



## CONTENTS

### VOLUME ONE

Preface .....	xvii
Summary of the Symposium .....	1
G. Bunce	

## EXPERIMENT AND THEORY

Spin Effects at Future Supercolliders .....	17
P. Taxil	
Status and Prospects for High Energy	
Spin Experiments .....	27
L. G. Pondrom	

### High-Energy Hadron Interactions--Fragmentation

Transverse Polarizations in the Fragmentation Region .....	48
P. Kroll	
Measurement of the Ratio of $\Sigma^0/\Lambda$ Inclusive	
Production and the $\Sigma^0$ and $\Lambda$ Polarizations	
by 28.5 GeV/c Protons on Beryllium .....	58
E. C. Dukes	
Spin Parameter Measurements in Inclusive	
$\Lambda$ , $\Sigma^0$ , $K_S$ , and $\Lambda$ Production .....	66
M. Nessi	
Polarization and Spin Transfer of $\Omega$	
and $\Xi^-$ Hyperons at 800 GeV .....	80
M. J. Longo <i>et al.</i>	
Analyzing Power in Inclusive $\pi^0$ Production	
at High $x_F$ , with 185 GeV/c Polarized Proton	
and Antiproton Beams .....	89
F. Nessi-Tedaldi	
Transverse Spin Effects and Resonance	
Interference in High Energy Inclusive Reactions .....	99
G. Nardulli	
Search for Azimuthal Asymmetry of $\pi^0$ Meson Production	
in Beam Fragmentation Region on Polarized Protons and Deuterons .....	105
V. D. Apokin <i>et al.</i>	

## High-Energy Hadron Interactions--Exclusives

<b>Spin Effects in Exclusive Scattering .....</b>	<b>112</b>
G. R. Farrar	
<b>Measurement of <math>A_n</math> and <math>A_{nn}</math> in Elastic <math>p\bar{p}</math></b>	
<b>at 18.5 GeV/c .....</b>	<b>119</b>
D. C. Peaslee	
<b>Spin Effects in Pion-Nucleon and Nucleon-Nucleon</b>	
<b>Scattering at High Energies and Fixed Angles .....</b>	<b>123</b>
M. P. Chavleishvili	
<b>Spin Effects in Exclusive Reactions at High Energies .....</b>	<b>131</b>
S. V. Goloskokov	
<b>Exclusive Processes in QCD and Spin-Spin</b>	
<b>Correlations .....</b>	<b>138</b>
G. F. de Teramond	
 <b>High-Energy Hadron Interactions-Spin Structure</b>	
<b>High Energy Hadron Interactions Summary .....</b>	<b>145</b>
P. G. Ratcliffe	
<b>Revealing of Essential Spin Effects</b>	
<b>in Hard Collisions at 40 GeV .....</b>	<b>149</b>
A. Vasiliev <i>et al.</i>	
<b>Single Spin Asymmetry in Large <math>p_t</math>,</b>	
<b>Inclusive <math>\pi^+</math> and <math>\pi^-</math> Production from <math>p\bar{p}</math> Interactions .....</b>	<b>157</b>
S. Heppelmann <i>et al.</i>	
<b>Measurement of the Spin Asymmetry of Cumulative</b>	
<b>Proton Production at 90 Degrees in the Reaction</b>	
<b><math>\pi^- d \rightarrow p\bar{p}</math> at 40 GeV by using a Polarized Deuterium Target .....</b>	<b>160</b>
R. Ya. Zukaneev <i>et al.</i>	
<b>Where is the Proton's Spin? .....</b>	<b>169</b>
F. E. Close	
<b>The Measurement of the Internal Spin Structure</b>	
<b>of the Nucleon .....</b>	<b>177</b>
K. P. Schuler	
<b>The EMC Polarized Target Results .....</b>	<b>188</b>
R. Gamet	
<b>Rotating Constituents in Polarized Proton? .....</b>	<b>200</b>
T-C. Meng	
<b>The Spin Dependence of Hadronic and Leptonic</b>	
<b>Production and Scattering .....</b>	<b>205</b>
H. Noya <i>et al.</i>	
<b>Polarized Proton and Antiproton Experiments</b>	
<b>at Fermilab E-581/704 .....</b>	<b>210</b>
A. Yokosawa	
<b>Electroweak Asymmetries of Deep Inelastic Scattering</b>	
<b>of Polarized Leptons on Polarized Nucleons</b>	
<b>as an Instrument for Discriminating Between Various Gauge Models .....</b>	<b>222</b>
T. V. Kukhto <i>et al.</i>	

## Lepton Interactions

Tests of the Standard Model (and Beyond) from Spin Physics .....	234
C. Verzegnassi	
Theory of the $Z^0$ Polarization Asymmetry	
Predictions .....	244
D. C. Kennedy	
Spin Effects and Electromagnetic Properties of $W$ and $Z^0$ Bosons in Reactions $\gamma e^\pm \rightarrow W^\pm \nu, Z^0 e^\pm$ .....	263
B. K. Kerimov and P. Buras	
$B$ Meson Physics with Polarized Electron Beams at the SLC .....	271
W. B. Atwood	
Asymmetry in Lepton Pair Production from $e^+e^-$ at KEK .....	280
S. K. Kim	
Determining Quark Helicity from Jet Distributions .....	291
G. R. Goldstein	
Low Lying Glueball Productions in Polarized $\gamma-\gamma$ Collisions .....	295
Z. X. Xu and C. G. Hu	

## Static Properties of Leptons and Hadrons

Summary of Static Properties of Leptons and Hadrons .....	298
J. Franklin	
Comparison of the Electron and Positron Anomalous Magnetic Moments: Experiment 1987 .....	305
Yu. Shatunov <i>et al.</i>	
Geonium Spectra-Electron Radius-Cosmon .....	319
H. Dehmelt	
Muon Anomalous Magnetic Moment .....	326
V. W. Hughes	
The Neutron Electric Dipole Moment .....	348
J. M. Pendlebury	
Magnetic Moments of the Hyperons, A Short Experimental Review .....	353
J. Lach	
Exotic Atom Measurements of the Magnetic Dipole Moment of the Sigma Minus .....	361
J. P. Miller <i>et al.</i>	
Preliminary Results from E 756 on the $\Xi^-$ and $\Omega^-$ Magnetic Moments .....	374
K. Johns <i>et al.</i>	
Theoretical Status of Baryon Magnetic Moments .....	384
J. Franklin	

## Weak Decays

<b>Spin and Polarization Studies of Weak Decays .....</b>	<b>390</b>
S. Rudaz	
<b>The <math>\Delta I = 1/2</math> Rule in Non-Leptonic Hyperon Decays .....</b>	<b>408</b>
K. Thorne	
<b>Overview of the Theory of Hyperon Decays .....</b>	<b>418</b>
J. F. Donoghue	
<b>Baryonic Leptonic Decay .....</b>	<b>428</b>
A. Beretvas	
<b>Experimental Status of Radiative Weak Decays .....</b>	<b>435</b>
C. James	
<b>A Preliminary Measurement of the <math>\Xi^0 \rightarrow \Sigma^0 \gamma</math></b>	
<b>Branching Ratio and Asymmetry Parameter .....</b>	<b>440</b>
S. Teige <i>et al.</i>	
<b>Polarization Effects in Heavy Meson Decays .....</b>	<b>445</b>
M. Bauer	

## Symmetries and Spin

<b>Summary: Symmetries and Spin .....</b>	<b>456</b>
W. C. Haxton	
<b>Parity Nonconservation in the Proton-Deuteron</b>	
<b>Total Cross Section at 800 MeV .....</b>	<b>463</b>
R. E. Mischke	
<b>Measurement of Parity Nonconservation</b>	
<b>in Proton-Deuteron Scattering at 43 MeV .....</b>	<b>469</b>
J. Lang <i>et al.</i>	
<b>Pion-Exchange Contribution to the Parity-Violating</b>	
<b>Asymmetry in <math>p\bar{p}</math> Scattering .....</b>	<b>474</b>
R. R. Silbar <i>et al.</i>	
<b>Parity Violation in Neutron Capture Reaction .....</b>	<b>482</b>
Y. Masuda	
<b>Parity Violation in Electron Scattering</b>	
<b>from Carbon: A Progress Report .....</b>	<b>486</b>
G. W. Dodson <i>et al.</i>	
<b>Sensitivity of <math>P</math>-Odd Polarization Observables</b>	
<b>in <math>\gamma p \rightarrow N\pi</math> to Axial Anomaly and Gluon Corrections</b>	
<b>in <math>\Delta</math>-Isobar Couplings .....</b>	<b>493</b>
Yu. V. Kulish	
<b>Tests of Time Reversal in Neutron Nucleus</b>	
<b>Scattering .....</b>	<b>501</b>
J. D. Bowman	
<b>The Method of Checking <math>T</math>-Invariance</b>	
<b>in <math>NN</math> Collisions by Means of a Polarized Target .....</b>	<b>508</b>
R. Ya. Zulkarneev	
<b>Lambda-Antilambda Asymmetries and CP Violation .....</b>	<b>513</b>
D. W. Hertzog <i>et al.</i>	

<b>Search for CP Violation Using Hyperons at Fermilab .....</b>	<b>522</b>
K. B. Luk	
<b>Charge Symmetry Breaking in the Nucleon–Nucleon System .....</b>	<b>527</b>
A. G. Williams	
<b>Charge Symmetry Breaking in the Two Nucleon System .....</b>	<b>532</b>
J. A. Niskanen and M. Iqbal	
 <b>Intermediate Energy Hadron Interactions</b>	
<b>Intermediate Energy Hadron Interactions Summary .....</b>	<b>540</b>
R. R. Silbar	
<b>Intermediate Energy Phenomenon I Summary .....</b>	<b>550</b>
M. J. Moravcsik	
<b>Nucleon–Nucleon Scattering at LAMPF and KEK .....</b>	<b>555</b>
G. Glass	
<b>Measurements of <math>np</math> Observables at TRIUMF .....</b>	<b>572</b>
C. A. Davis	
<b><math>n</math>–<math>p</math> Elastic Scattering Measurements of Spin Correlation and Charge Symmetry at IUCF .....</b>	<b>579</b>
J. Sowinski	
<b>Spin Observables in <math>\bar{p}N</math> Elastic Scattering .....</b>	<b>589</b>
R. Bertini	
<b>Complete Sets of Spin Observables in Pion–Nucleon Elastic Scattering from 427–657 MeV/c .....</b>	<b>597</b>
M. E. Sadler <i>et al.</i>	
<b>Asymmetry of Elastic Scattering in the Backward Hemisphere at 1.4–2.1 GeV/c .....</b>	<b>602</b>
V. P. Kanavets <i>et al.</i>	
<b>Measurement of the Analyzing Power in <math>pd</math> Elastic Scattering at 3.5 GeV .....</b>	<b>607</b>
N. Horikawa	
<b><math>NN \rightarrow NN\pi</math> at LAMPF and TRIUMF .....</b>	<b>613</b>
P. J. Riley	
<b>Polarization Measurements in the <math>pp + pn\pi^+</math> and <math>pp \rightarrow pp\pi^0</math> Reactions at 517 and 580 MeV .....</b>	<b>623</b>
Ph. Sormani <i>et al.</i>	
<b>Spin Observables and Exotic Resonances (Non-Strange and Strange) .....</b>	<b>630</b>
E. L. Lomon	
<b>Narrow Structure in the Analyzing Power of the <math>{}^3\text{He}(\vec{p}, d)\text{X}</math> Reaction at 0.8 GeV .....</b>	<b>641</b>
M. M. Gazzaly <i>et al.</i>	
<b>Diquark Cluster Model and Dibaryons .....</b>	<b>649</b>
N. Konno <i>et al.</i>	
<b>Recent Results from the Saclay Nucleon–Nucleon Program .....</b>	<b>655</b>
A. de Lesquen <i>et al.</i>	

<b>Asymmetry in the <math>D(\vec{e}, e'p)n</math> Reaction and Dibaryon Resonances .....</b>	<b>663</b>
M. P. Rekalo <i>et al.</i>	
<b>Measurement of 2-ND and 3-RD Order Vector and Tensor Spin Observables in the Reaction <math>\vec{p}(\vec{d}, d)\vec{p}</math> at 1.6 GeV Deuteron Beam Energy .....</b>	<b>668</b>
G. J. Igo <i>et al.</i>	
<b>Measurement of the Spin Rotation Parameters <math>R</math> and <math>A</math> in <math>\pi^-p</math>-Elastic Scattering in the Region of Pion-Nucleon Resonances .....</b>	<b>676</b>
S. P. Kruglov <i>et al.</i>	
<b>Anomalous Spin Response in the <math>{}^4\text{He}(p, p'){}^4\text{He}^*</math> Reaction at 500 MeV .....</b>	<b>681</b>
S. K. Nanda <i>et al.</i>	
<b>Present and Future of Polarized Neutron Physics at PSI .....</b>	<b>684</b>
G. Gaillard <i>et al.</i>	
<b>Measurement of the Vector Analysing Power of Reactions <math>d \uparrow C-pX</math> and <math>d \uparrow -dX</math> at 800 MeV/Nucleon .....</b>	<b>688</b>
P. V. Nomokonov <i>et al.</i>	
<b>Nucleon-Nucleon Double Spin Flip Interactions at Intermediate Energies .....</b>	<b>691</b>
A. Gersten	
<b>Dibaryon Resonances and Description of Polarization Observables in <math>\gamma d \rightarrow pn</math> at Photon Energies Below 600 MeV .....</b>	<b>702</b>
V. P. Barannik and Yu. Kulish	
<b>Studies of <math>(\gamma, n)</math> and <math>(\gamma, p)</math> Reactions in <math>{}^4\text{He}</math> Disintegration by 40 MeV Linearly Polarized Photons .....</b>	<b>708</b>
E. A. Vinokurov <i>et al.</i>	
<b>Inclusive Proton Polarization in <math>\gamma {}^{3,4}\text{He} \rightarrow pX</math> Reactions .....</b>	<b>717</b>
A. A. Zybalov <i>et al.</i>	
<b>A Study of Polarization Effects in Two-Body Photodisintegration of Helium-4 .....</b>	<b>720</b>
V. B. Ganenko <i>et al.</i>	

### Theory Workshop

<b>Recent Developments in our Understanding of Spin Effects at High Energy .....</b>	<b>728</b>
J. Soffer	
<b>Hyperon Polarization and Multiple Quark Scattering .....</b>	<b>739</b>
J. Szwed and R. Wit	
<b>Gluon Fusion as a Source for Massive Quark Polarization .....</b>	<b>744</b>
W. G. D. Dharmaratna and G. R. Goldstein	
<b>Report from the Theory Workshop II: Polarized Structure Functions .....</b>	<b>747</b>
R. D. Carlitz	

<b>Polarized Deep Inelastic Scattering: The Ultimate Challenge to PQCD .....</b>	<b>754</b>
G. Preparata	
<b>A Crisis in the Parton Model: Where, Oh Where is the Proton's Spin? .....</b>	<b>764</b>
E. Leader and M. Anselmino	
<b>Spin Models of the Proton .....</b>	<b>786</b>
G. P. Ramsey	
<b>Spin Correlations in Quark and Gluon Fragmentation .....</b>	<b>802</b>
M. B. Einhorn	
<b>Perturbative QCD Prediction of the Density Matrix</b>	
<b>Elements for the Reaction <math>\pi + p \rightarrow \rho + p</math> .....</b>	<b>812</b>
H. Zhang and G. R. Farrar	
<b>Spin Dependence of Hadronic Exclusive Reactions at High Energy .....</b>	<b>821</b>
C. Bourrely	
<b>Spin Effects in Exclusive Processes: Unitarity and Quark Interaction Dynamics .....</b>	<b>828</b>
S.M. Troshin and N. E. Tyurin	
<b>Spin Effects and Vector Diquarks: <math>\eta_c</math> Decay into Baryon–Antibaryon .....</b>	<b>838</b>
M. Anselmino <i>et al.</i>	
<b>The Pontryagin Current in Spin Physics .....</b>	<b>847</b>
B. A. Li	