

Quick beam summary in MR Run41

A.Murakami for beam group

Data set

- Data in ~ 3/6 (~run#410053)
 - Spills selected based on run type = “physics”
 - # of spills in this physics run = 2126
- Check the mean values of horn current & mumon yield

Spill selection

1. Physics run

Quick beam summary

- “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

Beam summary

- exclude unusable spills (e.g. PV2 magnet unstable etc...)

6. MUMON cut

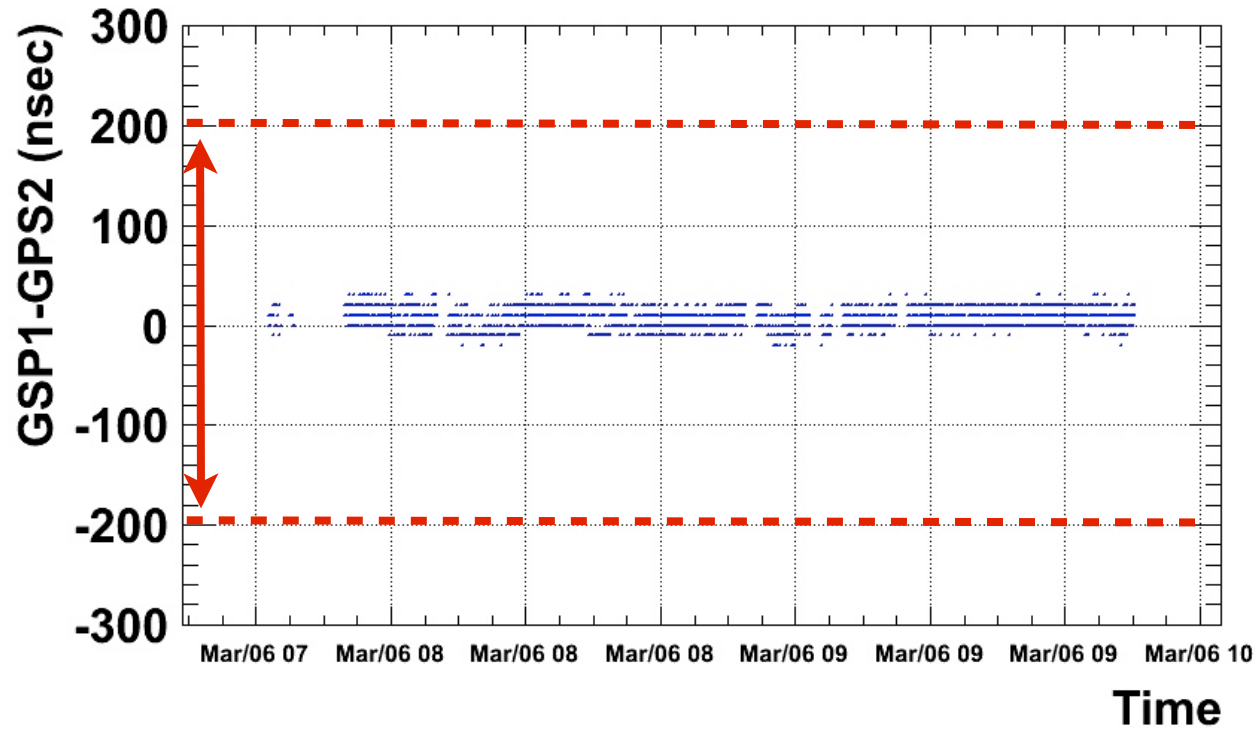
- beam angle within 1mrad ($|\text{Si fit X}| < 10\text{cm}$ & $|\text{Si fit Y}| < 10\text{cm}$)
- Si total Q / CT05 cut : mean of Q/CT05 $\pm 5\%$

Spill selection method (technical)

- Quick spill selection for physic run:
 - use beam summary data whose version is "p**"
 - `run_type == "physics run (1)" && spill_flag == 1`
- Good spill selection :
 - use beam summary data whose version is "v**"
 - `good_spill_flag == 1`

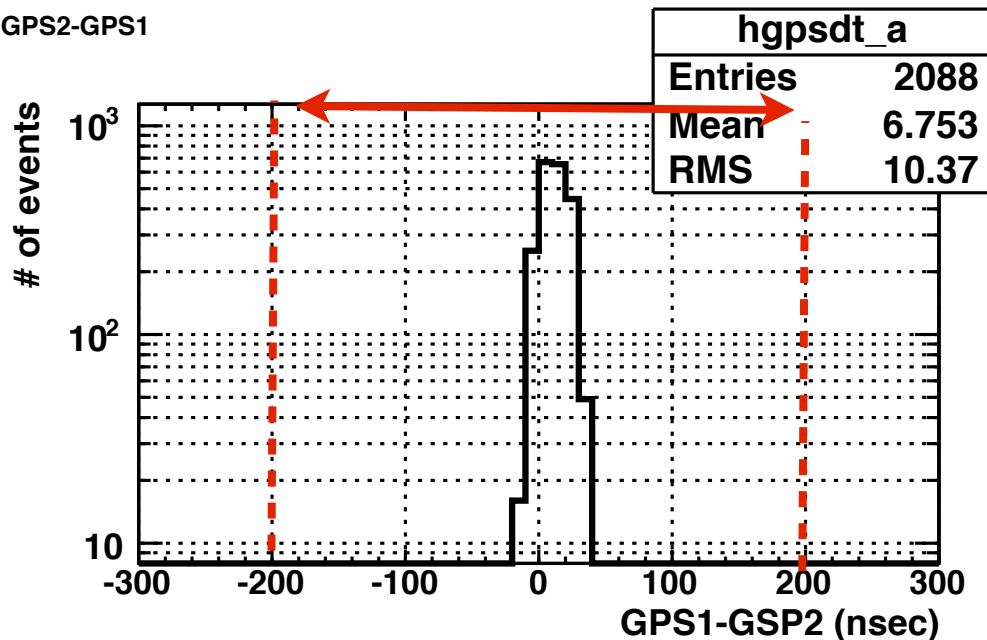
GPS status

Graph



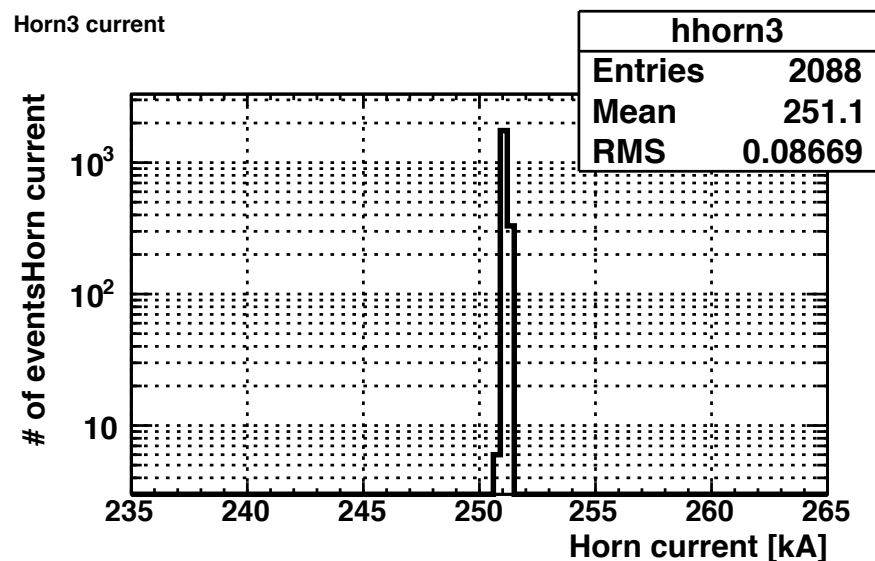
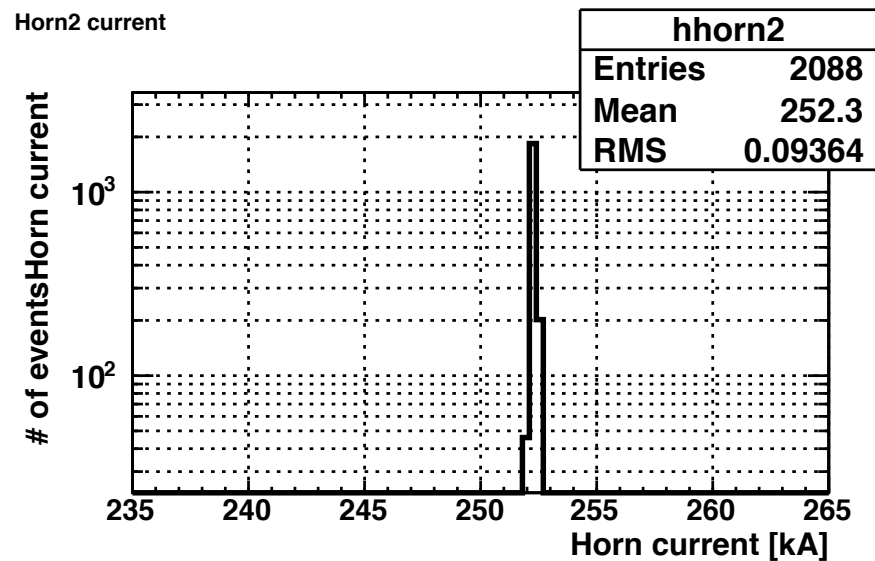
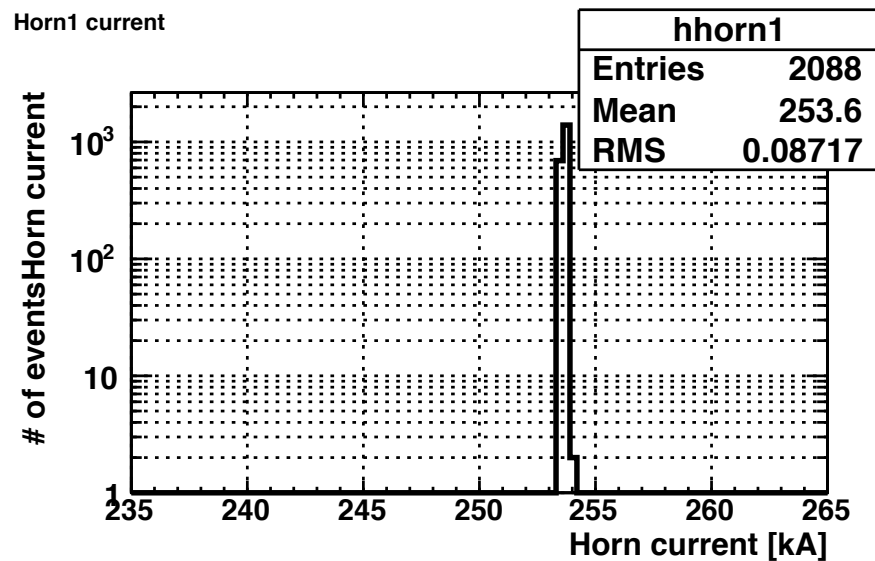
No spill of Bad GPS
status

GPS2-GPS1



Fluctuation(1σ) ~ 10.4 ns

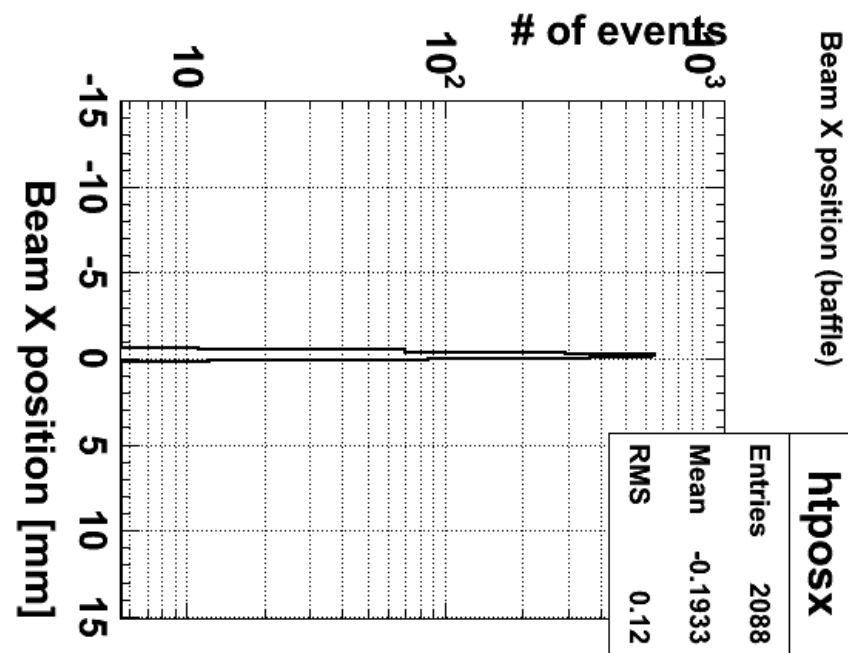
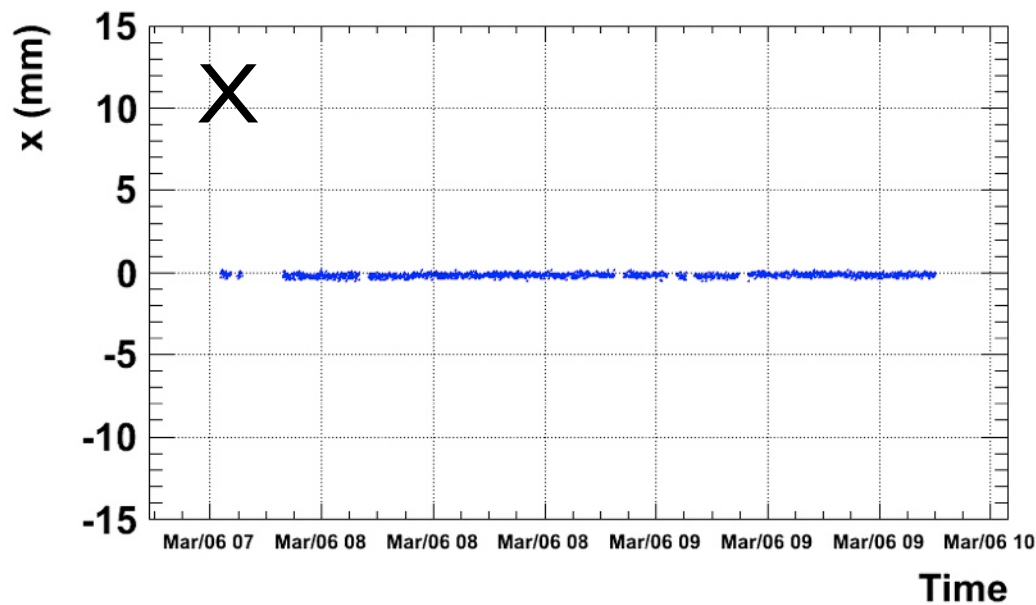
Horn status



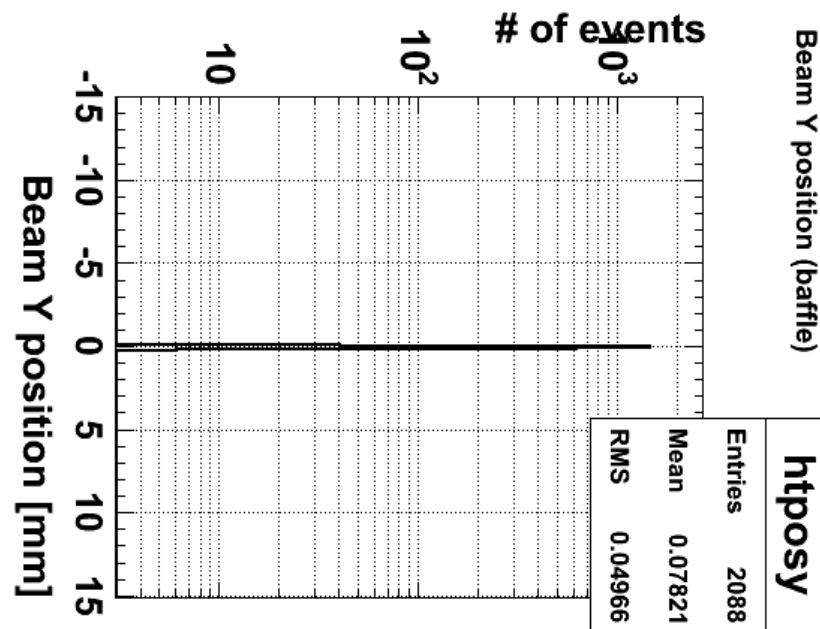
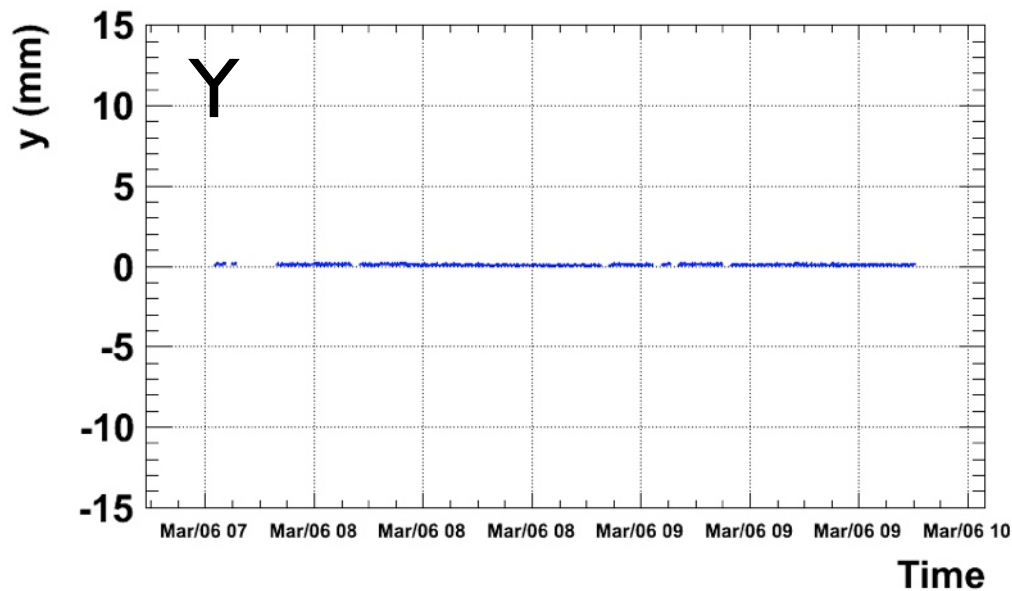
3 Horns are stable

Proton beam center

Beam X position (baffle)

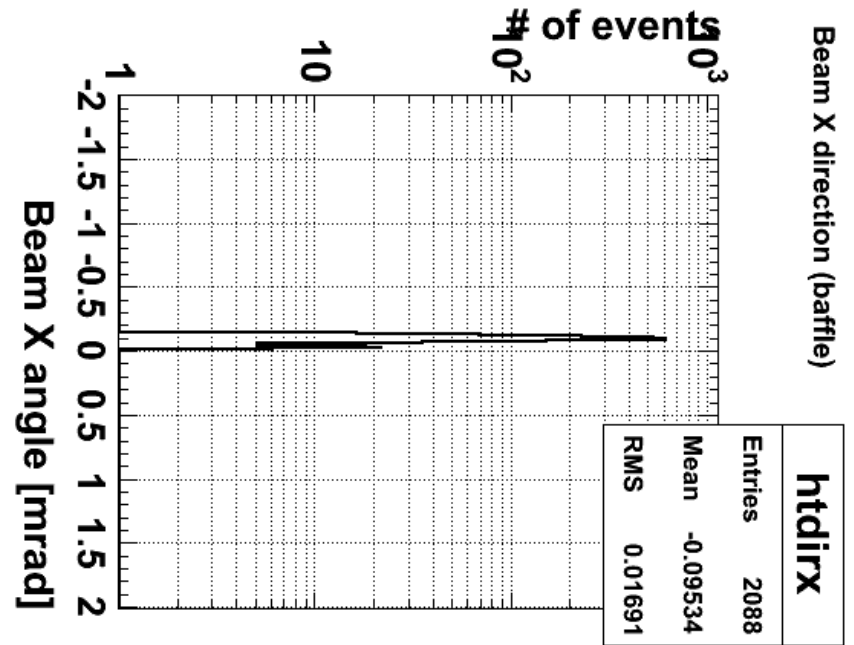
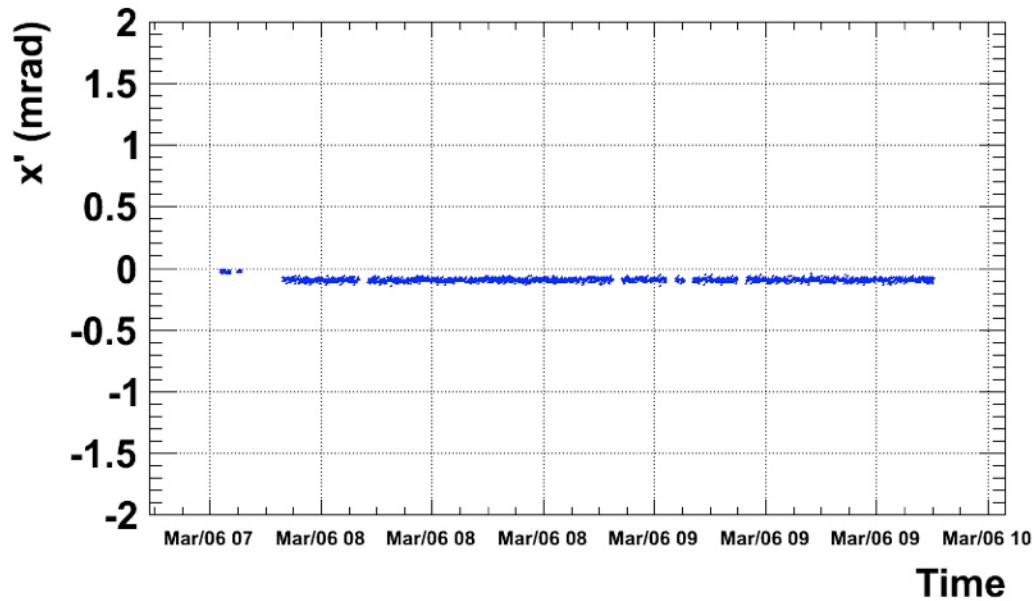


Beam Y position (baffle)

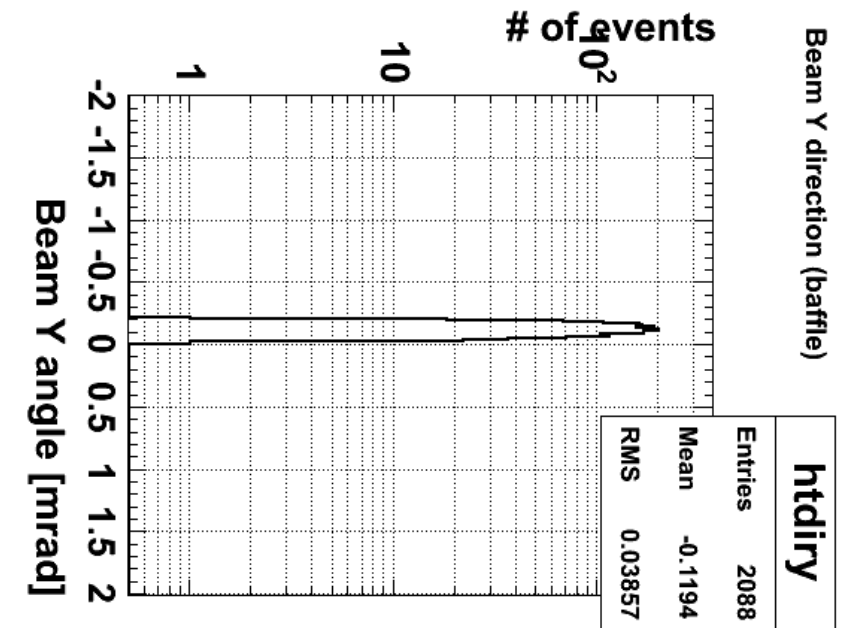
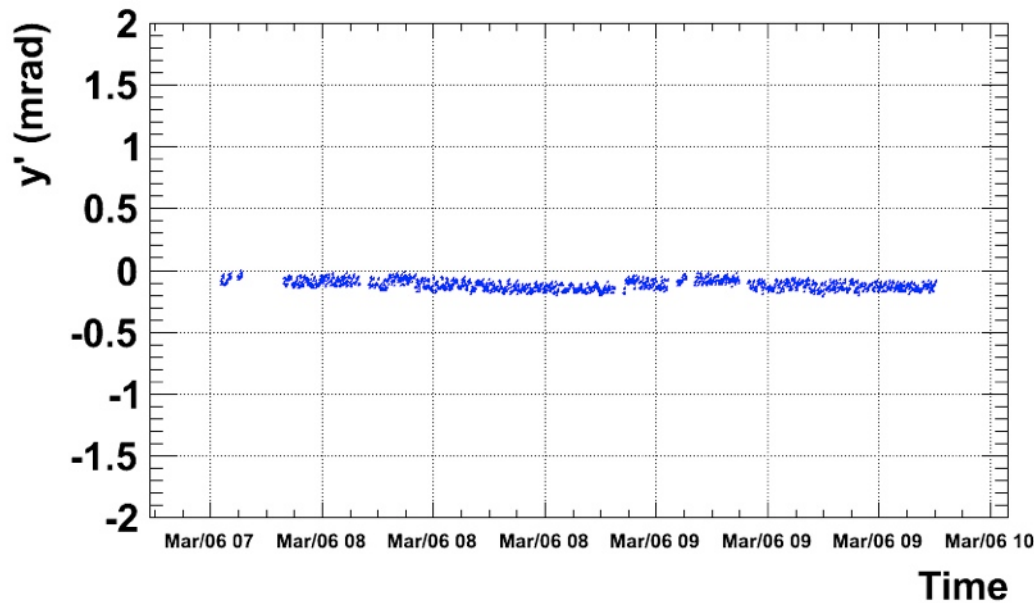


Proton beam angle

Beam X direction (baffle)

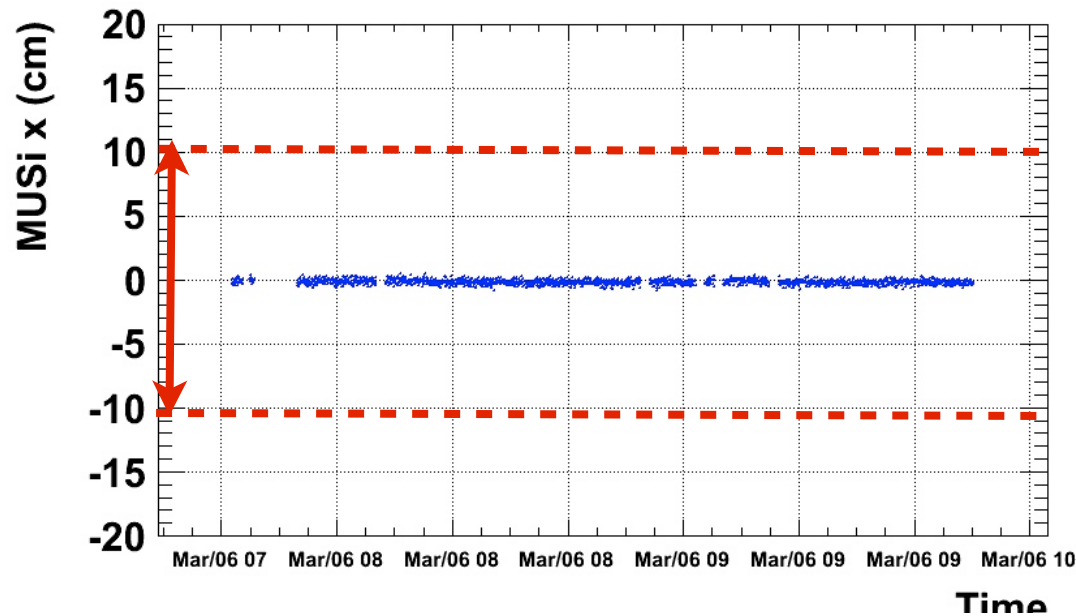


Beam Y direction (baffle)

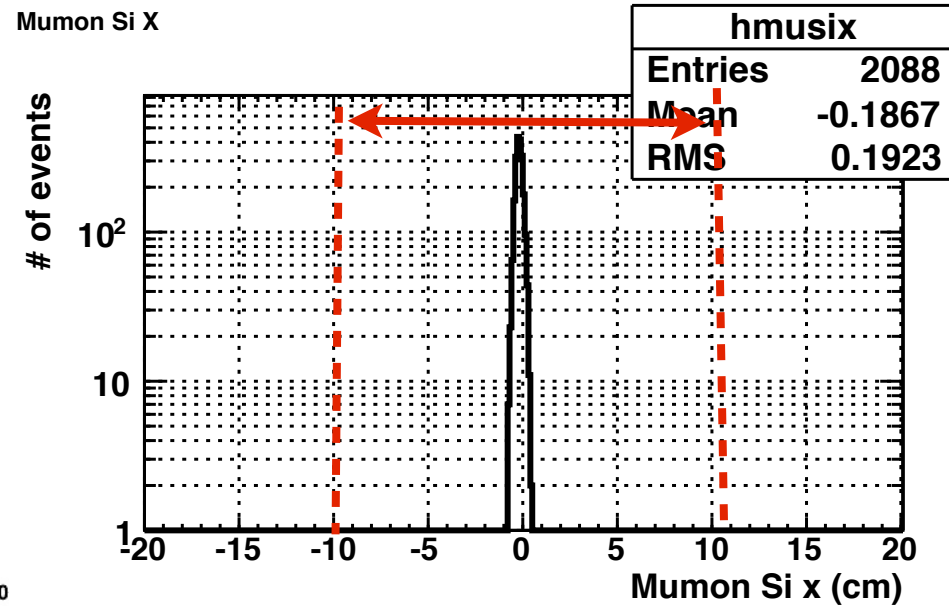


MUMON Si fit center

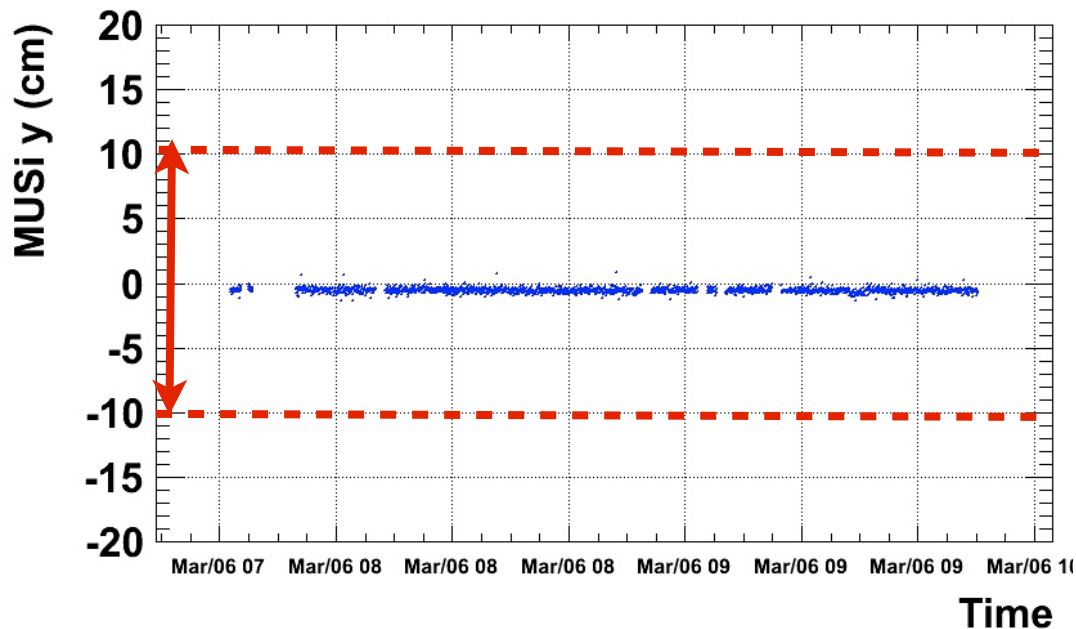
Mumon Si fit-X



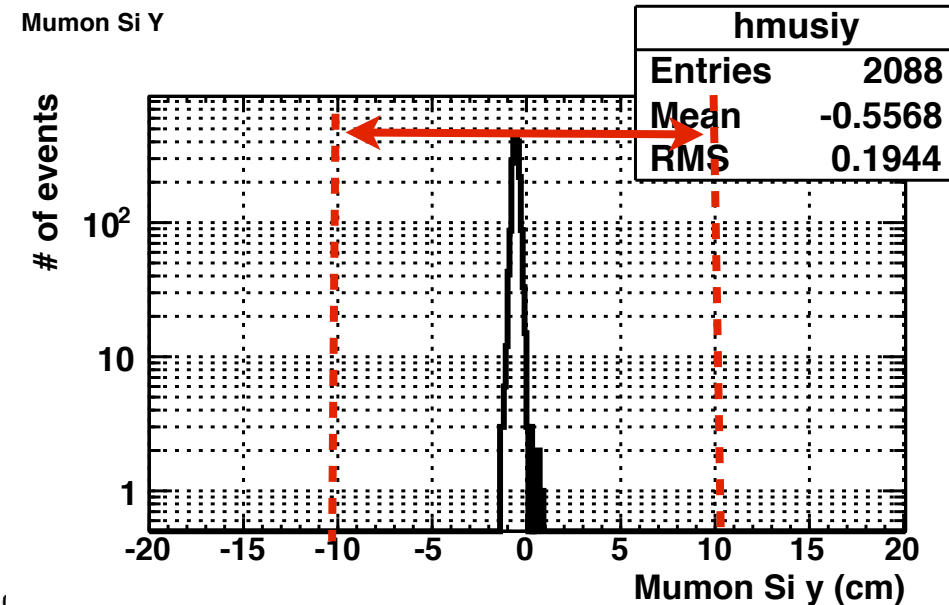
Mumon Si X



Mumon Si fit-Y

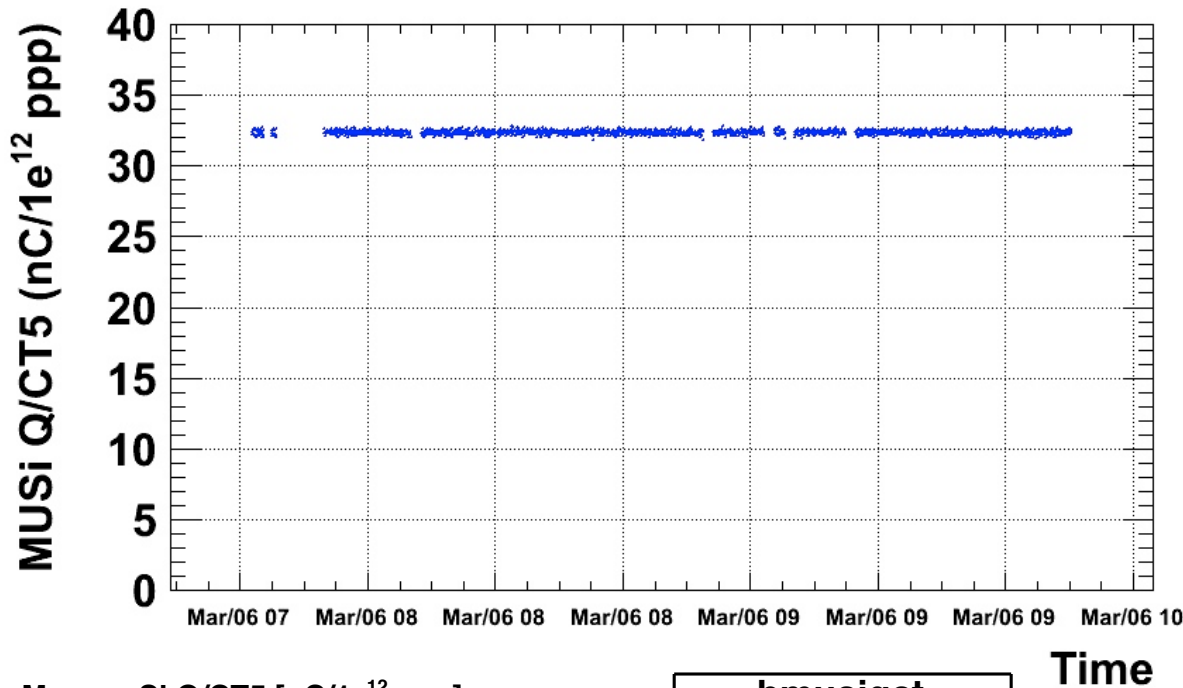


Mumon Si Y



MUMON Si Q / CT05

Mumon Si Qtotal/CT5

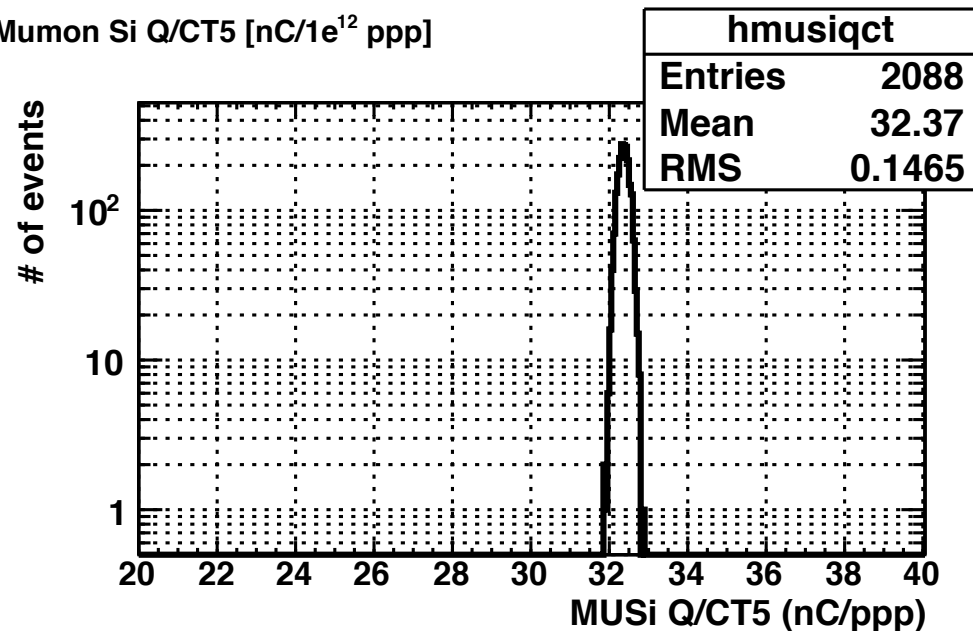


Mean of MUMON Si
Q /CT05 = **32.4**

→ Used for good spill
selection

(**30.8 < Si Q/CT05 < 34.0**)

Mumon Si Q/CT5 [nC/1e¹² ppp]



Summary

- Beam operation in physic run ($\sim 3/6$) is stable
- No spills failed by “quich spill selection,
excluded for dummy spills

$\sim$ run#410053	# of spills
In physics run	2126
After quick spill selection	2088