FREE ELECTRON LASER

Physicist Sues Duke Over Control of Lab

A federal court in North Carolina may soon have to answer a question that has vexed more than one big science project: Who calls the shots if the person who conceived the project has a falling-out with the university that oversees it? That issue has come up this fall at Duke University in Durham, North Carolina, where a scientist has sued to retain control of the Medical Free Electron Laser (MFEL) laboratory, a project that has received more than $40 million in federal funds.

Duke physicist John Madey, who invented, patented, and partly financed the first free electron laser more than a decade ago, has a 4-year, $19.7 million grant from the Office of Naval Research to develop medical applications for this device, which generates light from a beam of electrons forced to follow an undulating path. It differs from many lasers in that it can be tuned to operate at different frequencies, which in theory makes it a versatile tool for biomedical experimentation. But Duke, which manages the grant, earlier this year proposed naming physicist Berndt Mueller as principal investigator in Madey's place, offering Madey the title of chief scientist. Now, Madey is claiming that Duke made the change because the university wants to use "his" machine and lab for purposes he hasn't approved.

CHRIS HILDRETH/DUKE UNIVERSITY PHOTO

Whose grant? John Madey is contesting lab reorganization.

On 3 November, Madey filed suit in the federal court in Durham seeking an injunction to block Duke's management reorganization. In his legal brief, Madey claims that nuclear physicists on Duke's faculty who are short of funds are scheming to "take control of the MFEL project and to remove Dr. Madey from his position of authority in order to facilitate their nuclear research plans." The university, Madey claims, is supporting these changes because it wants to convert some of his lab space into a "user facility" for physicists and biomedical researchers. Madey says Duke tried to remove him as principal investigator after he refused to go along. He specifically accuses the university of patent infringement, violation of his constitutional rights, misappropriation of research opportunities, and violation of employment agreements.

Duke officials are not commenting on Madey's allegations. But some faculty members say privately that Duke took control of the MFEL lab after medical faculty members complained that they weren't getting access to the facility, as Duke had promised. An outside review panel in July had faulted Madey's management, recommending that Duke find a way to retain Madey as a scientific leader but appoint someone else to manage the lab. Duke followed that advice (*Science*, 19 September, p. 1769).

Madey does not challenge Duke's right to oversee management of the MFEL grant, and he concedes that last summer's visiting committee was critical of him. But he insists that he should retain control of the device he patented and direct the research on potential medical applications for which he received a grant. Duke's offer to let him continue as chief scientist, Madey says, would not give him adequate control over his own research. Duke's takeover, in his view, is a "violation of U.S. patent law" and an "out-and-out theft."

Mueller, Duke's physics department chair and the new principal investigator on Madey's grant, is named in Madey's lawsuit as one of those who want to acquire the FEL space for nuclear physics. Like other university officials, Mueller declines to comment because he fears his words might be used in court. However, John Burness, Duke's senior vice president for public affairs, issued a statement on 7 November praising Madey but suggesting that the university is not satisfied with his management of the MFEL lab. Burness said that Madey is "a first-rate scientist whose pathbreaking work ... has significantly advanced an important field of technology." Burness added, however, that "management of a complex research laboratory requires sets of skills that go beyond individual brilliance." Duke is "confident," he said, that the court will uphold the lab's reorganization.

Madey had a similar scrap with Stanford, where he received his Ph.D. and built the prototype infrared free electron laser that he later named the Mark III. There Madey clashed with administrators in 1988 over their attempt to charge his grant what he considered to be "excessive" overhead costs of $1.5 million. Madey had invested $142,000 of his own money in the machine at a time when many felt it couldn't succeed, and he didn't take kindly to Stanford's claims on his resources. Because he had obtained a patent on the FEL, and perhaps because Congress was battling with the university on overhead costs at the time, Stanford allowed Madey to depart with his machine.

The Defense Department, which is interested in the FEL because it may have military value someday, paid to move Madey and the Mark III to Duke. Now Madey is talking about picking up and moving again, but this time, his Defense sponsors may want the machine to stay put.

–Eliot Marshall

MALARIA

Consensus on African Research Projects

LONDON—A group of major biomedical research funding organizations and malaria researchers from around the world agreed last week on the outlines of a global initiative on malaria research. The initiative, a loose-knit collection of projects that will be run by individual agencies, will be focused on Africa, where 90% of the world's malaria cases occur. Its major objective will be to strengthen research in Africa itself and to build new ties between research institutions on the continent. "For the first time, the English-speaking and French-speaking researchers are talking together," says Maxime Schwartz, head of the Pasteur Institute in Paris. "It's a remarkable advance."

The harmony at last week's meeting was a welcome relief to many of the participants, for the initiative—known as the Multilateral Initiative on Malaria (MIM)—has sparked considerable wrangling behind the scenes since it was first proposed nearly a year ago at a meeting of malaria researchers in Dakar, Senegal. The original idea, backed largely by the U.S. National Institutes of Health and its director, Harold Varmus, was for a tightly coordinated program, run jointly by the major funders of malaria research and with its own pot of money. But that notion was shot down at a meeting in The Hague earlier this year, largely because some funding organizations were wary of creating a new bureaucracy that they feared would be dominated by NIH (*Science*, 18 July, p. 309). What emerged from last week's meeting is a less grandiose, more loosely structured effort in which each agency will take responsibility for a specific part of the program and raise money for it.

"We really feared there had been a loss of enthusiasm," says Robert Howells, director of international programs at London's Wellcome Trust. But there was "tremendous support for pushing ahead" at last week's meeting, he adds. "I'm very relieved it went smoothly," says

Schwartz. The chief funding organizations represented at the meeting, aside from NIH and the Pasteur Institute, were Britain's Medical Research Council, the World Health Organization, and the Wellcome Trust.

The participants at the meeting strongly endorsed current efforts to sequence the genome of the most lethal malaria parasite (*Plasmodium falciparum*) and supported plans to develop a repository of malaria research reagents to help standardize protocols across the continent. "There is a real need to ensure research results are comparable if real progress is to be made," says John LaMontagne, head of infectious disease studies at the U.S. National Institute of Allergy and Infectious Diseases. NIH, which is providing funds for the repository, is also backing an effort along with the National Library of Medicine to develop electronic links between key African malaria labs and their northern partners.

Several new initiatives also won an endorsement. The meeting backed a proposal from a working group set up after the Hague meeting to fund a small number of grants for collaborative research led by a principal investigator based in an internationally competitive African laboratory, with partners in less well developed African labs. The program, which would cost up to $3 million a year, has already won verbal support from several funding agencies.

The meeting also supported the establishment of a working group to monitor the use of antimalarial drugs and set up an early warning system to detect the emergence of drug resistance, which has been a major problem in Southeast Asia. "Everyone knows this problem is going to get worse," says Howells. As for the development of new drugs, participants at the meeting acknowledged that pharmaceutical companies are reluctant to invest in developing new therapies for which there is no guaranteed market. But researchers told *Science* that funding agencies and private companies are discussing a partnership to establish a "virtual company" to test compounds that show potential antimalarial activity.

Although MIM will not have its own large pot of funds, several individual agencies have increased their spending on malaria research. NIH, for example, has doubled its commitment from $11 million to $25 million over the past 6 years, and the World Bank is planning a substantial increase in its efforts. These new funds will be critical if the MIM partners are to realize their plans for a new model of support for malaria research. "The aim is to achieve a significant impact on the disease within 10 years," says Howells. The partners will hold another meeting next year to assess progress toward that goal.

–Nigel Williams

ENERGY RESEARCH

Laser-Fusion Hot Spot to Migrate East

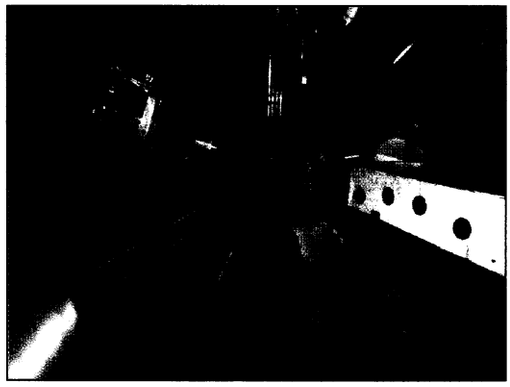
LIVERMORE, CALIFORNIA—Last week, Lawrence Livermore National Laboratory took the first steps toward turning off what was long the world's largest and most powerful laser. The beginning of the end for the laser, called Nova, came when researchers shut down a laboratory where its powerful ultraviolet beams had been used to drive x-ray laser experiments.

The rest of Nova will be dismantled by the fall of 1999 to make way for a vastly more powerful machine—the $1.2 billion National Ignition Facility, or NIF—which is already being built at Livermore. Its first module, which will be twice as powerful as Nova, is not expected to see "first light" until 2001. During the 2-year gap, the bulk of the nation's laser-related fusion and nuclear weapons research will migrate for the first time from closely guarded weapons labs to an open university campus—the University of Rochester in New York.

Research managers are pondering how to protect weapons secrets there as well as reconcile the different styles and schedules of the experimentalists at the various laboratories. "This will be quite a major transition," says Joseph Kilkenny, in charge of laser-fusion efforts at Livermore.

The first step came on 12 November when researchers pulled the plug on the Two-Beam facility, an extension of two of Nova's 10 arms into a 2-meter-diameter, stainless steel sphere where the twin beams pummel various types of targets. Built in 1985 as a laboratory for studying x-ray lasers under the "Star Wars" antiballistic missile program, it later yielded some key civilian advances, such as the world's first x-ray laser micrograph.

The rest of Nova will stay alive for energy- and weapons-related experiments in which the laser beams implode pellets of hydrogen. But its pulse is already slowing. The annual number of shots, which peaked at 1400, was just 930 in the last fiscal year and is expected to fall to between 300 and 700 in fiscal 1999. By late next year, the Two-Beam floor space will be converted to an optics cleaning and assembly plant for NIF. The same fate awaits the rest of Nova's four-story, 160-meter-long building after the final shutdown in September 1999.



B. QUINTARD/LLNL

Target for shutdown. A target chamber at Livermore's Nova laser, due to be dismantled in 2 years.

During the 2-year hiatus before the start-up of NIF, which will ultimately have 192 beams, Rochester's Laboratory for Laser Energetics will be the focal point for the nation's laser-fusion and related nuclear-weapons research. It houses the 60-beam Omega laser, which emerged from a $61 million overhaul in 1995 as a rival to Nova. "I'm going to have everyone here," says Robert McCrory, the lab's director.

Omega was built mainly to study direct drive, in which the converging laser beams strike the fusion target directly. By contrast, Nova specializes in indirect drive, in which the beadlike target rests within a tiny metal cylinder that absorbs the laser light and vanishes in a burst of x-rays, which in turn blast the target. But Omega allows both kinds of experiments, and by boosting the laboratory staff, McCrory plans to continue Rochester's direct-drive program of 700 shots per year at full bore despite the added load.

The Department of Energy (DOE), which funds all the lasers, is grappling with a challenge of its own: how to conduct classified laser experiments at an open campus. "I've told DOE I don't want any guns or dogs," McCrory says. "We don't have the sensitive stuff Livermore has. And it's just not the way to run the university."

David Crandall, head of DOE's inertial-fusion office, says that shielding the few classified experiments expected at Omega should require only a modest boost in security. Ordinarily, he explains, it's only the data or the diminutive laser target itself that is classified. "The amount of protection and guards required is not severe," he says.

The Livermore researchers, accustomed to having Nova in their back yard, may face the biggest adjustments. Some have balked at the prospect of tramping cross-country. Others expect to miss Nova's flexibility. Because it has only 10 beams versus Omega's 60, Nova can be reconfigured more easily and quickly for different styles of experiments.

–Peter Weiss

Peter Weiss covers science for the Valley Times *in Pleasanton, California.*