

the space station—though it is not certain the project can survive the next few years of deficit cutting.

Overall funding of space science and applications programs would rise by 18% under the Administration's request. The agency seeks \$27 million to proceed with a new project, the Advanced X-Ray Astrophysics Facility, which has been a top priority in the astronomical community for nearly a decade. AXAF would be the third of NASA's "Great Observatories," after the Hubble Space Telescope and the Gamma Ray Observatory. Also on the agency's agenda for 1989 is \$100 million to begin the Pathfinder technology program to conduct research to support exploration of the solar system by humans and robots. In addition, NASA would put up \$110 million to continue procurement of expendable launch vehicles to get science missions off the ground without relying on the shuttle.

Department of Defense

For the first time in the Reagan years, the share of the Federal R&D budget for military programs is set to decline slightly, from 67% to 66%. While DOD is proposing to spend \$38.7 billion on research, development, testing and evaluation next year, only \$906 million—a mere 2.3%—is designated for basic research, about half of it going to universities. In fact, DOD's basic research budget would increase only 1.5%. Over at DOE, \$2.4 billion is to be spent on weapons-related R&D, about the same as in 1988.

SDI is now the largest item in DOD's research and development budget. Last year, Congress appropriated about \$3.9 billion for the total

SDI program, including \$353 million to be spent by DOE on research like the nuclear-pumped x-ray laser project and the SP100 nuclear power reactor for space. The Reagan Administration is asking for \$4.95 billion for fiscal 1989, an increase of about 27%. As huge as those figures are, they still fall short of what the White House hoped to spend on SDI.

Defense department officials say the cuts will delay by a year or two the 1992 target date for deciding whether to go ahead with the engineering development of a missile defense system. About half of the SDI budget would be devoted to technologies that could be deployed in a first phase defense, using both space-based and ground-based interceptors, while about 40% of the program will go to longer term research, such as direct-energy weapons.

House budget resolution

To the surprise of many, on 23 March the House Budget Committee adopted a 1989 budget blueprint, well ahead of the sluggish pace in the last three years. The committee called for Function 250 to receive \$1.65 billion, of which NASA will get \$1.25 billion (half of its request), NSF \$300 million additional funding (only \$33 million short of the original request) and DOE \$100 million more for its general science and high-energy physics programs (\$300 million less than it sought). The budget committee did not specify how much of DOE's new funds would go to the SSC. The agency, said Gray, the committee chairman, "could use all of it for the Super Collider, none of it or anything in between." —IRWIN GOODWIN

ly hard, he wrote, because NSF program officials had been "overly optimistic." When the agency's 1988 request for a 16.7% overall boost turned out to be closer to 3.2%, as Congress finally passed its omnibus appropriation almost three months after the start of the fiscal year, almost all the awards in materials science had already been committed. Nicholson stated that though some projects continued to be funded at or even above 1987 levels, most were reduced by 6% to 9%, "and a few even more," so that new investigators with new ideas could be supported.

The cuts were an inside job by program officers, made without benefit of peer reviews. In the end it was theorists, including Nobel laureates Philip W. Anderson of Princeton and J. Robert Schrieffer of the University of California at Santa Barbara, who came out worse than experimenters. A letter from an NSF program officer to N. David Mermin, director of Cornell's Laboratory of Atomic and Solid State Physics, apologized that the reduction had nothing to do with whether the work was "promising and important" but was "across the board" in condensed matter theory.

Though Congressional appropriations for NSF research have been virtually flat since 1985, NSF makes its own allocations of research money. So when push comes to shove, Nicholson's statement admitted, "this situation should not have been allowed to develop. The foundation is taking steps to improve program management procedures."

At a meeting of the National Science Board on 18 March, Bloch stated that NSF was at fault for "not handling the situation as well as we should have. . . . We didn't do a good job of communicating with the communities. . . . We had a similar experience in 1986 when the Gramm-Rudman-Hollings budget-balancing law came in [resulting in a \$19 million reduction for the mathematical and physical sciences directorate], but we did a better job then and didn't get all the flak that came our way this time." Bloch told an advisory committee a week earlier that he was "getting a lot of hate mail."

Bloch is taking steps to head off such problems in the future. All financial implications of grants and projects will be recorded in a computer database showing weekly and quarterly outlays and future obligations over three to five years. "It will be relatively easy to keep track of commitments once a trigger mechanism is in place," says Bloch.

—IRWIN GOODWIN ■

NSF, UNDER SIEGE BY PHYSICISTS, ADMITS MISTAKES IN RESEARCH CUTS

The remark had a touch of irony. "The days of NSF as a quiet, obscure agency, insulated from political pressures, are gone," Erich Bloch, director of the National Science Foundation, told the annual joint meeting of The American Physical Society and the American Association of Physics Teachers in January. "We should welcome this." Even as he spoke, the foundation was under siege by battalions of university researchers, many in condensed matter and solid-state physics, which had taken the brunt of cuts when Congress pared NSF's fiscal 1988 funding. Not content with complaining to NSF about the ax it used to chop the size and number of

awards in those fields, the scientists protested to key members of Congress and to their staffs on appropriations and budget committees (PHYSICS TODAY, March, page 41).

As inquiries from Capitol Hill piled up on Bloch's desk, he directed a 17-year veteran in NSF's ranks, Richard S. Nicholson, assistant director for mathematical and physical sciences, to issue a communiqué about the action. It was a no-nonsense *mea culpa*. Significant reductions for existing grants in materials research were made, Nicholson admitted, as "the only way that funds can be made available for new awards this year." Some researchers were hit particular-