DR JAMES MATTHEWS
Astrophysicist

PERSONAL INFORMATION

Born in Reading, UK 27 January 1990

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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

2016-present University of Oxford

Postdoctoral Researcher

Project: *The Origin of Ultra-High Energy Cosmic Rays*
PIs: Prof. Tony Bell and Prof. Katherine Blundell.

2012-2016 University of Southampton

PhD Astrophysics

Thesis: *Disc Winds Matter: Modelling Accretion and Outflow On All Scales*
Supervisor: Prof. Christian Knigge

2011-2012 Harvard-Smithsonian Center for Astrophysics

Research Year Abroad

Thesis: *Searching For Nearby Planets During Predicted Microlensing Events*
Supervisor: Dr. Rosanne Di Stefano. *Mark: 84%*

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2008-2012 The University of Southampton

MPhys Astrophysics

· *First Class Honours (average 78%)*

PUBLICATIONS

2017 *'Amplification of perpendicular and parallel magnetic fields by cosmic ray currents'*, **Matthews, J.H.**, Bell. A., Blundell, K., Araudo, A., MNRAS, DOI: 10.1093/mnras/stx905

2017 *'Quasar emission lines as probes of orientation: implications for disc wind geometries and unification'*, **Matthews, J.H.**, Knigge, C., Long, K. S., MNRAS, DOI:10.1093/mnras/stx231

2016 *'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

2016 *'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

2015 *'The Impact of Accretion Disc Winds on the Optical Spectra of Cataclysmic Variables'*, **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 passges 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*'

2017 · Springer Thesis Prize, Southampton Astrophysics

Work Experience / Responsibilities

2017 · SPI-MAX Seminar Organiser

2013-2016 · Running Student Pizza Seminar and Journal Club

2012-2016 · Teaching Assistant & Demonstrator, Undergraduate Courses

2012-2016 · Public Engagement Demonstrator, Southampton Astrodome

2011 · Summer Intern, Oxford Instruments Plasma Technology

Presentations

2017 · *'Invited Review: UV Astronomy'*, Broadband Astrophysical Processes, Southampton

2017 · *'Magnetic Field Amplification by Cosmic Rays'*, Plasma Seminar, Oxford

2016 · *'Modelling Disc Winds in Quasars '*, SPI-MAX, Oxford

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, 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

2014 · *'Modelling The Spectra of Quasars'*, AGN Disc Winds Meeting, Durham

2012 · *'Searching For Nearby Planets During Predicted Microlensing Events'*, Masters Thesis Talk, Harvard-Smithsonian CfA, Boston

2012 · *'Searching For Nearby Planets During Predicted Microlensing Events'*, Exoplanet Lunch, Harvard-Smithsonian CfA, Boston

Interests

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

April 11, 2017