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A new Wilson-line based light-cone Lagrangian for gluodynamics

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We derive a new classical action for gluodynamics by canonically transforming the light cone Yang-Mills action, where the solutions to the field transformations are directly related to the straight infinite Wilson line functionals defined on the constant light-cone time x^+ . One of the key features of the new action is that it has no triple gluon vertices, because they have been effectively resummed inside the Wilson lines. The lowest order vertex is the four-point MHV vertex. In general, any n -leg vertex has $2m$ $n-2$ negative helicity legs. Thus the number of diagrams required to compute tree amplitudes is greatly reduced. We have checked that the action reproduces standard results by calculating tree amplitudes up to 8-point Next-to-Next-to-MHV amplitude and found agreement with the standard methods.

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