

# LHC status

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OC

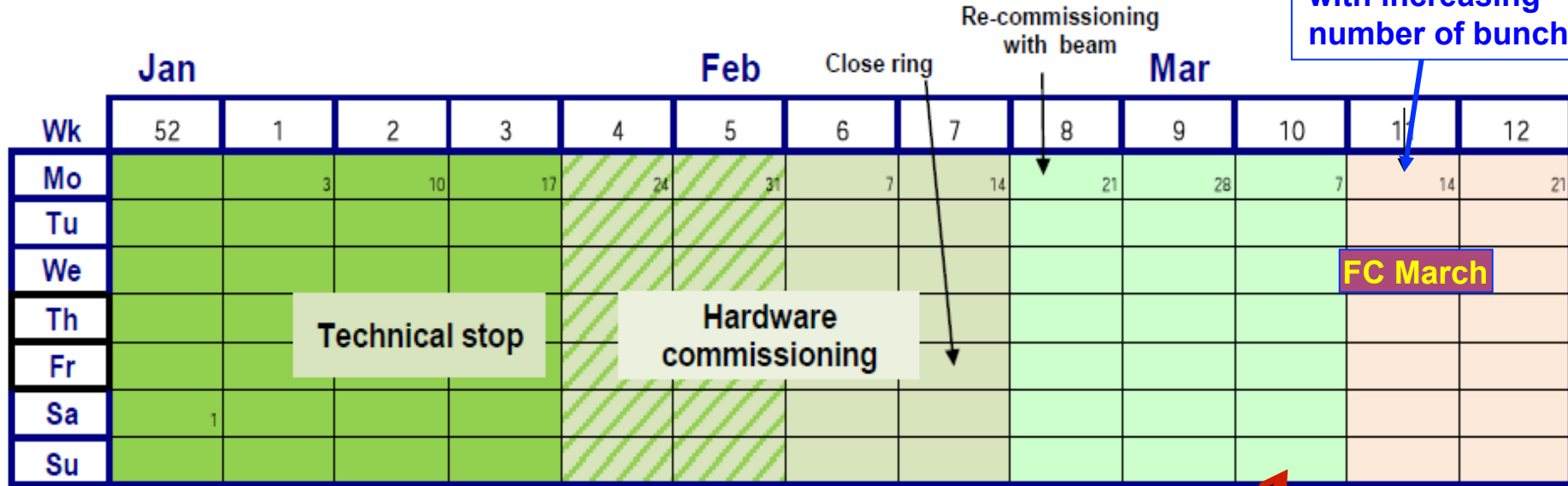
June 22, 2011

R-D Heuer



# 2011 LHC schedule (FC March 2011)

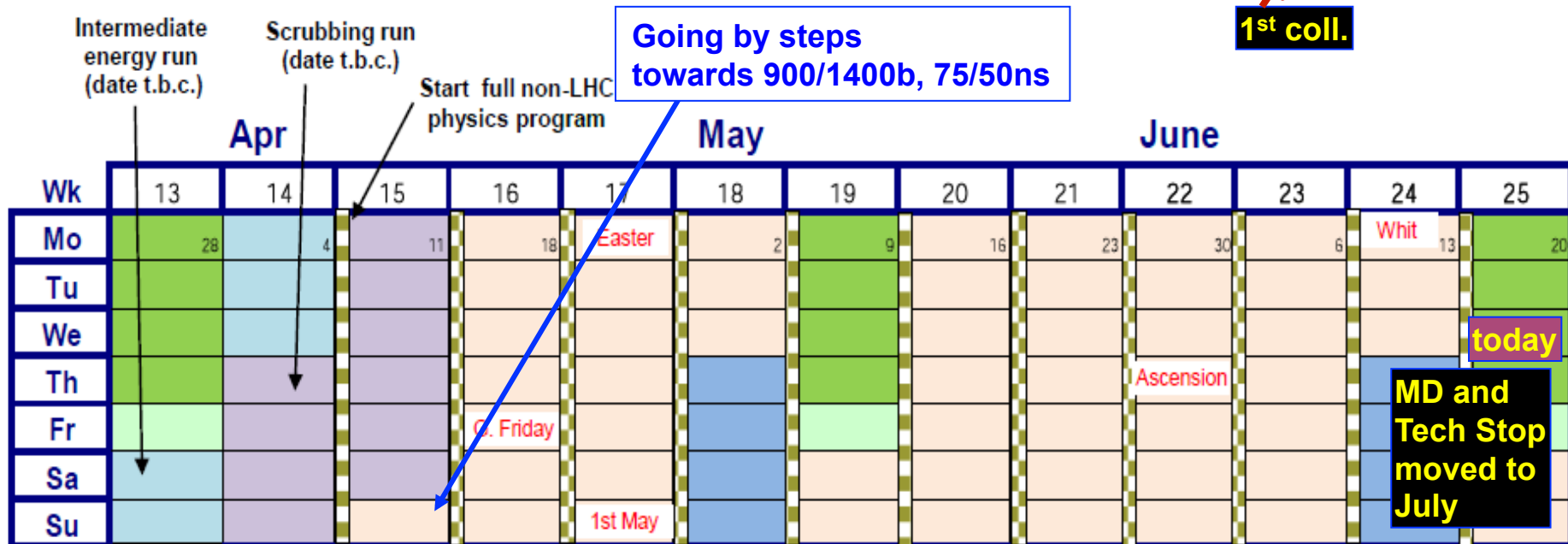
Physics 75ns with increasing number of bunches



FC March

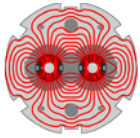
1st coll.

Going by steps towards 900/1400b, 75/50ns



today

MD and Tech Stop moved to July



# LHC in 2011 – so far

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- Beam commissioning: 3 weeks ✓
  - Exit - stable beams with low number of bunches
- Ramp-up to ~200 bunches (75 ns): 2 weeks ✓
  - Multi-bunch injection commissioning continued
  - Stable beams
- Intermediate energy run: 4 -5 days ✓
- Technical Stop: 4+1 days ✓
- **Scrubbing run: 10 days** ✓
- Decided to run at **50 ns** spacing ✓
- Resume operation for physics and increase number of bunches: ✓
  - 300 – 400 – 600 – 800 – 900 – **1100** ...1400
  - Machine protection qualification at each step

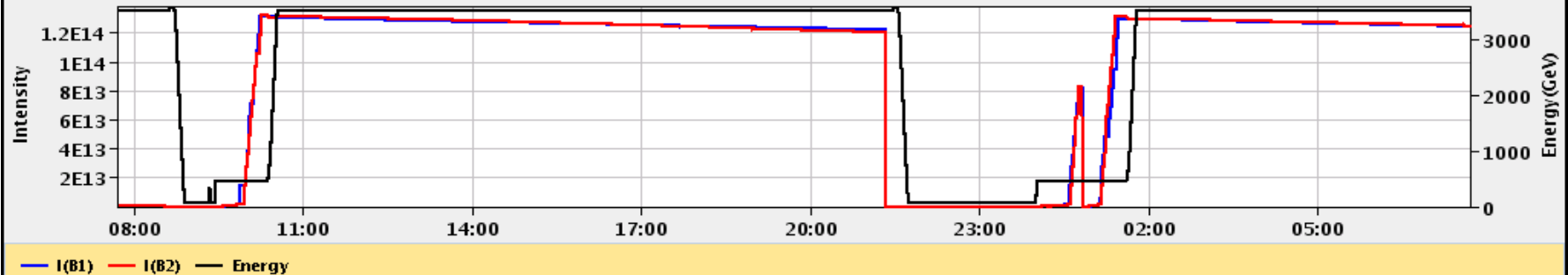
# Back to back fills with 1092 bunches

30-May-2011 07:41:43    Fill #: 1816    Energy: 3500 GeV    I(B1): 1.24e+14    I(B2): 1.25e+14

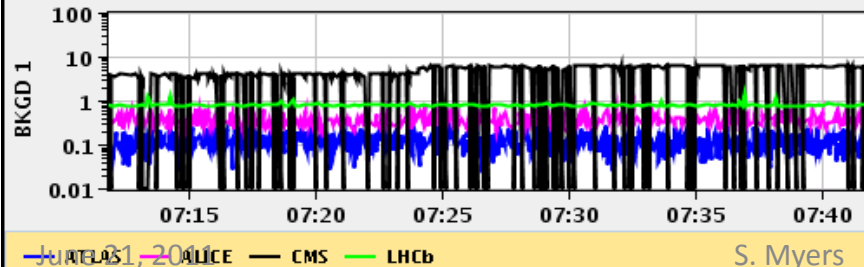
Experiment Status	ATLAS	ALICE	CMS	LHCb
Instantaneous Lumi (nb s <sup>-1</sup> )	957.572	0.574	945.849	296.325
BRAN Luminos	<b>Luminosity 1.2-1.3 x10<sup>33</sup>cm<sup>-2</sup>s<sup>-1</sup></b>			
Fill Luminos				5766.5
BKGD 1	0.179	0.392	6.482	0.779
BKGD 2	17.508	1.174	0.002	0.381
BKGD 3	8.419	1.398	3.268	1.087

LHCb VELO Position **IN**    Gap: -0.0 mm    **STABLE BEAMS**    TOTEM: **STANDBY**

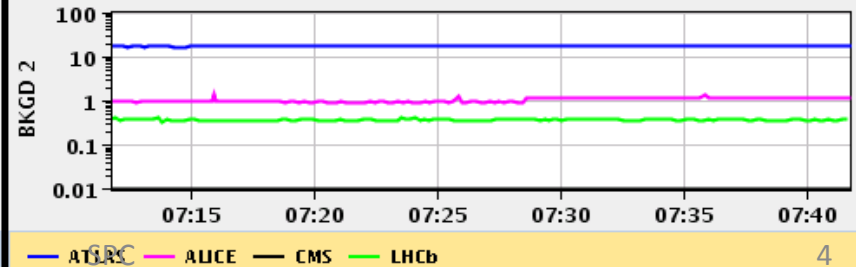
Performance over the last 24 Hrs    Updated: 07:41:41



Background 1    Updated: 07:41:42



Background 2    Updated: 07:41:41



# It is not always easy! A day in June.

Cryo S56

Injection preparation for 144b

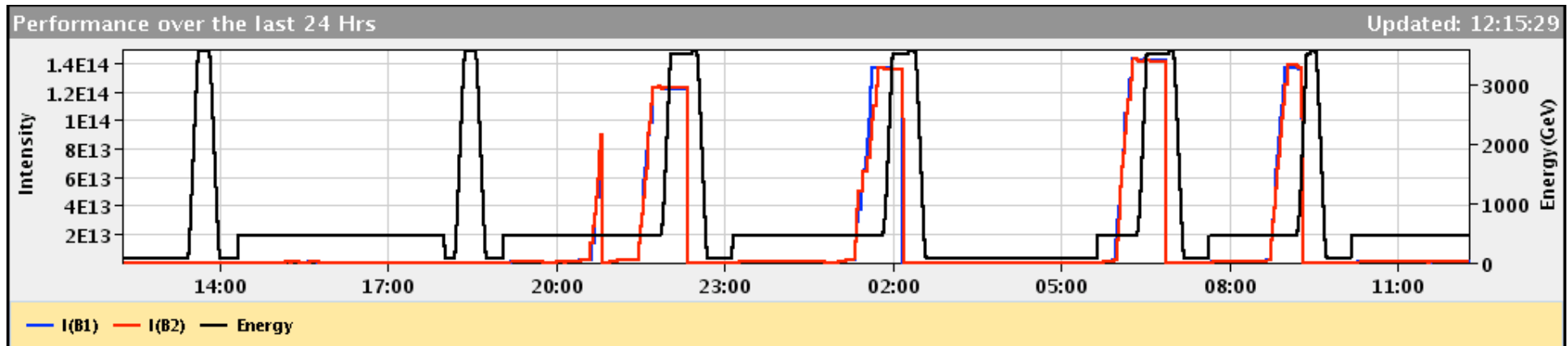
Cryo S34

UFO IR2

QPS noise → quench

RF arc

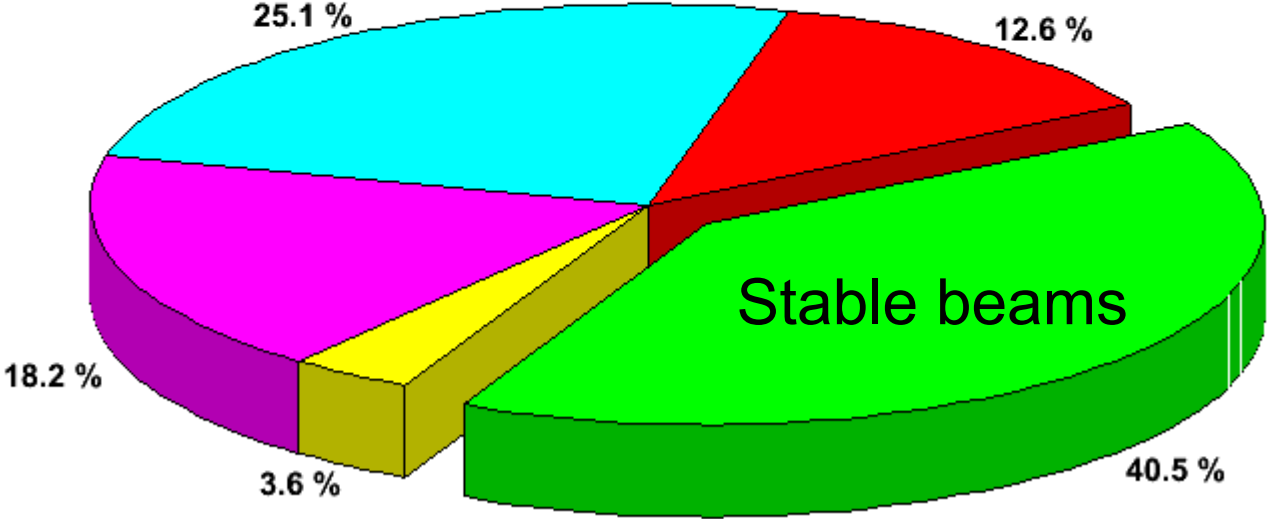
Collimator temperature



# LHC Efficiency: Last 10 fills

- Access - No Beam
- Machine - Setup
- Beam In
- Ramp + Squeeze
- Stable Beams

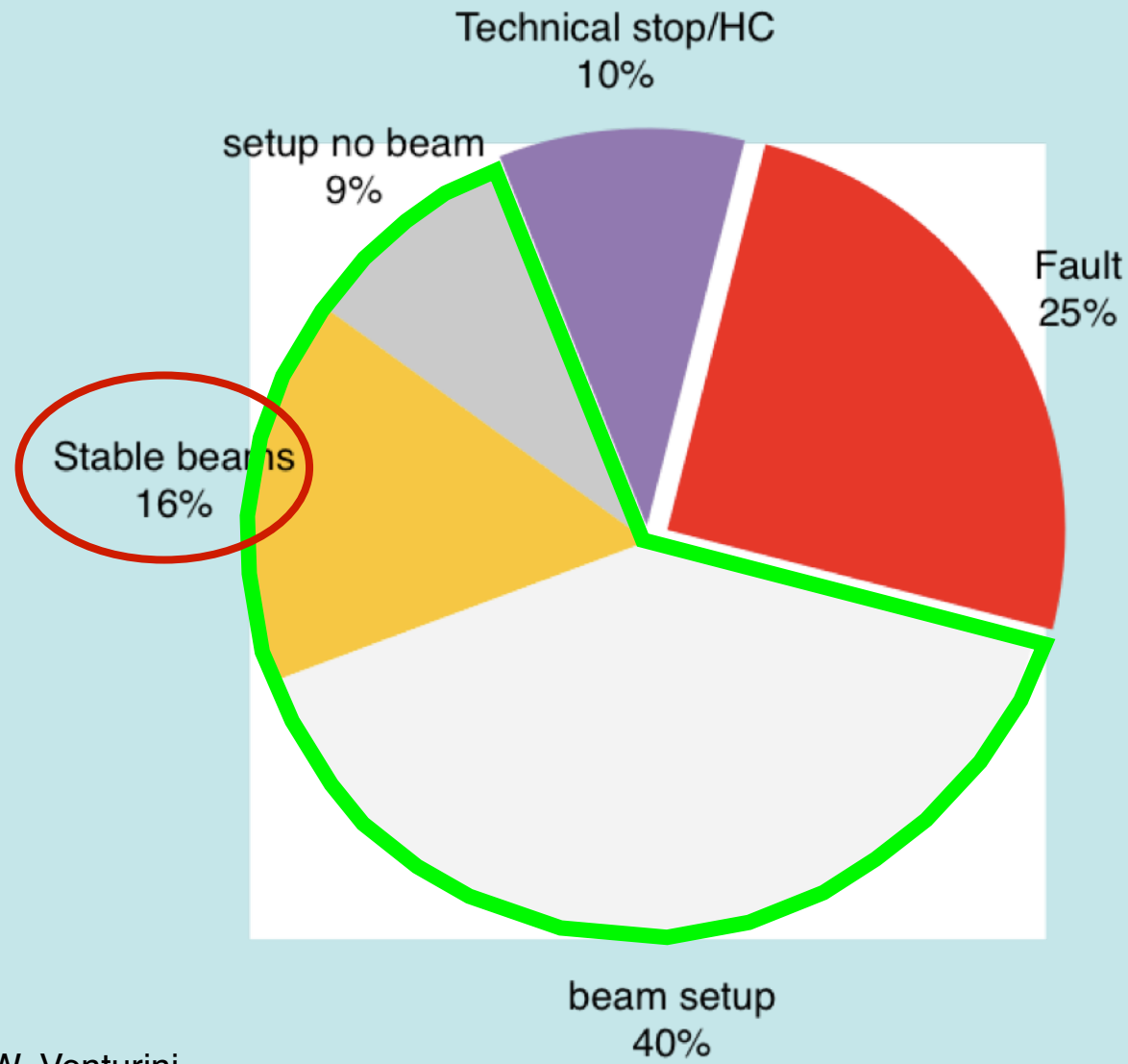
Statistics for fills 1857 to 1867  
Total Time Duration [hh:mm:ss]: 132:27:04  
Time in Stable Beams [hh:mm:ss]: 53:40:15



To be compared with the

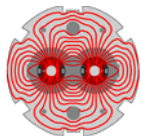
## Overall LHC efficiency in 2010

(FC March 2011)

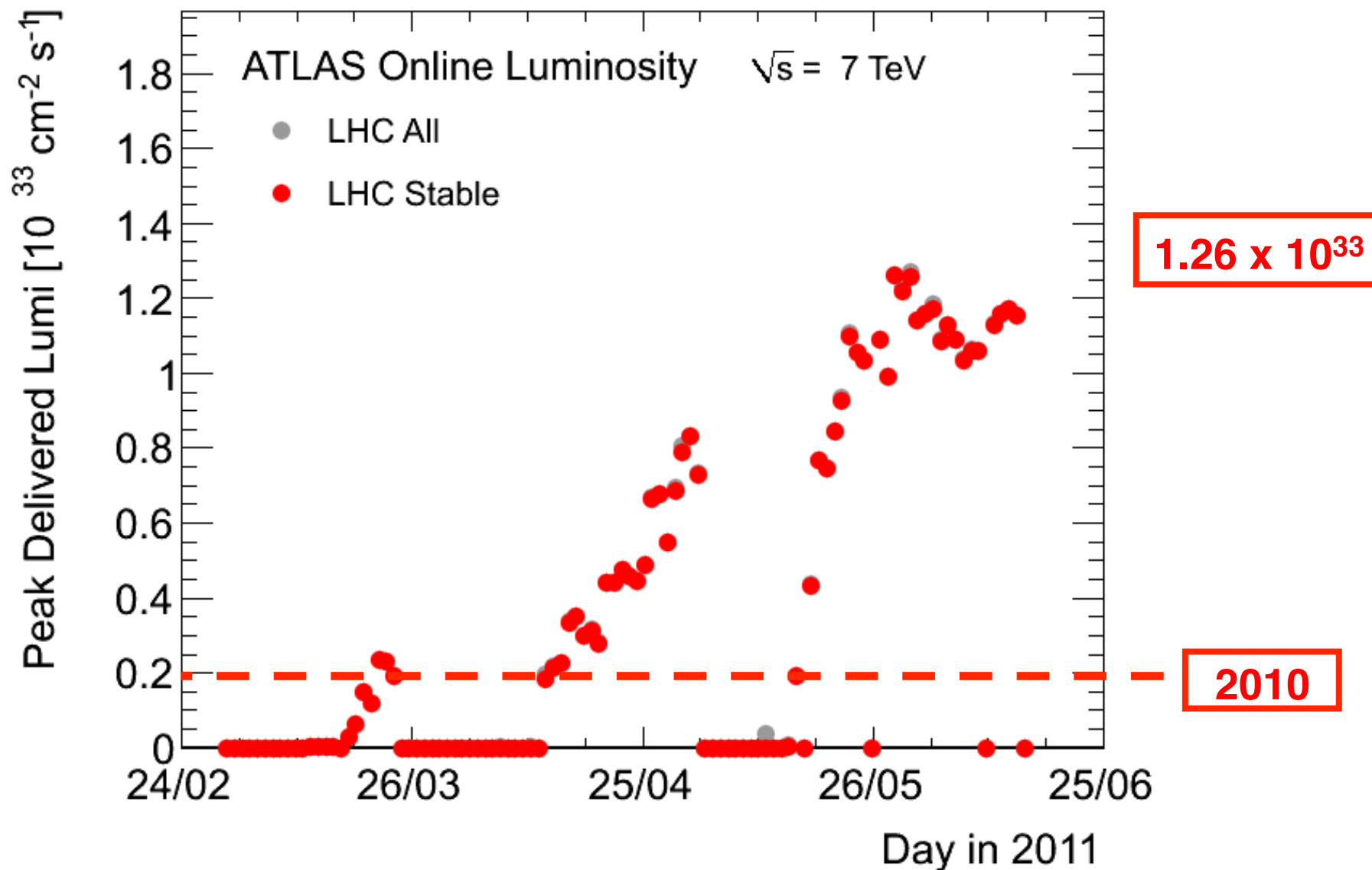


**65%  
availability!**

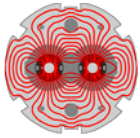
W. Venturini



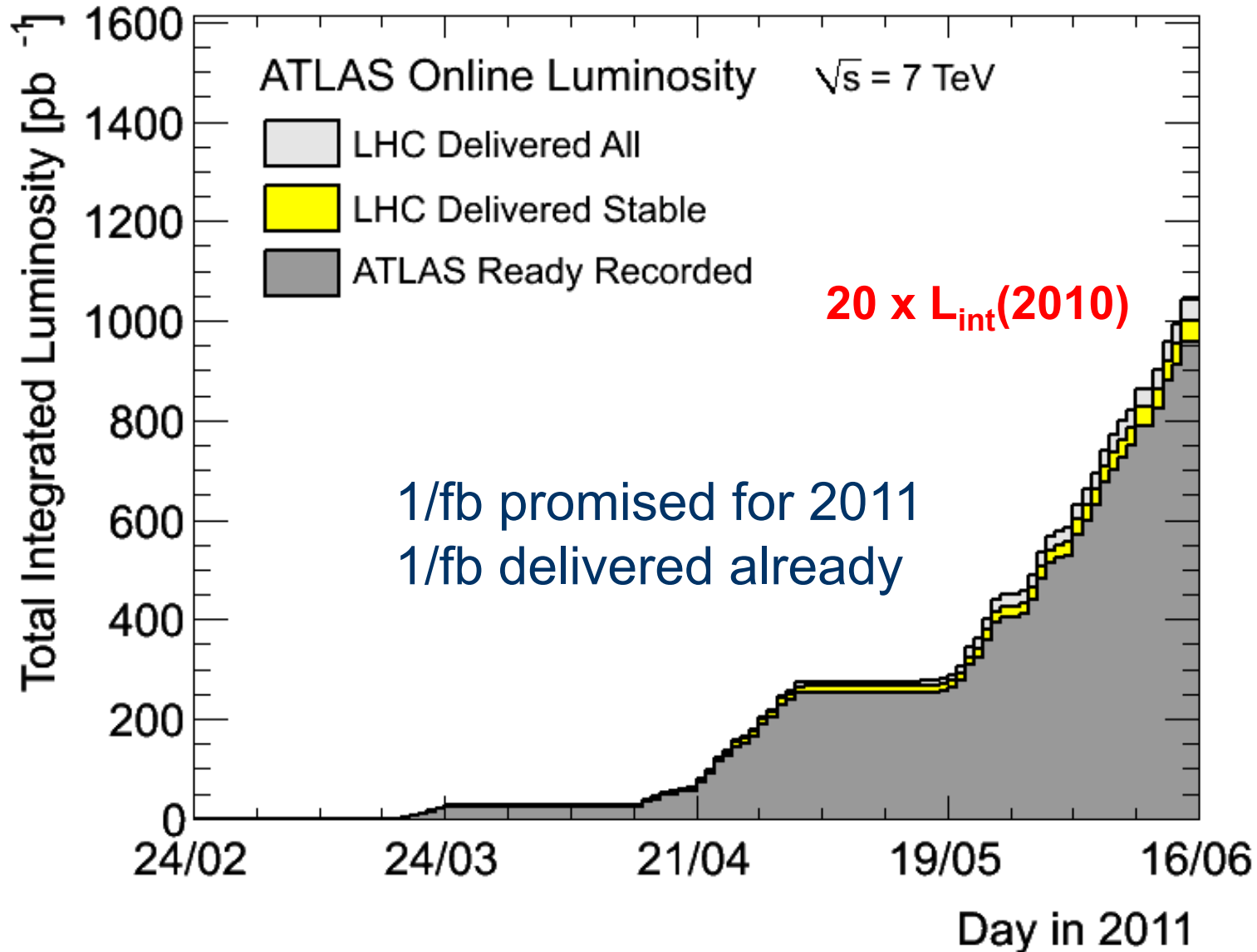
# Peak luminosity 2011







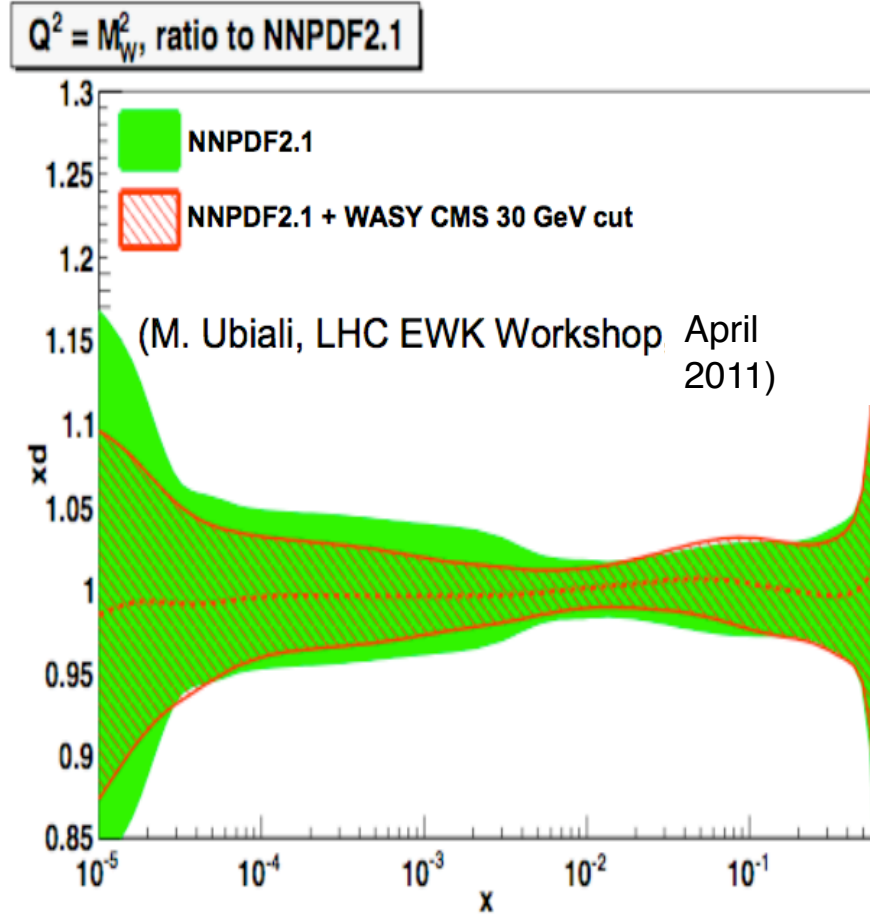
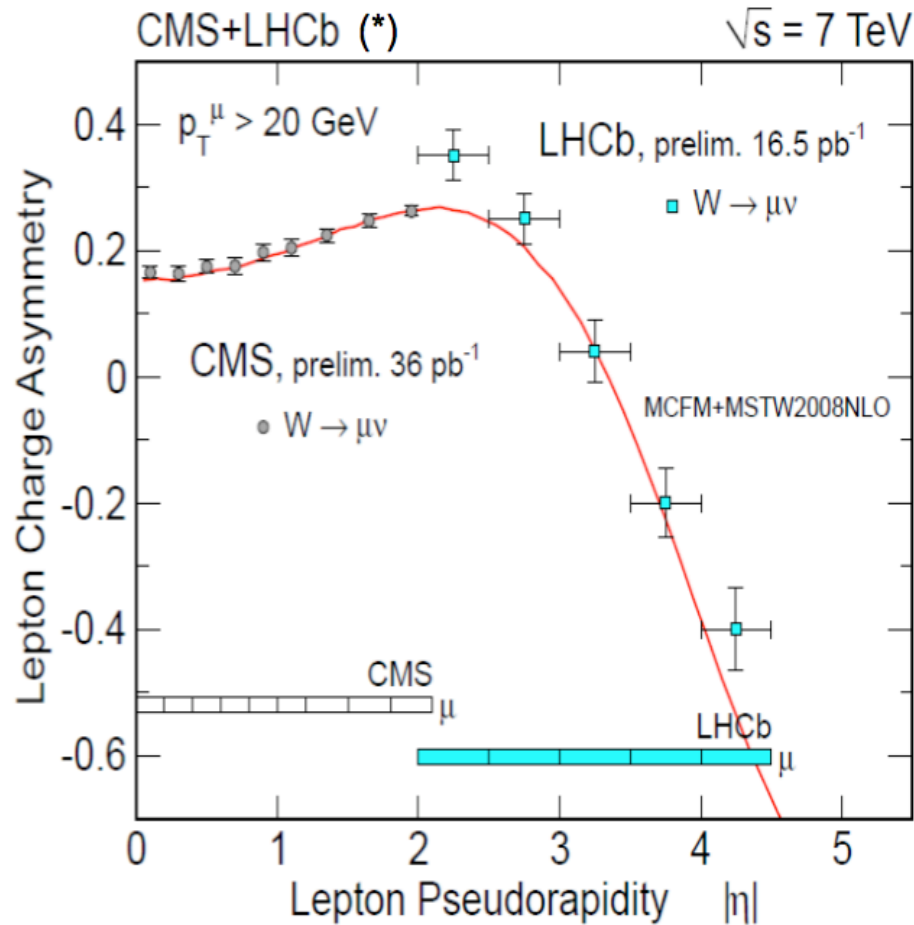
# ...and integrated luminosity 2011



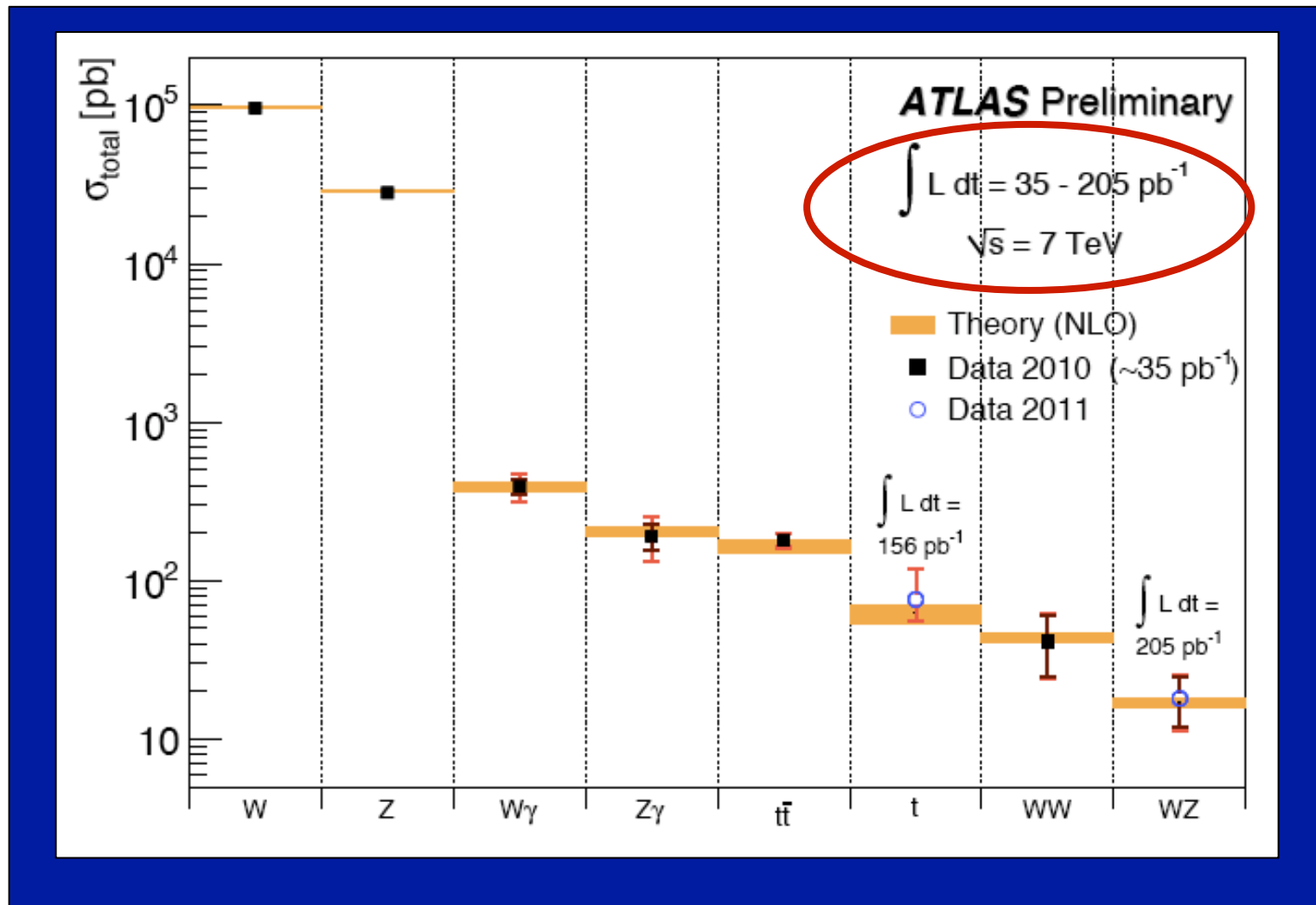


# Lepton charge asymmetry in inclusive W

We are able to produce precision EWK measurements good enough to constrain significantly the PDF global fits.



# Summary of main electroweak and top cross-section measurements



- ❑ Measuring cross-sections down to  $\sim 10 \text{ pb}$   
 Uncertainties dominated by systematics in all cases except  $Z\gamma$ , WW, WZ
- ❑ Good agreement with SM expectations (within present uncertainties)
- ❑ Experimental precision starts to challenge theory for W, Z, top-pairs

# Reminder

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## Prospects for the Higgs Boson at 7 TeV



# Summary of Prospects



Higgs Boson, if it exists between masses of (114 - 600 GeV) will either be discovered or ruled out in  $\approx$  next two years

→ Decided to run in 2011 and 2012

## SM Higgs Search Prospects (Mass in GeV)

<b>ATLAS + CMS <math>\approx 2 \times</math> CMS</b>	<b>95% CL exclusion</b>	<b><math>3 \sigma</math> sensitivity</b>	<b><math>5 \sigma</math> sensitivity</b>
<b><math>1 \text{ fb}^{-1}</math></b>	<b>120 - 530</b>	<b>135 - 475</b>	<b>152 - 175</b>
<b><math>2 \text{ fb}^{-1}</math></b>	<b>114 - 585</b>	<b>120 - 545</b>	<b>140 - 200</b>
<b><math>5 \text{ fb}^{-1}</math></b>	<b>114 - 600</b>	<b>114 - 600</b>	<b>128 - 482</b>
<b><math>10 \text{ fb}^{-1}</math></b>	<b>114 - 600</b>	<b>114 - 600</b>	<b>117 - 535</b>

# In summary

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- So far so good, keep pushing!
- ..and hope on the gentleness of Nature, offering us some early discovery!
- stay tuned for the summer conferences

