Physics
For more information visit www.lancaster.ac.uk/physics
Welcome to Lancaster Physics

I am proud to be head of one of the top physics departments both for physics education and research in the UK, as recognised in repeated assessments and league tables.

By putting aside preconceptions and analysing the world from a scientific viewpoint, physics furthers our understanding and can bring immense intellectual satisfaction. Based on our broad range of world-leading research, we provide flexible and engaging degrees that allow our students to experience the full fascination of the subject. Through project work, extra-curricular activities and an open-door policy, we offer a unique and inclusive study experience within a degree programme that is constantly evolving along with the frontiers of the discipline. This is supported by an institution that was awarded the highest rating, Gold, in the Teaching Excellence Framework, recognising outstanding teaching.

The Department of Physics offers a friendly, close community of staff and students and excels in academic support.

At Lancaster we’ve built a supportive learning environment where approachable lecturers and dedicated academic advisors will guide you through your studies. Whether in lectures, laboratories or projects, we believe that prompt feedback is essential to the development of your skills, understanding and confidence. As such, all our degree courses include regular coursework assessments that encourage and challenge you to put what you have learned into practice each week.

As you might expect, our teaching is underpinned by world-leading research spanning a wide range of physics disciplines. But at Lancaster, we’re particularly proud to be able to say that the academics driving this research all contribute to undergraduate teaching, so you can be confident that your lecturers are experts at the forefront of their specialist field. This is especially important in our advanced laboratories and projects, where you can actively contribute to research and help advance our knowledge of the physical world.

Professor Roger Jones
Head of Department

Professor Jim Wild
Director of Teaching

With recent investment of £14 million into upgrading our teaching labs, new lab equipment and creating welcoming spaces for studying and socialising, our building inspires world-class teaching and research, and offers a hub for staff and students to work together.

For more information visit www.lancaster.ac.uk/physics
An Engaging and Welcoming Atmosphere

Our Department is committed to fostering a diverse, supportive community as a source of academic excellence, cultural enrichment, and social strength. Your study spaces and laboratories are alongside our offices and research areas; therefore, you will also have regular informal contact with our staff and researchers.

A friendly department
A remarkable feature of the Department is how everyone is very approachable and happy to help. This positive atmosphere is significantly enhanced by the enthusiasm of our students, who run their own Physics Society LUPhys. Our recent investment into the Department was purposefully designed to further encourage the informal interactions of students and lecturers, while our engagement in the JUNO and Athena SWAN programmes constitutes a formal commitment to the principles of diversity, inclusiveness and fairness.

Campus experience and colleges
All these features are replicated across the whole University, which not only offers you a self-contained 560 acre parkland campus with amenities such as a theatre, a cinema, a modern sports centre and sports fields, but also more than 200 student-run societies. This is complemented by a thriving college system, which along with award-winning accommodation provides events and activities that further enrich and support your student experience.

Women in Physics
The Department has developed a Women in Physics group which provides a forum for women to meet, share their experiences and discuss research and career options. Topics such as ‘How I succeeded in Science’ create interesting discussions. The group meets regularly and aims to increase the visibility of women in the Department and to facilitate informal mentoring relationships. The group welcomes new members and is supportive to all.

For more information visit www.lancaster.ac.uk/physics
A Highly Supportive Learning Environment

We offer an open door policy, small-group tutorials, individually supervised projects, dedicated career advice, and summer placements and internships.

You will also carry out extensive research projects, first in groups and then under individual supervision, where you apply your knowledge and actively contribute to the development of the field.

Comprehensive academic support
You will be able to rely on extensive academic support with multiple possible contacts for any type of question – amongst others, you can choose to contact your lecturer, your departmental academic advisor, your degree scheme manager, or the teaching support staff. You will also be assigned a college tutor responsible for providing advice and assisting with any other questions you may have.

Continuous feedback
We continually provide academic feedback and keep you informed of your results. A very large part of your lab, project and course work counts towards your final degree mark – this allows us to make the assessment meaningful, in recognition of the fact that proper scientific work is deep and requires time. As a rough guide, 40-50% of your degree marks will be based on this continuous assessment, with the remainder based on exams.

SHAUN DEMPSEY
Third Year MPhys Physics, Astrophysics & Cosmology student

When I came to Lancaster, I asked for help a lot. The Department has an excellent open door policy which means you can find a lecturer when you need help and not only in the office hours. Lecturers are approachable and get to know you and your strengths and are happy to go through any topics with you outside of lectures which means that you feel comfortable going to ask for help. The workshops offered by the Department help you to understand lecture material so you can complete your coursework and if in doubt the teaching coordinators can point you in the right direction with any problem you may have. It is a really friendly, welcoming and understanding department.

For more information visit www.lancaster.ac.uk/physics
Flexible degrees
Our courses combine fundamental concepts with cutting-edge topics and admit a wide range of degree specialisations. A common first year means you will be able to explore all areas of physics and change your degree specialism up until December of your second year. Following this, all degrees have a common core, supplemented with degree scheme specific labs and projects. However you will also have a wide range of options that let you explore advanced topics and tailor the degree to your interests.

Getting you involved in world-leading research
The teaching on our courses is directly informed by our world-leading, experimental and theoretical research. Our staff includes many leading authorities, and the Department has achieved a number of world firsts in key research areas. Our courses are designed to link strongly to our research - providing an up to date physics education that is engaging and inspiring to our students and contributes to excellent student-staff relations. As a Lancaster student you will benefit from this, not only through the wide choice of optional courses and research projects, but also from the expertise and enthusiasm for these subjects by our staff.

An Outstanding Education
All of our degree programmes provide a comprehensive, state-of-the-art physics education at the frontiers of the discipline. We constantly update our syllabus in response to recent scientific developments, skills required by employers, and feedback from our students.

Excellent facilities and resources
You will have access to a wide range of learning resources, be it through the virtual learning environment, the University Library or our own computing suites, super laboratory and 365mm Schmidt-Cassegrain reflecting telescope in the newly refurbished building. You will also benefit from our unique and world-leading research facilities. This includes the highly specialised equipment and materials from our Quantum Technology Centre, IsoLab and Ultra-Low Temperature Lab and our direct involvement in international collaborations such as the Large Hadron Collider at CERN, T2K in Japan, the Hubble Space Telescope, space science experiments inside the Arctic and Antarctic circles, and NASA’s Cassini-Huygens space mission. These provisions significantly enhance your research projects, allowing you to use cutting-edge equipment on-site and providing real research data from the international facilities.
Throughout your degree you will have the opportunity to undertake exciting research projects, solving a real problem on a topic of your choice whilst being supervised by expert researchers.
Recent MPhys projects include:

- Physics for healthcare
- Optoelectronics characterisation
- Novel nanoscale detectors
- Modelling of stellar winds
- Studies of the Earth’s aurora
- Studies of Saturn’s ring current and aurora
- Particle physics with the ATLAS experiment
- Neutrino interactions in the T2K near detector
- Development of future neutrino experiments
- Studies of exotic atoms using quantum Monte Carlo simulations
- Galaxies and dark matter
- Superfluid wind tunnel
- Galaxy formation and evolution across cosmic time

Recent 3rd year group projects include:

- Particle physics: studies of cosmic rays, construction of low cost radiation detectors and investigating the role of quantum mechanics in nuclear decays
- Industrial projects: student teams worked with external organisations to investigate re-condensing gas-based anaesthetics to reduce waste, testing high-tech plastic films to improve the shelf-life of food and characterising technical non-woven fabrics for magnetic shielding
- Cosmology group project: using cosmological constants and dark energy to solve the Age of the Universe problem
- Theory and theoretical physics with mathematics group project: Modelling the properties of electrons in crystal lattices (e.g. graphene), dynamics of vortices in superfluids and studies of particles obeying fractional statistics

Examples of Recent Projects

My project involved looking into the properties of a new material for use in particle detectors, and before starting, all I knew was that it was able to detect some particles by emitting a pulse of light (scintillating). Now I have measured properties of the material that were unknown, and possibly explained why using different methods seemed to give different results. This meant that I was the first person to see certain properties of the material, which was really exciting!

Not only did the project help me gain skills for research, but it also landed me a PhD offer, as the collaboration I was working with were impressed by my work. They also invited me to talk at a conference in South Korea, and several other students were invited to give talks around the world as well.
Choosing Your Degree

We offer a choice of 4-year MPhys Hons degrees and 3-year BSc Hons degrees. With the exception of our combined course, all our degrees offer a common first year and common core giving you flexibility to tailor your degree to suit you.

Our degrees share a common first year, which makes it easy to settle on your preference. In the subsequent years, the degrees share a common physics core which covers all key areas of the discipline. The degree-scheme specific labs and projects equip you with specialist skills while the wide range of optional modules allows you to explore advanced topics and tailor your degree to suit your interests.

All our degrees provide you with a comprehensive education, and cover all the general and specialist skills valued for further study and employment in the private and public sectors.

The additional year in the MPhys degrees contains an extended research project, which is ideal if you are considering a PhD. We also offer a BSc/MSci degree in Theoretical Physics with Mathematics, jointly with the Mathematics Department, as well as our Study Abroad exchange programmes, where you can spend your third year studying at a partner institution overseas.

We welcome applicants with alternative qualifications and offer a unique Open Plus programme for those not meeting traditional requirements. Further details can be found on our website.

Scholarships

The Department of Physics is rewarding excellence by providing an academic scholarship of £1,000 for applicants who choose a Lancaster University Physics course as their firm choice and achieve A**A* in A level Mathematics and Physics, or equivalent grades for those with alternative qualifications. Lancaster University offers a range of additional scholarships and bursaries, see www.lancaster.ac.uk

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**DEGREE SCHEME**

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<td>Quantum Mechanics</td>
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<td>Particle Physics Statistics</td>
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<td>Waves &amp; Optics</td>
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<td>Properties of Matter</td>
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<tr>
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<td>Spacial Relativity</td>
<td>Spacial Relativity</td>
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<tr>
<td>Maths Core</td>
<td>Particles &amp; Nuclei</td>
<td>Particles &amp; Nuclei</td>
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<tr>
<td>Vectors</td>
<td>Computer Programming</td>
<td>Computer Programming</td>
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<tr>
<td>Calculus</td>
<td>Further Mathematics</td>
<td>Further Mathematics</td>
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<tr>
<td>Series Methods</td>
<td>Linear Algebra</td>
<td>Linear Algebra</td>
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<tr>
<td>Complex Methods</td>
<td>Partial Differential</td>
<td>Partial Differential</td>
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<td>Vector Calculus</td>
<td>Equations</td>
<td>Equations</td>
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<td>Fourier Methods</td>
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**PHYSICS**

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<tbody>
<tr>
<td>Laboratory Work</td>
<td>Advanced Laboratories</td>
<td>6 Optional Modules</td>
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<td>Group Project</td>
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<td></td>
<td>(Research or Industry)</td>
<td>2 Optional Modules</td>
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**ASTROPHYSICS AND COSMOLOGY**

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<tbody>
<tr>
<td>Astronomy</td>
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<td>Advanced Relativity</td>
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<td>Current Cosmology</td>
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<td>Galaxy 4 Optional Modules</td>
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**PARTICLE PHYSICS AND COSMOLOGY**

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<tr>
<td>Astronomy</td>
<td>Flavour Physics</td>
<td>Advanced Relativity</td>
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<td>Current Cosmology</td>
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<td>Gauge Theory 2 Optional Modules</td>
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**THEORETICAL PHYSICS**

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<tbody>
<tr>
<td>Analytical Mechanics</td>
<td>Complex Analysis</td>
<td>Advanced Magnetism &amp;</td>
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<tr>
<td>Field Theory</td>
<td>Advanced Quantum</td>
<td>Quantum Nanophysics</td>
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<td>Project</td>
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**THEORETICAL PHYSICS WITH MATHEMATICS**

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<tr>
<td>Physics Core I</td>
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<td>Physics Core III</td>
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<td>Mathematics II</td>
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<tr>
<td>Calculus</td>
<td>Real &amp; Complex Analysis</td>
<td>Statistical Physics</td>
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<tr>
<td>Geometry</td>
<td>Linear Algebra</td>
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<tr>
<td>Matrices</td>
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<td>Probability</td>
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<td>Numbers</td>
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<tr>
<td>Differential Equations</td>
<td>2 Optional Maths Modules</td>
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<tr>
<td>Extended/Physics Project</td>
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<tr>
<td>Topology &amp; Fractals</td>
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<tr>
<td>3 Optional Physics</td>
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<tr>
<td>Modules</td>
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<tr>
<td>2 Optional Maths Modules</td>
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For International Baccalaureate it’s 35-36 points with 17 from 3 HL subjects. We welcome alternative and international qualifications and consider each case on an individual basis.

For more information visit [www.lancaster.ac.uk/physics](http://www.lancaster.ac.uk/physics)
Physics

UCAS code: F303 (MPhys), F300 (BSc)

Physics is our broadest degree covering a range of topics from Quantum Physics and Electromagnetism to Particle and Condensed Matter Physics, Quantum Computation and Matter at Low Temperatures. This gives you the most flexibility to tailor your degree to suit your interests.

Our Physics degree equips you with the broad conceptual and practical working knowledge of modern-day physics that underpins present-day research. The specialist teaching is informed by our research activities in areas such as low-temperature physics and quantum technologies. This is combined with key transferable skills enabling you to embark on a wide variety of career paths.

The core curriculum includes subjects such as Quantum Physics and Electromagnetism in your first year, Quantum Mechanics and Relativity in your second year, and Particle Physics, Atomic Physics and Condensed Matter Physics in your third year. This is complemented by laboratories where you will perform state-of-the-art experiments with sophisticated equipment and associated software. In Year three, you can choose between a research group project and an extended industrially-oriented group project in collaboration with a company or other external organisation. You also explore advanced topics via a wide range of options, which include subjects such as Quantum Computation, Matter at Low Temperatures, and Physics of Living Systems.

In the final year of the MPhys degree you take further advanced options and carry out an extended investigative project. This embeds you into one of our leading research groups and gives you access to world-class facilities, such as our unique Quantum Technology and Low-Temperature centres. Examples of recent project topics include superconducting qubits, vortices in superfluids, single photon photodiodes, nanoscale probe microscopy of graphene, quantum dots and novel quantum nanostructures.

GEORGIE PLANT
Third year MPhys Physics

Physics allows the study of the big and the small, from galaxies to quarks. At Lancaster, you are given the opportunity to study over this wide range of disciplines. Research-led teaching gives context in addition to lecture material and keeps the content up to date. If you are undecided on which area of physics is your favourite, like me, then this is the best degree scheme to pick because you learn a vast variety of skills and have a choice of many optional modules.

SOFIA DURWARD
Third Year MPhys Physics, Astrophysics & Cosmology

I would recommend the Physics, Astrophysics and Cosmology course to anyone who has an interest in physics at the largest scales. The course is well structured and balances astrophysics and cosmology modules well, and there is a great choice of optional modules available, so people can tailor their study to their interests. The lecturers are very friendly and helpful and are experts in their field, which makes me confident that I’ll get a good start to the research career that I’m aiming for.

Physics, Astrophysics and Cosmology

UCAS code: F3F5 (MPhys), F3FM (BSc)

Supernovae, black holes, and distant galaxies - there is much to discover, and it holds the key to our existence.

This degree develops your understanding of the relationship between the physical laws of the universe and the astrophysical and cosmological domains. The specialist teaching is informed by our research activities in observational astrophysics, space and planetary science, and particle cosmology.

You will obtain a thorough grounding in core physics areas such as Quantum Physics and Electromagnetism in your first year, Quantum Mechanics and Relativity in your second year, and Particle and Atomic Physics in your third year. Furthermore, this scheme also includes lectures on Astronomy, Astrophysics and Cosmology in your second year and Stellar Astrophysics and Big Bang Cosmology in your third year, as well as specialised laboratory work in astrophysics and cosmology.

In your third year, you also carry out an investigative group project where you tackle a problem of current research.

In the final year of the MPhys degree, you will complete an extended research project on topics such as galaxy formation and evolution across cosmic time, dark energy, binary variable stars, cosmic radio noise, gravitational waves and cosmic inflation, and study subjects such as Cosmology and Advanced Relativity and Gravity. For your project work, you can use data from a large range of space and ground based observatories including the Hubble Space Telescope, NASA’s Cassini-Huygens mission, and the ESO Very Large Telescope.

For more information visit www.lancaster.ac.uk/physics
Physics with Particle Physics and Cosmology

UCAS code: F373 (MPhys), F372 (BSc)

The Universe is a mysterious place. How did it form? How does it work? What is the nature of visible and dark matter?

Lancaster’s particle physicists work with state-of-the-art particle accelerators to investigate and identify the nature of space and time. Our resident cosmologists employ all of their creative and mathematical abilities to explain the early history of the Universe in a way that complements and supports observational and experimental data. All this expertise is translated into an exciting, modern physics degree based on the foundation of our core physics programme.

Throughout your degree you will take a range of subjects including Quantum Physics and Electromagnetism in the first year, as well as Astronomy, Detection of Particles and Introductory Cosmology in the second year. In your third year, your modules include Big Bang Cosmology, Flavour Physics, a choice of advanced options, and a group project where you research an open question in particle physics or cosmology.

In the final year of the MPhys degree, you will study subjects such as Current Cosmology and Gauge Theory and carry out your individual investigative project, where you can use experimental data from the Large Hadron Collider at CERN or the T2K neutrino experiment in Japan, or develop cosmological models of our Universe. Recent project topics include W bosons, CP violation using B mesons, the Higgs particle, neutrino oscillations and cosmic inflation.

For more information visit [www.lancaster.ac.uk/physics](http://www.lancaster.ac.uk/physics)

Theoretical Physics

UCAS code: F321 (MPhys), F340 (BSc)

Quite possibly the most astonishing aspect of the world around us is that so much of it can be understood by using a small number of physical laws.

Our renowned theoretical physicists devote themselves to uncovering the most appropriate mathematical laws for deducing the essence of physical phenomena on all scales, from the quantum world of microscopic matter and nanomaterials to the geometry of curved space-time and the large scale structure of the cosmos.

The core curriculum includes subjects such as Quantum Physics and Electromagnetism in your first year, Quantum Mechanics and Relativity in your second year, and Particle Physics, Atomic Physics and Condensed Matter Physics in your third year. In addition, in years two and three you take specialised modules on Quantum Theory, Electromagnetism, Condensed Matter Physics, Gravitation and Cosmology, and Elementary Particle Physics. You also have a choice of options such as Quantum Information and Advanced Gravity and Relativity, and carry out a group project on a topic of current research.

In the final year of the MPhys degree, you take further advanced options, and carry out your individual investigative research project on a topic such as quantum computation, quantum physics of graphene, quantum optics, concepts of particle acceleration or gravitational waves.

For more information visit [www.lancaster.ac.uk/physics](http://www.lancaster.ac.uk/physics)
In Years two and three, the core physics modules are complemented by courses from the Theoretical Physics degree and mathematical topics such as group theory and differential equations. In the final year of your course you will take advanced options such as Quantum Information and Advanced Gravity and Relativity, and complete your extended research project on a topic such as gravitational waves, quantum computation, or geometry and electrodynamics.

Taught jointly with Lancaster’s Department of Mathematics and Statistics, this degree combines core physics and specialised theoretical physics subjects with classes in pure mathematics. This equips you with an understanding of the mathematical foundations of physics; for example, you will learn how quantum mechanics is underpinned by the powerful mathematical concept of a Hilbert space.

In your first year you will cover the core of physics in modules such as Quantum Physics and Electromagnetism, and the core of mathematics including geometry and calculus, numbers and relations, and probability.

For more information visit www.lancaster.ac.uk/physics

In collaboration with the Mathematics Department, this degree combines specialised theoretical physics with pure mathematics, creating a challenging and rewarding programme.

Lancaster is greatly experienced in organising exchange programmes, with more than 50 partner institutions. A year studying at a university abroad provides a unique opportunity to broaden your educational experience within a different academic and cultural context. Many former Lancaster students attest to the value of their year abroad for their personal development and the enhancement of their long-term career prospects.

You take the year abroad as the 3rd year of a 4-year MPhys or MSci degree. Whilst in Lancaster, you will study on one of the standard degree schemes outlined on the preceding pages. Prior to the year abroad you will be given every assistance with both the academic and the administrative aspects of the exchange. The modules you study abroad are similar to those you would have studied in Lancaster, so that you will smoothly fit back in on your return. All the work that you do at the partner university is assessed and counts towards your final degree.

A physics degree with a year in the USA, Canada, Australia, New Zealand or Europe.

In collaboration with the Mathematics Department, this degree combines specialised theoretical physics with pure mathematics, creating a challenging and rewarding programme.

The flexibility in the degree scheme also applies to Study Abroad. This has enabled me to tailor my studies toward the theoretical side of the subject, allowing me to focus on what I enjoy learning about the most. My third year was spent at the University of Illinois, where I was lucky enough to experience a very different way of life and learning. Thanks to my time spent in the USA, I was able to secure a work placement with Fermilab National Accelerator Laboratory near Chicago, where I begin the next chapter in my studies.

ALEXANDER BOOTH
Graduated MPhys Physics. Alexander spent a year at University of Illinois and is pictured above in front of Fermilab.
A Shared Love for Physics

Our academic staff engage in a very broad portfolio of internationally leading research. We love our research, and we love to share this with our students.

PROFESSOR GUENNADI BORRISOV
Recipient of the 2011 IOP Division Prize

DR SARAH BADMAN
Winner of the 2015 Fowler Award of the Royal Astronomical Society

PROFESSOR YURI PASHKIN
Winner of the 2012 Wolfson Award for his work on superconducting qubits

PROFESSOR DAVID LYTH
Recipient of the 2012 IOP Hoyle medal for his pioneering work on cosmic inflation

Our particle physicists have played a key role in the discovery of the Higgs boson.

Our low-temperature lab set a new record for cold electrons.

Our quantum metrologists and biomedical physicists developed novel methods of medical diagnosis.

Our astrophysicists and space scientists participated in satellite missions such as Hubble and Cassini, leading to discoveries as highlighted on page 25.

Our condensed matter physicists made groundbreaking discoveries on new materials such as graphene.

A LONG-STANDING RECORD OF EXCELLENCE

Before being ranked second for world-leading research outputs in the most recent Research Excellence Framework (2014), we are ranked first overall in the previous two Research Assessment Exercises (2001 and 2008).

Breakthrough Prize

Members of the Lancaster Neutrino group were awarded a share of the 2016 Breakthrough Prize in fundamental physics for their work investigating neutrino oscillations and interactions. Members of the group have leading roles in several current neutrino oscillation experiments and are also actively involved with several future experiments that will search for CP violation using neutrinos. Research into neutrino oscillations and CP violation will aid our understanding of the Universe, and could help explain why it is dominated by matter. In their final year projects, undergraduate students have the opportunity to work with our group by analysing data from current experiments and simulating future experiments.

The Space and Planetary Physics group is part of an international consortium called “SuperDARN” (Super Dual Auroral Radar Network) who, in 2017, won the Royal Astronomical Society’s “Group Achievement Award” for Geophysics.

SuperDARN routinely measures the structure and dynamics of the upper atmosphere in the northern and southern polar regions that are coupled, via the Earth’s magnetic field, into near-Earth space. Professor Jim Wild and other team members study the data from SuperDARN with the aim of better understanding the effects of the Sun and the aurora on the upper atmosphere, interactions with the lower atmosphere and disturbances that can disrupt radio communications. Our students conduct research projects that use cutting-edge scientific datasets from facilities such as SuperDARN as part of their studies.

SuperDARN routinely measures the structure and dynamics of the upper atmosphere in the northern and southern polar regions.
Amazing Opportunities

Our academics are involved in world-leading research and when possible always open up opportunities to our students.

In 2017, undergraduate students Tom & Alex observed at the William Herschel Telescope, using spectroscopy to study bright super distant galaxies in the very early universe, similar to CR7 shown here.

Our academics are responsible for world-leading research and have access to some of the best and largest telescopes on the ground and in space. Dr David Sobral often provides our students with the exciting opportunity to observe at major facilities, including the William Herschel and the Isaac Newton Telescopes in La Palma. This allows undergraduate and final year students to obtain unique hands-on experience and also use the state-of-the-art datasets they collect during their research projects at Lancaster.

All MPhys students get to choose a Masters project in their final year. Our projects gave both of us the opportunity to gain first-hand experience of observational astronomy at the William Herschel Telescope in La Palma. We were able to observe and study some of the Universe’s earliest galaxies that we discovered ourselves. We found this experience to be the most enjoyable part of our whole degrees because it allowed us to apply the skills and knowledge we had gained over our time at university while making a genuine contribution to the field. It also gave us the chance to experience the more practical world of astronomical research, which is not something it’s easy to gain an appreciation for in a lecture theatre.

In 2016 students Robbie, Joe & Shaun observed at the Isaac Newton Telescope, to study merging clusters like the one depicted here.

In 2017, undergraduate students Tom & Alex observed at the William Herschel Telescope, using spectroscopy to study bright super distant galaxies in the very early universe, similar to CR7 shown here.

In 2016 students Robbie, Joe & Shaun observed at the Isaac Newton Telescope, to study merging clusters like the one depicted here.

Merging cluster Abell 3411-3412 seen in visible light, X-rays (blue) and Radio (red), a cosmic double whammy. Cover of the first edition of nature Astronomy; van Weeren et al. (2017).

DR DAVID SOBRAL
Lecturer for Observational Astrophysics who discovered CR7 (image left), a discovery so significant that it was listed among ESO’s all-time top 10 astronomical discoveries.

TOM ROSE & ALEX BENNETT-FORSHAW

All MPhys students get to choose a Masters project in their final year. Our projects gave both of us the opportunity to gain first-hand experience of observational astronomy at the William Herschel Telescope in La Palma. We were able to observe and study some of the Universe’s earliest galaxies that we discovered ourselves. We found this experience to be the most enjoyable part of our whole degrees because it allowed us to apply the skills and knowledge we had gained over our time at university while making a genuine contribution to the field. It also gave us the chance to experience the more practical world of astronomical research, which is not something it’s easy to gain an appreciation for in a lecture theatre.

ROBBIE KAISER
“The whole experience was incredible. The aspect that we were able to contribute to science was brilliant and gave me an idea of what I want to do in the future. Even just visiting the observatory was amazing, standing between the MAGIC 1 and 2 telescopes, their sheer size was so much larger than I expected. Although the hours were unsociable and it was freezing cold, I would do it again!”

INGRID TENGS
“Observing at the William Herschel Telescope was an amazing experience. We got to see every step of the observations and properly experience a day (night) in the life of an astrophysicist. Furthermore, the night sky from outside of the telescope is by far the prettiest and most incredible sky I’ve ever seen.”

For more information visit www.lancaster.ac.uk/physics
A Rewarding Journey Onwards

Preparing you for your next step and helping you achieve good employment prospects is paramount for the Physics Department.

Enhancing your prospects

Our degree schemes will develop your transferable skills such as critical thinking, problem solving, numeracy, computational skills, communication skills, and team working, which are all highly valued by both employers and academia. We ensure we provide as many opportunities as possible to enhance your university experience and your degree. Involving you in real research and working with academics on location allows you to learn from those most experienced in the field and gives you an insight into the area you may later work in.

Industry & placements

You benefit from our direct links with industry and outside agencies, which contribute to the range of our third and fourth year projects and fund departmental research. Taking part in relevant work experience is highly valued when applying for graduate jobs. In addition to the Science and Technology Internship scheme the Department also provides internship opportunities over the summer months to motivated students who wish to enhance their skills. This is another opportunity to work with real data and solve open-ended problems.

Opportunities and rewards

You will have ample opportunities for extracurricular activities to further enhance your CV, for example, acting as a student ambassador and taking part in outreach activities, or by joining student societies and participating in the University’s Lancaster Award.

We reward academic excellence with prizes and certificates for academic achievement in each year of study. We also offer a number of prizes that recognise outstanding physics research, usually undertaken by students during their final year research project. Over the past ten years, Physics graduates have been sustained recipients of The Chancellor’s Medal, which is awarded by the University to its six best graduating students.

Exciting careers and excellent employability

We have a dedicated Employability Champion, who offers individual support to our students, organises trips to careers fairs and supports our Science and Technology careers fair.

We have also recently added the Physics Internship and Employability Booster programme within the structure of the degree schemes. This is designed to help you achieve the career you want and prepare you for your future. All these efforts culminate in an excellent range of career options, whether you are considering research or employment.

Our graduates find employment in high-technology industries, medical and telecommunication businesses, computer programming, public health and teaching programmes, as well as in consulting, finance and accountancy.

For more information visit www.lancaster.ac.uk/physics

LAURA NUTALL
Graduated MPhys Physics, Astrophysics & Cosmology and now works on the LIGO collaboration, allowing her to participate in the groundbreaking discovery of gravitational waves

A very enthusiastic lecturer told the class about interferometers and how there was an experiment in Germany (GEO 600) trying to detect the collisions of black holes and neutron stars. This immediately captured my imagination. For my final year at Lancaster I approached my future General Relativity professor and asked him if he would consider creating a new Masters project and advising on the theory of gravitational waves. I am indebted to Dr Burton for agreeing, and since then I have never looked back!

THEO NOBLE
Graduated MPhys Physics

My time at Lancaster has been the best years of my life. The Physics Department has a fantastic course that I have found to be challenging and rewarding. My course allowed me to pursue many topics that I have found interesting, such as my favourite module about quantum information processing. The lecturers and staff throughout my degree have all been friendly, and it is very easy to get help with any problems. The drive, friendliness and outstanding research found at Lancaster has convinced me to continue my studies here as a PhD research student, and I am very much looking forward to what the coming years will bring.

SAM JONES
Graduated MPhys Theoretical Physics and now works for KPMG

I purposely applied to a Masters degree because I wanted to get a taste for what research would be like. However I was never sold on a full career in research. During the summer between my third and fourth year I did a lot of research on different careers and decided on audit in accountancy. Through audit I will be learning how a variety of companies function, which is one of the things I loved about physics, learning how everything fits together into a bigger whole. At Lancaster you will be given opportunities to work both in groups and by yourself, giving you plenty to talk about at your interviews.
Interested? What next?

We share your excitement for the subject and are always happy to answer any questions about our courses and the application process. Once you apply we will look at all aspects of your application in a timely manner and keep you well informed. It would be nice to welcome you here to Lancaster, at an Open Day or Interview Day, and eventually as a student in our Department.

Find out more
For more details about the Department, our degrees, or research, news and more please visit our website www.lancaster.ac.uk/physics
For more information about Lancaster University see www.lancaster.ac.uk

Visit us
We encourage you to visit us to find out what the University and Department has to offer. You can get a feel for the Department, meet staff and students, see the teaching and research facilities, and explore the campus and colleges.

For University Open Days and Campus Tours, where we offer guided tours and talks, see www.lancaster.ac.uk/visitus

How to apply
You can apply through the Universities and Colleges Admissions Service (UCAS). Details are given on their web page www.ucas.com

Interview Days
We may invite our applicants to interview. This is a great opportunity for you to ask us questions about the course and Department and gives us the chance to learn more about you. The day will include a taster lecture, guided tours of the Department and campus, and ample opportunity to talk to staff and students. We look forward to meeting you and invite you to bring a parent/guardian to share in the experience. They will explore the campus and Department with you and whilst you are in interview have the opportunity to attend a dedicated programme.

Offers
Following a successful application we may invite you to interview, which will determine any offers we may make. We are also part of the University Unconditional Offer Scheme. For more information see www.lancaster.ac.uk

Interview Days - SHAUN MAY

Final Year MPhys Physics, Astrophysics & Cosmology

Lancaster University first caught my attention for being so highly ranked for physics in the university league tables, but it wasn’t until I visited the Department on an Open Day that my decision was made. The staff and students were very welcoming and unmistakably passionate, combine that with how the Department is dedicated to so many projects, and I was sold!

We Are Easy To Find!

Get in touch
If you would like to know more about our courses or entry requirements, please contact us:
Tel: 01524 592261
Email: physics-ugadmissions@lancaster.ac.uk
Twitter: @LancUniPhysics
Facebook: facebook.com/LancasterPhysics

By road
From the north or south: leave the M6 motorway at junction 33 and take the A6 north towards Lancaster for about 2 miles. The University is on the right.
For Sat Nav use: LA1 4YW.

By rail
There are direct rail links between Lancaster and London (Euston), Birmingham, Leeds, Manchester, Glasgow and Edinburgh. The single journey between London and Lancaster takes between 2.5 and 3 hours.

Buses and taxis are available from just outside the station.

By coach and bus
Lancaster city is on the national coach network; National Express coaches call at the University. Local buses (numbers 2, 2A, 3, 4, X4, 41) from Lancaster bus station run to the University every 5 minutes on weekdays.
Further details can be found on www.lancaster.ac.uk/travel

For more information visit www.lancaster.ac.uk/physics