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ARIADNE and CKKW

- Differences between standard CKKW and ARIADNE implementation
- Small- x issues
- Upcoming THEPEG-version of ARIADNE

CERN
2006.07.18
Leif Lönnblad



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Standard CKKW

ARIADNE

ktclus to get scales



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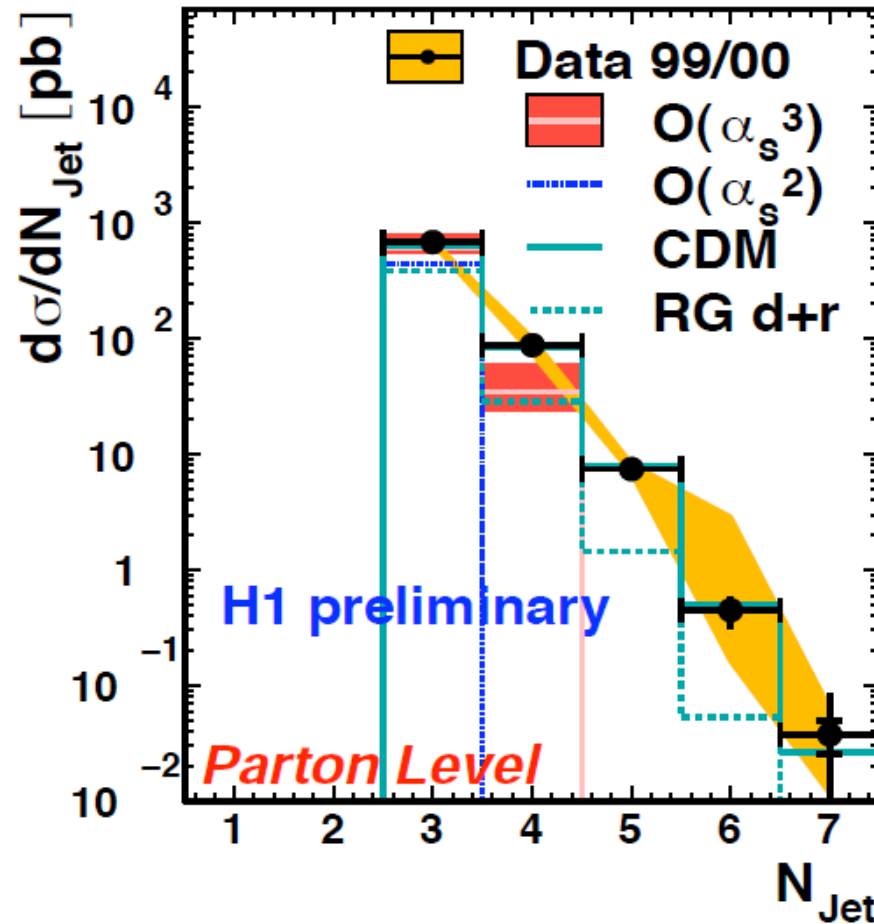
Implemented for $e^+e^- \rightarrow \text{jets}$ and $pp \rightarrow W + \text{jets}$

Not very user-friendly implementation



We do not want analytic (DGLAP) Sudakovs, because real ARIADNE Sudakovs resum also some logs of $1/x$. Important for reproducing small- x HERA data.

Ordered (DGLAP) vs. unordered (BFKL-like) evolution.



At the LHC, everything is small x

We're looking for new things at $m \gtrsim 100$ GeV.

Backgrounds are typically $W/Z + X$ with $M_W \approx 80$ GeV

$$\implies x \sim m/\sqrt{s} \sim 10^{-4} - 10^{-2}$$

The scales are higher than in HERA/DIS ($\lesssim 10$ GeV) but still...



At the LHC, everything is small x almost

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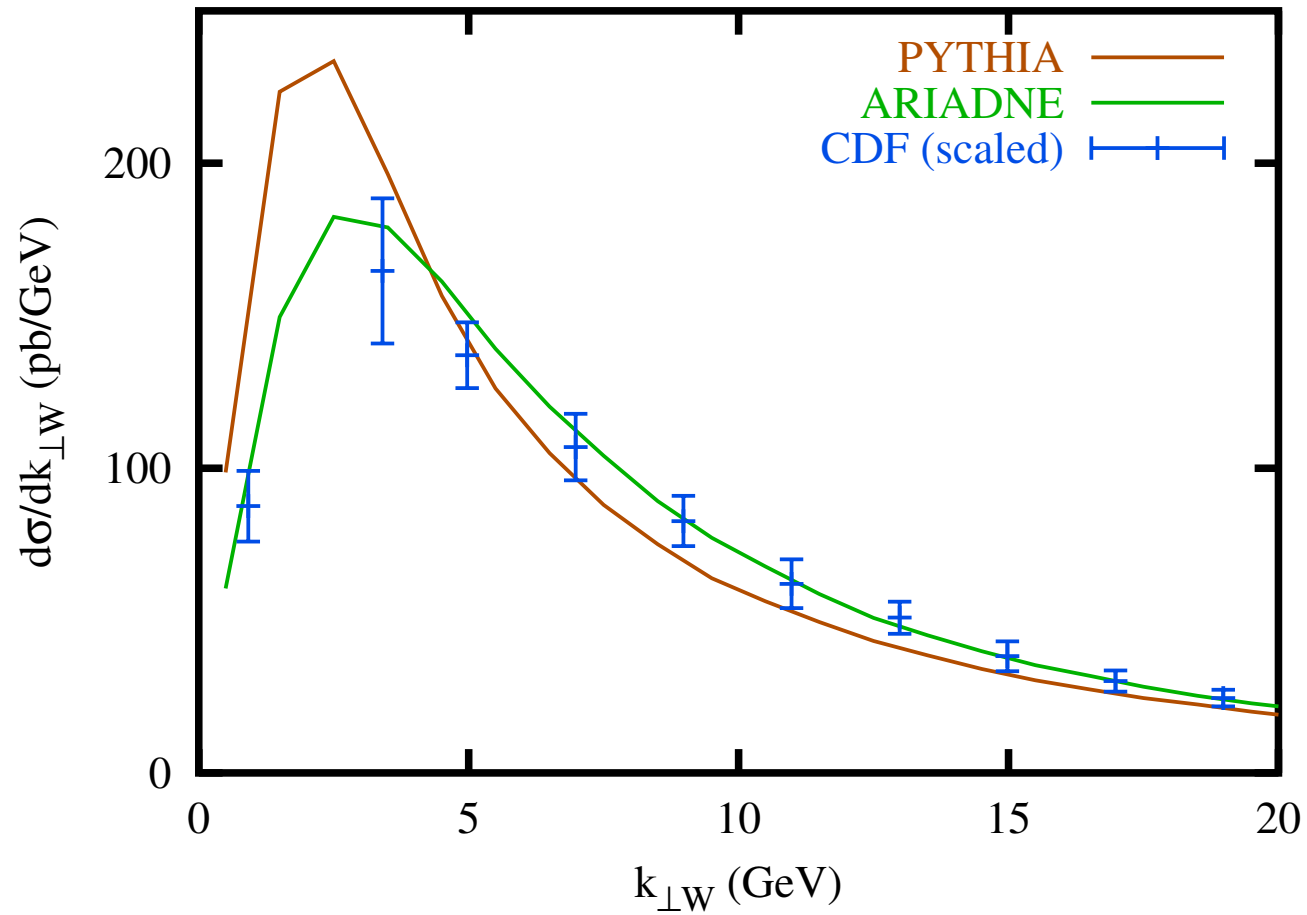
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W/Z -production at the Tevatron is not small- x , but there are still indications that something is going on.



Neither PYTHIA or HERWIG can describe the W k_{\perp} -spectrum at small k_{\perp} .

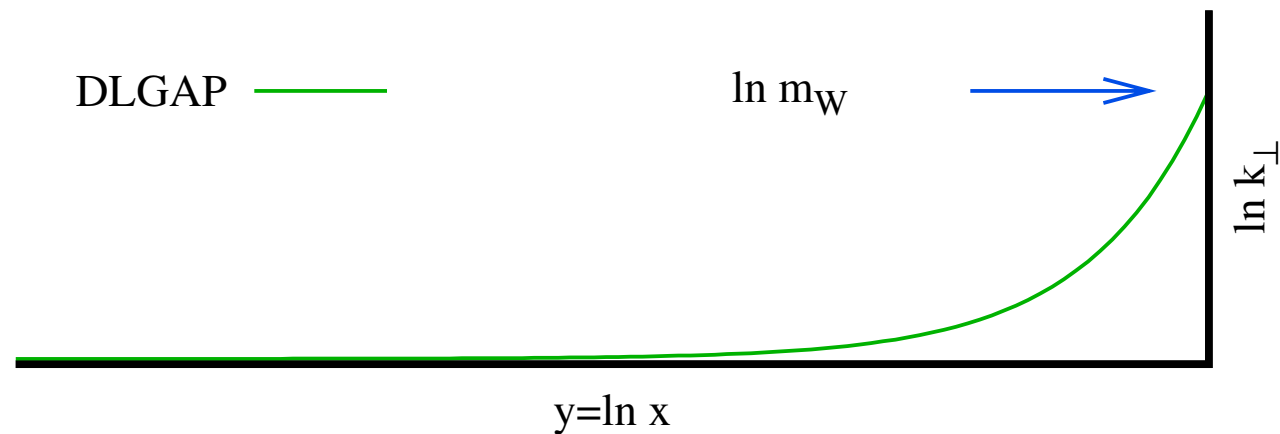
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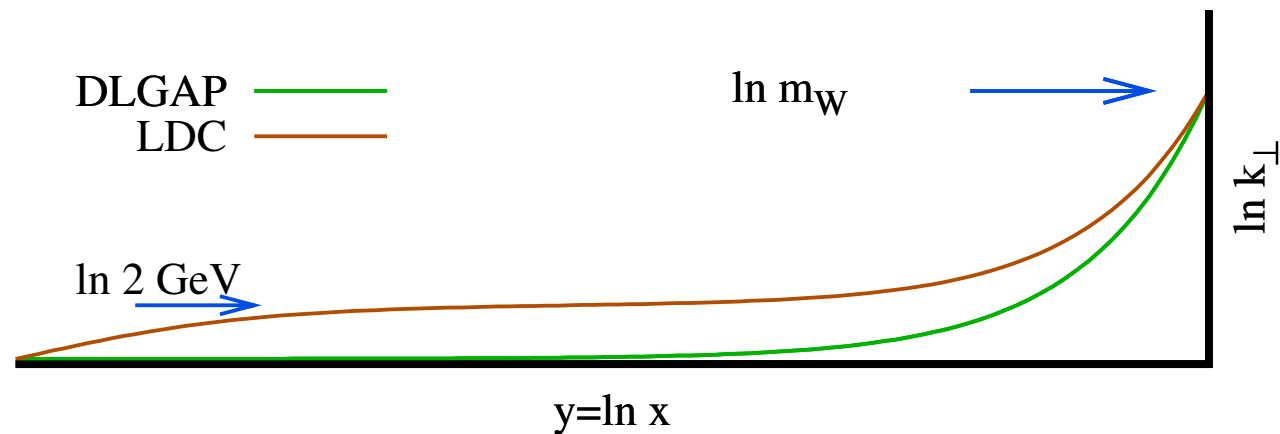
What is the typical evolution path?



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What is the typical evolution path?



The dipole model in ARIADNE basically only describes emission of gluons. $g \rightarrow q\bar{q}$ put in by hand. Initial-state $q \rightarrow g$ has not been put in yet. Important for eg. Higgs production at the LHC.

A first THEPEG version of ARIADNE with easy-to-use CKKW, suitable for LHC physics expected this year (L.L. and Nils Lavesson).

