Update

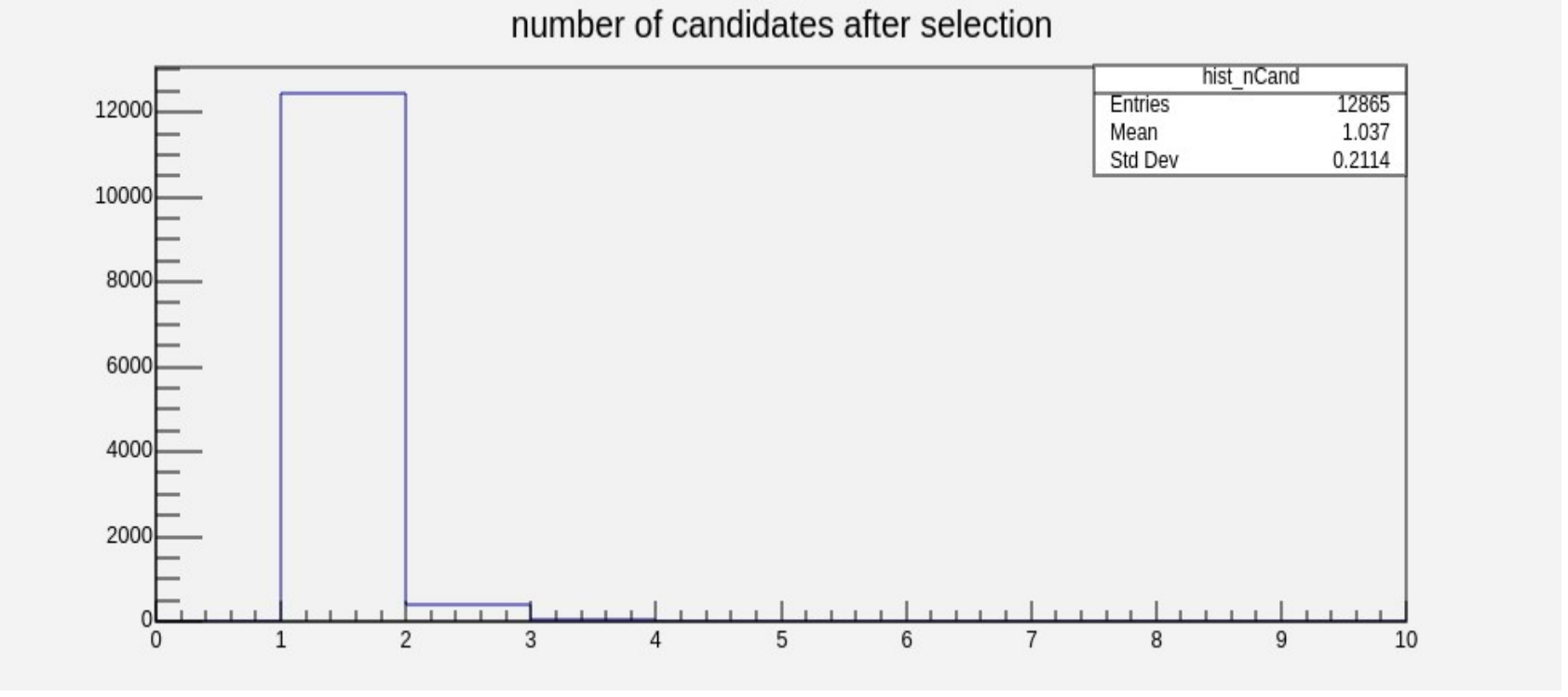
10/09/2024

Number of candidates after signal side cuts

Dedicated signal MC

Cut list

$\sin\varphi < 1$
$m_{k\pi} > 1.91$ GeV
$\lvert m_{\mu\pi} - 3.1 \rvert > 0.05$ & $\lvert m_{\mu\pi} - 3.69 \rvert > 0.05$GeV
$\lvert m_{\mu\mu} - 3.1 \rvert > 0.05$& $\lvert m_{\mu\mu} - 3.69 \rvert > 0.05$ GeV

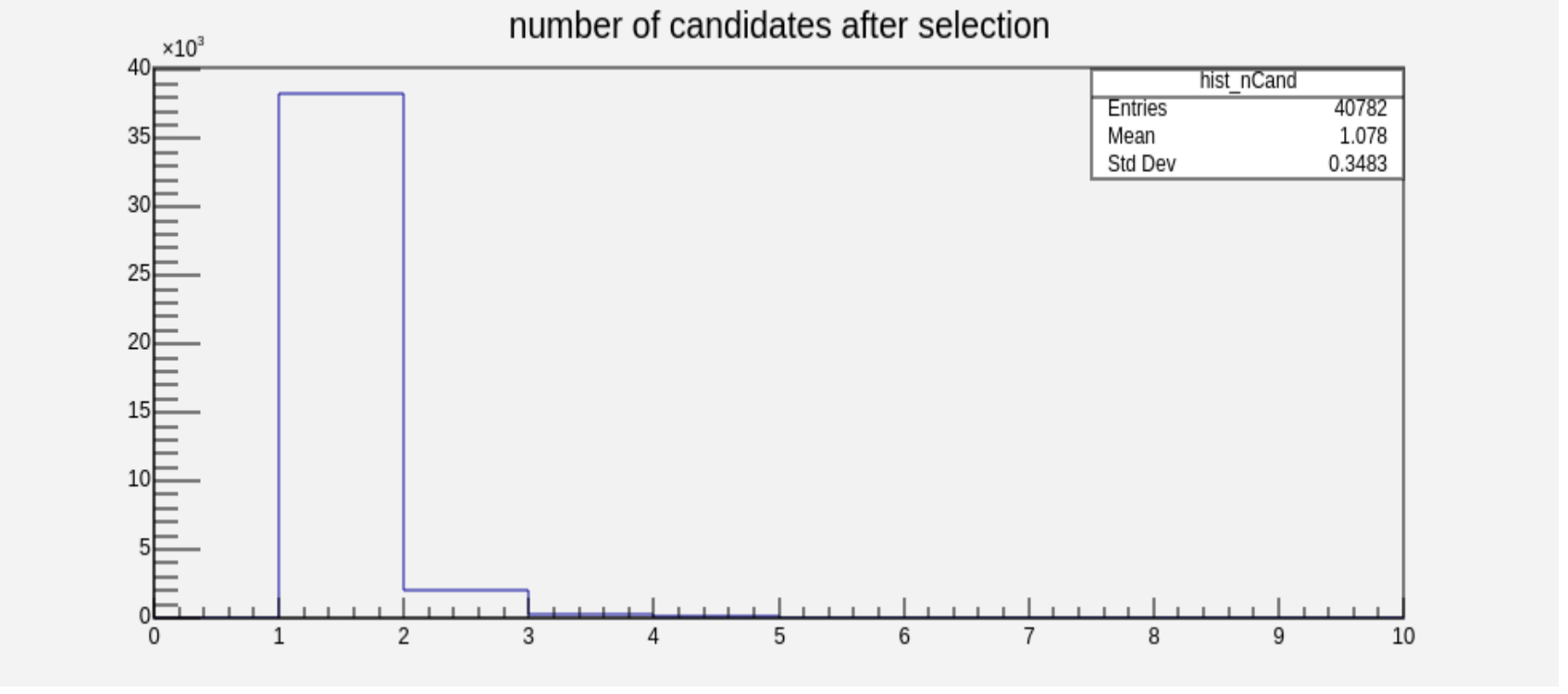


Number of candidates after signal side cuts

Generic B^+B^- MC

Cut list

$\sin\varphi < 1$
$m_{k\pi} > 1.91$ GeV
$\lvert m_{\mu\pi} - 3.1 \rvert > 0.05$ & $\lvert m_{\mu\pi} - 3.69 \rvert > 0.05$GeV
$\lvert m_{\mu\mu} - 3.1 \rvert > 0.05$ & $\lvert m_{\mu\mu} - 3.69 \rvert > 0.05$ GeV

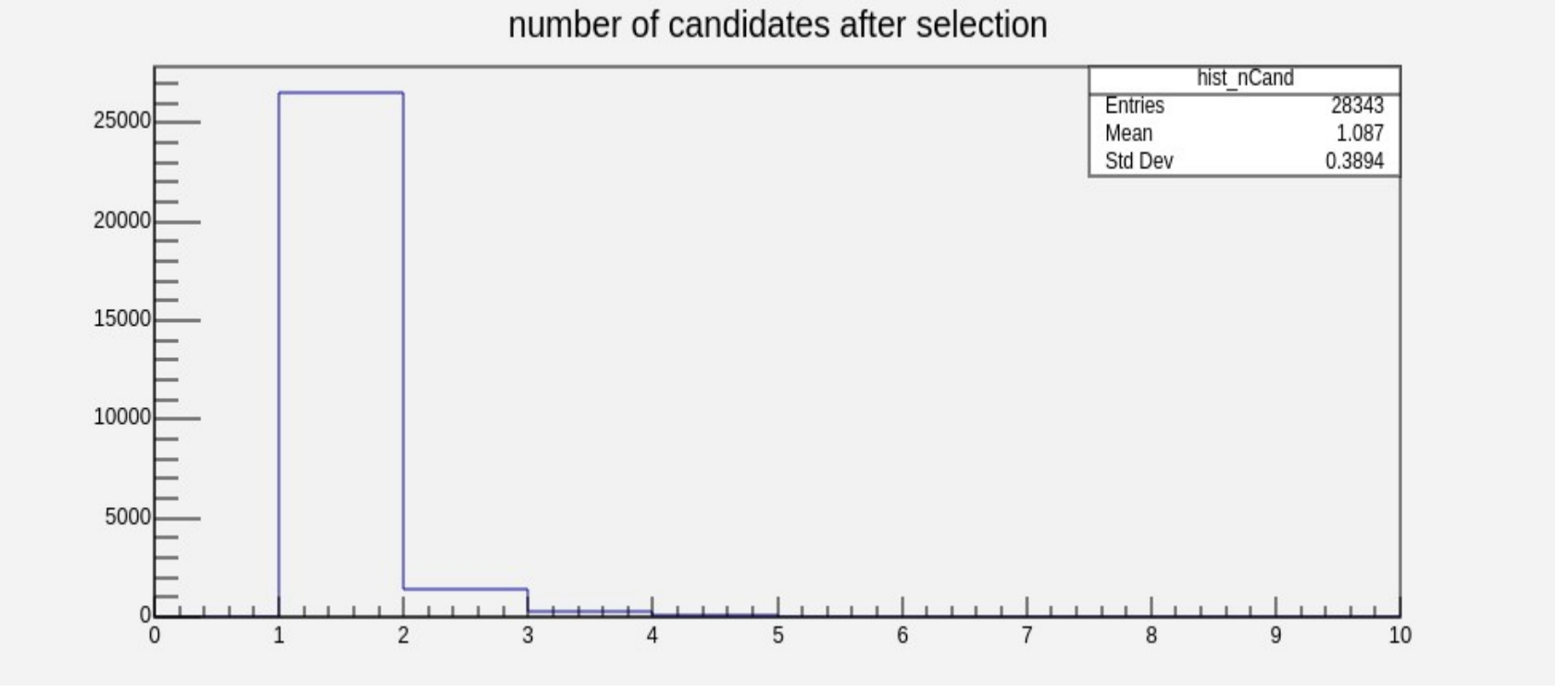


Number of candidates after signal side cuts

Generic $B^0\bar{B}^0$ MC

Cut list

$\sin\varphi < 1$
$m_{k\pi} > 1.91$ GeV
$\lvert m_{\mu\pi} - 3.1\rvert > 0.05$ & $\lvert m_{\mu\pi} - 3.69\rvert > 0.05$GeV
$\lvert m_{\mu\mu} - 3.1\rvert > 0.05$ & $\lvert m_{\mu\mu} - 3.69\rvert > 0.05$ GeV

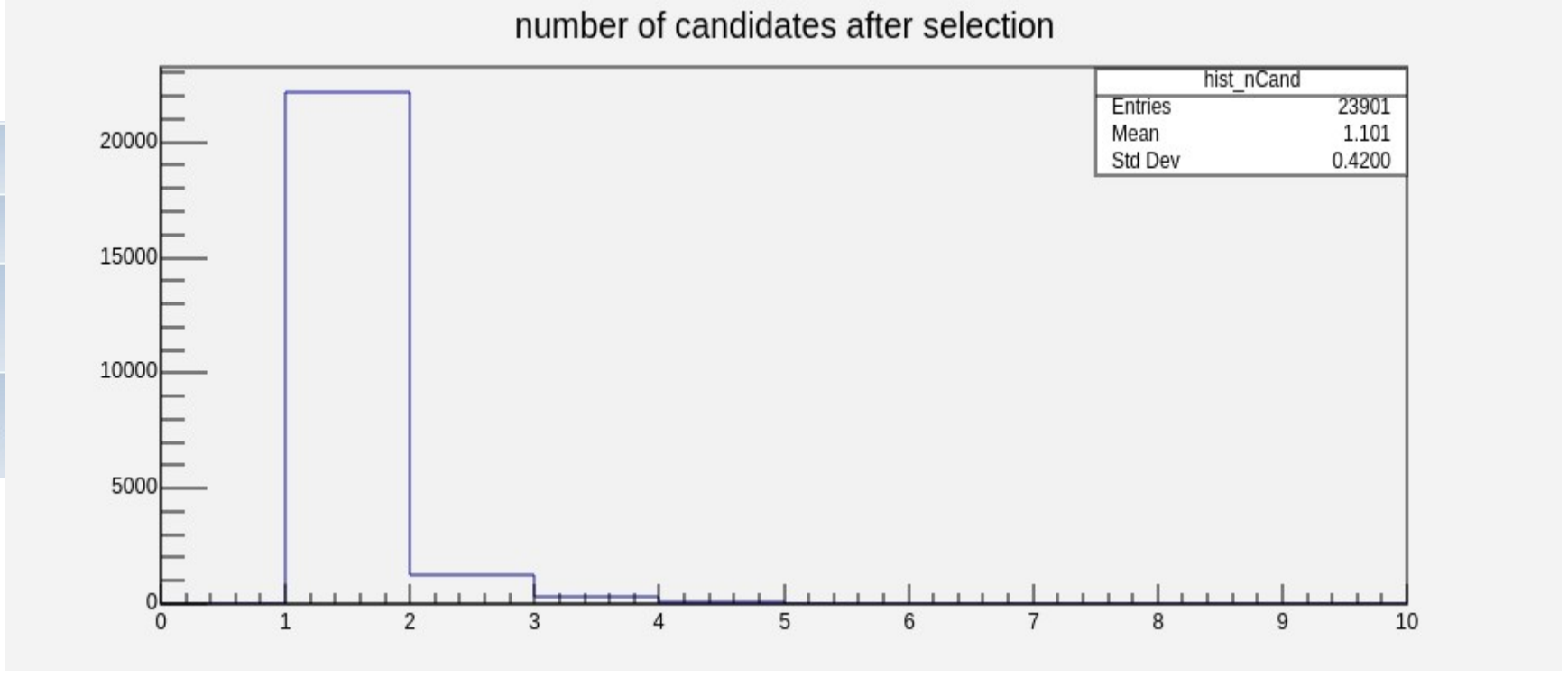


Number of candidates after signal side cuts

Generic $c\bar{c}$ MC

Cut list

$\sin\varphi < 1$
$m_{k\pi} > 1.91$ GeV
$\lvert m_{\mu\pi} - 3.1 \rvert > 0.05$ & $\lvert m_{\mu\pi} - 3.69 \rvert > 0.05$GeV
$\lvert m_{\mu\mu} - 3.1 \rvert > 0.05$ & $\lvert m_{\mu\mu} - 3.69 \rvert > 0.05$ GeV

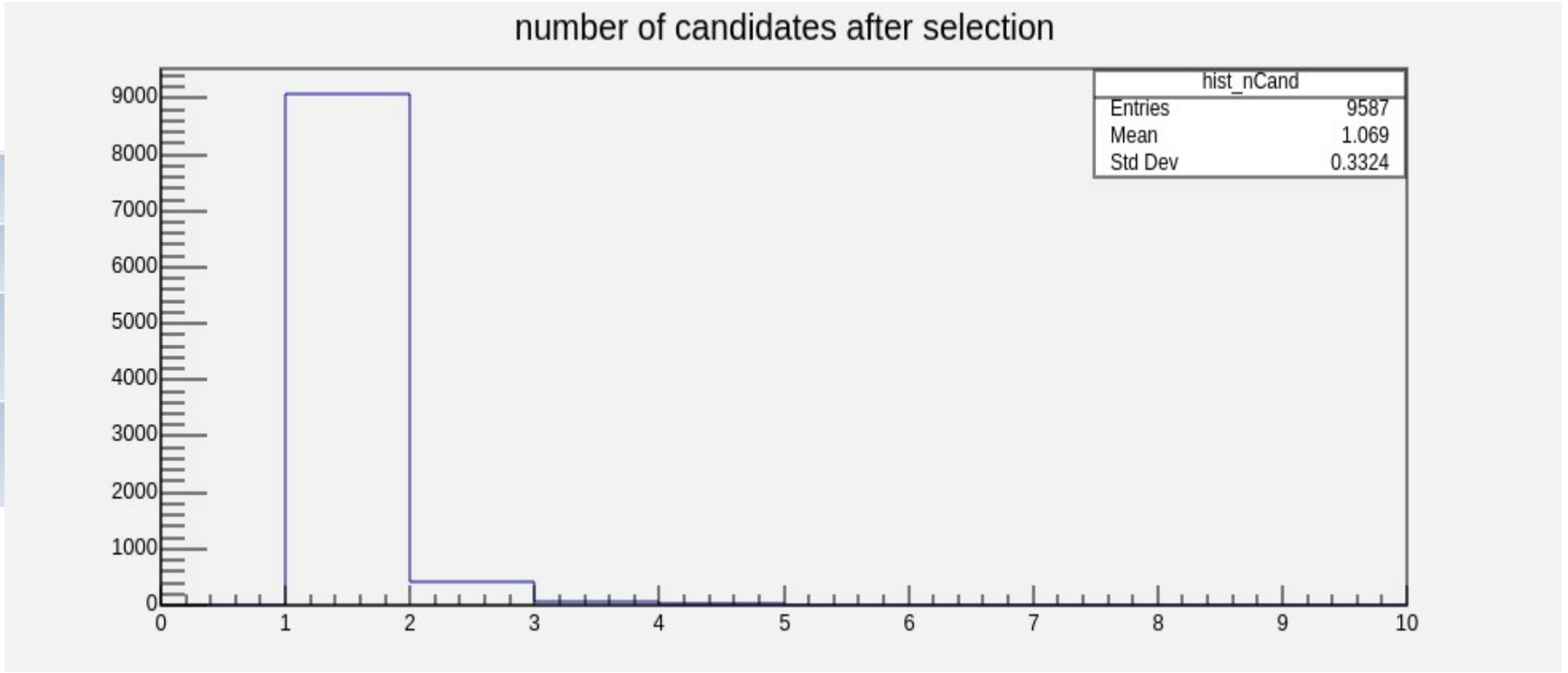


Number of candidates after signal side cuts

Generic uds MC

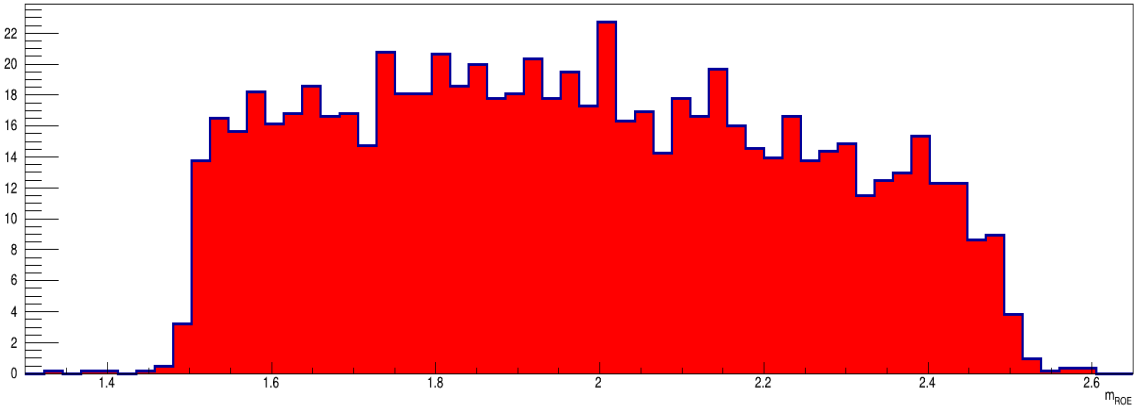
Cut list

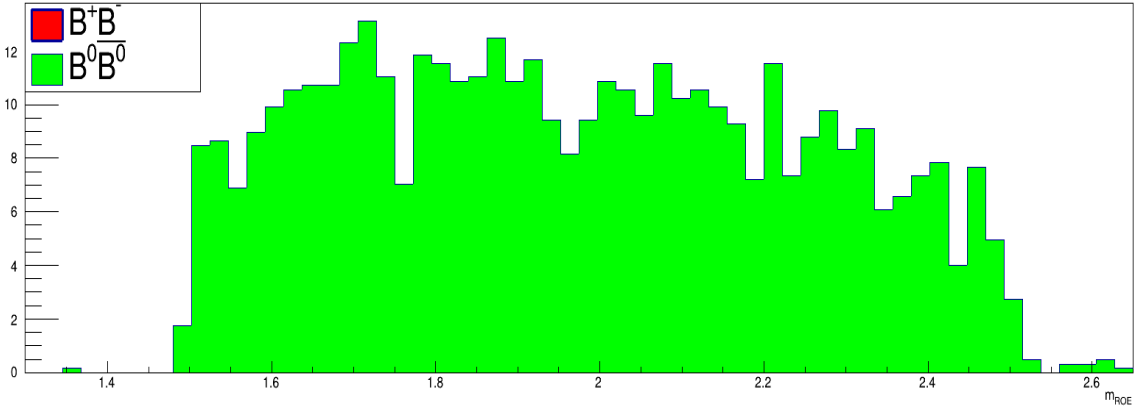
$\sin\varphi < 1$
$m_{k\pi} > 1.91$ GeV
$\lvert m_{\mu\pi} - 3.1 \rvert > 0.05$ & $\lvert m_{\mu\pi} - 3.69 \rvert > 0.05$GeV
$\lvert m_{\mu\mu} - 3.1 \rvert > 0.05$& $\lvert m_{\mu\mu} - 3.69 \rvert > 0.05$ GeV



m_{ROE}

$\sin\varphi < 1$
$m_{k\pi}>1.91$ GeV
$\lvert m_{\mu\pi}-3.1\rvert>0.05$& $\lvert m_{\mu\pi}-3.69\rvert>0.05$GeV
$\lvert m_{\mu\mu}-3.1\rvert>0.05$& $\lvert m_{\mu\mu}-3.69\rvert>0.05$ GeV
~~$1.5<m_{ROE}<2.06$ GeV~~
$p_{ltag} > 1.3$ GeV
$-2<\cos\theta_{tag}<1.1$





TMVA

- Using the following input variables.

  p_{ltag}, m_{ROE}, $\cos(p_{Btag},p_{vis.tag})$, nLeptons

- Applied some loose selections on tag side

  - $p_{ltag} > 0.3$ GeV && $p_{ltag} < 2.5$ GeV
  - $1.3 < m_{ROE} < 2.1$ GeV

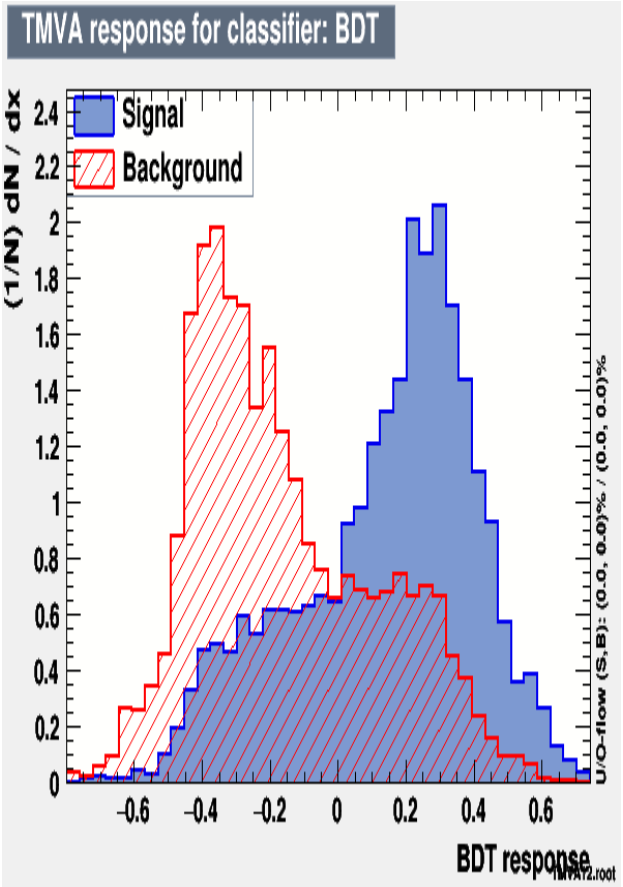
Signal side cuts

$\sin\varphi < 1$
$m_{k\pi} > 1.91$ GeV
$\lvert m_{\mu\pi}-3.1\rvert>0.05$& $\lvert m_{\mu\pi}-3.69\rvert>0.05$GeV
$\lvert m_{\mu\mu}-3.1\rvert>0.05$& $\lvert m_{\mu\mu}-3.69\rvert>0.05$ GeV

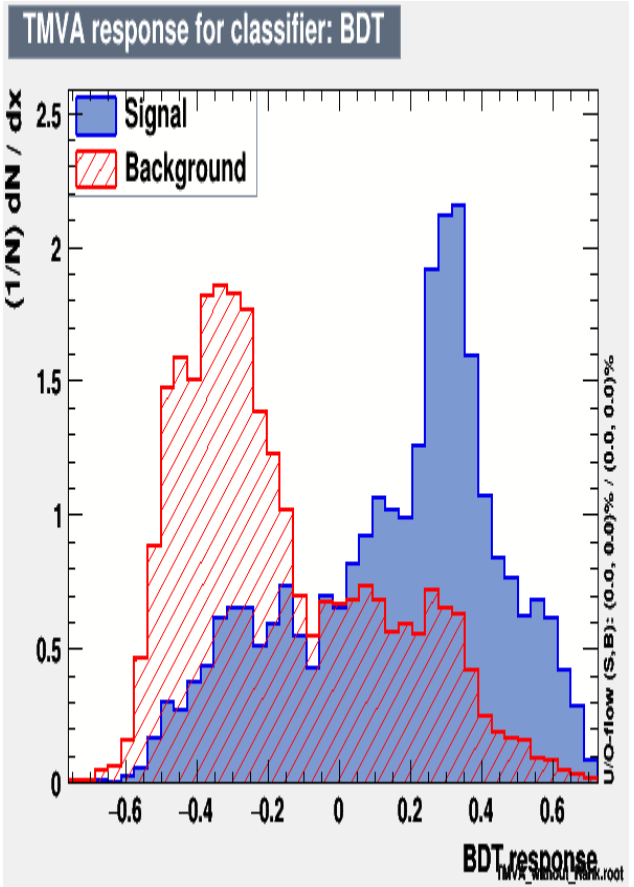
N_{sig} = 1,016 (BF = 10^{-4})
N_{bg} = 8,043

TMVA response

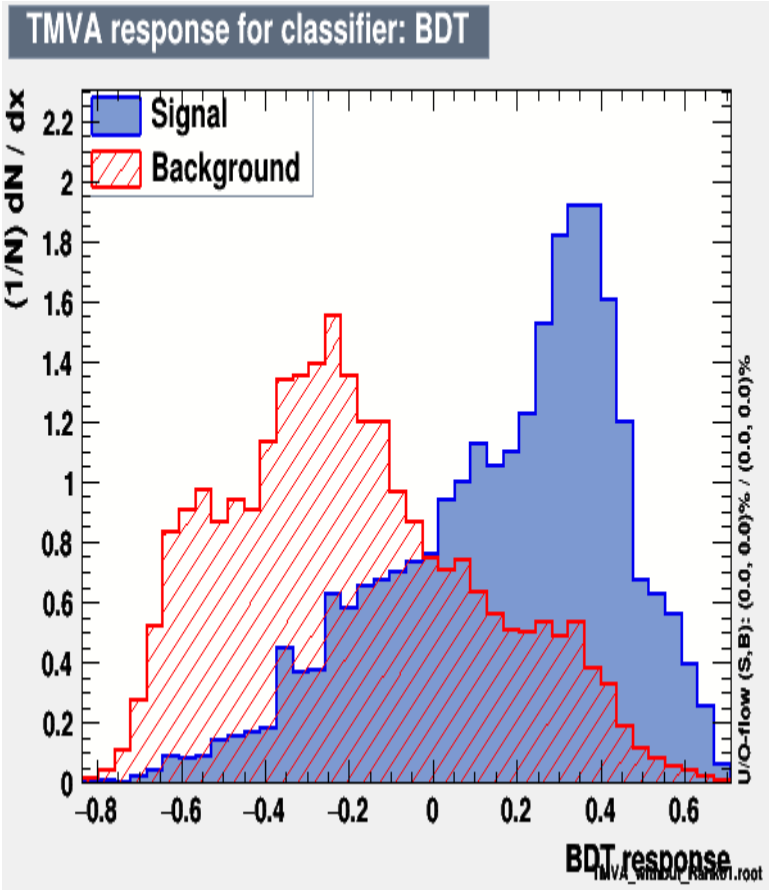
With Rank 01



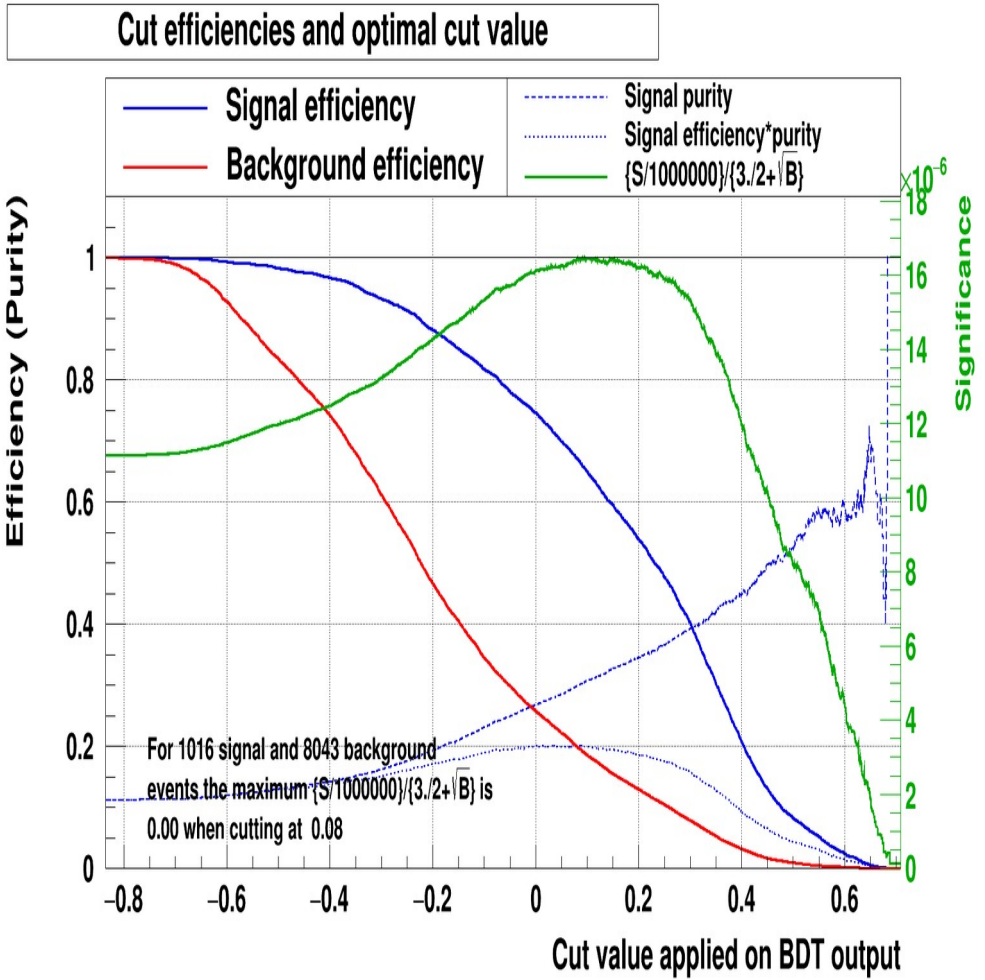
Without Rank 01

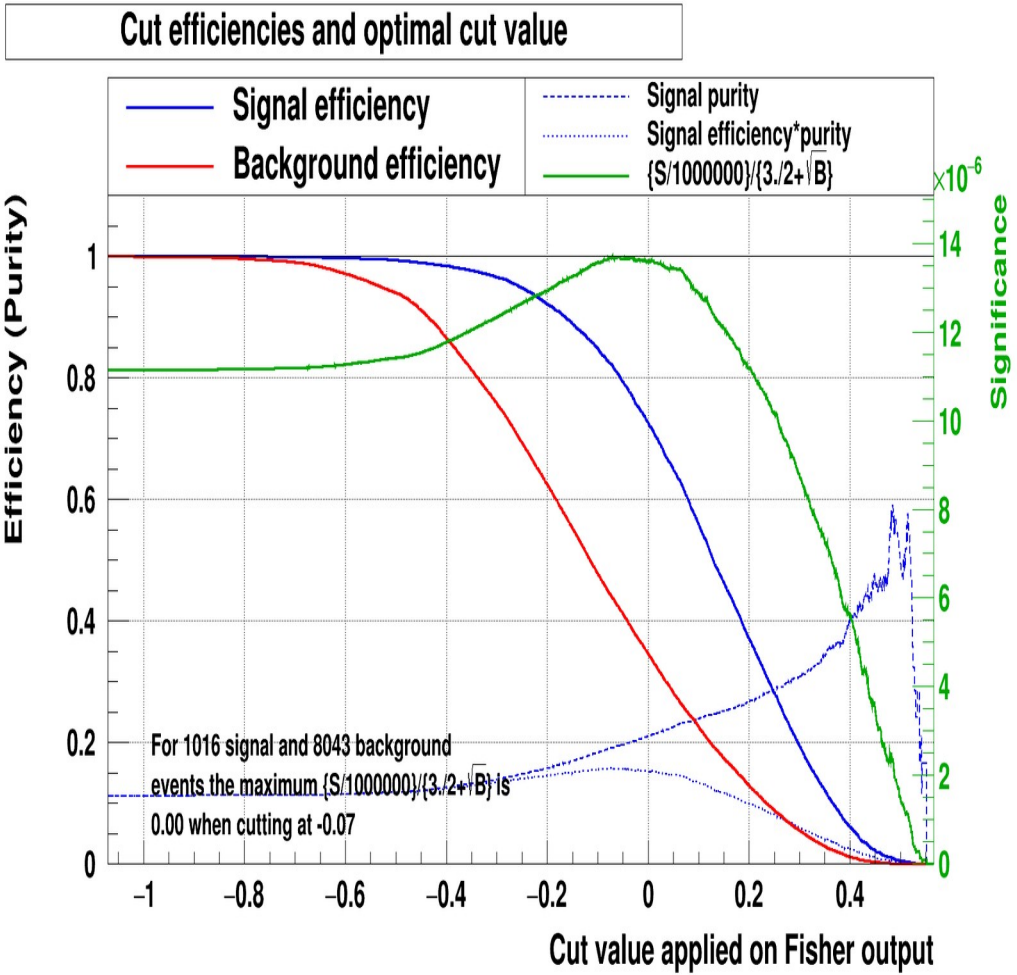


Without rank and with nLepton

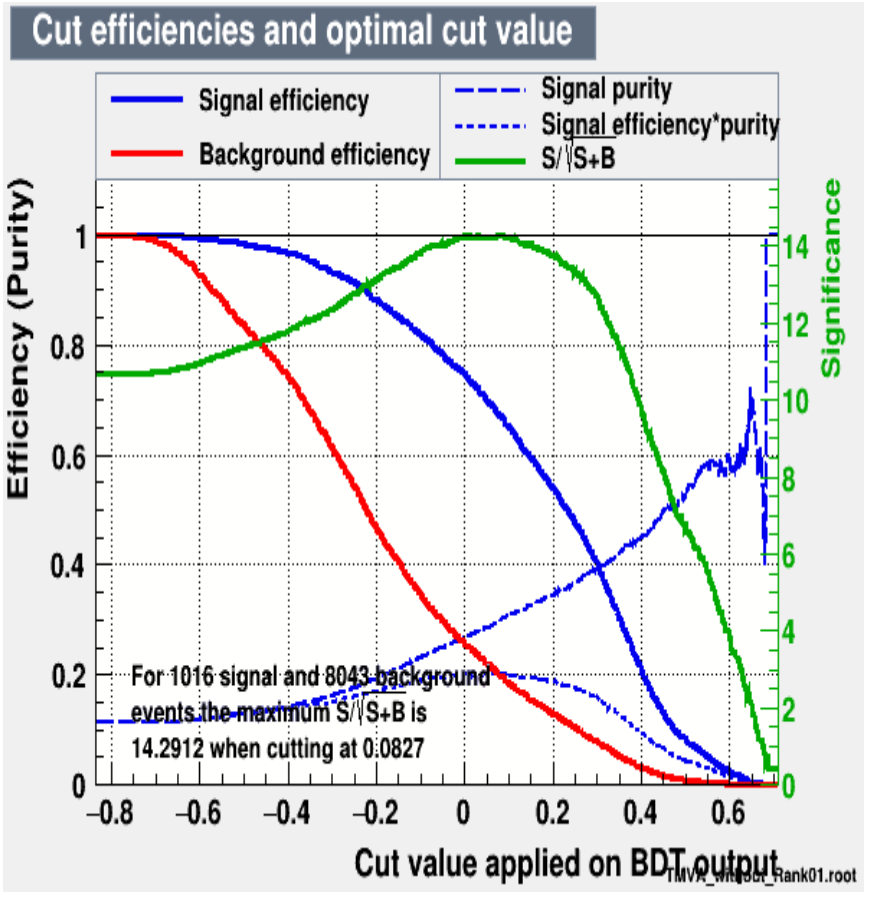


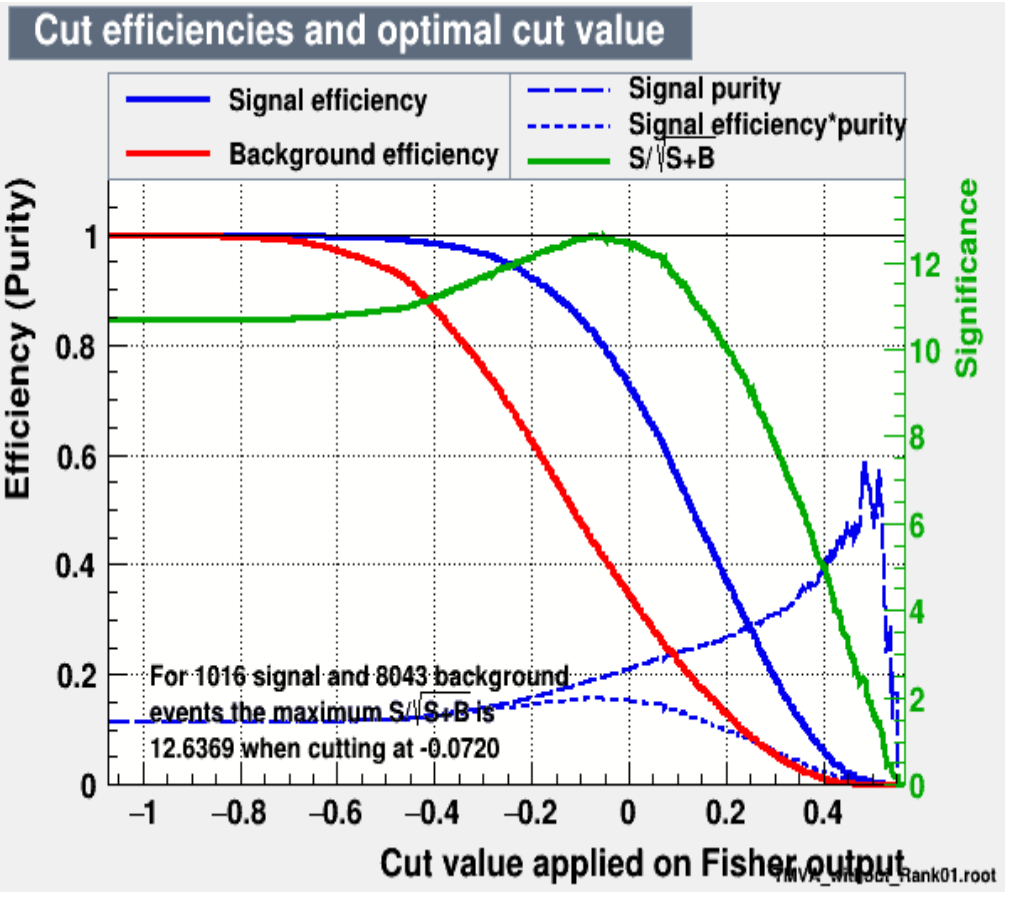
TMVA Ponzi FOM





TMVA FOM


Cut efficiencies and optimal cut value
Signal efficiency
Background efficiency
Signal purity
Signal efficiency*purity
S/√S+B
Efficiency (Purity)
Significance
For 1016 signal and 8043 background
events the maximum S/√S+B is
14.2912 when cutting at 0.0827
Cut value applied on BDT output
TMVA_Whitout_Rank01.root


Cut efficiencies and optimal cut value
Signal efficiency
Background efficiency
Signal purity
Signal efficiency*purity
S/√S+B
Efficiency (Purity)
Significance
For 1016 signal and 8043 background
events the maximum S/√S+B is
12.6369 when cutting at -0.0720
Cut value applied on Fisher output
TMVA_Whitout_Rank01.root

Back up

TMVA Ponzi FOM (1.5 sigma)