

state & society

Budget: some programs to be boosted, others cut

Funding for physics in the FY 1974 budget is at about the same level it was in the budget for FY 1973. Many programs will get small increases, which will help to make up for the effects of inflation, but some, such as the National Accelerator Laboratory and the controlled thermonuclear research program will get substantial increases. Others, like the rest of the Atomic Energy Commission's national laboratories, will be cut. One NSF official estimated that total funds for physics research in the universities and colleges would total around \$140 million, or about the same dollar level as last year.

Applied research is still the direction in which a lot of the money is flowing. NSF director H. Guyford Stever said that the new budget would continue to provide support for research and education, but that "the highest priority, however, is accorded the research programs which promote fundamental research in the long-range national interest and pursue research related to understanding and solving domestic problems." In keeping with this, the NSF Scientific Research Project Support program, which funds basic research, is requesting a rise of 5% to \$275 million as compared to an 11% rise to \$79.2 million in Research Applied to National Needs. In the Scientific Research Project Support program, the hard sciences and life sciences are requesting increases ranging from \$0.2 million on the \$12.4 million request for atmospheric sciences to \$1.5 million on the \$36.5 million request for physics and \$1.5 million on the \$58.8 million request for biological sciences. Social sciences will get an increase of \$2.1 million if a request for \$25.4 million is approved, and engineering will go up \$2.6 million on passage of a request for \$29.5 million.

The NSF request for FY 1974 totals \$641 million, an increase of \$26.5 million over the estimated spending for FY 1973. These figures, however hide the fact that the apparent largesse of the proposed increase is due to \$62.4 million in appropriated funds that were withheld by the Office of Management and Budget in FY 1973 and

added to the FY 1974 NSF figure. As a result of the expected release of these funds, the appropriation request for 1974 is only \$579.6 million plus \$3 million in foreign currency as opposed to the 1973 appropriation of \$638 million plus \$7 million in foreign currency.

The NSF physics budget within the Scientific Research Project Support has requested \$36.5 million, an increase of \$1.5 million (about 4%) that will amount to little or no real dollar gains if the current rate of inflation of about 4% or 5% per year continues. Marcel Bardon, the head of the physics section at NSF, said that the FY 1974 physics budget would essentially hold the line, although there are "some limited new thrusts in various fields of physics that will be funded at the expense of existing programs."

The NSF elementary-particle physics program is heavily involved in the support of users groups at the national laboratories (particularly NAL) and Cornell. The nuclear-physics funds will be under pressures from the users

of Nevis, LAMPF, and those at Indiana and from various developmental studies for new light- and heavy-ion accelerators. In theoretical physics, support will continue for work on elementary particles, nuclear structure and reactions, and there will also be some emphasis given to theoretical studies of gravitational interaction, including probes of source mechanisms, new experimental tests of gravitational theories and work on the problems of quantizing gravitational fields. NSF will continue to support a broad array of experimental studies in atomic, molecular and plasma physics, with some emphasis on new possibilities such as higher resolution spectroscopy and atomic interactions in an extended range of energies. Solid-state and low-temperature physics funding will respond to increased pressures in surface science, including studies of chemisorption, high-resolution studies of surface structure and studies of the behavior of monolayers adsorbed on regular surfaces.

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Ray appointed chairman of AEC

On 6 February President Nixon announced the appointment of Dixy Lee Ray as chairman of the US Atomic Energy Commission. Ray is the first woman chairman of the AEC, and, upon her appointment to the Commission last August, she was the first woman ever named to a full five-year term. She succeeds James R. Schlesinger, who has become Director of Central Intelligence.

A marine biologist specializing in marine invertebrates, Ray was director of the Pacific Science Center in Seattle and an associate professor of zoology at the University of Washington prior to her AEC appointment. As director of the PSC, a position she held since 1963, Ray was actively involved in improving the public understanding of science. The Center develops participation programs, demonstrations and exhibits in various fields of science.

Ray holds a BA (1937) and MA (1938) in zoology from Mills College in



RAY

J. E. WESTCOTT, USAEC

Oakland, California. After completing a PhD in biology at Stanford University in 1945, she joined the department of zoology at the University of Washington, where she has been engaged in research and teaching ever since. Among other science responsibilities, she has served on the executive committee of the Friday Harbor Laboratories (1945-60); she was a special consultant in biological oceanography to the National Science Foundation (1960-62); she was chief scientist and visiting professor on the Stanford University research ship *Te Vega* during the International Indian Ocean Expedition in 1964, and she served on the Presidential Task Force on Oceanography in 1969.

Budget

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According to Bardon, dropouts from other agencies who come to the physics section for support are "a problem very much smaller than they were a year ago, when they made a big impact." There is no new funding included in the 1974 budget earmarked to absorb dropouts, he said, and those who have lost funding at other agencies are simply put into open competition with others.

The NSF budget includes continuing decreases in funding for its institutional grants for science, down to \$6 million from \$8 million, and the termination of the graduate traineeship program, funded at a level of \$9.2 million, down \$4.8 million from FY 1973. This represents the end of this program and provides funds for the continuation of some awards and 500 new ones.

At the Foundation's National Research Centers, funding at Arecibo has dropped by \$0.2 million to \$3.1 million,

Cerro Tololo remains constant at \$2.6 million, Kitt Peak is up \$0.4 million to \$8.0 million and the National Center for Atmospheric Research is up \$1.0 million to \$17.1 million. Funding for the National Radio Astronomy Observatory is up \$7.3 million to \$17.2 million, but this includes \$10 million for the Very Large Array as planned when the project was announced last year.

Although increased opportunities are available to astronomers with the expected opening of the new 4-meter telescope at Kitt Peak and the twin instrument at Cerro Tololo and the upgrading of the Arecibo antenna, the small increase in the NSF astronomy program is overshadowed by the recent cuts in the NASA research program. NSF officials expect that many of those whose research is no longer supported at NASA, particularly those involved with HEAO, will come to NSF for grants, but that no money will be available. NSF is receiving an increase of \$0.4 million to \$9.0 million, which may be compared with the \$179 million cut from the NASA FY 1973 appropriated funds.

NSF will be supporting work on x-ray stars and some gamma-ray work as well as research on and installation of improved optical and radio detectors (particularly in the millimeter-wave region) for existing telescopes. The radio-telescope installations at Ohio State University and the University of Illinois will lose NSF support in 1974.

AEC. John Teem, head of the physical research program at AEC, said that the program had done well in this quest for funds in the FY 1974 budget. He said "although it is always the case that people feel that they should have gotten more money, we've done very well in a very tight year."

Within physical research, high-energy physics received an increase of \$4.1

End of Astron

At Lawrence Livermore Laboratory the Astron Program has been terminated effective 28 February. After the death of Nicholas C. Christofilos last September the \$1.9 million/year program had been headed by Richard Briggs. The fate of a classified program funded by ARPA that used the Astron facility is still being reviewed. The superconducting Levitron experiments are being phased out by the end of the fiscal year; this program, headed by Charles Hartman, cost \$400 000/year. The staff associated with both programs are being transferred to a scaled-up mirror program.

million, but the National Accelerator Laboratory, which is expected to be in full operation by the end of this year, got an increase of \$9.2 million. The Cambridge Electron Accelerator will terminate research some time in 1974 if the NSF does not pick it up as a synchrotron radiation source, and there are reductions in the high-energy programs at all of the other labs. Los Alamos, which is part of the medium-energy program, received an increase of \$2.7 million for work at LAMPF.

There is a shift in emphasis in the AEC nuclear chemistry and low-energy physics programs to more work with heavy ions. In the metallurgy and materials section of the physics program there will be a continued emphasis on studies of the effects of radiation on materials and the use of neutron scattering to study the structure of solids.

Layoffs have been announced at many of the AEC's laboratories. Although there were no breakdowns on what job categories will be affected at press time, the total numbers are: Argonne, 250; Brookhaven, 225; Lawrence Berkeley, 210; Lawrence Livermore, 275; Los Alamos, 200; Oak

Table 1. NSF Scientific Research Project Support

Discipline	(Millions of dollars)	
	FY 1973 (estimated)	FY 1974 (requested)
Atmospheric sciences	12.2	12.4
Earth sciences	10.3	11.3
Oceanography	13.1	14.5
Biological sciences	57.0	58.8
Physics	35.0	36.5
Chemistry	25.3	26.7
Astronomy	8.6	9.0
Mathematics	14.0	14.4
Social sciences	23.3	25.4
Engineering	26.9	29.5
Materials Research	35.0	36.5
Total	261.0	275.0

Table 2. NSF Physics Budget

Program	(millions of dollars)	
	FY 1973 (estimated)	FY 1974 (requested)
Atomic, molecular and plasma physics	3.6	3.7
Elementary particle physics	14.9	15.5
National Magnet Laboratory*	2.5	2.7
Nuclear physics	11.7	12.2
Solid-state and low temperature physics*	9.8	10.1
Theoretical physics (except low temperature and solid state)	4.8	5.1
Total	47.3	49.3

*Handled in Division of Materials Research

Table 3. AEC Physical Research and CTR Operating Budget

Program	(Millions of dollars)	
	FY 1973 (estimated)	FY 1974 (requested)
High Energy Physics		
Cambridge Electron Accelerator	2.0	0.6
Alternating Gradient Synchrotron	24.6	24.2
Zero Gradient Synchrotron	15.6	14.4
Bevatron	15.2	13.4
SLAC	24.95	24.2
200 GeV Accelerator	19.2	29.0
General Research and Development	22.850	22.7
Total High Energy Physics	124.4	128.5
Medium Energy Physics	15.9	18.0
Low Energy Physics	25.3	26.5
Mathematics and Computer Research	4.6	4.0
Chemistry	46.4	46.5
Metallurgy and Materials Research	24.2	26.5
Total Physical Research	240.8	250.0
Controlled Thermonuclear Research		
Research and Development	13.555	16.28
Confinement Systems	23.445	28.22
Total CTR	37.0	44.5

get (see PHYSICS TODAY, March, page 97), the Venus-Pioneer program is not in the FY 1974 funds and Orbiting Solar Observatories J and K are gone too. Applications Technology Satellite G has been cancelled. There is, however, still a strong program at NASA with Skylab, the US-Soviet docking venture in 1975, Viking landers, the 1977 Jupiter-Saturn missions, and another Mariner flight. The shuttle is being continued although it has taken a cut in funds that will delay its development somewhat. The NASA physics and astronomy program is down to \$95.0 million in the new budget, compared with \$126.2 million in 1973. —SMH

Four new members for AEC advisory committee

The President has appointed four new members to serve on the General Advisory Committee of the US Atomic Energy Commission. They are Evans Hayward, a physicist at the National Bureau of Standards center for radiation research; Hubert Heffner, chairman of the department of applied physics and professor of applied physics and electrical engineering at Stanford University; Michael M. May, associate director-at-large of the Lawrence Livermore Laboratory, and Walter H. Zinn, a retired vice-president of Combustion Engineering, Inc and former director of Argonne National Laboratory.

Nuclear Data Committee is now operating

A US Nuclear Data Committee has been formed to deal with problems in measurement, compilation, evaluation and distribution of nuclear data. It operates under the auspices of the Director of Physical Research of the US Atomic Energy Commission and in cooperation with the National Standard Reference Data System of the National Bureau of Standards.

The Committee directs requests for nuclear-data measurements to appropriate parties and, in turn, prepares and makes available periodic lists of the most sought-after nuclear-data measurements. It also distributes reports on progress made in supplying the information for which it has received requests.

Inquiries concerning nuclear-structure and reaction data should be made to the Nuclear Data Project, Oak Ridge National Laboratory, Oak Ridge Tennessee 37830. For neutron data the National Neutron Cross-Section Center at Brookhaven National Laboratory, Upton, New York 11973 should be contacted. Requests for other types

the scientific feasibility of controlled fusion in the early 1980's.

In confinement-systems funding, the open-systems operations are requesting funds of \$5.530 million in FY 1974 as opposed to \$5.625 million in FY 1973. Closed-systems operations, which include the Princeton Large Torus, the 2XII machine at Lawrence Livermore Labs, Scyllac at Los Alamos and the Ormak at Oak Ridge as well as other programs have received an increase of \$2.795 million to \$17.740 million. A total of \$4.950 million is allotted to major device fabrication, and much of this money will be used on the PLT, now in the beginning state of construction.

At the Department of Defense, R&D funding of \$8.99 billion is requested, \$482 million more than the estimate of spending for 1973. Most of this amount is for development with about \$1.9 billion for research. Basic research will get around \$0.5 billion of this, going up by \$29.6 million, but there is little information as to how much of this will go to basic physics. One source said that he saw significant shifts away from supporting basic physics at DOD, although he admitted that the picture was not all that clear.

NASA's budget shows an increase from \$3.062 billion to \$3.136 billion, although this is the result of money withheld from the FY 1973 budget. \$3.423 billion was spent in FY 1972 and the budget request for 1973 was \$3.302 billion. Apart from the casualties of recent cuts in the current bud-

Ridge, 500; Sandia, 700, and SLAC, 80.

In the AEC's controlled thermonuclear research program, which is now funded separately from the physical research program, the total funding is up \$7.5 million. This includes an increase of \$2.725 million in the research and development part of the program and a jump of \$4.775 million in confinement-systems funding. R&D in FY 1974 will focus on preparations for the development of larger superconducting magnets and more powerful neutral beam sources that will be used in the next generation of fusion devices, the generation that is expected to demonstrate



BARDON