

CERN Courier Archive: 1973

A LOOK BACK TO CERN COURIER VOL. 13, APRIL 1973, COMPILED BY PEGGIE RIMMER

BUBBLING UP AT CERN AND SLAC

BEBC getting ready to operate

First tracks were taken in the 3.7 m Big European Bubble Chamber (BEBC) in March. A hydrogen leak that interrupted the tests was repaired quickly and operation continued up to 2.6 T. No troublesome effects appeared due to eddy currents in the

metal piston that is temporarily replacing the plastic piston. BEBC has now been "warmed up" to receive the last touches before the physics programme is launched in about two months [with protons from the PS].

● Compiled from text on p109.

Right: Part of the control room of BEBC, giving an idea of the complexity of the many systems involved in the operation of the chamber.



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Gargamelle getting ready to operate again

The heavy-liquid bubble chamber Gargamelle is being prepared for operation again. Its first task will be to supply photographs of neutrino interactions in freon. Scheduled for December 1972, this had to be postponed because vibrations during expansion of the chamber led to fractures in some of the pipework of the pressure system.

The expansion system was completely dismantled during the annual PS shutdown

(January and February). The trolley which carries the recompression tanks as well as the expansion tank and storage tanks were all rebuilt. The girders were reinforced and the whole structure was strengthened with struts. The trolley no longer stands on wheels but on supports set in the floor and has arms resting on the edge of the pit to prevent the assembly from moving during operation.

● Compiled from text on p112.



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Right: Gargamelle after repairs. The top half of the photograph shows the magnet; the chamber itself is inside the magnet. The tanks of the expansion system have been reinstalled on the trolley, in the foreground, with struts fitted for added rigidity.

RCBC operating

At Stanford, the 15 inch Rapid Cycling Bubble Chamber (RCBC) is being used for physics for the first time. The experiment, carried out by a Purdue, Indiana, SLAC, Vanderbilt collaboration, began in March. It is a search for "exotic" mesons with double charge. The quark model maintains that mesons are built

up of quark and antiquark pairs. Thus, since a quark is supposed to carry a charge of 1/3 or 2/3, no doubly charged mesons can be built up.

Observation of such mesons will obviously be extremely rare. So the rapid cycling chamber is used in a hybrid system with spark chambers, to select only likely events.

A beam of about 10 positive pions per pulse is fired into the chamber. If exotic mesons exist, they could appear as

$\pi^+ + p \rightarrow n + X^{++}$. The emerging neutron is converted into charged particles that fire an optical spark chamber.

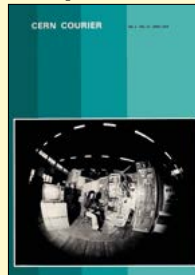
It is expected that the hybrid system will be triggered once every 200 pulses. The collaboration is hoping to collect 100,000 pictures. Operation without the possibility to trigger the chamber would require collecting and analysing 20 million pictures.

● Compiled from texts on pp114–115.



The body of the Stanford RCBC receiving the final touches before installation. It was successfully tested for two-million pulses at a rate of 20 Hz before data-taking started. The peak operating frequency of the chamber is 60 Hz.

Compiler's Note



In the 30 years following their invention in the 1950s, more than 100 bubble chambers were built and 100 million stereo photographs were taken.

Scientifically, among many seminal results was the discovery of the Omega-minus in the 80 inch hydrogen chamber at BNL, and the neutral weak current in Gargamelle at CERN.

Sociologically, effects were twofold. As chambers increased in size, they were housed as facilities in central laboratories and the community of users formed international collaborations. In addition, bubble-chamber photographs offered an intuitive view of subnuclear interactions that aided the public understanding of particle physics.

Technically, mainframe computing capacity at host labs grew to meet the needs of bubble-chamber physics, while smaller, dedicated, online computers became an integral part of film-scanning machines.

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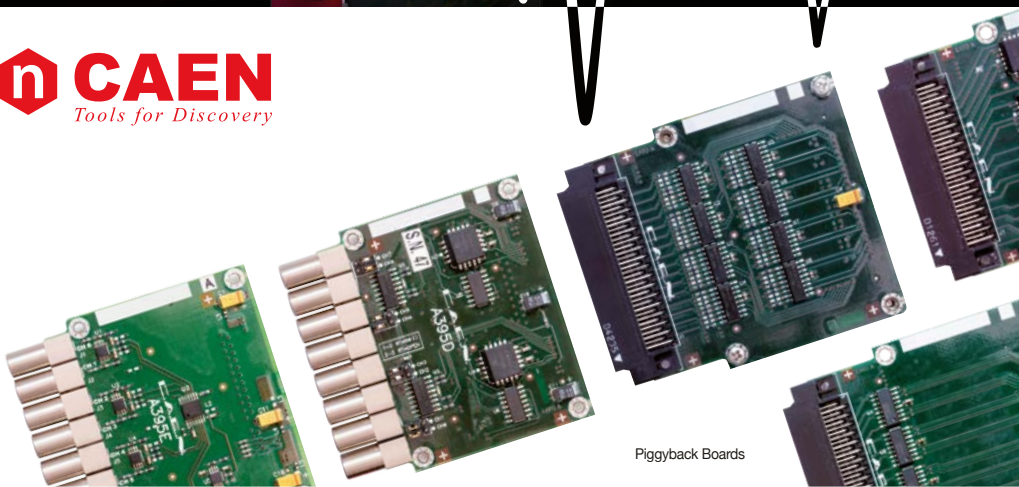


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WELCOME

CERN Courier – digital edition

Welcome to the digital edition of the April 2016 issue of *CERN Courier*.

The issue went to print while the LHC resumed operation after the technical stop that started in December 2015. At the same time, in another accelerator, SuperKEKB in Japan, beams have completed their first turns. However, the spotlight these days is not so much on accelerator physics as on the discovery of gravitational waves by the LIGO interferometers in the US, which is gaining the interest of the whole scientific community. The interview with Barry Barish, one of the founding fathers of LIGO, proves just how hard scientific endeavours can sometimes be. Hard, but also extremely rewarding. Coming back to closer universes, this issue also features articles about CERN's neutron facility, ALICE's new TPC, and science carried out with a PET cyclotron. Last but not least, Interactions & Crossroads brings you information about interesting conferences in physics and related fields around the world.

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