

LHC (and ATLAS) Status and Plans

Chicagoland LHC Workshop
University of Illinois (UIUC)
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Mark Neubauer

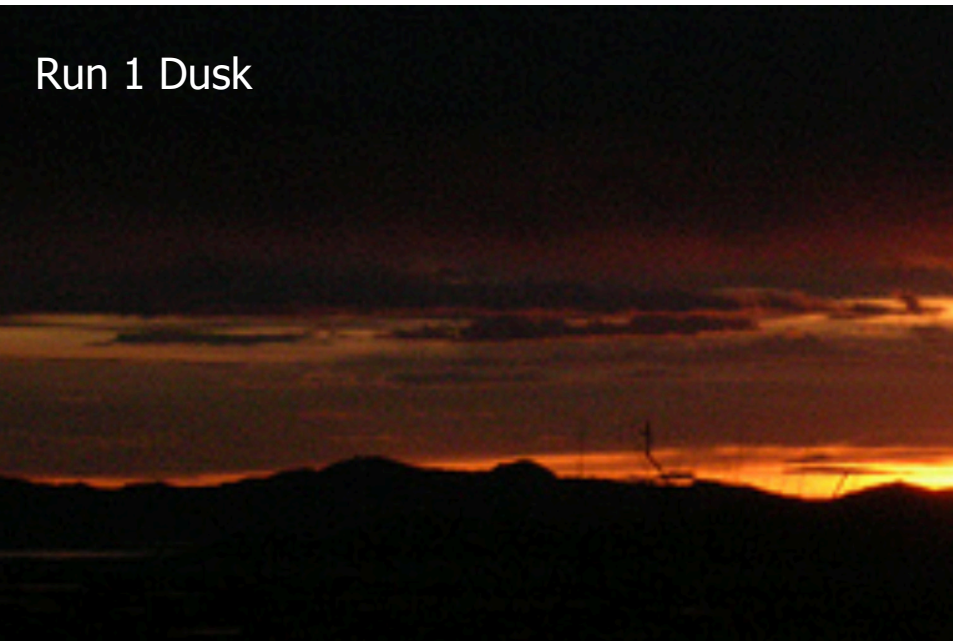
University of Illinois at Urbana-Champaign



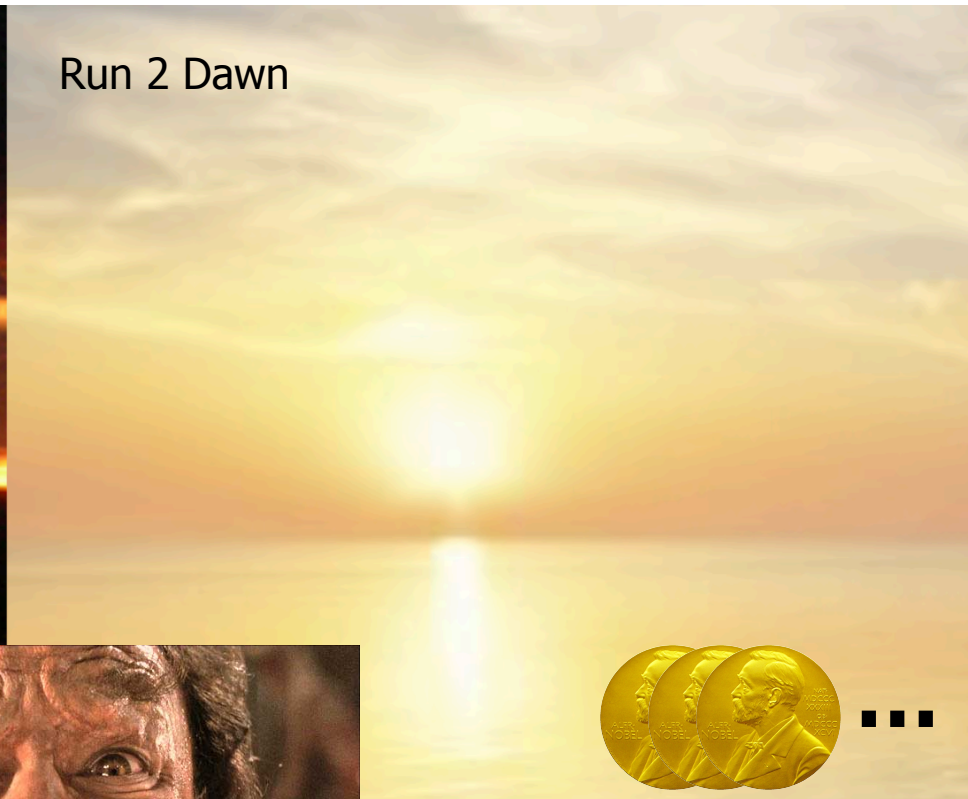


From Dusk Till Dawn...

Run 1 Dusk



Run 2 Dawn



Present state





LHC Status / Plans

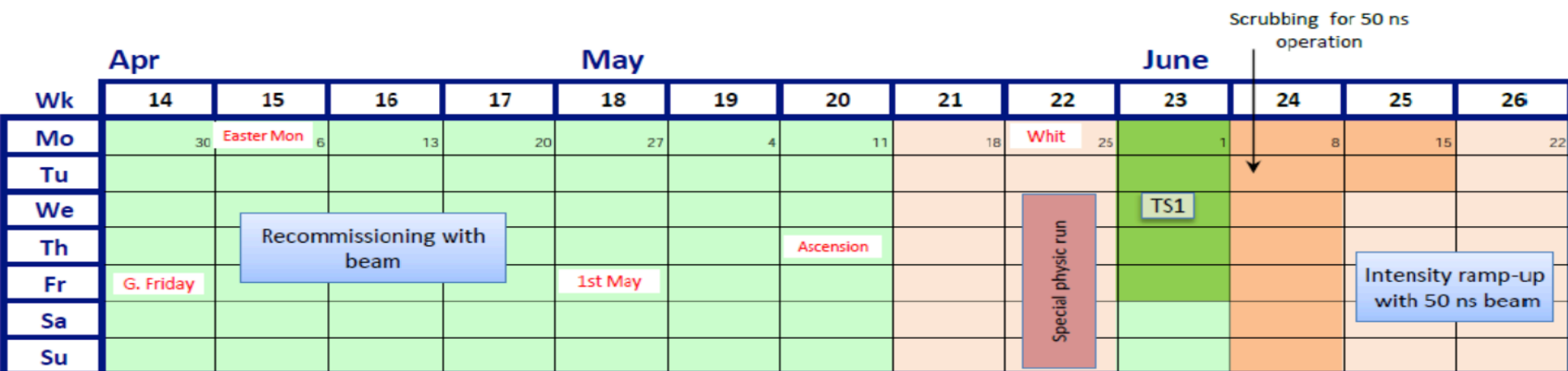
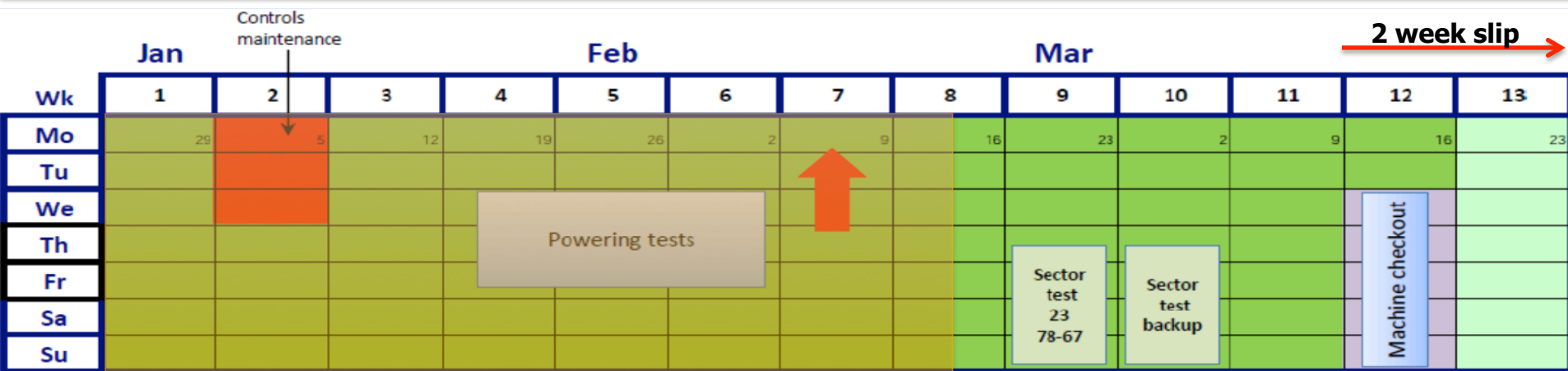


LHC Schedule: The Big Picture

- *LS = Long Shutdown*

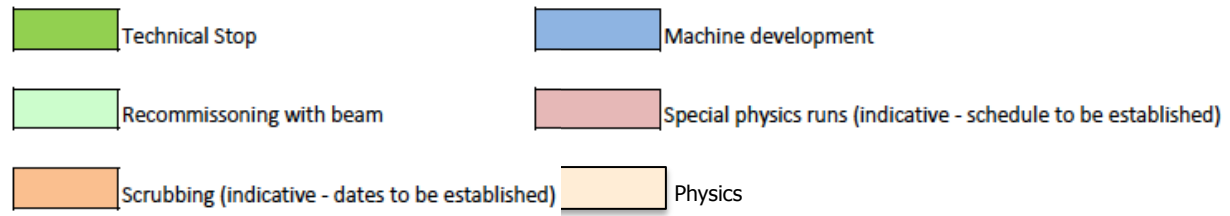
2010				2011				2012				2013				2014				2015				2016				2017				2018				2019			
Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Run 1 7-8 TeV, 0.7×10^{34} ($\mu \approx 20$), 25 fb ⁻¹								LS1								Run 2 13-14 TeV, 1.6×10^{34} ($\mu \approx 43$), 150 fb ⁻¹								LS2 Phase-I Install															
2020				2021				2022				2023				2024				2025				2026				2027				2028				2029			
Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Run 3 14 TeV, $2-3 \times 10^{34}$ ($\mu \approx 50-80$), 350 fb ⁻¹								LS3 – Phase-II Install								Run 4 14 TeV, $5-7 \times 10^{34}$ ($\mu \approx 140-200$), 3000 fb ⁻¹								LS4															

- *The HL-LHC running starts in 2025 and continues beyond LS4 until 2035*



Scrubbing for 50 ns operation

• *Expect 1st beam in the week starting March 23!*





Scrubbing for 25 ns operation

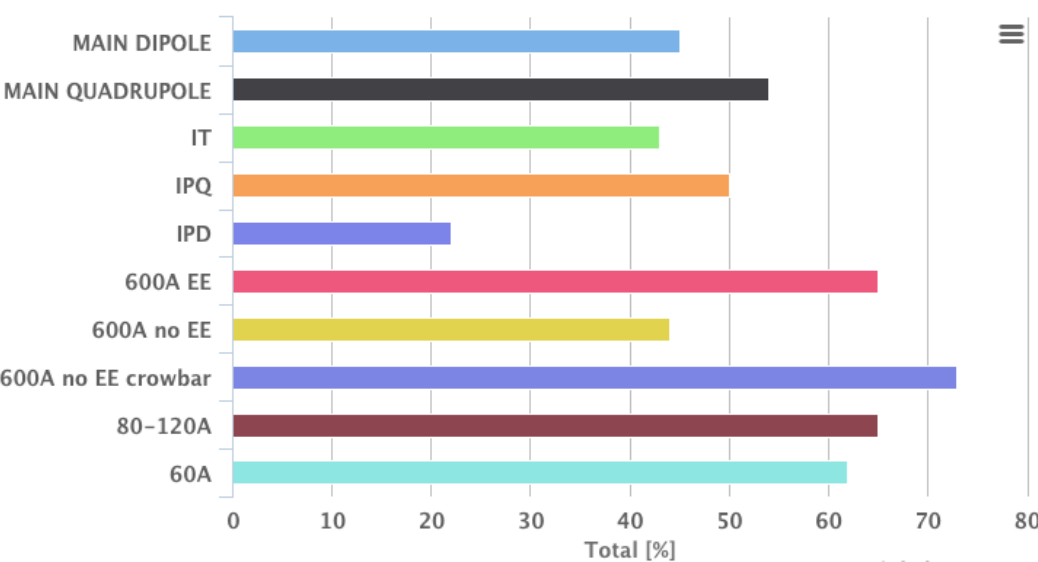
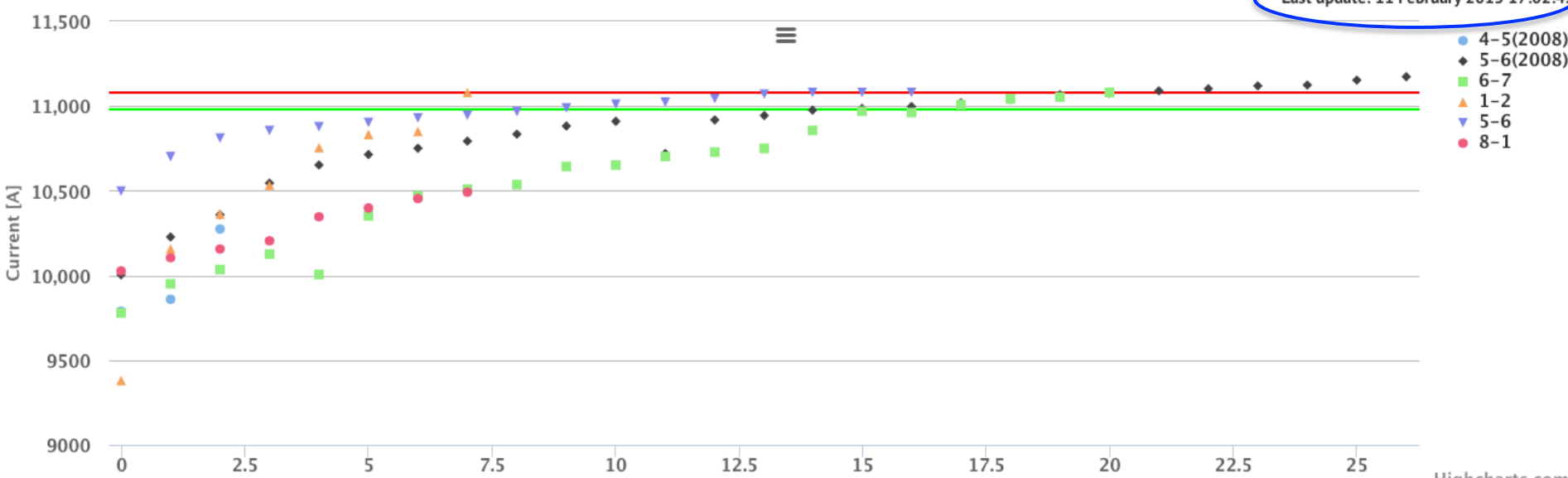
	July			Aug				Sep						
Wk	27	28	29	30	31	32	33	34	35	36	37	38	39	
Mo	29	6	13	20	27	3	10	17	24	Special physics run	31	7	14	21
Tu														
We	1			MD 1					TS2			MD 2		
Th					Intensity ramp-up with 25 ns beam							Jeune G		
Fr														
Sa					1							lower beta*		
Su														

	Oct			Nov				Dec				End physics [06:00]	
Wk	40	41	42	43	44	45	46	47	48	49	50	51	52
Mo	28	5	12	19	26	2	9	16	23	30	7	14	21
Tu								Ions setup				Technical stop	
We							TS3						
Th										IONS			
Fr					MD 3								Xmas
Sa													
Su													

- Technical Stop
- Machine development
- Recommissioning with beam
- Special physics runs (indicative - schedule to be established)
- Scrubbing (indicative - dates to be established)
- Physics



Last update: 11 February 2015 17:02:42



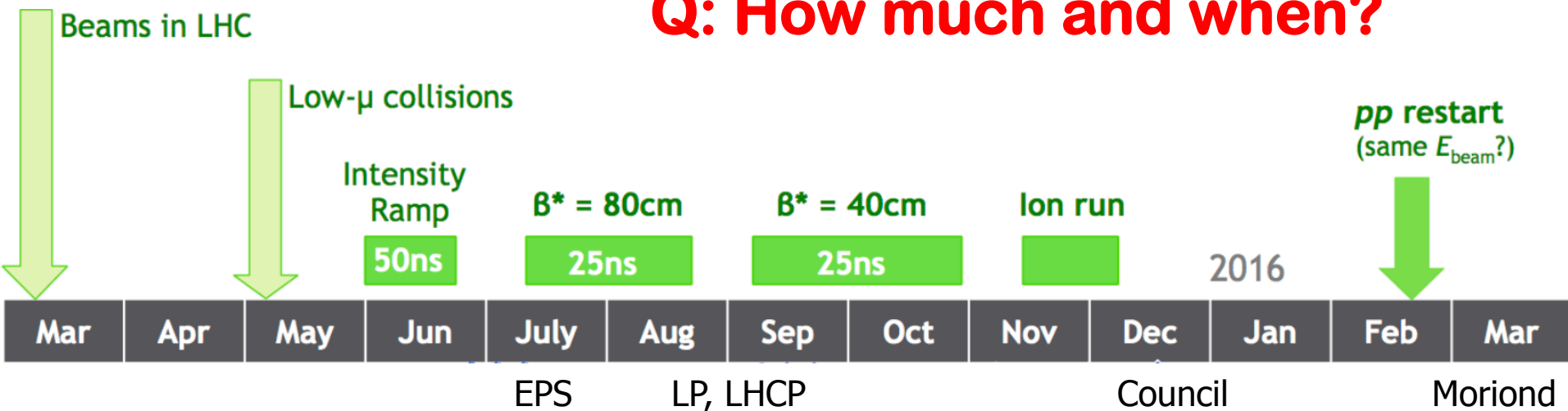
Latest Quenches

Sector	MAX I [A]	MAX E [TeV]	Date	N of Quenches
1-2	11080	6.55	19-01-2015	7
2-3	0	NOT STARTED	-	0
3-4	0	NOT STARTED	-	0
4-5	0	NOT STARTED	-	0
5-6	11080	6.55	08-02-2015	16
6-7	11080	6.55	10-12-2014	20
7-8	0	NOT STARTED	-	0
8-1	10491	6.21	11-02-2015	8

The target for 2015 is 10980 A \Leftrightarrow 6.5 TeV, with 100 A of margin for stable operation. Once the circuit has reached 11080 A, the training quench campaign is closed in the concerned sector.



Q: How much and when?



Phase	Days	
Initial Commissioning	56	
Scrubbing (for 50 and 25 ns)	23	
Early LHCf/VdM1	5	
Proton physics 50 ns	9 + 19	
Proton physics 25 ns – phase 1	30	
Change in beta*	5	
Proton physics phase 2 (including ramp-up)	48	- 10
Special physics runs (TOTEM/VdM2)	7	
Intermediate energy run - to be scheduled		
MD	15	- 4
Technical stops	15	
Technical stop recovery	6	
Ion setup/ion run	4 + 24	
Total	266 (38 weeks)	

2015 Summary (@13 TeV):

- $\leq 1 \text{ fb}^{-1}$ with 50 ns by July 5
- $\sim 3 \text{ fb}^{-1}$ with 25 ns by Sept 6
- $\sim 12 \text{ fb}^{-1}$ with 25 ns by Nov 3



ATLAS Status / Plans



We have now started 24/7 shift coverage

M8 “Week” - Major Milestone Run

Key goals for this milestone run

- Re-establish smooth running
- Collect > ~3M ID cosmics
- Solenoid ON Friday 13th
- All systems included and running together at 100 kHz
- Deploy full Run-2 menu, new CTP (at last!), L1topo etc
- Deploy new software release 20.1 at point-1 and Tier-0
- Full “dry-run” test of LHC handshake, warm start, scan variables ... (Feb 18th)
- Measure and test latencies with L1Topo and ALFA
- Test muon alignment run
- LAr HV on, flammable gas in muon detectors



ATLAS Run I Analyses & Publications...

Run II

Run I analyses

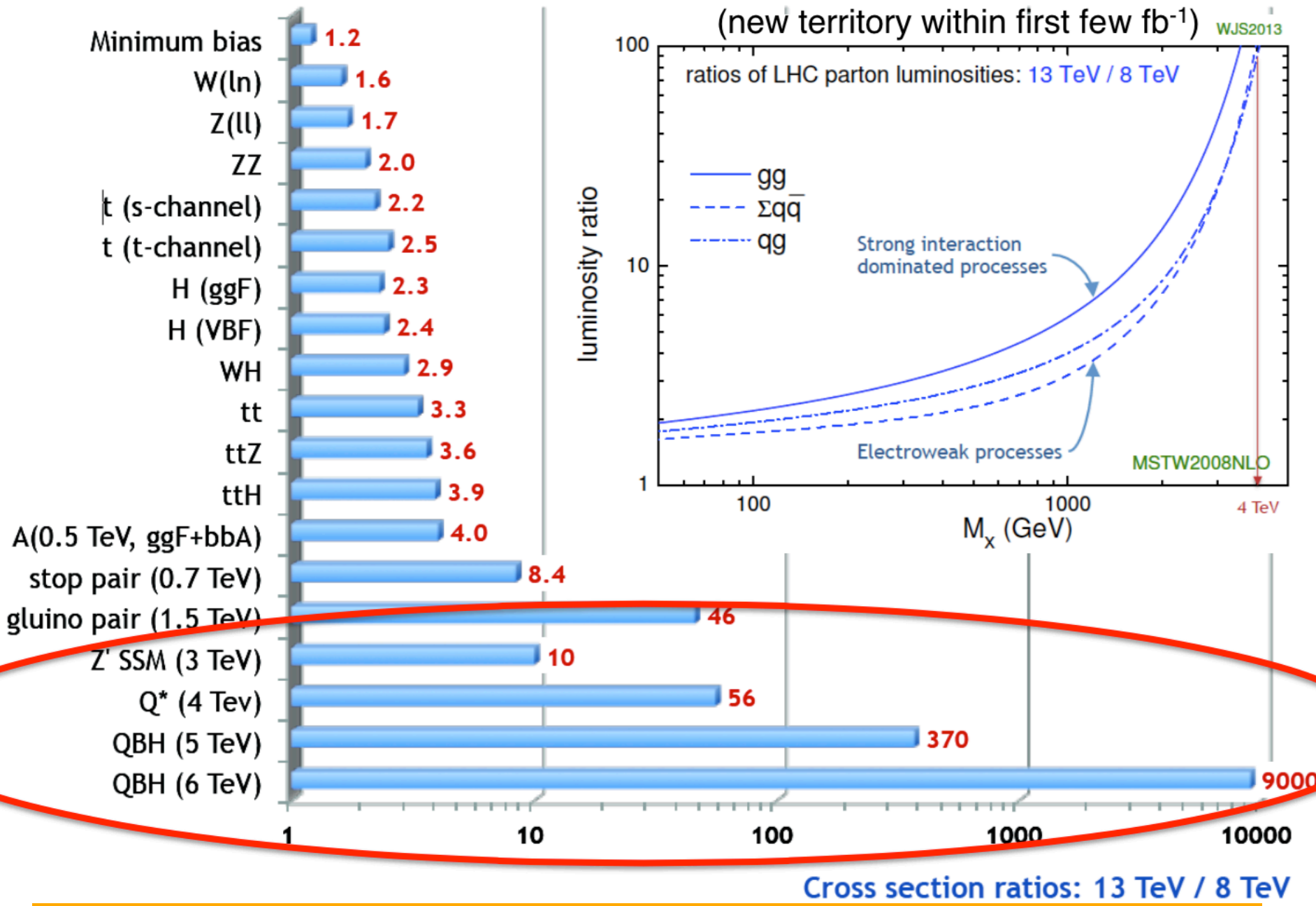


- *Run II preparations*
 - *Trigger menu development*
 - *New analysis framework, MC generation, etc..*
 - *FTK ;)*



Your Run I analysis missing Moriond*

*PC: parachute provided only in *exceptional* cases





Summary

- **A feast is coming...**
- *LHC is in the midst of magnet conditioning for 13 TeV*
 - *Expect 1st beam at on 23 March (previously 9 March)*
 - *“Success-driven schedule”, with ~no contingency in final powering tests*
- *ATLAS now in 24/7 shift mode*
 - *In midst of M8 commissioning work*
 - *Run 1 pub → Run 2 prep*
- *Expect ~3 (15) fb⁻¹ early Sep (Nov)*
 - *Many analyses exceed Run 1 sensitivity with a few fb⁻¹ (or less)*



Festina Lente!