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Japan hopes its 50-gigaelectronvolt synchrotron will boost the nation's standing in medical imaging and particle physics.

To create the beam of muon neutrinos, J-PARC will send a proton beam at a graphite target. Unlike conventional head-on collisions, J-PARC's proton beam will be adjustable to allow collisions at an angle. The angled collision will lower the average energy, but more of the resulting neutrinos will be in the range likely to oscillate into electron neutrinos on their underground trip to the SuperKamiokande detector, 295 kilometres away.

When J-PARC's big synchrotron isn't doing neutrino physics, it will focus on kaons and hypernuclear experiments. For example, scientists will look for evidence that neutral kaons decay into neutral pions plus a neutrino and an antineutrino.

About half of the \$10 million needed for the decay experiment, and \$8 million needed for other kaon experiments, still await funding. But this year's Nobel prizes may help to give the field a boost. In 2002, the awarding of the Nobel to Masatoshi Koshihara, then at the University of Tokyo, for neutrino work meant that Japan ploughed another ¥16 billion into J-PARC's neutrino project, accelerating its opening. This year, the Nobel physics prize was shared by the High Energy Accelerator Research Organization's Makoto Kobayashi and Kyoto University's Toshihide Maskawa for their work in explaining the dominance of matter over antimatter in the Universe — and some think that might boost funding for the kaon experiments at J-PARC. "It was," says Nagamiya, "very good timing." ■

David Cyranoski

Astronomers unveil wish list

European scientists and funding agencies have launched an ambitious plan to prioritize the astronomy projects they believe should be supported over the next 20 years.

The ASTRONET Infrastructure Roadmap was released on 25 November, timed to coincide with the opening of the European Space Agency's (ESA's) ministerial meeting in The Hague, the Netherlands, where, as *Nature* went to press, ESA member states were due to thrash out how planned space projects will be funded over the coming years. Several large ESA projects — including a suite of Earth-observing satellites called Kopernikus and the proposed ExoMars rover — are already facing funding difficulties (see *Nature* 455, 840–841 & 1013; 2008).

ASTRONET was set up in 2005 to deliver a concerted vision from the European astronomy community. It echoes a process that has been undertaken five times in the United States — the National Research Council's 'decadal survey' of astronomy and astrophysics.

Speaking with a single voice has helped US space scientists to get big projects such as the Hubble and Spitzer telescopes off the ground. Astronomer Joseph Taylor at Princeton University, who co-chaired the last decadal survey in 2001, thinks Europe will benefit from having a consolidated approach. "Over the past 50 years it's been a very useful way of prioritizing our national efforts," he says.

The European version collates views from 28 countries, as well as ESA and the European Southern Observatory (ESO). The process is a first for European astronomy, but could happen every five to ten years, says Michael Bode at Liverpool John Moores University, UK, and leader of ASTRONET.

ASTRONET's top priority is the European Extremely Large Telescope, a 42-metre telescope operating in the visible and infrared wavelengths that

would be the biggest yet built. The roadmap says that construction should begin at the ESO in 2010, backed by €1 billion (US\$1.3 billion) in funding that has yet to be committed. The Square Kilometre Array, a radio telescope aiming to probe the early Universe, should be the next priority, and would involve a global consortium of partners.

ESA has its own 'Cosmic Vision' for space-based missions for 2015–25, and there is inevitable overlap with the ASTRONET plan, says Bode. ESA missions favoured by the roadmap include the gravitational-wave observatory LISA — a joint project with NASA — and a probe called Gaia that will map the position and velocity of a billion stars in our Galaxy.

But the roadmap might be bad news for some facilities, because supporting big projects will mean savings must be made elsewhere. ASTRONET is already reviewing the roles of some smaller, two- to four-metre European telescopes in an attempt to eliminate research overlap, for example. "We think it is important to rationalize the observational set-up in Europe," says Jean-Marie Hameury, ASTRONET coordinator and deputy director of the National Institute of

Space Science at the CNRS, France's basic-research agency in Paris. A similar review of eight-metre telescopes should follow, he adds.

One such telescope, the 2.6-metre Nordic Optical Telescope on La Palma in the Canary Islands, is run by ASTRONET board chair Johannes Andersen. He points out that the roadmap's recommendation to integrate space- and

ground-based observations — something not currently done at a European level — should produce more science overall.

ASTRONET's plan requires European nations to collectively spend 20% more than the €2 billion they spend annually on astronomy. Securing that funding will be "the toughest part of the job", admits Hameury.

Katharine Sanderson

ASTRONET is enthusiastic about the European Extremely Large Telescope.

ESO