



The η dependence of charged particle v_2 measurements using the Silicon Vertex detector at RHIC-PHENIX

Hiroshi Nakagomi for the PHENIX Collaboration
(Univ. of Tsukuba)



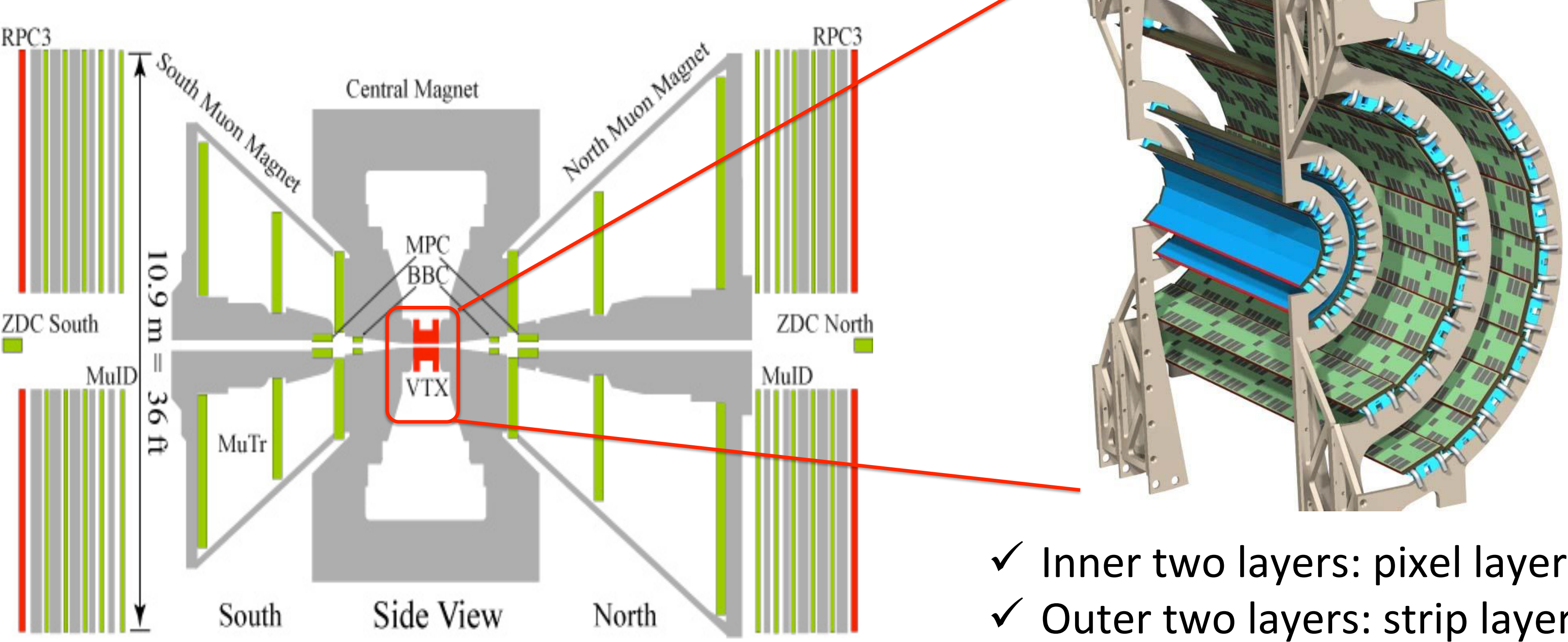
Introduction

In heavy-ion collisions, measurement of azimuthal anisotropy in emitted particle momentum distribution is one of the important themes for the investigation of Quark Gluon Plasma (QGP). For these measurements, we need to be able to measure the reference reaction/event planes direction with good accuracy.

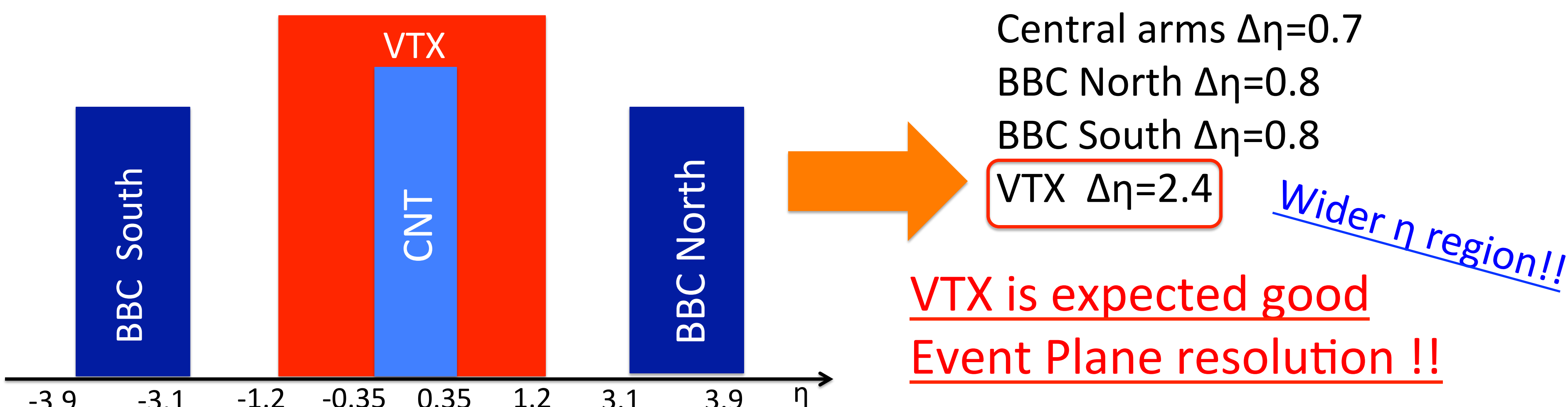
In 2011 the Silicon Vertex detector (VTX) was installed in the RHIC-PHENIX experiment. The VTX is composed of four layers, in which the inner two layers are built with pixel detectors and the outer two layers are built with strip detectors. The VTX can reconstruct charged particle tracks and identify hadrons that include c/b-quark. The reaction plane reconstructed using the VTX is expected to have good resolution due to the wide eta acceptance of the detector, -1 to +1.

Silicon Vertex detector

PHENIX detectors

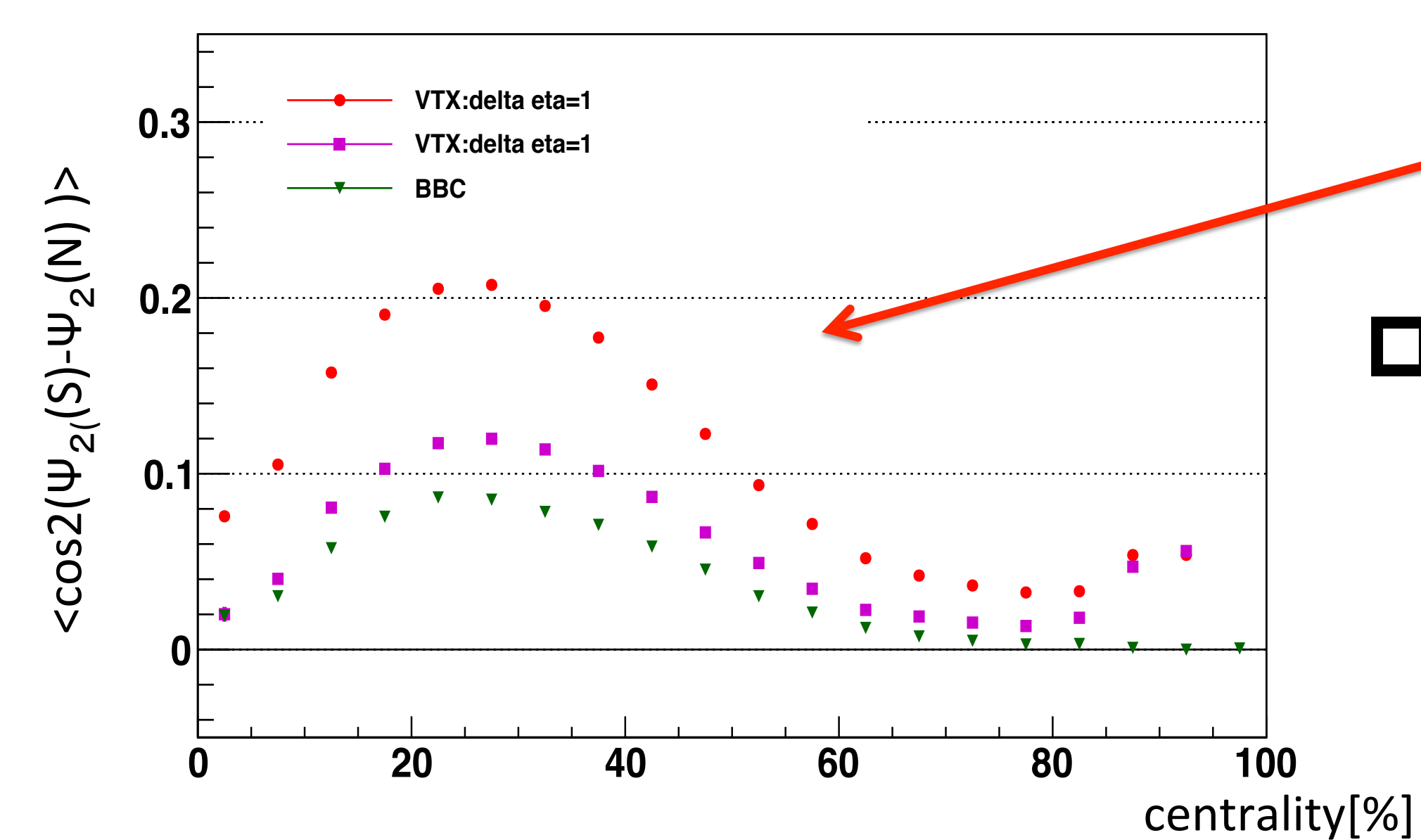


VTX η coverage region



Event Plane Correlation

South and North Correlation

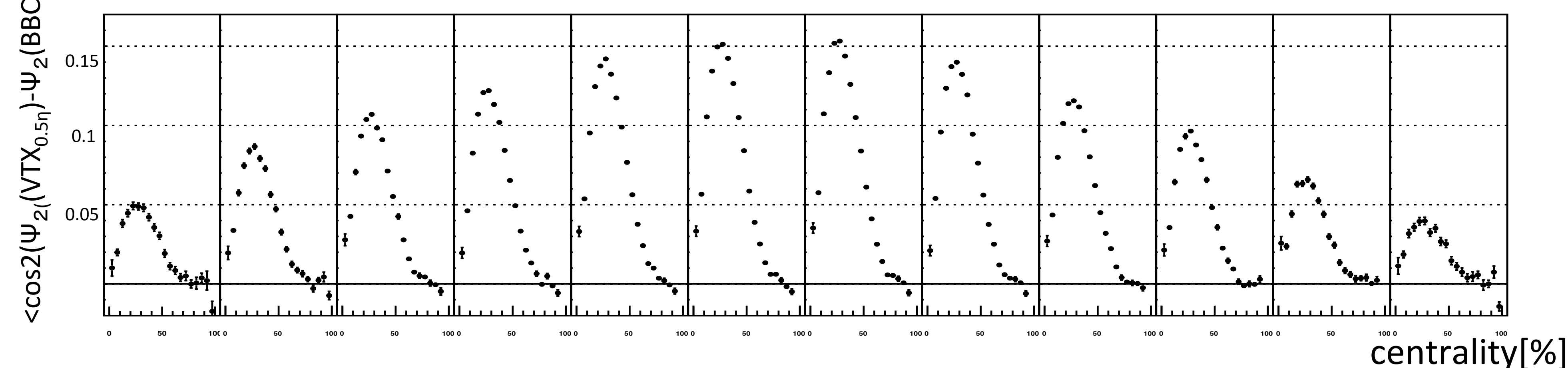


VTX Event Plane resolution is better than BBC !!

VTX 0.5 η -slice vs BBC S+N Correlation

- ✓ Divide VTX with 0.5 η slice.
- reconstruct 12 types of Event Plane.
- ✓ Plot correlation of each η slice plane and BBC S+N plane

$\langle \cos 2(\psi_2(VTX_{0.5\eta}) - \psi_2(BBC_{S+N})) \rangle$

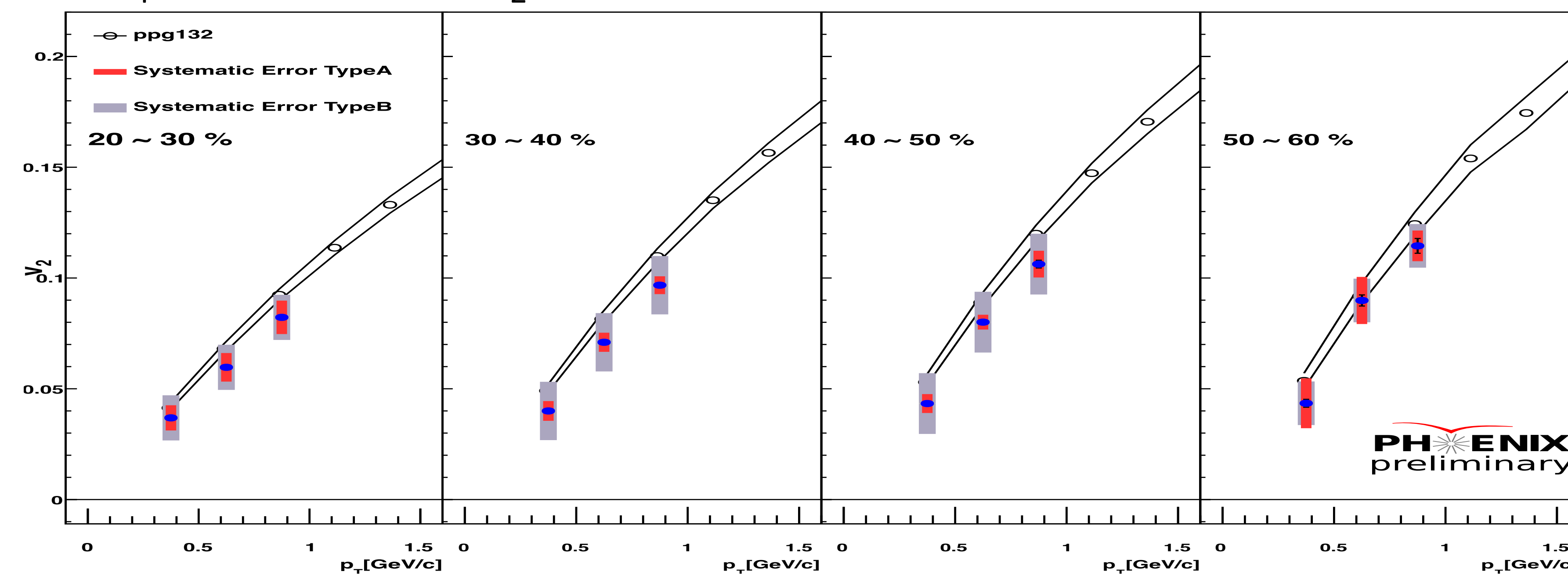


Measurement of v_2 using standalone VTX tracking

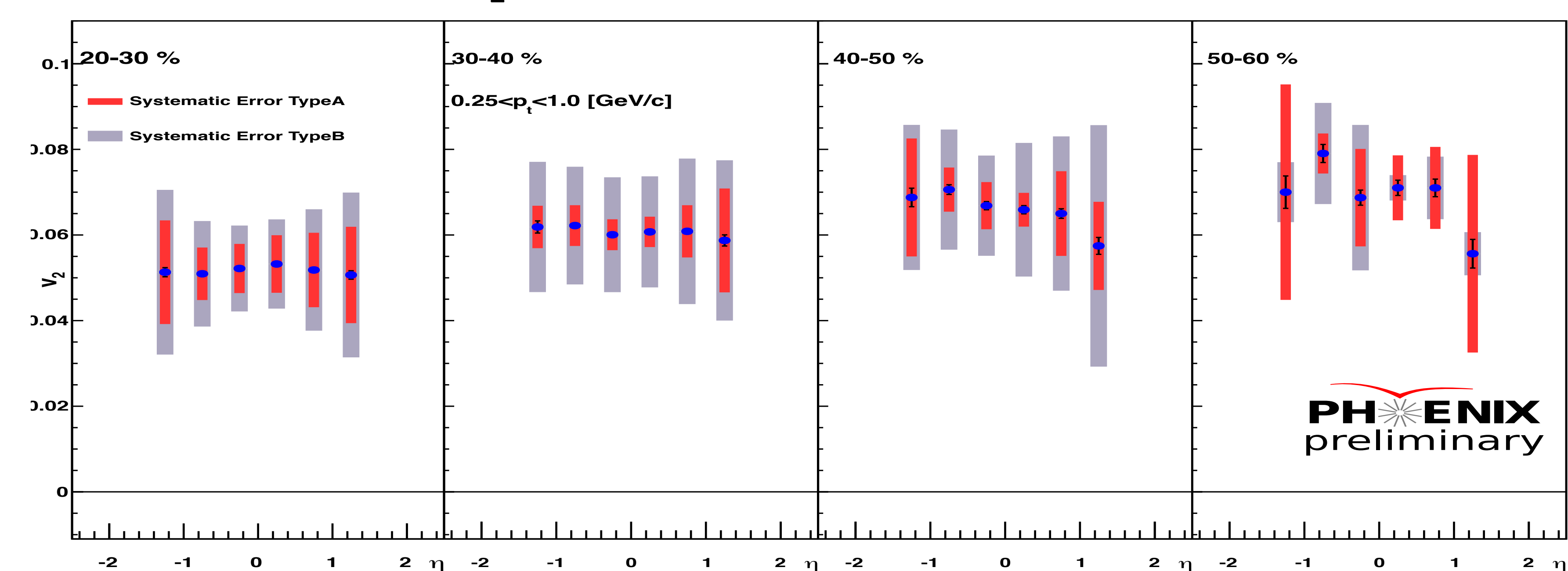
In the following all plots,

- ✓ Use standalone VTX tracking.
- ✓ Two types of systematic error bars
 - TypeA: track cut and RP variations and sin term
 - TypeB: difference to the ppg132 point at 1GeV/c

p_T dependence of v_2 ($|\eta| < 0.5$)

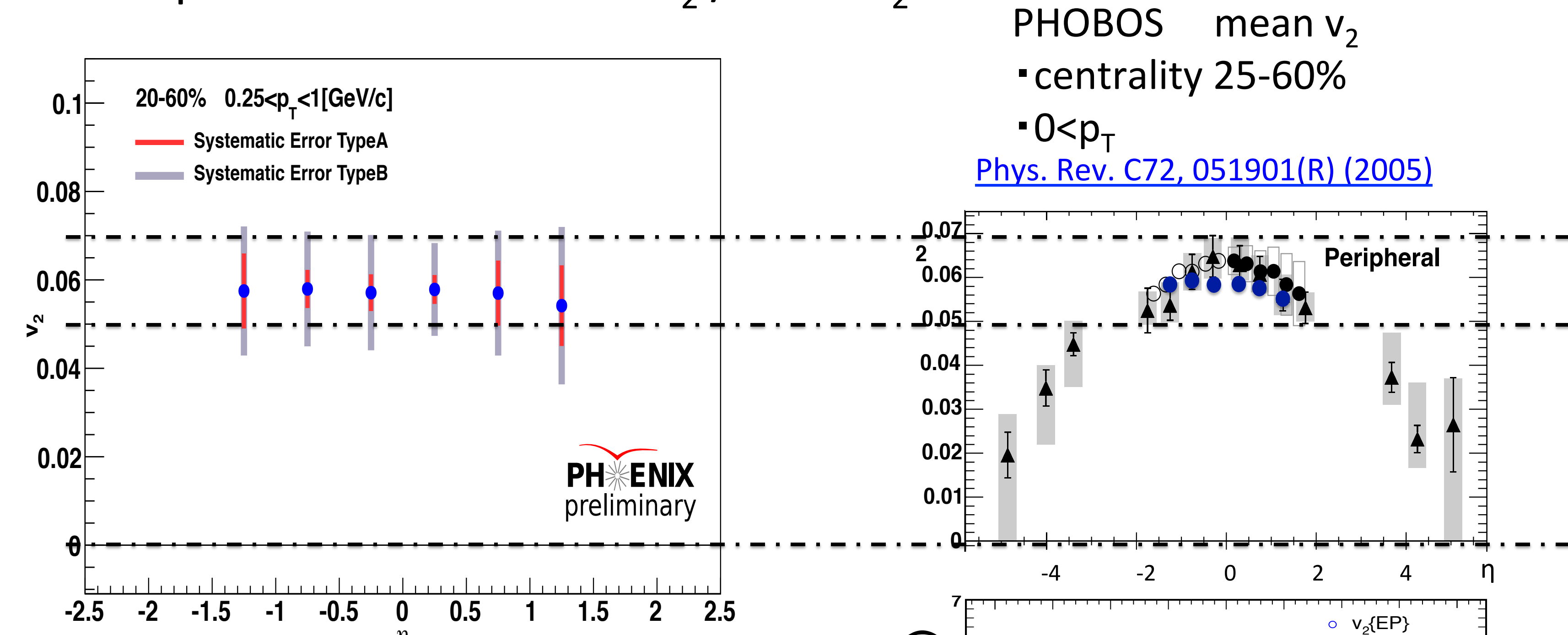


η dependence of v_2



✓ In the above centrality bins, η dependence of v_2 looks flat.

Comparison with PHOBOS v_2 / STAR v_2



- ✓ I compared our v_2 with PHOBOS's v_2 .
- consistent within systematic error.
- ✓ I attached v_2 measured in STAR.

Conclusion & Outlook

- ✓ VTX South side and North side Event Plane resolution is better than BBC.
- We can use Event Plane reconstructed by VTX.
- ✓ We prepare various types of Event Planes.
- ✓ v_2 is measured by standalone VTX tracking in $p_T < 1$ [GeV/c].
- Standalone tracking can be used for 2-p method and measurement of higher harmonics azimuthal anisotropy.
- ✓ Consistent with PHOBOS's result within systematic error.

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