

# Measure Higgs CP via $t\bar{t}h$ Channel

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# Overview

# with or without btag

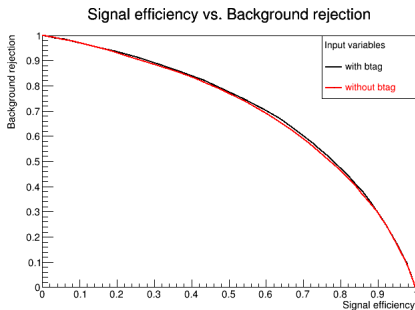


Figure: compare the ROC curve between with and without btag.

# 6 jets vs. 10 jets

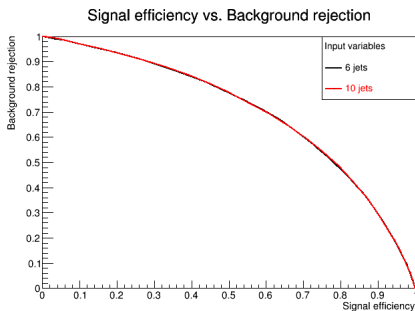
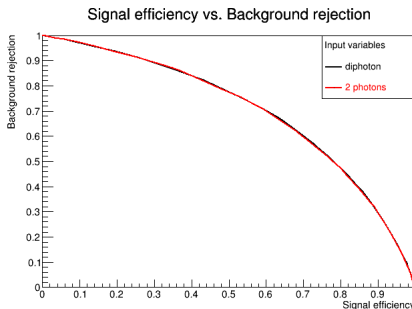


Figure: compare the ROC curve between 6 jets and 10 jets.

# diphoton information vs. 2 photons information



**Figure:** compare the ROC curve between diphoton information and information of 2 photons.

# with or without diPhoMass

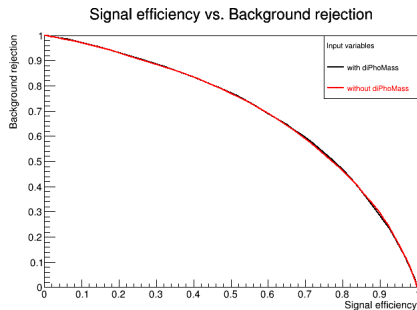


Figure: compare the ROC curve between with and without diPhoMass.

# different input variables

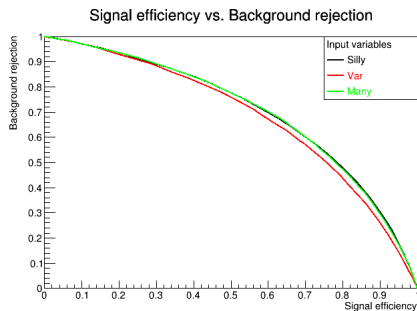


Figure: compare the ROC curve between three different type of input variables.

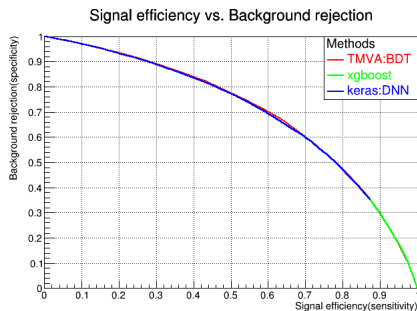
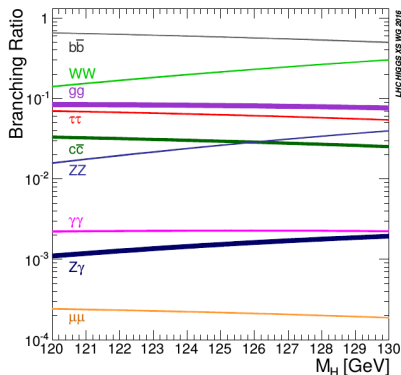


Figure: compare the ROC curve between three different tools.



# Higgs boson decay



(a) The branching ratios of Higgs boson near  $m_H = 125$  GeV

Decay channel	Branching ratio
$H \rightarrow \gamma\gamma$	$2.27 \times 10^{-3}$
$H \rightarrow ZZ$	$2.62 \times 10^{-2}$
$H \rightarrow W^+W^-$	$2.14 \times 10^{-1}$
$H \rightarrow \tau^+\tau^-$	$6.27 \times 10^{-2}$
$H \rightarrow b\bar{b}$	$5.84 \times 10^{-1}$
$H \rightarrow Z\gamma$	$1.53 \times 10^{-3}$
$H \rightarrow \mu^+\mu^-$	$2.18 \times 10^{-4}$

(b) The branching ratios of Higgs boson with  $m_H = 125$  GeV

Figure: The main decay modes of Higgs Boson. Take from PDG-2016

# The End