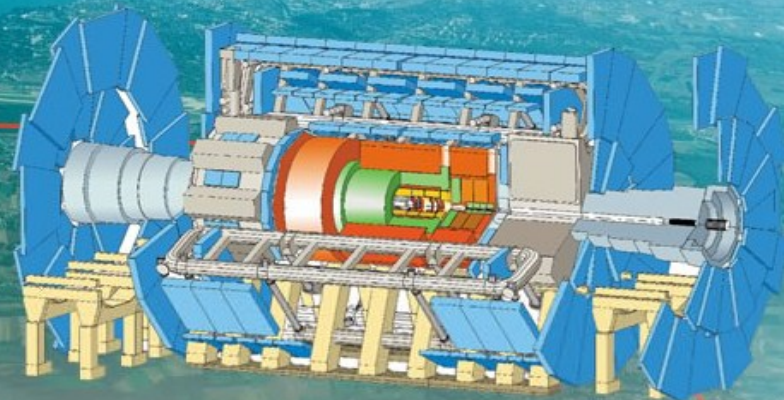


# Introduction on ATLAS FCPPL Project

ACC/CEA/IN2P3

Emmanuel MONNIER (CPPM)





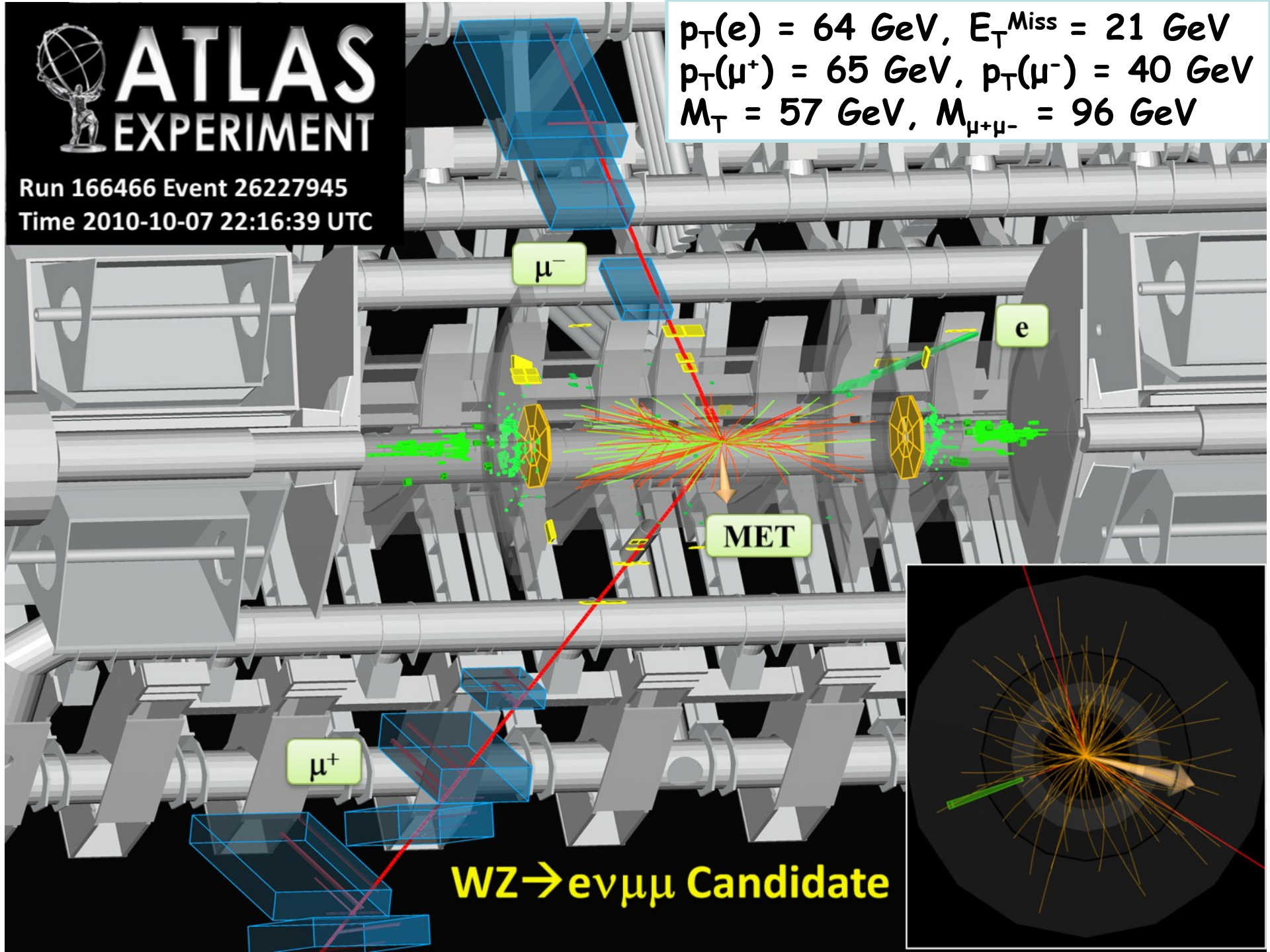


# ATLAS EXPERIMENT

Run 166466 Event 26227945

Time 2010-10-07 22:16:39 UTC

$p_T(e) = 64 \text{ GeV}$ ,  $E_T^{\text{Miss}} = 21 \text{ GeV}$   
 $p_T(\mu^+) = 65 \text{ GeV}$ ,  $p_T(\mu^-) = 40 \text{ GeV}$   
 $M_T = 57 \text{ GeV}$ ,  $M_{\mu^+\mu^-} = 96 \text{ GeV}$



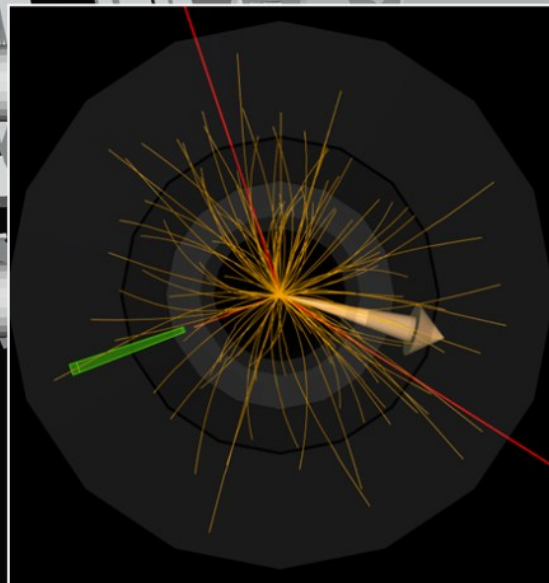
$\mu^+$

$\mu^-$

e

MET

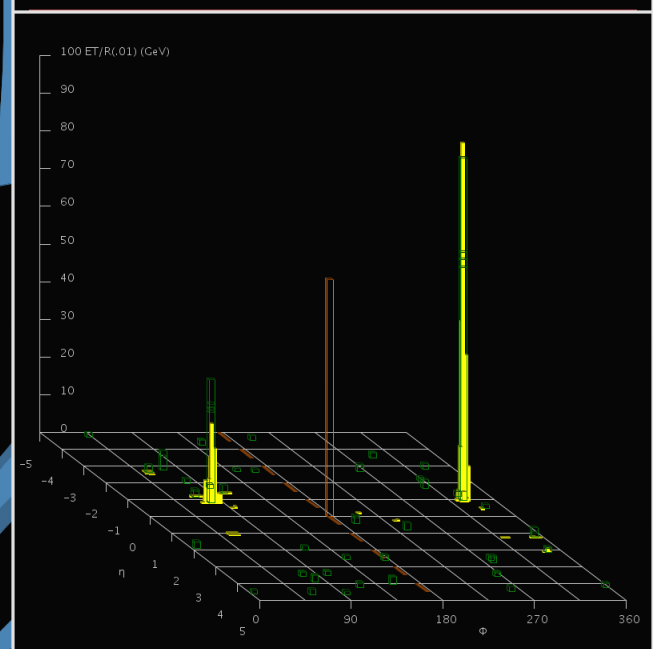
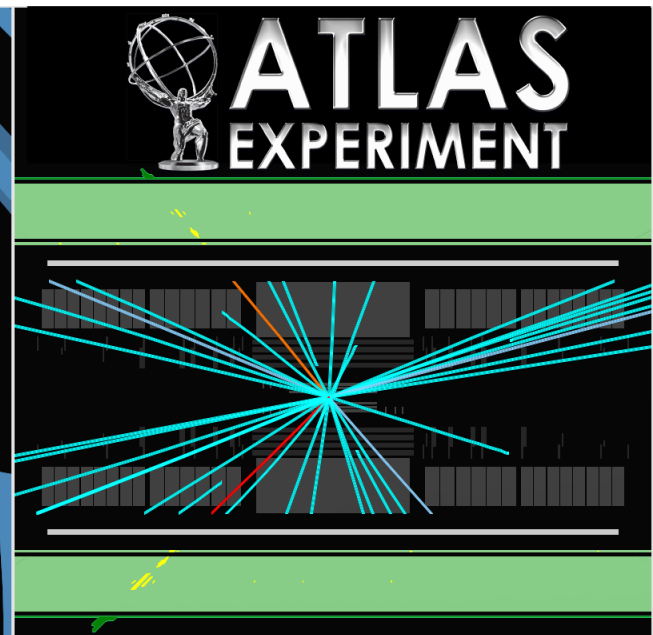
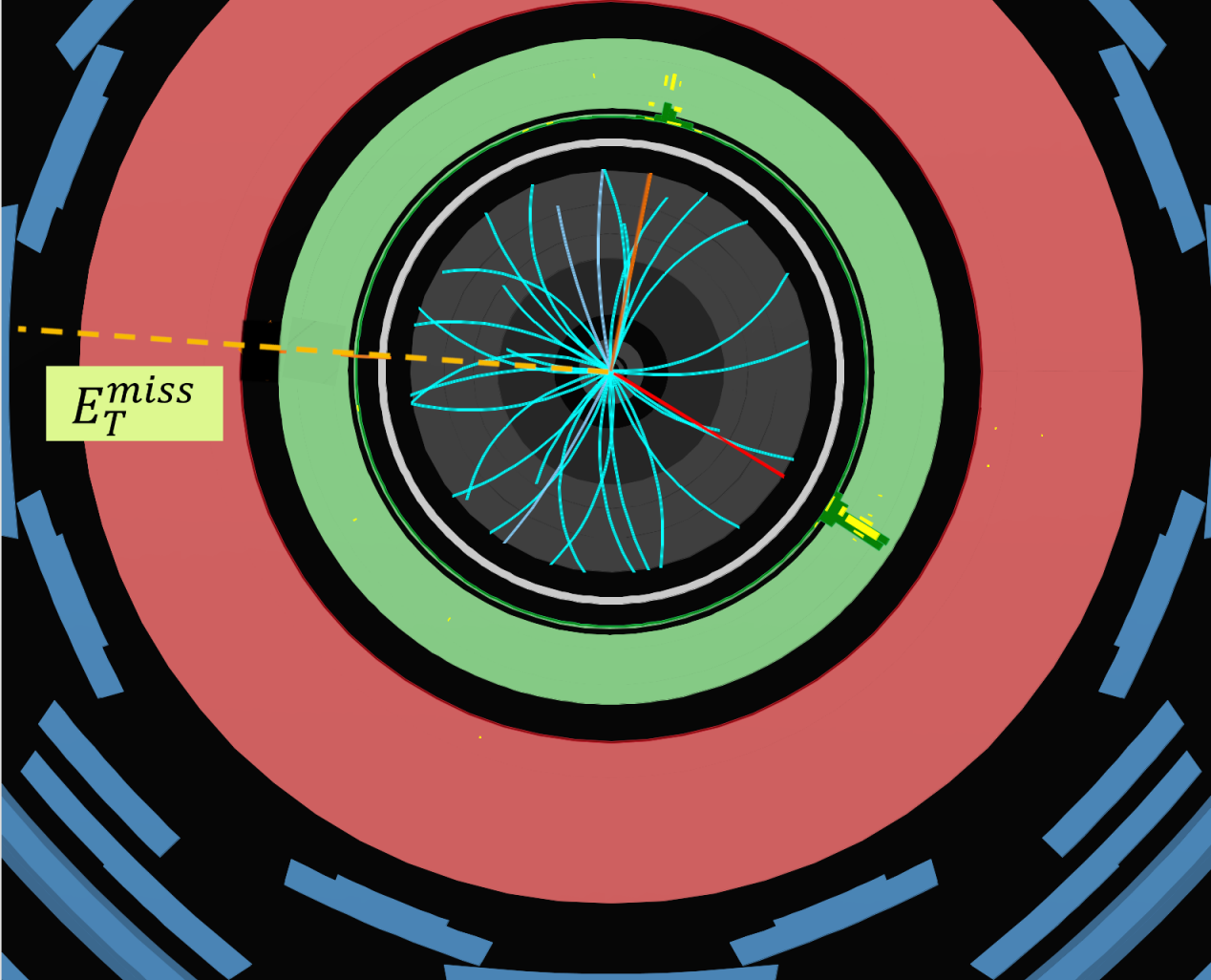
**$WZ \rightarrow e\nu\mu\mu$  Candidate**



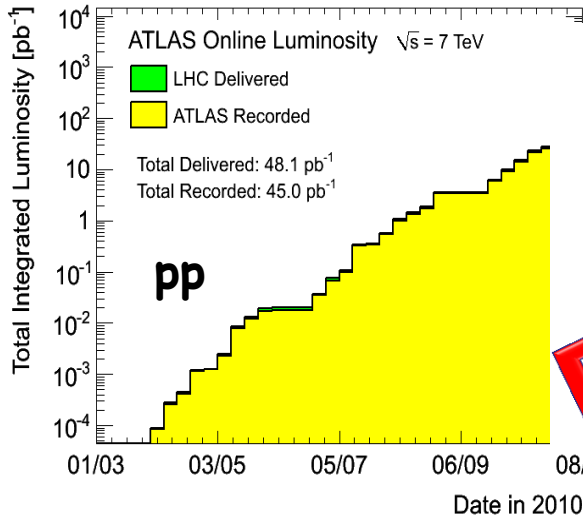
# WW $\rightarrow$ $e\nu e\nu$ Candidate

Run 166927 Event 23152220

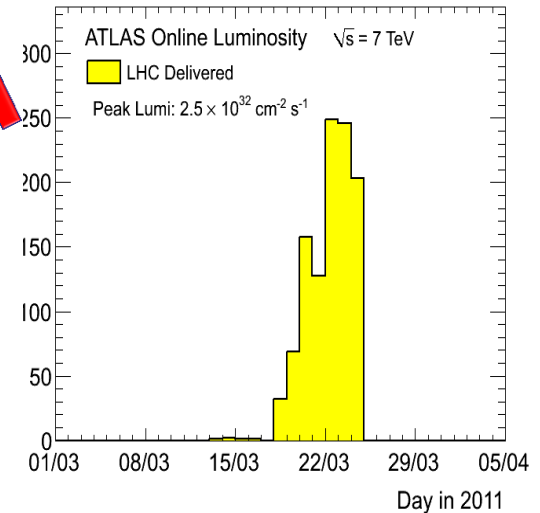
Time 2010-10-17 03:02:49 EDT



- In 2010 at 7TeV,  $\sim 45\text{pb}^{-1}$  pp,  $\sim 9\mu\text{b}^{-1}$  HI, more than 35 physics publications in the pipeline, **Very Successful Year !**
- Lots of work on Combined Perf and on Data quality, for example on LAr Calorimeter noise then on background studies using T/P technics...



**FCPPL2011**



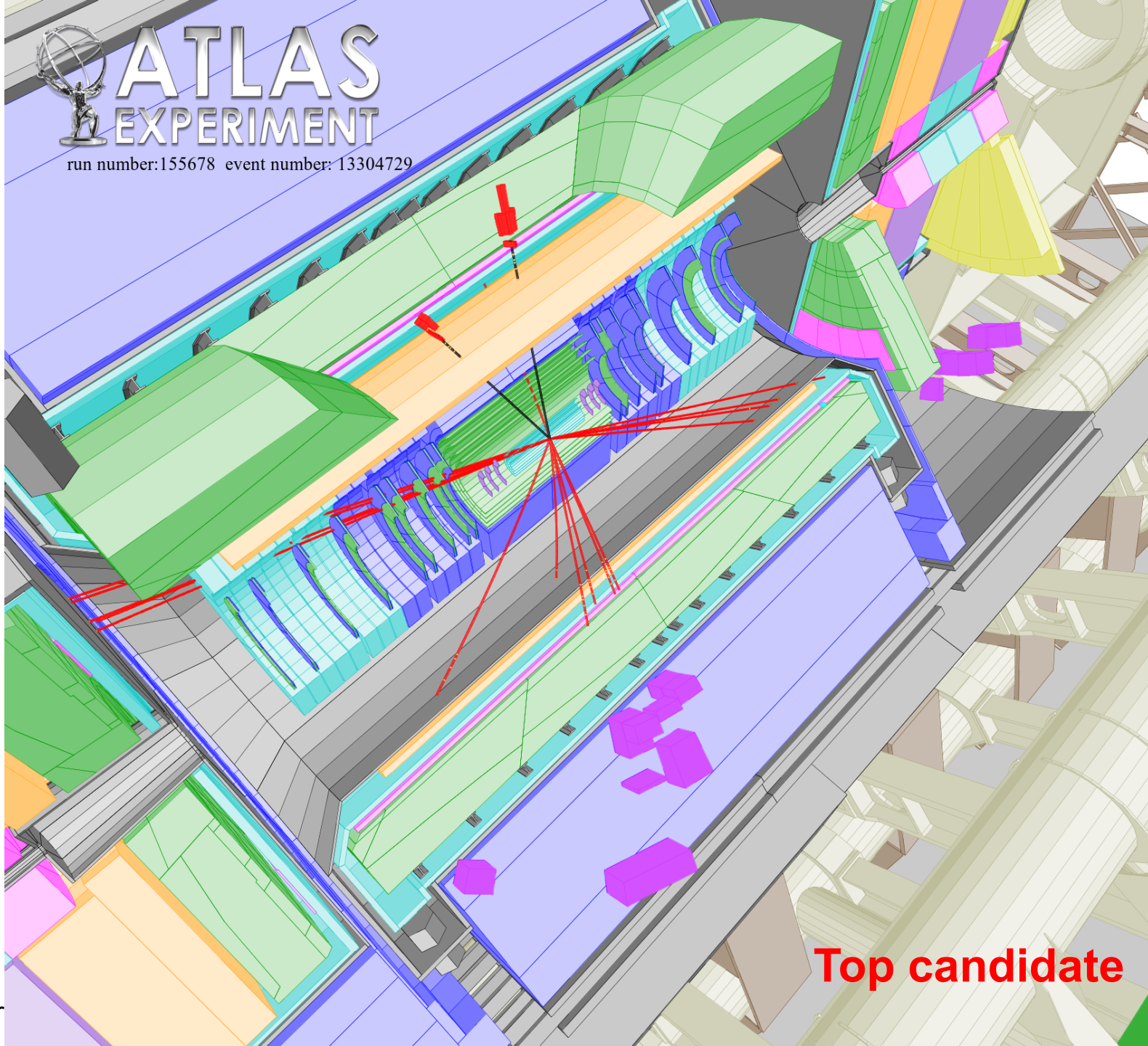
- In 2011, improved detector ( $>97\%$  efficient),  $> 20\text{pb}^{-1}$  already !
- @7TeV until end of 2012, **up to  $2\text{fb}^{-1}$**  in 2011 (depend LHC perf)
  - Shift in physics expectation and focus on data analysis
  - top, di bosons, SUSY, Higgs studies ...
  - and C. Perf. studies: E/gamma, Jet/Etmiss, B tag,  $\mu$ , Trigger...
  - and continue Data quality work, Shifts, ...





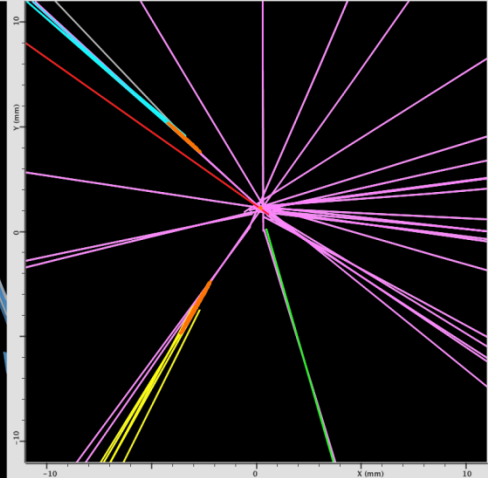
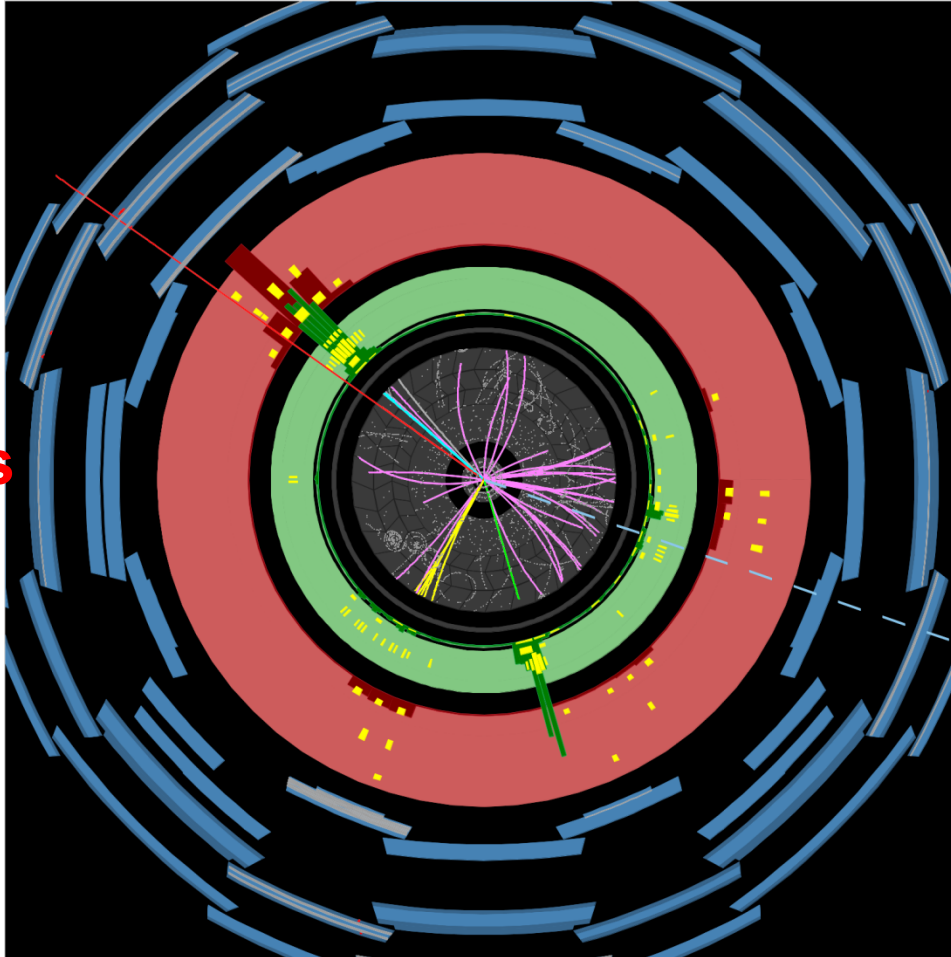
# ATLAS EXPERIMENT

run number: 155678 event number: 13304729



**Top candidate**

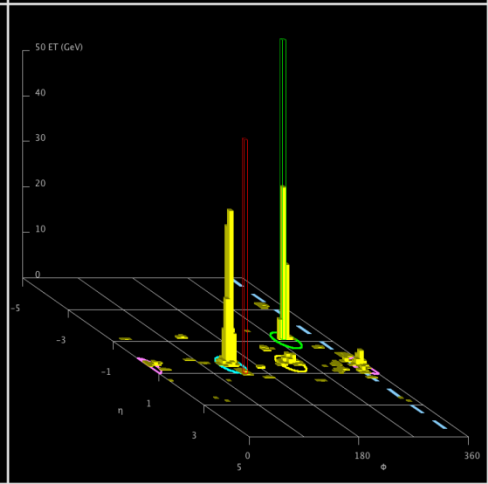
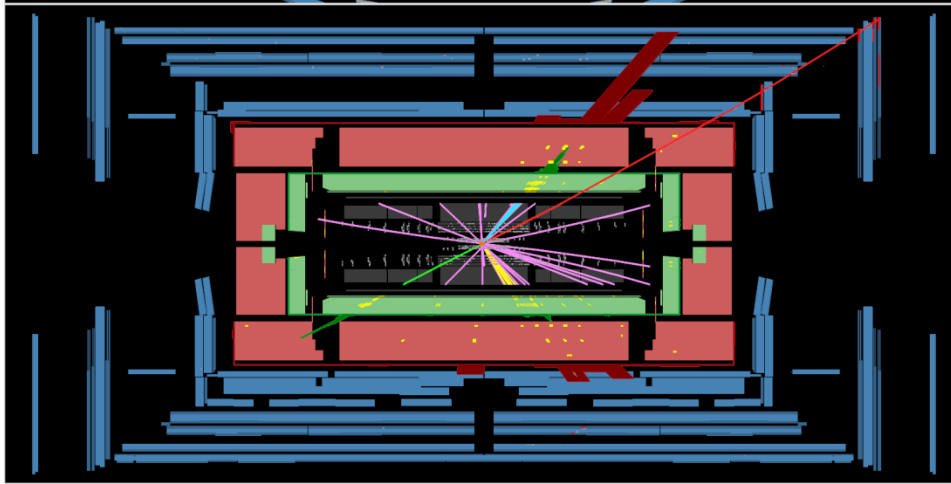
**Top->emu2b:  
e id, b tag, jets  
Missing E**



 **ATLAS  
EXPERIMENT**

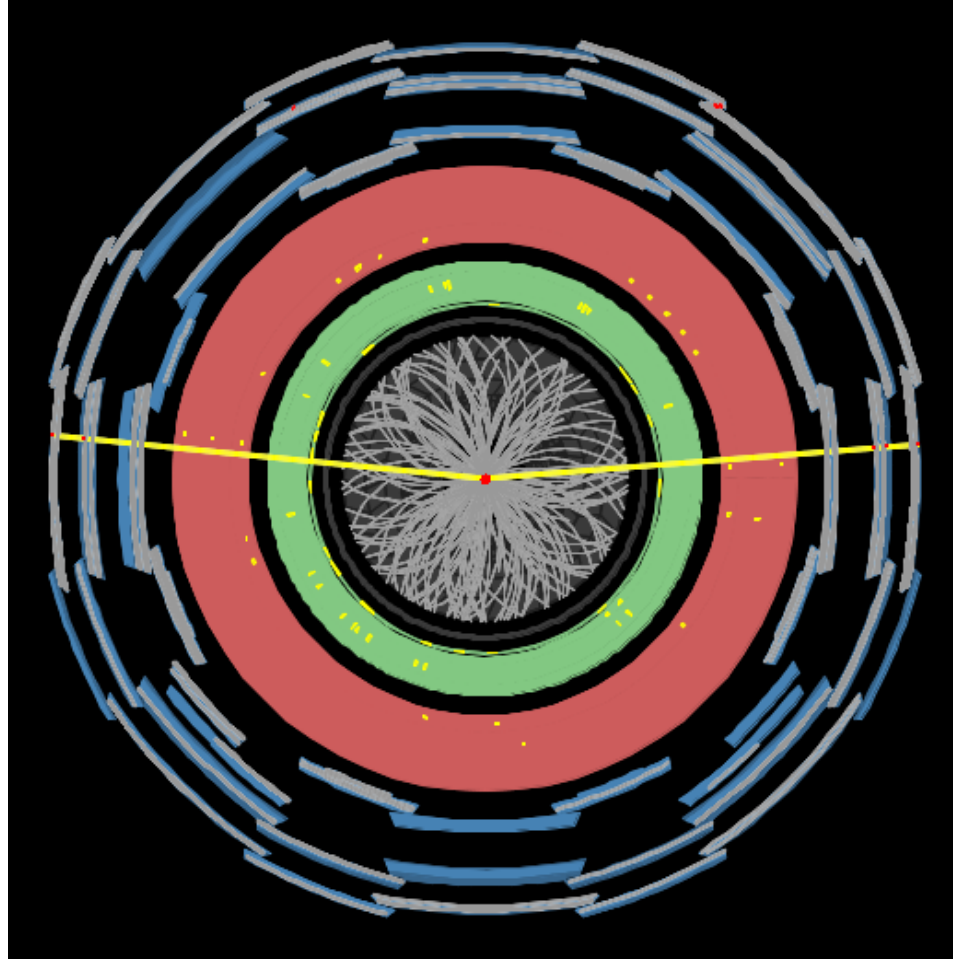
Run Number: 160958, Event Number: 9038972

Date: 2010-08-08 11:01:12 BST



21-Mar-12

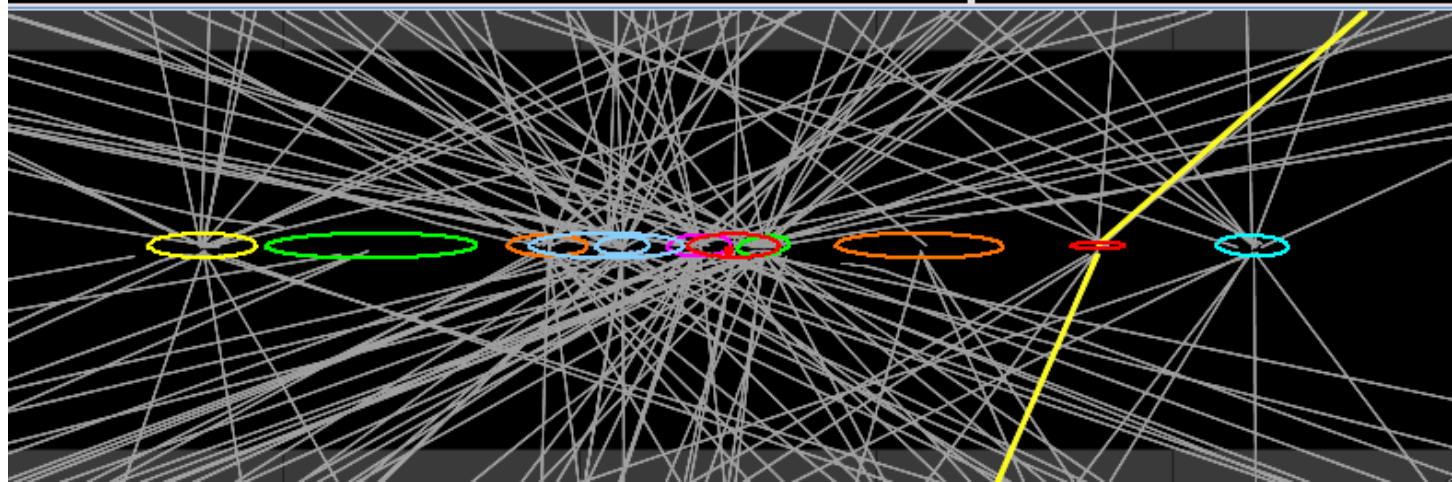
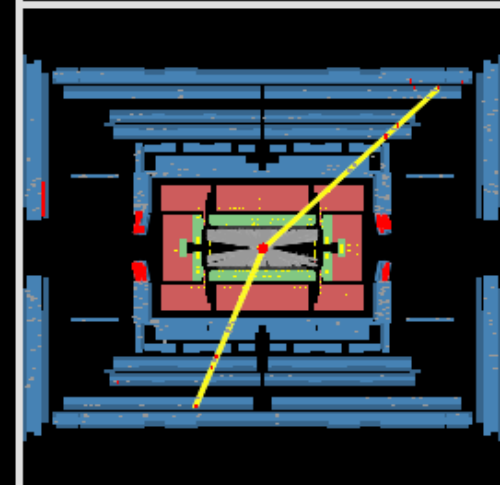
# Z with pileup



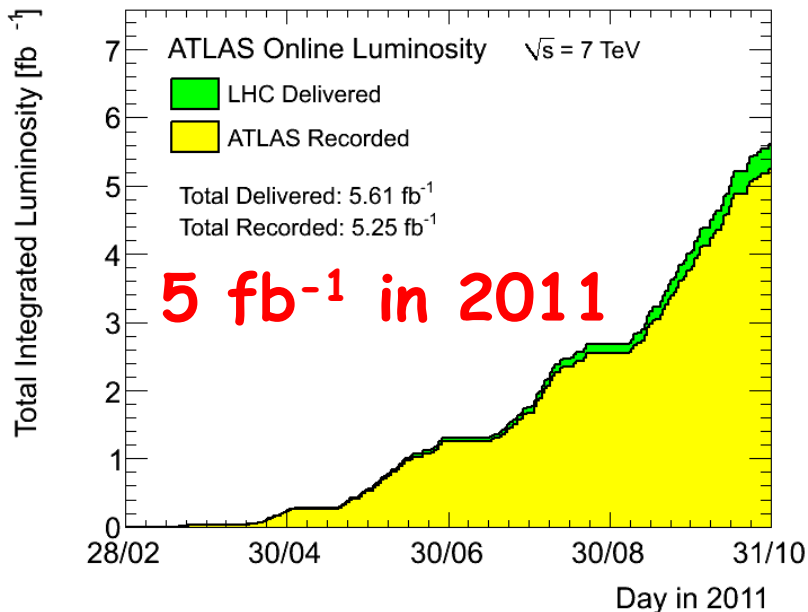
 **ATLAS**  
EXPERIMENT

Run Number: 180164, Event Number: 146351094

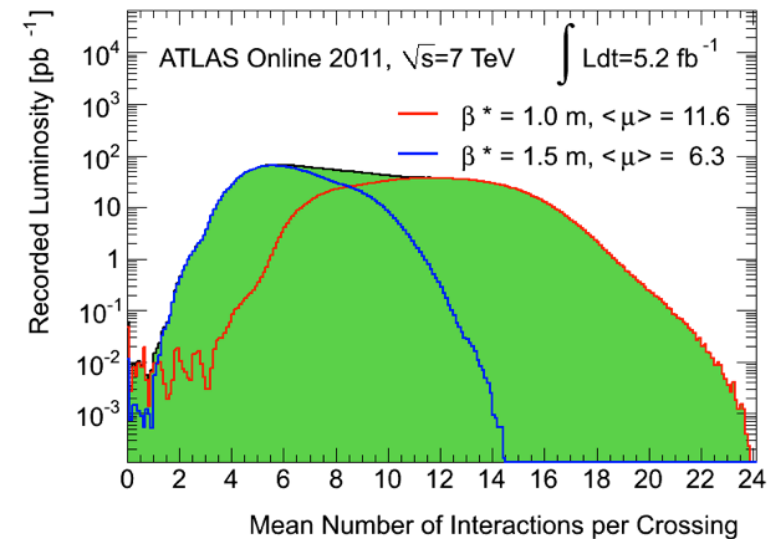
Date: 2011-04-24 01:43:39 CEST







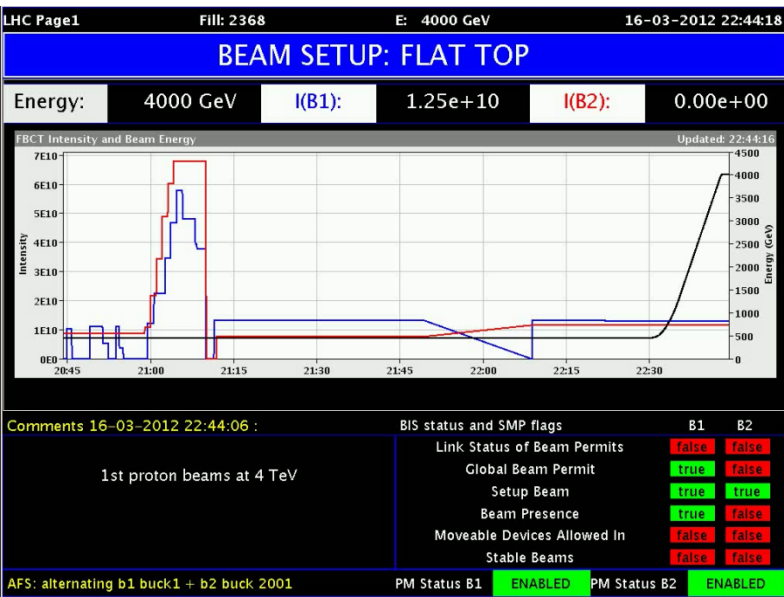
Subdetector	Number of Channels	Approximate Operational Fraction
Pixels	80 M	95.9%
SCT Silicon Strips	6.3 M	99.3%
TRT Transition Radiation Tracker	350 k	97.5%
LAr EM Calorimeter	170 k	99.9%
Tile calorimeter	9800	99.5%
Hadronic endcap LAr calorimeter	5600	99.6%
Forward LAr calorimeter	3500	99.8%
LVL1 Calo trigger	7160	100%
LVL1 Muon RPC trigger	370 k	98.4%
LVL1 Muon TGC trigger	320 k	100%
MDT Muon Drift Tubes	350 k	99.7%
CSC Cathode Strip Chambers	31 k	97.7%
RPC Barrel Muon Chambers	370 k	93.8%
TGC Endcap Muon Chambers	320 k	99.7%



- **130 papers submitted**
- **300 Conf notes...**
- **Thousands supporting notes**



In 2012:  
 8TeV, 0.6m  $\beta^*$ ,  
 >15 fb<sup>-1</sup> expected  
 Strong pileup



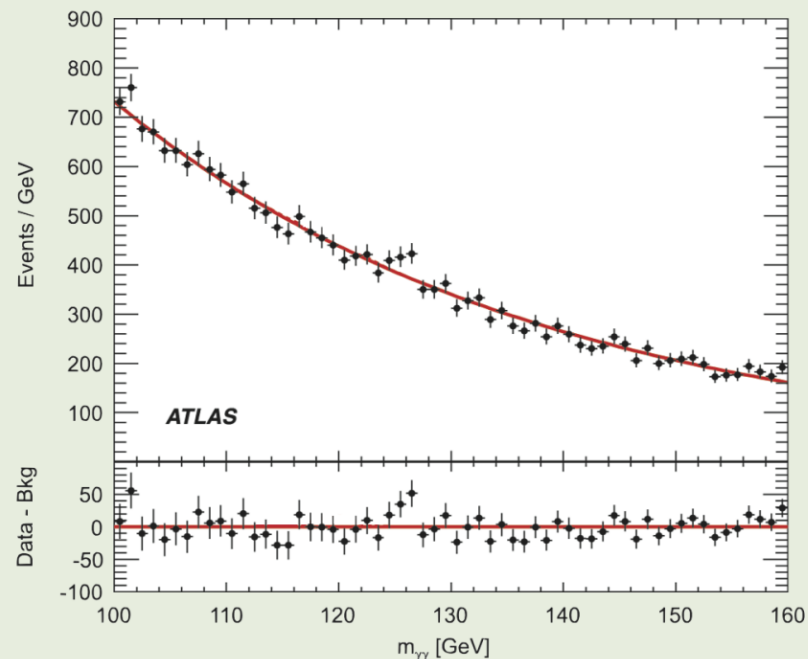
21-Mar-12

E.

# PHYSICAL REVIEW LETTERS

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Articles published week ending 16 MARCH 2012



Published by  
 American Physical Society



Volume 108, Number 11

## ACC(IHEP/NJU/SDU/USTC)-CEA-IN2P3(CPPM/LAL/LPNHE/LPSC)

● Very strong cooperation program between the Atlas Chinese Cluster (IHEP, NJU, SDU, USTC) and CPPM, IRFU, LAL, LPNHE, LPSC since several years:

- Higgs, Susy studies (through  $\gamma\gamma$  or  $WW$  final states and also lepton/jet/top final states)

(see X. Ruan, G. Marchiori, L. Yao, M Xiao ... talks)

- Di-boson studies (see S. Li talk)

- Top studies (see L. Shan, A. Lleres, E. Lancon talks)

- Performance studies (E/gamma - Jet/Missing Et - B tag - Trigger, Calorimeter...) (see G. Marchiori, L. Yao talks)

- Data quality, operation, shifts...

- Silicon detector R&D (see P. Pangaud talk)

# ATLAS ACC-IN2P3 heavily involved in data analyses in 2011-2012

- Co-PhD :

- B. Yu CAS funded/FCPPL (CPPM/IHEP) (05/12 defense)
- L. Yuan (French Embassy funded) (LPNHE/IHEP) (2011 defense)
- X. Ruan CAS funded (started 09/09) (LAL/IHEP)
- S. Li CSC/Eiffel funded (started 09/09) (CPPM/USTC)
- L. Yao CSC funded (started 09/10) (LPNHE/IHEP)
- B. Li CSC funded (started 09/10) (CPPM/SDU)
- L. Chen CSC Cai Yuanpei (started 01/11) (CPPM/SDU)
- J. Wang CSC funded (started 09/09) (LPSC/SDU) (06/12)
- X. Sun CSC funded (started 09/10) (LPSC/SDU)
- K. Liu CSC funded (started 09/11)(LPNHE/USTC) ....

- Many senior Physicists (C. Feng, Y. Liu, F. Lu, L. Shan, C. Zhu, W. Wei...) visits with continuous cooperation work between ACC physicist and IN2P3 physicists.

- Many presentations at ATLAS meetings by students and senior physicists (Chinese and French) and active contribution to Internal, Pub and Conf notes and physics paper on data analysis.

- **Strong SLHC Silicon detector R&D cooperation program ongoing**



## Prospect in 2012

- **Continue strong involvement in data analysis: physics analyses and performance. Need to sustain the effort to convert the fruit of our cooperation into more scientific results**
- On going Co-PhD will continue their work in this framework in both institutes involved but need to involve new PhD students since some have already defended (or about to)
- Several Senior Physicists visit already planned
- Several Students visits already planned
  
- **Strengthen SLHC Silicon Detector R&D cooperation**
- Senior Physicist visits planned with possible students accompanying.
- Senior + Student together very important for strong cooperation
- Increase continuity of design and test on both sides

## Summary

- Strong and mature France China cooperation on the ATLAS scientific program with recognize visibility within ATLAS.
- Sustain and strengthen the effort on Students as well as Senior physicists exchanges now that we have lots of data to analyze.
- Scientific results are now flowing from these collision data analysis, and much more expected.
- SLHC Silicon detector R&D program is growing up within the ATLAS community
- Strengthen SLHC Silicon Detector R&D cooperation program

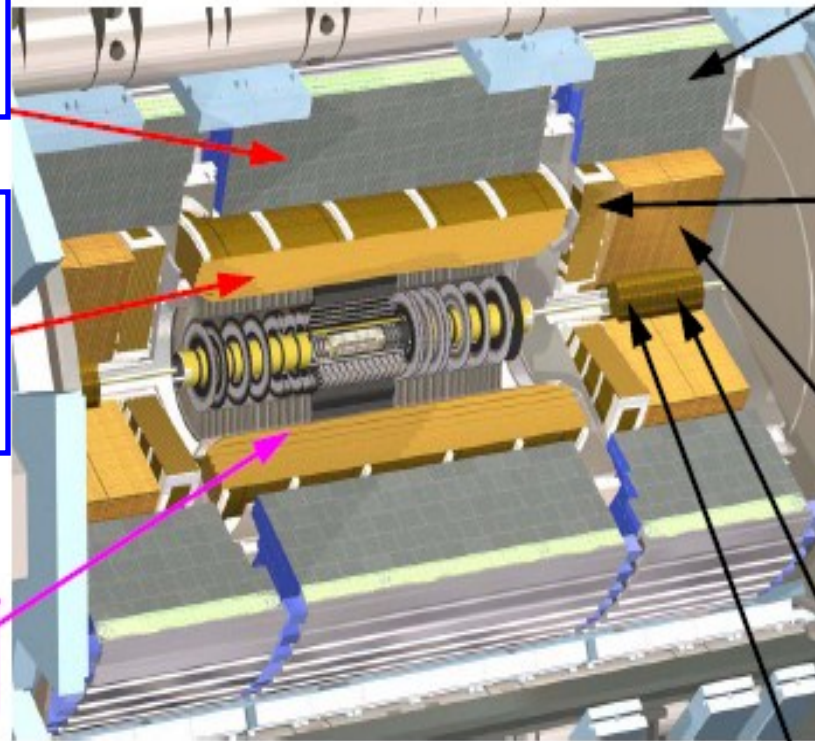
A scenic view of a rocky coastline. The foreground is dominated by dark, jagged rocks. The water is clear and turquoise, transitioning to a deeper blue further out. In the background, there are white limestone cliffs and a prominent rock formation in the sea. The sky is clear and blue.

谢谢！  
Merci !  
Thank You !



# Backup Slides

# Calorimeter system



## Hadronic Tile Calorimeter

$|\eta| < 1.7$ , 3 layers

$\sigma_E/E$  (jet)  $\sim 50\%/ \sqrt{E} \oplus 3\%$

## Hadronic Tile Calorimeter

Flat iron absorbers

Scintillator tiles

9800 Ch. ; 98.0% Op.

## EM LAr Calorimeter

$|\eta| < 3.2$

Presampler ( $|\eta| < 1.8$ )

+ 3 layers, (2 for  $2.5 < |\eta| < 3.2$ )

$\sigma_E/E$  (e/ $\gamma$ )  $\sim (10-15)\%/ \sqrt{E} \oplus 0.7\%$

## EM LAr Calorimeter

Accordion lead absorbers

Liquid Argon (LAr)

170k Ch. ; 98.6% Op.

## Hadronic LAr Calorimeter

Flat copper absorbers + LAr

5600 ch. ; 99,9% Op.

$1.5 < |\eta| < 3.2$ , 4 layers

$\sigma_E/E$  (jet)  $\sim 50\%/ \sqrt{E} \oplus 3\%$

The Solenoid

## Forward LAr Calorimeter

LAr/Cu + LAr/W

3500 Ch. ; 100% Op.

$3.1 < |\eta| < 4.9$

1 EM + 2 HAD layers

$\sigma_E/E$  (jet)  $\sim 100\%/ \sqrt{E} \oplus 10\%$

## Calorimeter L1 trigger

1GeV bit steps, tight noise suppression

L1 EM resolution  $< 5\%$  at high energy

