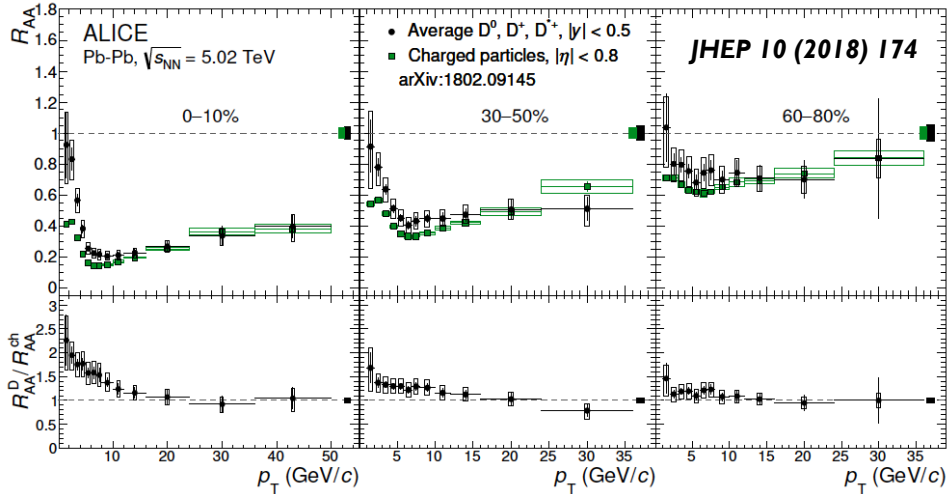


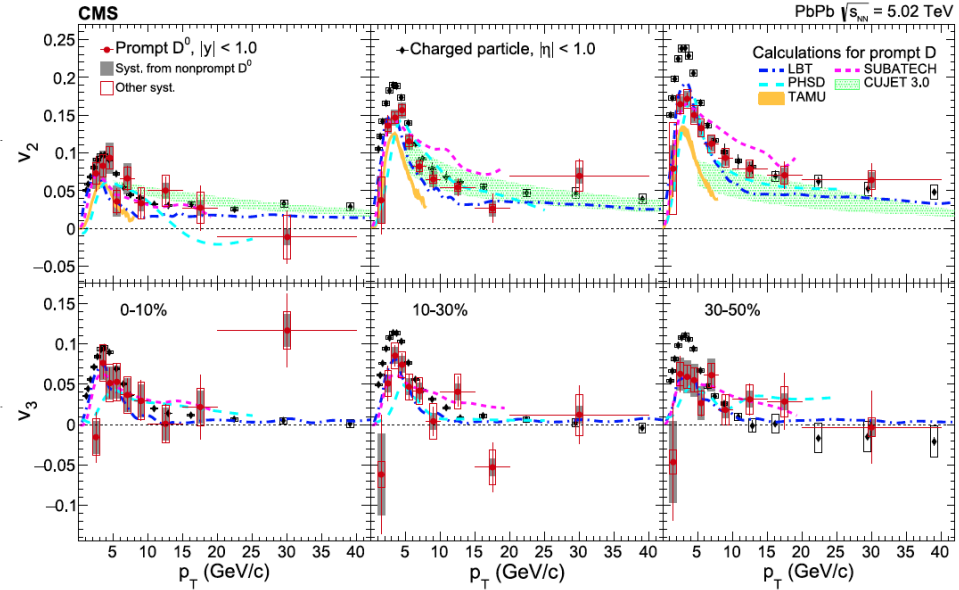
# ***Research plan in ALICE***

*Sanghoon Lim*  
*Pusan National University*

## Nuclear modification factor



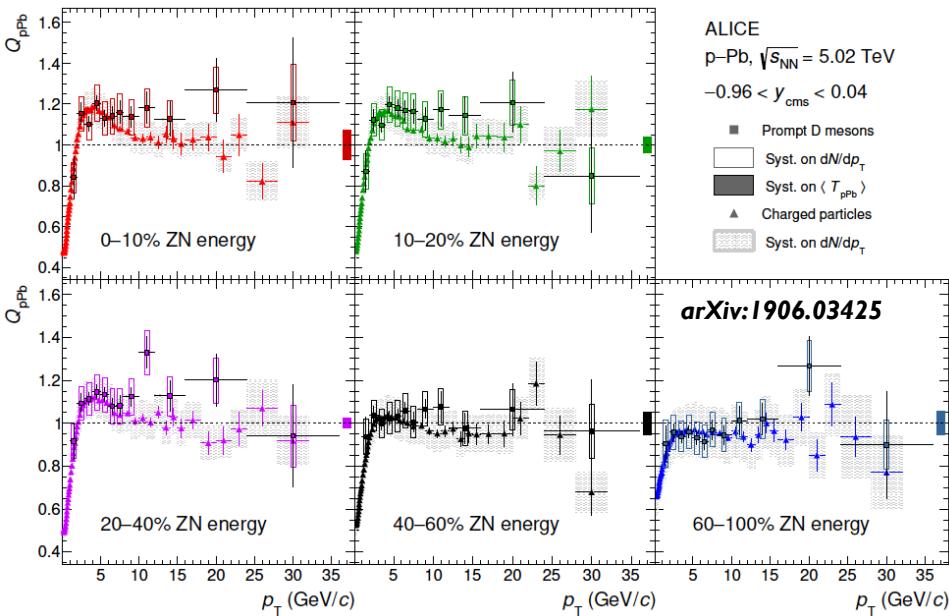
## Elliptic flow



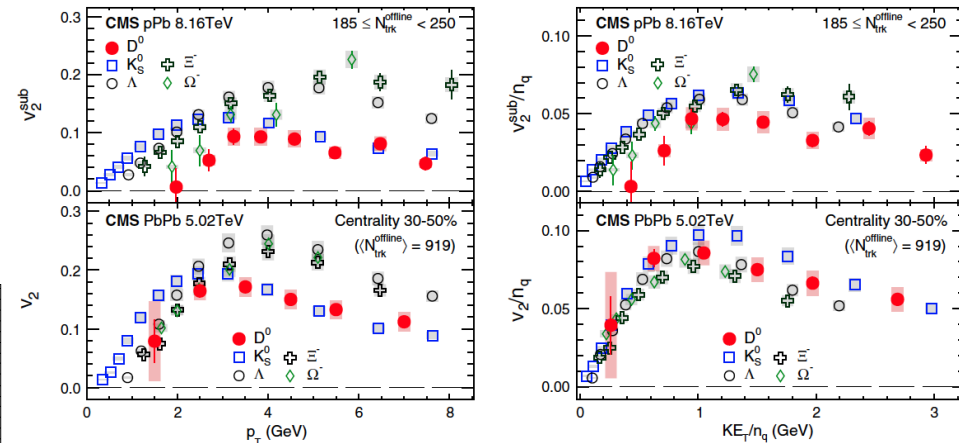
- Significant  $p_T$  distribution modification and elliptic flow in heavy-ion collisions
- Models qualitatively describe the data

# Heavy quarks in heavy-ion collisions

## Nuclear modification factor

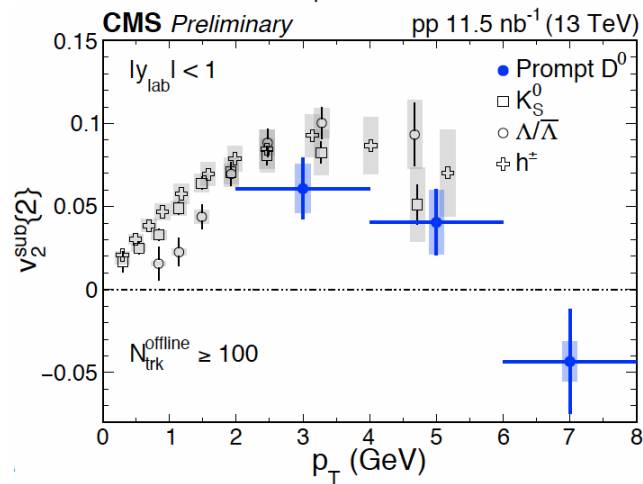
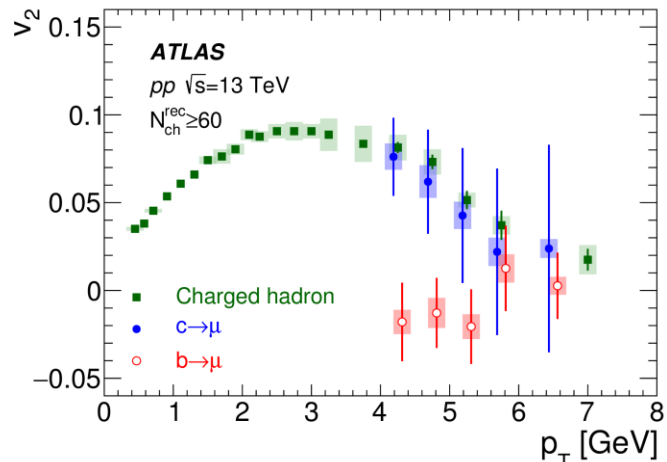
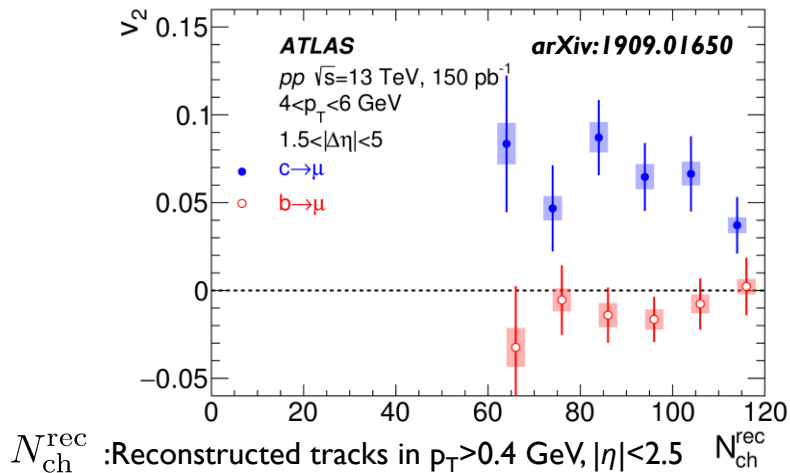


## Elliptic flow



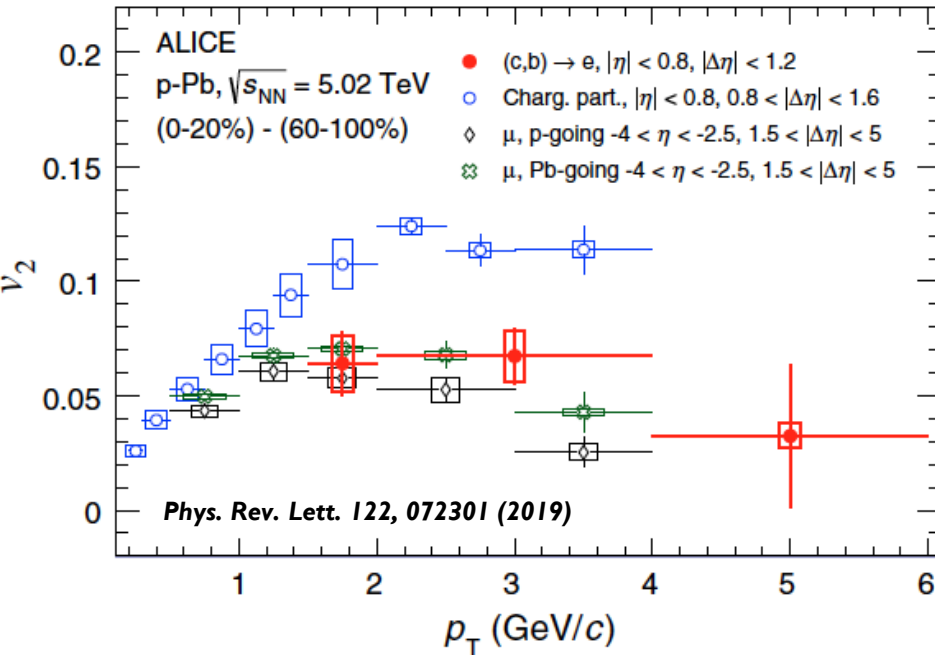
- Significant  $v_2$  for D mesons but modest modification (enhancement) of  $p_T$  distribution
- Quite extensive study has been done for charm
- Still more study is necessary on charm hadronization (charm baryon, exotic hadron)

# Charm and bottom muon $v_2$ in $pp$



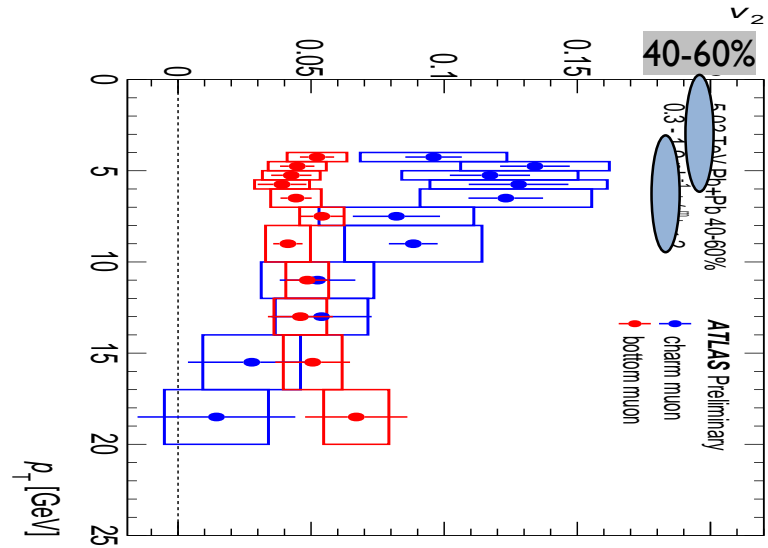
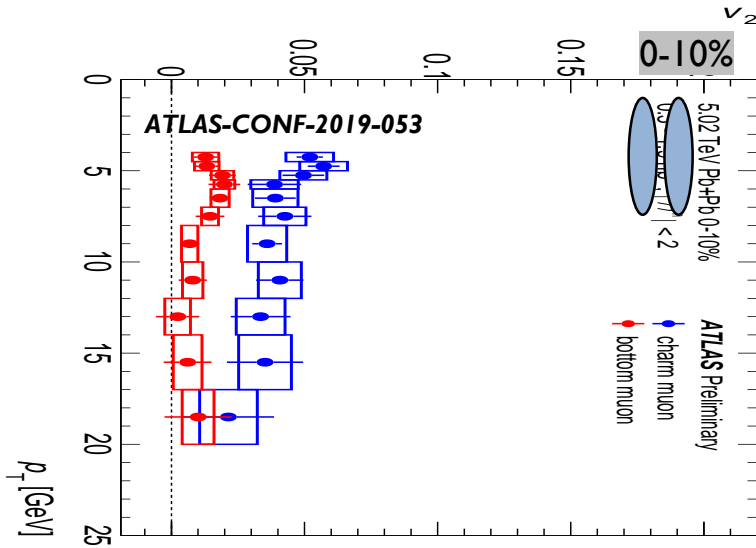
- Significant non-zero  $v_2$  for charm muons  
 Consistent with independent of multiplicity and decreasing with  $p_T$
- Bottom muon  $v_2$  is consistent with zero in multiplicity and  $p_T$
- Clear difference between charm and bottom in  $pp$  collisions  
 → No theory/model for comparison

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



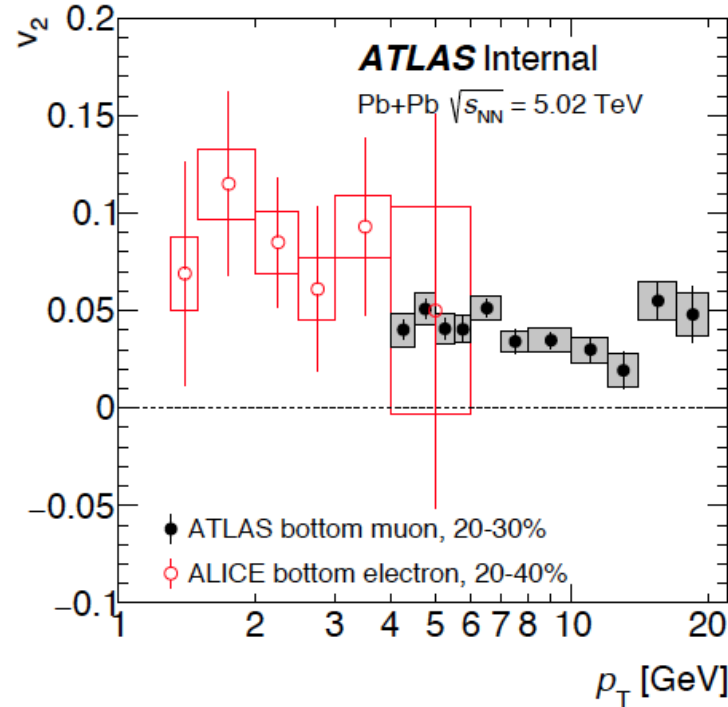
- One option:  
Correlation with particles in muon arm at forward rapidity  
➔ Backgrounds are contained
- Further study on jet-correlation and (sophisticated ?) analysis technique for flow measurements in small systems
- ITS upgrade both covering mid-rapidity and forward-rapidity will help

## 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

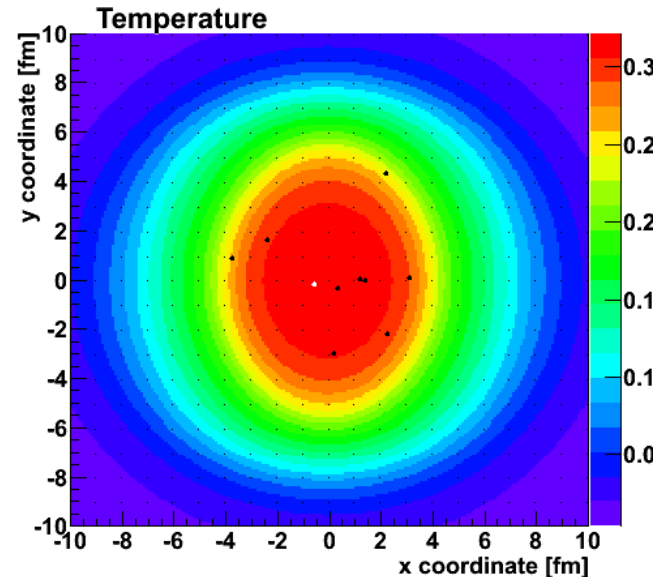
## Beyond charm (**bottom** flow in Pb+Pb)



- 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)?

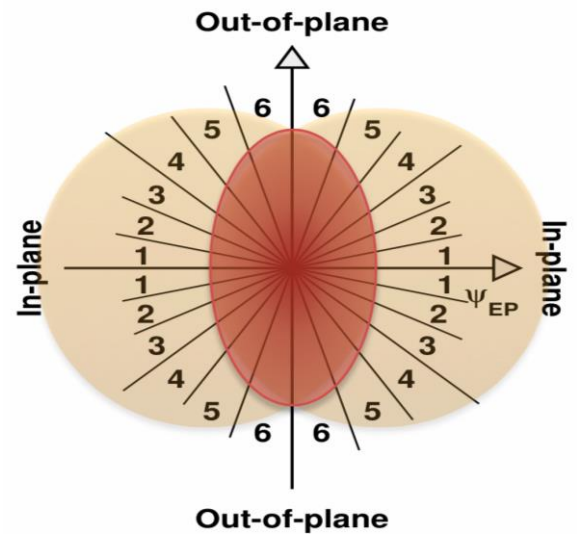
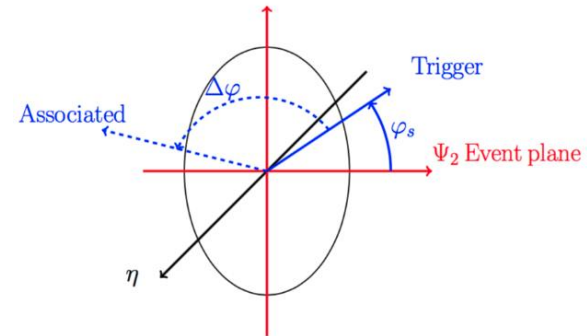
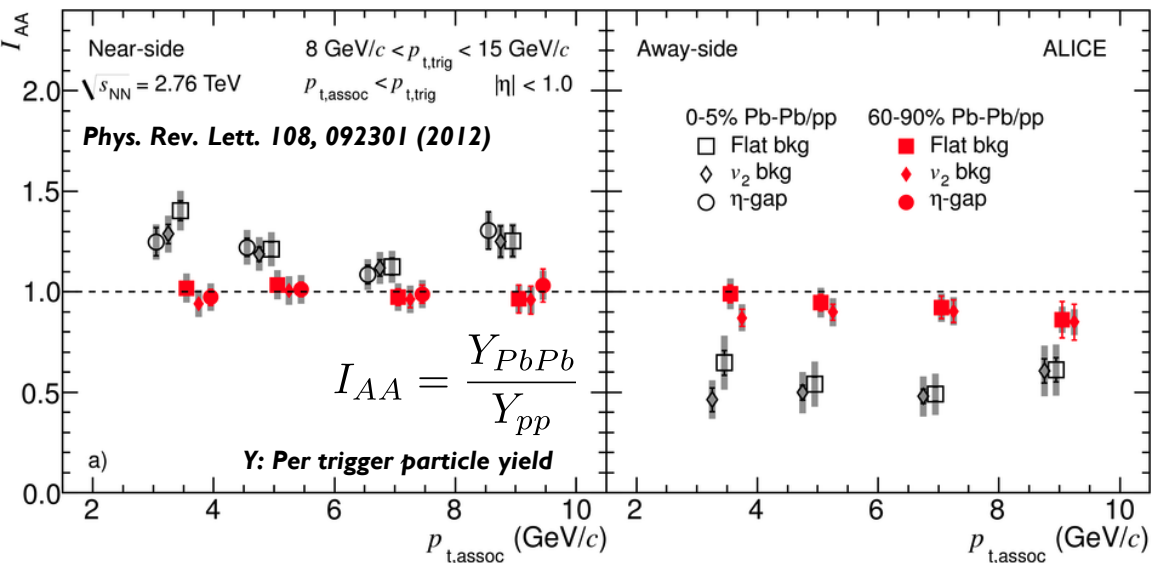
# *Model study on Quarkonia production in heavy-ion collisions*

- 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



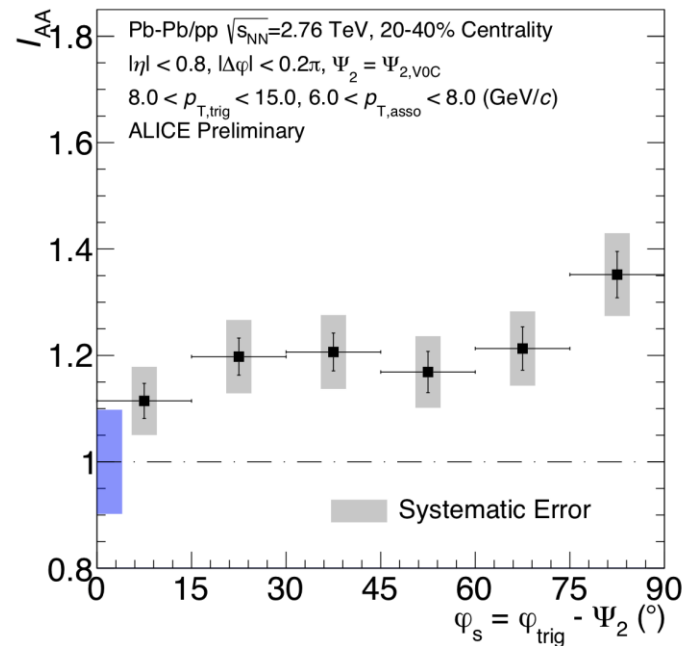
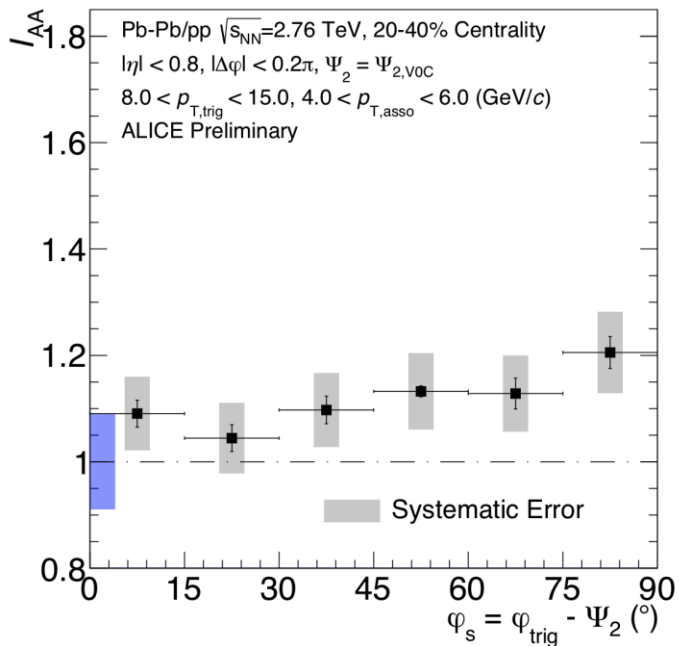


# Study of jet-medium interaction in heavy-ion collisions



- 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***