Super² collider: Higher energies

Valiantly striving toward the tera-electron-volt (TeV) energy level, the Tevatron at Fermi National Accelerator Laboratory in Batavia, Ill., set a new world's record on Aug. 15 for accelerating protons — 7×10^{11} electron volts, nearly three-fourths of a TeV (10^{12} electron volts). Meanwhile, accelerating at their own rapid pace, American physicists announced they are already planning and pushing what they regard as the next step on the climb to higher energies, the so-called desertron, or Super Superconducting Collider (SSC). The proposed giant machine would be designed to accelerate two beams of protons, or perhaps one of protons and one of antiprotons, to energies up to 20 TeV each and collide them.

Its size would depend on how strong magnets can be made. With magnets of maximum strength 3 teslas, roughly the limit of present technology, the SSC would require a ring of 52.3 kilometers in diameter. If technology can be improved to provide 8-tesla magnets, the ring could be as small as 19.6 km across. The magnets would have to be superconducting. According to Drasko Jovanovic, chairman of Fermilab's physics department, "We cannot sustain the power costs for conventional magnets." The SSC announcement came this week at the 12th International Conference on High Energy Accelerators, held at Fermilab.

The SSC will bring physicists into what Jovanovic calls "no man's land," a place where they have no precise idea what they will find. Theorists, who were so sure of themselves a short while ago, now confess themselves at an impasse. "They need more facts," says Leon Lederman, director of Fermilab.

Already, rolling on the momentum of the recent authorization of the Stanford Linear Collider (SN: 7/30/83, p. 71) American physicists are mounting a political push to get the SSC underway. Cost estimates range between $1.5 and $5 billion. The SSC would most likely be in a tunnel 60 feet underground; land would not have to be acquired for most of the circumference, only tunneling easements.

In the standard procedure for such projects the SSC was formally proposed to the U.S. Department of Energy (DOE) by its High Energy Physics Advisory Panel (HEPAP) only a few weeks ago. Responding swiftly, the DOE, in a letter dated Aug. 10, asked HEPAP to set up a subpanel to study what could be done in fiscal 1984 to prepare for a formal start on planning the SSC in fiscal 1985.

As of Aug. 16, according to an announcement at the conference by William Wallenmeyer of DOE, the subpanel was almost completely formed. Its chairman will be Wolfgang K. H. Panofsky, director of the Stanford Linear Accelerator Center in Palo Alto, Calif. Design and construction are expected to take 10 to 12 years.

— D.E. Thomsen

Now cyclosporine fights blindness

An effective treatment for uveitis, an inflammatory eye condition that is responsible for one out of every 10 cases of blindness in the United States, may at last have been found. It is the drug cyclosporine (also known as cyclosporin A), which has recently given the organ transplantation field such a boost (SN: 3/5/83, p. 150).

The finding, from Robert B. Nussenblatt of the National Eye Institute in Bethesda, Md., and colleagues, is published in the July 30 LANCET. It is the first report of cyclosporine's effectiveness against an eye disease.

Cyclosporine, in contrast to other available immunosuppressant drugs, is able to keep the immune system from rejecting a foreign organ, yet still allow it, at least in part, to fight infectious organisms and cancer. The reason appears to be that cyclosporine dampens only certain fighters in the body's immune system but not all of them. It is also cyclosporine's selective impact on immunity that led Nussenblatt and his team to pit it against uveitis.

Nussenblatt and his co-workers first found that uveitis is characterized by the production of a specific sugar-protein compound in the retina of the eye, and that certain cells called T cells in the immune systems of uveitis patients react against the sugar-protein. So uveitis, they reasoned, might be due to T cells responding to this particular sugar-protein, and a drug — cyclosporine — that suppresses the activity of at least some kinds of T cells might counter uveitis.

They confirmed their hypothesis in rats. Then they gave cyclosporine to eight patients with vision-threatening uveitis who hadn't been helped by conventional immunosuppressant drugs. The patients received cyclosporine from a period of two months up to a year. Seven of the eight patients, they report, experienced both a disappearance in eye inflammation and an improvement in vision. Further, it produced few side effects and gave no evidence of increasing patients' susceptibility to infectious diseases or cancer, as conventional immunosuppressants are apt to do.

Carl Kupfer, director of the National Eye Institute, told SCIENCE NEWS that he hopes "these promising early results are borne out in further studies and that the clinical indications for cyclosporine's use will be sufficiently broad to result in a significant reduction in our nation's toll of blindness."

— J.A. Treichel

Animal cruelty verdict reversed

The conviction of a Maryland psychologist on animal cruelty charges — the first such court action ever taken against an American scientist — has been overturned by the state's highest court. The decision ends a nationally publicized showdown that pitted the rights of scientific researchers against the competing rights of laboratory animals. In the unanimous decision, the Maryland Court of Appeals ruled that the state's anti-cruelty law does not apply to federally funded research.

Edward Taub, director of the Institute for Behavioral Research in Silver Spring, Md., was originally charged with 17 counts of animal cruelty, one for each monkey involved in the project (SN: 7/17/82, p. 37). Taub's research on the central nervous system required that animals' limbs be made insensate by severing nerve fibers. The cruelty charges were made following a dramatic pre-dawn raid on the laboratory by local police officers, who had been tipped off by an anti-vivisection activist who had infiltrated the lab. The ensuing trial attracted the attention of the media, the U.S. Congress and the National Institutes of Health, which subsequently terminated Taub's grant.

On his first appeal, Taub was cleared of all but one count of animal cruelty; that single conviction was overturned this week. Reacting to the ruling, Taub told SCIENCE NEWS he was "delighted to be exonerated." He says he has maintained all along that nothing improper was going on in his laboratory and that the local police simply lacked the scientific training to understand what they saw there. More important, Taub says, is that the ruling is a victory for science and for free inquiry.

According to Alex Pacheco, whose testimony motivated the original 1981 police investigation, Taub's claims are hollow. The court, he says, did not deal with the questions debated in the earlier trials — the questions of suffering and cruelty — but instead chose to rule on a narrow legal issue that was not even raised before. The state's attorney's office agrees, and in fact has decided to ask the court to reconsider its uncommon decision to ignore the substance of the earlier trials.

The implications of the ruling remain unclear. For Taub personally, it must be a Pyrrhic victory; although he has received financial and moral support from the scientific community throughout his appeals, he still has no funding and his laboratory has been closed down (he is appealing the grant termination). The practical effect on scientific research may go beyond state boundaries, depending on how Congress ultimately acts; several bills have been introduced to replace the existing Animal Welfare Act with a law that offers greater protection to animals.

— W. Herbert