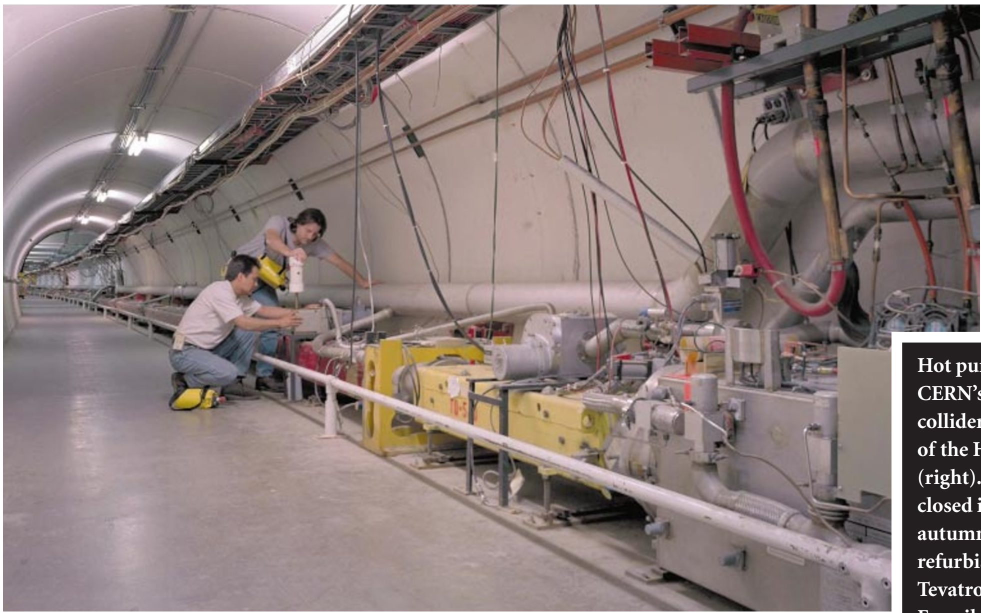
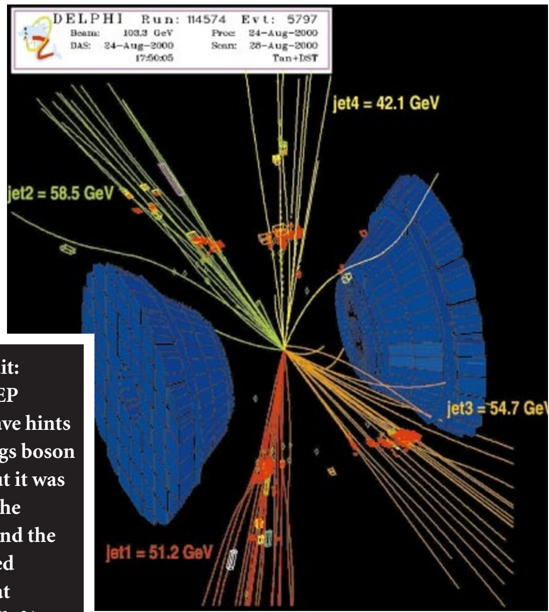


FERMILAB



DELPHI, CERN

Hot pursuit: CERN's LEP collider gave hints of the Higgs boson (right). But it was closed in the autumn, and the refurbished Tevatron at Fermilab (left), may pinpoint the particle first.

already formed, and reverse some of the associated cognitive deficiencies[12,13].

Many researchers would have predicted that it would have been impossible to raise an immune response against one of the body's own peptides, or that the antibodies would have failed to penetrate the brain. "There were many reasons not to test out the idea," says Dale Schenk of Elan Pharmaceuticals in South San Francisco, whose team developed the vaccine. "Sometimes it pays not to think too much."

Schenk cautions that what works in mice may not work in people. The vaccine has already passed through initial human safety studies, however, and larger trials to determine its clinical efficacy are being planned. ■

Peter Aldhous and Alison Abbott

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High-energy physics

When priorities collide

Change often brings regrets as well as the excitement of new beginnings. And that was definitely the case this year in high-energy physics. As the Relativistic Heavy Ion Collider (RHIC) at Brookhaven National Laboratory on Long Island, New York, detected its first particles, physicists at CERN, the European Laboratory for Particle Physics near Geneva, bade a fond, even anguished, farewell to their stalwart accelerator, the Large Electron–Positron (LEP) collider.

Nine years in the making, the RHIC reported its first collisions in June (see Back, B. B. *et al. Phys. Rev. Lett.* **85,** 3100–3104; 2000). The collider accelerates gold nuclei to nearly the speed of light in two accelerator rings. When two ions collide head on, they create a mini-fireball with a temperature of one trillion kelvin — ten thousand times hotter than the inside of the Sun.

This should recreate the conditions that existed about ten millionths of a second after the Big Bang, before the soup of quarks and gluons had condensed to form protons and neutrons. The RHIC's main objective is to study the properties of this 'quark–gluon plasma'. Researchers at LEP reported hints of this exotic form of matter in February, but the RHIC will be able to study the plasma in detail.

For the researchers who have tended LEP, pulling the plug was always going to be an emotional wrench. But few would have predicted the drama that unfolded in September, when LEP gave tantalizing hints of the elusive Higgs boson — the fundamental particle that is thought to give other particles their mass.

For its parting shot, LEP was fired up to run at energies beyond those it had been designed for. Within weeks, physicists had recorded five events consistent with a Higgs boson with a mass of 115 giga-electron volts.

Those results bought a stay of execution until November. But to secure the claim, more data were needed. They failed to materialize, and CERN's management decided that the evidence was not strong enough to delay the construction of the lab's next centrepiece, the Large Hadron Collider (LHC), which will occupy the same tunnel. Some physicists are still smarting over the decision.

"We felt there was enough evidence to justify running LEP again next year," says Tiziano Camporesi of LEP's DELPHI experiment.

Within two years of its completion in 2005, the LHC should yield huge numbers of Higgs particles. But by then, US physicists may have stolen Europe's thunder. Fermilab near Chicago will in the spring restart its Tevatron collider, after a major refit. Although it was not designed to look for the Higgs, pinning down the signature of a particle with a mass of 115 giga-electron volts should be well within its capabilities. "Fermilab will use all its efforts and resources to solve the question," says a bitter Patrick Janot, physics coordinator at LEP. "Then CERN will look ridiculous at having missed this opportunity."

The Tevatron got another feather in its cap this year. Analysing data collected in 1997, researchers working on an experiment called DONUT reported in July that collisions between a high-energy electron beam and a tungsten target had produced five sightings of the tau neutrino, the most massive of the three types of neutrino.

This particle and the Higgs complete the bestiary predicted by high-energy physics' prevailing theory, the Standard Model, and its extension, the Higgs mechanism. But physicists will still have plenty to do when and if the Higgs is found — in particular searching for the 'supersymmetric' interactions that may unite the two classes of fundamental particles, fermions and bosons, which differ in the property of 'spin'. ■

Philip Ball