# Charge Asymmetry Dependence of Proton Elliptic Flow in 200 GeV Au+Au (Update)

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# Outline

- Analysis Summary

- Results

- Outlook

# Analysis Summary

- Physics motivation: search for CMW

- CMW signal already observed in pions and kaons

- Observable ($r$) is the charge asymmetry ($A_{ch}$) of the difference in elliptic flow ($\Delta v_2$) between protons and anti-protons:
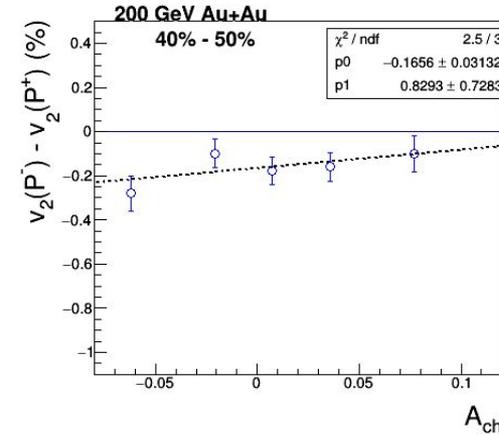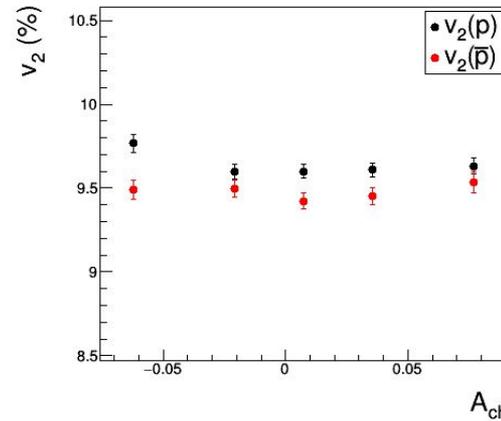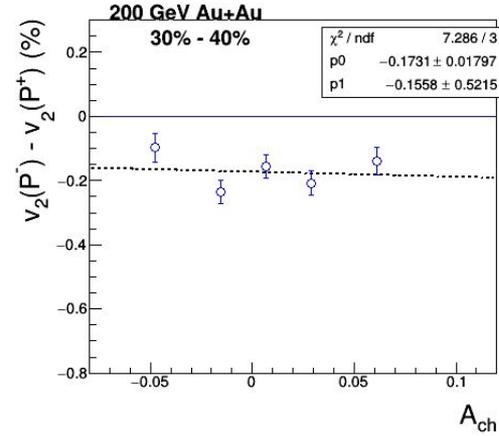
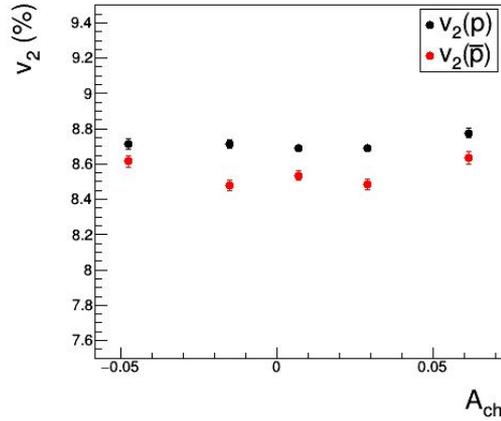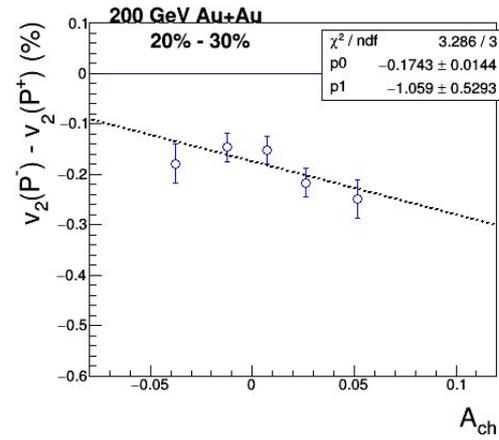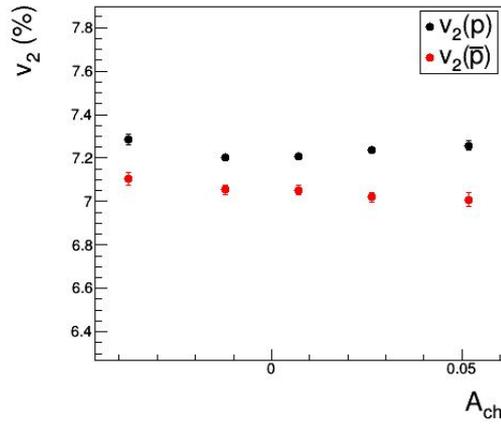$$\Delta v_2(A_{ch}) = v_2(p^-) - v_2(p^+) = c + r A_{ch}$$

$$v_n = \langle \cos\left[n(\phi - \Psi_{RP})\right] \rangle$$

$$A_{ch} = \frac{N_+ - N_-}{N_+ + N_-}$$

# Analysis Summary: Cuts

| Event | | Protons | |
|---|---|---|---|
| Vertex (cm) | (-30,30) | N dE/dx | > 10 |
| **Particles** | | Mass$^2$ (GeV$^2$/c$^4$) | (0.8,1) |
| Dca (cm) | < 2 | P$_T$ (GeV/c) | (0.4,2) |
| Eta | (-1,1) | n$\sigma$ of proton | (-2,2) |
| | | ToF Flag | > 0 |
| | | ToF ß | > 0 |
| | | ToF YLocal (cm) | (-1.8,1.8) |

# Results

## Central value

# Results



Systematics

# Results

L. Adamczyk, *et al*, Phys. Rev. Lett. 114 (2015) 252302.
Q.-Y Shou, Nucl. Phys. A 931 (2014) 758.
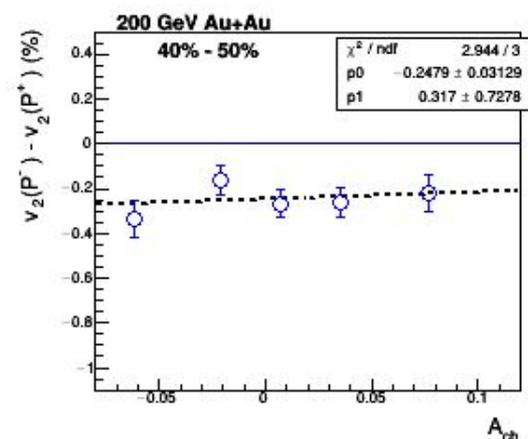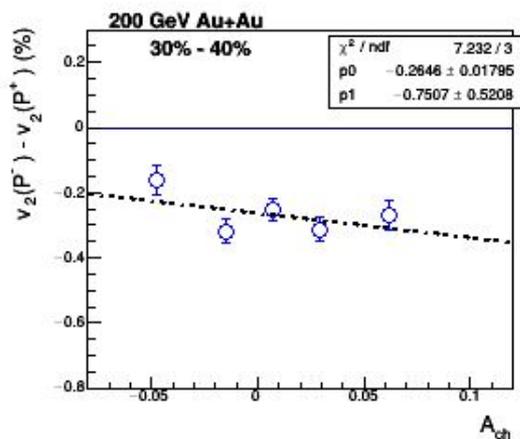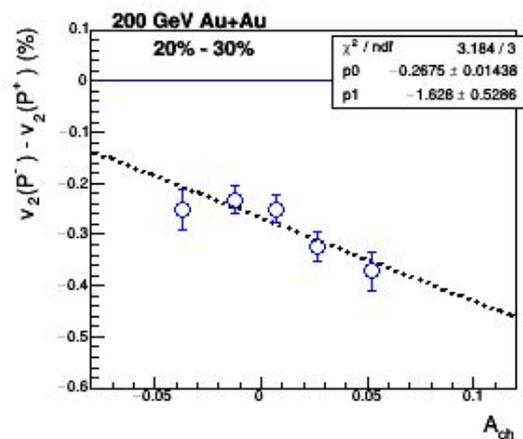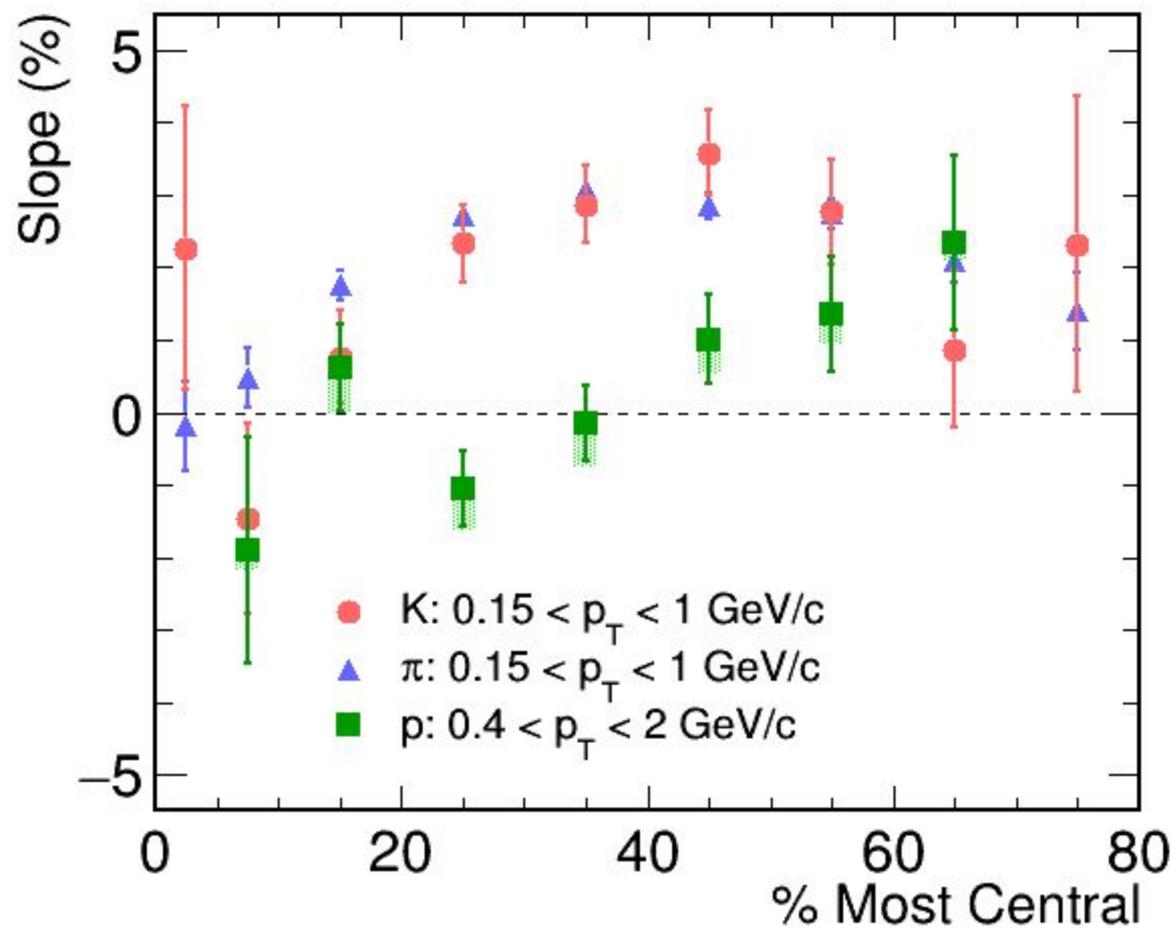
# **Outlook**

- Prepare poster for Conference Experience for Undergraduates (CEU) at the 2016 DNP Fall meeting

- Negative proton slope may be due to combination of CMW and $\mu_B$ physics - predicts more negative slope for more central collisions

- Motivation for future studies