



# Physics: investing in our future

Powering the new industrial era

Throughout history, physics has transformed our world. From fibre optic communications to magnetic resonance imaging, UK physics has been indispensable to many of the world's most impactful and successful innovations.

**The UK is leading the world in physics research**

**95%**

of physics outputs assessed in the 2021 Research Excellence Framework were rated as

**'internationally excellent'**  
or **'world leading'**

**The evidence shows us that the government's policies are having a positive effect on business R&D**

**£1**

of tax relief claimed through the RDEC scheme for large businesses generates

**£2.40 - £2.70**

of additional R&D expenditure

**As a result, physics-based businesses are also major contributors to private sector R&D**

**1/3**

of total private R&D expenditure in the UK comes from businesses that rely most strongly on physics research

**£8.9bn**

**And physics businesses are also major contributors to the economy**

In 2019 alone, physics directly contributed

**£229bn**

to the economy, sustaining more than

**2.7m FTE jobs**

**Our R&D blueprint sets out how the physics R&D system can be strengthened. Find out more:**



**But physics innovators are doing this in a climate of uncertainty, against a backdrop of significant challenges for industry, including:**

- **Limited incentives for translational research**  
The current R&D system creates few incentives for early-stage researchers to engage with late-stage developers: a cultural shift is needed to encourage greater focus on translating excellent ideas into real-world impact.
- **Difficulty accessing finance**  
The public funding landscape is complex and perceived as a barrier to accessing support.
- **Poorly targeted tax incentives**  
The scope of qualifying expenditure should be widened to include capital expenditure, staff training and development costs.
- **Difficulty accessing knowledge, skills and facilities**  
Skills shortages and a lack of suitable equipment and facilities are a barrier to physics innovators.

**As a result, over the last five years:**

**66%**

**have already reported suspending or delaying R&D activities because of skills shortages**

**70%**

**report that, without public funding for R&D/innovation, their activity would not take place**

**And over the next five years, only:**

**59%**

**expect their R&D/innovation spending to increase**

**To avoid falling behind, the UK needs a clear, comprehensive and long-term vision for R&D, which instils confidence among researchers and innovators, and unleashes ingenuity wherever it is found.**

**If we take action and invest in physics now, we can secure a place at the forefront of the new industrial era.**

**We recommend that government be guided by the following principles:**

1. The UK needs a clear, comprehensive vision for R&D and a stable policy environment, to build confidence among the research community and potential investors
2. R&D funding must be long-term and sustainable, to enable people and disruptive ideas to flourish and drive tomorrow's breakthroughs
3. Funding and governance processes must recognise and nurture a broader range of excellence across all types of institution and all stages of research
4. Approaches to career progression and skills development must be versatile enough to prepare people to succeed in a variety of R&D careers, to foster innovation across the whole economy
5. Learning and working cultures must be welcoming and inclusive to people from all backgrounds, to build a thriving, diverse physics R&D workforce

By making these changes and building a thriving physics R&D system, we can deliver transformative benefits in every part of the UK - delivering on the UK's ambition to become a global science superpower, all while levelling up the country.

The UK is at a critical juncture. International competitors are already significantly scaling up their R&D efforts, and a new wave of innovation enabled by physics is set to break. It promises zero-carbon energy generation, radically accelerated drug discovery, self-repairing infrastructure, and myriad other benefits.