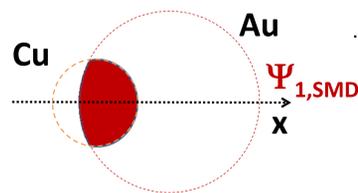
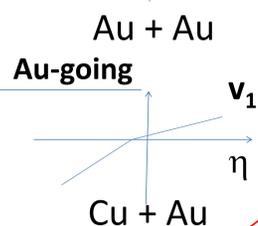
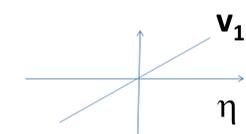
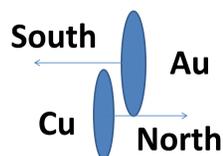
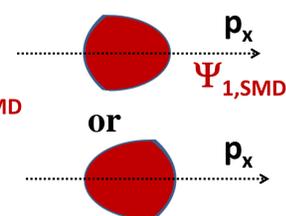


1. Motivations

Coordinate space asymmetry



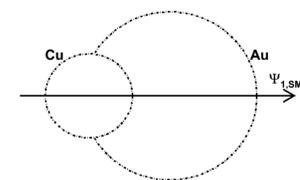
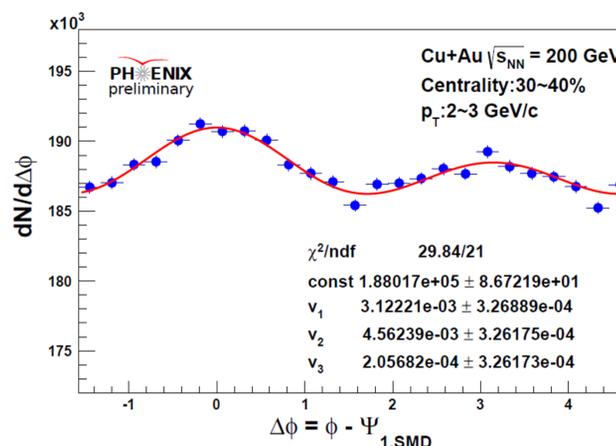
Momentum space?



- 1) An asymmetric coordinate space will lead to an asymmetric density profile and pressure gradient
- 2) The energy loss for jets will be different
- 3) Rapidity shift will bring the anti-flow effect into mid-rapidity $|\eta| < 0.35$

$\Psi_{1,SMD}$: Combination of $\Psi_{1,SMD}^{South}$ with flipped $\Psi_{1,SMD}^{North}$. The direction of Ψ_1 plane is decided by the Au spectators

2. $dN/d\Delta\phi$ distribution

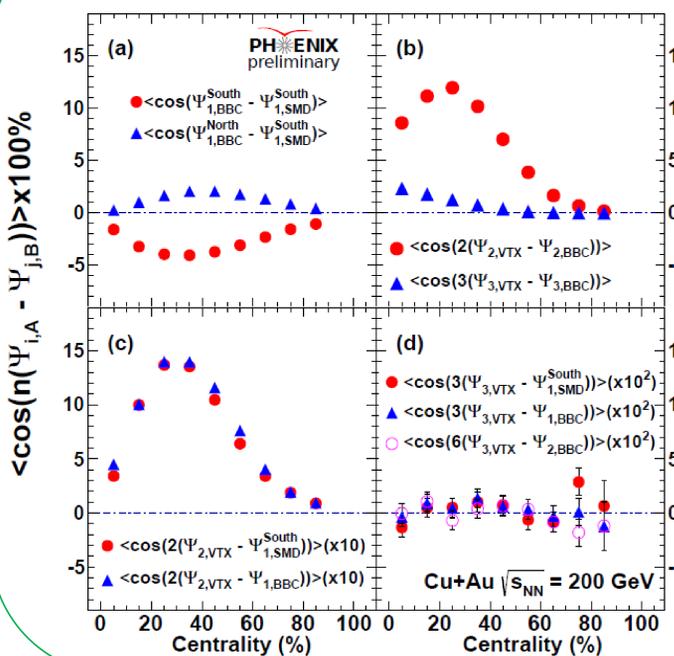


❑ An asymmetric $dN/d\Delta\phi$ distribution is observed with $\Psi_{1,SMD}$, which indicates there are more particles emitting from the Au side than from the Cu side

$$dN/d\Delta\phi = \text{const} * (1 + 2v_1 \cos(\Delta\phi) + 2v_2 \cos(2\Delta\phi) + 2v_3 \cos(3\Delta\phi))$$

❑ A sizeable v_1 is extracted from fitting by the formula shown on the left

3. Event plane correlation

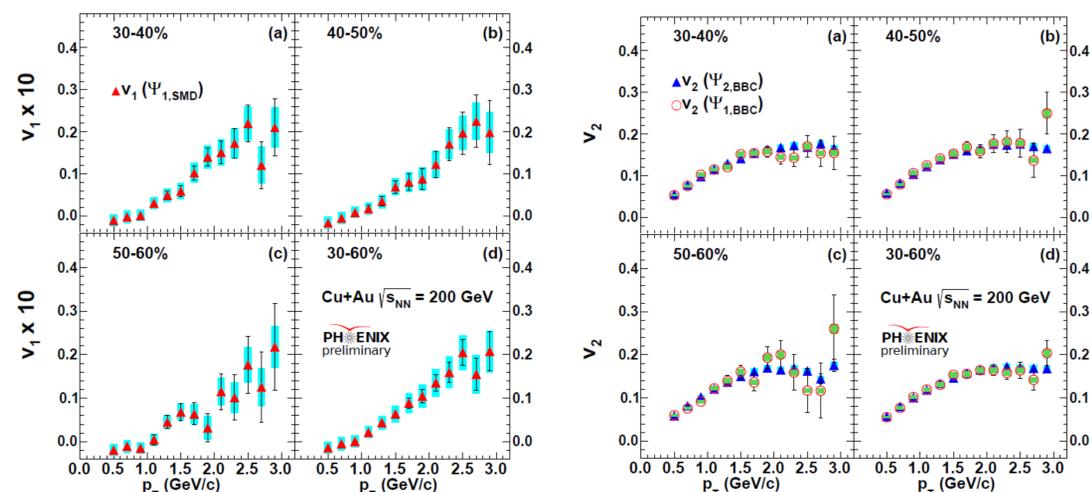


1. The correlation between $\Psi_{1,BBC}^{South}$, measured by the south BBC in the Au-going direction, and $\Psi_{1,SMD}$ is stronger than the correlation between $\Psi_{1,BBC}^{North}$ in the Cu-going direction and $\Psi_{1,SMD}$. It indicates that v_1 is larger in the Au-going direction than that of Cu-going direction

2. The raw correlation of Ψ_3 with Ψ_1 and Ψ_2 are pretty weak

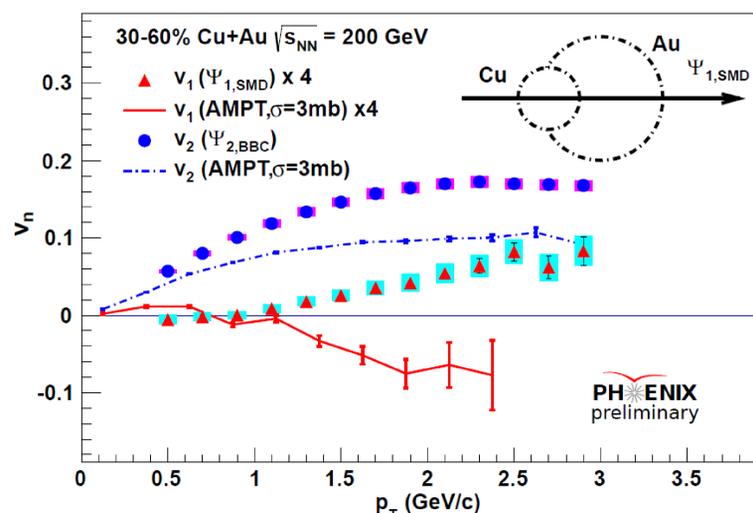
South : Au-going
North: Cu-going

4. Measurements of v_1 and v_2 in Cu + Au



- ✓ The v_1 of charged hadrons in $|\eta| < 0.35$ increases as a function of p_T in each centrality bin
- ✓ The v_2 measured from Ψ_1 and Ψ_2 are consistent with each other

5. Comparing with AMPT model



- 1. AMPT (v1.21) results are calculated by H. Ruiz and J. Nagle with string melting cross section (σ) of 3 mb
- 2. Both data and AMPT show a sizeable v_1 but they have opposite values for the sign of v_1
- 3. A 3 mb string melting cross section is not enough to reproduce the measured v_2

6. Conclusions

- With the Ψ_1 measured using Au-going spectator, a positive v_1 is observed for the charged hadrons in $|\eta| < 0.35$. It may be due to the asymmetric density profile and pressure gradient, or the rapidity shift which brings the anti-flow effect into the mid-rapidity region $|\eta| < 0.35$
- The $\Psi_{1,BBC}^{South}$ measured by the south BBC in the Au-going direction is more strongly correlated with the $\Psi_{1,SMD}^{South}$ than the $\Psi_{1,BBC}^{North}$ measured by the north BBC in the Cu-going direction, which indicates a larger v_1 in the Au-going direction
- Both data and AMPT model with a string melting cross section of 3 mb show a sizeable v_1 in $|\eta| < 0.35$, but their sign disagree