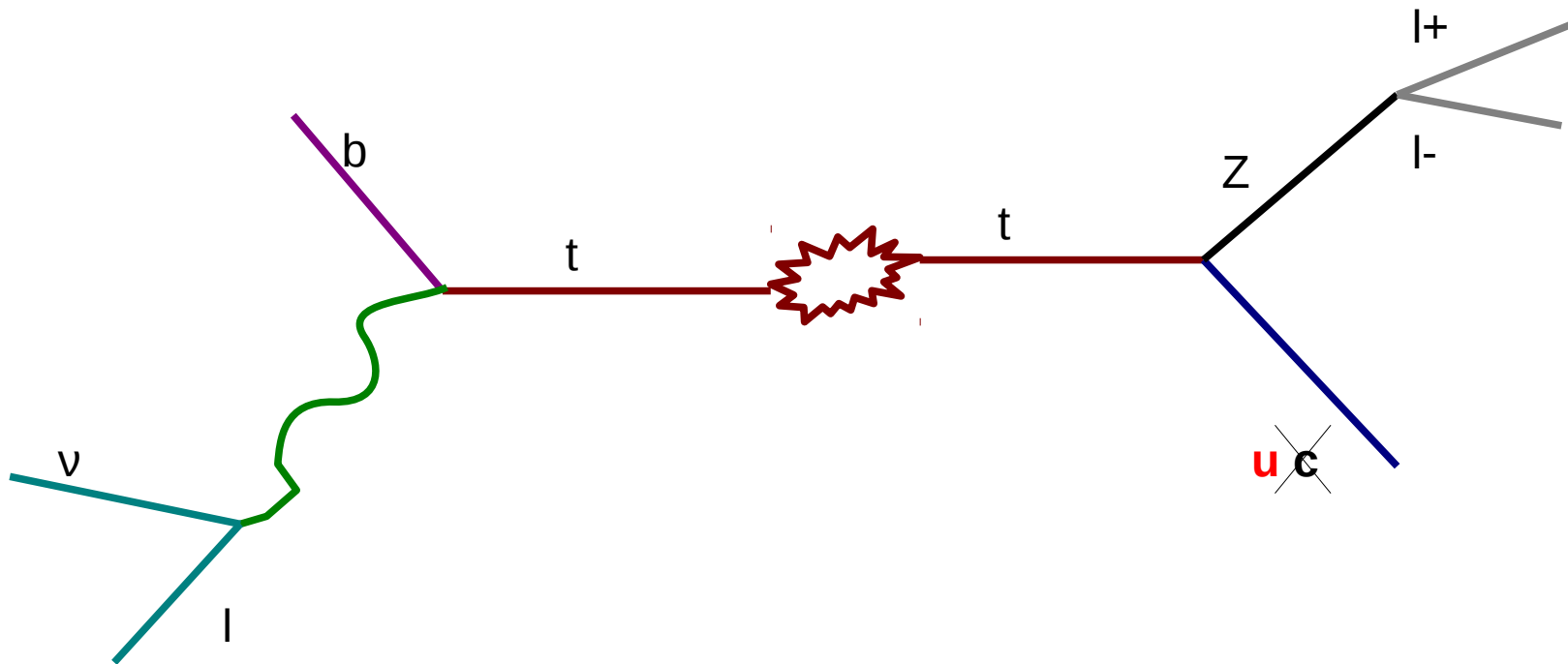


# Status of $t\bar{t}$ $\rightarrow$ 3 leptons Checking Z $\nu$ signal



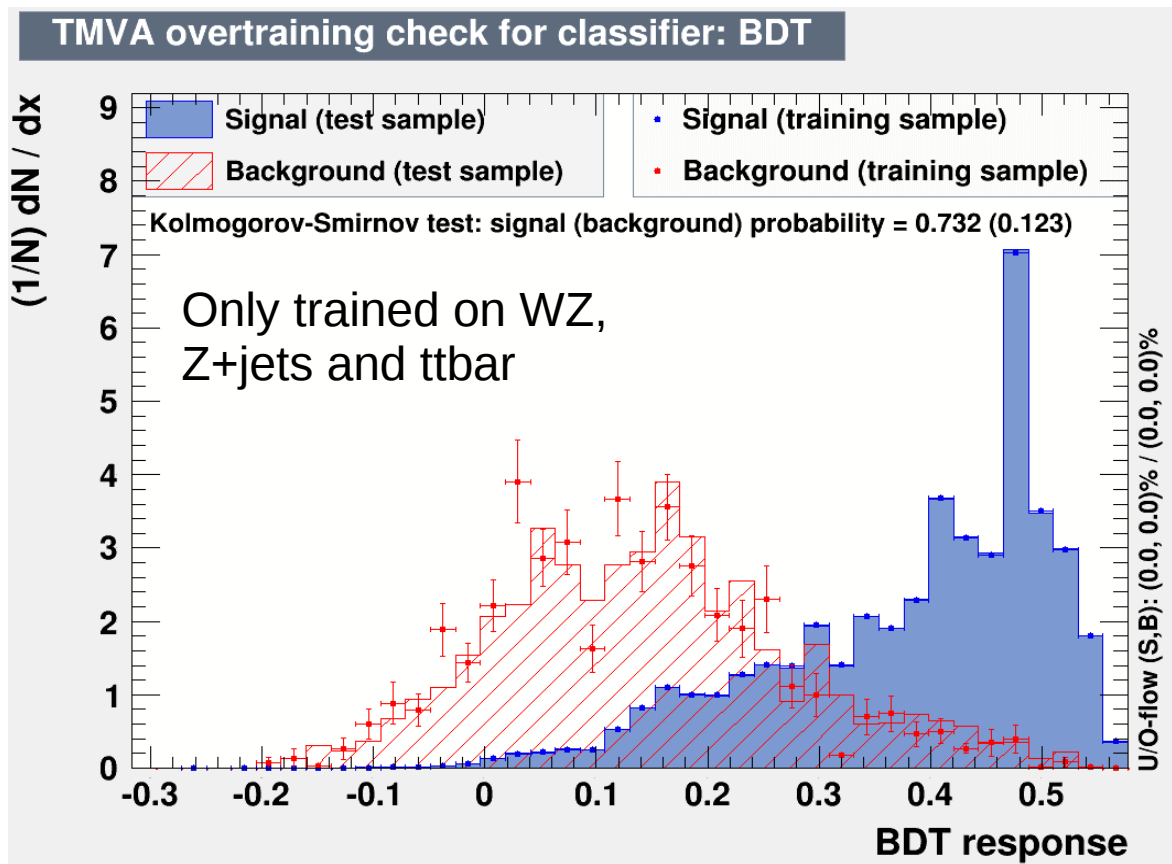
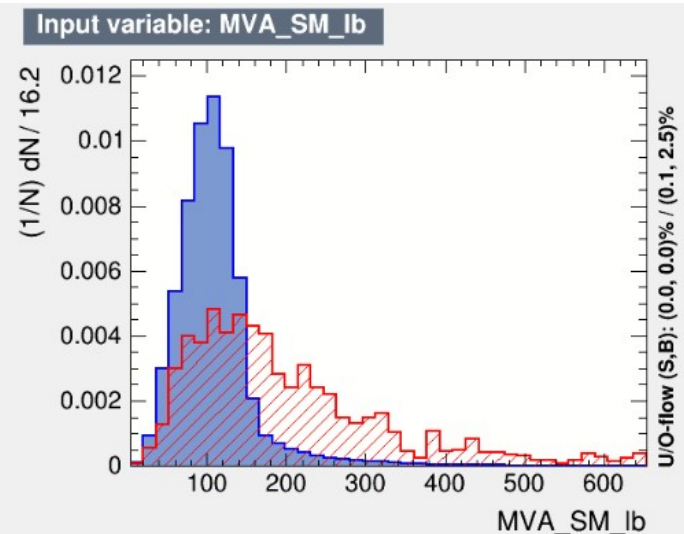
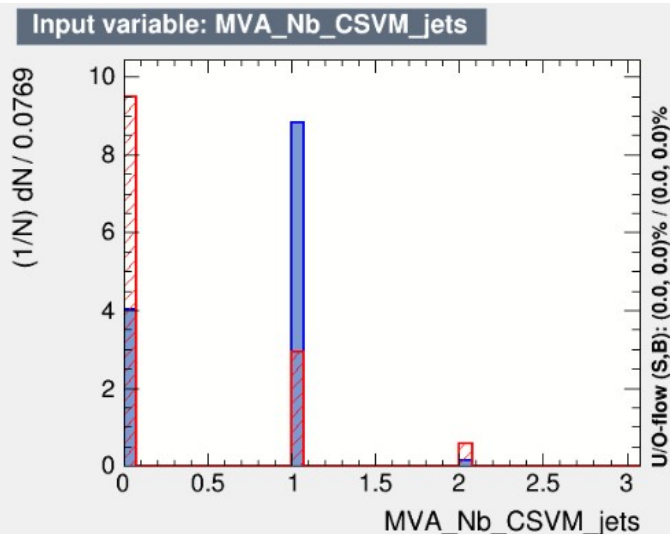
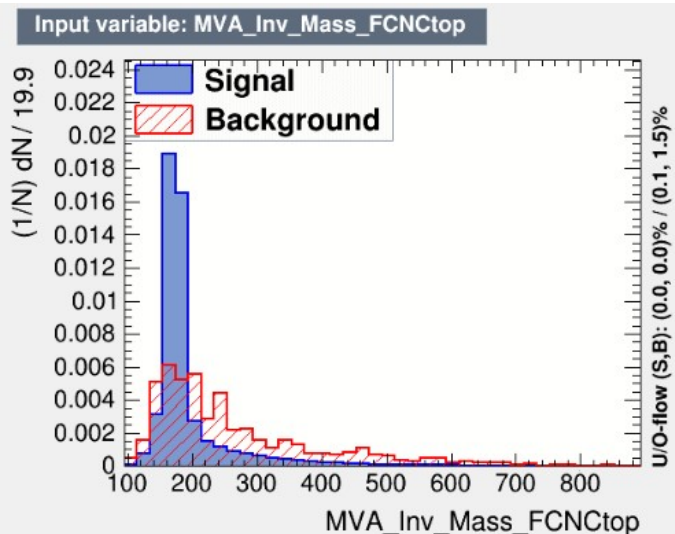
# Cut and Count

	Initial	3 leptons	At least 2 jets	At least 1 CSVL	At least 1 OSSF pair	Inv Mass Z
TTto3L-Kappa-zut	$2.09e+03 \pm 0.703$	$541 \pm 0.349$	$262 \pm 0.242$	$200 \pm 0.213$	$200 \pm 0.213$	$192 \pm 0.208$
TTsemilep Kappa Zct Ztoll	$2.09e+03 \pm 0.718$	$242 \pm 0.239$	$159 \pm 0.193$	$134 \pm 0.178$	$133 \pm 0.177$	$128 \pm 0.173$
TTdilep WToLNu madspin	$1.93e+03 \pm 7.6$	$149 \pm 2.11$	$85 \pm 1.6$	$77.9 \pm 1.53$	$60.1 \pm 1.34$	$14.9 \pm 0.669$
TTdilep ZToLL madspin	$803 \pm 2.54$	$209 \pm 1.29$	$121 \pm 0.988$	$112 \pm 0.949$	$104 \pm 0.915$	$78.1 \pm 0.793$
TTdilep madspin	$6.78e+06 \pm 3.44e+03$	$4.04e+03 \pm 82.1$	$1.41e+03 \pm 48.5$	$1.2e+03 \pm 44.7$	$914 \pm 39.1$	$232 \pm 19.7$
TTsemilep HToZZ madspin2	$267 \pm 0.34$	$2.64 \pm 0.0339$	$0.00174 \pm 0.00087$	$0.00174 \pm 0.00087$	$0.00087 \pm 0.000615$	$0.00087 \pm 0.000615$
TTsemilep ZToLL madspin 1	$1.68e+03 \pm 5.3$	$110 \pm 1.36$	$82.8 \pm 1.18$	$73.5 \pm 1.11$	$71.9 \pm 1.1$	$61.5 \pm 1.02$
TTsemilep ZToLL madspin 2	$1.68e+03 \pm 5.3$	$111 \pm 1.37$	$84.4 \pm 1.19$	$74.3 \pm 1.12$	$72.3 \pm 1.1$	$62.3 \pm 1.02$
WZToLLLNu	$2.57e+05 \pm 60.5$	$1.53e+04 \pm 15.5$	$1.73e+03 \pm 5.17$	$497 \pm 2.77$	$495 \pm 2.77$	$446 \pm 2.63$
ZToLL50-3Jets sm-no masses	$6.28e+06 \pm 3.39e+03$	$3.13e+03 \pm 76.1$	$777 \pm 37.9$	$268 \pm 22.3$	$265 \pm 22.1$	$248 \pm 21.4$
ZToLL50-4Jets sm-no masses	$2.16e+06 \pm 1.49e+03$	$1.66e+03 \pm 40.9$	$959 \pm 31.1$	$341 \pm 18.5$	$339 \pm 18.5$	$315 \pm 17.8$
ZZToLLJJ sm-no masses	$2.12e+05 \pm 480$	$83.7 \pm 9.54$	$14.1 \pm 3.92$	$6.53 \pm 2.66$	$6.53 \pm 2.66$	$6.53 \pm 2.66$
ZZToLLLL sm-no masses	$3.59e+04 \pm 135$	$2.75e+03 \pm 37.3$	$181 \pm 9.58$	$51.3 \pm 5.1$	$50.3 \pm 5.05$	$45.7 \pm 4.82$

Total B= 1511

$$Z_{ut}: S/\sqrt{S+B} = 4.65$$

$$Z_{ct}: S/\sqrt{S+B} = 3.16$$



## MVA cut and count:

$$S/\sqrt{S+B} = 7.6$$

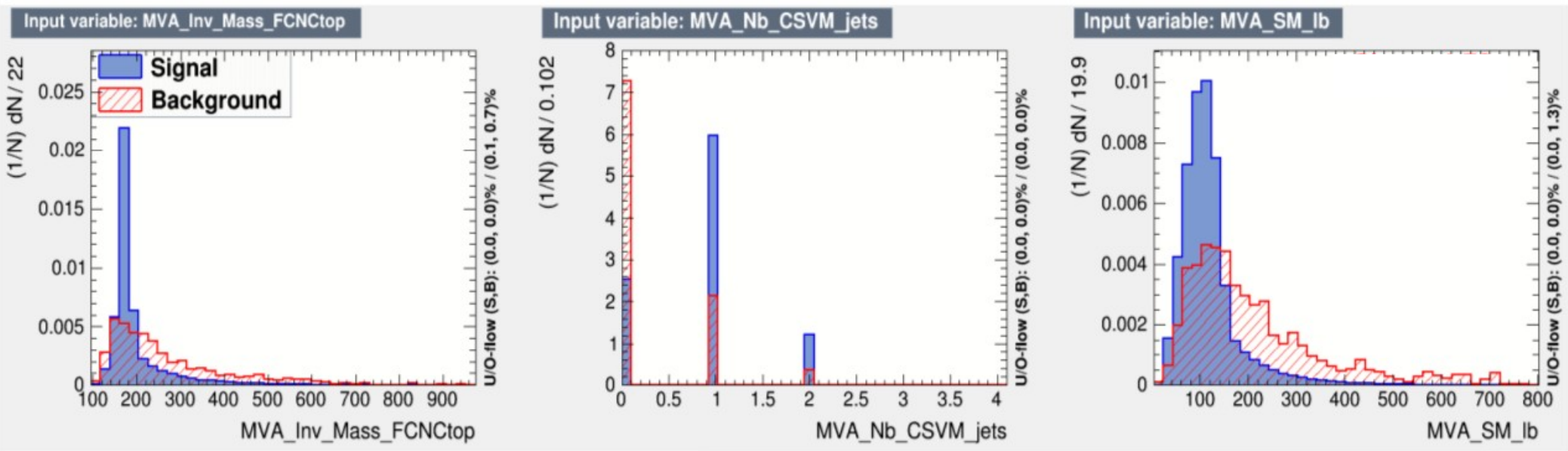
Nb signal: 94

Nb background: 60

With Zct:  $S/\sqrt{S+B} = 4.44$

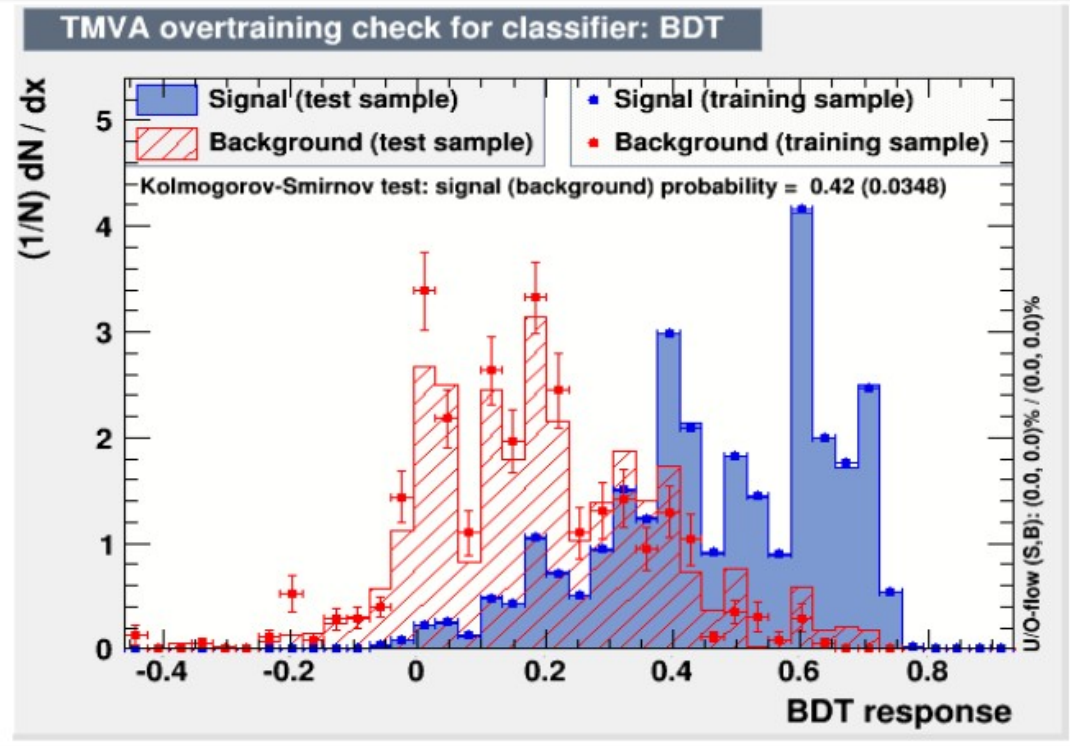
Nb signal: 45

Nb background: 60

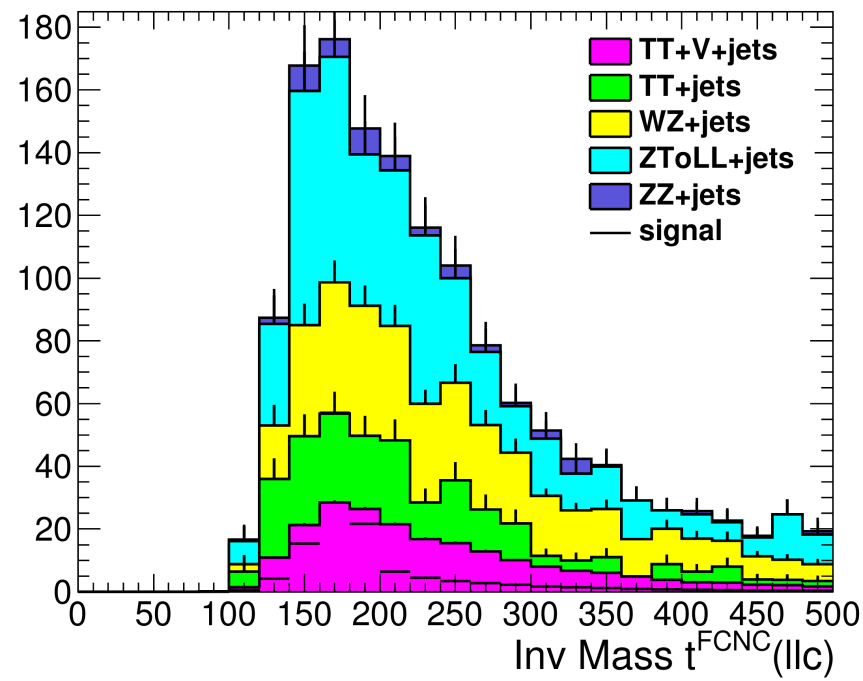
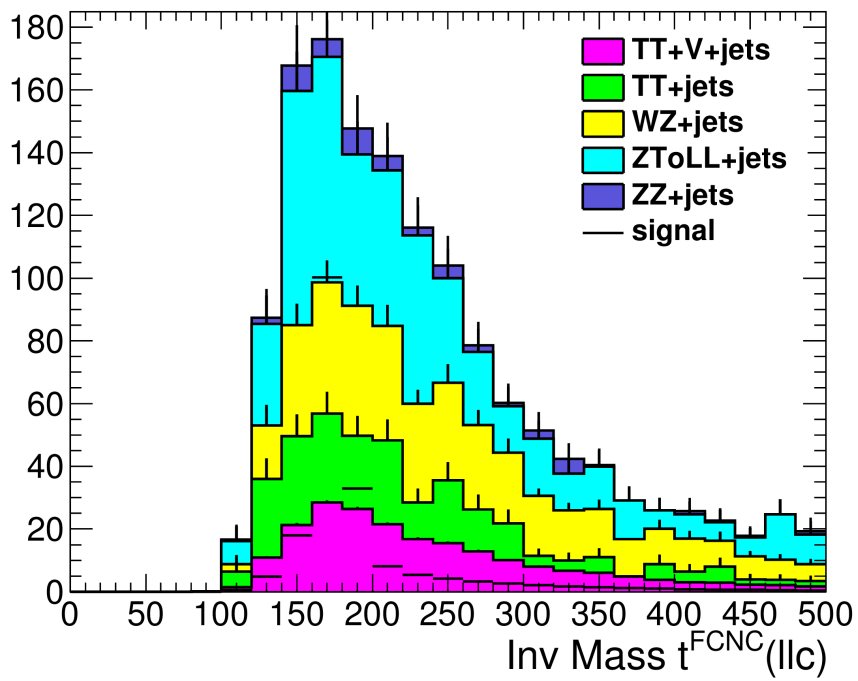


Signal: tcZ  
 Backgrounds for training: WZ, Z+jets, tt dilep

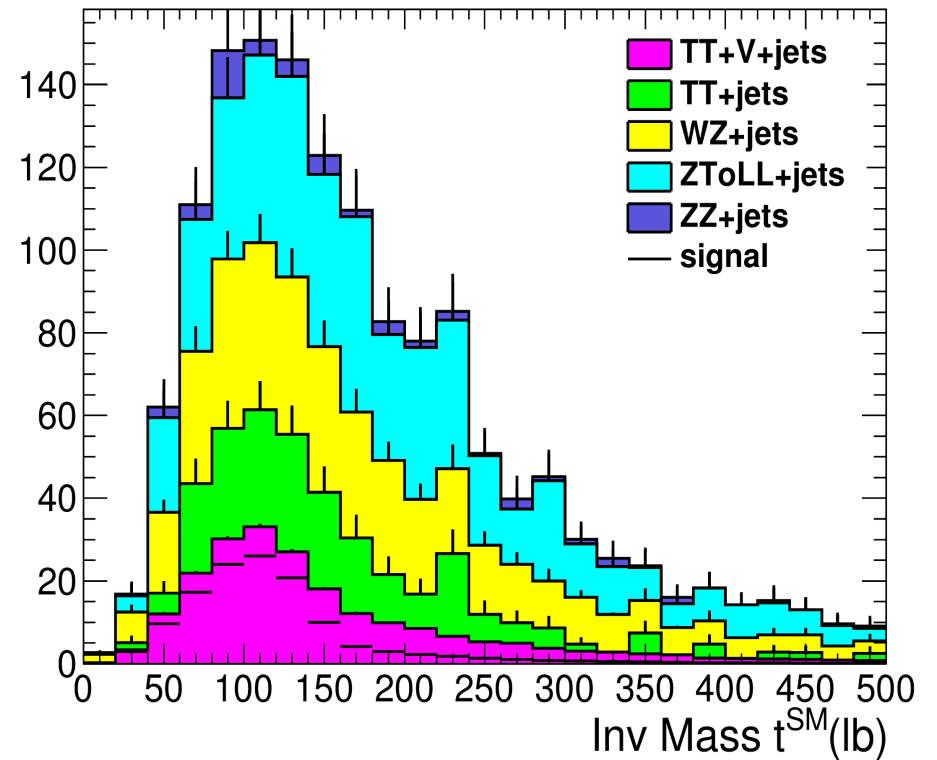
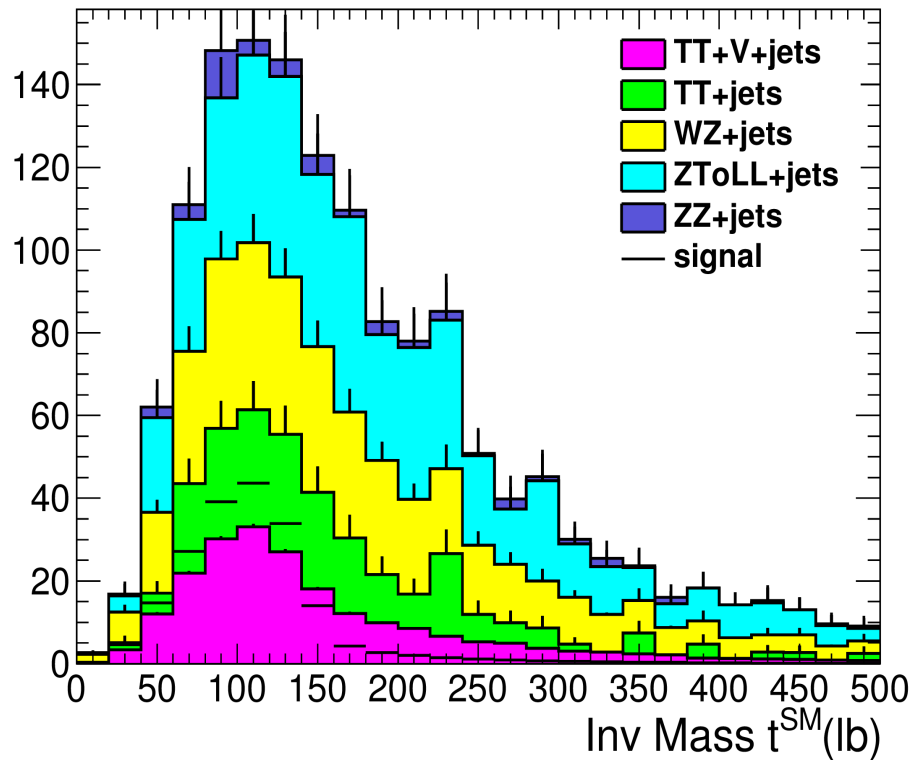
MVA cut and count with all backgrounds  
 $\rightarrow s/\sqrt{(s+b)} = 4.44$



# Left Z<sub>ut</sub> – right Z<sub>ct</sub>



# Left Zut – right Zct



# Left Z<sub>ut</sub> – right Z<sub>ct</sub>

