

CURRICULUM VITAE
Ashkbiz Danehkar

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EDUCATION

- Ph.D.** Physics & Astronomy, Macquarie University, Australia 2014
Dissertation: *Evolution of Planetary Nebulae with WR-type Central Stars*
Adviser: Professor Quentin A. Parker
- M.S.** Plasma Physics (with distinction), Queen's University Belfast, UK 2009
Thesis: *Propagation of Electron-Acoustic Waves in a Plasma with Suprathermal Electrons*
Advisers: Dr. Ioannis Kourakis, Professor Manfred A. Hellberg
- M.S.** Computational Science, University of Rostock, Germany 2007

RESEARCH INTERESTS

High Energy Astrophysics, Supermassive Black Holes, Active Galactic Nuclei, AGN Feedback, Galactic Outflows, Galaxy Formation and Evolution, Accretion Disks, Relativistic Jets, Stellar-mass Black Holes, Interstellar Medium, X-ray Spectroscopy, Spectral-Temporal Analysis, Imaging Spectroscopy, Astrophysical Plasmas, Relativistic Cosmology

PROFESSIONAL HISTORY

- Postdoctoral Fellow**, Harvard-Smithsonian Center for Astrophysics, Cambridge, USA 2015–present
- Research Assistant**, Macquarie University, Department of Physics and Astronomy, Australia 2010–2014
- Postgraduate Student**, Queen's University Belfast, Centre for Plasma Physics, UK 2008–2009
- Early-Stage Researcher**, University of Craiova, Faculty of Physics, Romania 2007–2008

AWARDS, PRIZES, & HONORS

- Postdoctoral Fellowship, Smithsonian Astrophysical Observatory 2015–present
- Astronomical Society of Australia, Student Travel Assistance 2014
- Australian Institute of Physics, Student Conference Support 2014
- International Astronomical Union Travel Grant (IAUS312) 2014
- Sigma Xi Grants-in-Aid of Research (GIAR) 2013
- Macquarie University Higher Degree Research Funds 2012
- International Astronomical Union Travel Grants (IAUS281–3) 2011
- Max Planck Institute for Extraterrestrial Physics Scholarship (ICDPD6) 2011
- International Macquarie University Research Excellence Scholarship 2010–2013
- Northern Ireland, Department for Employment and Learning Studentship 2008–2009
- Marie Curie Early-Stage Fellowship (MRTN-CT-2004-005104) 2007–2008

PROPOSALS & GRANTS

Awarded Observing Time

- PI, Gemini 8.2-m Telescope, GMOS-IFU (GS-2013A-Q-88), 8.0 HR Queue Mode 2013
- Co-I, AAT 3.9-m Telescope, AAO-SPIRAL (SP019), 3.9 HR Service Mode 2013
- PI, Gemini 8.2-m Telescope, GMOS-IFU (GS-2012B-Q-69), 5.2 HR Queue Mode 2012
- PI, ANU 2.3-m Telescope, WiFeS (ID 3120158), 4 Nights On-Site 2012
- PI, ANU 2.3-m Telescope, WiFeS (ID 1120214), 4 Nights On-Site 2012

Awarded Computing Time

- PI, NSF XSEDE Supercomputer Allocation (10kSU startup), TACC STAMPEDE cluster 2016–present
- FAS Research Computing Group, Harvard University, ODYSSEY cluster 2016–present
- Harvard-Smithsonian Center for Astrophysics, HYDRA Beowulf cluster 2015–present
- Co-I, NCI National Facility, RAIJIN / VAYU cluster (projects pk3 & g33), 450 kSU 2010–2015
- PI, Swinburne University of Technology, gSTAR / swinSTAR (project p063_astro), 500 kSU 2011–2015
- Co-I, Intersect Australia, ORANGE cluster (project g33), 200 kSU 2010–2014

Approved Proposals & Grants

- (PI) NSF XSEDE (STAMPEDE): “Expanding a 3-D Photoionization Code for X-ray Astrophysics of AGNs”
- (PI) NCI National Facility (500 kSU): “On the physics of the nebular surface brightness-radius-density correlation”
- (Co-I) NCI National Facility (450 kSU): “Photoionization modeling of planetary nebulae with binary central stars”
- (Co-I) AAT Telescope (3.9 hours): “Kinematical study of Galactic planetary nebulae with binary central stars”
- (PI) ANU Telescope (4 nights): “Morphokinematics and abundances analysis of Galactic planetary nebulae”
- (PI) ANU Telescope (4 nights): “Kinematic study of planetary nebulae with potential double-degenerate nuclei”

PROFESSIONAL MEMBERSHIPS

American Astronomical Society, <i>Full Member</i>	2015–present
Royal Astronomical Society, <i>Fellow</i>	2014–present
Astronomical Society of Australia, <i>Member</i>	2011–present
X-ray Surveyor Science Working Group, <i>Member</i>	2016–present
Sigma Xi Scientific Research Society, <i>Full Member</i>	2010–present
Australian National Institute for Theoretical Astrophysics, <i>Member</i>	2011–present
Australian Institute of Physics, <i>Member</i>	2011–2015
UK Institute of Physics, <i>Associate Member</i>	2009–2011
American Physical Society, <i>Student Member</i>	2009–2011

EXPERTISE

Integral Field Spectroscopy:
Wide-Field Spectrograph (WiFeS), ANU 2.3-m Telescope
GMOS-IFU, Gemini 8.2-m Telescope
Instrument operation, data reduction, data analysis, visualization
Photo-ionization Modeling: 3D MOCASSIN, CLOUDY, XSTAR
Morpho-kinematic Modeling: SHAPE
Stellar Astrophysics: MESA, CMFGEN
Abundance Analysis: EQUIB, NEAT, IRAF NEBULAR

COMPUTING SKILLS

C, C++, FORTRAN, Pascal, Delphi, Java
IDL, Python, MayaVi, SciPy, AstroPy
IRAF, 2dFDR, DS9, Ureka, Starlink Namaka, PyRAF
MATLAB, Maple, Mathematica
OpenMPI, MPICH, Intel MPI
L^AT_EX, B_IB_TE_X, LibreOffice, Microsoft Office
Linux and other UNIX variants, Microsoft Windows family

TEACHING EXPERIENCE

Laureate International Universities, Think Education Group	Sydney, Australia
<i>Learning Management System Builder</i> , Undergraduate and Postgraduate Courses	2014
Responsible for building and developing courses for student access	
Macquarie University, Department of Physics and Astronomy	Sydney, Australia
<i>Teaching Assistant</i> , Undergraduate Physics Laboratory	2010–2012
Lab Demonstrator for physics I & II and assistant in laboratory procedure	
<i>Grader</i> , Undergraduate Astronomy	2010–2012
Graded weekly lab reports and provided laboratory feedback	

MEETING ATTENDANCE

Talk Contributor

CfA Postdoc Symposium, Center for Astrophysics, Cambridge, USA	October 7, 2016
High Energy Phenomena Seminar, Harvard CfA, Cambridge, MA, USA	September 7, 2016
HEA Group Meeting, MIT Kavli Institute, Cambridge, MA, USA	December 3, 2015
CfA Postdoc Symposium, Center for Astrophysics, Cambridge, USA	November 20, 2015
12th Asia-Pacific Regional IAU Meeting, Daejeon, Korea	August 20, 2014
MQ AAastro Workshop, Macquarie University, Sydney, Australia	December 6, 2011
MQ Astroseminar, Macquarie University, Sydney, Australia	May 12, 2011

Poster Presenter

IAU Symposium 312, Beijing, China	August 25–29, 2014
12th Asia-Pacific Regional IAU Meeting, Daejeon, Korea	August 18–22, 2014
IEEE ICOPS/BEAMS, Washington DC, USA	May 25–29, 2014
ASA Annual Scientific Meeting, Melbourne, Australia	July 7–12, 2013
ASA Annual Scientific Meeting, Sydney, Australia	July 1–6, 2012
IAU Symposium 283, Puerto de la Cruz, Tenerife, Spain	July 25–29, 2011
IAU Symposium 282, Tatranská Lomnica, Slovakia	July 18–22, 2011
IAU Symposium 281, Padova, Italy	July 4–8, 2011
ICPDP6, Garmisch-Partenkirchen, Germany	May 16–20, 2011

General Participant

Chandra Science for the Next Decade, Cambridge, MA, USA	August 16–19, 2016
CIAO Workshop, Chandra X-ray Center, Cambridge, MA, USA	August 15–16, 2016
AusGO/AAO Observational Techniques Workshop, Sydney, Australia	April 1–4, 2014
Astroinformatics, CSIRO Astronomy and Space Science, Australia	December 9–13, 2013
Mount Stromlo Observatory Student Seminars, Canberra, Australia	November 21–22, 2013
ANITA Theory Workshop, Brisbane, Australia	February 21–22, 2013
Astroinformatics Summer School, Brisbane, Australia	February 18–20, 2013
Harley Wood Winter School, Blue Mountains, Australia	June 28–July 1, 2012
Large Surveys in the Multi-IFS era, SAMI workshop, CSIRO, Sydney, Australia	February 9–10, 2012
MQ AAAstro Workshop on Phases of Late Stage Stellar Evolution, Sydney, Australia	December 5–7, 2011
3rd National Conference on Theoretical Physics, Buşteni, Romania	June 10–13, 2008
6th International Spring School and Workshop: Quantum Field Theory, Călimăneşti, Romania	May 6–11, 2008

COLLOQUIA & CONFERENCE TALKS

8. *Photoionization Modeling of Warm Absorbing Outflows in Active Galactic Nuclei*
CfA Postdoc Symposium, Harvard CfA, Cambridge, USA, October 7, 2016.
7. *Ultra-fast Outflows from Active Galactic Nuclei of Seyfert I Galaxies*
High Energy Phenomena Seminar, Harvard CfA, Cambridge, USA, September 7, 2016.
6. *Collimated Bipolar Outflows in Planetary Nebulae from Integral Field Spectroscopy*
HEA Group Meeting, MIT Kavli Institute, Cambridge, USA, December 3, 2015.
5. *Insights into the Morphology of Planetary Nebulae from 3D Spectroscopy*
CfA Postdoc Symposium, Harvard CfA, Cambridge, USA, November 20, 2015.
4. *Kinematic Properties of Planetary Nebulae with Wolf-Rayet Stars*
12th Asia-Pacific Regional IAU Meeting, Daejeon, Korea, August 20, 2014.
3. *Photoionization models of the Eskimo Nebula: Evidence for a Hidden Ionizing Source*
MQ AAAstro Workshop, Macquarie University, Sydney, Australia, December 6, 2011.
2. *Electron Beam-Plasma Interaction in Non-thermal Plasmas*
MQ Astroseminar, Macquarie University, Sydney, Australia, May 12, 2011.
1. *Nonlinear Electron-Acoustic Waves with Suprathermal Electrons*
CPP Project Seminar, Queen's University Belfast, UK, September 30, 2009.

PROFESSIONAL SERVICE

Referee Service (publons.com/a/843927)

- Astrophysical Journal* (2015–present)
- Astrophysics and Space Science* (2011–present)
- Journal of Geophysical Research: Space Physics* (2015–present)
- Physics of Plasmas* (2012–present), *Entropy* (2016–present)

Editorial Service

- Frontiers in Physics* (2016–present): Review Editor
- Frontiers in Astronomy & Space Sciences* (2016–present): Review Editor

Review Panel Service

- Chandra X-ray Center (CXC) Peer Review Panel (Cycle 18): Facilitator

Computing Service (github.com/danehkar)

pyEQUIB: Python Package for Equilibrium Atomic Populations and Line Emissivities

proEQUIB: IDL Library for Equilibrium Atomic Populations and Line Emissivities

MGFIT: IDL Library for Least-Squares Minimization Genetic Algorithm Fitting

MPI_XSTAR: MPI-based Parallelization of XSTAR Photoionization Program

REFEREED PUBLICATIONS

Number of peer-reviewed publications: 11 of which 9 as first author

Number of proceedings publications: 12 of which 9 as first author

h -index: 7, m -index: 0.9, g -index: 10, $i10$ -index: 5, Citations: 125

10. **Danehkar, A.**, Q. A. Parker, and W. Steffen. Fast, low-ionization emission regions of the planetary nebula M2-42. *The Astronomical Journal*, 151(2):38, 2016. doi:10.3847/0004-6256/151/2/38
9. **Danehkar, A.**. Discovery of collimated bipolar outflows in the planetary nebula Th 2-A. *The Astrophysical Journal*, 815(1):35, 2015. doi:10.1088/0004-637X/815/1/35
8. **Danehkar, A.**. Evolution of Planetary Nebulae with WR-type Central Stars. *Publications of the Astronomical Society of the Pacific: Dissertation Summary*, 127(951):499, 2015. doi:10.1086/681244
7. **Danehkar, A.**, and Q. A. Parker. Spatially resolved kinematic observations of the planetary nebulae Hen 3-1333 and Hen 2-113. *Monthly Notices of the Royal Astronomical Society. Letters*, 449(1):L56–L59, 2015. doi:10.1093/mnras/51/022
6. **Danehkar, A.**, H. Todt, B. Ercolano, and A. Y. Kniazev. Observations and three-dimensional photoionization modelling of the Wolf–Rayet planetary nebula Abell 48. *Monthly Notices of the Royal Astronomical Society*, 439(4):3605–3615, 2014. doi:10.1093/mnras/stu203
5. Frew, D. J., I. S. Bojicic, Q. A. Parker, M. Stupar, S. Wachter, K. DePew, **A. Danehkar**, M. T. Fitzgerald, and D. Douchin. The planetary nebula Abell 48 and its [WN] nucleus. *Monthly Notices of the Royal Astronomical Society*, 440(2):1345–1364, 2014. doi:10.1093/mnras/stu198
4. **Danehkar, A.**, Q. A. Parker, and B. Ercolano. Observations and three-dimensional ionization structure of the planetary nebula SuWt 2. *Monthly Notices of the Royal Astronomical Society*, 434(2):1513–1530, 2013. doi:10.1093/mnras/stt1116
3. **Danehkar, A.**, N. S. Saini, M. A. Hellberg, and I. Kourakis. Electron-acoustic solitary waves in the presence of a suprathermal electron component. *Physics of Plasmas*, 18(7):072902/1–10, 2011. doi:10.1063/1.3606365
2. **Danehkar, A.**. On the significance of the Weyl curvature in a relativistic cosmological model. *Modern Physics Letters A*, 24(38):3113–3127, 2009. doi:10.1142/S0217732309032046
1. Bizdadea, C., E. M. Cioroianu, **A. Danehkar**, M. Iordache, S. O. Saliu, and S. C. Sararu. Consistent interactions of dual linearized gravity in $D = 5$: couplings with a topological BF model. *The European Physical Journal C: Particles and Fields*, 63(3):491–519, 2009. doi:10.1140/epjc/s10052-009-1105-0

PROCEEDINGS PUBLICATIONS

12. **Danehkar, A.**, and Q. A. Parker. Orientation of Galactic Bulge Planetary Nebulae toward the Galactic Center. In: *Proceedings of the International Astronomical Union Symposium on Star Clusters and Black Holes in Galaxies across Cosmic Time*, IAU Symposium 312 August 25–29, 2014. *IAU Symposium 312* :128–130, 2016. doi:10.1017/S1743921315007681
11. **Danehkar, A.**, W. Steffen, and Q. A. Parker. Kinematical Properties of Planetary Nebulae with WR-type Nuclei. In: *Proceedings of the 12th Asia-Pacific Regional IAU Meeting (APRIM)*, August 18–22, 2014. *Publications of The Korean Astronomical Society* 30:163–167, 2015. doi:10.5303/PKAS.2015.30.2.163
10. **Danehkar, A.**, R. Wesson, A. I. Karakas, and Q. A. Parker. Physical and Chemical Properties of Planetary Nebulae with WR-type Nuclei. In: *Proceedings of the 12th Asia-Pacific Regional IAU Meeting (APRIM)*, August 18–22, 2014. *Publications of The Korean Astronomical Society* 30:159–161, 2015. doi:10.5303/PKAS.2015.30.2.159
9. **Danehkar, A.**, I. Kourakis, and M. A. Hellberg. Electron-acoustic solitons in an electron-beam plasma system with kappa-distributed electrons. In: *Plasma Sciences (ICOPS), IEEE International Conference on High-Power Particle Beams (BEAMS), IEEE 41st International Conference on*, May 25–29, 2014. *Plasma Sciences (ICOPS) IEEE*, 1–6, 2014. doi:10.1109/PLASMA.2014.7012747
8. **Danehkar, A.**, I. Kourakis, and M. A. Hellberg. Electron-acoustic solitons in an electron-beam plasma system with kappa-distributed electrons. In: *Plasma Sciences (ICOPS), Abstracts IEEE International Conference on*, May 25–29, 2014. *Plasma Sciences IEEE Abstracts*, 1, 2014. doi:10.1109/PLASMA.2014.7012400

7. **Danehkar, A.**, D. J. Frew, O. De Marco, and Q. A. Parker. A search for Type Ia supernova progenitors: the central stars of the planetary nebulae NGC 2392 and NGC 6026. In: *Proceedings of the International Astronomical Union Symposium on Binary Paths to the Explosions of type Ia Supernovae*, July 4–8, 2011. *IAU Symposium* 281:221–222, 2013. doi:10.1017/S1743921312015074
6. **Danehkar, A.**, D. J. Frew, Q. A. Parker, and O. De Marco. Photoionization models of the Eskimo nebula: evidence for a binary central star?. In: *Proceedings of the International Astronomical Union Symposium on From Interacting Binaries to Exoplanets: Essential Modeling Tools*, July 18–22, 2011. *IAU Symposium* 282:470–471, 2012. doi:10.1017/S1743921311028134
5. **Danehkar, A.**, D. J. Frew, O. De Marco, and Q. A. Parker. Photoionization modeling of the Galactic planetary nebulae Abell 39 and NGC 7027. In: *Proceedings of the International Astronomical Union Symposium on Planetary Nebulae: an Eye to the Future*, July 25–29, 2011. *IAU Symposium* 283:340–341, 2012. doi:10.1017/S1743921312015074
4. Saini, N. S., **A. Danehkar**, M. A. Hellberg, and I. Kourakis. Large-amplitude electron-acoustic solitons in a dusty plasma with kappa-distributed electrons. In: *Proceedings of the Sixth International Conference on the Physics of Dusty Plasmas (ICPDP 2011)*, May 16–20, 2011. *AIP Conference Proceedings*, 1397:357–358, 2011. doi:10.1063/1.3659841
3. **Danehkar, A.**, N. S. Saini, M. A. Hellberg, and I. Kourakis. Electron beam–plasma interaction in a dusty plasma with excess suprathermal electrons. In: *Proceedings of the Sixth International Conference on the Physics of Dusty Plasmas (ICPDP 2011)*, May 16–20, 2011. *AIP Conference Proceedings*, 1397:305–306, 2011. doi:10.1063/1.3659815
2. Sultana, S., **A. Danehkar**, N. S. Saini, M. A. Hellberg, and I. Kourakis. Effect of superthermality on nonlinear electrostatic modes in plasmas. In: *Proceedings of the 37th European Physical Society Conference on Plasma Physics*, June 21–25, 2010. *EPS Conference Proceedings*, 34A:P2.410/1–4, 2010.
1. Bizdadea, C., E. M. Cioroianu, **A. Danehkar**, M. Iordache, S. O. Saliu, and S. C. Sararu. BF Models in Dual Formulations of Linearized Gravity. In: *Proceedings of the Physics Conference TIM-08*, November 28–29, 2008. *AIP Conference Proceedings*, 1131:29–35, 2009. doi:10.1063/1.3153449

REFERENCES

Available Upon Request.