

James K. Glasbrenner

Assistant Professor, Computational & Data Sciences Department
Associate Director, Quantum Materials Center
College of Science, George Mason University

Contact Information

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Current Employment/Appointments/Affiliations

Assistant Professor, 2016-Present. George Mason University, Fairfax, VA.

Associate Director, 2018-Present. Quantum Materials Center, Fairfax, VA.

Past Employment/Appointments/Affiliations

Visiting Researcher, 2016-2017, Naval Research Laboratory, Washington, DC.

National Research Council Postdoctoral Research Associate, 2013-2016. Advisor: Igor Mazin, Naval Research Laboratory, Washington, DC.

Postdoctoral Research Associate, 2013. Advisor: Kirill Belashchenko, University of Nebraska, Lincoln, NE.

Education

Ph.D. (Physics & Astronomy), University of Nebraska-Lincoln, May 2013

B.S. (Physics), Lebanon Valley College; Minor: English, May 2006

Research Record

1 publication in Nature Physics, 15 publications in Physical Review, 263 citations, 1 American Physical Society invited talk

Current Research Interests

- Discovery of new quantum materials using machine learning
- Magnetism of the iron-based superconductors
- Noncollinear and frustrated magnetism

Teaching Experience

Professor, George Mason University

- CSI-702: High-Performance Computing (Graduate), Spring 2017, Spring 2018
- CDS-101: Introduction to Computational and Data Sciences (Undergraduate), Fall 2016, Spring 2017, Fall 2017, Spring 2018, Summer 2018
- CDS-102: Introduction to Computational and Data Sciences Lab (Undergraduate), Fall 2016, Spring 2017, Fall 2017, Summer 2018
- CDS-411: Modeling and Simulation II (Undergraduate), Fall 2017

Recognition and Honors

Mason's Center for Advanced Study competition winner	2018
<i>Establishes a Quantum Materials Center at George Mason University</i>	
NRC/ASEE Postdoctoral Research Publication Award	2016
National Research Council Research Associateship Award	2013-2016
Graduate Assistance in Areas of National Need (GAANN) Fellowship	2006-2008
<i>Teaching fellowship: observation and critique of teaching skills by Dr. Richard Lombardo</i>	
54 th Midwest Solid State Conference Poster Award	2007
Summa Cum Laude, Lebanon Valley College	2006

Outstanding Achievement Award in Physics, <i>Lebanon Valley College Physics Department</i>	2006
Vickroy Award Scholarship, <i>Lebanon Valley College</i>	2002-2006
First Year Achievement Award in Physics, <i>Lebanon Valley College Physics Department</i>	2003

Publications in Refereed Journals

- [17] S. Ikeda, Y. Tsuchiya, X.-W. Zhang, S. Kishimoto, T. Kikegawa, Y. Yoda, H. Nakamura, M. Machida, **J. K. Glasbrenner**, and H. Kobayashi, "New Antiferromagnetic Order with Pressure-Induced Superconductivity in EuFe_2As_2 ," *Phys. Rev. Lett.* (*in submission*)
- [16] M. A. Surmach, B. J. Chen, Z. Deng, C. Q. Jin, **J. K. Glasbrenner**, I. I. Mazin, A. Ivanov, and D. S. Inosov, "Weak doping dependence of the antiferromagnetic coupling between nearest-neighbor Mn^{2+} spins in $(\text{Ba}_{1-x}\text{K}_x)(\text{Zn}_{1-y}\text{Mn}_y)_2\text{As}_2$," *Phys. Rev. B* **97**, 104418 (2018).
- [15] K. Zhao, **J. K. Glasbrenner**, H. Gretarsson, D. Schmitz, J. Bednarcik, M. Etter, J. P. Sun, R. S. Manna, A. Al-Zein, S. Lafuerza, W. Scherer, J. G. Cheng, and P. Gegenwart, "Collapsed tetragonal phase as a strongly covalent and fully nonmagnetic state: Persistent magnetism with interlayer As-As bond formation in Rh-doped $\text{Ca}_{0.8}\text{Sr}_{0.2}\text{Fe}_2\text{As}_2$," *Phys. Rev. B* **97**, 020510 (2018).
- [14] G. Zhang, **J. K. Glasbrenner**, R. Flint, I. I. Mazin, and R. M. Fernandes, "Double-stage nematic bond ordering above double stripe magnetism: Application to $\text{BaTi}_2\text{Sb}_2\text{O}$," *Phys. Rev. B* **95**, 174402 (2017).
- [13] Daniel Guterding, Harald O. Jeschke, I. I. Mazin, **J. K. Glasbrenner**, E. Bascones, and Roser Valentí, "Non-trivial role of interlayer cation states in iron-based superconductors," *Phys. Rev. Lett.* **118**, 017204 (2017).
- [12] **J. K. Glasbrenner**, "Collapse and control of the MnAu_2 spin-spiral state through pressure and doping," *Phys. Rev. B* **93**, 184402 (2016).
- [11] **J. K. Glasbrenner**, I. I. Mazin, H. O. Jeschke, P. J. Hirschfeld, R. M. Fernandes and R. Valentí, "Effect of magnetic frustration on nematicity and superconductivity in Fe chalcogenides," *Nat. Phys.* **11**, 953 (2015).
- [10] **J. K. Glasbrenner**, K. M. Bussmann, and I. I. Mazin, "Magnetic spiral induced by strong correlations in MnAu_2 ," *Phys. Rev. B* **90**, 144421 (2014).
- [9] **J. K. Glasbrenner**, I. Žutić, and I. I. Mazin, "Theory of Mn-doped II-II-V semiconductors," *Phys. Rev. B* **90**, 140403(R) (2014).
- [8] **J. K. Glasbrenner**, B. S. Pujari, and K. D. Belashchenko, "Deviations from Matthiessen's rule and resistivity saturation effects in Gd and Fe from first principles," *Phys. Rev. B* **89**, 174408 (2014).
- [7] **J. K. Glasbrenner**, J. P. Velev, and I. I. Mazin, "First-principles study of the minimal model of magnetic interactions in Fe-based superconductors," *Phys. Rev. B* **89**, 064509 (2014).
- [6] **J. K. Glasbrenner** and I. I. Mazin, "First-principles evidence of Mn moment canting in hole-doped $\text{Ba}_{1-2x}\text{K}_{2x}\text{Mn}_2\text{As}_2$," *Phys. Rev. B* **89**, 060403(R) (2014).
- [5] K. D. Belashchenko, **J. K. Glasbrenner**, and A. L. Wysocki, "Spin injection from a half-metal at finite temperatures," *Phys. Rev. B* **86**, 224402 (2012).
- [4] J. Kudrnovský, V. Drchal, I. Turek, S. Khmelevskiy, **J. K. Glasbrenner**, and K. D. Belashchenko, "Spin-disorder resistivity of ferromagnetic metals from first principles: The disordered-local-moment approach," *Phys. Rev. B* **86**, 144423 (2012).
- [3] **J. K. Glasbrenner**, K. D. Belashchenko, J. Kudrnovský, V. Drchal, S. Khmelevskiy, and I. Turek, "First-principles study of spin-disorder resistivity of heavy rare-earth metals: Gd-Tm series," *Phys. Rev. B* **85**, 214405 (2012).
- [2] A. L. Wysocki, **J. K. Glasbrenner**, and K. D. Belashchenko, "Thermodynamics of itinerant magnets in a classical spin fluctuation model," *Phys. Rev. B* **78**, 184419 (2008).
- [1] S. N. Walck, **J. K. Glasbrenner**, M. H. Lochman, and S. A. Hilbert, "Topology of the three-qubit space of entanglement types," *Phys. Rev. A* **72**, 052324 (2005).

Conference and Workshop Publications

- [2] J. Kudrnovský, V. Drchal, I. Turek, S. Khmelevskiy, **J. K. Glasbrenner**, and K. D. Belashchenko, "The disordered local moment approach to the spin-disorder resistivity of metallic ferromagnets," in *European Physics Journal Web of Conferences* **40**, 12001 (2013).

- [1] **J. K. Glasbrenner**, J. M. An, J. Kudrnovský, V. Drchal, S. Khmelevskiy, I. Turek, and K. D. Belashchenko, "First-principles calculations of transport and magnetic properties of rare-earth materials," in *SPIE Proceedings Vol. 8461* (2012).

Invited Talks

- [8] "Using data science and materials simulations to control the corkscrew magnetism of MnAu_2 " *Colloquium at George Mason University*, Fairfax, VA, March 19, 2018.
- [7] "Reproducible research and best practices for computational science" *Colloquium at George Mason University*, Fairfax, VA, December 4, 2017.
- [6] "Understanding and controlling the magnetic exchange of novel materials" *Colloquium at George Mason University*, Fairfax, VA, September 19, 2016.
- [5] "The effect of the Schrieffer-Wolff interaction on magnetic ordering in $(\text{Ba}, \text{K})(\text{Zn}, \text{Mn})_2\text{As}_2$ and MnAu_2 ," *Seminar at NIST Center for Neutron Research*, Gaithersburg, MD, April 22, 2015.
- [4] "Double exchange in the 122 crystal structure: the driver of ferromagnetic order in $(\text{Ba}, \text{K})\text{Mn}_2\text{As}_2$ and $(\text{Ba}, \text{K})(\text{Zn}, \text{Mn})_2\text{As}_2$," *Colloquium at University of Maryland Center for Nanophysics and Advanced Materials*, College Park, MD, March 26, 2015.
- [3] "Theory of the novel Mn-doped II-II-V Dilute Magnetic Semiconductors," *Invited talk at the American Physical Society meeting*, San Antonio, TX, March 5, 2015.
- [2] "Electronic origin of the spin-disorder resistivity enhancement in the heavy rare-earth metals," *Colloquium at George Mason University*, Fairfax, VA, October 7, 2013.
- [1] "First-principles and model studies of spin fluctuation effects in transport and thermodynamics," *Seminar at Naval Research Laboratory*, Washington, DC, October 15, 2012.

Conference and Workshop Presentations

- [14] "Collapse and control of the MnAu_2 spin-spiral state through pressure and doping," **J. K. Glasbrenner**, *Contributed talk at the American Physical Society meeting*, Baltimore, MD, March 2016.
- [13] "Magnetic spiral induced by strong correlations in MnAu_2 ," **J. K. Glasbrenner**, K. M. Bussmann, and I. I. Mazin, *Contributed talk at the American Physical Society meeting*, San Antonio, TX, March 2015.
- [12] "First-principles evidence of Mn moment canting in hole-doped $\text{Ba}_{1-2x}\text{K}_{2x}\text{Mn}_2\text{As}_2$," **J. K. Glasbrenner** and I. I. Mazin, *Contributed talk at the American Physical Society meeting*, Denver, CO, March 2014.
- [11] "First-principles investigation of deviations from Matthiessen's rule due to the interplay of phonon and spin disorder scattering in iron and gadolinium," **J. K. Glasbrenner**, B. S. Pujari, and K. D. Belashchenko, *Contributed talk at the American Physical Society meeting*, Baltimore, MD, March 2013.
- [10] "First-principles study of spin-disorder resistivity of heavy rare-earth metals: Gd-Tm series," **J. K. Glasbrenner**, K. D. Belashchenko, J. Kudrnovský, V. Drchal, S. Khmelevskiy, and I. Turek, *Contributed talk at the 12th Joint MMM-Intermag Conference*, Chicago, IL, January 2013.
- [9] "Spin-disorder resistivity of heavy rare-earth metals from Gd to Tm: An ab-initio study," **J. K. Glasbrenner** and K. D. Belashchenko, *Poster presentation at the Nebraska Research and Innovation Conference*, Omaha, NE, September 2011.
- [8] "Ohmic spin injection from a half-metal at finite temperatures: Is the conductivity mismatch problem relevant?" **J. K. Glasbrenner**, A. L. Wysocki, and K. D. Belashchenko, *Contributed talk at the American Physical Society meeting*, Dallas, TX, March 2011.
- [7] "Surface magnetization of a multiferroic with linear M-to-P coupling: The case of FeTiO_3 ," **J. K. Glasbrenner** and K. D. Belashchenko, *Poster presentation at the American Physical Society meeting*, Dallas, TX, March 2011.
- [6] "Spin-disorder resistivity of heavy rare-earth metals from Gd to Tm: An ab-initio study," **J. K. Glasbrenner** and K. D. Belashchenko, *Poster presentation at the American Physical Society meeting*, Portland, OR, March 2010.
- [5] "Thermodynamics of itinerant magnets in a classical spin fluctuation model," **J. K. Glasbrenner**, A. L. Wysocki, and K. D. Belashchenko, *Poster presentation at the 55th Midwest Solid State Conference*, Iowa City, IA, April 2009.
- [4] "Generalized Onsager cavity field method for magnets with local spin fluctuations," A. L. Wysocki,

- J. K. Glasbrenner**, and K. D. Belashchenko, *Contributed talk at the American Physical Society meeting*, Pittsburgh, PA, March 2009.
- [3] “Thermodynamics of itinerant magnets: a simple classical model with longitudinal spin fluctuations,” **J. K. Glasbrenner**, A. L. Wysocki, and K. D. Belashchenko, *Contributed talk at the American Physical Society meeting*, New Orleans, LA, March 2008.
- [2] “Thermodynamics of itinerant magnets: a simple classical model with longitudinal spin fluctuations,” A. L. Wysocki, **J. K. Glasbrenner**, and K. D. Belashchenko, *Contributed talk at the 52nd Annual Conference on Magnetism and Magnetic Materials*, Tampa, FL, November 2007.
- [1] “Thermodynamics of itinerant magnets: a simple classical model with longitudinal spin fluctuations,” A. L. Wysocki, **J. K. Glasbrenner**, and K. D. Belashchenko, *Poster presentation at the 54th Midwest Solid State Conference*, Lincoln, NE, October 2007.

Dissertation

Ab-initio and model studies of spin fluctuation effects in transport and thermodynamics of magnetic metals
Advisor: Kirill Belashchenko

Society Memberships

- American Physical Society
- Golden Key International Honor Society, University of Nebraska
- Phi Alpha Epsilon, Lebanon Valley College

Journal Refereeing

Physical Review Letters, Physical Review B, New Journal of Physics, Journal of Physics: Condensed Matter, Journal of Applied Physics, physica status solidi (b)