News & Analysis

Linear collider faces lengthy delay

Physicists have been told that the next big accelerator on their wish list – the International Linear Collider (ILC) – might not switch on until at least the mid-2020s, more than five years later than anticipated. A detailed plan of the multibillion dollar electron-positron collider released in February predicted that the machine could start up in about 2019 (*Physics World* March p7). But Raymond Orbach, undersecretary for science at the US Department of Energy (DOE), which would provide much of the ILC's funding, warned that this estimate is unrealistic. He says that researchers in the US must therefore think of how they can maintain a healthy particle physics programme in the meantime.

Many particle physicists regard Fermilab, near Chicago, as the favourite to host the ILC, which would examine in detail particles that could be discovered at CERN's Large Hadron Collider, such as the Higgs boson and perhaps "supersymmetric" particles. A successful bid for the ILC is central to the vitality of particle physics in the US, given that Fermilab's Tevatron accelerator is expected to close in 2009

Cautionary note
Funding head
Raymond Orbach
thinks that particle
physicists are far too
optimistic in their
schedule for the
International
Linear Collider.

and the Stanford Linear Accelerator Center's B-factory in California will shut early in the next decade. But Orbach believes that researchers cannot rely on the ILC alone.

"Even assuming a positive decision to build an ILC, the schedules will almost certainly be lengthier than the optimistic projections," Orbach told the High Energy Physics Advisory Panel at a meeting in Washington, DC, in late February. "Completing the R&D and engineering design, negotiating an international structure, selecting a site, obtaining firm financial commitments, and building the machine could take us well into the mid-2020s, if not later."

These remarks have surprised, and annoyed, many high-energy physicists.

Sheldon Stone from Syracuse University says that "part of the community really wants the ILC", adding that the call for interim projects was also unexpected. "Up to that point, the DOE didn't want to hear about any other projects," he adds.

Barry Barish, a physicist at the California Institute of Technology and head of the ILC's design effort, is more sanguine, believing that Orbach wants to have "a realistic schedule in planning the non-ILC part of the US high-energy-physics programme". Meanwhile, Fermilab director Pier Oddone has announced he is to form a steering committee that will look at his institution's future programme in light of Orbach's comments. The programme will aim to ensure the continued supply of people with the skills needed to build the ILC.

Stone, however, remains cautious. "Everybody realizes that the ILC will be a great machine and the sooner we get it done the better," he says. "But the main concern is whether there will be an ILC at all."

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Going underground

Particle physics may be a grand scientific quest to understand nature at its most fundamental level, but central to that quest is moving huge chunks of metal and electronics through concrete tunnels and shafts. Nowhere would you have caught a better glimpse of this heavy engineering than at CERN on 28 February, when the 1920 tonne central section of the Compact Muon Solenoid (CMS) particle detector was lowered into its cavern 100 m underground. CMS is one of two enormous detectors that are being built at the Large Hadron Collider (LHC), the world's highest energy particle accelerator due to come online in November. By stopping and measuring the debris from the billion or so proton-proton collisions that will take place each second at the LHC, CMS could be where the infamous Higgs boson will be revealed some time next year. The lowering of "Yoke Barrel 0", which marks the half-way point in assembling the 12 500 tonne CMS, was carried out with just 20 cm clearance on either side. The delicate procedure took about 12 hours to complete.

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