RESEARCH FELLOW, THEORETICAL ASTROPHYSICS

DEPARTMENT/UNIT	School of Physics and Astronomy
FACULTY/DIVISION	Faculty of Science
CLASSIFICATION	Level A
WORK LOCATION	Clayton campus

ORGANISATIONAL CONTEXT

Everyone needs a platform to launch a satisfying career. At Monash, we give you the space and support to take your career in all kinds of exciting new directions. You'll have access to quality research, infrastructure and learning facilities, opportunities to collaborate internationally, as well as the grants you'll need to publish your work. We're a university full of energetic and enthusiastic minds, driven to challenge what's expected, expand what we know, and learn from other inspiring, empowering thinkers. Discover more at www.monash.edu.

The Faculty of Science works at the frontiers of research and scholarship, and is committed to high quality teaching and learning; we have numerous partnerships with research institutions, industry, government and individual supporters. Our five Schools offer a large and diverse range of disciplines in undergraduate and postgraduate courses. Ten Schools from other Monash faculties contribute to science teaching at all levels, allowing students to choose their studies from physical, biological, biomedical, behavioural, environmental, mathematical and computer sciences. Our researchers are at the forefront of their fields - conducting research that spans the theoretical to the applied, contributing to new knowledge and technologies, and challenging how we understand and interact with the world. To learn more about the Faculty of Science, please visit our website: www.monash.edu/science/.

The **School of Physics and Astronomy** aims to position itself as one of the top physics and astronomy research and teaching departments in Australia. In the past five years the School has gone through an exciting period of renewal - investing significantly in people and facilities. The School of Physics and Astronomy is committed to teaching and research of the highest quality in astronomy, astrophysics, experimental physics, and theoretical physics. It aims to produce graduates with a solid foundation in physics and astrophysics. We are recognised internationally for research in several fields of physics and astrophysics; however, we are focused on significantly strengthening our research base to achieve the status of a top ranked international department.

In the most recent national audit of research excellence (ERA 2015), the School achieved the maximum overall rating of 5 for Physical Sciences, including the maximum rating of 5 in each of our assessed fields of research (spanning astronomy & astrophysics, atomic & molecular physics, nuclear physics, particle physics, condensed matter physics and optics).

The School has research strengths in astronomy & astrophysics, ultracold atomic gases, X-ray optics and synchrotron science, gravitational-wave astrophysics, electron microscopy and diffraction, condensed matter physics and high-energy particle physics. Currently the School has 29 academic staff, 28 research-only staff and 17 adjunct staff, supported by 14 professional staff. In 2017, the School's total recurrent income was approximately $20M, with research income in the past four years totaling >$40M. It is actively involved in six research centres:

- The ARC Centre of Excellence for Future Low Energy Electronics Technologies (FLEET) https://www.fleet.org.au/
- The ARC Centre of Excellence for Gravitational Wave Discovery (OzGrav) - http://www.ozgrav.org/
- The ARC Centre of Excellence for Particle Physics at the Terascale (CoEPP) - http://www.coepp.org.au/
- The Monash Centre for Astrophysics (MoCA) - http://moca.monash.edu
- The Monash Centre for Electron Microscopy (MCEM) - http://mcem.monash.edu.au
- The Monash Centre for Atomically Thin Materials (MCATM) - https://www.monash.edu/atomically-thin materials

In addition, the School has over a dozen Australian Research Council funded programmes and is an active user of the Australian Synchrotron and the Melbourne Centre for Nanofabrication, which are located adjacent to the Clayton Campus of Monash University. Modern laboratory facilities are a high priority in the School's Strategic Plan. In 2013 the School's research laboratories relocated to a new building - the $175M New Horizons Research Centre (NHRC). This research centre houses state-of-the art x-ray imaging facilities (e.g., an Excillum liquid jet x-ray source), atom optics, BEC, biophotonics, condensed matter physics and nanotechnology laboratories, and specialised infrastructure that supports active research programmes in a wide range of areas.

Astronomy and Astrophysics

The School hosts the Monash Centre for Astrophysics, which is one of the most diverse astrophysics research groups in Australia. Major areas of research include: active galaxies, astrophysical fluid dynamics and magnetohydrodynamics, galaxy evolution, first stars, the formation of stars, stellar evolution, stellar nucleosynthesis, nuclear astrophysics, chemical evolution, galactic archaeology, supernovae, supernova remnants, neutron stars, stellar transients, supermassive black holes, high-energy astrophysics, gravitational-wave astronomy, stellar and planetary dynamics, and exoplanets. The Australian astrophysics community is heavily involved in major observational and computational facilities, including the Australian Square Kilometre Array Pathfinder (ASKAP), the Giant Magellan Telescope, the Australian Astronomical Observatory, Skymapper, HERMES, NCI, the European Southern Observatory (ESO) and the Green II and gSTAR supercomputers. The School is a major node of the ARC Centre of Excellence for Gravitational Wave Discovery (OzGrav) - http://www.ozgrav.org/. In addition, the School conducts research into particle physics and particle astrophysics through the ARC Centre of Excellence for Particle Physics at the Terascale (CoEPP). It is also member of the Joint Institute for Nuclear Astrophysics and has close collaborations with the Center for Nuclear Astrophysics at Shanghai Jiao Tong University

Further information about the position and the School of Physics and Astronomy is available at: http://www.physics.monash.edu.au/.

POSITION PURPOSE

The postdoctoral research fellow will join the newly established research group of Professor Ilya Mandel to carry out research in theoretical astrophysics. The group's research focuses in the following key areas:

- Gravitational-wave astrophysics and the astrophysical interpretation of the exciting new data on binary neutron star and black hole mergers

- Modelling massive stellar and binary evolution
- The interpretation of high-energy astrophysical transients, including tidal disruption events and gamma ray burst
- Stellar dynamics
- Astrostatistics

The Research Fellow will also collaborate with other members of the Monash Center for Astrophysics (MOCA), the ARC Centre of Excellence for Gravitational-wave Discovery (OzGrav, spanning multiple universities in Australia), and will have opportunities to join other international collaborations along with Prof. Mandel (e.g. ENGRAVE) as applicable.

The Research Fellow will publish papers in high-impact journals, present results at major conferences and collaboration meetings, and assist in the supervision of students.

Reporting Line: The position reports to a Professor in the School, under broad direction

Supervisory Responsibilities: Not Applicable

Financial Delegation: Not Applicable

Budget Responsibilities: Not Applicable

KEY RESPONSIBILITIES

A Level A research only academic shall work with support, guidance and/or direction from staff classified at Level B and above and with an increasing degree of autonomy as the research academic gains in skill and experience.

1. The conduct of research under limited supervision either as a member of a team or, where appropriate, independently and the production or contribution to the production of conference and seminar papers and publications from that research
2. Involvement in professional activities including, subject to availability of funds, attendance at conferences and seminars in the field of expertise
3. Limited administrative functions primarily connected with the area of research of the academic
4. Development of a limited amount of research-related material for teaching or other purposes with appropriate guidance from other staff
5. Occasional contributions to teaching in relation to her/his research project(s)
6. Attendance at meetings associated with research or the work of the organisational unit to which the research is connected and/or at departmental, school and/or faculty meetings and/or membership of a limited number of committees
7. Provide advice within the field of the staff member's research to postgraduate students

KEY SELECTION CRITERIA

Education/Qualifications

1. The appointee will have:
    - An honours degree in astrophysics or relevant discipline or have equivalent qualifications or research experience; or
    - an honours degree or higher qualifications in the relevant discipline and/or progress towards a doctorate in the relevant discipline; or
    - a doctoral qualifications in the relevant discipline or a closely related field

Knowledge and Skills

2. A demonstrated aptitude for research with a sound record of publication, commensurate with experience and opportunities
3. Ability to solve problems by using discretion, innovation and the exercise of diagnostic skills within areas of functional responsibility or professional expertise
4. Well-developed written communication and verbal communication skills with proven ability to effectively analyse information and produce clear, succinct reports and documents which requires interaction with others
5. Planning and organisational skills, with the ability to prioritise multiple tasks and set and meet deadlines
6. Demonstrated well-developed computer literacy and proficiency in the production of high level work using languages and domain-specific software, with the capability and willingness to learn new packages as appropriate
7. Experience in topics connected to the interests of the research group outlined above

OTHER JOB RELATED INFORMATION

- Travel to other campuses of the University may be required
- There may be a requirement to work additional hours from time to time
- There may be peak periods of work during which taking of leave may be restricted

LEGAL COMPLIANCE

Ensure you are aware of and adhere to legislation and University policy relevant to the duties undertaken, including: Equal Employment Opportunity, supporting equity and fairness; Occupational Health and Safety, supporting a safe workplace; Conflict of Interest (including Conflict of Interest in Research); Paid Outside Work; Privacy; Research Conduct; and Staff/Student Relationships.