Dr. James Wurster

Astrophysics Group
School of Physics and Astronomy
University of Exeter
Stocker Road
Exeter EX4 4QL
Email: j.wurster@exeter.ac.uk
Web: http://www.astro.ex.ac.uk/people/wurster/
ORCID: 0000-0003-0688-5332

Employment

2016 – present	**Research Fellow** Astrophysics Group, School of Physics and Astronomy University of Exeter, Exeter, England
2013 – 2016	**Research Fellow** Monash Centre for Astrophysics (MoCA), School of Physics and Astronomy Monash University, Melbourne, Australia

Education

2013	**Ph. D. Astronomy** Department of Astronomy and Physics Saint Mary's University, Halifax, Canada Advisor: Dr. Robert J. Thacker
2008	**M. Sc. Astronomy** Department of Physics, Engineering Physics and Astronomy Queen's University, Kingston, Canada Advisor: Dr. Kayll Lake
2006	**B. Sc. (Honours) Mathematics and Physics** The University of Western Ontario London, Canada Honours Thesis Advisor: Dr. Shantanu Basu

Fellowships, scholarships and awards

2015	Awarded 600,000CPU hours from the Australian National Computational Merit Allocation Scheme (NCMAS)
2009 – 2011	National Science and Engineering Research Council of Canada (NSERC) Canada Graduate Scholarship – Ph. D. Level
2006 – 2008	NSERC Canada Graduate Scholarship – M. Sc. Level

Supervision summary

Nov. 2015 – Jan. 2016	Ms. Madeline Marshall Third year summer student at Monash University, Australia
Nov. 2015 – Jan. 2016	Mr. Bernard Field First year summer student at Monash University, Australia
2015	Mr. David Liptai Honours student at Monash University, Australia

Teaching summary

Autumn 2015	Lecturer: Stars and Galaxies (galaxy interactions and galaxy clusters) Monash University, Australia
Spring 2013	Instructor: University Physics laboratory Saint Mary's University, Canada
2012	Instructor: Physics for Life Science laboratory Saint Mary's University, Canada
2008-2012	Teaching Assistant: Physics for Life Science & University Physics laboratories Saint Mary's University, Canada

Organisation of scientific meetings

2019	Local Organising Committee member: 14th International SPHERIC Workshop. Hosted at the University of Exeter, England, June 2019. Estimating 120-150 participants.

Institutional responsibilities

2015 – 2016	Co-coordinator: MoCA Public Talk Series, Monash University, Australia
2014	Coordinator: MoCA Seminar Series, Monash University, Australia

Memberships of scientific societies

2013–2016	Member: Astronomical Society of Australia
2013–2016	Member: Australian National Institute for Theoretical Astrophysics
2008–2013	Student Member: Canadian Astronomical Society

Conference talks: Invited

Feb. 2018	*1st Phantom Users Workshop*, Melbourne, Australia "Physical and Artificial Resistivity (in smoothed particle magnetohydrodynamics)"
Dec. 2017	*Computational MHD Workshop 2017*, Leeds, England "Smoothed Particle Magnetohydrodynamics"

Conference talks: Contributed

2019	Great Barriers in Planet Formation, 14th International SPHERIC workshop
2018	The Wonders of Star Formation, 1st European Phantom Users Workshop, The Olympian Symposium 2018, Cosmic rays: Salt of the star formation recipe, 1st Phantom Users Workshop, Magnetic Fields or Turbulence?
2017	12th International SPHERIC workshop
2016	Sixth Annual Dirac Science Day, ANITA 2016 meeting
2015	Protoplanetary Disk Dynamics & Planet Formation, ANITA 2015 meeting

Public talks

Sept. 2017	*North Bay Astronomy Club*, North Bay, Canada "My career in astronomy: From watching sci-fi to studying the stars."

Seminars

2019	Chalmers University of Technology, University College London
2018	University of Hertfordshire, University of Cambridge (DAMTP), Cardiff University, University of Southampton, Academia Sinica Institute of Astronomy and Astrophysics
2017	University of Leicester, University of Toronto (CITA), University of Western Ontario, Monash University (MoCA)
2016	University of Exeter, Swinburne University, Monash University (MoCA)
2015	Monash University (Math), University of Exeter, University of Melbourne
2014	University of Central Lancashire, Monash University (MoCA)

Refereed journal publications

1. F. Priestley, **J. Wurster** & S. Viti. *Ambipolar diffusion and the molecular abundances in pre-stellar cores*. MNRAS, 488:2357-2364, Sept 2019.

2. **J. Wurster** & M. R. Bate. *Disc formation and fragmentation using radiative non-ideal magnetohydrodynamics.* MNRAS, 486:2587-2603, June 2019.

3. **J. Wurster** & Z.-Y. Li. *The role of magnetic fields in the formation of protostellar discs.* Frontiers in Astronomy and Space Science, 5:39, December 2018.

4. **J. Wurster**, M. R. Bate, & D. J. Price. *On the origin of magnetic fields in stars.* MNRAS, 481:2450-2457, December 2018.

5. **J. Wurster**, M. R. Bate, & D. J. Price. *Hall effect-driven formation of gravitationally unstable discs in magnetized molecular cloud cores.* MNRAS, 480:4434-4442, November 2018.

6. D. J. Price, **J. Wurster**, T. S. Tricco, C. Nixon, S. Toupin, A. Pettitt, C. Chan, D. Mentiplay, G. Laibe, S. Glover, C. Dobbs, R. Nealon, D. Liptai, H. Worpel, C. Bonnerot, G. Dipierro, G. Ballabio, E. Ragusa, C. Federrath, R. Iaconi, T. Reichardt, D. Forgan, M. Hutchison, T. Constantino, B. Ayliffe, K. Hirsh, & G. Lodato. *Phantom: A Smoothed Particle Hydrodynamics and Magnetohydrodynamics Code for Astrophysics.* PASA, 35:e031, September 2018.

7. **J. Wurster**, M. R. Bate, & D. J. Price. *The effect of extreme ionization rates during the initial collapse of a molecular cloud core.* MNRAS, 476:2063-2074, May 2018.

8. **J. Wurster**, M. R. Bate, & D. J. Price. *The collapse of a molecular cloud core to stellar densities using radiation non-ideal magnetohydrodynamics.* MNRAS, 475:1859-1880, April 2018.

9. **J. Wurster**, D. J. Price, & M. R. Bate. *The impact of non-ideal magnetohydrodynamics on binary star formation.* MNRAS, 466:1788-1804, April 2017.

10. D. Liptai, D. J. Price, **J. Wurster** & M. R. Bate. *Does turbulence determine the initial mass function?* MNRAS, 465:105-110, February 2017.

11. R. Iaconi, T. Reichardt, J. Staff, O. De Marco, J.-C. Passy, D. Price, **J. Wurster**, & F. Herwig. *The effect of a wider initial separation on common envelope binary interaction simulations.* MNRAS, 464:4028-4044, February 2017.

12. **J. Wurster**. *NICIL: A Stand Alone Library to Self-Consistently Calculate Non-Ideal Magnetohydrodynamic Coefficients in Molecular Cloud Cores.* PASA, 33:e041, September 2016.

13. M. L. A. Richardson, E. Scannapieco, J. Devriendt, A. Slyz, R. J. Thacker, Y. Dubois, **J. Wurster**, & J. Silk. *Comparing Simulations of AGN Feedback.* ApJ, 825:83, July 2016.

14. **J. Wurster**, D. J. Price, & M. R. Bate. *Can non-ideal magnetohydrodynamics solve the magnetic braking catastrophe?* MNRAS, 457:1037-1061, March 2016.

15. **J. Wurster**, D. Price, & B. Ayliffe. *Ambipolar diffusion in smoothed particle magnetohydrodynamics*. MNRAS, 444:1104-1112, October 2014.

16. R. J. Thacker, C. MacMackin, **J. Wurster**, & A. Hobbs. *AGN feedback models: correlations with star formation and observational implications of time evolution.* MNRAS, 443:1125-1141, September 2014.

17. D. J. Williamson, R. J. Thacker, **J. Wurster**, & B. K. Gibson. *Cloud angular momentum and effective viscosity in global SPH simulations with feedback.* MNRAS, 442:3674-3685, August 2014.

18. **J. Wurster** & R. J. Thacker. *A comparative study of AGN feedback algorithms.* MNRAS, 431:2513-2534, May 2013.

19. **J. Wurster** & R. J. Thacker. *Accretion disc particle accretion in major merger simulations.* MNRAS, 431:539-553, May 2013.

20. S. Basu, G. E. Ciolek, W. B. Dapp, & **J. Wurster**. *Magnetically-regulated fragmentation induced by nonlinear flows and ambipolar diffusion.* New A, 14:483-495, July 2009.

21. S. Basu, G. E. Ciolek, & **J. Wurster**. *Nonlinear evolution of gravitational fragmentation regulated by magnetic fields and ambipolar diffusion*. New A, 14:221-237, April 2009.

Conference proceedings

1. **J. Wurster** & M. R. Bate. *Resolving numerical star formation: A cautionary tale.* Proceedings of the 14th international SPHERIC workshop, Exeter, United Kingdom, June 2017.

2. **J. Wurster**, M. R. Bate, D. J. Price, & T. S. Tricco. *Investigating prescriptions for artificial resistivity in smoothed particle magnetohydrodynamics.* Proceedings of the 12th international SPHERIC workshop, Ourense, Spain, June 2017.

Submitted journal articles

1. **J. Wurster**, M. R. Bate, & D. J. Price. *The effect of non-ideal magnetic fields on low mass star cluster formation.* Submitted to MNRAS.

Journal articles I refereed

2019	Astrophysical Journal (1)
2018	Monthly Notices of the Royal Astronomical Society (2), Astronomy & Astrophysics (1), Astrophysical Journal (2), Astronomy and Computing (1)
2017	Monthly Notices of the Royal Astronomical Society (1)
2016	Monthly Notices of the Royal Astronomical Society (1), Publications of the Astronomical Society of Australia (1)
2015	Publications of the Astronomical Society of Australia (1)

Scientific research summary and primary astrophysical codes used

Keywords	stars: low-mass – stars: formation – stars: winds, outflows – protostellar discs: formation – magnetic fields – magnetohydrodynamics (MHD) – methods: numerical
PHANTOM	Smoothed particle magnetohydrodynamics astrophysical code; public code. Roles: Major contributions to development; user. Reference: Price, Wurster, et al., 2018, PASA, 35:e031.
SPHNG	Smoothed particle magnetohydrodynamics astrophysical code; private code. Roles: Minor contributions to development; user.
NICIL	Library to calculate the non-ideal MHD coefficients; public library. Role: Sole developer and maintainer; user. Reference: Wurster, 2016, PASA, 33, e041.

July 28, 2019