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warwickphysics

The Department of Physics at the University of Warwick

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Physics at Warwick

'Welcome to the Department of Physics at the University of Warwick. Physics is a practical subject full of beautiful ideas. If you study physics as an undergraduate, you will be exploring deep questions about the nature of the universe and developing many useful skills.

This booklet should give you a good idea of what studying with us would be like. We look forward to hearing from you and answering any further questions you may have about our courses and the University.'

Professor Tony Arber

Head, Undergraduate Admissions



Honours Degree Courses offered by the Department of Physics

Physics F300 (BSc) and F303 (MPhys)

Mathematics and Physics GF13 (BSc) and FG31 (MMathPhys)

Physics and Business Studies FN31

The courses **Mathematics and Physics** and **Physics and Business Studies** are taught jointly with the Department of Mathematics and the Warwick Business School respectively.



Introduction



Physics is about ideas and skills. A key idea is that systems can be understood by identifying a few fundamental quantities such as energy and momentum, and the universal principles which govern them. One of the joys of physics is seeing how a simple principle, established after studying one particular problem, can go on to explain seemingly unrelated phenomena. For example, the laws of thermodynamics were discovered in the nineteenth century by people trying to design better steam engines. They turned out to apply to everything in the universe from the big bang onwards. Einstein himself is quoted as saying that thermodynamics "is the only theory of universal content which I am convinced ... will never be overthrown".

Physics teaches ways of thinking about and tackling problems. This is just as true when studying the laws governing interactions between individual particles, as it is when studying the implication of these laws for complicated systems made up of many particles. In all cases, the process involves making measurements, trying to solve models of what might be happening, and, hopefully, celebrating when a coherent picture emerges.

Studying physics gives a good general preparation for many different careers. Graduates from the department now work in nearly all parts of the public and private sectors including IT, finance, journalism, general management as well as in the public sector. Some students go on to postgraduate study in physics usually working towards the research degree of PhD.

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Physics at Warwick

Our main entry streams are Physics and the Mathematics and Physics joint honours course, which is taught jointly with the Department of Mathematics. The courses are designed to challenge students intellectually and to help them develop general transferable skills.

The courses are built around a flexible curriculum, which, particularly after the first year, allows students to choose a sizable proportion of their modules from lists of options. Students often choose to concentrate on particular areas in physics (and mathematics for students on the joint course). The need to make choices about which modules to take encourages students to think about physics in the context of science as a whole, and to form their own opinions about the relative importance of the various strands within the subject.

Physics Degree

The structure of the course reflects the structure of the subject. The core of compulsory lecture modules, concentrated mainly in the first two years, introduces and develops the fundamental concepts, such as those of quantum theory and electromagnetism, and covers the mathematics used in physics.

The modules chosen from option lists are largely concerned with seeing how the basic concepts can explain the phenomena we can observe. Examples include the light emitted and absorbed by stellar matter, and the response to mechanical and electrical signals of the liquids, solids and gases we meet on a daily basis.

A physics graduate should be a practical person. The Laboratory work in the course helps to develop important experimental skills and goes together with other more general skills training in computing, communication and problem-solving.

A feature of Warwick is that the Departments keep many of their modules open to students from other disciplines. Physics students can opt to take modules in other related sciences including mathematics, computing and statistics, or from outside of science altogether. There are modules in modern languages, philosophy and other areas.



Teaching

The Department provides a supportive and friendly environment in which to study. Students learn not just from the lectures and laboratories but also from interacting with others on the course, research students and friends from outside physics.

Lectures

Lectures are a very effective way of presenting information to a large group of students. The fifty-minute lectures introduce the material which students then study further on their own.

The core modules in the first year are supported by weekly classes at which students meet in small groups with a member of the research staff or a postgraduate student. These classes have two main purposes: to discuss any problems of understanding which arise from the lectures and to go through any written work associated with the module. They also provide an important indirect route back to the lecturer for students' comments about the lectures and their general impression of the module.

Laboratories

The laboratory modules teach the essential skills of experimental physics. In broad terms a scientist needs to know how to carry out an investigation, assess its significance and report the results clearly and concisely. As well as developing the techniques of experimental physics, time spent in the laboratory helps illustrate the theoretical aspects of the subject presented in the lectures.

Projects

In their final year students work on a research-style project. This is for many students a high point of their degree course. It gives them the opportunity to develop their own ideas in a particular field of interest. Usually students work in pairs within one of the Department's research groups alongside postgraduate students and other members of staff. Sometimes the project work can involve interacting with people from other disciplines or from industry.

Personal Tutor

Each student has a personal tutor who is an important contact with the academic staff. During the first two years, personal tutors hold weekly tutorials with their tutees and routinely advise on the choice of options and planning for future years. Normally they would also be the first person to see about any problem which might arise. The personal tutor can direct a student to the University's Senior Tutor who, with a team of professional counsellors, is there to deal with more serious worries.

Assessment

A student's performance is assessed on the basis of written examinations and coursework. In any year about 30% of the overall mark is assigned to coursework. Coursework components of a degree course include problems set in association with lecture modules, laboratory and computational projects and modules assessed on the basis of one or more reports.

Feedback

The staff and student representatives meet regularly on a Staff Student Liaison Committee (SSLC) to discuss any changes and improvements which can be made to the teaching.



Associated degrees

Mathematics and Physics

This joint honours degree course has been designed for students with a genuine interest in mathematics and physics. It is one of the best-established Mathematics and Physics joint honours courses in Britain, admitting around fifty students a year. The course has a flavour distinct from the single honours Mathematics and Physics degree courses, as a significant proportion of the modules taught by both Departments have been designed specifically for joint degree students. The general theme of the course is theoretical physics and the course benefits from the presence in both Departments of staff working in theoretical physics.

There is a large optional component to the degree which allows students to concentrate on their strengths and interests. The flexibility of the Warwick degree makes it a sensible choice for students who are still not sure whether they enjoy one subject more than the other, as it is normally possible to switch to either of the single subject degrees at a later stage.

Physics and Business Studies

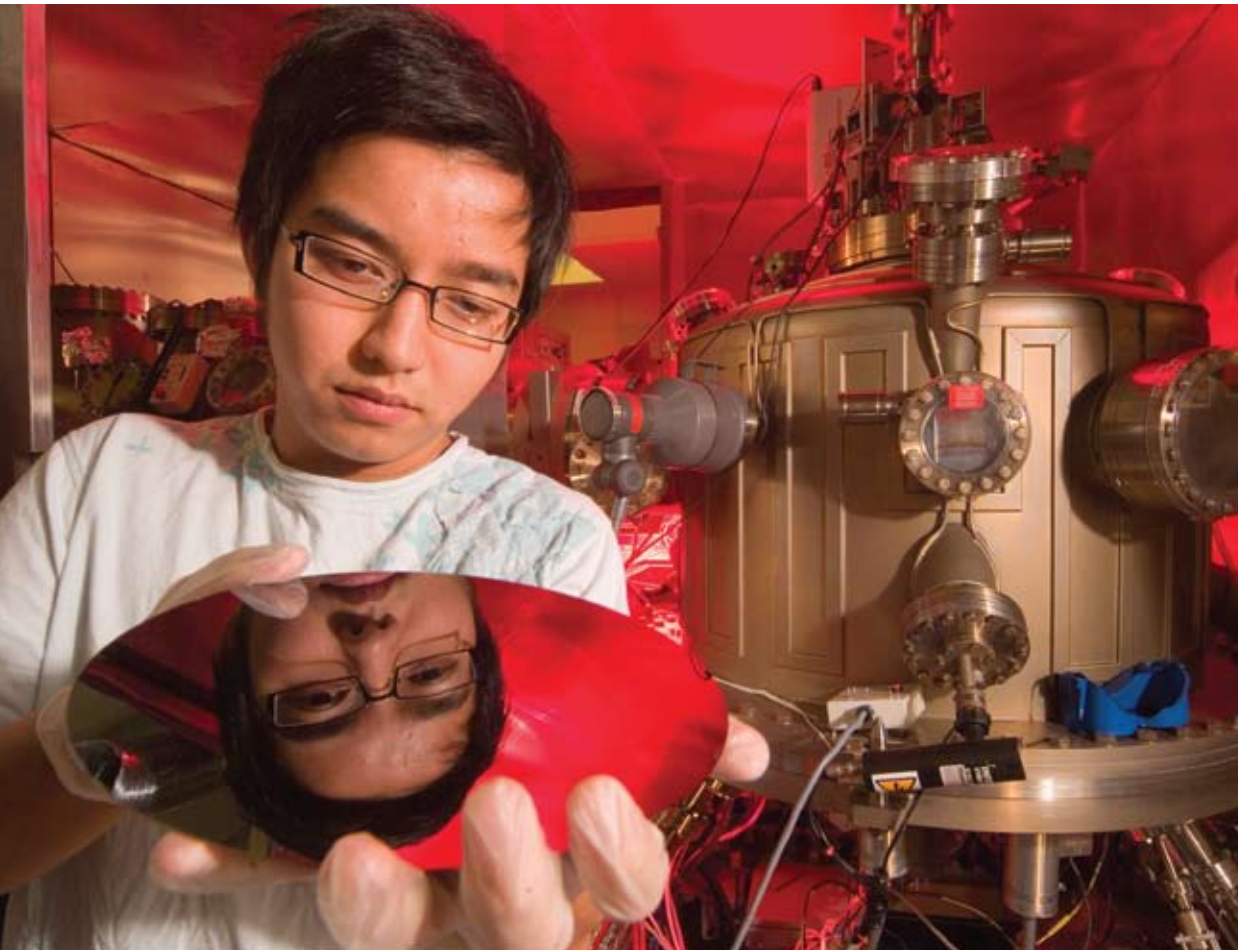
Students who wish to widen their studies to include business studies, possibly with a view to a career in management or finance, can opt for the Physics and Business Studies course. In the first two years the course only differs from the physics course in that one second year business module is compulsory. In the third year students transfer to the Warwick Business School and take all their modules on business-related topics.

The physics community

Apart from teaching, the University's main role is to carry out research. Warwick has earned an excellent reputation for its research and in all recent research assessment exercises the Higher Education Funding Councils placed Warwick amongst the top universities for research in the UK and rated the Department of Physics highly as an individual Department. The interaction with the research community in the Department exposes students to the latest innovations and ideas and is particularly valuable for students in their final year when they carry out their project work.

The Department of Physics has a number of areas of research excellence including: astronomy, the physics of condensed matter, elementary particle physics, plasma physics, theoretical and computational physics.

The other Departments which teach physics-based undergraduates – Mathematics, Statistics and the Warwick Business School – have all been rated highly in recent research assessment exercises.



Looking ahead

There has always a strong demand for physics graduates. Employers value the general skills which the discipline develops: the ability to argue clearly and to tackle problems.

After graduation about 65% of our graduates move directly into employment while 35% go on to further academic training usually in physics, mathematics or computing. The 65% entering employment are made up of around 20% in the financial/accounting sector, 20% in the IT sector and 10% in engineering. The remaining 15% are spread across a range of disciplines which, in recent years, have included journalism, the health service and management.