FUNDING

Plasma Physics Gets a Home

Plasma scientists have rushed to take advantage of a new $13 million federal program aimed at generating more basic knowledge about these ionized gases. They hope that the program, jointly sponsored by the U.S. Department of Energy (DOE) and the National Science Foundation (NSF), will reverse a decades-long pattern of viewing plasma science as "a large collection of applications" strewn across fields from fusion energy to plasma processing of semiconductors. That trend jeopardized both the basic research and its applications, according to a National Research Council (NRC) panel on opportunities in plasma science and technology, which called for "the revitalization of basic plasma science" (*Science*, 14 July 1995, p. 153).

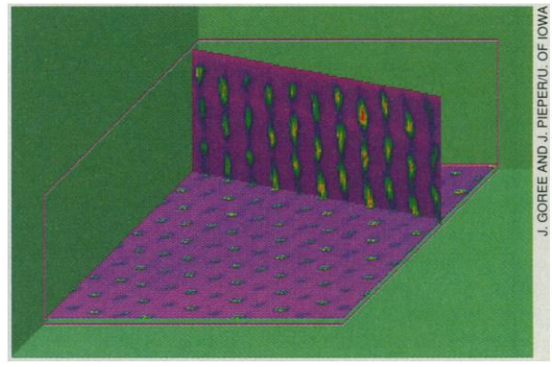
Now, the two agencies have taken action, setting up a 3-year program called Partnership in Basic Plasma Science and Engineering that excludes proposals for fusion studies. The community's response was "overwhelming," says Barry Schneider of NSF's Division of Physics: Some 300 proposal abstracts, for 25 to 30 funding slots, were received by the 28 February deadline. "It's a little startling to us," he says.

University researchers aren't surprised. Basic plasma science has been "just bits and scraps of other programs" scattered among at least a half-dozen agencies, says John Goree of the University of Iowa. "People doing basic plasma research have had to be the tail of the application dog," adds Goree, who sent in a proposal to study the crystalline patterns spontaneously formed by dust particles as they hover in a plasma. Although the dispersion of plasma funding among agencies and the fuzzy boundary between basic and applied research make it hard to gauge existing funding, the new program should boost it by 10% to 50%.

NSF had realized that new tools for creating and probing plasmas in the laboratory, such as cheap, high-powered lasers, were opening new opportunities for understanding basic plasma physics, says C. Denise Caldwell of NSF's Division of Physics. Unifying plasma funding at the agency, she and other managers realized, could benefit everything from studies of the plasma storms called "space weather" to the superhot plasma furnaces used for incinerating toxic waste.

At the same time, DOE was also recognizing the need for a plasma science program separate from applications. The awakening came a year ago when a fusion energy advisory panel called for a restructuring of the agency's energy-research program (*Science*, 2 February 1996, p. 592). The committee recommended that DOE "redirect the program away from the expensive development path to a fusion power plant" and toward increasing "the knowledge base needed for an economically and environmentally attractive fusion-energy source."

The emphasis of the new program, say officials from both agencies, will be on university-scale research efforts by small groups and collaborations. "I think it's a very positive and focused response that addresses in many ways what [the NRC report] had recommended," says Clifford Surko, a plasma physicist at the University of California, San Diego, who co-chaired the NRC panel. Although the new program falls far short of the panel's recommendation for $15 million a year for university-scale plasma research, "this is just an excellent start," says Surko. "The key will be continuation."



J. GOREE AND J. PIEPER/U. OF IOWA

Dusty crystal. Micrometer-diameter spheres in a plasma pick up charge, repel each other, and form an orderly array.

But first NSF must deal with the enthusiastic response the program has generated. As Ronald McKnight of DOE's Office of Fusion Energy Sciences notes, "This large a response probably indicates some pent-up pressure."

–James Glanz

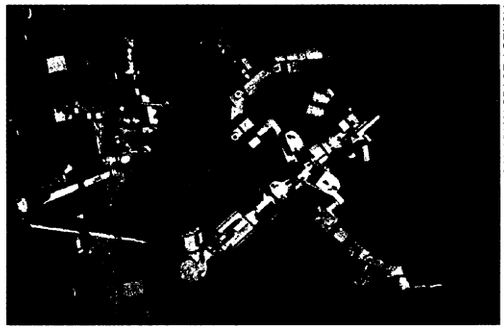
SPACE STATION

Canada Reaches Out to NASA

OTTAWA—Three years after Canada decided it could not afford to do science on the international space station, Canadian officials are hoping to broker a deal with NASA that would reopen the facility's labs to the nation's research community in exchange for making an essential piece of hardware. But some Canadian space scientists are wary of any deal. Although they would like to work in space, they fear that the Canadian government won't pay for what they want to do even if NASA lets them aboard.

Under the deal, discussed here last week during a meeting of top scientific leaders from both countries, Canada would spend a projected $150 million to manufacture the robotic hand, the Special Purpose Dexterous Manipulator (SPDM), which Canadian engineers have already designed for the station. The project, which industry strongly supports, complements the $865 million Canada is spending to build the station's main robotic arm, known as the Space Station Remote Manipulator System. Together, the two pieces will help astronauts assemble the station and carry out needed repairs and maintenance. In return, Canada wants a break on contributions to common system operating costs, which are required of all nations doing science on the station. Canadian officials estimate that a 2.7% stake in the station's research capacity is worth roughly $22 million a year.

From NASA's perspective, Canada's offer to build the robotic hand would help hold down construction costs, an important consideration for a project facing overruns (*Science*, 14 March, p. 1558). And agency officials see a way around a standing policy that capital expenditures should not be included as in-kind contributions to offset operating costs. The robotic hand is a unique apparatus, says one NASA official, adding that Canada also is willing to accept a lower stake in research capacity, 2.3%, in exchange for access.



CANADIAN SPACE AGENCY

Handsome deal. Canada wants its robotic hand to count toward doing science on the station.

Canadian officials say that the arrangement is necessary for the country to even think about participating in the station's scientific phase. And NASA's help may not be enough. The manufacturing cost of the hand alone "would entirely eat up" what has been budgeted for new initiatives under the Canadian Space Agency's 10-year plan, says CSA President Mac Evans. Additional government funding is needed,