Away-side Modification and Near-side Ridge Relative to Reaction Plane

Aoqi Feng[ab] for STAR Collaboration

[a] Department of Physics, Purdue University, West Lafayette, IN 47907, USA, *afeng@purdue.edu*

[b] Institute of Particle Physics, Huazhong Normal University, Wuhan, Hubei 430079, China

Di-hadron correlations are sensitive to the properties of the matter created at RHIC due to strong interactions of the traversing parton with the medium (jet quenching). Previous measurements have revealed two novel phenomena in Au+Au collisions: the away-side correlation is double-peaked and the near-side correlation is atop of a long range $\Delta\eta$ ridge. In this talk, we investigate the geometry dependence of these phenomena by studying dihadron correlations as a function of the trigger particle azimuthal angle relative to the reaction plane ($\Delta\phi_{T-RP}$). The mid-central (20-60%) and central (top 5%) Au+Au collisions taken in year 4 by STAR are used; the d+Au data are used as reference. The trigger and associated p_T dependences of the correlation functions are studied. Our measurements bring new insights into the two novel phenomena observed in inclusive dihadron correlations:

(i) The away-side correlation broadens (and becomes double-peaked) with increasing $\Delta\phi_{T-RP}$ in 20-60% collisions. In top 5% collisions, the away-side correlation is broader at small $\Delta\phi_{T-RP}$, but at $\sim 90^\circ$ little difference is found between the two centralities, perhaps consistent with the variations in the away-side medium pathlength.

(ii) The near-side jet component varies little with $\Delta\phi_{T-RP}$ and generally agrees with d+Au. However, the ridge component decreases significantly with $\Delta\phi_{T-RP}$ in 20-60% collisions. The change is weaker in top 5% collisions, consistent with the more spherical geometry.

Investigation of our results in theoretical frameworks will hopefully help further our understanding of the physics mechanisms underlying jet-quenching and the medium properties at RHIC.