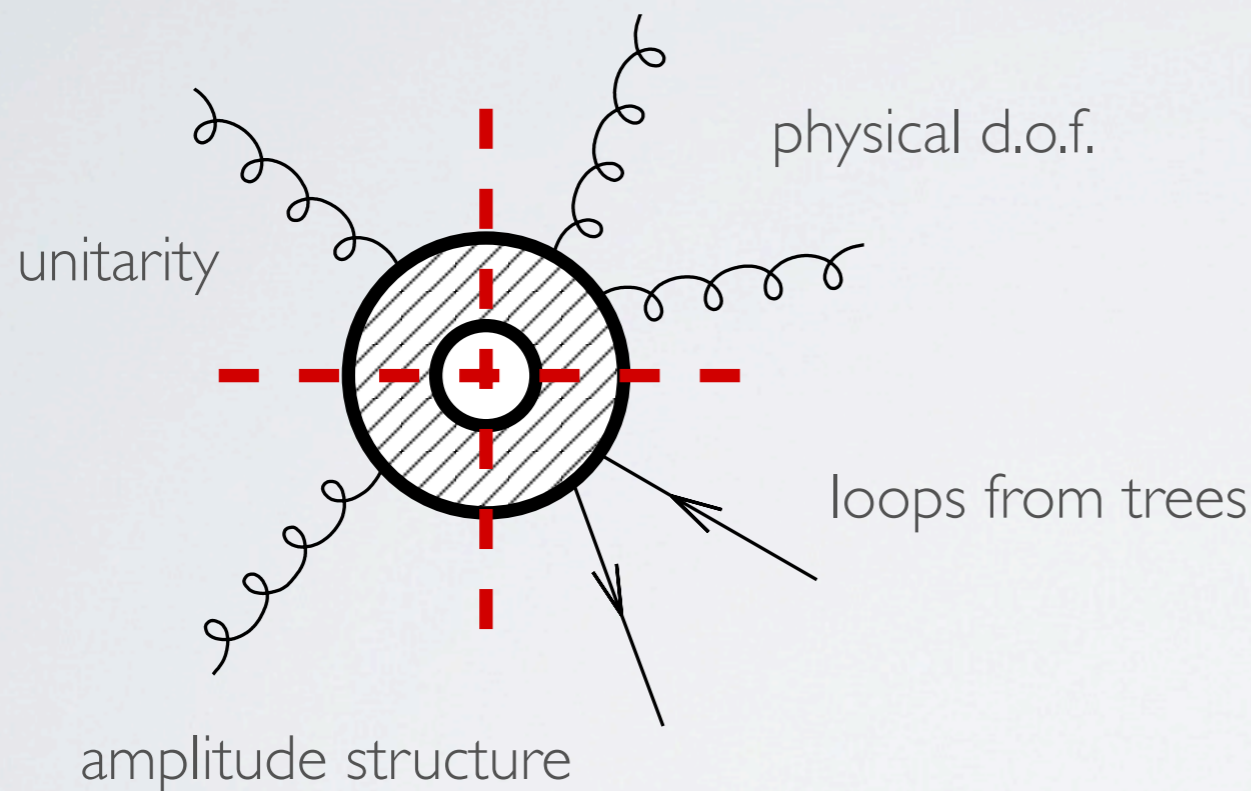


# Simon Badger

on-shell methods



precision QCD

strong coupling measurements

improve description of jets

backgrounds in BSM searches

multi-loop amplitudes

integrand level reduction

computational algebraic geometry

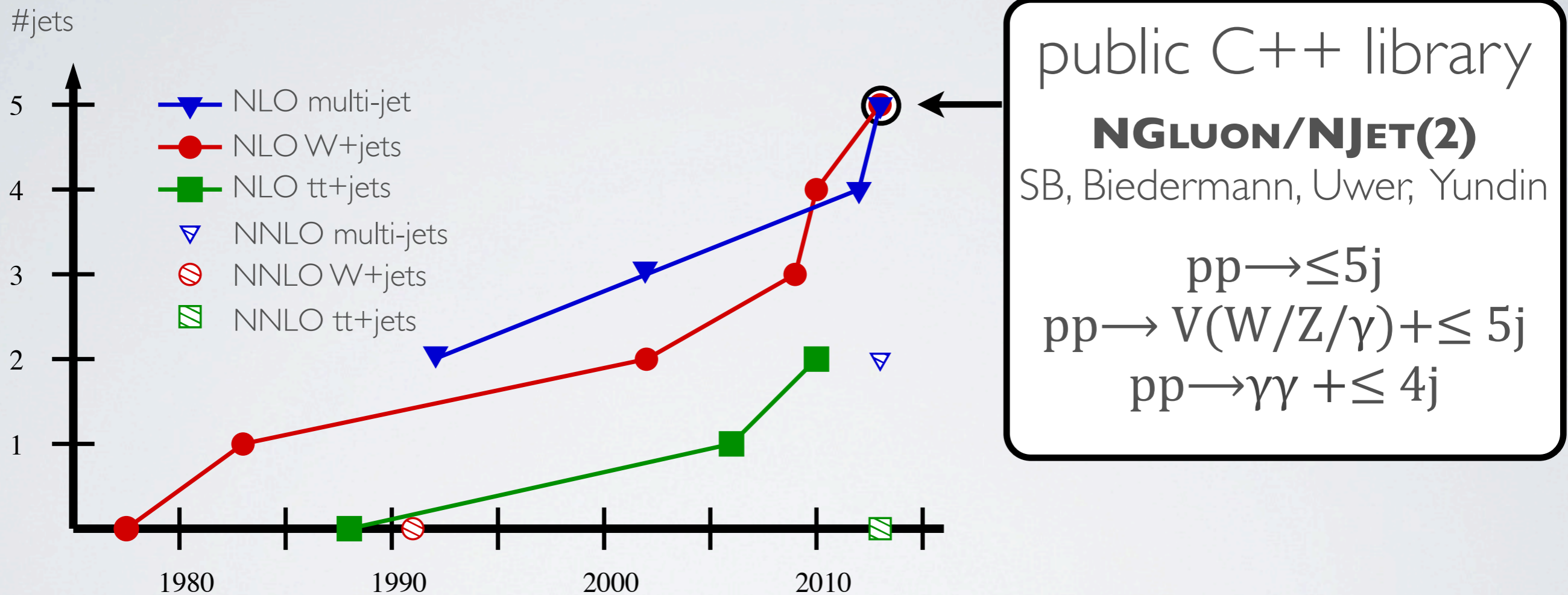
multi-leg NLO

available and automated

matching and merging?

speed and accuracy

# Precision Backgrounds

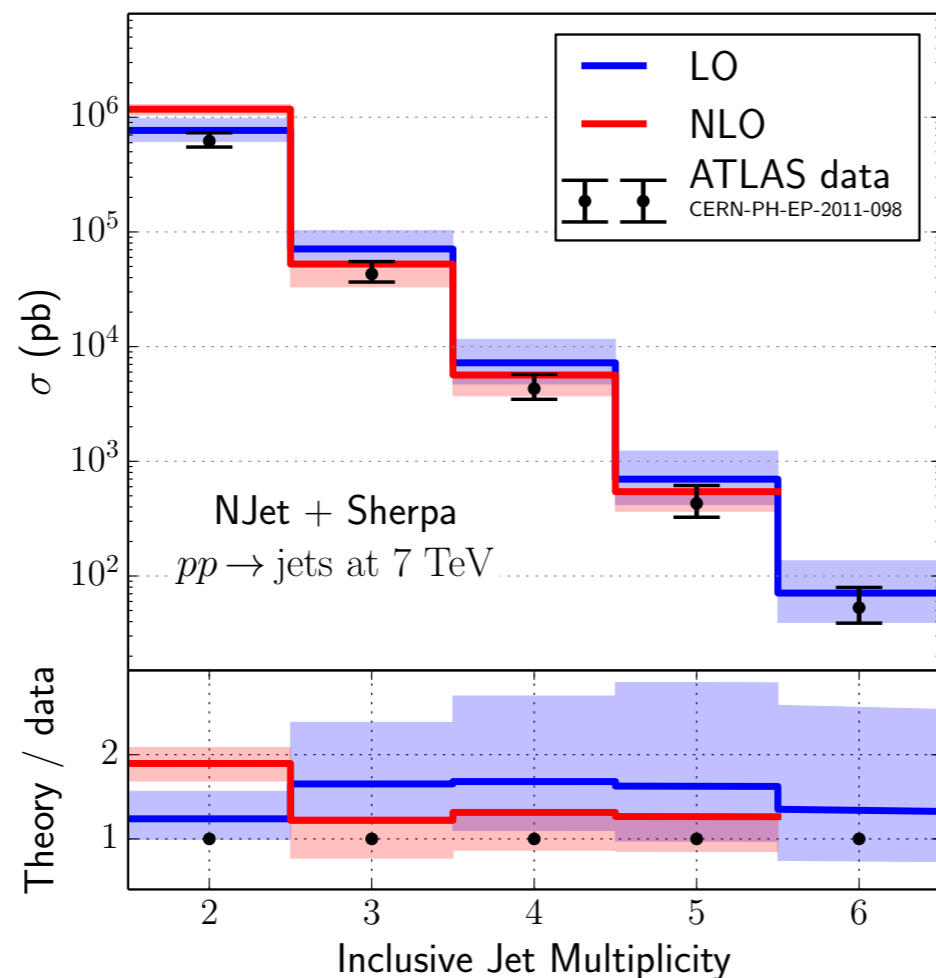
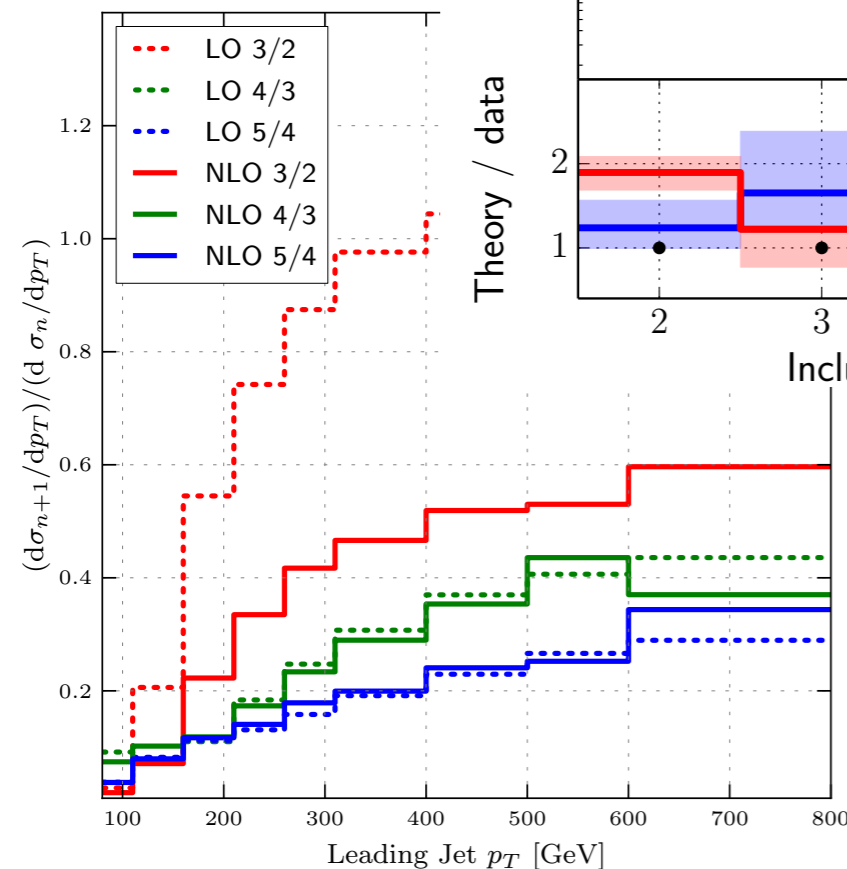


- Theoretical challenges - combat growth in complexity
- Keep theory uncertainties in line with experiments

# Multi-jet production at NLO

arXiv:1309.6585

Simple interface to Sherpa via BLHA

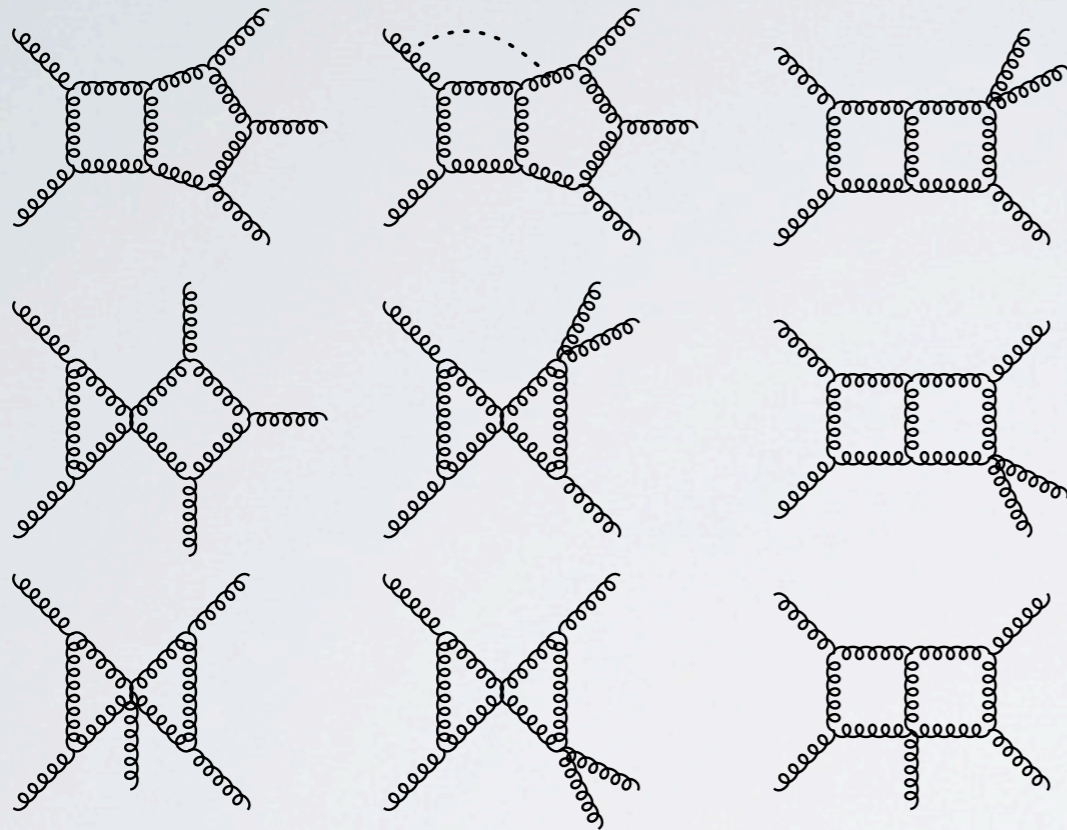


Jet ratios good candidates for future  $\alpha_s$  extraction at high energies

# Integrand reduction methods

arXiv:1310.1051

planar five-gluon all-plus  
helicity amplitude in QCD



compact analytic form

general D-dimensional  
reduction procedure  
6D helicity trees    algebraic geometry  
momentum twistors

To do:

loop integral computations

two-loop amplitudes for  $pp \rightarrow 3j$

non-planar corrections