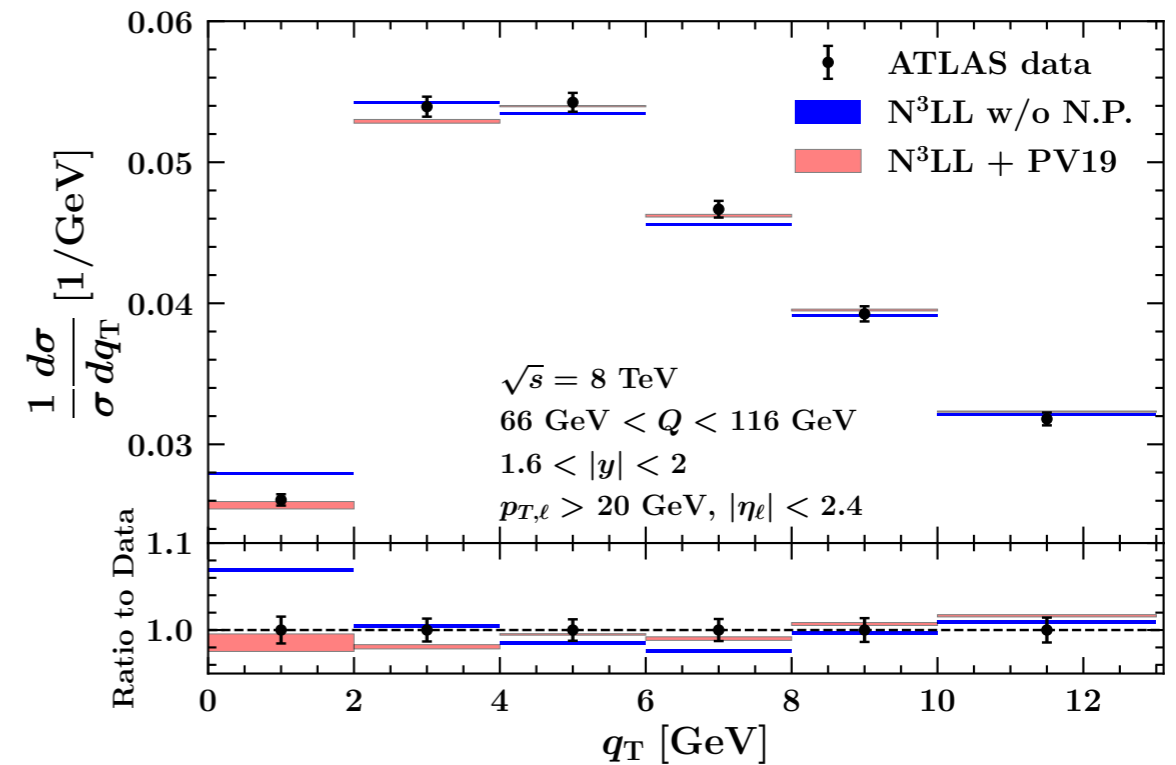
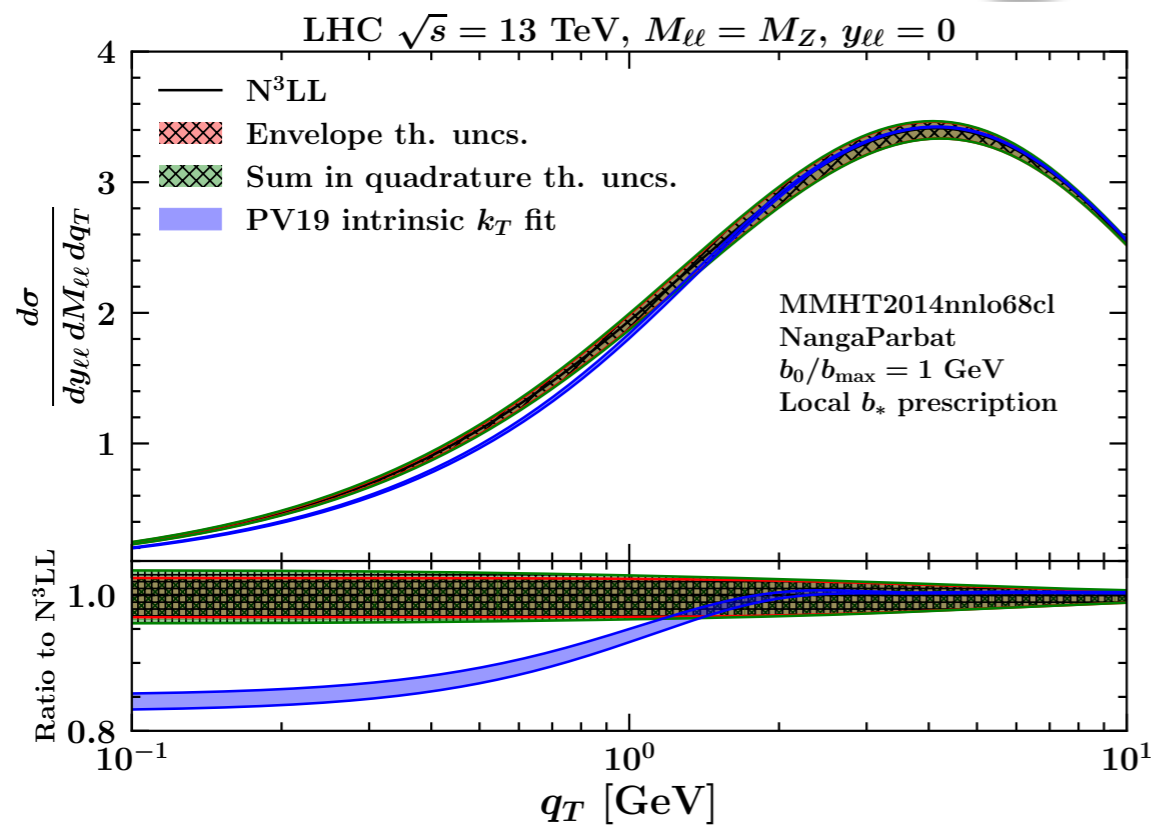


# Constraining NP contributions



🍏 Need to consider only observables for which factorisation has been proven: Semi-Inclusive Deep Inelastic Scattering, **Drell-Yan**,  $e^+e^- \rightarrow$  hadrons

🍏  **$q_T$  distribution** most relevant (directly related to intrinsic- $k_T$ )

🍏 All TMD collaborations fit exactly the same DY data from Fermilab and CERN (with suitable cuts)

🍏 Other possible observable (not yet explored):  $\phi^* = \tan\left(\frac{\pi - \Delta\phi}{2}\right)\sin(\theta^*)$

# Desiderata

Table 1: Synopsis of the  $\phi_\eta^*$  and  $p_T^{\ell\ell}$  measurements, and of the fiducial region definitions used. Full details including the definition of the Born, bare and dressed particle levels are provided in the text. Unless otherwise stated criteria apply to both  $\phi_\eta^*$  and  $p_T^{\ell\ell}$  measurements.

Particle-level definitions (Treatment of final-state photon radiation)	
electron pairs	dressed; Born
muon pairs	bare; dressed; Born
combined	Born
Fiducial region	
Leptons	$p_T > 20$ GeV and $ \eta  < 2.4$
Lepton pairs	$ y_{\ell\ell}  < 2.4$
Mass and rapidity regions	
$46 \text{ GeV} < m_{\ell\ell} < 66 \text{ GeV}$	$ y_{\ell\ell}  < 0.8$ ; $0.8 <  y_{\ell\ell}  < 1.6$ ; $1.6 <  y_{\ell\ell}  < 2.4$ ( $\phi_\eta^*$ measurements only)
	$ y_{\ell\ell}  < 2.4$
$66 \text{ GeV} < m_{\ell\ell} < 116 \text{ GeV}$	$ y_{\ell\ell}  < 0.4$ ; $0.4 <  y_{\ell\ell}  < 0.8$ ; $0.8 <  y_{\ell\ell}  < 1.2$ ; $1.2 <  y_{\ell\ell}  < 1.6$ ; $1.6 <  y_{\ell\ell}  < 2.0$ ; $2.0 <  y_{\ell\ell}  < 2.4$ ; $ y_{\ell\ell}  < 2.4$
$116 \text{ GeV} < m_{\ell\ell} < 150 \text{ GeV}$	$ y_{\ell\ell}  < 0.8$ ; $0.8 <  y_{\ell\ell}  < 1.6$ ; $1.6 <  y_{\ell\ell}  < 2.4$ ( $\phi_\eta^*$ measurements only)
	$ y_{\ell\ell}  < 2.4$
Very-low mass regions	
$12 \text{ GeV} < m_{\ell\ell} < 20 \text{ GeV}$	} $ y_{\ell\ell}  < 2.4$ , $p_T^{\ell\ell} > 45 \text{ GeV}$ , $\ell\ell$ measurements only
$20 \text{ GeV} < m_{\ell\ell} < 30 \text{ GeV}$	
$30 \text{ GeV} < m_{\ell\ell} < 46 \text{ GeV}$	

Finest possible binning at low  $p_T$  in these regions

More data at low  $p_T$  in these regions (NP  $\sim O(p_T/m_{II})$ )