

Some MCenter/NOvA Beam Characteristics

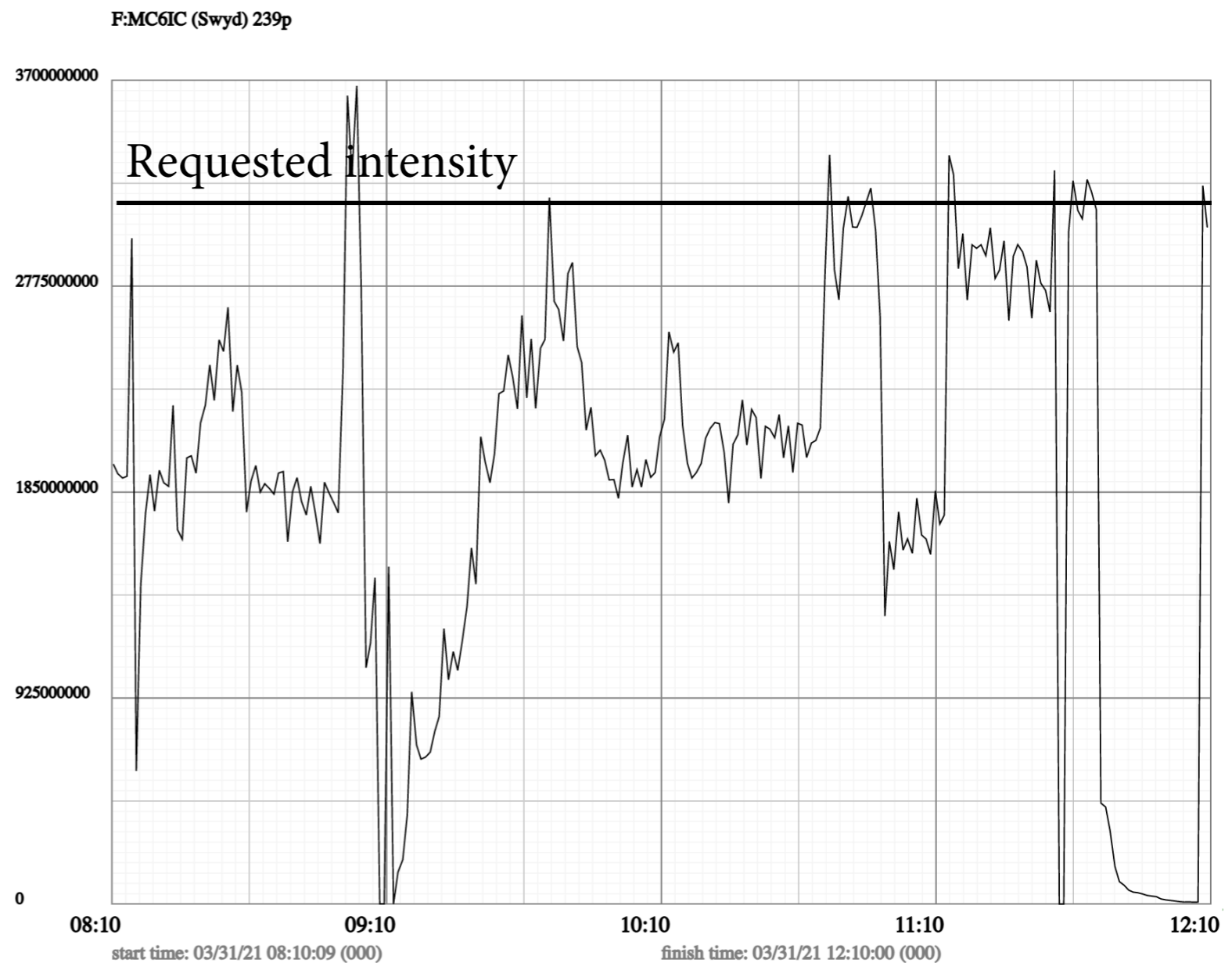
Mike Wallbank

University of Cincinnati

NOvA Test Beam/AD Coordination Meeting, 3/31/2021

Beam Stability

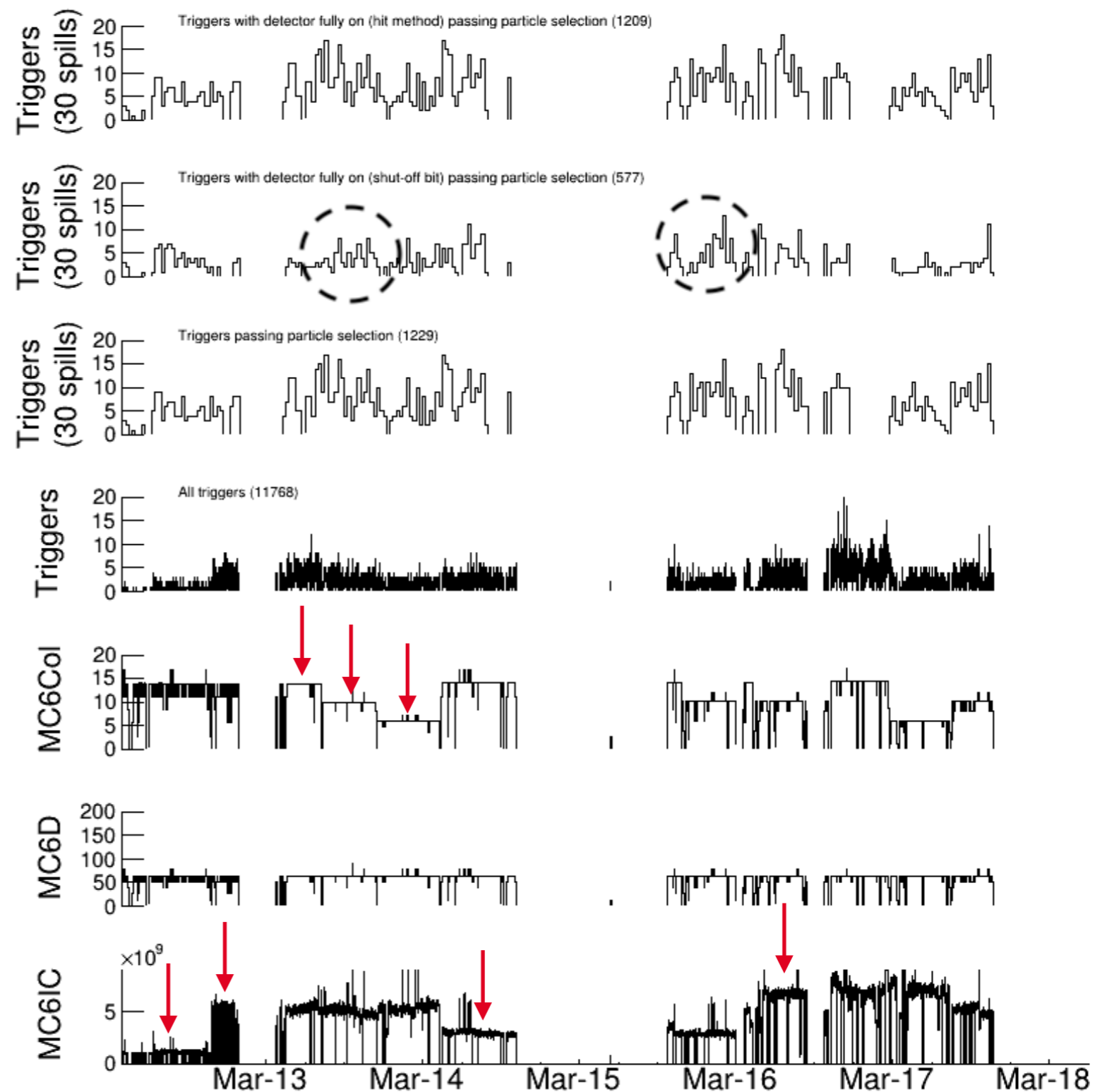
- I'm sure the Operators are aware of this and are doing all they can, I just wanted to bring it up.
- The last few times I've glanced at our intensity it seems to be dropping below what we request.
 - I know a lot of it is due to MTest changing conditions and accesses etc, but I wondered if there was anything we can do to help the Operators out?
 - How much effort is it to re-enable the alarms, given we may change again?



Last 4 hours

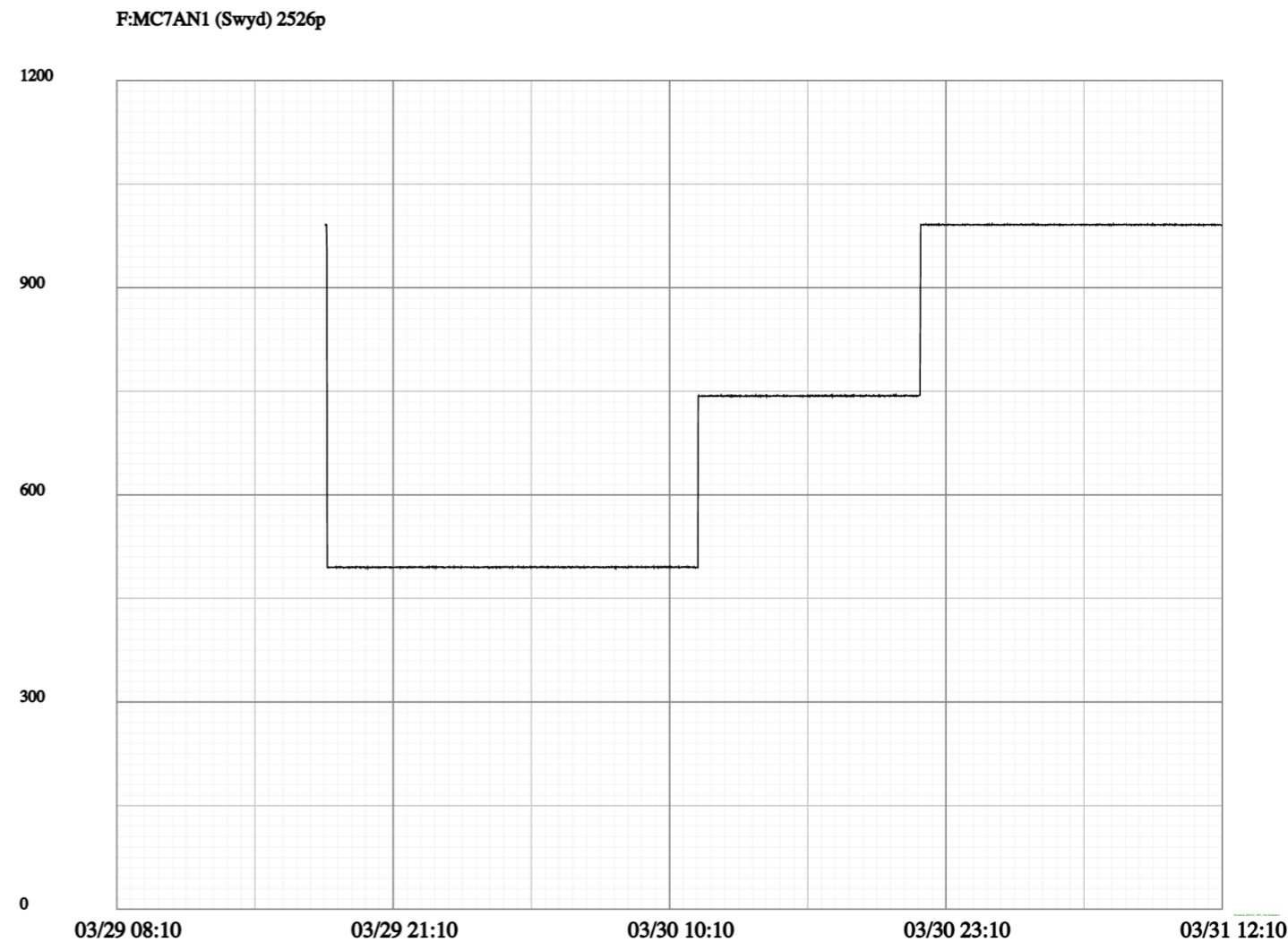
NOvA Beam Scans

- We scanned over intensities $\{1,3,5,7\}e9ppp$ and collimator apertures $\{6,10,14\}mm$.
- Best aperture to maximize throughput/backgrounds seemed to be 10mm.
 - New nominal.
- Best intensity seemed to be between $3e9$ and $5e9ppp$.
 - $5e9ppp$ gives better good particle rates; $3e9ppp$ appears to be less affected by shut-offs.
 - $3e9ppp$ our current new nominal.



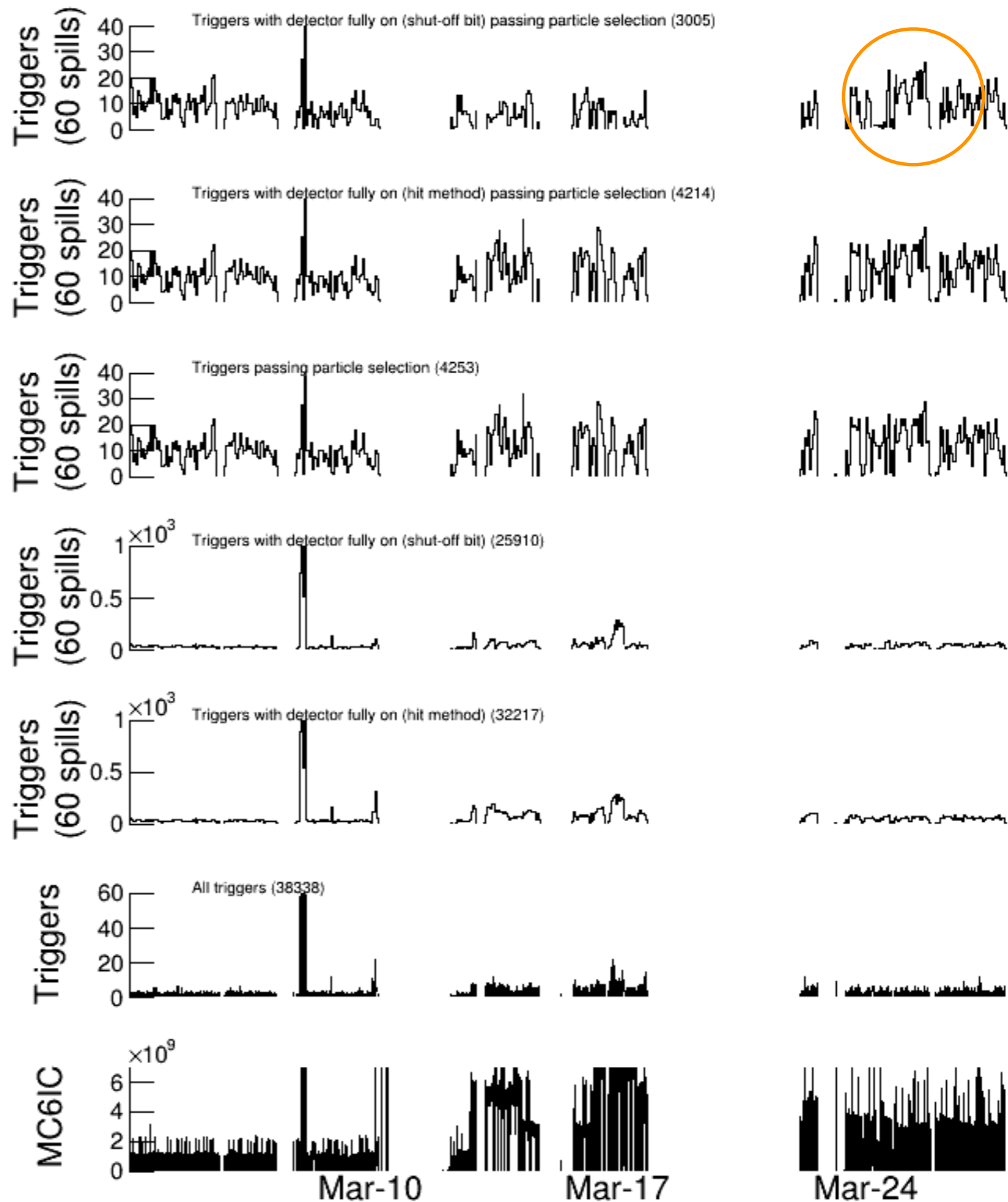
NOvA Tertiary Beam Scans

- To plan the rest of our run to ensure we collect sufficient particles across a range of momenta, we took some runs at different tertiary particle tunes.
- ‘Nominal’ so far has been 1 kA (~ 0.9 T, ~ 1 GeV/c focus); also took ~ 8 -12 hour runs at 500 A and 750 A.



March Data

- Lots of work understanding and characterizing our beam and data throughout March, high rates (c.f. February at least!) in general.
- Maybe a new golden period from last week?



Main Injector

Switchyard

MC1

MC2

MC3

MC4

MC5

MC6

MC7a

MC7b

Analysis Particles

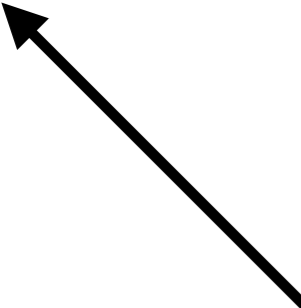
All Triggers

Spill Duty Factor

MW1SEM



MTest



MCenter

Lambertson

SM11



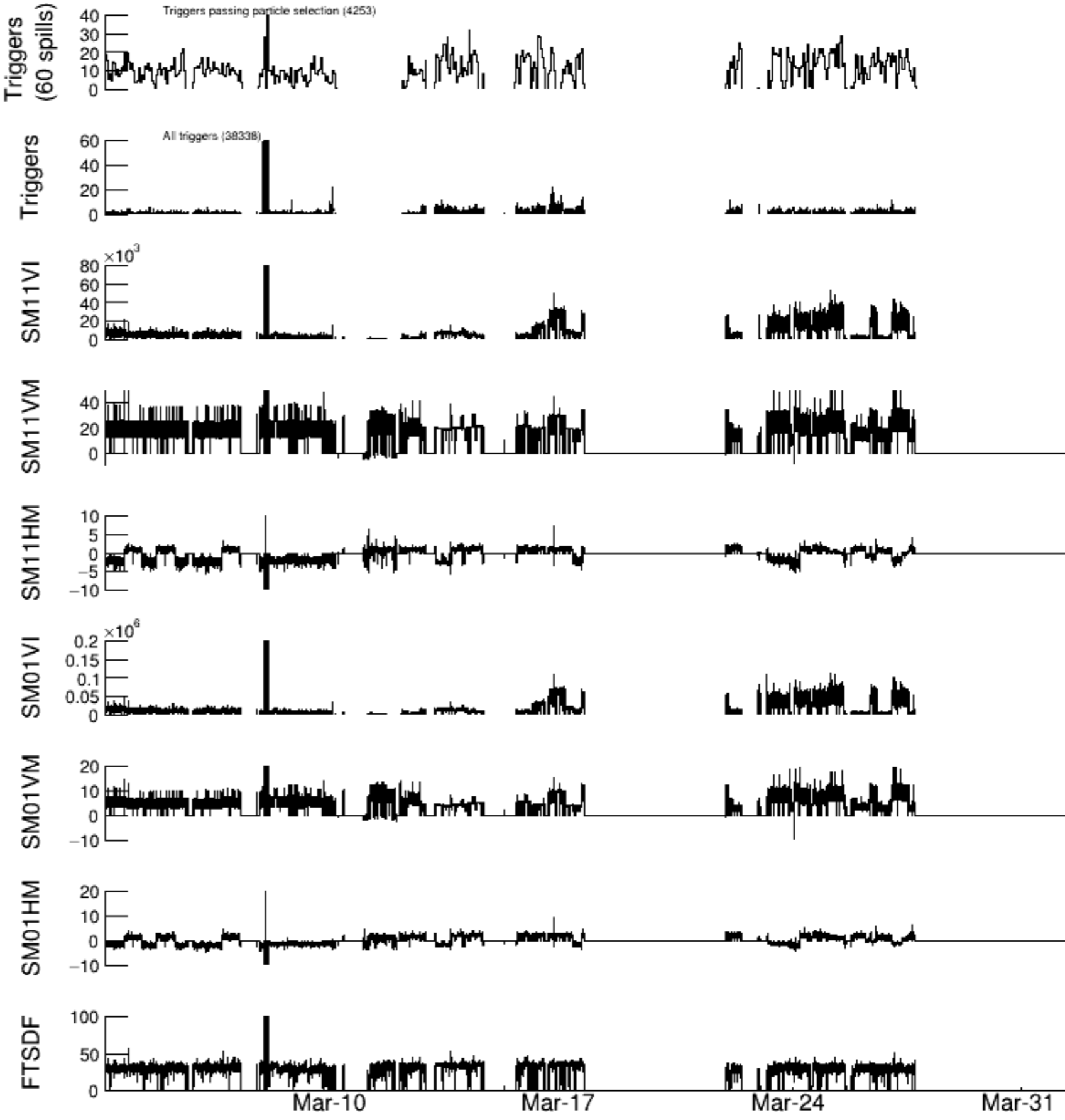
Chamber

SM01



Chamber

Septum



Main Injector

Switchyard

MC1

MC2

MC3

MC4

MC5

MC6

MC7a

MC7b

Analysis Particles

All Triggers

MCenter

MC1D



Dipole

SMC1

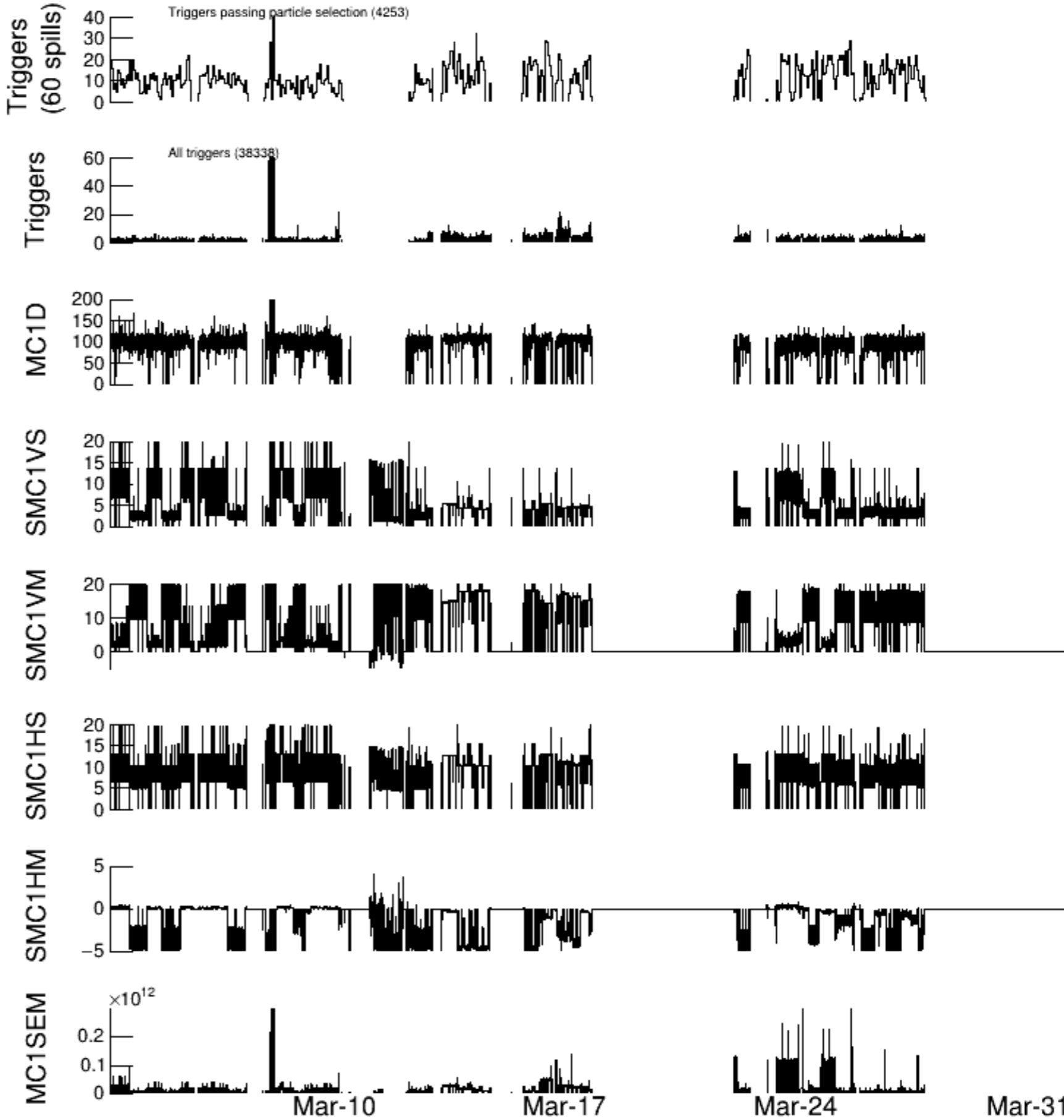


Chamber

MC1SEM



Intensity



Main Injector

Switchyard

MC1

MC2

MC3

MC4

MC5

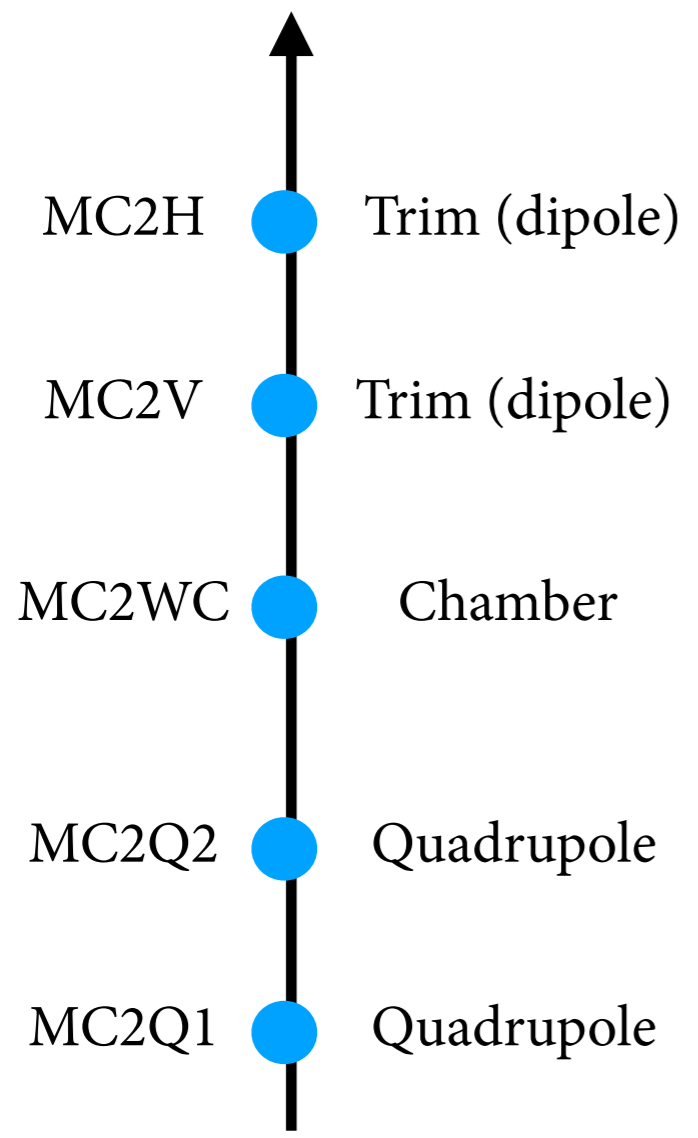
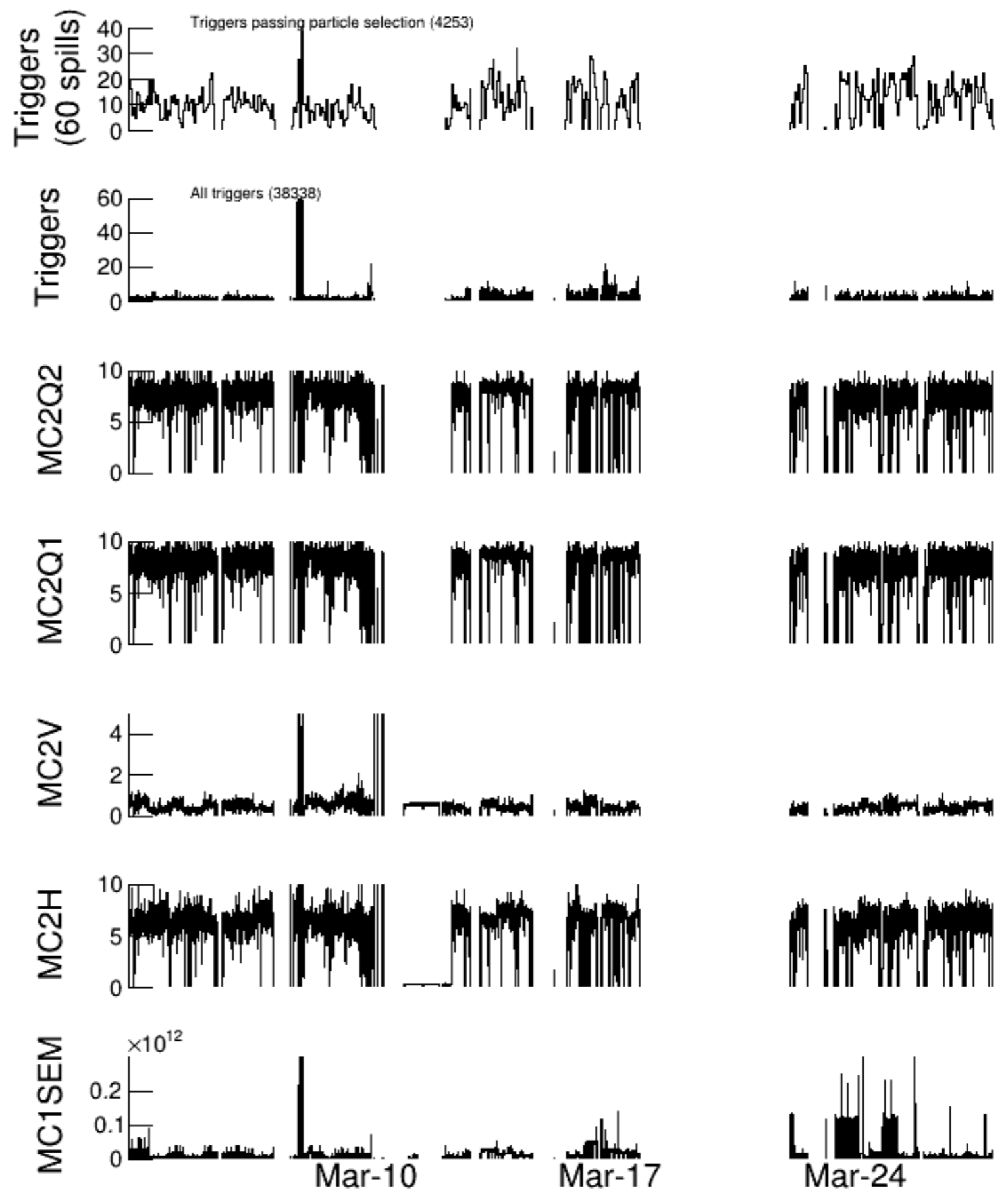
MC6

MC7a

MC7b

Analysis Particles

All Triggers



Main Injector

Switchyard

MC1

MC2

MC3

MC4

MC5

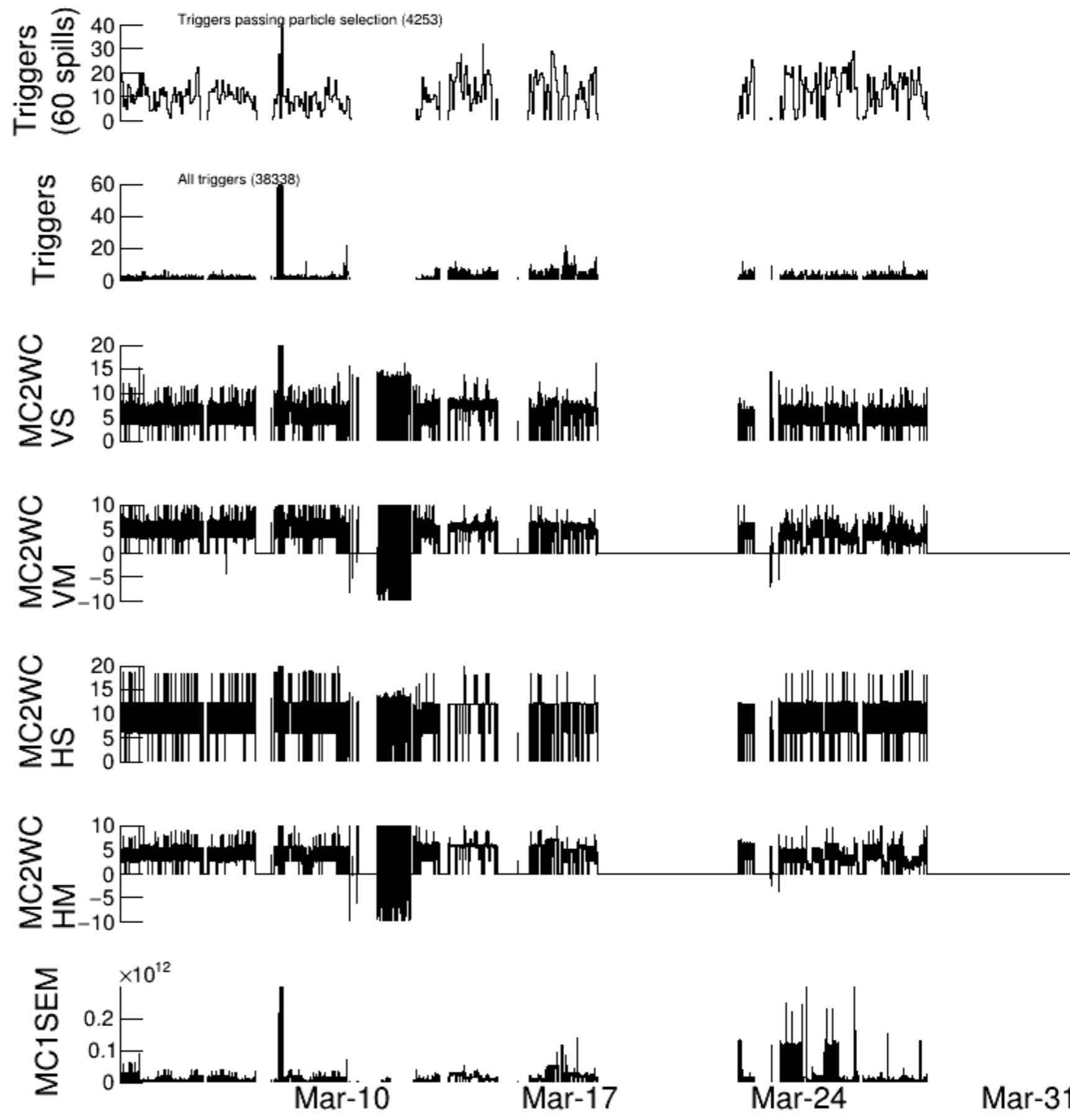
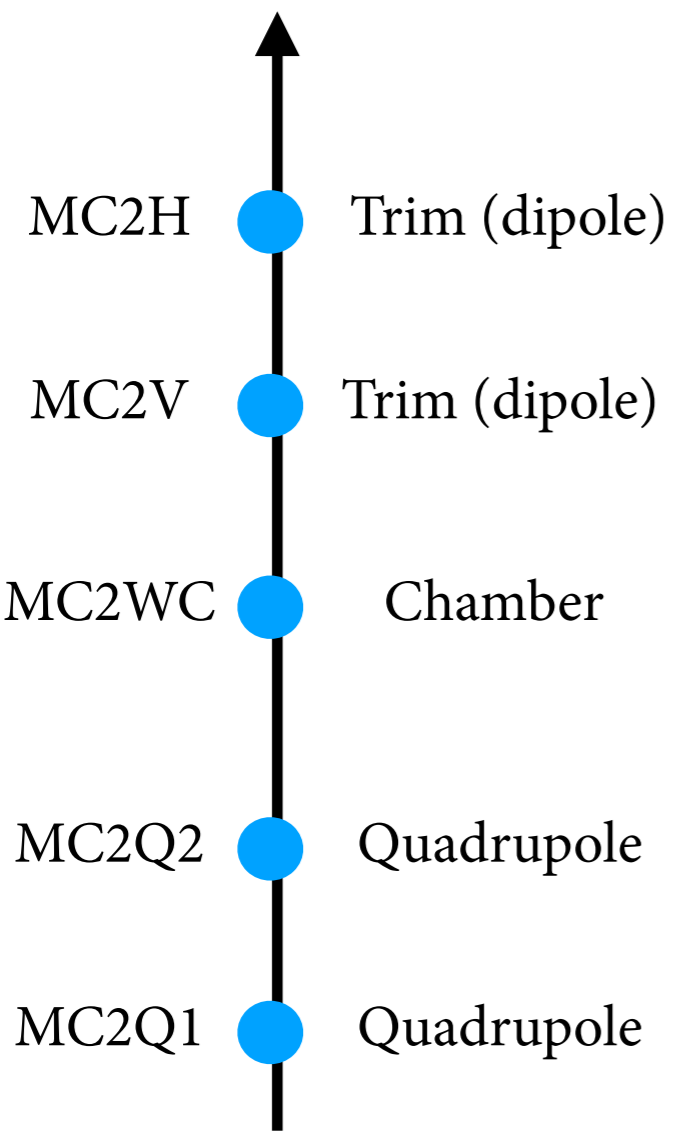
MC6

MC7a

MC7b

Analysis Particles

All Triggers



Main Injector

Switchyard

MC1

MC2

MC3

MC4

MC5

MC6

MC7a

MC7b

Analysis Particles

All Triggers

MC4WC



Chamber

MC3CH

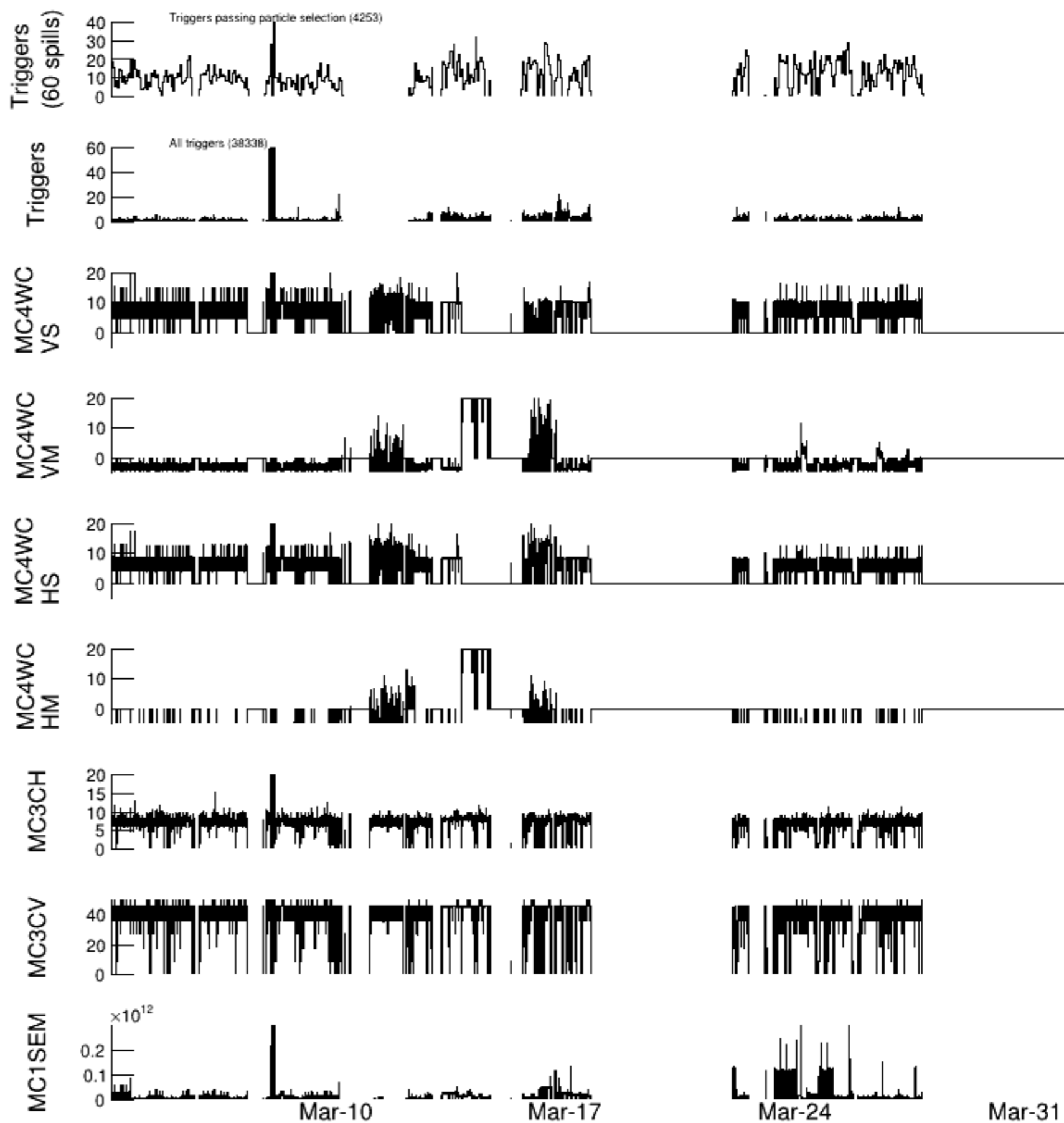


Collimator

MC3CV



Collimator



Main Injector

Switchyard

MC1

MC2

MC3

MC4

MC5

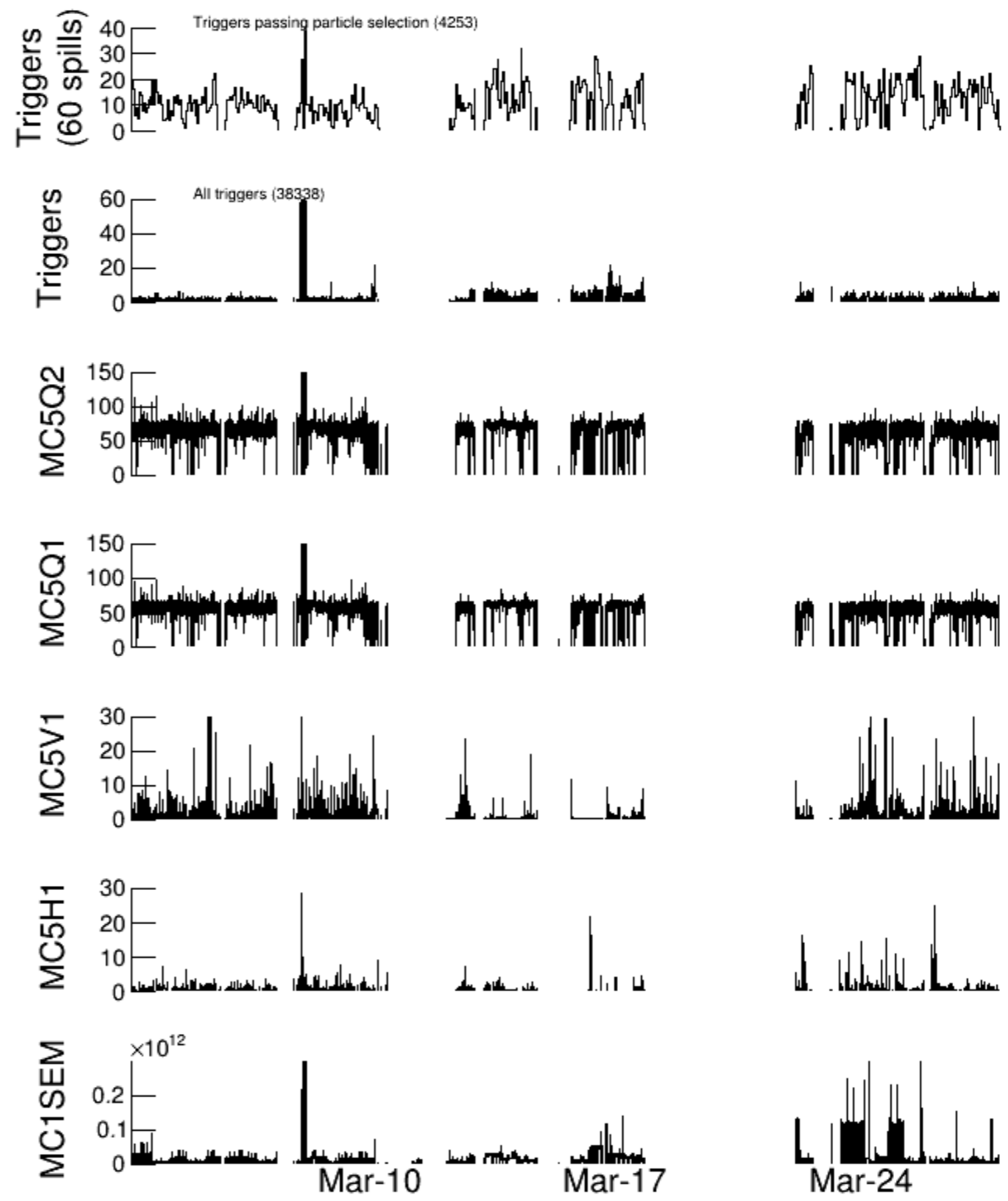
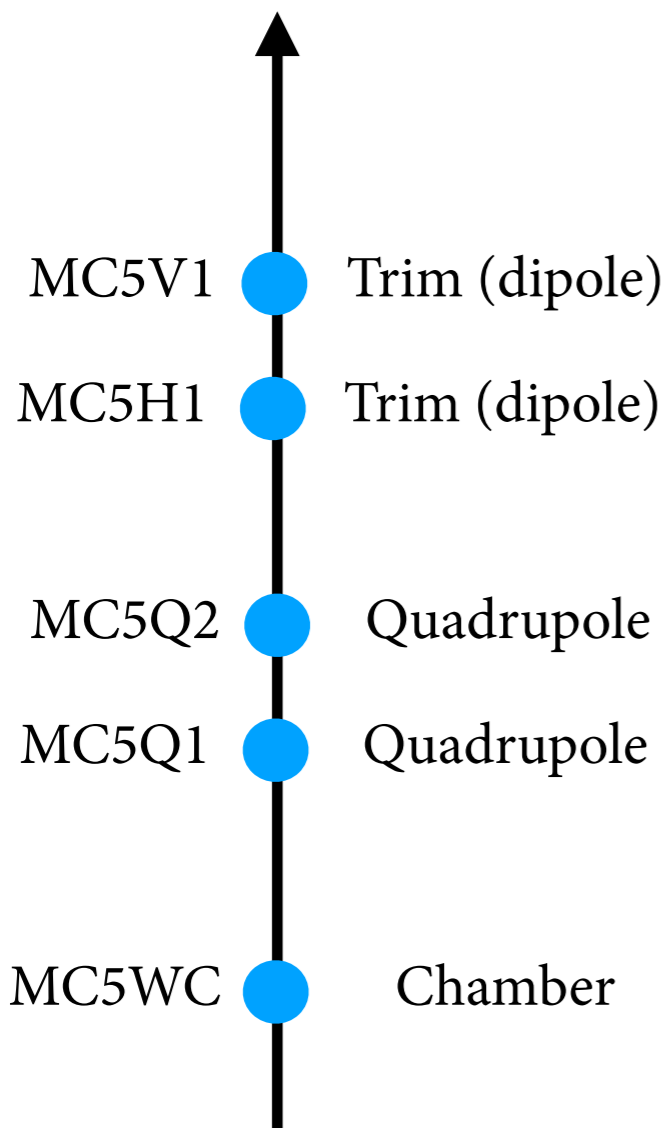
MC6

MC7a

MC7b

Analysis Particles

All Triggers



Main Injector

Switchyard

MC1

MC2

MC3

MC4

MC5

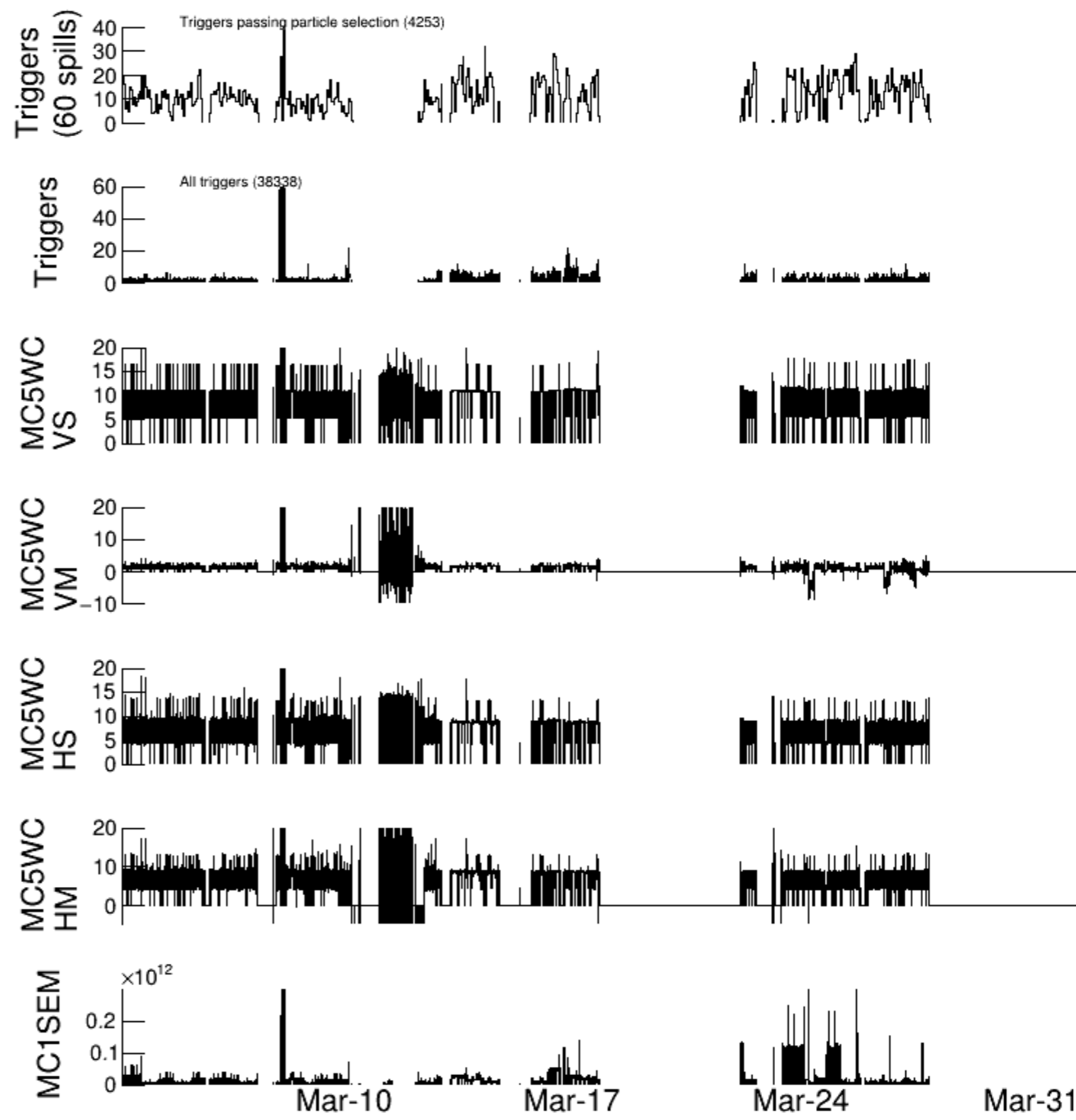
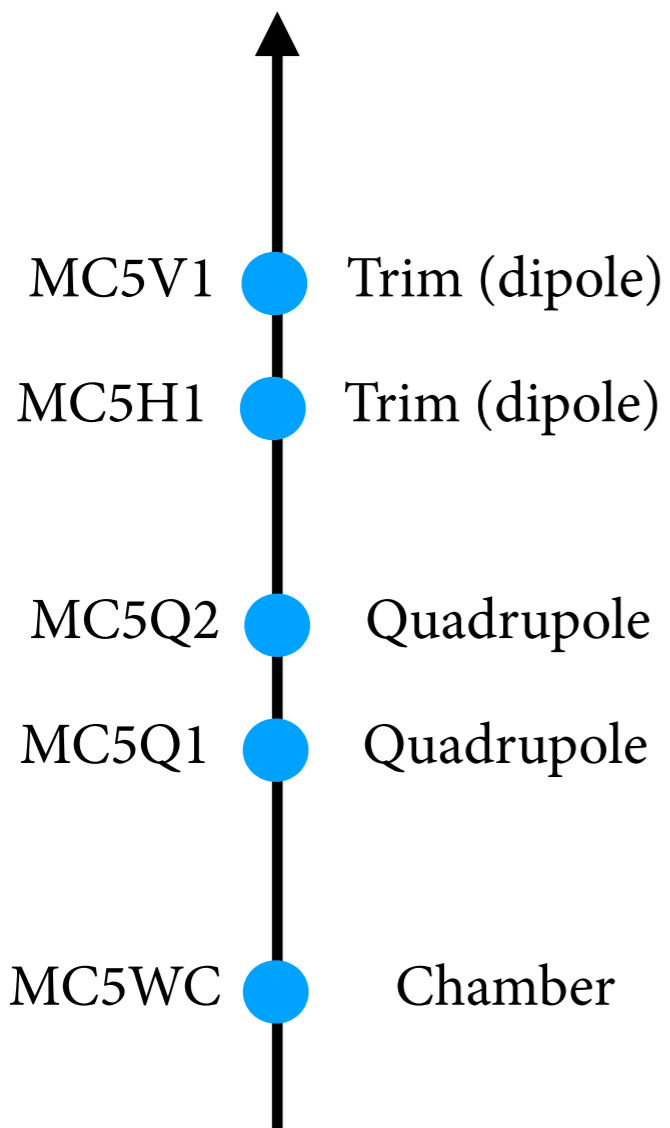
MC6

MC7a

MC7b

Analysis Particles

All Triggers



Main Injector

Switchyard

MC1

MC2

MC3

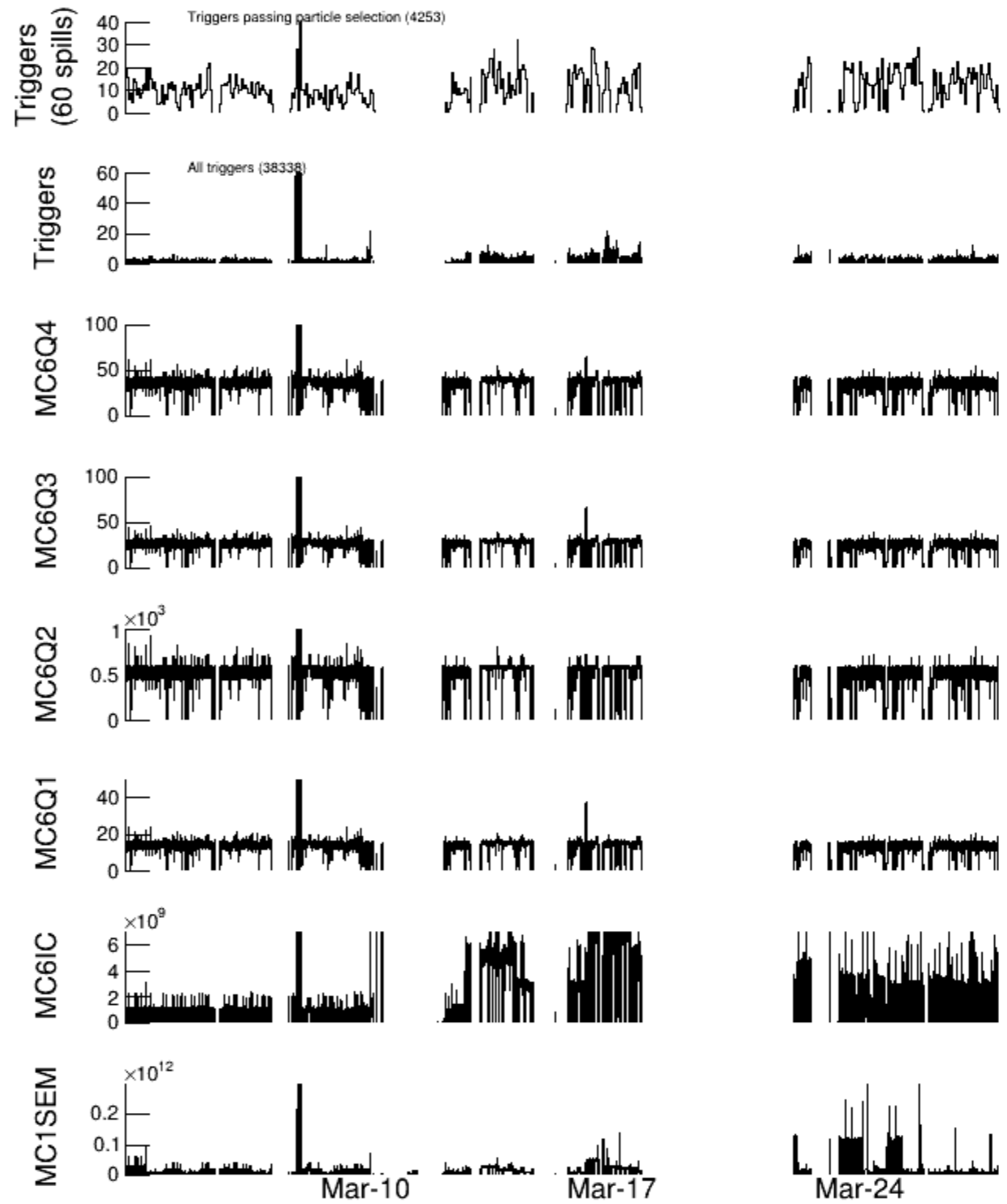
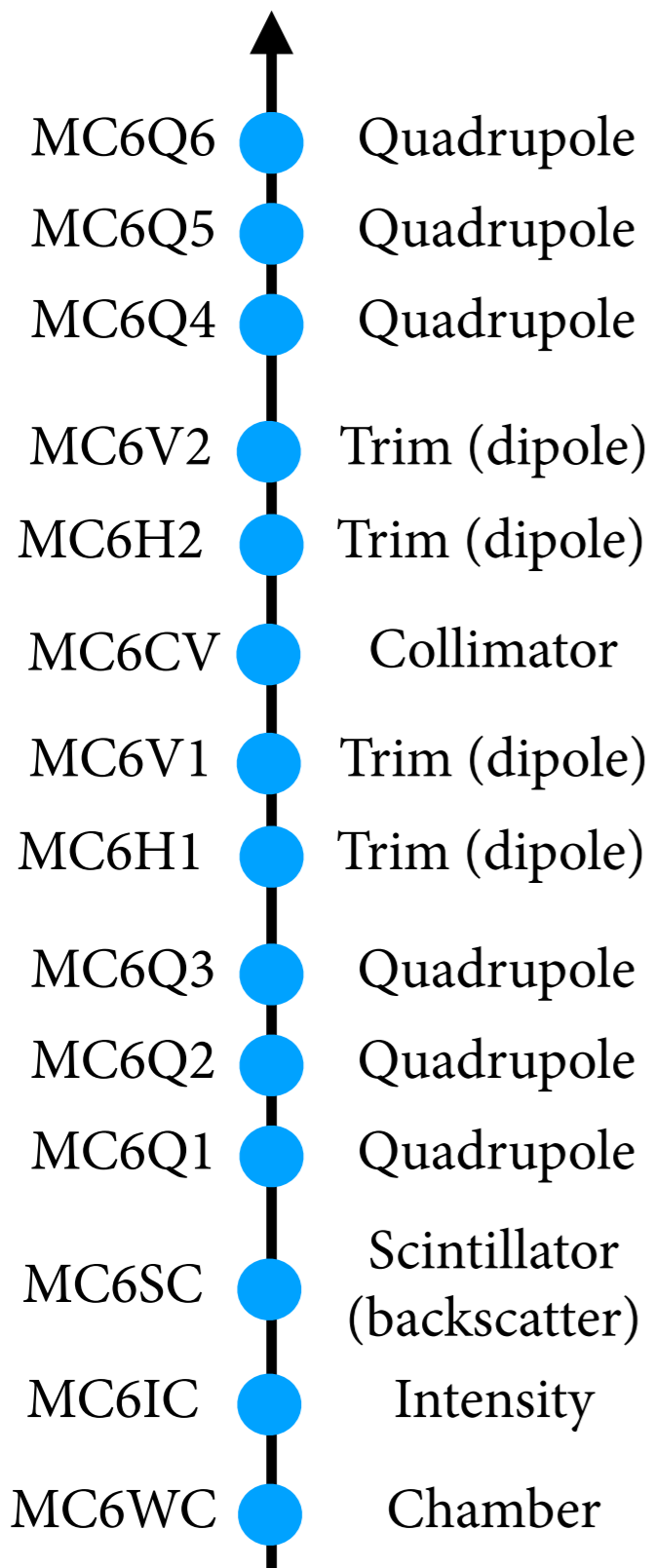
MC4

MC5

MC6

MC7a

MC7b



Main Injector

Switchyard

MC1

MC2

MC3

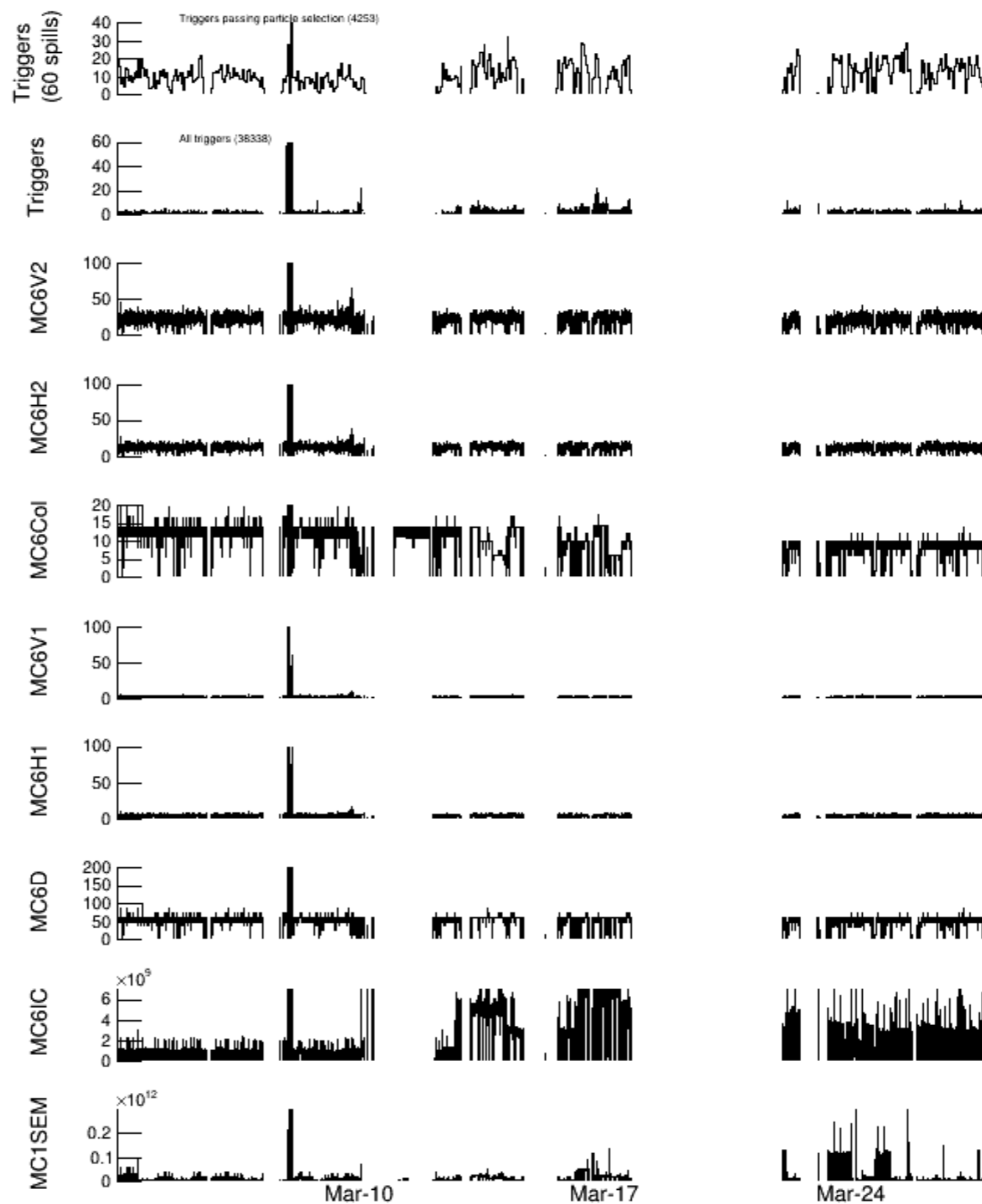
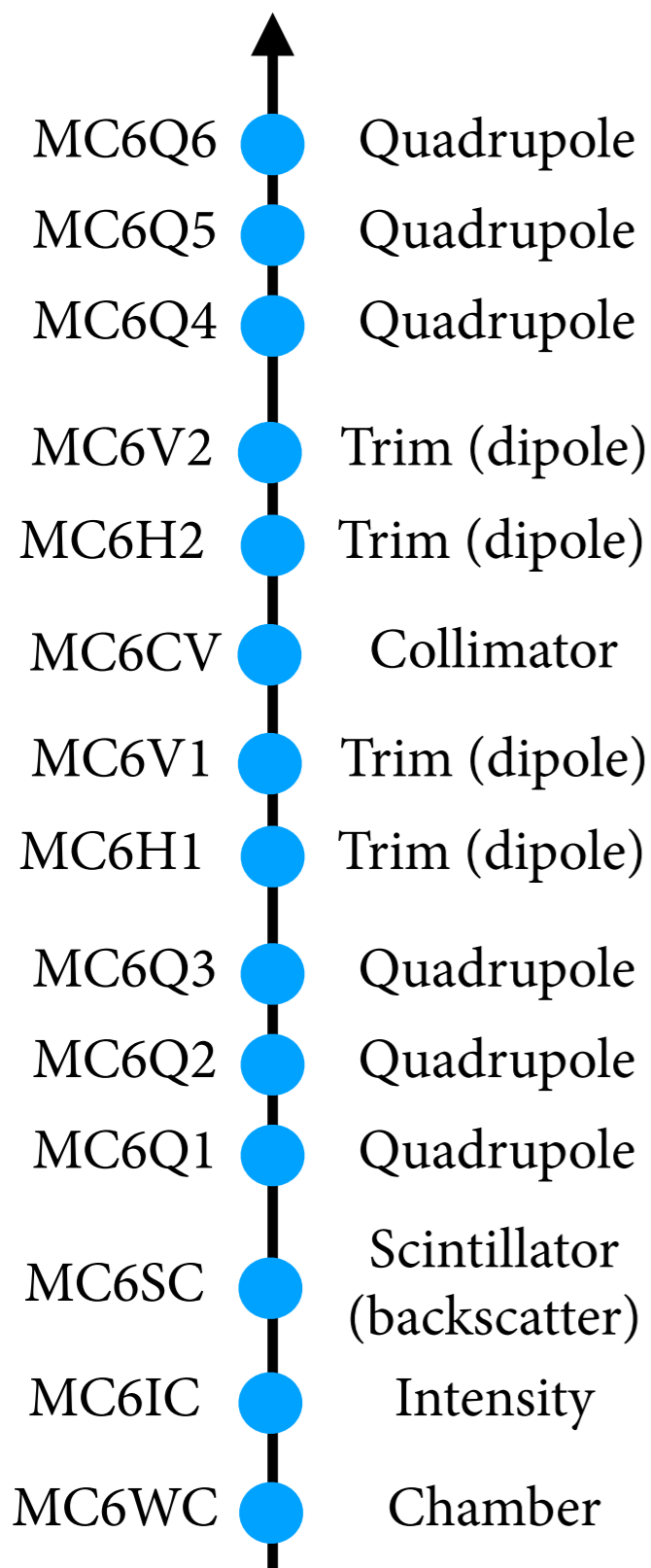
MC4

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MC7a

MC7b



Main Injector

Switchyard

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MC3

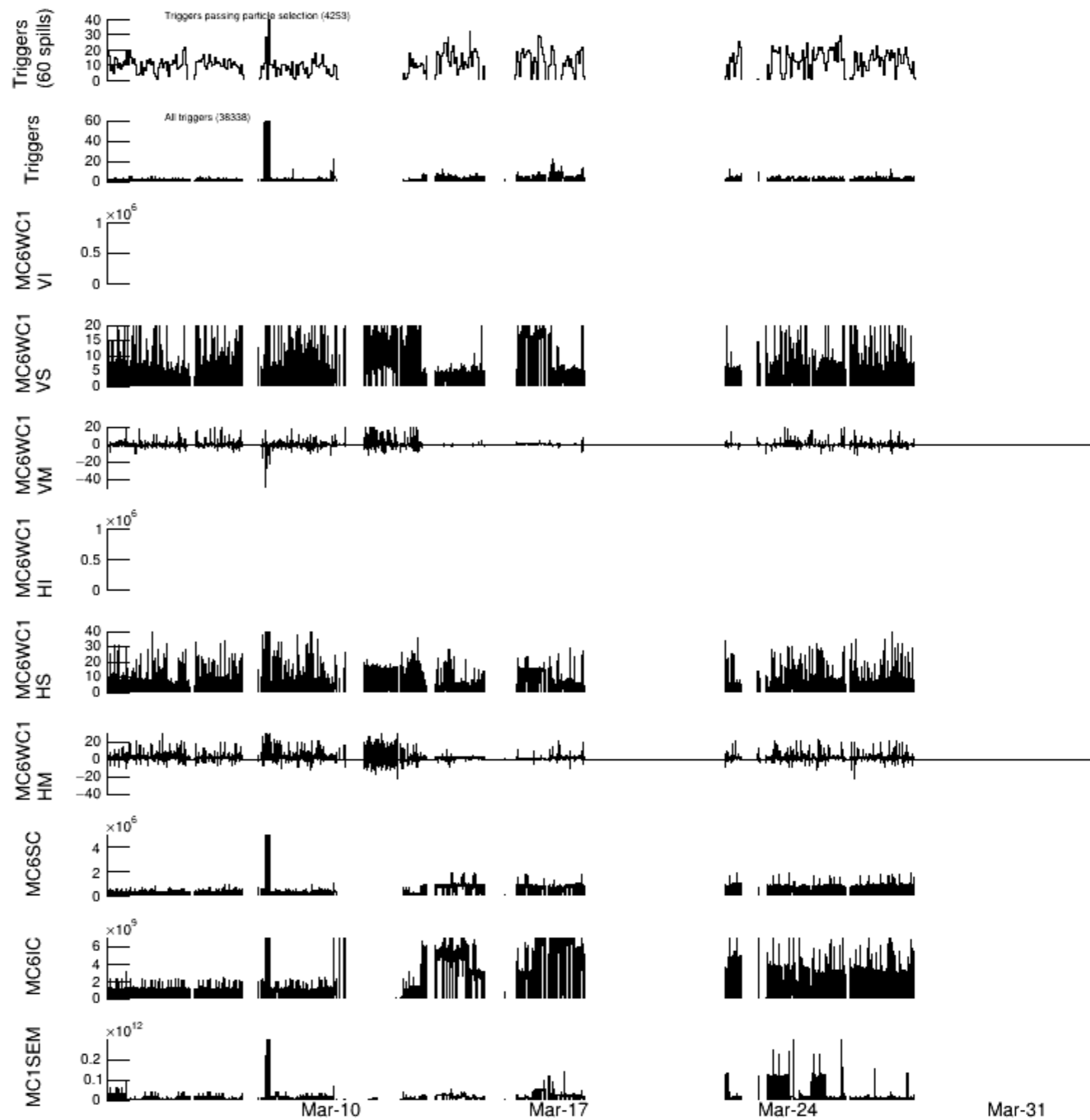
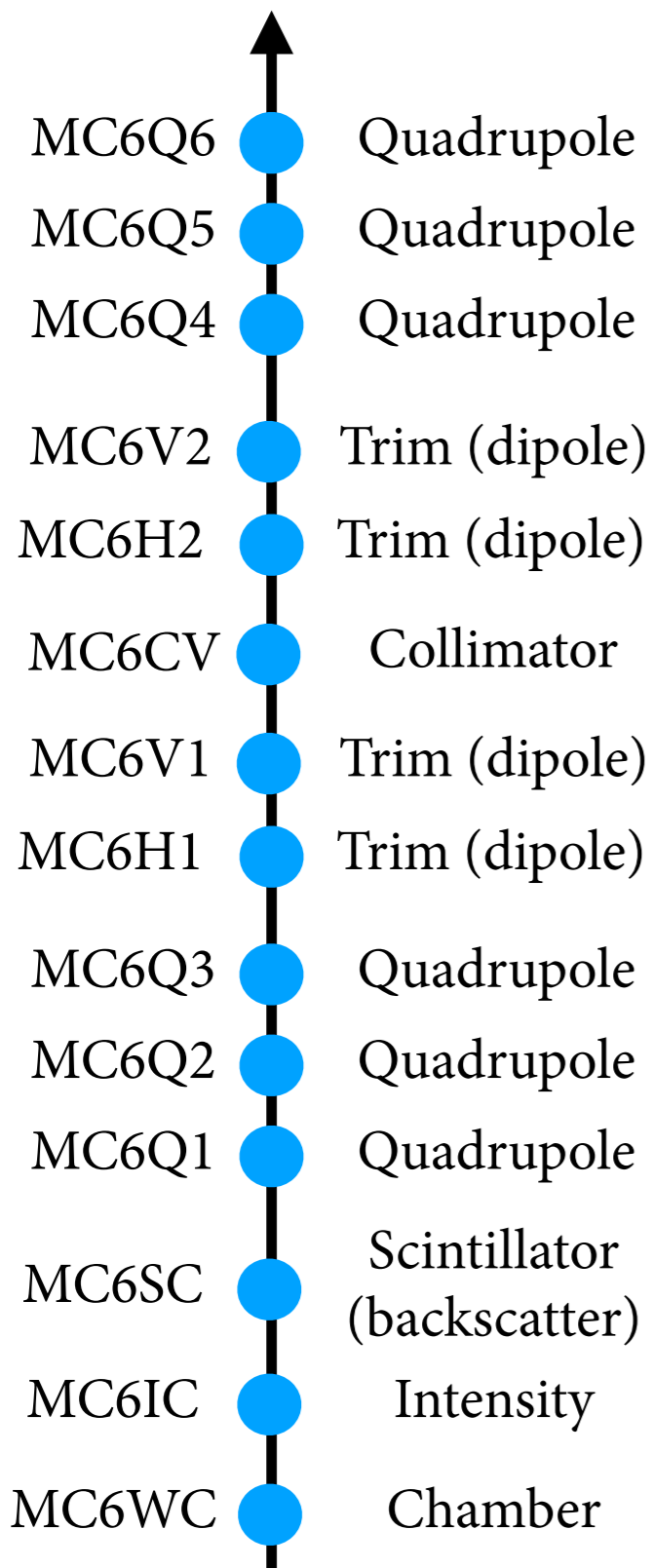
MC4

MC5

MC6

MC7a

MC7b



Main Injector

Switchyard

MC1

MC2

MC3

MC4

MC5

MC6

MC7a

MC7b

NOvA Target

Secondary Through-Put

NOvA US Chamber

MC7WC2

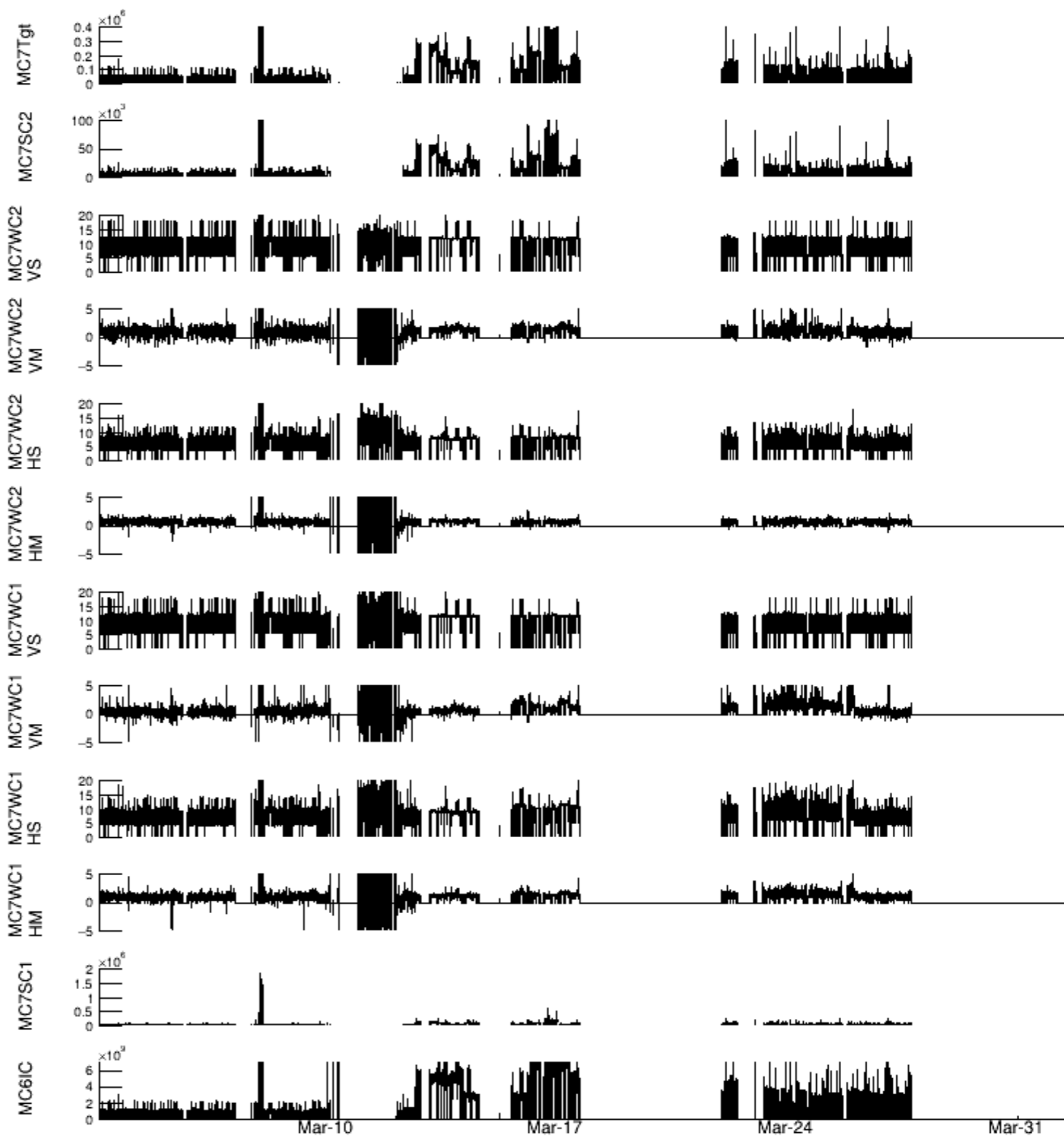
Chamber

MC7SC1

Intensity

MC7WC1

Chamber



Main Injector

Switchyard

MC1

MC2

MC3

MC4

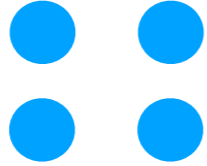
MC5

MC6

MC7a

MC7b

NOvA Detector Face



MC7Shield



MC6Tgt90Deg



MC6Tgt

