ANTON V. IEVLEV

Postdoctoral Research Associate
Center for Nanophase Materials Sciences
Oak Ridge National Laboratory
E-mail: anton.ievlev@gmail.com; ievlevav@ornl.gov
Office phone: (865)-242-8658

Education

Ural Federal University, Ekaterinburg, Russia	Physics	PhD, 2012
Ural State University, Ekaterinburg, Russia	Physics	M.S., 2009
Ural State University, Ekaterinburg, Russia	Physics	B.S., 2007

Professional Experience

2013 - present	Postdoctoral Research Associate; Scanning Probe Microscopy Group, Center for Nanophase Materials Science, Oak Ridge National Laboratory
2012 – 2013	Researcher, Institute of Natural Sciences, Ural Federal University, Ekaterinburg, Russia
2006 – 2012	Junior Researcher, Institute of Physics and Applied Mathematics, Ural State University, Ekaterinburg, Russia

Awards and Honors

- 2012: Scholarship of the Government of Russian Federation
- 2011: Scholarship of the Government of Russian Federation
- 2010: Scholarship of the Governor of the Sverdlovsk Region

Research Accomplishments

- Papers in peer-reviewed journals: **25** published articles, h-index: **8** (Google Scholar); sum of the times cited: **186** (Google Scholar); average citation per article: **7.44.**

Research Synopsis

- **Combined Scanning Probe and Raman confocal** investigations of the nanoscale phenomena and their coupling in functional materials (ferroelectrics, piezoelectrics, energy related materials, etc.)
- **Tip-induced polarization reversal in ferroelectric materials:** Experimental study and numerical simulation of the polarization reversal processes in ferroelectric single crystals and thin film using tip of Scanning Probe Microscope (SPM).
- **Big data** approaches for comprehensive analysis of the multidimensional data in Physics, Chemistry and Material Sciences.

- **SPM tip dynamics:** Investigation of electrical and ionic contributions to dynamics of Scanning Probe Microscopy tip in the contact mode voltage modulated techniques: Piezoresponse force microscopy (PFM) and Electrochemical strain microscopy (ESM).

Professional Service

Reviewed manuscripts for: Journal of Applied Physics, Journal of Electronic Materials, Nature Scientific Reports, ACS Nano.

Served as a chair for the 23rd International joint IEEE-ISAF-IWATMD-PFM symposium session "PFM-III".

Organizing of the 1st International Workshop "Nanoscale Electromechanical phenomena in functional materials. Piezoresponse Force & Electrochemical Strain Microscopies".

PUBLICATIONS

25. **Ievlev A.V.**, Susner M.A., McGuire M.A., Maksymovych P and Kalinin S.V., Quantitative analysis of the local phase transitions induced by laser heating, **ACS NANO**, 9 (12), 12442 (2015).

24. **Ievlev A.V.**, Jesse S., Cochell T.J. Unocic R.R., Protopopescu V.A. and Kalinin S.V., Quantitative Description of Crystal Nucleation and Growth from In situ Liquid Scanning Transmission Electron Microscopy, **ACS NANO**, 9 (12), 11784 (2015).

23. Cao Y., **Ievlev A.V.**, Morozovska A.N., Chen L.-Q., Kalinin S.V. and Maksymovych P., Intrinsic space charge layers and field enhancement in ferroelectric nanojunctions, **APPLIED PHYSICS LETTERS**, 107 (2), 022903 (2015).

22. **Ievlev A.V.**, Morozovska A.N., Shur V.Ya. and Kalinin S.V., Ferroelectric Switching by the Grounded Scanning Probe Microscopy Tip, **PHYSICAL REVIEW B**, 91, 214109 (2015).

21. Belianinov A., Vasudevan R., Strelcov E., **Ievlev A.**, Steed C., Yang S.M., Tselev A., Jesse S., Biegalski M., Shipman G., Symons C., Borisevich A., Archibald R. and Kalinin S., Big data and deep data in scanning and electron microscopies: deriving functionality from multidimensional data sets, **ADVANCED STRUCTURAL AND CHEMICAL IMAGING,** 1:6 (2015).

20. **Ievlev A.V.** and Kalinin S.V., *Data encoding based on the shape of the ferroelectric domains produced by a scanning probe microscopy tip*, **NANOSCALE**, 7, 11040 (2015).

19. Alikin D.O., **Ievlev A.V.**, Turygin A.P, Lobov A.I., Kalinin S.V. and Shur V.Ya., *Tip-induced domain growth on the non-polar cuts of lithium niobate single-crystals,* **APPLIED PHYSICS LETTERS,** 106 (18), 182902 (2015).

18. **Ievlev A.V.**, Alikin D.O., Morozovska A.N., Varenyk O.V., Eliseev E.A., Kholkin A.L., Shur V.Ya. and Kalinin S.V., *Symmetry breaking and electrical frustration during tip-induced polarization switching in the non-polar cut of lithium niobate single crystals*, **ACS NANO,** 9 (1), 769 (2015).

17. Morozovska A.N., Eliseev E.A., **Ievlev A.V.**, Varenyk O.V., Pusenkova A.S., Chu Y.-H., Strikha M.V., Shur V.Ya. and Kalinin S.V., *Ferroelectric domain triggers the charge modulation in semiconductors*, **JOURNAL OF APPLIED PHYSICS** 106 (6), 066817 (2014).

16. **Ievlev A.V.**, Morozovska A.N., Eliseev E.A., Shur V.Ya. and Kalinin S.V., Ionic field effect and memristive phenomena in single-point ferroelectric domain switching, **NATURE COMMUNICATIONS** 5:4545 doi:10.1038/ncomms5545 (2014).

15. Eliseev E.A., Morozovska A.N., **Ievlev A.V.**, Balke N., Maksymovych P., Tselev A. and Kalinin S.V., *Electrostrictive and electrostatic responses in contact mode voltage modulated Scanning Probe Microscopies*, **APPLIED PHYSICS LETTERS** 104 (23), 232901 (2014).

14. **Ievlev A.V.,** Morozovska A.N., Shur V.Ya. and Kalinin S.V., *Humidity effects on tip-induced polarization switching in lithium niobate*, **APPLIED PHYSICS LETTERS** 104 (9), 092908 (2014).

13. Strelcov E., **Ievlev A.V.**, Jesse S., Kravchenko I.I., Shur V.Ya., and Kalinin S.V., *Direct Probing of Charge Injection and Polarization-Controlled Ionic Mobility on Ferroelectric $LiNbO_3$ Surfaces*, **ADVANCED MATERIALS**, *26*, 958-963 (2014)

12. **Ievlev A.V.**, Jesse S., Morozovska A., Strelcov E., Eliseev E., Pershin Y., Kumar A., Shur V.Ya. and Kalinin S.V., *Intermittency, Quasiperiodicity, and Chaos during Scanning Probe Microscopy Tip-Induced Ferroelectric Domain Switching*, **NATURE PHYSICS**, *10*, 59-66 (2013).

11. Zelenovskiy, P.S., Shikhova V.A., **Ievlev A.V.,** Neradovskiy M.M. and Shur V.Ya., *Micro-Raman Visualization of Domain Structure in Strontium Barium Niobate Single Crystals*, **FERROELECTRICS** 439 (1), 33-39 (2012).

10. Smirnova A.N., Mushinskiy S.S., Baturin I.S., Azanova I.S., Shevtsov D.I., Akhmatkhanov A.R., **Ievlev A.V.** and Shur V.Ya., *Electric Field Poling of Lithium Niobate Crystals after Proton-Exchanged Channel Waveguide Fabrication* **FERROELECTRICS** 441, 9-16 (2012).

9. Shur V.Ya. Shikhova V.A., **Ievlev A.V.**, Zelenovskiy P.S., Neradovskiy M.M., Pelegov D.V. and Ivleva L.I., *Nanodomain structures formation during polarization reversal in uniform electric field in strontium barium niobate single crystals*, **JOURNAL OF APPLIED PHYSICS** 112 (6), 064117 (2012).

8. Shur V.Ya., Alikin D.O., **Ievlev A.V.**, Dolbilov M.A., Sarmanova M.F. and Gavrilov N.V., *Formation of nanodomain structures during polarization reversal in congruent lithium niobate implanted with Ar ions* **IEEE TRANSACTIONS ON ULTRASONICS**, ferroelectrics, and frequency control 59 (9), 1934-41 (2012).

7**.** Shur V.Ya., Shikhova V.A, Pelegov D.V., **Ievlev A.V.** and Ivleva L.I., *Formation of nanodomain ensembles during polarization reversal in Sr0.61Ba0.39Nb2O6: Ce single crystals*, **PHYSICS OF THE SOLID STATE**, 53 (11), 2311-2315 (2011).

6. Shur V.Ya., Kuznetsov D.K., Mingaliev E.A., Yakunina E.M., Lobov A.I. and **Ievlev A.V.**, *In situ investigation of formation of self-assembled nanodomain structure in lithium niobate after pulse laser irradiation*, **APPLIED PHYSICS LETTERS** 99 (8), 082901 (2011).

5. Shur V.Ya., **Ievlev A.V.**, Nikolaeva E.V., Shishkin E.I. and Neradovskiy M.M., *Influence of adsorbed surface layer on domain growth in the field produced by conductive tip of scanning probe microscope in lithium niobate*, **JOURNAL OF APPLIED PHYSICS** 110 (5), 052017 (2011).

4. Shur V.Ya., Zelenovskiy P.S., Nebogatikov M.S., Alikin D.O., Sarmanova M.F., **Ievlev A.V.**, Mingaliev E.A. and Kuznetsov D.K., *Investigation of the nanodomain structure formation by piezoelectric force microscopy and Raman confocal microscopy in LiNbO3 and LiTaO3 crystals*, **JOURNAL OF APPLIED PHYSICS** 110 (5), 052013 (2011).

3. Alikin D.O., Shishkin E.I., Nikolaeva E.V., Shur V.Ya., Sarmanova M.F., **Ievlev A.V.**, Nebogatikov M.S. and Gavrilov N.V., *Formation of Self-Assembled Domain Structures in Lithium Niobate Modified by Ar Ions Implantation*, **FERROELECTRICS** 399 (1), 35-42 (2010).

2. **Ievlev A.V.**, Nikolaeva E.V., Shishkin E.I. and Shur V.Ya. Shape of Local *Hysteresis Loops Measured by Means of Piezoresponse Force Microscopy*, **FERROELECTRICS** 398 (1), 26-33 (2010)

1. Shishkin E.I., **Ievlev A.V.**, Nikolaeva E.V., Nebogatikov M.S. and Shur V.Ya., *Local Study of Polarization Reversal Kinetics in Ferroelectric Crystals Using Scanning Probe Microscopy* **FERROELECTRICS** 374 (1), 26-32 (2008).

Participation in international meetings and conferences (9 oral and 7 poster presentations):

- **MRS Fall Meeting 2015, Boston**
    - **Talk** "A Quantitative Description of Crystal Nucleation and Growth from In situ Liquid Scanning Transmission Electron Microscopy"
    - **Talk** "Advanced Mathematical Techniques for Investigation of the Tip-induced Ferroelectric Switching"

- **Microscopy & Microanalysis 2015, Portland**
  - **Poster sessions** "Quantitative analysis of nucleation and growth behavior from in situ liquid cell studies"
- **MRS Spring Meeting 2015, San Francisco**
  - **Talk** "Neural network based investigations of the tip-induced ferroelectric switching"
  - **Poster session** "Symmetry braking during tip-induced polarization switching at non-polar cuts of the lithium niobate single-crystals"
- **MRS Fall Meeting 2014, Boston**
  - **Talk** "Unexpected dynamics of the tip-induced polarization reversal in lithium niobate single crystals"
  - **Poster session** "Tip-induced domain growth on the non-polar cuts of the lithium niobate single-crystals"
- **2014 Joint IEEE ISAF-IWATMD-PFM**
  - **Talk** "Humidity effects on tip-induced polarization switching in lithium niobate"
  - **Talk** "Long-range domain-domain interaction during tip-induced ferroelectric domain switching"
- **MRS Spring Meeting 2014, Boston**
  - **Poster session** "Intermittency, quasiperiodicity, and chaos in tip-induced ferroelectric domain switching"
- **2012 ISFD-11-RCBJSF, Ekaterinburg, Russia**
  - **Talk** "Study of wall shape change and discrete switching in vicinity of 180^o domain wall by scanning probe microscopy"
- **2012 Joint IEEE ISAF-IWATMD-PFM Aveiro, Portugal**
  - **Talk** "Local change of the wall shape and discrete switchingin the vicinity of 180^o domain wall"
- **EMF 2011, Borauex, France**
  - **Talk** "Influence of Adsorbed Surface Layer Conductivity on Single Domain Growth in Electric Field Produced by Tip of Scanning Probe Microscope"
- **2010 ISFD-10, Prague, Czech Republic**
  - **Poster session** "Influence of Adsorbed Surface Layers on Polarization Reversal by Electric Field Produced by Conductive Tip of Scanning Probe Microscope"
- **2009 ISDS'09, Ekaterinburg, Russia**
  - **Poster session** "Local Hysteresis Measurements by Piezoresponse Force Microscopy: Methodical Improvements and New Achievements"
- **2007 ISDS'07, Ekaterinburg, Russia**
  - **Poster session** "Local Study of Polarization Reversal Kinetics in Ferroelectric Crystals and Thin Films using Scanning Probe Microscopy"

Professional References:

1. **Sergei V. Kalinin**
   Director, Institute for Functional Imaging of Materials, Oak Ridge National Laboratory

Email: sergei2@ornl.gov; Phone: (865) 241-0236

2. **Alexander Tagantsev**
   Professor, Swiss Federal Institute of Technology (EPFL)
   Email: alexander.tagantsev@epfl.ch; Phone: +41-21-69-34886
3. **Lane W. Martin**
   Associate Professor, University of California, Berkeley
   Email: lwmartin@berkeley.edu; Phone: (217) 244-9162

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