November between Connecticut-based Combustion Engineering, Inc., and the Ministry of Petroleum Refining and Petrochemical Industries.

Combustion Engineering's chief, Charles E. Hugel, reported that the new company, created after 3 years of negotiating, has a Russian president and a Russian-speaking operating vice president from Combustion Engineering. A factory has not yet been located and people are still staying in hotels, but Hugel said the company, which manufactures oil refinery equipment, plans to start production—starting with a valve and branching out to other industrial technologies—in June.

Hugel said the main obstacle to planning joint ventures on the Soviet side is the section in their law which limits repatriation (conversion into hard currency) of profits to those gained from exports. This is a problem since the products of joint ventures are primarily for domestic consumption. There are ways of getting around that problem, however, such as taking payment in the product.

With regard to the bigger picture, the largest source of dissatisfaction for American businesses is the controls on the export of high technology goods set by the Commerce Department's Export Administration. These are seen as particularly damaging for competition as European countries are seen to be selling things to the Russians that are on the forbidden list for U.S. exporters.

Hugel and others complained that the controls contribute to the image of the United States as an "unreliable" trading partner. Paul Freedenberg of the Export Administration explained, however, that the United States has to set the tone for its allies—"the will of the West is firming"—and not to expect any major changes in export control policy.

There are clearly enormous obstacles that need to be overcome before business relationships on any large scale can be established between the United States and the Soviet Union. Giffen pointed out, too, that managers of American companies are afraid to enter into long-term business agreements because of fear of American consumer reaction, political unpredictability, and the dubious profitability of trading with Communists.

Nonetheless, Giffen said the Soviets have clearly signaled a new willingness to cooperate and that Americans and their allies should be trying a lot harder to develop ties. As James A. Gray of the National Machine Tool Builders Association observed: "The only virtually untapped markets are the socialist countries." ■

CONSTANCE HOLDEN

# Superconductor Funds Flat

With all the hype and pomp that surrounded the Reagan Administration's symposium on high-temperature superconductors last July (*Science*, 7 August, p. 593), one might have expected that funding for research would have soared in this area and in the broader field of condensed matter physics. But after the National Science Foundation parceled out funds for the current year, the budget for condensed matter physics is virtually flat, rising by just 0.5% to $37.2 million.

The situation has set off a firestorm within the immediate research community. In recent weeks, NSF Director Erich Bloch has been besieged with complaints from unhappy scientists. Not only has the agency not been able to meet requests for larger research grants, but NSF is cutting support for more than half of the field's investigators below 1987 levels.

In February, 52 American research scientists representing universities, industry, and government laboratories sent a letter of protest to members of NSF's National Science Board. The researchers, including Nobel Prize winners Phillip Anderson of the University of Illinois and John R. Schrieffer of the University of California, Santa Barbara, contend that the reductions come at precisely the wrong time. Discoveries of the past year in high-temperature superconductors, they note, "have both spawned the promise of yet another technological revolution and increased interest in condensed matter physics."

The U.S. leadership in the area of materials research and behavior has produced a string of landmark technological advances including the transistor, microelectronics, and the use of optical fibers in communications. Support for condensed matter physics, the scientists say, must increase in real terms "if this country is to have any realistic hope of maintaining technological competitiveness in the coming decade."

At present, however, university researchers are having to turn away promising graduate students from the field for a lack of funding, says Robert J. Birgeneau, head of atomic, condensed matter, and plasma physics at the Massachusetts Institute of Technology. That concern is shared by David Pines of the University of Illinois, who fears that the United States could face a shortfall of trained scientists in the field in the future if funding does not rise.

Birgeneau notes that he had planned to add a researcher to his team to expand work in the field of high-temperature superconductivity in 1988 and was seeking a grant of $6.1 million from NSF. He abandoned the plan, however, when he saw his budget slashed to $4.4 million—down from $5 million in 1987.

While the agency hands out relatively few grants as large as Birgeneau's, most researchers in his field also saw their NSF funds cut in 1988. The widespread reductions led ranking scientists attending a meeting in January at the Aspen Center for Physics in Colorado to decide to fight to reverse the funding slide. In addition to writing Bloch, they have communicated their concerns to key members of Congress.

Besides reducing the size of grants, it appears that the number of awards made this year will fall below 1987's level of 470. Indeed, NSF officials say that part of the reason grants have been cut is because the condensed matter theory group in 1987 agreed to $2 million more in grants in 1988 than it has funds to cover.

Also contributing to the bleak funding picture is the overall squeeze on NSF's budget and how the agency chose to distribute the small 3.2% increase it received from Congress in 1988. The allocation for materials research rose by 1.8% overall to $110.9 million. The engineering centers, in contrast, got an increase of 13.3%. The higher increase for the engineering centers, according to Douglas J. Scalapino of the University of California at Santa Barbara, reflects Bloch's bias toward engineering and applied science.

The agency support for high-temperature superconductor research, in fact may be less generous than it appears. Although the effort is climbing from $10.7 million to $13.7 million in 1988, little of the growth is derived from new money. Rather, agency officials say the increase in effort has been obtained as a result of individual investigators dropping work in one area of materials research and using existing grant money to pursue projects in superconductivity. ■ MARK CRAWFORD