DESY makes a bid for protons in Hamburg

DESY, the West German subnuclear physics laboratory, appears to be establishing a rapprochement with CERN, Europe's international centre for the subject. It could rest on DESY building a superconducting storage ring for protons of around 280 GeV, while CERN builds LEP, a device for colliding 80 or 90 GeV electrons with positrons.

DESY would collide the protons with the electrons of its latest electron storage ring, PETRA, thus providing itself with the world's most precise instrument for probing the structure of the proton. LEP would be the most advanced tool for creating new forms of matter, such as new quarks, the intermediate vector boson, and Higgs particles.

This plan, which has yet to be formally adopted by the European high energy physics community, emerged at last week's inauguration ceremony for PETRA, held at the DESY laboratory in Hamburg. Professor Schopper, the director of DESY, told *Nature* that towards the end of this year he would be making an application to the German government to build a proton storage ring within the PETRA tunnel. The cost would be "about 1½ PETRAs"—around 150 million DM.

Earlier, the West German minister for science, Dr Volker Hauff, had made an extremely positive speech on behalf of basic science, from which it seemed clear that he would treat such an application sympathetically. "Political freedoms are inconceivable without a free science", he said unequivocally. However funds were limited (whereas research was unlimited) and choices had to be made. "We've got to limit ourselves to what we can do particularly well, where we can teach others and create top performance . . . with PETRA we do have a chance of creating this performance".

"With pride we can look forward to the development of PETRA as a centre of international research", said the minister. "More than half the researchers are guests, contributing thir intellect and funds. PETRA is fundamentally enriched in this way."

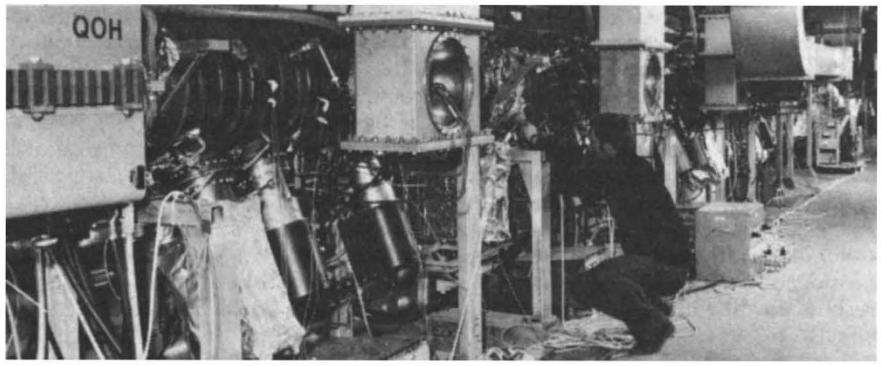
And on the relationship of DESY and CERN, he said: "Very soon we will begin a dialogue with scientists to see if Germany can contribute to LEP. To have two flourishing laboratories, like CERN and DESY, is commensurate with the size of this continent. We cannot discuss the future of the one laboratory without thinking of that of the other."

This mood was reflected by Pofessor Jean Teillac, the President of CERN Council, the supreme body directing CERN, who said that "with CERN and PETRA Europe has a good, well-balanced programme . . . More even than in the past we must use central facilities like CERN and DESY".

Meanwhile, the new cooperative mood has yet to be translated into firm proposals by ECFA, the European Committee for Future Accelerators, which is currently deliberating on the question of the precise energy for LEP—a delicate matter because costs increase rapidly with energy, particularly at CERN, where a big LEP would have to burrow under the Jura mountains.

"But we are not letting politics get in the way of our judgements", the chairman of ECFA, Professor Marcel Vivargent, said last week.

Robert Walgate



RF accelerator cavities at PETRA: resonances are causing beam losses

PETRA in a race to highest energy

PETRA, the world's largest electron-positron colliding beam device, is still having trouble reaching design luminosity at its highest energy—and is beginning to fear the strength of the American competition, PEP, under construction at Stanford, California.

PETRA, the brightest jewel of West German sub-nuclear physics, is hoped to make two major discoveries: the mass of the sixth quark, "top" (or "truth"), and the first indication of the masses of the intermediate vector bosons (IVBs), the particles whose exchange is believed to be responsible for the weak nuclear force. But both experiments need the highest PETRA energies, and a reasonable data-taking rate.

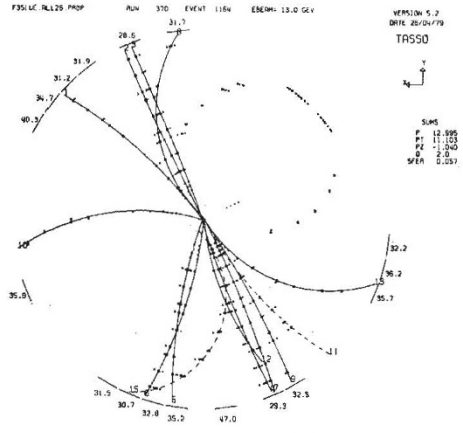
Last week PETRA was brought up to 26 GeV, and 10 events—the results of collisions between 13 GeV electrons and 13 GeV positrons—recorded in two detectors. But the "luminosity" (effectively, the data rate) was a factor 70 below design, producing something of the order of one event per hour. At this rate the experiment to detect the IVBs—an ambitious construction by Nobel laureate Sam Ting—would take 50 years. "Top" might be found by chance, but really requires a systematic energy scan, which would also take a long time at current rates.

The problem appears to be due to the fact that PETRA must accelerate its own electron and positron bunches from 6.5 GeV, thus moving through a number of electromagnetic resonances in the 32 accelerating cavities. (Until now, at lower energies, PETRA has used only four cavities.) The resonances make handling the beam a rather tricky procedure, and the beam is frequently lost.

PEP, on the other hand, which is due to come on line at the end of this year, takes injection from the Stanford linear accelerator at 17 GeV for positrons, and 24 GeV for electrons, thus scaling PETRA's 'ramping' problems at one leap.

However a glass of water may be half full or half empty, and one's view of PETRA's difficulties depends on which side of the fence one sits. On the one hand the experimenters, such as Ting's group, appear to be pessimistic; but the accelerator physicists, whose job it is to produce the beam, hand-wave hopefully. Only time will tell who is right.

Robert Walgate



PETRA's first event at 26 GeV shows jet structure

0028–0836/79/0279—0004$01.00