Thesis Flash Talk

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Advisor: Barbara Jacak
RHIC/Users Meeting
10 June 2010

PHENIX

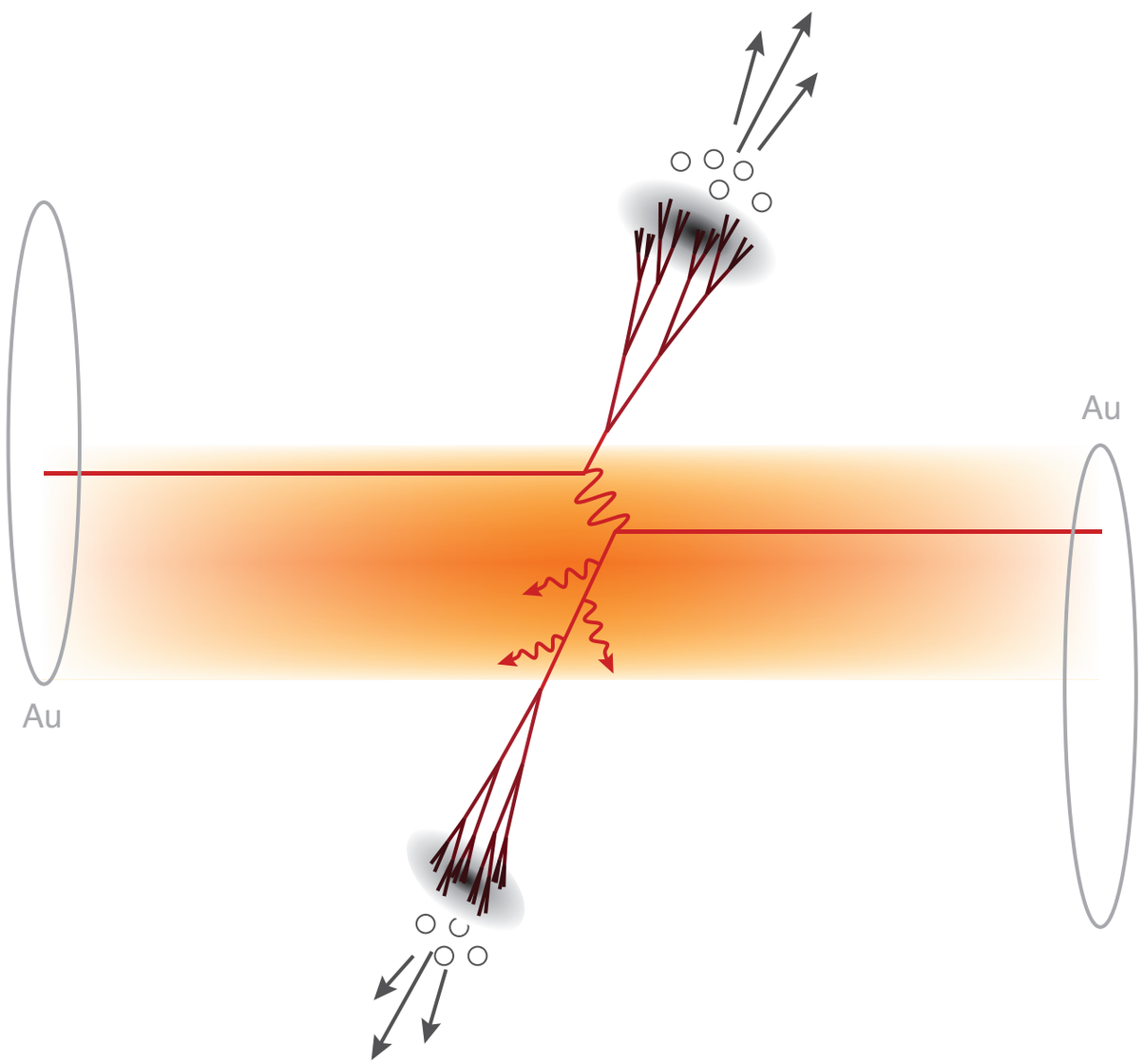
STONY BROOK
STATE UNIVERSITY OF NEW YORK

Thank you!

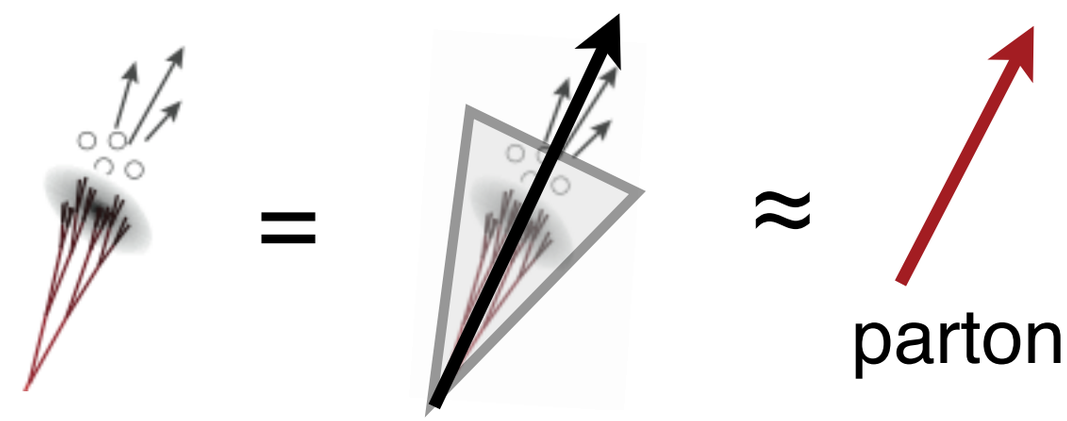
Hard Scattering and Jets

Physics Motivation:

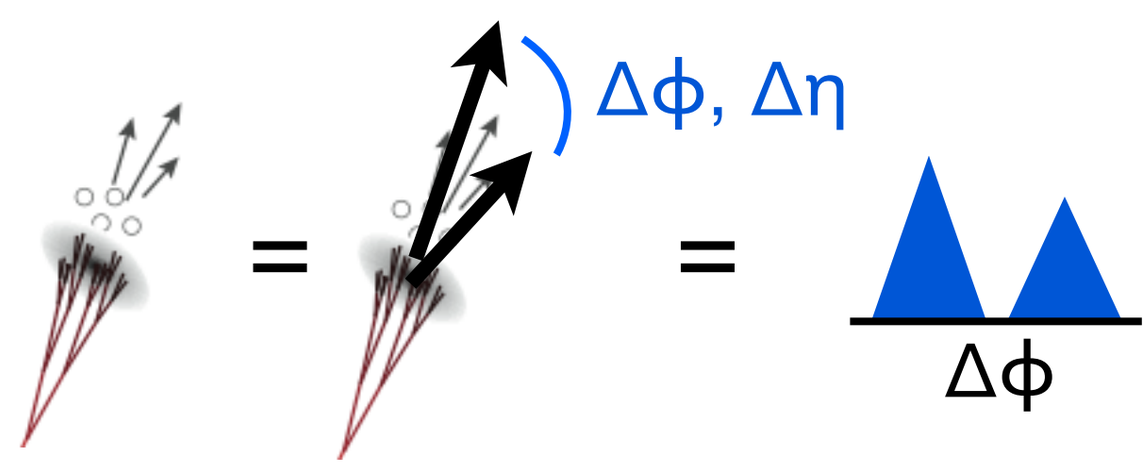
- Energy loss
- Production geometry
- Medium excitations



Jet Reconstruction

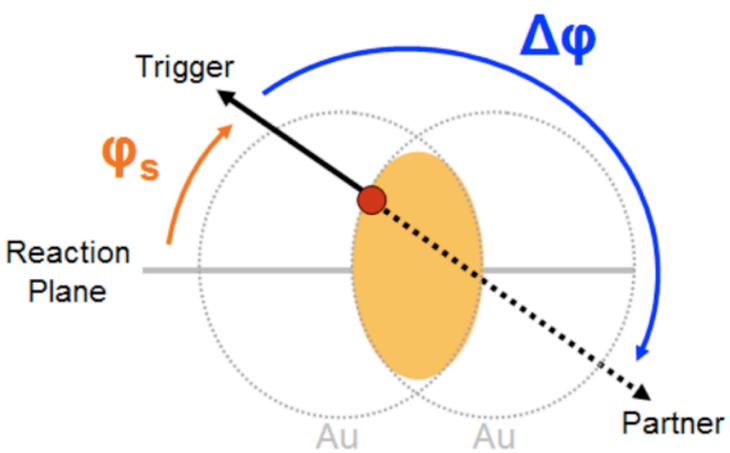


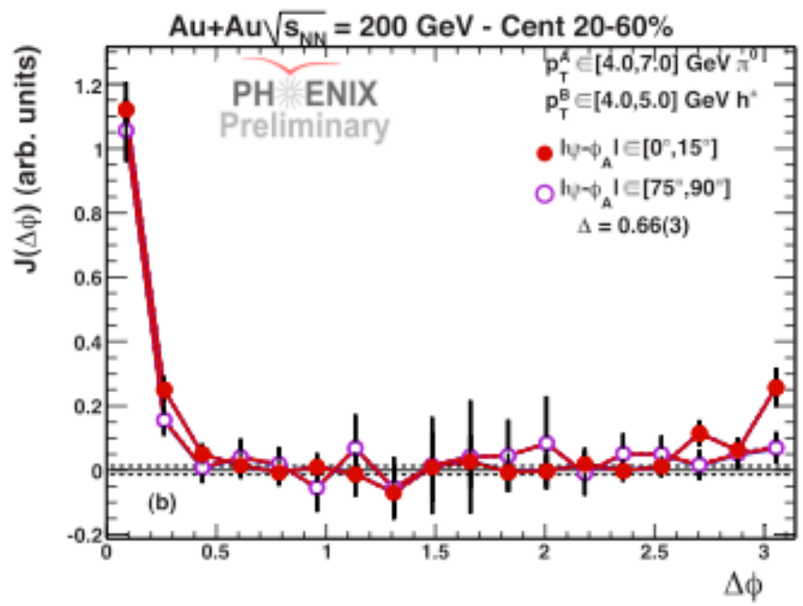
Two Particle Correlation



The Division of Labor

Higher pair momentum: $p_T^{\{A,B\}} \gtrsim 4\ \mathrm{GeV}/c$





Explore:

fast parton survival

Learn:

initial deposit geometry

energy loss characteristics

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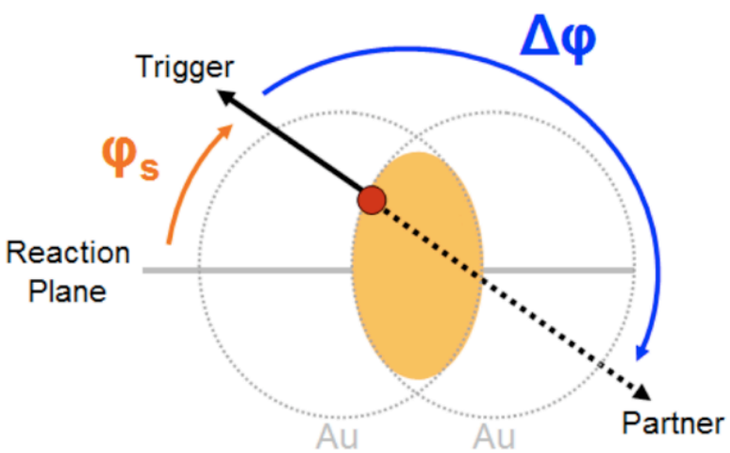
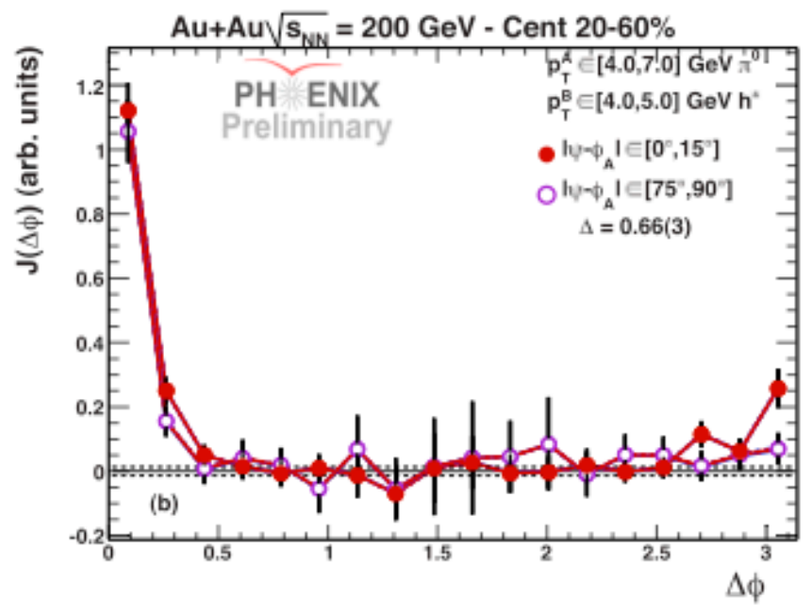
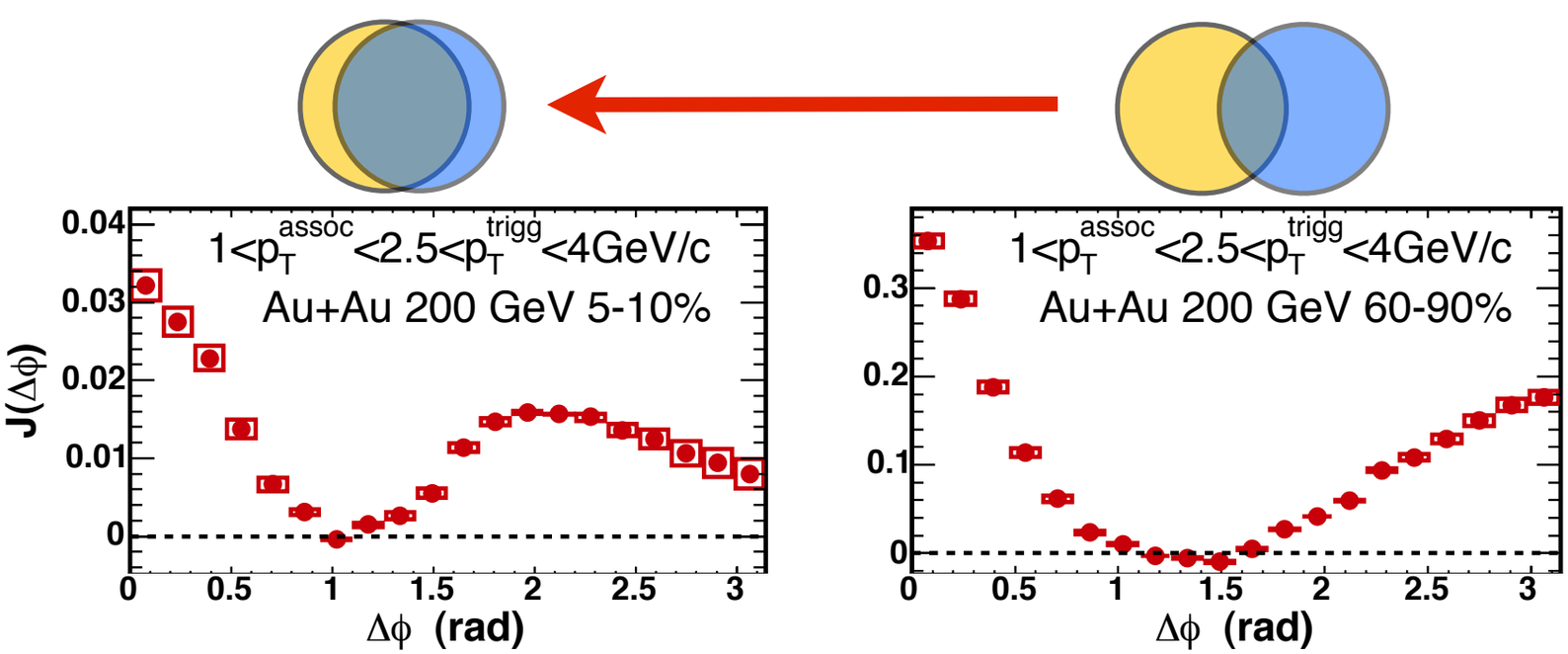




Explore:
fast parton survival

Learn:
initial deposit geometry
energy loss characteristics

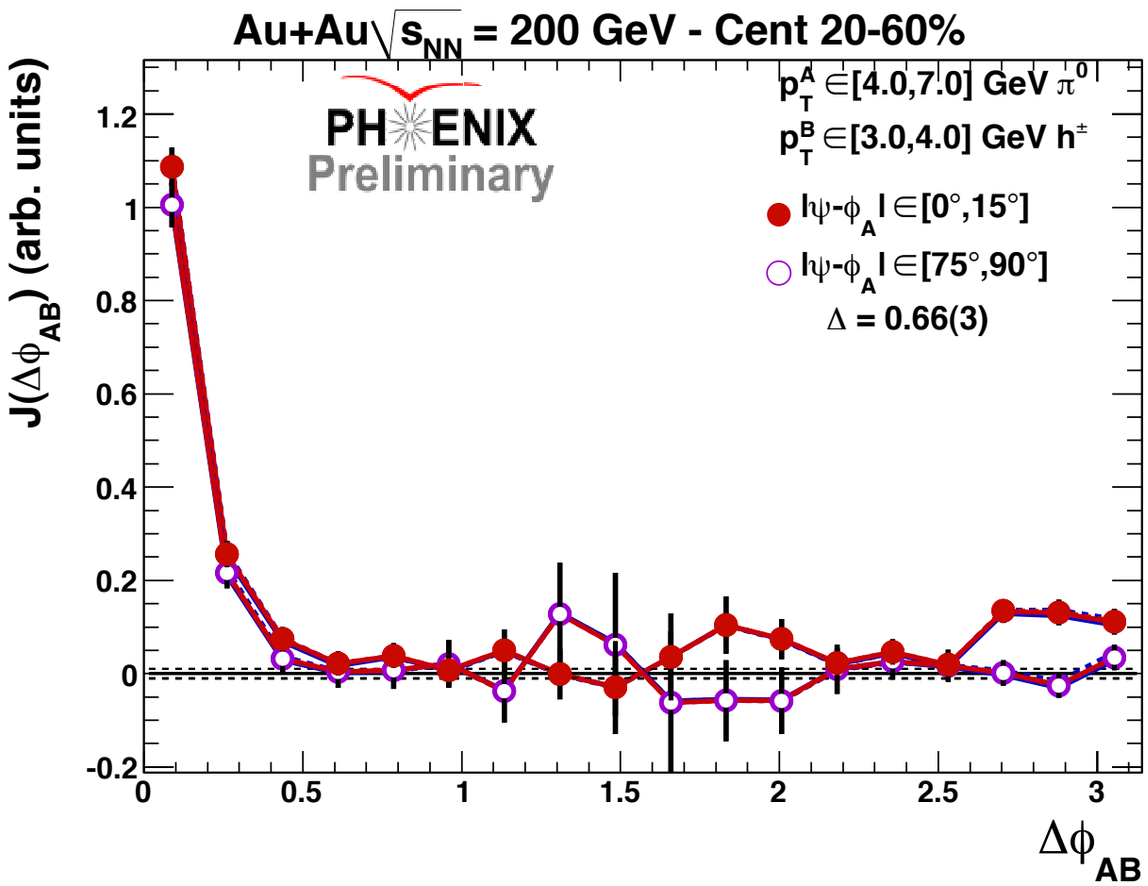
Lower pair momentum: $p_T^{\{A,B\}} \lesssim 4\ \mathrm{GeV}/c$



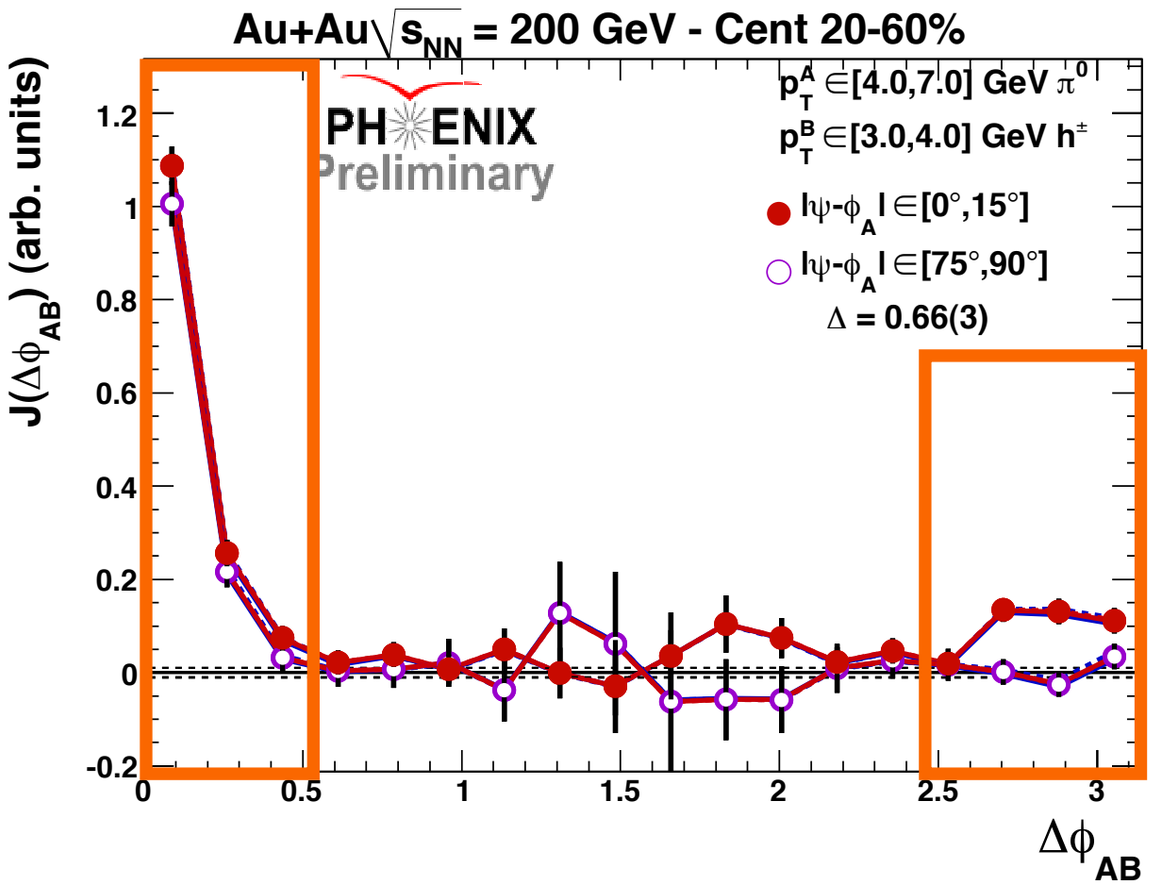
Explore:
medium response
or triangular flow

Learn:
production mechanisms
medium properties

Energy Loss


Au+Au $\sqrt{s_{NN}}$ = 200 GeV - Cent 20-60%
PHENIX
Preliminary
$p_T^A \in$[4.0,7.0] GeV π^0
$p_T^B \in$[3.0,4.0] GeV $h^\pm$
$|\psi-\phi_A| \in$[0°,15°]
$|\psi-\phi_A| \in$[75°,90°]
Δ = 0.66(3)
$J(\Delta\phi_{AB})$ (arb. units)
$\Delta\phi_{AB}$
1.2
1
0.8
0.6
0.4
0.2
0
-0.2
0
0.5
1
1.5
2
2.5
3

Energy Loss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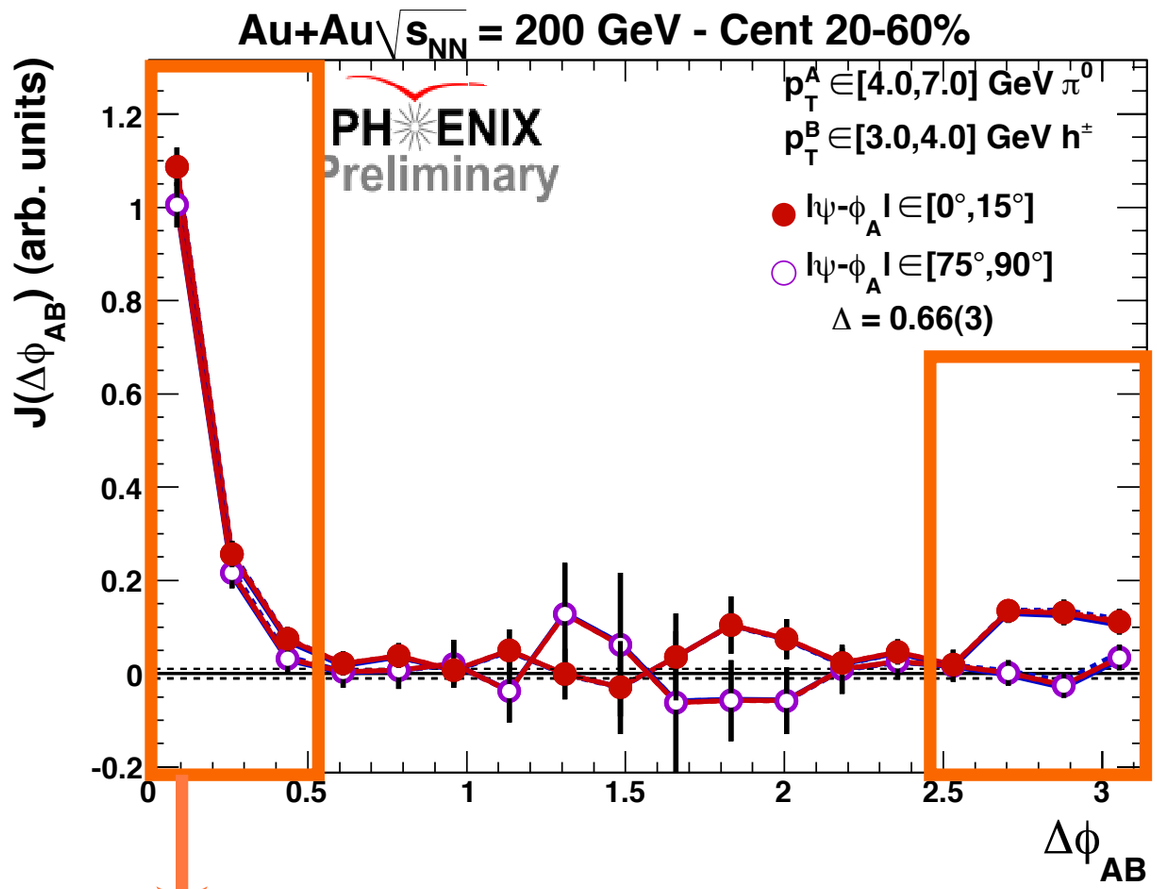
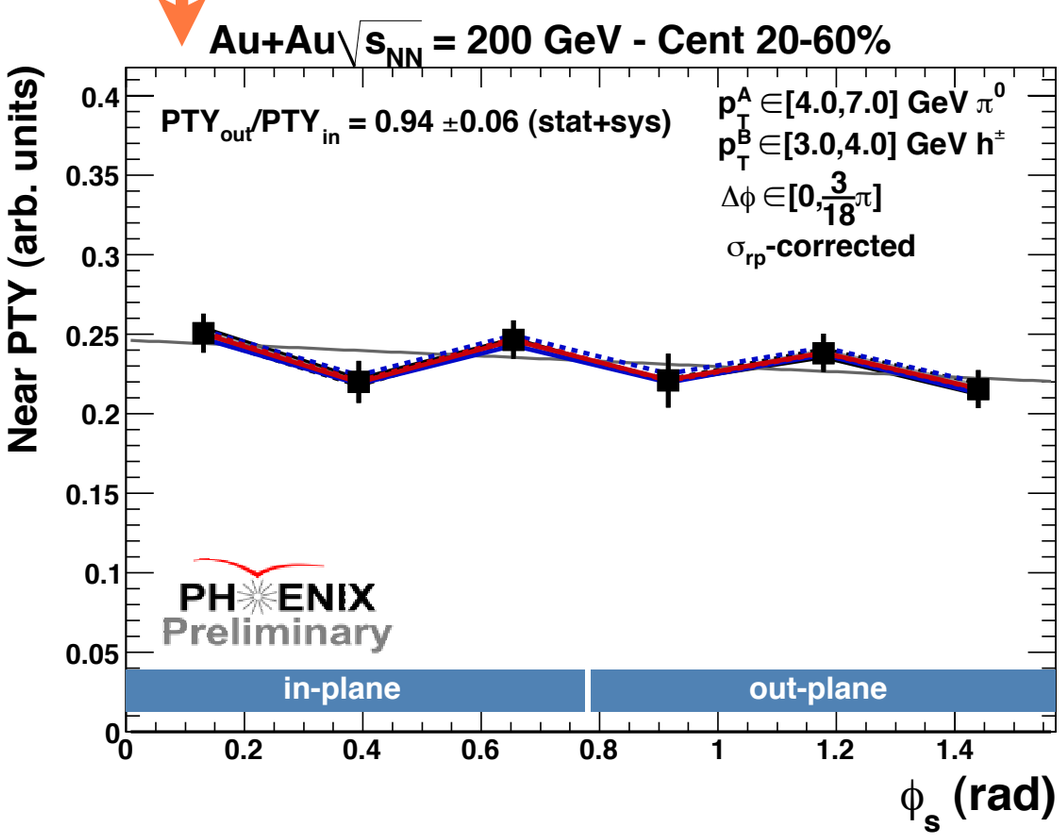
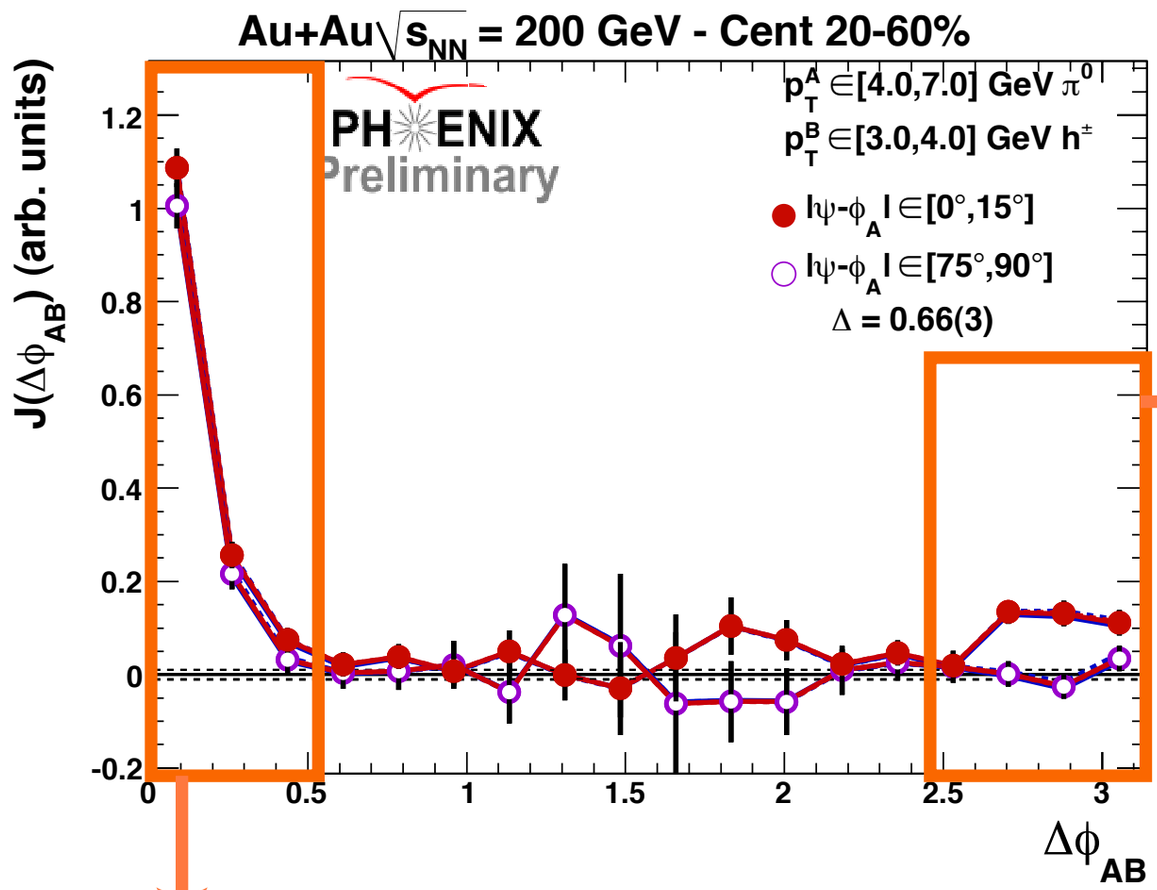
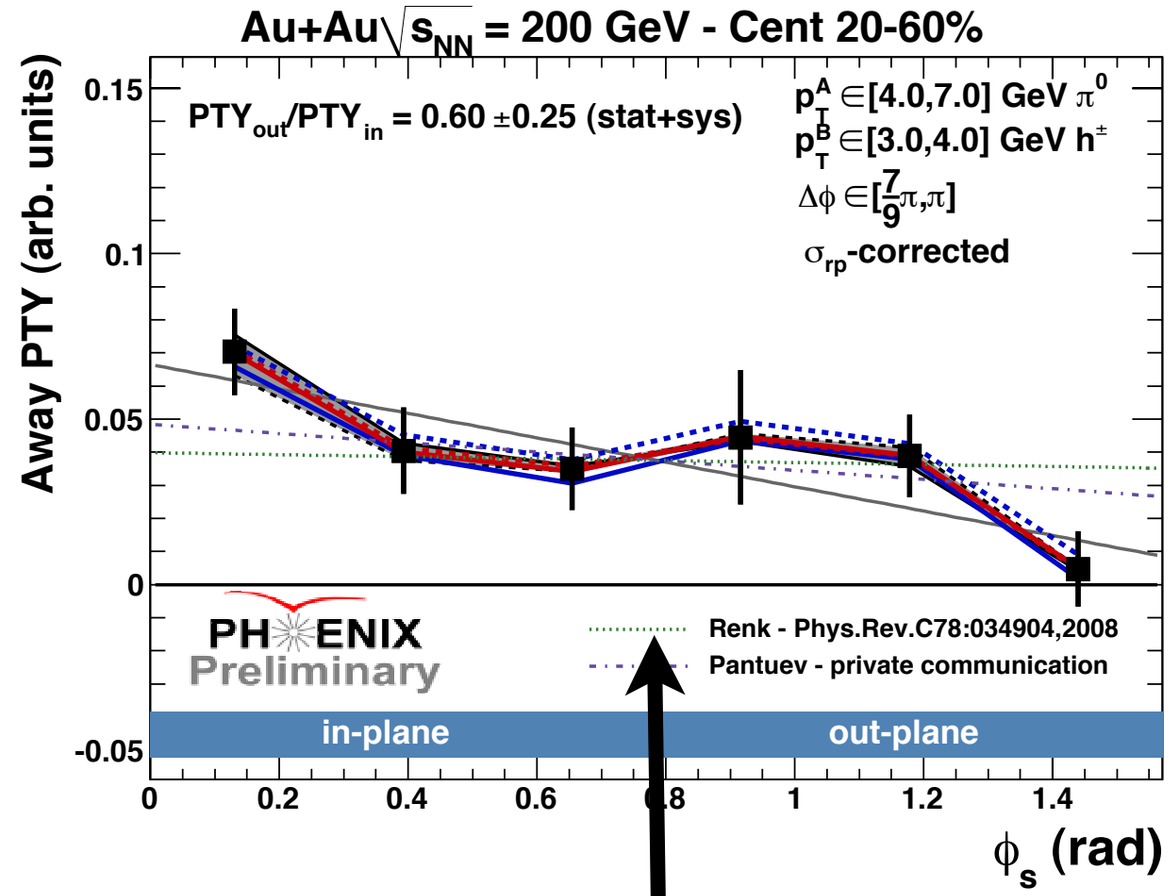




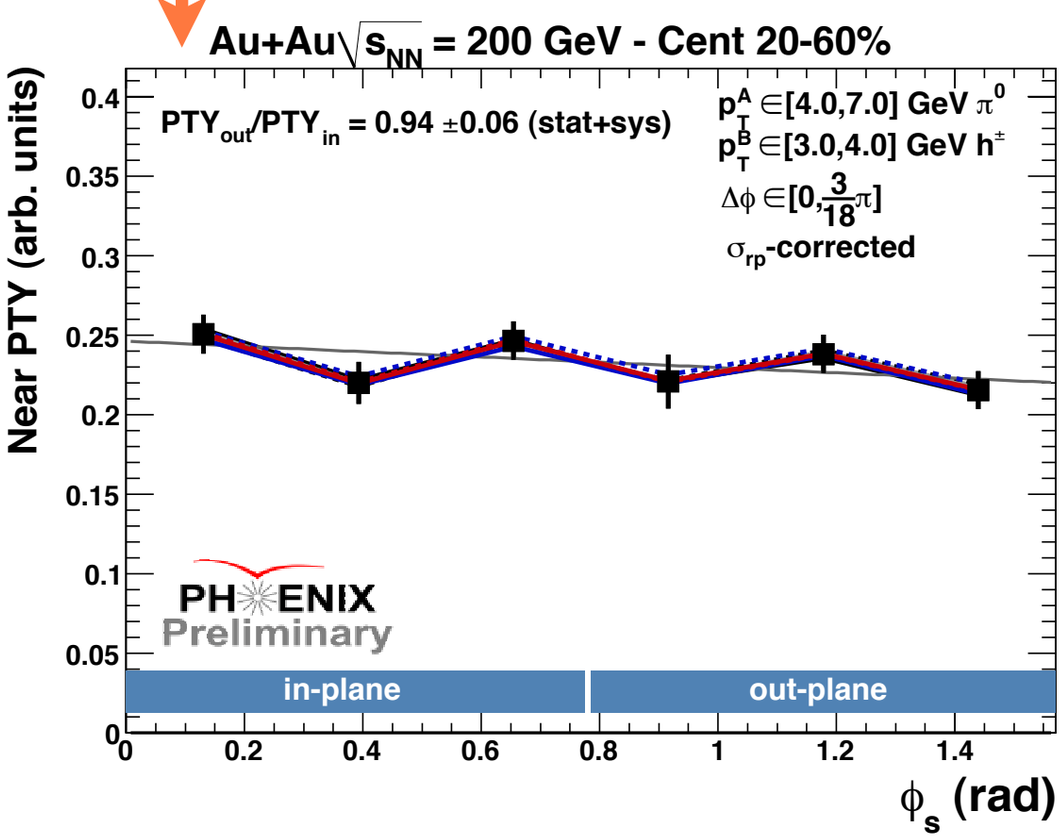
insignificant near-side trend

Energy Loss





falling away-side trend



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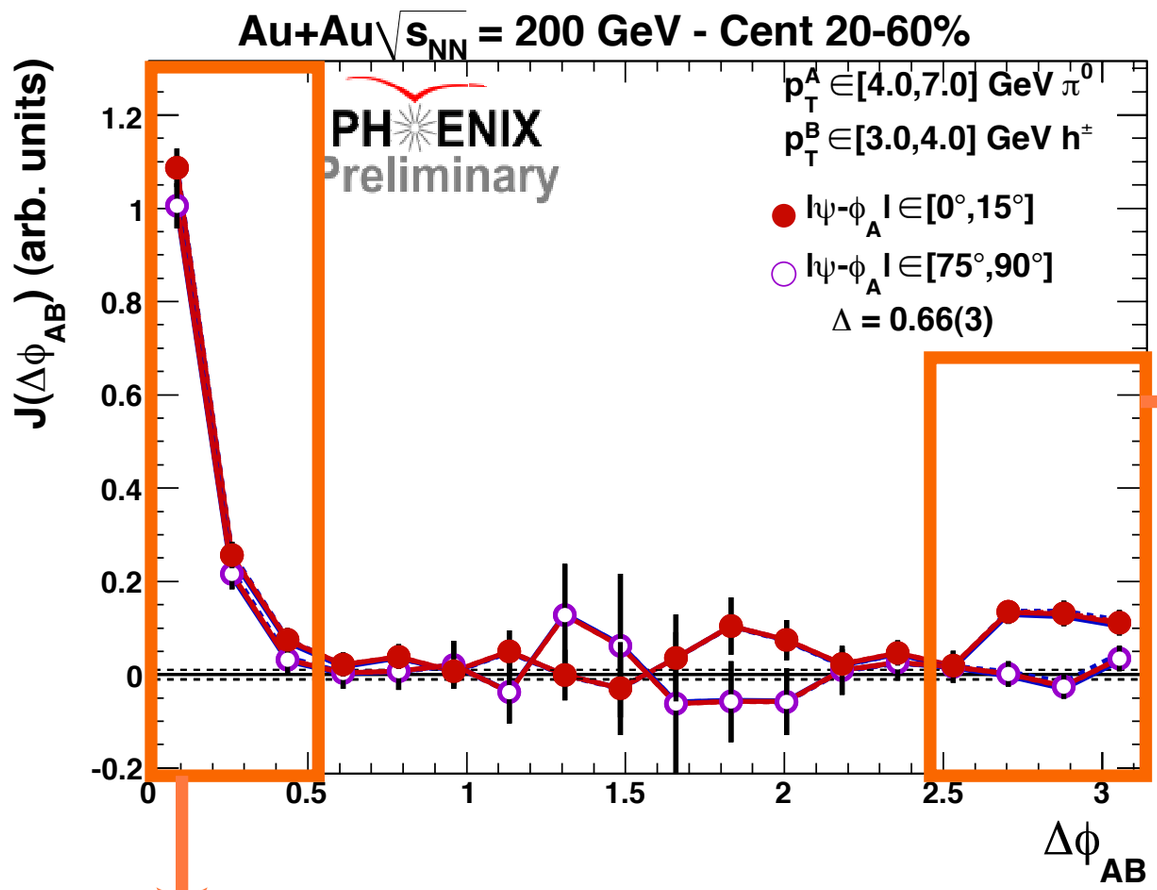
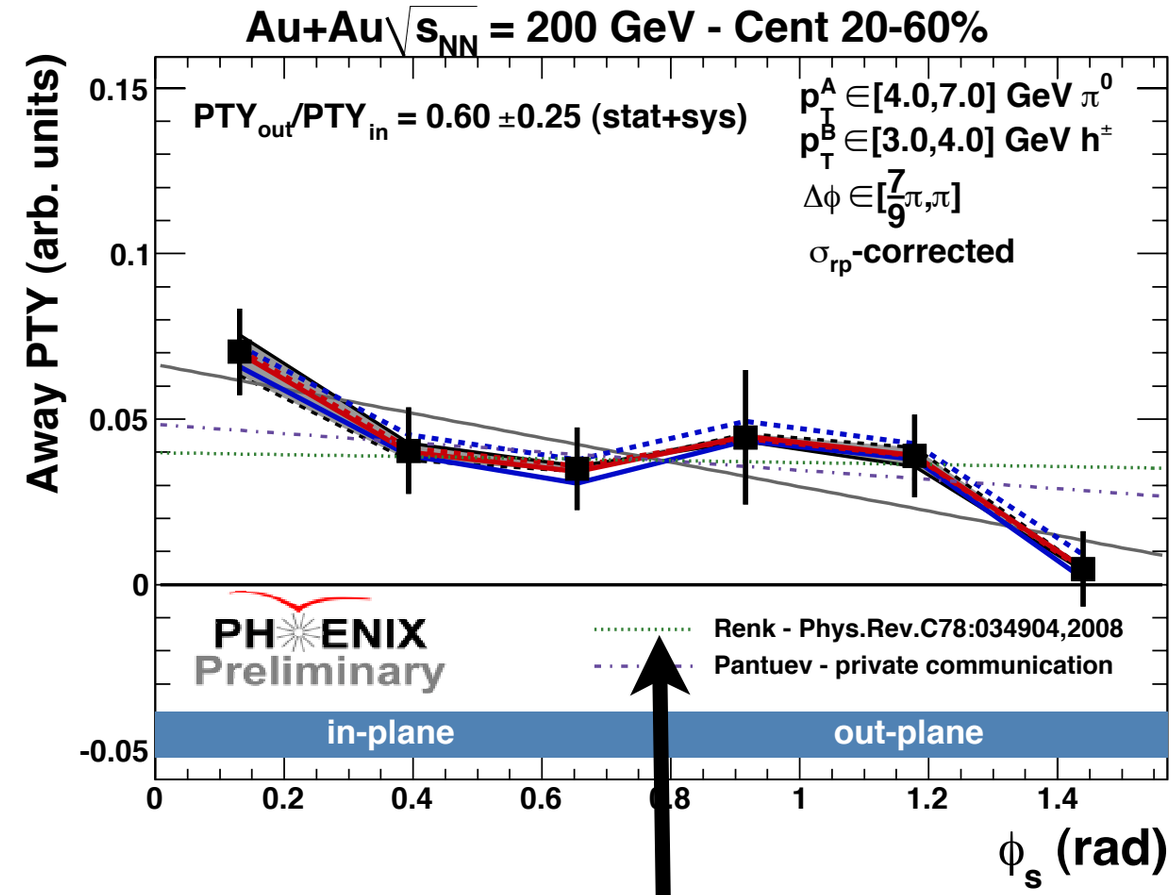
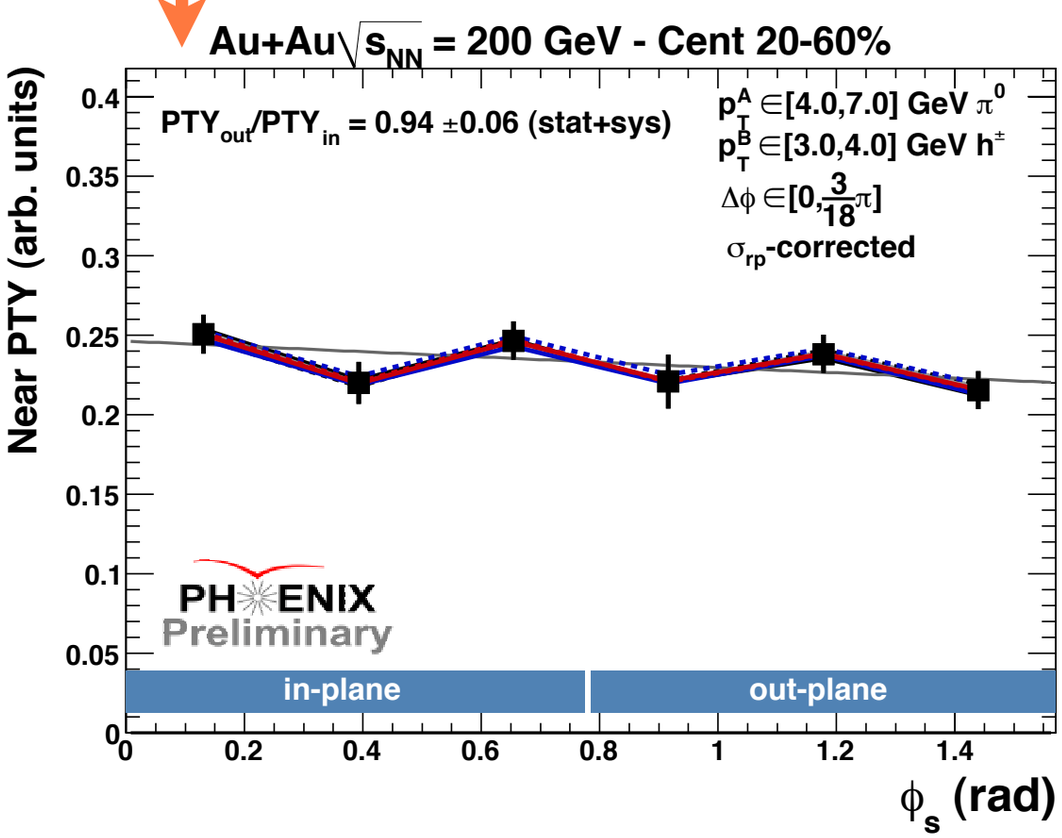
Energy Loss





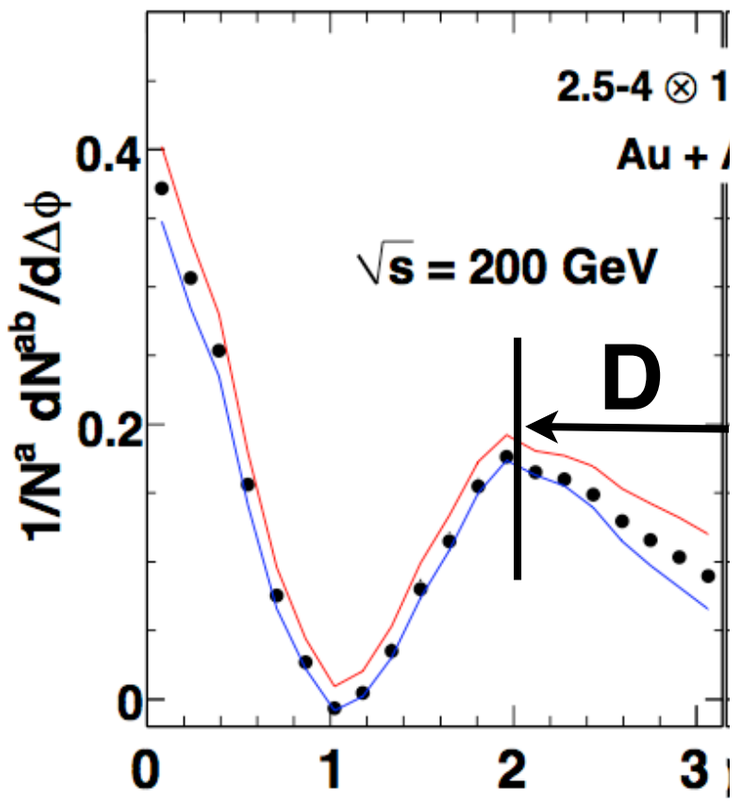


- a **large initial anisotropy**

  or

- a **large path-length dependence**

Lower p_T Correlations



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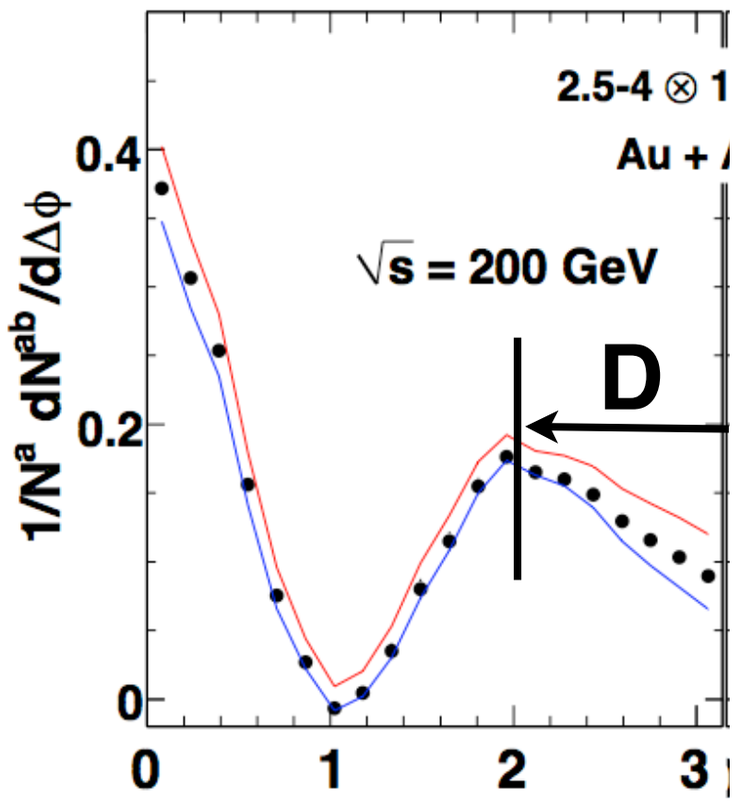
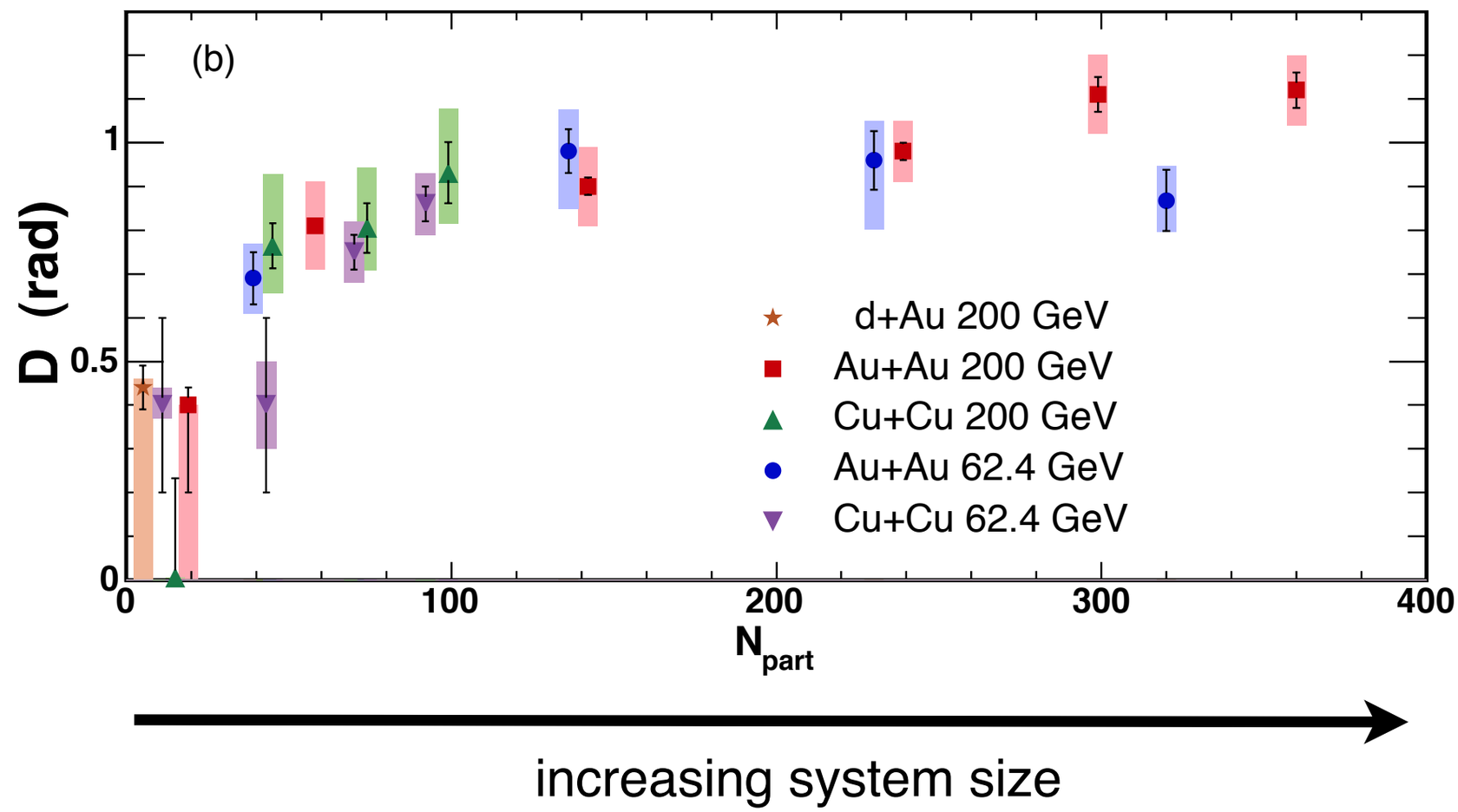
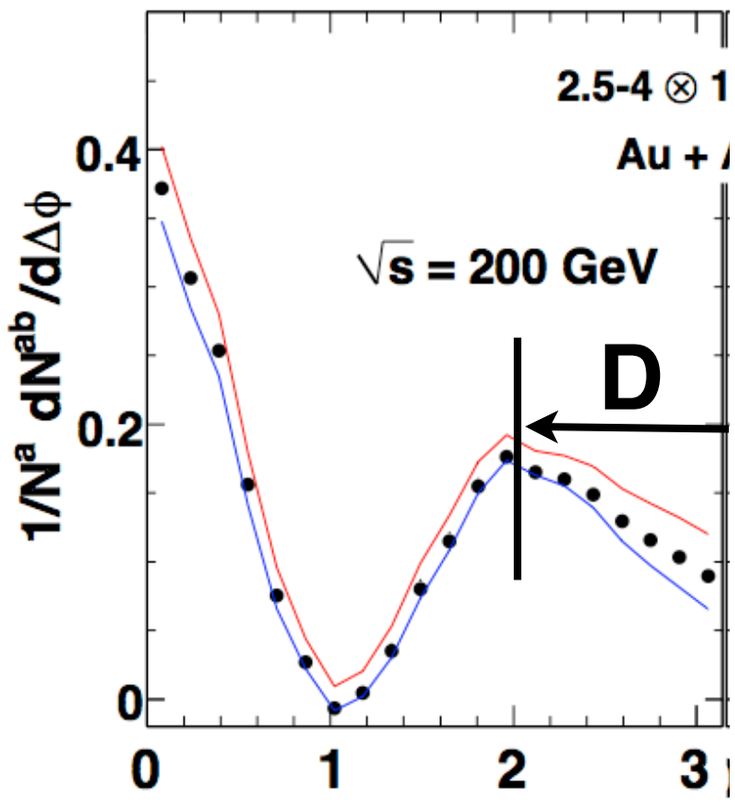
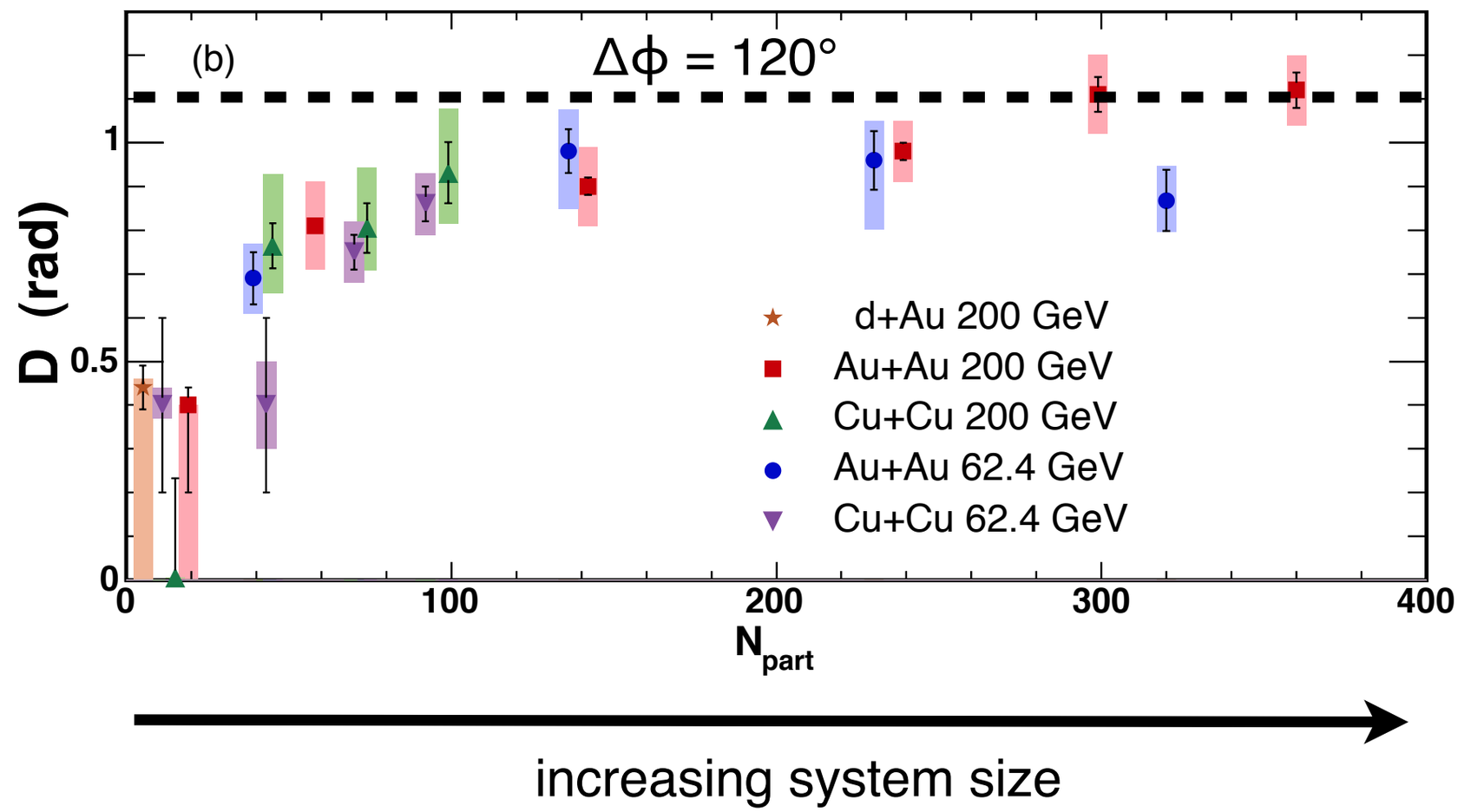




- Common trend with system size
- Transition region between 0 and 100 N_{part}
- Shape saturates above 100 N_{part}
- No observed energy dependence at RHIC

Lower p_T Correlations





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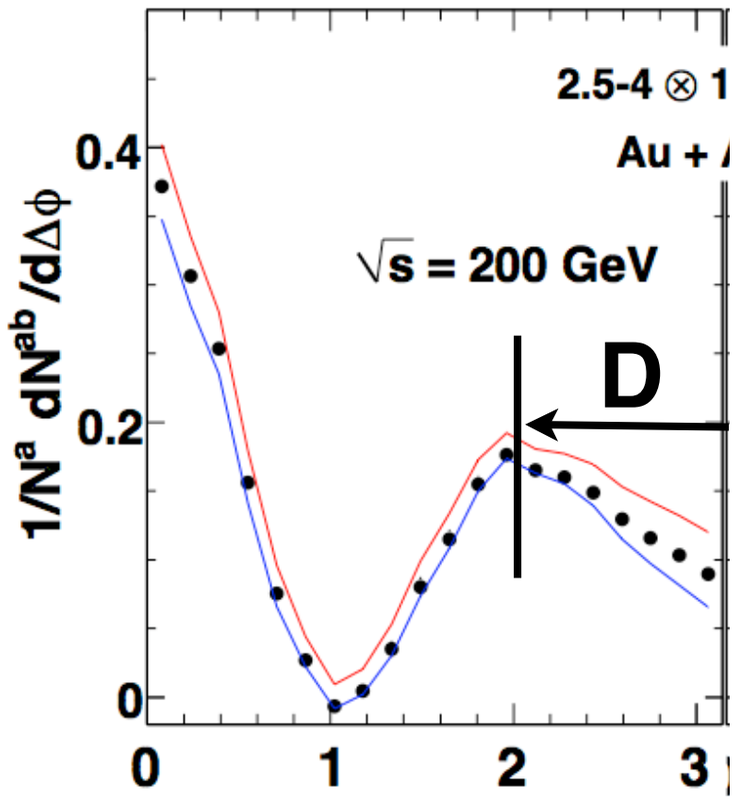

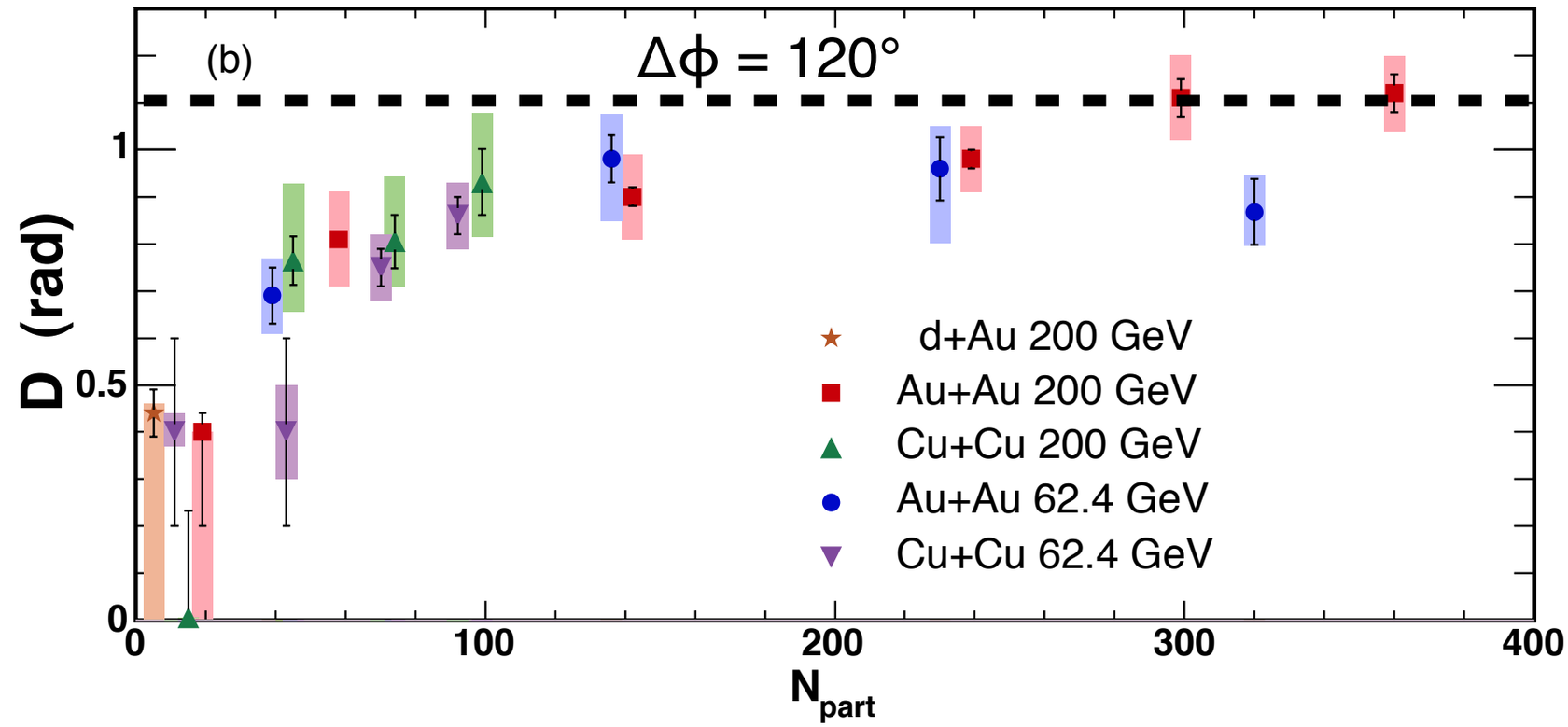

increasing system size

- Common trend with system size
- Transition region between 0 and 100 N_{part}
- Shape saturates above 100 N_{part}
- No observed energy dependence at RHIC

- a response due to **parton-medium interactions**

or

- triangular flow from **initial geometry fluctuations**