4.7% from last year. Within J-PARC, the combined budget for grants and for the Japan Atomic Energy Association will be nearly 11% lower, while KEK's budget will go up about 4.6%, to ¥6.8 billion.

SPring-8's budget will shrink by 2%. The WPI's budget will go up a bit to facilitate starting a new institute focused on the environment. The five existing WPI institutes "get a marginal cut. It doesn't hurt much," Okaya says. (See PHYSICS TODAY, December 2008, page 28.) Funding for universities will be cut slightly less than the 1% a year decrease instituted a few years ago. As PHYSICS TODAY went to press, funding for some projects was still being clarified. But in general, says Okaya, the cuts will affect bricks and mortar more than jobs. "That's a new orientation we are pursuing."

Lessons learned

Despite science having to a large extent been spared, the process did do damage, says Hideo Ohno, a condensed-matter physicist at Tohoku University. "I believe the most serious part is the negative message that the suggested cuts on science and technology carries," he says. "I, along with many others, feel that the government needs to realize that higher education, in particular graduate-level education, is important for the future of Japanese science and technology. Without educated people, we cannot do anything."

In more than a suggestion, a key program for supporting graduate students was chopped 21%. More than a third of undergraduate science students at the University of Tokyo surveyed last December said that slashes to science funding might lead them to quit their plans to become researchers, and around the same number said they would now consider pursuing their careers abroad. Says Masaki Hoso, a postdoc in evolutionary biology at Tohoku University, Japanese students "have learned that the path for scientists is fragile. At least, just after the GRU decisions, most students felt so."

The reviews were a "wake-up call for Japan's science community and us bureaucrats," says MEXT's Okaya. "It was a lack of a long-range comprehensive plan blessed by the current administration that gave rise to the cutting without strategy. The government has embarked on such a plan. We will look at six areas of economic growth. One is science and technology." And, he says, "the lesson learned from the process is that we need to focus on how to reach out to taxpayers in their own language. It's difficult to explain to taxpayers why a black hole is important. That effort needs to be pursued more." Adds Hoso, "We scientists learned that we need to explain what we are doing and why [it] could increase human well-being. Or we lose funding and honor."

Toni Feder

UK slashes physics budget

The UK's Science and Technology Facilities Council (STFC) announced in mid-December a five-year plan that includes drastic cuts for physics. "This [plan] has involved tough choices affecting the entire program, including a managed withdrawal from some areas," says Michael Sterling, chairman of the STFC, which funds all major physics programs and facilities in the UK.

The £115 million ($200 million) cuts to the STFC budget come on top of a £398 million reduction for the university education system, despite Prime Minister Gordon Brown stating in a speech a year ago that "the downturn is no time to slow down our investment in science but to build more vigorously for the future."

Over the next three years, the STFC will pull the UK out of several international projects, including CERN's Alice experiment, the Gemini telescopes, the New Light Source (NLS), and the UK Infrared Telescope; the complete list is included with the online version of this report. Doctoral fellowships and student grants will be cut by 25% next year. Ian Leslie, pro vice chancellor for research at the University of Cambridge, says the cuts "will prove extremely damaging."

The move to terminate the NLS "was a regrettable outcome," says the project's leader, Jon Marangos. "If it is true that the UK cannot at the present time afford to build a FEL [free electron laser] of her own, it has also become abundantly clear to me over the last two years that she cannot afford not to play a major part in FEL science."

Also to be phased out is UK involvement in five space missions—Cassini, Cluster, the Solar and Heliospheric Observatory, Venus Express, and XMM-Newton. Andy Fabian, president of the Royal Astronomical Society, says, "With these cuts, UK-based researchers will struggle to retain their leading position in astronomy and space science."

"Astronomers in the UK are highly productive and deliver this excellence for a relatively low investment," he adds. "Research in astronomy is not an area where large 'efficiency savings' can be made without a detrimental impact on the quality of that work."

Nuclear physics is hit particularly hard, with a 52% budget cut and withdrawal scheduled from the Advanced Gamma Tracking Array, a European project to build a powerful spectrometer to look at the structure of atomic nuclei. The UK is also dropping out of PANDA, a project linked to the Facility for Antiproton and Ion Research particle accelerator under construction in Germany.

Long time coming

Keith Mason, who runs the STFC's day-to-day operations, blames the cuts on "the impact of the international financial situation" and the devaluation of the pound, which has led to about a 15% rise in the UK's dues to CERN and other international facilities, from £215 million in 2008–09 to £247 million this fiscal year. The budget gap is so significant that after transferring £14 million from other science budgets to put toward the STFC—compensated through extra time on facilities such as the Diamond synchrotron source for biology and chemistry—it still had a £6 million deficit for next year. "The funding of international subscriptions and major domestic research facilities clearly needs to be rethought," says Leslie.

The STFC was formed three years ago through the merger of two research councils, and it immediately found itself with an £80 million shortfall, about 12% of its budget, due to an accounting error. "It has underperformed in attracting funding ever since," says University College London physicist Mark Lancaster, who calls the cuts a "shameful waste of a decade's investment in new facilities across STFC science." The STFC has been planning the cuts for some months and had been surveying the physics community about which projects to prune.

Lancaster is concerned about the long-term impact of the cuts that the STFC is making: "The behavior of the UK is viewed with disbelief by countries which can now see that the UK is no longer to be trusted as an international partner in major scientific programs. The situation for UK scientists is made particularly bitter by the knowledge that competitor countries are making investment in science a strategic priority as their economies

emerge from recession."

Brian Foster, head of particle physics at Oxford University, says the cuts "give the lie to" the promise that science funding would be protected from the budget cuts the UK had to make because of the recession.

Backlash

Jocelyn Bell Burnell, president of the UK Institute of Physics, says, "The greatest shame about the [STFC budget] is the reduced investment in people. With all of the challenges we face, from climate change and energy security to a rapidly aging population, we urgently need individuals well trained in physics. The amount needed to avoid this unfortunate cut is minor in comparison to the huge sums of money spent saving the financial sector. Surely, money can be found to avoid it."

All of the UK's nuclear physicists signed a letter to science minister Paul Drayson alerting him to the implications of the cuts for the government's push to build 10 new nuclear power plants. "These out-of-proportion cuts have the potential to kill off the UK skills base in nuclear physics," says Patrick Regan at the University of Surrey. "It's incredible. Where does the STFC think the trained manpower that the UK will need is going to come from?"

The outcry has not gone unnoticed by the government. In a 16 December statement, Drayson said, "It has become clear to me that there are real tensions in having international science projects, large scientific facilities, and UK grant-giving roles within a single research council. It leads to grants being squeezed by increases in costs of the large international projects, which are not solely within their control. I will work urgently with Professor Sterling, the STFC, and the wider research community to find a better solution by the end of February 2010."

Paul Guinnessy

US scientists step up their efforts at diplomacy

With recent visits to North Korea and Cuba, US scientists are seeking interactions with their peers to open channels of communication.

In early December, as President Obama's special envoy was in Pyongyang trying to revive negotiations to end North Korea's nuclear weapons program, six US scientists were in town on a different mission: establishing contacts with their North Korean counterparts. In an effort in the mold of US–Soviet cold war science diplomacy, the US delegation, led by Nobel laureate biochemist Peter Agre, broke new ground as the first attempt at scientific outreach to the politically isolated nation.

The five-day visit by scientists to the Democratic People's Republic of Korea (DPRK) was the culmination of a four-year-old cooperative effort by the American Association for the Advancement of Science (AAAS), the US Civilian Research and Development Foundation (CRDF), the Korea Society, and Syracuse University, which is engaged with Pyongyang's Kim Chaek University of Technology in the sole ongoing academic science collaboration between the two nations. Members of the delegation say there was no connection with US special envoy Stephen Bosworth's visit, and the timing was purely coincidental.

Although no specific follow-up visits are planned, Agre pronounced the trip a success. "Our greatest sense of accomplishment came from the person-to-person exchanges and becoming acquainted with counterparts in the DPRK," says Agre, director of the Johns Hopkins University's Malaria Research Institute. "This can be the beginning of what we think can be a very wonderful relationship. But it's just the beginning, and we have far to go."

Agre, who steps down as AAAS president this month, had just returned from a November scientific journey to Cuba, where he and seven other US visitors met for three days with counterparts at the University of Havana and with officials from the Cuban ministries of science, health, higher education, foreign affairs, and environment. The Cuban visit also took several years to arrange, but it received an unexpected boost when Vaughan Turekian, who directs the AAAS science diplomacy program, bumped into Fidel Ángel Castro Díaz-Balart—the eldest son of Fidel Castro—during a conference in Japan. A nuclear physicist, Castro Díaz-Balart acts as scientific adviser to the Cuban government. Though out of the country during the visit, Castro Díaz-Balart