DESY Director Bjorn Wiik enjoys the end of 1994 physics at DESY's unique HERA electron-proton collider, which supplied experiments with 20% more integrated luminosity than targeted.

electron and positron trains, each of four bunches.

The increased collision rate given by this scheme will eventually be a boon at LEP2, where the production rate of W pairs will be thousands of times less than the Z production rate at LEP1.

In preparation for LEP2 commissioning later in the year, delivery of superconducting niobium-coated cavities has been progressing well after some initial acceptance problems. Superconductivity is a very delicate condition to have to preserve, and many precautions have to be taken. The sophisticated surface treatments needed to ensure good cavity performance are being mastered and improved, troublesome heating in the surrounding radiofrequency plumbing is being overcome, and unwelcome 'multipactoring' on the niobium surfaces is being controlled.

LEP experience in 1994 and plans for this year are being reviewed in January during the end-year shutdown at the traditional performance workshop in Chamonix in the French Alps. A report of the workshop will feature in a forthcoming issue.

DESY
Luminous 1994

The 1994 physics run at DESY's unique HERA electron-proton collider supplied the H1 and Zeus experiments with 6.2 inverse picobarns (October 1994, page 1) of integrated luminosity, some 20% more than the target figure.

The luminosity increase was the result of several factors. In 1994 the proton beam was made up of up to 170 bunches (compared with 84 in 1993 and 9 in 1992), giving average proton currents of 40 milliamps (maximum 60), while electron/positron beams were typically 25-30 milliamps.

Switching from electron to positron beam running (sidestepping problems with impurity positive ions) in the middle of the run increased the beam lifetime to about 10 hours.

For positron running, the polarity of the entire 'electron' chain - the DESY synchrotron, PETRA and the HERA electron ring - were all switched. HERA operations for 1995 are scheduled to begin on 3 April.

DARMSTADT
Heaviest of them all (so far)

The heaviest nuclei yet, with atomic numbers of 111 and 110, have been synthesized at the GSI (Gesellschaft für Schwerionenforschung) heavy ion Laboratory, Darmstadt.

The breakthrough was made by an international group (GSI/Dubna/Bratislava/Jyvaeskylae) including Peter Armbruster and Sigurd Hofmann using the SHIP separator for heavy reaction products. This group has already discovered the elements 107, 108 and 109 at GSI.

The element 110 experiment initially fused nickel 62 ions accelerated in the GSI UNILAC on a lead 208 target. The resulting nuclei were sorted by SHIP's velocity filter and an alpha-decay chain could be unambiguously assigned to 269/110. In the Periodic Table, this new nucleus is a heavier cousin of nickel, palladium and platinum.

Subsequently, irradiation of bismuth 209 with nickel 64 produced 272/111, exactly on the 25th anniversary of GSI's founding on 17 December 1969.