Beam Current and Position Study

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Group Meeting

- Goal: to be able to determine if the trip file is doing its job correctly
- Trip file indicates events that have had beam trips. This data can not be trusted
    - if the trip flag assigns a number not equal to zero for the event, it is labeled as bad, and cut
    - if the trip flag assigns zero to the event it is labeled as good, and kept
- Are there incorrect regions of "good" and "bad" data?

Organization of data

Event #	head time	Trip	Epic X, Y, Current
100	t1	0	current = 37 nA
102	t2	0	current = 37 nA
103	t3	1	current = 37 nA
104	t4	0	...
...			...
...			
...			
120	t20	0	current = 38 nA
...			current = 38 nA
...			current = 38 nA
137	t37	1	current = 5 nA
...	...	...	current = 5 nA
...			...
170	t70	0	current = 38 nA
...	...	...	current = 38 nA

The head time is associated with the EVNT bank, NOT the EPIC bank

Epic read here

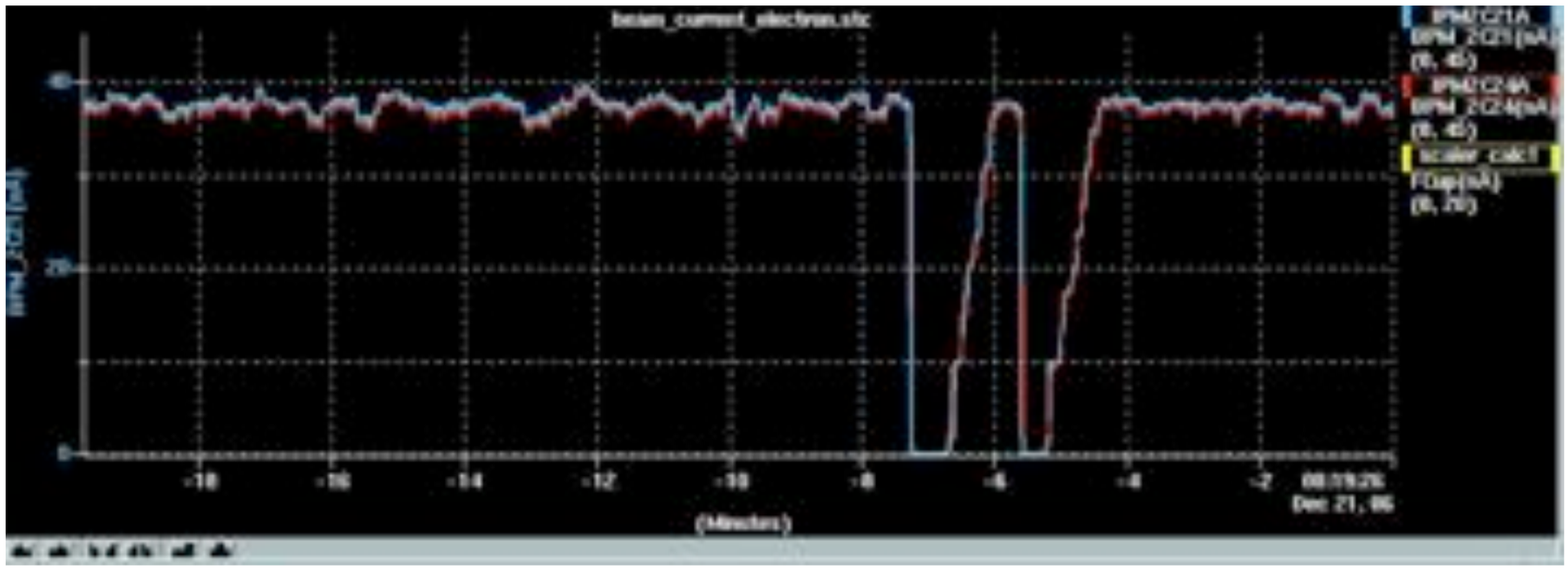
The information from the epic bank comes every two seconds. This means events that are registered 2 seconds after an epic entry will be assigned the previous current and position.

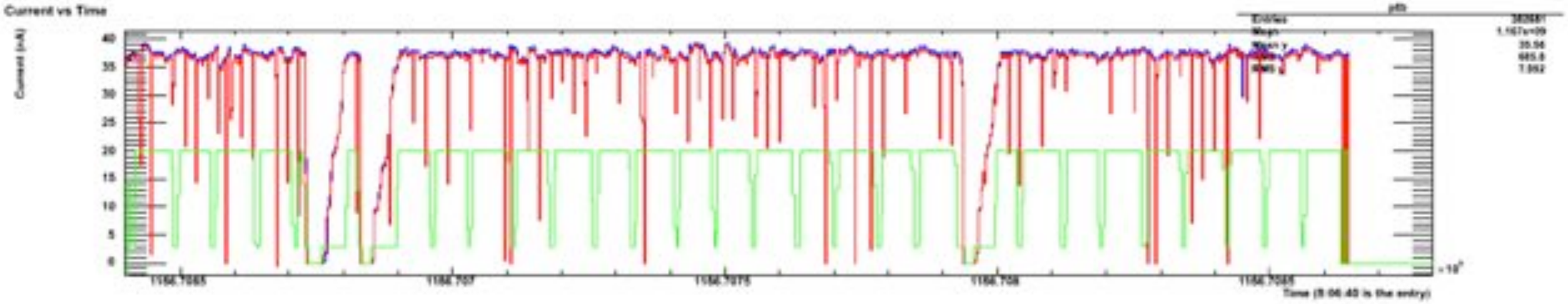
Events 100-119 will be assigned the EPIC value which is only read at event 100

Epic read here

Events 120-136 will be assigned the EPIC value which is only read at event 120

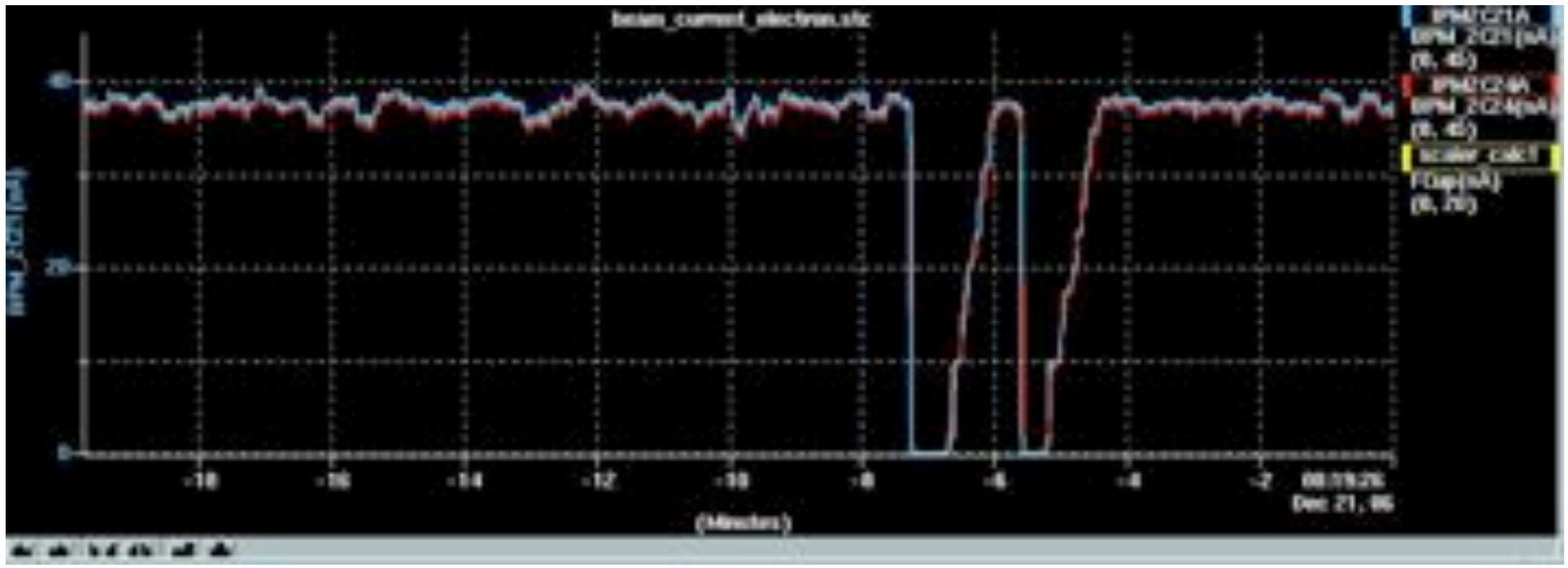
Step 1: Visual comparison of the shift information to my data. Data shown from run 53580

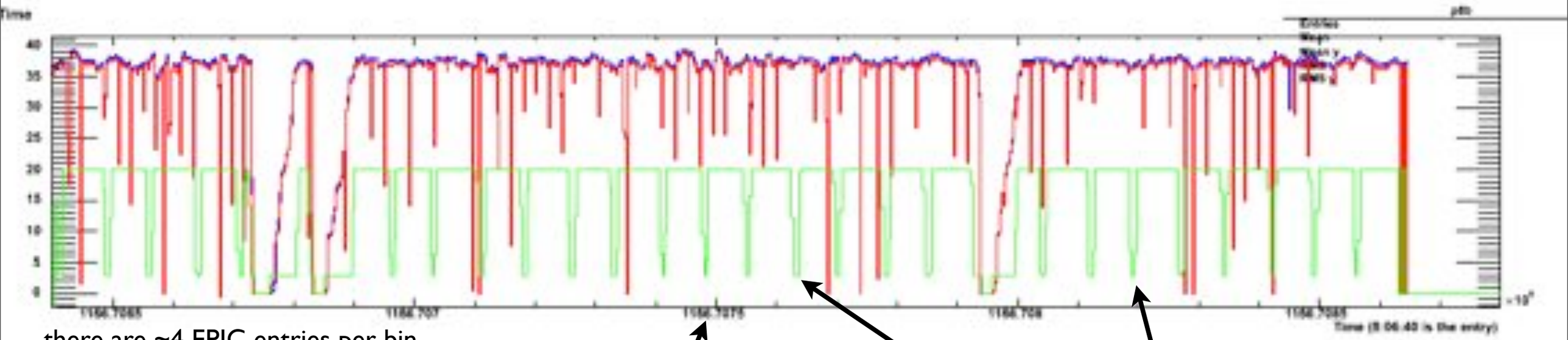




The scales for the x axis are not aligned. I checked the times of distinct features between the two images and they line up

Blue: IPM2C21A
Red: IPM2C24A
Green: Trip Flag (good=20, bad=3)
If value is 0: there is no information because these are only events from my reaction $\gamma d \rightarrow K^0 \Lambda p$



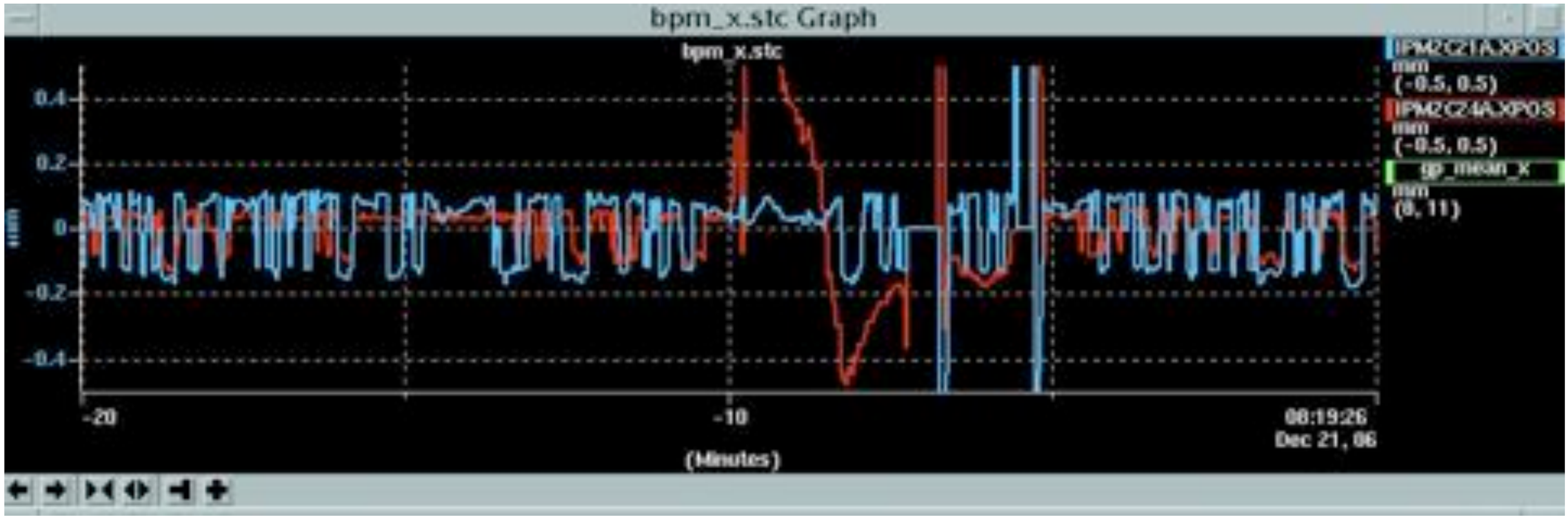


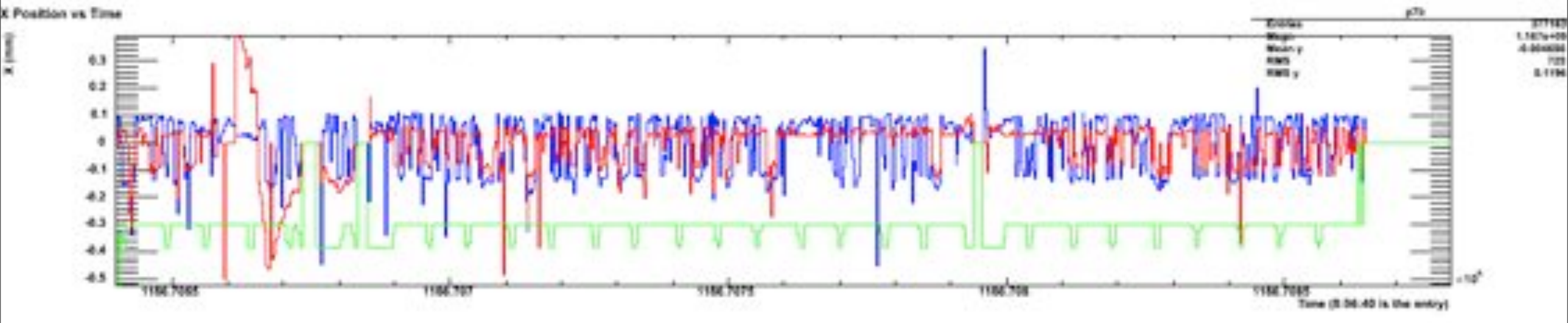
there are ~4 EPIC entries per bin in this histogram. This translates to ~8 seconds

picture above ends around here

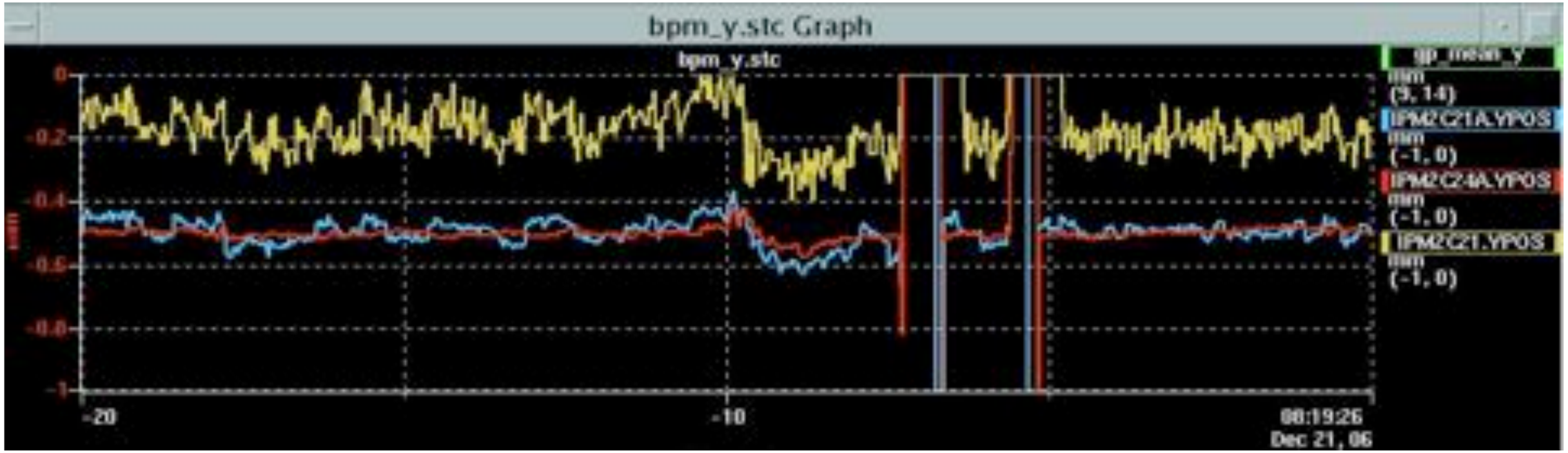
These regions are examples of a beam trip, yet the current appears to be fine

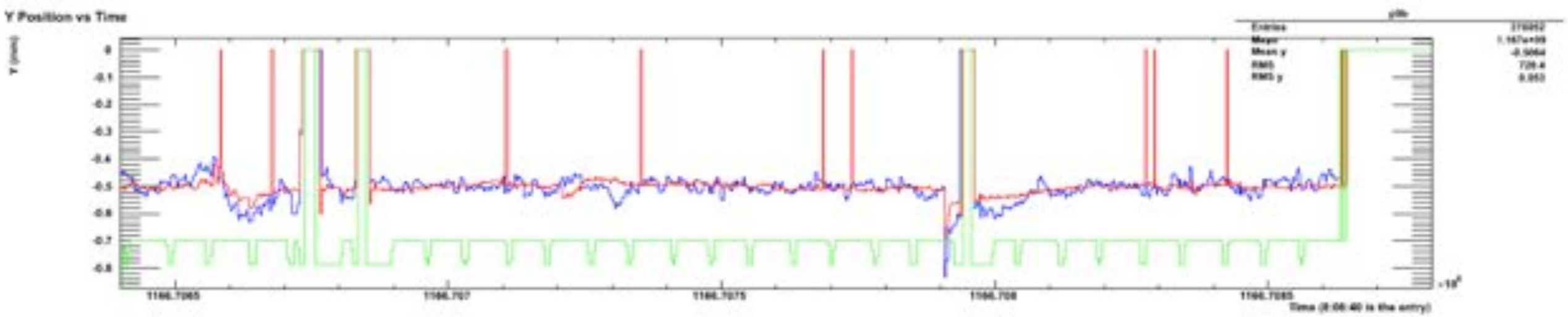
Blue: IPM2C21A
Red: IPM2C24A
Green: Trip Flag (good= -0.3, bad=- 0.4)
If value is 0: there is no information because these are only events from my reaction $\gamma d \rightarrow K^0 \Lambda p$

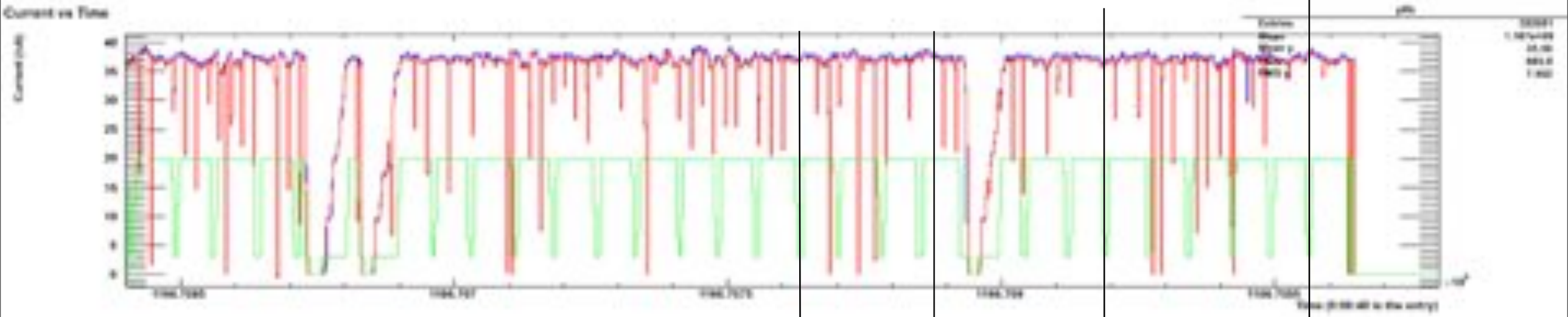




Blue: IPM2C21A
Red: IPM2C24A
Green: Trip Flag (good= -0.7, bad=- 0.8)
If value is 0: there is no information because these are only events from my reaction $\gamma d \rightarrow K^0 \Lambda p$






Current vs Time
Current (mA)
X Position vs Time
X (mm)
Y Position vs Time
Y (mm)

- Appears to be regions where data is labeled incorrectly
- I've only looked at this 1 run
- Need to better understand how the trip flag is assigned
- Expand to all my data
- Look at all triggered events and not just KΛ events