

DEPARTMENT OF PHYSICS

APPENDIX TO THE MPhil/PHD DEGREE STUDENT HANDBOOK 2022/23

This appendix should be read in conjunction with the [core MPhil/PhD student handbook](#)

The Department of Physics is part of the School of Engineering, Physical and Mathematical Sciences (EPMS) which includes: Computer Science, Electronic Engineering, Mathematics, Information Security and Physics.

Welcome to your School

Congratulations on getting a place to join our School of Engineering, Physical and Mathematical Sciences. We are delighted to welcome you and hope you will have a very successful, productive and enjoyable time with us. You will find support in your studies not only from your immediate supervisory team but also from the PGR Lead in your home department – Dr Andrew Ho (Physics), and from the Doctoral School.

Dr Rikke Bjerg Jensen, Director of PGR Education for the School of EPMS

Welcome to your Department

A very warm welcome to the Department of Physics.

This appendix to the Research Degrees Student Handbook contains important information for research students in the Department of Physics. You should read it once in full and thereafter refer to it as necessary.

Our aim is to enable you to be as successful as possible and I very much hope you enjoy and excel in your research!

Dr Andrew Ho, PGR Lead for Physics

Key contacts

Role	Name	Email	Phone	Room
Executive Dean	Prof Gavin Shaddick	Gavin.Shaddick@rhul.ac.uk	01784 414161	LB1-22 - Bedford
Head of Department	Prof Stephen Gibson	Stephen.Gibson@rhul.ac.uk	01784 276466	Tolansky 116
School Director of PGR Education	Dr Rikke Jensen	Rikke.Jensen@rhul.ac.uk	01784 276549	Bedford 2-04
Department	Dr	andrew.ho@rhul.ac.uk	01784 443196	Tolansky

PGR Lead	Andrew Ho			103
School helpdesk	EPMS-school@rhul.ac.uk		01784 276881	Bedford 0-37

* For the majority of your non-academic related issues, please contact the [Doctoral School](#). However, for queries about teaching contracts, expenses and study space within the school, please contact the School of EPMS helpdesk.

Supervision

A supervisory team consisting of a primary supervisor, second supervisor and independent observer has been or will be appointed for you early in your research programme. Their concern is with your academic progress.

Your first point of contact is always with your primary supervisor and if they are not available, with your second supervisor. If some topic arises that you prefer not to discuss with your supervisors then please refer to the Physics PGR lead (Dr Andrew Ho), or if necessary the Head of Department, Prof Stephen Gibson or the School PGR Dr Rikke Bjerg Jensen.

Supervisory team

- The primary supervisor is responsible for directing the research project and academic supervision of the student on a regular basis.
- The second supervisor is a member of academic staff working in an area close to the project, able to give advice to the student when the primary supervisor is unavailable.
- The independent observer is a third academic, in an area more distant from the project, who may be consulted on general matters when the need arises.
- The second supervisor and independent observer conduct the annual review (oral) meeting of the student.
- Some students may also have an external supervisor, usually in projects that are collaborative between research organisations, companies or other universities. The way the external supervisor interacts with the project and the student is usually defined by the primary supervisor.

In general, your first port of call for any questions about your research or the administrative aspects of your course will be your primary supervisor. The Doctoral School will be happy to help with administrative issues around your funding and formal progress through your course. For queries about teaching contracts, expenses and study space within the school, contact the EPMS School helpdesk.

Staff

[List of staff within the Department of Physics](#)

Research areas

The latest UK research assessment (REF 2014) confirmed the high international significance of our research. Our strengths range from explorations of the fundamental properties of condensed matter through to technological applications and to the study of elementary particles at the highest attainable energies. Experimental research is carried out in the department's own laboratories, and at major international centres.

Research is generously supported by the Engineering and Physical Sciences Research Council (EPSRC), the Science and Technology Facilities Council (STFC), the European Commission, the Royal Society, the National Physical Laboratory, CERN, the European Spallation Source, SNOLAB, and by industry. Much of our research is carried out in collaboration with other leading universities in Europe and worldwide, creating a vibrant international atmosphere.

Centre for Particle Physics

- CERN, the ATLAS experiment is collecting data produced by the Large Hadron Collider (LHC).
- Our physicists played an important role in the 2012 discovery at the LHC of the Higgs boson and are studying the new particle's properties. Members are also carrying out studies of the top quark and searching for new physics that goes beyond the current Standard Model, such as quark-lepton compositeness and extra dimensions. The group also plays an important role in computing for the LHC through involvement in the Particle Physics Grid.
- Research centred on the physics of cutting edge particle accelerators, both for particle physics experiments including the LHC, and for light sources and neutron spectroscopy experiments. This work is being pursued in the John Adams Institute for Accelerator Science, a joint initiative between Royal Holloway, Oxford University, and Imperial College.
- The search for dark matter and neutrino physics with the DEAP/CLEAN and DMTPC direct detection experiments, located at underground laboratories in Canada and the United States respectively. A major goal of this activity is developing beyond state-of-the-art instrumentation for the next generation of dark matter searches in a new laboratory on campus.
- Research in theoretical particle physics in the areas of collider phenomenology and astroparticle theory. This includes calculations for the LHC and phenomenological studies of Higgs and electroweak gauge bosons in and beyond the Standard Model. The astroparticle activity includes theoretical developments in dark matter physics, early Universe cosmology and neutrino physics.
- Research in Astronomy Group specialises in the study of black holes and ultra-compact neutron stars using gravitational waves.

Centre for Condensed Matter Physics

- The Nanophysics and Nanotechnology Group explores metallic nanostructures, including superconducting nanocircuits for quantum computation; electron-spin-polarized currents; the design of nanometre-scale devices; and the electrical and thermal properties of GaAs quantum wires. We own and operate 'SuperFab', a world class nanofabrication centre dedicated to the study of superconducting quantum devices.
- The London Low Temperature Laboratory studying the emergent properties of Helium, which is a model quantum system. Research projects are available in our MilliKelvin Laboratory on 2D quantum fluids and solids, solid ^3He and helium clusters, NMR using SQUIDs and current sensing noise thermometry.
- The Materials Physics Group use neutron and synchrotron X-ray scattering at the nearby ISIS and Diamond facilities to study fundamental problems including magnetic monopoles, quantum criticality and superconductivity, and new materials for energy applications such as thermoelectrics and battery materials. These experiments are an ideal test bed for our first-principles density functional calculations using ARCHER.
- The Hubbard Theory Consortium offers strongly correlated theory projects in dynamical mean field theory, correlated electron systems, cold atoms and quantum many-body non-equilibrium physics.

Research facilities and partners

Major facilities in the Department of Physics include the SuperFab nanofabrication centre, the Materials Discovery Laboratory; extensive computer networking facilities; the University of London Low Temperature Laboratory Accelerator Physics Laboratory, Dark Matter Laboratory, and High Power Laser Facility. Collaborative research is carried out by our scientists at major international centres in the UK and across the world and with many industrial partners.

Student-Staff Committee

It is vital that the department should know of any concerns you have about the progress of your work or of any suggestions for improving the research environment. You have several ways of making your views known:

- by talking to your supervisor(s), and perhaps by following up your discussion with a letter or e-mail, so that your comments can be forwarded if appropriate.
- by contacting the School Director of PGR Education or the Head of Department, either to arrange a meeting or again by putting your ideas in writing.
- through the School PGR Staff-Student Action Meeting.
- in the on-line survey that you will be asked to complete as part of the Annual Review process
- through the Students' Union if your concerns or ideas relate to the University rather than to the department

The purpose of the PGR Staff-Student Action Meeting is to enable improvements and tackle concerns across all aspects of research life at Royal Holloway by maintaining and fostering communication within the School. The meeting is a platform to receive and to discuss matters of concern to both students and staff. As such, it provides a formal means of communication between students and the School Board.

The PGR Staff-Student Action Meeting meets at least once every term. You can use the Meeting to raise any issues by either attending one of the meetings or passing the information to the current student representatives. Course representatives are there to represent your views and ultimately, to help improve the quality of education provided by the University.

Facilities and resources

Lockers

Lockers are provided for your use on the second floor of the Tolansky Building opposite the lift. These lockers are intended for daily use and not for overnight storage. To use a locker, open one with a key in the door, insert £1 in the slot inside the door, close the door and remove the key. The £1 is returned when the key is returned to the locker. For the sake of subsequent users, please ensure that lockers are left clean and dry.

No guarantee of security or insurance is provided and the department retains the right to open any locker and remove the contents.

Contact the technical staff in the Tolansky Laboratory if you lose a locker key or if the department has removed the contents. Proof of ownership of the contents will be required in either case and it is, therefore, strongly recommended that your name or other means of identification be stored with the contents.

Software

A variety of institutional software licenses are available including MS Office and Mathematica. Contact IT Services for a full list.

Photocopying

Photocopying is deprecated in favour of scanning and electronic document handling. However, you can make photocopies of notes, papers etc. using the copier in room T127. Photocopying is charged; ask your supervisor about a charge code. Copy-scan-print devices for students are also located in the Teaching Lab(231), the Library, the Computer Centre and many campus PC labs.

When copying please remember that it is a criminal offence to infringe the Copyright, Designs and Patents Act 1988.

Astronomical Observation

The four-metre dome on top of the Wilson Building houses the department's telescope – a 12-inch Schmidt-Cassegrain computerised f/10 telescope. Depending on weather conditions, regular sessions are organised by the Physics Society to observe objects such as planets, multiple star systems, galaxies, galactic clusters, and globular clusters. Students wishing to use the telescope should, in the first instance, consult the academic in charge of the Dome.

Colloquia

The department organises a regular programme of colloquia – research level talks intended for broad appeal. Staff in the department (including postdoctoral fellows and PhD students) give some, external speakers give others. Details are emailed and advertised on web and by email. All research students are expected to attend all departmental colloquia.

Computers

The PCs in the Physics teaching laboratory T231 are used for UG teaching. When not timetabled they are available for more general use but may not be used for playing games etc. Other PCs are available in the Physics Resources Room T118.

Health and Safety

The following notes provide information of a general nature about security and safety within the department:

- **Normal hours:** The department is normally open Monday to Friday 08.30 to 17.30 and closed at weekends and public holidays. Outside normal hours all external doors are locked. Postgraduate researchers have access via their Student ID card with their supervisor's permission.
- **Fire procedure:** Fire regulations are posted in the department. Staff and students should familiarise themselves with these and with the fire alarm system, the evacuation procedure and assembly point 12 on the corner near the Physics Workshops. Fire Wardens are appointed for each floor and building. In the event of a bomb scare, evacuation procedures are as for a fire drill.
- **First aid:** First Aid Boxes are provided in the Department. Staff and students should be aware of their location. Qualified First Aiders are listed near these boxes. Outside normal hours dial 444 from any phone in the department and ask for assistance.
- **Smoking:** The department follows the University No Smoking Policy. Smoking is not allowed anywhere in or near the department.
- **Eating and drinking:** The department has a small kitchen in T132. Food (small meals and snacks) and drink may be prepared and consumed in T132/T118. Food and drink are not allowed anywhere else in the building, especially in laboratories or workshops.
- **Safety:** It is important that you are safe in the laboratory at all times. You must become familiar with safety procedures and safe working practices must be followed at all times. 24 hour access is granted to postgraduate researchers subject to the [University's lone working regulations](#). Everyone, including you, has a legal duty to ensure the safety of yourself and others. The Head of Department has appointed a Safety Officer, a Deputy Safety Officer and a Radiation Supervisor to advise and assist him in safety matters. Risk

Assessments will have been carried out for all work in teaching laboratories, research laboratories and workshops.

- **Ionising Radiation:** Work with ionising radiation is only permitted when approved by the Departmental Radiation Protection Supervisor and the University Safety Officer. All work must conform to the RHUL Site Rules and the Physics Department Local Rules for Work with Ionising Radiation.
 - **Accident reports:** All accidents involving injury must be reported to the University Safety Officer by the senior person on site within 24 hours of any occurrence via an Accident Report Form. First Aiders and the Departmental Safety Officer have these forms and will usually be required to complete them.
 - **Out of hours working:** Experimental work is not permitted outside normal hours if it involves working alone.
 - **Dangerous incidents:** Events that give rise to a situation involving the possibility of an accident, even though no harm in fact occurs, must be reported to the Safety Officer.
 - **Laser pointers:** Students must not use or keep their own laser equipment on University premises. If a student requires a laser pointer for use during a presentation, the department can supply one.
-

Research skills training

Research students are expected to undertake a programme of skills training. You should discuss your research skills training needs with your primary supervisor and second supervisor soon after you start your research degree and further discussion on your training may take place during the year with your supervisory team. You should keep your Research Student Training Log up to date with details of courses that you have attended during the year.

During the annual review, you should review the training completed in the previous year and draw up a plan for the following year. You should be fully engaged with the design of your training programme, as this is an important part of your personal development planning, and both you and your supervisor should be considering what will be of benefit to you in both the short and long term.

The research skills training requirements for research students are as follows:

- An average of 5 days of training per academic year for all full-time students, with a total of 15 days across three years of study.
- The training requirements are the same for part-time students, but operate on a pro-rata basis (minimum of 2.5 days per academic year).

The research skills training requirements can be fulfilled through:

- Taking courses on the Researcher Development Programme - both face-to-face and online courses;
- Attendance at GRADnet courses and events;
- Departmental courses which offer developmental and generic skills training (subject-specific training courses cannot be used to meet the requirements);
- By attending eligible courses at other institutions;
- Completion of modules from the inSTIL teacher-training programme (which can only be taken when you are teaching at the University);
- Attendance at reading groups such as HARC;
- Additional research training activities that count towards the training requirements:
 - submission of conference paper abstract: half day;
 - presentation of poster at conference: half day;
 - presentation of conference paper: 1.5 days;
 - submission of paper or book chapter for publication: 2 days;
 - organisation of conference as part of a committee; 2 days
 - volunteer to help at a conference for one day: 1 day.

In addition, research students in the Department of Physics are also expected to undertake a minimum of 80 hours advanced physics or related discipline specific training relevant to the broader remit of their PhD as set out in the [SEPnet](#) policy.

GRADnet training programme

Professional skills courses specifically for physics postgraduate students will be available via the GRADnet Virtual Research Environment and you should register for this.

Advanced discipline specific training (80 hours)

The department's research activity is undertaken by the various research groups and the subject-specific training offered to postgraduate research students is matched to their particular needs. Every student receives training in safety.

Annual reviews and upgrades

Although you will meet with your supervisor regularly during the academic year, your academic progress is formally reviewed at least once every twelve months, regardless of whether you are studying full or part time.

The Doctoral School administers the formal Annual Review Process.

- [Core annual review details](#)
- [Annual reviews in the Department of Physics](#)

All MPhil / PhD students start their programme on the MPhil and have to pass the upgrade review meeting in order to be eligible to submit for the PhD.

- [Core upgrade details](#)
- [Upgrades in the Department of Physics](#)

Department guidance on your thesis and viva examination

A thesis is a scientific document and the purpose of writing a thesis is to partly to prove that you are able to complete and report on a scientific research project that contributes somehow to the worldwide body of knowledge in your field.

By the time you come to write your thesis you should have a good idea of what it is going to contain. It is a good habit to ask yourself throughout your studies, "Is what I am doing today going to appear in my thesis?". You may achieve better focus in your studies if you consider and plan the value of your day to day activities against this criterion.

Clearly reporting on around three years of scientific work requires a systematic approach to your project and throughout your studies careful recording of your work as notes and summary documents (to a standard that might be almost copied into your thesis) is extremely important.

Guidance on how to write a thesis and its contents should come mainly from your primary supervisor, but the reading of theses produced by other students in your field both at Royal Holloway and elsewhere is pedagogically worthwhile and will give you a good understanding of what will be required. Needless to say, your work needs to be

judged in the context of your research field, and so systematic study of key research papers in your field throughout your studies is also critically important preparation. Your thesis will require a bibliography.

As part of the annual review procedure you will write project reports and undertake “mock viva’s”. These activities are intended to prepare you for your thesis writing, your PhD examination, and for lifelong engagement in the scientific community. You may also draft reports for research collaborators or material for presentation at conferences or in journal publications. Generally, you should seek opportunities to present your work at conferences and to talk to other researchers in your field about your work. Scientific communication with your collaborators and competitors is essential for training as a scientist, but also very good preparation for thesis writing. University courses are available on academic writing. Your project supervisor will comment on the first draft of your thesis and can offer more detail on answering potential viva questions.