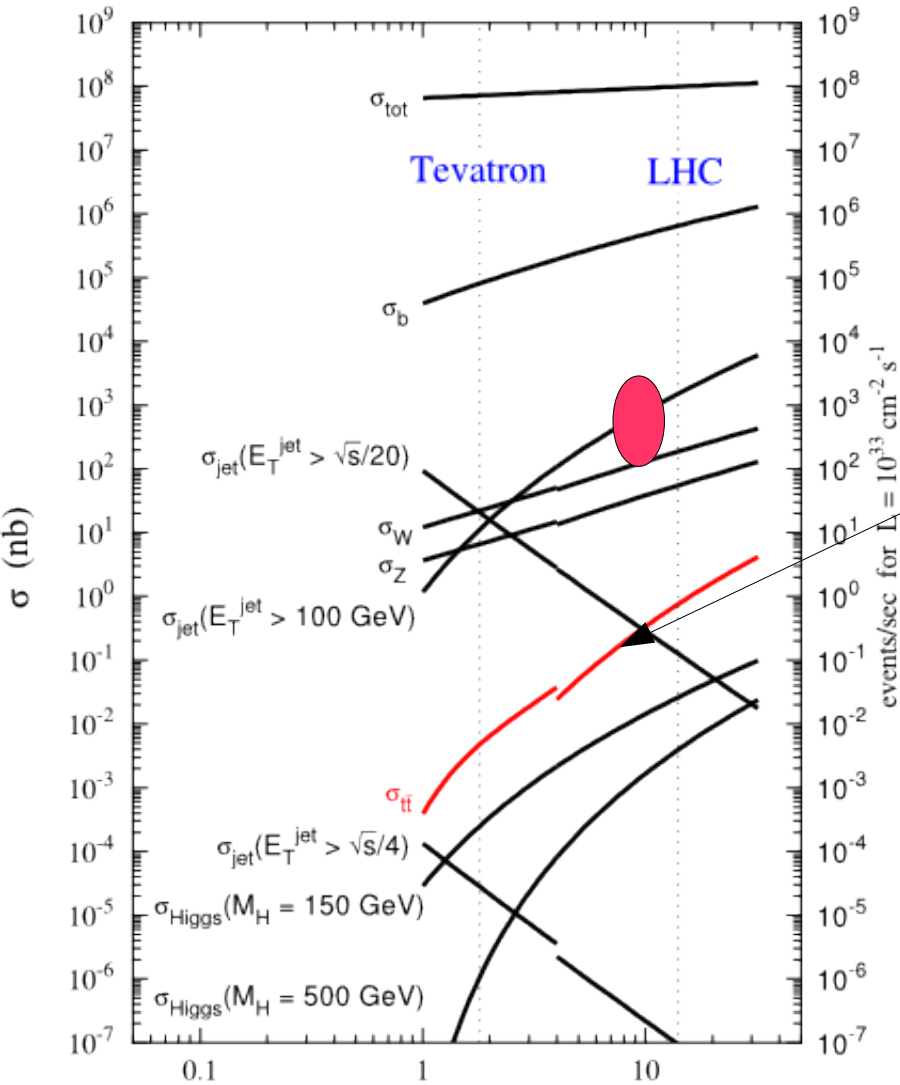


PhD Thesis to Come:  
Measure the Top Quark Mass  
in the  
All Hadronic Channel @ Atlas

by Paul Seidler

# Signal Estimation

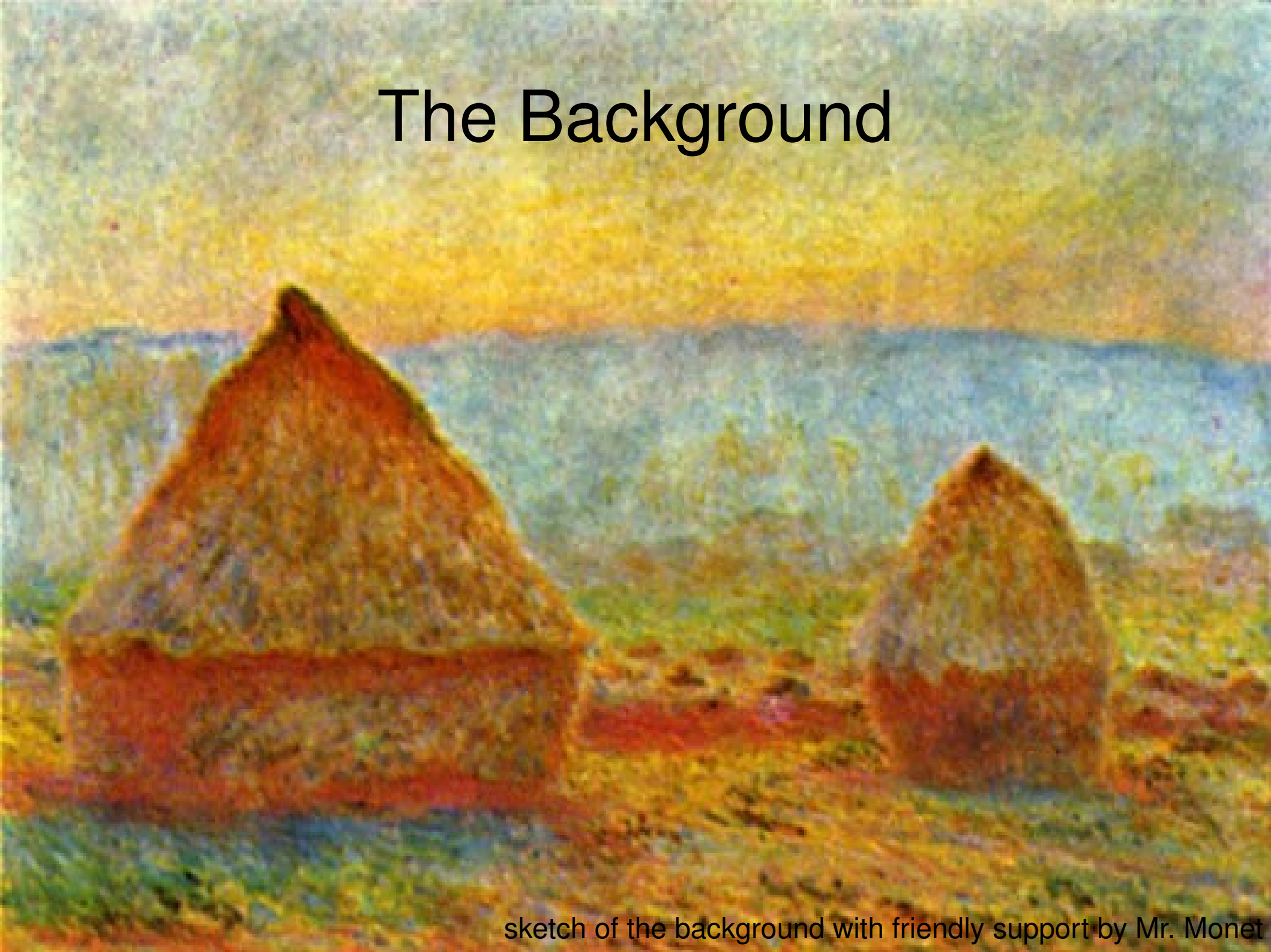
proton - (anti)proton cross sections



**Xsec (pp→ttbar) ~ 100pb**  
**200/pb data next year?**  
**44% all hadronic decays**

**→ up to 8800 all hadronic ttbar decays**

# The Background



sketch of the background with friendly support by Mr. Monet

# Fight The Background

## Background:

- ~3 orders of magnitude higher than signal
- something like 1/2 b-tags + 5/4++ Jets

## To Get a Data Sample:

- Investigate Trigger (Paola)

Improve S/B by X , with Multijet Trigger efficiency

### -Preselection

Make kinematical and topological cuts

Develop neural network

- PhD Thesis (M. Lambacher) (@14TeV)

Proposes Cut Selection, but hardly applicable

- Martins event shapes

- spy at studies from CDF (S/B ~ 1/3 with NN)

# Thinking of a Possible Analysis

very preliminary so far...

Use a [Matrix Element Method](#) (CDF arXiv 0811.1062v2)  
to derive Top Mass:

- per event calculate the probability, that signal originated from  $t\bar{t}$  decay  $P(j | M_{top})$
- e.g. extract  $M_{top}$  that maximizes this function per event
- create likelihood function out of these

→ derive top mass... BUT still a long way to go

# steps on the way and ?'s

- statistics?
- $t\bar{t}$  cross section (depends on  $s$ , higher than CDF)
- data quality? (lets see (hopefully))
- understand signal
- understand background (more than CDF, how much?)
  - systematic studies with MC
- matrix element calculation
- JES (biggest uncertainty in this channel at CDF)
- estimate systematical errors
- ...

# Summary

No doubt there will be a lot of work to measure the top mass via the all hadronic channel!

Not many people working on this so far (pro or con?)

Work on this will start from now on!

Lets see what LHC will deliver!