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small x part of a hadron wavefunction in terms of classical gluon I try to motivate this approach, des

might be solved, and the current status of the method.

Small x Physics is the Physics of Classical Gluon Fields

In this talk and a later one by Pivovarev[1] at this meeting, you will hear 55455attempts to descri

8Felds. It is worthwhile therefore to have an intuitive understanding of why such an approach may be useful. The physics of small x is that of a high density of gluons. If we take the gluon density scaled by the cross section of the hadron of interest, If we go into the regime where a typical transverse momentum of a is p

It is of course possible to generalize this variable to a Lorentz invariant vable, but working in the large m

will do this generalization later.

Small x is the region where x

question we must ask is: How can the rapid small x growth seen at be consistent with the slow growth

transverse momentum jets which are produced in hadron-hadron collisions. What about the great majority of particles which are not produced at huge values of transverse momenta? Can we predict dN/dy for produced hadrons as $y \quad \to \infty?_{proj}$

What about

At early times the problem is complicated by two types of coherence.

The first is quantum mechanical. This is what forbids us to use cascade simulations up to $t = 0$ since in a cascade one simultaneously specifies the momentum and coordinates of a participant in the cascade. The second typof coherence is charge

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Before proceeding further, we must develop more refined variables for describing the physics at small x. These will be light cone coordinates momenta. If we let the

On account of the uncertainty principle, for the quantum mechanical which describes small x physics, we e

Therefore at small x, the strong coupling constant becomes small is proportional to the parton d

$$^{2} \qquad xG(x, \quad Q) = {}_{0}^{Q \quad 2} \qquad \frac{dN}{dyd^2\alpha_T} \tag{23}$$

The quantity which is computed from QCD is the density of partons per unit area per unit $d^{p}\ _{T}$,

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rapidity much greater than that at which we are measuring the field. the variation in the gluon field is

scale for variation in rapidity of the gluon density must be of order 1s .
This must also be the typical length scale over which charges a

squared at rapidities larger than that of interest is explicit expression for the renormalization group equations. It remains to bseen if they can be solved ana

What Does the Gluon Field Look Like?

The equations of motion for the gluon field are the non-abelian Yang-Mills equations in the presence of a source localized in x

The solution which solves the equations of motion after $t = 0$, and boundary conditions at $t = 0$ is ea

dependence on rapidity, the solution is

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order of magnitude.

Such a picture is manifestly un-stringy. Nevertheless,