Measurement of non-flow influence on the CMW-sensitive slope parameter from STAR

Haojie Xu (for the STAR Collaboration)
Huzhou University

The charge asymmetry ($A_{\rm ch}$) dependence of the π^+ and π^- elliptic flow difference, $\Delta v_2(A_{\rm ch}) \equiv v_2^{\pi^-}(A_{\rm ch}) - v_2^{\pi^+}(A_{\rm ch})$, is sensitive to the Chiral Magnetic Wave (CMW). Previous measurements in 200 GeV Au+Au collisions by STAR indicated a positive $\Delta v_2(A_{\rm ch})$ slope and, in central and peripheral collisions, a negative triangular flow $\Delta v_3(A_{\rm ch})$ slope. Since only backgrounds contribute to the latter, the results disfavor a pure background scenario for the $\Delta v_2(A_{\rm ch})$ slope.

We show in this talk, however, that including all charged particles as reference in the Q-cumulant flow method automatically introduces a trivial linear term in $v_n(A_{\rm ch})$ if non-flow correlations differ between same-sign and opposite-sign particle pairs. This contributed artificial slopes to the previous $\Delta v_n(A_{\rm ch})$ measurements. After eliminating this non-flow artifact, the $\Delta v_2(A_{\rm ch})$ and $\Delta v_3(A_{\rm ch})$ slopes, normalized by the respective v_2 and v_3 magnitudes, are consistent with each other within errors. The present error on the $\Delta v_3(A_{\rm ch})$ slope is relatively large: the average normalized $\Delta v_3(A_{\rm ch})$ slope in $0-80\%$ centrality is about $2.2\,\sigma$ above zero, and that in $20-60\%$ is about $1.5\,\sigma$ above zero. The implications of our results in terms of the possible CMW signal and local charge conservation backgrounds are discussed.