PR-04-001: *Measurement of $F2$ and R on nuclear targets in the resonance region* **(Gross and Van Orden)**

This is a Hall C experiment to measure the separated inclusive structure functions in the resonance region ($W < 2$). The experiment uses a variety of heavy targets also used in neutrino measurements, and complements/supplements existing measurements on the proton, and approved measurements on the deuteron (E02-109). To collect data at the same kinematical points as these previous measurements requires beam energies of 1.18 and 2.30.

Continuing interest in duality and the effect of the nuclear medium on nucleon structure provides solid theoretical motivation and theoretical interest in these measurements remains strong. It was differed with regret (not enough beam time) by the previous PAC.

PR-04-002: *Hadronization in Nuclei by Deep Inelastic Scattering* **(Vanderhaeghen and Melnitchouk)**

Semi-inclusive deep inelastic scattering is a unique probe to study how a quark hadronizes into mesons and baryons. This hadronization will be modified by the nuclear medium through which the quark propagates. Quantifying this process can lead to a better understanding of the long-distance dynamics of QCD, and also provide very useful input information in the interpretation of RHIC data, leading to a cross-fertilization between these two fields. Semi-inclusive DIS experiments have previously been performed at SLAC, CERN (EMC), Fermilab (E665), and DESY (Hermes). The experiments were performed at relatively large values of the virtual photon energy ν (for HERMES $\nu > 7$ GeV). As the average distance travelled during the hadronization process (formation length) grows with ν, for the measurements at large ν most of the hadrons are formed outside the nucleus. To study medium effects, data at smaller values of ν are very much needed. This experiment proposes to measure the fragmentation functions for a quark fragmenting into pions, kaons and protons for $\nu = 4$ GeV, and using several nuclear targets (up to W), heavier than previously studied targets. This will allow to emphasize the nuclear medium effects.

The experiment is exploratory as factorization is not guaranteed for semi-inclusive DIS in the Q^2 range (2.8 - 4.2 GeV^2) proposed. This type of experiment will clearly benefit from a 12 GeV upgrade as for a given value of ν one can reach much higher values of $Q2$. The present proposal could, however, pave the way into this direction.

PR-04-003: *The Neutron Electric Form Factor at Higher* Q^2 *up to* $4.0\ \mathrm{GeV}^2$ *from the Reaction* $^2H(\vec{e}, e'\vec{n})^1H$ *via Recoil Polarimetry* **(Edwards and Goity)**

This proposal is an extension of E93-038 to measure G_E^n at $Q^2 = 3\&4\mathrm{GeV}^2$ via deuterium. Using the polarization transfer method allows a measurement of the sign of G_E^n. JLab E02-013 will measure this quantity at $Q^2 = 1.3, 2.4$ and $3.4\ \mathrm{GeV}^2$ on polarized ^3He in $^3\vec{H}(\vec{E}, e'n)$. This experiment will measure the ratio of scattering asymmetries: one from precessing the neutron polarization vector in a positive direction, the other from precessing in a negative direction. The previous experiment has demonstrated the efficacy of the measurement techniques.

Concerning the question of whether to use deuterium or ^3He, it is not *a priori* known which has less systematic errors. Experiments with both targets should be done at some point.

This is one of the flagship calculations for the lab, and of great theoretical interest. The large Q^2 behavior is not known - even the sign is not determined.

PR-04-004: *Search for Exotic Pentaquark Θ^{++}, Θ^{*++} and Θ^{+} in Hall C* **(Roberts and Richards)**

The authors of this proposal are interested in exploring the various predicted spectra of pentaquark states. Since the first pentaquark signal was reported, there have been a number of manuscripts exploring the possible nature of the state, with each scenario having consequences for the expected spectrum of states. These consequences include various spin-hyperfine and orbitally excited partners, as well as partners within suggested isospin multiplets.

This experiment would search for some of these exotic states using an electron beam and both hydrogen and helium targets. The experiment is proposed for Hall C, where the combination of the SOS (Short Orbit Spectrometer) and HKS (High resolution Kaon Spectrometer) spectrometers will allow determination of, or upper limits on, the widths of these states, that are significantly better than any reported measurement thus far. The experiment will also determine the mass of the state(s) to better than 1 MeV.

This experiment, if carried out to the claimed precision, can provide important information that will be crucial to our understanding of these states; it should be noted, however, that, in common with similar proposals, the assumed spin and parity of the states drastically effects expected production rates.

PR-04-005: *Search for New Forms of Hadronic Matter in Photoproduction* **(Richards and Roberts)**

This experiment proposes to explore meson, and in particular exotic meson, spectroscopy, using the CLAS detector. An important motivation for this experiment is that the vector nature of the photon beam might allow a considerably enhancement in the exotic cross sections compared to those arising from a pion beam; the photon assumes the role of a vector meson probe, such as a ρ meson.

There is some confusion about what lattice, and flux-tube, studies say about the decoupling of the quark and gluon degrees of freedom. The most precise lattice studies to date have been in the heavy-quark sector, i.e. for charmonium, or calculations of the adiabatic potential. In the latter case, the quarks themselves are nailed down and it is purely the string excitations that are being measured. It is encouraging that the hybrid spectrum computed using these adiabatic potentials is in reasonable agreement with the lattice charmonium hybrid spectrum, but a crucial question is whether this picture does indeed extend to the light quark sector; the latest generation lattice results using light dynamical quarks suggest it might, but the quark masses are now attaining the values where the lightest exotic is no longer a stable particle.

This experiment would certainly be a useful and interesting one, but there are concerns about the analysis and interpretation of the multi-particle final states that will be studied. At the energies proposed, a significant portion of the multiparticle final states will arise from production of intermediate baryon resonances, and this will certainly cloud the interpretation of measured observables in terms of meson resonances. A more general issue is that of the ingredients of the partial-wave-analyses themselves. The questions of analyticity and unitarity play a crucial role in ANY partial-wave-analysis of baryon resonance production experiments. It is hard to imagine that unitarity, in particular, doesn't play a role in similar analyses for meson resonance production experiments. However, to the best of my knowledge, this issue is not raised in most analyses of this type and, at least in my mind, it raises the question of exactly how reliable any interpretations provided are.

PR-04-006: *Withdrawn*

PR-04-007: *Precision Measurement of the Electroproduction of π^0 Near Threshold: A Test of Chiral QCD Dynamics* **(Melnitchouk and Edwards)**

This is a jeopardy experiment that will measure precisely the reaction $p(e, e'p)\pi 0$ from threshold to 20 MeV above threshold for $Q2 = 0.04$ to 0.14 GeV^2. The experiment will determine cross sections on a fine grid of four momentum transfer, pion momentum and angle in the pion-nucleon center of mass. The authors plan to extract the structure functions $\sigma_L + \epsilon_L \sigma_T$, σ_{TL}, and σ_{TT}, from which one can determinte various multipole amplitudes and compare to ChPT.

A motivation for this proposal is the recent Mainz data claiming disagreements with ChPT. The JLab experiment proposes to perform these measurements with considerably more accuracy. The authors should be aware that there is an extension of the threshold pion electroproduction experiment at Mainz (A1/1-94) that has recently collected data at $Q2 = 0.05$, 0.1 and 0.15 GeV^2, which are currently being analyzed. The authors should consider how this might impact this proposal.

Otherwise, it is a sound proposal and tests are needed to verify ChPT in the region where it is expected to work, to give confidence that the methods can be used in more speculative situations.

PR-04-008: *Measurements of Target Single-Spin Asymmetry in Elastic ep Scattering* **(Vanderhaeghen and Gross)**

It has been suggested that the discrepancy between the Rosenbluth and polarization results for the ratio of the proton electric to magnetic form factor can be attributed to two-photon exchange. To sort this out beyond doubt requires observables directly sensitive to the two-photon exchange contributions. An observable which is directly proportional to two-photon exchange is the elastic scattering of unpolarized electrons on an proton target polarized normal to the scattering plane. The resulting single spin asymmetry is zero in one-photon exchange and directly measures the imaginary part of the two-photon exchange box diagram.

The present experiment proposes to measure this asymmetry in the Q^2 range of 2.5 - 4.5 GeV^2. The precision obtained is limited, however, with a statistical error on the asymmetry of 0.23 - 0.33 %, and a systematic error of 0.1 %. As only one model calculation is presented it is not clear whether this experiment will be as definitive as the authors claim. In this respect, a more comprehensive survey is highly desirable to determine optimal kinematics and required precision.

More generally, it should be emphasized that a measurment of the normal spin asymmetry, which measures the imaginary part of the two photon exchange, will not directly resolve the discrepancy between the two different extractions of GE/GM, the latter experiments involving the real part of the two-photon exchange. However, the imaginary part may contain interesting physics by itself as it is related to double virtual Compton scattering measuring the off-forward analog of nucleon structure functions. One would like to see the theoretical motivation of this proposal to be better worked out and focussed on what one may learn from the imaginary part of the two-photon exchange amplitude.

PR-04-009: *Measurement of the Born-Forbidden Recoil Proton Normal Polarization in Electron-Proton Elastic Scattering* **(Radyushkin and Vanderhaeghen)**

The standard method of measuring electric and magnetic form factors of the nucleon, used for many years, is based on the Rosenbluth separation technique. The data obtained in this way are consistent with a constant ratio of magnetic and electric form factors. Recently another, polarization-transfer method, that directly measures this ratio, was used at Jefferson Lab. The result of this experiment is that the ratio of electric and magnetic form factors monotonically decreases with momentum transfer. This result attracted a lot of attention and is considered as one of the most interesting results obtained by JLab. However, the high precision measurement of the magnetic and electric form factors based on Rosenbluth separation (RS) confirmed the previous RS data. Two-photon exchange has been suggested as a possible explanation of the discrepancy between the Rosenbluth and polarization transfer measurements.

The proposed experiment aims at measuring induced normal proton polarization in electron-proton elastic scattering. One-photon exchange cannot induce such a polarization, while the two-photon one can. Hence, the measurement would produce information about the size of the two-photon exchange contribution. But it should be stressed (and the authors of the proposal are aware of this) that the normal proton polarization is due to the imaginary part of the two-photon amplitude, while in the electric and magnetic form factor measurements it is the real part of the two-photon exchange amplitude which is important. For this reason, the proposed measurement cannot directly used to resolve the electric/magnetic form factor puzzle. Furthermore for possible corrections of parity-violating electron-proton scattering the real parts of electroweak boxes enter.

Still, the normal spin asymmetry contains interesting physics by itself, related to double virtual Compton scattering measuring the off-forward analogs of nucleon structure functions which is not discussed in detail in the proposal. One would like to see the theoretical motivation more focussed on what one actually measures in this experiment (i.e. the imaginary part of the two photon exchange amplitude) and what one can learn from it.

PR-04-010: *Proposal to serach for exotic cascades with CLAS using an untagged virtual photon beam* **(Richards and Roberts)**

This Hall B proposal aims to search for evidence of a further exotic member of the anti-decuplet, the Ξ_5^{--}, evidence for which was reported by the NA49 collaboration at CERN with a mass of 1.86 GeV. Though the authors cite the chiral soliton model of Diakonov and collaborators, it is worth noting that other models, such as the diquark model of of Jaffe and Wilczek (hep-ph/0307341), predict a mass that is somewhat lighter than that reported by NA49.

The ability to isolate the decays of the daughter particles and thus reconstructing the mass of the inital cascade particle, rather than using a missing-mass technique, looks an exctremely effective way of reconstructing the mass. Furthermore, they provide a good example of the efficacy of the method is isolating the backgrounds.

We are very much in an area of discovery, with the properties of the pentaquark states being largely unknown. Thus, the proposers are able to cite only one calculation of the production cross section, by W. Liu. In an earlier calculation of photoproduction of Θ^+ by the same author, he noted that the cross section would decrease by a factor of 10 in the case that the pentaquark had negative parity. It would useful were W. Liu encouraged to show the variation in production rates for this calculation also since that could effect dramatically the number of produced events.

PR-04-011: *Photoproduction of* Θ^+ *via the* $\gamma d \to \Theta^+\Lambda$ *Reaction* **(Roberts and Melnitchouk)**

The authors of this proposal are interested in confirming the signal for the Θ^+ in Hall A. The energy resolution that can be achieved in Hall A will allow the determination of the width of the state, if that width is greater than 2 MeV. While we consider searching for Θ^+ signals in different channels to be a very important component of the quest to establish the existence and properties of this state, there are a number of theoretical questions that need to be clarified in this proposal. These include:

- The rescattering mechanism is a crucial assumption in this proposal. How often does this happen in deuterium? It has been argued (see for instance Hashimoto, Phys. Rev. C 29, 1377 (1984)) that rescattering can be neglected in K^+d scattering due to the long nuclear mean free path of $K+$ mesons (around 6 fm) compared with the deuteron size.

- While the possibility of kinematic 'reflections' from $K\bar{K}$ resonances has been eliminated in the choice of this process, there will still be the possibility of reflections from N^* that couple to the ΛK channel. An estimate of the size of this 'background' process is necessary, as it will lead to the same final state.

- The statement that 'the theoretical analysis of the reaction is to a large extent model-independent' is somewhat optimistic. The parametrization of the amplitudes for kaon photoproduction are model dependent, particularly as there is little or no polarization data to constrain these amplitudes, especially their phases (and these phases are very important for the interference between the two diagrams of figure 1). Furthermore, since the process $\gamma n \to \Lambda K^0$ has not been measured (to the best of our knowledge), the parametrization of those amplitudes assume that isospin symmetry works well when comparing processes like $\gamma n \to \Lambda K^0$ and $\gamma p \to \Lambda K^+$. In the case of pions, it is known that a number of subtleties come into play, and one should expect similar difficulties in the case of kaons.

PR-04-012: *High Resolution Study of the 1540 Exotic State* **(Edwards and Richards)**

This appears to be a "Cadillac" experiment for determining the fundamental parameters of the recent $S = +1$ baryonic Θ state. It will measure production cross sections, using 4.5 and 6.0 GeV beams in 3 studies:

1. Investigate the reaction $D(e, K^- n K^+)X$ which will measure the resonance mass and (primary goal) width with a resolution of 2.9 MeV. The angular distribution of decay products will also be measured, which may allow a spin determination.

2. In the reaction $D(e, e' K^- p_{\text{soft}})$, the experiment will measure the mass (to within 1.3 MeV) and width. The photon linear polarization asymetry will also be measured, providing information on the parity of the state.

3. The reactions $H(e, e' K^-)X$ and $H(e, e' K^+)X$ will be investigated, allowing the search for the possible isotensor multiplet member Θ^{++} in the mass range 1450-1620 MeV, and the antidecuplet member Σ^0_{10} in 1560-1860 MeV.

Determining the parameters, i.e. the spin, parity and isospin, of the Θ^+ state is absolutely crucial for any further theoretical understanding of these states. Their nature is still highly speculative yet crucial both to verifying pictures of the states, and to compute cross sections; in particular, there is typically a factor 10 variation in photo-production rates according to the parity of the state. The Monte Carlo simulations for this experiment indicate a very large count rate in tiny 1 MeV bins. This experiment could dramatically (and spectacularly) demonstrate the existence of this exotic state. This kind of verification (either positive or negative) would be a real success for the lab and its unique resources.

Furthermore, the authors wish to explore the spectrum for other exotic partner states. Obviously, this is also is of great theoretical interest, though any estimates of production rates are crucially dependent on the assumed spin and parity as noted above.

PR-04-013: *Measurement of the nuclear dependence of the EMC effect at large x* **(Gross and Schiavilla)**

This is a Hall C experiment to measure the A dependence of the EMC effect in the region where the EMC ratio crosses unity (around $x = 0.8$). Even running at the highest CEBAF energy (6 GeV), large x can be reached only in a region where $W < 2$. The proposers argue that duality insures that the measurements in this region can be compared to DIS predictions, but running at higher energies (after the 12 GeV upgrade) would remove some of these theoretical uncertainties. The experiment would provide much more accurate large x data for a variety of nuclei in the region where nuclear effects should be very important. These measurements are related to the approved few body measurements on ^{3}He and ^{4}He.

Continuing interest in duality and the origin of the EMC effect provides solid theoretical motivation and theoretical interest in these measurements remains strong.

PR-04-014: *Measurement of G_E^p/G_M^p using elastic $\vec{p}(\vec{e},e')p$ up to $Q^2 =$* 3.5 GeV^2 **(Radyushkin and Vanderhaeghen)**

The standard method of measuring electric and magnetic form factors of the nucleon, used for many years, is based on Rosenbluth separation technique. The data obtained in this way are consistent with a constant ratio of magnetic and electric form factors. Recently another, polarization transfer method, that directly measures this ratio was used at Jefferson Lab. The result of this experiment is that the ratio of electric and magnetic form factors monotonically decreases with momentum transfer.

This result attracted a lot of attention and is considered as one of the most interesting results obtained by JLab. However, the high precision measurement of the magnetic and electric form factors based on Rosenbluth separation (RS) confirmed the previous RS data. The proposed experiment aims at providing a third method to measure the ratio of the electric and magnetic form factors by measuring the double polarization asymmetry in electron-proton scattering.

The method is expected to be less sensitive to the two-photon exchange, just like the measurement based on the polarization transfer. From the theoretical viewpoint, the method is very similar to that based on the polarization transfer, and should give the same result, as a consequence of time reversal invariance. In this sense, the goal of the proposal is purely experimental: it would be a test that there are no flaws in the polarization transfer experiment.

PR-04-015: *Precision measurement of longitudinal and transverse response functions of quasi-elastic electron scattering in the momentum transfer range* $0.55 < q < 0.9$ GeV **(Van Orden and Schiavilla)**

The problem of the apparent quenching of the Coulomb sum rule for medium sized nuclei is of long standing and has resulted in considerable controversy. Given the current state of the debate, this controversy can only be eliminated by the collection of new high-quality data. The main theoretical problem with these measurements remains the calculation of electron Coulomb distortions for the heavier nuclei. This has a substantial impact on the Rosenbluth separated data. It is important that a consensus be reached in theoretical community on this issue before the data is analyzed for this experiment. It would also be useful for the authors of this proposal to indicate how they arrived at their estimate of the size of two-photon dispersion effects given the current concern over this issue.

PR-04-016: *Search for the Ξ^{--} Pentaquark* **(Edwards and Goity)**

This experiment will search for the Cascade Ξ^{--} (called Ξ_5^{--}) in $\gamma d- > K^+K^-p\Xi_5^{--}$. The authors will search for the state by using the missing mass technique developed in investigations into the $\gamma d \longrightarrow K^+K^-pX$ process. The authors request a 5.7 GeV beam. Based on previous runs to investigate the reaction $\gamma d- > K^+K^-p\Xi^-$, they expect 180 Ξ_5^{--} events in 10 days if the mass is 1862 MeV, as claimed by NA49. They expect to determine the mass to 2 MeV and put an upper limit on the width to a precision of $15 - 20$ MeV, and make first measurements of the energy dependence and angular distribution for the Ξ_5^{--} compared to the Ξ^-.

If a 5.7 GeV beam is not available, the 5.0 GeV beam in the g10 (approved) run in E03-113 could be used. Using this beam energy will decrease the yield, hence they request an extra 10 days either way. They expect 35-40 Ξ_5^{--} events in this latter case.

This experiment can apparently be tacked onto a current proposed experiment resulting in $\sim 1/5$ events of a dedicated experiment. Either is a short amount of time. The missing mass method here would be a useful comparison to other experiments, say possibly PR-04-012. The real drawback though in tacking onto a current experiment is the marginal 35-40 expected events; there is a very large uncertainty in production-rate calculations due to, say, assumed spin and parity, and this expectation is subject to maybe an uncertainty of a factor of 10. Something more definitive would be strongly preferred.

PR-04-017: *A comprehensive study of exotic baryons with CLAS off of a proton target* **(Goity and Melnitchouk)**

This proposal addresses crucial physics issues in pentaquark physics. The definite confirmation of the existence of the Θ^+ state, investigating its production mechanism and elucidating its spin/parity quantum numbers are all issues that the proposed experiment can address. Given the rather primitive present theoretical understanding of pentaquarks, a comprehensive experimental study of the Θ^+ state is extremely important. With such a study the nature of the state can be further exposed and also key information can be produced for theorists to build realistic models.

Another important issue is to find out what are the companions of the Θ^+. Because, in general, this state could belong into any of the exotic $SU(3)$ multiplets $\bar{10}$, 27, or 35, uncovering some partners will help resolve the issue. The CERN's NA49 signals for the Ξ_5^{--} and Ξ_5^0 states represent important steps towards that goal. This proposal requires a beam energy of at least 5.7 GeV for this study of the cascades. There is the potential to learn important properties of these states if they are produced at enough rate.

As a byproduct, the proposed experiment can further gather data on conventional cascade resonances, an area of excited baryons where there is shortage of data. Such data will certainly help better the understanding of the spin-flavor multiplet structure of excited baryons.

PR-04-018: *Elastic electron scattering off* ^{3}He *and* ^{4}He *at large momentum transfers* **(Van Orden and Schiavilla)**

The $A = 2, 3$ and 4 form factors are the testing ground of present relativistic and "non-relativistic + correction" theories of nuclear structure. Thus these data on the high Q2 behavior of the form factors of the $A = 3$ and 4 nuclei are crucial to this program. Given the current problem with the Rosenbluth separations of the proton form factors, some estimate of the size of the two-photon dispersion corrections for these measurements is desirable since this effect increases with the charge of the target

PR-04-019: *Measurement of the Two-Photon Exchange Contribution in ep Elastic Scattering using Recoil Polarization* **(Radyushkin and Gross)**

The standard method of measuring electric and magnetic form factors of the nucleon, used for many years, is based on the Rosenbluth-separation technique. The data obtained in this way are consistent with a constant ratio of magnetic and electric form factors. Recently another, polarization transfer method, that directly measures this ratio was used at Jefferson Lab. The result of this experiment is that the ratio of electric and magnetic form factors monotonically decreases with momentum transfer. This result attracted a lot of attention and is considered as one of the most interesting results obtained by JLab. However, the high precision measurement of the magnetic and electric form factors based on Rosenbluth separation (RS) confirmed the previous RS data.

The two-photon exchange has been suggested as a possible explanation of the discrepancy between the Rosenbluth and polarization transfer measurements. The proposed experiment aims at finding deviations from predictions based on the one-photon-exchange approximation. Its goal is to measure simultaneously all three components of the induced polarization. While the polarization in the direction normal to the scattering plane measures the imaginary part of the two-photon scattering amplitude, the other two components are sensitive to its real part. It is the latter which is important in the studies of discrepancies between the two types of the E/M form factor ratio measurements. Another signature of the two-photon scattering contribution is deviation from linearity in the ϵ dependence. The proposed experiment intends to perform measurements at 4 ϵ values.

Summarizing, the proposed experiment is a well-thought-out attempt to resolve the E/M form factor puzzle, and to study the physics of two-photon exchange.

PR-04-020: *A measurements of two-photon effects in unpolarized electron-proton scattering* **(Melnitchouk and Radyushkin)**

The Rosenbluth method of performing longitudinal and transverse cross section separation has been a fundamental tool in the study of nucleon structure. Inherent in this is the assumption of linearity in the angular (or ϵ) dependence of the cross section, which one expects from the dominance of single-photon exchange. This can be called into question if there are sizable effects from two-photon exchange (beyond those already included in the standard radiative corrections) which could produce observable nonlinearities. Two-photon exchange has been suggested as an explanation (at least partially) of the discrepancy between the Rosenbluth and polarization transfer measurements of the electric to magnetic proton form factor ratio. We believe it is of paramount importance to establish the limitations of the Rosenbluth technique, as this method is used in many observables, from elastic form factors, to quasi-elastic cross sections, and deep inelastic structure functions.

Pinning down the size of two-photon corrections is difficult in a model-independent manner, however. Firstly, some of the two-photon exchange effects can yield a linear dependence (within experimental limits), and still significantly affect the form factor ratio extraction. A combined analysis of the cross sections, together with transverse and longitudinal polarization observables, may allow one to extract the size of the two-photon corrections, assuming these are responsible for any differences between the cross section and polarization transfer measurements.

The range of ϵ coverage and the high precision of the expected data should provide critical tests of various models of two-photon exchange, which predict deviations from linearity. Accessing the regions of $\epsilon \to 0$ and $\epsilon \to 1$ is particularly important, since this is where the deviations from linearity are expected to be largest. Although these models are to some extent preliminary at this stage, there is considerable theoretical activity taking place in this field at present, and we can expect refinements of these models as the calculations mature and become more complete.

Finally, since the discrepancy in the form factor ratio is larger at higher Q^2, it would be desirable to perform the linearity test also at higher Q^2 values, comparable to those in the polarization transfer experiments.

PR-04-021: *Study of Exotic Baryons in Photoproduction off Protons* **(Melnitchouk and Richards)**

The proposed experiment aims to firmly establish the phenomenology of the Θ^+ spectrum, including the mass, width, decay channels, and production mechanisms, in the $\bar{K}^0\Theta^+$ and $\pi^+K^-\Theta^+$ channels of photoproduction from protons. Furthermore, it hopes to clarify whether the two peaks observed in the current proton data are real. Both of these goals are clearly of immediate interest and importance for the current pentaquark discussions. The means by which this is planned to be achieved is a factor of 10 increase in statistics over existing data.

The measured cross sections may also be useful in constraining models of Θ^+ production. However, given our poor knowledge of the reaction mechanism, it is unlikely that cross section measurements alone will enable a definitive determination of the parity of the state. Even if the cross sections for positive parity are an order of magnitude larger than for negative parity, there is no model-independent means of determining whether a measured cross section is the "large" or "small" one.