

CURRICULUM VITAE

Valery Kiryukhin

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EDUCATION

Ph.D. (Physics), Nov. 1997	Princeton University , Princeton, NJ
M.S., Sep. 1992	Moscow Institute of Physics and Technology , Moscow, Russia

PROFESSIONAL EMPLOYMENT

July 2024 – present	Rutgers University , Piscataway, NJ Distinguished Professor, Dept. of Physics and Astronomy
July 2011 – June 2024	Rutgers University , Piscataway, NJ Professor, Dept. of Physics and Astronomy
July 2005 – June 2011	Rutgers University , Piscataway, NJ Associate Professor, Dept. of Physics and Astronomy
Sep. 1999 – June 2005	Rutgers University , Piscataway, NJ Assistant Professor, Dept. of Physics and Astronomy

PROFESSIONAL PREPARATION

Sep. 1997 - Aug. 1999	Massachusetts Institute of Technology , Cambridge, MA Postdoctoral Research Associate, Department of Physics
Sep. 1992 - Aug. 1997	Princeton University , Princeton, NJ Graduate Research Assistant, Department of Physics

GUEST RESEARCHER POSITIONS

May 2015 – Aug. 2015	Brookhaven National Laboratory Upton, NY Guest Researcher
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Feb. 2009 - Aug. 2009

Max Planck Institute for Solid State Research,
Stuttgart, Germany
Guest Researcher

Oct. 2008 – Nov. 2008

National Institute for Standards and Technology,
Gaithersburg, MD
Guest Researcher, NIST Center for Neutron Research

AWARDS AND ACADEMIC HONORS

- 2024 Donald H. Jacobs Chair in Applied Physics, Rutgers University (2025-2027)
- 2014 Fellow, American Physical Society
- 2008 Friedrich Wilhelm Bessel Research Award, Alexander von Humboldt Foundation
- 2005 Rutgers University Board of Trustees Fellowship for Scholarly Excellence
- 2001 Alfred P. Sloan Foundation Fellowship Award
- 2001 NSF CAREER Grant Award.

OTHER PROFESSIONAL ACTIVITIES

- Scientific Committee Member, Brainstorming Workshop “Roadmap for Altermagnetism”, Newark, NJ, January 8-10, 2025.
- Co-organizer, Telluride Science School Workshop “Enhanced functionalities in 4d and 5d Containing Materials from Large Spin-Orbit Coupling”, Telluride, CO, June 25-29, 2024.
- Reviewer, laboratory research projects at Oak Ridge National Laboratory (ORNL), supported by the U.S. Department of Energy (DOE), Office of Basic Energy Sciences (BES), Materials Sciences and Engineering Division. April, 2021.
- Program Committee member, 2020 Annual Meeting of the American Physical Society Mid-Atlantic Section (December 4-6, 2020).
- Co-organizer, Telluride Science School Workshop “Enhanced functionalities in 4d and 5d Containing Materials from Large Spin-Orbit Coupling”, Telluride, CO, June 23-27, 2020. Postponed.
- Proposal Review Panel member, National Synchrotron Light Source II, Brookhaven National Laboratory, 2018 – present.
- Co-organizer, Telluride Science School Workshop “Enhanced in 4d and 5d Containing Materials from Large Spin-Orbit Coupling”, Telluride, CO, June 26-30, 2018.
- Program and Focus Session Committee member, 2017 Annual Meeting of the American Physical Society Mid-Atlantic Section (November 3-5, 2017).
- Beamline Advisory Team member, Integrated In-Situ and Resonant X-ray Studies Beamline (ISR), NSLS II, Brookhaven National Laboratory. (2012-2017).
- Neutron Science Review Committee Member, Oak Ridge National Laboratory (2013-2017).
- Proposal review panel, National Science Foundation, 2017, 2018.
- Proposal Development Team member for two NSLS II beamlines, “A Beamline for Integrated In-Situ and Resonant Hard X-ray Studies: Illuminating the Physics of Materials for the 21st Century (ISR)”, and “A Beamline for Materials Physics and Processing (MPP)” (2010-2012.)
- Beam Time Allocation Committee (BTAC) member, NIST Center for Neutron Research (2009-present).
- Co-Organizer of “Complex Oxides” Focus Topic (APS Division of Materials Physics) for 2007 March Meeting of the American Physical Society.

- Proposal Review Panel Member, Advanced Photon Source, Argonne National Laboratory (2005-2008).
- Coordinator, Workshop on Science Opportunities using X-Rays and Split Gap High-Field Magnets, Argonne National Laboratory (June 8-9, 2006).
- Special Interest Group Representative (x-ray scattering and crystallography), Users Executive Committee, National Synchrotron Light Source, Brookhaven National Laboratory (2004-2005).
- Proposal Review Panel Member, the National Synchrotron Light Source, Brookhaven National Laboratory (2004-2007).
- Member of the Program Committee, 46th Annual Conference on Magnetism and Magnetic Materials, July 2001.
- Proposal Study Group, Cooperative Grants Program, U.S. Civilian Research and Development Foundation (CRDF), Washington DC, May 21-22, 1996.
- Proposal Study for the U.S. Department of Commerce (NIST), for Stanford Linear Accelerator Center (SSRL), and for the U.S. National Science Foundation, 1997—present. Proposal review panel for the CRDF, 2004.

PUBLICATIONS

94. N. Khan, A. Barbour, J. Yang, S.-W. Cheong, C. Mazzoli, V. Kiryukhin, “Static and dynamic topological defects in the domain textures in the helical antiferromagnet $\text{Ni}_2\text{CoTeO}_6$ ”, *Phys. Rev. B* **111**, 014435 (2025); doi:10.1103/PhysRevB.111.014435.
93. V. Kiryukhin, “Unveiling ultrafast disorder dynamics”, *Nat. Mater.* **23**, 1011–1012 (2024). <https://doi.org/10.1038/s41563-024-01946-5>
92. P. Yadav, S. Lee, G. L. Pascut, J. Kim, M. J. Gutmann, X. Xu, B. Gao, S.-W. Cheong, V. Kiryukhin, S. Choi, “Noncollinear magnetic order, in-plane anisotropy, and magnetoelectric coupling in the pyroelectric honeycomb antiferromagnet $\text{Ni}_2\text{Mo}_3\text{O}_8$ ”, *Phys. Rev. Research* **5**, 033099 (2023).
91. K. Park, J. Kim, S. Choi, S. Fan, C. Kim, D. G. Oh, N. Lee, S.-W. Cheong, V. Kiryukhin, Y. J. Choi, D. Vanderbilt, J. H. Lee, J. L. Musfeldt, “Spin–phonon interactions and magnetoelectric coupling in $\text{Co}_4\text{B}_2\text{O}_9$ ($B = \text{Nb}, \text{Ta}$)”, *Appl. Phys. Lett.* **122**, 182902 (2023); doi:10.1063/5.0137903.
90. M. G. Kim, A. Barbour, W. Hu, S. B. Wilkins, I. K. Robinson, M. P. M. Dean, J. Yang, C. Won, S.-W. Cheong, C. Mazzoli, V. Kiryukhin, “Real-space observation of fluctuating antiferromagnetic domains”, *Sci. Adv.* **8**, eabj9493 (2022); doi:10.1126/sciadv.abj9493.
89. K. Park, G. L. Pascut, G. Khanal, M. O. Yokosuk, Xianghan Xu, Bin Gao, M. J. Gutmann, A. P. Litvinchuk, V. Kiryukhin, S.-W. Cheong, D. Vanderbilt, K. Haule, and J. L. Musfeldt, “Band-Mott mixing hybridizes the gap in $\text{Fe}_2\text{Mo}_3\text{O}_8$ ”, *Phys. Rev. B* **104**, 195143 (2021).
88. S. Choi, D. G. Oh, M. J. Gutmann, S. Pan, G. Kim, K. Son, J. Kim, N. Lee, S.-W. Cheong, Y. J. Choi, V. Kiryukhin, “Noncollinear antiferromagnetic order in the buckled honeycomb lattice of magnetoelectric $\text{Co}_4\text{Ta}_2\text{O}_9$ determined by single-crystal neutron diffraction”, *Phys. Rev. B* **102**, 214404 (2020).
87. T. N. Stanislavchuk, G. L. Pascut, A. P. Litvinchuk, Z. Liu, Sungkyun Choi, M. J. Gutmann, B. Gao, K. Haule, V. Kiryukhin, S.-W. Cheong, and A. A. Sirenko, “Spectroscopic and first principle DFT+eDMFT study of complex structural, electronic, and vibrational properties of $\text{M}_2\text{Mo}_3\text{O}_8$ ($M = \text{Fe}, \text{Mn}$) polar magnets”, *Phys. Rev. B* **102**, 115139 (2020).

86. N. Lee, D. G. Oh, S. Choi, J. Y. Moon, J. H. Kim, H. J. Shin, K. Son, J. Nuss, V. Kiryukhin, Y. J. Choi, “Highly nonlinear magnetoelectric effect in buckled-honeycomb antiferromagnetic $\text{Co}_4\text{Ta}_2\text{O}_9$ ”, *Sci. Rep.* **10**, 12362 (2020). <https://doi.org/10.1038/s41598-020-69117-5>
85. S.-W. Cheong, M. Fiebig, W. Wu, L. Chapon, V. Kiryukhin, “Seeing is believing: visualization of antiferromagnetic domains”, *npj Quantum Materials* (2020)5:3; <https://doi.org/10.1038/s41535-019-0204-x>
84. M. G. Kim, B. Winn, S. Chi, A. T. Savici, J. A. Rodriguez-Rivera, W. C. Chen, X. Xu, Y. Li, J. W. Kim, S.-W. Cheong, and V. Kiryukhin, “Spin-liquid-like state in pure and Mn-doped TbInO_3 with a nearly triangular lattice”, *Phys. Rev. B* **100**, 024405 (2019).
83. A.A. Sirenko, P. Marsik, C. Bernhard, T.N. Stanislavchuk, V. Kiryukhin, S.-W. Cheong, “Terahertz vortex beam as a spectroscopic probe of magnetic excitations”, *Phys. Rev. Lett.* **122**, 237401 (2019).
82. M. G. Kim, H. Miao, B. Gao, S.-W. Cheong, C. Mazzoli, A. Barbour, W. Hu, S.B. Wilkins, I.K. Robinson, M.P.M. Dean, V. Kiryukhin, “Imaging antiferromagnetic antiphase domain boundaries using magnetic Bragg diffraction phase contrast”, *Nature Communications* **9**, article number: 5013 (2018); doi: 10.1038/s41467-018-07350-3.
81. S.-W. Cheong, D. Talbayev, V. Kiryukhin, A. Saxena, “Broken symmetries, non-reciprocity, and multiferroicity”, *npj Quantum Materials* (2018) 3:19 ; doi:10.1038/s41535-018-0092-5.
80. O.G. Danylchenko, R.E. Boltnev, V.V. Khmelenko, V. Kiryukhin, O.P. Konotop, D.M. Lee, N.V. Krainyukova, “Argon nanoclusters with fivefold symmetry in supersonic gas jets and superfluid helium”, *J. Low Temp. Phys.* **187**, 156 (2017).
79. W. Ratcliff, J.W. Lynn, V. Kiryukhin, P. Jain, M.R. Fitzsimmons, “Magnetic structures and dynamics of multiferroic systems obtained with neutron scattering”, *npj Quantum Materials* **1**, 16003 (2016), doi:10.138/npjquantmats.2016.3
78. T. Maurerer, M. Vogt, P.-H. Hsu, G.L. Pascut, K. Haule, V. Kiryukhin, J. Yang, S.-W. Cheong, W. Wu, M. Bode, “Visualizing anisotropic propagation of stripe domain walls in staircaselike transitions of IrTe_2 ”, *Phys. Rev. B* **94**, 014106 (2016).
77. Y. Wang, G.L. Pascut, B. Gao, T.A. Tyson, K. Haule, V. Kiryukhin, S.-W. Cheong, “Unveiling hidden ferrimagnetism and giant magnetoelectricity in polar magnet $\text{Fe}_2\text{Mo}_3\text{O}_8$ ”, *Sci. Rep.* **5**, 12268; doi: 10.1038/srep12268 (2015).
76. S.F. Blake, M.D. Watson, A. McCollam, S. Kasahara, R.D. Johnson, A. Narayanan, G.L. Pascut, K. Haule, V. Kiryukhin, T. Yamashita, D. Watanabe, T. Shibauchi, Y. Matsuda, A.I. Coldea, “Fermi surface of IrTe_2 in the valence-bond state as determined by quantum oscillations”, *Phys. Rev. B* **91**, 121105(R) (2015).
75. D. Mazumdar, K. Haule, J.J. Yang, G.L. Pascut, B.S. Holinsworth, K.R. O’Neal, V. Kiryukhin, S.-W. Cheong, J.L. Musfeldt, “Optical evidence for bonding-antibonding splitting in IrTe_2 ”, *Phys. Rev. B* **91**, 041105 (R) (2015).

74. S.-Z. Lin, X. Wang, Y. Kamiya, G.-W. Chern, F. Fan, D. Fan, B. Casas, Y. Liu, V. Kiryukhin, W.H. Zurek, C.D. Batista, S.-W. Cheong, “Topological defects as relics of emergent continuous symmetry and Higgs condensation of disorder in ferroelectrics”, *Nature Physics* **10**, 970 (2014).
73. G.L. Pascut, T. Birol, M.J. Gutmann, J.J. Yang, S.-W. Cheong, K. Haule, V. Kiryukhin, “Series of alternating states with unpolarized and spin-polarized bands in dimerized IrTe₂”, *Phys. Rev. B* **90**, 195122 (2014).
72. G.L. Pascut, K. Haule, M.J. Gutmann, S.A. Barnett, A. Bobmardi, S. Artyukhin, T. Birol, D. Vanderbilt, J.J. Yang, S.-W. Cheong, V. Kiryukhin, “Dimerization-induced cross-layer quasi-two-dimensionality in metallic IrTe₂”, *Phys. Rev. Lett.* **112**, 086402 (2014).
71. J.W. Kim, Y. Kamiya, E.D. Mun, M. Jaime, N. Harrison, J.D. Thompson, V. Kiryukhin, H.T. Yi, Y.S. Oh, S.-W. Cheong, C.D. Batista, V.S. Zapf, “Multiferroicity with coexisting isotropic and anisotropic spins in Ca₃Co_{2-x}Mn_xO₆”, *Phys. Rev. B* **89**, 060404(R) (2014).
70. S. Lee, M.T. Fernandez-Diaz, H. Kimura, Y. Noda, D.T. Adroja, S. Lee, J. Park, V. Kiryukhin, S.-W. Cheong, M. Mostovoy, J.-G. Park, “Negative magnetostrictive magnetoelectric coupling of BiFeO₃”, *Phys. Rev. B* **88**, 060103 (R) (2013).
69. N.V. Krainyukova, R.E. Boltnev, E.P. Bernard, V.V. Khmelenko, D.M. Lee, V. Kiryukhin, “Observation of the fcc-to-hcp transition in ensembles of argon nanoclusters”, *Phys. Rev. Lett.* **109**, 245505 (2012).
68. J. Jeong, E.A. Goremychkin, T. Guidi, K. Nakajima, G.S. Jeon, S.-A. Kim, S. Furukawa, Y.B. Kim, S. Lee, V. Kiryukhin, S.-W. Cheong, J.-G. Park, “Spin wave measurements over the full Brillouin zone of multiferroic BiFeO₃”, *Phys. Rev. Lett.* **108**, 077202 (2012).
67. M. Ramazanoglu, M. Laver, W. Ratcliff II, S.M. Watson, W.C. Chen, A. Jackson, K. Kothapalli, Seongsu Lee, S.-W. Cheong, and V. Kiryukhin, “Local Weak Ferromagnetism in Single-Crystalline Ferroelectric BiFeO₃”, *Phys. Rev. Lett.* **107**, 207206 (2011).
66. J. Park, S.-H. Lee, S. Lee, F. Gozzo, H. Kimura, Y. Noda, Y. J. Choi, V. Kiryukhin, S.-W. Cheong, Y. Jo, E. S. Choi, L. Balicas, G. S. Jeon, J.-G. Park, “Magnetoelectric feedback among magnetic order, polarization, and lattice in multiferroic BiFeO₃”, *J. Phys. Soc. Japan* **80**, 114714 (2011).
65. M. Ramazanoglu, W. Ratcliff II, H. T. Yi, A. A. Sirenko, S.-W. Cheong, V. Kiryukhin, “Giant Effect of Uniaxial Pressure on Magnetic Domain Populations in Multiferroic Bismuth Ferrite”, *Phys. Rev. Lett.* **107**, 067203 (2011).
64. N. Lee, Y. J. Choi, M. Ramazanoglu, W. Ratcliff II, V. Kiryukhin, and S.-W. Cheong, “Mechanism of exchange striction of ferroelectricity in multiferroic orthorhombic HoMnO₃ single crystals”, *Phys. Rev. B* **84**, 020101(R) (2011).
63. M. Ramazanoglu, W. Ratcliff II, Y. J. Choi, Seongsu Lee, S.-W. Cheong, V. Kiryukhin, “Temperature-dependent properties of the magnetic order in single-crystal BiFeO₃”, *Phys. Rev. B* **83**, 174434 (2011).
62. T. D. Kang, E. Standard, K. H. Ahn, A. A. Sirenko, G. L. Carr, S. Park, Y. J. Choi, M. Ramazanoglu, V. Kiryukhin, S.-W. Cheong, “Coupling between magnon and ligand-field excitations in magnetoelectric Tb₃Fe₅O₁₂ garnet”, *Phys. Rev. B* **82**, 014414 (2010).

61. R. Flint, H.-T. Yi, P. Chandra, S.-W. Cheong, and V. Kiryukhin, “Spin-state crossover in multiferroic $\text{Ca}_3\text{Co}_{2-x}\text{Mn}_x\text{O}_6$ ”, *Phys. Rev. B* **81**, 092402 (2010).
60. V. Kiryukhin, Seongsu Lee, W. Ratcliff II, Q. Huang, H.T. Yi, Y.J. Choi, S-W. Cheong, “Order by Static Disorder in the Ising Chain Magnet $\text{Ca}_3\text{Co}_{2-x}\text{Mn}_x\text{O}_6$ ”, *Phys. Rev. Lett.* **102**, 187202 (2009).
59. T. Choi, S. Lee, Y. J. Choi, V. Kiryukhin, S.-W. Cheong, “Switchable Ferroelectric Diode and Photovoltaic Effect in BiFeO_3 ”, *Science* **324**, 63 (2009).
58. Y.J. Jo, S. Lee, E.S. Choi, H.T. Yi, W. Ratcliff II, Y.J. Choi, V. Kiryukhin, S-W. Cheong, L. Balicas, “3:1 magnetization plateau and suppression of ferroelectric polarization in an Ising chain multiferroic”, *Phys. Rev. B* **79**, 012407 (2009).
57. W. Wu, V. Kiryukhin, H.-J. Noh, K.-T. Ko, J.-H. Park, W. Ratcliff II, P.A. Sharma, N. Harrison, Y.J. Choi, Y. Horibe, S. Lee, S. Park, H.T. Yi, C.L. Zhang, S.-W. Cheong, “Formation of Pancakelike Ising Domains and Giant Magnetic Coercivity in Ferrimagnetic LuFe_2O_4 ”, *Phys. Rev. Lett.* **101**, 137203 (2008).
56. S. Lee, T. Choi, W. Ratcliff II, R. Erwin, S-W. Cheong, V. Kiryukhin, “Single ferroelectric and chiral magnetic domain of single-crystalline BiFeO_3 in an electric field”. *Phys. Rev. B* **78**, 100101(R) (2008).
55. S. Lee, W. Ratcliff II, S-W. Cheong, V. Kiryukhin, “Electric field control of the magnetic state in BiFeO_3 single crystals”. *Appl. Phys. Lett.* **92**, 192906 (2008).
54. Y.J. Choi, H.T. Yi, S. Lee, Q. Huang, V. Kiryukhin, S-W. Cheong, “Ferroelectricity in an Ising Chain Magnet”, *Phys. Rev. Lett.*, **100**, 047601 (2008).
53. S. Grenier, K.J. Thomas, J.P. Hill, U. Staub, Y. Bodenthin, M. Garcia-Fernandez, V. Scagnoli, V. Kiryukhin, S-W. Cheong, B.G. Kim, J.M. Tonnerre, “Direct Observation of Oxygen Superstructures in Manganites”, *Phys. Rev. Lett.* **99**, 206403 (2007).
52. V. Kiryukhin, E.P. Bernard, V.V. Khmelenko, R.E. Boltnev, N.V. Krainyukova, D.M. Lee, “Noble-Gas Nanoclusters with Fivefold Symmetry Stabilized in Superfluid Helium”, *Phys. Rev. Lett.* **98**, 195506 (2007).
51. M. Croft, V. Kiryukhin, Y. Horibe, S-W. Cheong, “Universality in one-dimensional orbital wave ordering in spinel and related compounds: an experimental perspective”, *New Journal of Physics* **9**, 86 (2007).
50. S. Grenier, V. Kiryukhin, S-W. Cheong, B.G. Kim, J.P. Hill, K.J. Thomas, J.M. Tonnerre, Y. Joly, U. Staub, V. Scagnoli, “Observation of orbital ordering and Jahn-Teller distortions supporting the Wigner-crystal model in highly doped $\text{Bi}_{1-x}\text{Ca}_x\text{MnO}_3$ ”, *Phys. Rev. B* **75**, 085101 (2007).
49. V. Kiryukhin, Y. Horibe, Y.S. Hor, H.J. Noh, S-W. Cheong, and C.H. Chen, “Incommensurate Structural Correlations in the Disordered Spin-Dimer State Induced by X-Ray and Electron Irradiation in CuIr_2S_4 ”, *Phys. Rev. Lett.* **97**, 225503 (2006).
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46. S. Grenier, J. P. Hill, V. Kiryukhin, W. Ku, Y.-J. Kim, K. J. Thomas, S.-W. Cheong, Y. Tokura, Y. Tomioka, D. Casa, T. Gog, “*d-d* excitations in manganites probed by resonant inelastic x-ray scattering”, *Phys. Rev. Lett.* **94**, 047203 (2005).
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44. V. Kiryukhin, A. Borissov, J. S. Ahn, Q. Huang, J. W. Lynn, and S-W. Cheong, “Uncorrelated and correlated nanoscale lattice distortions in the paramagnetic phase of magnetoresistive manganites”, *Phys. Rev. B* **70**, 214424 (2004).
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38. S. Grenier, K. J. Thomas, Y-J. Kim, J. P. Hill, Doon Gibbs, V. Kiryukhin, Y. Tokura, Y. Tomioka, D. Casa, T. Gog, C. Venkataraman, “Resonant X-ray scattering as a probe of the valence and magnetic ground state and excitations in $\text{Pr}_{0.6}\text{Ca}_{0.4}\text{MnO}_3$ ”, *Physica B* **345**, 6 (2004).
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35. M. Croft, W. Caliebe, H. Woo, T. A. Tyson, D. Sills, Y. S. Hor, S-W. Cheong, V. Kiryukhin, and S-J. Oh, “Metal-insulator transition in CuIr_2S_4 : XAS results on the electronic structure”, *Phys. Rev. B* **67**, 201102 (2003).
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