CMS LHC REPORT

CMS AND LHC REPORT

ALL EXPERIMENTERS MEETING
FERMILAB

JULY 9, 2018

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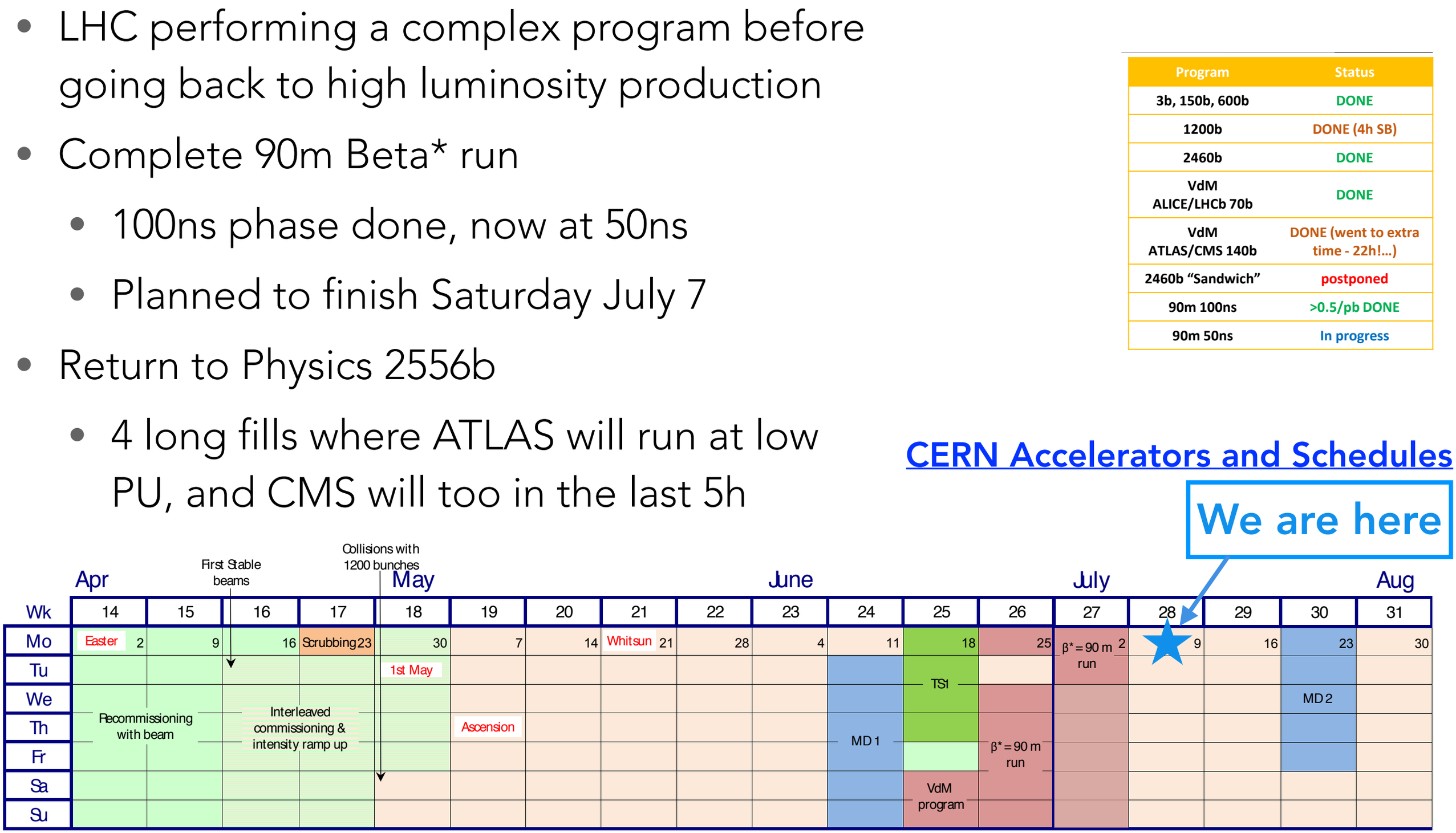
LHC & CMS SCHEDULE

- LHC performing a complex program before going back to high luminosity production
- Complete 90m Beta* run
  - 100ns phase done, now at 50ns
  - Planned to finish Saturday July 7
- Return to Physics 2556b
  - 4 long fills where ATLAS will run at low PU, and CMS will too in the last 5h

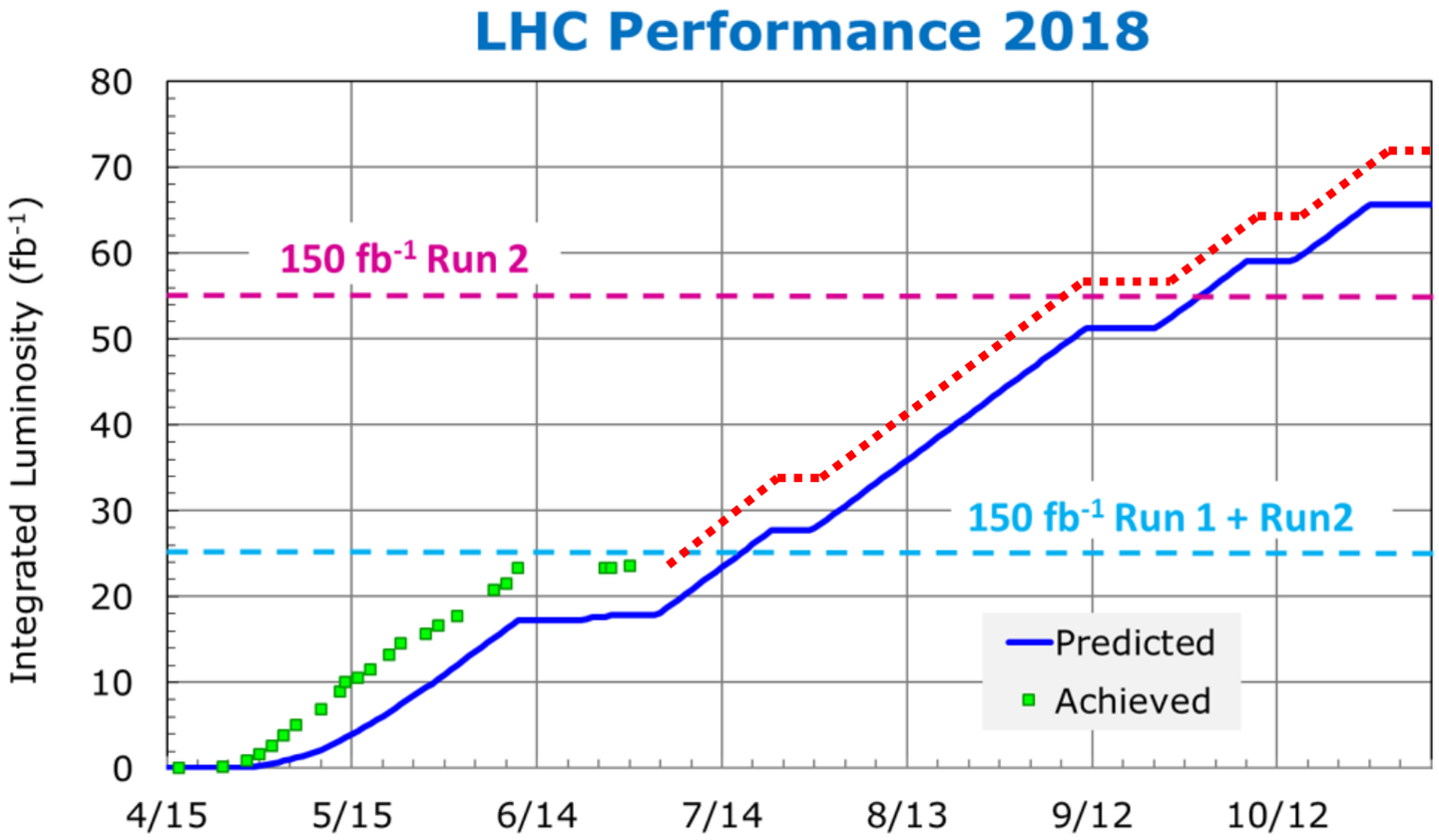
Program	Status
3b, 150b, 600b	DONE
1200b	DONE (4h SB)
2460b	DONE
VdM ALICE/LHCb 70b	DONE
VdM ATLAS/CMS 140b	DONE (went to extra time - 22h!...)
2460b "Sandwich"	postponed
90m 100ns	>0.5/pb DONE
90m 50ns	In progress

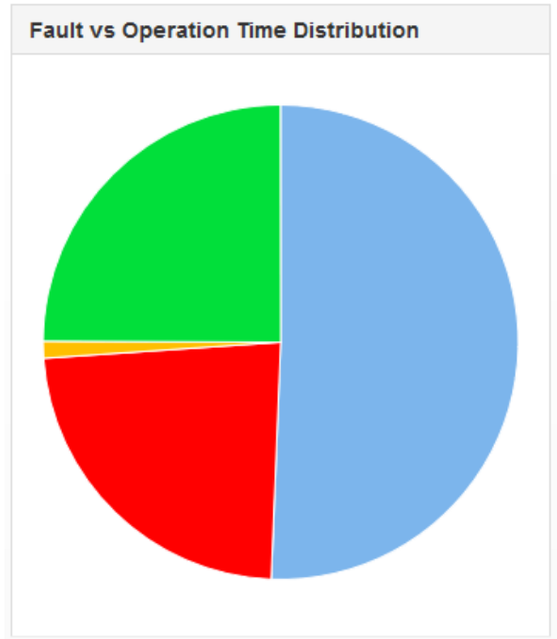
[CERN Accelerators and Schedules]



LHC STATUS

- Despite slower restart after MD1 and TS1, still ahead of schedule
- Main events:
  - Several LHC issues in recovery after TS1
  - Alice water leak
  - Experiments (Alice, Atlas) cooling faults
  - CMS Fire Alarms

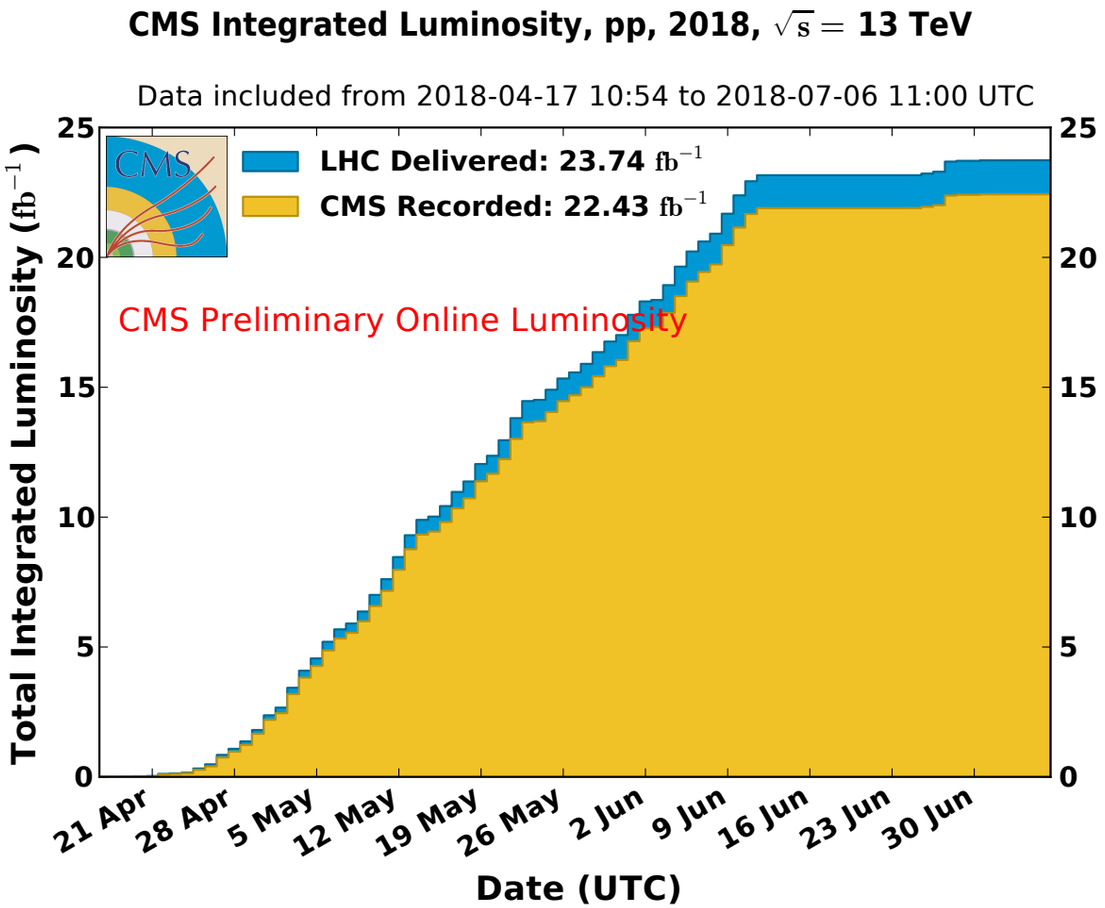


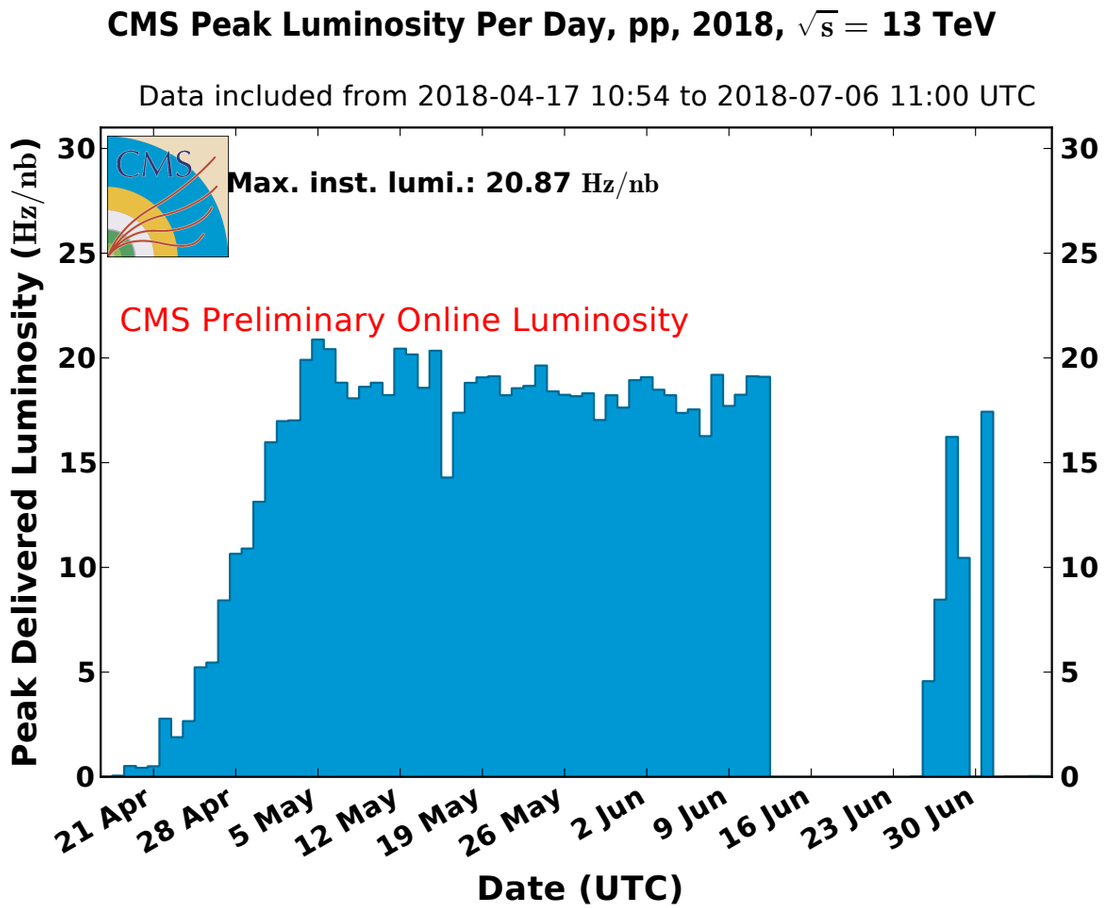


Machine Availability	LHC Stable Beam
76.7%	24.9%

CMS STATUS

- 94% data-taking efficiency (~19/fb certified for physics)

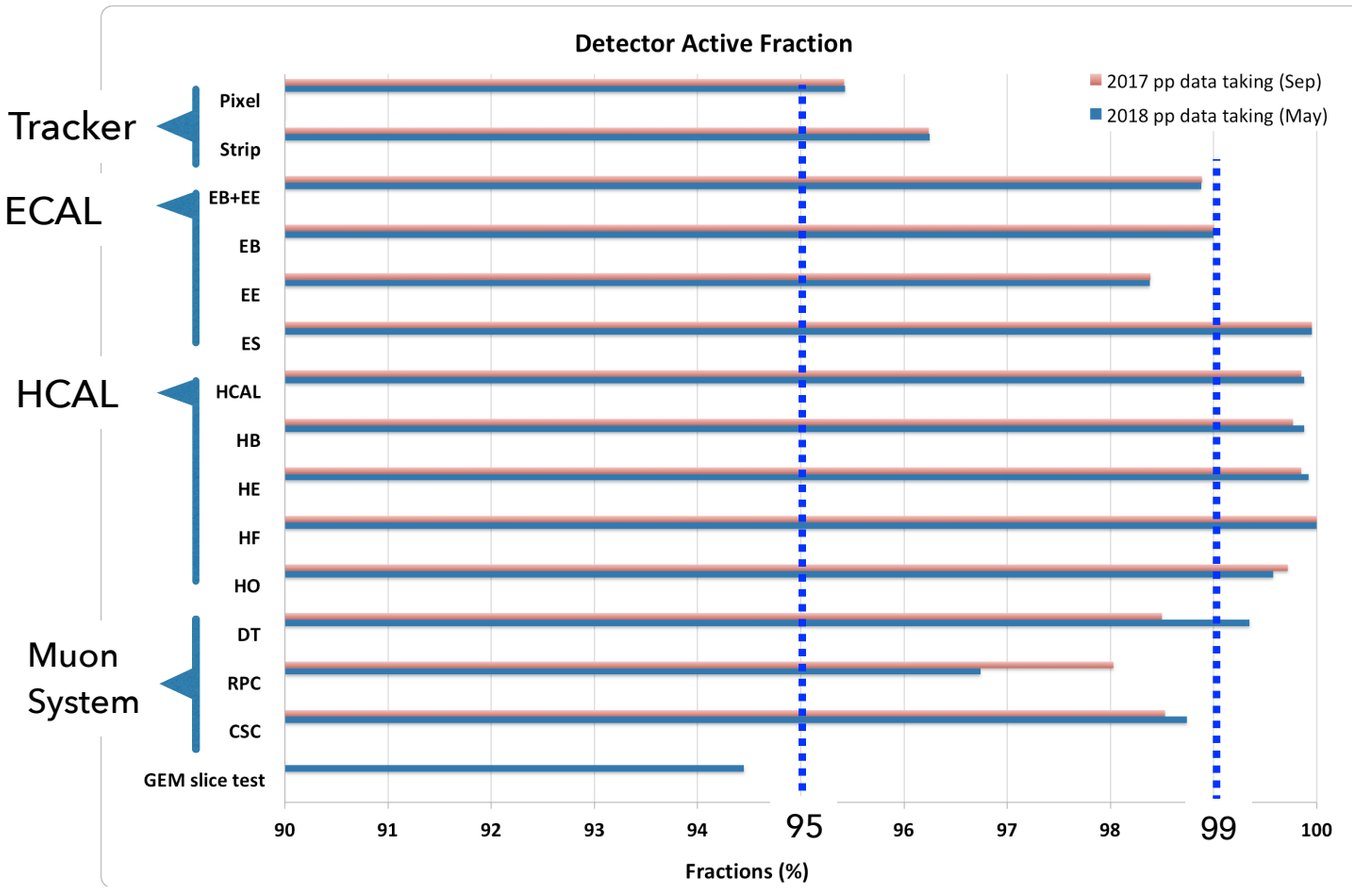




[CMS Luminosity Public Results]

CMS DETECTOR STATUS

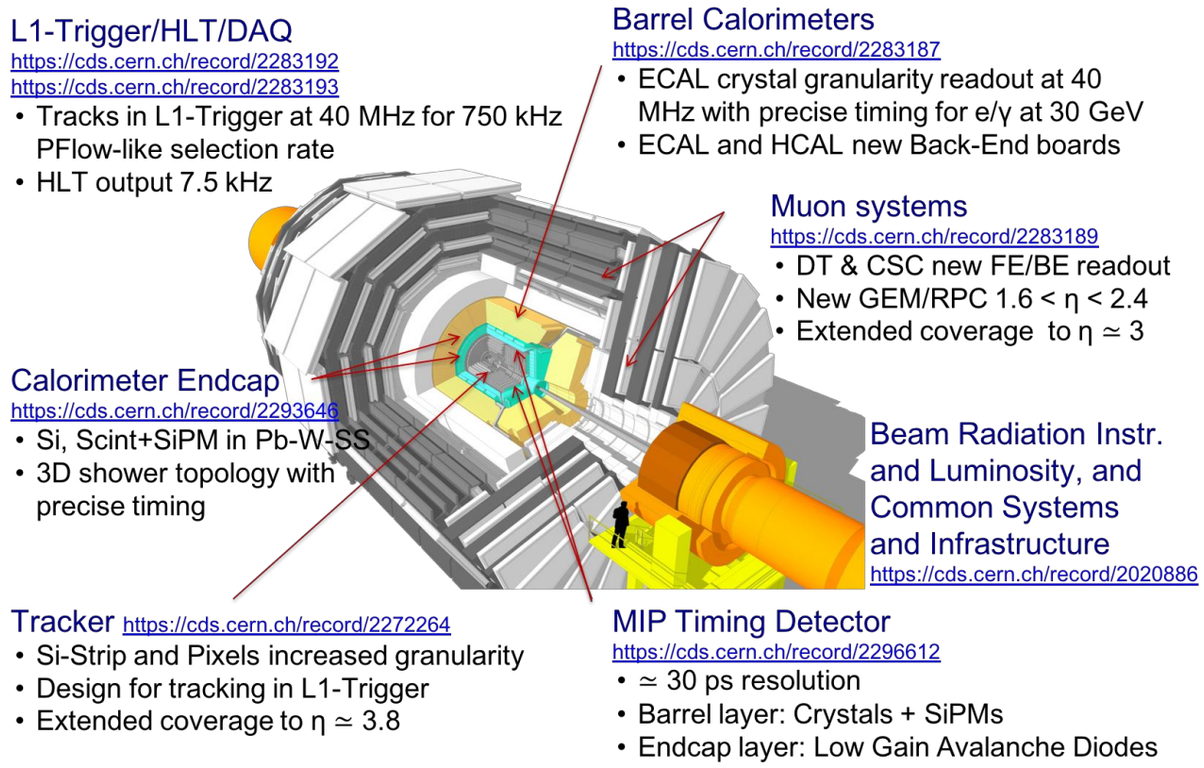
- 95-99% detector active fractions
- Saturday June 30: After (fake) fire alarm brought down all parts of CMS detector during the ATLAS/CMS VdM scans, two sectors of HCAL Endcap Minus (HEM15 and HEM16) could no longer be operated (LV power supply unit replaced, but problem persisted)
  - "Technical Incident Panel" is investigating, but current understanding is that there is little hope to recover these two sectors (a total of $\Delta\Phi = 40°$ on the minus side of HE) until the HCAL Endcap Minus can be opened
- Impact on physics also being understood



[CMS WGM365 Report]

PHASE 2 UPGRADE

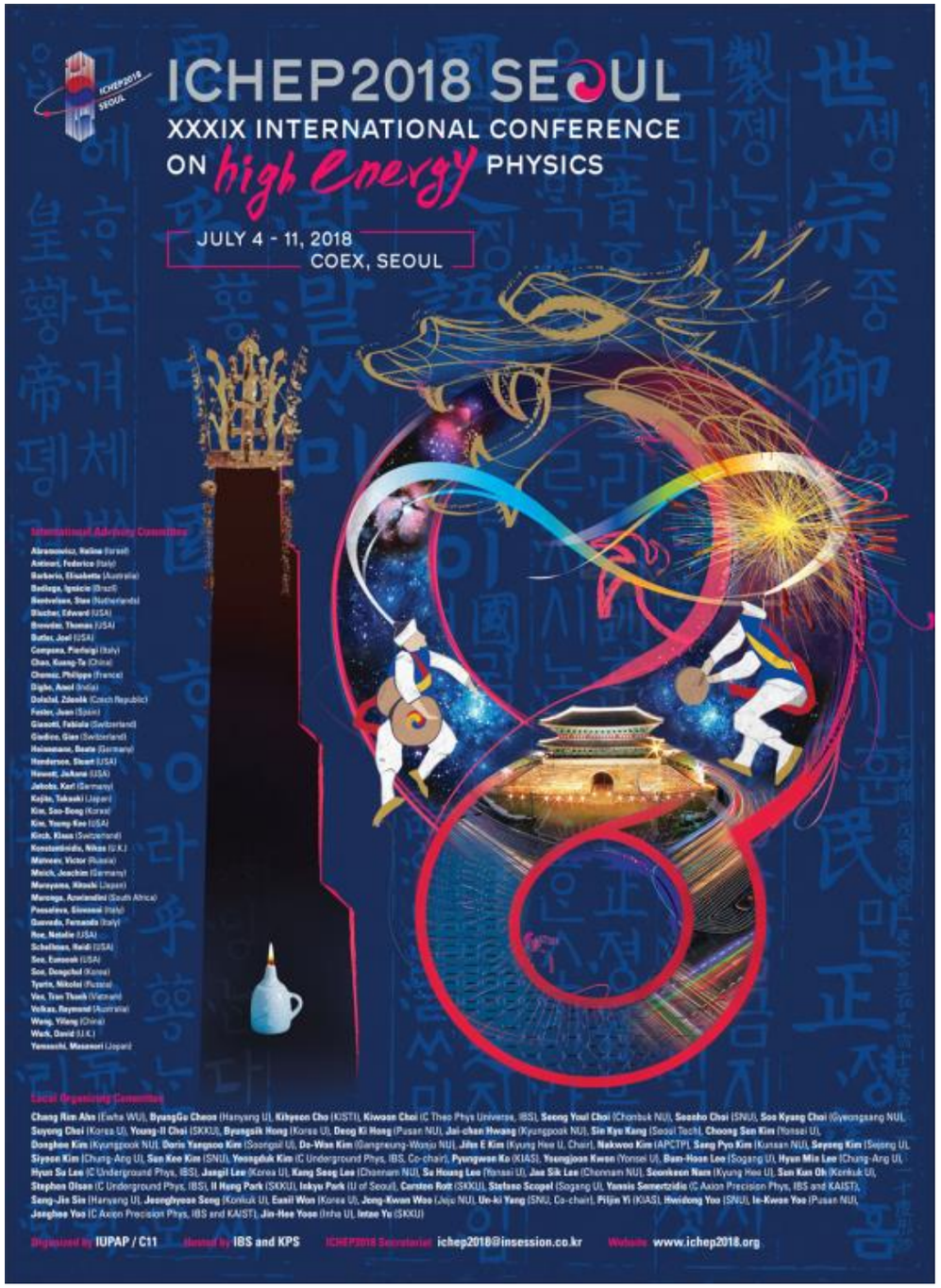
- Calendar of CMS International Reviews
  - MIP Timing Detector, Jun. 21: https://indico.cern.ch/event/735160/
  - Barrel Calorimeter, Jul. 2: https://indico.cern.ch/event/735166/
  - Muon systems, week of Sep. 24
  - Tracker, week of Oct. 8 or 15
  - L1-Trigger and DAQ/HLT, week of Nov. 5 or Nov. 12
  - Calorimeter Endcap, week of Jan, 21 or 28



PHYSICS

- ICHEP is ongoing
- CMS is presenting over 25 new results
  - Summary of ICHEP results was sent to CERN communication office, expected to be issued on Monday
  - Web page with summary of CMS results

http://cms.cern/news/ICHEP-2018



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BACKUP

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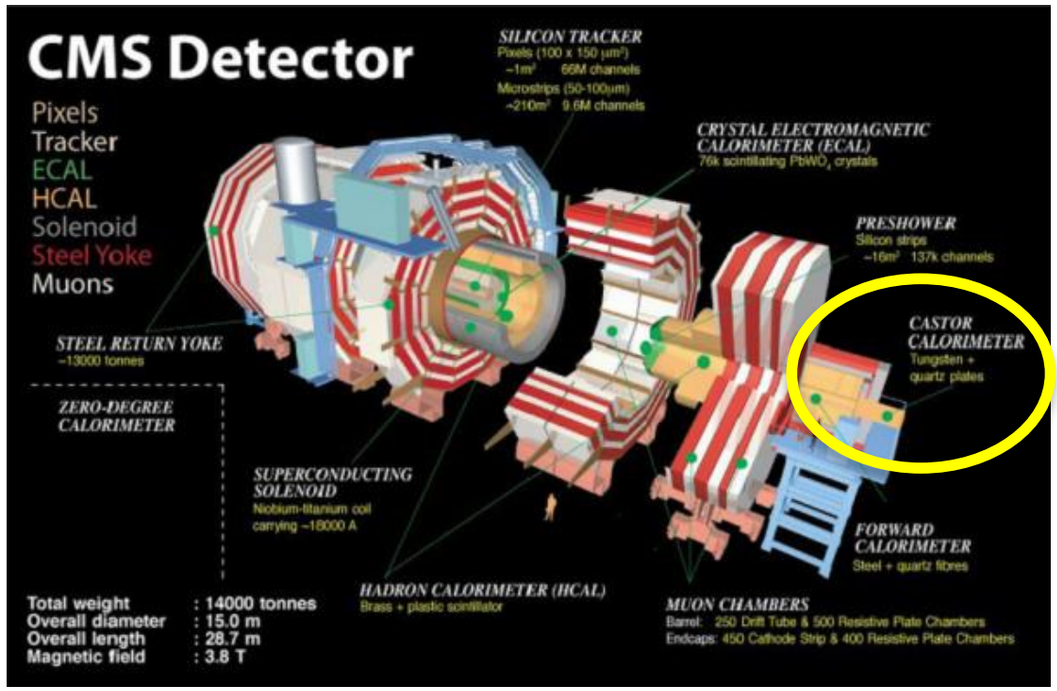
CASTOR



It is the last opportunity to use CASTOR, in LS2 we will replace the beampipe and it will not be compatible anymore

- Decided in a cross coordination meeting to reinstall CASTOR before the HI run
  - A very forward calorimeter with acceptance $-6.6 < \eta < -5.2$
  - Need some work to recommission the detector and DAQ, group committed
- Baseline is to use it with the nominal HI trigger, but more refined options are under study
  - If compatible with the HI program

VAN DER MEER SCAN

- VdM program completed, despite the power cut in CMS

CT-PPS BETA* = 90 M RUN

- Run dedicated to low mass diffraction physics: low missing PT searches, glue-balls
  - CMS-TOTEM collected ~0.4 pb^{-1} of low-PU (μ=0.06-0.13) data at 13 TeV in 2015
  - Preparation in a series of joint bi-weekly CMS - TOTEM meetings.
    - Last one was on Wed 20th: https://indico.cern.ch/event/731660/
    - Hardware :Digitizer boards for the timing arrived and tested, installed during TS1
    - TOTEM trigger tested during the 90m alignment run last night with three HF thresholds.
    - HLT Menu using paths defined with Cluster counting or HLT track cuts will be tested during 600b ramp up.
    - Offline: software release (CMSSW_10_1_7) to support the 90m run activities has been validated and deployed at Tier0 on June 20th.
- **RP alignment for 90m beta* last night**
  - L1 trigger menu LowPU/90-m with 3 different HF thresholds; ~1h data taking with quiet beam. TOTEM team starting the analysis. More news during the Run Coordination Plenary session on Wed.
- **90m beta* run starting from June 29th (in the current schedule…)** ~10pb^{-1} expected in 5 days of physics runs

LOW PU RUN

Low PU Run

- **Data taking after 90 beta* run and during VdM scan in other experiments.**
- CMS has a programme which would require ~25pb^{-1} of PU~ 1 data for HIN and FSQ studies
  - All physics requests collected in: https://docs.google.com/document/d/1nsHt3V-fYAj236wL_AZYxtp44eaiLMNPIjds7Vy675g/edit
- CMS Would like to take this data ideally in the last ~ 5 hours of each of the 4 fills requested by ATLAS.
- We will collect data at nominal luminosity until we will not request beam separation.
- HLT Menu will be tested during 600b ramp up.

Heavy Ion Run (Nov)

- Continuing preparation in all fronts: trigger/DAQ etc..

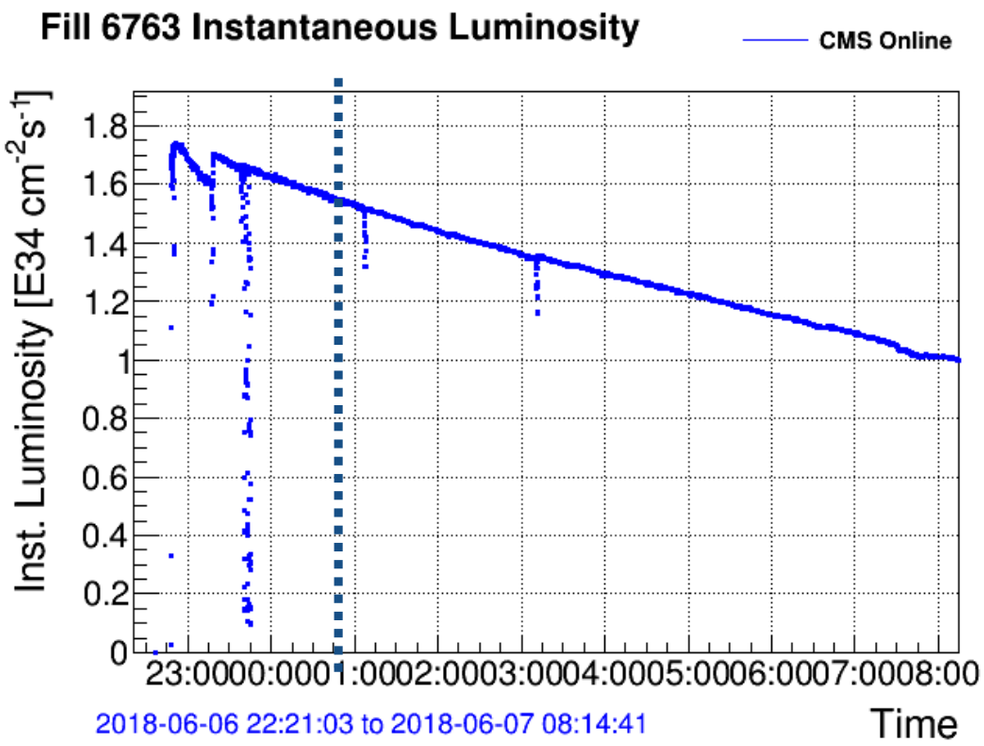
DATA PARKING FOR B-PHYSICS

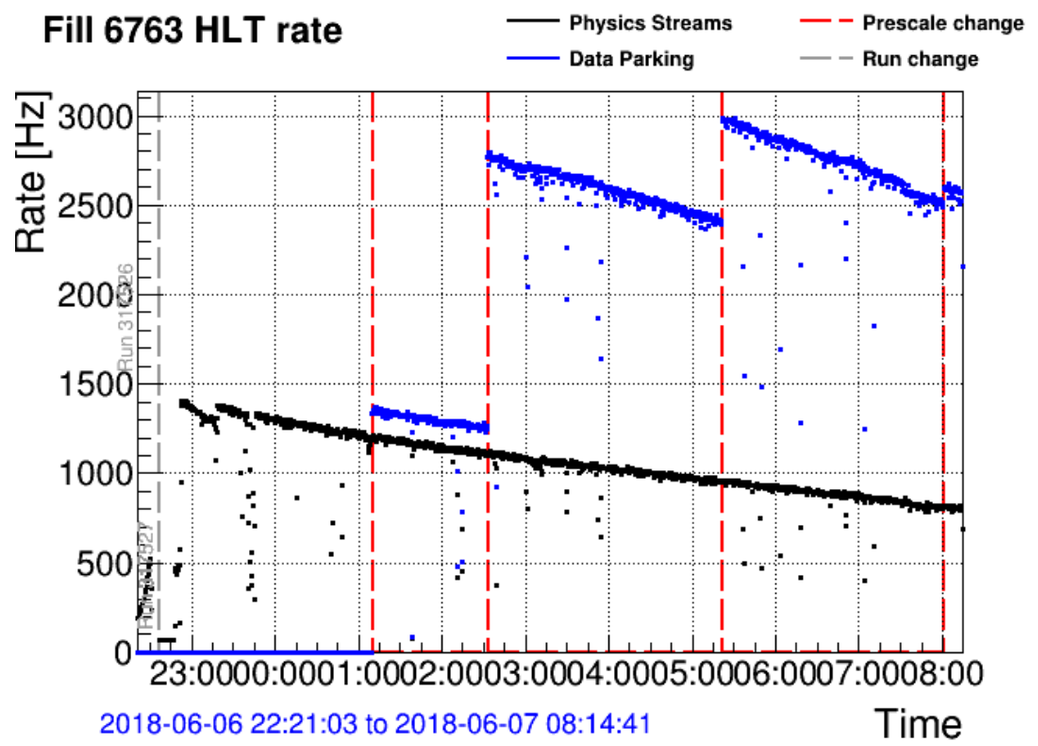
Collect an un-biased sample for B-physics to be reconstructed during the shutdown

Started with tests enabling parking at <10^{34} Hz/cm^2 (May 9th). Since May 11th starting at <1.4 * 10^{34} Hz/cm^2 and since June 6th starting at < 1.6 * 10^{34} Hz/cm^2 –> **Until Jun 19th recorded ~3B of events.** More information at: https://indico.cern.ch/event/738079/

The total L1A rate (optimised for 100 kHz) is below 80 kHz for the highest luminosity seen so far (2.05* 10^{34}). It is also much more linear with pile-up than what we had in 2017.

Deadtime has increased with parking ~0.5% due to the increased L1 rate





SOFTWARE AND COMPUTING

- System full as usual. Majority of resources given to different campaigns on daily basis, following priorities