

# Top quarks in ATLAS (or: my life with tops)

DESY FH Fellow Meeting

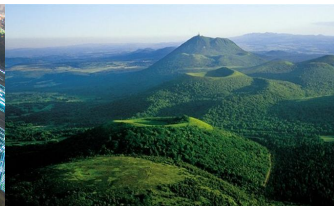
Timothée Theveneaux-Pelzer

DESY - Zeuthen

Tuesday February 27<sup>th</sup>, 2018

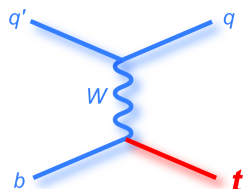
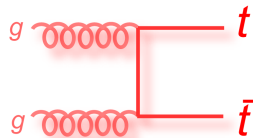
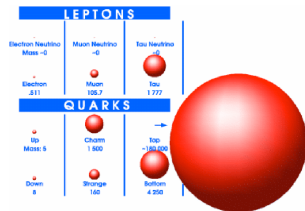


- Most of my life (since 1985) close to Paris
  - born and grew up in Noisy-Le-Grand
  - studied physics at Université Pierre et Marie Curie
- PhD thesis at LPNHE (Paris) : 2009-2012
- Post-doc at LPC (Clermont-Ferrand) : 2012-2015
- Post-doc at CPPM (Marseille) : 2015-2017
- Post-doc at DESY (Zeuthen) : since Sept. 2017

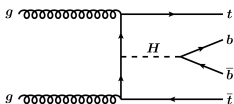


# My work

- Member of ATLAS since 2009
- I have worked mostly on top quarks so far
  - the elementary particle with the largest mass (so far)
- PhD thesis at LPNHE (Paris) : 2009-2012
  - electron reconstruction
  - $t\bar{t}$  cross-section measurement
  - ⇒ main top-quark production mode at the LHC
- Post-doc at LPC (Clermont-Ferrand) : 2012-2015
  - searches for "new physics" in single-top events
  - ⇒ EW production of top quarks : sensitive to new physics
  - convener of ATLAS single-top group
- Post-doc at CPPM (Marseille) : 2015-2017
  - search for  $t\bar{t}H(\rightarrow b\bar{b})$  events
  - ⇒ aiming to measure the top-Higgs coupling
  - convener of ATLAS top-reconstruction group
- Post-doc at DESY (Zeuthen) : since Sept. 2017
  - search for  $t\bar{t}H(\rightarrow b\bar{b})$  events
  - contact of the ATLAS  $t\bar{t}H(\rightarrow b\bar{b})$  analysis



# My favourite plot worst nightmare



- Currently in search for  $t\bar{t}H(\rightarrow b\bar{b})$  events
  - ATLAS paper with  $36 \text{ fb}^{-1}$  : [1712.08895 \[hep-ph\]](https://arxiv.org/abs/1712.08895)
- Irreducible  $t\bar{t} + b\bar{b}$  background challenging to estimate
  - QCD at two different energy scales ( $m_t$  and  $m_b$ )
  - large uncertainties from predictions
  - S/B not better than 5% in purest regions
- Need to kill large uncertainties for next paper !
  - improving  $t\bar{t}$  modelling with better MC generators
  - reducing experimental systematics with better calibrations

