

Curriculum Vitae of John Bonini

john@rbonini.science
<https://github.com/jrbp>

RESEARCH INTERESTS

Application and development of computational and data-driven techniques to facilitate the discovery and understanding of functional materials, including ferroelectrics, piezoelectrics, topological insulators and semimetals as bulk, thin films, and heterostructures.

EDUCATION

2013- **PhD. in Physics** (expected 2020)
Rutgers University, Condensed Matter Theory
Advisor: Karin Rabe

2009-2013 **B.S. in Physics**
Rowan University, Minor in Mathematics, Minor in Computer Science

ARTICLES

- 2020 “Berry Flux Diagonalization: Application to Electric Polarization”
J. Bonini, D. Vanderbilt, and K. M. Rabe
arXiv:2002.02995 [cond-mat.mtrl-sci]
- 2019 “First-principles bulk-layer model for dielectric and piezoelectric responses in superlattices”
J. Bonini, J. W. Bennett, P. Chandra, and K. M. Rabe
Phys. Rev. B **99**, 104107
- 2011 “Enhanced resonant magnetoelectric coupling in frequency-tunable composite multiferroic bimorph structures”
P. Finkel, J. Bonini, E. Garrity, K. Bussman, J. Gao, J. F. Li, S. E. Lofland, and D. Viehland
Appl. Phys. Lett. **98**, 092905

TALKS

- 2020 “First principles dielectric slab model for dielectric and piezoelectric response in superlattices”

- Fundamental Physics of Ferroelectrics, Tampa, Florida*
- 2019 “Fantastic metastable states and where to find them: A computational search for superlattices with enhanced functional properties”
- APS March Meeting, Boston, Massachusetts*
- “First principles dielectric slab model for dielectric and piezoelectric response in superlattices”
- Symposium of the Laboratory for Surface Modification, Rutgers University*
- “First principles dielectric slab model for dielectric and piezoelectric response in superlattices”
- Fundamental Physics of Ferroelectrics, Tampa, Florida*
- 2018 “First principles dielectric slab model for dielectric and piezoelectric response in superlattices”
- APS March Meeting, Los Angeles, California*
- 2017 “Efficient computation of spontaneous polarization using Wannier center displacements”
- APS March Meeting, New Orleans, Louisiana*
- 2016 “Efficient computation of spontaneous polarization using Wannier center displacements”
- Fundamental Physics of Ferroelectrics, Washington D.C.*
- 2015 “High throughput density functional theory calculations for predicting new ferroelectrics”
- Student Seminars in Physics and Astronomy, Rutgers University*

SCHOOLS/WORKSHOPS ATTENDED

- 2019 Workshop on Recent Developments in Electronic Structure
- University of Illinois at Urbana-Champaign
- Poster: “Computing spontaneous polarization without sampling a switching path”
- 2018 NSF EFRI-2DARE, DMRED-2D & MIP Grantees Meeting
- Pennsylvania State University Materials Research Institute
- 2017 International School on Oxide Electronics
- Institut d’Études Scientifiques Cargèse, France
- Poster: “Efficient computation of spontaneous polarization using Wannier center displacements”
- Workshop on Recent Developments in Electronic Structure

- Princeton University
- 2015 Machine Learning for Materials Science Workshop
University of Maryland
- 2014 Quantum Espresso Workshop
Pennsylvania State University
- 2013 NJSGC Annual Summer Research Conference
Rutgers University
- Poster: “Engineering the interaction between cold dipolar molecules with external fields to produce novel quantum phases”
- 2012 NJSGC Academic Year Fellowship Poster Session
Rutgers University
- Poster: “Design of a system for Elastic, Electric, and Magnetic Properties of Multi-ferroic Devices ”
- STEM Symposium
Rowan University
- Poster: “Design of a system for Elastic, Electric, and Magnetic Properties of Multi-ferroic Devices ”

AWARDS

- 2019 **Best Oral Presentation by student or postdoc (3rd Place)**
Fundamental Physics of Ferroelectrics Workshop
- 2013 **Excellence Fellowship**
Rutgers University
- Medallion for Excellence in Physics**
Rowan University

COMPUTER SKILLS

Python, HPC, Linux, MongoDB, Git, Bash, Fortran, Lisp, C

REFERENCES

Karin Rabe

Board of Governors Professor

Department of Physics and Astronomy, Rutgers University

kmrabe@physics.rutgers.edu

David Vanderbilt

Board of Governors Professor

Department of Physics and Astronomy, Rutgers University

dhv@physics.rutgers.edu

Cyrus Dryer

Assistant Professor

Department of Physics and Astronomy, Stony Brook University

Affiliate Associate Research Scientist

Center for Computational Quantum Physics, Flatiron Institute

cyrus.dreyer@stonybrook.edu