

CERN Courier Archive: 1969

A LOOK BACK TO CERN COURIER VOL. 8, SEPTEMBER 1969, COMPILED BY PEGGIE RIMMER

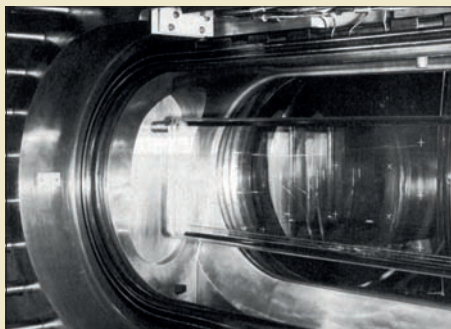
RUTHERFORD LAB

Successful tests on target technique

A new target technique has been successfully applied in the 1.5 m hydrogen bubble chamber at the Rutherford Laboratory. It involves the installation of a hydrogen target within a larger chamber containing a hydrogen neon mixture, to take advantage of the merits of both the hydrogen and the heavy-liquid bubble chamber.

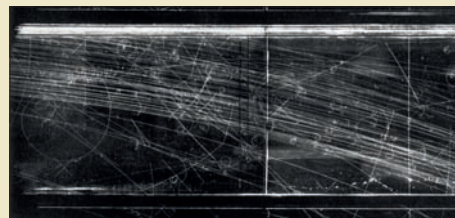
A perspex "bag" containing hydrogen runs the length of the 1.5 m chamber whilst the main volume is filled with a hydrogen neon mixture. The target bag has been developed and constructed in the Track Chambers Division at CERN on the basis of experience gained with similar devices for the DESY chamber and the CERN 1 m model.

The bag has plane walls parallel to the main chamber windows. It is constructed of perspex 2 mm thick and is 30 cm high by 4 cm deep. When the pressure system of the chamber is operated, the expansion is transmitted to the hydrogen in the bag



The 1.5 m hydrogen bubble chamber at the Rutherford Laboratory showing the perspex bag which contains the target hydrogen. The bag runs the length of the chamber, with plane walls parallel to the chamber windows.

due to the movement of the perspex walls. Since the expansion required is about 1%, the movement of each wall needs to be only about 0.2 mm.



A photograph taken during the first test runs. Tracks appear in the hydrogen inside the bag and the hydrogen neon mixture outside with negligible track distortion going from inside to outside.

Thus the two liquids are simultaneously sensitive, i.e. charged particle tracks can be produced inside and outside the bag. The first test run has shown that the Rutherford system, by far the biggest of its type yet to be assembled, works well and will be an excellent instrument for physics.

● Compiled from texts on pp270–271.

CERN NEWS

Fire in the PS tunnel

On the morning of Sunday 31 August, fire broke out in the outer tunnel in the south-east Proton Synchrotron PS area, which houses the k 11 low-momentum separated pion beam

and the neutrino beam which will feed the heavy-liquid bubble chamber, Gargamelle.

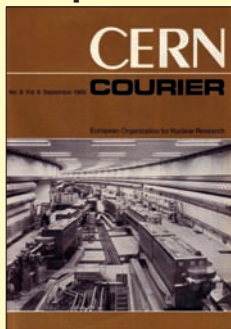
It took the CERN firemen over two hours to put out the blaze. Fortunately, no one was injured. However, a whole series of cables were burned out and the pulsed magnets,

vacuum system and beam control system were damaged by the intense heat and falling white-hot debris. The photograph gives some idea of the damage.

Every effort is being made to have the k 11 beam operating again as soon as possible after the annual PS shutdown and an investigation is under way to see how safety conditions can be improved before Gargamelle comes into operation.

● Compiled from texts on p267.

Compiler's Note



During the 1960s, earnest attempts were underway to develop a gauge theory of the weak interaction. Three carriers were postulated for the force – the charged and neutral vector bosons W^+ , W^- and Z^0 – with the so-called "Higgs mechanism" formulated to solve the problem that the carriers had to be massive.

Experimental evidence was needed urgently. Bubble chambers were in their heyday and Gargamelle, built at Saclay, was installed in the PS neutrino beam at CERN in record time, despite the fire. In 1973, the collaboration announced the groundbreaking observation of a weak neutral current, a discovery that boosted activity on the Standard Model of unified electroweak interactions.

Throughout the next decade, bubble chambers gave way to electronic detectors and beam energies available from accelerators steadily increased, especially with the advent of storage rings. The heavy W^+ , W^- and Z^0 bosons were detected in 1983 by the UA1 and UA2 experiments at CERN's Super Proton Synchrotron, converted to a proton–antiproton collider.

Now, the gargantuan detectors ATLAS and CMS at the LHC have recorded clear sightings of a new particle, consistent with being a/the boson of the hypothetical Higgs field. If these preliminary results are confirmed by the additional data currently being collected, then another chapter of the electroweak story will have been written by beams at CERN.



Fire damage in the outer PS tunnel.

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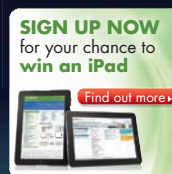
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