-TYPE $MgTiO_3$ THIN FILM PREPARED BY PLD TECHNIQUE***

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P236, AR224 ***FERROELECTRIC PLZT FILMS GROWN ON METAL FOILS FOR POWER ELECTRONIC APPLICATIONS***

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P229, AR301 ***INFLUENCE OF POLING ON RF AND PULSED DC SPUTTERED PZT THIN FILMS***

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P230, AR430 ***STRUCTURES AND PROPERTIES OF (001) PREFERENTIAL ORIENTED $(K_{0.48}Na_{0.52})NbO_3$ THIN FILMS BY PULSED LASER DEPOSITION***

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P231, AR427 ***EFFECT OF TiO_2 BUFFER LAYER ON CRYSTALLIZATION AND PROPERTIES OF CHEMICAL SOLUTION DEPOSITED $Pb(Zr_{0.52}Ti_{0.48})O_3$ THIN FILMS***

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18. Piezocrystals Workshop

P233, AR397 ***A PIEZOELECTRIC $Pb(In_{1/2}Nb_{1/2})O_3$-$Pb(Mg_{1/3}Nb_{2/3})O_3$-$PbTiO_3$ SINGLE-CRYSTAL BASED ULTRASONIC MICROMOTOR WITH SUPERHIGH POWER DENSITY***

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P234, AR84 ***EFFECT OF Mn_2O_3/Au COMPOSITE ELECTRODE ON PIEZOELECTRIC PROPERTIES OF LEAD MAGNESIUM NIOBATE TITANATE SINGLE CRYSTAL***

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P235, AR560 ***DOMAIN ENGINEERED SWITCHABLE STRAIN STATES IN FERROELECTRIC (011) $[Pb(Mg_{1/3}Nb_{2/3})O_3]_{(1-x)}$-$[PbTiO_3]_x$ (PMN-PT, x≈0.32) SINGLE CRYSTALS FOR MAGNETOELECTRIC MEMORY APPLICATION***

Tao Wu,[1] Ping Zhao,[1] Mingqiang Bao, [2] Alexandre Bur,[1] Joshua L. Hockel, [1] Kin Wong,[2] Kotekar P. Mohanchandra,[1] Christopher S. Lynch[1] and Gregory P. Carman[1]
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P237, AR757 ***GROWTH AND CHARACTERIZATION OF SOME TERNARY RELAXOR FERROELECTRIC CRYSTALS***

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ISAF-PFM-2011

Workshop on Relaxor-Based Piezoelectric Single Crystals: Current Status, Issues, and Proposed Concepts

The Westin Bayshore Hotel, Vancouver, B.C.

Sunday, July 24, 2011, 12:00 PM – 6:00 PM, Mckenzie Room

Agendas

12:00–12:30		**Workshop Introduction and Goals** *(includes working lunch)*	**Z.-G. Ye & T. Shrout**
		Session I. Applications	
12:30–12:45	WS-I-1 (098)	***PROGRESS IN SINGLE CRYSTAL SONAR PROJECTION INTEGRATION***	**Richard J. Meyer, Jr.**
12:45–1:00	WS-I-2 (393)	***SINGLE CRYSTAL PROJECTORS FOR COMPACT, BROADBAND SONAR***	**Harold C. Robinson**
1:00–1:15	WS-I-3 (362)	***HIGH PERFORMANCE APPLICATIONS BASED ON PMN-PT SINGLE CRYSTALS*** Sang-Goo Lee, N.Neumann, Jung Hyui Cha, Yangmo Yu, Jin Ho Chang, and Tai-kyong Song	**Sang-Goo Lee**
1:15–1:30	WS-I-4 (700)	***PYROELECTRIC PERFORMANCES OF RELAXOR-BASED SINGLE CRYSTALS FOR INFRARED DETECTORS*** Linhua Liu, Haosu Luo, Xiangyong Zhao, Xiaomin Li, Weiping Jing, Ping Yu and Norbert Neumann	**Haosu Luo**
1:30–1:45		**Discussion**	
		Session II. Generation II & III Relaxor-PT Crystals	
1:45–2:00	WS-II-1 (253)	***EXPLORATION OF RELAXOR-BASED TERNARY PIEZOELECTRIC CRYSTALS BY THE BRIDGMAN METHOD*** Jun Luo, Shujun Zhang and Wesley S. Hackenberger	**Jun Luo**
2:00–2:15	WS-II-2 (712)	***REQUIRED WORKS IN THE PIN-PMN-PT CRYSTALS*** Zhuo Xu, Zhenrong Li, LingHang Wang, and Fei Li	**Zhuo Xu**
2:15–2:30	WS-II-3 (744)	***GROWTH AND CHARACTERIZATION OF $Pb(Zr_{1-x}Ti_x)O_3$ [PZT] SINGLE CRYSTALS*** Yujuan Xie, Alexei A. Bokov, Xifa Long and Zuo-Guang Ye	**Yujuan Xie**
2:30–2:45	WS-II-4 (153)	***SHAPED CRYSTAL GROWTH OF LANGASITE-TYPE PIEZOELECTRIC SINGLE CRYSTALS*** Akira Yoshikawa, Yuui Yokota, Masato Sato, Kazushige Tota, Yoshisuke Futami, Akihiro Yamaji, Takayuki Yanagida and Ko Onodera	**Akira Yoshikawa**

2:45–3:00		**Discussion**	
3:00–3:15		Coffee Break	
		Session III. Crystal Growth & Composites	
3:15-3:30	WS-III-1 (088)	***PMN-PT-BASED PIEZOELECTRIC SINGLE CRYSTALS AND COMPOSITES*** Jian Tian and Pengdi Han	**Jian Tian**
3:30–3:45	WS-III-2 (085)	***Mn-DOPED PMN-PT AND PMN-PZT SINGLE CRYSTALS*** S.-M. Lee, D.-H. Kim, J.-Y. Lee, and H.-Y. Lee	**Ho-Yong Lee**
3:45–4:00	WS-III-3 (757)	***GROWTH AND CHARACTERIZATION OF SOME TERNARY RELAXOR FERROELECTRIC CRYSTALS*** Xifa Long, Chao He, Dongquan Shen	**Xifa Long**
4:00-4:15	WS-III-3 (703)	***GROWTH OF MODIFIED PZN-PT SINGLE CRYSTALS FOR COMPACT ULTRA-HIGH SENSITIVITY PIEZOELECTRIC DEVICES*** L.C. Lim and Z.M. Lee	**Leong-Chew Lim**
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		Session IV. Applications II	
4:30–4:45	WS-IV-1 (117)	***APPLICATION OF SINGLE CRYSTALLINE PMN-PT AND PIN-PT IN HIGH-PERFORMANCE PYROELECTRIC DETECTORS*** Norbert Neumann, Ping Yu, Yadong Ji, Sang-Goo Lee and Haosu Luo	**Norbert Neumann**
4:45–5:00	WS-IV-2 (185)	***A PIEZOELECTRIC SINGLE CRYSTAL ULTRASONIC MICRO-ACTUATOR FOR DRIVING OPTICS*** Mingsen Guo, Shuxiang Dong, Bo Ren, and Haosu Luo	**Shuxiang Dong**
5:00–5:15	WS-IV-3 (084)	***EFFECT OF Mn_2O_3/Au COMPOSITE ELECTRODE ON PIEZOELECTRIC PROPERTIES OF LEAD MAGNESIUM NIOBATE TITANATE SINGLE CRYSTALS*** Yohachi (John) Yamashita, Noriko Yamamoto, Kazuhiro Itsumi, and Yasuharu Hosono	**Yohachi (John) Yamashita**
5:15–5:30	WS-IV-4 (086)	***THE DRAFT STANDARD FOR RELAXOR-BASED PIEZOELECTRIC SINGLE CRYSTAL MATERIALS FOR TRANSDUCER AND ACTUATOR APPLICATIONS: ACCOMPLISHMENTS OF A DECADS*** Lynn M. Ewart and Zuo-Guang Ye	**Lynn Ewart**
5:30-5:45		**General Discussion & Conclusions**	**T. Shrout & Z.-G. Ye**

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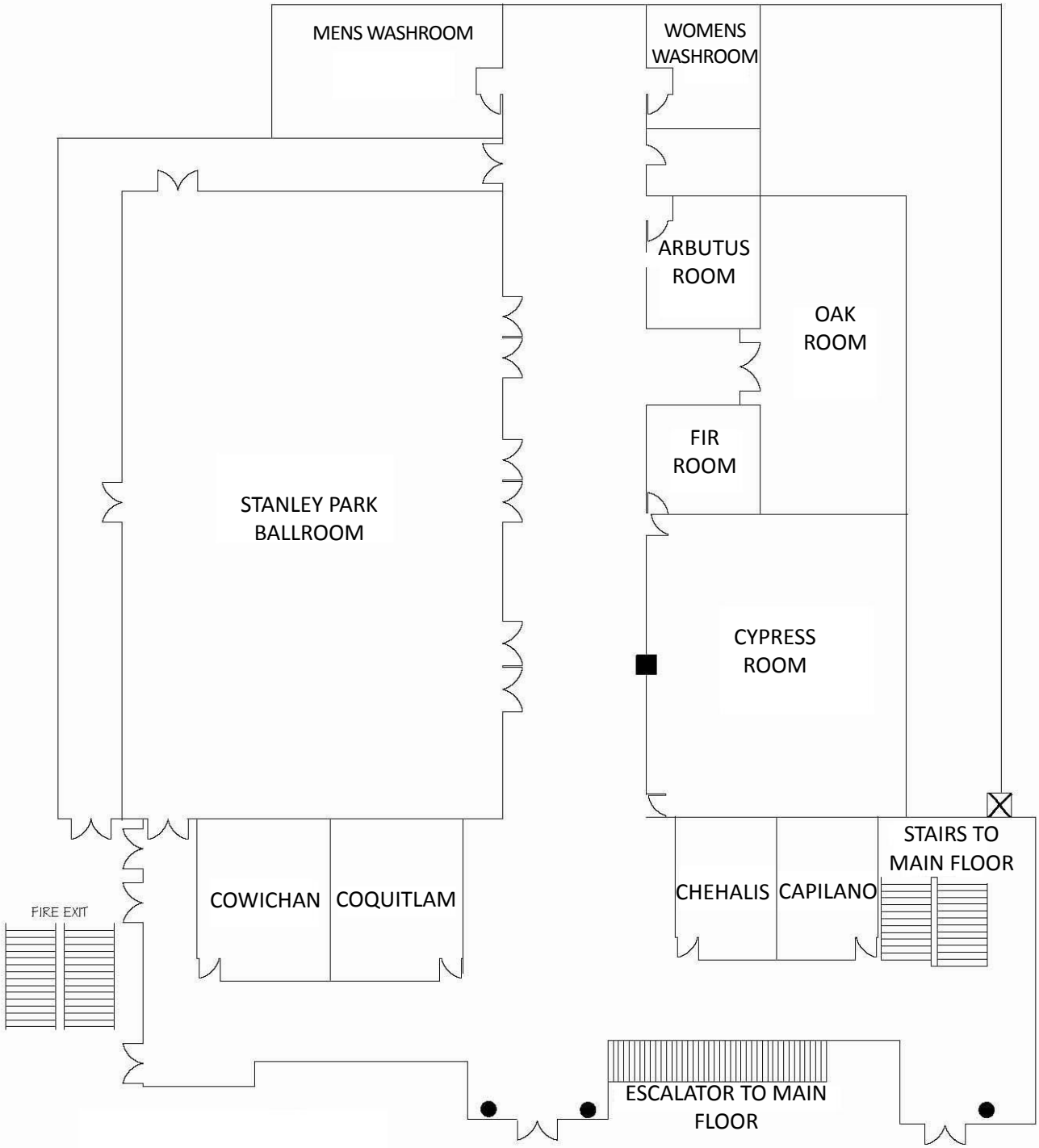
The 11th European Conference on Polar Dielectrics (ECAPD)
The 4th International Symposium “Piezoresponse Force Microscopy & Nanoscale Phenomena in Polar Materials” (PFM)

GENERAL CHAIR: Andrei Kholkin (http://isaf-ecapd.web.ua.pt/)

ISAF-PFM-2011
2nd FLOOR MAP



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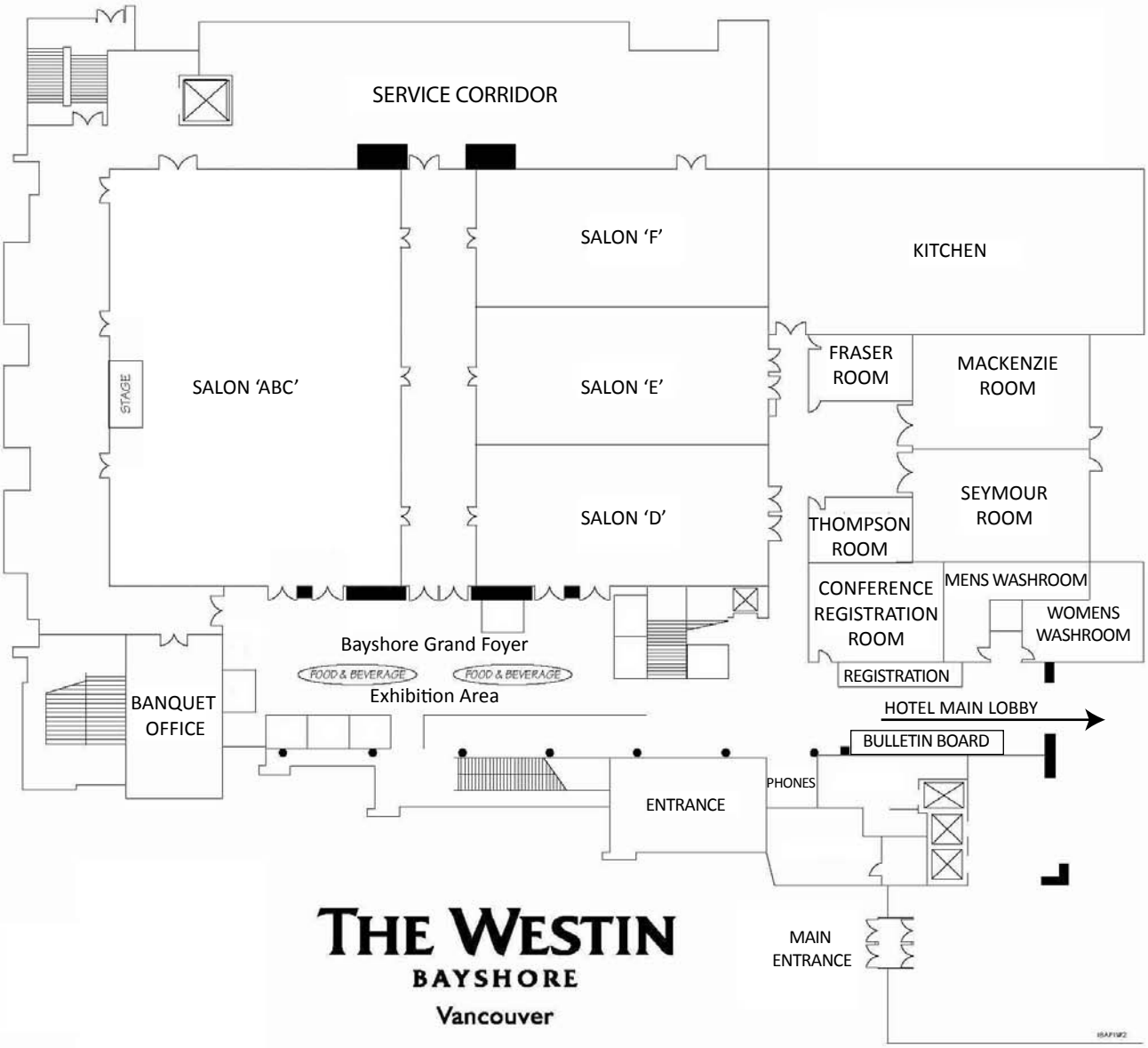
Vancouver

ISAF-PFM-2011
1ST FLOOR MAP



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