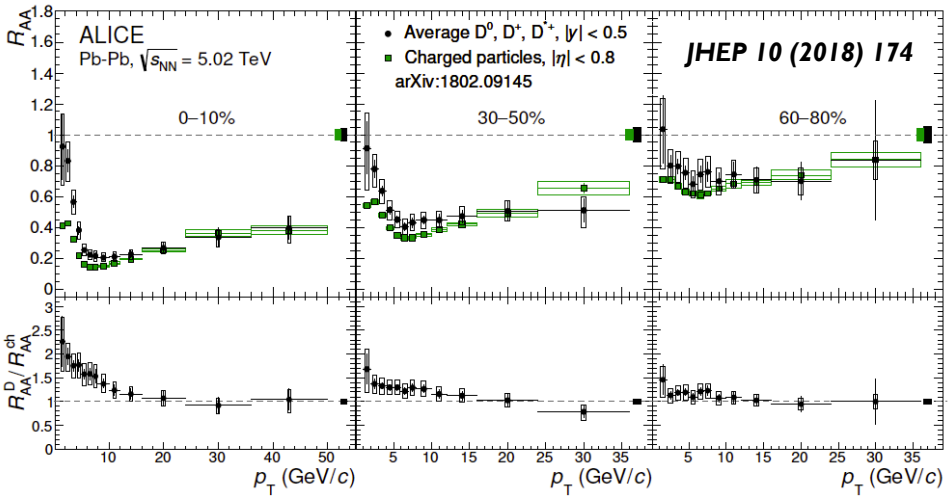
Research plan in ALICE

Sanghoon Lim

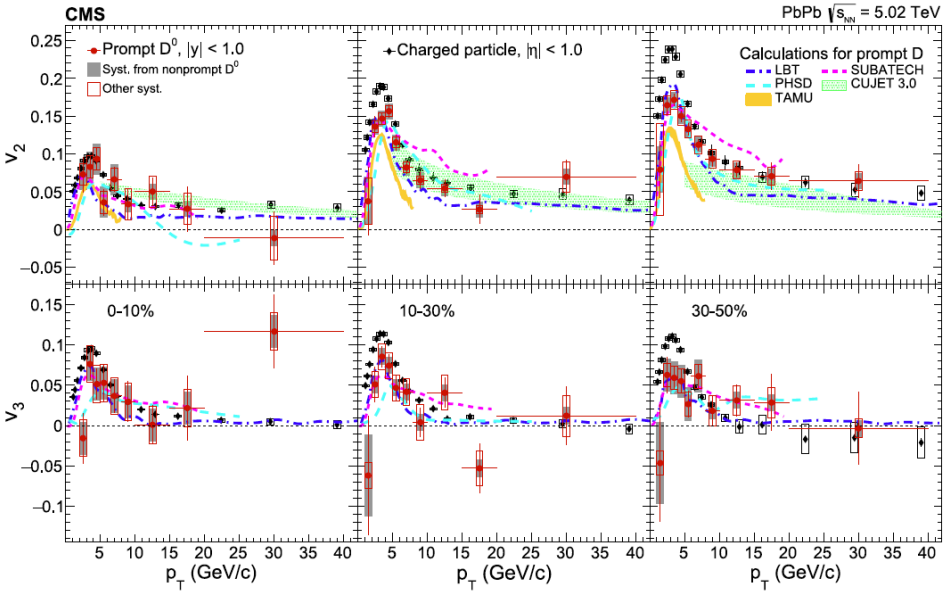
Pusan National University

Heavy quarks in heavy-ion collisions

Nuclear modification factor



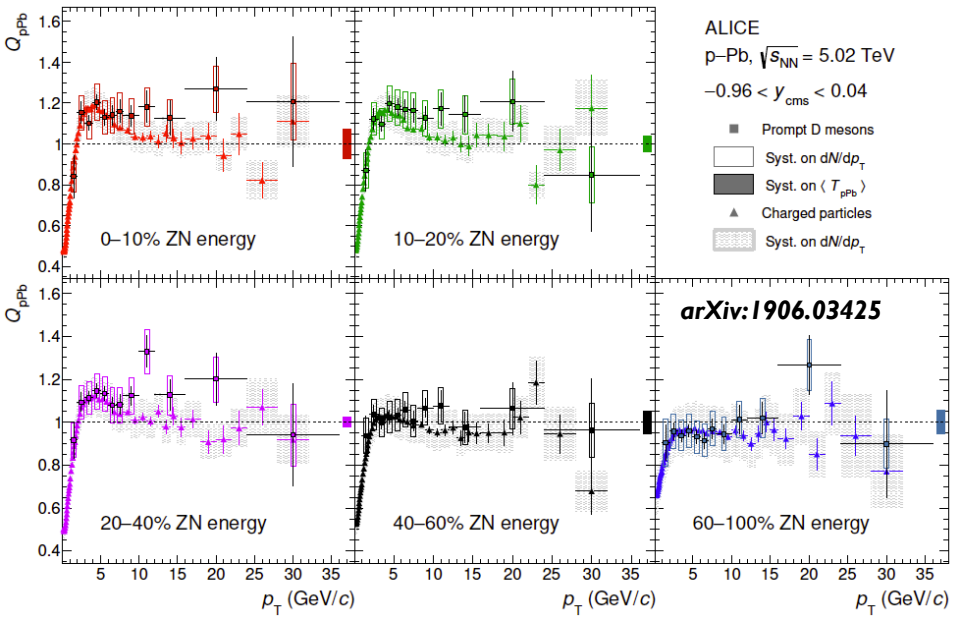
Elliptic flow



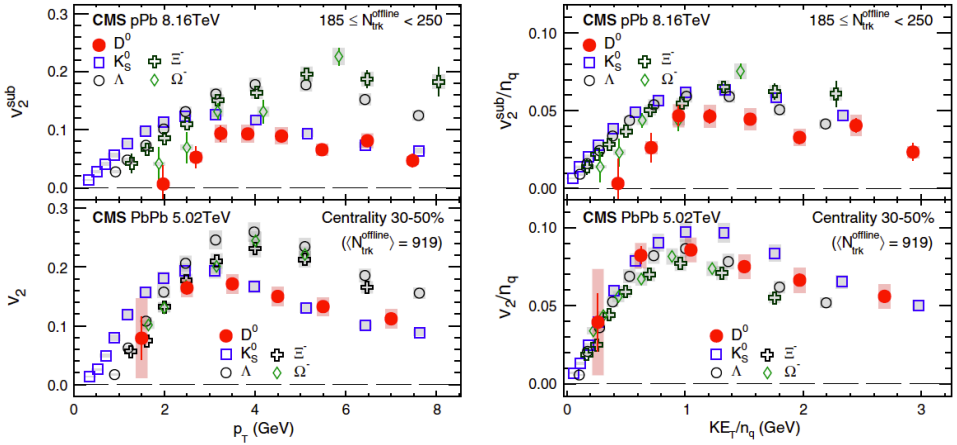
- Significant p_T distribution modification and elliptic flow in heavy-ion collisions
- Models qualitatively describe the data

Heavy quarks in heavy-ion collisions

Nuclear modification factor

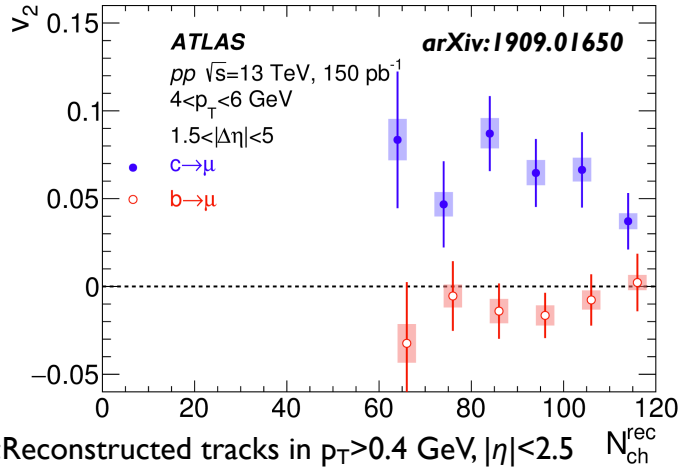


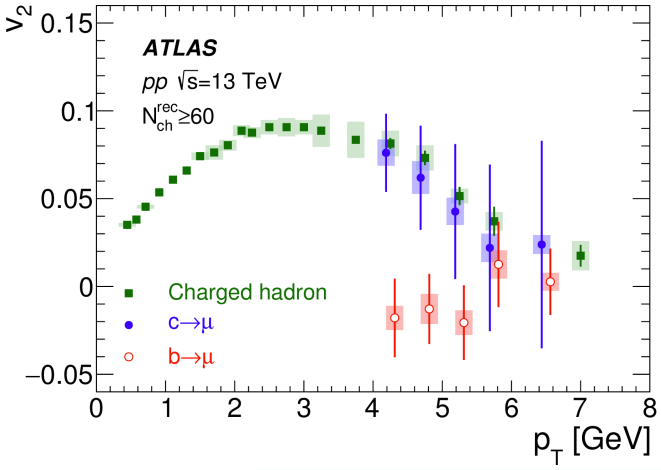
Elliptic flow



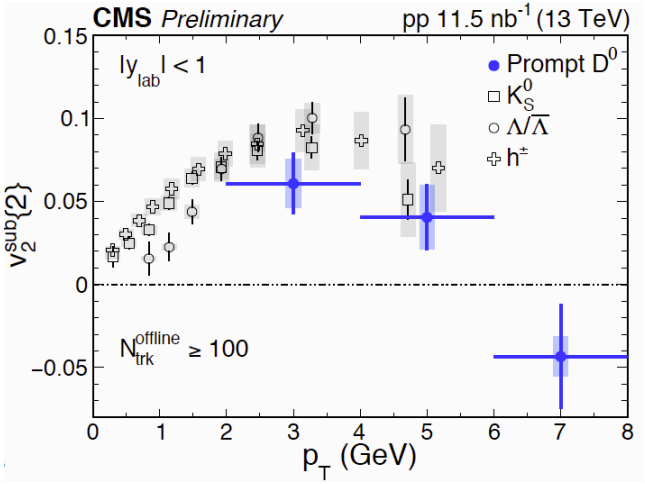
- Significant v_2 for D mesons but modest modification (enhancement) of p_T distribution
- Quite extensive study has been done for charm
- Still more study is necessary on charm hadronization (charm baryon, exotic hadron)

Charm and *bottom* muon v_2 in *pp*

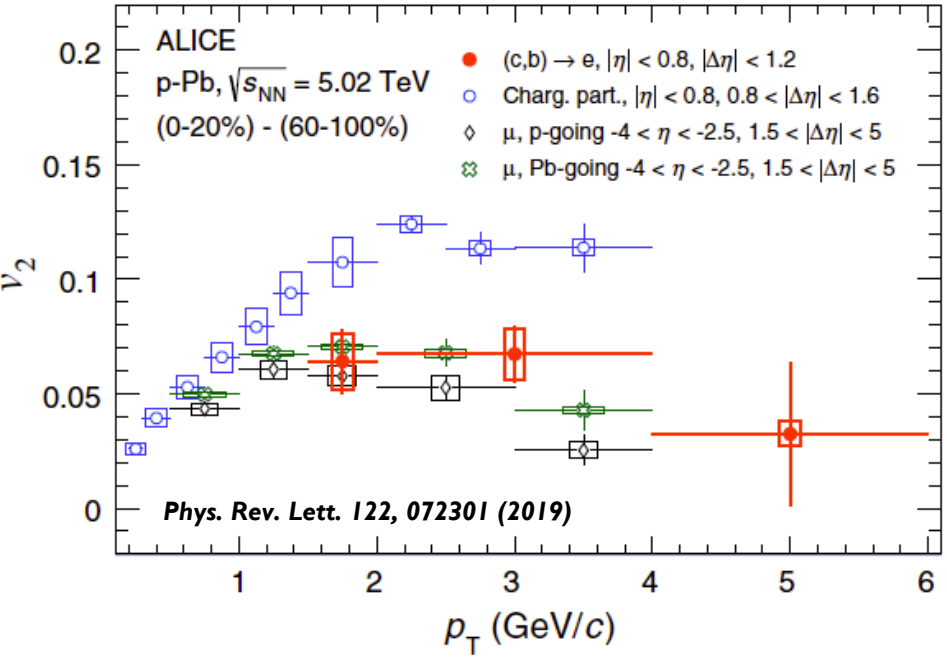




- Significant non-zero v_2 for charm muons
  Consistent with independent of multiplicity and decreasing with p_T
- Bottom muon v_2 is consistent with zero in multiplicity and p_T
- Clear difference between charm and bottom in *pp* collisions
  ➔No theory/model for comparison



- Due to smaller tracker acceptance than CMS and ATLAS,
  there is a limitation flow study in small system requiring non-flow subtraction in ALICE

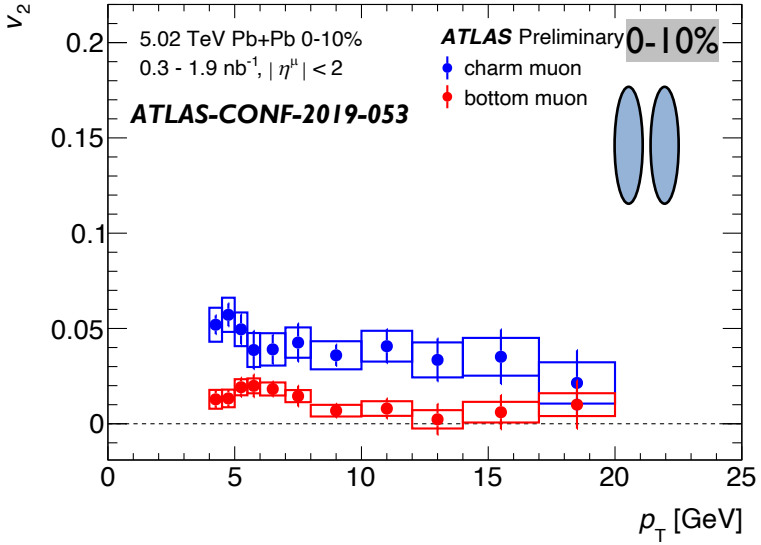


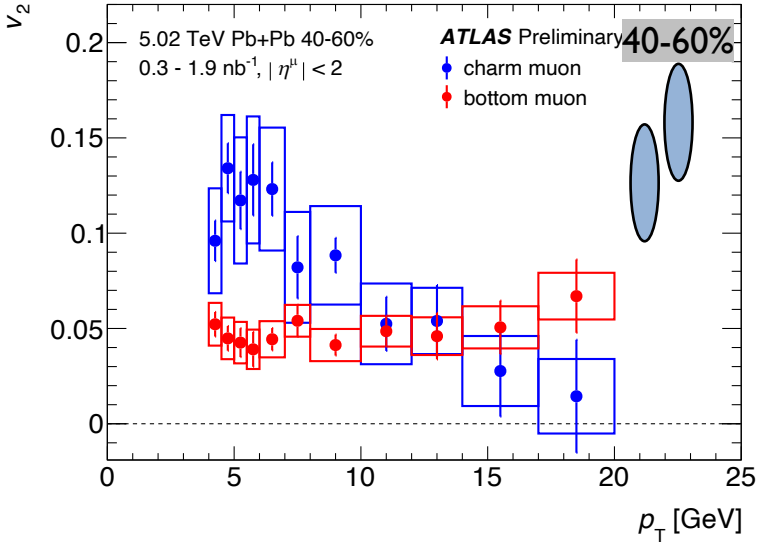
- One option:
  Correlation with particles in muon arm at forward rapidity
  ➔Backgrounds are contained

- Further study on jet-correlation and (sophisticated ?) analysis technique for flow measurements in small systems

- ITS upgrade both covering mid-rapidity and forward-rapidity will help

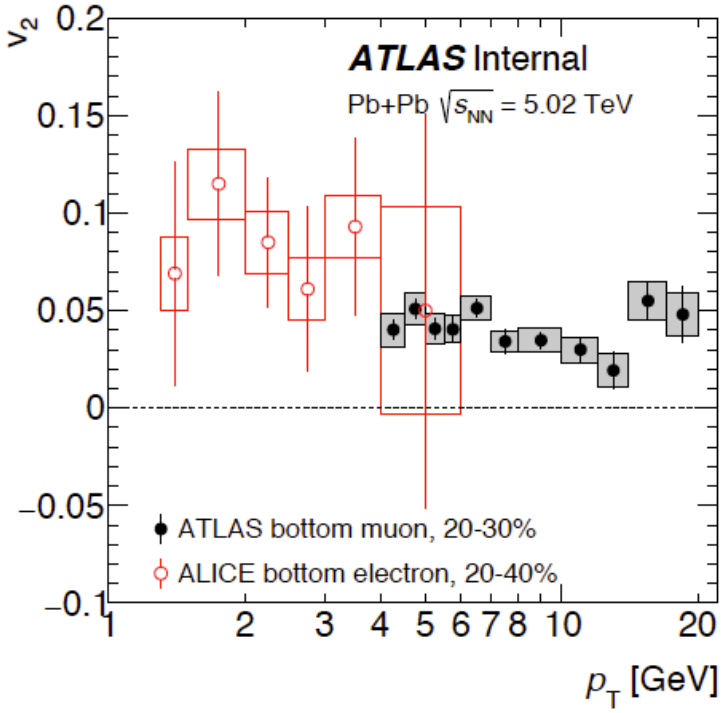
Beyond charm (bottom flow in Pb+Pb)





- Non-zero bottom muon v_2
  ➔Different from pp
- Charm muon v_2 is higher than bottom muon v_2 in lower p_T region and becomes similar in higher p_T of 40-60% centrality interval

Beyond charm (bottom flow in Pb+Pb)



- ALICE can cover lower p_T region where mass difference will be more important
- Can be explored with existing data
  Statistical and/or systematic uncertainties can be improved (with ITS upgrade)?

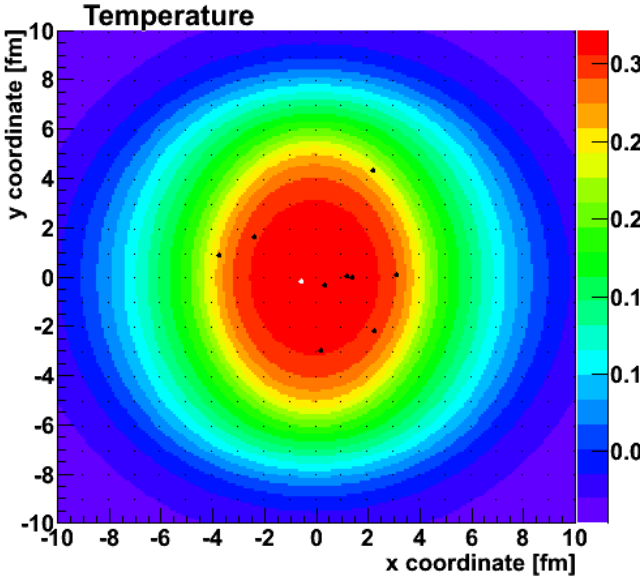
Model study on Quarkonia production in heavy-ion collisions

- SHINCHON
  Simulation for Heavy IoN Collision with Heavy-quark and ONia

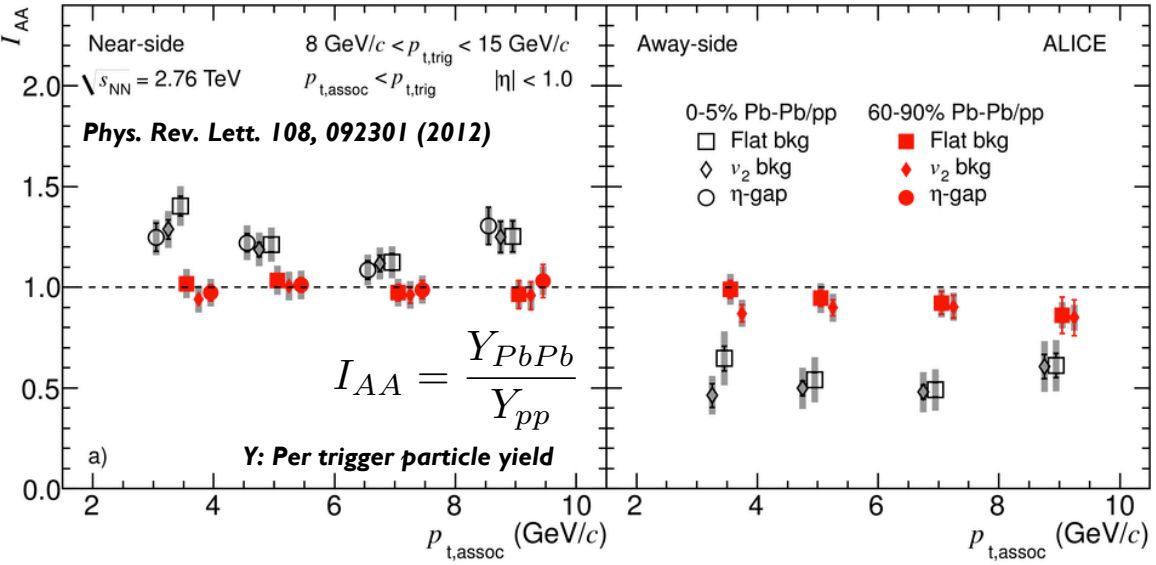
- Implement theory from Yonsei group (SH Lee and JH Hong)
  Phys. Rev. C 99, 034905 (2019)
  arXiv:1909.07696

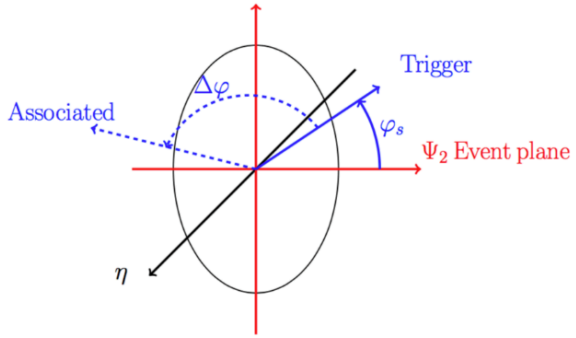
- SHINCHON school in PNU (1/7-11)
  18 participants
  https://n-ext.inha.ac.kr/event/382/

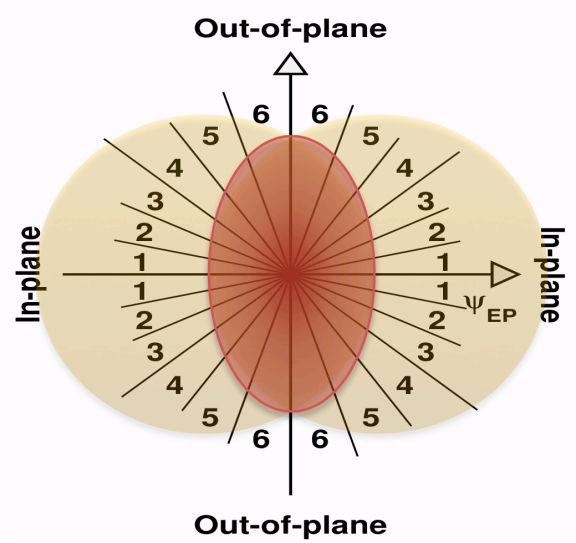
- Computing resource in KISTI will be useful



Study of jet-medium interaction in heavy-ion collisions

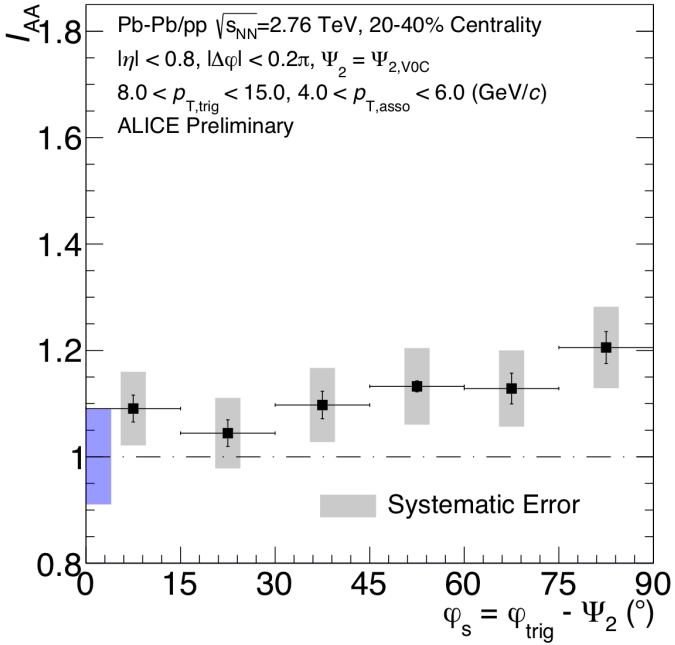


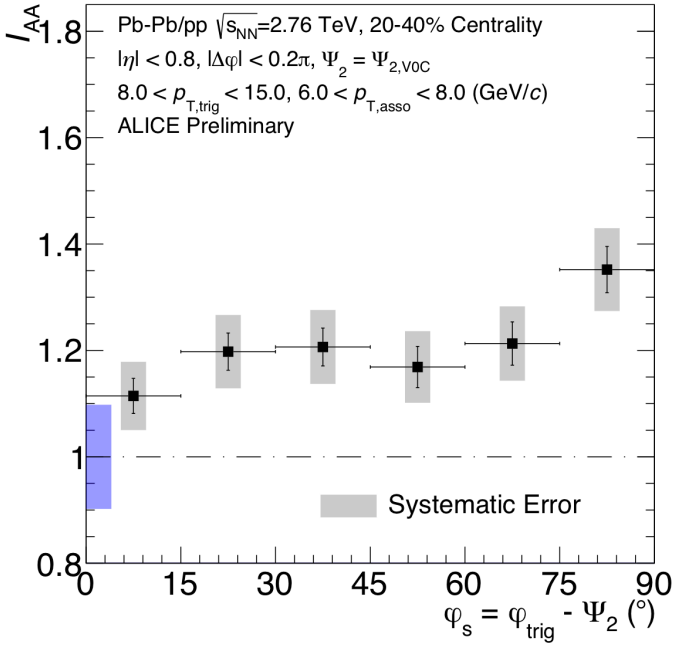




- Different variation of pair yields in near-side and away-side
- More differential study with two particle correlation in differential azimuthal angle of trigger particles w.r.t. second-order event plane
- Finalize Hyeonjoong's preliminary analysis

Study of jet-medium interaction in heavy-ion collisions





- Weak path-length dependence in $8<p_T,trig<15$ GeV/c, $4<p_T,asso<6$ GeV/c
- Re-visiting Hyeonjoong's analysis procedure
- Other p_T ranges? EP resolution effect (EP unfolding)?

BACKUP