a proposal by the end of the year. And, says Owens, "we are making sure that the current science minister and funding ministers know what we are doing, so that it is within the national conversation. We have to work the political system."

The time limit puts pressure on the whole endeavor, admits Owens. "But even if it does not come off, our researchers will be involved in the project."

"People would have been surprised if we saw something with LIGO," says Shoemaker, but whether the observatory's third leg is in Australia or in the US, "they will be shocked if we see nothing with Advanced LIGO."

Toni Feder

Japan plans underground gravitational-wave detector

An underground site and cryogenic mirrors are the hallmarks of Japan's planned gravitational-wave detector. In June the Japanese government approved about two-thirds of the estimated ¥15.5 billion ($190 million) tab for building the Large-scale Cryogenic Gravitational-wave Telescope (LCGT).

The funding granted so far covers construction, but not the equipment to cool the interferometer's four mirrors. Money for that and for digging perpendicular tunnels some 200 m below ground to accommodate the 3-km-long arms of the interferometer will be sought in the next few years, says project principal investigator Takaaki Kajita of the University of Tokyo's Institute for Cosmic Ray Research.

Tests using a prototype detector with 100-m-long arms found that seismic noise from wind, human activities, and other sources was attenuated about two orders of magnitude underground compared with on the surface, Kajita says. The LCGT will share the Kamioka Mountain location some 250 km northwest of Tokyo with the Super-Kamiokande neutrino detector and other experiments, but it will have its own entrance to avoid disturbances.

LCGT GROUP, INSTITUTE FOR COSMIC RAY RESEARCH, UNIVERSITY OF TOKYO

Gravitational waves may soon have a detector in Japan's Kamioka Mountains.

The interferometer's 30-kg mirrors will be cooled to 20 K to reduce thermal noise. When decisions were being made for the LCGT 10 years ago, the choice was between cold mirrors or heavy, ton-scale ones, says Kajita. "People thought that cooling the mirrors must be easier." The Advanced Laser Interferometer Gravitational-Wave Observatory (LIGO) is taking a different tack—using 40-kg monolithic silica mirrors and an all-glass suspension system (see story on page 31). But, says Advanced LIGO project leader David Shoemaker of MIT, "We appreciate them doing the pathfinding on cryogenic mirrors."

The LCGT, like Advanced LIGO, should be able to detect the merger of two neutron stars at a distance of around 700 million light-years.

For now, the LCGT is funded entirely by the Japanese government. But Kajita says groups of scientists in the US, China, and Taiwan are interested in collaborating. He adds, "since the information obtained by any single detector is limited, it is really essential to form a worldwide network of gravitational detectors." If all goes smoothly, the LCGT could be fully online by 2017.

Toni Feder

Panel urges reprieve for the Tevatron

After much delay, CERN's Large Hadron Collider (LHC) has been accumulating proton–proton data since April, albeit at only half the 14-TeV collision energy for which it was designed. Its predecessor, the 2-TeV Tevatron proton–antiproton collider at Fermilab, was scheduled to shut down for good at the end of 2011. But the Tevatron's excellent performance over the past two years and the LHC's delayed ramp-up to its design parameters prompted Fermilab's program advisory committee in August to recommend that the Tevatron be kept running through 2014.

That extension would cost an estimated $130 million. So HEPAP, the high-energy-physics advisory panel to the funding agencies, asked its particle-physics project prioritization subpanel (P5) to assess the scientific merit of the proposed extension and weigh it against anticipated negative impacts on the rest of the US particle-physics program.

At a special HEPAP meeting on 26 October, P5 chairman Charles Baltay (Yale University) presented the subpanel's conclusions. The P5 report's principal recommendation was that the funding agencies should proceed with the three-year extension *if* the required resources "become available in addition to the present funding" for US particle physics. That means that an extra $35 million per year would have to be found for the next three fiscal years and $25 million for the following year.

The science case for the extension centers on the search for the putative Higgs boson, "the most pressing problem in our field," as Baltay put it. Null results of Higgs searches at the Tevatron and CERN's Large Electron–Positron collider have already narrowed its mass to the range 115–158 GeV. (For comparison, the proton's mass is 0.94 GeV.) By the end of 2014, concludes the P5 report, the accumulated Tevatron data will have reached "better than 3-standard-deviation sensitivity" to a Higgs anywhere in that mass range. "This is the main motivation for the three-year extension."