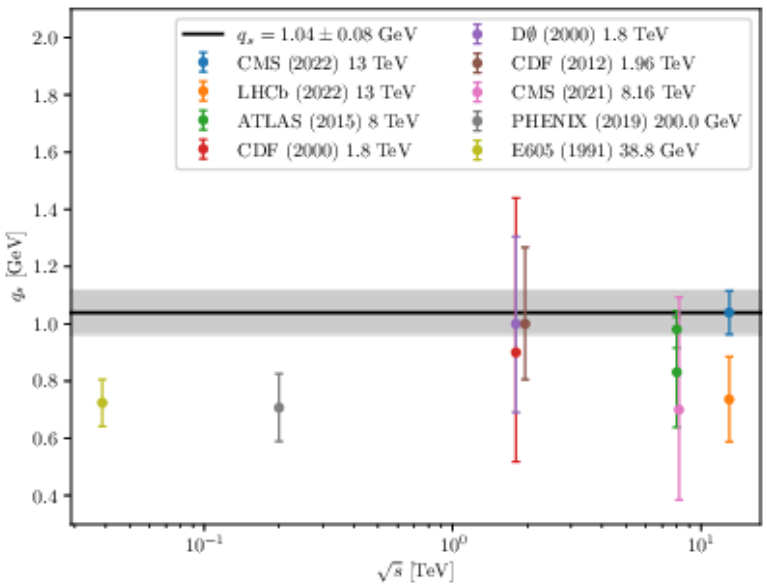
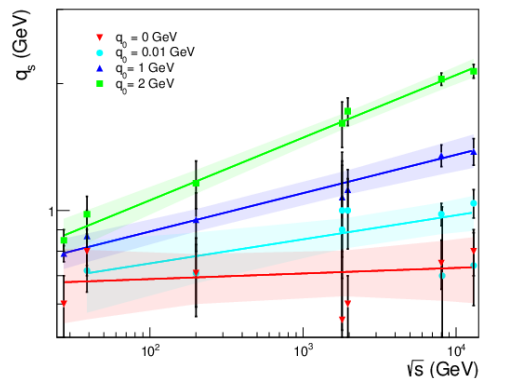
Motivation

Where does the slope for PBset2 comes from?
Eur.Phys.J.C 84 (2024) 2, 154:
CMS 13 TeV: $qs = 1.04$ GeV
Tevatron: $qs \approx 1$ but big error
ATLAS 8 TeV: $qs \approx 0.8 - 1$ depending on mass window
Other measurements (E605, Phenix,LHCb, CMS 8 TeV) $qs \approx 0.7$ GeV.
We never focused much on the fact that at 13 TeV CMS gives $qs = 1$ and LHCb $qs = 0.7$ GeV



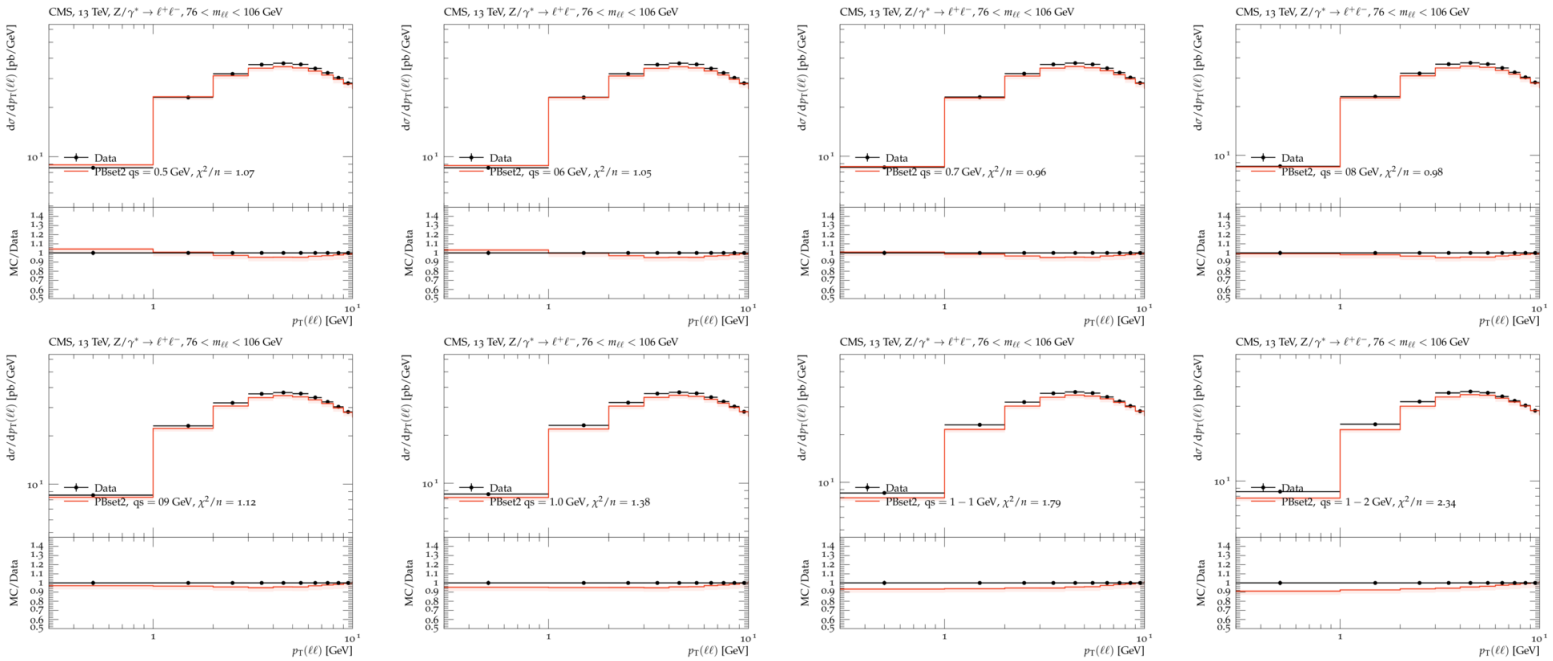


Our official explanation:

- slope comes from soft gluons treatment (← no doubt about it)
- Eur.Phys.J.C 85 (2025) 3, 278: $q0 = 0.01$ GeV gives zM still too far away from 1, $q0 = 0.000001$ gives flat curve (← doubts here)

→ this doesn't explain the difference between CMS and LHCb
Recent studies suggest:
the reason is the method chosen to compute $\chi 2$

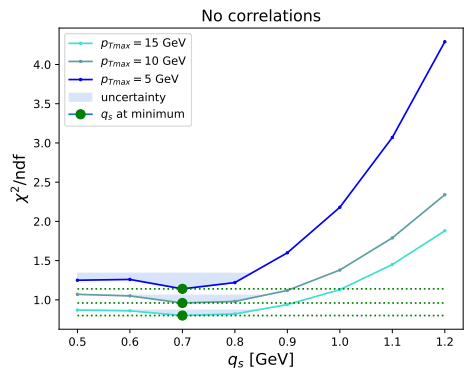
PBset2, CMS 13 TeV,2nd mass window, ptMax 10



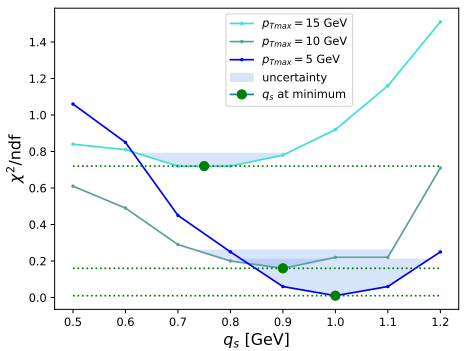
(Hannes LHE files and TMDs)

PBset2, CMS 13 TeV,2nd mass window, comparison of different codes

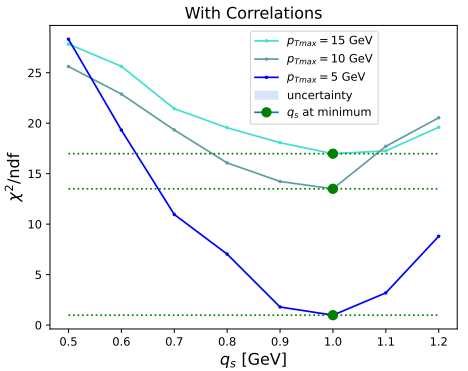
makeband:



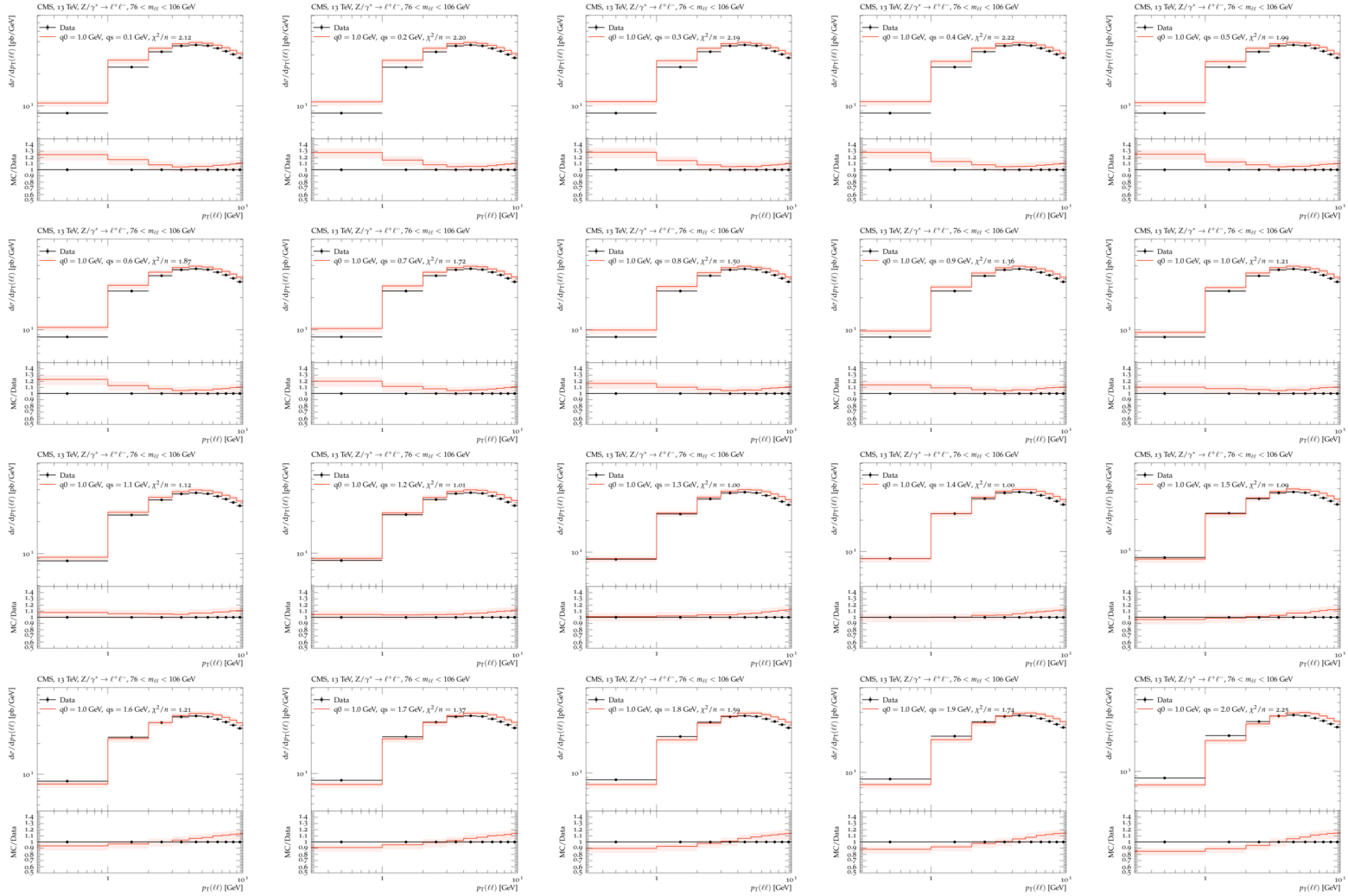
LCorpe:



LMoureaux:

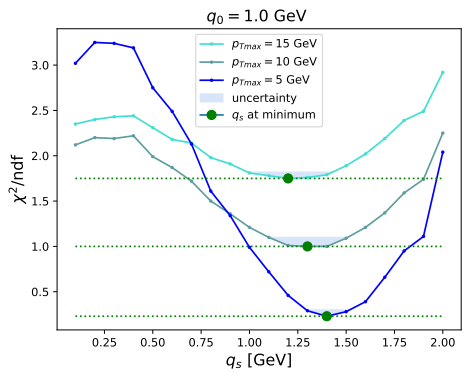


Dyn zmax, CMS 13 TeV,2nd mass window, ptMax 10



Dyn zmax, CMS 13 TeV,2nd mass window, comparison of different codes

makeband:



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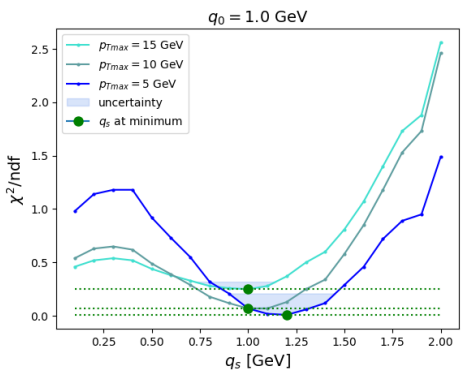

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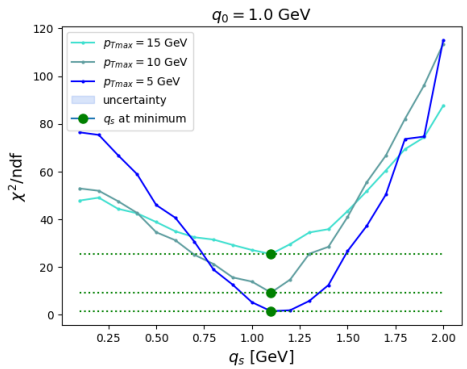
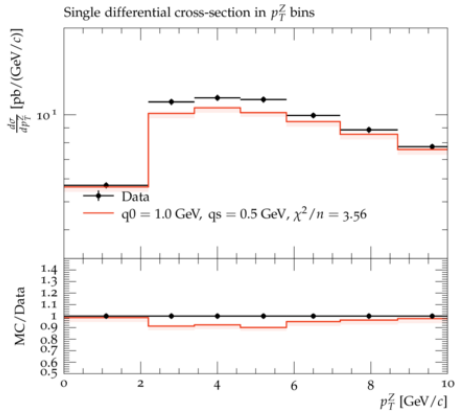
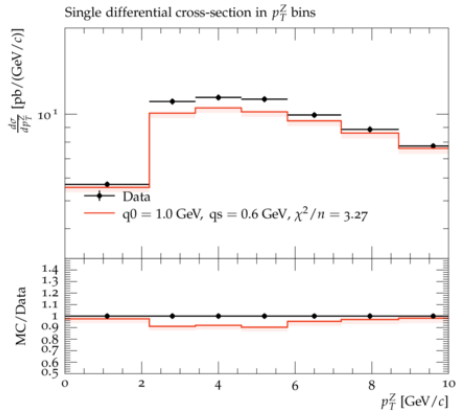


LHCb PBset2


Single differential cross-section in p_T^Z bins
$\frac{d\sigma}{dp_T^Z}$ [pb/(GeV/c)]
Data
q0 = 1.0 GeV, qs = 0.5 GeV, $\chi^2/n = 3.56$
MC/Data
p_T^Z [GeV/c]


Single differential cross-section in p_T^Z bins
$\frac{d\sigma}{dp_T^Z}$ [pb/(GeV/c)]
Data
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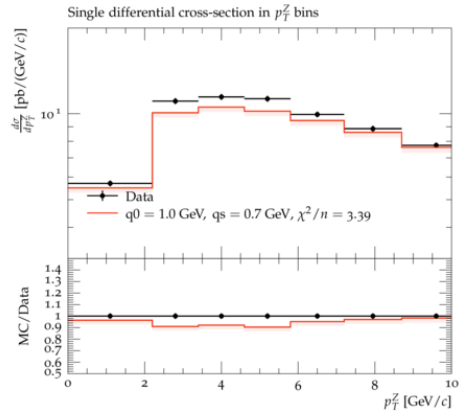
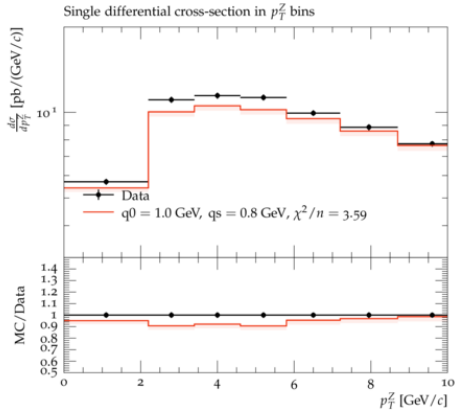
MC/Data
p_T^Z [GeV/c]


Single differential cross-section in p_T^Z bins
$\frac{d\sigma}{dp_T^Z}$ [pb/(GeV/c)]
Data
q0 = 1.0 GeV, qs = 0.7 GeV, $\chi^2/n = 3.39$
MC/Data
p_T^Z [GeV/c]


Single differential cross-section in p_T^Z bins
$\frac{d\sigma}{dp_T^Z}$ [pb/(GeV/c)]
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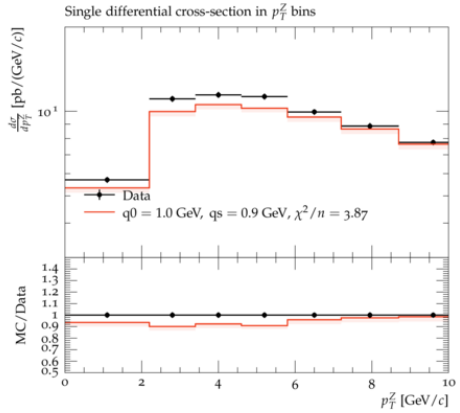
MC/Data
p_T^Z [GeV/c]


Single differential cross-section in p_T^Z bins
$\frac{d\sigma}{dp_T^Z}$ [pb/(GeV/c)]
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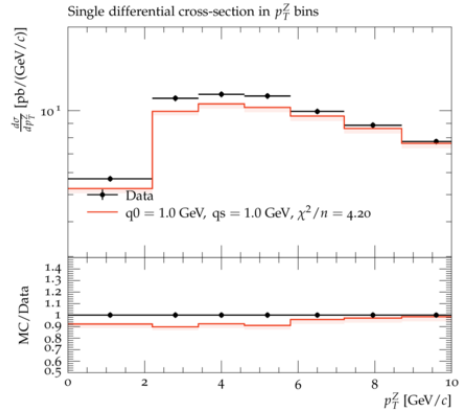
MC/Data
p_T^Z [GeV/c]


Single differential cross-section in p_T^Z bins
$\frac{d\sigma}{dp_T^Z}$ [pb/(GeV/c)]
Data
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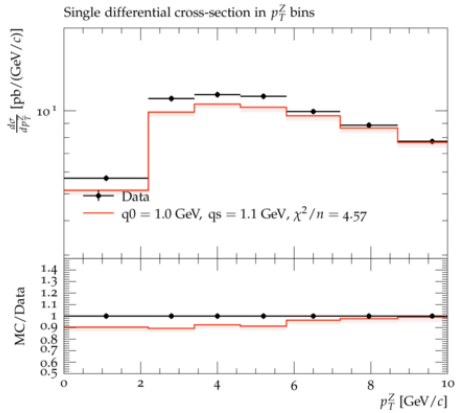
MC/Data
p_T^Z [GeV/c]


Single differential cross-section in p_T^Z bins
$\frac{d\sigma}{dp_T^Z}$ [pb/(GeV/c)]
Data
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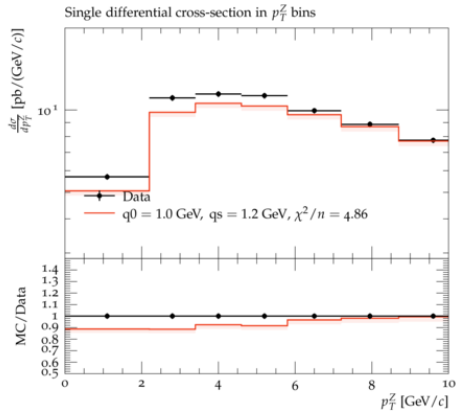
MC/Data
p_T^Z [GeV/c]


Single differential cross-section in p_T^Z bins
$\frac{d\sigma}{dp_T^Z}$ [pb/(GeV/c)]
Data
q0 = 1.0 GeV, qs = 1.2 GeV, $\chi^2/n = 4.86$
MC/Data
p_T^Z [GeV/c]

makeband vs LCorpe