Directed event anisotropy in 200GeV Au+Au collisions at RHIC-PHENIX

--- Relation between flow and (mini-)jets in high energy heavy-ion collisions ---

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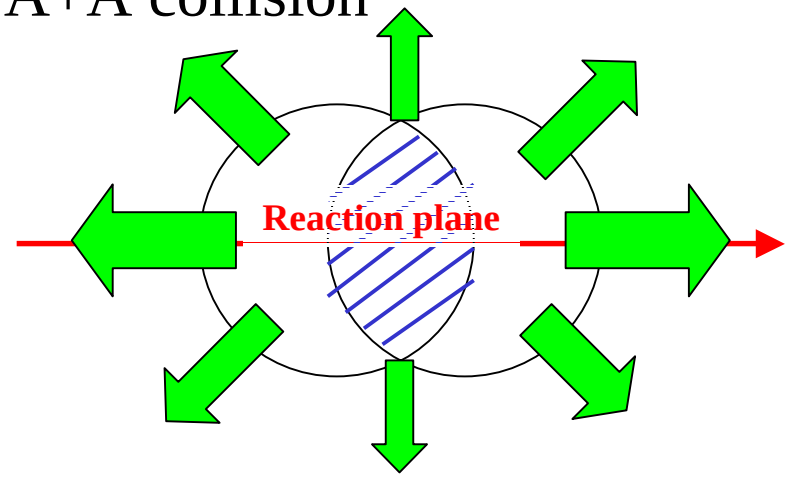
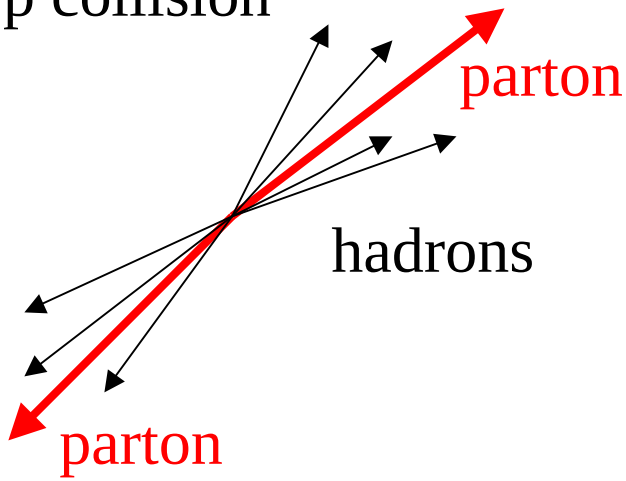
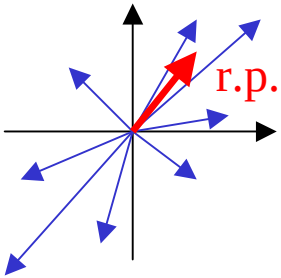
Introduction
Simulation
Experimental data
Summary

A+A collision



p+p collision

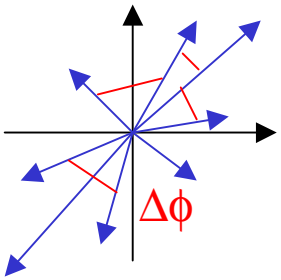




r.p. for a geometrical origin

suffer r.p. resolution (smeared shape)

$$dN/d(\phi-\Phi) = N\,(1 + \Sigma\, 2v_n{}'\cos(n(\phi-\Phi)))$$



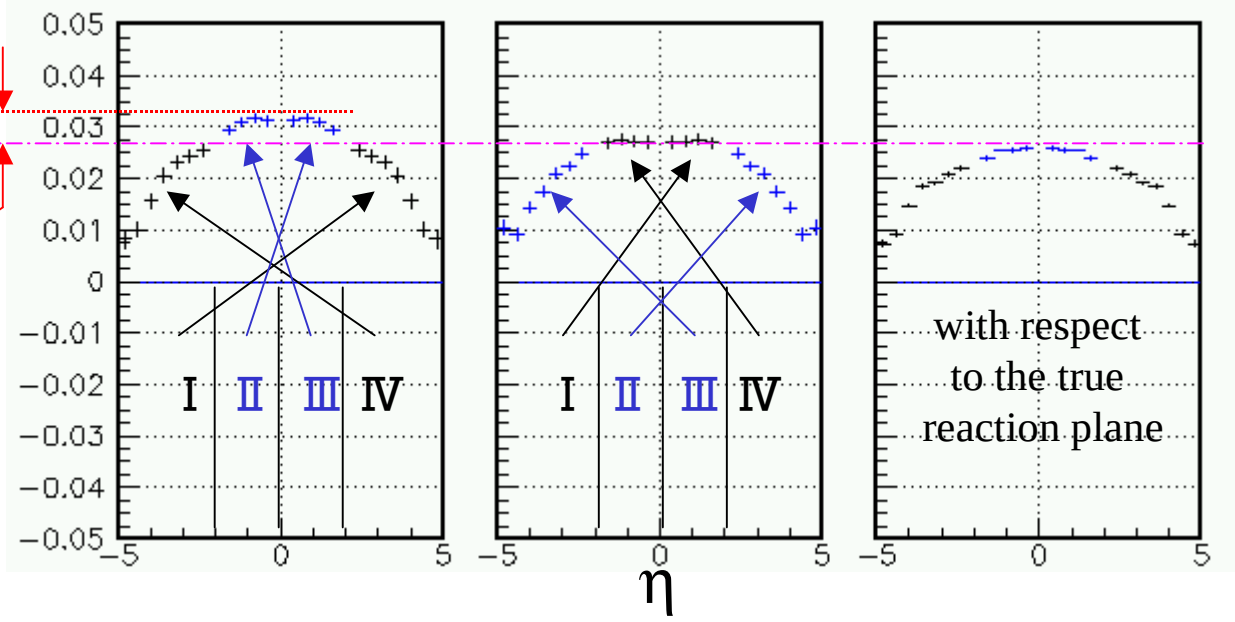
no smearing (detailed shape analysis)

event anisotropy shape (no relation to r.p.)

$$N^{real}(\Delta\phi)/N^{mixed}(\Delta\phi) = N\,(1 + \Sigma\, 2v_n{}^2\cos(n(\Delta\phi)))$$

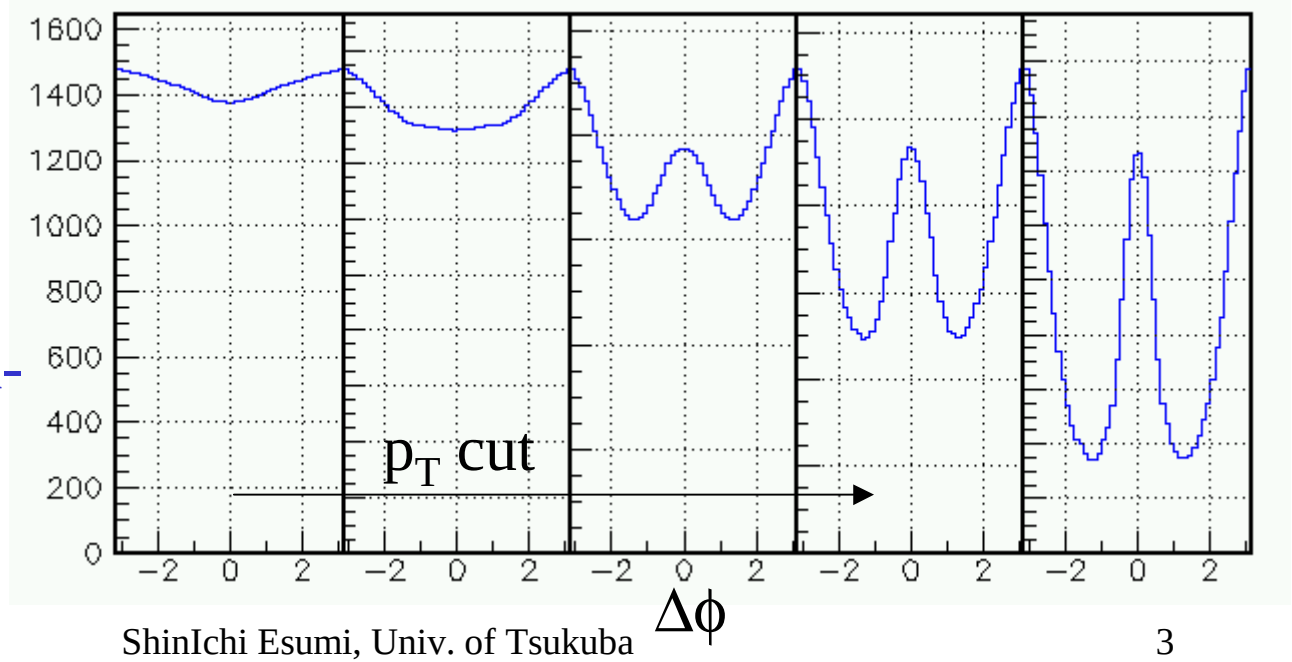
RQMD Au+Au
at 200GeV

non-flow
(decays, multiple
interactions)

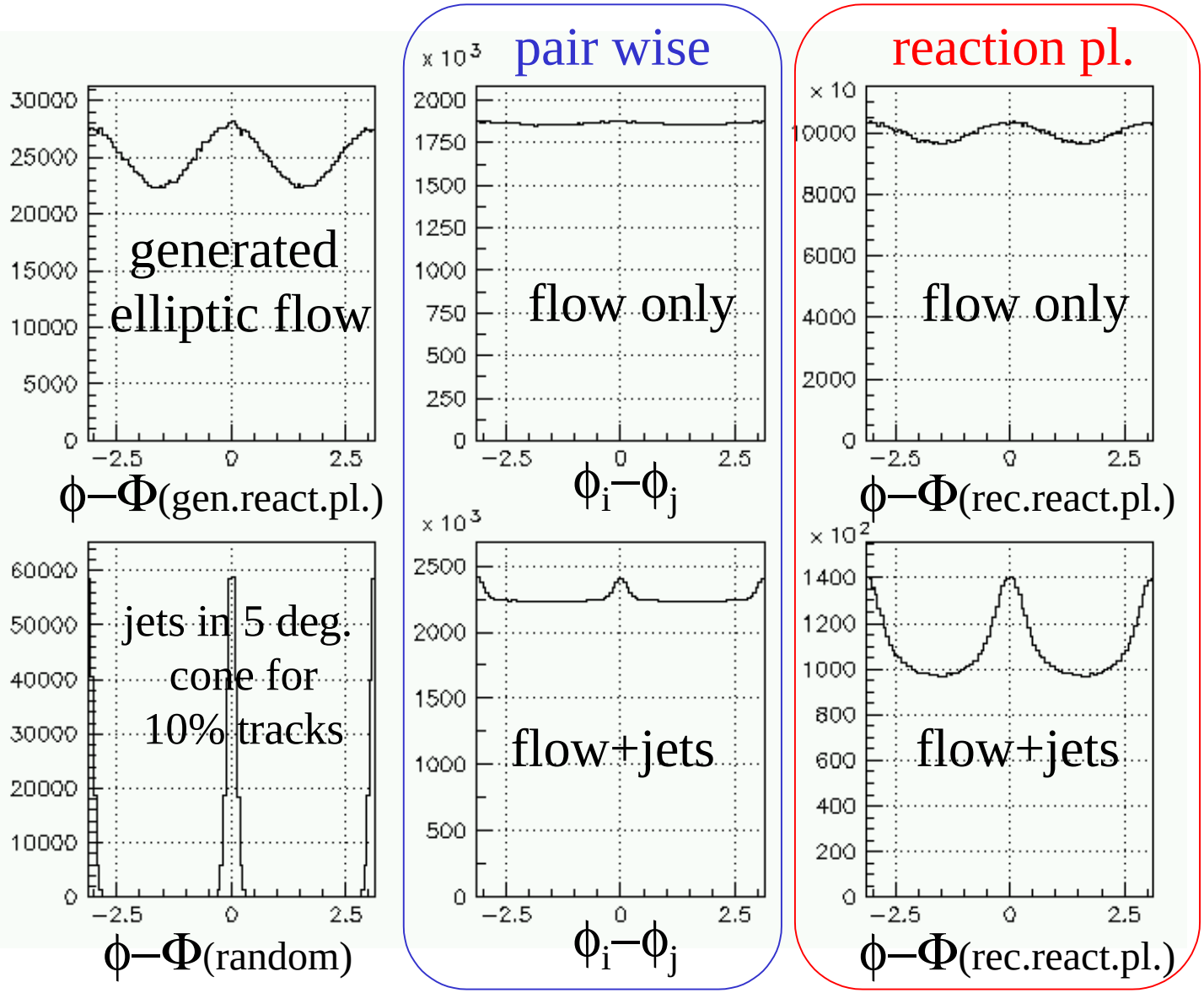


Pythia p+p
at 200GeV

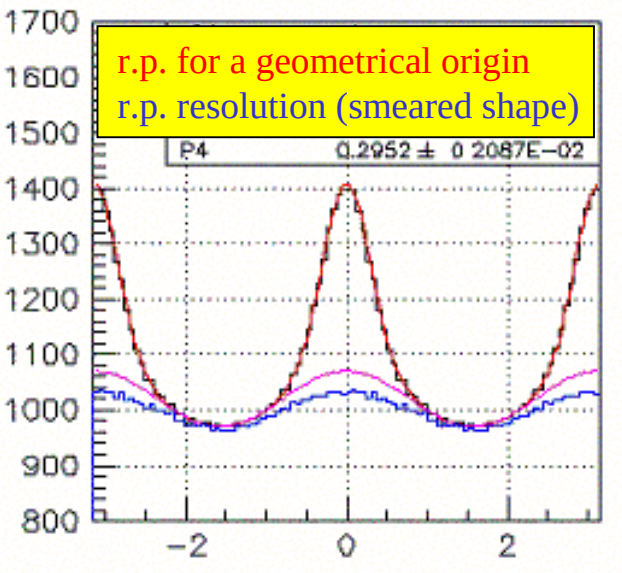
zero v1/v2,
pure jets and back-
to-back jets can
generate v1/v2.

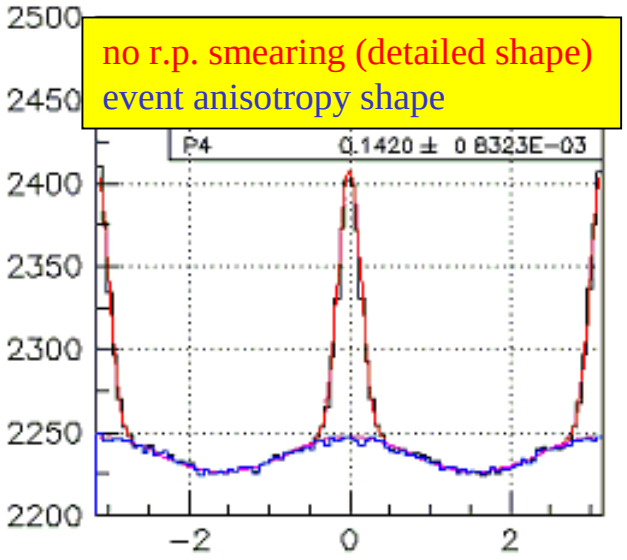


toy model : elliptic flow and jet generation

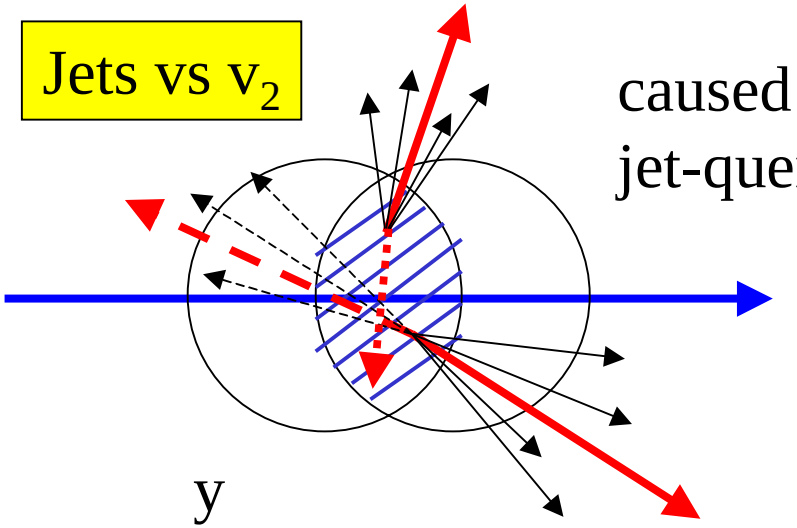


The both methods give the same answer for each case with $\langle \cos n\Delta\phi \rangle$ calc.

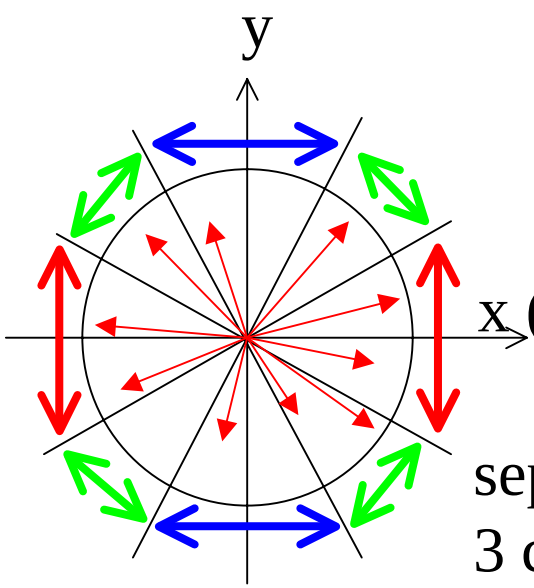




Jets vs v_2



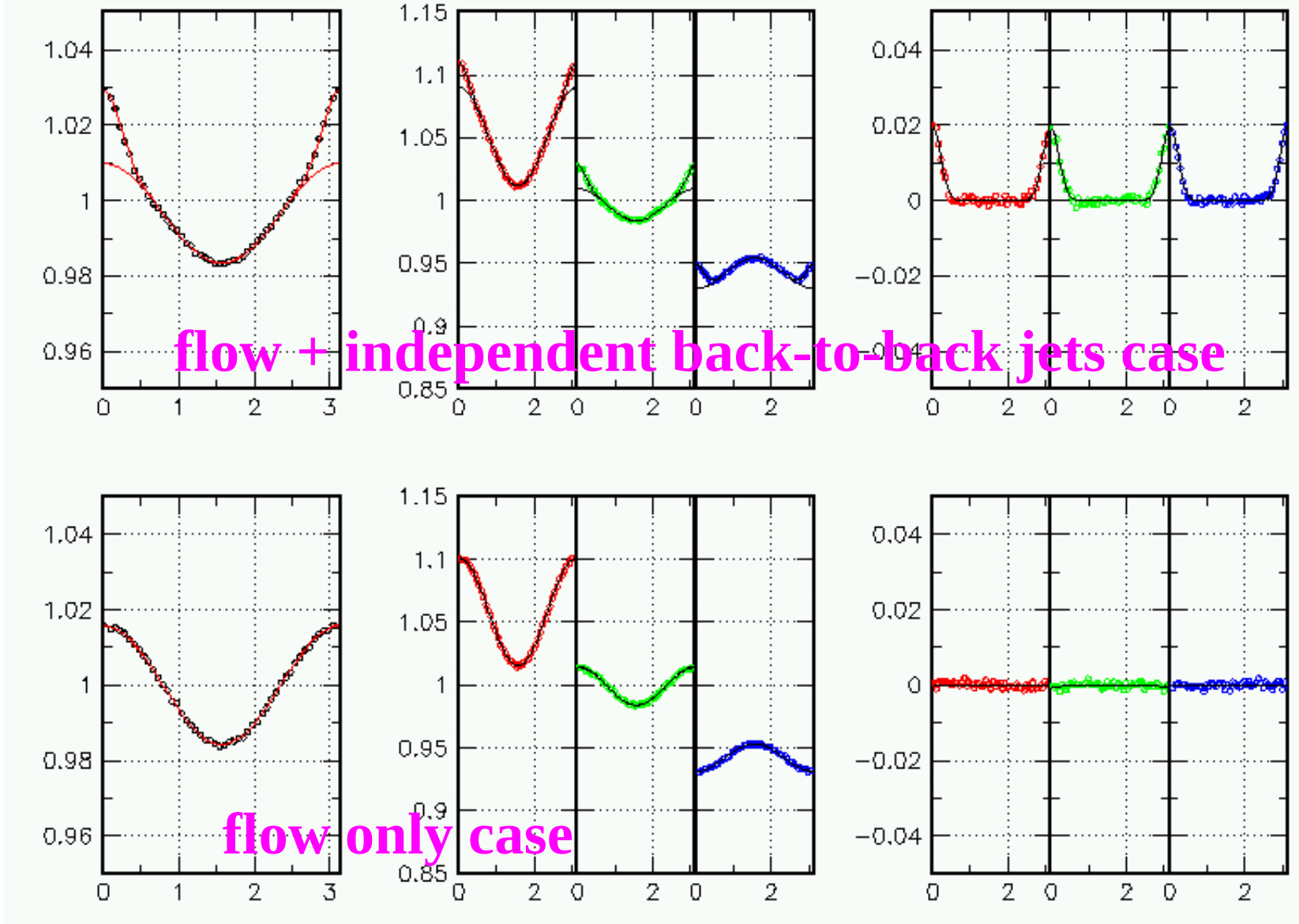
caused by the jet-quenching



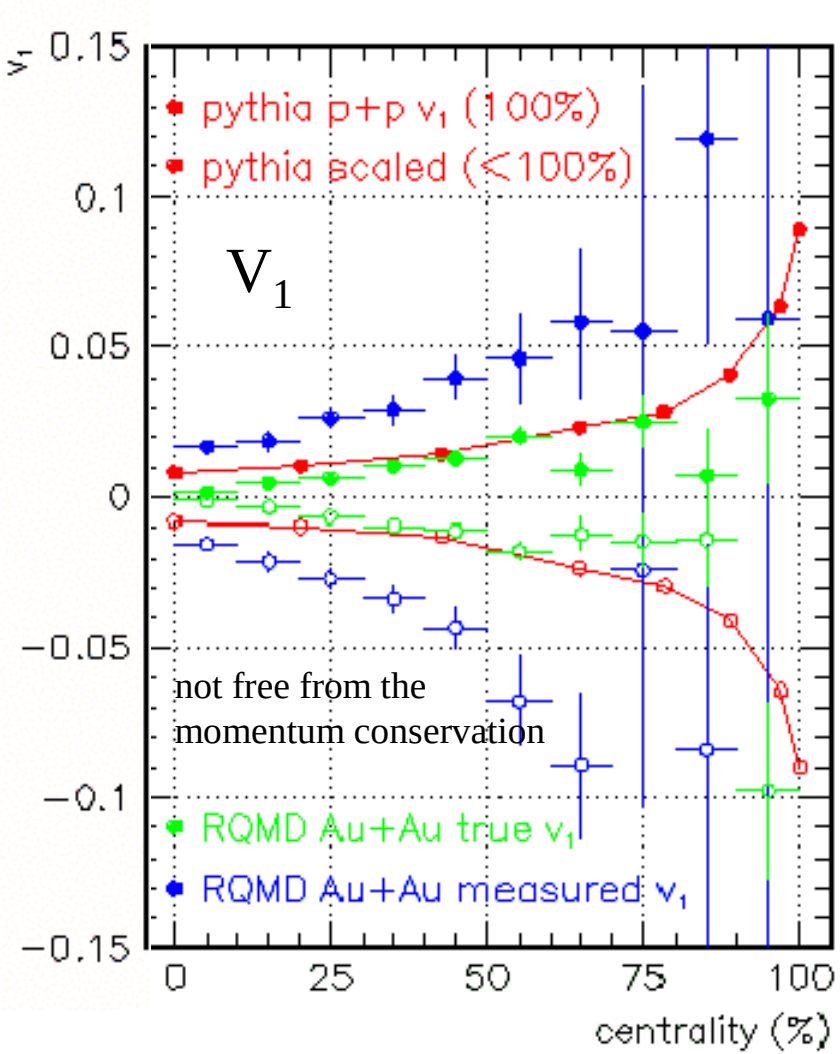
new method

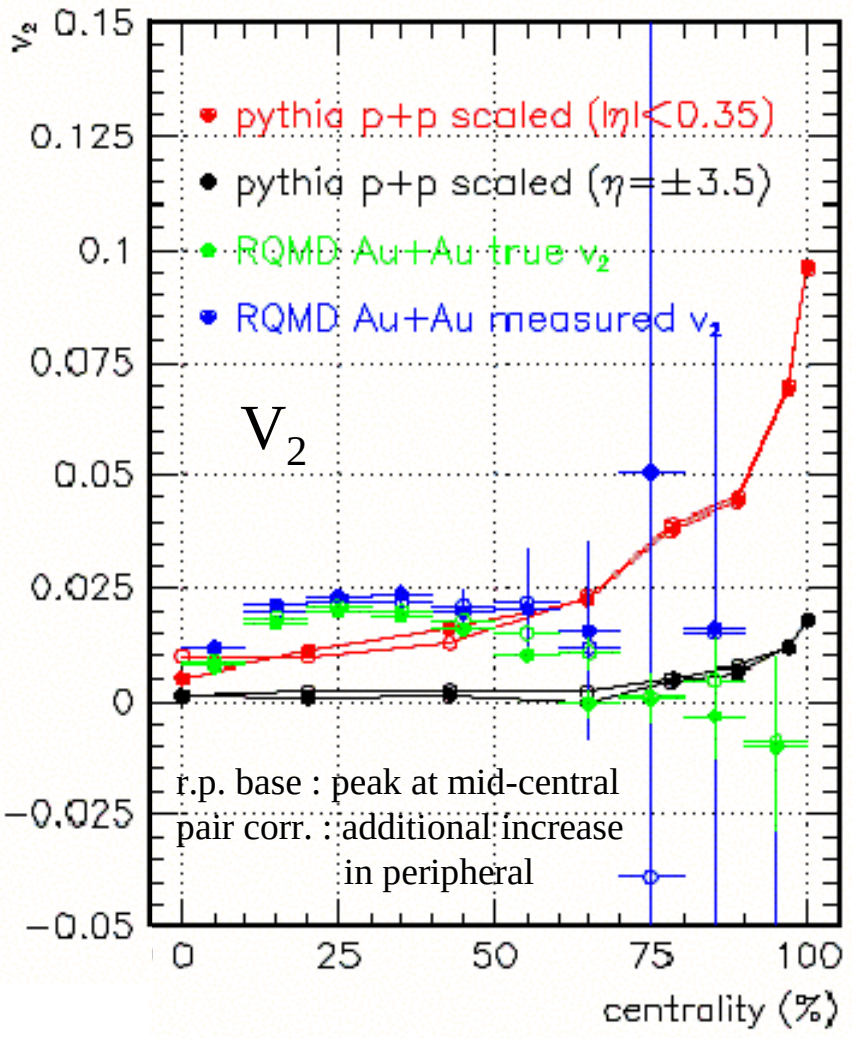
separate corr. func. into 3 classes according to the pair orientation w.r.t. the reaction plane

toy model : elliptic flow and random back-to-back jet generation



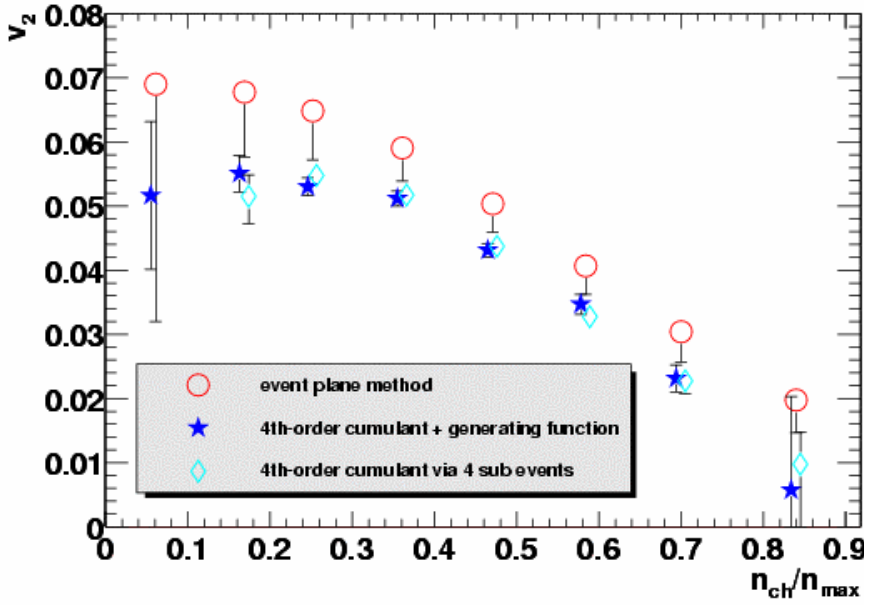
RQMD v2.4 Au+Au, Pythia p+p at 200 AGeV

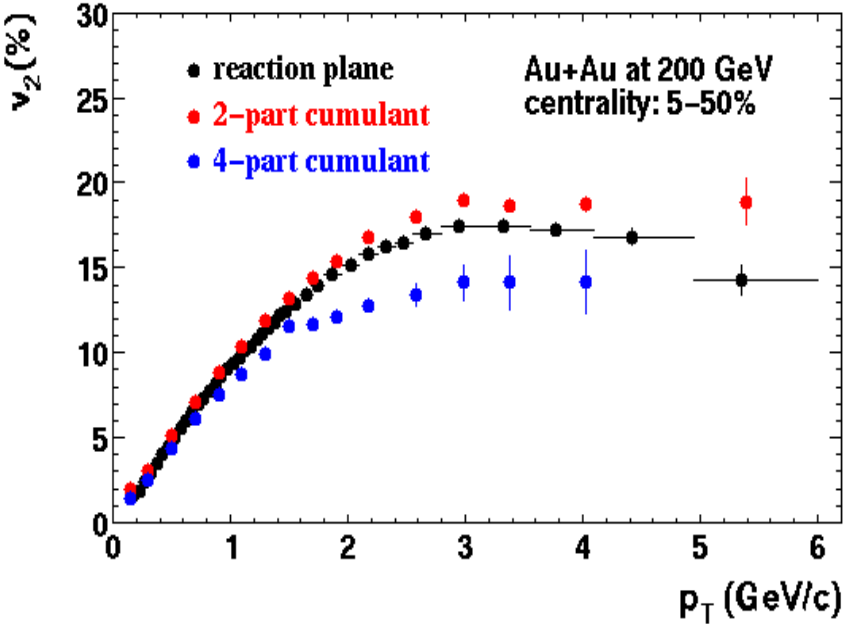


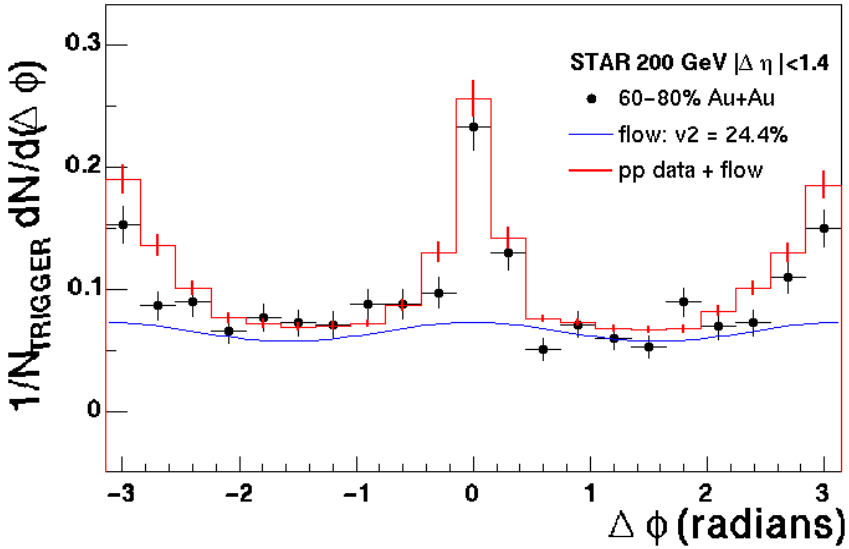


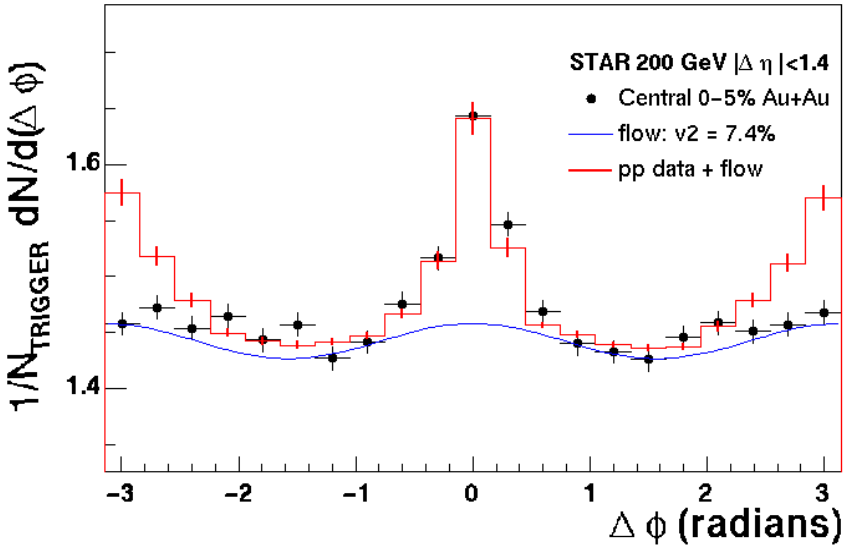
STAR at RHIC 200GeV Au +Au

qm02



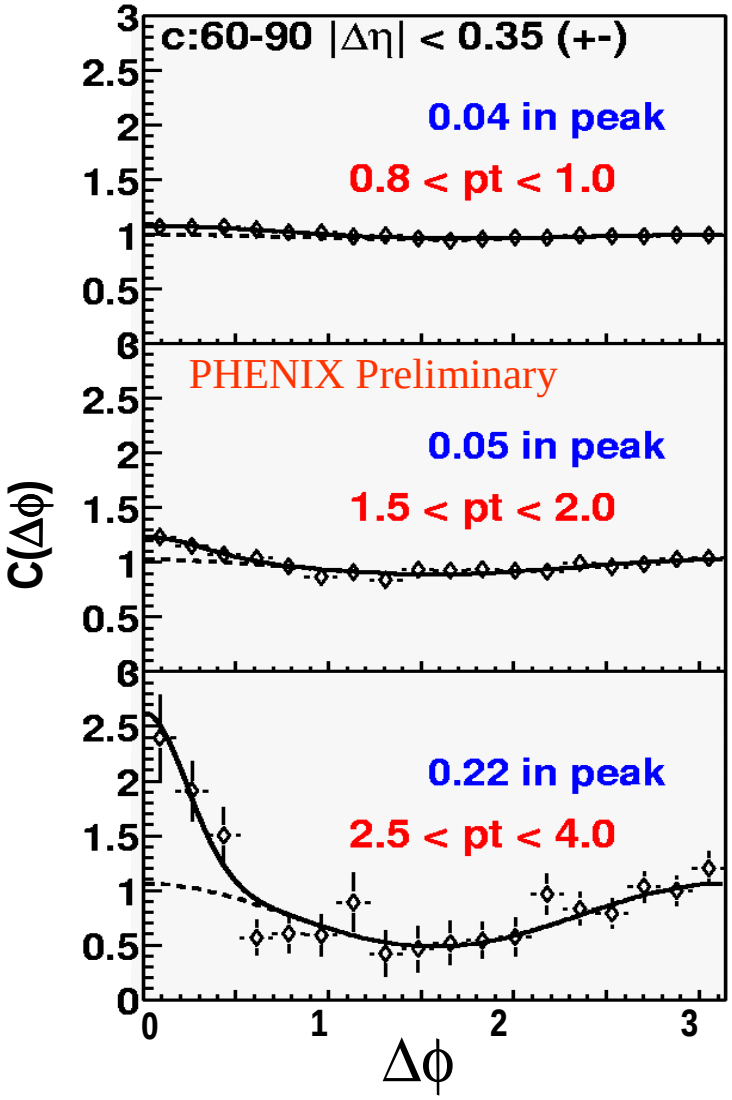


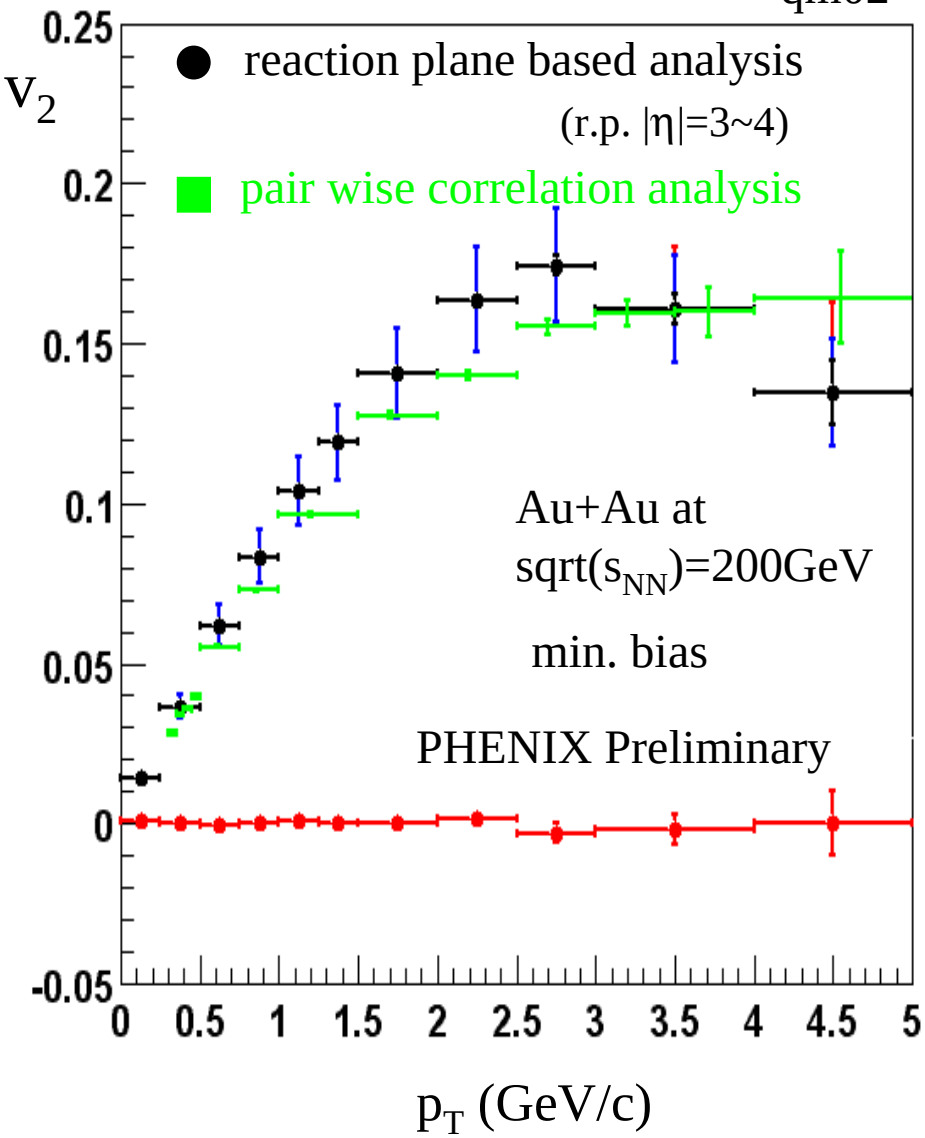




PHENIX at RHIC 200GeV Au +Au

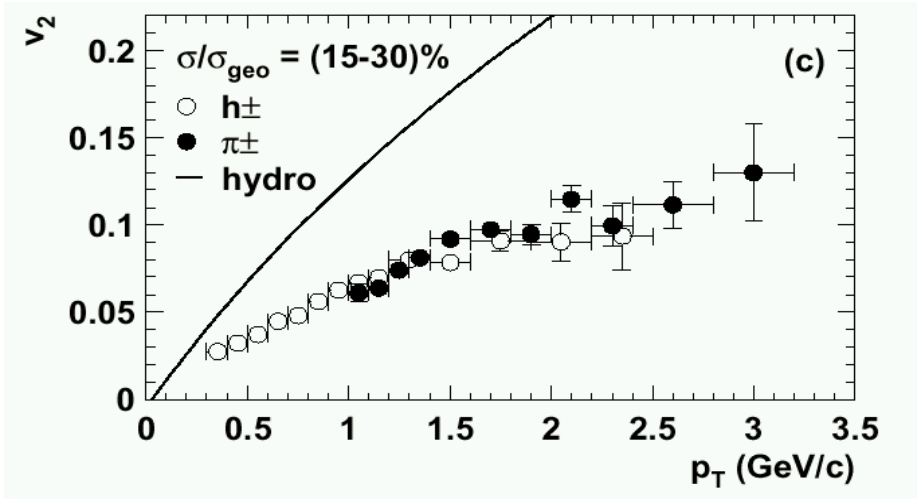
qm02

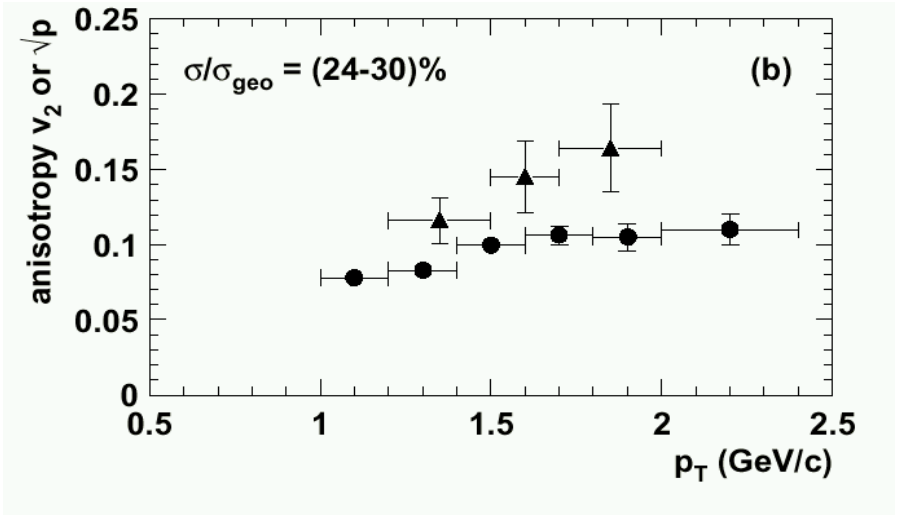


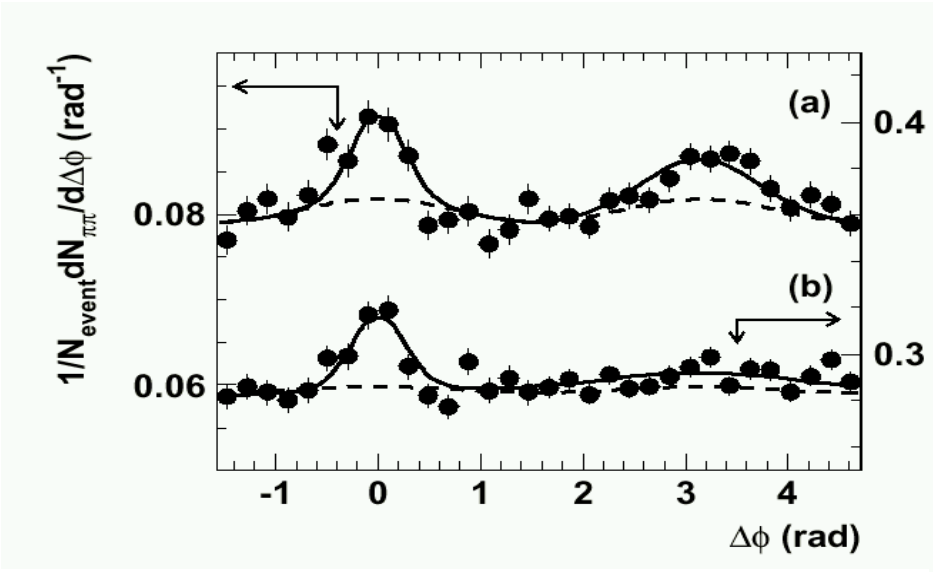


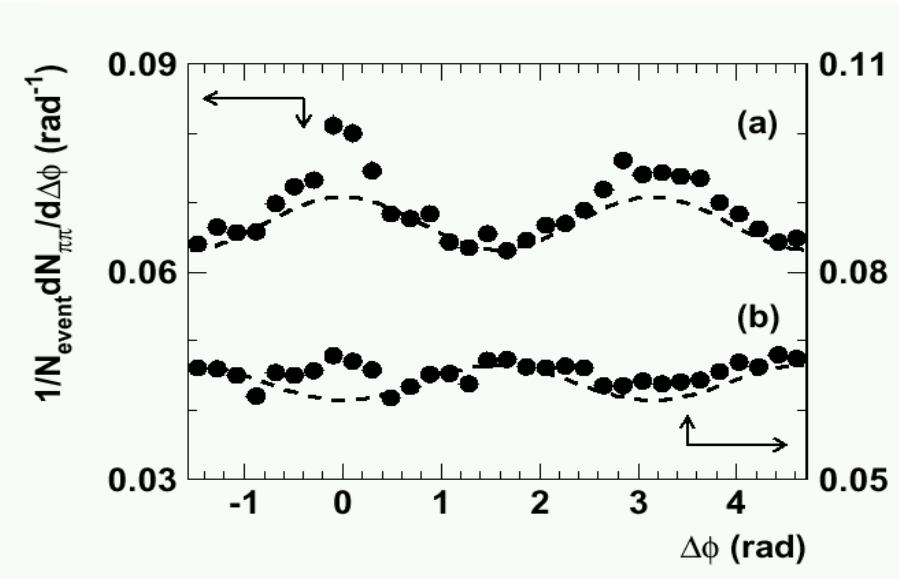
CERES/NA45 at SPS 19GeV Pb +Au

nucl-ex/0303014









Summary

(1) Mini-jets (production/survival) could be one of the source of v2 at high (and low) pT in high energy heavy ion collisions.

(2) There is a clear difference between CERN and RHIC in terms of the jet orientation w.r.t. the reaction plane.

(3) The new analysis of pair correlation w.r.t. the reaction plane is underway in different experiments.

(4) ‘v1,v2 vs eta’ data come out very soon.