

# Level 3

🍏 Main ingredient of the level 3 benchmark:

$$\left[ \frac{d\sigma^{\text{res.}}}{dq_T} \right]_{\text{f.o.}} = \sum_{n=0}^{\text{f.o.}} \alpha_s^n \sum_{l=0}^{2n} B^{(n,l)} I_l(q_T)$$

$$I_l(q_T) = \int_0^\infty db b J_0(bq_T) \ln^l \left( \frac{b^2 Q^2}{b_0^2} (+1) \right)$$

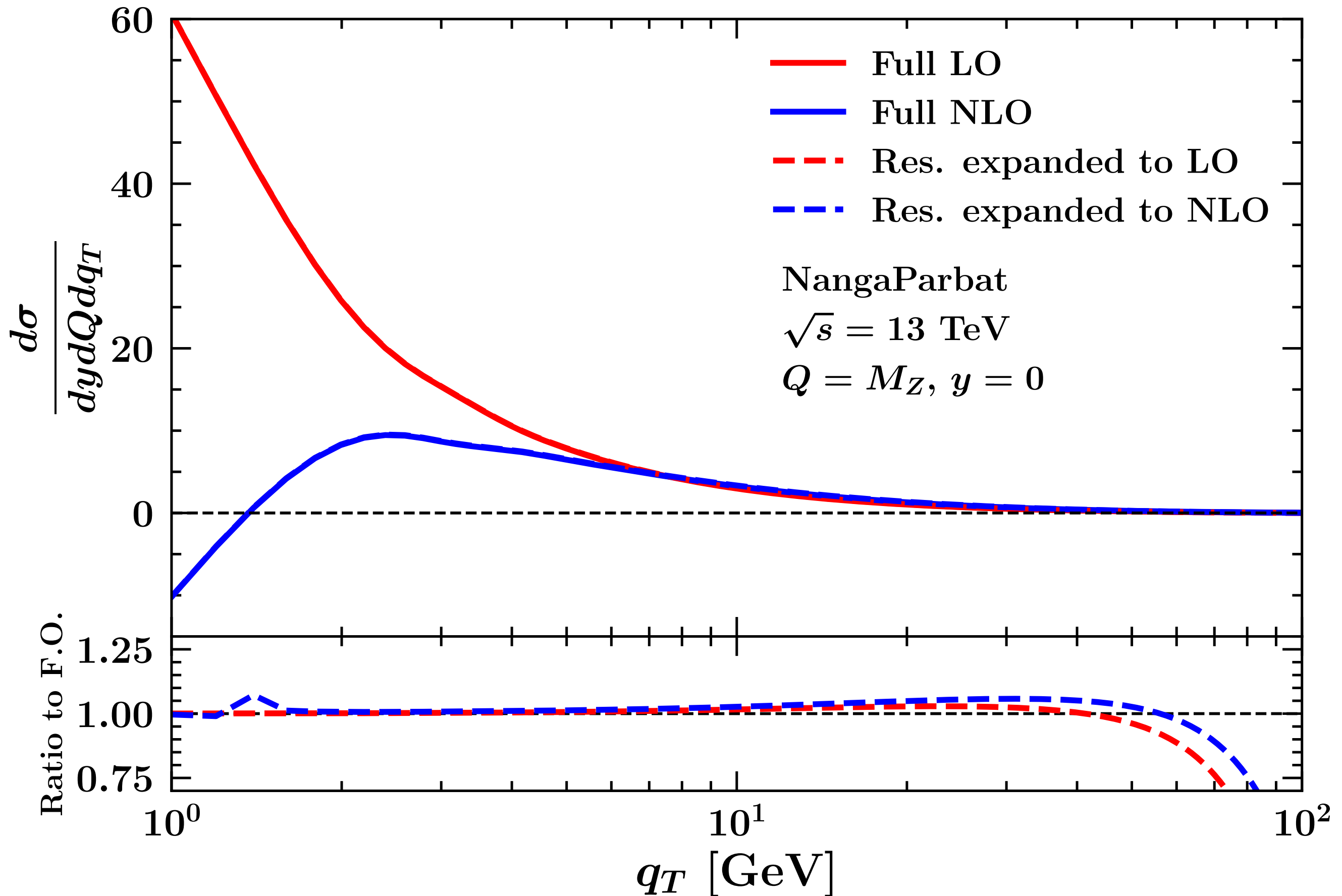
🍏  $I_0$  is irrelevant for differential distributions:

$$I_0(q_T) = \delta(q_T)$$

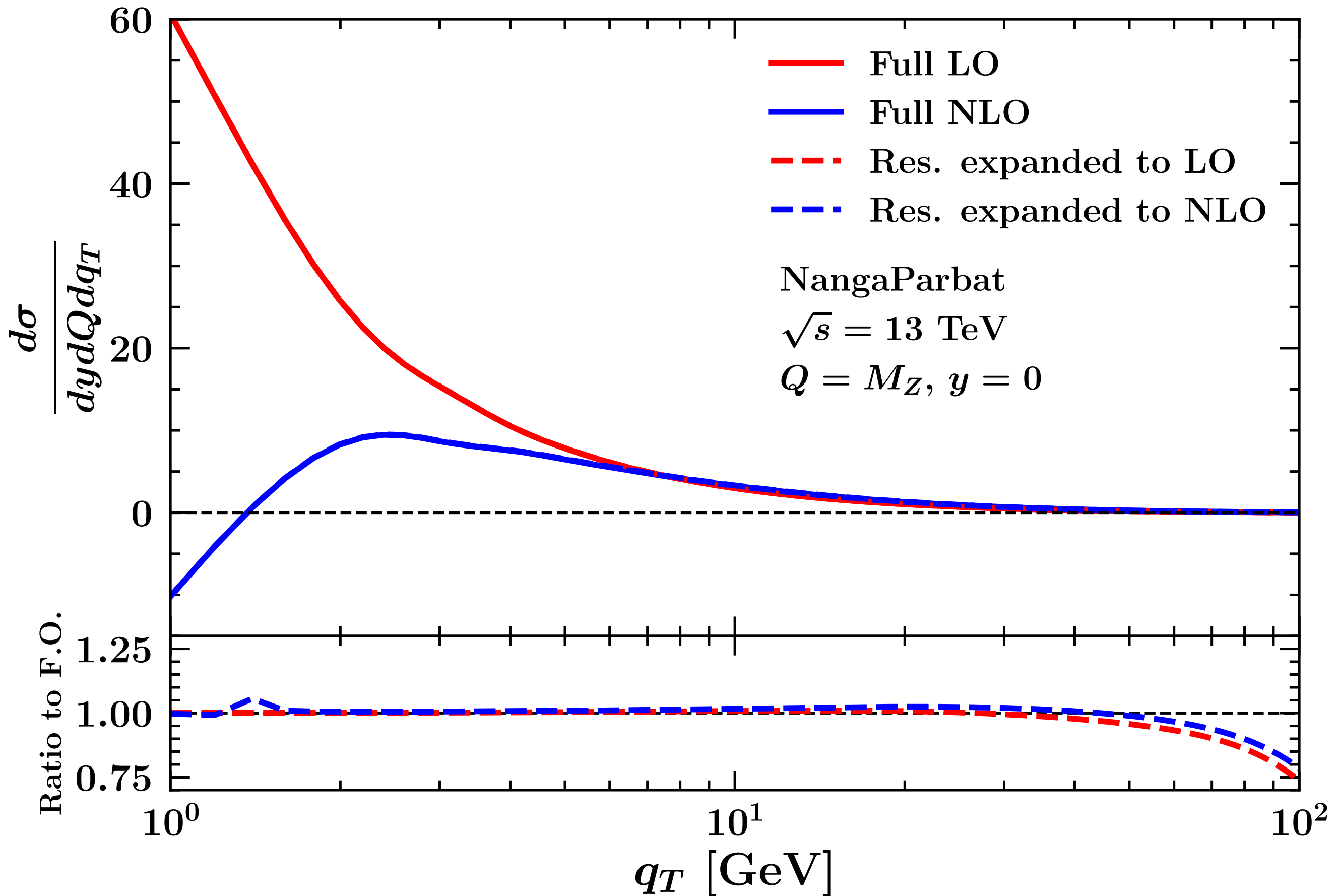
🍏 The **+1** defines the modified logarithms:

- 🍏 originally introduced as a “unitarity constraint”
- 🍏 do not spoil the cancellation at large  $\mathbf{b}$  (low  $\mathbf{q_T}$ ) between fixed order and expansion of resummation
- 🍏 reduce unjustified resummation effects at small  $\mathbf{b}$  (high  $\mathbf{q_T}$ )

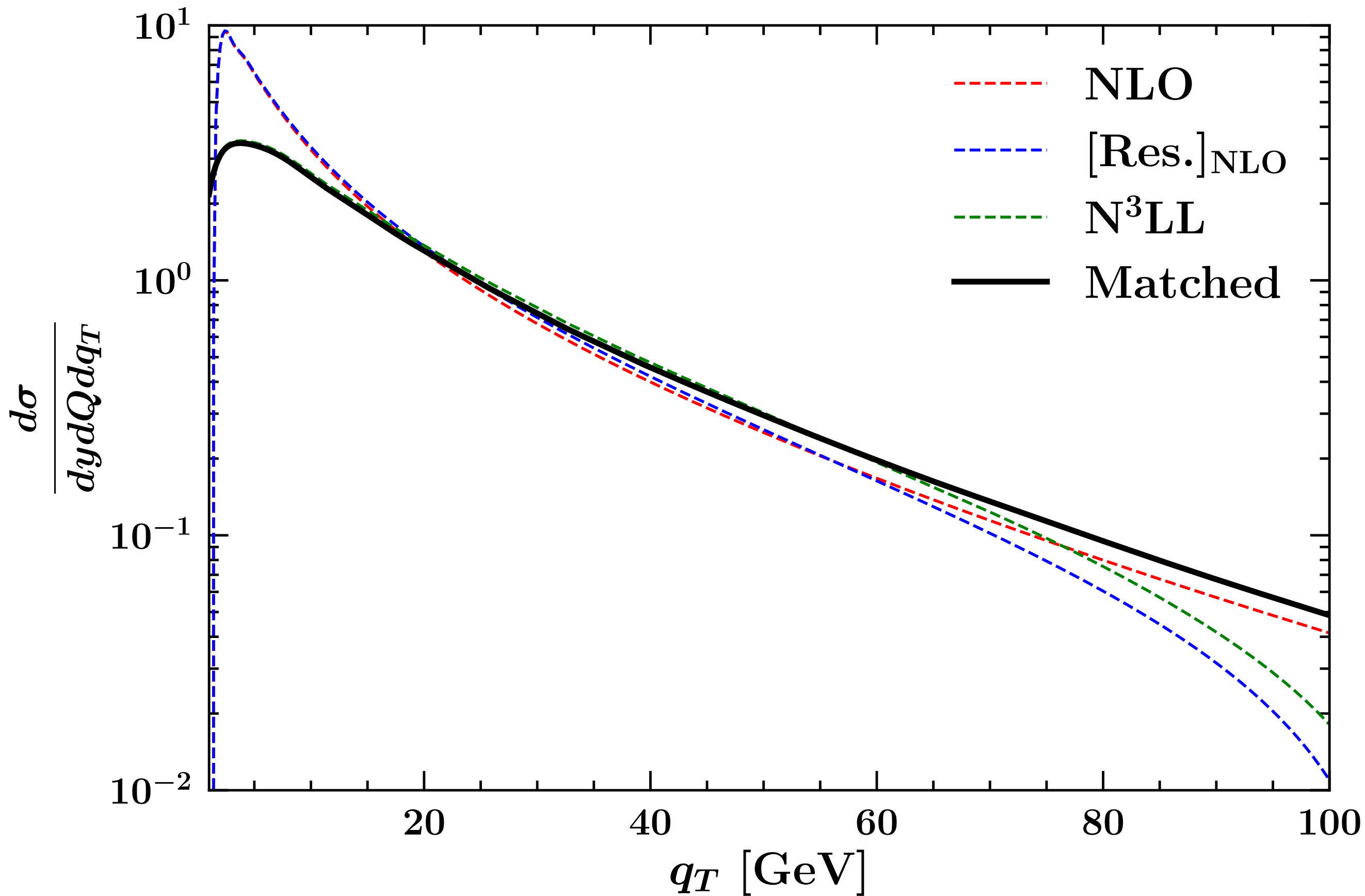
# W/o modified logs



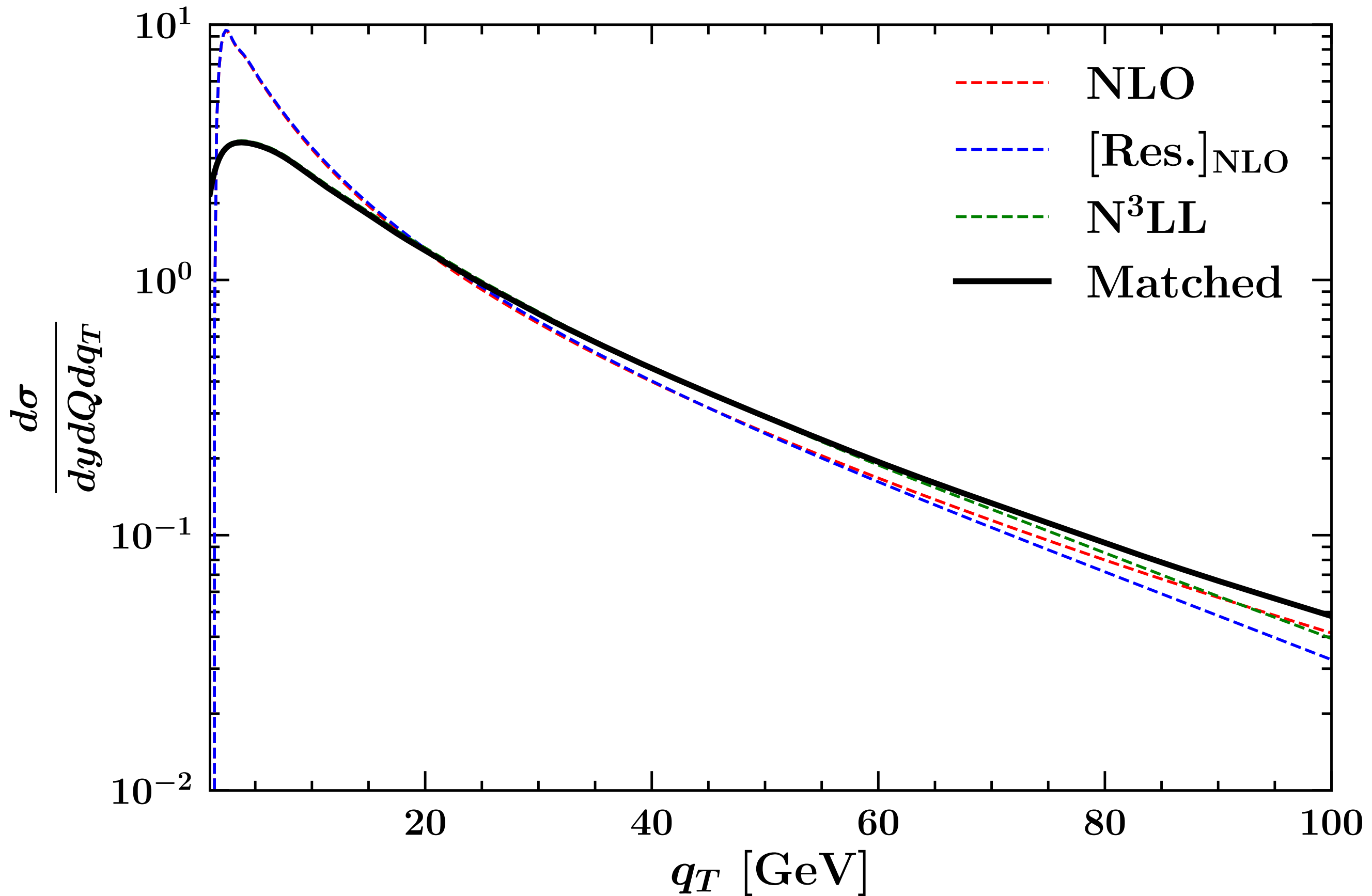
# W/ modified logs



# W/o modified logs



# W/ modified logs



# W/ modified logs

