Introduction and background

The Institute of Physics is a scientific charity devoted to increasing the practice, understanding and application of physics. It has a worldwide membership of more than 36,000 and is a leading communicator of physics-related science to all audiences, from specialists through to government and the general public. Its publishing company, IOP Publishing, is a world leader in scientific publishing and the electronic dissemination of physics.

Higher Education and Research

The Department of Higher Education and Research falls within the Education and Science Directorate of the Institute. The department works to promote the interests of physics and physicists in academia in a number of ways. It uses its extensive networks of contacts with members to provide information on issues which affect higher education and research policy. The department can then respond quickly and effectively to consultations and produce policy papers on key issues.

Programme of activities

Policy

Consultations

A fundamental concern of the Institute, in its role of representing physics and physicists, is to identify and contribute to debate on public issues relating to physics. This includes national and international policies for the prioritisation and funding of scientific research, and issues of public policy where physics has a contribution to make.

The department responds actively to consultations, reports and reviews (by government and others) which affect physics and physics-related activities. Examples include responses to consultations from parliamentary select committees, government departments and agencies.

Influencing policy

The department is active in advising and lobbying government and external agencies on a range of science and higher education policy issues. The department also maintains close relationships with government departments and funding agencies responsible for science and higher education, and regularly represents its views to ministers and senior officials within government and its agencies.
Higher Education

Degree Accreditation
The accreditation of physics degrees is an important part of the department’s support for higher education. Accreditation is the means by which the department monitors and keeps the wider community of physicists informed about the content and standard of physics degrees.

Accreditation provides an independent, rigorous and valid assessment of physics degree programmes. It gives potential students a guarantee that an Integrated Masters degree can satisfy the educational requirements for the professional award of Chartered Physicist. The department continues to accredit at the bachelors level and such programmes partially fulfil the educational requirements for Chartered Physicist.

The document, The Physics Degree, details the skills and knowledge that graduates of accredited degree programmes should have, including subject specific skills, graduate skills and essential physics concepts as described in The Core of Physics.

Degree Recognition
Degree recognition is a new scheme introduced to support degree programmes that contain substantial physics content but are not intended to meet the accreditation requirements. The scheme promotes the benefits of interdisciplinary study and encourages the study of physics and related areas. It also provides a guarantee to potential students that the degree will satisfy the educational requirements for membership of the Institute.

Standing Conference of Physics Professors
Membership of the Standing Conference of Physics Professors (SCPP) comprises the heads of physics departments at UK and Irish universities. The group meets twice a year to discuss policy issues which are considered to be of current importance to its research and teaching. The department consults the SCPP when responding to consultations relating to university teaching and research.

Head of department booklet
The department produces a booklet containing the names and contact details of the heads of all physics departments in the UK and Ireland as well as the departmental administrators. The booklet serves as a useful resource for the academic community.
Undergraduate Bursary Scheme
The Institute provides bursaries to selected physics undergraduates. The aim of the Undergraduate Bursary Scheme is to encourage greater participation in undergraduate physics degrees. Its objective is to increase the numbers of physics undergraduates, with an emphasis on encouraging those students who do not traditionally choose physics or those who might otherwise be deterred from university entry by financial constraints.

These bursaries, administered through participating universities, are worth £3000 over the duration of a Bachelor’s degree and £4000 over the duration of an integrated Master’s degree (i.e. an MPhys or an MSci). The scheme is due to end in 2013/14, with the last cohort intake in 2009/10.

University/School links scheme
The department encourages university physics departments to increase their links with secondary schools. Grants are offered for activities such as making equipment and laboratories available to local schools, giving local physics teachers visiting status in the department or offering speakers (lecturers, postgraduates and undergraduates) to speak in schools.

Engaging with Universities and National Laboratories
The department runs two schemes ‘IOP on Campus’ and ‘IOP Laboratory Briefings’. The purpose of these schemes is for the Institute to inform both members and potential members about what the Institute is doing to support them and to promote physics, and for the Institute to better understand the concerns and needs of these institutions.

For ‘IOP on Campus’ a team from the Institute visits the university campus for one day and runs activities including presentations to staff and students, careers sessions and discussions with university management.

For ‘IOP Laboratory Briefings’ a similar programme is followed with discussions with the research institute’s management, and a presentation and Q&A session for staff.

National Higher Education STEM Programme
The National Higher Education STEM Programme (HE STEM), funded by the Higher Education Funding Councils, is a national programme hosted at the University of Birmingham, which aims to generate interest in STEM (Science, Technology, Engineering and Mathematics) subjects amongst young people, enhance higher level skills in the workplace and increase accessibility of HE courses in these subjects, to fulfil the needs of employers and boost the UK economy.

The HE STEM team at the IOP is working with universities to present degrees to attract a broader cohort to the subject; developing a new style of physics course with a strong emphasis on physics in action and employability; producing careers resources to highlight the benefits of studying physics at university, and working to develop and promote a model for employer engagement that will be applicable across the sector. A specific cross-cutting focus on under-represented groups is embedded in the activities.
Statistics
It is important that the Institute’s representations on behalf of physics and physicists are grounded in sound statistics. Therefore, the Institute collects and collates data to ensure it has a definitive and comprehensive set of statistics on physics education and research covering all areas of school and university education, teaching and teacher supply, academic research and funding, and the employment of physicists.

Profile for Physics
The department has initiated a major programme to demonstrate to decision-makers and the public, the opportunities and importance of physics. It highlights the exciting and leading-edge areas of physics research, its importance both in its own contribution to scientific knowledge and to underpinning other areas of science and application.

Vision Papers
The Vision Papers are a series of technical briefings which highlight exciting new areas of physics research and their theoretical and technological implications. From fundamental areas such as the quest to understand the forces of nature to the practical applications of high-intensity lasers, these papers show how physics pervades all areas of science.

The papers all follow a similar format. A basic introduction to the physics behind the topic is followed by a selection of examples of current and potential future use. Recent editions have focused on T-rays and magnetic resonance imaging; all papers published to date can be viewed and downloaded in a number of formats.

Seminars
The seminars aim to facilitate debate of the key issues in physics and its interaction with industry and other sectors. Some of the seminars have dealt with topics discussed in the Vision Papers, but the majority have covered areas with which the audience, including decision-makers and opinion-formers, may not be familiar. Recent examples include Geo-engineering: Challenges and global impacts and Space: Exploration and exploitation in a modern society.

Collaborative Meetings
The department collaborates with various partners including other scientific bodies to hold conferences on cross-disciplinary subjects.

Examples of collaborative meetings previously held:

- Fusion - will it always be 40 years away?, organised in partnership with the European Physical Society; and;
- Intelligent robots in science and society, organised in partnership with the Parliamentary Office of Science and Technology, Walking with Robots and others.
Physics for Future Technology

Physics for Future Technology is an initiative to showcase various areas of physics research that are of current interest and technological importance. Two examples are the reports: *Optics and Photonics: Physics enhancing our lives,* and *Condensed Matter: Physics for future technology.*

The aim is to alert decision-makers, funders and others who influence the advancement of physics to research developments that are likely to have commercial applications and beneficial impact on society within the next 5 to 10 years.

Research

International review

In November 2005, a panel of international physicists and astronomers undertook a second review of UK physics and astronomy research, under the sponsorship of the Engineering and Physical Sciences Research Council, the former Particle Physics and Astronomy Research Council, the Royal Astronomical Society and the Institute.

The review, which followed on from an initial review of physics and astronomy research undertaken in April 2000, reported on the quality, distribution of effort and future potential of research in physics and astronomy in the UK. The review aimed to indicate areas of strength, weakness, improvement, decline and growth with respect to the preceding review.

Research Fields in Physics

Research Fields in Physics (RFIP) is a resource that provides descriptions of research in progress, together with the names of the senior personnel involved, given under the individual research fields of each department. Amongst other things, RFIP serves as a useful guide for postgraduate and postdoctoral opportunities, and facilitates channels of communication between research groups.

Special Town Meetings

The department holds one-off meetings on issues of importance to the physics community. These meetings provide a forum for the department to let its members know how it is responding to policy issues as well as an opportunity for the community to voice its concerns, which the department can then represent to the relevant body. One such example was the meeting held in July 2010 on the Spending Review plans of the Engineering and Physical Sciences Research Council (EPSRC) and the Science and Technology Facilities Council (STFC).
Reports

The department publishes reports on issues of current concern. These reports are used in a number of ways; firstly, they demonstrate the important contribution physics and physicists make to wealth creation and improved quality of life in society; secondly, they provide evidence with which to influence government policy; and lastly, they challenge preconceptions about physics and physicists.

*Particle physics - it matters*, and *MRI and the Physical Agents (EMF) Directive* are recent high profile examples.

Resources for students and graduates

Science Policy Intern Scheme

The department has established a scheme to enable a physics undergraduate student, or one that has recently graduated, to work within the department for a period of three months. This opportunity allows the successful candidate to gain invaluable experience of working in science policy.

MSc Booklet

The department has produced a booklet to help students who are seeking advice on Master’s degrees available in UK and Irish universities in physics and cognate disciplines.

In the booklet, the courses are listed in alphabetical order under each institution and details are provided on the length of the course, entry requirements and classification of course. Full contact details are provided along with information on the availability of studentships and bursaries where known.

Links

In order to keep up to date with key policy developments and ensure it can effectively lobby and influence on issues of concern, the department maintains close links with government departments and agencies, funding and research councils and other bodies including learned societies and national academies.
Further information on the topics covered in this booklet can be found at the following links:

General information about the department and access to the Heads of Department booklet: www.iop.org/education/higher_education/index.html


Degree Accreditation: www.iop.org/education/higher_education/accreditation/page_43310.html

Degree Recognition: www.iop.org/education/higher_education/recognition/page_43321.html

National STEM Higher Education Programme: www.iop.org/education/higher_education/stem/page_43325.html


Policy events calendar: www.iop.org/events/policy/policy-events/index.html

Reports and related publications: www.iop.org/publications/iop/index.html

Science Policy Internship Scheme: www.iop.org/education/higher_education/fellowship/page_43347.html


University/School Links Scheme: www.iop.org/about/grants/university_school/page_38821.html

The department can also be contacted at:

Higher Education and Research Department
The Institute of Physics
76 Portland Place
London W1B 1NT

Tel +44 (0)20 7470 4800
Fax +44 (0)20 7470 4848
E-mail heandresearch@iop.org
www.iop.org