

The Prairie Home Accelerator

A gathering of folks from all over considers the meaning and impact of the proposed Superconducting Super Collider

By DIETRICK E. THOMSEN

“When the mayor of Waxahachie, Texas, says, ‘We have to find the Higgs boson,’ something has happened.” This remark by Leon Lederman, director of the Fermi National Accelerator Laboratory in Batavia, Ill., seems to describe the mood of the National SSC Symposium held recently in Denver. One of several meetings planned around the theme of the construction of the proposed Superconducting Super Collider (SSC), which would be the most powerful proton accelerator and largest physics laboratory ever built, the symposium seemed to be part of an attempt to build an intellectual and political coalition of an unprecedented sort.

If the mayor of Waxahachie (pop. 14,624) and the mayor of Fairfield, Calif. (pop. 58,099), who was also there, didn’t know what a Higgs boson was before the meeting, they had a good idea afterward. The symposium gave them and a few hundred other people a mini-tutorial in particle physics and accelerator technology taught by some of the most prominent scientists in the field. Between technical lectures was a lot of political talk — most of it upbeat — by representatives of the Reagan administration, members of Congress, state governors and one lieutenant governor.

In all probability, there has never been a scientific meeting remotely like the National SSC Symposium. The meeting had some aspects of a political convention, or perhaps a Chamber of Commerce or Rotary Club convention, and some aspects of a university extension course in physics. People went around wearing large lapel buttons, some with outlines of the state of Michigan, others with a yellow clock inscribed “Time for Amarillo,” yet others touting California, Nevada or northern New York. Earnest partisans of various of the 36 sites under consideration for the SSC buttonholed passersby in corridors to expatiate on the scenic, educational and commercial virtues of their neighborhoods. Interspersed with the salesmanship were remarks like: “My goodness, I never knew what a lepton was before.” Or: “How strong is the evidence for the existence of the top quark?”

Previous proposals for physics laboratories did not feature this kind of grassroots politicking. Fermilab, which now



Energy Secretary Herrington

has the world’s most powerful proton accelerator, was authorized mainly by negotiations between physicists and federal officials — and particularly by negotiations between President Lyndon B. Johnson and the then minority leader of the Senate, Everett Dirksen of Illinois — though state officials did get into the site selection process.

The SSC will have 20 times the energy of Fermilab’s accelerator, the Tevatron — 40 trillion electron-volts to 2 trillion. It will require a ring tunnel 53 miles in circumference and will take several thousand acres of land. Allowing for inflation over the construction period, its cost will be \$5 billion or \$6 billion. Apparently the magnitude of the project inspired its proponents to seek this kind of widespread popular support. Even if the SSC is never built, the symposium seems to have done something new for popular literacy in physics.

The filling out of the standard model of particle physics, finding the particles it predicts but that have not yet been found, is suddenly of interest to the sort of person who attends precinct party caucuses. The Higgs bosons are, in theory, fundamental objects whose existence is connected to the question of how particles that make up matter get their mass — or, one might say, the question of why they are matter and not something else. The suspense over whether the Higgses really exist is now injected into the municipal politics of Texas. People from all over listen intently to a discussion of the things physicists expect to be made in a collision of quark with quark, and why the experiment has to start with very high-energy collisions of proton against proton to get the quark-quark collision.

Welcoming the symposium, Gov. Roy Romer of Colorado sounded notes that would be heard repeatedly from the political side. He called the SSC “a basic commitment we must make to science,” which is “a challenge to the priorities of our nation” and “symbolic of our willingness to compete.” In his peroration he invoked “the type of coalition that will make the SSC a success.” Gov. George S. Mickelson of South Dakota referred to “a coalition building a unique partnership between the scientific community and politicians.”

The grand national coalition that SSC proponents want seemed to be holding — at least during the meeting. Proponents of rival sites acted cordial toward one another. A panel of four governors and one lieutenant governor agreed more than they disagreed. Each of them, as well as the three U.S. representatives who spoke, recited the advantages of the proposed locations in their states, but all ended with words similar to those of Gov. Richard Celeste of Ohio: “I will support the SSC even if Ohio doesn’t get it.”

On the other hand Sen. Pete V. Domenici (R-N.M.), who takes a gloomy view of the SSC’s prospects in Congress and wants consideration delayed for a year or so, doubted the strength of the coalition and called the support parochial, based mainly on the desires of different locations to get the SSC. Even Rep. Ralph M. Hall (D-Tex.), who strongly supports the SSC, could get a bit cynical on the point. “Watch the program once they zero in on a location,” he said, “and see how parochial we can be.” And Rep. Sherwood Boehlert (R-N.Y.) said that “If the site is selected before the [special authorization] bill [for the SSC] comes to the floor, I fear it will be dead on arrival.”

Meanwhile, back in Washington, a committee of the National Academy of Sciences and National Academy of Engineering was sifting through the site submissions to select a group of finalists. On Dec. 30, the Department of Energy (DOE) announced that the committee had picked sites in Arizona, Colorado, Illinois, Michigan, New York, North Carolina, Tennessee and Texas as best qualified. The choices were not ranked. The final decision, however, is up to the DOE, which is likely but is not required to follow the committee’s recommendations.

Few oppose the scientific goals of the SSC — the search for the fundamental constituents of matter and for a comprehensive explanation of how matter is put together — but many wonder whether they can be achieved without breaking the budget or impoverishing the rest of science. Hall pointed out that \$1 billion a year for the SSC and \$4 billion for the space station would account for half of what the country spends on science. Boehlert, who entitled his talk “Why I Support the SSC and Why I’m Not Sure I’m Entirely Happy With My Decision,” said he had asked academic leaders whether they would support the SSC “if it meant scaling back other initiatives; the unanimous answer was a subdued and reluctant ‘no.’”

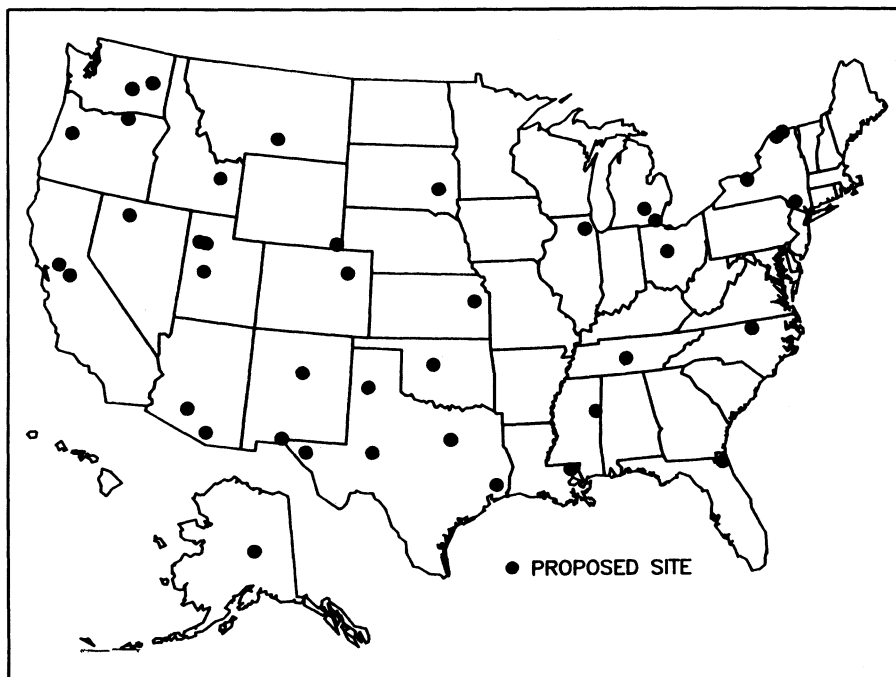
Daniel Kleppner, an atomic physicist at the Massachusetts Institute of Technology, said, “The SSC must not be built at the expense of the rest of science.” However, Gov. James G. Martin of North Carolina, an organic chemist, did not refer to such anxieties at all in his presentation.

The Reagan administration has proposed to double the budget of the National Science Foundation (NSF). According to Kleppner, this “might give an assurance that the rest would be put right,” but he pleaded particularly for those branches of science funded not by the NSF but by DOE. In this area he cited atomic and condensed-matter physics as being in particular trouble. Kleppner accused the DOE of promoting the SSC at the expense of its other programs, and he said, “The DOE should respond to needs in basic energy science.”

Opposition to the SSC also arises here and there from people who don’t want it in their neighborhoods. This kind of opposition has caused the withdrawal of a proposed site near New York City. In the Rochester area SSC opponents spat at New York Lt. Gov. Stan Lundine, and others rocked his car, according to the *New York Times*.

Similar opposition has shown up in California, where people are concerned with the loss of agricultural land and the removal of groundwater during construction, which they fear will never be put back. Slow growth and no growth have recently become popular in California, and some there worry about development spurred by the SSC. One woman referred to the possibility of “a new Silicon Valley” coming up near Stockton. She obviously meant “Silicon Valley,” but the slip may have betrayed an unconscious intention to attribute a quality of falseness to the project.

However, proponents of the California sites, who were out in force, insisted that the opposition was insignificant compared to the support. To an opponent’s claim of 20,000 signatures on an anti-SSC petition, they responded that in California, where so much public business is



SSC sites originally proposed in September.

done by initiative, it is very easy to get signatures on petitions.

The Reagan administration is touting the SSC as a kind of icon of American competitiveness. Energy Secretary John S. Herrington told the meeting: “Construction of the Super Collider is important to maintaining American competitiveness in the increasingly challenging world economy. It would contribute significantly to America’s scientific and technological leadership and give another clear sign that America is committed to keeping this nation on the cutting edge of world leadership and competitiveness.”

Herrington also mentioned the desirability of keeping talented people at home. He pointed out that in recent years American particle physicists have been going abroad, particularly to the West European CERN laboratory in Geneva, Switzerland. Carlo Rubbia, who was recently chosen to be the next director of CERN, rubbed in the point by naming Americans who head important projects at CERN.

Nationalist rhetoric about competition notwithstanding, the DOE has expressed a desire for foreign contributions to the SSC. Congressional critics, however, accuse the department of not being aggressive enough about seeking foreign partners and talked of having Congress give it a push.

Boehlert is particularly sharp about foreign participation. In that connection he said, “The Department of Energy seems to be doing all it can to make the SSC more expensive to American taxpayers . . . Department officials repeat the phrase ‘an American project within American borders’ with mind-numbing frequency as if it were some kind of

mantra.”

New York had sought the collaboration of the Canadian government and the provinces of Ontario and Quebec, and those governments are interested in one proposed site, in New York’s St. Regis Valley. Lundine suggested that Canadian participation might be the catalyst for bringing in other interested countries such as Japan and Italy.

Canadian participation could also make international use of the SSC easier. Mark Ablamowitz of the Clarkson College of Technology in Potsdam, N.Y., envisioned a “campus,” a headquarters and work area, for the SSC on the Canadian side to go with one on the American side. Canadian immigration regulations are not as stringent as those of the United States. Ablamowitz suggested that foreign physicists might find it easier to become residents of Canada and use the SSC from there. Boehlert said: “There is no reason to beware of Canadians bearing gifts.”

Opposition to the SSC on principle does not seem to arise. Dubious scientists would support it if they were sure it wouldn’t hurt their endeavors. Other objectors would be glad to see it built if it didn’t take *their* property and provided the money could be found. The meeting ended with an eye on the 21st century. Herrington called the SSC “a visible inspiration for young people to pursue careers in science.”

In the last session Rep. Manuel A. Lujan Jr. (R-N.M.) called the symposium “a very good idea, only the first of several around the country. It is important to educate the public,” he said, “to demonstrate a national commitment.” □