

A privileged view of the COSY (Jülich) cooler synchrotron before it was hidden by concrete shielding. COSY will add significantly to the world stock of polarized beam data.



cally-pumped DC sources such as at TRIUMF and pulsed plasma-ionizer colliding-beams sources such as at INR Moscow) were reported. Internal targets, such as HERMES at HERA (DESY), at AmPS (NIKHEF) and at IUCF (Indiana) now move towards routine data taking.

Practical experience communicated at Cologne included the handling and selection of materials for optical-pumping and storage cells to keep depolarization rates low, and (strained) photocathodes for the production of intense polarized electron beams.

The helium afterglow technique for polarized electrons (Orsay) has become competitive with other methods within the last few years. Another boon is the availability of high power, low price laser diode arrays for optical pumping. The sharp increases in polarized beam currents with certain sources means that the goal of equalling unpolarized intensities is being approached.

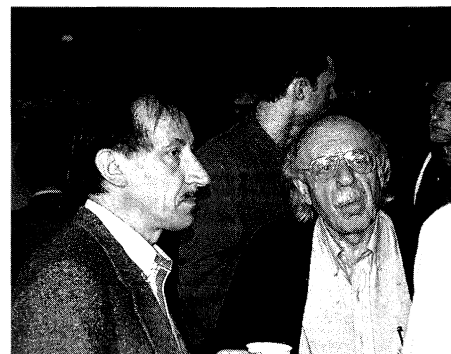
A number of schemes proposed at

the Cologne Workshop could go on to have considerable influence, an example being the idea of combining several existing developed technologies into source designs capable of considerably higher intensities. These involve state-of-the-art polarized atomic-beam sources, existing high intensity unpolarized sources, and the storage-cell technology to be used in a new type of colliding-beams source.

Another new scheme is the MECSIS (multiple electron capture and stripping) idea to increase considerably the polarization of helium-3 ions.

The Cologne Workshop was organized by a team at the University of Cologne headed by Hans Paetzgen, Schieck and Lutz Sydow. It was sponsored and supported by the International Committee of High Energy Spin Physics Symposia, by the DFG (Deutsche Forschungsgemeinschaft), Bonn, by the Minister of Science and Research of the State

Hans-Otto Meyer (left) of Indiana with Willy Haeberli of Madison at the recent Cologne workshop on polarized beams and polarized gas targets. Haeberli, who celebrated his 70th birthday shortly thereafter, has long been a spin/polarization physics notable.



of North Rhine-Westphalia, Düsseldorf, by the Forschungszentrum Jülich and by the University of Cologne.

Proceedings will be published by the World Scientific Publishing Company.

...Spin workshop

The biennial International Workshop on High Energy Spin Physics at the Institute for High Energy Physics, Protvino, Russia, alternates with the International Spin Symposium (the most recent in this series having been held at Bloomington, Indiana - March 1995, p.14). The large attendance at the recent Protvino meeting reflected the wide interest in spin physics, where most of the world's major Laboratories are either using or considering spin-oriented beams and/or targets, and the significant progress being made on both the experimental and technological fronts.

In addition, new quark spin effects invite explanation, with 'valence' proton constituents carrying only about 33% of the proton spin, and with polarization evident among the accompanying 'sea' quarks.

A focus for these measurements is the SMC collaboration at CERN, now

In a spin. Participants at the recent International Workshop on High Energy Spin Physics at the Institute for High Energy Physics, Protvino, Russia.



revealing the constituent structure of deuterons and neutrons in additional kinematic regions. Such experiments will be continued at SLAC (Stanford), while the HERMES gas target at the DESY HERA electron beam is preparing for its debut. In a standard model context, a rich polarization physics programme is underway at SLAC's SLD linear collider.

At lower energies, polarization is also being studied at the Joint Institute for Nuclear Research (JINR), Dubna, where new results show that the deuteron is a complicated system (October 1995, page 18).

Igor Ternov (Moscow) suggested that the spin radiation spectrum differs from that of ordinary synchrotron radiation, hinting that such effects had already been detected at Novosibirsk in 1983.

The meeting showed how major progress is being made in spin technology - polarized targets, intense sources of polarized ions, partial Siberian snakes, fast spin flippers, polarimeters...

The possibilities for accelerating polarized protons at the Tevatron (Fermilab), RHIC (Brookhaven) and HERA (DESY) were summarized.

The Protvino Workshop was sponsored by the Ministry of Russian Federation on Atomic Energy, the Institute for High Energy Physics and the International Committee for Spin Symposia.

HISTORY What is it ?

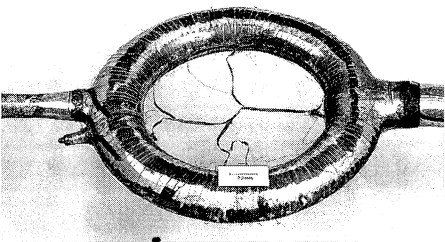
It is a sign of maturity when a subject begins to get interested in his own history. While particle accelerators still look to the future, it is not too early for the study of high energy particle beams to learn from its past.

In the quest for high energy electrons, many unsuccessful attempts to accelerate electrons inductively were made before Don Kerst's betatron operated in 1941. These are surveyed in a historic Kerst article in *Nature* (157, 90, 1946), which includes a brief description of a machine designed by Jim Tuck at Oxford's Clarendon Laboratory before World War II, where Tuck was working with Leo Szilard, visiting from the US.

(Tuck, well-known for his wartime work at Los Alamos and subsequently in leading the controlled fusion programme there, is best known to accelerator specialists for proposing, with Teng, the regenerative extraction scheme used so successfully on the Liverpool synchro-cyclotron.)

In his paper, Kerst states that of all the pre-betatron attempts to accelerate electrons, Tuck's scheme seems to have been the most promising and technically complete - 'The investigation would surely have

What is it? Mystery torus from Oxford's Clarendon Laboratory archives.



succeeded were it not for the war in Europe'.

Accelerator pioneer John Lawson, retired from the UK Rutherford Appleton Laboratory but now researching the early history of UK betatrons and synchrotrons, would like to discover more about Tuck's scheme, as would John Sanders, retired from the Clarendon Laboratory and interested in its history, particularly a strange torus in the Clarendon collection.

Kerst's article explains the outline of the scheme, but the historians have no record of any experiments. Was this torus ever tested? What is the purpose of the very thin winding, connected on the inside by a tape? What is the logic of the complicated electron design?

X-rays reveal a very thin winding, connected on the inside by a tape, and a complicated electrode design.

