

Dr. Blakesley K. Burkhart

Institute for Theory and Computation
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Professional Preparation

Institute for Theory and Computation (ITC) Postdoctoral Fellow, Harvard, 2017-Present
Submillimeter Array (SMA) Postdoctoral Fellow, Harvard, 2017-Present
Einstein Postdoctoral Fellow, Harvard, 2014-2017
Ph.D. Astronomy, University of Wisconsin-Madison, 2014
M.A. Astronomy, University of Wisconsin-Madison, 2010
M.S. Physics, University of Wisconsin-Madison, 2010
B.S. Physics & Math (minor: Latin), University of Louisville, 2008, *Magna Cum Laude*

Honors, Awards and Grants

2017 Astronomical Society of the Pacific, Robert J. Trumpler Award
2016 Finalist APS Division of Astrophysics Ph.D. Thesis Award
2015 Raymond and Beverly Sackler TAU-ITC Visiting Researcher
2015 CO-PI SOFIA Cycle 4
2014 UC Berkeley Miller Fellowship (declined)
2014 Caltech Prize Theory Fellowship (declined)
2013 PI Green Bank Telescope Observing proposal, GBT13A-332-2
2011 UW Madison Jansky Fellowship for Outstanding Research
2011 NASA Space Science Student Ambassador
2009 National Science Foundation Graduate Research Fellowship in Astrophysics
2009, 2011, 2012, 2014 American Astronomical Society Travel Grant
2009, 2010, 2011, 2012, 2013 Wisconsin Space Grant
2008 Donald M. Bennett Award for Outstanding Scholastic Achievement in Physics
2008 American Astronomical Society Chambliss Award, Honorable Mention
2006 Bullitt Award in Astrophysics
2004 University of Louisville Presidential Scholarship (Full Tuition)

Refereed Journal Publications: 24 First Author/Mentored Student Lead

38. *Chen, H.*¹, **Burkhart, B.**, & Goodman, A., “*The Anatomy of the Column Density PDF*”, 2017, ApJ, submitted, arXiv:1707.09356
37. **Burkhart, B.** & Loeb, A., “*The Detectability of Radio Auroral Emission of Proxima B*”, 2017, ApJL, submitted, arXiv:1706.07038
36. *Herron, C.*¹, **Burkhart, B.**, Gaensler, B., Lewis, G. F., & M., McClure-Griffiths, N., “*Advanced Diagnostics for the Study of Linearly Polarized Emission II: Application to Diffuse Interstellar Radio Synchrotron Emission*”, 2017, ApJ, submitted.
35. Krumholz, M., **Burkhart, B.**, Forbes, J., & Crocker, R., “*A Unified Model for Galactic Discs: Star Formation, Turbulence Driving, and Mass Transport*”, 2017, MNRAS, submitted, arXiv:1706.00106.
34. Cassanova, D., Lazarian, A., & **Burkhart, B.**, “*The Velocity Centroid Gradient for an Absorbing Media*”, 2017, MNRAS, submitted, arXiv:1703.03035

¹* denotes a project with an undergraduate or graduate student primarily mentored by B. B.

33. *Bialy, S.*, **Burkhart, B.**, & Sternberg, A., “*HI-to-H₂ Photodissociation Transition in Cold Turbulent Interstellar Gas*”, 2017, ApJ, in press, arXiv:1703.08549
32. Hull, C., Mocz, P., **Burkhart, B.**, Hernquist, L., et al. “*Unveiling the Role of Magnetic Fields at the Smallest Scales of Star Formation*”, 2017, ApJ, 842, 9, ArXiv:1706.03806
31. Pingel, N., Lee, M. Y., **Burkhart, B.**, & Stanimirovic, S., “*The Multiphase Spatial Power Spectrum of the Perseus Molecular Cloud*”, 2017, ApJ, submitted.
30. Mocz, P., **Burkhart, B.**, Hernquist, L., & Springel, V., “*Moving Mesh Simulations of Star Forming Cores in Magneto-Gravo-Turbulence*”, 2017, ApJ, 838, 40, arXiv:1702.06133
29. Herron, C., Federrath, C., Gaensler, B., McClure-Griffiths, N., & **Burkhart, B.**, “*Probes of turbulent driving mechanisms in molecular clouds from fluctuations in synchrotron intensity*”, 2017, MNRAS, 466, 2272, arXiv:1612.05672
28. Hoang, T., Lazarian, A., **Burkhart, B.**, & Loeb, A., “*The Interaction of Relativistic Spacecrafts with the Interstellar Medium*”, 2017, ApJ, 837, 5, arXiv:1608.05284.
27. *Gurvich, A.*, **Burkhart, B.**, & Bird, S., “*The Effect of AGN Heating on the Low-redshift Lyman alpha Forest*”, 2017, ApJ, 835, 175 arXiv:1608.03293.
26. **Burkhart, B.**, Stalpes, K., & Collins, D. “*At the Razor’s Edge of Collapse: the PDF Transitional Column Density in Molecular Clouds*”, 2017, ApJL, 834, 1 arXiv:1609.04409
25. Imara, N. & **Burkhart, B.**, “*Examining the Atomic Hydrogen Associated with Molecular Clouds*”, 2016, ApJ, 829, 2, arXiv:1609.04817
24. **Burkhart, B.** & Loeb, A., “*Predicted Sizes of Pressure-Supported HI Clouds in the Outskirts of the Virgo Cluster*”, 2016, ApJL, 834, 7, arXiv:1604.01767.
23. Krumholz, M. & **Burkhart, B.**, “*Is Turbulence in the Interstellar Medium Driven by Feedback or Gravity? An Observational Test*”, 2016, MNRAS, 458, 1671, arXiv:1512.03439.
22. *Correia, C.*, Lazarian, A., **Burkhart, B.**, Pogosyan, D., & de Medeiros, J. R., “*Principal Component Analysis of Turbulence in Optically Thick Gas*”, 2016, ApJ, 818, 118, arXiv: 1511.03712.
21. **Burkhart, B.** & Lazarian, A., “*Phase Coherence of Interstellar MHD Turbulence*”, 2016, ApJ, 827, 26, arXiv:1511.03660.
20. **Burkhart, B.**, Lee, M. Y., Murray, C., & Stanimirovic, S., “*The Lognormal PDF of the Perseus Molecular Cloud: A Comparison of HI and Dust*”, 2015, ApJL, 811, 28, arXiv:1509.02889.
19. *Herron, C.*, **Burkhart, B.**, Lazarian, A., Gaensler, B., & M., McClure-Griffiths, N., “*Radio Synchrotron Fluctuation Statistics as a Probe of Magnetized Interstellar Turbulence*”, 2015, ApJ, 822, 13, arXiv:1603.02751.
18. Chepurnov, A., **Burkhart, B.**, & Lazarian, A., “*The Turbulence Velocity Power of Neutral Hydrogen in the Small Magellanic Cloud*”, 2015, ApJ, 810, 33, arXiv:1506.03448.
17. **Burkhart, B.**, Collins, D., & Lazarian A., “*Observational Diagnostics of Self-Gravitating MHD Turbulence in GMCs*”, 2015, ApJ, 808, 48, arXiv:1505.03855.
16. **Burkhart, B.**, Lazarian A., Meyer, C., & Balsara, D., “*Alfvénic Turbulence Beyond the Ambipolar Diffusion Scale*”, 2015, ApJ, 805, 118, arXiv:1412.3452.
15. **Burkhart, B.**, Lazarian A., Leão, I., & de Medeiros, J. R., “*Measuring the Alfvénic Nature of the Interstellar Medium: Velocity Anisotropy Revisited*”, 2014, ApJ, 790, 130, arXiv:1408.4858.
14. *Iacobelli, M.*, **Burkhart, B.**, Haverkorn, M., Lazarian, A., Carretti, E., Staveley-Smith, L., Gaensler, B. M., Bernardi, G., Kesteven, M. J., & Poppi, S., “*Galactic Interstellar Turbulence Across the Southern Sky Seen Through Spatial Gradients of the Polarization Vector*”, 2014, A&A, 566, 5, arXiv:1404.6077.
13. Pingel, N., Stanimirovic, S., Peek, J. E. G., Lee, M.-Y., Lazarian, A., **Burkhart, B.**, Babler, B., Begum, A., Douglas, K. A., Heiles, C., Gibson, S., Grcevich, J., Korpela, E., Lawrence, A., Murray, C., Peek, J. E. G., Putman, M. E., & Saul, D., “*Characterizing the Turbulent Properties of MBM16*”, 2013, ApJ, 779, 36, arXiv:1310.7244.
12. *Correia, C.*, **Burkhart, B.**, Lazarian, A., Ossenkopf, V., Stutzki, J., Kainulainen J., Kowal, G., & de Medeiros, J. R. “*Opacity Broadening of CO Linewidths and its Effects on the Variance-Sonic Mach Number Relation*”, 2013, ApJL, 785, 1, arXiv:1402.6702.
11. Meyer, C., Balsara, D., **Burkhart, B.**, & Lazarian, A., “*Observational Diagnostics for Two-Fluid Turbulence in Molecular Clouds As Suggested by Simulations*”, 2013, MNRAS, 439, 219, arXiv:1307.3527.

10. **Burkhart, B.**, Lazarian, A., Ossenkopf V., & Stutzki J., “*The Turbulence Power Spectrum in Optically Thick Interstellar Clouds*”, 2013, ApJ, 771, 123, arXiv:1305.3619.
9. **Burkhart, B.**, Ossenkopf V., Lazarian, A., & Stutzki J., “*The Effects of Radiative Transfer on the PDFs of Molecular MHD Turbulence*”, 2013, ApJ, 771, 122, arXiv:1304.3131.
8. **Burkhart, B.**, Lazarian, A., Goodman, A., & Rosolowsky, E., “*Hierarchical Structure of Magneto-hydrodynamic Turbulence in Position-Position-Velocity Space*”, 2013, ApJ, 770, 141, arXiv:1206.4703.
7. Saul ,D., Peek, J., Grcevich, J., Putman, M. E., Douglas, K. A., Korpela, E. J., Stanimirović, S., Heiles, C., Gibson, S., Lee, M., Begum, A., Brown, A. R. H., **Burkhart, B.**, Hamden, E. T., Pingel, N. M., Tonnesen, S., “*The GALFA-HI Ultra-Compact Cloud Catalog*”, 2012, ApJ, 758, 44, arXiv:1208.4103.
6. **Burkhart, B.** & Lazarian A., “*The Column Density Variance-Sonic Mach Number Relation*”, 2012, ApJL, 755, 19, arXiv:1205.3792.
5. **Burkhart, B.**, Lazarian A., & Gaensler B., “*Properties of Interstellar Turbulence from Gradients of Linear Polarization Maps*”, 2012, ApJ, 749, arXiv:1111.3544.
4. Gaensler, B., Haverkorn, M., **Burkhart, B.**, Newton-McGee, K. J., Ekers, R. D., Lazarian, A., McClure-Griffiths, N. M., Robishaw, T., Dickey, J. M., Green, A. J., “*Low Mach Number Turbulence in Interstellar Gas Revealed by Radio Polarization Gradients*”, 2011, Nature, 478, 214, arXiv:1110.2896.
3. *Tofflemire, B.*, **Burkhart, B.**, Lazarian, A., “*Interstellar Sonic and Alfvénic Mach Numbers and the Tsallis Distribution*”, 2011, ApJ, 736, 60, arXiv:1103.3299.
2. **Burkhart, B.**, Stanimirović S., Lazarian A., Kowal G., “*Characterizing Magnetohydrodynamic Turbulence in the Small Magellanic Cloud*”, 2010, ApJ, 708, 1204, arXiv:0911.3652.
1. **Burkhart, B.**, Falceta-Gonçalves D., Kowal G., Lazarian A., “*Density Studies in MHD Interstellar Turbulence: Statistical Moments, Correlations and Bispectrum*”, 2009, ApJ, 692, 250, arXiv:0811.0822.

Select *Invited Presentations/Colloquia* (career total seminars/talks/colloquia: 104)

2017

75. *Astronomy Colloquium*, NASA Ames, November
74. *Astronomy Colloquium*, UCLA, October
73. *Magnetic Fields in the Universe VI*, Natal, Brazil, October
72. *ISM in 3D*, Paris, France, July
71. *Galactic Star Formation with Surveys*, Heidelberg, Germany, July
70. *Breakthrough Discuss Invited Panel*, Stanford, April
69. Honors Physics Colloquium, UofL, April
68. Astronomy Colloquium, Univ. Maryland, March
67. Astronomy Colloquium, Arizona, February
66. Astronomy Colloquium, Santa Barbara, February
65. *6 Years of ISM SPP - What have we learned?*, Cologne, Germany, February
64. Flatiron Institute CCA Colloquium, February
63. Astronomy Colloquium, Cornell, January
62. Astronomy Colloquium, Columbia, January

2016

61. Astronomy Colloquium, NRAO/Socorro, December
60. *Cosmic Rays, Astrophysical Turbulence and Magnetic Reconnection*, Natal, Brazil, December
59. *Next in Science*, Radcliffe Institute for Advanced Study, October
58. Astronomy Colloquium, Columbia, October
57. *Fellows on the Frontier*, Chicago, August
56. *The Cold Universe*, Kavli Week Lecturer, Santa Barbara, June
55. Astronomy Colloquium, Caltech, May

54. *Breakthrough Discuss Invited Panel*, Stanford, April
53. *From Stars to Massive Stars*, Gainesville, April
52. APS Thesis Prize Talk, Salt Lake City, April
51. TAC Seminar, UC Berkeley, April
50. Physics Colloquium, Univ. of Florida, March
49. CITA Seminar, Univ. Toronto, March
48. Physics Colloquium, Tel Aviv University, January

2015

47. Physics Colloquium, Ben-Gurion University, December
46. Astronomy Colloquium, Ohio State, December
45. Astronomy Colloquium, Boston University, November
44. *Magnetic Fields in the Universe V*, Corsica, France, October
43. Astronomy Colloquium, UC Santa Cruz, September
42. *GBT High Frequency Science Workshop*, Green Bank, September
41. *Life Cycle of Gas in Galaxies: A Local Perspective*, Dwingeloo, Netherlands, August
40. *Orion Unplugged*, Vienna, July
39. Boston University Lunch Seminar, February
38. Astronomy Colloquium, NRAO/UVA, February
37. Astronomy Colloquium, UMASS Amherst, February
36. *Star Formation Mini-Meeting*, UMASS Amherst, January

2014

35. Lunch Seminar, Univ. Chicago, December
34. Astronomy Colloquium, Univ. of Illinois Urbana-Champaign, November
33. *Superbubbles, HI Holes and Supershells*, Freising, Germany, November
32. ITC Lunch Seminar, Harvard CfA, November
31. Einstein Fellow Symposium, Harvard CfA, November, 2014
30. *Turbulence in the Sky as on the Earth*, Natal, Brazil, October
29. *Cosmic Magnetic Fields*, Krakow, Poland, October
28. *Asia-Pacific Regional IAU Meeting*, Dajeeon, Korea, August
27. CIERA Astrophysics Seminar, Northwestern U, May
26. Caltech TAPIR Seminar, May
25. UW Milwaukee CGCA Seminar, May
24. Talk *223rd AAS Meeting*, Washington D.C., January

2013

23. ITC Seminar, Harvard CfA, October
22. SMA Seminar, Harvard CfA, October
21. TAC Seminar, Berkeley, October
20. RAL Seminar, Berkeley, October
19. Lunch Seminar, Columbia, September
18. WUNCH Seminar, Princeton, September
17. *Galactic Magnetism in the Era of LOFAR and SKA*, Stockholm, Sweden, September
16. *8th International Conference on Numerical Modeling of Space Plasma Flows*, Biarritz, France, July
15. *Magnetic Fields from Cloud Cores to Protostellar Disks*, Heidelberg, Germany, May
14. *Magnetic Fields in the Universe IV*, Playa del Carmen, Mexico, February
13. Astronomy Colloquium, UNAM, February

2012

12. *The Low-metallicity ISM: Chemistry, Turbulence and Magnetic Fields*, Goettingen, Germany, October
11. Astronomy Colloquium, Univ. Notre Dame, September
10. *Solar and Astrophysical Dynamos, Symposium 294, IAU General Assembly*, Beijing, China, August
9. *7th International Conference on Numerical Modeling of Space Plasma Flows*, Hawaii, June

2011

8. Astronomy Colloquium, Univ. of Costa Rica, Costa Rica, November
7. ISM and Magnetic Fields Workshop, Natal, Brazil, November
6. Astronomy Colloquium, Univ. of São Paulo Colloquium, Brazil, November
5. *CMSO General Meeting*, Durham, New Hampshire, October

2010

4. *IAU Plasma Astrophysics Conference*, Gardini-Naxos, Italy, September
3. *Kelowna Dendrogram Conference*, Kelowna, Canada, August
2. *Communicating Astronomy with the Public*, Cape Town, South Africa, March
1. Joint Astronomy Colloquium, Madison, Wisconsin, January

Teaching and Mentoring

- 2016 Spring Guest Teaching *Ast 253, Plasma Astrophysics*, Harvard University
- 2016 Supervised Senior Thesis (Missy McIntosh), Harvard University
- 2015 Co-supervised Research Science Institute (MIT) Student
- 2015 Supervised Harvard REU student; resulted in Gurvich, Burkhart & Bird (2016)
- 2014, Supervised student UW Madison/Univ. Sydney; resulted in Herron et al. 2015
- 2014 Spring Teaching Assistant *Ast 104, Exploration of the Solar System*, UW Madison
- 2012-2014 Supervised student at UFRN (Natal, Brazil); resulted in Correia et al. (2013, 2015)
- 2012 Supervised two REU students
- 2010 Supervised REU student; resulted in Tofflemire, Burkhart & Lazarian (2011)
- 2008 Spring Teaching Assistant, *Physics 224*, University of Louisville
- 2006-2008 Supplemental Instructor of Physics (6 semesters), University of Louisville

Conferences Organized

- 2017 SOC, *Magnetic Fields in the Universe VI*, Natal, Brazil, December
- 2016 SOC Leader, *Star formation, magnetic fields, and diffuse matter in the Galaxy: A conference honoring the contributions of Richard Crutcher & Carl Heiles*, Madison, WI
- 2015 SOC, *Harvard-Heidelberg Star Formation Workshop*, Cambridge, MA
- 2011, 2012, 2013, 2014 Conference Co-Organizer for the *Midwest Magnetic Fields*, Madison, WI
- 2011 Conference Co-Organizer for *ISM and Magnetic Fields Workshop*, Natal, Brazil

Select Service and Outreach

2017 *Harvard Observatory Nights*

2015, 2016 CfA Seminar Co-Chair

2015, 2016 ITC Colloquium Co-Chair

2014 Harvard CfA ITC Lunch Chair

2013, 2014 *5 Minute Astronomy*, **Host** of Podcast on iTunes, Featured on *New and Noteworthy*, approximately 600 downloads per day

2012-2014 *Radio Astronomy*, **Host** of weekly radio show WORT 89.9FM, Madison, WI

2012-Present **Referee** for: *Astrophysical Journal*, *Astrophysical Journal Letters*, *Astronomy & Astrophysics*, *Monthly Notices of the Royal Astronomical Society*

2011-2013 Outreach Coordinator for the Department of Astronomy, UW Madison

2008-2012 Organizer for *Expanding Your Horizons* (STEM middle school girl's program)

2008-2012 *Universe in the Park* telescope shows

2011 *Science Expeditions* Presenter, Madison, WI

2011 *Madison Middle School Science Symposium* Mentor

2008-2011 Public Outreach Talks at the UW Space Place and Local Public Schools

2010 *SciFest Africa* Exhibitioner, Grahamstown, South Africa

2009-2010 Writer for American Physical Society's *Physics Frontline*

2008-2009 Assistant Editor of *The Nucleus* (National Society of Physics Students website)