Beam summary in MR Run41

A.Murakami for beam group

Data set

- Good spill selection for run#**410189(3/19)~410202(3/21)**
  - Total # of spills of physic run : 104227
- Horn current settings in this period : 200kA

Spill selection

Quick spill selection

1. Physics run
   - "run_type" is "physic run" and all Horn ON
   - exclude spills for beam tuning, beam study
2. TriggerFlag is "Beam Trigger" (beam during MR operation)
3. Good GPS status
4. CT05 # of protons per spill > 1e11 in order to exclude spills which no beam in MR (due to machine interlock etc...)

5. Normal condition cut
   - exclude unusable spills (e.g. PV2 magnet unstable etc...)

Good spill selection

6. Horn current cut
   - Nominal current ± 5 kA for all three horns
7. MUMON cut
   - beam angle within 1mrad (|Si fit X|<10cm & |Si fit Y|<10cm)
   - Si total Q / CT05 cut : mean of Q/CT05 ± 5%

Good spill selecton

- Apply good spill selection for these physic run data
  - Horn current & MUMON Si Q /CT5 cut threshold are defined as the followings table.
    - Nominal Horn current = mean of three horns current in each period.
    - Nominal MUMON SiQ / CT5 = mean of this value in each period.

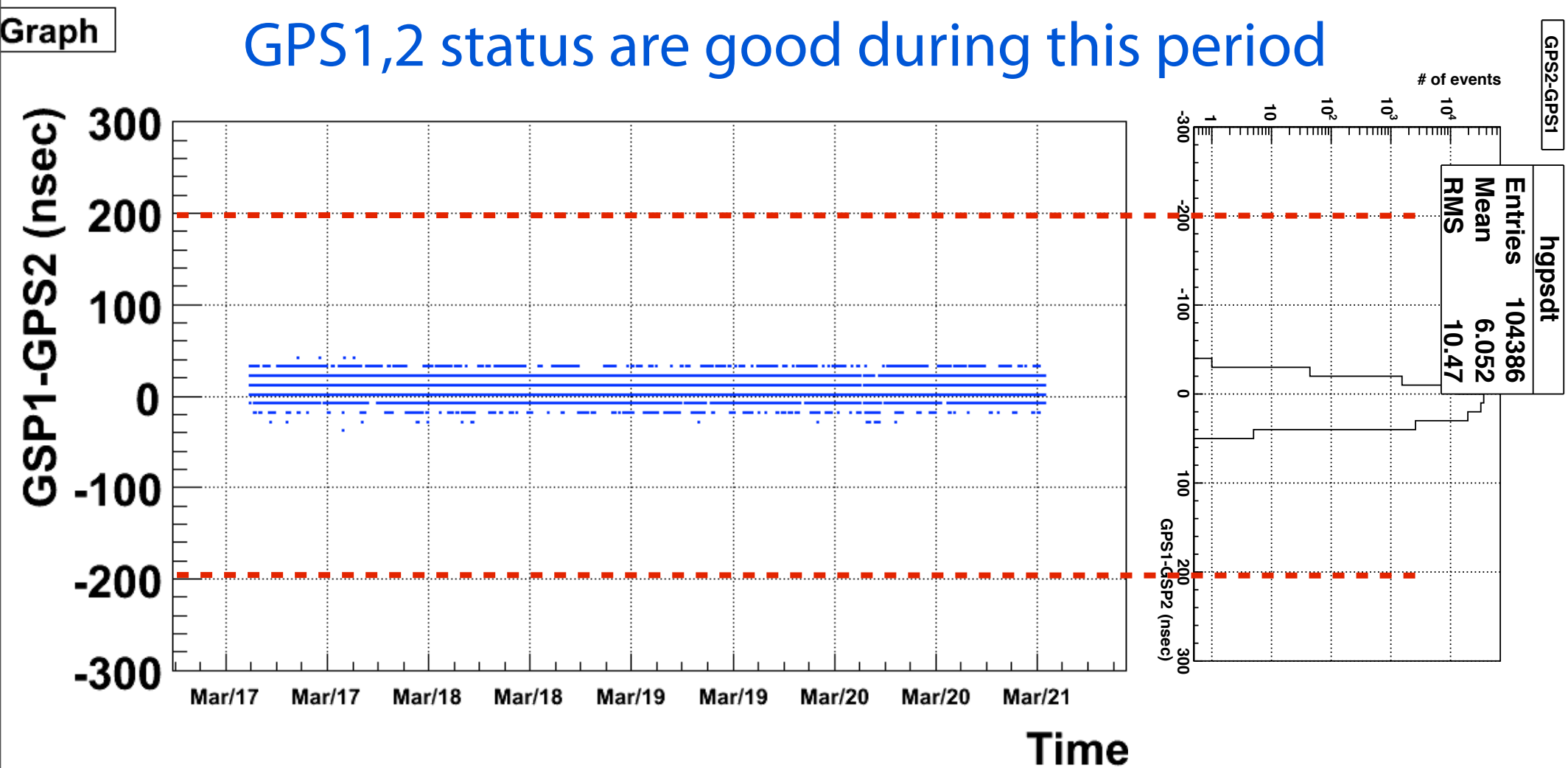
run#	Horn current setting	Horn current cut	MUMON SiQ/ CT5 cut
410052~410053	250kA	252.3 ± 5 kA	32.37 ± 5%
410065~410068	0kA	0kA	8.54 ± 5%
410074~	200kA	204.9 ± 5kA	21.8 ± 5%

Normal condition cut

- Remove these spills in run#410192 by normal condition cut
  - spill#=1919127 : Beam stop due to MPS of MR Beam loss monitor
  - spill#=1919128 : 1 shot after recover of above MPS.
  - spill#=1919129 : Check beam condition (2bunch beam) after setting magnets
  - spill#=1919130 : Check beam condition (8bunch)

GPS Status

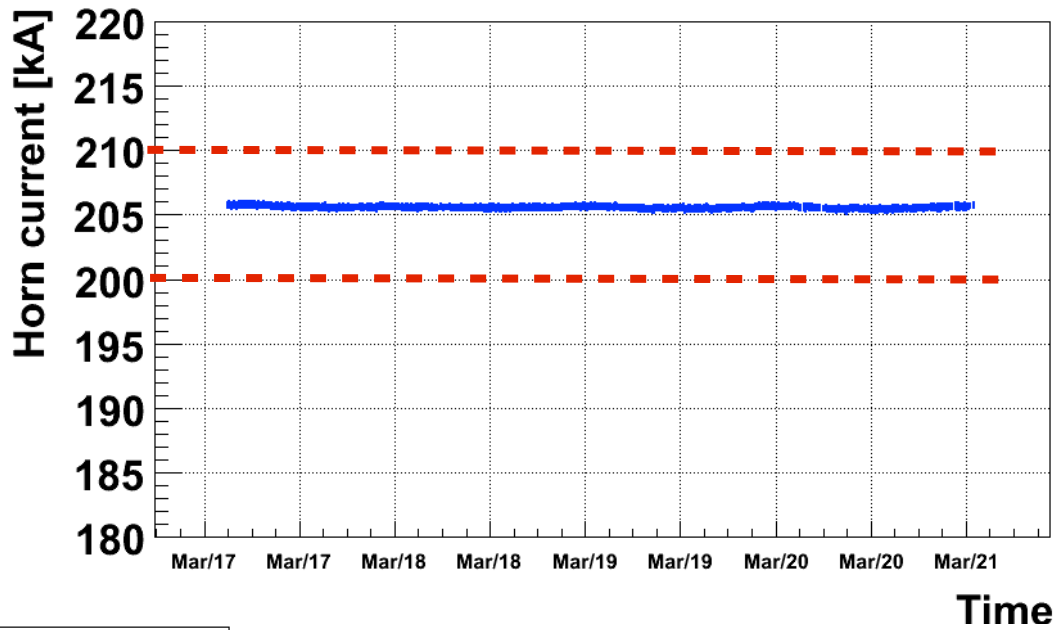
GPS1,2 status are good during this period



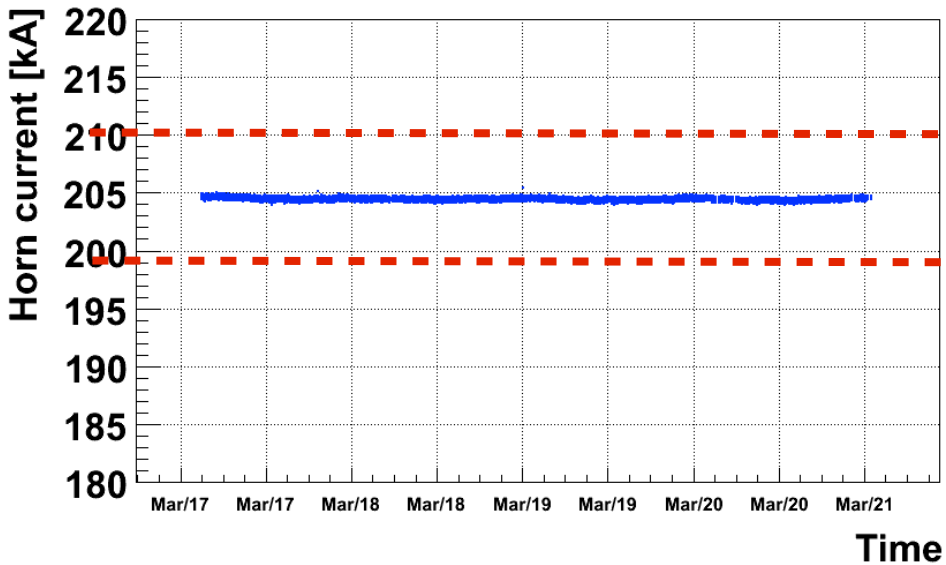
No Bad spill

Horn current

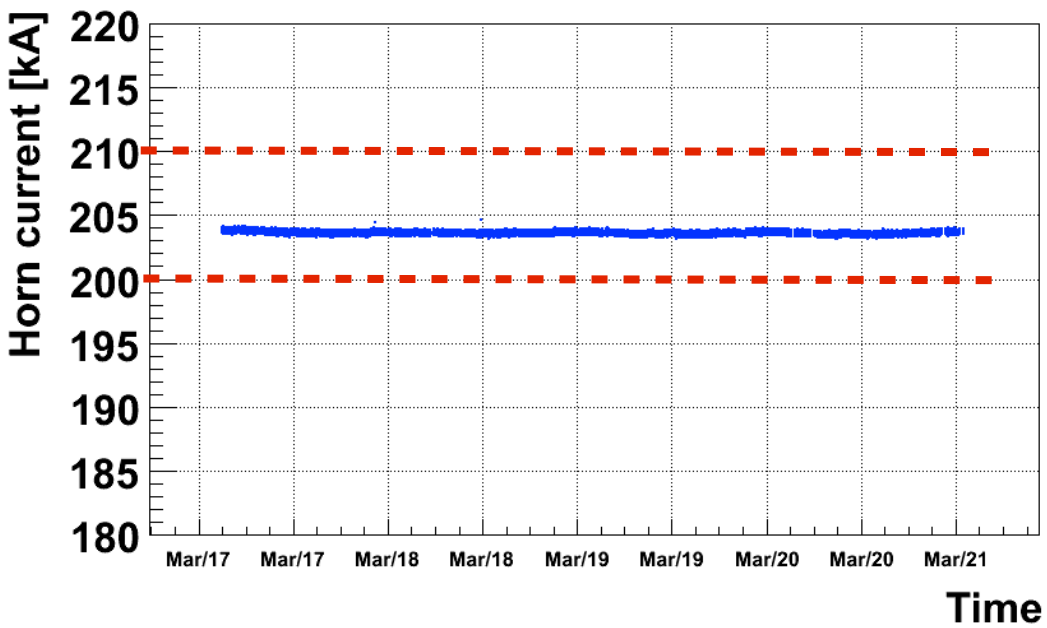
Horn1 current



Horn2 current

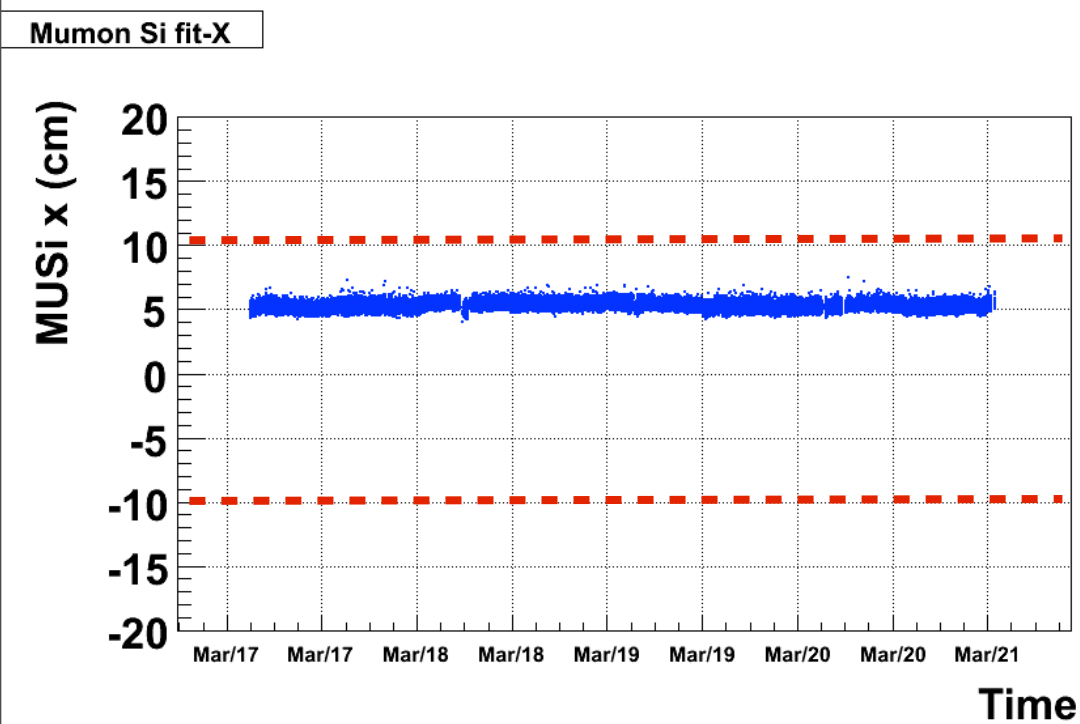


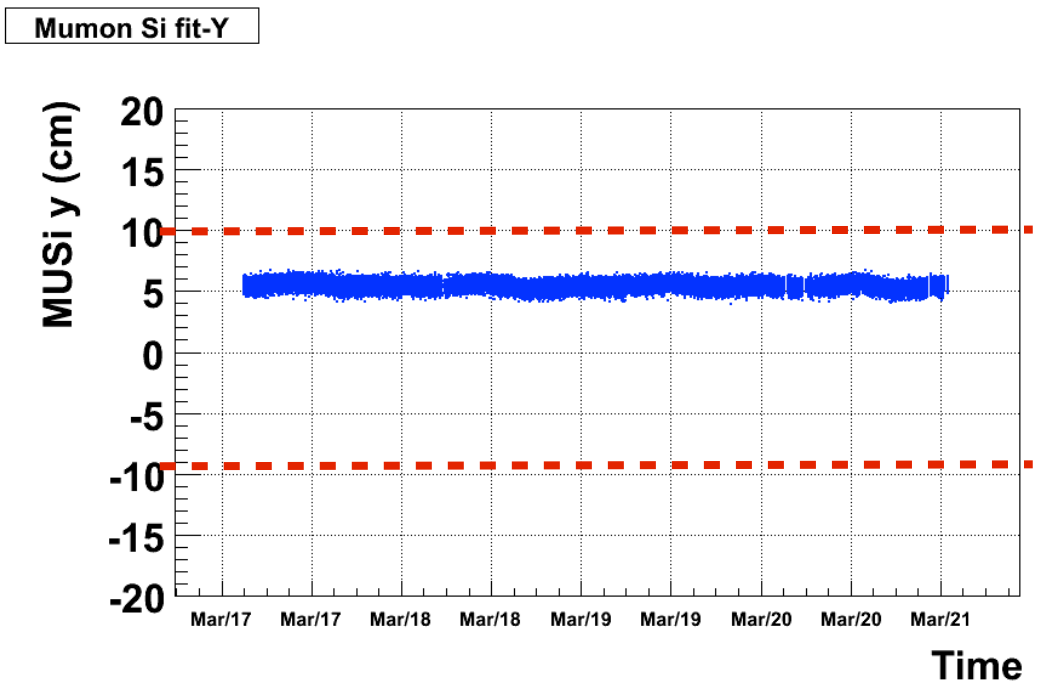
Horn3 current



No spill failed by horn cut

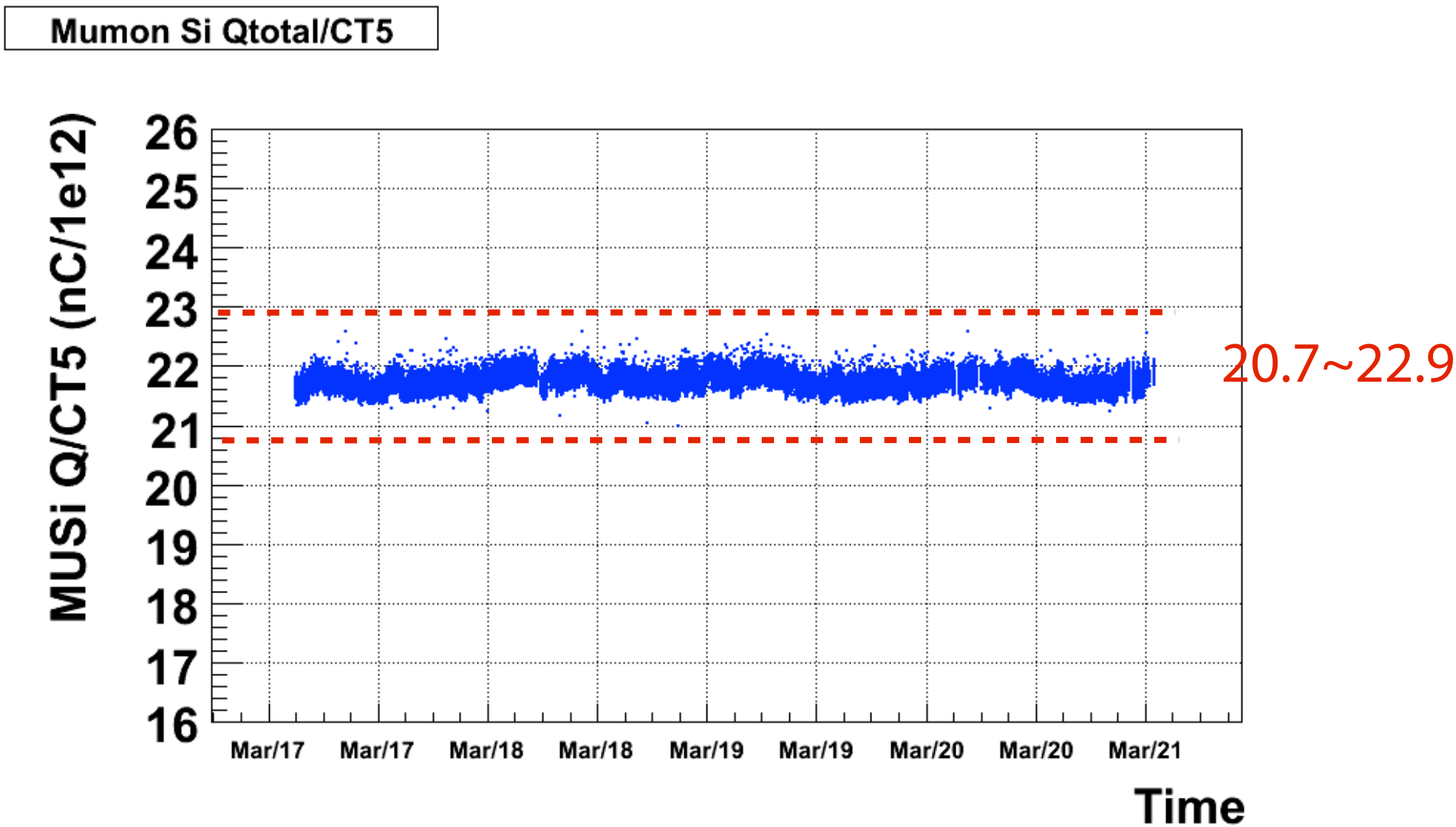
MUMON Si fit center





No Bad spill

MUMON Si Q / CT05



No Bad spill

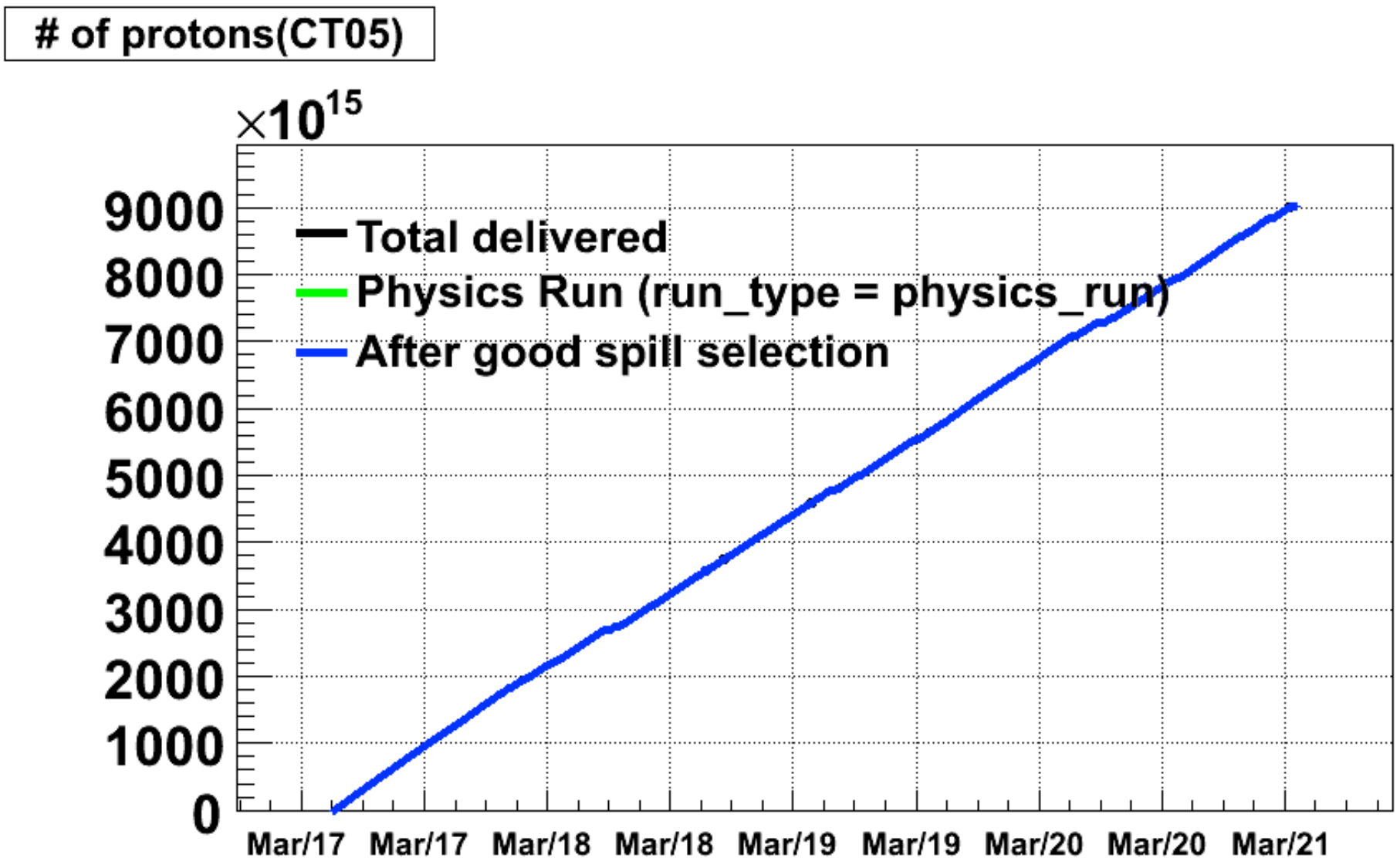
Good spill for physics runs

	# of spills	Ratio
Physics spills	104227	1
Beam trigger	103950	0.997
Good GPS	103950	0.997
ppp(CT5)>1e11	103882	0.997
Normal beam	103878	0.997
Horn cut	103878	0.997
MUMON cut	103878	0.997

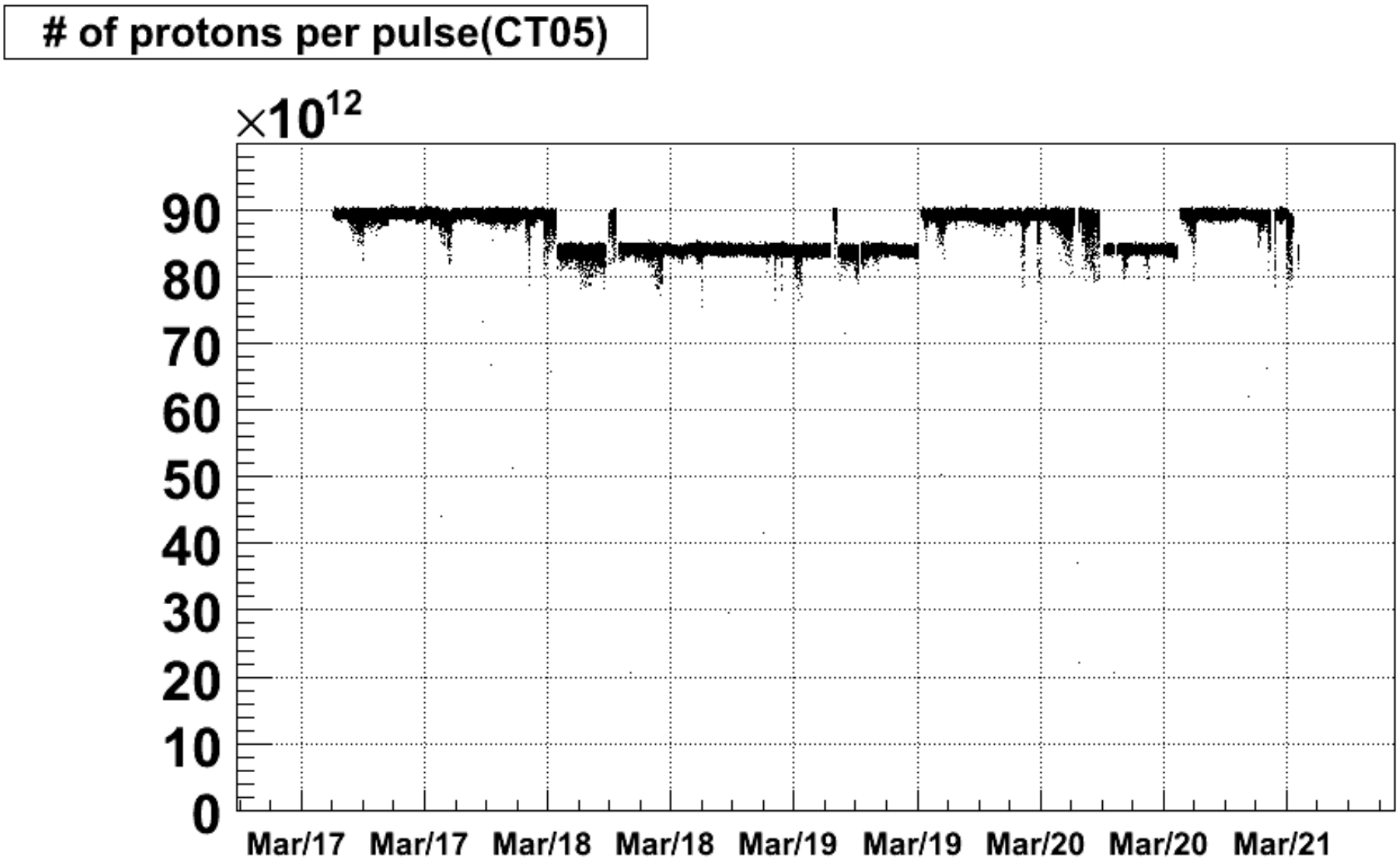
# of delivered protons(CT5) after Good spill selection

Total POT : 9.021e18

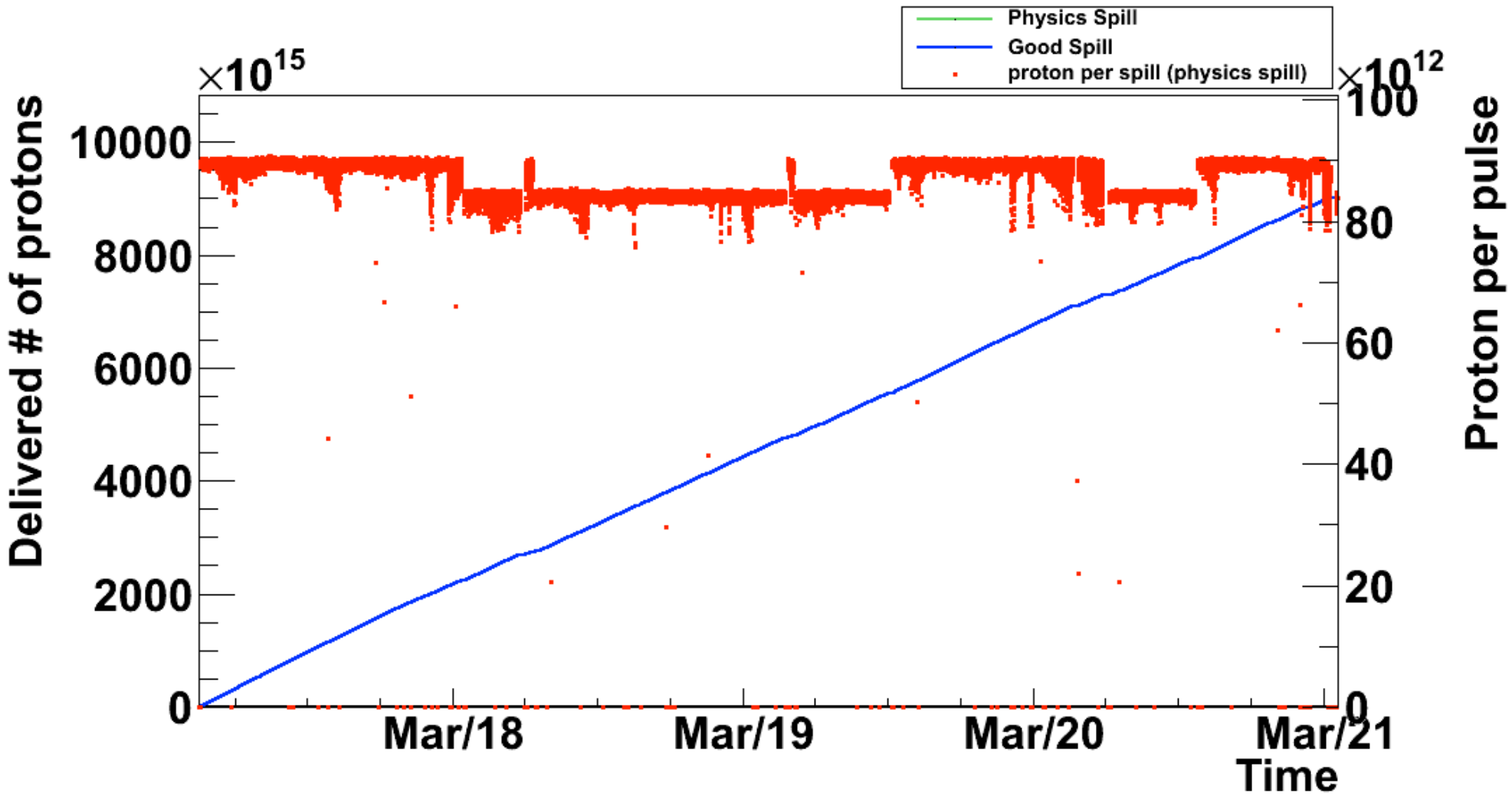
Integrated POT (MR Run41)



Proton per pulse



POT history


Physics Spill
Good Spill
proton per spill (physics spill)
×10^15
Delivered # of protons
10000
8000
6000
4000
2000
0
×10^12
100
80
60
40
20
0
Proton per pulse
Mar/18
Mar/19
Mar/20
Mar/21
Time

Definition of Good spill flag

- Rule:
  - In order to distinguish the Horn-off spill from the horn ON spill, the value of the good flag will be re-defined.
    - flag =0 : Not suitable data for physics analysis.
    - flag =1 : Good spill for Horn 250kA operation.
    - flag =100 : Good spill for Horn OFF.
    - flag = 2, 3 ... 99: Reserved for the other horn operation mode.
    - flag =-1,-2 ... -99: Reserved for the other horn operation mode with opposite polarity.

horn current	0 kA	200 kA	250 kA
good spill flag	100	2	1