Cascade 1-jettiness in DIS

1-jettiness studies the projection of the radiated particle onto the photon four-vector (see arXiv:1004.2489v2)

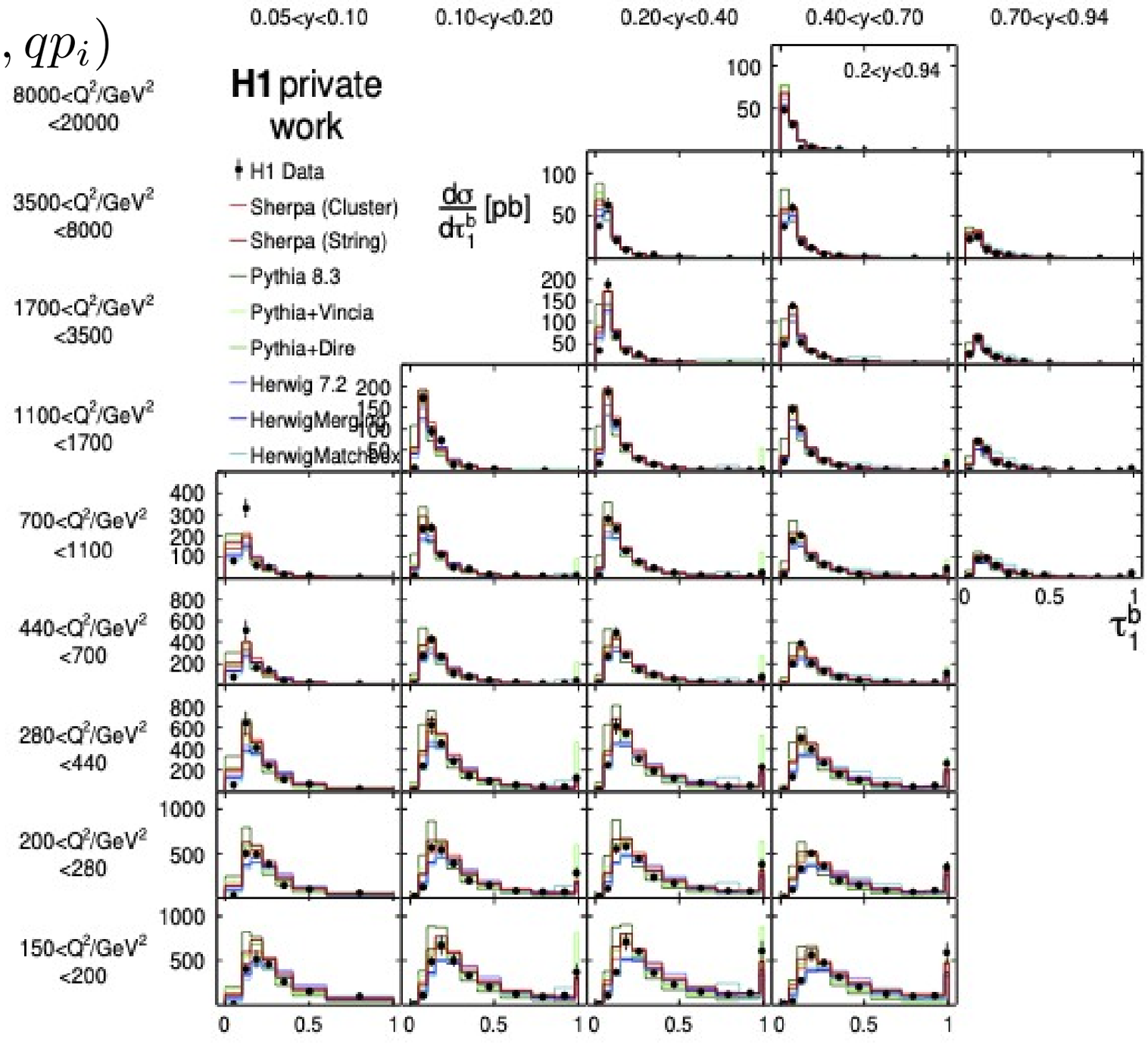
Request of calculation for DIS: DIS - jettiness

- request from H1:

$$\tau_{1b} = 1 + \frac{2}{Q^2} \sum_i \min(0, qp_i)$$

$$0 < \tau_{1b} < 1$$

- Problem for low τ_{1b} soft effects and hadronisation become important



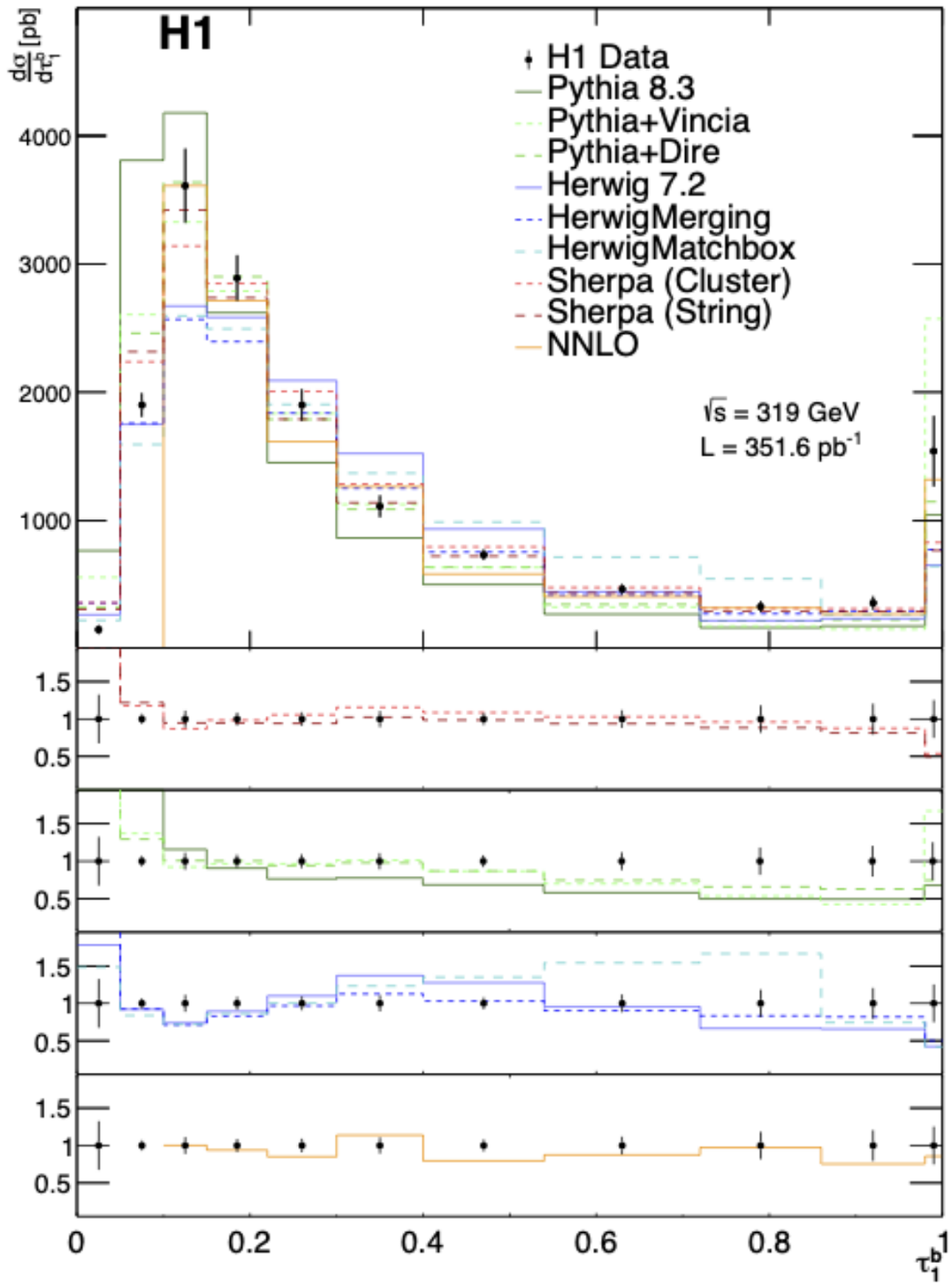
Request of calculation for DIS: DIS - jettiness

- request from H1:

$$\tau_{1b} = 1 + \frac{2}{Q^2} \sum_i \min(0, qp_i)$$

$$0 < \tau_{1b} < 1$$

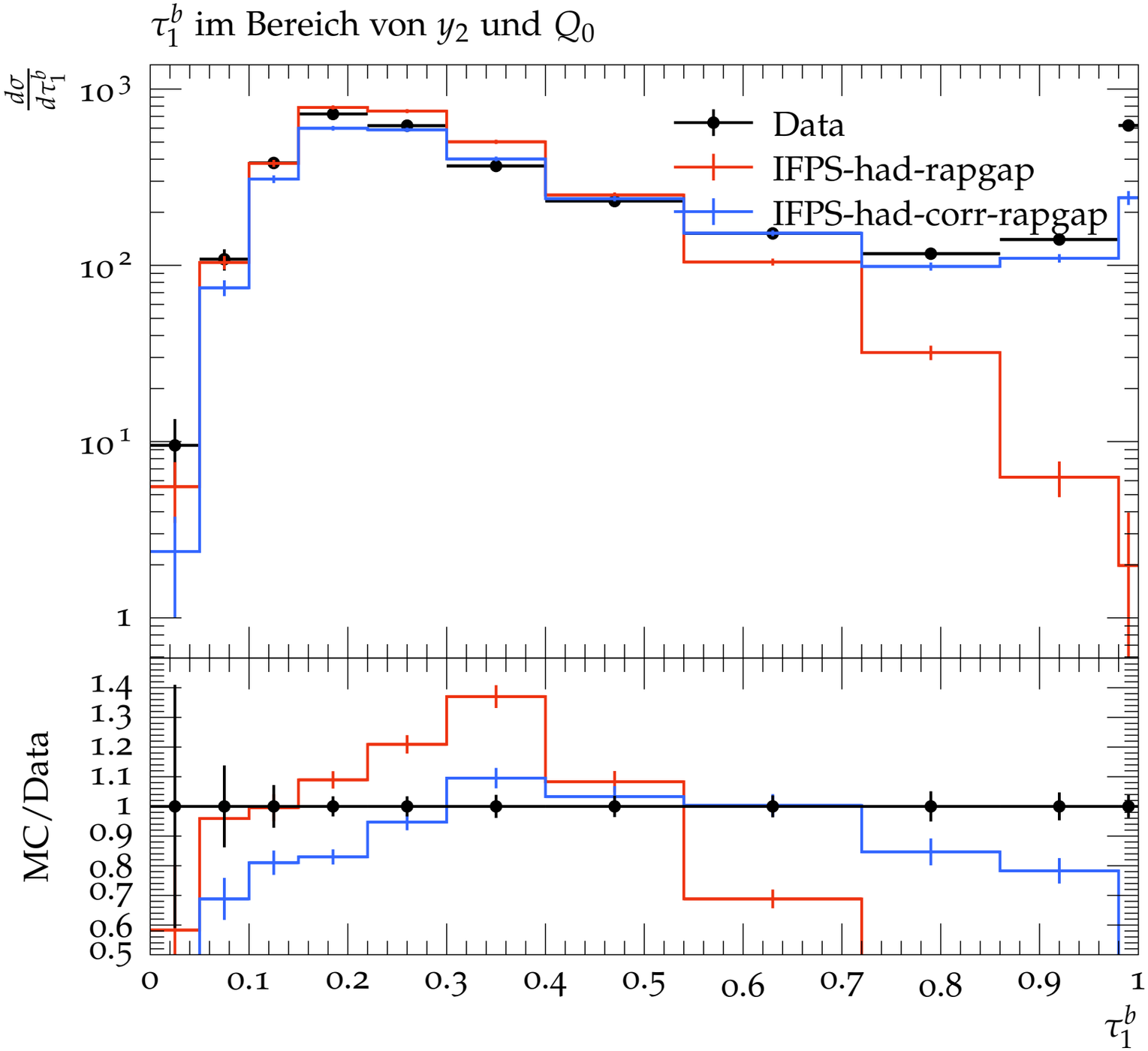
- Large range of predictions
- Nothing fits on small τ_{1b} values
- NNLO starts with $\tau_{1b} = 0.1$



Rivet Plugin

- Rivet plugin updated/corrected
- Data file in HepData format with help from Luis Ignacio

Rapgap



$150 < Q^2 < 200$

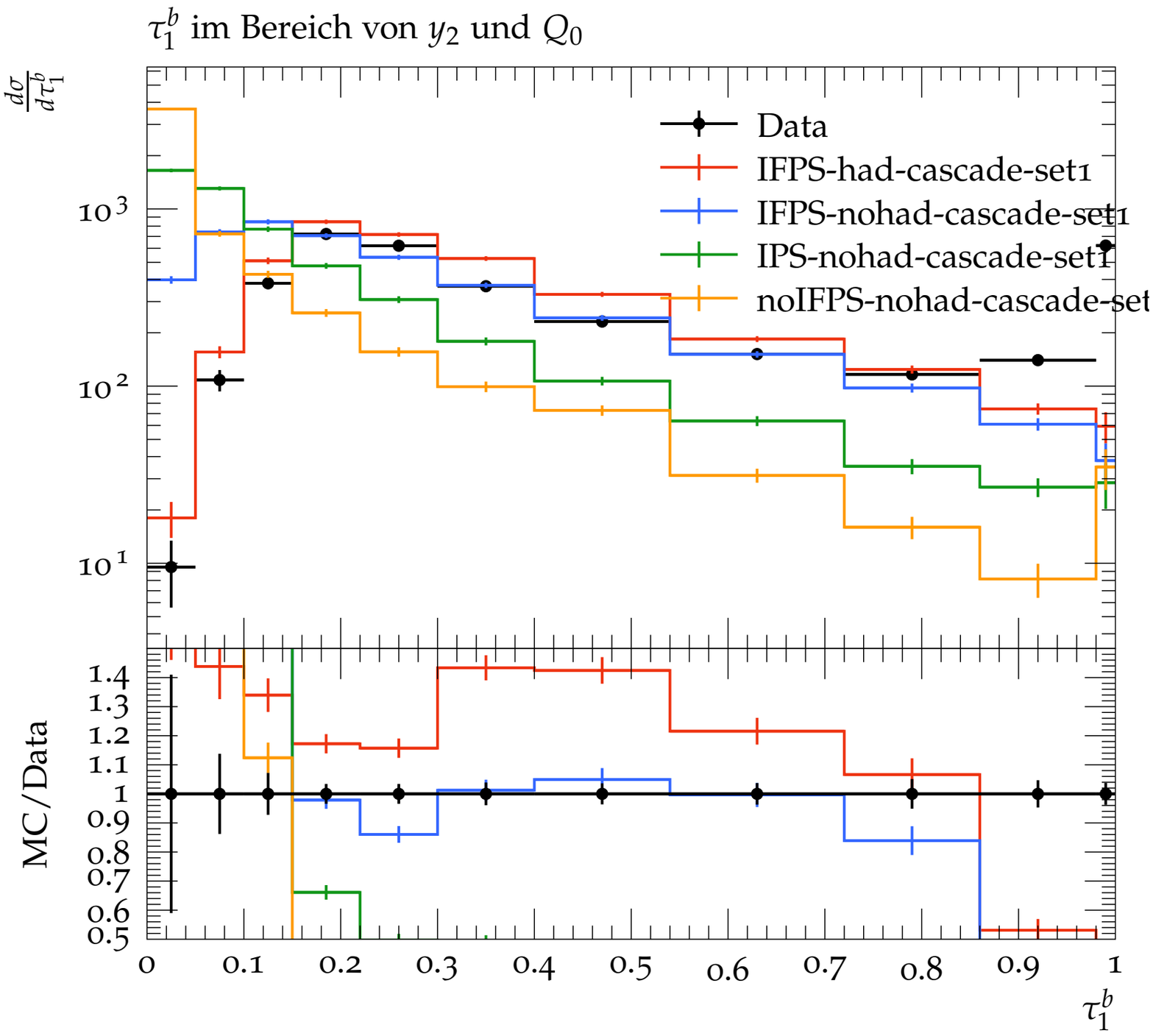
$0.2 < y < 0.4$

$QPM \rightarrow 1jet$

$QPM + \mathcal{O}(\alpha_s)$

- Low τ_{1b} : 1-jet events
- Large τ_{1b} : 2-jet events

Cascade

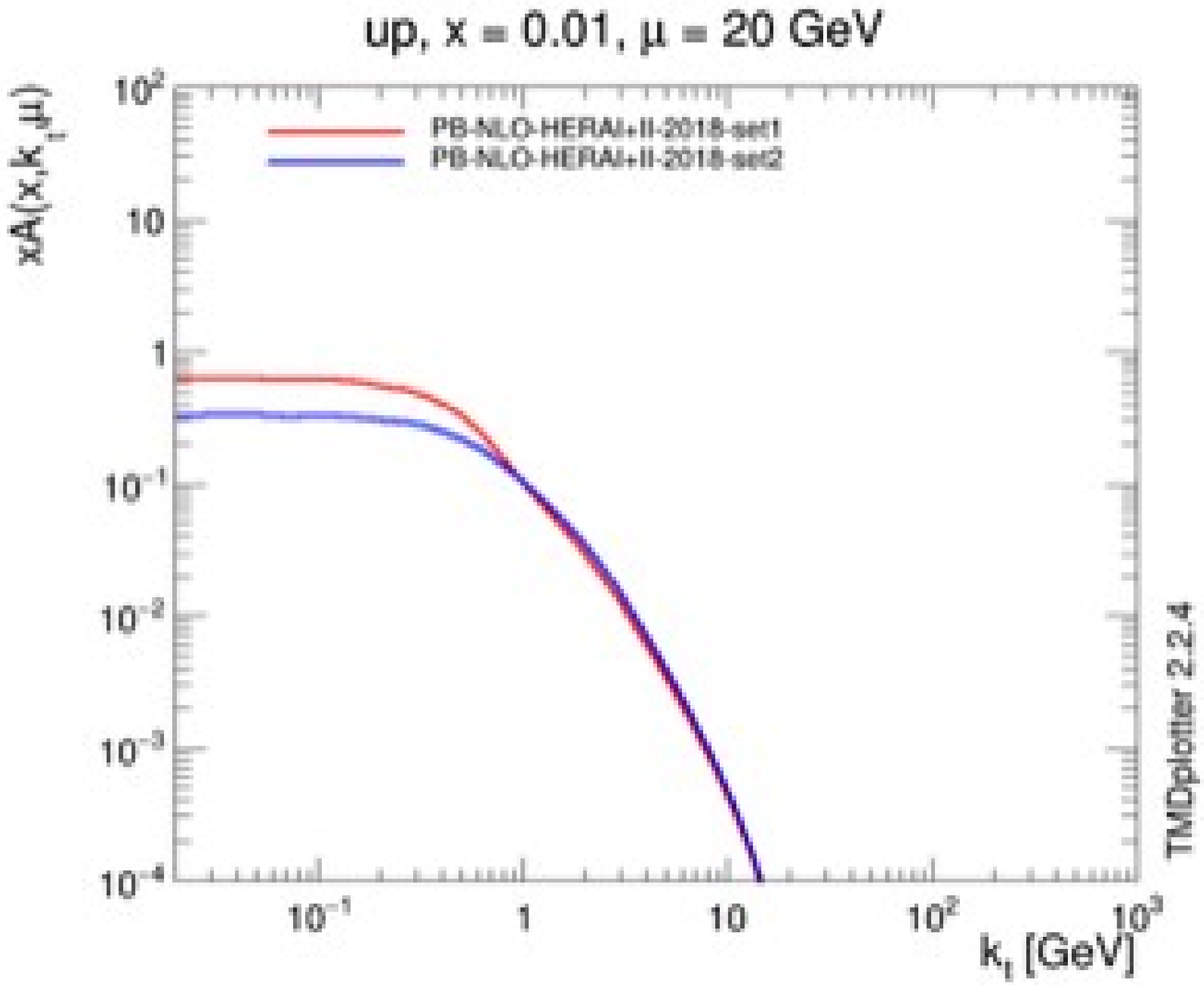


$$150 < Q^2 < 200$$

$$0.2 < y < 0.4$$

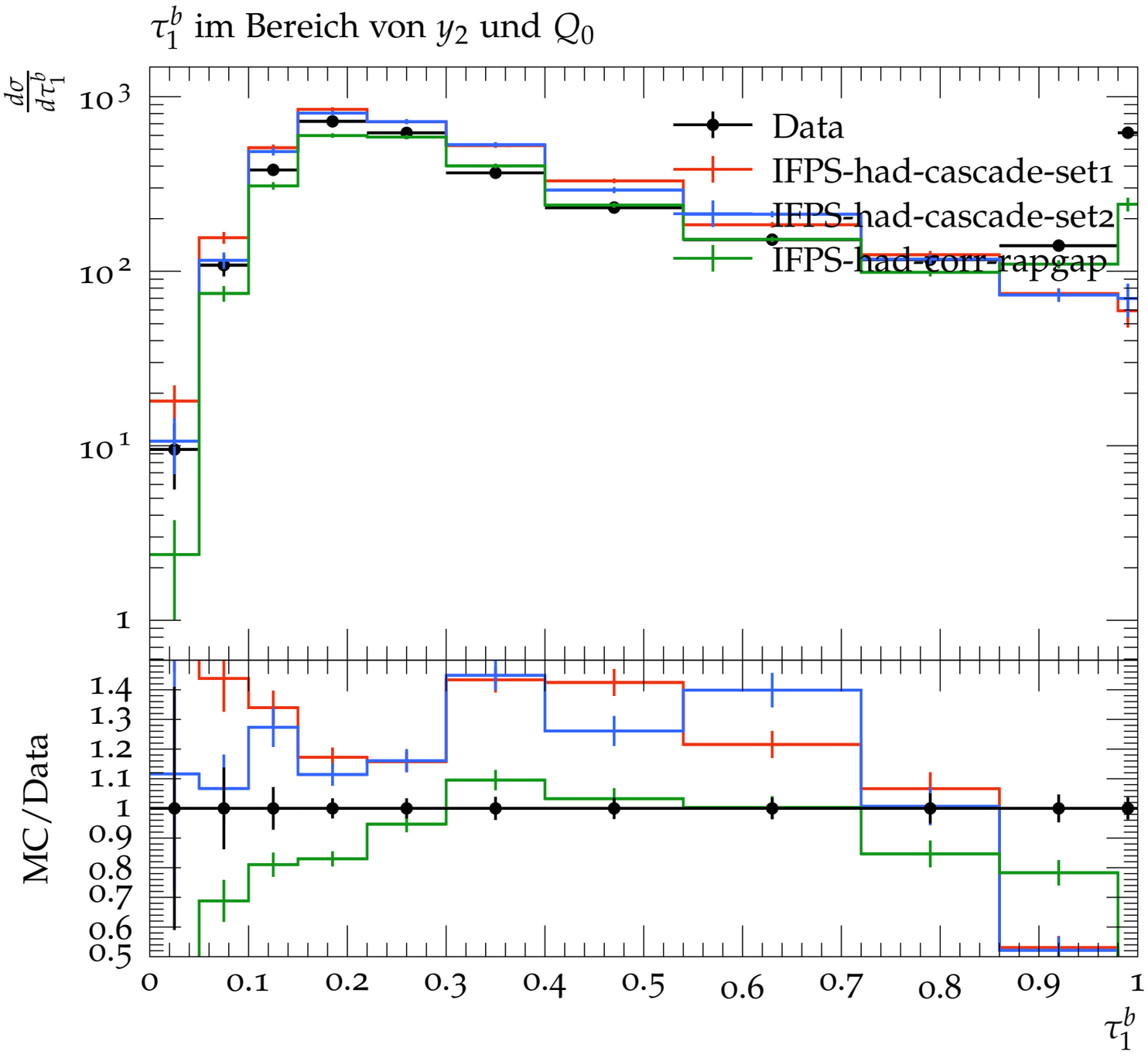
- KaTie lhe file
- Off-shell Matrixelements

TMD distribution



- TMD’s are different at low k_t

Cascade



$$150 < Q^2 < 200$$

$$0.2 < y < 0.44$$

- Set 2 fits better
- At low τ_{1b} even better than rapgap

Conclusion

- Rivet plugin for jettiness measurements in DIS updated
- Comparison of rapgap with measurement
- Studies of cascade with TMD’s for jettiness measurement performed for the first time