

The dipole representation of vector meson electroproduction beyond leading twist

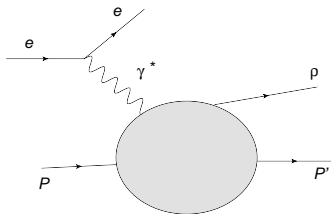
Adrien Besse^{a, b1}, Lech Szymanowski^b and Samuel Wallon^a

^a LPT, Université Paris-Sud, CNRS, 91405, Orsay, France

^b National Centre for Nuclear Research (NCBJ), Warsaw, Poland

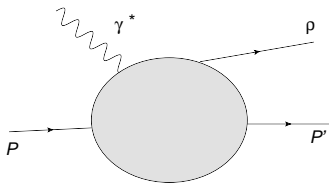
The exclusive electroproduction of ρ -meson:

$$e P \rightarrow e' \rho_{L,T} P'$$



The exclusive electroproduction of ρ -meson:

$$\gamma^*(q^2 < 0) P \rightarrow \rho_{L,T} P'$$

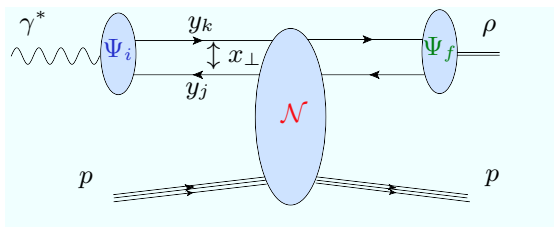


- Experiments at high energies:
many data from HERA at DESY (Germany), in the future from LHeC at CERN (Switzerland) or EIC
- Data for both: the longitudinal (L) and the transverse (T) polarizations
- Theory:
 - effects of longitudinal (L) polarization \Rightarrow leading power of q^2
leading twist-2, "easy"
 - effects of transverse (T) polarization \Rightarrow nonleading power of q^2
non-leading twist-3, "complicated"

Anikin et al, Nuclear Physics B828 (2010) 1

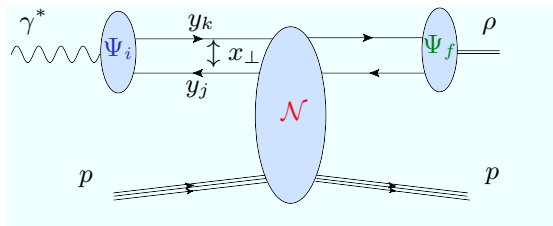
Dipole picture:

high energy



Dipole picture:

high energy

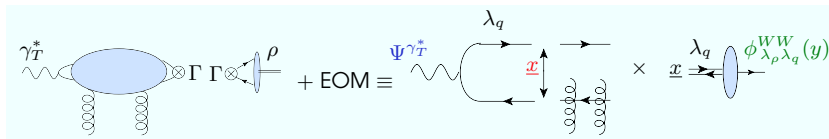


Dipole representation \Rightarrow the starting point to include the saturation effects

high density \Rightarrow partons start to overlap
 \Rightarrow non-linear evolution eqs

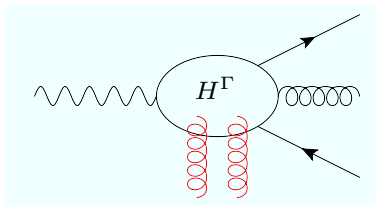
Dipole picture:

two parton Fock state



Dipole picture:

three parton Fock state

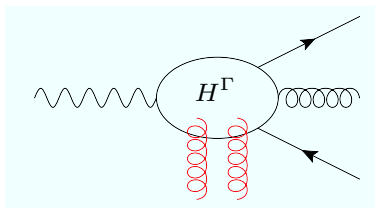


Are dipoles the only objects which interact ?

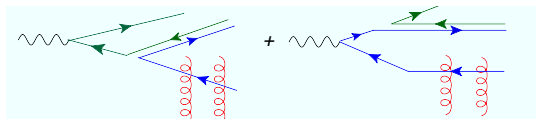
maybe quadrupoles ?? or ...?

Dipole picture:

three parton Fock state



the EOM + the n-independence eqs. (gauge inv. of QCD):



Conclusion:

The hard contribution to the scattering amplitude up to twist-3 still exhibits the signature of the interaction of the colour dipoles with the t-channel gluons. This result opens the way to include the saturation effects in the description of lepton production of vector meson.

Merci pour votre attention