

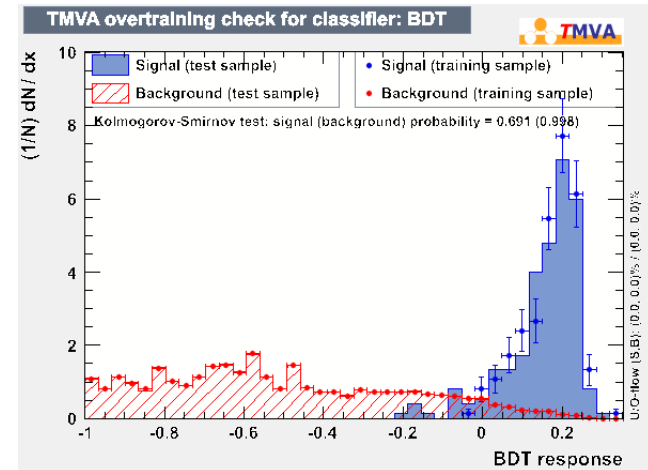
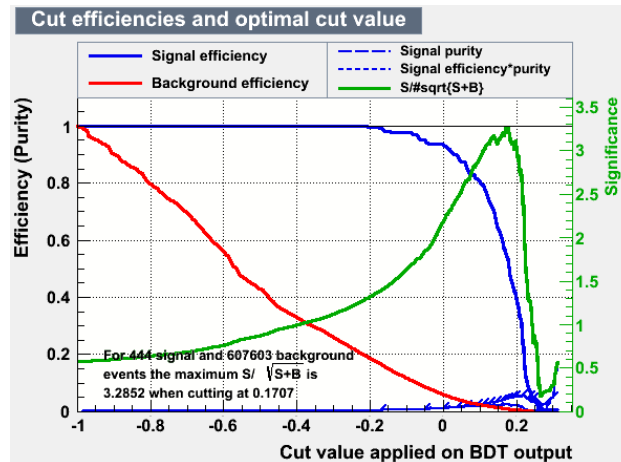
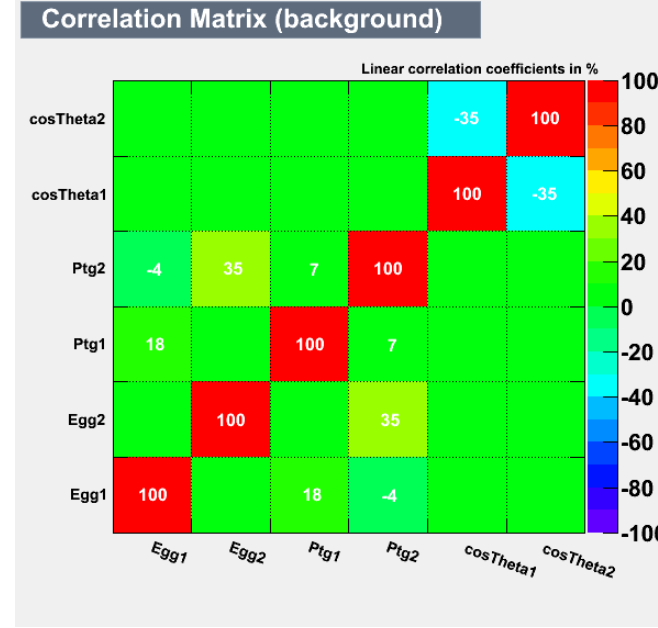
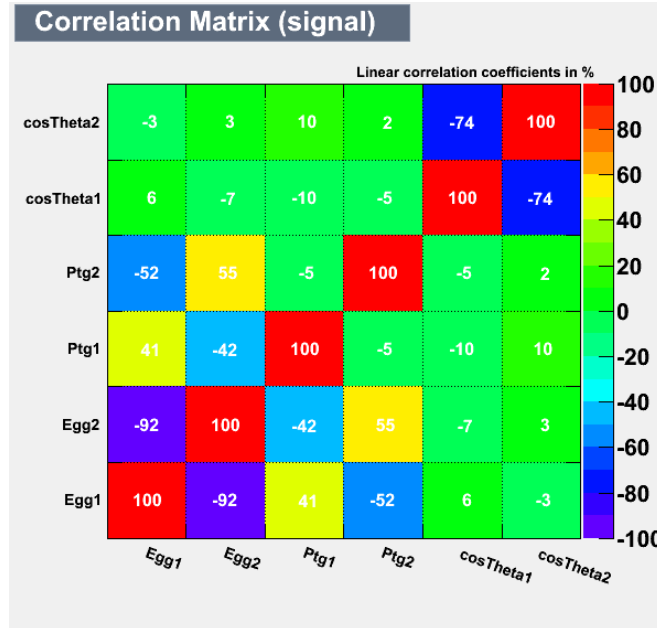
# Weekly meeting

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IHEP, Beijing

October 1, 2014

# result after training



# TMVA-BDT selection with $\text{BDT} \geq 0.15$

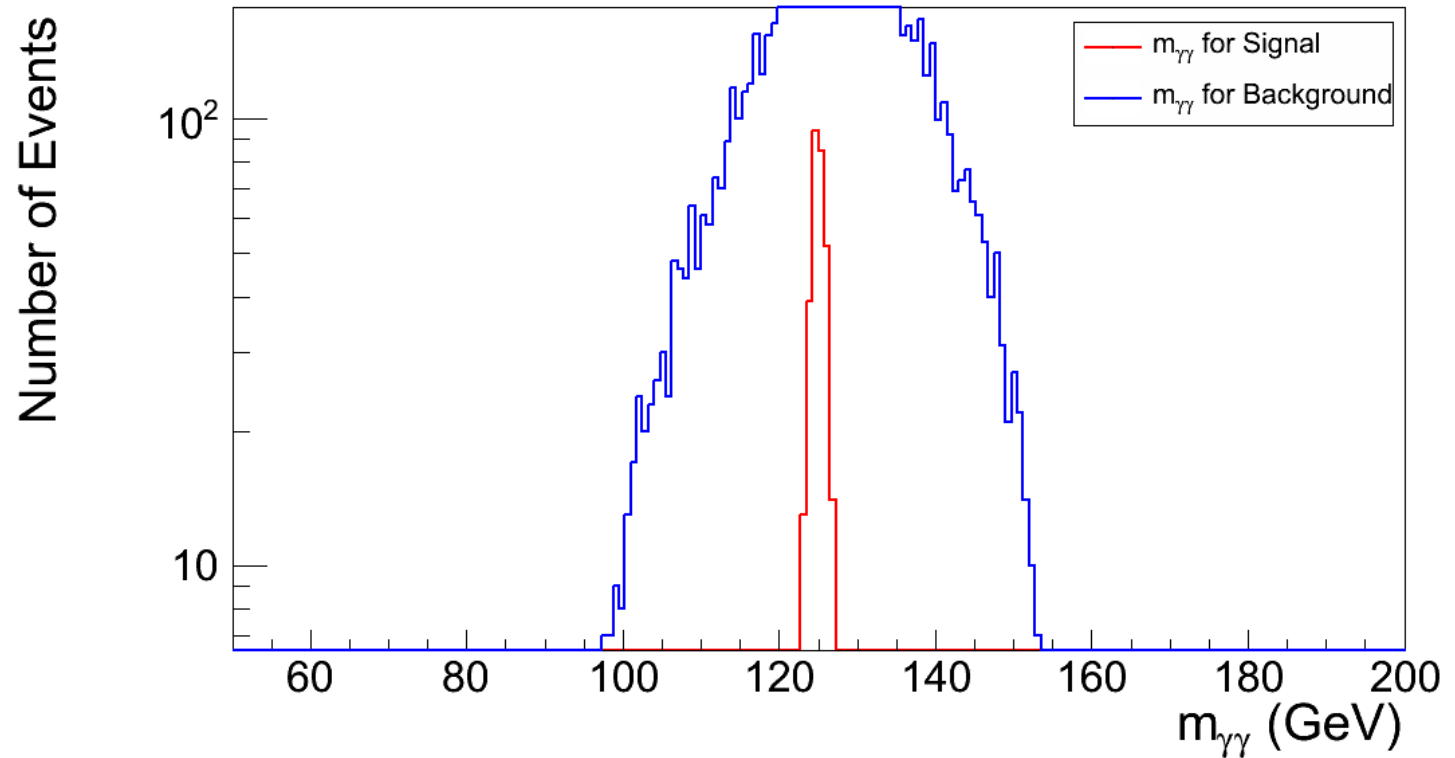
- $N = L * \sigma * \epsilon$
- *From the right diagram, we can get:*
- $\epsilon[\text{signal}] = 297/444 = 0.67$
- $\epsilon[\text{bkg}] = 7956/607603 = 0.013$
- $L = 4000 \text{fb}^{-1}$  (get it from graph in the next slide)

```
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=====
Signal events: 444
BG events: 607603
num_signal:297
num_bkg:7956
root [1] Info in <TCanvas::Print>: png file /scratchfs/...
root [1]
root [1]
root [1]
root [1]
root [1]
root [1]
root [1]
root [1]
root [1]
root [1]
root [1]
root [1]
```

# The cross section in this two samples

	Pol.	nnH	nnaa
Cross section	eLpR	128.63997	398.025
	eRpL	65.098189	209.5782
	No pol	48.4345	151.9008
Events	eLpR	--	--
	eRpL	--	--
	total (4000 fb <sup>-1</sup> )	193738	607603
	total (5000 fb <sup>-1</sup> )	242173	759504

# The result after the BDT selection



# TMVA

$$N[\text{signal}] = 4000 * 48.4345 * 0.67 * 0.228\% = 296$$

$$N[\text{bkg}] = 4000 * 151.9008 * 0.013 = 7956$$

The significance is

$$\frac{S}{\sqrt{S+B}} = \frac{N[\text{signal}]}{\sqrt{N[\text{signal}] + N[\text{bkg}]}} = \frac{296}{91} = 3.25$$

# The mu and its uncertainty

```
FCN=-314174 FROM MINOS      STATUS=PROBLEMS      26609 CALLS      245951 TOTAL
                        EDM=0.000106961      STRATEGY= 2      ERR MATRIX NOT POS-DEF
EXT PARAMETER              PARABOLIC              MINOS ERRORS
NO.  NAME      VALUE      ERROR      NEGATIVE      POSITIVE
 1  mu      1.29471e+00  2.24871e-01
 2  nbkg_VBF_loose  3.97199e+02  1.78024e+01
 3  nbkg_VBF_tight  6.09225e+01  7.03659e+00
 4  nbkg_VH_MET    3.30756e+01  5.15519e+00
 5  nbkg_VH_dilepton  1.99996e+00  1.23950e+00
 6  nbkg_VH_hadronic  1.81591e+02  1.19190e+01
 7  nbkg_VH_onelepton  3.60993e+01  5.35846e+00
 8  nbkg_central_highpt  7.88826e+02  2.49487e+01
 9  nbkg_central_lowpt  2.39099e+04  1.37635e+02
10  nbkg_forward_highpt  2.50666e+03  4.41826e+01
11  nbkg_forward_lowpt  6.61207e+04  2.28483e+02
12  nbkg_ttH_hadronic  1.50184e+01  3.48729e+00
13  nbkg_ttH_leptonic  4.38231e+00  1.92094e+00
14  nuis_A1.Theory_QCDscale_VBF  -1.38657e-04  8.72056e-01
15  nuis_A1.Theory_QCDscale_VH  -2.86387e-03  8.72008e-01
16  nuis_A1.Theory_QCDscale_bbH  3.91814e-04  8.68798e-01
17  nuis_A1.Theory_QCDscale_ggF  -6.02041e-02  8.47895e-01
18  nuis_A1.Theory_QCDscale_ttH  -5.90701e-04  8.80511e-01
```