

Update

05/09/2024

Previous cuts (recap)

Cut

Best candidate selection

$\sin\phi < 1$

$m_{k\pi} > 1.91 \text{ GeV}$

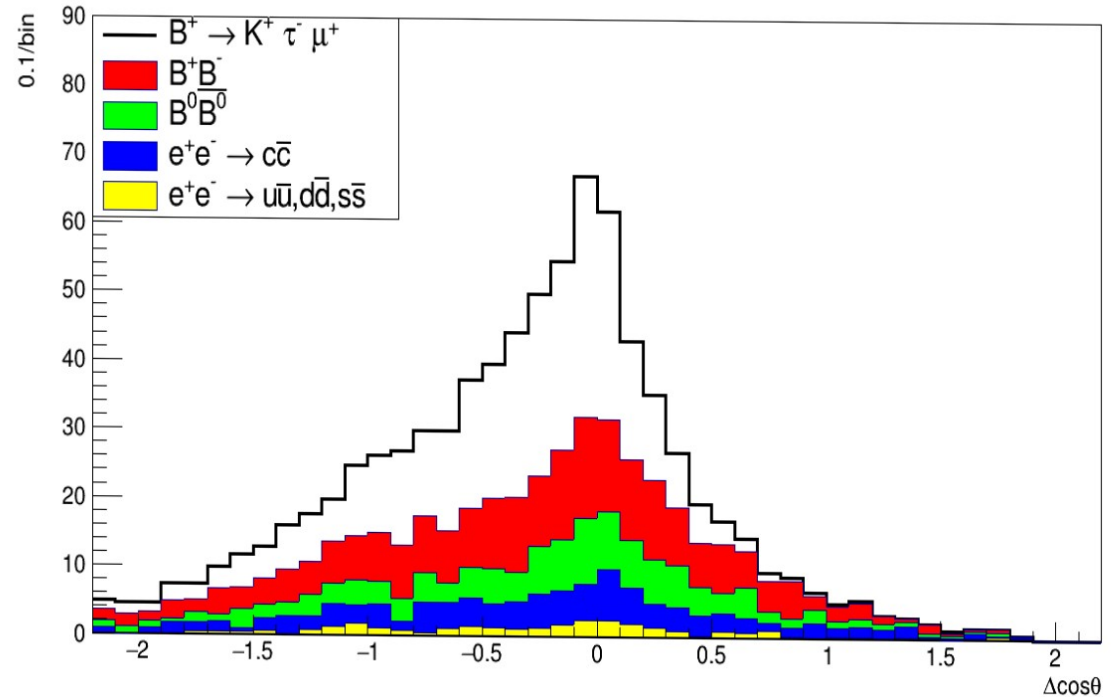
$|m_{\mu\pi} - 3.1| > 0.05$ &
 $|m_{\mu\pi} - 3.69| > 0.05 \text{ GeV}$

$|m_{\mu\mu} - 3.1| > 0.05$ &
 $|m_{\mu\mu} - 3.69| > 0.05 \text{ GeV}$

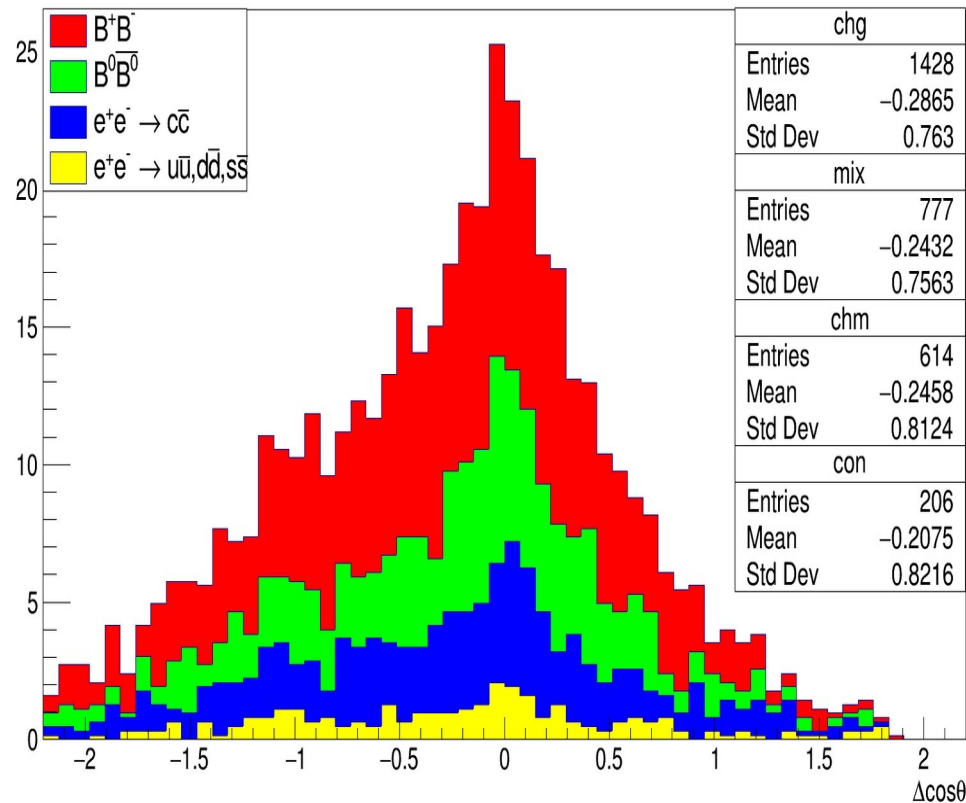
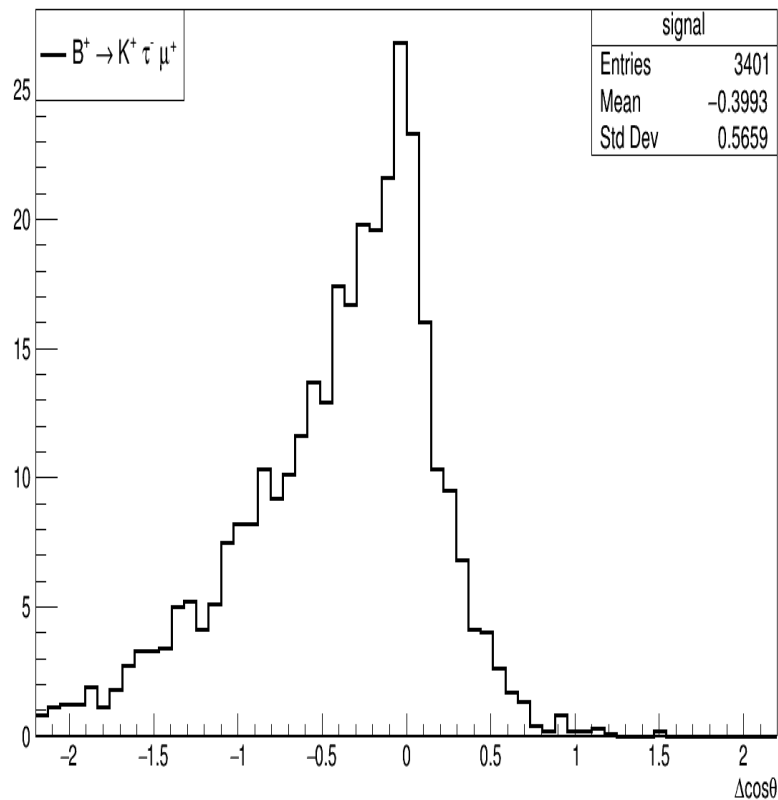
$1.5 < m_{\text{ROE}} < 2.06 \text{ GeV}$

$p_{\text{tag}} > 1.3 \text{ GeV}$

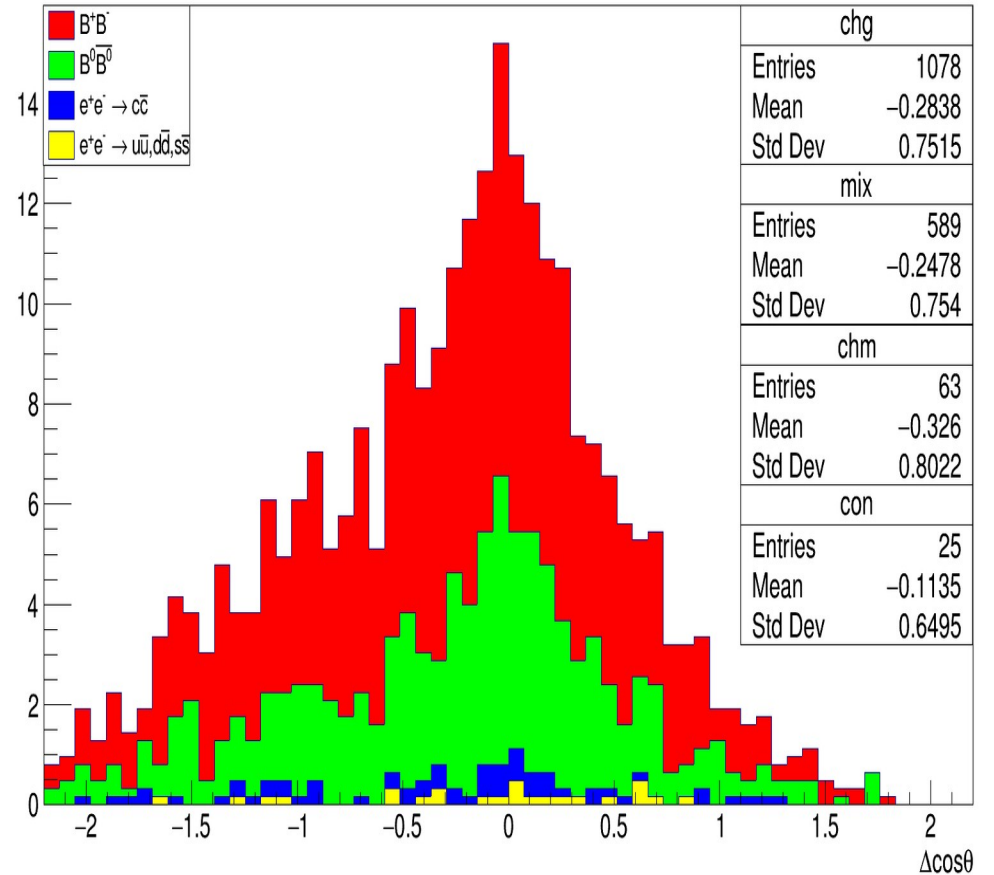
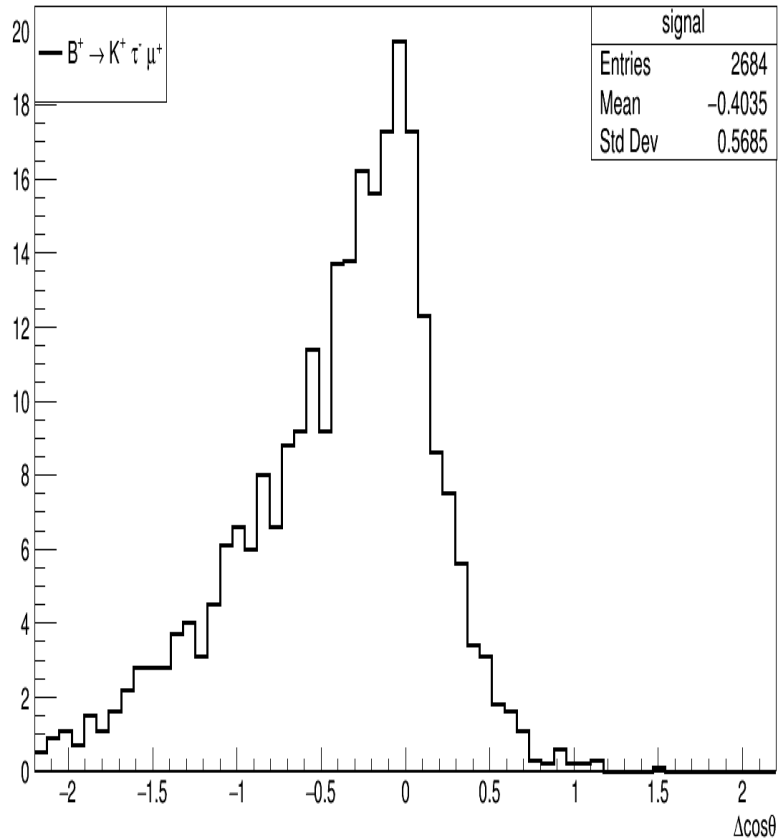
$-2 < \cos\theta_{\text{tag}} < 1.1$



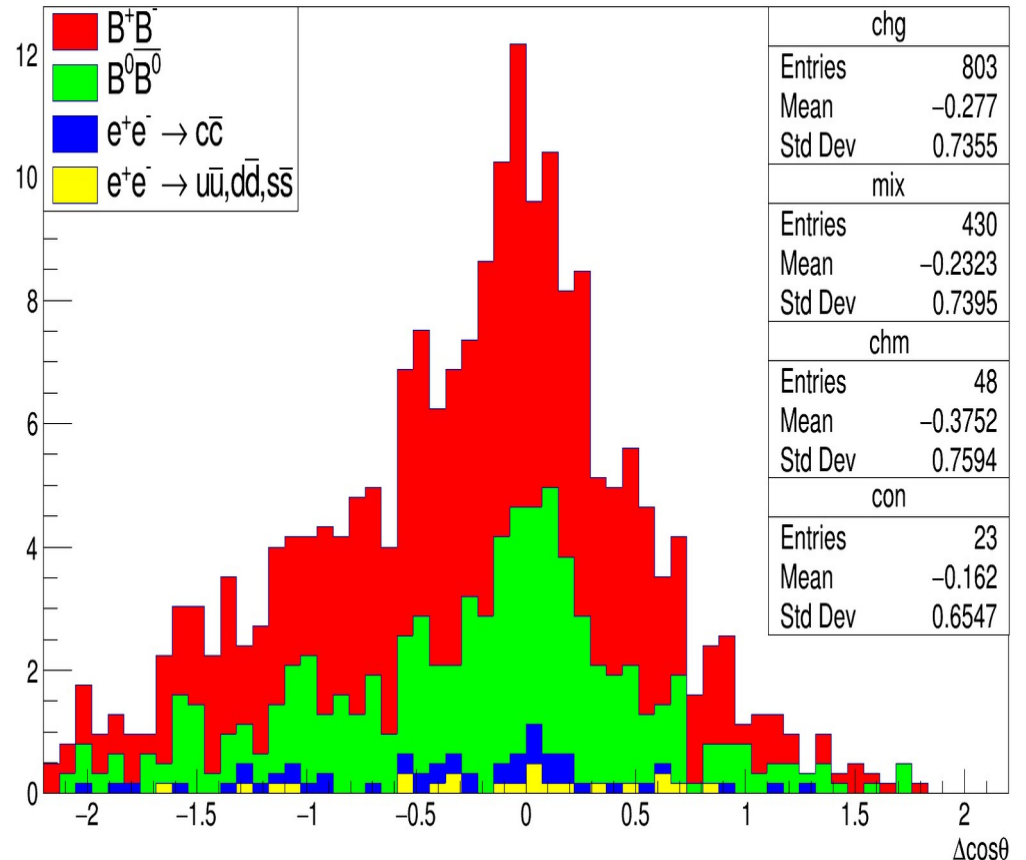
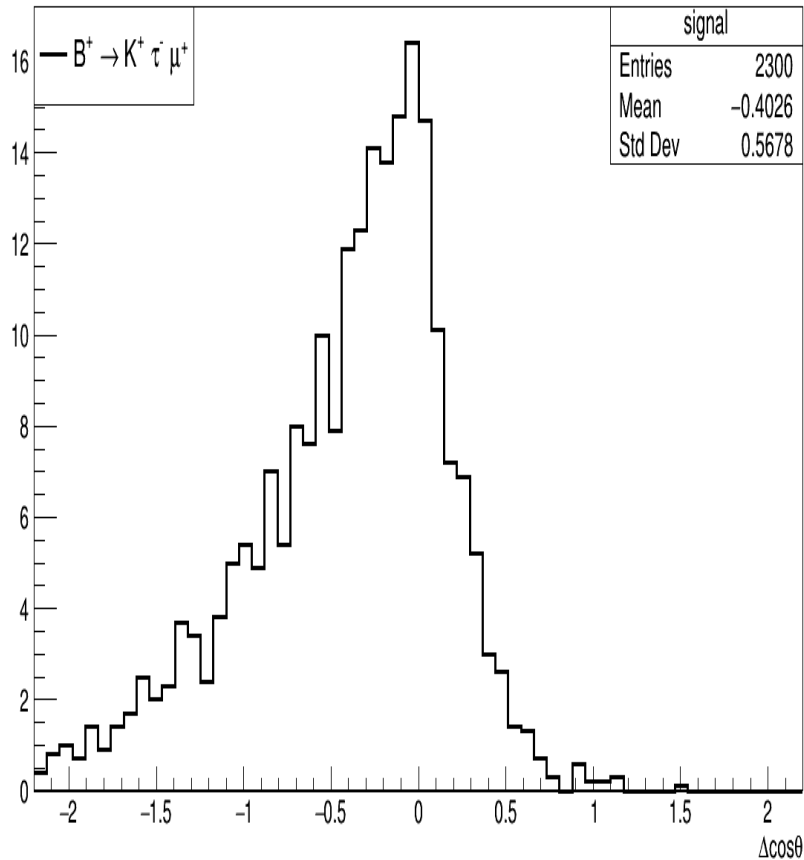
With previous cuts



With $R2 < 0.3$ cut



With $R2 < 0.3$ and $n\text{Leptons} = 2$ cuts



TMVA

- Applied some loose selections on tag side
 - $p_{l\text{tag}} > 0.3 \text{ GeV}$
 - $1.3 < m_{\text{ROE}} < 2.1 \text{ GeV}$

Cut

Best candidate selection

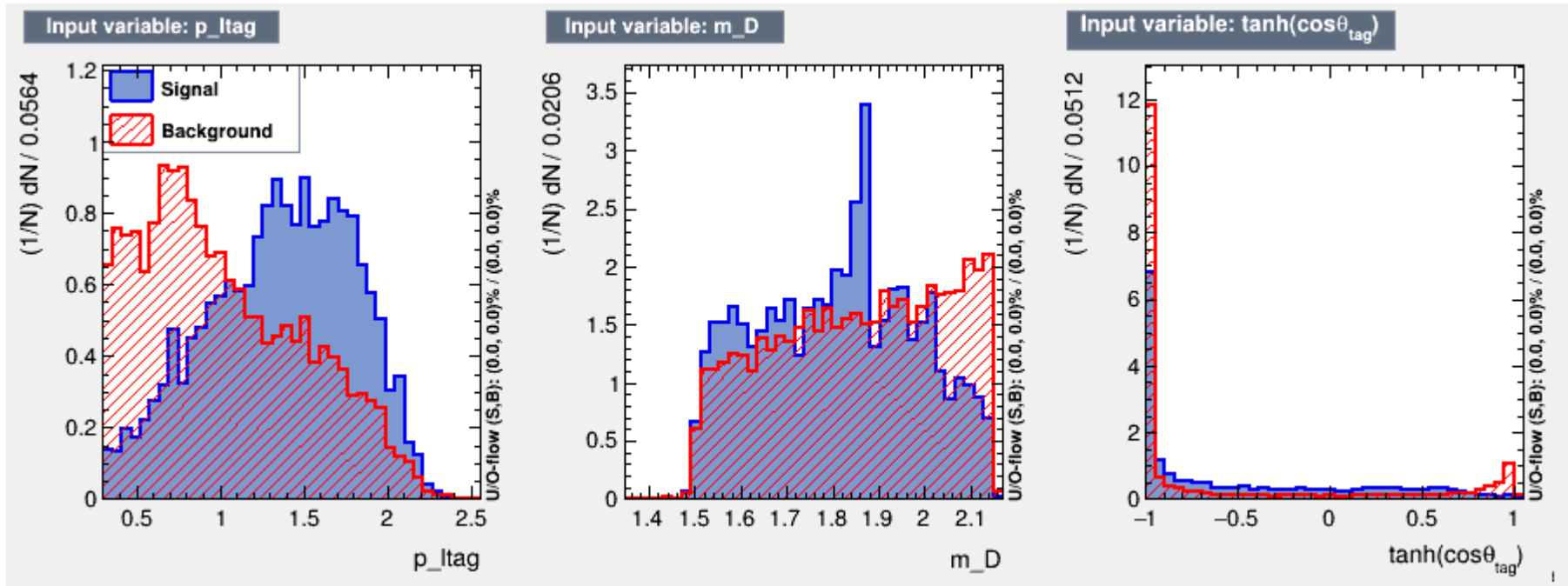
$\sin\phi < 1$

$m_{k\pi} > 1.91 \text{ GeV}$

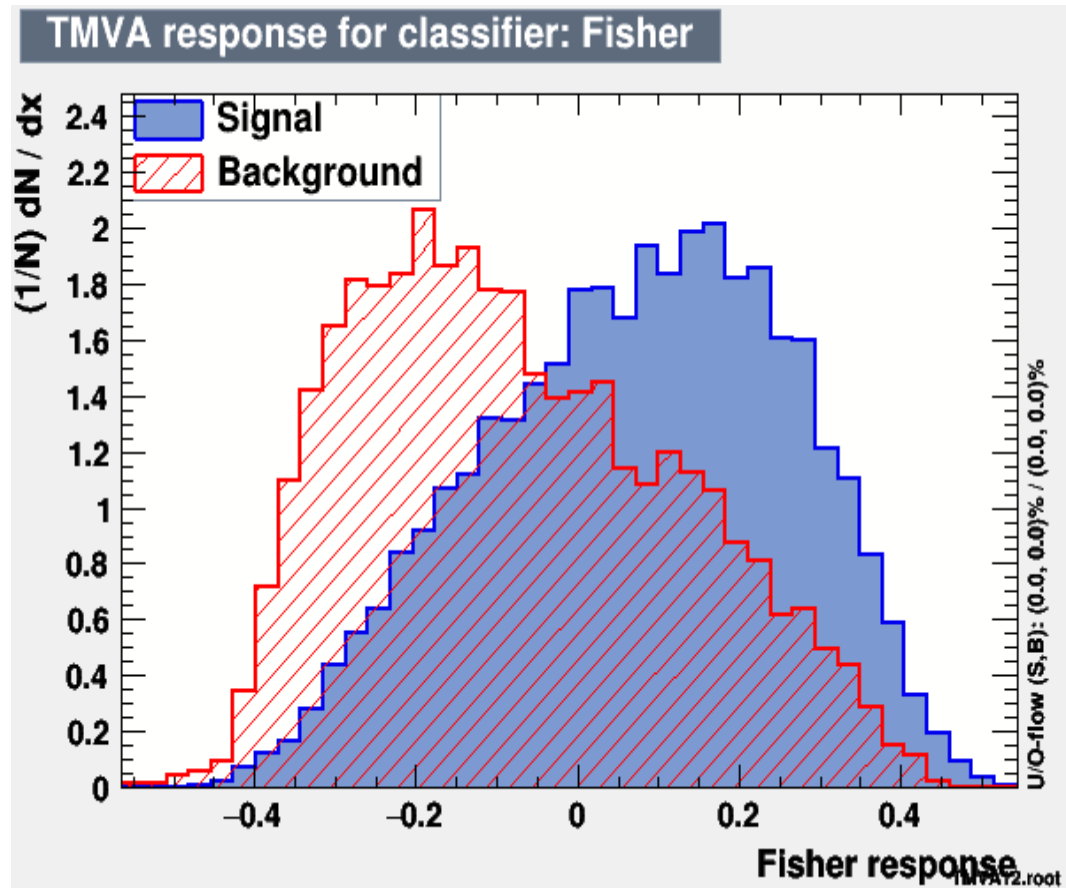
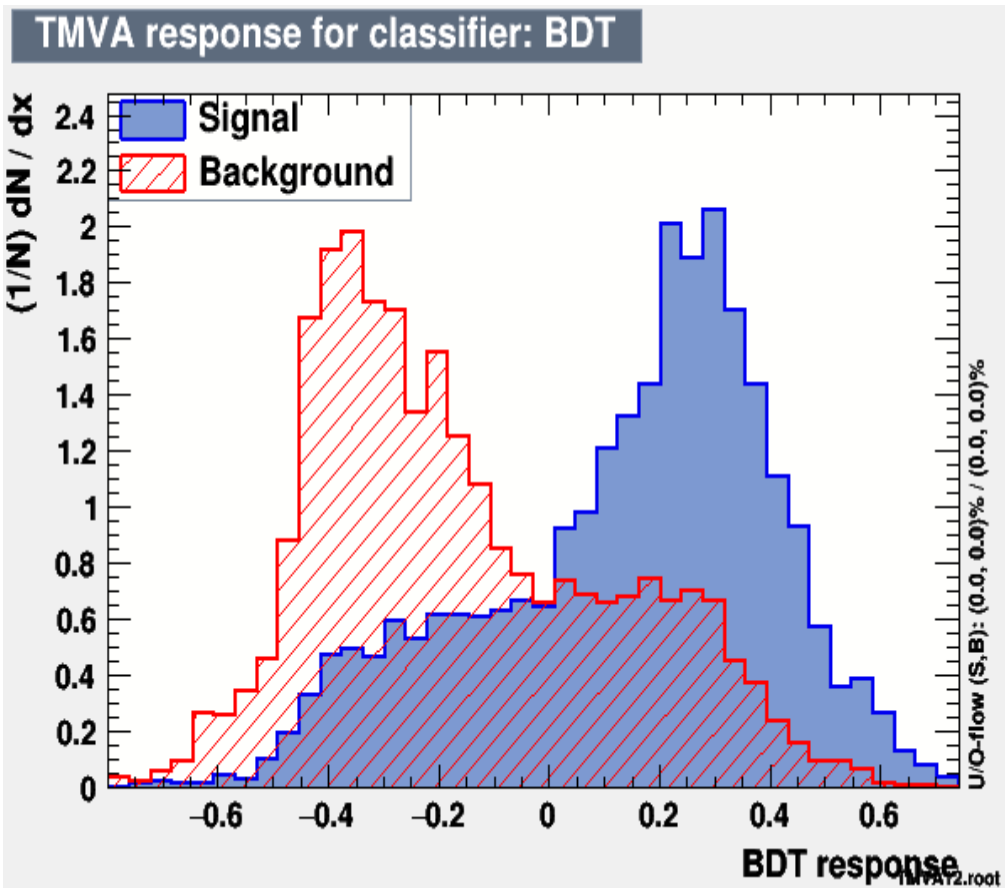
$|m_{\mu\pi} - 3.1| > 0.05 \&$
 $|m_{\mu\pi} - 3.69| > 0.05 \text{ GeV}$

$|m_{\mu\mu} - 3.1| > 0.05 \&$
 $|m_{\mu\mu} - 3.69| > 0.05 \text{ GeV}$

Input variables

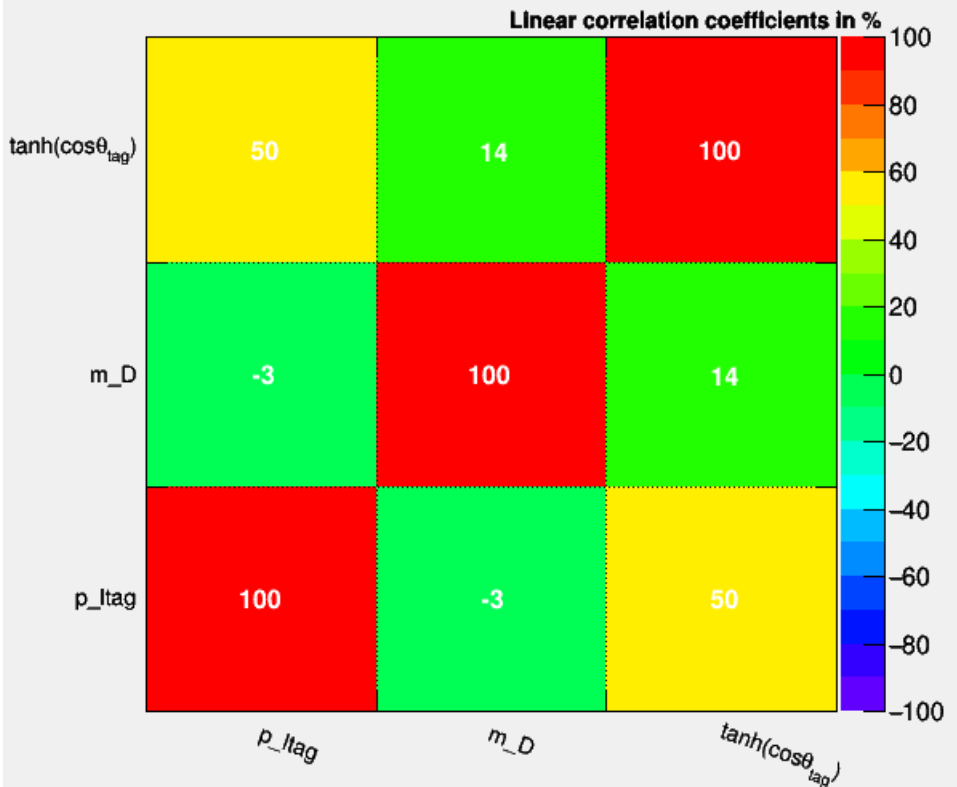


BDT output



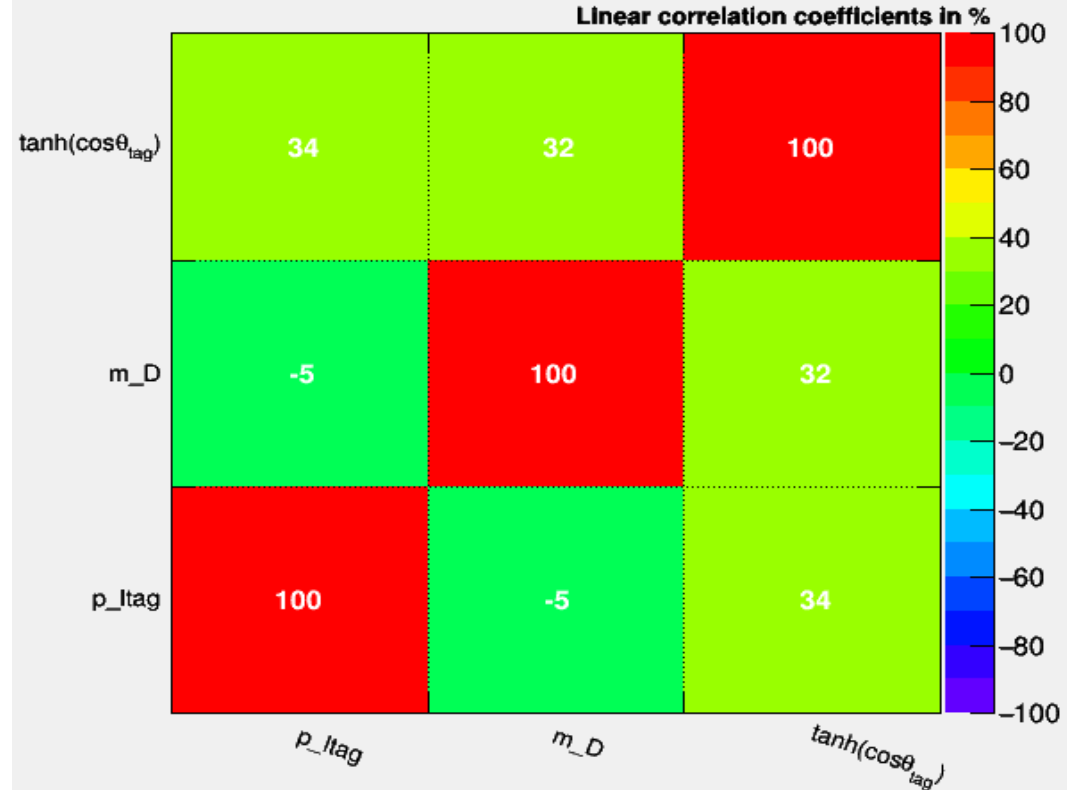
Correlation matrices

Correlation Matrix (background)



TMVA12.root

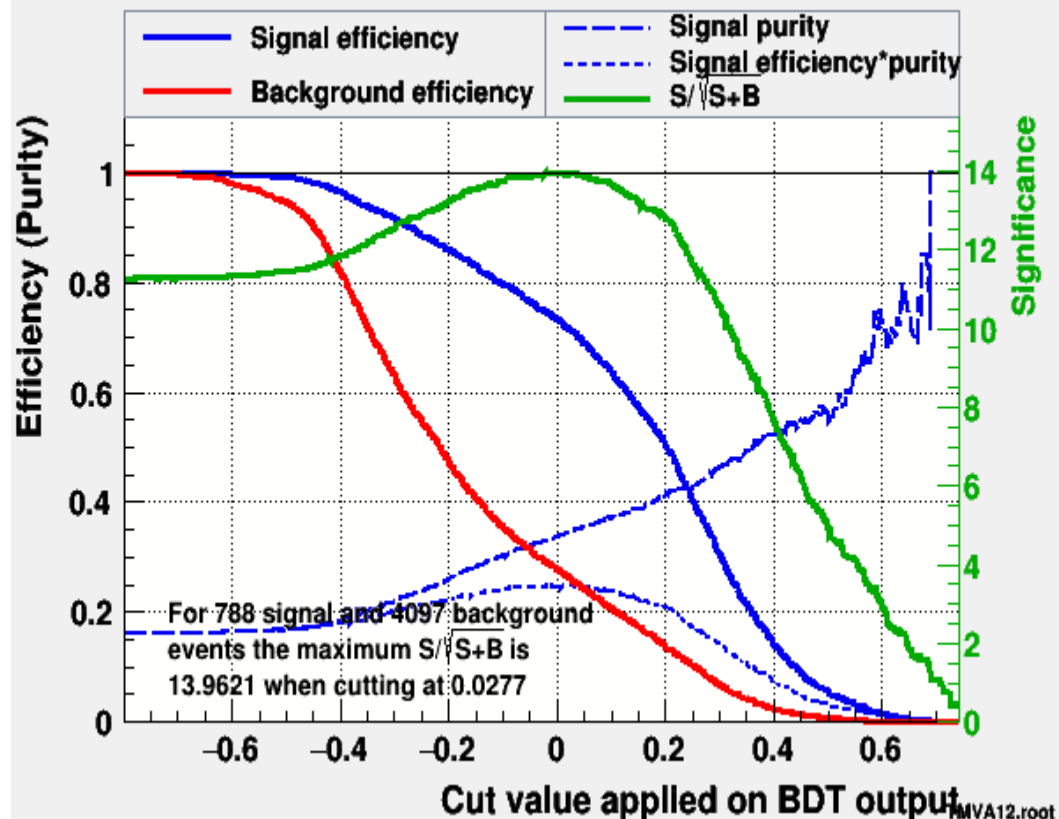
Correlation Matrix (signal)



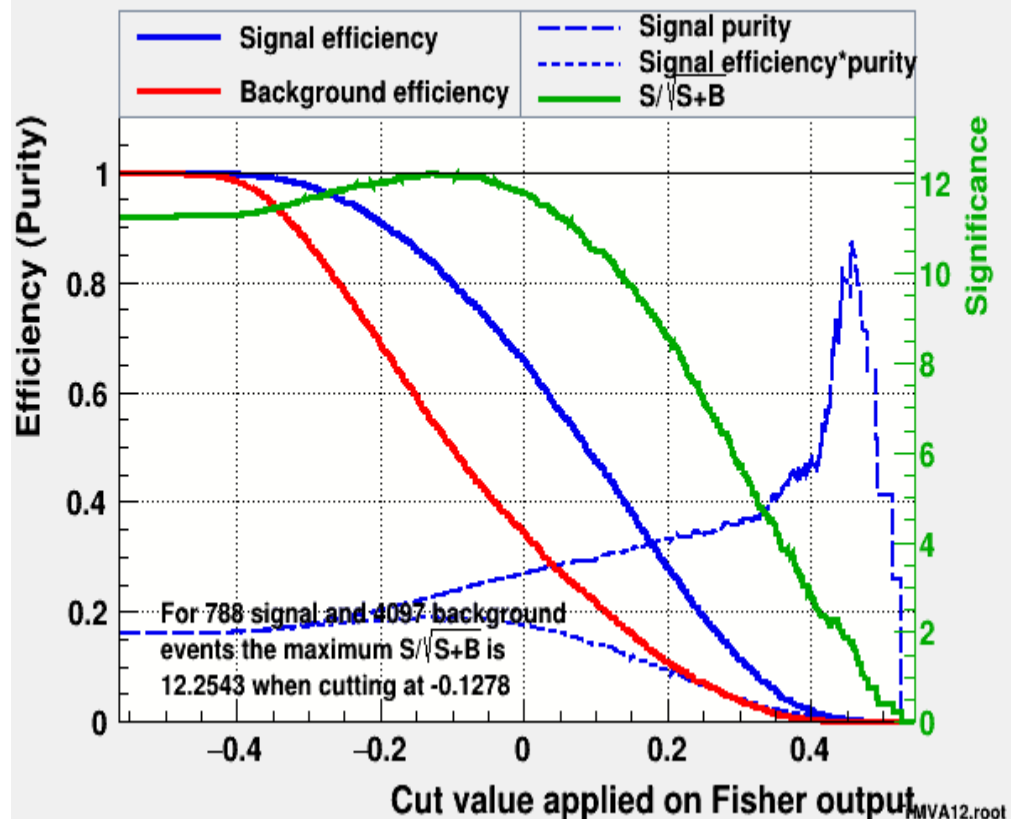
TMVA12.root

Classifier efficiencies (FOM)

Cut efficiencies and optimal cut value

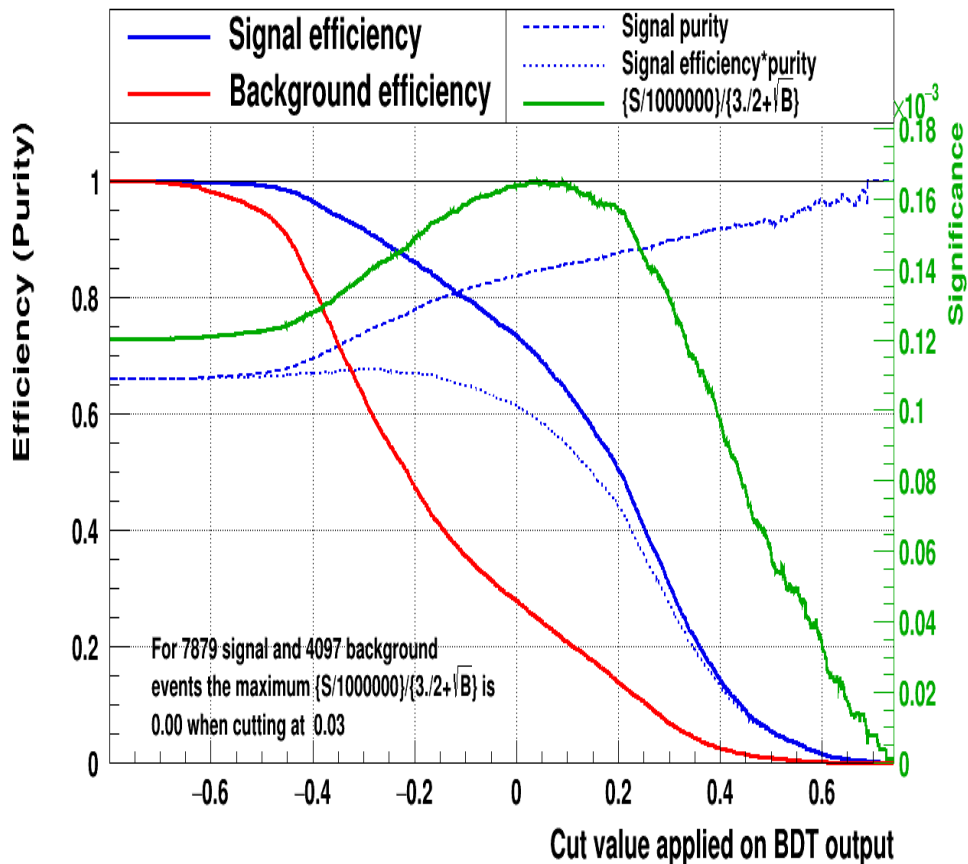


Cut efficiencies and optimal cut value

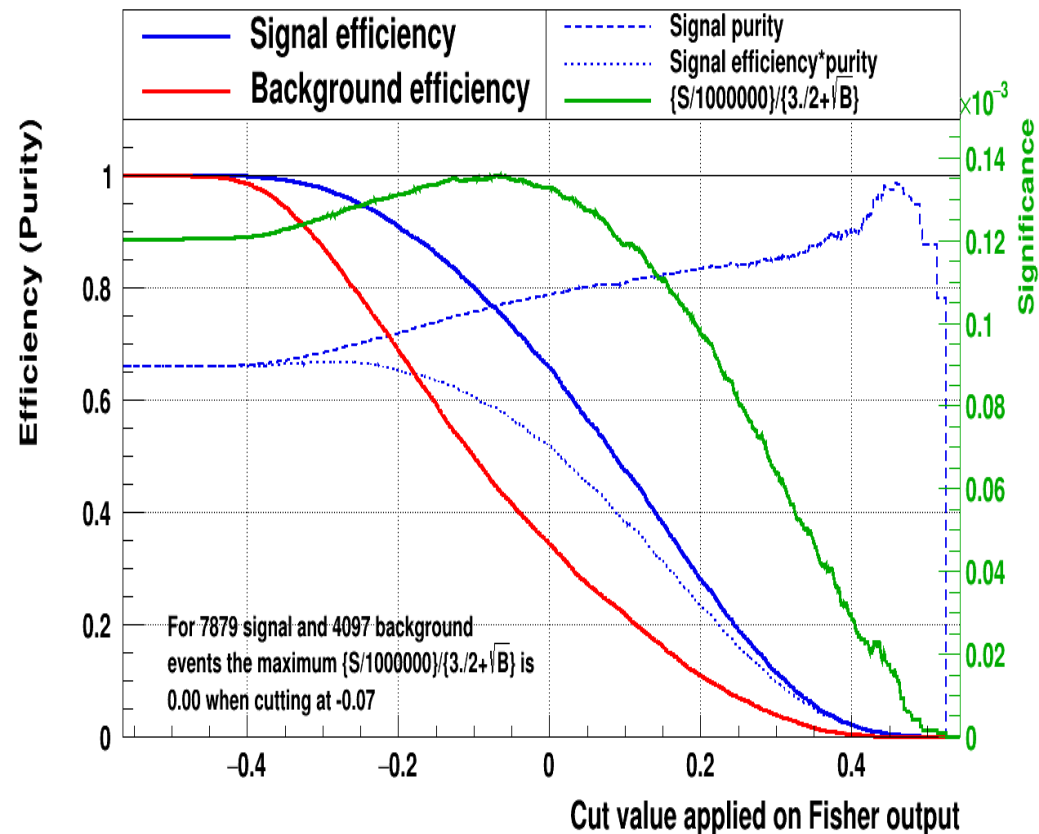


Classifier efficiencies (PFOM)

Cut efficiencies and optimal cut value

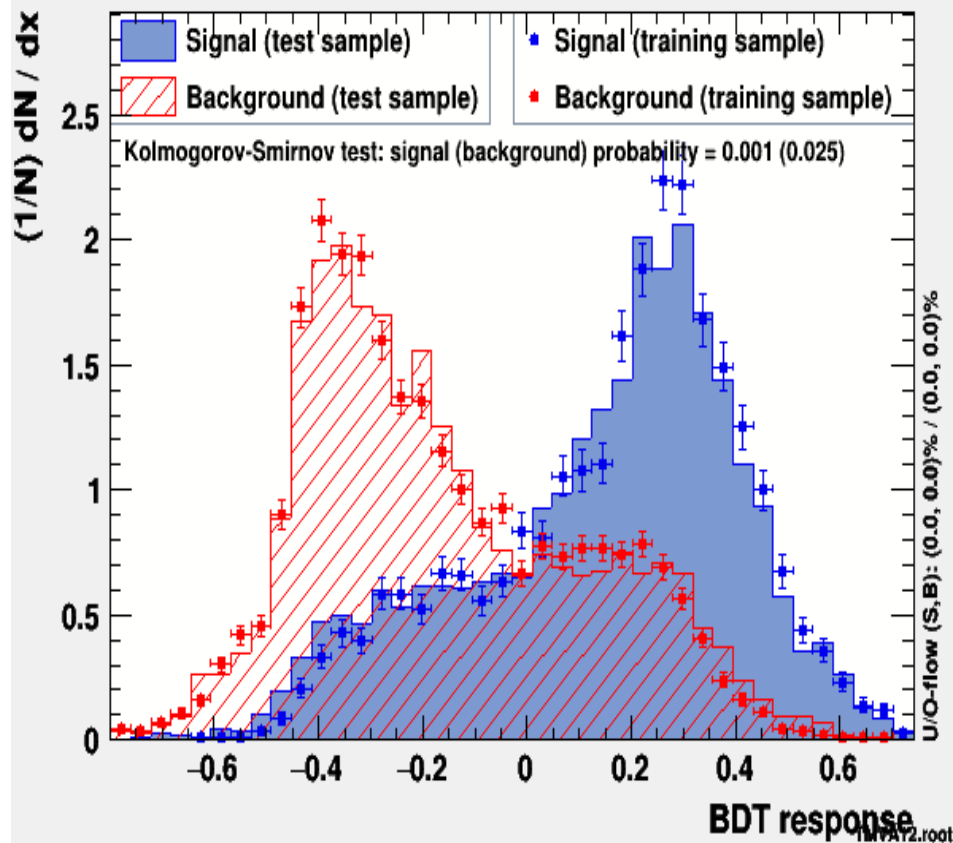


Cut efficiencies and optimal cut value

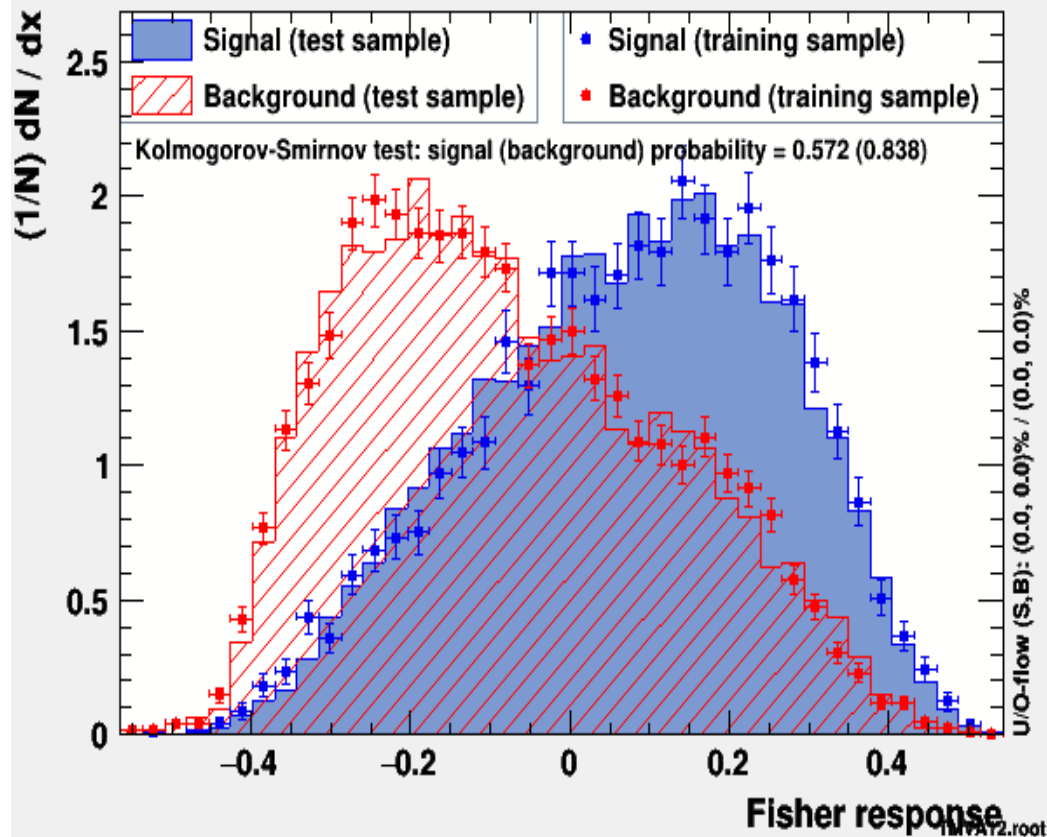


Classifier training

TMVA overtraining check for classifier: BDT



TMVA overtraining check for classifier: Fisher



ROC curve

