Kiersten Ruisard

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Education

2018 PhD in Physics, University of Maryland, College Park, MD
Dissertation: "Design of a Nonlinear Quasi-Integrable Lattice for Resonance Suppression at the University of Maryland Electron Ring"

2012 BSc in Physics *summa cum laude*, Rutgers University, Piscataway, NJ
Honors thesis: "Design of an Electrostatic Extraction Section for the University of Maryland Electron Ring."

Research interests

Physics of accelerator beams with space charge
Beam loss and halo growth
Nonlinear optics and resonances in rings

Professional Experience

2022- present Accelerator Physicist, Spallation Neutron Source, Oak Ridge National Laboratory
Accelerator Physics Group, Supervisor: Nicholas Evans

2018- 2021 Shull Fellow, Spallation Neutron Source, Oak Ridge National Laboratory
Accelerator Physics Group, Supervisor: Andrei Shishlo

2012-2018 Graduate Research Assistant, Institute for Research in Electronics and Applied Optics, University of Maryland College Park
Nonlinear optics for the University of Maryland Electron Ring, Advisor: Timothy Koeth
Source design for high power ionospheric modification, Advisor: Thomas Antonsen

2011-2012 Research Assistant, Institute for Research in Electronics and Applied Optics, University of Maryland College Park
Extraction section for University of Maryland Electron Ring, Advisor: Timothy Koeth

2010 Research Assistant, International REU in Gravitational Wave Detection, Physics Department, University of Florida, Gainesville
Glitch rejection in automated detection pipeline, Advisor: B.S. Sathyaprakash (Cardiff University)

2011 Independent study, Department of Physics, Rutgers University, NJ
Azimuthally-varying magnetic field design for Rutgers Cyclotron, Advisor: Timothy Koeth

2009-2011 Research Assistant, Department of Physics, Rutgers University, NJ
Galaxy Morphology with Adaptive Optics Imaging, Advisor: Andrew Baker

Teaching

2019,2021-2022,2024 Co-instructor, Fundamentals of Accelerator Physics and Technology, US Particle Accelerator School

2018 Teaching assistant, Classical Mechanics and Electromagnetics, US Particle Accelerator School

2015,2017 Co-instructor, Cyclotrons and Their Design, US Particle Accelerator School

2016-2017 Teaching assistant and co-designer, Accelerator Physics - Building the Maryland 5 MeV Cyclotron, University of Maryland *(Senior capstone course in engineering department)*

2014 Teaching assistant, General Physics: Electrodynamics, Light, Relativity and Modern Physics, University of Maryland Physics Department

Grants, honors & awards

2021 DOE Early Career Research Program Awardee, “Advancing accelerator beam modeling via high-dimensional phase space diagnostics at a high intensity injector test stand”
2014-2017 National Science Foundation Graduate Research Fellow
2013,2017 "Most popular talk" in Departmental Graduate Student Seminar
2016 Student Poster Prize at North American Particle Accelerator Conference
2012-2013 University of Maryland Dean’s Fellowship
2012 Henry Rutgers Scholar Undergraduate Thesis Award *(university-wide competition)*
2011-2012 Barry M. Goldwater Scholarship *(nationally competed merit scholarship)*

Professional Memberships and Service

2023 Early Career Member-at-large, American Physical Society, Division of Physics of Beams

Local Organizing Committee for 2024 International Particle Accelerator Conference (focus on student programs)

Chair, Americas Region Selection Committee for Student Grants for 2023 International Particle Accelerator Conference

2022 Workshop Chair, 5th ICFA Mini-Workshop on Space Charge, Knoxville, TN, Oct. 2022

Publications & Presentations

Refereed Journal Articles

2023 Hoover A., **Ruisard K.**, Aleksandrov A., Zhukov A., Cousineau S. Analysis of a hadron beam in five-dimensional phase space (submitted).

2021 **Ruisard K**, Aleksandrov A. Rapid charge redistribution leading to core hollowing in a high-intensity ion beam. *Phys Rev Accel Beams* 2021;24(1):014201.

2020 Aleksandrov A, Cousineau S, **Ruisard K**, Zhukov A. First measurement of a 2.5 MeV RFQ output emittance with 1 part-per-million dynamic range. *Nucl Instruments Methods Phys Res Sect A* 2021;987:164829.

2020 **Ruisard K**, Aleksandrov A, Cousineau S, Shishlo A, Tzoganis V, Zhukov A. High dimensional characterization of the longitudinal phase space formed in a radio frequency quadrupole. *Phys Rev Accel Beams* 2020;23(12):124201.

2019 **Ruisard K**, Komkov H B, Beaudoin B, Haber I, Matthew D, Koeth T. Single-invariant nonlinear optics for a small electron recirculator. *Phys Rev Accel Beams* 2019;22(4):41601.

Newsletter articles

2023 Ruisard K, Aleksandrov A, Hoover A, Six Dimensional Distributions at the SNS Beam Test Facility. *APS-DPB News 2022*.

2020 Aleksandrov A, Cousineau S, **Ruisard K.** Understanding beam distributions in hadron linacs in the presence of space charge. *J Instrum* 2020; 15(7).

Seminars

2021 "How measuring 6D beam distributions can help control losses in high power accelerators," Accelerator Science Seminar, University of Chicago, May 10, 2021

2021 "More range and more dimensions: Understanding beam distributions at the SNS Beam Test Facility," Fermilab Accelerator Physics and Technology Seminar, March 2, 2021

2018 "Design of nonlinear quasi-integrable optics for resonance suppression at the University of Maryland Electron Ring," John Adams Institute for Accelerator Science Seminar, Oxford University, Feb. 22, 2018

Outreach activities

2023 "The Spallation Neutron Source: powering neutron science at Oak Ridge National Laboratory," SAGE Live, remote, May 13, 2023. recording available

2021 "Connecting into Accelerator Physics," ORISE *Lunch with a Researcher*, remote, Oct. 14, 2021.

Panelist, “What Do Early-Career Physicists Do? A view of the Post-Doc Experience" APS March Meeting, remote, March 15-19

Conference and Workshop Talks

Full citation indicates written proceedings are available.

2022 Ruisard, K., Cousineau, A. A. S., Hoover, A., Zhukov, A. (2022). Observation of current-driven features of 2.5 MeV ion bunch with complete and efficient 5D measurements at the SNS Beam Test Facility," in *Proceedings of LINAC2022*.

Ruisard, K., Hoover, A., Zhukov, A., Ridge, O. (2022). Model/measurement comparison of the transverse phase space distribution of an RFQ-generated bunch at the SNS BTF," in Proceedings of NAPAC2022.

“Exploring Initial Distributions at the Beam Test Facility,” 5th ICFA mini-workshop on Space Charge, Knoxville, TN

2021 "Beyond RMS: Understanding the Evolution of Beam Distributions in High Intensity Linacs," in *Proceedings of IPAC2021*, remote, May 24-28 2021. **Invited Speaker**

"The implications and challenges of representing the 6D distribution of high charge bunches," 2021 APS April Meeting, remote

"6D measurements at an RFQ test stand," ARIES Workshop on Experiences during Hadron LINAC commissioning, remote, January 2021

2019 Ruisard KJ, Aleksandrov A, Cousineau S, Zhang Z. "Characterization and modeling of high-intensity evolution in the SNS Beam Test Facility," in *Proceedings of NAPAC2019*, Lansing, MI.

"Application of SNS Beam Test Facility (BTF) to halo formation in high-intensity linacs," ICFA Space Charge Workshop, CERN, Geneva, Switzerland. **Invited Speaker**

2018 Ruisard K, Beaudoin B, Haber I, Matthew D, Koeth T. "Nonlinear Optics At Umer : Lessons Learned in Simulation," in *Proceedings of the 13th Int. Computational Accelerator Physics Conference*, Key West, FL. **Invited speaker**

2017 "The UMER nonlinear optics experiments/simulations, nonlinear insert and octupole magnet development", ICFA Space Charge Workshop, Darmstadt, Germany. **Invited Speaker**

"Non-linear optics in UMER: theory, simulations, experiments," FAST IOTA scientific program meeting, Fermilab, Batavia, IL, June 6

2016 “The University of Maryland Electron Ring distributed octupole lattice: marrying quasi-integrable optics with the FODO lattice,” Advanced Accelerator Concepts Workshop, Washington DC

Ruisard K, Baumgartner H, Beaudoin B, Haber I, Matthews D, Koeth T. "Early tests and simulation of quasi-integrable octupole lattices at the University of Maryland Electron Ring," in *Proceedings of HB2016*. Malmo, Sweden, 511-516. **Invited Speaker**

"Status update: nonlinear optics experiments at UMER," FAST IOTA scientific program meeting, Fermilab, Batavia, IL, June 14

2015 Focused Workshop on Scientific Opportunities in IOTA, Fermilab, Batavia, IL, April 28-29

2014 “Nonlinear optics at the University of Maryland Electron Ring,” Advanced Accelerator Concepts Workshop, San Jose, CA.

2013 Ruisard K, Hine G, Koeth T, Rosenberg A. "The Rutgers cyclotron: Placing student’s careers on Target," in *Proceedings of the 20th International Conference on Cyclotrons and Their Applications.* Vancouver, BC, Canada, 291-295. **Invited Speaker**

"Nonlinear Integrable Optics at the University of Maryland Electron Ring," 1st Advanced Superconducting Test Accelerator (ASTA) User’s Meeting, Fermilab, Batavia, IL, July 23-24

Poster Presentations with Proceedings

2023 Ruisard K, Hoover A., Aleksandrov A., Cousineau S., Thompson T., Zhukov A. "Measurements at peak operational beam current in the SNS Beam Test Facility," in *Proceedings of IPAC23*, Venice, Italy. May 7-12 2023.

2020 Ruisard K, Aleksandrov A, Shishlo A. "Virtual slit for improved resolution in longitudinal emittance measurement," in *Proceedings of IBIC2020*, remote, Sept. 14-18, 2020.

2018 Ruisard KJ, Baumgartner H, Beaudoin B, et al. "Tuning low-current beams for nonlinear quasi-integrable optics experiments at the University of Maryland Electron Ring." in *Proceedings of IPAC2018*, Vancouver, Canada, May 2018.

2016 K. J. Ruisard et al., "Experimental plans for single-channel strong octupole fields at the University of Maryland Electron Ring", in *Proceedings of the 2016 NAPAC*, Chicago, IL, October 2016. **Student Poster Prize**

2015 K. J. Ruisard, B. Beaudoin, I. Haber, T. Koeth, "Simulations and experiments in support of octupole lattice studies at the University of Maryland Electron Ring," in *Proceedings of the 2015 IPAC*, Richmond, VA, May 2015.

2013 K. J. Ruisard, S. Bernal, I. Haber, R.A. Kishek, T. Koeth, "Design and simulation of an extraction section for the University of Maryland Electron Ring", in *Proceedings of the 2013 IPAC*, Shanghai, China, May 2013.

2012 K. J. Ruisard, B. Beaudoin, I. Haber, R.A. Kishek, T. Koeth, "Design of an Electrostatic Extraction Section for the University of Maryland Electron Ring", in *Proceedings of the 2012 IPAC*, New Orleans, LA, May 2012.

Interests

Rowing, gardening, baking and wild fermentation

Last updated: May 15, 2023