the facility should be an entirely new machine—such as Argonne's proposed IPNS—or a modified existing facility.

ERDA is funding Fermilab's Energy Doubler/Saver, a ring of superconducting magnets to be installed in the main tunnel. When completed, this project will double the energy of the accelerated protons to 1000 GeV and reduce the electric power used. The development work is being done out of operating funds, rather than with construction funds, Kane said. He justifies the project's support as follows: "We have defined it as a development project, not as construction, until we get a beam. Anything we have to do after that to make it the real Doubler/Saver—like upping the rf, for instance—will be construction," but for now he is trying to get along just using R&D money.

Kane told us his highest-priority construction project for the next fiscal year is a new $24-million synchrotron light source, proposed in the FY 1978 budget, to be built at Brookhaven. This, too, will be a frontier facility, he said, with applications in many areas of science, not just in energy-related work.

Nuclear-research funding history. Because the President's budget request for physical research at ERDA in FY 1977 was "so stringent," according to Kane, the low-energy portion of the agency's nuclear-science request was deliberately cut back by almost $3 million. "The OMB didn't tell us to do that, *we* did it," he said, in order to expand basic-research programs in other areas. Congress appropriated an extra $7 million for ERDA's nuclear-science program last year, but it also failed to authorize any of the ERDA budget, including the additional money. At the time we spoke with Kane, he expected that the program would receive the full $7 million for nuclear science provided as a Congressional add-on.

Materials and molecular sciences. Kane told us he expects ERDA's support for high-energy and nuclear physics to remain fairly level for the foreseeable future, but in other physical-research areas he looks for increasing activity. Some of the fields to be studied more intensively, he said, are combustion and the formation of pollutants from fossil fuels; the structure and chemistry of coal; catalysis, especially as related to hydrocarbons, and the whole realm of photoconversion, the transformation into usable energy of photons (and the storage of that energy).

Many of these concerns come under the heading of materials sciences, and Kane outlined some of the division's physics-related efforts in this category: For historical reasons, he said, ERDA runs most of the high-flux research reactors in the US; originally used for the study of scattering cross-sections and neutronic phenomena, they now are employed extensively in solid-state research, for which their neutron beams make fine probes. Because of the slowdown in nuclear-physics support, research-reactor operations may be affected. In the past the nuclear-physics and materials programs had been sharing the cost. Now there is danger that the materials-research program will be unable to afford the increased cost. Kane told us the division is also heavily involved in superconductivity; other materials-related research includes the study of how impurities in coal affect structural materials in fossil-energy plants and of the combined effect of chemicals and stresses in corrosion.

In the division's catch-all "Molecular, Mathematical and Geosciences" program, Kane told us, combustion is an area in which ERDA must really push hard to solve very complex physical problems almost from first principles. The division's mathematics program emphasizes applied, mostly numerical, work; according to Kane, the agency possesses an enormous complex of computation equipment, including most of the really big computers in the US.

"Relevance" vs "Good science." Asked how he chooses which physics research efforts to fund, Kane told us that the agency's energy mission in no way restrains him from supporting promising new physics work that comes along. "I believe deeply," he said, "that so many times you don't know what's 'relevant' until after you do it. Good science has a way of proving relevant." If a mission agency takes the attitude that it won't try anything unless the expected results are clearly relevant to one of its existing programs, then it is heading for trouble, according to Kane. —FCB

Kissinger asks cooperation for technology transfer

At a National Meeting on Science, Technology and Development convened in Washington, DC by the State Department in the waning days of the Ford administration, then-Secretary of State Henry Kissinger called on the audience of 800 business, government and academic leaders to help in the process of technology transfer. The conference was the first held to assist the State Department in planning for the United Nations Conference on Science and Technology for Development, scheduled to take place in 1979.

In his keynote address Kissinger said, "When we called this conference we were expecting to do some more long-range planning than now turns out to be the case . . ." When the laughter subsided, he said that if other nations do not have a sense of belonging, "then those who feel themselves disadvantaged, unjustly treated, dispossessed, will band together, and they will join any other group that is willing to undermine the existing order."

KISSINGER

"In the broad self-interest of the United States which, in this sense, is identical with the world interest, development of less-developed nations must be one of the increasing concerns of our country." The developing countries must have access to worldwide capital markets, and they must be helped to find new markets for the goods and services that they produce. Although the international community ought to help them develop, transfer, adapt and manage technology appropriate to their needs, "there is no substitute for hard effort by the developing countries in their own process of development . . ."

Over the last year the US had made a number of proposals, which include:

- Creation of an international center for exchange of technological information,
- Support of regional advisory services under UNCSTAD auspices,
- Establishment of an international resources bank,
- Development of incentives and measures to curb emigration of highly trained manpower from developing countries, and
- Establishment of an international energy institute and an international industrialization institute. —GBL

Office of Naval Research celebrates anniversary

The Office of Naval Research has marked its thirtieth anniversary with an awards banquet and a two-day symposium. Highlights of the celebration were the presentation of a citation to ONR by William A. Fowler, president of The American Physical Society, and an award honoring James A. Van Allen, discoverer of the radiation belts that bear his name.

Fowler's citation praised the Office for setting an example "in establishing a pattern of support for research in physics, and in other sciences," that has proven

"important and extensive." He recognized the "significant contributions" made by ONR scientists and expressed confidence that the Office would continue "to play a major role in scientific research, development and applications. . . ."

Van Allen received the Navy's Distinguished Public Service Award from H. Tyler Marcy, Assistant Secretary of the Navy for Research and Development. The award cited Van Allen's "outstanding achievement and unparalleled contributions" to the Navy in the field of space science. Van Allen, now head of the physics and astronomy department at the University of Iowa, has served as an ONR contractor since 1952. He reported his discovery of the Earth's radiation belts in 1958.

The Office's anniversary "Symposium on Science and the Future Navy," introduced by National Academy of Sciences president Philip Handler, included addresses by Edward Teller (Lawrence Livermore Laboratory), Lewis Branscomb (IBM Corp) and Kip S. Thorne (Cal Tech), as well as statements from a number of naval and defense-department spokesmen. David Packard (board chairman, Hewlett-Packard Corp) delivered the keynote speech at the awards ceremony. —FCB

NSF announces changes in its physics staff

New and continuing staff members in the Physics Division of the National Science Foundation have been announced. Nuclear-physics program director William S. Rodney shares responsibility for NSF's nuclear-physics support with new program officer Robert M. McGrath, on leave this year from the State University of New York at Stony Brook; McGrath replaces Gerard M. Crawley, who has returned to Michigan State University after spending a year at the Foundation. Another newcomer is Bruce Steiner, who takes the place of Stephen J. Smith (now returned to the University of Colorado) to share with Rolf M. Sinclair the direction of the program in atomic, molecular and plasma physics. Steiner has joined NSF for one year as a Commerce Science and Technology Fellow from the National Bureau of Standards.

Members of the division who will continue in their present roles include Howel G. Pugh, on leave from the University of Maryland (program director for intermediate-energy physics); Boris Kayser and Richard Isaacson (program director and associate program director, respectively, for theoretical physics), and Alexander Abashian and David Berley, who share responsibility for the Foundation's program in elementary-particle physics. In addition, Laura P. Bautz—formerly senior staff associate in NSF's Directorate of Mathematical and Physical Sciences and Engineering—has joined the Physics Division as senior staff associate.

William E. Wright and Marcel Bardon continue as Director and Deputy Director, respectively, of the division.

in brief

N. Bruce Hannay has been appointed foreign secretary of the National Academy of Engineering. Hannay, vice-president, research and patents, at Bell Laboratories, will serve as foreign secretary through the spring of 1978.

The book series *Vistas in Astronomy*, edited by Arthur and Peter Beer, is now available as a review journal. Beginning with volume 19, the journal is published quarterly. Subscription price for 1977 is $56; inquiries may be addressed to Pergamon Press Ltd, Headington Hill Hall, Oxford OX3 OBW, England.

the physics community

AIP publishes survey on graduate students

Unemployment among new doctoral-level physicists was greater in 1975 than it was in 1974; a 4% increase, from 9% to 13%, for those who are unemployed or seeking employment is reported in the *1974–75 Graduate Student Survey* (AIP Pub no. R-207.8). The survey, which has been compiled by the American Institute of Physics Manpower Statistics Division, also indicates fewer job offers to physics graduates at the master's level and an increase in the number of foreign graduates who return to their native countries.

This annual survey supplies information on various characteristics of the graduate-student group: number and distribution, employment offers, sources of support, duration of study and specialities. Data on women, minorities and foreign students are also included. For the first time, information on graduate students in astronomy is reported.

According to the survey, the number of graduate physics students and degree recipients continues an eight-year decline from a peak of 15 500 in 1966–67. At the beginning of academic year 1974–75, the total graduate physics enrollment was 10 410—by comparison, the 1973–74 total was 11 119. Overall, this group showed little change from the year before in terms of general characteristics, such as the percentage of foreign students as compared to US students and the median duration of study (beyond the BA level) for a doctorate degree.

However, the first-year graduate-student group does differ from the previous year in that 10% were women and 15% were foreign students. These figures were 8% and 13%, respectively, in 1973–74, although the total number of students comprising this group hardly declined, from 2680 to 2668.

Free copies of this survey may be obtained from Susanne Ellis, AIP Manpower Statistics Division, 335 East 45th Street, New York, N.Y. 10017.

Materials group issues educational aids

Two instructional modules on materials for fiber-optics communication, in addition to a publication entitled *Media Index*, have been produced by the Educational Modules for Materials Science and Engineering (EMMSE) Project. Funded by the National Science Foundation, the project is intended to involve members of the materials-science community in the development of instructional materials.

The two modules, written by William G. French (Bell Laboratories) are "Optical Properties of Transmission Media" and "Fiber Fabrication." The *Media Index* consists of 243 pages of data on teaching aids in a variety of media and is intended to assist in the location of aids for materials-sciences and engineering instruction. Free copies of these publications may be obtained from Clifford A. Hewitt, EMMSE Coordinator, Materials Research Laboratory, The Pennsylvania State University, University Park, Penna. 16802.

Four topic-area teams have been formed by the project for the purpose of developing future modules. Each of these teams will subdivide their respective fields, establish topical priority, select authors and organize a review system. Team chairpersons and their areas are: Metals—William M. Mueller (Colorado School of Mines); Ceramics—Hayne Palmour III (North Carolina State University); Polymers—S. H. Carr (Northwestern University) and Characterization—James F. Clum (University of Wisconsin). Suggestions for new modules and contributions of existing material may be sent to the project coordinator's office. □