

# DM Coordination Meeting



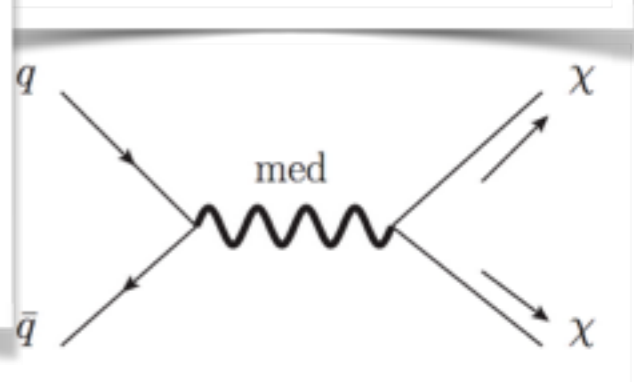
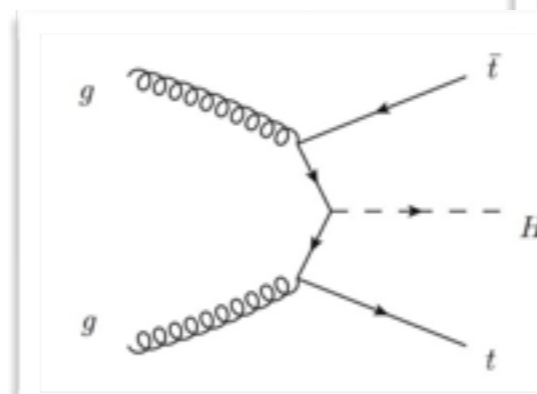
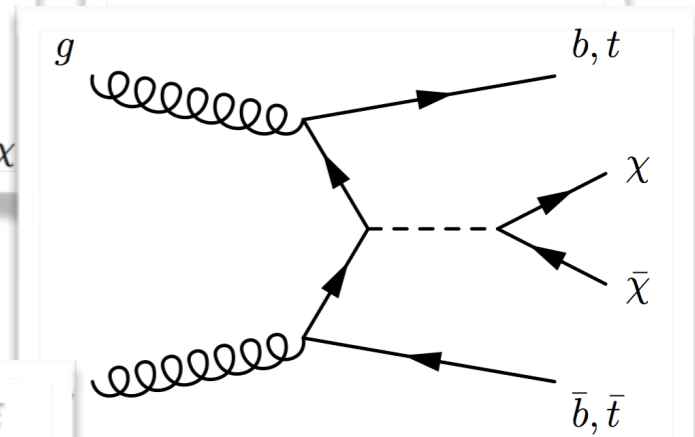
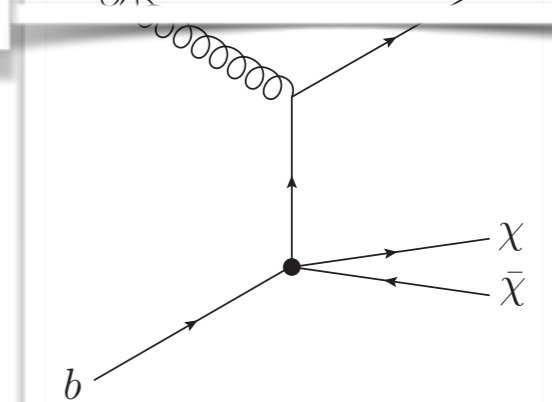
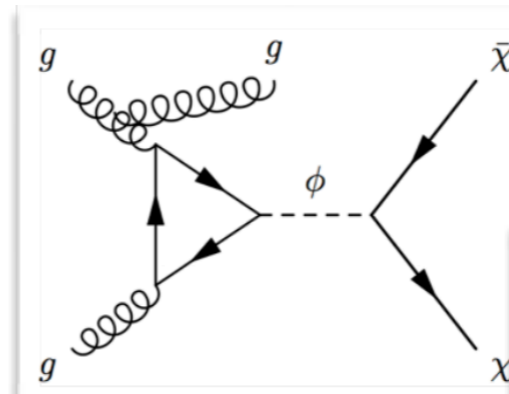
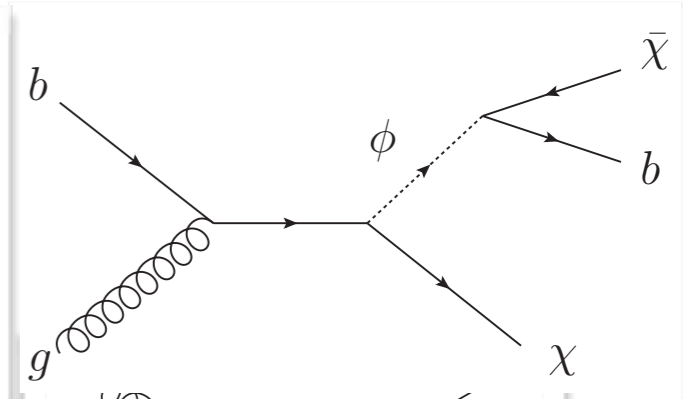
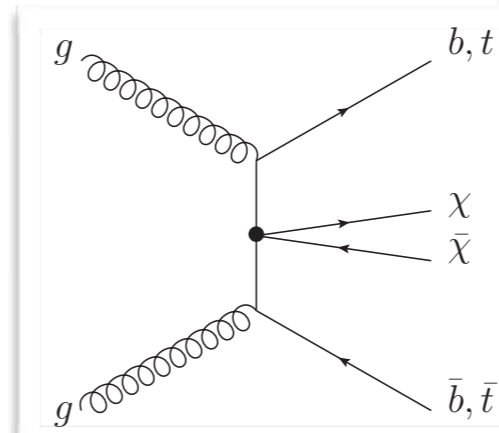
University of  
Zurich<sup>UZH</sup>

Imperial College  
London

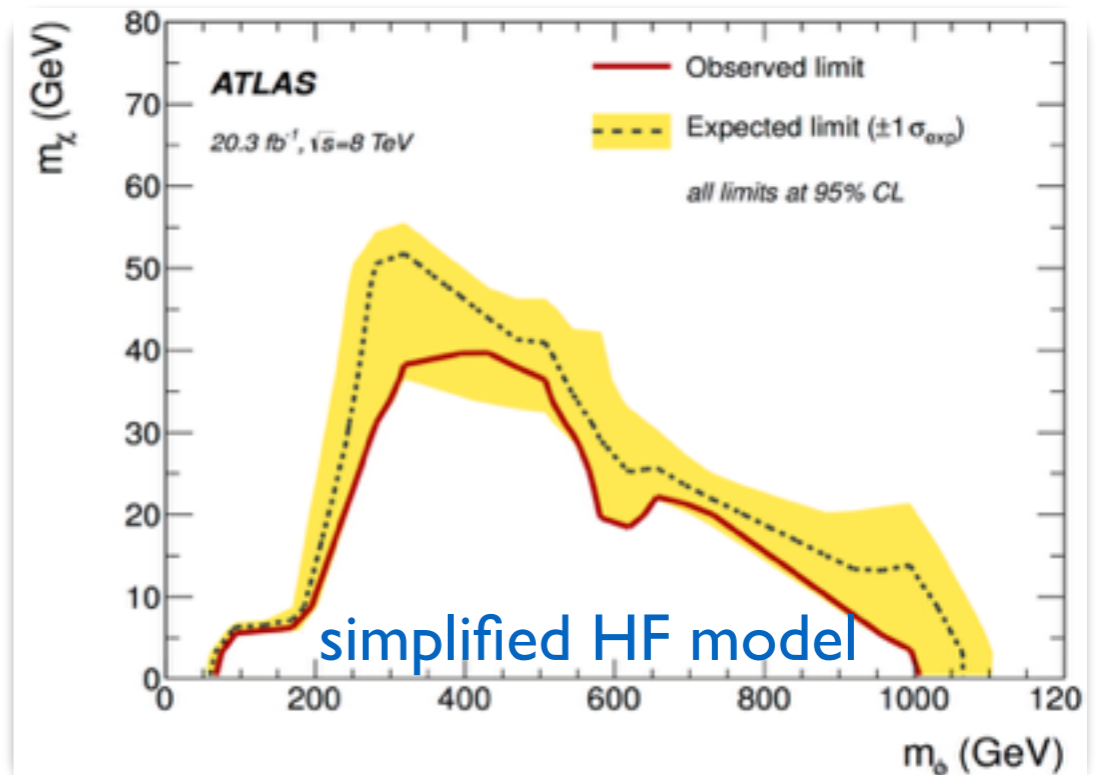
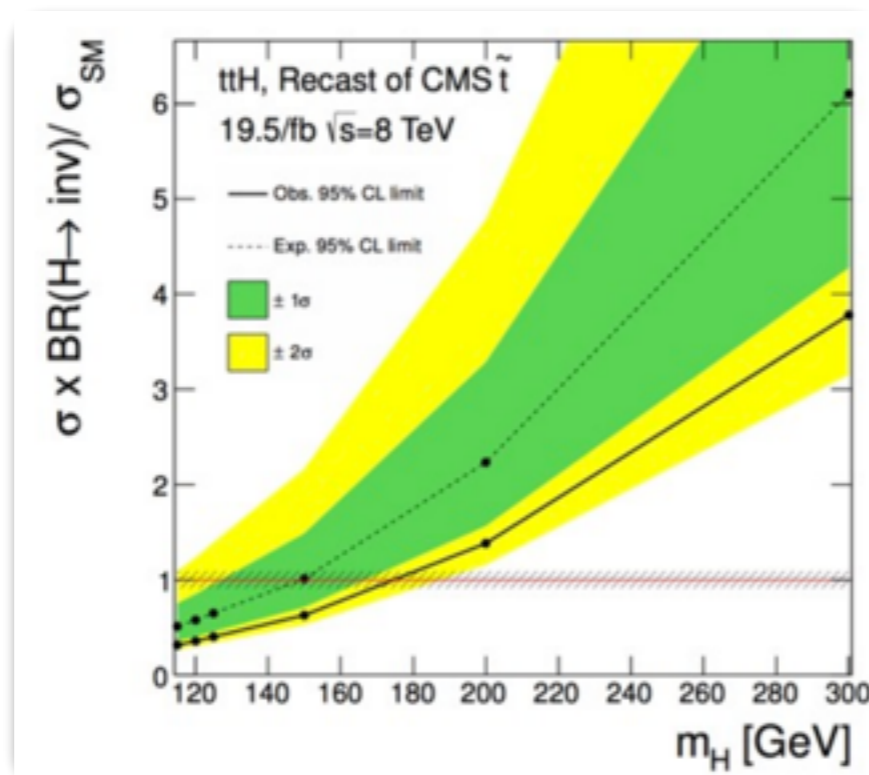
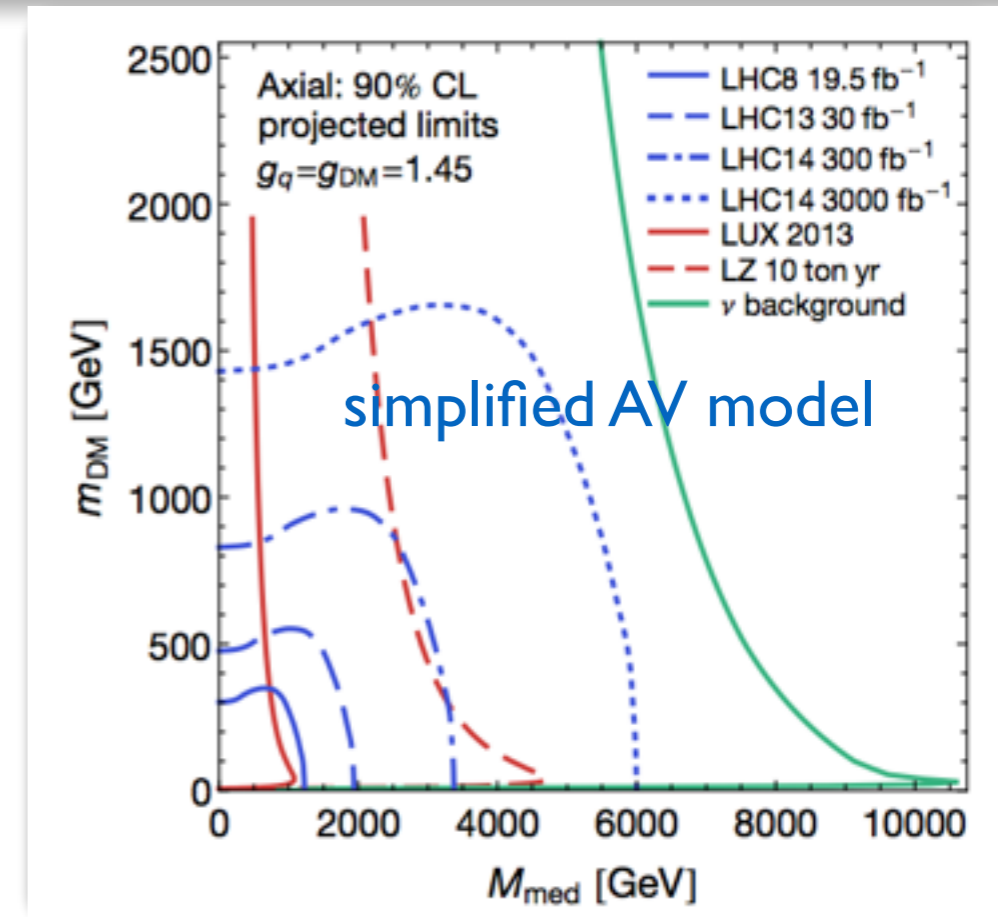
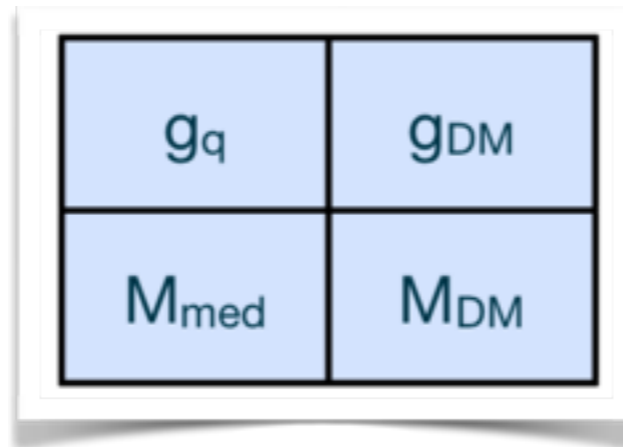
Deborah Pina, Florencia Canelli,  
Yong Yang, Annapaola De Cosa

Sarah Malik, Christian Laner,  
Oliver Buchmüller, Björn Penning

- Set up various simulations:
- Simplified light jet:
  - (Pseudo-)Scalar
  - (Vector-)Axial
- Simplified models for heavy quarks
  - DM+tt, DM+b(b) (for benchmarking)
  - bFDM
  - t-channel stop like
  - fermion triplet mediator
- Agreed on particular interesting parameters during [Durham-Bristol-Imperial Theory workshop](#)
- Many thanks to [Matt Buckley](#), [Tongyan Lin](#), [Valya Khoze](#), [Ciaran Willams](#), [Christopher McCabe](#), [Tim Tait](#) etc for useful discussions



- Checked feasibility of these models
- Aim to probe (as appropriate)
  - mediator mass
  - DM mass
  - coupling/width
  - ...



- All (public) models collected on [DM@LHC](https://twiki.cern.ch/twiki/bin/view/DMLHC/WebHome) web page
  - <https://twiki.cern.ch/twiki/bin/view/DMLHC/WebHome>
- Detailed information posted:
  - Theory authors and papers
  - Model tar files
  - Config files
  - Cross sections & example distributions
  - Calculations and results for coupling, relic density normalization etc
- Should be truly transparent, try to include if possible/known ATLAS counter part in conversations (e.g. Priscilla Pani for heavy jets)
- Twice growing as more results become available
- Very inclusive, get in touch if we missed you

**DM+tt**

The model is a variation of the original [DM EFTmodel](#) extended to top-quark pairs as studied by [Lin et al.](#) and [Artoni et al.](#)

The models come in the typical Dirac and Majorana incarnations with couplings specified as D1, D5 etc.

**Process**

Example card file:

```
import model EFTDM -modelname
define p = g u c d s u- c- d- s-
define j = g u c d s u- c- d- s-
define l+ = e+ mu+
define l- = e- mu-
define vl = ve vm vt
define vl- = ve- vm- vt-
define p = g u u- d d- s s- c c- b b-
define j = g u u- d d- s s- c c- b b-
define p = g u u- d d- s s- c c- b b- t t-
define j = g u u- d d- s s- c c- b b- t t-
generate p p > chi chi- t t- QCD=0 QCD=6 D1=1 D2=0 D3=0 D4=0 D5=0 D6=0 D7=0 D8=0 D9=0 D10=0 D11=0 D12=0 D1
```

**Model files**

Model files are attached for

- Fermion Dirac DM: [EFTDM.tar.gz](#) (attached)
- Majorana DM: [EFTDMS.tar.gz](#) (attached)

The mediator mass is set to  $M^*=1$  TeV.

**Kinematic Distributions**

The following kinematic distributions are based on the attached [run\\_card\\_DMtt.dat](#). Only selected DM masses are shown.

