

Course Information Sheet for entry in 2025-26: DPhil in Atomic and Laser Physics



Course facts

Mode of study	Full Time Only
Expected length	3 to 4 years

About the course

The DPhil in Atmospheric and Laser Physics (ALP) is a research-based course of three to four years in duration. Research in atomic and laser physics involves some of the most rapidly developing areas of physical science and ranges from the fundamental physics of quantum systems to interdisciplinary application of lasers.

This course is hosted by the Atmospheric and Laser Physics sub-department, one of six sub-departments of the Department of Physics.

The sub-department researches the interaction of light and matter over an enormous range of conditions, from high-energy plasmas created by the most powerful lasers in the world, to the coherent manipulation of single quantum particles for implementing quantum information processing, to the creation of exotic states of quantum matter such as Bose-Einstein condensation.

Research in atomic and laser physics (ALP) involves some of the most rapidly developing areas of physical science and ranges from the fundamental physics of quantum systems to interdisciplinary application of lasers.

The research themes include the following, using both experiment and theory:

- quantum computation
- quantum cryptography
- quantum chaos
- quantum memories
- optical manipulation of cold atoms and molecules
- ultra-cold matter
- Bose-Einstein condensations
- optical lattices and quantum simulations
- ions traps and entanglement
- non-linear optics
- cavity quantum electrodynamics
- quantum optics
- high-intensity laser interactions
- ultra-fast X-ray science
- laser-plasma science
- attosecond optics
- optical metrology and precision spectroscopy
- fundamental tests of QED
- femtosecond combs
- EPR and NMR for QIP
- laboratory astrophysics.

Your research work begins on day one and will be underpinned by a taught graduate course in the first year that runs in parallel. You will be expected to attend a taught course one day a week in atomic and laser physics in the first year, comprising lectures, seminars and discussion classes at graduate level. Depending on your level of knowledge, the department may also require you to attend lectures in the final year (masters'-level) undergraduate course at Oxford.

The ALP sub-department provides a detailed timetable and syllabus list for the graduate class. Topics covered include:

- basic light-matter interaction
- photonics and quantum optics
- laser-plasma interactions
- quantum information processing and communication
- trapped particles and quantum gases
- high energy density science.

Some subjects, such as laser-plasma interactions and high energy density science, are taught across a number of sub-departments. You will also have the opportunity to follow courses taught at other departments across the Maths, Physics and

Life Sciences division.

Whilst working on your research project you will engage in a thorough skills training programme which includes a range of workshops and seminars in transferable skills, generic research skills and specific research techniques. There are also numerous seminars and lectures held in the department by local and visiting physicists, and you will be provided with many opportunities to meet experts in various fields. There will also be opportunity for you to present your work at both formal and informal conferences, seminars and colloquia.

In addition, the sub-department's journal club focuses on recent research highlights in atomic and laser physics, quantum technologies, and laser-plasma interactions. Active participation is compulsory for first year graduate students and takes place once a week in term time. Many other opportunities exist to attend training courses outside the sub-department.

Attendance

The course is full-time and requires attendance in Oxford. Full-time students are subject to the University's Residence requirements.

Provision exists for students on some courses to undertake their research in a 'well-founded laboratory' outside of the University. This may require travel to and attendance at a site that is not located in Oxford. Where known, existing collaborations will be outlined on this page. Please read the course information carefully, including the additional information about course fees and costs.

Resources to support your study

As a graduate student, you will have access to the University's wide range of world-class resources including libraries, museums, galleries, digital resources and IT services.

The Bodleian Libraries is the largest library system in the UK. It includes the main Bodleian Library and libraries across Oxford, including major research libraries and faculty, department and institute libraries. Together, the Libraries hold more than 13 million printed items, provide access to e-journals, and contain outstanding special collections including rare books and manuscripts, classical papyri, maps, music, art and printed ephemera.

The University's IT Services is available to all students to support with core university IT systems and tools, as well as many other services and facilities. IT Services also offers a range of IT learning courses for students, to support with learning and research.

The extent of resources, laboratories and other experimental facilities depend very strongly on the particular research project.

The department provides a good level of IT support, online access to most relevant journals and access to the Radcliffe Science Library. Access is provided to the student mechanical workshop after attending an initial training session. You will usually be allocated a desk in a shared office.

There are also small common areas in each group where people can meet up, in addition to the department's common room (canteen). The academic year starts off with a welcome to Oxford, which includes a tour of Oxford and a welcome party where the new student intake can meet the academic staff, postdoctoral researchers and second year students.

Supervision

For this course, the allocation of graduate supervision is the responsibility of the Department of Physics and it is not always possible to accommodate the preferences of incoming graduate students to work with a particular member of staff. Under exceptional circumstances, a supervisor may be found outside the Department of Physics.

You will have the opportunity to meet with your supervisor individually to discuss your project.

Assessment

All students will be initially admitted to the status of Probationer Research Student (PRS). Within a maximum of four terms you will be expected to apply for transfer of status from Probationer Research Student to DPhil status.

A successful transfer of status from PRS to DPhil status will require a written report. If you are successful at transfer you will also be expected to apply for and gain confirmation of DPhil status to show that your work continues to be on track. This will need to be done within nine terms of admission for full-time students.

Full-time students will be expected to submit a thesis within 12 terms of admission. To be successfully awarded a DPhil in Atomic and Laser Physics you will need to defend your thesis orally (viva voce)

Changes to this course

The University will seek to deliver this course in accordance with the description set out above. However, there may be situations in which it is desirable or necessary for the University to make changes in course provision, either before or after

you commence your course. These might include significant changes made necessary by any pandemic, epidemic or local health emergency. For further information, please see the University's Terms and Conditions (<http://www.graduate.ox.ac.uk/terms>) and our page on changes to courses (<http://www.graduate.ox.ac.uk/coursechanges>).

Costs

Annual fees for entry in 2025-26

Fee status	Annual Course fees
Home	£10,070
Overseas	£33,370

Information about course fees

Course fees are payable each year, for the duration of your fee liability (your fee liability is the length of time for which you are required to pay course fees). For courses lasting longer than one year, please be aware that fees will usually increase annually. Information about how much fees and other costs may increase is set out in the University's Terms and Conditions (<http://www.graduate.ox.ac.uk/terms>).

Course fees cover your teaching as well as other academic services and facilities provided to support your studies. Unless specified in the additional cost information (below), course fees do not cover your accommodation, residential costs or other living costs. They also don't cover any additional costs and charges that are outlined in the additional cost information.

Graduate students who have reached the end of their standard period of fee liability may be required to pay a termly University and/or a college continuation charge.

The University continuation charge, per term for entry in 2025-26 is £672, please be aware that this will increase annually. For part-time students, the termly charge will be half of the termly rate payable by full-time students.

If a college continuation charge applies (not applicable for non-matriculated courses) it is likely to be in the region of £100 to £600. Please contact your college for more details, including information about whether your college's continuation charge is applied at a different rate for part-time study.

Additional cost information

There are no compulsory elements of this course that entail additional costs beyond fees (or, after fee liability ends, continuation charges) and living costs. However, please note that, depending on your choice of research topic and the research required to complete it, you may incur additional expenses, such as travel expenses, research expenses, and field trips. You will need to meet these additional costs, although you may be able to apply for small grants from your department and/or college to help you cover some of these expenses.

Living costs

In addition to your course fees and any additional course-specific costs, you will need to ensure that you have adequate funds to support your living costs for the duration of your course.

The likely living costs for the 2025-26 academic year are published below. These costs are based on a single, full-time graduate student, with no dependants, living in Oxford. We provide the cost per month so you can multiply up by the number of months you expect to live in Oxford.

Likely living costs for one month

	Lower range	Upper range
Food	£330	£515
Accommodation	£790	£955
Personal items	£200	£335
Social activities	£45	£100
Study costs	£40	£90
Other	£20	£40
Total	£1,425	£2,035

Likely living costs for nine months

	Lower range	Upper range
Food	£2,970	£4,635
Accommodation	£7,110	£8,595
Personal items	£1,800	£3,015
Social activities	£405	£900
Study costs	£360	£810
Other	£180	£360
Total	£12,825	£18,315

Likely living costs for twelve months

	Lower range	Upper range
Food	£3,960	£6,180
Accommodation	£9,480	£11,460
Personal items	£2,400	£4,020
Social activities	£540	£1,200
Study costs	£480	£1,080
Other	£240	£480
Total	£17,100	£24,420

When planning your finances for any future years of study at Oxford beyond the 2025-26 academic year, it is suggested that you allow for potential increases in living expenses of 4% each year – although this rate may vary depending on the national economic situation.

More information about how these figures have been calculated is available at www.graduate.ox.ac.uk/livingcosts.

Document accessibility

If you require a more accessible version of this document please contact Graduate Admissions and Recruitment by email (graduate.admissions@admin.ox.ac.uk) or via the online form (<http://www.graduate.ox.ac.uk/ask/form>).