

Bernhard Mistlberger

QFT, Precision QCD and LHC phenomenology

Les Houches, CERN Theory Retreat 2015

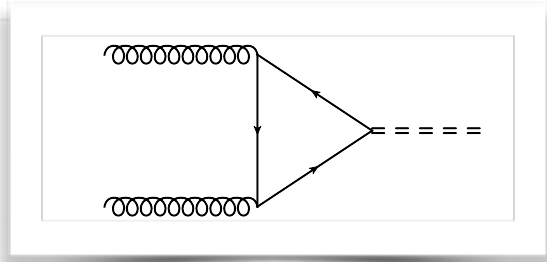
MY HISTORY

PHD **with Babis Anastasiou**
at ETH Zurich
2012- 2015
Higgs Production at N3LO in QCD

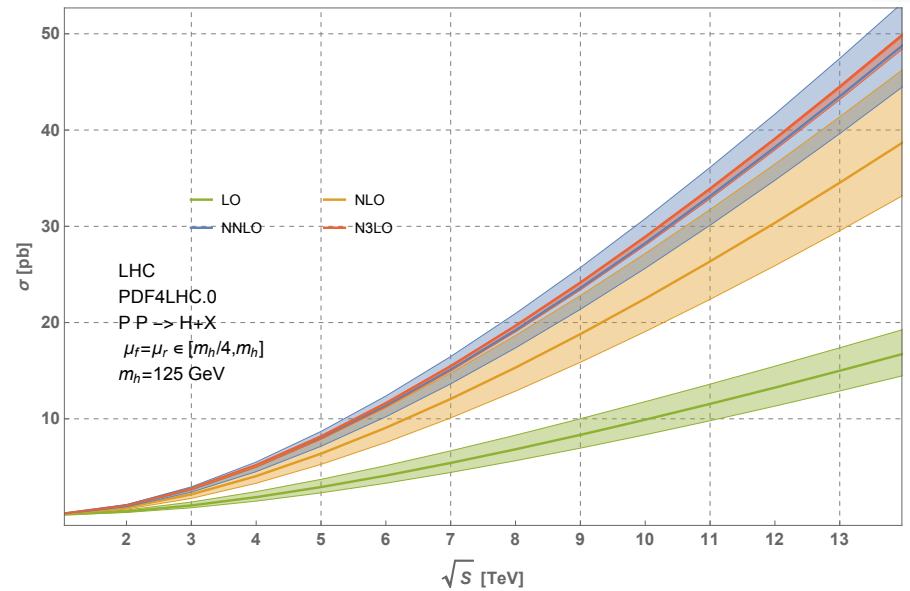
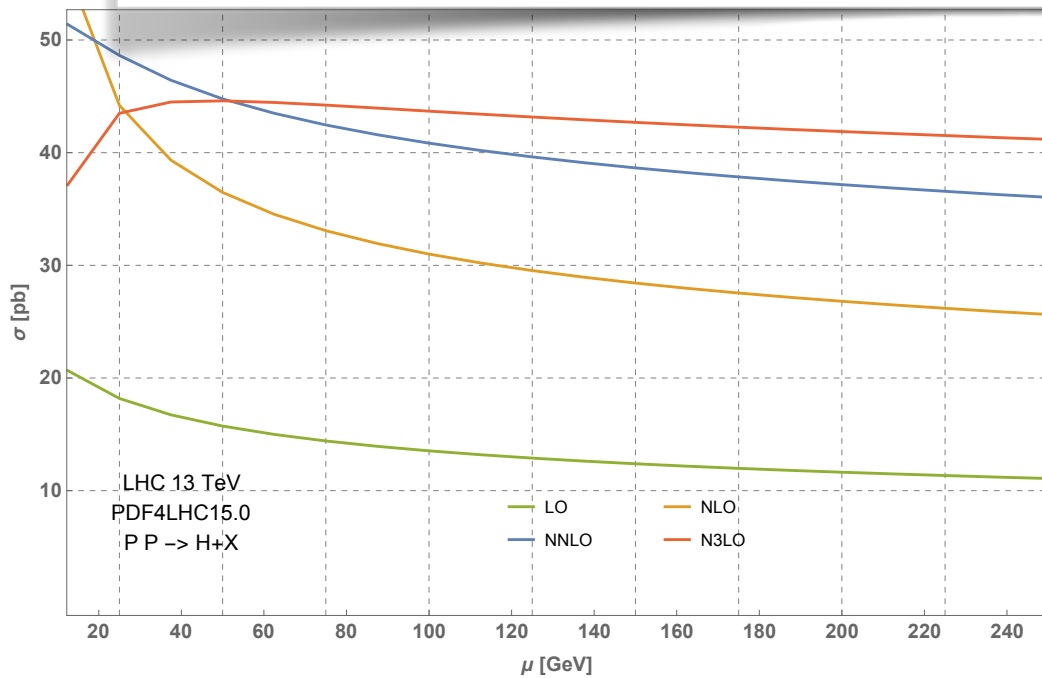
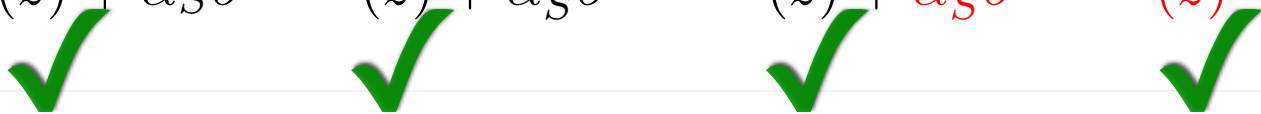
1. Postdoc **CERN**
Since October

PREVIOUS WORK

N3LO Higgs Production



$$\hat{\sigma}(z) = \hat{\sigma}^{LO}(z) + \alpha_S \hat{\sigma}^{NLO}(z) + \alpha_S^2 \hat{\sigma}^{NNLO}(z) + \alpha_S^3 \hat{\sigma}^{N3LO}(z) + \mathcal{O}(\alpha_S^4)$$

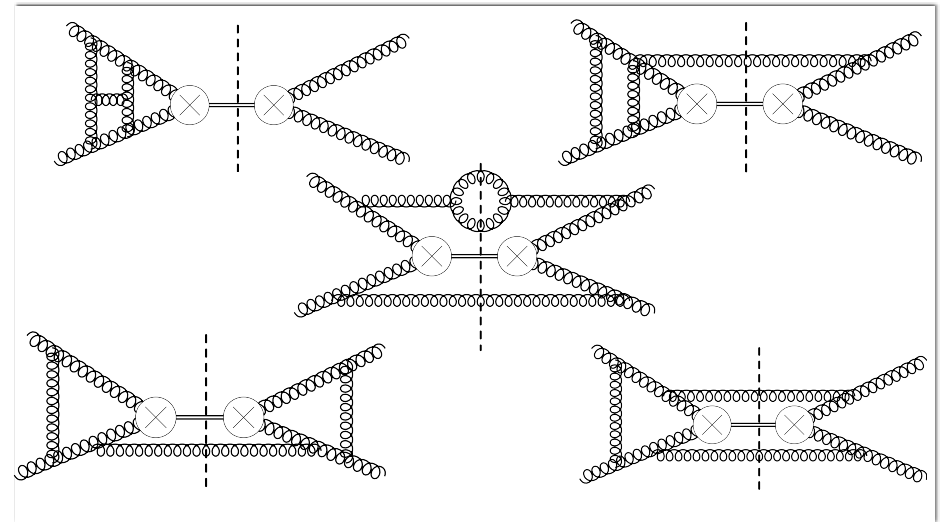


High Precision for LHC

PREVIOUS WORK

N3LO Higgs Production

Analytic Techniques



- Amplitude computation
- Integral Reductions
- Master Integral Computation
- Integrand/Integral Expansions
- ...

CURRENT/FUTURE WORK

N3LO Higgs Production: Non-Threshold Expansion

Phenomenology for LHC

Mass dependence / EWK

N3LO - New Precision Standard at LHC

Drell-Yan, HZ,

2->2 Inclusive?

N3LO - Why not differential?

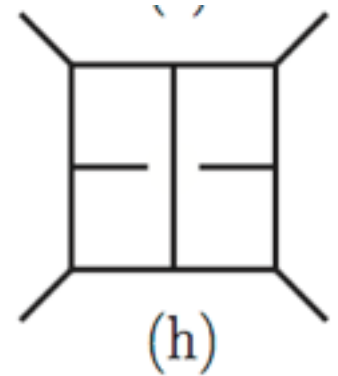
2->1: Higgs Rapidity /
Fully Differential

CURRENT/FUTURE WORK

Pushing the limits of amplitude computation

N=4 SYM 4 - point amplitude

Structure of QFT



**NNLO event generation - Real Life - High Precision
Predictions for LHC**

**- MINLO Approach
Parton-Shower
meets Higher Order**

