

ANNOUNCEMENT:

RHIC/AGS Open Forum Meeting

DNP Fall Meeting Hilton Waikoloa Village

Oct 9th 2-6 pm (DNP Town Meeting Oct 8th)

Open to input, will be forum for more opportunities like this—short presentations/discussion aimed at Long Range Plan



γ - h , Jet- h , & h - h Angular Correlations at $p_T = 10$ - 20 GeV/c

- Far from obsolete, good ole two “particle” angular ($\Delta\phi$) correlations should continue to be employed in jet studies and could fill in a hole in accessible jet energies in the next decade
- Consistent with the idea of probing wider length scales by going to as low of Q^2 as possible, these measurements are the most promising way to access the **jet trigger p_T 's between ~10-20 GeV** for both RHIC and LHC
 - “Full” full jet reco becomes difficult in this p_T region; want h unrestricted by found AS jet axis
 - 2-p methods well proven and will gain sufficient statistics in the next 5-10 years to precisely study this whole p_T region including γ - h , eventually overlapping “full” jet reco studies at the high end
 - Interpretation of E_{loss} effects should still be clean from softer process contamination above 10 GeV
- These studies will continue to yield constraints and offer another rich opportunity into the sPHENIX era at RHIC

Current Progress and Status

RHIC

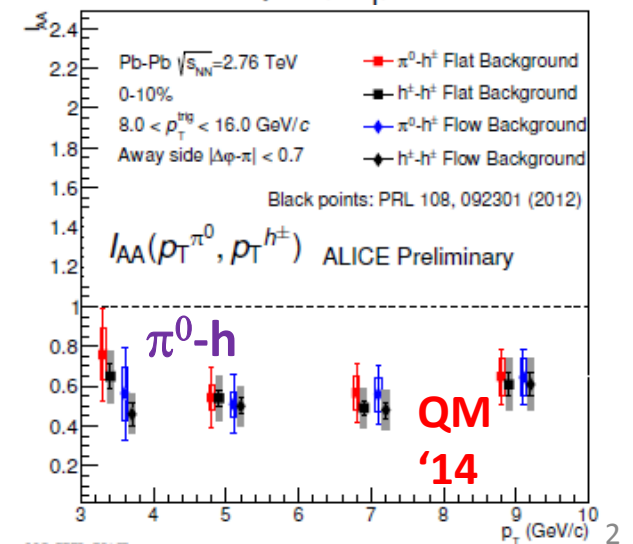
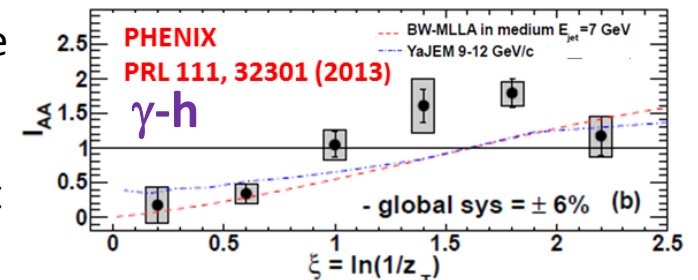
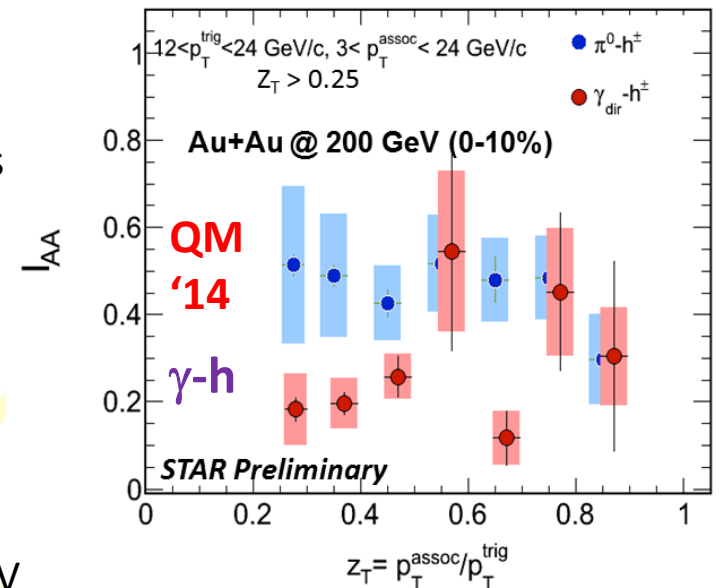
- PHENIX and STAR Direct Photon-Hadron Correlation Results trigger/jet p_T 5-~15 GeV
- STAR Jet-h results $E_{jet} = 10\text{-}\sim 15$ GeV
- RHIC measurements nicely qualitatively consistent, e.g. showing enhancement of low z

LHC

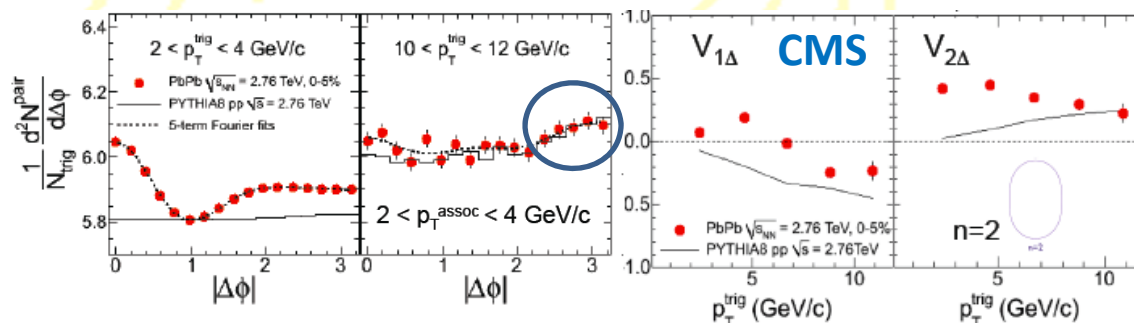
- h - h mostly lower $p_T < 10$ GeV focused on v_n measurements (RHIC too)
- Jet-h (e.g. CMS p_T^{\parallel} , FF's) & h - h data at higher $E_{jet} > 20$ GeV
- γ - h / h - h : 2.76 current data statistics enough? -- needs more analyzers?

Theory

- Jet MC's should be reliable, at least for yields above fragment "thermalization" scale
- Renk: E_{loss} constraints from 2-p (even h - h) competitive if not better than jet reconstruction observables



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Future Prospects and Needs

- Understanding of low hadron p_T flow contributions continually improves
- Raising hadron p_T slightly (~ 2 GeV/c) makes remaining systematic small for trigger $p_T > 10$
- Less biased studies of angular locations of lost energy by reducing need for a reconstructed jet to be found (jets at this energy may be even more severely modified so e.g. no usable A_J)

- RHIC Increased luminosity already from 2014/2016 running: establish beginning of precision measurements in this p_T region
- Further lumi increases during sPHENIX era should allow more differential constraints e.g. “event engineering”, PID hadron correlations, including reco-jet information, etc.
- One easily demonstrable scenario for STAR/sPHENIX coexistence: STAR focuses on similar measurements but using its strengths like PID. STAR interest seems there. sPHENIX γ -h

- As with more jet-reco focused observables, there is a need to make common measurements at both LHC and RHIC – these are good, simple candidates, in addition to jet reco observables
- LHC Jet/ γ /h – hadron correlations in Pb+Pb without reconstructing 2nd jet axis feasible!
- Direct photon-hadron results needed from all LHC experiments
- 5.5 TeV LHC data -- LHC Analyzers!

- Combining with the planned jet reco studies at higher Q^2 : allows for more complete coverage of jet energies into lowest energy region—more insurance for sPHENIX era how and why goals.