Beam summary in MR Run41

A.Murakami for beam group

Data set

- Good spill selection for run#~410137 (3/14)
  - Total # of spills of physic run : 103932
- 3 horn current settings in this period
  - 250kA : run# 410052, 410053
  - 200kA : run# 410074~
  - 0kA : run# 410065~410068

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%

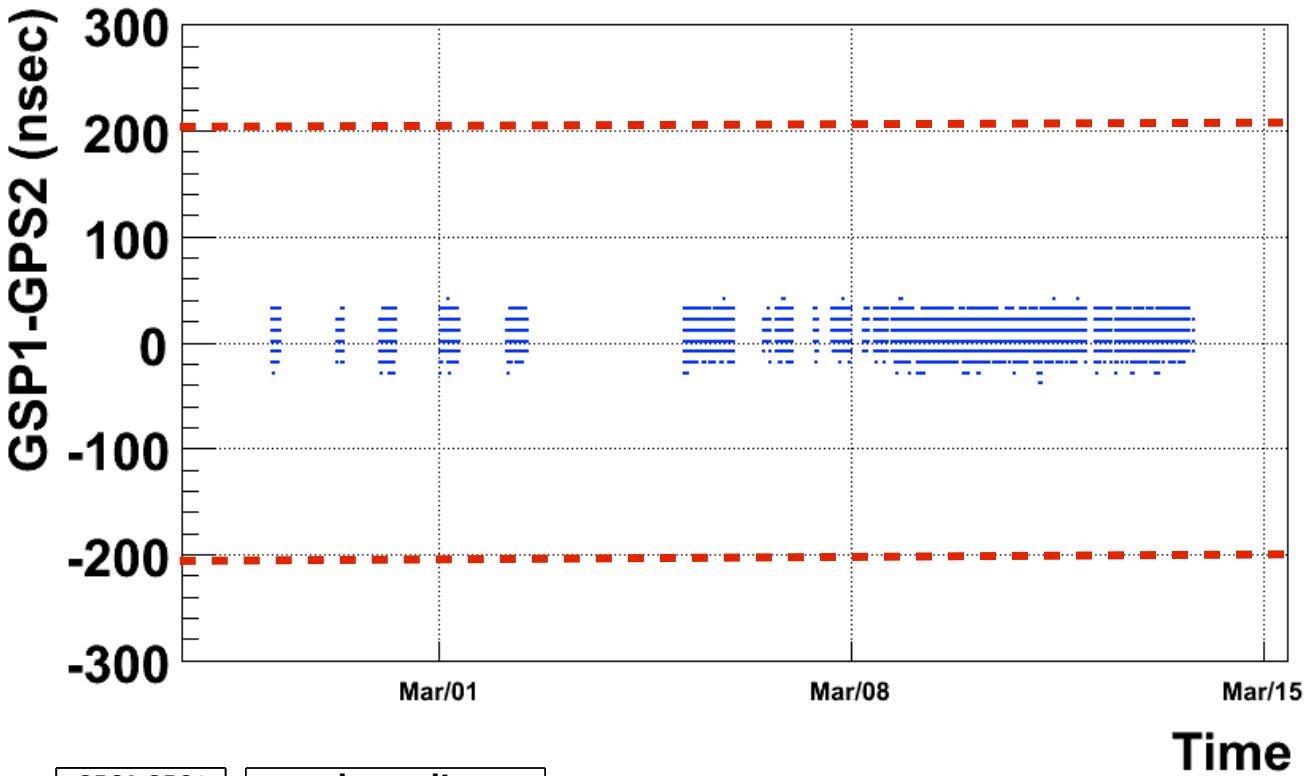
Good spill selecton

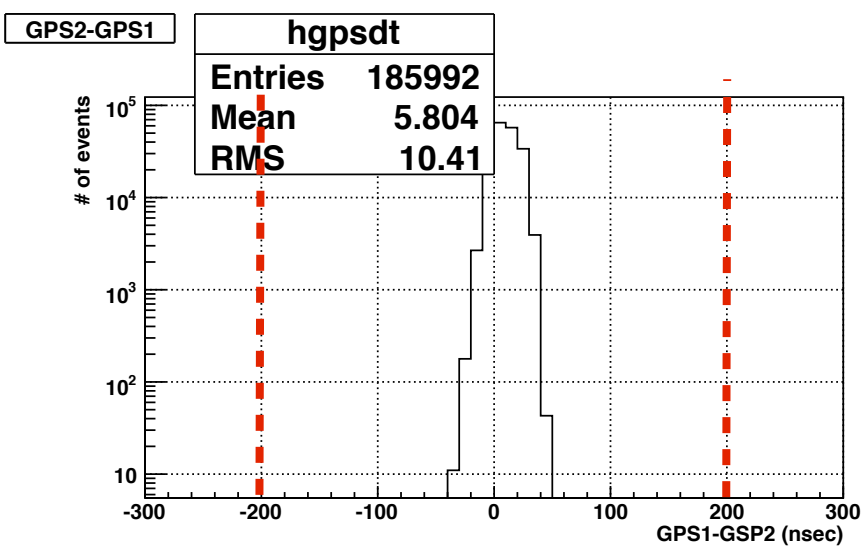
- Apply good spill selection for these physic run data
  - Horn current & MUMON Si Q /CT5 cut threshold are defined as the followings table.
    - Nominal Horn current = mean of three horns current in each period.
    - Nominal MUMON SiQ / CT5 = mean of this value in each period.

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%

GPS Status

Graph

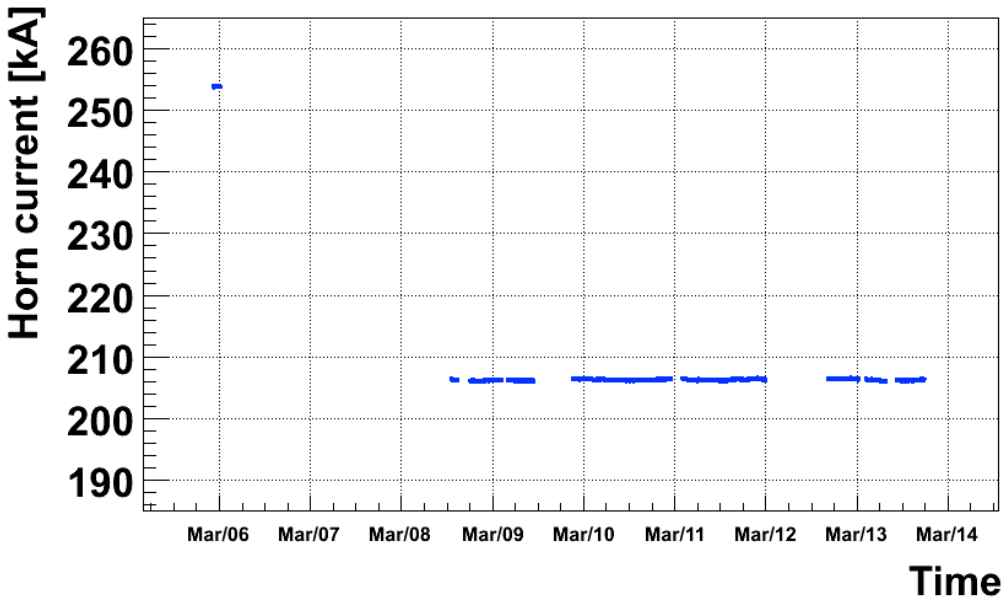




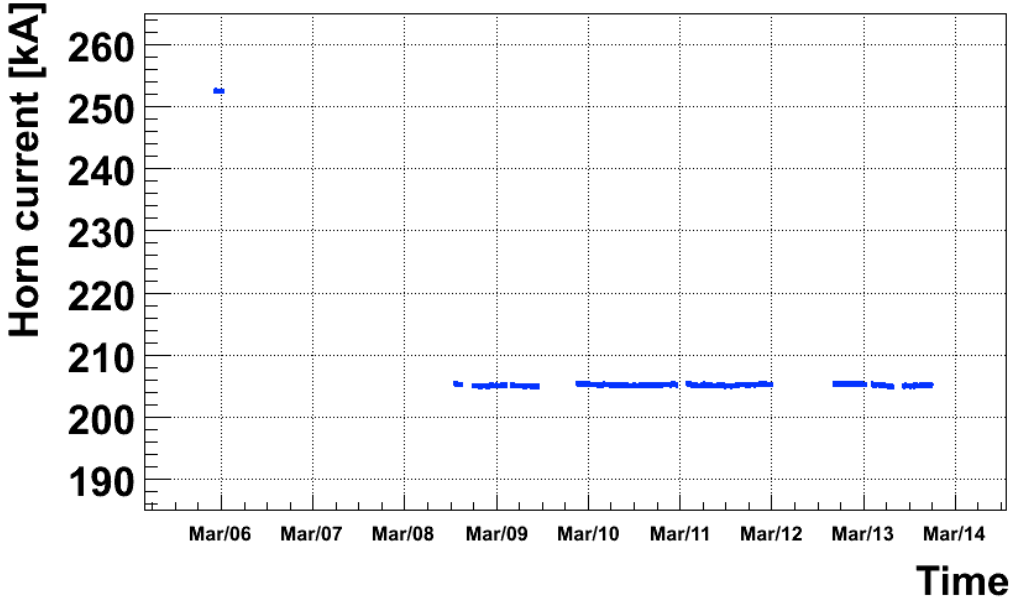
No Bad spill

Horn current

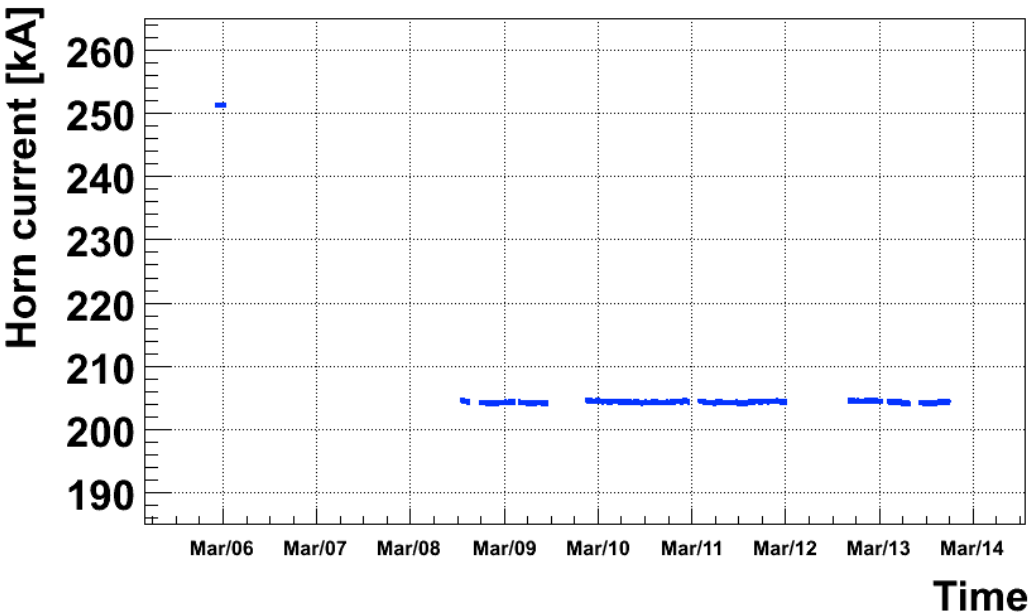
Horn1 current



Horn2 current

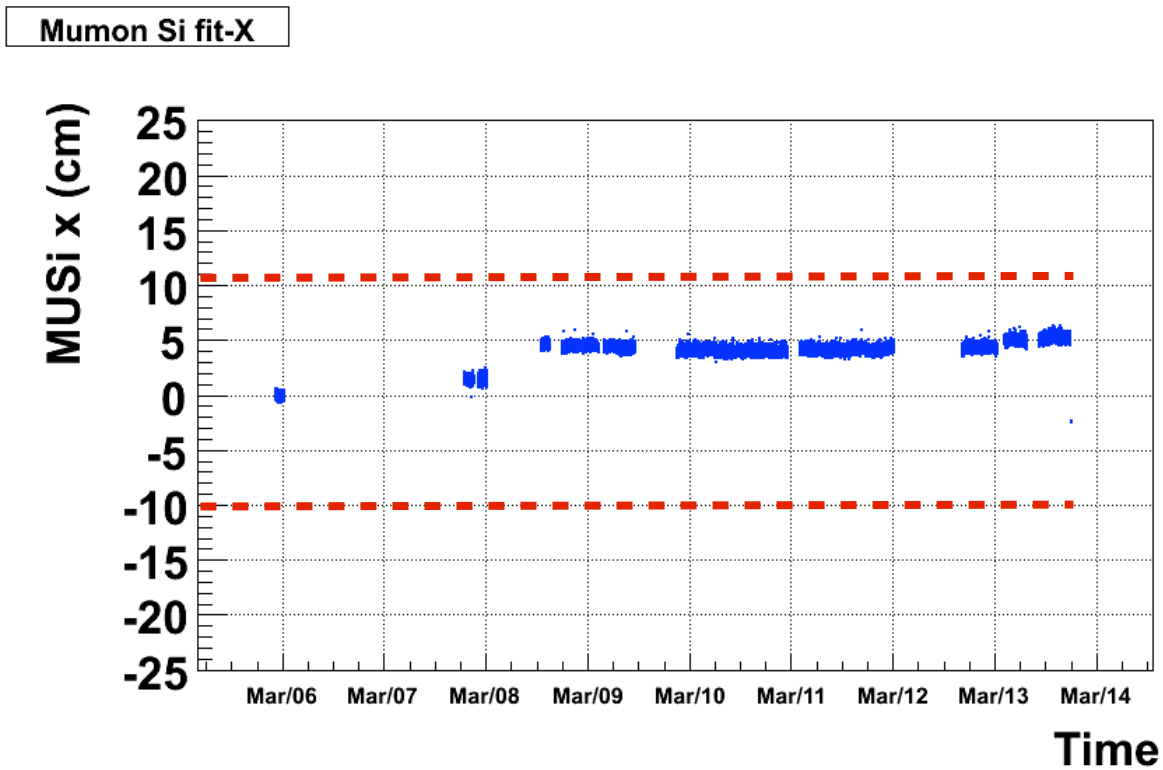


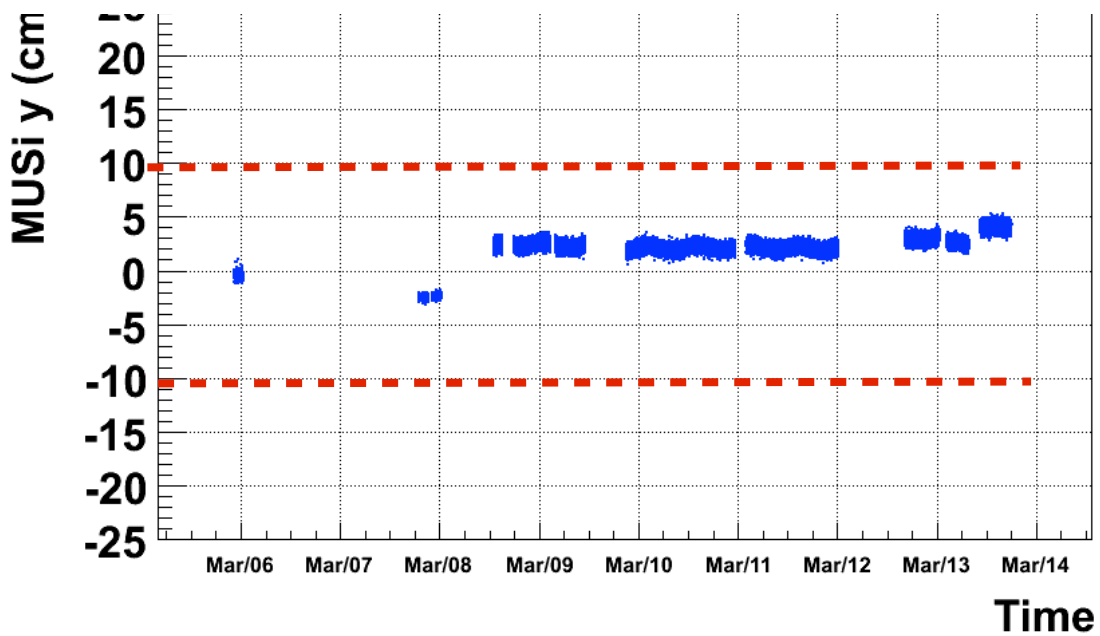
Horn3 current



No Bad spill

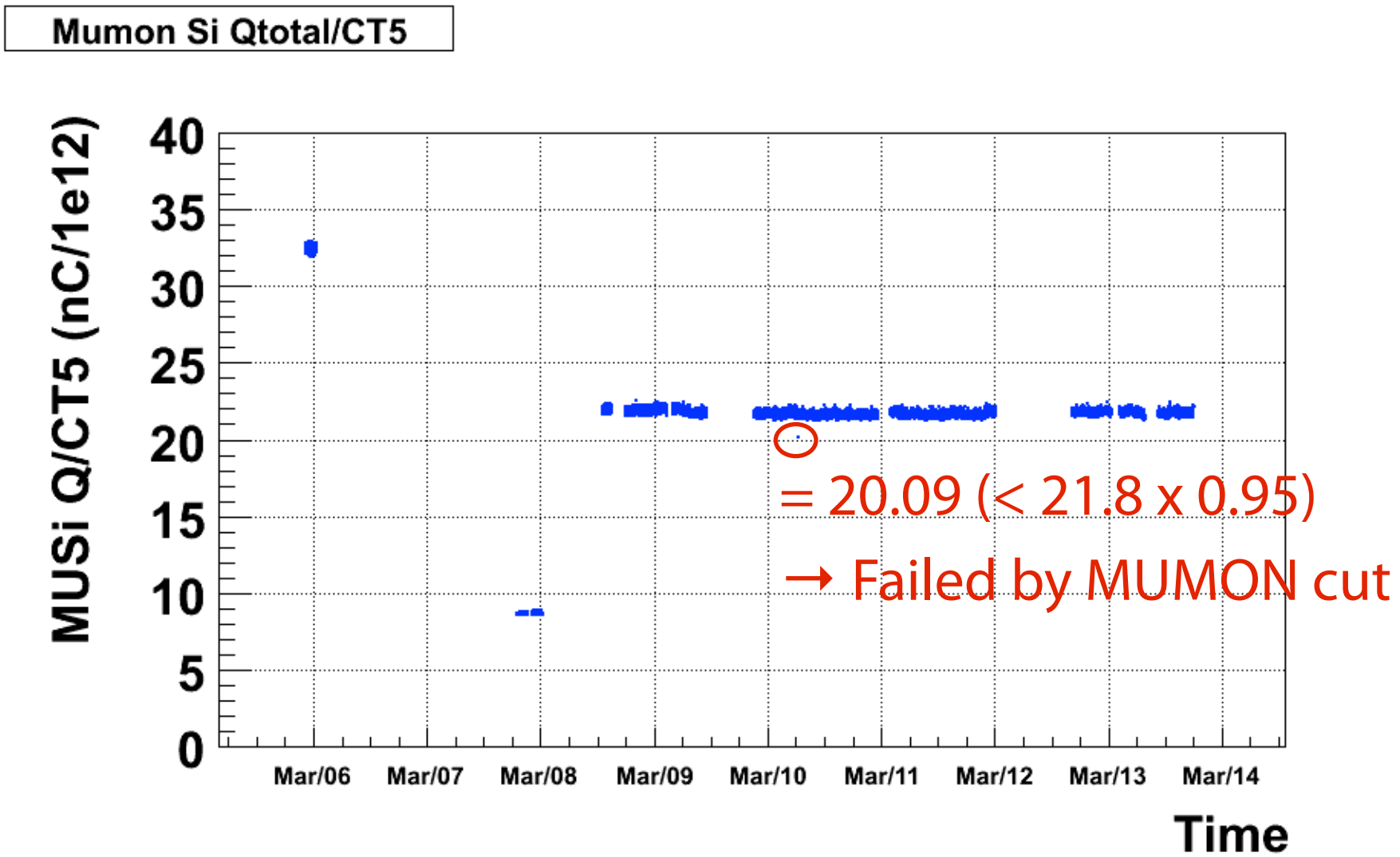
MUMON Si fit center





No Bad spill

MUMON Si Q / CT05



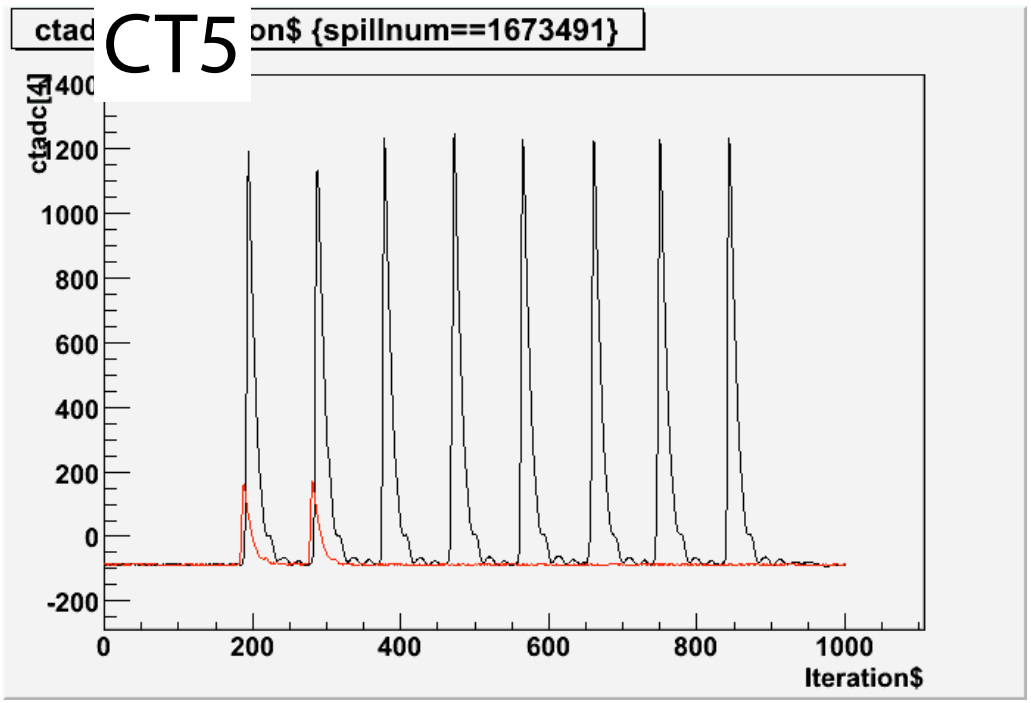
Bad spill: Run#=410091, spill#=1673492

MUMON, CT FADC signal

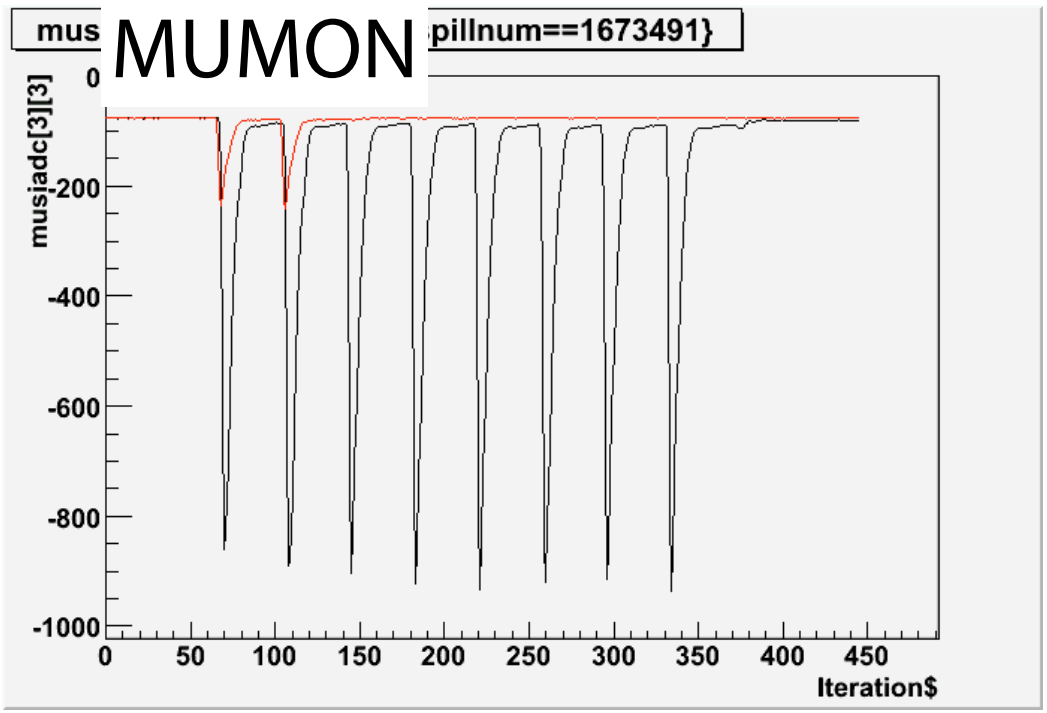
- Spill#:1673491
- Spill#:1673492(bad spill)

by suzuki-san

CT5



MUMON



MPS seems to issue at this spill

→ MUMON/CT ratio becomes not nominal → bad spill

This spill is categorized not “normal beam condition”.

Good spill for physics runs at all horn current setting(0, 200, 250kA)

	# of spills	Ratio
Physics spills	103932	1
Beam trigger	103524	0.996
Good GPS	103524	0.996
ppp(CT5)>1e11	103397	0.995
Normal beam	103397	0.995
Horn cut	103397	0.995
MUMON cut	103396	0.995

# of delivered protons(CT5) after Good spill selection

Total POT : 7.848e18

Good spill for physics runs at 250kA horn current setting

	# of spills	Ratio
Physics spills	2126	1
Beam trigger	2096	0.986
Good GPS	2096	0.986
ppp(CT5)>1e11	2088	0.982
Normal beam	2088	0.982
Horn cut	2088	0.982
MUMON cut	2088	0.982

# of delivered protons(CT5) after Good spill selection

Total POT : 7.263e15

Good spill for physics runs at 0kA horn current setting

	# of spills	Ratio
Physics spills	4460	1
Beam trigger	4404	0.987
Good GPS	4404	0.987
ppp(CT5)>1e11	4345	0.974
Normal beam	4345	0.974
Horn cut	4345	0.974
MUMON cut	4345	0.974

# of delivered protons(CT5) after Good spill selection

Total POT : 3.362e17

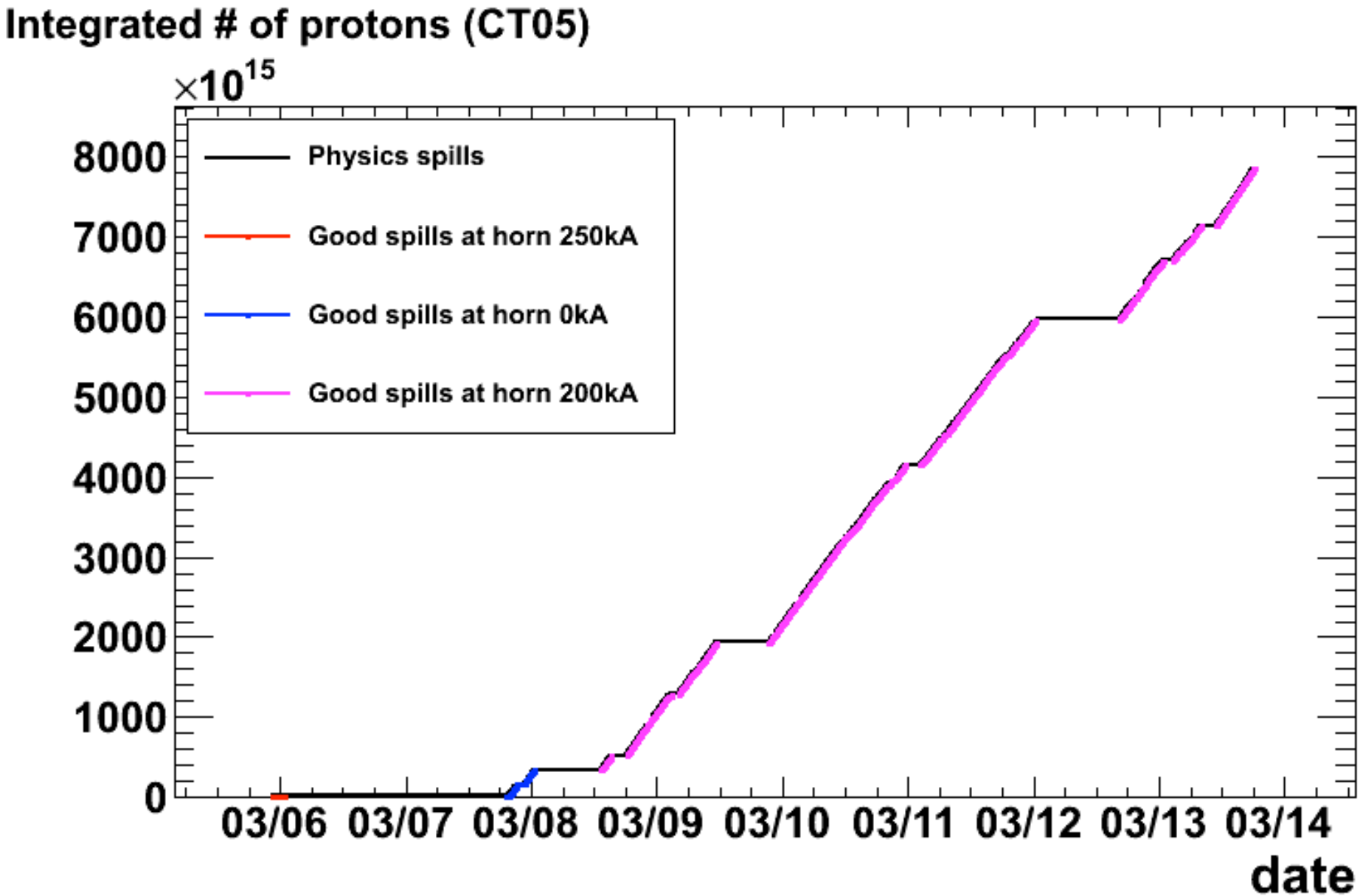
Good spill for physics runs at 200kA horn current setting

	# of spills	Ratio
Physics spills	97346	1
Beam trigger	97024	0.997
Good GPS	97024	0.997
ppp(CT5)>1e11	96964	0.996
Normal beam	96963	0.996
Horn cut	96963	0.996
MUMON cut	96963	0.996

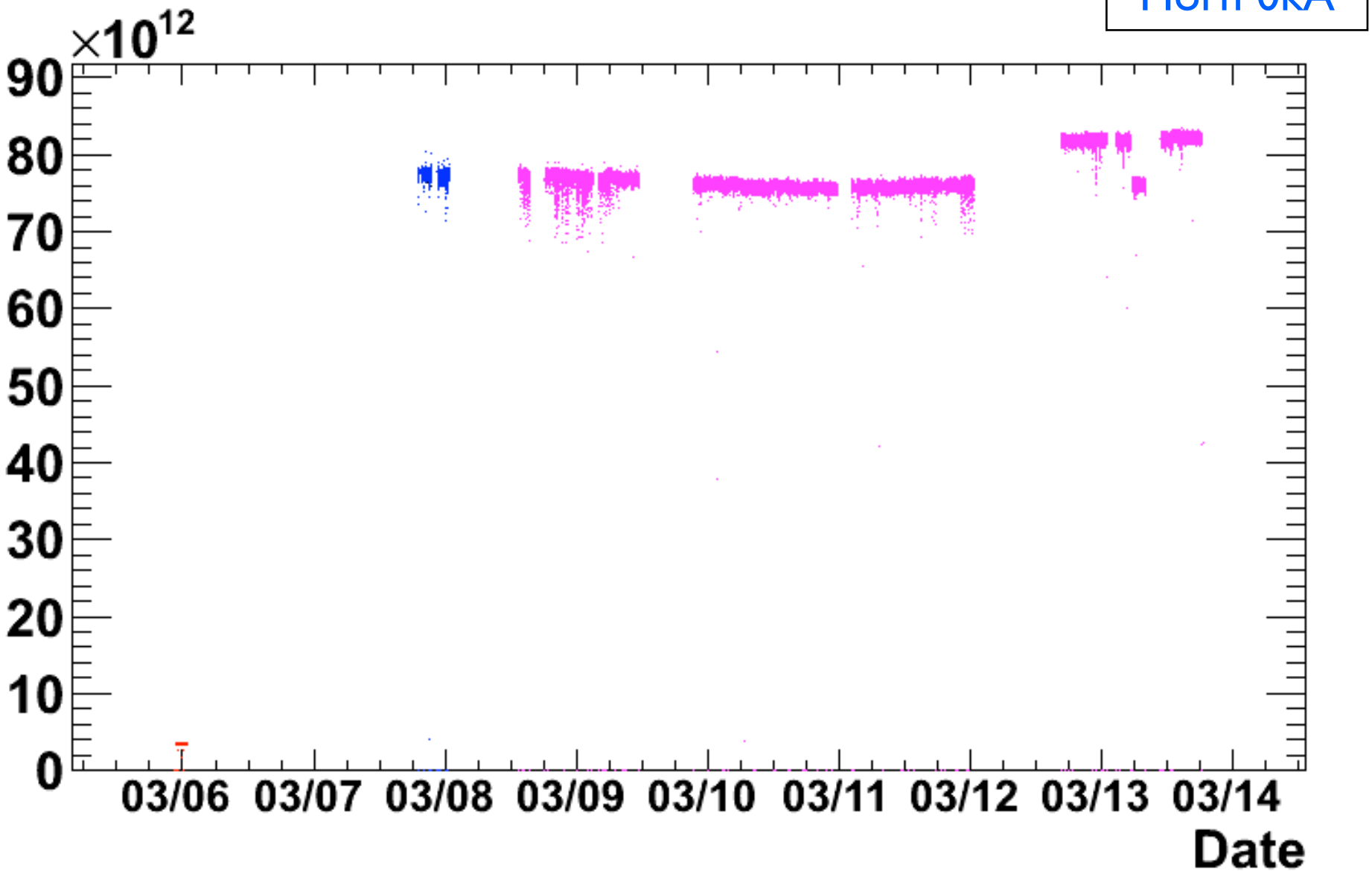
# of delivered protons(CT5) after Good spill selection

Total POT : 7.504e18

Integrated POT (MR Run41)

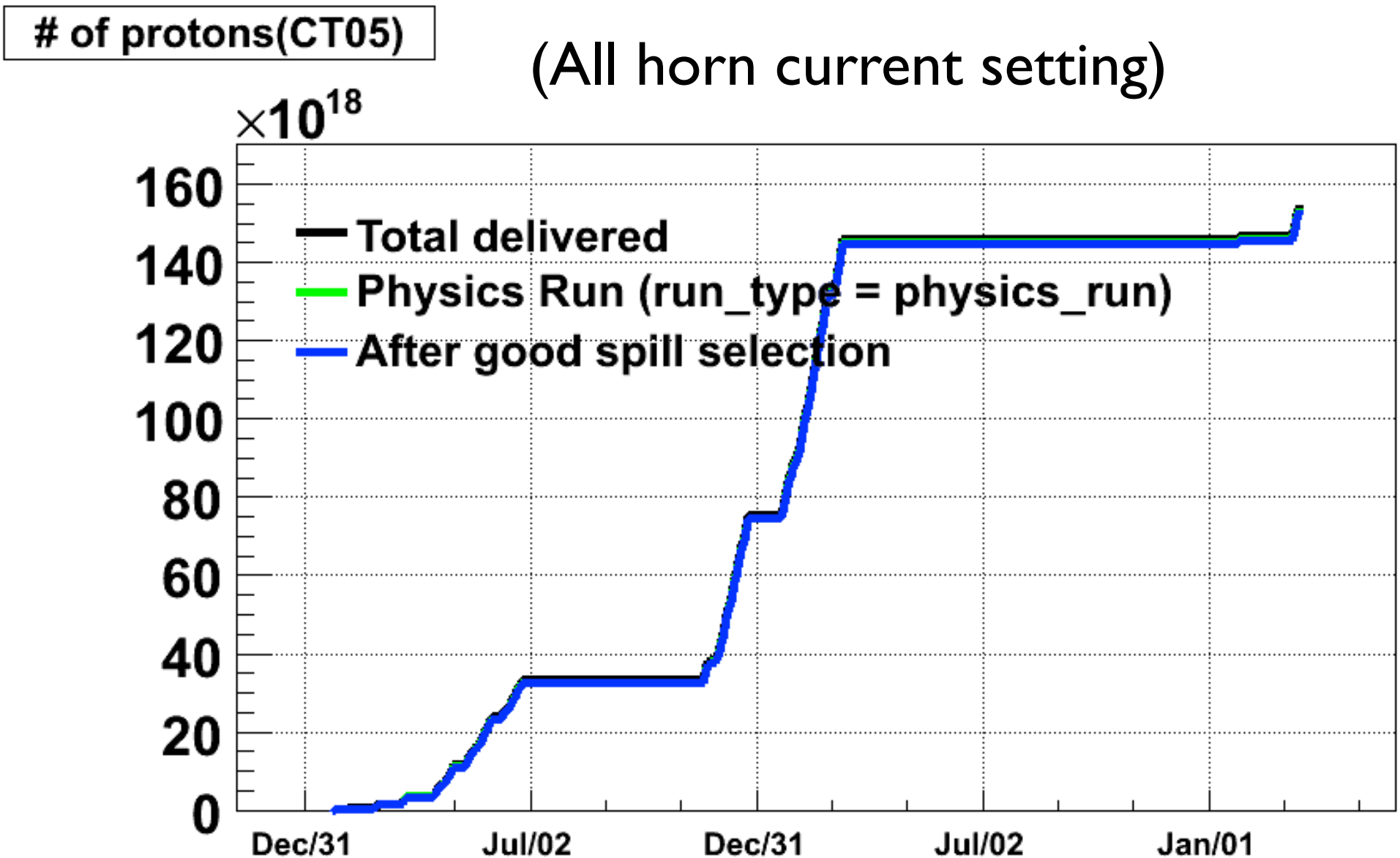


Proton per pulse



Integrated POT (so far)

(All horn current setting)



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.

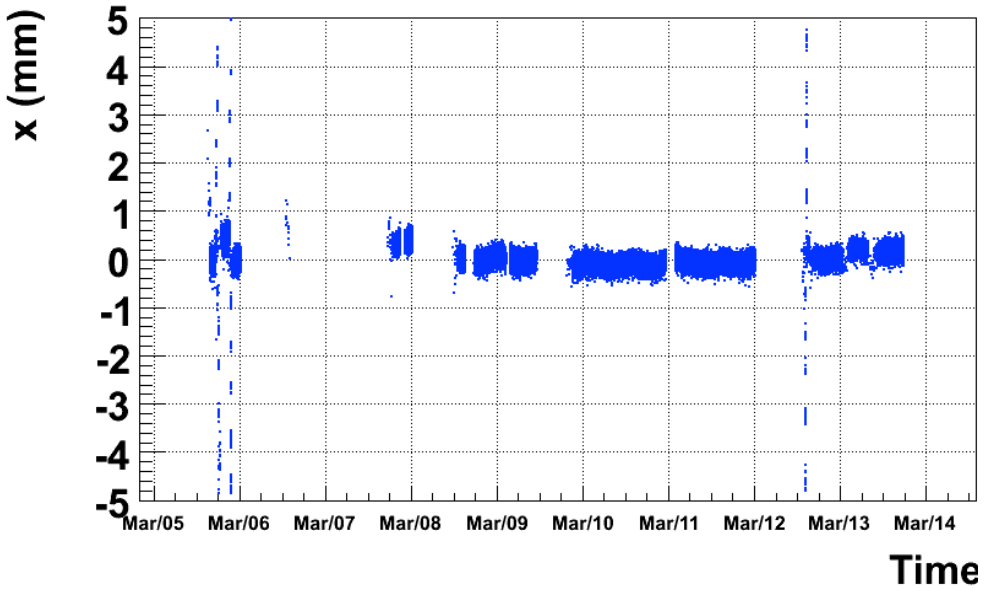
horn current	0 kA	200 kA	250 kA
good spill flag	100	2	1

Back up

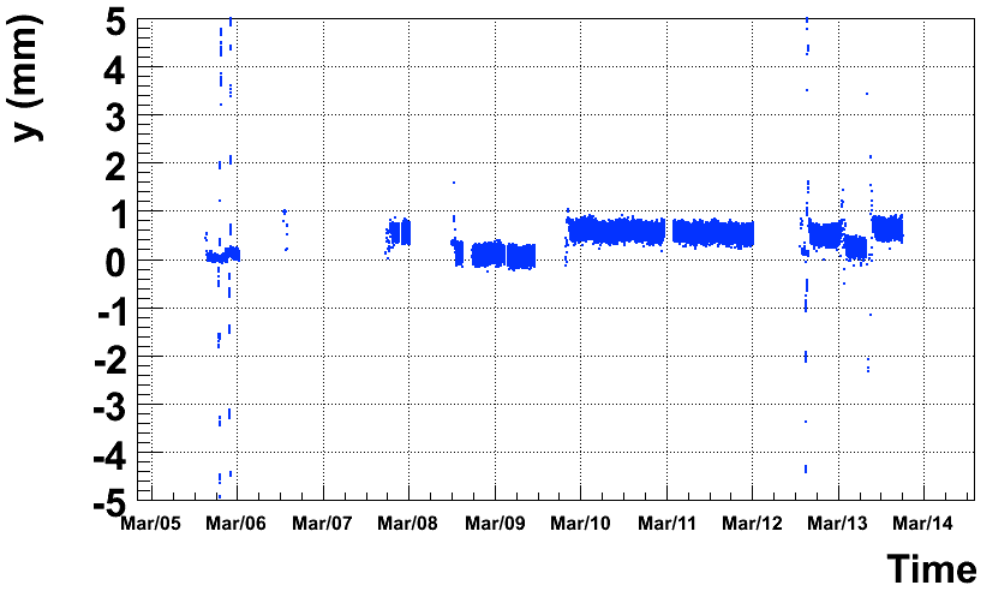
Proton beam position/angle

Include all spills (beam tuning, study)

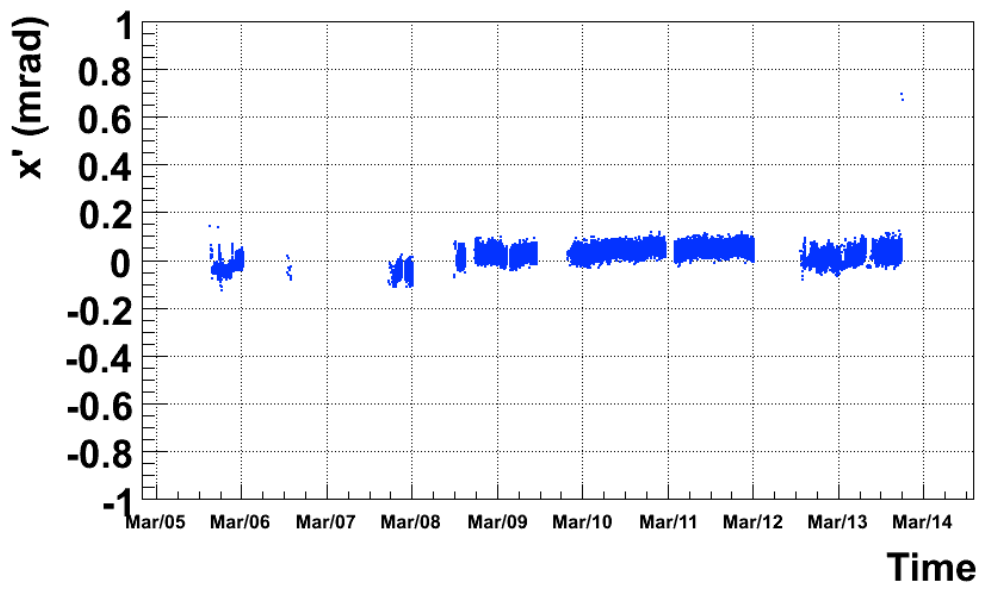
Beam X position (baffle)



Beam Y position (baffle)



Beam X direction (baffle)



Beam Y direction (baffle)