Measurement of direct photon anisotropy at PHENIX

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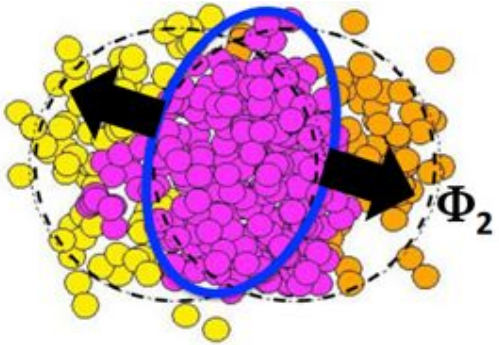
Photon Anisotropy



$$E\frac{d^3N}{d^3p} = \frac{1}{2\pi}\frac{d^2N}{p_T dp_T dy}\left(1 + \sum_{n=1}^{\infty} 2v_n cos\left(n\left(\phi - \Psi_{RP}\right)\right)\right)$$

Estimated from π^0

Includes all photons

$$v_n^{dir} = \frac{R_\gamma v_n^{inc} - v_n^{dec}}{R_\gamma - 1}$$

ratio of inclusive to decay photons

Au+Au at 200 GeV – Direct photon v_2

Cu+Au at 200 GeV – Inclusive photon v_2

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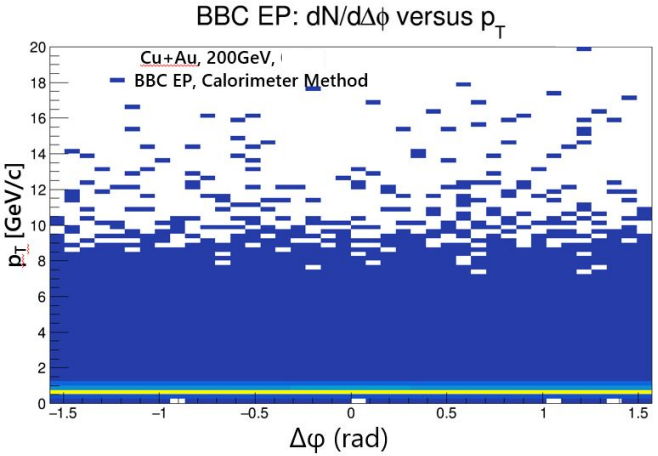
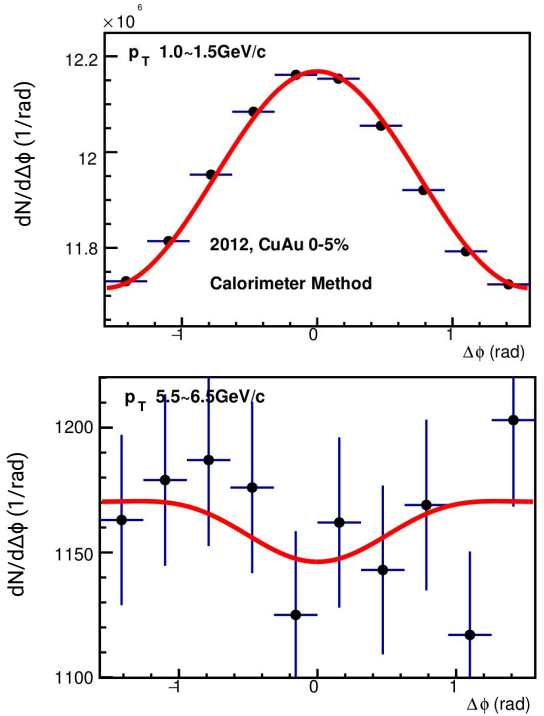
Technical Details



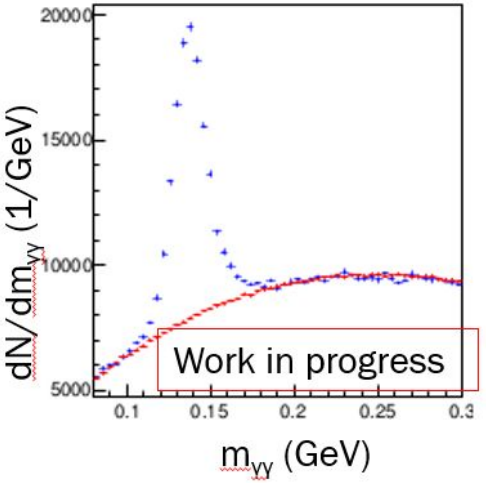
X-axis projection



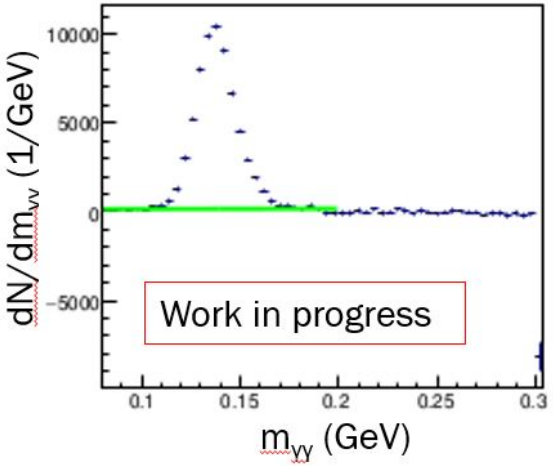
- Inclusive means all reconstructed photons are included in the fit
- Event plane is determined using BBC detector (3.1<η<3.9)

Technical Details

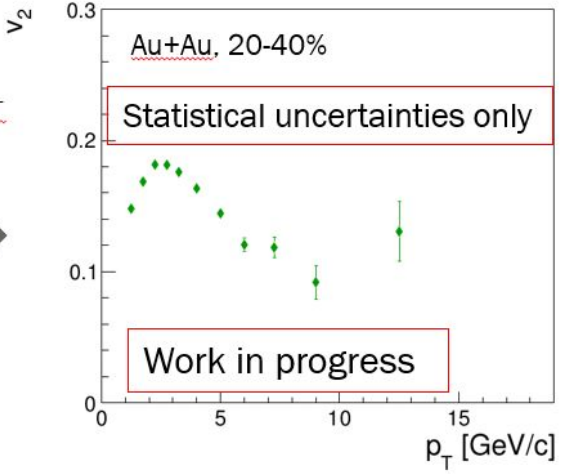
Counts in peak for each angle bin gives angular distribution



BG subtraction



All p_T bins



- π^0 v_2: angular distribution from integrating invariant mass peak for given angular bin
- π^0 v_2 is used to measure the hadron decay v_2

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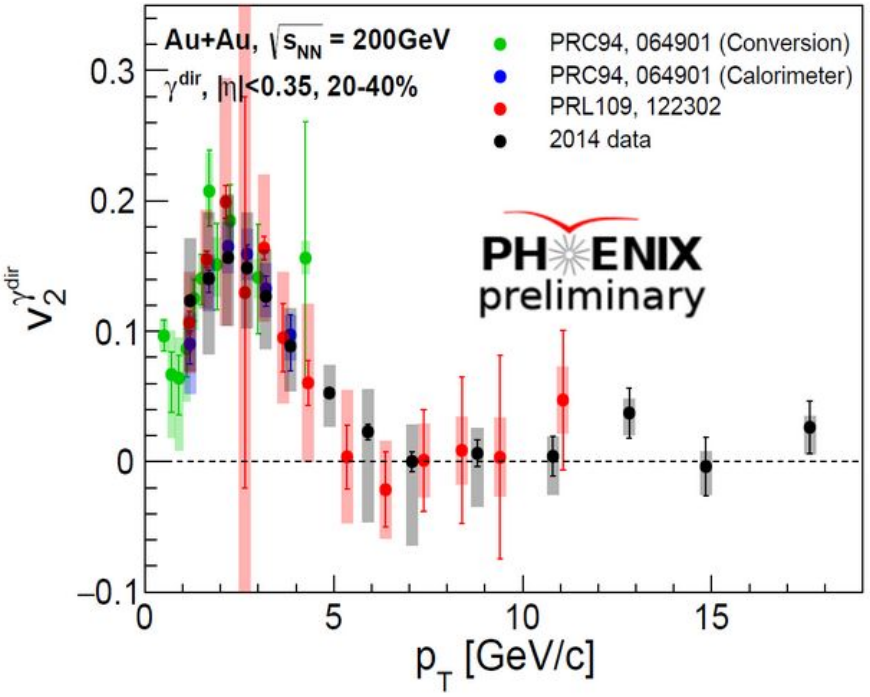
Results: Direct Photon v_2



$$v_n^{dir} = \frac{R_\gamma v_n^{inc} - v_n^{dec}}{R_\gamma - 1}$$

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Next Steps

- Analyze Cu+Au dataset
  - Final result: Direct Photon v_2
- Compare different methods for photon identification in both the Cu+Au and Au+Ag analyses