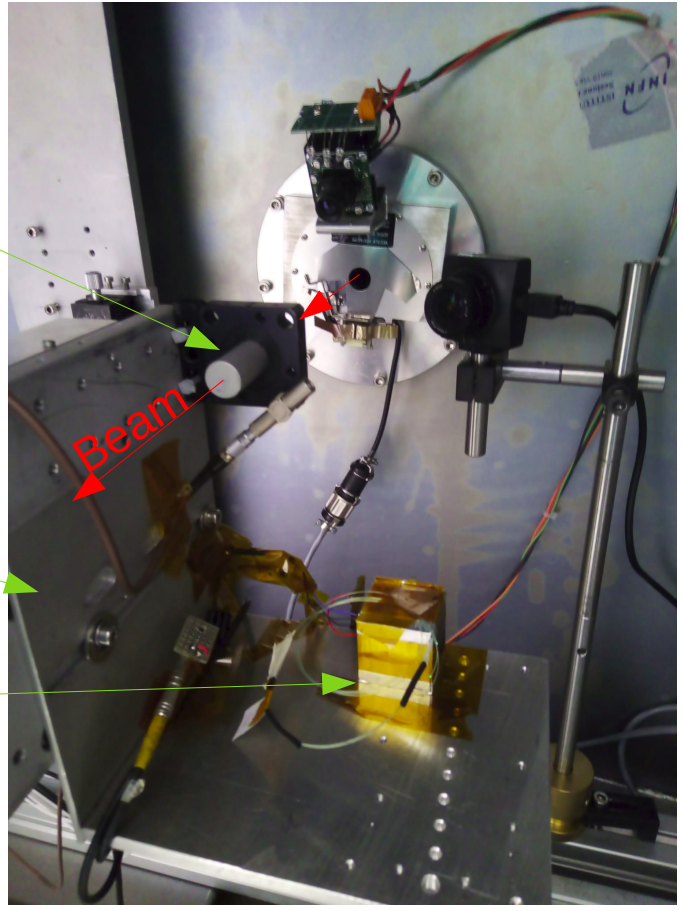
Problems in data acquired at LABEC test beam

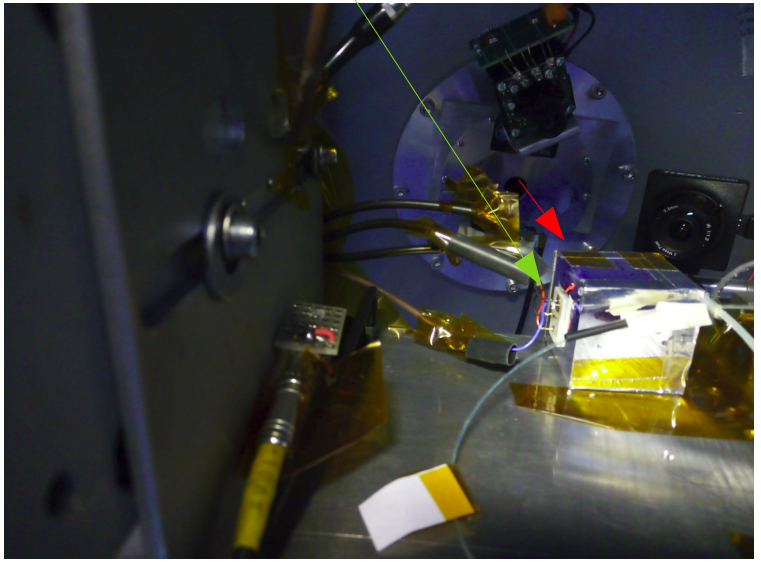
Faraday cup to measure the beam current

Moving support to align Faraday cup and LYSO cube with the beam

LYSO cube



PD package was never positioned in a cube face perpendicular to te beam direction

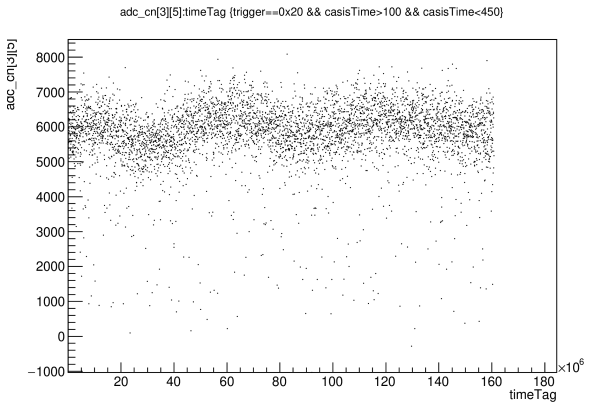


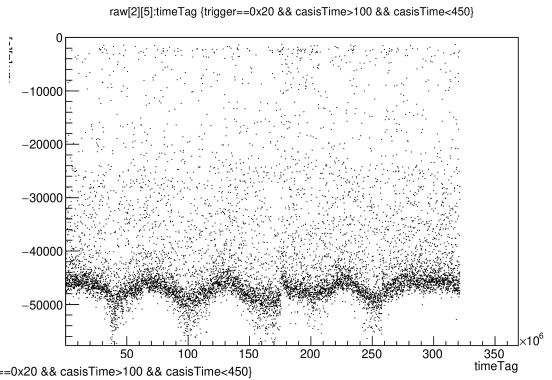
Attention!

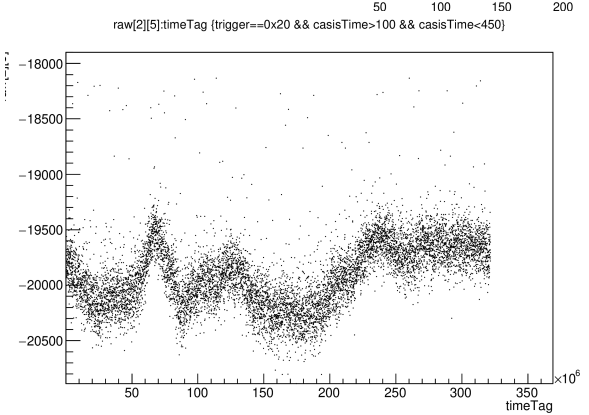
From now on you will see bad data!
Don’t worry this is a presentation on the problems and the worst data we get at LABEC!
We have also good data that we’ll show you in future!

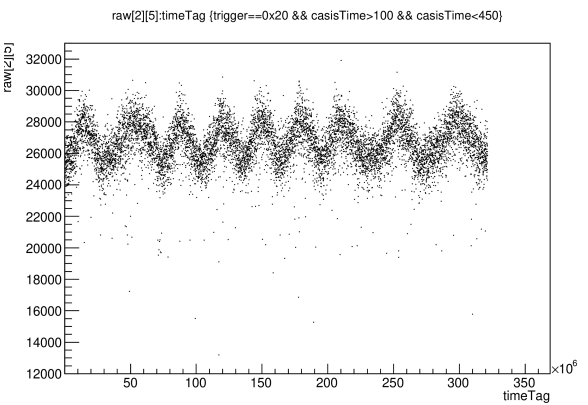
1) Instability of the beam

A lot of different time oscillation in two days of acquisition:





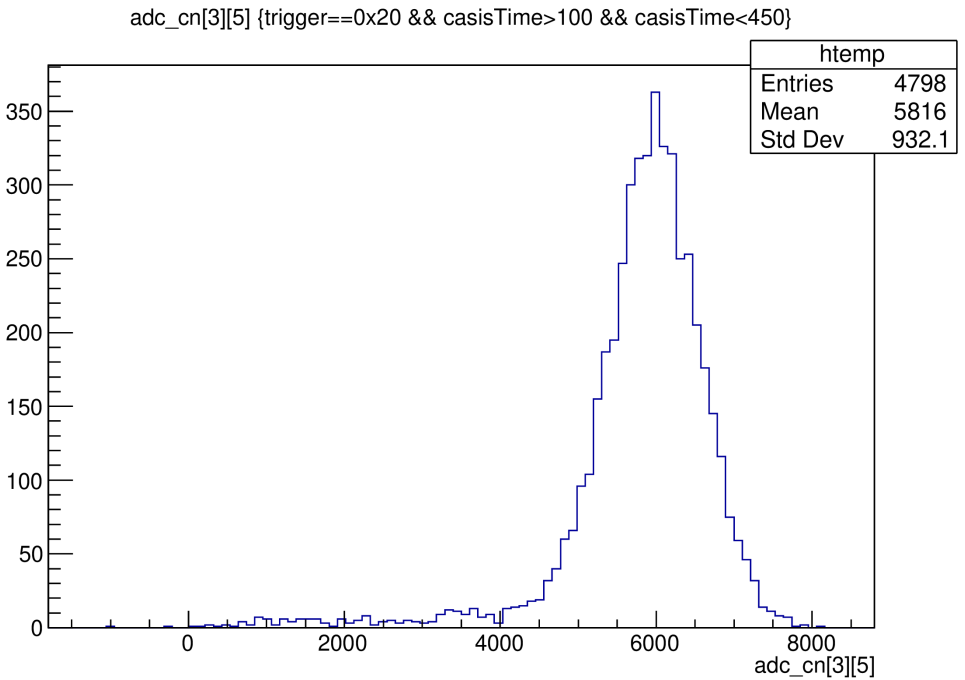


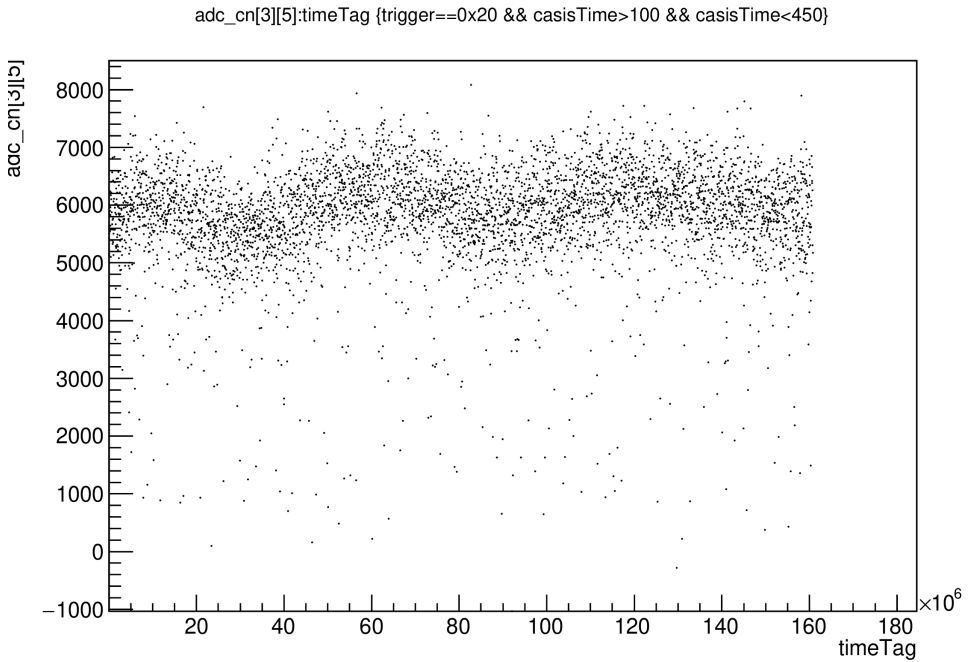


This dependence on the timeTag is the same for LPD and SPD

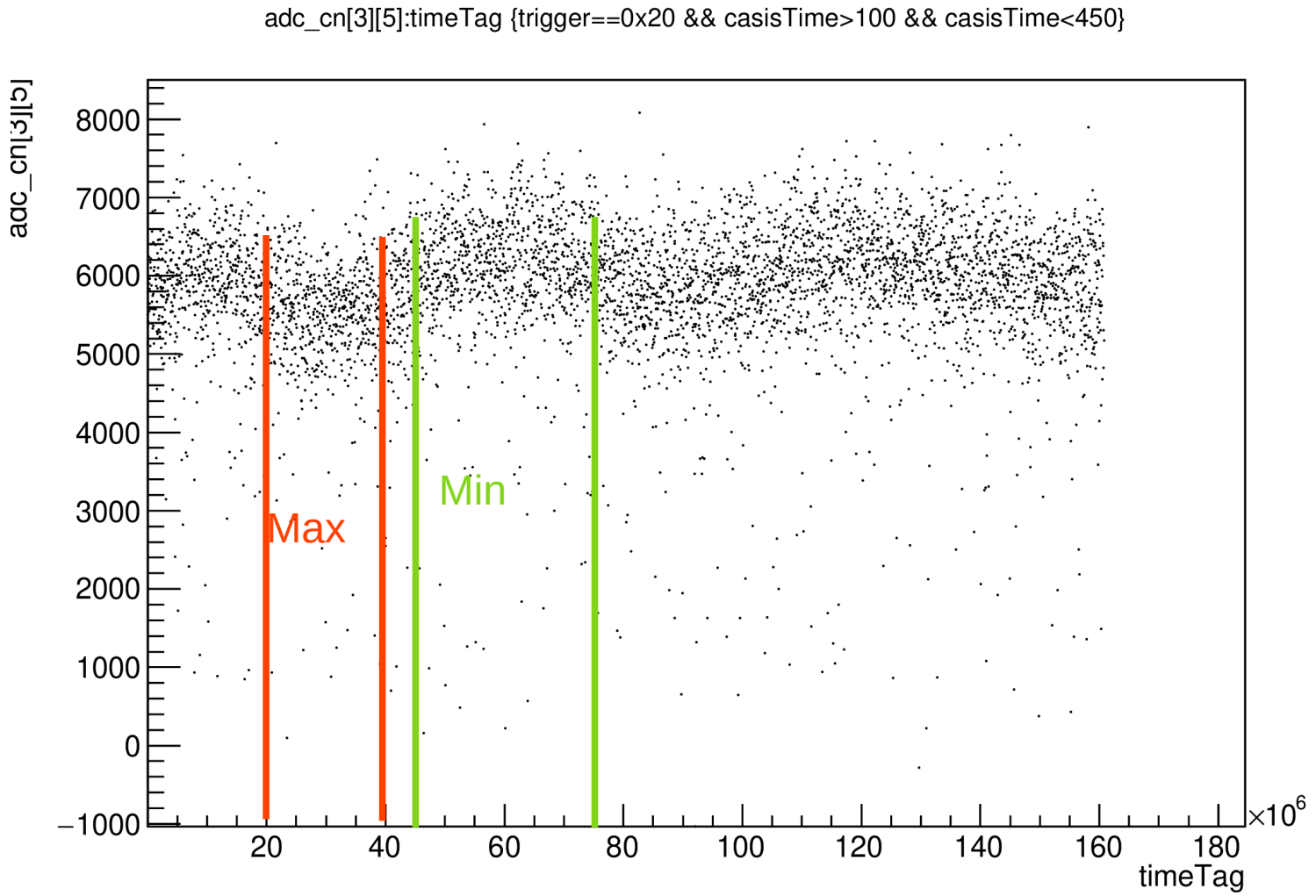
How to estimate instability of the beam

SPD signal where we have already put a constraint on casisiTime

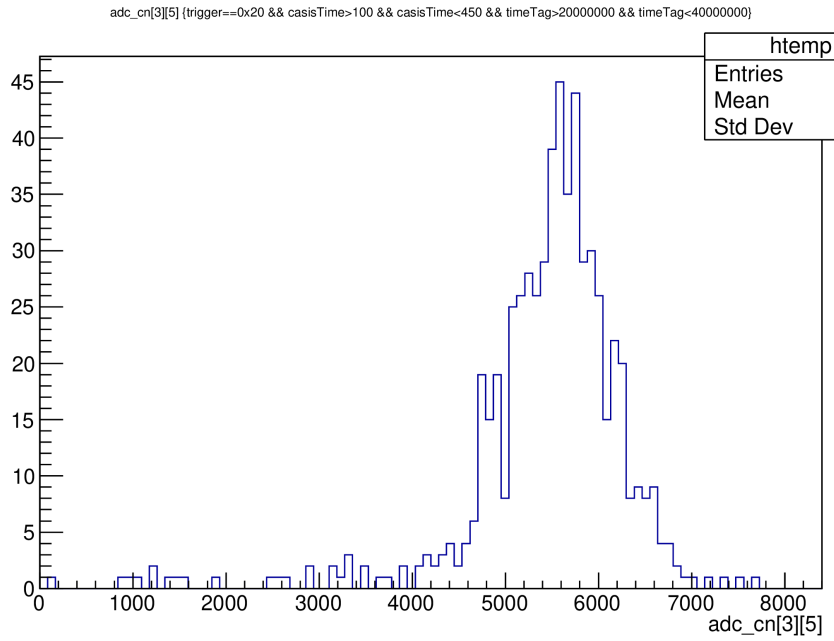




Select max and min signals

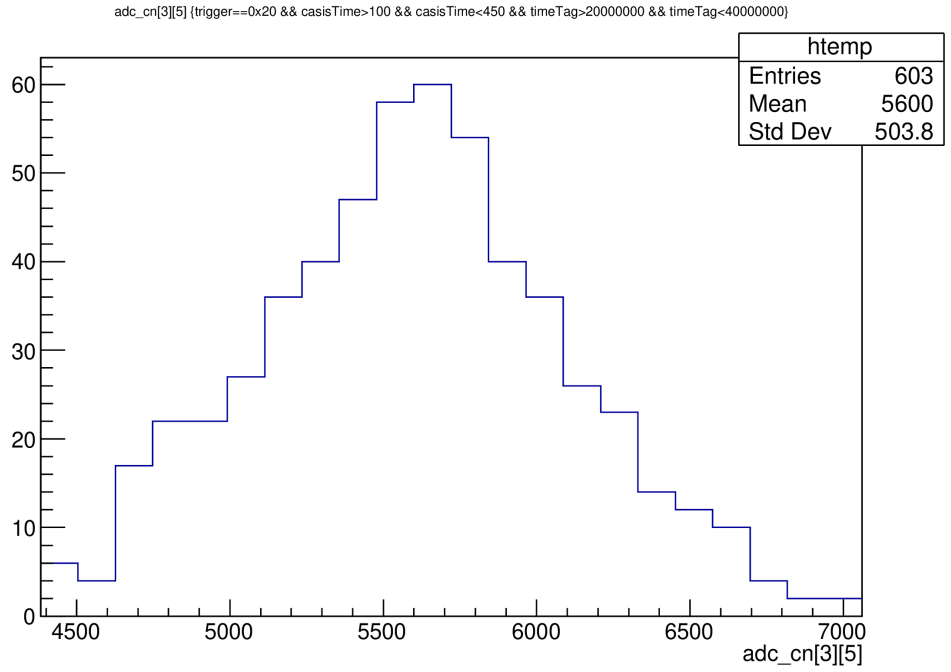


Histogram with interval of timeTag of the previous slide

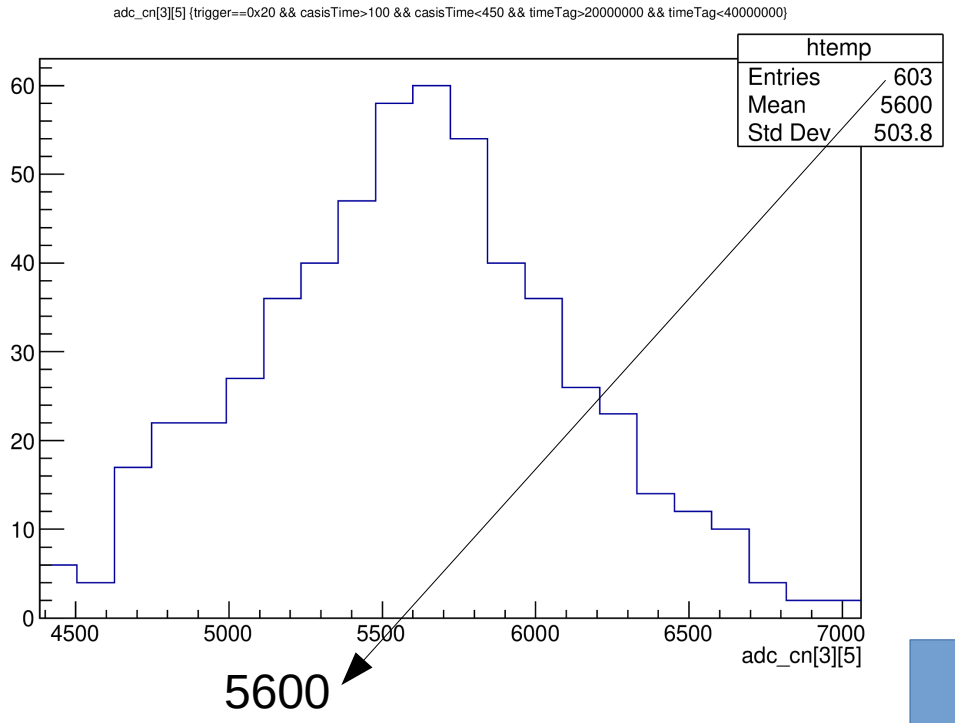


Zoom on the peak and rebin the histogram

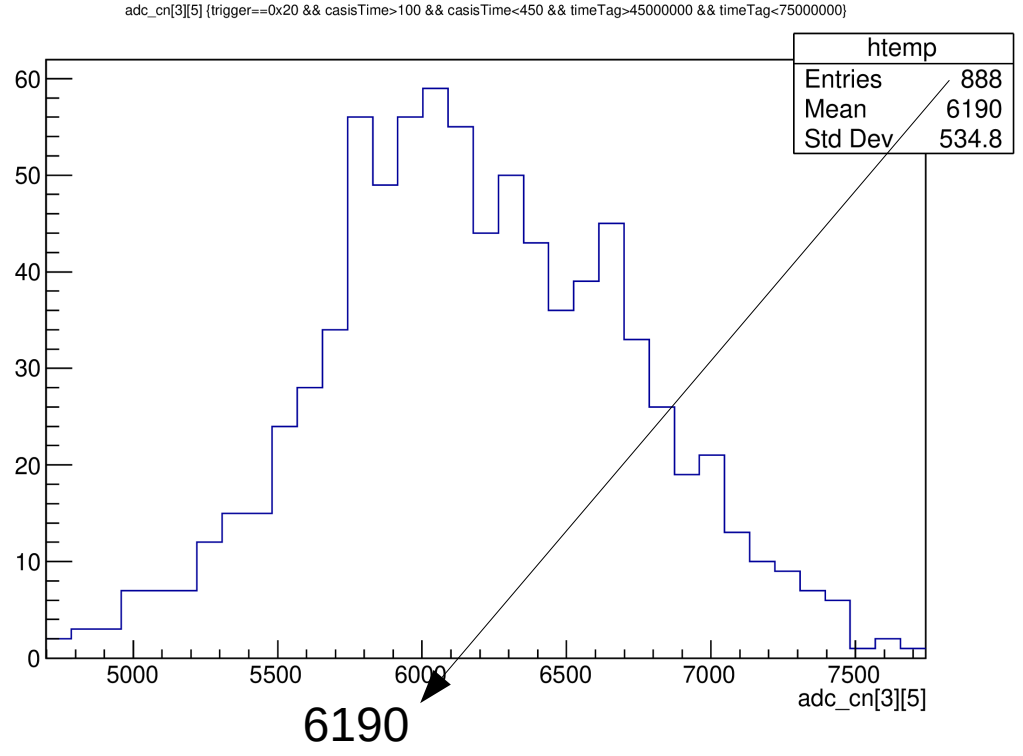
Signal value



Min



Max



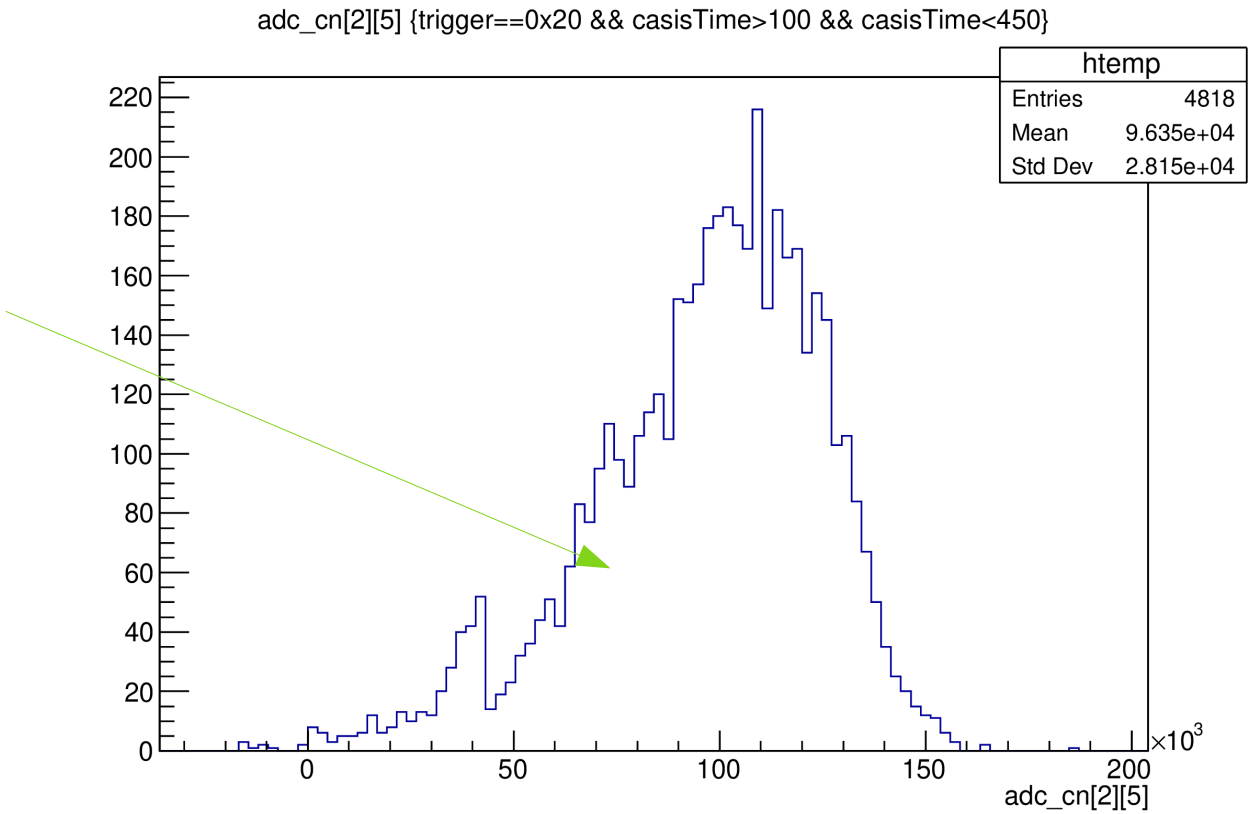
Beam instability: 6190-5600=590

Instability del 9% circa

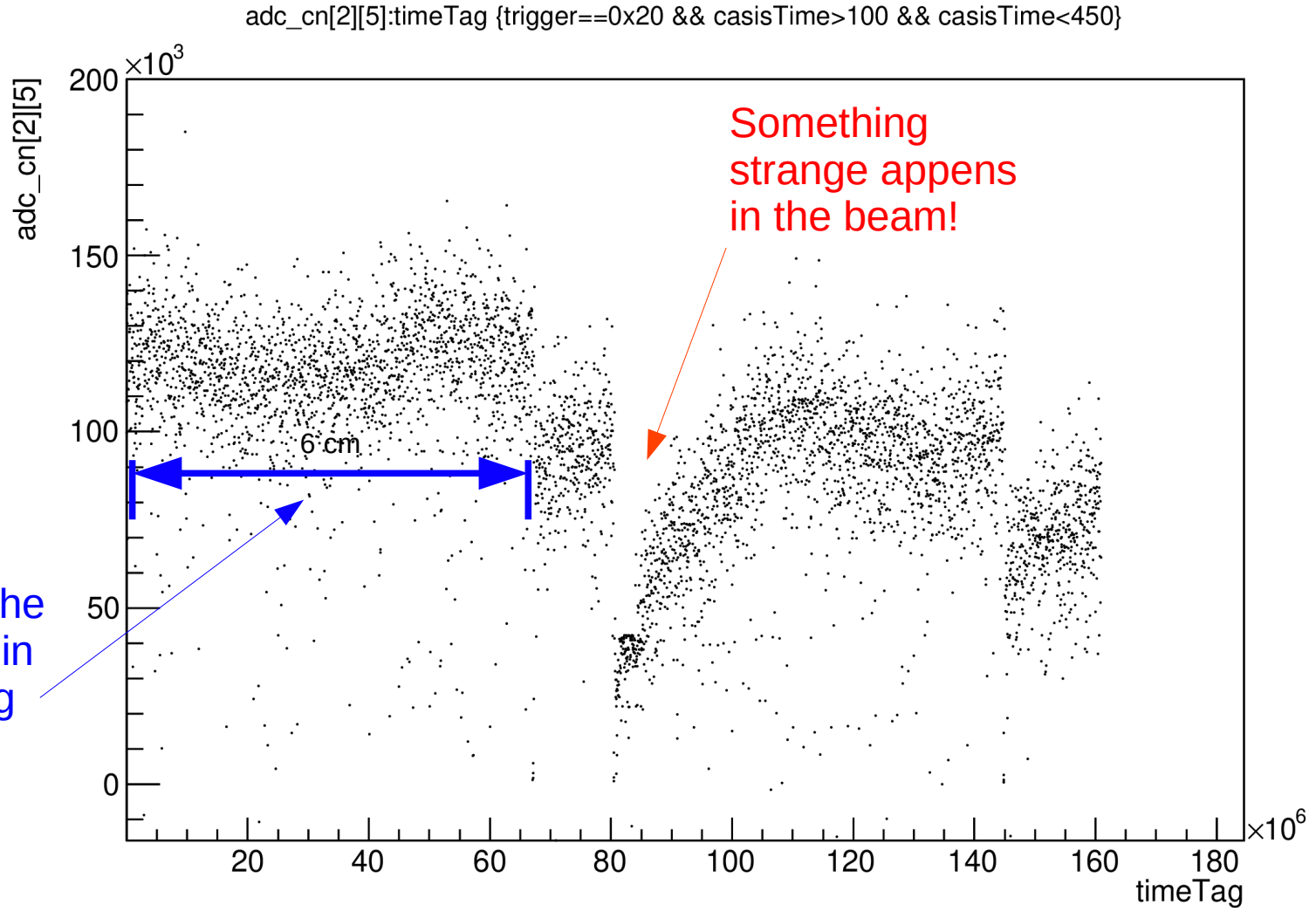
In all the run we acquired we have an instabilty <25%

2)Not clean signal peaks

Bad structure on the left of the peak!!

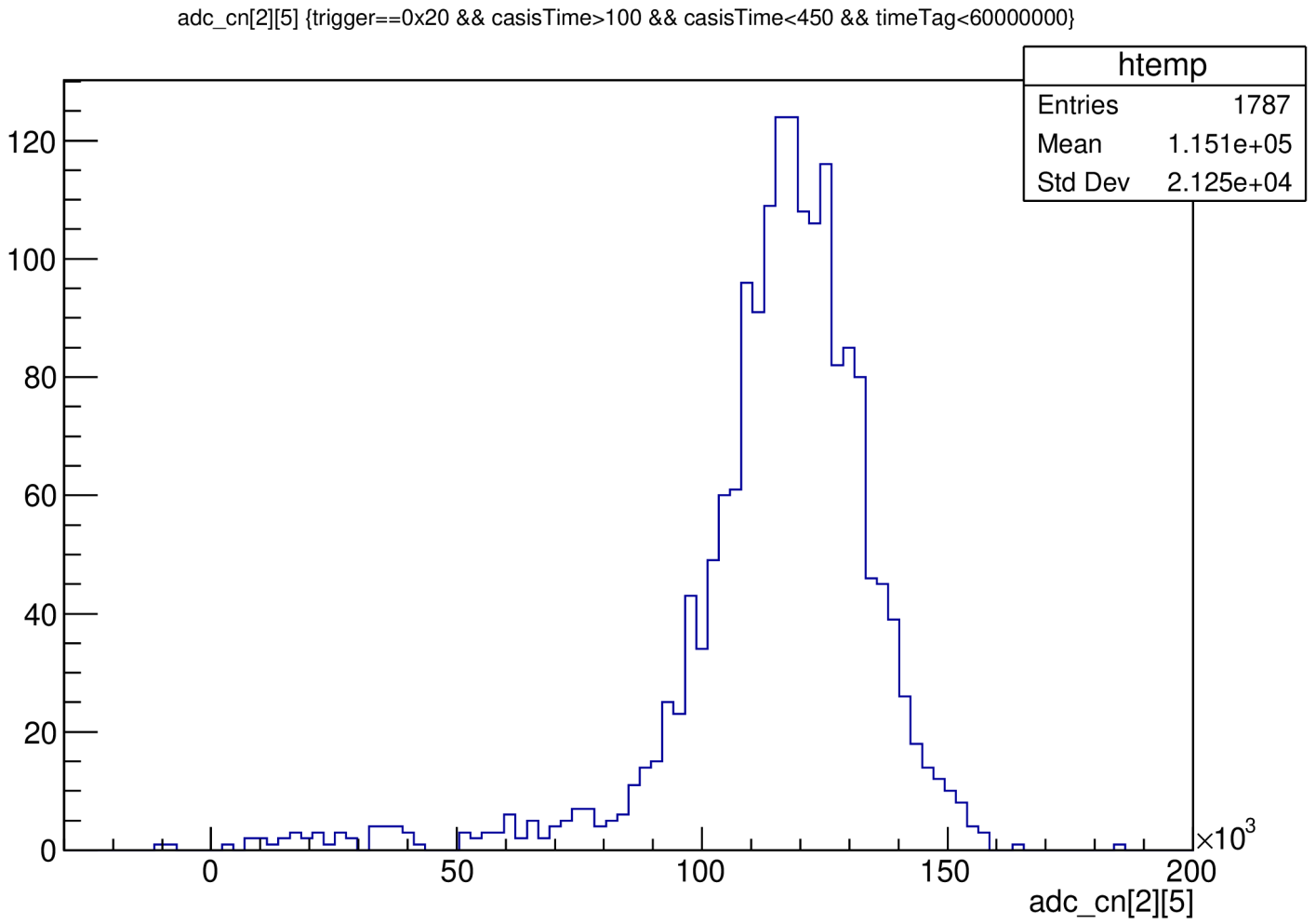


Plot the signal versus timeTag



We select the signal only in this timeTag window

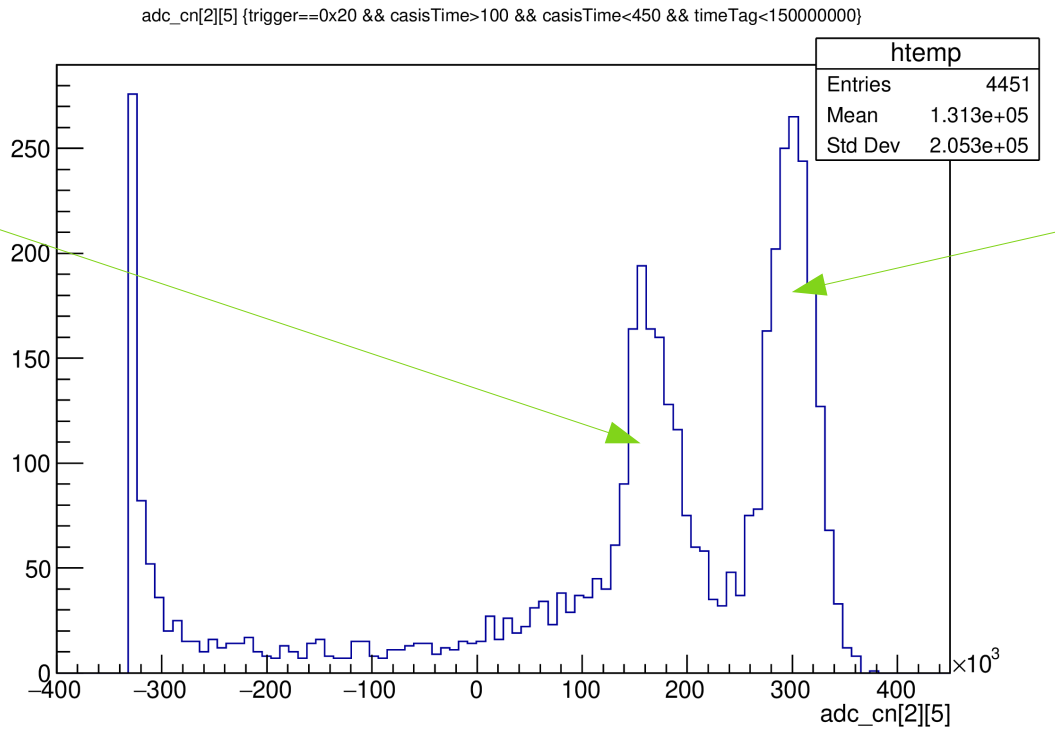
With the constraint on timeTag we get a better peak



3) Zoology of the antlers

Beam regulator
open for 2.45mm

Second
antler

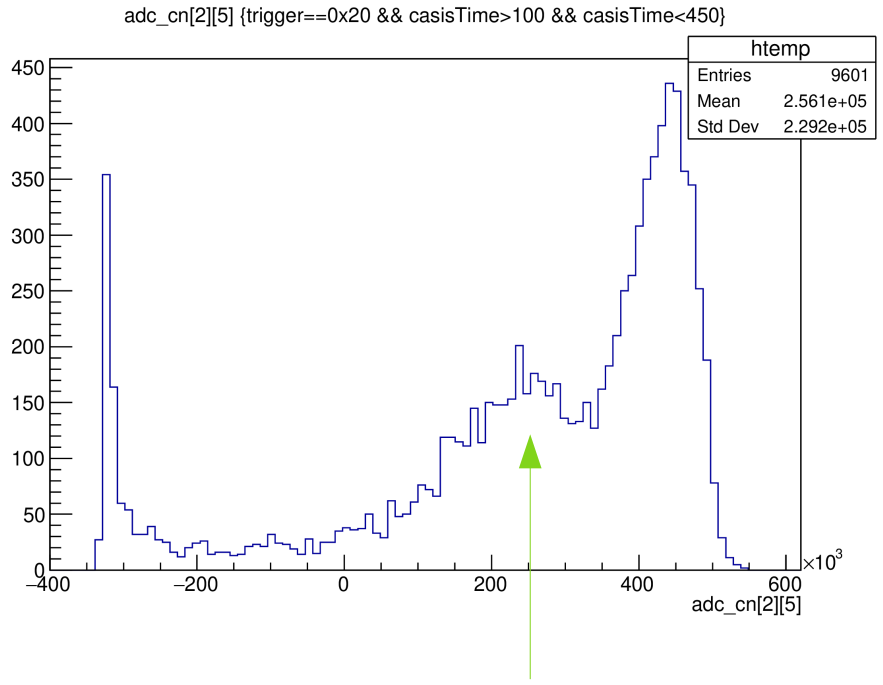


First
antler

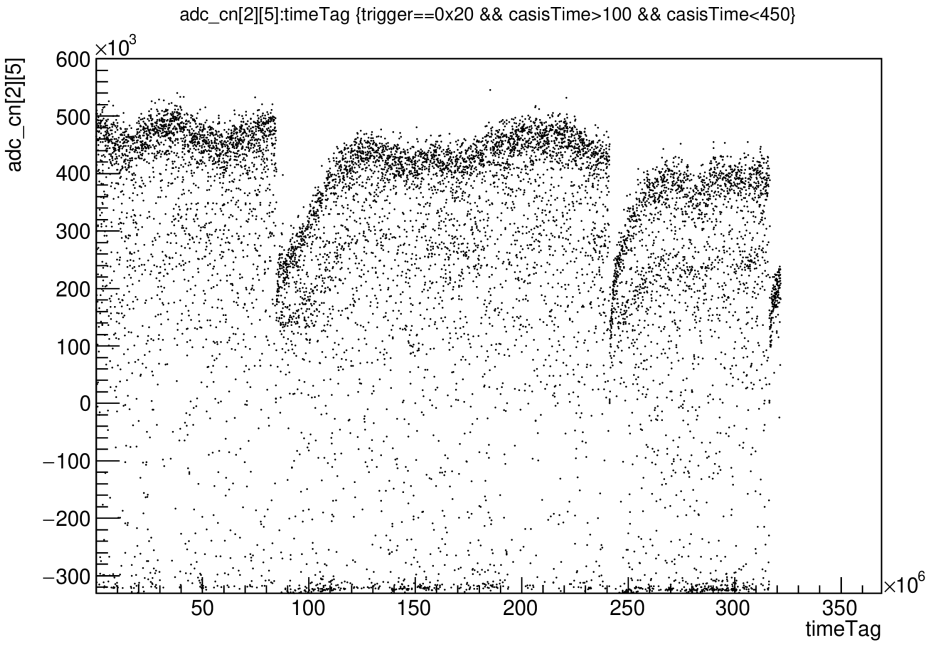
File 20210603_174954

3.1) Quite eliminable antlers

Beam regulator open for 3.16mm



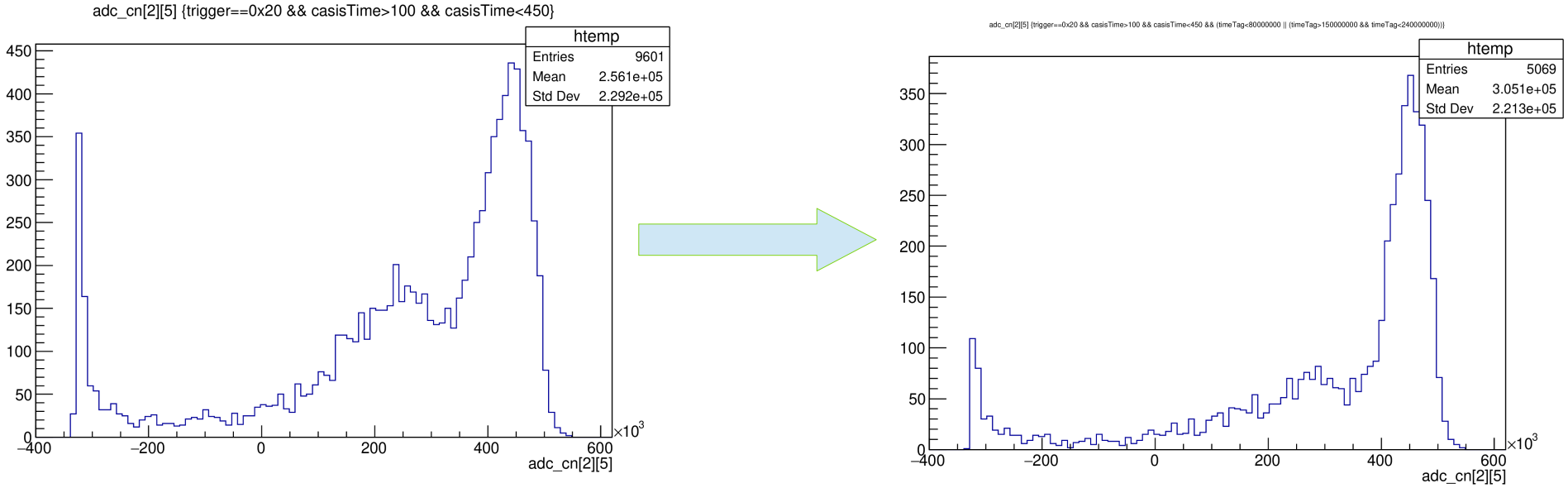
Not so big antler



Bad timeTag dependence!

File 20210603_181352

If we put a constraint on timeTag we get

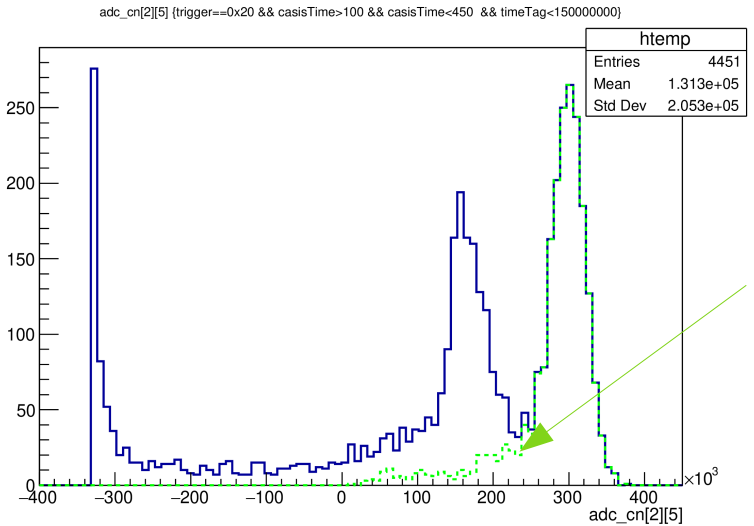


But we still have prolems, what are all the signals on the left of the peak?
They’re also negative, how is possible?

3.2) Eliminable antlers with a selection on the ratio between LPD and SPD signals

Beam regulator open for 2.45mm

We know from other measures tha the ratio LPD/SPD is circa 20, we can select a ratio (LPD/SPD)>16 and see what appens



LPD/SPD > 16

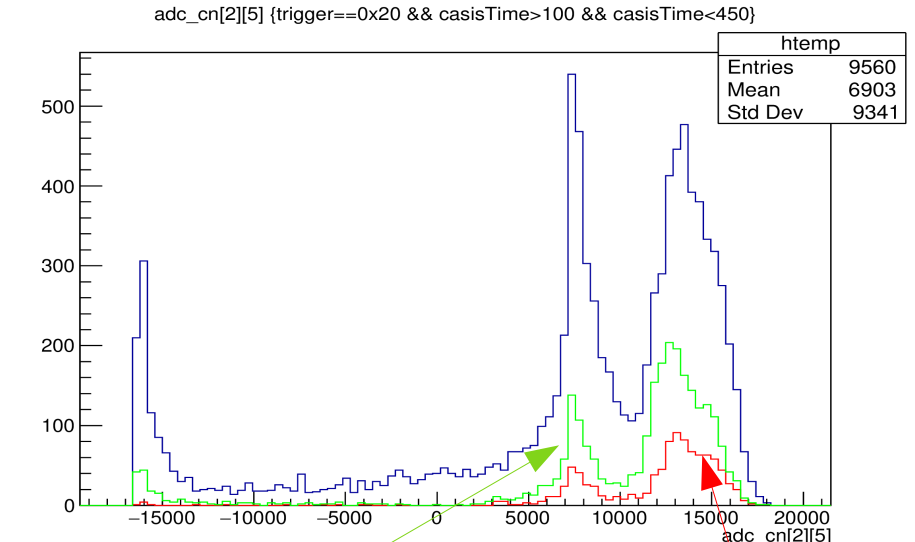
It looks like the good data are that of the first peak, but this procedure is like to cheat because we use a selection on the quantity we want to measure!

File 20210603_174954

3.3) Inelimibable antlers

Beam regulator open for 0.5 mm

No constraint on any variable gives a good result



File 20210604_140657

Summary of antlers

The antlers appear for high and low beam intensities, but not for average intensity.

Slitte [mm]	antlers
0.5	
0.5	
0.5	x
0.5	x
0.5	
0.7	x
1	
1	
1	
1	
1	
1	
1	
1	
1.5	
1.5	
1.5	
1.5	
1.5	
1.5	
1.5	

Slitte [mm]	antlers
1.5	
2	
2	
2	
2	x
2	x
2.45	x
2.45	x
2.45	x
2.45	x
2.83	x
3.16	x
3.16	x
3.16	x
3.16	x
3.16	x
3.16	
3.46	x
3.75	
4	
4	x

Questions for you

We showed quite all the problems we have with the data:

1) Instability of the beam - > how to consider it in the experimental error
2) Antlers - > do you have any idea?