Higgs to Invisible MC Comparison

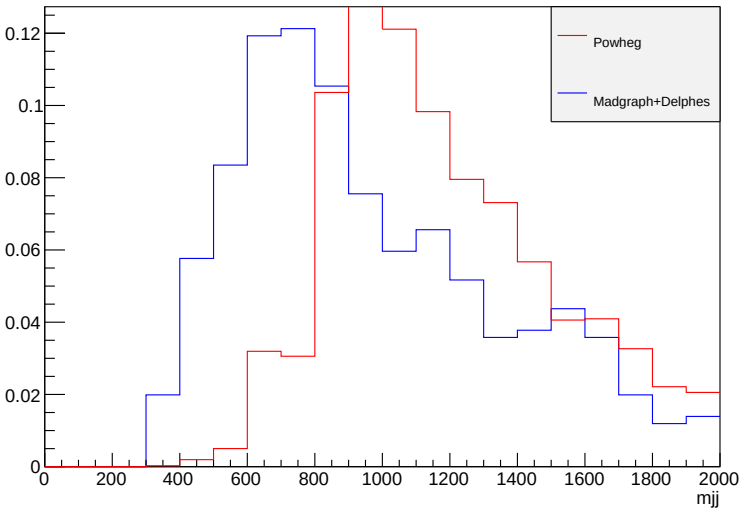
Cut flow

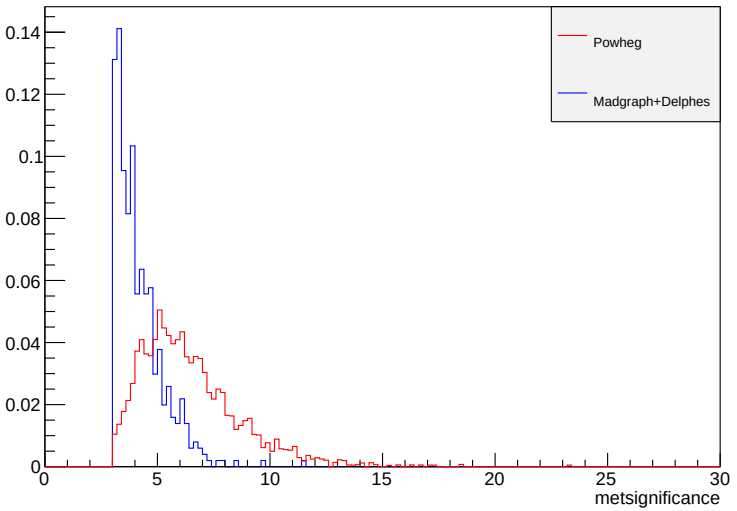
- Compare yields cut by cut
- Loosest selection easily available in CMS samples is: met significance>3, $\Delta\eta_{jj} > 3.6$
  - all selection steps below have this requirement
- Add cuts one by one
- Agreement at $\sim$20% until M_{jj} and met significance cuts

Cut added	Powheg + CMS yield	Madgraph + Delphes yield
$j_1 p_T > 50$, $j_2 p_T > 45$	1351	1156
min$\Delta\phi(j, met) > 2.3$	649	507
met>90	624	507
$M_{jj} > 1200$	300	147
met significance>4	273	78

Compare Distributions

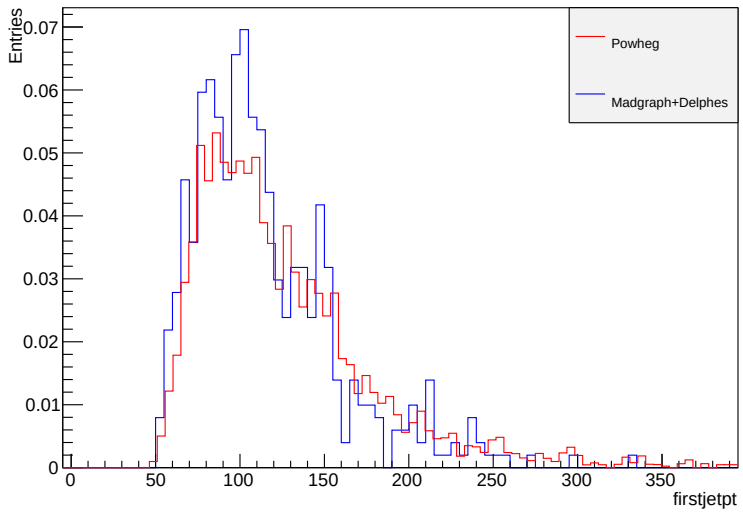
- Selection: met significance>3, $\Delta\eta_{jj} > 3.6$, $j_1 p_T > 50$, $j_2 p_T > 45$, $\min\Delta\phi(j, met) > 2.3$, met$>90$
- These two variables cause the largest difference in the cut flow

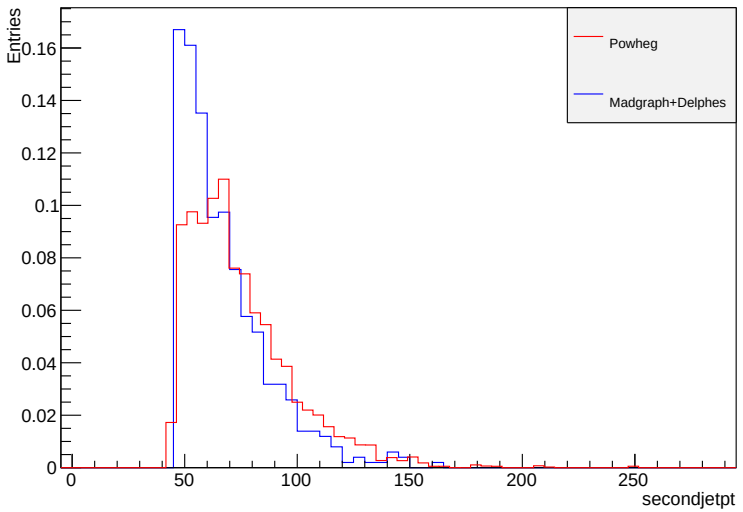




Compare Distributions

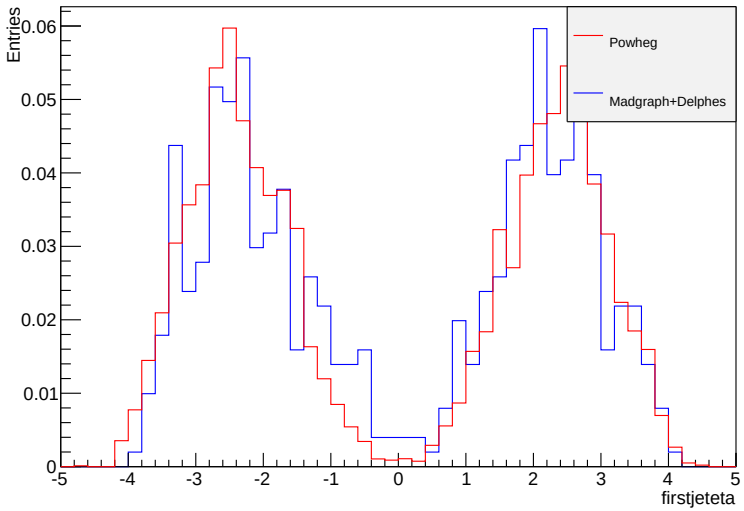
- Selection: met significance$>$ 3, $\Delta\eta_{jj} > 3.6$, $j_1 p_T > 50$, $j_2 p_T > 45$, min$\Delta\phi(j, met) > 2.3$, met$>$ 90
- Jet pts fairly similar, a little harder in powheg

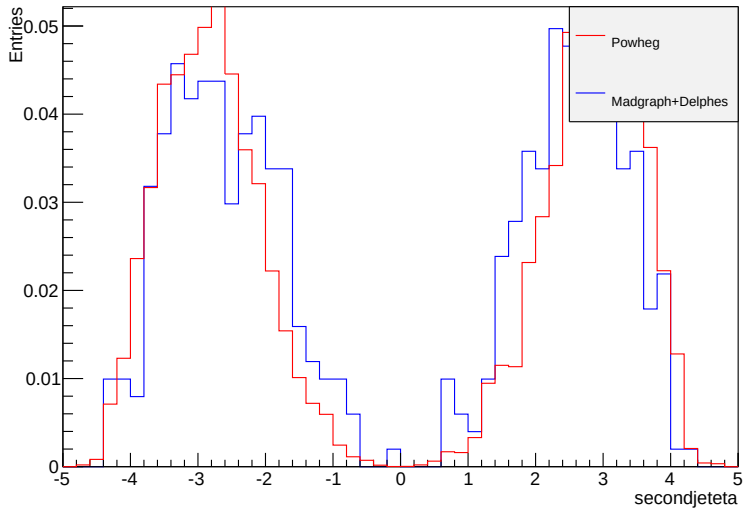




Compare Distributions

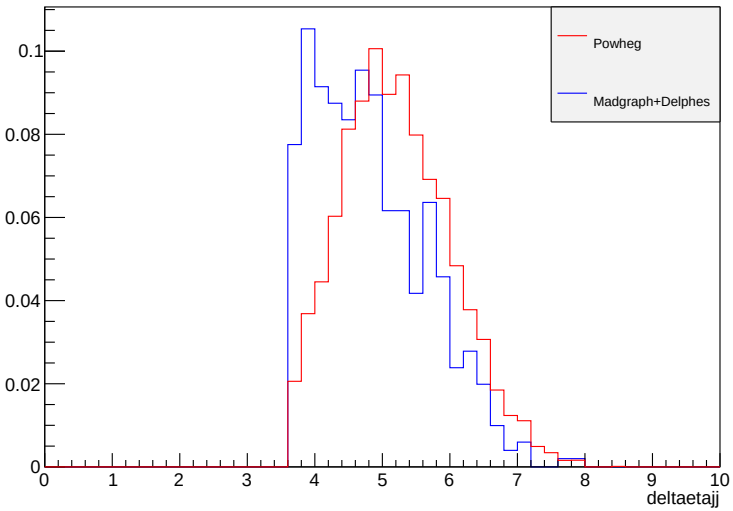
- Selection: met significance$>$ 3, $\Delta\eta_{jj} > 3.6$, $j_1 p_T > 50$, $j_2 p_T > 45$, min$\Delta\phi(j, met) > 2.3$, met$>$ 90
- Madgraph jets more central than powheg

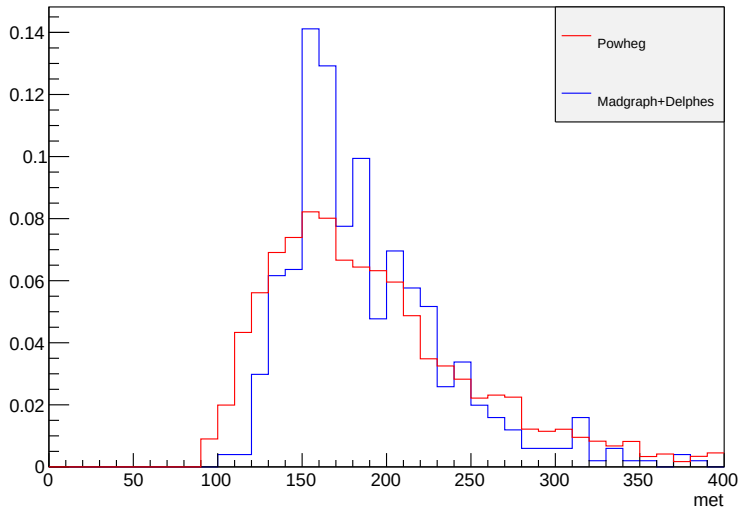




Compare Distributions

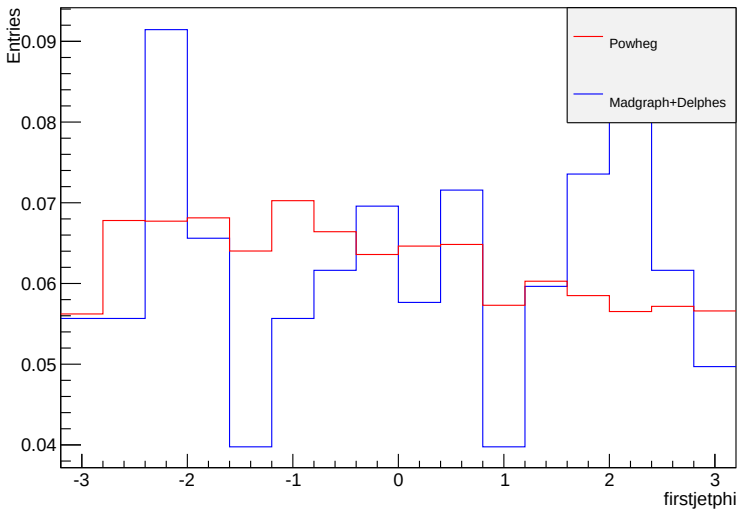
- Selection: met significance$>$ 3, $\Delta\eta_{jj} > 3.6$, $j_1 p_T > 50$, $j_2 p_T > 45$, min$\Delta\phi(j, met) > 2.3$, met$>$ 90
- Again see madgraph jets being more central
- Met similar between madgraph and powheg

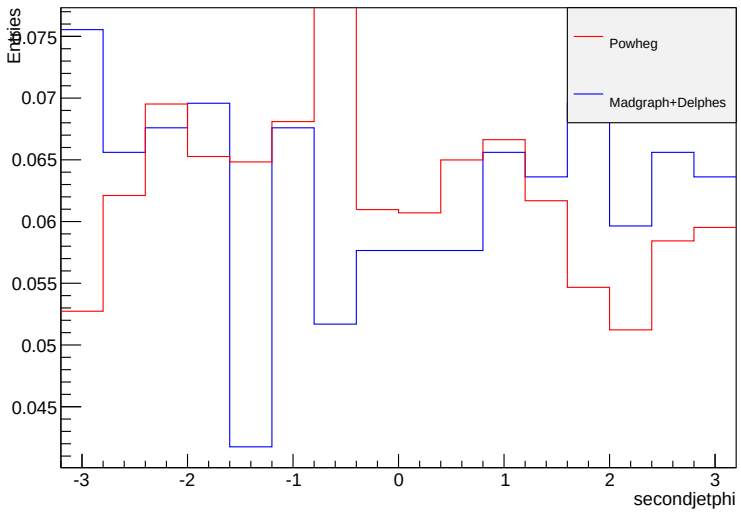




Compare Distributions

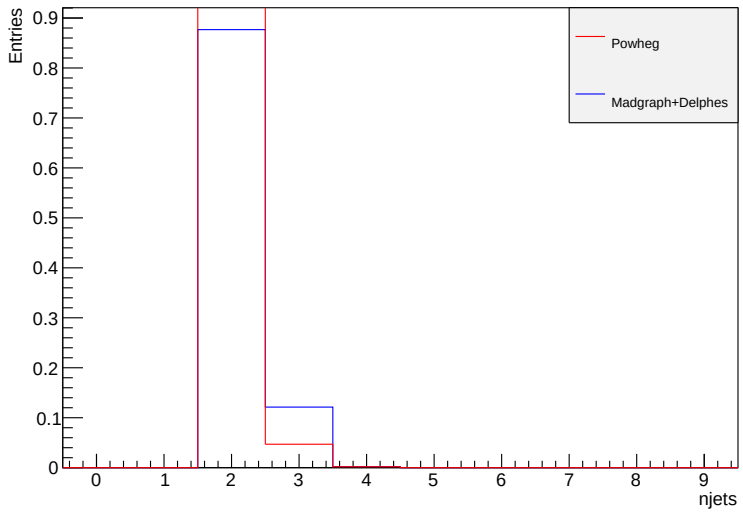
- Selection: met significance$>$ 3, $\Delta\eta_{jj} > 3.6$, $j_1 p_T > 50$, $j_2 p_T > 45$, min$\Delta\phi(j, met) > 2.3$, met$>$ 90
- Limited statistics in phi





Compare Distributions

- Selection: met significance>3, $\Delta\eta_{jj} > 3.6$, $j_1 p_T > 50$, $j_2 p_T > 45$, $\min\Delta\phi(j, met) > 2.3$, met$>90$
- Numbers of jets similar, slightly more additional jets in madgraph



Summary

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Backup