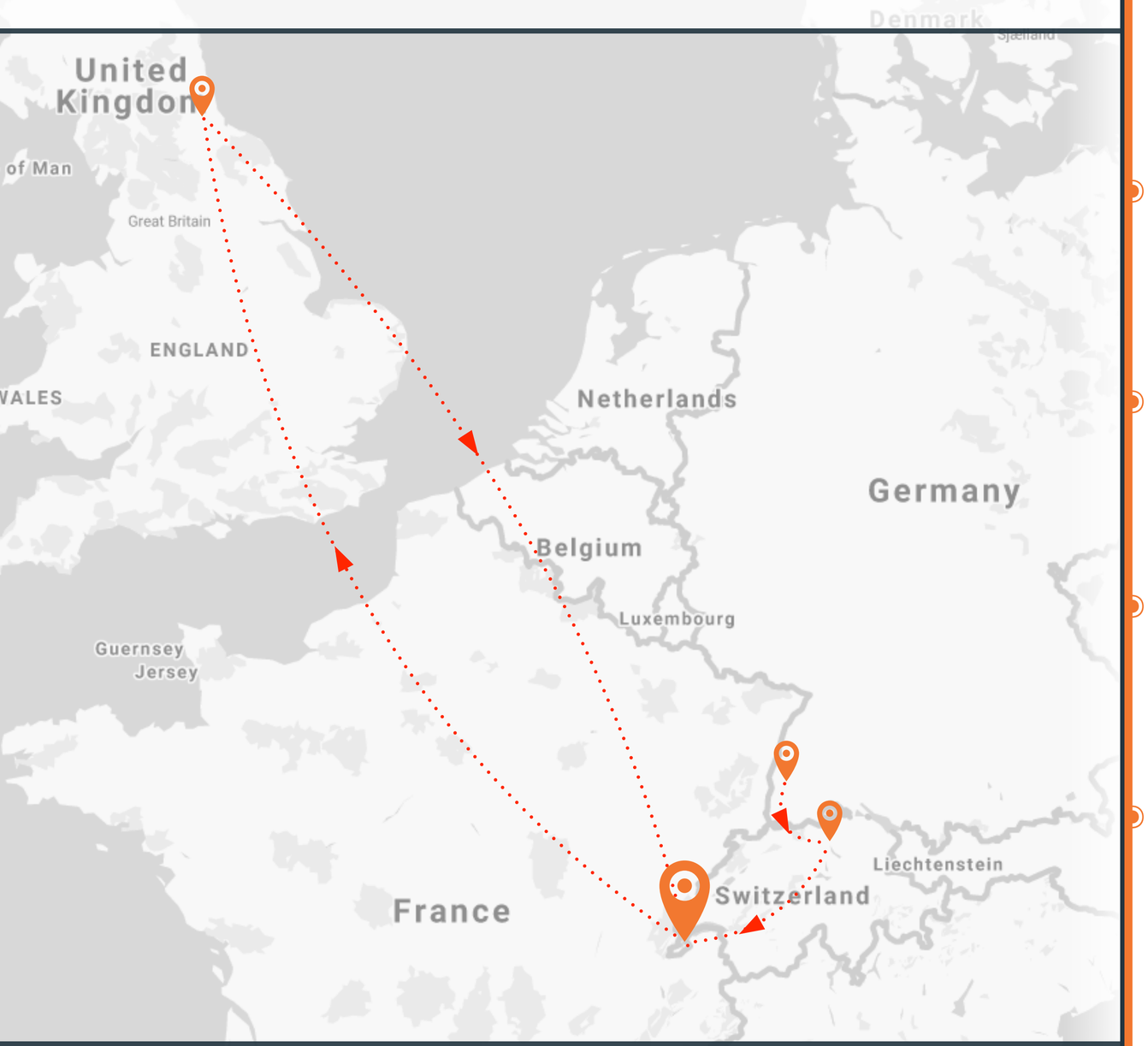
Alexander 洋平 Huß



10/2020–… ***LD Staff***

- CERN, Switzerland

01–09/2020 ***Lecturer***

- IPPP, University of Durham, UK

2017–2020 ***Post-Doctoral Fellow***

- CERN, Switzerland

2014–2017 ***Post-Doctoral Researcher***

- ETH Zurich, Switzerland

02/2015 ***PhD***

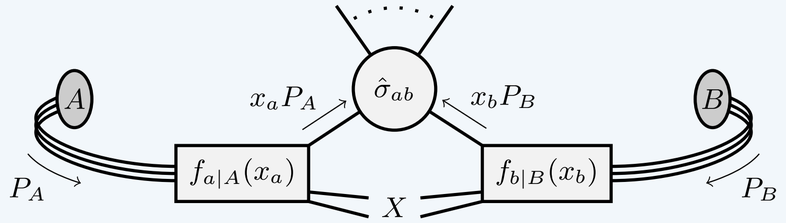
- University of Freiburg, Germany

Research Interests

Alexander 洋平 Huß

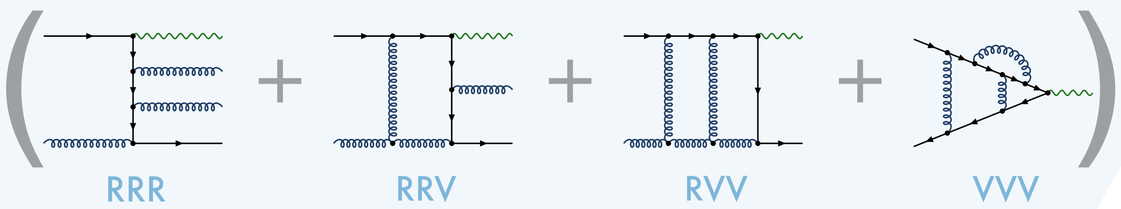
Precision Phenomenology @ Colliders

- Higgs & "Standard Candles" (jets, gauge bosons, …)
  - ↪ accurate determination of SM parameters
  - ↪ PDFs, α_s (APPLfast)
  - ↪ identified objects, fragmentation (γ, hadron)
- suggest analyses & identify new observables



$$\sigma = \sigma_0 \times \left(1 + \alpha_s + \alpha_s^2 + \alpha_s^3 + \ldots\right)$$

fixed order: LO NLO NNLO N³LO …



RRR | RRV | RVV | VVV

single- & double- & triple-unresolved | $1/\epsilon^2$, $1/\epsilon$ single- & double-unresolved | $1/\epsilon^4$, $1/\epsilon^3$, … single-unresolved | $1/\epsilon^6$, $1/\epsilon^5$, …

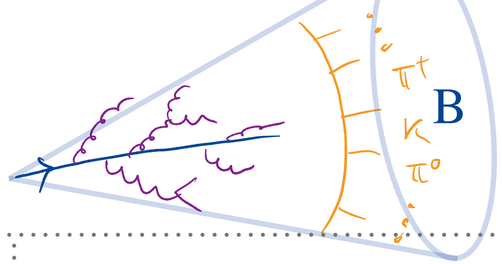
Kinoshita–Lee–Nauenberg & factorization

⇝ finite

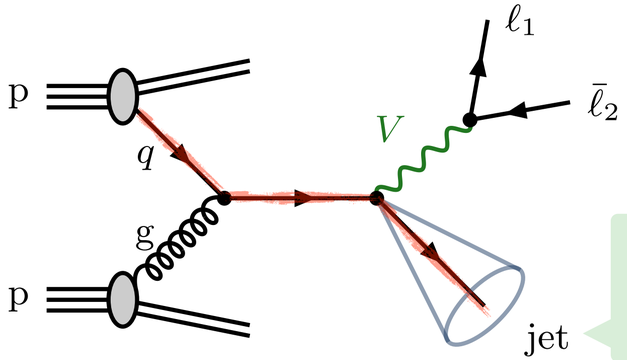
Conceptual / Technical Developments

- Realistic setup requires "subtraction":
  - ↪ NNLO: $2 \to 2$ established, frontier $2 \to 3$
  - ↪ N³LO: first results for $2 \to 1$
- parton-level Monte Carlo (NNLOJET)
- Bayesian model for theory uncertainties
  - ↪ correlations?

Flavoured Jets ⇜⇝ Proxy for q_f



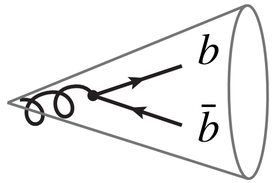
[Gauld, AH, Stagnitto '22]



pinpoint specific scattering process

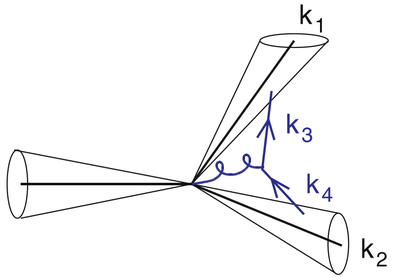
problematic (divergent) configurations $(m_q \equiv 0)$

- collinear (from NLO)



$g \leftrightarrow (b \parallel \bar{b})$ indistinguishable!

- soft (from NNLO)

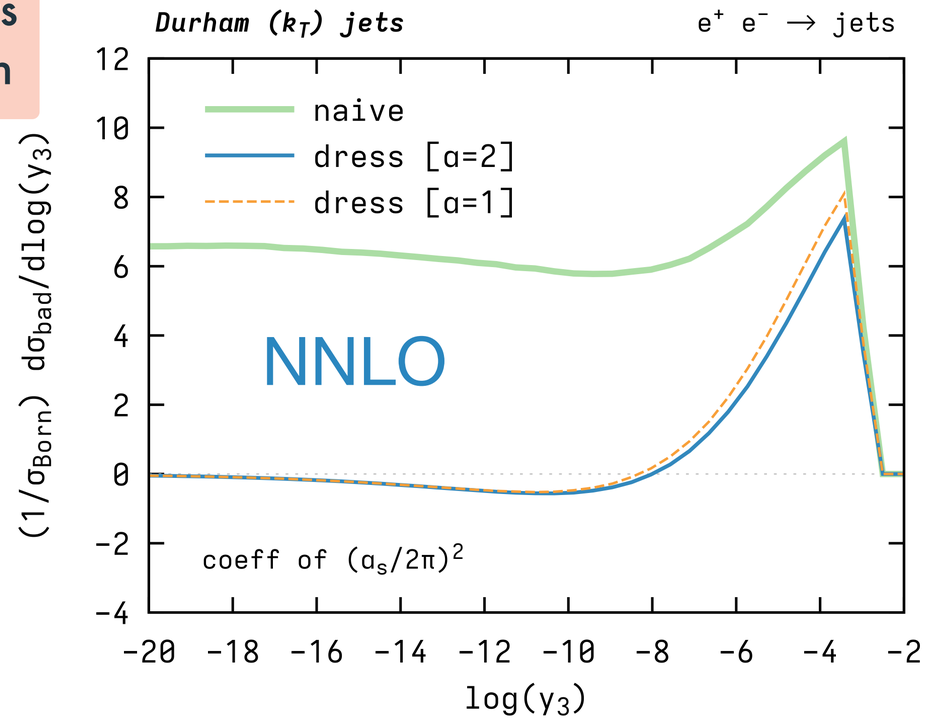


$E_g \to 0$ not protected by $E_g \geq 2m_b$

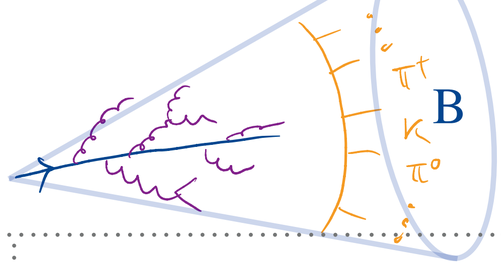
- de-facto standard in experiment: anti-k_T
  - ↪ naive (——) not safe!
  - ↪ dressing (– – –) safe!

"bad" assignments must vanish

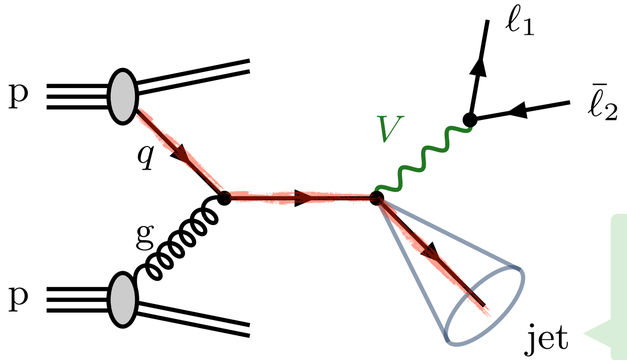
only soft and/or collinear radiation



Flavoured Jets ⇔ Proxy for q_f



[Gauld, AH, Stagnitto '22]



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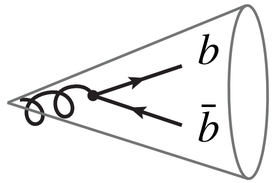

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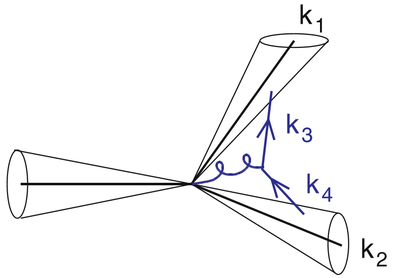

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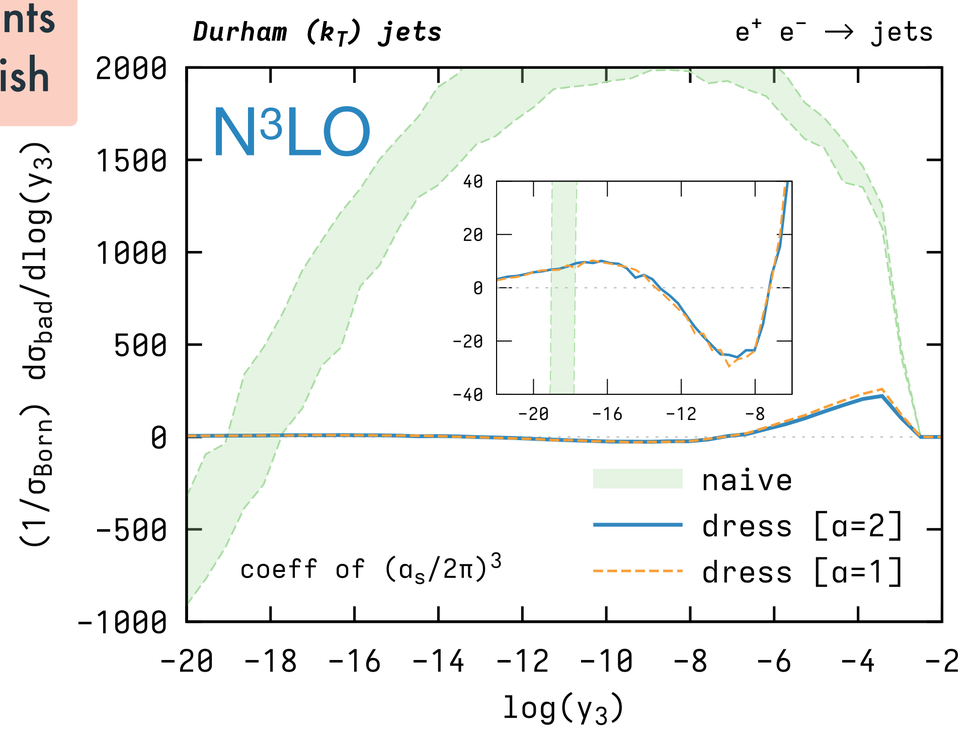
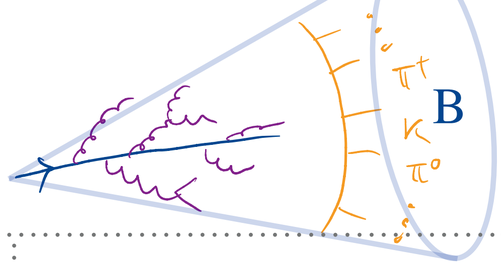
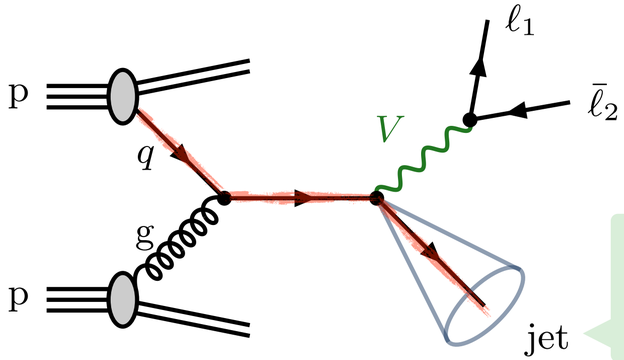


Flavoured Jets ⇜⇝ Proxy for q_f



[Gauld, AH, Stagnitto '22]



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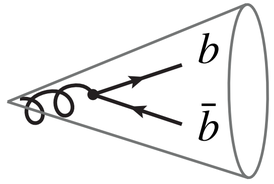

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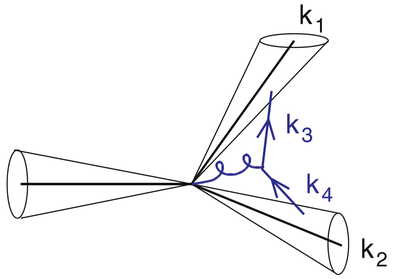

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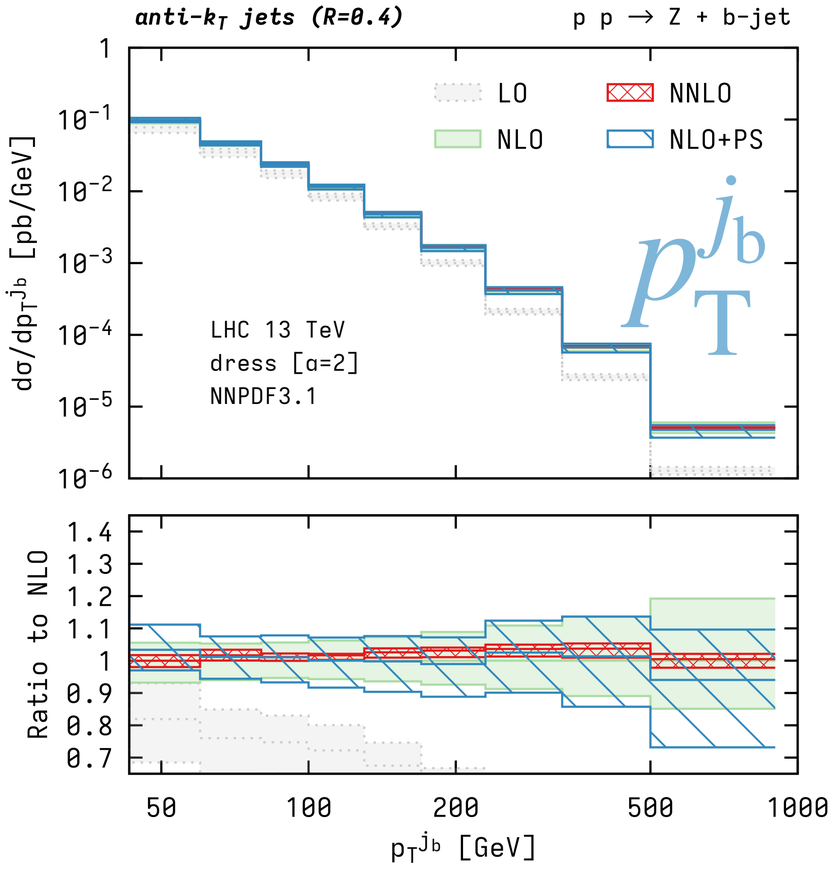
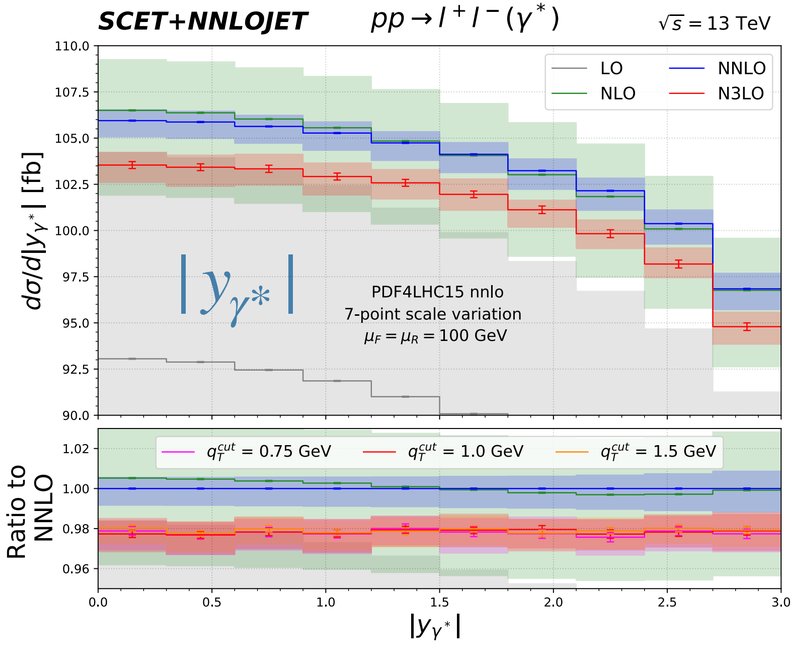
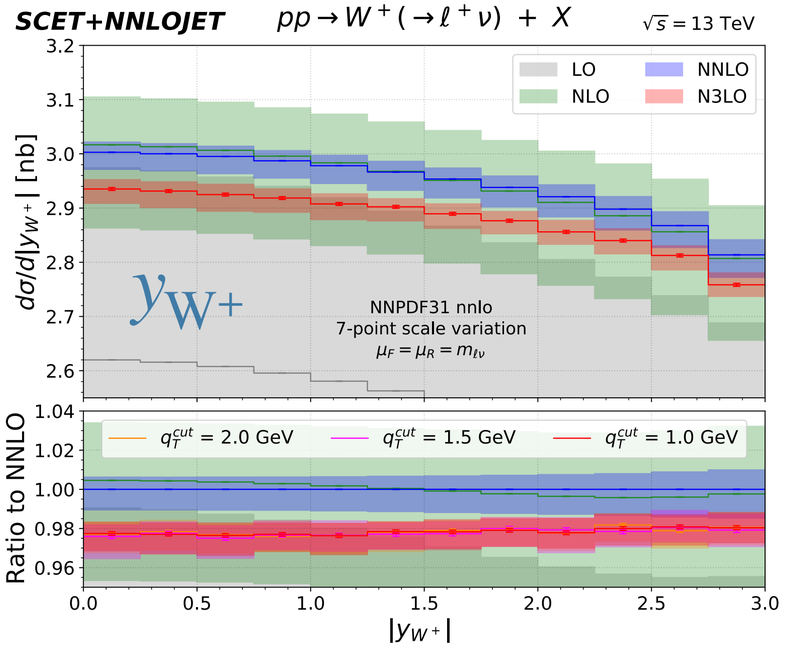
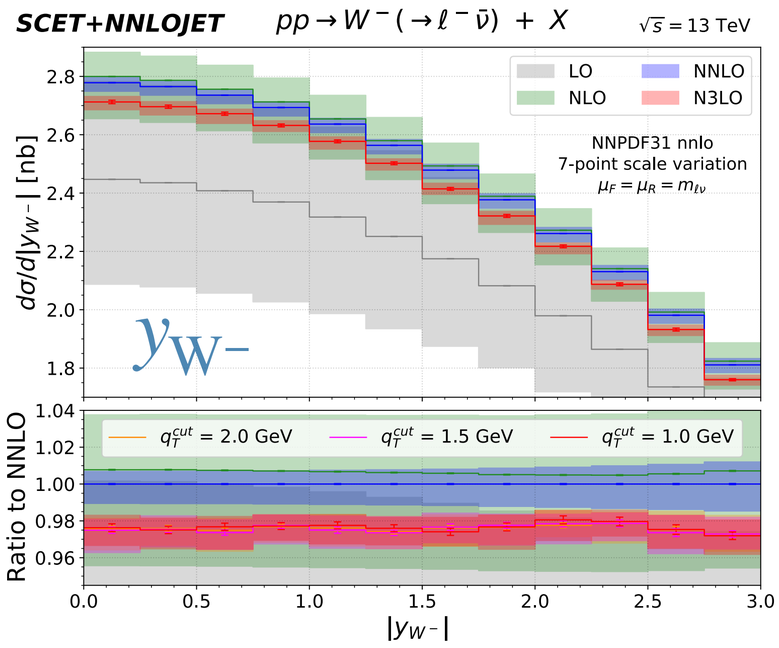


Differential Drell–Yan @ N³LO

[Chen, Gehrmann, Glover, AH, Yang, Zhu ‘21,‘22]







- confirm results for σ^{tot} ⇝ peculiar NNLO → N³LO corrections!
  [Duhr, Mistlberger et al. ’20,’21]
- not ready for fully-fledged precision phenomenology ⇝ 100 × speedup possible?
- ⊕ N³LL′ resummation [Chen, Gehrmann, Glover, AH, Monni, Rottoli, Re, Torrielli '22]

TASKS @ CERN-TH

ALEXANDER 洋平 HUß

- CERN SCHOOLS (physicsschool.web.cern.ch)
  - ↪ ESHEP (European) ⇝ Denmark (2023)
  - ↪ CLASHEP (Latin-American) ⇝ Chile (2023)
  - ↪ AEPSHEP (Asia-Europe-Pacific) ⇝ ??? (2024)
  - may approach you to act as discussion leader 

- COMPUTING (w/ E. Gianolio, A. Jüttner)
  - batch computing ⇝ alhuss.web.cern.ch/lxplus.pdf
  - high-memory machines ⇝ alhuss.web.cern.ch/lxtheory.pdf
  - Twiki ⇝ twiki.cern.ch/twiki/bin/viewauth/TH/WebHome