



Weekly update

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June 15, 2020



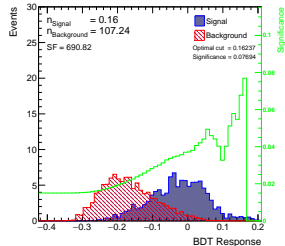
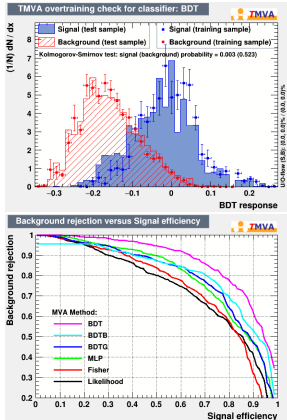
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TMV Classification

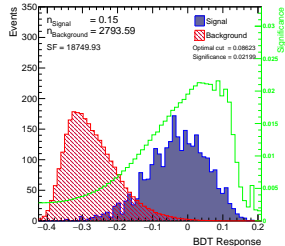
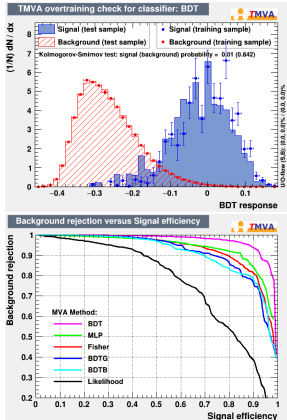
Over-training check and efficiency cut: 0/1-SFOS



After applying the TMVA weight

TMV Classification

Over-training check and efficiency cut: 2-SFOS



After applying the TMVA weight

Theodota Lagouri

She's looking for students to co-supervise on the following projects:

- HIGGS-HZZ: off-shell high mass studies
- HDBS-HRLS: Zdark studies.



Thank you!



Additional slides

Cut-based optimisation

	Non-Res	qq → ZZ'	gg → ZZ'	qq → ZZ'(E,W)	ttV	tt	VVV	Z+jets	WZ	Significance
Weighted events	7444.81	2.39578e+07	1.38448e+06	3.72681e-07	412492	1.31915e+11	1262.01	1.12627e+12	1.16574e+08	-
4 σ	0.85±0.02	5757.21±8.79	34.54±0.07	105.95±31.45	336.93±1.46	3008.11±11.12	43.79±0.25	3471.90±37.51	172.34±1.78	0.0057±0.0004
$\sum_i Q = 0$	0.61±0.02	5569.18±8.60	34.05±0.07	104.49±31.45	284.19±1.32	2375.62±9.88	40.84±0.25	3099.05±35.45	105.00±1.39	0.0056±0.0004
Trigger	0.58±0.01	5271.19±8.43	31.74±0.06	102.53±31.45	279.83±1.31	2141.38±9.38	40.62±0.25	2720.63±33.36	98.05±1.35	0.0056±0.0004
Trigger Match	0.50±0.01	4265.14±7.38	26.20±0.05	88.84±31.45	244.59±1.22	1697.73±8.39	36.02±0.24	1893.38±25.40	80.05±1.22	0.0055±0.0004
$p_{T,1} > 10$ GeV	0.47±0.01	3931.09±7.05	24.38±0.05	84.86±31.45	228.46±1.18	1529.54±7.96	33.33±0.23	1665.66±23.89	70.64±1.15	0.0054±0.0004
$ \eta $ requirement	0.43±0.01	3638.35±6.80	23.32±0.05	81.29±31.45	215.19±1.14	1173.70±6.97	32.45±0.23	1081.73±19.21	56.44±1.03	0.0054±0.0005
Loose ID	0.43±0.01	3638.35±6.80	23.32±0.05	81.29±31.45	215.19±1.14	1173.70±6.97	32.45±0.23	1081.73±19.21	56.44±1.03	0.0054±0.0005
Loose ISO	0.33±0.01	3077.37±6.22	20.99±0.05	38.40±0.29	161.03±0.96	37.52±1.24	29.67±0.22	43.27±3.95	13.88±1.01	0.0057±0.0000
$m_{T,1}(\text{SFOS}) > 12$ GeV	0.32±0.01	2783.11±6.03	20.50±0.04	36.31±0.28	156.73±0.94	25.82±1.03	29.46±0.22	16.73±2.45	13.20±0.50	0.0058±0.0000
0-SFOS	0.02±0.00	0.05±0.02	0.00±0.00	0.00±0.00	0.53±0.07	2.97±0.36	0.06±0.01	0.00±0.00	0.02±0.02	0.0121±0.0002
1-SFOS	0.14±0.01	42.62±0.71	0.23±0.00	0.48±0.03	81.25±0.68	11.93±0.70	13.88±0.18	9.70±1.75	6.91±0.36	0.0107±0.0001
2-SFOS	0.16±0.01	2740.44±5.98	20.27±0.04	35.83±0.28	74.96±0.65	10.91±0.67	15.51±0.13	7.03±1.72	6.27±0.34	0.0300±0.0000
0/1-SFOS	0.16±0.01	42.67±0.71	0.23±0.00	0.48±0.03	81.77±0.68	14.90±0.78	13.95±0.18	9.70±1.75	6.94±0.36	0.0123±0.0001
b-veto	0.16±0.01	41.46±0.70	0.23±0.00	0.45±0.03	22.55±0.36	13.08±0.73	13.63±0.18	9.11±1.70	6.74±0.36	0.0150±0.0002
$m_{Z_1} > 10$ GeV	0.15±0.01	40.76±0.70	0.22±0.00	0.45±0.03	22.47±0.36	12.90±0.73	13.59±0.18	8.47±1.64	6.47±0.35	0.0149±0.0002
$m_{Z_2} - m_{Z_1} < 15$ GeV	0.06±0.00	35.78±0.64	0.21±0.00	0.38±0.02	19.22±0.33	4.66±0.44	12.68±0.18	7.95±1.60	5.33±0.32	0.0063±0.0001
$m_{Z_2} - m_{Z_1} < 20$ GeV	0.07±0.00	36.96±0.66	0.21±0.00	0.38±0.02	19.77±0.34	6.02±0.49	12.97±0.18	8.13±1.61	5.71±0.33	0.0073±0.0001
$m_{Z_2} - m_{Z_1} < 25$ GeV	0.08±0.00	37.75±0.66	0.21±0.00	0.39±0.02	20.22±0.34	7.51±0.55	13.14±0.18	8.47±1.64	5.91±0.33	0.0085±0.0001
$E_{T,miss} > 10$ GeV	0.08±0.00	35.38±0.65	0.20±0.00	0.39±0.02	20.01±0.34	7.43±0.55	12.94±0.18	7.64±1.57	5.76±0.33	0.0086±0.0001
$E_{T,miss} > 20$ GeV	0.08±0.00	29.86±0.60	0.16±0.00	0.36±0.02	19.36±0.33	6.98±0.53	12.43±0.18	5.68±1.38	5.38±0.32	0.0087±0.0001
$E_{T,miss} > 30$ GeV	0.07±0.00	23.79±0.53	0.13±0.00	0.32±0.02	18.31±0.33	6.30±0.50	11.62±0.17	3.63±1.13	4.74±0.30	0.0089±0.0001
$ m_{Z_2} - m_{Z_1} > 15$ GeV	0.10±0.00	4.99±0.26	0.02±0.00	0.07±0.01	3.25±0.15	8.24±0.59	0.92±0.03	0.52±0.38	1.14±0.15	0.0218±0.0002
$ m_{Z_2} - m_{Z_1} > 20$ GeV	0.08±0.00	3.81±0.23	0.01±0.00	0.06±0.01	2.70±0.13	6.88±0.54	0.62±0.03	0.34±0.34	0.76±0.12	0.0215±0.0002
$ m_{Z_2} - m_{Z_1} > 25$ GeV	0.07±0.00	3.01±0.21	0.01±0.00	0.05±0.01	2.25±0.12	5.39±0.48	0.45±0.02	0.00±0.00	0.56±0.10	0.0208±0.0002
$E_{T,miss} > 10$ GeV	0.07±0.00	2.66±0.20	0.01±0.00	0.05±0.01	2.21±0.12	5.30±0.48	0.45±0.02	0.00±0.00	0.56±0.10	0.0210±0.0002
$E_{T,miss} > 20$ GeV	0.08±0.00	2.74±0.20	0.01±0.00	0.06±0.01	2.54±0.13	6.53±0.53	0.59±0.03	0.00±0.00	0.69±0.11	0.0222±0.0002
$E_{T,miss} > 30$ GeV	0.08±0.00	2.22±0.18	0.01±0.00	0.04±0.01	2.42±0.13	5.97±0.50	0.55±0.03	0.00±0.00	0.61±0.11	0.0219±0.0002
$E_{T,miss} > 40$ GeV	0.07±0.00	1.76±0.16	0.00±0.00	0.04±0.01	2.21±0.12	5.31±0.48	0.50±0.03	0.00±0.00	0.53±0.10	0.0209±0.0002
$E_{T,miss} > 50$ GeV	0.06±0.00	1.50±0.14	0.00±0.00	0.03±0.01	2.03±0.12	4.65±0.45	0.46±0.02	0.00±0.00	0.47±0.09	0.0196±0.0002
2-SFOS	0.16±0.01	2740.44±5.98	20.27±0.04	35.83±0.28	74.96±0.65	10.91±0.67	15.51±0.13	7.03±1.72	6.27±0.34	0.0300±0.0000
b-veto	0.15±0.01	2682.22±5.95	19.92±0.04	34.43±0.27	21.06±0.35	9.16±0.61	15.15±0.12	6.84±1.71	6.04±0.33	0.0028±0.0000
$m_{Z_1} > 10$ GeV	0.15±0.01	2682.22±5.95	19.92±0.04	34.43±0.27	21.06±0.35	9.16±0.61	15.15±0.12	6.84±1.71	6.04±0.33	0.0028±0.0000
$ m_{Z_2} - m_{Z_1} > 15$ GeV	0.14±0.00	744.32±2.99	4.38±0.03	14.32±0.18	17.88±0.32	8.72±0.60	10.56±0.11	6.29±1.66	5.26±0.31	0.0050±0.0000
$ m_{Z_2} - m_{Z_1} > 20$ GeV	0.14±0.00	647.63±2.78	3.69±0.03	13.39±0.17	16.60±0.31	8.36±0.58	9.79±0.11	5.77±1.62	4.95±0.30	0.0053±0.0000
$ m_{Z_2} - m_{Z_1} > 25$ GeV	0.14±0.00	581.95±2.67	3.24±0.03	12.73±0.17	15.34±0.30	7.69±0.56	9.08±0.11	5.77±1.62	4.51±0.29	0.0054±0.0000
$E_{T,miss} > 10$ GeV	0.13±0.00	432.11±2.41	2.67±0.02	11.26±0.16	15.22±0.29	7.52±0.55	8.97±0.10	4.63±1.47	4.38±0.29	0.0061±0.0000
$E_{T,miss} > 20$ GeV	0.13±0.00	261.19±1.61	1.72±0.02	8.23±0.15	14.84±0.29	7.11±0.54	8.58±0.10	2.81±1.26	3.97±0.27	0.0071±0.0000
$E_{T,miss} > 30$ GeV	0.11±0.00	152.45±1.24	1.02±0.01	5.42±0.13	14.07±0.28	6.74±0.52	7.97±0.10	0.76±0.80	3.29±0.25	0.0082±0.0000
$E_{T,miss} > 40$ GeV	0.10±0.00	87.54±0.98	0.58±0.01	3.30±0.07	13.20±0.27	5.85±0.49	7.26±0.09	0.95±0.51	2.53±0.22	0.0093±0.0000
$E_{T,miss} > 50$ GeV	0.09±0.00	51.89±0.68	0.33±0.01	2.06±0.05	12.07±0.26	5.24±0.46	6.52±0.09	0.33±0.33	1.97±0.19	0.0100±0.0000