Charged pion analysis

Single Spin Asymmetry

Korea Univ.
Jaehee Yoo

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Alternate Averaging Methods (Square Root Formula)

inverse polarization weighted sum of the yields

$$N^{hybrid} = \sum_{Fill} N_{Fill}/P_{Fill}$$

luminosity weighted polarization

$$\langle P \rangle_L = \sum_{Fill} \mathcal{L}_{Fill} P_{Fill} / \sum_{Fill} \mathcal{L}_{Fill}$$

$$A_N^{hybrid} = \frac{\sqrt{N_L^{\uparrow,hybrid} N_R^{\downarrow,hybrid}} - \sqrt{N_R^{\uparrow,hybrid} N_L^{\downarrow,hybrid}}}{\sqrt{N_L^{\uparrow,simple} N_R^{\downarrow,simple}} + \sqrt{N_R^{\uparrow,simple} N_L^{\downarrow,simple}}}$$
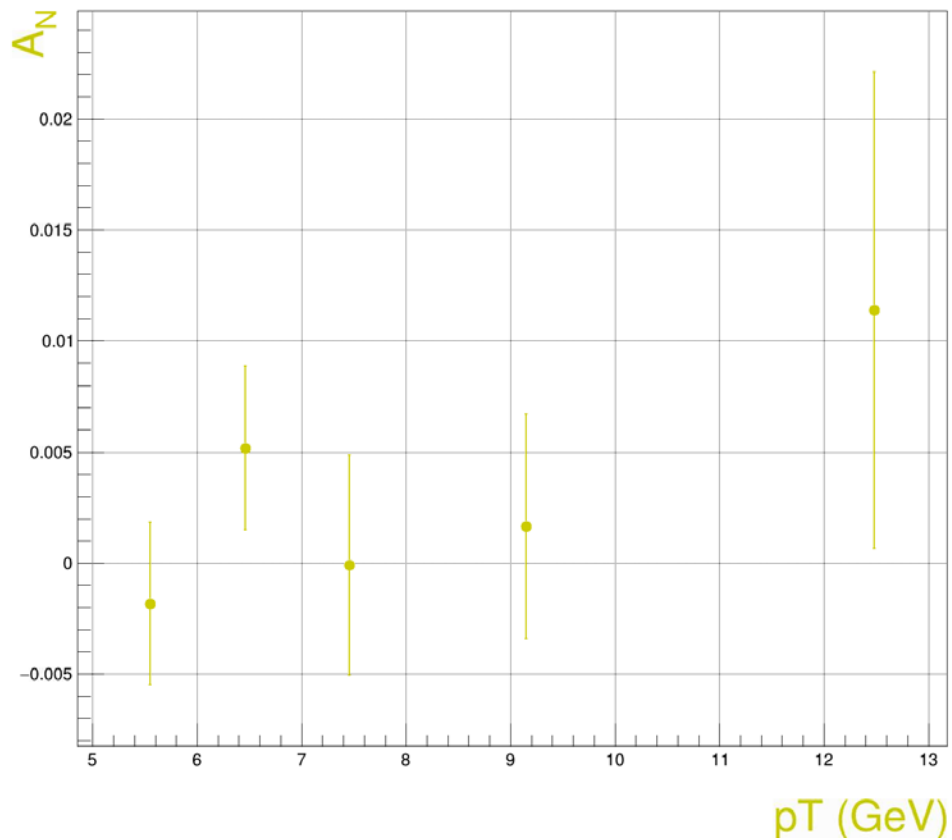
error bars

$$\delta A_N = \frac{1}{\sqrt{N}\langle P \rangle_L}$$
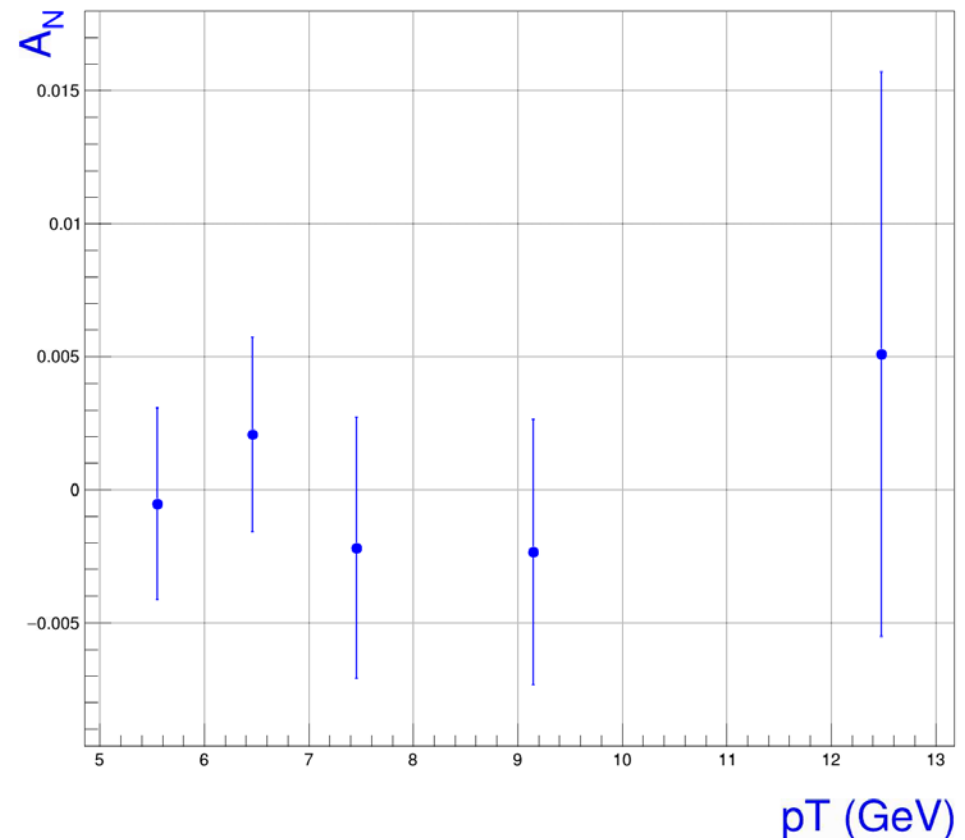
error bars

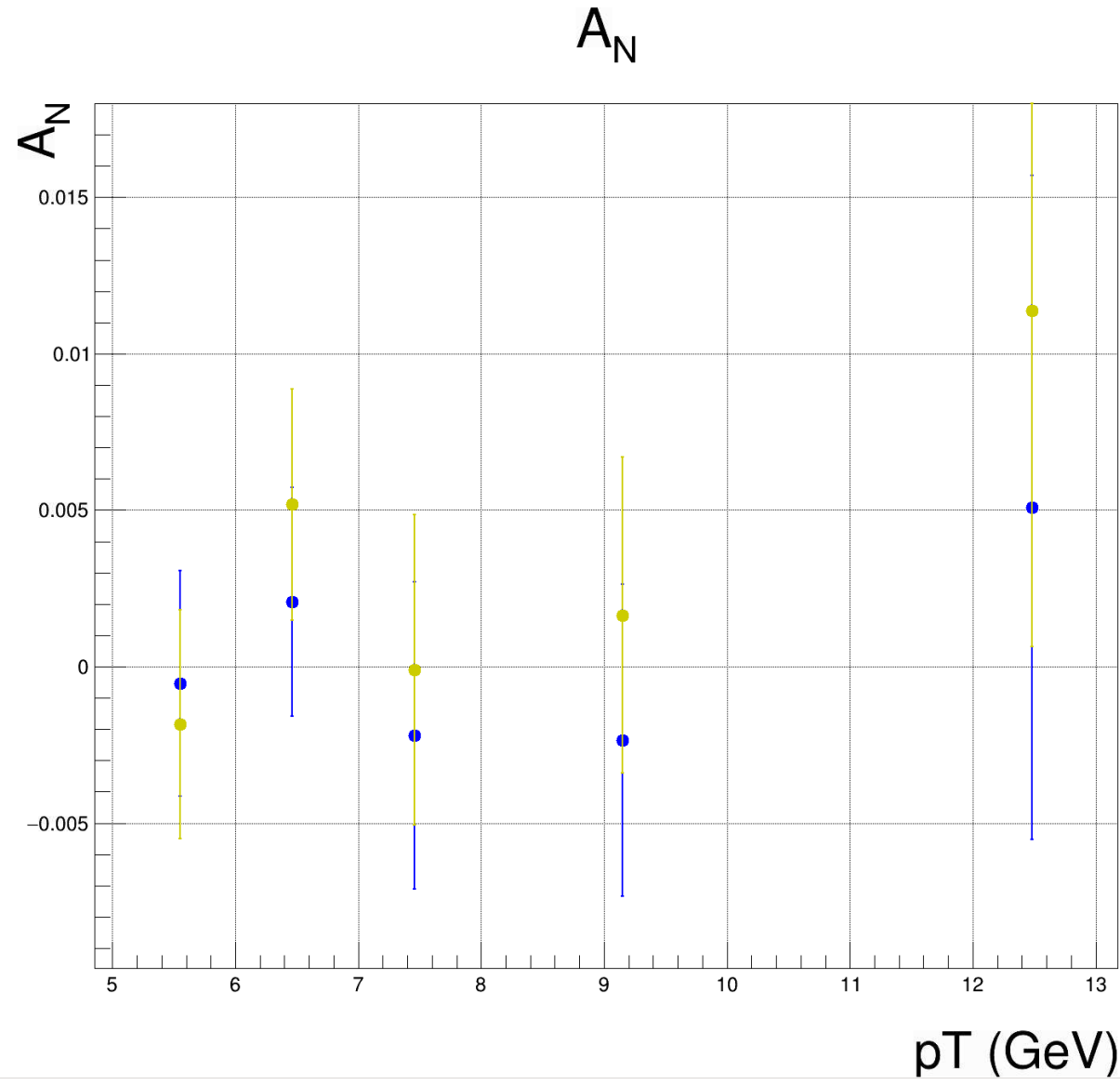$$A_N = \frac{\epsilon}{P_y \langle |cos(\phi)| \rangle}$$

Single Spin Asymmetry

A_N (yellow beam)

A_N (blue beam)

Single Spin Asymmetry
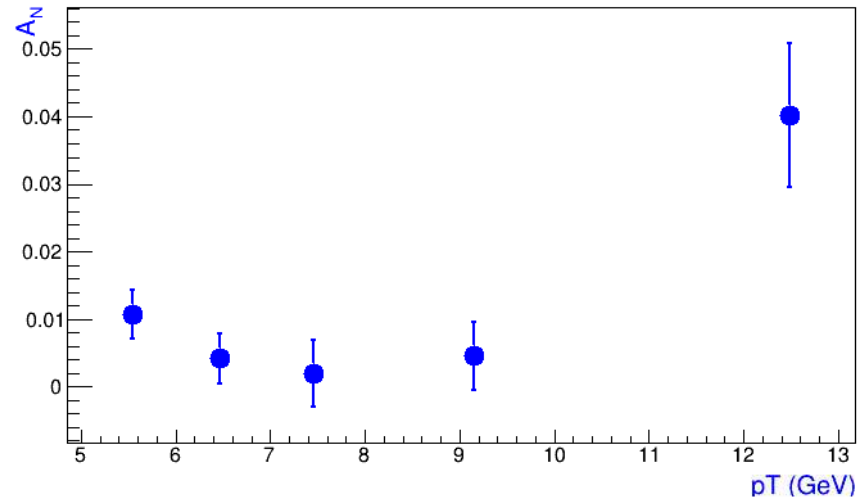
Traditional Averaging (Luminosity Formula)

$$A_N = \frac{\sum_{Fill} P_i (N_i^{\uparrow}(\phi) - R_i N_i^{\downarrow}(\phi))}{\sum_{Fill} P_i^2 (N_i^{\uparrow}(\phi) + R_i N_i^{\downarrow}(\phi))}$$
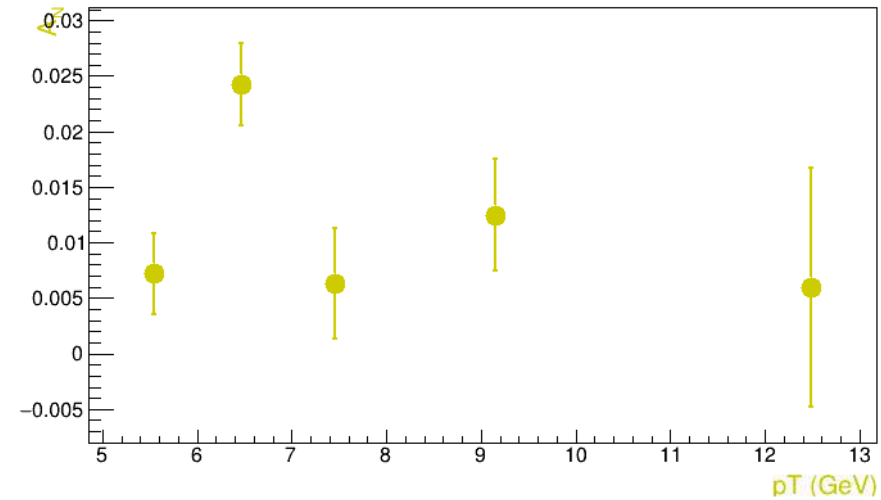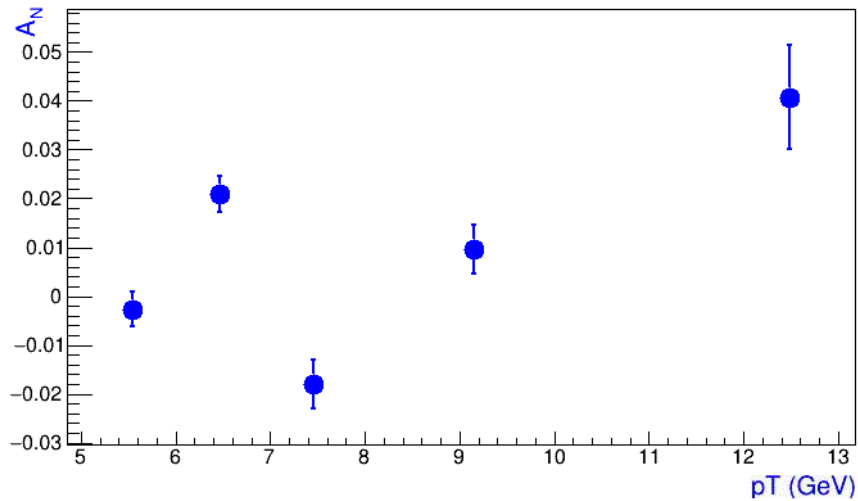
Single Spin Asymmetry