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Leading hadron PID effects in di-hadron angular correlations in STAR

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Hard scatterings of partons provide a valuable colored probe of the strongly-coupled medium created in ultra-relativistic heavy ion collisions. These hard scatterings can be studied by means of angular correlations of charged hadrons with respect to a high transverse momentum trigger particle. Several recent two-particle correlation studies indicate that A+A collision dynamics evolve significantly with collision centrality. They specifically reveal the presence of unexpected strong away-side deformation and the development of a long-range "ridge" in correlation measured as a function of $\Delta\eta$ vs $\Delta\phi$. The detailed physics mechanisms responsible for these features however remain under active investigation.

We will present preliminary results of a new di-hadron correlation analysis, measured as a function of $\Delta\phi$ vs $\Delta\eta$, for identified high-pT triggers from the high-statistics 200 GeV Au+Au data sample collected by the STAR experiment at RHIC during Run-10. The relativistic rise of the ionization energy loss dependence of particles measured in the STAR TPC is used to obtain a statistical separation of charged pions, kaons, and protons. The $\Delta\phi$ vs $\Delta\eta$ correlations measured in this work extend earlier measurements of azimuthal correlations (in $\Delta\phi$ only) with identified hadron triggers, which, admittedly with large uncertainties, reported no significant dependence on a leading hadron identity. The added $\Delta\eta$ dimension and improved statistics reveal a rich set of new features: the near-side ($|\Delta\phi| < 1$) associated hadron distributions with respect to high-pT pion, kaon and proton triggers exhibit distinctly different features for both "ridge" (large $\Delta\eta$ and small $\Delta\phi$) and "jet-like" ($|\Delta\phi| < 0.7$ excluding the ridge) particles. We will discuss the implications of these results in the context of the existing models and possible connection of the leading hadron ID with the color-charge and/or flavor of a hard-scattered parton.

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