

Extra material for discussion

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Jet bin cross-section and uncertainties with JVE

Setup as in JHEP 1604 (2016) 049

- PDF4LHC_nnlo_mc, $\mu=m_H/2$
- HEFT
- N³LO σ_{TOT} (= 45.1 pb) + NNLO σ_{H+J} (q channels at NLO only)
- JVE with 7-point scale variation (uncertainties on ϵ_i and σ_{tot} symmetrized here)

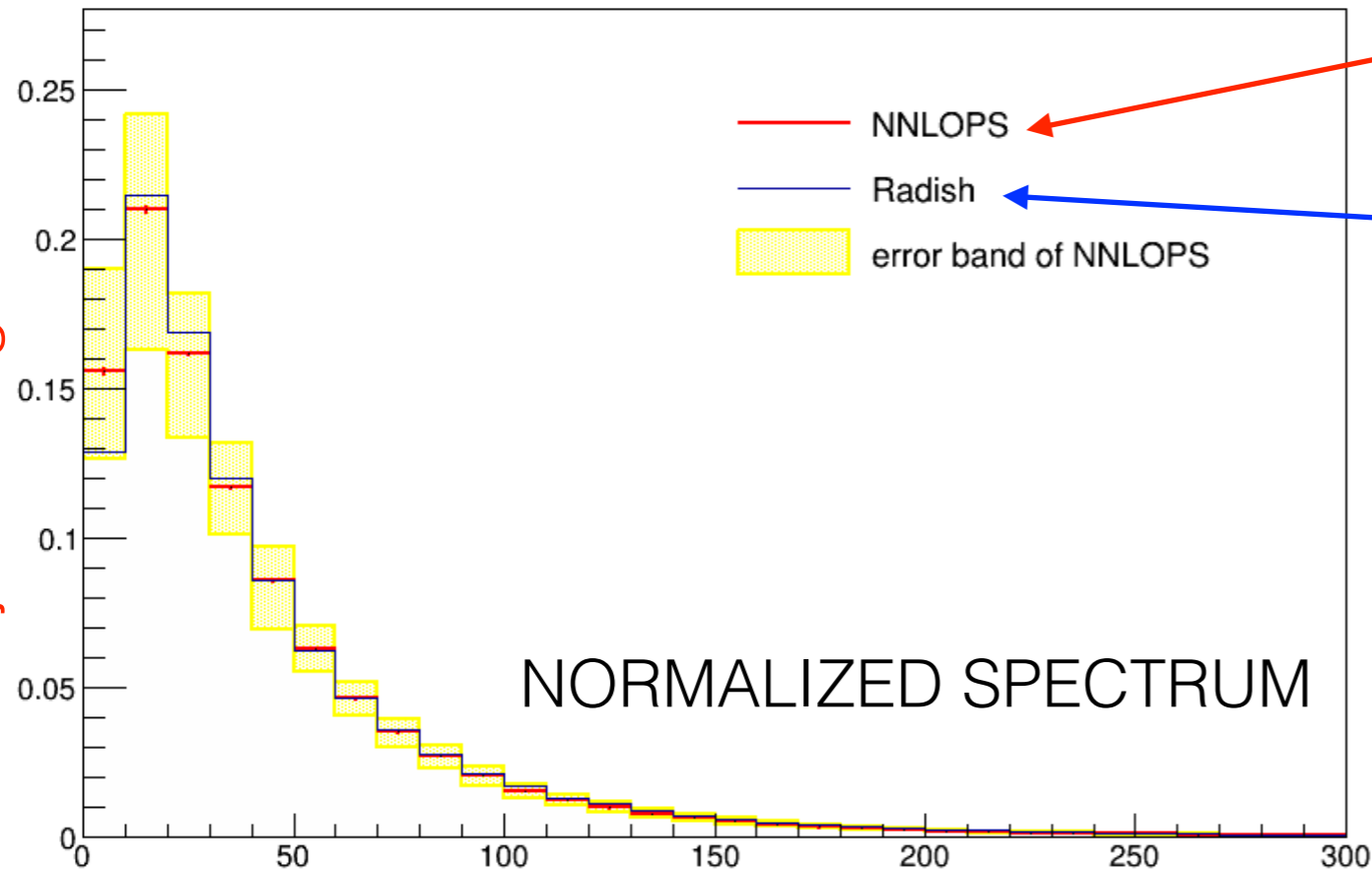
	N ³ LO+NNLL+LL _R	NNLO	NLO
	Σ_{0j} (pb)	Σ_{1j} (pb)	$\Sigma_{\geq 2j}$ (pb)
$p_T > 25$ GeV	24.6 ± 3.0%	13.1 ± 12.2%	7.4 ± 20.8%

Correlation follows from JVE method, but *need to be careful about theory assumptions*

E.g.: constraint on the total cross-section + much smaller error in 0/1 jet bins w.r.t. 2 jet bin will lead to very large correlation between 1 and 2 jet bins

Higgs p_T spectrum

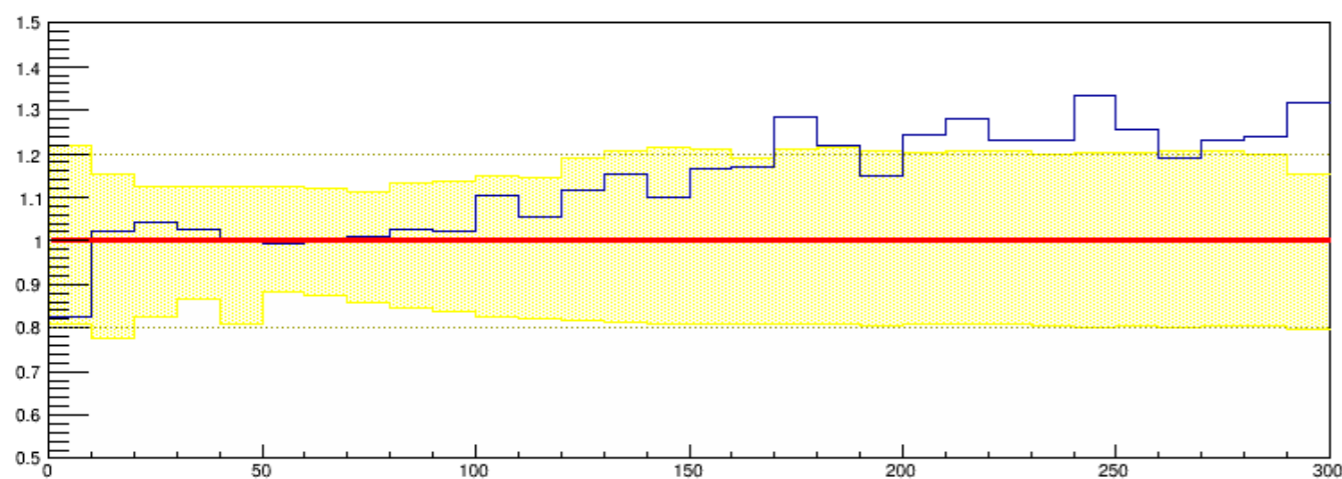
- PDF4LHC_nnlo_mc, $\mu=m_H/2$ [dyn. scale@NNLO: few percent effect up to ~ 200 GeV]
- HEFT+mass effects@LO only



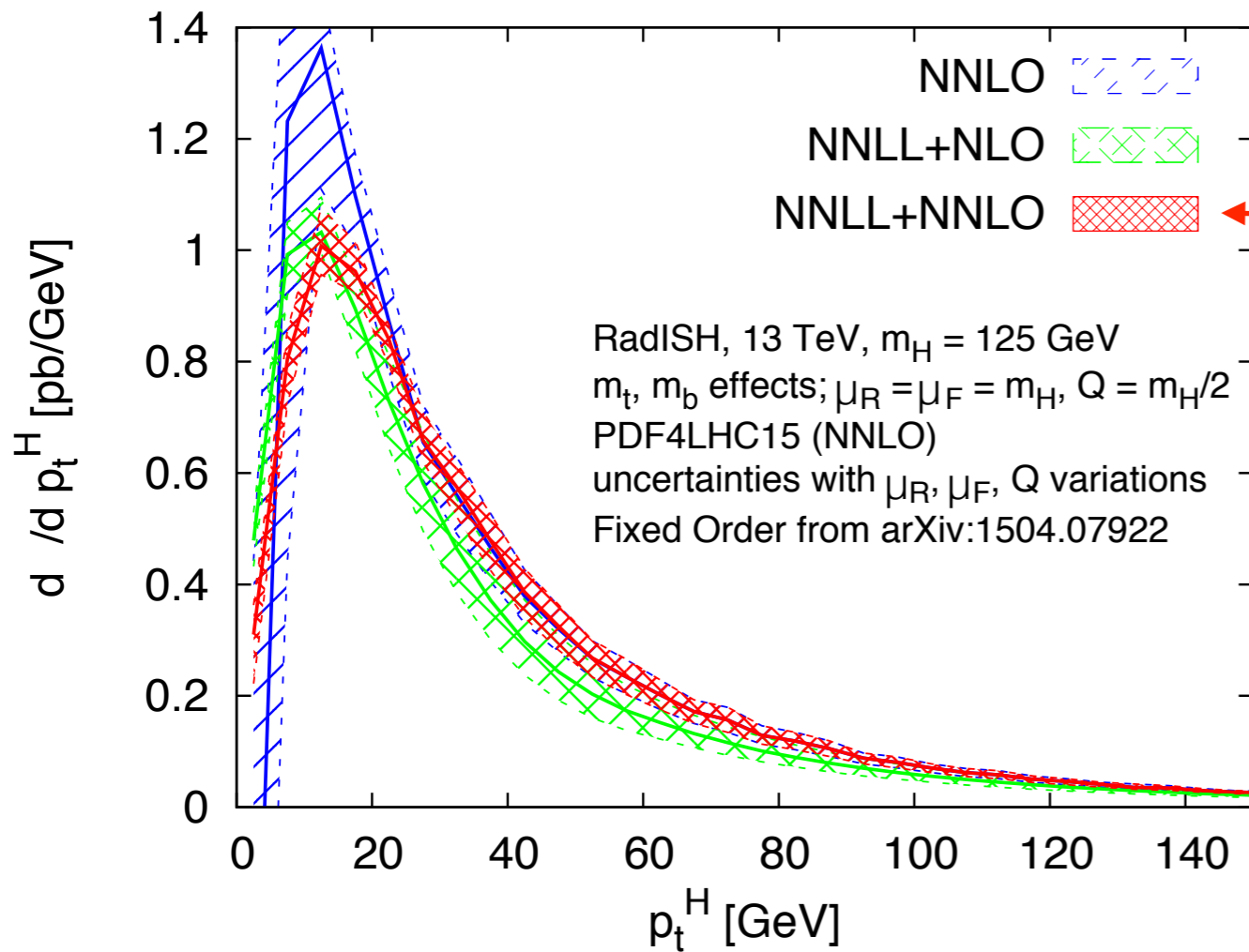
NLO + PS in the spectrum
(NNLO in normalization)

NNLO+NNLL in the spectrum
(N^3 LO in normalization)

- NNLOPS correctly reproduces the shape within uncertainties once normalized
- Must be careful though if more exclusive regions are probed (e.g. simultaneous $p_{T,H}-p_{T,j}$ cut)
- Tail: large effect of 2/3 jet ME
- Large effect ($\sim 20/30\%$) on unnormalized distributions

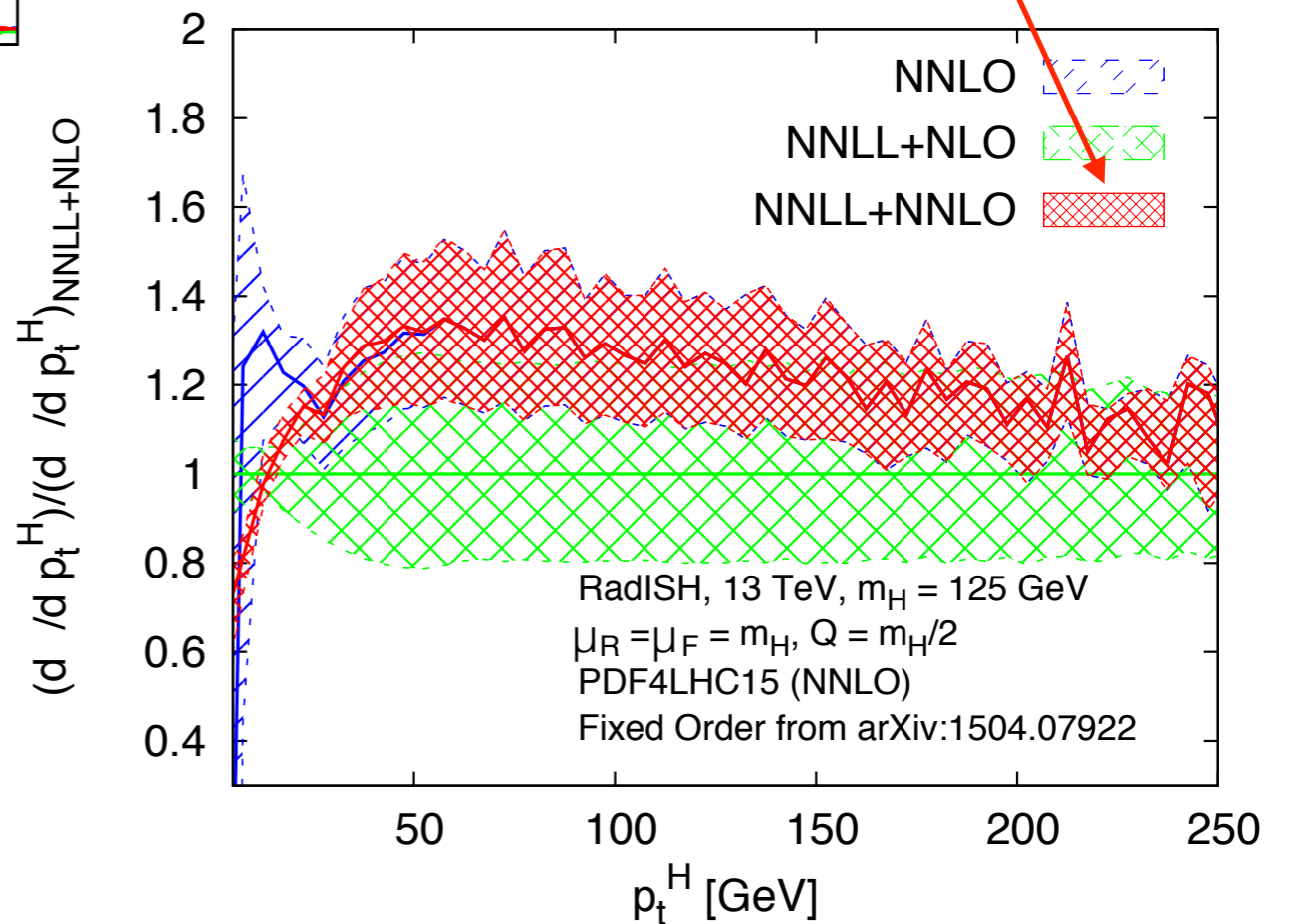


Higgs p_T spectrum



RadISH
(unnormalized spectrum)

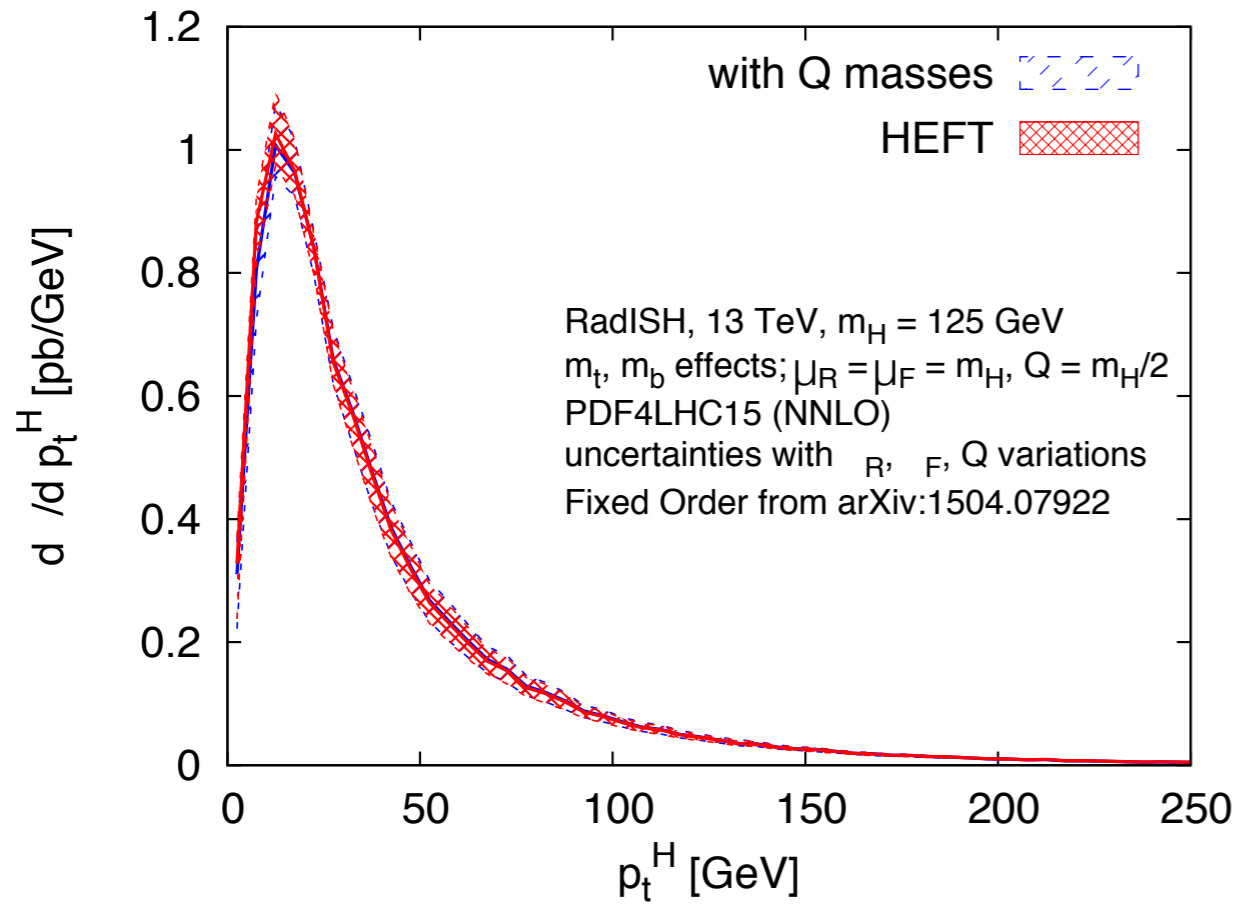
- ~10% uncertainties
- smaller in the shape



Backup material

Higgs p_T spectrum: mass effects

NNLL+NNLO distribution



- Mass effect at LO only (no rescaling)
- $\overline{\text{MS}}$ masses

NNLL+NNLO distribution

