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Dihadron azimuthal correlations at large pseudo-rapidity difference in multiplicity-selected d+Au collisions by STAR

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A long-range pseudo-rapidity correlation is unexpectedly observed in pp and p+Pb collisions at the LHC after a uniform background subtraction. It is called the "ridge," in analogy to the similar phenomenon in heavy-ion collisions after subtraction of an elliptic-flow-modulated background. The heavy-ion ridge has been attributed primarily to triangular anisotropy, resulting from initial geometry fluctuations and subsequent hydrodynamical evolution. The question arises whether the pp/p+Pb ridge is of similar origin, which would be surprising in the small collision systems of pp and p+Pb. Another physics mechanism, the color glass condensate, is also proposed as an explanation for the correlated production of dihadrons forming the ridge.

PHENIX showed, following the method by ALICE and ATLAS, that the difference of dihadron correlations between central and peripheral collisions can be mostly described by a second harmonic. While it is an open question how much jet contribution remains in the PHENIX result in their limited acceptance, the complementarity between LHC and RHIC can be potentially powerful to distinguish the proposed ridge production mechanisms. In this talk, we present STAR results of dihadron correlations in d+Au collisions as a function of multiplicity, with the large acceptance of |\Delta\eta|<2 by the STAR's Time Projection Chamber (TPC). We also present dihadron correlations using STAR's mid-rapidity TPC and forward TPC, with a |\Delta\eta| coverage of 1.8-4.8. We examine the \Delta\eta dependence of the correlations as well as the difference in the correlations between central and peripheral collisions. We discuss our results in the context of the LHC and PHENIX data.

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