

Aaron Reinhard

Kenyon College
Department of Physics
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EDUCATION

AUG 2008	<i>Ph.D. (Physics)</i> Dissertation: <i>Cold Rydberg-Atom Interactions</i>	University of Michigan
MAY 2003	<i>B.S. (Physics) and B.S.E.E. (Electrical Eng.)</i> Summa Cum Laude	Valparaiso University

PROFESSIONAL APPOINTMENTS

JUL 2024 - PRES	<i>Professor of Physics</i>	Kenyon College
AUG 2024 - JUL 2025	<i>Leverhulme Visiting Professor</i>	Durham University (UK)
JUL 2017 - JUL 2024	<i>Associate Professor of Physics</i>	Kenyon College
JAN 2014 - AUG 2014	<i>Interim Director of Systems Engineering</i>	Otterbein University
AUG 2012 - JUL 2017	<i>Assistant Professor of Physics</i>	Otterbein University
JUL 2008 - JUN 2012	<i>Postdoctoral Research Associate</i>	The Pennsylvania State University

EXTERNAL GRANTS

2026 - 2029	<i>RUI: Optical Tweezer Array for Tripartite Rydberg Entanglement</i> The National Science Foundation, \$234,667.
2024 - 2025	<i>Fast Qubit Readout Using Rydberg Polaritons</i> The Leverhulme Trust, £51,900.
2022 - 2026	<i>RUI: Demonstrating Control Over State-Mixing Interactions in Rydberg Excitation Near Förster Resonance.</i> The National Science Foundation, \$199,221.
2016 - 2022	<i>CAREER: The Effect of State-Mixing Interactions on the Rydberg Excitation Blockade.</i> The National Science Foundation, \$400,000.

AWARDS

2014	Otterbein University New Teacher of the Year Award
2006	Marcellus V. Wiedenbeck Award (Univ. of Michigan Physics Dept.: Teaching)
2005	GSI Service Award (Univ. of Michigan Physics Dept.: Teaching)
2004	Outstanding First-Year GSI Award Dept. (Univ. of Michigan Physics: Teaching)
2003	Armin W. Manning Award, Outstanding Senior Physics Student (Valparaiso Univ.)
2003	Member, Sigma Pi Sigma Physics Honor Society
2002	Caterpillar Excellence Scholarship
2002 - 2003	Member, Mortar Board
2001	Kraig Olejniczak Power Engineering Scholarship
2001 - 2003	Member, Tau Beta Pi Engineering Honor Society (Executive Board - Cataloger 2003)
2000	Member, Alpha Lambda Delta Honor Society

SERVICE TO PROFESSION

2025 - Pres. Referee: American Journal of Physics
 2025 - Pres. Referee: Review of Scientific Instruments
 2023 Chair: Ohio PKAL Conference Committee
 2022 - 2024 Member: Ohio PKAL Executive Board
 2022 Vice Chair: Ohio PKAL Conference Committee
 2022 - Pres. Referee: Physical Review Research
 2020 - Pres. Panelist: National Science Foundation
 2016 - Pres. Reviewer: National Science Foundation (AMO-E)
 2009 - Pres. Referee: Physical Review Letters, Physical Review A
 2005 - Pres. Member, American Physical Society

COLLEGIATE SERVICE

07/2026 - 06/2029 Chair of the Department of Physics (Kenyon College)
 10/2026- Pres. Member, President's Working Group on Retention (Kenyon College)
 02/2026 - 07/2026 Co-Chair: Provost Search Committee (Kenyon College)
 08/2022 - 08/2024 Director: Math and Science Skills Center (Kenyon College)
 08/2021 - 08/2023 Co-Chair: Academic Infractions Board (Kenyon College)
 02/2022 STEM Scholar Selection Group (Kenyon College)
 08/2021 - 08/2024 Goldwater Liaison (Kenyon College)
 08/2021 - 05/2024 Co-Organizer, Natural Sciences Reading Group (Kenyon College)
 08/2020 - 08/2023 Member, Academic Infractions Board (Kenyon College)
 08/2019 - 12/2019 Member, Tenure-Track Search Committee Math Dept. (Kenyon College)
 07/2019 - Pres. Pre-Engineering Advisor (Kenyon College)
 04/2019 Member, Visiting Faculty Search Committee Psychology Dept. (Kenyon College)
 01/2019 - 12/2019 Faculty Advisor to Society of Physics Students (Kenyon College)
 04/2018 Ad-Hoc Reviewer for HHMI Inclusive Excellence Grants (Kenyon College)
 10/2017 - 05/2019 Member, Fellowships and Awards Committee (Kenyon College)
 08/2015 - 05/2017 Member, Faculty Scholar Development Committee (Otterbein University)
 03/2015 - 03/2016 Chair of Science Lecture Series Committee (Otterbein University)
 Planned visit of Nobel Laureate William D. Phillips on 02/18/16 - 02/19/16
 01/2015 - 05/2017 Member, Science Lecture Series Committee (Otterbein University)
 08/2014 - 05/2017 Member, Academic Council/Academic Hearing Board (Otterbein University)
 01/2014 - 05/2017 Member, 3 Tenure-Track Search Committees for Engineering. (Otterbein University)
 01/2014 - 08/2014 Interim Director of Systems Engineering (Otterbein University)
 11/2013 - 05/2015 Member, WIDER grant project advisory team (Otterbein University)
 01/2013 - 05/2015 Member, Health and Safety Committee (Otterbein University)

OUTREACH

JUN 2025 *Framwellgate School (UK) Science Club*
 Designed and led a lesson on light and color for about 20 secondary school students.

DEC 2019 - *Emerson Elementary Third Grade Science Experiences*
 MAY 2023 Designed and led two lessons for a third grade classes in the "gifted program" at Emerson elementary in Westerville, OH. The experiences, designed to complement the third grade science curriculum, involved liquid nitrogen demonstrations and ice cream, as well as building fidget spinner electric motors.

DEC 2019 - *Blacklick Elementary: Liquid Nitrogen Demonstrations*
 DEC 2022 Used liquid nitrogen to perform demonstrations and make ice cream for approximately 120 3rd grade students at Blacklick Elem. in Gahanna, OH.

APR 2018 *Cub Scout Pack 560 Science Night*
 Helped organize a science night for a local Cub Scout pack.

OUTREACH

- JAN 2017 *Annehurst Elementary Science Night*
Co-organized an event for elementary school children and families to learn about science through demonstrations and interaction with Otterbein students.
- AUG 2015 - *Chair of Otterbein Science Lecture Series Committee*
MAR 2016 Coordinated the visit of Nobel Laureate William D. Phillips on 02/18/16 - 02/19/16 which included a public lecture.
- NOV 2010 *Ferguson Township Elementary: Nuclear Energy Presentation*
Developed an interactive lesson on nuclear energy and presented it to 69 fifth grade students at Ferguson Township Elementary in State College, PA.
- DEC 2007 *Keystone Elementary: Liquid Nitrogen Demonstrations*
Used liquid nitrogen to perform demonstrations and make ice cream for approximately 100 grade school students in Belleville, MI.

PUBLICATIONS IN PEER-REVIEWED JOURNALS

(Undergraduate student co-authors denoted with an asterisk)

Richard Wolfendale, Philipp Kohler, Karen Wadenpfehl, **Aaron Reinhard**, Rob Mellor*, Jake Hulse*, Kevin Weatherill, and C. Stuart Adams, *Effects of Ionisation and Förster Resonances on Rydberg EIT Lineshapes in a Hot Atomic Vapour*, In preparation.

Dominick Frost*, Calista Pearlstone*, Anyssa El Mhaïa*, Lilian Gehres*, Lucy Shamel*, and **Aaron Reinhard**, *Characterizing the coherence of three-atom entangled states near Förster resonance*, In preparation.

Karen Wadenpfehl, **Aaron Reinhard**, Oliver Hughes, Lucy Downes, Kevin Weatherill, and C. Stuart Adams, *Switching Rydberg interactions by three orders of magnitude using a terahertz field*, arXiv:2605.18664.

Tomohisa Yoda*, Emily Hirsch*, Jason Montgomery*, Dilara Sen*, and **Aaron Reinhard**, *Coherent excitation of three-atom entangled states near a two-body Förster resonance*, Phys. Rev. A **107**, 062818 (2023).

Aaron Reinhard, Alex Felleson*, Paula C. Turner, and Maxwell Green*, *Assessing the impact of metacognitive postreflection exercises on problem-solving skillfulness*, Phys. Rev. Phys. Educ. Res. **18**, 010109 (2022).

Milo Eder*, Andrew Lesak*, Abigail Plone*, Tomohisa Yoda*, Michael Highman*, and **Aaron Reinhard**, *Quantifying the impact of state mixing on the Rydberg excitation blockade*, Phys. Rev. Research **2**, 023234 (2020).

Keegan Orr*, Ian George*, and **Aaron Reinhard**, *A pressure-tuned Fabry Pérot interferometer for laser frequency stabilization and tuning*, Rev. Sci. Instrum. **89**, 093107 (2018).

Lin Xia, Laura A. Zundel, Juan Carrasquilla, **Aaron Reinhard**, Joshua M. Wilson, Marcos Rigol, and David S. Weiss, *Quantum distillation and confinement of vacancies in a doublon sea*, Nature Physics **11**, 314 (2015).

Jean-Félix Riou, Laura A. Zundel, **Aaron Reinhard**, and David S. Weiss, *Effect of optical-lattice heating on the momentum distribution of a one-dimensional Bose gas*, Phys. Rev. A **90**, 033401 (2014).

Aaron Reinhard, Jean-Félix Riou, Laura A. Zundel, and David S. Weiss, *Dark-ground imaging high optical thickness atom clouds*, Opt. Comm. **324**, 30 (2014).

Shuming Li, Salvatore R. Manmana, Ana Maria Rey, Rafael Hipolito, **Aaron Reinhard**, Jean-Félix Riou, Laura A. Zundel, and David S. Weiss, *Self-trapping dynamics in a two-dimensional optical lattice*, Phys. Rev. A **88**, 023419 (2013).

Aaron Reinhard, Jean-Félix Riou, Laura A. Zundel, David S. Weiss, Shuming Li, Ana Maria Rey, and Rafael Hipolito, *Self-Trapping in an Array of Coupled 1D Bose Gases*, Phys. Rev. Lett., **110**, 033001 (2013).

Jean-Félix Riou, **Aaron Reinhard**, Laura A. Zundel, and David S. Weiss, *Spontaneous-emission-induced transition rates between atomic states in optical lattices*, Phys. Rev. A **86**, 033412 (2012).

K. C. Younge, **A. Reinhard**, T. Pohl, P. R. Berman, and G. Raithel, *Mesoscopic Rydberg ensembles: Beyond the pairwise-interaction approximation*, Phys. Rev. A **79**, 043420 (2009).

A. Reinhard, K. C. Younge, and G. Raithel, *Effect of Förster Resonances on the Excitation Statistics of Many-Body Rydberg Systems*, Phys. Rev. A **78**, 060702(R) (2008).

A. Reinhard, K. C. Younge, T. Cubel Liebisch, B. Knuffman, P. R. Berman, and G. Raithel, *Double-resonance spectroscopy of interacting Rydberg atom systems*, Phys. Rev. Lett. **100**, 233201 (2008).

A. Reinhard, T. Cubel Liebisch, K. C. Younge, P. R. Berman, and G. Raithel, *Rydberg-Rydberg collisions: resonant enhancement of state-mixing and Penning ionization*, Phys. Rev. Lett. **100**, 123007 (2008).

A. Reinhard, T. Cubel Liebisch, B. Knuffman, and G. Raithel, *Level shifts of rubidium Rydberg states due to binary interactions*, Phys. Rev. A **75**, 032712 (2007).

T. Cubel Liebisch, **A. Reinhard**, P. R. Berman, and G. Raithel, *Atom counting statistics in ensembles of interacting Rydberg atoms*, Phys. Rev. Lett. **95**, 253002 (2005).

T. Cubel, B. K. Teo, V. S. Malinovsky, J. R. Guest, **A. Reinhard**, B. Knuffman, P. R. Berman, G. Raithel, *Coherent population transfer of ground-state atoms into Rydberg states*, Phys. Rev. A **72**, 023405 (2005).

BOOK CHAPTERS

J.-H. Choi, B. Knuffman, T. Cubel Liebisch, **A. Reinhard**, G. Raithel, *Cold Rydberg Atoms*, in Advances in Atomic, Molecular and Optical Physics vol. 54, eds. E. Arimondo and P. R. Berman (Elsevier, 2007).

INVITED PRESENTATIONS

A. Reinhard, *Optics at Kenyon College - Coherent Control of Three-Atom Rydberg States*, Ohio Optical Frontiers Showcase (The Ohio State University), Columbus, Ohio, October 2026.

A. Reinhard, *Coherent control of three-atom Rydberg states: Research at an American liberal arts college*, Université Paris Saclay and CNRS, Orsay, France, July 2026.

A. Reinhard, *Coherent control of entangled three-atom Rydberg states*, Oberlin College, Oberlin, Ohio, October 2025.

A. Reinhard, *Coherent control of three-atom Rydberg states: Research at an American liberal arts college*, University of Nottingham, Nottingham, UK, June 2025.

A. Reinhard, *Teaching as Research and Research as Teaching: My experience at an American liberal arts college*, Kings College London, London, UK, June 2025.

A. Reinhard, *Research at an American liberal arts college – in the lab and in the classroom*, University of Bristol, Bristol, UK, June 2025.

A. Reinhard, *Coherent control of three-atom Rydberg states: Research at an American liberal arts college*, University of Oxford, Oxford, UK, May 2025.

A. Reinhard, *Coherent control of three-atom Rydberg states: Research at an American liberal arts college*, University of Strathclyde, Glasgow, UK, March 2025.

A. Reinhard, *Coherent control of three-atom Rydberg states: Research at an American liberal arts college*, Durham University, Durham, UK, February 2025.

A. Reinhard, *Teaching as Research and Research as Teaching: My experience at an American liberal arts college*, Durham University, Durham, UK, February 2025.

A. Reinhard, *Coherent control of three-atom Rydberg states: Research at an American liberal arts college*, Imperial College London, London, UK, November 2024.

A. Reinhard, *Coherent control of three-atom Rydberg states: Research at an American liberal arts college*, University College London, London, UK, November 2024.

A. Reinhard, *Coherent Control of Three-Body Rydberg States: Hoorah for WAHUHA!*, Denison University, Granville, Ohio, April 2024.

A. Reinhard, *Coherent Control of Processes the Break the Dipole Blockade*, IQUIST Seminar, University of Illinois, Urbana, Illinois, February 2022.

A. Reinhard, *Towards Control of State Mixing Interactions in Rydberg Excitation Near Förster Resonance*, Midwest Cold Atom Workshop, West Lafayette, Indiana, November 2021.

A. Reinhard, *Ultracold Rydberg Atoms: How State Mixing Breaks the Rydberg Excitation Blockade*, Miami University, Oxford, Ohio, October 2019.

A. Reinhard, *Quantifying the Impact of State Mixing on the Rydberg Excitation Blockade*, University of Michigan, Ann Arbor, Michigan, October 2019.

A. Reinhard, *Ultracold Rydberg Atom Interactions*, Denison University, Granville, Ohio, February 2019.

A. Reinhard, *Ultracold Rydberg Atoms (And Why I’m “Highly Excited” About Them)*, Youngstown State University, Youngstown, Ohio, October 2018.

A. Reinhard, *Cold Rydberg-Atom Interactions*, John Carroll University, University Heights, Ohio, April 2017.

A. Reinhard, *Ultracold Bosons in 1D*, Valparaiso University Homecoming Physics Colloquium, Valparaiso, Indiana, October 2012.

A. Reinhard, *Cold Rydberg-Atom Interactions*, Valparaiso University, Valparaiso, Indiana, February 2008.

CONTRIBUTED PRESENTATIONS

(Undergraduate student co-authors denoted with an asterisk)

Aaron Reinhard, Dominick Frost*, Anyssa El Mh  ia*, Lilian Gehres*, Calista Pearlstone*, and Lucy Shamel*, *Coherent Manipulation of Three-Atom Entangled States Near F  rster Resonance*, CATMIN IV, Granada, Spain, May 2025.

Tomohisa Yoda*, Emily Hirsch*, Jason Madison*, and **Aaron Reinhard**, *Coherent Control of Processes that Break the Dipole Blockade*, DAMOP, Orlando, Florida, June 2022.

Aaron Reinhard, Milo Eder*, Tomohisa Yoda*, Andrew Lesak*, Abigail Plone*, and Michael Highman*, *Quantifying the Impact of State Mixing on the Rydberg Excitation Blockade*, DAMOP, Virtual Meeting, June 2021.

Aaron Reinhard and Tom Giblin, *Experiments in Supporting A Diverse Community of Learners*, Ohio PKAL Conference, Alliance, Ohio, May 2018.

Aaron Reinhard, Jean-Felix Riou, Laura A. Zundel, David S. Weiss, *Self-localization in bundles of 1D gases*, DAMOP, Orange County, California, May 2012.

Jean-Felix Riou, **Aaron Reinhard**, Laura Adams, David S. Weiss, *Onset of thermalization in a 1D Bose gas*, DAMOP, Atlanta, Georgia, May 2011.

Aaron Reinhard, Jean-Felix Riou, Phillip Schafer, David S. Weiss, *Studies of 1D gases away from integrability*, DAMOP, Houston, Texas, May 2010.

A. Reinhard, K. C. Younge, T. Cubel Liebisch, B. Knuffman, P. R. Berman, G. Raithel, *Double-resonance spectroscopy of interacting Rydberg-atom systems*, DAMOP, University Park, Pennsylvania, May 2008.

K. C. Younge, **A. Reinhard**, T. Pohl, P. R. Berman, G. Raithel, *Rydberg atom interactions in high density samples*, DAMOP, University Park, Pennsylvania, May 2008.

A. Reinhard, K. C. Younge, B. Knuffman, R. Mhaskar, R. E. Sapiro, M. Shah, R. Zhang, P. R. Berman, and G. Raithel, *Double-resonance spectroscopy of interacting Rydberg atom systems*, Midwest Cold Atom Workshop, Madison, Wisconsin, November 2007.

A. Reinhard, T. Cubel Liebisch, P. R. Berman, and G. Raithel, *Resonant enhancement of state-mixing and ionizing collisions in Rb Rydberg states*, DAMOP, Calgary, Alberta, June 2007.

T. Cubel Liebisch, **A. Reinhard**, B. Knuffman, P. R. Berman, and G. Raithel, *van-der-Waals shifts of rubidium Rydberg states*, DAMOP, Knoxville, Tennessee, May 2006.

A. Reinhard, T. Cubel, B. K. Teo, V. Malinovsky, J. R. Guest, B. Knuffman, P. R. Berman, G. Raithel, *Coherent Population Transfer of Ground State Atoms into Rydberg States and Applications to the van der Waals Blockade*, DAMOP, Lincoln, Nebraska, May 2005.

POSTERS

(Undergraduate student co-authors denoted with an asterisk)

Dominick Frost*, Anyssa El Mhaia*, Lillian Gehres*, Calista Pearlstone*, and **Aaron Reinhard**, *Coherent Manipulation of Three-Atom Entangled States Near F  rster Resonance*, Midwest Cold Atom Workshop, Ann Arbor, Michigan, November 2024

Lucy Shamel*, Dominick Frost*, Gabriella Pesticci*, Dilara Sen*, Anyssa El Mhaia*, Lillian Gehres*, Calista Pearlstone*, and **Aaron Reinhard**, *Coherent Manipulation of Three-Atom Entangled States Near Förster Resonance*, DAMOP, Fort Worth, Texas, June 2024

Lucy Shamel*, Gabriella Pesticci*, Dominick Frost*, Emily Hirsch*, Dilara Sen*, Tomohisa Yoda*, and **Aaron Reinhard**, *Characterizing the Decoherence of Three-Atom Entangled States Near Förster Resonance*, Midwest Cold Atom Workshop, Chicago, Illinois, November 2023

Emily Hirsch*, Lucy Shamel*, Tomohisa Yoda*, Dilara Sen*, Gabriella Pesticci*, Dominick Frost*, and **Aaron Reinhard**, *Characterizing the Decoherence of Three-Atom Entangled States Near Förster Resonance*, DAMOP, Spokane, Washington, June 2023

Lucy Shamel*, Dilara Sen*, Emily Hirsch*, Jason Madison*, Tomohisa Yoda*, and **Aaron Reinhard**, *Coherent excitation of three-atom entangled states near a two-body Förster resonance*, Midwest Cold Atom Workshop, Madison, Wisconsin, November 2022

Emily Hirsch*, Jason Madison*, Tomohisa Yoda*, Lucy Shamel*, Dilara Sen*, and **Aaron Reinhard**, *Modeling Coherent Laser Excitation of Mixed Three-Atom States Near Förster Resonance*, DAMOP, Orlando, Florida, June 2022

Tomohisa Yoda*, Emily Hirsch*, Jason Montgomery*, Lucy Shamel*, and **Aaron Reinhard**, *Modeling State Mixing in Rydberg Excitation near Förster Resonance*, Midwest Cold Atom Workshop, West Lafayette, Indiana, November 2021

Tomohisa Yoda*, Milo Eder*, Andrew Lesak*, Abigail Plone*, and **Aaron Reinhard**, *Modeling the Effects of State-Mixing Interactions near Förster Resonance*, DAMOP, Virtual Meeting, June 2021

Milo Eder*, Andrew Lesak*, Abby Plone*, **Aaron Reinhard**, *Towards Quantifying the Impact of State-Mixing on the Rydberg Excitation Blockade*, DAMOP, Milwaukee, WI, May 2019

Andrew Lesak*, **Aaron Reinhard**, *Progress towards quantifying the impacts of state mixing on the Rydberg excitation blockade*, The American Physical Society March Meeting, Boston, MA, March 2019.

Andrew Lesak*, Milo Eder*, **Aaron Reinhard**, *Towards quantifying the impact of state-mixing interactions on the Rydberg excitation blockade*, Midwest Cold Atoms Workshop, Urbana-Champaign, IL, November 2018.

Keegan Orr*, Ian George*, Andrew Lesak*, Molly Eder*, **Aaron Reinhard**, *A pressure-tuned Fabry-Pérot interferometer for laser stabilization and tuning*, DAMOP, Fort Lauderdale, FL, May 2018

Aaron Reinhard, Jean-Felix Riou, Laura Adams, David S. Weiss, *Evolution of a nearly integrable 1D Bose gas due to optical lattice “heating”*, DAMOP, Atlanta, Georgia, June 2011.

Shuming Li, **Aaron Reinhard**, Jean-Felix Riou, Laura Adams, Rafael Hipolito, Anatoli Polkovnikov, Ana Rey, David S. Weiss, *Self-Trapping dynamics in a 2D optical lattice*, DAMOP, Atlanta, Georgia, June 2011.

Jean-Felix Riou, **Aaron Reinhard**, Phillip Schafer, David S. Weiss, *Characterizing the dynamics of an out-of-equilibrium 1D Bose gas*, DAMOP, Houston, Texas, May 2010.

A. Reinhard, K. C. Younge, P. R. Berman, and G. Raithel, *Double-resonance spectroscopy of interacting Rydberg atom systems*, Midwest Cold Atom Workshop, Madison, Wisconsin, November 2007.

K. C. Younge, **A. Reinhard**, P. R. Berman, and G. Raithel, *State-mixing Rydberg atom interactions*, Midwest Cold Atom Workshop, Madison, Wisconsin, November 2007.

K. C. Younge, **A. Reinhard**, P. R. Berman, and G. Raithel, *High resolution spectroscopy of Rydberg-atom interactions*, DAMOP, Calgary, Alberta, June 2007.