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Odderon and three-pomeron one-dimensional reggeon models

Thursday, 13 October 2022 16:45 (25 minutes)

The talk is dedicated to some variants of Regge-Gribov model, namely, to simplified one-dimensional model with pomeron and odderon field

$$\begin{aligned}
 & \backslash\text{begin}\{\text{multline}\} \\
 & H = -\left(\Phi^+ \partial_y \Phi + \Psi^+ \partial_y \Psi - L \right) = -\mu_P \Phi^+ \Phi - \mu_O \Psi^+ \Psi \\
 & + \backslash \\
 & i \lambda \left(\Phi^+ \Phi^+ \Phi + \Phi^+ \Phi \Phi + 2 \Psi^+ \Psi \Phi + 2 \Phi^+ \Psi \Phi^+ \Psi - \Phi^+ \Psi \Psi + \Psi \Psi^+ \Psi \Phi \right) \\
 & \backslash\text{end}\{\text{multline}\}
 \end{aligned}$$

and three pomeron fields (of conformal spins 0,+2,-2)

$$\begin{aligned}
 & \backslash\text{begin}\{\text{multline}\} \\
 & H = -\mu_0 \Phi^+ \Phi_0 - \mu_2 \left(\Phi^+ \Phi_{-2} + \Phi^+ \Phi_{-2} \right) + \backslash \\
 & i \lambda \left(\Phi^+ \left(\Phi_0^2 + 2 \Phi_{-2} \Phi_{-2} \right) + 2 \Phi^+ \Phi_{-2} \Phi_{-2} \Phi_0 + 2 \Phi^+ \Phi_{-2} \Phi_{-2} \Phi_0 + \right. \\
 & \left. \Phi_0 + \right) \backslash \\
 & \left. \left(\Phi^+ \Phi_0 + 2 \Phi^+ \Phi_{-2} \Phi^+ \Phi_{-2} \right) \Phi_0 + 2 \Phi^+ \Phi_{-2} \Phi^+ \Phi_0 \Phi_{-2} + 2 \Phi^+ \Phi_{-2} \Phi^+ \Phi_0 \Phi_{-2} \right) \\
 & \backslash\text{end}\{\text{multline}\}
 \end{aligned}$$

where transverse momenta dependence is neglected. These models, while not really being suited to quantitative purposes due to the possibility of transverse momenta being high in loops, they do provide qualitative results on whether inclusion of additional reggeons has any considerable effect on the behavior of propagators, while being quite significantly less cumbersome for calculations. Some analytical methods for further simplifications are provided, and then the results of performed numerical calculations are presented. Three-pomeron model is particularly interesting, since it can be transformed into two-pomeron model, thus all the calculations can be significantly simplified. Overall, the results obtained coincide with expectations, namely, inclusion of odderon increases propagators and inclusion of subdominant pomerons decreases them.

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