



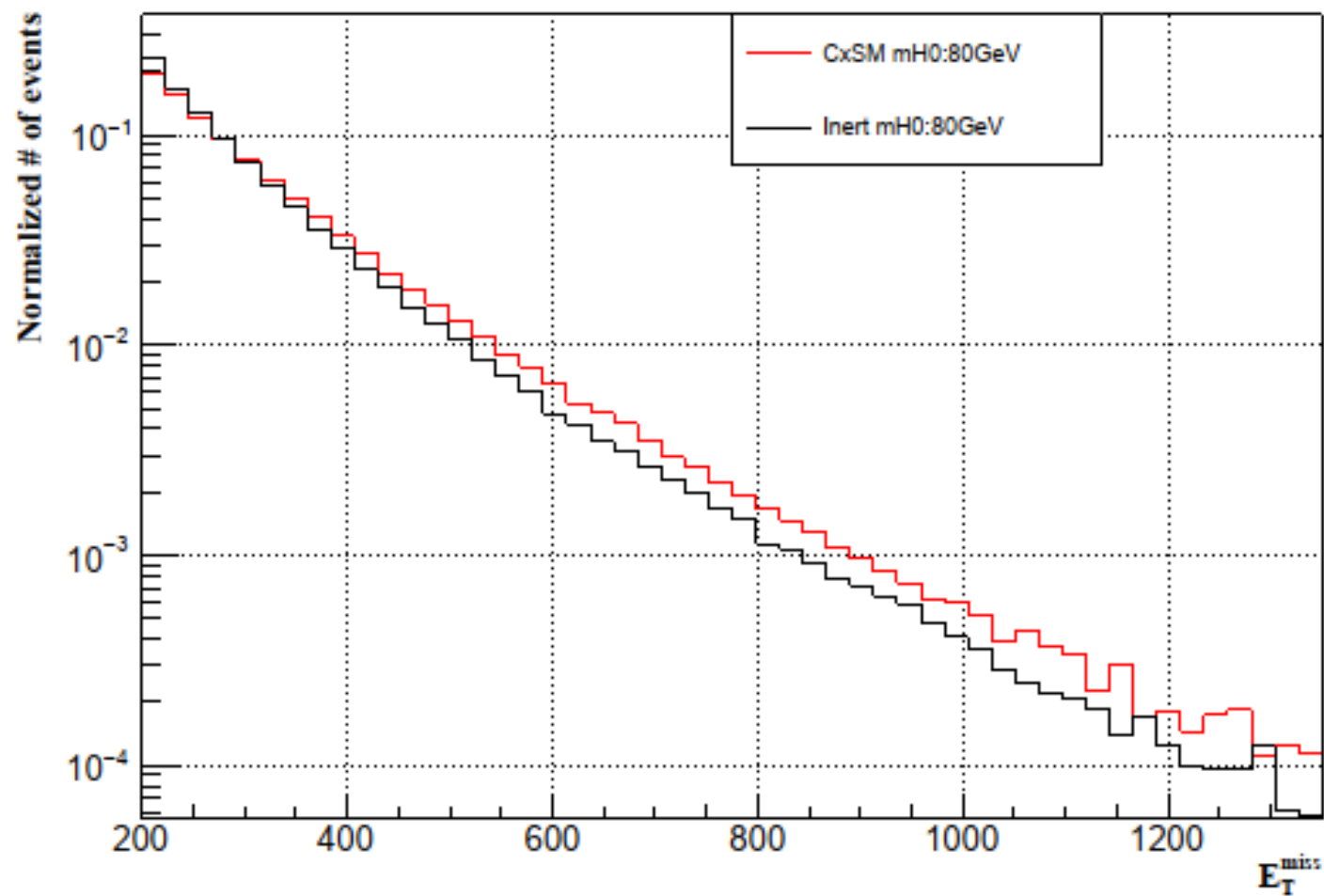
Dark Matter Signals at LHC

Missing Energy of Single Jets

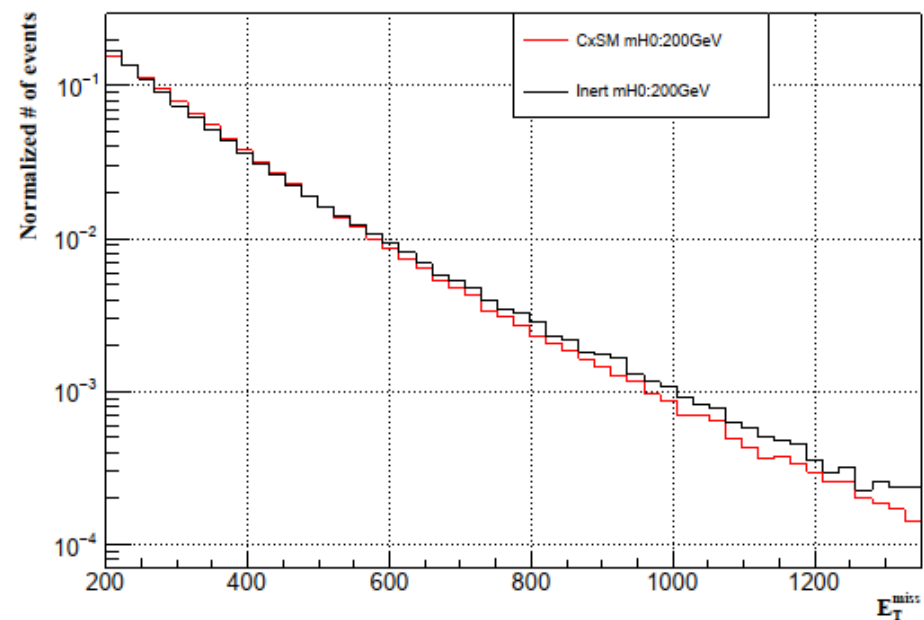
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2 Inert Doublet vs CxSM

Transverse Missing Energy



Transverse Missing Energy



N2HDM

$$\begin{aligned} V = & (\dots) \\ & + m_{11}^2 |\Phi_1|^2 + m_{22}^2 |\Phi_2|^2 - m_{12} (\Phi_1^\dagger \Phi_2 + h.c.) \\ & + \frac{\lambda_1}{2} (\Phi_1^\dagger \Phi_1)^2 + \lambda_2 (\Phi_2^\dagger \Phi_2)^2 \\ & + \lambda_3 (\Phi_1^\dagger \Phi_1) (\Phi_2^\dagger \Phi_2) + \lambda_4 (\Phi_1^\dagger \Phi_2) (\Phi_2^\dagger \Phi_1) + \lambda_5 \left[(\Phi_1^\dagger \Phi_2)^2 + h.c. \right] \\ & + \frac{1}{2} m_S^2 \Phi_S^2 + \frac{\lambda_6}{8} \Phi_S^4 + \frac{\lambda_7}{2} (\Phi_1^\dagger \Phi_1) \Phi_S^2 + \frac{\lambda_8}{2} (\Phi_2^\dagger \Phi_2) \Phi_S^2 \end{aligned}$$

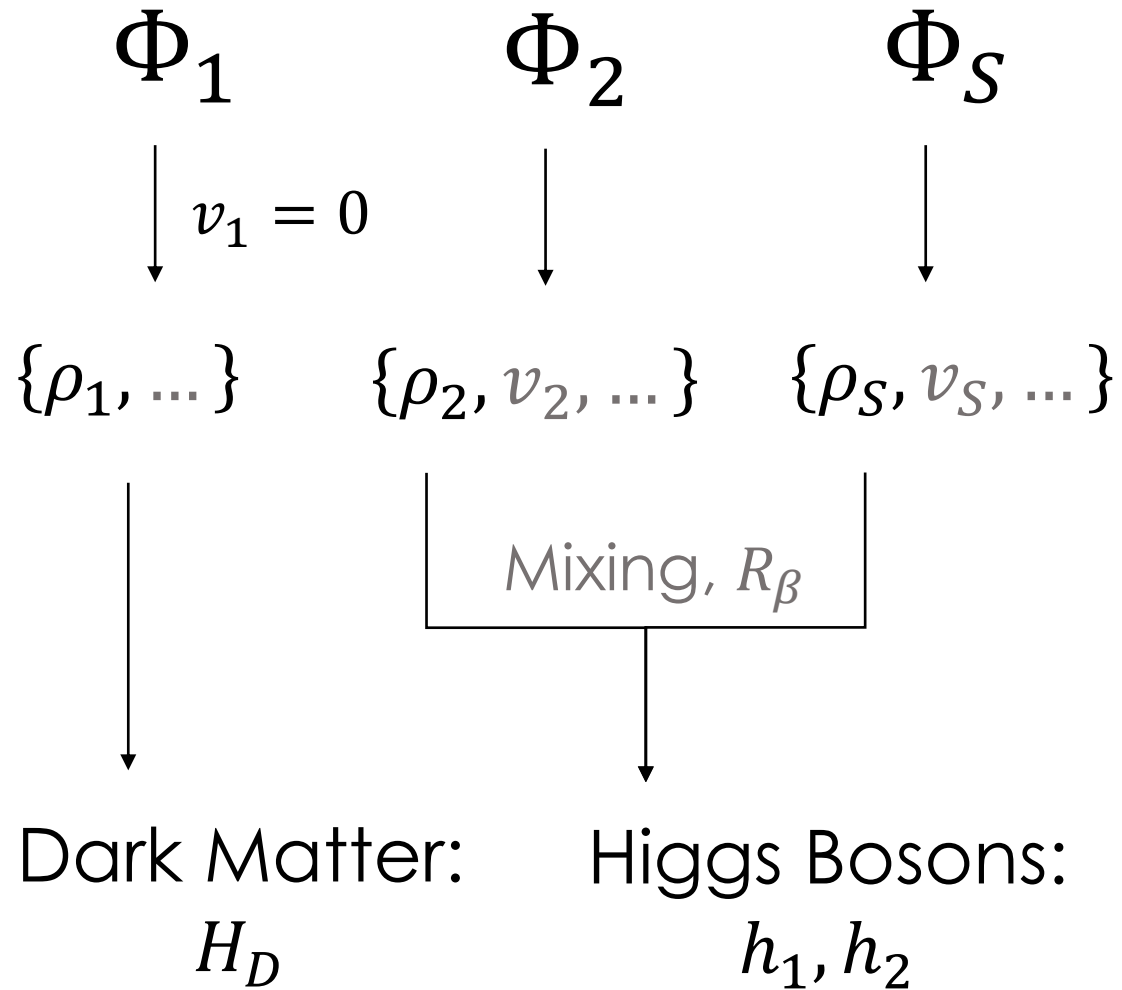
Doublets: Φ_1, Φ_2

Singlet: Φ_S

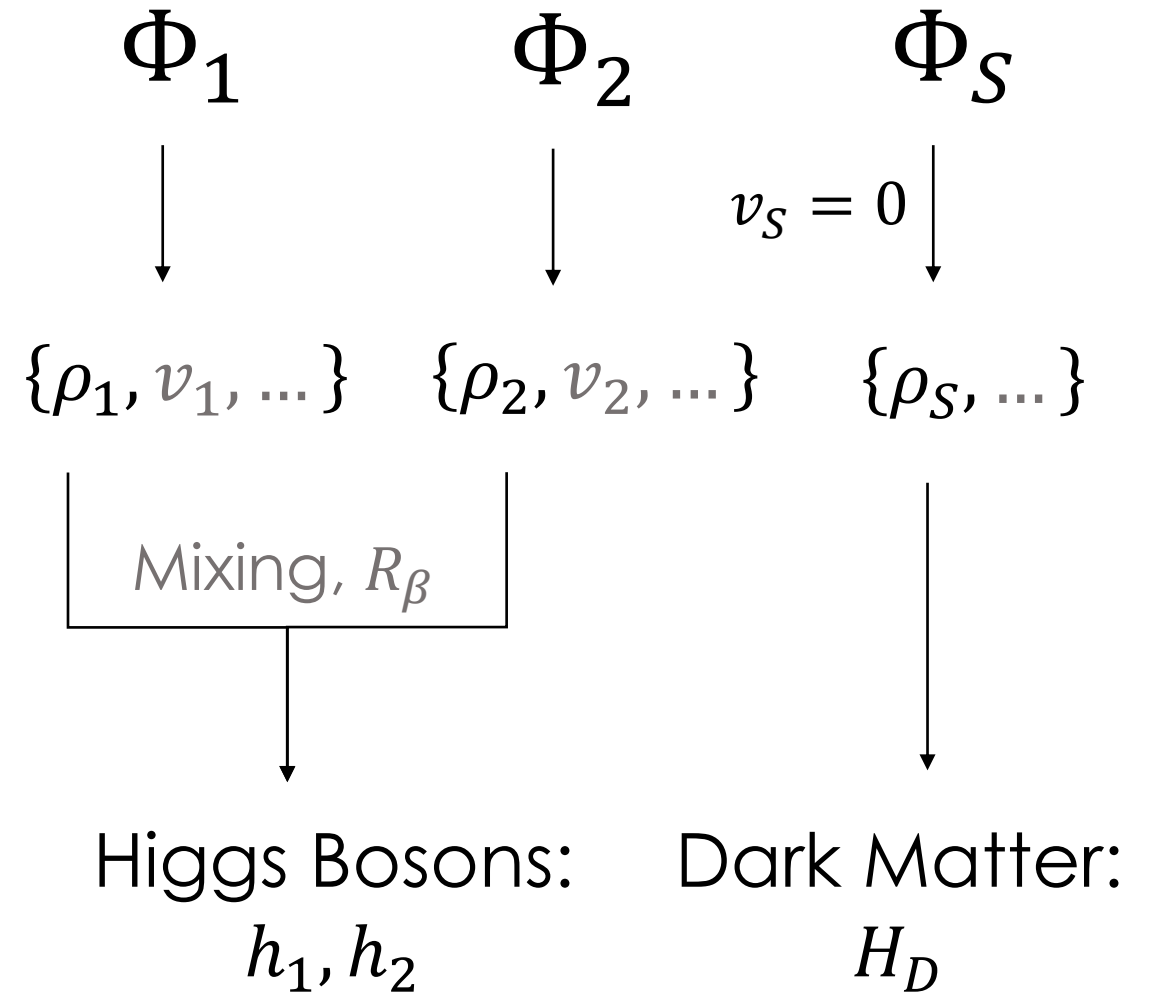
$$\Phi_i = \begin{bmatrix} \phi_i^+ \\ \frac{1}{\sqrt{2}} (v_i + \rho_i + i \eta_i) \end{bmatrix}$$

$$\Phi_i = v_S + \rho_S + i \eta_S$$

Inert Doublet Phase



Singlet Phase

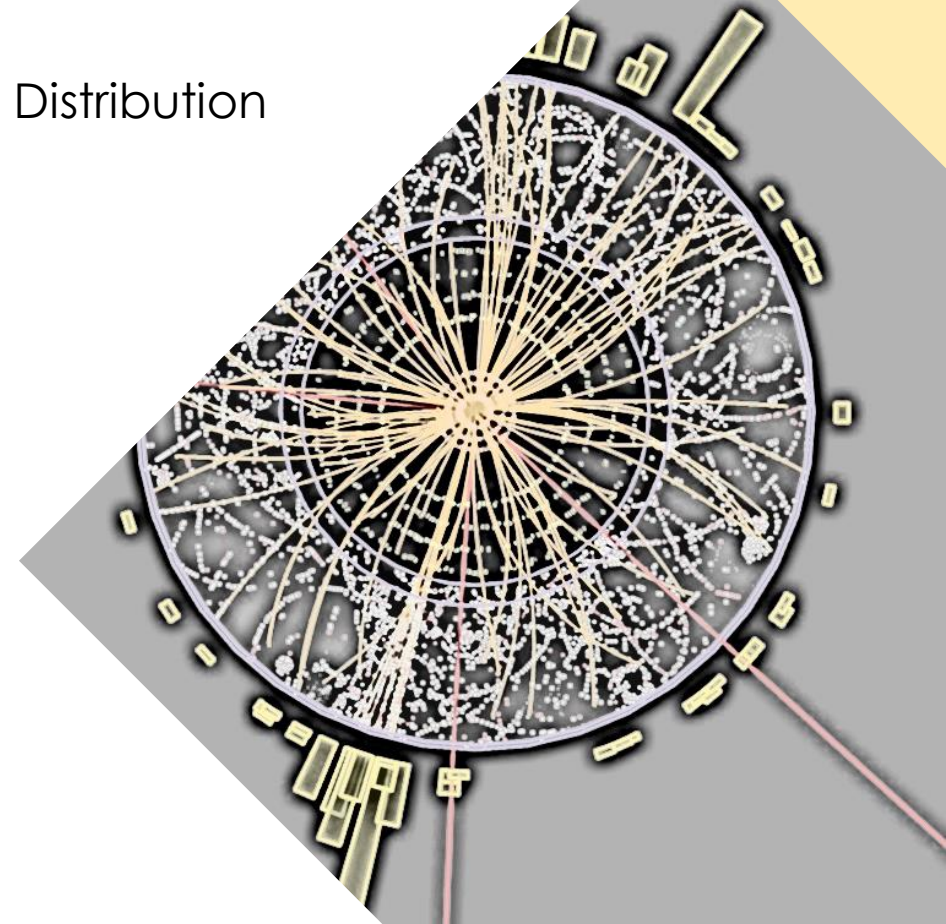


Dark Matter Candidate, H_D

No LHC signature



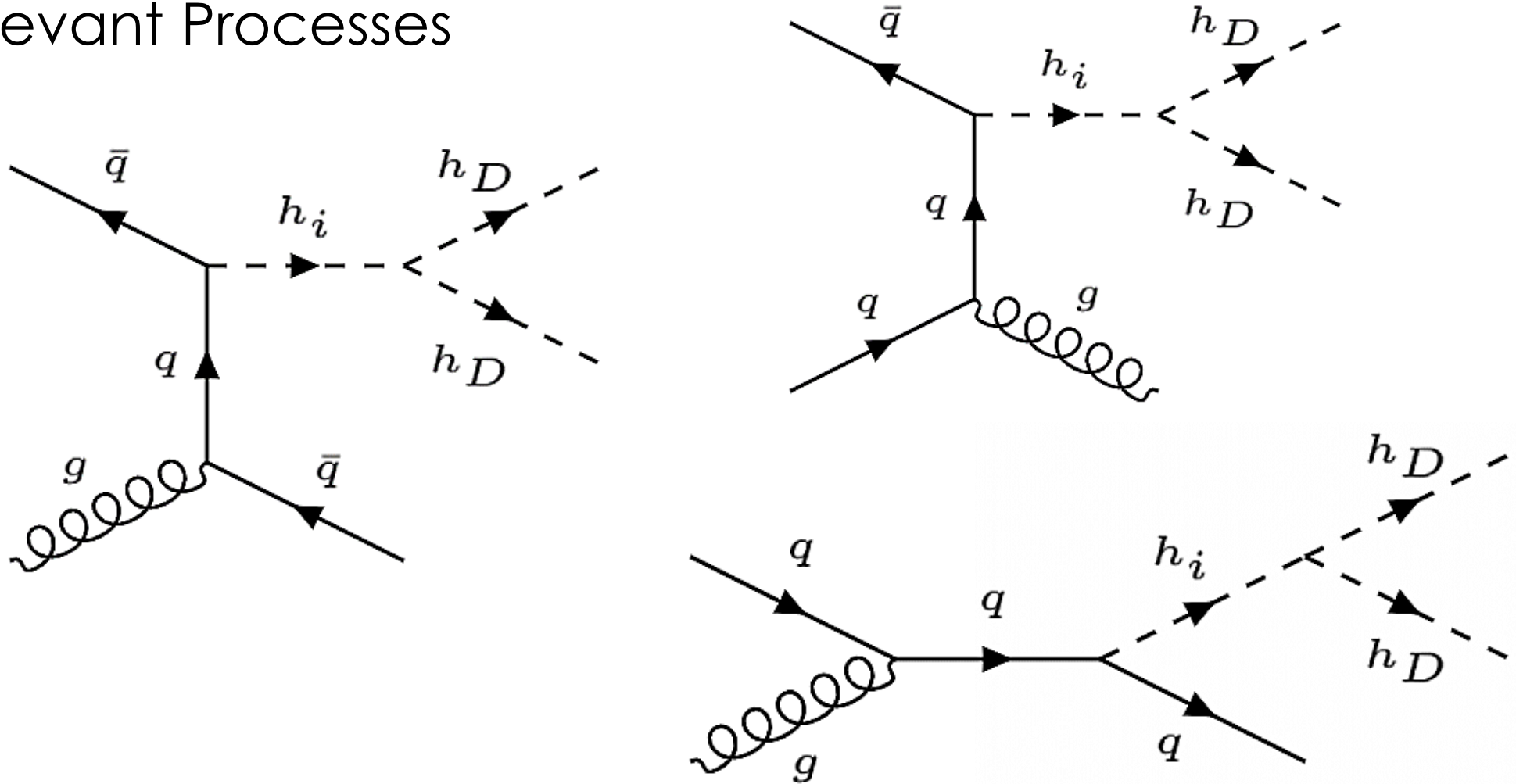
Missing Energy Distribution



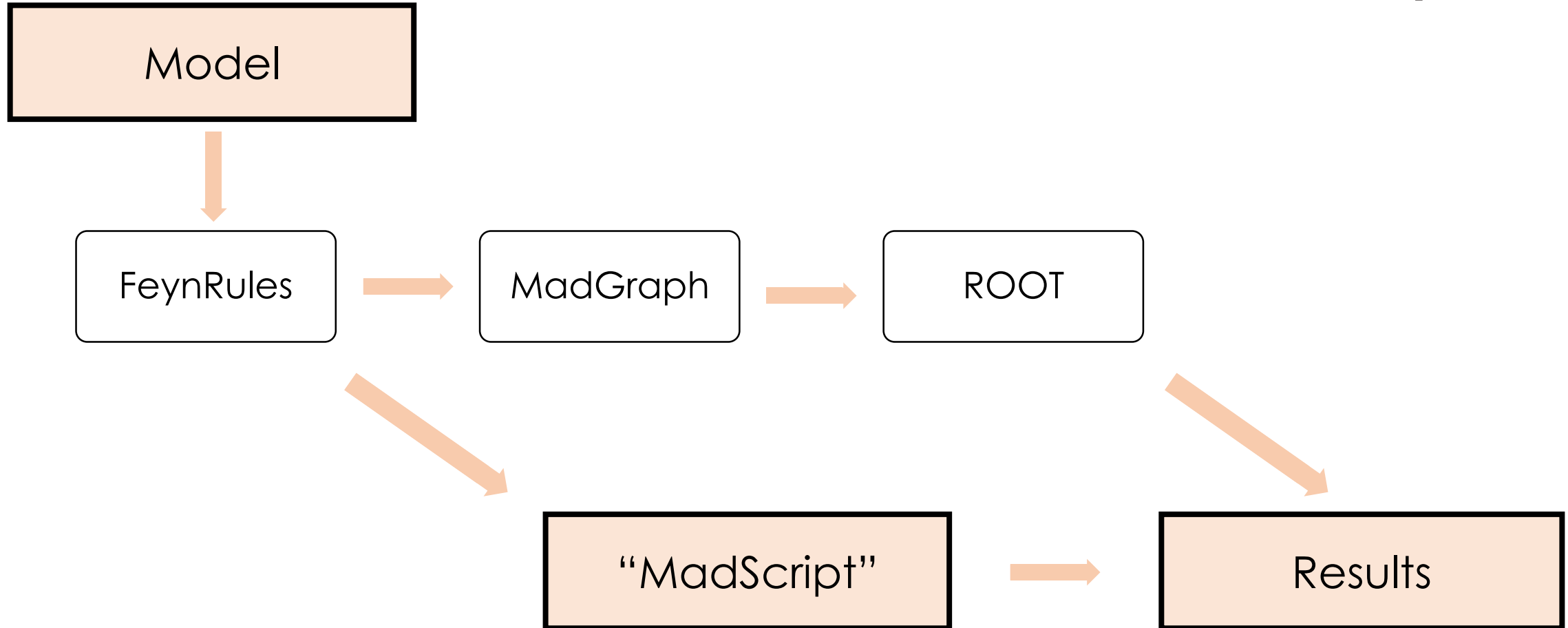
Missing Energy Distribution

in Proton + Proton \rightarrow Single Jet + 2 DM

Relevant Processes

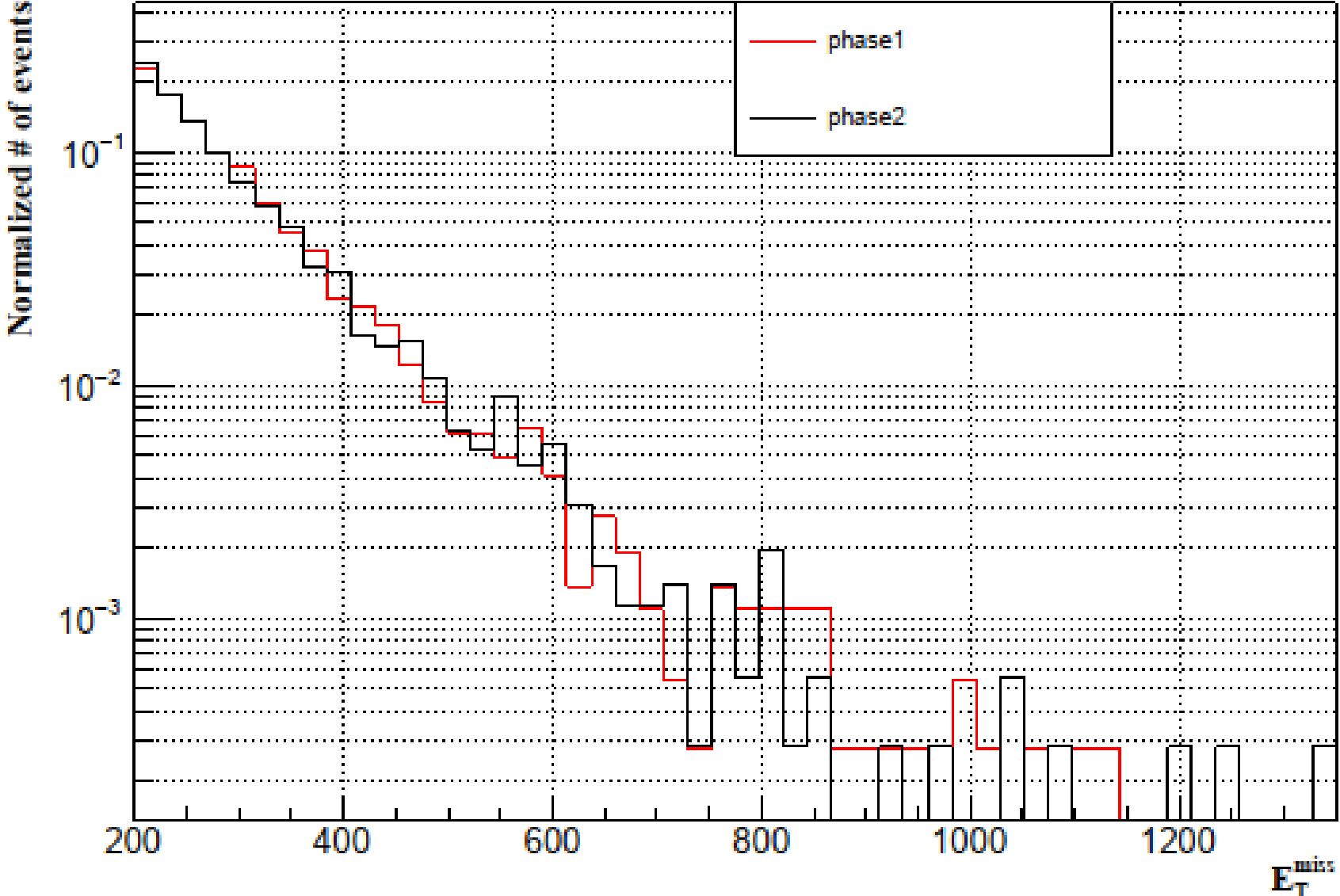


Workflow



[Easy to try out a bunch of different parameter values.
All the plots.]

Transverse Missing Energy





What now

- Probing the parameter space

What now

- Probing the parameter space
- One Loop Corrections

