

state & society

Physics research gains in Defense budget

President Carter's budget request for FY 1979 contains over \$130 million for physics-related research to be conducted or sponsored by the Air Force, Army and Navy. This would be a 13% increase over the previous fiscal year. Overall, defense-related R&D in FY 1979 has been budgeted at \$12.7 billion (about 45% of the total Federal R&D budget), an increase of \$1.0 billion over FY 1978. DOD research funding is also expected to rise by 14% to \$467 million.

In addition to the funds budgeted for the services, the Defense Advanced Research Projects Agency has allocated \$49.1 million for its Defense Research Sciences program, as compared to \$42.0 million in FY 1978. Precisely how much of this is physics-related research is uncertain, but a brief breakdown is given in the table on page 103.

The DOD High-Energy Laser Program, according to the budget, would increase from \$150.0 million in FY 1978 to \$184.1 million in FY 1979. The charged-particle beam technology program, funded at about \$11 million since FY 1977, may receive an additional \$6.0 million this year as a result of a new management plan. Both of these programs are funded by all three services, and laser research receives additional support from DARPA.

DOD has asked for \$9 million to begin



DAVIS

a new Defense Science and Engineering Program designed to strengthen ties between the department and the academic research community.

The estimates summarized in the table come from several military sources. It should be realized that each service (including its office of scientific research) has different management systems and thus different ways of reporting their budget figures. Care should therefore be taken

in making comparisons or overall assessments of each service's program.

For example, in-house work to be done in the Army is listed by technology area; thus exact figures were unobtainable for research to be done in separate scientific disciplines at the Army laboratories. George Gamota, in the Office of the Undersecretary of Defense for Research and Engineering, estimates that about \$30 million will be allocated for physics-related work at these locations. A detailed breakdown of physics and materials research done under Army contract was also unobtainable for FY 1979, but the Army Research Office indicated that optics is expected to receive a large percentage increase, and that moderate increases were planned for work in condensed matter, electromagnetic technology and the last three categories listed under "Materials" in the table. All other programs were expected to remain at a fairly constant level.

Air Force support for physics-related research appears to have increased only to the extent of meeting cost-of-living increases. A separate breakdown of in-house and contract work was unobtainable. Similar increases are budgeted for most of the Navy's physics-related efforts; small decreases are planned in the Naval

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New NBS director plans to restore scientific strength

New opportunities for employment of physicists at the National Bureau of Standards will occur this year if its budget for FY 1979 is approved by Congress. This is the expectation of Ernest Ambler, sworn in as the new director of NBS on 3 February. Ambler recently talked with PHYSICS TODAY about his plans for the Bureau.

The President has asked Congress to appropriate \$94.4 million, a 26% or \$24.2 million increase (the largest in the Bureau's history) over the FY 1978 level. (NBS's total budget for FY 1979 may reach \$155 million, which includes Congressional appropriations as well as funds received from sales of goods and services and for work done for other Federal

agencies and industry.) The new budget includes a program increase of \$2 million as the final increment of a five-year plan for increasing basic research and rebuilding technical competence. The erosion of NBS's scientific and technical base was recently the focus of Congressional concern (PHYSICS TODAY, January 1978, page 101). At his confirmation hearings Ambler noted that NBS's efforts in mathematical modeling, computer sciences, organic chemistry, materials science and surface physics "are all presently at a level where increased resources could be applied in the national interest."

In the first year of the rebuilding period, Ambler told us, he expects that

physicists will be hired to work in computer science, mathematical modeling, the study of mechanical properties of materials and the determination of properties of materials through small-angle neutron scattering using the NBS reactor. He was less certain about what new personnel he would be recruiting in future years, but believed that some physicists would be hired to strengthen the Bureau's capabilities in theory and mathematics. In addition, "there are areas of physics in which the Bureau must be pre-eminent and where there will always be opportunities, such as the fundamental limitations to the width of a resonance (which is directly linked to how well you can stabilize frequencies), and

any new kind of idea that holds promise in the area of fundamental constants. We shall be strengthening through consolidation, and possibly through expansion, our studies on the nature of critical phenomena, an area that we are strong in."

Ambler contrasted his situation with that of Edward Condon, who was director of the NBS in the immediate postwar period (1945-51) when the Bureau had a similar opportunity to strengthen its scientific capability. In Condon's time, many new fields of physics were opening up. "Now, I'm not sure whether the situation is the same. To be sure, there are areas of rapid growth; but some of these, such as high-energy physics, are just way outside our being able to afford them. Some of the best opportunities I see for physicists in the Bureau would come if they are interested in the contributions of physics to multidisciplinary problems. If physicists have a turn of mind to be interested in the broader aspects of problems, I think the future will be very bright for them." As examples of multidisciplinary problems, Ambler mentioned mathematical modeling, the nature of surfaces from the point of view of their physical, chemical and mechanical properties, non-equilibrium processes in chemical kinetics, the technology of computers, automation and sensors and the strength of materials.

Ambler stressed that in building scientific competence within the Bureau, he will be consulting with people in industry and in the universities—something he has been unable to do to any great extent while serving as acting director of the NBS since June 1975. He expects to have more time to represent the Bureau externally after he completes building his upper-level management team, which includes a new deputy director (the position which Ambler has held since 1973) and the directors of the major management units within the NBS.

Ambler has become director of the NBS at a time not only when it expects to receive a large increase in funding, but also during a period when a major reorganization along disciplinary lines will be taking place within the Bureau. At his confirmation hearings, he pointed out that "many activities that have developed a common technical discipline are now spread throughout the organization. Bringing these dispersed activities together will strengthen the organization technically."

Under the old organizational structure, the NBS was divided into four institutes: Basic Standards, Materials Research, Applied Technology, and Computer Sciences and Technology. The new structure retains the last institute as a separate unit, but the others have been reorganized into two new units. The National Engineering Laboratory will be responsible for R&D and services allied to solving national problems in engineering and ap-



AMBLER

plied science; the National Measurement Laboratory will be responsible for the national system of physical, chemical and materials measurement. The latter will be divided into five centers (for absolute physical quantities, radiation research, thermodynamics and molecular science, analytical chemistry, and materials science) and nine offices.

The largest increase in the NBS's FY 1979 budget would be in computer technology, up from 4.3 million in FY 1978 to \$17.9 million. A program increase of \$1.6 million (up to \$19.9 million) has been requested for the program in properties and performance of materials, including nearly \$1 million in additional funds for the nondestructive evaluation techniques program.

At his confirmation hearings, Ambler noted that NBS during the coming year plans to double the present power (10 megawatts) of its reactor, which functions as an experimental neutron source. The NBS linear accelerator, he admitted, is facing obsolescence and competition from more modern facilities, but studies are being made to see if possible design modification can return it to the status of a frontier instrument. He also conceded that the NBS synchrotron ultraviolet radiation facility has a smaller and less powerful beam than similar facilities elsewhere, making it less desirable for research purposes; but he noted that it has the best stability and definition of beam, allowing it to function as an absolute standard source of uv radiation.

—CBW

Staff changes at NSF physics division

The physics division of the National Science Foundation has a new director, and other staff changes have also been made within the division.

Marcel Bardon, the former deputy director of the division, became the director in November, succeeding the late William Wright in the position. Shortly before his

death in March, Wright was appointed a senior planning officer to work with James A. Krumhansl, the assistant director charged with the administration of research in the physical sciences at NSF.

Other staff changes include the appointment of Howel G. Pugh, the former program director for intermediate-energy physics, to head the new nuclear science section formed within the physics division. Several new program officers were also appointed.

The new program officers are:

John Poirier of Notre Dame University, now a program officer for elementary-particle physics; Barry Holstein from the University of Massachusetts, Amherst, is now a theoretical physics program officer; Douglas Bryman of the Tri-University Meson Facility in Vancouver, Canada, who is a program officer for intermediate-energy physics; Hobson Wildenthal of Michigan State University and new program officer for nuclear physics and Norman Gelfand of the University of Chicago, who also is an elementary-particle physics program officer.

Additionally, Richard Isaacson has been named the program director for gravitational physics. Isaacson moves from being the associate program director for theoretical physics.

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Research Laboratory's support of general physics and materials research.

Lasers and charged particles. For its High-Energy Laser Program DOD has requested \$184.1 million in FY 1979. The funding is aimed at developing the technology base (pointing, tracking, subsystems and fire control) for potential weapons using lasers. The amount of \$145.4 million has been requested for the three services and \$38.7 million for the Defense Advanced Research Projects Agency. The latter agency is investigating the possible applications of high-energy lasers in space; it is thus concentrating its efforts on the development of efficient infrared chemical and visible electric laser technologies as well as the precise pointing systems and large optics that will be necessary in space.

The charged-particle beam technology program of DOD may receive in FY 1979 an additional \$6 million beyond its regular funding of about \$11 million per year. The possibility of extra funding, which would go to the Navy, developed after a new management plan addressing this technology was completed by Ruth M. Davis, Deputy Under Secretary of Defense for Research and Advanced Technology.

Davis testified in a Congressional hearing that "Plans for advanced development efforts have been cancelled. In-