Bringing the Large Hadron Collider to museum audiences

Harry Cliff

Cavendish Laboratory, University of Cambridge

The Science Museum, London
The Science Museum
The trouble with physics in museums

\[ \mathcal{L} = (\partial_\mu \phi)^* D^\mu \phi - U(\phi) - \frac{1}{4} F_{\mu \nu} F^{\mu \nu} \]

\[ D^\mu \phi = \partial^\mu \phi - i e A^\mu \phi \]

\[ F_{\mu \nu} = \partial_\mu A_\nu - \partial_\nu A_\mu \]

\[ U(\phi) = \alpha \phi \phi^* + \beta (\phi^* \phi)^2 \]

\[ \alpha < 0, \quad \beta > 0 \]

Peter Higgs

ICHEP, Valencia, 3 July 2014
The trouble with physics in museums
Challenging objects
Challenging objects
Challenging objects

ICHEP, Valencia, 3 July 2014
Challenging objects
What’s in it for me?
What’s in it for me?

ICHEP, Valencia, 3 July 2014
What’s in it for me?

Observation of a New Particle in the Search for the Standard Model Higgs Boson with the ATLAS Detector at the LHC

The ATLAS Collaboration

This paper is dedicated to the memory of our ATLAS colleagues who did not live to see the full impact and significance of their contributions to the experiment.

Abstract

A search for the Standard Model Higgs boson in proton-proton collisions with the ATLAS detector at the LHC is presented. The datasets used correspond to integrated luminosities of approximately 4.9 fb⁻¹ collected at √s = 7 TeV in 2011 and 10.7 fb⁻¹ at √s = 8 TeV in 2012. Indirect searches in the channels H → Zγ, H → WW⁺⁻ and Z → μ⁺μ⁻ → e⁺e⁻νν are carried out in the ATLAS data and are compared with previously published results. Experiments for H → Zγ, H → WW⁺⁻ and Z → μ⁺μ⁻ in the 7 TeV data and results from improved analysis of the Z → μ⁺μ⁻ and H → Zγ channels in the 8 TeV data. Clear evidence for the production of a neutral boson with a mass of √s = 125.3 ± 0.4 (stat.) ± 0.4 (syst.) GeV is presented. This observation, which has a significance of 5.3 standard deviations, corresponding to a background fluctuation probability of 1.8 × 10⁻¹⁰, is compatible with the production and decay of the Standard Model Higgs boson.
Use of place in museums
Use of place in museums
Deciding on the approach
Building the team
Transition from museum to CERN
Engaging the audience
Exploring CERN for yourself
The challenge of scale
Discovering the ordinary
Reception

Positive press coverage
54,000 visitors over six months
International tour confirmed

Engagement with stakeholders:
Chancellor of Exchequer, Science Minister, Education Secretary, businesspeople, funding agencies
Evaluation

- 94% visitors satisfied or very satisfied
- Immersive design highly engaging
- Communicated process of science, internationalism and complex engineering effectively

But:
- Some missed museum-style interactives
- Confusion over what was real/fake
- Mismatch of expectations – glamour vs shabbiness
- CERN propaganda?

ICHEP, Valencia, 3 July 2014
Conclusions

Touring until 2017.
Article forthcoming in Science Museum Group Journal (online, open access)
Find out more: sciencemuseum.org.uk/collider