STFC input to the “European Strategy for Particle Physics” related to Innovation/Technology Transfer, Knowledge Exchange

The infrastructure and research related to Particle Physics plays an important role in creating a more sustainable society by actively pushing the frontiers of human understanding. Whilst positively contributing to the EU’s social and economic growth through innovation and Knowledge Transfer of related technology and research. In this short paper STFC outlines its innovation strategy in the context of Particle Physics and its role in maximising the economic and social impact vital in mobilising inventive capacity of the UK.

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STFC input to the “European Strategy for Particle Physics” related to Innovation

The Particle Physics community sets out to resolve some of the most ambitious and challenging scientific questions facing the world today, such as ‘How did the Universe begin and evolve?’, and ‘How do stars and planetary systems develop?’ To respond to these questions, the Particle Physics community develops and exploits frontier research, through programmes of activities in universities and national laboratories, and working internationally through a wide range of long-term collaborative research projects.

It is research which seeks to understand the Universe from the tiniest constituents of matter and creates impact on a very tangible, human scale. From cancer treatment to airport security, to hydrogen powered cars, energy generation and the visualisation of big data, The Particle Physics community’s contribution is felt in many aspects of daily life.

The infrastructure and research related to Particle Physics plays an important role contributing to economic growth and a more sustainable society by actively pushing the frontiers of human understanding. STFC’s role in delivering world-leading science facilities and programmes for industrial and academic research is vital in mobilising the inventive capacity of the UK.

Creating high-value jobs and high-technology businesses are among the UK’s key objectives with respect to Particle Physics. Through our activities, STFC develops and exploits frontier research not only in Particle Physics but also in Astronomy, Nuclear Physics, and Space Science. We have created three new themes in our strategy to drive our focus on world-class innovation: the first aims to improve the application of our advanced technology to solve business challenges; the second to use the power of data-intensive science to enhance productivity; and the third to begin the next phase of growth of our successful research and innovation campuses.

We will also strengthen our partnerships with established businesses and other partners to respond to specific industrial challenges, enabling them to exploit our facilities to enhance their international competitive advantage. Together these activities will create an innovation ecosystem where new and developing high-tech companies can grow and flourish, developing better products and services. Translating discoveries into practical applications and exploitable outcomes, and developing research and innovation provides novel products for industry, new ventures, and high-growth businesses.

Our annual STFC Impact Report https://stfc.ukri.org/files/stfc-impact-report-2017 demonstrates the progress we are making. Through the multifaceted nature of our science and research programmes we have developed a range of approaches and support mechanisms to actively enhance and drive innovation, in all its forms. Companies are using ISIS Neutron Source to help determine whether their critical electronic components could be adversely affected by cosmic rays by accessing a new dedicated beamline. Simulation and analysis software codes, developed to support the life sciences and material experiments carried out on our particle accelerators, are now making their way into the first wave of Artificial Intelligence and Machine Learning suites of industrial software services and products. The knowledge gained from our detector work for high speed imaging is used in chip and process design and modelling for mobile phone, camera and microscope technologies. We develop advanced technology to tackle the challenges of frontier research which can then be applied to challenges in other sectors; for example, for cargo security scanners and medical imaging.

STFC supports Particle Physics innovation from the very early stages, fostering novel ideas and spinning-out new ventures. Our business incubation programme with CERN provides tailored

support to meet the needs of start-up enterprises in sectors such as biomedicine, energy and security.

STFC sits on several European innovation and knowledge transfer networks, including HEPTech, a technology transfer network where organisations that host large scale science facilities meet to share best practice and industrial brokerage in technology transfer, and the Knowledge Exchange Network, which supports the dissemination of knowledge and skills within the Particle Physics research community. In addition, STFC plays an important role in promoting opportunities for UK companies to win commercial contracts from international science facilities and organisations, such as CERN, ESRF, ESS and ILL, ensuring a return for UK businesses from the government's global Particle Physics investments. Over the past 10 years, UK companies have won over £220 million in contracts from our international facilities and collaborations. Our ambition is to deliver far more.