LUND
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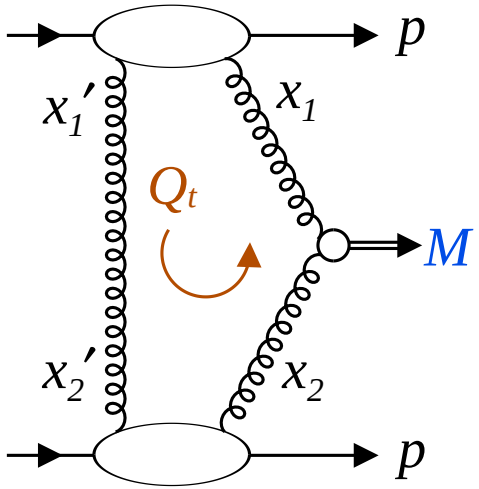
Central Exclusive Higgs with LDC uPDFs

- Higgs à la Khoze, Martin, Ryskin
- Unintegrated gluons from LDC
- Results

CERN
2004.03.27
Leif Lönnblad

Exclusive Diffractive Higgs



$$\frac{d\sigma_M^{\text{excl}}}{dM^2dy} = \frac{d\mathcal{L}}{dM^2dy}\hat{\sigma}_{gg\to M}(M^2)$$

$$M^2\frac{d\mathcal{L}}{dM^2dy} = S^2L$$

$$L = S^2\left(\frac{\pi}{(N_c^2-1)b}\int\frac{dQ_t^2}{Q_t^4}f_g(x_1,x_1',Q_t^2,M^2/4)f_g(x_2,x_2',Q_t^2,M^2/4)\right)^2$$

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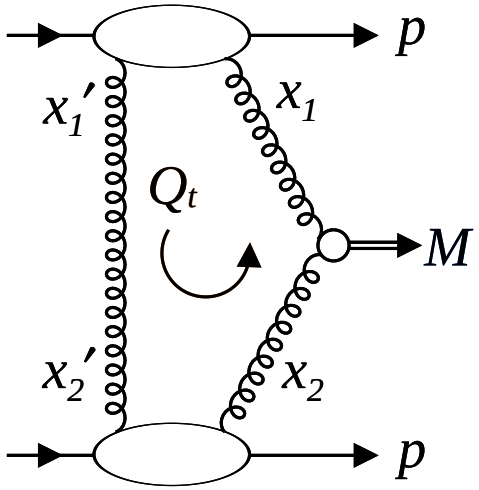

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f_g is the un-integrated, off-diagonal gluon density.

S^2 is a soft survival probability.

b is the t-slope of the proton.

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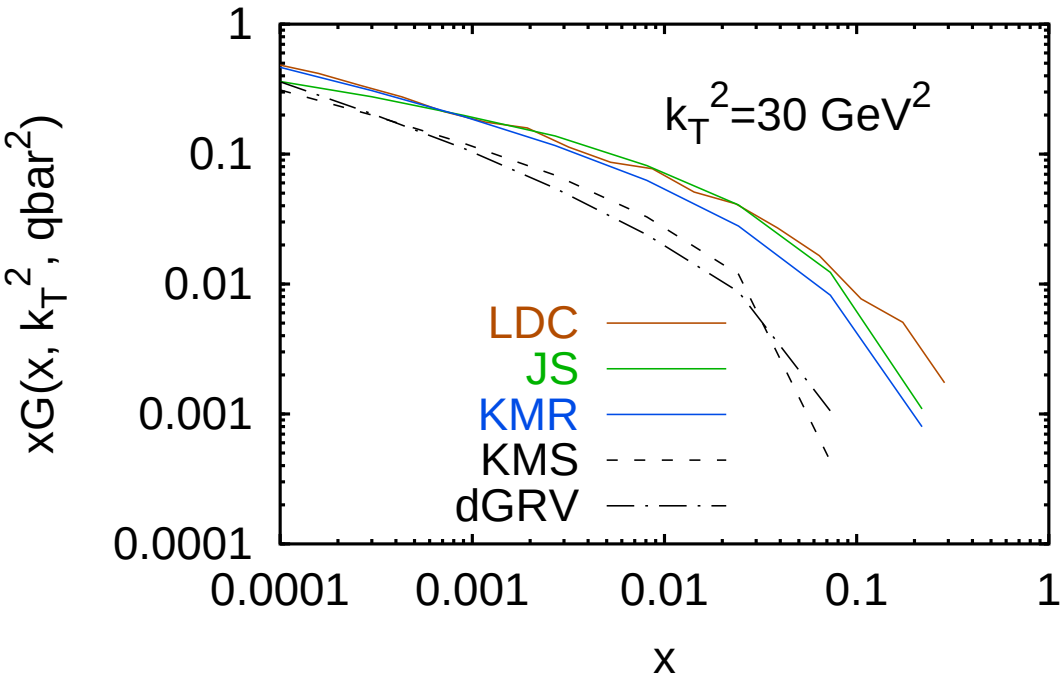
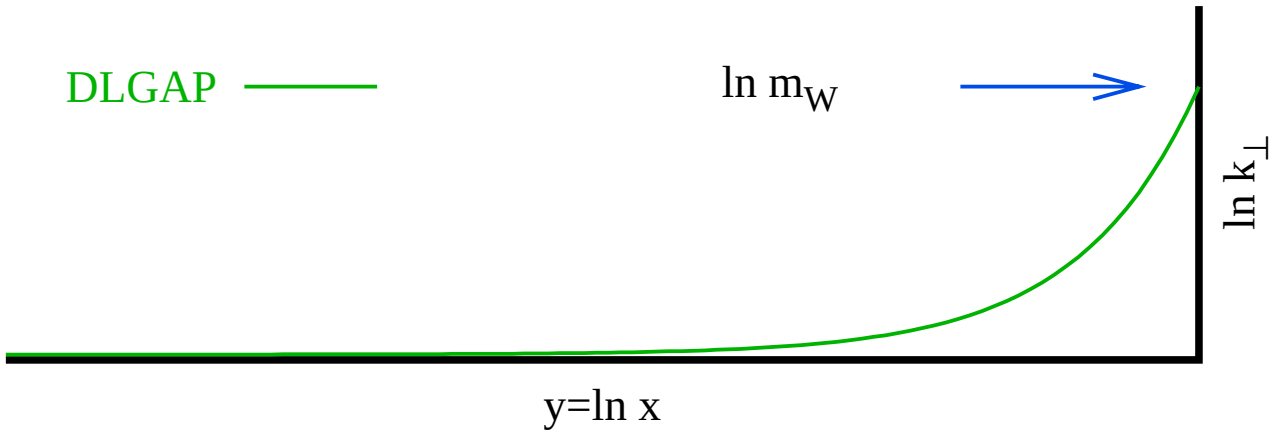


$$f_g^{\mathrm{KMR}}(x,x',Q_t^2,M^2/4) = R_g \frac{\delta}{\delta Q_t^2}\left[\sqrt{T(Q_t,M/2)}xg(x,Q_t^2)\right]$$

$$f_g^{\mathrm{LDC}}(x,x',Q_t^2,M^2) = R_g\sqrt{\Delta_S(Q_t^2,M^2)}\,\mathcal{G}(x,Q_t^2,Q_t^2)$$

What is the typical evolution path?



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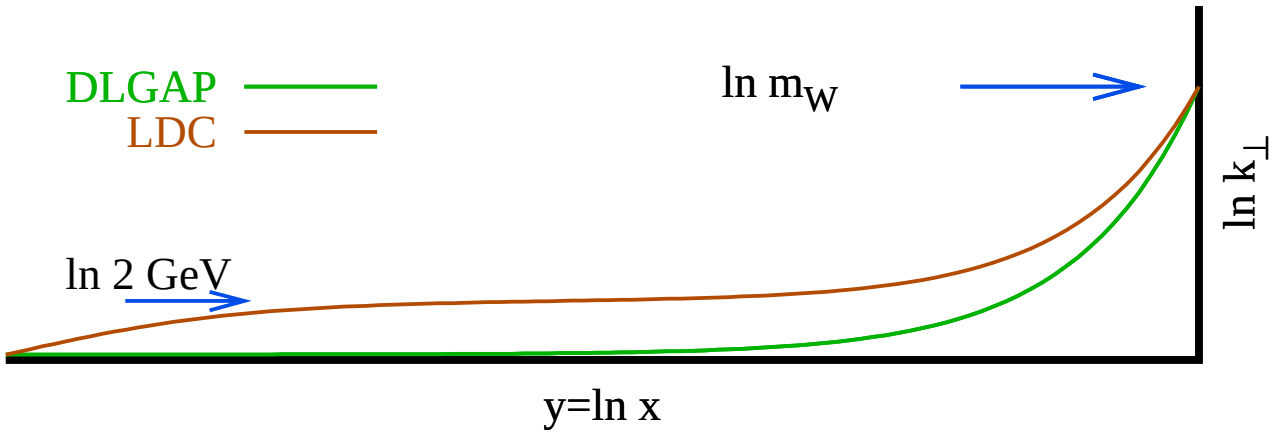


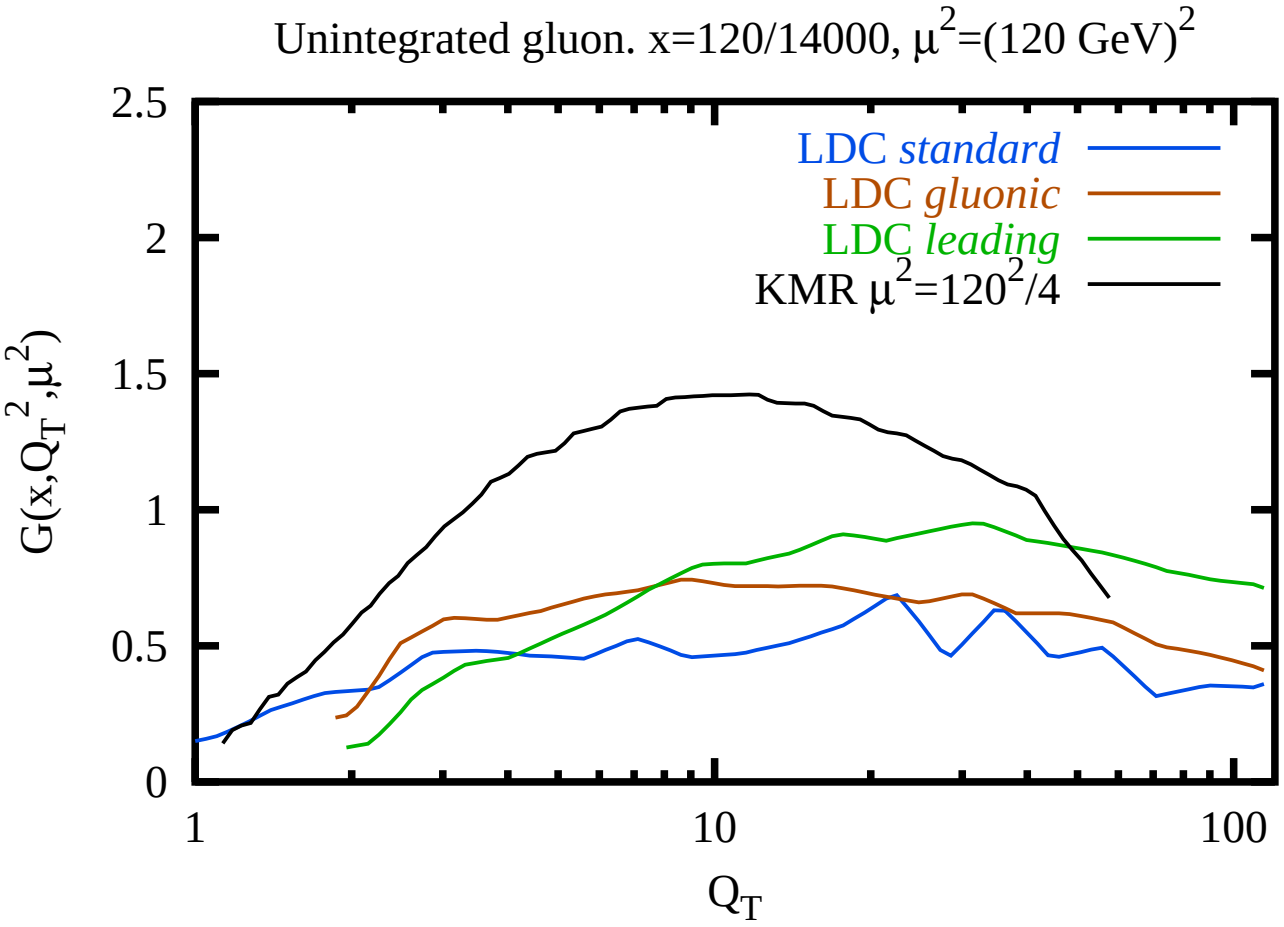
We will use three different LDC unintegrated gluons which differs in the treatment of non-leading terms.

standard uses quark and gluon evolution with full splitting functions. Gives a good description of F_2.

gluonic uses only gluons with full splitting function. Gives a good description of the integrated gluon.

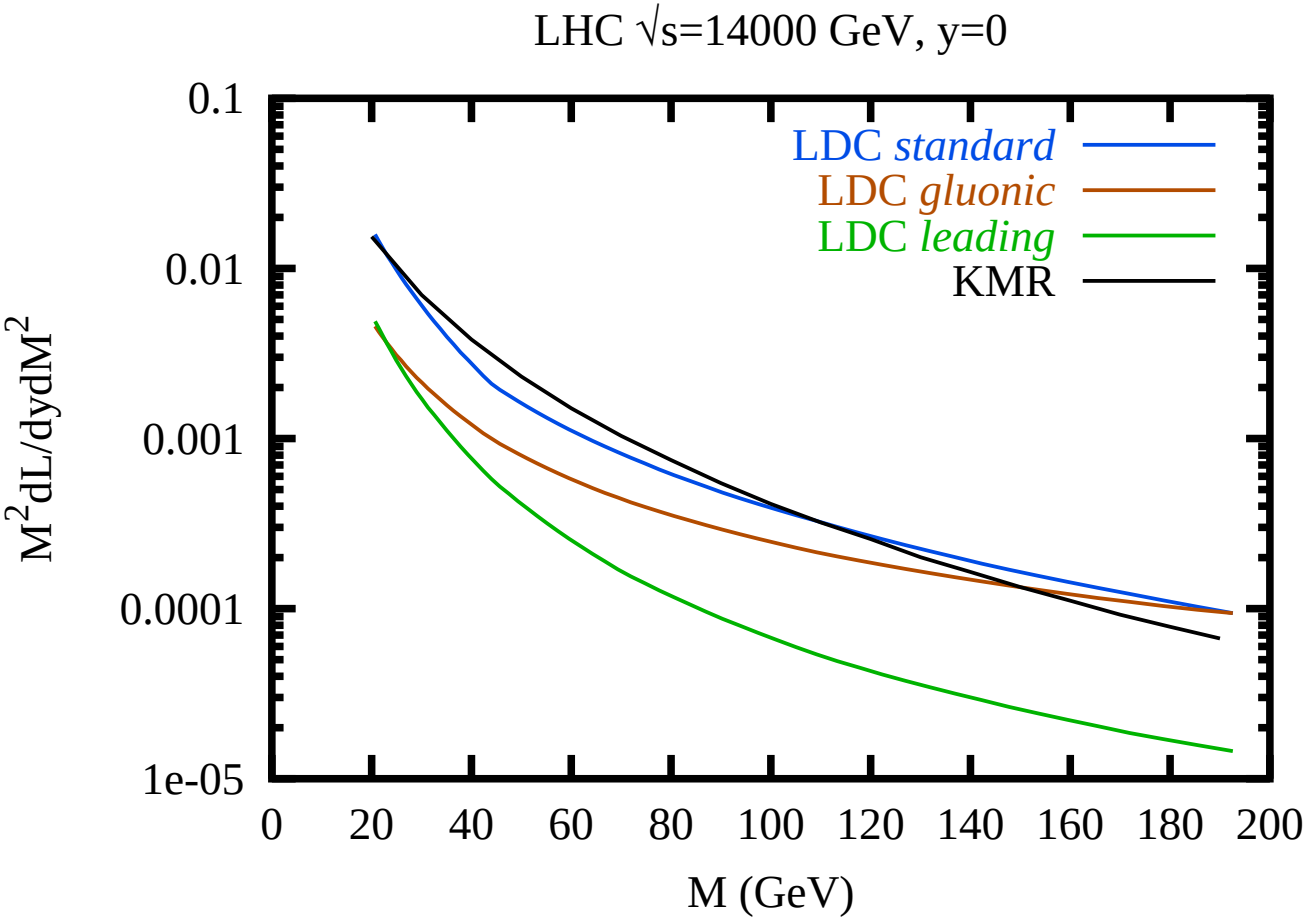
leading uses only gluons with only singular terms in the splitting function. Gives a good description of forward jets and b-production at the Tevatron.

They are all extracted from generating a large number of DIS events with LDCMC and sampling the gluon density in bins of x and $k_\perp$.

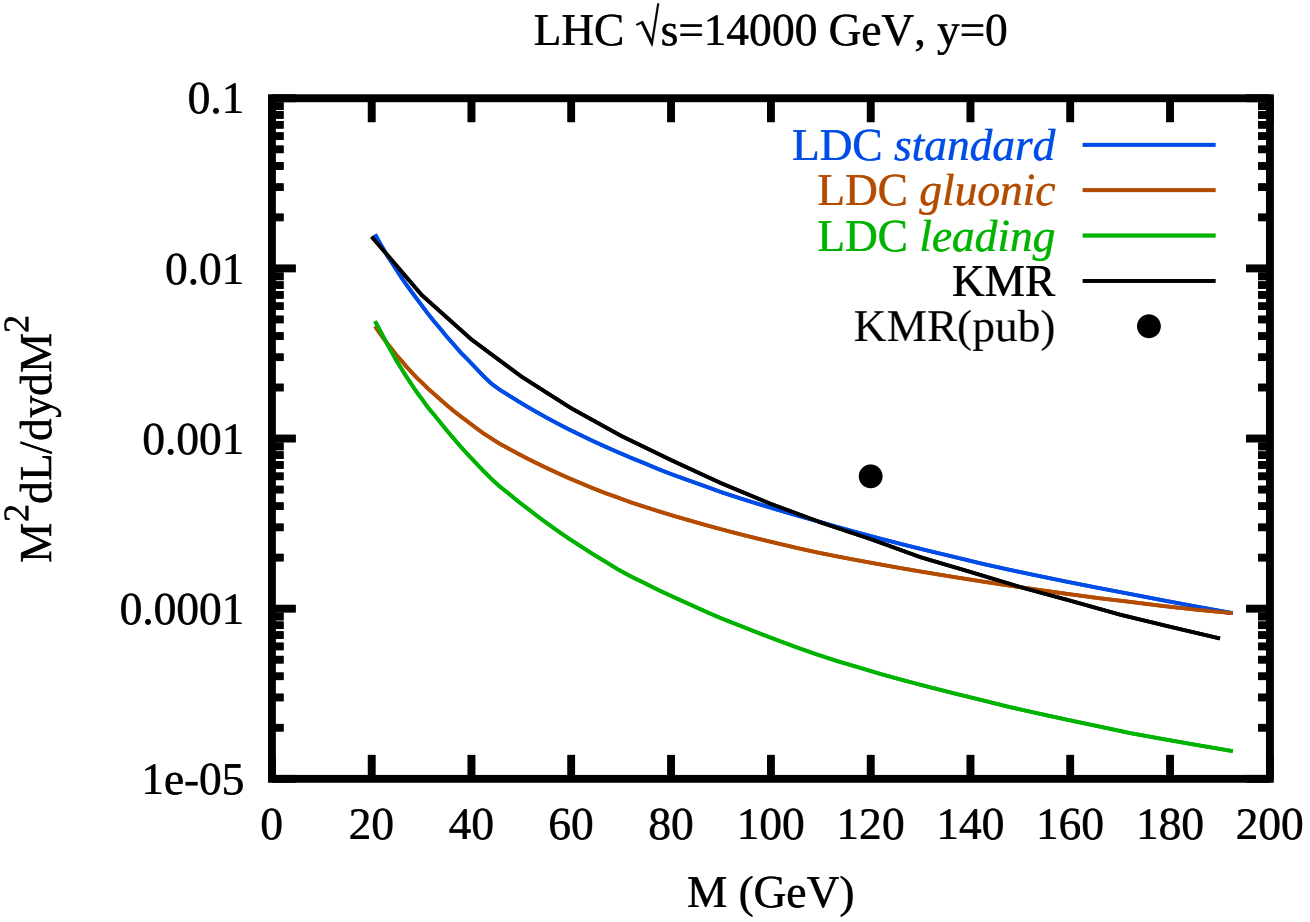


In the luminosity function the Sudakov hits you at small Q_T and the $1/Q_T^4$ at large. $\langle Q_T \rangle \approx 2 - 3$ GeV.

Results


LHC √s=14000 GeV, y=0
LDC standard
LDC gluonic
LDC leading
KMR
M²dL/dydM²
0.1
0.01
0.001
0.0001
1e-05
0
20
40
60
80
100
120
140
160
180
200
M (GeV)

Results



Khoze, Martin, Ryskin, *Eur. Phys. J.* **C23** (2002) 311.

Continued studies

Trying to understand skewedness inside LDC

Toying around with "intrinsic $k_\perp$" (non-perturbative and non-perturbative) within the original KMR framework.

Gap survival from PYTHIA

PYTHIA does not have hard diffraction. But if you generate the corresponding non-diffractive process with multiple interactions included, just look at `MSTI(31)`. The probability that the number of scatterings is one is your gap survival probability.