

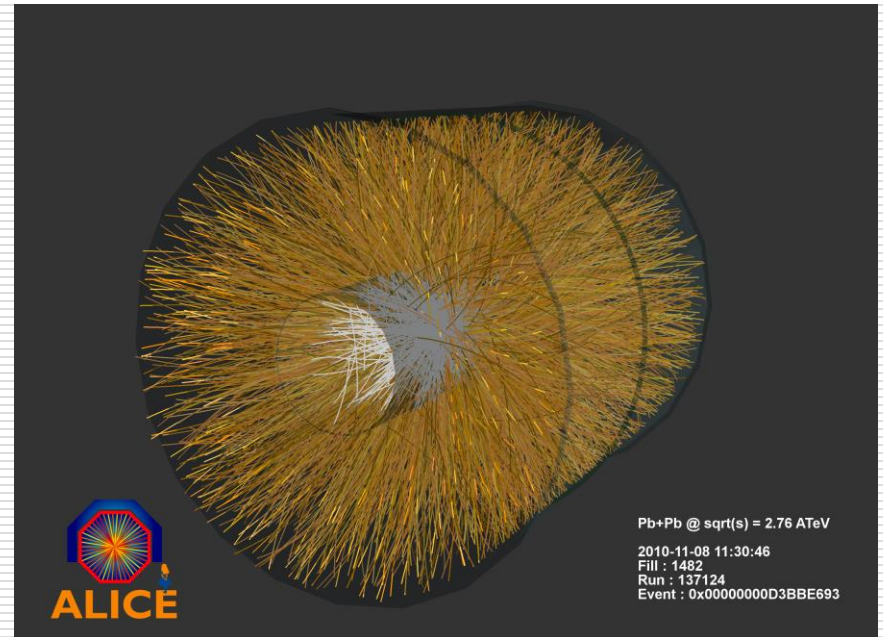
A Toy Model Correlations Analysis in Heavy Ion Collisions

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August 12, 2015



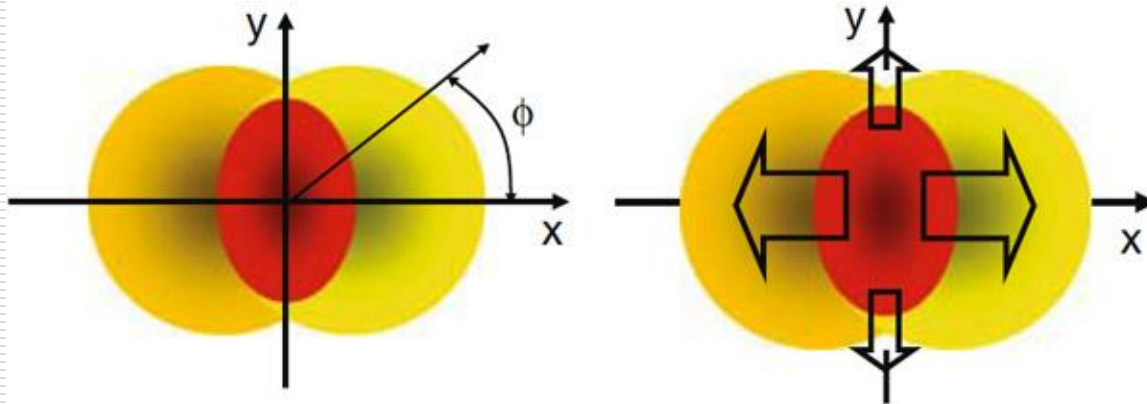
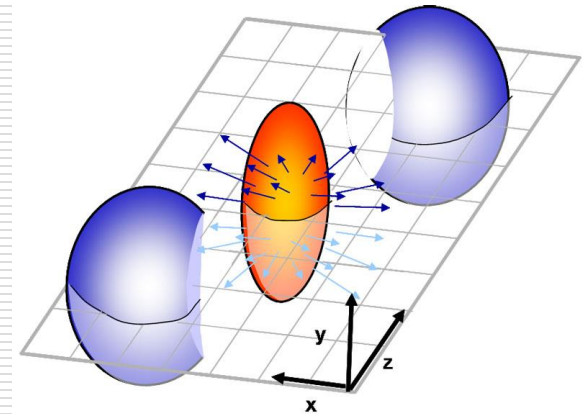
Heavy Ion Collisions

- Inherently messy with high particle multiplicities
- Fundamental probe of QCD and early universe cosmology



v_2 and Flow

- Anisotropic azimuthal particle distribution
- Fourier Series Expansion



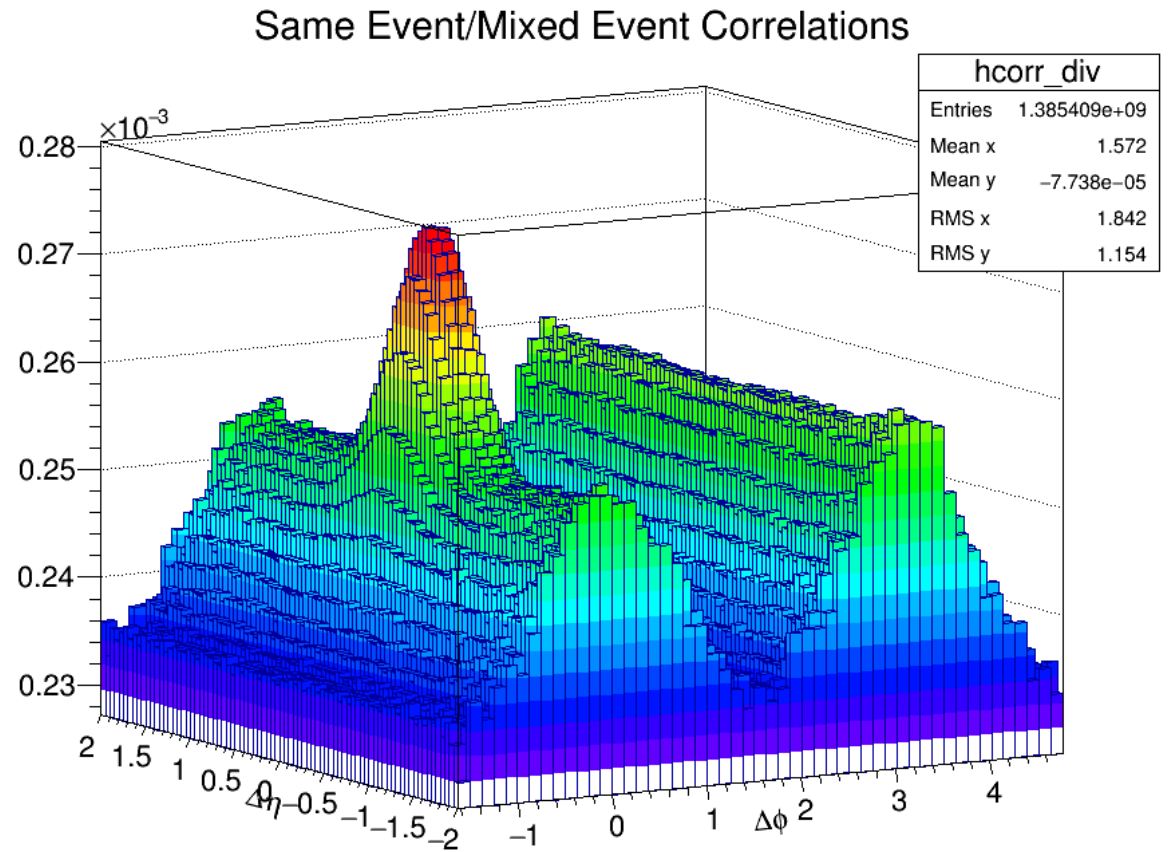
The Toy Model

- Toy model with some parameters
 - Jet Particle Multiplicity
 - Background Particle Multiplicity
 - Particle Ratios
 - V_2
 - p_T Dependence
 - Particle Species
 - Centrality Dependence

Correlations Plot

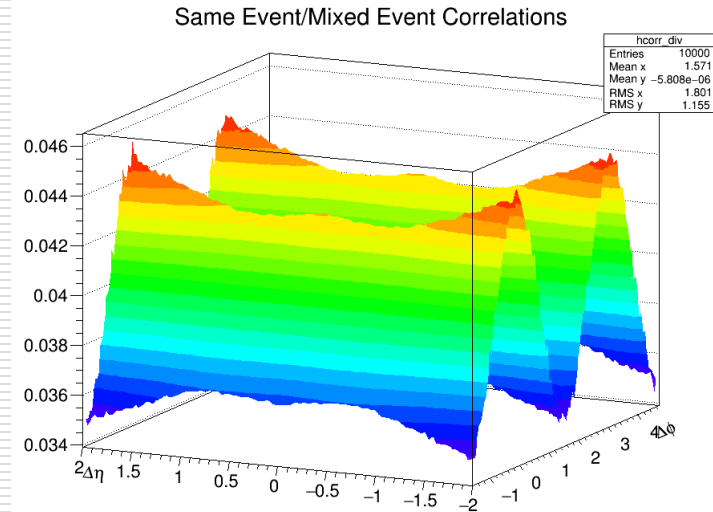
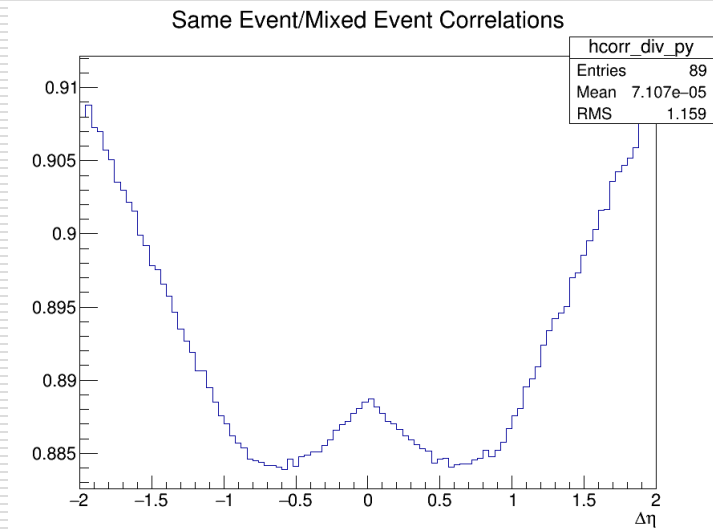
□ Features

- Near Side Jet Peak
- Double Ridge Effect



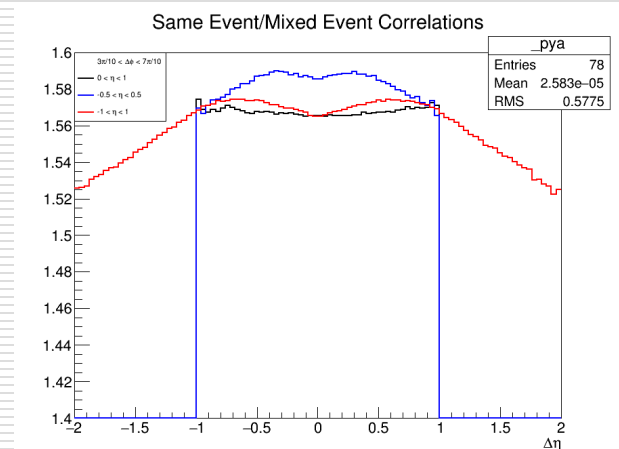
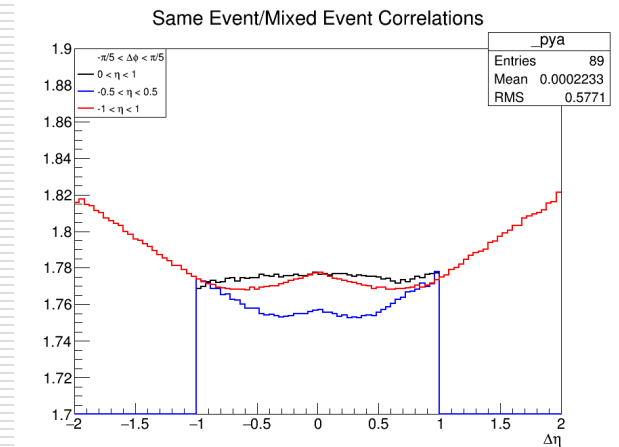
Pions and Protons

- ❑ Flat in rapidity
- ❑ Realistic proton to pion ratios
- ❑ Wings can be generated by forming correlations in pseudorapidity, not rapidity
- ❑ Projection over $-\pi/5 < \Delta\phi < \pi/5$



Ridge & Valley Projections

- Symmetric η cuts both show a clear wing structure in the ridge and “anti-wing” structure in the valley
- Asymmetric cut in black eliminates this
- The length of the interval does not affect the wings
- Projection taken around $\Delta\phi$ of 0 (ridge) and $\pi/2$ (valley)



Conclusions

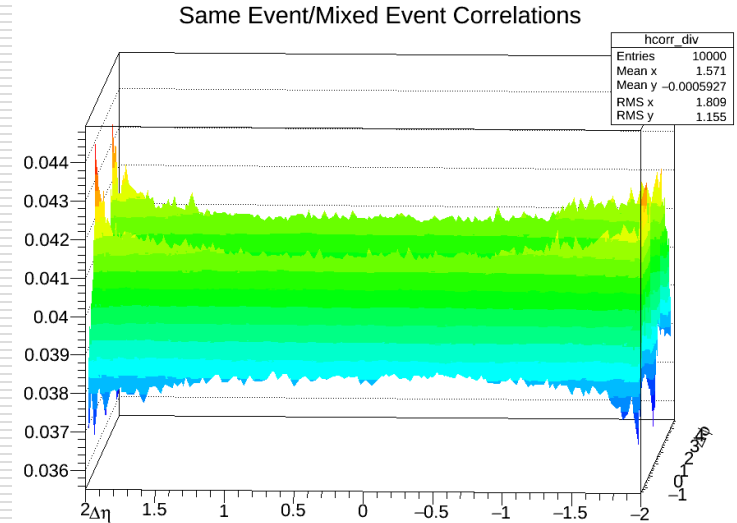
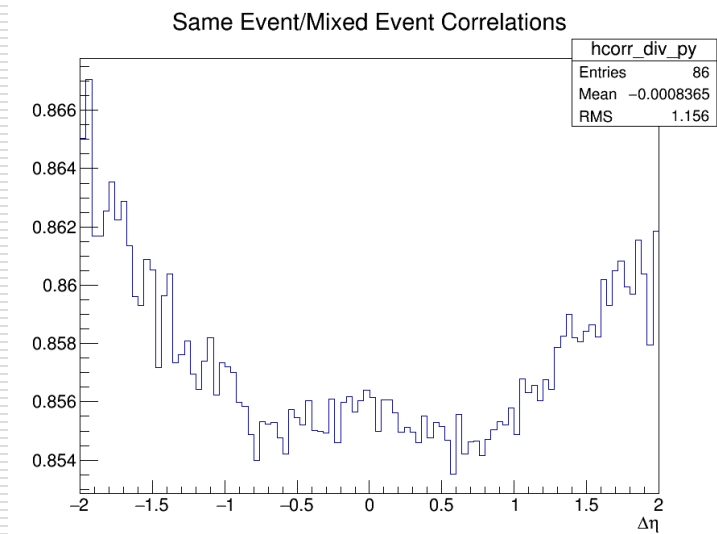
- Looking at an asymmetric η region does remove the wings
- The valleys exhibit an “anti-wing” structure
 - Characteristic of η dependent v_2
 - Not seen in data!!
- The results of this simple toy model seem to indicate that an η dependent v_2 may not be the cause of the wings.

Questions?

Backup

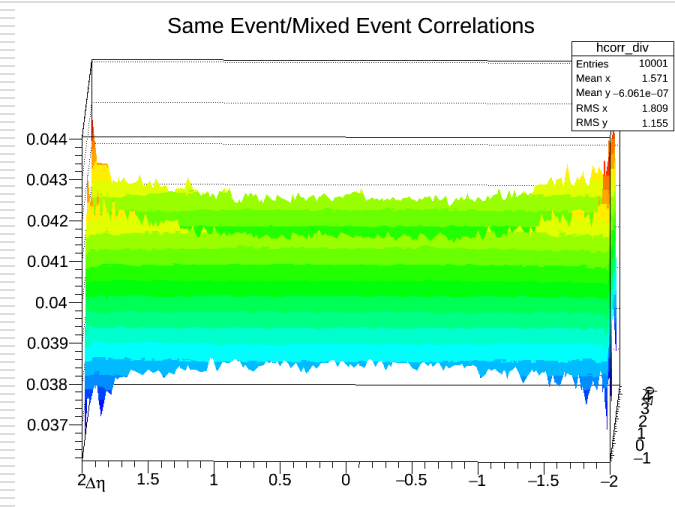
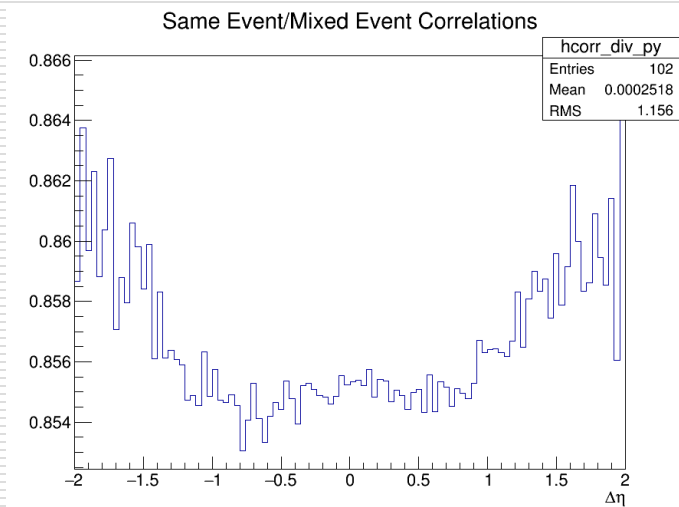
η Dependent v_2

- Wings clearly evident
- Projection over $-\pi/5 < \Delta\phi < \pi/5$



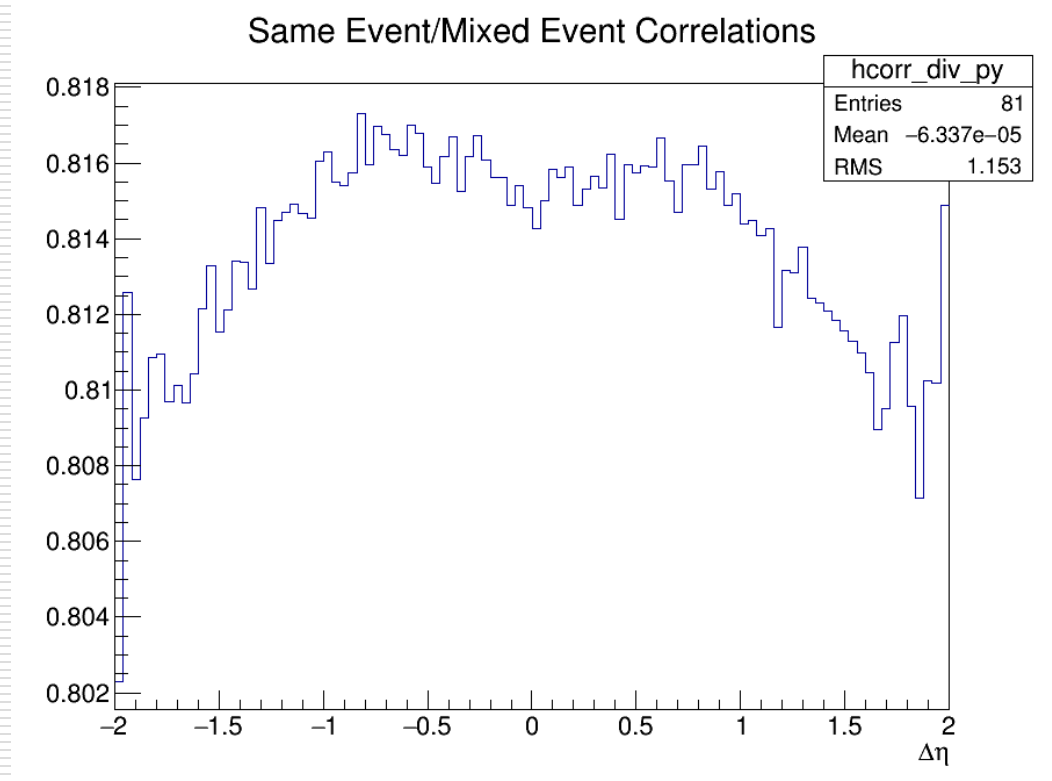
A Step Further...

- Letting both v_2 and particle multiplicity depend on η
- Projection over $-\pi/5 < \Delta\phi < \pi/5$



Valley Projection – η Dependent v_2

- The “anti-wing” structure isn’t due to the addition of protons and pions.
- Observed in the case of η dependent v_2 as well.



Different η Cuts

- Asymmetric η cut should reduce the wings
 - Completely get rid of them in the case of a linear dependence

