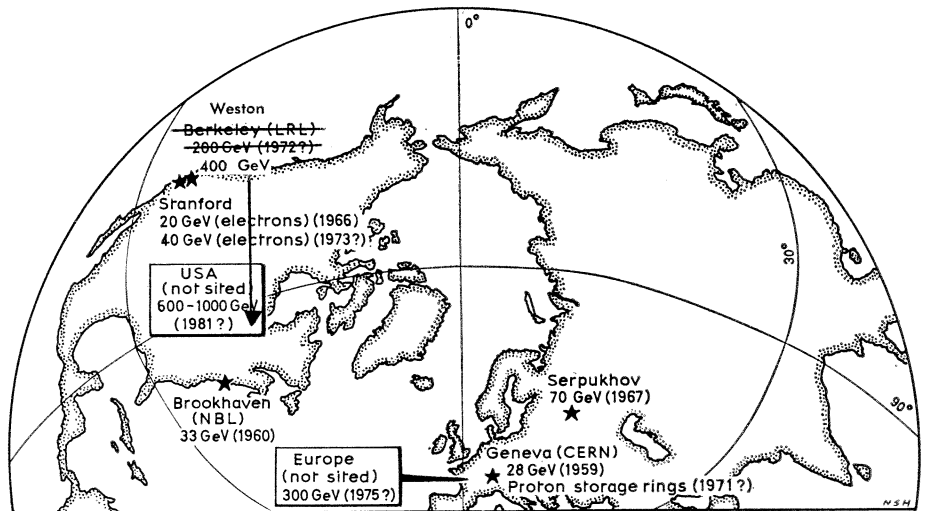


Particle Physics Balance Shifts



Reevaluation enables 200 GeV (Bev) planners to change world balance.

200 Bev's planners go for 400 Bev, leapfrogging CERN.

As the cost of high energy physics goes up and up, scientists have come to realize more and more that the decisions governing the size and location of their particle accelerators have to be made on a political and economic basis, as well as on scientific considerations. It's not often they get a scientific bonus out of a political compromise. Last week they did.

The political decision to locate the long-planned 200 billion electron volt machine in Weston, Ill., instead of California actually gives the scientists a chance to increase the size and power of their accelerator, overleaping the 300 Bev device planned in Europe and giving the United States clear leadership in the field.

Results of a hard summer of study of the 200 Bev plans were reported to the Sixth International Conference on High Energy Accelerators by Dr. Robert R. Wilson, director of the National Accelerator Laboratory, which will operate the machine.

The accelerator experts found that available techniques allow increasing the size of the giant race track around which the protons will be accelerated from the original radius of half a kilometer to a kilometer. Thus they could build-in the potential for boosting the energy of the Weston machine to 400 Bev or perhaps higher.

The orbit size to reach 400 Bev eventually can be achieved within the \$300 million set by Congress by some scientific sleight of hand. Initially, the machine would function at less than its maximum capacity. Later a higher power supply to bring the accelerator to full strength would be installed.

Even though increasing the ring radius means more magnets, the cost can be kept down by separating the two functions of the magnets—keeping the protons in their circular tracks and focusing them in a tight beam. In such big machines as the 33 Bev at Brookhaven National Laboratory on Long Island and CERN's 28 Bev at Geneva the same magnets are used both for bending and for focusing. Separating the functions allows using simpler magnets and higher fields for guidance, reserving the more expensive quadrupole magnets for focusing at appropriate intervals, about 100 feet apart.

The accelerator will fit nicely into one corner of the large Weston site. The emergent proton beams will shoot out across the site diagonally, allowing long beam runs for future experiments. Final intensity of the proton beams will be 1,500 million million protons per pulse, in a beam guided by several hundred magnets.

The new director is optimistic and hopes to be able to finish the machine in a much shorter time than originally proposed. Dr. Wilson's goal: completion within five years.

A formal version of the still-preliminary plan will be submitted to the Atomic Energy Commission before October 15. That is the time schedule set up by the AEC under what is known as Schedule 44, which calls for a firm cost estimate and schematic design to be submitted by that date.

The deadline was set in order to get funds for construction into the fiscal

'69 budget, which President Johnson will present to Congress in January.

The next step will be to submit more definitive design studies some time in January.

Although the site has been selected, the State of Illinois, which will furnish it, has chosen not to act on buying the land it has an option to purchase until Congress actually appropriates funds for the first year's operation—\$7.3 million which is tied up in the Senate Appropriations committee.

The legislature has authorized Gov. Otto Kerner of Illinois to spend up to \$30 million to buy the requisite land, but he is holding off action until a formal transfer of the property to the AEC can be made.

Within a week or two of that time, the architectural-engineering firm formed especially for the purpose of doing the construction work will be ready to move in and start excavating.

The National Accelerator Laboratory is being run along the same lines as many other large national scientific facilities—by a group of universities. Some 40 institutions from every part of the country have joined together as Universities Research Associates to run NAL. Dr. Norman F. Ramsey of Harvard University is president of the board of URA, which met during the International Accelerator Conference, and approved the revised preliminary plans Dr. Wilson presented. He said the designs are aimed at "seeing how much machine could be built for a total of \$300 million, \$240 million for the accelerator itself and \$60 million for auxiliary equipment."

Dr. Wilson notes that the plans are in a state of continuous refinement and will be until next January. By then he hopes to have those for NAL as firm as the original California ones were several years ago. ♦