

Around the Laboratories

rings, with the largest encircling the present TRIUMF site, but subsequent work showed that improved performance would result if the larger rings were racetrack-shaped. To avoid these rings passing too close to existing buildings, the site could expand across the street.

As part of the preconstruction studies, design teams have looked at some of the demanding problems to be solved, including beam dynamics, magnet design, power supplies, beam kickers, radiofrequency systems, vacuum, etc.

Meanwhile the existing cyclotron continues to provide beams for a wide range of experiments. New ion sources will extend the range of studies possible. Proton-rich isotopes for medical use are manufactured both at the main cyclotron and a smaller dedicated machine. A second such machine is being assembled to boost capacity.

CERN LEP progress

The commissioning of CERN's new LEP electron-positron collider continues to make good progress. As mentioned briefly in the previous issue, by mid-August confidence in the new 27-kilometre ring warranted going for a pilot physics run to give the four big experiments – L3, Aleph, Opal and Delphi – their first taste of collision physics and explore the impressive capabilities of their detection systems.

Late in the evening of Sunday 13 August, only one month after a lone positron beam had circulated for the first time in the ring, just

two weeks after electrons had made their LEP debut and a mere 16 minutes after the start of the pilot run, the first Z had turned up. By midnight three Zs had been seen, and more soon followed.

The run, with collision luminosities of the order of 5×10^{28} per sq cm per s, encountered some technical problems. With 51 Zs in the bag, the run was terminated on 18 August after some 16 hours of physics operation and attention returned to the job of getting Europe's big ring in tip-top shape. One goal is to eliminate some troublesome coupling between vertical and horizontal beam motion. Meticulous machine studies and careful vacuum conditioning continued with the goal of optimizing LEP's

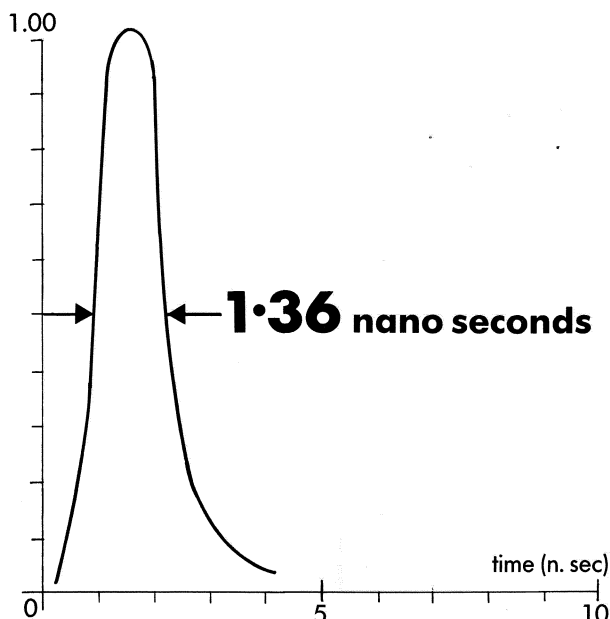
The LEP control room. Seated is Albert Hofmann, who, with Steve Myers, is jointly responsible for commissioning CERN's big new machine.

(Photo CERN 61.8.89)



DETECTORS WITH THE SPEED OF LIGHT!

Relative light output from 'Pilot-U'



**The solution to all your special detector needs:
SCINTILLATORS from
NE TECHNOLOGY**

- ★ Ultra-fast response – 'Pilot-U'
- ★ New formulations and wavelength shifters
- ★ Very wide range of applications
- ★ Improved light transmission now offered
- ★ Particle-selective capabilities
- ★ Materials of proven performance
- ★ Any practical size or shape
- ★ Can be tailored to each application

Contact our sales office staff now for further details

NE TECHNOLOGY LIMITED

Bankhead Medway Sighthill
Edinburgh EH11 4BY, Scotland
Tel: 44 (0) 31 453 5560
Tlx: 72333 Fax: 44 (0) 31 458 5044

Switzerland: NES Technology SA
17 Chemin Tavernier, 1218 Geneva
Telephone (022) 798 1661/62
Fax: (022) 791 0062

NE·TECHNOLOGY



MEASURING UP TO THE FUTURE



ULTRASTABLE CURRENT TRANSDUCERS

Danfysik ULTRASTAB Current Transducers enable current measurements with full scale ranges selectable from 40A to 2,000A.

Temperature stability is better than 1 ppm/month and the temperature coefficient is better than 1 ppm/°C. The output signal is bipolar $\pm 10V$ full-scale with noise of less than 1 ppm rms (dc to 10 kHz) and an exceptional frequency response of dc up to 500 kHz.

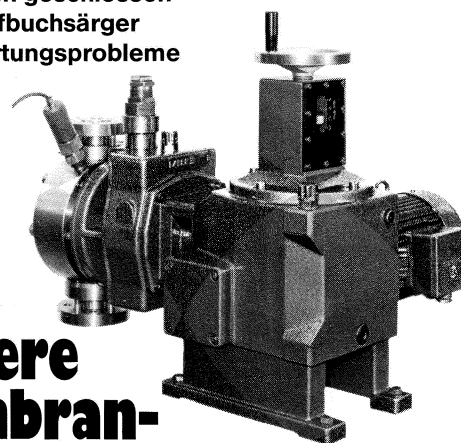
These Transducers are available complete with processing electronics for either stand-alone current measurements, or as the current sensor for high stability or high speed current regulated power supplies.



Danfysik, DK 4040 Jyllinge, Denmark
Tel (45-2) 388150. Fax (45-2) 131551
In U.S.A.: P.O. Box 2578, Redwood City, CA 94064
Tel (415) 368-4884. Fax (415) 368-0816

LEWA

Hermetisch geschlossen
Kein Stopfbuchsäger
Keine Wartungsprobleme



Die sichere Membran- Dosierpumpe

Für alle umweltgefährdenden, kritischen Fluide (übelriechende, giftige, radioaktive, aber auch sterile oder abrasive). In vielen Ausführungen für nahezu alle Betriebsanforderungen. Auch mit "Remote-Head". Förderströme von 5 ml/h bis über 100 m³/h, Drücke bis 3500 bar. Mit der patentierten LEWA-Sandwichmembran bietet sie ein Höchstmaß an Betriebssicherheit.

Weitere Informationen: Broschüre D 2-200 bitte anfordern.

HERBERT OTT AG

Missionsstrasse 22, Postfach, CH-4003 Basel
Telefon 061 / 25 98 00, Telex 964 562 (hoc)

A 45 GeV beam in CERN's new LEP electron-positron collider, as seen by a synchrotron light monitor.



myriad of components and systems.

Next physics operation began mid-September.

Lithium lens

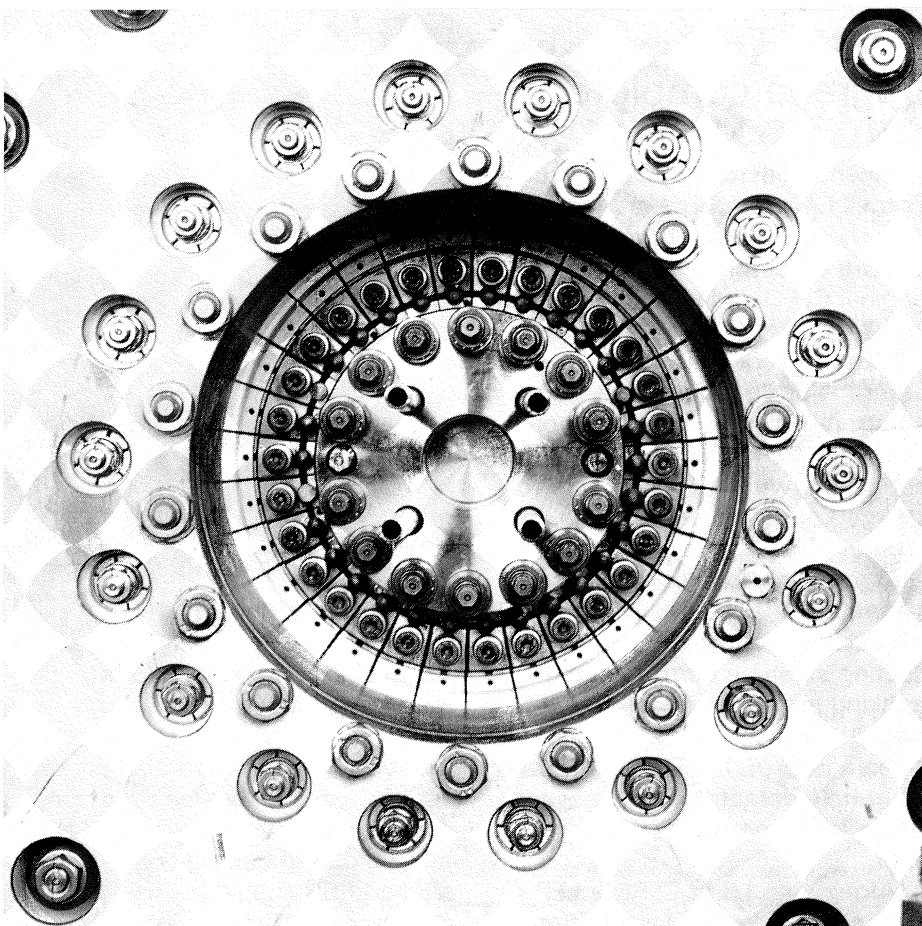
In the context of CERN's push to boost antiproton production, a record 10^8 antiprotons from a single pulse of the PS proton synchrotron have been injected into CERN's antiproton collector ring during the first beam test of a 36mm-diameter lithium lens.

The lens is a short (15 cm) cylindrical column of lithium metal with a constant current density along its axis, giving an azimuthal magnetic field which focuses particles transversely. A short focal length (about 10cm) is needed to collect antiprotons produced at small angles.

Lithium is chosen to minimize nuclear interaction losses of antiprotons. A gaseous plasma would be even better and such lenses are being investigated.

The particles have a momentum of 3.5 GeV, implying magnetic gradients of 5T/cm and currents of 1 million amperes!

The lithium is loaded into a water-cooled steel pressure vessel and the whole assembly mounted in a concentric current pulse trans-



former built at the Novosibirsk (USSR) Institute for Nuclear Physics for CERN. Because of eddy currents it takes several hundreds of microseconds for the current and field to penetrate inside the lithium column.

Peak pulse current was 1.1 MA with a time to peak value of 1 ms. The system is designed to operate up to 1.3 MA. During the pulse, magnetic and thermal pressures exceeding 1000 bars result in 30-40 ton thrusts on the end-flanges of the pressure vessel. During preliminary testing a flange became distorted, and the design was altered before beam tests.

In a series of developments in-

Centre, the steel pressure vessel containing a lithium antiproton lens, mounted concentrically inside a current pulse transformer, built for CERN at the Novosibirsk (USSR) Institute for Nuclear Physics. In tests, the lens enabled a record number of antiprotons from a single pulse of CERN's PS proton synchrotron to be injected into the Antiproton Collector ring.

initiated at Novosibirsk (May 1988, page 11), this latest lithium lens design, with its increased diameter and current, is essential for the collection of particles produced at large angles. Smaller lens diameter and current would suffice for a point source, but for a maximum of antiprotons captured in the Collector ring, the target must be about 6cm long and there are mechanical constraints on the target-lens spacing.

The tests promise even higher antiproton stacking rates in the near future. The eventual improvement in antiproton yield is estimated at 40%, a good return on the investment.