



The Holifield Radioactive Ion Beam Facility is to close, a victim of the shrinking US science budget.

OAK RIDGE NAT'L LAB., DOE

#### RESEARCH FUNDING

# US physics feels the squeeze

*Obama's pro-science 2012 budget hides some bitter pills for physical scientists.*

BY EUGENIE SAMUEL REICH

Joseph Bisognano sounds strained as he describes his current task: laying off 13 of the 40 staff members at the Synchrotron Radiation Center that he directs at the University of Wisconsin–Madison.

The facility produces infrared and ultraviolet photons that some 300 scientists use each year to study the structure of materials, including semiconductors and high-temperature superconductors. “Our last peer review said it would be a terrible mistake if we were closed,” says Bisognano. But the National Science Foundation (NSF) had to trim its instrument and facilities budget by 15%, so it opted to cut funding for the centre in the 2012 budget, making it likely that more lay-offs will follow.

The difficult call in Wisconsin provides a visceral glimpse of how restricted budgets are starting to squeeze some areas of the physical sciences in the United States. Although Congress and President Barack Obama have yet to agree on a final 2011 budget, stop-gap spending bills have forced the NSF and other agencies to start cutting programmes. And the president’s proposal for a fiscal year 2012 budget reflects continuing pressure to cut spending.

It does request solid increases for key agencies, with large boosts in energy research, but those increases are likely to be scaled back or reversed in Congress. Even as it stands, the 2012 budget is forcing agencies to terminate mature scientific initiatives to make way for new ones.

That will undermine US supremacy in some areas of physics, warn researchers. And they complain that, in some cases, cuts have been made without consulting the scientific community. For example, the budget proposes to shutter operations at the Holifield Radioactive Ion Beam Facility at Oak Ridge National Laboratory in Tennessee, saving US\$10.3 million a year. Timothy Hallman, associate director for nuclear physics at the Department of Energy’s (DOE’s) Office of Science, acknowledges that the decision was not put to the department’s nuclear-science advisory committee, saying the department had to act quickly.

The 2012 budget’s best-known victim is the Tevatron, the particle accelerator at Fermilab in Batavia, Illinois. The DOE planned to close the facility this year as operations scaled up at the more powerful Large Hadron Collider (LHC) near Geneva in Switzerland. But the Tevatron’s excellent performance prompted US researchers to request an extension, which

the DOE turned down because it would have cost \$35 million a year. Postdocs such as Elisa Pueschel of the University of Massachusetts, Amherst, saw this coming three years ago. She moved from the Tevatron to the LHC, and says that many Americans there expect to stay abroad indefinitely.

The DOE opted to close the Tevatron in part to focus on other experiments, including several aiming to capture elusive particles of dark matter or study the properties of neutrinos. Lately, though, budget concerns have hit these plans too. The DOE and the NSF have yet to reach agreement on how to fund the Deep Underground Science and Engineering Laboratory (DUSEL), to be based in Homestake, South Dakota, which would host many of these experiments. This project is estimated to cost between \$800 million and \$900 million.

The United States leads the world in developing the sophisticated beams, accelerators and detectors used in neutrino and dark-matter experiments. But it may no longer be eager to host them. “Lower-cost countries will say we’ll dig the hole to put your detectors in,” says Milind Diwan of Brookhaven National Laboratory in Upton, New York, a co-spokesman for the Long Baseline Neutrino Experiment, to be based at DUSEL.

#### SPACE WOES

The space sciences also face tough times. Last week, a review panel recommended that NASA make a Mars sample-return mission its top priority in planetary science. But the panel assumed a budget much higher than the one NASA stands to receive, and agency officials say the mission may be unaffordable.

The James Webb Space Telescope, the replacement for the Hubble Space Telescope, is adding to NASA’s budget pressure. Its cost has ballooned to \$6.5 billion — nearly half of NASA’s astrophysics budget — and is squeezing mature, productive missions. For example, Suzaku, an X-ray satellite run jointly by NASA and the Japanese space agency JAXA, will lose its US support of \$2.5 million in the 2012 budget. The satellite has unrivalled resolution in the high-energy part of the X-ray spectrum. But it is not known whether JAXA will keep it going without US support.

Jon Miller, an astrophysicist at the University of Michigan in Ann Arbor who chairs the Suzaku users’ group, is pessimistic about the future for US astrophysics. “High-energy astrophysics is a field where you get good return for the dollar, and it’s being made to suffer,” he says. Jon Morse, astrophysics division director at NASA, says the agency sought to balance funding of existing missions with the goal of increasing the launch rate for future missions.

Rob Roser, spokesman for the Collider Detector at Fermilab experiment, says he tries to convince himself that good times will return. “My dream would be yes. But I don’t know how good an imagination I have today,” he says. ■