

- Summary of the document status

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11.23

looking forward

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We are here

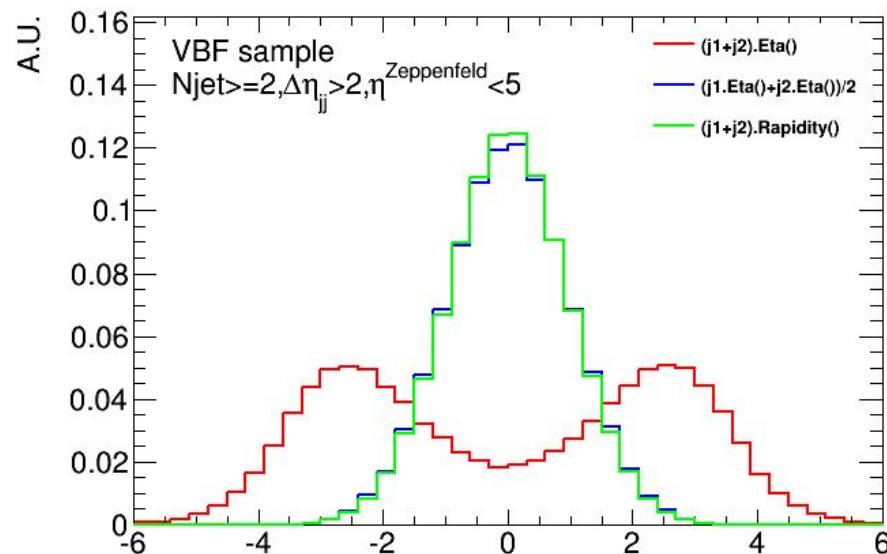
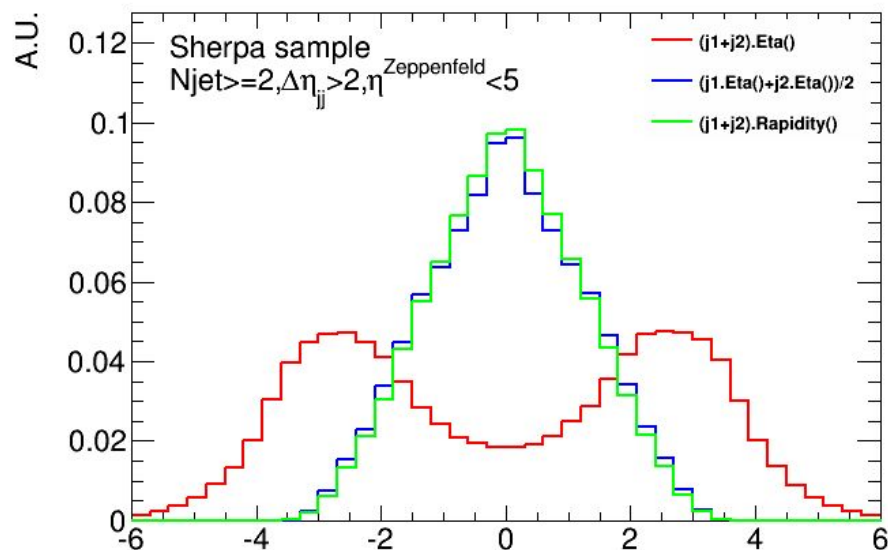
Holidays here

Target here

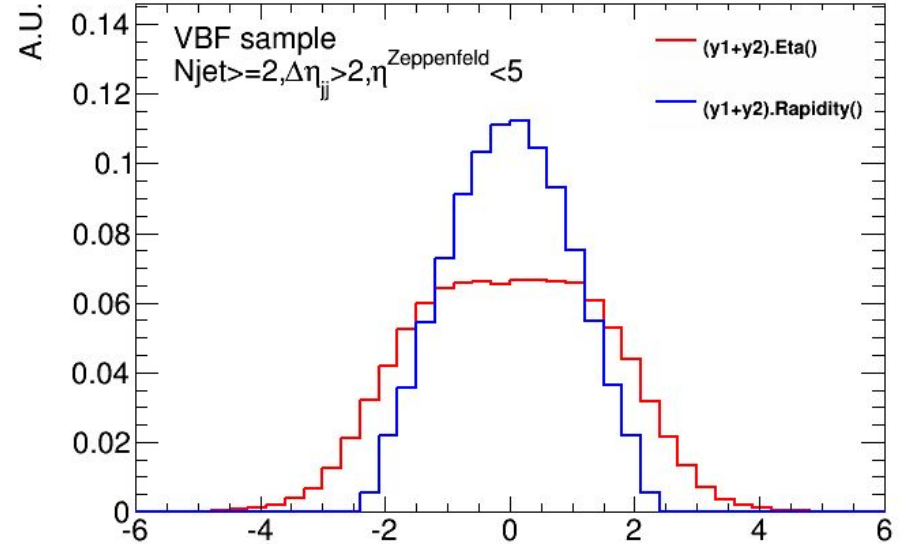
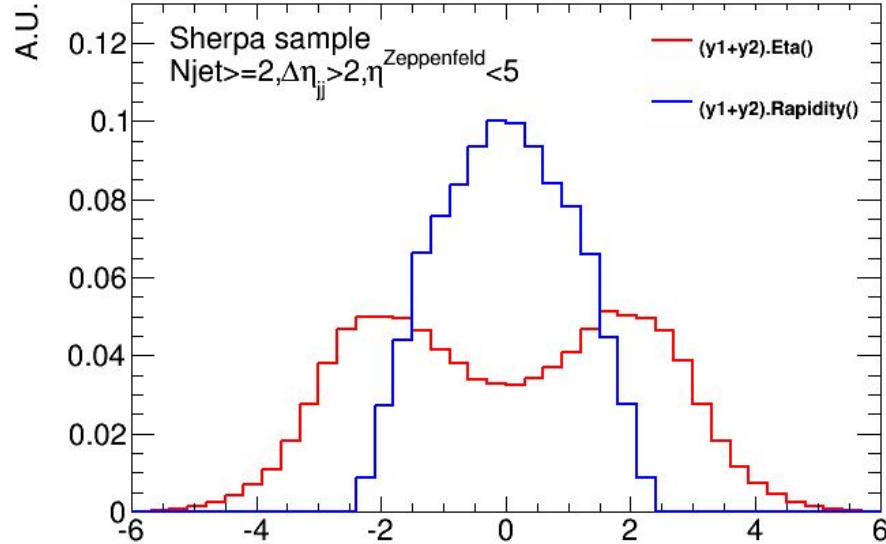
> Time is passing...

- Aiming for analysis of VBF+Uncategorised for Moriond
- Need to think about next steps and time plan
- Define some deadlines/timescales and to-do list
- Assign high-priority tasks

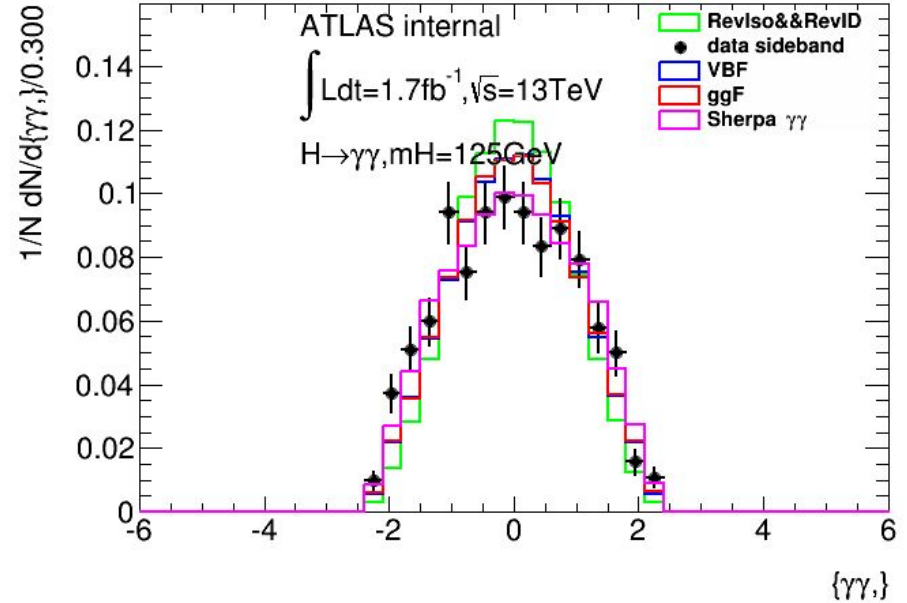
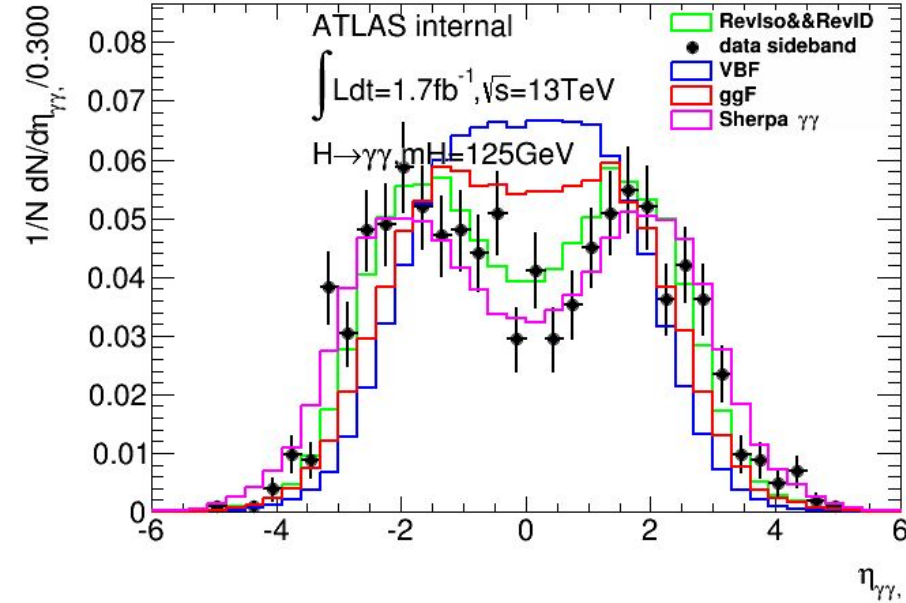
- $\text{eta_Zeppenfeld} = |\eta_{\gamma\gamma} - 0.5 * (\eta_{j1} + \eta_{j2})|$
 - the meaning of $\eta_{\gamma\gamma}$ is not clear, far away from rapidity for massive diphoton system
 - rapidity of diphoton system is recommended
- $\text{Dy_yy_jj} = |Y_{\gamma\gamma} - Y_{jj}|$
 - $0.5 * (\eta_{j1} + \eta_{j2})$ is similar with Y_{jj}
 - physics meaning is clear



- Sherpa DP +up to 3jets and VBF samples are used
- as expected, $(j1+j2).Rapidity()$ is close $(j1.Eta()+j2.Eta())/2$
- because dijet system has large invariant mass, $(j1+j2).Rapidity$ is not close to $(j1+j2).Eta()$
- $(j1+j2).Eta()$ shape is resonable?



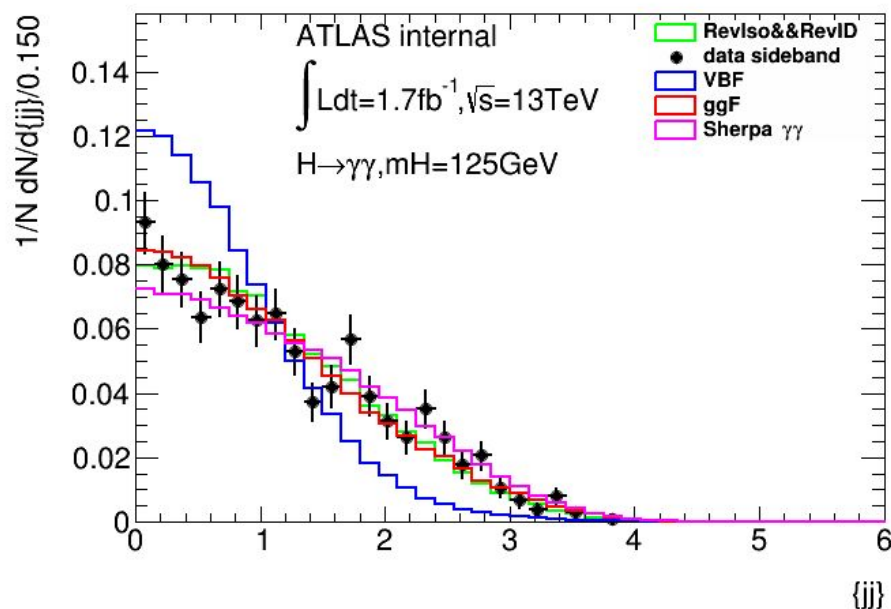
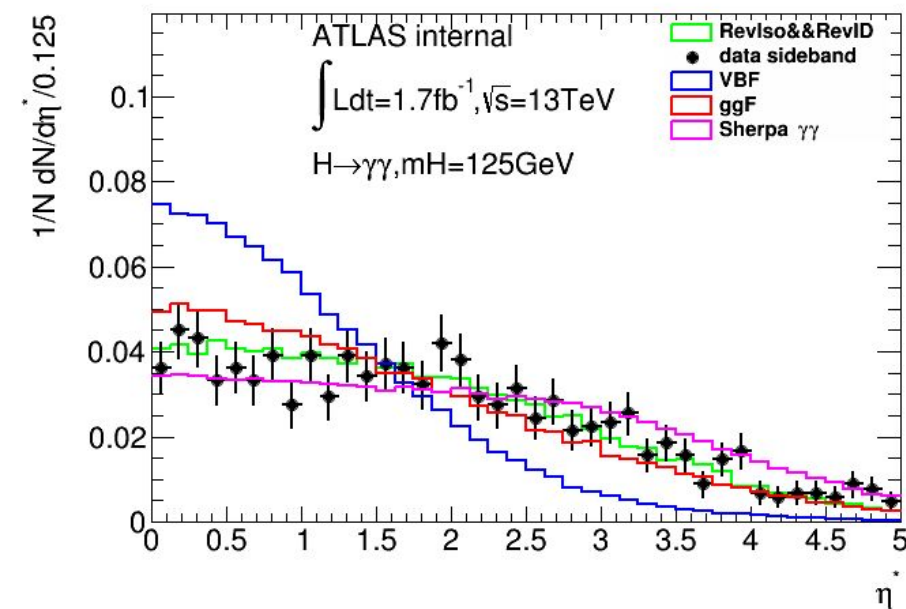
- in VBF sample, (y1+y2).Eta() is more wider
- in Sherpa sample, (y1+y2).Eta() has two peaks, totally different with (y1+y2).Rapidity()



- left is $(y_1 + y_2) \cdot \text{Eta}()$, right is $(y_1 + y_2) \cdot \text{Rapidity}()$
- rapidity of higgs is much more narrow

eta_Zeppenfeld and Dy_yy_jj

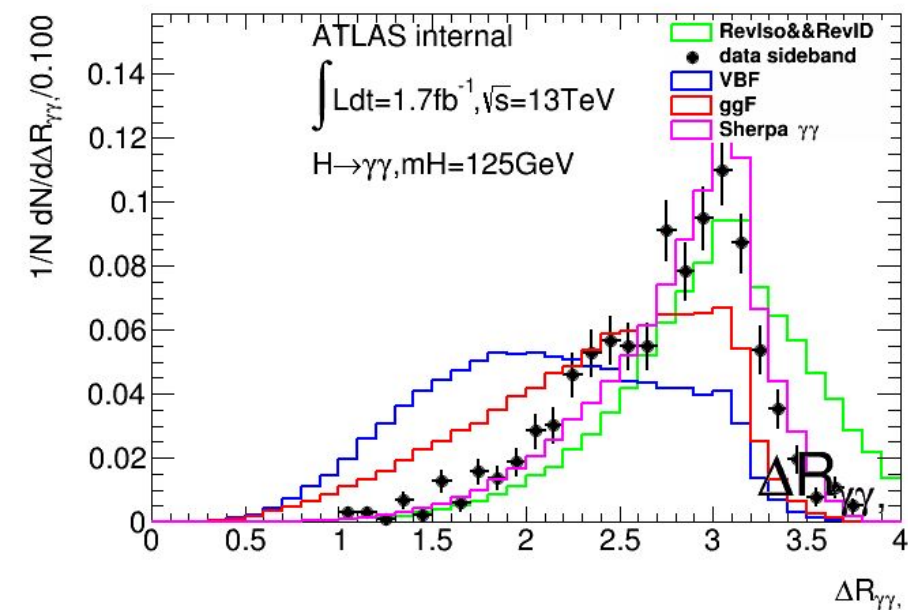
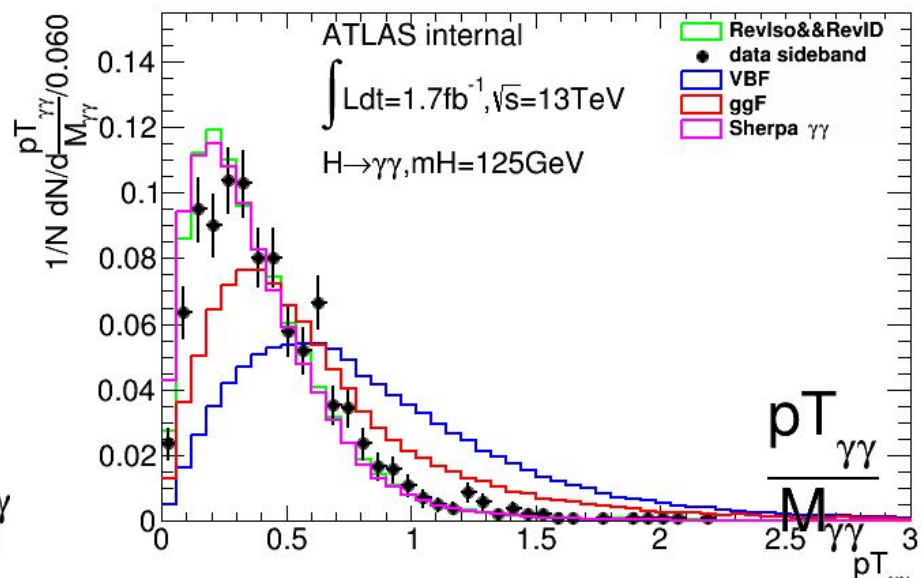
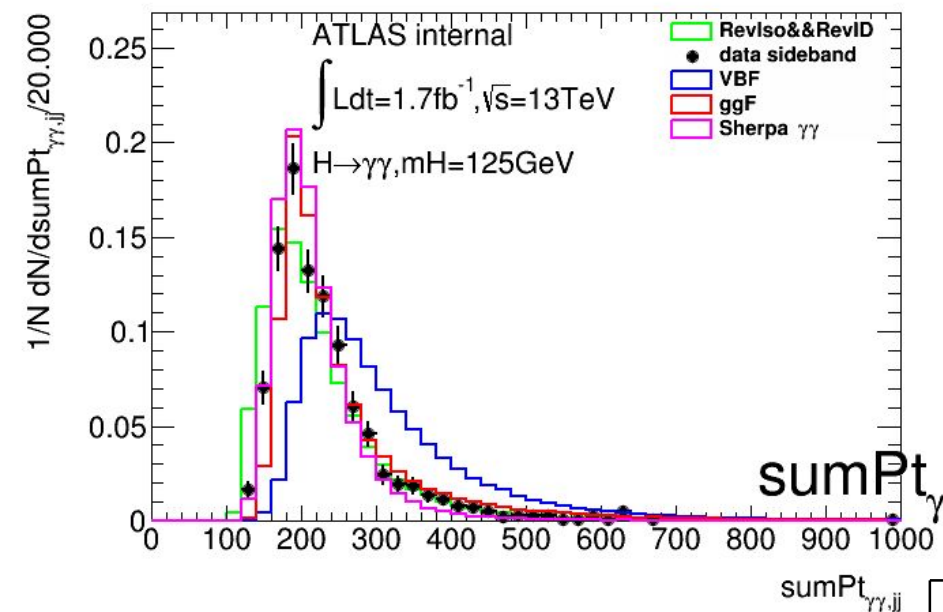
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- separation power: eta_Zeppenfeld, 0.127
Dy_yy_jj, 0.079
- considering the separation power, two choices
 - still use eta_Zeppenfeld due to relative high separation power compared with Dy_yy_jj (even the meaning of latter one is clear)
 - remove eta_Zeppenfeld due to relative low separation power compared with some other variables
- anyway, need to find an optimal combination in next step

discriminating variables

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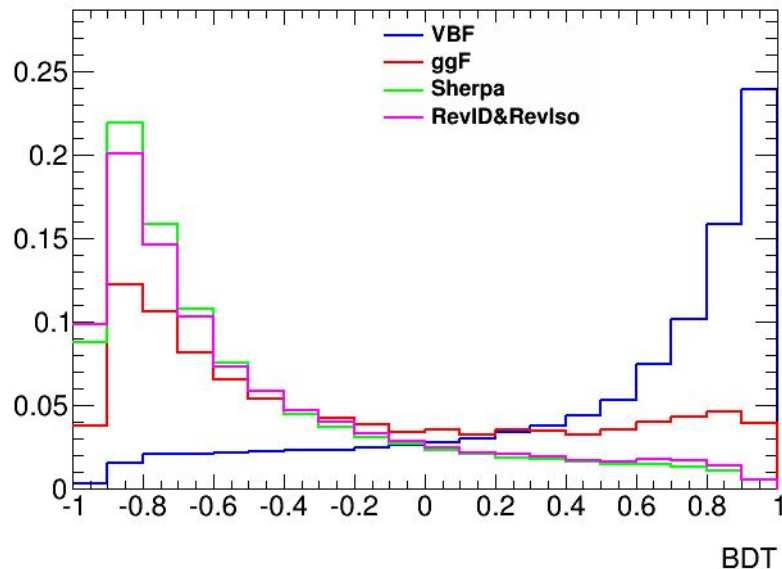


	separation power	correlation
$\text{sumPt}_{\gamma\gamma jj}$	0.263	0.015
$pT_{\gamma\gamma}/m_{\gamma\gamma}$	0.250	-0.008
$\Delta R_{\gamma\gamma}$	0.286	0.139

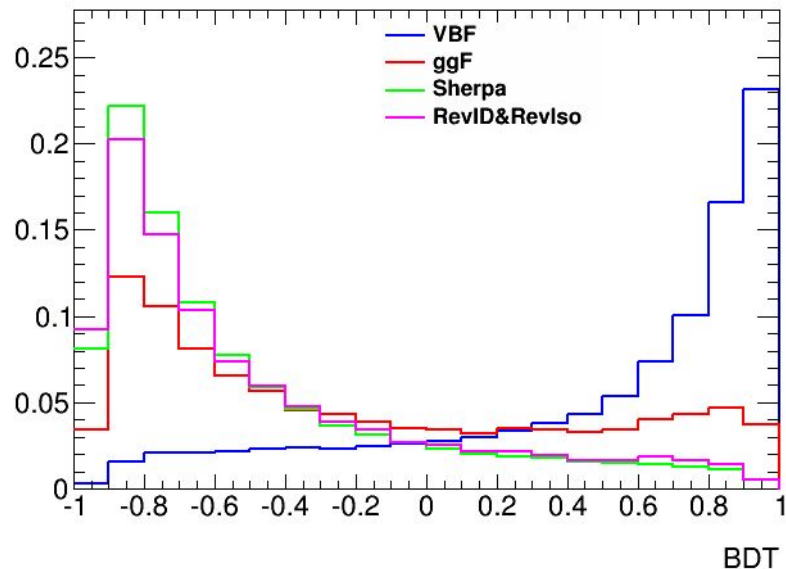
BDT response

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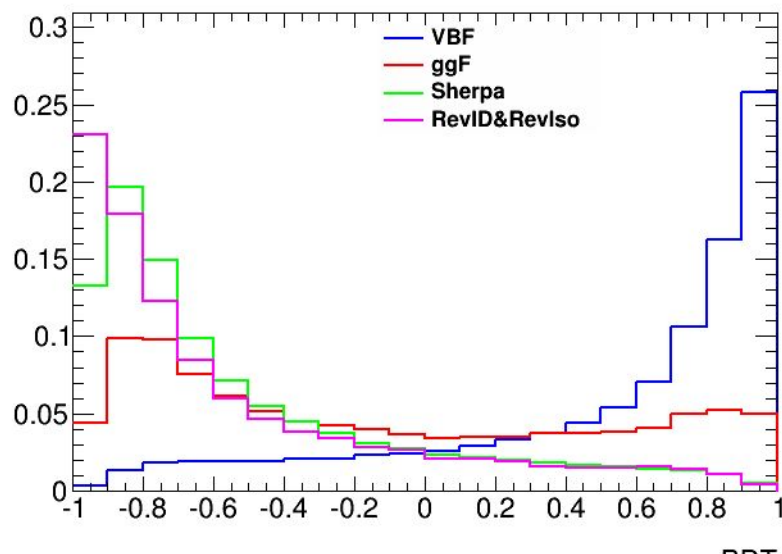
6 variables ,ggF not included in training



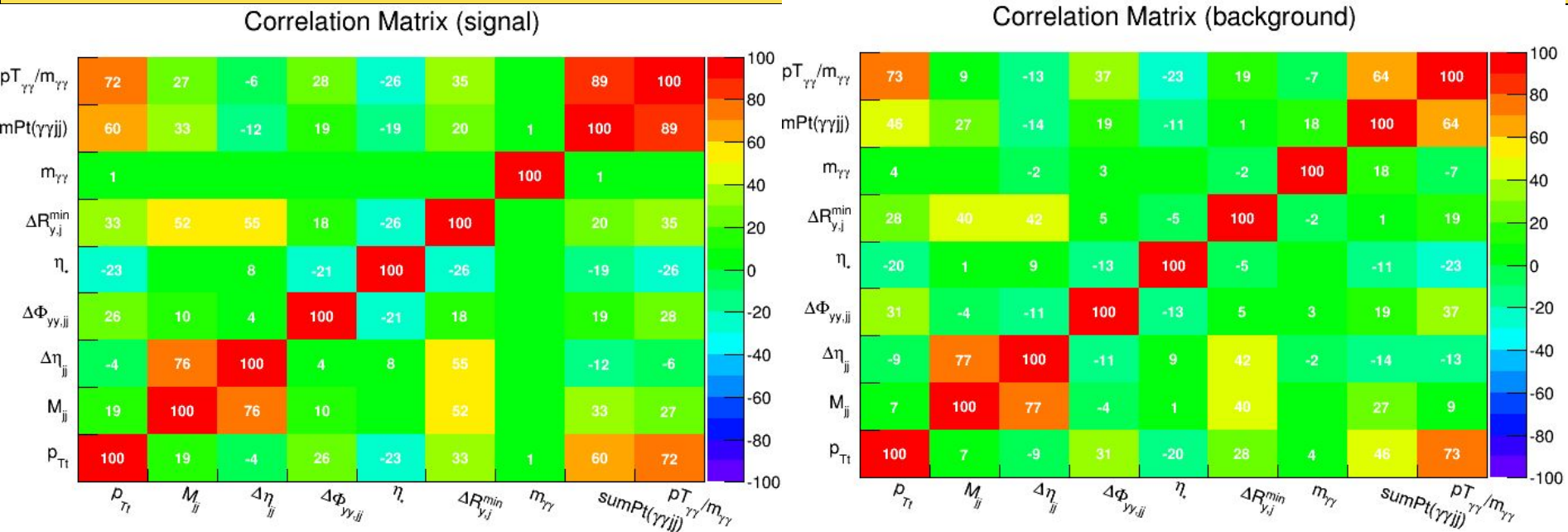
6 variables ,ggF included in training



8 variables ,ggF not included in training



- comparison between 3 strategies
- "including ggF" doesn't make great difference
- "8 variables" has more separation power



- $\text{sumPt}_{\gamma\gamma,jj}, p_{T\gamma\gamma}/m_{\gamma\gamma}$ and p_{Tt} are highly correlated
- separation power : p_{Tt} 0.235
- large QCD uncertainty with $\text{sumPt}_{\gamma\gamma,jj}$
- systematic is under investigation
- in principle ,just keep $p_{T\gamma\gamma}/m_{\gamma\gamma}$

comparison

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	6 vars,not include ggF		6 vars,include ggF		8 vars,not include ggF	
VBF	1.85	2.47	1.81	2.40	1.84	2.21
ggF	0.73	2.47	0.70	2.32	0.82	2.12
background	3.06	26.21	2.90	24.01	2.21	16.47
VBF purity	0.72	0.50	0.72	0.51	0.69	0.51
significance	0.88	0.45	0.89	0.46	0.97	0.50
combined significance	0.99		1.00		1.09	

- variable combination
- MVA configuration
- systematic

