

LEP Inauguration

First physics from LEP – see page 18

On 13 November, Heads of State, Heads of Government and Ministers from CERN's 14 Member States, together with more than a thousand invited guests, attended the inauguration ceremony of LEP, CERN's new 27-kilometre electron-positron collider. The event reflected CERN's pride in the construction and now extremely successful operation of the world's largest scientific machine and such a fine example of international collaboration. A full report on the event will feature in the next issue.

CERN Director General Carlo Rubbia addresses the LEP inauguration ceremony on 13 November. Speeches also came from King Carl XVI Gustaf of Sweden, President of the Swiss Confederation Jean-Pascal Delamuraz and French President François Mitterrand. The representatives of CERN's 14 Member States then symbolically signed a document 'opening up the era of scientific experimentation with the LEP collider'.

(Photo CERN)



The LHC road at CERN

Well before the successful completion of the LEP project at CERN, thinking on future options for the Laboratory had begun to take shape, being ultimately spearheaded by the Long Range Planning Committee chaired by Carlo Rubbia, now Director General.

To explore the 1 TeV (1000 GeV) energy scale where fundamental particle interactions should encounter new conditions, two major routes were proposed – a high magnetic field proton collider in the LEP tunnel, dubbed LHC for Large Hadron Collider, and the CERN Linear Collider (CLIC) to supply beams of electrons and positrons.

Two years down the line, exploratory studies have shown that while CLIC remains a valid long-term goal, LHC appears as the most cost-effective way for CERN to enter the 1 TeV arena. At these energies, the 'weak' nuclear force is expected to become powerful enough to match its electromagnetic partner, opening the door to the underlying symmetry breaking mechanism, thought to be due to a 'Higgs' particle (July/August page 1), which makes the two phenomena look so different at lower energies.

High-field superconducting magnet prototype work (September,

page 5) demonstrates that a 'two-in-one' design supplying the 10 tesla fields needed to handle LHC's 8 TeV proton beams (collision energy 16 TeV) is a practical proposition.

By compressing the colliding proton beams as tightly as possible, by increasing both the number of proton bunches and the number of protons in each bunch, LHC's design luminosity (a measure of the collision rate) has been uprated from the 1.4×10^{33} per sq cm per s level initially foreseen to as high as 4×10^{34} , providing a powerful lever arm for new physics.