Accelerator Labs Face Austere Year

Operation of new high-energy particle accelerators at Fermi National Laboratory and at Stanford Linear Accelerator Center (SLAC) will be restricted this year by tight budgets. To operate the facilities, the laboratories are having to cut back other physics research and related engineering activities. The austerity results from a lower-than-expected congressional appropriation for high-energy physics in fiscal year 1987, which began on 1 October.

The Reagan Administration had requested $546.7 million for high-energy physics in 1987. But Congress appropriated only $524.7 million, and also imposed a $35-million general reduction across the high-energy and nuclear-physics programs. The high-energy physics budget now sits at $499.7 million. SLAC is having to limp along with a budget of $88 million; the Administration had requested $115 million.

The tough budget climate is forcing the laboratory to virtually shut down for a year the Positron-Electron Project (PEP) and the Stanford Positron-Electron Axisymmetric Ring (SPEAR). Despite such steps, it still is uncertain whether the new Stanford Linear Collider (SLC) will operate in 1987. The latest plan, which is subject to Department of Energy and congressional approval, calls for running the 100-GeV machine for 3 months starting in May. A major problem still remains, however. SLAC officials say that after squeezing program budgets, they are still $5 million short in operating funds. Layoffs may be necessary later this year, laboratory officials say.

Assuming a way is found to turn on SLC, scientists still will not be able to take full advantage of the machine's capabilities. There is not enough money to pay the electricity bill, so scientists will pulse the machine 60 times instead of 120 times a second—meaning it will produce half as many particle collisions.

Even with this reduced volume, says William T. Kirk of SLAC, the SLC electron-positron collider will produce a wealth of Z bosons—one of three particles that comprise the weak force in the Standard Model defining the structure of matter. The W^-, W^+, and Z particles were discovered at the European Laboratory for Particle Physics' (CERN) 630-GeV proton-antiproton collider by Carlo Rubbia of Harvard and CERN, and a team of European and American researchers. The find won the scientists a Nobel Prize in 1984. CERN produces only a handful of Z particles each year while SLC will produce 15 each day when operating at just 60 cycles per second.

But time is short for SLAC scientists hoping to lay claim to new particle physics discoveries. They face competition in the future from the 100-GeV Large Electron-Positron (LEP) collider at CERN, which is scheduled to start operating in the spring of 1989. From then on SLAC will be at a disadvantage because LEP will have four detectors compared to SLC's one. Furthermore, LEP may be upgraded to 200 GeV in the early 1990's.

At Fermi, Director Leon M. Lederman is planning to operate "a full physics program" this year, but not without some cost. To do this, the laboratory is laying off 150 people, mostly from the engineering related services. Fermi has had to cut $20 million from its operating program in order to allow Tevatron I to operate. The 1800-GeV proton-antiproton machine is expected to enhance the understanding of quarks, W particles, and possibly lead to the discovery of a massive particle called the Higgs boson. This particle is thought to have a key role in the unification of the electromagnetic and weak forces.

The Administration had requested a budget of $191 million for this year, but received only $171 million, just $1 million above that of fiscal year 1986. As a result, Lederman says little planning for new experiments in future years is being done.

The particle physics program at Brookhaven National Laboratory also is suffering from the budget pinch. Laboratory Director Nicholas P. Samios says that in addition to losing 30 positions in the physics program, operating time on the 33-GeV Alternating Gradient Synchrotron will be slashed to 14 weeks compared to 27 weeks in fiscal year 1986.

The shortage of operating funds, which is keeping existing particle physics facilities from being fully utilized, may dampen Congress's enthusiasm for going forward with the Superconducting Super Collider (SSC), congressional aides say. The Administration is expected to decide in the coming weeks whether to endorse the project for the 1988 budget. As of now, only $16 million is being allocated for SSC research in 1987, less than the $20 to $30 million DOE officials say would be necessary if accelerator construction planning were to proceed in fiscal 1988. ■ **MARK CRAWFORD**

Eiffel Centenary to Put Art in Space

Paris

The owners of the Eiffel Tower, one of France's (and Europe's) most famous landmarks, are planning to celebrate the 1989 centenary of its construction by launching into orbit a 24-kilometer-circumference ring, studded with almost 100 spheres designed to reflect the light of the sun.

The resulting "ring of light," which will circle the earth in an orbit of varying longitude once every 90 minutes, was announced on 24 November as the winner of a Europe-wide contest organized by the Société Nouvelle d'Exploitation de la Tour Eiffel, supported by the European Space Agency with technical advice from France's National Center for Space Studies.

The ring, which would cover an area equivalent to the city of Paris, has been designed by a group of architects working with Pierre Pommereau, a research scientist with the Centre Nationale de la Recherche Scientifique. After launch by Ariane 4, it will be automatically deployed in space and is expected to survive for 3 years. It will appear in the night sky as a ring of light with the same circumference as the moon.

Announcing the winner of a competition that attracted over 100 entries from various European countries—two-thirds of them from France—Bernard Rocher, president of the company that operates the Eiffel Tower, said that a number of technical questions still remain to be answered about the feasibility of the $1.2-million project.

If all the problems cannot be worked out, the company will look for joint sponsors for a more ambitious project proposed by the second prizewinner. This would be an orbiting reflective sail 1800 square meters in area and also illuminated by sunlight. The satellite, designed by space physicist Christian Marchal of the Observatory of Paris and artist Pierre Comte, would cost an estimated $7.5 million. It is described by them as a "new star created by man" whose deployment would constitute "a happening watched by 5 billion people."

Asked how other countries might react to a large, man-made object appearing regularly in the night sky, a spokesman for the competition's organizers pointed out that there are currently no legal restrictions on what could be done at an altitude of more than 80 kilometers. "Outer space is like the high seas; outside territorial waters, everyone has the right to express themselves as they wish," he said. ■ **DAVID DICKSON**