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Two-dimensional distribution features of two-gluon correlations in pp collisions based on color glass condensate framework

Summary

We investigate two-dimensional (2-D) distribution of two-gluon correlations in pp collisions at $\sqrt{s_{NN}} = 7$ TeV by using the color glass condensate (CGC) formalism for the first time. After calculation, we find a strong correlation around $\Delta\phi = 0$, extended over many units in $\Delta\eta$. To get this result, we have to consider the effect of different x on 2-D correlations distribution in our calculation, because the x is linked to the dynamics feature in the initial state. By the way, we qualitatively compared with the published experimental results by selecting the rapidity window consistent with the detector. The two-gluon correlations show two peaks at $\Delta\phi = 0$ and π in relative azimuthal angle direction, and show a broad ridge structure at $\Delta\phi \approx 0$ in the relative rapidity direction, but the trend is slightly different. Beyond that, both the integrated and differential correlation function of two particles are also compared in this work.

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