

Dr. Robert Fisher - Curriculum Vitae (Revised 6/15/2016)

Education

- University of California at Berkeley, Ph.D., (Physics, 2002)
 - Thesis : “Single and Multiple Star Formation in Turbulent Giant Molecular Cloud Cores”
 - Thesis Advisors : Christopher F. McKee and Richard I. Klein
- University of California at Berkeley, M.S., (Physics, 1998)
- Caltech, B.S. with Honors, (Physics, 1994)

Faculty Appointments

- Associate Professor, Department of Physics, University of Massachusetts Dartmouth (2014–current)
- Assistant Professor, Department of Physics, University of Massachusetts Dartmouth (2008–2014)
- Research Scientist and Astrophysics Group Leader, DOE Advanced Scientific Computing (ASC) Flash Center, Department of Astronomy & Astrophysics, University of Chicago (2005–2008)

Postdoctoral Training

- Lawrence Livermore National Laboratory, Postdoctoral Research Associate, (AX Division, 2002-2005)

Academic and Professional Honors

- Visiting Faculty, Harvard-Smithsonian Center for Astrophysics Institute for Theory and Computation (2016 - 2017)
- Kavli Institute for Theoretical Physics (KITP) Scholar (2014 - 2016)
- Department of Energy Certificate of Service (2009), awarded to members of the Flash Center “For... leadership in advancing the field of computational science and engineering by using high-performance computing within the University of Chicago Advanced Simulation and Computing (ASC) Alliance Center to elevate the understanding of the physical problems of nuclear ignition, detonation, and turbulent mixing of complex multi-component fluids and other materials as represented by supernovae.”

- NASA Graduate Student Research Fellowship (1998 - 2001)
- Lawrence Livermore National Laboratory Institute for Geophysics and Planetary Sciences (IGPP) Fellowship (1997)
- NASA/University of California at Berkeley Space Sciences Laboratory Summer Research Fellowship (1996)
- California Institute of Technology B.S. Physics with Honors (1994)
- George W. and Bernice E. Green Prize for Creative Scholarship (1994), awarded annually to a Caltech undergraduate for outstanding research
- National Merit Scholarship Finalist (1990)

Publications

Publication Impact Summary (6 / 15 / 2016)

Total Citations as of 9/21/2015 (from Google Scholar & ADS)¹ : 1087

Mean Citations Per Peer-Reviewed Paper (23 papers > 1 yr old) : 47

***h*-index (largest number *h* such that *h* publications have at least *h* citations; inclusive of all publications) : 17**

***i*100-index (number of publications with greater than 100 citations; inclusive of all publications) : 2**

***i*10-index (number of publications with greater than 10 citations; inclusive of all publications) : 20**

Note : Student co-authorships (including UMassD graduate students, undergraduate students, as well as international summer intern students) boldfaced below.

* Denotes a partially- or fully-alphabetized author list below.

Peer-Reviewed Journal and Conference Proceedings

28. **R. Kashyap, R. Fisher**, E. García-Berro, G. Aznar-Siguán, **S. Ji**, P. Lorén-Aguilar, “Gravitational Instability in Accretion Disks from Double Degenerate Mergers,” *submitted*, 2016.

27. D. van Rossum, **R. Kashyap, R. Fisher**, R. Wollaeger, E. García-Berro, G. Aznar-Siguán, **S. Ji**, P. Lorén-Aguilar, “Light curves and Spectra from a Thermonuclear Explosion of a White Dwarf Merger,” *accepted*, 2016. (Citations : 1)

¹ See [Google Scholar](#) for an incomplete summary. The statistics provided combine ADS and Google, and are complete as of the date listed.

26. **R. Fisher & K. Jumper**, “Single-Degenerate Type Ia Supernovae Are Preferentially Overluminous,” *Astrophysical Journal*, **805**, 150, 2015. [DOI](#) (Citations : 7)
25. R. DiStefano, **R. Fisher**, J. Guillochon, & J. Steiner, “Death by Dynamics: Planetoid-Induced Explosions on White Dwarfs,” *submitted*, 2015. [arXiv](#) (Citations : 1)
24. **R. Kashyap, R. Fisher**, E. García-Berro, G. Aznar-Siguán, **S. Ji**, P. Lorén-Aguilar, “Spiral Instability Can Drive Thermonuclear Explosions in Binary White Dwarf Mergers,” *Astrophysical Journal Letters*, **800**, L7, 2015. [DOI](#) (Citations : 11)
23. **S. Ji, R. Fisher**, E. García-Berro, P. Tzeferacos, G. Jordan, D. Lee, P. Lorén-Aguilar, **P. Cremer**, and **J. Behrends**, “The Post-Merger Magnetized Evolution of White Dwarf Binaries: The Double-Degenerate Channel of Sub-Chandrasekhar Type Ia Supernovae and the Formation of Magnetized White Dwarfs,” *Astrophysical Journal*, **773**, 136, 2013. [DOI](#) (Citations : 27)
- * 22. A. Dubey, A. Calder, C. Daley, **R. Fisher**, C. Graziani, G. Jordan, D. Lamb, L. Reid, D. Townsley, K. Weide, “Pragmatic Optimizations for Best Scientific Utilization of Large Supercomputers,” *International Journal of High Performance Computing Applications*, 2013. [DOI](#) (Citations : 9)
21. **P. Jumper & R. Fisher**, “Shaping the Brown Dwarf Desert : Predicting the Primordial Brown Dwarf Binary Distributions from Turbulent Fragmentation,” *Astrophysical Journal*, **769**, 9, 2013. [DOI](#) (Citations : 20)
20. **A. Kumar & R. Fisher**, “Astrochemical Evolution of Turbulent Giant Molecular Clouds : I - Physical Processes and Method of Solution for Hydrodynamic Starless Clouds,” *Monthly Notices of Royal Astronomical Society*, **431**, 455, 2013. [DOI](#) (Citations : 5)
19. G. Jordan, H. Perets, **R. Fisher**, D. van Rossum, “Failed-Detonation Supernovae: Sub-luminous, Low-Velocity Ia Supernovae and Their Remnant-Kicked Iron-Core White Dwarfs,” *Astrophysical Journal Letters*, **761**, L21, 2012. [DOI](#) (Citations : 53)
18. G. Jordan, C. Graziani, **R. Fisher**, D. Townsley, C. Meakin, K. Weide, L. Reid, J. Norris, R. Hudson, D. Lamb, “The Detonation Mechanism of the Pulsationally-Assisted Gravitationally-Confining Detonation Model of Type Ia Supernovae,” *Astrophysical Journal*, **759**, 53, 2012. [DOI](#) (Citations : 25)
17. C. Hansen, R. Klein, C. McKee, and **R. Fisher**, “Feedback Effects on Low-Mass Star Formation,” *Astrophysical Journal*, **747**, 22, 2012. [DOI](#) (Citations : 40)
16. **D. Falta, & R. Fisher** “The Stochastic Gravitational Wave Background from the Single-Degenerate Channel of Type Ia Supernovae,” *Physical Review D*, **84**, 12402, 2011. [DOI](#) (Citations : 2)

15. **D. Falta, R. Fisher**, & G. Khanna, “Gravitational Waves From Single Degenerate Channel of Type Ia Supernovae,” *Physical Review Letters*, **106**, 201103, 2011. [DOI](#) (Citations : 6)

* 14. R. Benzi, L. Biferale, **R. Fisher**, D. Lamb, & F. Toschi, “Inertial Range Eulerian and Lagrangian Statistics from Numerical Simulations of Isotropic Turbulence,” *Journal of Fluid Mechanics*, **653**, 221-244, 2010. [DOI](#) (Citations : 60)

* 13. D. Townsley, R. Bair, A. Dubey, **R. Fisher**, N. Hearn, D. Lamb, K. Riley, “Large-scale Simulations of Buoyancy-Driven Turbulent Nuclear Burning,” *Journal of Physics : Conference Series* **125**, 012009, 2008. [DOI](#) (Citations : 5)

* 12. A. Arnèodo, R. Benzi, J. Berg, L. Biferale, E. Bodenschatz, A. Busse, E. Calzavarini, B. Castaing, M. Cencini, L. Chevillard, **R. Fisher**, R. Grauer, H. Homann, D. Lamb, A.S. Lanotte, E. Lévêque, B. Lüthi, J. Mann, N. Mordant, W. C. Müller, S. Ott, N.T. Ouellette, J. F. Pinton, S. B. Pope, S.G. Roux, F. Toschi, H. Xu, & P.K. Yeung, “Universality and Multifractality of Lagrangian Turbulence,” *Physical Review Letters*, **100** : 254504, 2008. [DOI](#) (Citations : 105)

11. P.S. Li, C. McKee, R. Klein, & **R. Fisher**, “Sub-Alfvénic Non-Ideal MHD Turbulence Simulations with Ambipolar Diffusion: I. Turbulence Statistics,” *Astrophysical Journal*, **684**:380–394, 2008. [DOI](#) (Citations : 43)

* 10. R. Benzi, L. Biferale, **R. Fisher**, L. Kadanoff, L., D. Lamb, & F. Toschi, “Intermittency and Universality in Fully-Developed Inviscid and Weakly-Compressible Turbulent Flows,” *Physical Review Letters*, **100** : 234503–07, 2008. [DOI](#) (Citations : 62)

9. J. Jordan, **R. Fisher**, D. Townsley, A. Calder, C. Graziani, S. Asida, D. Lamb, & J. Truran, “Three-Dimensional Simulations of the Deflagration Phase of the Gravitationally-Confined Detonation Model of Type Ia Supernovae,” *The Astrophysical Journal*, **681**:1448–1457, 2008. [DOI](#) (Citations : 98)

* 8. **R. Fisher**, S. Abarzhi, K. Antypas, S. Asida, A. Calder, F. Cattaneo, P. Constantin, A. Dubey, I. Foster, J. Gallagher, M. Ganapathy, C. Glendenin, L. Kadanoff, D. Lamb, S. Needham, M. Papka, T. Plewa, L. Reid, P. Rich, K. Riley, & D. Sheeler. “Terascale Turbulence Computation on BG/L Using the FLASH3 Application Framework,” *IBM Research Journal Special Issue on Applications of Massively Parallel Systems*, 1 : 127 – 136, 2008. [Journal](#) (Citations : 37)

7. A. Dubey, L. Reid, and **R. Fisher**, “Introduction to FLASH 3.0, with application to supersonic turbulence,” *Physica Scripta*, 014046, 2008. [DOI](#) (Citations : 46)

6. F. Nakamura, C. McKee, R. Klein, & **R. Fisher**, “On the Hydrodynamic Interaction of Shock Waves with Interstellar Clouds. II. The Effect of Smooth Cloud Boundaries on Cloud Destruction and Cloud Turbulence,” *The Astrophysical Journal Supplement Series*, **164** : 477 – 505, 2006. [DOI](#) (Citations : 92)

* 5. K. Antypas, A. Calder, A. Dubey, **R. Fisher**, M. Ganapathy, J. Gallagher, L. Reid, K. Riley, D. Sheeler, & N. Taylor, “Scientific Applications on the Massively-Parallel BG/L Machine,” in *Parallel Computational Fluid Dynamics: Theory and Applications*, 2006. (Citations : 15)

4. R. Crockett, P. Colella, **R. Fisher**, R. Klein, & C. McKee, “An Unsplit, Cell-Centered Godunov Method for Ideal MHD,” *Journal of Computational Physics*, 2005, **203** : 422 –448. [DOI](#) (Citations : 57)

3. **R. Fisher**, “A Turbulent Interstellar Medium Origin of the Binary Period Distribution,” *The Astrophysical Journal*, 2004, **600** : 769–780. [DOI](#) (Citations : 53)

2. A. Boss, **R. Fisher**, R. Klein, & C. McKee, “The Jeans Condition and Collapsing Molecular Cloud Cores : Filaments or Binaries?,” *The Astrophysical Journal*, 2000, **528** : 325-335. [DOI](#) (Citations : 116)

1. J. Weinstein, **R. Fisher**, S. Vasanawala, M. Shapiro, & T. Tombrello, “Molecular Dynamics Simulation of Cluster-Ion Fragmentation,” *Nuclear Instruments and Methods in Physics Research Section B*, 1994, **88** : 74 – 80. [DOI](#) (Citations : 9)

Non-Refereed Publications

* 12. R. Bair, J. Bernstein, C. Daley, B. Diemer, A. Dubey, **R. Fisher**, and others, “Verification and Validation of Current Models of Thermonuclear-Powered Supernovae Using Large-Scale Simulations,” *Proceedings of SciDAC 2010*, 2010. [PDF](#)

11. **R. Fisher**, **D. Falta**, C. Jordan, & D. Lamb, “The Role of Variations of Central Density of White Dwarf Progenitors Upon Type Ia Supernovae,” *Proceedings of The Ninth Asia-Pacific International Conference on Gravitation and Astrophysics (ICGA9)*, 2010, p. 335. [arXiv](#) (Citations : 5)

10. Jordan, C. Meakin, N. Hearn, **R. Fisher**, D. Townsley, D. Lamb, & J. Truran, “Simulations of the Gravitationally Confined Detonation Model of Type Ia Supernovae for Multiple Ignition Points,” *Numerical Modeling of Space Plasma Flows: ASTRONUM-2008 ASP Conference Series*, Vol. 406, 2009, p. 92. [arXiv](#) (Citations : 4)

9. A. Dubey, **R. Fisher**, C. Graziani, G. Jordan, D. Lamb, L. Reid, P. Rich, D. Sheeler, D. Townsley, & K. Weide, “Challenges of Extreme Computing using the FLASH Code,” in *Numerical Modeling of Space Plasma Flows : Astronom 2007 ASP Conference Series*, Vol. 385, 2008, p. 145. [ADS](#) (Citations : 11)

8. G. Jordan, **R. Fisher**, D. Townsley, A. Calder, C. Graziani, S. Asida, D. Lamb, & J. Truran, “Preliminary Results of Three-Dimensional Simulations of the Deflagration Phase of the Gravitationally Confined Detonation Model of Type Ia Supernovae,” in *Numerical Modeling of Space Plasma Flows : Astronom 2007 ASP Conference Series*, Vol. 385, 2008, p. 97. [ADS](#) (Citations : 2)

7. R. Klein, **R. Fisher**, C. McKee, & M. Krumholz, “Recent Advances in the Collapse and Fragmentation of Turbulent Molecular Cloud Cores,” in Star Formation in the Interstellar Medium: In Honor of David Hollenbach, Chris McKee and Frank Shu, 2004, 227–234. [ADS](#) (Citations : 1)
6. R. Klein, **R. Fisher**, & C. McKee, “Resolution Issues in the Collapse and Fragmentation of Turbulent Molecular Cloud Cores,” in Gravitational Collapse: From Massive Stars to Planets : A Meeting to Celebrate Peter Bodenheimer For His Outstanding Contributions to Astrophysics, 2004. [ADS](#) (Citations : 5)
5. R. Klein, **R. Fisher**, M. Krumholz, & C. McKee, “Recent Advances in the Collapse and Fragmentation of Turbulent Molecular Cloud Cores,” in Winds, Bubbles, and Explosions: A conference to Honor John Dyson, 2003, 92-96. [ADS](#) (Citations : 22)
4. M.R. Krumholz, **R. Fisher**, R. Klein, & C. Mckee, “Realistic Initial Conditions for Star-Formation Simulations,” in Winds, Bubbles, and Explosions: A conference to Honor John Dyson, 2003, 138 - 138. [ADS](#) (Citations : 1)
3. R. Klein, **R. Fisher**, C. McKee, & M. Krumholz, “Low Mass Star Formation in Turbulent Molecular Cloud Cores,” in Star Formation at High Angular Resolution, International Astronomical Union. Symposium no. 221, 2003. [ADS](#)
2. R. Klein, **R. Fisher**, & C. McKee, “Fragmentation and Star Formation in Turbulent Cores,” in The Formation of Binary Stars, Proceedings of IAU Symposium 200, 2001. [arXiv](#) (Citations : 10)
1. R. Klein, **R. Fisher**, C. McKee, & J. Truelove, “Gravitational Collapse and Fragmentation in Molecular Clouds with Adaptive Mesh Refinement Hydrodynamics,” in Numerical Astrophysics : Proceedings of the International Conference on Numerical Astrophysics, 1999. [arXiv](#) (Citations : 13)

Grants Summary

\$480,480 Grants (PI/Co-PI) Received to Date

Over 130 Million CPU Hours of Computer Time (PI/Co-PI) Received to Date

Grants Received

Principal Investigator Grants Awarded at UMass Dartmouth

- 2015 NSF XSEDE : “The Double-Degenerate Channel of Type Ia Supernovae” (1/1/14 - 12/31/15) 1.5 Million CPU Hours (\$51,000 equivalent) - **Awarded**
- 2013 NSF XSEDE : “The Double-Degenerate Channel of Type Ia Supernovae” (7/1/13 - 6/30/14) 4 Million CPU Hours - **Awarded**

- 2012 AAS/NASA Small Research Grant : “Probing the Double-Degenerate Channel of Type Ia Supernovae” (1/01/12 - 12/31/12) \$3,200 - **Awarded**
- 2010 NSF MRI-R² : “Acquisition of a Heterogeneous Terascale Shared Campus Computing Facility” (10/01/10 - 10/01/11) \$199,480 - **Awarded**
- 2010 NSF Teragrid : “From Star Formation to Supernovae : Astrochemistry of Turbulent GMC Models and Gravitational Waves from Type Ia Supernovae” - 1.1 Million CPU Hours, requested and **Awarded**
- 2009 NSF Teragrid : “Astrochemical Diagnostics of Turbulent Giant Molecular Clouds” 300,000 SUs requested and **Awarded**

Principal Investigator Grants Awarded Prior to UMass Dartmouth

- 2007-2008 University of Chicago and Argonne National Laboratory Joint Theory Institute : “Support for International Collaboration on Turbulence Research,” \$78,000 **Awarded**
- 2005 Lawrence Livermore National Laboratory : “Large-Scale 3-D Simulation of Weakly-Compressible Homogeneous Isotropic Turbulence with Lagrangian Tracer Particles,” 26.7 Million CPU hours on IBM BG/L (then fastest supercomputer in world) - **Awarded**

Co-Principal Investigator Grants Awarded at UMass Dartmouth

- 2009 AFOSR DURIP : “Acquisition of a Heterogeneous Terascale Shared Campus Computing Facility” (10/01/10 - 10/01/11, PI S. Gottlieb, University Massachusetts Dartmouth) \$199,800 - **Awarded**
- 2009 DOE INCITE, “Study of Buoyancy-Driven Turbulent Nuclear Burning and Validation of Type Ia Supernova Models,” (PI D. Lamb, University of Chicago), 70 Million CPU hours **Awarded**
- 2008 DOE INCITE, “Study of Buoyancy-Driven Turbulent Nuclear Burning and Validation of Type Ia Supernova Models,” (PI D. Lamb, University of Chicago), 22 Million CPU hours **Awarded**

Co-Principal Investigator Grants Awarded Prior to UMass Dartmouth

- 2006 NSF Teragrid MRAC, : “Scientific Analysis and Visualization of Turbulence Data,” (PI M. Papka, Argonne National Laboratory) 30,000 SUs requested and **Awarded**
- 2005 NSF Teragrid LRAC, “Progress Towards a Comprehensive Theory of Star Formation – From Low to High Mass and on to Giant Molecular Clouds,” (PI R. Klein, University of California at Berkeley/LLNL) 700,000 SUs **Awarded** on SDSC IBM SP-4

- 2005 LBNL ERCAP "Toward a Comprehensive Theory of Star Formation," (PI R. Klein, University of California at Berkeley/LLNL) 700,000 SUs on IBM SP-3 requested, 400,000 SUS **Awarded**
- 2004 NSF NRAC, "Progress Towards a Comprehensive Theory of Star Formation – From Low to High Mass and on to Giant Molecular Clouds," (PI R. Klein, University of California at Berkeley/LLNL) 1,100,000 SUs on SDSC IBM SP-4 requested and **Awarded**
- 2004 LBNL NERSC ERCAP "Toward a Comprehensive Theory of Star Formation," (PI R. Klein, University of California at Berkeley/LLNL) 700,000 SUS **Awarded** on IBM SP-3
- 2003 NSF NRAC, "Towards A Comprehensive Theory of Star Formation – From Low to High Mass," PI R. Klein, University of California at Berkeley/LLNL) 770,000 SUs on SDSC IBM-SP2 requested and **Awarded**
- 2003 LBNL NERSC ERCAP "Toward a Comprehensive Theory of Star Formation," (PI R. Klein, University of California at Berkeley/LLNL) 525,000 SUS **Awarded** on IBM SP-3
- 2002 NSF NRAC "Towards a Comprehensive Theory of Star Formation – From Low to High Mass," (PI R. Klein, University of California at Berkeley/LLNL) 500,000 SUs on SDSC IBM SP-2 requested and **Awarded**
- 2001 NSF NPACI "Towards a Comprehensive Theory of Star Formation – From Low to High Mass," (PI R. Klein, University of California at Berkeley/LLNL) 350,000 SUs on SDSC IBM SP-2, requested and **Awarded**
- 2000 NSF NPACI "Star Formation in Turbulent Molecular Cloud Cores." (PI R. Klein, University of California at Berkeley/LLNL) 156,000 SUs on Univ. Texas IBM SP-2 requested. 100,000 **Awarded**
- 1999 NSF NPACI "Numerical Studies of Fragmentation in Star-Forming Regions," (PI R. Klein, University of California at Berkeley/LLNL) 800 SUs on PSC Cray T90, 4000 SUs on Univ. Texas IBM SP-2, requested and **Awarded**
- 1998 NSF NPACI "Numerical Studies of Fragmentation in Star-Forming Regions," (PI R. Klein, University of California at Berkeley/LLNL) 1000 SUs requested and **Awarded** on SDSC Cray T90
- 1997 NSF Pittsburgh Supercomputing Center "Numerical Studies of Fragmentation in Star-Forming Regions," (PI R. Klein, University of California at Berkeley/LLNL) 400 SUs requested and **Awarded** on PSC Cray C90.