DESY

Mikel Mendizabal

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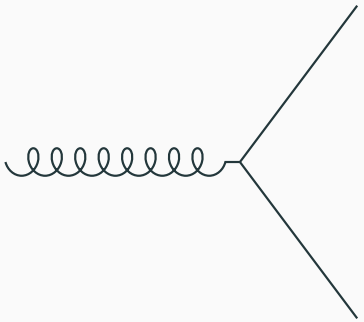

$$g_4 \propto \frac{g_5}{N(L)} \int_0^L dy e^{A(y)} f_g^{(1)}(y) f_q^{(0)}(y) f_{\bar{q}}^0(y) \sim g_5 g_0$$

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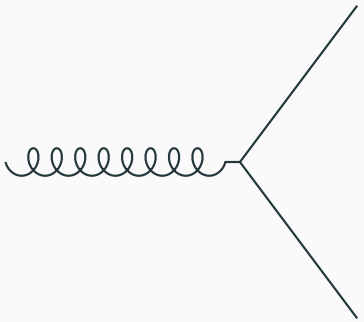

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- Study of the coupling of the first mode of the gluon to the right handed top quark
- One loop corrections to the mass of the gluon and the partonic CS of the $q\bar{q} \rightarrow t\bar{t}$

Highlight

Precise results, *pp* collisions $\rightarrow$ MadGraph:

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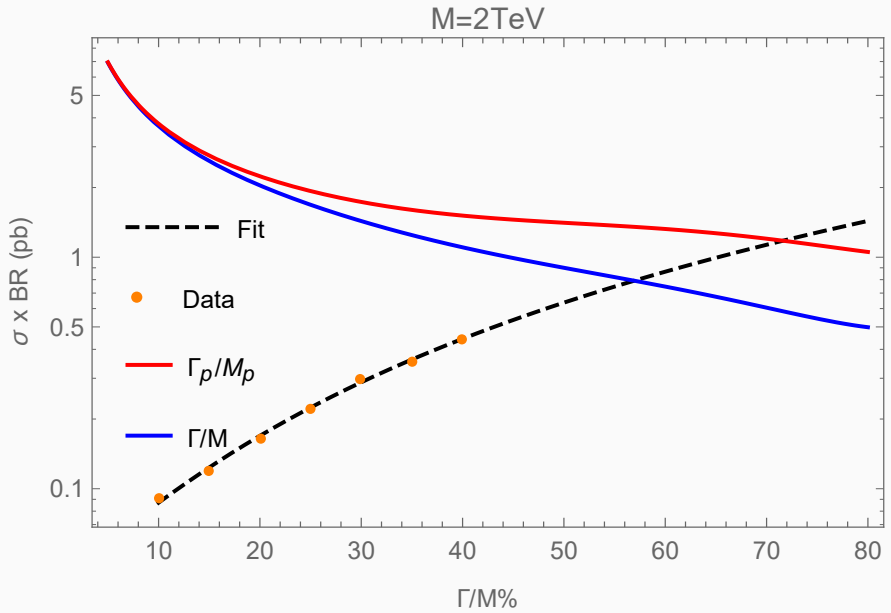

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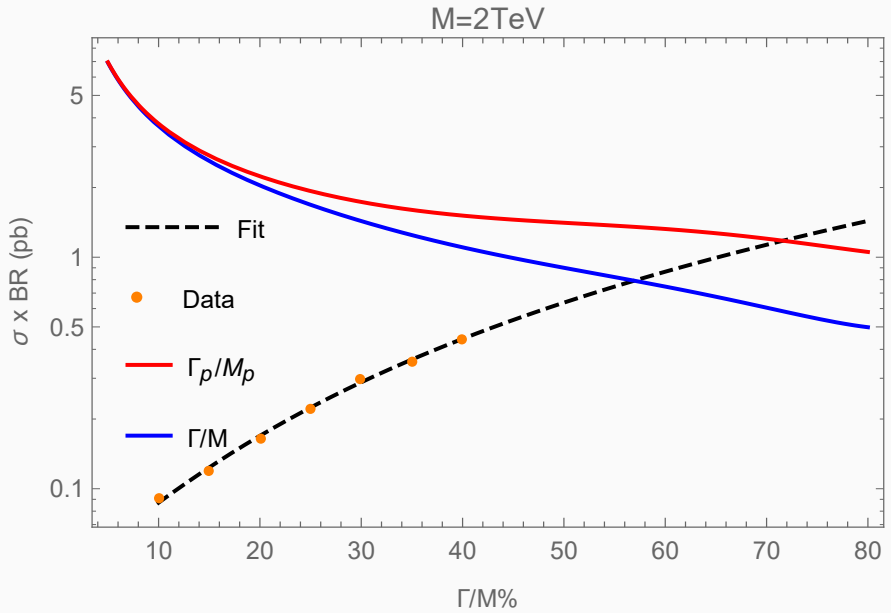

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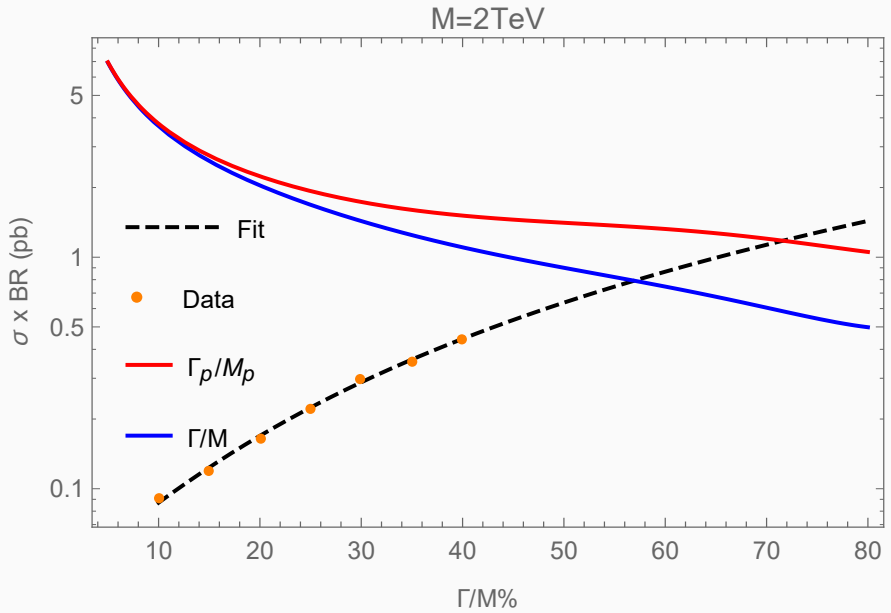

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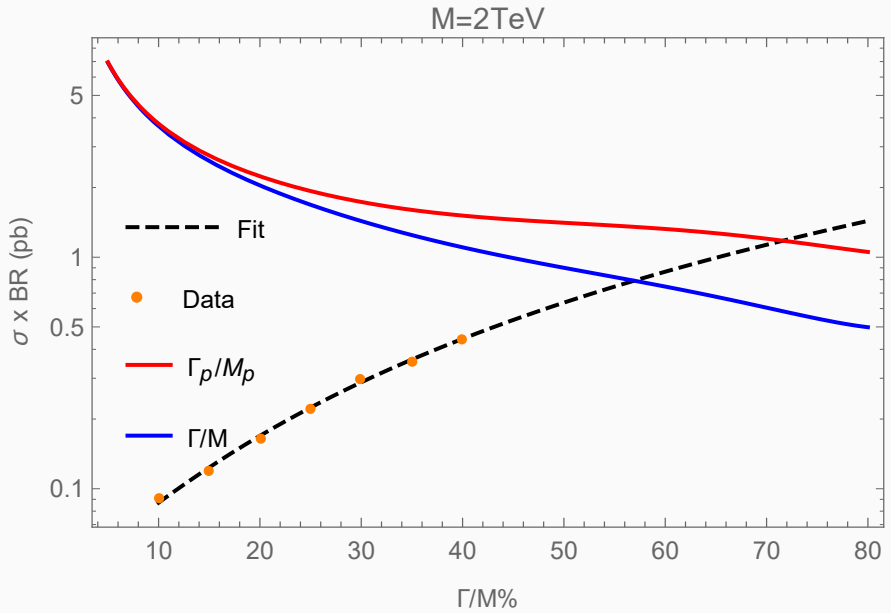

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Interesting results!

Antwerp internship: Nonperturbative effects in Drell-Yan transverse momentum spectra

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- Provides method to treat the evolution of transverse momentum dependent (TMD) parton distributions
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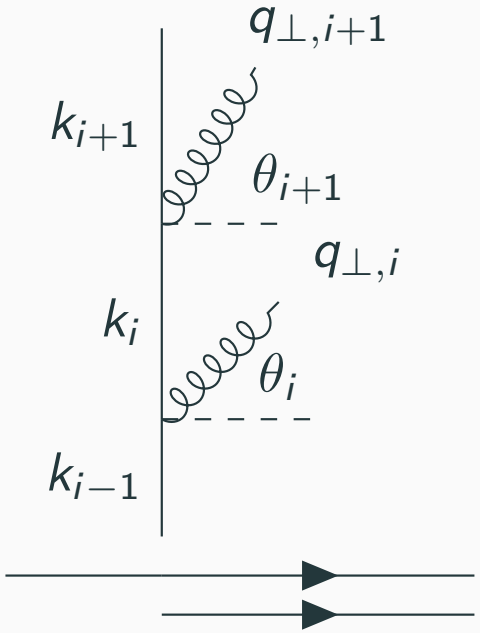
In my work I focused on non-perturbative aspects of the approach

Angular ordering

- The way we choose how to order the evolution in PB incorporates an important physical phenomena

Angular ordering: $\theta_{i+1} > \theta_i$



- Angular ordering enters in the evolution as

$$q^2_{\perp,c} = (1-z)^2\mu'^2 \qquad z_M = 1-\left(\frac{q_0}{\mu'}\right) \qquad \alpha_s((1-z)^2\mu'^2)$$

- The scale is proportional to the angle of the momentum of the radiated particle with respect to the particle beam

$$\frac{q_{\perp,i}}{1-z_i} = |k_{i-1}| \sin\theta_i = \mu'$$

- The first radiation is the one with the smallest angle

Non-perturbative effects: q_0

q_0: the minimum transverse momentum of the emitted parton

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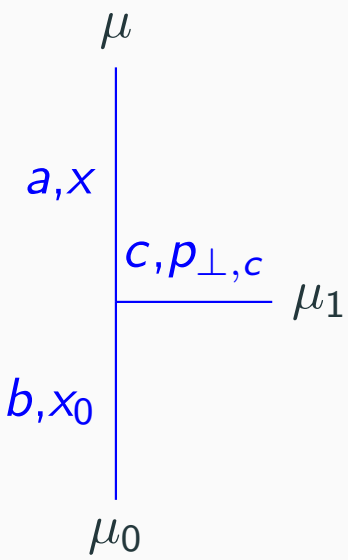

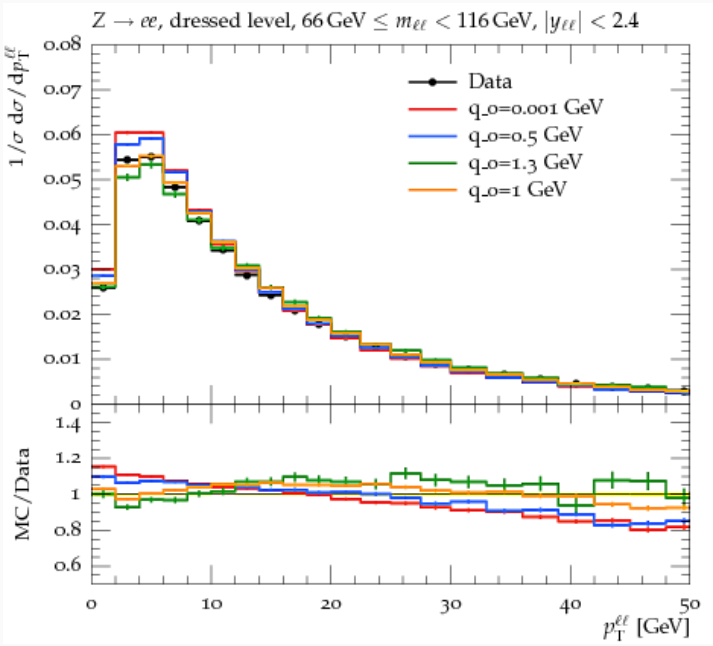

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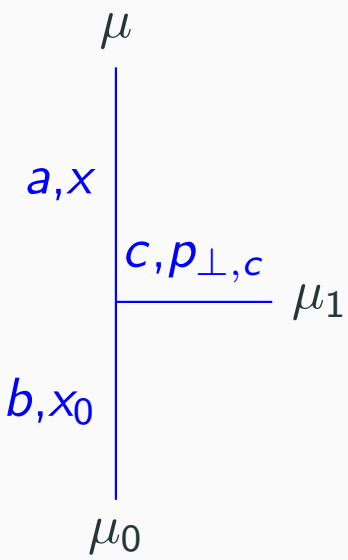

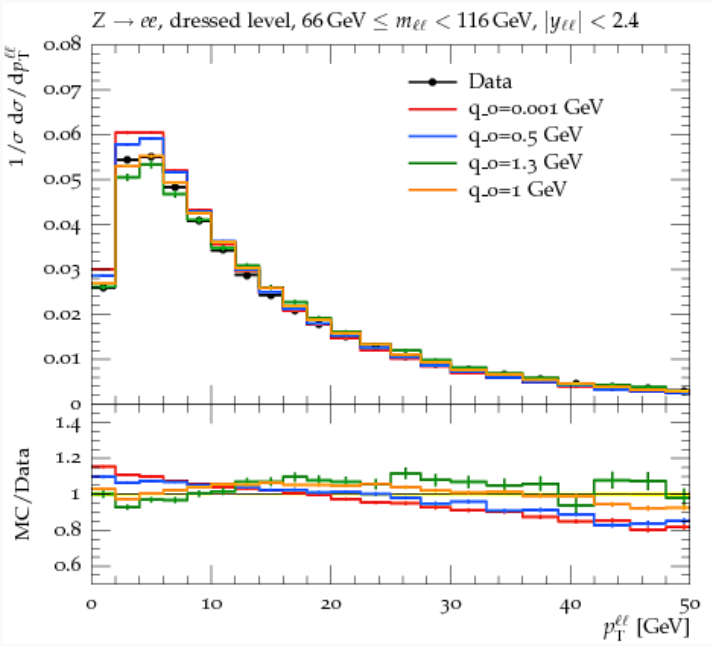

$q_0 \sim 1$ GeV best choice

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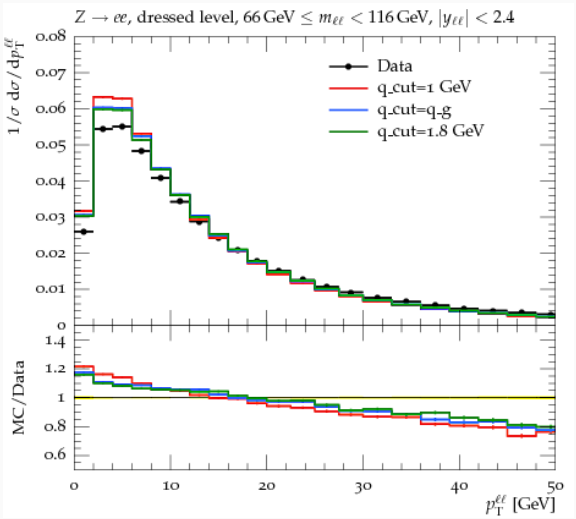

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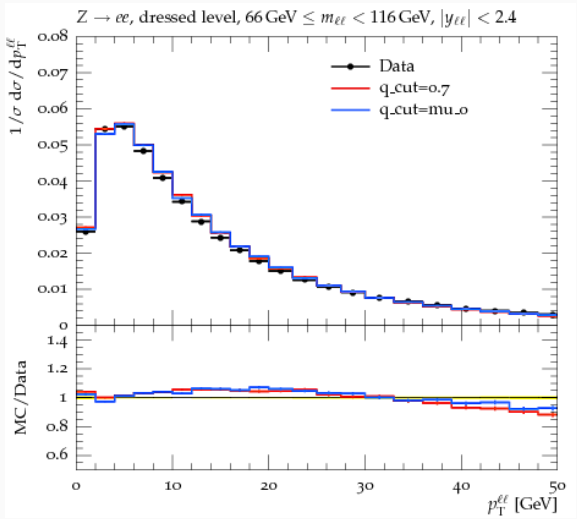

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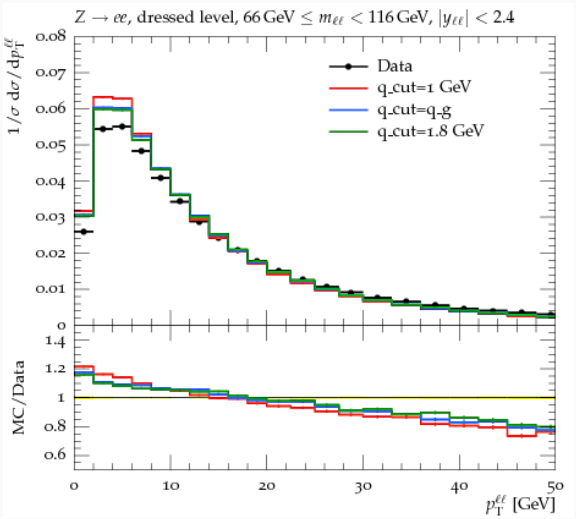

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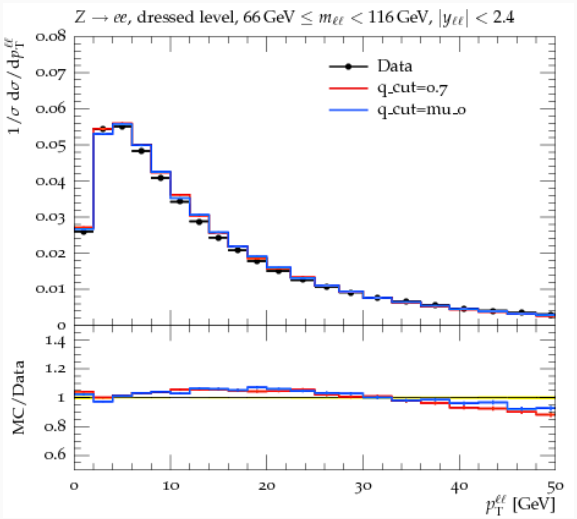

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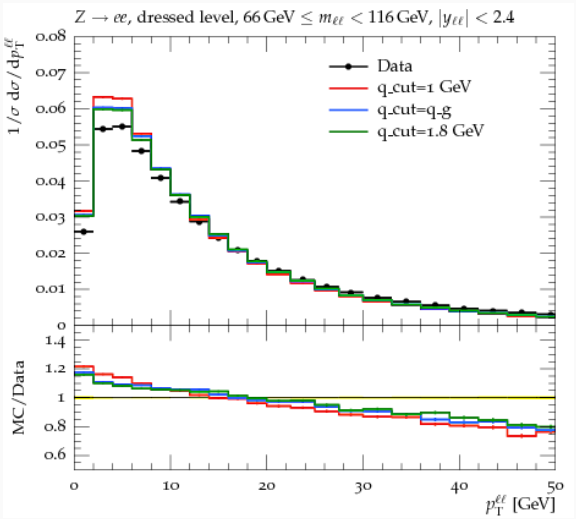

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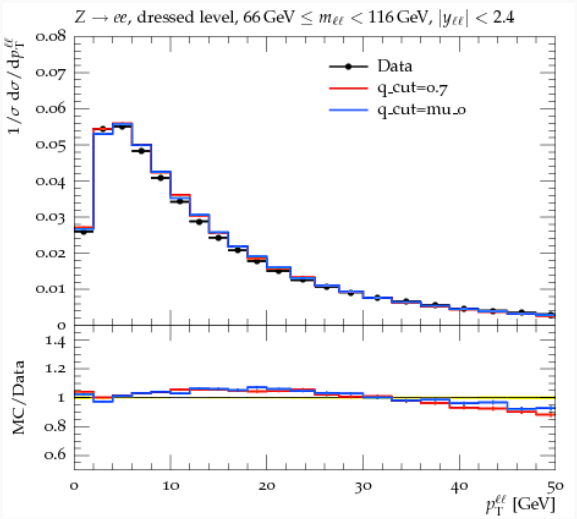

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For values of $q_0 \sim 1$ GeV the cut did not have effects

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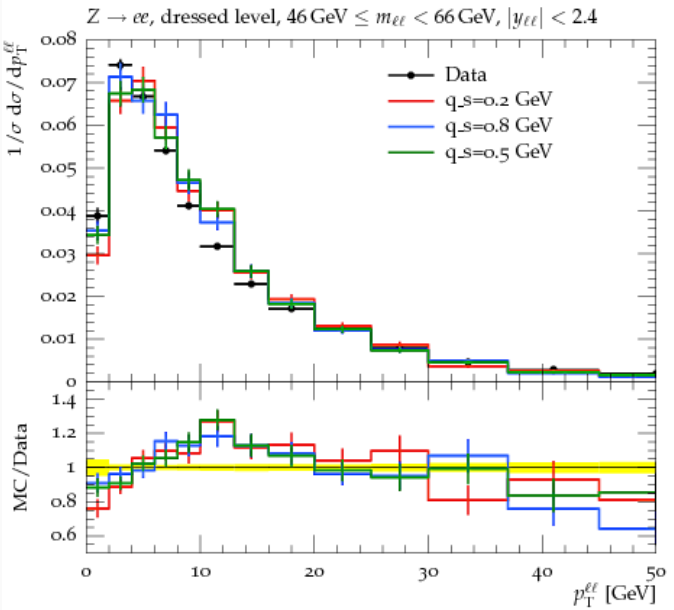
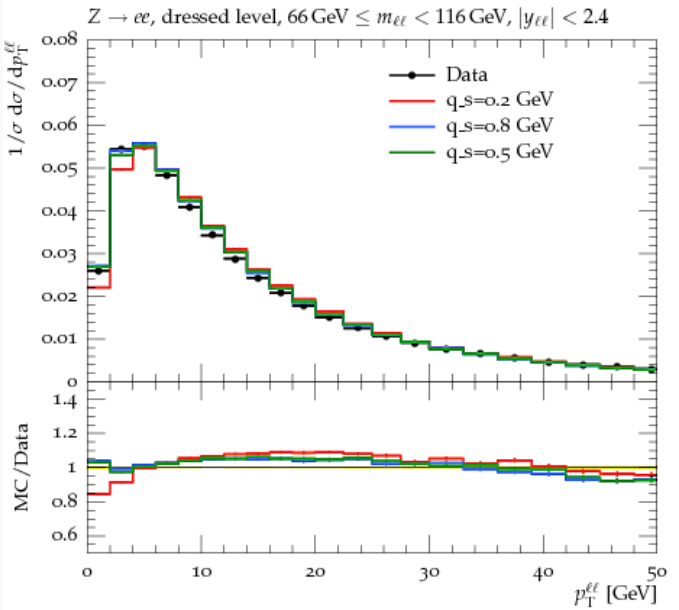


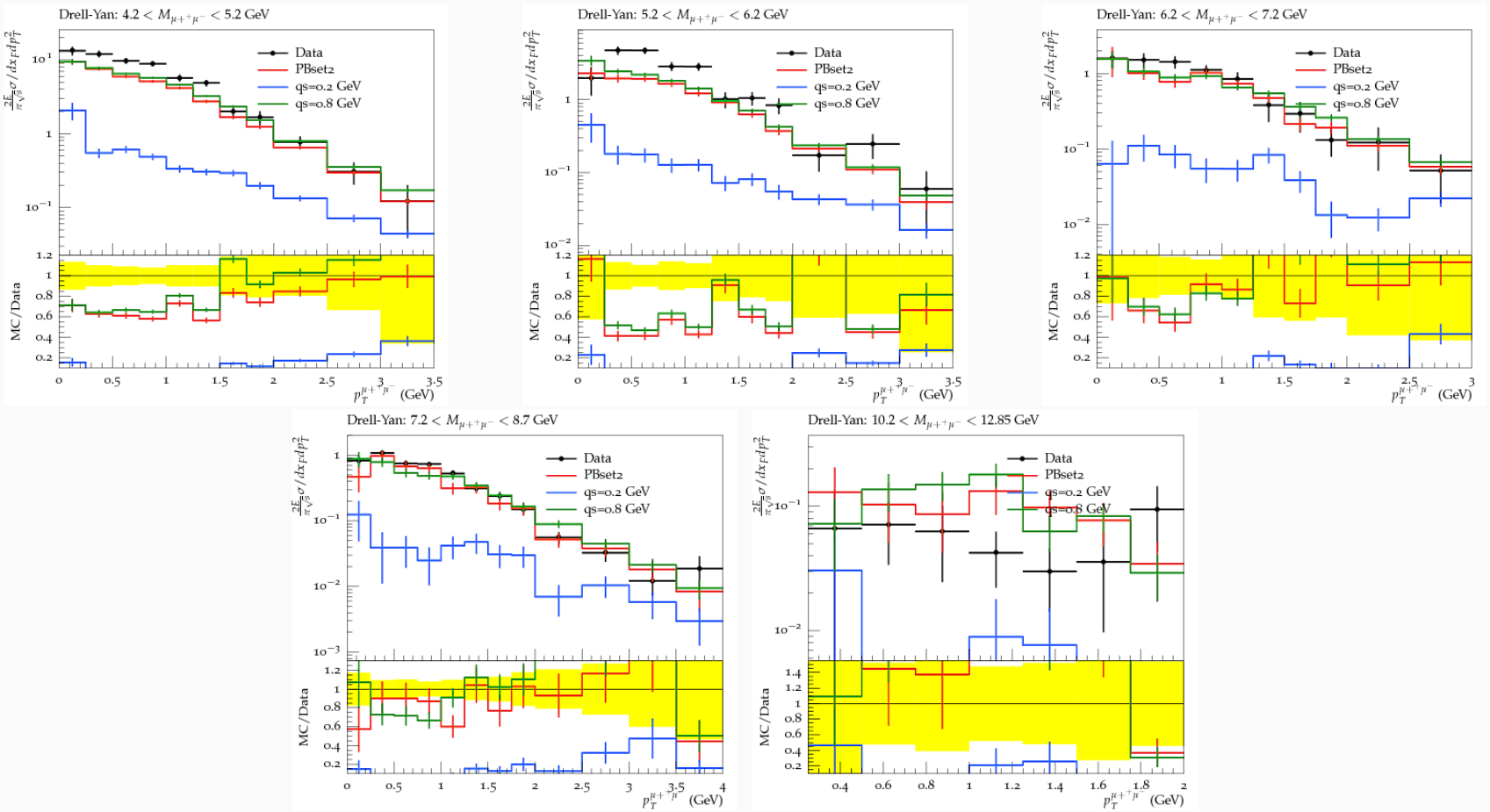


The width of the Gaussian of the k_t distribution affects the low p_T region and should be studied in detail in low energy experiments

ATLAS data is not sensitive enough at low p_T $\rightarrow$ NuSea experiment (Low mass DY

NuSea and intrinsic k_t

NuSea experiment is a fixed target low energy experiment performed at Fermilab where protons collide with deuterium and hydrogen



At low energy DY there is a big sensitivity to intrinsic k_t

Conclusions

- Study of non-perturbative parameters (q_0, q_{cut}, q_s) in PB method was performed
- With $q_0 \sim 1$ GeV the best description of the Z boson p_t spectrum
- No need of introducing cuts for $q_0 \sim 1$ GeV
- First application of PB method to low energy Drell-Yan processes (NuSea)
- Significant sensitivity to intrinsic k_t was found in NuSea data