

Colin V. Parker

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Research Experience

Georgia Institute of Technology **Assistant Professor** **2016-present**

- Developing a laboratory to use ultracold lithium for simulation of condensed matter systems

University of Chicago **Postdoctoral Researcher** **2011-2015**

Supervisor: Cheng Chin

- Studied magnetism and roton modes in quantum gases using a novel lattice shaking technique
- Confirmed a long-standing prediction of geometric scaling in three-body bound states with large mass imbalance

École Normale Supérieure **Visiting Postdoc** **2011**

Supervisor: Christophe Salomon

Princeton University **Research Assistant** **2006-2011**

Supervisor: Ali Yazdani

- Used high-resolution scanning tunneling spectroscopy to show that checkerboard electronic structure persists well into the pseudogap temperature range in the high- T_c cuprates.
- Performed early scanning tunneling spectroscopy studies confirming lack of backscattering in topological insulators

Teaching Experience

Instructor, Georgia Institute of Technology

Courses: Atomic Physics (4261 – advanced undergrad)

SMART+ Program, University of Chicago

Assistant with lecturing and demonstrations for underrepresented high school students

Assistant in Instruction, Princeton University

Courses: General Physics, Solid State Physics, Advanced Laboratory

Education

Princeton University **Ph. D. Physics** **2006-2011**

Dissertation: Exploring superconductivity and pseudogap using high-resolution scanning tunneling microscopy (Ali Yazdani, advisor)

Harvey Mudd College

B. S. Physics

2002-2006

Thesis: Time-resolved Magneto-Optical Kerr Effect Measurements on a Multilayer Spin-valve System (Peter N. Saeta, advisor)

Honors

- Kadanoff-Rice Postdoctoral Fellow, University of Chicago 2011-2013
- National Science Foundation Graduate Research Fellowship, Honorable Mention, 2006, 2008
- Fannie and John Hertz Foundation Fellowship, Finalist, 2006
- Bell Prize for academic performance, creativity, and service to the community, Harvey Mudd College, 2005

Invited Talks

1. "Engineering ferromagnetism with shaken optical lattices," APS March Meeting, San Antonio, TX, 2015
2. "Geometric scaling of three-body collision resonances for a ${}^6\text{Li}$ - ${}^{133}\text{Cs}$ mixture in the Efimov scenario," INT Few-Body Workshop, Seattle, WA, 2014
3. "Direct imaging of effective ferromagnetism in a shaken optical lattice," Midwest Cold Atoms Workshop (MCAW), Purdue University, 2013
4. "Detecting Fluctuating Stripes in the Pseudogap Phase of the High- T_c Cuprates," Gordon Research Conference: Superconductivity, Waterville Valley, NH 2011

Publication Highlights

1. S.-K. Tung, J. Johansen, K. Jiménez-García, **C. V. Parker**, and C. Chin, "Geometric scaling of Efimov states in a ${}^6\text{Li}$ - ${}^{133}\text{Cs}$ mixture," *Phys. Rev. Lett.* **113**, 240402 (2014)
2. L.-C. Ha, L. W. Clark, **C. V. Parker**, B. M. Anderson, and C. Chin, "Roton-maxon excitation spectrum of Bose condensates in a shaken optical lattice," *Phys. Rev. Lett.* **114** 055301 (2015)
3. **C. V. Parker**, L.-C. Ha, and C. Chin, "Direct observation of effective ferromagnetic domains of cold atoms in a shaken optical lattice," *Nature Phys.* **9** 769-774 (2013)
4. **C. V. Parker**, P. Aynajian, E. H. da Silva Neto, A. Pushp, S. Ono, J.-S. Wen, Z.-J. Xu, G. Gu, and A. Yazdani, "Fluctuating Stripes at the Onset of Pseudogap in the High- T_c Superconductor $\text{Bi}_2\text{Sr}_2\text{Ca}_2\text{CuO}_{8+x}$," *Nature* **468**, 677-680 (2010)
***Selected for News and Views**
5. **C. V. Parker**, A. Pushp, A. N. Pasupathy, K. K. Gomes, J.-S. Wen, Z.-J. Xu, S. Ono, G. Gu, and A. Yazdani, "Nanoscale Proximity Effect in the High-Temperature Superconductor $\text{Bi}_2\text{Sr}_2\text{Ca}_2\text{CuO}_{8+\delta}$ Using a Scanning Tunneling Microscope," *Phys. Rev. Lett.* **104**, 117001 (2010)
***Selected for Viewpoint in Physics**

6. P. Roushan, J.-P. Seo, **C. V. Parker**, Y. S. Hor, D. Hsieh, D. Qian, A. Richardella, M. Z. Hasan, R. J. Cava and A. Yazdani, "Topological Surface States Protected From Backscattering by Chiral Spin Texture," *Nature* **460**, 1106-1109 (2009)
***Selected for News and Views**

Other Publications

7. N. Kowalski, B. Xie, **C. V. Parker**, and C. Chin, "Stable levitation and dynamics of ice particles at low pressures," *arXiv* 1504.01035 (2015)
8. F. Sievers, S. Wu, N. Kretschmar, D. R. Fernandes, D. Suchet, M. Rabinovic, S. Wu, **C. V. Parker**, L. Khaykovich, C. Salomon, and F. Chevy, "Simultaneous sub-Doppler laser cooling of fermionic ${}^6\text{Li}$ and ${}^{40}\text{K}$ on the D_1 line: Theory and Experiment," *Phys. Rev. A* **91** 023426 (2015)
9. S. Gopalakrishnan, **C. V. Parker**, and E. Demler, "Mobile magnetic impurities in a Fermi superfluid: a route to designer molecules," *Phys. Rev. Lett.* **114** 045301 (2015)
10. D. O. Sabulsky, **C. V. Parker**, N. D. Gemelke, and C. Chin, "Efficient continuous-duty Bitter-type electromagnets for cold atom experiments," *Rev. Sci. Instrum.* **84** 104706 (2013)
11. S.-K. Tung, **C. V. Parker**, J. Johansen, C. Chin, Y. Wang, and P. Julienne, "Ultracold mixtures of atomic ${}^6\text{Li}$ and ${}^{133}\text{Cs}$ with tunable interactions," *Phys. Rev. A* **87** 010702 (2013)
12. E. H. da Silva Neto, P. Aynajian, **C. V. Parker**, and A. Yazdani, "Detecting incipient stripe order in the high-temperature superconductor $\text{Bi}_2\text{Sr}_2\text{Ca}_2\text{CuO}_{8+x}$," *Physica C* **481** 153 (2012)
13. E. H. da Silva Neto, **C. V. Parker**, P. Aynajian, A. Pushp, J. Wen, Z.-J. Xu, G. Gu, and A. Yazdani, "Scattering from incipient stripe order in the high-temperature superconductor $\text{Bi}_2\text{Sr}_2\text{Ca}_2\text{CuO}_{8+x}$," *Phys. Rev. B* **85** 104521 (2012)
14. P. Aynajian*, E. H. da Silva Neto*, **C. V. Parker***, Y.-K. Huang, A. Pasupathy, J. Mydosh, and A. Yazdani, "Visualizing the formation of the Kondo lattice and the hidden order in URu_2Si_2 ," *Proc. Nat'l. Acad. Sci. USA* **107**, 10383 (2010)
15. A. Pushp*, **C. V. Parker***, A. N. Pasupathy, K. K. Gomes, S. Ono, J. Wen, Z. Xu, G. Gu, and A. Yazdani, "Extending Universal Nodal Excitations Optimizes Superconductivity in $\text{Bi}_2\text{Sr}_2\text{Ca}_2\text{CuO}_{8+\delta}$," *Science* **324**, 1689-1693 (2009)
16. L. Wray, D. Qian, D. Hsieh, Y. Xia, L. Li, J. G. Checkelsky, A. Pasupathy, K. K. Gomes, **C. V. Parker**, A. V. Federov, G. F. Chen, J. L. Luo, A. Yazdani, N. P Ong, N L. Wang, and M. Z Hasan, "Momentum-dependence of Superconducting Gap, strong-coupling dispersion kink, and tightly bound Cooper pairs in the high- T_c $(\text{Sr,Ba})_{1-x}(\text{K,Na})_x\text{Fe}_2\text{As}_2$ superconductors," *Phys. Rev. B* **78** 184508 (2008)

17. K. K. Gomes, A. N. Pasupathy, A. Pushp, **C. Parker**, S. Ono, Y. Ando, G. Gu, and A. Yazdani, "Mapping of the formation of the pairing gap in $\text{Bi}_2\text{Sr}_2\text{Ca}_2\text{CuO}_{8+\delta}$," *J. Phys. Chem. Solids* **69** 3034-3038 (2008)
18. A. N. Pasupathy, A. Pushp, K. K. Gomes, **C. V. Parker**, J. Wen, Z. Xu, G. Gu, S. Ono, Y. Ando, and A. Yazdani, "Electronic Origin of the Inhomogeneous Pairing Interaction in the High- T_c Superconductor $\text{Bi}_2\text{Sr}_2\text{Ca}_2\text{CuO}_{8+\delta}$," *Science* **320**, 196 (2008)
19. J. Shinagawa, Y. Kurosaki, F. Zhang, **C. Parker**, S. E. Brown, D. Jérôme, J. B. Christensen, and K. Bechgaard, "Superconducting State of the Organic Conductor $(\text{TMTSF})_2\text{ClO}_4$," *Phys. Rev. Lett.* **98** 147002 (2007)
20. **C. V. Parker**, C. H. Skinner, and A. L. Roquemore, "Controlling surface dust in a tokamak," *J. Nuc. Mat.* **363-365** 1461-1465 (2007)
21. J. Shinagawa, W. Wu, P. M. Chaikin, W. Kang, W. Yu, F. Zhang, Y. Kurosaki, **C. Parker**, and S. E. Brown, " ^{77}Se NMR Studies on Magic Angle Effect and Nature of the Superconducting State in the Organic Superconductors $(\text{TMTSF})_2\text{X}$," *J. Low Temp. Phys.* **142** 227-232 (2006)