

Promotion of the Large Hadron Collider project in the UK

1 Background

When CERN's Large Hadron Collider (LHC) begins to operate in 2007, it is likely to bring particle physicists the most exciting experimental results for a generation. It is crucial that people outside particle physics share this excitement. In order to ensure that STFC makes the most of this opportunity, we recommend a four-year programme of carefully targeted initiatives that will verifiably increase both public knowledge and support for this branch of physics. We shall also endeavour to inspire young people and thereby increase recruitment to undergraduate physics courses. This document outlines the proposed programme; details are given in the appendices.

2 Messages and target audiences

The principal messages that we wish to communicate about the project are:

- 1 This extraordinarily ambitious facility – one of the biggest in the history of science – seeks to shed light on some of the most fundamental questions in science
- 2 It is an exciting international venture that involves thousands of people from dozens of countries collaborating harmoniously; the UK has a leading role
- 3 There are valuable technological spin-offs from this type of work: a classic example is the invention of the World Wide Web at CERN
- 4 The scientists involved are keen that the public, whose funding has made this facility possible, share the excitement of this adventure
- 5 Young people, from every background and with many different talents, can be part of scientific activities like this if they study physics and closely related subjects
- 6 British industry benefits considerably from this project
- 7 For a reasonable investment from the public purse, the project will tell us fundamental things about the way the universe works

The three main target audiences for the programme are:

- **public** The best way of reaching them is via the media, especially television and high-profile newspaper articles. According to survey data, about twenty per cent of UK adults (about eight million people) are disposed to be interested in new scientific developments.
- **policy makers and opinion formers** It is crucial that Members of Parliament and the House of Lords, as well as government officials, are clear about the great value of this research, in intellectual and economic terms. It is crucial to win the support of opinion-formers in order to reach all other audiences, who all use the media.
- **students aged 14-16** These are the students who are reflecting on the subjects they would like to study at university: it is vital that we persuade more of them to choose physics. Other important audiences, though ones with a slightly lower priority, are gifted 12-14 year-olds and students in the age range 16-18 who are already studying science at post-GCSE-level and whom we hope will continue to study physics, mathematics or engineering. In order to inspire these students, we must win the active support of their teachers

We intend the strategy to make a national impact with these three groups. As a result, at the conclusion of the project, we intend the sustainable legacy of this strategy to be:

- greater awareness in the media of the excitement of particle physics
- a higher level of skill among particle physicists in dealing with the media
- increased awareness in UK industry of the commercial opportunities at CERN
- substantially increased political support for particle physics.

3 Proposed promotion programme

We propose the following components to the promotion programme, which will reach the target audiences with the appropriate key messages. Costs are detailed

separately, and while the potential audience numbers are listed, clearly there are very different levels of engagement with them involved:-

TV and radio coverage Cultivation of producers and programme makers, seeking to arrange the making of high-profile programmes on experiments carried out at the facility (aiming for two major features on terrestrial TV and three on non-terrestrial networks), as well as news and popular daytime programmes when results are announced. (Targets all audiences; potential audience ca 4 million)

National Schools Programme To support science teachers in bringing the LHC programme into schools. The activities will include: briefing for teachers (CPD and talks for teachers); specially produced packs of information, web and multi-media materials for use by teachers; portable demonstrations and a lecture that will visit schools all over the country. Begins mid 2006. (Ultimately targets students; potential audience ca 0.25 million)

National touring exhibition This would be on display in London for around 6 months in 2007 at a prestigious popular location and then travel to four venues across the UK in the following year (Targets mainly public and students; related Website and special events; audience ca 0.5 million)

Public events across the UK From mid-2006 to late 2008, a programme of eight public gatherings involving scientists and the public to present LHC science and share the excitement of discovery (locations will usually be science centres and Cafés Scientifiques). Two of the events (London, Edinburgh) will have an especially high media profile as they will be co-organized with national newspapers and be covered by radio and TV. (Targets public; direct audience 1000 plus ca 0.1 million via media coverage)

Receptions for VIPs and opinion formers Held in London, these will include one in 2007 to mark the 'switching on' of the machine (to alert attendees of what might be coming) and two during the first two years of the facility's operation, to highlight what is being achieved (Targets mainly policy makers; potential audience 400)

Updating meetings for journalists Aim to engage reporters (not all of them science specialists) with the LHC project, seeking to keep them informed, enthused and up to

date. First meeting in 2007, when the machine is switched on, another in the next year, when the results are coming through (Ultimately targets public and opinion formers; public audience 2 million)

Continually updated website A national website will be a hub for top-quality information (text, photographs, podcasts etc.) about the LHC programme. It is essential that this site is continually updated so that it is acknowledged as the best source of information about the UK contribution to the LHC (targets all audiences; potential audience 1 million)

4 Organization and preparation

Preparations to deliver the programme have already begun. STFC will develop and deliver the programme as a partnership that will involve researchers, science communicators, evaluators and CERN officials. The key tasks to be achieved before spring 2006 are:

- 1 **Co-ordination** In order to be as effective as possible, this programme must be carefully coordinated. This will require the employment of an additional half-time person in the STFC office (Targets all audiences)
- 2 **Evaluation** In order to ensure that we communicate effectively with all our target audiences, we shall evaluate our programme with representative focus groups of the public and teachers and with lobbyists who are experienced in dealing with opinion formers and people in government. At the end of the project, it will be evaluated against its initial aims. (Targets all audiences)
- 3 **Press support** The STFC press office is arranging for journalists to be given guided tours of the LHC during its construction. Also, a library of television footage and high-quality still photographs is being prepared, to aid programme makers and journalists. (Ultimately targets public, opinion formers and teachers)
- 4 **Media training for LHC physicists** To ensure that the media are in contact with fluent and articulate particle physicists, of both sexes and from

a variety of cultural backgrounds (Ultimately targets public, opinion formers and teachers)

The entire communications project will be a collaboration between STFC, the research community, industrial companies in the UK, and CERN, and will include co-ordination with other CERN member states.

5 Conclusion

The total cost of the communications programme, which we envisage will run until early 2009, is under 0.2 per cent of the UK's total commitment to the LHC project and is therefore excellent value. The price of *not* properly promoting the project – of not sharing our excitement with the public and with the UK physicists of the future – would be incalculable. We therefore commend this programme as an inexpensive but crucial investment in the future of particle physics in the UK.

20 March 2006

Appendix 1: Detailed messages and comments on how best to reach target audiences

More detailed messages

This extraordinarily ambitious facility – the biggest in the history of science – seeks to shed light on some of the most fundamental questions in science [the notes in square brackets refer to the topics in particle physics that underlie the message]

- The LHC is the biggest facility ever carried out in the entire history of science
- For the first time, it will enable people on Earth to create at will the same conditions as the universe when it was only a billionth of a second old, after the Big Bang
- It will shed light on how fundamental particles originally interacted to produce a universe apparently made of matter not anti-matter [asymmetry of matter and anti-matter]
- It will help us understand if there was a previously unidentified form of matter at the beginning of the universe [quark-gluon plasma]
- It will help us find out about the 96 per cent of the universe that is unaccounted for and the ultimate fate of the universe [dark matter]
- It will help us understand why the universe is built the way it is, and whether it could have been built any other way [standard model; supersymmetry]
- It will help us to see whether there is a deep symmetry at the heart of nature [supersymmetry]
- It should help us understand why things have mass and are not as insubstantial as light [Higgs boson]
- It may shed light on the most familiar force of all, gravity [supersymmetry, a fundamental of string theory]

It is an exciting international venture that involves thousands of people from dozens of countries collaborating harmoniously; the UK has a leading role

- CERN is a hugely successful scientific research laboratory, mainly a European venture
- 85 countries participate, including the UK, which contributes hundreds of scientists and engineers, many of them PhD students
- It runs smoothly and with little friction – a genuinely successful collaboration
- Among the leading UK people involved in the story are Lynn Evans (project manager), Peter Higgs (theorist), etc.

There are valuable technological spin-offs from this type of work: a classic example is the invention of the World Wide Web at CERN

- British scientist Tim Berners-Lee invented the Web when he was working at CERN to facilitate the sharing of information among scientists who were collaborating but based in locations all over the world
- A computing Grid, a new resource that will enable huge quantities of information to be shared and processed on a global scale, is being developed specifically to make the LHC project possible
- The Grid may, in time, become as important as the Web
- Small scale particle accelerators are used in hospitals to produce beams for radiation therapy
- Accelerators are widely used industry, e.g. in the production of semiconductor chips and for investigating the structures of large molecules such as proteins.
- Historically, many practically useful ideas in science were first developed by scientists who were simply exercising their curiosity, for example, Faraday's electric motor and his means of generating electricity from moving magnets.

The scientists involved are keen that the public, which has made possible this facility, share the excitement and value of this work

- Almost all of CERN's budget comes from European governments, i.e. from European tax payers

- The public has ready access to information about LHC from high-quality web sites and from the many public events attended by scientists, who both talk and listen
- CERN is open to the public

Young people, from every background and with many different talents, can be part of scientific activities like this if they study physics

- The branch of science addressed in LHC is particle physics, the study of the fundamental things that make up the universe and the laws that govern how they behave
- Anyone with sufficient ability and enthusiasm can contribute to this field: you don't have to be a genius
- Young people make many of the most powerful creative contributions to science— it is a myth that brilliant scientists are usually old white men.
- People with many different talents are needed to make the LHC a success: experimental and theoretical physicists, engineers, project managers, materials scientists, and so on
- Anyone can enjoy this science but to participate in it, you have to study physics and closely related subjects

British industry benefits considerably from this project

- British companies have made several crucial contributions to the building of the LHC and its detectors, including precision high-tech engineering, electronic and magnetic components and state-of-the-art vacuum technology.

At reasonable cost, the project will tell us fundamental things about the way the universe works

- The total cost to the UK taxpayer of the LHC is £344M, spread over about 10 years. That's an average of £34M per annum
- This is roughly the cost of a pint of beer or a modest glass of wine per person each year

- CERN's annual budget is about the same as that of Geneva's main hospital, i.e. a major city hospital
- The entire LHC project will cost about the same as one week of the world's budget on advertising ('The Economist' estimates this budget to be \$1bn per day).

Regarding the final general point, we need at least three comparators that will stand scrutiny on the 'Today' programme. The examples should refer to, for example, government expenditure on health and well-being, other branches of research, and something relatively frivolous like spending on the Lottery or on liquor.

We also need to have to hand the most powerful quotes. A classic is the remark made by Robert Wilson in 1969 when he was testifying before the Congressional Joint Committee on Atomic Energy and Senator John Pastore demanded to know how a multimillion-dollar particle accelerator improved the security of the country. Wilson said the accelerator had "nothing at all" to do with security, "it has only to do with the respect with which we regard one another, the dignity of men (sic), our love of culture. It has to do with: Are we good painters, good sculptors, great poets? I mean all the things we really venerate in our country and are patriotic about. It has nothing to do directly with defending our country except to make it worth defending."

Another great quote is from Einstein in the closing weeks of his life: "One thing I have learned in a long life: that all our science, measured against reality, is primitive and childlike-and yet it is the most precious thing we have."

Appendix 2: Audiences – how best to reach them

Experience has given us many clues about how we can best reach our target audiences. The following comments summarize key points that we need to bear in mind if we are to engage our three primary audiences effectively.

Public

Before we decide precisely how to pitch our stories, it is important to try them out with representatives of the public in well-organized focus groups. This will be invaluable in helping us to ensure that we are ‘pushing the right buttons’ and not merely feeding them with what we physicists think they ought to hear. A special challenge is that most stories in particle physics usually have a much stronger appeal to men than to women.

In addition, we shall need to

- Train ambassadors for the experiments, notably very senior spokespeople and exceptional communicators among the younger physicists. It is important that these people are identified before Easter 2006.
- Canvass those involved to find strong human stories that relate to the project.
- Identify examples of people who have contributed to the subject who are not in the usual white male category (e.g. Marie Curie, Abdus Salam).

Students aged 14-16

It is crucial that we provide teachers with what is useful to them and not what we think they need. Their requirements are best obtained in a well-run focus group in which we ask them how we can most effectively reach our aim of ‘turning on to physics’ students in this age range. It is likely that we shall be encouraged to focus some of our resources on gifted children.

The same is true of the audience of children in the age range 17-18.

Policy makers and opinion formers

We should consider employing a leading firm of PR consultants to work with our press office in reaching Members of Parliament and the House of Lords. This work will be done in partnership with STFC's Corporate Affairs Team.