



VBF+MET+photon

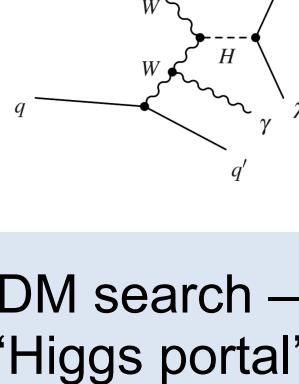
Han CUI, Zhijun LIANG, Bo LIU

IHEP



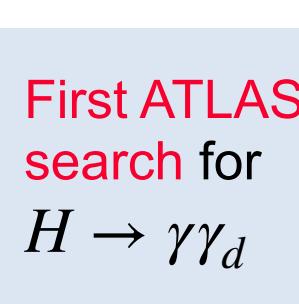
Welcome to visit us

What we studied with the VBF+MET+ γ final state?



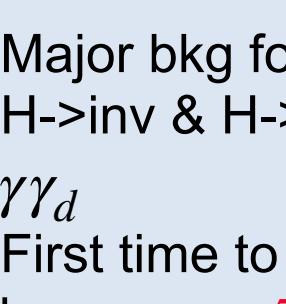
- DM search — ‘Higgs portal’
- First analysis of the $H(\rightarrow \text{inv})\gamma$
- Combination with VBF+MET analysis

VBF $H \rightarrow \gamma\gamma_d$



- First ATLAS search for $H \rightarrow \gamma\gamma_d$

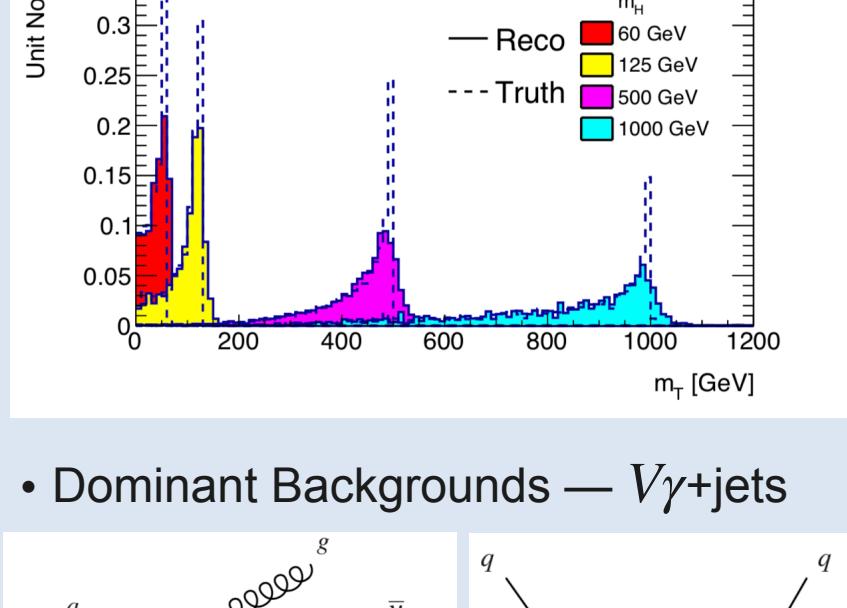
EW $Z(\rightarrow \nu\nu)\gamma$



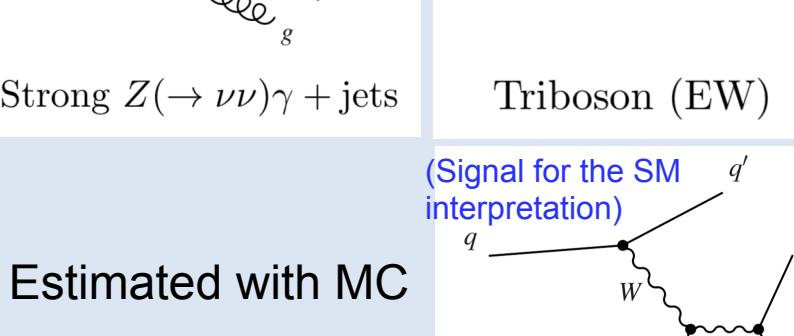
- Major bkg for $H\rightarrow\text{inv}$ & $H\rightarrow\gamma\gamma_d$
- First time to have $\mu_{\text{sig}} > 5\sigma$
- Combination with SM $Z(\rightarrow \nu\nu)\gamma$

Signal & Backgrounds

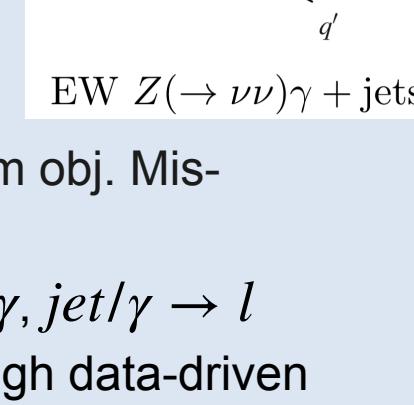
- $H \rightarrow \gamma\gamma_d$ mediators
- $m_T^{\gamma, E_T^{\text{miss}}}$ is a proxy for m_H



- Dominant Backgrounds — $V\gamma + \text{jets}$



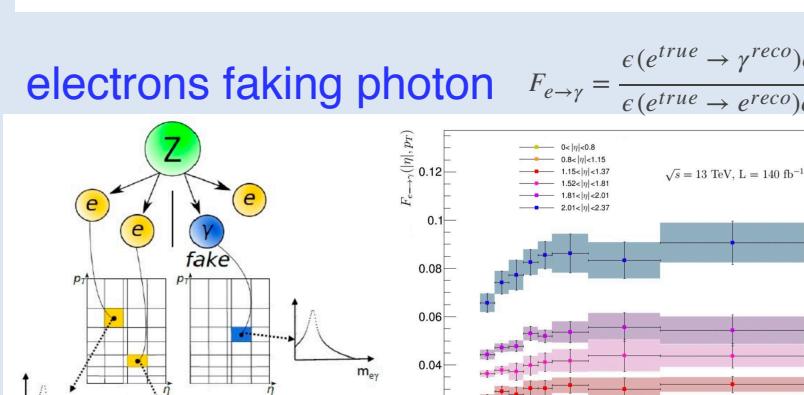
- Estimated with MC
- Normalized in W/Z CRs



- Additional BKG from obj. Mis-reconstruction

- $\text{jets} \rightarrow \gamma, e \rightarrow \gamma, \text{jet}/\gamma \rightarrow l$
- Estimated through data-driven method

Jets faking photon — ABCD method



electrons faking photon

$$F_{e \rightarrow \gamma} = \frac{e(e^{\text{true}} \rightarrow \gamma^{\text{reco}})e_\gamma}{e(e^{\text{true}} \rightarrow \gamma^{\text{reco}})e_e}$$

