Appendix 2A

Annual Plan 2015-16 Department of Physics

1. Executive Summary

The Department of Physics aims to contribute strongly to the delivery of University and Faculty objectives and to meeting the targets in our Outcome Agreement, whilst actively promoting the University's values in all aspects of our activities. Pillars of the 2015 Departmental Strategy Plan include the following:

- The retention and development of talent, including supporting our newly appointed Chancellor's Fellows.
- A sustainable growth in research income and PGR numbers to remain on, or ahead of, targets over the coming years.
- An emphasis on maintaining a high proportion of 3*/4* research outputs and impacts.
- The integration of the Institute of Photonics (IoP) in the Physics Department.
- Seeking full engagement of Departmental staff in research collaborations, KE and PGR training with the TIC project, the National Physical Laboratory (NPL), the Fraunhofer Centre for Applied Photonics, the International Max Planck Partnership (IMPP), the Scottish Universities Physics Alliance (SUPA), the evolving partnership with Stanford University (SU2P), the UK Quantum Technologies initiative, national research facilities (Central Laser Facility, Diamond etc.), the magnetic and inertial fusion networks, and the European ELI project.
- An increase in PGR numbers, achieved through building on our extensive engagement with external partners including CDTs, industry, and NPL. In addition, effort will be put into international recruitment of self-funded PGR students.
- Maximising the effectiveness of our teaching and ensuring strong recruitment at UG and PGT levels. Exploring the development of new MSc and CPD opportunities.
- Achieving future prosperity through our traditional Departmental approach, which is well described by the University's value agenda.

2. Plans for 2015-16

2.1 Renowned research quality and intensity [PMF2, PMF3, PMF5]

We are starting this planning period from an exceptionally strong position. The Department obtained the highest overall grade point average of the 41 UK physics departments submitting under the Physics Unit of Assessment in the 2014 REF. We aim to consolidate and build on this position through increased grant income, optimisation of the number of PIs and CIs, an increase in PGR numbers and the further strengthening of our research outputs.

Research spend [PMF2]

The research spend forecasting takes place on the background of a disappointing year 2013/14 for new awards. However, based on pFACT approvals the year as a whole was comparable to previous years, but applications went in late resulting in a steep decline in awards for that year. We are already seeing a recovery in 2014/15 with the award until the end of 2014 of ~£2M in 'conventional' grants, that will maintain our recent expenditure, and in addition to this, a major boost through awards totalling £7.1M from the Quantum Technology initiative.

The profile of the Department's Research Spend (income) as obtained from SUnBIRD over recent years is shown in the chart on the right. The 2014/15 data is for approximately 4 months, and so would indicate we are well on track to at least match the previous year's expenditure, totalling ~£5.6M. This is seen as our current baseline, sustainable with no further initiatives. In addition to this there will be expenditure in the region of £1.5M for the QT hubs in the current financial year and in excess of £1M pa for the remainder of the four 5-year grants.



Growth beyond that to our total Physics Department target of £8.3M in 16/17 will be achieved (and hopefully exceeded) as the financial benefits of new appointments are recorded:

- While grants have been awarded, expenditure has still to be fully recorded for some new
 professorial appointments. We will conservatively estimate that three new professors will each
 build up to an average annual spend of £250k.
- We have six Chancellor's Fellows that we will support strongly in their endeavour to build up to an average spend of order £150k pa.

In addition to this and as part of our drive towards increasing PI numbers we are stepping up support for a number of relatively junior staff, who have yet to fully exploit their grant-winning capacities. The expectation is that this would build up to an additional £250k annual sustainable expenditure.

We are expecting occasional one-off opportunities e.g. through EPSRC equipment initiatives, where we currently have \sim £5M under review. We will actively seek to target these opportunities.

Number of Pls [PMF3]

Currently all but a handful of staff in the Physics Department included in the 2014 REF are PIs on grants and a similar number not included in the REF are also PIs.

Planned work to maintain and increase the number of Pls on grants and widen the pool of grant awarding bodies to which we submit our proposals, include:

- A mentoring scheme for junior applicants, which places senior staff in the role of 'friendly critical reviewers for grant proposals.
- Active encouragement for Staff to participate in the University's Grant Challenge and Fellowship Challenge Schemes, and for successful grant winning staff to participate in the schemes, acting as 'friendly critical reviewers' and sharing good practice.
- New senior staff consolidating their Strathclyde activities by winning research funding.
- Establishing personal contacts with a wider range of grant managers.

We are encouraging young research staff to seek to establish their independent careers through personal fellowships (EPSRC, STFC, EU, Royal Soc., RSE, etc.) and see this as an important vehicle for developing new talent in our core areas of research.

Increasing PGR numbers [PMF5]

A key target for the Department is to increase the PGR population registered in Physics. As shown in the chart on the right, we have grown our PGR intake from 18 in 2010 to 34 in 2014. This exceeds our recent target of 30 pa and sees us well on the way to achieving the planning target of a population of ~130 corresponding to a sustained annual intake of ~37. Actions and plans to grow to this level in the present and future years include:



- Further engagement with CDTs in which we are partners but which are led by other institutions (Applied Photonics (Heriot-Watt), Biomedical Imaging (Edinburgh), Diamond (Warwick)). In the current academic year we have taken in 4 students but see scope for a modest increase.
- Full engagement with Fraunhofer and other external partners for jointly-funded studentships.
- Full involvement with NPL, benefitting from the NPL iCASE and University NPL studentship schemes. This represents a new and potentially significant source where we should target a sustainable annual intake of at least 5 students within the next two years.
- Staff being encouraged to apply for ERC and H2020 funds with studentships included (e.g. ETNs). The award of a single ITN would typically add at least three PGR students.
- Increase the international intake of self-funded students. There are two potential sources here:

 development of international links where full and split PGR students are an essential component in establishing bilateral relationships and ii) a more aggressive targeting of the international market from the developed world where new funding sources may be accessed (e.g. Commonwealth Scholarships). This is an area where we have limited experience and intend to exploit our REF2014. However, we are likely to see slow growth in single digits.
- A strategic approach to filling of University Tranche 1&2 studentships with the aim of securing strong candidates early. We will take a strategic approach to student-specific funding e.g. Carnegie and University Tranche 3 studentships.
- Filling of STFC and NERC quota studentships and a number of high-profile IMPP and Higgs studentships.
- By actively pursuing opportunities for nascent CDTs in our leading research areas we hope to be in a strong position if a new call for national CDTs emerges.

A student intake of around 30 represents an annual commitment to PGR students in excess of £2M. It continues to be a challenging task to achieve this and it is particularly difficult for new and junior members of staff who may not yet have connections that result in studentships or yield matching funding to University studentships.

Strengthening outputs

We will maintain and preferably improve our high level of 3*/4* publications. This will be achieved by:

- Ensuring that staff have sufficient opportunities to conduct their research including a full recognition of salary recovery in our Departmental workload model.
- Providing a Departmental support network aimed at optimising chances of having high-profile publications accepted.
- Encouraging staff to attend paper-writing challenges and information sessions with e.g. journal editors [PMF20].
- Providing support to increase the number of staff that can be returned at the 3* level in the next REF, thereby improving our research intensity.
- Monitoring progress through Pure and the ADR process.

Future strategic developments

A contributing factor to the Department's success in REF 2014 has been a significant investment in some of its strong and growing research areas. We are keen to explore the potential for continuing this approach in our current areas of strength, as well as complementing our portfolio by expanding into related fields through strategic investments in new staff and infrastructure. This has the potential for contributing significantly to all of the categories listed above. We hope to be able to start the recruitment of a 'star appointment' to Physics in 2015.

2.2 Exemplary knowledge exchange and impact [PMF8, PMF9]

Consultancy income [PMF8]

Staff are encouraged to engage with industry and exploit the opportunities for consultancies. These include long-term relationships with previous successful spin-out companies from the Department. We are also experiencing particular opportunities in the Plasma Physics area (recent £32k contract). Levels of activity and progress towards an increase are monitored through Pure and the ADR process and new opportunities identified through discussions between staff and HoD and Research Director.

Increase CPD income in 2015-16 [PMF9]

The Departmental CPD income fluctuates significantly as a major contributing activity is the organisation of international summer schools for PGR students. We are aiming to maintain at least one of these per year. Two major international schools in Quantum Dynamics and Quantum Optics in 2015 and Laser-Plasma Interactions in 2016 are scheduled to take place at Strathclyde, with funding arrangements already in place.

The Institute of Photonics will continue to run a biannual "Introduction to Lasers" course for staff at local optics companies and have expanded this to a 2-day advanced course to be held as part of the "Engage with Strathclyde" week generating in the region of £20k per event.

A new summer-school style CPD course at the MSc level and aimed at employees in the optics industry is under consideration. Market research will be conducted to assess the financial viability and sustainability of the proposition. If viable, this could be seen as a model for other areas.

We are investigating the potential for teacher CPD as the new Advanced Higher curriculum and Curriculum for Excellence come into being.

Spinout opportunities [PMF10]

Through an RSE Enterprise Fellow spinout opportunities are currently being investigated for technology relating to research in high-power microwave sources.

2.3 Outstanding teaching and student experience [PMF11, PMF12, PMF14]

<u>Recruitment</u> **[PMF11, PMF12]** - We are consistently meeting our recruitment target in our main market of Scottish students of high entrance qualifications. We expect to meet the gradual increase targeted in the coming year. In 14/15 we had 31% MD40 and 7% college leavers.

<u>Widening access</u> – The Department is actively working on setting up links with selected schools with low progression into University. We are investigating possible connections to the Children's University in order to couple in with their widening access programmes.

<u>RUK recruitment</u> – We are considering a targeted recruitment of students in England, especially in the north. We have been struggling to meet a low RUK target, but the REF result and the potential for stronger advertising of direct entry into second year should be considered. As part of our well established programme of offering all UCAS applicants the opportunity to visit Strathclyde, we will cover part of the travel costs to ensure that RUK students are not disadvantaged.

<u>Good relationships</u> – We continue to develop our good relationship with the student population and engage in a dialogue in which we welcome student feedback and explain changes implemented in response to previous feedback.

<u>NSS results</u> – Overall 2013/14 saw a satisfactory score in the NSS survey for Physics (overall satisfaction 88% and 95% for Teaching). We are continuing to develop actions to improve and increase feedback to students, such as the feedback sheets for each exam paper. We have revisited and refined our departmental feedback policy and this was issued to staff in September 2014. We will continue to monitor the progress in these areas.

<u>Retention</u> **[PMF14a]** – As reported in the annual course review we continue to experience a satisfactory retention rate of 93% for 1st to 2nd year, increasing to high 90s and 100% for later years. We actively encourage students to meet with their PDAs to discuss progress.

<u>Increase international student numbers</u> **[PMF16]** – The Department is actively engaged in developing new articulation agreements with universities in China, with the aim of increasing international UG, PGT and PGR numbers. It appears increasingly important to consider these as bilateral arrangements including collaboration in research.

Introduction of new MSc Courses – The Department is launching a new MSc in Advanced Physics from January 2015. This will be advertised to agents along with our REF result. It is hoped that this degree will build on the excellent performance of the newly introduced MSc in Applied Physics, which was launched in 2013/14. To increase the number of applications to the other degrees the Department will be re-branding the other MSc degrees to include the keyword 'Physics'. In 13/14 we achieved a high conversion rate from applications to offers and attribute this to the rapid response rate of the Department's selection team. This will be continued and if possible improved further. The Department is also in discussion with the Photonics industry over the development of an "Industrial Photonics" MSc.

2.4 Thriving international profile and reputation [PMF 17, PMF18]

Our strategy to continue to enhance our international profile and reputation includes:

- Continuing to play a leading role in the International Max Planck Partnership and the SU2P Alliance with Stanford, with expansion of the Stanford connection to Quantum Technology.
- Having many staff with significant active roles in international research consortia, e.g., ELI, international fusion research (ITER and IFE projects), muon project (MICE), an international collaborative project (QCLES) in Quantum Computing (University of Pittsburgh), and a Multidisciplinary University Research Initiative in ultracold atoms (MIT) and funded by the US Air Force Office of Scientific Research.
- Investigating the potential for joint PhD programmes with leading Russian, Saudi and Chinese universities.
- Diverse international student population in particular for PGT (>10 countries).
- More than half the academic staff is from outside the UK (cf. with Russell Group ~35%).
- A twice annual recruitment trip to China, visiting articulation partners in Beijing, Nanjing, Shanghai and potential new partners in Suzhow, Wuhan and ZJUT in Hangzhou.

2.5 Operational excellence [PMF20]

- The ADR process will be used to focus on the responsibility of the individual members of the Department in achieving our common targets.
- The regular upkeep of Pure is emphasized, enabling an easy overview of Departmental position with regard to outcomes and developing impact.
- We are currently exploring the potential for streamlining the administration e.g. aiming at eliminating any duplication of effort in the IoP and the rest of the Department.
- We are fully engaged with the introduction of new systems in the University (e.g., Agresso), with the expectation that this will result in a workload reduction of about half an admin FTE once it is up and running.
- Maximise the benefit of the transfer of staff from Colville to John Anderson Building while remaining integrated with staff based in the TIC building.
- The Department is preparing for Quinquennial Faculty Review Spring 2015.
- Work continues to promote equality and diversity. The departmental Athena Swan Bronze Award was obtained in 2014.
- The Departmental risk register is reviewed regularly and is up-to-date.