News & Analysis

Japan gives physics a super boost

The Japanese government has announced that it will fund 14 new research projects worth a total of ¥57bn (\$500m), with the physical sciences taking the bulk of the money. The funds will include \$100m for an upgrade to the B-meson factory at the KEK particle-physics lab, as well as \$98m to build a gravitational-wave detector in a disused mine.

Located just north of Tokyo, KEK's main facility is the 3 km-circumference KEK-B electron-positron collider, which produces streams of B-mesons that are studied by the BELLE detector. The facility has led to major progress in our understanding of charge-parity violation, which brought Makoto Kobayashi from KEK a share of the 2008 Nobel Prize for Physics.

When built, the new SuperKEKB will be able to produce B-mesons 40 times faster than the current collider. The funding would provide about a third of the total costs for upgrading KEK-B and it would put Japan ahead in the race to build the world's first such advanced B-factory. Italy is already planning to build a B-factory – SuperB – at the DAFNE accelerator based at the Frascati National Laboratories near Rome, while

At the frontier

The KEK particle-physics lab has been awarded \$100m to upgrade its B-meson factory.

the US is planning to use the idle PEP-II collider at the SLAC National Accelerator Laboratory in California.

Masanori Yamauchi, deputy director of the Institute for Particle and Nuclear Studies at KEK and former spokesperson for the Belle detector, says physicists in Japan are "delighted" to hear they will receive the funds. "KEK in Japan is launching a renewed research programme in the search for new physics by using a technique which is complementary to what is employed at the Large Hadron Collider at CERN," he says.

The government money also in-

cludes \$98m for the Institute for Cosmic Ray Research at the University of Tokyo to develop a gravitational-wave detector. The Large-scale Cryogenic Gravitational-wave Telescope (LCGT) will be constructed in the Kamioka mine, which lies some 200 km north-west of Tokyo and is already home to the SuperKamiokande neutrino detector. The money will cover about a third of the total costs but will not include the funds needed to excavate the mine to prepare for the LCGT.

The LCGT will include two 3 km long laser interferometers located in an underground tunnel of the Kamioka mine to reduce seismic noise. It will be similar to existing gravitational-wave detectors like the LIGO facility, located in Louisiana and Washington, which is designed to detect tiny changes in the interference patterns of laser beams sent down kilometre-long pipes that are positioned at right angles to one another. The LCGT will seek to detect gravitational waves that emanate from binary neutron stars that lie up to three million light-years away from Earth and have a mass similar to the Sun.

Michael Banks

Astroparticle physics

Further delays hit troubled \$2bn cosmic-ray detector

A \$2bn mission to study cosmic rays will have to wait another few months before being sent to the International Space Station (ISS) after NASA announced last month that it was pushing back the launch of the Space Shuttle *Endeavour* until 26 February 2011. The Alpha Magnetic Spectrometer (AMS), which is the brainchild of the Nobel-prize-winning physicist Samuel Ting, was expected to take off in November aboard *Endeavour* – the last ever shuttle flight – but delays to the penultimate shuttle launch have postponed the mission by another three months.

The AMS was actually due to take off in July but its launch was already delayed until November following a last-minute decision by project sci-

entists to replace the detector's liquid-helium-cooled superconducting magnet with the permanent magnet first used on a demonstration flight in 1998. The decision to swap magnets was made following an announcement in February by US President Barack Obama that NASA would keep the ISS running through to 2020, rather than 2015 as intended, which rendered the option of the superconducting magnet unattractive as its helium would have run dry long before the ISS was mothballed.

The delay to 2011 is in fact the latest in a long series of twists and turns for the experiment, which was criticized by astrophysicists for avoiding NASA's peer-review process and then dropped altogether following the *Columbia*

Final checks

The Alpha Magnetic Spectrometer should launch on 26 February 2011 aboard the Space Shuttle *Endeavour*.

disaster in 2003 (*Physics World* June pp12–13). According to Ting, who is at the Massachusetts Institute of Technology, assembly of the AMS was due to be finished by 22 July, with beam testing at the CERN particle-physics lab near Geneva to take place from 7–14 August. However, no extra tests will take place now that *Endeavour*'s launch has been delayed and the US Air Force will transport the detector to the Kennedy Space Center in Florida on 24 August. Ting's colleague Roberto Battiston of the University of Perugia in Italy adds that the detector is working "beautifully". "An extra one or two months does not make a lot of difference to an experiment that should run for 10 years," he says.

Edwin Cartlidge