

Around the Laboratories

CERN Lead time

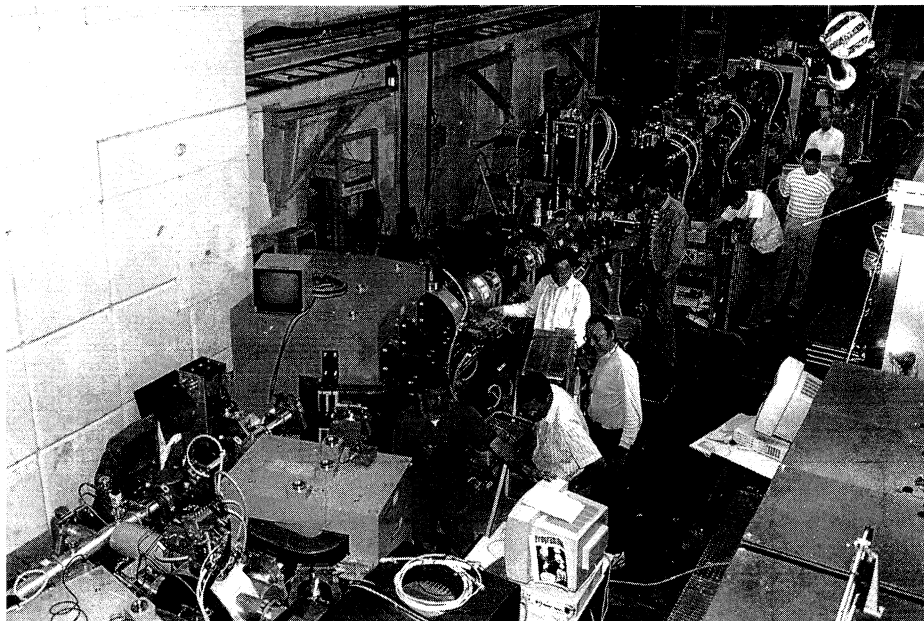
One of the highlights of CERN's ongoing research programme is the Heavy Ion Facility developed by an international collaboration between CERN (infrastructure and 200 MHz RF), France (source), Germany (the Linac and 100 MHz RF), Italy (RFQ and low energy, stripper and filter beam lines), India (software and some vacuum equipment), Sweden and Switzerland.

In the years to come, its beams will extend to still heavier ions the programme which began at CERN in the early 1980s in collaboration with Berkely and GSI Darmstadt and led to a series of studies at the SPS synchrotron using first oxygen and then sulphur nuclei.

It has, as its key component, a new dedicated linac to accelerate highly charged lead ions (March 1992, page 8). Progress in the commissioning of

this linac, whose installation has been aided by manpower from the Czech Republic, has been rapid since the acceleration of lead 27^+ ions to 250 keV nucleon in the radiofrequency quadrupole (RFQ) preinjector earlier this year. After installation, alignment and commissioning of the Linac, the first beam at 1.8 MeV per nucleon lead 208 (27^+) was observed on 25 May, and steadily increased to reach its design energy of 4.2 MeV/nucleon on 27 May. During all these steps, the energy was checked by an instrument developed in Russia. Finally a stripped beam of $Pb53^+$ was seen on 31 May. In June, 4.2 MeV/nucleon ions were fed into the next accelerator in the chain, the PS Booster, and several weeks later accelerated to 95.4 MeV/nucleon, the energy at which the ions will be fed into the subsequent stage, the PS.

CERN's new lead linac supplied its first beams in May.



SLAC Final focus on nanometre beams

An international collaboration of physicists working at the Stanford Linear Accelerator Center (SLAC) passed a major milestone in the worldwide effort to demonstrate the feasibility of TeV-scale linear colliders when it produced an electron beam 75 nanometres high during the first dedicated run of the Final Focus Test Beam (FFTB - November 1990, page 11).

This achievement of beam sizes a tenth the wavelength of visible light proves that the large compression factors required for next-generation linear colliders can indeed be attained and that the challenge of controlling and measuring such narrow beams can actually be met.

Led by David Burke of SLAC, physicists from the Budker Institute (Novosibirsk), DESY (Hamburg), Fermilab (US), KEK (Japan), LAL (Orsay, France), MPI Munich and SLAC completed construction of this test beam in the summer of 1993 and took a brief shake-down run to verify radiation protection systems and the integrity of beamline components.

The first beam studies began in April of this year. New beam-based measurement techniques and precision magnet-movers were used to position magnetic elements to within 20 to 30 microns of their ideal coordinates, and a stretched-wire alignment system monitored movements of these magnets as small as a micron; final checks of the optical properties of this beamline were made using specially designed algorithms.

These tests all showed excellent