



PWG comments and suggestions on paper proposal  
“Elliptic flow of strange and multi-strange hadrons in  
isobar collisions at  $\sqrt{s_{NN}} = 200$  GeV at RHIC”

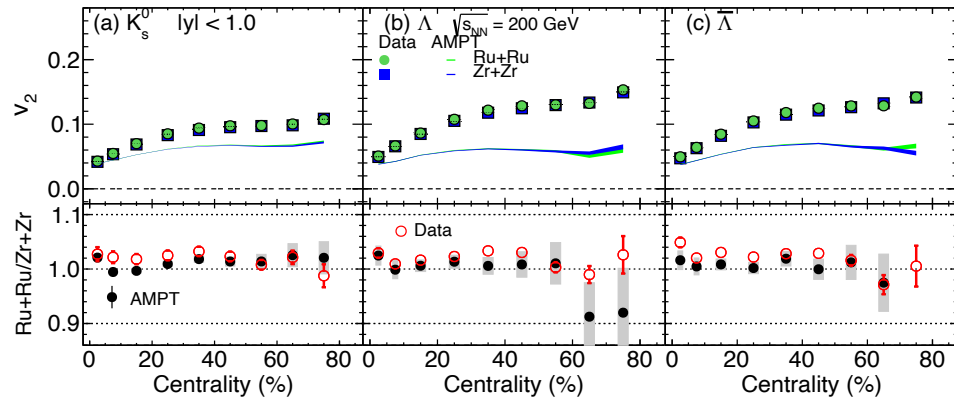
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(on behalf of PAs)

Paper proposal in PWG (29<sup>th</sup> November 2023): <https://drupal.star.bnl.gov/STAR/system/files/isobarDataProposal.pdf>

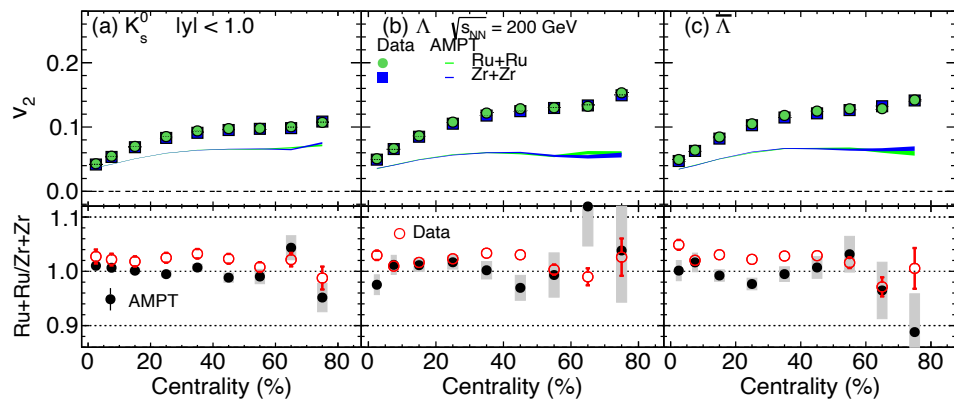


# AMPT model comparison of $\langle v_2 \rangle$

Deform case:



Default case:

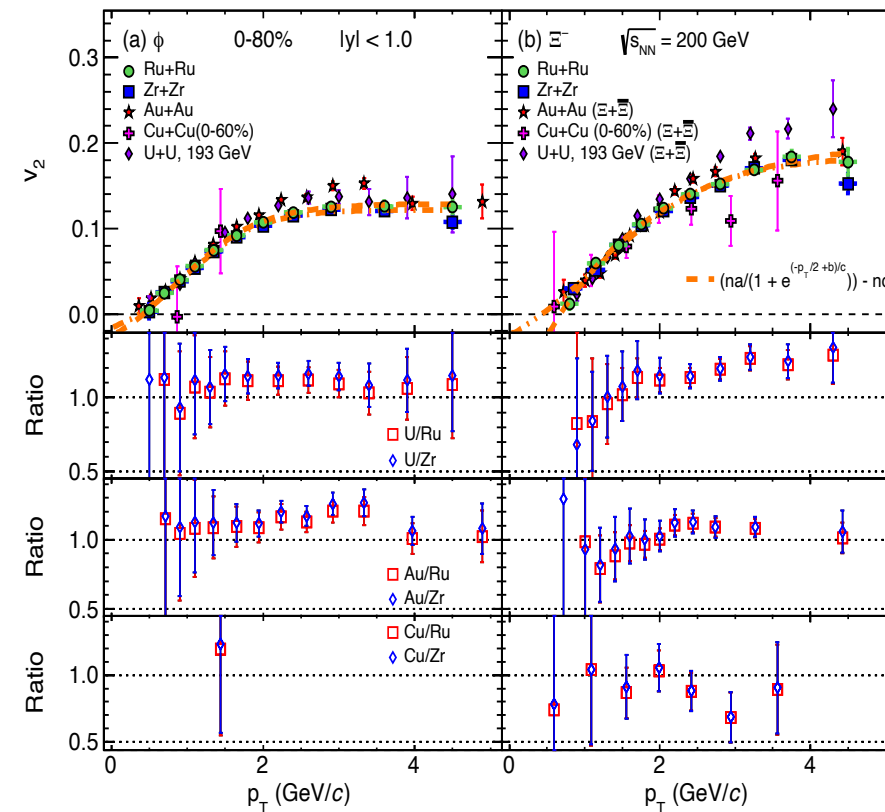
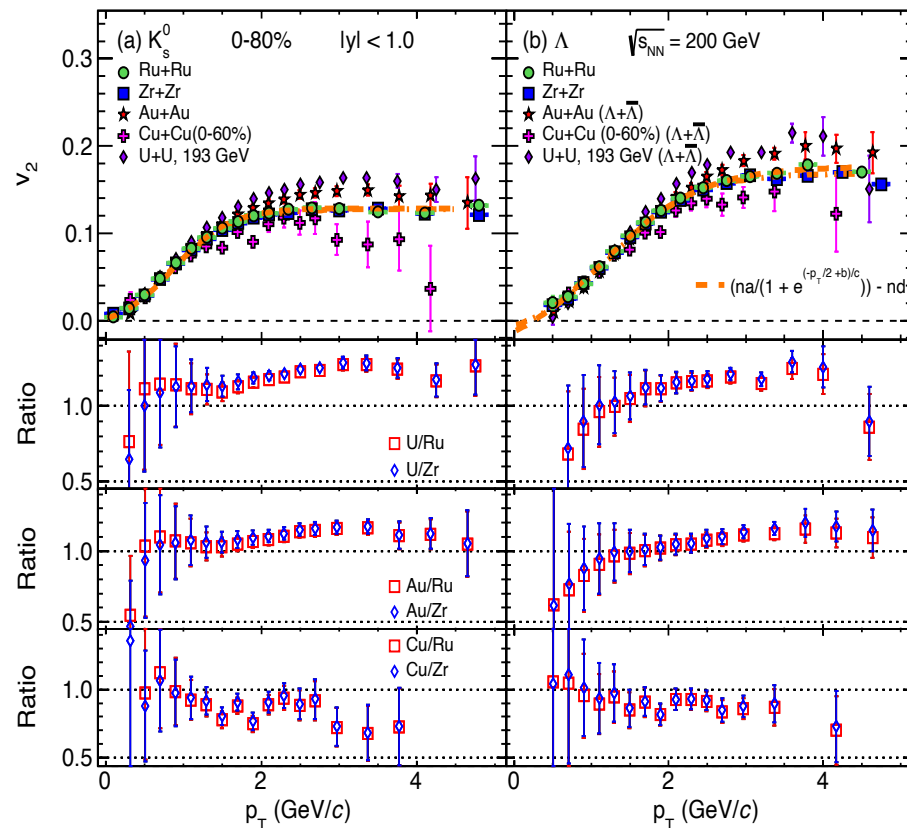


- The ratio of  $\langle v_2 \rangle$  between the two isobar systems from AMPT model with deformed nuclei is able to describe the STAR data better especially in the mid-central collisions unlike in the default case
- The ratio of  $\langle v_2 \rangle$  seems to show that the difference between Ru+Ru and Zr+Zr might be due to the deformation of the nuclei
- Difference between the  $\langle v_2 \rangle$  values from AMPT and STAR data can be due to efficiency and acceptance corrections (see slide 7 for details)

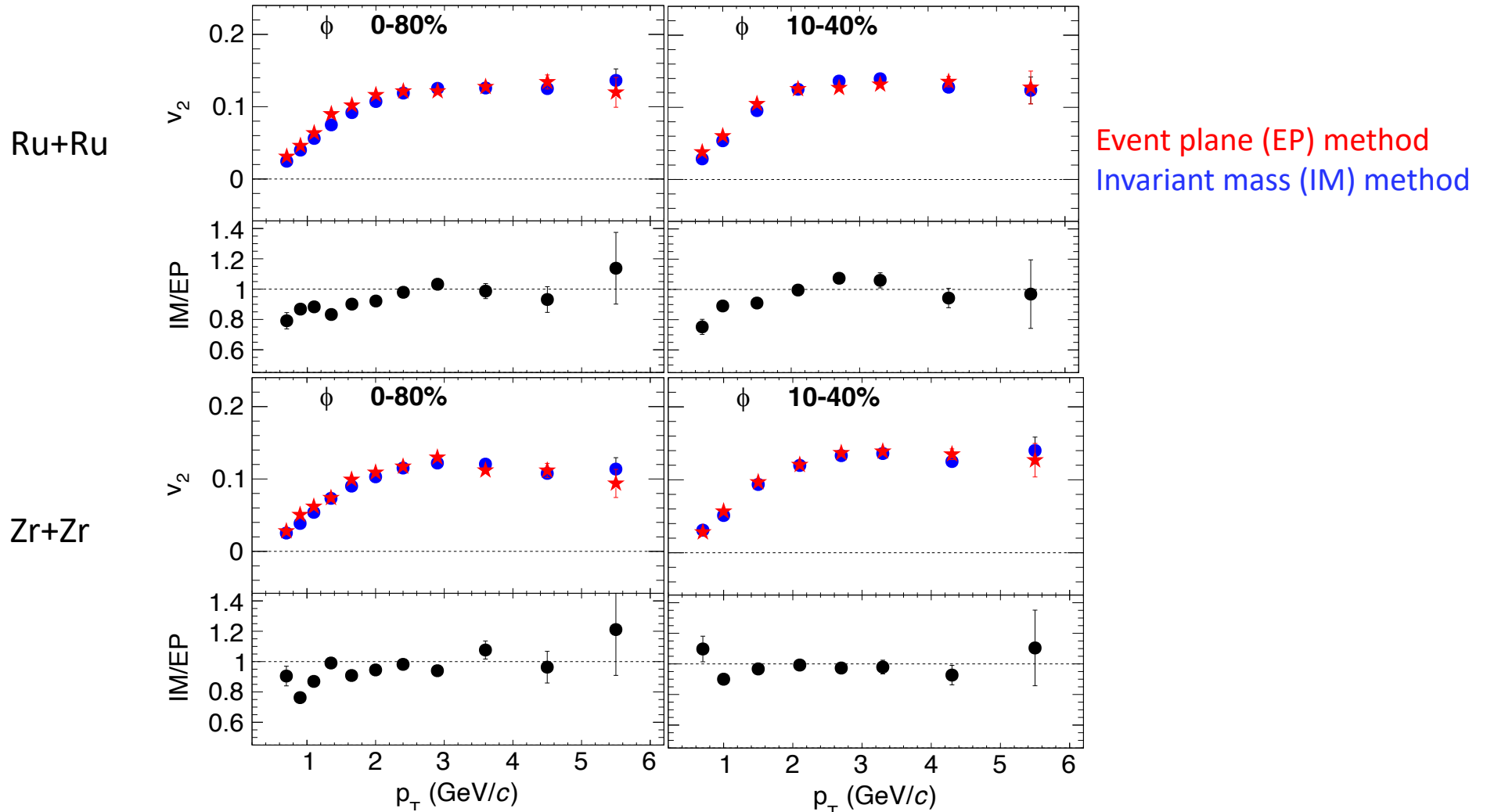
Deform	$R_0$	$a$	$\beta_2$	$\beta_3$	Default	$R_0$	$a$	$\beta_2$	$\beta_3$
Ru	5.09	0.46	0.162	0.0	Ru	5.096	0.54	0.0	0.0
Zr	5.09	0.52	0.060	0.2	Zr	5.096	0.54	0.0	0.0

# System size dependence

- The  $v_2(p_T)$  is higher for  $p_T > 2$  GeV/c is higher in larger systems (U+U and Au+Au collisions) as compared to isobar collisions
- The ratio with Cu+Cu collisions also seems to show system size dependence within the statistical uncertainties



# Comparison between invariant mass and event plane method



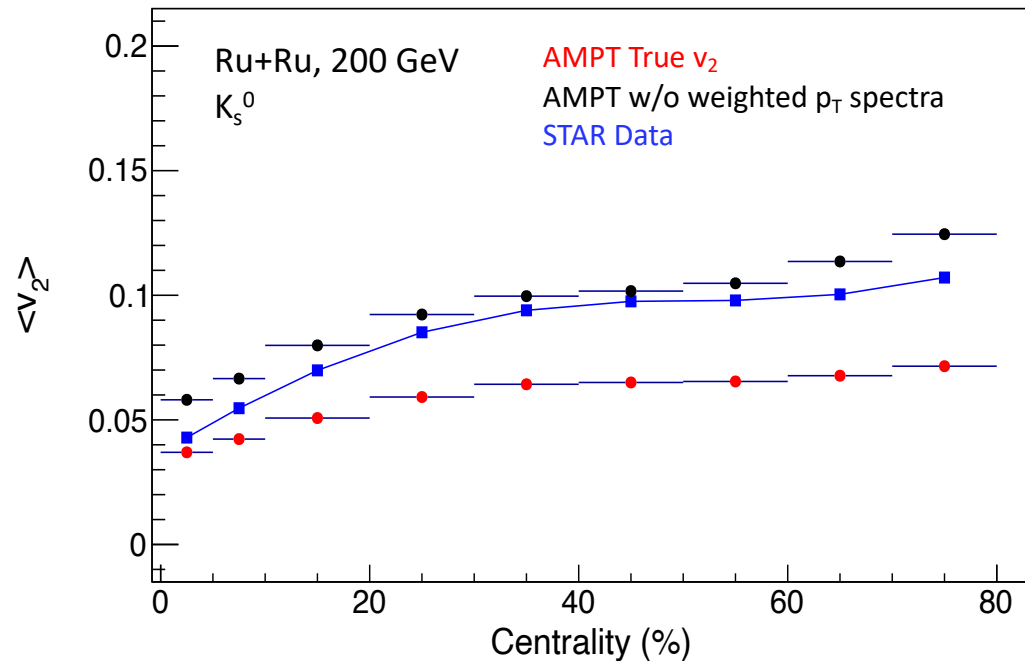
- The  $v_2(p_T)$  for  $\phi$ -mesons from event plane and invariant mass methods are consistent with each other in both the collision systems

# Summary

- The ratio of  $\langle v_2 \rangle$  between Ru+Ru and Zr+Zr collisions from AMPT model shows similar difference as in the STAR data which suggests different deformation of the nuclei
- A systematic size dependence is observed from the ratio of  $v_2(p_T)$  at  $p_T > 2$  GeV/c in isobar collisions when compared to U+U, Au+Au and Cu+Cu collisions
- $v_2(p_T)$  from invariant mass method is consistent with event plane method

# Back-up

# AMPT model comparison of $\langle v_2 \rangle$



- The absolute value of  $\langle v_2 \rangle$  from AMPT seems to be lower than the data because the  $\langle v_2 \rangle$  in STAR data is not weighted for the corrected particle  $p_T$  spectra
- Comparison of  $K_s^0$   $\langle v_2 \rangle$  from STAR data (blue) in Ru+Ru collisions with  $p_T$  spectra weighted (red) and without weighted (black) from AMPT model; On uncorrecting the model data with efficiency factors for  $K_s^0$  from central Au+Au @ 62.4 GeV (STAR, Phys. Rev. C 83 (2011) 024901) collisions seems to match the data better