



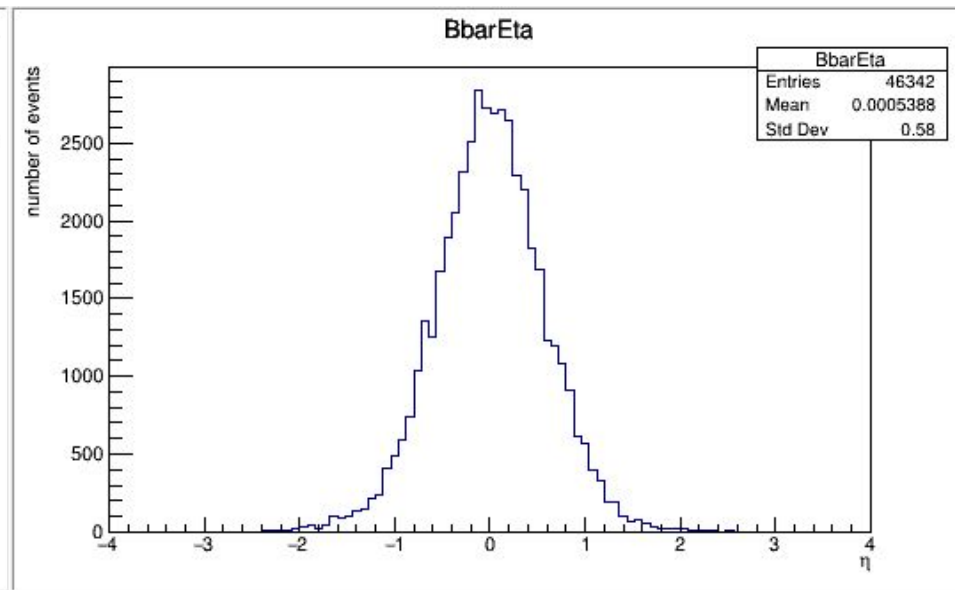
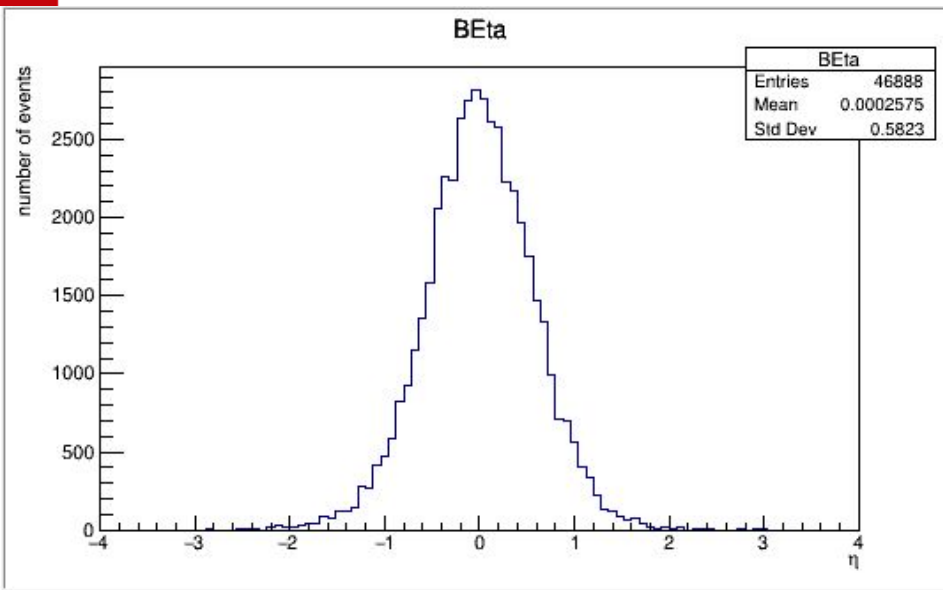
DM Studies in $\mu\mu$ monohigg $\rightarrow b\bar{b}$

By: Philip Bjorklund

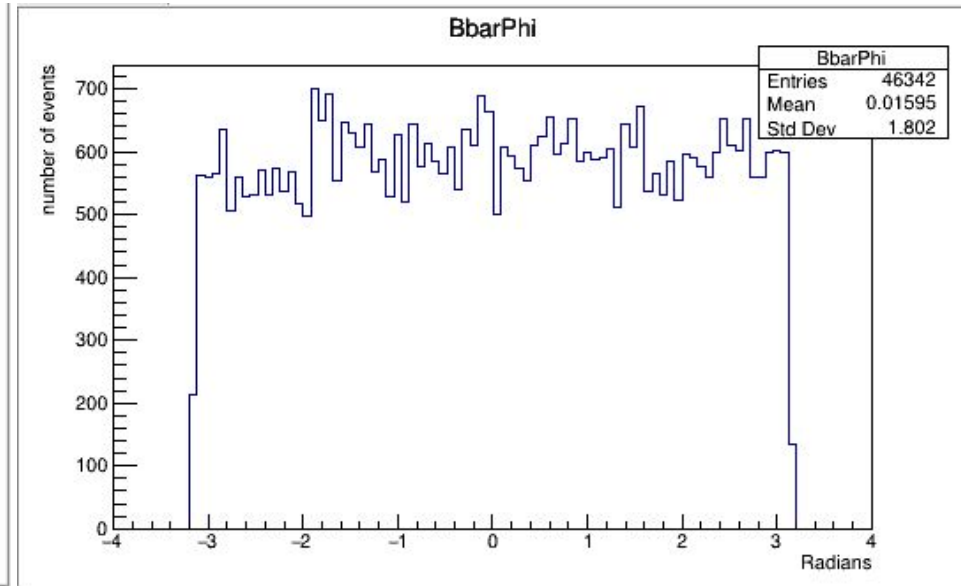
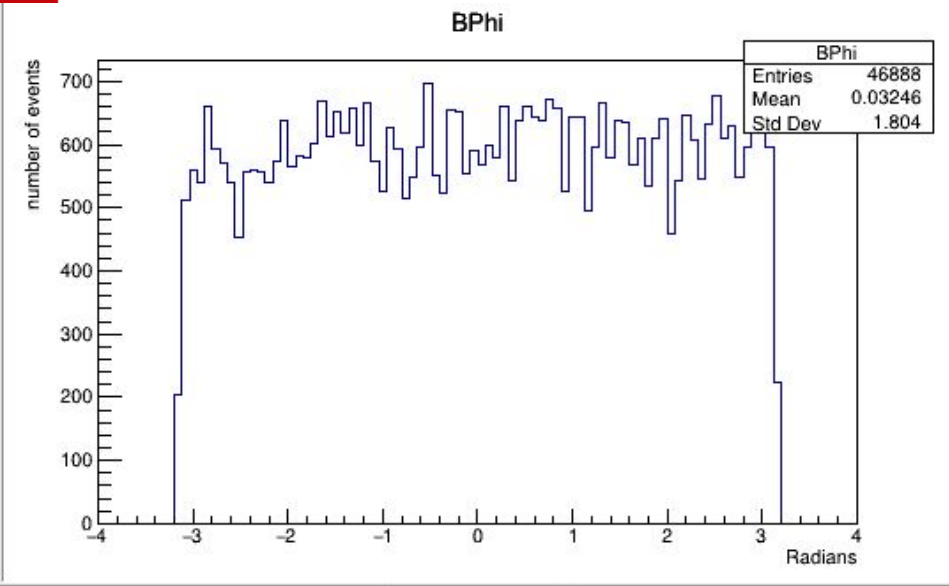
Simulation

- Model: Zp2HDM
- Signal: $\mu^+ \mu^- \rightarrow a_0 h / z, a_0 \rightarrow n_1 n_1^{\sim}, h \rightarrow b b^{\sim}$
- Background: $\mu^+ \mu^- \rightarrow w j j, w \rightarrow l \nu_l$
 - $\mu^+ \mu^- \rightarrow w^+ w^- z$
 - $\mu^+ \mu^- \rightarrow z z$
 - $\mu^+ \mu^- \rightarrow t t^{\sim}, t \rightarrow w^+ b, t^{\sim} \rightarrow w^- b^{\sim}$
 - $\mu^+ \mu^- \rightarrow w b t^{\sim}, w \rightarrow l \nu_l$
 - $\mu^+ \mu^- \rightarrow z j j, z \rightarrow \nu_l \nu_l^{\sim}$
 - $\mu^+ \mu^- \rightarrow z b b^{\sim}, z \rightarrow \nu_l \nu_l^{\sim}$
 - $\mu^+ \mu^- \rightarrow z j j, z \rightarrow l^+ l^-$
- Ebeam1: 1500 Mass a_0 : 300 GeV
Ebeam2: 1500 Mass X ($n_1/n_1^{\sim}$): 100 GeV
 Mass Z_p : 1 TeV
- Cross Section: $3.196 \cdot 10^{-12}$ pb

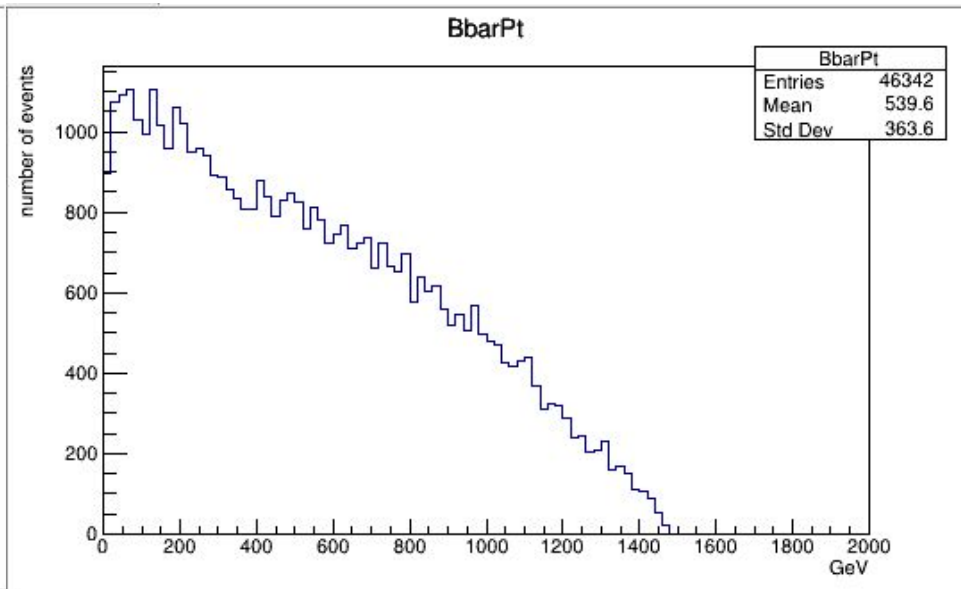
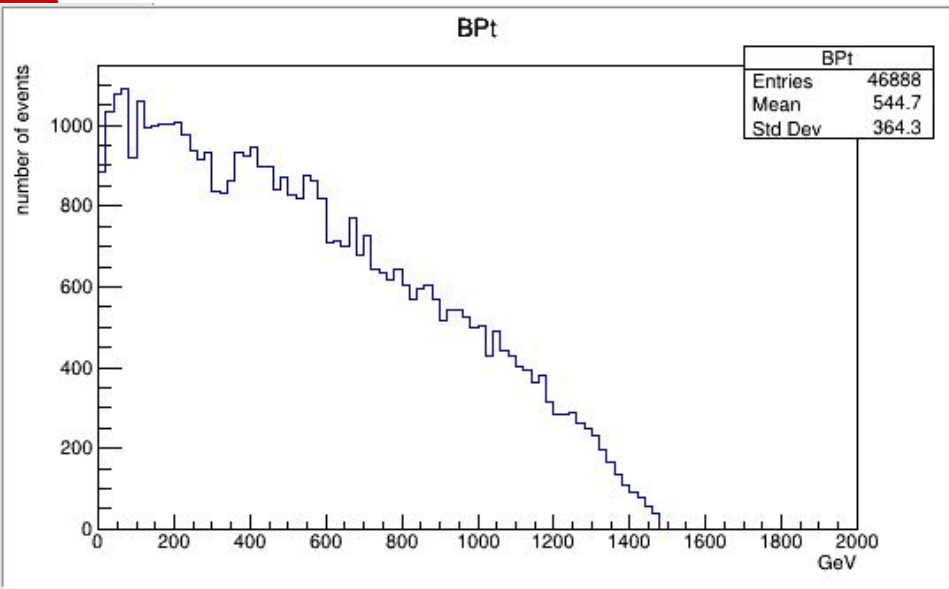
Eta for b bbar



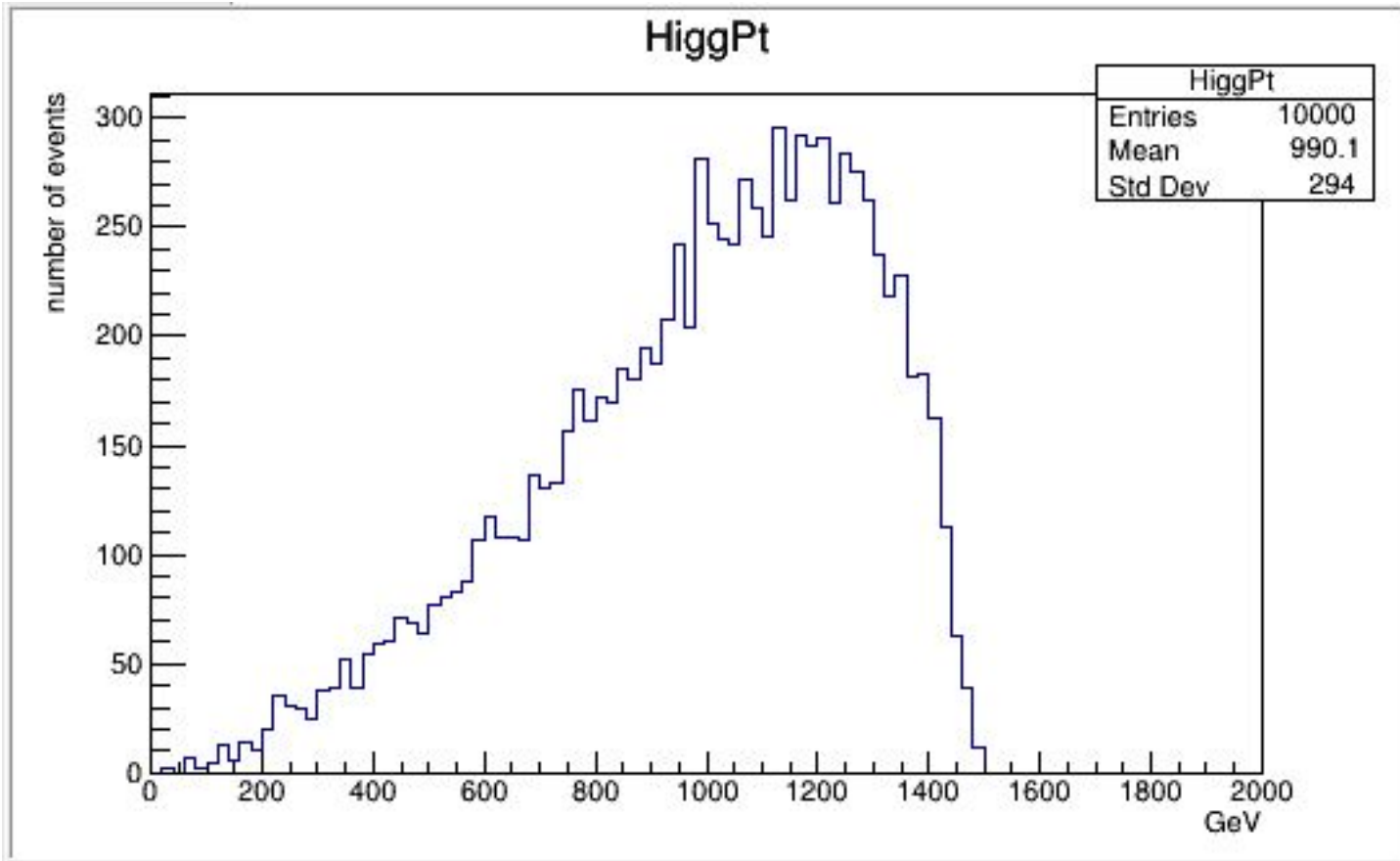
Phi for b bbar



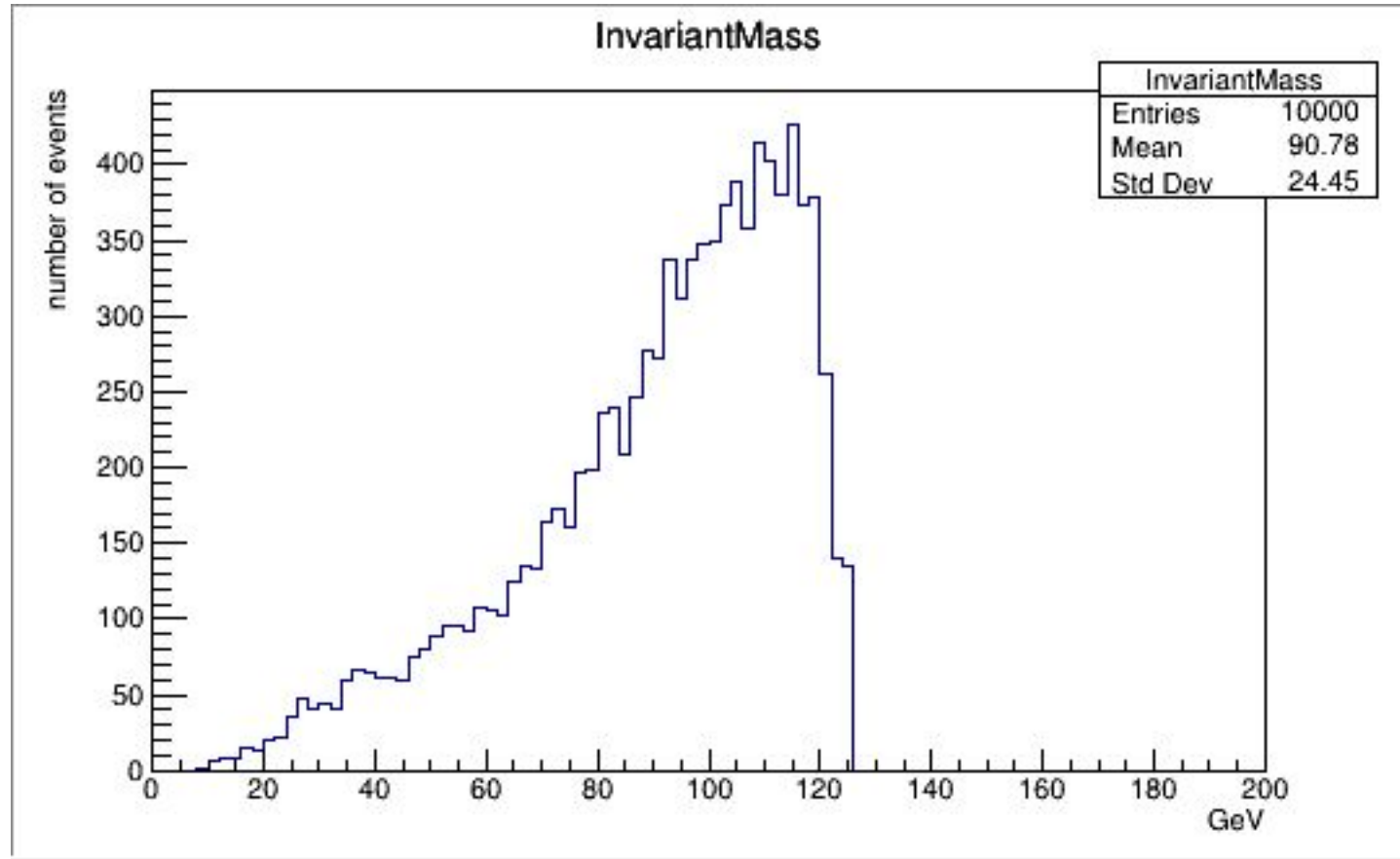
Pt for b bbar



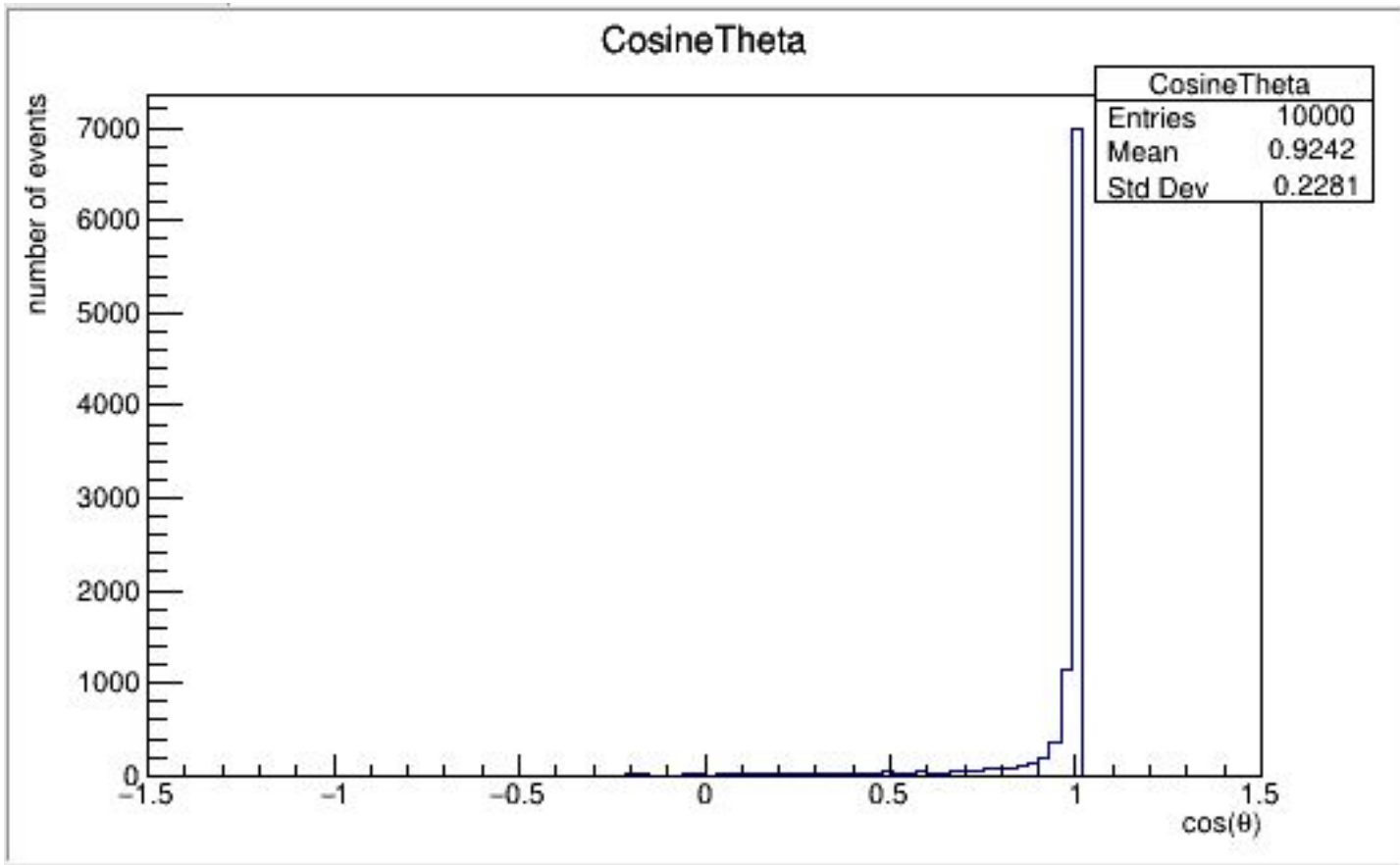
Reconstructed HiggPt



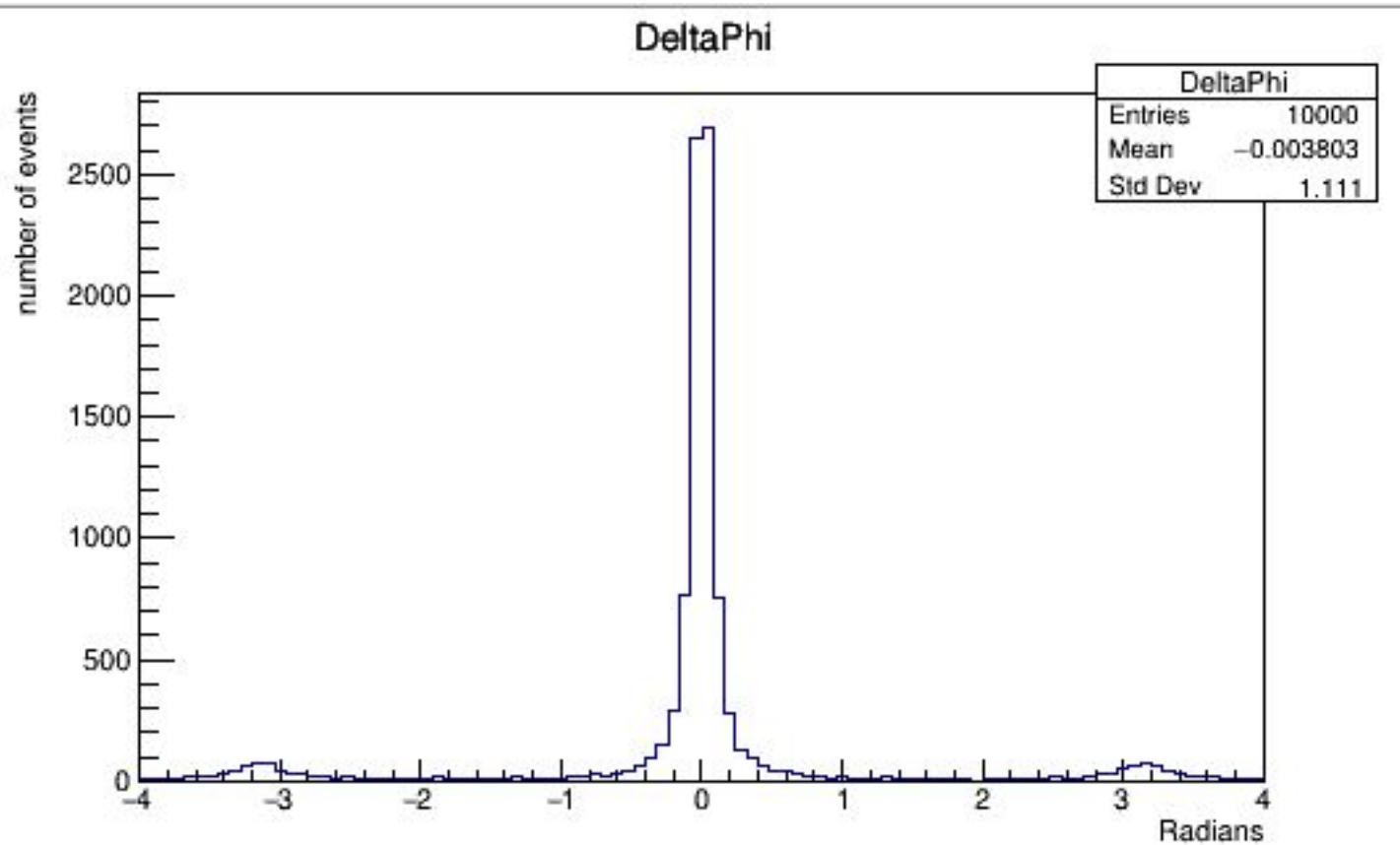
Reconstructed Invariant Mass



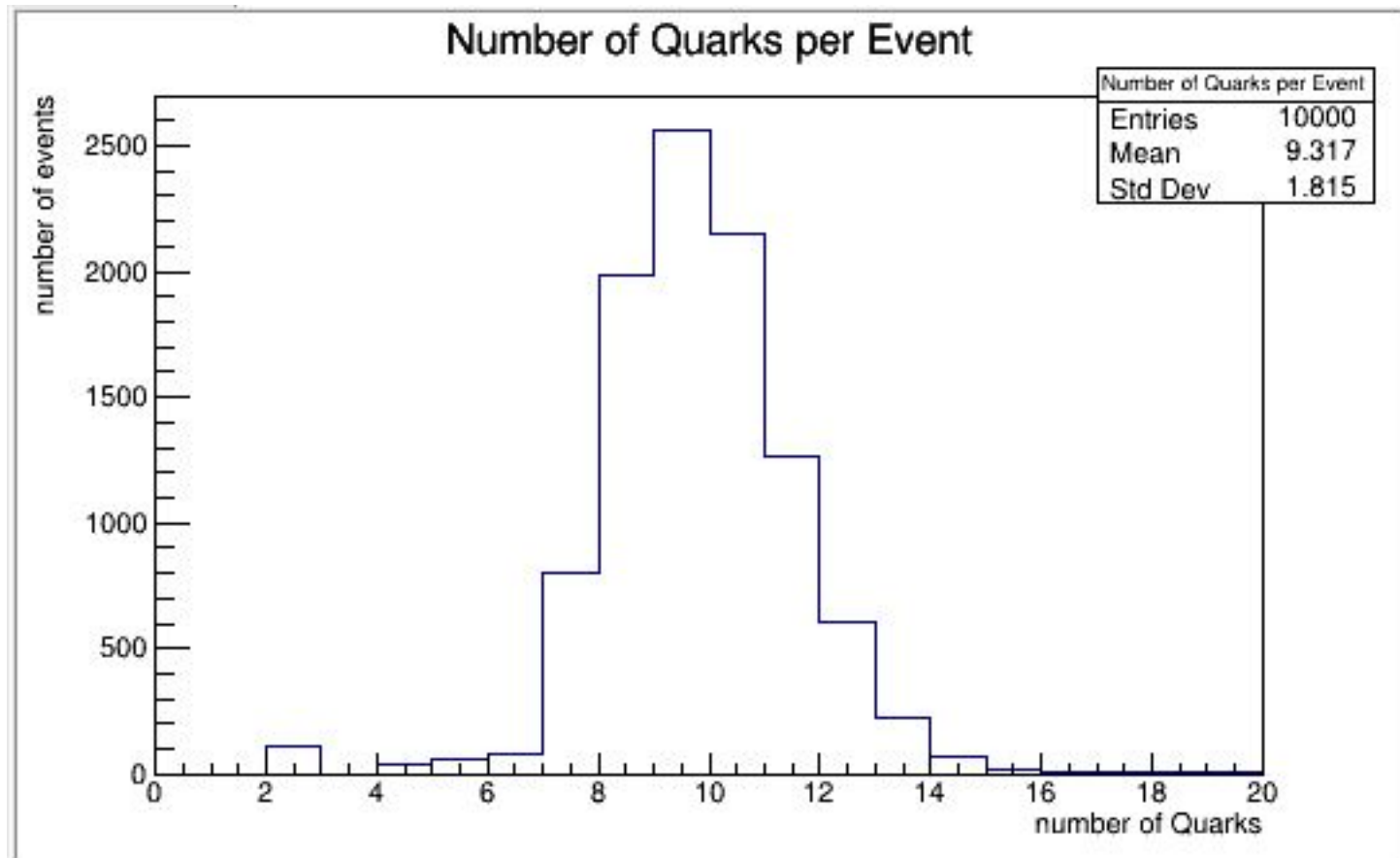
Cos(θ) between Higg and MET



$\Delta\Phi$ between Higg and MET



nQuark



Cross Sections: Signal and Background

wjlv: $\mu^+ \mu^- \rightarrow w j j, w \rightarrow l \nu$

wwz: $\mu^+ \mu^- \rightarrow w^+ w^- z$

zz: $\mu^+ \mu^- \rightarrow z z$

ttwb: $\mu^+ \mu^- \rightarrow t \bar{t}, t \rightarrow w^+ b, \bar{t} \rightarrow w^- b^-$

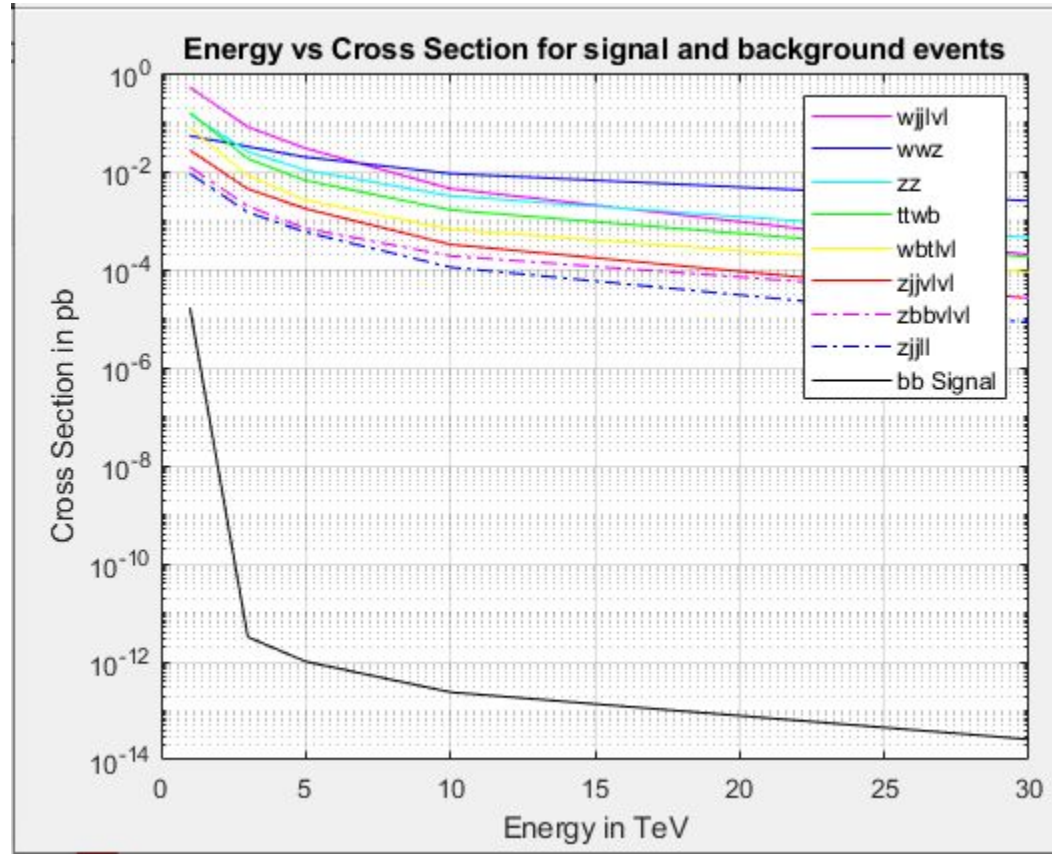
wbtvl: $\mu^+ \mu^- \rightarrow w b t, w \rightarrow l \nu$

zjjlv: $\mu^+ \mu^- \rightarrow z j j, z \rightarrow \nu \bar{\nu}$

zbbvl: $\mu^+ \mu^- \rightarrow z b \bar{b}, z \rightarrow \nu \bar{\nu}$

zjll: $\mu^+ \mu^- \rightarrow z j j, z \rightarrow l^+ l^-$

bb signal: $\mu^+ \mu^- \rightarrow a_0 h / z, a_0 \rightarrow n_1 n_1^-, h \rightarrow b \bar{b}$



Cross Sections: Background

wjllvl: $\mu^+ \mu^- \rightarrow w j j, w \rightarrow l \nu$

wwz: $\mu^+ \mu^- \rightarrow w^+ w^- z$

zz: $\mu^+ \mu^- \rightarrow z z$

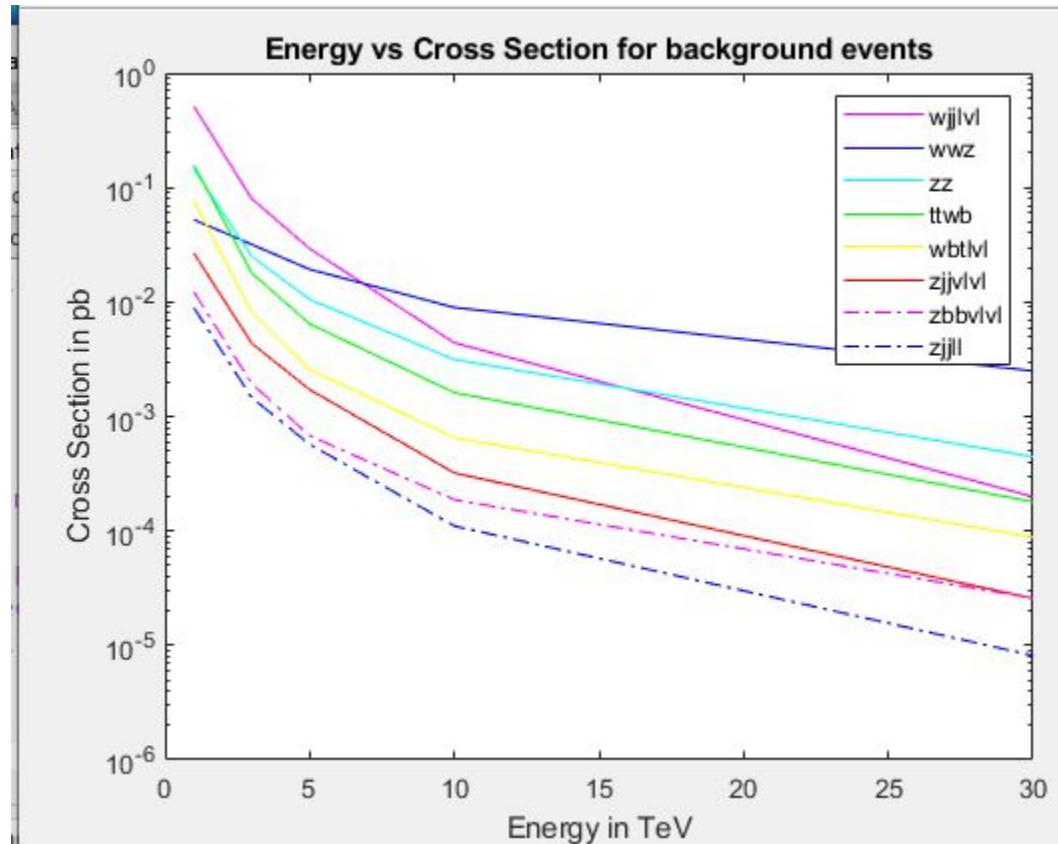
ttwb: $\mu^+ \mu^- \rightarrow t \bar{t}, t \rightarrow w^+ b, \bar{t} \rightarrow w^- b^-$

wbtlvl: $\mu^+ \mu^- \rightarrow w b \bar{t}, w \rightarrow l \nu$

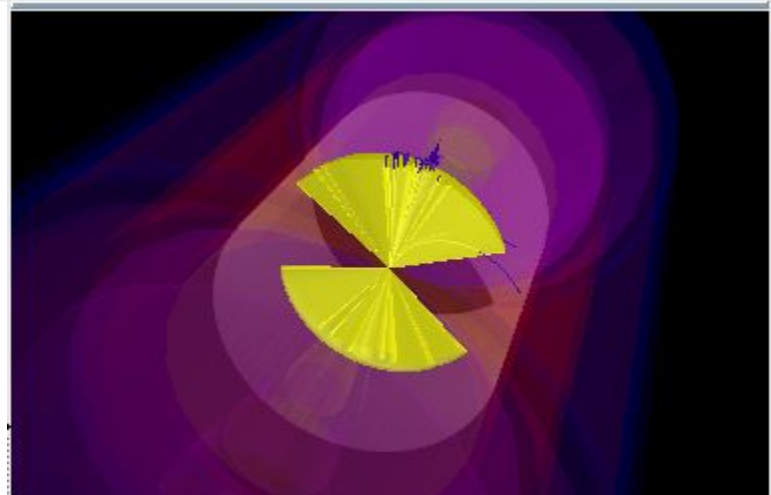
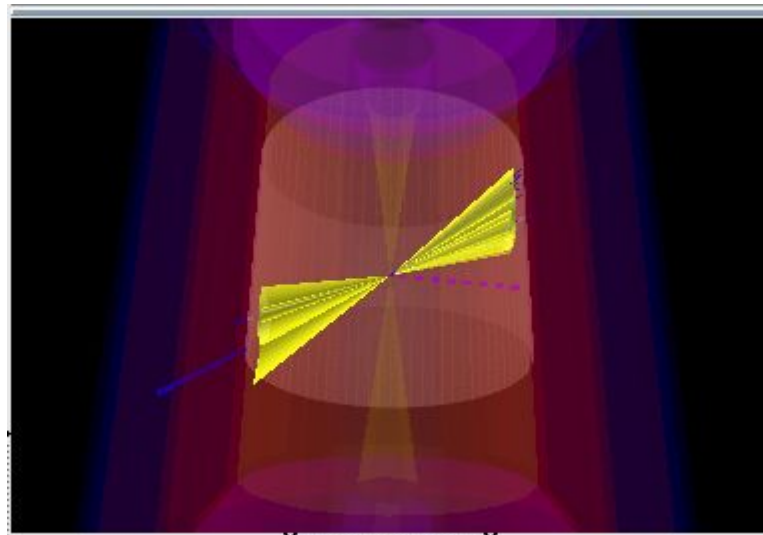
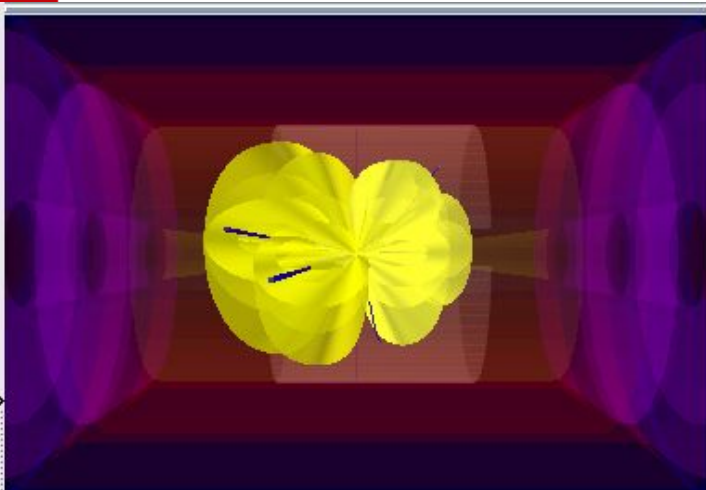
zjjlvlvl: $\mu^+ \mu^- \rightarrow z j j, z \rightarrow \nu l \bar{\nu}$

zbbvlvl: $\mu^+ \mu^- \rightarrow z b \bar{b}, z \rightarrow \nu l \bar{\nu}$

zjjll: $\mu^+ \mu^- \rightarrow z j j, z \rightarrow l^+ l^-$



Event Displays



Next Steps

- KTJets
- Cuts