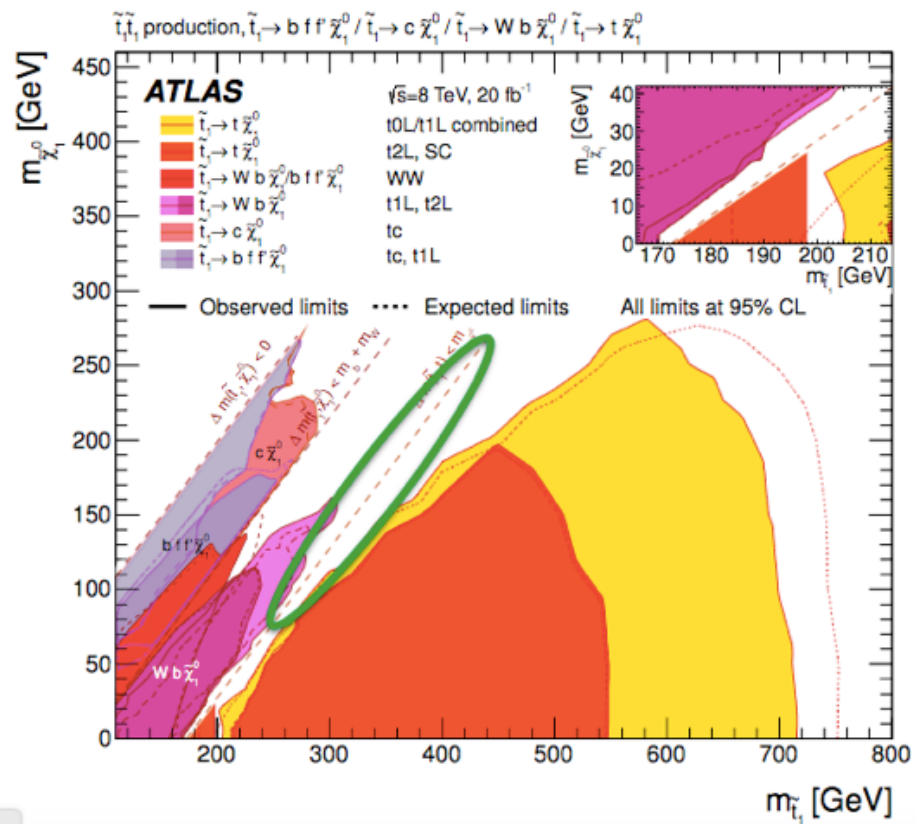


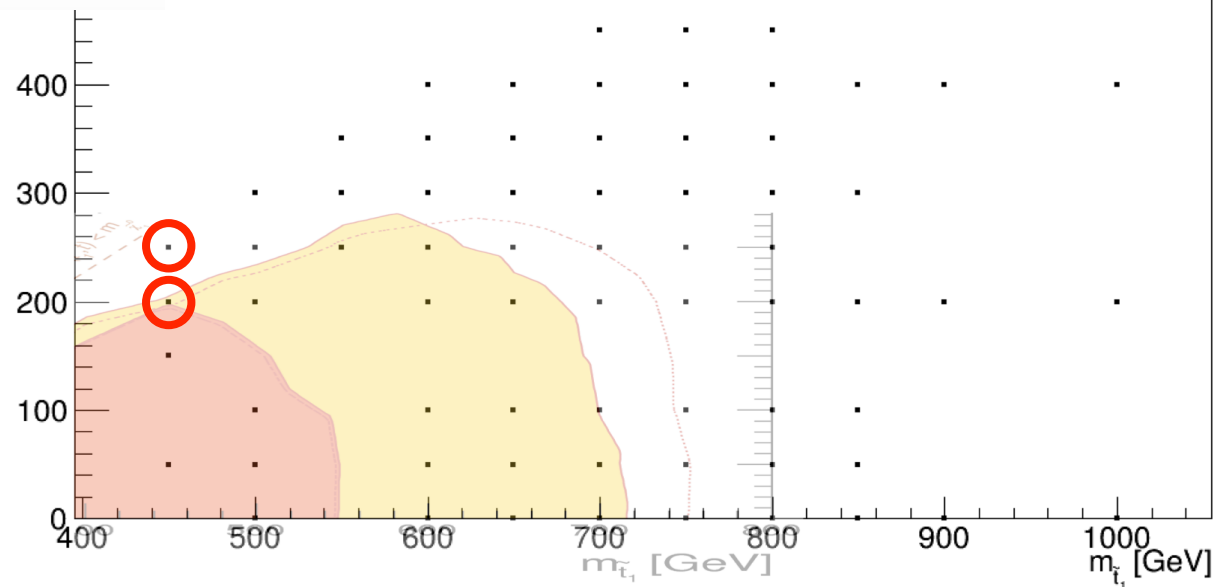
Meeting bisettimanale Lecce

Updates on Stop- $\rightarrow$ top+Neutralino analysis

Region of interest



Stop -> top neut



Last meeting status

TRAINING CONFIGURATION:

- T450L200+T450L250 vs ttbar
- INPUT VARIABLES: DPhiMetPbll, mT2, pbllmod, mll, ptJet1, ptJet2, Etmis/meff, Etmis/ptleps
- Presel Cuts: mll > 20GeV, ptL1 > 25GeV, ptJet1 > 20GeV, ptJet2 > 20GeV, Etmis > 50GeV, meff > 300GeV
- 1000trees, qw=10

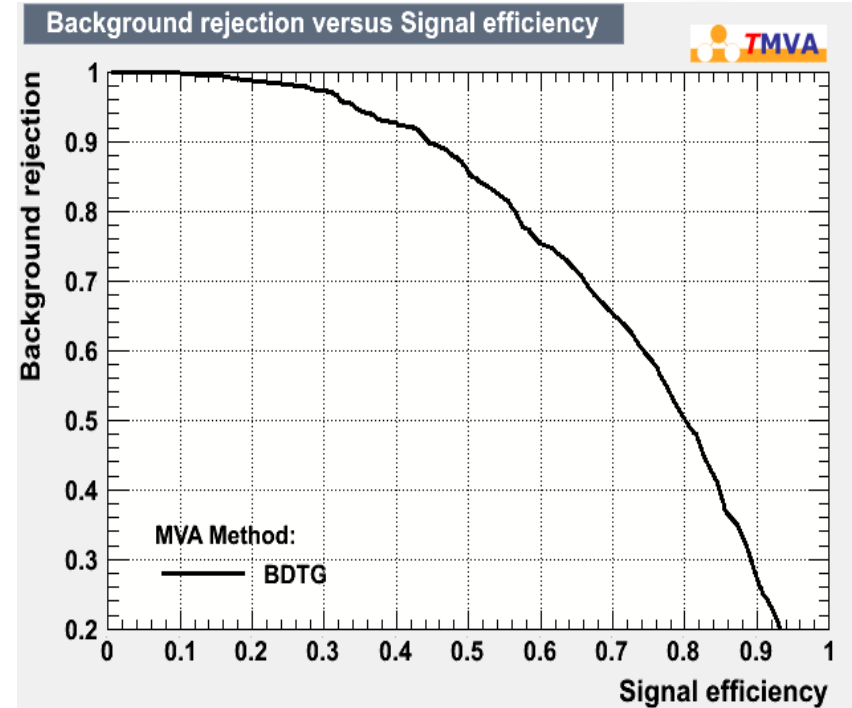
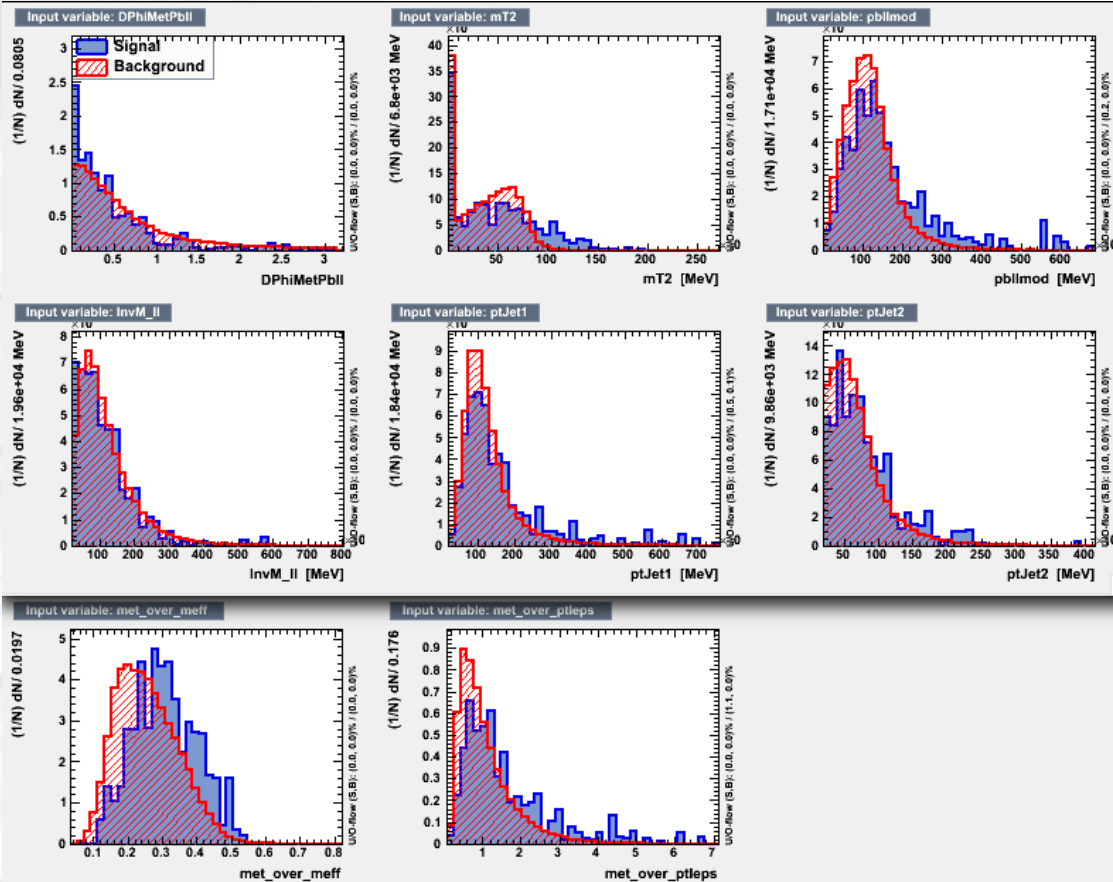
STATISTICS:

	Number of Events	After Presel Cuts	Efficiency
SIGNAL	2837 (446,27 weighted events)	1032 (159,9 weighted events)	0.36
BACKGROUND	1077349 (219127 weighted events)	235763 (45806 weighted events)	0.21

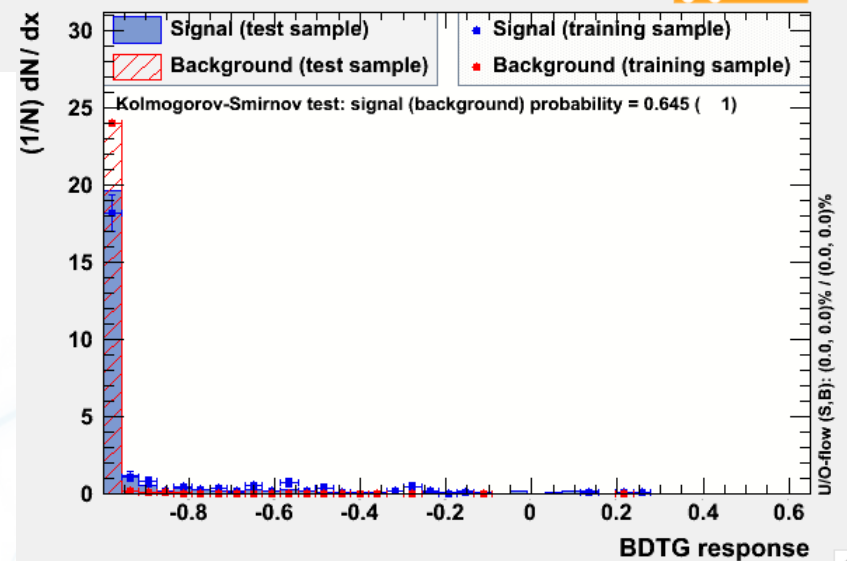
VARIABLES RANKING:

```
--- BDTG : -----
--- BDTG : Rank : Variable      : Variable Importance
--- BDTG : -----
--- BDTG :      1 : MT2           : 2.710e-01
--- BDTG :      2 : met_over_ptleps : 2.138e-01
--- BDTG :      3 : pbllmod        : 1.842e-01
--- BDTG :      4 : ptJet1         : 1.312e-01
--- BDTG :      5 : met_over_meff    : 9.087e-02
--- BDTG :      6 : ptJet2         : 4.542e-02
--- BDTG :      7 : InvM_ll         : 4.200e-02
--- BDTG :      8 : DPhiMetPbll      : 2.156e-02
--- BDTG : -----
```

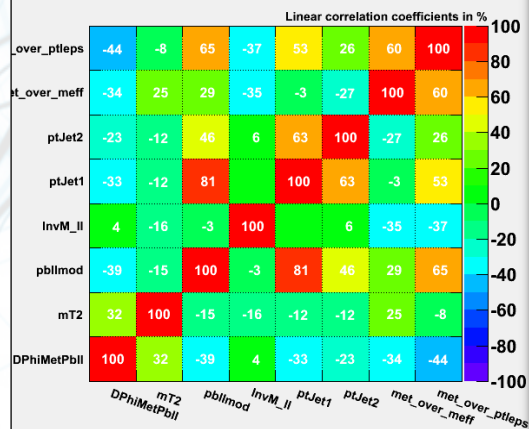
Last meeting status



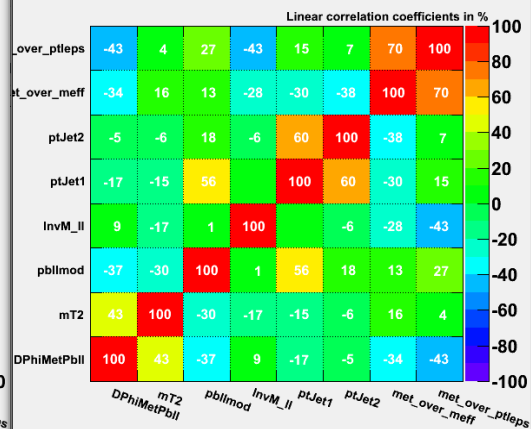
TMVA overtraining check for classifier: BDTG



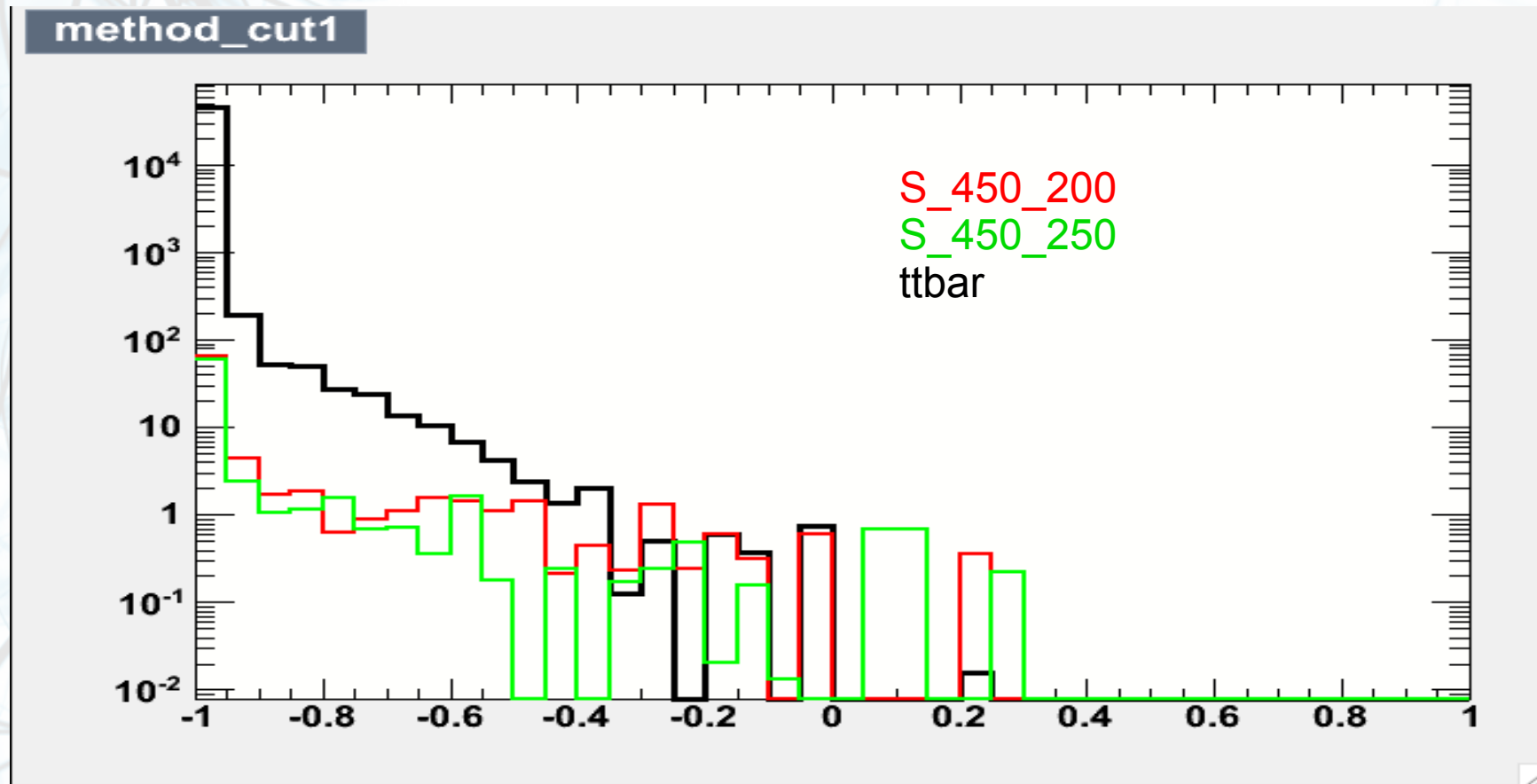
Correlation Matrix (signal)



Correlation Matrix (background)



APPLICATION:



BDTG > -0.3

NEvents(ttbar)=2.25

NEvents(S_450_L200)=3.45 → signif=1.31

NEvents(S_450_250)=2.54

New approach: ask for ISR jet

Theorists suggest a new approach for studying the “compressed region”:
kinematics of stop events will be different from ttbar events when an **ISR jet** is asked

NEW TRAINING CONFIGURATION:

- T450L200+T450L250 vs ttbar
- INPUT VARIABLES: mT2, pblmod, ptJet1, ptJet2, Etmis/meff, Etmis/ptleps, [Etmis/ptJet1](#), [Etmis/ptJets](#)
- Presel Cuts: mll > 20GeV, ptL1 > 25GeV, **ptJet1 > 150GeV**, ptJet2 > 20GeV, Etmis > 50GeV, meff > 300GeV
- 1000trees, qw=10

High pT jet request:
Very reduced statistics!!!

New variables introduced

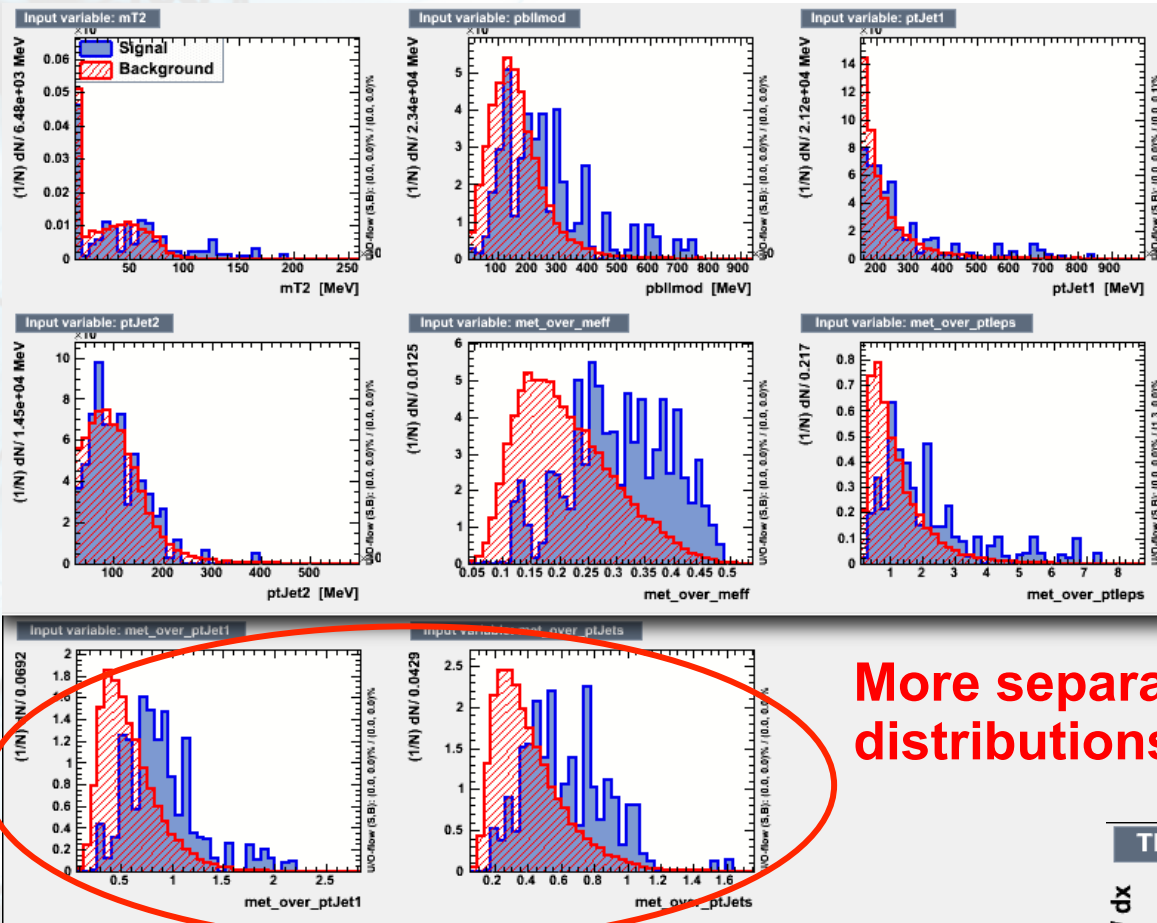
STATISTICS:

	Number of Events	After Presel Cuts	Efficiency
SIGNAL	2837 (446,27 weighted events)	380 (64.5 weighted events)	0.14
BACKGROUND	1077349 (219127 weighted events)	57590 (11260.3 weighted events)	0.05

VARIABLES RANKING:

----	BDTG	:	-----
----	BDTG	:	Rank : Variable : Variable Importance
----	BDTG	:	-----
----	BDTG	:	1 : pblmod : 2.489e-01
----	BDTG	:	2 : MT2 : 2.066e-01
----	BDTG	:	3 : met_over_ptleps : 1.720e-01
----	BDTG	:	4 : met_over_meff : 1.077e-01
----	BDTG	:	5 : (EtMissTST/ptJet1) : 9.410e-02
----	BDTG	:	6 : ptJet1 : 7.964e-02
----	BDTG	:	7 : EtMissTST/(ptJet1+ptJet2) : 5.918e-02
----	BDTG	:	8 : ptJet2 : 3.184e-02

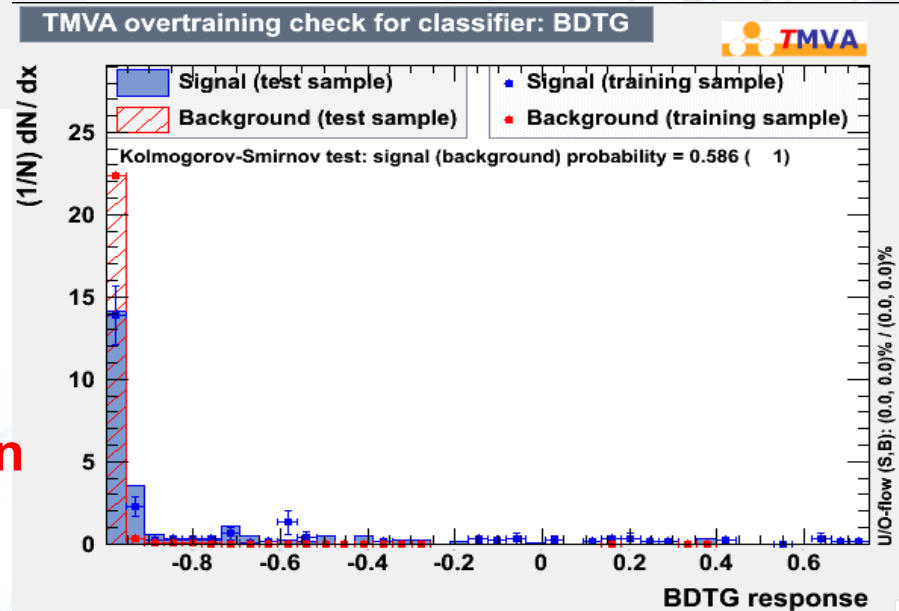
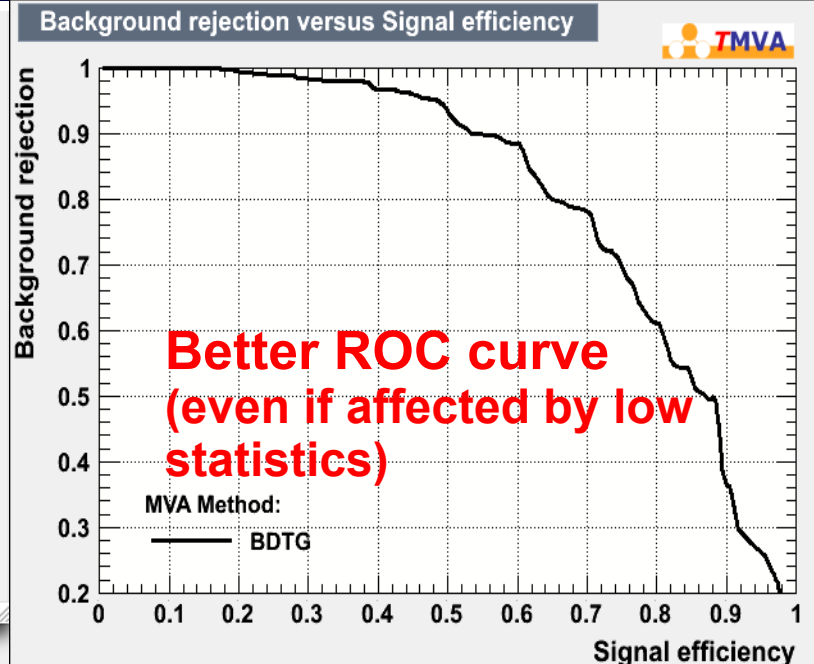
New approach: ask for ISR jet



More separated distributions

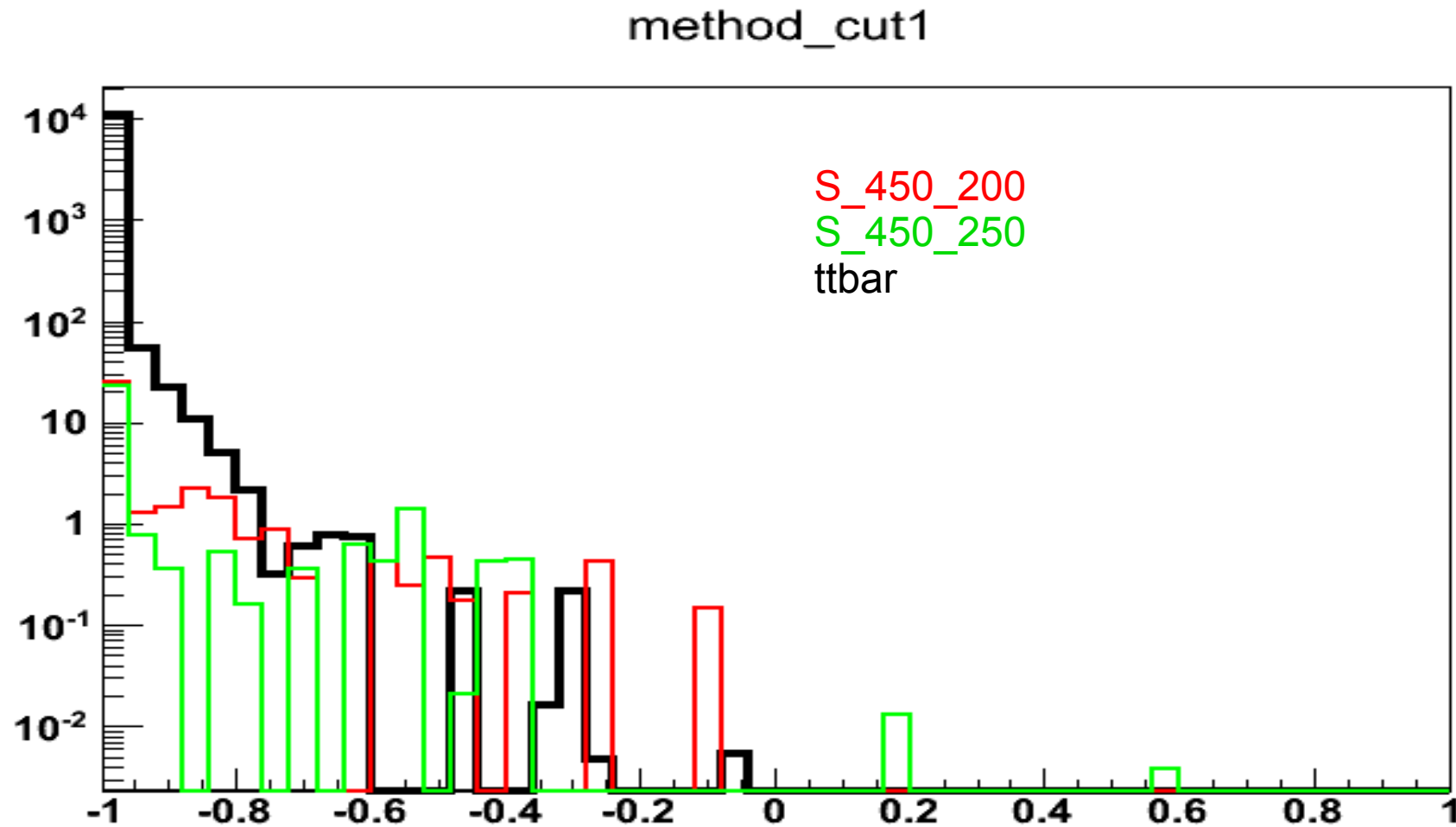
New introduced variables

Better BDTG distribution
(up to BDTG~0.7)



New approach: ask for ISR jet

APPLICATION:



BDTG > -0.6

NEvents(ttbar)=0.46

NEvents(S_450_L200)=2.09 → signif=1.30

NEvents(S_450_250)=2.71 → signif=1.51

Just a test: how much do we actually gain asking for an ISR jet?

A new training is computed, equivalent to the previous one, with the exception of the ISR jet request

NEW TRAINING CONFIGURATION:

- T450L200+T450L250 vs ttbar
- INPUT VARIABLES: mT2, pblmod, ptJet1, ptJet2, Etmis/meff, Etmis/ptleps, [Etmis/ptJet1](#), [Etmis/ptJets](#)
- Presel Cuts: mll > 20GeV, ptL1 > 25GeV, **ptJet1 > 20GeV**, ptJet2 > 20GeV, Etmis > 50GeV, meff > 300GeV
- 1000trees, qw=10

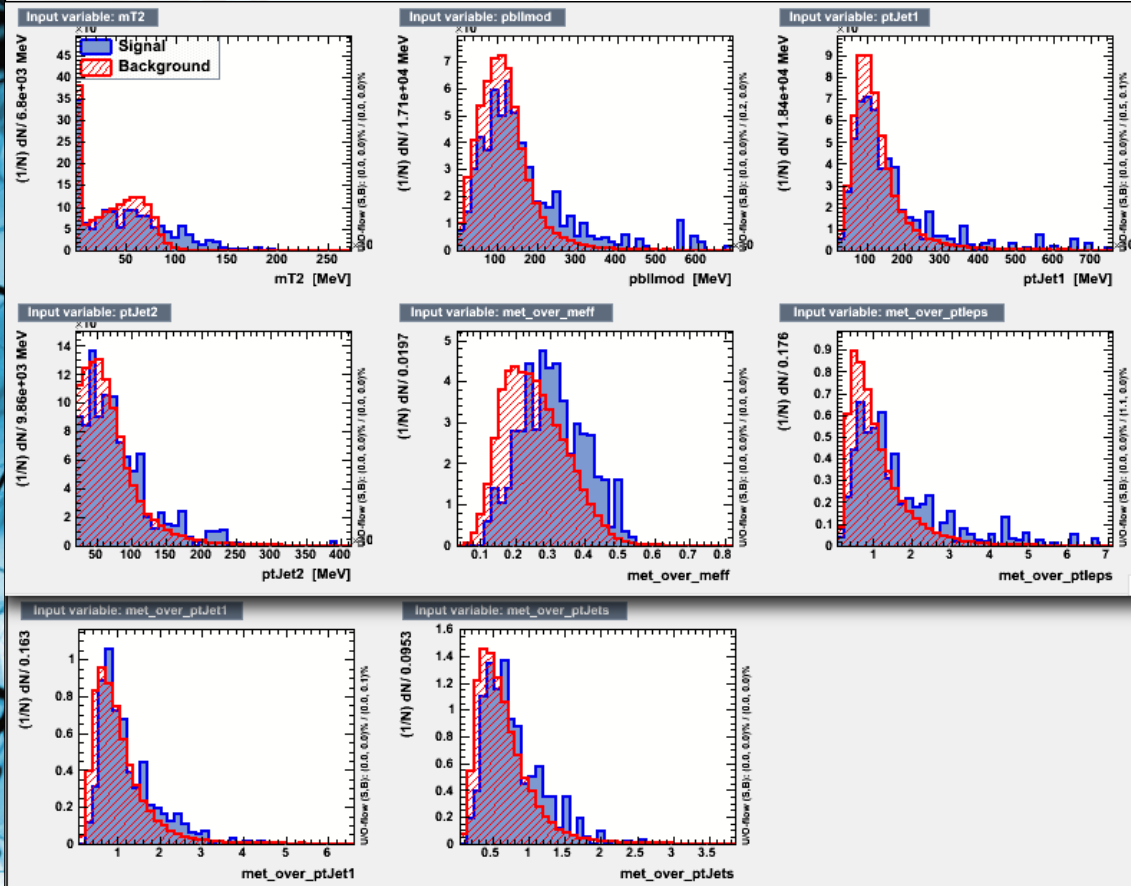
STATISTICS:

	Number of Events	After Presel Cuts	Efficiency
SIGNAL	2837 (446,27 weighted events)	1032 (159,9 weighted events)	0.36
BACKGROUND	1077349 (219127 weighted events)	235763 (45806 weighted events)	0.21

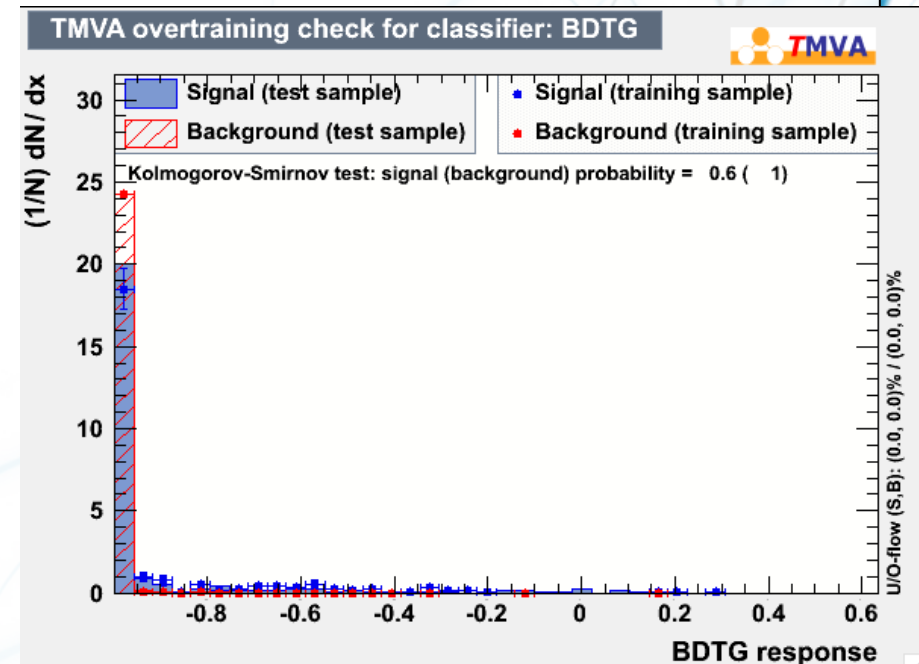
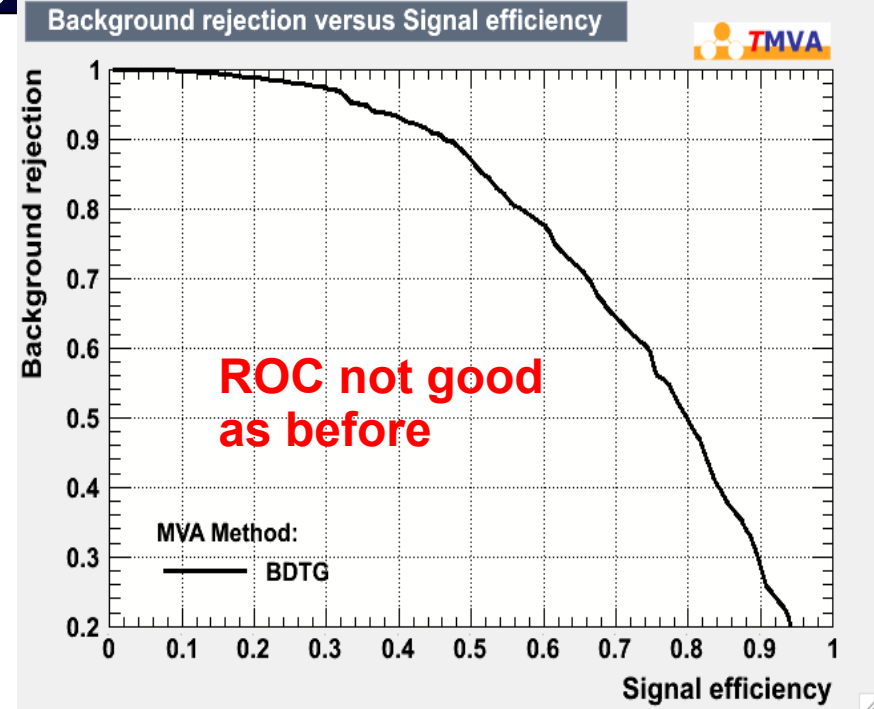
VARIABLES RANKING:

```
--- Factory          : Ranking input variables (method specific)...
--- BDTG             : Ranking result (top variable is best ranked)
--- BDTG             : -----
--- BDTG             : Rank : Variable                : Variable Importance
--- BDTG             : -----
--- BDTG             :      1 : MT2                      : 2.692e-01
--- BDTG             :      2 : met_over_ptleps          : 2.132e-01
--- BDTG             :      3 : pblmod                   : 1.825e-01
--- BDTG             :      4 : ptJet1                   : 1.335e-01
--- BDTG             :      5 : met_over_meff              : 9.255e-02
--- BDTG             :      6 : ptJet2                   : 5.034e-02
--- BDTG             :      7 : EtMissTST/(ptJet1+ptJet2) : 2.944e-02
--- BDTG             :      8 : (EtMissTST/ptJet1)           : 2.914e-02
--- BDTG             : -----
```

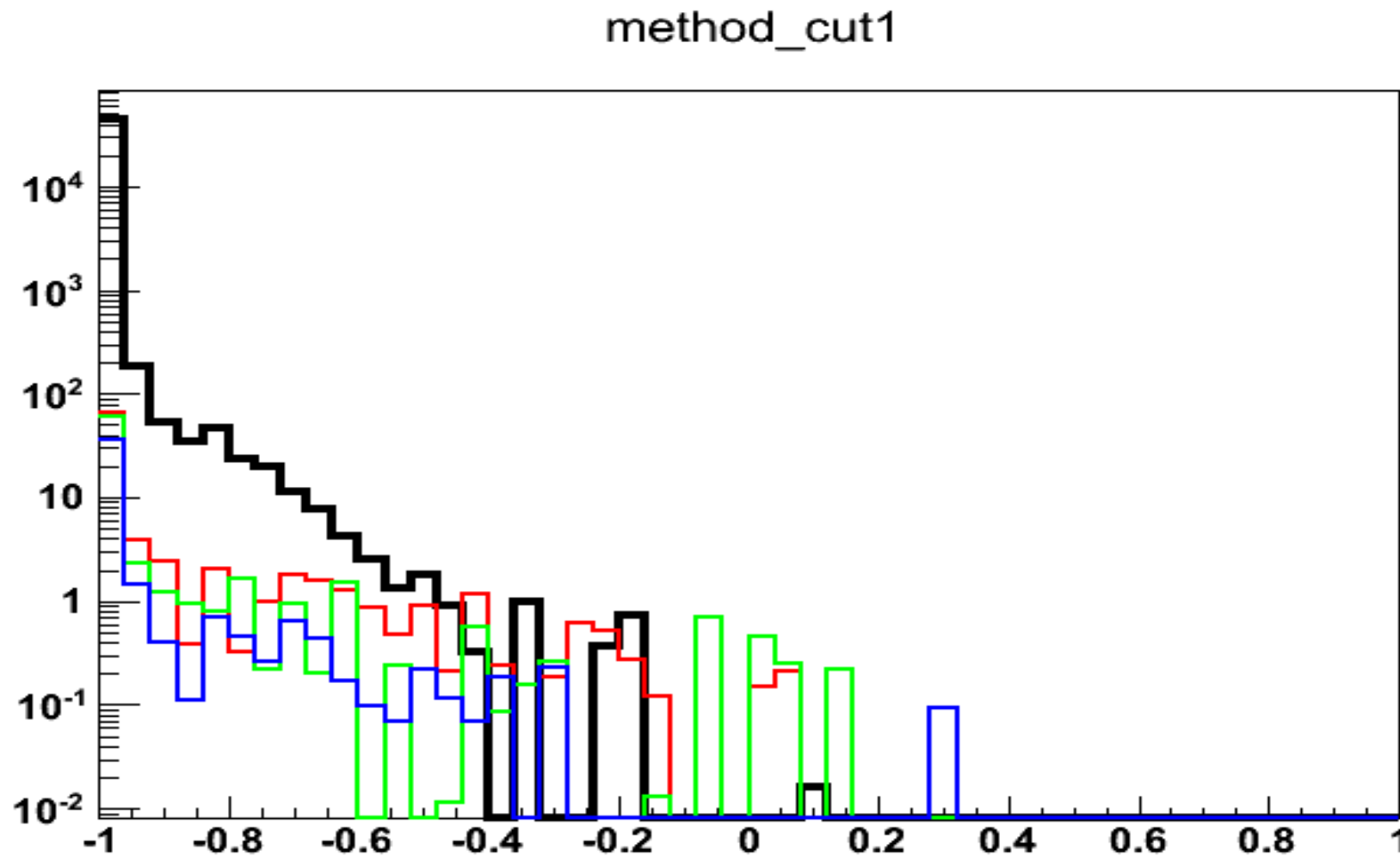
Just a test: how much do we actually gain asking for an ISR jet?



Slightly worse BDTG distribution, but compatible Kolmogorov-Smirnov probabilities



Just a test: how much do we actually gain asking for an ISR jet?



BDTG > -0.3

NEvents(ttbar)=1.11

NEvents(S_450_L200)=1.52 → signif=0.89

NEvents(S_450_250)=0.70