IOP Institute of Physics

Submission to the Migration Advisory Committee into EEA-workers in the UK labour market

27 October 2017

The Institute of Physics is a leading scientific membership society working to advance physics for the benefit of all. We have a worldwide membership ranging from enthusiastic amateurs to those at the top of their fields in academia, business, education and government. Our purpose is to gather, inspire, guide, represent and celebrate all who share a passion for physics. And, in our role as a charity, we aim to ensure that physics delivers on its exceptional potential to benefit society. Alongside professional support for our members, we engage with policymakers and the public to increase awareness and understanding of the value that physics holds for all of us. Our subsidiary company, IOP Publishing, is a world leader in scientific communications, publishing journals, eBooks, magazines and websites globally.

The IOP welcomes the opportunity to submit evidence to the Migration Advisory Committee inquiry into EEA-workers in the UK labour market. Our written evidence concerns the availability of workers in physics so that UK universities and businesses can appoint the best candidates, irrespective of where they are from.

Summary

- **Workers from non-UK EU countries make up 26% of all academic staff in UK physics departments. A further 18% of staff are from outside of the EU. Non-UK EU workers make up 31% of postdoctoral researchers and 18% of professors.**
- **Research is a global enterprise and UK research is extremely collaborative: nearly one in five publications submitted to the Research Excellence Framework in 2014 in physical sciences had an EU collaborator. 51.3% of all UK articles in 2014 resulted from international collaboration, an increase of 6.7% from 2010. Reports from our members[1] have suggested that UK collaborators are already being left out of collaborative research bids due to the risks of Brexit, and this will have an impact on the research base and the strength of UK physics.**
- **Active researchers in the UK are highly mobile. The migration of highly skilled workers and the mobility of UK researchers has a positive impact on UK research and productivity and plays a significant role in maintaining the UK's reputation as world leading in science and research.**

[1] IOP Blog. *Physicists share their Brexit concerns.* http://www.iopblog.org/physicists-share-their-brexit-concerns/

- **The UK has a STEM skills gap and a specific problem with the supply of physics and engineering professionals arising from the shortage of physics teachers.**
- **The impact of the current STEM skills gap is mitigated by EEA and non-EEA migration. There are concerning gaps in the STEM skills pipeline as demand for graduates is set to increase. EEA migrants will be needed at least in the medium term to fulfil Government aims of increasing productivity and supporting the development of emerging technologies.**
- **More than two million people are employed in physics-based businesses, which make a £177 bn GVA contribution to the UK economy. The productivity of employees in physics-based businesses is more than double the UK average.[2] Disruptions to the workforce as a result of a new immigration system would adversely impact the UK economy.**
- **A diverse workforce, where staff are selected as best for specific roles, regardless of where they originate, is more productive. This will benefit universities, businesses and the UK economy more broadly. One survey of researchers found that the top benefit of immigration listed by respondents was that it supported international collaboration,[3] showing that migration benefits UK workers.**
- **Short-term, fixed-term and long-term migration of EEA and non-EEA workers is essential for UK physics as researchers can be required to travel to the UK for conferences, visit institutions or facilities for research and collaborations, and to take up fixed-term contracts as well as permanent roles.**
- **Future immigration policies must ensure that the UK attracts talent of the future as well as those who are already operating at elite levels. The policies must be perceived as welcoming and inviting, or skilled workers may choose to work elsewhere.**

EEA Migration trends

Please provide evidence on the characteristics (e.g. types of jobs migrants perform; skill levels, etc.) of EEA migrants in your particular sector/local area/ region. How do these differ from UK workers? And from non-EEA workers?

EEA migrants in universities and physics-based businesses benefit the UK economy in terms of productivity, innovation and the competitiveness of the UK science base. The UK is world-leading in areas from nuclear fusion to the life sciences, and continuing to develop its strength across other areas of science. The ability of the UK to continue punching above its weight, in terms of population and R&D expenditure compared to outputs and citations,[4] depends upon being able to recruit the people with the right skills, expertise and potential, regardless of where they are from.

[2] IOP, 2017. *The role of physics in driving UK economic growth and prosperity.* http://www.iop.org/publications/iop/2017/page_70262.html
[3] CaSE, 2016. *Immigration: Keeping the UK at the heart of global science and engineering*. http://www.sciencecampaign.org.uk/resource/caseimmigrationreport2016.html
[4] Elsevier, 2017. *International comparative performance of the UK research base*. https://www.elsevier.com/__data/assets/pdf_file/0018/507321/ELS-BEIS-Web.pdf

EEA-workers in the UK make a vital contribution to the strength and effectiveness of the UK science base. UK institutions benefit from the ability to attract top talent from the EU to work and study in UK universities. Nearly one in five publications submitted to the Research Excellence Framework in 2014 in physical sciences had an EU collaborator.[5] The IOP has conducted research into the most important countries for the UK for collaboration in physics research – several being EU countries, including Germany, Italy, France and the Netherlands.[6]

In UK university physics departments, 31% of postdoctoral researchers, 26% of all academic staff and 18% of professors are from non-UK EU countries. Recent research has found that active researchers in the UK are highly mobile – nearly half (49.3%) of researchers considered active were transitory – meaning they had worked in the UK for less than two years or stayed outside of the UK for a similar period. The same report found that almost three quarters (72%) of active UK researchers had published at least one article under a non-UK affiliation in the period 1996 – 2015. The report notes that this does not mean the rest were not mobile; they may have travelled and collaborated internationally without this leading to a peer-reviewed publication. The UK currently benefits from its active participation in this powerful global network of researchers.

In industry, workers from EEA countries are recruited for their specific skillset, which may have been facilitated by having previously been resident in the UK or studied at a UK university. This may differ from non-EEA workers, who may be less likely to be hired at a small or medium company which has restrictions or cannot afford to sponsor a visa.[7]

To what extent are EEA migrants seasonal; part-time; agency-workers; temporary; short-term assignments; intra-company transfers; self-employed? What information do you have on their skill levels? To what extent do these differ from UK workers and non-EEA workers?

International mobility is common in science and research and staff can move to the UK temporarily (e.g. for a conference, accessing a research facility or examining), for a fixed-term period attached to a research project, as well as for a permanent role in a UK institution. These roles will often be considered highly-skilled but this may not be reflected in their salary.

Postdoctoral researchers are an example of a highly mobile part of the physics workforce. After completing a PhD, it is common to take fixed-term postdoctoral roles in a university prior to obtaining a permanent position. In UK physics departments alone, this amounted to 345 staff in the 2015-2016 academic year from non-UK EU countries, 330 from non-EU countries and a further 435 from the UK. The number of postdoctoral researchers from all domiciles has been rising over the last few years (see annex). Research by the National Academies found that 57% of researchers in their sample had moved from their PhD

[5] EPSRC, 2015. *Investing in excellence, delivering impact for the UK: Insights from the Research Excellence Framework 2014*: https://www.epsrc.ac.uk/newsevents/pubs/investing-in-excellence-delivering-impacts-for-the-uk-summary-report/

[6] IOP, 2014. *The UK's performance in physics research.* http://www.iop.org/publications/iop/2014/file_63082.pdf

[7] RAND Europe, 2017. *International mobility of researchers: perspectives from industry*. https://royalsociety.org/~/media/policy/projects/international-mobility/international-researcher-mobility-industry.pdf

institution to take a postdoctoral position elsewhere (although not necessarily abroad).[8] The reasons for this might be for funding opportunities, benefiting their career and available research positions.

The IOP will be continuing to monitor the proportion of postdoctoral researchers and all levels of staff over the next few years with a particular interest in any changes to EEA-workers.

Are there any relevant sources of evidence, beyond the usual range of official statistics, that would allow the MAC to get a more detailed view of the current patterns of EEA migration, especially over the last year?

Not that we are aware of.

Have the patterns of EEA migration changed over time? What evidence do you have showing your employment of EEA migrants since 2000? And after the Brexit referendum? Are these trends different for UK workers and non-EEA workers?

A survey of 432 staff in academic physics departments conducted by the IOP in 2008[9] found that 37.5% of staff were from non-UK EU countries, with a further 17.8% from non-EU countries. More recently, analysis of data from the Higher Education Statistics Agency (HESA) found that the total number of academic staff in UK physics departments rose over the 2012-16 period, including a rise in the number of staff from non-UK EU countries and non-EU countries. The proportion of staff from the UK has dropped from 61% to 56% during this period. There were 1055 staff from non-UK EU countries, making up 26% of total staff. There were 725 from non-EU countries, making up a further 18% of the total. This has shown a small upward trend over the last five years – see the Annex for further information.

Subject-level data from HESA for the 2016-17 academic year will be available in spring 2018. While we expect some variability year-to-year owing to some staff being on fixed-term contracts for research projects and the international mobility of researchers, we will be monitoring the data closely to see any effects of the UK leaving the EU on the makeup of staff in UK physics departments.

Employment of EEA migrants is difficult to measure in industry as the data are not always collected. Some companies may not hire those who do not have a right to work in the UK already, (i.e. non-EEA nationals) as they do not have a licence to do so or cannot afford the costs of sponsoring a visa.[10]

Have you conducted any analysis on the future trends of EEA migration, in particular in the absence of immigration controls?

[8] The UK National Academies, 2017. *The role of international collaboration and mobility in research*. https://royalsociety.org/topics-policy/projects/international-researcher-mobility/role-of-international-collaboration-mobility-in-research/

[9] IOP, 2010. *Survey of Academic Appointments in physics 2004-2008*. http://www.iop.org/publications/iop/2010/page_38419.html

[10] RAND Europe, 2017. *International mobility of researchers: perspectives from industry*. https://royalsociety.org/~/media/policy/projects/international-mobility/international-researcher-mobility-industry.pdf

Not to date.

Have you made any assessment of the impact of a possible reduction in the availability of EEA migrants (whether occurring naturally or through policy) as part of your workforce? What impact would a reduction in EEA migration have on your sector/local area/region? How will your business/sector/area/region cope? Would the impacts be different if reductions in migration took place amongst non-EEA migrants? Have you made any contingency plans?

A reduction in the availability of EEA migrants in UK physics would have consequences for both academia and industry, at all levels. The UK has a STEM skills gap and a specific problem with the supply of physics and engineering professionals arising from the physics teacher shortage.[11] The IOP is working to ensure that all young people receive an excellent experience of learning physics, so that anyone with an interest and aptitude to continue with the subject is able to do so.[12] UK research as a whole would lose out without EEA migration; the ability of EEA migrants to take up temporary or permanent roles is important as they may be the best placed for the job.

The impact of the current STEM skills gap is presently mitigated by migration from both EEA countries and internationally.[13] Any reduction in the availability of EU workers in UK physics would increase the impact of this gap, as non-UK EU nationals make up 26% of staff in UK physics departments. A further supply gap in industry could open up as businesses can easily recruit non-UK EU workers given their right to work in the UK[14], especially if someone with a certain skillset or niche area of expertise is required.

If universities and businesses are less easily able to recruit from outside of the UK there will be consequences for improving UK productivity, in terms of both the skills gap and the value and impact of UK research. Maintaining world-class UK higher education institutions will be more difficult with a smaller and less diverse pool of talent. Additionally, nearly one in five publications submitted to the Research Excellence Framework in 2014 in physical sciences had an EU collaborator.[15] The international collaborative environment adds value to UK research, as the network brings in a greater share of results than just the research happening in the UK alone. Having the best talent working in the UK adds to the direct benefit of leading the research, which strengthens the UK research base. Reports from our members[16] have suggested that UK collaborators are already being left out of collaborative research bids due to the risks of Brexit, and this will have an impact on the research base and the strength of UK physics.

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[11] IOP, ASE, RSB, RSC and RS response to the Education Select Committee on the supply of teachers, 2015. http://www.iop.org/policy/consultations/file_66631.pdf

[12] IOP Education: Policy and Projects . http://www.iop.org/publications/iop/2016/page_68328.html

[13] House of Commons Science and Technology committee, 2017. *Industrial Strategy: Science and STEM skills.* https://publications.parliament.uk/pa/cm201617/cmselect/cmsctech/991/991.pdf

[14] RAND Europe, 2017. *International mobility of researchers: perspectives from industry*. https://royalsociety.org/~/media/policy/projects/international-mobility/international-researcher-mobility-industry.pdf

[15] EPSRC, 2015. *Investing in excellence, delivering impact for the UK: Insights from the Research Excellence Framework 2014*. www.epsrc.ac.uk/newsevents/pubs/refreport2015/

[16] IOP Blog. *Physicists share their Brexit concerns.* http://www.iopblog.org/physicists-share-their-brexit-concerns/

The impact would also be felt in the physics workforce, particularly around the areas being focused on in the Government's sector deals. The industrial strategy green paper[17] states the intention of focus in the areas of manufacturing on ultra-low emission vehicles, adopting digital technology across advanced manufacturing and increasing the UK's competitiveness in the nuclear sector. These ambitious goals will require a talent pipeline to ensure a workforce equipped for these roles. For example in the nuclear sector, this analysis has been undertaken by the 2017 Nuclear Workforce Assessment. The assessment identifies current and future demand, which is expected to rise to 100,619 from the current level of 87,560.[18] It also identified the top skills that are listed as fragile and not matching the trainee pathways in the UK.

Recruitment practises, training and skills

Please provide evidence on the methods of recruitment used to employ EEA migrants. Do these methods differ from those used to employ UK and non-EEA workers? What impact does this have on UK workers? Have these methods changed following the Brexit referendum?

Do recruitment practices differ by skill-type and occupation?

What are the advantages and disadvantages of employing EEA workers? Have these changed following the Brexit referendum result?

There are a number of mechanisms which support international mobility in the EU that can be a method of recruitment for attracting EEA nationals to UK universities, and vice versa. Firstly, the European Research Area (ERA), which aims to make the national research system allow for better flows of knowledge, technology and people. Its aims include supporting an open labour market for researchers and encouraging international cooperation. Framework programmes are a major contributing factor to mobility as well as other EU mechanisms including Marie-Skłodowska Curie actions. Out of European destinations, the UK hosted the most fellows (1166) between 2014 and 2016.[19] Another mechanism is European Research Council (ERC) grants, which are aimed at early career scientists with 2-7 years of experience since completing their PhD. The UK also hosts the largest number of ERC grant holders.[20]

A government report from 2014[21] found that there are concerning weaknesses in the STEM skills talent base and acknowledged that a strong talent base is vital for an effective science and innovation system. The report found that there was not enough domestic talent (in terms of the number of masters/PhD graduates working in research) to exploit science and innovation, relative to leading comparator countries. While Government action in addressing

[17] BEIS, 2017. *Building our Industrial strategy*. https://beisgovuk.citizenspace.com/strategy/industrial-strategy/supporting_documents/buildingourindustrialstrategygreenpaper.pdf
[18] Nuclear Skills Strategy Group, 2017. *Nuclear Workforce Assessment 2017.* http://www.cogentskills.com/media/76523/nwa2017_public.pdf

[19] EC, 2017. *20 years of Marie Skłodowska-Curie actions*. https://h2020.org.tr/sites/default/files/u390/dg.pdf
[20] *ERC, 2017. ERC - A success story for Europe.* https://erc.europa.eu/sites/default/files/document/file/ERC10_Press_pack.PDF
[21] BIS, 2014. *Insights from international benchmarking of the UK science and innovation system.* https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/277090/bis-14-544-insights-from-international-benchmarking-of-the-UK-science-and-innovation-system-bis-analysis-paper-03.pdf

the UK STEM talent pipeline will help mitigate this in the longer term, the ability to easily recruit talent from outside of the UK has mitigated the severity of the shortage to date.

While the skills shortage contributes to the need to bring in skilled workers from overseas, it is not the sole reason. International mobility is a feature of research careers and brings large benefits to the productivity of science and engineering in academia and industry. In a survey of scientists and engineers conducted by the Campaign for Science and Engineering, 'supporting international collaboration' was the most highly cited benefit of immigration. This was followed by 'advances UK science' and 'fills a skills gap.'[22] Freedom of movement allows recruiters to attract the best candidates for roles regardless of where they are from. Where researchers from abroad have been hired as the best candidate from a larger pool, it improves the quality of UK science, even if there is 'enough' talent in the UK.

International researchers broaden the scientific and cultural experience of UK physics departments. They open up opportunities for new collaborations and add scientific and cultural experience for both EEA and UK workers. They bring contacts, leading to new collaborations and greater research output; 51.3% of all UK articles in 2014 resulted from international collaboration, an increase of 6.7% from 2010.[23]

In manufacturing, businesses rely on the EEA-workers to fill low, mid and highly skilled roles. A report by EEF found that for 64% of employers an insufficient number of UK nationals apply for jobs within the industry.[24] For some small and medium enterprises, visa policies can be seen as a deterrent and some small companies may not recruit from outside of the EU because they do not have a licence to sponsor applicants for visas. However, research has found that companies do not always monitor numbers of EEA staff as they do not currently need to do so.[25] In small numbers of specialised roles, recruiters may look to hire workers who have been trained at specific institutions from around Europe.

Policies must ensure that the UK attracts talent of the future as well as those who are already operating at elite levels. Future immigration policy needs to be perceived as welcoming and inviting, or skilled workers may choose to work elsewhere.

To what extent has EEA and non-EEA migration affected the skills and training of the UK workers?

In academia, the diversity of the workforce adds value to UK workers who learn from the incoming staff and benefit from their input. Researchers coming to work in the UK extend networks leading to collaborative research efforts, outputs and the knowledge base. In

[22] CaSE, 2016. *Immigration: Keeping the UK at the heart of global science and engineering*. http://www.sciencecampaign.org.uk/resource/caseimmigrationreport2016.html
[23] Elsevier, 2017. *International comparative performance of the UK research base*. https://www.elsevier.com/__data/assets/pdf_file/0018/507321/ELS-BEIS-Web.pdf
[24] EEF, 2017. *Making migration work for manufacturers: Accessing skills in a post-Brexit world.* https://www.eef.org.uk/resources-and-knowledge/research-and-intelligence/industry-reports/making-migration-work-for-manufacturers
[25] RAND Europe, 2017. *International mobility of researchers: perspectives from industry*. https://royalsociety.org/~/media/policy/projects/international-mobility/international-researcher-mobility-industry.pdf

industry, workers hired from EEA and non-EEA countries will have been chosen as they are best for the job and their skills exceed those of UK workers, which is good for the business and the UK economy. A report by Elsevier[26] suggested that the sustained upward trend in UK science productivity may be correlated to increasing levels of international collaboration.

In terms of training, students are taught by staff at universities who are at the top of their field in the subject. To enable this, teaching staff are recruited from all over the world. In industry, UK workers may be trained by EEA citizens, for example, by researchers who have been brought in for their knowledge, skills or experience in a specific research area. The mobility between academia and industry also contributes to the training of workers as a result of knowledge exchange; between 1996 and 2015, 12,500 staff came to the UK from industry into academic roles, and 13,650 arrived from academic roles to take industry roles in the UK. The numbers leaving the UK and moving between sectors are of the same magnitude, with almost 12,000 from industry to academia and nearly 15,000 to industry from academia.[27]

How involved are universities and training providers in ensuring that the UK workforce has the skills needed to fill key roles/roles in high demand in your sector? Do you have plans to increase this involvement in the future?

The 2016 Wakeham review[28] found that graduate employability was affected by concerns from employers that graduates of certain subjects, including physics, did not meet their needs as they lacked 'soft' skills and commercial awareness, experience or career planning skills. Physics education has been shown to be aligned to skills needs; an IOP survey (referenced in the Wakeham review) found that 67% of physics courses offer a placement in industry as part of the course, improving outcomes for physics graduates and helping to ensure that the demand in the sector is being filled.

The review recommended that employer and the higher education sector engagement can play a role in better aligning the supply and demand for high level STEM skills and although initiatives like work placements improve this, more can be done. Indeed, physics education processes are still improving this alignment, with programmes such as the SEPnet summer placement scheme[29] and the HEFCE funded White Rose Industrial Physics Academy[30] linking graduates to industry employers. However, even if the alignment between graduate supply and demand was optimal, there would remain a significant requirement for ongoing immigration to improve the quality, quantity and diversity of skills. The changing nature and increasing demand of STEM jobs mean that we will always need incoming talent.

[26] Elsevier, 2017. *International comparative performance of the UK research base*. https://www.elsevier.com/__data/assets/pdf_file/0018/507321/ELS-BEIS-Web.pdf
[27] Elsevier, 2017. *International comparative performance of the UK research base*. https://www.elsevier.com/__data/assets/pdf_file/0018/507321/ELS-BEIS-Web.pdf
[28] BIS, 2016. *Wakeham review of STEM degree provision and graduate employability*. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/518582/ind-16-6-wakeham-review-stem-graduate-employability.pdf
[29] South East Physics Network. *SEPnet Summer Placement Scheme*. http://www.sepnet.ac.uk/students-employers/careers-information/summer-placement-scheme/
[30] White Rose Industrial Physics Academy. http://wripa.ac.uk/

The demand for STEM graduates is expected to increase. The 2016 CBI survey[31] found that 90% of engineering, science and hi-tech businesses are expecting an increased demand for STEM skills in the next 3-5 years as businesses require increasingly skilled employees as technologies, products and services evolve. The UK should make use of existing STEM skills where they can be found to meet current demand to ensure the UK does not lag behind in productivity and research and innovation.

The Government is taking steps to create new routes into STEM careers in the UK and increase the talent pipeline for the UK workforce. There are plans to create three million new apprenticeships by 2020[32] and to reform technical education with new 'T-levels'. The Government's T-levels action plan[33] lays out plans for new qualifications to contribute to increasing the UK's economic productivity. These reforms should increase parity between academic and technical routes and reduce complexity in the further education system and the skills pipeline. The Government should work with industry on the development of T-levels to ensure that the content of courses align with occupations in the sector and meet the requirements for skilled employment, higher level technical training or a degree.

Both EEA and non-EEA migration will need to rise as long as there is a shortage of STEM graduates from the UK. The high demand for STEM graduates was documented in the Wakeham review, which recommended that careers advice play a stronger role in STEM degrees to help physics graduates understand how the skills and knowledge developed during their degree can translate to the job market. There is difficulty in building the domestic pipeline of skills and predicting what new skills will be needed in the future. Being able to rely on hiring someone from the EEA or outside of the EEA is valuable if the skillset for a particular role cannot be found from someone trained in the UK. Also, it is not a given that UK scientists stay in the UK for the duration of their career.

How well aware are you of current UK migration policies for non-EEA migrants? If new immigration policies restrict the numbers of low-skilled migrants who can come to work in the UK, which forms of migration into low-skilled work should be prioritised? For example, the current shortage occupation list applies to high skilled occupations; do you think this should be expanded to cover lower skill levels?

The new immigration system can be seen as an opportunity to put right the aspects of the system which are currently limiting, as the current system will not work if simply applied to EEA-nationals. This includes the cap on tier 2 visas, the salary cap and the costs and bureaucracy of preparing an application. Tier 1 (exceptional talent) visas are relatively under-used currently[34] but have a cap of 1,000 across all disciplines which would be far too low if it includes EEA-nationals. We look forward to the consultation later this year on the features of a new immigration system.

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[31] CBI 2016. *The right combination. CBI/Pearson Education and skills survey 2016.* http://www.cbi.org.uk/cbi-prod/assets/File/pdf/cbi-education-and-skills-survey2016.pdf

[32] HM Treasury, 2015. *Fixing the foundations, creating a more prosperous nation.* https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/443897/Productivity_Plan_print.pdf

[33] Department for Education, 2107. *Post 16 technical education reforms – T-level action plan.* https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/650969/T_level_Action_Plan.pdf

[34] CaSE, 2016. *Immigration: Keeping the UK at the heart of global science and engineering*. http://www.sciencecampaign.org.uk/resource/caseimmigrationreport2016.html

The salary proxy in the current immigration system for non-EEA migrants is not applicable for many jobs and does not recognise skill specialisms. The raised salary threshold of £30,000 is higher than some highly-skilled early career physics roles are paid; for example, specialist science technicians and postdoctoral researchers. Some researchers are hired for a specific project and their salary is connected to specific funding, so the salary cannot be guaranteed or controlled by the institution. These categories might be mistakenly identified as low skilled under this system. There are other important roles in science that would not be considered highly-skilled nor meet the salary threshold, such as technicians and skilled construction workers, which cannot be immediately replaced by UK workers. Any revisions of the shortage occupation list should explore these types of roles.

Economic, Social and Fiscal Impacts

What are the economic, social and fiscal costs and benefits of EEA migration to the UK economy? What are the impacts of EEA migrants on the labour market, prices, public services, net fiscal impacts (e.g. taxes paid by migrants; benefits they receive), productivity, investment, innovation and general competitiveness of UK industry?

We do not have specific evidence relating to the fiscal contribution to the UK economy made by the EEA research workforce, but as they are of working age and in highly skilled, above average-wage jobs, their net contribution will be higher than the average immigrant. Recent work commissioned by the IOP found that more than two million people are employed in physics-based businesses in the UK. In terms of their productivity, each person contributed an average of more than £88,000 per year in value added – this is more than double the UK average.[35] EEA workers in physics and science have a positive impact on the labour market, productivity, investment, innovation and competitiveness of the UK science base and wider economy.[36] For example, if they bring partners with them who also get a job they are contributing to the economy. EEA-workers bring in expertise as well as a different cultural perspective to the UK. In academia, this can benefit both the individual as well as the whole department.

International mobility not only benefits the higher education sector but the UK and global economy more broadly – it is important in industry as well as in academia. There is evidence that researchers are also mobile between academia and industry, both within the UK and internationally.[37] The movement of researchers between academia and industry is an example of the collaborative nature of the UK research base that contributes to the innovation, investment and competitiveness of UK industry. Both universities and research institutions play a key role in generating innovation. The UK performs well in terms of field-weighted citation impact in key areas of emerging technologies, such as advanced materials and nanotechnology, big data and energy and storage.[38]

[35] IOP, 2017. *The role of physics in driving UK economic growth and prosperity.* http://www.iop.org/publications/iop/2017/page_70262.html
[36] CaSE, 2016. *Immigration: Keeping the UK at the heart of global science and engineering*. http://www.sciencecampaign.org.uk/resource/caseimmigrationreport2016.html
[37] Elsevier, 2017. *International comparative performance of the UK research base*. https://www.elsevier.com/__data/assets/pdf_file/0018/507321/ELS-BEIS-Web.pdf
[38] Elsevier, 2017. *International comparative performance of the UK research base*. https://www.elsevier.com/__data/assets/pdf_file/0018/507321/ELS-BEIS-Web.pdf

The ambitious plans set out by the Government in the industrial strategy include goals to raise productivity and drive growth across the country. This will require international mobility to allow scientists to move between academia and industry flexibly, as well as around the world, so that the UK remains competitive in these important areas.

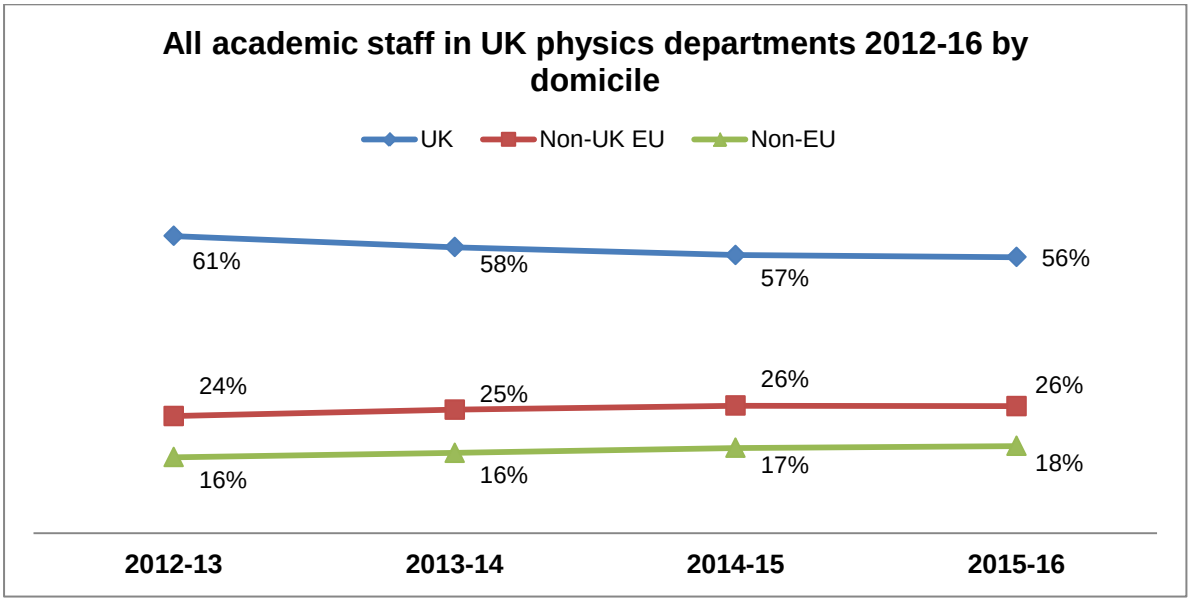
A new immigration system should be grounded on the evidence that ensures UK universities and businesses continue to thrive and can recruit and retain people with the skills that they need wherever they are from. It should support the UK as a destination of choice for qualified international students, academic, technical and research talent within universities, and allow researchers and university staff to come to the UK, regardless of their nationality. There should be an appropriate transitional arrangement to avoid skills shortages and plans for how the UK can mitigate losses after the UK leaves the EU.

Annex

Domicile of staff in UK physics departments in the 2015-16 academic year	UK	Non-UK EU	Non-EU
Postdoctoral researchers	39.1%	31.1%	29.8%
All academic staff	56.3%	25.9%	17.8%
Professors	71.8%	18.4%	9.8%

	Proportion of all academic staff from non-UK EU countries in physics departments in the 2015-16 by nation.
England	25.1%
Scotland	30.4%
Wales	23.5%
UK (includes N.I.)	25.9%

Proportion of university staff in UK physics departments from non-UK EU countries from 2012-16.	2012-13	2013-14	2014-15	2015-16
Postdoctoral researchers	30.5%	31.4%	33.8%	31.1%
All academic staff	23.9%	25.2%	26.0%	25.9%
Professors	15.5%	17.2%	17.2%	18.4%



Percentages may not always round to 100% due to rounding.

Source: HESA