



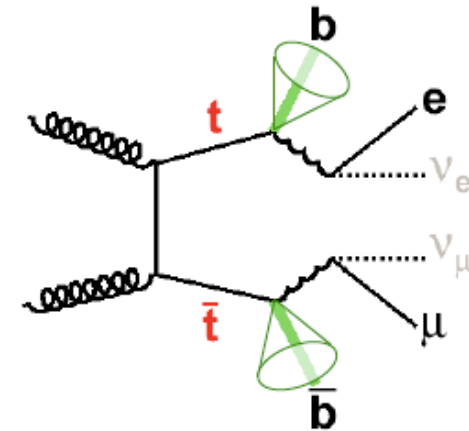
Vrije  
Universiteit  
Brussel

UMONS  
Université de Mons



UCL  
Université  
catholique  
de Louvain

## Top Quark Physics in Belgium Period 2003-2009



- as part of the CMS collaboration
- 5 key staff members: *Prof. J.D'Hondt (VUB)*, *Prof. C.Vander Velde (ULB)*, *Prof. V.Lemaitre (UCL)*, *Dr. E.Daubie (UMons)*, *Prof. M.Grunewald (UGent)*
- in total 14 PhD students & 8 post-docs
- convenorship of Top Quark physics in CMS (*Prof. J.D'Hondt*), subgroup convenorship for Single-top physics (*Dr. A.Giammanco*)
- two times winner of the annual CMS Thesis Award (*Dr. S.Lowette & Dr. J.Heyninck*)
- in total ~25 notes/papers (~400 pages of research results) & ~25 conference talks
- connection to phenomenology of top quark physics in Belgium (*Prof. F.Maltoni*)
- involvement in different areas, examples: **commissioning** activities for top quark physics, **calibration** of jets, calibration of b-tagging algorithms, commissioning of particle flow and other methods for top quark physics, diverse **measurements** (cross section, mass,  $V_{tb}$ , angular distributions), **search for new physics** in the top quark sector (fourth generation, resonances, charged Higgs, ...)
- organizers of the *3rd International Top Quark Workshop* (Bruges, May-June 2010)



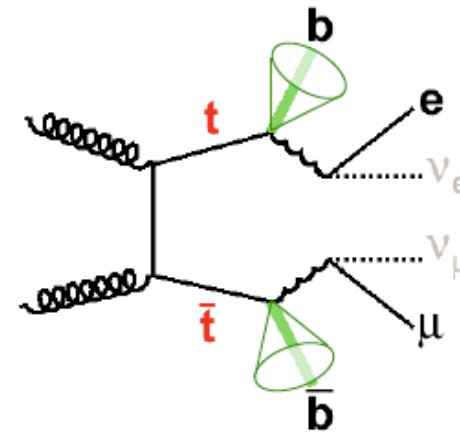
Vrije  
Universiteit  
Brussel

UMONS  
Université de Mons

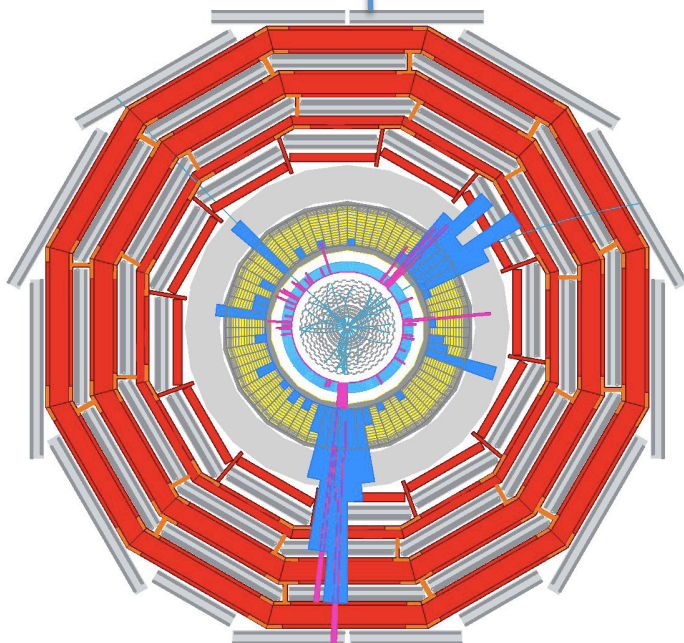


UCL  
Université  
catholique  
de Louvain

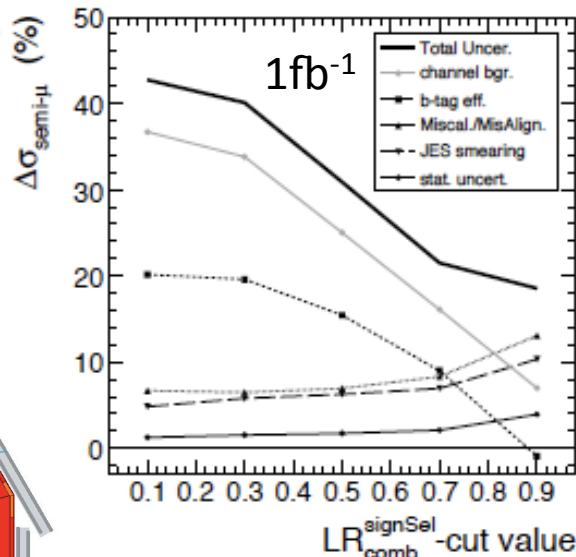
# Top Quark Physics in Belgium Period 2003-2009



Some examples  
top quark pairs

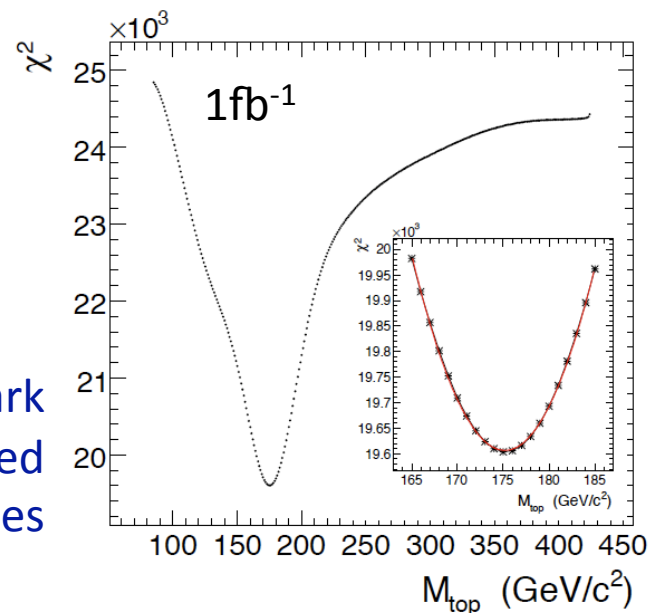


Simulated top pair event at CMS



Reducing the total uncertainty  
on the cross section with  
creative cuts

Measuring the top quark  
mass with advanced  
likelihood techniques





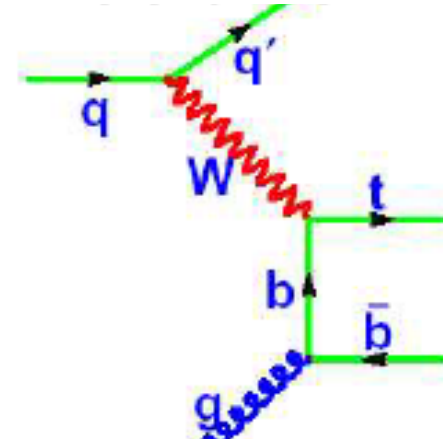
Vrije  
Universiteit  
Brussel

UMONS  
Université de Mons



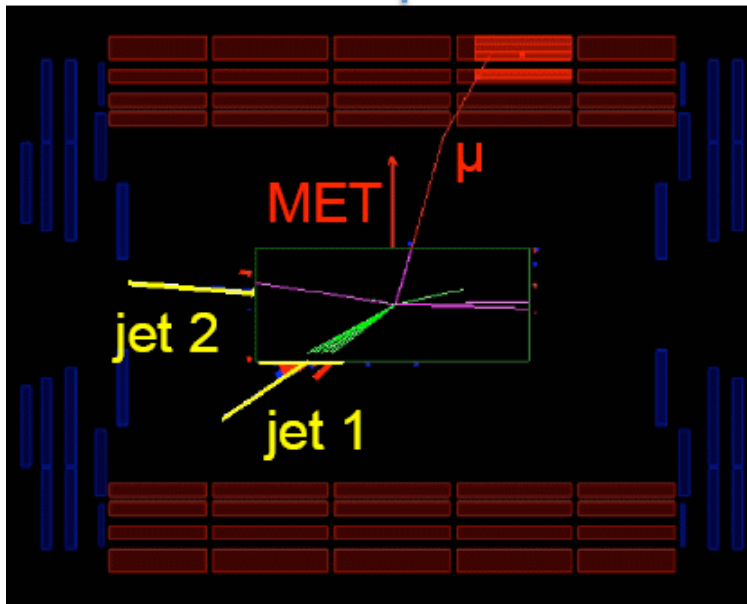
UCL  
Université  
catholique  
de Louvain

# Top Quark Physics in Belgium Period 2003-2009

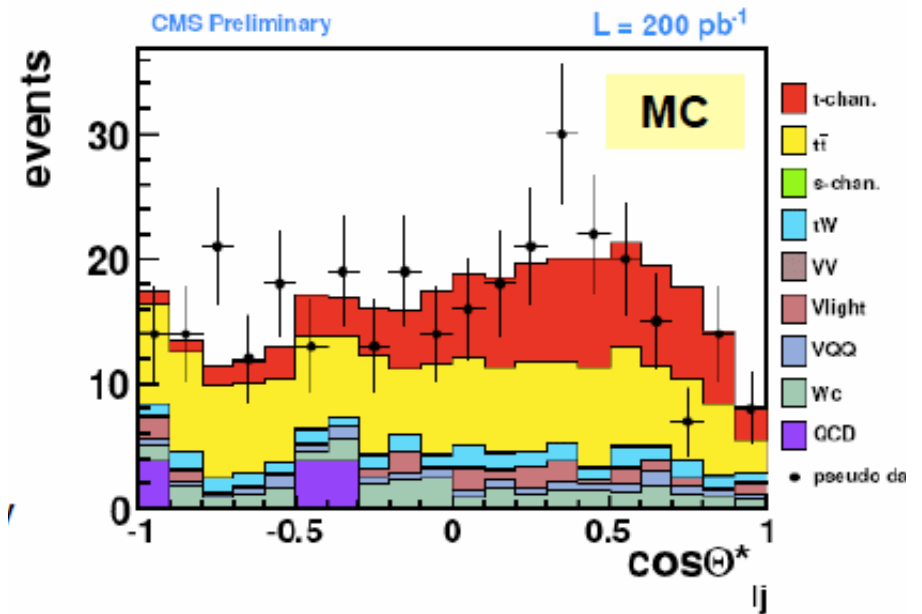


*Some examples  
single-top*

Extracting the single-top components  
via the angular distribution of the top  
quark decay, to measure  $|V_{tb}|$



Simulated single top event at CMS





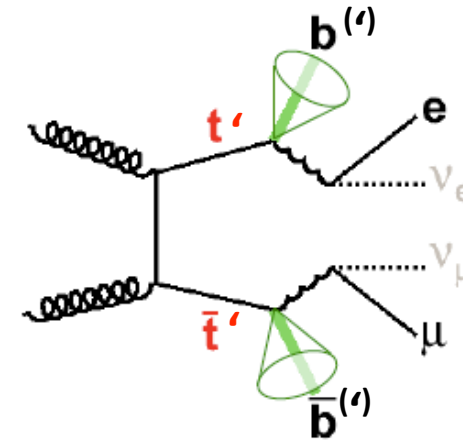
Vrije  
Universiteit  
Brussel

UMONS  
Université de Mons

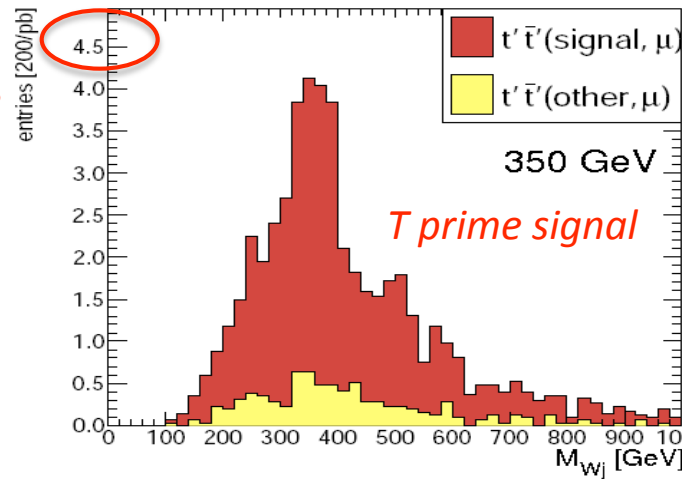


UCL  
Université  
catholique  
de Louvain

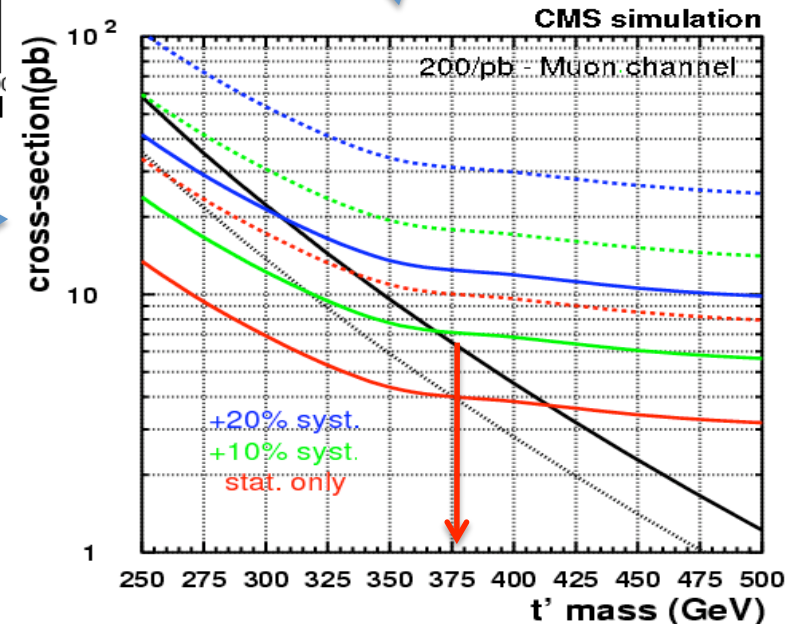
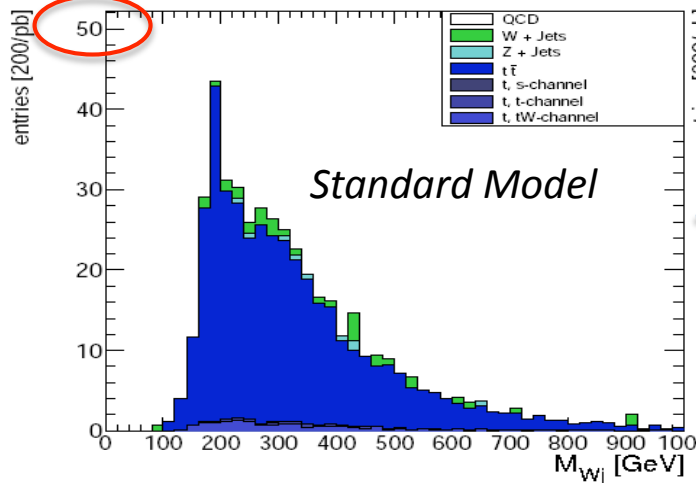
# Top Quark Physics in Belgium Period 2003-2009



Some examples  
New physics in the  
top quark sector



expected limits for  
 $t'$  particles with  $200\text{pb}^{-1}$





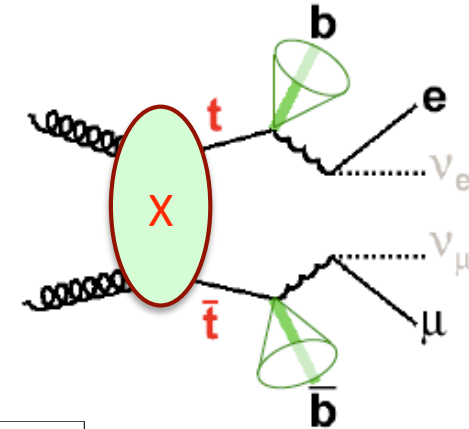
Vrije  
Universiteit  
Brussel

UMONS  
Université de Mons

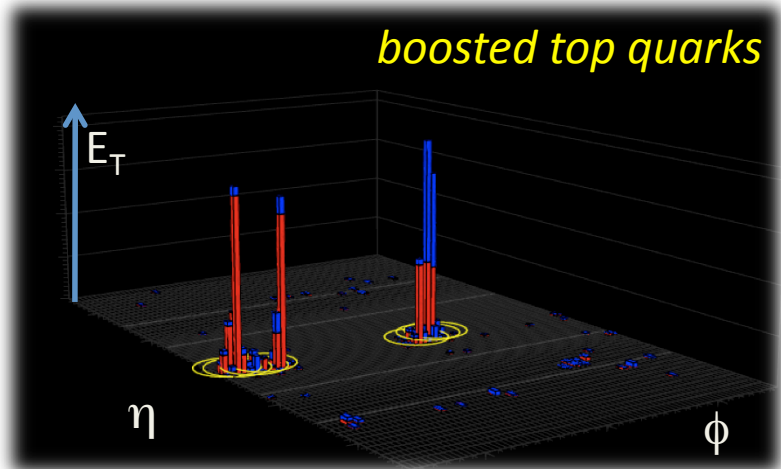
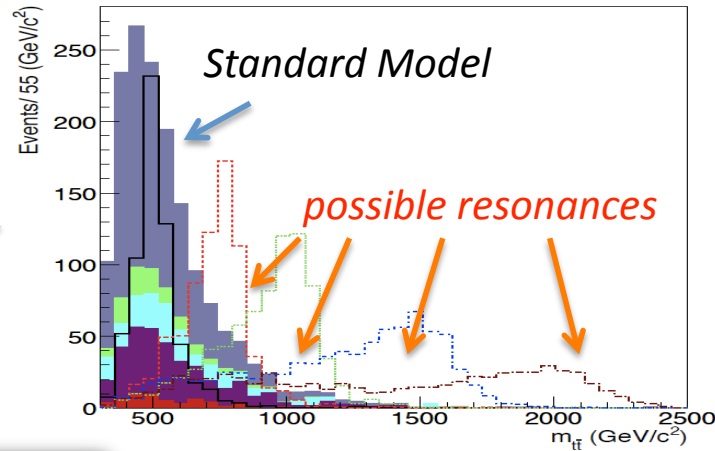


UCL  
Université  
catholique  
de Louvain

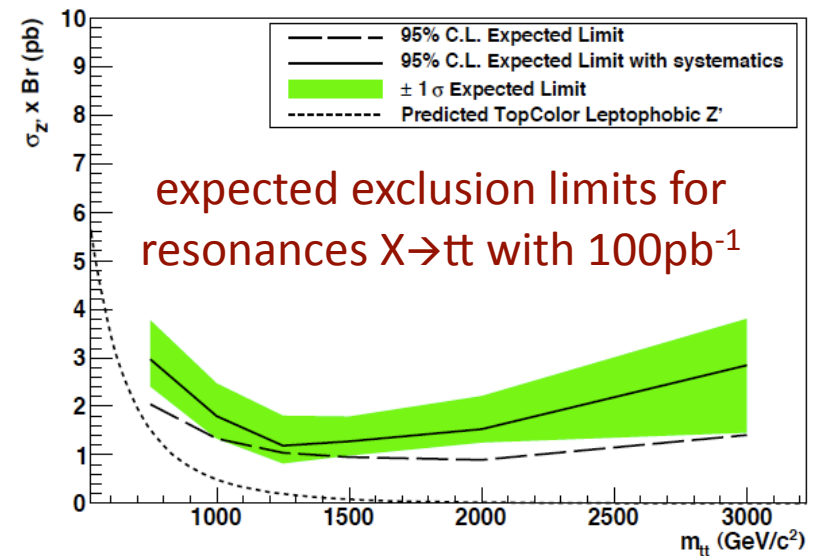
# Top Quark Physics in Belgium Period 2003-2009



*Some examples  
New physics in the  
top quark sector*



Simulated  $Z' \rightarrow t\bar{t}$  event at CMS







ULB



Vrije  
Universiteit  
Brussel

UCL

Université  
catholique  
de Louvain

## Top Quark Physics in Belgium Outreach

- 3<sup>rd</sup> International Workshop on Top Quark Physics
- theory & experiment
- about 130 participants



## TOP2010 Conference

30<sup>th</sup> of May - 5<sup>th</sup> of June 2010  
Brugge, Belgium

[www.top2010.be](http://www.top2010.be)

CP3 - IIHE

