

# DR JAMES MATTHEWS

## Astrophysicist

### PERSONAL INFORMATION

*Born in Reading, UK* 27 January 1990

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### GOAL

### RESEARCH INTERESTS

Understanding the physics and observational signatures of accretion discs and their associated winds and jets. Modelling particle acceleration mechanisms and MHD turbulence to help uncover the origin of the highest energy cosmic rays. Developing state-of-the-art radiative transfer and MHD methods to complement observations. Testing unification models and understanding the connection between outflows and galaxy evolution.

### ACADEMIC CAREER AND EDUCATION

<i>Postdoctoral Researcher</i>	<i>2016-present</i>	University of Oxford
		Project: <i>The Origin of Ultra-High Energy Cosmic Rays</i> PIs: Prof. Tony Bell and Prof. Katherine Blundell.
<i>PhD Astrophysics</i>	<i>2012-2016</i>	University of Southampton
		Thesis: <i>Disc Winds Matter: Modelling Accretion and Outflow On All Scales</i> Supervisor: Prof. Christian Knigge
<i>Research Year Abroad</i>	<i>2011-2012</i>	Harvard-Smithsonian Center for Astrophysics
		Thesis: <i>Searching For Nearby Planets During Predicted Microlensing Events</i> Supervisor: Dr. Rosanne Di Stefano. Mark: 84%
<i>MPhys Astrophysics</i>	<i>2008-2012</i>	The University of Southampton
		· <i>First Class Honours (average 78%)</i>

### PUBLICATIONS

<i>2017</i>	<i>'Quasar emission lines as probes of orientation: implications for disc wind geometries and unification 2017', Matthews, J.H., Knigge, C., Long, K. S., MNRAS, DOI:10.1093/mnras/stx231</i>
<i>2016</i>	<i>'Testing Quasar Unification: Clumpy Wind Models and Radiative Transfer', Matthews, J.H., Knigge, C., Long, K. S., Sim, S. A., Higginbottom, N., Mangham, S. W., MNRAS, 458, 293</i>
<i>2016</i>	<i>'The Optical-UV Emissivity of Quasars: Dependence on Black Hole Mass, Luminosity and Radio Loudness', Shankar, F., Calderone, G., Knigge, C., Matthews, J.H. et al., ApJ Letters, 818, 1</i>
<i>2015</i>	<i>'The Impact of Accretion Disc Winds on the Optical Spectra of Cataclysmic Variables',</i>

- Matthews, J.H.**, Knigge, C., Long, K. S., Sim, S. A., Higginbottom, N., MNRAS, 450, 3331
- 2014 'Line-driven Disk Winds in Active Galactic Nuclei: The Critical Importance of Ionization and Radiative Transfer', Higginbottom, N., Proga, D., Knigge, C., Long, K. S., **Matthews, J.H.**, Sim, S. A., ApJ, 789, 19
- 2013 'A Simple Disc Wind Model for Broad Absorption Line Quasars', Higginbottom, N., Knigge, C., Long, K. S., **Matthews, J.H.**, Sim, S. A., MNRAS, 436, 1390
- 2013 'Nearby planetary systems as lenses during predicted close passages to background stars', Di Stefano, R., **Matthews, J.H.**, Lepine, S., ApJ, 771, 79

## COMPUTER SKILLS

- Fluent use of Python, Fortran and C applied to complex numerical simulations, database manipulation and data visualisation.
- Extensive experience of large scale Monte Carlo simulations utilising big atomic datasets.
- Responsible for MPI parallelisation, unit testing, version control and Travis CI integration of a large scale project ( $\sim 40,000$  lines of C code) during PhD. Especially fluent with git and Github integration.
- Familiar with Windows, Mac OSX and Linux. Some experience using BASH and IDL.

## OTHER INFORMATION

### Awards

- 2008 · University of Southampton 4-year Academic Scholarship
- 2013 · RAS Grant, 'Support for a Short Academic Stay at Colombia University'

### Work Experience / Responsibilities

- 2013-2015 · Journal Club Organiser
- 2016 · Running Student Pizza Seminar
- 2012-2016 · Teaching Assistant & Demonstrator, Undergraduate Courses
- 2012-2016 · Public Engagement Demonstrator, Southampton Astrodome
- 2011 · Summer Intern, Oxford Instruments Plasma Technology

### Presentations

- 2015 · 'Modelling The Spectra of Quasars: Clumpy Winds and Unification', TORUS 2015, Winchester
- 2015 · 'The Impact of Accretion Disc Winds on the Optical Spectra of Cataclysmic Variables', Invited Talk, The Golden Age of Cataclysmic Variables, Palermo
- 2015 · 'Modelling The Spectra of Quasars: Clumpy Winds and X-ray Properties', The Extremes of Black Hole Accretion, ESAC, Madrid
- 2015 · 'Modelling The Spectra of Quasars: Clumpy Winds and X-ray Properties', Black Hole Accretion and AGN Feedback, Shanghai
- 2014 · 'The Search for Alien Life', Public Talk, Southampton
- 2014 · 'The Impact of Accretion Disc Winds on the Optical Spectra of Cataclysmic Variables', Cataclysmic Variables and Compact Binaries, Columbia University, NY
- 2014 · 'Modelling The Spectra of Quasars', AGN Disc Winds Meeting, Durham, UK
- 2012 · 'Searching For Nearby Planets During Predicted Microlensing Events', Masters Thesis Talk, Harvard-Smithsonian CfA, Boston, MA
- 2012 · 'Searching For Nearby Planets During Predicted Microlensing Events', Exoplanet Lunch, Harvard-Smithsonian CfA, Boston, MA

*Interests*

Piano · Guitar · Sport and Fitness · Public Engagement · Travel

January 31, 2017