so. "If the political situation and the economic situation were better, [Arima's] initiatives would be much more effective," says Keiichi Kodaira, director-general of the National Astronomical Observatory in Tokyo. For political appointees, "it is an extremely difficult time."

–DENNIS NORMILE

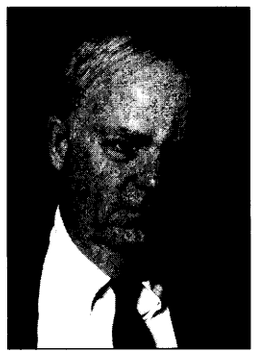
ENERGY

Fusion Facility Faces Fall Deadline

A battle of wills between two powerful members of the U.S. Congress and the Department of Energy (DOE) is jeopardizing efforts to salvage a multibillion-dollar international fusion project. The two congressmen told DOE not to sign an agreement late last month to continue work on the effort, known as the International Thermonuclear Experimental Reactor (ITER) project. If the United States doesn't sign the agreement by fall, the result would be "irreparable damage" to the project with "serious consequences" to fusion programs around the world, warns Shigeru Aoe, director-general of Japan's Atomic Energy Bureau.

The dispute comes at a critical time for ITER. The four partners in the project—Japan, the United States, the European Union, and Russia—have been working on a design for a massive, $10 billion machine that would be a prototype for commercial fusion power plants. But that design has come under fire in the past 18 months for technical and financial reasons, prompting researchers to explore a simpler and cheaper version—dubbed ITER Lite—that would cost roughly half as much (*Science*, 30 January, p. 649). Project supporters hope to win a green light from politicians in 2000 to build the scaled-down device.

SAM KITTNER



No go. McDade *(above)* and Sensenbrenner *(below)* oppose further ITER work.

Whether the United States will continue to participate in reshaping the project depends on whether DOE can persuade Representative John McDade (R–PA), who chairs the House panel that funds DOE, and Representative James Sensenbrenner (R–WI), who heads the Science Committee, to lift a hold they have placed on extending the ITER agreement, which expired in July. Both lawmakers are loath to spend more money on the project until a thorough review of the U.S. fusion effort is complete (*Science*, 3 July, p. 26), and they directed DOE officials not to sign an extension of the ITER agreement when the partners met 21 to 23 July in Vienna. McDade's panel has also declined to appropriate the $12 million DOE has requested to continue work on ITER in 1999. Senior DOE officials and White House staff have been unable to meet directly with McDade on the matter, and their entreaties to his staff have failed. ITER supporters hope that Sensenbrenner will be persuaded to support the project during a mid-August visit to Japan.

Aoe told DOE Undersecretary Ernest Moniz in a 14 July letter that all parties must sign the agreement in order for work on ITER to continue. The U.S. decision, he wrote in the strongly worded missive, would determine the project's fate and "the future fusion programs" of all four partners. Hidetoshi Nakamura, director of the Science and Technology Agency's Office of Fusion Energy, explains that Japan's ability to work on ITER is based on a four-party international agreement. Without an agreement, "efforts [in Japan] would have to be suspended," he says. That would mean disbanding the teams of scientists and engineers working on the project. But Hiroshi Kishimoto, executive director of the Japan Atomic Energy Research Institute, which heads Japan's ITER design efforts, emphasizes that if the United States drops out entirely, "The other three parties—Japan, Europe, and Russia—will consider other possibilities to continue the joint work." Europe also is willing to proceed without the United States, say fusion officials, but Japan's participation is key, since it wants to host the facility and is willing to pay the largest share of the project's cost.

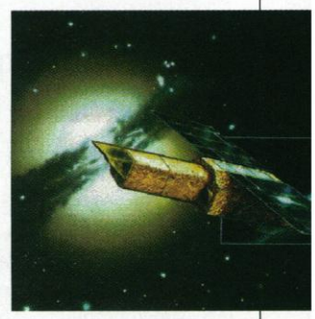
The congressional ban on extending the agreement is already hampering U.S. efforts to convince the other project partners to consider alternatives to ITER Lite as a hedge against a failure of the scaled-down design to win political backing, says Anne Davies, U.S. fusion program chief. She says that because of time, money, and resource constraints, the partners rejected a U.S. proposal that the ITER team work simultaneously on the design of smaller and cheaper machines that could be parceled out to various countries. But the partners agreed to cooperate with a U.S. effort to examine such options. "We want our partners to join

ScienceScope

X-RAY MISSION SNAGGED

The launch of an $86 million Japanese satellite designed to answer questions about the universe's development could be postponed due to problems plaguing NASA's contribution to the payload.

In early 2000, Japan's Institute of Space and Astronautical Sciences (ISAS) intends to orbit a satellite carrying a half-dozen x-ray telescopes aboard a $50 million ISAS M-5 rocket. NASA is equipping the satellite with an array of delicate sensors to provide high-resolution data on the energy outputs of the telescopes' targets. But "this is a troublesome program—and not a week seems to go by without a problem popping up," says NASA space science chief Wes Huntress. The technical glitches could push back the M-5's launch, he told an agency advisory panel 29 July.



ISAS

Hajime Inoue, an ISAS project scientist, says NASA's snags have him "a little worried." But he admits ISAS is running into its own problems building the satellite. Inoue says ISAS hopes to make up time by testing and calibrating the telescopes more rapidly than planned and by working weekends. "It's still too early to talk of delaying the launch," he says.

WAR DECLARED ON ALIENS

Exotic invaders, beware. The White House plans to establish a high-level council next month to coordinate the efforts of more than 30 federal agencies coping with the pernicious effects of non-native plants and animals.

The action stems from a letter sent to Vice President Al Gore last year by more than 500 scientists decrying the government's piecemeal approach to exotic species (*Science*, 14 February 1997, p. 915). These species can destroy native habitats, outcompete crops for soil and water, and clog waterways.

President Bill Clinton will soon issue an executive order that creates a federal council to spell out each agency's responsibilities and tactics. "That makes good management sense," says Elizabeth Chornesky, director of stewardship for The Nature Conservancy. The council will also estimate how much money is needed to control the invaders.

the actual pull of gravity changes. So Kasevich and his colleagues stacked one atom interferometer on top of another, a meter apart.

In their initial tests of the approach, the researchers gauged gradients between the devices as small as one part in 10,000,000. They have since improved the sensitivity of the setup 100-fold. Made over a broad area, such measurements can generate a map of gravitational gradients, useful for everything from prospecting for oil to warning a submarine navigator when his ship is nearing the sea floor.

The new device "is a very impressive first step" toward measuring gravitational gradients with atom interferometers, says Dave Pritchard, an atom interferometry pioneer at the Massachusetts Institute of Technology. For now, the mechanical gradiometers traditionally used to look for oil and gas deposits still beat the atom-based device in sensitivity. Part of the trouble, says Yale team member Jeff McGuirk, is that some vibrations can cause unwanted movements in the instrument's laser-directing mirrors, affecting the paths of the laser pulses through the interferometers. But McGuirk adds that the group has already tested a scheme for compensating for the vibrations, which should improve the sensitivity by another factor of 10 to 100, good enough to beat the competition, he says. –ROBERT F. SERVICE

CATHALEEN CURTISS

PROTEIN CHEMISTRY

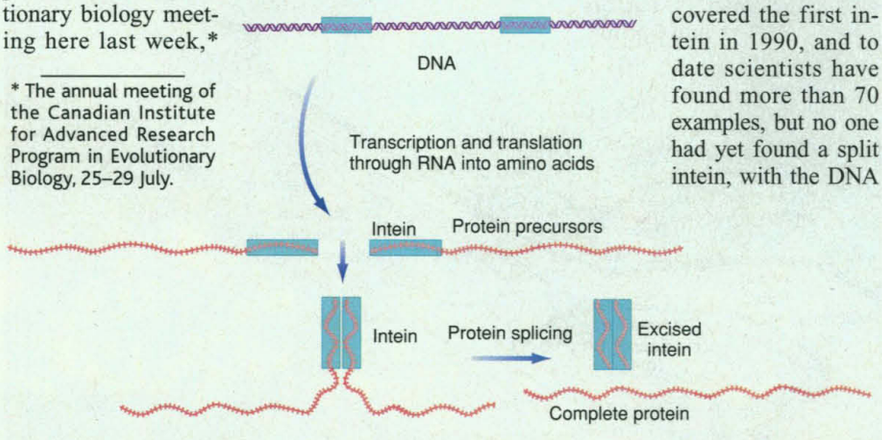
A Two-Piece Protein Assembles Itself

MONT-ROLLAND, QUEBEC—Proteins do many of the trickiest jobs in living cells, catalyzing reactions, passing signals, and providing basic structure. Now scientists have discovered a bacterial protein with yet another talent: seamlessly splicing together two other protein pieces. At an evolutionary biology meeting here last week,* molecular biologist Xiang-Qin Liu reported that he and his colleagues have identified a molecular matchmaker, a protein-within-a-protein called a split intein, which brings together two pieces of protein encoded on very different parts of the chromosome, knits the pieces together, and then neatly cuts itself out.

Scientists had theorized that a bit of protein with such clever action might exist, and several protein engineers had made artificial versions in the lab, but "it is gratifying and very exciting" to have an example in nature, says molecular biologist Henry Paulus of the Boston Biomedical Research Institute. Although many proteins are made from several subunits that clump together, this is the first time anyone has found a natural mechanism that actually splices two disparate protein fragments together into an unbroken amino acid chain. Researchers predict that other split inteins will surface from newly sequenced genomes, and they hope the find will lead to new ways to manipulate proteins in biotechnology.

The finding, published in the current issue of the *Proceedings of the National Academy of Sciences*, may also offer clues to the origin of more run-of-the-mill inteins—stretches of extraneous amino acids that interrupt proteins. Inteins are similar to the better known introns, sequences of extra DNA that commonly interrupt genes. Introns, however, are cut out of the RNA code for making a protein before the code is translated into an amino acid sequence. Inteins, on the other hand, are encoded in both RNA and DNA; only after they are translated into proteins do they remove themselves and splice the interrupted protein back together. In a process similar to some intron splicing mechanisms, the intein forms a loop, bringing the protein fragments together, and then catalyzes the formation of a normal peptide bond between them.

Researchers discovered the first intein in 1990, and to date scientists have found more than 70 examples, but no one had yet found a split intein, with the DNA



Some assembly required. A bacterial DNA polymerase protein is made in two pieces and then spliced together by a bit of protein called an intein.

* The annual meeting of the Canadian Institute for Advanced Research Program in Evolutionary Biology, 25–29 July.

ScienceScope

LANE, RICHARDSON GET GREEN LIGHT

While Congress and much of Washington head out of town this week on vacation, Bill Richardson and Neal Lane will start work in their new positions as, respectively, energy secretary and director of the White House Office of Science and Technology Policy (OSTP). The Senate confirmed both nominations by President Bill Clinton hours before leaving for a monthlong recess.

Richardson's confirmation came after Clinton assured Senator Larry Craig (R–ID) that the new secretary would have full authority over nuclear waste issues at the Department of Energy (*Science*, 31 July, p. 623). Craig had threatened to hold up the nomination because of his concerns about undue White House influence on DOE's approach to nuclear cleanup. Lane's nomination, in contrast, was not controversial, but was held up for months because of the Republican-controlled Senate's tardiness in approving Clinton nominees. Lane's confirmation clears the way for Rita Colwell to succeed him as National Science Foundation director.

... BUT VISA FIGHT ON HOLD

Congress left town, however, before resolving a controversy over how many software-savvy foreigners should be allowed to work in the United States. U.S. high-tech companies, citing a booming economy and tight job market, are lobbying lawmakers to increase the number of visas granted to skilled overseas workers—such as computer programmers, engineers, and scientists—from 65,000 this year to 115,000 in 2001. The visas, which can be extended for up to 6 years, can be an important step for workers looking to settle permanently in the United States.

Last May the Senate approved legislation to boost the visa ceiling, but the House was still struggling to pass its own version as *Science* went to press. If the bill is approved, it won't be until September that both chambers can come up with a single bill to send to President Bill Clinton for his signature. The White House has threatened to veto the legislation, saying that its provisions so far—including one designed to ensure that an employer tried and failed to find an American for the job and that no Americans were fired in order to hire a foreigner—don't go far enough to protect jobs for U.S. citizens.

Contributors: Andrew Lawler, Erik Stokstad, and Luis Campos.