The SPEAR/SLAC days 1973-1977

PIONEERING PHYSICS and the ΑΠΟΚΡΥΦΑ

PREAMBLE

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- We hoped that it might be produced at SPEAR and one could to detect it by looking for Weak-Electromagnetic interference in the Mu^+Mu^- final states.
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- If the e^+e^- beams were transversely polarized then we would have an extra handle to beat the background because QED predicts accurately the modification of the angular distribution when the beams are polarized.
- This is why a Penn-Wisconsin Collaboration led by D. Cline and A.K. Mann proposed to measure the beam polarization at SPEAR

➢ Proposal SP-7.

RADIATIVE SPIN FLIP TRANSITIONS

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RADIATIVE SPIN FLIP TRANSITIONS

- The mechanism for this process is the interaction between the electron and the synchrotron radiation field, which results in unequal transition rates between the two states of spin orientation in the guide field.

- Note however, that (g-2) resonances will destroy the beam polarization i.e. when the precession frequency of the spin is a harmonic of the orbital frequency.

SPEAR I

***Measurement of the radiative electron polarization in a 2.4GeV storage ring,* 1975**

U. Camerini, D. Cline, J. Learned, A. K. Mann, and L. K. Resvanis

It is expected that the electron and positron beams in a storage ring become transversely polarized after their injection into the ring, with the positron polarization vector parallel to the guide magnetic field and the electron polarization vector antiparallel.

$$P(t) = P_0\left(1 - e^{-t/T}\right) \qquad \text{(eq. 1)}$$

where the net polarization at equilibrium is $P_0 = 0.924$ and the relaxation time is given by

$$T \cong 98\,\text{sec}\left(\frac{R_{bend}^3}{E^5(GeV)}\right)\frac{R_{avg}}{R_{bend}} \qquad \text{(eq. 2)} \qquad \text{(note the strong dependence on E)}$$

with R_{avg} and R_{bend} determined by the geometry of the storage ring. For SPEAR I, Eq. (2) yields $T \cong$2.0hr at 2.4 GeV, which is compatible with the lifetime of the beam.

The use of Möller scattering as a means of measuring the transverse polarization was first proposed by Baier.

Möller scattering of pairs of electrons within the same bunch in the storage ring occurs because of the relative motion, mainly due to radial betatron oscillations, of electrons within the bunch. Two electrons with initial center-of-mass energy E^* will, after scattering, have laboratory energies E_1, and E_2, different in general from the storage ring energy E_0. The guide field bending magnets separate these electrons from the bunch and cause them to follow approximately symmetrical trajectories with respect to the bunch, close to the common horizontal plane. This outscattering -sometimes called the Touschek effect- can be an important element of beam loss in a storage ring, particularly at low energies.

The cross section for Möller scattering is spin-dependent, and for this reason the rate of out-scattering depends on the polarization state of the electrons in the bunch.

SPEAR I

***Measurement of the radiative electron polarization in a 2.4GeV storage ring,* 1975**

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The apparatus consisted of a double-arm telescope with scintillation counters placed about the beam center line. The inside arm of the telescope was composed of scintillators placed in three pockets (1,2,3). Each pocket was a retractable well of 3.8 cm diameter of 1.25-mm thick stainless steel. The outside arm was composed of two stationary pockets (4, 5), 1.3m apart; these located the counters 4 cm from the beam center line. Counters C_1, C_2, C_4 and C_5 where 6.4-mm thick scintillators 1 cm × 2 cm. Pocket 3 had a four radiation length shower counter S_3 with a 6.4mm × 1cm × 2cm defining counter, D_3, in front of it. The shower counter was set to reject low-energy background.

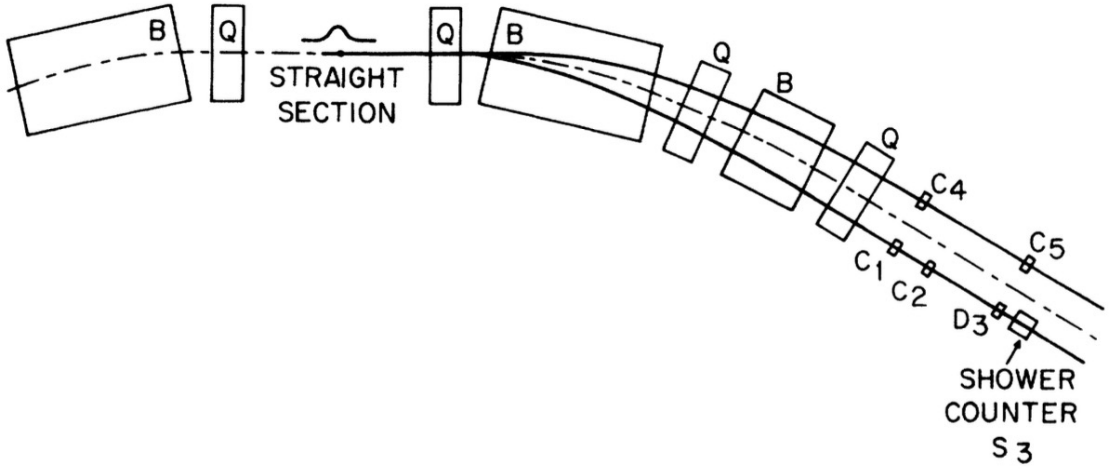


FIG. 2. Experimental arrangement showing the location of the innter and outer counter telescopes with respect to the SPEAR lattice. *B* and *Q* are, respectively, bending and quadrupole magnets of the storage ring.

Most measurements were performed with a single electron beam, at currents between 25 and 15 mA,

The existence of polarization in the beam at SPEAR was demonstrated by two methods.

First, the beam was allowed to coast for approximately six hours during which the time dependence of the outscattered rate was studied. The exponential build-up of the polarization indicated in Eq. (1) will manifest itself in a corresponding time dependence of the outscattered rate.

Second, after this time the beam energy was changed in such a way that a (g— 2) depolarizing resonance was crossed and the energy of the beam was then returned to its original value.

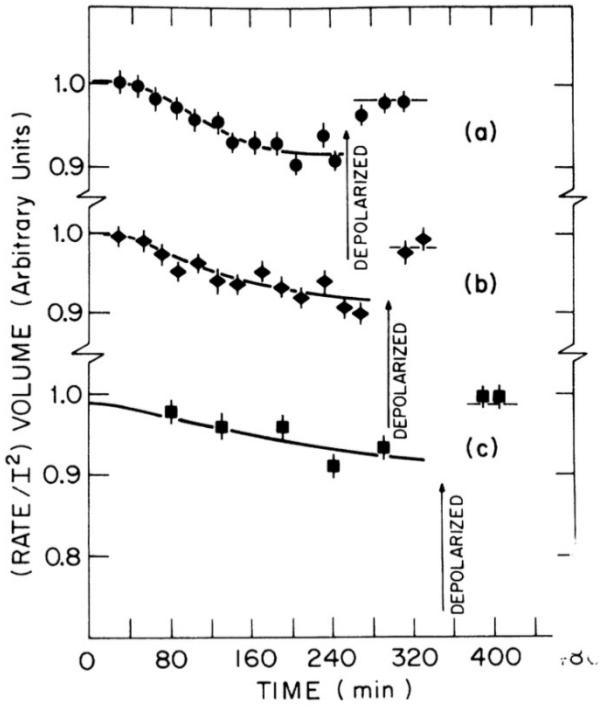


FIG. 4. Plot of the observed normalized coincidence rate vs time for three independent runs. At $t = t_{DEPOL}$ the circulating beam was depolarized by the method described in the text.

One clearly sees the slow drop in the normalized rate, with a characteristic time of roughly 120 minutes and a discontinuity in rate at the time of depolarization, t_D. The zero of the time scale in these plots corresponds to the instant at which the beam was brought to its operating energy.

…the search in χ^2 yielded the value $P = 0.85^{+0.10}_{-0.25}$ to be compared with the prediction $P = 0.924$, and the value $T = 90^{+40}_{-35}$ compared with the predicted value $T = 124$ min.

There is, however, substantial evidence for polarization in these results.
We intend to study polarization more extensively at SPEAR II with colliding beams.

SPEAR I SINGLE BEAM

PHYS. REV. D. 12, 1855, 1 Oct.1975, (submitted 31March 1975)

***Measurement of the radiative electron polarization in a 2.4GeV storage ring*, 1975**

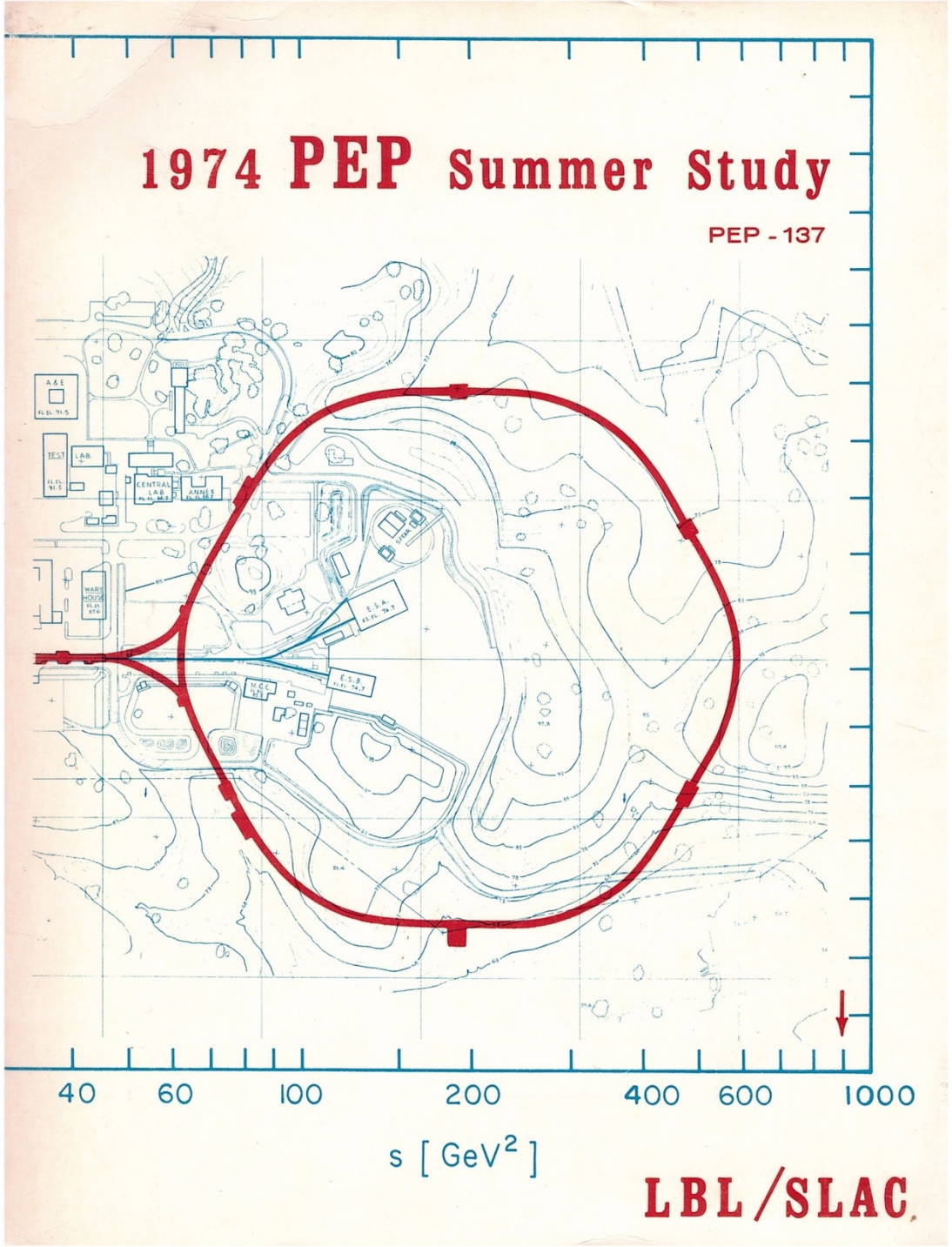
U. Camerini, D. Cline, J. Learned, A. K. Mann, and L. K. Resvanis

WE CONCLUDED

We have observed the existence of transverse polarization of the electron beam in the SPEAR storage ring resulting from the emission of synchrotron radiation in the magnetic field. The time constant for polarization build-up has been measured for a single circulating electron beam to be 90^{+40}_{-35} *min and the corresponding equilibrium polarization to be* $0.85^{+0.10}_{-0.25}$*. These values are to be compared with the theoretical predictions of 124 min and 0.924, respectively.*

Note however, the paper was not accepted for publication in the Phys. Rev. Letters but kicked to the Phys. Rev., delaying thus the publication date.

As you will see in the APOCRYPHA part of my talk, this was NOT an accident.



POLARIZATION GROUP COORDINATORS SUMMARY

L. K. Resvanis

30 August 1974

D. Buchholz
G. Manning
F. Martin
C. Morehouse, Deputy Coordinator
C. Prescott
L. K. Resvanis, Coordinator
G. Shapiro
H. Steiner
R. Schwitters
K. Strauch
W. Toner
P. Wanderer
W. Wenzel

ABSTRACT

The magnitude and direction of the e^+,e^- polarization are very important parameters at PEP. During the Summer Study many polarization monitors were considered together with methods for rotating and controlling the direction of polarization.

***Two Methods to Measure the e^+e^- Polarization at PEP*, 1974.**

U. Camerini, D.B. Cline, J.G. Learned, A.K. Mann, L.K. Resvanis & P.J. Wanderer

I) Backward Compton scattering of circularly polarized photons from an e- beam can be used to measure the polarization of that beam. We described a simple, compact, fast monitor that measures the beam polarization at P.E.P. by scattering a laser beam off the e- bunches and detecting the backscattered photons.

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II) We also presented graphs of how the $\frac{d\sigma}{d\Omega}$ of the electromagnetic processes $e^+e^- \rightarrow e^+e^-, \mu^+\mu^-, \gamma^+\gamma^-$ *is* modified by the transverse polarization of the initial state particles. (As we had originally proposed for SPEAR, proposal SP-7)

Two Methods to Measure the e^+e^- Polarization at PEP, 1974

U. Camerini, D.B. Cline, J.G. Learned, A.K. Mann, L.K. Resvanis & P.J. Wanderer

TWO METHODS TO MEASURE

THE $e^{\pm}$ POLARIZATION AT PEP

U. Camerini, D. B. Cline, J. G. Learned, A. K. Mann,
L. K. Resvanis, and P. J. Wanderer

ABSTRACT

Backward Compton scattering of circularly polarized photons from an $e^{\pm}$ beam can be used to measure the polarization of that beam. We describe a simple, compact, fast monitor that measures the beam polarization at P.E.P. by scattering a laser beam off the $e^{\pm}$ bunches and detecting the backscattered photons. We also present graphs of how the $\frac{d\sigma}{d\Omega}$ of the electromagnetic processes $e^+e^- \to e^+e^-$, $\mu^+\mu^-$, $\gamma\gamma$ is modified by the transverse polarization of the initial state particles.

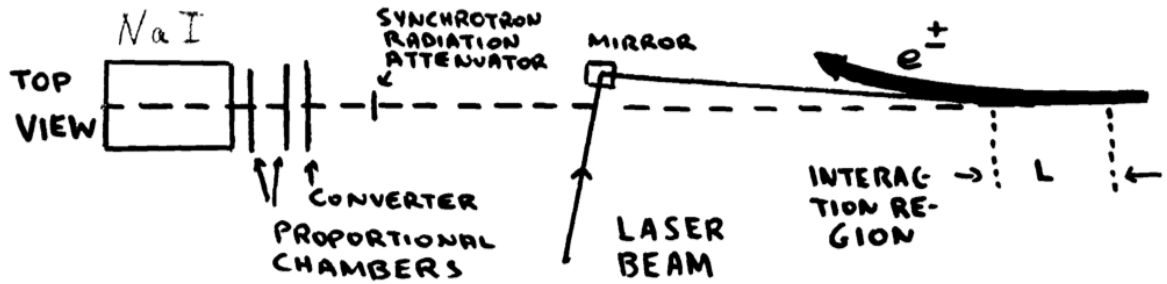
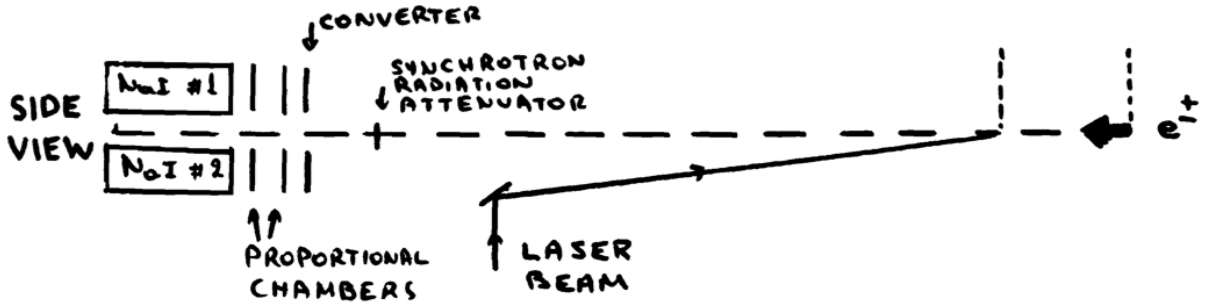


FIG. 1



- A couple of years later, John Learned and Ugo Camerini worked hard and submitted such a proposal for SPEAR II.

- It was turned down BUT was “resurrected” a few years later by an “in house” group and approved this time.

SPEAR II

***Polarization of Colliding e^+e^- Beams at SPEAR II*, 1975**

J. Learned, L. K. Resvanis & C.M. Spencer

In this experiment we measure the polarization through the study of reactions

(i) $e^+e^- \rightarrow e^+e^-$ and (ii) $e^+e^- \rightarrow \mu^+\mu^-$.

Polarization effects in these interactions may be reliably calculated from QED. The expected angular distributions for reactions (i) and (ii) are given to first order in α by

$$\frac{d\sigma_{ee}}{d\Omega} = \frac{r_0^2 m^2}{16E^2}\left(\frac{3+z^2}{1-z}\right)^2\left[1-\left(\frac{1-z^2}{3+z^2}\right)^2 P^2\cos(2\varphi)\right]$$

$$\frac{d\sigma_{\mu\mu}}{d\Omega} = \frac{r_0^2 m^2}{16E^2}[(1+z^2)+(1-z^2)\mathrm{P}^2\cos(2\varphi)]$$

φ: azimuth
ϑ: polar

We define the asymmetry $A = (V-H)/(V+H)$ where H is the number of events with φ in the range -45° to +45° and 135° to 225° and V is the number of events in the remaining range. Integrating the cross section over the appropriate ranges in φ and θ one finds $\mathrm{A} = \mathrm{P}^2\times 0.50$ for muons $\mathrm{A} = \mathrm{P}^2\times 0.048$ for electrons.

We examined the angular distributions for the reactions (i) and (ii) using the SPEAR magnetic detector at:

beam energies of 1.55, 3.1, and 3.7 GeV.

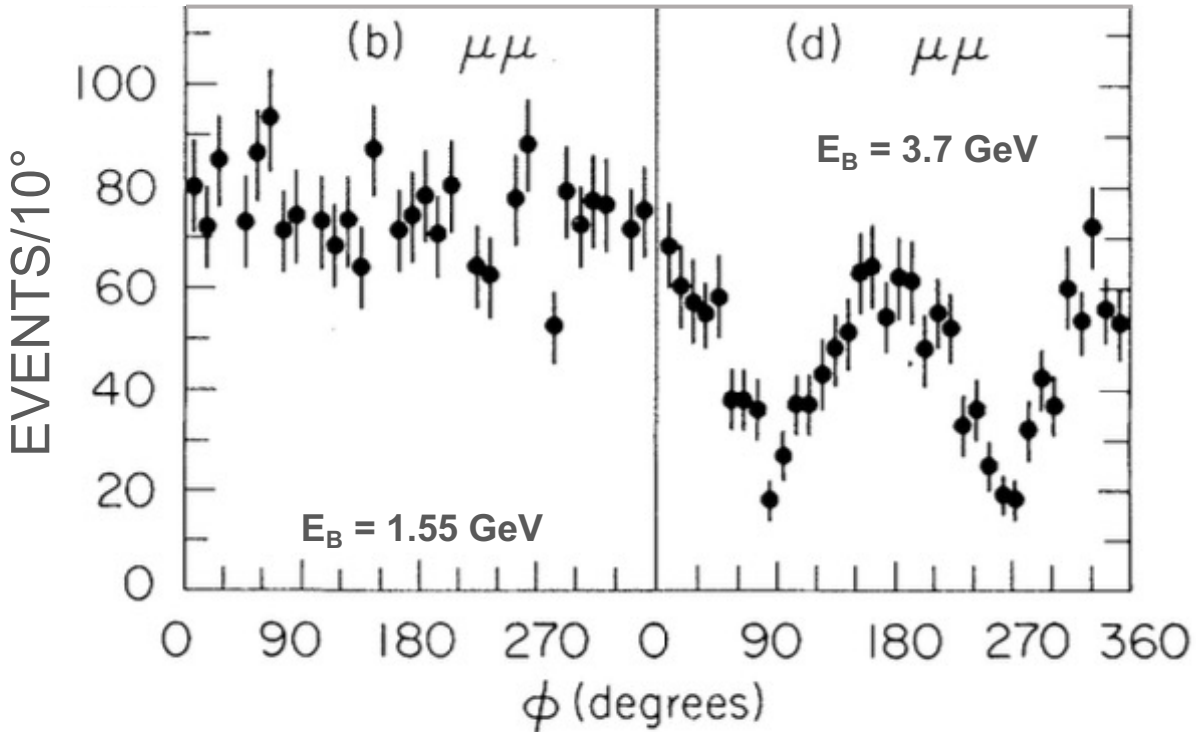
SPEAR II

***Polarization of Colliding e^+e^- Beams at SPEAR II*, 1975**

J. Learned, L. K. Resvanis & C.M. Spencer

At 3.7 GeV there is clear evidence of beam polarization.

The average polarization of the 1.55 GeV data is consistent with **zero,** in accordance with the fact that, at this energy, the polarization time constant is much longer than the typical beam lifetime.



Azimuthal angular distributions for events with $|z|<0.6$ at beam energies of 1.55 GeV (left plot) and 3.7 GeV (right plot) for $\mu^+\mu^-$ final states. Error bars are statistical, φ=0 is horizontal.

SPEAR II

Polarization of Colliding e^+e^- Beams at SPEAR II, 1975

J. Learned, L. K. Resvanis & C.M. Spencer

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The average polarization of the 1.55-GeV data is consistent with **zero**, in accordance with the fact that, at this energy, the polarization time constant is much longer than the typical beam lifetime.

At **3.08 GeV the precession frequency of the spin is a harmonic of the orbital frequency providing a mechanism for rapid depolarization**. For this reason the data at "3.1" GeV also show **no evidence** of polarization.

TABLE I. Observed average polarization, number of events, integrated luminosity, and asymmetry for different beam energies and final states. The errors are statistical. The 3.1-GeV data are near a depolarizing resonance. The asymmetries have been corrected for angular regions excluded from the data.

Single beam energy (GeV)	$\sqrt{s}$ (GeV)	Expected lifetime (min)	Integrated luminosity (nb^{-1})	Final State	Number of Events	Corrected asymmetry	$\langle P \rangle$
1.55	3.1	1107	110.74	e^+e^-	5292	-0.026 ± 0.014	~ 0
				$\mu^+\mu^-$	2345	-0.011 ± 0.021	~ 0
3.1	6.2	35	863.2	e^+e^-	10 345	0.005 ± 0.011	~ 0
				$\mu^+\mu^-$	1142	0.0005 ± 0.03	~ 0
3.7	7.4	14	2545.4	e^+e^-	19 334	$+0.020 \pm 0.007$	0.66 ± 0.12
				$\mu^+\mu^-$	1671	-0.245 ± 0.024	0.70 ± 0.03

SPEAR II

***Polarization of Colliding e^+e^- Beams at SPEAR II*, 1975**

J. Learned, L. K. Resvanis & C.M. Spencer

The time distribution of the asymmetry of μ, pairs at 3.7 GeV is shown in Fig. 2.

The angular and time distributions of these data were analyzed by a maximum-likelihood method. We find $P_0 = 0.76 \pm 0.05$ and $\tau = 10^{+20}_{-5}$ min.

The polarization is clearly significantly lower than the theoretical value of 0.924, which probably indicates the presence of a depolarizing effect.

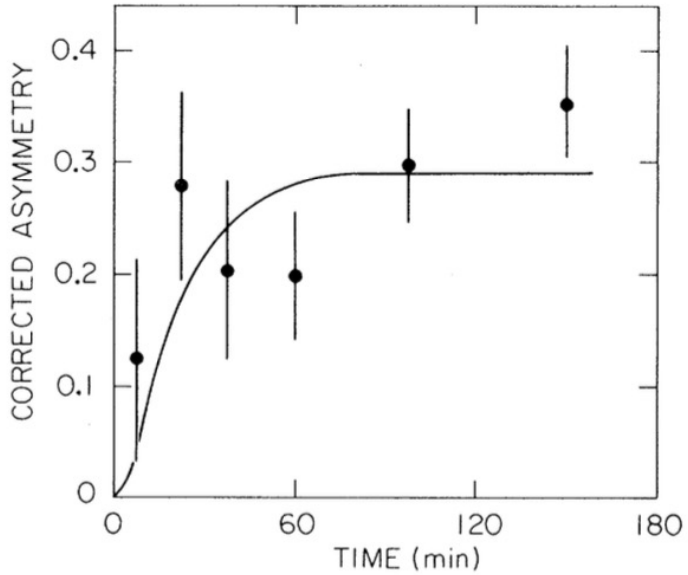

FIG. 2. Time dependence of the corrected asymmetry at a beam energy of 3.7 GeV for $\mu^+\mu^-$ final state. The solid line shows theoretical expectations for an equilibrium polarization value of 0.76. Errors are from maximum-likelihood fit.

SPEAR II

***Polarization of Colliding e^+e^- Beams at SPEAR II*, 19**

J. Learned, L. K. Resvanis & C.M. Spencer

A further fit was made to the φ and θ distributions for events with t greater than 30 min. The angular distributions are shown in Fig. 3 together with the theoretical ones.

These data show, for the first time, good agreement with the complete first-order differential cross sections for reaction $e^+e^- \rightarrow \mu^+\mu^-$ in accordance with the predictions of QED.

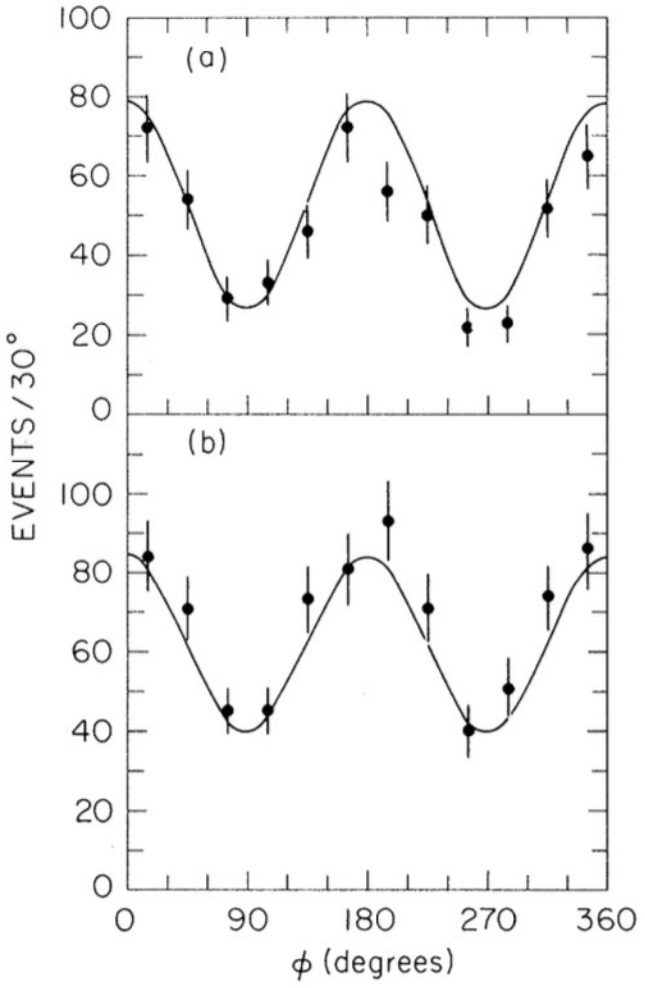

FIG. 3. φ distributions for $\mu^+\mu^-$ events recorded later than 30 min after beam stabilization. Data and predictions for events with $|z| < 0.3$ (a) and $0.3 < |z| < 0.6$ (b) are shown.

SPEAR II

PHYSICAL REVIEW LETTERS,35,1688 (1975)

Polarization of Colliding e^+ e^- Beams at SPEAR II

J. Learned, L. K. Resvanis & C.M. Spencer

ABSTRACT:

We have studied the angular distribution for the reactions $e^+e^- \rightarrow e^+e^-$ and $e^+e^- \rightarrow \mu^+\mu^-$ at beam energies of 1.55, 3.1, and 3.7 GeV at SPEAR II. At a beam energy of 3.7 GeV a significant azimuthal asymmetry was observed indicating that the electron and positron beams are strongly polarized. The angular distribution of the μ pairs was found to be in good agreement with the predictions of quantum electrodynamics. The equilibrium value of the polarization and the polarization time constant are found to be $P_0 = 0.76 \pm 0.05$ and $\tau = 10^{+20}_{-5}$ min.

SURPRISE!!

- Out of curiosity, we also examined the Polarization Run data by analyzing the Hadronic final states and looking at the azimuthal distribution of the leading (most energetic) pion.
- Since pions are bosons, one expects the “dip” in azimuth to be perpendicular to the guide field and not parallel as with muons and electrons.

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- BUT the dip was in the vertical!!
- This can ONLY be IFF the leading pions are decay products of spin ½ particles.
- **This is the FIRST evidence that these pions are fragments of SPIN ½ particles.**
- **Ergo quarks are fermions.**

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- **This is the FIRST evidence that these pions are fragments of SPIN ½ particles.**
- **Ergo quarks are fermions.**
- We showed these results to Burt Richter, he was pleasantly very surprised and he **promised us co-authorship.**
- **However this NEVER happened**, but we hold no grudge since our agreement was that they loan us the MARK-I for one weekend for the Polarization studies with e^+e^- and muon data.

more, in the APOCRYPHA ……..

Measurement of anomalous muon pair production in electron-positron annihilations, 1976-1978

J.G. Smith, W.T. Ford & R. Morse, A.K. Mann & L. Resvanis, U
Camerini, D.B. Cline, J. Freeman, J.G. Learned, J.W. Linton, R.
March, D.D. Reeder, K.M. Seidman, C.M. Spencer & C. Wilkins

The detector, shown in Fig. 1, was a magnetized iron muon spectrometer. The "iron ball" magnet was a cylindrically symmetric, nearly spherical volume of iron with four sets of coils embedded in the horizontal and vertical planes which produced an azimuthal magnetic field in the iron of approximately 15 kG. A (field-free) central cavity of 1m length and 0.94m diameter allowed for the detection of particles produced at the interaction region prior to their incidence at the iron.

The basic idea was to interact the pions out and study the dimuon angular distribution as we had planned to do all along.

However

By this time, Neutral Currents were established on firm ground and we all knew that the mass of the Z0 was much much bigger than the SPEAR II energy.

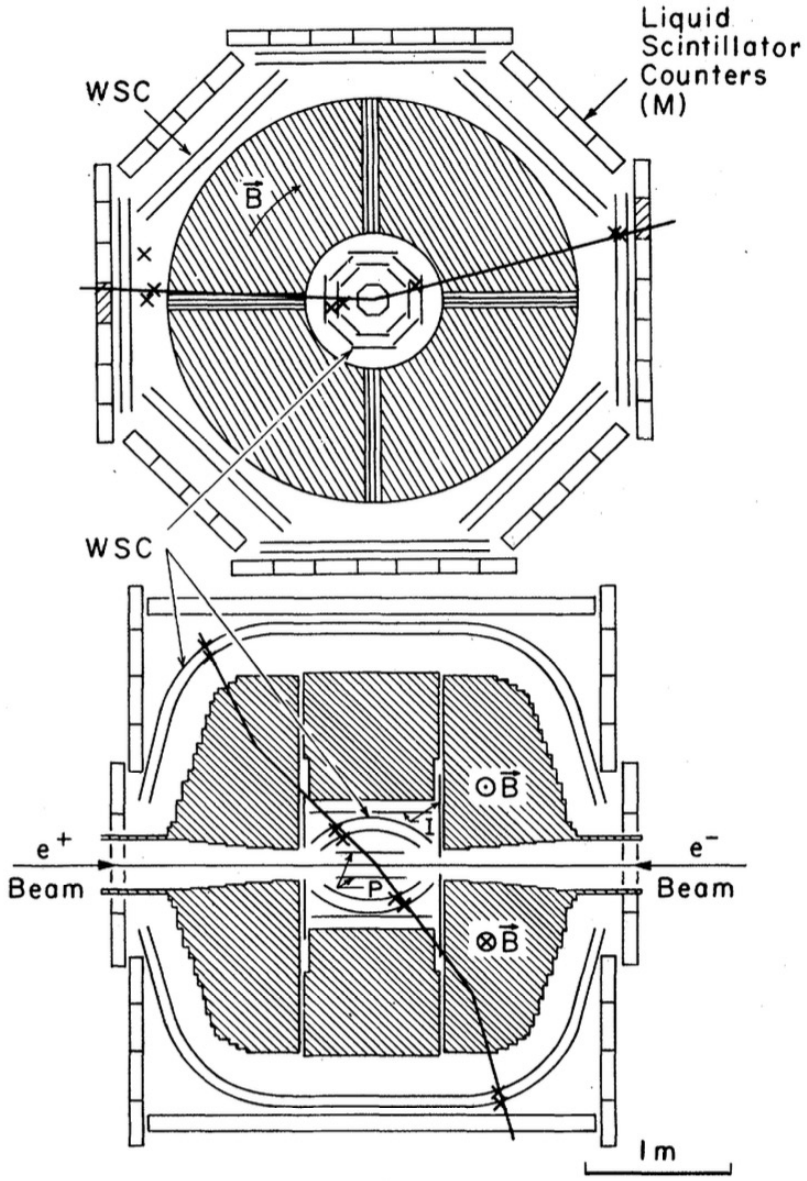

FIG. 1. End and side elevation views of the detector. In the end view the smallest octagon represents the *P* counters. The *I* counters (not shown in the end view) immediately surround the WSC's. Superimposed on the detector drawing is an acoplanar dimuon event. The *M* counters which registered are shaded.

Phys. Rev. D, 18,1. 1 July 1978

Measurement of anomalous muon pair production in electron-positron annihilations, 1978

J.G. Smith, W.T. Ford & R. Morse, A.K. Mann & L. Resvanis, U. Camerini, D.B. Cline, J. Freeman, J.G. Learned, J.W. Linton, R. March, D.D. Reeder, K.M. Seidman, C.M. Spencer & C. Wilkinson

ABSTRACT:

We have observed 16 events of the type $\mu^+\mu^-$+(missing energy and momentum) from e^+e^- annihilations at center-of-mass energies between 6.4 and 7.4 GeV. Taking into account QED backgrounds, we find an excess of 11 anomalous dimuon events. If these are attributed to the production and subsequent decay of a pair of heavy leptons L^+L^- , we obtain the muonic branching ratio $B\left(\left(L^+ \to \mu^+\nu_\mu\overline{\nu_{\mathrm{L}}}\right)/(L^+ \to all)\right) = 0.22^{+0.07}_{-0.08}$

PHYS. REV. LETTERS 35, 483. 25 August 1975.

Photoproduction of the ψ Particles, 1975

U. Camerini, J.G. Learned, R. Prepost, C.M. Spencer, & D.E. Wiser
W.W. Ash, R.L. Anderson, D.M. Ritson, D.J. Sherden, & C.K. Sinclair

ABSTRACT:

The *s* and *t* dependence of incoherent $\psi(3100)$ photoproduction from deuterium has been measured at the Stanford Linear Accelerator Center. $\psi(3700)$ photoproduction and $\psi(3100)$ photoproduction from hydrogen has also been measured.

ΤΑ Α Π Ο Κ Ρ Υ Φ Α

Apocrypha (/əˈpɒkrɪfə/) are biblical or related writings not forming part of the accepted canon of scripture, some of which might be of doubtful authorship or authenticity.[1] In Christianity, the word apocryphal (ἀπόκρυφος) was first applied to writings that were to be read privately rather than in the public context of church services. Apocrypha were edifying Christian works that were not always initially included as canonical scripture.

1996 W.K.H. PANOFSKY PRIZE

Established in 1985 by the friends of W.K.H. Panofsky and the Division of Particles and Fields, this prize is awarded annually in recognition of outstanding achievements in experimental particle physics.

Gail G. Hanson

Indiana University

Roy Frederick Schwitters

University of Texas, Austin

Gail Hanson Citation: "Gail Hanson and Roy Schwitters are honored for their separate contributions which together provided the first clear evidence that hadronic final states in e+e- annihilation, which are largely composed of spin 0 and spin 1 particles, originate from the fragmentation of spin 1/2 quarks. Gail Hanson observed hadron jets and determined the jet axis by developing and applying the sphericity analysis to the hadrons in e+ e- events. She showed that events become more jet-like with increasing energy, contrary to what one expects from a simple phase space production mechanism. Using the beam polarization, she showed that the observed azimuthal distribution of the jet axis was that expected from the production of spin 1/2 quarks that fragment into hadrons.“

Hanson received her Ph.D. from MIT in 1972 and joined the Stanford Linear Accelerator Center as a research associate, eventually becoming a permanent member of the research staff. She left SLAC in 1989 to become a professor of physics at Indiana University. A fellow of both the APS and AAPT, she has served on numerous advisory committees, including the HEPAP Subpanel on High Energy Physics over the next decade.

Roy Schwitters Citation: "Gail Hanson and Roy Schwitters are honored for their separate contributions which together provided the first clear evidence that hadronic final states in e+ e- annihilation, which are largely composed of spin 0 and spin 1 particles, originate from the fragmentation of spin 1/2 quarks. Roy Schwitters used muon pair production to measure the polarization of the beams in the electron-positron storage ring SPEAR. He showed that the azimuthal distribution of high momentum hadrons in hadronic final states was the same as that observed for muon pairs, consistent with the origin of these hadrons from the fragmentation of spin 1/2 quarks."

- Schwitters is currently the S.W. Richardson Foundation Regental Professor of Physics at the University of Texas at Austin, where he teaches and conducts research in experimental high energy physics. Schwitters has been involved with research in high energy physics and related developments in particle detectors and accelerators for over twenty years. From its founding in 1989 until canceled by Congress in 1993, he was director of the Superconducting Super Collider (SSC) Laboratory in Dallas, Texas. He joined Stanford in 1971 as a research associate after receiving his Ph.D. degree in physics from the Massachusetts Institute of Technology, eventually becoming an associate professor at the Stanford Linear Accelerator Center. From 1979 until assuming the directorship of the SSC, he was a professor of physics at Harvard University.

- *The State Department and the CIA keep their sensitive documents CLASSIFIED for 20-25 years. Then they become public.*

- *I have kept the following pages CONFIDENTIAL on Vera Luth's request*

(no one, not even John has actually read her letter).

- *After 30 years I feel that I should make it public.*

UNIVERSITY OF ATHENS
PHYSICS LABORATORY
DIRECTOR: PROF.LEONIDAS K. RESVANIS
SOLONOS 104 – 106 80 ATHENS
TEL.: 36 46 451, 36 33 413, 36 33 414
FAX: 36 33 413

28 May 1996

Prof. Gary Feldman
Deparment of Physics,
Harvard University,
Cambridge, MA 02138

Dear Gary,

I am writing to you in your capacity as chairman of the selection committee for the APS-DPF Panofsky Prize.

Recently, I received the APS Newsletter which announced the award of the 1996 Prizes and I was very surprised to read that part of the justification of the award to Roy Schwitters was that "Roy Schwitters used muon pair production to measure the polarization of the beams in the electron-positron storage ring SPEAR...". First, I would like to state very clearly that I value Roy as a friend and I honour him as one of the leaders of the H.E.P. community. In my opinion he fully deserves the Panofsky Prize but not for the reasons cited.

I believe that the part of the citation made by the Panofsky Prize committee which I just quoted is wrong. The Romans used to abide by the rule" verba volant scripta manent", and because I believe it still holds true today I would like to go on record.

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Best regards

Leo

Leonidas K. Resvanis

c.c. Professors:
F.J.Sciulli, Chair, DPF-APS.
P.Grannis, Chair elect, DPF-APS.
B.Richter
M.Perl
R.Schwitters
A.K.Mann
D.Cline
U.Camerini
J.G.Learned
C.Spencer

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TEL.: 36 46 451, 36 33 413, 36 33 414
FAX: 36 33 413

28 May 1996

Prof. Gary Feldman
Deparment of Physics,
Harvard University,
Cambridge, MA 02138

Dear Gary,

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DIRECTOR: PROF. LEONIDAS K. RESVANIS

104, SOLONOS STR.
10680 ATHENS-GREECE
TEL. 3633414, 13, 15

July 11, 1996

Dear Gary

How are you? I guess the original of the letter I am enclosing must have gone astray

Best regards,

Leo

HARVARD UNIVERSITY
DEPARTMENT OF PHYSICS

OFFICE OF THE CHAIRMAN
JEFFERSON PHYSICAL LABORATORY
CAMBRIDGE, MASSACHUSETTS 02138

September 10, 1996

Professor Leonidas K. Resvanis
University of Athens
Physics Laboratory
Solonos 104
GR-10680 Athens
Greece

Dear Leo,

Thank you for your letter. I'm sorry for the delay. I was at CERN all summer and am just now going through the pile of mail that arrived over the summer.

Although I am currently the chair of the Panofsky Prize Committee, the chair of the committee that awarded the prize in question was Vera Lüth. I think it is most appropriate that she answer you, so I have forwarded your letter to her.

Best wishes,

Gary

Gary Feldman

cc: V. Lüth

PHONE: (617) 495-2866
FAX: (617) 495-0416

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October 8, 1996

Professor Leonidas Resvanis
University of Athens
Physics Laboratory
Solonos 104
10 680 Athens
GREECE

CONFIDENTIAL

Dear Leo,

Thank you for your letter concerning last year's Panofsky Prize. It was forwarded to me by Gary Feldman.

Your comment that the citation does not fully reflect the reason for the award to Roy Schwitters is absolutely correct. You are also correct in referencing the work by you and the University of Pennsylvania Group in regard to the first measurement at SPEAR of polarization based on Touschek scattering and the confirmation with muon pairs in the Mark I detector.

Last year's Panofsky Prize was awarded for the discovery of jets produced in e+e- annihilation and the correlation of these jets with spin 1/2 partons. As you remember well there were two components to this measurement, first, the observation of jet-like behavior at the highest energy of SPEAR based on the sphericity method proposed by Bjorken and carried out by Gail Hanson, and second, the correlation by Roy Schwitters of the modulated azimuthal distribution of jets and high x charged particles with muon pairs and the polarization of the beams.

The original citation read:
:" the observation of jet structure in hadronic events in e+e- annihilation, the observation of the same polarization asymmetry in muon pair and jet pair production, and the use of this asymmetry to reveal spin 1/2 quarks as the parents of hadronic jets"

Unfortunately, one of the recipients was very unhappy with this citation, and in a long negotiation, in which I was not directly involved, the published text was formulated and accepted as a compromise. I agree with you that this final version does not fully reflect the actual contributions by Roy, but believe me we tried very hard. The result is a compromise which understandably makes you somewhat unhappy. In retrospect, we should tried to expand citation to cover other contributions by Roy. But remember, the prize can only be given to more than one person if they share in the same accomplishment. We wanted to honor the discovery of jets as the parents of spin 1/2 partons! You are probably aware of proposals to award this or another prize to the discovery of gluon jets.

I hope that you will understand the situation, and we can remain friends. We all learned how difficult it is to award a prize in these days of large collaborations. We considered quite a few other recommendations for the Pief Prize, in fact, the committee can only award the prize in response to an outside recommentation. Both Gary and I were actually favoring that the award be given to a different set of people for totally unrelated work! So, it was not an inside job! In the end, the final recommendation was supported by everybody on the committee.

Please try to understand! The above information is confidential and I trust you will respect this confidentiality !

Anyway, how are you? how is NESTOR? BABAR is coming along well, though we still have two years to go, only two years!

Best wishes

Vera

Vera Lüth

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The SPEAR/SLAC days
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