

WG5 chapter on Flow and Correlations

Second meeting
05 March 2018

Physics Observables

- Event-by-Event v_n measurements:

- a. Papers:

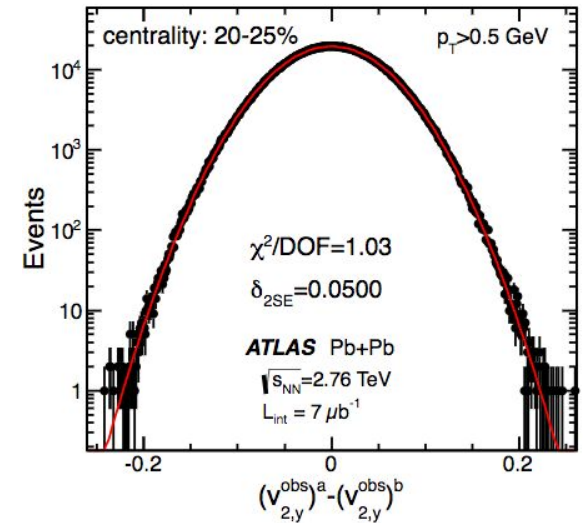
- i. <https://arxiv.org/abs/1305.2942> (ATLAS event by event v_n)
- ii. Also from CMS

- b. Reason for improvement

- i. Increased per-event acceptance (+4 units in eta)
- ii. Better unfolding to truth

- c. Additional: UC collisions, XeXe, ArAr

- d. Asked ATLAS for projection plots



- Flow decorrelations:

- a. Papers:

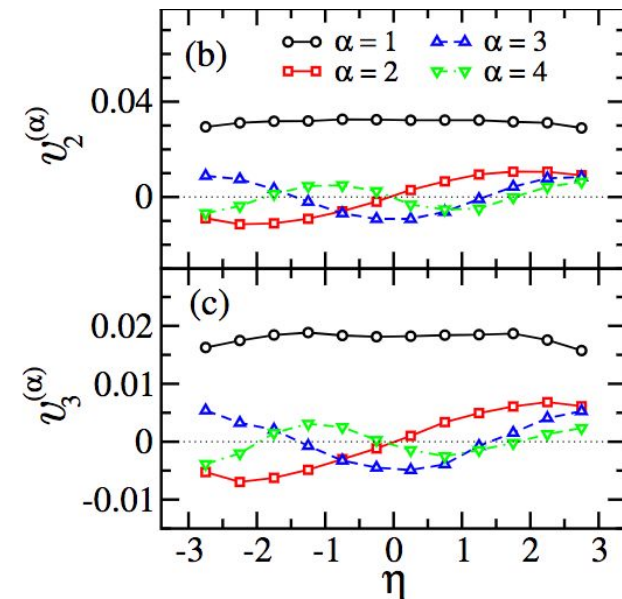
- i. <https://arxiv.org/abs/1709.02301> (ATLAS event-plane decorrelations)
- ii. <https://arxiv.org/abs/1410.7739> (Theory Principal component analysis)

- iii. (CMS EP decorrelations)

- b. Reason for improvement:

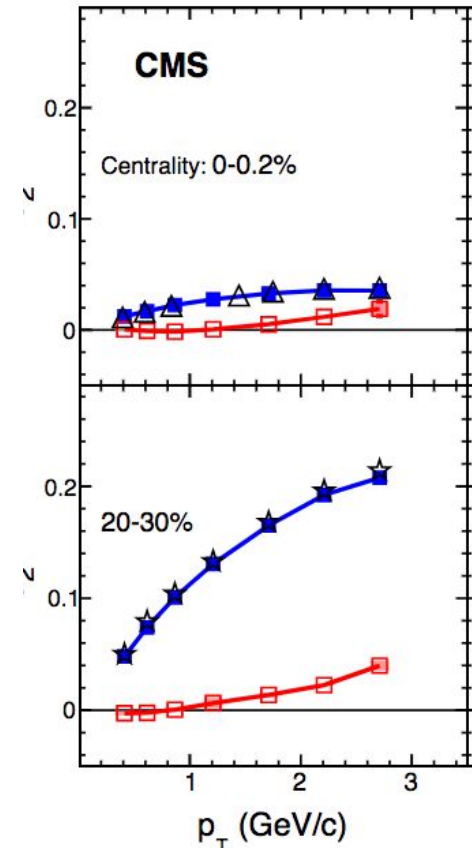
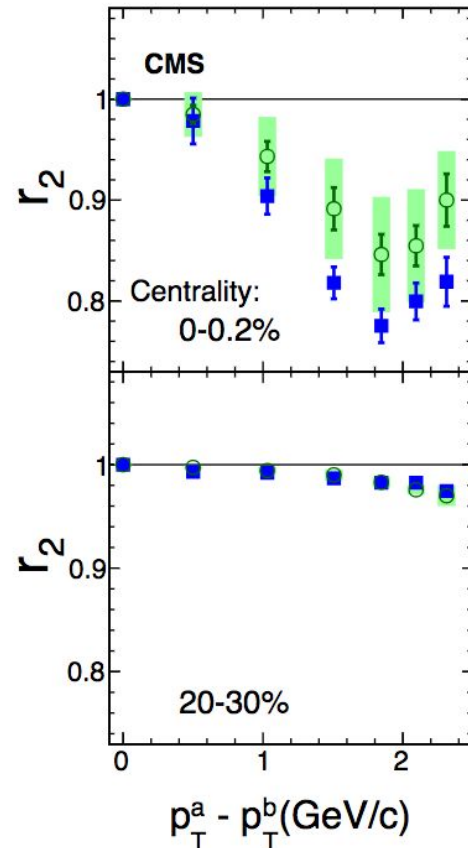
- i. Larger eta acceptance to study de-correlations over longer eta range
- ii. Study longitudinal fluctuations (PCA)

- c. Asked ATLAS for projection plots (EP decorrelation)



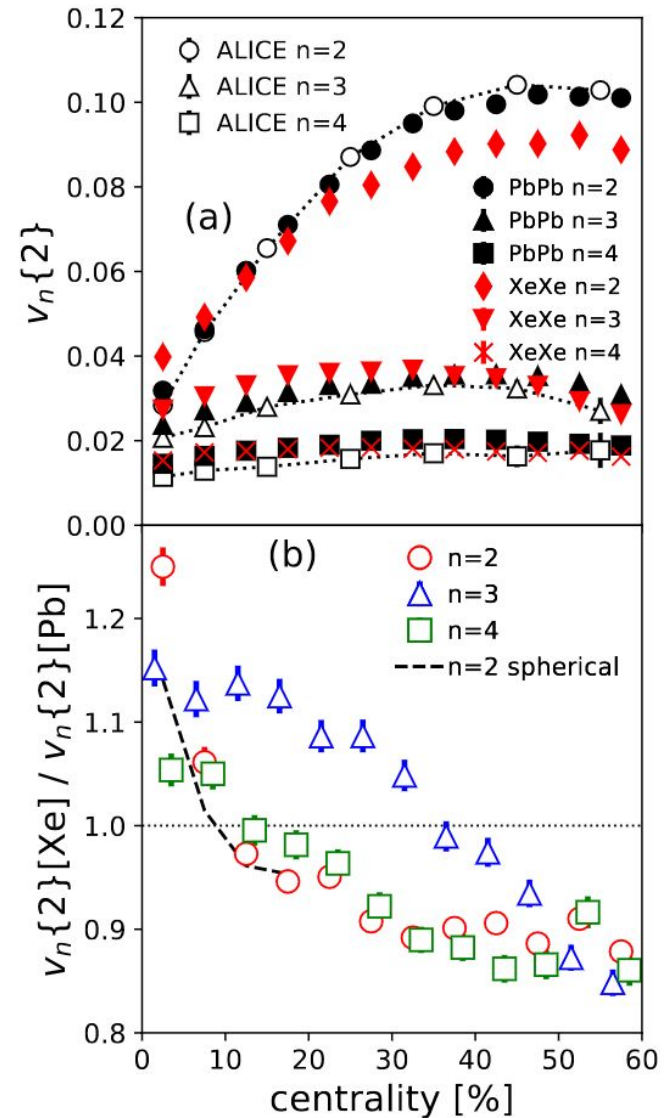
Physics Observables

- v_n in ultra-central collisions
 - a. Papers:
 - i. <https://arxiv.org/abs/1312.1845>
(CMS v_n in UC collisions)
 - ii. <https://arxiv.org/abs/1708.07113>
(CMS UC collisions principal component analysis)
 - b. Reason for improvement
 - i. More statistics (UC triggers)
 - ii. More per-event multiplicity (better acceptance)
 - c. Other : UCC in XeXe and ArAr
 - d. Ask CMS experiment for projection plots (To Do)



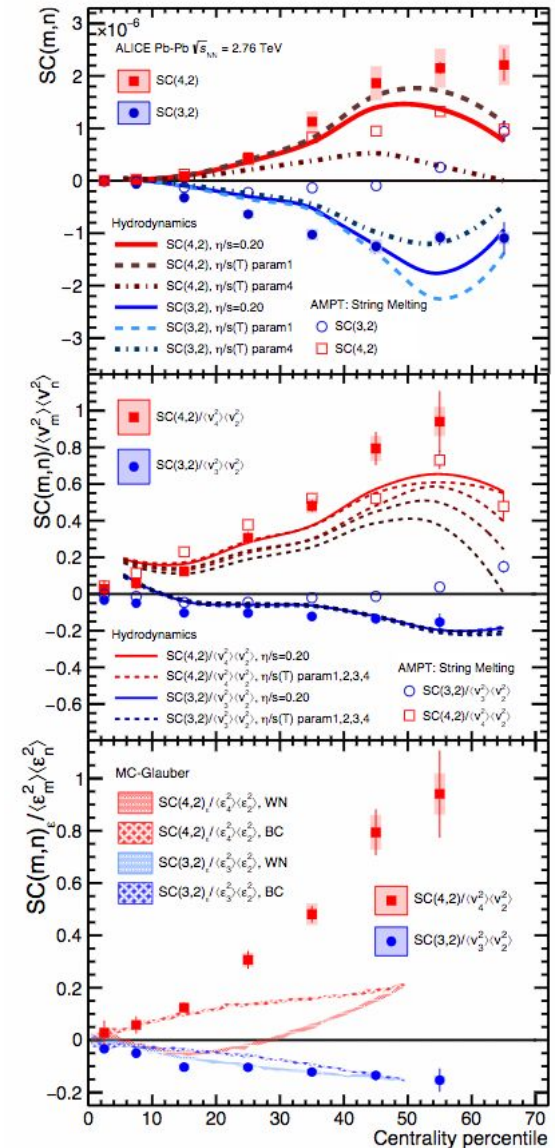
Physics Observables

- Cross-system comparisons (ArAr, XeXe)
 - Hope to get results from LHC collaborations by QM (Standard 2PC/SP, cumulant measurements.)
 - Also ask theorists for predictions for XeXe and other light ions (and how these can constrain theory)
 - Plot from arXiv:1711.08499 (Giacalone et al.)



Physics Observables

- Correlation between flow harmonics and event-planes:
 - a. Papers:
 - i. <https://arxiv.org/abs/1504.01289>
(ATLAS vn-vm correlations)
 - ii. <https://arxiv.org/abs/1403.0489>
(ATLAS event-plane correlations)
 - iii. <https://arxiv.org/abs/1604.07663>
(ALICE symmetric cumulants)
 - iv. <https://arxiv.org/abs/1709.01127>
(ALICE symmetric cumulants long paper)
 - v. <https://arxiv.org/abs/1709.09189> (CMS symmetric cumulants)
 - b. Need some input from experiments as to what improvements will be seen in Runs 3-4



Physics Observables

- Magnetic field: Charged particle/ Charm directed flow, CME related measurements
 - a. Papers:
 - i. <https://arxiv.org/abs/1401.3805> (U. Gürsoy et al., magnetic field from charged particle v1)
 - ii. <https://arxiv.org/abs/1608.02231> (S. Das et al., magnetic field from charm v1)
 - iii. <https://arxiv.org/abs/1610.00263> (CMS, CME in pPb)
 - iv. <https://arxiv.org/abs/1708.01602> (CMS, CME ESE in pPb and PbPb)
 - v. <https://arxiv.org/abs/1709.04723> (ALICE, CME ESE in PbPb)
 - vi. <https://arxiv.org/abs/1708.08901> (CMS, CMW in pPb and PbPb)
 - vii. <https://arxiv.org/abs/1512.05739> (ALICE, CMW in PbPb)

Physics Observables

- Vorticity: Lambda (transverse and longitudinal) polarization
 - a. Papers:
 - i. <https://arxiv.org/abs/1707.07984> (Becattini et al., longitudinal polarization)
 - ii. <https://arxiv.org/abs/1610.02506> (Becattini et al., global polarization)
 - iii. <https://arxiv.org/abs/1710.08934> (Voloshin, global polarization)

Organization of the chapter

- Chapter outline:
 - Introduction (why measure flow & correlations)
 - What we have learnt from Runs-1 and 2
 - Briefly touch on unanswered/new questions raised
 - Go over current status of observables, and how they will improve in Runs 3-4
 - Should go in to details
 - Will need some projection plots from experiments and theory (will finalize the list as we proceed with writing the document)
 - Discuss briefly about small-systems
 - HF flow?
 - Summary

General stuff

- WG-5 Meeting tomorrow:
 - <https://indico.cern.ch/event/698005/>
 - Will request that light ions be handled in individual chapters
- Writing the chapter:
 - Query if there is a standard template/repository
 - Else will use github (I will setup during the next 2 weeks)
- Also send out requests for plots to experimental collaborations requesting some projection plots for the observables.
- Should also invite other theorists/experimentalists to give their input into the chapter.
 - Not necessarily attend our meetings (but would be nice if they could attend one)
 - Please suggest Names
 - Jean-Vyes Ollitrault
 - Derek Teaney
 - Raju Venugopalan