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Quark correlations in the Color Glass Condensate

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The explanation of the ridge observed in pp and pA collisions at the Large Hadron Collider constitutes one of open questions in our understanding of high-energy hadronic collisions. Apart from final-state hydrodynamic models, correlations between gluons in the wave function of the incoming hadrons, computed in the framework of the Color Glass Condensate, offer an alternative rationale to explain such phenomenon. A natural question is then what happens to quarks. Here we consider, for the first time, correlations between produced quarks in pA collisions in the light-cone wave function approach to the CGC. We find a quark-quark ridge that shows a dip at $\Delta\eta \sim 2$ relative to the gluon-gluon ridge. The origin of this dip is the short range (in rapidity) Pauli blocking experienced by quarks in the wave function of the incoming projectile. We observe that these correlations, present in the initial state, survive the scattering process. We discuss possibilities for observing such correlations e.g. in open charm-open charm correlations at the LHC.

Reference: T. Altinoluk, N. Armesto, G. Beuf, A. Kovner and M. Lublinsky, arXiv:1610.03020 [hep-ph]

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