

Differential cross-section variables

Higgs variables

$y(H)$, $p_T(H)$

Legend:

H+0jet Born variables,

H+0/1j resolution variables

(note: once a *H+0/1j var* is not $\ll m_H$ it turns into a *H+1jet Born variable*)

Diphoton variables

$p_T(\gamma_{1,2})$, $y(\gamma_{1,2})$, $\cos \theta^*(\gamma\gamma)$, $p_{Tt}(\gamma\gamma)$, $\varphi^*(\gamma\gamma)$, $(p_T(\gamma_1) + p_T(\gamma_2))/2$

Leading Jet variables

$p_T(j)$, $y(j)$, $|y(j) - y(H)|$

$\tau_C(j) = \max_j \{ m_T(j)/(2\cosh y(j)) \}$ where j runs over all jets

$p^+(j) = \tau_B(j) = \max_j \{ E(j) - |p_z(j)| \}$ where j runs over all jets

Higgs-jet variables

H+1/2jet resolution variables: $\mathbf{p}_T(\mathbf{Hj})$, $\Delta\phi(\mathbf{H}, \mathbf{j})$, $\mathbf{p}_T(\mathbf{j2})$, $m(j)$

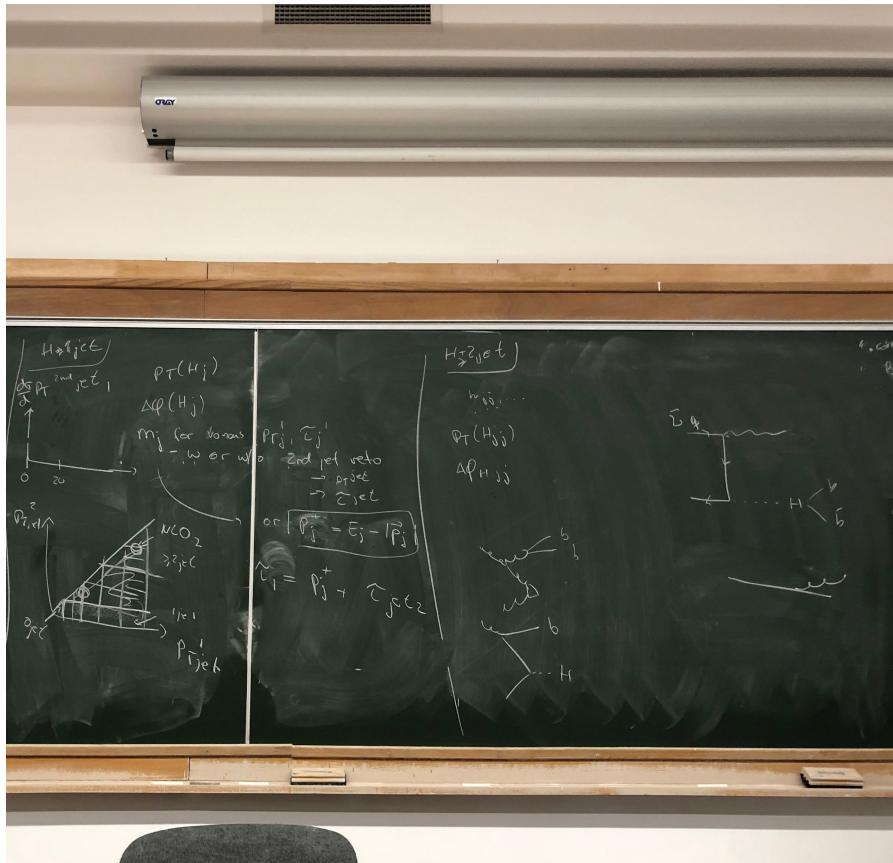
(note: each of these requires defining cuts that specify the underlying H+j Born system)

H+2jet Born variables: $m(jj)$, $\Delta\phi(j, j)$, $\Delta\eta(j, j)$,

H+2/3jet resolution variables: $\mathbf{p}_T(\mathbf{Hjj})$, $\Delta\phi(\mathbf{H}, \mathbf{jj})$, $\mathbf{p}_T(\mathbf{j3})$

(note: each of these requires defining cuts that specify the underlying H+jj system)

Source material



Handwritten notes and equations on a blackboard:

Top right:
$$m_H = \sqrt{p_T^H + q^2}, \quad \gamma_H, \quad p_T^{3^{\text{rd}} \text{ leading}} \text{ or } \frac{p_T^{2^{\text{nd}}} + p_T^{3^{\text{rd}}}}{2}, \quad \gamma_\tau, \quad \cos\theta^\tau$$

Bottom right:
$$q \rightarrow |\gamma_j - \gamma_\tau|$$

$$p_{T,jet} = \begin{cases} \tau_C^{\text{jet}} \\ \tau_B^{\text{jet}} \\ \tau_C^{\text{jet}} \\ \tau_B^{\text{jet}} \end{cases}$$

$$p_{T,jet}^{\max} = \max_j |p_{T,jet}^j|, \quad \check{\tau}_B^{\text{jet}} = \max_j |p_T^j e^{-\eta_j}| = |\tau_B^j| - |\vec{p}_j^\perp|$$

$$\frac{dp}{dp_{T,jet}^2} = \int_0^{\infty} d\phi$$

$$\check{\tau}_C^{\text{jet}} = \begin{cases} \frac{|p_T|}{\cosh \eta_j} \\ m_j \\ \frac{|p_T|}{\cosh \eta_j} \end{cases}$$