

Eric C. O'Quinn, PhD

Personal

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Professional

Postdoctoral Research Associate
University of Tennessee
Knoxville, Tennessee, USA

Graduate Research Fellow
Oak Ridge National Laboratory
Oak Ridge, Tennessee, USA

Education

Ph.D., Nuclear Engineering
University of Tennessee
Knoxville, Tennessee, USA

B.Sc., Physics
Louisiana State University
Baton Rouge, Louisiana, USA

Research

Grant: *Far-from-Equilibrium Processing of Materials Under Extreme Conditions*
Department of Energy, Basic Energy Sciences
PI: Dr. Maik Lang

Dissertation: *Characterizing Heterogeneous Disorder in Complex Oxides*
University of Tennessee, Graduate Research
Advisor: Dr. Maik Lang
Department of Energy Office of Science Graduate Student Research (SCGSR) Fellowship
Advisor: Dr. Matthew Tucker

Publications (g-index = 15, h-index = 9)

22. Min Niu; K. Jayanthi; Hongfei Gao; Alexandre P. Solomon; **Eric C. O'Quinn**; Lei Su; Yuanbin Qin; Maria Eugenia Toimil-Molares; Maik Lang; Alexandra Navrotsky, *Structural and thermodynamic evolution of an amorphous SiOC ceramic after swift heavy ion irradiation* (2022) in review with *Acta Materialia*
21. Hirtz, John; **O'Quinn, Eric**; Gussev, Igor; Neuefeind, Joerg; Lang, Maik, *Cation Short Range Ordering of $MgAl_2O_4$ and $NiAl_2O_4$ Spinel Oxides at High Temperature* (2022) in review with *Inorganic Chemistry*
20. Donald Z. Chaney, John Hirtz, Evan Williams, Jacob Minnette, William F. Cureton, **Eric C. O'Quinn**, Xiaodong Zhao, Xiaofeng Guo, Takahiro Matsuoka, Michael Koehler, David Sprouster, and Maik Lang, *Grain size dependence of thermally-induced oxidation in ZrC* (2022) in review



2020-present

2018-2019

2015-2019

2007-2011

19. Cale Carlton Overstreet, Jacob Cooper, **Eric C. O'Quinn**, William Cureton, Raul Palomares, Julia Leys, Guido Deissmann, Stefan Neumeier, Chien-Hung Chen, Maik Lang, *Structural stability of REE-PO₄ (REE=Sm,Tb) under swift heavy ion irradiation*, under review with *Nuclear Inst. and Methods in Physics Research, B* (2022).
18. D. Drey, **Eric C. O'Quinn**, S. Finkeldei, J. Neuefeind, M. Lang, Local Ordering in Disordered Nd Zr₁-O₂-0.5 Pyrochlore as Observed using Neutron Total Scattering, *Acta Mater.* 225 (2021) 117590.
17. **Eric C. O'Quinn**, Devon L. Drey, Antonio F. Fuentes, Maik K. Lang, *Defining the Structural Stability Field of Disordered Fluorite Oxides*. *Frontiers in Chemistr* (2021)
16. **Eric C. O'Quinn**, Cameron L. Tracy, William F. Cureton, Ritesh Sachan, Joerg C. Neuefeind, Christina Trautmann, Maik K. Lang, *Multi-scale Investigation of Heterogeneous Swift Heavy Ion Tracks in Stannate Pyrochlore*. *Journal of Materials Chemistry A* (2021)
15. Alexandre Solomon, Cameron Tracy, **Eric C. O'Quinn**, Maik Lang, and Daniel Severin, *Transformations to Amorphous and X-type Phases in Swift Heavy Ion-Irradiated Ln₂O₃ and Mn₂O₃*. *Journal of Applied Physics* (2021)
14. Roman Sherrod, **Eric C. O'Quinn**, Igor M. Gussev, Cale Overstreet, Joerg Neuefeind, Maik Lang, *Comparison of Short-Range Order in Irradiated Dysprosium Titanates*. *Nature Materials Degredation.*, (2021)
13. Mingyang Zhao, **Eric C. O'Quinn**, Nancy Birkner, Yun Xu, Maik Lang, Kyle Brinkman, *Radiation damage and thermal annealing in tunnel structured hollandite materials*. *Acta Mater.*, (2020)
12. Devon L. Drey, **Eric C. O'Quinn**, Tamilarasan Subramani, Kristina Lilova, Gianguido Baldinozzi, Igor M. Gussev, Antonio F. Fuentes, Joerg Neuefeind, Michelle Everett, David Sprouster, Alexandra Navrotsky, Maik Lang, *Disorder in Ho₂Ti_{2-x}Zr_xO₇: Pyrochlore to Defect Fluorite Solid Solution Series*. *RSC Advances*, (2020)
11. Igor M. Gussev, **Eric C. O'Quinn**, Gianguido Baldinozzi, Jörg Neuefeind, Rodney C. Ewing, and Maik Lang, *Determination of local orthorhombic order of weberite-type Y₃TaO₇ using neutron total scattering and density functional theory calculation techniques*. *Acta Materialia*, (2020)
10. M. Lang, **E. C. O'Quinn**, J. Neuefeind, and C. Trautmann, *Characterization of Radiation Effects and Ion Tracks with Spallation Neutron Probes*. *Nucl. Phys. News* **30**, 16 (2020).
9. **E. C. O'Quinn**, K.E. Sickafus, R.C. Ewing, G. Baldinozzi, J.C. Neuefeind, M.G. Tucker, A.F. Fuentes, D. Drey, and M.K. Lang, *Predicting Short-Range Order and Correlated Phenomena in Disordered Crystalline Materials*. *Science Advances*, **6**, 1 (2020).
8. Chung, C.-K.; **O'Quinn, E. C.**; Neuefeind, J. C.; Fuentes, A. F.; Xu, H.; Lang, M.; Navrotsky, A. *Thermodynamic and Structural Evolution of Mechanically Milled and Swift Heavy Ion Irradiated Er₂Ti₂O₇ Pyrochlore*. *Acta Mater.* **2019**.
7. W.F. Cureton, R.I. Palomares, C.L. Tracy, **E. C. O'Quinn**, J. Walters, M. Zdorovets, R.C. Ewing, M. Lang, *Effects of Irradiation Temperature on the Response of CeO₂, ThO₂, and UO₂ to Highly Ionizing Radiation*. *Acta Mater.* (2019).

6. **E. C. O'Quinn**, J. L. Bishop, R. Sherrod, J. Neuefeind, M. Sagrario, A. F. Fuentes, M. Lang, *Advanced Characterization Technique for Mechanochemically Synthesized Materials: Neutron Total Scattering Analysis*. *J. Mater. Sci.* (2018).
5. Lang, M. **O'Quinn, E.C.**, Shamblin J., Neuefeind, J., *Advanced Experimental Technique for Radiation Damage Effects in Nuclear Waste Forms: Neutron Total Scattering Analysis*. MRS Advances. (In Press)
4. Park, S.; Rittman, D. R.; Tracy, C. L.; Chapman, K. W.; Zhang, F.; Park, C.; Tkachev, S. N.; **O'Quinn, E.**; Shamblin, J.; Lang, M.; Mao, W. L.; Ewing, R. C. *A₂TiO₅ (A = Dy, Gd, Er, Yb) at High Pressure*. *Inorg. Chem.* (2018)
3. Shamblin, J., Tracy C., Palomares, R.I., **O'Quinn, E.C.**, Ewing, R.C., Neuefeind, J., Feygenson, M., Behrens, J., Trautmann, C., Lang. M., *Similar local order in disordered fluorite and aperiodic pyrochlore structures*. *Acta Mater.* 144, 60–67 (2018).
2. Chung, C.K., Shamblin, J., **O'Quinn, E. C.**, Shelyug, A., Gussev, I., Lang, M., Navrotsky, A., *Thermodynamic and Structural Evolution of Dy₂Ti₂O₇ Pyrochlore after Swift Heavy Ion Irradiation*. *Acta Mater.* 145:1–26 (2017)
1. **O'Quinn, E. C.**, Shamblin, J.; Perlov, B.; Ewing, R. C.; Neuefeind, J.; Feygenson, M.; Gussev, I.; Lang, M., *Inversion in Mg_{1-x}Ni_xAl₂O₄ Spinel: New Insight into Local Structure*. *J. Am. Chem. Soc.* 139, 10395–10402 (2017).

Presentations

Characterization of Disordered Oxides with Neutron Total Scattering

October 2022

Eric O'Quinn

Materials Science & Technology 2022, Pittsburgh, Pennsylvania, USA. (**Invited** Talk)

Far-From-Equilibrium Processing of Materials with Swift Heavy Ions and Mechanical Milling October 2022

Eric O'Quinn

Materials Science & Technology 2022, Pittsburgh, Pennsylvania, USA. (Talk)

Probing Short-Range Order in Disordered Crystalline Materials for Extreme Environments October 2022

Eric O'Quinn

Materials Science & Technology 2022, Pittsburgh, Pennsylvania, USA. (Talk)

Far-from-Equilibrium Processing of Materials Under Extreme Conditions

August 2022

Eric O'Quinn and Maik Lang

Condensed Matter Division of the European Physical Society, Manchester, United Kingdom. (**Invited** Talk)

Multi-scale investigation of heterogeneous swift heavy ion tracks in pyrochlore oxides

June 2022

Eric C. O'Quinn, Cameron L. Tracy, William F. Cureton, Ritesh Sachan, Joerg C. Neuefeind, Christina Trautmann, Alexandre Solomon, and Maik K. Lang

Swift Heavy Ions in Materials 2022, Helsinki, Finland. (Talk)

Far-from-Equilibrium Processing of Materials Under Extreme Conditions

October 2021

Eric O'Quinn, Alexandre Solomon, Casey Corbridge, Antonio Fuentes, Maik Lang

Materials Science & Technology 2021, Columbus, Ohio, USA. (**Invited** Talk)

Multi-scale structural response of pyrochlore oxides to far-from-equilibrium conditions December 2020
 Eric O'Quinn, Devon Drey, Antonio Fuentes, Gianguido Baldinozzi, Maik Lang
 MRS Fall Meeting 2020, Boston, USA (**"Hot Topic"** Talk)

Characterizing Disordered Crystalline Materials with Pauling's Rules November 2020
 Eric O'Quinn, Kurt Sickafus, Rodney Ewing, Gianguido Baldinozzi,
 Joerg Neuefeind, Matthew Tucker, Antonio Fuentes, Devon Drey, Maik Lang
 Materials Science & Technology 2020, Pittsburgh, Pennsylvania, USA. (**Invited** Talk)

Neutron Total Scattering Analysis of Materials Prepared by Far-From Equilibrium Methods October 2019
 Eric C. O'Quinn, J. Neuefeind, A. Fuentes, M. Tucker, M. Lang
 Materials Science & Technology 2019, Portland, Oregon, USA. (Talk)

The nature of amorphization and recrystallization in irradiated complex oxides October 2018
 Eric C. O'Quinn, W. Cureton, C-K. Chung, J. Neuefeind, A. Navrotsky, M. Lang
 Nuclear Materials Conference 2018, Seattle, Washington, USA. (Poster)

Characterizing Radiation Effects with Neutron Total Scattering July 2018
 Eric C. O'Quinn, R.I. Palomares, W. Cureton, C.L. Tracy, J. Neuefeind, C. Trautmann, R.C. Ewing, and
 M. Lang
 Swift Heavy Ions in Materials 2018, Caen, France. (Talk)

Short-range Ordering in Spinel Oxides April 2018
 Eric O'Quinn, Jacob Shamblin, Brandon Perlov, R.C. Ewing, Joerg Neuefeind, Igor Gussev, Maik Lang
 MRS Spring Meeting 2018, Phoenix, USA (Talk)

Radiation-Induced Correlated Disorder and its Impact on Ionic Conductivity August 2017
 Eric O'Quinn, Jacob Shamblin, C.K. Chung, C. Trautmann, Joerg Neuefeind,
 A. Navrotsky, Maik Lang
 2017 Joint Nanoscience and Neutron Scattering User Meeting, Oak Ridge, USA. (Poster)

Radiation-Induced Correlated Disorder and its Impact on Ionic Conductivity July 2017
 Eric O'Quinn, Jacob Shamblin, Joerg Neuefeind, Maik Lang
 Radiation Effects in Insulators 2017, Versailles, France. (Poster)
 Awarded Best Poster Presentation

Characterizing Disorder in Titanate Pyrochlores November 2016
 Eric O'Quinn, Jacob Shamblin, Maik Lang
 Materials Science of Actinides – Energy Frontier Research Center 2016, South Bend, USA. (Talk)

Characterizing Mechanically Milled Pyrochlores with Neutron Total Scattering October 2016
 Eric O'Quinn, Jacob Shamblin, Antonio Fuentes, Maik Lang
 Materials Science & Technology 2016, Salt Lake City, USA. (Poster)

Grants, Honors & Awards

Outstanding Ph.D. Student 2019
 Nuclear Engineering Department – University of Tennessee

Graduate Student Research (SCGSR) Fellowship 2018
 Department of Energy Office of Science

US School on Total Scattering Analysis Participant Oak Ridge National Laboratory	2017
National School on Neutron & X-ray Scattering Participant Argonne National Laboratory and Oak Ridge National Laboratory	2016
Summer Graduate Research Assistantship Fund Recipient University of Tennessee Office of Research and Engagement	2016

Graduate Coursework

Nuclear Cross Section Modeling - NE 640
 Fundamentals of Radiation Damage in Materials - NE 540
 Radiological Assessment and Dosimetry - NE 552
 Radiation Protection - NE 551
 Broadband Dielectric Spectroscopy – CBE 691
 Solid State Physics/Structure of Matter - PHYS 555
 Fundamentals of Materials Science and Engineering - MSE 511
 Particle Accelerators: Technology and Applications - NE 588
 Isotope Production – NE 597
 Nuclear Security Science and Analysis - NE 530
 Global Nuclear Security Culture - NE 531
 Application of Linear Algebra in Engineering Systems - NE 529
 Principles of Health Physics - NE 433
 Medical Physics – NE 567
 Radiation Biology - NE 490
 Nuclear Reactor Theory - NE 470
 Nuclear Fuel Cycle - NE 404

Teaching Assistant

Principles of Health Physics (substitute lecturer) - NE 433 University of Tennessee	Fall 2017, Spring 2018
Nuclear Reactor Theory - NE 470 University of Tennessee	Spring 2016
Introduction to Nuclear & Radiological Engineering - NE 200 University of Tennessee	Fall 2015

Professional Memberships

American Nuclear Society (ANS)
 Alpha Nu Sigma Honor Society
 American Physical Society (APS)