

Observable		(≥ 9 jets, ≥ 4 b tags)	FH (8 jets, ≥ 4 b tags)	(7 jets, ≥ 4 b tags)	SL (≥ 6 jets, ≥ 4 b tags)	(5 jets, ≥ 4 b tags)	DL (≥ 4 jets, ≥ 3 b tags)	(3 jets, 3 b tags)
MEM	matrix element method discriminant	✓	✓	✓	✓	✓	✓	
BLR	b tagging likelihood ratio discriminant						✓	
$\ln\left(\frac{\text{BLR}}{1-\text{BLR}}\right)$	transformed b tagging likelihood ratio discriminant				✓	✓		
$p_T(j^2)$	p_T of second leading jet, ranked in p_T						✓	
$p_T(j^3)$	p_T of third leading jet, ranked in p_T							✓
$p_T(j^7)$	p_T of seventh leading jet, ranked in p_T	✓						
$p_T(b^i)$	p_T of i^{th} , $i=1-4$, leading b-tagged jet, ranked in p_T						✓	
$\eta(j^i)$	η of i^{th} , $i=1-2$, leading jet, ranked in b tagging discriminant value	✓	✓	✓				
$\langle d_b(j) \rangle$	average b tagging discriminant value of all jets				✓	✓		
$\langle d_b(b) \rangle$	average b tagging discriminant value of all b-tagged jets				✓	✓		
$d_b^3(j)$	third highest b tagging discriminant value of all jets				✓	✓		
$\text{Var}(d_b(j))$	variance of b tagging discriminant values of all jets				✓	✓		
$\langle \Delta R(\text{bb}) \rangle$	average of ΔR between two b-tagged jets						✓	
$\langle \Delta R(\text{jj}) \rangle$	average of ΔR between two jets	✓	✓					
$\min \Delta R(\text{jj})$	minimum of ΔR between two jets		✓	✓				✓
$\max \Delta R(\text{jj})$	maximum of ΔR between two jets	✓	✓	✓				
$\langle \Delta \eta(\text{bb}) \rangle$	average of $\Delta \eta$ between two b-tagged jets				✓	✓		
$\langle \Delta \eta(\text{jj}) \rangle$	average of $\Delta \eta$ between two jets	✓	✓	✓	✓	✓		
$\langle m(\text{b}) \rangle$	average invariant mass of all b-tagged jets				✓	✓		
$\langle m(\text{j}) \rangle$	average invariant mass of all jets				✓	✓		
$m(\text{bb}_{\min \Delta R})$	invariant mass of pair of b-tagged jets closest in ΔR				✓	✓	✓	
$m(\text{jb}_{\min \Delta R})$	invariant mass of pair of jet and b-tagged jet closest in ΔR						✓	
$m(\text{jj}_{125\text{GeV}})$	invariant mass of pair of jets with mass closest to 125 GeV	✓						
$m(\text{bb}_{\max m})$	maximum invariant mass of pairs of b-tagged jets	✓	✓				✓	✓
$m(\text{jbb}_{\max p_T})$	invariant mass of jet and pair of b-tagged jets with highest p_T						✓	
$\langle p_T(\text{j}) \rangle$	average p_T of all jets				✓	✓		
$\langle p_T(\text{b}) \rangle$	average p_T of all b-tagged jets				✓	✓		
$p_T(\text{bb}_{\min \Delta R})$	p_T of pair of b-tagged jets closest in ΔR				✓	✓	✓	✓
$p_T(\text{jj}_{\min \Delta R})$	p_T of pair of jets closest in ΔR							✓
$p_T(\text{jb}_{\min \Delta R})$	p_T of pair of jet and b-tagged jet closest in ΔR							✓
$H_T(\text{j})$	scalar sum of p_T of all jets				✓	✓	✓	
$H_T(\text{b})$	scalar sum of p_T of all b-tagged jets				✓	✓	✓	
$N(\text{j})$	number of jets				✓			
$N(\text{b}^{\text{loose}})$	number of jets with loose b tag						✓	
$d_b(\text{b}_{\text{top}}^{\text{tHW}})^{\dagger}$	b tagging discriminant value of b jet from t quark decay from tHW reconstruction				✓	✓		
$ \eta(\text{q}^{\text{tHq}}) ^{\dagger}$	$ \eta $ of light-quark jet from tHq reconstruction				✓	✓		
$m(\text{t}_{\text{lep}}^{\text{tH}})^{\dagger}$	inv. mass of leptonically decaying t quark from $\text{t}\bar{\text{t}}\text{H}$ reconstruction				✓	✓		
$\text{BDT}^{\dagger\dagger}$	reconstruction BDT output for tHq, $\text{t}\bar{\text{t}}\text{H}$, $\text{t}\bar{\text{t}}$ hypotheses				✓	✓		
A, S	event aplanarity and sphericity [76]	✓	✓	✓				
H_i^{FW}	i^{th} , $i=0-5$, Fox-Wolfram moment [77]	✓	✓	✓				
$H_i^{\text{FW}}/H_0^{\text{FW}}$	ratio of Fox-Wolfram moments, $i=1-4$	✓	✓	✓				