Influence of jets on v_4/v_2^2

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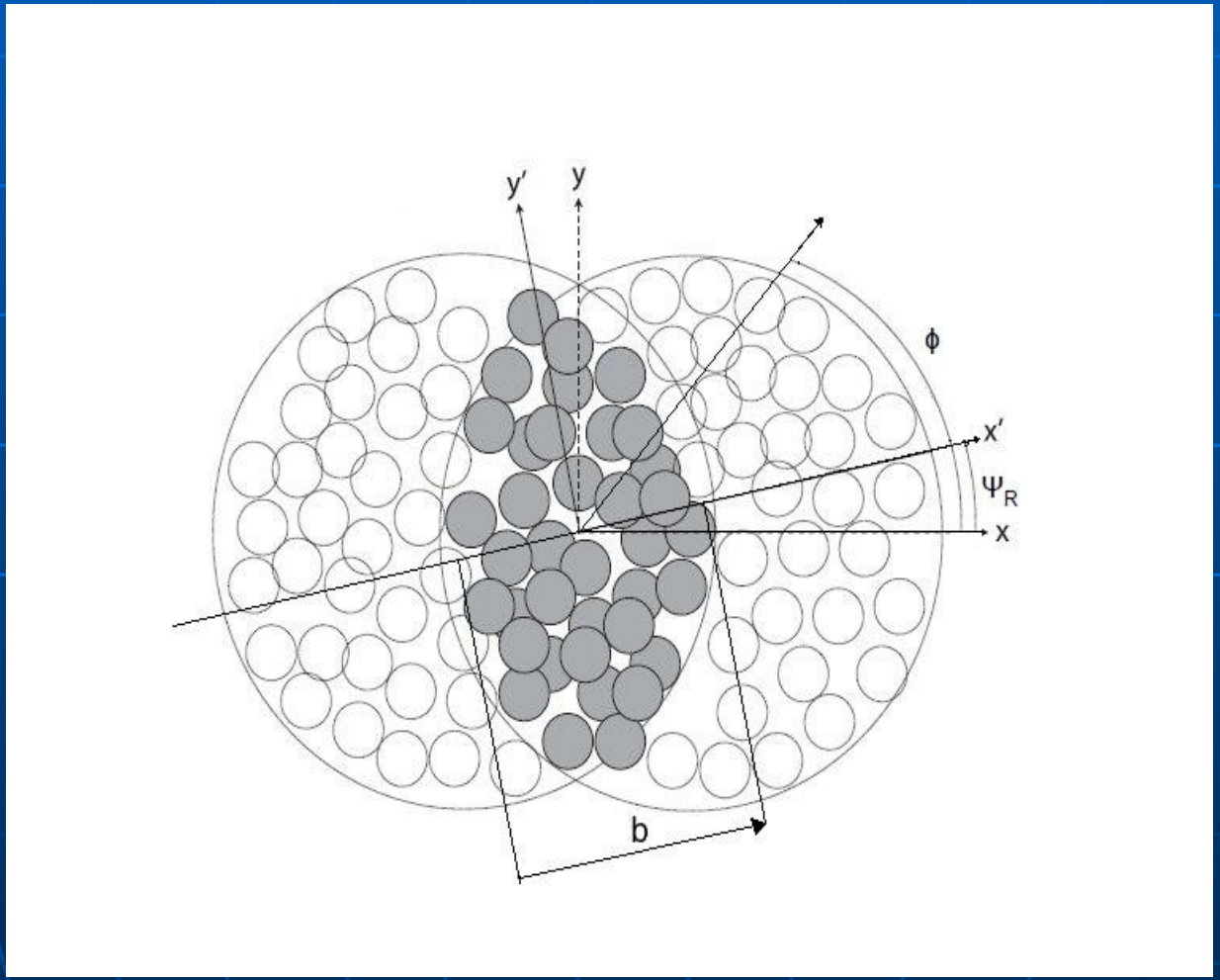
Content

- Introduction: Anisotropic flow in HIC
  Experimental overview
- HYDJET++ - Hydro + Jet Quenching
- V_2 - interplay between HYDRO, Resonance Decays and Jets
- $V_4(\psi 2)$ – part, correlated with V_2
- v_4/v_2^2 - ratio and comparison with experiment

Collision Situation

- Reaction plane
- Participant plane
- Impact parameter, "b"



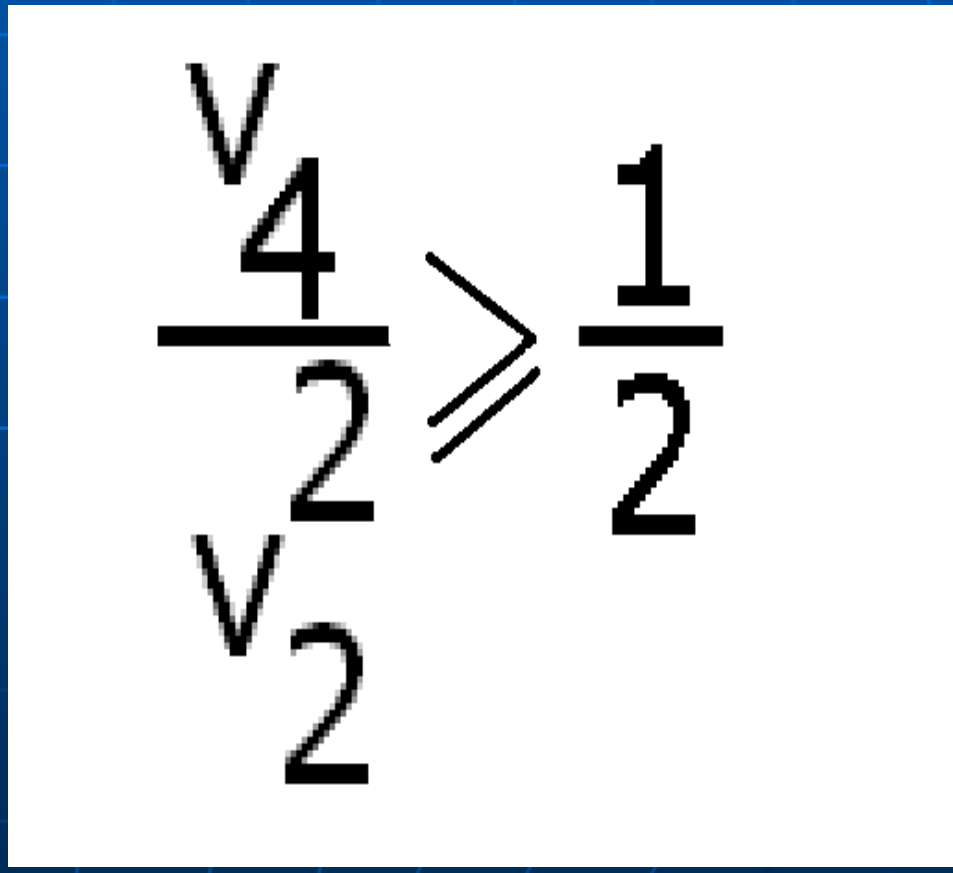
General theory

- Particles collide ultrarelativistic
- Anisotropy in the matter distribution
- Evolves in momentum space
- Ideal Hydrodynamics + Strong interactions

$$E\frac{d^3N}{d^3p} = \frac{1}{2\pi pdpdy}\frac{d^2N}{}\left(1+\sum_{n=1}^{\infty}2v_n\cos[n(\phi-\Psi_R)]\right)$$

V2 And v4

- Elliptic and Hexadecapole flow
- Observable
- Theorethical prediction
- Examining RHIC, LHC
- Experimental Results

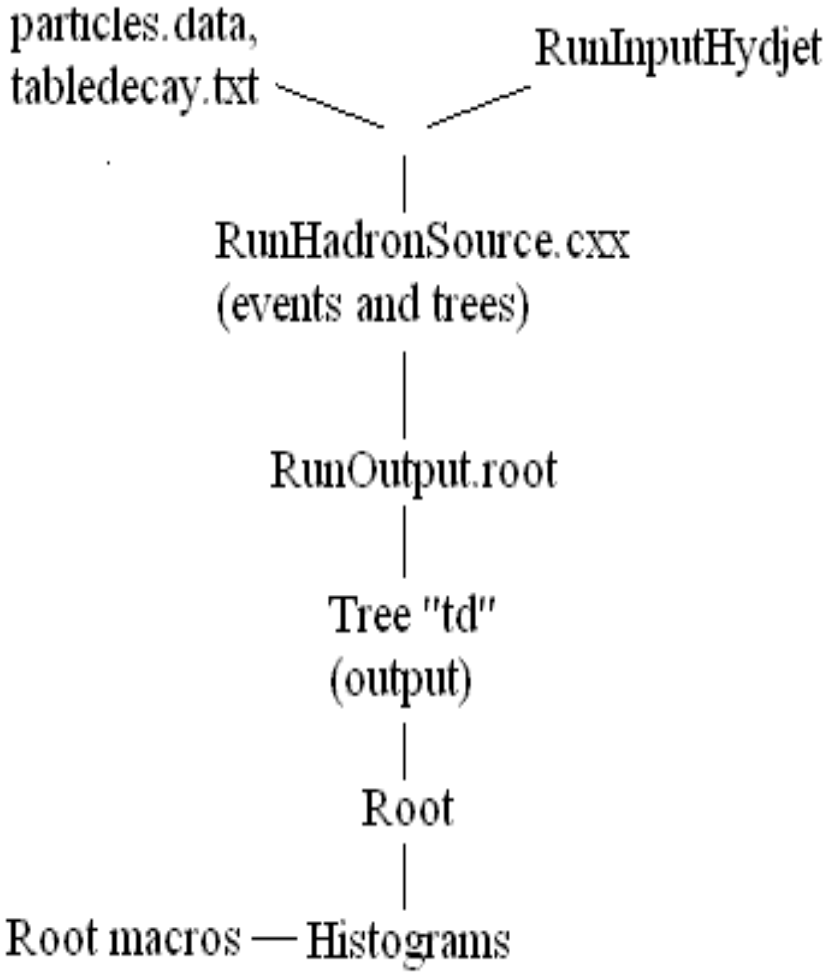


HYDJET++

- MC event generator
- Soft ”thermal” state parametrized +hard processes.
- Using PYTHIA and PYQUEN
- Rescattering, Radiative, Collision losses
- Nuclear shadowing correction.

HYDJET++ Structure

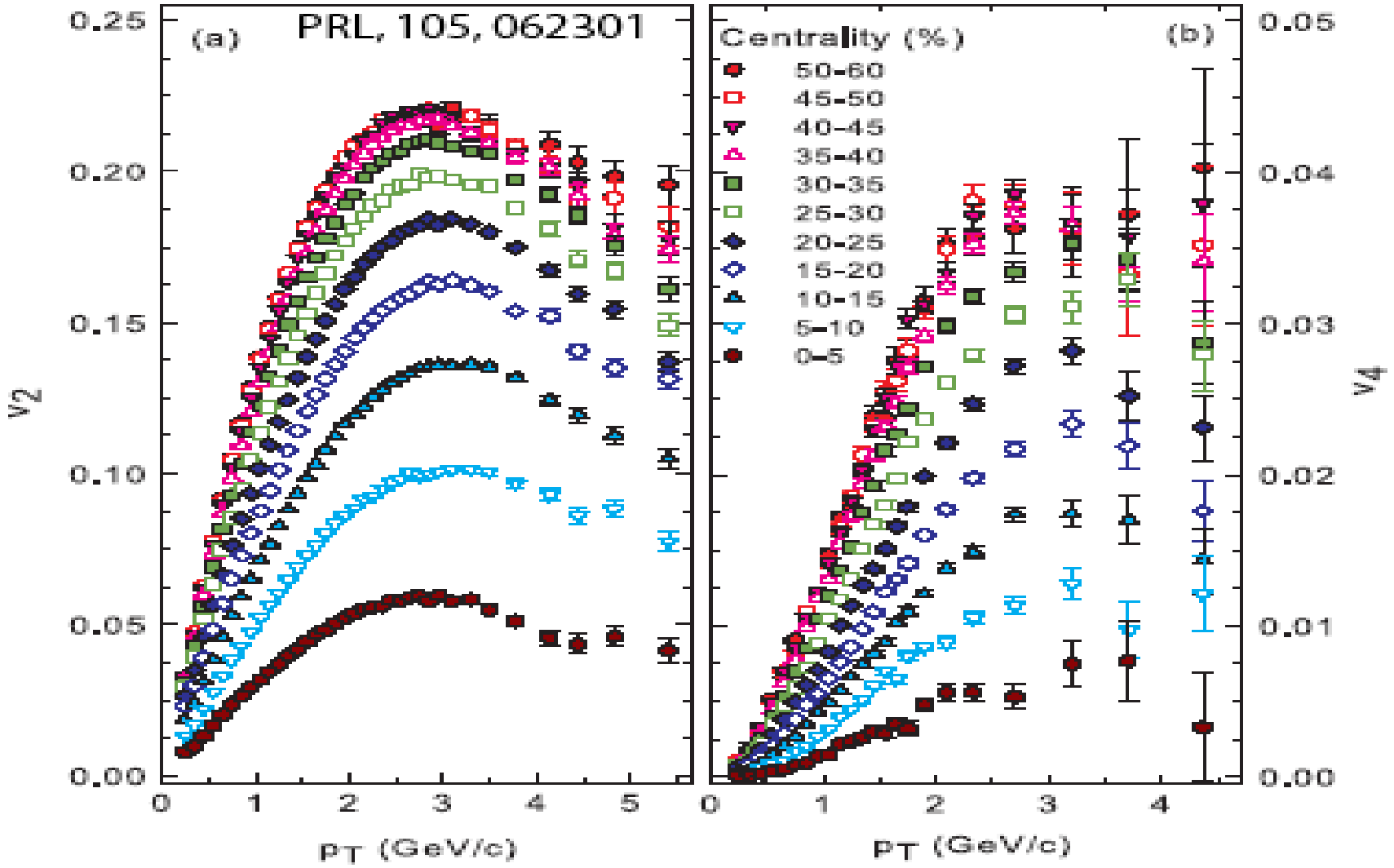
- HYDJET general structure
- Main Input file
- Macro file RHS.
- Outputfiles
- Histograms



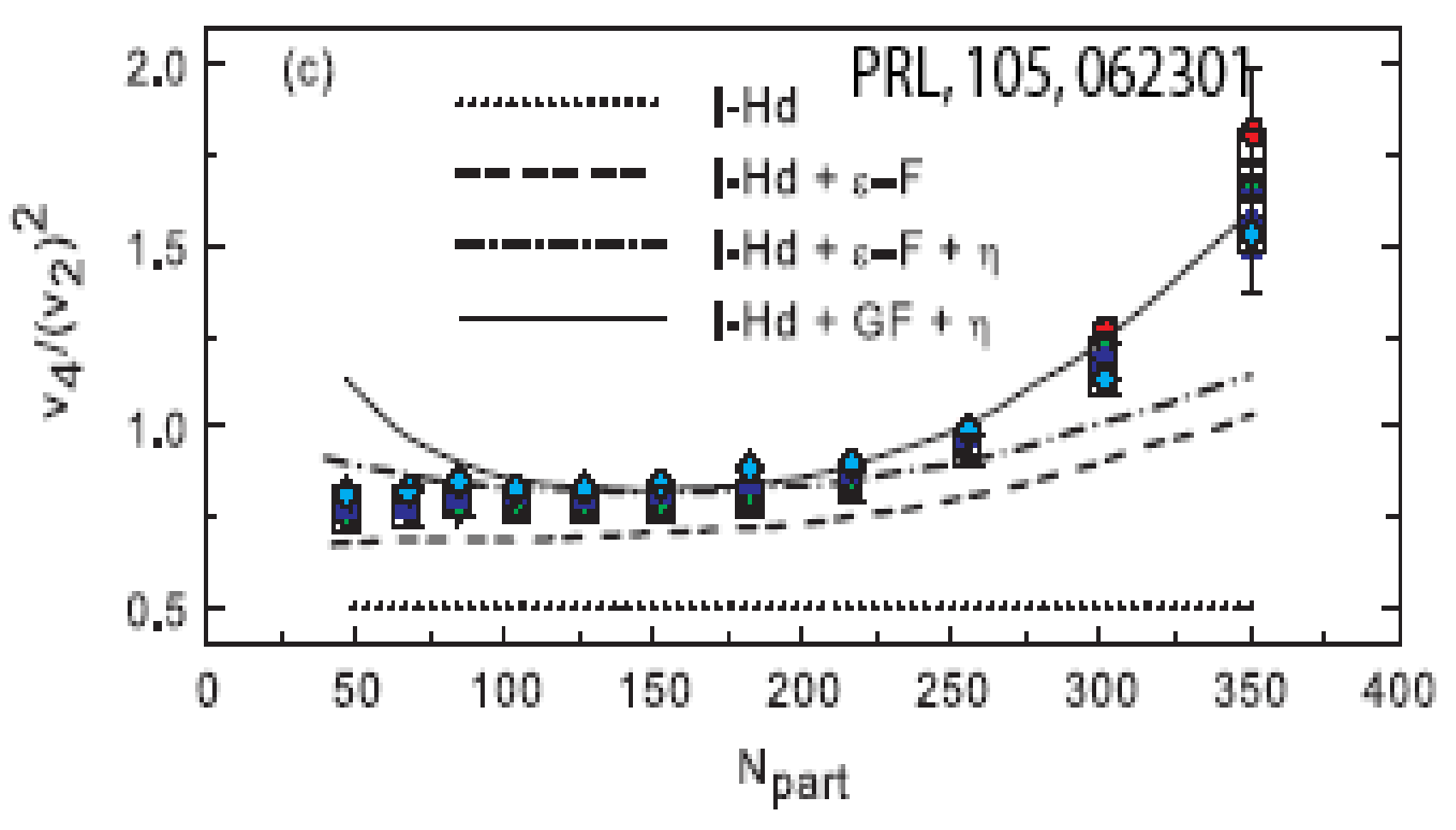
HYDJET++ Parameters

- Seperated chemical and thermal freeze out
- Charge dependent chemical potentials
- Rapidity Interval
- Impact Parameter
- Anisotropy parameters
- Particle mass
- Energy
- Abilty to regulate jet influence.

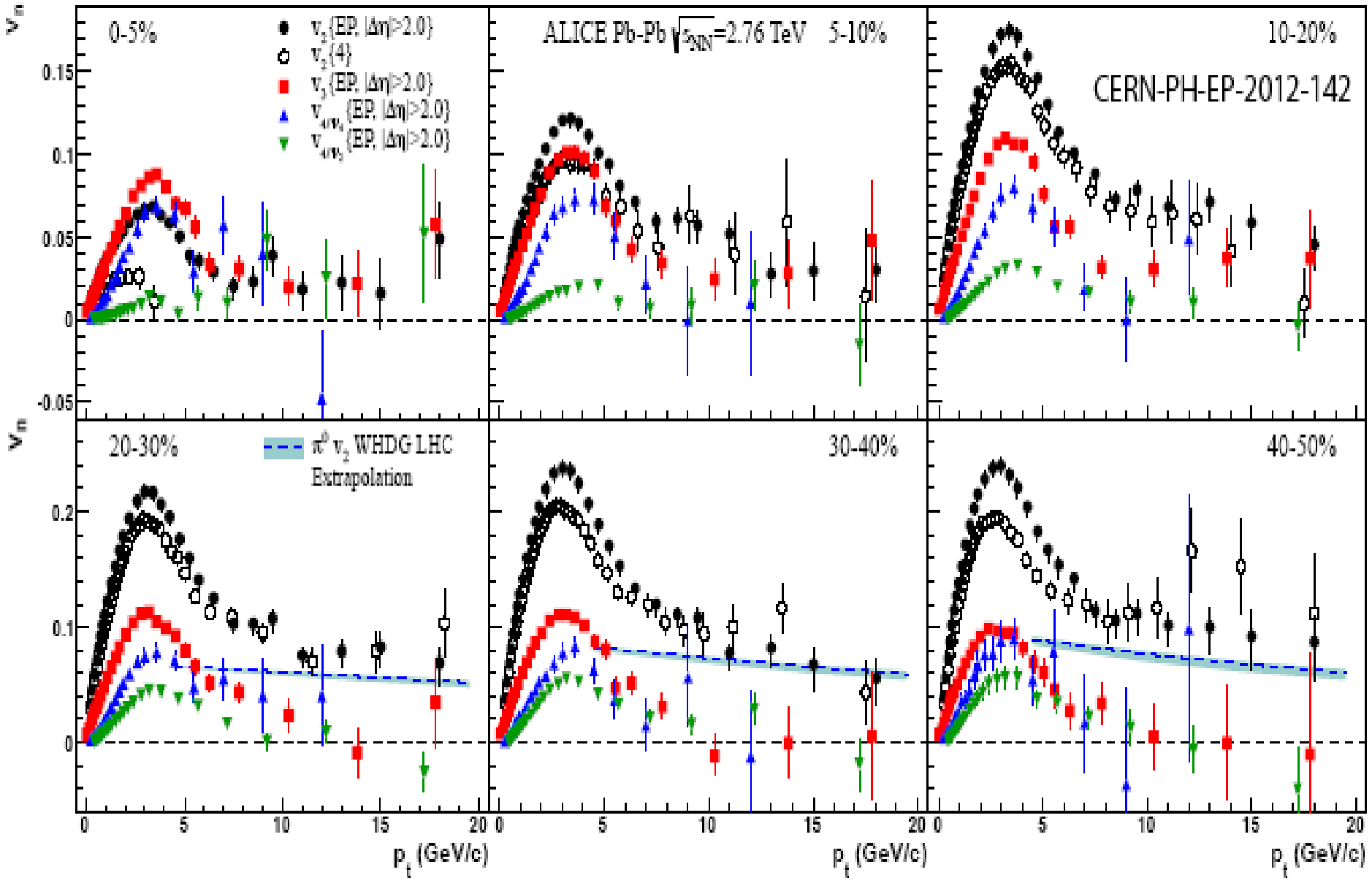
Experimental Data Phenix



Experimental Data Phenix

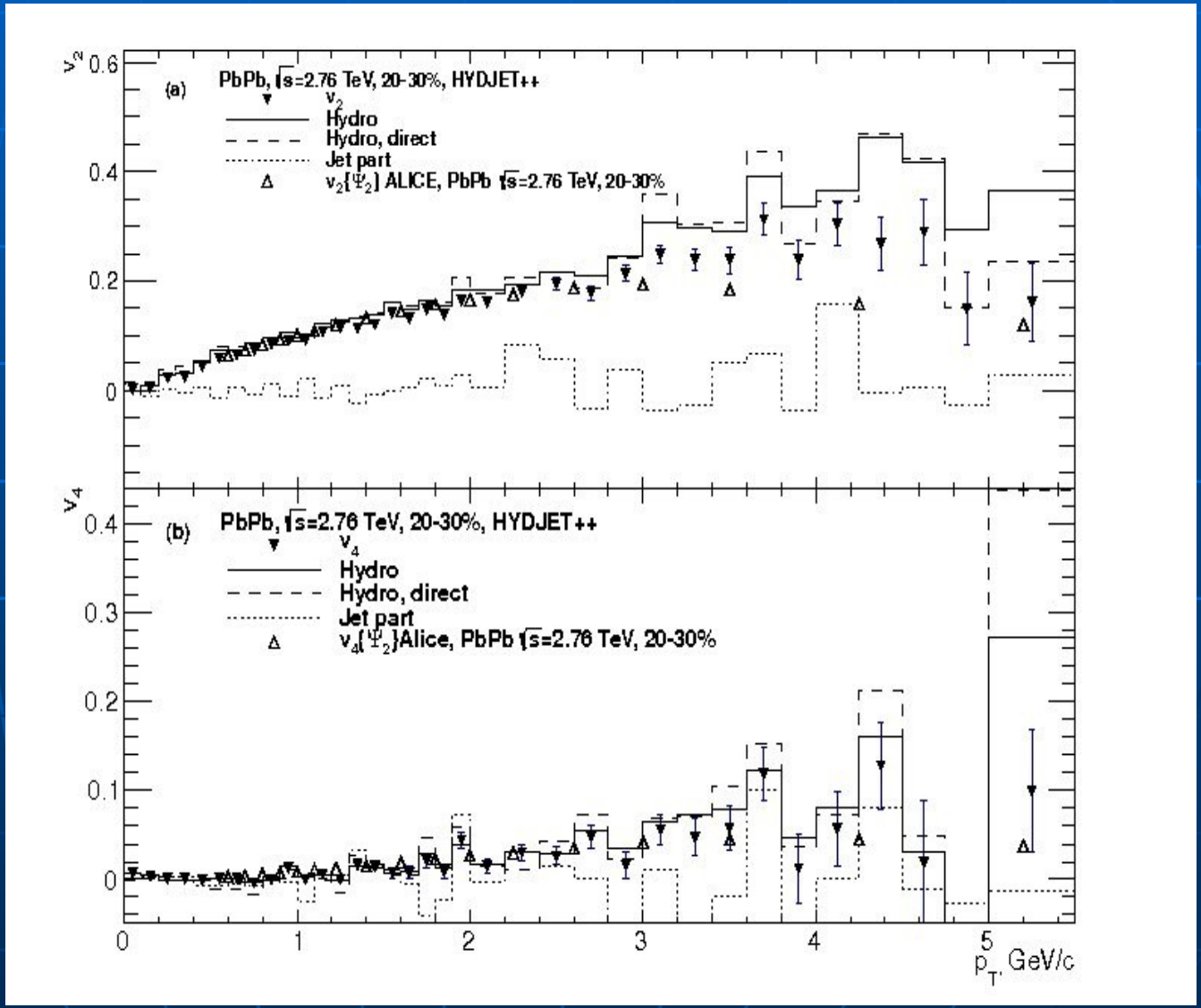


Experimental Data ALICE



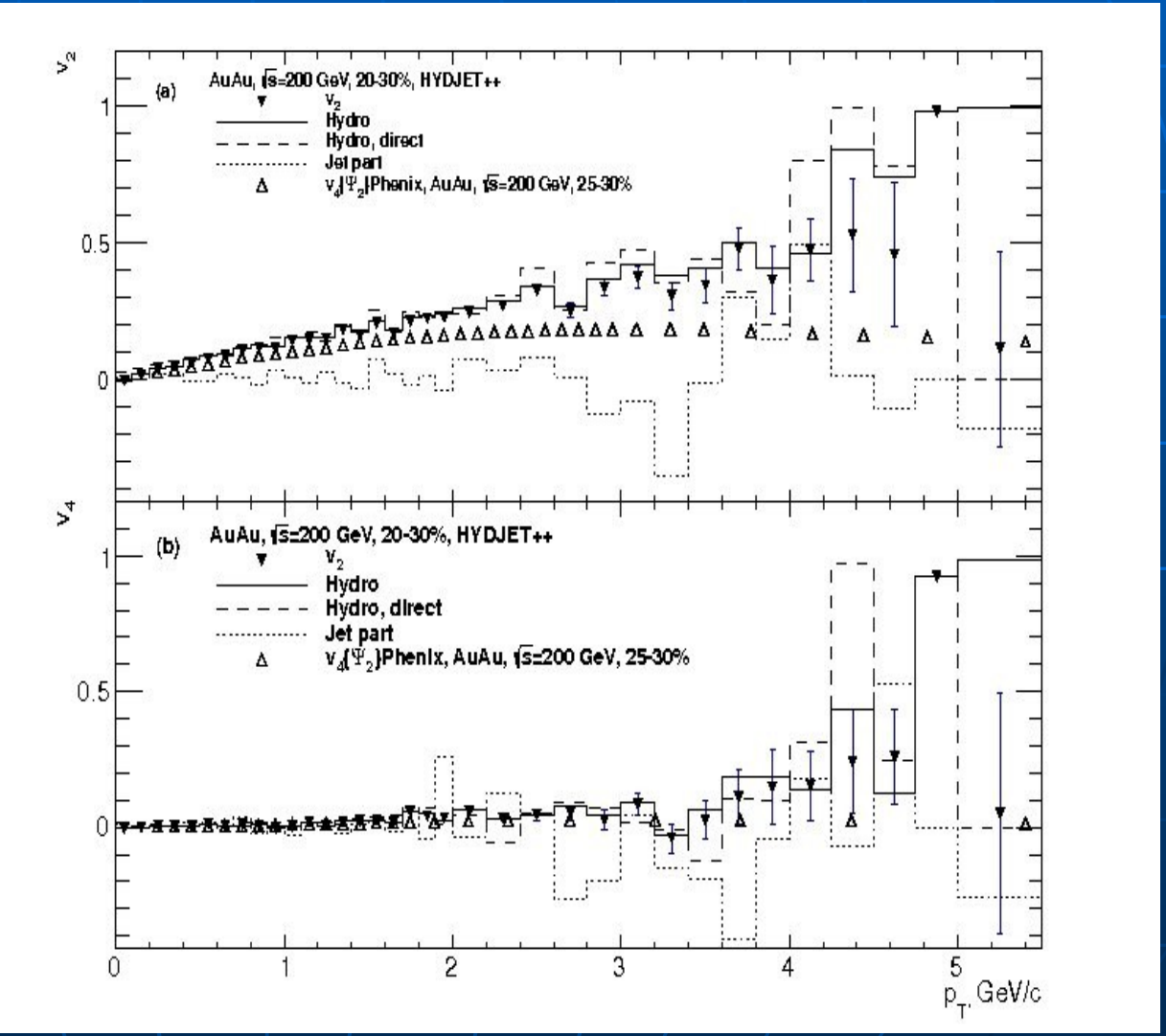
Overview v2 v4

- Flow at LHC
- Quench contrub ution for both v2 and v4.



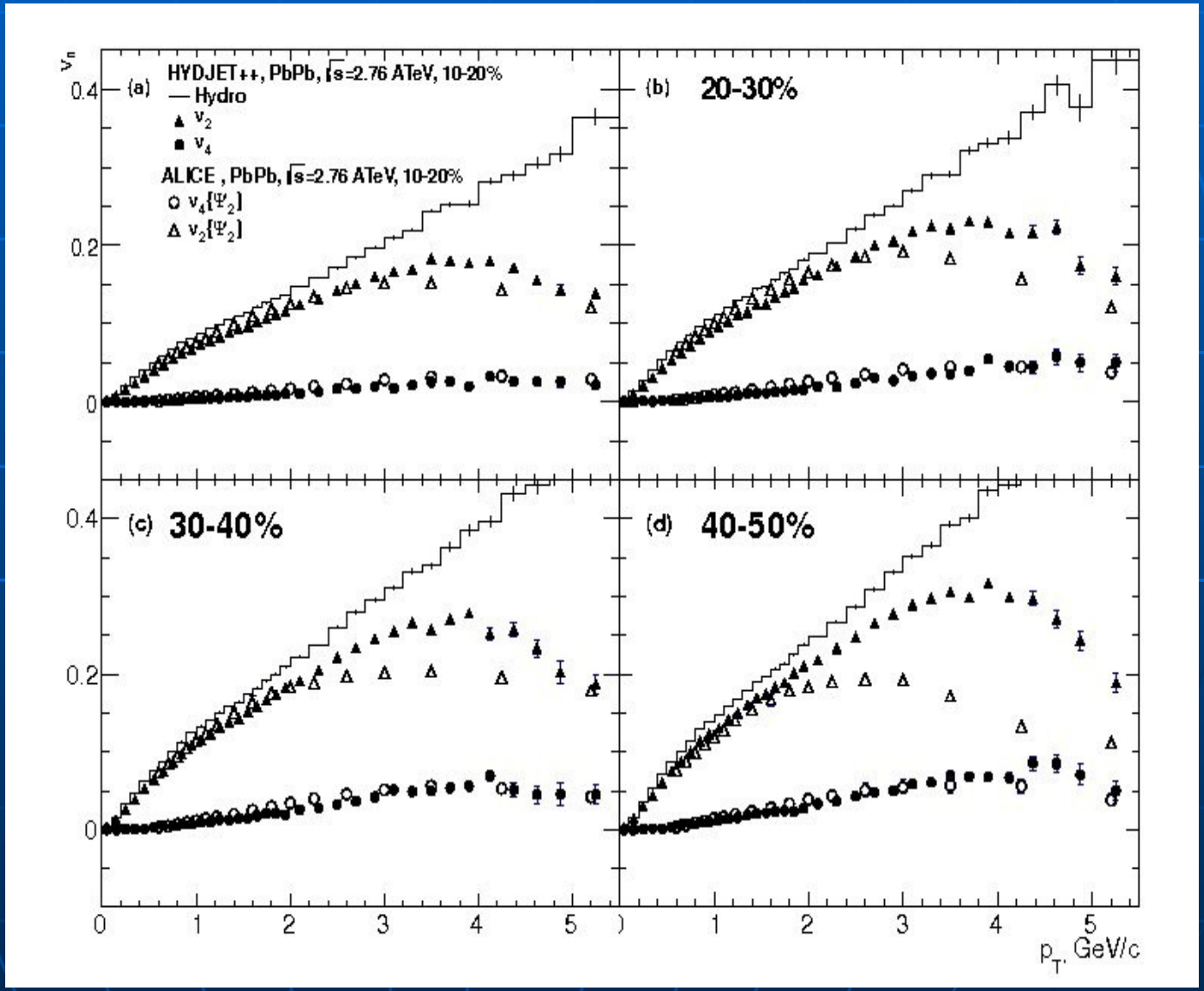
Overview v2 v4

- RHIC
- Quenched Flow
- HYDJET Overshoots



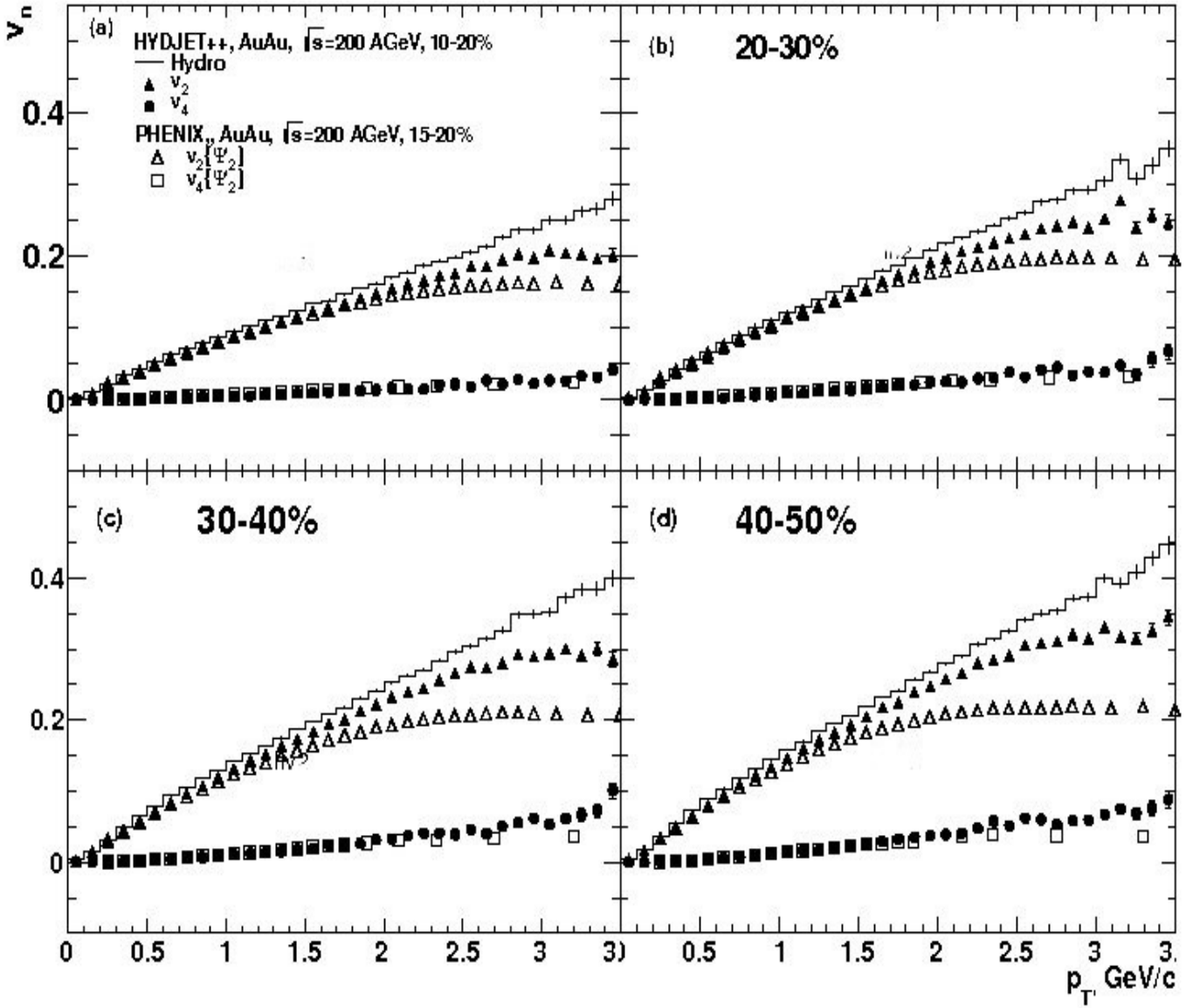
Comparison with Experiments

- LHC



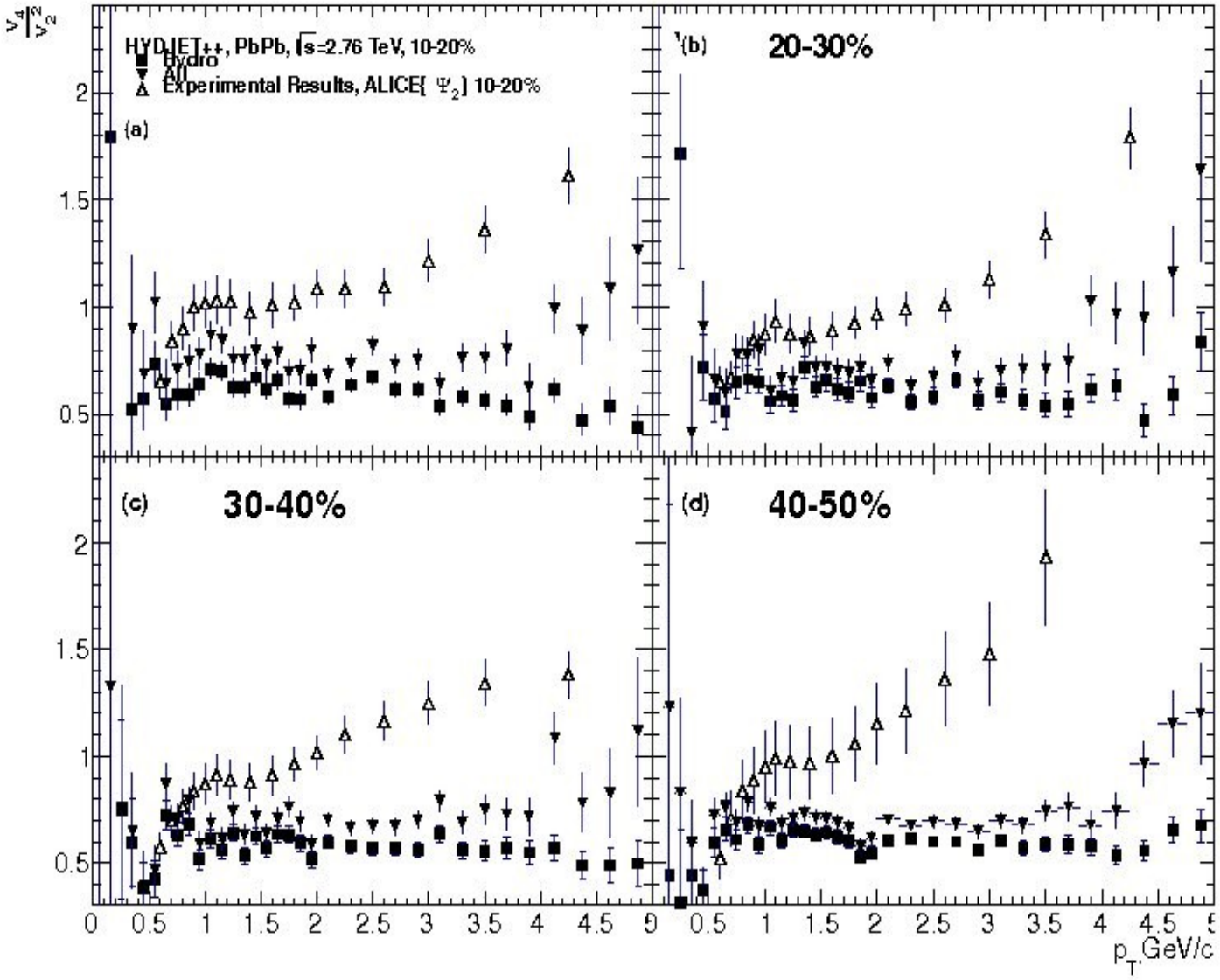
Comparison with Experiments

- RHIC
- Discrepancies for high centralities.
- Radiative losses.



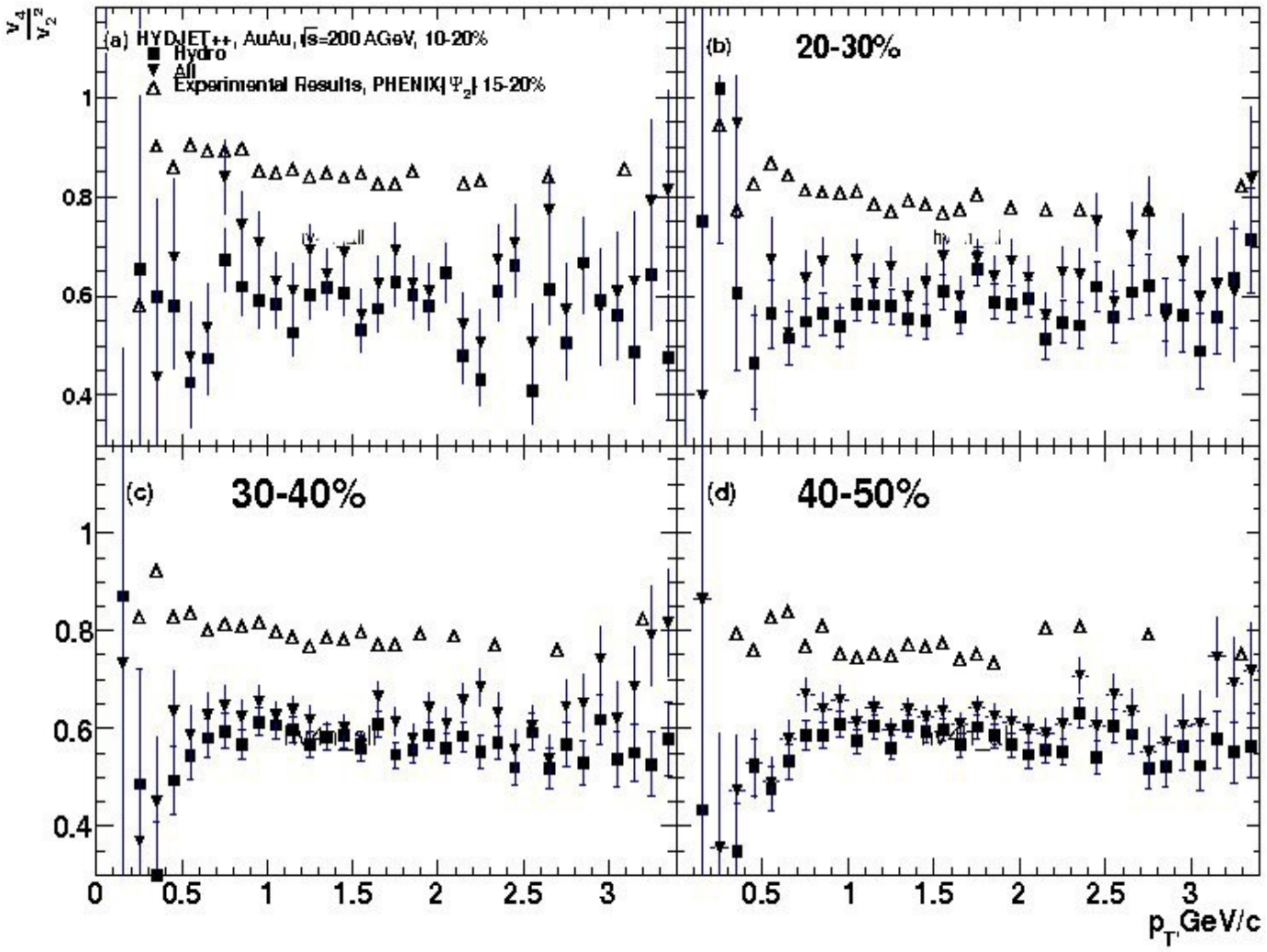
Ratio LHC

- LHC
- Hydro as Predicted
- Jets Increases flow



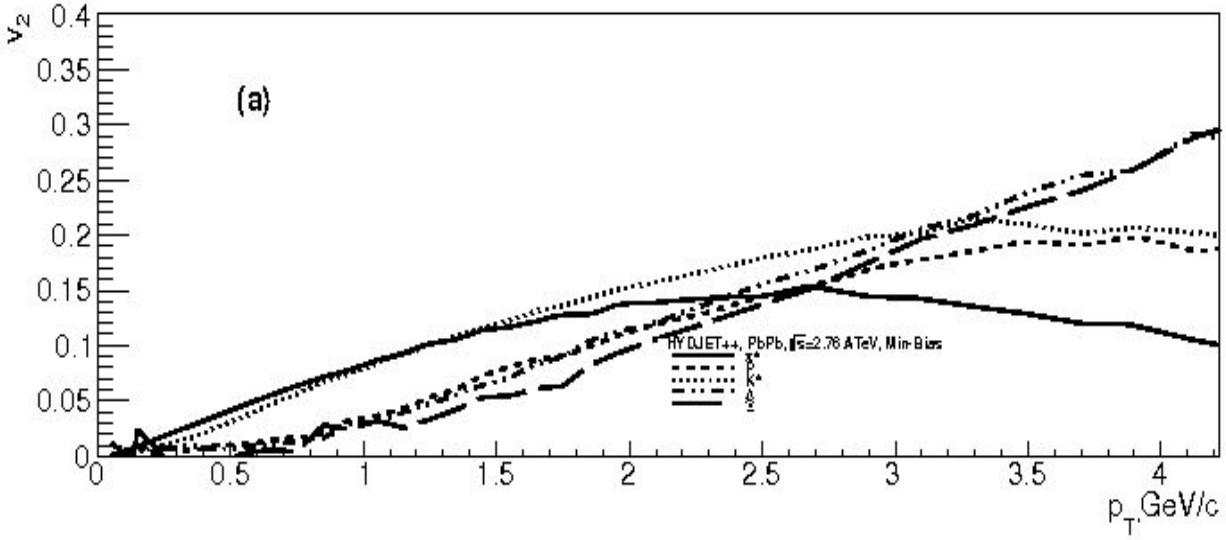
Ratio RHIC

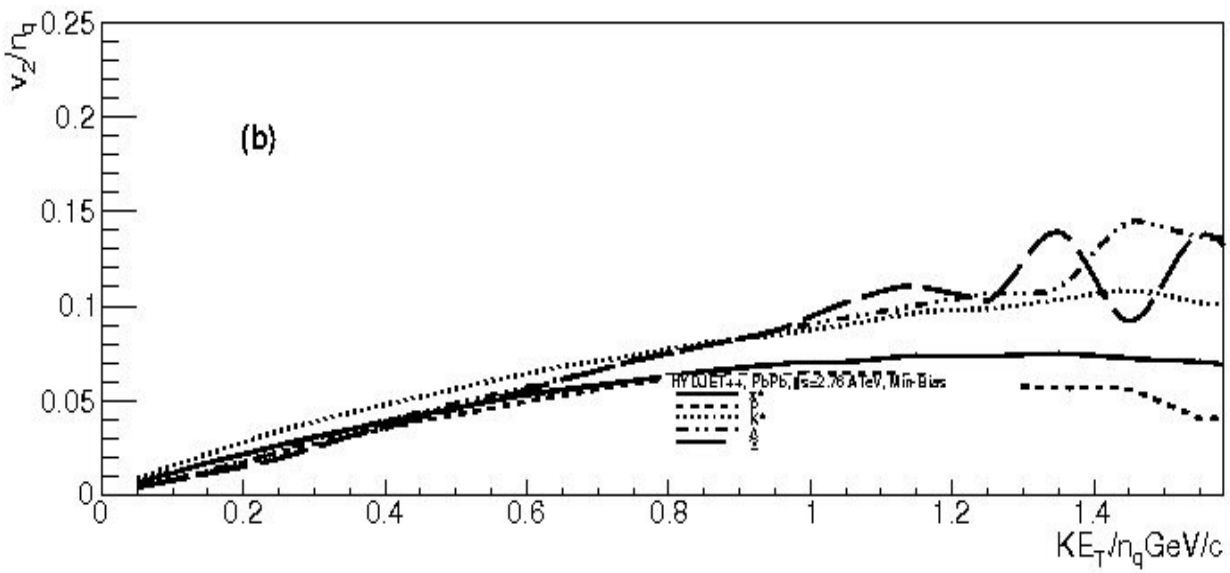
- RHIC
- Lower than Experiments



Min-Bias LHC

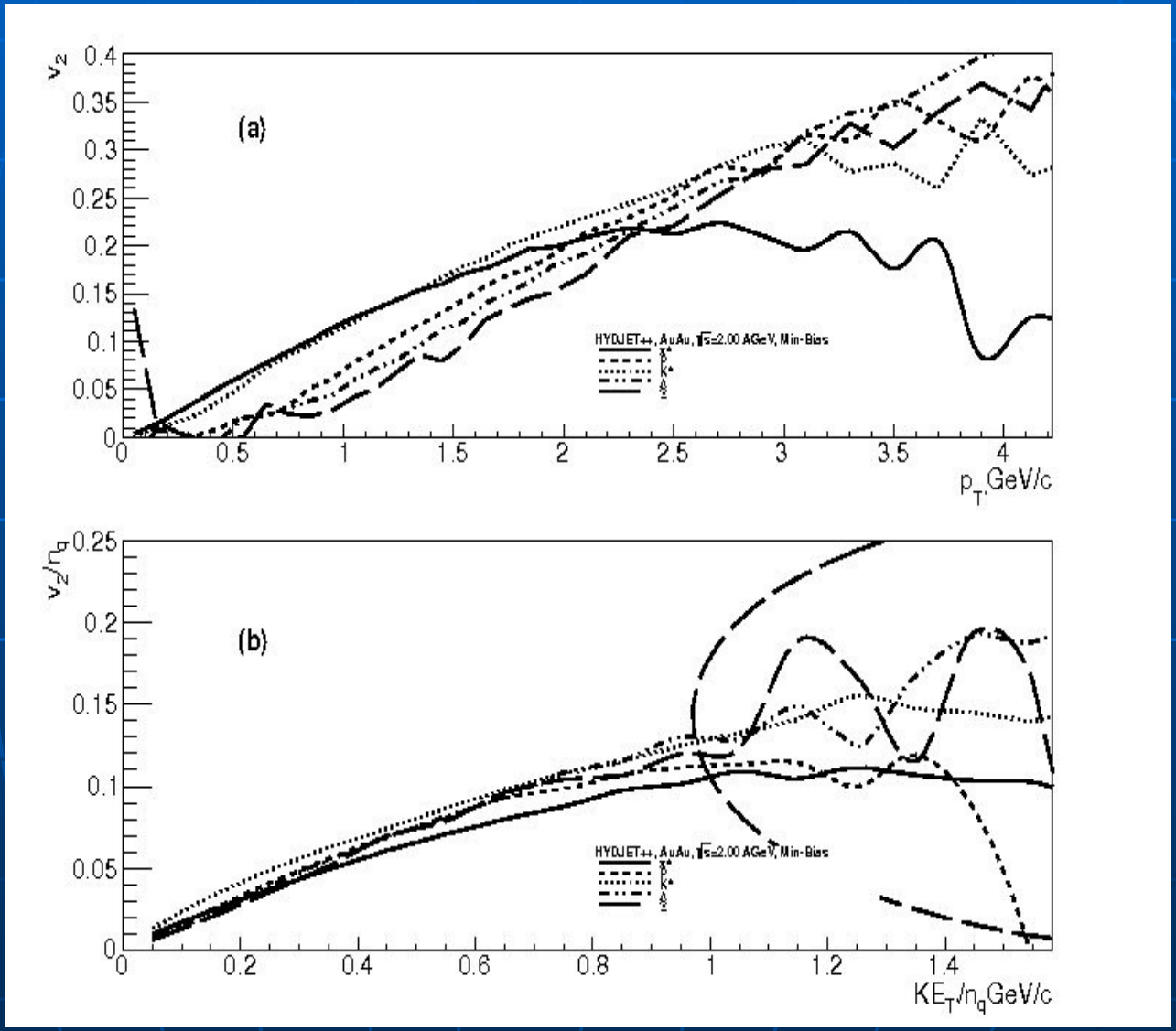
- LHC
- Approximate scaling for low pt regime.
- High pt still splits





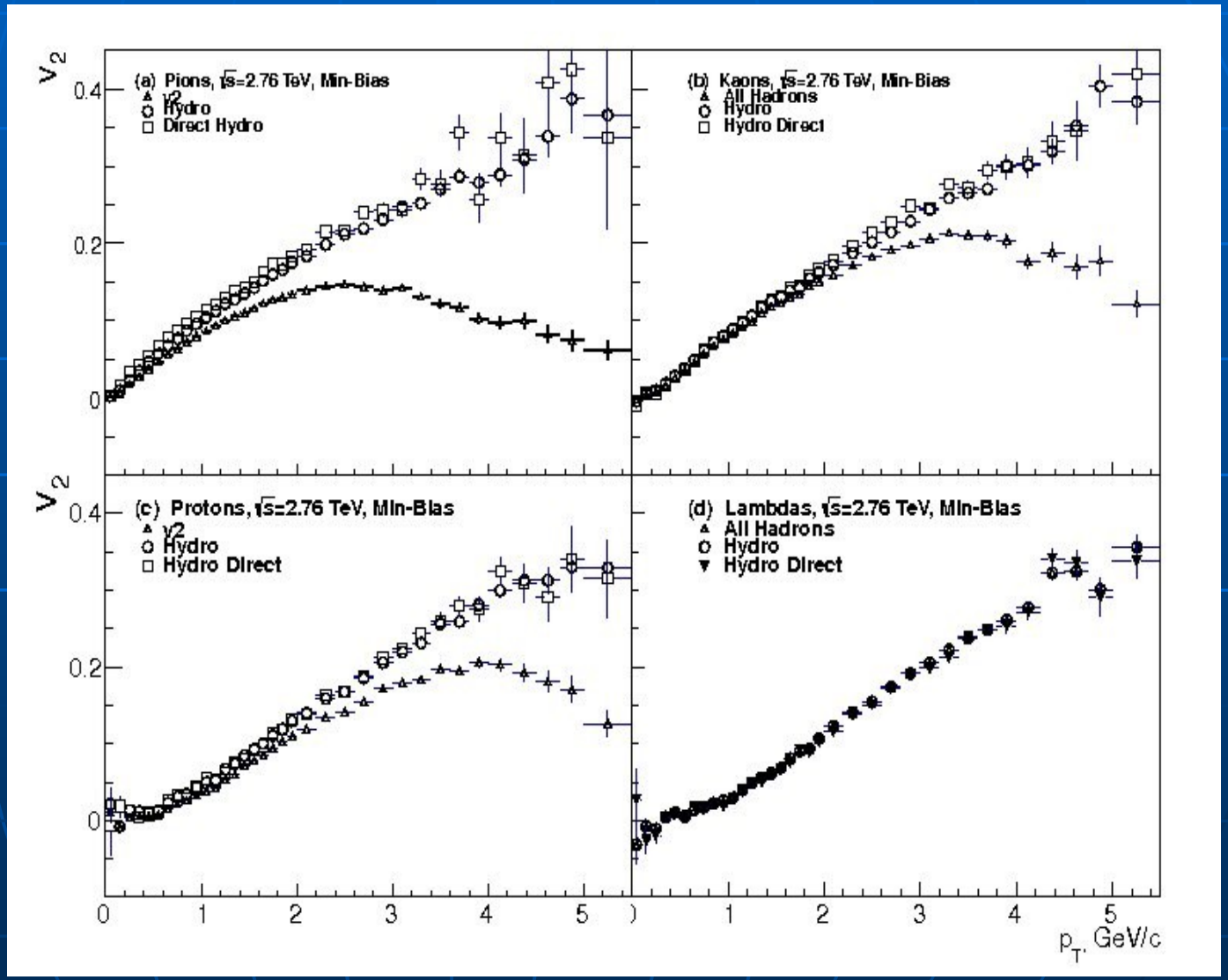
Min-Bias RHIC

- RHIC
- Scales in low pt regime
- Splits for high pt



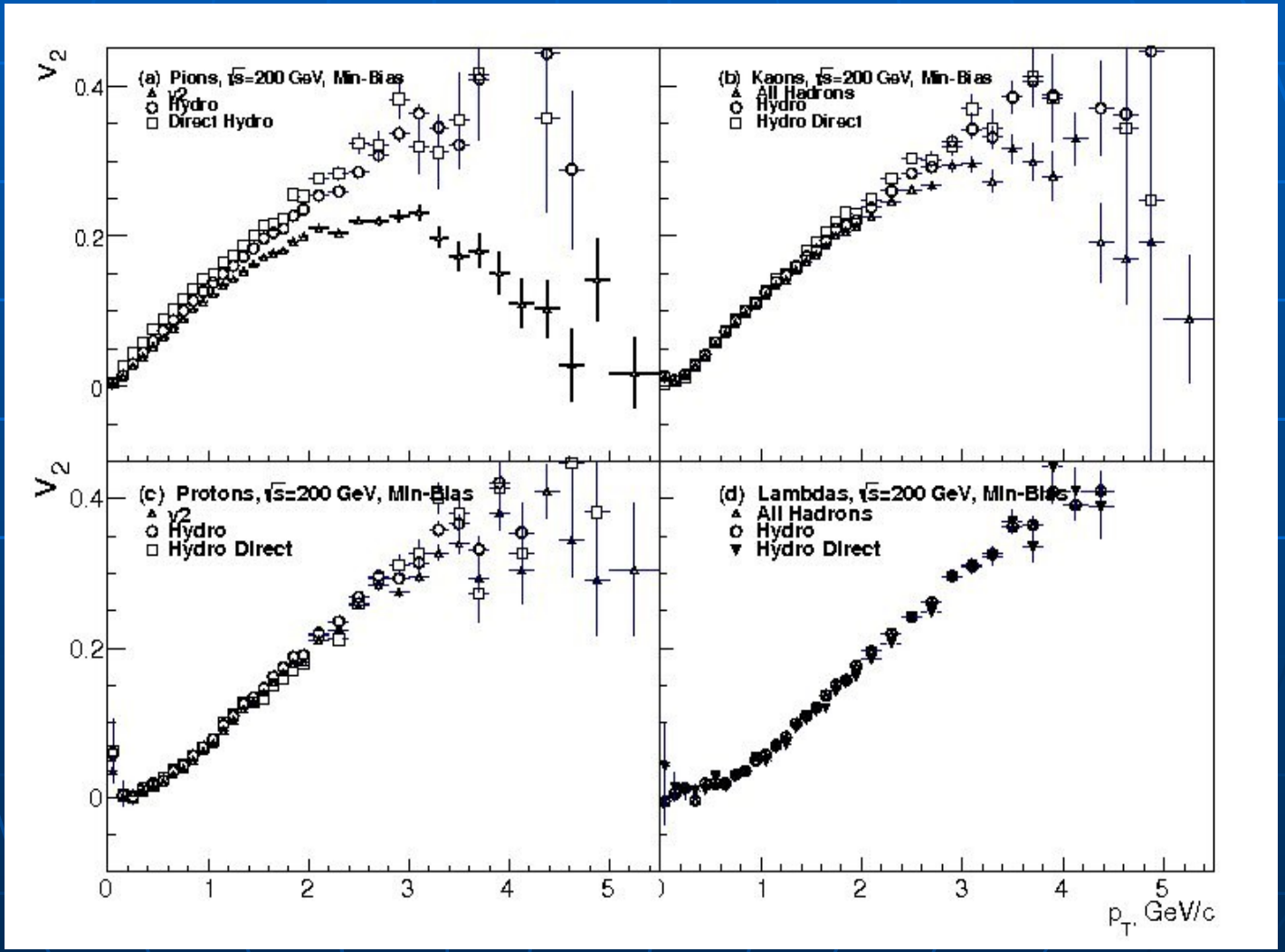
Min Bias LHC

- LHC
- Species
- Losses due to radiation



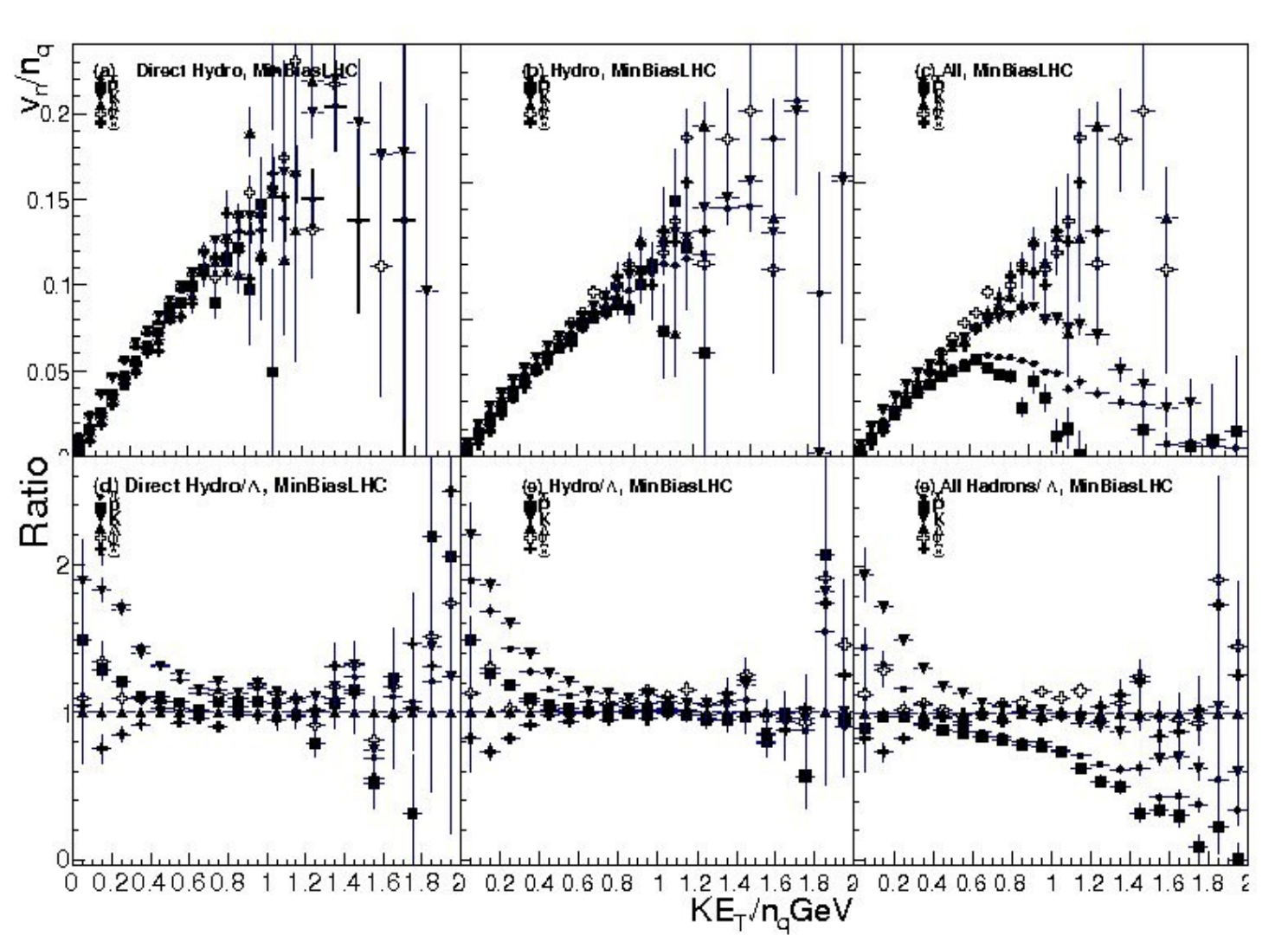
Min-Bias RHIC

- RHIC
- Losses for Pions only.



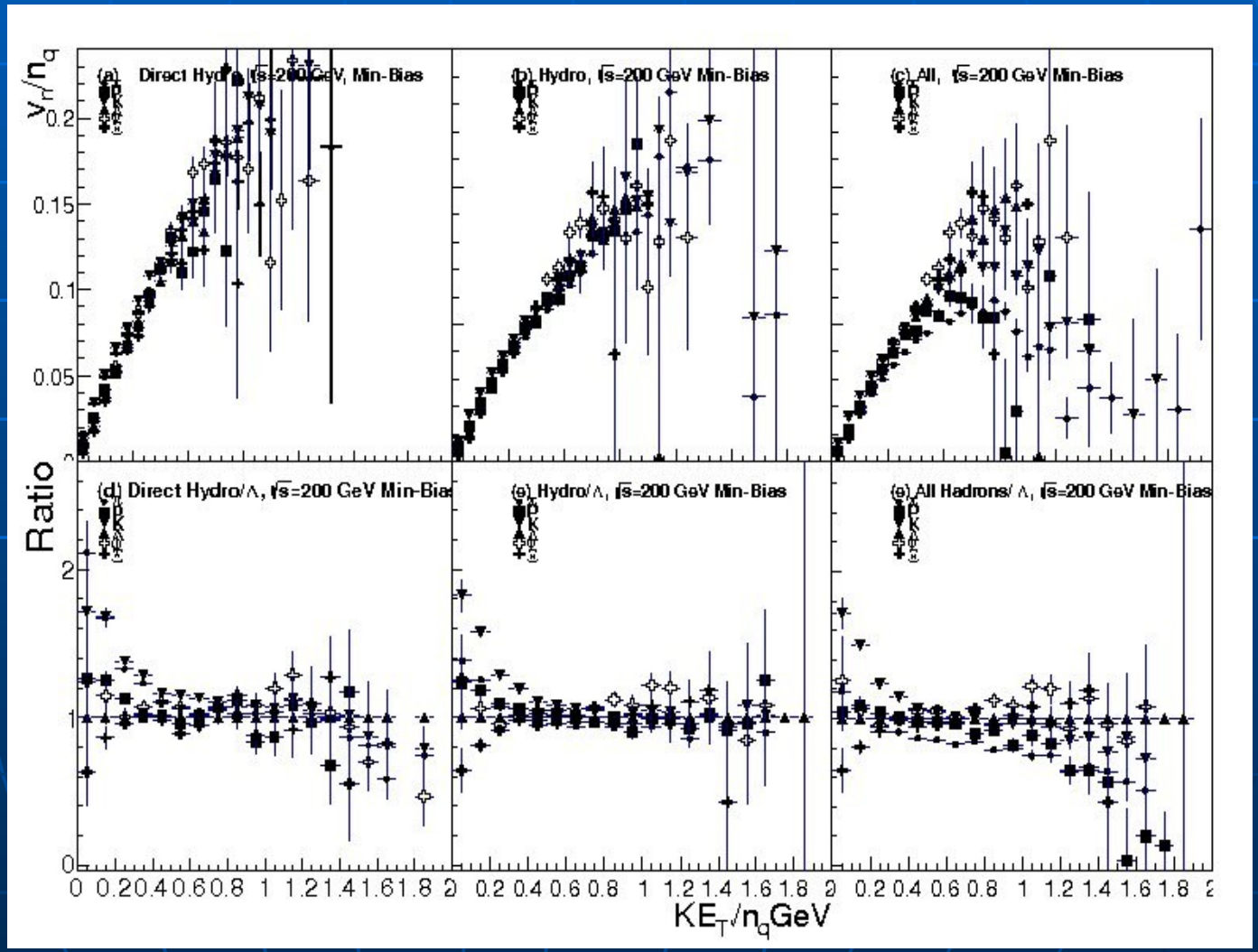
Min-Bias LHC, Scaled

- Hydro lowers flow
- Scales approximately
- Except oin for Protons Pions and Kaons



Min-Bias RHIC, Scaled

- RHIC
- Same type of scaling issue



Conclusions

- V4 Flow is maintained due to jets increases for high pt regime while v2 is quenched.
- Flow ratio too low still, slightly higher with imposed fluctuations.
- Importance of right simulation setting

Introduction

- Part of Thesis Work
- Use of HYDJET++
- Use of Computing cluster (Titan)
- Use of Root (Macros, Plotting, Printing)
- Reading (Relevant Papers)