

# Kate A. Ross

*Assistant Professor*

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## Research Interests

Quantum materials, quantum spin liquids, quantum phase transitions, topological spin textures, neutron scattering, crystal growth, ultrasound spectroscopy.

## Current Positions

2015/08 - present

Department of Physics, Colorado State University

*Position:* Assistant Professor

2016/07 - 2018/07

CIFAR Quantum Materials Program

*Position:* CIFAR Azrieli Global Scholar

## Education

09/2007 - 11/2012 McMaster University, Hamilton, Ontario Canada

Ph.D., Physics; Thesis title: *Neutron Scattering Studies of the Quantum Spin Ice Material  $Yb_2Ti_2O_7$* . Advisor: Bruce Gaulin

09/2002 - 09/2007 University of Waterloo, Waterloo, Ontario Canada

B.Sc., Honours Physics, Co-operative Program; Research: *Specific Heat Measurements of the Magnetic Pyrochlores  $Gd_2Sn_2O_7$  and  $Gd_2Ti_2O_7$* . Advisor: Jan Kycia

## Grants, Awards, and Fellowships

- Oxford Instruments 2018 Lee Osheroff Richardson prize (Feb. 2018)
- Kavli Fellow (Feb. 2018)
- American Physical Society 2016 George E. Valley Jr. Prize (awarded March 2017)
- NSF DMR-1611217 “Quantum phases in spin-orbit coupled honeycomb magnets: beyond 4d and 5d transition metal ions” (Sept. 2016 - Sept. 2019)
- Canadian Institute for Advanced Research (CIFAR) Azrieli Global Scholar (June 2016)
- Royal Society of Canada’s Alice Wilson Award (Nov 2014)
- NSERC Post Doctoral Fellowship (awarded Feb 2014)
- 2014 Prize for Outstanding Student Research, Neutron Scattering Society of America (February 2014)
- One of two Canadians selected by the Royal Society of Canada to attend the interdisciplinary “IAP Conference of Young Scientists” in Dalian, China in 2013.
- NSERC CGS-D: Sept. 2009 - Sept. 2011
- NSERC CGS-M: Sept. 2007 – Sept. 2009
- 1st Place Presentation at Symposium Day (September 2008), Department of Physics and Astronomy, McMaster University
- NSERC Industrial USRA: Summer 2006
- Xerox Research Centre Award (for written communication, University of Waterloo): 2004 and 2005
- I.R. Dagg Memorial Scholarship (University of Waterloo): 2005-2006
- Selected to attend the 2008 Lindau Nobel Laureate conference (June 2008), Lindau Germany

## Past Positions

2014/09 - 2015/08

Department of Chemistry, Colorado State University

*Position:* NSERC Postdoctoral fellow

*Research focus:* Synthesis of new exotic magnetic materials

*Advisor:* James Neilson

2012/09 - 2014/09

Institute for Quantum Matter, Johns Hopkins University and the NIST Center for Neutron Research.

*Position:* Postdoctoral fellow

*Research focus:* Quantum magnets, exotic phases of magnetic materials, neutron scattering as a probe of strongly interacting electronic systems, emergent phenomena

*Advisor:* Collin Broholm

2010/09 - 2012/09

McMaster University, Hamilton, Ontario Canada

*Position:* Instrument Responsible at McMaster Nuclear Reactor (MNR)

*Research focus:* Commissioning the new triple-axis neutron spectrometer at the MNR, preparation for use as a teaching and research tool

*Advisor:* Bruce Gaulin

2007/09 - 2012/09

McMaster University, Hamilton, Ontario Canada

*Position:* Ph.D. Candidate

*Research focus:* Crystal growth, neutron and x-ray scattering, frustrated magnetic materials

*Advisor:* Bruce Gaulin

2006/09 – 2007/04

University of Waterloo, Waterloo, Ontario Canada

*Position:* Undergraduate researcher

*Research focus:* Ultra-low temperature specific heat measurements, frustrated magnetic materials

*Advisor:* Jan Kycia

2004/09 – 2004/12

PICASSO Dark Matter Search Experiment, Queen's University, Kingston, Ontario Canada

*Position:* Undergraduate researcher

*Research focus:* Design and construction of a portable neutron calibration source, machine shop, design drawings, Monte Carlo simulations in C++

*Advisor:* Tony Noble

2004/01 – 2004/04

TRIUMF Weak Interaction Symmetry Test (TWIST), Vancouver, British Columbia Canada

*Position:* Undergraduate researcher

*Research focus:* Monte Carlo simulations in C++

*Advisor:* Art Olin

## **Professional Activities**

- Communications Secretary, Neutron Scattering Society of America (Feb 2017 - Feb 2021)
- Member of Oak Ridge National Laboratory's SNS/HFIR User Group Executive Committee (SHUG-EC) (*Vice-Chair* Jan 2016 - Dec 2016, *Chair* Jan 2017 - Dec 2018)
- Member of the Program Committee for the 2016 Highly Frustrated Magnetism conference held in Taipei, Sept. 2016
- Member of the Scientific Review Committee (SRC) for Oak Ridge National Laboratory's neutron scattering user program. (2015 - present)
- Focus Topic Organizer for the APS March Meeting (GMAG unit) (Fall 2015 & Fall 2017)
- Member of the TRIUMF MMS-EEC (scientific review committee for the muSR user program) (Jan. 2016 - present)
- Co-organizer for the Front Range Magnetism Symposium (FRAMS) at Colorado State University (Sept. 2015)

- Referee for peer-reviewed journals: Science, Nature, PRL, PRB

## Publications (updated April 14, 2018)

- 1) H.S. Nair, J.M. Brown, E. Coldren, G. Hester, M.P. Gelfand, A. Podlesnyak, Q. Huang, K.A. Ross. *Short range order in the quantum XXZ honeycomb lattice material  $BaCo_2(PO_4)_2$* . Phys. Rev. B **97**, 134409 (2018)
- 2) M.J. Tarne, M.M. Bordelon, S. Calder, J.R. Neilson, K.A. Ross. *Tuning the antiferromagnetic helical pitch length and nanoscale domain size in  $Fe_3PO_4O_3$  by magnetic dilution*. Phys. Rev. B **96**, 214431 (2017)
- 3) B. A. Frandsen, K. A. Ross, J. W. Krizan, G. J. Nilsen, A. R. Wildes, R. J. Cava, R. J. Birgeneau, S. J. L. Billinge. *Real-space investigation of short-range magnetic correlations in fluoride pyrochlores  $NaCaCo_2F_7$  and  $NaSrCo_2F_7$  with magnetic pair distribution function analysis*. Phys. Rev. Materials **1**, 074412 [Editor's suggestion] (2017)
- 4) A. J. Neer, J. Milam-Guerrero, J. E. So, B. C. Melot, K. A. Ross, Z. Hulvey, C. M. Brown, A. A. Sokol, and D. O. Scanlon. *Ising-like antiferromagnetism on the octahedral sublattice of a cobalt-containing garnet and the potential for quantum criticality*. Phys. Rev. B **95**, 144419 (2017)
- 5) K.A. Ross, J.M. Brown, R.J. Cava, J.W. Krizan, S. E. Nagler, J.A. Rodriguez-Rivera, and M. B. Stone. *Single-ion properties of the  $S = 1/2$  XY antiferromagnetic pyrochlores,  $NaA'Co_2F_7$  ( $A' = Ca^{2+}, Sr^{2+}$ )*. Phys. Rev. B **95**, 144414 [Editor's suggestion] (2017)
- 6) J.-J. Wen, S. M. Koohpayeh, K. A. Ross, B. A. Trump, T. M. McQueen, K. Kimura, S. Nakatsuji, Y. Qiu, D. M. Pajerowski, J. R. D. Copley, and C. L. Broholm. *Disordered Route to the Coulomb Quantum Spin Liquid: Random Transverse Fields on Spin Ice in  $Pr_2Zr_2O_7$* . Phys. Rev. Lett. **118**, 107206 (2017)
- 7) Edwin Kermarrec, Jonathan Gaudet, Katharina Fritsch, Rustem Khasanov, Zurab Guguchia, Clemens Ritter, Kate Ross, Hanna Dabkowska, and Bruce Gaulin. *Ground state selection under pressure in the quantum pyrochlore magnet  $Yb_2Ti_2O_7$* . Nature Communications **8**, 14810 (2017)
- 8) K. Fritsch, K.A. Ross, G.E. Granroth, G. Ehlers, H.M.L. Noad, H.A. Dabkowska, B.D. Gaulin. *Quasi-two-dimensional spin correlations in the triangular lattice bilayer spin glass  $LuCoGaO_4$* . Phys. Rev. B **96**, 094414 (2017)

- 9) J.H. Roudebush, K.A. Ross, and R.J. Cava. *Iridium containing honeycomb Delafossites by topotactic cation exchange*. Dalton Trans., **45**, 8783-8789 (2016)
- 10) J. Gaudet, K. A. Ross, E. Kermarrec, N. P. Butch, G. Ehlers, H. A. Dabkowska, and B. D. Gaulin. *Gapless quantum excitations from an ice-like splayed ferromagnetic ground state in stoichiometric  $\text{Yb}_2\text{Ti}_2\text{O}_7$* . Phys. Rev. B **93**, 064406 [**Editor's suggestion**] (2016)
- 11) K. A. Ross, J. W. Krizan, J. A. Rodriguez-Rivera, R. J. Cava, and C. L. Broholm. *Static and dynamic XY-like short-range order in a frustrated magnet with exchange disorder*. Phys. Rev. B **93**, 014433 (2016)
- 12) L. Pan, N. J. Laurita, K. A. Ross, B. D. Gaulin & N. P. Armitage. *A measure of monopole inertia in the quantum spin ice  $\text{Yb}_2\text{Ti}_2\text{O}_7$* . Nature Physics (2015)
- 13) J. Gaudet, D. D. Maharaj, G. Sala, E. Kermarrec, **K. A. Ross**, H. A. Dabkowska, A. I. Kolesnikov, G. E. Granroth, and B. D. Gaulin. *Neutron spectroscopic study of crystalline electric field excitations in stoichiometric and lightly stuffed  $\text{Yb}_2\text{Ti}_2\text{O}_7$* . Phys. Rev. B **92**, 134420 (2015)
- 14) K. A. Ross, M.M. Bordelon, G. Terho, J. R. Neilson. *Nanosized helical magnetic domains in strongly frustrated  $\text{Fe}_3\text{PO}_4\text{O}_3$* . Phys. Rev. B **92**, 134419 [**Editor's suggestion**] (2015)
- 15) L. Pan, S.K. Kim, A. Ghosh, C.M. Morris, K.A. Ross, E. Kermarrec, B. D. Gaulin, and S.M. Koohpayeh, O. Tchernyshyov, N. P. Armitage. *Low-energy electrostatics of novel spin excitations in the quantum spin ice  $\text{Yb}_2\text{Ti}_2\text{O}_7$* . Nature Communications **5**, 4970 (2014)
- 16) E.M. Seibel, J.H. Roudebush, M.N. Ali, K.A. Ross, R.J. Cava. *Structure and Magnetic Properties of the Spin-1/2-Based Honeycomb  $\text{NaNi}_2\text{BiO}_{6-\delta}$  and Its Hydrate  $\text{NaNi}_2\text{BiO}_{6-\delta}\cdot 1.7\text{H}_2\text{O}$* . Inorganic Chemistry **53** (20), 10989-10995 (2014)
- 17) K.A. Ross, L. Harriger, Z. Yamani, W. J. L. Buyers, J. D. Garrett, A. A. Menovsky, J. A. Mydosh, C. L. Broholm. *Strict limit on in-plane ordered magnetic dipole moment in  $\text{URu}_2\text{Si}_2$* . Phys. Rev. B, **89**, 155122 (2014)
- 18) K. A. Ross, Y. Qiu, J. R. D. Copley, H. A. Dabkowska, B. D. Gaulin. *Order by Disorder Spin Wave Gap in the XY Pyrochlore Magnet  $\text{Er}_2\text{Ti}_2\text{O}_7$* . Phys. Rev. Lett. **112**, 057201 (2014)
- 19) H. J. Silverstein, K. Fritsch, F. Flicker, A.M. Hallas, J.S. Gardner, Y. Qiu, G. Ehlers, A.T. Savici, Z. Yamani, K.A. Ross, B.D. Gaulin, M.J.P. Gingras, J.A.M. Paddison, K. Foyevtsova,

- R. Valenti, F. Hawthorne, C.R. Wiebe, H.D. Zhou. *Liquid-like correlations in single crystalline  $Y_2Mo_2O_7$ : an unconventional spin glass*. Phys. Rev. B **89**, 054433 (2014)
- 20) R. M. D’Ortenzio, H. A. Dabkowska, S. R. Dunsiger, B. D. Gaulin, M. J. P. Gingras, T. Goko, J. B. Kycia, L. Liu, T. Medina, T. J. Munsie, D. Pomaranski, K. A. Ross, Y. J. Uemura, T. J. Williams, and G. M. Luke. *Unconventional magnetic ground state in  $Yb_2Ti_2O_7$* . Phys. Rev. B **88**, 134428 (2013)
- 21) J. J. Wagman, G. Van Gastel, K. A. Ross, Z. Yamani, Y. Zhao, Y. Qiu, J. R. D. Copley, A. B. Kallin, E. Mazurek, J. P. Carlo, H. A. Dabkowska, and B. D. Gaulin. *Two-dimensional incommensurate and three-dimensional commensurate magnetic order and fluctuations in  $La_{2-x}BaxCuO_4$* . Phys. Rev. B, **88** 014412 (2013)
- 22) D. Pomaranski, L.R. Yaraskavitch, S. Meng, K.A. Ross, H.M.L. Noad, H.A. Dabkowska, B.D. Gaulin, J.B. Kycia. *Absence of Pauling’s residual entropy in thermally equilibrated  $Dy_2Ti_2O_7$* . Nature Physics, **9**, 353-356 (2013)
- 23) K. Fritsch, K.A. Ross, Y. Qiu, J.R.D. Copley, T. Guidi, R.I. Bewley, H.A. Dabkowska, B.D. Gaulin. *Antiferromagnetic spin ice correlations at  $(1/2, 1/2, 1/2)$  in the ground state of the pyrochlore magnet  $Tb_2Ti_2O_7$* . Phys. Rev. B **87** (9), 094410 (2013)
- 24) W. H. Toews, S.S. Zhange, K.A. Ross, H.A. Dabkowska, B.D. Gaulin and R.W. Hill. *Thermal conductivity of  $Ho_2Ti_2O_7$  along the  $[111]$  direction*. Phys. Rev. Lett., **110**, 217209, (2013)
- 25) N.R. Hayre, K.A. Ross, R. Applegate, T. Lin, R.R.P. Singh, B.D. Gaulin and M.J.P. Gingras. *Thermodynamic properties of  $Yb_2Ti_2O_7$  pyrochlore as a function of temperature and magnetic field: Validation of a quantum spin ice exchange Hamiltonian*, Phys. Rev. B, **87**, 184453, (2013)
- 26) K.A. Ross, T Proffen, H.A. Dabkowska, J.A. Quilliam, L.R. Yaraskavitch, J.B. Kycia, B.D. Gaulin. *Lightly stuffed pyrochlore structure of single-crystalline  $Yb_2Ti_2O_7$  grown by the optical floating zone technique*. Phys. Rev. B **86** (17), 174424 (2012)
- 27) H.M Revell, L.R. Yaraskavitch, J.D. Mason, K.A. Ross, H.M.L. Noad, H.A. Dabkowska, B.D. Gaulin, P. Henelius, J.B. Kycia. *Evidence of impurity and boundary effects on magnetic monopole dynamics in spin ice*. Nature Physics **9** (1), 34-37 (2012)

- 28) L. Savary, K.A. Ross, B.D. Gaulin, J.P.C. Ruff, L. Balents. *Order by Quantum Disorder in  $Er_2Ti_2O_7$* . Phys. Rev. Lett. **109** (16), 167201 (2012)
- 29) L.R. Yaraskavitch, H.M. Revell, S. Meng, K.A. Ross, H.M.L. Noad, H.A. Dabkowska, B.D. Gaulin, and J.B. Kycia. *Spin dynamics in the frozen state of the dipolar spin ice material  $Dy_2Ti_2O_7$* . Phys. Rev. B **85**, 020410(R) (2012)
- 30) Z. Islam, J.P.C. Ruff, K.A. Ross, H. Nojiri, and B.D. Gaulin. *Time-resolved one-dimensional detection of x-ray scattering in pulsed magnetic fields*. Rev. Sci. Instrum. **83**, 013113 (2012)
- 31) K.A. Ross, L. Savary, B. D. Gaulin, and L. Balents. *Quantum Excitations in Quantum Spin Ice*. Phys. Rev. X **1**, 021002 (2011).
- 32) K.A. Ross, L.R. Yaraskavitch, M. Laver, J.S. Gardner, J. A. Quilliam, S. Meng, J.B. Kycia, D. K. Singh, H.A. Dabkowska, and B.D. Gaulin. *Dimensional Evolution of Spin Correlations in the Magnetic Pyrochlore  $Yb_2Ti_2O_7$* . Phys. Rev. B., **84**, 174442 (2011).
- 33) H. Nojiri, S. Yoshii, M. Yasui, K. Okada, M. Matsuda, J. -S. Jung, T. Kimura, L. Santodonato, G. E. Granroth, K. A. Ross, J. P. Carlo, and B. D. Gaulin. *Neutron Laue Diffraction Study on the Magnetic Phase Diagram of Multiferroic  $MnWO_4$  under Pulsed High Magnetic Fields*. Phys. Rev. Lett., **106**, 237202 (2011).
- 34) J.P. C. Ruff, Z. Islam, J. P. Clancy, K. A. Ross, H. Nojiri, Y. H. Matsuda, H. A. Dabkowska, A. D. Dabkowski, and B. D. Gaulin. *Magnetoelastics of a Spin Liquid: X-Ray Diffraction Studies of  $Tb_2Ti_2O_7$  in Pulsed Magnetic Fields*. Phys. Rev. Lett., **105**, 077203 (2010).
- 35) Granroth G. E., Kolesnikov A. I., Sherline T. E., Clancy J. P., Ross K. A., Ruff J. P. C., Gaulin B. D., Nagler S. E. *SEQUOIA: a newly operating chopper spectrometer at the SNS*. Journal of Physics: Conference Series **251**, 12058 (2010).
- 36) K.A. Ross, J.P.C. Ruff, C.P. Adams, J.S. Gardner, H.A. Dabkowska, Y. Qiu, J.R.D. Copley, and B.D. Gaulin. *Two dimensional kagome correlations and field induced long range order in the ferromagnetic XY pyrochlore  $Yb_2Ti_2O_7$* . Phys. Rev. Lett., **103**, 227202 (2009).



- 37) Z. Islam, J.P.C. Ruff, H. Nojiri, Y.H. Matsuda, K.A. Ross, B.D. Gaulin, Z. Qu, J.C. Lang. *A portable high field pulsed magnet system for single crystal x-ray scattering studies*. Rev. Sci. Instrum., **80**, 113902 (2009).
- 38) J.A. Quilliam, K. A. Ross, A. G. Del Maestro, M. J. P. Gingras, L. R. Corruccini, and J.B. Kycia. Phys. *Evidence for Gapped Spin-Wave Excitations in the Frustrated Gd<sub>2</sub>Sn<sub>2</sub>O<sub>7</sub> Pyrochlore Antiferromagnet from Low-Temperature Specific Heat Measurements*. Rev. Lett. **99**, 097201 (2007).

### Plenary talks

- “*Spin Orbit Coupled Quantum Magnetism*”: American Physical Society’s Four Corners Section Meeting (Oct. 2017)
- “*Towards Emergent Electrodynamics in a Geometrically Frustrated Magnet*”: American Conference on Neutron Scattering (June 2014) (Outstanding Student Research Prize talk)

### Invited talks

- “*Spin Orbit Coupled Quantum Magnetism*”, Northwestern University, Evanston, IL (Feb 2018)
- “*Spin Orbit Coupled Quantum Magnetism*”, Seaborg Institute Lecture, Los Alamos, NM (November 2017)
- “*Spin Orbit Coupled Quantum Magnetism*”, University of Colorado, Boulder, Boulder, CO (October 2017)
- “*New Manifestations of Classical Ground State Degeneracy*”, Ohio State University, Columbus, OH (October 2017)
- “*Quantum phenomena in  $S_{\text{eff}} = 1/2$  pyrochlores revealed by neutron scattering*”, NCNR summer school, Gaithersburg, MD (June 2017)
- “*Frustration, Quantum Magnetism, Spin Liquids*”, CIFAR Summer School, Vancouver, Canada (April 2017)
- George E. Valley, Jr. Prize Talk: “*Quantum Frustrated Magnetism and its Expression in the Ground State Selection of Pyrochlore Magnets*”, APS March Meeting, New Orleans, LA (March 2017)
- “*Quantum Phenomena in XY Pyrochlores*”, National High Magnetic Field Laboratory, Tallahassee, FL (Dec. 2016)

- “*Quantum Phenomena in XY Pyrochlores*”, University of California Irvine, Orange County CA (Nov. 2016)
- “*Quantum Phenomena in XY Pyrochlores*”, Sherbrooke University, Sherbrooke QC (Nov. 2016)
- “*Quantum Phenomena in XY Pyrochlores*”, Stanford University, Palo Alto CA (Nov. 2016)
- “*Ferromagnetism with continuum excitations in the geometrically frustrated pyrochlore,  $Yb_2Ti_2O_7$* ”, APS Four Corners meeting, Las Cruces, NM (Oct. 2016)
- “*Quantum Phenomena in XY Pyrochlores*”, CIFAR Quantum Materials meeting. Paris, France (Oct. 2016)
- “*Quantum Spin Ice and Other Phenomena in XY Pyrochlores*”, Gordon Research Conference on Correlated Electron Systems (June 2016)
- “*Ice-like Ferromagnetism with Continuum Excitations in Stoichiometric  $Yb_2Ti_2O_7$* ”, Topological Matter Conference, MPI, Dresden Germany (Feb. 2016)
- “*Frustrated Magnetism and Quantum Phases of Matter*”: Colloquium, Colorado School of Mines, Golden (Dec. 2015)
- “*Order-by-Disorder versus Spin Freezing in XY Pyrochlore Antiferromagnets*”: Condensed Matter Seminar, University of Utah, Salt Lake City (Nov. 2015)
- “*Quantum Spin Ice*”: Front Range Magnetic Symposium (FRAMS), Colorado State University (Sept. 2015)
- “*Spin Excitations in Stoichiometric  $Yb_2Ti_2O_7$* ”: KITP, Santa Barbara (July 2015)
- “*The effect of exchange disorder on a pyrochlore antiferromagnet: XY fluctuations and freezing in  $NaCaCo_2F_7$* ”: Gordon Research Conference (GRC), Hong Kong (June 2015)
- “*From Order by Disorder to Emergent Electrodynamics in Geometrically Frustrated Pyrochlore Magnets*”: LASSP Seminar, Cornell University, Ithaca NY (May 2015)
- “*Towards Emergent Electrodynamics in a geometrically frustrated magnet*”: Center for Science at Extreme Conditions (CSEC), University of Edinburgh, UK (April 2015)
- “*Order-by-Disorder versus Spin Freezing in XY Pyrochlore Antiferromagnets*”: Seminar, IFW, Dresden, Germany (April 2015)

- “*From Order by Disorder to Emergent Electrodynamics in Geometrically Frustrated Pyrochlore Magnets*”: Colloquium, TU Dresden, Dresden, Germany (April 2015)
- “*Low energy XY spin clusters in a pyrochlore antiferromagnet with weak disorder*”: APS March Meeting, San Antonio, TX (March 2015)
- “*Experimental Pyrochlore Systems*”: Theory Winter School, National High Magnetic Field Lab, Tallahassee, FL (January 2015)
- “*Magnetic Correlations in a Frustrated Ni<sup>3+</sup>-based Honeycomb Lattice*”: Strongly Correlated Electron Systems (SCES), Grenoble, France (July 2014)
- “*Magnetic Correlations in a Frustrated Ni<sup>3+</sup>-based Spin 1/2 Honeycomb Lattice: Na<sub>(1-x)</sub>Ni<sub>2</sub>SbO<sub>6</sub> \* 1.5 D<sub>2</sub>O*”: Workshop on Novel Quantum Materials and Phases, Okinawa Institute of Science and Technology, Okinawa, Japan (May 2014)
- “*From “Order By Disorder” to Emergent Electrodynamics in Geometrically Frustrated Pyrochlore Magnets*”: “Chez Pierre” seminar, MIT, Cambridge MA (April 2014)
- “*Towards Emergent Electrodynamics in a Geometrically Frustrated Magnet*”: Lehigh University, Bethlehem PA (March 2014)
- “*From “Order By Disorder” to Emergent Electrodynamics in Geometrically Frustrated Pyrochlore Magnets*”: Condensed Matter Seminar, Caltech, Pasadena CA (February 2014)
- “*Ground states of the effective spin-1/2 XY pyrochlores: “Quantum Spin Ice” and “Order By Disorder”*”: Condensed Matter Seminar, University of Kentucky, Lexington KY (November 2013)
- “*Ground states of the effective spin-1/2 XY pyrochlores: “Quantum Spin Ice” and “Order By Disorder”*”: Condensed Matter Seminar, George Mason University, Arlington VA (November 2013)
- “*Pulsed magnet neutron scattering applied to multiferroic MnWO<sub>4</sub>*”: SNS and HFIR User Group Meeting, Oak Ridge TN (August 2013)
- “*Spin Hamiltonians determined for Er<sub>2</sub>Ti<sub>2</sub>O<sub>7</sub> and Yb<sub>2</sub>Ti<sub>2</sub>O<sub>7</sub> through high-field inelastic neutron scattering*”: Workshop on Synchrotron and Neutron Applications of High Magnetic Fields, ESRF, Grenoble France (October 2012)
- “*“Quantum Spin Ice” Physics Determined from High Field Spin Wave Excitations in Yb<sub>2</sub>Ti<sub>2</sub>O<sub>7</sub>*”: Exotic Phases of Frustrated Magnets, Kavli Institute for Theoretical Physics (KITP), Santa Barbara CA (October 2012)

- “*Spin Hamiltonian and Ground State Clues from Neutron Scattering in the Pyrochlore Spin Liquid Candidate,  $\text{Yb}_2\text{Ti}_2\text{O}_7$* ”: NIST Center for Neutron Research Seminar, NIST, Gaithersburg MD (October 2012)
- “*Experimental Clues to the Ground State of a "Quantum Spin Ice" Pyrochlore Magnet*”: Canadian Association of Physicists (CAP) Congress, Calgary AB (June 2012)
- “*Experimental clues to the ground state of the quantum spin ice  $\text{Yb}_2\text{Ti}_2\text{O}_7$* ”: Highly Frustrated Magnetism (HFM), McMaster University, Hamilton ON (June 2012)
- “*Effective Spin-1/2 Hamiltonians Determined for  $\text{Er}_2\text{Ti}_2\text{O}_7$  &  $\text{Yb}_2\text{Ti}_2\text{O}_7$  Through Inelastic Neutron Scattering*”: 4-Corner Condensed Matter Symposium, Perimeter Institute, Waterloo ON (May 2012)
- “*Experimental clues to the ground state of the magnetic pyrochlore,  $\text{Yb}_2\text{Ti}_2\text{O}_7$* ”: Condensed Matter Seminar, Johns Hopkins University, Baltimore MD (January 2012)
- “*Experimental clues to the ground state of the magnetic pyrochlore,  $\text{Yb}_2\text{Ti}_2\text{O}_7$* ”: Condensed Matter Seminar, MIT, Cambridge MA (January 2012)
- “*Dimensional Evolution of Spin Correlations in  $\text{Yb}_2\text{Ti}_2\text{O}_7$* ”: Geometrically Frustrated Magnets (International Institute of Physics) conference, Natal Brazil (December 2011).
- “*Experimental Clues to the Ground State of the Magnetic Pyrochlore  $\text{Yb}_2\text{Ti}_2\text{O}_7$* ”: Condensed Matter Seminar, University of Waterloo, Waterloo ON (October 2011).
- “*You can take it with you: tailoring your undergraduate degree to prepare for graduate school*”: Undergraduate seminar, University of Waterloo, Waterloo ON (October 2011).
- “*From Two Dimensional Correlations to a Disordered Ground State in the XY Pyrochlore,  $\text{Yb}_2\text{Ti}_2\text{O}_7$* ” APS March Meeting 2011, abstract #A18.00001, Dallas TX (March 2011).
- “*Time of Flight Neutron Diffraction at 30T*”, American Conference on Neutron Scattering, Ottawa ON (June 2010).
- “*Unexpected Frustration, 2D Spin Correlations, and Field-Induced Order in  $\text{Yb}_2\text{Ti}_2\text{O}_7$* ”, Seminars at Kyoto University and Japan Atomic Energy Agency, Japan (Feb 2010).
- “*Unexpected Frustration, 2D Spin Correlations, and Field-Induced Order in  $\text{Yb}_2\text{Ti}_2\text{O}_7$* ”, Advanced Photon Source User Talk, Argonne IL (October 2009).

## Contributed talks

- K.A. Ross, J. Roudebush, D. Pajerowski, C. Brown, J. Rodriguez, C.L. Broholm, R.J. Cava, “*Magnetic Correlations in a Frustrated Ni<sup>3+</sup>-based Spin 1/2 Honeycomb Lattice*”, APS March Meeting 2014, abstract #L4.00009, Denver CO (March 2014)
- K.A. Ross, Th. Proffen, H.A. Dabkowska, J.A. Quilliam, L.R. Yaraskavitch, J.B. Kycia, B.D. Gaulin, “*Single crystals of Yb<sub>2</sub>Ti<sub>2</sub>O<sub>7</sub> grown by the Optical Floating Zone technique: naturally “stuffed” pyrochlores?*”, APS March Meeting 2013, abstract #U14.00005, Baltimore MD (March 2013)
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- K.A. Ross, J.P.C. Ruff, B.D. Gaulin, C.P. Adams, J.S. Gardner, H.A. Dabkowska, Y. Qiu, J.R.D. Copley, “*Unexpected Frustration, 2D Spin Correlations, and Field-Induced Order in Yb<sub>2</sub>Ti<sub>2</sub>O<sub>7</sub>*”, Canadian Association of Physicists (CAP) Congress, Toronto ON (June 2010).
- K.A. Ross, J.P.C. Ruff, B.D. Gaulin, C.P. Adams, J.S. Gardner, H.A. Dabkowska, Y. Qiu, J.R.D. Copley, “*Planar Correlations and Field Induced Order in Yb<sub>2</sub>Ti<sub>2</sub>O<sub>7</sub>*”, International Conference on Neutron Scattering, Knoxville TN (April 2009).
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- K.A. Ross, J.P.C. Ruff, B.D. Gaulin, C.P. Adams, J.S. Gardner, H.A. Dabkowska, Y. Qiu, J.R.D. Copley, “*Two Dimensional Correlations and Field Induced Order in the Pyrochlore Ferromagnet Yb<sub>2</sub>Ti<sub>2</sub>O<sub>7</sub>*”, APS March Meeting 2009, abstract #Y31.00002, Pittsburgh PA (March 2009)
- K.A. Ross, J.A. Quilliam, L. Corruccini, J.B. Kycia “*Low temperature specific heat of geometrically frustrated Gd<sub>2</sub>Sn<sub>2</sub>O<sub>7</sub>*”. APS March Meeting, March 5-9, 2007, abstract #A15.003, Denver CO (March 2007)

## Teaching

2015 - present

Lecturer, Colorado State University (Math Methods, Physical Thermodynamics)

2018/01

Lecturer, Magnetism PRSE Workshop

2017/04

Instructor, CIFAR Summer School

2013/07 & 2017/06

Instructor, NCNR Neutron Scattering Summer School

2007/09 - 2012/09

Teaching Assistant, McMaster University

Undergraduate level: Physics 1B03 (kinematics and dynamics), Physics 2B03 (electronics), Arts and Science 2D06 (physics for an interdisciplinary program), Solid State Physics 4K03

## **Outreach**

04/2017: STEM Middle School Girls workshop leader (Expand Your Horizons)

06/2015: Interview for “The Innovators with Laurelle Turner”, KCSU radio station.

06/2014: Participated in a live television interview about neutron scattering on Knoxville’s WBIR news station

2012 - 2014: Tour guide for school group tours of the NIST Center for Neutron Research.

2011/09 - 2012/09: Member of the Organizing committee for the Condensed Matter Journal Club, McMaster University

2011/09 - 2012/09: Mentor for incoming graduate students, McMaster University

2010/09 and 2011/09: Volunteer for the Engineering and Science Olympics, McMaster University

2007/09 - 2012/09: Liquid Nitrogen and Superconductivity Demonstrator for the High School Outreach program, McMaster University

2010/10: Graduate student representative for McMaster University, Canadian Undergraduate Physics Conference (CUPC), Halifax NS, Canada