Jetcorr PWG Summary

A. Hamed for the Jetcorr PWG

University of Mississippi, Texas A&M University
Updates Given at Meeting

• Event Mixing for full jet reconstruction (Alex Schmah)
• Full Jet Reconstruction (Jan Rusnak)
• Paper update - p+p and d+Au correlations (Mriganka Mondal)
• Paper update - Near-side Jet-like Correlations (Li Yi)
• Data Structure development (Martin Codrington) – slides not yet made available
Updates Given at Meeting

• Higher Harmonics and Pomeron Models (Lanny Ray) – see L.R. plenary talk for details
• Identified 2-Particle Correlations (Prabhat Bhattarai)
• Correlations in d+Au (Fuqiang Wang)
• Strange-Particle-Triggered Correlations (Zillay Khan)
• Direct Photon $v_2$ and Gamma-Jet Correlations (Ahmed Hamed)
Possible QM 2014 Topics

Topics that will likely have results for QM:

1. Full Jet Reconstruction
2. Direct Photon $v_2$ (and gamma-jet, if ready)
3. Investigating the existence of a d+Au Ridge

Other results may come up between now and February
Outline

• Summary of updates related to possible QM topics (3)
• Summary of updates related to papers in preparation (2)
• Summary of updates related to identified particle correlations (2 new analyses)
1. Full Jet Reconstruction (A. Schmah)

Mixed Event Generation

Sample number of tracks from real event distribution, e.g., 765 tracks → use 765 events in buffer

Pick one random track per real event → add to mixed event, remove from list

For every centrality bin, $\Psi_{EP}$ bin, $z$-vertex bin

Mixed event

$0.0 < p_T^{\text{jet}} < 20.0$ GeV/c
$1.0 < p_T^{\text{jet}} < 2.0$ GeV/c
$3.0 < p_T^{\text{jet}} < 4.0$ GeV/c
$7.0 < p_T^{\text{jet}} < 10.0$ GeV/c

Counts

Jet $p_T$ - $pA$ (GeV/c)
1. Full Jet Reconstruction (J. Rusnak)

Status:
• Run-11 data – full jet reconstruction with charged tracks only (for now)
• Unfolding procedure correcting for background fluctuations is under control (within ~10-20%)
  - Alex’s event mixing will provide alternative way to remove/reduce background

New:
• Instrumental corrections underway
• For $I_{AA}$ measurement - p+p reference produced from STAR data+PYTHIA (to provide reference of jets with charged tracks only) (Matt Lamont)
2. Direct Photon $v_2$ (A. Hamed)

- $v_2$ (TPC) of direct photons is not zero (3-5%)
- $v_2$ (FTPC) of direct photons is zero
- $v_2$ of $\pi^0$ using the FTPC is apparently due to the $L$ dependence of $\Delta E$. 
2. Gamma-Jet (A. Hamed)

New: Analysis of Run-9 p+p data set

Next step:
Increase $p_T^{\text{trig}}$ cut > 15 GeV/c for a comparison with Au+Au data ($I_{AA}$) at low $z_T$

The AS conditional yields per direct $\gamma$ from different data sets (pp2006, dAu2008, and pp2009) agree
3. Ridge in d+Au? (F. Wang)

ZDC-east centrality

$1 < p_T^{\text{trig}}, p_T^{\text{assoc}} < 3 \text{ GeV/c}$

- Au-side away-side correl: central $>$ peripheral
- d-side away-side correl: central $<$ peripheral

Impact parameter centrality
3. Ridge in d+Au? (F. Wang)

Status Summary:

- d+Au is more complex than thought.
- Central-peripheral has jet contributions (caused by centrality bias).
- Very forward/backward correlations are suppressed/enhanced on the away side.
- Premature to draw physics conclusions from central-peripheral.
- p+Au (neutron tag) similar to d+Au. (NEW)
Updates from Papers in GPC

Paper on Correlations in $p+p$ and $d+Au$ (M. Mondal)

Changes made in GPC:

- $\eta$-dependent gain corrections
- Acceptance corrections in $\Delta\eta$
- Generalized Gaussian fittings
- Modified plots

Paper has been in GPC for a long time because significant changes in analysis were required to compare results of ch-ch and $\pi^0$-ch correlations directly;
But paper is steadily progressing
Updates from Papers in GPC

Comparison of Near-Side Jet-like Correlations in Au +Au and d+Au (L. Yi)

\[ |\Delta \eta| < 1 ' - 1 < |\Delta \eta| < 1.8' /0.8 \quad |\Delta \phi| < 1 \]

• Results show lack of significant difference in Near-side Correlation in d +Au and Au+Au collisions
• Paper in GPC (Josh Konzer’s PhD analysis)
• Missing- more complete model Comparisons
• New – more complete and systematic study of models (HIJING + AMPT, d +Au, Au+Au) from Li Yi

Lower panels – yields have been divided by factor 2 (\( \Delta \phi/\Delta \eta \) range)
Identified Particle Correlations

2-Particle Correlations of PID’d particles (P. Bhattarai) – new analysis with Run10/11 data sets

(All PID’d particles with $p_T > 0.15$ GeV/c)

Like-Sign

$\pi$-K Correlations

Unlike-Sign

Also looked at $\pi$-p, $\pi$-$\pi$, p-p, p-K, K-K
Identified Particle Correlations

Jet-Like Correlations with Neutral Strange Hadrons

(Z. Khan) – new analysis with Run-11 data set

\[ K^0_s \text{ Vs. } \Lambda \text{ Triggers} \]

- Need corrections at small angles
- Larger ridge for \( \Lambda \)
Summary/Outlook

• At least 3 topics are on track to having results for QM (Full jet reconstruction, Direct photon $v_2$/Correlations, Correlations in d+Au)

• Other topics possible (several ongoing analyses of di-hadron correlations)