

NSF foresees tight budgets for years to come

The proposed FY 1983 budget for the National Science Foundation represents a 7.7% increase over funding levels appropriated for FY 1982. Research and related activities are slated to receive \$1.055 billion of the \$1.072 billion NSF budget, 8.7% more than last year. The mathematical and physical sciences did better than average, up \$25.8 million or 9.5% above FY 1982 (see the table for details). Meanwhile, President Reagan has once again recommended reducing science and engineering education funding. His request for FY 1983 is down \$5.9 million from the \$20.9 million approved by Congress for FY 1982, eliminating all but graduate fellowships.

At this writing, Reagan's budget request had already embarked on its passage through the Congressional committees and subcommittees that will determine the final amount available to NSF in FY 1983; if this year is like last year, there may well be many changes along the way (PHYSICS TODAY, September 1981, page 53).

Donald Langenberg, deputy director of NSF, explained to us that there was a new outlook regarding budgetary decisions this year. He said, "We have every reason to believe that the budget will be tight for a number of years, and it has already been tight for awhile. Thus, while continuing to emphasize scientific excellence and to provide support for the best projects that are proposed, if necessary we will reduce the number of grants offered."

Physics. Marcel Bardon, director of the NSF physics division, told us his division is planning an internal review of all programs. A review of nuclear physics, which included eight external reviewers as well as staff, concluded with participants presenting their findings at a meeting at NSF on 2 March. A review for particle physics is now in the works. Bardon felt that the reviews were necessary because "you cannot go on cutting back programs across the board year after year. You have to be more selective."

For nuclear physics one of the major changes in FY 1983 is the transfer of responsibility to NSF from the Department of Energy for continuing con-

struction of Phase II of the Michigan State University Cyclotron (PHYSICS TODAY, April 1982, page 55). There is \$6.8 million for MSU Phase II in the NSF budget for FY 1983; an additional \$10 million will be needed in FY 1984 and FY 1985 budgets to complete the project, according to current cost estimates.

The Indiana University Cyclotron

Facility, given high priority by the Nuclear Science Advisory Committee, is slated to have its capabilities enhanced by the construction of an electron-cooling storage ring (PHYSICS TODAY, March 1982, page 21). Construction for the Indiana cooler will begin in FY 1983, with \$2.0 million budgeted of the total \$6.0 million estimated to be needed for its completion.

NSF physics-related research

	FY 1981 actual	FY 1982 estimate (in millions of dollars)	FY 1983 request
Mathematical and physical sciences directorate			
Mathematical sciences	28.3	31.2	33.9
Computer research	22.3	25.7	29.3
Physics			
Elementary particle	25.2	26.2	28.4
Intermediate energy	11.9	13.0	14.2
Nuclear	13.2	12.7	13.5
Atomic, molecular and plasma	9.0	9.4	10.3
Theoretical	9.0	9.5	10.4
Gravitational	3.8	4.5	4.9
Sub-total	72.1	75.3	81.7
Transfer from DOE of MSU Phase II	0	0	6.8
Total physics	72.1	75.3	88.5
Chemistry	57.6	60.7	66.1
Materials research			
Solid-state physics	9.0	9.6	10.3
Solid-state chemistry	5.6	6.0	6.8
Low-temperature physics	5.2	5.4	5.8
Condensed-matter theory	5.4	6.0	6.5
Metallurgy	7.5	8.1	8.7
Ceramics	4.3	4.6	4.9
Polymers	4.8	5.3	6.0
Materials research laboratories	21.3	22.5	24.2
National Magnet Laboratory	4.6	4.5	4.7
Synchrotron radiation	2.8	2.0	2.4
Small-angle neutron scattering	0.5	0.5	0.6
Sub-Total	71.0	74.5	80.9
Transfer to DOE of SSRL	5.2	5.5	0
Total materials research	76.2	80.0	80.9
Total mathematical and physical sciences	256.5	272.9	298.7
Astronomical, atmospheric, earth and ocean sciences directorate			
Astronomical sciences			
Kitt Peak/Cerro Tololo	16.9	17.3	18.5
Sacramento Peak Observatory	1.9	2.0	2.1
National Astronomy and Ionosphere Center	5.4	5.3	5.7
National Radio Astronomy Observatory	14.8	14.8	15.9
Research project support	19.4	19.7	21.0
Total astronomical sciences	58.4	59.1	63.2
Atmospheric sciences	69.3	70.0	74.8
Earth sciences	27.9	29.2	34.4
Ocean sciences	75.0	75.8	81.0
Arctic research program	5.8	5.9	6.3
Total astronomical directorate	236.4	240.0	259.7

Due to a constricting budget, NSF will no longer be able to continue to support accelerator operation at all nine university laboratories currently supported, Bardon said. (They are Caltech, Florida State, Notre Dame, Princeton, Rutgers, Stony Brook, University of Rochester, University of Pennsylvania, and the University of Pittsburgh.) Two of the laboratories, which have yet to be selected, will receive reduced support from NSF, which will enable experimenters to use national facilities but will severely limit funds for in-house machine operation.

Upgrading the tandem Van de Graaff at Stony Brook will be completed with FY 1982 funds, and initiation of a superconducting post accelerator for the tandem Van de Graaff at Florida State is scheduled with FY 1983 funds.

In particle physics, Bardon told us, "Some groups won't be able to build major experimental equipment, but they will receive funds to participate in experiments at national facilities." This reflects an attempt to use funds more effectively by concentrating major support on some of the programs. As part of this effort, support for the Cornell Electron Storage Ring is increased by \$0.8 million to \$9.2 million, permitting a constant level of activity to be maintained and some storage and detector improvements to be made.

The increase in FY 1983 of \$0.9 million for theoretical physics will allow support for the Institute of Theoretical Physics at Santa Barbara (see page 21) to continue, provide some support for theorists at universities, and permit an increase in computing capabilities for theorists.

Funding for gravitational physics in FY 1983 increases \$0.4 million over FY 1982, providing support for both the continuation of the ongoing program and the further development of prototypes for a laser interferometer gravity-wave detector system.

Materials research. Lewis H. Nosenow, acting director of the NSF materials research division, told us, "Because of the increased costs of equipment and other factors in the support of materials research, the funding requested for FY 1983 probably will not allow NSF to support as many research workers as were supported in FY 1982. Therefore, there will be a continuation of the erosion that has been taking place for several years in the overall effective level of support." The increase in the materials research budget of about 8.6% will be used primarily to support ongoing programs, with no realignment of priorities. The only major change, according to Nosenow, is the completion of the swap between DOE and NSF (PHYSICS



LANGENBERG

TODAY, April 1982, page 55), with DOE assuming responsibility from NSF for the Stanford Synchrotron Radiation Laboratory, budgeted at \$5.5 million in FY 1982, while NSF assumes support for MSU Phase II. The Cornell and Wisconsin synchrotron radiation labs will remain under NSF.

The National Magnet Laboratory's budget of \$4.7 million, up only 4.4% after an overall reduction in FY 1982, will require further reductions of in-house research to permit continuation of user operation at constant levels.

Research-project support for solid-state chemistry and polymers shows modest growth above inflation in FY 1983. In addition, there will be an increased emphasis on intermediate-sized equipment that serves several users, such as a scanning transmission electron microscope. Ronald Kagarise, acting assistant director for mathematical and physical sciences, told us this effort should entail about \$1 million more in FY 1983 than was funded in FY 1982.

Although instrumentation needs were cited (at the budget briefing in February) by NSF director John B. Slaughter as a high priority within NSF, Langenberg said that while there had been growth in the equipment and instrumentation budget, increased to \$85.1 million in FY 1983 from \$77.7 million in FY 1982, funding was still below the \$86.7 million spent in FY 1981. Last November Congress passed

legislation that provides increased tax deductions to corporations for equipment donated to universities for research. Discussing industry's ability to fill university instrumentation needs, Kagarise told us, "Industry is not going to be a major factor, and manufacturers are unlikely to donate expensive equipment because of a tax write-off."

Astronomy. The budget request for FY 1983 for the astronomical, atmospheric, earth and ocean sciences directorate is approximately 8.2% more than FY 1982. According to assistant director Francis Johnson, little change in priorities within astronomy can be seen in this year's budget (see the table).

The National Scientific Balloon Facility in Texas, whose budget was reduced from \$2.4 million in FY 1981 to \$1.5 million in FY 1982, is in the process of being transferred for FY 1983 to NASA, according to Johnson, because it is the primary user of the Facility.

Funds for the earth sciences are increased nearly 18%, consistent with recommendations made by the National Science Board. This reflects both a continuation of a trend begun in FY 1982 and the Administration's policy, cited by Slaughter, to emphasize the earth sciences because of their importance to national goals.

Education. The FY 1983 budget request of \$15 million for science and engineering education in NSF represents another attempt by the Reagan Administration to eliminate this directorate. The FY 1982 request of \$9.0 million, down from \$70.7 million in FY 1981, would have provided only enough funds for ongoing graduate fellowships. Congress balked, and passed appropriations of \$20.9 million for FY 1982. At a hearing of the House Committee on Science and Technology held 4 March to discuss the FY 1983 NSF budget, several Congressmen expressed criticism of the Administration's attempt to drop all science-education activities from NSF except the \$15-million graduate fellowship program. However, even if Congress restores funds for education, NSF may have problems administering the money because the staff has been cut from 65 employees last October to 15. —JC

NASA budget cuts planetary programs

In President Reagan's proposed budget for FY 1983, funds for NASA increase from \$4.7 billion in FY 1982 to \$6.6 billion. Support for basic research is scheduled to increase by \$102 million over FY 1982 levels, to \$682 million. Funds for planetary exploration are cut 25%, to \$154.6 million (from \$205.0 million last year). More than half of the

total NASA budget for FY 1983, or approximately \$3.8 billion, supports the continued development of the Space Shuttle and its auxiliary systems.

While the budget request for NASA increases overall, cuts to particular programs and possible shifts in priorities have caused concern. At a press briefing in February, Thomas Newman