



RESEARCH FELLOW IN THEORETICAL CONDENSED MATTER PHYSICS

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 30 academic staff, 28 research-only staff and 17 adjunct staff, supported by 14 professional staff. In 2018, 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.

Condensed Matter Physics

The School has recently built significant strength in quantum condensed matter physics. ARC Laureate Fellow Professor Michael Fuhrer joined the school in 2013 and has a vigorous research program on graphene, atomically thin semiconductors, and topological materials. Professor Fuhrer founded the MCATM which also includes researchers in Chemistry, Materials Engineering, and Mechanical Engineering, with interests in graphene and other atomically thin materials. Professor Fuhrer directs the ARC Centre of Excellence in Future Low-Energy Electronics Technologies, with six investigators at Monash (Profs. Fuhrer and Helmerson, A/Prof. Parish and Dr Schiffrin, in the School of Physics & Astronomy, and A/Profs. Medhekar and Bao in the Department of Materials Science and Engineering). The School also has a significant effort on experimental and theoretical atomic, molecular and optical physics, including ultracold atomic gases. The successful candidate is expected to have a high degree of synergy with the existing experimental and theoretical condensed matter physics program.

Further information about the position and the School of Physics and Astronomy is available at:

- <http://www.physics.monash.edu.au/employment.html#academic>
- <http://www.physics.monash.edu.au/>

POSITION PURPOSE

The postdoctoral research fellow will join the newly established research group of Dr Dmitry Efimkin to carry out research in theoretical condensed matter physics. The group's research focuses in the following key areas:

- Physics of excitons in novel two-dimensional materials
- Dirac materials including graphene, topological insulators and Weyl semimetals
- Unconventional superconductivity

The Research Fellow will also collaborate with other members of the The ARC Centre of Excellence for Future Low Energy Electronics Technologies (FLEET) <https://www.fleet.org.au/>.

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 Lecturer, under general supervision

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:
 - A PhD in condensed matter physics or a related research area and/or progress towards a doctorate in the relevant discipline

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.