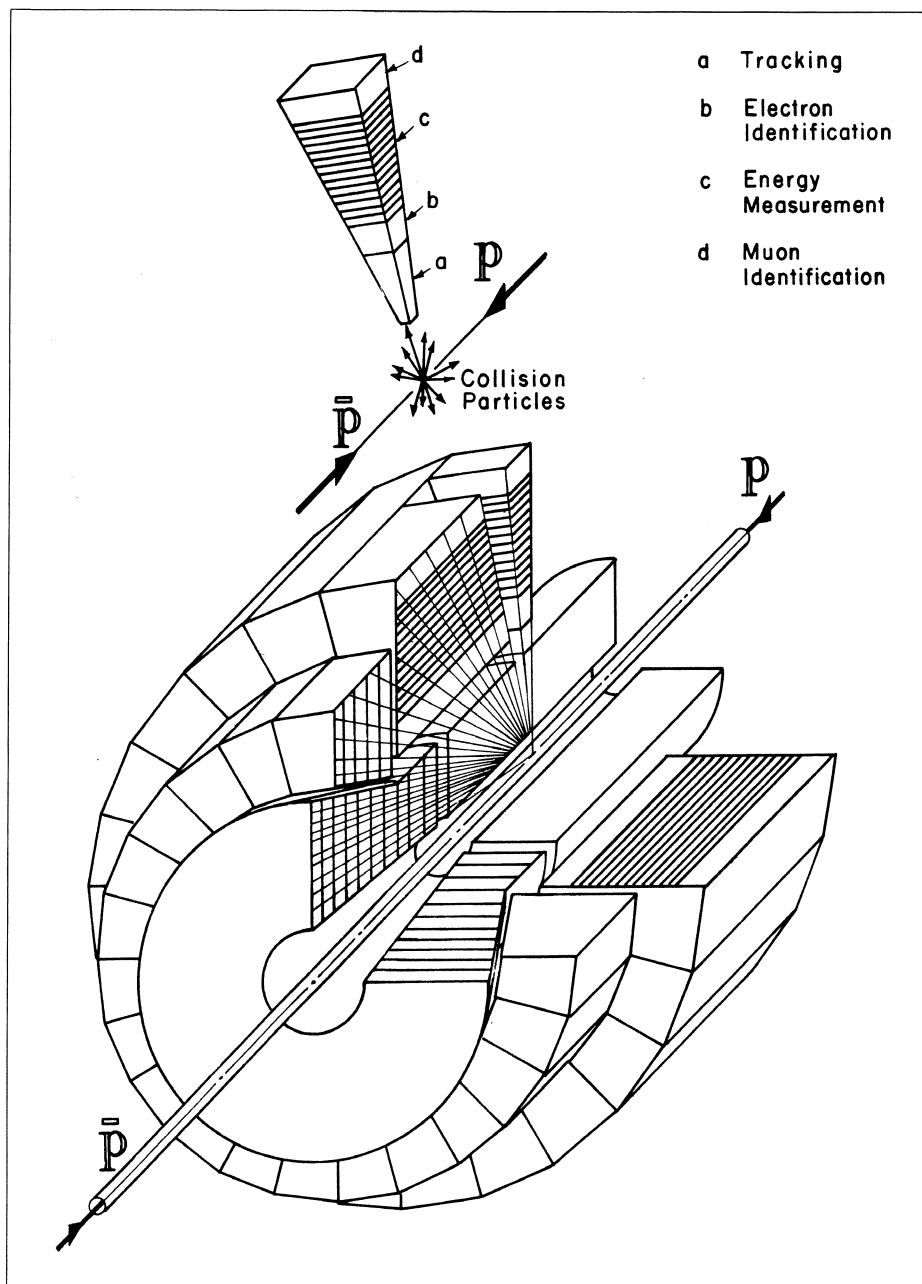


measure the total energy carried. Neutral particles are also absorbed and their energy measured in the 'calorimeter' but leave no tracks in the inner tracking chamber.

Segmentation of the detector is required because often the tracks are bunched together into a cluster as they emerge from the collisions. The detailed study of these clusters or 'jets' provides valuable information on the behaviour of the quarks deep inside the collision.

On the outside of the detector is a final layer of instrumentation to intercept and record the penetrating muons passing through the rest of the apparatus.

Schematic of the CDF Collider Detector at Fermilab used in the Tevatron proton-antiproton collider, showing the segmentation surrounding the collision point, and the radial structure of the main detector components.



Physics in a spin

The biennial international high energy spin physics meetings (Lausanne, 1980; Brookhaven, 1982; Marseille, 1984) provide a useful focus of attention for the enthusiastic community of followers of a sector of physics rarely lacking in interest and where the unexpected is increasingly expected.

The latest International Symposium on High Energy Spin Physics was held at Protvino (near Serpukhov, USSR) from 22 to 27 September, organized by the USSR State Committee for the Utilization of Atomic Energy. The Organizing Committee under the leadership of L. Soloviev with N. Tyurin, V. Solovianov et al. ensured a

smoothly running conference for the 158 physicists from 18 countries who attended. The meeting reflected optimism about the future of spin physics, with many new polarized beam projects and stimulating new results.

One highlight was the report presented by V. Solovianov (Serpukhov) of the successful completion of polarization studies in charge-exchange reactions at Serpukhov. Big and unexpected spin polarizations up to 40 per cent were discovered at 40 GeV, with a polarized target used for the first time in many reactions.

Acceleration of polarized protons up to 22 GeV at Brookhaven was

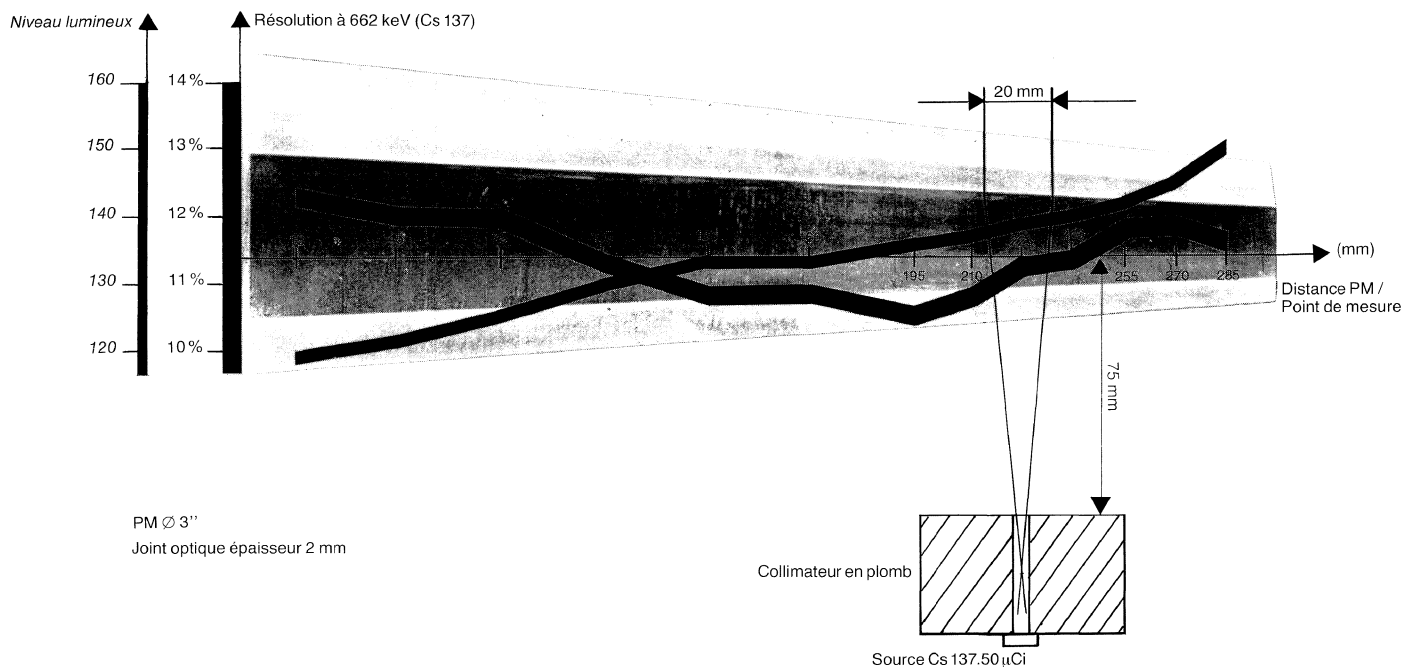
described by A. Krisch (Michigan). The polarization reached 46 per cent, with an intensity of some 2×10^{10} protons/pulse (see May 1986 issue, page 17). The successful start-up of a similar programme at the Japanese KEK Laboratory was covered by S. Hiramoto (KEK). The polarization in the KEK PS machine at 3.5 GeV was about 20 per cent.

K. Heller (Minnesota) gave an extensive review of hyperon polarization in hadron-hadron reactions at high energies. Data accumulated worldwide over ten years show large hyperon polarizations and still lack a convincing explanation.

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viewed the measurements of magnetic moments of baryons and quarks, most deriving from the spin precession technique.

Results from the Brookhaven AGS polarized proton beam were covered by D. Crabb (Michigan). The spin-spin correlation parameter at 18.5 GeV and large transverse momentum in proton-proton elastic scattering tended towards zero (see October 1986 issue, page 16). Comparison with lower energy Argonne data shows a sharp and surprising energy dependence.

New data on the asymmetry seen in reactions at 40 GeV at Serpukhov included a surprisingly big spin effect in negative pion on proton charge exchange reactions at large transverse momentum, presented by B. Khachaturov (Dubna). This disagreed with quantum chromodynamics (QCD) predictions.

D. Underwood (Argonne) and L. Dick (CERN) outlined preparations for two studies at the highest energies in spin physics—the imminent 200 GeV polarized proton beam experiment at Fermilab and the polarized gas jet experiment at CERN. Important results will come from these measurements of spin effects at hundreds of GeV.

1959 Nobel prizewinner O. Chamberlain (Berkeley) concluded that colliding polarized beams at 20 TeV would be possible in the proposed US SSC Superconducting Supercollider if the 'Siberian Snake' scheme worked.

Meanwhile a comprehensive programme of investigations at intermediate energies is going ahead. Parallel session contributions included detailed data to reconstruct the scattering amplitudes, to improve the results of partial wave analyses, to extend the spectroscopy of baryon reson-

ances, and to search for exotic states such as dibaryons and hybrids, as well as experiments on parity-nonconserving effects, etc. A. Masaike (Kyoto) gave experimental results from KEK, and J. Arvieux (Saturne) from Saturne II.

A lot of attention was given to technical developments. S. Jaccard (SIN) reviewed the recent SIN-Montana Workshop on Polarized Sources and Targets. One parallel session highlight was the status of polarized ion sources at INR (Moscow) with successful results from two independent groups (presented by A. Belov and A. Zelen-sky). Very efficient plasma ionization led to polarized beam currents of up to 10 mA with 76 per cent polarization. The laser source could give 4 mA of protons and 400 microamps for negative hydrogen ions with 65 per cent polarization.

L. Soloviev (Serpukhov) discussed in his plenary talk new insights into the origin of particle spin. Some progress in under-

L. Soloviev of the Institute for High Energy Physics, Serpukhov, USSR, was Chairman of the Local Organizing Committee for the recent International Symposium on High Energy Spin Physics held at Protvino.



standing spin phenomena through QCD was reflected in the report by A. Efremov (Dubna). Polarization effects may be due to angular momentum conservation in a string field, maintained B. Andersson (Lund). H. Lipkin (Argonne) looked at more QCD tests.

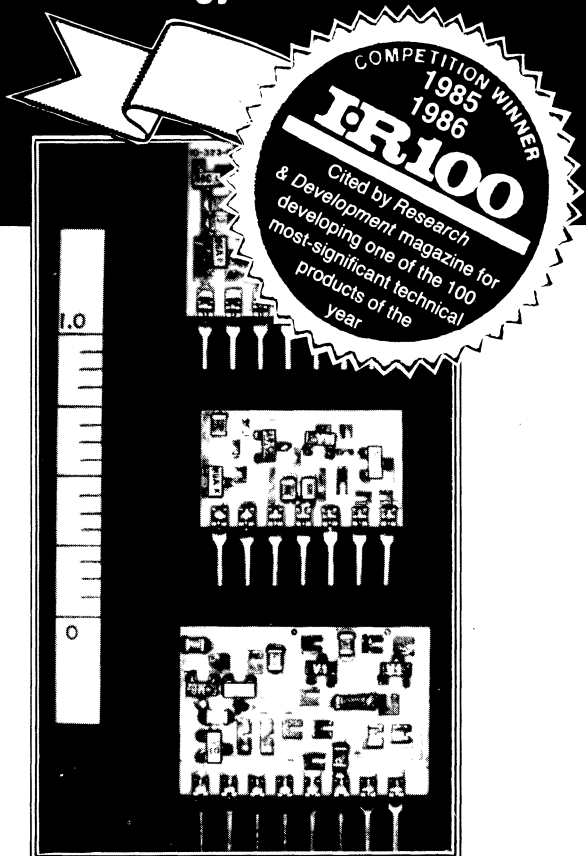
The latest spin-spin correlation parameter results in the elastic proton-proton scattering were covered by M. Anselmino (Turin) and S. Troshin (Serpukhov). Both these theoretical approaches are helicity nonconserving and agree with the data.

The quasi-potential approach to the spin effect analysis was discussed by S. Goloskokov (Dubna). V. Petrov (Serpukhov) described the gluon dominance hypothesis and its observable consequences while M. Moravcsik (Oregon) outlined the use of polarization as a probe of particle reaction dynamics.

The concluding talk was given by A. Krisch (Michigan) who underlined the importance of spin and

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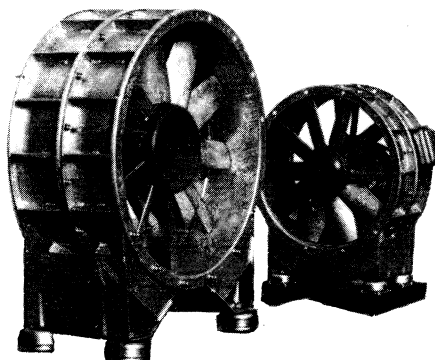
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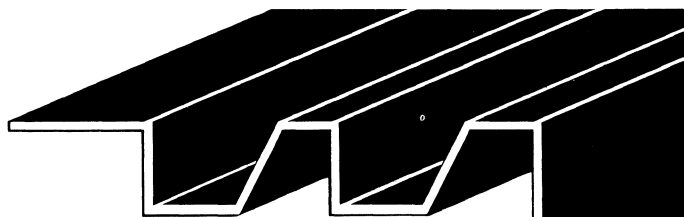


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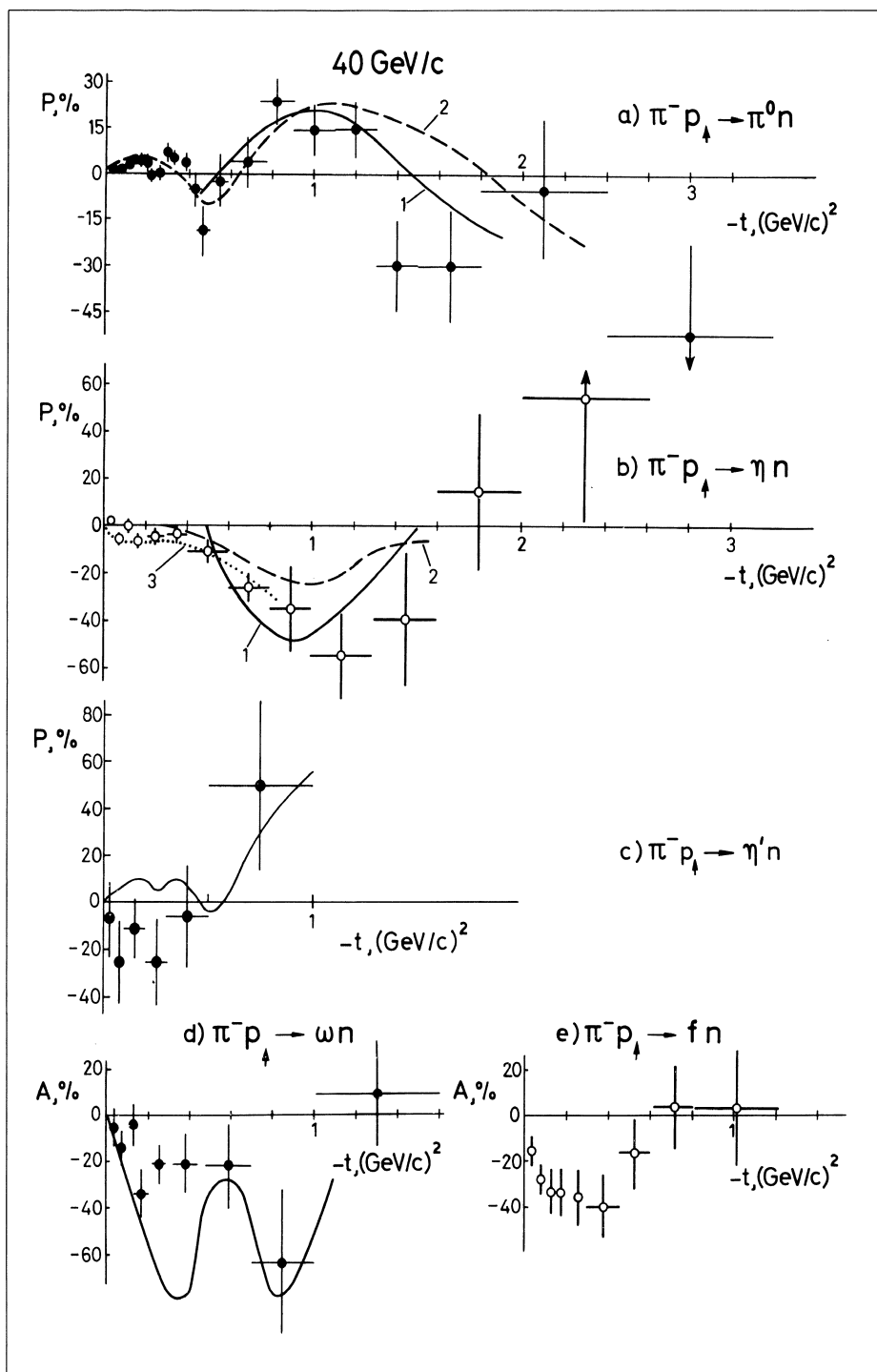
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Polarization data from negative pion on proton charge exchange reactions at Serpukhov show some large spin effects.

polarized beams and targets. He reviewed the list of large and unexpected spin effects obtained during the last ten years, which had shown that pure spin reaction rates are more fundamental than spin averaged ones.

The next Symposium in the series is to be held at Minneapolis in autumn 1988 and will surely continue the spin physics tradition of providing stimulating results.

From S.M. Troshin

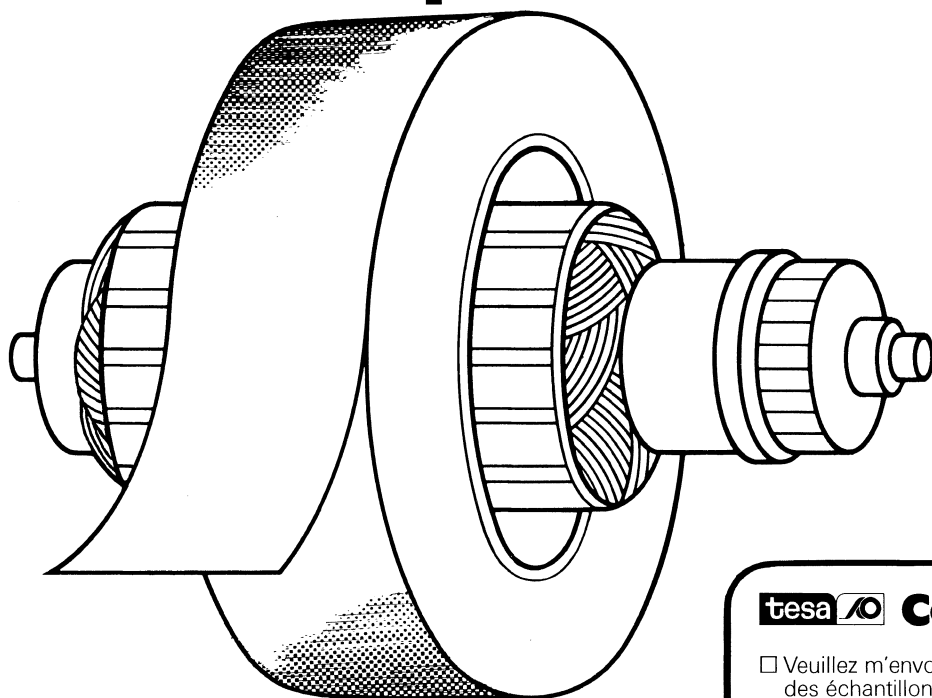


Time out from spin. O. Chamberlain (left) with B. Arbuzov (Serpukhov).





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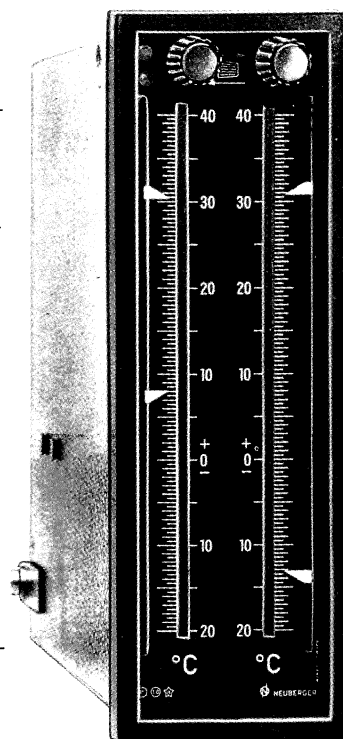
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