

*Report of the December 15-17, 1993 Meeting of the
CEBAF Program Advisory Committee*

– PAC7 –

CEBAF

The Continuous Electron Beam Accelerator Facility

The Continuous Electron Beam Accelerator Facility (CEBAF) is a national physics user facility managed by the Southeastern Universities Research Association (SURA), Inc., for the U.S. Department of Energy (DOE) under contract DE-AC05-84ER40150.

For more information or copies of this report contact:

CEBAF User Liaison Office, MS 12B

12000 Jefferson Avenue

Newport News, VA 23606

Phone: (804) 249-7586

Fax: (804) 249-7398

E-mail: users@cebaf.gov

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Introduction

The CEBAF Program Advisory Committee (PAC) held its seventh meeting on December 15-17, 1993, at CEBAF Center. In response to its charge from the Director, Dr. Hermann Grunder (given in Appendix A), the committee reviewed seven proposals which had previously been recommended for conditional approval, considered thirteen letters-of-intent submitted in April 1993, took a look at the overall CEBAF program, and provided preliminary scientific priorities for experiments accepted for running in Hall C. The latter responsibility was a particularly daunting task given the considerable time elapsed since many of these proposals were first submitted. The PAC members were provided with copies of the original proposals and all previous PAC, Technical Advisory Committee and Technical Advisory Panel comments.

An overview of the physics program in each of the Halls was presented to allow PAC members to get a picture of the overall physics program evolving at CEBAF and to comment on how this program is seen to address the central issues in nuclear physics at present. The members commented on the overall quality of the program and on the fact that the program indeed has evolved considerably and certainly contains many top-rated experiments. Particularly promising are programs to study weak form factors using parity violation, nucleon form factors from polarization observables, and information on meson and baryon excited states including exotics.

General Comments

The PAC members had some reservations about their ability to do the best job of providing scientific priorities for running the various Hall programs given no new information. The PAC thus recommends that some form of update on both the scientific motivation and progress on experiments be provided when this exercise is expanded to include Halls A and B at future meetings.

The PAC comments and preliminary ratings of the Hall C experiments are not included in this report. They are only being sent to the spokespersons of the experiments. This will allow the spokespersons of the Hall C experiments the opportunity to file an update with the next PAC if they would like to have their preliminary rating reviewed before becoming part of a PAC report.

There is general concern among the PAC membership that completing the very challenging parity violation experiments successfully will require more manpower and beam time (and more calendar time) than is currently estimated by the proponents. Furthermore, these experiments may require the operation of equipment in a stable configuration for long periods of time; the impact of that mode of operation on the scheduling of other parts of the physics program has not been evaluated carefully, and could be substantial.

Summary of proposal recommendations

The following tables summarize the results for this PAC and also provide some summary information from all of the PACs:

PAC 7 Summary by Hall

Hall	A	B	C
Proposals Recommended for Approval	5		1
Proposals Recommended for Conditional Approval		1	
Days Recommended for Approval	200		46

The reports and PAC recommendations for each of the proposals reviewed are given in Appendix D.

Totals for PACs 4 -7

	Experiments Recommended for Approval	Additional Experiments Recommended for Conditional Approval	Total
Experiments	61	4	65
Authors	424	16	440
Institutions	101	2	103
Countries	18		18

Totals by Physics Topic for PACs 4-7

Topic	Number	Hall A	Hall B	Hall C
Nucleon and Meson Form Factors and Sum Rules	10	2	3	5
Few Body Nuclear Properties	12	7	3	2
Properties of Nuclei	15	4	8	3
N^* and Meson Properties	16	2	13	1
Strange Quarks	12	2	7	3
Total	65	17	34	14

A detailed listing of the experiments by physics topic is available from the User Liaison Office in the report: *CEBAF Experiment Summaries, January 1994*.

Days of Beam Time for Physics

Hall (Three Year Period)	A (96+97+98)	B (97+98+99)	C (95+96+97)
Beam time available in first three years (See PAC6 report.)	480	500	420
Beam time recommended for approval by PACs 4-7	451	453	353
Beam time recommended for conditional approval by PACs 4-7 plus the currently deferred portion of beam time from approved experiments for first three year period.	100	30	139

John Cameron
Chair, CEBAF Program Advisory Committee

Date: _____

Appendices

- A. Charge to the PAC
- B. PAC Membership and Reading Assignments
- C. Recommendation Summary Listing
- D. Individual Reports
- E. Letters-of-Intent

Appendix A

The following charge was given to the PAC by the CEBAF Director, Hermann Grunder:

Charge to the December 15-17, 1993 Program Advisory Committee (PAC7):

CEBAF requests PAC7 to:

- 1) review updates on conditionally approved experiments and provide advice on,
 - A) the scientific merit, technical feasibility, and manpower requirements of the proposals,
 - B) a recommendation for the proposal to be placed into one of four classes:
 - a) approval of the proposal,
 - b) retain conditional approval status pending clarification of special issues,
 - c) deferral, or
 - d) rejection,
- 2) provide comments on letters-of-intent submitted to the June 14-18, 1993 PAC,
- 3) take an overall look at the full physics program based on the 55 approved and 10 conditionally approved experiments, and
- 4) provide scientific priorities for the Hall C experiments.

Appendix B PAC7 Membership

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JOHN CAMERON (Chair)
Indiana University Cyclotron Facility
2401 Milo B. Sampson Lane
Bloomington, IN 47405
Ph/Fax: (812) 855-9407/855-6645
E-mail: CAMERON@IUCF

DIETER DRECHSEL
Insitut Fuer Kernphysik, Universitaet Mainz
J.-Joachim-Becher Weg 45, Postfach 39 80
6500 Mainz, Germany
Ph/Fax: 011-49-6131-39-3695/39-2964
E-mail: drechsel@vkpmzd.kph.uni-mainz.de

STEFANO FANTONI
Inst. School of Advanced Studies-SISSA
Via Beirut, 2-4, 34014 Trieste-Miramare
Italy
Ph/Fax: 011-39-40-3787-417/3787-528
E-mail: FANTONI@ITSSISSA

BRAD FILIPPONE
California Institute of Technology
Kellogg Radiation Laboratory
Pasadena, CA 91125
Ph/Fax: (818) 395-4517/564-8708
E-mail: brad@erin.caltech.edu

BERNARD FROIS
DPHN/HE CEN Saclay
91191 Gif-Sur Yvette, France
Ph/Fax: 011-3316-908-7226/908-7584
E-mail: FROIS@FRSAC11

WICK HAXTON
Department of Physics - FM 15
University of Washington
Seattle, WA 98195
Ph/Fax: (206) 685-2397/0635
E-mail: haxton@gamow.npl.washington.edu

BARRY HOLSTEIN
Department of Physics & Astronomy
University of Massachusetts
1126 Lederie Graduate Research Center Towers
Amherst, MA 01003
Ph/Fax: (413) 545-2545/545-0648
E-mail: holstein@phast.umass.edu

ROY HOLT
Physics Division
Argonne National Laboratory
9700 S. Cass Avenue
Argonne, IL 60439
Ph/Fax: (708) 252-4012/252-3903
E-mail: HOLT@ANLPHY

JEAN-MARC LAGET
DAPNIA/SPhN
Orme des Merisiers
CEN Saclay
91191 Gif-Sur-Yvette Cedex, France
Ph/Fax: 33 16 908 7554/7584
E-mail: laget@phnx7.saclay.cea.fr

RICHARD MILNER
Department of Physics, 26-447
Massachusetts Institute of Technology
77 Massachusetts Avenue
Cambridge, MA 02139
Ph/Fax: (617) 258-5439/258-6923
E-mail: milner@mitlms.mit.edu

GIANNI RICCO
Istituto Nazionale di Fisica Nucleare
Sezione di Genova
Via Dodecaneso 33
16146 Genova
Italy
Ph/Fax: 011-39-10-353-6230/39-10-313-358
E-mail: ricco@genova.infn.it

DONALD ROBSON
Department of Physics
Florida State University
Tallahassee, FL 32306
Ph/Fax: (904) 644-1767/644-6735
E-mail: robson@ds14.scri.fsu.edu

PAUL STOLER
Physics Department
Rensselaer Polytechnic Institute
Troy, NY 12181
Ph/Fax: (518) 276-8388/276-6680
E-mail: stolerp@rpimep.phys.rpi.edu

JAMES SYMONS
Lawrence Berkeley Laboratory
70-A-3307
1 Cyclotron Road
Berkeley, CA 94720
Ph/Fax: (510) 486-5670/486-4808
E-mail: symons@lbl.gov

GLEN R. YOUNG
Physics Division MS 6375
Oak Ridge National Laboratory
Oak Ridge, TN 37831
Ph/Fax: (615) 576-2770/2822
E-mail: YOUNG@ORPH01

Appendix C

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Rating†-Days

PAC 7 Recommendations

A-18	E-89-019	Hall A	Measurement of Proton Polarization in the $d(\gamma,p)n$ Reaction
A-85	E-91-004	Hall A	Measurement of Strange Quark Effects Using Parity-Violating Elastic Scattering from ^4He at $Q^2=0.6 \text{ (GeV)}^2$
A-42	E-91-010	Hall A	Parity Violation in Elastic Scattering from the Proton: Plans for the First Run
A-45	E-91-011	Hall A	High-Precision Separation of Polarized Structure Functions in Electroproduction of the Δ and Roper Resonances
A-10	E-93-050	Hall A	Nucleon Structure Study by Virtual Compton Scattering
C	E-91-020	Hall B	Experiments with a Polarized ^3He Target and the CEBAF Large Acceptance Spectrometer
A-46	E-91-017	Hall C	“ G^0 ”: Measurement of the Flavor Singlet Form Factors of the Proton
<hr style="width: 100px; margin-left: 0;"/> 246	Total Days		

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A = Approve, C = Conditionally Approve, D = Defer, R = Reject

Proposal: E-89-019, Hall A
Spokespersons: R. Gilman, R. Holt and Z.-E. Meziani
Title: Measurement of Proton Polarization in the $d(\gamma,p)n$ Reaction

Motivation:

It is proposed to measure proton polarization in the reaction $d(\gamma,p)n$ up to an energy of 2.8 GeV at four angles. The measurements will improve upon the accuracy of existing lower energy data and extend the range in energy by more than a factor of two.

The proposal addresses the issue of the scaling region where perturbative QCD predicts the polarization to vanish. Differential cross section measurements from SLAC experiments NE8 and NE17 indicate that the onset of scaling may occur in this kinematic region.

Measurement and Feasibility:

A Bremsstrahlung photon beam with maximum energies essentially equal to the electron kinetic energy is produced by a radiator some 20 cm upstream of the target.

The PAC was satisfied that the technical issues of initial energy spread, backgrounds due to electrodisintegration and experimental technique had been addressed effectively.

Issues:

The PAC views this as an interesting experiment, but notes that, given absence of a successful theory for photodisintegration experiments in the range below two GeV, it is difficult to predict what precision is needed in P_n to differentiate among competing models. The PAC suggests concentrating on one excitation function at $\theta = 90^\circ$ with a more extensive sample of energies than proposed and deferring angular distribution measurements.

It seems unlikely that $P_n = 0$ over this energy range, therefore precise data with small errors could serve to stimulate both theoretical efforts to calculate polarization and differential cross sections in a hadronic picture, and experimental efforts to focus on selective cases of angular distributions.

Manpower:

The manpower is considered adequate.

Recommendation:

The PAC recommends an initial beam time allocation of 18 days to permit measurement of an excitation function at 90° cm between 0.8 and 2.4 GeV.

E-89-019, Hall A

Proposal: E-91-004, Hall A
Spokesperson: E. Beise
Title: Measurement of Strange Quark Effects Using Parity-Violating Elastic Scattering from ${}^4\text{He}$ at $Q^2=0.6 (\text{GeV})^2$

Motivation:

This experiment will measure the parity-violating asymmetry in elastic electron scattering from ${}^4\text{He}$ at $Q^2 = 0.6 (\text{GeV}/c)^2$ in order to look for possible strange quark contributions. A 40% measurement of $\Delta A/A$ would correspond to a strangeness electric form factor with an uncertainty $\Delta G_E^S \sim 0.06$. The $J = I = 0$ character of the target makes the experiment relatively insensitive to theoretical uncertainties.

Measurement and Feasibility:

Measurement and Feasibility: The development of this project is proceeding satisfactorily and PAC looks forward to seeing this experiment take place on schedule.

Issues:

Like the other parity experiments, this measurement would profit from any reduction of the statistical error. In particular, improved performance of the polarized source beyond that assumed in the proposal would be highly desirable. It is a challenging experiment that will require careful attention to systematic errors by the collaborators and commitment to delivery of a highly reliable high intensity polarized electron beam by CEBAF to attain the desired level of precision.

Manpower:

We encourage a common effort by those involved in parity experiments to develop the capability of performing these difficult experiments.

Recommendation:

The PAC recommends approval of the experiment for 85 days and asks the collaboration to regularly report on the status of the preparation of the experiment and provide answers to the remaining issues.

E-91-004, Hall A

Proposal: E-91-010, Hall A
Spokespersons: M. Finn and P. Souder
Title: Parity Violation in Elastic Scattering from the Proton: Plans for the First Run

Motivation:

The experiment proposes to measure the parity violating asymmetry in elastic scattering from hydrogen at $Q^2 = 0.7 \text{ (GeV}/c)^2$. The measurement will be made to an accuracy of $\pm 8\%$ of the Standard Model for this asymmetry, which is -1.4×10^{-5} in the absence of strange quarks. This results in a measurement of the combination $G_E^S + 0.57 G_M^S$ with an uncertainty of ± 0.02 .

Measurement and Feasibility:

The measurement is feasible and has the potential to set the first stringent limit on the magnitudes of the strange form-factors of the proton. A significant deviation from the above prediction would be of great interest and would provide strong motivation to proceed with an extensive program of parity violation measurements at CEBAF.

Issues:

Like the other parity experiments, this measurement would profit from any reduction of the statistical error. In particular, improved performance of the polarized source beyond that assumed in the proposal would be highly desirable. It is a challenging experiment that will require careful attention to systematic errors by the collaborators and commitment to delivery of a highly reliable high intensity polarized electron beam by CEBAF to attain the desired level of precision.

Manpower:

The collaboration is strong and experienced in measurement of small polarization asymmetries. We encourage a common effort by those involved in parity experiments to develop the capability of performing these difficult experiments.

Recommendation:

The PAC recommends approval of the experiment for 42 days and asks the collaboration to regularly report on the status of the preparation of the experiment and provide answers to the remaining issues.

E-91-010, Hall A

Proposal: E-91-011, Hall A
Spokespersons: R. Lourie
Title: High-Precision Separation of Polarized Structure Functions in Electroproduction of the Δ and Roper Resonances

Motivation:

The purpose of the proposed work is to make a separation of six structure functions in the N - Δ transition as a function of θ_{cm} . The accuracy of the measurements should be sufficient to perform a stand-alone multipole analysis of the amplitudes. Among other amplitudes, the resonant quadrupole transition C2 will be extracted from the data. The measurements will be performed at $Q^2 = 1.0 \text{ (GeV}/c)^2$, at 6 cm angles, and over an energy transfer range of approximately 130 MeV.

Measurement and Feasibility:

The measurement will be performed in a kinematic region where the proton energy is less than 800 MeV and where the polarimeter calibration is well known. The experiment does not make critical demands on the spectrometer performance.

Issues:

The collaboration addressed all previous PAC issues: The experiment is focused on one value of Q^2 and sufficient angles to make a multipole analysis. It is important that the data taken include three energy bins in the Δ resonance region so that the resonance and background contributions are well defined. Finally, the value of $Q^2 = 1.0 \text{ (GeV}/c)^2$ is chosen to overlap the data to be taken by the N^* collaboration on CLAS.

Manpower:

The manpower appears adequate.

Recommendation:

Approval for 45 days.

E-91-011, Hall A

Proposal: E-93-050, Hall A
Spokespersons: P. Bertin
Title: Nucleon Structure Study by Virtual Compton Scattering

Motivation:

The experimenters propose the first measurement of virtual Compton scattering (VCS). The reaction $p(e, e'p)\gamma$ will be measured with the Hall A high resolution hadron and electron spectrometers. There are significant regions of phase space where the VCS cross section will stand out against the Bethe-Heitler background.

The principal motivations of the experiment are to examine resonances with a clean purely electromagnetic reaction and the possibility of studying resonances that couple only weakly to hadronic decay channels, but might be strongly excited by virtual photons. An additional motivation is the verification of low energy theorems and the measurement of corrections linear in q . This in itself is exciting, new physics. We do not, at this point, support the effort to do an L/T separation, feeling this effort should be reserved for a second-stage experiment. Successful completion of the initial VCS experiment could lead to more ambitious studies of the generalized polarizabilities that govern VCS.

Measurement and Feasibility:

The Hall A spectrometers are ideally suited for this measurement, allowing the identification of the photon final state via high resolution missing mass information.

Issues:

The collaboration has clarified its physics objectives and added measurements below pion threshold. The PAC notes however that some of this physics, in particular the lower Q^2 sub-threshold measurements, has been presented in a letter of intent LOI-93-008. Studies of virtual Compton scattering to extract generalized polarizabilities and make connection with the real photon point at lower Q^2 is viewed by the PAC as an important aspect of this program. These two groups, E-93-050 and LOI-93-008 collaborations, are encouraged to work together to address the technical issues involved with this program.

Manpower:

The collaboration has significantly improved their strength with the addition of new members.

Recommendation:

The PAC recommends approval for this experiment for 10 days of beam time to measure the resonance response and the sub-threshold response for $Q^2 > 1$ (GeV/c)².

E-93-050, Hall A

Proposal: E-91-020, Hall B
Spokespersons: R. D. McKeown
Title: Experiments with a Polarized ^3He Target and the CEBAF Large Acceptance Spectrometer

Motivation:

The collaboration proposed to study polarized electron scattering from a polarized ^3He target in CLAS to test models of the structure of ^3He as well as to use this target as a polarized neutron in the measurement of G_E^n . The PAC concurs with the opinion of PAC5 that both of these goals are very interesting and important.

Measurement, Feasibility and Issues:

The PAC is eager to see this experiment run at CEBAF. However, the PAC is concerned at the slow progress which has been made in developing the proposal since PAC5 in 1991. There are several issues which need attention in the coming months if the experiment is to be successful:

- 1) Collaboration: The PAC is very concerned at the apparent breakdown of communication between the spokesperson and the management of the CLAS collaboration. Both parties will need to take the initiative in addressing the collaboration issues as they come up if this experiment is to realize its high scientific potential.
- 2) Target technology: The collaboration should be commended on the progress during the past two years in developing polarized ^3He target technology. However, the PAC remains concerned about the large contribution to the luminosity coming from the cell windows. The PAC believes that much (but certainly not all) can be learned on this issue using the Monte Carlo codes developed for CLAS at CEBAF. The appropriate simulation should be set up as soon as possible. The PAC also believes that this work will require the attention of experienced physicists in the collaboration. Most important of all, there needs to be active discussion within the collaboration of the most appropriate technology so that any necessary R&D issues can be identified as soon as possible.
- 3) Resolution: The present proposal is to remove the innermost drift chamber and mini-toroid to locate the target within CLAS. While the PAC understands that there is no obvious technical solution to fitting the target inside this chamber, the PAC believes that this is another area where a careful simulation must be made to ensure that the resolution will be adequate to resolve the quasielastic peak at all momentum transfers and background from the target windows.

Manpower:

It has come to the attention of the PAC that some of the collaborators listed may not be working actively on development of the proposal. If this is indeed the case, this issue must be settled quickly.

Recommendation:

The experiment is conditionally approved until the issues concerning the manpower and collaboration have been addressed. A status report should be given to the PAC within one year.

E-91-020, Hall B

Proposal: E-91-017, Hall C
Spokespersons: D. Beck
Title: “G⁰”: Measurement of the Flavor Singlet Form Factors of the Proton

Motivation:

The flavor content of the nucleon is one of the most exciting and forefront issues in nuclear physics currently. The goal of this experiment is to measure the flavor singlet form factors by means of a parity violating scattering of polarized electrons on protons. The experiment will perform the separation of the electric and magnetic form factors in the $0.1 \leq Q^2 \leq 0.5$ (GeV/c)² range.

Measurement and Feasibility:

The separation will be achieved by detecting protons for forward angle scattering and electrons for backward scattering in a specially designed large solid angle toroidal spectrometer. The combination of the asymmetry measurements at both angles affords a determination of the G_E^S and G_M^S contribution.

Issues:

The collaboration should address all the technical issues raised by the last Technical Advisory Panel (Nov 93). The PAC is also concerned with the possibility of systematic errors related to the different methods used to measure the forward and backward asymmetry. In such a long term program the collaboration should follow the development of experiments performed elsewhere and adapt its strategy to the outcome of these experiments.

Manpower:

The group has recognized expertise and is strongly committed to this long term project. However, the PAC recommends that the collaboration be enlarged.

Recommendation:

The PAC recommends approval of the initial 46 days to commission the experiment and asks the collaboration to regularly report on the status of the preparation of the experiment and provide answers to the remaining issues. Since it is hoped that the injector performance will be significantly improved above 49% polarization by the time this experiment takes data, the running time for data collection to be recommended for approval will be put forth by a future PAC.

LOI 93-001**Spokespersons:** R. O. Avakian & K.A. Ispirian**Title:** Experimental Investigation of Photon Splitting in Coulomb Field of Nuclei

The splitting of a photon into two photons in the Coulomb field of the nucleus is a QED effect related to production and annihilation of virtual e^+e^- pairs. This phenomenon has not yet been unambiguously observed. However, the feasibility of this experiment at photon energies as high as 100-200 MeV needs to be demonstrated by simulating backgrounds and experimental responses realistically. The PAC notes that this experiment involves construction of complex equipment.

LOI 93-002**Spokespersons:** P. Stoler**Title:** Excited Baryon Form-Factors at High Momentum Transfer via Single Meson Electroproduction with a 6 GeV Electron Beam

This letter is an extension of an approved experiment (PR-91-002) to measure the Q^2 dependence of several nucleon resonance form factors. Momentum transfers up to $5 - 7 (\text{GeV}/c)^2$ can be accessed after 6 GeV beam becomes available. This is an important range to study as nucleon form factor scaling appears to begin in this regime.

This experiment requires a significant amount of beam time and will depend on understanding the CLAS spectrometer at higher energies, both in terms of specialized triggers and particle identification.

LOI 93-003**Spokesperson:** G. Adams**Title:** A Search for Multi-hadron Decays of Exotic Mesons

This letter of intent proposes a search for exotic states (hybrids, glueballs, etc.) using the CLAS spectrometer. Clearly, a positive result would have great impact. However, this has to be balanced against the very substantial amount of beam time needed to carry out a meaningful search, and the relatively low probability of success.

This experiment needs a 6 GeV beam and is seen by the PAC as a possible second generation experiment for CLAS, once its characteristics are well understood.

LOI 93-004**Spokesperson:** B. M. Freedom**Title:** Search for Medium Modifications of Vector Meson Masses

This letter of intent is an update of an earlier one (LOI-89-001). The use of CLAS in Hall B to detect e^+e^- pairs and possibly a recoiling proton in coincidence has the potential to measure medium modifications of the masses of vector mesons. The main effect is expected for the rho meson. Detailed simulation of the backgrounds such as misidentified charged pions as well as other photoproduction mechanisms will be needed before the feasibility of this type of experiment with untagged bremsstrahlung beams can be evaluated.

Actual CLAS operational experience with photon beams may be a prerequisite. It may also be necessary to consider other options to see this physics.

LOI 93-005**Spokesperson:** W. Briscoe**Title:** The Photoproduction of Pions

It is proposed to measure pion photoproduction in order to improve the data base for partial wave analyses of that process. Several experiments addressing similar issues have been proposed and, in some cases, approved by the PAC. The existing data base contains many measurements with bremsstrahlung beams known to have normalization problems and poorly estimated errors. The PAC does not see any new and exciting physics issues addressed in the LOI. Moreover, there are new (though yet unpublished) data from Bonn for differential cross sections up to energies of about 2.1 GeV with an accuracy of about 3% for the proton and 10% in the case of the neutron, including systematic errors due to the deuteron model. Concerning the use of polarization degrees of freedom mentioned as a further development in the LOI, there is a considerable overlap with other projects at CEBAF. In view of these already existing activities, which actually address interesting new physics issues, the PAC does not encourage the proposed program to simply improve the data base.

LOI 93-006**Spokesperson:** R. R. Whitney**Title:** Vector Meson Production from the Proton and Deuteron

The development of linearly polarized photons would be an important addition to the capability of Hall B and CLAS. The PAC encourages such a development and notes there is a proposal to do so using backscattering of a polarized laser beam.

LOI 93-007**Spokesperson:** J. Gomez**Title:** Measurement of the Neutron to Proton Inelastic Structure Function Ratio F_2^n/F_2^p in the Region $0.1 \leq x \leq 0.6$ and Low Invariant Mass

This LOI proposes to measure the nucleon structure functions F_2^n/F_2^p in the transition region between the nucleon resonances but below the deep inelastic regime in order to look for possible differences in the u , d quark wavefunctions. While the physics is of interest, at 6 GeV the data base to be obtained does not significantly improve that already measured at SLAC and therefore PAC does not encourage development of this proposal.

LOI 93-008**Spokesperson:** J. F. J. van den Brand**Title:** A Study of Off-Shell Effects in Electromagnetic Reactions

The use of virtual compton scattering at CEBAF has the potential of opening up an interesting new window on the study of off-shell effects. The spectrometers in Hall A seem ideally suited for this purpose. The PAC has accepted one proposal and received this LOI to use the technique. The PAC wants to encourage these investigations and the application of virtual photon scatterings. It suggests that the various proponents form as strong a collaborative effort as possible to develop this capability.

LOI 93-009**Spokesperson:** A. Saha**Title:** A Detailed Study of Nucleon Structure Functions in Nuclei in the Valence Quark Region

This letter discusses the possibility of carrying out deep inelastic scattering measurements on the nucleon and nuclei in Hall A at CEBAF. PAC notes that a energy of at least 6 GeV is required to embark on such a program. Once 6 GeV beam is available, the collaboration may wish to develop a detailed case to justify such studies.

LOI 93-010**Spokesperson:** P. Markowitz and C. C. Chang**Title:** Electroproduction of Kaons in the Deep Inelastic Scattering Region

The experimental program can yield a variety of exclusive ($e, e'K$) scattering data in a kinematical region where the quark degrees of freedom may become essential to understand the nature of the reaction. The energy is low enough to produce one kaon and one hyperon only. The data may provide useful information on the question of the strangeness content of the nucleon.

The proposed exclusive ($e, e'K$) reactions are on the proton and the deuteron at $1 \leq Q^2 \leq 2$ (GeV/c)², $4 \leq s \leq 5.5$ (GeV)² and $-0.3 \geq t \geq -1.0$ GeV². Separations of the cross sections Σ_T , Σ_L and Σ_{LT} as a function of Q^2 , W and t will be done for 3 of the 4 proposed kinematics. The parameters of Hall A may be ideally suited for this study.

For this program, a beam energy of 6 GeV beam will be a start and higher energies progressively better. The separation of the structure functions may be difficult, so systematic errors will need to be minimized.

LOI 93-011**Spokesperson:** G. G. Petratos**Title:** Measurement of the Deuteron Magnetic Form Factor at Large Momentum Transfers

The proposed measurements of $B(Q^2)$ at high Q^2 should provide a strong constraint on the various theoretical models for electron-deuteron elastic scattering. The proposed data would represent a significant improvement over the previous data above 1.2 (GeV/c)².

The significant issues are:

- i) requirement for a 180° spectrometer
- ii) large beam request (75 days), and
- iii) large number of beam energies

Any future proposal should address these issues. In particular, are all beam energies necessary? Can the 180° spectrometer be better matched to the HRS? In view of the large beam time required, the proponents should design an optimized spectrometer.

LOI 93-012**Spokesperson:** B. Norum and T. Welch**Title:** Intense Polarized Photon Source at CEBAF

This is a suggestion to produce an intense beam of linearly or circularly polarized photons of energy up to 1.1 (0.5) GeV by backscattering of optical photons from the CEBAF 6 (4) GeV beam as it enters Hall B. Fluxes of up to 10^5 photons/MeV/s can be obtained with polarizations nearly equal to that of the initial laser radiation. The effort would require development of a 5.5 m long optical cavity, a chicane to align the incident electron beam with the optical cavity axis, an extension to the present tagger focal plane to intercept the scattered electrons, appropriate control instrumentation and eventually a Compton polarimeter. Estimated cost is \$725K, and initial contacts have been made with appropriate technical collaborators.

The properties of the thus produced polarized tagged photons are quite attractive. (There is a similar project at the European Synchrotron Light Source at Grenoble. Its experimental equipment is complementary to Hall B.) An example is the production of vector mesons by linearly polarized photons or the photoexcitation of the delta with simultaneous measurement of parallel and perpendicular cross sections in CLAS. The PAC thus encourages the development of the hardware proposal to the point that it could be given a technical review. The PAC also encourages the parallel development of associated physics proposals to utilize these beams and their timely submission for review.

LOI 93-013**Spokesperson:** R. Badalian**Title:** Electroproduction of pions from ^2H and ^{40}Ca (A Quark Hadronization Mechanism)

This experiment proposes to study the electroproduction of π^+ on ^2H and ^{40}Ca at an incident energy of 4 GeV. The goal of this proposal is to extract information on the quark hadronization mechanism from a nuclear matter transparency analysis. The experiment would be performed in Hall C using the SOS and HMS spectrometers. The PAC is concerned by the relatively low energy proposed for this experiment. Understanding hadronization requires that electrons scatter from quarks via a well understood mechanism. To be interpretable, this experiment would require a significantly higher beam energy to be sure that the reaction mechanism is caused by hard scattering.