

CURRICULUM VITAE
Ashkbiz Danehkar

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EDUCATION

Ph.D. Physics and Astronomy, Macquarie University, Sydney, Australia	2014
M.Sc. Plasma Physics (with distinction), Queen's University Belfast, UK	2009
M.Sc. Computational Science and Engineering, University of Rostock, Germany	2007

RESEARCH INTERESTS

- **AGN Outflows and Black Holes:** Ultra-fast Outflows [20,4,5], Quasars [20,4]
- **Nebular Astrophysics:** Jets and Outflows [8,17,18], Chemical Composition and Photoionization [14,15,10]
- **Plasma Physics:** Suprathermality [13], Electron-Positron Pair [9], Beam-Plasma Interaction [11]
- **Spectroscopy:** IFU [14,15,16,8,17], *Chandra* HETGS [20], *HST* WFC3 [18], *HST* COS [4,5], VLA [20]
- **Computational Methods:** Parallel Computing [19], Fluids Dynamics [13,9,11], IFU maps [13,7,15]
- **Gravitational Physics:** General Relativity [6,12], Dual Gravity [2,12,1]

PROFESSIONAL HISTORY

Postdoctoral Fellow , Harvard-Smithsonian Center for Astrophysics, Cambridge, USA	2015–2018
PhD Student , Macquarie University, Physics & Astronomy, Sydney, Australia	2010–2014
Postgraduate Student , Queen's University Belfast, Centre for Plasma Physics, Belfast, UK	2008–2009
Early-Stage Researcher , University of Craiova, Faculty of Physics, Craiova, Romania	2007–2008

AWARDS & HONORS

Postdoctoral Fellowship, Smithsonian Astrophysical Observatory	2015–2018
Astronomical Society of Australia Student Travel Assistance	2014
International Astronomical Union Travel Grant (IAUS312)	2014
Sigma Xi Grants-in-Aid of Research (GIAR)	2013
International Astronomical Union Travel Grants (IAUS281–3)	2011
Max Planck Institute for Extraterrestrial Physics Travel Support (ICDPD6)	2011
International Macquarie University Research Excellence Scholarship	2010–2013
Northern Ireland, Department for Employment and Learning Studentship	2008–2009
Marie Curie Predoctoral Fellowship (MRTN-CT-2004-005104)	2007–2008

PROFESSIONAL MEMBERSHIPS

International Astronomical Union (IAU), <i>Member</i>	2018–present
International Union of Radio Science (URSI), <i>Member</i>	2018–present
American Astronomical Society (AAS+HEAD), <i>Full Member</i>	2015–present
Lynx Science Working Groups (Member: <i>Physics of Feedback, Multi-wavelength</i>)	2016–present
American Physical Society, <i>Member</i>	2017–present
Royal Astronomical Society, <i>Fellow</i>	2014–present
Astronomical Society of Australia, <i>Member</i>	2011–present
Sigma Xi Scientific Research Society, <i>Full Member</i>	2010–present
Australian National Institute for Theoretical Astrophysics, <i>Member</i>	2011–present

SUCCESSFUL PROPOSALS & GRANTS

- (PI) NCI National Facility (250 kSU, 2014): “On the physics of the nebular surface brightness correlation”
- (Co-I) NCI National Facility (450 kSU, 2012): “Photoionization modeling of planetary nebulae with binary stars”
- (PI) ANU Telescope (4 nights, 2012): “Morphokinematics and abundances analysis of Galactic planetary nebulae”
- (PI) ANU Telescope (4 nights, 2012): “Kinematic study of planetary nebulae with double-degenerate nuclei”

OBSERVING EXPERIENCE

Australian National University 2.3-m Telescope, Siding Spring Observatory, NSW, Australia
IFU Spectroscopy of Planetary Nebulae (Wide Field Spectrograph, 5 nights) August 18-23, 2012
IFU Spectroscopy of Planetary Nebulae (Wide Field Spectrograph, 5 nights) February 11-16, 2012

TEACHING EXPERIENCE

Laureate International Universities, Think Education Group Sydney, Australia
Learning Management System Builder, Undergraduate and Postgraduate Courses 2014
Responsible for building and developing courses for student access
Managing courses in learning management systems, creating assessments

Macquarie University, Department of Physics and Astronomy Sydney, Australia
Teaching Assistant & Grader, Undergraduate Physics Laboratory and Astronomy 2010–2012
Responsible for supervision of physics laboratory
Lab Demonstrator, assistant in laboratory procedure, graded weekly lab reports and provided feedback

COMPUTING SKILLS

C, C++, FORTRAN, Pascal, Java
ISIS, S-Lang, IDL, Python, SciPy, AstroPy
IRAF, 2dFDR, Starlink Namaka, PyRAF
OpenMPI, MPICH, Intel MPI
Linux and other UNIX variants

SEMINAR & CONFERENCE PRESENTATIONS

21. *Discovery of Low-ionization Envelopes in NGC 5189: Spatially-resolved Diagnostics from HST Observations* (poster), AAS Winter 231st Meeting, Washington, DC, USA, January 8-12, 2018.
20. *Low-ionization Envelopes in NGC 5189: Spatially-resolved HST Observations* (talk) CfA Postdoc Symposium, Harvard CfA, Cambridge, USA, October 20, 2017.
19. *Multiwavelength Observations of PG 1211+143: Unveiling the Ultra-fast Outflows in AGNs* (poster) From Chandra to Lynx, Harvard University, USA, August 8-10, 2017.
18. *Chandra Grating Spectroscopy of PG 1211+143: Evidence for an Ultra-fast Outflow* (talk) New England Regional Quasar and AGN Meeting, Boston University, USA, May 12, 2017
17. *Photoionization Modeling of Warm Absorbing Outflows in Active Galactic Nuclei* (talk) CfA Postdoc Symposium, Harvard CfA, Cambridge, USA, October 7, 2016.
16. *Ultra-fast Outflows from Active Galactic Nuclei of Seyfert I Galaxies* (lunch talk) High Energy Phenomena Seminar, Harvard CfA, Cambridge, USA, September 7, 2016.
15. *Collimated Bipolar Outflows in Planetary Nebulae from Integral Field Spectroscopy* (talk) HEA Group Meeting, MIT Kavli Institute, Cambridge, USA, December 3, 2015.
14. *Insights into the Morphology of Planetary Nebulae from 3D Spectroscopy* (talk) CfA Postdoc Symposium, Harvard CfA, Cambridge, USA, November 20, 2015.
13. *Orientation of Galactic Bulge Planetary Nebulae toward the Galactic Center* (poster) IAU Symposium 312, Beijing, China, August 25–29, 2014.
12. *Kinematic Properties of Planetary Nebulae with Wolf-Rayet Stars* (talk) 12th Asia-Pacific Regional IAU Meeting, Daejeon, Korea, August 20, 2014.
11. *Physical and Chemical Properties of Planetary Nebulae with WR-type Nuclei* (poster) 12th Asia-Pacific Regional IAU Meeting, Daejeon, Korea, August 18–22, 2014.
10. *Electron-acoustic Solitons in an Electron-beam Plasma System with κ -distributed Electrons* (poster) IEEE ICOPS/BEAMS, Washington DC, USA, May 25–29, 2014.
9. *Photoionization Models of the Eskimo Nebula: Evidence for a Hidden Ionizing Source* (talk) MQ AAAstro Workshop, Macquarie University, Sydney, Australia, December 6, 2011.
8. *Photoionization Modeling of the Galactic Planetary Nebulae Abell 39 and NGC 7027* (poster) IAU Symposium 283, Puerto de la Cruz, Tenerife, Spain, July 25–29, 2011.
7. *Photoionization Models of the Eskimo Nebula: Evidence for a Binary Central Star?* (poster) IAU Symposium 282, Tatranská Lomnica, Slovakia, July 18–22, 2011.

6. *A Search for Type Ia Supernova Progenitors: NGC 2392 and NGC 6026* (poster)
IAU Symposium 281, Padova, Italy, July 4–8, 2011.
5. *Electron Beam–Plasma Interaction in a Dusty Plasma with Excess Suprathermal Electrons* (poster)
ICPDP6, Garmisch-Partenkirchen, Germany, May 16–20, 2011.
4. *Electron Beam–Plasma Interaction in Non-thermal Plasmas* (seminar talk)
MQ Astroseminar, Macquarie University, Sydney, Australia, May 12, 2011.
3. *Electrostatic Solitary Waves in Suprathermal Plasma* (talk)
Max-Planck-Institute for Quantum Optics, Garching, Germany, November 10, 2009.
2. *Nonlinear Electron-Acoustic Waves with Suprathermal Electrons* (talk)
CPP Project Seminar, Queen’s University Belfast, UK, September 30, 2009.
1. *Dual Graviton coupled to a Topological BF Model: BRST Cohomology* (talk)
Max-Planck-Institute for Quantum Optics, Garching, Germany, September 22, 2009.

PROFESSIONAL SERVICE

Referee Service (publons.com/a/843927)

Astrophysical Journal, Astrophysics and Space Science, Physics of Plasmas,
Journal of Geophysical Research (Space Physics), Modern Physics Letters, & other journals

Editorial Service

Frontiers in Physics: Review Editor

Frontiers in Astronomy & Space Sciences: Review Editor

Guest Associate Editor in *High-Energy and Astroparticle Physics* for the Special Issue:

“Electric-Magnetic Duality in Gravitational Theories” (with Prof. Thomas Curtright)

Review Panel Service

NASA’s Astrophysics Data Analysis Program (ADAP; AGAL 2017): Review Panelist

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

Computing Service (github.com/danehkar)

slmpi_emcee: MPI-based Parallelization of the S-Lang MCMC Hammer

MPLXSTAR: MPI-based Parallelization of XSTAR Photoionization Program

AtomNeb: IDL Library for Atomic Data of Ionized Nebulae

pyEQUIB: Python Package for Equilibrium Atomic Populations and Line Emissivities

REFEREED PUBLICATIONS

Number of peer-reviewed publications: 18 of which 8 as first-author and 6 as sole-author

h-index: 7, *m*-index: 0.9, *g*-index: 12, *i*10-index: 6, Citations: 208

Journal Abbreviations: ApJ – The Astrophysical Journal (IF = 5.533); AJ – The Astronomical Journal (IF = 4.617); MNRAS – Monthly Notices of the Royal Astronomical Society (IF = 4.961); PASP – Publications of the Astronomical Society of the Pacific (IF = 4.446); PASA – Publications of the Astronomical Society of Australia (IF = 4.095); Eur.Phys.J.C – European Physical Journal C (IF = 5.331); Plasma Phys.Control.Fusion – Plasma Physics and Controlled Fusion (IF = 2.392); Phys.Plasmas – Physics of Plasmas (IF = 2.115); Mod.Phys.Lett.A – Modern Physics Letters A (IF = 1.338)

* Impact Factors (IF) from the *Web of Science* maintained by Clarivate Analytics.

First Author (Refereed)

20. **Danehkar, A.**, M. A. Nowak, J. C. Lee, G. A. Kriss, A. J. Young, M. J. Hardcastle, S. Chakravorty, T. Fang, J. Nielsen, F. Rahoui, and R. K. Smith. The Ultra-fast Outflow of the Quasar PG 1211+143 as Viewed by Time-averaged *Chandra* Grating Spectroscopy. *ApJ*, 853(2):165, 2018. doi:10.3847/1538-4357/aaa427
19. **Danehkar, A.**, M. A. Nowak, J. C. Lee, and R. K. Smith. MPLXSTAR: MPI-based parallelization of the XSTAR photoionization program. *PASP*, 130(984):024501, 2018. doi:10.1088/1538-3873/aa9dff
18. **Danehkar, A.**, M. Karovska, W. P. Maksym, and R. Montez Jr. Mapping Excitation in the Inner Regions of the Planetary Nebula NGC 5189 Using *HST* WFC3 Imaging. *ApJ*, 852(2):87, 2018. doi:10.3847/1538-4357/aa9e8c
17. **Danehkar, A.**, Q. A. Parker, and W. Steffen. Fast, low-ionization emission regions of the planetary nebula M2-42. *AJ*, 151(2):38, 2016. doi:10.3847/0004-6256/151/2/38
16. **Danehkar, A.**, and Q. A. Parker. Spatially resolved kinematic observations of the planetary nebulae Hen 3-1333 and Hen 2-113. *MNRAS.Letters*, 449(1):L56–L59, 2015. doi:10.1093/mnrasl/slv022
15. **Danehkar, A.**, H. Todt, B. Ercolano, and A. Y. Kniazev. Observations and three-dimensional photoionization modelling of the Wolf–Rayet planetary nebula Abell 48. *MNRAS*, 439(4):3605–3615, 2014. doi:10.1093/mnras/stu203

14. **Danehkar, A.**, Q. A. Parker, and B. Ercolano. Observations and three-dimensional ionization structure of the planetary nebula SuWt 2. *MNRAS*, 434(2):1513–1530, 2013. doi:10.1093/mnras/stt1116
13. **Danehkar, A.**, N. S. Saini, M. A. Hellberg, and I. Kourakis. Electron-acoustic solitary waves in the presence of a suprathermal electron component. *Phys. Plasmas*, 18(7):072902/1–10, 2011. doi:10.1063/1.3606365

Sole Author (Refereed)

12. **Danehkar, A.**. Electric-magnetic duality in gravity and higher-spin fields. *submitted*, 2018.
11. **Danehkar, A.**. Electron beam-plasma interaction and electron-acoustic solitary waves in a plasma with suprathermal electrons. *Plasma Phys. Control. Fusion*, 60(6):065010, 2018. doi:10.1088/1361-6587/aabc40
10. **Danehkar, A.**. Bi-Abundance Ionisation Structure of the Wolf–Rayet Planetary Nebula PB 8. *PASA*, 35:e005, 2018. doi:10.1017/pasa.2018.1
9. **Danehkar, A.**. Electrostatic solitary waves in an electron-positron pair plasma with suprathermal electrons. *Phys. Plasmas*, 24(10):102905/1–9, 2017. doi:10.1063/1.5000873
8. **Danehkar, A.**. Discovery of collimated bipolar outflows in the planetary nebula Th 2-A. *ApJ*, 815(1):35, 2015. doi:10.1088/0004-637X/815/1/35
7. **Danehkar, A.**. Evolution of Planetary Nebulae with WR-type Central Stars. *PASP*, 127(951):499, 2015. doi:10.1086/681244
6. **Danehkar, A.**. On the significance of the Weyl curvature in a relativistic cosmological model. *Mod. Phys. Lett. A*, 24(38):3113–3127, 2009. doi:10.1142/S0217732309032046

Contributing Author (Refereed)

5. Kriss, G. A., J. C. Lee, and **A. Danehkar**. A Search for H I Ly α Counterparts to Ultra-fast X-ray Outflows. *ApJ*, 859(2):94, 2018. doi:10.3847/1538-4357/aabf38
4. Kriss, G. A., J. C. Lee, **A. Danehkar**, M. A. Nowak, T. Fang, M. J. Hardcastle, J. Neilsen, and A. J. Young. Discovery of an Ultraviolet Counterpart to an Ultra-fast X-ray Outflow in the Quasar PG 1211+143. *ApJ*, 853(2):166, 2018. doi:10.3847/1538-4357/aaa42b
3. 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. *MNRAS*, 440(2):1345–1364, 2014. doi:10.1093/mnras/stu198
2. 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. *Eur. Phys. J. C*, 63(3):491–519, 2009. doi:10.1140/epjc/s10052-009-1105-0

Book Review (Refereed)

1. **Danehkar, A.**. Book Review: Gauge/Gravity Duality: Foundations and Applications. *Frontiers in Physics*, 6:82, 2018. doi:10.3389/fphy.2018.00082

SELECTIVE PROCEEDINGS PUBLICATIONS

7. Nowak, M., **A. Danehkar**, G. A. Kriss, J. C. Lee, R. K. Smith, and J. Neilsen. The Ultra-fast Outflows of PG 1211+143. In: *American Astronomical Society, HEAD Meeting 16*, August 20–24, 2017. *AAS/High Energy Astrophysics Division* 16:200.03, 2017. ads:2017HEAD...1620003N
6. **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
5. **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
4. **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

3. **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](https://doi.org/10.1017/S1743921311028134)
2. 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](https://doi.org/10.1063/1.3659841)
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](https://doi.org/10.1063/1.3153449)

REFERENCES

Available Upon Request.