

g_2^p Preliminary Asymmetries

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Methodology

- Events are sorted into helicity state and placed in 50MeV bins corresponding to $\nu = E - E'$
- The raw asymmetry is calculated bin by bin as

$$A_{raw} = \frac{Y_+ - Y_-}{Y_+ + Y_-} \text{ where } Y_{+/-} = \frac{N_{+/-}}{(Q_{+/-})(L_{+/-})}$$

$$\text{and } \delta_{A_{raw}} \cong \frac{1}{\sqrt{N_+ + N_-}}$$

- Raw Asymmetries are scaled to physics asymmetries by

$$A_{phy} = \left(\frac{1}{fp_b p_t}\right) A_{raw}$$

$$\delta_{A_{phy}} = \left(\frac{1}{fp_b p_t}\right) \delta_{A_{raw}}$$

Weighting

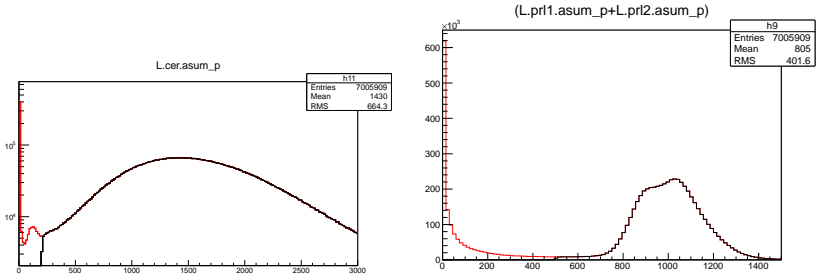
The bin by bin asymmetry is summed over all runs at a given setting as

$$A = \sum_i \frac{A_i / \delta_{A_i}^2}{1 / \delta_{A_i}^2}$$
$$\delta_A = \sum_i \frac{1}{\sqrt{1 / \delta_{A_i}^2}}$$

Taking into account HWP flips (The sign of P_t is taken into account when scaling from raw to physics asymmetry)

Electron Cuts

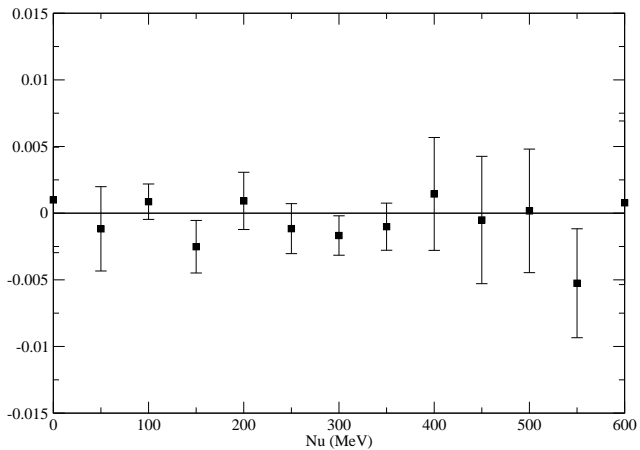
- Extremely loose target variable cuts used
e.g. Y -target $\pm 2cm$, $d\Theta$ $\pm 10\%$
- PID cuts used to eliminate large pion asymmetries.
- At this stage in analysis statistics are very important, cuts only eliminate 5-10% of total events.



Example PID cuts applied to the $P_o = 1589MeV/c$, $E_b = 1.711GeV/c$ setting

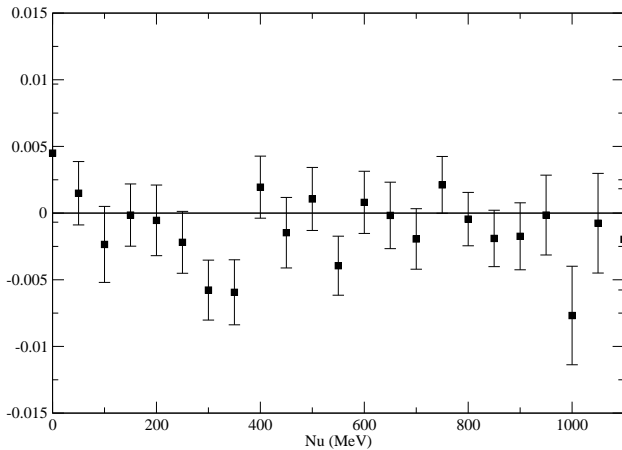
Preliminary Results

A_T for $E=1157\text{MeV}/c$



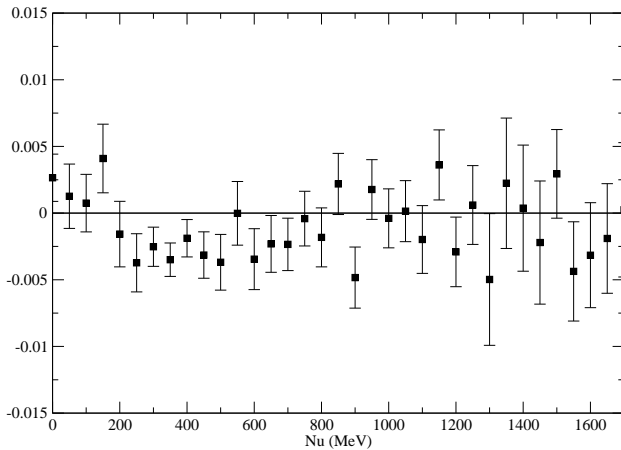
Preliminary Results Cont.

A_T for $E=1711\text{MeV}/c$



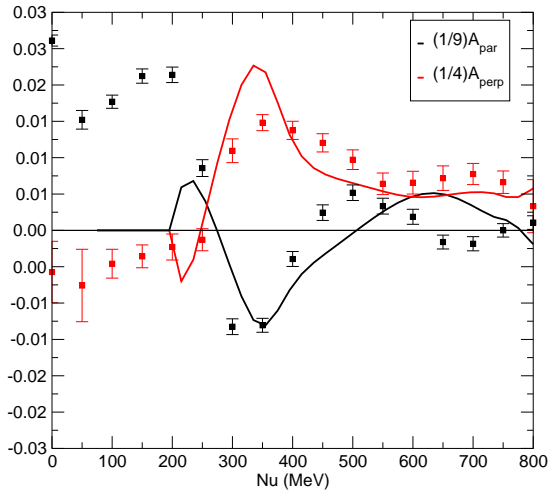
Preliminary Results Cont.

A_T for $E=2254\text{MeV}/c$



Preliminary Results Cont.

E=2254MeV 5T Asymmetry



To Do

- Analyze 3.3GeV/c data.
- $\frac{1}{f_{p_b p_t}}$ can be approximated using our asymmetry result from 5T 2.2GeV/c setting, this may give us a better understanding of the dilution in the elastic regime.
- Add dilution correction from experimental results.
- Unpolarized elastic tail correction might fix diluted 2.5T asymmetries?