ϕ-meson Global Spin Alignment Update

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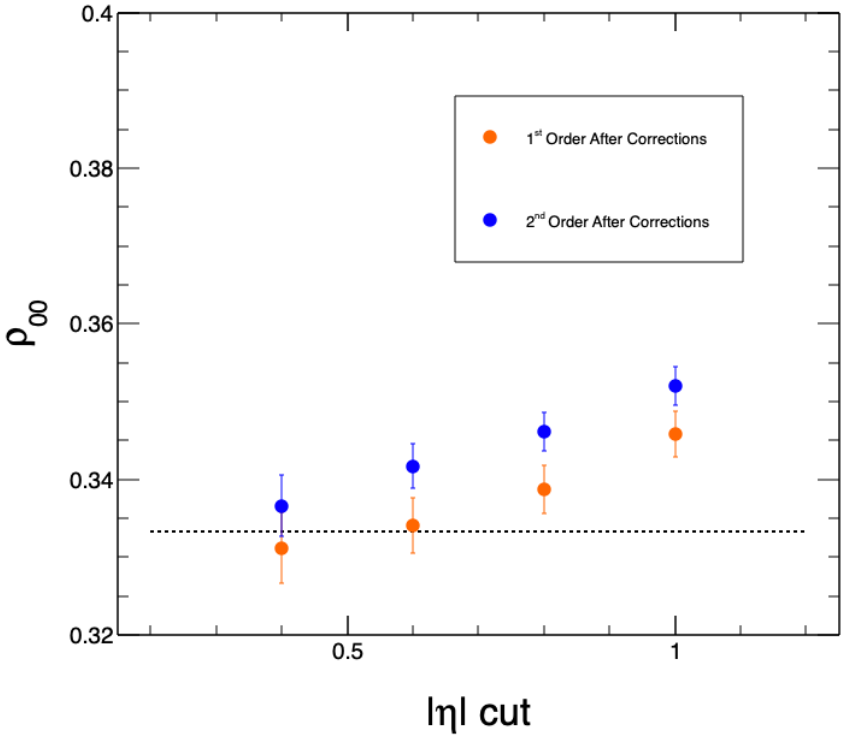
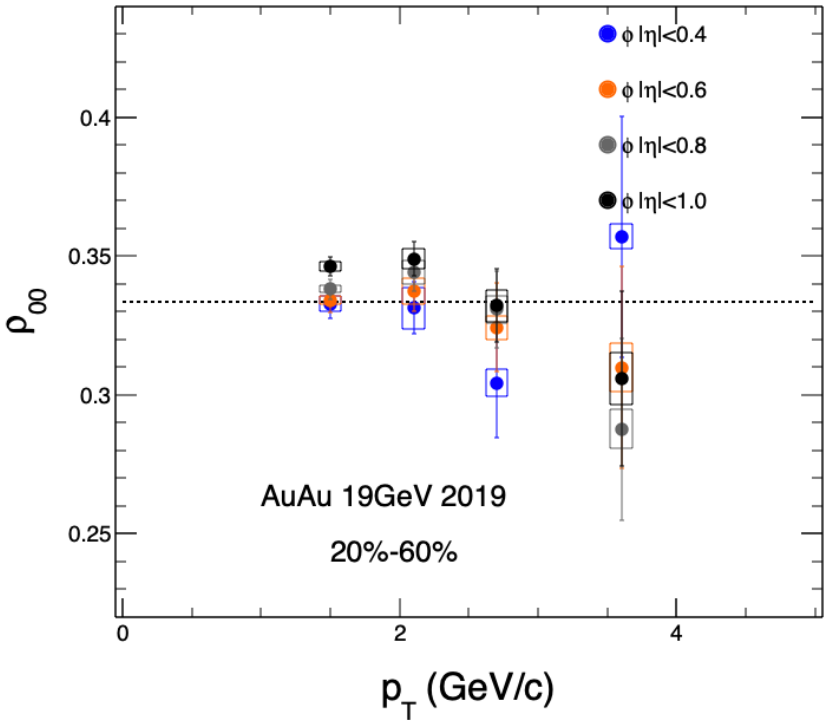
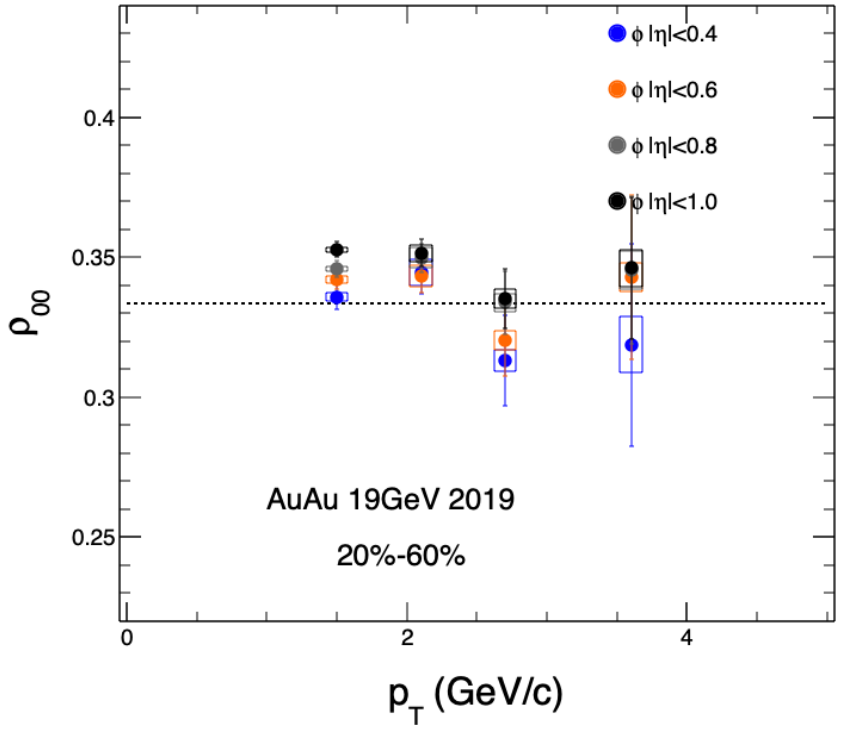
pT Dependence (20-60% Centrality)



1st Order

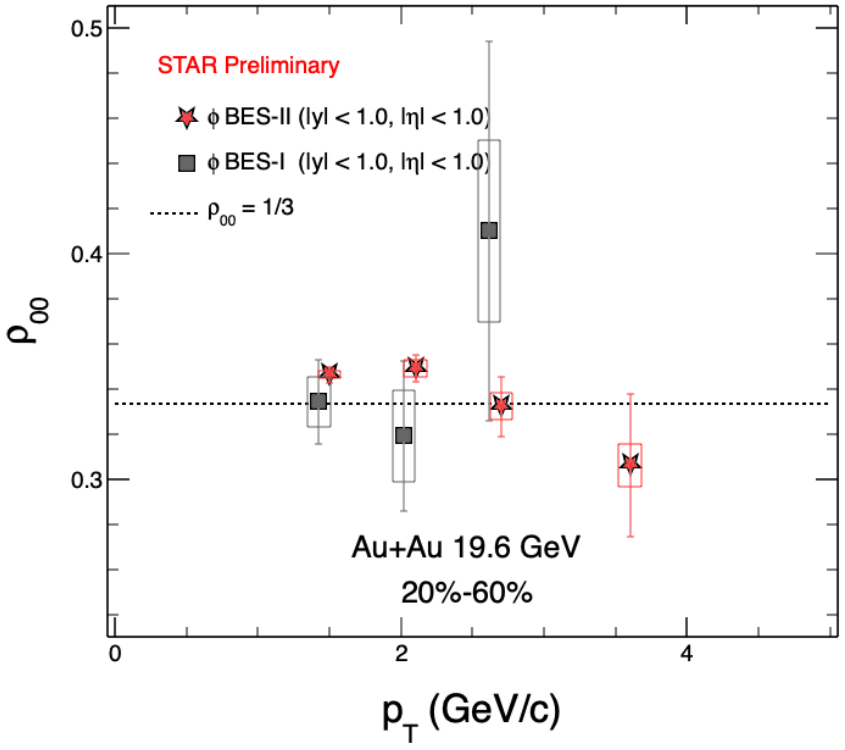


2nd Order

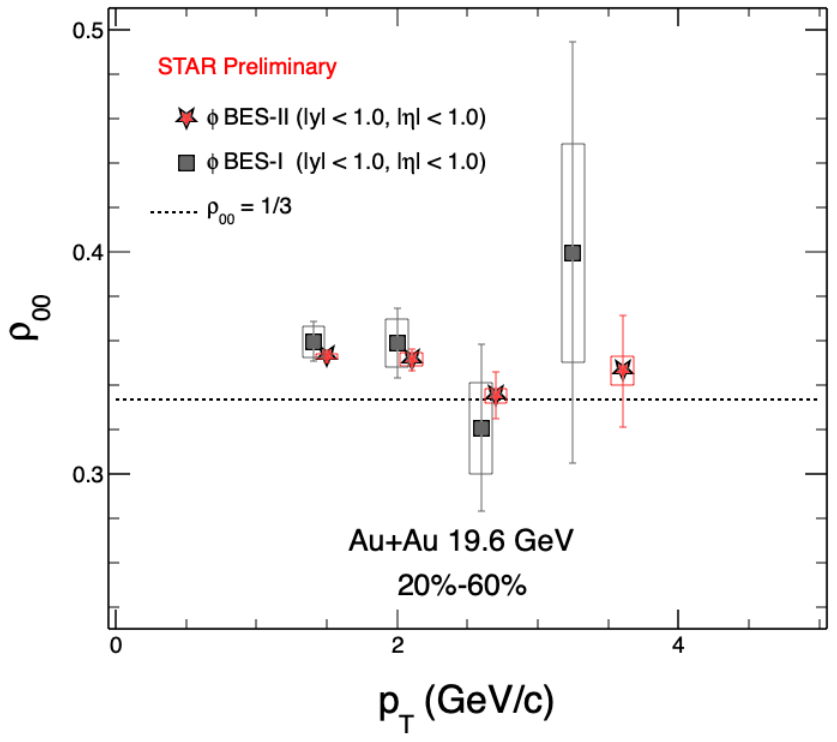


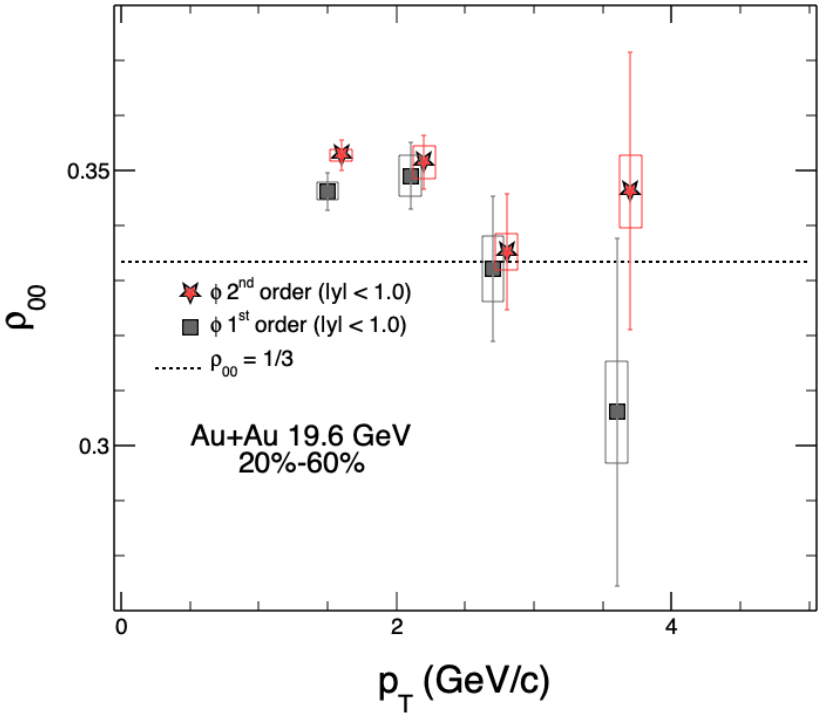
pT Dependence (20-60% Centrality)

1st Order



2nd Order

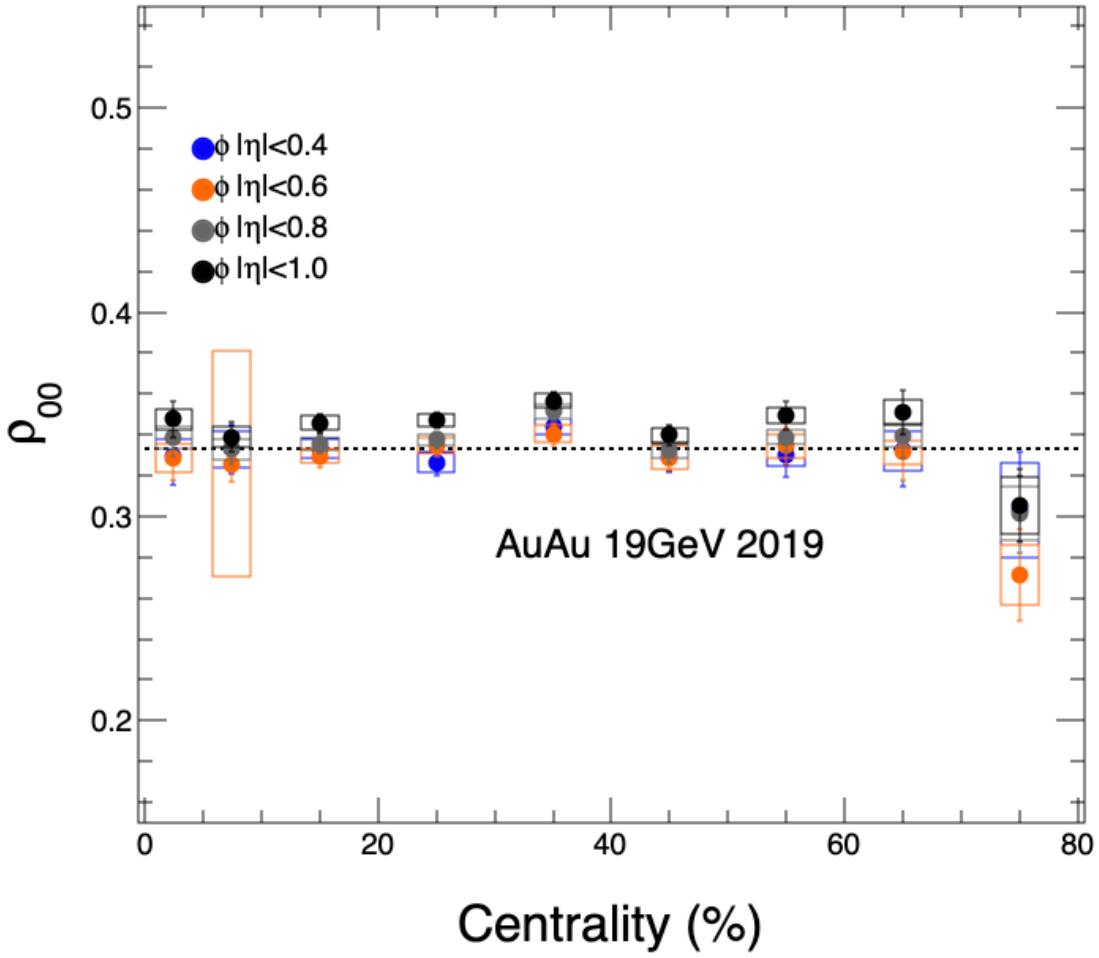




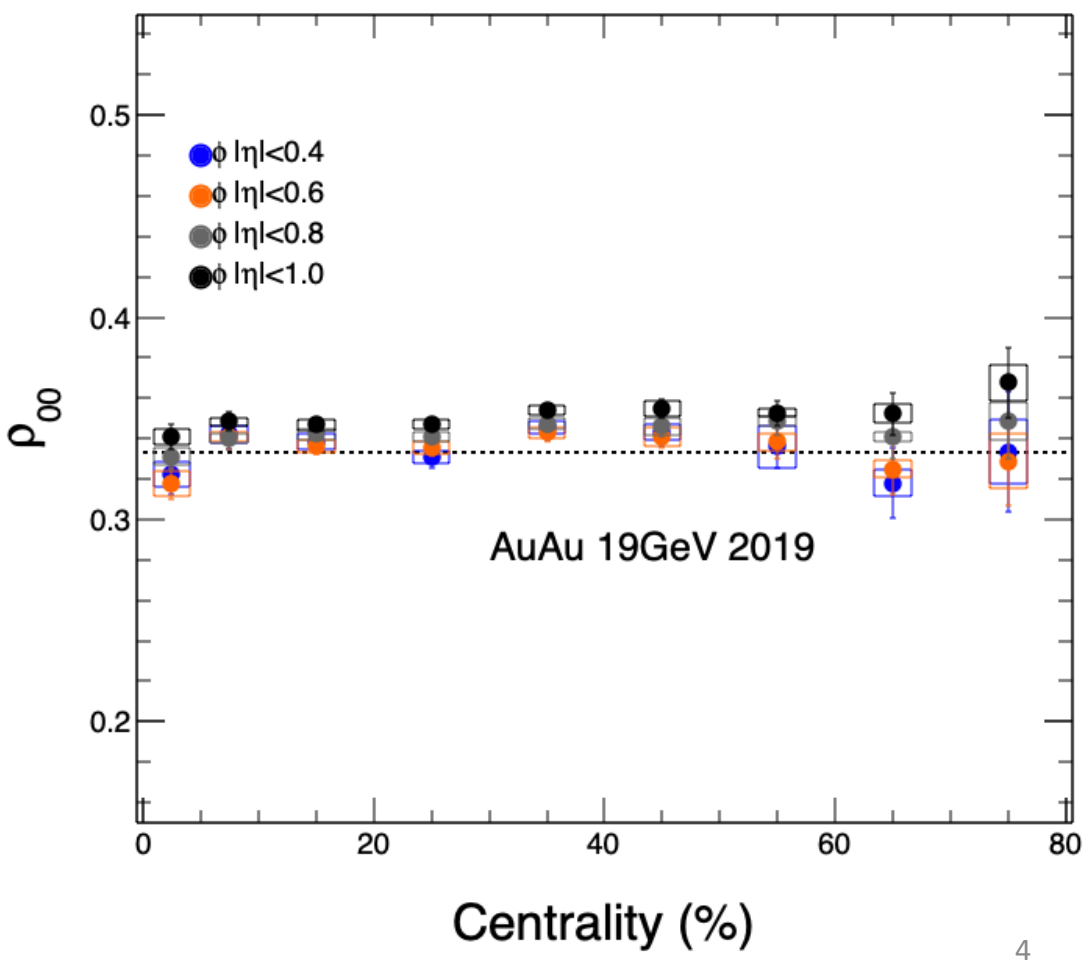
Centrality Dependence

1 < pT < 5 GeV/c

1st Order

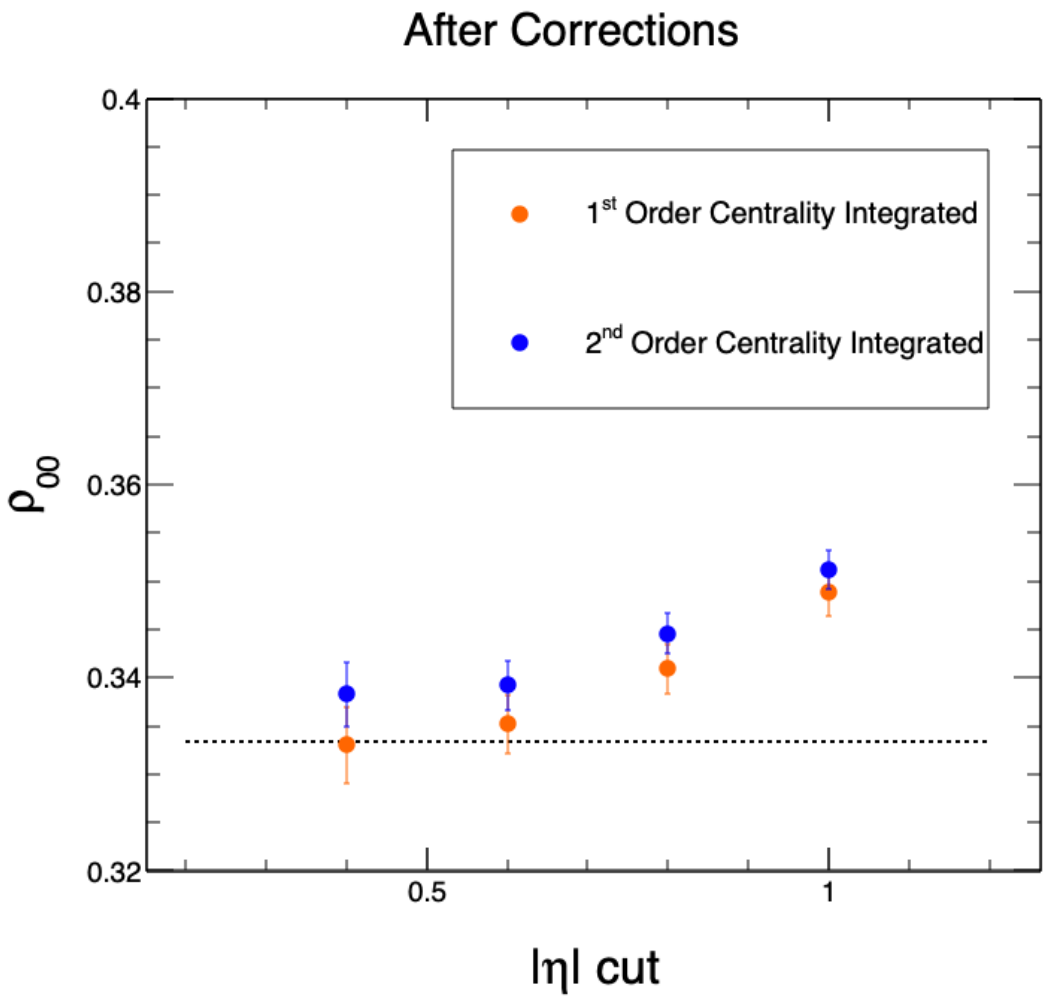


2nd Order

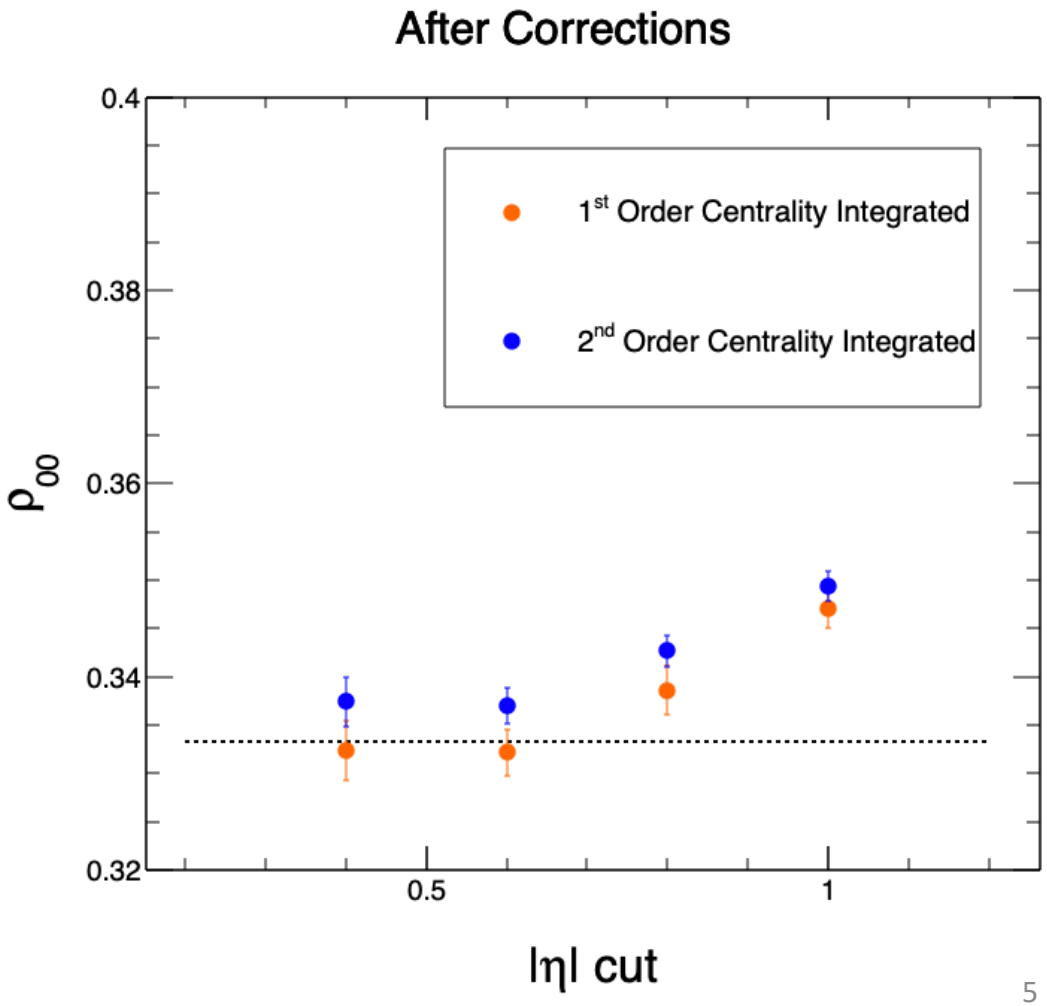


1 < pT < 5 GeV/c

20-60% Centrality

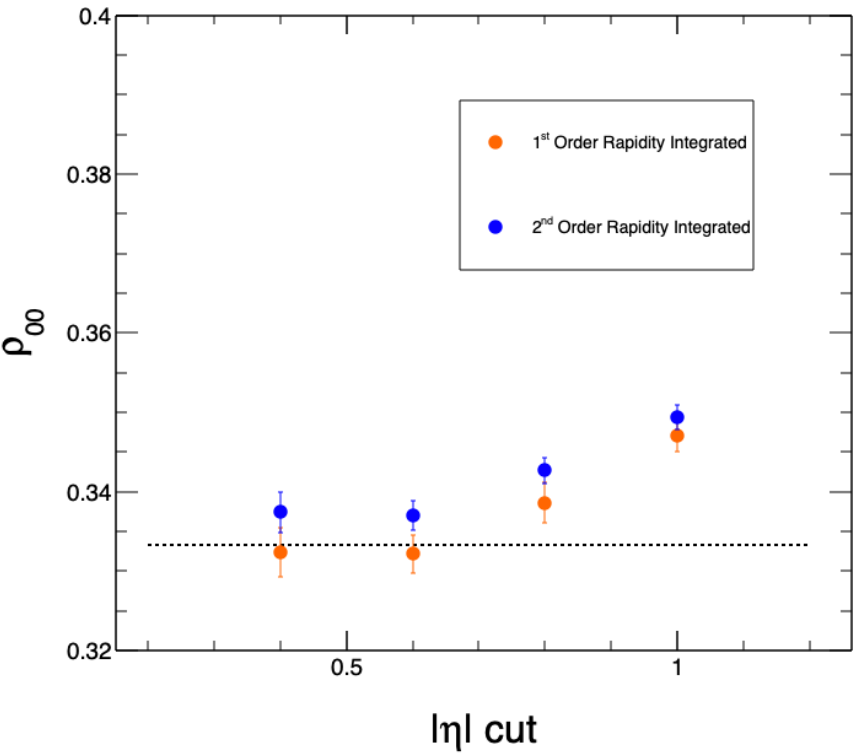


0-80% Centrality

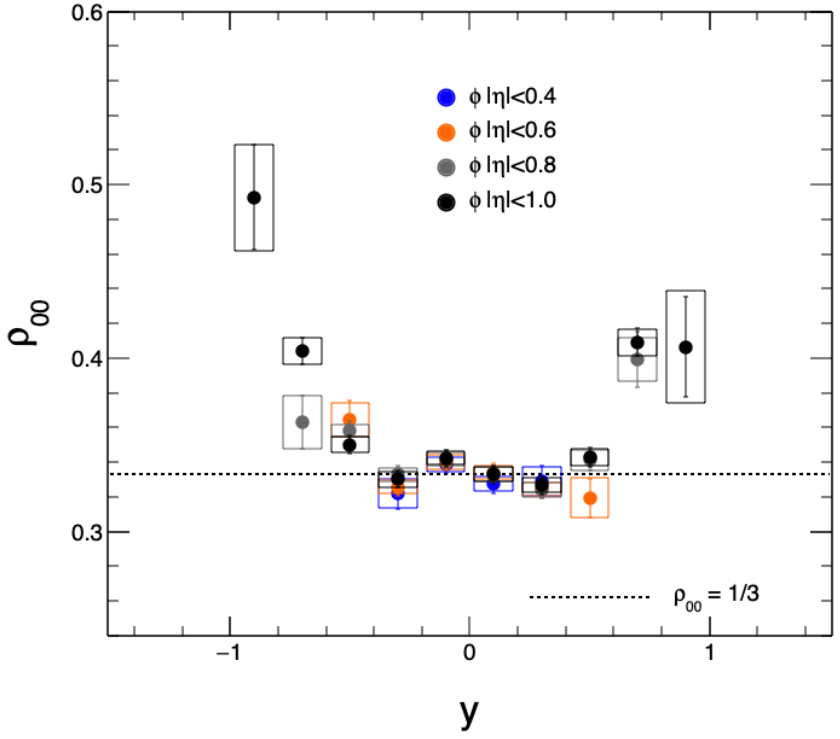


Rapidity Dependence (0-80% Centrality)

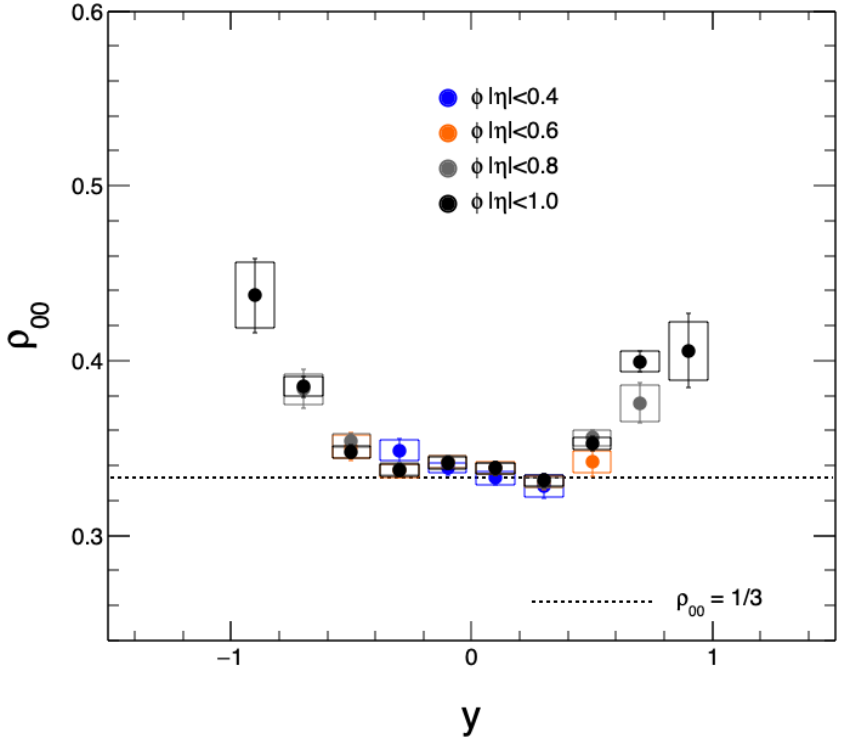
1 < pT < 5 GeV/c



1st Order



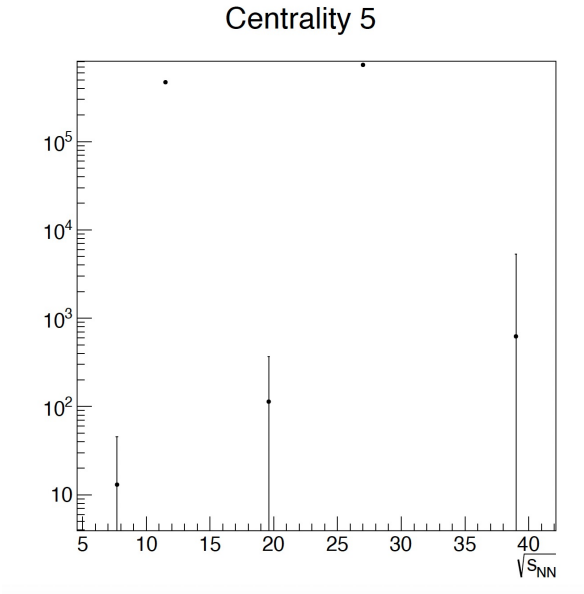
2nd Order



Au+Au 14.6 GeV p_T spectra interpolation

$$\frac{1}{2\pi m_T}\frac{d^2N}{dm_T dy} = \frac{dN/dy(n-1)(n-2)}{2\pi nT_{\text{Levy}}(nT_{\text{Levy}} + m_0(n-2))} \times \left(1 + \frac{m_T - m_0}{nT_{\text{Levy}}}\right)^{-n},$$

- Using Lévy function for interpolation is difficult due to parameter n varying too much energy to energy.
- Function used for sampling pT in 19.6 GeV simulations.



$$\frac{1}{2\pi m_T}\frac{d^2N}{dm_T\,dy} = \frac{dN/dy}{2\pi T_{\text{exp}}(m_0 + T_{\text{exp}})} e^{-(m_T - m_0)/T_{\text{exp}}},$$

- In exponential function we have two well behaved parameters (dN/dy) and T_{exp}
- This will be used for extrapolation.
- Fit the distributions of the two parameters as a function of collision energy.
  - We really only need T_{exp} since dN/dy is just a normalization and we just want the shape.
- Then we can just grab the interpolated parameters for 14.6 GeV and generate the spectra for simulation.

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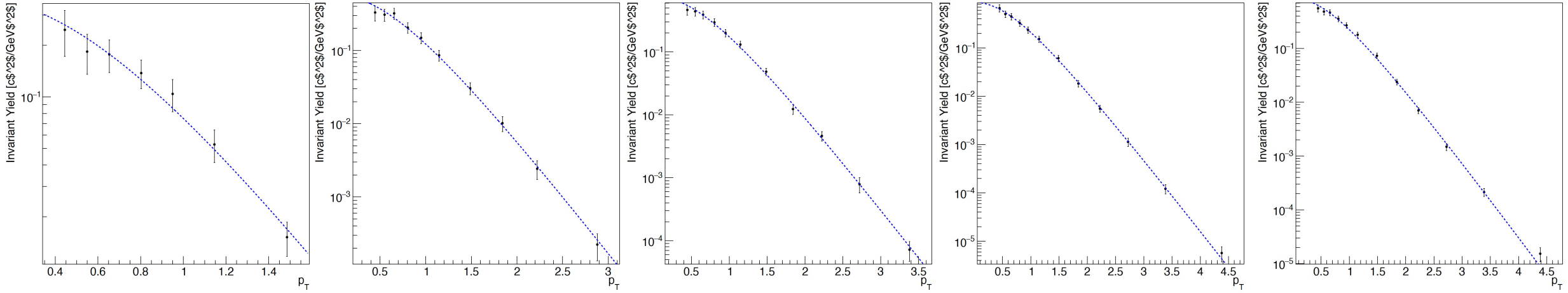
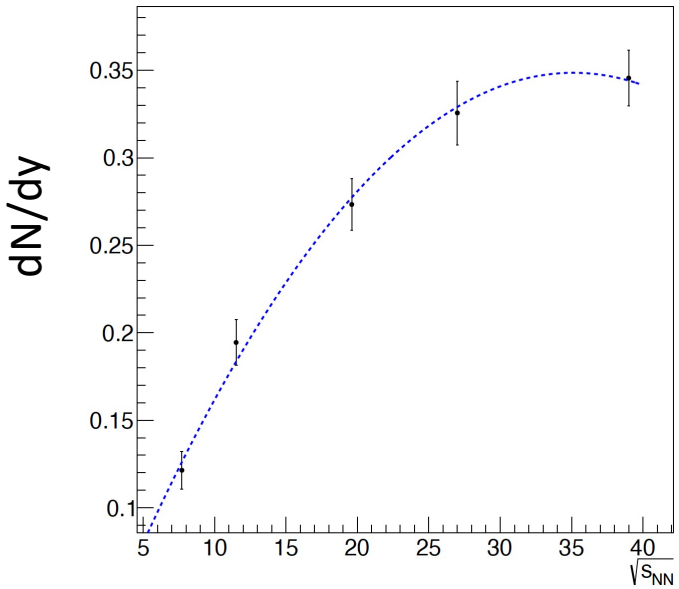
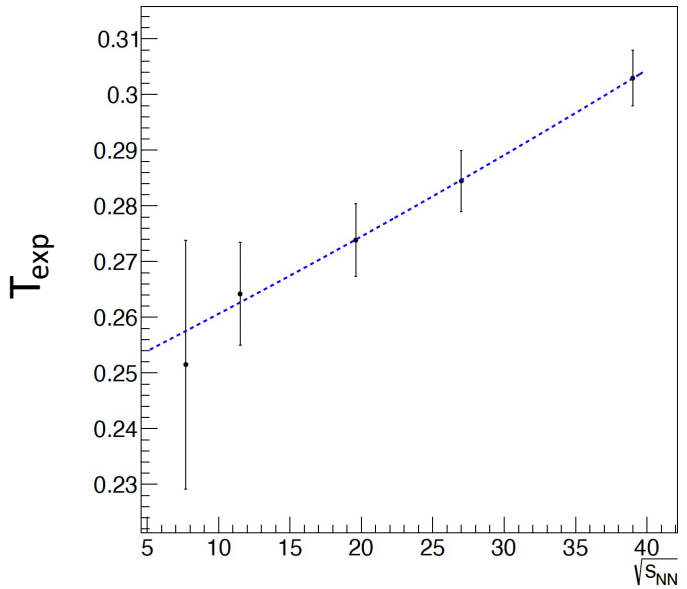
Au+Au 14.6 GeV p_T spectra interpolation

10-20% centrality

7.7 GeV | 11.5 GeV | 19.6 GeV | 27 GeV | 39 GeV

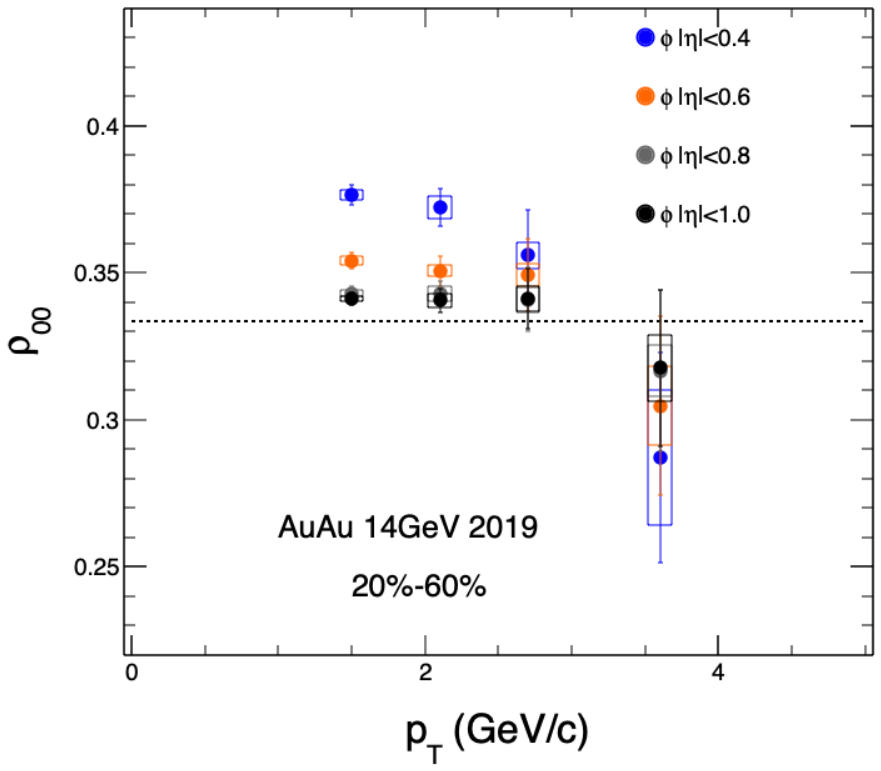


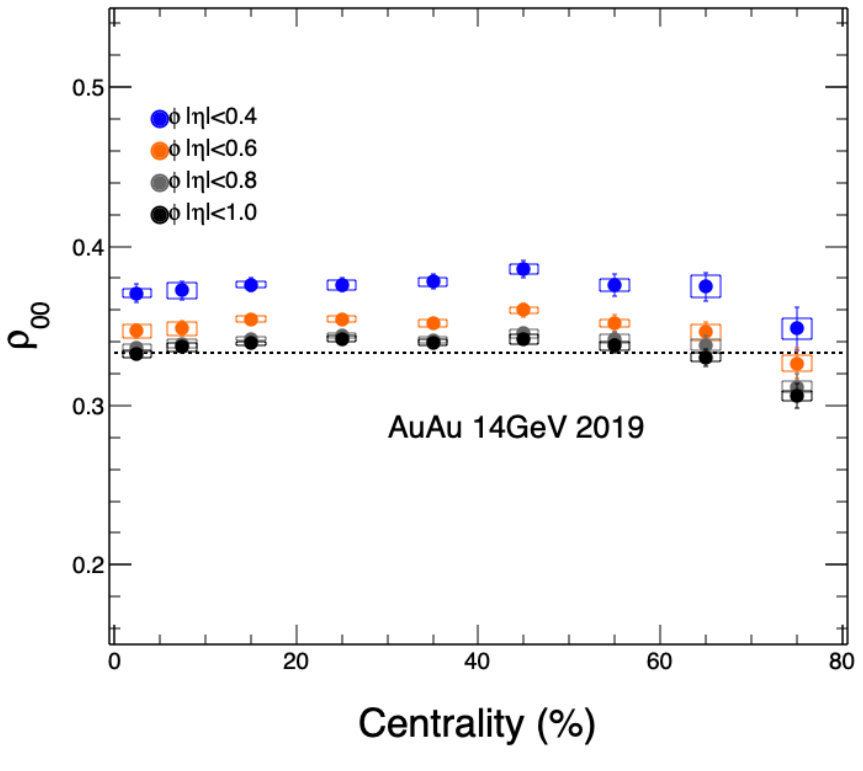




- Use second order polynomial to fit both parameters.
- Fits to parameters are well behaved.
- Performed for each centrality.

14.6 GeV 1st Order Raw Results





Rapidity Dependent Study Pending

Summary and Outlook

19.6 GeV

- First order EP results appear systematically lower than second order EP results.

14.6 GeV

- Correction Simulations:
  - Working on ToF Matching fits.
  - Add code for interpolated pT spectra in simulation.
  - I will start running the simulation tomorrow.