

F344: Theoretical Physics



Undergraduate MPhys 2021

Essentials

Please note: 2020-21 courses may be affected by Covid-19 and are therefore subject to change due to the ongoing impact of Covid-19. Summaries of course-specific changes resulting from the impact of Covid-19 will be provided to applicants during August 2020.

For the latest information on our plans for teaching in academic year 2020/21 in light of Covid-19, please see www.durham.ac.uk/coronavirus

UCAS code	F344
Degree	MPhys
Mode of study	Full Time
Duration	4 years
Location	Durham City (www.durham.ac.uk/study/location/durham.city)
A-Level	A*A*A
BTEC	D*D*D
International Baccalaureate	38
Alternative qualifications	<ul style="list-style-type: none"> • Other UK qualifications (www.dur.ac.uk/resources/undergraduate/apply/UK.pdf) • EU qualifications (www.dur.ac.uk/resources/undergraduate/apply/EU.pdf) • International qualifications (www.dur.ac.uk/international/country.information/)
Contextual Offers	You may be eligible for an offer which is one or two grades lower than our standard entry requirements. Find out more (www.durham.ac.uk/study/ug/apply/contextualoffers/).
More information	Still have questions? (www.durham.ac.uk/study/askus/)
Department(s) Website	www.durham.ac.uk/physics

Course Summary

Description

Durham is one of the leading physics and astronomy departments in the UK, enrolling around 170 students each year. The dedication to our teaching and research consistently puts us high up in all the league tables. While studying here you will benefit from the buzz and creative environment of a large research department and join a dynamic and focused intellectual community. Our research ranges from fundamental elementary particle physics and cosmology to more applied topics in which we collaborate closely with industry.

We offer degrees in Physics, Physics and Astronomy, and Theoretical Physics, all of which are accredited by the Institute of Physics. Our course structures have been designed to provide flexibility in your final choice of degree course. The three-year BSc degree is aimed at those mainly interested in a degree in Physics as a preparation for a career not necessarily in the Physics area.

Our four-year MPhys degrees will suit those looking for professional training leading to research in physics or a physics-related career. The first year of the BSc and MPhys degree courses in Physics, Physics and Astronomy, and Theoretical Physics is identical, and it is possible to select modules in your second year such that you need not make a firm choice of course until the end of the second year.

Year 1

Foundations of Physics is the main lecture module in the first year and is complemented with a practical laboratory module, including an introduction to programming. Two mathematics modules are taken in the Department of Mathematical Sciences. There is a further module of choice, with Introduction to Astronomy proving to be very popular.

Year 2

Core modules:

- Foundations of Physics 2A/2B
- Mathematical Methods in Physics
- Laboratory Skills and Electronics.

Additional topics include Theoretical Physics 2 (the transition from classical to quantum mechanics), Stars and Galaxies (an exploration of astrophysics), and Physics in Society.

At the end of the year, you need to decide your degree title, choosing between:

- BSc Physics (F300) (www.dur.ac.uk/courses/info/?id=26267&title=Physics&code=F300&type=BSC&year=2021)
- MPhys Physics (F301) (www.dur.ac.uk/courses/info/?id=26318&title=Physics&code=F301&type=MPHYS&year=2021)
- MPhys Physics and Astronomy (FF3N)
(www.dur.ac.uk/courses/info/?id=26320&title=Physics+and+Astronomy&code=FF3N&type=MPHYS&year=2021)
- MPhys Theoretical Physics (F344).
(www.dur.ac.uk/courses/info/?id=26319&title=Theoretical+Physics&code=F344&type=MPHYS&year=2021)

Year 3

Besides core courses in Foundations of Physics 3A/3B and Physics Problem-Solving (which includes a computing project), there is a wide choice of topics, for example:

- Planets and Cosmology
- Theoretical Physics
- Physics into schools
- Maths Workshop
- Team Project
- Laboratory Project
- A module taken in another department (subject to approval).

Your options will have an emphasis on theoretical physics.

Year 4

A research-based project is undertaken in one of the Department's wide range of research groups. Optional lecture course topics have included in the past: advanced and theoretical astrophysics (including general relativity and galaxy formation), biological and nanophysics, laser physics, advanced quantum physics and particle physics.

Your options will have an emphasis on theoretical physics.

We review course structures and core content (in light of e.g. external and student feedback) every year, and will publish finalised core requirements for 2021 entry from September 2020.

Study Abroad

The experience of having lived independently abroad can be very rewarding in terms of employability and of personal development. For this reason, students are encouraged to apply during their degree for a year-long placement with one of the Physics Department's or the University's international partners, either in replacement of the third year of study within an MPhys degree or as an additional year of study. Students may study in English at some of the partner universities, whereas at others foreign language skills are essential. Students are fully supported by the Department both during the application process and during the year abroad.

Adding a supplementary international study placement to the BSc Physics degree or to an MPhys degree leads respectively to the degrees of BSc Physics with Year Abroad and MPhys Physics with Year Abroad. Adding a supplementary international work or training placement instead leads to the degrees of BSc Physics with Placement and MPhys Physics with Placement. Admissions to these degrees are through transfer from F300, F301, FF3N or F344 after year one.

Placement Year

You may be able to take a work placement. Find out more (www.durham.ac.uk/placements/).

Admissions Process

Subject requirements, level and grade

A level offer – A*A*A including Physics and Mathematics.

BTEC Level 3 National Extended Diploma/OCR Cambridge Technical Extended Diploma – D*D*D and A levels as above.

IB Diploma score – 38 with 776 in higher level subjects, including Mathematics and Physics.

In addition to satisfying the University's general entry requirements, please note:

- We welcome applications from those with other qualifications equivalent to our standard entry requirements and from mature students with non-standard qualifications or who may have had a break in their study.
- Entry requirements for all four Physics degrees are the same and transfer from the BSc degree to the MPhys degree is possible and is based upon first and second-year examinations.
- We may request further information such as UMS marks and/or predicted grades if this information is not available on the UCAS application. This is to ensure that we have an equal amount of information for all applicants. If for some reason this cannot be supplied, the candidate's application will not be disadvantaged.
- If you are an international student who does not meet the requirements for direct entry to this degree, you may be eligible to take an International Foundation Year pathway programme at the Durham University International Study Centre
(www.durhamisc.com/?ch=uniweb&cc=signposting&cid=uniweb&utm_source=signposting&utm_medium=signposting&utm_campaign=uniweb)
- We are pleased to consider applications for deferred entry.

Science A levels

Applicants taking Science A levels that include a practical component will be required to take and pass this as a condition of entry. This applies only to applicants sitting A levels with an English examination board.

English Language requirements

Please check requirements for your subject and level of study (www.durham.ac.uk/learningandteaching.handbook/1/3/3/)

How to apply

www.durham.ac.uk/undergraduate/apply

Information relevant to your country

www.durham.ac.uk/international/country.information/

Fees and Funding

Full Time Fees

EU Student	£27,350.00 per year
Home Student	£9,250.00 per year
Island Student	£9,250.00 per year
International non-EU Student	£27,350.00 per year

The tuition fees shown for **home** students are for one complete academic year of full time study and are set according to the academic year of entry. Fees for subsequent years of your course may rise in line with an inflationary uplift as determined by the government.

The tuition fees shown for **overseas and EU** students are for one complete academic year of full time study, are set according to the academic year of entry, and remain the same throughout the duration of the programme for that cohort (**unless otherwise stated**).

Please also check costs for colleges and accommodation (www.durham.ac.uk/undergraduate/accommodation/costs/).

Scholarships and funding

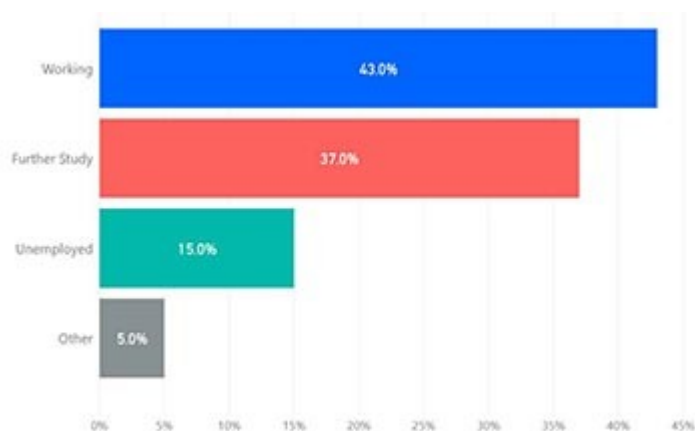
www.durham.ac.uk/undergraduate/finance

Career Opportunities

Physics

Durham University is highly regarded by employers and has an excellent graduate employment record with over 95% of students finding employment or entering further training within six months of graduation. The University is regularly among the country's top performers in graduate employment.

We seek to develop the practical and intellectual skills sought by employers, and offer preparation for a range of careers, while at the same time maintaining a high level of academic content. Our courses aim to provide you with a comprehensive understanding of Physics. Apart from familiarity with key theoretical concepts, experimental methods and technology, you will gain training in problem solving, communication skills, group working, interpreting numerical data, experimental design and project work. This range of skills will provide you with excellent all-round training for many future careers. Our graduates enter a wide variety of careers in business, industry, commerce, research, management, education, and typically over a fifth of our graduates go on to study for higher degrees.



Of those students who left in 2017:

- 80% are in employment or further study six months after graduating

Of those in employment:

- 97% of those are in graduate level employment
- Median salary £27,000

(Source: Destinations of Leavers from Higher Education (DLHE) survey of 2016/17 graduates. The DLHE survey asks leavers from higher education what they are doing six months after graduation. Full definitions for the DLHE Record can be found here: www.hesa.ac.uk/support/definitions/destinations)

“ As a Durham graduate now working in the field of Human Resources for Rolls Royce, there are certain things we look for in our graduates: influence, judgement, integrity, leadership, breadth of knowledge and teamwork to name but a few. We consistently recruit high calibre graduates from Durham University who demonstrate these competencies and are a true asset to our organisation. ”

Employment development opportunities

The Careers, Employability and Enterprise Centre (www.durham.ac.uk/careers/) works extremely closely with the Physics Department to ensure that current students receive information and details of vacancies relevant to their needs. Innovative talks take place by a Careers Adviser to ensure that the students receive the most relevant and up-to-date advice about professions that Physics students are attracted to.

A wide range of work is carried out in conjunction with the Careers, Employability and Enterprise Centre to develop our students' employability skills including presentations on scientific CV preparation, interview preparation for scientific and non-scientific employers and those considering PhD study. A wide range of recruiters of Durham physics graduates are present at the annual Science, I.T. and Engineering Fair (DETICA, DSTL, BAE Systems, The Thales Group, Sage UK Ltd, Lloyds Register).

Vacation placements

Each year Durham University is awarded a number of bursaries for students interested in working on research projects as vacation placements (www.dur.ac.uk/physics/students/vacplacements/). Full details of these and other work placement opportunities are listed in the Physics web pages.

Professional endorsement and recognition

The Institute of Physics (www.iop.org/) is the professional body addressing the needs and interests of physicists in the U.K. All students registered for Single Honours Physics, Physics and Astronomy, and Theoretical Physics degrees are entitled to free electronic membership of the Institute. Benefits include electronic access to a monthly magazine, *Physics World*, dealing with issues and topical articles in the world of physics. Nexus (www.iop.org/activity/nexus/index.html) is the student wing of the Institute of Physics and runs additional events, just for students, such as careers evenings, CERN trips and the Young Physicists Conference.

All of the Department's Single Honours degrees are accredited by the Institute of Physics. In addition, the M.Sci. Joint Honours degrees in Mathematics and Physics and in Chemistry and Physics are also currently accredited. Holders of accredited degrees are eligible to follow a route to corporate membership of the Institute and to the C.Phys. professional qualification. Degrees which are successfully accredited are listed in the Register of Accredited Courses which is available in the public domain.

Further information on the Institute of Physics, including full details of the benefits of membership, can be found at <http://www.iop.org>.

What our students say...

To read comments and first-hand accounts of student life at Durham from Physics graduates visit www.dur.ac.uk/physics/undergraduate/careers/profiles

Open days and visits

Pre-application open day

Pre-application open days are the best way to discover all you need to know about Durham University. With representatives from all relevant academic and support service departments, and opportunities to explore college options, the open days provide our prospective undergraduates with the full experience of Durham University.

Please see the following page for further details and information on how to book a place:

www.durham.ac.uk/opendays

Discover Durham Tours

Discover Durham tours offer a brief introduction to the University. The tour begins at one of our undergraduate colleges, where you will receive an introductory talk from a member of college staff, followed by a tour of the college by current students.

www.durham.ac.uk/undergraduate/live/visit/discoverdurham

Overseas Visit Schedule

www.durham.ac.uk/international/office/meetus

Department Information

Physics

Overview

Physics is central to our understanding of natural phenomena, from the smallest-length scales probed in elementary particle accelerators to the grandest structures of the universe.

Physics has enhanced our lives, by underpinning inventions such as mobile communications, the Internet, solar cells and medical scanners. At Durham University you can learn about the Big Bang, black holes, the Higgs boson, high-temperature superconductors, lasers, cold-atom Bose-Einstein condensates, biophysics and much more, from leading researchers in the field.

Rankings

- World Top 100 in the *QS World University Subject Rankings 2020*.
- 4th in *The Guardian University Guide 2020*.
- 4th in *The Times and Sunday Times Good University Guide 2020*.

Staff

For a current list of staff, please see the Physics Department web pages. (www.dur.ac.uk/physics/staff/)

Facilities

The Department is situated in a modern, well-equipped building with excellent facilities for undergraduate laboratories and projects, including four modern computer-controlled telescopes.

All Durham students have free access to the internet and are provided with an email account. Lab projects are analysed on dedicated computers. The Computing and Information Services provide a large number of networked PCs across campus, and college study bedrooms are wired for network access.

Website

www.durham.ac.uk/physics

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