Investigating the Drell-Yan transverse momentum distribution in the color dipole approach M. A. Betemps $^{1,a}$E-mail:mandrebe@if.ufrgs.br, M. B. Gay Ducati $^{2,a}$E-mail:gay@if.ufrgs.br, M. V. T. Machado $^{3,a,b}$E-mail:magnus@if.ufrgs.br and J. Raufeisen $^{4,c}$E-mail:jorgr@lanl.gov

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Abstract

We study the influence of unitarity corrections on the Drell-Yan transverse momentum distribution within the color dipole approach. These unitarity corrections are implemented through the multiple scattering Glauber-Mueller approach, which is contrasted with a phenomenological saturation model. The process is analyzed for the center of mass energies of the Relativistic Heavy Ion Collider (RHIC, $\sqrt{s} = 500$ GeV) and of the Large Hadron Collider (LHC, $\sqrt{s} = 14$ TeV). In addition, the results are extrapolated down to current energies of proton-proton collisions, where non-asymptotic corrections to the dipole approach are needed. It is also shown that in the absence of saturation, the dipole approach can be related to the QCD Compton process.