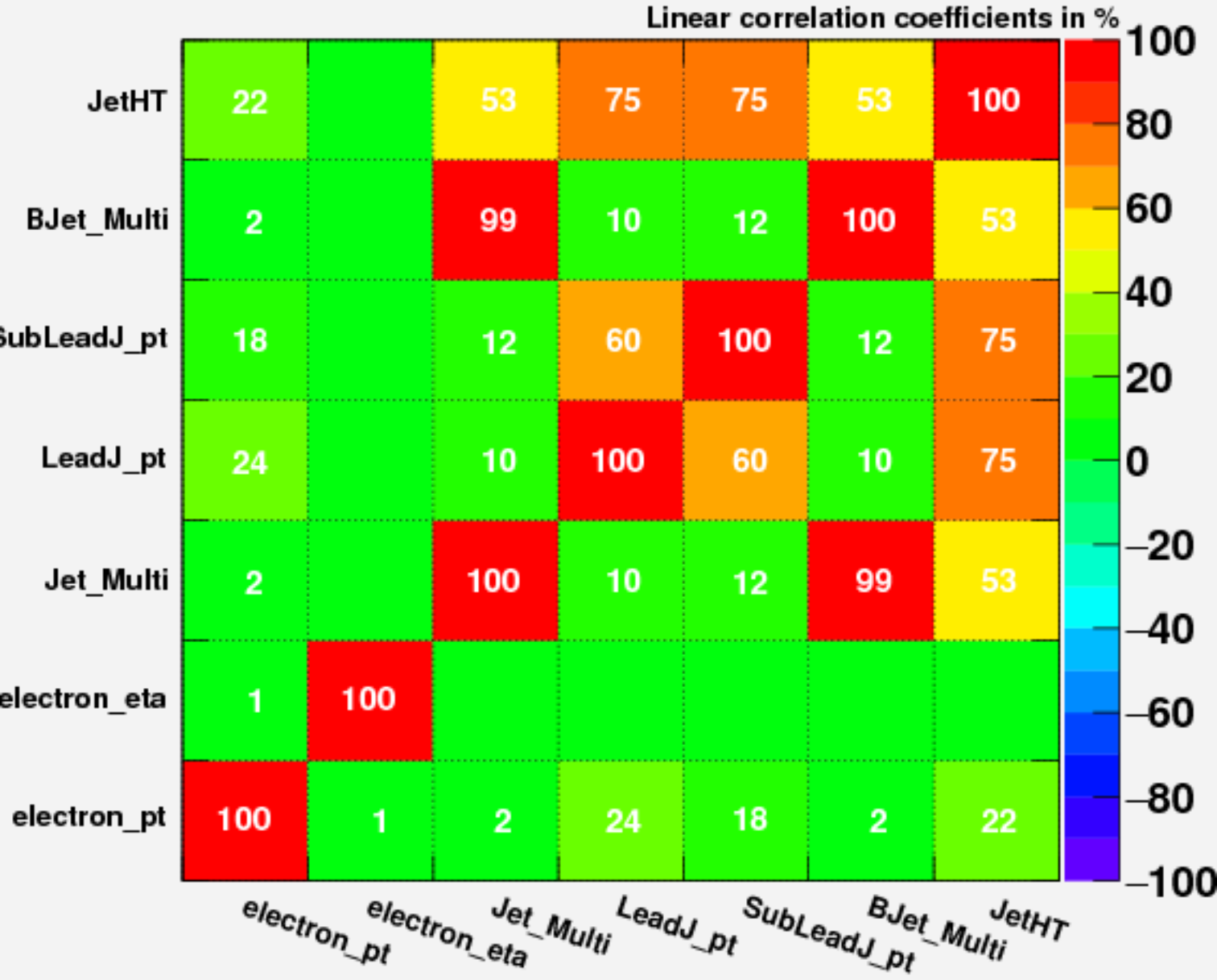
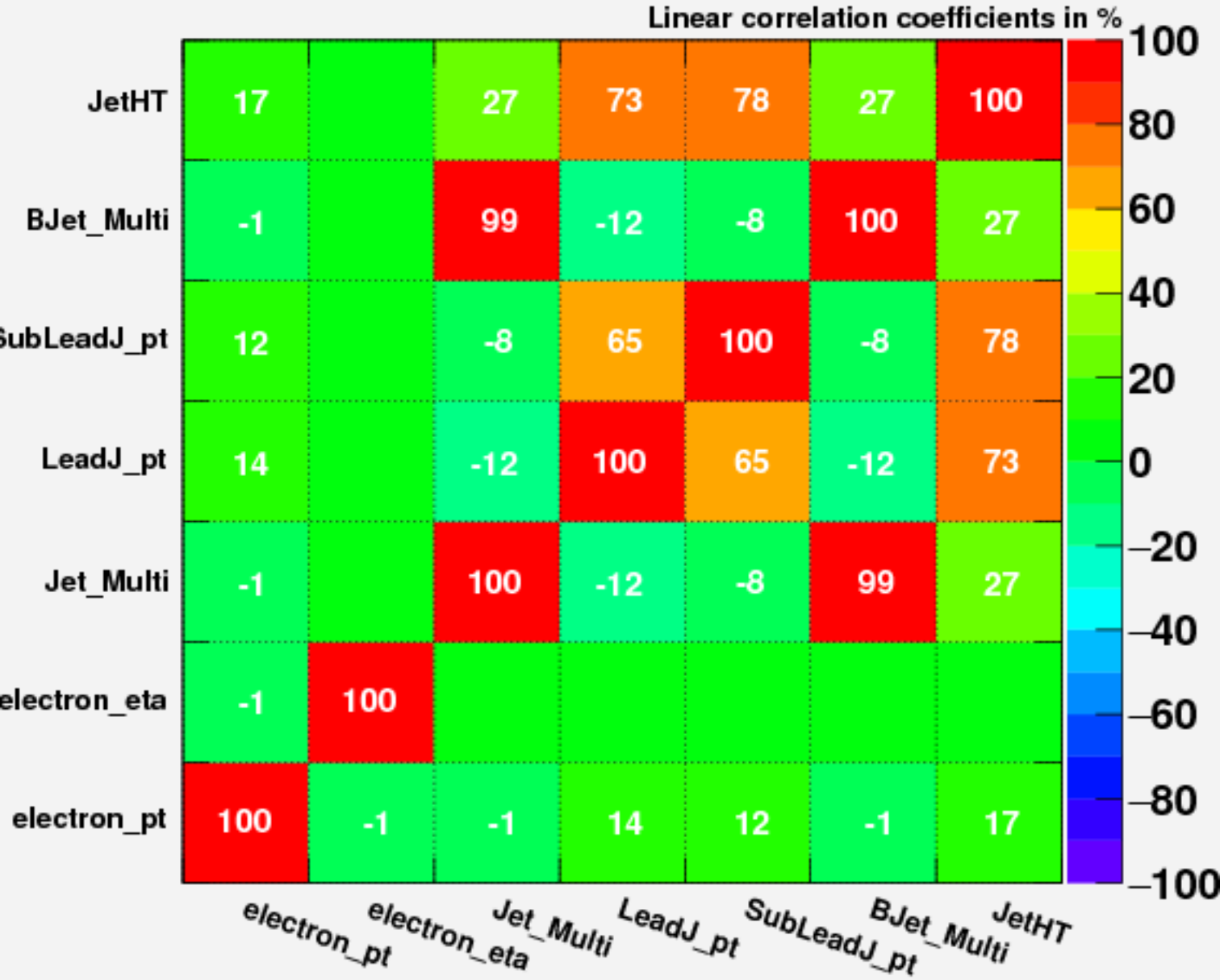
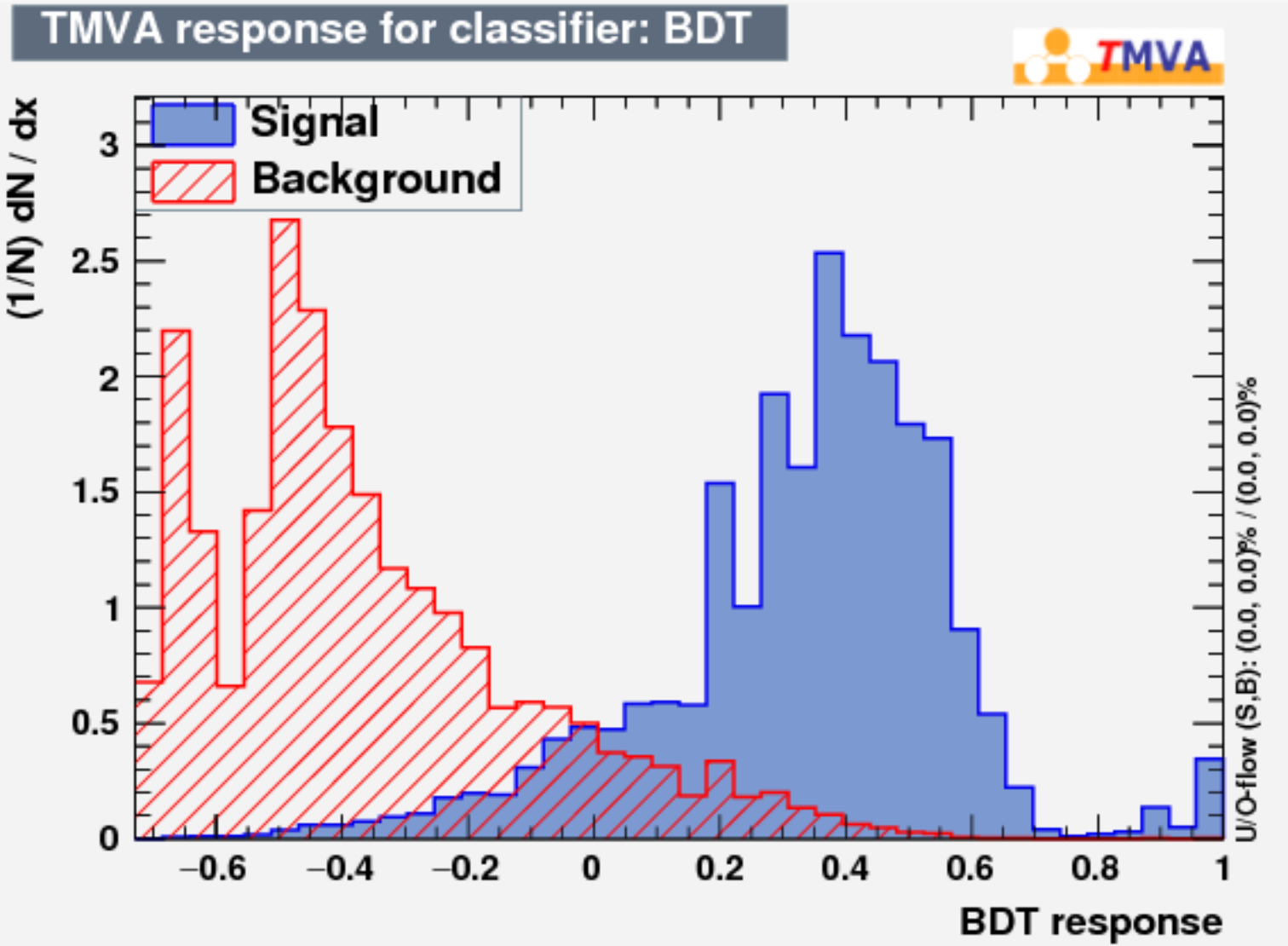
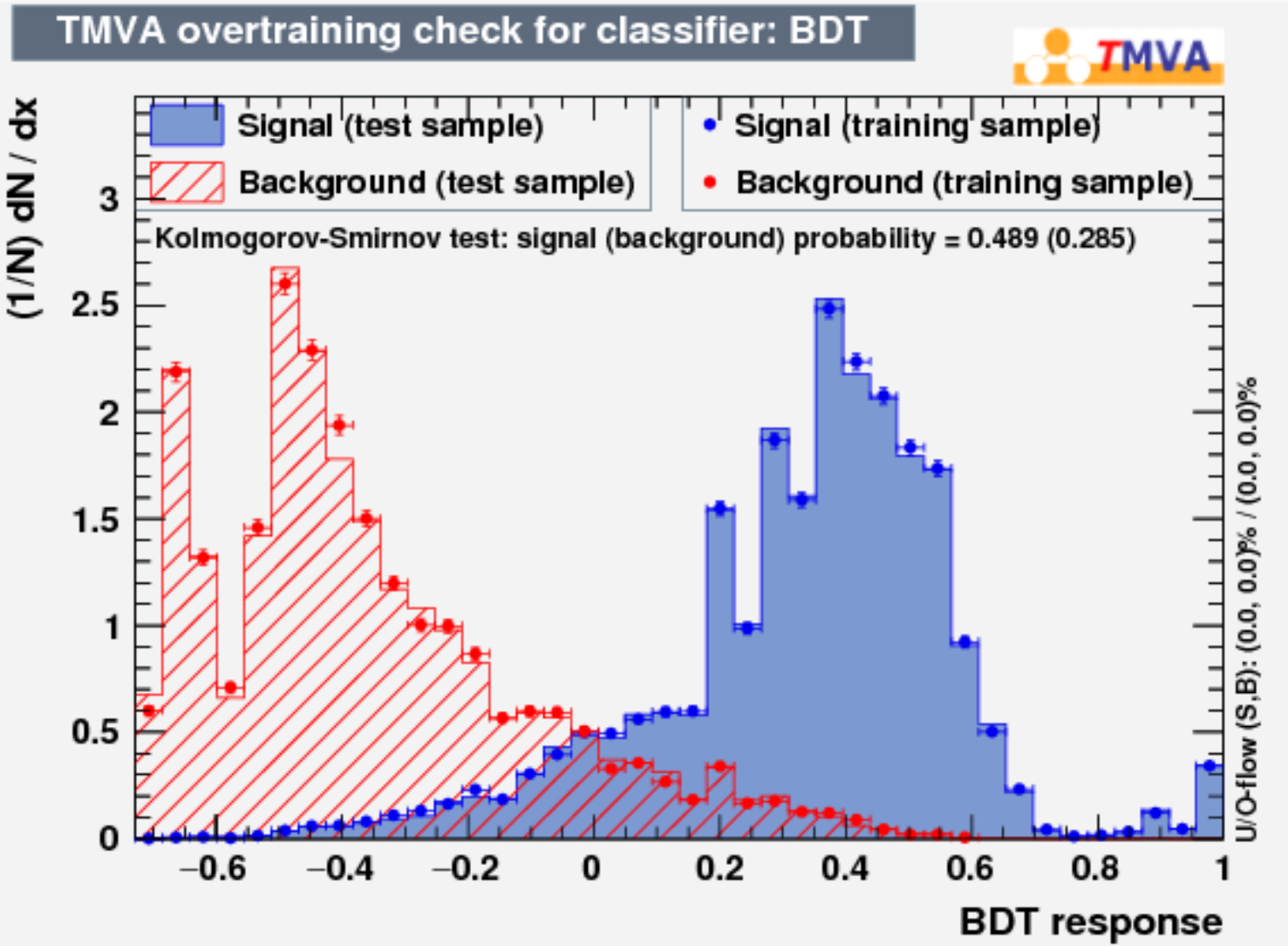
Correlation Matrix (background)

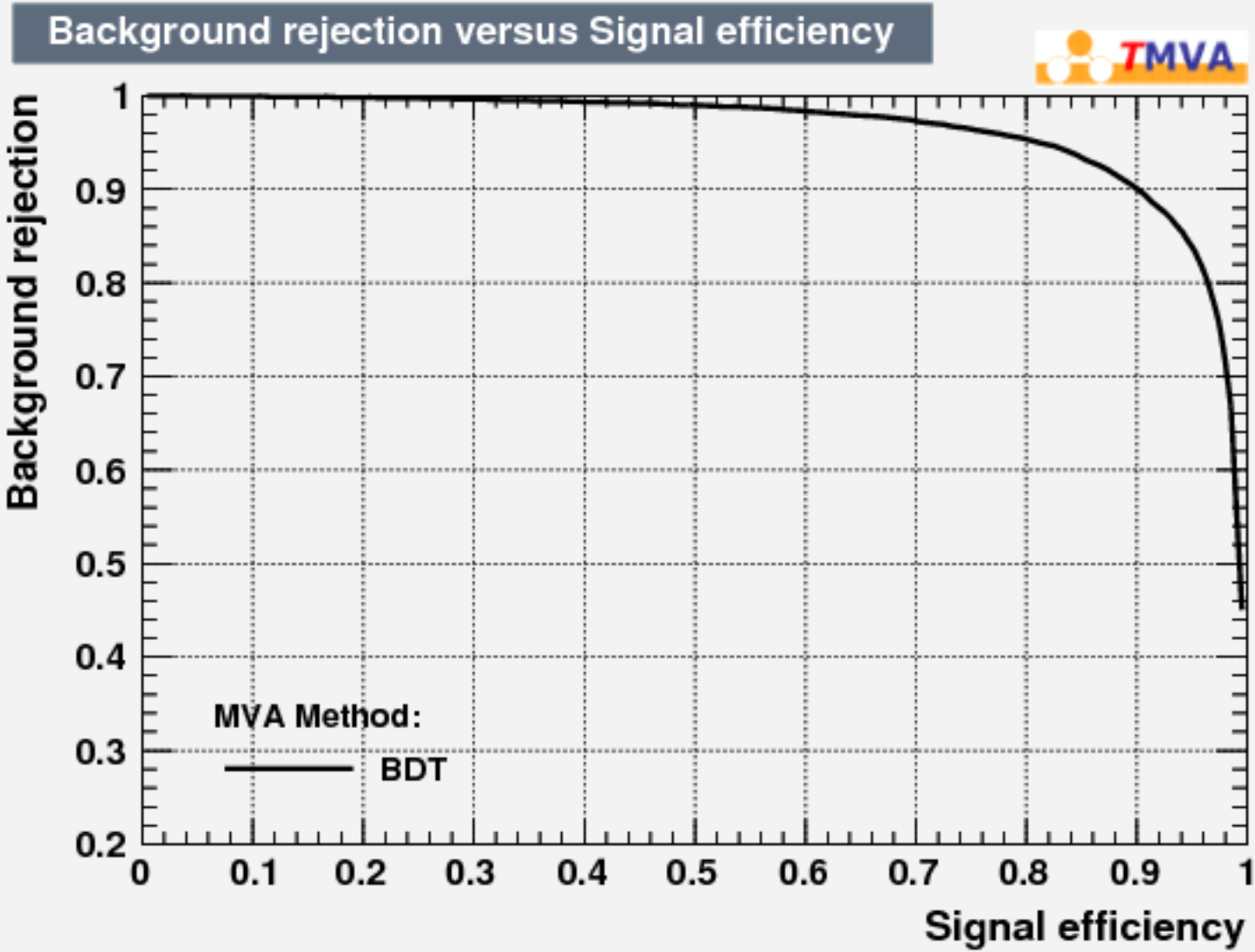


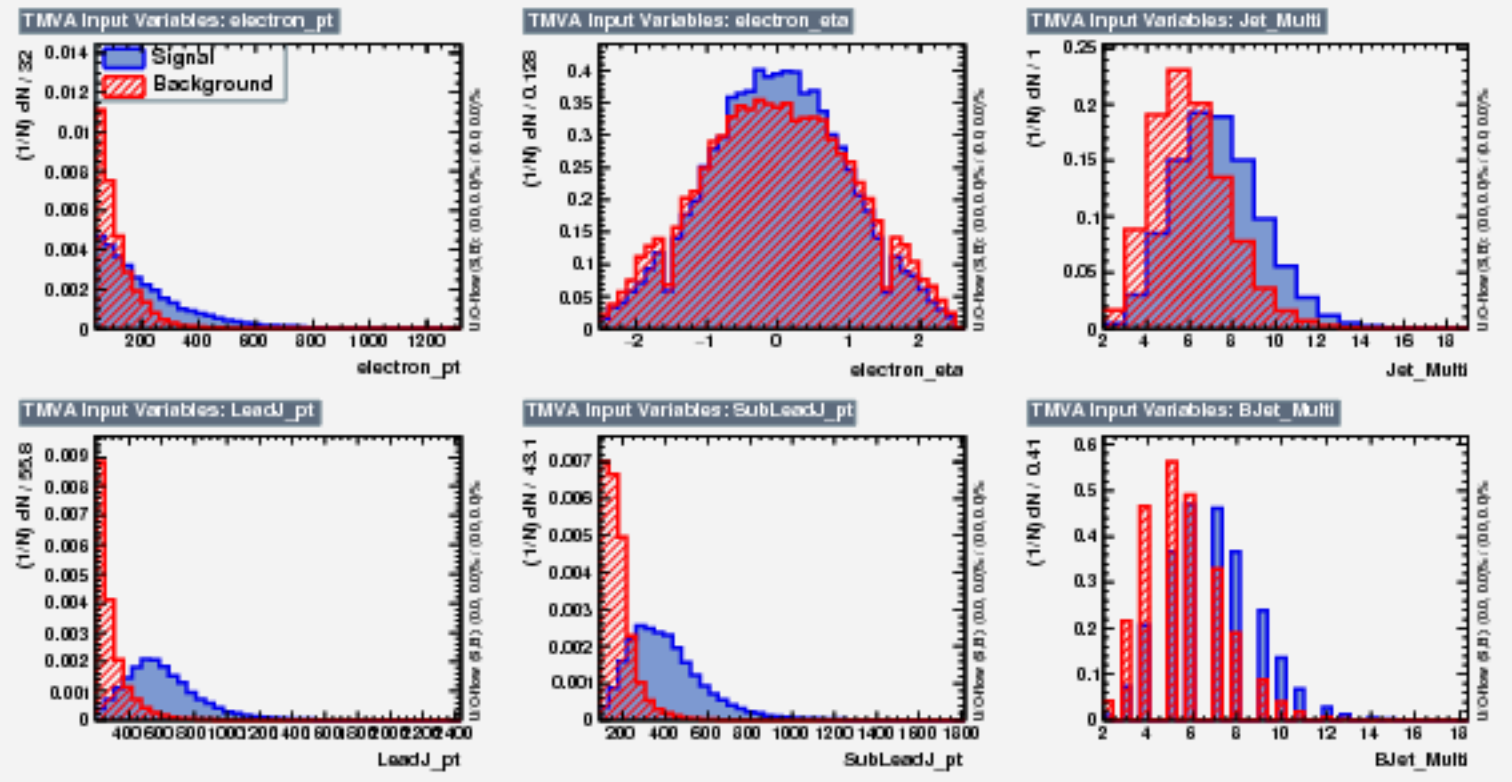
Correlation Matrix (signal)

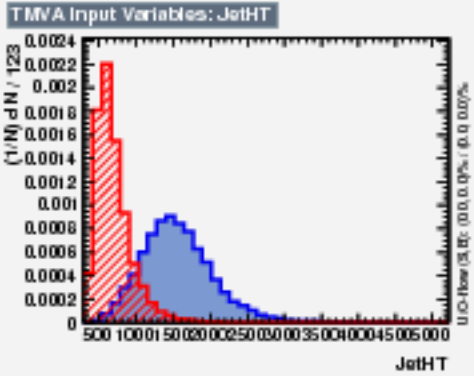



TMVA response for classifier: BDT
TMVA
Signal
Background
(1/N) dN / dx
3
2.5
2
1.5
1
0.5
0
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
1
BDT response
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%

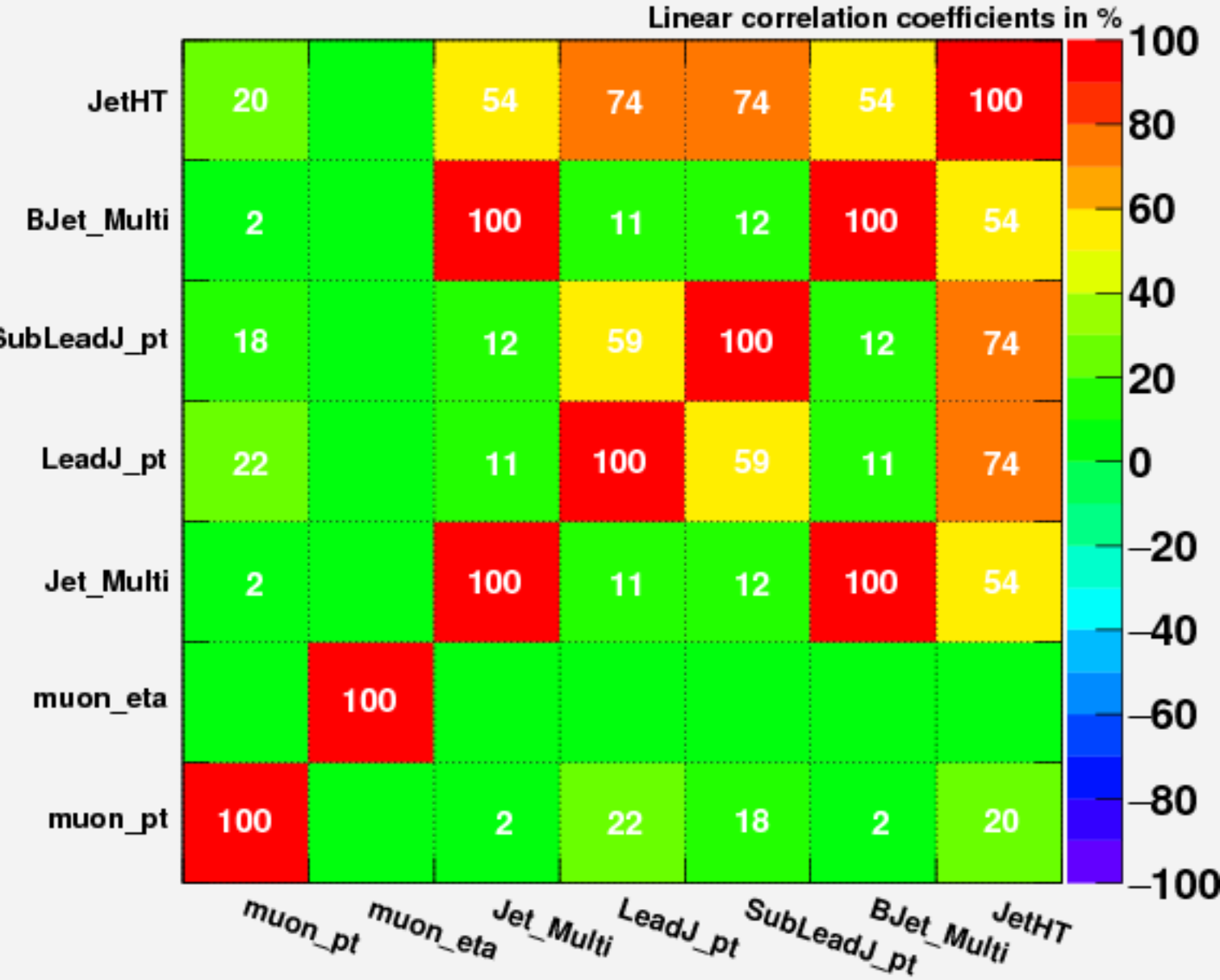

TMVA overtraining check for classifier: BDT
TMVA
Signal (test sample)
Background (test sample)
Signal (training sample)
Background (training sample)
Kolmogorov-Smirnov test: signal (background) probability = 0.489 (0.285)
(1/N) dN / dx
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%
BDT response
0
0.5
1
1.5
2
2.5
3
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
1


Background rejection versus Signal efficiency
TMVA
Background rejection
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Signal efficiency
MVA Method:
BDT

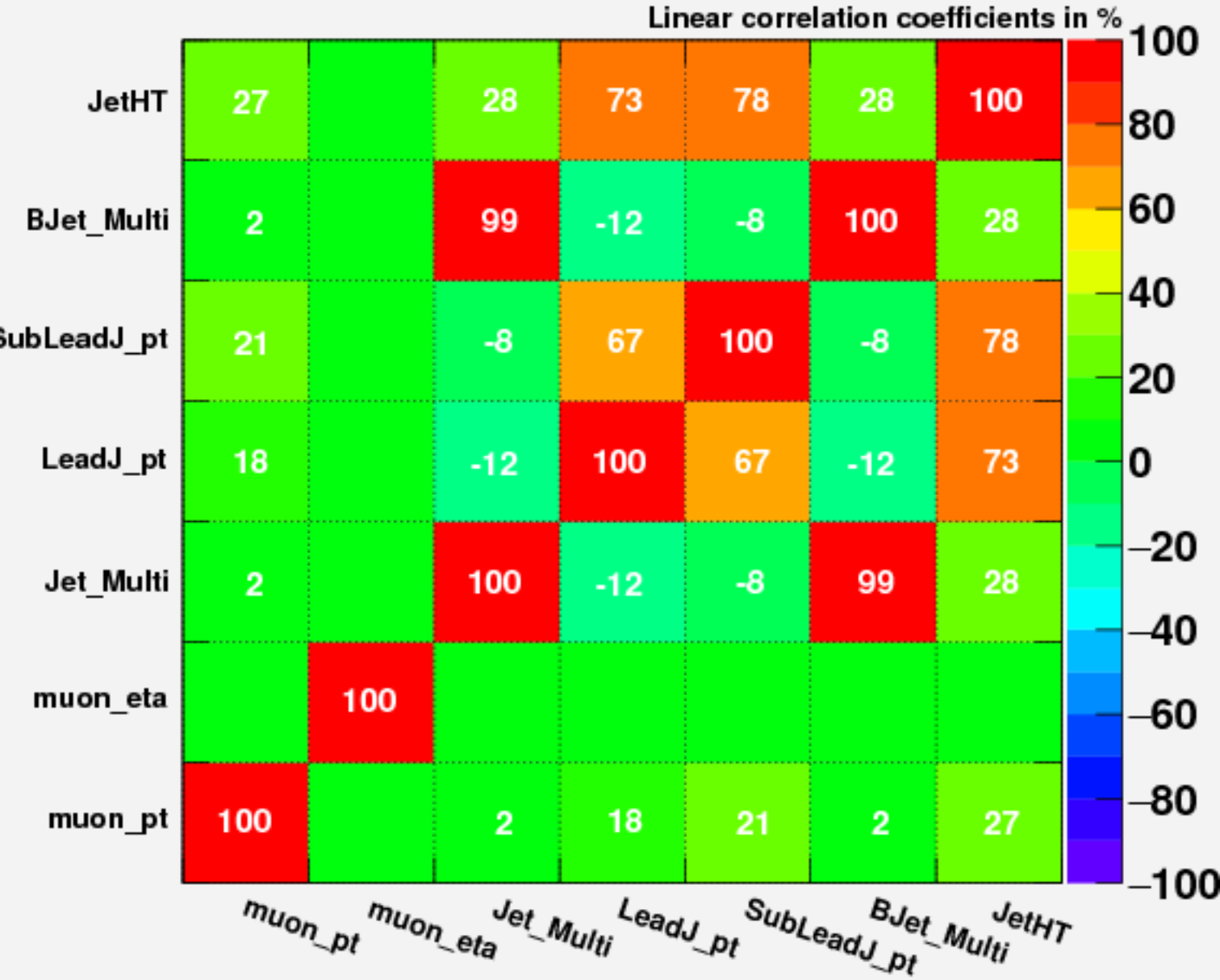

TMVA Input Variables: electron_pt
Signal
Background
(1/N) dN / 32
electron_pt
TMVA Input Variables: electron_eta
(1/N) dN / 0.128
electron_eta
TMVA Input Variables: Jet_Multi
(1/N) dN / 1
Jet_Multi
TMVA Input Variables: LeadJ_pt
(1/N) dN / 55.8
LeadJ_pt
TMVA Input Variables: SubLeadJ_pt
(1/N) dN / 43.1
SubLeadJ_pt
TMVA Input Variables: BJet_Multi
(1/N) dN / 0.41
BJet_Multi

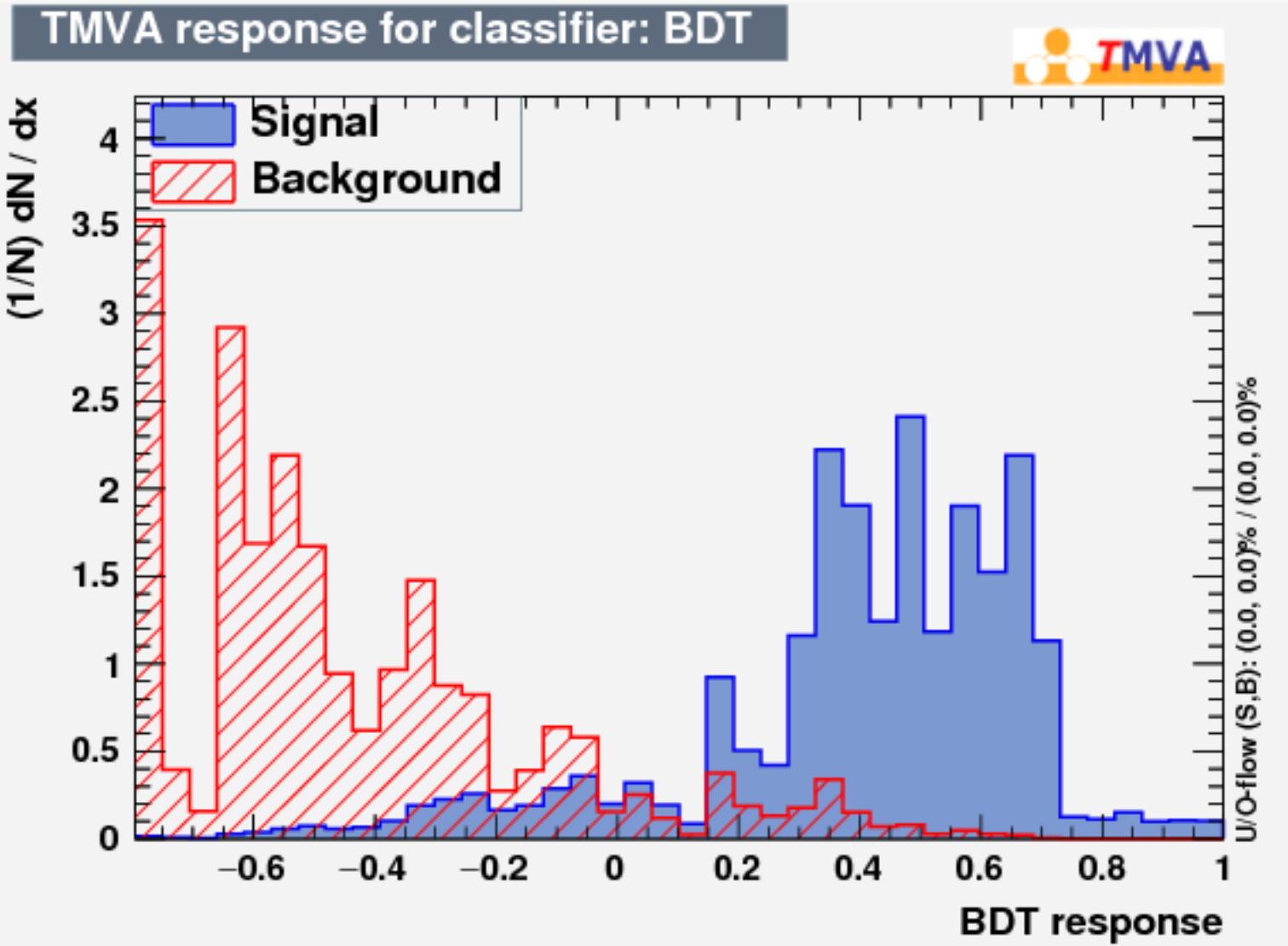

TMVA Input Variables: JetHT
(1/N) dN / 123
0.0024
0.0022
0.002
0.0018
0.0016
0.0014
0.0012
0.001
0.0008
0.0006
0.0004
0.0002
0
500 1000 1500 2000 2500 3000 3500 4000 4500 5000
JetHT
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%

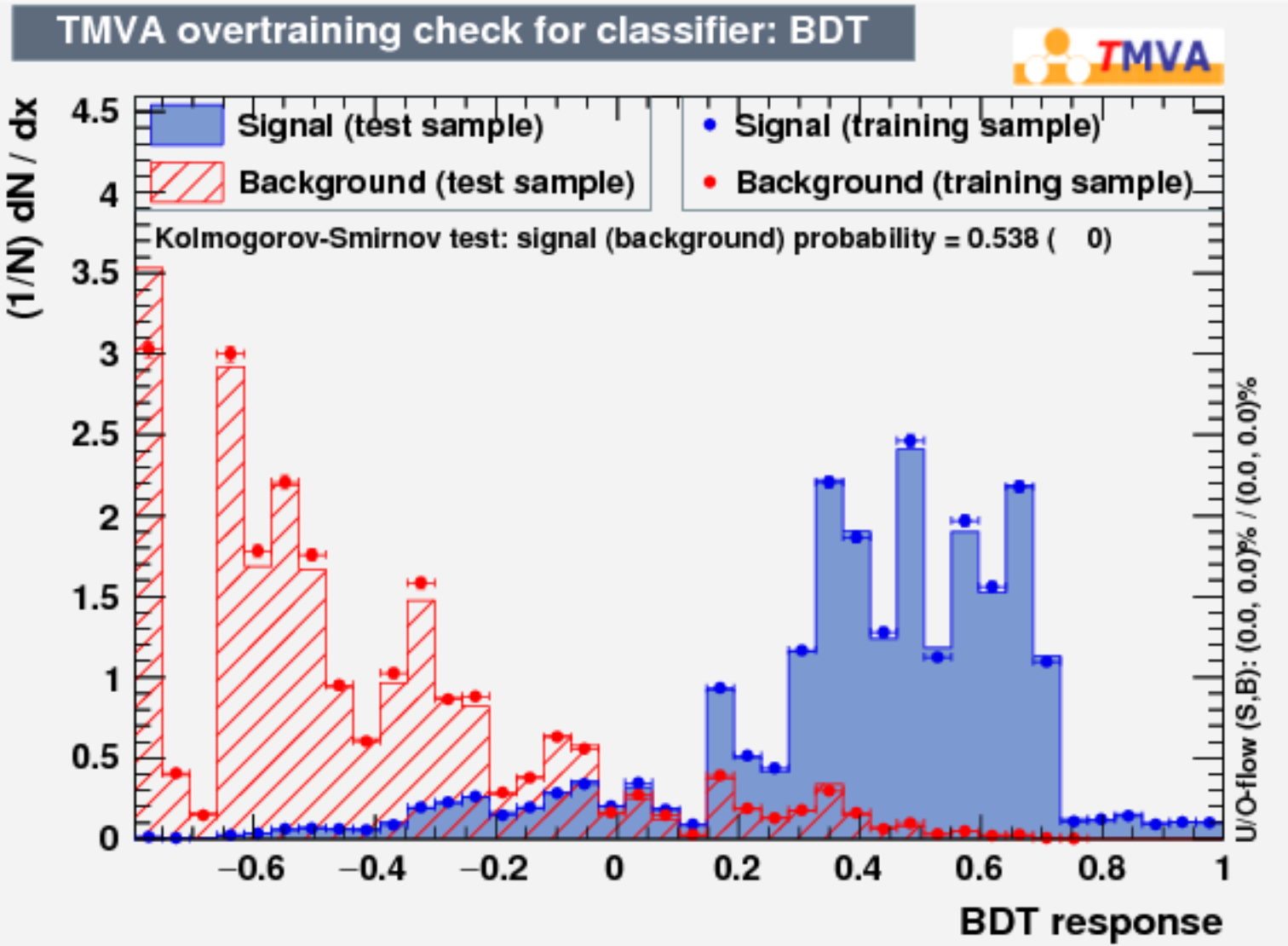
Correlation Matrix (background)

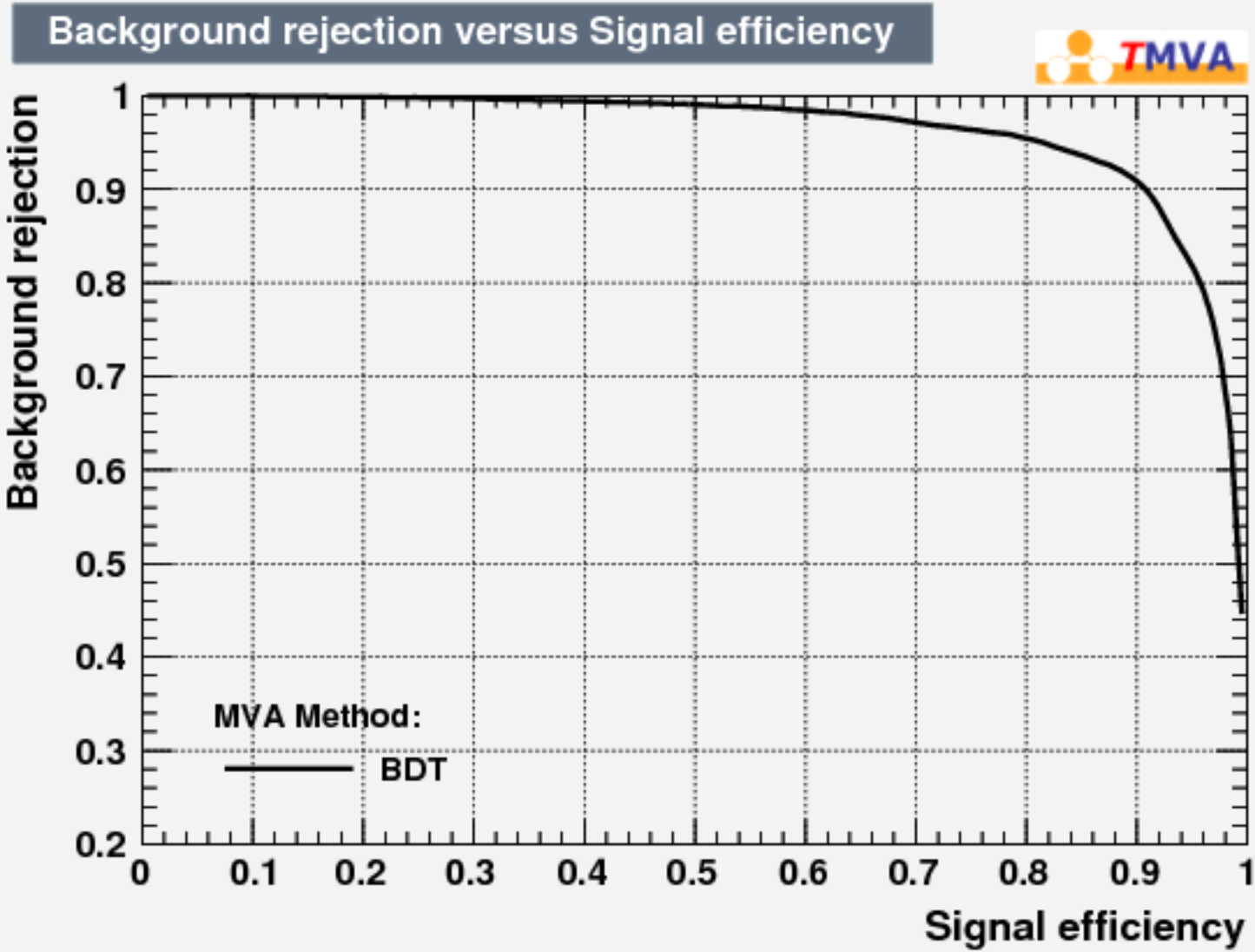


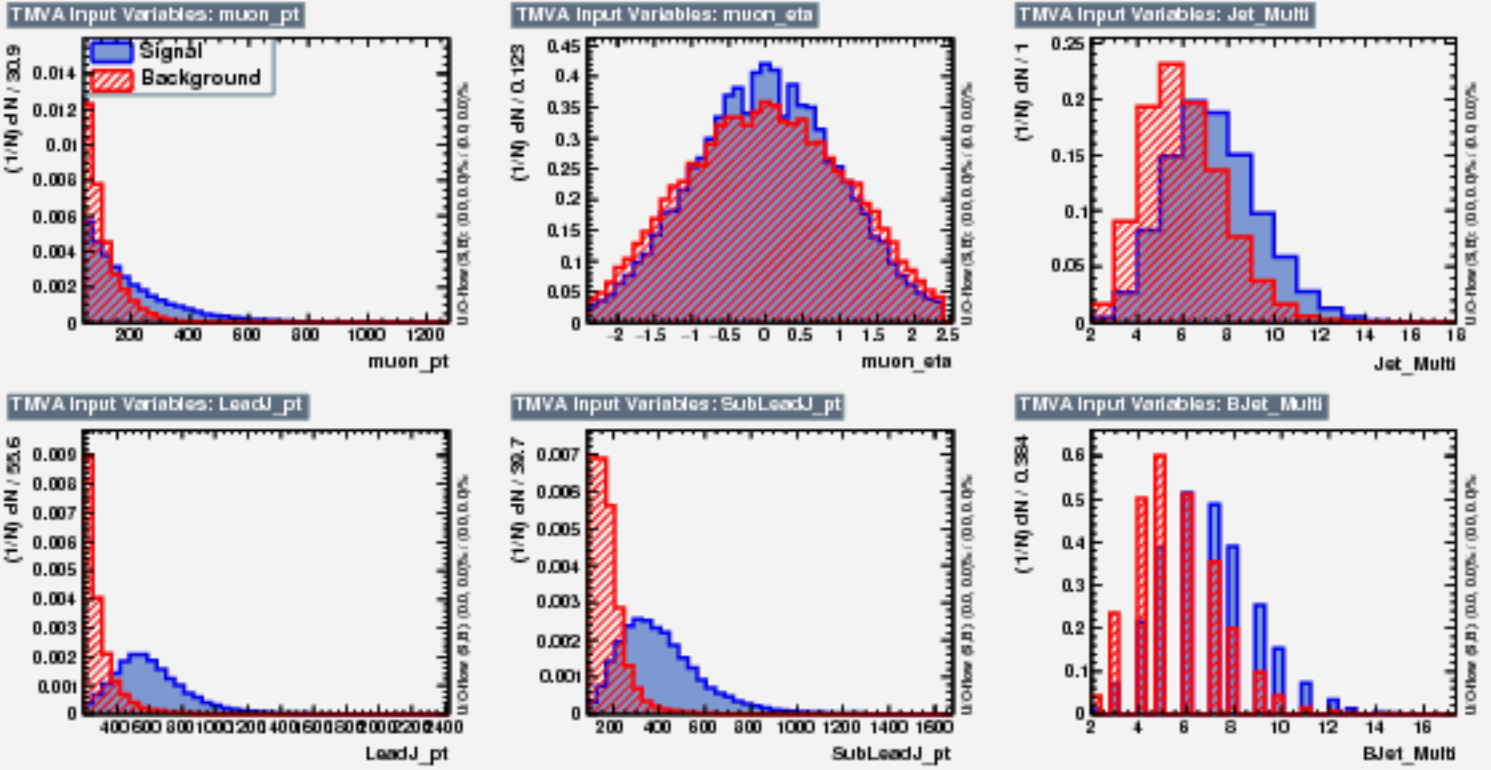
Correlation Matrix (signal)

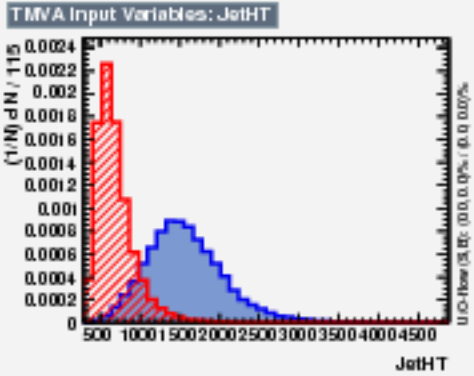



TMVA response for classifier: BDT
TMVA
Signal
Background
(1/N) dN / dx
4
3.5
3
2.5
2
1.5
1
0.5
0
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
1
BDT response
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%

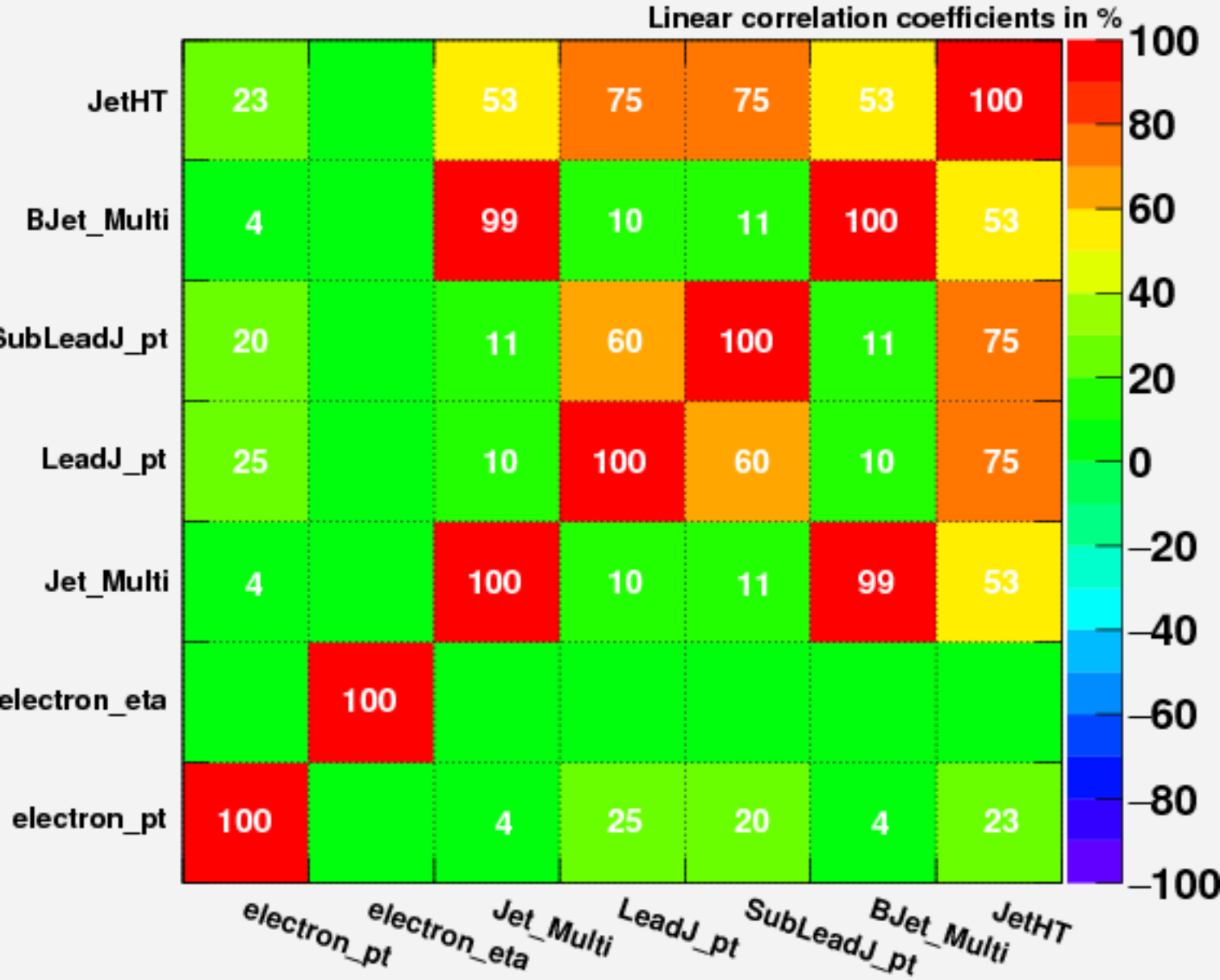

TMVA overtraining check for classifier: BDT
TMVA
Signal (test sample)
Background (test sample)
Signal (training sample)
Background (training sample)
Kolmogorov-Smirnov test: signal (background) probability = 0.538 (0)
(1/N) dN / dx
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%
BDT response
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
1


Background rejection versus Signal efficiency
TMVA
Background rejection
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Signal efficiency
MVA Method:
BDT

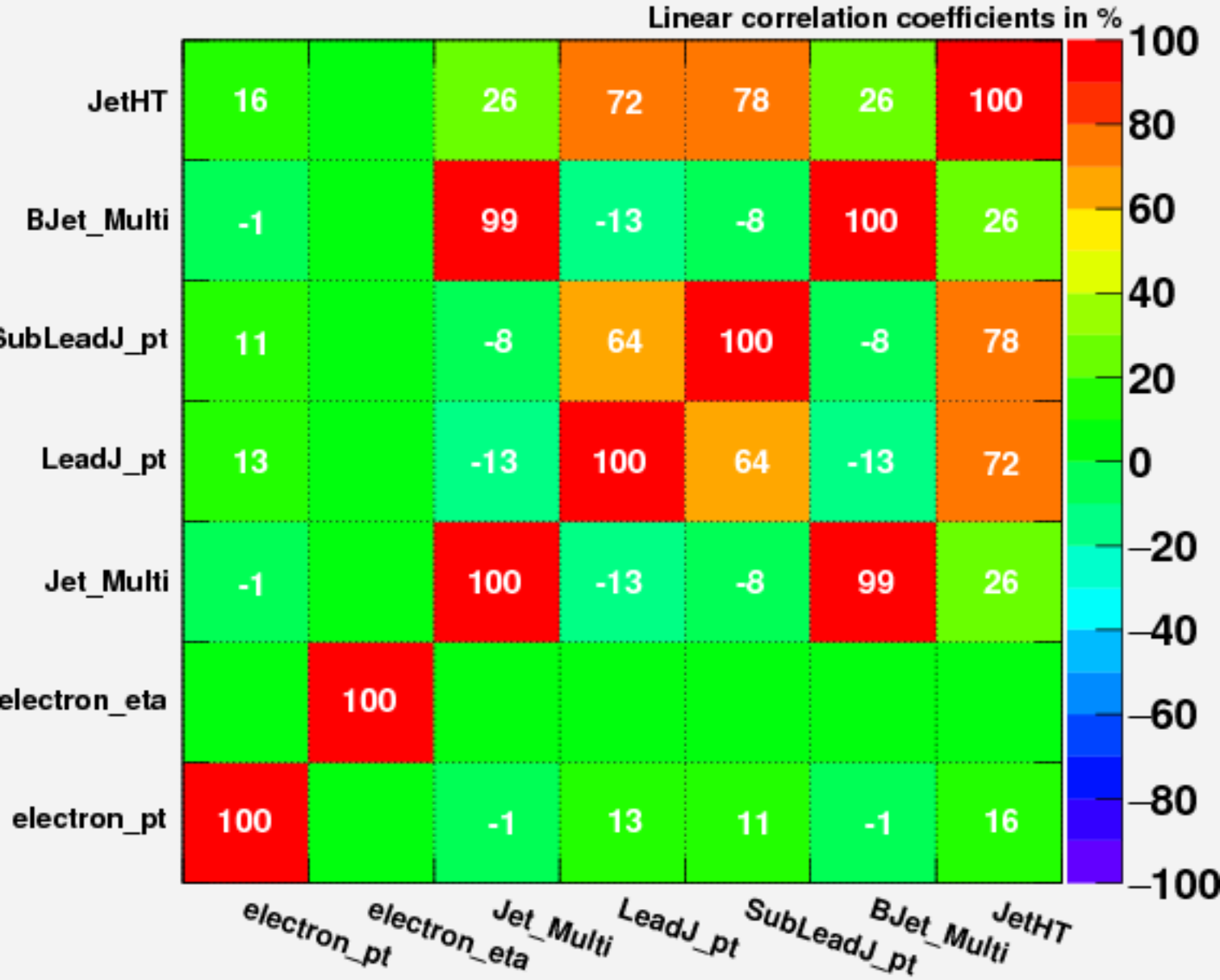

TMVA Input Variables: muon_pt
Signal
Background
(1/N) dN / 30.9
muon_pt
TMVA Input Variables: muon_eta
(1/N) dN / 0.123
muon_eta
TMVA Input Variables: Jet_Multi
(1/N) dN / 1
Jet_Multi
TMVA Input Variables: LeadJ_pt
(1/N) dN / 55.6
LeadJ_pt
TMVA Input Variables: SubLeadJ_pt
(1/N) dN / 39.7
SubLeadJ_pt
TMVA Input Variables: BJet_Multi
(1/N) dN / 0.384
BJet_Multi

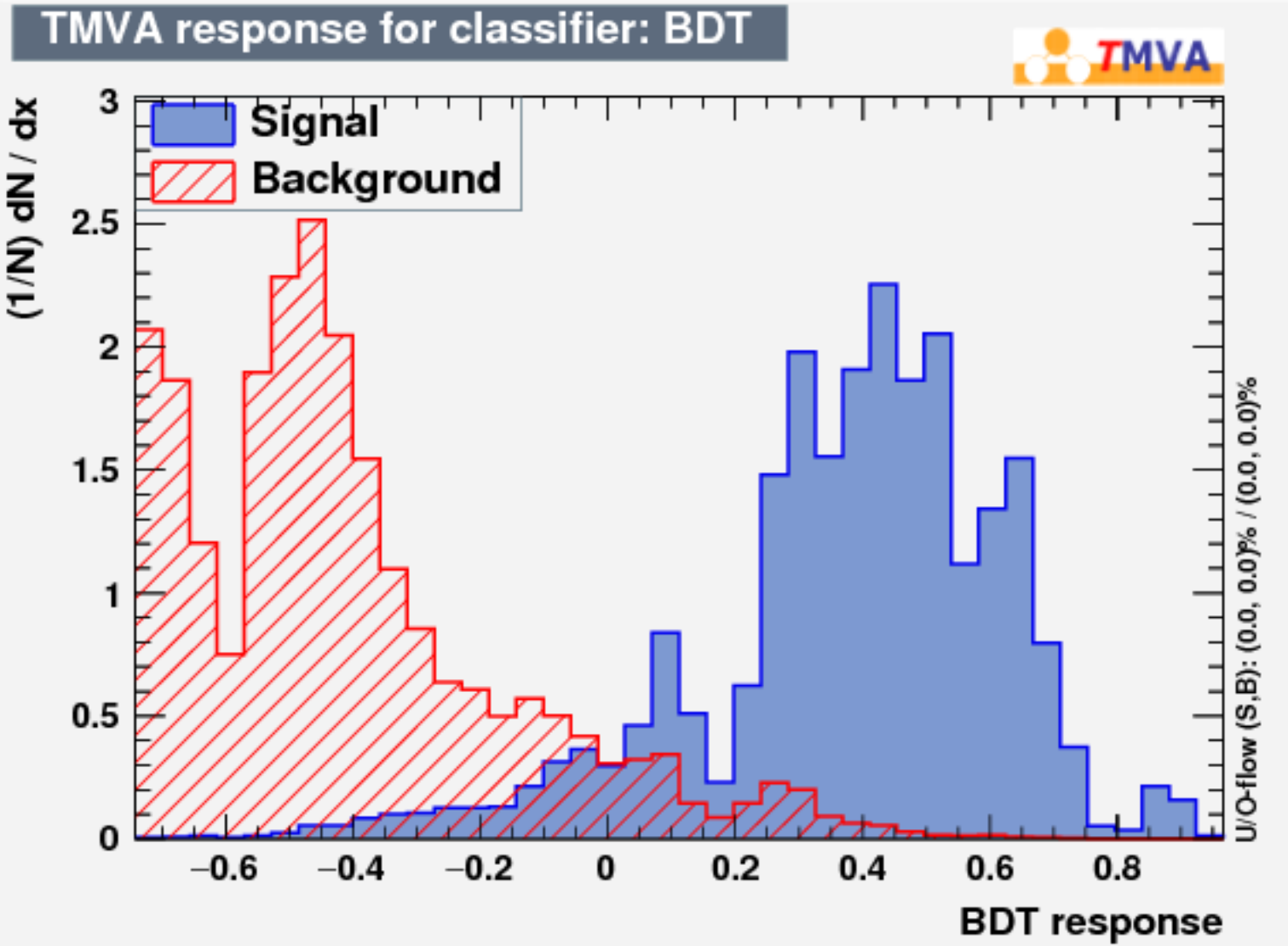

TMVA Input Variables: JetHT
(1/N) dN / 115
0.0024
0.0022
0.002
0.0018
0.0016
0.0014
0.0012
0.001
0.0008
0.0006
0.0004
0.0002
0
500 1000 1500 2000 2500 3000 3500 4000 4500
JetHT
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%

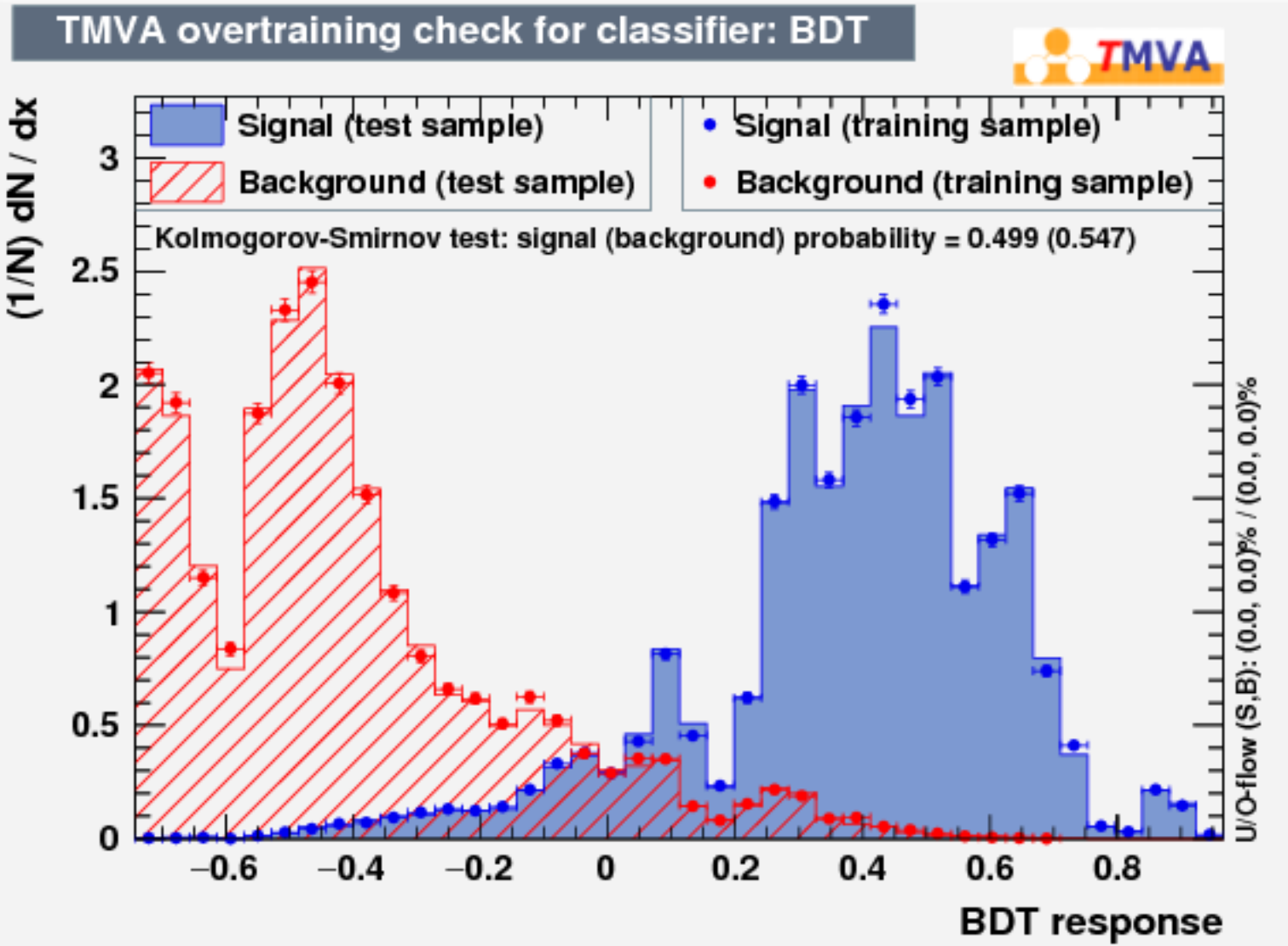
Correlation Matrix (background)

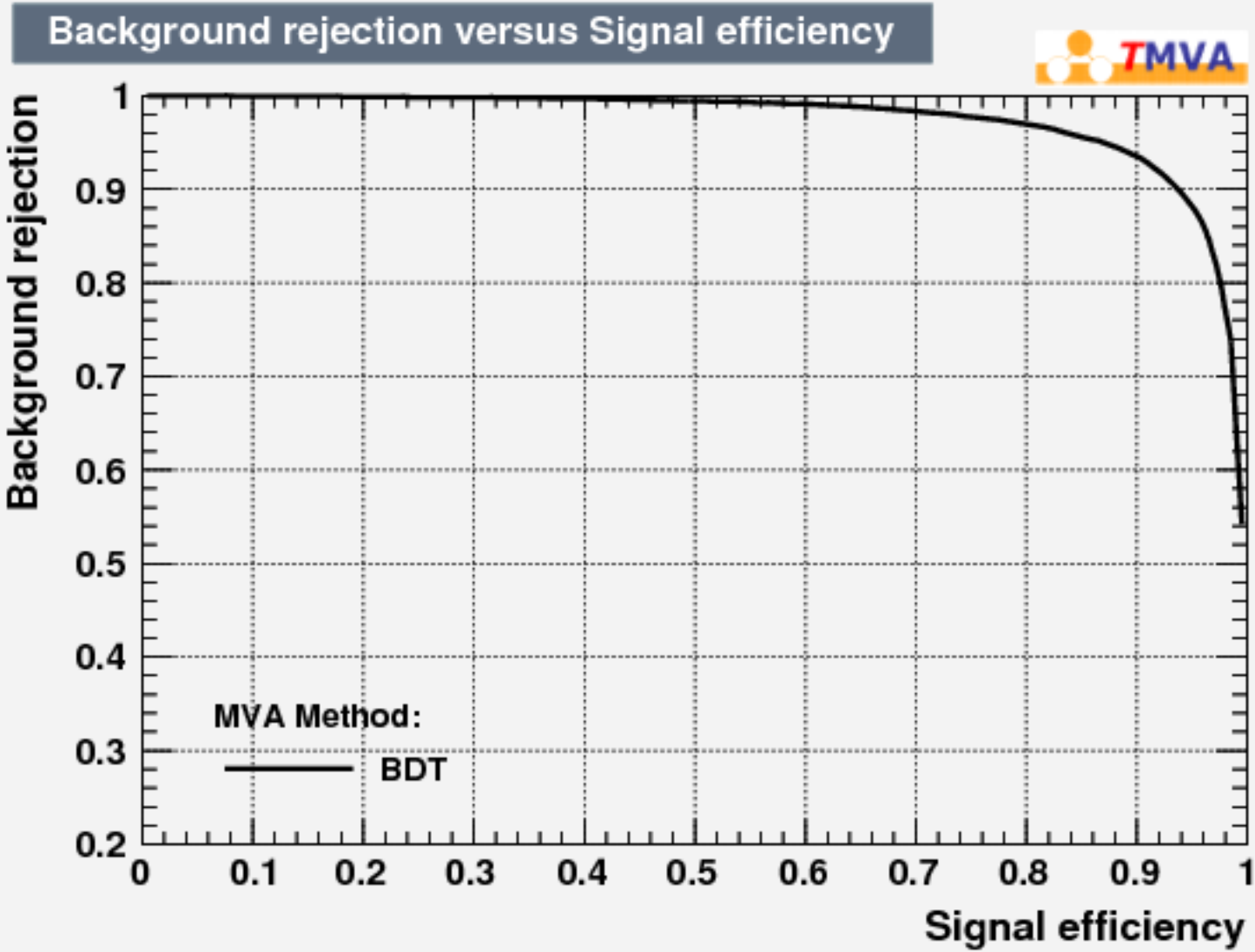


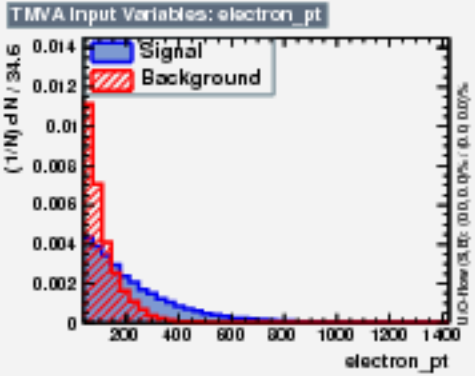
Correlation Matrix (signal)

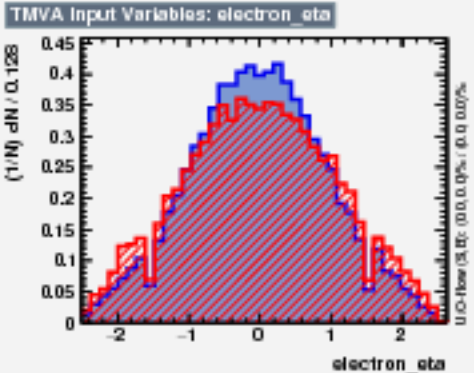


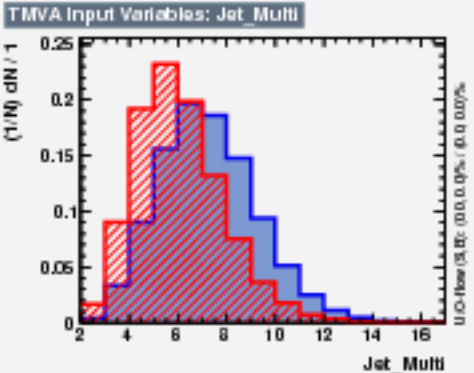

TMVA response for classifier: BDT
TMVA
Signal
Background
(1/N) dN / dx
3
2.5
2
1.5
1
0.5
0
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
BDT response
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%

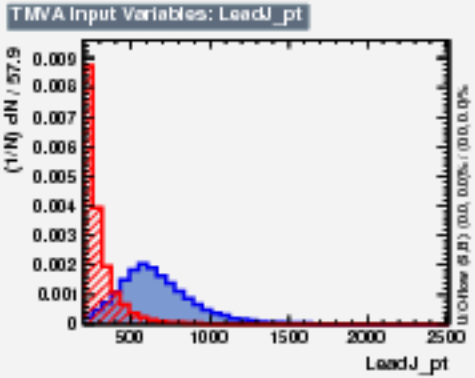

TMVA overtraining check for classifier: BDT
TMVA
Signal (test sample)
Background (test sample)
Signal (training sample)
Background (training sample)
Kolmogorov-Smirnov test: signal (background) probability = 0.499 (0.547)
(1/N) dN / dx
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%
BDT response
0
0.5
1
1.5
2
2.5
3
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8

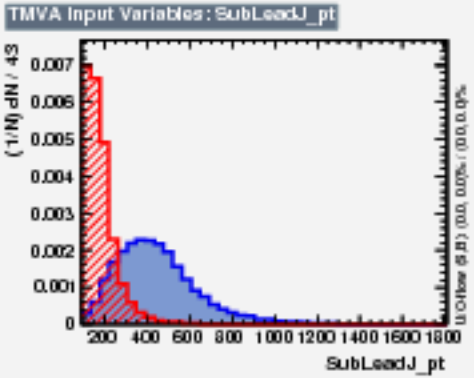

Background rejection versus Signal efficiency
TMVA
Background rejection
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Signal efficiency
MVA Method:
BDT

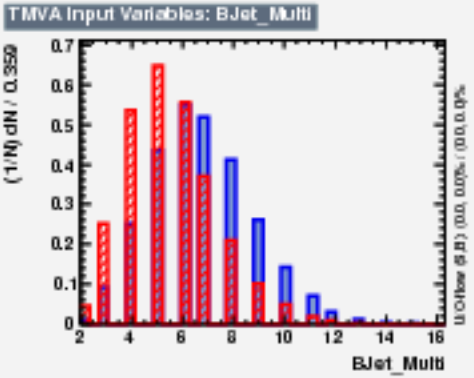

TMVA Input Variables: electron_pt
Signal
Background
(1/N) dN / 34.6
electron_pt

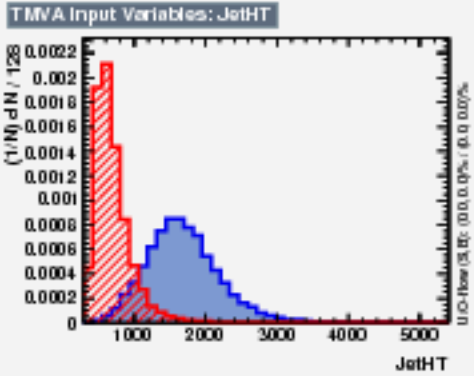

TMVA Input Variables: electron_eta
(1/N) dN / 0.128
electron_eta


TMVA Input Variables: Jet_Multi
(1/N) dN / 1
Jet_Multi

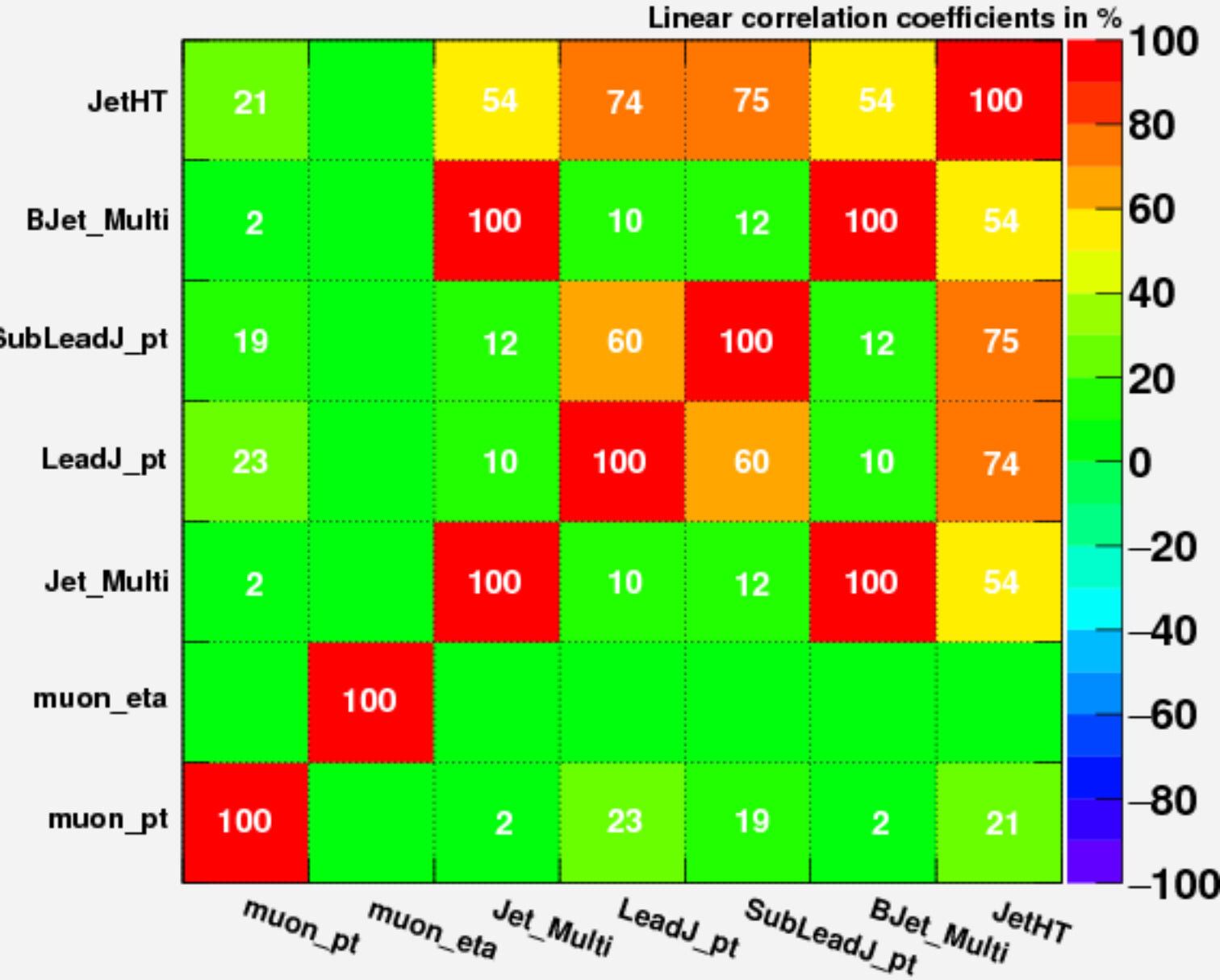

TMVA Input Variables: LeadJ_pt
(1/N) dN / 57.9
LeadJ_pt


TMVA Input Variables: SubLeadJ_pt
(1/N) dN / 43
SubLeadJ_pt

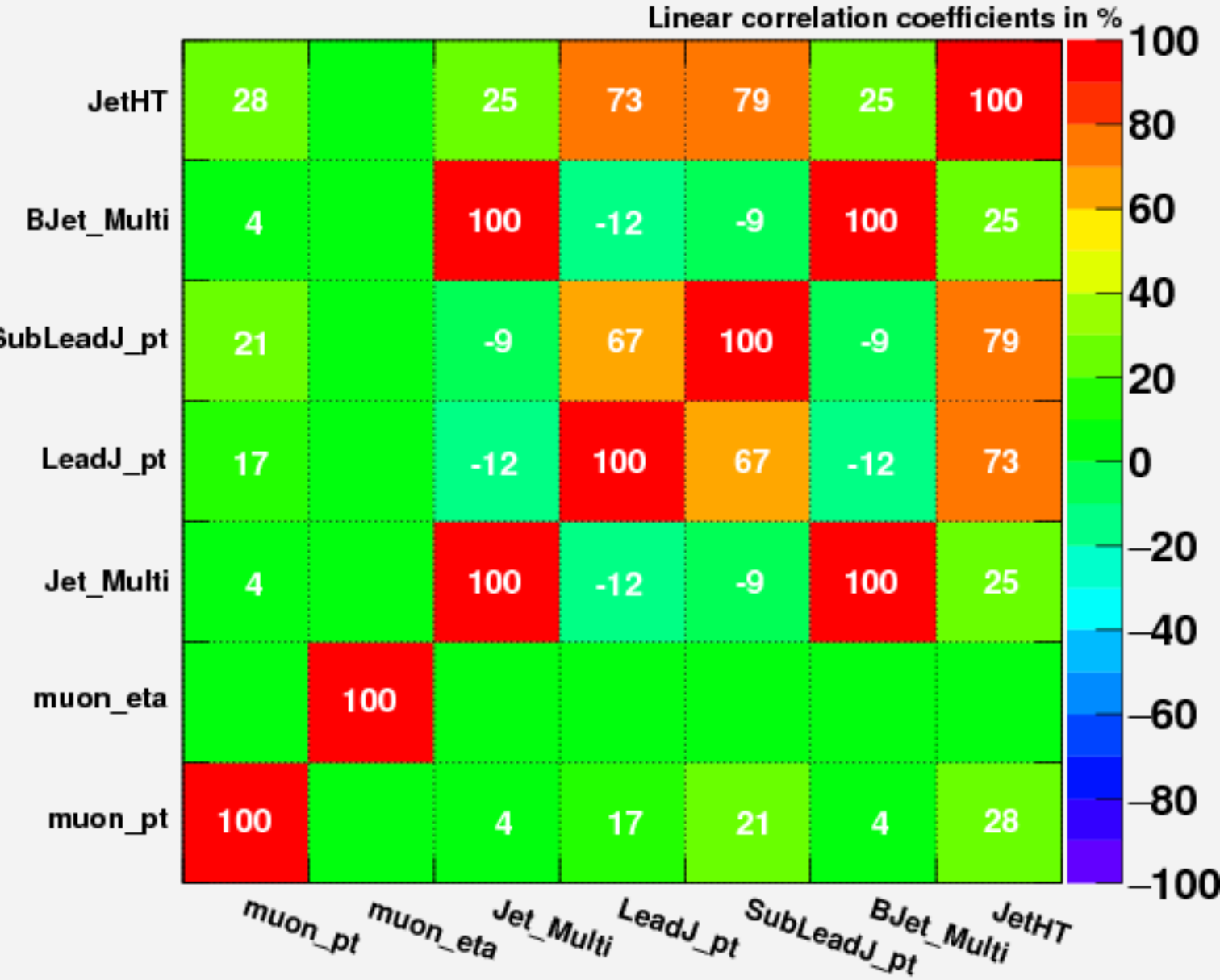

TMVA Input Variables: BJet_Multi
(1/N) dN / 0.359
BJet_Multi

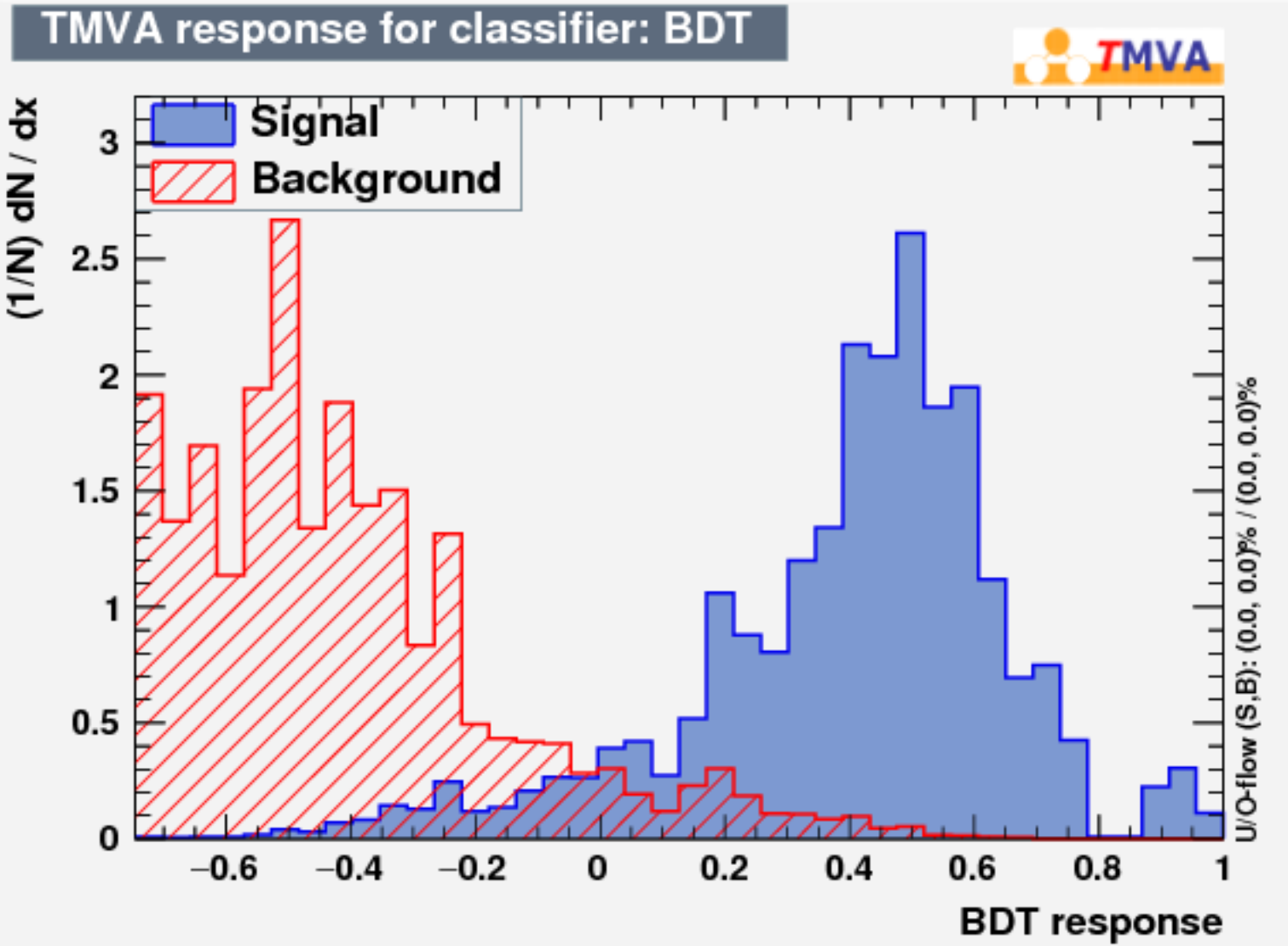

TMVA Input Variables: JetHT
(1/N) dN / 128
0.0022
0.002
0.0018
0.0016
0.0014
0.0012
0.001
0.0008
0.0006
0.0004
0.0002
0
1000
2000
3000
4000
5000
JetHT
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%

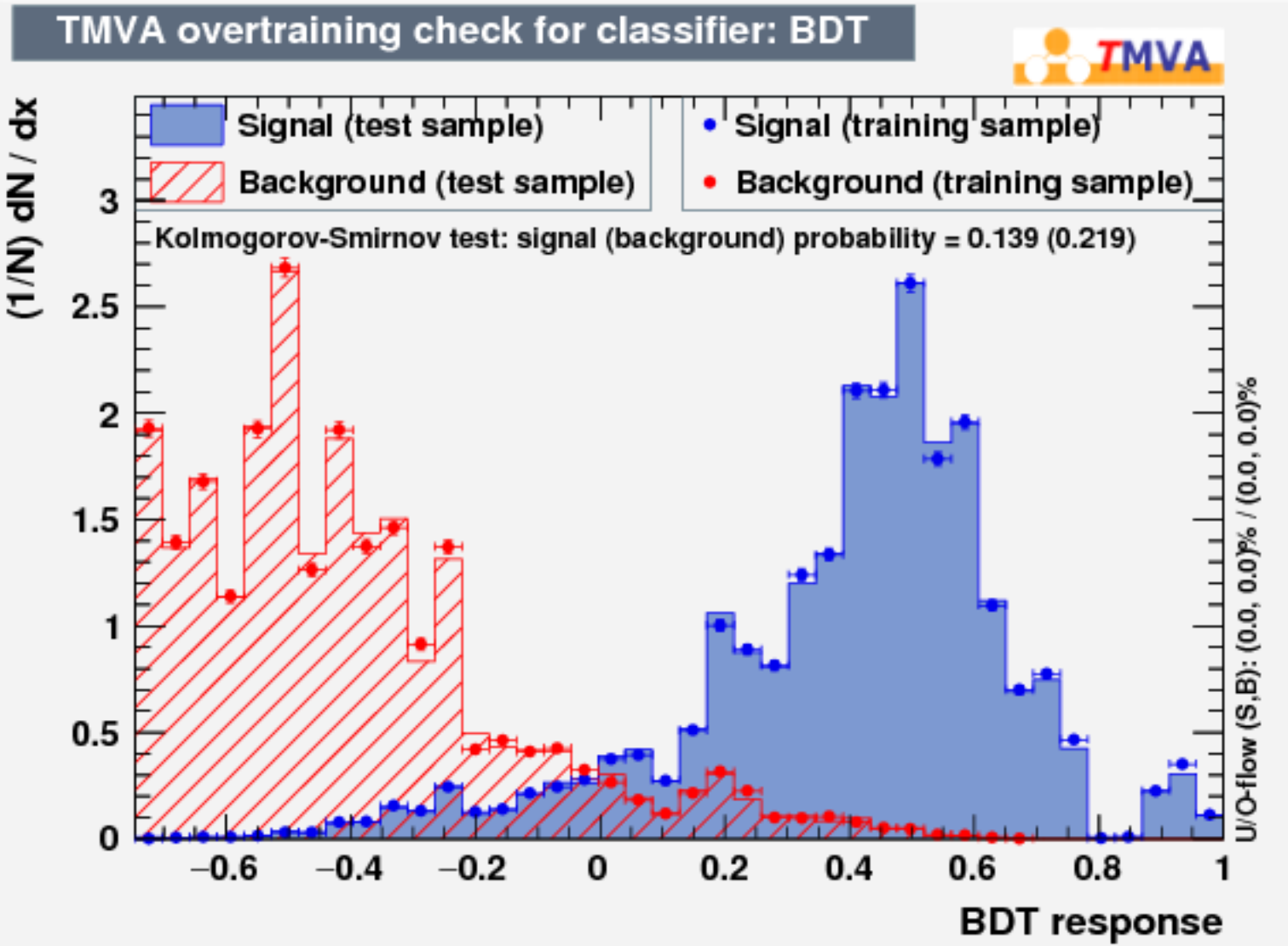
Correlation Matrix (background)

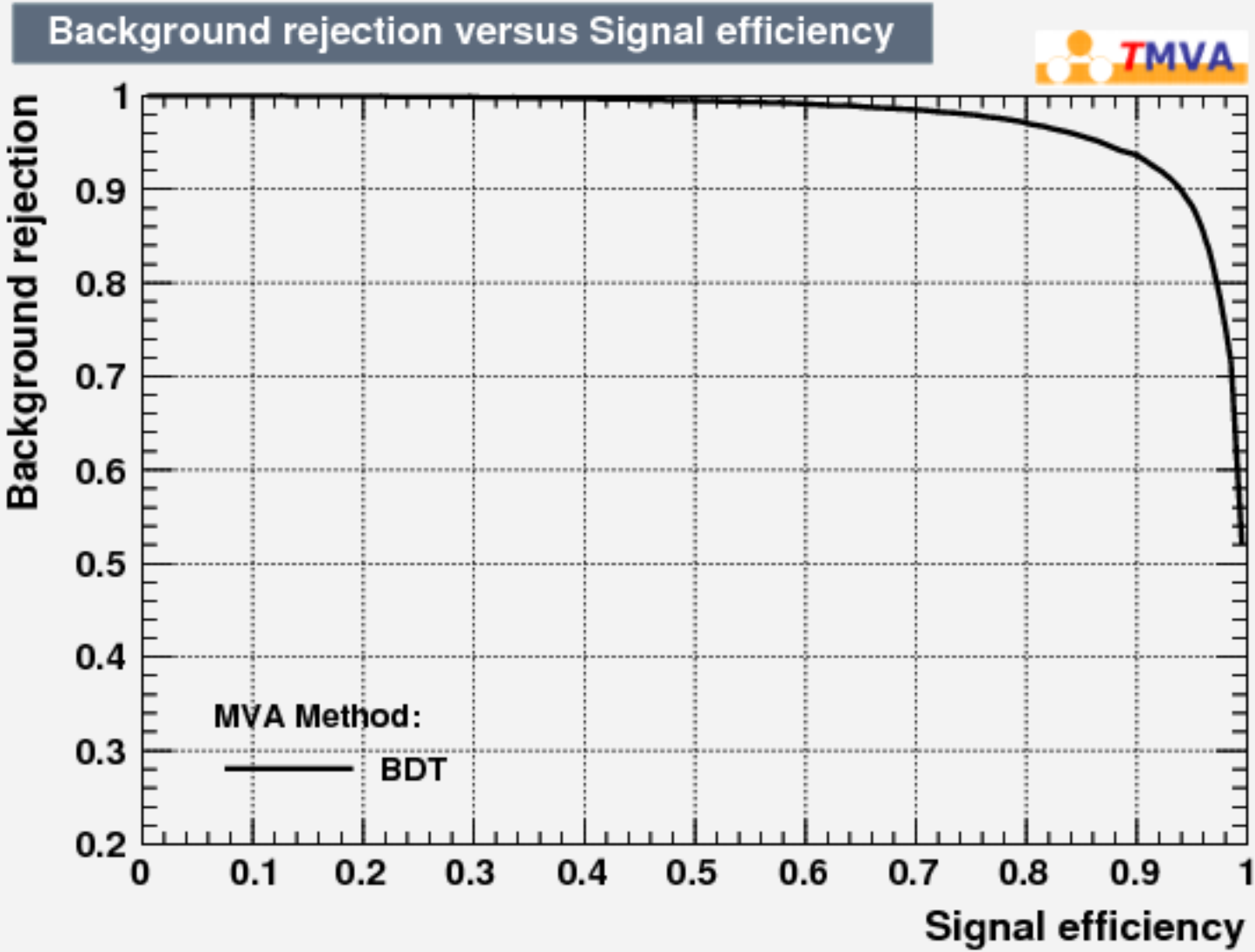


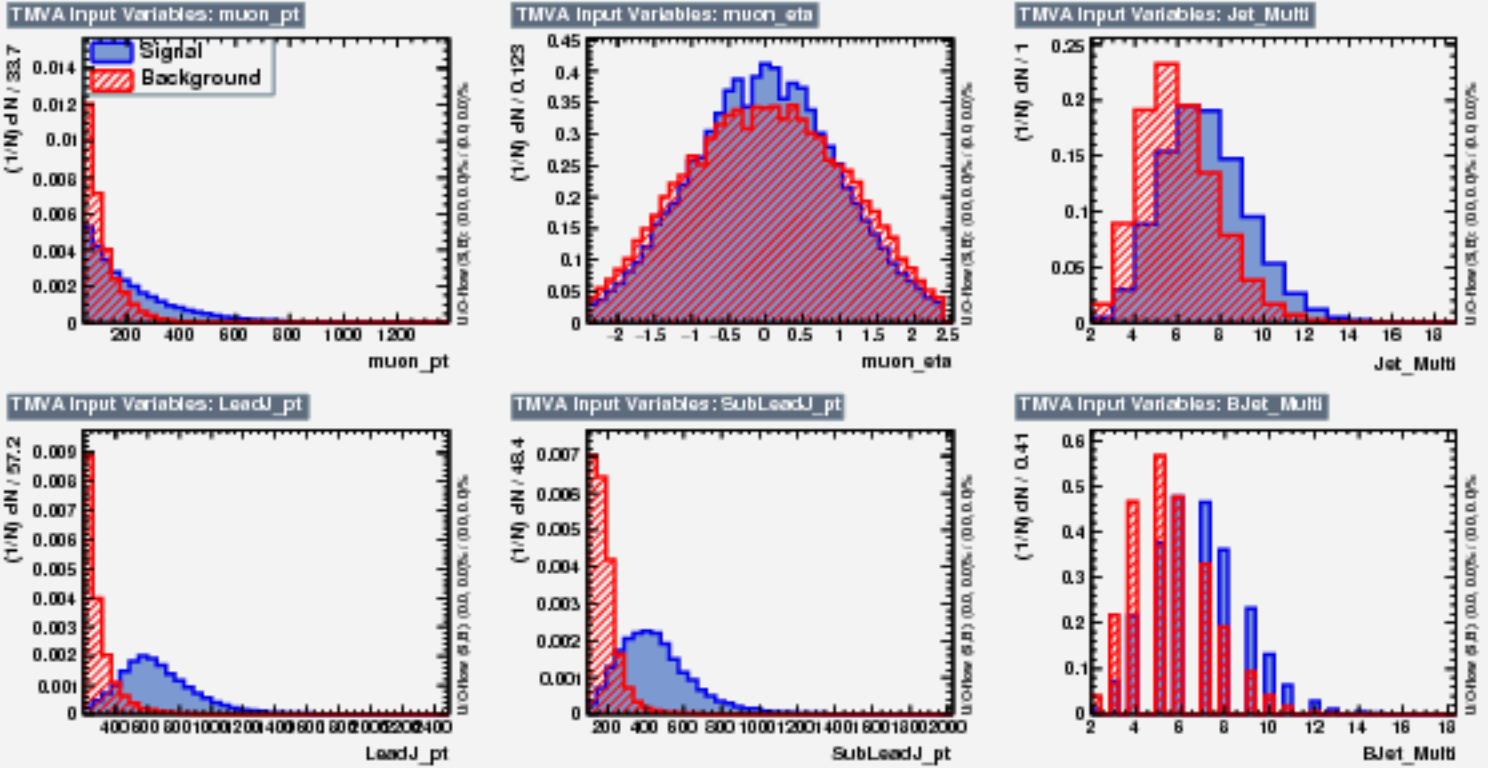
Correlation Matrix (signal)

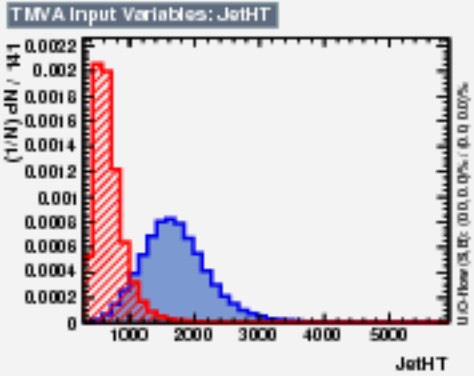



TMVA response for classifier: BDT
TMVA
Signal
Background
(1/N) dN / dx
3
2.5
2
1.5
1
0.5
0
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
1
BDT response
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%

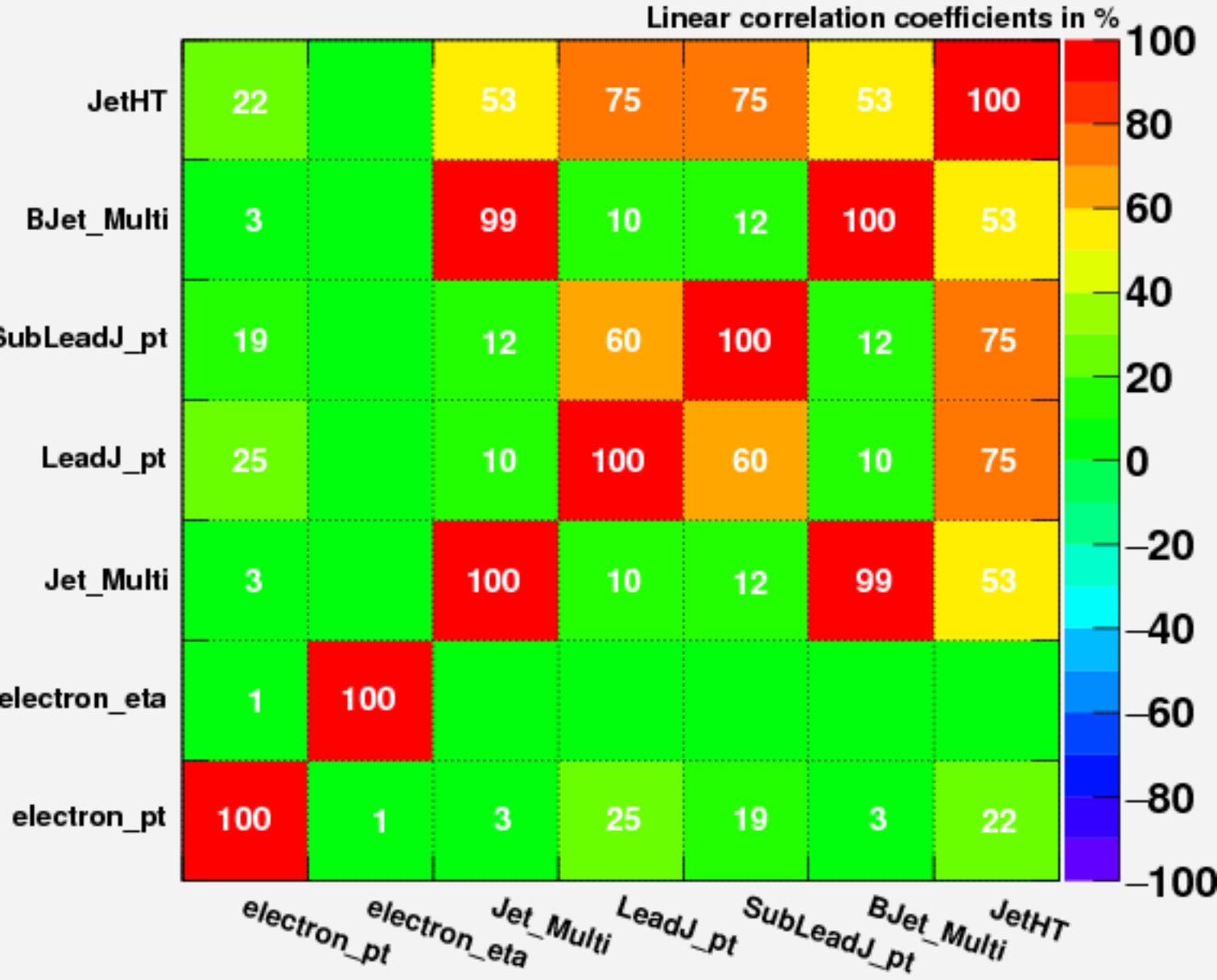

TMVA overtraining check for classifier: BDT
TMVA
Signal (test sample)
Background (test sample)
Signal (training sample)
Background (training sample)
Kolmogorov-Smirnov test: signal (background) probability = 0.139 (0.219)
(1/N) dN / dx
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%
BDT response
0
0.5
1
1.5
2
2.5
3
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
1


Background rejection versus Signal efficiency
TMVA
Background rejection
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Signal efficiency
MVA Method:
BDT

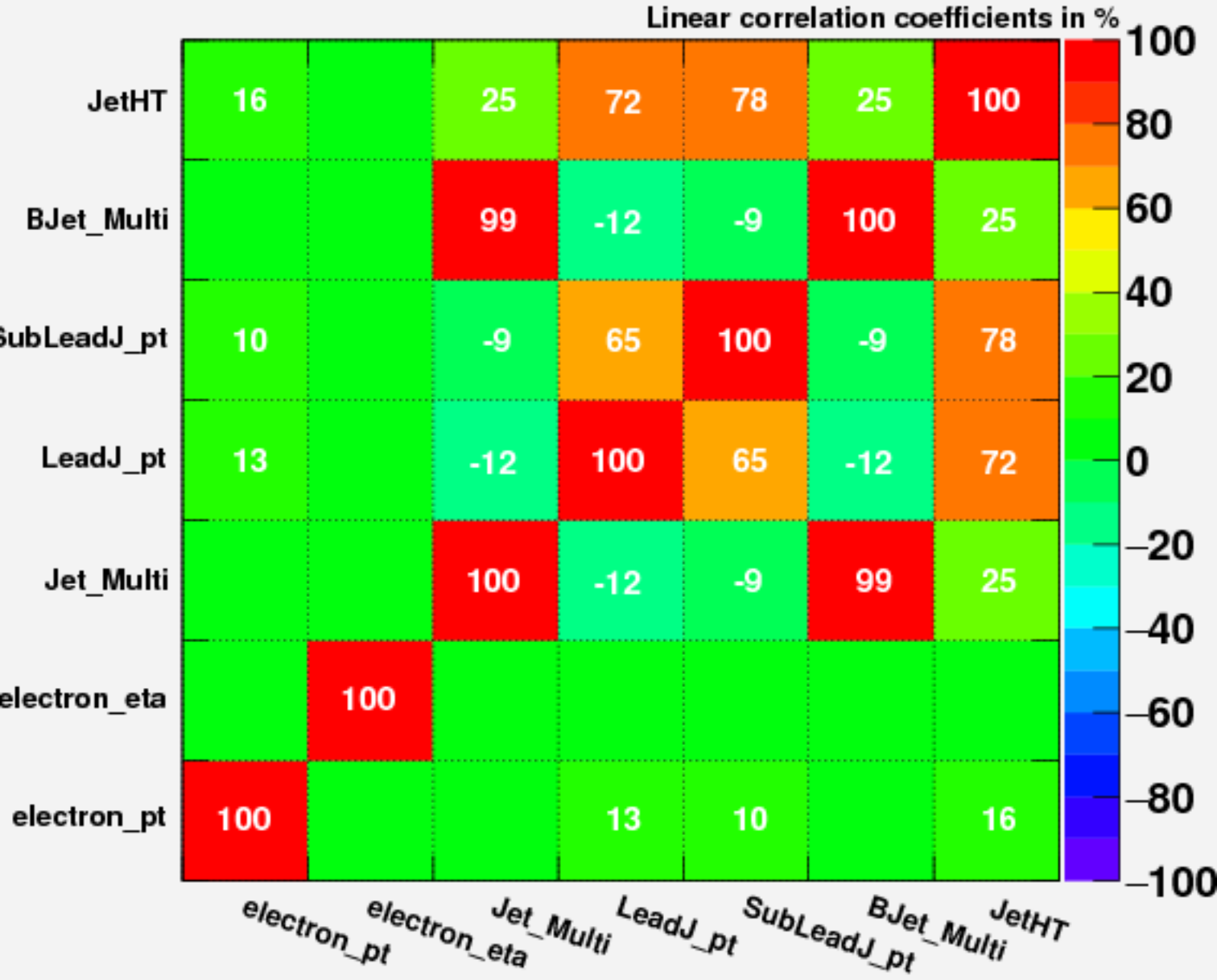

TMVA Input Variables: muon_pt
Signal
Background
(1/N) dN / 33.7
muon_pt
TMVA Input Variables: muon_eta
(1/N) dN / 0.123
muon_eta
TMVA Input Variables: Jet_Multi
(1/N) dN / 1
Jet_Multi
TMVA Input Variables: LeadJ_pt
(1/N) dN / 57.2
LeadJ_pt
TMVA Input Variables: SubLeadJ_pt
(1/N) dN / 48.4
SubLeadJ_pt
TMVA Input Variables: BJet_Multi
(1/N) dN / 0.41
BJet_Multi

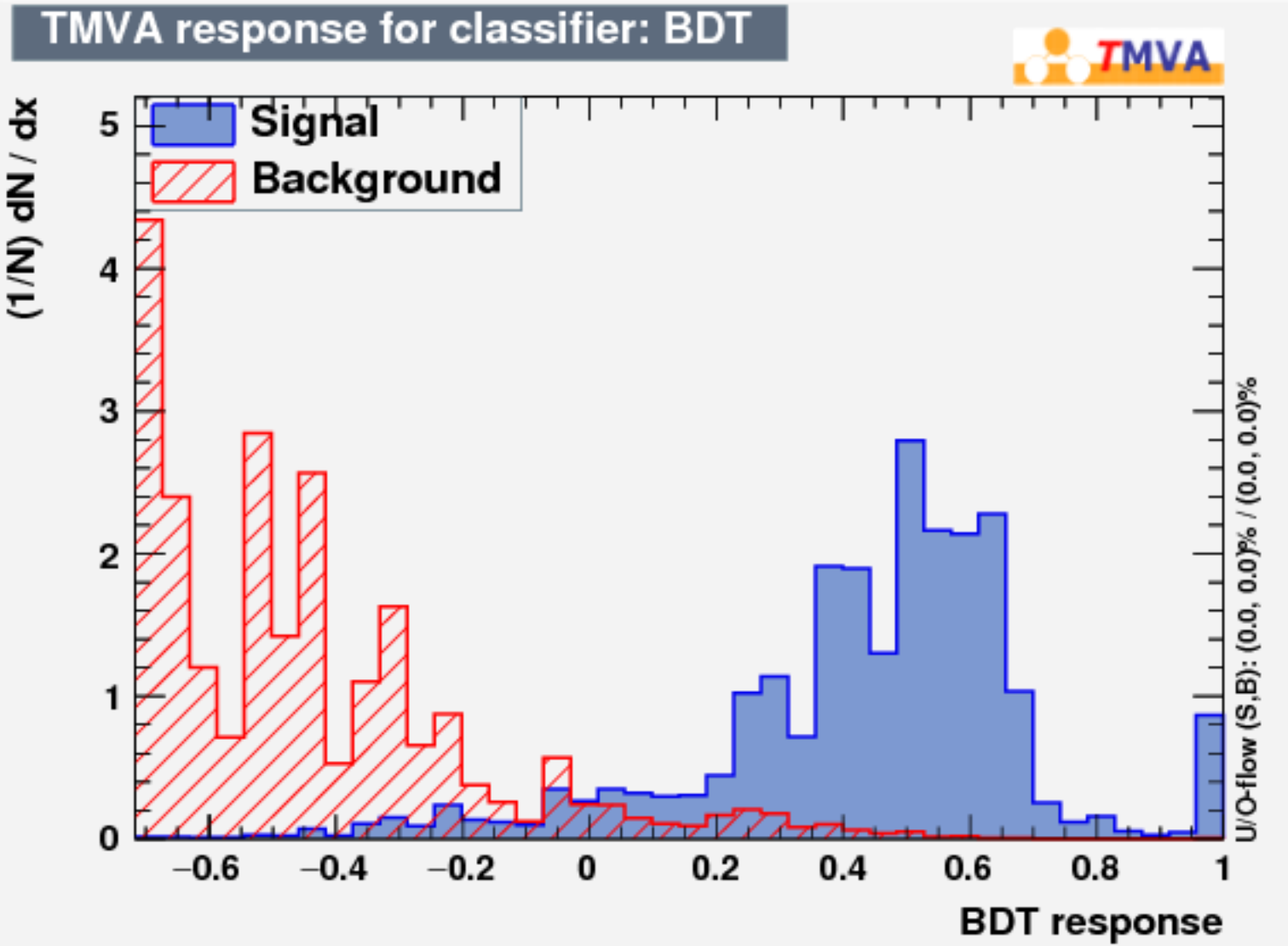

TMVA Input Variables: JetHT
(1/N) dN / 141
0.0022
0.002
0.0018
0.0016
0.0014
0.0012
0.001
0.0008
0.0006
0.0004
0.0002
0
1000
2000
3000
4000
5000
JetHT
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%

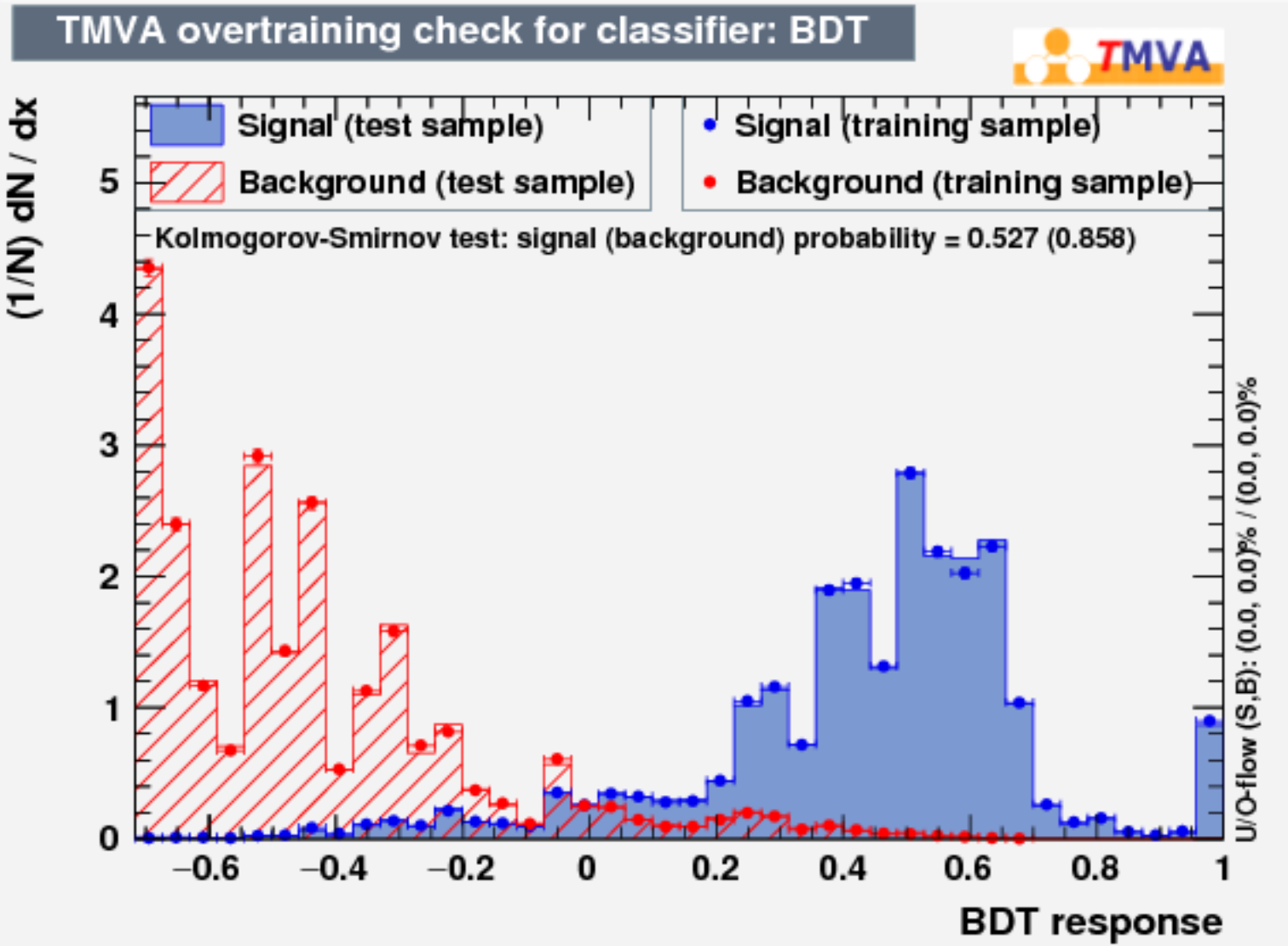
Correlation Matrix (background)

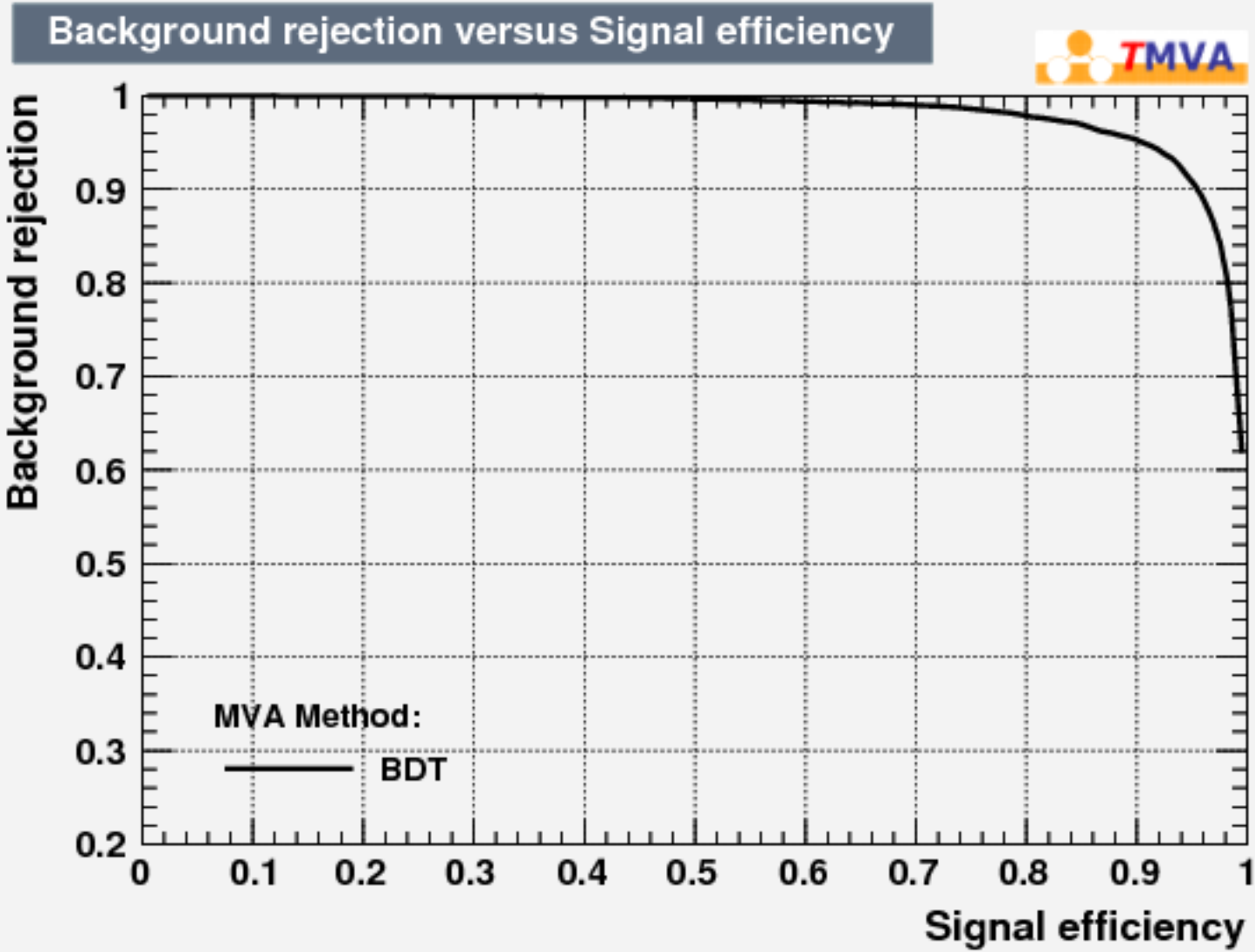


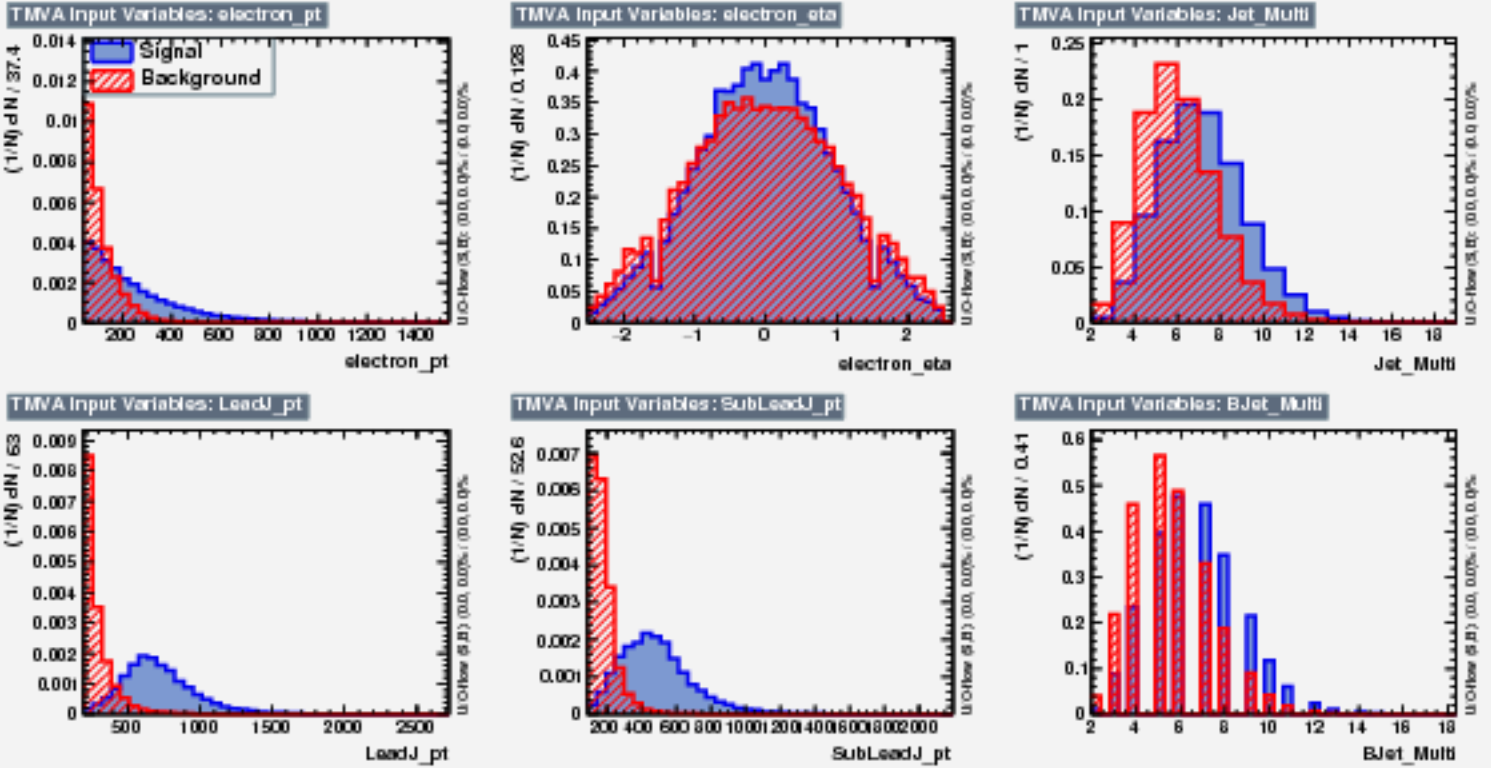
Correlation Matrix (signal)



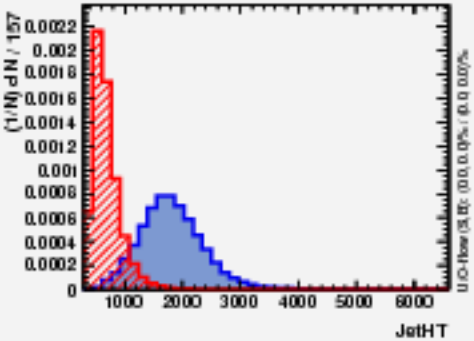

TMVA response for classifier: BDT
TMVA
Signal
Background
(1/N) dN / dx
5
4
3
2
1
0
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
1
BDT response
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%


TMVA overtraining check for classifier: BDT
TMVA
Signal (test sample)
Background (test sample)
Signal (training sample)
Background (training sample)
Kolmogorov-Smirnov test: signal (background) probability = 0.527 (0.858)
(1/N) dN / dx
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%
BDT response
0
1
2
3
4
5
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
1

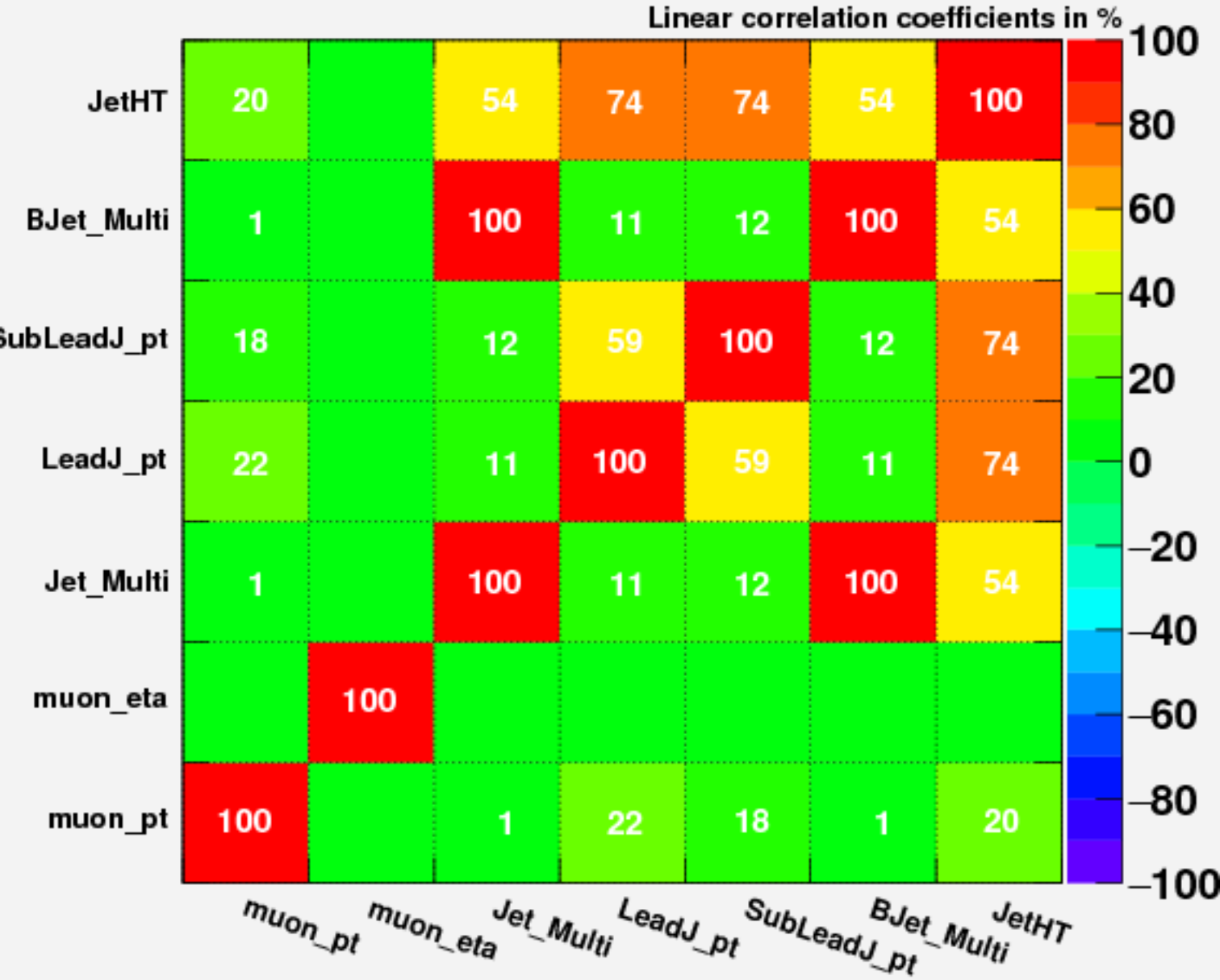

Background rejection versus Signal efficiency
TMVA
Background rejection
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Signal efficiency
MVA Method:
BDT


TMVA Input Variables: electron_pt
Signal
Background
(1/N) dN / 37.4
electron_pt
TMVA Input Variables: electron_eta
(1/N) dN / 0.128
electron_eta
TMVA Input Variables: Jet_Multi
(1/N) dN / 1
Jet_Multi
TMVA Input Variables: LeadJ_pt
(1/N) dN / 53
LeadJ_pt
TMVA Input Variables: SubLeadJ_pt
(1/N) dN / 52.6
SubLeadJ_pt
TMVA Input Variables: BJet_Multi
(1/N) dN / 0.41
BJet_Multi

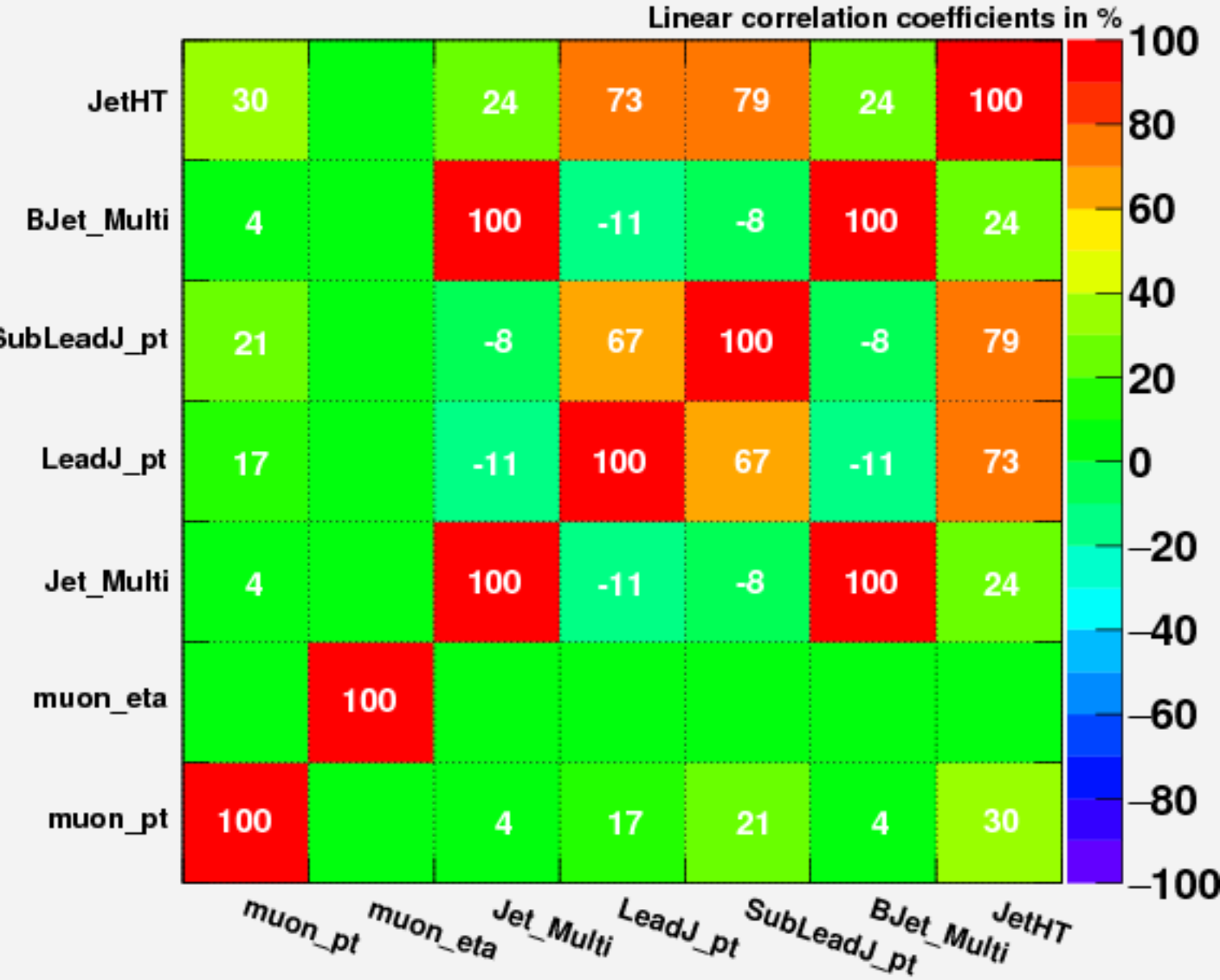
TMVA Input Variables: JetHT

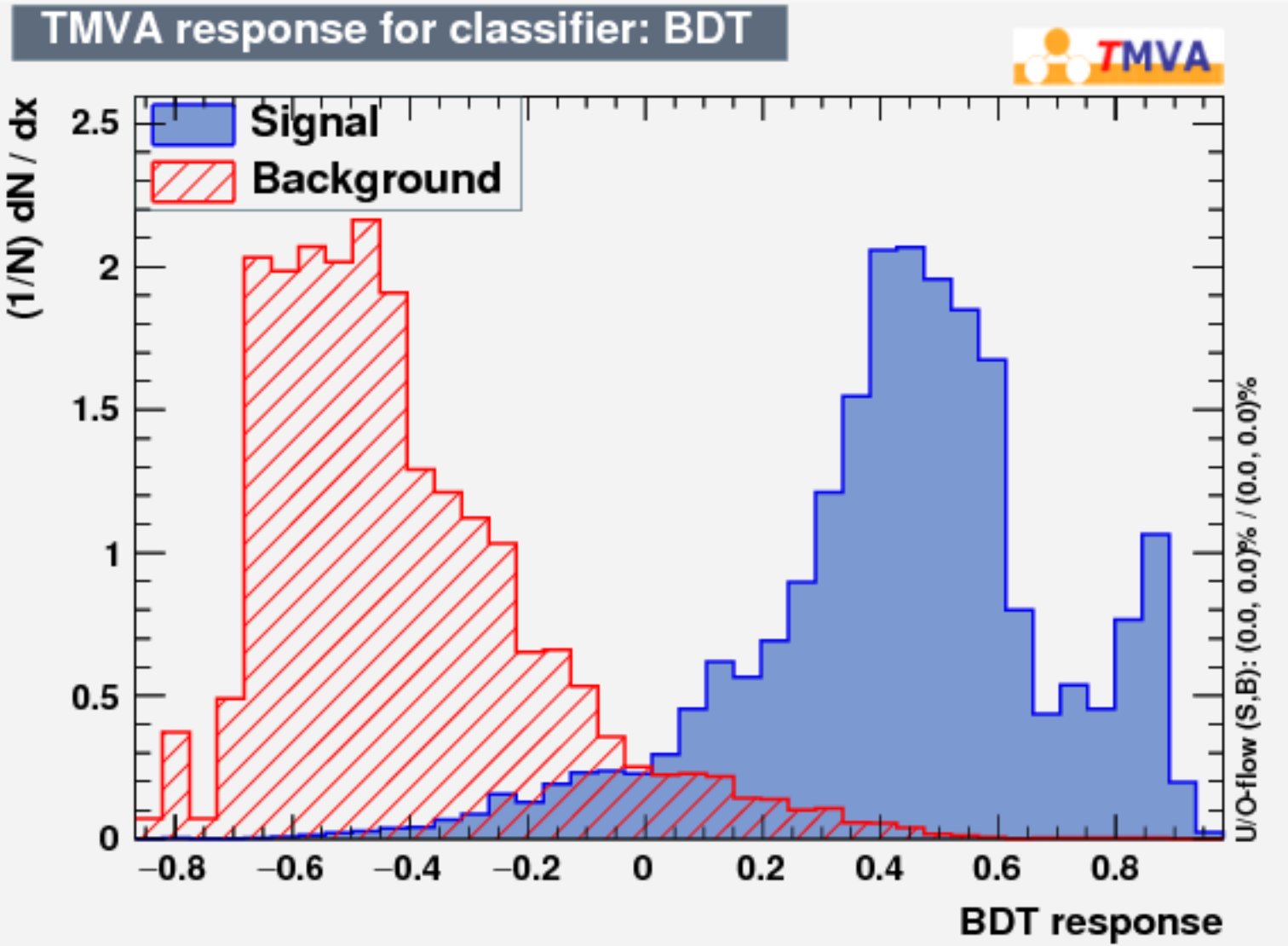


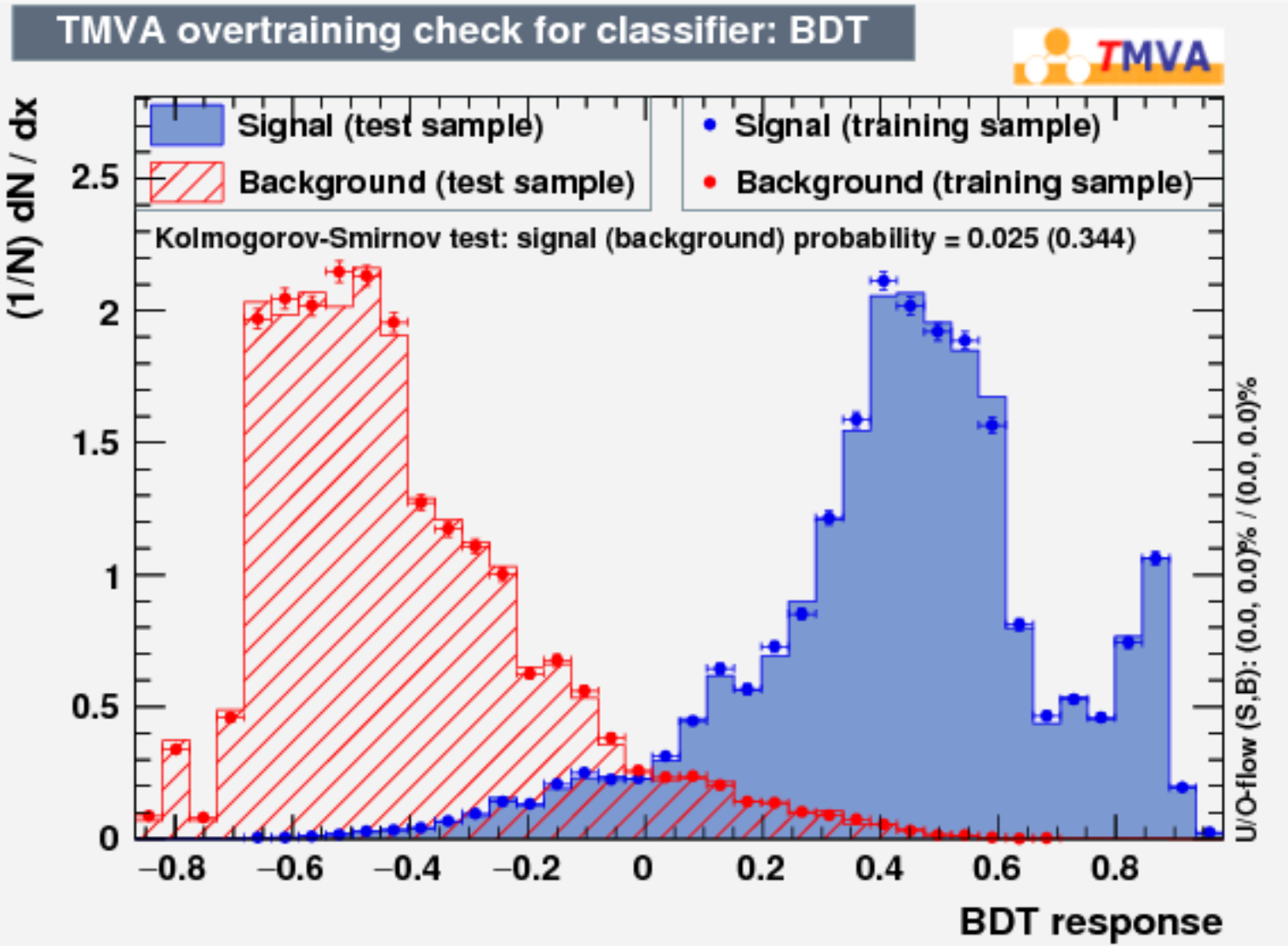
Correlation Matrix (background)

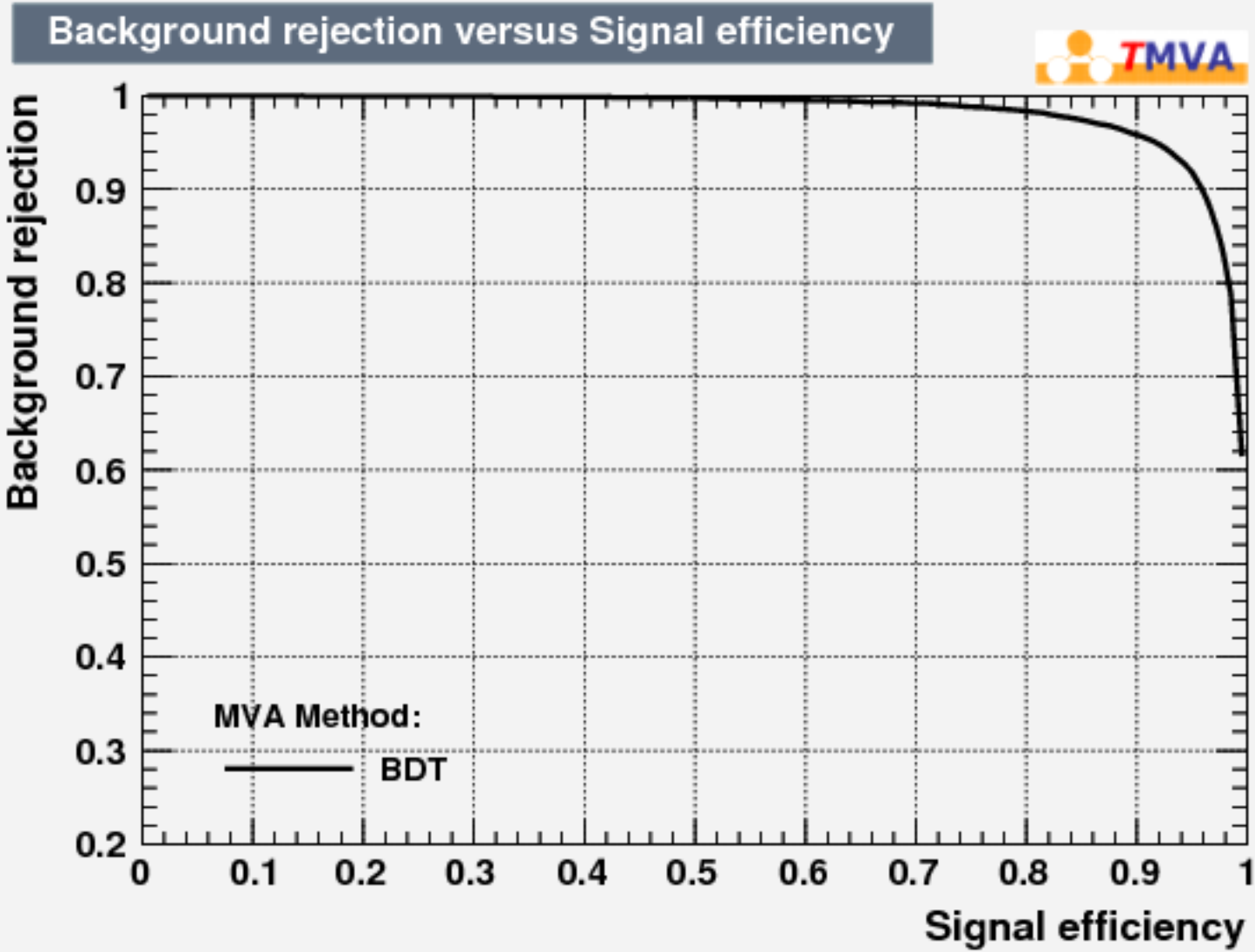


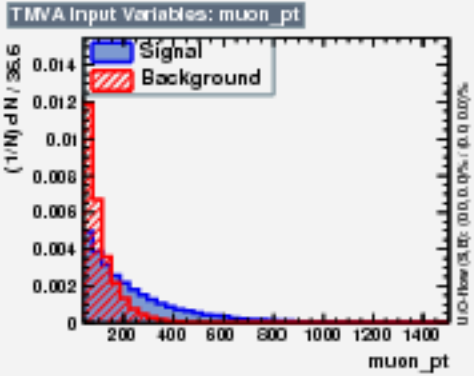
Correlation Matrix (signal)

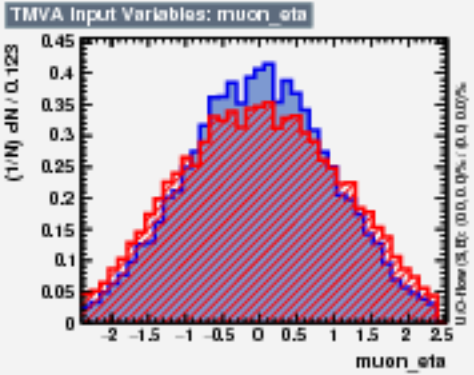


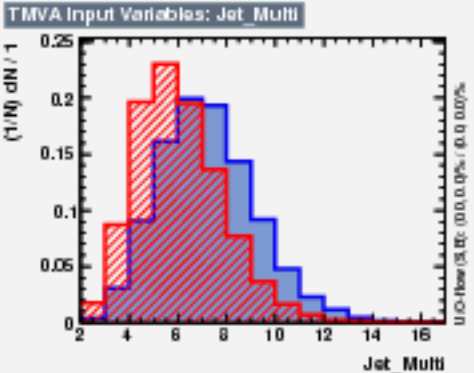

TMVA response for classifier: BDT
TMVA
Signal
Background
(1/N) dN / dx
2.5
2
1.5
1
0.5
0
−0.8
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
BDT response
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%

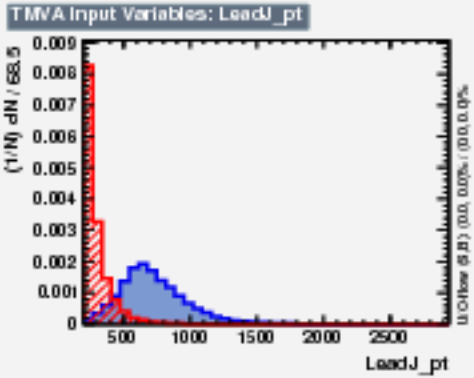

TMVA overtraining check for classifier: BDT
TMVA
Signal (test sample)
Background (test sample)
Signal (training sample)
Background (training sample)
Kolmogorov-Smirnov test: signal (background) probability = 0.025 (0.344)
(1/N) dN / dx
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%
BDT response
0
0.5
1
1.5
2
2.5
−0.8
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8

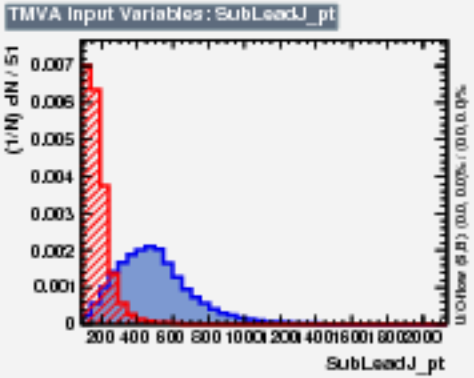

Background rejection versus Signal efficiency
TMVA
Background rejection
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Signal efficiency
MVA Method:
BDT

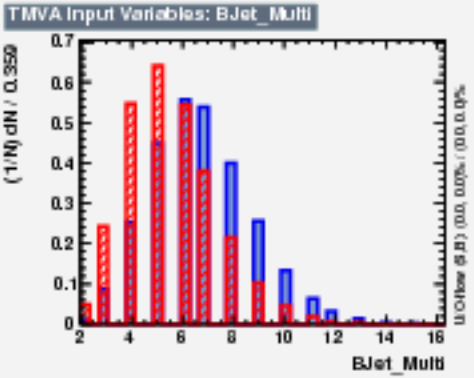

TMVA Input Variables: muon_pt
Signal
Background
(1/N) dN / 36.6
muon_pt


TMVA Input Variables: muon_eta
(1/N) dN / 0.123
muon_eta

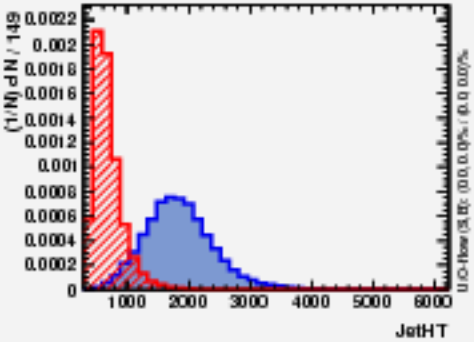

TMVA Input Variables: Jet_Multi
(1/N) dN / 1
Jet_Multi


TMVA Input Variables: LeadJ_pt
(1/N) dN / 68.5
LeadJ_pt

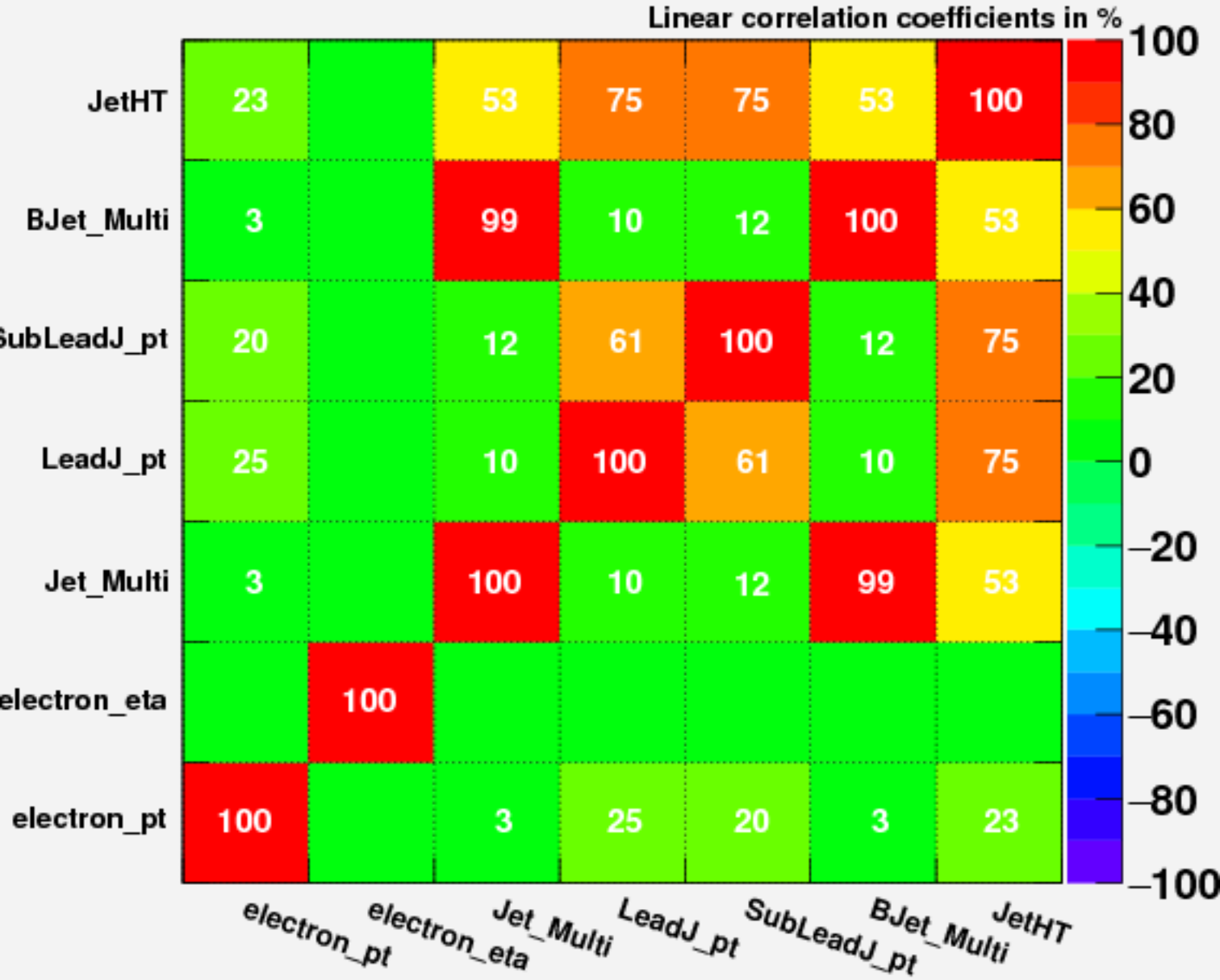

TMVA Input Variables: SubLeadJ_pt
(1/N) dN / 51
SubLeadJ_pt


TMVA Input Variables: BJet_Multi
(1/N) dN / 0.359
BJet_Multi

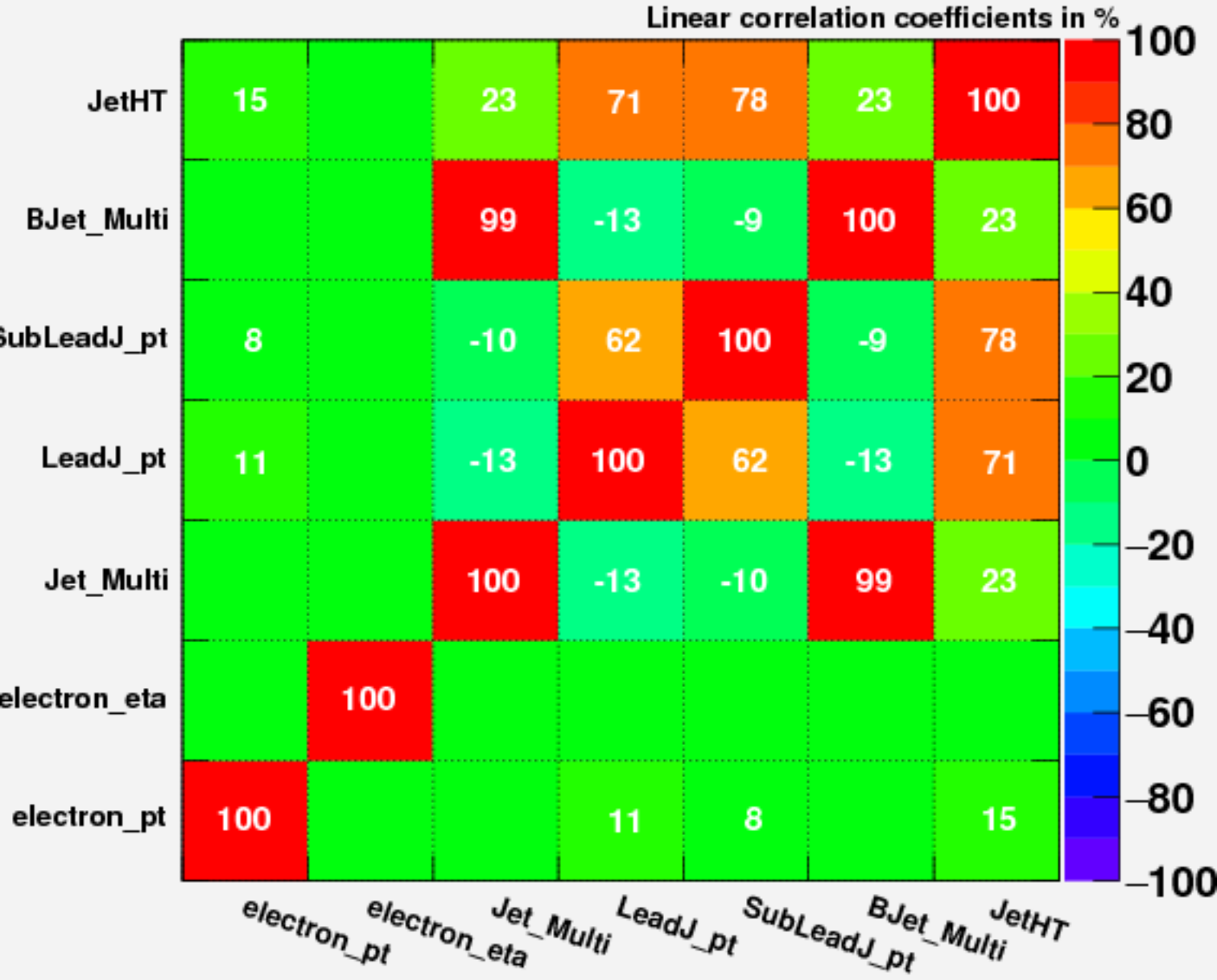
TMVA Input Variables: JetHT

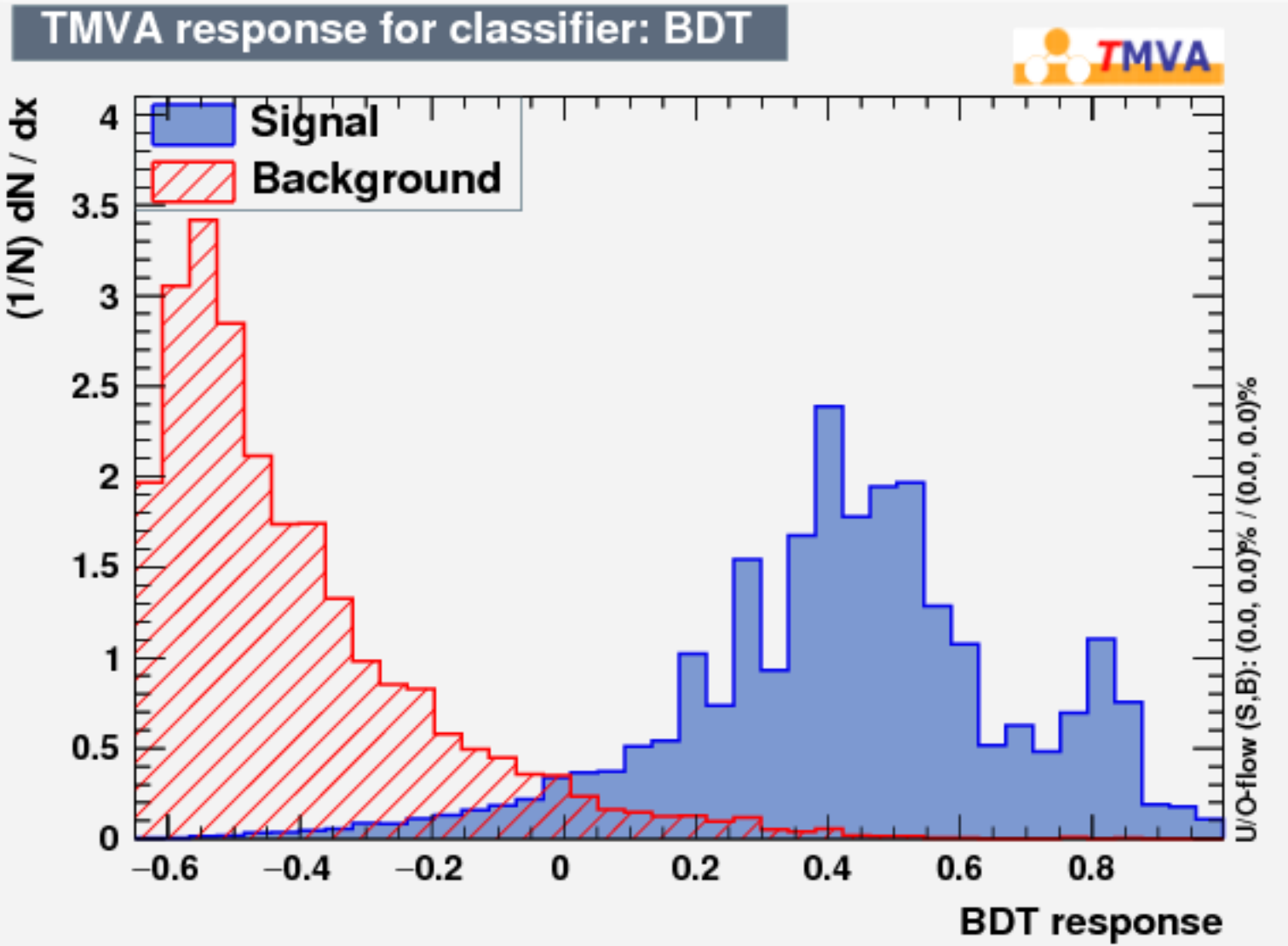


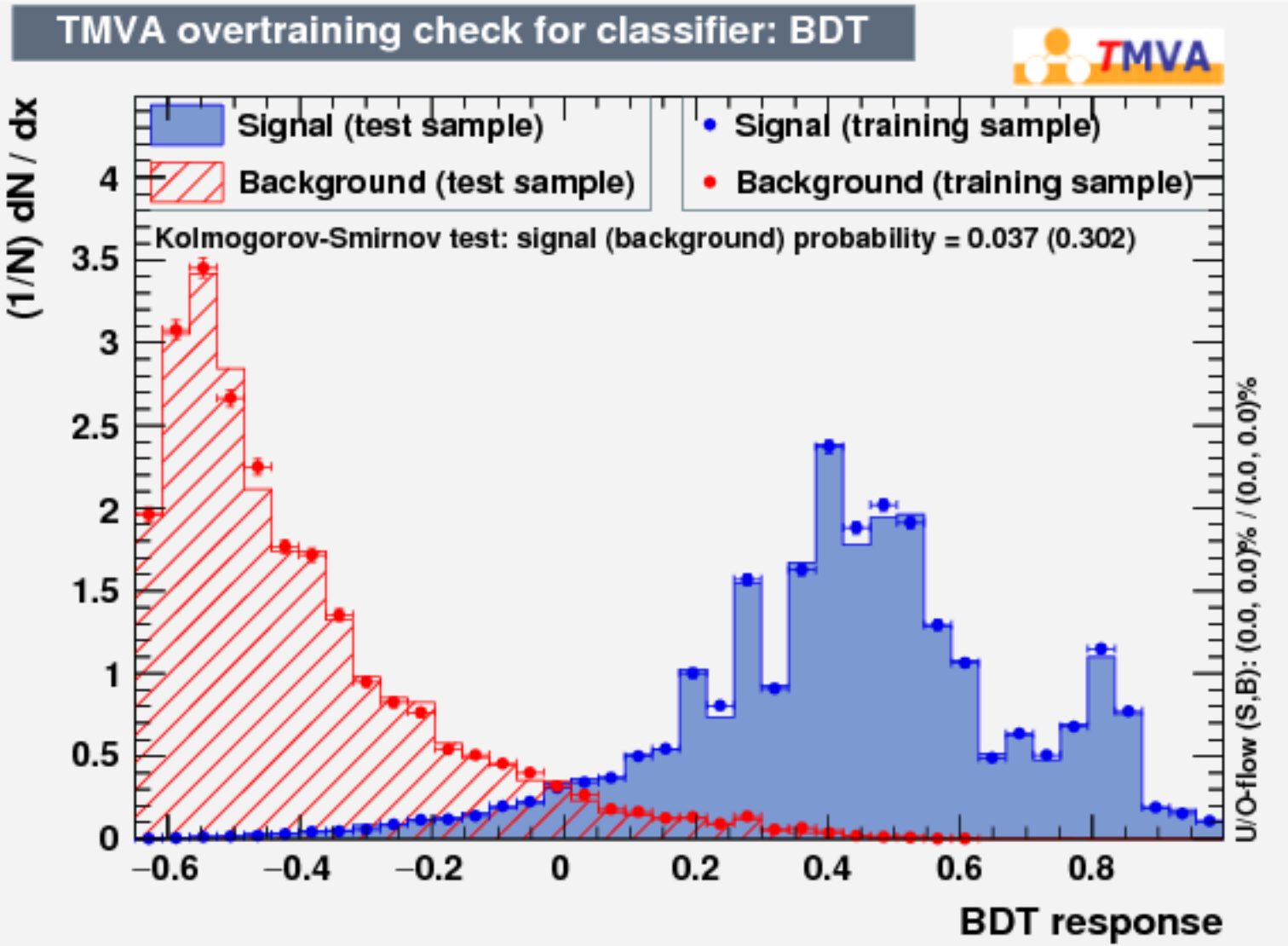
Correlation Matrix (background)

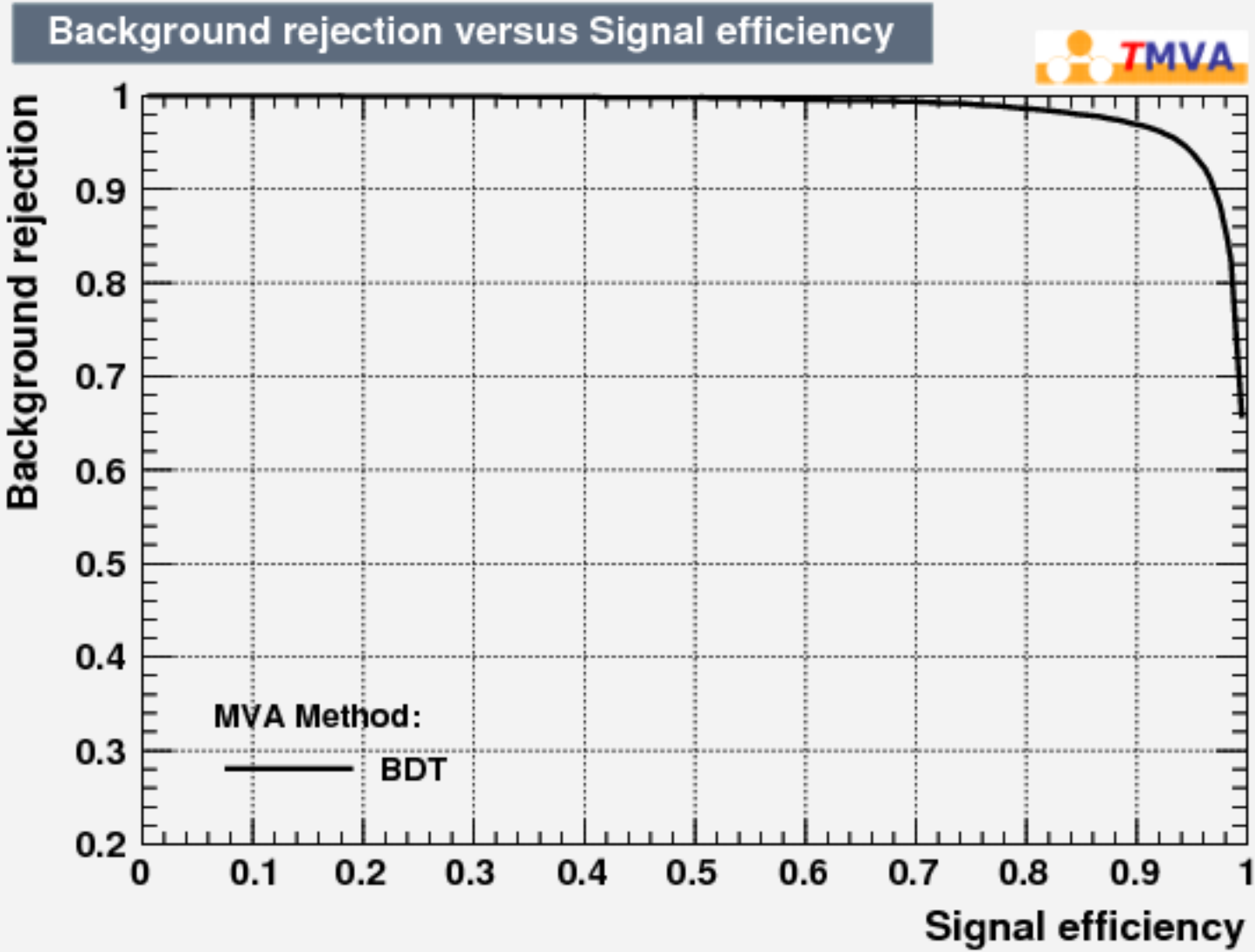


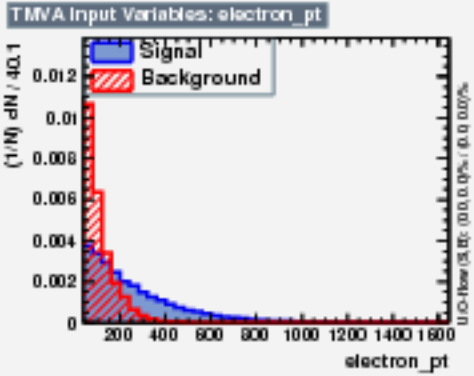
Correlation Matrix (signal)

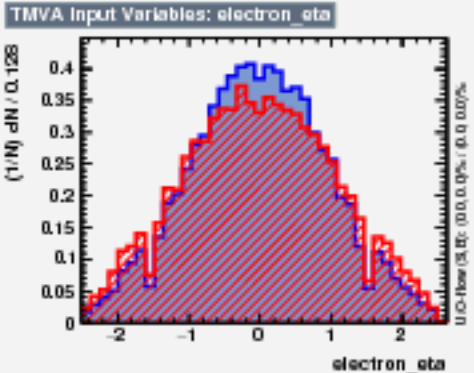


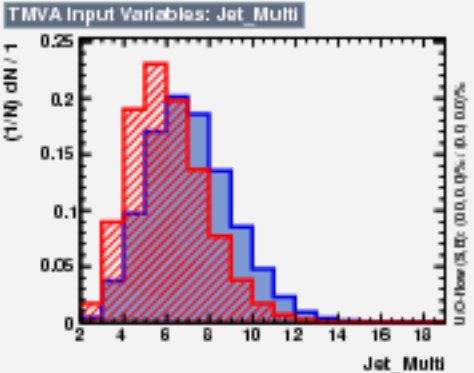

TMVA response for classifier: BDT
TMVA
Signal
Background
(1/N) dN / dx
4
3.5
3
2.5
2
1.5
1
0.5
0
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
BDT response
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%

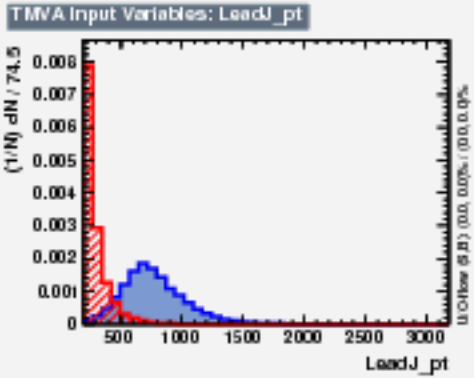

TMVA overtraining check for classifier: BDT
TMVA
Signal (test sample)
Background (test sample)
Signal (training sample)
Background (training sample)
Kolmogorov-Smirnov test: signal (background) probability = 0.037 (0.302)
(1/N) dN / dx
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%
BDT response
0
0.5
1
1.5
2
2.5
3
3.5
4
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8

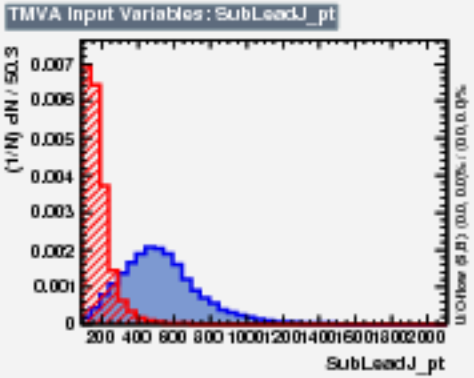

Background rejection versus Signal efficiency
TMVA
Background rejection
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Signal efficiency
MVA Method:
BDT

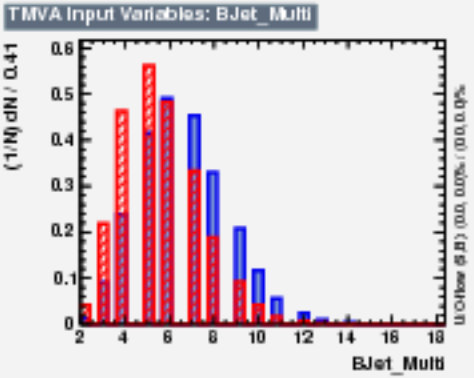

TMVA Input Variables: electron_pt
Signal
Background
(1/N) dN / 40.1
electron_pt

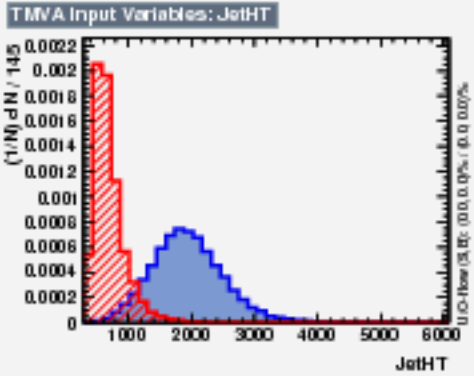

TMVA Input Variables: electron_eta
(1/N) dN / 0.128
electron_eta


TMVA Input Variables: Jet_Multi
(1/N) dN / 1
Jet_Multi

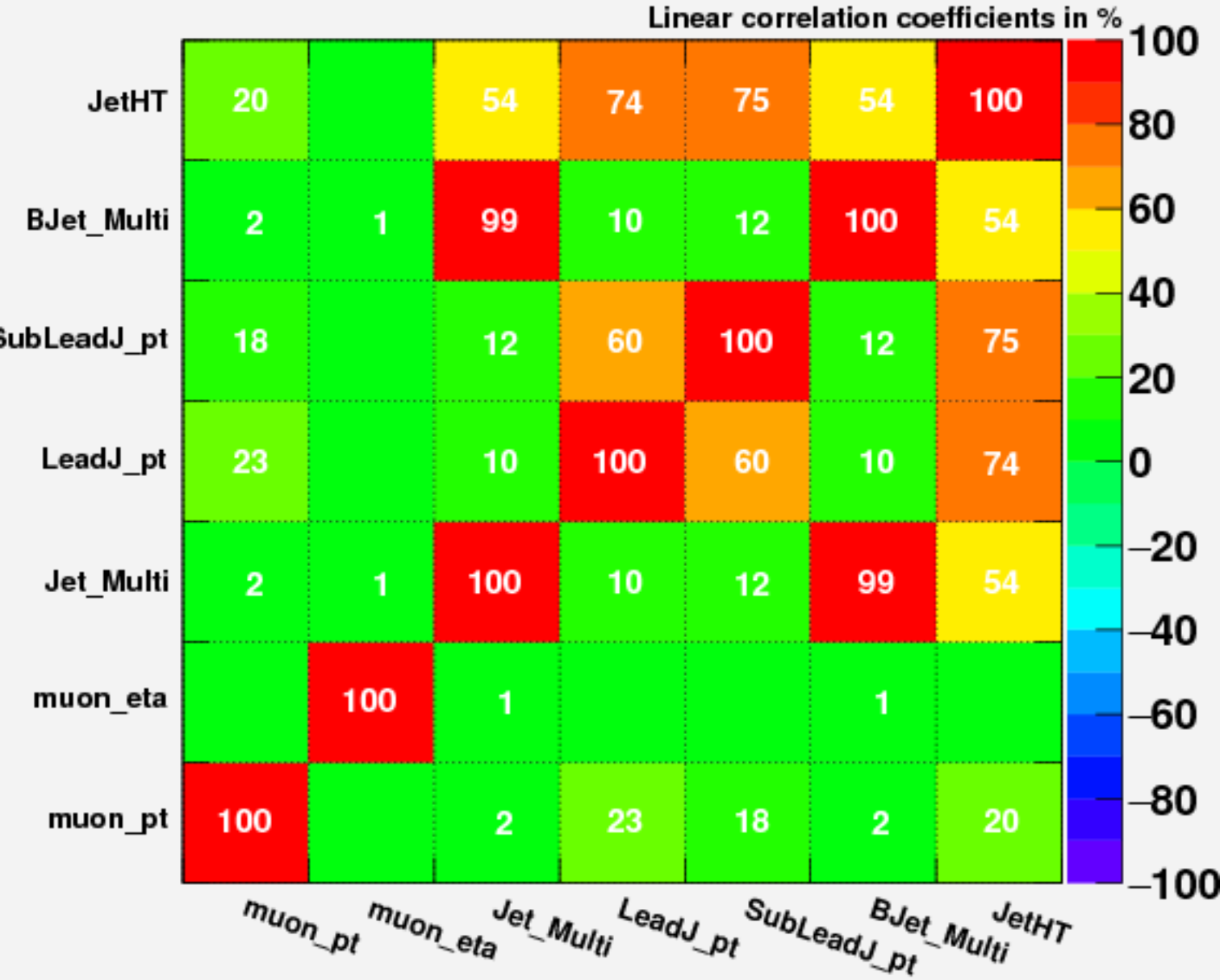

TMVA Input Variables: LeadJ_pt
(1/N) dN / 74.5
LeadJ_pt


TMVA Input Variables: SubLeadJ_pt
(1/N) dN / 50.3
SubLeadJ_pt

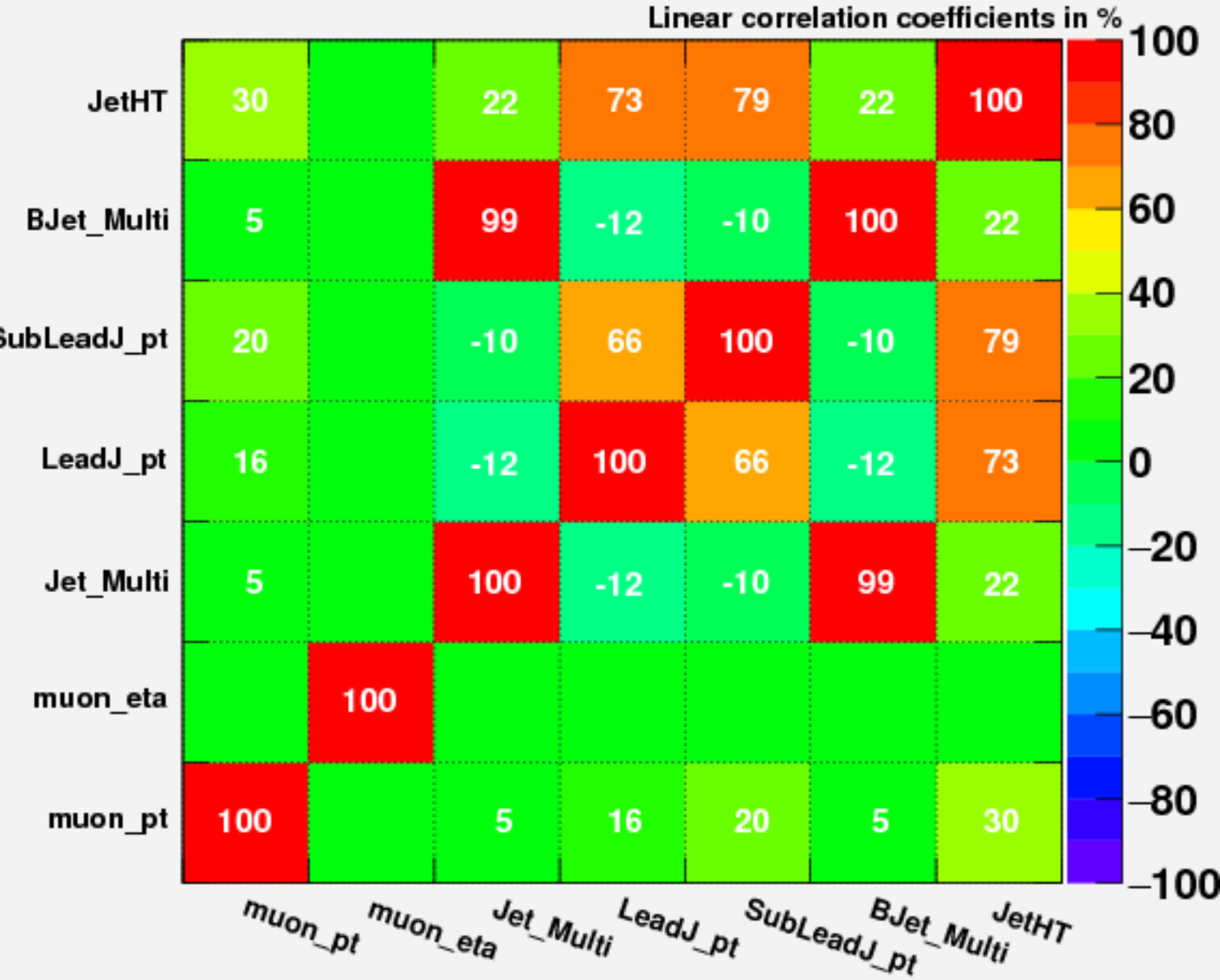

TMVA Input Variables: BJet_Multi
(1/N) dN / 0.41
BJet_Multi

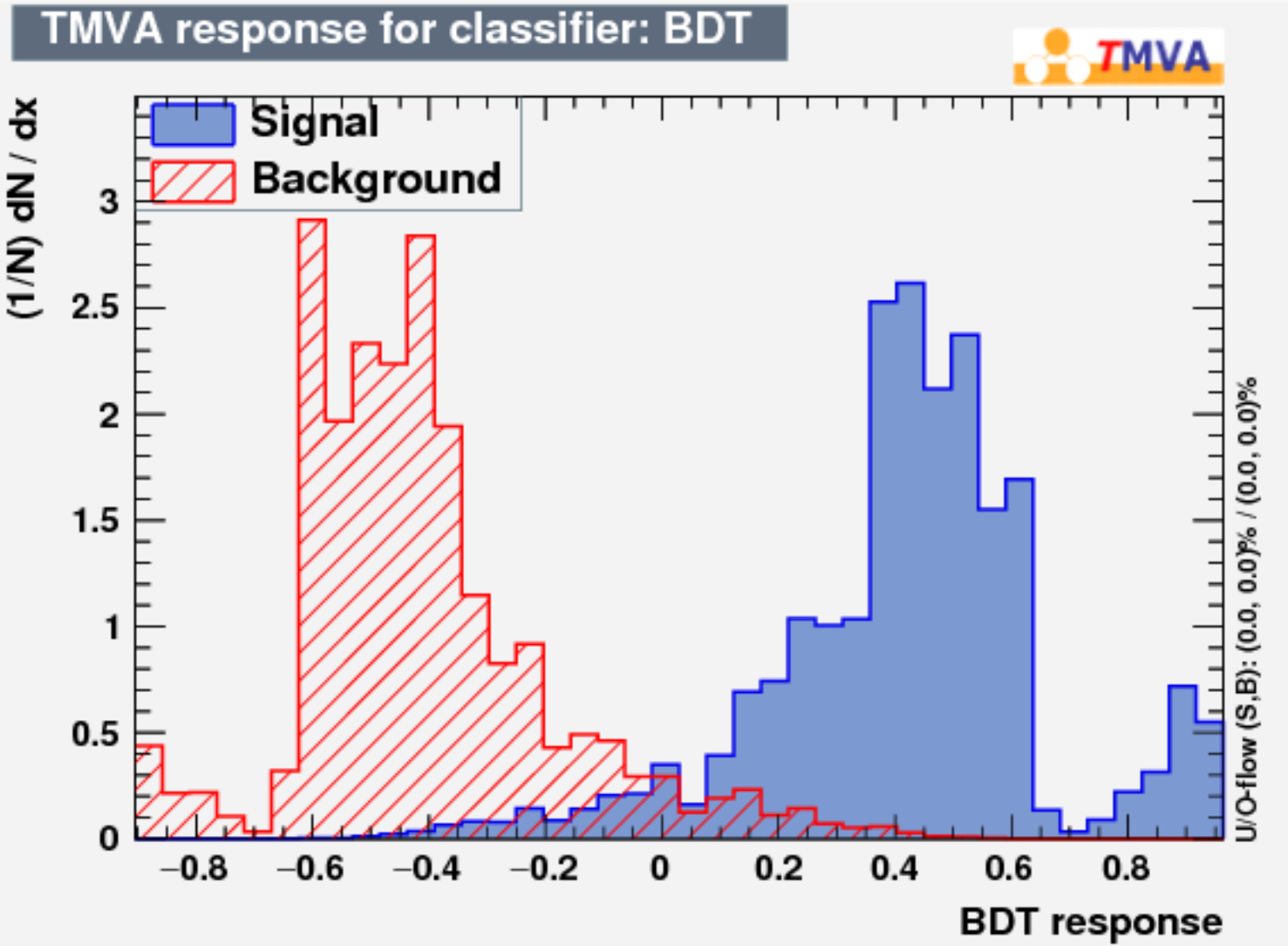

TMVA Input Variables: JetHT
(1/N) dN / 14/5
0.0022
0.002
0.0018
0.0016
0.0014
0.0012
0.001
0.0008
0.0006
0.0004
0.0002
0
1000
2000
3000
4000
5000
6000
JetHT
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%

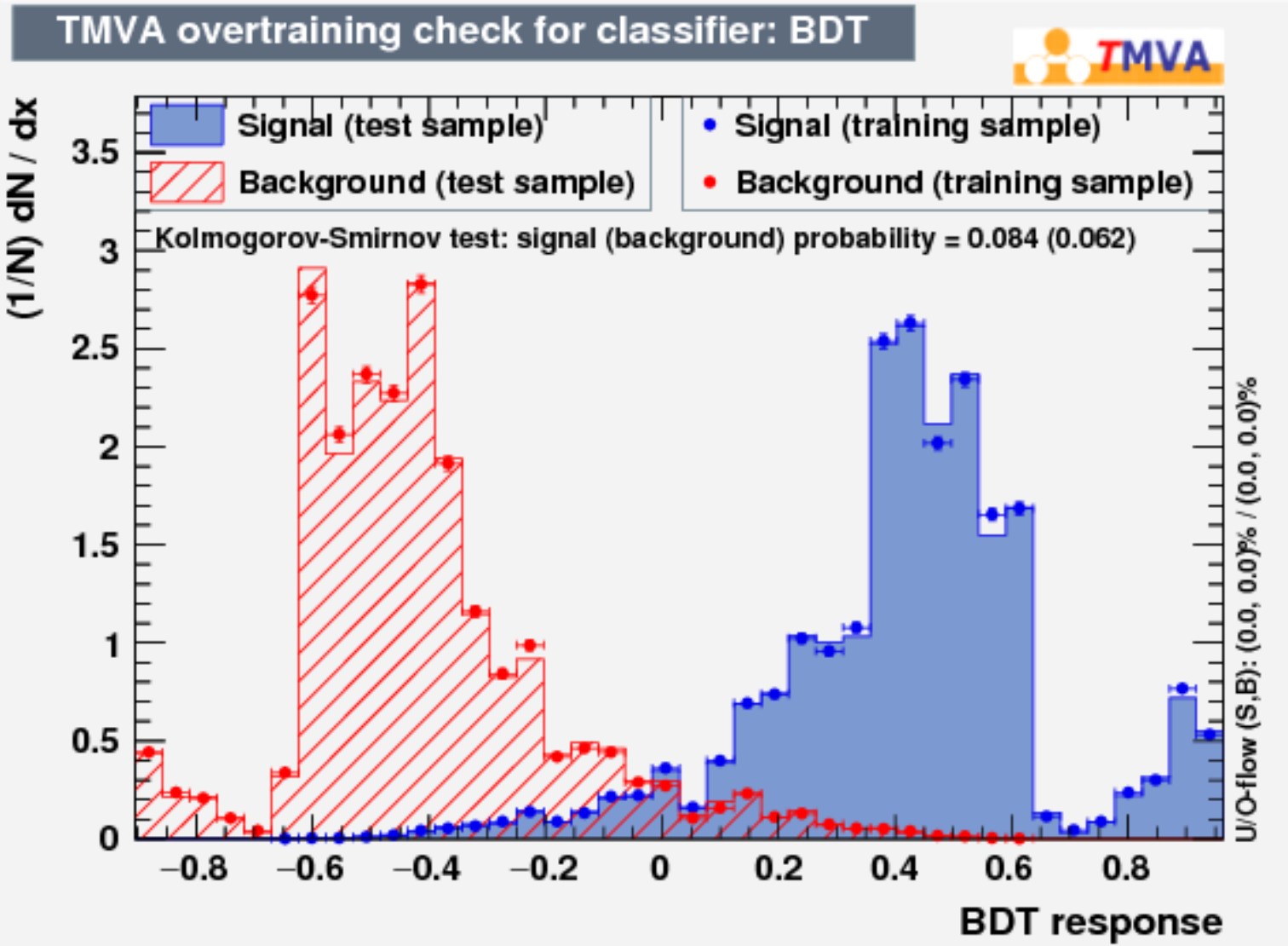
Correlation Matrix (background)

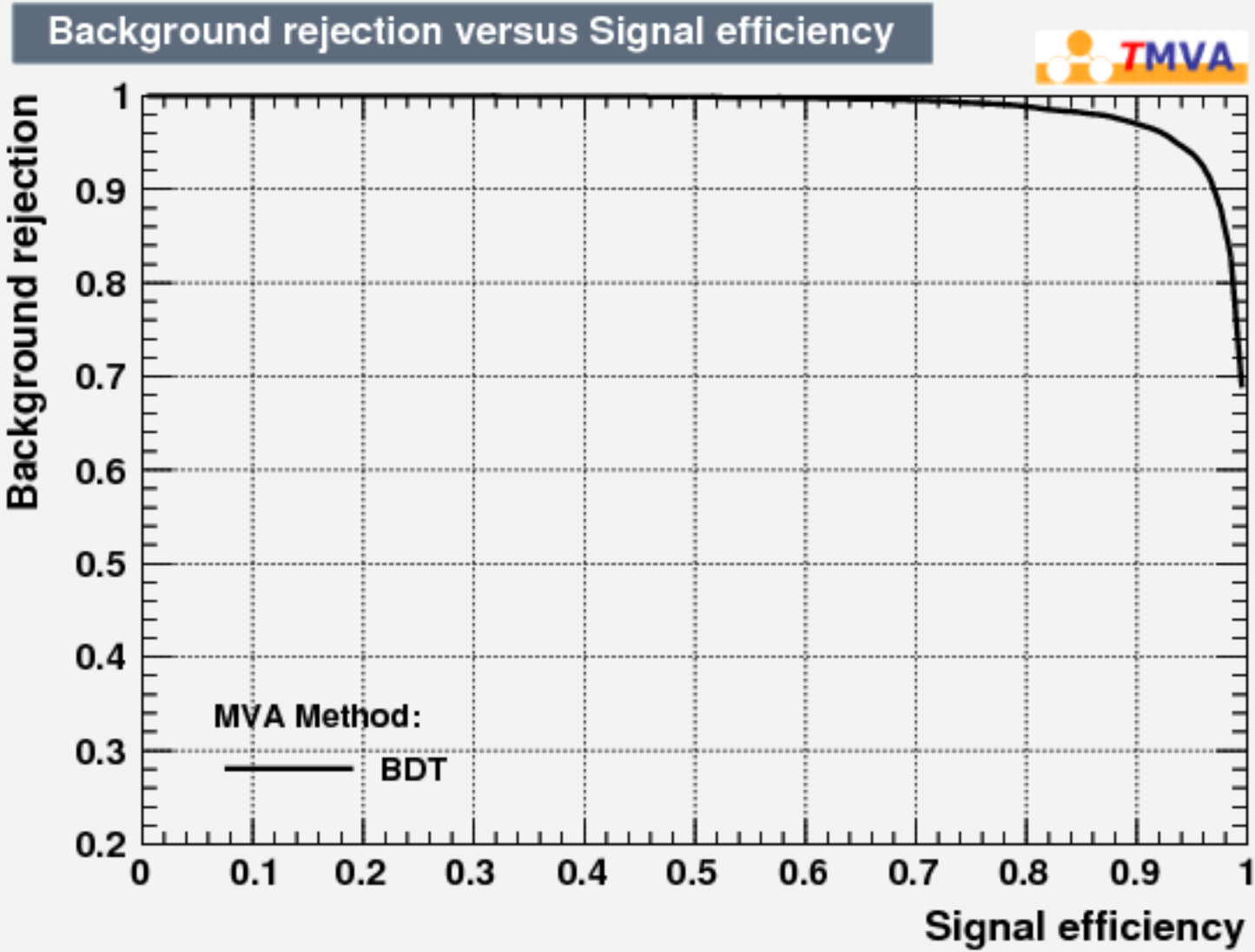


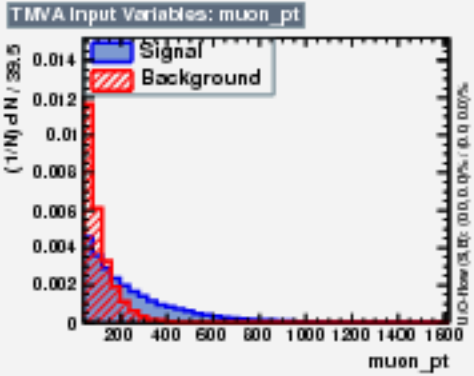
Correlation Matrix (signal)

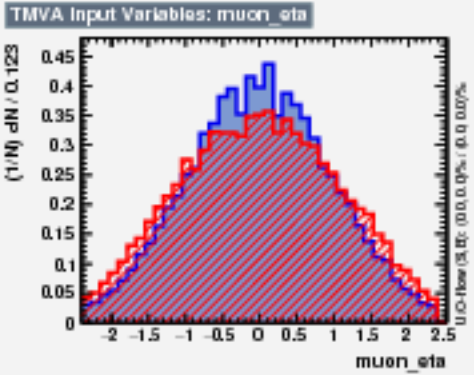


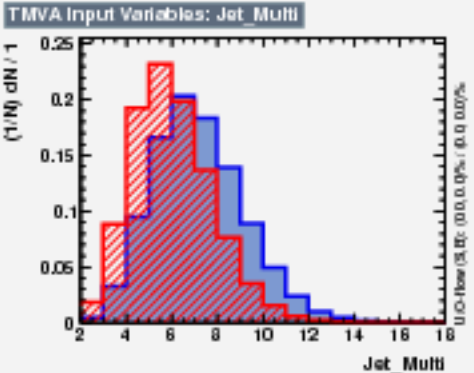

TMVA response for classifier: BDT
TMVA
Signal
Background
(1/N) dN / dx
3
2.5
2
1.5
1
0.5
0
−0.8
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
BDT response
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%

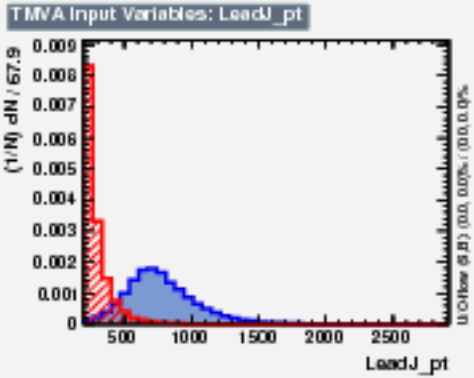

TMVA overtraining check for classifier: BDT
TMVA
Signal (test sample)
Background (test sample)
Signal (training sample)
Background (training sample)
Kolmogorov-Smirnov test: signal (background) probability = 0.084 (0.062)
(1/N) dN / dx
3.5
3
2.5
2
1.5
1
0.5
0
−0.8
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
BDT response
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%

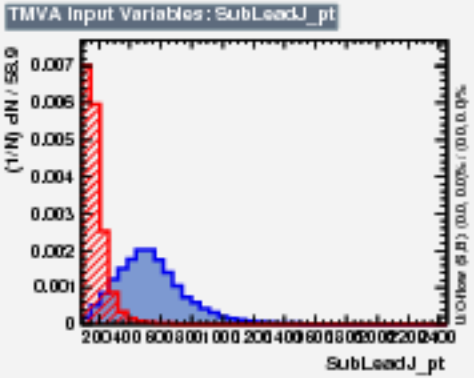

Background rejection versus Signal efficiency
TMVA
Background rejection
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Signal efficiency
MVA Method:
BDT

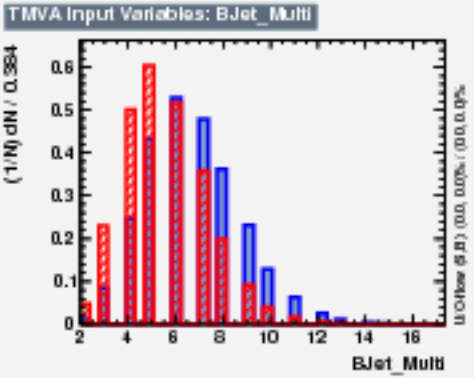

TMVA Input Variables: muon_pt
Signal
Background
(1/N) dN / 39.5
muon_pt


TMVA Input Variables: muon_eta
(1/N) dN / 0.123
muon_eta

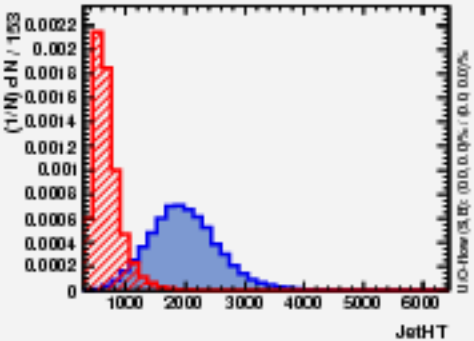

TMVA Input Variables: Jet_Multi
(1/N) dN / 1
Jet_Multi


TMVA Input Variables: LeadJ_pt
(1/N) dN / 57.9
LeadJ_pt

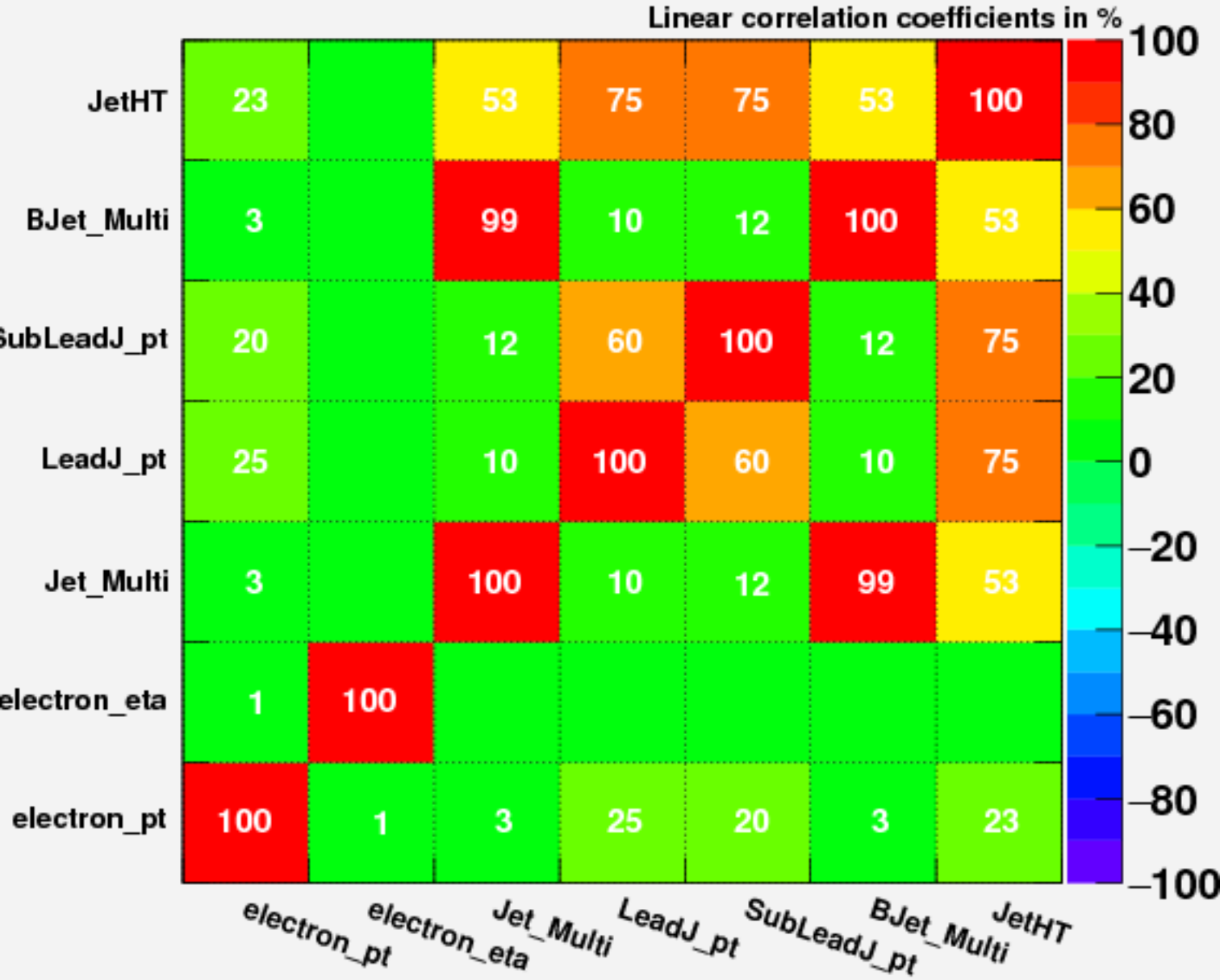

TMVA Input Variables: SubLeadJ_pt
(1/N) dN / 58.9
SubLeadJ_pt


TMVA Input Variables: BJet_Multi
(1/N) dN / 0.384
BJet_Multi

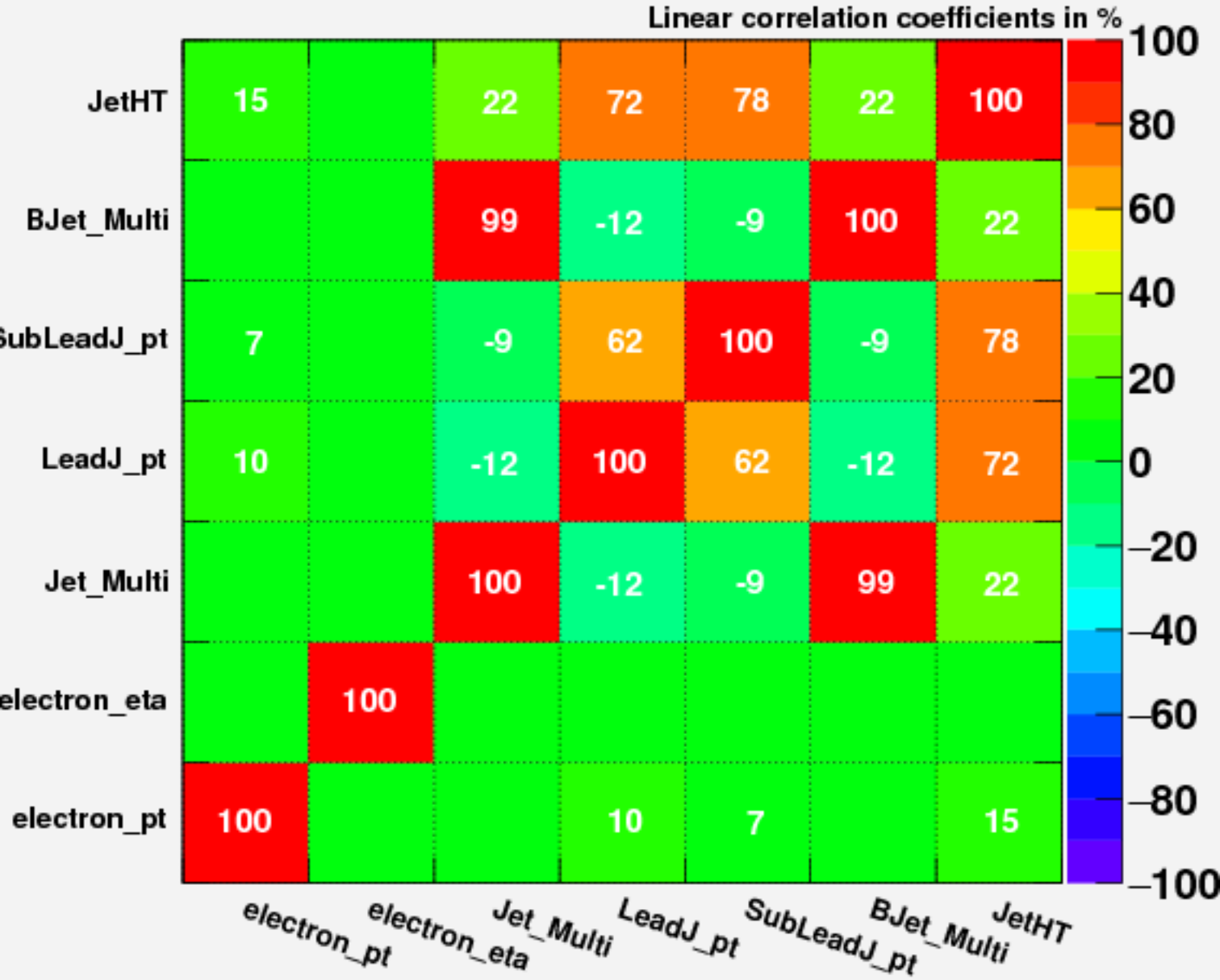
TMVA Input Variables: JetHT

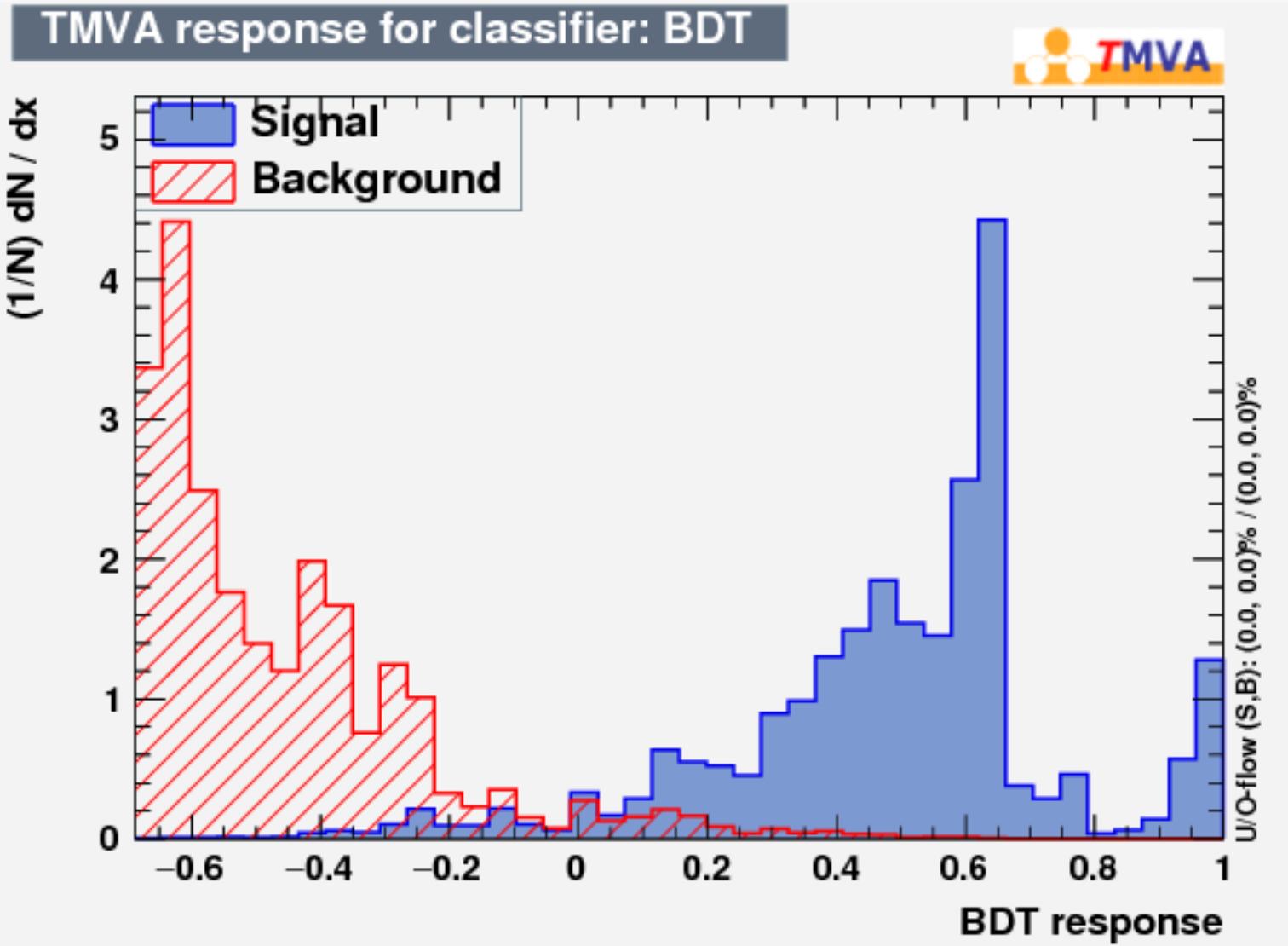


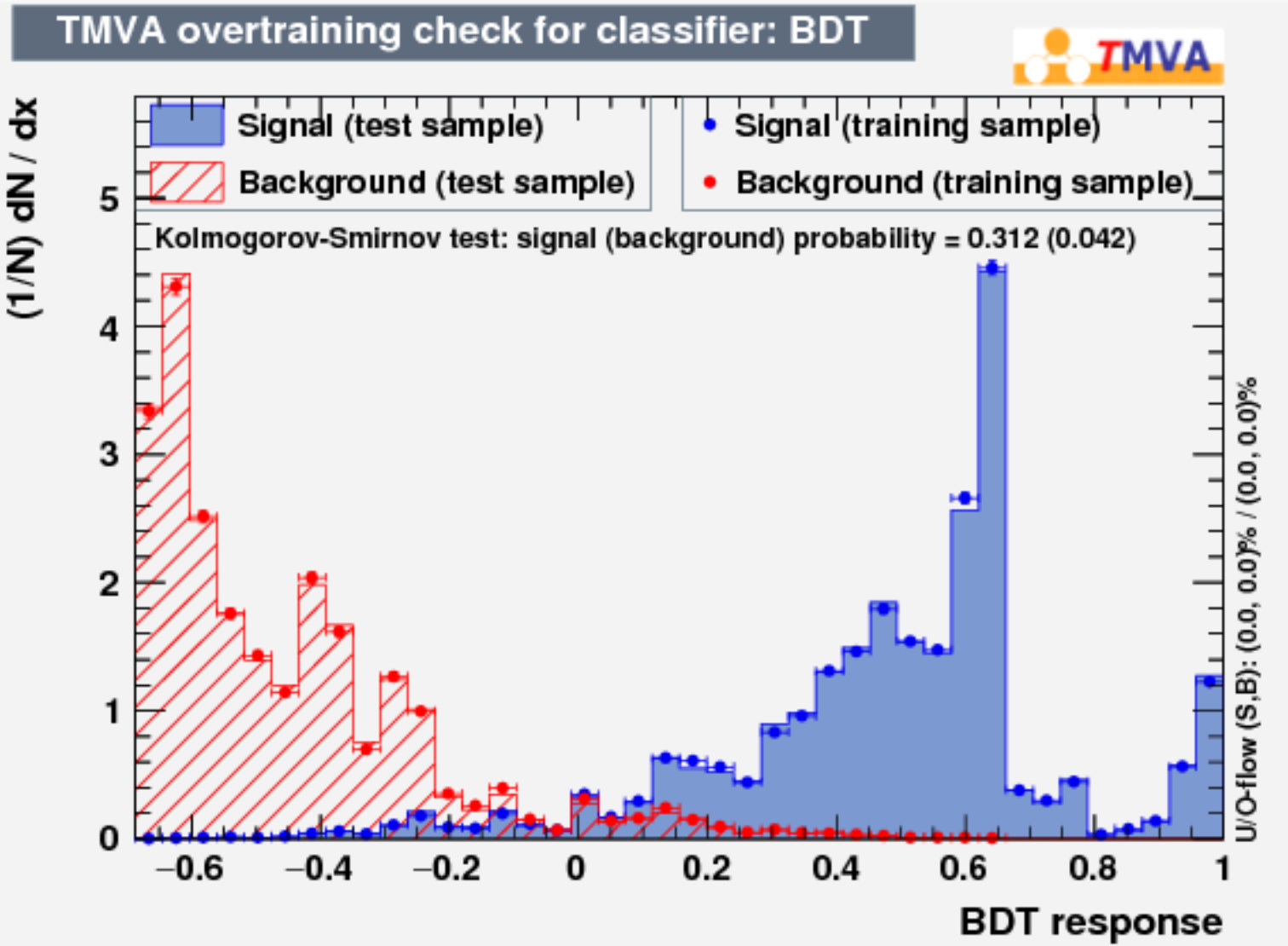
Correlation Matrix (background)

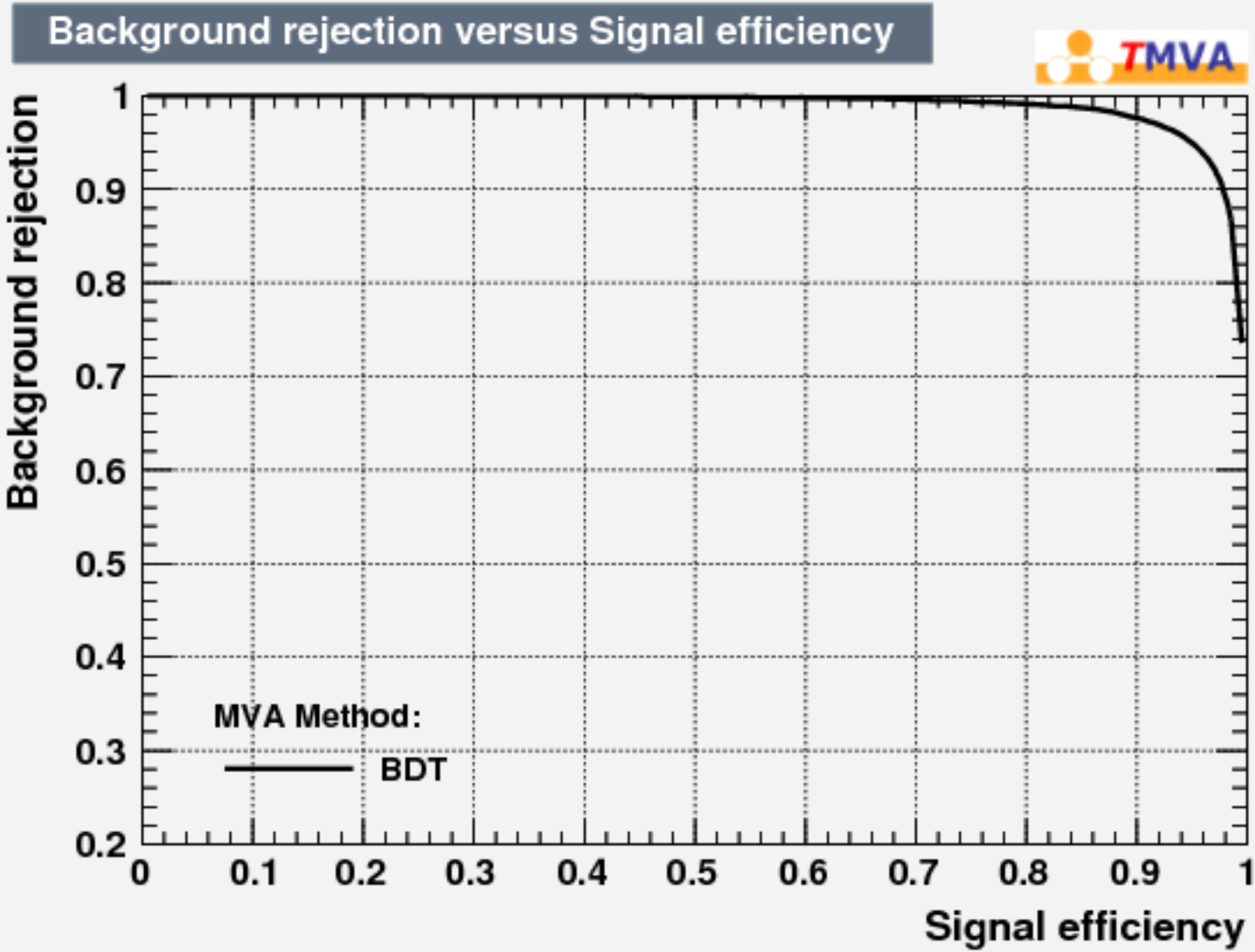


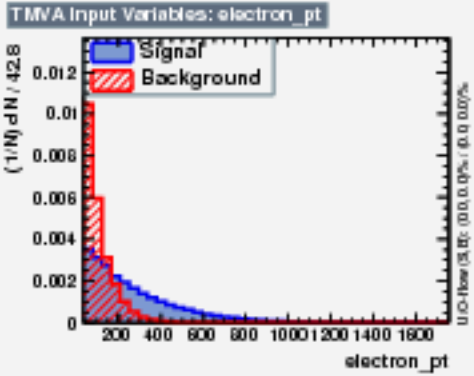
Correlation Matrix (signal)

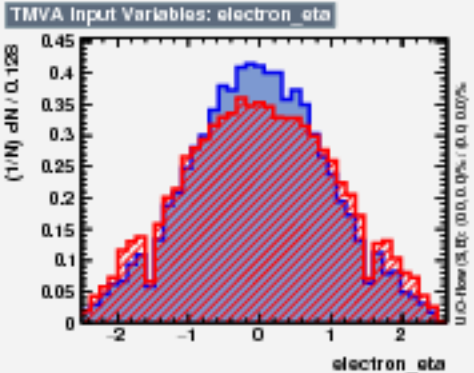


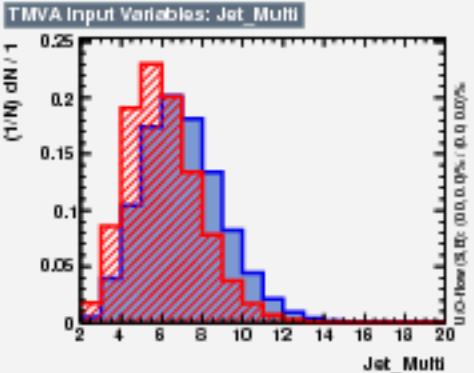

TMVA response for classifier: BDT
TMVA
Signal
Background
(1/N) dN / dx
5
4
3
2
1
0
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
1
BDT response
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%

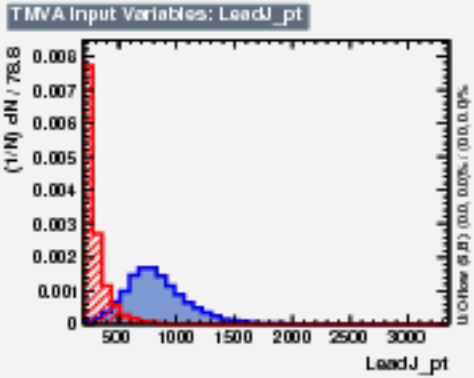

TMVA overtraining check for classifier: BDT
TMVA
Signal (test sample)
Background (test sample)
Signal (training sample)
Background (training sample)
Kolmogorov-Smirnov test: signal (background) probability = 0.312 (0.042)
(1/N) dN / dx
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%
BDT response
0
1
2
3
4
5
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
1

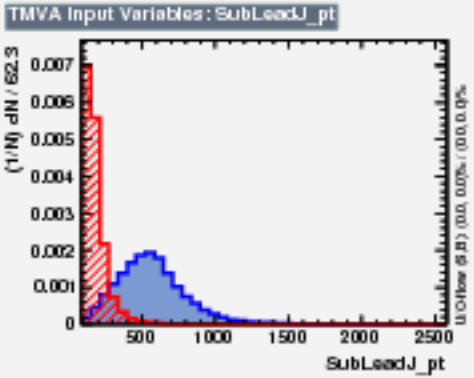

Background rejection versus Signal efficiency
TMVA
Background rejection
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Signal efficiency
MVA Method:
BDT

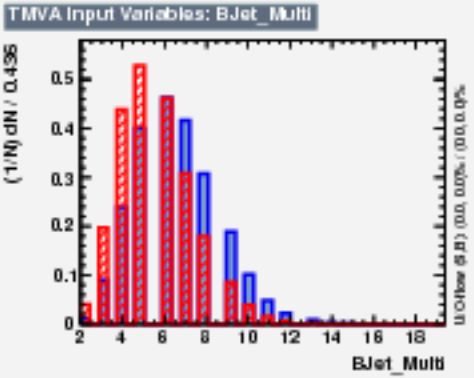

TMVA Input Variables: electron_pt
Signal
Background
(1/N) dN / 42.8
electron_pt

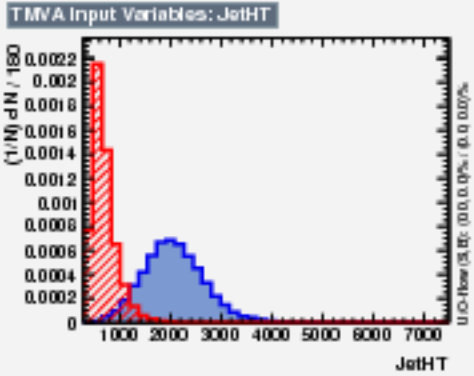

TMVA Input Variables: electron_eta
(1/N) dN / 0.128
electron_eta


TMVA Input Variables: Jet_Multi
(1/N) dN / 1
Jet_Multi

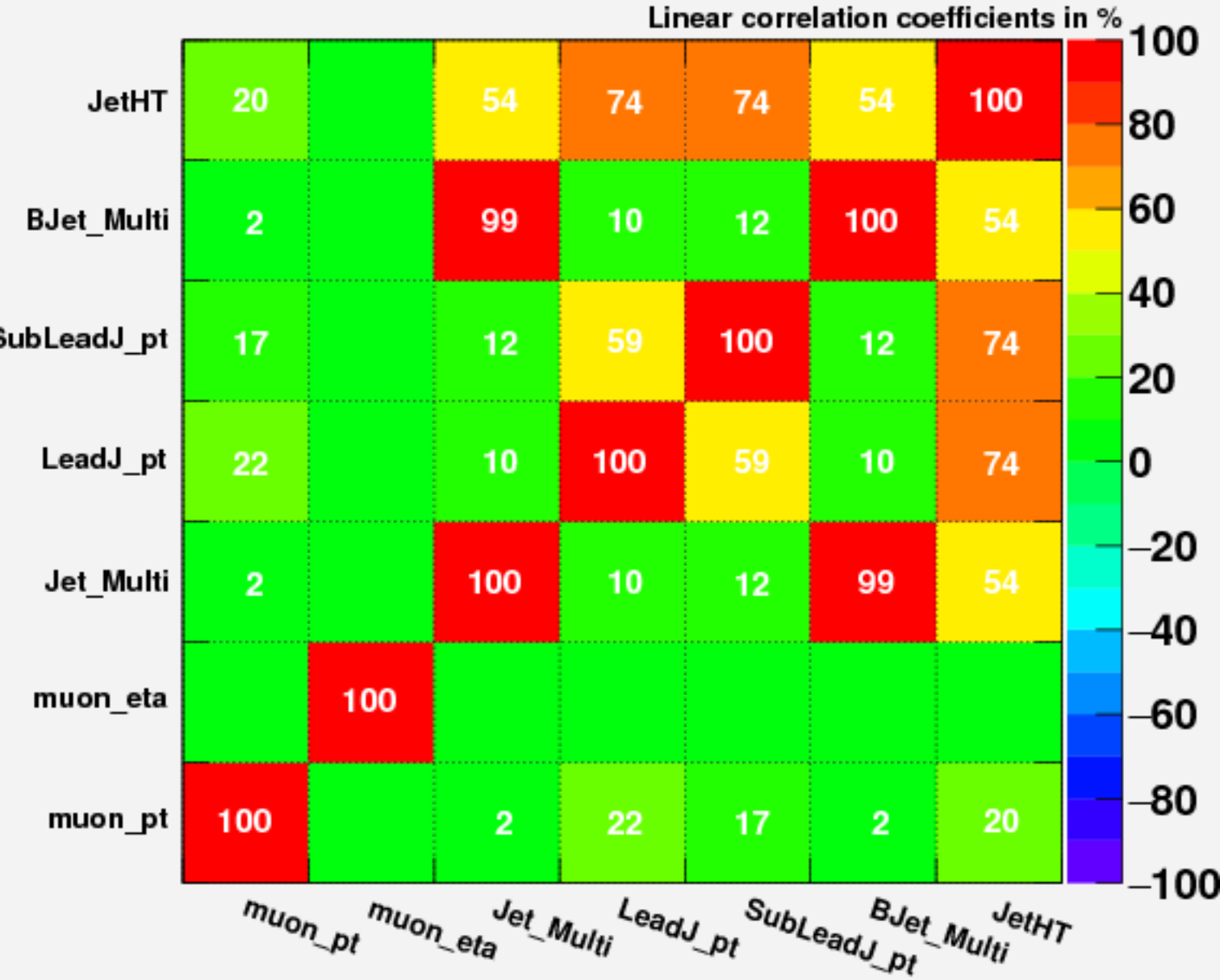

TMVA Input Variables: LeadJ_pt
(1/N) dN / 78.8
LeadJ_pt


TMVA Input Variables: SubLeadJ_pt
(1/N) dN / 62.3
SubLeadJ_pt

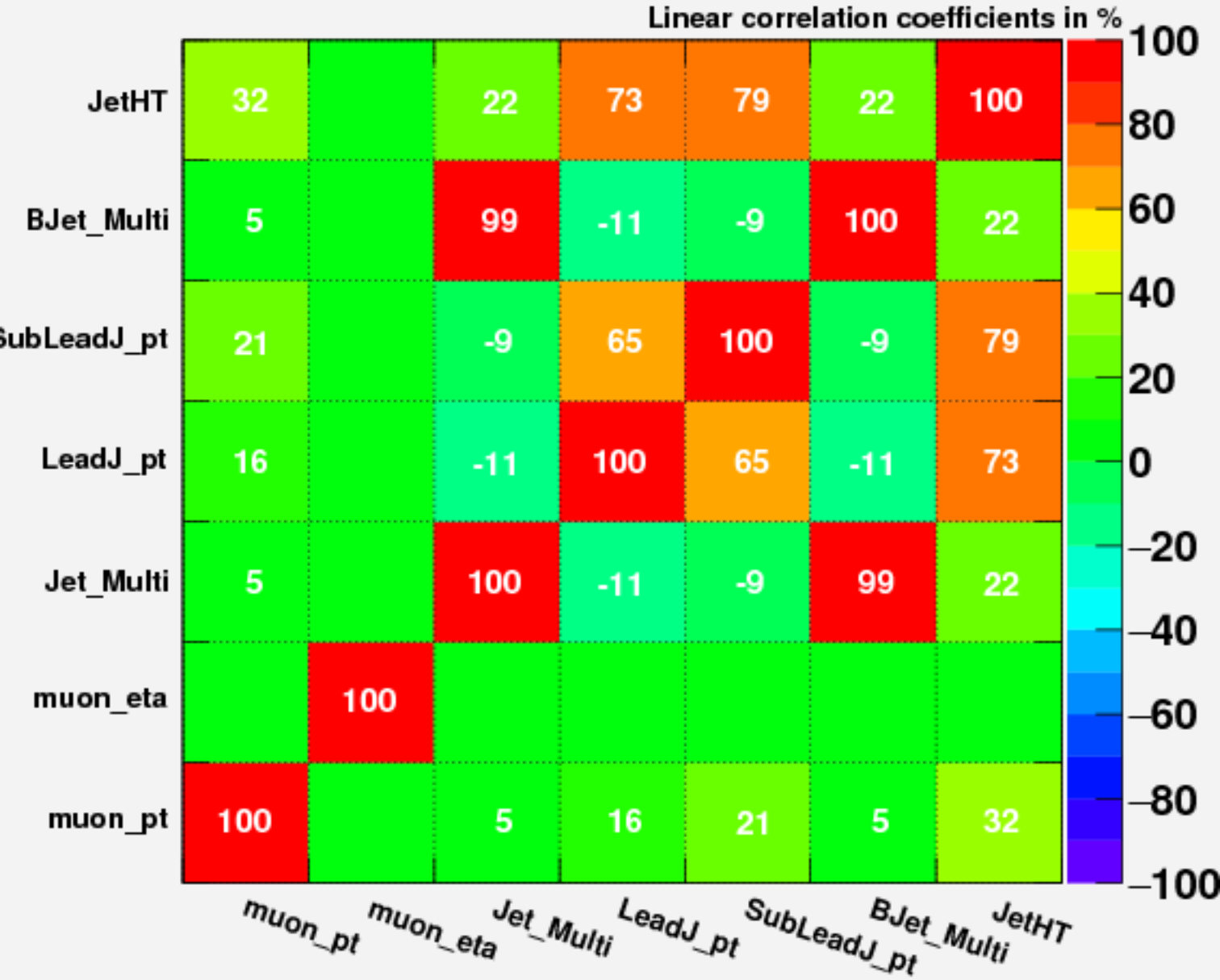

TMVA Input Variables: BJet_Multi
(1/N) dN / 0.436
BJet_Multi

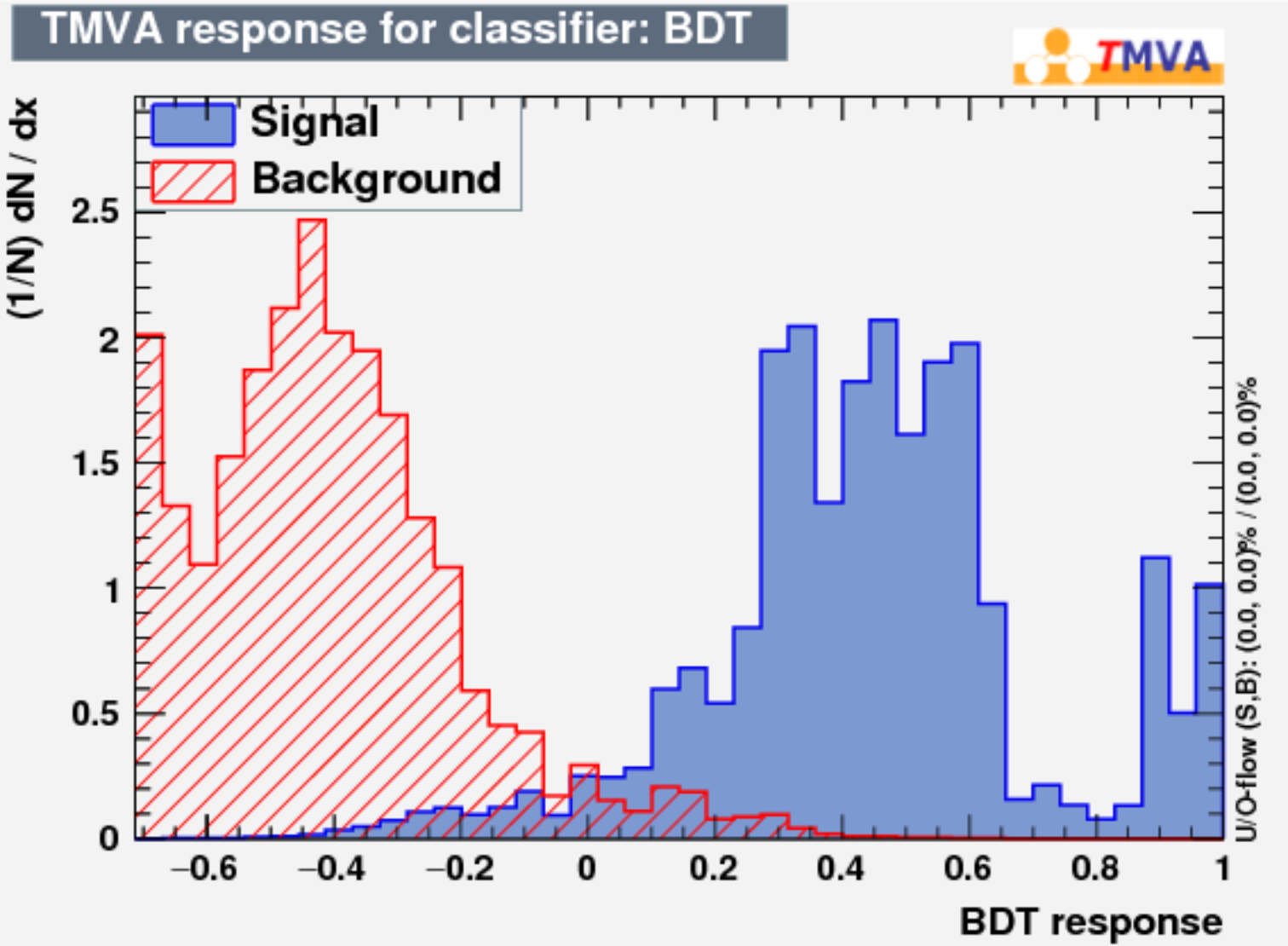

TMVA Input Variables: JetHT
(1/N) dN / 180
0.0022
0.002
0.0018
0.0016
0.0014
0.0012
0.001
0.0008
0.0006
0.0004
0.0002
0
1000 2000 3000 4000 5000 6000 7000
JetHT
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%

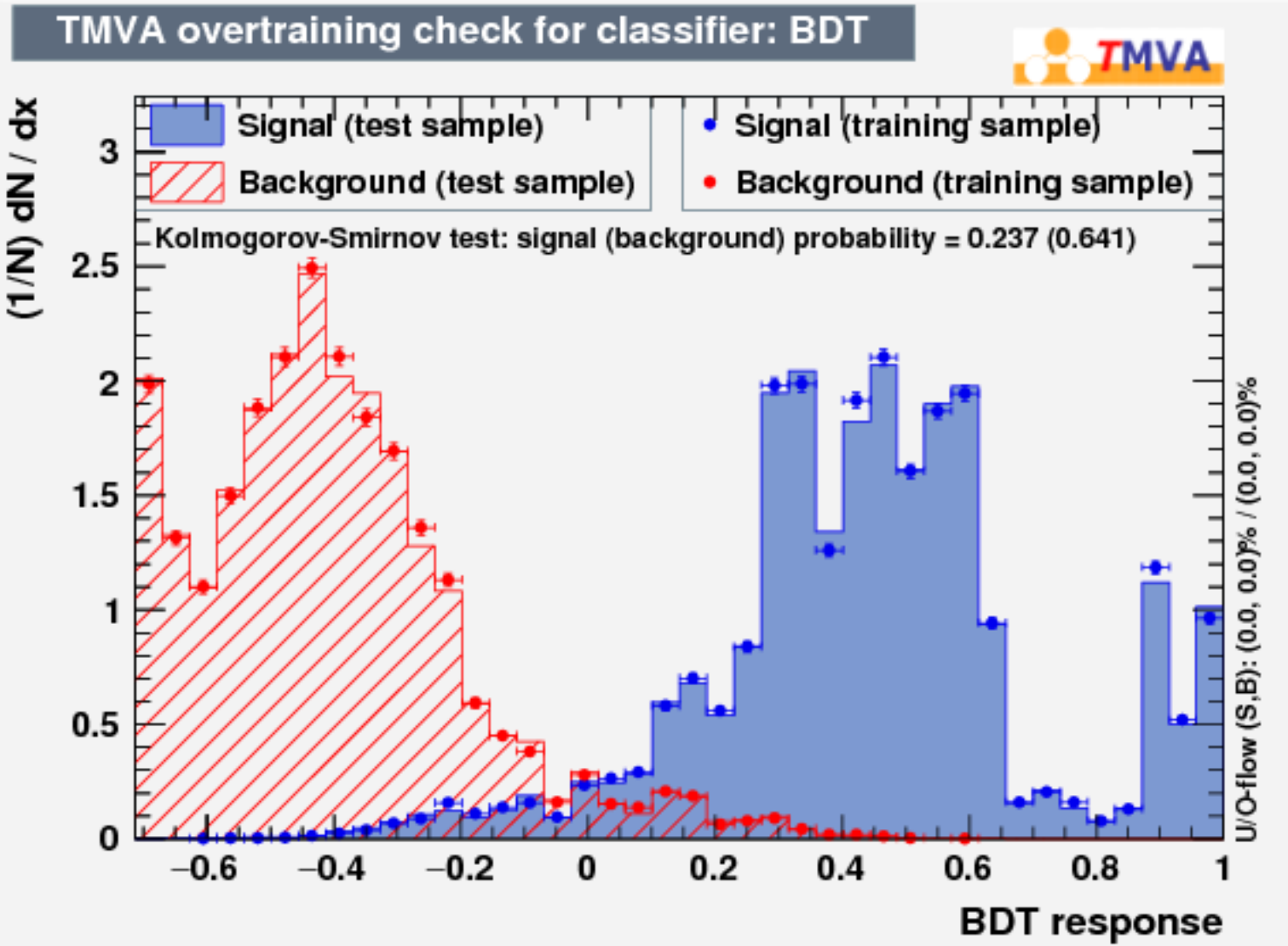
Correlation Matrix (background)

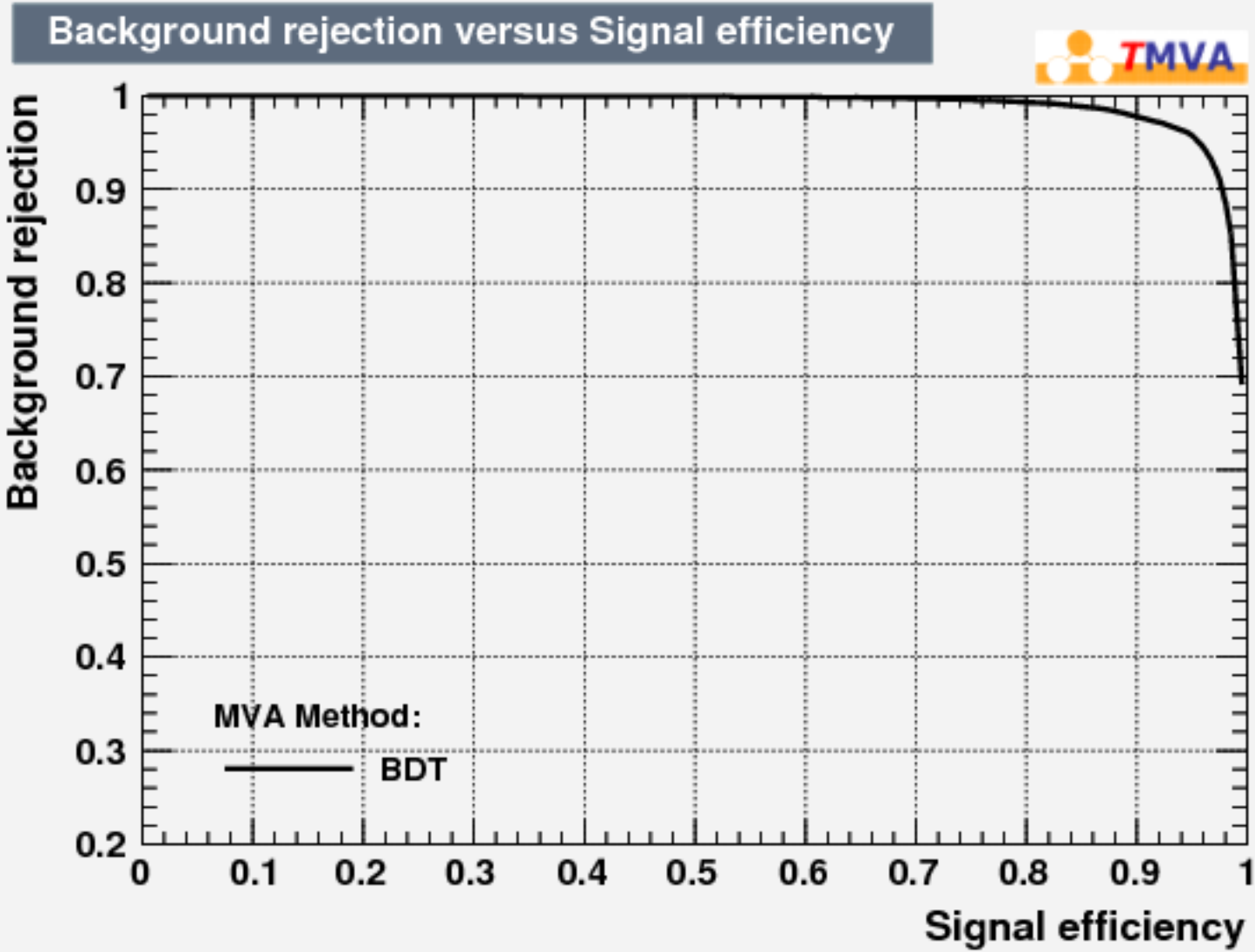


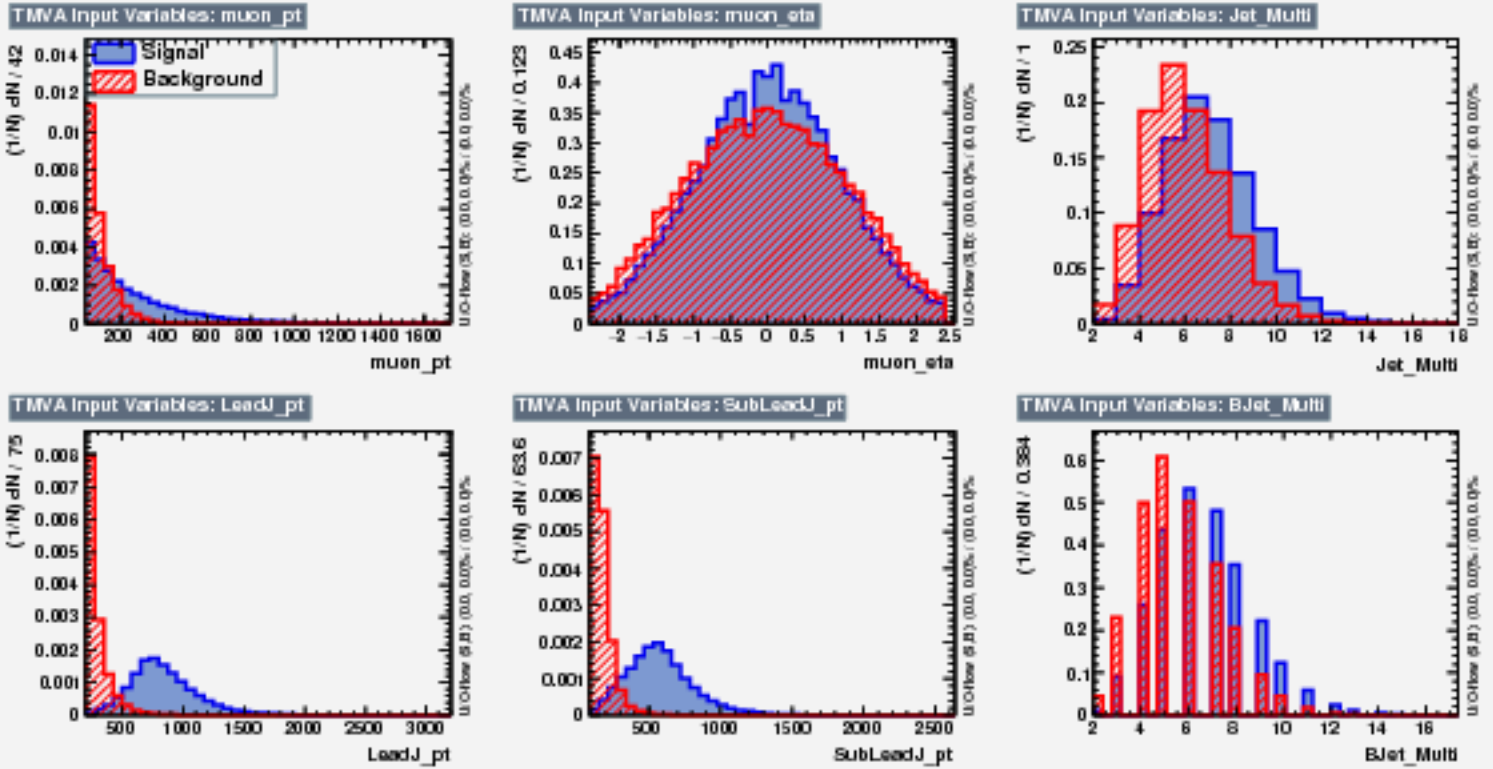
Correlation Matrix (signal)



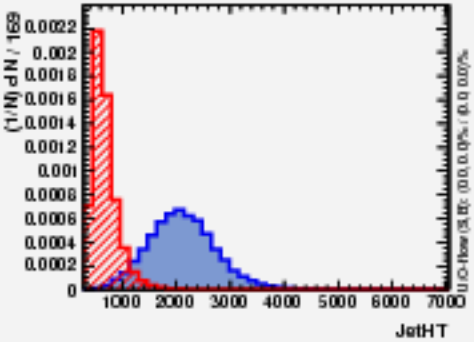

TMVA response for classifier: BDT
TMVA
Signal
Background
(1/N) dN / dx
2.5
2
1.5
1
0.5
0
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
1
BDT response
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%


TMVA overtraining check for classifier: BDT
TMVA
Signal (test sample)
Background (test sample)
Signal (training sample)
Background (training sample)
Kolmogorov-Smirnov test: signal (background) probability = 0.237 (0.641)
(1/N) dN / dx
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%
BDT response
0
0.5
1
1.5
2
2.5
3
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
1

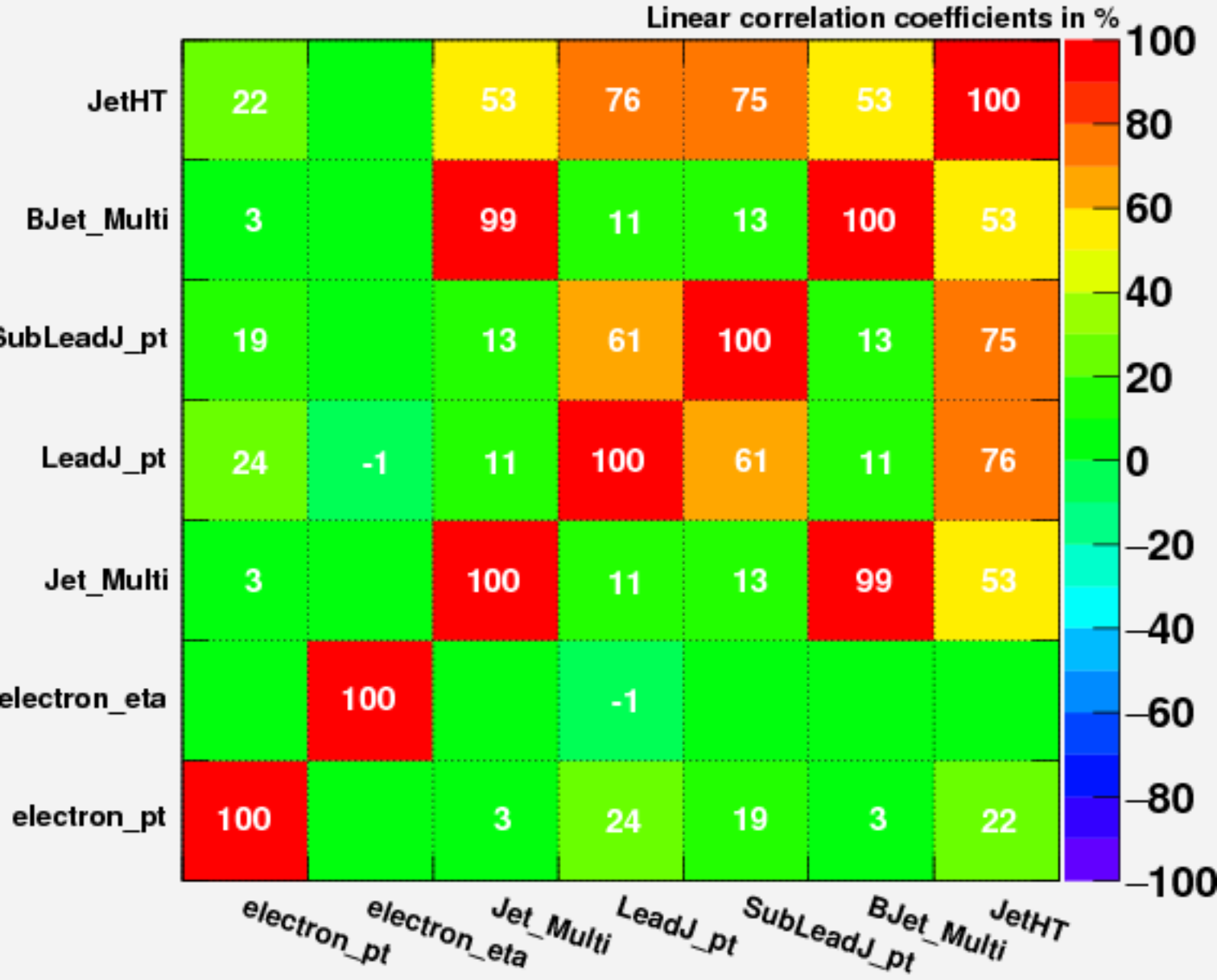

Background rejection versus Signal efficiency
TMVA
Background rejection
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Signal efficiency
MVA Method:
BDT


TMVA Input Variables: muon_pt
Signal
Background
(1/N) dN / 42
muon_pt
TMVA Input Variables: muon_eta
(1/N) dN / 0.123
muon_eta
TMVA Input Variables: Jet_Multi
(1/N) dN / 1
Jet_Multi
TMVA Input Variables: LeadJ_pt
(1/N) dN / 75
LeadJ_pt
TMVA Input Variables: SubLeadJ_pt
(1/N) dN / 63.6
SubLeadJ_pt
TMVA Input Variables: BJet_Multi
(1/N) dN / 0.384
BJet_Multi

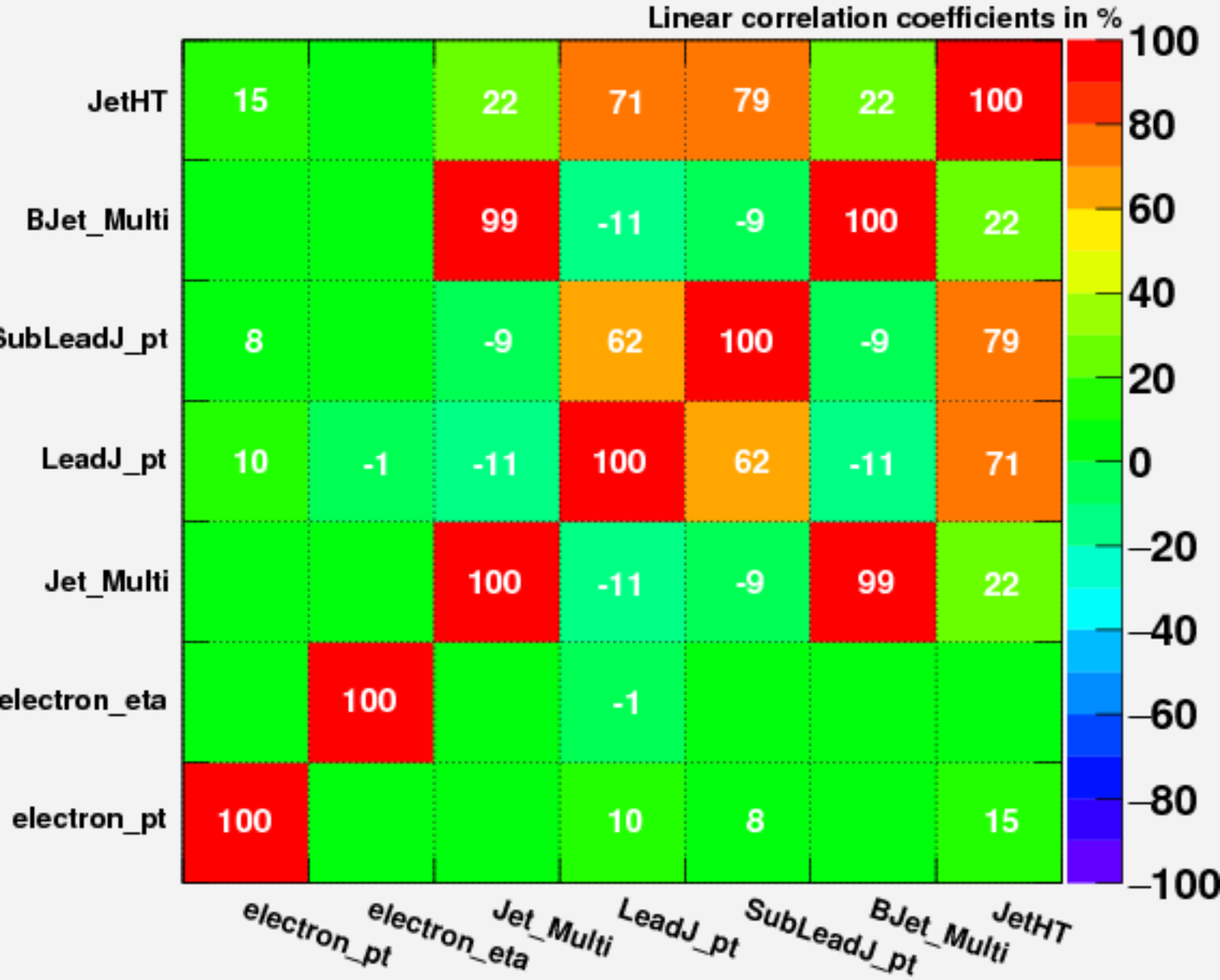
TMVA Input Variables: JetHT

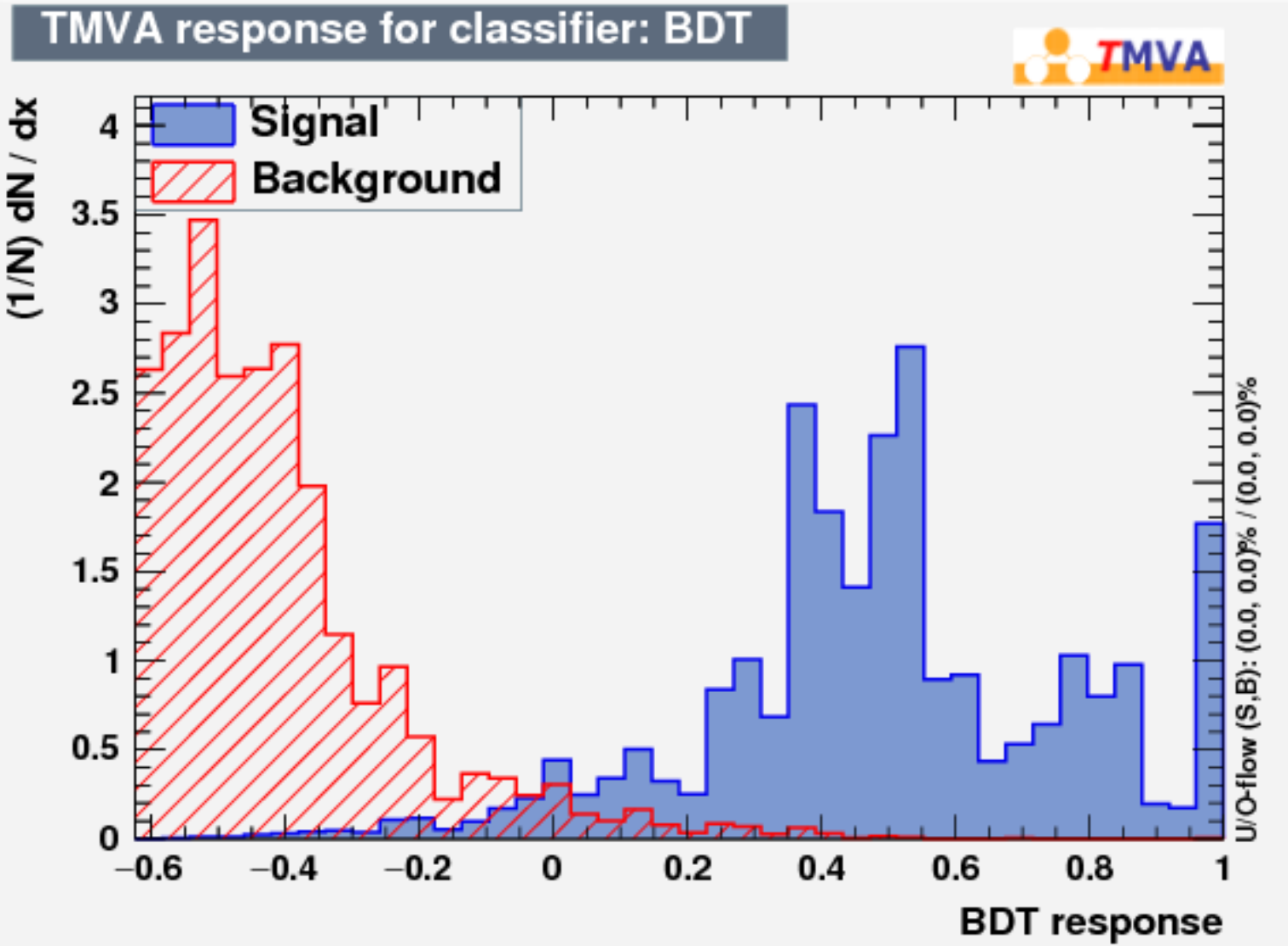


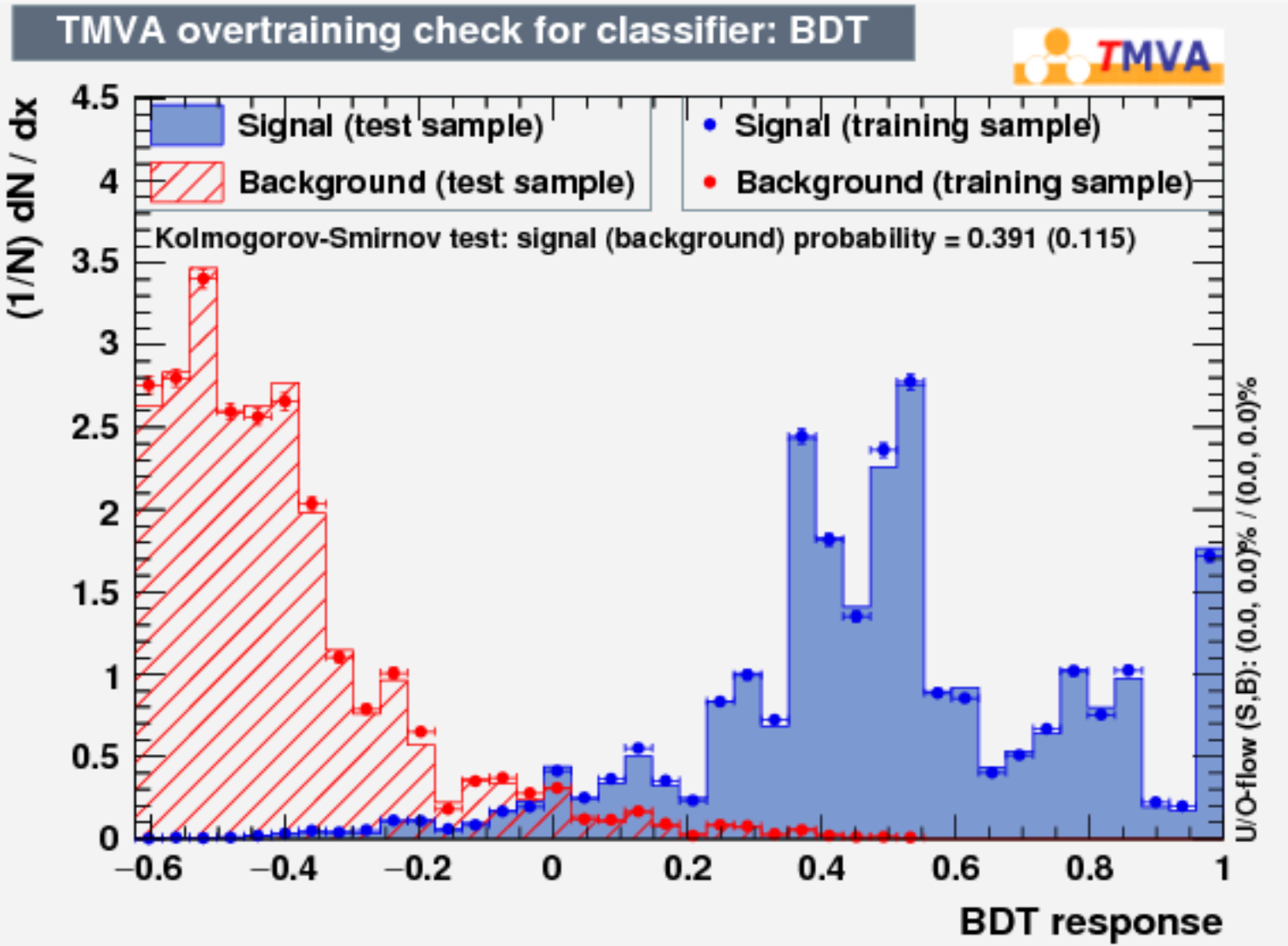
Correlation Matrix (background)

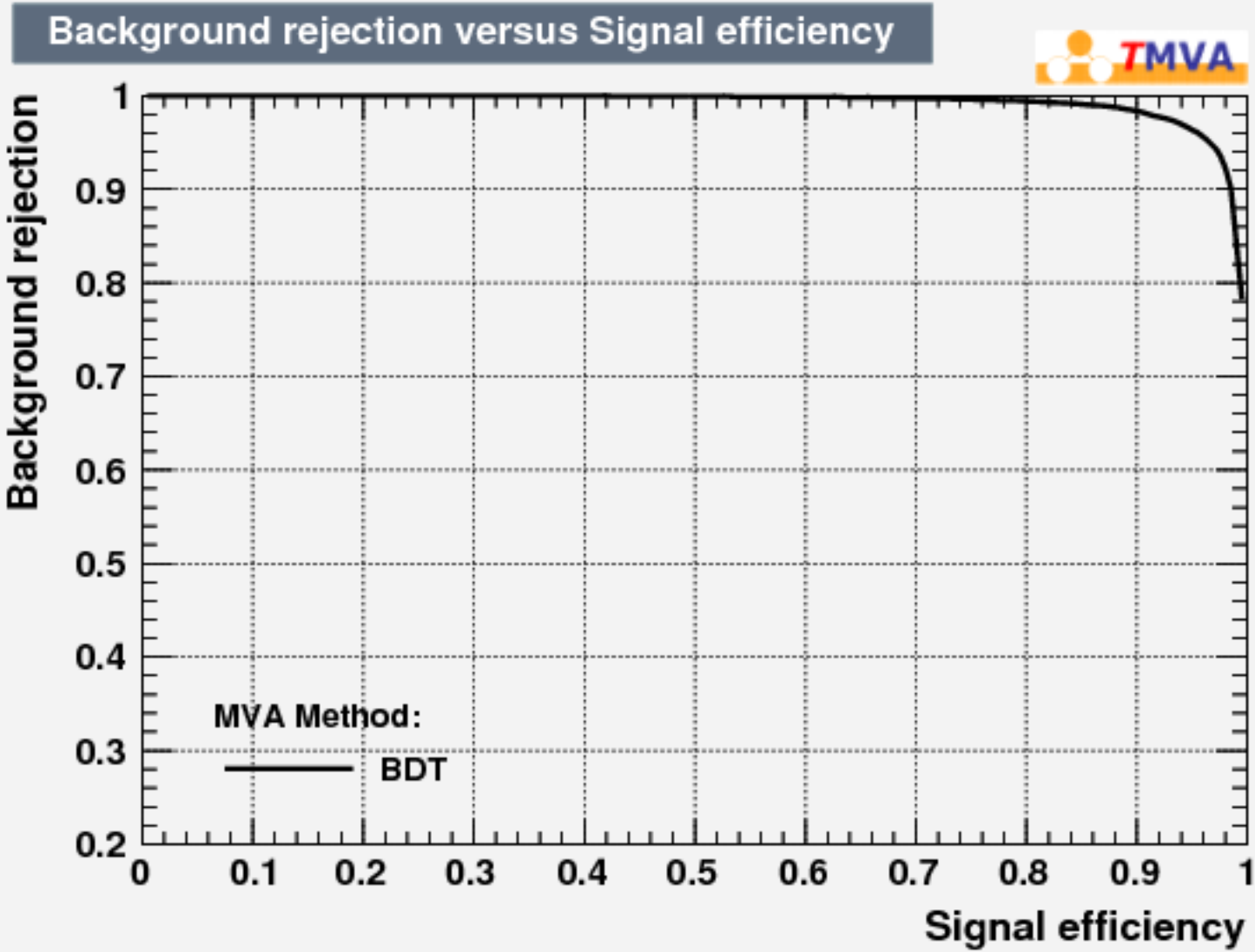


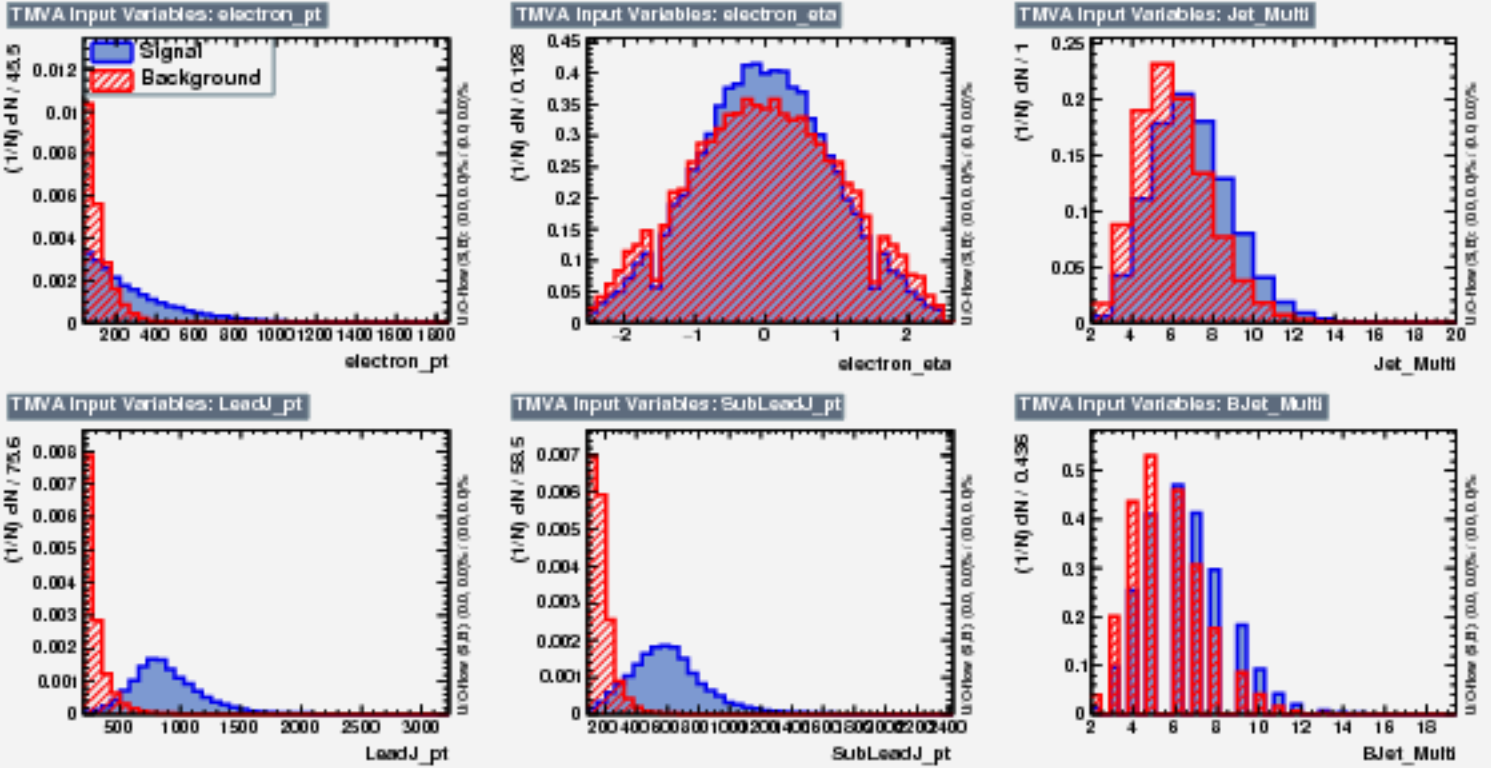
Correlation Matrix (signal)



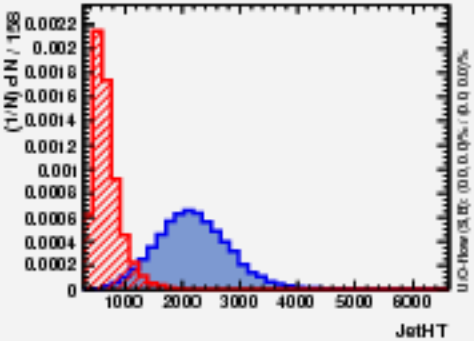

TMVA response for classifier: BDT
TMVA
Signal
Background
(1/N) dN / dx
4
3.5
3
2.5
2
1.5
1
0.5
0
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
1
BDT response
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%


TMVA overtraining check for classifier: BDT
TMVA
Signal (test sample)
Background (test sample)
Signal (training sample)
Background (training sample)
Kolmogorov-Smirnov test: signal (background) probability = 0.391 (0.115)
(1/N) dN / dx
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%
BDT response
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
1

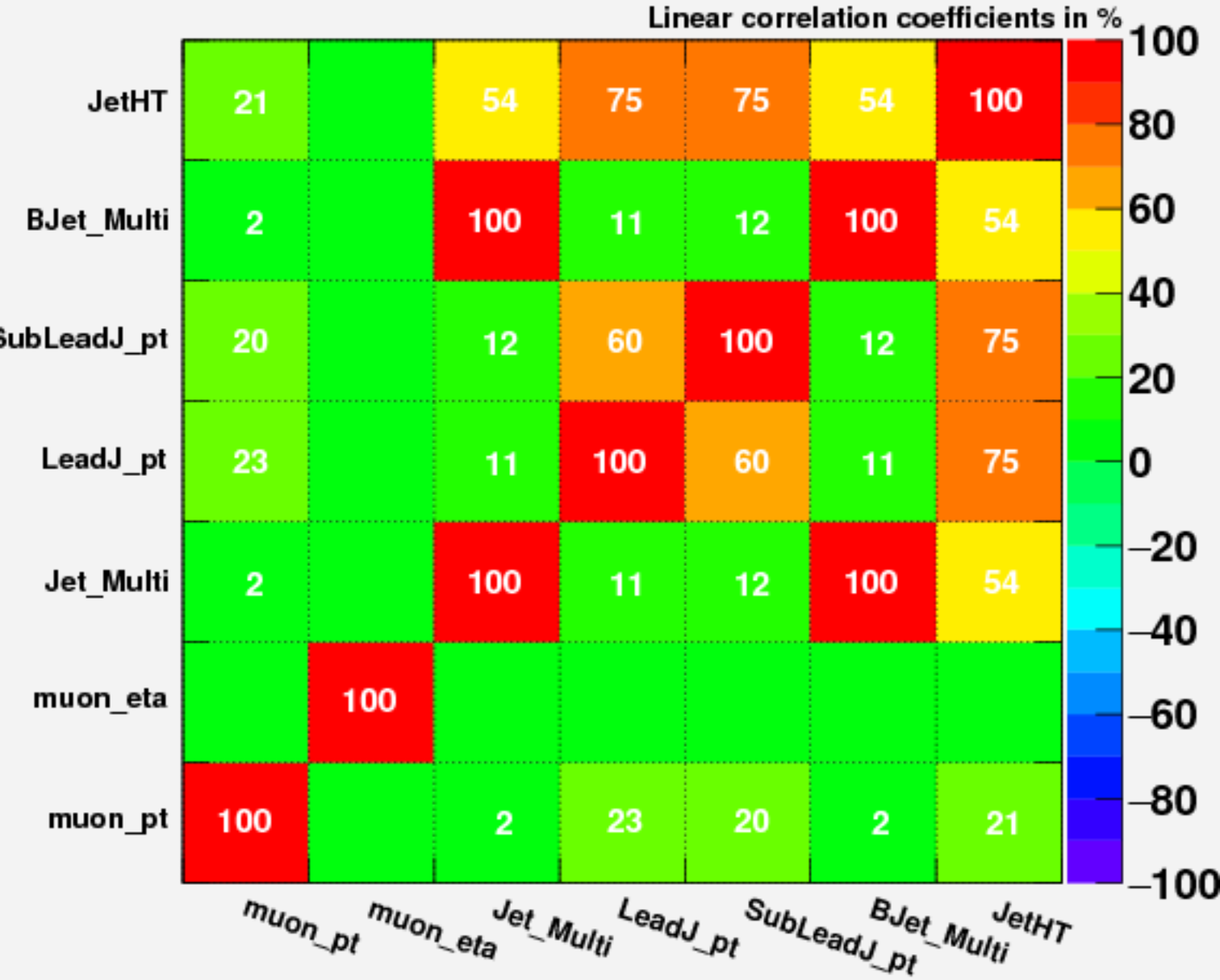

Background rejection versus Signal efficiency
TMVA
Background rejection
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Signal efficiency
MVA Method:
BDT


TMVA Input Variables: electron_pt
Signal
Background
(1/N) dN / 45.5
electron_pt
TMVA Input Variables: electron_eta
(1/N) dN / 0.128
electron_eta
TMVA Input Variables: Jet_Multi
(1/N) dN / 1
Jet_Multi
TMVA Input Variables: LeadJ_pt
(1/N) dN / 75.6
LeadJ_pt
TMVA Input Variables: SubLeadJ_pt
(1/N) dN / 58.5
SubLeadJ_pt
TMVA Input Variables: BJet_Multi
(1/N) dN / 0.436
BJet_Multi

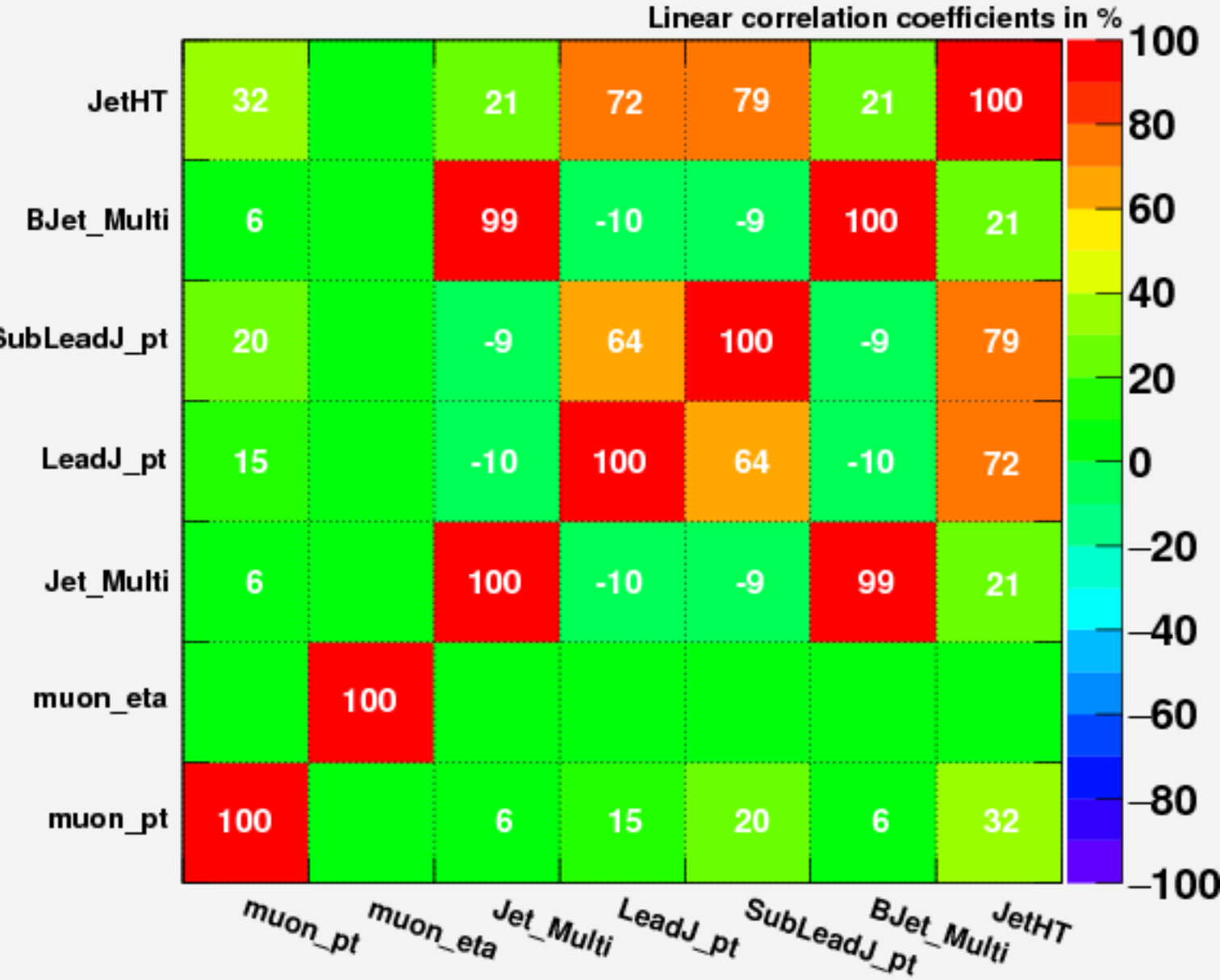
TMVA Input Variables: JetHT

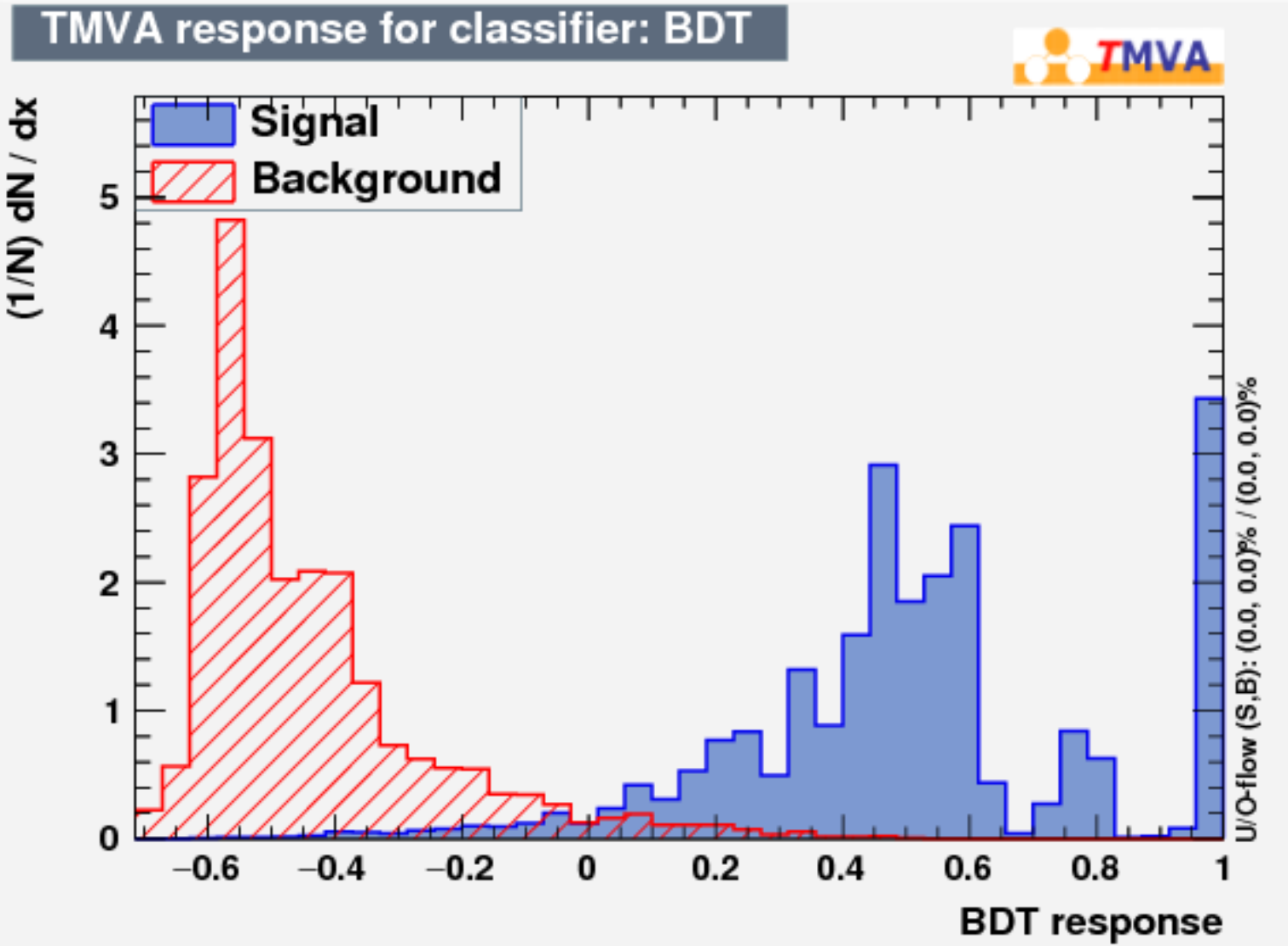


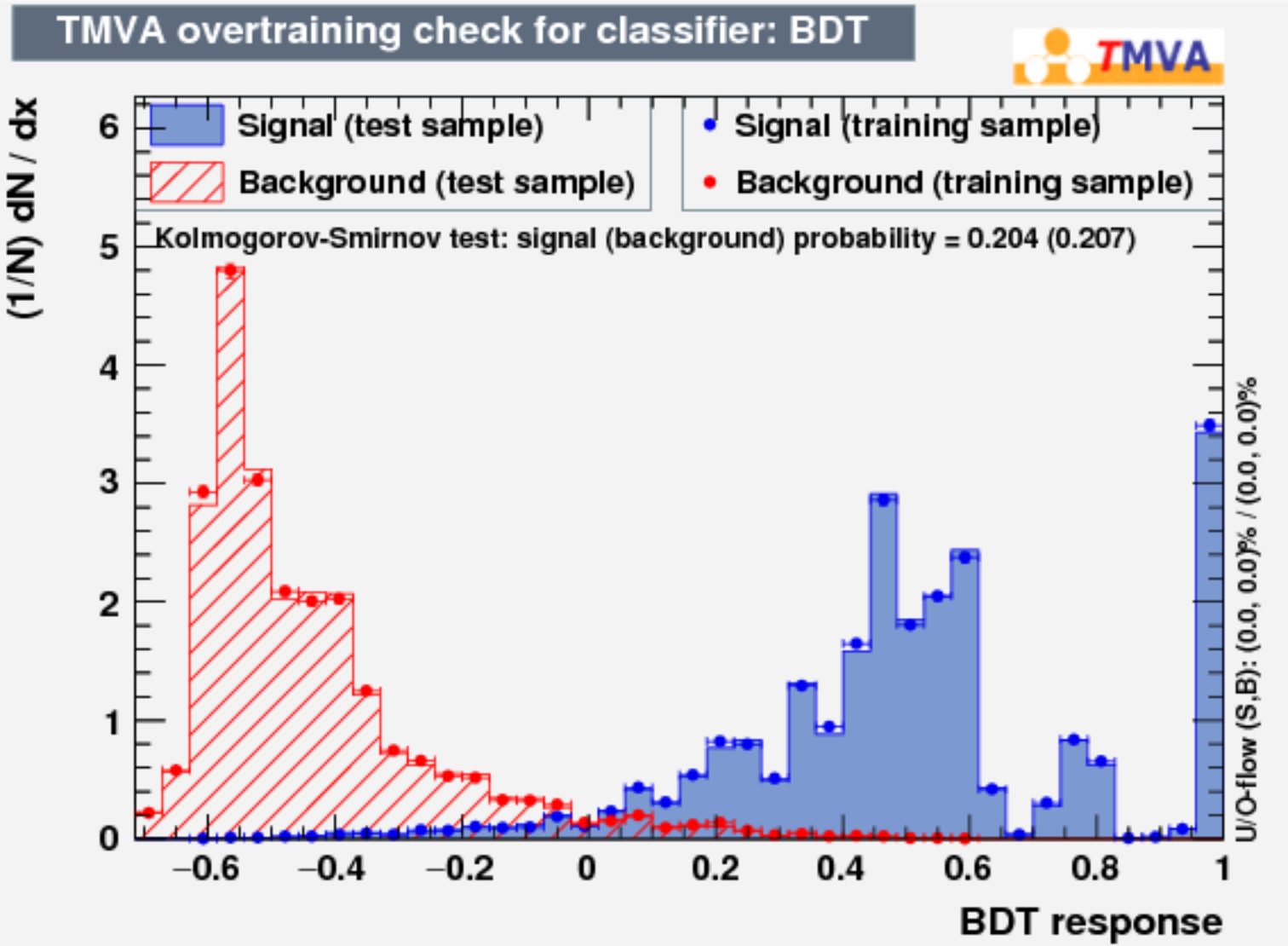
Correlation Matrix (background)

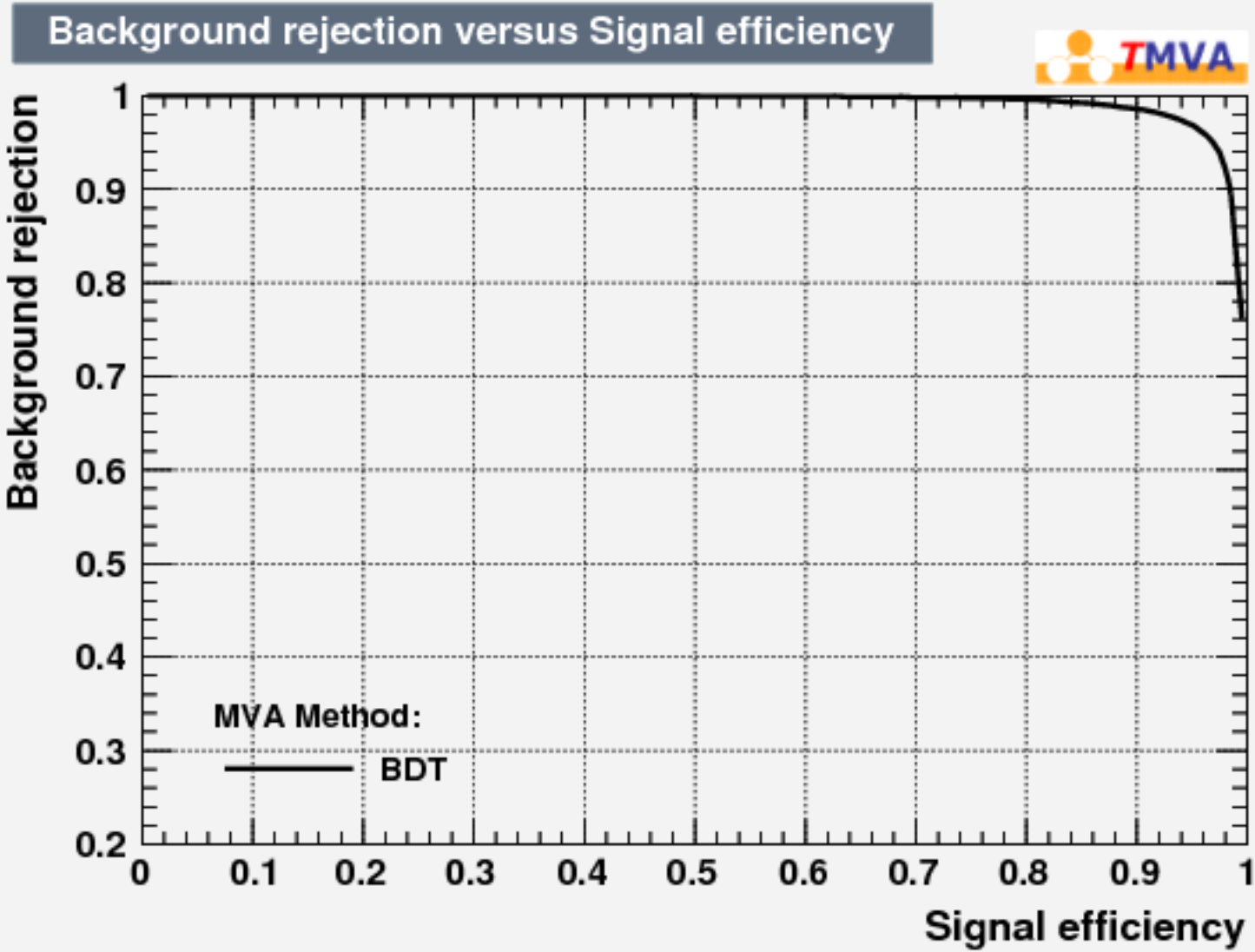


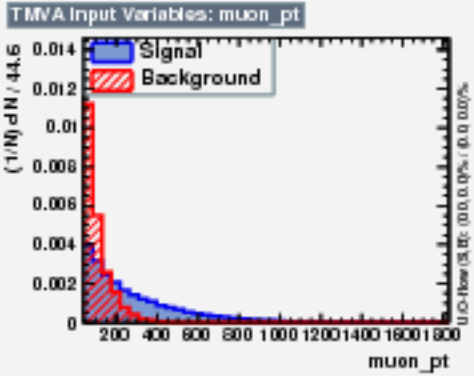
Correlation Matrix (signal)

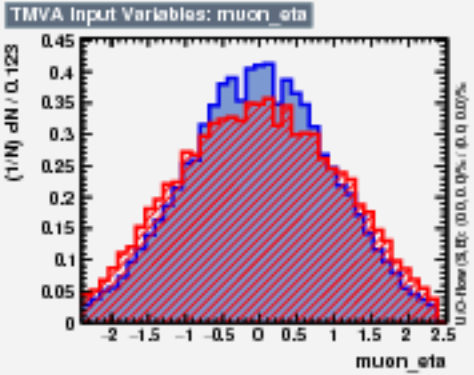


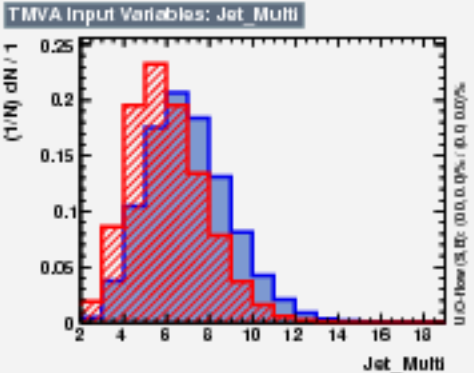

TMVA response for classifier: BDT
TMVA
Signal
Background
(1/N) dN / dx
0
1
2
3
4
5
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
1
BDT response
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%

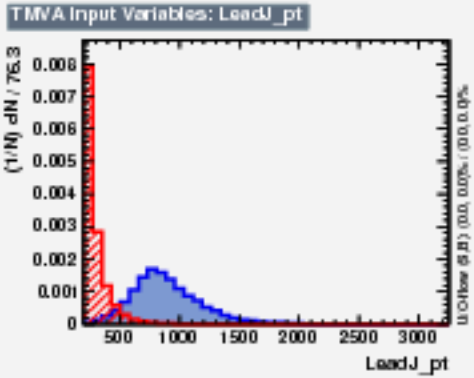

TMVA overtraining check for classifier: BDT
TMVA
Signal (test sample)
Background (test sample)
Signal (training sample)
Background (training sample)
Kolmogorov-Smirnov test: signal (background) probability = 0.204 (0.207)
(1/N) dN / dx
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%
BDT response
0
1
2
3
4
5
6
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
1

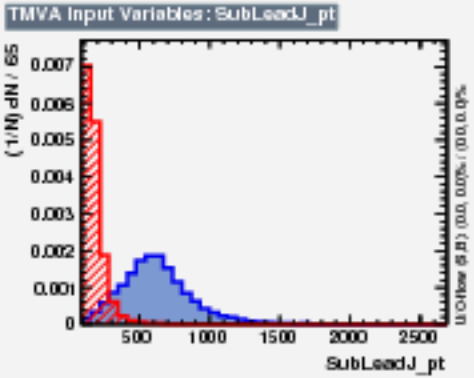

Background rejection versus Signal efficiency
TMVA
Background rejection
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Signal efficiency
MVA Method:
BDT

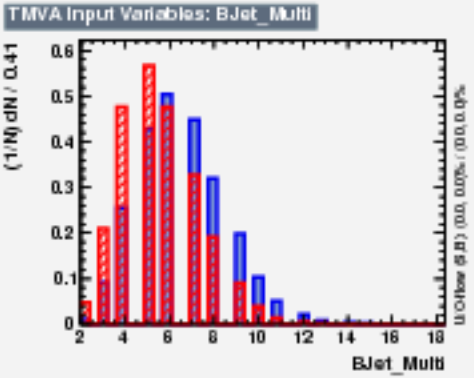

TMVA Input Variables: muon_pt
Signal
Background
(1/N) dN / 44.6
muon_pt


TMVA Input Variables: muon_eta
(1/N) dN / 0.123
muon_eta

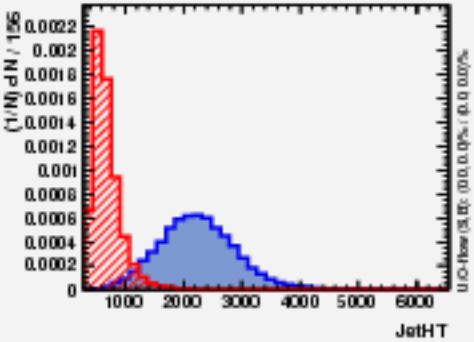

TMVA Input Variables: Jet_Multi
(1/N) dN / 1
Jet_Multi


TMVA Input Variables: LeadJ_pt
(1/N) dN / 75.3
LeadJ_pt

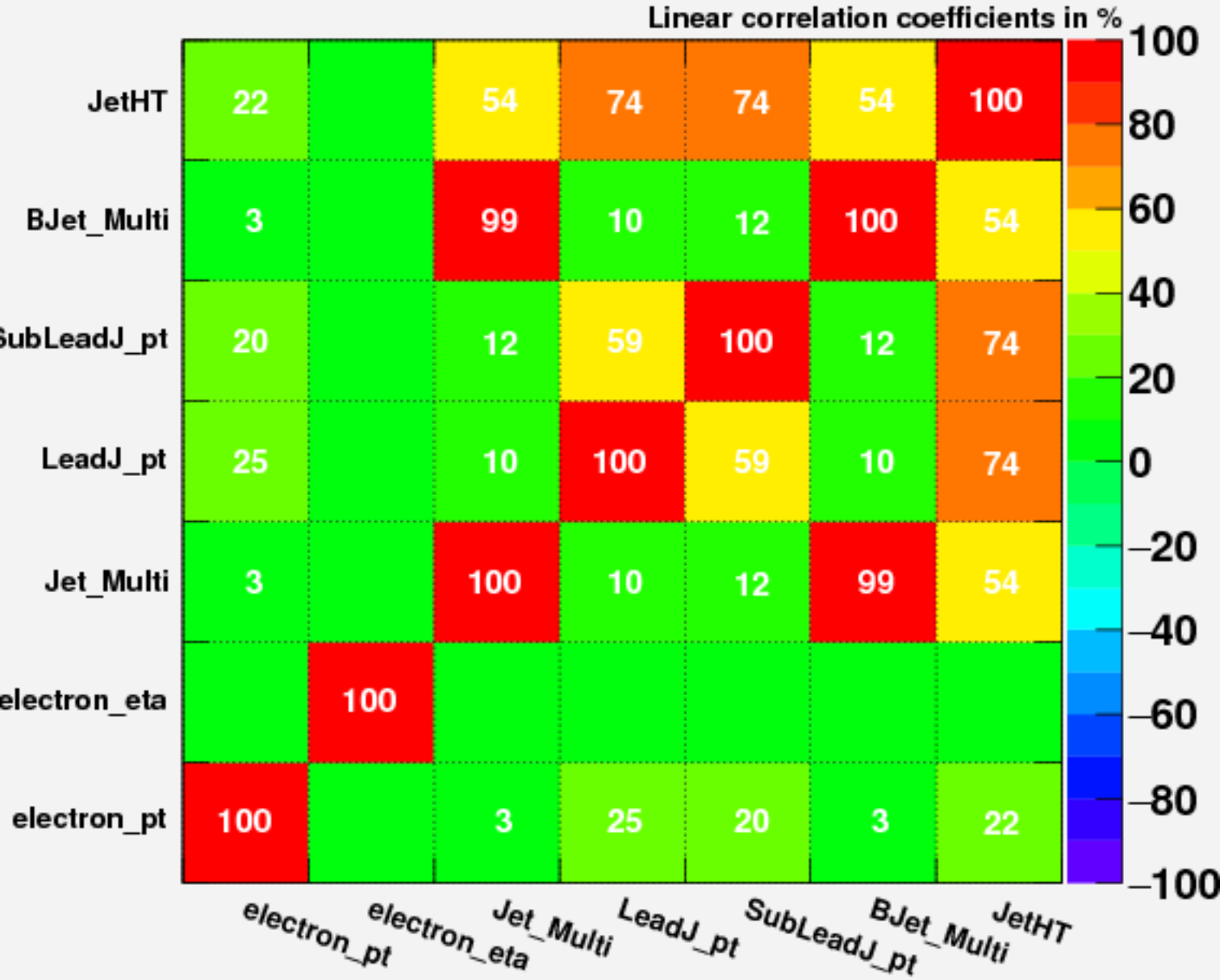

TMVA Input Variables: SubLeadJ_pt
(1/N) dN / 65
SubLeadJ_pt


TMVA Input Variables: BJet_Multi
(1/N) dN / 0.41
BJet_Multi

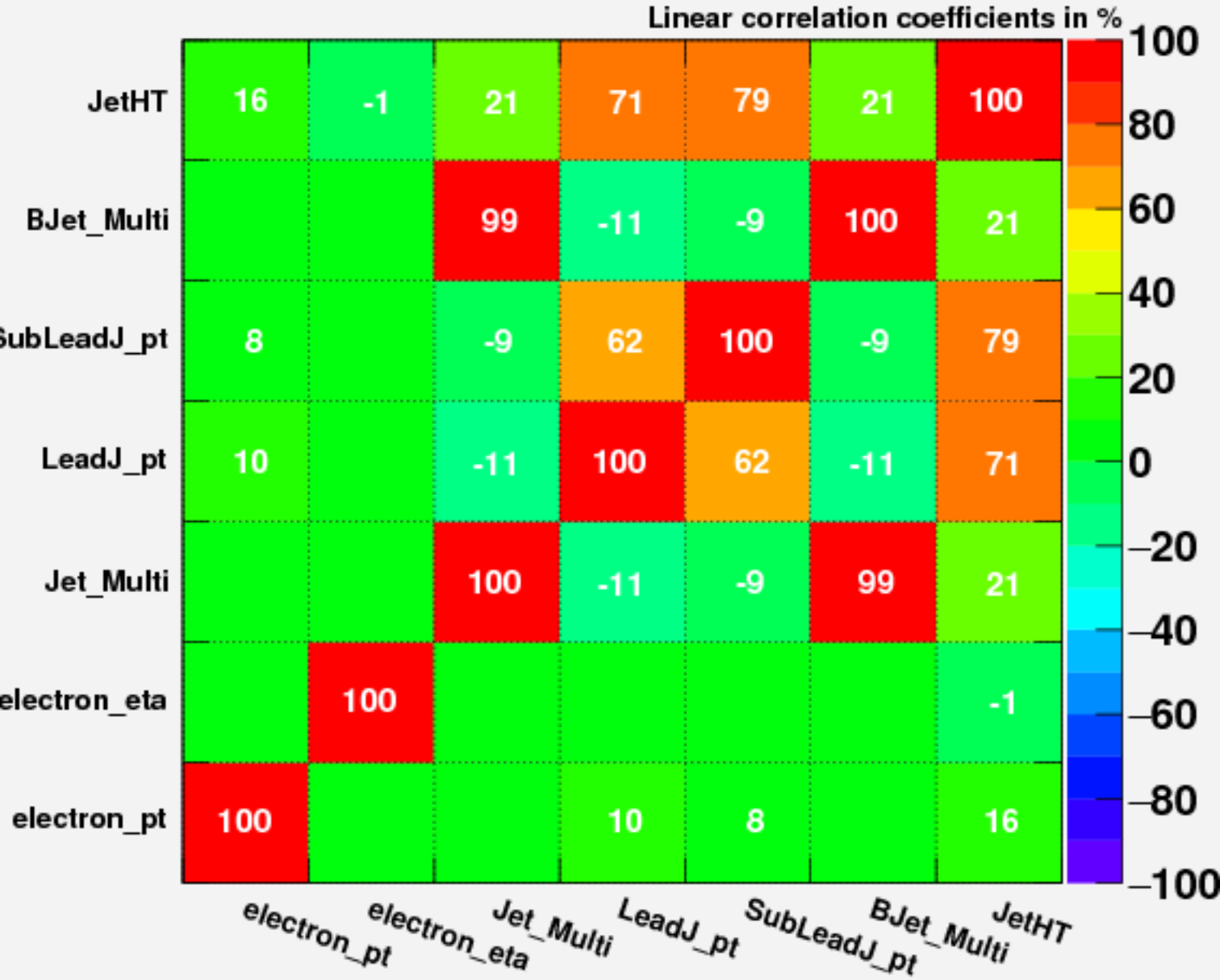
TMVA Input Variables: JetHT

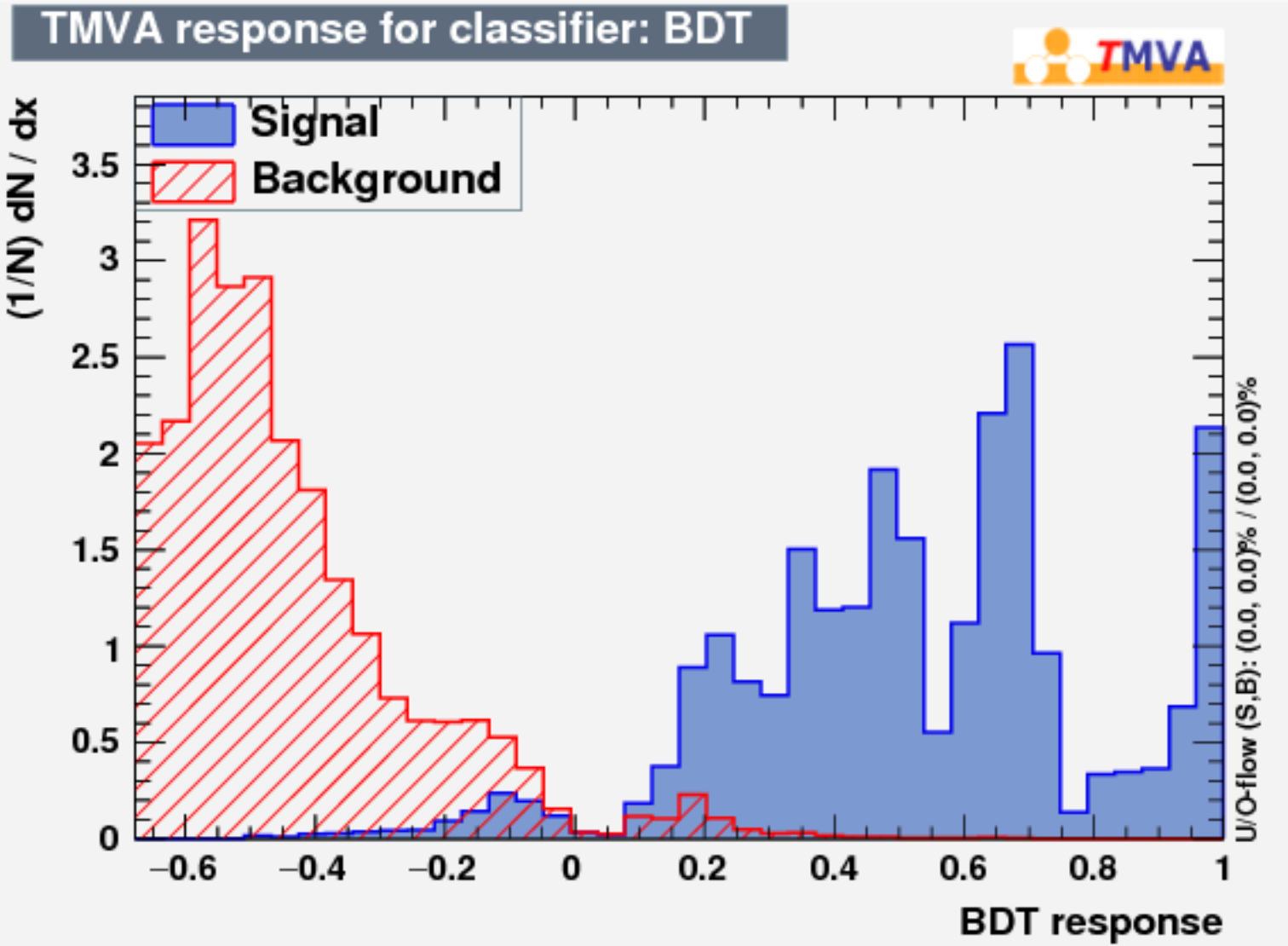


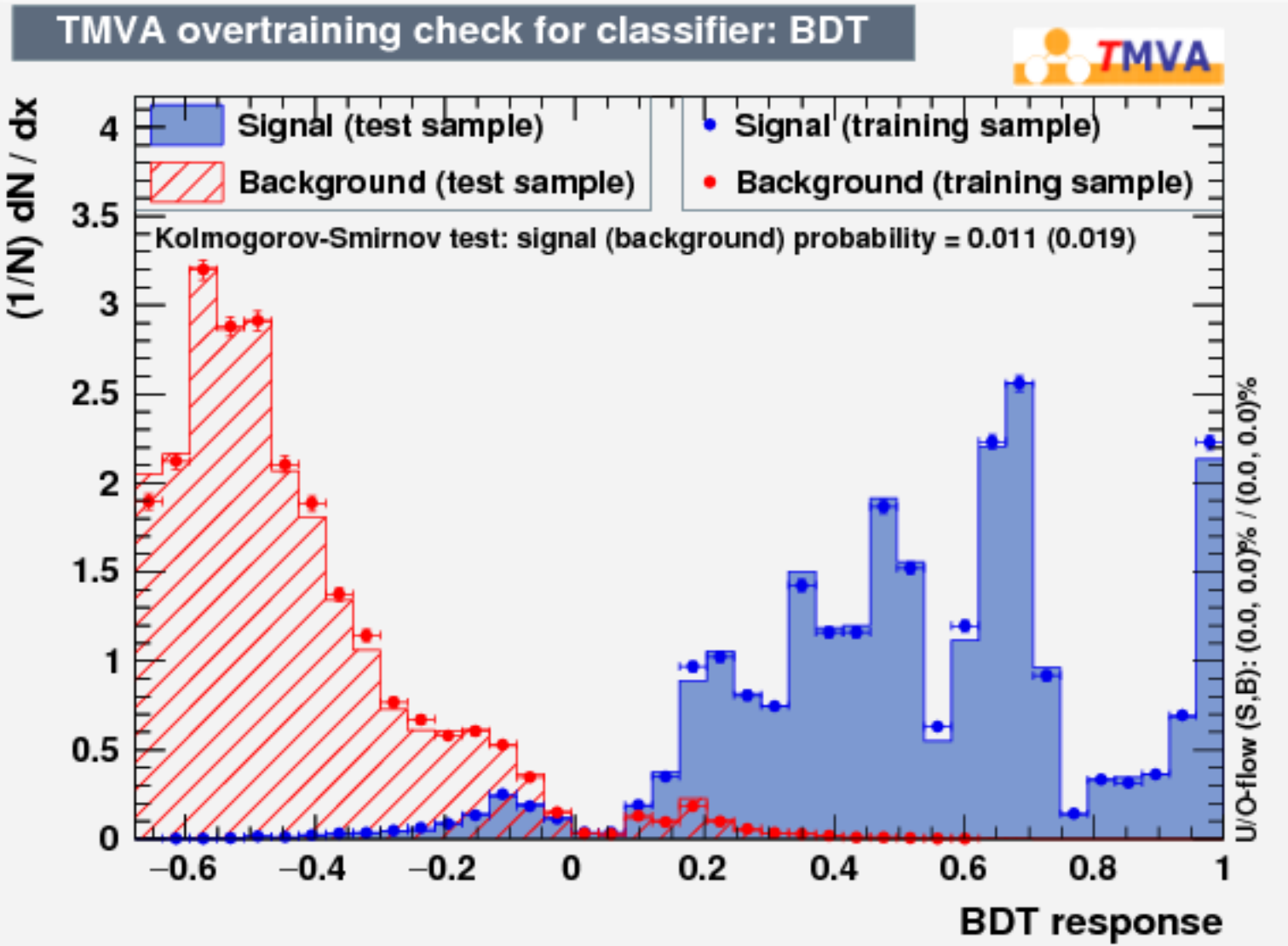
Correlation Matrix (background)

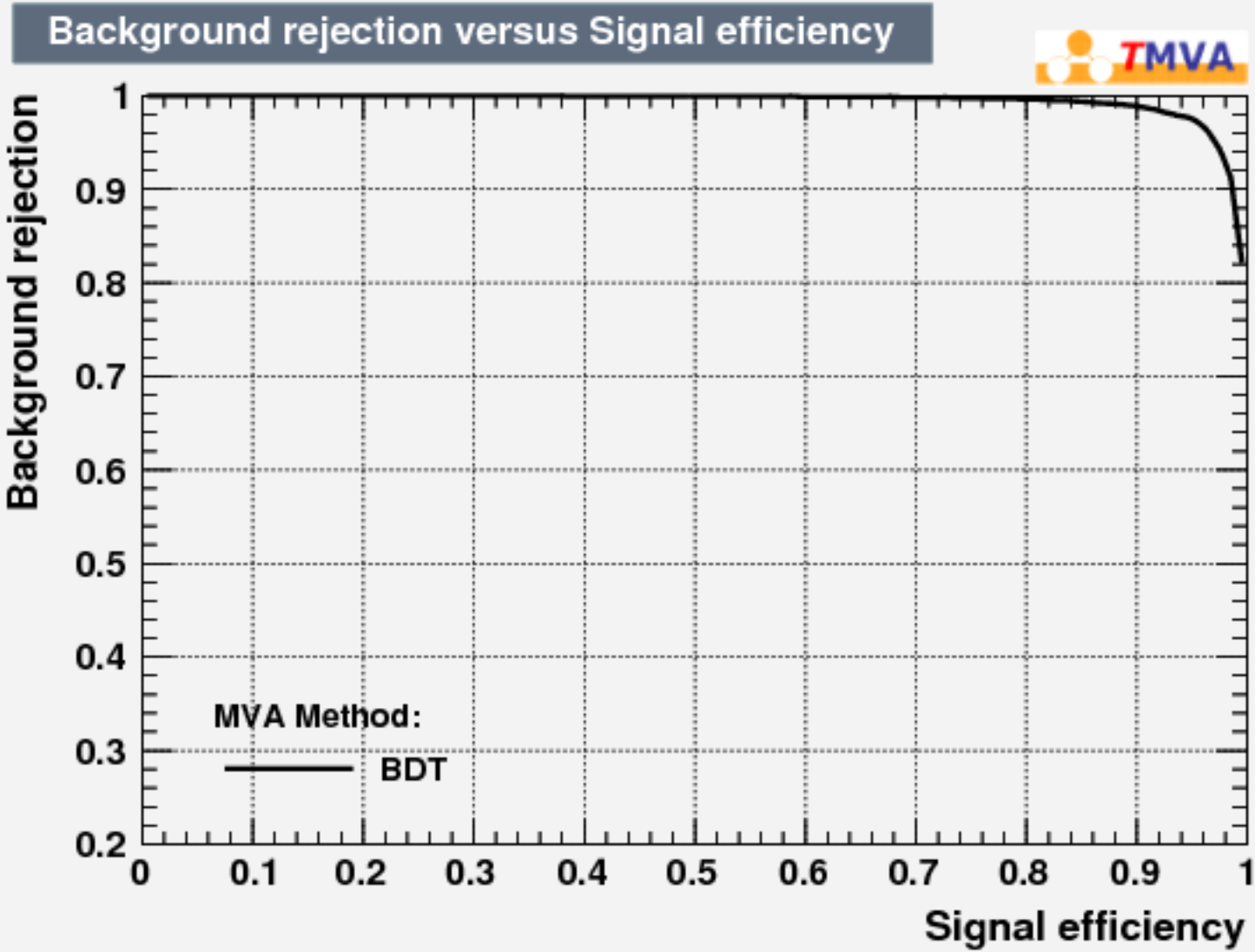


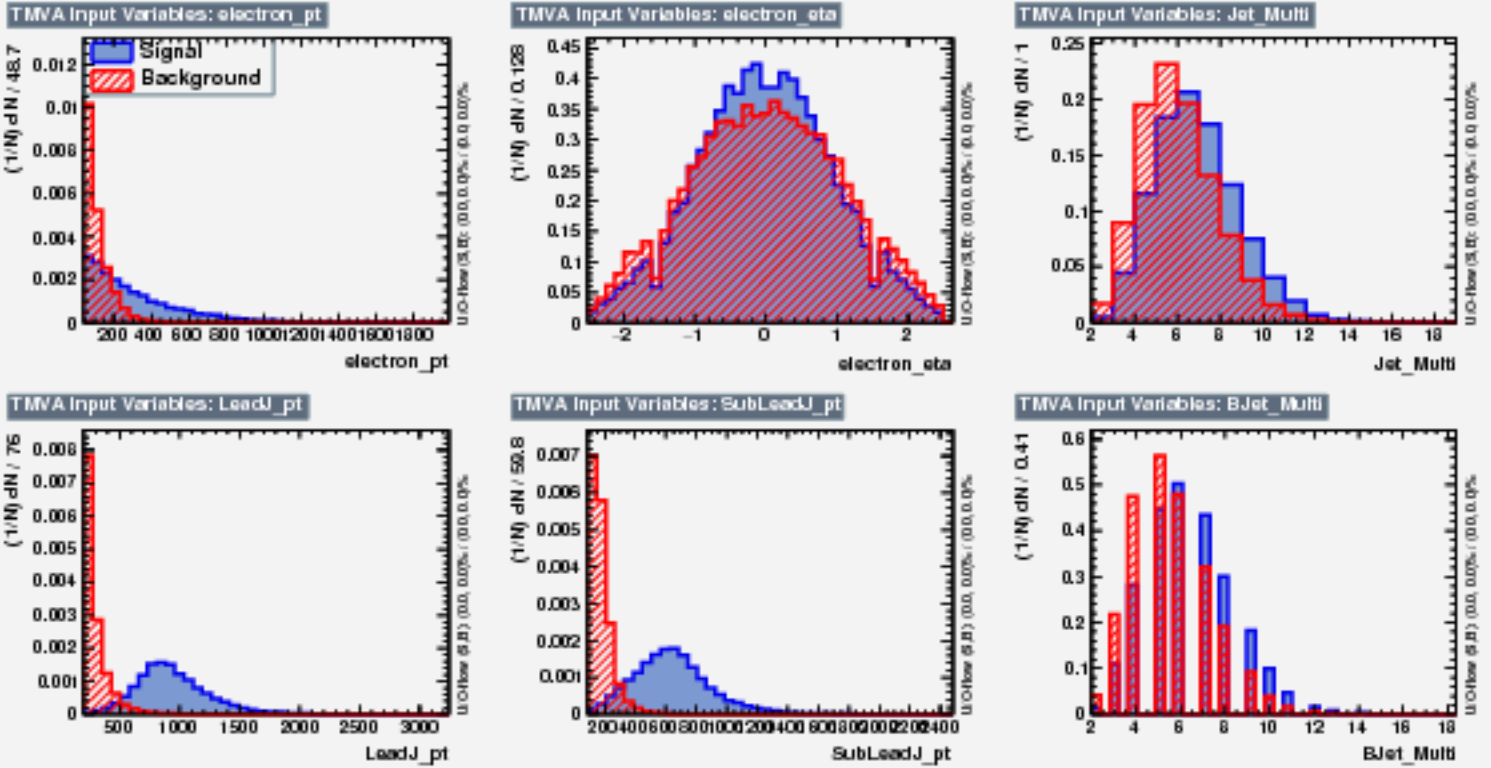
Correlation Matrix (signal)



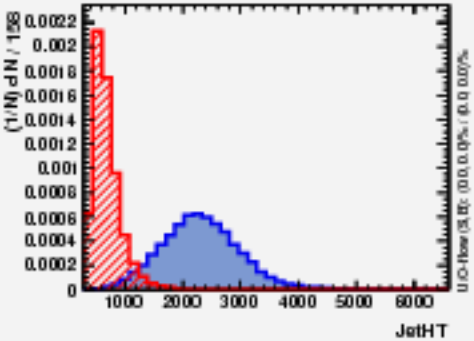

TMVA response for classifier: BDT
TMVA
Signal
Background
(1/N) dN / dx
3.5
3
2.5
2
1.5
1
0.5
0
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
1
BDT response
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%


TMVA overtraining check for classifier: BDT
TMVA
Signal (test sample)
Background (test sample)
Signal (training sample)
Background (training sample)
Kolmogorov-Smirnov test: signal (background) probability = 0.011 (0.019)
(1/N) dN / dx
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%
BDT response
0
0.5
1
1.5
2
2.5
3
3.5
4
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
1

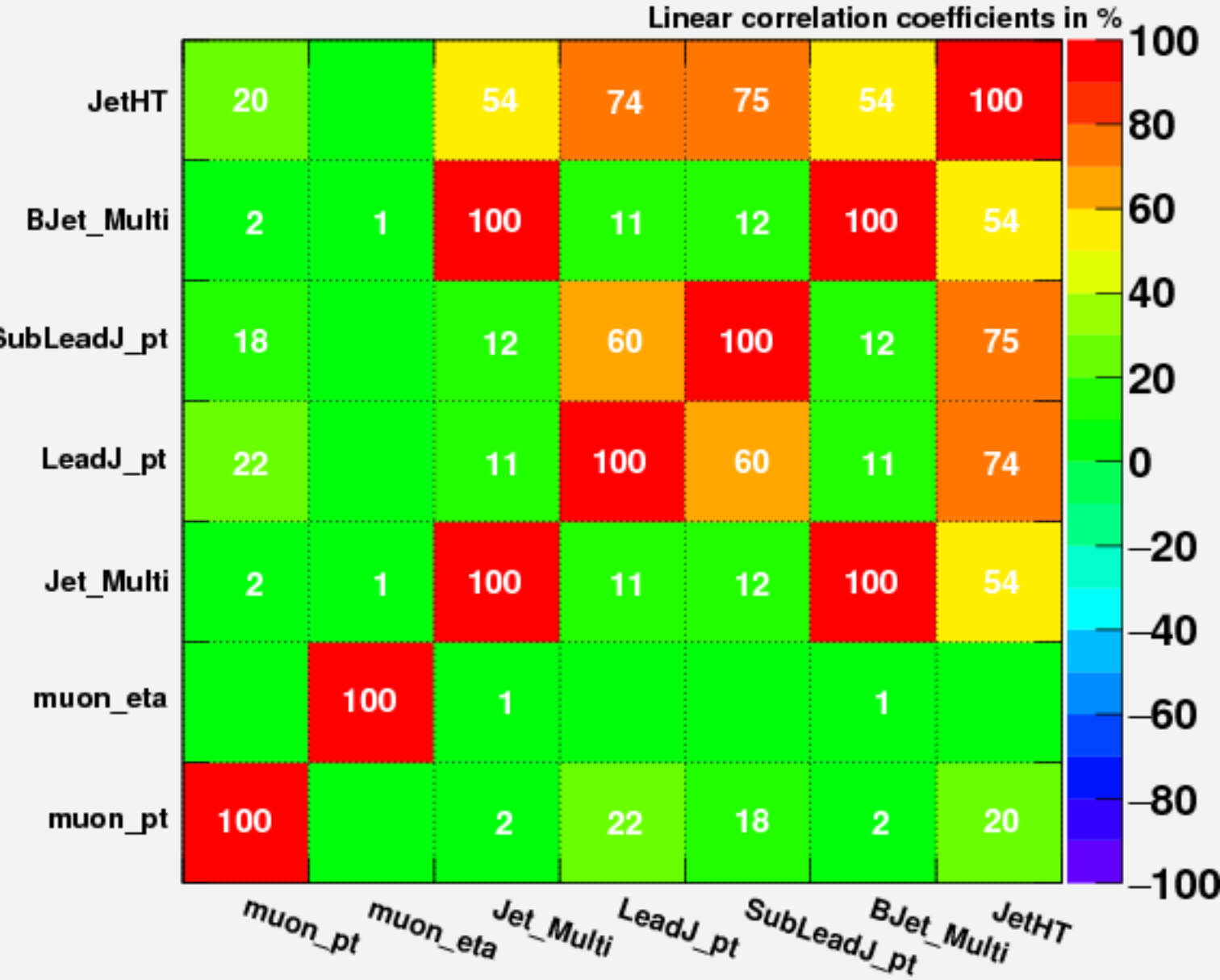

Background rejection versus Signal efficiency
TMVA
Background rejection
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Signal efficiency
MVA Method:
BDT


TMVA Input Variables: electron_pt
Signal
Background
(1/N) dN / 48.7
electron_pt
TMVA Input Variables: electron_eta
(1/N) dN / 0.128
electron_eta
TMVA Input Variables: Jet_Multi
(1/N) dN / 1
Jet_Multi
TMVA Input Variables: LeadJ_pt
(1/N) dN / 75
LeadJ_pt
TMVA Input Variables: SubLeadJ_pt
(1/N) dN / 59.8
SubLeadJ_pt
TMVA Input Variables: BJet_Multi
(1/N) dN / 0.41
BJet_Multi

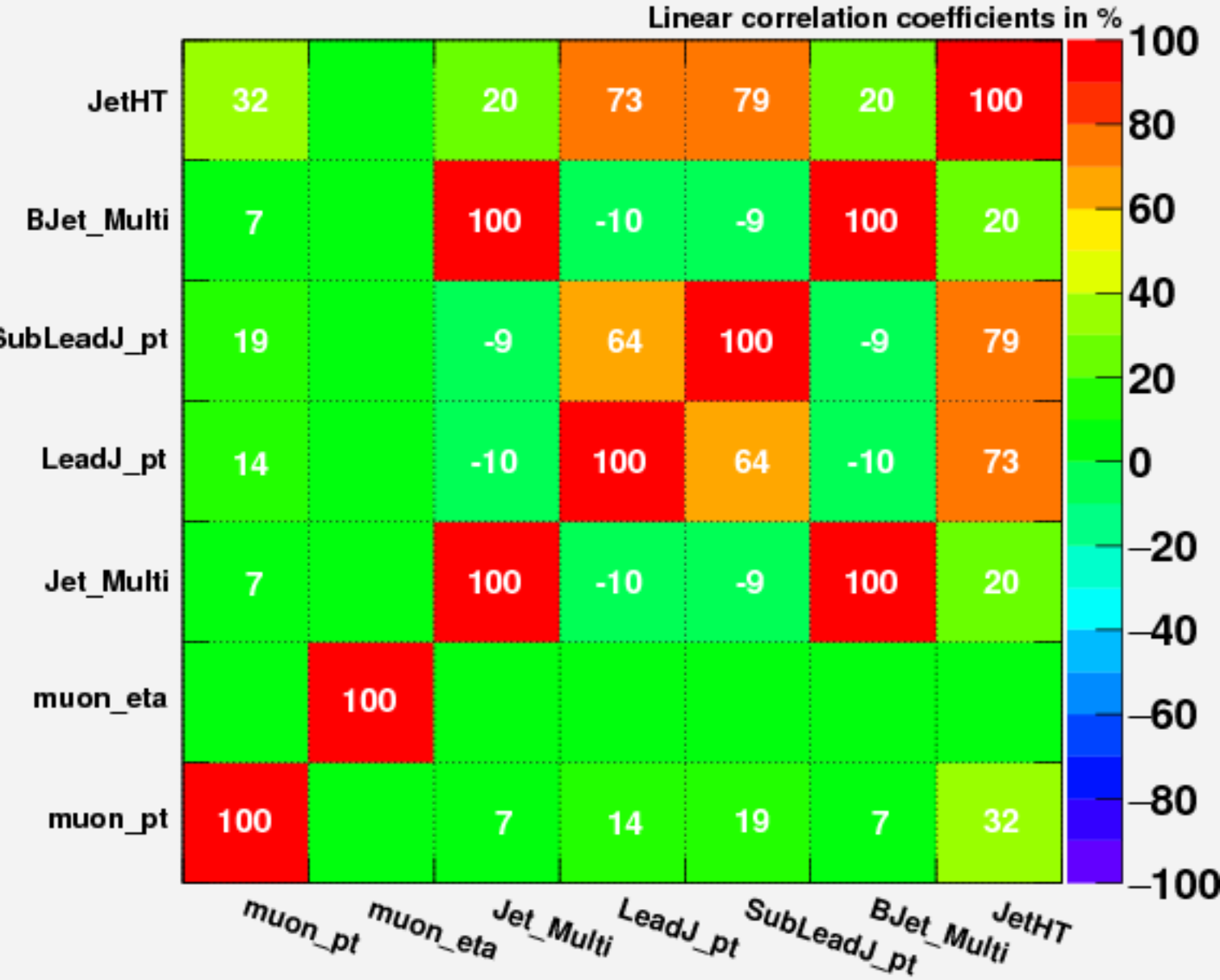
TMVA Input Variables: JetHT

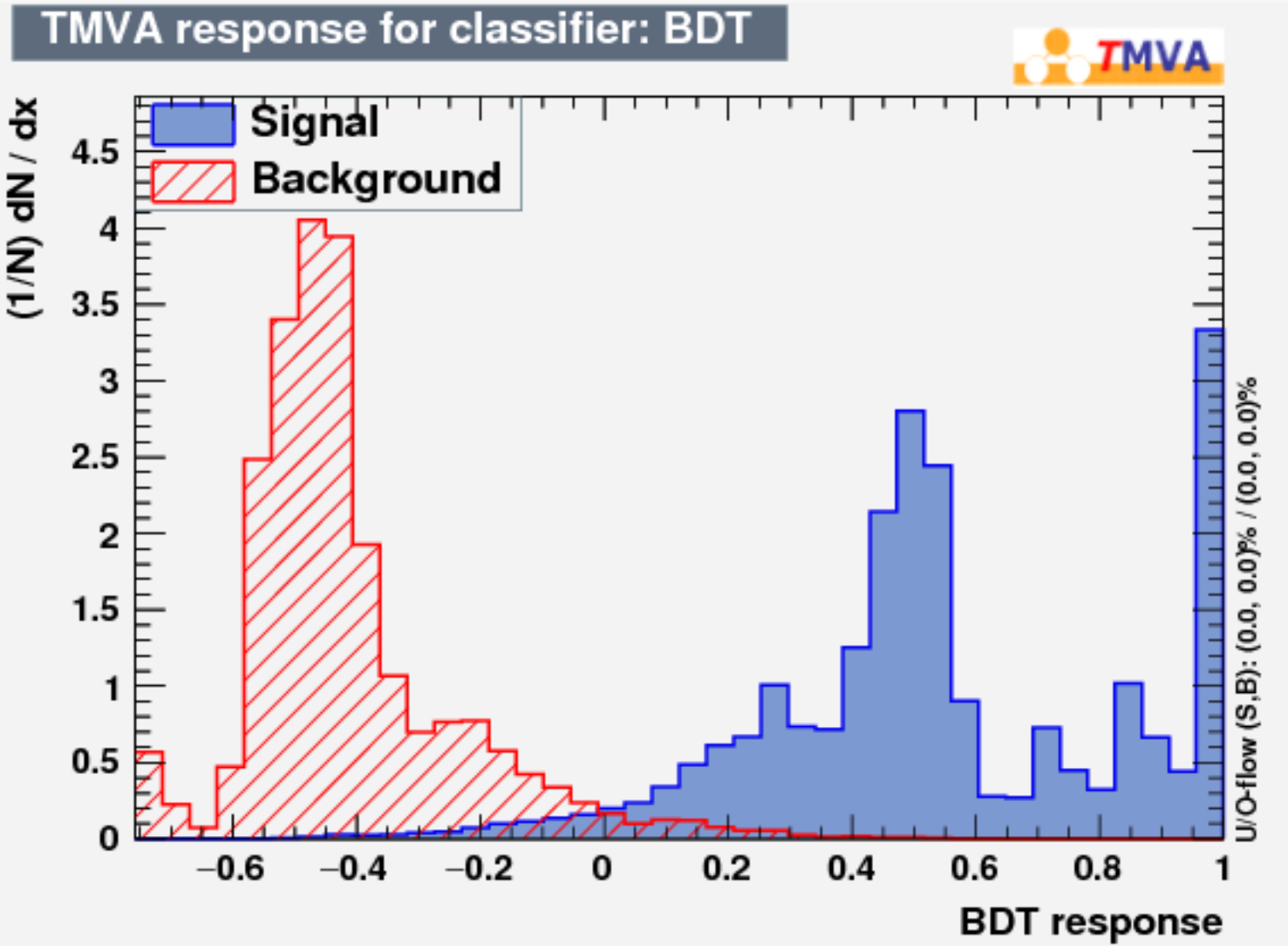


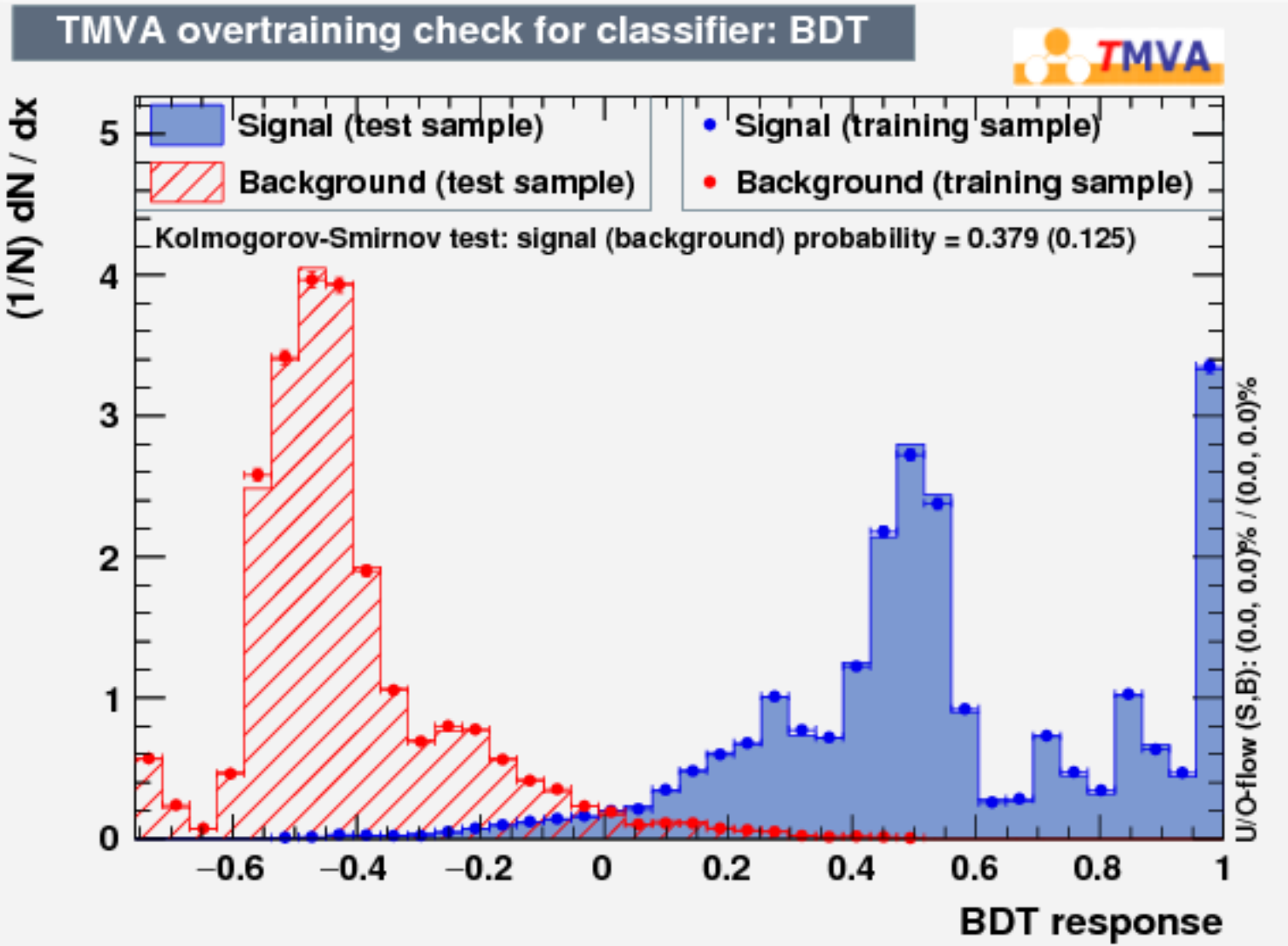
Correlation Matrix (background)

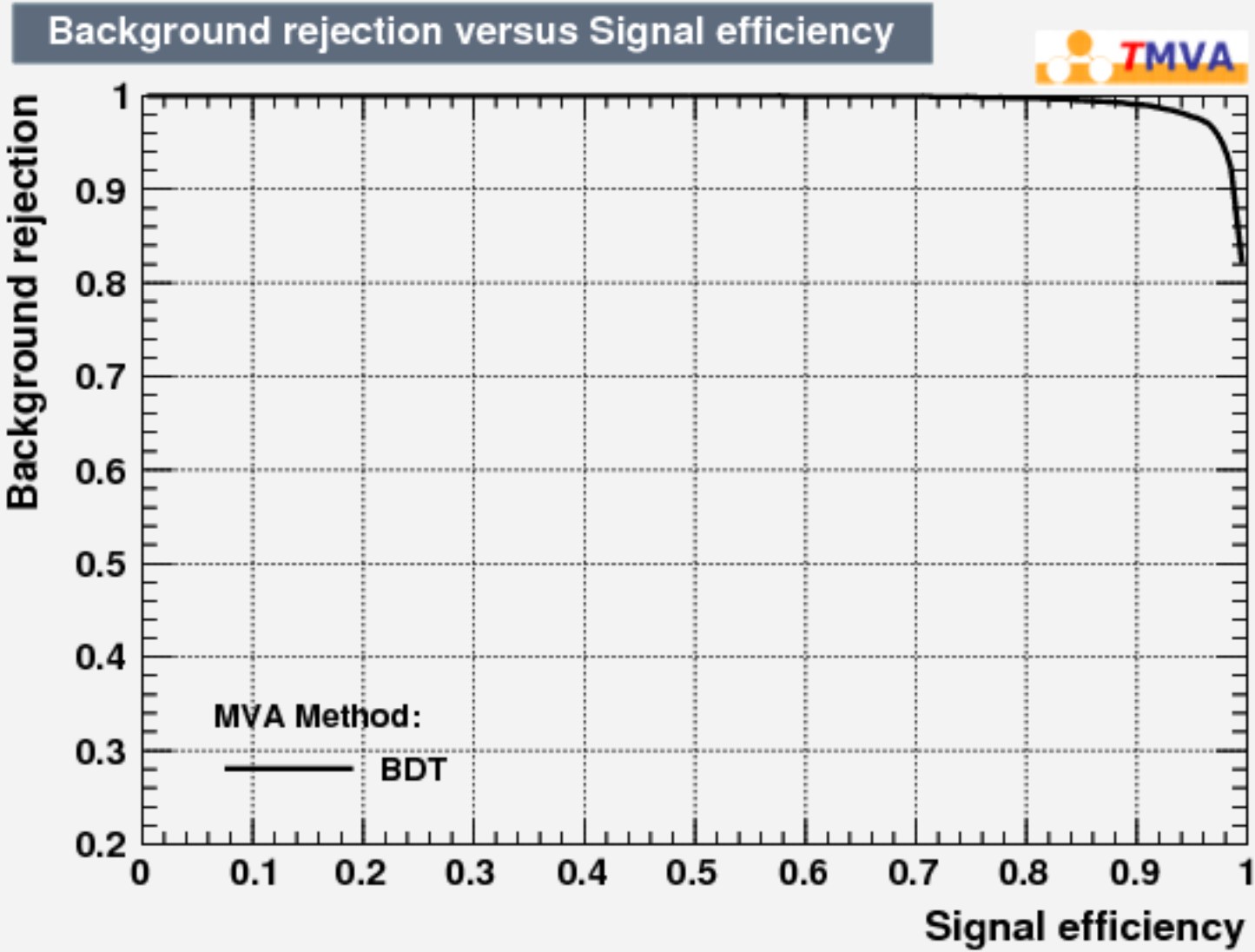


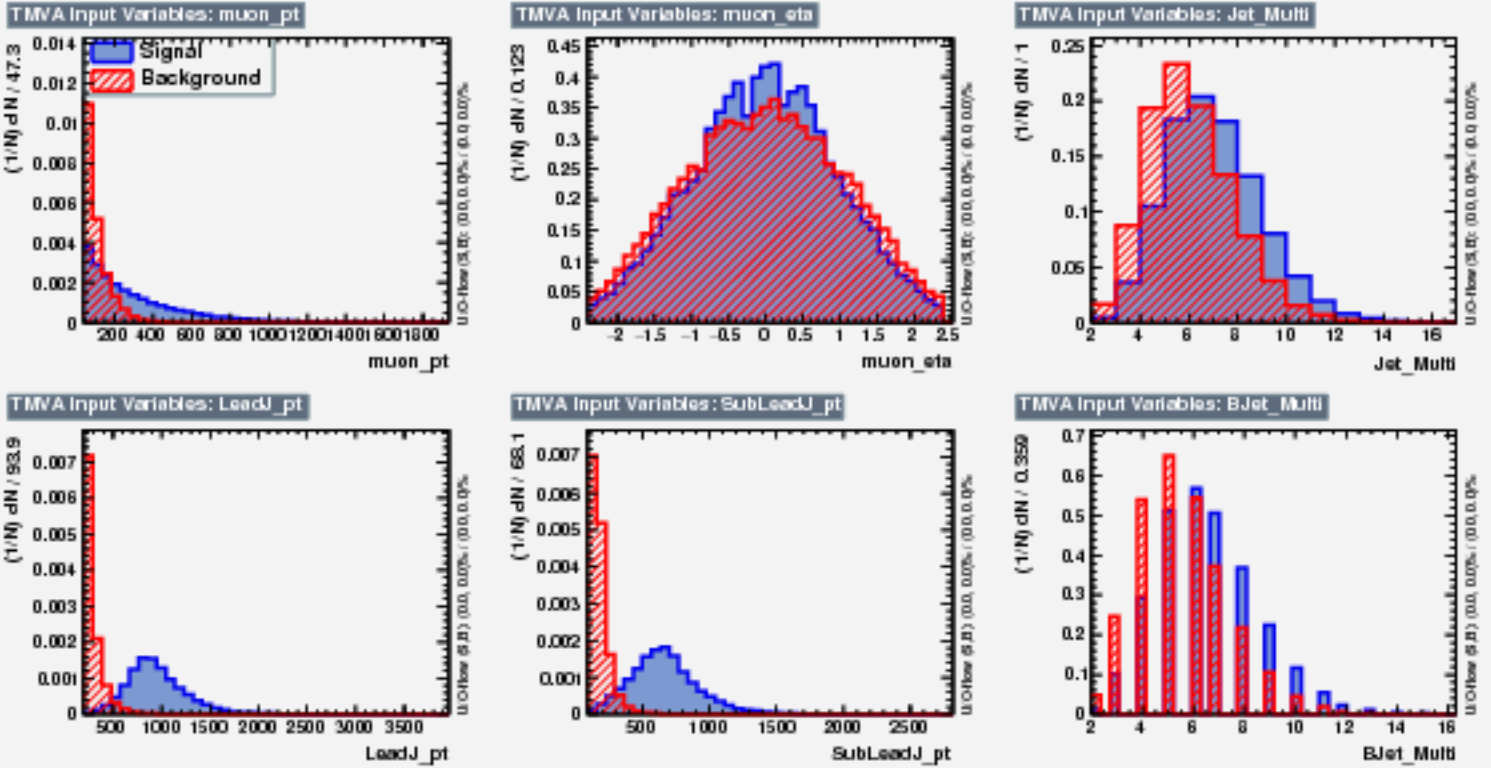
Correlation Matrix (signal)



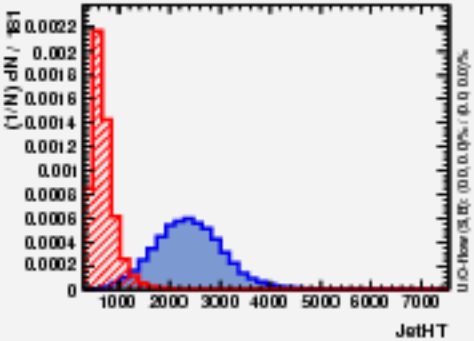

TMVA response for classifier: BDT
TMVA
Signal
Background
(1/N) dN / dx
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
1
BDT response
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%


TMVA overtraining check for classifier: BDT
TMVA
Signal (test sample)
Background (test sample)
Signal (training sample)
Background (training sample)
Kolmogorov-Smirnov test: signal (background) probability = 0.379 (0.125)
(1/N) dN / dx
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%
BDT response
0
1
2
3
4
5
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
1

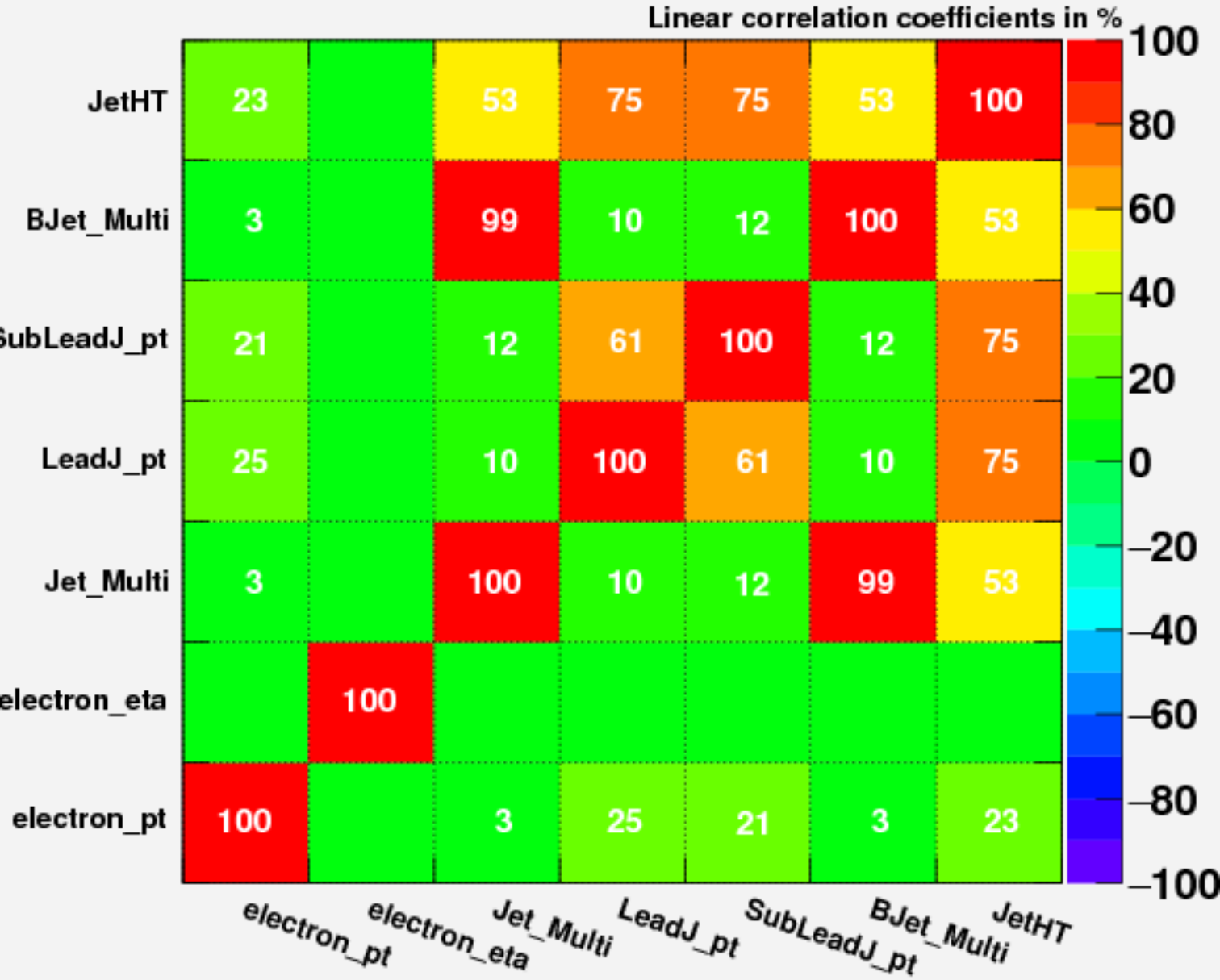

Background rejection versus Signal efficiency
TMVA
Background rejection
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Signal efficiency
MVA Method:
BDT


TMVA Input Variables: muon_pt
Signal
Background
(1/N) dN / 47.3
muon_pt
TMVA Input Variables: muon_eta
(1/N) dN / 0.123
muon_eta
TMVA Input Variables: Jet_Multi
(1/N) dN / 1
Jet_Multi
TMVA Input Variables: LeadJ_pt
(1/N) dN / 93.9
LeadJ_pt
TMVA Input Variables: SubLeadJ_pt
(1/N) dN / 68.1
SubLeadJ_pt
TMVA Input Variables: BJet_Multi
(1/N) dN / 0.359
BJet_Multi

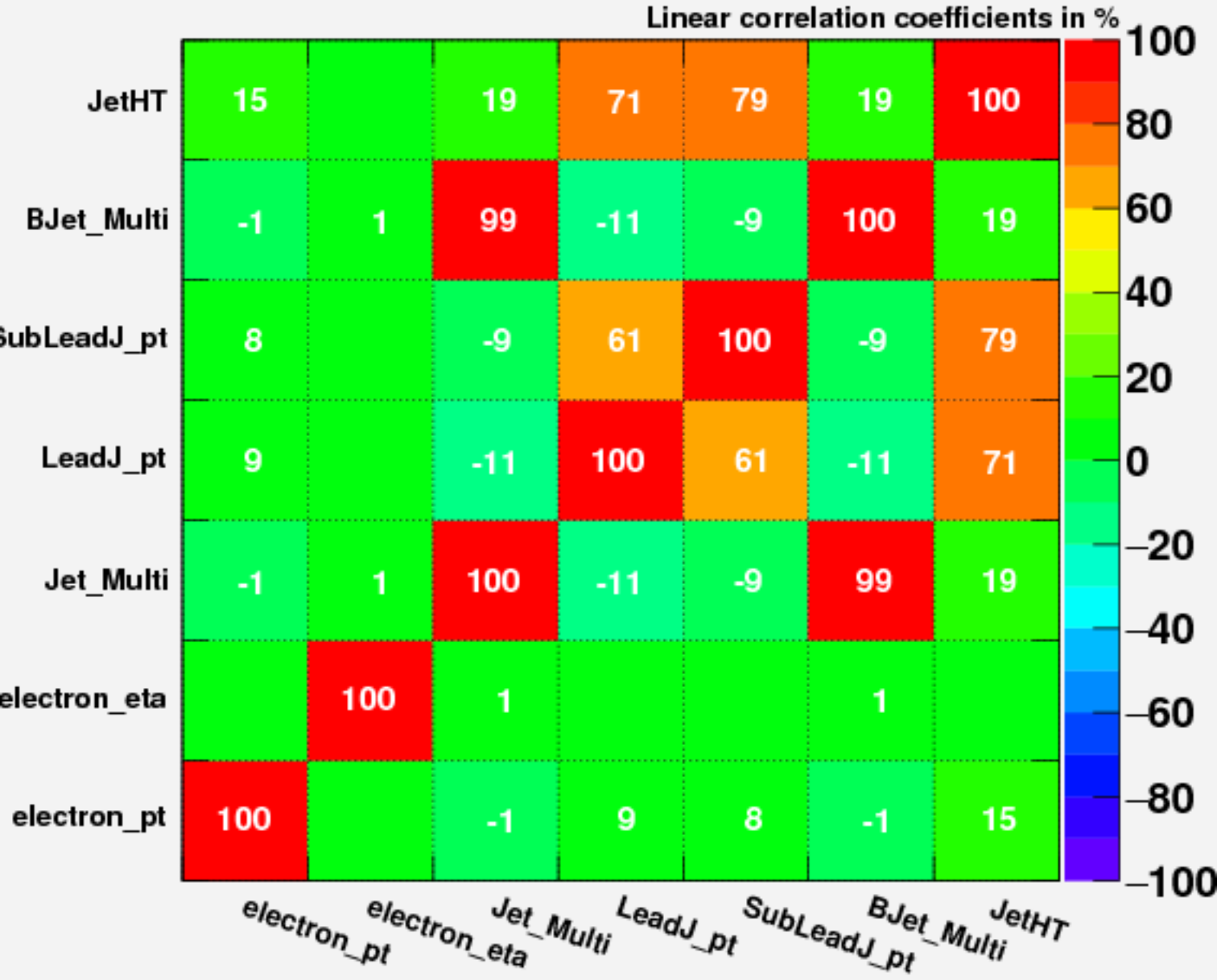
TMVA Input Variables: JetHT

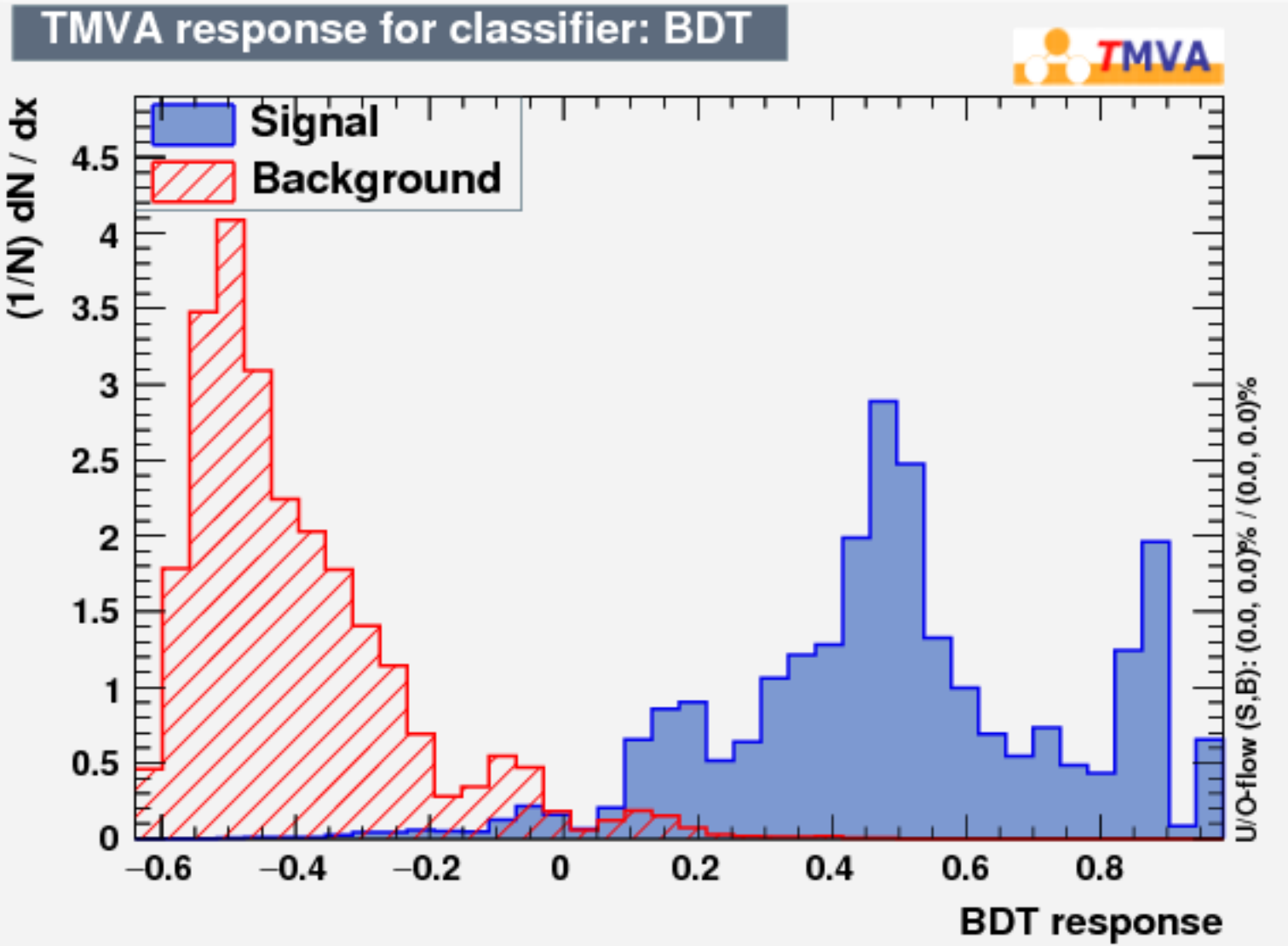


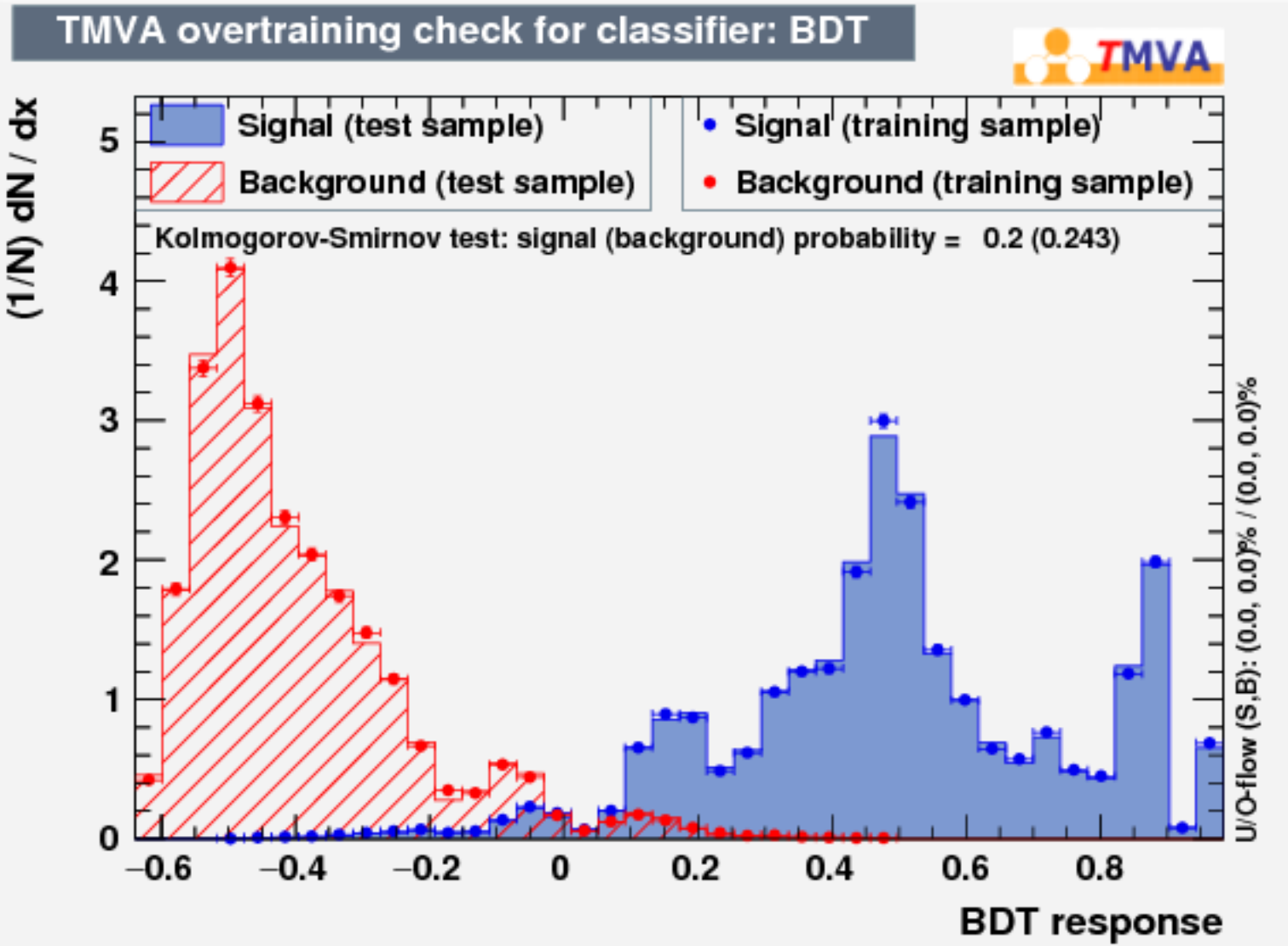
Correlation Matrix (background)

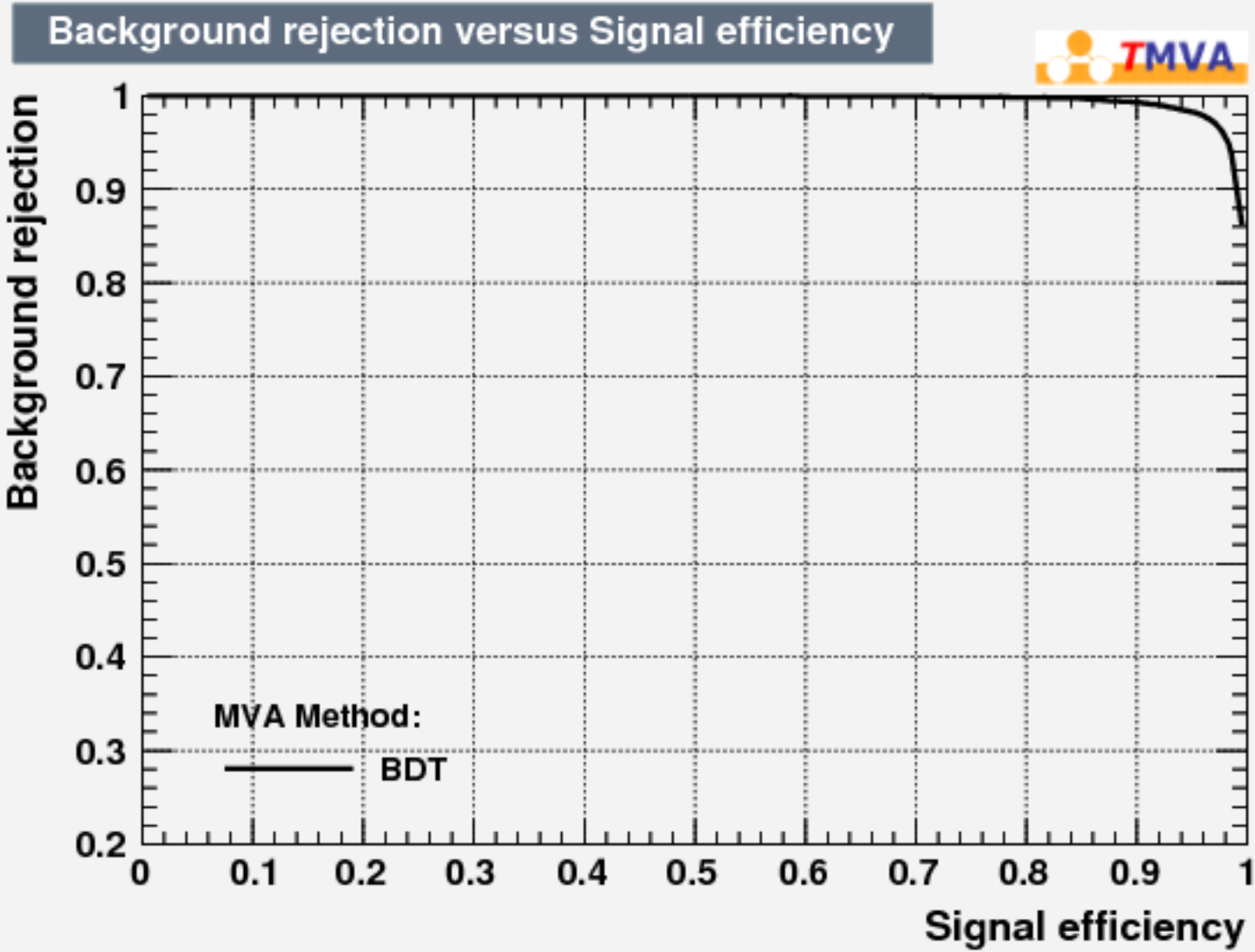


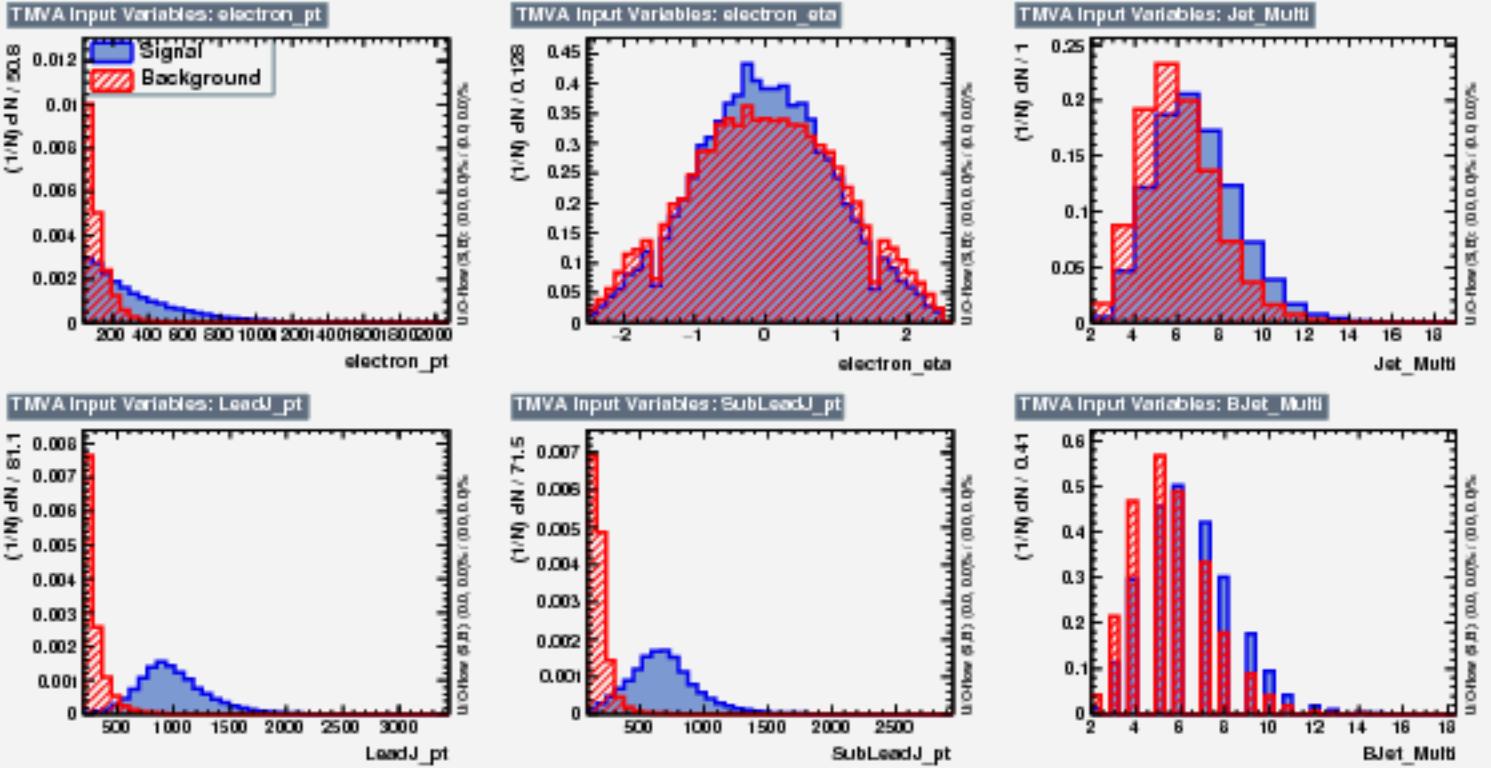
Correlation Matrix (signal)



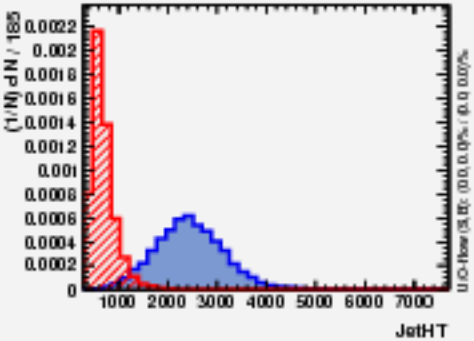

TMVA response for classifier: BDT
TMVA
Signal
Background
(1/N) dN / dx
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
BDT response
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%


TMVA overtraining check for classifier: BDT
TMVA
Signal (test sample)
Background (test sample)
Signal (training sample)
Background (training sample)
Kolmogorov-Smirnov test: signal (background) probability = 0.2 (0.243)
(1/N) dN / dx
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%
BDT response
0
1
2
3
4
5
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8

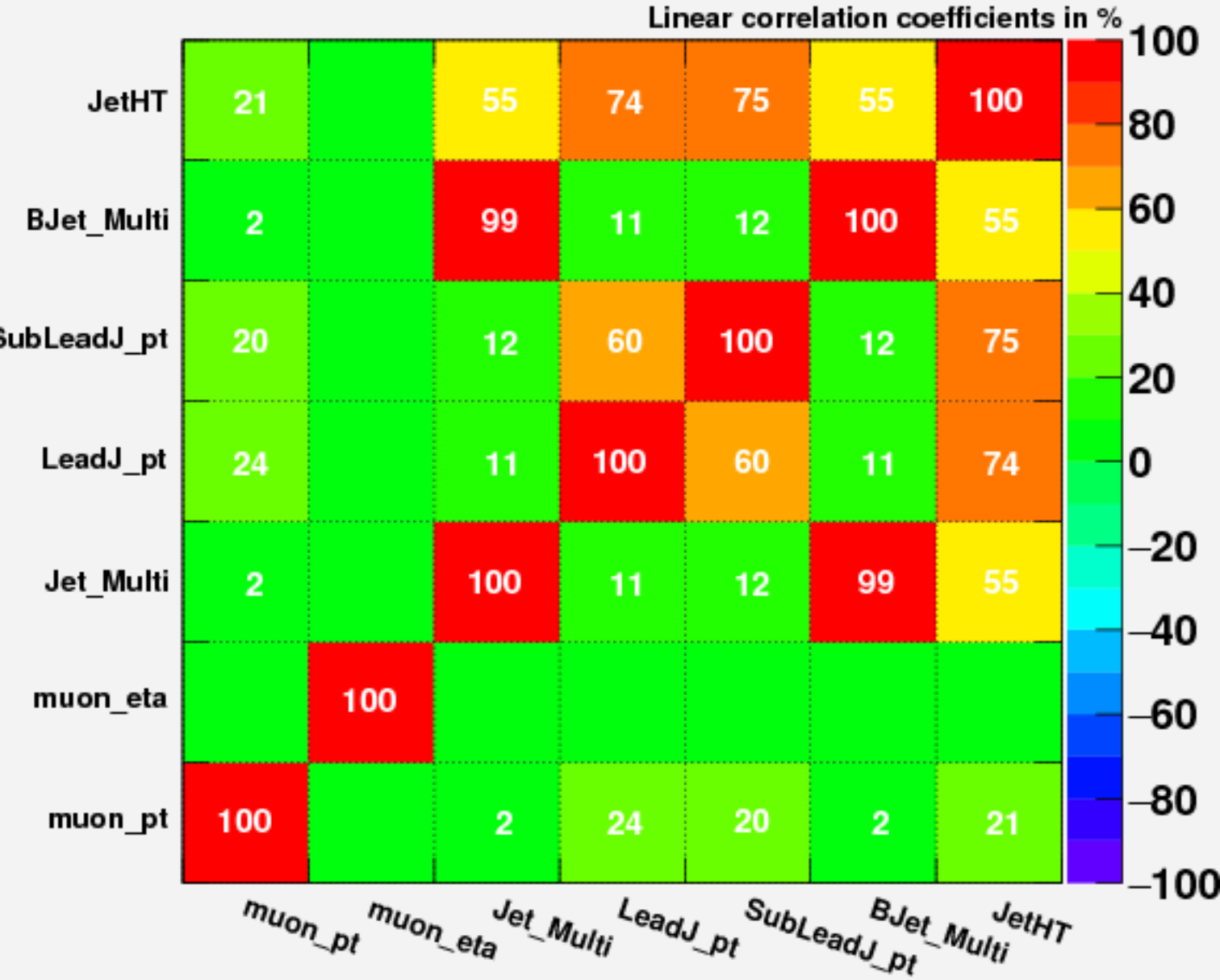

Background rejection versus Signal efficiency
TMVA
Background rejection
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Signal efficiency
MVA Method:
BDT


TMVA Input Variables: electron_pt
Signal
Background
(1/N) dN / 50.8
electron_pt
TMVA Input Variables: electron_eta
(1/N) dN / 0.128
electron_eta
TMVA Input Variables: Jet_Multi
(1/N) dN / 1
Jet_Multi
TMVA Input Variables: LeadJ_pt
(1/N) dN / 81.1
LeadJ_pt
TMVA Input Variables: SubLeadJ_pt
(1/N) dN / 71.5
SubLeadJ_pt
TMVA Input Variables: BJet_Multi
(1/N) dN / 0.41
BJet_Multi

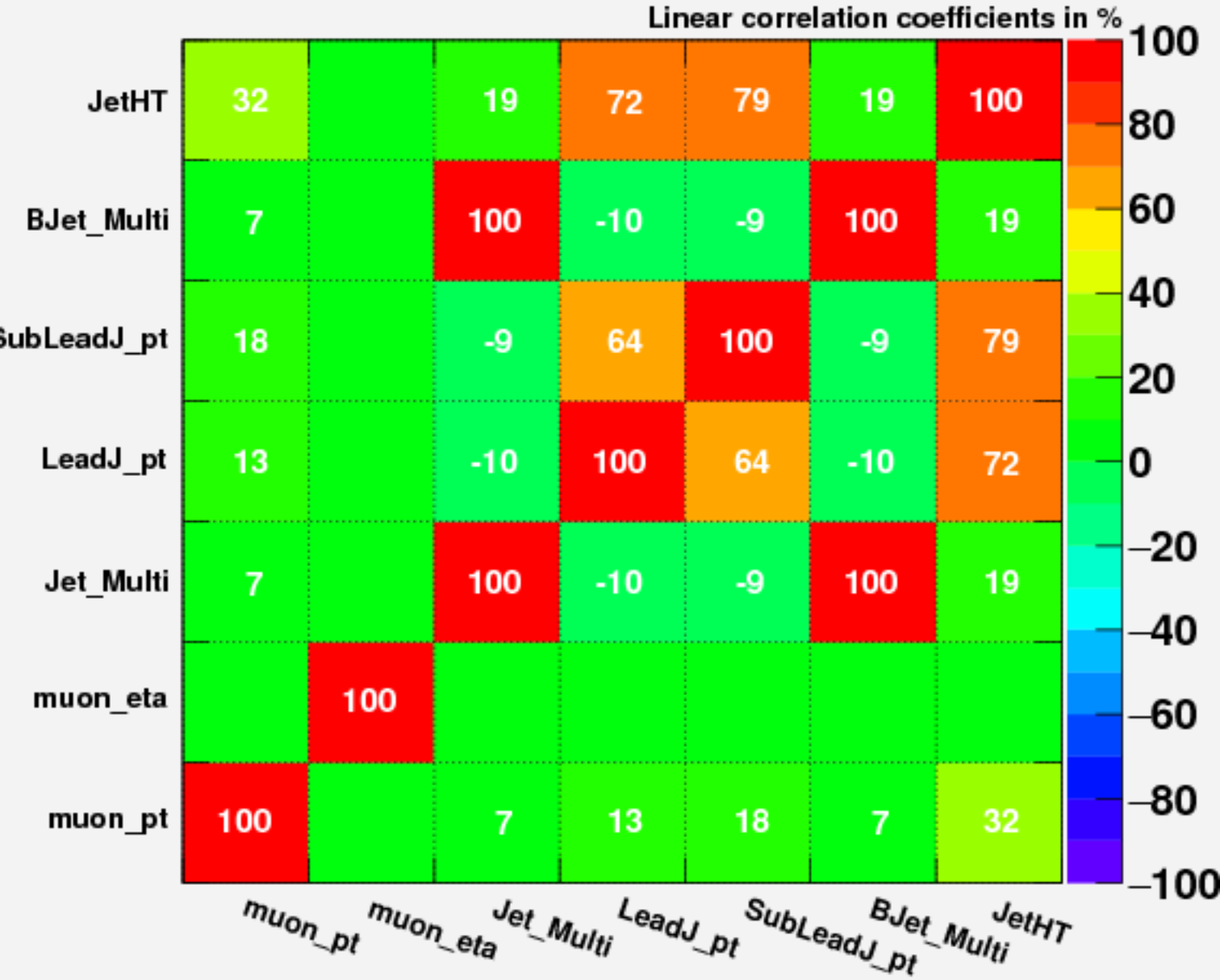
TMVA Input Variables: JetHT

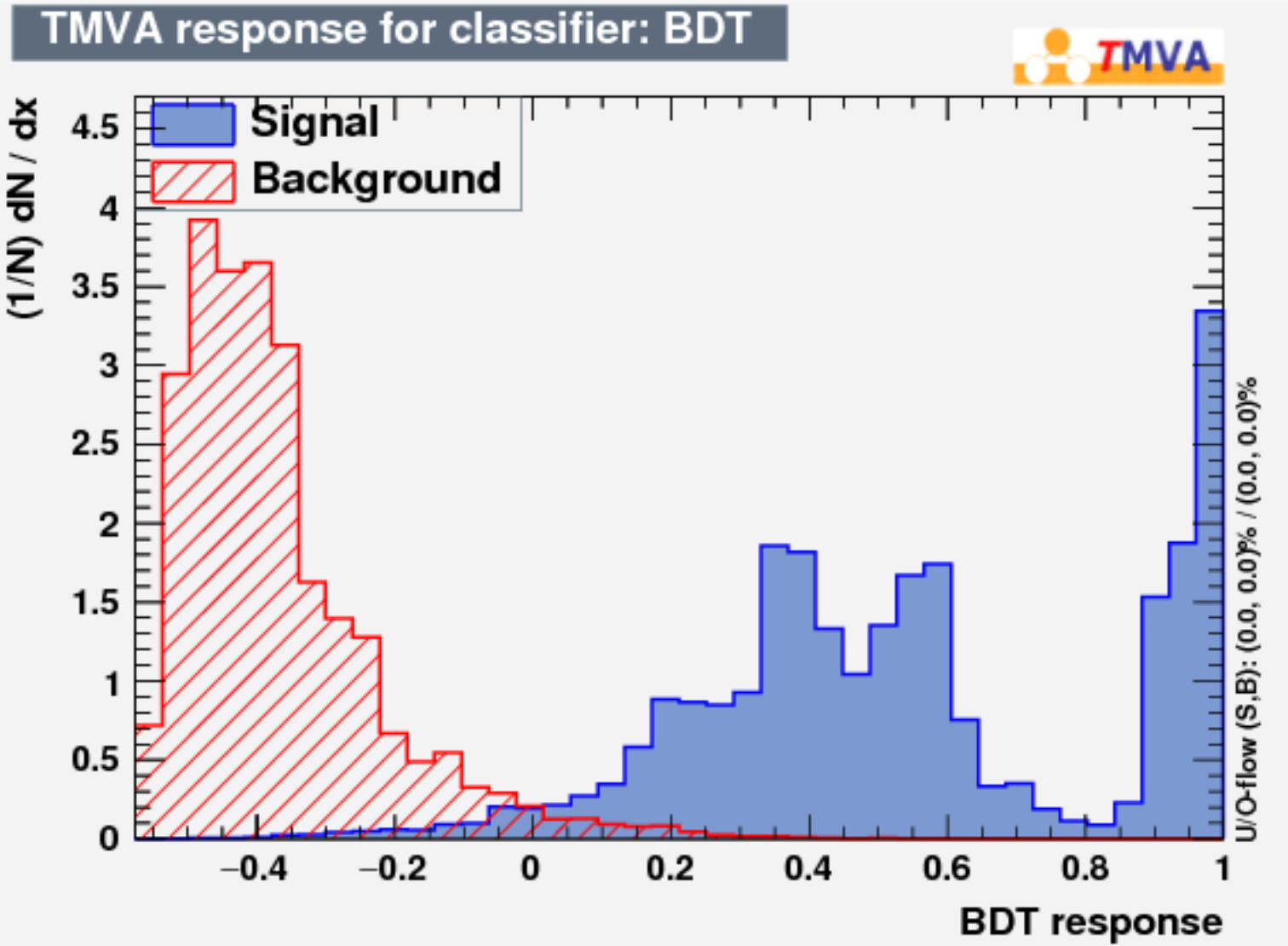


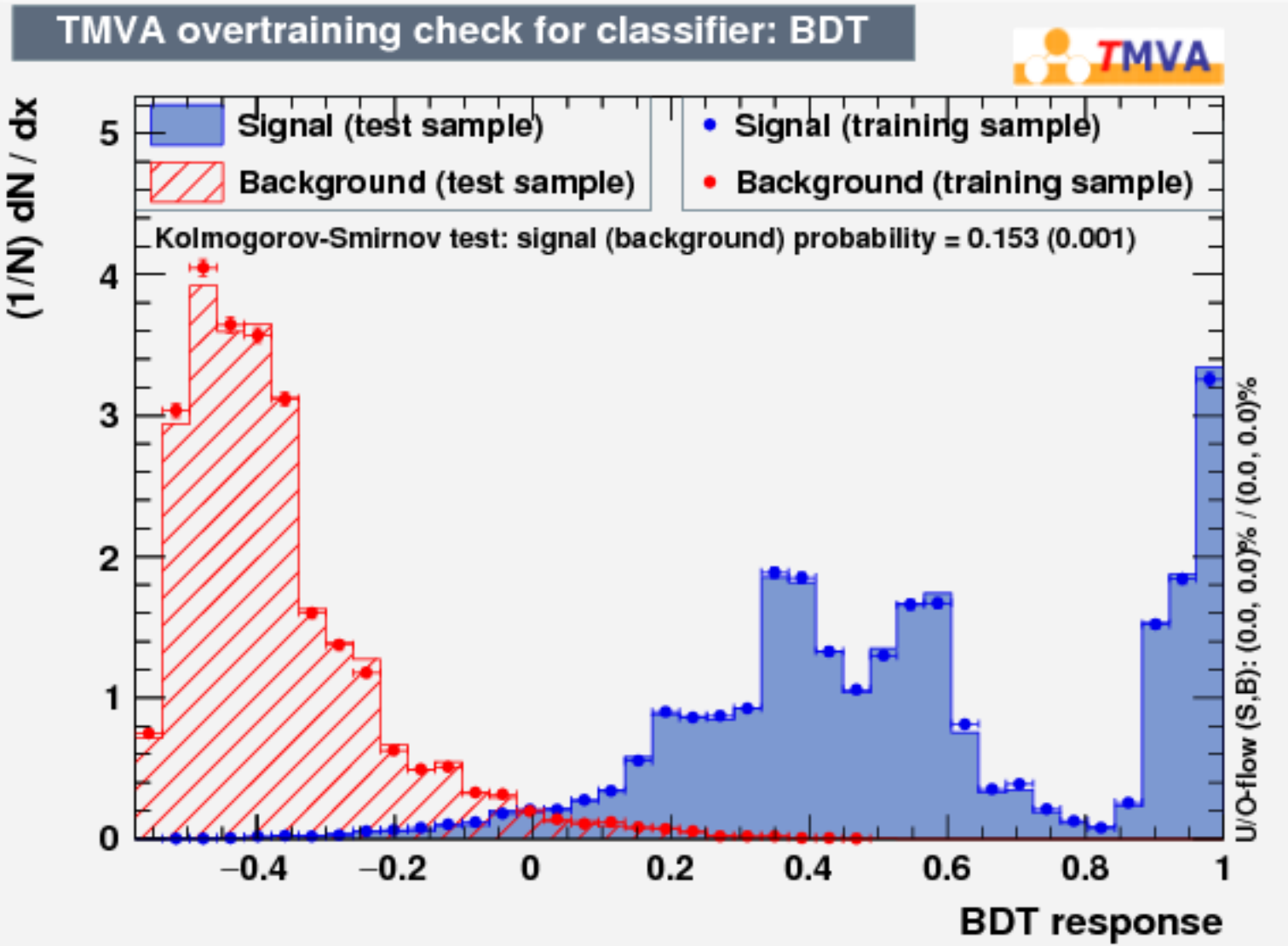
Correlation Matrix (background)

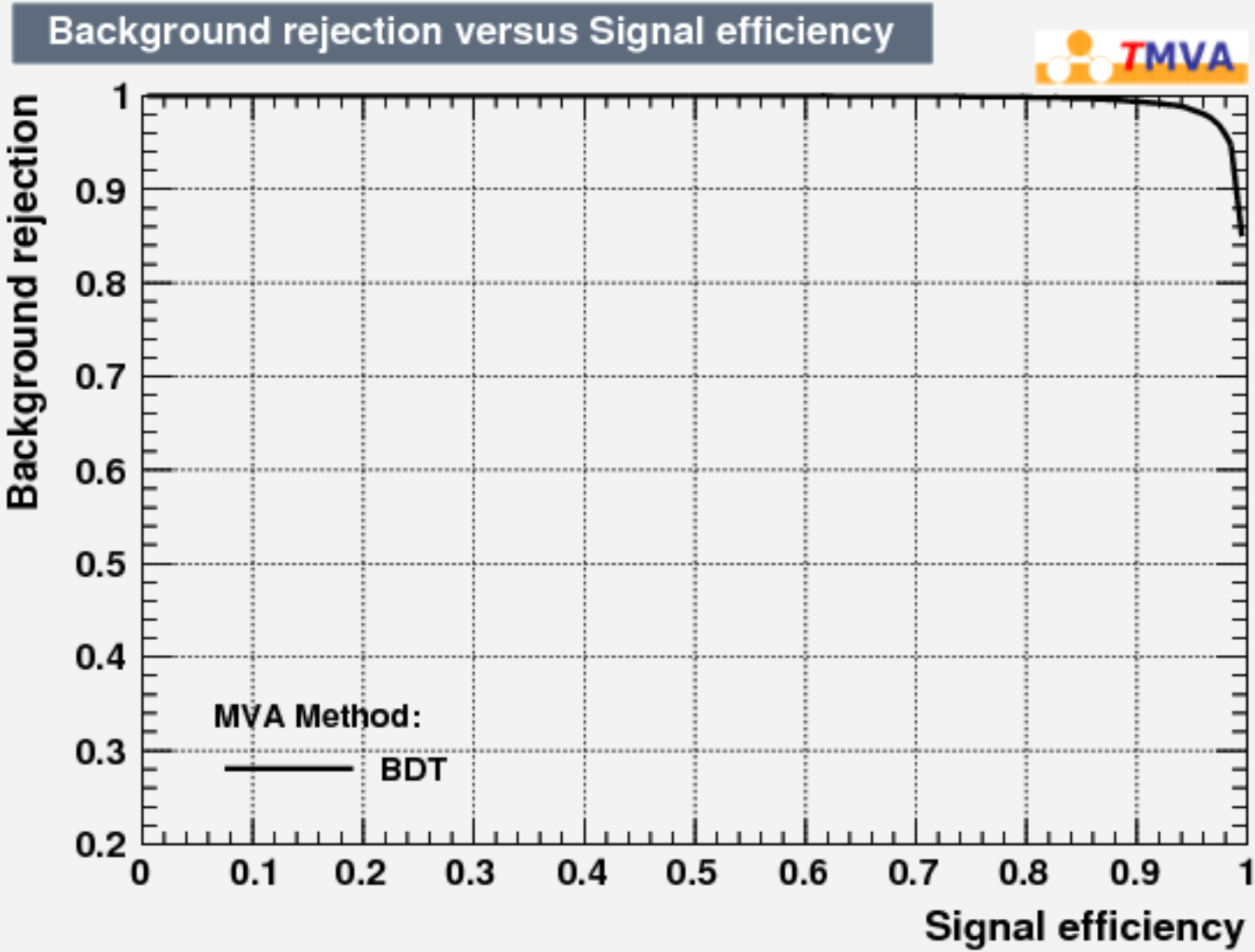


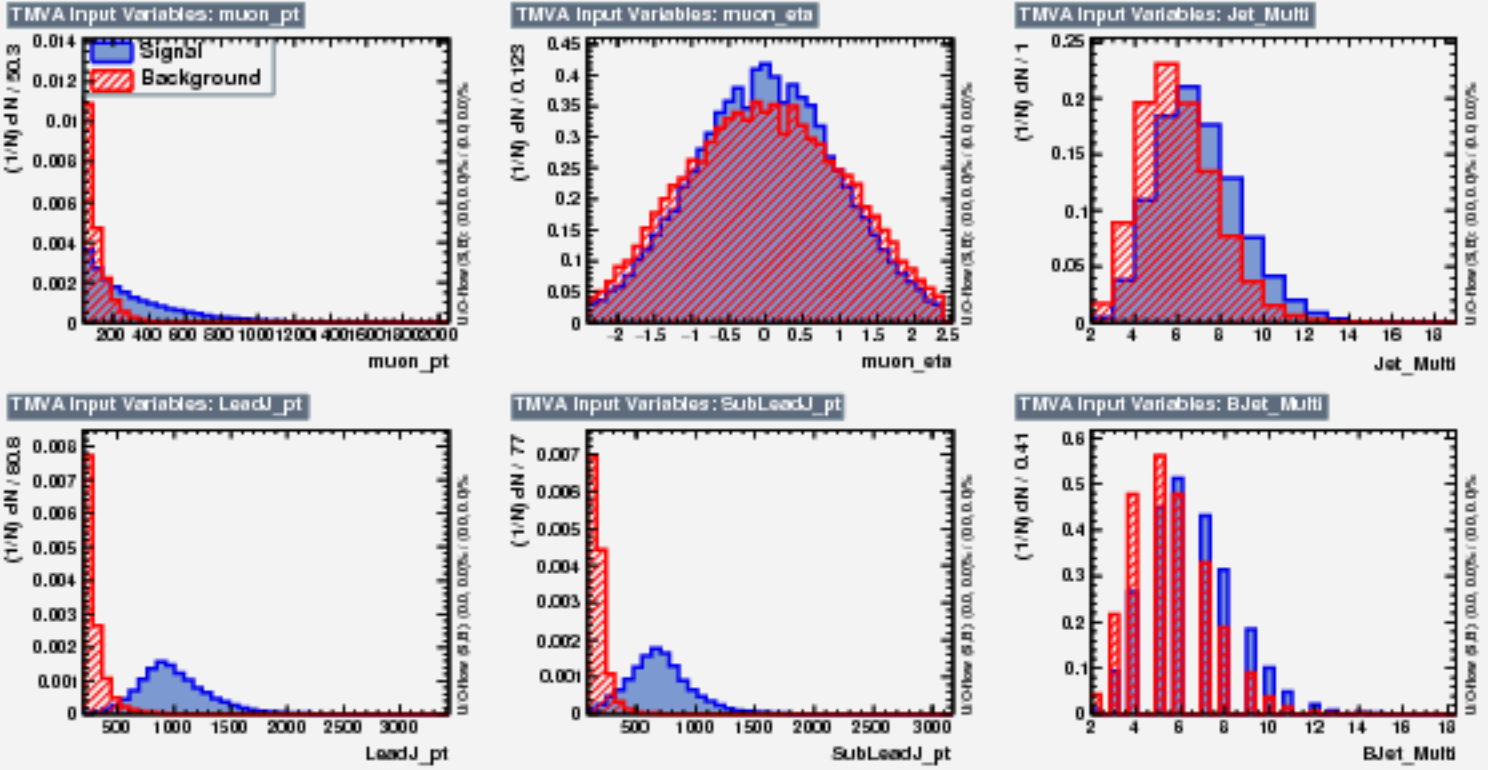
Correlation Matrix (signal)

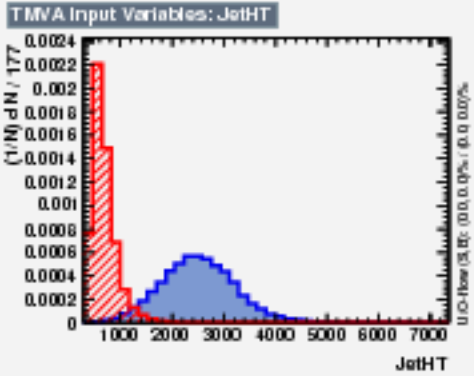



TMVA response for classifier: BDT
TMVA
Signal
Background
(1/N) dN / dx
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
−0.4
−0.2
0
0.2
0.4
0.6
0.8
1
BDT response
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%

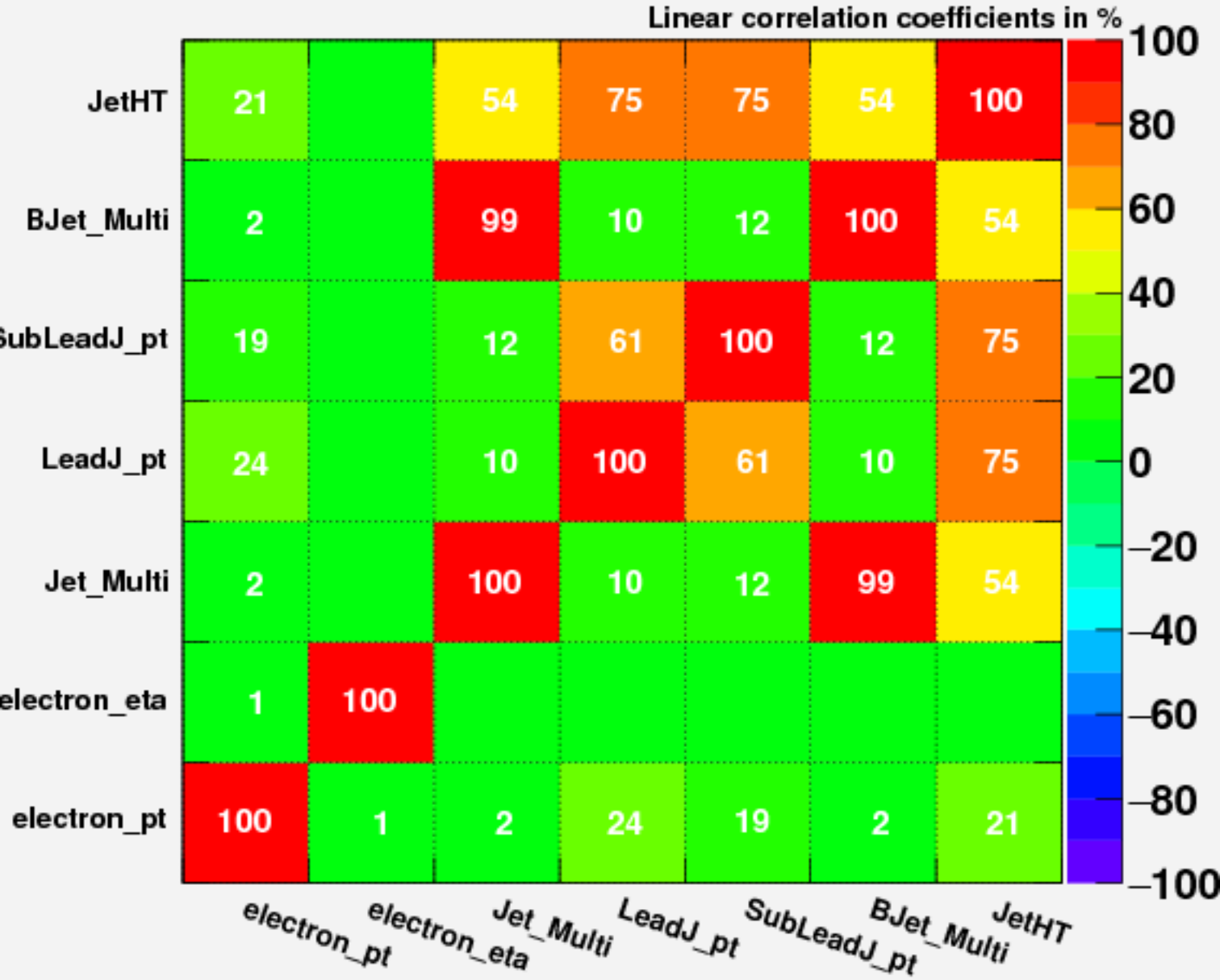

TMVA overtraining check for classifier: BDT
TMVA
Signal (test sample)
Background (test sample)
Signal (training sample)
Background (training sample)
Kolmogorov-Smirnov test: signal (background) probability = 0.153 (0.001)
(1/N) dN / dx
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%
BDT response
0
1
2
3
4
5
−0.4
−0.2
0
0.2
0.4
0.6
0.8
1


Background rejection versus Signal efficiency
TMVA
Background rejection
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Signal efficiency
MVA Method:
BDT

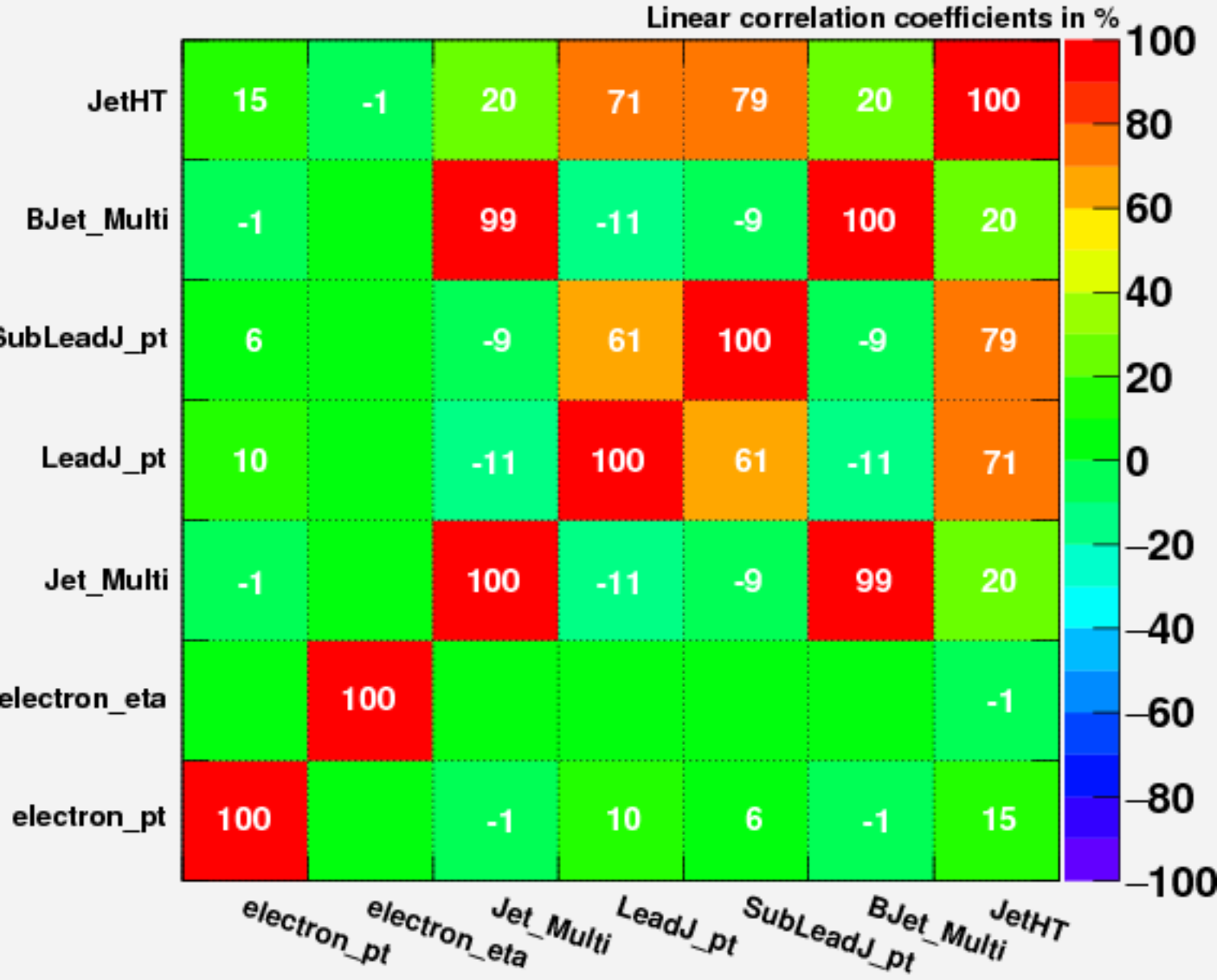

TMVA Input Variables: muon_pt
Signal
Background
(1/N) dN / 90.3
muon_pt
TMVA Input Variables: muon_eta
(1/N) dN / 0.123
muon_eta
TMVA Input Variables: Jet_Multi
(1/N) dN / 1
Jet_Multi
TMVA Input Variables: LeadJ_pt
(1/N) dN / 80.8
LeadJ_pt
TMVA Input Variables: SubLeadJ_pt
(1/N) dN / 77
SubLeadJ_pt
TMVA Input Variables: BJet_Multi
(1/N) dN / 0.41
BJet_Multi

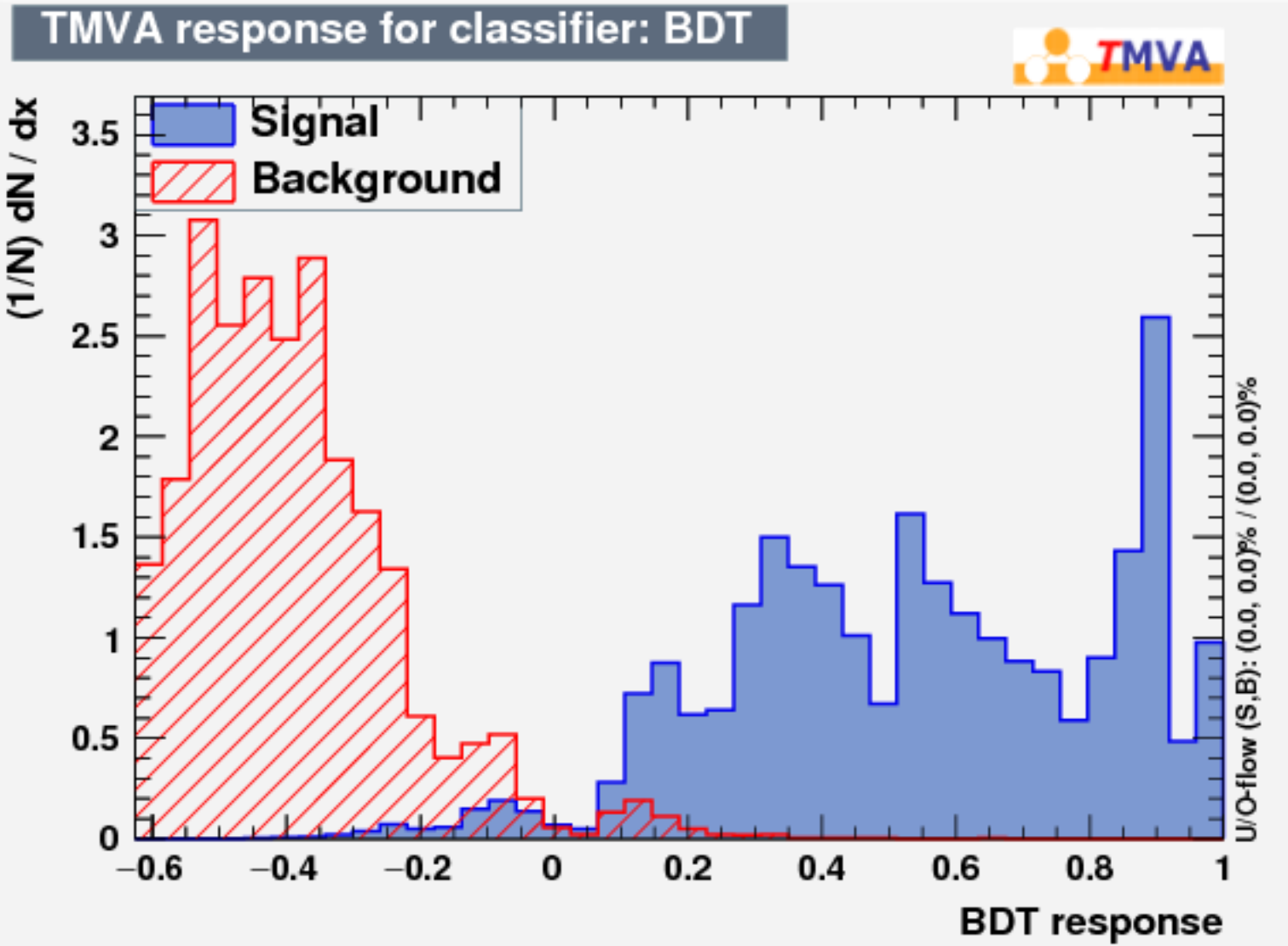

TMVA Input Variables: JetHT
(1/N) dN / 177
0.0024
0.0022
0.002
0.0018
0.0016
0.0014
0.0012
0.001
0.0008
0.0006
0.0004
0.0002
0
1000
2000
3000
4000
5000
6000
7000
JetHT
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%

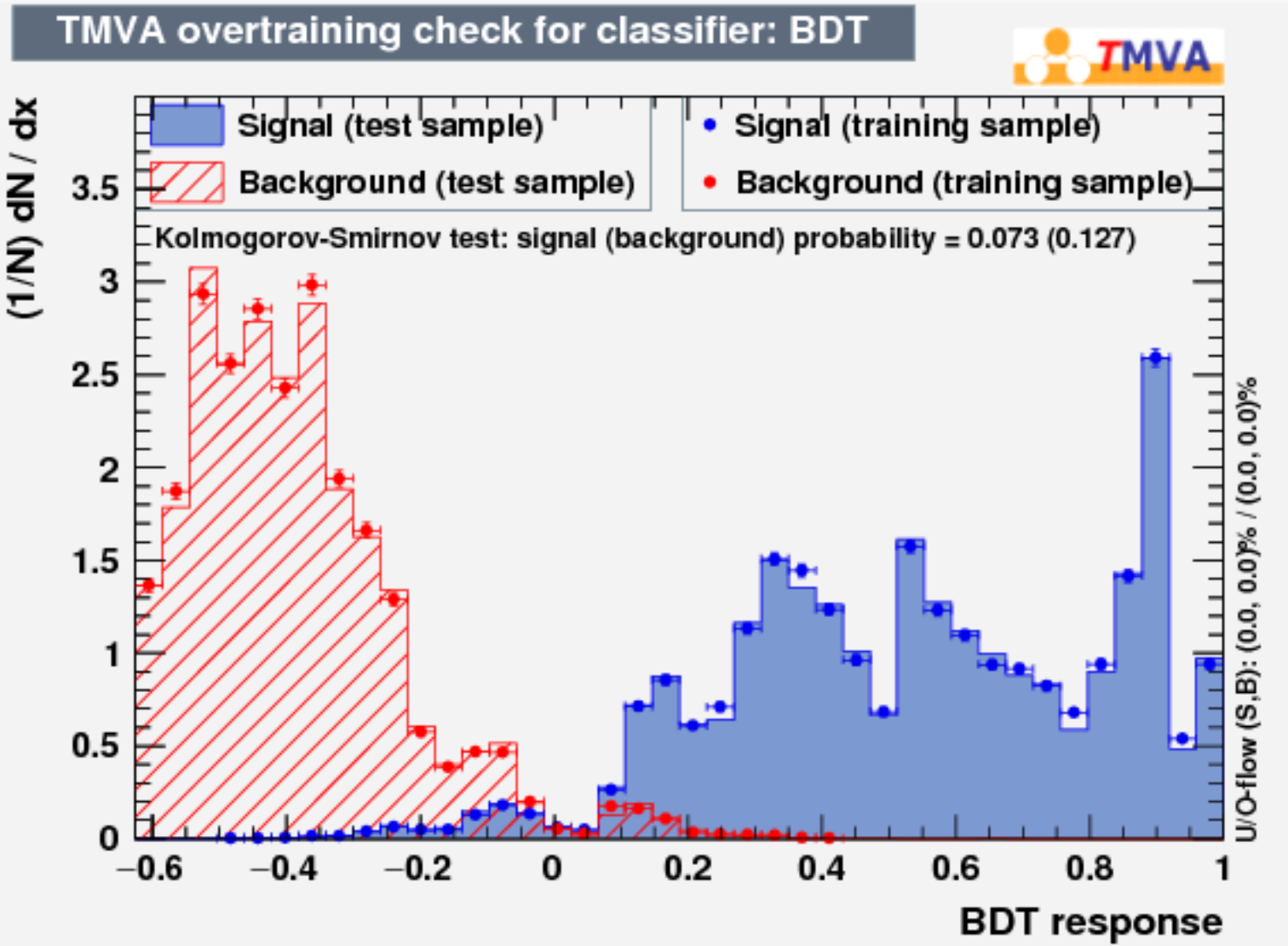
Correlation Matrix (background)

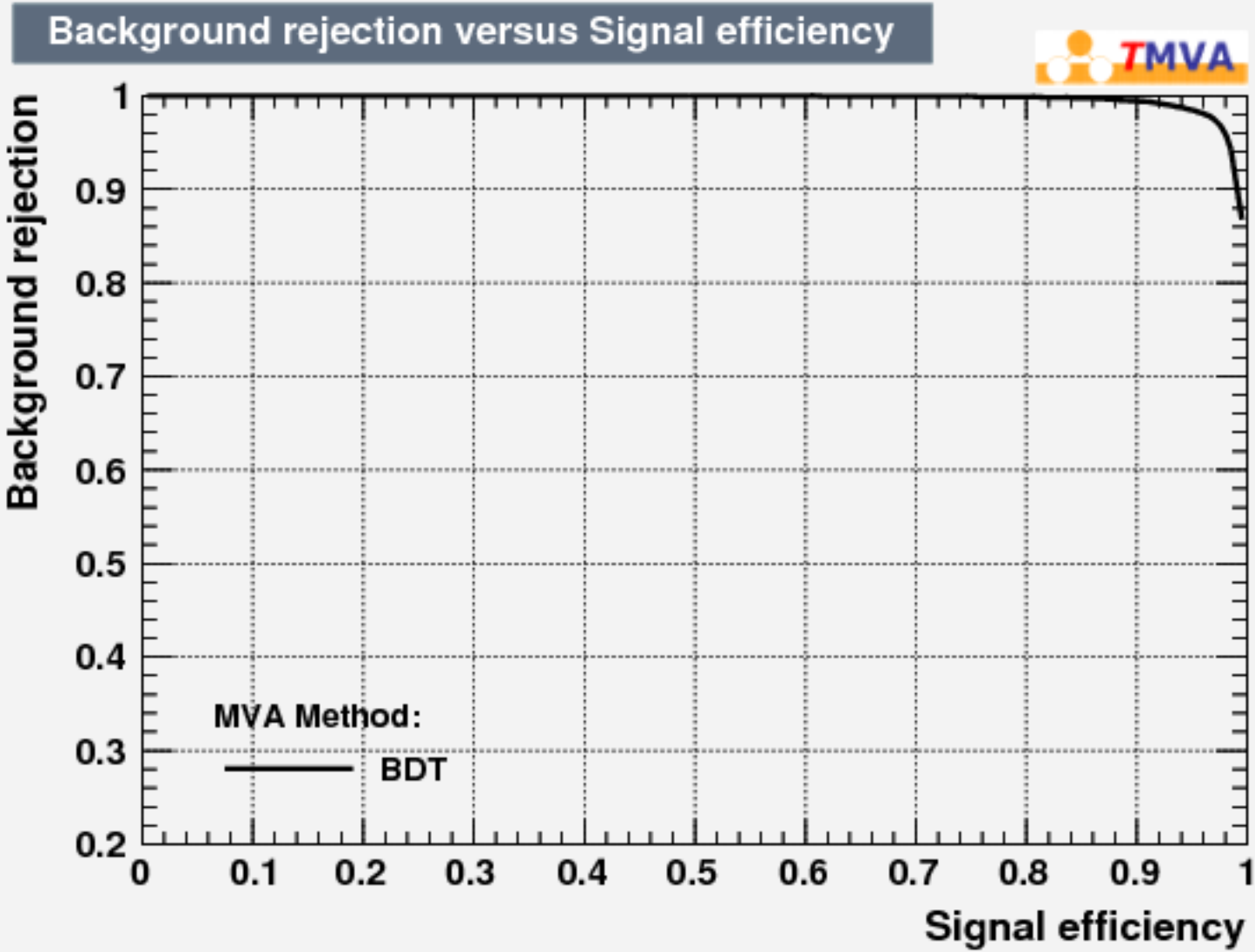


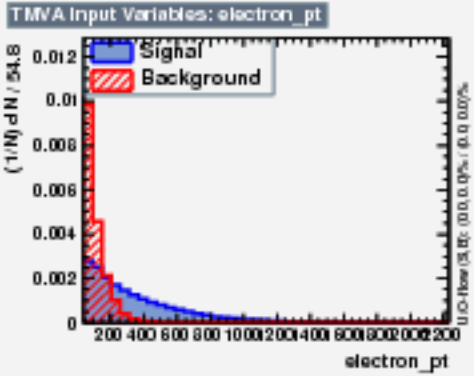
Correlation Matrix (signal)

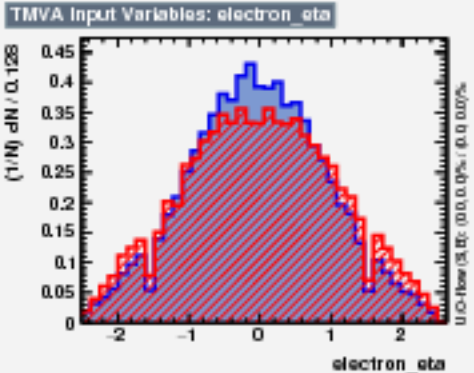


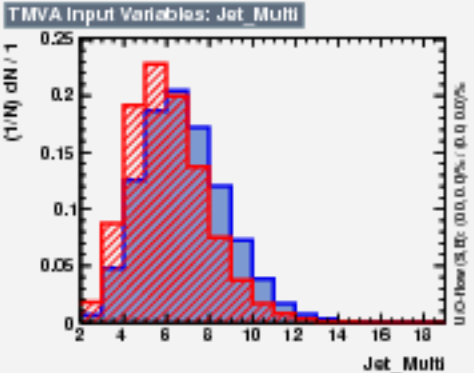

TMVA response for classifier: BDT
TMVA
Signal
Background
(1/N) dN / dx
3.5
3
2.5
2
1.5
1
0.5
0
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
1
BDT response
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%

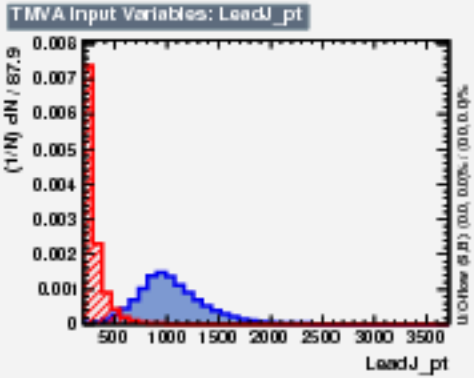

TMVA overtraining check for classifier: BDT
TMVA
Signal (test sample)
Background (test sample)
Signal (training sample)
Background (training sample)
Kolmogorov-Smirnov test: signal (background) probability = 0.073 (0.127)
(1/N) dN / dx
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%
BDT response
0
0.5
1
1.5
2
2.5
3
3.5
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
1

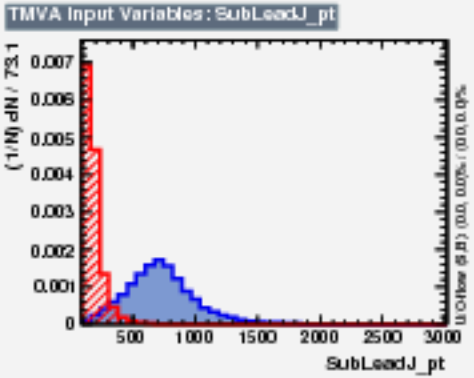

Background rejection versus Signal efficiency
TMVA
Background rejection
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Signal efficiency
MVA Method:
BDT

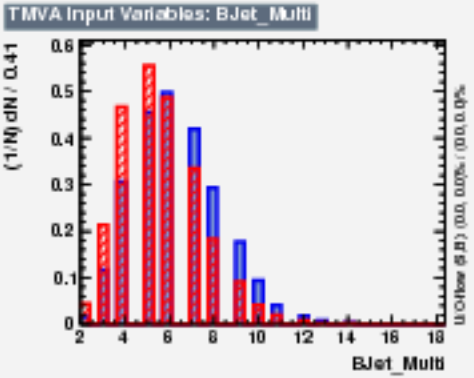

TMVA Input Variables: electron_pt
Signal
Background
(1/N) dN / 54.8
electron_pt


TMVA Input Variables: electron_eta
(1/N) dN / 0.128
electron_eta

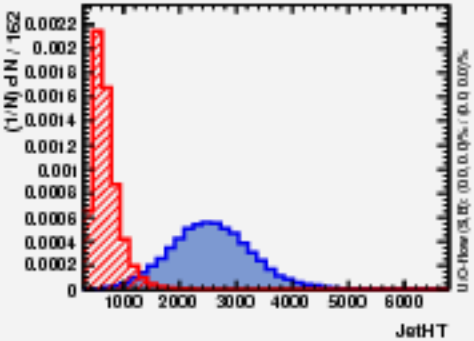

TMVA Input Variables: Jet_Multi
(1/N) dN / 1
Jet_Multi


TMVA Input Variables: LeadJ_pt
(1/N) dN / 87.9
LeadJ_pt

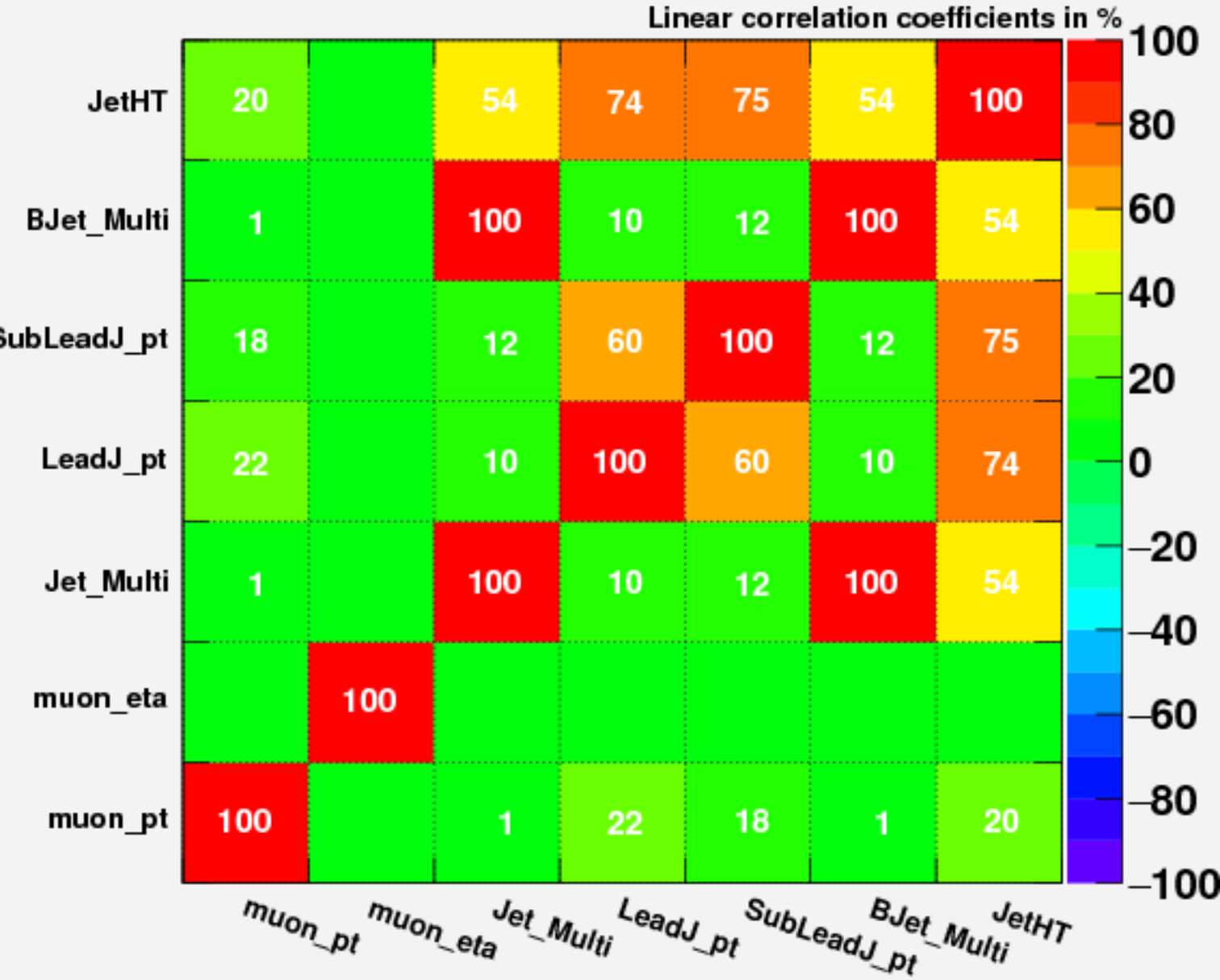

TMVA Input Variables: SubLeadJ_pt
(1/N) dN / 73.1
SubLeadJ_pt


TMVA Input Variables: BJet_Multi
(1/N) dN / 0.41
BJet_Multi

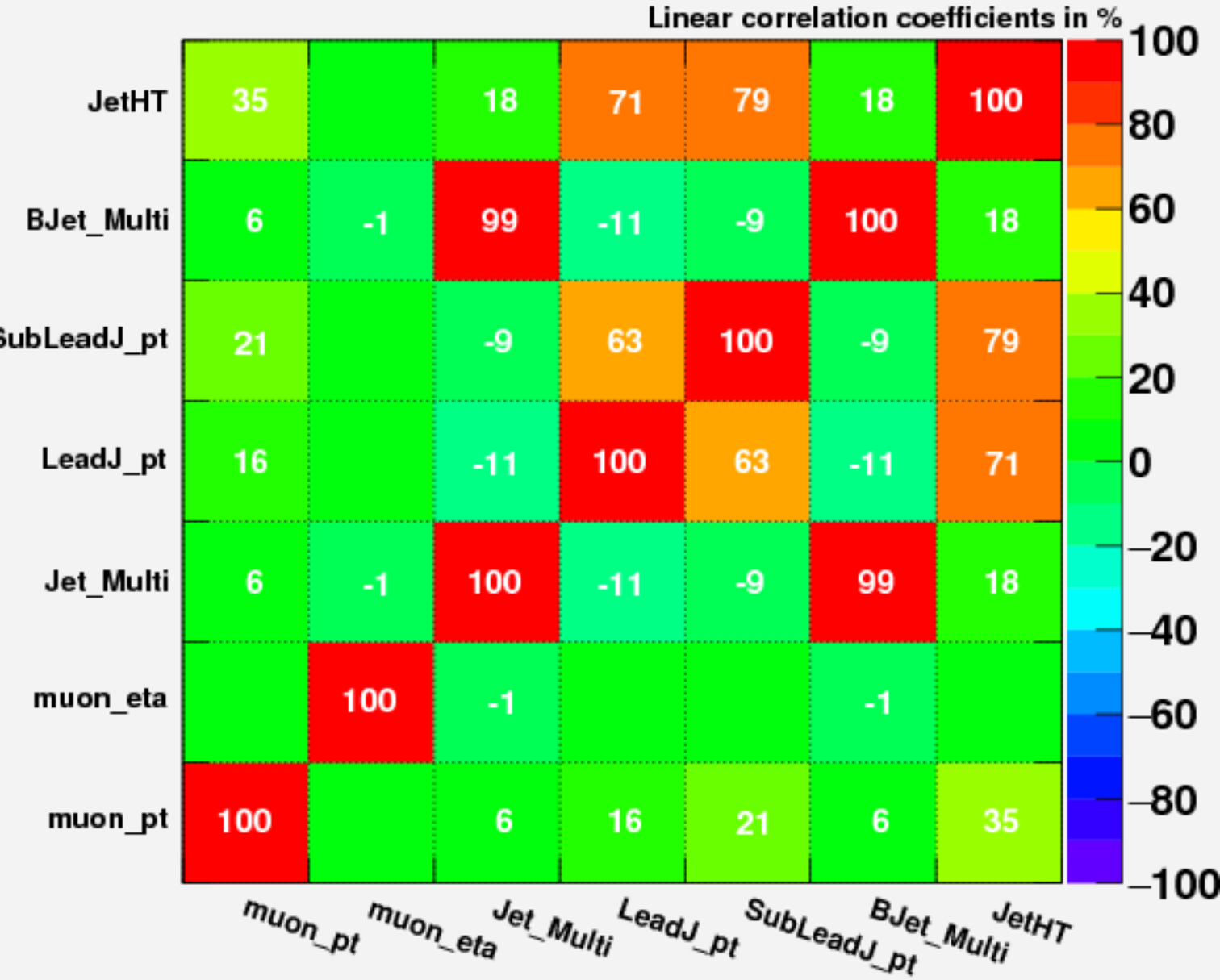
TMVA Input Variables: JetHT

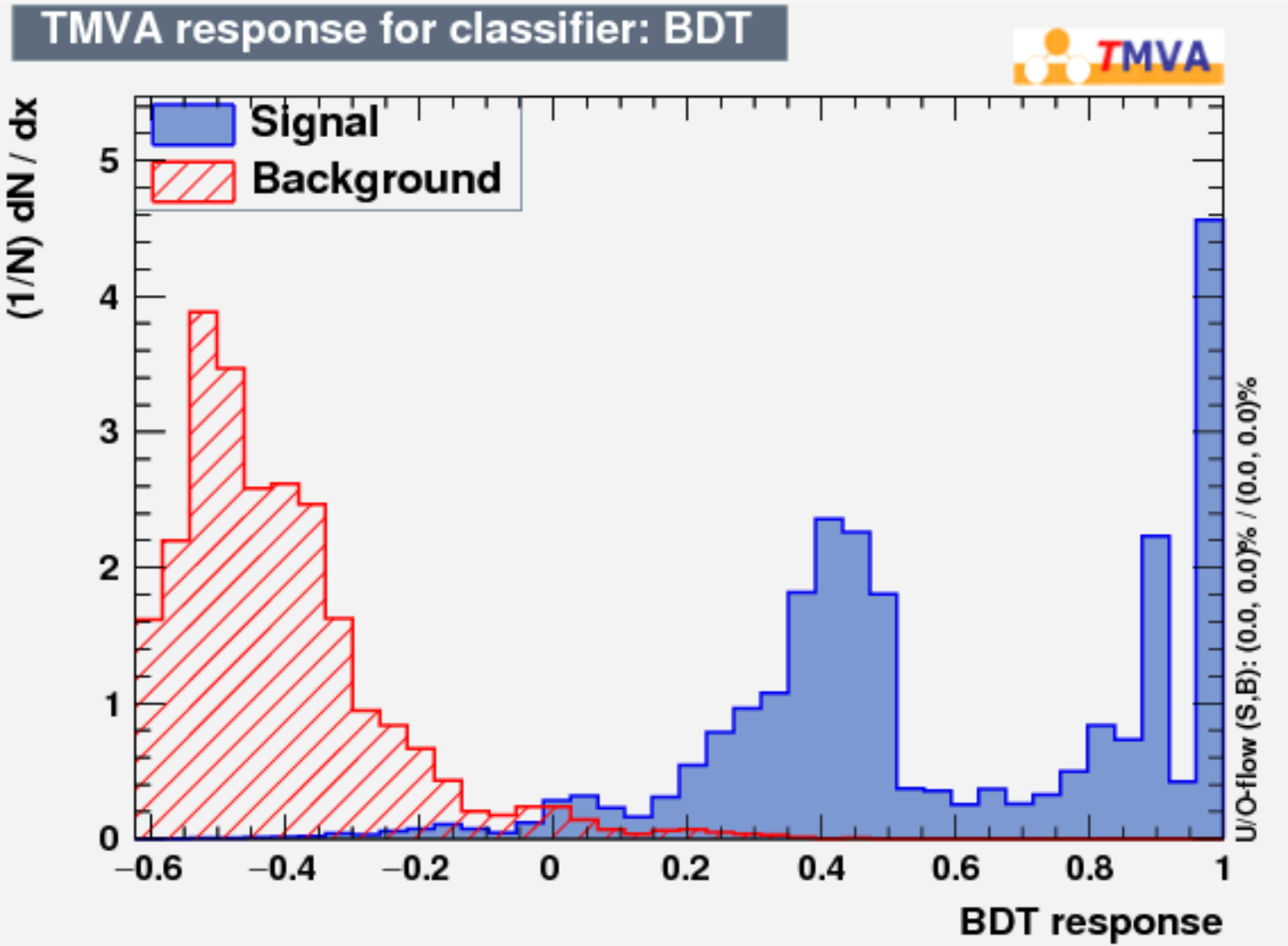


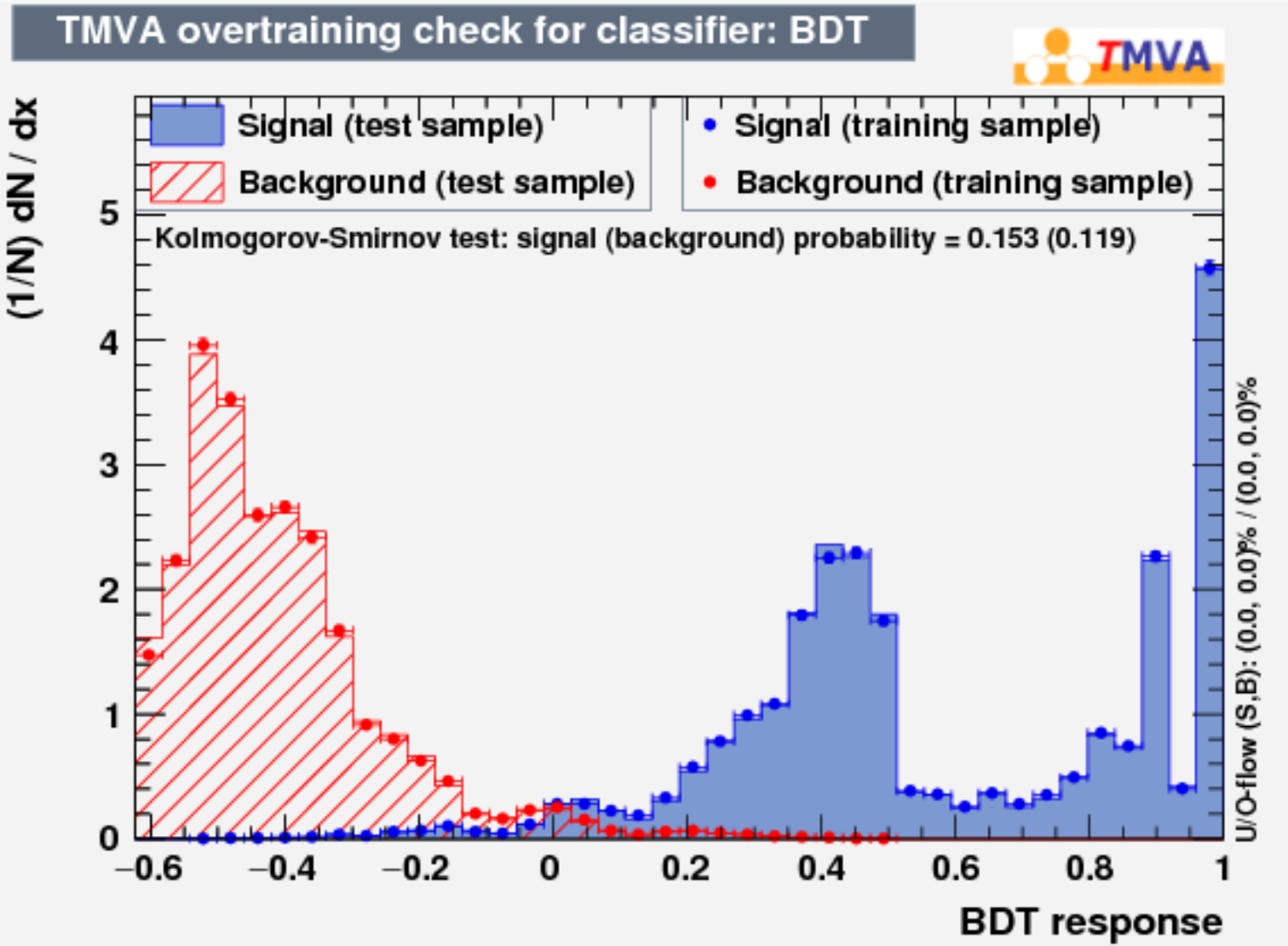
Correlation Matrix (background)

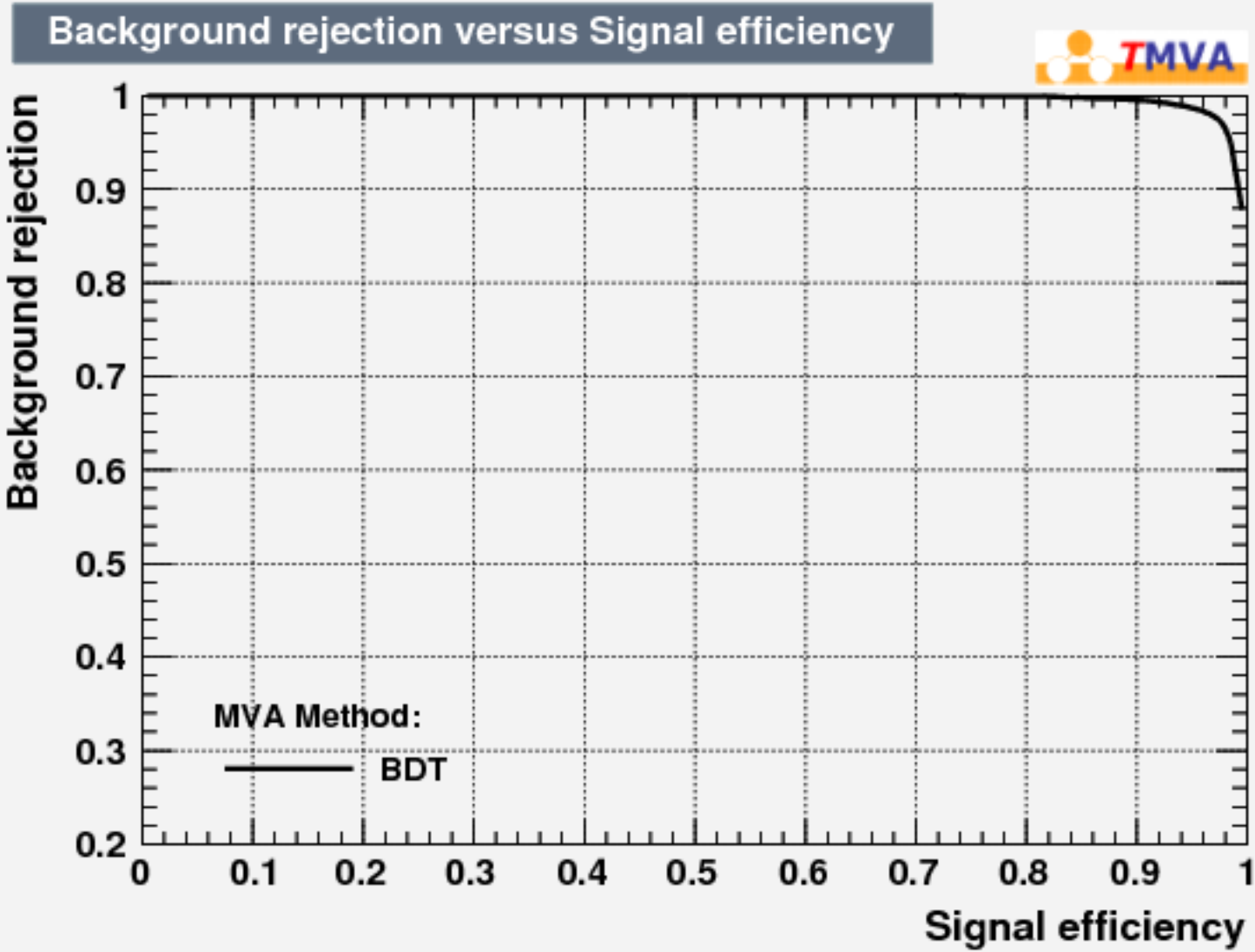


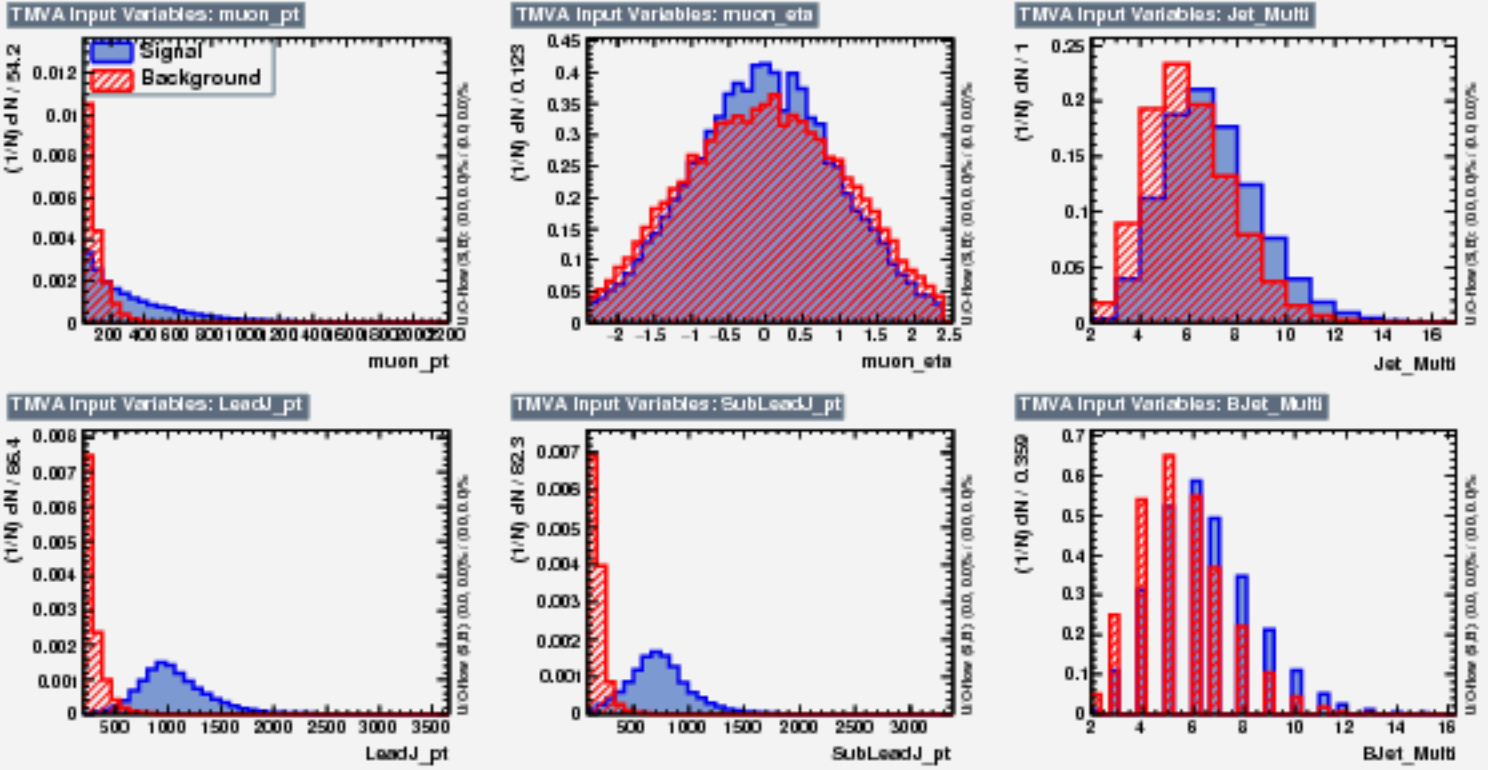
Correlation Matrix (signal)



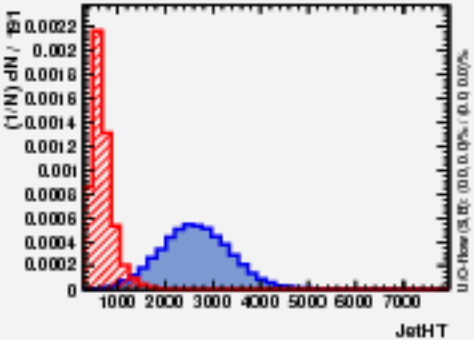

TMVA response for classifier: BDT
TMVA
Signal
Background
(1/N) dN / dx
5
4
3
2
1
0
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
1
BDT response
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%


TMVA overtraining check for classifier: BDT
TMVA
Signal (test sample)
Background (test sample)
Signal (training sample)
Background (training sample)
Kolmogorov-Smirnov test: signal (background) probability = 0.153 (0.119)
(1/N) dN / dx
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%
BDT response
0
1
2
3
4
5
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
1

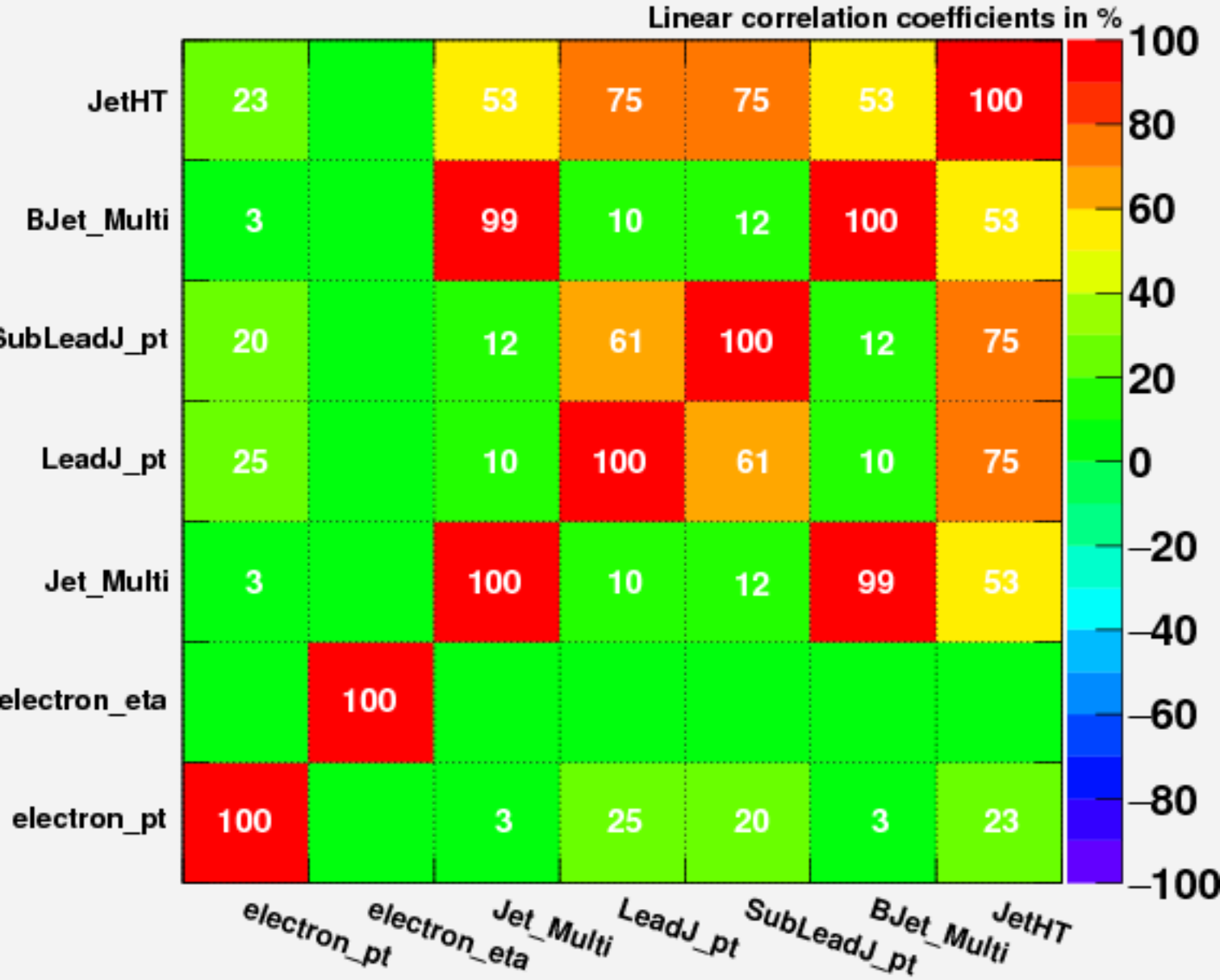

Background rejection versus Signal efficiency
TMVA
Background rejection
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Signal efficiency
MVA Method:
BDT


TMVA Input Variables: muon_pt
Signal
Background
(1/N) dN / 54.2
muon_pt
TMVA Input Variables: muon_eta
(1/N) dN / 0.123
muon_eta
TMVA Input Variables: Jet_Multi
(1/N) dN / 1
Jet_Multi
TMVA Input Variables: LeadJ_pt
(1/N) dN / 86.4
LeadJ_pt
TMVA Input Variables: SubLeadJ_pt
(1/N) dN / 82.3
SubLeadJ_pt
TMVA Input Variables: BJet_Multi
(1/N) dN / 0.359
BJet_Multi

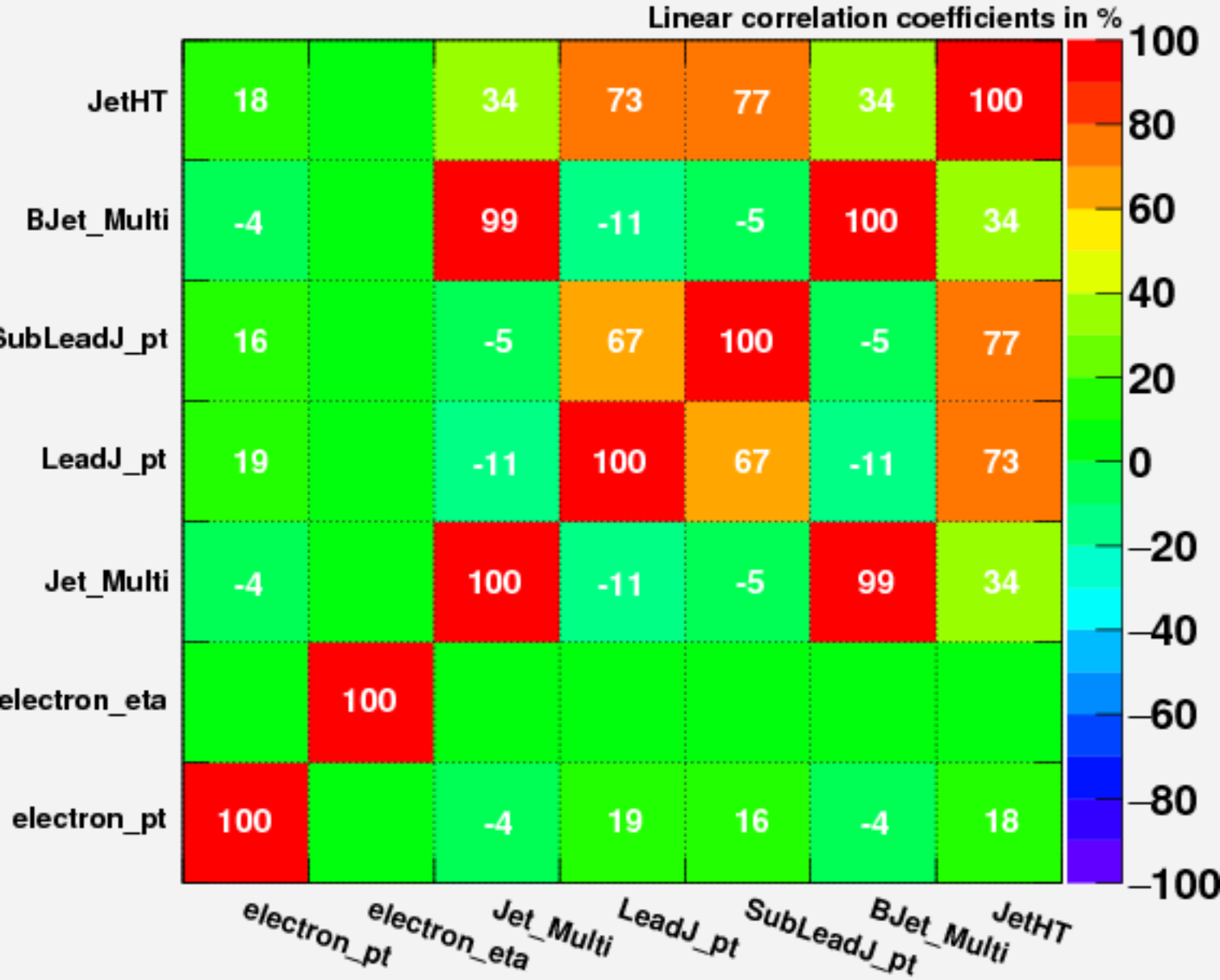
TMVA Input Variables: JetHT

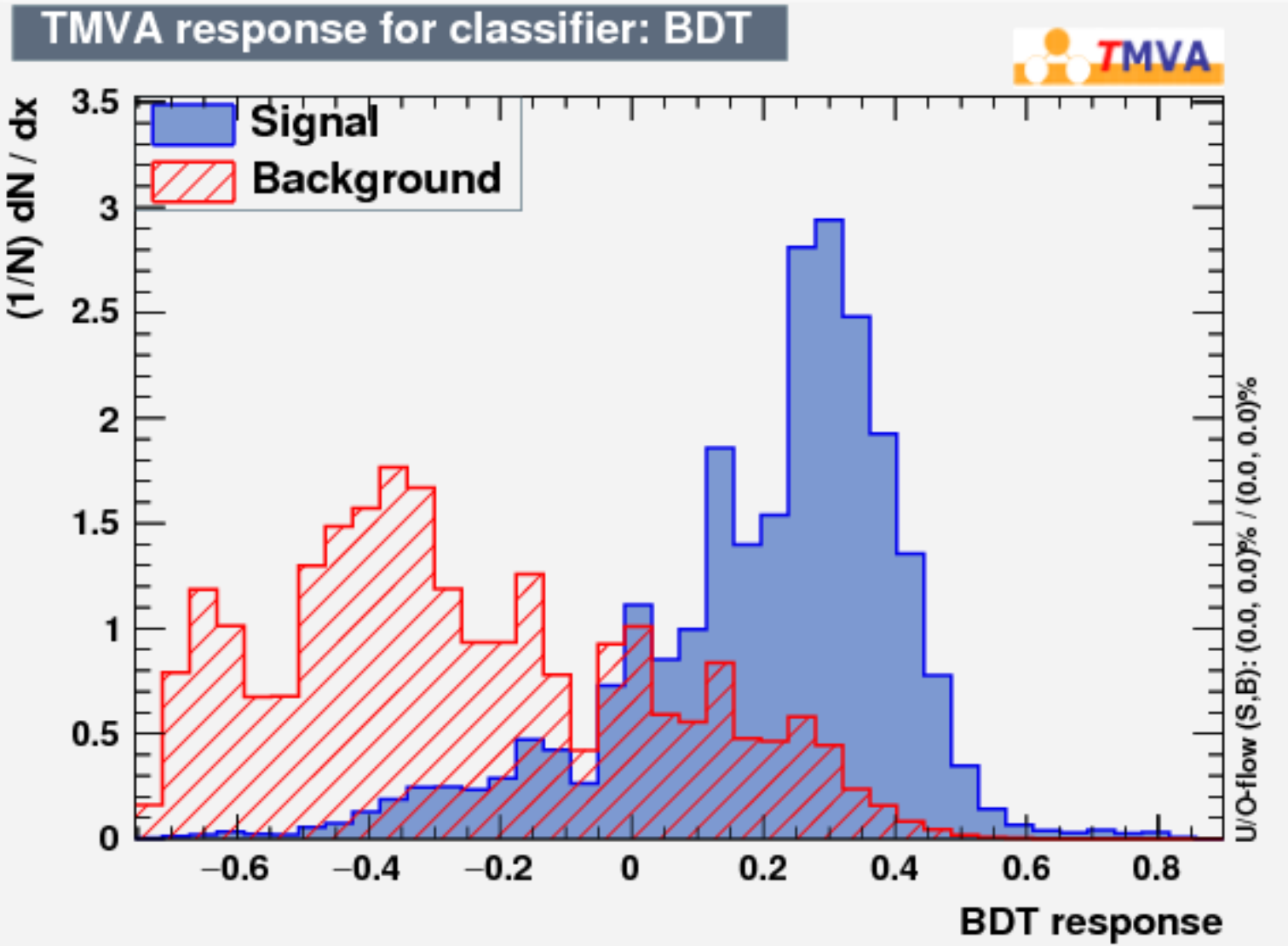


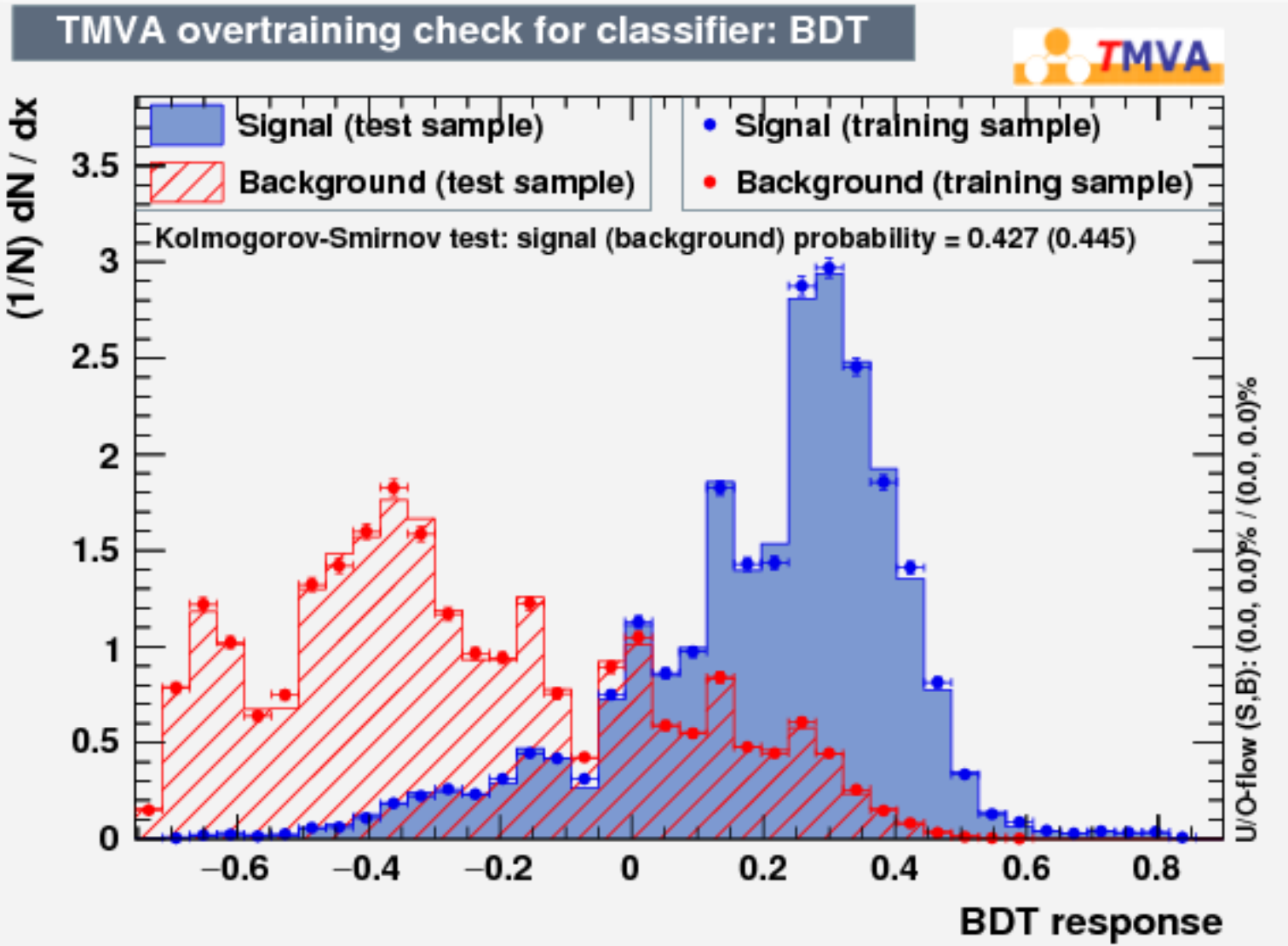
Correlation Matrix (background)

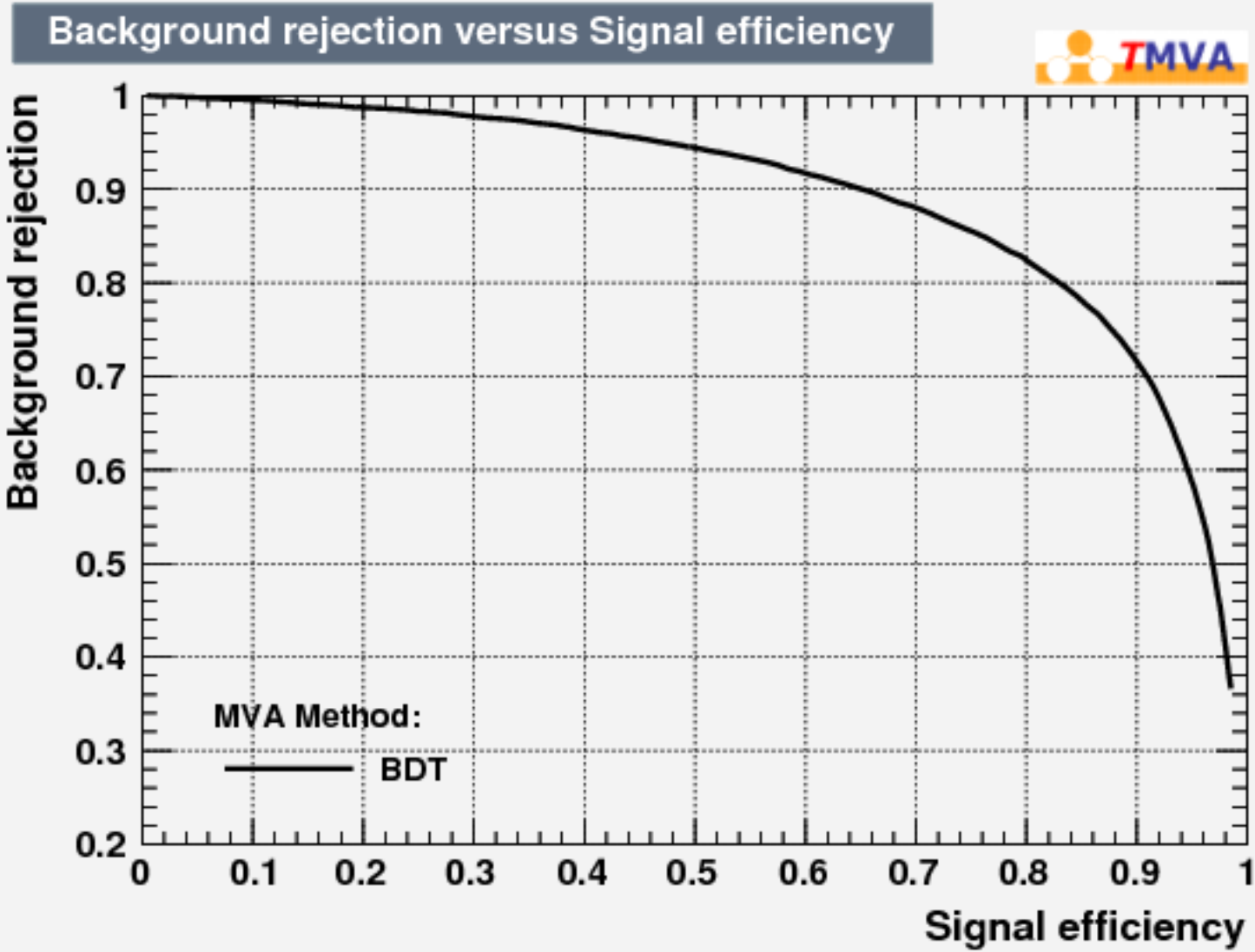


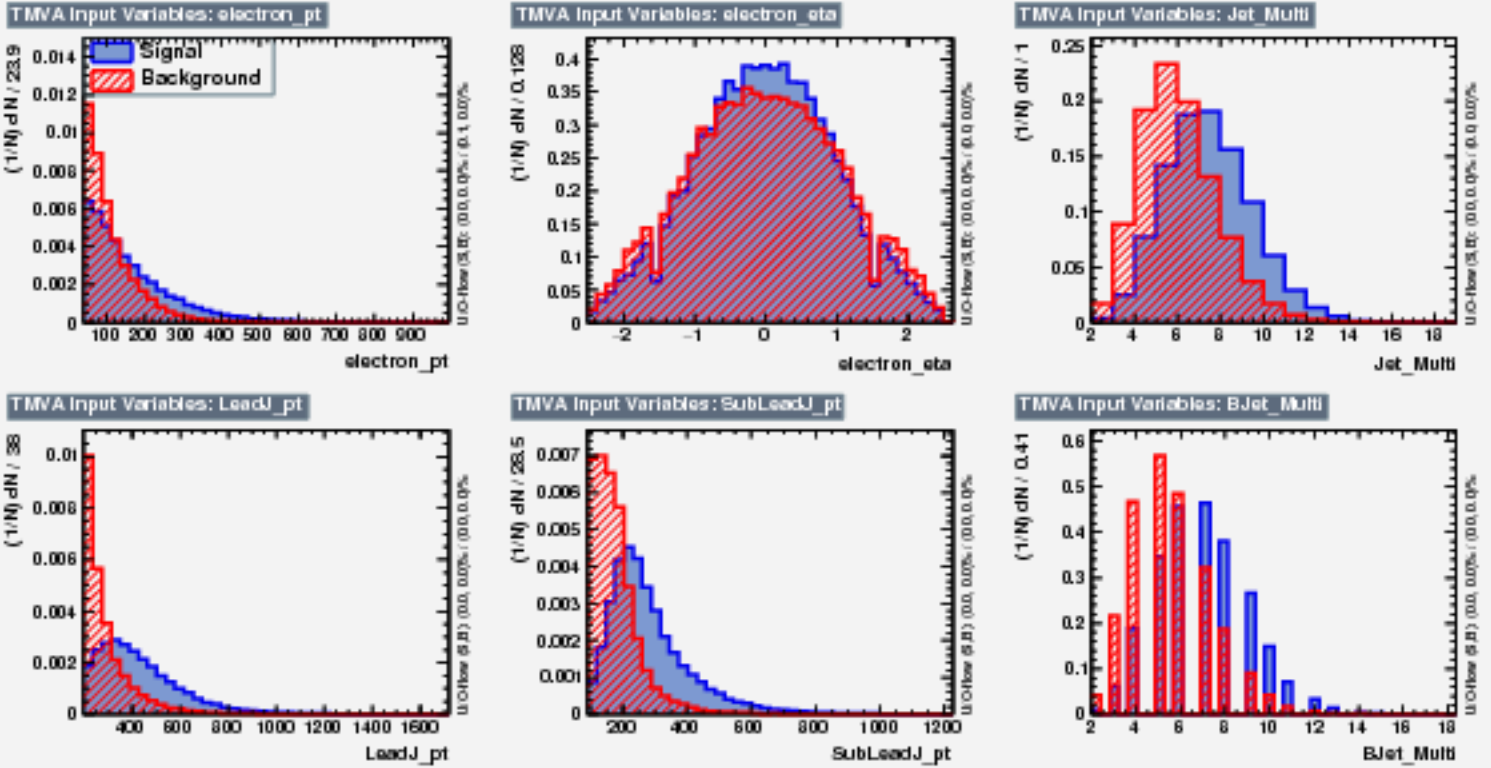
Correlation Matrix (signal)



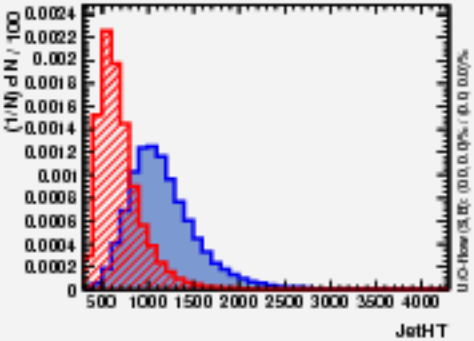

TMVA response for classifier: BDT
TMVA
Signal
Background
(1/N) dN / dx
3.5
3
2.5
2
1.5
1
0.5
0
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
BDT response
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%


TMVA overtraining check for classifier: BDT
TMVA
Signal (test sample)
Background (test sample)
Signal (training sample)
Background (training sample)
Kolmogorov-Smirnov test: signal (background) probability = 0.427 (0.445)
(1/N) dN / dx
3.5
3
2.5
2
1.5
1
0.5
0
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
BDT response
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%

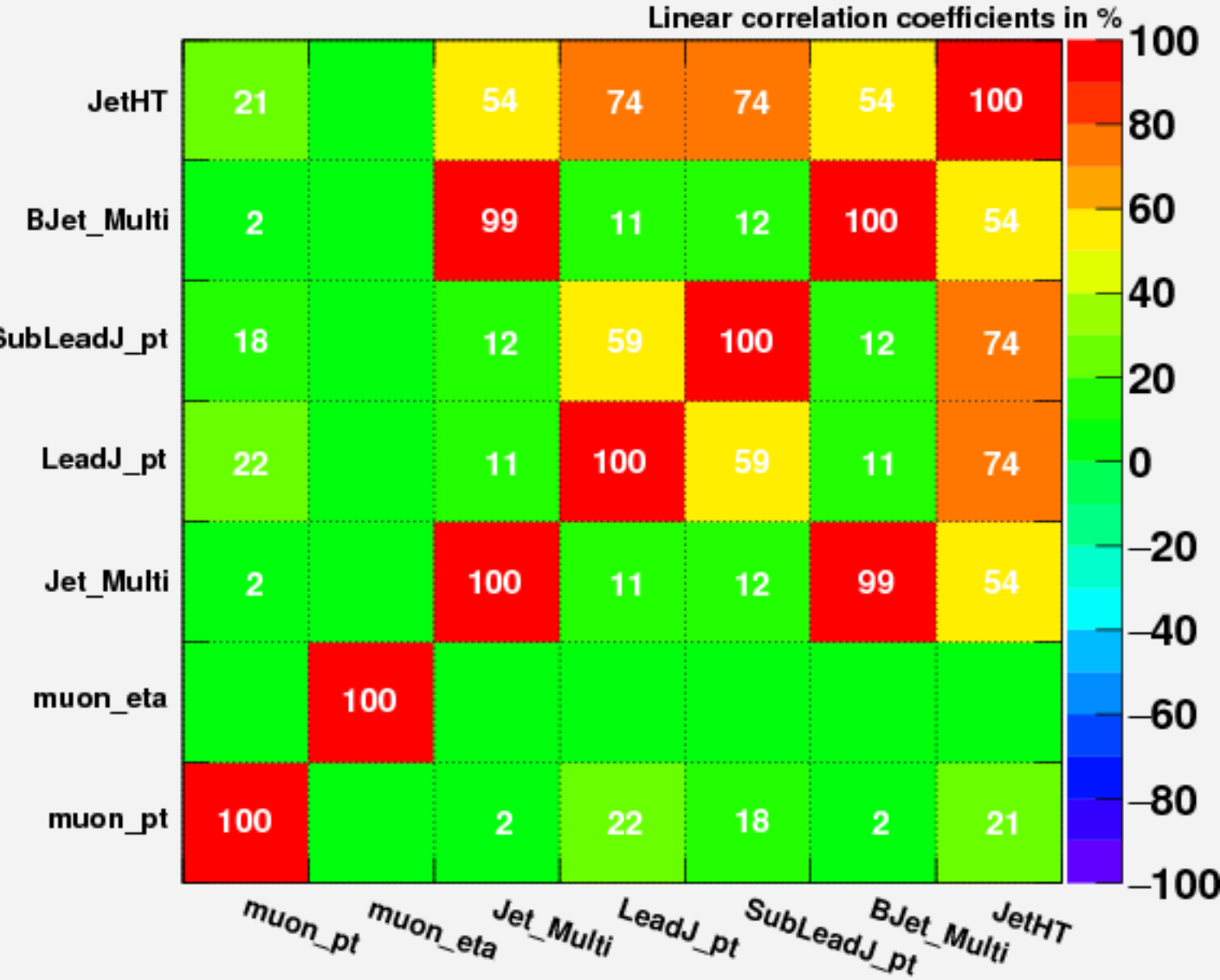

Background rejection versus Signal efficiency
TMVA
Background rejection
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Signal efficiency
MVA Method:
BDT


TMVA Input Variables: electron_pt
Signal
Background
(1/N) dN / 23.9
electron_pt
TMVA Input Variables: electron_eta
(1/N) dN / 0.128
electron_eta
TMVA Input Variables: Jet_Multi
(1/N) dN / 1
Jet_Multi
TMVA Input Variables: LeadJ_pt
(1/N) dN / 38
LeadJ_pt
TMVA Input Variables: SubLeadJ_pt
(1/N) dN / 28.5
SubLeadJ_pt
TMVA Input Variables: BJet_Multi
(1/N) dN / 0.41
BJet_Multi

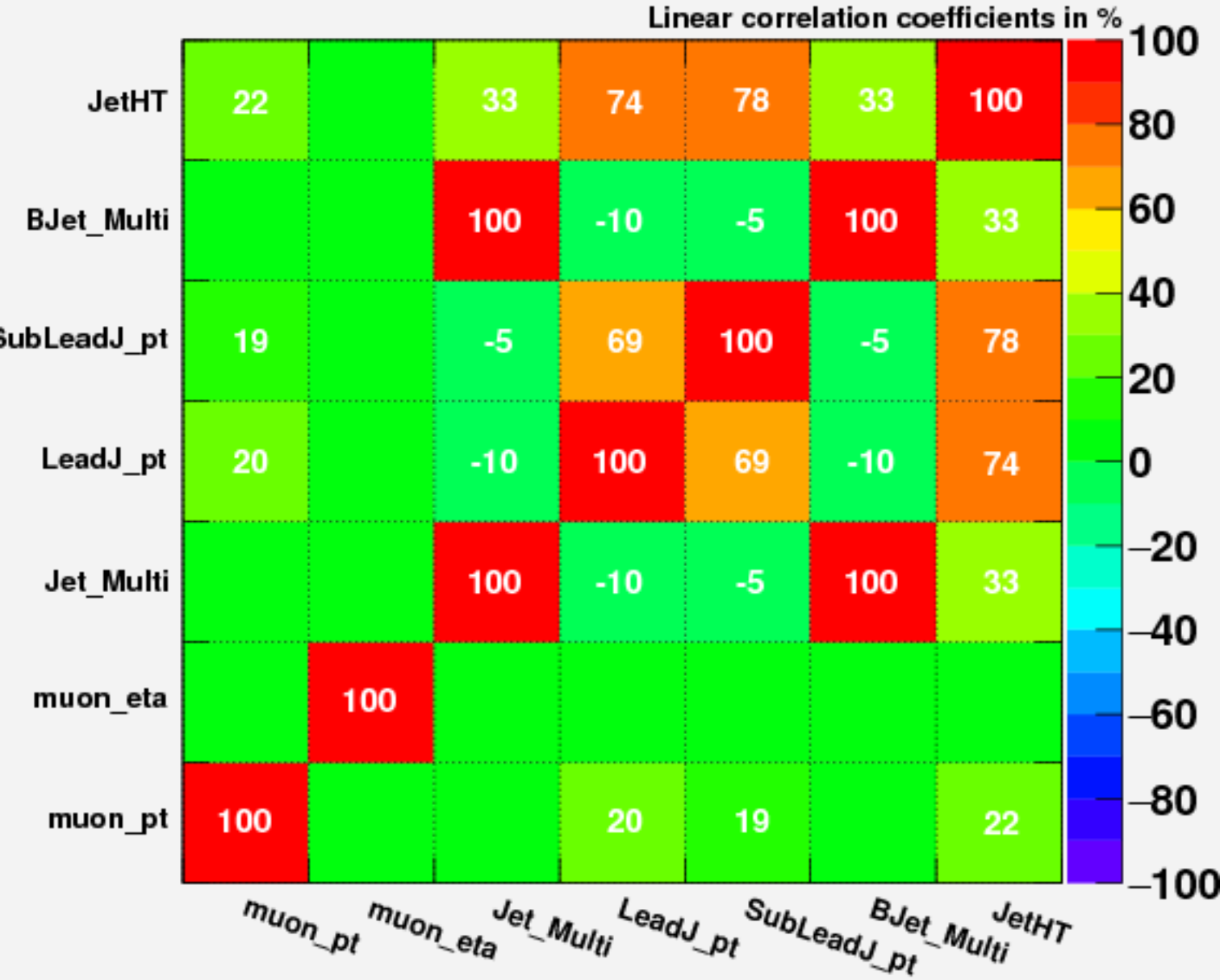
TMVA Input Variables: JetHT

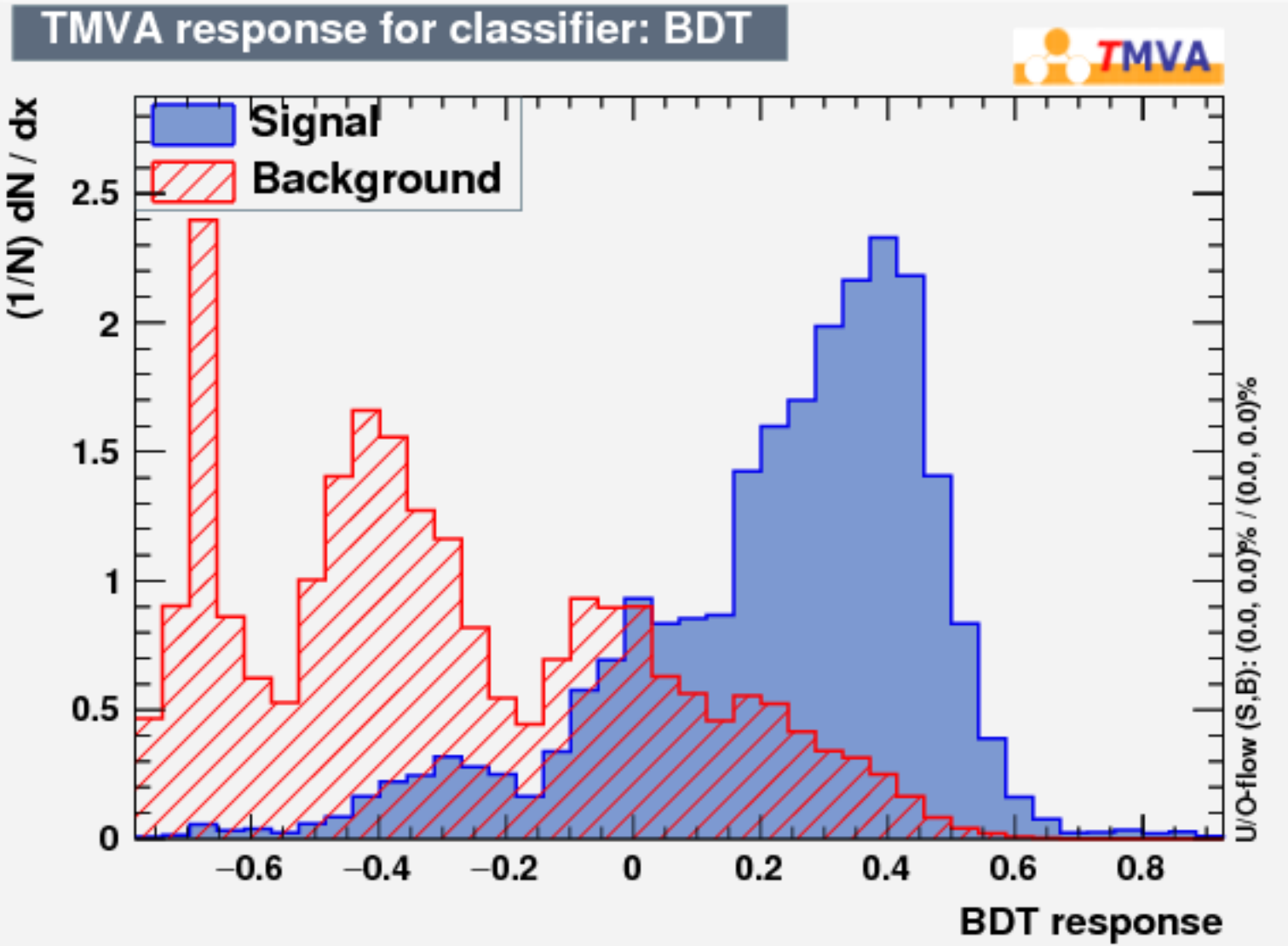


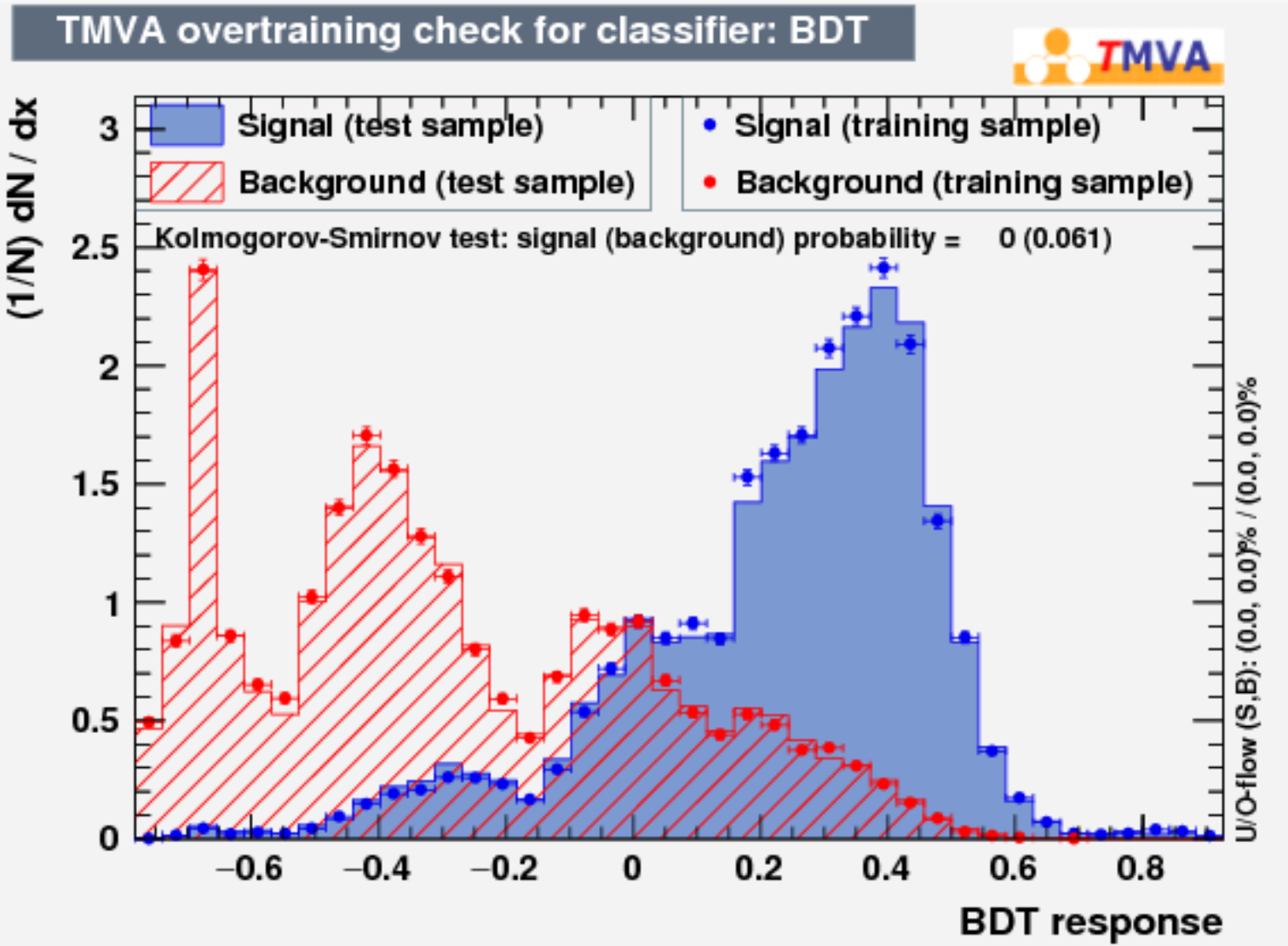
Correlation Matrix (background)

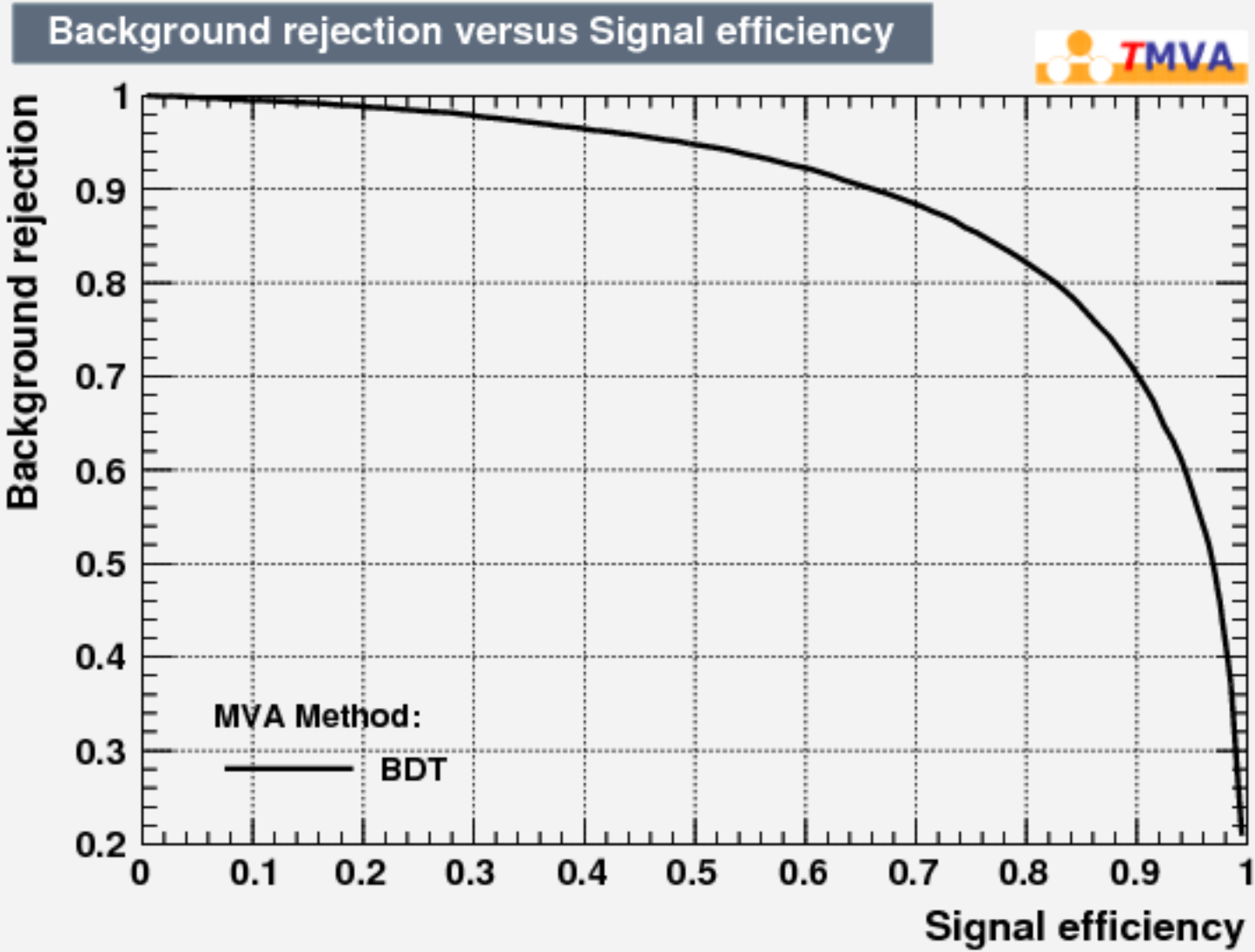


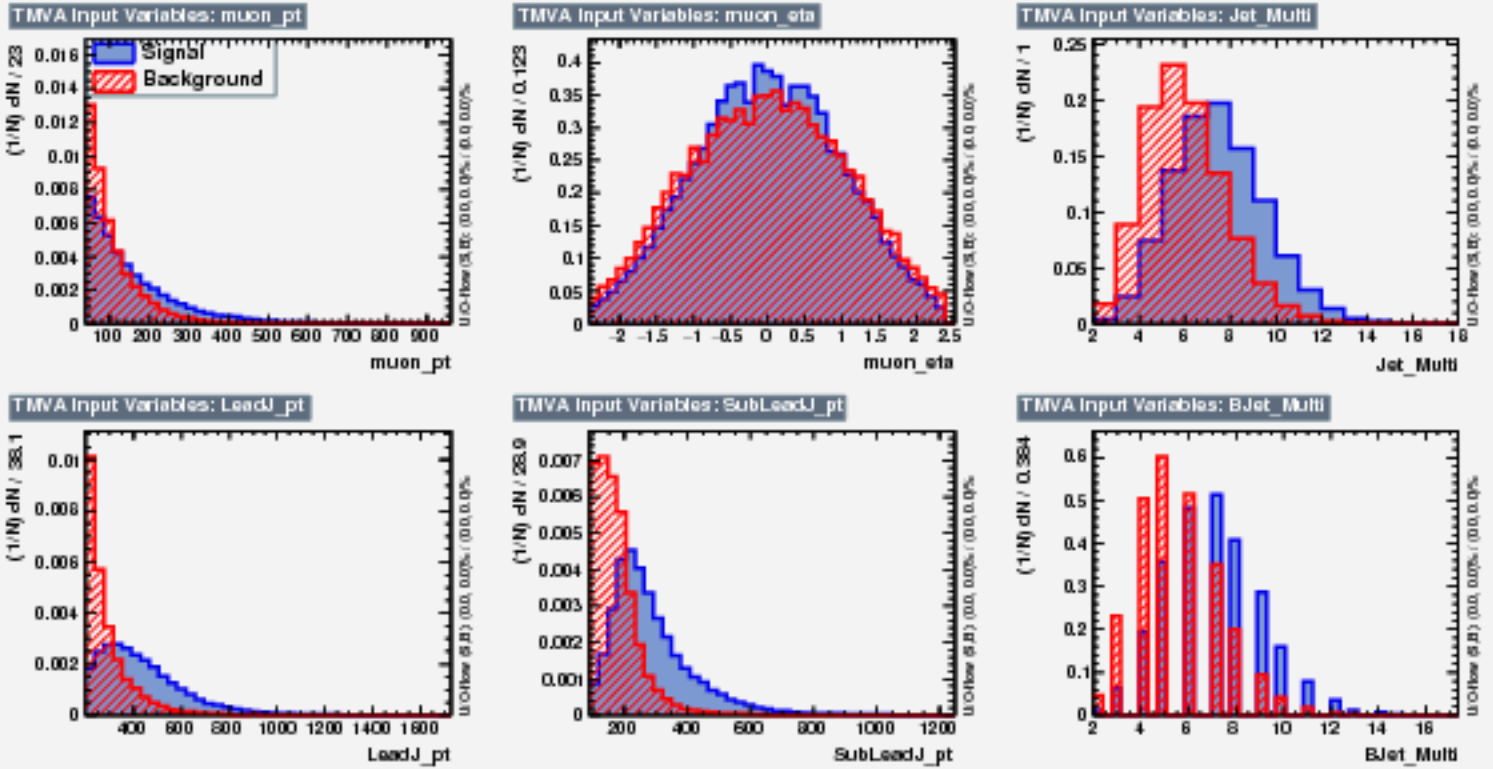
Correlation Matrix (signal)



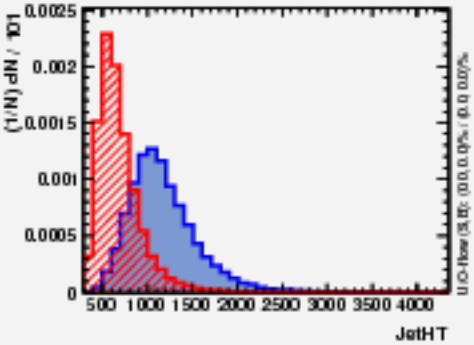

TMVA response for classifier: BDT
TMVA
Signal
Background
(1/N) dN / dx
2.5
2
1.5
1
0.5
0
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
BDT response
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%


TMVA overtraining check for classifier: BDT
TMVA
Signal (test sample)
Background (test sample)
Signal (training sample)
Background (training sample)
Kolmogorov-Smirnov test: signal (background) probability = 0 (0.061)
(1/N) dN / dx
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%
BDT response
0
0.5
1
1.5
2
2.5
3
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8

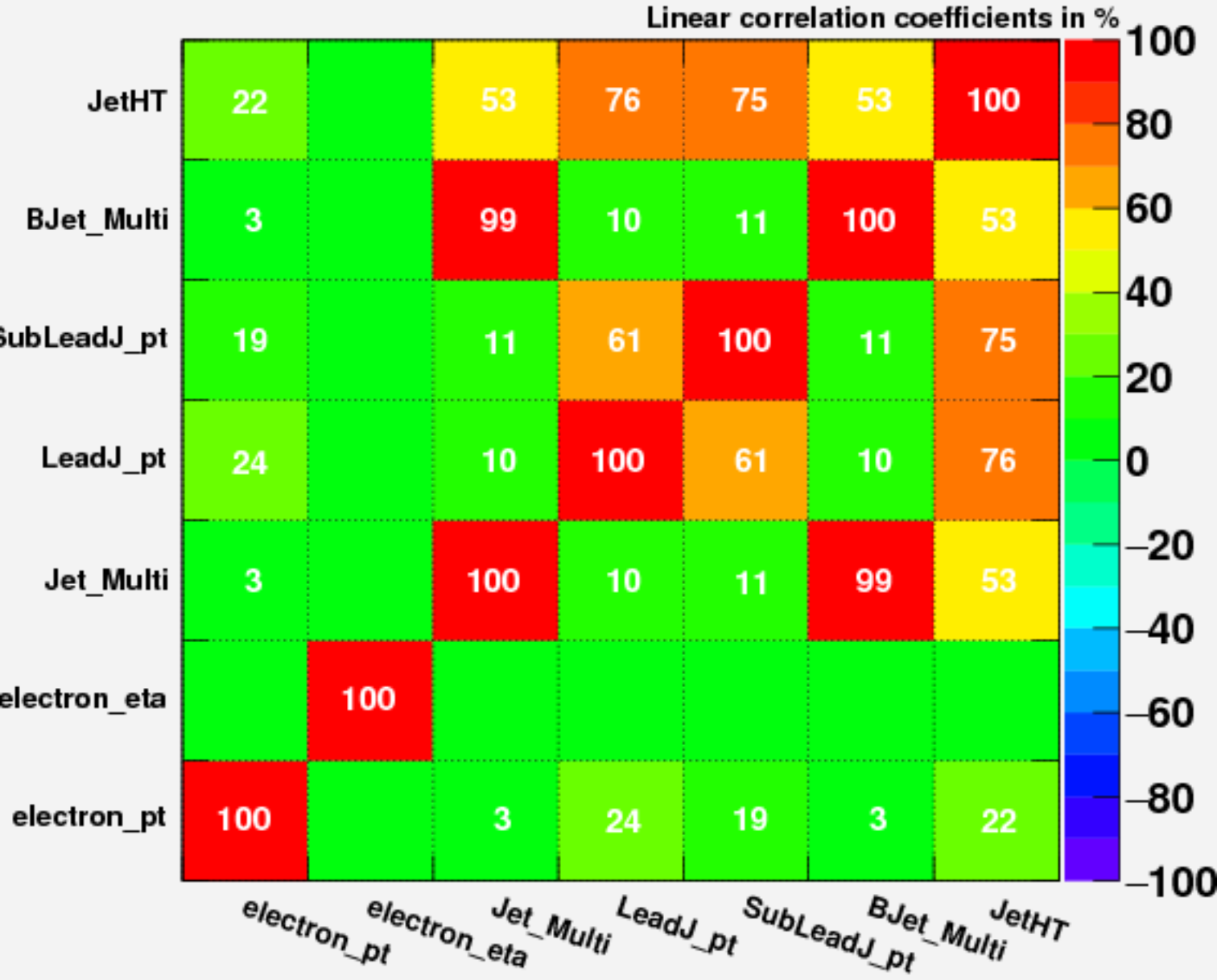

Background rejection versus Signal efficiency
TMVA
Background rejection
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Signal efficiency
MVA Method:
BDT


TMVA Input Variables: muon_pt
Signal
Background
(1/N) dN / 23
muon_pt
TMVA Input Variables: muon_eta
(1/N) dN / 0.123
muon_eta
TMVA Input Variables: Jet_Multi
(1/N) dN / 1
Jet_Multi
TMVA Input Variables: LeadJ_pt
(1/N) dN / 38.1
LeadJ_pt
TMVA Input Variables: SubLeadJ_pt
(1/N) dN / 28.9
SubLeadJ_pt
TMVA Input Variables: BJet_Multi
(1/N) dN / 0.384
BJet_Multi

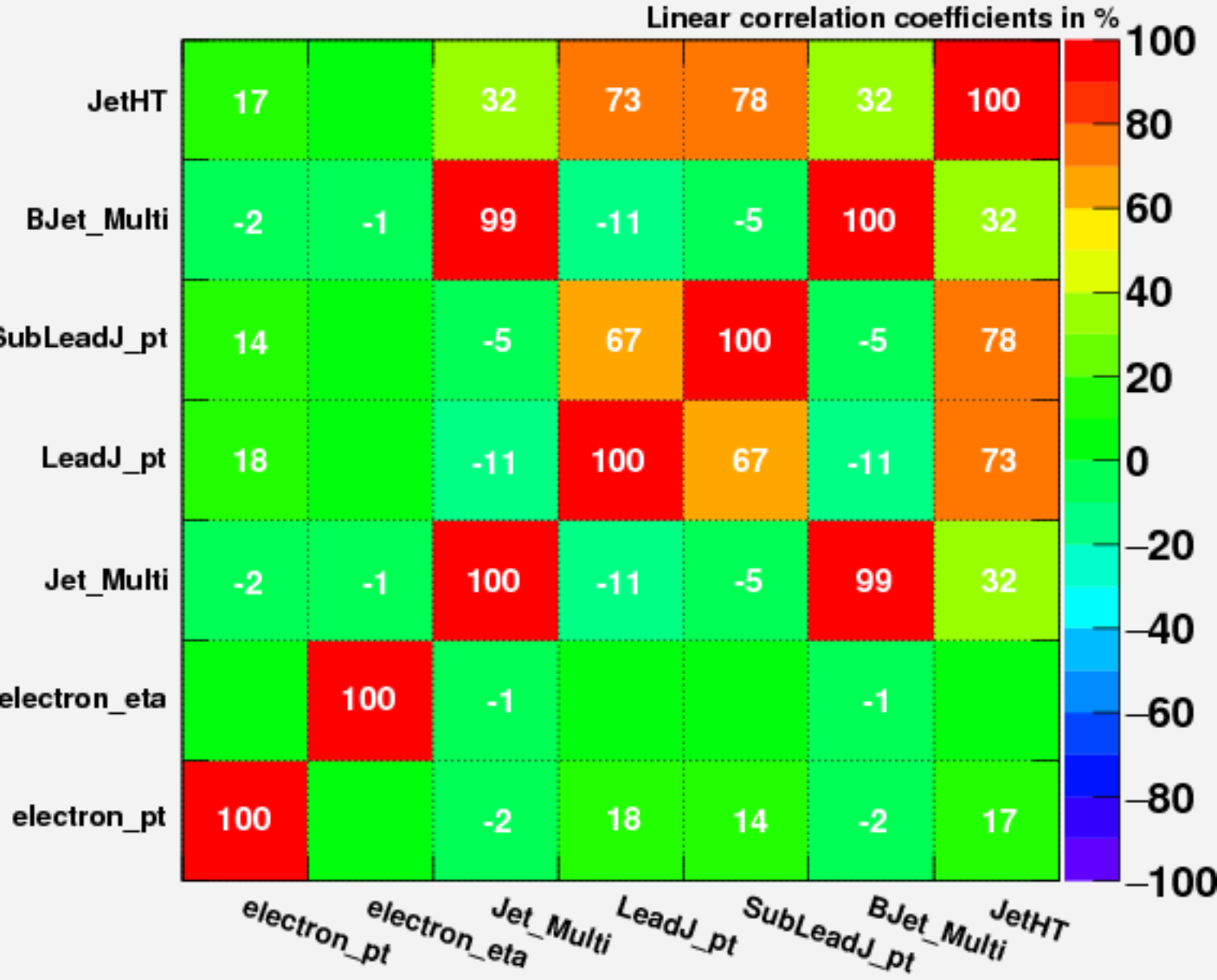
TMVA Input Variables: JetHT

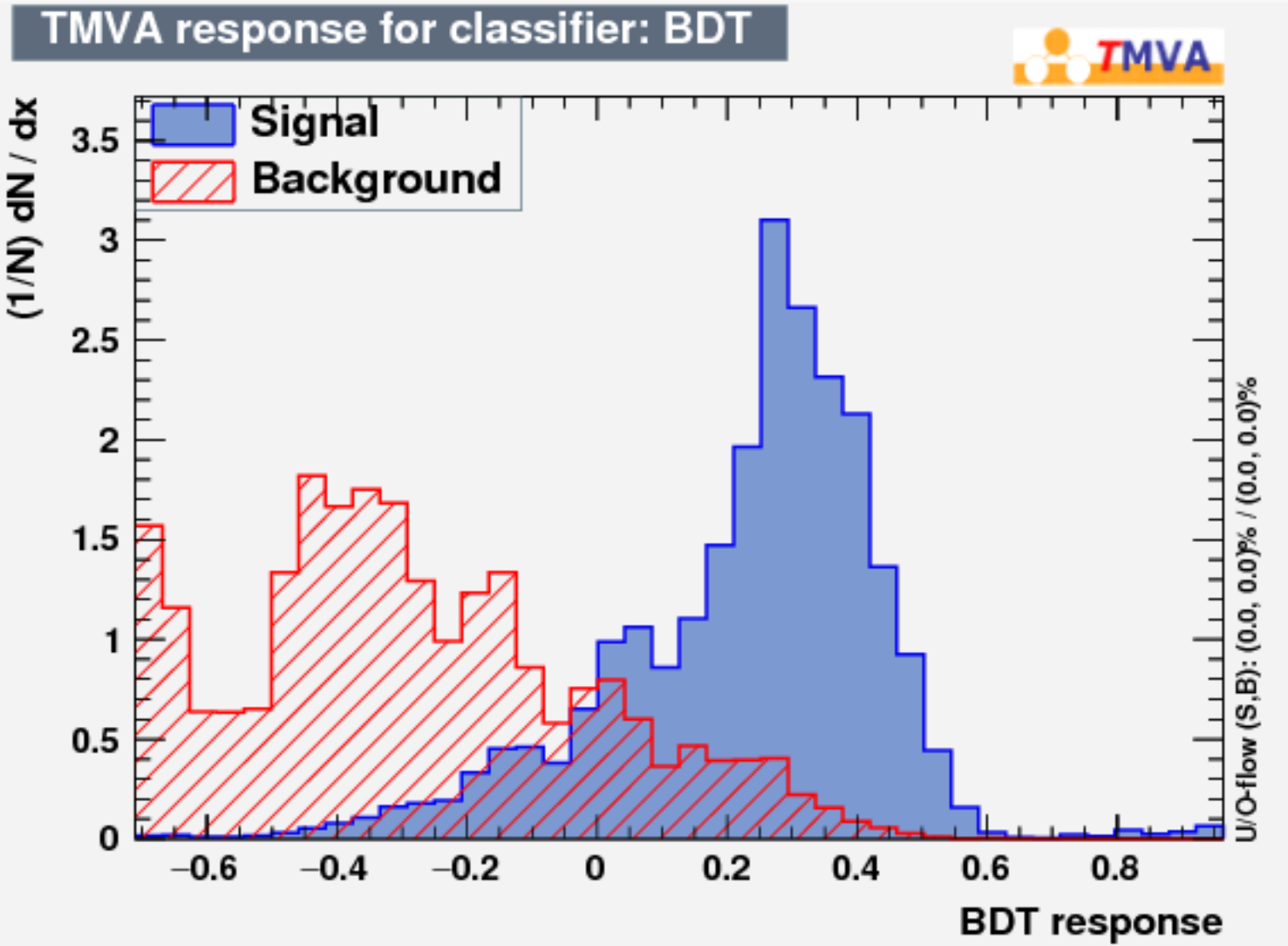


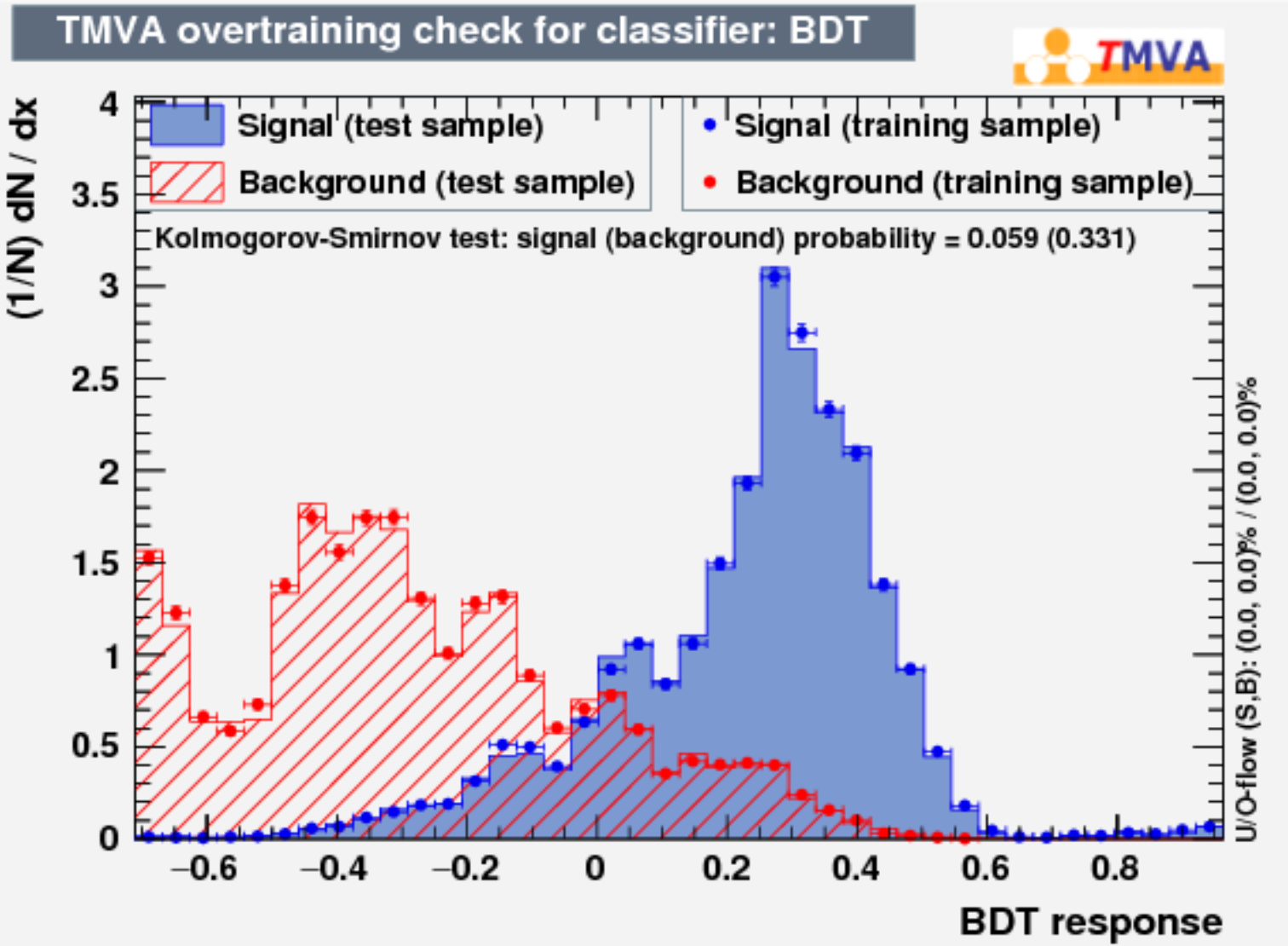
Correlation Matrix (background)

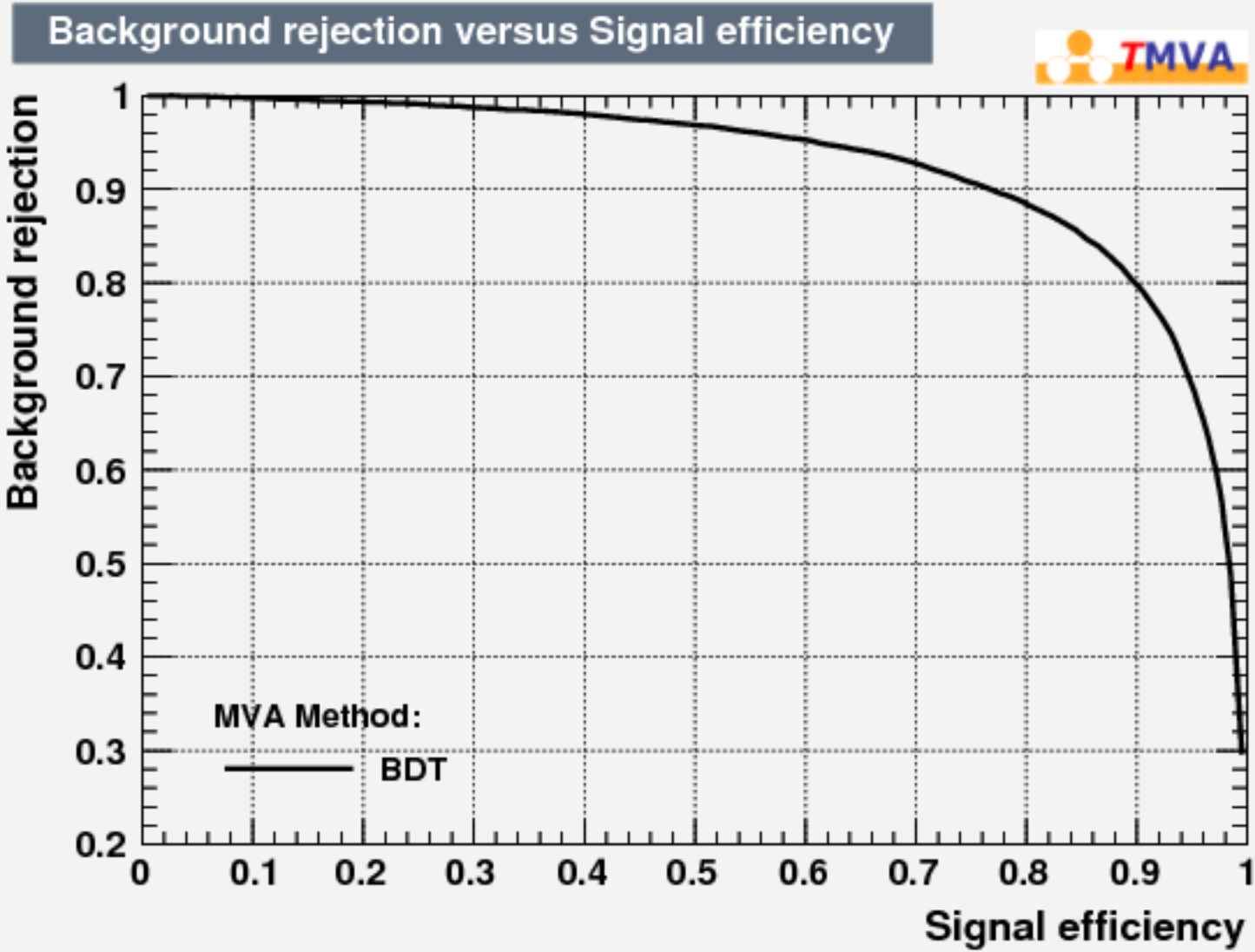


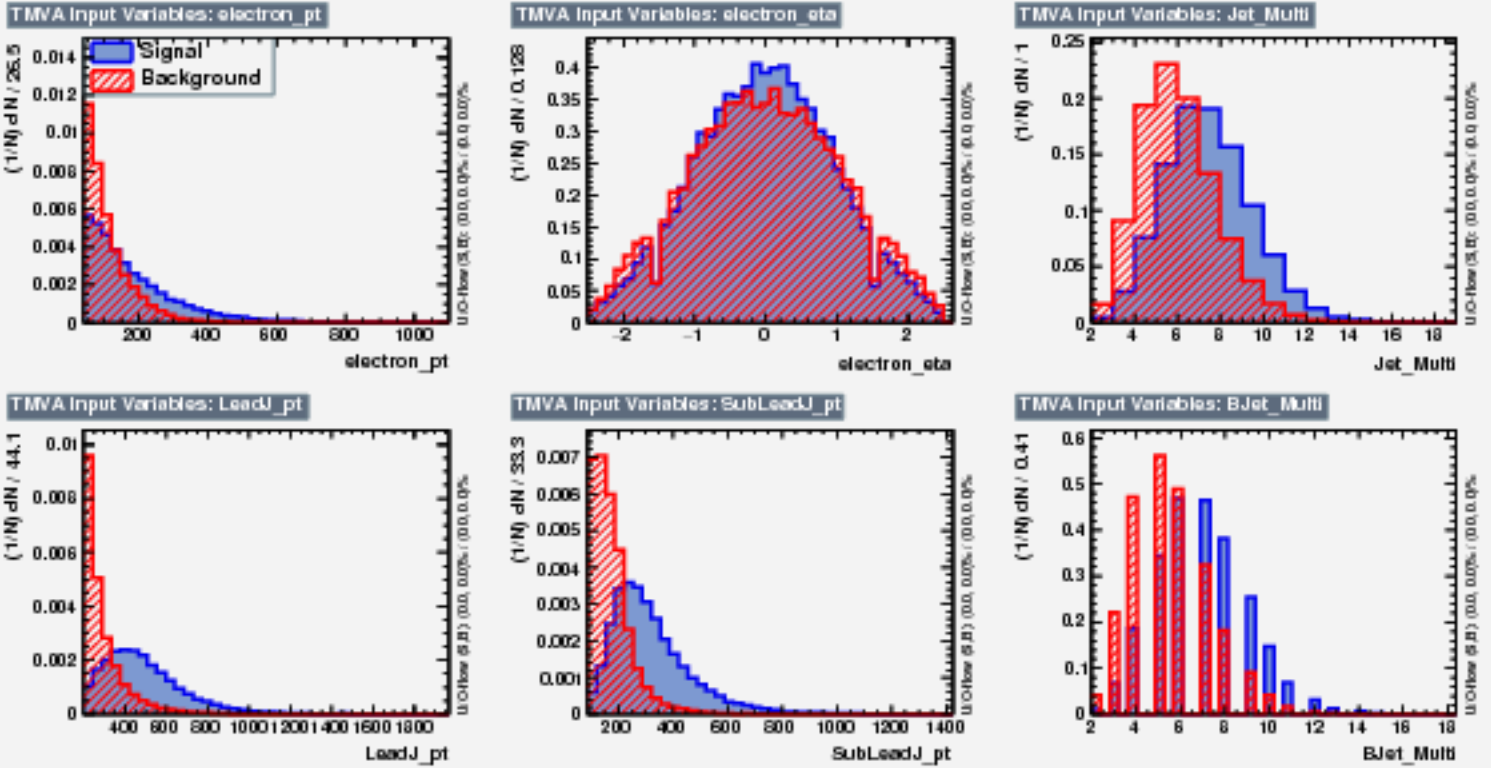
Correlation Matrix (signal)



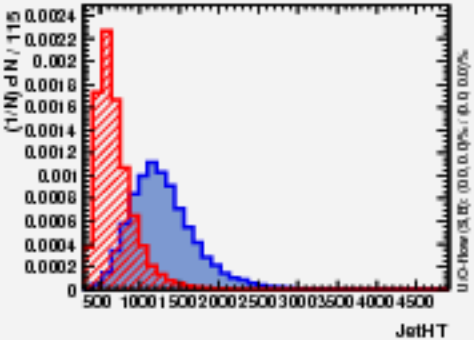

TMVA response for classifier: BDT
TMVA
Signal
Background
(1/N) dN / dx
3.5
3
2.5
2
1.5
1
0.5
0
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
BDT response
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%


TMVA overtraining check for classifier: BDT
TMVA
Signal (test sample)
Background (test sample)
Signal (training sample)
Background (training sample)
Kolmogorov-Smirnov test: signal (background) probability = 0.059 (0.331)
(1/N) dN / dx
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%
BDT response
0
0.5
1
1.5
2
2.5
3
3.5
4
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8

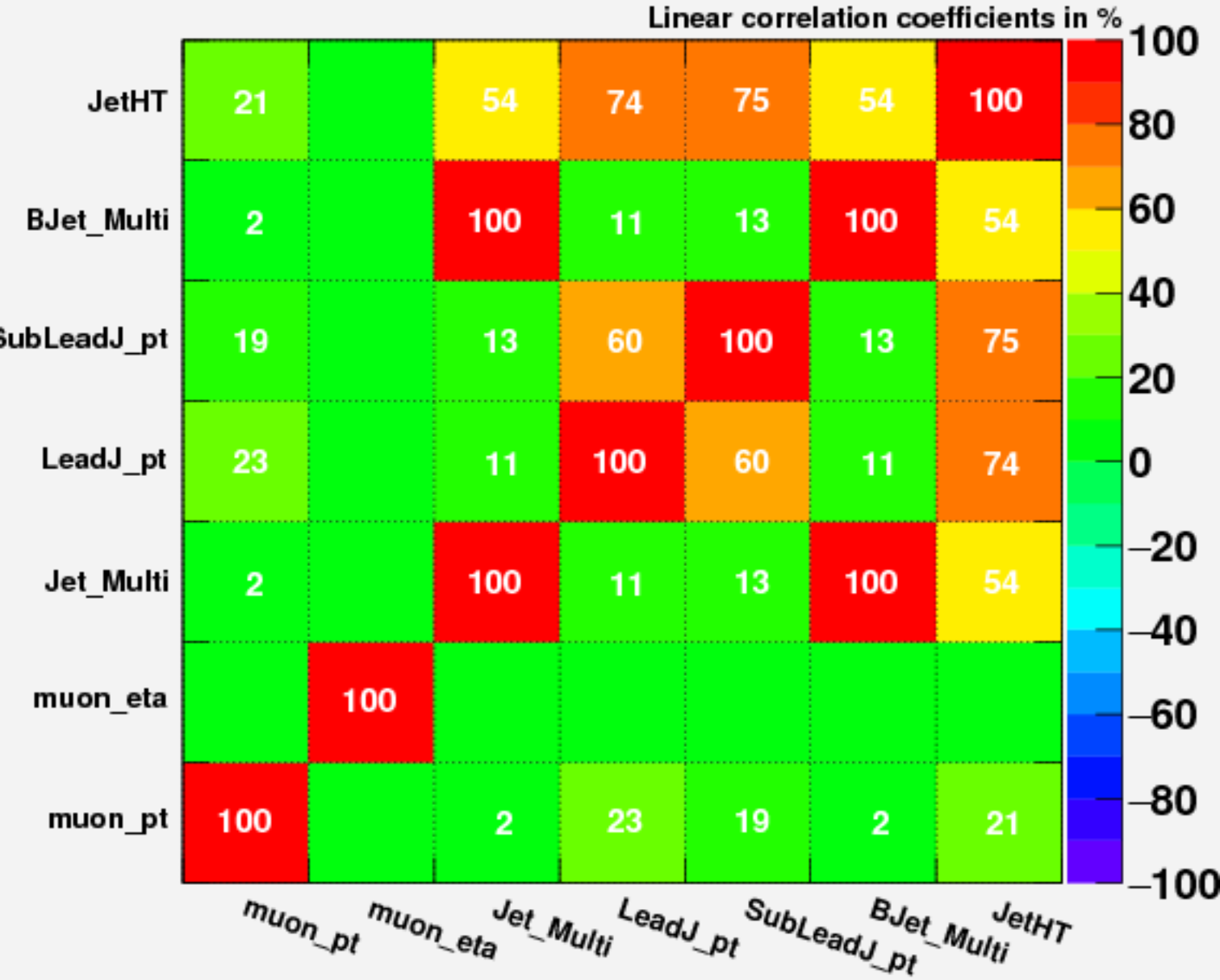

Background rejection versus Signal efficiency
TMVA
Background rejection
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Signal efficiency
MVA Method:
BDT


TMVA Input Variables: electron_pt
Signal
Background
(1/N) dN / 26.5
electron_pt
TMVA Input Variables: electron_eta
(1/N) dN / 0.128
electron_eta
TMVA Input Variables: Jet_Multi
(1/N) dN / 1
Jet_Multi
TMVA Input Variables: LeadJ_pt
(1/N) dN / 44.1
LeadJ_pt
TMVA Input Variables: SubLeadJ_pt
(1/N) dN / 33.3
SubLeadJ_pt
TMVA Input Variables: BJet_Multi
(1/N) dN / 0.41
BJet_Multi

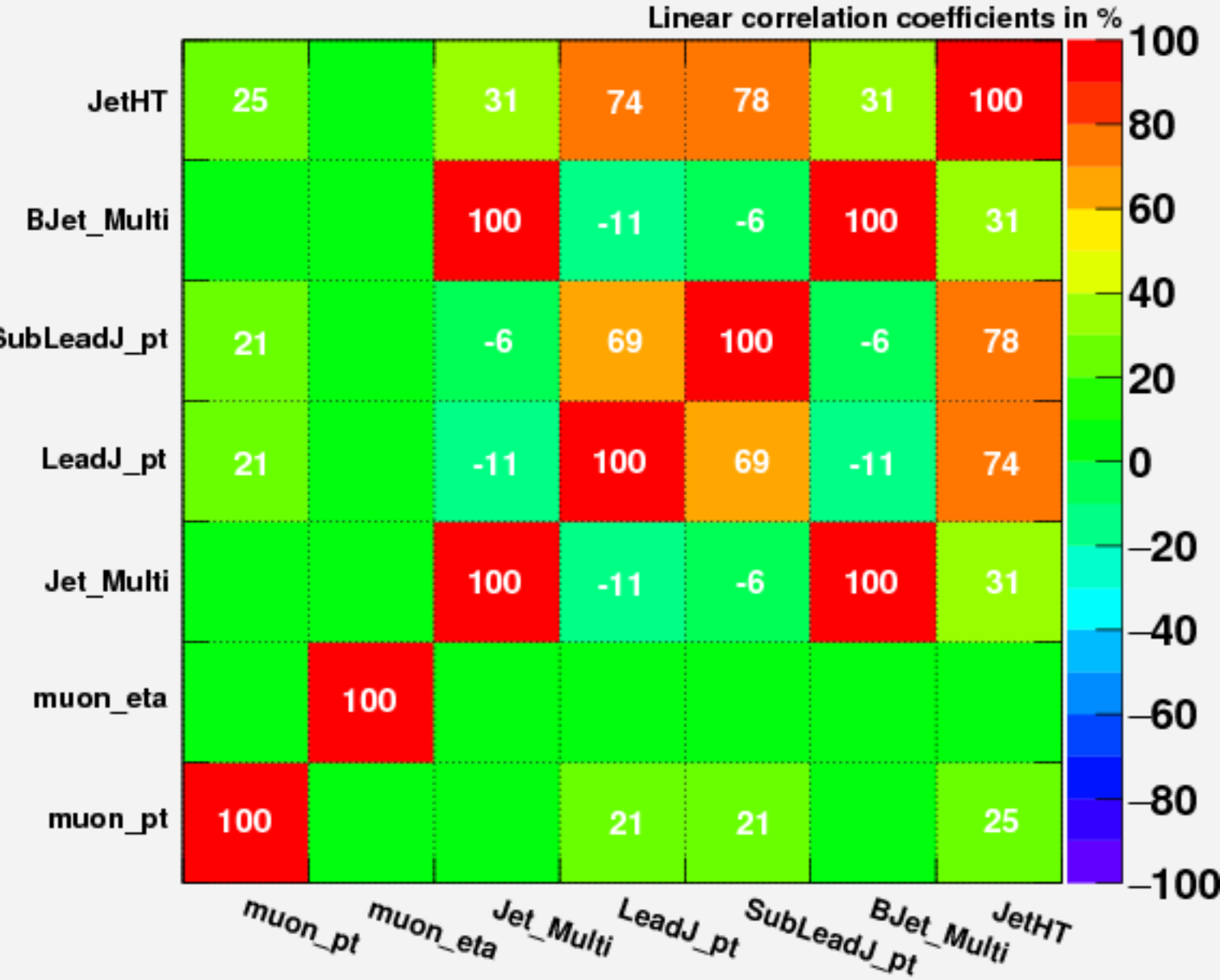
TMVA Input Variables: JetHT

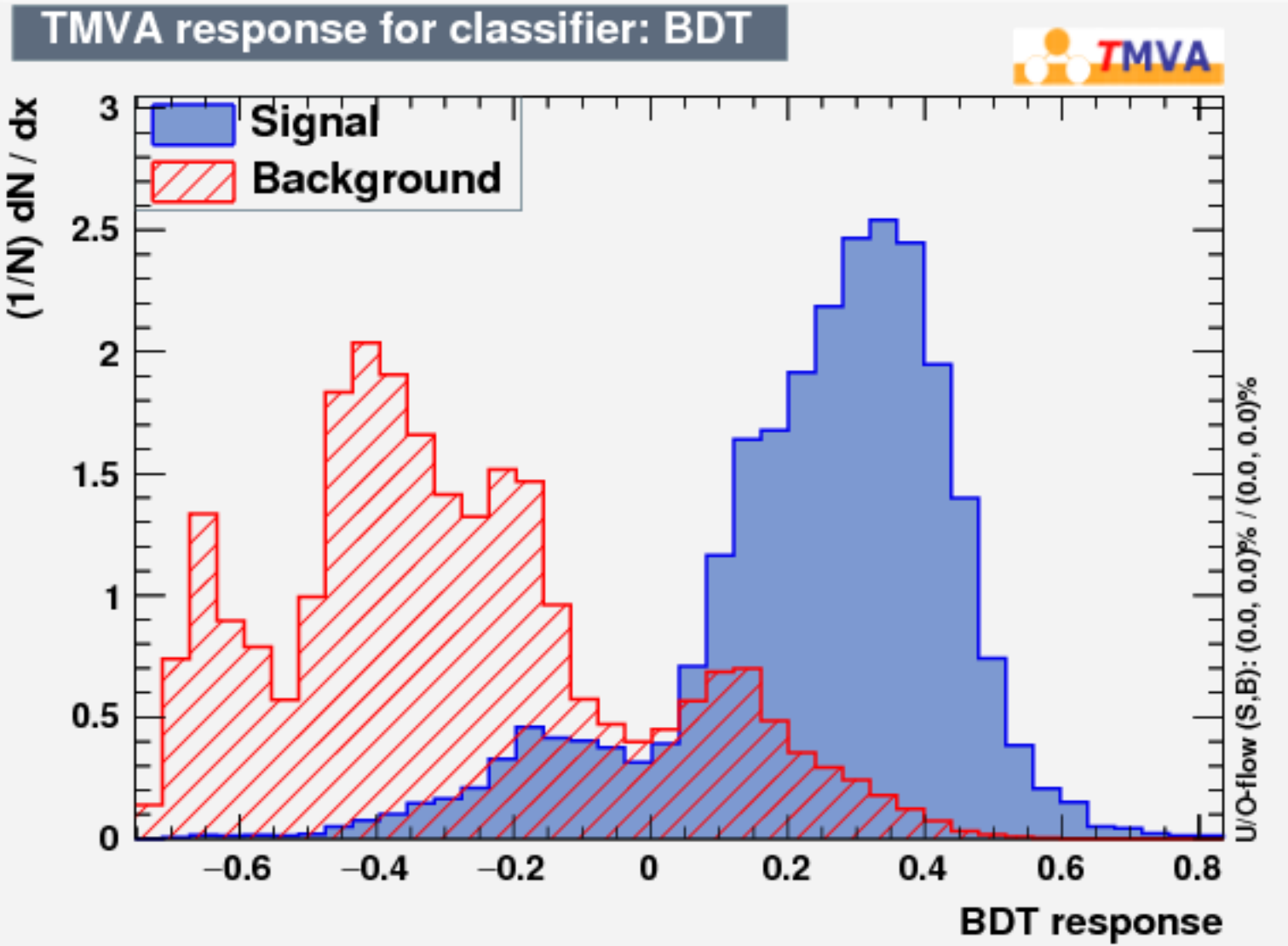


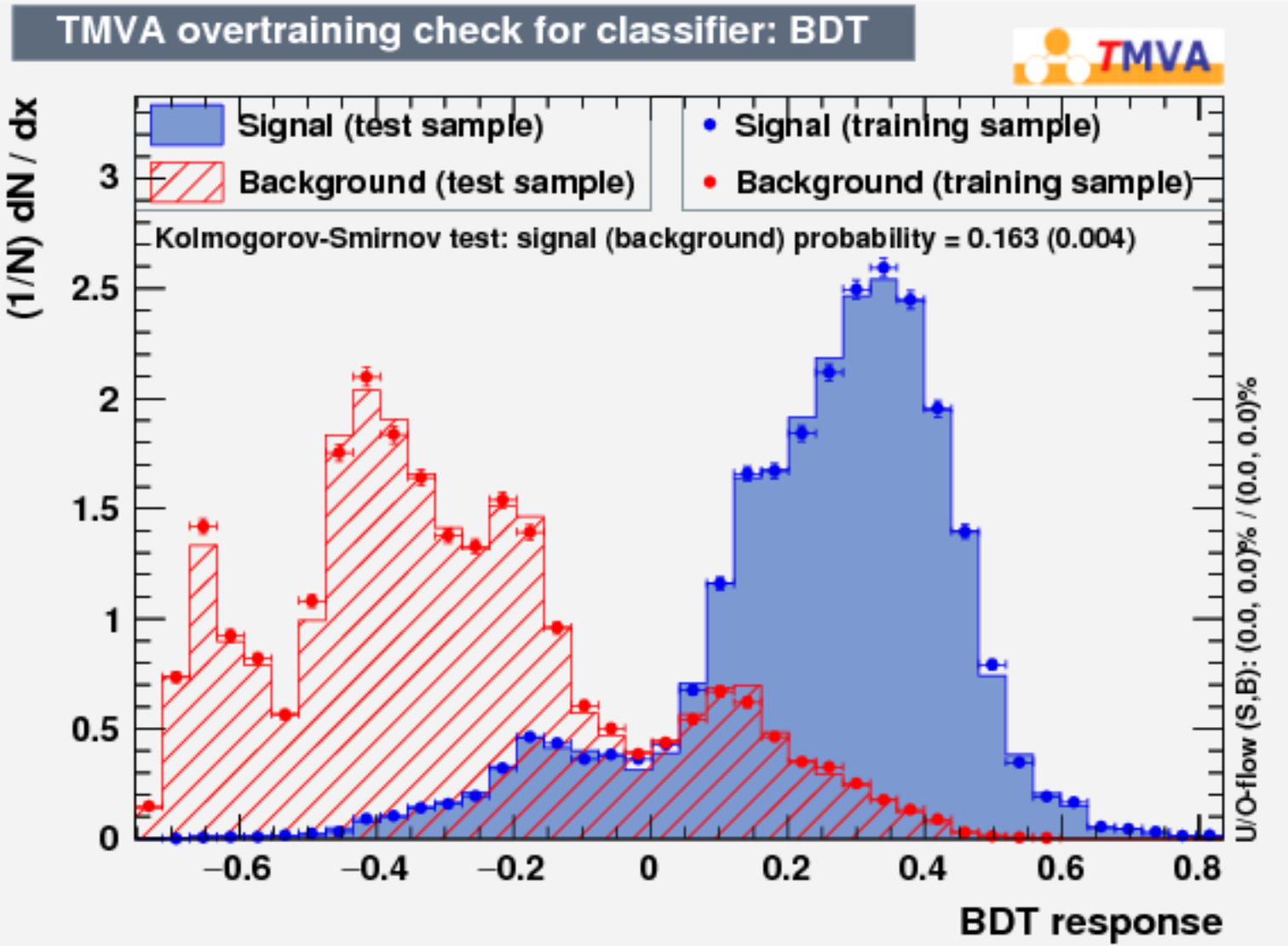
Correlation Matrix (background)

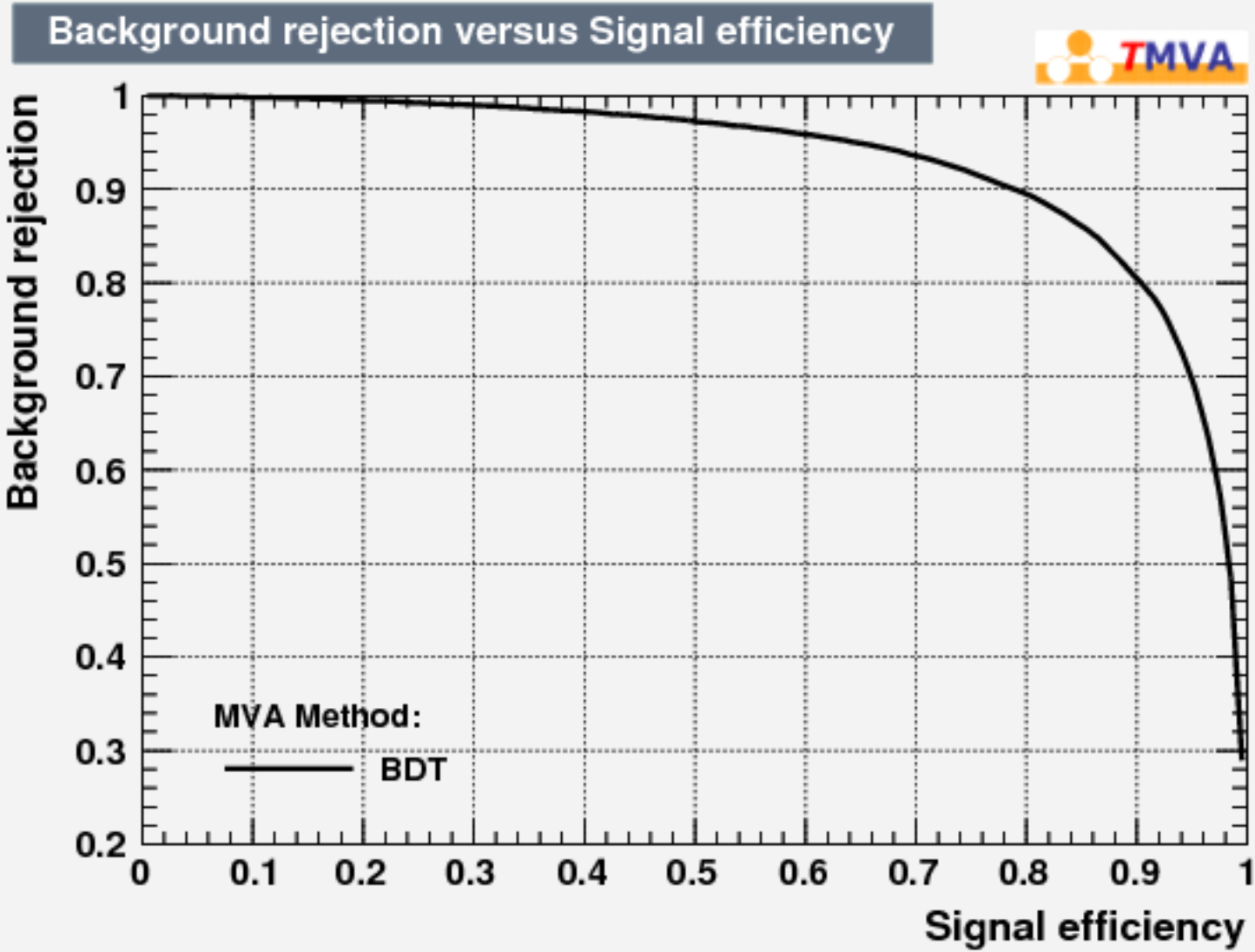


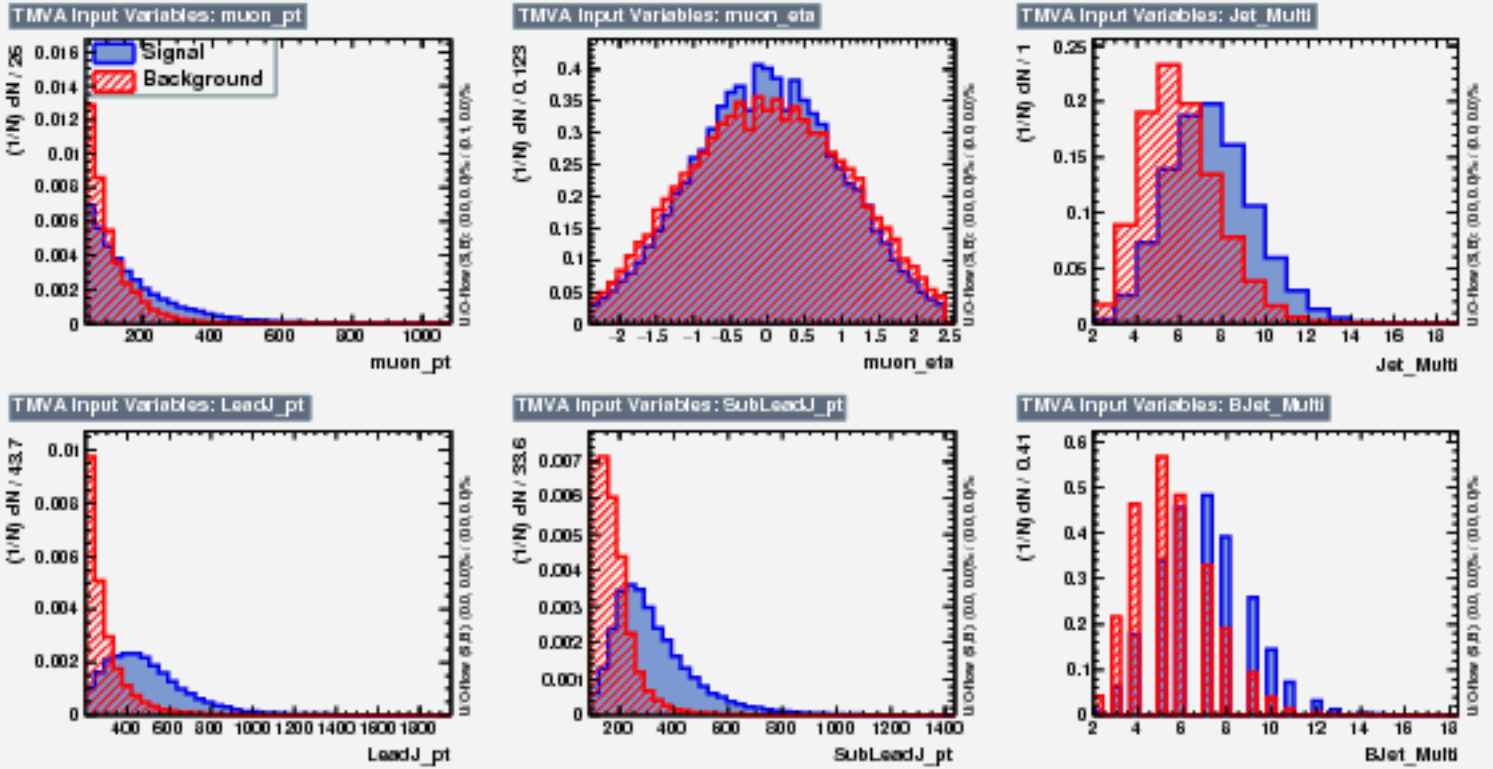
Correlation Matrix (signal)

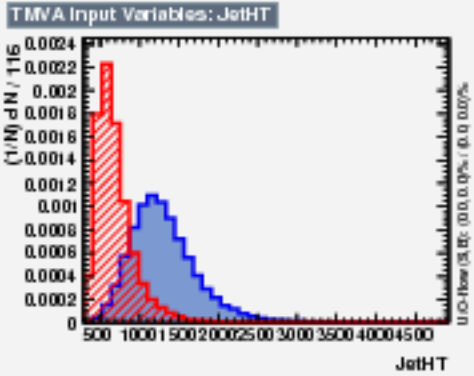



TMVA response for classifier: BDT
TMVA
Signal
Background
(1/N) dN / dx
3
2.5
2
1.5
1
0.5
0
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
BDT response
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%

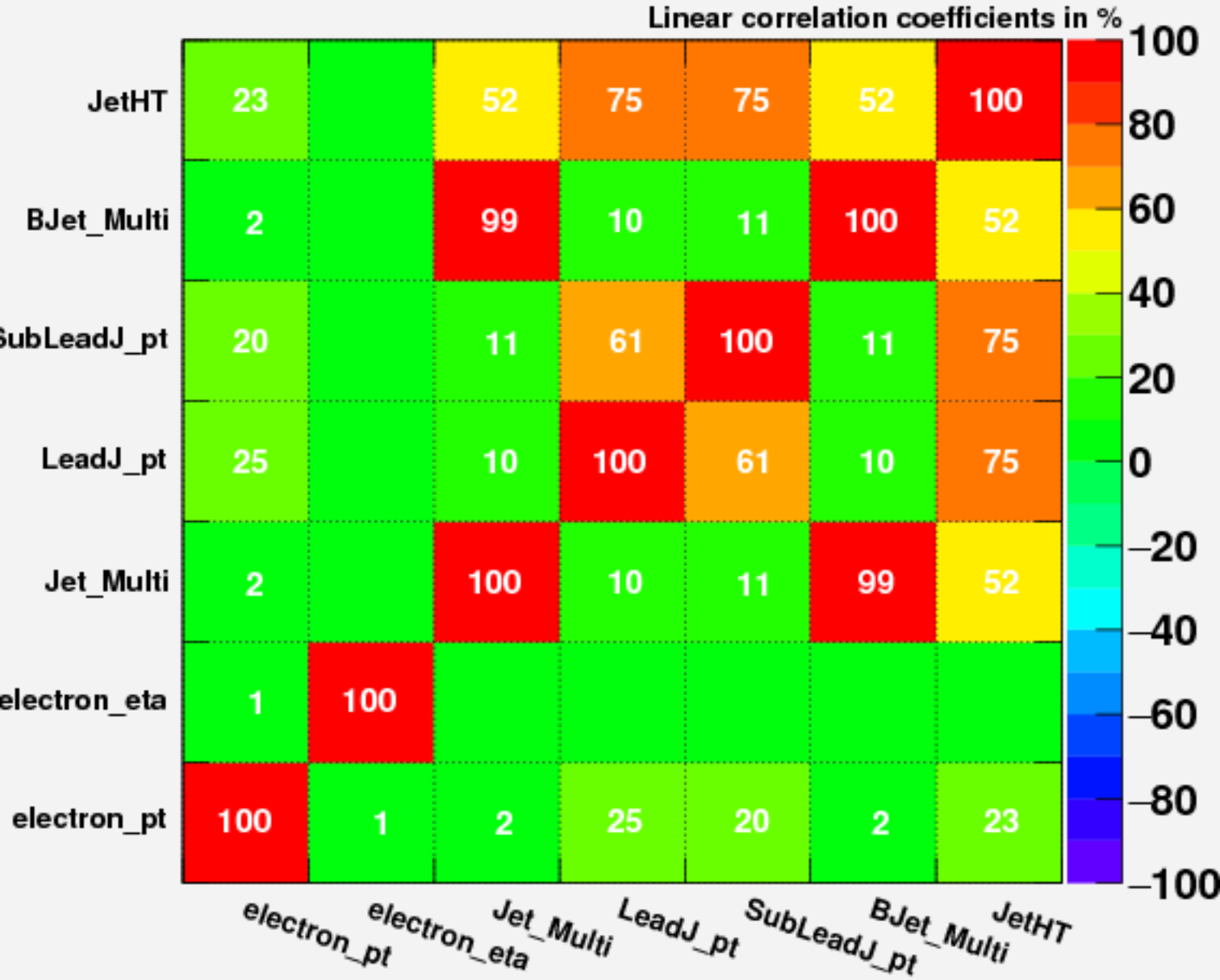

TMVA overtraining check for classifier: BDT
TMVA
Signal (test sample)
Background (test sample)
Signal (training sample)
Background (training sample)
Kolmogorov-Smirnov test: signal (background) probability = 0.163 (0.004)
(1/N) dN / dx
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%
BDT response
0
0.5
1
1.5
2
2.5
3
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8


Background rejection versus Signal efficiency
TMVA
Background rejection
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Signal efficiency
MVA Method:
BDT

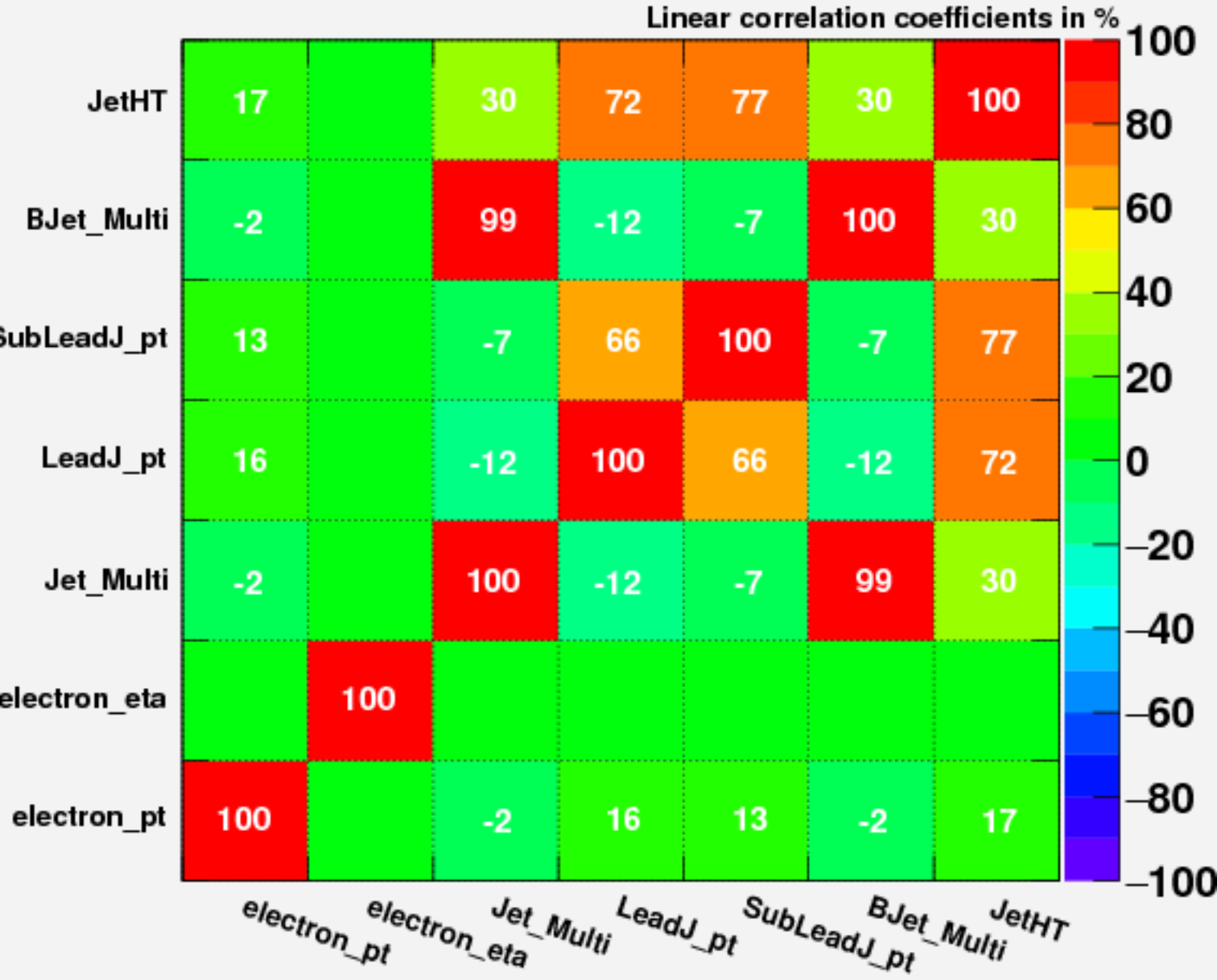

TMVA Input Variables: muon_pt
Signal
Background
(1/N) dN / 25
muon_pt
TMVA Input Variables: muon_eta
(1/N) dN / 0.123
muon_eta
TMVA Input Variables: Jet_Multi
(1/N) dN / 1
Jet_Multi
TMVA Input Variables: LeadJ_pt
(1/N) dN / 43.7
LeadJ_pt
TMVA Input Variables: SubLeadJ_pt
(1/N) dN / 33.6
SubLeadJ_pt
TMVA Input Variables: BJet_Multi
(1/N) dN / 0.41
BJet_Multi

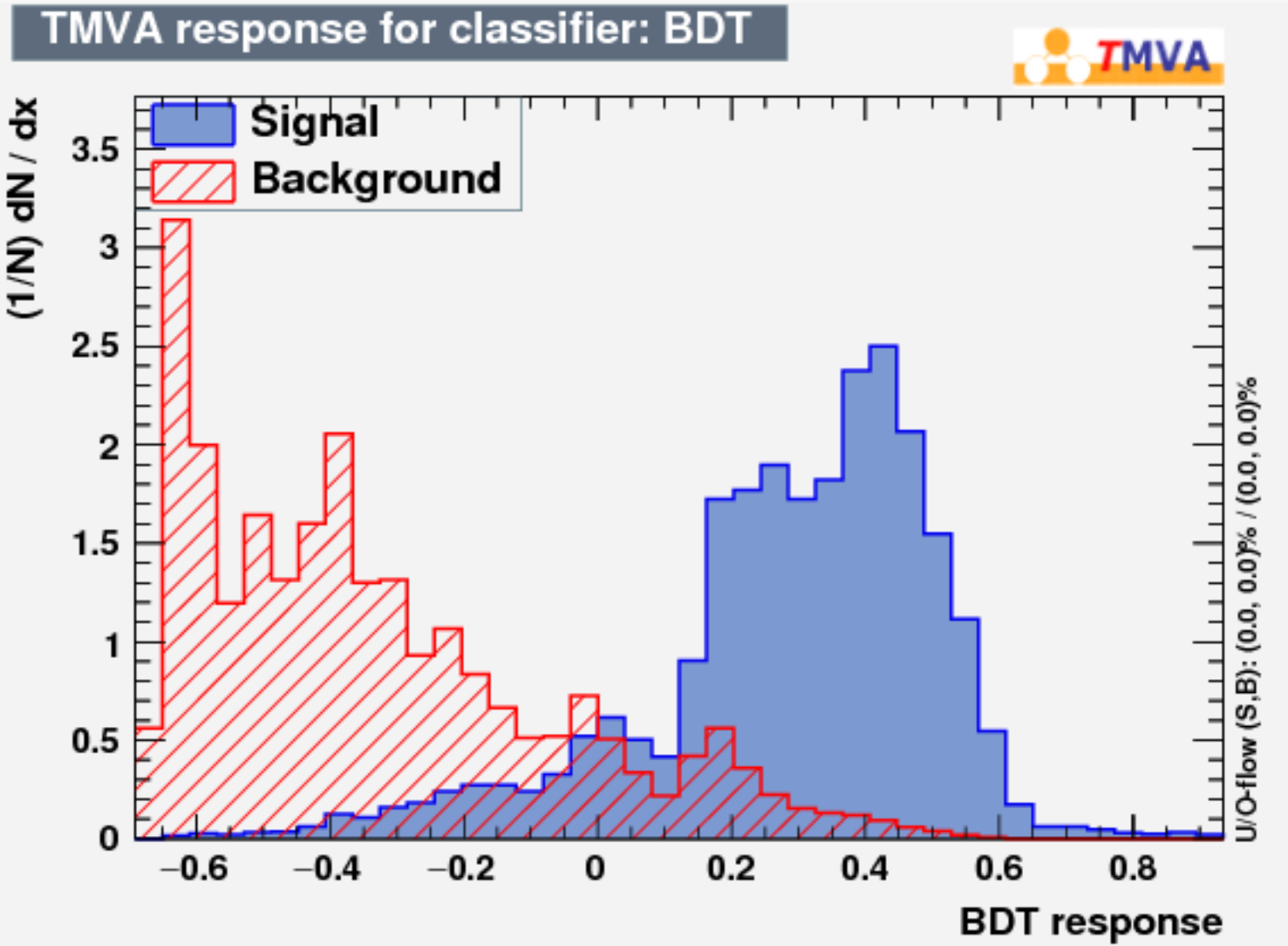

TMVA Input Variables: JetHT
(1/N) dN / 116
0.0024
0.0022
0.002
0.0018
0.0016
0.0014
0.0012
0.001
0.0008
0.0006
0.0004
0.0002
0
500 1000 1500 2000 2500 3000 3500 4000 4500
JetHT
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%

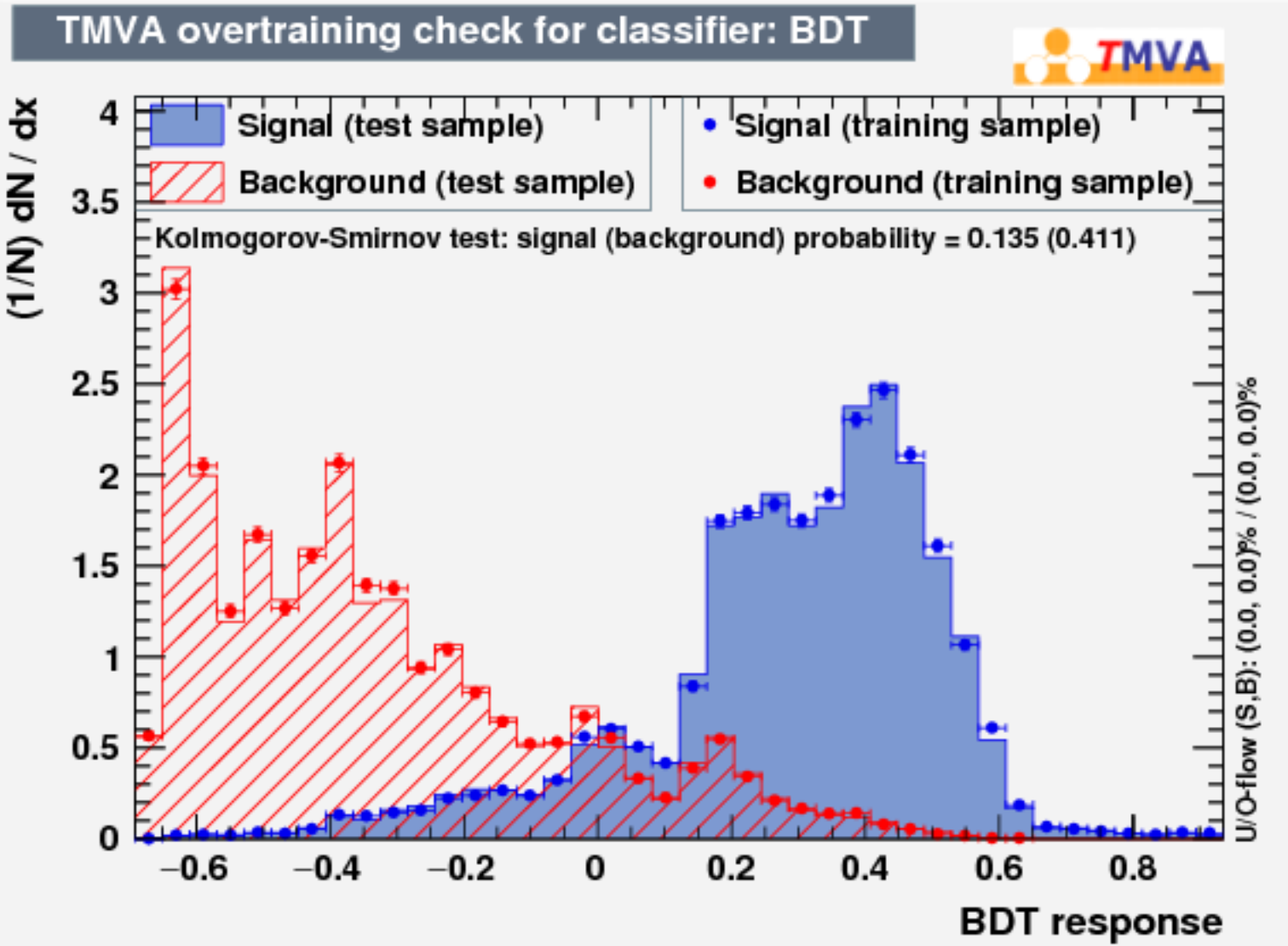
Correlation Matrix (background)

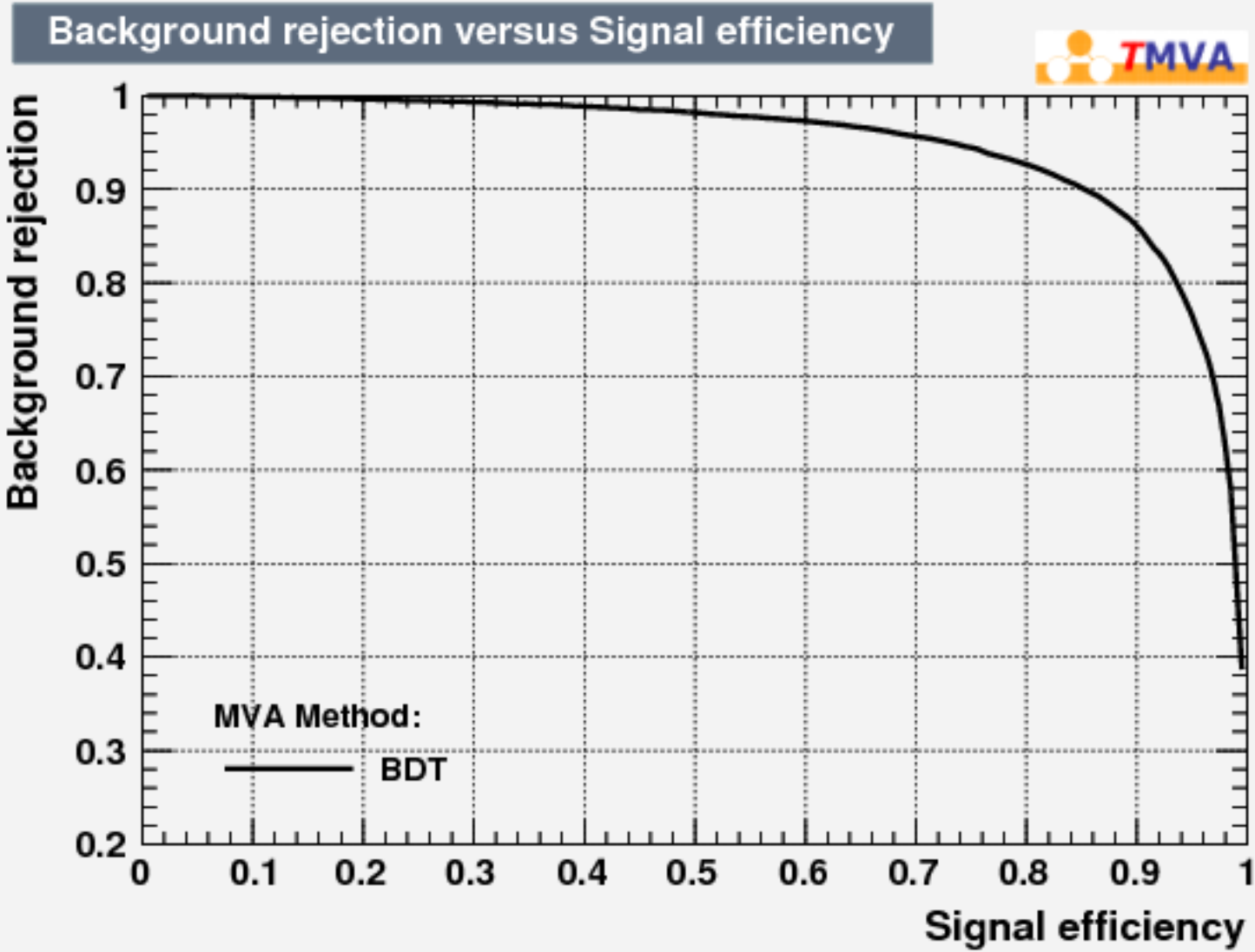


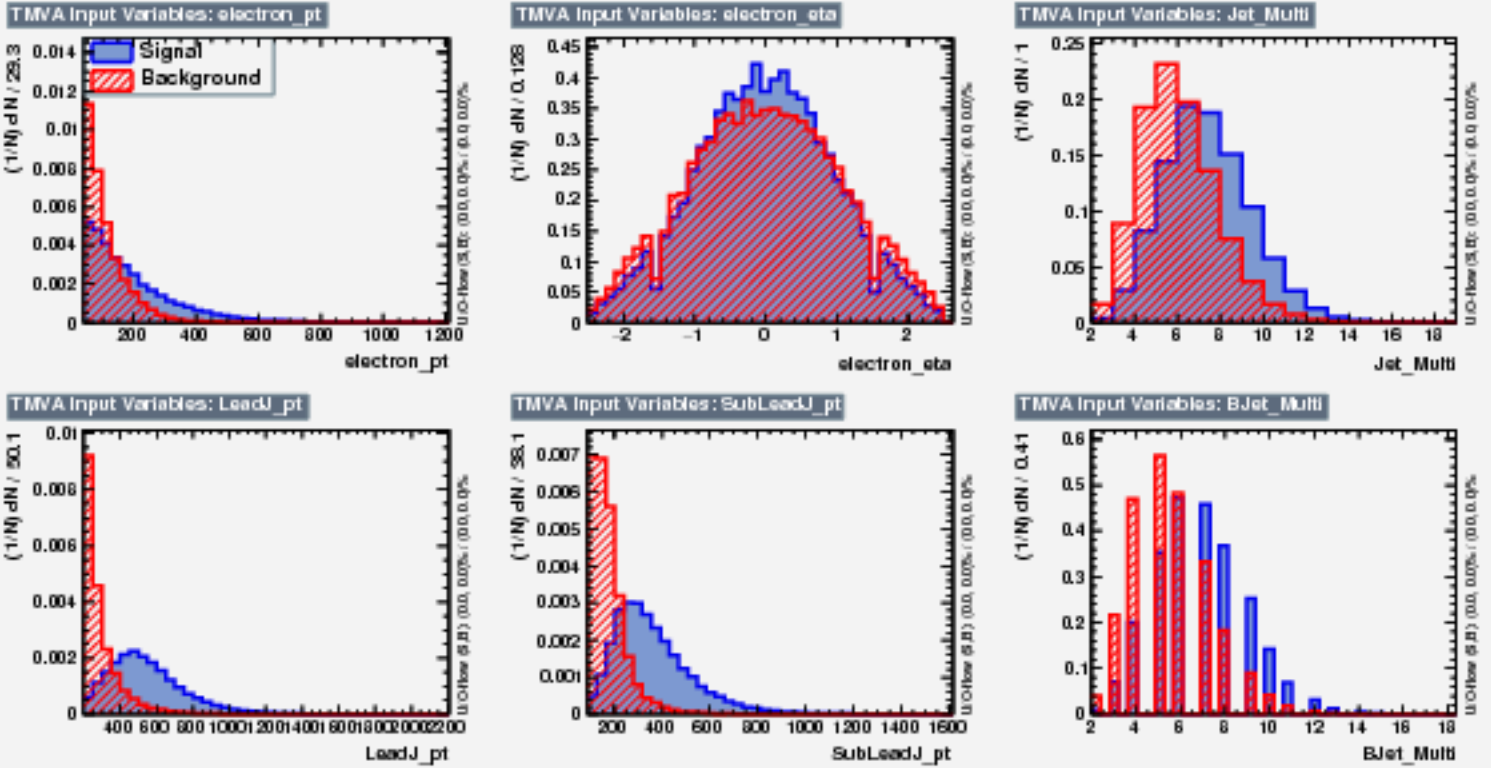
Correlation Matrix (signal)



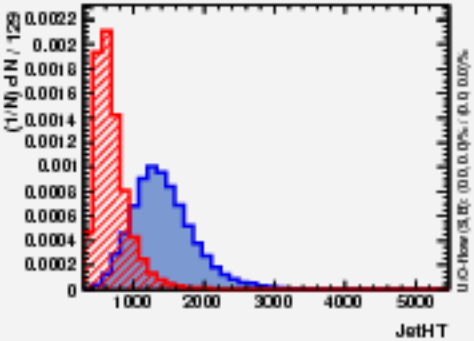

TMVA response for classifier: BDT
TMVA
Signal
Background
(1/N) dN / dx
3.5
3
2.5
2
1.5
1
0.5
0
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
BDT response
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%


TMVA overtraining check for classifier: BDT
TMVA
Signal (test sample)
Background (test sample)
Signal (training sample)
Background (training sample)
Kolmogorov-Smirnov test: signal (background) probability = 0.135 (0.411)
(1/N) dN / dx
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%
BDT response
0
0.5
1
1.5
2
2.5
3
3.5
4
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8

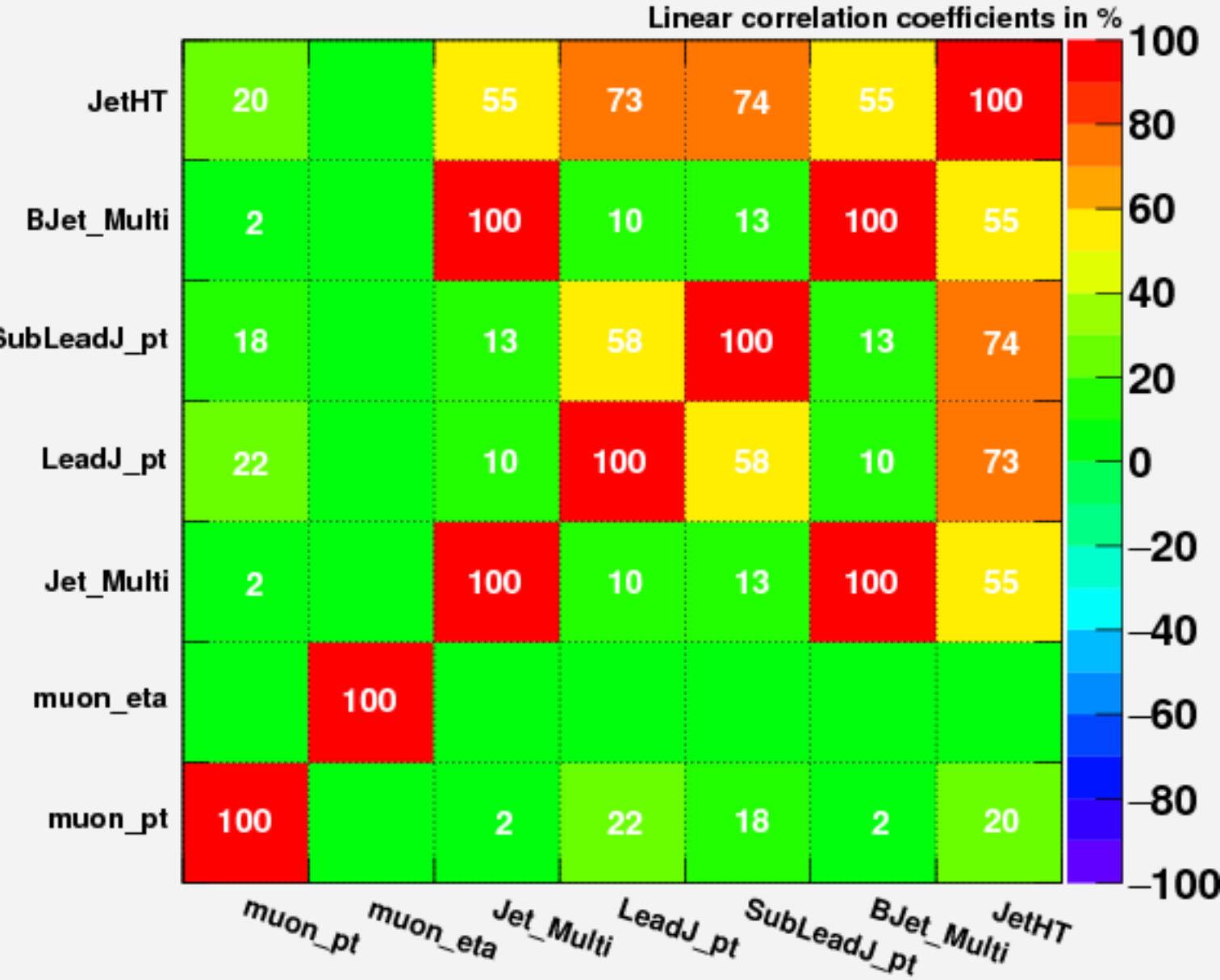

Background rejection versus Signal efficiency
TMVA
Background rejection
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Signal efficiency
MVA Method:
BDT


TMVA Input Variables: electron_pt
Signal
Background
(1/N) dN / 29.3
electron_pt
TMVA Input Variables: electron_eta
(1/N) dN / 0.128
electron_eta
TMVA Input Variables: Jet_Multi
(1/N) dN / 1
Jet_Multi
TMVA Input Variables: LeadJ_pt
(1/N) dN / 50.1
LeadJ_pt
TMVA Input Variables: SubLeadJ_pt
(1/N) dN / 38.1
SubLeadJ_pt
TMVA Input Variables: BJet_Multi
(1/N) dN / 0.41
BJet_Multi

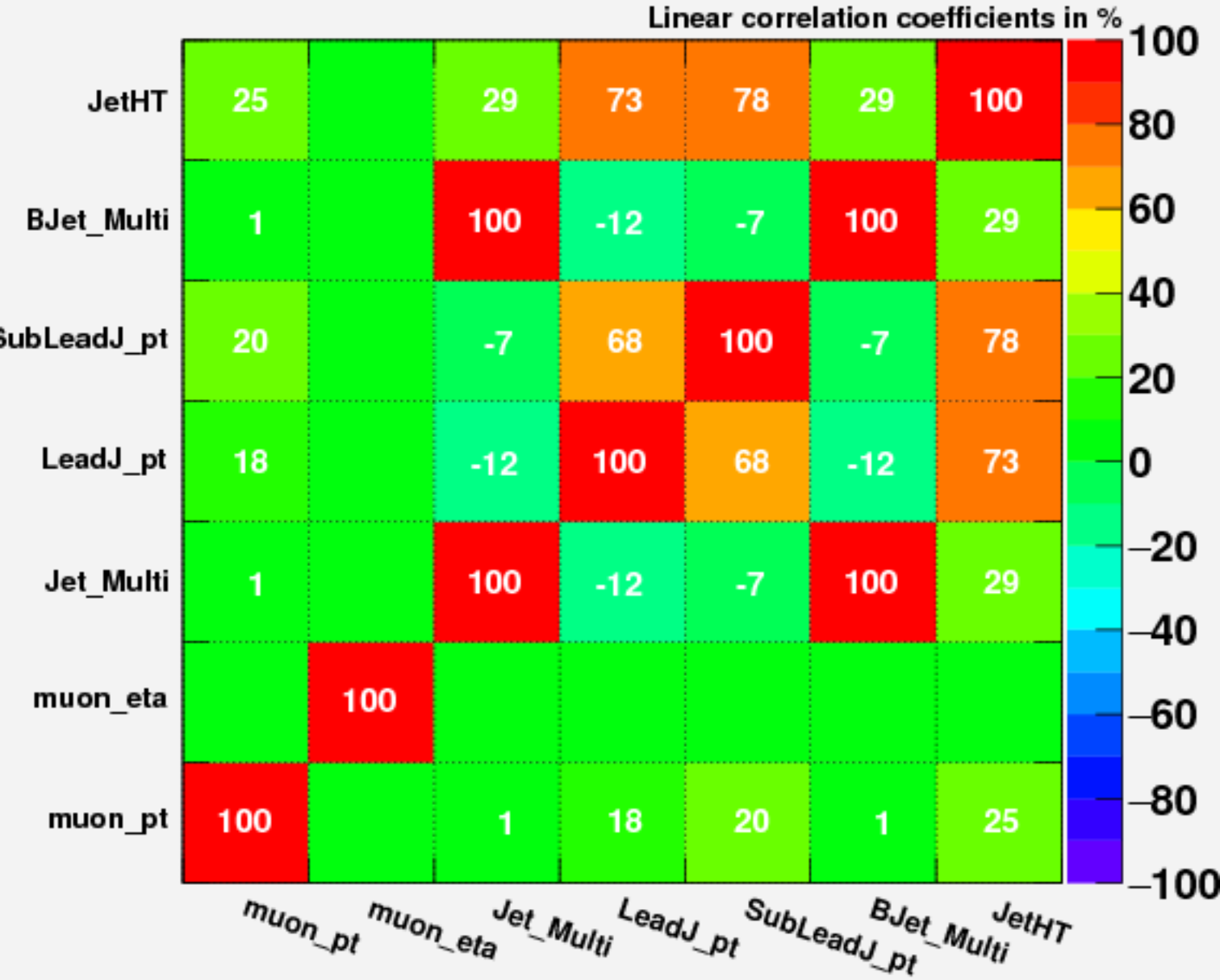
TMVA Input Variables: JetHT

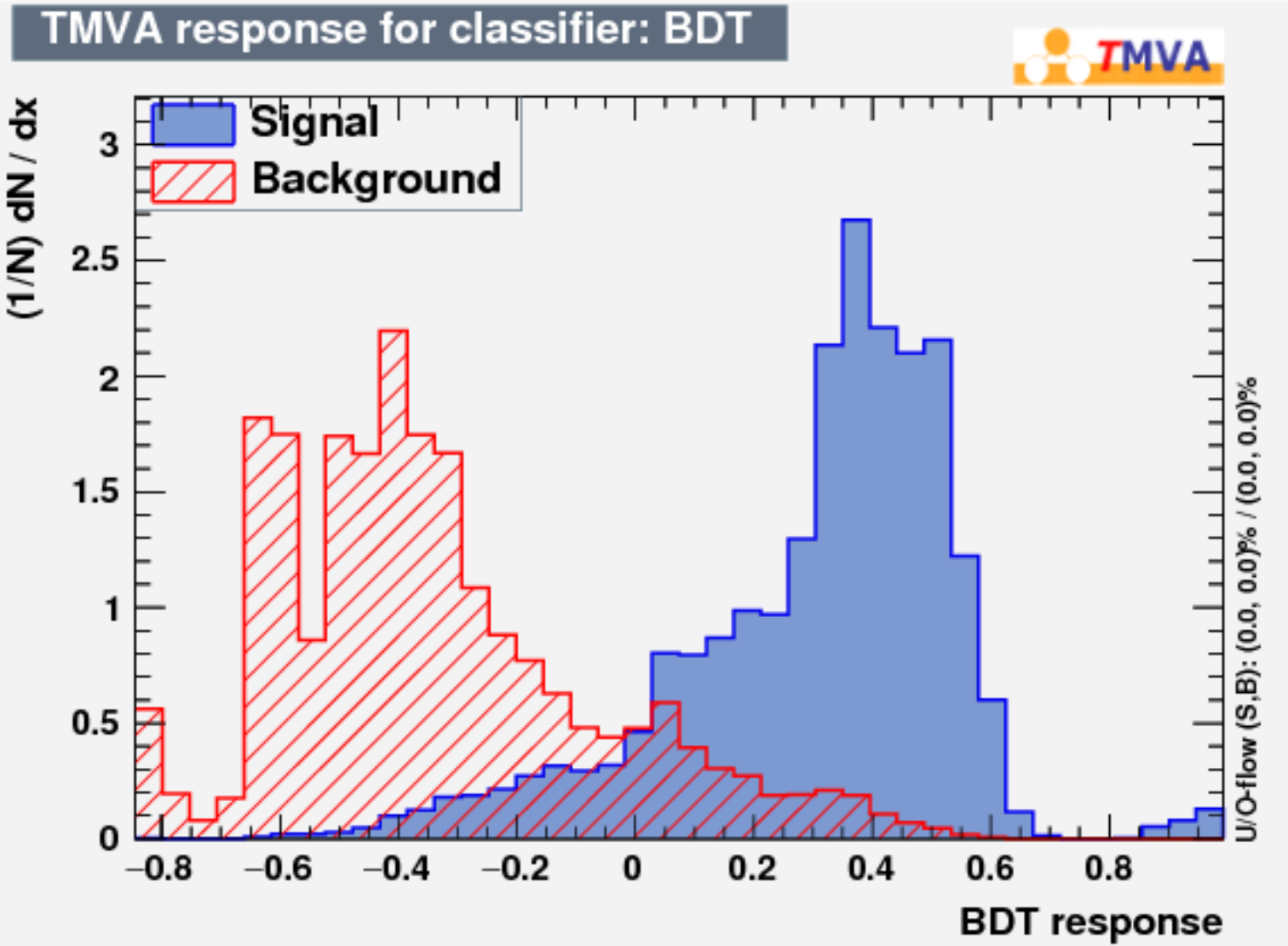


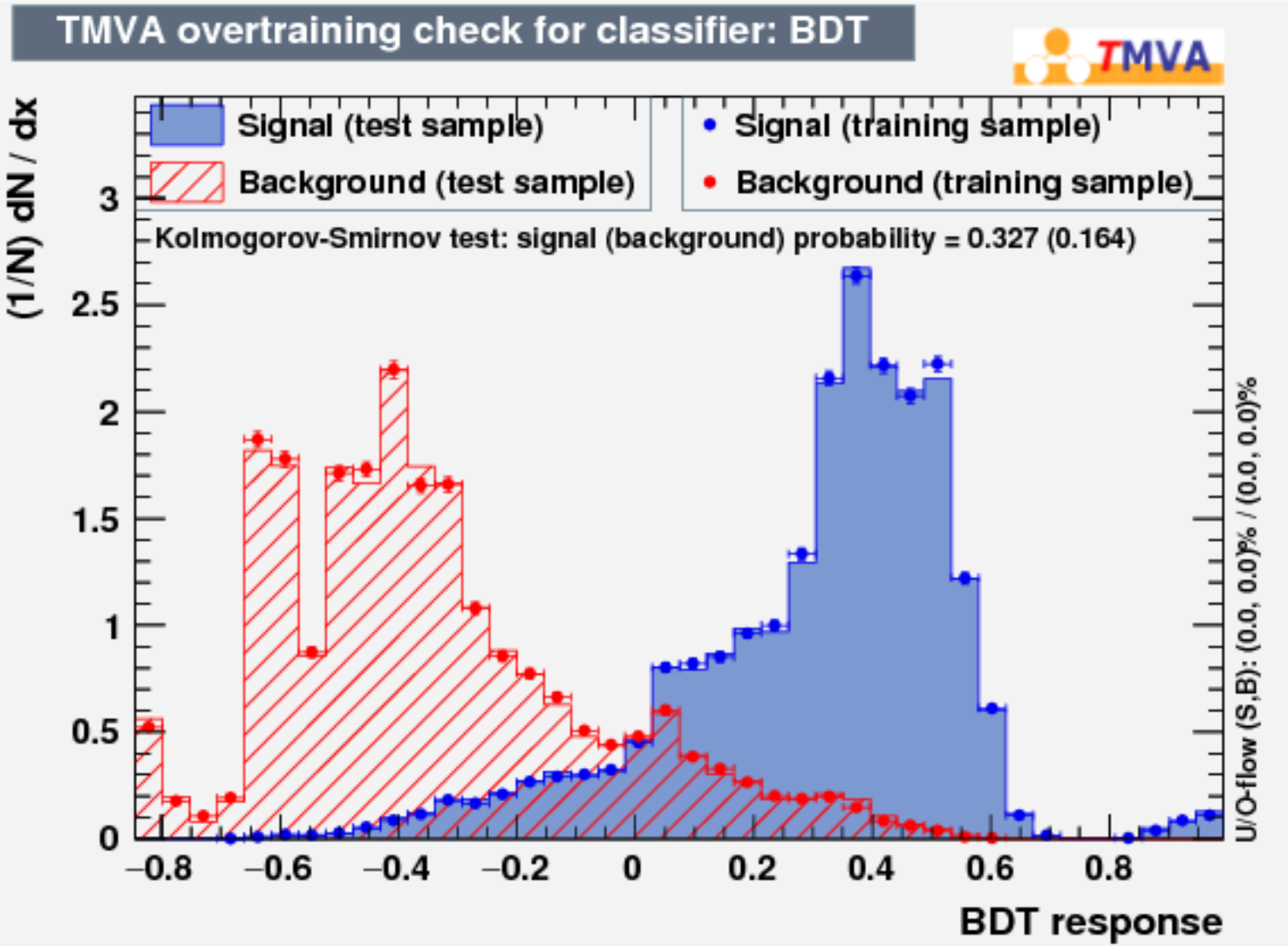
Correlation Matrix (background)

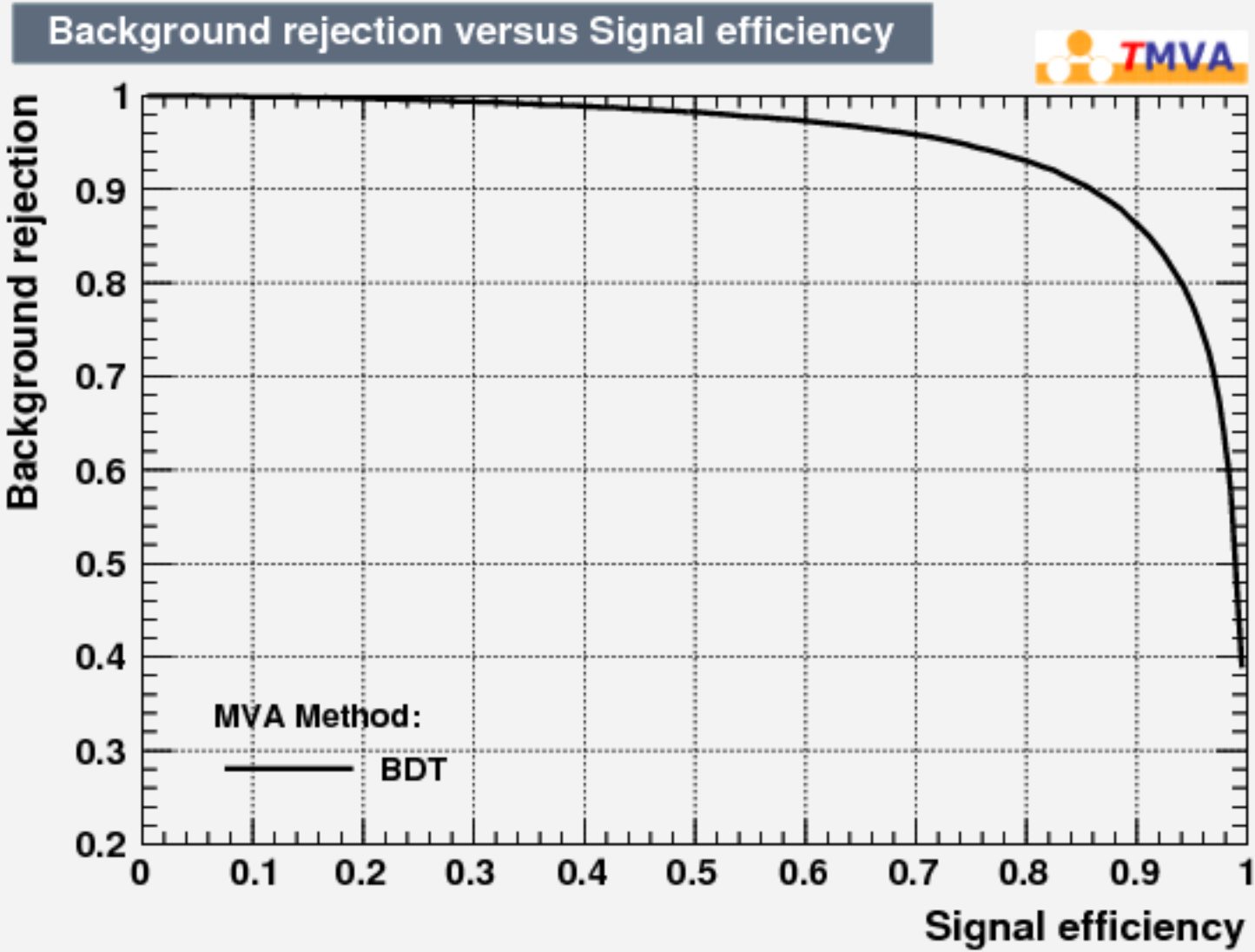


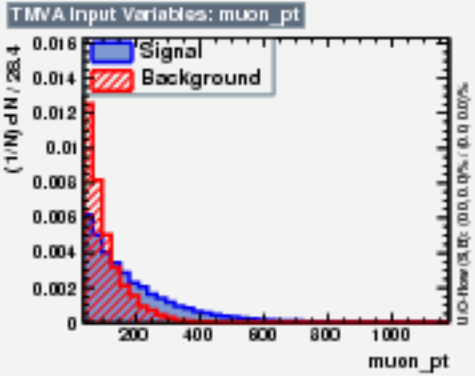
Correlation Matrix (signal)

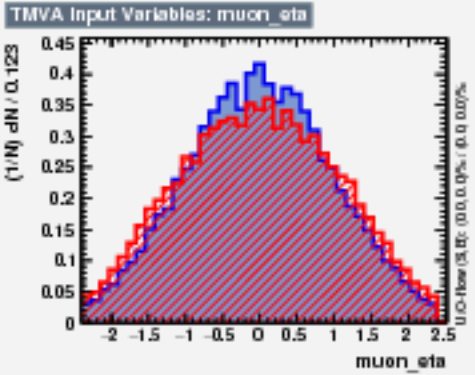


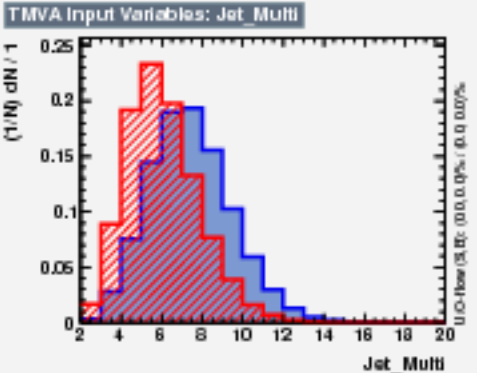

TMVA response for classifier: BDT
TMVA
Signal
Background
(1/N) dN / dx
3
2.5
2
1.5
1
0.5
0
−0.8
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
BDT response
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%

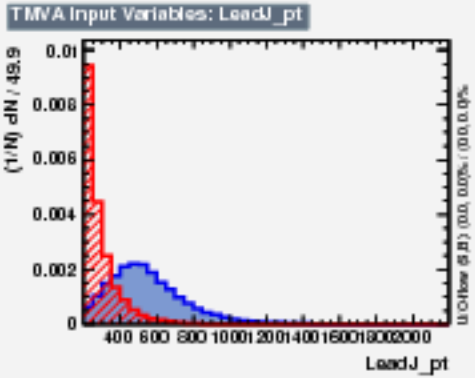

TMVA overtraining check for classifier: BDT
TMVA
Signal (test sample)
Background (test sample)
Signal (training sample)
Background (training sample)
Kolmogorov-Smirnov test: signal (background) probability = 0.327 (0.164)
(1/N) dN / dx
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%
BDT response
0
0.5
1
1.5
2
2.5
3
−0.8
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8

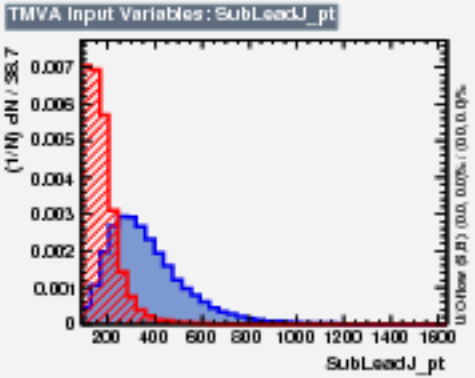

Background rejection versus Signal efficiency
TMVA
Background rejection
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Signal efficiency
MVA Method:
BDT

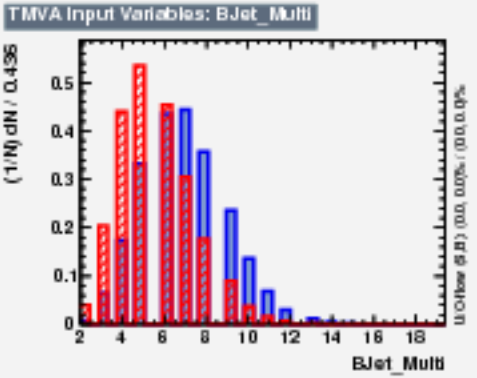
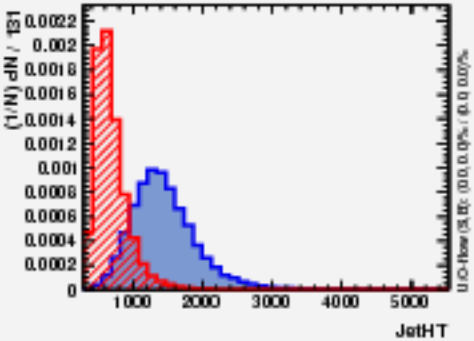

TMVA Input Variables: muon_pt
Signal
Background
(1/N) dN / 28.4
muon_pt


TMVA Input Variables: muon_eta
(1/N) dN / 0.123
muon_eta


TMVA Input Variables: Jet_Multi
(1/N) dN / 1
Jet_Multi


TMVA Input Variables: LeadJ_pt
(1/N) dN / 49.9
LeadJ_pt


TMVA Input Variables: SubLeadJ_pt
(1/N) dN / 38.7
SubLeadJ_pt


TMVA Input Variables: BJet_Multi
(1/N) dN / 0.436
BJet_Multi

TMVA Input Variables: JetHT