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Pursuing the Precision Study for Color Glass Condensate in Forward Hadron Productions

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With the tremendous accomplishments of RHIC and the LHC experiments and the advent of the future Electron-Ion Collider on the horizon, the quest for compelling evidence of the color glass condensate (CGC) has become one of the most aspiring goals in the high energy quantum chromodynamics research. Pursuing this question requires developing the precision test of the CGC formalism. By systematically implementing the threshold resummation, we significantly improve the stability of the next-to-leading-order calculation in CGC for forward rapidity hadron productions in pp and pA collisions, especially in the high p_T region, and obtain reliable descriptions of all existing data measured at RHIC and the LHC across all p_T regions. Consequently, this technique can pave the way for the precision studies of the CGC next-to-leading-order predictions by confronting them with a large amount of precise data.

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