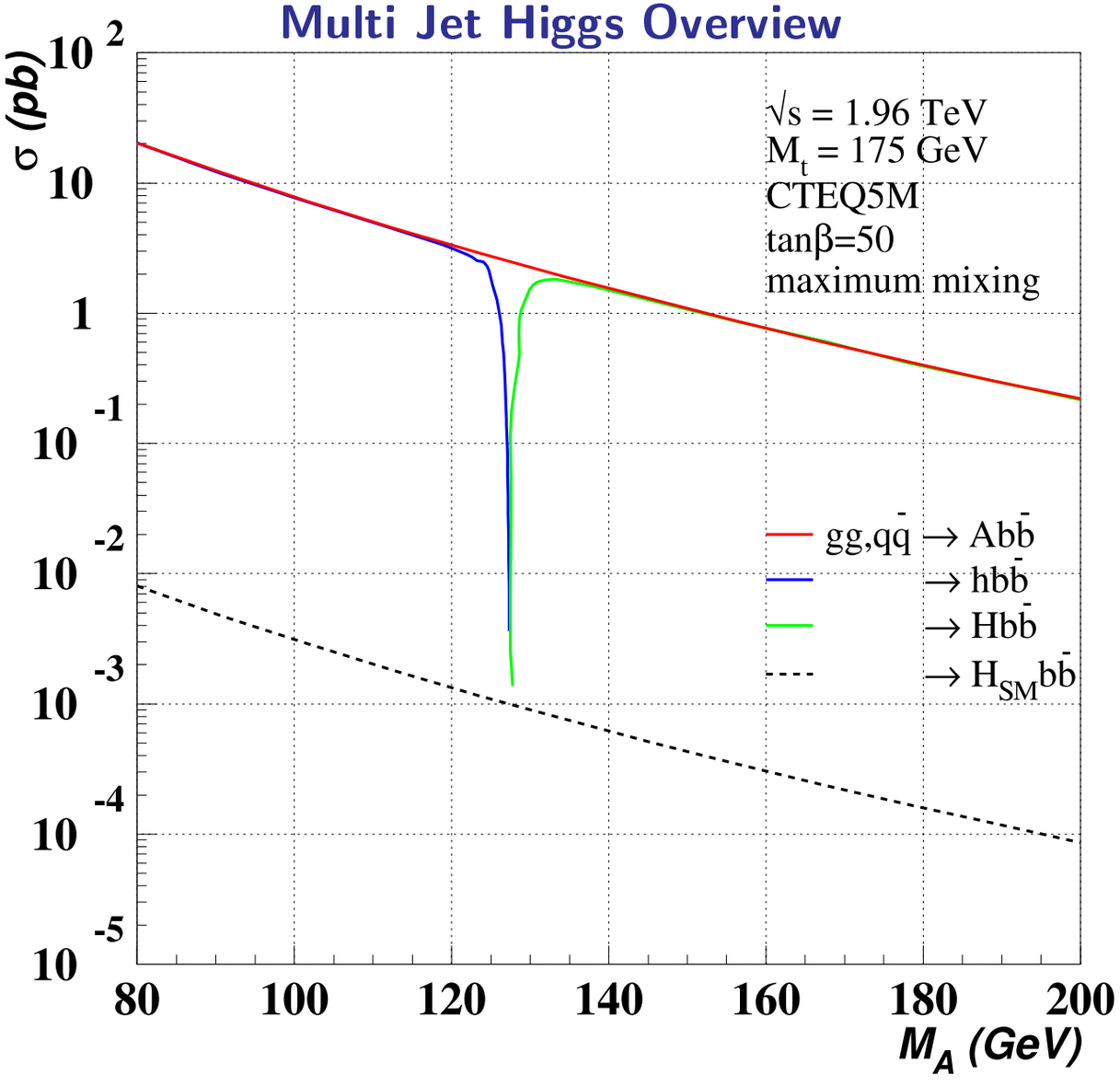
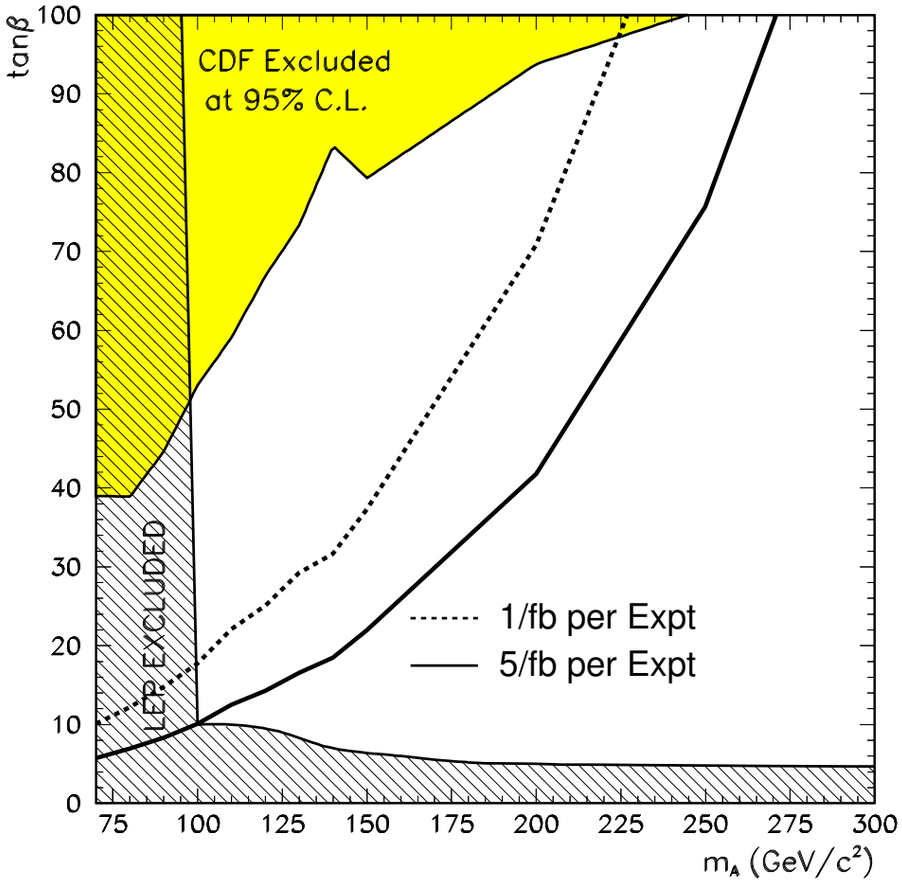
Multi Jet Higgs Overview



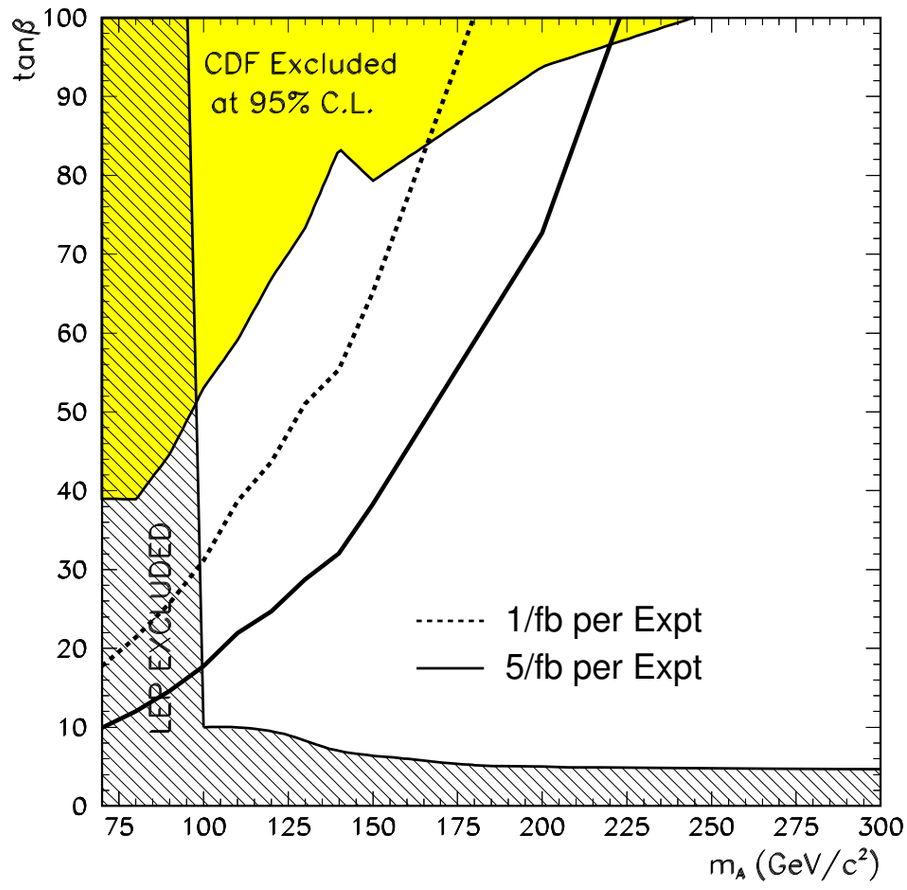
Need orders of magnitude less int. lumi for discovery compared to SM Higgs

Multi Jet Higgs Overview

95% CL Exclusion

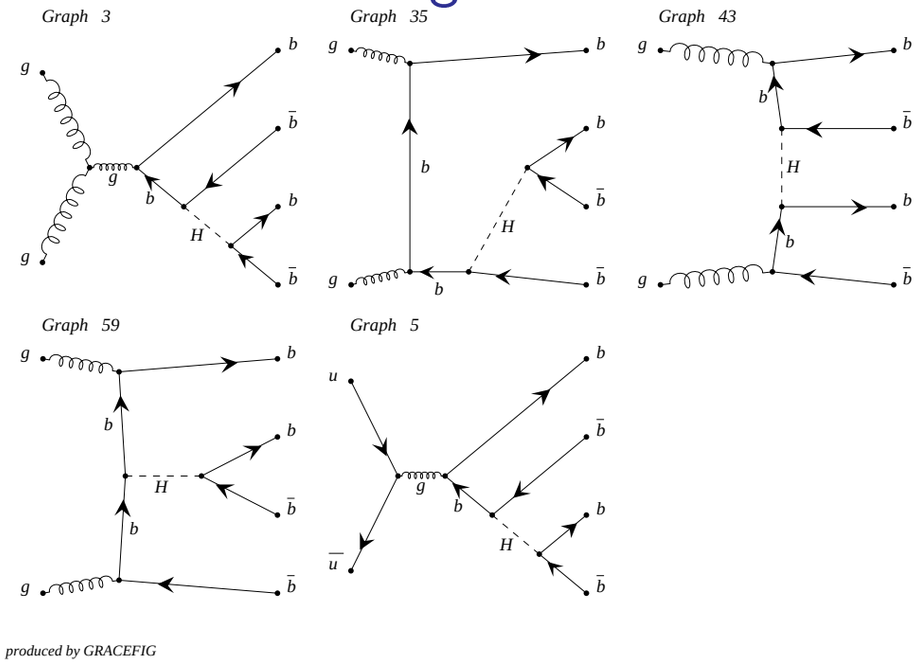


5σ Discovery

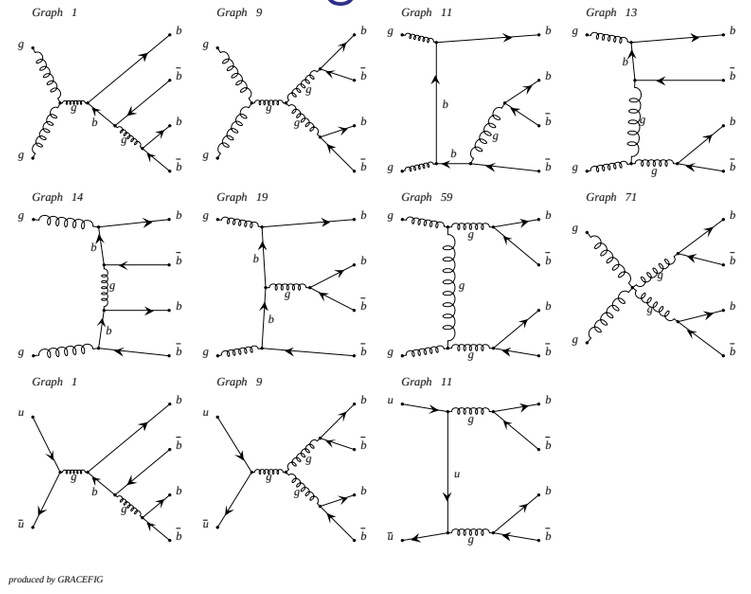


Multi Jet Higgs Overview

Signal



QCD 4b Background Dominant



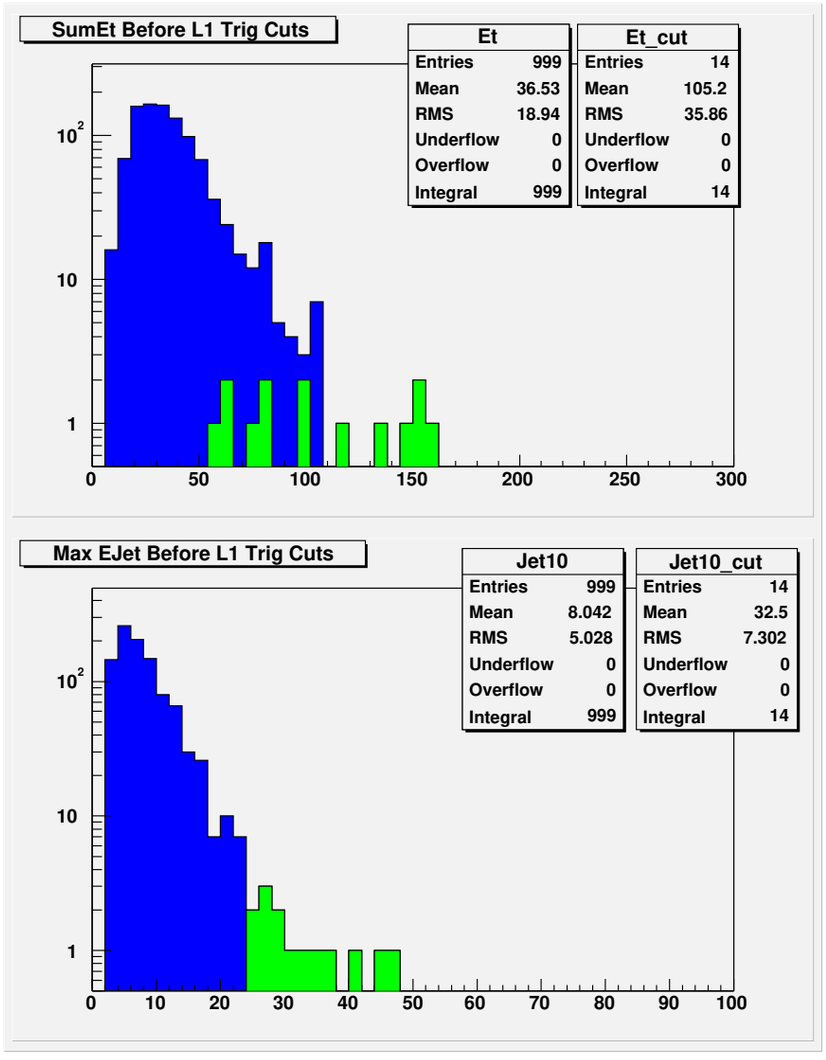
RunI Expected BKG from J. Valls's Analysis

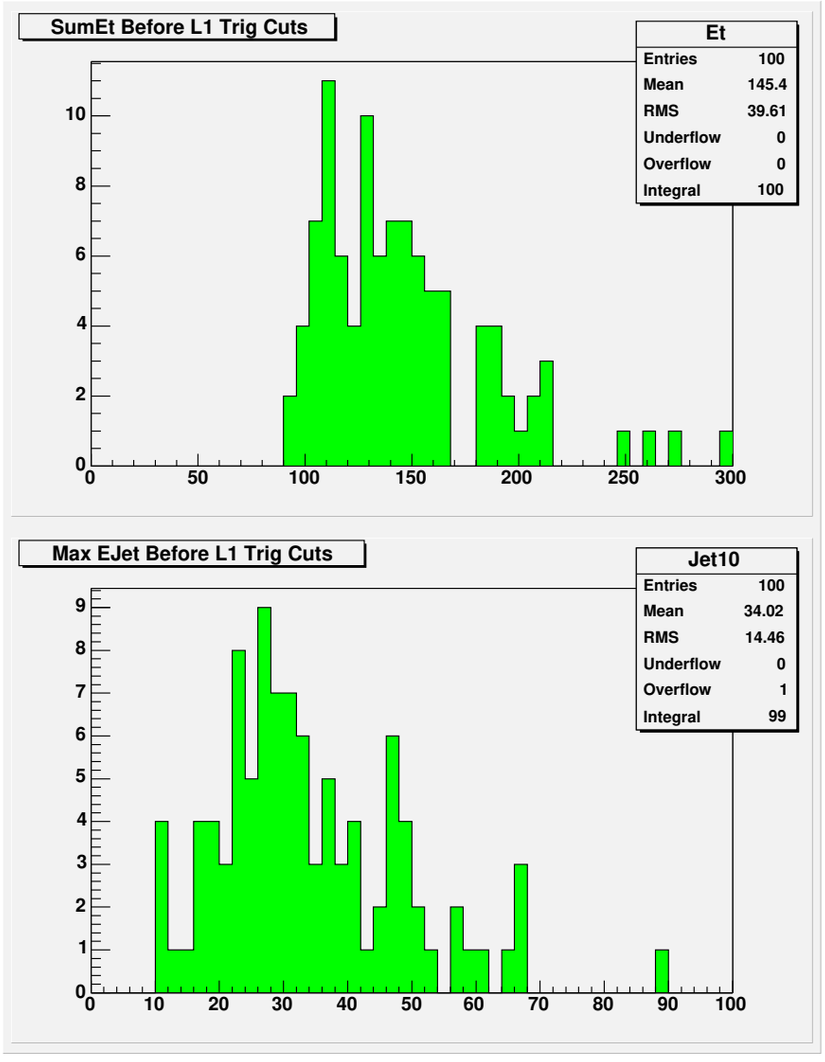
QCD	Fakes	$t\bar{t}$	W $b\bar{b}$ +W $c\bar{c}$	Z $b\bar{b}$ +Z $c\bar{c}$	Total
2.16 ± 0.55	0.5 ± 1.2	0.70 ± 0.18	0.09 ± 0.06	0.37 ± 0.02	3.8 ± 1.3

Multi Jet Higgs Status

- Aaron and Lauren measuring
  - HIGGS_MULTI_JET trigger stability
  - 4-jet QCD background using 2-tag-bin-normalization technique
  - Investigating newly implemented trigger
- Pete and Jared (Steve)
  - Getting GRAPPA to run with generator-level cuts for QCD MC bkg
  - CL calculation tools
- Kevin investigating means of measuring trigger eff from data

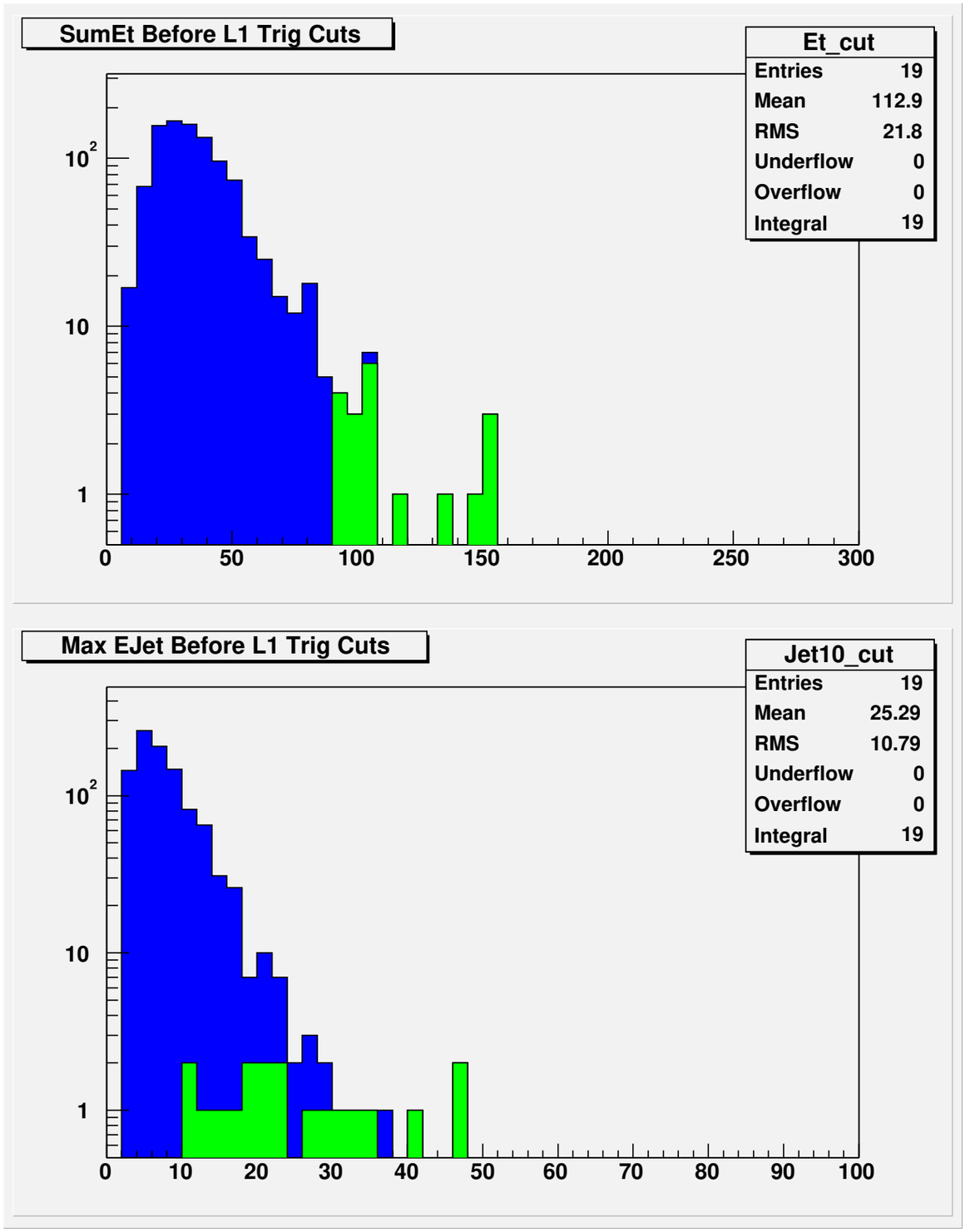
TRGSim++ Problem





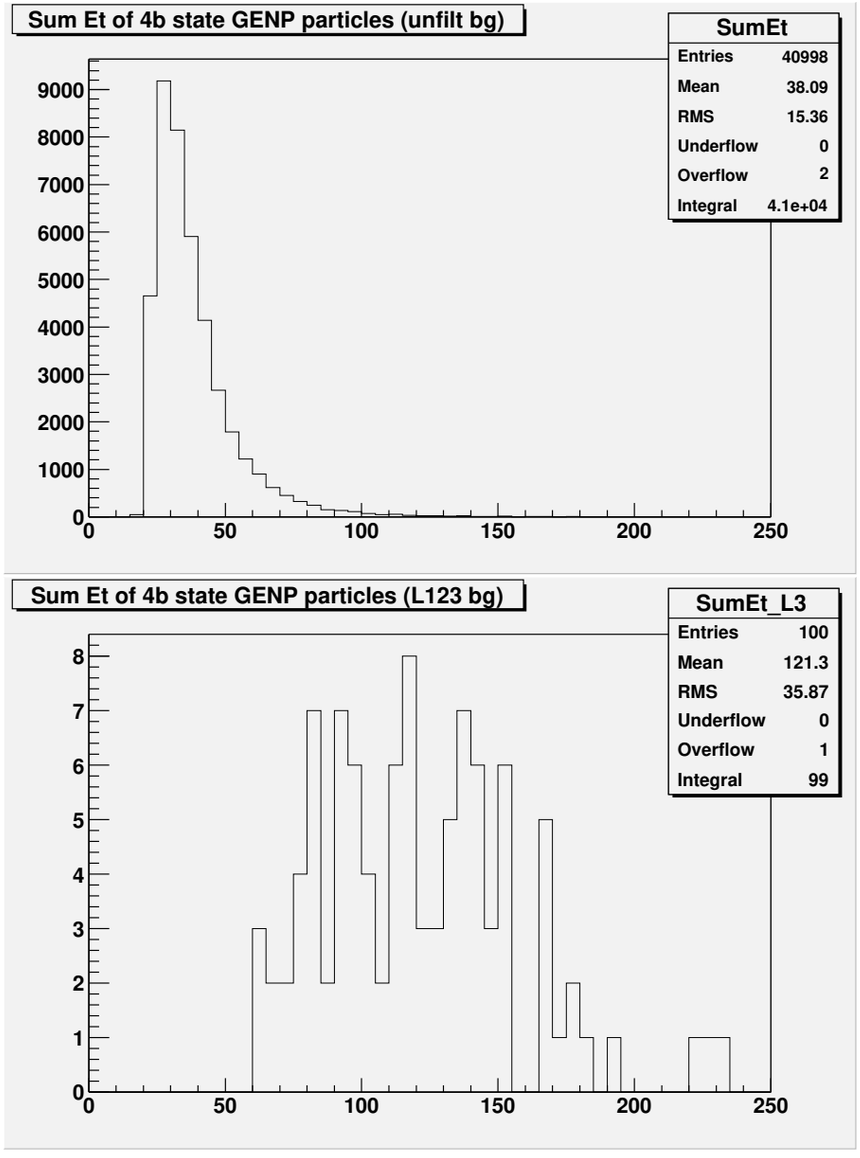
4.11.2 Simulation of run 151435 still had L1 problems, not seen in data.

TRGSim++ Bug Fixed by Simona, Carla & Aaron



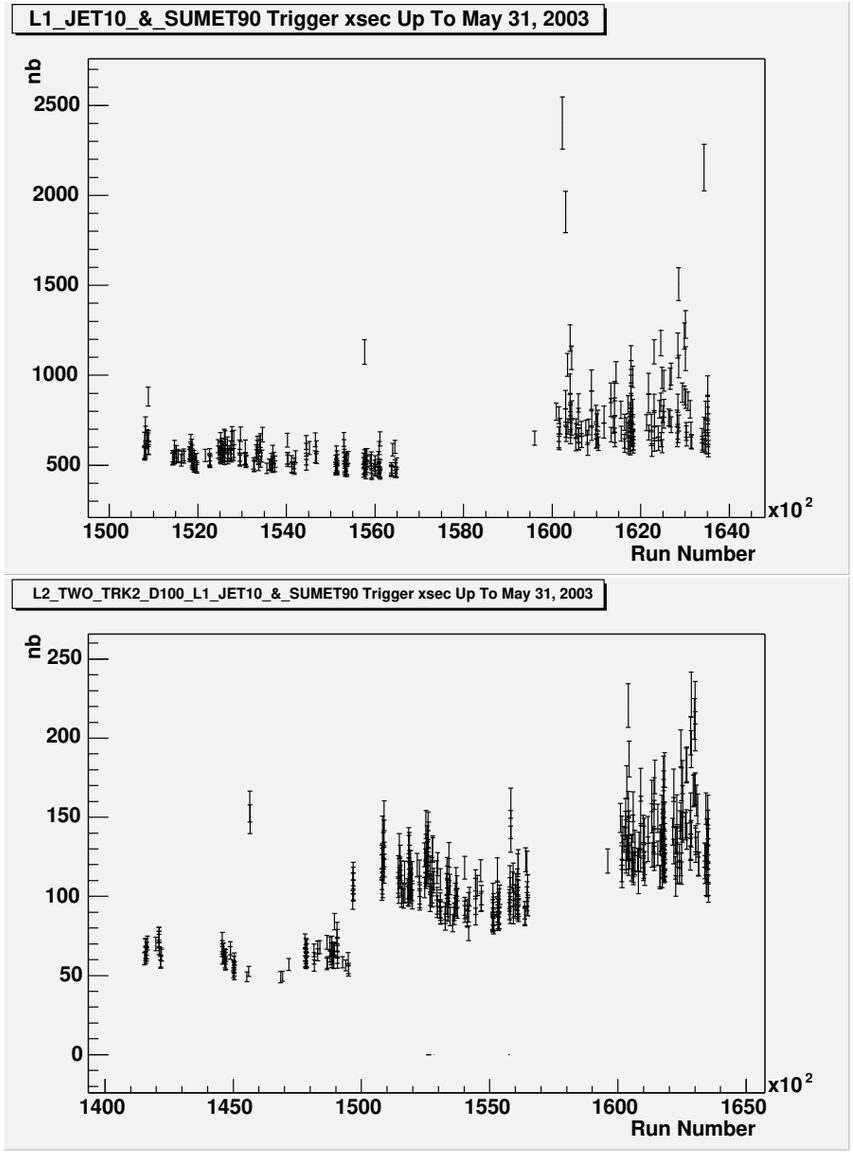
Can now use TRGSim++ to evaluate MC trigger effs

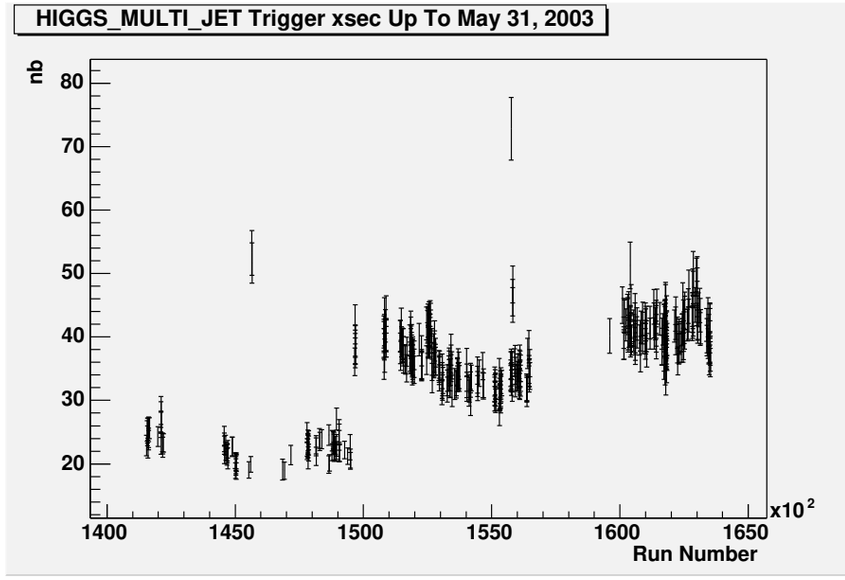
GR@PPA 4b QCD Generator-Level Cuts



- Jared studied generator-level cuts in GR@PPA
- 50 GeV cut on parton-level $\sum E_T$ is quite safe
  - $\sigma(\text{GRAPPA nocut}) = 19883\text{pb}$
  - $\sigma(\text{GRAPPA 50 GeV cut}) = 3286\text{pb}$
- Has generated 1.7M events on Rutgers farm
- Run through 4.11.2 realistic MC and make stntuples
- Use QCD bkg and 4b sig to do toy analysis

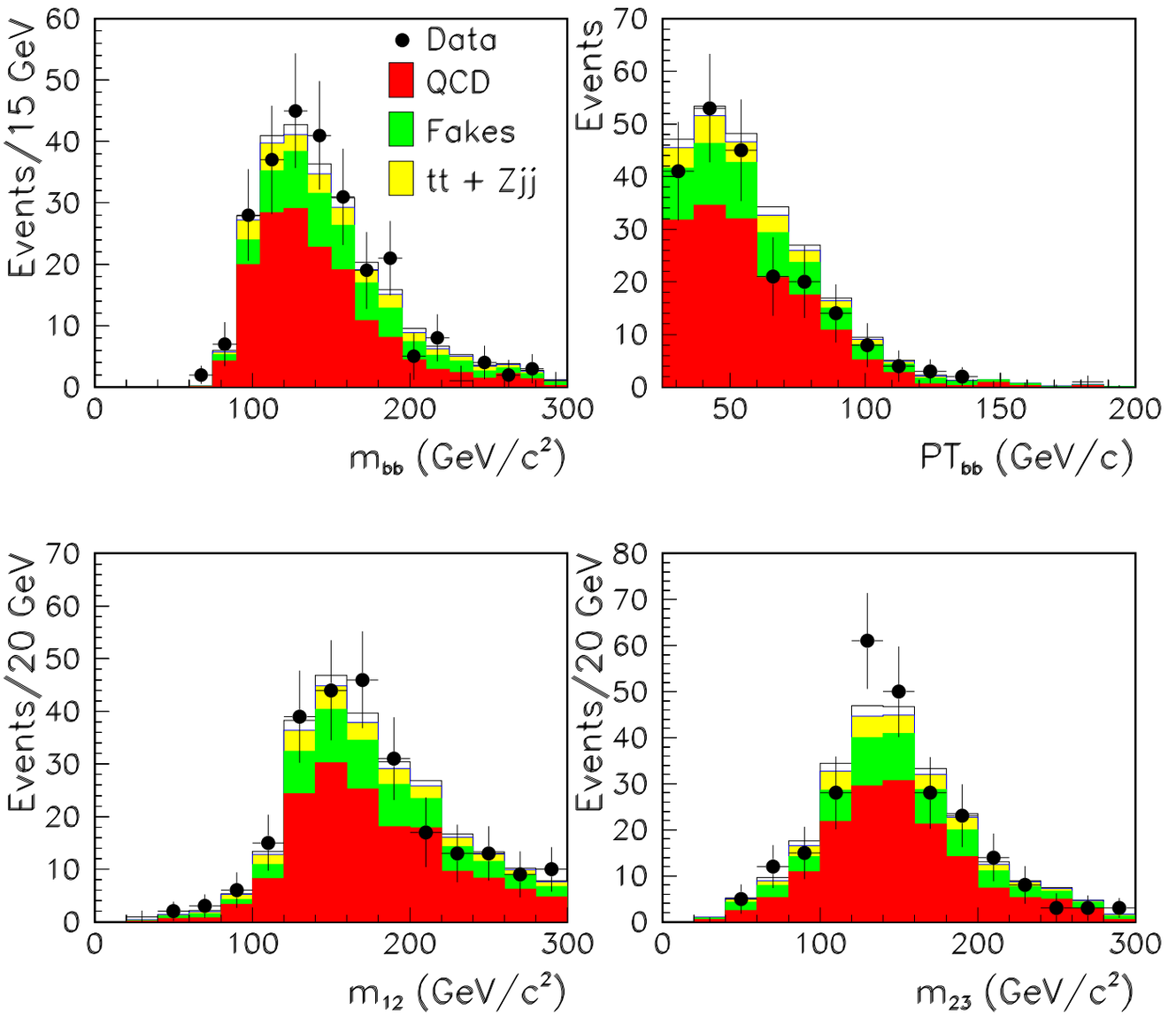
Trigger Stability





- Trigger seems stable in most good runs
- Investigate anomolous runs
- Lauren making stntuples of all `HIGGS_MULTI_JET` triggers in `ehig09`

Next Step: Measure QCD Bkg



Use RunI analysis technique to fit data to QCD+fakes+etc in 2-btag $m_{\mathrm{b\bar{b}}}$ distribution