The future of Fermilab

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In this month's *Physics World*, reviews and careers editor, Margaret Harris, visits the Fermi National Accelerator Laboratory (Fermilab) to explore what future projects are in the pipeline now that the Tevatron particle accelerator has closed for good.

After 28 years of ground-breaking discoveries, the Tevatron accelerator has finally surrendered to the mighty Large Hadron Collider (LHC) at CERN, placing Fermilab, in some people's mind, on the brink of disappearing into obscurity.

The lab appears to be moving into a new frontier, however, with several other projects ready to step out of the shadow of the Tevatron and excel in many more areas of science. The excitement amongst the researchers working at the Chicago-based lab over the new developments is clearly conveyed in this feature.

Fermilab can no longer compete with the LHC when it comes to smashing particles together at high energies, but it can look for rare interactions between particles at lower energies. In this type of experiment, the key is not a beam's energy but its intensity: the number of particles produced per second.

Their plans include two experiments – one already being built and another in the pipeline – that will send beams of neutrinos underground to distant detectors to see how these particles change between one form and another.

More ambitious still is Project X – expected to cost between $1-2bn – which will provide intense beams of protons for experiments on neutrinos, rare decays and heavy nuclei. Outside of high-energy physics, the lab currently participates in experiments into cosmic rays, dark matter and dark energy.

One obstacle that stands in the way of Fermilab's progression is money. With the US Congress's budgetary process – which allocates funds one year at a time – threatening to delay projects, combined with the current economic downturn, there is cause for concern, especially for a lab currently in transition.

"This is an opportunity for the US to establish a leadership position in this very important area of physics that will last for decades," said Fermilab physicist Steve Holmes. "If we do it right, we'll just blow away the competition."

Also in this issue:

Science in the UK did well to avoid major cuts in the last government spending round, but John Womersley, chief executive of the Science and Technology Facilities Council, says the research community needs to safeguard its own future.

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