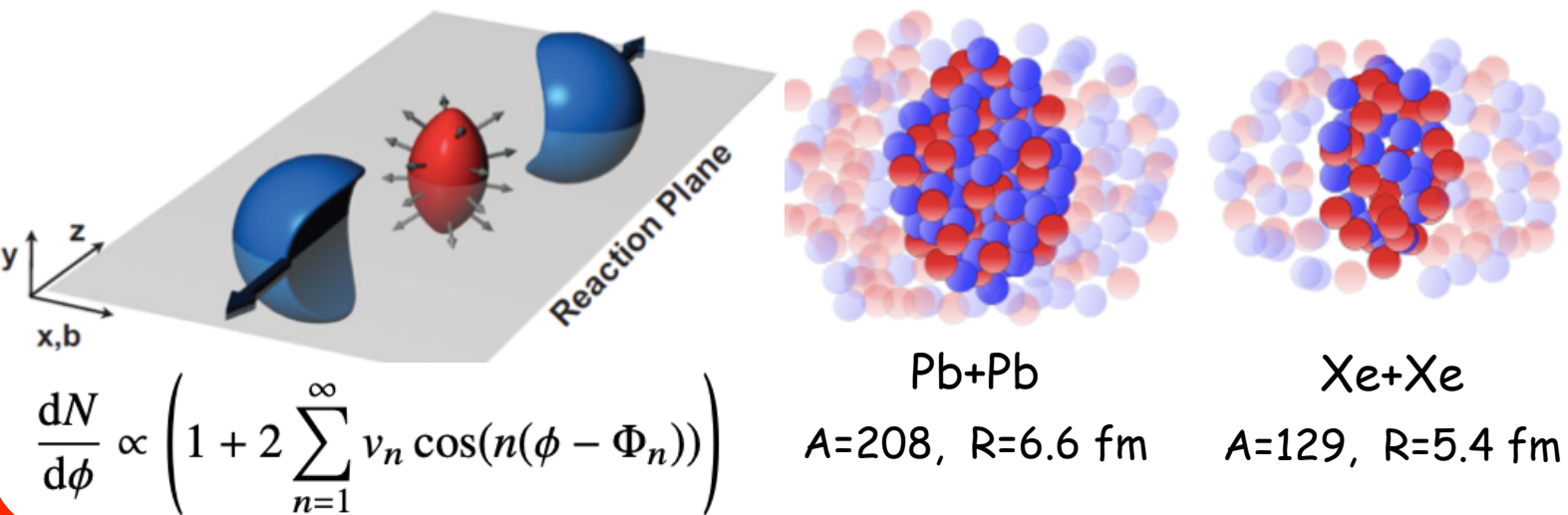


# Collective dynamics of heavy ion collisions in ATLAS

Helena Santos, LIP, on behalf of ATLAS Collaboration

ISMD 2021, 12-16 July

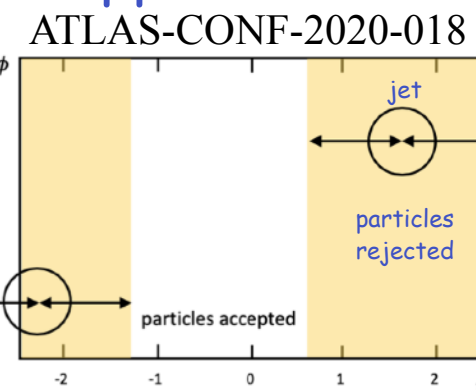
## Transverse flow



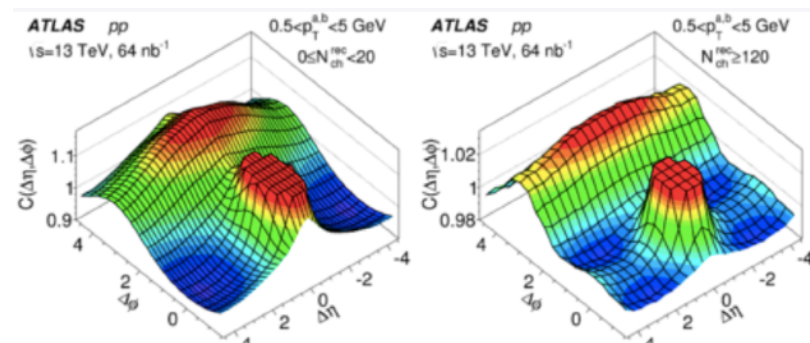
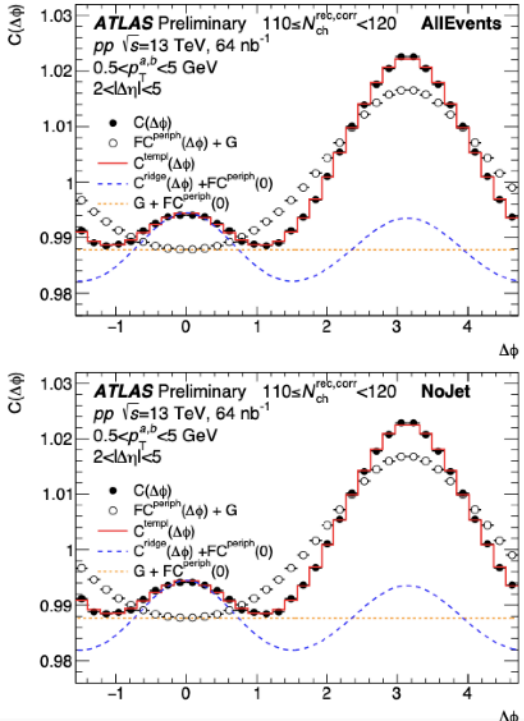
## Sensitivity of 2PC to presence of jets in pp@13 TeV

4 event classes:  
**WithJet**: sample with jets with  $p_T > 10 \text{ GeV}$ .  
**NoJet**: sample with no jet with  $p_T > 10 \text{ GeV}$ .

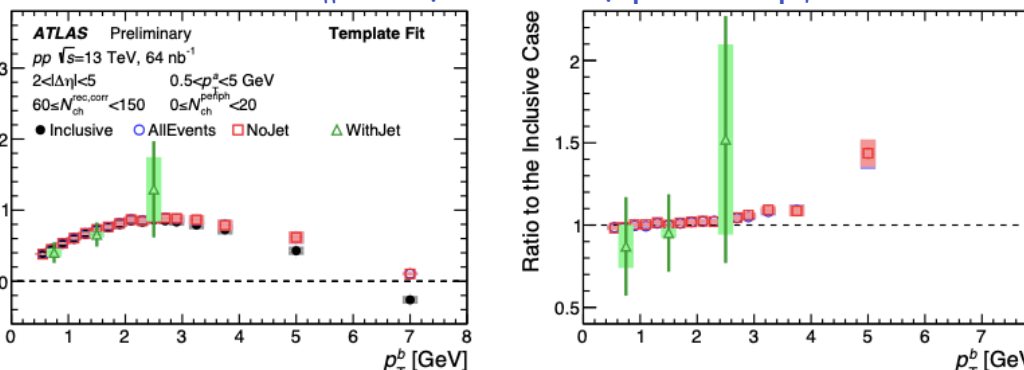
Inclusive: standard pp ridge analysis  
**AllEvents**: Reject tracks within  $|\eta| \leq 1$  of any jet with  $p_T > 10 \text{ GeV}$



## 2PC for two event classes



## $v_n$ as a function of particle $p_T$



Ridge is visible in both event classes.

Difference between **NoJet** and **AllEvents** is marginal.

**AllEvents** and **NoJet** results agree.

Tension at high- $p_T$  wrt the inclusive results, which are possibly affected by dijet bias.

The low- $p_T$   $v_n$  are not affected by the presence/absence of jets.

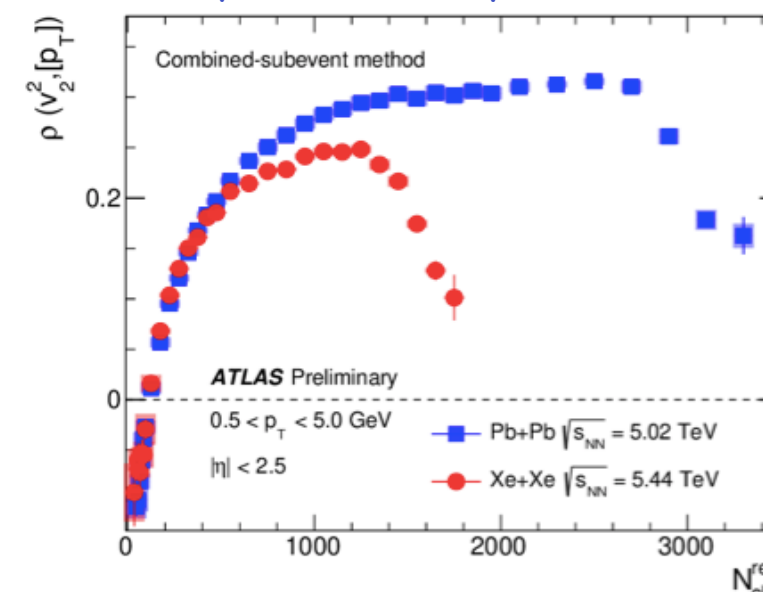
## $v_n - [p_T]$ correlations

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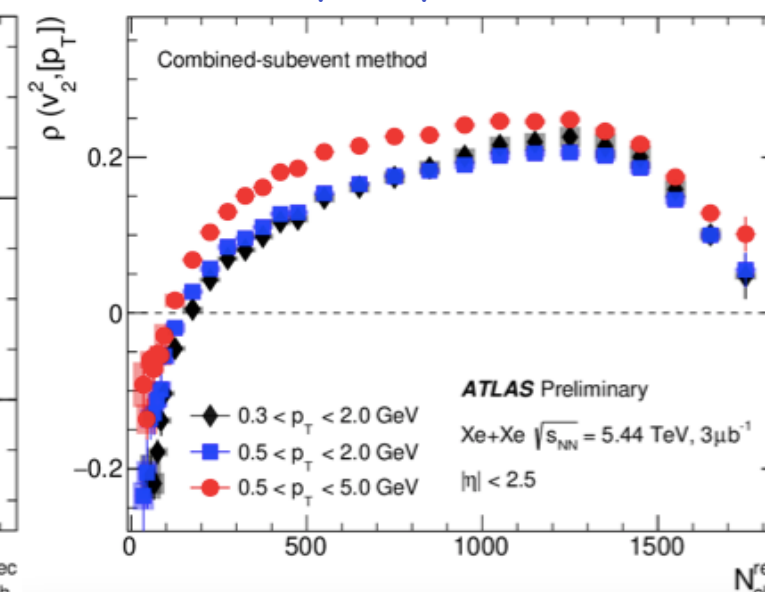
Pearson correlation coefficient

$$\rho(v_n^2, [p_T]) = \frac{\text{cov}(v_n^2, [p_T])}{\sqrt{\text{var}(v_n^2)} \sqrt{c_k}}$$

System size dependence



$p_T$  dependence

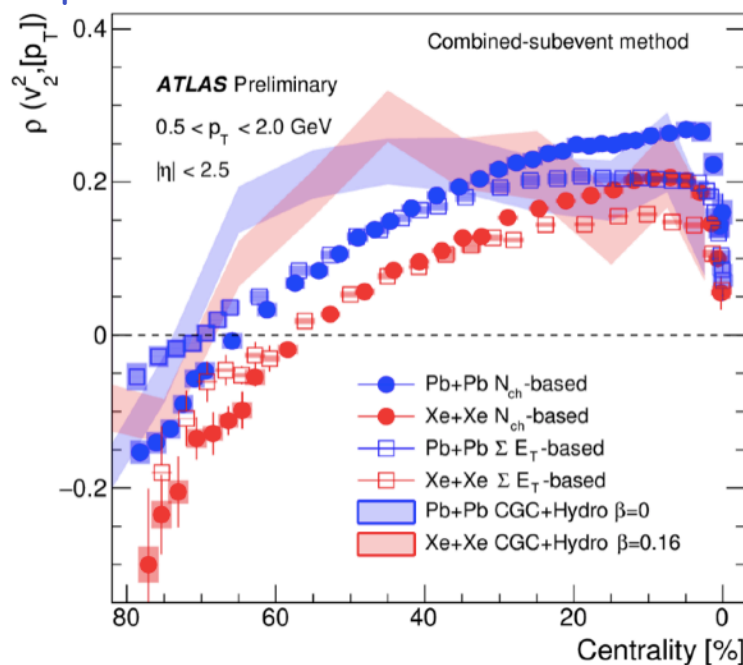
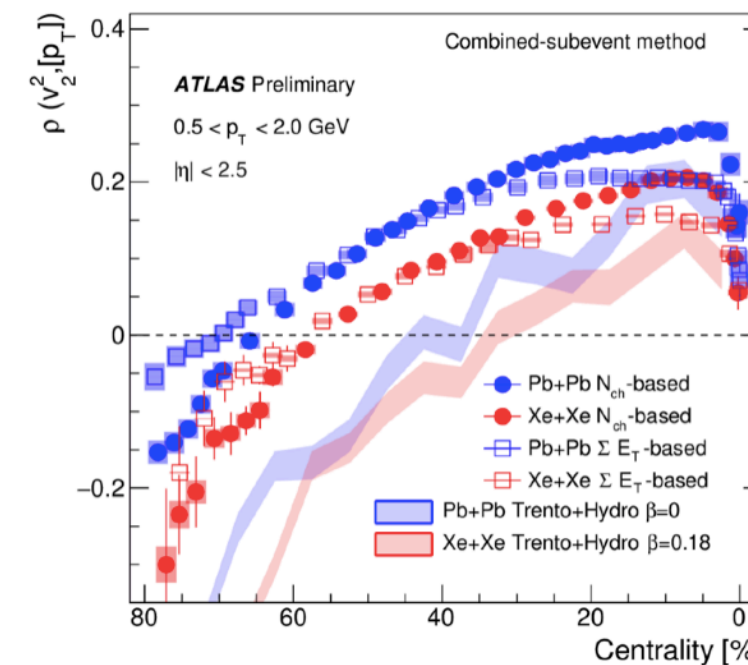


Smaller magnitude of  $\rho_2$  in **Xe+Xe**

Larger magnitude of  $\rho_2$  for larger  $p_T$

Decreasing to low- $p_T$  does not change the dependence with  $N_{ch}$

## Centrality dependence



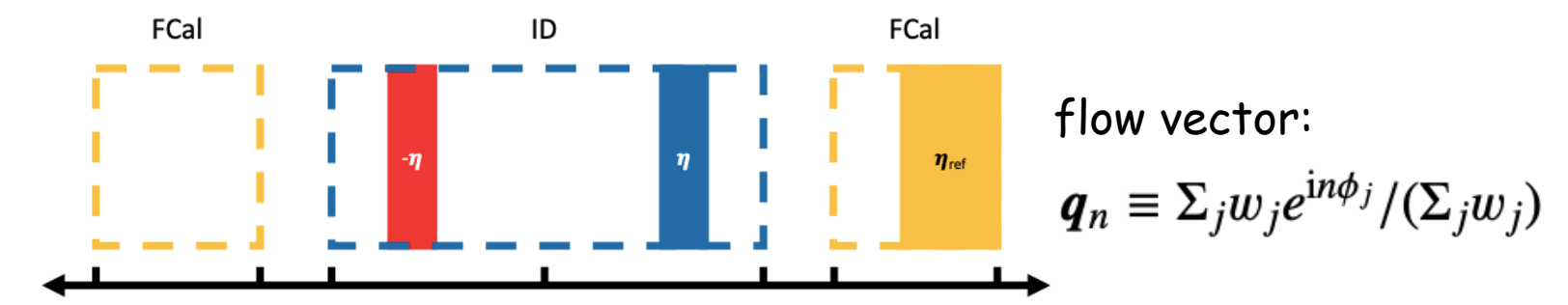
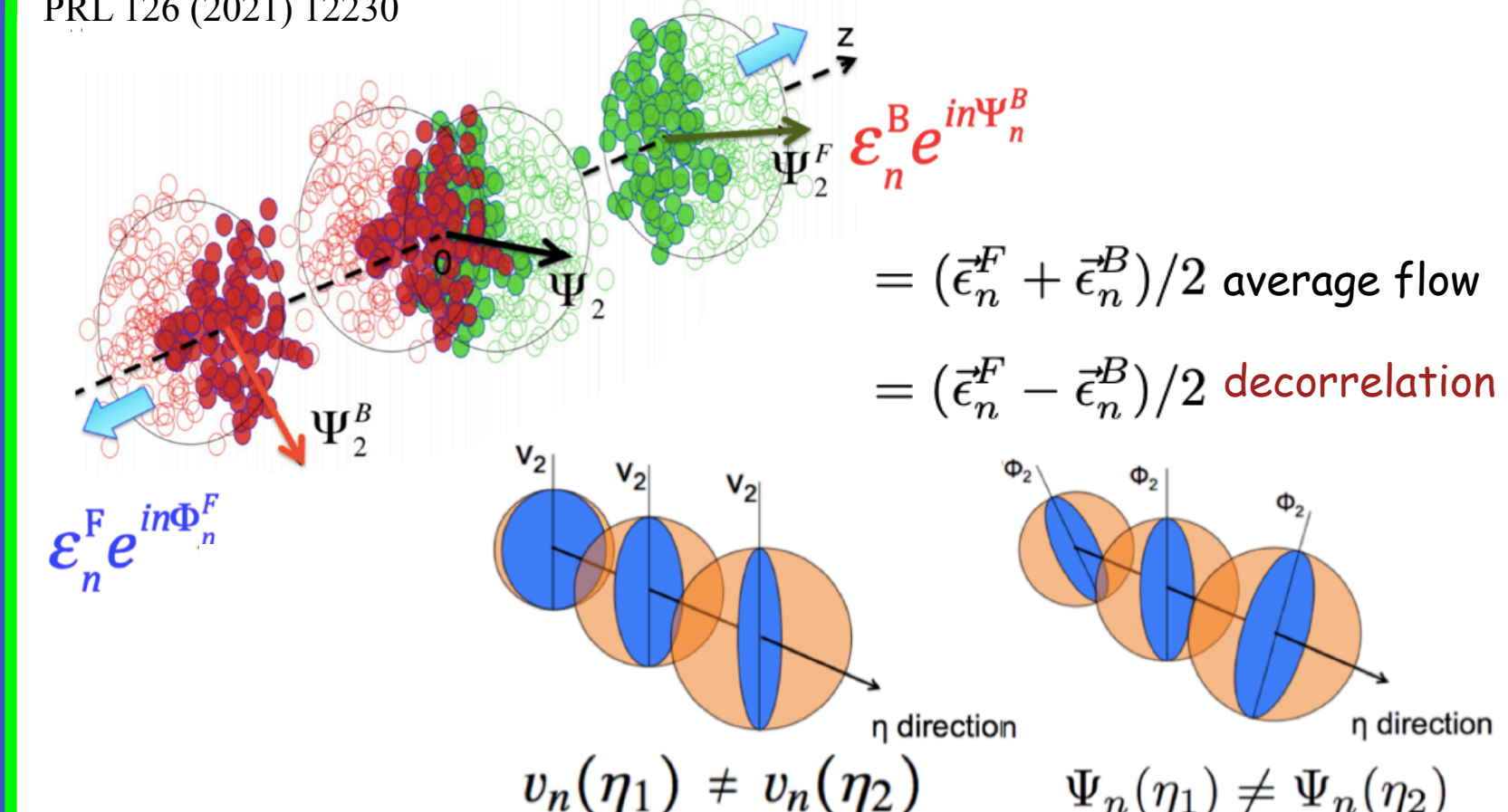
Smaller magnitude of  $\rho_2$  in **Xe+Xe** in all centrality range.

Significant difference in  $N_{ch}$ -based vs  $\Sigma E_T$  centrality binning.

Trento+Hydro or CGC+Hydro do not capture the trends in the data, either qualitatively or quantitatively. Centrality fluctuations need to be taken into account in the understanding of the nuclear deformation effects on the Xe+Xe results.

## Longitudinal decorrelation dynamics

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Decorrelation between  $-\eta$  and  $\eta$ :  $r_{n|n}(\eta) = \frac{\langle q_n(-\eta) q_n^*(\eta_{ref}) \rangle}{\langle q_n(\eta) q_n^*(\eta_{ref}) \rangle} \leq 1$

