



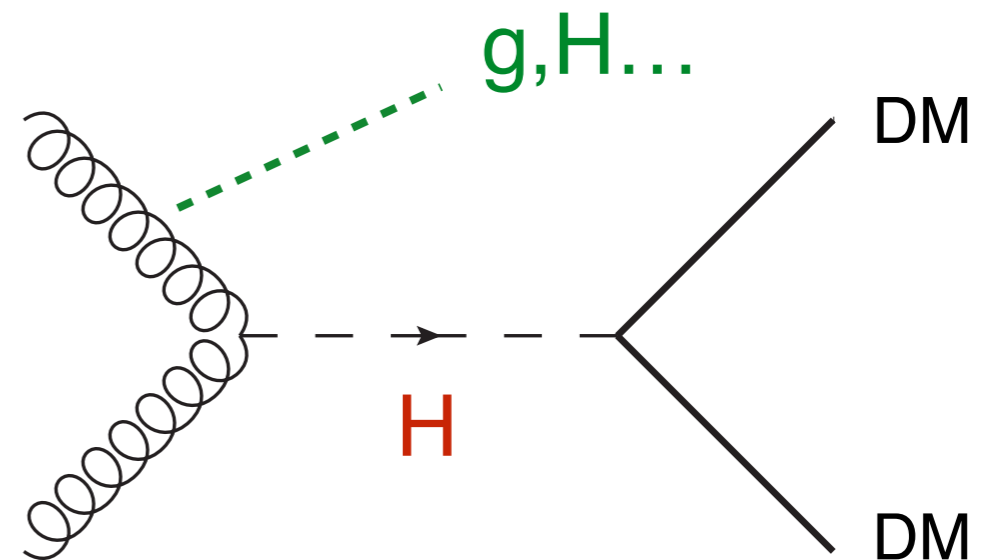
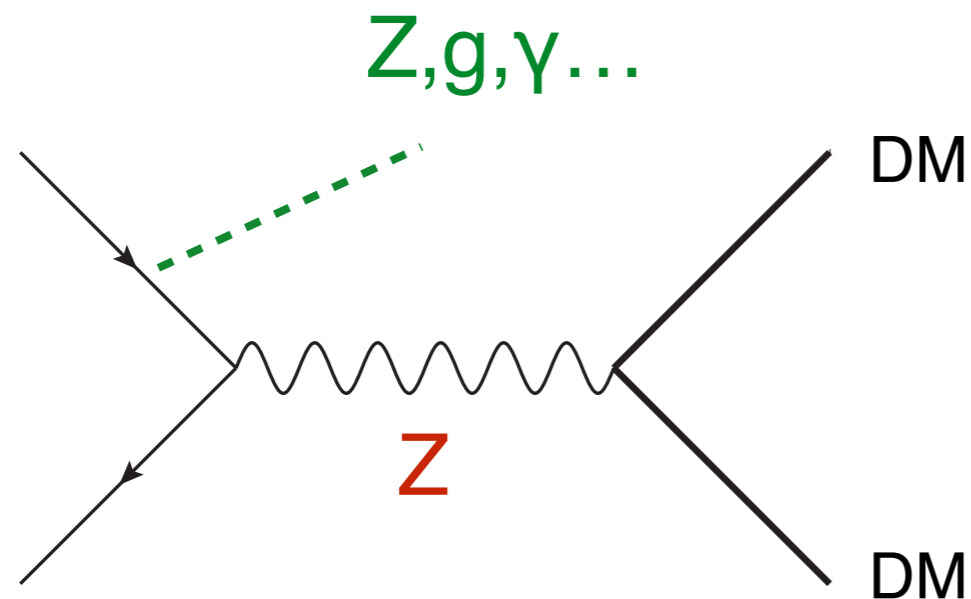
Examining a mono-jet excess

Pedro Schwaller
CERN

FHC-hh working group
meeting, CERN

What can we learn from mono-X ratios

- Consider: Z-portal vs. Higgs-portal DM



- Ratios contain information about DM couplings

$$\frac{\sigma(pp \rightarrow \text{mono-X})}{\sigma(pp \rightarrow \text{mono-X}')}$$

- Also mono vs. di-jet, etc.

Models

- Thoughts so far: Focus on SM mediators, gauge multiplets

- ▶ Higgs portal

$$\mathcal{L}_1 = m_s^2 s^2 + \lambda_s |H|^2 s^2,$$

$$\mathcal{L}_2 = m_\chi \bar{\chi}^c \chi + \lambda_\chi |H|^2 \bar{\chi}^c \chi$$

- ▶ Z portal

$$\mathcal{L}_3 = m_\chi \bar{\chi}^c \chi + g' Z_\mu \bar{\chi} \gamma^\mu \gamma_5 \chi$$

- ▶ minimal DM (= Higgsino)

- Compare with EFT?
Not valid at 100 TeV...

$$\mathcal{L}_4 = \bar{q} \gamma_\mu \gamma_5 q \bar{\chi} \gamma^\mu \gamma_5 \chi,$$

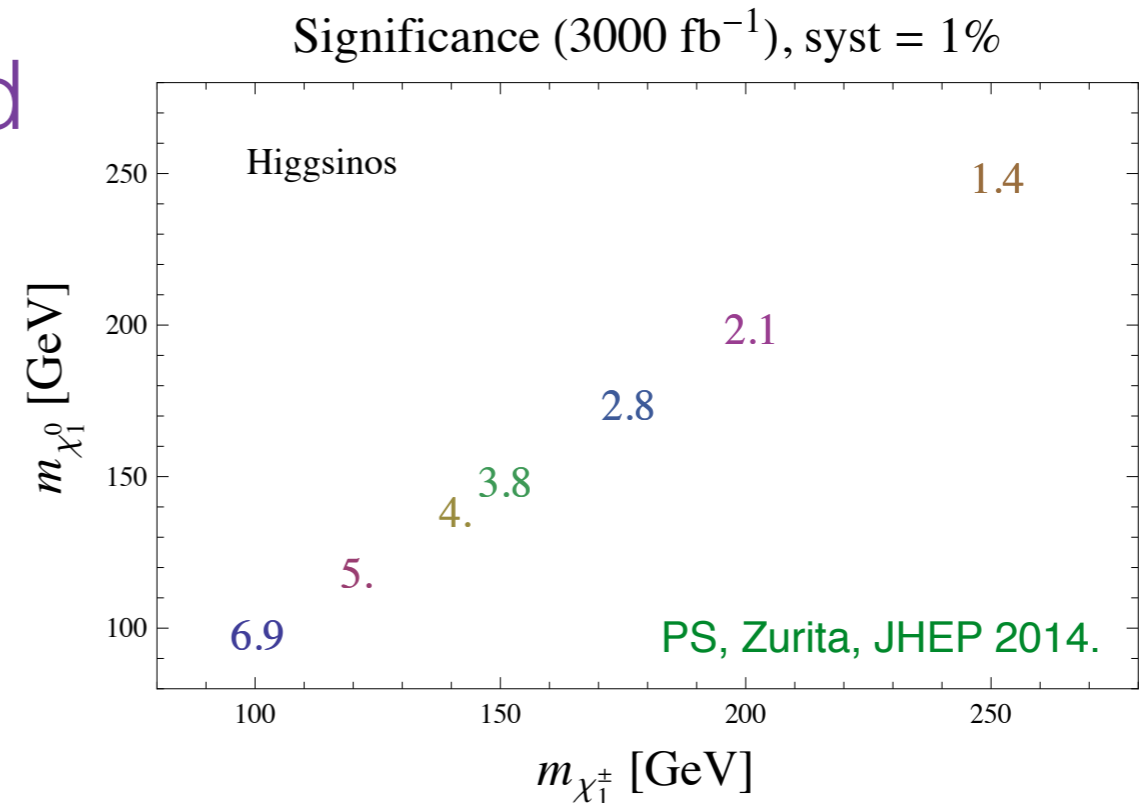
$$\mathcal{L}_5 = \bar{\chi} \chi G G.$$

- Simplified models are an option

Scenarios

1. Few σ excess at the end of LHC 14

- E.g. pure Higgsino
2-5 σ after 3ab^{-1}
- Can we distinguish it from e.g. a Wino?



2. Nothing seen at LHC

- How well can we do?

Discussion

- Models
- More channels? VBF, ttbar, soft leptons, ...?
- Can angular/kinematic variables be useful or even better than just ratios?
- ...