Qingteng Zhang ORCID: 0000-0002-1600-2161

Education and Research Experience:

- Postdoctoral Fellow, 2015/05 – Present
  Advanced Photon Source, Argonne National Laboratory
  - ❖ Arrest of fast diffusive dynamics of colloidal nanoparticle suspensions during quench-induced gelation:
    Phys. Rev. Lett. 119, 178006 (2017) 1st author
  - ❖ Spontaneous fluctuations of ferroelectric nanodomains in epitaxial atomic layers:
    Phys. Rev. Lett. 118, 097601 (2017) 1st author
  - ❖ Characterization, commissioning and application of high frame rate pixel array x-ray photon correlation spectroscopy detectors:
    J. Synchrotron Rad. 25, 1408 (2018) 1st author
    J. Synchrotron Rad. 63, 679 (2016) 1st author
    Opt. Express 24, 355 (2016) 5th author
  - ❖ 3-D recovery of disordered nanoscale features from single 2-D Bragg projection measurements (simulation):
    Phys. Rev. A 94, 043803 (2016) 2nd author

- Postdoctoral Fellow, 2012/10 – 2015/05
  Department of Material Sciences and Engineering, University of Wisconsin – Madison
  - ❖ Unusual seconds-long photoinduced transformation in ferroelectric nanodomains:
    Phys. Rev. Lett. 119, 057601 (2017) 5th author
  - ❖ Sub-ns lattice relaxation in epitaxial ferroelectric thin films under ps optical excitations:
    Rev. Sci. Instrum. 86, 083904 (2015) 2nd author
  - ❖ Nanodomain alignment in 300 nm FIB-etched objects on a ferroelectric superlattice:
    Nanoscale, 10, 3262 (2018) 3rd author

- Ph.D., 2009/08 – 2012/10
  Department of Physics, University of South Florida
  - ❖ First-principle-based molecular dynamics (MD) study of damped oscillatory ferroelectric nanodomain dynamics driven by THz electric field:
    Phys. Rev. Lett. 107, 177601 (2011) 1st author
  - ❖ First-principle-based MD study of formation of unusual low symmetry phase in temperature-graded ferroelectrics:
    Phys. Rev. Lett. 105, 147602 (2010) 1st author

- B. Eng., 2005/09 – 2009/07
  Department of Electrical Engineering, Xi'an Jiaotong University, China
  - ❖ Thesis: Fabrication of zinc oxide nanowires using a solution-based method.

Qingteng Zhang ORCID: 0000-0002-1600-2161

Awards:

- 2018 Argonne Postdoctoral Performance Award

Invited Talks:

10. "Microsecond-to-second-resolved Mesoscale Dynamics Studied with X-ray Photon Correlation Spectroscopy", *Division of Chemical Sciences and Engineering, Argonne National Laboratory*, United States (2018)
9. "Thermal Fluctuations of Ferroelectric Nanodomains with Wide-angle XPCS", *2018 International Workshop on Phase Retrieval and Coherent Scattering*, United States (2018)
8. "Quantum Ordering and Mesoscale Dynamics Unraveled by Coherent X-ray Beams", *Center of Nanomaterials, Argonne National Laboratory*, United States (2018)
7. "Nanoscale sub-ps Dynamics in Electronic Structures: Optical Pump - Coherent X-ray Microprobe", *SwissFEL*, Switzerland (2018)
6. "From Bragg XPCS to Bragg Ptychography: Dynamics and Structures of Electronic Orderings in Thin Atomic Layers", *Diamond Light Source*, Oxfordshire, United Kingdom (2017)
5. "Time-Resolved Mesoscale Dynamics Studieds with Coherent X-ray Scattering", *Cornell High Energy Synchrotron Source (CHESS), Cornell University*, United States (2017)
4. "Universal Scaling of Quench-Dependent Dynamics in Intermediate Concentration Colloidal Gels with 20 Microsecond Small Angle XPCS", *Advanced Photon Source, Argonne National Laboratory*, United States (2017)
3. "Time-Resolved Mesoscale Dynamics Studied with Coherent X-ray Scattering", *Sirius, Brazilian Synchrotron Light Laboratory*, Brazil (2017)
2. "Structure and Dynamics of Nanodomains in Ferroelectric/Dielectric Superlattices", *Advanced Photon Source, Argonne National Laboratory*, United States (2015)
1. "Spatial Topology and Switching Dynamics of Nanodomains in Ferroelectric/Dielectric Superlattices", *National Synchrotron Light Source II, Brookhaven National Laboratory*, United States (2013)

Ad Hoc Reviewing:

Scientific Reports
Applied Physics Letters
Journal of Applied Physics
Review of Scientific Instruments
Journal of Synchrotron Radiation
Journal of Computational Electronics
Measurement Science and Technology
IUCrJ

Qingteng Zhang ORCID: 0000-0002-1600-2161

Publications:

18. **Q. Zhang**, Eric M. Dufresne, Suresh Narayanan, Piotr Maj, Anna Koziol, Robert Szczygiel, Pawel Grybos, Alec R. Sandy,
"Sub-microsecond-Resolved Multi-Speckle X-ray Photon Correlation Spectroscopy with a Pixel Array Detector", Journal of Synchrotron Radiation, **25**, 1408 (2018)

17. **Q. Zhang**, Eric M. Dufresne, Alec R. Sandy,
"Dynamics in hard condensed matter probed by X-ray photon correlation spectroscopy: Present and beyond", Current Opinion in Solid State & Materials Science, **22**, 202 (2018)

16: A. Sandy, **Q. Zhang**, L. Lurio,
"Hard X-Ray Photon Correlation Spectroscopy Methods for Materials Studies",
Annual Review of Materials Research, **48**, 167 (2018)

15: J. Park, J. Mangeri, **Q. Zhang**, M. H. Yusuf, A. Pateras, M. Dawber, M. V. Holt, O. G. Heinonen, S. Nakhmanson, P. G. Evans,
"Domain Alignment within Ferroelectric/Dielectric $PbTiO_3/SrTiO_3$ Superlattice Nanostructures",
Nanoscale, **10**, 3262 (2018)

14: P. Vodnala, N. Karunaratne, L. Lurio, G. M. Thurston, M. Vega, E. Gaillard, S. Narayanan, A. Sandy, **Q. Zhang**, E. M. Dufresne, G. Foffi, P. Grybos, P. Kmon, P. Maj, and R. Szczygiel,
"Hard-sphere-like dynamics in highly concentrated alpha-crystallin suspensions",
Physical Review E (Rapid), **97**, 020601(2018)

13: **Q. Zhang**, D. Bahadur, E.M. Dufresne, P. Grybos, P. Kmon, R.L. Leheny, P. Maj, S. Narayanan, R. Szczygiel, S. Ramakrishnan, A.R. Sandy,
"Dynamic Scaling of Quench-Dependent Dynamics in Intermediate Concentration Colloidal Gels",
Physical Review Letters, 119, 178006 (2017)
Nanoparticle Gel Formation Revealed, Nanowerk Nanotechnology News, 12/21/2017
New Insight on Nanoparticle Colloidal Gel Formation, Cosmetic Design USA, 01/04/2018
Advanced Photon Source Research Highlight, Advanced Photon Source, 12/18/2017

12: Y. Ahn, J. Park, A. Pateras, M.B. Rich, **Q. Zhang**, P. Chen, M.H. Yusuf, H. Wen, M. Dawber, P.G. Evans,
"Photoinduced Domain Pattern Transformation in Ferroelectric-Dielectric Superlattices",
Physical Review Letters, 119, 057601 (2017)

11: **Q. Zhang**, E.M. Dufresne, P. Chen, J. Park, M.P. Cosgriff, M. Yusuf, Y. Dong, D.D. Fong, H. Zhou, Z. Cai, R. Harder, S.J. Callori, M. Dawber, P.G. Evans, A.R. Sandy,
"Thermal Fluctuations of Ferroelectric Nanodomains in a Ferroelectric/Dielectric $PbTiO_3/SrTiO_3$ Superlattice",
Physical Review Letters, 118, 097601 (2017)
Advanced Photon Source Research Highlight, 12/05/2017

10: S. Hruszkewycz, **Q. Zhang**, M.V. Holt, M.J. Highland, P.G. Evans, P.H.Fuoss,
"Structural Sensitivity of X-ray Bragg Projection Ptychography to Domain Patterns in Epitaxial Thin Films",
Physical Review A, 94, 043803 (2016)

9: **Q, Zhang**, E.M. Dufresne, P. Grybos, P. Kmon, P. Maj, S. Narayanan, G.W. Deptuch, R. Szczygiel, A. Sandy,
"Submillisecond X-ray Photon Correlation Spectroscopy from a Pixel Array Detector with Fast Dual Gating and No Readout Dead-Time",

Journal of Synchrotron Radiation, 63, 679 (2016)

8: E.M. Dufresne, S. Narayanan, A.R. Sandy, D.M. Kline, **Q. Zhang**, E.C. Landahl, S. Ross, "Pushing X-ray Photon Correlation Spectroscopy Beyond the Continuous Frame Rate Limit", Optics Express, 24, 355 (2016)

7: Y. Zhu, Z. Cai, P. Chen, **Q. Zhang**, M.J. Highland, I.W. Jung, D.A Walko, E.M. Dufresne, J. Jeong, M.G. Samant, S.S.P. Parkin, J.W. Freeland, P.G. Evans, H. Wen, "Mesoscopic Structural Phase Progression in Photo-Excited VO2 Revealed by Time-Resolved X-ray Diffraction Microscopy", Scientific Reports, 6, 21999 (2016)

6: J. Park, **Q. Zhang**, P. Chen, M.P Cosgriff, J.A Tilka, C. Adamo, D.G. Schlom, H. Wen, Y. Zhu, P.G. Evans, "Spatially Confined low-power optically pumped ultrafast synchrotron x-ray nanodiffraction", Review of Scientific Instruments, 86, 083904 (2015)

5: Y. Li, C. Adamo, P. Chen, P.G. Evans, S.M. Nakhmanson, W. Parker, C.E. Rowland, R.D. Schaller, D.G. Schlom, D.A. Walko, H. Wen, **Q. Zhang,** "Giant Optical Enhancement of Strain Gradient in Ferroelectric BiFeO3 Thin Films and Its Physical Origin", Scientific Reports, 5, 16650 (2015)

4: **Q. Zhang** and I. Ponomareva, "Depolarizing Field in Temperature-Graded Ferroelectrics from Atomistic Viewpoint", New Journal of Physics, 15, 043022 (2013)

3: P. Chen, M.P. Cosgriff, **Q. Zhang**, S.J. Callori, B.W. Adams, E.M. Dufresne, M. Dawber, and P.G. Evans, "Field-Dependent Domain Distortion and Interlayer Polarization Distribution in PbTiO3/SrTiO3 Superlattices", Physical Review Letters, 110, 047601 (2013)

2: **Q. Zhang**, R. Herchig, and I. Ponomareva "Nanodynamics of Ferroelectric Ultrathin Films", Physical Review Letters, 107, 177601 (2011)

1: **Q. Zhang** and I. Ponomareva, "Microscopic Insight into Temperature-Graded Ferroelectrics", Physical Review Letters, 105, 147602 (2010)

Conferences:

21: "Dynamic Scaling during Colloidal Gel Formation (Poster)", *2017 Gordon Research Conference: X-ray Sciences*, Easton, MA;

20: "Ferroelectric domain alignment in $PbTiO_3/SrTiO_3$ superlattice nanostructures (Talk)", *2017 American Physics Society March Meeting*, New Orleans, LA;

19: "Photoinduced Nanodomain Pattern Transformation in Ferroelectric/Dielectric Superlattice Heterostructure (Talk)", *2017 American Physics Society March Meeting*, New Orleans, LA;

18: "Gelation of Polymer-grafted SiO2 Nanoparticle Colloid Studied with 20 μs X-ray Photon Correlation (Talk)",
2017 American Physics Society March Meeting, New Orleans, LA;

17: "Gelation of Polymer-grafted Silica Nanoparticle Colloid Studied with Sub-100 μs X-ray Photon Correlation Spectroscopy (Poster)",
2016 Advanced Photon Source Users Meeting, Lemont, IL;

16: "Ferroelectric Striped Nanodomains in $PbTiO_3/SrTiO_3$ Superlattice Islands (Talk)",
2015 American Physics Society March Meeting, San Antonio, TX;

15: "Time resolved hard X-ray nano-diffraction study on the long-lived strain in $BiFeO_3$ induced by optical transient grating (Talk)",
2015 American Physics Society March Meeting, San Antonio, TX;

14: "Control of Striped Ferroelectric Nanodomains in Isolated $PbTiO_3/SrTiO_3$ Superlattice Islands (Poster)",
2014 First Imaging Initiative Workshop: Tomography and Ptychography, Lemont, IL;

13: "Equilibrium Dynamics of Striped Ferroelectric Nanodomains in $PbTiO_3/SrTiO_3$ Superlattices (Talk)",
2014 International Workshop on Phase Retrieval and Coherent Scattering, Northwestern University, Chicago, IL;

12: "Transient grating-induced phase inhomogeneity in FeRh studied by time-resolved hard x-ray nanodiffraction (Talk)",
2014 American Physics Society March Meeting, Denver, CO;

11: "Spatial Variation and Temporal Fluctuation of Domains at Equilibrium in $PbTiO_3/SrTiO_3$ Superlattice (Talk)",
2014 American Physics Society March Meeting, Denver, CO;

10: "Thermal Fluctuation and Field-induced Pinning of Serpentine Striped Domains in a $PbTiO_3/SrTiO_3$ Superlattice (Talk)",
2014 Fundamental Physics of Ferroelectrics and Related Materials, Washington, MD;

9: "Coherent X-ray Scattering from Striped Serpentine Nanodomains in a Ferroelectric/Dielectric Superlattice (Talk)",
2013 Material Research Society Fall Meeting, Boston, MA;

8: "Coherent X-ray Diffraction from Striped Nanodomain in a $PbTiO_3/SrTiO_3$ Superlattice (Talk)",
2013 American Physics Society March Meeting, Baltimore, MD;

7: "Component-Layer-Dependent Distortion of Striped Domains in $PbTiO_3/SrTiO_3$ Superlattices (Talk)",
2013 American Physics Society March Meeting, Baltimore, MD;

6: "Film-Thickness Dependence of the Relaxation of the Ultrafast Photo-induced Strain in $BiFeO_3$ (Talk)",
2013 Fundamental Physics of Ferroelectrics and Related Materials, Ames, IA;

5: "Dynamics of Nanowalls in Ferroelectric Ultrathin Films (Talk)",
2012 American Physics Society March Meeting, Boston, MA;

4: "Domain Wall Dynamics of Ferroelectric Ultrathin Films (Talk)",
2012 Fundamental Physics of Ferroelectrics and Related Materials, Lemont, IL;

3: "Nanodynamics of Ferroelectric Ultrathin Films (Talk)",
2011 American Physics Society March Meeting, Dallas, TX;

2: "Study of Temperature-Graded Ferroelectrics Using First-Principle-Based Approaches (Talk)",
2011 American Physics Society March Meeting, Dallas, TX;

1: "Polarization Response to Temperature Gradient in Perovskite Ferroelectrics Using First-principle-based Method (Poster)",
2011 Fundamental Physics of Ferroelectrics and Related Materials, Gaithersburg, MD.

References:

- Alec R. Sandy
  Physicist,
  X-Ray Science Division, Argonne National Laboratory
  Tel: 630-252-0281
  Email: asandy@anl.gov

- Suresh Narayanan
  Physicist,
  X-Ray Science Division, Argonne National Laboratory
  Email: sureshn@anl.gov

- Paul G. Evans
  Professor
  Department of Material Sciences and Engineering, University of Wisconsin - Madison
  Tel: 608-265-6773
  Email: pgevans@wisc.edu