science programme has been restored. But it remains a minor component of the programme, and the most obvious materials requirement of a fusion energy programme — a neutron source that could simulate the huge neutron fluxes to which a functioning power tokamak would be subjected — remains a distant dream.

The primary goal of the US community has remained constant since before ITER was conceived in 1988: an experiment that would enable physicists to investigate burning plasma.

Few of the scientists at Snowmass dismiss the prospects of Japan, Russia and Europe pressing ahead with a reduced-cost ITER. The Snowmass statement on burning plasma therefore holds open the prospect of the United States being a minor player in ITER, collaborating on an upgrade to JET in the United Kingdom (see *Nature* **389,** 769; 1997), or helping to build Ignitor, the compact design championed by Bruno Coppi of MIT, which is being developed in Italy.

Dale Meade of the Princeton Plasma Physics Laboratory (PPPL) has prepared an outline design for a US burning-plasma experiment, christened the Flexible Ignition Reactor Experiment, or FIRE. Such a step would need major new resources. "No-one wants a burning-plasma experiment to take away from the base programme," says Richard Hawryluk of PPPL, one of the meeting organizers.

And, as John Sheffield of the Oak Ridge National Laboratory, chair of the Fusion Energy Sciences Advisory Council (FESAC), pointed out, no one ruled out some US role in ITER. FESAC met at Snowmass after the consensus meeting to start preparing a key report on the balance of the programme.

Some of the US community feel isolated by the hasty withdrawal from ITER imposed on them by Congress (see *Nature* **394,** 511-512; 1998). "We've erected an iron curtain" by withdrawing so completely, says Charlie Baker of the University of California at San Diego (UCSD), former head of the US ITER home team. He added that the US community is already suffering by not participating in ITER's expert groups, which brought together global expertise in fusion research.

In a sense, the Snowmass meeting was a bid to avoid repeating the mistakes which characterized the entry of the United States into ITER. Parts of the US fusion community never bought into that decision, and their rancour doubtless contributed to Congress's dim view of the international collaboration.

The hope of the Snowmass meeting is that, if the community takes greater control of its destiny, discusses and agrees its priorities and maximizes its scientific output and visibility in a range of fields that could eventually contribute to fusion energy, it will be better positioned to exploit the day when fusion power comes back into fashion.

According to Robert Conn, dean of engineering at UCSD and a member of FESAC, the fortunes of fusion research have always been dominated by externalities — the oil shocks of 1973 and 1979, the thawing of the Cold War in 1988, budget cuts in 1995 and the Test Ban Treaty leading to the construction of NIF. As Meade puts it: "We need to get our sail ready for when the wind changes direction".

External assessment of this strategy has been requested by the DoE. Last month, a sub-panel of the Secretary of Energy's Advisory Board found largely in favour of it, and the National Research Council (NRC) is now undertaking an additional review. Charles Kennel, director of the Scripps Institution of Oceanography in California and chair of the NRC panel, attended the Snowmass meeting and seemed to like what he saw.

"There's no immediate crisis in the fusion programme," he says. "Clearly when you have a technology development focus you operate like a technology development programme, and when you back off from that, you have a greater opportunity to work with other disciplines. The fact that they captured the idea of the high-energy physicists, to hold a meeting like this without institutional support, is an encouraging sign." □

NIH weighs in behind improved synchrotrons

[WASHINGTON] The National Institutes of Health (NIH) announced last week that it will put $18 million into "significantly" improving two major synchrotron facilities. The base funding of both facilities comes from the Department of Energy (DoE), and the move reflects the increasing use of synchrotron radiation by life scientists.

Under a memorandum of understanding from the NIH and DoE, the Stanford Synchrotron Radiation Laboratory (SSRL), a division of the Stanford Linear Accelerator Center, will receive $14 million from the NIH this year, and the National Synchrotron Light Source (NSLS) at the Brookhaven National Laboratory on Long Island, New York, will receive $4 million.

Synchrotron radiation – bright X-rays produced by electrons circulating in a huge storage ring – gives information on objects at an atomic and molecular level. Biological researchers use it to study protein structure, but drug development is also a key application.

For instance, researchers used DoE-funded synchrotron light sources to develop protease inhibitors for treating HIV infection.

According to Marvin Cassman, director of the NIH's National Institute of General Medical Sciences, the Stanford money is the first instalment of a $45-million upgrade.


SSRL

Get the picture: studying protein structure in 3D.

The money will be used to improve the accelerator and instrumentation at NSLS, while the SSRL's electron storage ring will be upgraded to optimize it for biological use. NIH officials point out, however, that the accelerator upgrades at both facilities will benefit all users of the two sources.

In recent years, structural biologists supported by the NIH have become major users of synchrotron sources. This has put pressure on DoE-funded facilities traditionally used by physicists and materials scientists.

But biologists have complained that access to DoE synchrotron sources can take more than six months to arrange (see *Nature* **393,** 3 & **396,** 203; 1998). Last year, a government working group was established to assess how the sources could adapt to their increasing use by biologists.

The upgrades are one result. "These resources are critical to the development of modern biology, and we feel a responsibility to ensure that they are operated at a level that will benefit the community we serve, and hopefully everybody else," says Cassman, who headed the working group.

NIH director Harold Varmus said that the new money "holds the promise of providing dramatically improved capabilities for determining the structure of important molecules". For instance, the upgrade at the SSRL will enable its five protein-crystallography beamlines each to collect up to five times more data.

Wayne Hendrickson, a structural biologist who is a Howard Hughes Medical Institute investigator at Columbia University, calls the initiative "a very positive move". While recognizing life scientists' growing need for synchrotron radiation, he says, it properly leaves supervision of the expensive facilities in the hands of a single agency, the DoE.

Two newer DoE-funded synchrotron sources will not benefit from the new money. They are the Advanced Photon Source at the DoE's Argonne National Laboratory in Illinois and the Advanced Light Source at the Lawrence Berkeley National Laboratory in California. **Meredith Wadman**