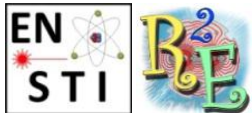


MCWG report to the RadWG

Report at the RadWG 5th

December 2012

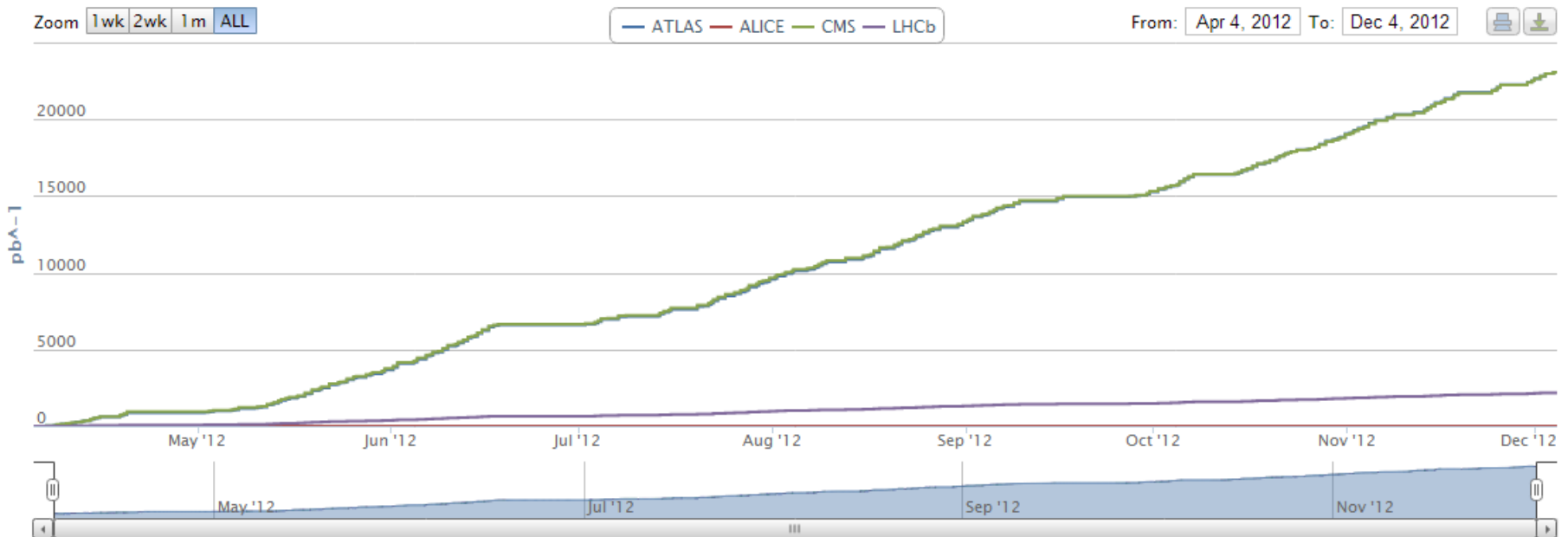


M. Calviani for the MCWG

Luminosity overview

Cum lumi (fb ⁻¹)	2011	2012
ATLAS	5.3	23.1
CMS	5.4	23.1
ALICE	4.8 (pb ⁻¹)	9.7 (pb ⁻¹)
LHCb	1.2	2.2

► Cumulated lumi
~1.5x larger than
initially foreseen for
2012



Area	High Energy Hadron fluence (#/cm ²)				Comments
	2011	2012	2011/fb ⁻¹	2012/fb ⁻¹	
UJ14	2.8*10 ⁸	1.6*10⁸	5.1*10 ⁷	7.9*10 ⁶	Physics deb.
UJ16	2.2*10 ⁸	1.2*10⁸	4.2*10 ⁷	6.2*10 ⁶	Physics deb.
UJ23	1.5*10 ⁶	3.2*10⁶	2.8*10 ⁵ (*)	1.5*10 ⁵ (*)	Injection
UJ56	3.9*10 ⁷	1.5*10⁸	7.2*10 ⁶	7.3*10 ⁶	Physics deb.
UJ76	6.4*10 ⁶	6.0*10⁷	1.2*10 ⁶ (*)	3.4*10 ⁶ (*)	Collimation
UJ87	3.0*10 ⁶	2.6*10⁶	5.7*10 ⁵ (*)	1.5*10 ⁵ (*)	Injection

(*) = ATLAS/CMS Luminosity

- ▶ **P1**: decrease by factor of 6x, due to additional shielding
- ▶ **P7**: increase due to tight collimator settings
- ▶ **P2/8**: reduction because of cleaner injections in the LHC

High Energy Hadron fluence (#/cm ²)					Comments
Area	2011	2012	2011/fb ⁻¹	2012/fb ⁻¹	
RR13	7.2*10 ⁶	2.1*10⁷	1.4*10 ⁶	7.9*10 ⁵	Physics deb.
RR17	8.4*10 ⁶	2.5*10⁷	1.6*10 ⁶	1.1*10 ⁶	Physics deb.
RR53	1.2*10 ⁷	2.5*10⁷	2.3*10 ⁶	1.1*10 ⁶	Physics deb.
RR57	1.0*10 ⁷	2.4*10⁷	1.9*10 ⁶	1.1*10 ⁶	Physics deb.
RR73	7.7*10 ⁶	5.0*10⁷	1.5*10 ⁶ (*)	2.4*10 ⁶ (*)	Collimation
RR77	1.1*10 ⁷	2.9*10⁷	2.1*10 ⁶ (*)	1.2*10 ⁶ (*)	Collimation

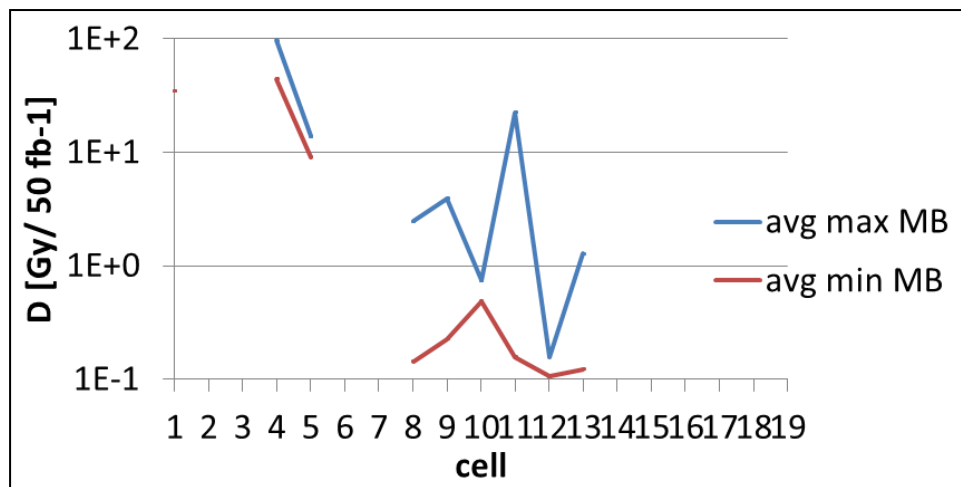
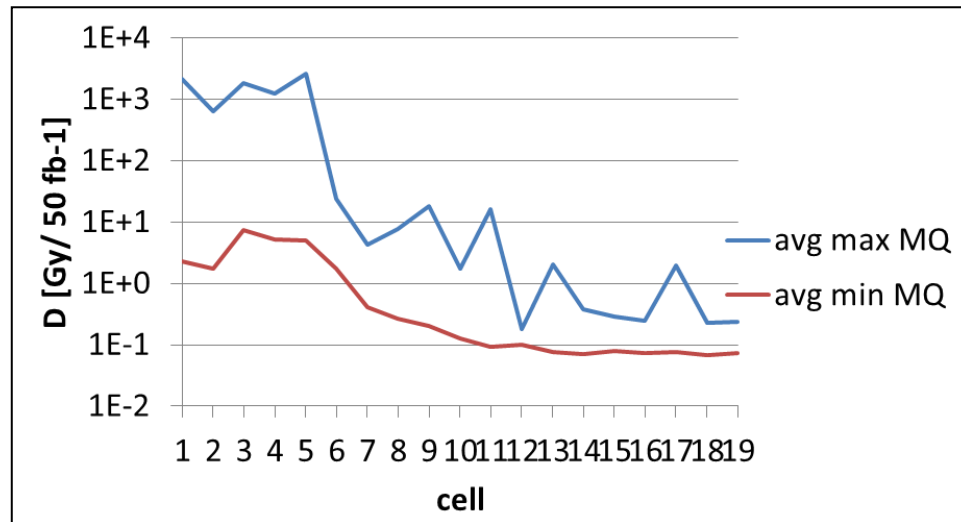
(*) = ATLAS/CMS Luminosity

- ▶ **PI/5: decrease** up to a factor of 2x (1.5-2x) due to TCL.4 closure
- ▶ **P7: asymmetry L/R:** also observed in operation

Area	High Energy Hadron fluence (#/cm ²)				Comments
	2011	2012	2011/fb ⁻¹	2012/fb ⁻¹	
UX45	2.6*10 ⁶	1.8*10⁷	4.3*10 ⁵ (*)	8.2*10 ⁵ (*)	Beam-gas
UX65	N/A	~10 ⁶	N/A	N/A	Beam-gas
UX85	2.1*10 ⁸	3.5*10⁸	1.7*10 ⁸ (**)	1.6*10 ⁸ (**)	Physics deb.
US85	4.4*10 ⁷	8.8*10⁷	3.7*10 ⁷ (**)	4.1*10 ⁷ (**)	Physics deb.

- ▶ **P8: 2012 equivalent** to 2011
 - ▶ Increase with LHCb luminosity
- ▶ **P4: increase**, beam-gas coupled with higher cumulative current in the machine
 - ▶ Potentially weak point in view of 25ns operation

- ▶ **Leakage into DS** getting important
 - ▶ Cells 7-10: ~10 Gy
 - ▶ <Cell 17: ~1 Gy
 - ▶ >Cell 17: 0.1 Gy
- ▶ Currently **relatively low vacuum activity**
- ▶ Not clear how this will evolve with **25ns operation**



Observation compared to predictions

Critical LHC Areas	High-Energy	
	2011	2012
UJ14/16	2.1E+08	1.3E+08
RR13/17	7.0E+06	2.1E+07
UJ56	3.5E+07	1.1E+08
RR53/57	1.1E+07	3.3E+07
UJ76	5.4E+06	1.6E+07
RR73/77	8.1E+06	2.4E+07
UX85b	1.7E+08	2.1E+08
US85	3.5E+07	4.4E+07

2012 prediction

2012 measurements

1.2-1.6*10⁸

2.1-2.5*10⁷

1.5*10⁸

2.5*10⁷ lower loading (TCL)

6.0*10⁷ tight collimation

2.9-5.0*10⁷

3.5*10⁸ higher than pred. lumi

8.8*10⁷ higher than pred. lumi

- ▶ **UX45** cavern values are starting to be worrying, especially as 2012 vs. 2011 is higher than expected
 - ▶ Almost $2 \cdot 10^7$ HEH/cm²
 - ▶ TE/CRG failures triggered actions to displace the sensitive object
 - ▶ *How the situation will evolve with 25ns operation?*
- ▶ **UX65** still calm, as no particular object from a beam-gas pressure point of view is present in the tunnel section
 - ▶ $\leq 10^6$ HEH/cm²

- ▶ 3rd slot finished on the 3rd December 2012!
 - ▶ EN/EL, TE/CRG, EN/ICE, PH/ESE and many others participated in this last “crowdy” irradiation slot!
- ▶ Thanks a lot for your all help!

**An end-of-test drink
is organized for
tomorrow 6th
December at 16h30 in
the RI-Glassbox**

