Issues in data 6-12 Sep.

Issues recently discovered in CLEAR's data

- Digitizers' saturation for some of the channels, especially when vertical scale was set to minimize the ADC error
- Acquisition lauched twice on day 8 from 17:20 for '30 min
- Beam characteristics have not *always* measured on the YAG keeping the same spec.s - e.g. the beam width during irradiation with train charge 10nC/train has been measured with lower bunch number on the screen.
- Different horizontal time scales among different channels, within the same digitizer
- Timing issue in the bergoz charge data (or in the digitizers) - not understood the reason. This occurs most frequently on files saved day 7 and much less on day 8
- Last irradiation with highest dose rates required to decrease the HV in order not to saturate the digitizers. This means that to compare the ratio signal/beam one has to correct with CCE calibration at the end of the day (took a few minutes later)

Strategy and solutions

- Tagging algorithm to detect digitizer's saturation and flag 'issued' datapoints
- Comparison of detector/beam correlation functions among different acquisition can show synchronization issues related with bad timing. Diagnostic function (inspectFile_syncWaveform) developed

News in the analysis software

- Fixed a bug in the synch algorithm (synch was shifted 1 trigger left)
- More robust synchronization algorithm performing synchronization on all dgt. Channels!

Lessons for the future

- Acquisition system which saves calibrated data both in horizontal (time) and vertical (voltage) scales
  - Check calibration with test signals at the beginning and end of the experiment
- Online monitoring system capable of detecting missing shots
- Online monitoring system capable of detecting digitizers (FERS) saturation
- Online monitoring system with raw synchronization algorithm implemented – e.g. capable to detect missing shots or issues in data taking *on site*
- Check beam parameters more often
- Try to find a way to gather SYNCHRONIZED data from the beginning – i.e. using JAPC
- Online plotting of the correlation function between acquired data and beam charge – this is of fundamental importance to detect timing issues in data acquisition of the Bergoz charge!

8th September

- 8

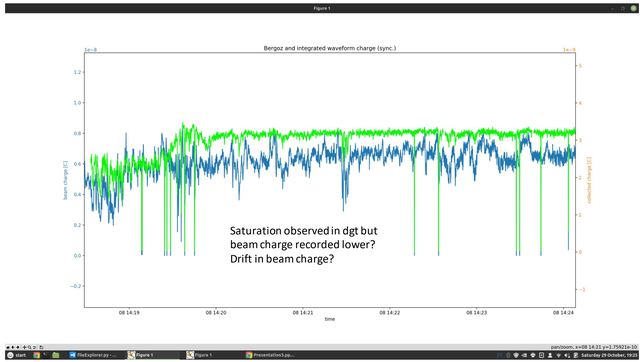


Figure 1
Bergoz and integrated waveform charge (sync.)
1e−8
1e−4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
5
4
3
2
1
0
−1
beam charge [C]
collected charge [C]
Saturation observed in dgt but
beam charge recorded lower?
Drift in beam charge?
08 14:19
08 14:20
08 14:21
08 14:22
08 14:23
08 14:24
time
pan/zoom, x=08 14:21 y=1.75921e-10
start
FileExplorer.py - ...
Figure 1
Figure 1
Presentation1.pp...
Saturday 29 October, 19:21

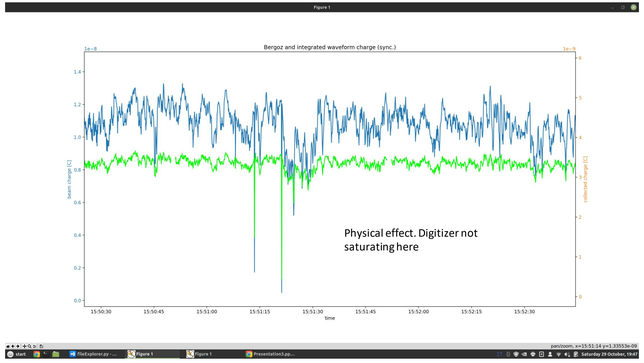


Figure 1
Bergoz and integrated waveform charge (sync.)
1e−8
1e−4
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6
5
4
3
2
1
0
Beam charge [C]
Waveform charge [C]
15:50:30
15:50:45
15:51:00
15:51:15
15:51:30
15:51:45
15:52:00
15:52:15
15:52:30
time
Physical effect. Digitizer not saturating here
pan/zoom, x=15:51:14 y=1.33553e-09
start
FileExplorer.py -...
Figure 1
Figure 1
Presentation1.pp...
Saturday 29 October, 19:47

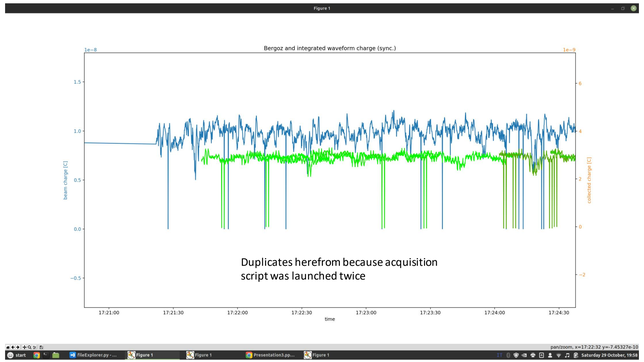
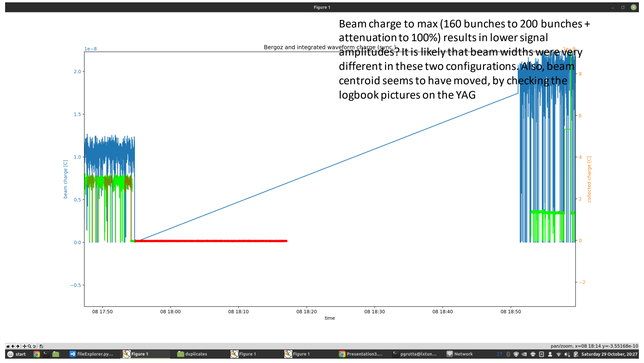
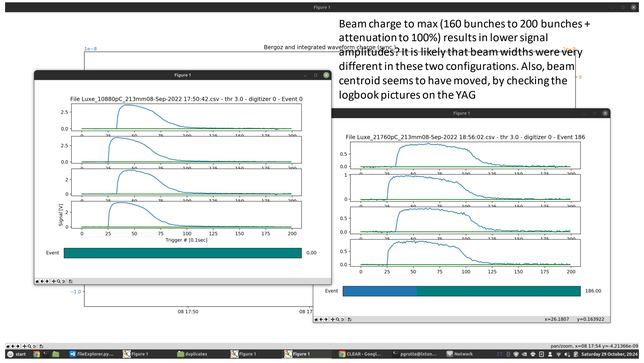


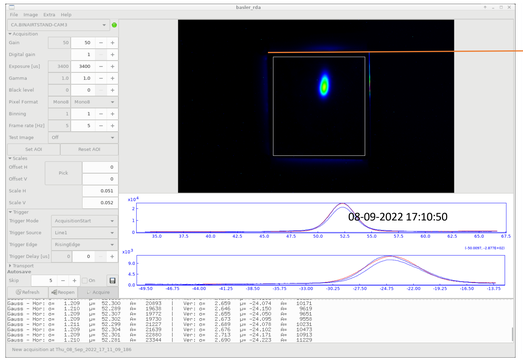
Figure 1
Bergoz and integrated waveform charge (sync.)
1e−8
1e−4
1.5
1.0
0.5
0.0
−0.5
beam charge [C]
4
2
0
−2
collected charge [C]
Duplicates herefrom because acquisition
script was launched twice
17:21:00
17:21:30
17:22:00
17:22:30
17:23:00
17:23:30
17:24:00
17:24:30
time
panzoom, x=17:22:32 y=-7.453274e-10
start
FileExplorer.py - ...
Figure 1
Figure 1
Presentation1.po...
Figure 1
Saturday 29 October, 19:04

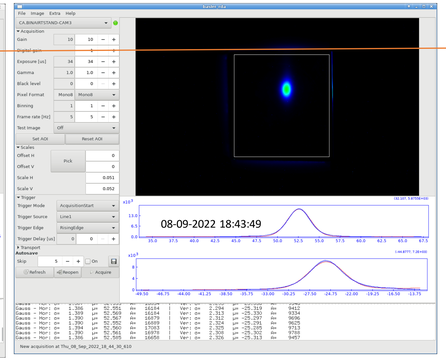


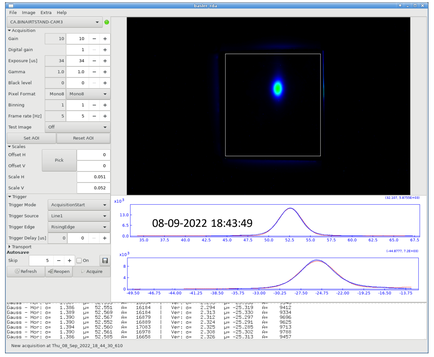
Beam charge to max (160 bunches to 200 bunches + attenuation to 100%) results in lower signal amplitudes? It is likely that beam widths were very different in these two configurations. Also, beam centroid seems to have moved, by checking the logbook pictures on the YAG

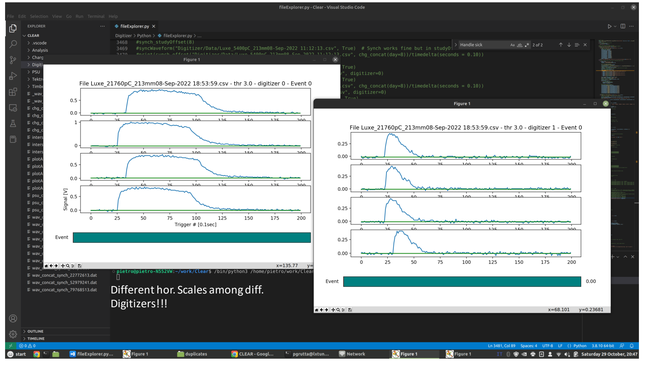


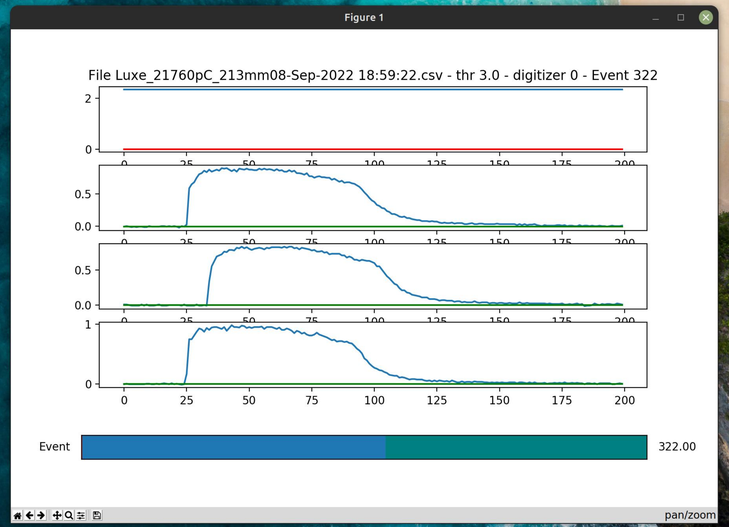
Beam charge to max (160 bunches to 200 bunches + attenuation to 100%) results in lower signal amplitudes? ~~It is likely that beam widths were very~~ different in these two configurations. Also, beam centroid seems to have moved, by checking the logbook pictures on the YAG


basler_rda
File Image Extra Help
CA_BINARTSTAND-CAM3
Acquisition
Gain 50
Digital gain 1
Exposure [us] 3400
Gamma 1.0
Black level 0
Pixel Format Mono8
Binning 1
Frame rate [Hz] 5
Test Image Off
Set AOI
Reset AOI
Scales
Offset H
Offset V
Scale H 0.051
Scale V 0.052
Pick
Trigger
Trigger Mode AcquisitionStart
Trigger Source Line1
Trigger Edge RisingEdge
Trigger Delay [us] 0
Transport
Autosave
Skip 5
On
Refresh
Reopen
Acquire
08-09-2022 17:10:50
Gauss - Mo= 0= 1.209 µ= 52.350 A= 20693 | Ver= 0= 2.659 µ= -24.074 A= 10171
Gauss - Mo= 0= 1.213 µ= 52.298 A= 19630 | Ver= 0= 2.646 µ= -24.150 A= 9619
Gauss - Mo= 0= 1.209 µ= 52.307 A= 19772 | Ver= 0= 2.605 µ= -24.050 A= 9651
Gauss - Mo= 0= 1.208 µ= 52.302 A= 19730 | Ver= 0= 2.673 µ= -24.095 A= 9556
Gauss - Mo= 0= 1.211 µ= 52.299 A= 21227 | Ver= 0= 2.689 µ= -24.076 A= 10231
Gauss - Mo= 0= 1.209 µ= 52.301 A= 21227 | Ver= 0= 2.713 µ= -24.171 A= 10231
Gauss - Mo= 0= 1.209 µ= 52.301 A= 21993 | Ver= 0= 2.713 µ= -24.171 A= 10913
Gauss - Mo= 0= 1.210 µ= 52.291 A= 23344 | Ver= 0= 2.690 µ= -24.223 A= 11229
New acquisition at Thu_08_Sep_2022_17_11_09_186


basler_rda
File Image Extra Help
CA_BINARTSTAND-CAM3
Acquisition
Gain 10
Digital gain 1
Exposure [us] 34
Gamma 1.0
Black level 0
Pixel Format Mono8
Binning 1
Frame rate [Hz] 5
Test Image Off
Set AOI
Reset AOI
Scales
Offset H
Offset V
Scale H 0.051
Scale V 0.052
Pick
Trigger
Trigger Mode AcquisitionStart
Trigger Source Line1
Trigger Edge RisingEdge
Trigger Delay [us] 0
Transport
Autosave
Skip 5
On
Refresh
Reopen
Acquire
08-09-2022 18:43:49
Gauss - Mo= 0= 1.396 µ= 52.351 A= 16184 | Ver= 0= 2.194 µ= -25.318 A= 9412
Gauss - Mo= 0= 1.389 µ= 52.369 A= 16184 | Ver= 0= 2.313 µ= -25.330 A= 9334
Gauss - Mo= 0= 1.390 µ= 52.367 A= 16878 | Ver= 0= 2.312 µ= -25.297 A= 9696
Gauss - Mo= 0= 1.394 µ= 52.360 A= 16878 | Ver= 0= 2.326 µ= -25.296 A= 9713
Gauss - Mo= 0= 1.394 µ= 52.360 A= 17083 | Ver= 0= 2.329 µ= -25.301 A= 9713
Gauss - Mo= 0= 1.390 µ= 52.361 A= 16973 | Ver= 0= 2.308 µ= -25.302 A= 9760
Gauss - Mo= 0= 1.396 µ= 52.369 A= 16656 | Ver= 0= 2.326 µ= -25.313 A= 9457
New acquisition at Thu_08_Sep_2022_18_44_30_410


Basler ride
File Image Extra Help
CA_BINARITSTAND-CAM1
Acquisition
Gain 10
Digital gain 1
Exposure [us] 34
Gamma 1.0
Black level 0
Pixel Format Mono8
Binning 1
Frame rate [Hz] 5
Test Image Off
Set AOI
Reset AOI
Scales
Offset H
Offset V
Pick
Scale H 0.051
Scale V 0.052
Trigger
Trigger Mode AcquisitionStart
Trigger Source Line1
Trigger Edge RisingEdge
Trigger Delay [us] 0
Transport
Autosave
Skip 5
On
Refresh
Reopen
Acquire
08-09-2022 18:43:49
Gauss - Mor: a= 1.366 µ= 52.551 dx 16184 | Ver: a= 2.294 µ= -25.310 dx 9412
Gauss - Mor: a= 1.369 µ= 52.569 dx 16154 | Ver: a= 2.313 µ= -25.330 dx 9334
Gauss - Mor: a= 1.390 µ= 52.560 dx 16159 | Ver: a= 2.314 µ= -25.291 dx 9625
Gauss - Mor: a= 1.390 µ= 52.552 dx 16099 | Ver: a= 2.314 µ= -25.291 dx 9625
Gauss - Mor: a= 1.394 µ= 52.560 dx 17083 | Ver: a= 2.325 µ= -25.195 dx 9713
Gauss - Mor: a= 1.396 µ= 52.569 dx 16970 | Ver: a= 2.326 µ= -25.301 dx 9289
Gauss - Mor: a= 1.396 µ= 52.565 dx 16650 | Ver: a= 2.326 µ= -25.313 dx 9407
New acquisition at Thu_08_Sep_2022_18_44_30_810

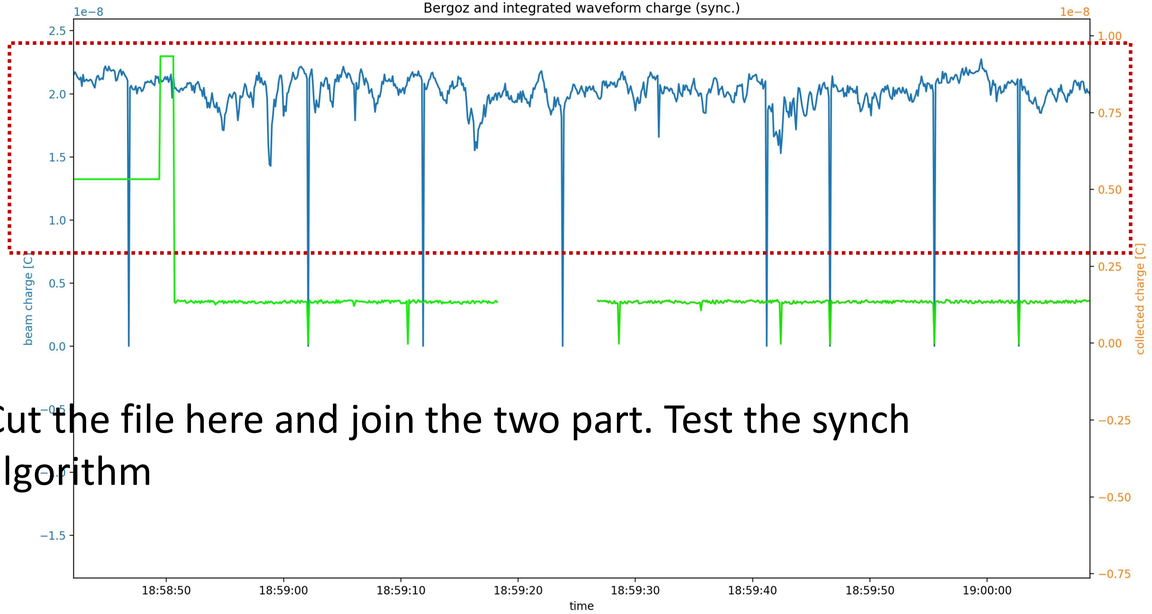

File Luxe_21760pC_213mm08-Sep-2022 18:53:59.csv - thr 3.0 - digitizer 0 - Event 0
Signal [V]
Trigger # [0.1sec]
Event
File Luxe_21760pC_213mm08-Sep-2022 18:53:59.csv - thr 3.0 - digitizer 1 - Event 0
Signal [V]
Trigger # [0.1sec]
Event
Different hor. Scales among diff.
Digitizers!!!



Saturation at 18:58 means 1V scale. Digitizer setting were changed channel by channel for some reasons. For a brief moment, the digitizer full scale reached 2V in ch1 dgt0 at 18:58:50. Why?

fileExplorer.py - Clear - Visual Studio Code

Figure 1



Cut the file here and join the two part. Test the synch algorithm

pan/zoom, x=18:59:58 y=-5.13611e-09

OUTLINE

TIMELINE

Offset is -81

Python

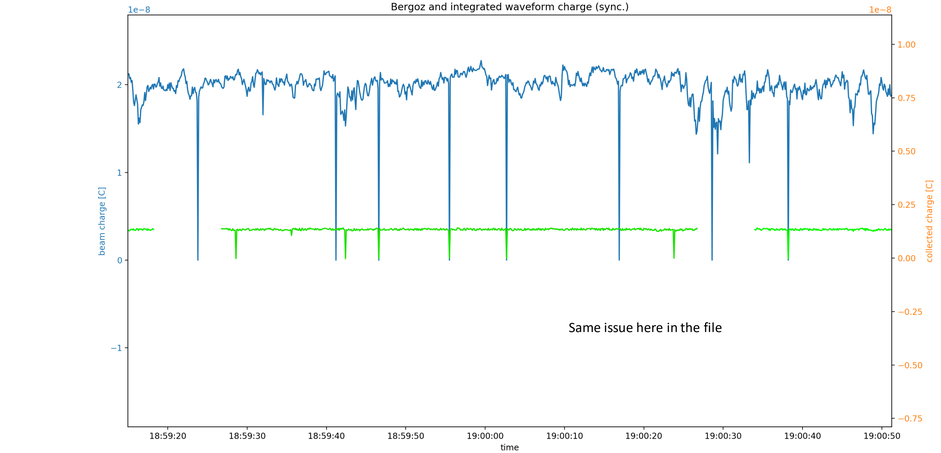
python3

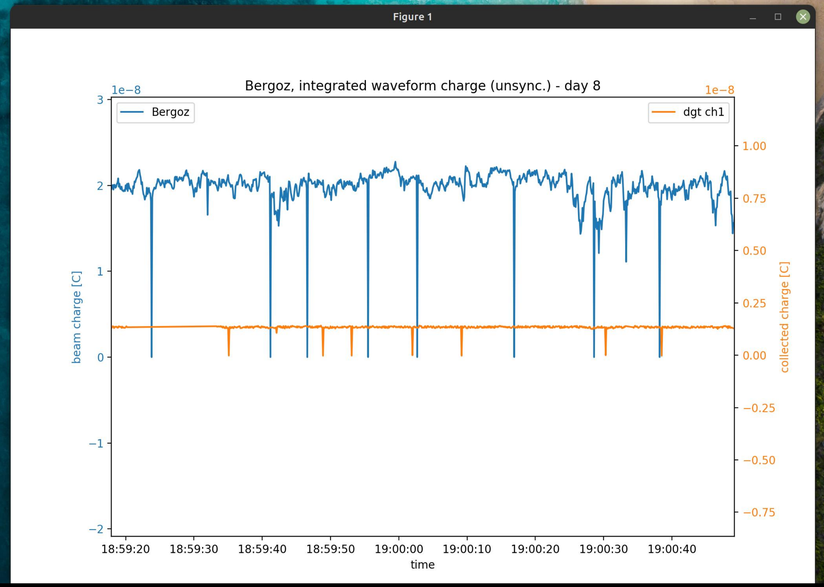
bash

Ln 3484, Col 72 Spaces: 4 UTF-8 LF Python 3.8.10 64-bit

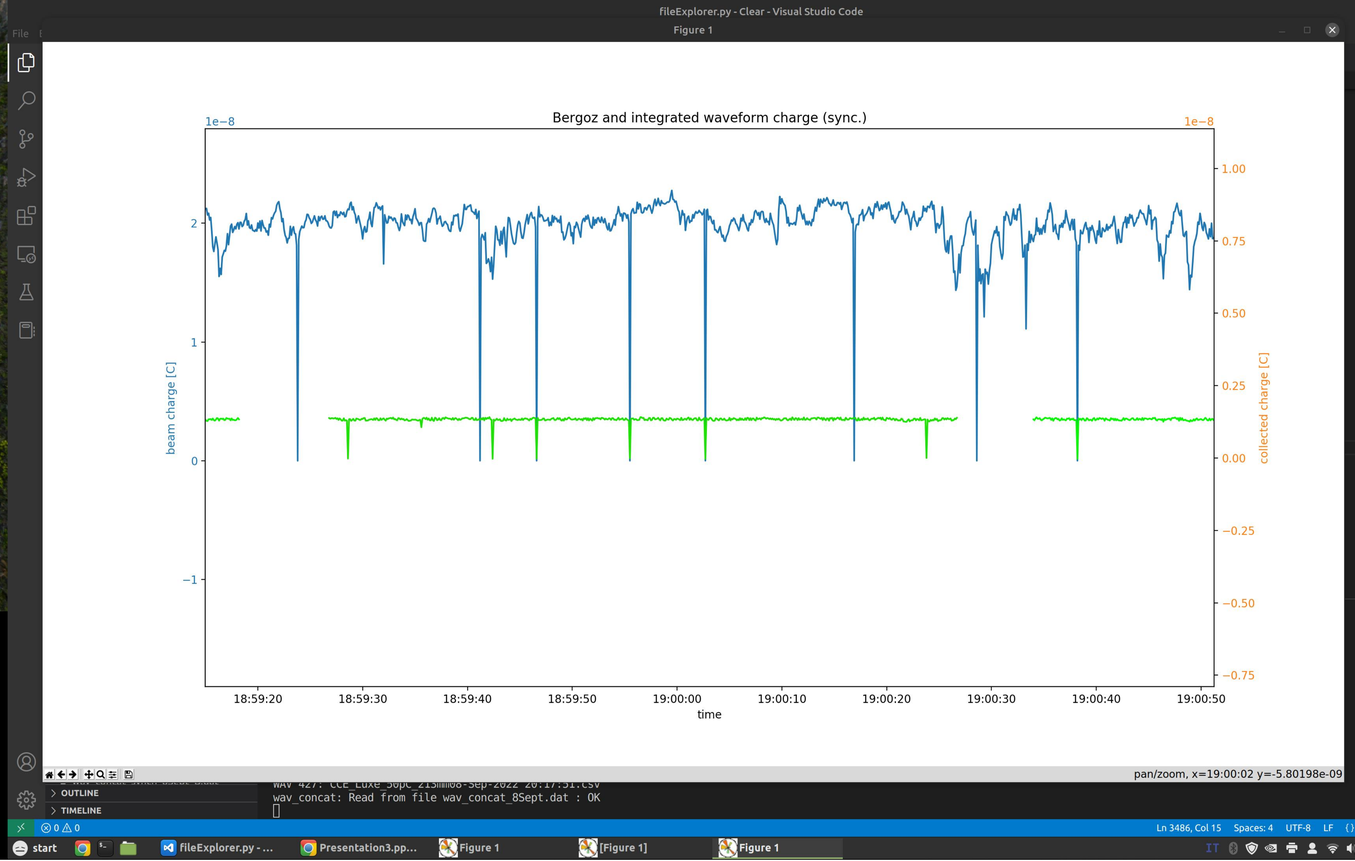
start fileExplorer.py - ... [Presentation3.p... Figure 1 Figure 1

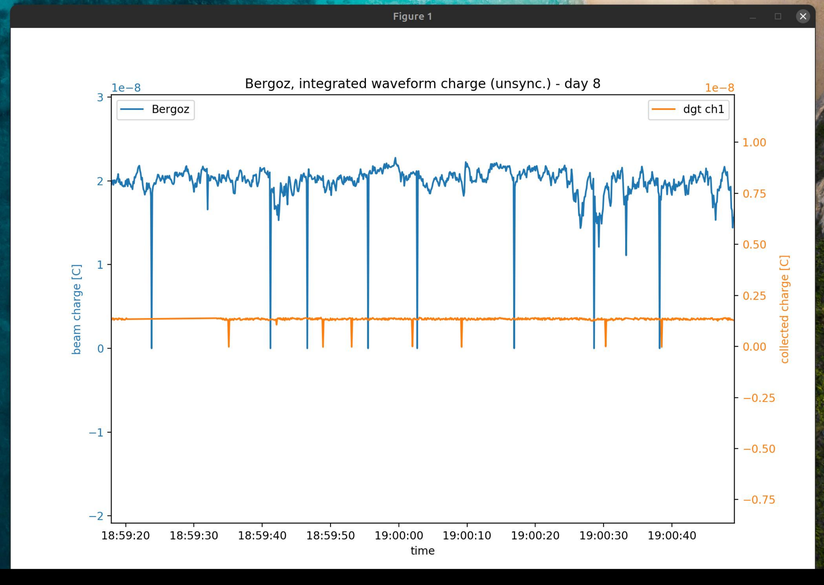
Sunday 30 October, 13


Bergoz and integrated waveform charge (sync.)
1e−8
1e−8
beam charge [C]
collected charge [C]
2
1
0
−1
1.00
0.75
0.50
0.25
0.00
−0.25
−0.50
−0.75
Same issue here in the file
18:59:20
18:59:30
18:59:40
18:59:50
19:00:00
19:00:10
19:00:20
19:00:30
19:00:40
19:00:50
time
pan/zoom, x=19:00:05 y=-4.3[202e-09

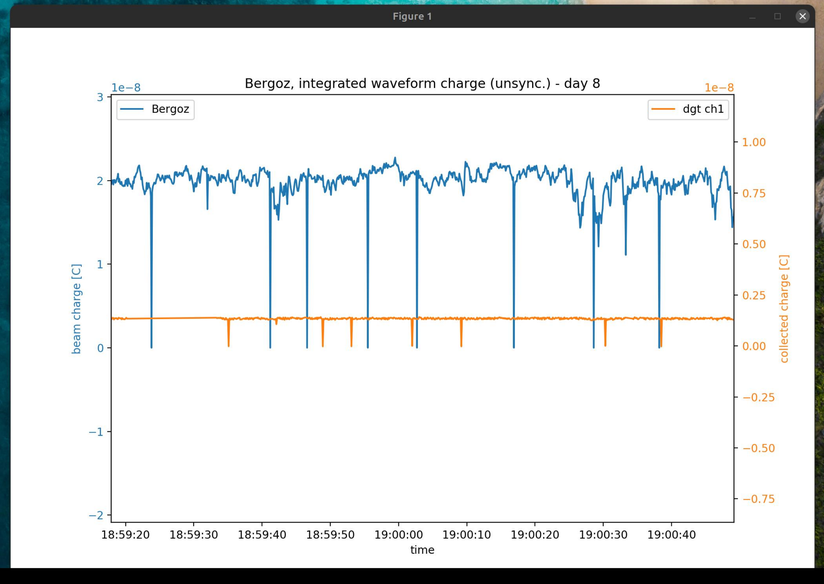


Not an issue of the synchronization algorithm: it doesn't change time scales anyway...





Different acquisition rate? Maybe the bergoz?



The time attached to each bergoz data point is calculated by the initial time recorded in the file. This because the timestamps attached to each charge measure are completely unrealiable since they are local times of the computer (e.g. between one shot and another there is no fixed 0.1sec difference). Therefore it may have occurred that a very long irradiation.dat bergoz datafile containing missing shots and this causes timing to be wrong in some cases. However, this should preserve the fact that between one shot and another there is always 0.1 sec time delay.

fileExplorer.py - Clear - Visual Studio Code

File Edit Selection View Go Run Terminal Help

EXPLORER

CLEAR

Luxe_Charge_Scan_219mm09-Sep-2022 15:16:08.csv
Luxe_Charge_Scan_219mm09-Sep-2022 15:17:09.csv
Luxe_Charge_Scan_219mm09-Sep-2022 15:18:11.csv
Luxe_Charge_Scan_219mm09-Sep-2022 15:19:12.csv
Luxe_Charge_Scan_219mm09-Sep-2022 16:10:05.csv
Luxe_Charge_Scan_219mm09-Sep-2022 16:11:06.csv
Luxe_Charge_Scan_219mm09-Sep-2022 16:12:07.csv
Luxe_Charge_Scan_219mm09-Sep-2022 16:14:11.csv
Luxe_Charge_Scan_219mm09-Sep-2022 16:15:12.csv
Luxe_Charge_Scan_219mm09-Sep-2022 16:16:13.csv
Luxe_Charge_Scan_219mm09-Sep-2022 16:17:14.csv
Luxe_Charge_Scan_219mm09-Sep-2022 16:18:16.csv
Luxe_Charge_Scan_219mm09-Sep-2022 16:19:19.csv
Luxe_Charge_Scan_219mm09-Sep-2022 16:20:20.csv
Luxe_Charge_Scan_219mm09-Sep-2022 16:21:21.csv
Luxe_Charge_Scan_219mm09-Sep-2022 16:22:23.csv
Luxe_Charge_Scan_219mm09-Sep-2022 16:23:24.csv
Luxe_Charge_Scan_219mm09-Sep-2022 16:24:25.csv

Python
fileExplorer.py
notebook.ipynb
test.py
Scripts
6SeptList.txt
7SeptList.txt
8SeptList_excludedfromIrratiation.txt
8SeptList.txt
PSU
Tektronix
Timber
_wav_concat_synch_append_7Sept.dat
_wav_concat_synch_append_8Sept.dat
chg_concat_6Sept.dat
chg_concat_7Sept.dat
chg_concat_8Sept.dat
chg_concat_9Sept.dat
intersectAndDivide_7Sept.dat
intersectAndDivide_8Sept.dat
intersectAndDivide_9Sept.dat

OUTLINE
TIMELINE

fileExplorer.py

Digitizer > Python > fileExplorer.py > _core_readDATFile

```
349 def _core_readDATFile(fname = "Charge/Data/Irradition_160_1700pC_211mm.dat", unit = 1e-12) -> list:
350     # Handle file Irradition_160_2700pC_211mm_4.dat
351     if fname == "Charge/Data/Irradition_160_2700pC_211mm_4.dat":
352         unit = 0.5*unit
353
354     timeData = []
355     chargeData = []
356     with open(fname, mode='r') as infile:
357         tpm = infile.readline()
358         #print()
359         reader = csv.reader(infile, quoting=csv.QUOTE_NONNUMERIC, delimiter=' ')
360         data = list(reader)
361
362         unixtime = data[0][1]
363         startTime = datetime.fromtimestamp(unixtime)
364         startTime -= timedelta(microseconds=startTime.microsecond)
365         #print(f"startTime: {startTime:%d-%m %H:%M:%S.%f}")
366
367
368         i=0
369         for row in data:
370             time = startTime + timedelta(seconds=i*0.1)
371             timeData.append(time)
372             chargeData.append(2.0*row[2]*unit)
373             #if(2.0*row[2]*unit < 1.5e-9):
374             #    print(fname, i, time.timestamp(), 2.0*row[2]*unit)
375             #    exit()
376             i+=1
377             #print(f"time {time}")
378     return [timeData, chargeData]
379
380
381 ##### PSU PART ##############################################################################
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

```
WAV 366: Luxe_21760pC_213mm08-Sep-2022 18:59:22.csv
WAV 367: Luxe_21760pC_213mm08-Sep-2022 19:00:35.csv
WAV 368: Luxe_21760pC_213mm08-Sep-2022 19:01:36.csv
WAV 369: Luxe_21760pC_213mm08-Sep-2022 19:02:44.csv
WAV 370: Luxe_21760pC_213mm08-Sep-2022 19:03:46.csv
WAV 371: Luxe_21760pC_213mm08-Sep-2022 19:04:47.csv
WAV 372: Luxe_21760pC_213mm08-Sep-2022 19:05:48.csv
WAV 373: Luxe_21760pC_213mm08-Sep-2022 19:06:49.csv
WAV 374: Luxe_21760pC_213mm08-Sep-2022 19:07:51.csv
WAV 375: Luxe_21760pC_213mm08-Sep-2022 19:08:52.csv
WAV 376: Luxe_21760pC_213mm08-Sep-2022 19:09:53.csv
WAV 377: Luxe_21760pC_213mm08-Sep-2022 19:10:54.csv
WAV 378: Luxe_21760pC_213mm08-Sep-2022 19:11:55.csv
WAV 379: Luxe_21760pC_213mm08-Sep-2022 19:12:57.csv
```

Python
python3
python3

0 0 Ln 368, Col 12 Spaces: 4 UTF-8 LF Python 3.8.10 64-bit

start fileExplorer.py - ... Presentation3.pp... Figure 1 Figure 1 Figure 1 Sunday 30 October, 13:44

Here for example the problem is not present anymore....so it is a isolated issue around 19:01:50 to 19:05:50

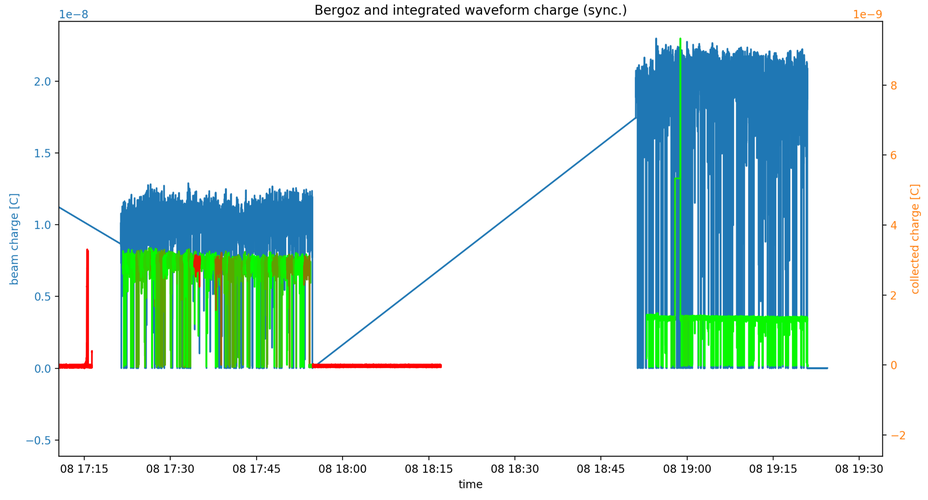


Figure 1
Bergoz and integrated waveform charge (sync.)
1e−8
1e−9
beam charge [C]
collected charge [C]
time
08 17:15
08 17:30
08 17:45
08 18:00
08 18:15
08 18:30
08 18:45
08 19:00
08 19:15
08 19:30
pan/zoom

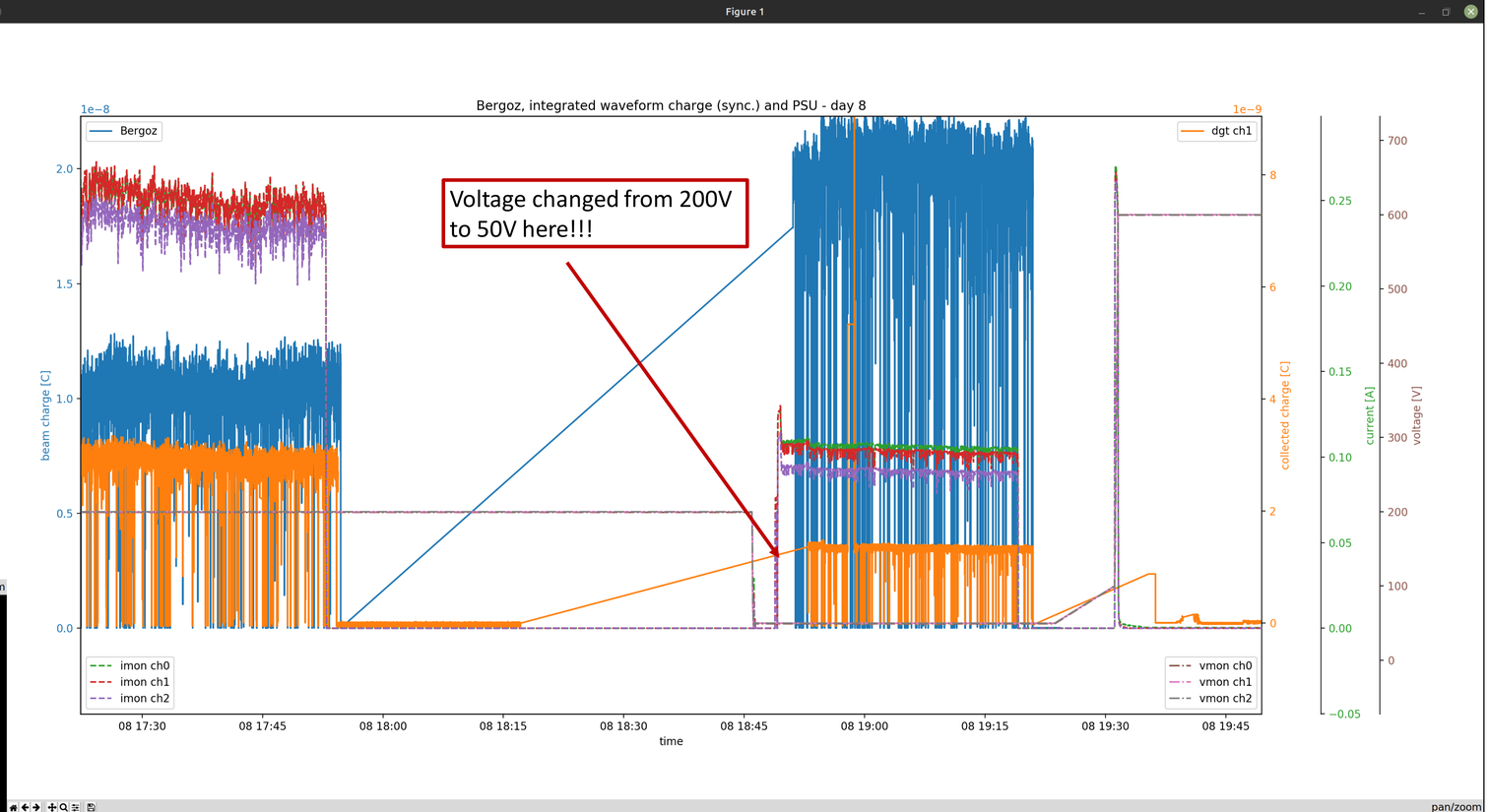


Figure 1
Bergoz, integrated waveform charge (sync.) and PSU - day 8
Voltage changed from 200V to 50V here!!!
Bergoz
dgt ch1
imon ch0
imon ch1
imon ch2
vmon ch0
vmon ch1
vmon ch2
beam charge [C]
collected charge [C]
current [A]
voltage [V]
time
08 17:30
08 17:45
08 18:00
08 18:15
08 18:30
08 18:45
08 19:00
08 19:15
08 19:30
08 19:45
pan/zoom
start
fileExplorer.py - ...
CLEAR - Google C...
Figure 1
Figure 1
Sunday 30 October, 16:10

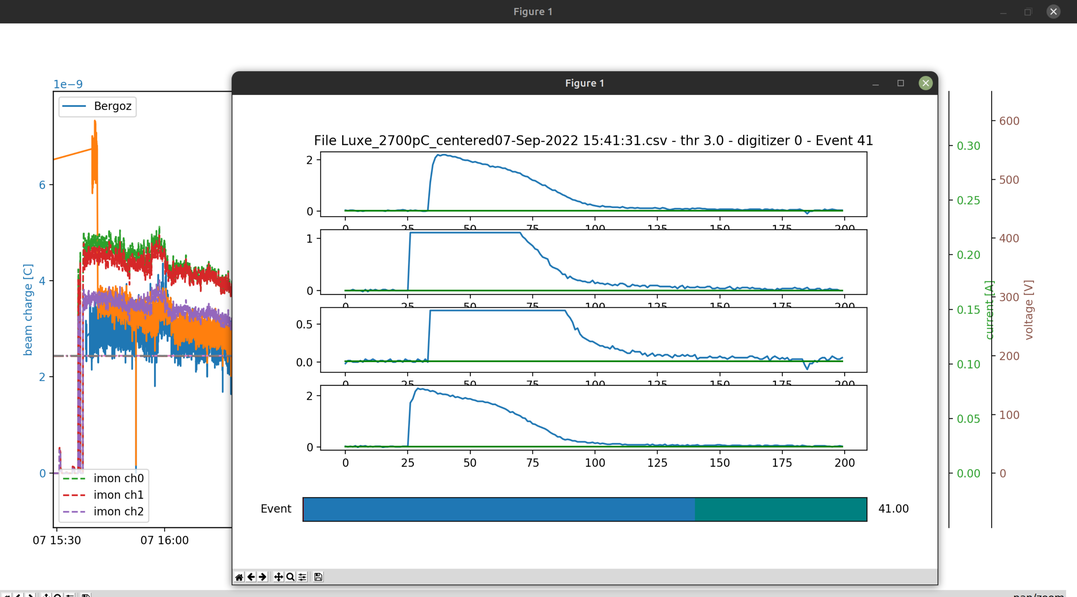


Figure 1
1e−9
Bergoz
beam charge [C]
imon ch0
imon ch1
imon ch2
07 15:30
07 16:00
Figure 1
File Luxe_2700pC_centered07-Sep-2022 15:41:31.csv - thr 3.0 - digitizer 0 - Event 41
current [A]
voltage [V]
Event
41.00
pan/zoom

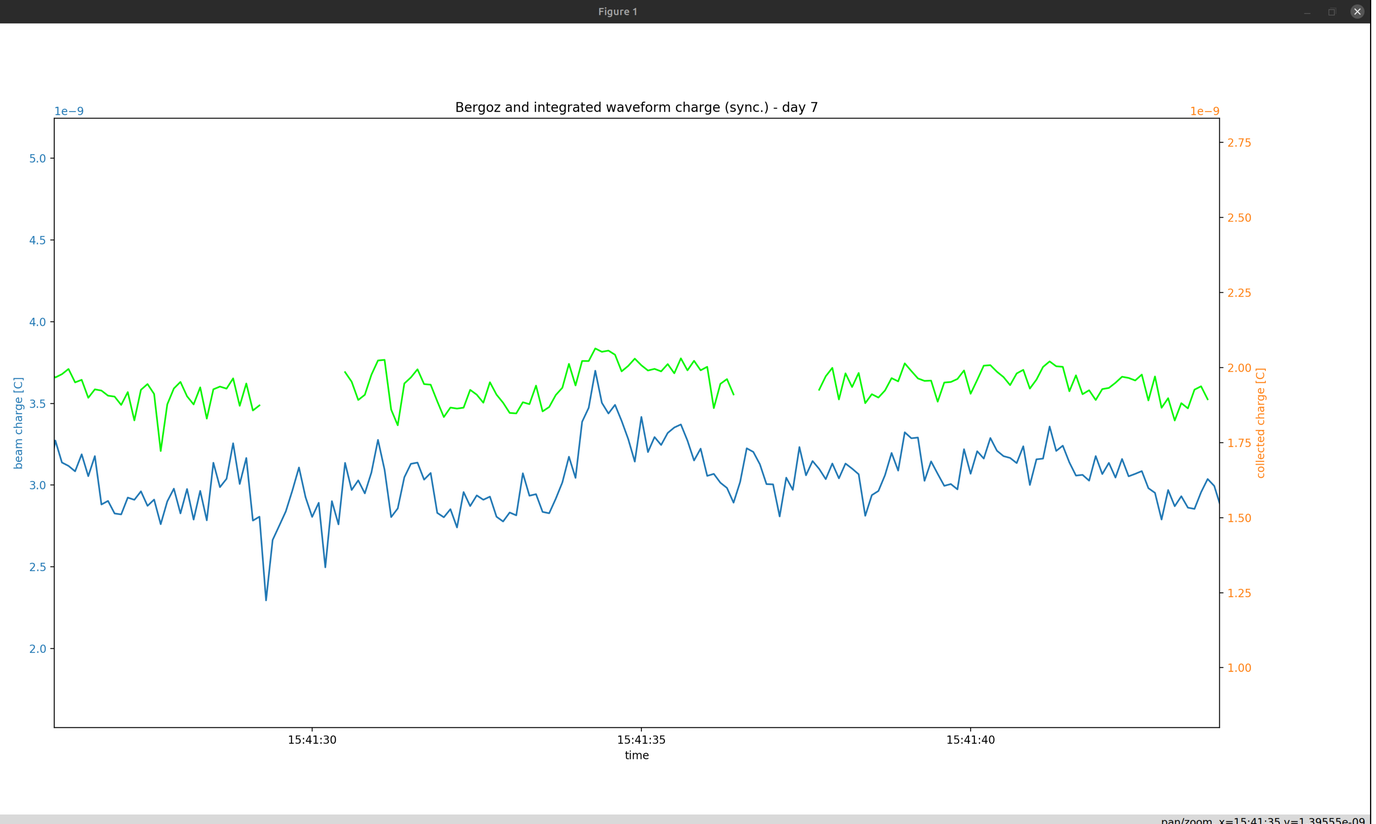
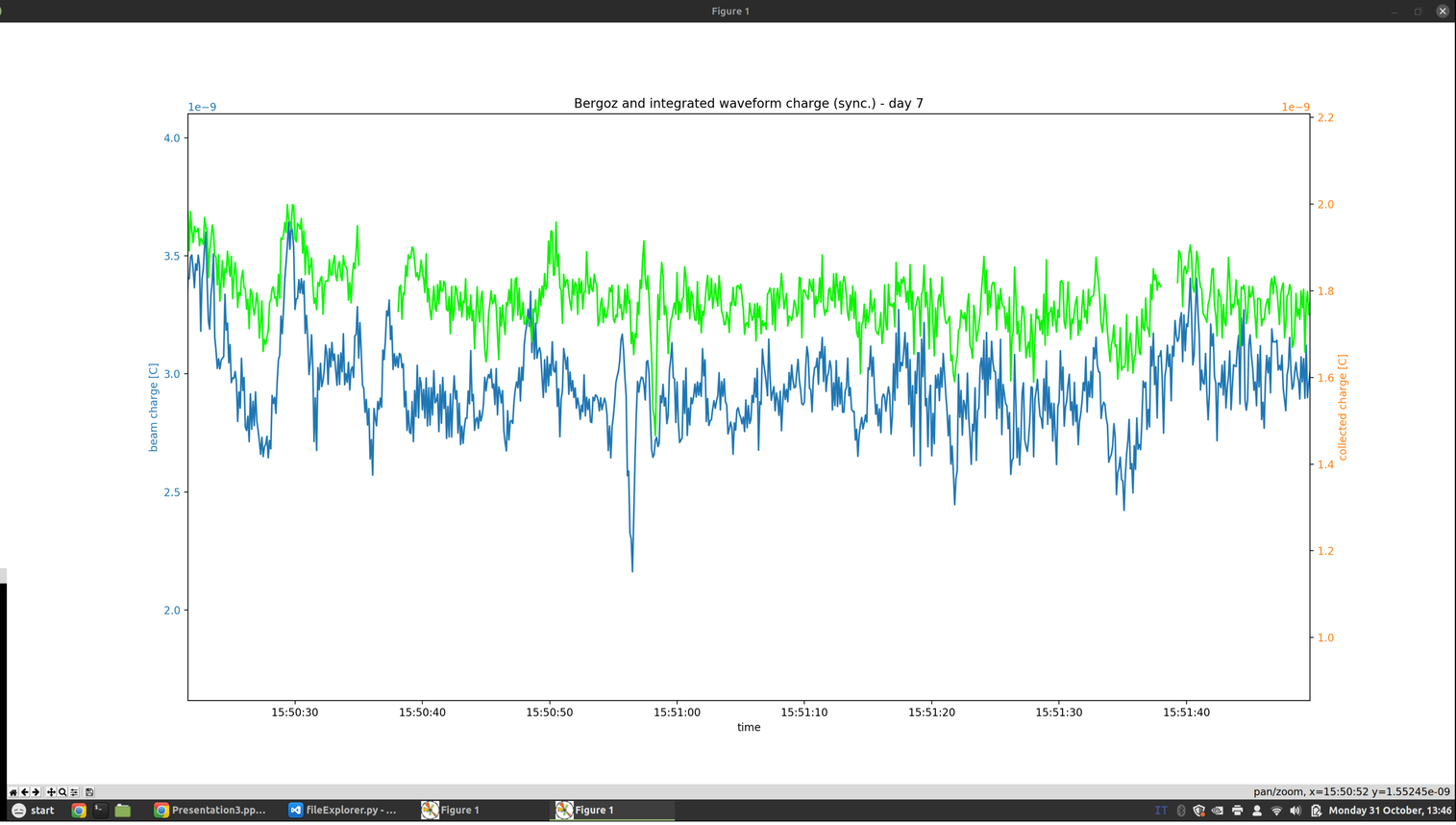
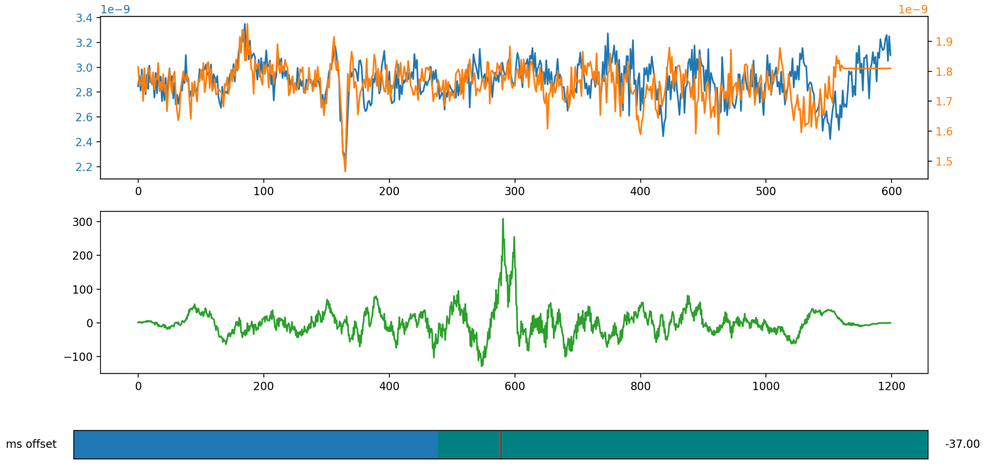


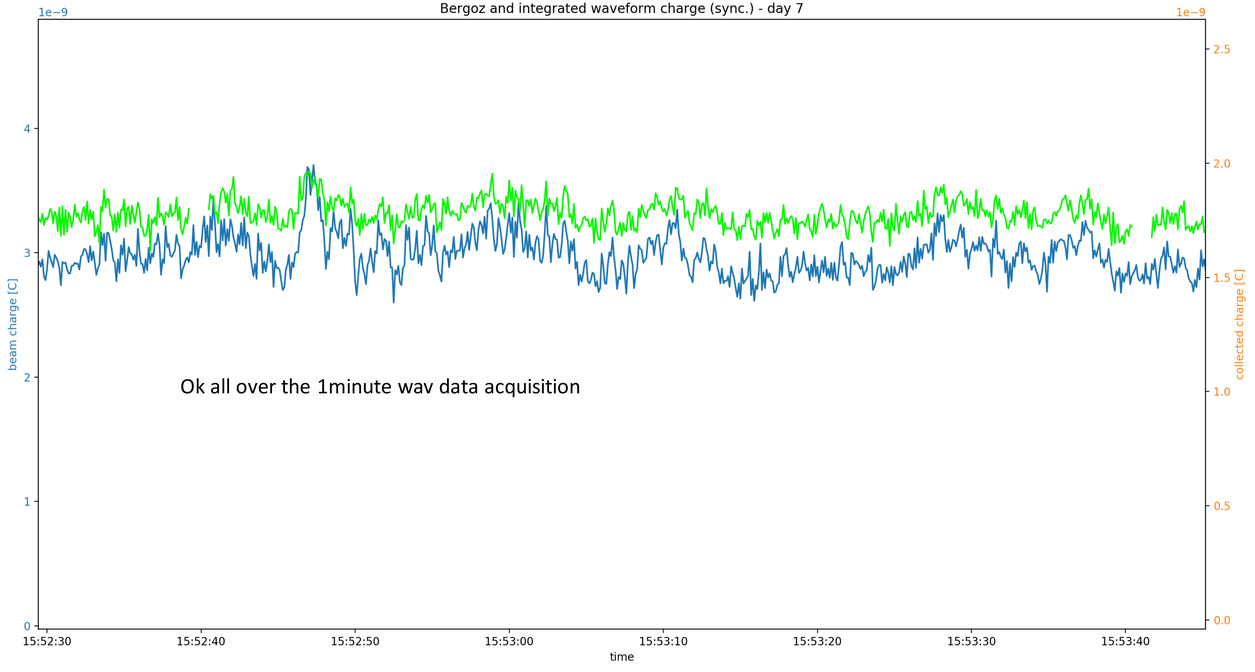
Figure 1
Bergoz and integrated waveform charge (sync.) - day 7
1e−9
beam charge [C]
1e−9
collected charge [C]
15:41:30
15:41:35
15:41:40
time
pan/zoom, x=15:41:35 y=1.39555e-09
start
fileExplorer.py - ...
[Presentation3.p...
Figure 1
Figure 1
Figure 1
Sunday 30 October, 16:34

This example shows that you can synch one part of the waveform but not in the entire range within the same file. This means that either the rate 10Hz of the digitizer or the rate of the Bergoz data is not truly 10Hz.

However, this is not always the case as shown in the next slide picture




1e−9
1e−9
3.4
3.2
3.0
2.8
2.6
2.4
2.2
1.9
1.8
1.7
1.6
1.5
0
100
200
300
400
500
600
300
200
100
0
−100
0
200
400
600
800
1000
1200
ms offset
-37.00


Bergoz and integrated waveform charge (sync.) - day 7
1e−9
1e−9
beam charge [C]
collected charge [C]
Ok all over the 1minute wav data acquisition
4
3
2
1
0
2.5
2.0
1.5
1.0
0.5
0.0
15:52:30
15:52:40
15:52:50
15:53:00
15:53:10
15:53:20
15:53:30
15:53:40
time

pan/zoom, x=15:53:01 y=1.93522e-10

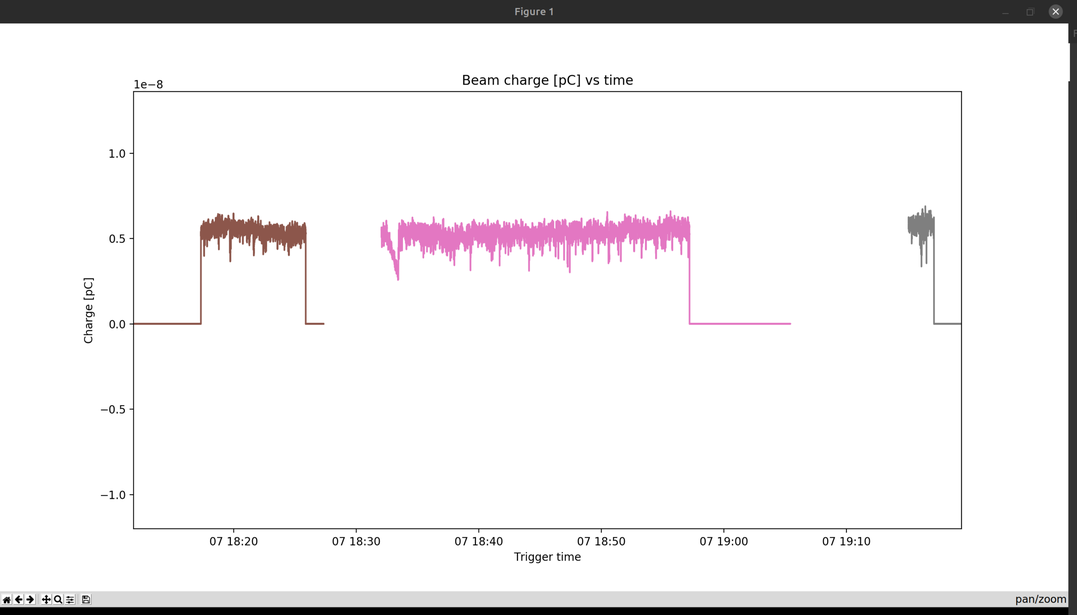


Figure 1
Beam charge [pC] vs time
1e−8
1.0
0.5
0.0
−0.5
−1.0
Charge [pC]
07 18:20
07 18:30
07 18:40
07 18:50
07 19:00
07 19:10
Trigger time
pan/zoom

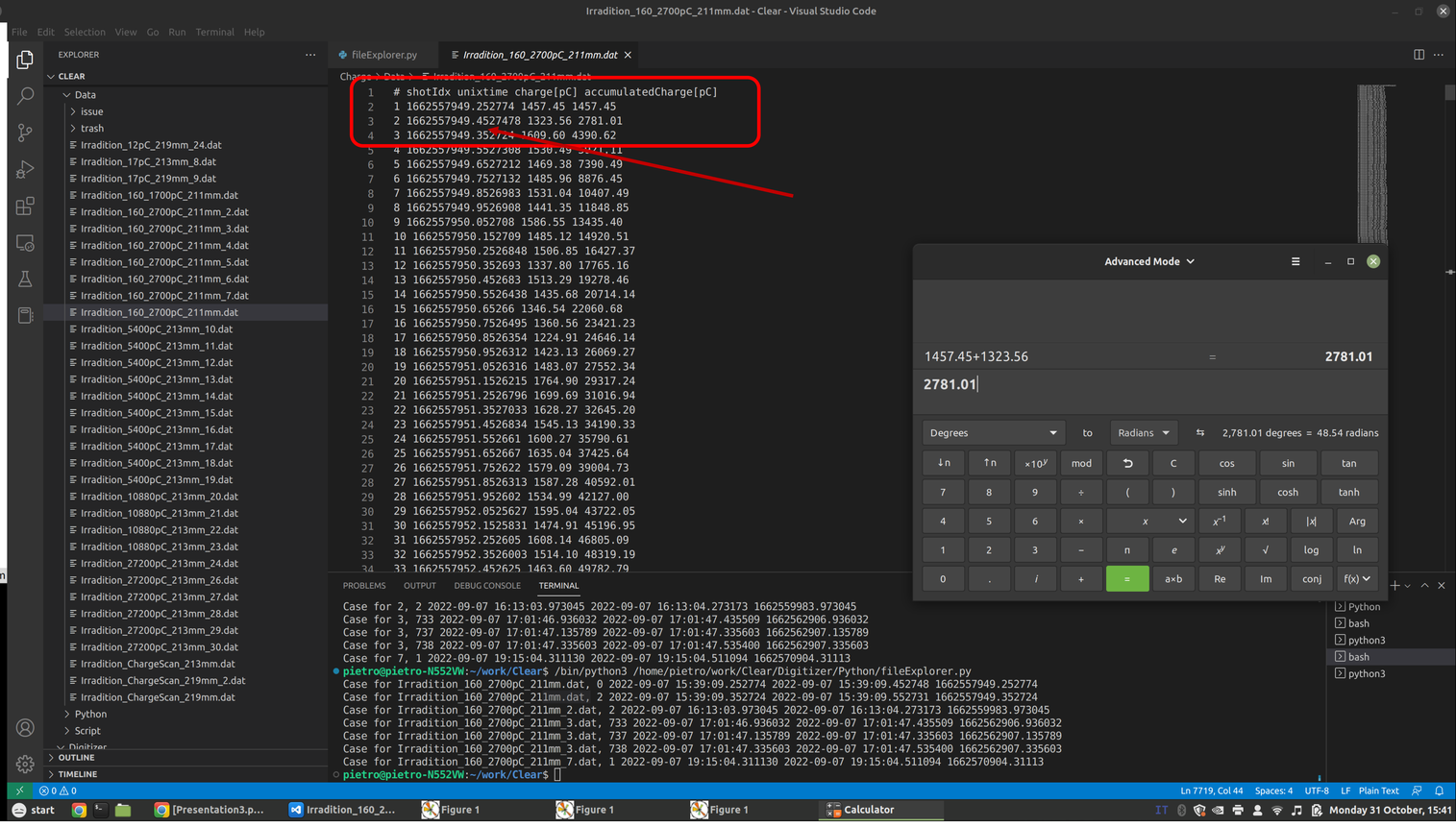
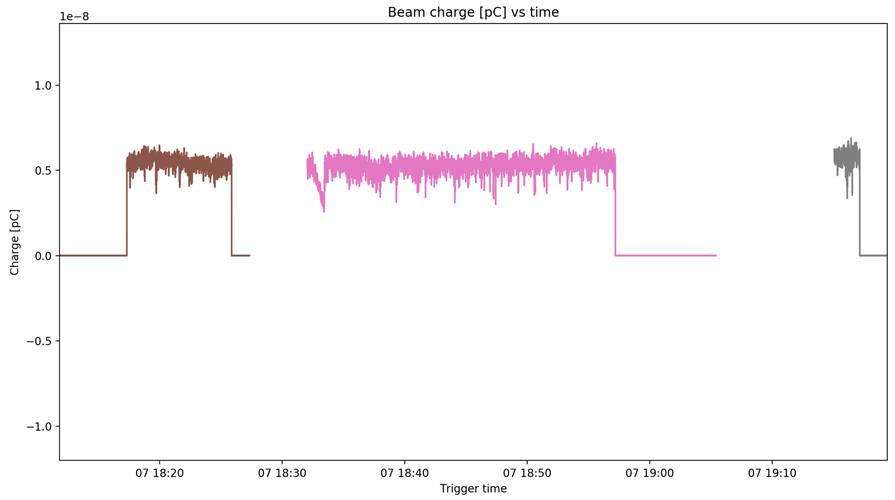

Irradition_160_2700pC_211mm.dat - Clear - Visual Studio Code
File Edit Selection View Go Run Terminal Help
EXPLORER
CLEAR
Data
issue
trash
Irradition_12pC_219mm_24.dat
Irradition_17pC_213mm_8.dat
Irradition_17pC_219mm_9.dat
Irradition_160_1700pC_211mm.dat
Irradition_160_2700pC_211mm_2.dat
Irradition_160_2700pC_211mm_3.dat
Irradition_160_2700pC_211mm_4.dat
Irradition_160_2700pC_211mm_5.dat
Irradition_160_2700pC_211mm_6.dat
Irradition_160_2700pC_211mm_7.dat
Irradition_160_2700pC_211mm.dat
Irradition_5400pC_213mm_10.dat
Irradition_5400pC_213mm_11.dat
Irradition_5400pC_213mm_12.dat
Irradition_5400pC_213mm_13.dat
Irradition_5400pC_213mm_14.dat
Irradition_5400pC_213mm_15.dat
Irradition_5400pC_213mm_16.dat
Irradition_5400pC_213mm_17.dat
Irradition_5400pC_213mm_18.dat
Irradition_5400pC_213mm_19.dat
Irradition_10880pC_213mm_20.dat
Irradition_10880pC_213mm_21.dat
Irradition_10880pC_213mm_22.dat
Irradition_10880pC_213mm_23.dat
Irradition_27200pC_213mm_24.dat
Irradition_27200pC_213mm_26.dat
Irradition_27200pC_213mm_27.dat
Irradition_27200pC_213mm_28.dat
Irradition_27200pC_213mm_29.dat
Irradition_27200pC_213mm_30.dat
Irradition_ChargeScan_213mm.dat
Irradition_ChargeScan_219mm_2.dat
Irradition_ChargeScan_219mm.dat
Python
Script
Digitizer
OUTLINE
TIMELINE
fileExplorer.py
Irradition_160_2700pC_211mm.dat
Charge > Data > Irradition_160_2700pC_211mm.dat
shotIdx unixtime charge[pC] accumulatedCharge[pC]
1 1662557949.252774 1457.45 1457.45
2 1662557949.4527478 1323.56 2781.01
3 1662557949.352724 1609.60 4390.62
4 1662557949.5527308 1530.49 5921.11
5 1662557949.6527212 1469.38 7390.49
6 1662557949.7527132 1485.96 8876.45
7 1662557949.8526983 1531.04 10407.49
8 1662557949.9526908 1441.35 11848.85
9 1662557950.052708 1586.55 13435.40
10 1662557950.152709 1485.12 14920.51
11 1662557950.2526848 1506.85 16427.37
12 1662557950.352693 1337.80 17765.16
13 1662557950.452683 1513.29 19278.46
14 1662557950.5526438 1435.68 20714.14
15 1662557950.65266 1346.54 22060.68
16 1662557950.7526495 1360.56 23421.23
17 1662557950.8526354 1224.91 24646.14
18 1662557950.9526312 1423.13 26069.27
19 1662557951.0526316 1483.07 27552.34
20 1662557951.1526215 1764.90 29317.24
21 1662557951.2526796 1699.69 31016.94
22 1662557951.3527033 1628.27 32645.20
23 1662557951.4526834 1545.13 34190.33
24 1662557951.552661 1600.27 35790.61
25 1662557951.652667 1635.04 37425.64
26 1662557951.752622 1579.09 39004.73
27 1662557951.8526313 1587.28 40592.01
28 1662557951.952602 1534.99 42127.00
29 1662557952.0525627 1595.04 43722.05
30 1662557952.1525831 1474.91 45196.95
31 1662557952.252605 1608.14 46805.09
32 1662557952.3526003 1514.10 48319.19
33 1662557952.452625 1463.60 49782.79
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL
Case for 2, 2 2022-09-07 16:13:03.973045 2022-09-07 16:13:04.273173 1662559983.973045
Case for 3, 733 2022-09-07 17:01:46.936032 2022-09-07 17:01:47.435509 1662562906.936032
Case for 3, 737 2022-09-07 17:01:47.135789 2022-09-07 17:01:47.335603 1662562907.135789
Case for 3, 738 2022-09-07 17:01:47.335603 2022-09-07 17:01:47.535400 1662562907.335603
Case for 7, 1 2022-09-07 19:15:04.311130 2022-09-07 19:15:04.511094 1662570904.31113
pietro@pietro-N552VW:~/work/Clear$ /bin/python3 /home/pietro/work/Clear/Digitizer/Python/fileExplorer.py
Case for Irradition_160_2700pC_211mm.dat, 0 2022-09-07 15:39:09.252774 2022-09-07 15:39:09.452748 1662557949.252774
Case for Irradition_160_2700pC_211mm.dat, 2 2022-09-07 15:39:09.352724 2022-09-07 15:39:09.552731 1662557949.352724
Case for Irradition_160_2700pC_211mm_2.dat, 2 2022-09-07 16:13:03.973045 2022-09-07 16:13:04.273173 1662559983.973045
Case for Irradition_160_2700pC_211mm_3.dat, 733 2022-09-07 17:01:46.936032 2022-09-07 17:01:47.435509 1662562906.936032
Case for Irradition_160_2700pC_211mm_3.dat, 737 2022-09-07 17:01:47.135789 2022-09-07 17:01:47.335603 1662562907.135789
Case for Irradition_160_2700pC_211mm_3.dat, 738 2022-09-07 17:01:47.335603 2022-09-07 17:01:47.535400 1662562907.335603
Case for Irradition_160_2700pC_211mm_7.dat, 1 2022-09-07 19:15:04.311130 2022-09-07 19:15:04.511094 1662570904.31113
pietro@pietro-N552VW:~/work/Clear$
Python
bash
python3
bash
python3
Advanced Mode
1457.45+1323.56 = 2781.01
2781.01
Degrees to Radians 2,781.01 degrees = 48.54 radians
Ln 7719, Col 44 Spaces: 4 UTF-8 LF Plain Text
start
[Presentation3.p...
Irradition_160_2...
Figure 1
Figure 1
Figure 1
Calculator
Monday 31 October, 15:41

Figure 1



pan/zoom

Irradition_160_2700pC_211mm_3.dat - Clear - Visual Studio Code

File Edit Selection View Go Run Terminal Help

EXPLORER

CLEAR

- Data
  - issue
  - trash
  - Irradition_12pC_219mm_24.dat
  - Irradition_17pC_213mm_8.dat
  - Irradition_17pC_219mm_9.dat
  - Irradition_160_1700pC_211mm.dat
  - Irradition_160_2700pC_211mm_2.dat
  - Irradition_160_2700pC_211mm_3.dat
  - Irradition_160_2700pC_211mm_4.dat
  - Irradition_160_2700pC_211mm_5.dat
  - Irradition_160_2700pC_211mm_6.dat
  - Irradition_160_2700pC_211mm_7.dat
  - Irradition_160_2700pC_211mm.dat
  - Irradition_5400pC_213mm_10.dat
  - Irradition_5400pC_213mm_11.dat
  - Irradition_5400pC_213mm_12.dat
  - Irradition_5400pC_213mm_13.dat
  - Irradition_5400pC_213mm_14.dat
  - Irradition_5400pC_213mm_15.dat
  - Irradition_5400pC_213mm_16.dat
  - Irradition_5400pC_213mm_17.dat
  - Irradition_5400pC_213mm_18.dat
  - Irradition_5400pC_213mm_19.dat
  - Irradition_10880pC_213mm_20.dat
  - Irradition_10880pC_213mm_21.dat
  - Irradition_10880pC_213mm_22.dat
  - Irradition_10880pC_213mm_23.dat
  - Irradition_27200pC_213mm_24.dat
  - Irradition_27200pC_213mm_26.dat
  - Irradition_27200pC_213mm_27.dat
  - Irradition_27200pC_213mm_28.dat
  - Irradition_27200pC_213mm_29.dat
  - Irradition_27200pC_213mm_30.dat
  - Irradition_ChargeScan_213mm.dat
  - Irradition_ChargeScan_219mm_2.dat
  - Irradition_ChargeScan_219mm.dat
- Python
- Script
  - chargeLoggerTool.py

OUTLINE

TIMELINE

fileExplorer.py | Irradition_160_2700pC_211mm_3.dat

Charge > Data > Irradition_160_2700pC_211mm_3.dat

```
717 1662562905.2378695 1359.75 955524.44
718 1662562905.3377118 1324.99 956849.43
719 1662562905.4376295 1367.95 958217.38
720 1662562905.5375113 1370.11 959587.49
721 1662562905.6374023 1379.80 960967.29
722 1662562905.737313 1371.86 962339.15
723 1662562905.837238 1422.62 963761.77
724 1662562905.9370916 1340.03 965101.80
725 1662562906.0368948 1414.49 966516.29
726 1662562906.136855 1382.07 967898.37
727 1662562906.2367752 1362.97 969261.34
728 1662562906.336676 1410.21 970671.55
729 1662562906.4365833 1374.53 972046.09
730 1662562906.5364256 1387.93 973434.01
731 1662562906.636332 1384.78 974818.79
732 1662562906.736253 1329.89 976148.69
733 1662562906.8361526 1379.33 977528.01
734 1662562906.936032 1350.53 978878.55
735 1662562907.4355087 1353.13 980231.67
736 1662562907.2356994 1348.55 981580.23
737 1662562907.0359437 1347.82 982928.05
738 1662562907.135789 1340.91 984268.96
739 1662562907.3356035 1361.58 985630.54
740 1662562907.5354004 1349.58 986980.12
741 1662562907.63527 1365.28 988345.39
742 1662562907.7351515 1371.39 989716.78
743 1662562907.8350635 1331.50 991048.28
744 1662562907.9349277 1317.05 992365.33
745 1662562908.0348196 1346.83 993712.17
746 1662562908.134636 1266.18 994978.35
747 1662562908.2346165 1251.07 996229.42
748 1662562908.3344874 1246.39 997475.81
749 1662562908.4343987 1283.02 998758.83
```

Times here are all messed

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

```
Case for 2, 2 2022-09-07 16:13:03.973045 2022-09-07 16:13:04.273173 1662559983.973045
Case for 3, 733 2022-09-07 17:01:46.936032 2022-09-07 17:01:47.435509 1662562906.936032
Case for 3, 737 2022-09-07 17:01:47.135789 2022-09-07 17:01:47.335603 1662562907.135789
Case for 3, 738 2022-09-07 17:01:47.335603 2022-09-07 17:01:47.535400 1662562907.335603
Case for 7, 1 2022-09-07 19:15:04.311130 2022-09-07 19:15:04.511094 1662570904.31113
pietro@pietro-N552VW:~/work/Clear$ /bin/python3 /home/pietro/work/Clear/Digitizer/Python/fileExplorer.py
Case for Irradition_160_2700pC_211mm.dat, 0 2022-09-07 15:39:09.252774 2022-09-07 15:39:09.452748 1662557949.252774
Case for Irradition_160_2700pC_211mm.dat, 2 2022-09-07 15:39:09.352724 2022-09-07 15:39:09.552731 1662557949.352724
Case for Irradition_160_2700pC_211mm_2.dat, 2 2022-09-07 16:13:03.973045 2022-09-07 16:13:04.273173 1662559983.973045
Case for Irradition_160_2700pC_211mm_3.dat, 733 2022-09-07 17:01:46.936032 2022-09-07 17:01:47.435509 1662562906.936032
Case for Irradition_160_2700pC_211mm_3.dat, 737 2022-09-07 17:01:47.135789 2022-09-07 17:01:47.335603 1662562907.135789
Case for Irradition_160_2700pC_211mm_3.dat, 738 2022-09-07 17:01:47.335603 2022-09-07 17:01:47.535400 1662562907.335603
Case for Irradition_160_2700pC_211mm_7.dat, 1 2022-09-07 19:15:04.311130 2022-09-07 19:15:04.511094 1662570904.31113
pietro@pietro-N552VW:~/work/Clear$
```

Python
bash
python3
bash
python3

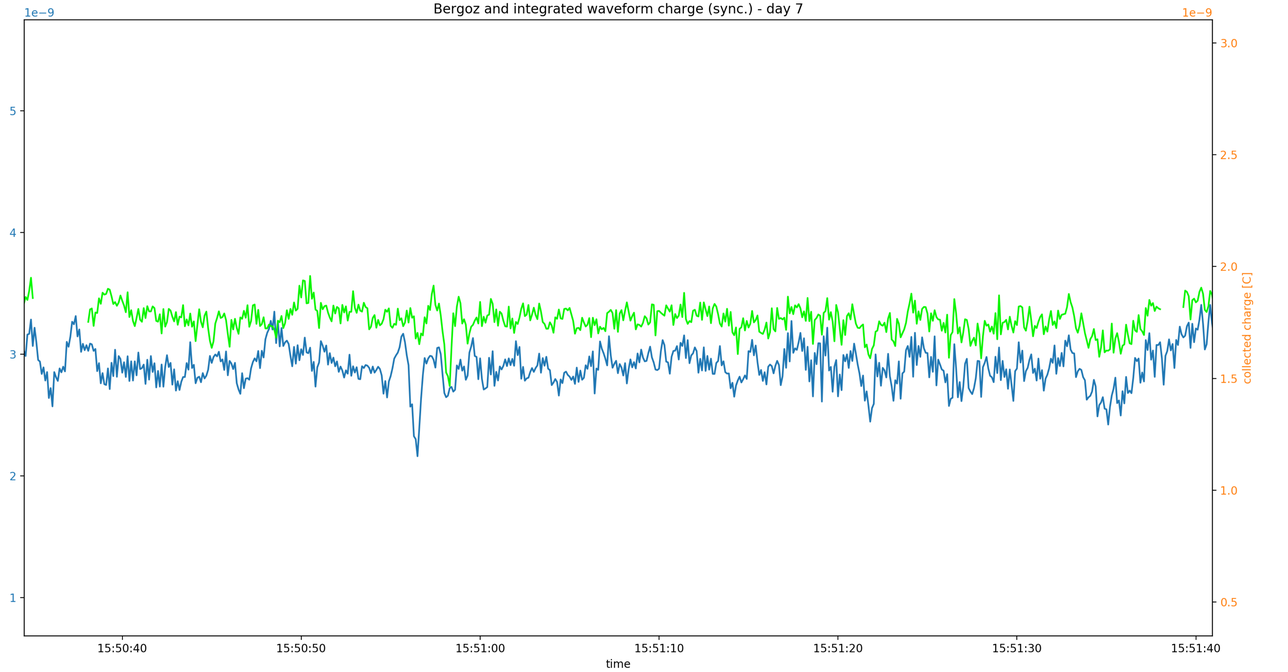
0 ⚠ 0

Ln 736, Col 21 Spaces: 4 UTF-8 LF Plain Text

start | Presentation3.pp... | Irradition_160_2... | Figure 1 | Figure 1 | Figure 1 | Irradition_160_2...

Monday 31 October, 15:55


Ratio dgt/beam (sync.) - wav/chg smooth each N=2
ch1
ch2
ch3
ch4
ch5
ch6
ch7
ch8
ch9
ch11
ch12
5:50:40
15:50:50
15:51:00
15:51:10
15:51:20
15:51:30
time


Bergoz and integrated waveform charge (sync.) - day 7
1e−9
1e−9
collected charge [C]
15:50:40
15:50:50
15:51:00
15:51:10
15:51:20
15:51:30
15:51:40
time

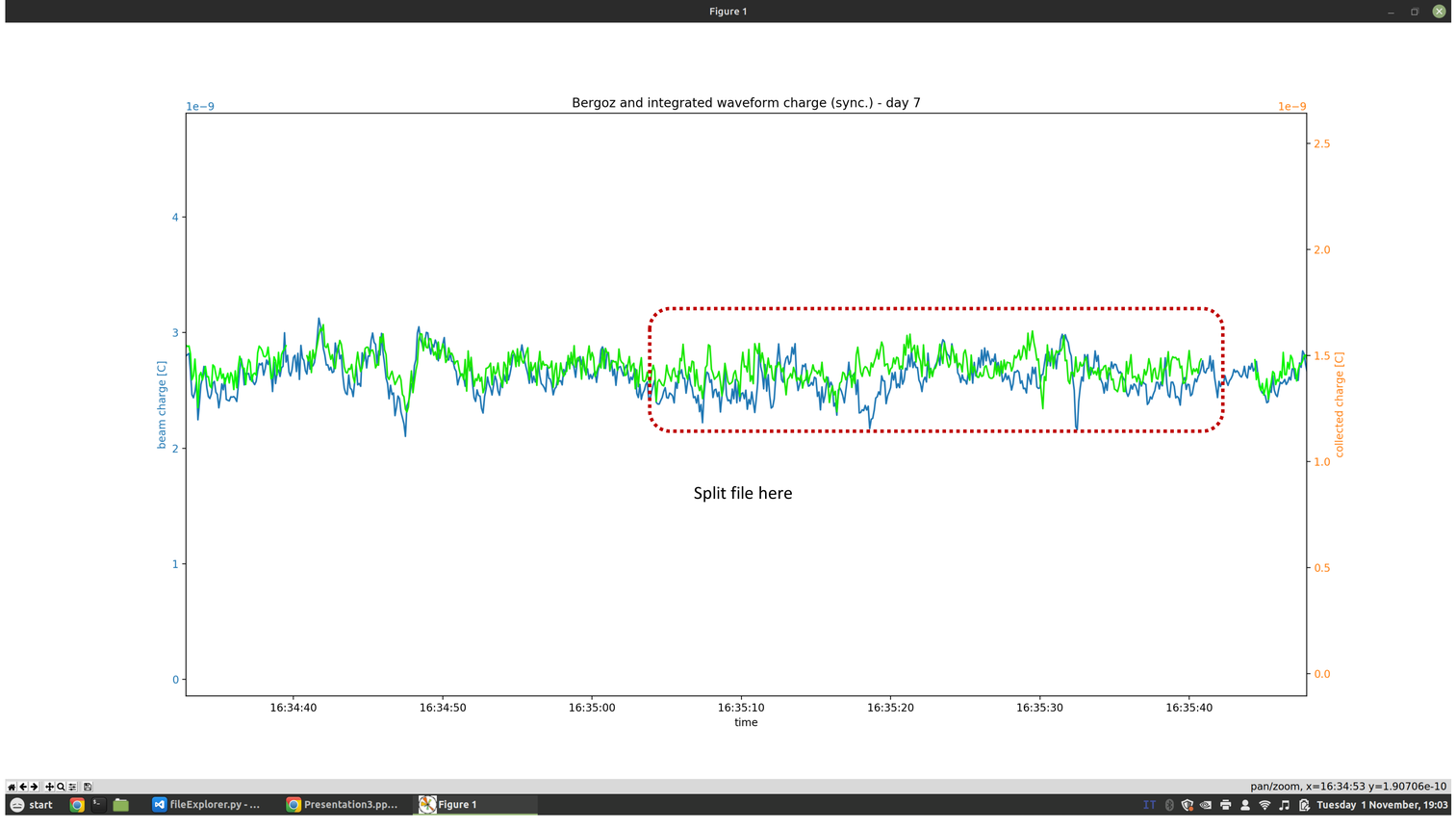
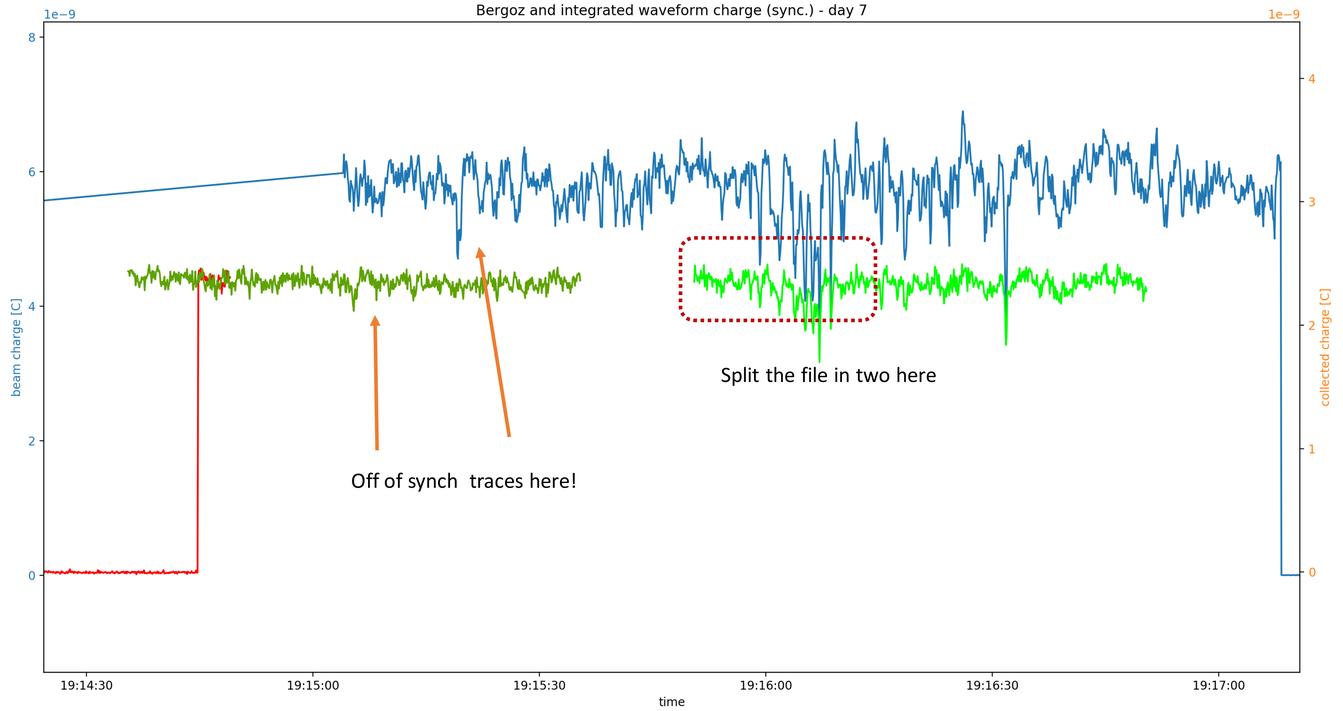


Figure 1
Bergoz and integrated waveform charge (sync.) - day 7
1e−9
1e−9
beam charge [C]
collected charge [C]
Split file here
time
16:34:40
16:34:50
16:35:00
16:35:10
16:35:20
16:35:30
16:35:40
pan/zoom, x=16:34:53 y=1.90706e-10
start
fileExplorer.py - ...
Presentation3.pp...
Figure 1
Tuesday 1 November, 19:03


Bergoz and integrated waveform charge (sync.) - day 7
1e−9
1e−9
beam charge [C]
collected charge [C]
Split the file in two here
time
17:55:10
17:55:20
17:55:30
17:55:40
17:55:50
17:56:00
17:56:10
0
2
4
6
8
0
1
2
3
4
5



pan/zoom, x=19:16:35 y=1.42631e-09

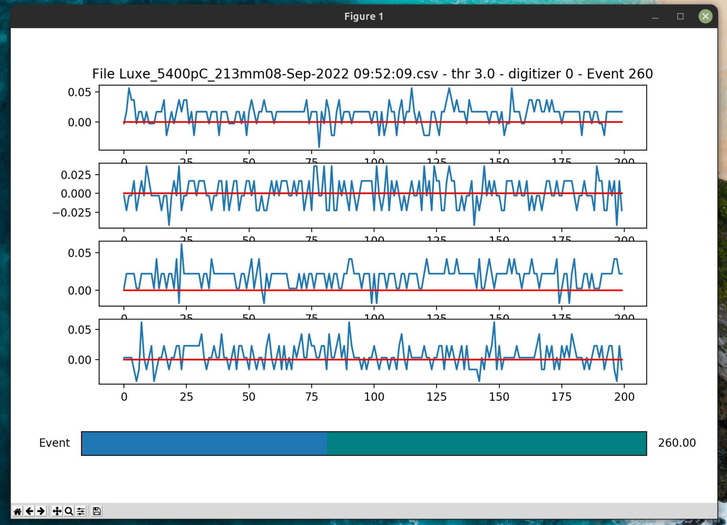
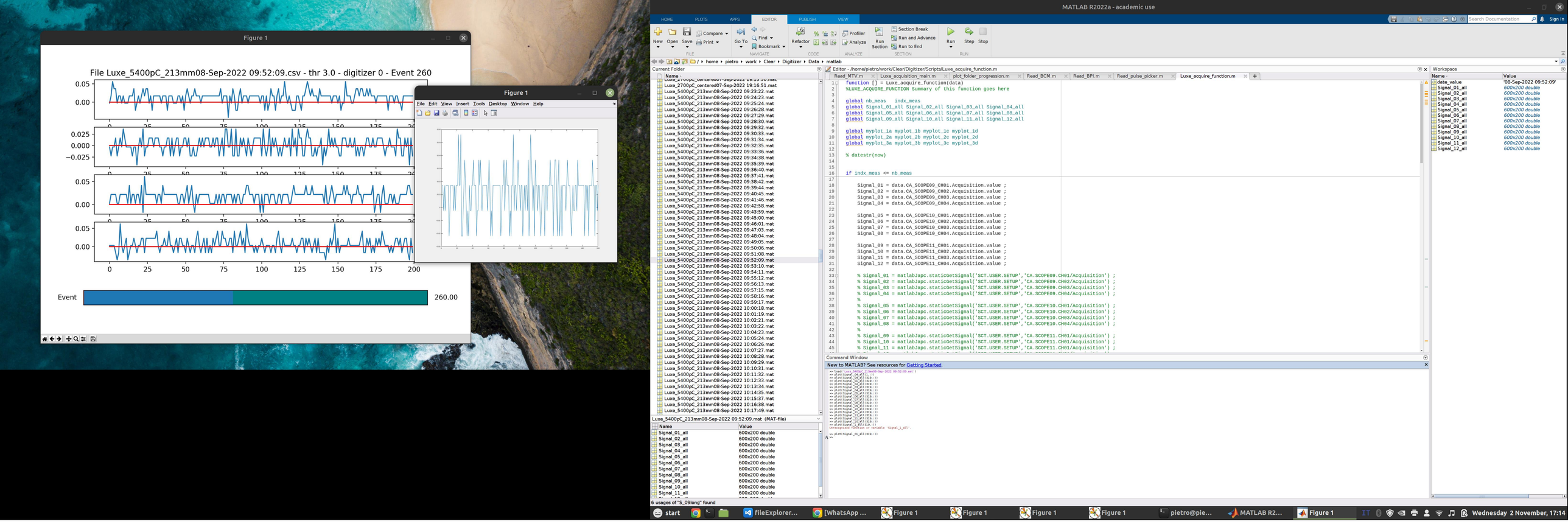


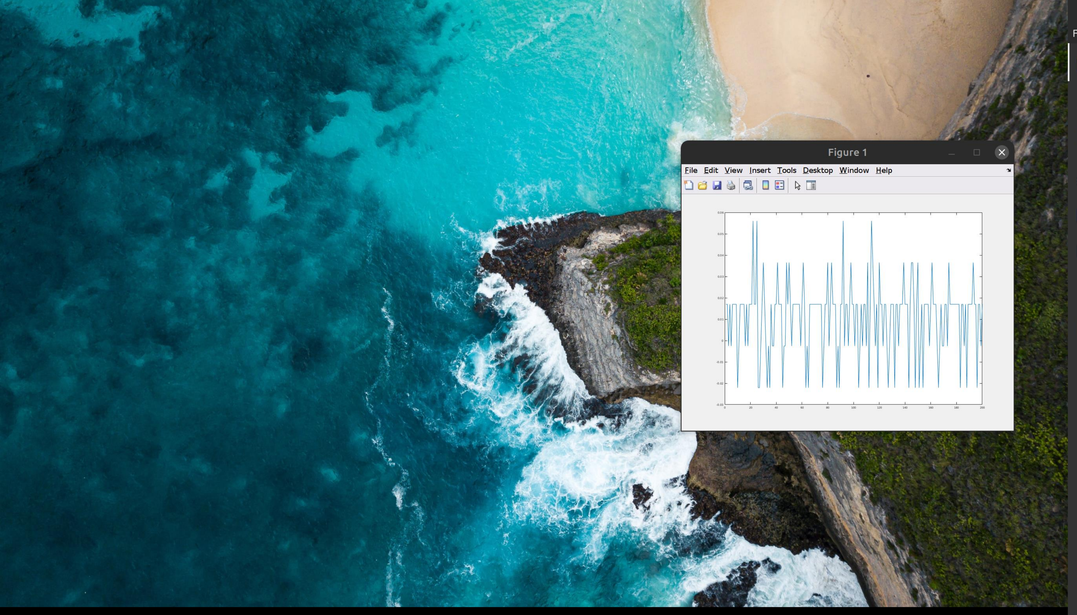
Figure 1
File Luxe_5400pC_213mm08-Sep-2022 09:52:09.csv - thr 3.0 - digitizer 0 - Event 260
0.05
0.00
0.025
0.000
−0.025
0.05
0.00
0.05
0.00
0 25 50 75 100 125 150 175 200
Event
260.00


Figure 1
manualOffsetGUICorrelation - file Digitizer/Data/Luxe_5400pC_213mm08-Sep-2022 09:52:09.csv
1e−9
1e−9
digitizer
digitizer ch1
digitizer ch2
digitizer ch3
bergoz
beam charge [C]
collected charge [C]
0 1 2 3 4 5 6 7 8
0.0 0.5 1.0 1.5 2.0 2.5
0 100 200 300 400 500 600
correlation
500 400 300 200 100 0 −100
0 200 400 600 800 1000 1200
ms offset
0.00
zoom rect
start
fileExplorer.py - ...
Google - Google ...
Figure 1
Figure 1
Figure 1
Wednesday 2 November, 16:42

Figure 1
File Luxe_5400pC_213mm08-Sep-2022 09:52:09.csv - thr 3.0 - digitizer 0 - Event 260
0.05
0.00
0.025
0.000
−0.025
0.05
0.00
0.05
0.00
0 25 50 75 100 125 150 175 200
Event
260.00

Figure 1
File Edit View Insert Tools Desktop Window Help


MATLAB R2022a - academic use
HOME PLOTS APPS EDITOR PUBLISH VIEW
New Open Save Compare Print Go To Find Bookmark Refactor Profiler Analyze Run Section Section Break Run and Advance Run to End Run Step Stop
/ home pietro work Clear Digitizer Data matlab
Current Folder
Name
Luxe_5400pC_213mm08-Sep-2022 09:23:22.mat
Luxe_5400pC_213mm08-Sep-2022 09:24:23.mat
Luxe_5400pC_213mm08-Sep-2022 09:25:24.mat
Luxe_5400pC_213mm08-Sep-2022 09:26:28.mat
Luxe_5400pC_213mm08-Sep-2022 09:27:29.mat
Luxe_5400pC_213mm08-Sep-2022 09:28:30.mat
Luxe_5400pC_213mm08-Sep-2022 09:29:32.mat
Luxe_5400pC_213mm08-Sep-2022 09:30:33.mat
Luxe_5400pC_213mm08-Sep-2022 09:31:34.mat
Luxe_5400pC_213mm08-Sep-2022 09:32:35.mat
Luxe_5400pC_213mm08-Sep-2022 09:33:36.mat
Luxe_5400pC_213mm08-Sep-2022 09:34:38.mat
Luxe_5400pC_213mm08-Sep-2022 09:35:39.mat
Luxe_5400pC_213mm08-Sep-2022 09:36:40.mat
Luxe_5400pC_213mm08-Sep-2022 09:37:41.mat
Luxe_5400pC_213mm08-Sep-2022 09:38:42.mat
Luxe_5400pC_213mm08-Sep-2022 09:39:44.mat
Luxe_5400pC_213mm08-Sep-2022 09:40:45.mat
Luxe_5400pC_213mm08-Sep-2022 09:41:46.mat
Luxe_5400pC_213mm08-Sep-2022 09:42:58.mat
Luxe_5400pC_213mm08-Sep-2022 09:43:59.mat
Luxe_5400pC_213mm08-Sep-2022 09:45:00.mat
Luxe_5400pC_213mm08-Sep-2022 09:46:01.mat
Luxe_5400pC_213mm08-Sep-2022 09:47:03.mat
Luxe_5400pC_213mm08-Sep-2022 09:48:04.mat
Luxe_5400pC_213mm08-Sep-2022 09:49:05.mat
Luxe_5400pC_213mm08-Sep-2022 09:50:06.mat
Luxe_5400pC_213mm08-Sep-2022 09:51:08.mat
Luxe_5400pC_213mm08-Sep-2022 09:52:09.mat
Luxe_5400pC_213mm08-Sep-2022 09:53:10.mat
Luxe_5400pC_213mm08-Sep-2022 09:54:11.mat
Luxe_5400pC_213mm08-Sep-2022 09:55:12.mat
Luxe_5400pC_213mm08-Sep-2022 09:56:13.mat
Luxe_5400pC_213mm08-Sep-2022 09:57:15.mat
Luxe_5400pC_213mm08-Sep-2022 09:58:16.mat
Luxe_5400pC_213mm08-Sep-2022 09:59:17.mat
Luxe_5400pC_213mm08-Sep-2022 10:00:18.mat
Luxe_5400pC_213mm08-Sep-2022 10:01:19.mat
Luxe_5400pC_213mm08-Sep-2022 10:02:21.mat
Luxe_5400pC_213mm08-Sep-2022 10:03:22.mat
Luxe_5400pC_213mm08-Sep-2022 10:04:23.mat
Luxe_5400pC_213mm08-Sep-2022 10:05:24.mat
Luxe_5400pC_213mm08-Sep-2022 10:06:26.mat
Luxe_5400pC_213mm08-Sep-2022 10:07:27.mat
Luxe_5400pC_213mm08-Sep-2022 10:08:28.mat
Luxe_5400pC_213mm08-Sep-2022 10:09:29.mat
Luxe_5400pC_213mm08-Sep-2022 10:10:31.mat
Luxe_5400pC_213mm08-Sep-2022 10:11:32.mat
Luxe_5400pC_213mm08-Sep-2022 10:12:33.mat
Luxe_5400pC_213mm08-Sep-2022 10:13:34.mat
Luxe_5400pC_213mm08-Sep-2022 10:14:35.mat
Luxe_5400pC_213mm08-Sep-2022 10:15:37.mat
Luxe_5400pC_213mm08-Sep-2022 10:16:38.mat
Luxe_5400pC_213mm08-Sep-2022 10:17:49.mat
Luxe_5400pC_213mm08-Sep-2022 09:52:09.mat (MAT-file)
Name Value
Signal_01_all 600x200 double
Signal_02_all 600x200 double
Signal_03_all 600x200 double
Signal_04_all 600x200 double
Signal_05_all 600x200 double
Signal_06_all 600x200 double
Signal_07_all 600x200 double
Signal_08_all 600x200 double
Signal_09_all 600x200 double
Signal_10_all 600x200 double
Signal_11_all 600x200 double
6 usages of "S_09long" found
Editor - /home/pietro/work/Clear/Digitizer/Scripts/Luxe_acquire_function.m
Read_MTV.m Luxe_acquisition_main.m plot_folder_progression.m Read_BCM.m Read_BPI.m Read_pulse_picker.m Luxe_acquire_function.m
function [] = Luxe_acquire_function(data)
%LUXE_ACQUIRE_FUNCTION Summary of this function goes here
global nb_meas indx_meas
global Signal_01_all Signal_02_all Signal_03_all Signal_04_all
global Signal_05_all Signal_06_all Signal_07_all Signal_08_all
global Signal_09_all Signal_10_all Signal_11_all Signal_12_all
global myplot_1a myplot_1b myplot_1c myplot_1d
global myplot_2a myplot_2b myplot_2c myplot_2d
global myplot_3a myplot_3b myplot_3c myplot_3d
% datestr(now)
if indx_meas <= nb_meas
Signal_01 = data.CA_SCOPE09_CH01.Acquisition.value ;
Signal_02 = data.CA_SCOPE09_CH02.Acquisition.value ;
Signal_03 = data.CA_SCOPE09_CH03.Acquisition.value ;
Signal_04 = data.CA_SCOPE09_CH04.Acquisition.value ;
Signal_05 = data.CA_SCOPE10_CH01.Acquisition.value ;
Signal_06 = data.CA_SCOPE10_CH02.Acquisition.value ;
Signal_07 = data.CA_SCOPE10_CH03.Acquisition.value ;
Signal_08 = data.CA_SCOPE10_CH04.Acquisition.value ;
Signal_09 = data.CA_SCOPE11_CH01.Acquisition.value ;
Signal_10 = data.CA_SCOPE11_CH02.Acquisition.value ;
Signal_11 = data.CA_SCOPE11_CH03.Acquisition.value ;
Signal_12 = data.CA_SCOPE11_CH04.Acquisition.value ;
% Signal_01 = matlabJapc.staticGetSignal('SCT.USER.SETUP','CA.SCOPE09.CH01/Acquisition') ;
% Signal_02 = matlabJapc.staticGetSignal('SCT.USER.SETUP','CA.SCOPE09.CH02/Acquisition') ;
% Signal_03 = matlabJapc.staticGetSignal('SCT.USER.SETUP','CA.SCOPE09.CH03/Acquisition') ;
% Signal_04 = matlabJapc.staticGetSignal('SCT.USER.SETUP','CA.SCOPE09.CH04/Acquisition') ;
%
% Signal_05 = matlabJapc.staticGetSignal('SCT.USER.SETUP','CA.SCOPE10.CH01/Acquisition') ;
% Signal_06 = matlabJapc.staticGetSignal('SCT.USER.SETUP','CA.SCOPE10.CH02/Acquisition') ;
% Signal_07 = matlabJapc.staticGetSignal('SCT.USER.SETUP','CA.SCOPE10.CH03/Acquisition') ;
% Signal_08 = matlabJapc.staticGetSignal('SCT.USER.SETUP','CA.SCOPE10.CH04/Acquisition') ;
%
% Signal_09 = matlabJapc.staticGetSignal('SCT.USER.SETUP','CA.SCOPE11.CH01/Acquisition') ;
% Signal_10 = matlabJapc.staticGetSignal('SCT.USER.SETUP','CA.SCOPE11.CH01/Acquisition') ;
% Signal_11 = matlabJapc.staticGetSignal('SCT.USER.SETUP','CA.SCOPE11.CH01/Acquisition') ;
Command Window
New to MATLAB? See resources for Getting Started.
Workspace
Name Value
date_value '08-Sep-2022 09:52:09'
Signal_01_all 600x200 double
Signal_02_all 600x200 double
Signal_03_all 600x200 double
Signal_04_all 600x200 double
Signal_05_all 600x200 double
Signal_06_all 600x200 double
Signal_07_all 600x200 double
Signal_08_all 600x200 double
Signal_09_all 600x200 double
Signal_10_all 600x200 double
Signal_11_all 600x200 double
Signal_12_all 600x200 double
Unrecognized function or variable 'Signal_1_all'.
start fileExplorer... [WhatsApp ... Figure 1 Figure 1 Figure 1 Figure 1 pietro@pie... MATLAB R2... Figure 1 Wednesday 2 November, 17:14



Never ending problems...
Offsets between different digitizers! Issue found in the original MATLAB files too...not a problem of my script

fileExplorer.py - Clear - Visual Studio Code

File Edit Selection View Go Run Terminal Help

EXPLORER

CLEAR
- .vscode
- Analysis
- Charge
- Digitizer
  - Data
  - Python
    - fileExplorer.py
    - notebook.ipynb
    - test.py
  - Scripts
  - 6SeptList_synch.txt
  - 6SeptList.txt
  - 7SeptList_synch.txt
  - 7SeptList.txt
  - 8SeptList_excludedfromIrratiation.txt
  - 8SeptList_synch.txt
  - 8SeptList.txt
  - 9SeptList_synch.txt
- PSU
- Tektronix
- Timber
- _wav_concat_synch_append_7Sept.dat
- _wav_concat_synch_append_8Sept.dat
- chg_concat_6Sept.dat
- chg_concat_7Sept.dat
- chg_concat_8Sept.dat
- chg_concat_9Sept.dat
- intersectAndDivide_7Sept.dat
- intersectAndDivide_8Sept.dat
- plotAllDay_Bergoz_7Sept.dat
- plotAllDay_Bergoz_8Sept.dat
- plotAllDay_Digitizers_6Sept.dat
- plotAllDay_Digitizers_7Sept.dat
- plotAllDay_PwrSupply_7Sept.dat
- plotAllDay_PwrSupply_8Sept.dat
- psu_concat_6Sept.dat
- psu_concat_7Sept.dat
- psu_concat_8Sept.dat
- wav_concat_6Sept.dat
- wav_concat_7Sept.dat

OUTLINE

TIMELINE

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

```
WAV 206: Luxe_2700pC_centered07-Sep-2022 18:51:21.csv
WAV 207: Luxe_2700pC_centered07-Sep-2022 18:52:23.csv
WAV 208: Luxe_2700pC_centered07-Sep-2022 18:53:24.csv
WAV 209: Luxe_2700pC_centered07-Sep-2022 18:54:25.csv
WAV 210: Luxe_2700pC_centered07-Sep-2022 18:55:26.csv
WAV 211: Luxe_2700pC_centered07-Sep-2022 18:56:28.csv
WAV 212: Luxe_2700pC_centered07-Sep-2022 18:57:29.csv
WAV 213: Luxe_2700pC_centered07-Sep-2022 18:58:30.csv
WAV 214: Luxe_2700pC_centered07-Sep-2022 18:59:31.csv
WAV 215: Luxe_2700pC_centered07-Sep-2022 19:00:32.csv
WAV 216: Luxe_2700pC_centered07-Sep-2022 19:01:34.csv
WAV 217: Luxe_2700pC_centered07-Sep-2022 19:02:35.csv
WAV 218: Luxe_2700pC_centered07-Sep-2022 19:03:36.csv
WAV 219: Luxe_2700pC_centered07-Sep-2022 19:04:37.csv
WAV 220: Luxe_2700pC_centered07-Sep-2022 19:05:38.csv
WAV 221: Luxe_2700pC_centered07-Sep-2022 19:06:39.csv
WAV 222: Luxe_2700pC_centered07-Sep-2022 19:07:41.csv
WAV 223: Luxe_2700pC_centered07-Sep-2022 19:08:42.csv
WAV 224: Luxe_2700pC_centered07-Sep-2022 19:09:43.csv
WAV 225: Luxe_2700pC_centered07-Sep-2022 19:10:44.csv
WAV 226: Luxe_2700pC_centered07-Sep-2022 19:11:45.csv
WAV 227: Luxe_2700pC_centered07-Sep-2022 19:12:47.csv
WAV 228: Luxe_2700pC_centered07-Sep-2022 19:13:48.csv
WAV 229: Luxe_2700pC_centered07-Sep-2022 19:14:49.csv
WAV 230: Luxe_2700pC_centered07-Sep-2022 19:15:50.csv
WAV 231: Luxe_2700pC_centered07-Sep-2022 19:16:51.csv

 --- Diagnostic (lag different digitizers)... ---
WAV 0: Luxe_25pC_centered07-Sep-2022 09:53:03.csv : [[0, 0], [0, 0], [0, 0], [0, 0]]
WAV 1: Luxe_25pC_centered07-Sep-2022 09:55:25.csv : [[0, 0], [0, -51], [0, 0], [0, 0]]
WAV 2: Luxe_25pC_centered07-Sep-2022 09:57:17.csv : [[0, 0], [0, -2], [0, 0], [0, 0]]
WAV 3: Luxe_25pC_centered07-Sep-2022 09:58:47.csv : [[0, 0], [0, 38], [0, 0], [0, 0]]
WAV 4: Luxe_25pC_centered07-Sep-2022 10:00:26.csv : [[0, 0], [0, 120], [0, 0], [0, 0]]
WAV 5: Luxe_25pC_centered07-Sep-2022 10:01:59.csv : [[0, 0], [0, 0], [0, 0], [0, 0]]
WAV 6: Luxe_25pC_centered07-Sep-2022 10:03:54.csv : [[1, 1], [1, 3], [1, 1], [1, 1]]
WAV 7: Luxe_25pC_centered07-Sep-2022 10:05:29.csv : [[0, 0], [0, -36], [0, 0], [0, 0]]
WAV 8: Luxe_25pC_centered07-Sep-2022 10:06:55.csv : [[0, 0], [0, -52], [0, 0], [0, 0]]
WAV 9: Luxe_25pC_centered07-Sep-2022 10:08:25.csv : [[0, 0], [0, 1], [0, 0], [0, 0]]
WAV 10: Luxe_25pC_centered07-Sep-2022 10:10:37.csv : [[0, 0], [0, -15], [0, 0], [0, 0]]
WAV 11: Luxe_25pC_centered07-Sep-2022 10:11:47.csv : [[0, 0], [0, -4], [0, 0], [0, 0]]
WAV 12: Luxe_25pC_centered07-Sep-2022 10:12:56.csv : [[0, 0], [0, 0], [0, 0], [0, 0]]
WAV 13: Luxe_25pC_centered07-Sep-2022 10:14:25.csv : [[0, 0], [0, 89], [0, 0], [0, 0]]
WAV 14: Luxe_25pC_centered07-Sep-2022 10:16:05.csv : [[0, 0], [0, 56], [0, 0], [0, 0]]
WAV 15: Luxe_25pC_centered07-Sep-2022 10:17:30.csv : [[0, 0], [0, -168], [0, 0], [0, 0]]
WAV 16: Luxe_25pC_centered07-Sep-2022 10:19:51.csv : [[-92, -152], [-25, 168], [-13, -37], [387, 0]]
WAV 17: Luxe_2700pC_centered07-Sep-2022 15:39:55.csv : [[0, 0], [0, -16], [0, 0], [0, 0]]
WAV 18: Luxe_2700pC_centered07-Sep-2022 15:40:02.csv : [[0, 0], [0, 4], [0, 0], [0, 0]]
WAV 19: Luxe_2700pC_centered07-Sep-2022 15:40:09.csv : [[0, 0], [0, 5], [0, 0], [0, 0]]
WAV 20: Luxe_2700pC_centered07-Sep-2022 15:40:16.csv : [[0, 0], [0, -19], [0, 0], [0, 0]]
WAV 21: Luxe_2700pC_centered07-Sep-2022 15:40:23.csv : [[0, 0], [0, 10], [0, 0], [0, 0]]
WAV 22: Luxe_2700pC_centered07-Sep-2022 15:40:31.csv : [[0, 0], [0, 14], [0, 0], [0, 0]]
WAV 23: Luxe_2700pC_centered07-Sep-2022 15:40:38.csv : [[0, 0], [0, -4], [0, 0], [0, 0]]
WAV 24: Luxe_2700pC_centered07-Sep-2022 15:40:45.csv : [[0, 0], [0, -34], [0, 0], [0, 0]]
WAV 25: Luxe_2700pC_centered07-Sep-2022 15:40:52.csv : [[0, 0], [0, 1], [0, 0], [0, 0]]
WAV 26: Luxe_2700pC_centered07-Sep-2022 15:41:00.csv : [[0, 0], [0, -18], [0, 0], [0, 0]]
```

Correlation lag between ch1 dgt1 and ch1 dgt 2

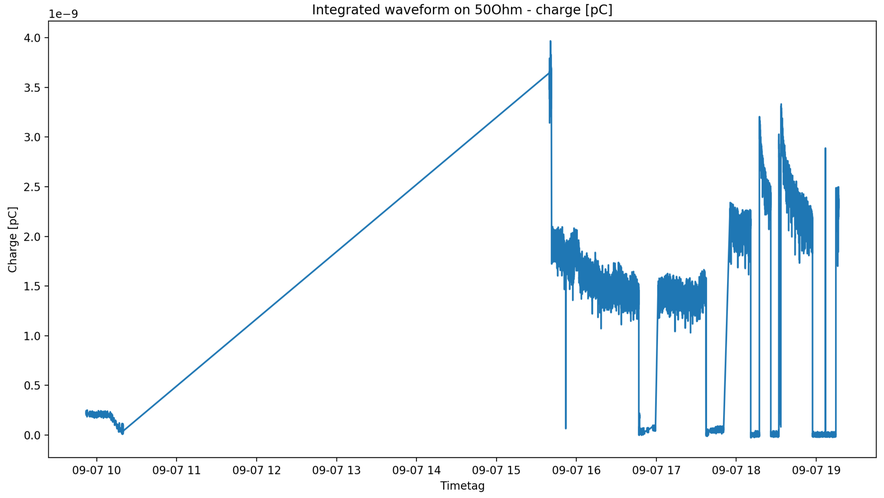
Correlation lag between ch4 dgt1 and ch4 dgt 2

Python
bash
python3
python3
python3
bash

Ln 3850, Col 60 Spaces: 4 UTF-8 LF {} Python 3.8.10 64-bit

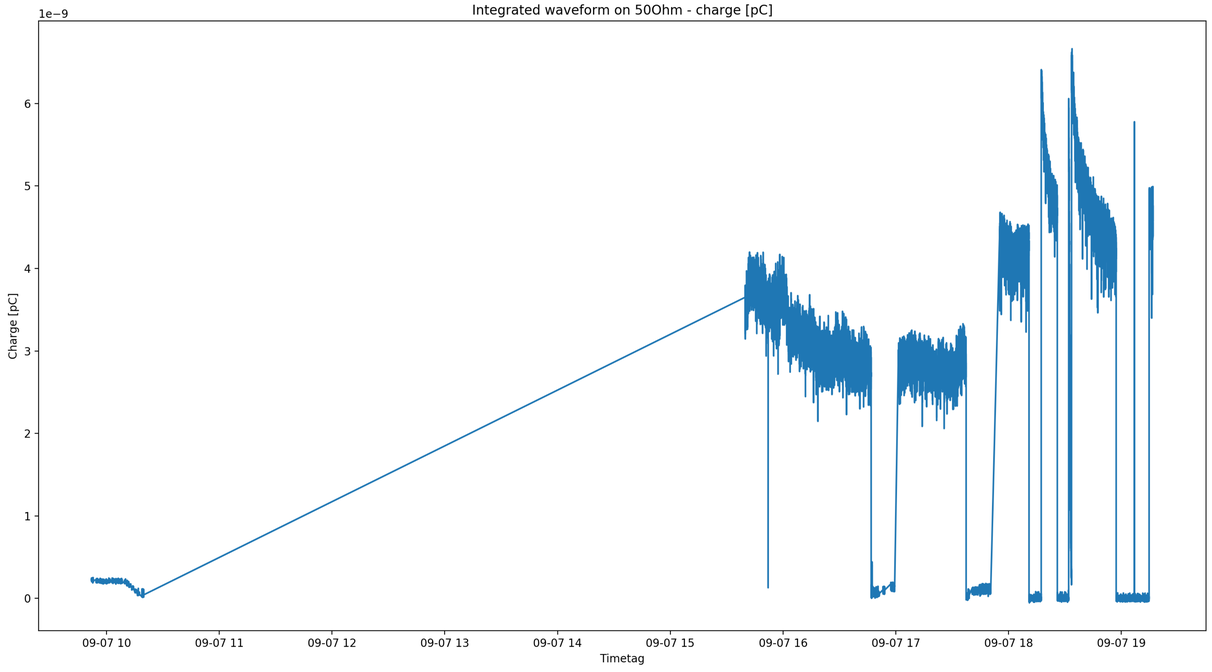
start fileExplorer... Presentatio... Figure 1 Figure 1 [Figure 1] Figure 1 [pietro@pie... MATLAB R2... Figure 1 Wednesday 2 November, 18:27

Figure 1



Before (left) and after (right) the correction for digitizers horizontal scale

Figure 1



x=09-07 14 y=1.95734e-09

start | plotAllDay_Digiti... | Presentation3.pp... | CLEAR - Google C... | Figure 1 | Figure 1

Sunday 6 November, 13:15