

Helicity-dependent generalization of the JIMWLK evolution

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The small- x evolution equations for the quark and gluon helicity distribution have recently been constructed by finding sub-eikonal corrections to the eikonal shock wave formalism. Those equations are written for correlators of infinite light-cone Wilson lines along with the so-called polarized Wilson lines. Those equations close in the large N_c -limit (N_c is the number of quark colors), but also in the large N_c & N_f -limit (N_f is the number of quark flavors). However, in the shock wave formalism, no closed form can be obtained for arbitrary value of N_c and N_f .

For the unpolarized case, the generalization of the Balitsky-Kovchegov equation is done by the Jalilian-Marian—Iancu—McLerran—Weigert—Leonidov—Kovner (JIMWLK) functional evolution equation. Such an approach for the small- x evolution of the helicity is beneficial for numerical evaluation at finite N_c and N_f (beyond previously used limit), and for the evaluation of helicity-dependent operator with an arbitrary number of Wilson lines. We derive an analogue of the JIMWLK evolution equation for the small- x evolution of helicity distributions and obtain an evolution equation for the target weight functional.

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