Two-particle azimuthal correlations at forward rapidity in STAR

Ermes Braidot

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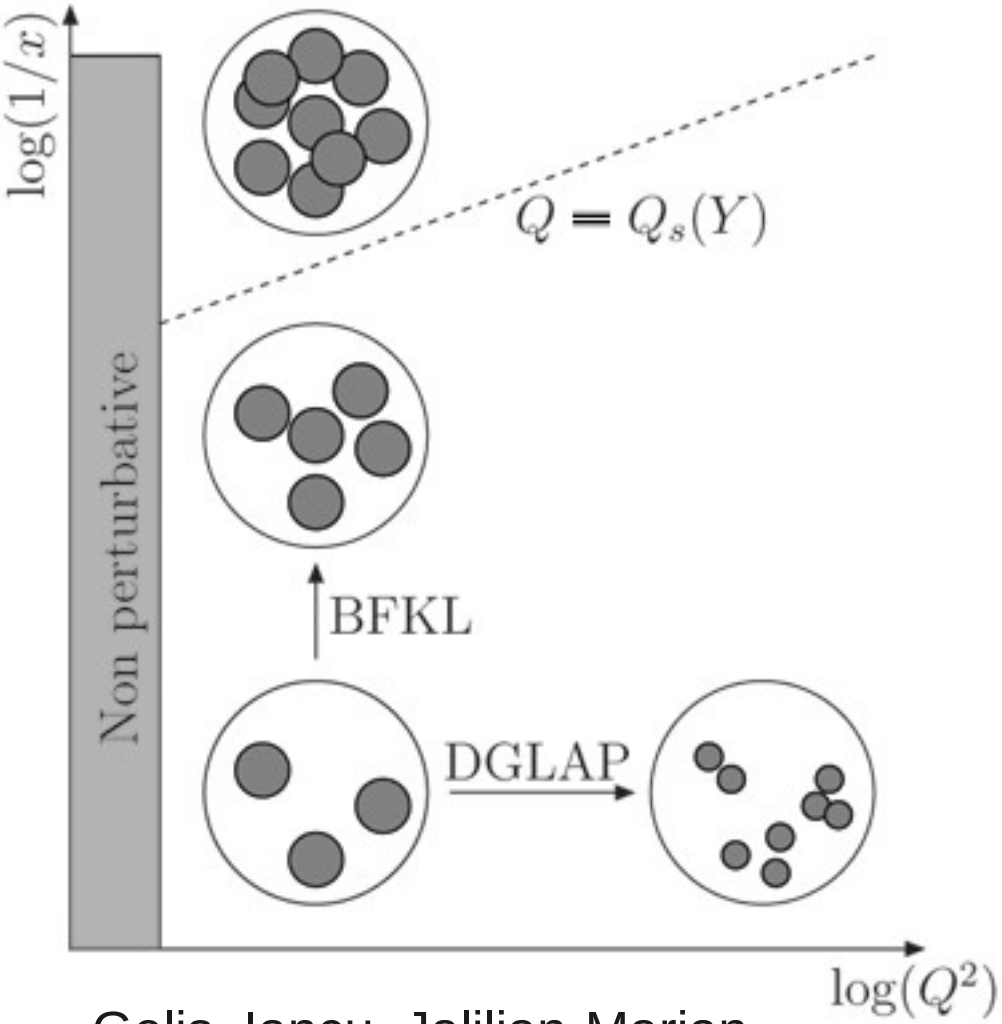
Saturation

- Low-x problem:

  BFKL and DGLAP predict gluon distributions to diverge
- Non-linear effects to be added to restore unitarity:
  - perturbatively

    (multiple scattering)
  - semi-classically

    (Color Glass Condensate)

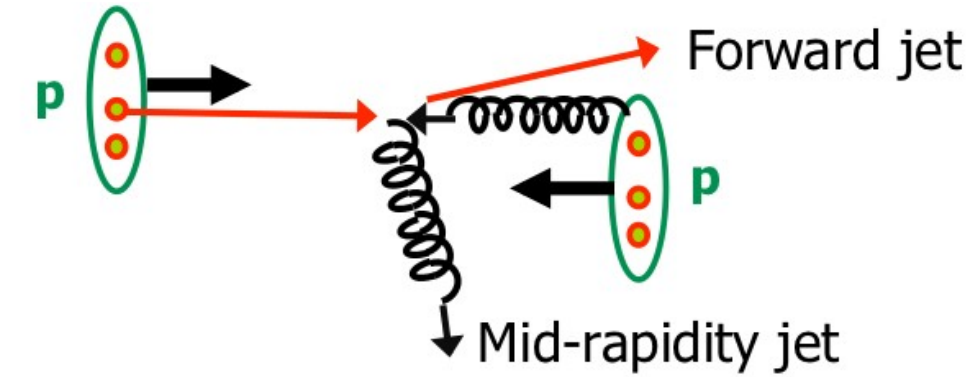


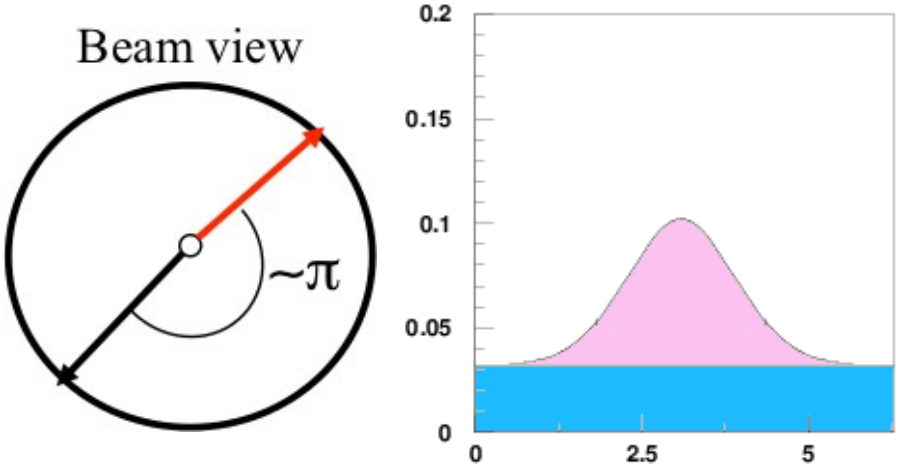
Gelis, Iancu, Jalilian-Marian,

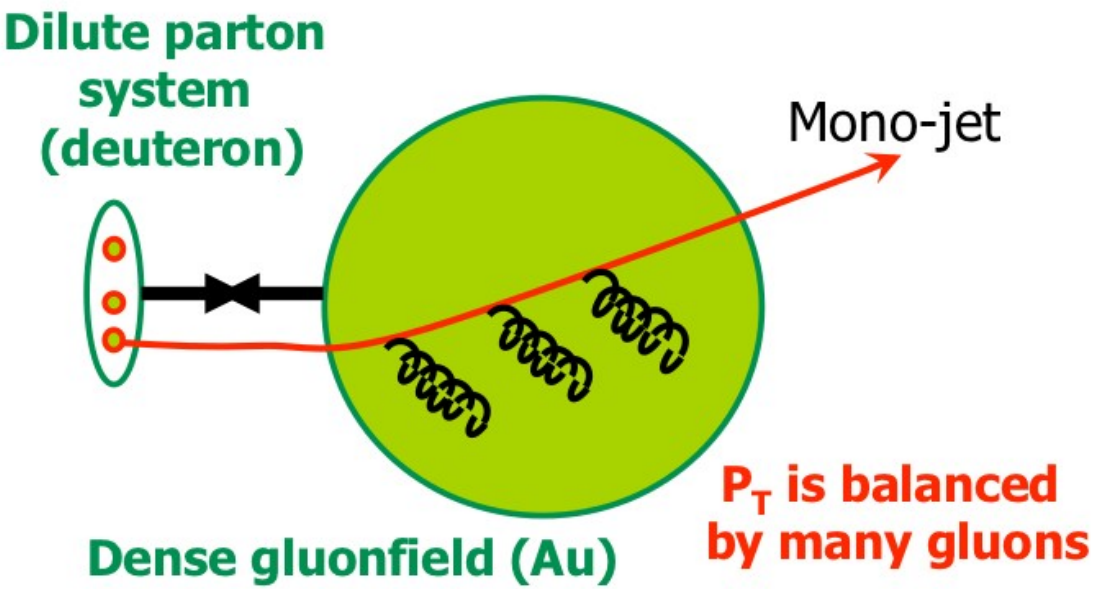
hep-ph/1002.0333

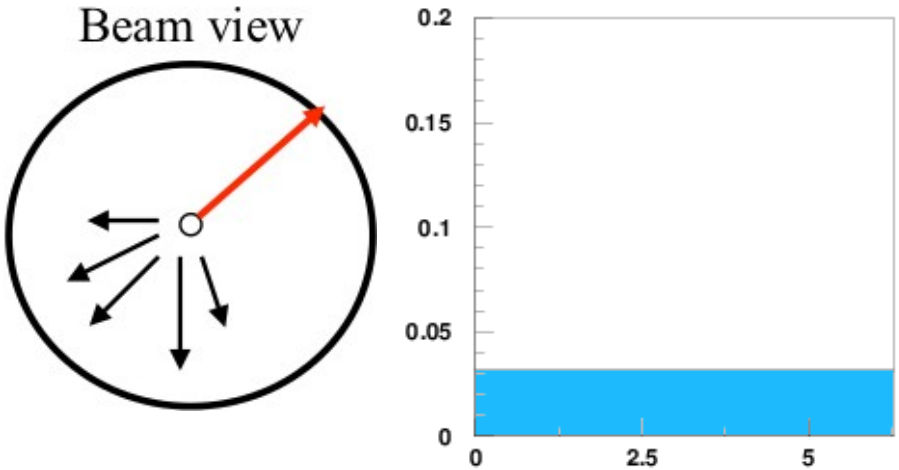
Azimuthal correlations

- Is saturation accessible at RHIC energies?

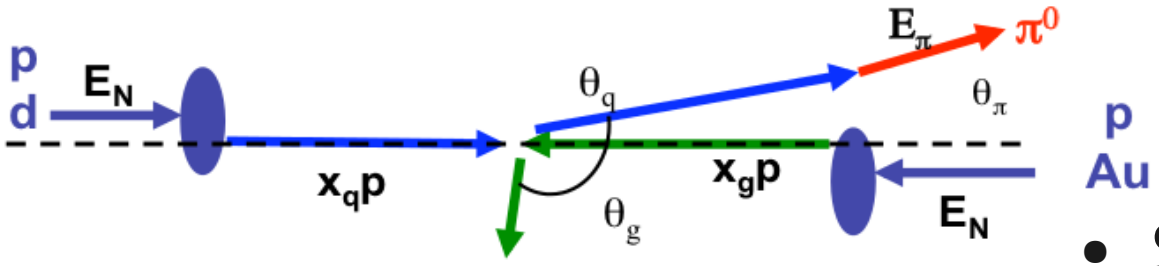


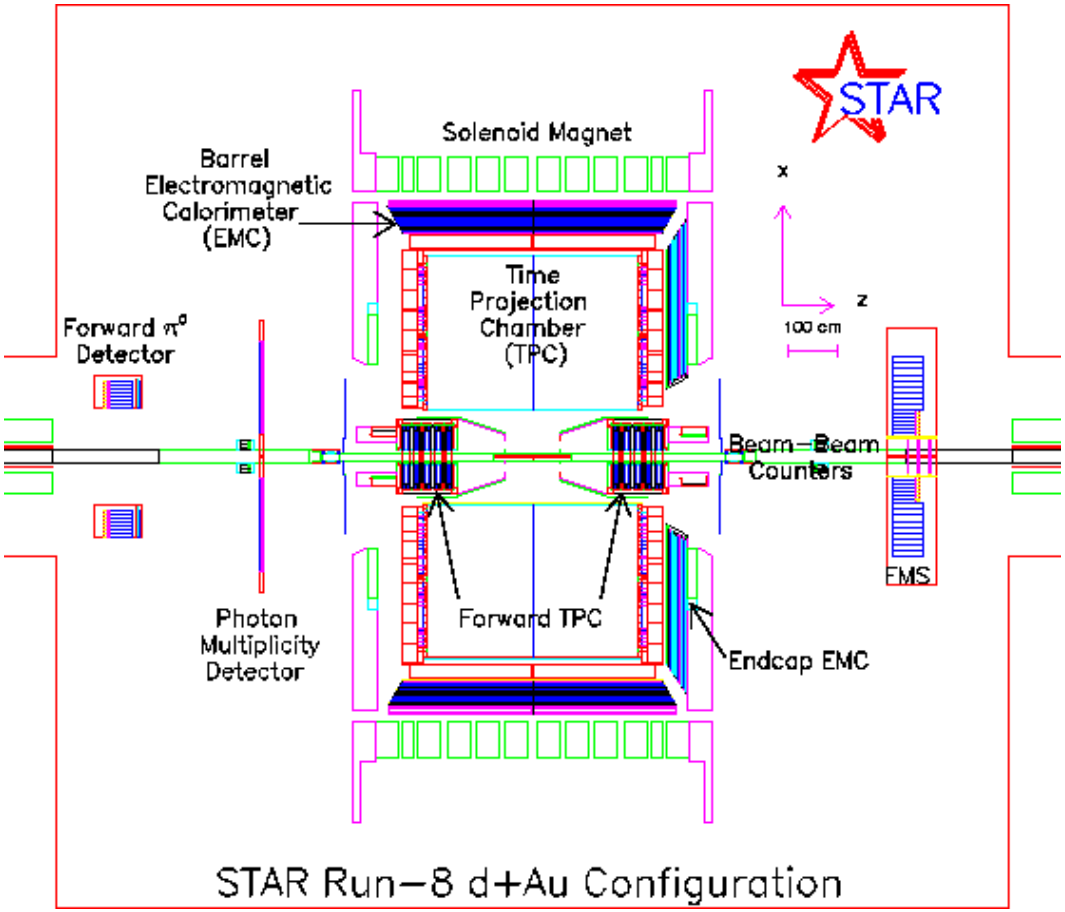






Probing the boundaries

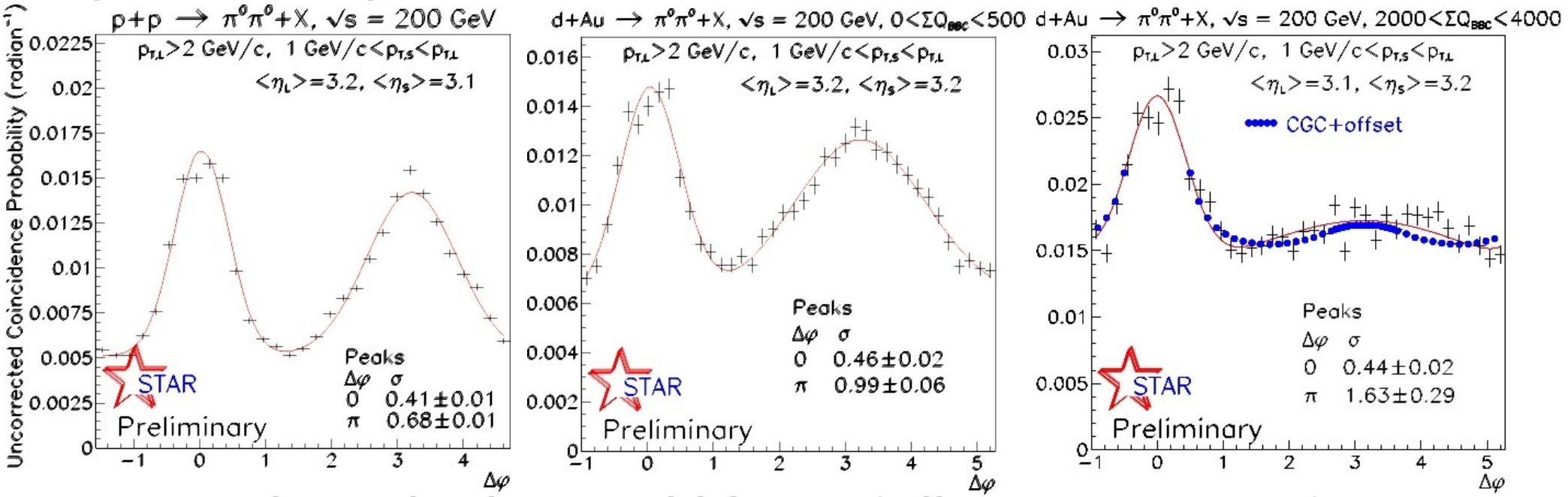




- Saturation effects are expected to become more important with
  - decreasing Q2 (low p_T)
  - decreasing x (large η: FMS-FMS)
  - increasing centrality (large density)

Results

- No significant broadening for forward-midrapidity azimuthal correlations (FMS-BEMC / FMS-TPC)
- Significant broadening for forward di-pion correlations (FMS-FMS)



- Strong broadening and hints of disappearance for central forward-forward correlations

Conclusions

- Non-linear effects appear at a scale which is relevant for RHIC energies
- RHIC regime placed in the transitional region between dilute and saturated systems:
  - No significant broadening of away-side peak in d+Au collisions when one particle is at mid-rapidity
  - Strong suppression of away-side peak in central d+Au collisions when both particles are forward
- Theoretical calculation including saturation (CGC) are qualitatively consistent with data

THANK YOU !

arxiv.org/abs/1102.0931