CMS and LHC Update

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For the CMS Collaboration

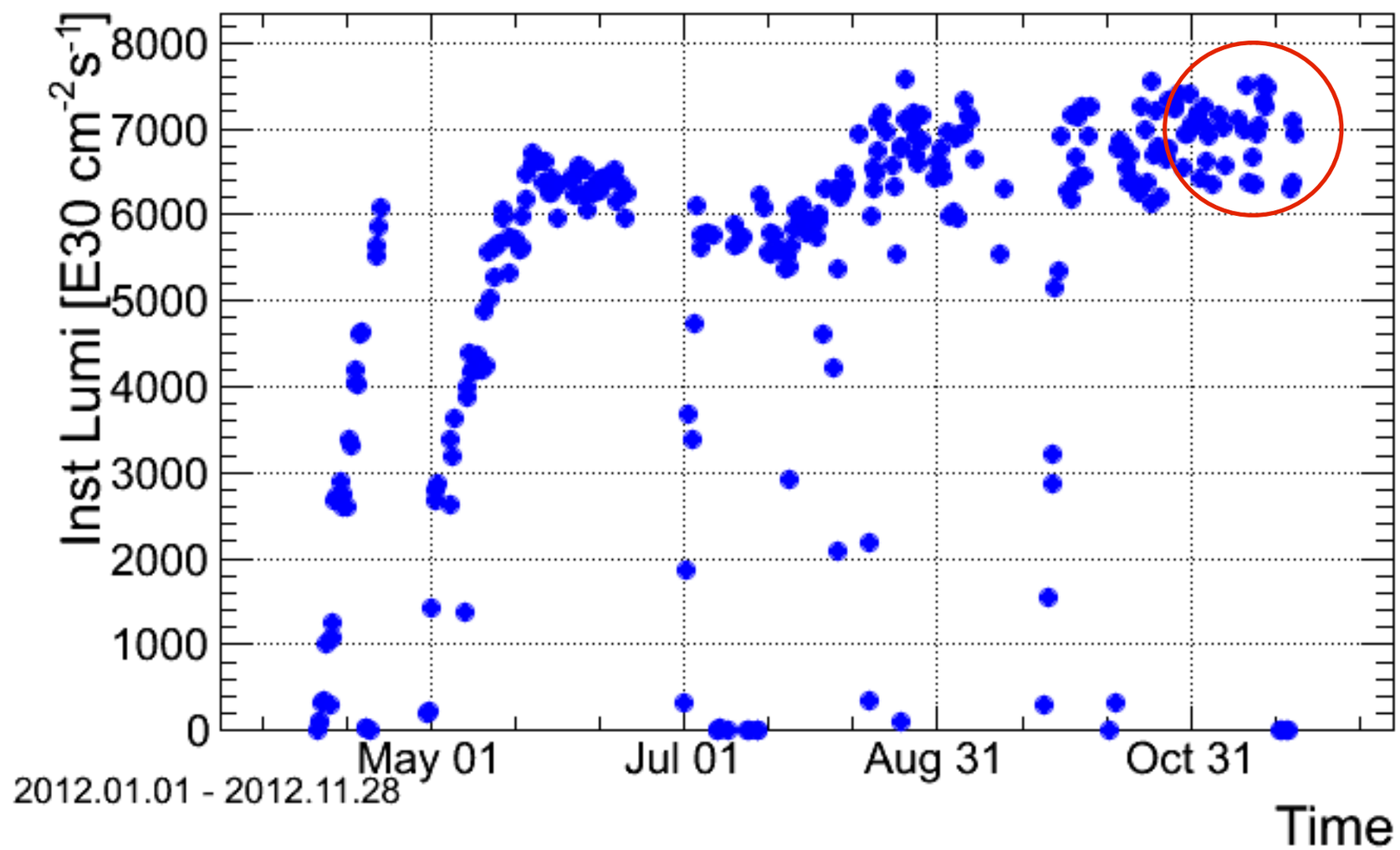
All Experimenters' Meeting
3rd December 2012

LHC Status (past month)

- First 3 weeks: colliding beams for physics
  - 36% of the time in Stable Beam delivery
  - Instantaneous luminosity peaking at 7.5×10^{33} cm^{-2} s^{-1}

- Van der Meer scan with more Gaussian beams
- Last week: machine development
  - dedicated study of component heating vs bunch length
- Physics data again over the weekend

CMS Peak Inst. Lumi (per Fill)



CMS Activities

- Preparation for 25 ns run (this week)
- Preparation for Heavy Ion data taking also started
- Load testing HLT farm for computing usage (data processing)
- Survey of HCAL radiation damage
- Work on problematic read-out card in silicon tracker
- Tuning of CSC (endcap muon detectors)
- Human error forced a slow ramp of the magnet to 2 Tesla

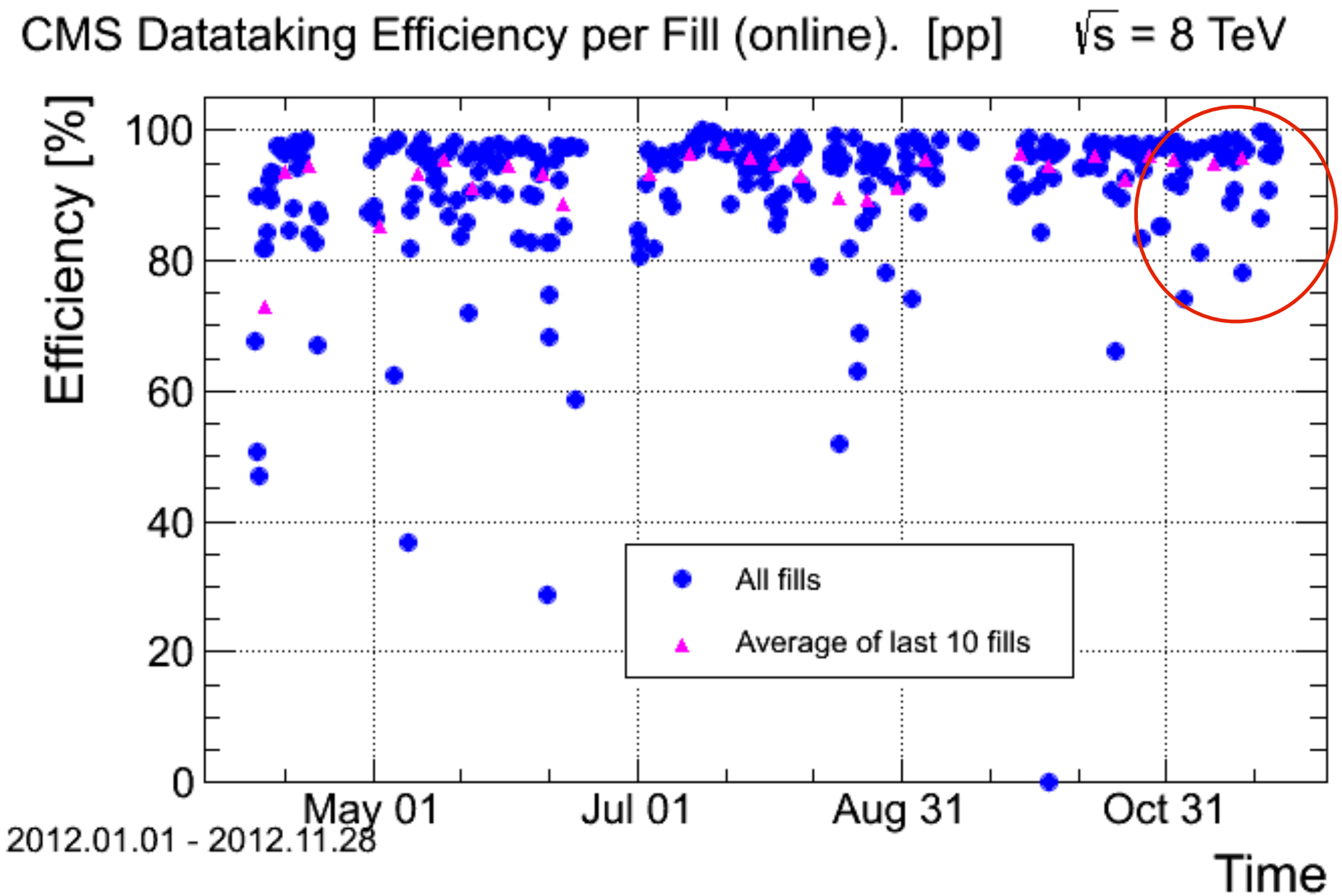
Summary of Fills

Fill	Begin Time YYYY.MM.DD HH:MM	Duration HH:MM	PeakInstLumi $\times 10^{30} cm^{-2}s^{-1}$ pp $\times 10^{24} cm^{-2}s^{-1}$ PbPb	DeliveredLumi pb^{-1}	RecordedLumi pb^{-1}	EffByLumi %
3266	2012.11.05 21:16	16:12	6360	198.1	192.5	97.2
3269	2012.11.07 12:42	12:28	7154	188.2	182.2	96.8
3272	2012.11.08 12:32	03:23	7018	65.2	53.0	81.2
3273	2012.11.09 01:47	07:59	6582	127.3	123.7	97.2
3279	2012.11.11 19:50	07:45	7121	132.3	129.6	97.9
3285	2012.11.13 12:56	10:11	7001	153.8	147.4	95.8
3286	2012.11.14 02:31	10:20	7506	164.3	158.9	96.7
3287	2012.11.14 18:31	09:01	6370	137.1	134.9	98.4
3288	2012.11.15 05:57	13:05	6682	169.1	150.7	89.1
3292	2012.11.16 04:16	03:40	6361	68.5	65.2	95.1
3293	2012.11.16 10:27	01:17	6932	28.6	26.0	90.8
3296	2012.11.17 07:23	12:27	7045	181.1	178.7	98.7
3297	2012.11.17 22:39	00:24	7328	9.6	7.5	78.2
3298	2012.11.18 01:28	03:16	7532	70.4	68.6	97.6
3299	2012.11.18 09:53	11:44	7268	175.2	169.6	96.8
3300	2012.11.19 04:38	08:27	7489	148.4	144.1	97.1
3310	2012.11.22 06:56	00:58	0	0.0	0.0	99.9
3311	2012.11.22 16:33	06:10	3	0.1	0.0	86.6
3314	2012.11.23 09:54	00:11	2	0.0	0.0	99.9
3316	2012.11.23 19:29	08:43	3	0.1	0.0	96.3
3318	2012.11.24 08:51	10:31	6302	147.2	133.6	90.8
3319	2012.11.24 22:30	02:11	6373	44.3	42.6	96.1
3322	2012.11.25 03:53	11:13	7081	168.3	165.7	98.4
3323	2012.11.25 18:21	10:41	6947	164.1	159.2	97.0
Summary		182:17	7532	**2541.4**	**2433.7**	**95.8**

about 150pb^{-1} per fill

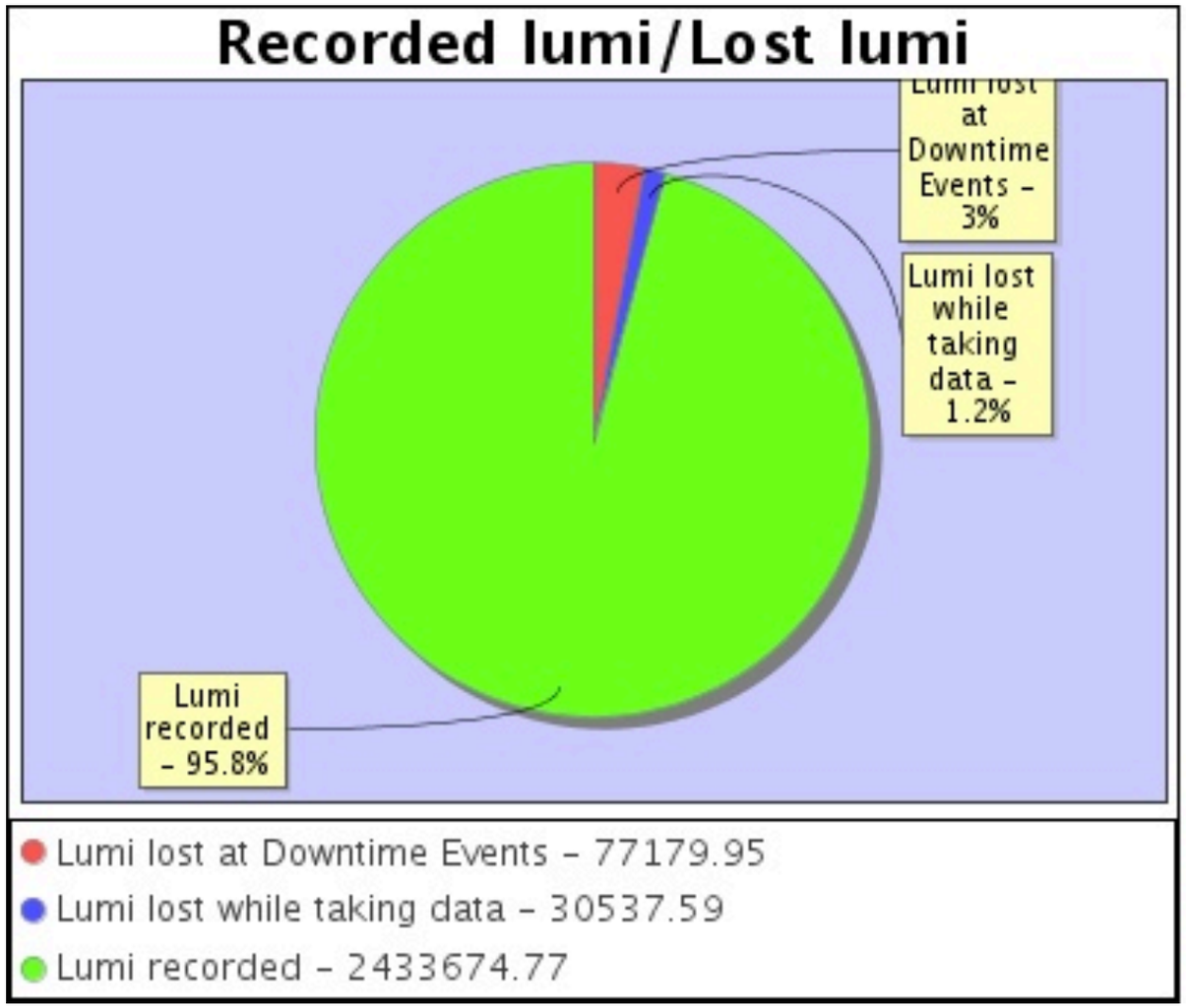
}VdM

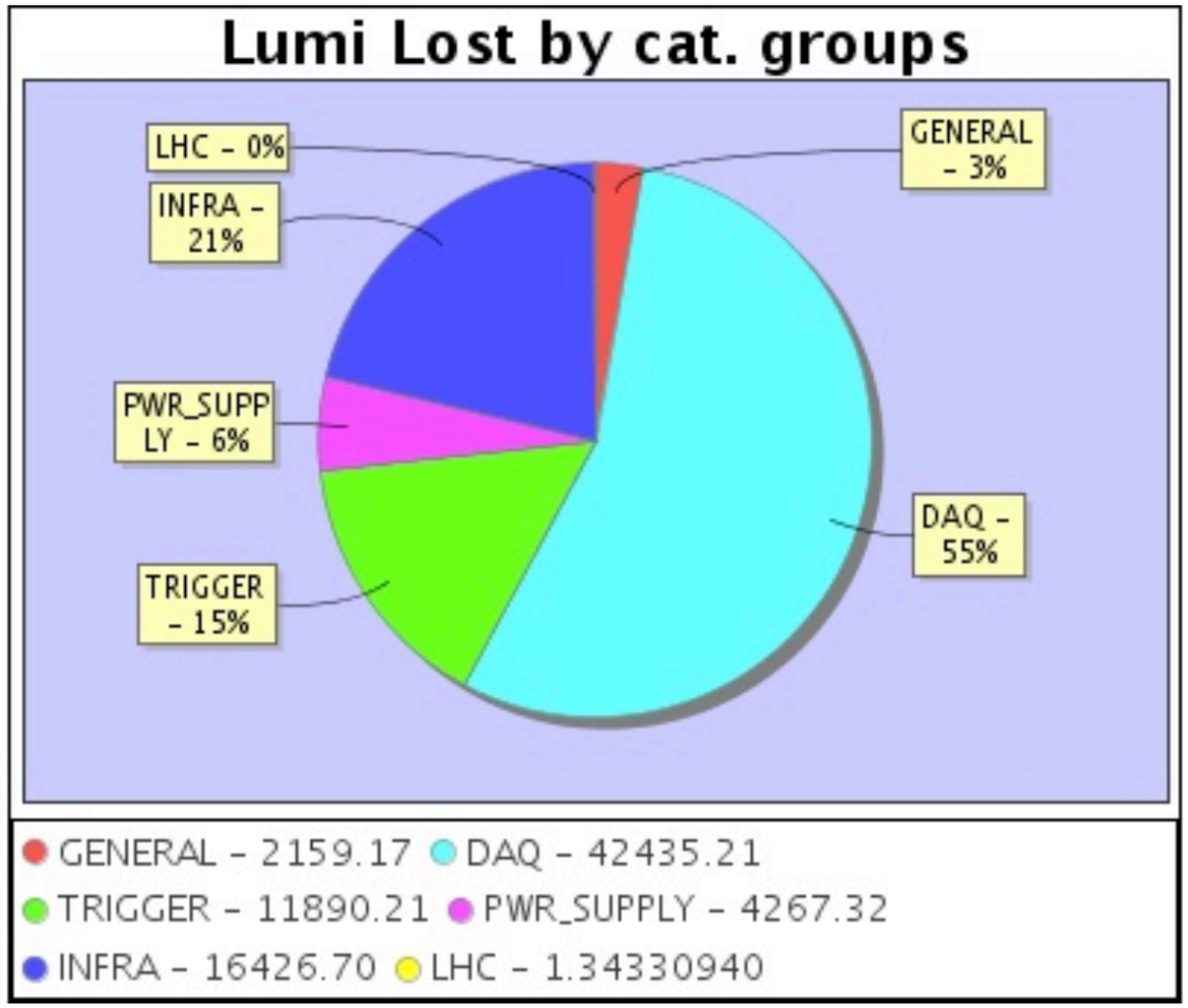
Efficiency



- Lower efficiency points on above plot are usually very short fills
- Luminosity weighted average efficiency is 95.8% for Nov 5 – 30 and 93.7% for all of 2012

Downtimes (past month)

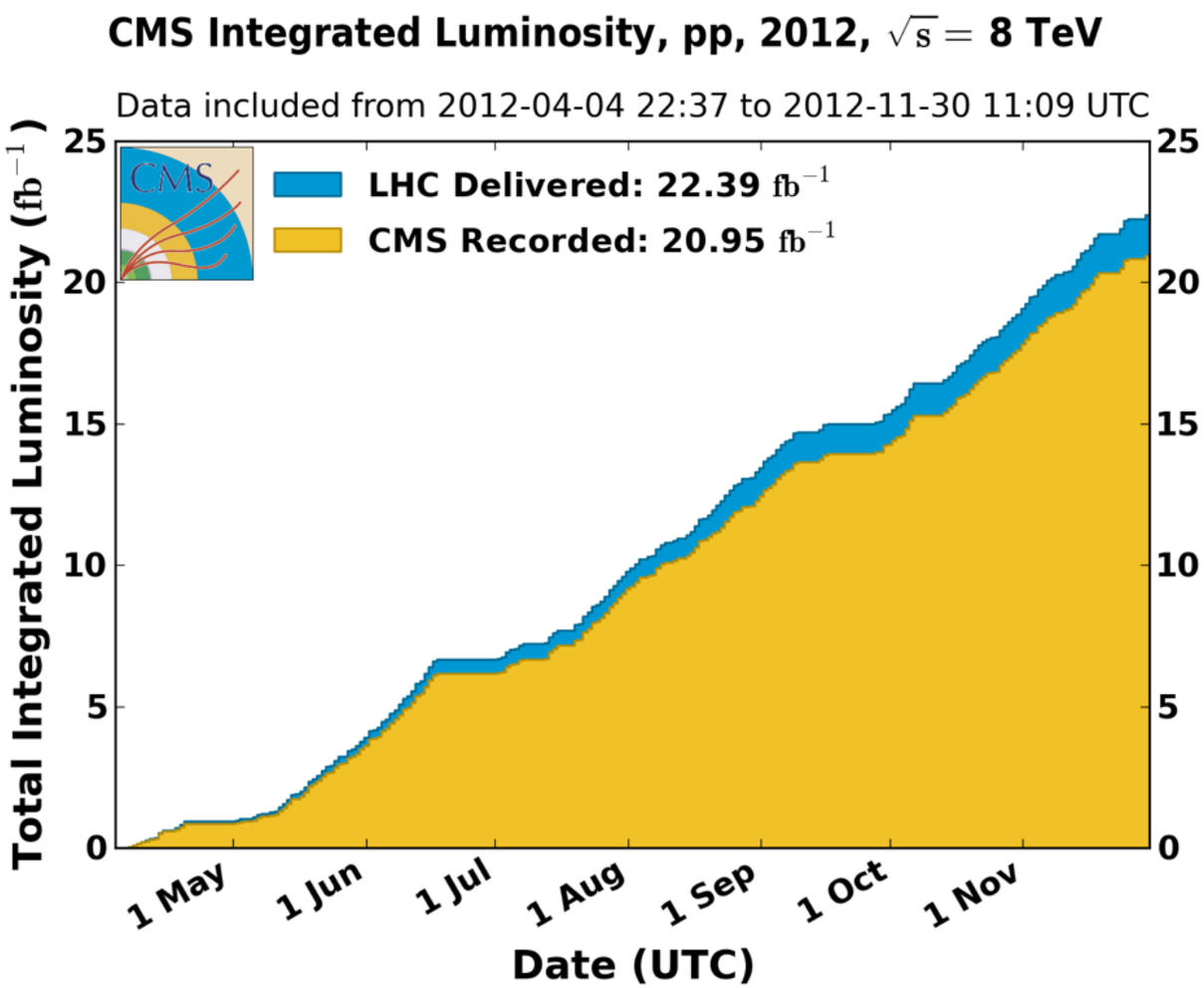




- 95.8% lumi recorded, 3% down time, 1.2% DAQ/Trigger dead time
- Largest sources of lost luminosity:
  - DAQ(tracker): 23%, DAQ(HCAL, ECAL, other): 32%, Infrastructure(cooling): 21%, Trigger: 15%

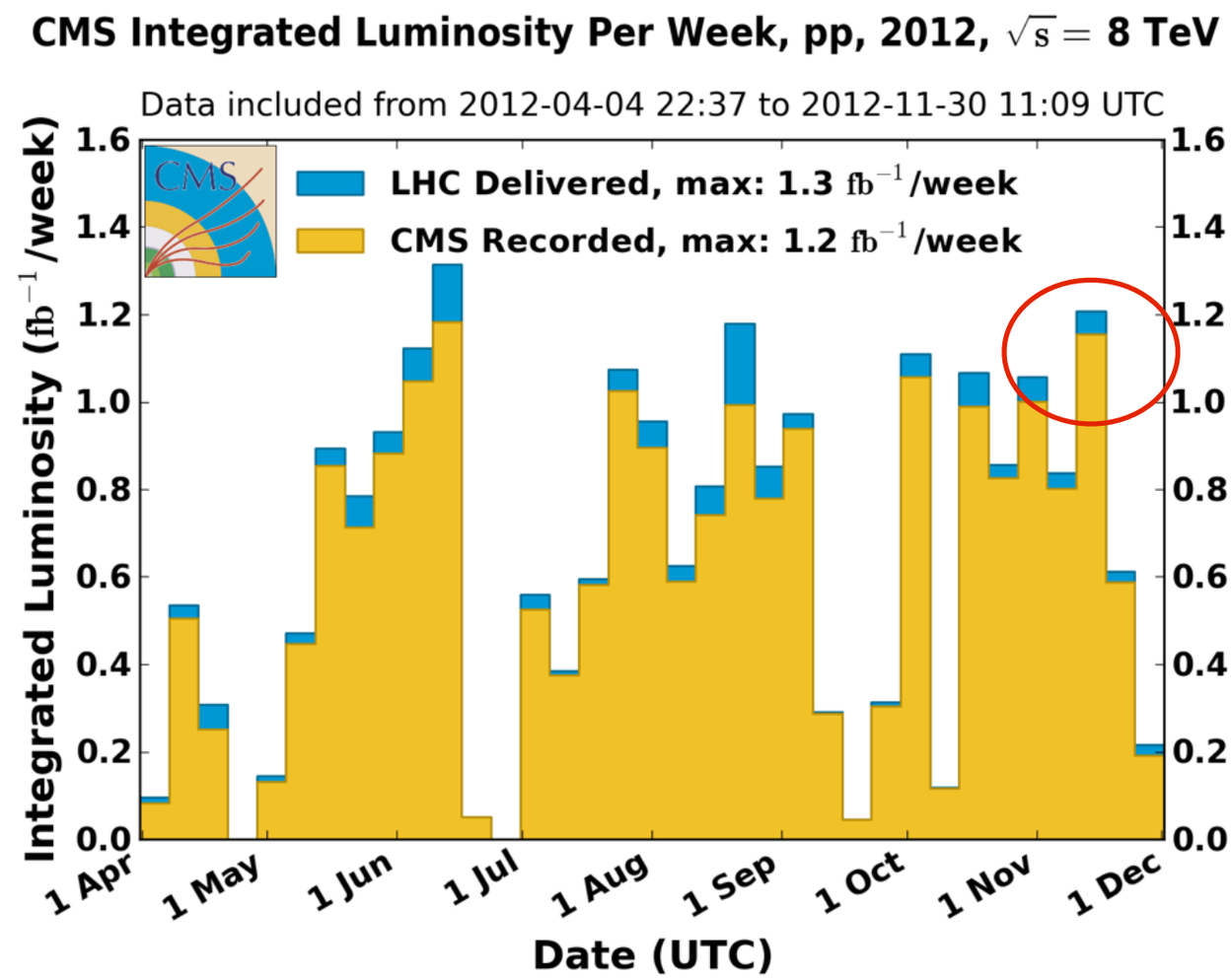
Integrated luminosity

Cumulative



20.95 fb^{-1} recorded

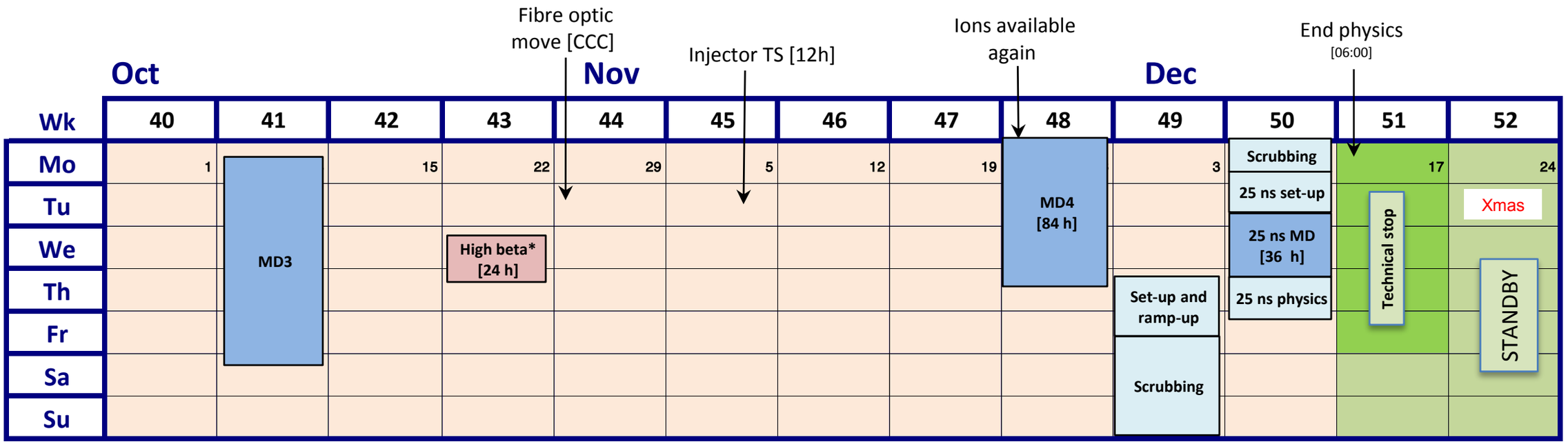
Weekly

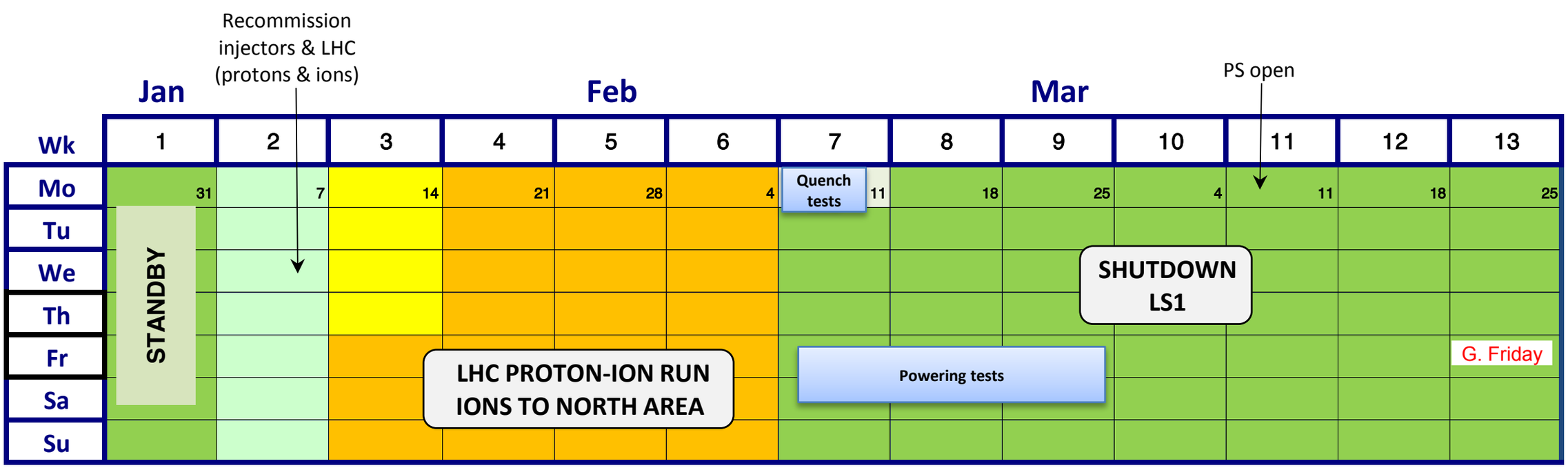


second best week ever: 1.15 fb^{-1} recorded

Plan

- Just a few more days of normal pp physics (run ends 17 Dec)

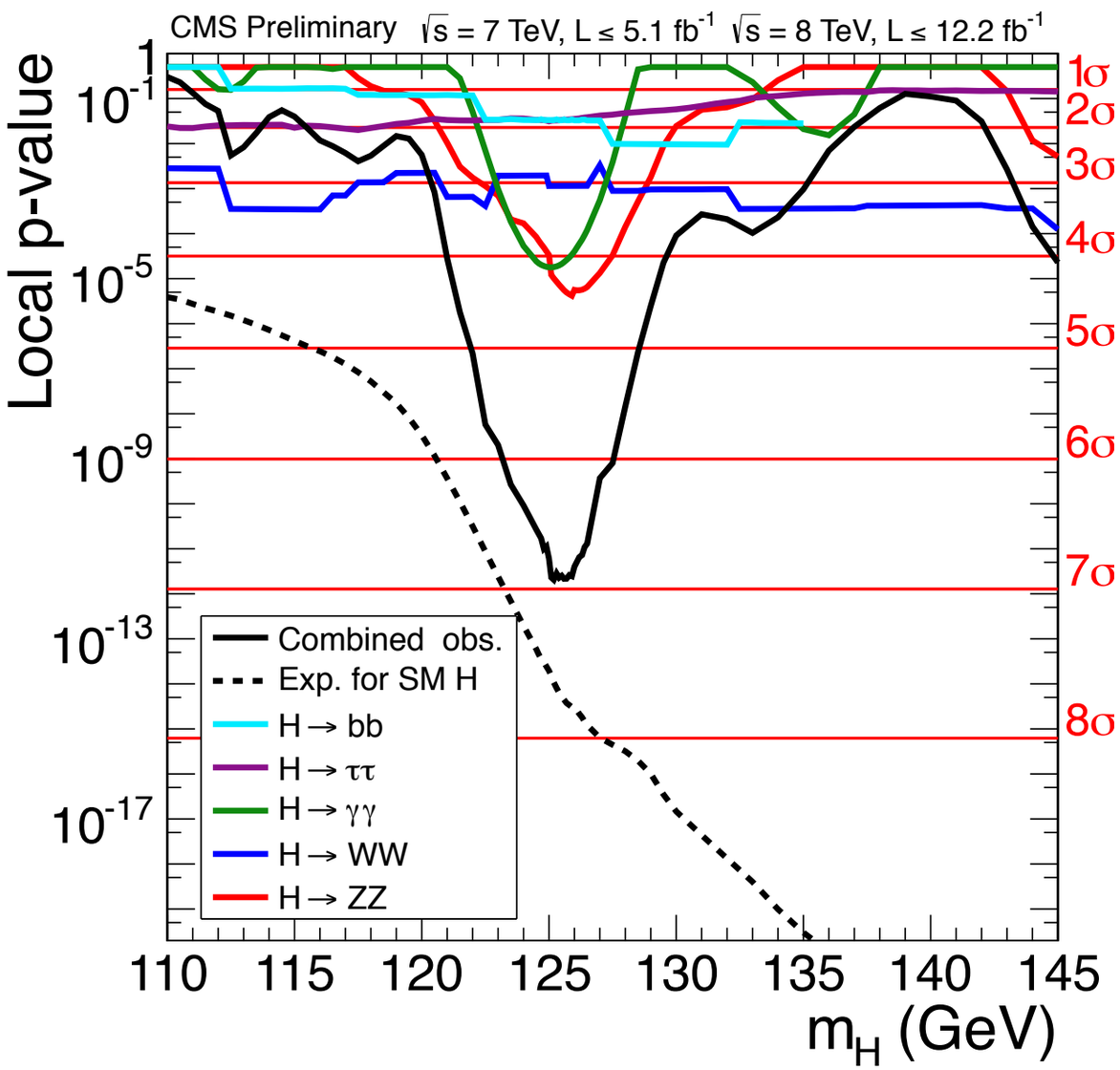


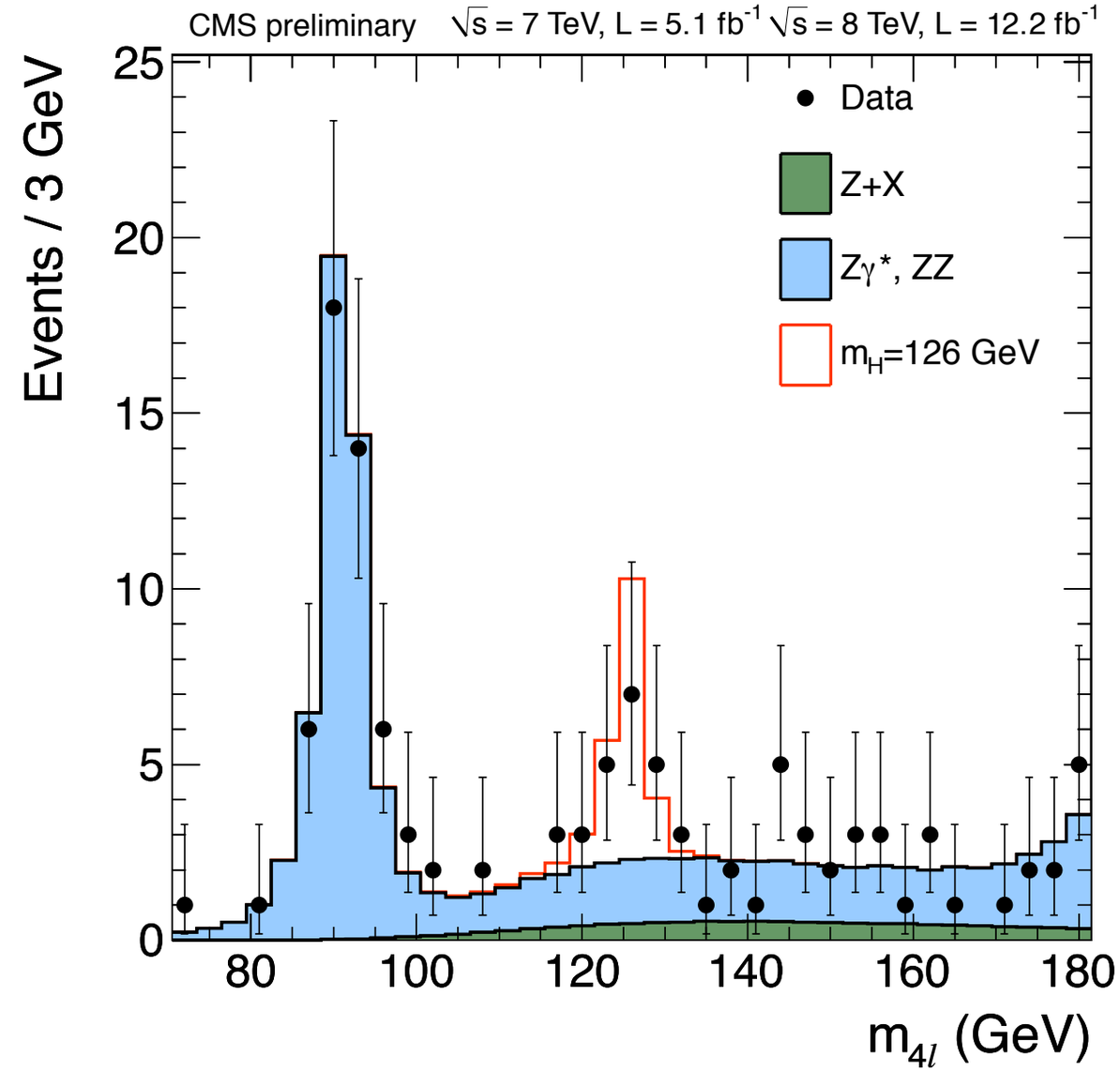


Machine development
Technical Stop
Proton-ion run
Special physics runs
Recommissoning with beam
Proton-ion setup

Physics Highlight

- Higgs results from last month's HCP conference





CMS combined result: local significance is **6.9σ** for m_H=125.8 ±0.4 ±0.4 GeV

local significance for H->ZZ->4l: **4.5σ**