

state & society

AEC's fusion division hopes to prove feasibility by 1982

The AEC Division of Controlled Thermonuclear Research has recently completed a review of the large confinement systems it supports and has identified three high-priority experiments: the Princeton Large Torus now under fabrication, the Scyllac device at Los Alamos, which is now being converted to a toroidal configuration, and the 2XII mirror device at Lawrence Livermore Laboratory. The Division's new director, Robert L. Hirsch, told us that they have formally adopted the immediate goal of establishing the feasibility of fusion by 1980 to 1982. Ultimately the Division's goal is to make a practical, commercial, environmentally attractive fusion power plant.

Organization. Hirsch has organized the Division along programmatic lines; before the reorganization there was a director and individual staff members, who handled university contracts and other matters on a more-or-less *ad-hoc* basis. Now Hirsch has established

three programs, with an assistant director for each. These are: Confinement Systems, Development and Technology, and Basic Plasma Research.

The Confinement-Systems Office, which is headed by Stephen O. Dean, spends about 60% of the Division's \$40-million budget. It handles the larger magnetic containment devices, such as tokamak, theta pinch and mirror varieties, in addition to other experiments related to these devices. Dean worked at AEC for eight years before leaving to do a thesis on laser-produced plasmas at the Naval Research Laboratory; he then returned to AEC early last year.

The Development and Technology Office handles development such as prototype superconducting magnets, large neutral-beam sources and magnetic energy storage systems—things needed for the next generation of experimental systems. In addition, in

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HIRSCH

New international group will study global problems

Seventeen institutions in the physical, biological and social sciences and the humanities from fourteen different countries have joined to form the International Federation of Institutes for Advanced Study. The federation, a sort of multinational think tank, is nongovernmental and nonprofit and is intended to provide a structure for transdisciplinary and transnational work.

The member institutes are known for their high standards and include, among others, the Pasteur Institute in Paris, The Niels Bohr Institute in Copenhagen, The Woods Hole Oceanographic Institution in Woods Hole, Mass., the University Corporation for Atmospheric Research in Boulder, Colorado, the International Rice Research Institute in Manila and the Japan Economic Research Center. They constitute a body of more than 5000 professionals whose activities at their own institutes involve an annual expenditure

of \$100 million. IFIAS has been funded by the Nobel and Rockefeller Foundations. The federation is being assisted by a number of trustees and a panel of special advisers.

At its inception, IFIAS has three primary objectives: analysis of urgent global problems, exchanges of scholars between member institutions and the building of a community of joint interests and programs. The federation's resources are committed to advance these joint efforts only when they are clearly concerned with man and his values.

IFIAS will undertake transnational and transdisciplinary research and analysis in conjunction with its member institutes as well as other institutes and experts in order to approach problems that require new overviews. In this function, the federation plans to try to use its broad research base to provide assessments and insights in areas that are not being studied ade-

quately through traditional means.

Exchanges of members among both less developed and highly developed countries will be set up in order to provide faculty members, scholars and postdoctoral students with experiences that would otherwise be denied to them. Some of IFIAS member institutes have already begun to establish "associateships" for scientists and scholars from the less developed countries to permit them to work at institutes in the highly developed countries. This arrangement provides a five-year appointment during which the associate may make two or three visits to the institute up to three months long, with the institute paying travel and subsistence during the visit. The Director of the International Centre for Theoretical Physics in Trieste, Abdus Salam, said recently that he would try to set up ten such posts to be called "IFIAS associateships" at the Centre.

It is partly through these and other exchanges of people as well as of plans and ideas that the federation hopes to build a community that will be able to examine issues from a very broadly based multidisciplinary viewpoint.

The philosophy of IFIAS is to try to go further than what is usually called interdisciplinary work. The federation intends not merely to join physicists to chemists, or mathematicians to economists, but also to bring to its programs and projects dimensions of concern with ethical, social and humanistic consequences of various lines of research and analysis.

IFIAS was set up with a minimum of structure to attempt to compensate for the problems that sometimes face institutions that are built around a single discipline. There is in the federation, however, a very thorough procedure for screening proposed programs and projects. A proposal can be supported by the new federation only when two or more member institutes are willing to take on responsibility for the project and an individual project leader is able to supervise it. Also, the proposed project must be likely to make substantial progress in three to five years and individuals and groups outside the IFIAS must be able to participate. Funding may also have to be found outside the federation. Problems will be tackled only if they are urgent both in the short-term and long-term perspective and must be useful to those making decisions about the possible paths of action facing society.

Some of the programs and proposals that have been approved for further screening by IFIAS are:

- ▶ An examination of the many current studies of energy sources to determine whether they provide "an adequate assessment of the social, ethical and humanistic implications of the decisions societies may make on their principal sources of energy for the future." A small panel of advisers will discuss the problem and they may recommend that a full study of the subject be undertaken by IFIAS.

- ▶ An IFIAS adviser is working to define the content of a study of possible applications resulting from new work in enzyme technology and its social, ethical, and economic effects. Some of the areas being studied are medicine, protein synthesis and fuel cells.

- ▶ Several member institutes are in the beginning stages of a study of the impact of climate on man, which, they say, has been studied little and only in certain disciplines.

- ▶ Other titles of possible IFIAS Special Projects include "The Quality of Life and Human Settlement" and "Water Resources and Strategies for Management."

IFIAS's first chairman is Nils K.

Stähle, who was President of the Nobel Foundation for over 20 years. The federation headquarters is located in Stockholm and is under the full-time direction of Stähle and the Executive Secretary, Sam Nilsson. Further information can be obtained from IFIAS, The Nobel House, Box 5344, S-102 46 Stockholm, Sweden.

Bitter Magnet Lab can take more experiments

The Francis Bitter National Magnet Laboratory has returned to a longer operating schedule. With the new schedule the laboratory reports that it will be able to meet the present high level of demand for high-strength magnetic fields and to accommodate additional experiments.

The Laboratory, which is sponsored by the National Science Foundation at the Massachusetts Institute of Technology, is open at no charge to all qualified scientists and engineers. Some of the instruments there include 21 water-cooled solenoid magnets with bore diameters from 3 cm to 15 cm and some with perpendicular (radial) access up to 5 cm × 5 cm. Maximum continuous field strengths range from 70 to 220 kilogauss.

General inquiries should be addressed to: Director, Francis Bitter National Magnet Laboratory, Bldg. NW14-3220, Massachusetts Institute of Technology, Cambridge, Mass. 02139.

Fusion prospects

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fusion-reactor technology, the Office deals with preliminary design of fusion reactors, definition of non-plasma problems, and in some cases handles advanced research, such as materials and tritium diffusion problems. The Office spends about 20% of the Division's budget. An assistant director for the Office has not yet been named; Hirsch is looking for someone with a background in fission-reactor development.

The Research Office is responsible for relevant basic plasma research at both universities and national laboratories, and it spends about 20% of the Division's budget. It is headed by Alvin W. Trivelpiece, who came to the Division last month from the University of Maryland, where he was a physics professor. Earlier he had been in the electrical engineering department at the University of California at Berkeley. He has worked in non-neutral and relativistic plasmas.

In addition Hirsch has named Fred R. Tesche as special assistant to the director. Tesche worked at Los Ala-

mos for many years, in the weapons program and then at the Los Alamos Meson Physics Facility. Subsequently he served as deputy director of the AEC Division of Military Applications for three years.

On the Division staff are 11 professionals. They meet every week to make sure everyone knows what the others are doing. If a laboratory wants to seek a contract from the Division, Hirsch recommends contacting one of the staff members informally for guidance on how to prepare a proposal. AEC has two types of contracts: fixed price and cost-type contracts (which have ceilings to them).

The Division has close communication with the Division of Military Applications, which has a \$22-million program on laser fusion. This program is pursued primarily for military applications, Hirsch notes, but both the physics research and the laser development are in such an early phase that they apply to nearly all the applications. Hirsch feels that there are not yet enough experimental data to touch base with theory, to demonstrate that the basic physics will indeed work according to expectations. He likens the situation to baseball: "In magnetic containment we've rounded first base, and we're headed towards second. In laser fusion they're headed toward first base at this time." In order to maximize the probability of achieving controlled fusion power, Hirsch believes that a number of approaches should be pursued in parallel at this stage, and he welcomes the laser-fusion approach as a potentially attractive new contender.

Another organizational feature of the Division is the Standing Committee, which is advisory to the director. It has eight members—the project directors at the four major laboratories—T. Kenneth Fowler (Livermore), Fred Ribe (Los Alamos), Herman Postma (Oak Ridge) and Melvin Gottlieb (Princeton)—and four "civilians," two of them being Solomon Buchsbaum (Bell Labs) and Edward Creutz (NSF). The other two civilians, H. Richard Crane (University of Michigan) and John Whinnery (Berkeley), have just retired after more than three years of service. Because of the recent law that opened up the meetings of advisory committees to the public under certain conditions, Hirsch says the Division will have to examine its Committee's operation once the law is clearly interpreted by the Office of Management and Budget.

Priorities. In view of the fusion-program's goal of feasibility by 1982, the Division, together with its Standing Committee, recently undertook a review of the confinement-systems program. The Committee and separately