Small Angle GDH Meeting
October 03, 2003

Tentative Dates of the next Meeting: December 15-16 or 18-19, 2003

Alexandre Deur gave a summary of the two run periods:

From both run periods, 143 kinematic settings were completed. The first run period Septum commissioning was difficult due to large background. In addition, the Septum was miswired causing it to behave as a skewed quadrupole. Due to the special acceptance from the miswired Septum, the data was taken at lower Q^2. Despite these problems all the statistics were taken.

The analysis for the first run also provides significant challenges for the optics and acceptance. In addition to the above problems, ice was found on the Septum entrance after the run ended. On-line elastic asymmetries already look good, but the cross section analysis will be difficult and take longer. The error bar from these data is expected to be larger (at least 10%).

For the second run, the Septum was fixed and commissioning went successfully. About 80% of the standard cell data were taken. One cell, Penelope was lost after the first week of the experiment. On-line elastic asymmetries looked very good. Periodically the entrance for the Septum was checked, and no significant ice build up was detected. During the run, a lot of pions were seen with 4 GeV beam energy.

Vincent Sulkosky gave an update on the optics status:

For the second run period y-target and the angular optimization was done at 2.1 GeV for 6 degrees. Y-target optimization is good, but more work is required on the angles. For 9 degrees, y-target was optimized at 1.1 GeV, but the optimization requires more work as well. 6 degree optimization is drawing close to completion. The momentum is still left to be optimized. Then the database can be tested at other momenta.

Vincent Sulkosky gave an update on the target status:

From the field maps of the target region, the gradients from the Septum magnet are small below 300 Amps. Above 325 Amps, the dB_y/dz and dB_z/dy components are greater than 20 mG/cm. For the experiment, good water calibrations were obtained before and after the experiment. Plus EPR-NMR calibrations were done. AFP loss tests showed that the EPR AFP loss increased with Septum current, whereas NMR loss remained relatively small. The vertical corrections coils were used to reduce the EPR loss above 300 Amps on the Septum. During the experiment, there was an unexplained polarization loss of 20% in 8 hours.

Currently the target is being setup for tests in the Target Lab.

Jaideep Singh reported on the elastic and VDC track analysis:

For the elastic asymmetries, the data agree well with simulation. However only some of the corrections have been applied such as the livetime, beam and target polarization, and charge normalization. Quasi-elastic and nitrogen corrections still need to be applied. Currently Jaideep is working on finishing the cell characterization analysis and VDC tracking. There are some nitrogen elastic runs were 10% of the events are track 2. Plus about 1% of the events are no track events for both Polarized ^{3}He and N_2, though a Cherenkov cut removes most of these events.

Jing Yuan discussed PID detector calibration and scaler analysis:

After calibration, the Total Shower and gas Cerenkov detectors look good. The detection efficiencies are above 99%, but Jing still has to look at the cut efficiencies. Some work remains until the detector calibrations are finished. The scaler charge asymmetry was typically below 200 ppm. However it is consistently negative. The results will be compared to the Parity DAQ results.

Tim Holmstrom discussed the beamline, Moller and Compton:

From Eugene Chudakov's measurements, the average beam polarization from Moller was 74.7%. Details from the Moller measurements can be found at http://www.jlab.org/ moller/e97-110.html. Compton runs were also taken throughout the second running period, but runs do not exist for each kinematic. The average polarization from Compton was 74.6%, and details can be found at http://compton.jlab.org/compton.

A major concern during the experiment was bleedthrough from the Hall C beam into Hall A. During the second run, the bleedthrough was measured 94 times. The measurements will be used to determine the bleedthrough throughout the experiment. The average bleedthrough was 2.5%. A current calibration was also performed. The calibration is linear above 5μA, but below 1μA, the calibration is nonlinear. The Left HRS data will be used to get another measurement of the current. Tim will look at the beam and energy analysis next.

John LeRose discussed Optics for the Septum:

For the bucked Septum, John's model was unable to reproduce the acceptance. The Tosca model maybe inadequate for the bucked Septum. For the second run period, John has been working on an R function, which is almost ready. He showed plots with and without the target collimators for y=δ=0 at 6°. The acceptance is almost the same for collimators in and out, except the acceptance moved up in phi. Some more work remains, and after finishing, John will give the transfer and R functions to the Collaboration.

The Collaboration discussed the GDH analysis plan:

Analysis will begin with the second period data, then will progress to the first period, though some analysis can be done for both sets of data together.

- Manpower:

  - Three students (Jaideep Sing, Jing Yuan, Vince Sulkosky)
  - One post-doc (Tim Holmstrom)

- Task List:
  - Beamline (Tim)
  - Optics and Acceptance (Vince, Nilanga/Xiaodong)
  - Elastic, VDC, and scintillators (Jaideep)
  - Target (Jaideep, Vince, Patricia)
  - Background (Alexandre)
  - PID (Jing)
  - Scalers (Jing)
  - HAPPEX DAQ (Parity Group)
  - Left HRS (Tim)
  - Beta optimization (Nilanga)
  - ESPACE problems (Seonho)

Spin Duality Meeting
October 03, 2003

Patricia Solvignon gave an update on Duality analysis:

Patricia refit all NMR and EPR measurements and currently is using the on-line calibration constants. The average polarization was 37%. For the PID detectors, the calibration is almost completed. The detection efficiency is greater than 99.9% for the left and right Cherenkov detectors. For the pion rejector, E/P should drop with momentum but it increases. Patricia will look into the problem. The detection efficiency is greater than 99.6% for both the shower and pion rejectors.

The first pass analysis for the BPM/raster calibration has been completed. For the next pass, Patricia will look at "bad" runs. For the VDC's, there appears to be a problem with zero track events. For some runs, about 80% are zero track events. A Cerenkov cut greatly reduces the number of zero track events. Nilanga and Patricia are looking into the problem. The charge asymmetry is typically below 200 ppm, however the deadtime asymmetries are much larger. The Collaboration suggested that the plot should be done with beam half-waveplate in and out to check for helicity correlated deadtime.

Patricia then showed the raw and physics asymmetries. The raw asymmetries are pretty close to zero. For the physics asymmetries, beam and target polarization corrections applied, the 3 GeV data looks good, but the 4 and 5 GeV asymmetries are still small. The effect of adding shower and pion rejector cuts is negligible.

Patricia will take a closer look at the VDCs, target analysis, and asymmetry analysis.

Nilanga Liyanage discussed the Duality analysis plan:

Task List:

- PID - Almost done
- BPM Analysis - Done
- NMR and EPR Target Analysis (Patricia, Vince, and Jaideep)
- VDC, scint analysis - Almost done (Nilanga)
- Check Optics (Nilanga)
- N_2 dilution
- Elastic asymmetries (Patricia)
- Form asymmetries (Patricia)
- Radiative Corrections
- Study Cut dependence
- Cross section calculation

A_1^n and g_2^n Meeting
October 03, 2003

Xiaochao Zheng discussed the A_1^n PRL status and PRC draft:

Comments on the A_1^n PRL from the first referee looked promising. The referee's comments were addressed, and the PRL was resubmitted. Now the Collaboration is waiting for comments from the second referee. The Collaboration then discussed the long paper. There was discussion on Figure 4, which shows the world data and theoretical predictions for A_1^n, about separating the data from the predictions to make the plot less busy. There was also a suggestion to have more discussion on the g_2^n and the pion asymmetries results. Those with further comments should write to Xiaochao before the end of October.

Kevin Kramer gave an update on the g_2^n analysis:

Kevin presented his results on g_2^n after further analysis on the unpolarized cross sections and using g_2^p from Blumlein and Bottcher (Wolfgang Korsch's calculation). Compared to earlier results, there is an order of magnitude difference for g_2^p. The error bar on F_2^n was reduced to 8% by analyzing the cross section data instead of using the world fit. Kevin will check the error bars on the fit for g_2^p with Wolfgang.

For the next collaboration meeting, Todd Averett will have a first draft of the g_2^n paper.

GDH Meeting and New Experiments Discussion
October 04, 2003

Karl Slifer gave an update of the GDH ^{3}He analysis:

Karl showed his results from the ^{3}He quasi-elastic analysis with a concentration on the threshold region. Karl used unpolarized radiative correction rather than polarized. The difference appears to be small about 5%. For some of the plots, the error bars need to be included. A comparison of Karl's results and Seonho's shows reasonable agreement for GDH and Γ_1^n, except for the lowest two points.

For the unpolarized cross sections, the data agrees well with existing data, but the Golak prediction is about 20% larger than the data. Karl will contact Golak about the discrepancy. At 862 MeV, it was suggested that Karl keep the elastic tail contribution to look at the effects from the threshold region.

Zein-Eddine Meziani discussed the status of the 2nd PRL:

The paper was resubmitted about a week ago. Response from the first referee was positive. The paper can be found on the Archive. Currently the paper is with the editors, and the goal is to have it published as soon as possible.

Seonho Choi discussed the work on the 3rd PRL:

DIS g_1^n was evolved down to the measured Q^2 range of GDH. Then Seonho compared the integrals of the measured g_1^n to the DIS g_1^n. Since the curves are a comparison of the ^{3}He GDH data to the DIS neutron, it was suggested that the plot should be done for ^{3}He instead of the neutron. What regions on which to integrate was also discussed. Wally Melnitchouk suggested integrating over all the data and including the elastic neutron contribution. A separate integration over the delta region will also be done.

Until the uncertainties are ironed out from the evolution to lower Q^2, no definite conclusions can be drawn. But it appears that there is no clear evidence of duality at low Q^2 below 0.9 GeV^2

Other papers were discussed by the Collaboration:

Once Karl has complete his analysis, he will write the ^{3}He GDH paper. Seonho was supposed to write a polarizibility paper, but since he doesn't have time, JP will write the paper.

Future experiments were discussed by the Collaboration:

Kathy McCormick discussed the preparations and work for G_E^n. Due to the large fringe fields from Big Bite, a metal box has been designed to generate the holding field for the target. The box is capable of producing a uniform 30 G field. However the design does not allow for field direction changes greater than 5°, and the field cannot be swept. So frequency swept NMR will be done for G_E^n. The laser hut will be moved to a new building behind the Counting House, and the laser light will be combined together into one fiber that runs into Hall A. New cell designs are also being considered. A couple possible ideas are larger pumping chambers with flat windows and potassium-rubidium hybrid cells.

JP Chen discussed the Transversity experiment. A possible time to run is right after G_E^n, since it will also use Big Bite. The standard target system will be used with vertical Helmholtz coils and vertical pumping. Also the frequency swept NMR will be used to flip the target spin approximately every few minutes.