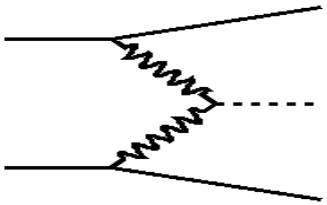
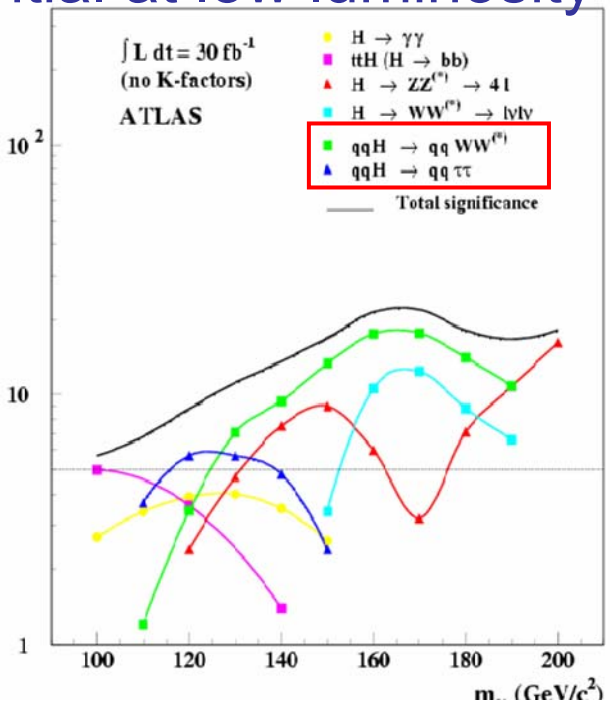
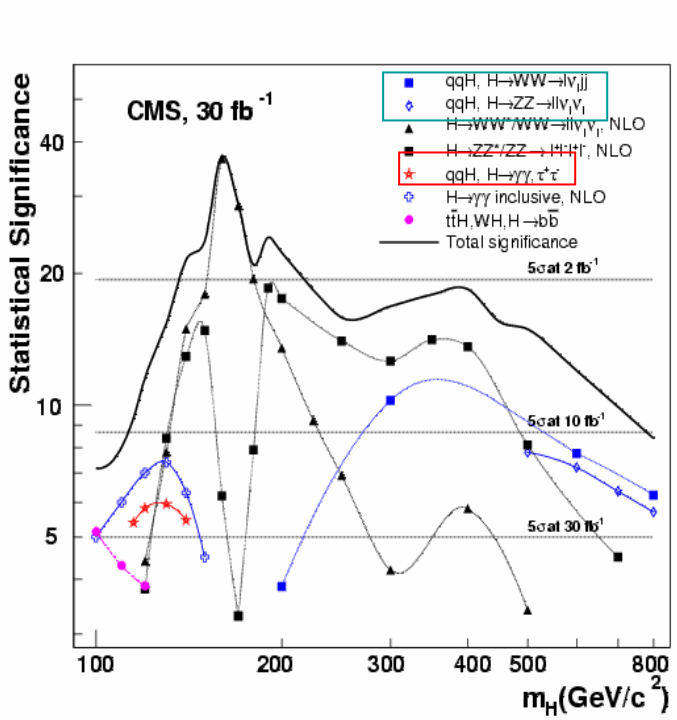
Higgs via Vector Boson Fusion

- 10-20% of production rate (at low masses)
  (signal Xsec known at NLO, small K factor)
- specific topology ("tagging jet", no jet activity in central region)
- significant contribution to discovery potential at low luminosity







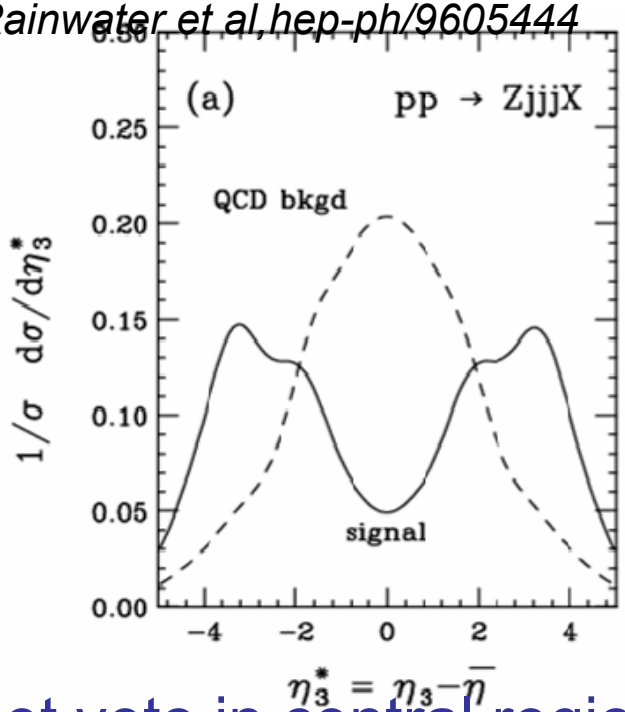
- H -> tau tau -> dilepton or lepton+hadron
  - main background: Z+2 jets (QCD > EW)
  - main experimental issue: mass resolution (<-> Missing transverse momentum resolution)
  - Jet veto Z+3jets/Z+2jets after tagging cut ("Zeppenfeld plot")
- H -> W W* -> dilepton
  - main backgrounds t-tbar(+jet), t-W (veto jets from top decay), WW+2jets (QCD and EW)
  - main issue: background extrapolation from control samples (but better S/B than inclusive H->WW* channel).
- (H -> gamma gamma)

Common issues:

➢ Jet veto. How to model it ? How to normalize with data ? (both for signal and background)

➢ Understanding of forward jets. W,Z production via vector boson fusion is =< signal rate. Single top?

Rainwater et al,hep-ph/9605444



Recent studies based on Sherpa/CKKW, Alpgen+Mangano prescription to generate Z+njets+PS without double counting

Is this accurate enough ?

MC@NLO for Z+2 jets ?

Signal NLO computation exists,

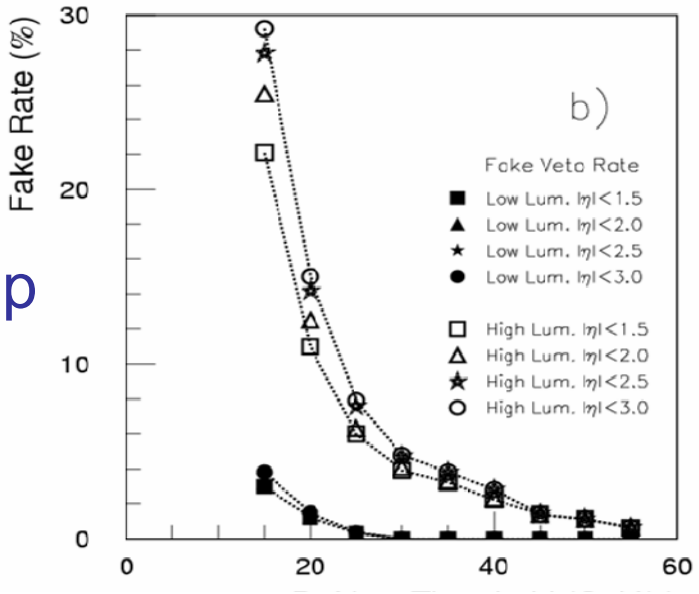
QCD Z+2j NLO (parton level) is in MCFM

Are we happy with these tools ?

Jet veto in central region to improve S/B

Atlas-SN-2003-24

Signal loss from jet veto
<=> Underlying event/PileUp
for low Pt threshold



On which topics do you want to contribute ?

- …