*The PEP-II injection system at the Stanford Linear Accelerator Center (SLAC) is almost half complete. In October an 11 GeV electron beam was extracted from the linac and transported to the end of the two-mile linac tunnel. Here PEP-II Injector System Manager Elliott Bloom (right) and Injector System Engineer Bruce Feerick take a breather before the next phase of installation, scheduled for next June. Also in attendance is Deputy System Manager and Head of SLAC's Accelerator Department John Sheppard (background centre).*

quency quadrupole (RFQ) and a linac (October 1994, page 8).

However to optimize the beam properties (emittance), the nuclei have to be cooled in the crossed electric and magnetic fields of a Penning trap, which also serves as a beam buncher. It is a spin-off development of a mass spectrometer being developed at Mainz (also part of the REX-ISOLDE collaboration) for unstable isotopes. Continual improvements are being made to this trap apparatus, and this year precision measurements of rare earth isotopes have been very useful both in demonstrating the value of the technique and in providing physics results.

With this trap, the REX-ISOLDE pilot experiment will go on to study how to bunch, charge-breed and accelerate separated (singly charged spin-parity $1^+$) ions. The neutron-rich states which can be produced using these beams will probe the nuclear shell model away from its traditional 'valley of stability', possibly revealing new kinds of nuclear deformations.

## BERKELEY
## Collaboration on PEP-II

Since the announcement by President Clinton in October 1993 that the US Department of Energy would going ahead the PEP-II Asymmetric B Factory project (a joint proposal of the Stanford Linear Accelerator Center - SLAC, the Lawrence Berkeley National Laboratory - LBNL, and the Lawrence Livermore National Laboratory - LLNL), LBNL has continued its strong support of the project (for a review, see October, page 9).

LBNL accelerator physicists have been active in the design of PEP-II since 1988 - shortly after the original concept was suggested by LBNL Deputy Director Pier Oddone. Indeed, the original feasibility study for such a machine was a joint LBNL-SLAC-Caltech effort led by Swapan Chattopadhyay, now head of LBNL's Center for Beam Physics (CBP) in the Accelerator & Fusion Research Division (AFRD). The effort grew to include about seven full-time LBNL accelerator physicists (along with about 15 SLAC and LLNL physicists) during the formal design phase, which began in late 1989. This effort encompassed three editions of the Conceptual Design Report, along with innumerable reviews, as is typical of today's accelerator projects.

Taking advantage of an experienced engineering staff, fresh from the successful completion of the Advanced Light Source (ALS), LBNL has been assigned lead responsibility for the challenging Low Energy Ring (LER) of the PEP-II project, an entirely new storage ring to be added to the PEP tunnel. The LBNL design team is headed by CBP accelerator physicist Michael Zisman and senior engineers Ron Yourd (who served as the Project Manager for the ALS) and Hank Hsieh (a recent addition to the LBNL staff who was Project Engineer for the NSLS storage rings at BNL and most recently served as Project Engineer for the DAFNE project at Frascati). LBNL is also represented in the overall management of the PEP-II project by Tom Elioff, who serves as Deputy to the Project Director Jonathan Dorfan at SLAC. (Elioff served in the same role for the original PEP project, which was also carried out as a collaboration between SLAC and LBNL.)

In addition to participating in the accelerator physics aspects of the project, the main construction responsibilities for LBNL include providing most of the 800 magnets for the LER, the 1500 m of LER arc

vacuum chambers, the transverse multibunch feedback systems for both LER and High Energy Ring (HER), and various power supplies and diagnostics devices for the project.

As is natural, many of LBNL's PEP-II project tasks were selected based on the experience developed in building the ALS. The magnet design and production are being carried out collaboratively with the help of the Institute for High Energy Physics (IHEP) in Beijing, under the US-China International Agreement on High Energy Physics. In August 1995 an IHEP-built prototype quadrupole passed its acceptance tests and approval was granted for full production of some 300 magnets. The LER dipole prototype is also well along and should be available for testing in the next few months.

After a detailed study of the LER vacuum system, it was decided to fabricate the LER arc chambers from aluminium extrusions with discrete copper photon stops, a design patterned after that of the ALS. It is expected that this approach will result in considerably improved vacuum performance compared with the design proposed in the Conceptual Design Report (LBL-PUB-5379; SLAC-418, June 1993).

Work on the multibunch feedback systems has also benefited considerably from the availability of the ALS to serve as a test bed for the proposed PEP-II designs. Both the longitudinal and transverse PEP-II feedback systems operate in the time domain, detecting the offset of each individual bunch in the ring and providing a correction via a fast kicker. The design concept has proved to be very flexible and will be adopted by several rings, including the ALS and the DAFNE Phi Factory under construction at Frascati. Both the longitudinal and transverse feedback systems have been successfully tested at the ALS, with excellent results to date.

LBNL's role in the LER will continue through the commissioning of the ring, scheduled to begin in early 1998. Project staff are off to a good start and are looking forward to successful operation of the collider by the end of 1998. LBNL physicists are also heavily involved in the design of the BaBar detector (September, page 16).

*Highlight of Russian Prime Minister Viktor Chernomyrdin's recent visit to the Joint Institute for Nuclear Research (JINR), Dubna, was the signing of an agreement underlining JINR's status in the Russian Federation. Left to right, JINR's Administrative Director A.I. Lebedev, JINR Vice-Director A.N. Sissakian, Deputy Minister for Foreign Affairs S.B. Krylov, JINR Director V.G. Kadyshevsky, Prime Minister Chernomyrdin and Russian Minister for Science B.G. Saltykov.*

## DUBNA
## High level agreement

On 23 October Russian Prime Minister Viktor Chernomyrdin visited the Joint Institute for Nuclear Research (JINR), Dubna, with a delegation which included President of the Russian Academy of Sciences Yu.S. Ossipov, Russian Minister for Science and Technical Policy B.G. Saltykov, Russian Minister for Atomic Energy V.N. Mikhailov, First Deputy Minister of Finance A.P. Vavilov, Deputy Minister for Foreign Affairs S.B. Krylov, and Deputy Economics Minister S. M. Ignatyev.

In his speech, the Prime Minister acknowledged Dubna's achievements in science and in international scientific cooperation, particularly with CERN. 'Russia cannot stand on the sidelines of the major international project - the large new generation accelerator being constructed at Geneva,' he said, referring to CERN's LHC proton-proton collider to be built in the 27-kilometre LEP tunnel. 'It is noteworthy that JINR's specialists have already joined this long-term programme,' he declared.

The highlight of the Prime Minister's visit to Dubna was the signing by S.B. Krylov, Deputy Minister for Foreign Affairs, and JINR Director V.G. Kadyshevsky of an agreement underlining JINR's status in the Russian Federation.