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LHC Machine Status
RRB

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LHC 2017 operation

Thanks to all the teams from infrastructure, all equipment groups to operation for their competence, professionalism, creativity and commitment.

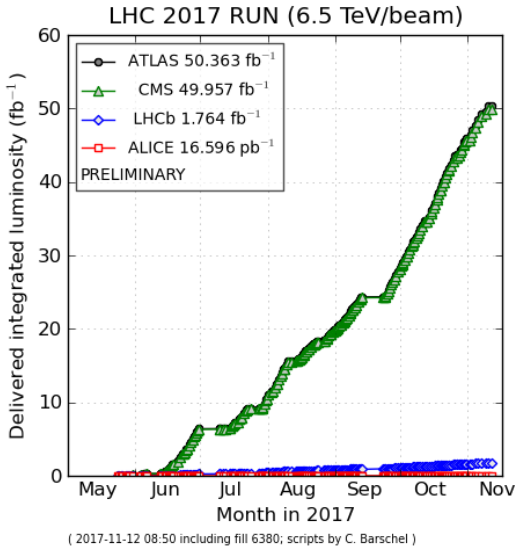
2017 goal:

45 fb^{-1}

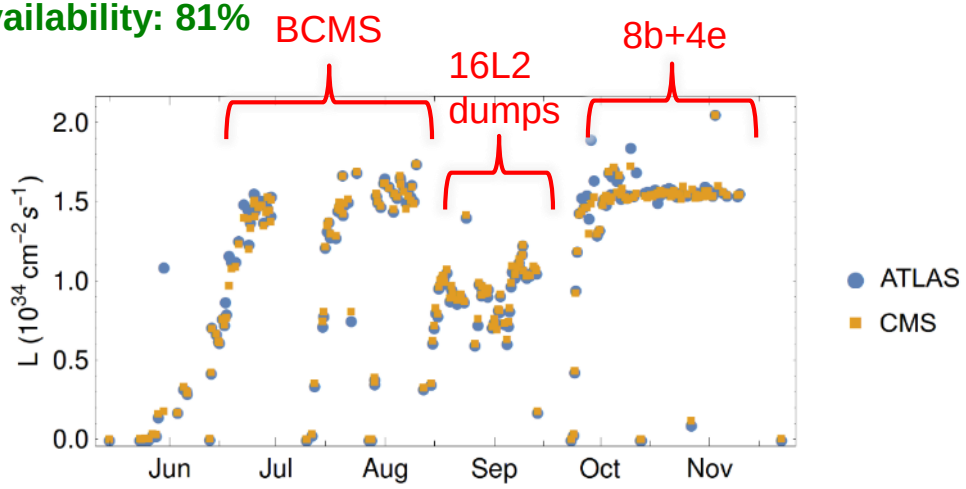
Peak luminosity
2.2 10^{34} cm^{-2} s^{-1}

With luminosity levelling at
1.5 10^{34} cm^{-2} s^{-1}

Lower β* 30 cm
(new ATS optics)

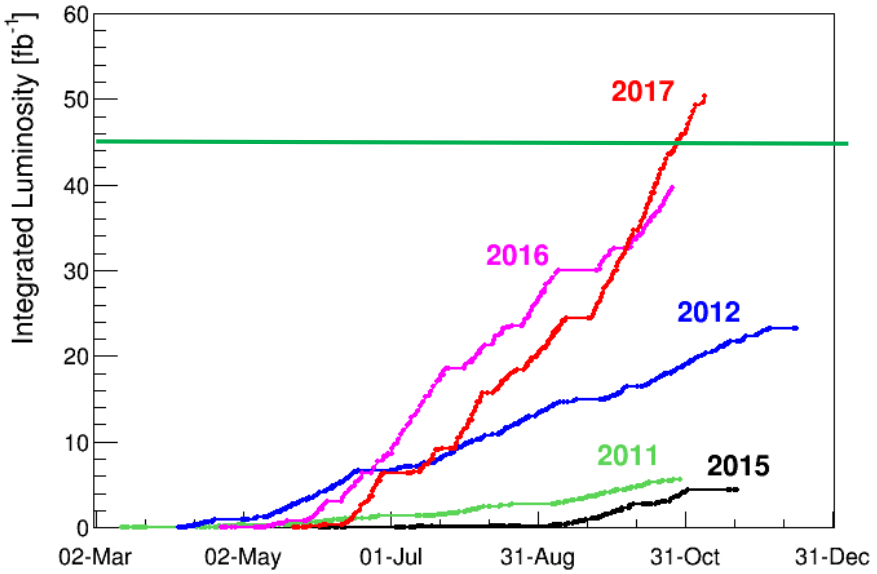


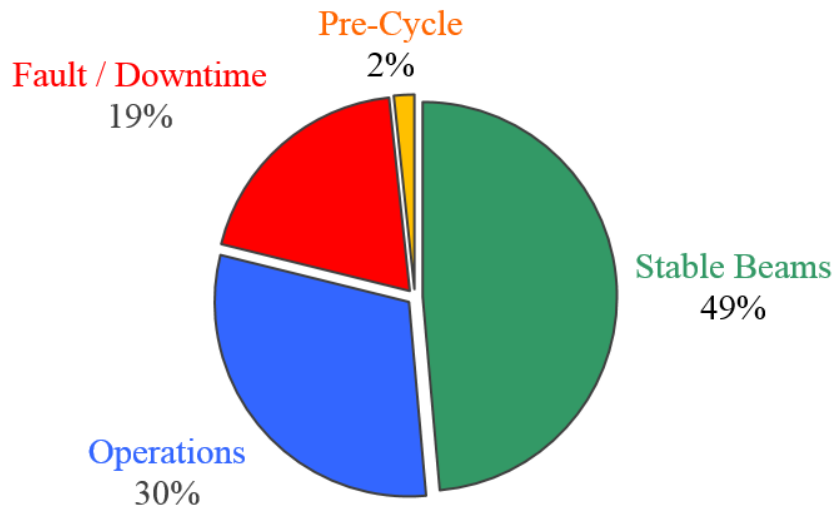
Availability: 81%



LHC takes <0.03 % of the CERN protons

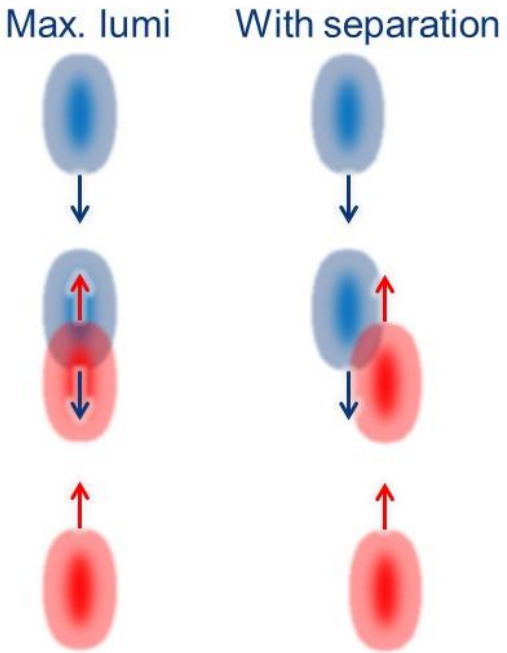
Achieved : 50 fb^{-1}

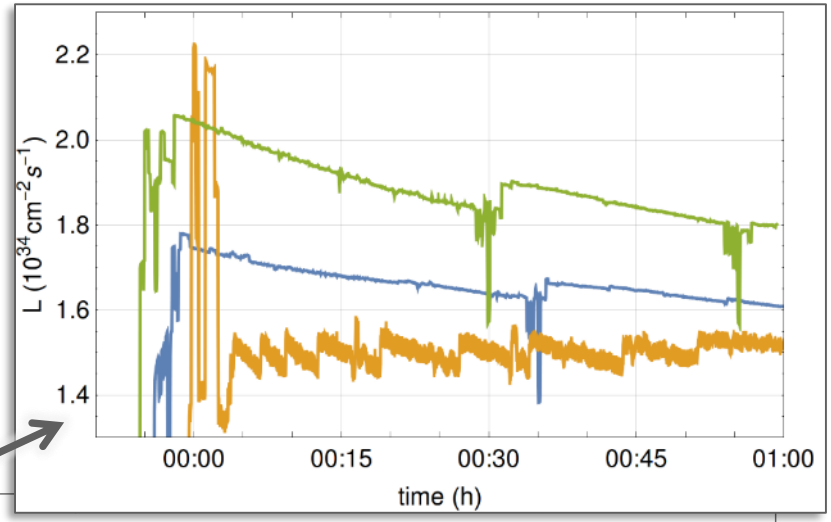


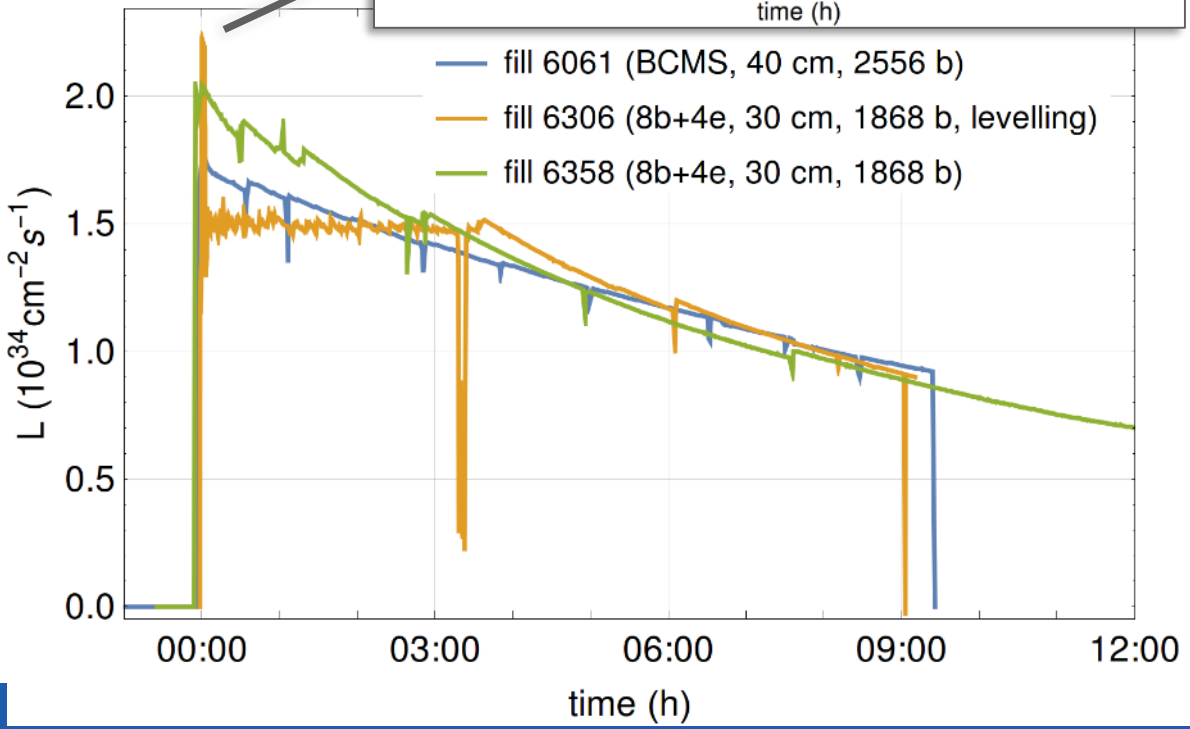


LHC 2017 : separation levelling

- Introduced separation levelling for all experiments (Separation levelling is used since many years for ALICE and LHCb)
- Dynamic orbit bump changes overlap of colliding bunches
- Initial spike before leveling reaching 2.2×10^{34} $cm^{-2}s^{-1}$

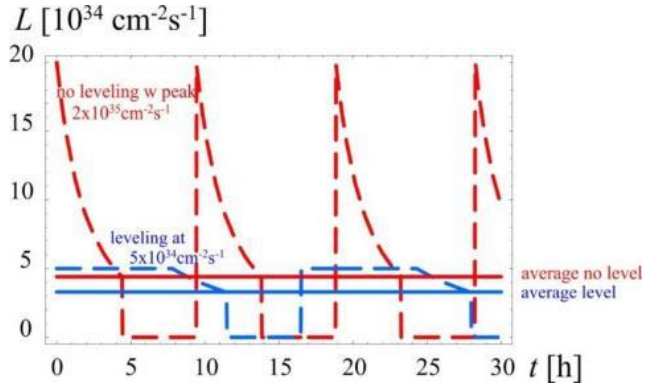




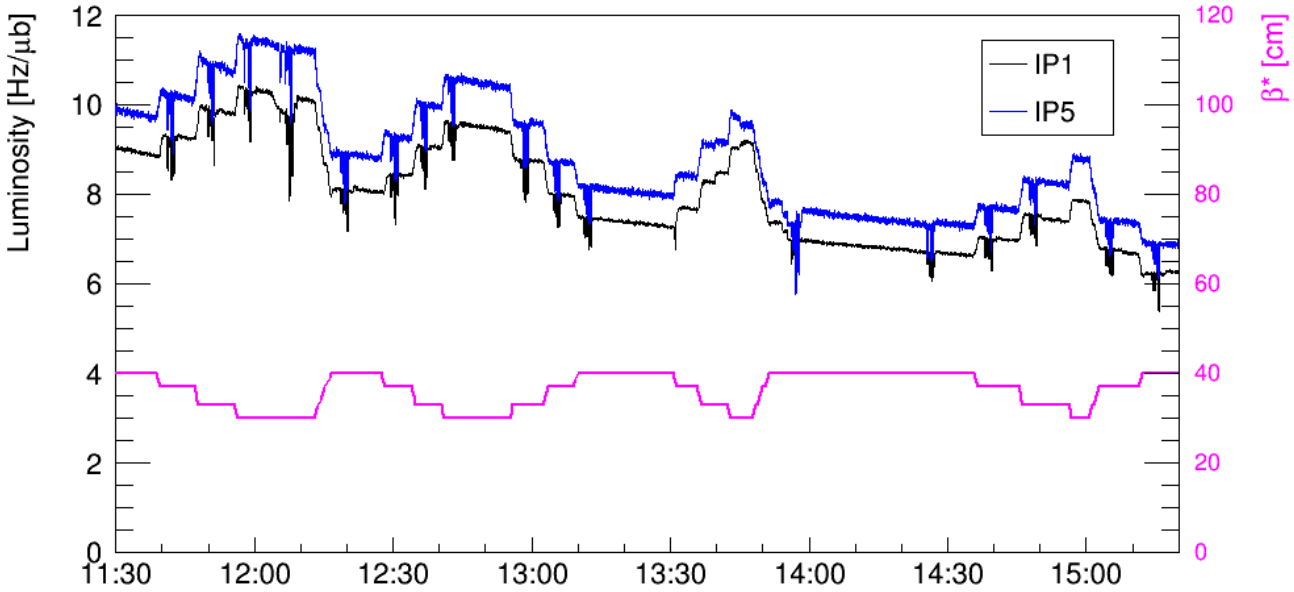


MDs on β* levelling

Levelling luminosity by β* should be the main levelling technique for HL-LHC

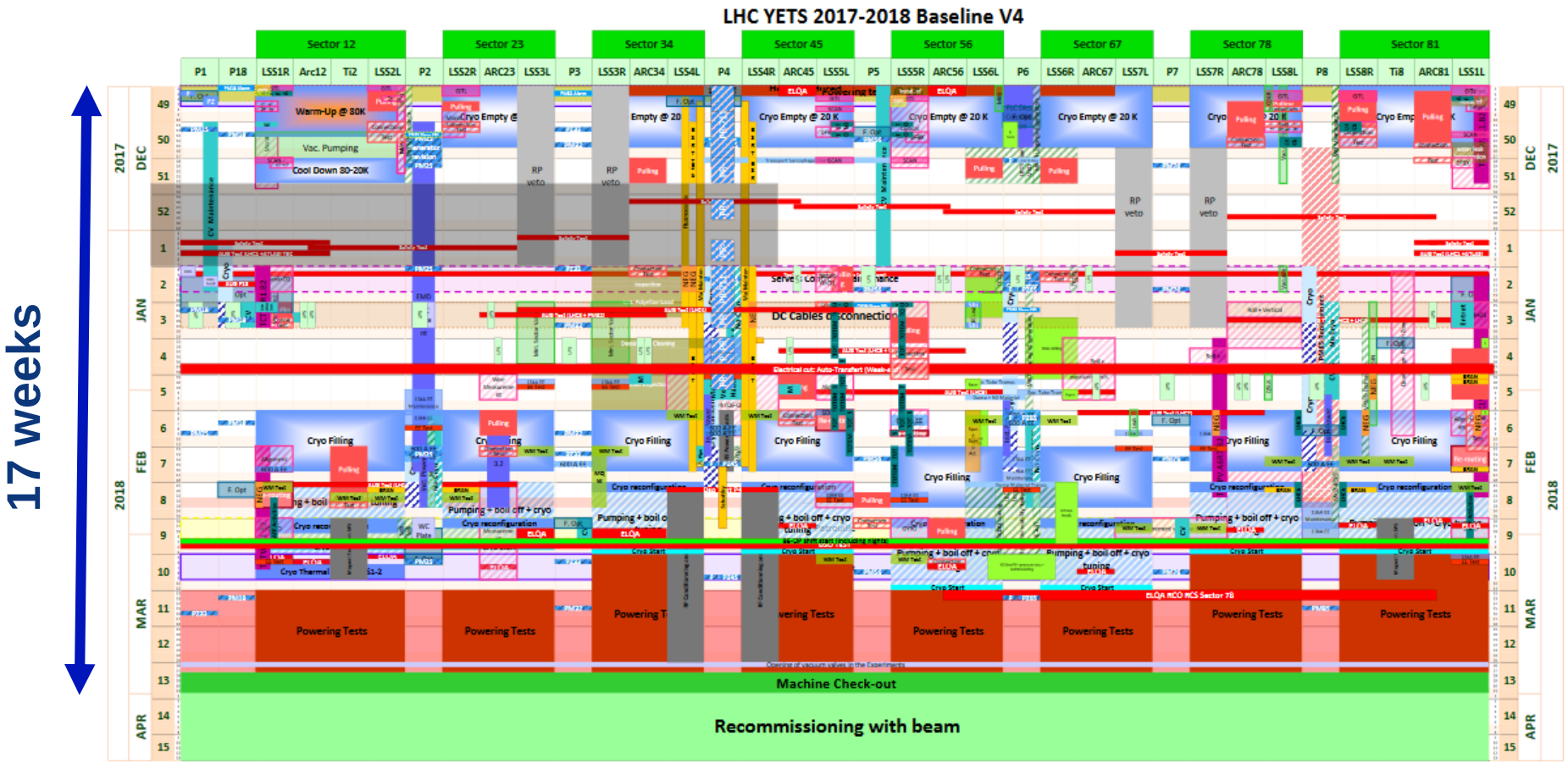


β* levelling in the last LHC MD: a possible tool for 2018 operation



Luminosity evolution during β levelling, moving back and forth between 30 cm and 40 cm. The beams remained head-on **within ~ 2 μm** !*

Summary of main activities in the LHC during YETS 2017-2018



LHC schedule 2018

A production year to complete Run 2 (13 TeV)

Goal 60 fb^{-1} ATLAS/CMS

2 fb^{-1} for LHCb

with 131 days of p-p physics

55 fb^{-1} and 1.8 fb^{-1} if 119 days

keeping the LHC high availability and >50% stable beams)

Pb-Pb run : 24 days + 4 days setting-up

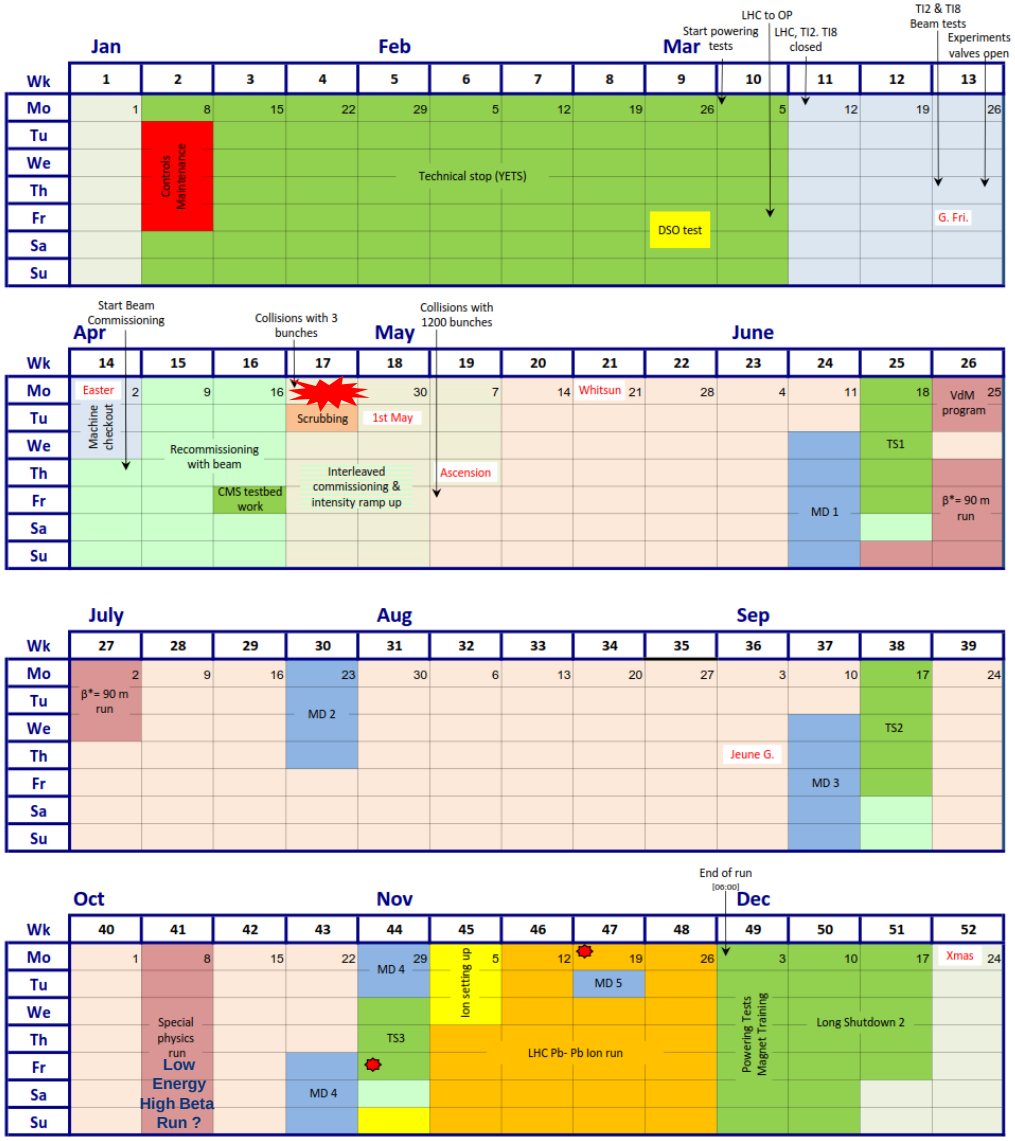
Goal: > 600 µb^{-1} ALICE (Run 2 > 1nb^{-1})

Special runs: 9 days (16 days ?)

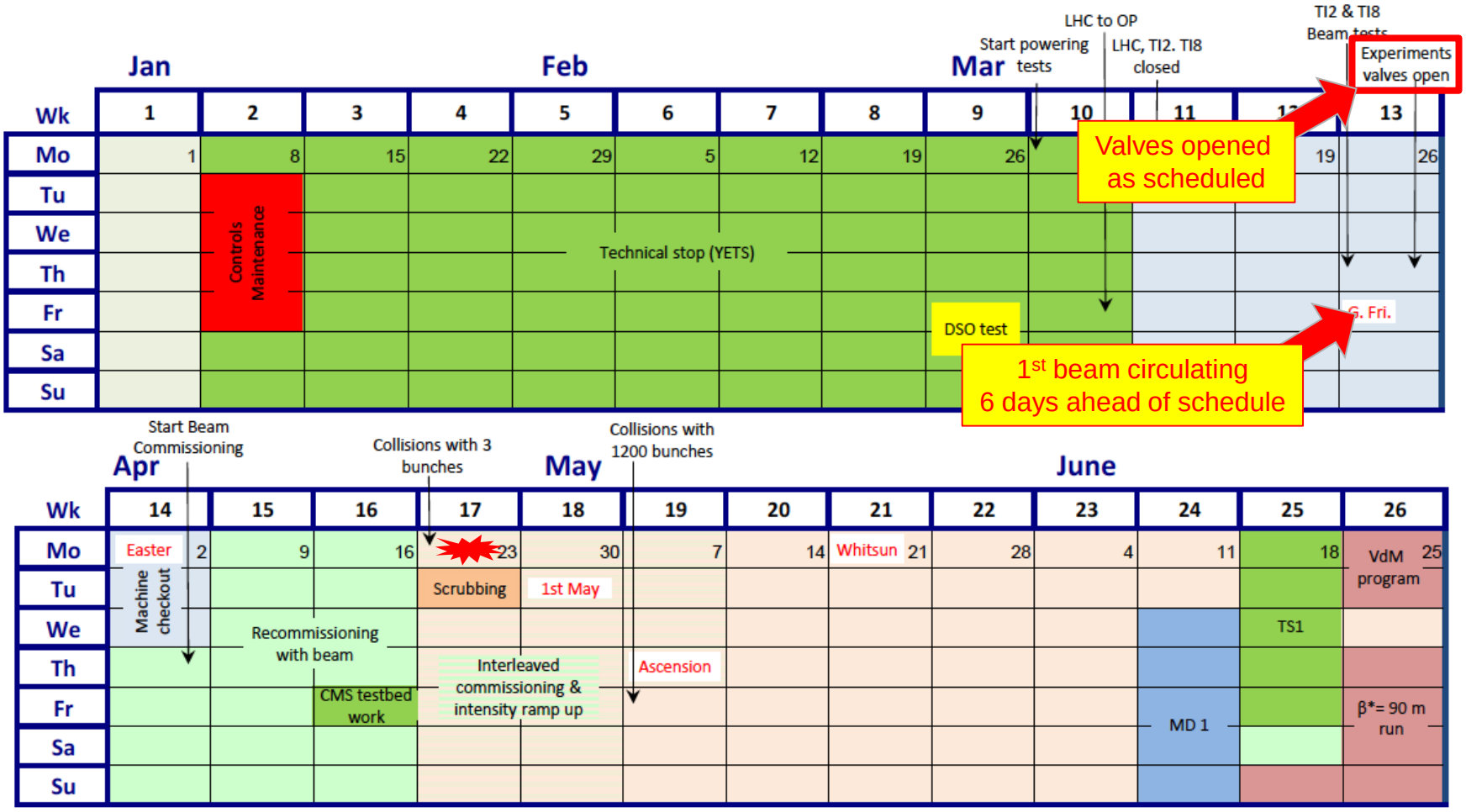
20 days of MD

+ 3-5 days, later during 2018 according integrated luminosity

Week 49: **powering tests to 14 TeV**
(Main dipole circuit ONE sector training to 14 TeV)



2018 LHC schedule : Q1 and Q2

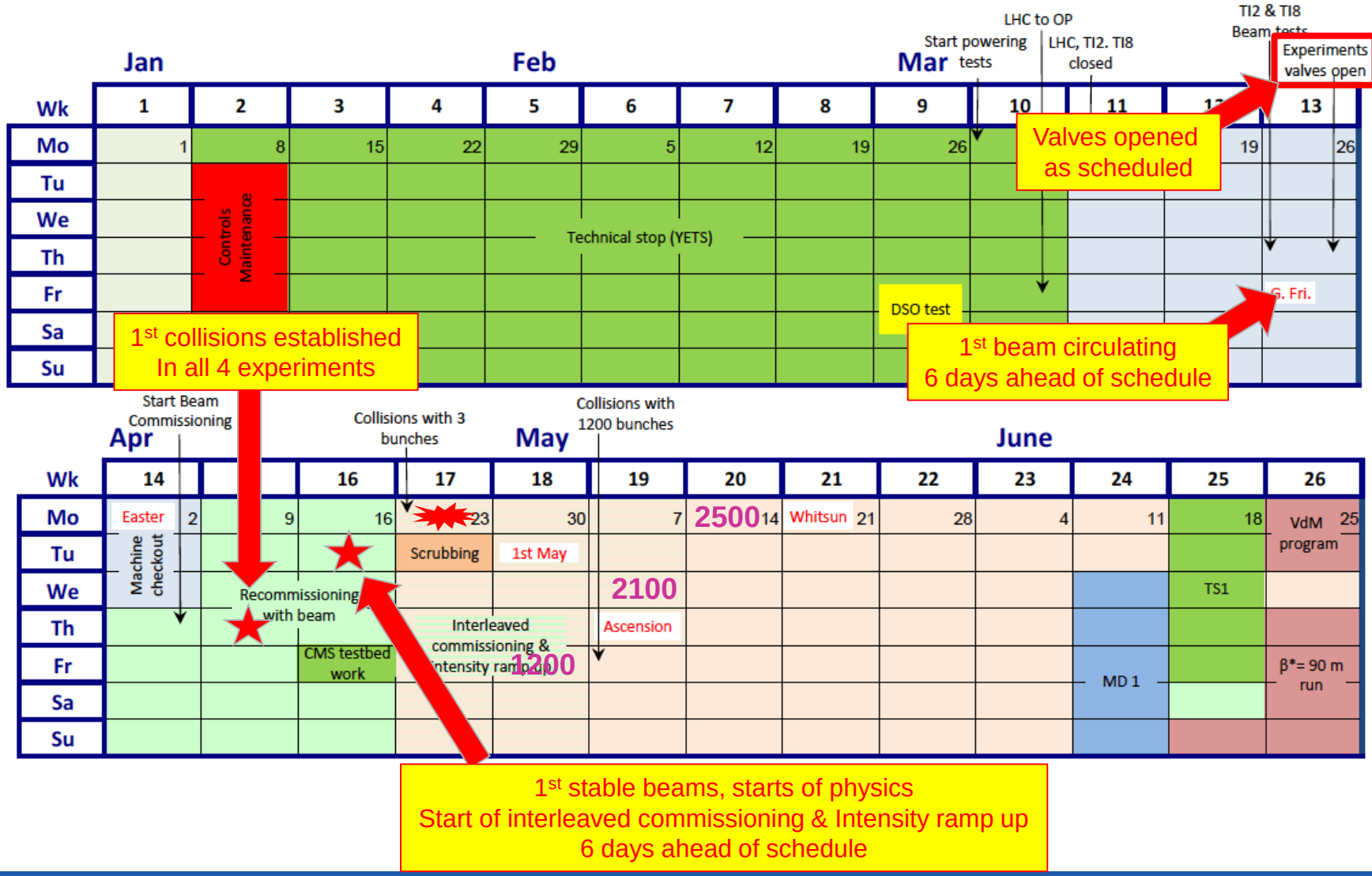


A Good Friday: First Circulating Beams

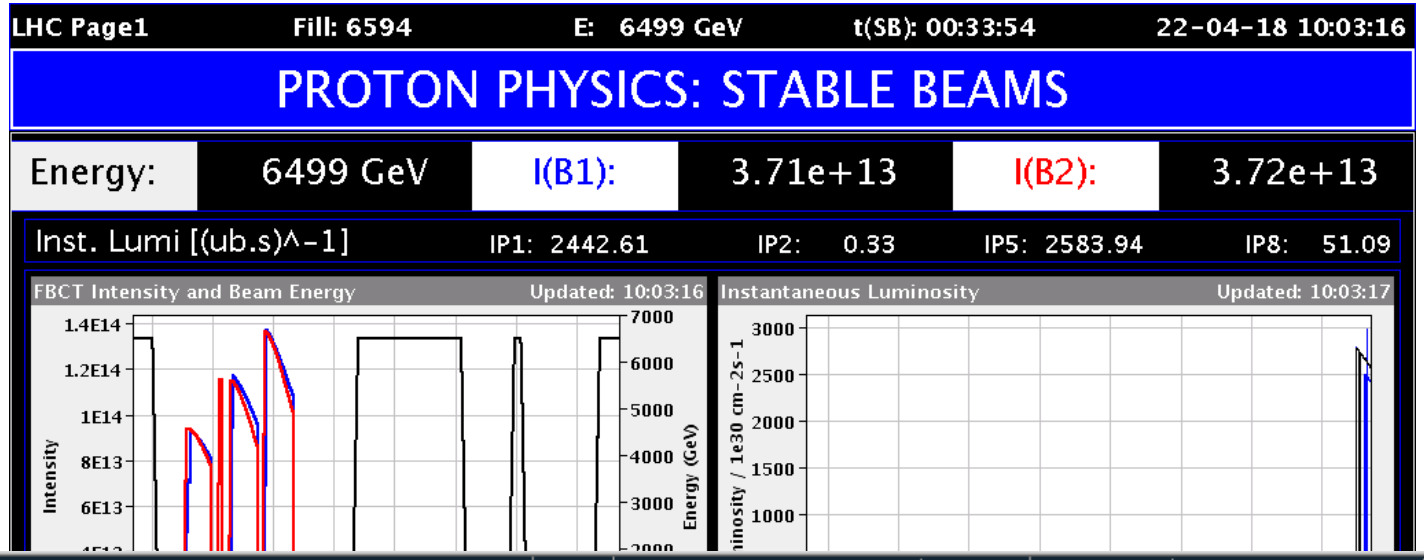
- Stepwise approach with intermediated orbit checks and corrections
- Beam 1 circulating 12:15, Beam 2 circulating 12:40

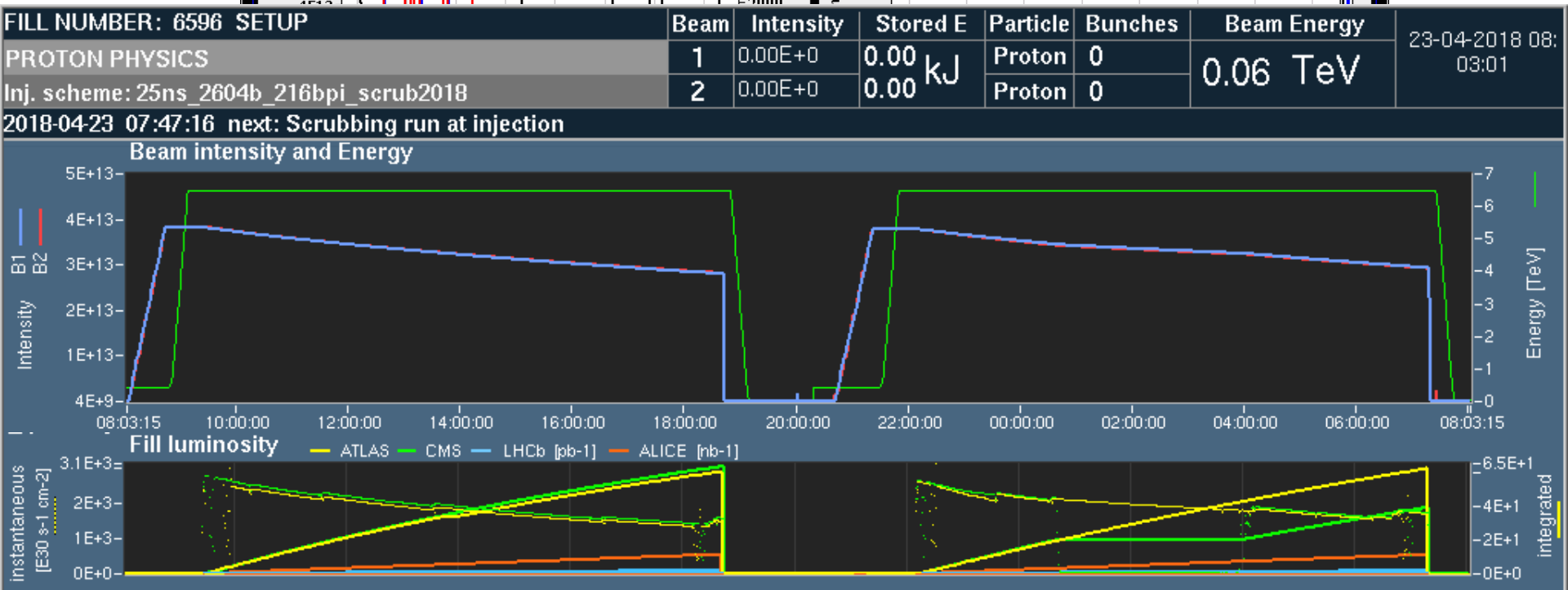
Trajectory of beam 1 going from injection to point 3

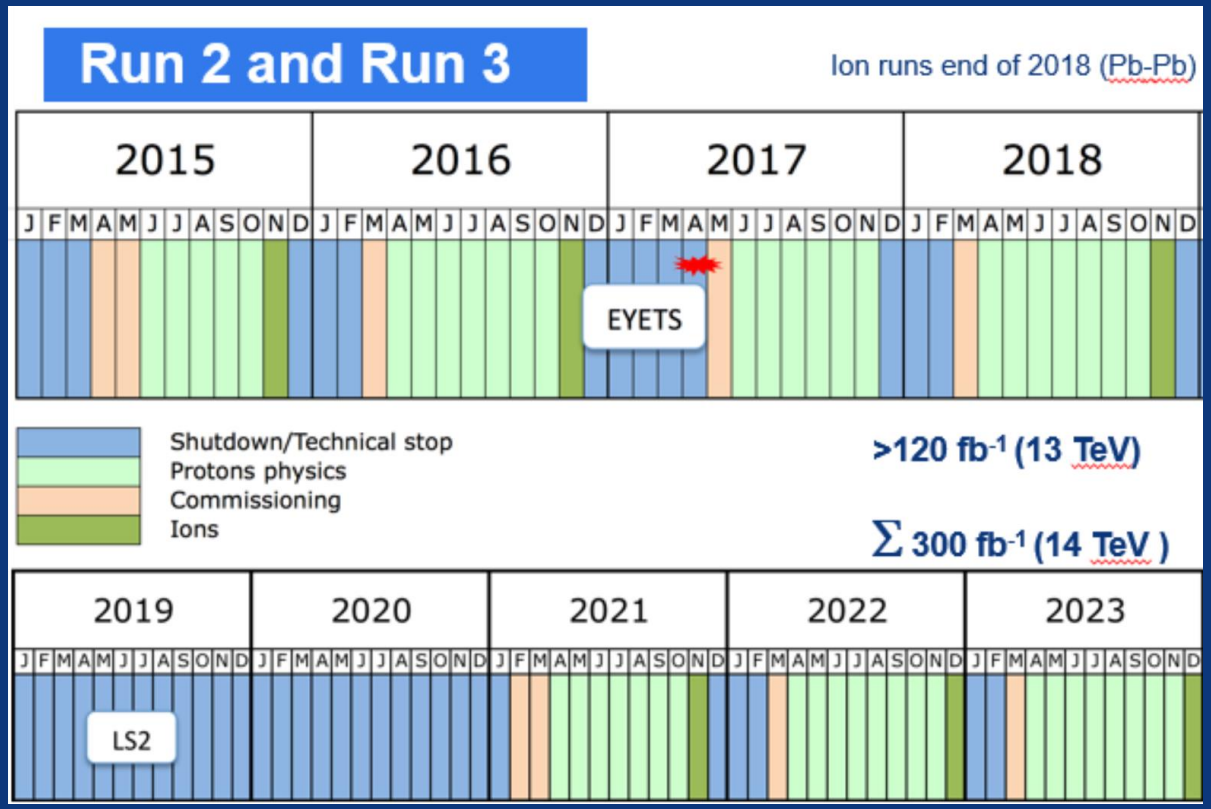
2018 LHC schedule : Q1 and Q2



Collisions with 339 bunches (22.04)







2018: a production year to complete Run 2

- Look forward to the post-LS2 LIU era and how to exploit the potential
- Look forward to HL-LHC without compromising present performance

Thanks for your attention