Weekly report

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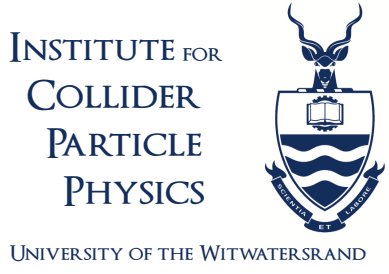
April 6, 2020

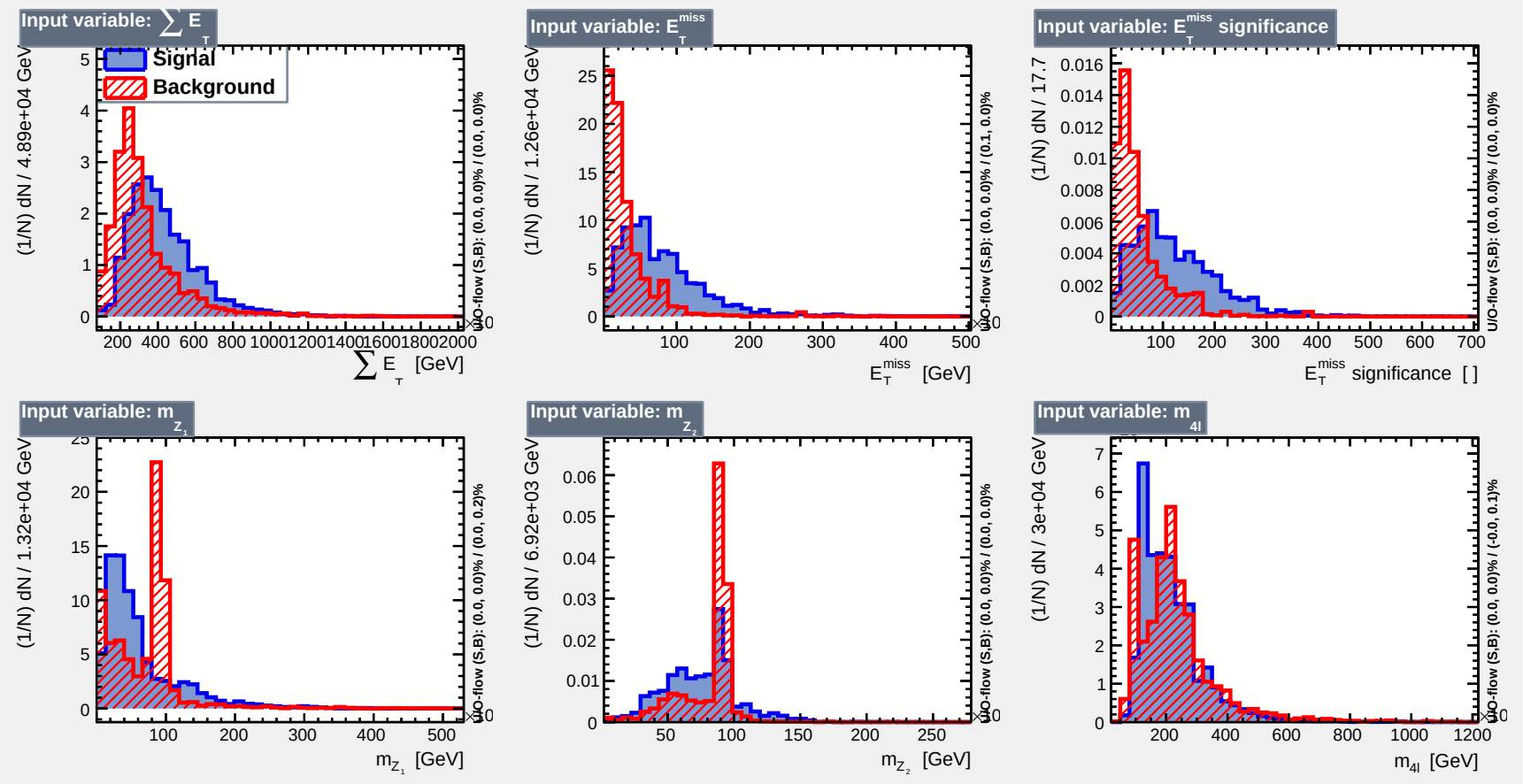


DiHiggs to multilepton analysis
TMVA

- Total number of the signal is 9268;
- Total number of background is 2065752;
- Half of the signal event used for the training and the other for testing;
- A 10k of the background used for training and another 10k for testing;

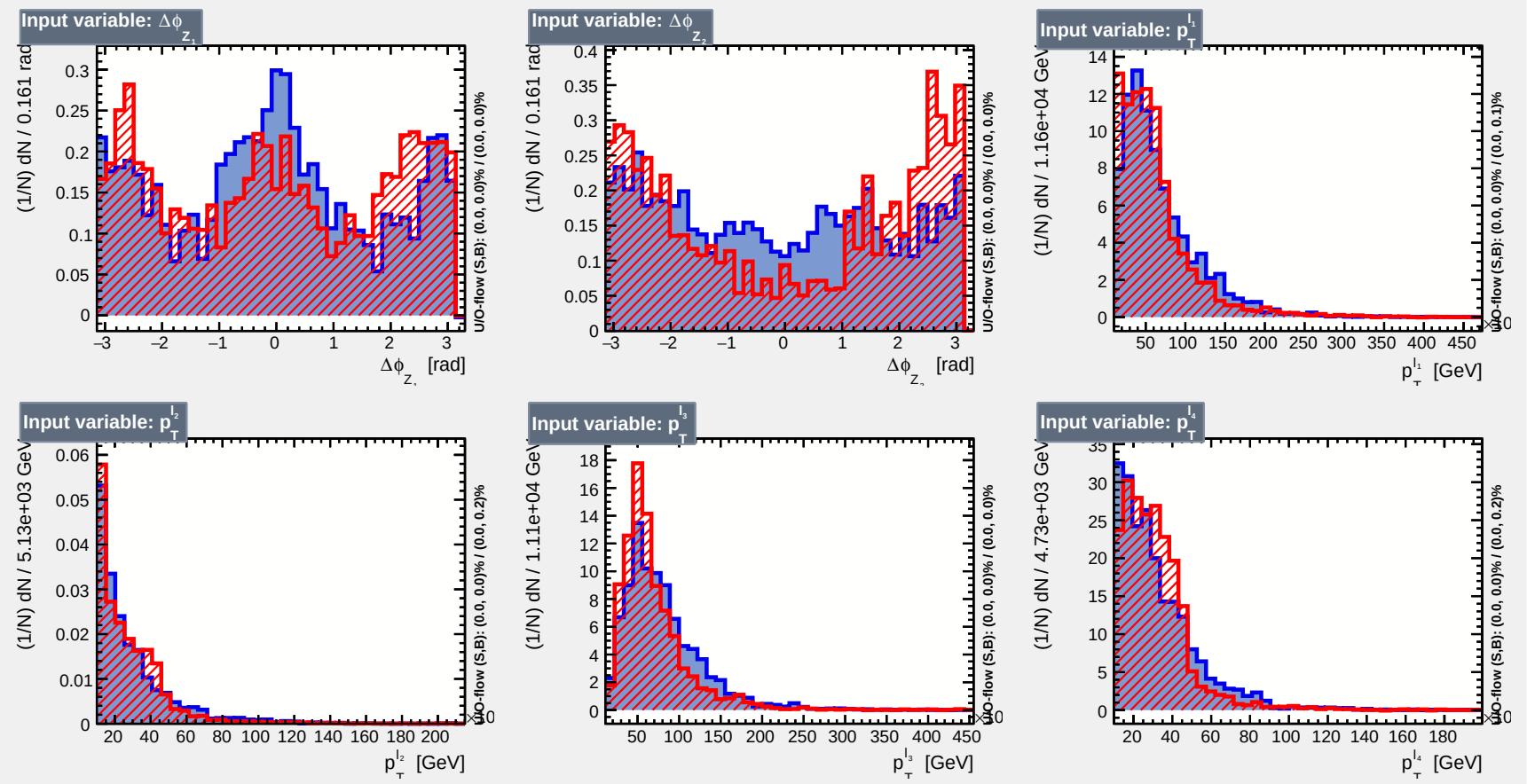
DiHiggs to multilepton analysis

TMVA: Input variables



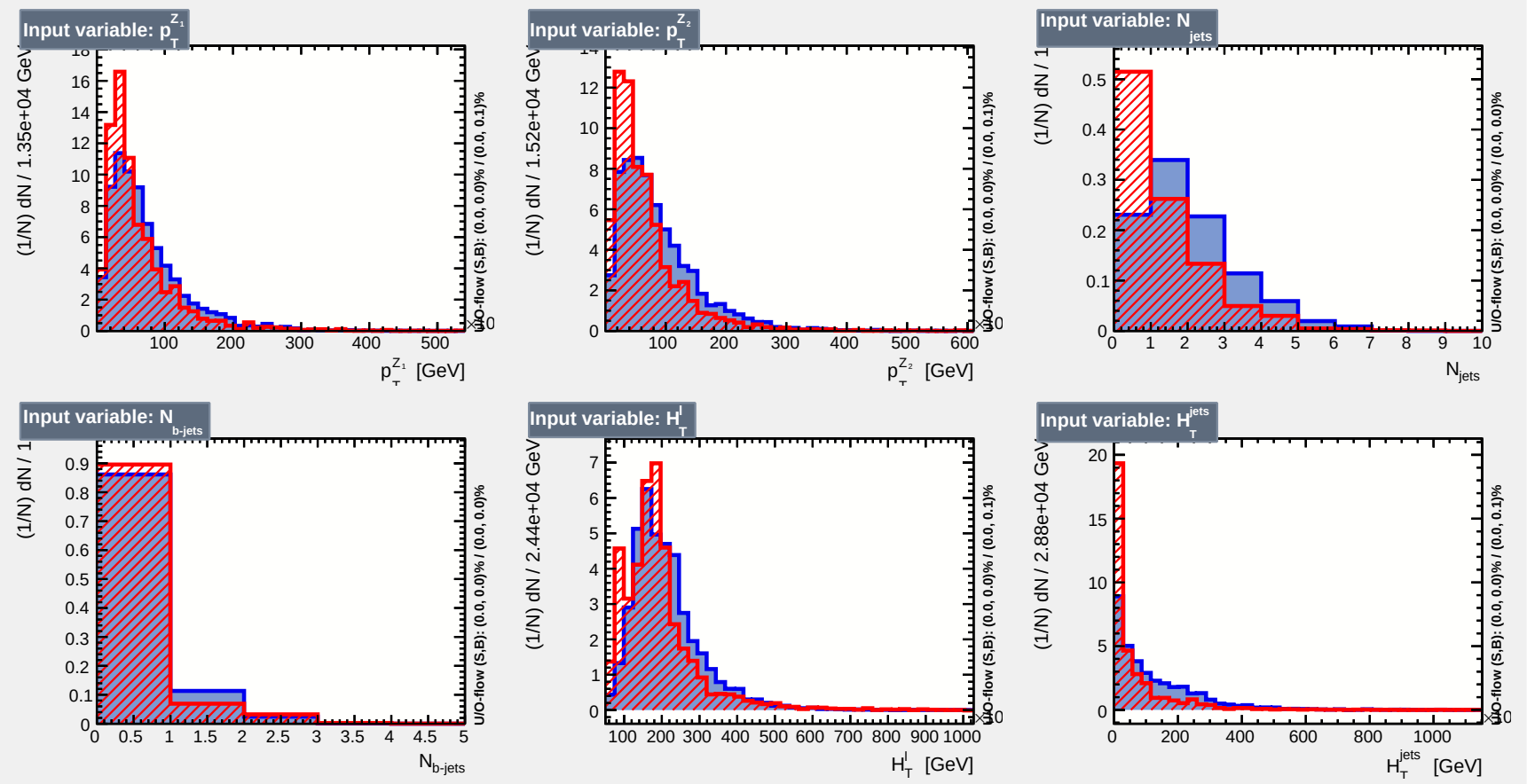
DiHiggs to multilepton analysis

TMVA: Input variables



DiHiggs to multilepton analysis

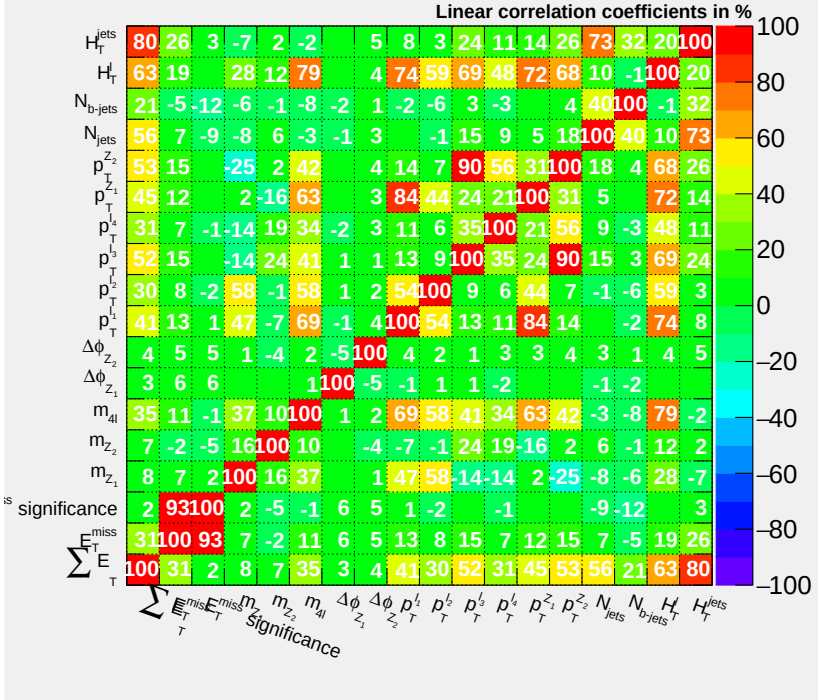
TMVA: Input variables



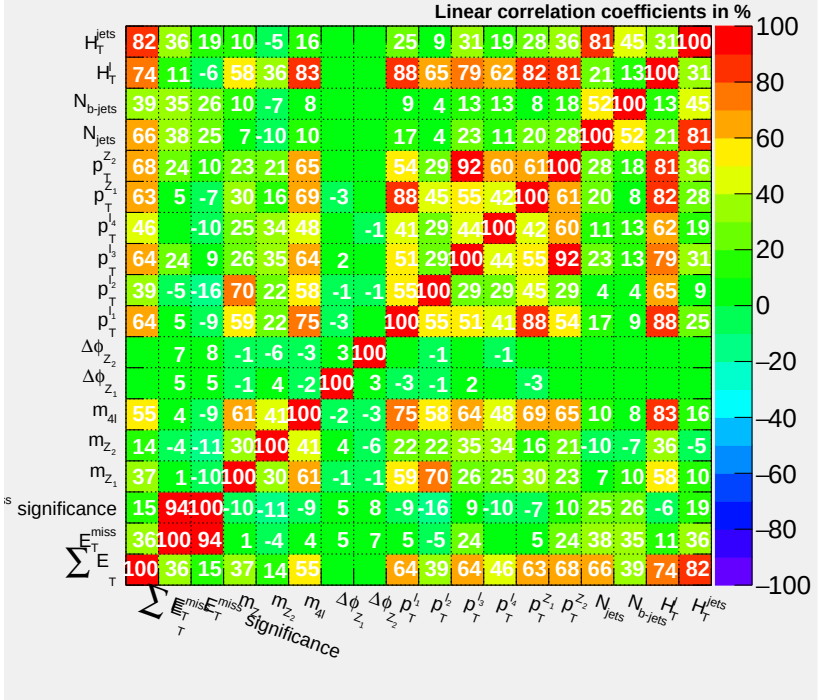
DiHiggs to multilepton analysis

TMVA: Correlation matrix

Correlation Matrix (signal)

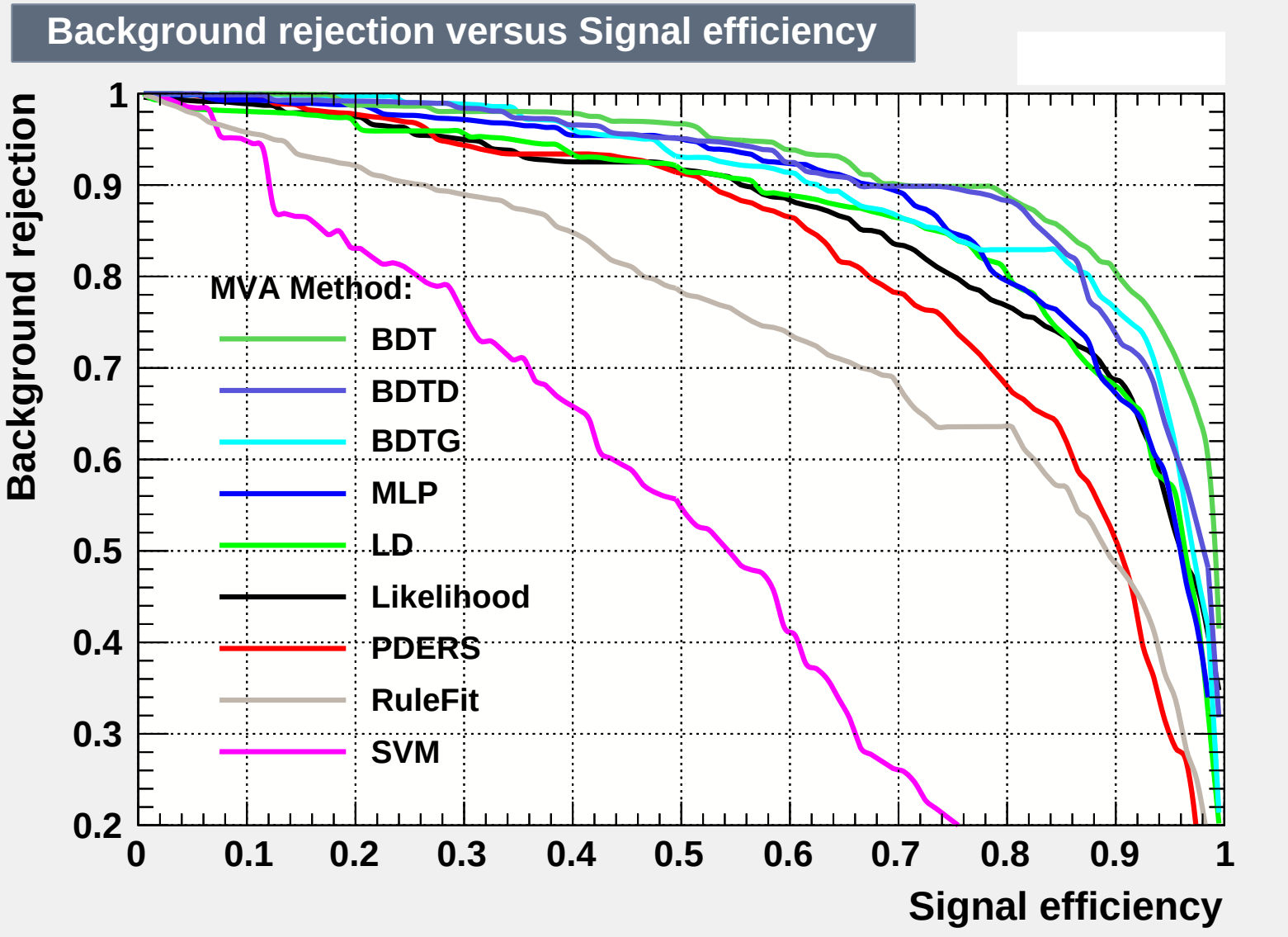


Correlation Matrix (background)



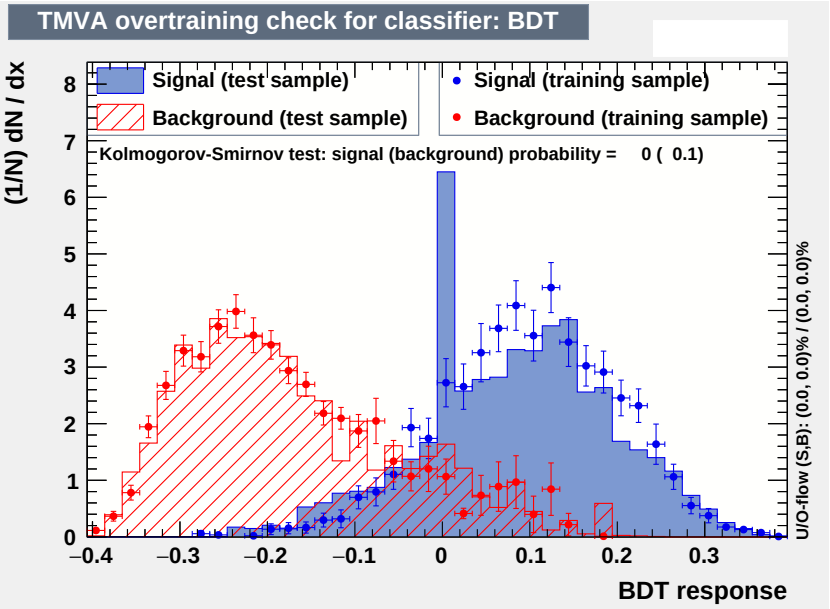
DiHiggs to multilepton analysis

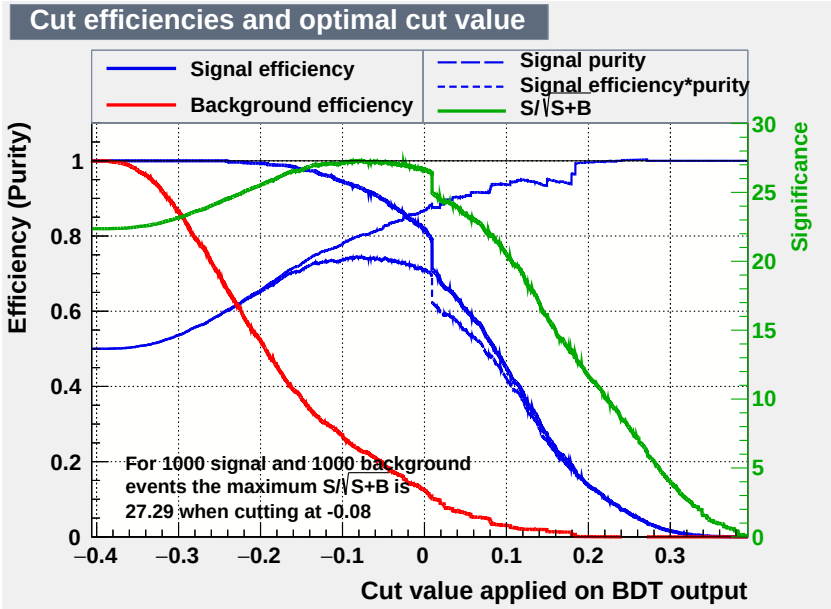
TMVA: ROC



DiHiggs to multilepton analysis

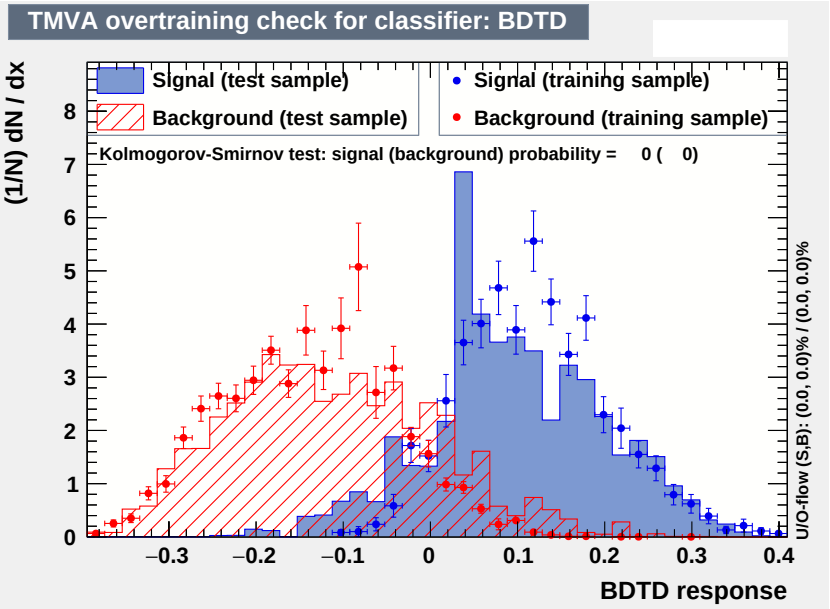
TMVA: Over training check & efficiency cut

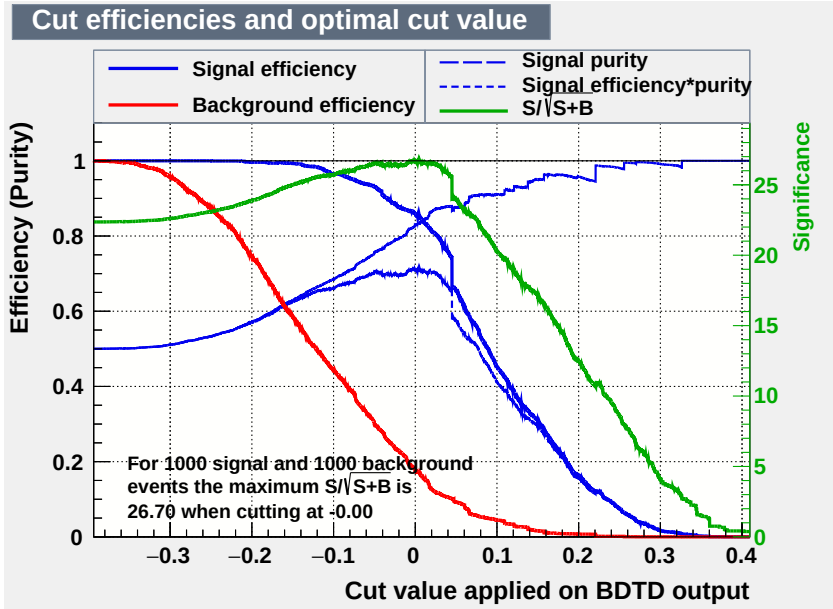




DiHiggs to multilepton analysis

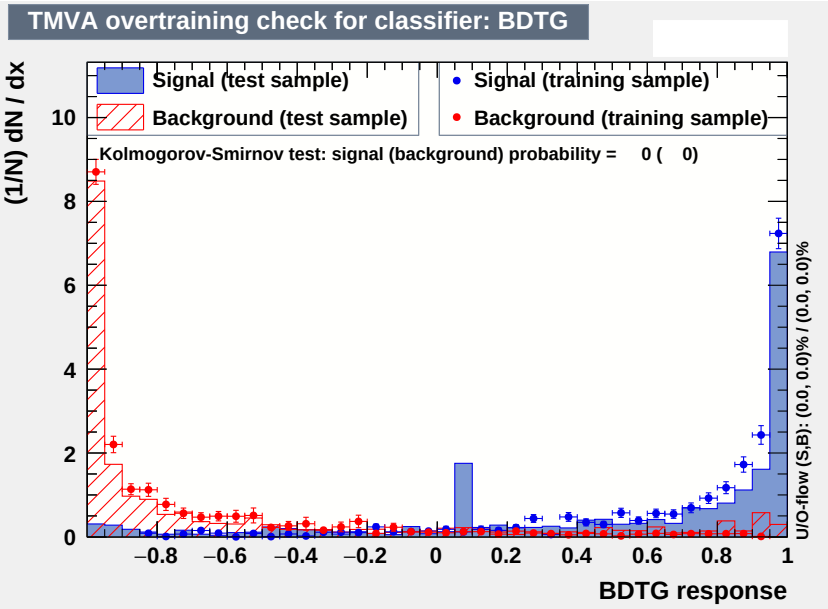
TMVA: Over training check & efficiency cut

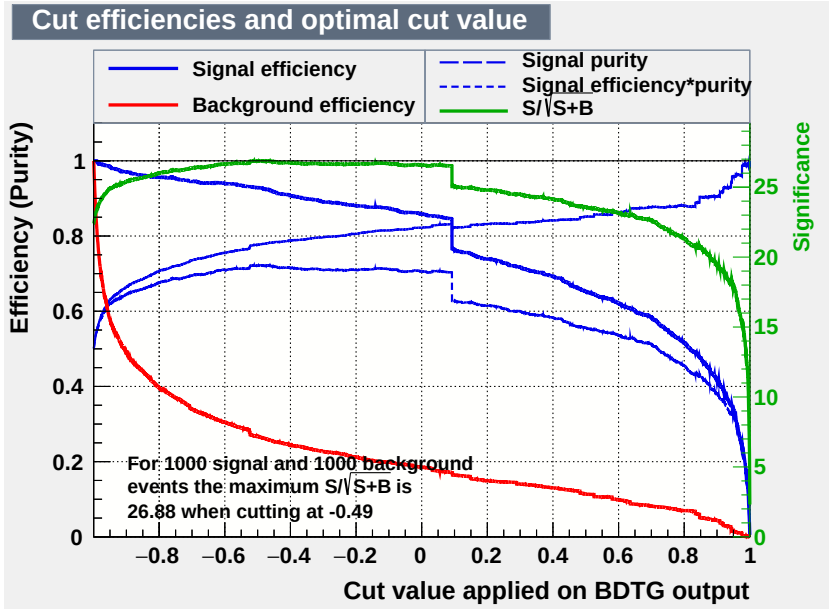




DiHiggs to multilepton analysis

TMVA: Over training check & efficiency cut





Experimental systematic uncertainties

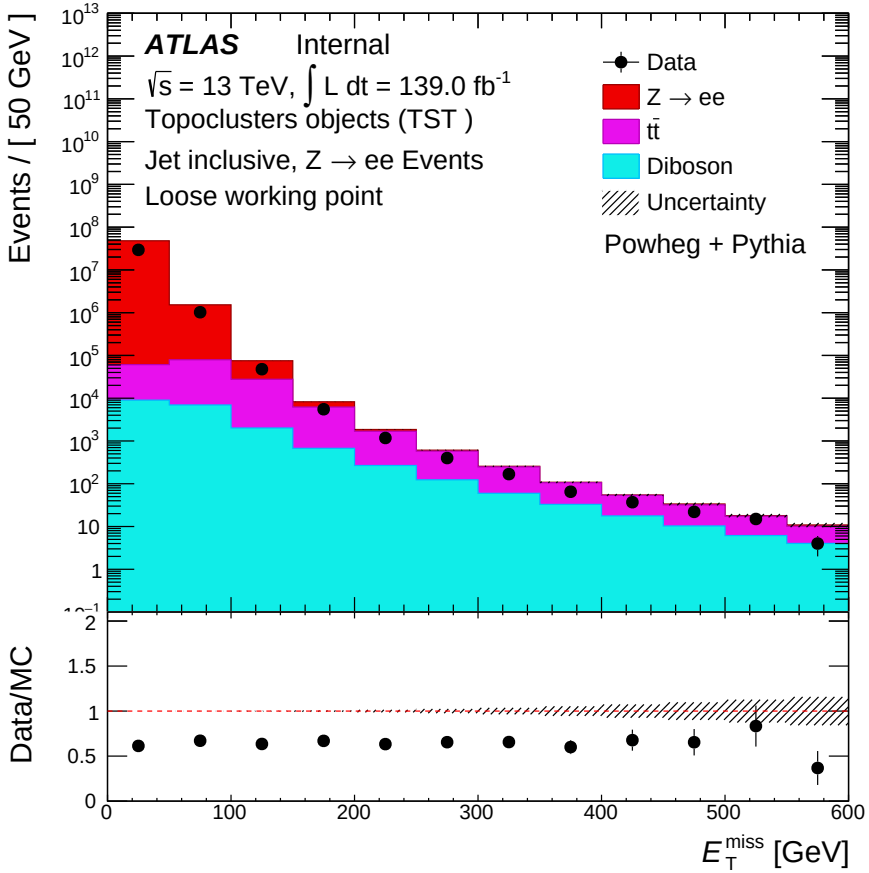
Normalisation	Shape
Electrons	
	EG_RESOLUTION_ALL
EL_EFF_ID_CorrUncertaintyNP[0-15]	EG_SCALE_ALLCORR
EL_EFF_ID_SIMPLIFIED_UncorrUncertaintyNP[0-17]	EG_SCALE_E4SCINTILLATOR
EL_EFF_Iso_TOTAL_1NPCOR_PLUS_UNCOR	EG_SCALE_LARCALIB_EXTRA2015PRE
EL_EFF_Reco_TOTAL_1NPCOR_PLUS_UNCOR	EG_SCALE_LARTEMPERATURE_EXTRA2015PRE
	EG_SCALE_LARTEMPERATURE_EXTRA2016PRE
Muons	
MUON_EFF_ISO_STAT	
MUON_EFF_ISO_SYS	
MUON_EFF_RECO_STAT	MUON_ID
MUON_EFF_RECO_STAT_LOWPT	MUON_MS
MUON_EFF_RECO_SYS	MUON_SAGITTA_RESBIAS
MUON_EFF_RECO_SYS_LOWPT	MUON_SAGITTA_RHO
MUON_EFF_TTVA_STAT	MUON_SCALE
MUON_EFF_TTVA_SYS	
Jets	
	JET_BJES_Response
	JET_EffectiveNP_[1-7]
	JET_EffectiveNP_8restTerm
	JET_EtaIntercalibration_Modelling
	JET_EtaIntercalibration_NonClosure_highE
	JET_EtaIntercalibration_NonClosure_negEta
	JET_EtaIntercalibration_NonClosure_posEta
	JET_EtaIntercalibration_TotalStat
	JET_Flavor_Composition
	JET_Flavor_Response
	JET_JER_DataVsMC
	JET_JER_EffectiveNP_[1-6]
	JET_JER_EffectiveNP_7restTerm
	JET_Pileup_OffsetMu
	JET_Pileup_OffsetNPV
	JET_Pileup_PtTerm
	JET_Pileup_RhoTopology
	JET_PunchThrough_MC16
	JET_SingleParticle_HighPt
Missing transverse energy	
	MET_SoftTrk_Reso
	MET_SoftTrk_Scale
Other	
HOEW_QCD_syst	
HOEW_syst	
HOQCD_scale_syst	
PRW_DATASF	

```
[HighMet0cjet_2mu2e]
ATLAS_EL_RES = 1.000014 1.000029
ATLAS_EL_ESCALE = 0.998069 1.001984
ATLAS_JET_BJES = 1.000002 0.999998
ATLAS_JET_EffectiveNP_1 = 0.999982 1.000047
ATLAS_JET_EffectiveNP_2 = 1.000017 1.000012
ATLAS_JET_EffectiveNP_3 = 0.999998 1.000012
ATLAS_JET_EffectiveNP_4 = 1.000001 0.999999
ATLAS_JET_EffectiveNP_5 = 1.000000 1.000000
ATLAS_JET_EffectiveNP_6 = 1.000000 1.000000
ATLAS_JET_EffectiveNP_7 = 0.999999 1.000000
ATLAS_JET_EFF_8REST = 1.000000 1.000000
ATLAS_JET_EtaIntercalibration_M = 1.000013 0.999997
ATLAS_JET_EtaIntercalibration_NonClosure_HE = 1.000000 1.000000
ATLAS_JET_EtaIntercalibration_NonClosure_NG = 0.999993 0.999995
ATLAS_JET_EtaIntercalibration_NonClosure_PO = 0.999998 1.000001
ATLAS_JET_JET_EtaIntercalibration_TotalStat = 1.000011 1.000016
ATLAS_JET_Flavor_Composition = 1.000030 1.000153
ATLAS_JET_Flavor_Response = 1.000079 1.000003
ATLAS_JET_JER_DataVsMC = 1.000025 1.000025
ATLAS_JET_JER_EffectiveNP_1 = 1.000032 1.000032
ATLAS_JET_JER_EffectiveNP_2 = 1.000034 1.000034
ATLAS_JET_JER_EffectiveNP_3 = 1.000030 1.000030
ATLAS_JET_JER_EffectiveNP_4 = 1.000053 1.000053
ATLAS_JET_JER_EffectiveNP_5 = 1.000073 1.000073
ATLAS_JET_JER_EffectiveNP_6 = 1.000028 1.000028
ATLAS_JET_JER_EffectiveNP_7RES_Term = 1.000071 1.000071
ATLAS_JET_Pileup_OffsetMu = 0.999991 1.000001
ATLAS_JET_Pileup_OffsetNPV = 0.999993 1.000052
ATLAS_JET_Pileup_PtTerm = 1.000004 0.999999
ATLAS_JET_Pileup_RhoTopology = 0.999998 1.000105
ATLAS_JET_PunchThrough = 1.000000 1.000000
ATLAS_SingleParticle_HighPt = 1.000000 1.000000
ATLAS_MET_SoftTrk_Reso = 1.000000 1.000001
ATLAS_MET_SoftTrk_Scale = 1.000002 0.999998
ATLAS_MU_MS_RES_ID = 0.999946 1.000102
ATLAS_MU_MS_RES_MS = 1.000044 1.000035
ATLAS_MU_ESCALE = 1.000251 0.999715
ATLAS_EL_EFF_ID_CorrUncertaintyNP0 = 1.000044 1.000044
ATLAS_EL_EFF_ID_CorrUncertaintyNP10 = 1.000039 1.000049
ATLAS_EL_EFF_ID_CorrUncertaintyNP11 = 1.000045 1.000043
ATLAS_EL_EFF_ID_CorrUncertaintyNP12 = 1.000045 1.000042
ATLAS_EL_EFF_ID_CorrUncertaintyNP13 = 1.000041 1.000046
```

- Still need to find a way to quantify this.

Qualification Task

Missing data when comparing the full dataset



- This could be some data is missing or there's a bug somewhere in the code.

Thank you!