

Input variable	Description	ggF	VBF
Higgs boson kinematic variables			
$p_{T,\ell\ell\gamma}/m_{\ell\ell\gamma}$	Higgs boson candidate p_T relative to its mass	✓	✓
Photon quality indicators			
γ IDMVA	Photon identification MVA score	✓	✓
$\sigma_E(\gamma)/E(\gamma)$	Photon energy resolution	✓	✓
Angular variables of final state particles from Higgs boson candidate			
$\eta(\ell_1), \eta(\ell_2), \eta(\gamma)$	Pseudorapidity of leptons and photon	✓	✓
$\Delta R_{\min}(\gamma, \ell)$ and $\Delta R_{\max}(\gamma, \ell)$	Separation between photon and leptons	✓	✓
$\cos \Theta$	Z boson production angle	✓	✓
$\cos \theta$	Z boson decay polar angle	✓	✓
ϕ	Z boson decay azimuthal angle	✓	✓
Jet variables			
$\eta(j)$	Jet pseudorapidity	✓	
$p_T(j_{1,2})$	Jet transverse momenta	✓	✓
$\Delta\eta(j_1, j_2)$	Dijet pseudorapidity separation		✓
$\Delta\phi(j_1, j_2)$	Dijet azimuthal angular separation		✓
$\Delta R(j_{1,2}, \gamma)$	Jet separation from photon	✓	✓
m_j, m_{jj}	Jet/dijet system invariant mass	✓	✓
N_{jet}	Number of jets	✓	✓
System balance indicators			
$\Delta\phi(\ell^+\ell^-\gamma, j), \Delta\phi(\ell^+\ell^-\gamma, jj)$	Azimuthal separation between jet/dijet and $\ell^+\ell^-\gamma$	✓	✓
$ \sum_{\ell\ell,\gamma,jets} \vec{p}_T^i / \sum_{\ell\ell,\gamma,jets} p_T^i$	System p_T balance	✓	✓
$ \eta(\gamma) - \eta(j) , \eta_\gamma - \frac{\eta_{j_1} + \eta_{j_2}}{2} $	Pseudorapidity separation between photon and jet(s)	✓	✓
$\Delta\phi(\gamma, \vec{S}_T^{\text{miss}})$	Azimuthal angular separation between photon and $\vec{S}_T^{\text{miss}}$	✓	✓