

THOUGHTS ON FUTURE ACTIVITIES

"BRAINSTORMING ON IDEAS"

- what do we do after we have "understood" the top quark processes

- many options:

- perform detail precision measurements.
- use this knowledge to search for new physics (in general or specific models)
- make a link to theory & cosmology (CMB, dark matter, ...)
- ...

TOP QUARK PHYSICS WITH 2009 DATA

(assume 100 pb^{-1} collected at 10 TeV)

$$\Rightarrow 100 \text{ pb}^{-1} \times 400 \text{ pb} = 40'000 \text{ } t\bar{t} \text{ events.}$$

$L \quad \times \quad \sigma$

↓
 $\sim 6'000 \text{ events } t\bar{t} \rightarrow b\mu\nu bq\bar{q}$

Given the usual event selections of 2-5% efficiency
you have 100-300 events to test the Standard Model

\Rightarrow possible to observe the process & measure
simple things, but no complicated differential
analyses

\leadsto first cross section & jet calibration & b-tagging
& simple differential distributions

TOP QUARK PHYSICS WITH 2010 DATA

(assume 1000 pb^{-1} with 14 TeV)

$$\Rightarrow 1000 \text{ pb}^{-1} \times 800 \text{ pb} = 800\,000 \text{ } t\bar{t} \text{ events}$$



$$\sim 120\,000 \text{ events } t\bar{t} \rightarrow b \nu u b q \bar{q}$$

More than enough for most of the analyses, few analyses need more data because they measure detailed properties (= complex) of the process.

\Rightarrow detailed studies of precision measurements can start

\Rightarrow search for new physics features in specific region

two parallel directions we should follow
(measure top quark processes & look for new physics in these topologies) page 3

PRO / CONT 'A

Precision measurements

- ⊕ always a hot topic
- ⊕ learn the details of an experiment
- ⊕ profound physics knowledge
- ⊕ guaranteed result
- ⊕ a lot of interesting optimization tools
- ⊖ long term project
- ⊖ one can get stuck on a small issue for a long time

Search for new physics

- ⊕ exciting (want to be first)
- ⊕ learn about new physics models
- ⊕ short term projects
- ⊕ link with cosmology
(model dependent!)
- ⊖ does not necessarily study reality
- ⊖ most of the searches have a null result

Combining both provides the best option for an interesting and broad future ...