

James Matthews

Astrophysicist

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Academic Career

- 2016–present **Postdoctoral Researcher**, *University of Oxford*.
Project title: "The origin of ultra-high energy cosmic rays", PIs: Profs. A. R. Bell and K. M. Blundell
- 2012–2016 **PhD Physics**, *University of Southampton*.
Thesis: "Disc Winds Matter: Modelling Accretion and Outflow On All Scales", Supervisor: Prof. C. Knigge
- 2012 **Research Year Abroad**, *Harvard-Smithsonian CfA*.
Thesis: "Searching For Nearby Planets During Predicted Microlensing Events", Supervisor: Dr. R. Di Stefano
- 2008–2012 **MPhys Astrophysics**, *University of Southampton*, first class honours (7th in year).

Research Interests & Goals

- Uncovering the origin of the highest energy cosmic rays (CRs).
- Understanding the physics and observational signatures of accretion discs and their associated outflows.
- Understanding the connection between outflows and galaxy evolution, including the impact of CRs.
- Developing state-of-the-art radiative transfer and MHD methods to complement observations.

Programming Skills

- Advanced Python, C, Fortran, git/github, CI, L^AT_EX, OpenMPI
- Familiar IDL, Topcat, Bash
- Astro (magneto)hydrodynamics, Monte Carlo radiative transfer, Cloudy, CRPropa, PLUTO.

Selected Publications

14 journal articles, 2 in prep, H-index: 7, full list on website and ADS..

- 2018 **Ultra-high energy cosmic rays from shocks in the lobes of radio galaxies.**
Matthews, J.H., Bell. A., Blundell, K., Araudo, A., MNRAS Submitted.
- 2018 **The origin of radio emission in broad absorption line quasars: results from LoTSS.**
Morabito, L. K., Matthews, J.H., et al., A&A Accepted.
- 2018 **Fornax A, Centaurus A other radio galaxies as sources of ultra-high energy cosmic rays.**
Matthews, J.H., Bell. A., Blundell, K., Araudo, A., MNRAS Letters
- 2018 **Cosmic-ray acceleration by relativistic shocks: limits and estimates.**
Bell. A., Araudo, A., Matthews, J.H., Blundell, K., MNRAS, 473, 2364
- 2017 **Amplification of perpendicular and parallel magnetic fields by cosmic ray currents.**
Matthews, J.H., Bell. A., Blundell, K., Araudo, A., MNRAS, 469, 1849
- 2017 **The reverberation signatures of rotating disc winds in active galactic nuclei.**
Mangham, S. W., Knigge, C., Matthews, J.H., Long, K. S., et al. MNRAS, 471, 4788
- 2017 **Quasar emission lines as probes of orientation.**
Matthews, J.H., Knigge, C., Long, K. S., MNRAS, 467, 2571
- 2016 **Testing quasar unification: radiative transfer in clumpy winds.**
Matthews, J.H., Knigge, C., Long, et al., MNRAS, 458, 293
- 2015 **The impact of accretion disc winds on the optical spectra of CVs.**
Matthews, J.H., Knigge, C., Long, et al., MNRAS, 458, 293
- 2014 **Line-driven Disk Winds in Active Galactic Nuclei.**
Higginbottom, N., Proga, ..., Matthews, J.H. et al., ApJ, 789, 19

Responsibilities and Experience

- 2018 Invited reviewer, “Particle acceleration in jets”, for “100 years of jets” review anthology.
- 2018-present Astrophysics summer project admissions and co-ordination
- 2017-present SPI-MAX seminar organiser
- 2017-present Galaxies coffee organiser
- 2018 Summer project supervisor: Andrew Sellek
- 2018 Organiser and founder, Oxford Astrophysics Outreach for the Homeless at O’Hanlon House
- 2017 Summer project supervisor: Ziyang Li
- 2012-2016 Outreach Demonstrator, University of Southampton Astrodome
- 2012-2016 Teaching Demonstrator, University of Southampton
- 2011 Summer Intern, Oxford Instruments Plasma Technology

Talk Highlights

Over 20 talks at international conferences and invited colloquia across Europe, Asia and the US..

- 2018 **Invited Colloquium**, *University of Nottingham.*
- 2018 **Invited Colloquium**, *University of Manchester.*
- 2017 **Invited Colloquium**, *University of Oxford.*
- 2017 **Invited Review**, *Broadband Astrophysical Processes, Southampton.*
- 2017 **Invited Colloquium**, *University of Southampton.*
- 2017 **Contributed Talk**, *AGN Winds on the Georgia Coast.*
- 2015 **Contributed Talk**, *TORUS 2015, Winchester.*
- 2015 **Contributed Talk**, *Black Hole Accretion and AGN feedback, Shanghai.*

Awards, Grants & Successful Proposals

- 2017 **HST Proposal**, *The spectra of nova-like variables.*
- 2016 **Springer Thesis Prize**, *University of Southampton.*
- 2015 **SALT Proposal**, *The spectra of nova-like variables.*
- 2013 **RAS Grant**, *Visit to Columbia University.*
- 2008-2012 **Academic Scholarship**, *Top 5 students, University of Southampton.*

References

Prof. Tony Bell FRS, *University of Oxford*, tony.bell@physics.ox.ac.uk.

Connection: PI at Oxford.

Prof. Christian Knigge, *University of Southampton*, C.Knigge@phys.soton.ac.uk.

Connection: PhD Supervisor

Prof. Katherine Blundell OBE, *University of Oxford*, tony.bell@physics.ox.ac.uk.

Connection: PI at Oxford.

Dr. Knox Long, *STScI/Eureka Scientific*, long@stsci.edu.

Connection: Scientific collaborator and co-supervisor.