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Correlations between azimuthal asymmetries and multiplicity and mean transverse momentum in small collision systems in the CGC

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The ridge phenomenon found in high multiplicity pp and pPb collisions is one of the most important observations at the LHC. In such small systems, final state explanations become challenging. We study particle correlations in the Color Glass Condensate, which offers a weak coupling but non perturbative framework to study how correlations in the wave function of the incoming hadrons reflect on those in the final state. Considering a dilute-dense situation suitable for pA collisions, we compute the correlation between azimuthal asymmetries, specifically the squared second Fourier coefficient v_2^2 , and the total multiplicity in the event. We also consider the correlation between v_2^2 and the mean squared transverse momentum of particles in the event. In both cases, we find that the correlations are generally very small, consistent with the observations. We also note an interesting sharp change in the value of v_2^2 and its correlations as a function of the width of the transverse momentum bin, related with a change of the dominance of Bose and HBT quantum correlations.

Reference: Tolga Altinoluk, Néstor Armesto, Alex Kovner, Michael Lublinsky and Vladimir V. Skokov, e-Print: 2012.01810 [hep-ph].

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