

# Film digitization

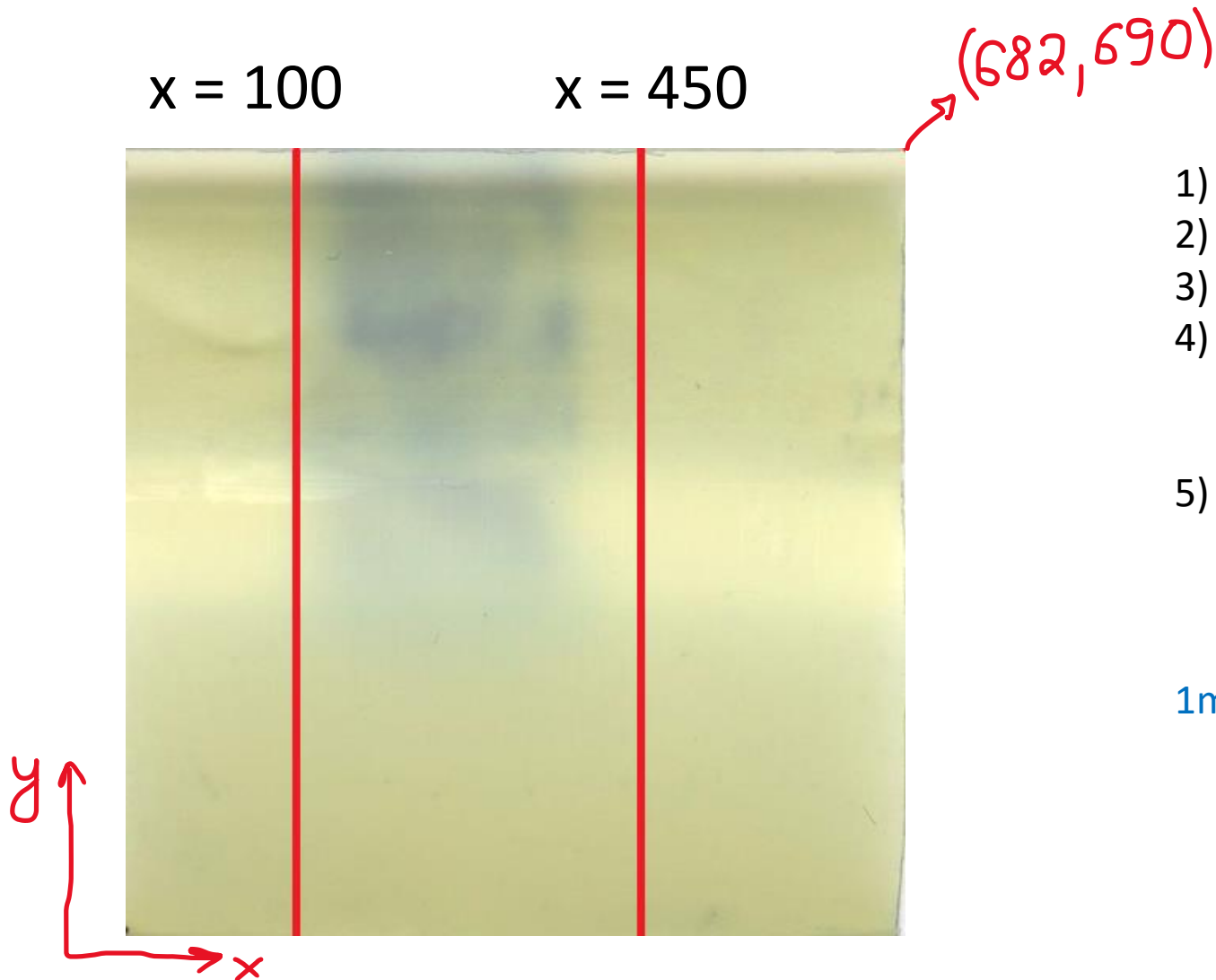
## Background removal algorithm – part 2

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ATLAS-JINR FCalPulse project meeting

17 October 2022

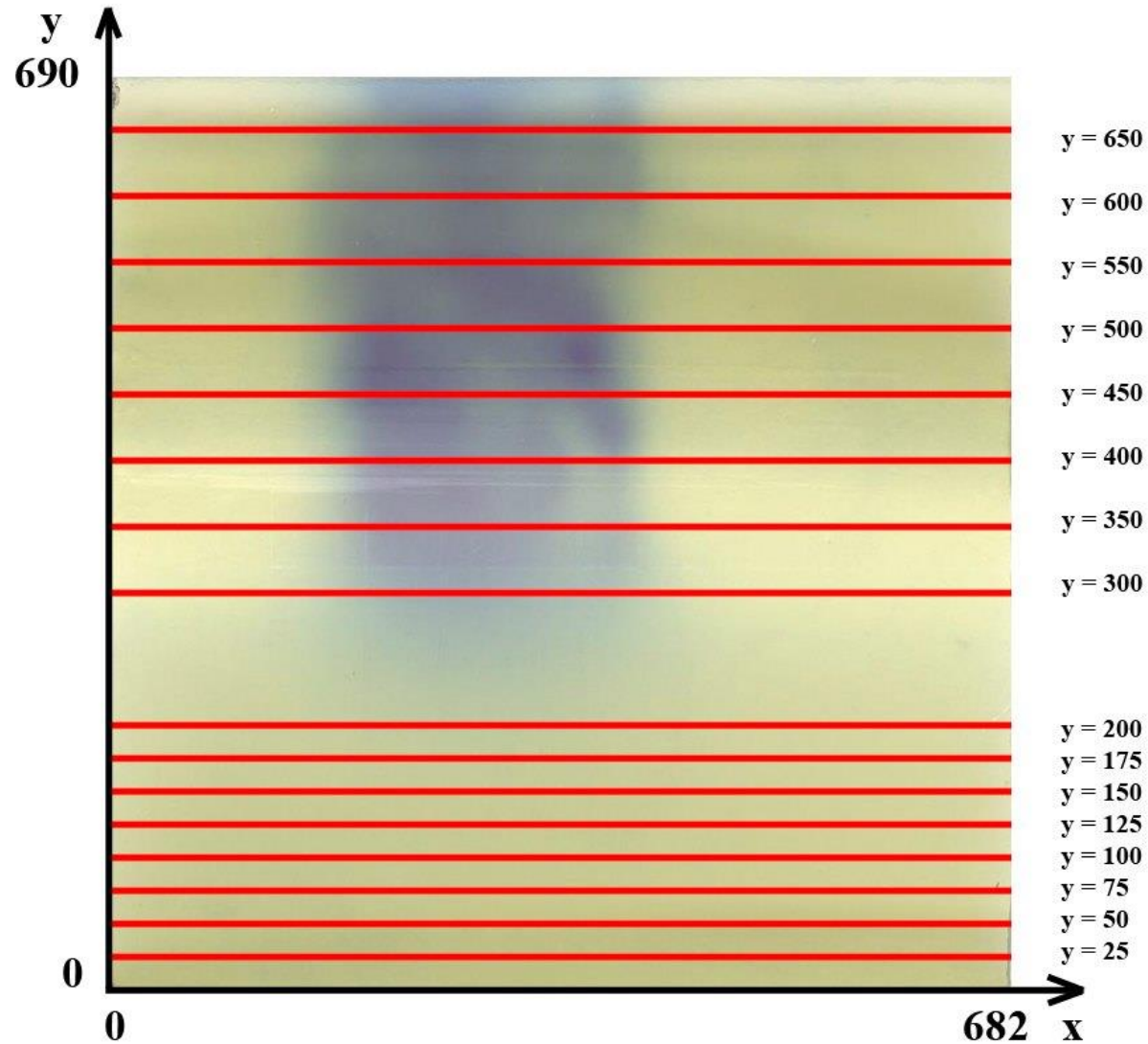
# Idea of Background removal algorithm



- 1) Draw 2 lines outside of the exposure area
- 2) Define RGB color codes on red lines.
- 3) Remove area between the lines.
- 4) Connect dots between the lines using **polynomial function** and fill the area to define background
- 5) Subtract background values from original image

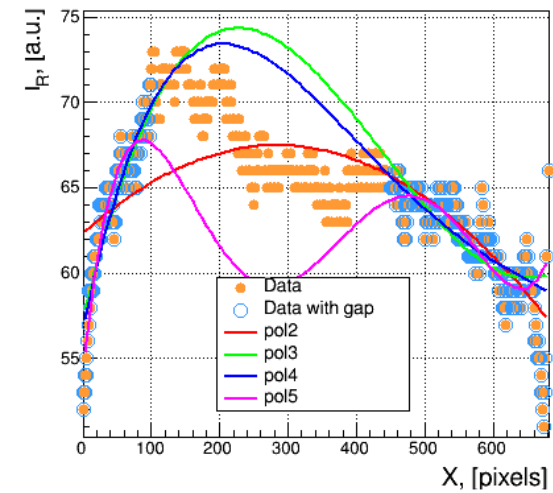
1mm = 25.4 pixels

# Idea of Background removal algorithm

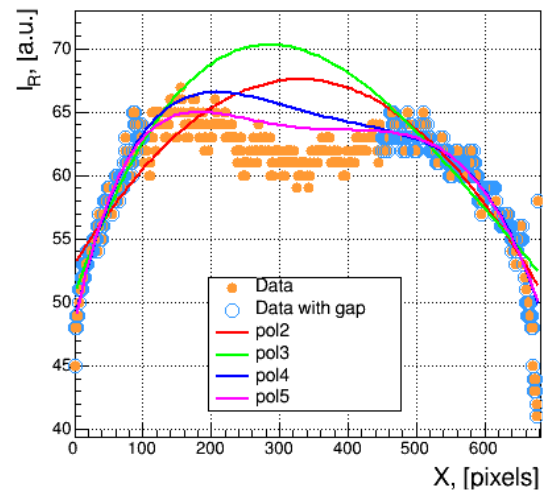


# 1 min 30 sec (Red)

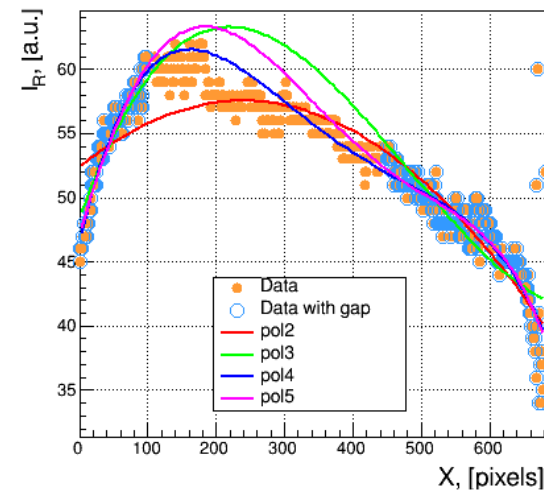
y = 25



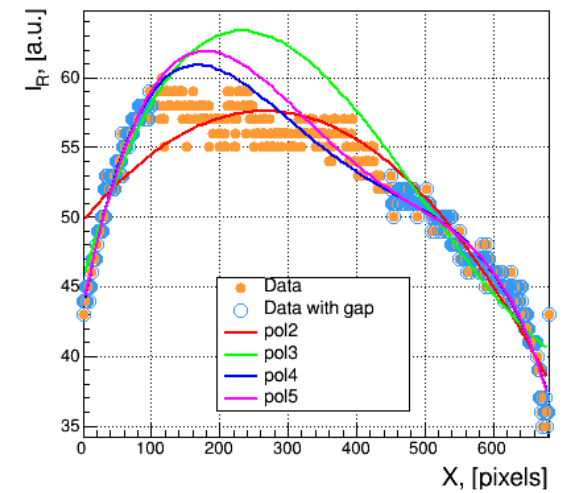
y = 50



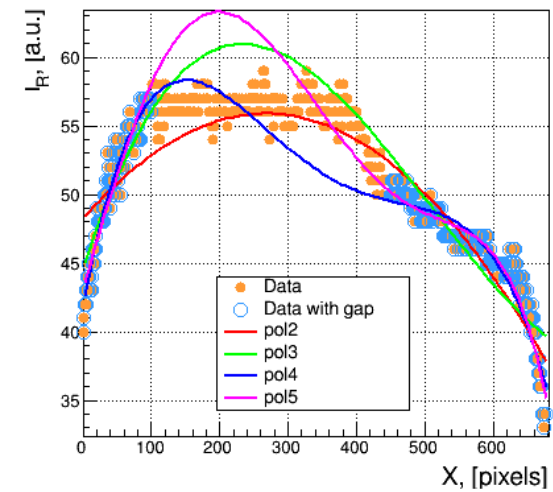
y = 75



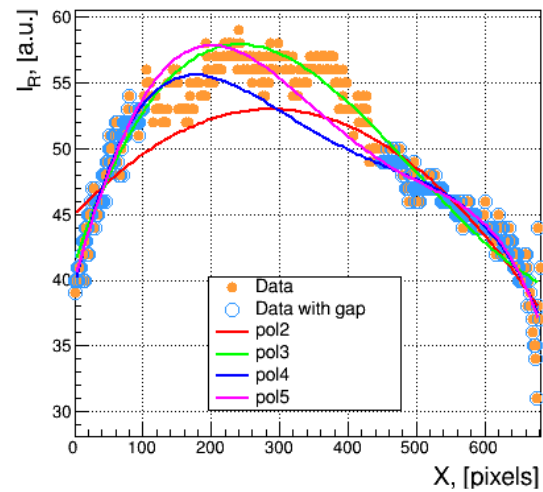
y = 100



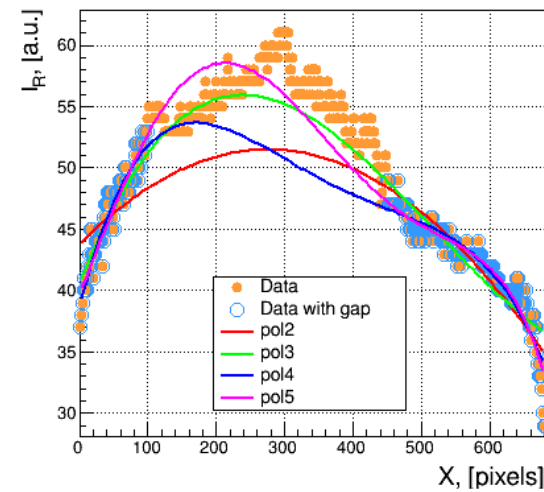
y = 125



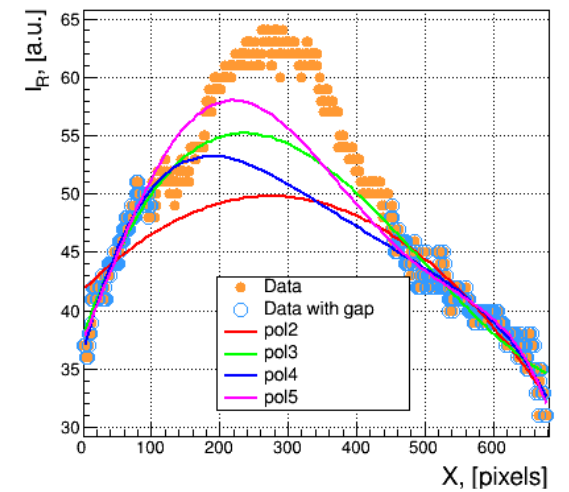
y = 150



y = 175

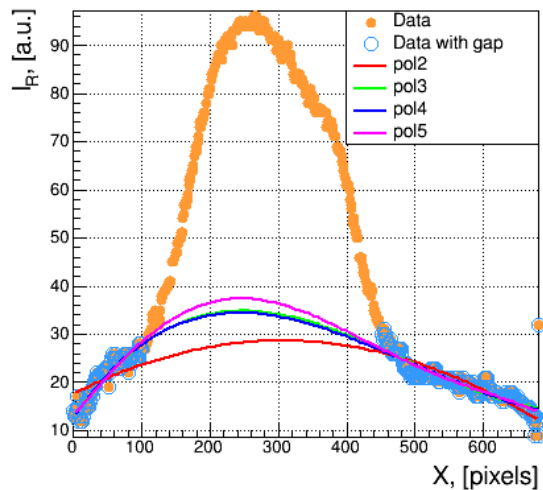


y = 200

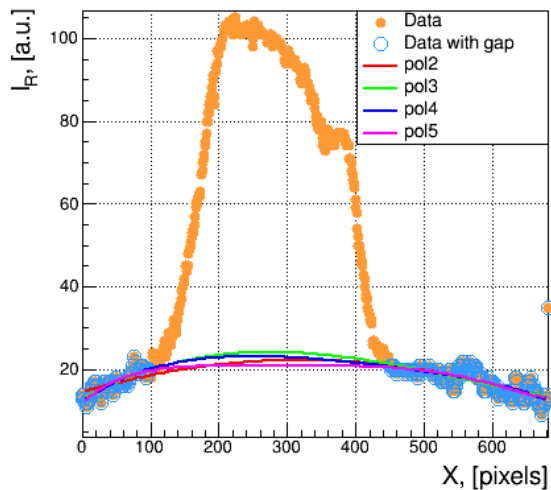


# 1 min 30 sec (Red)

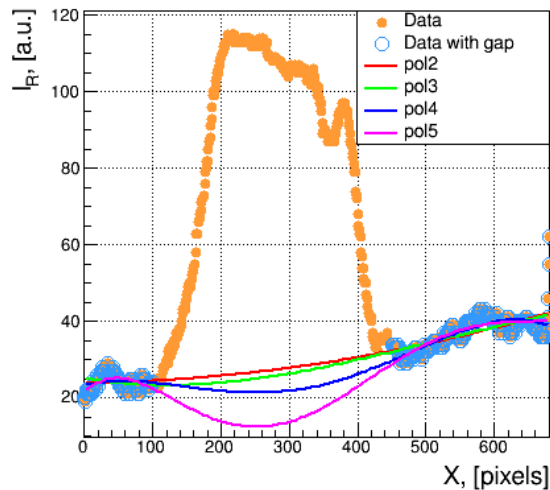
y = 300



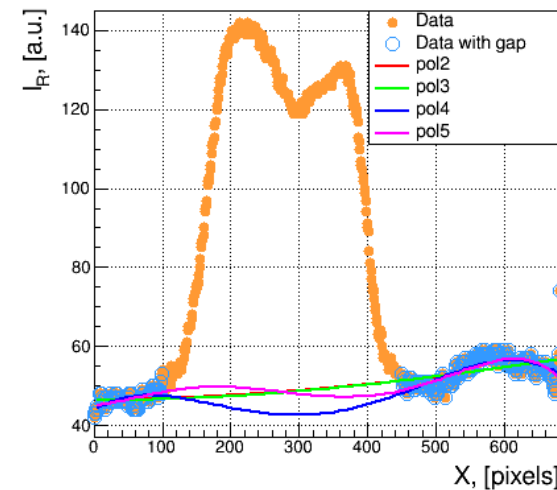
y = 350



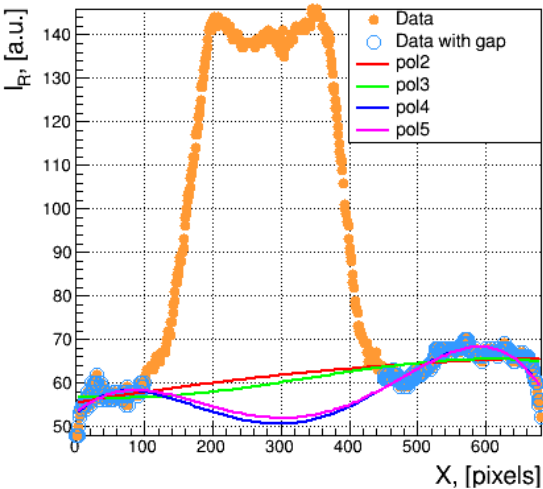
y = 400



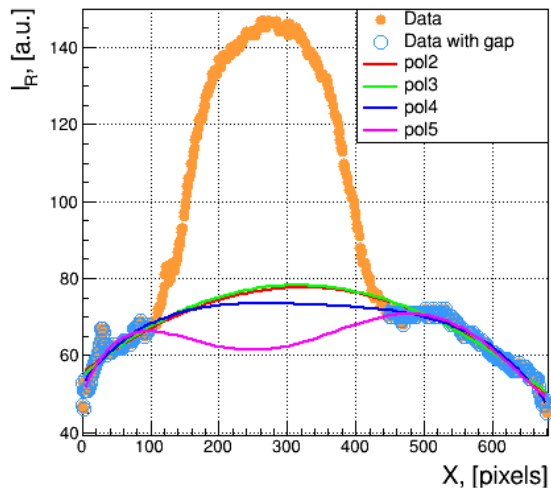
y = 450



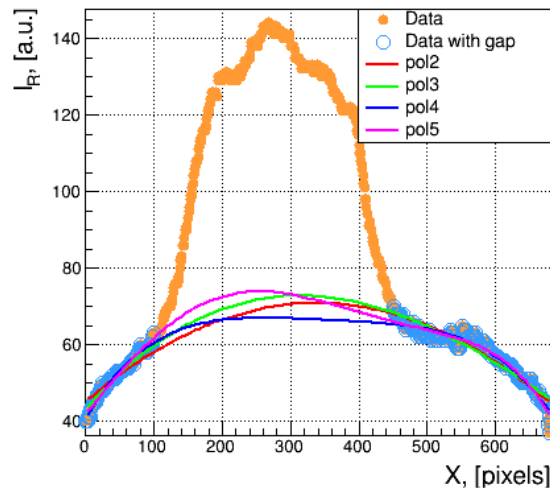
y = 500



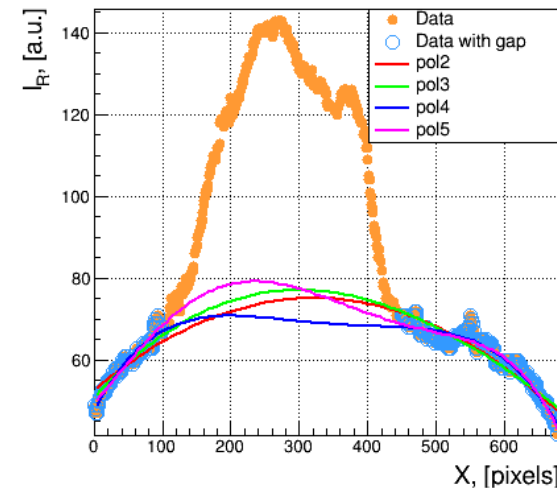
y = 550



y = 600

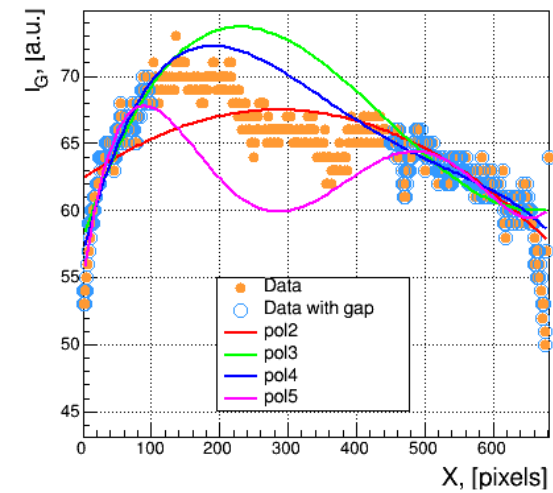


y = 650

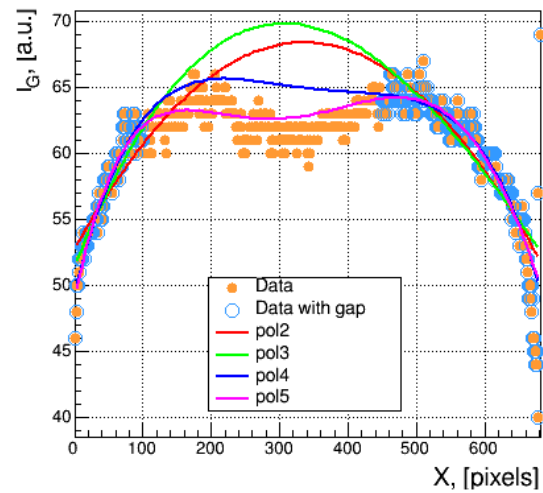


# 1 min 30 sec (Green)

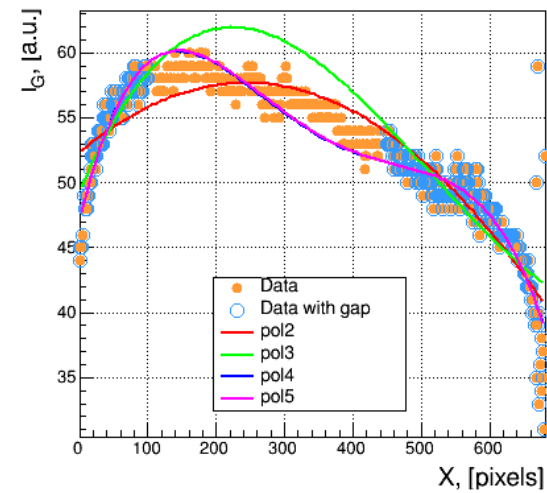
y = 25



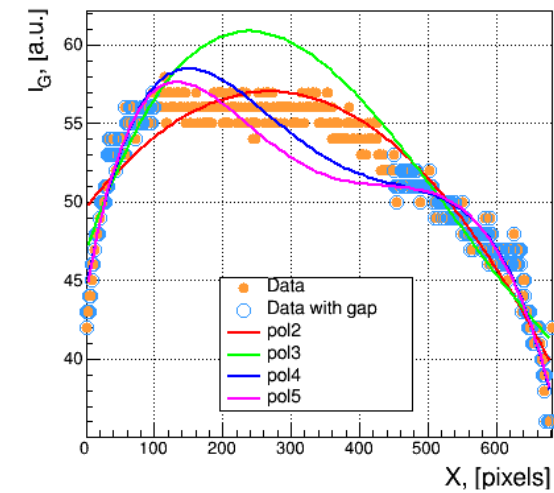
y = 50



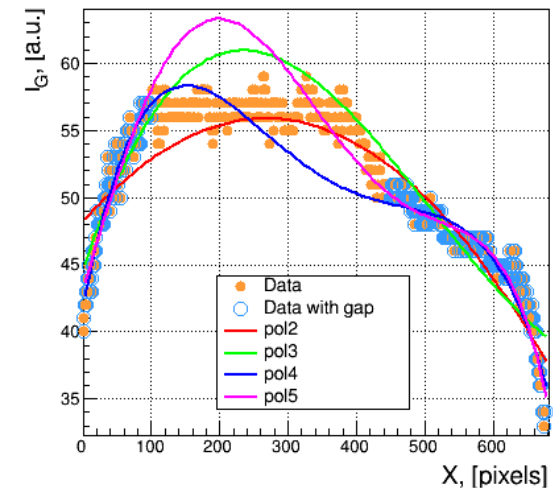
y = 75



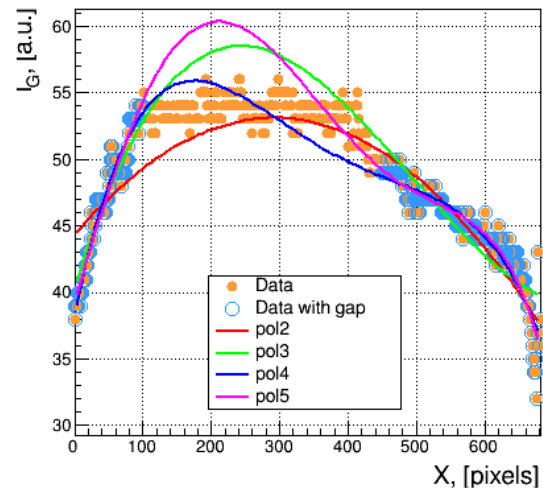
y = 100



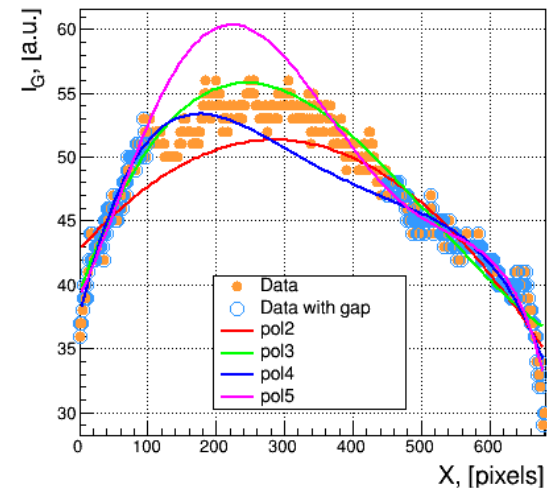
y = 125



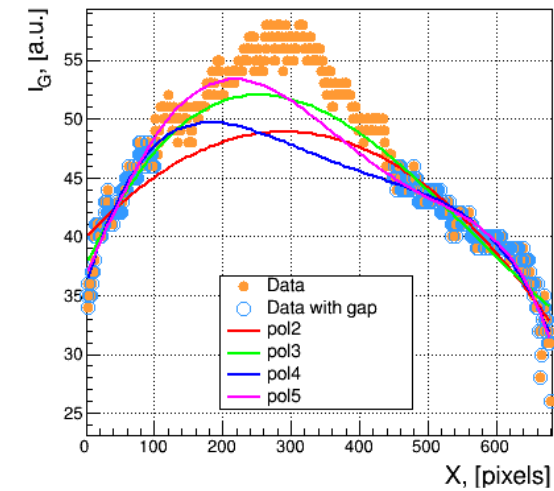
y = 150



y = 175

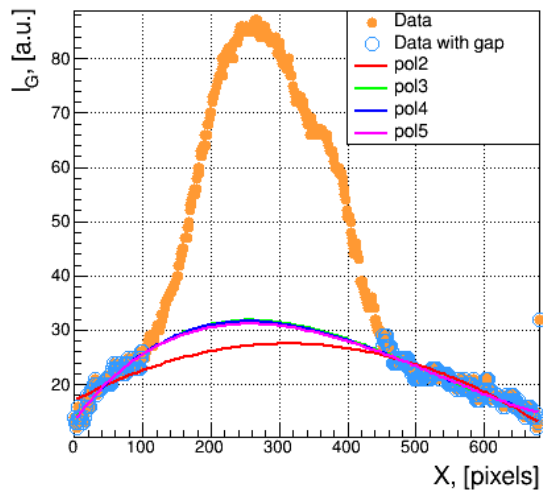


y = 200

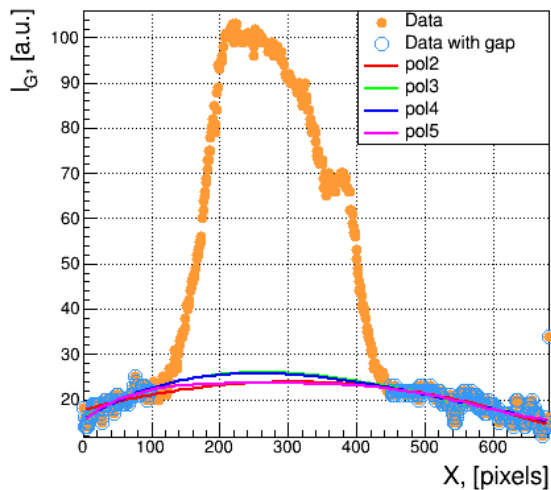


# 1 min 30 sec (Green)

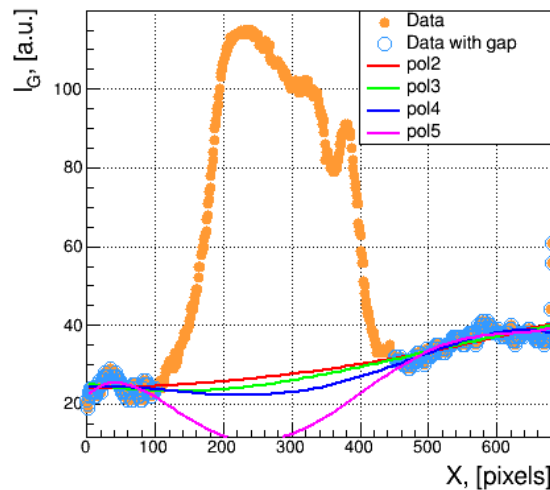
y = 300



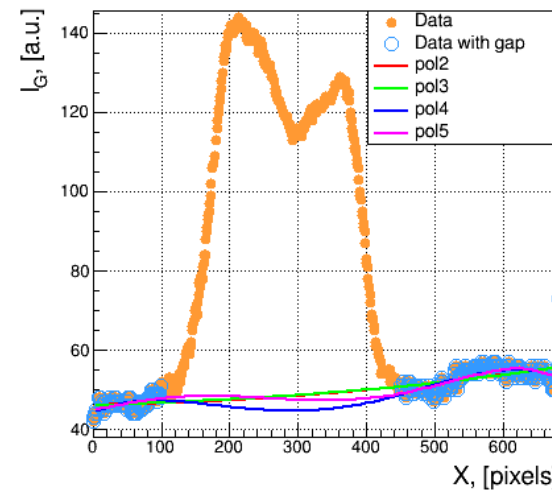
y = 350



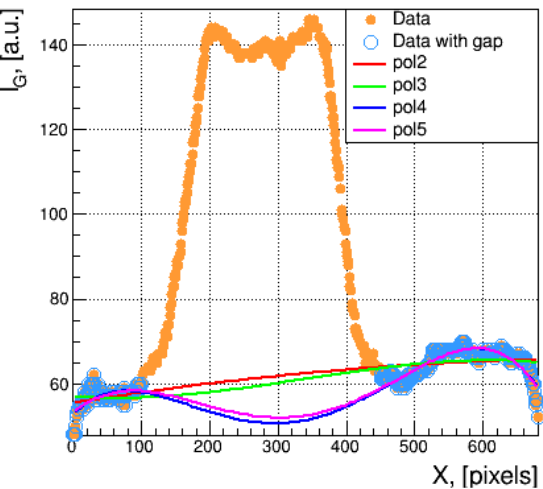
y = 400



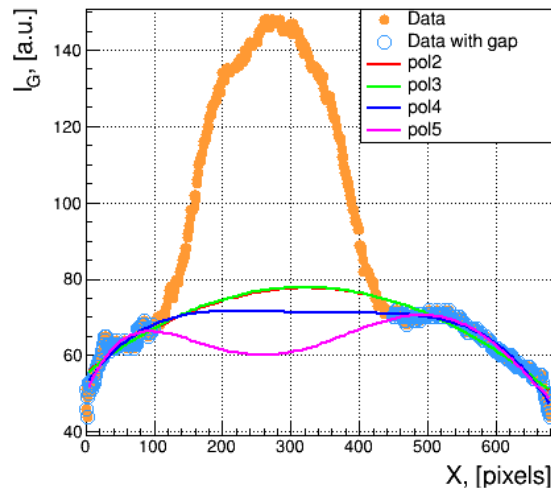
y = 450



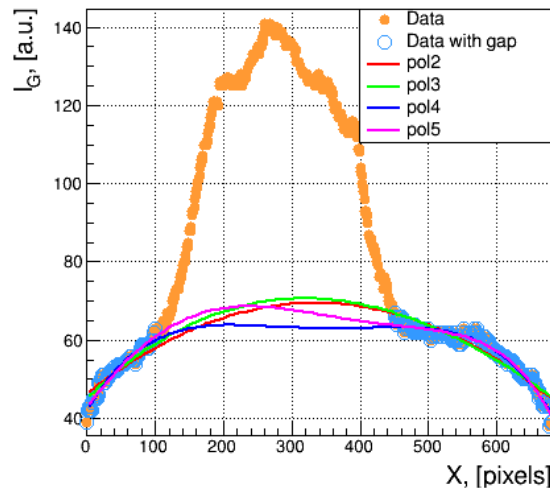
y = 500



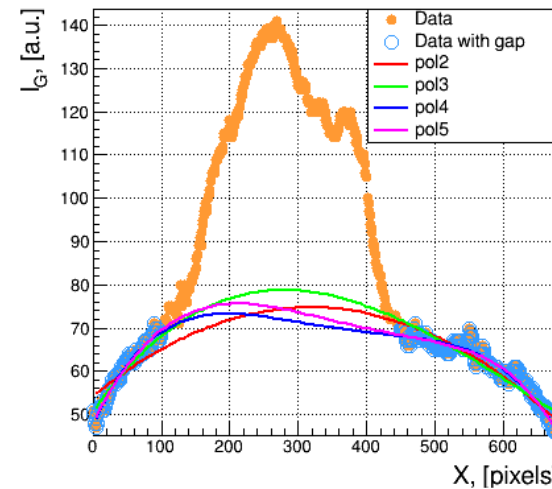
y = 550



y = 600

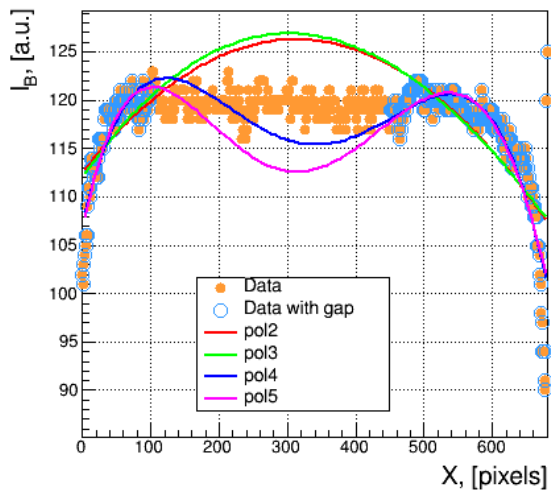


y = 650

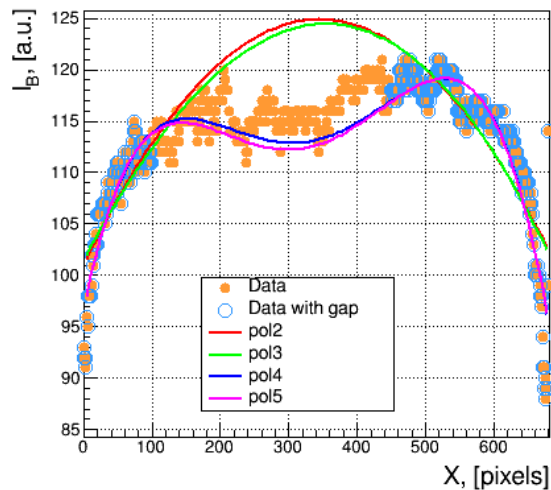


# 1 min 30 sec (Blue)

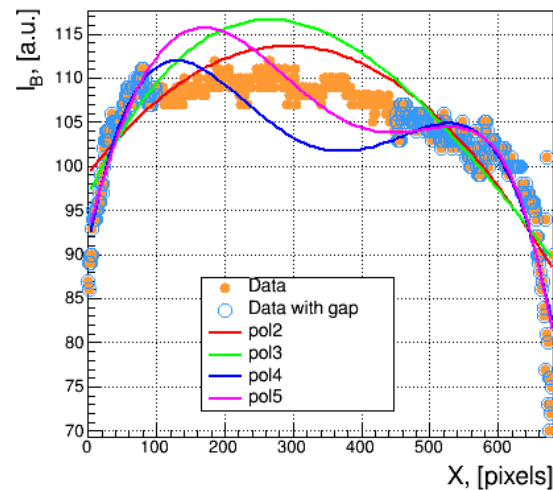
y = 25



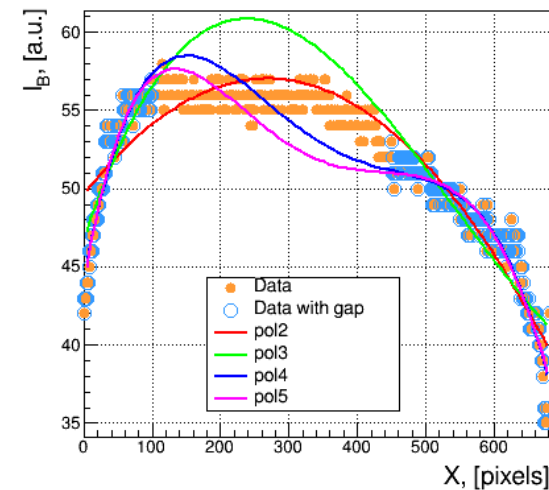
y = 50



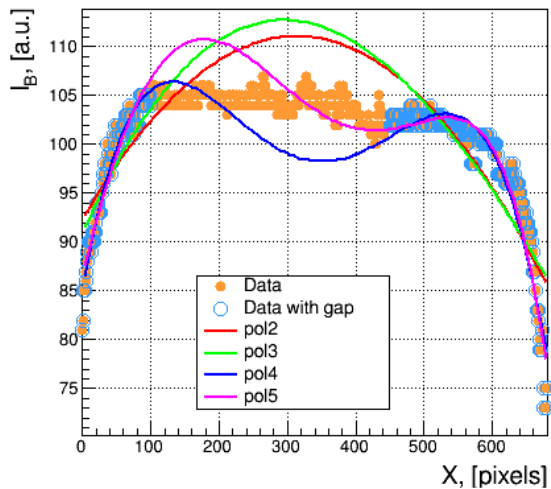
y = 75



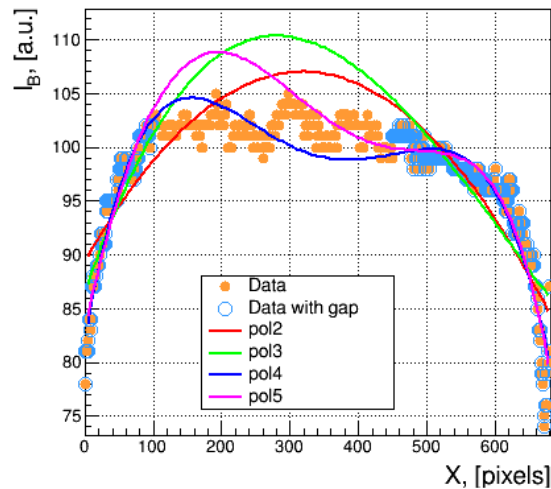
y = 100



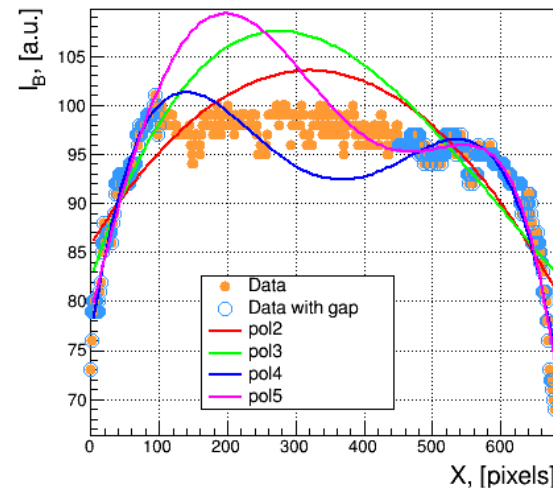
y = 125



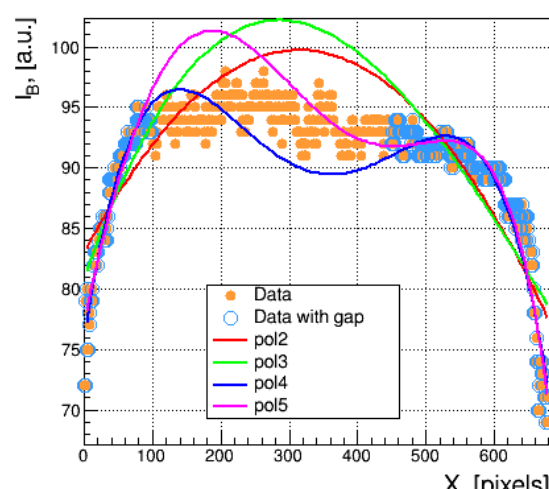
y = 150



y = 175



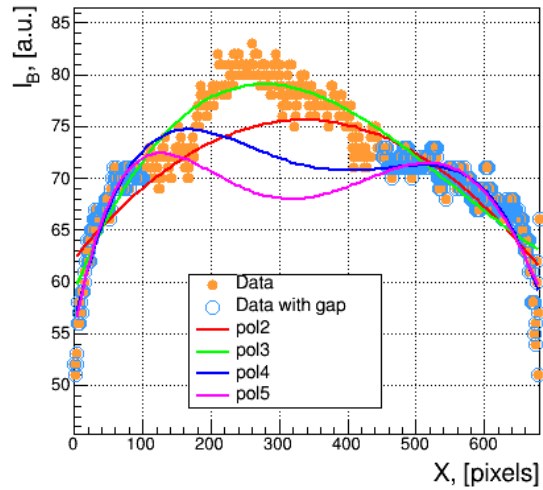
y = 200



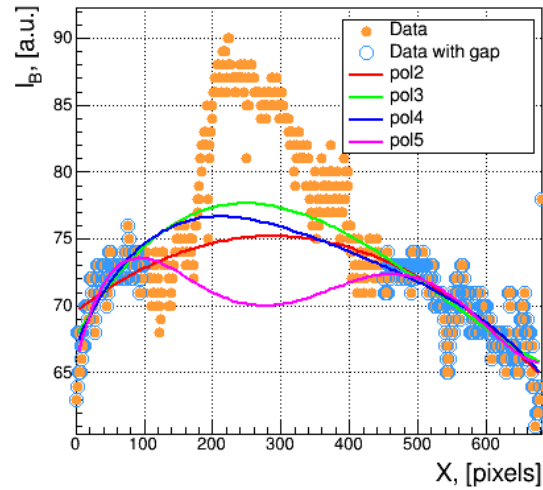


# 1 min 30 sec (Blue)

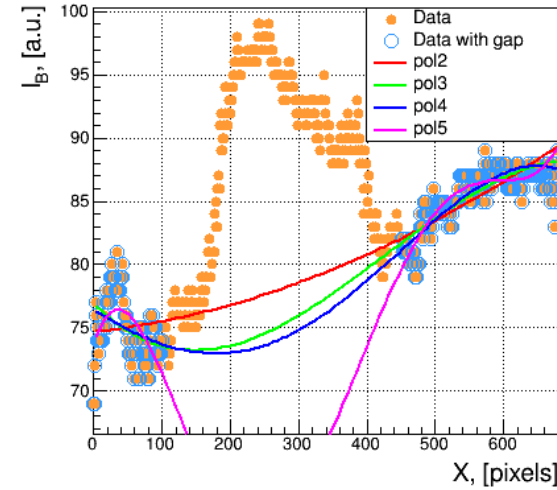
y = 300



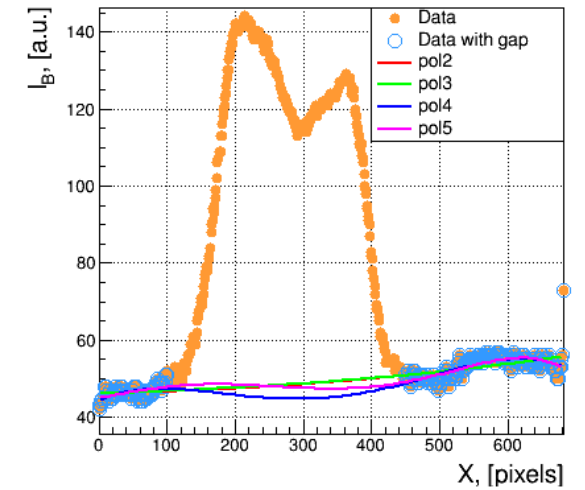
y = 350



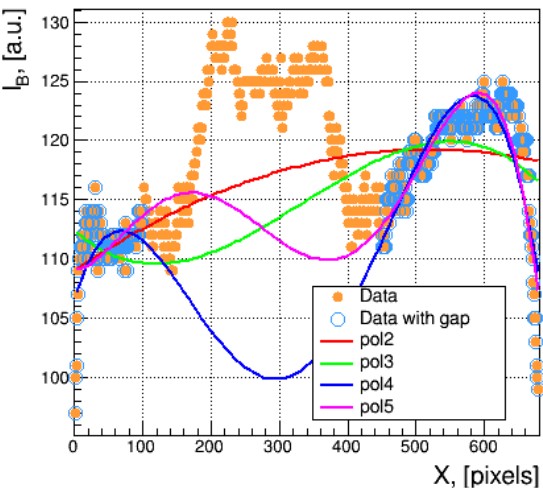
y = 400



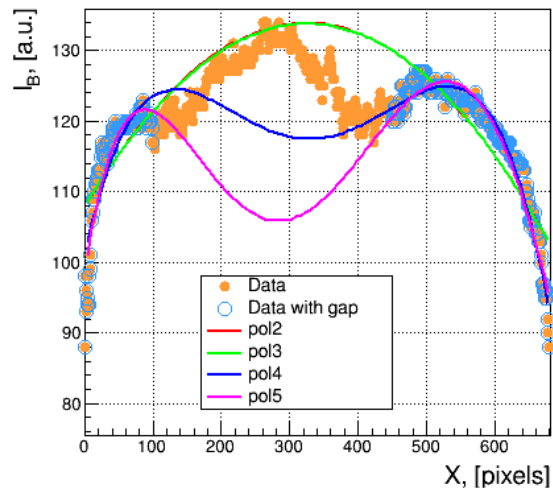
y = 450



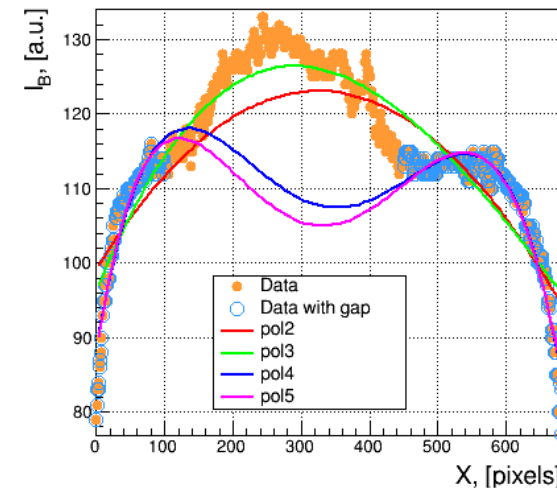
y = 500



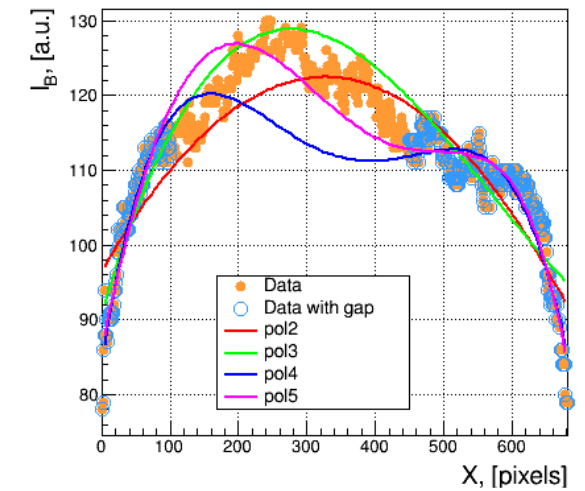
y = 550



y = 600

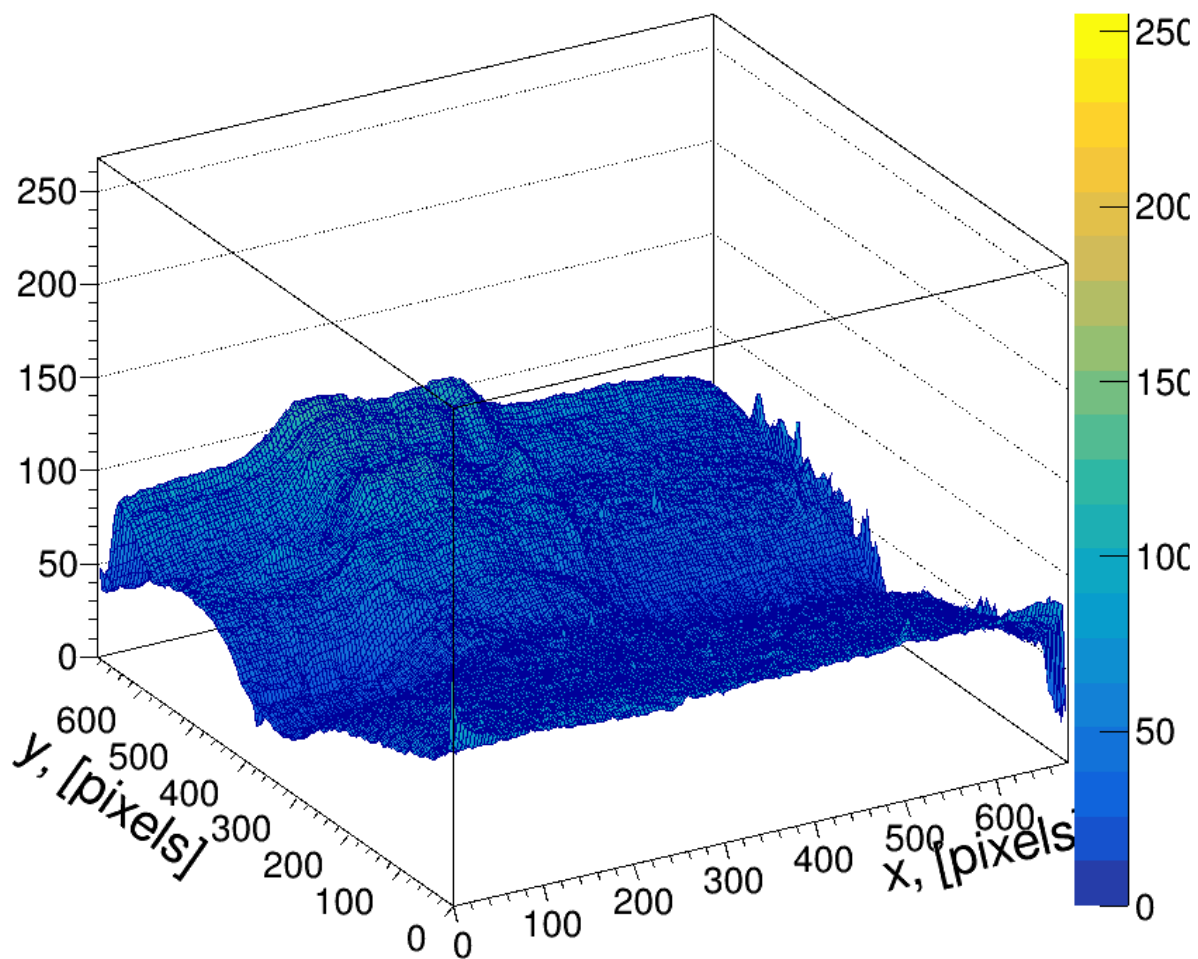


y = 650

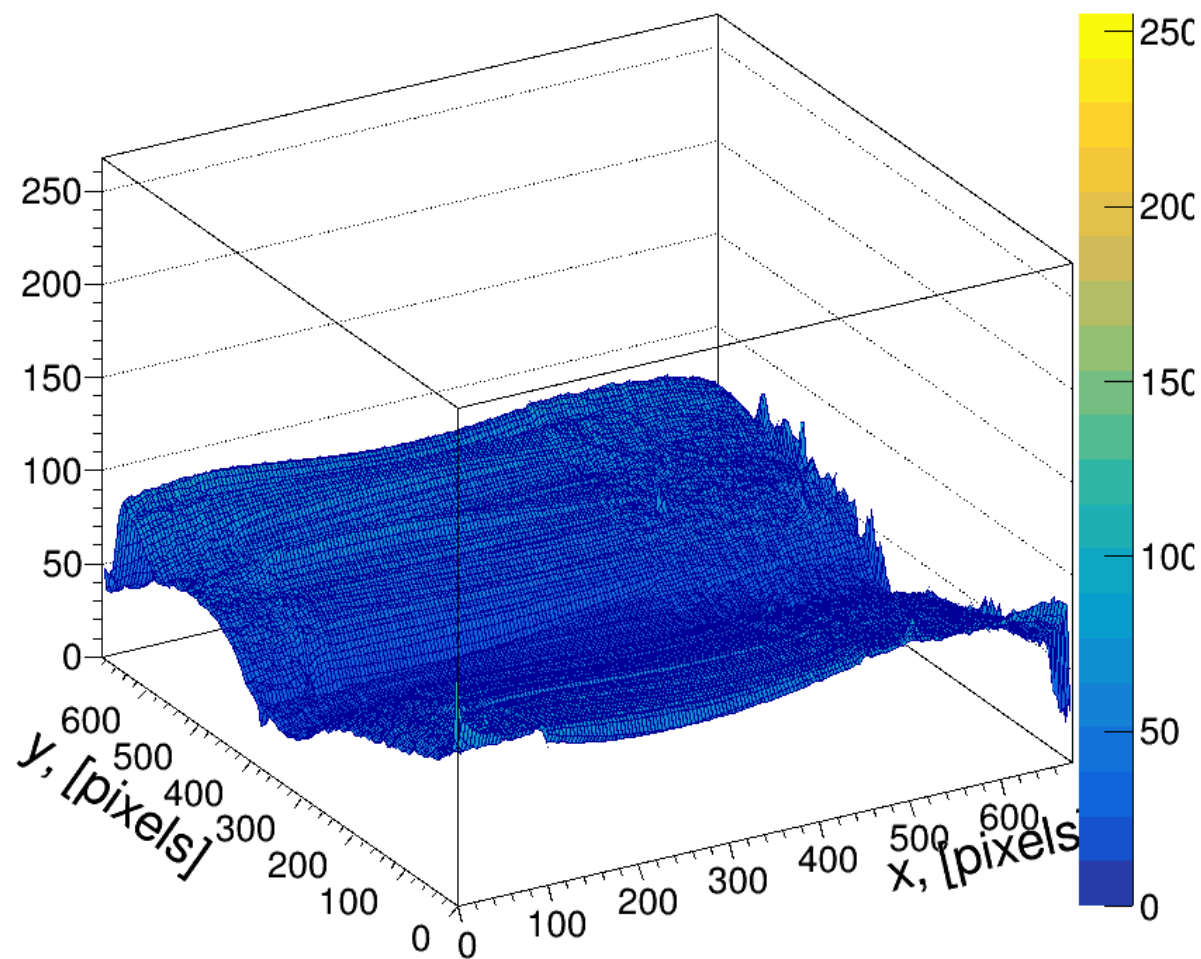


# 30 sec

## Original data

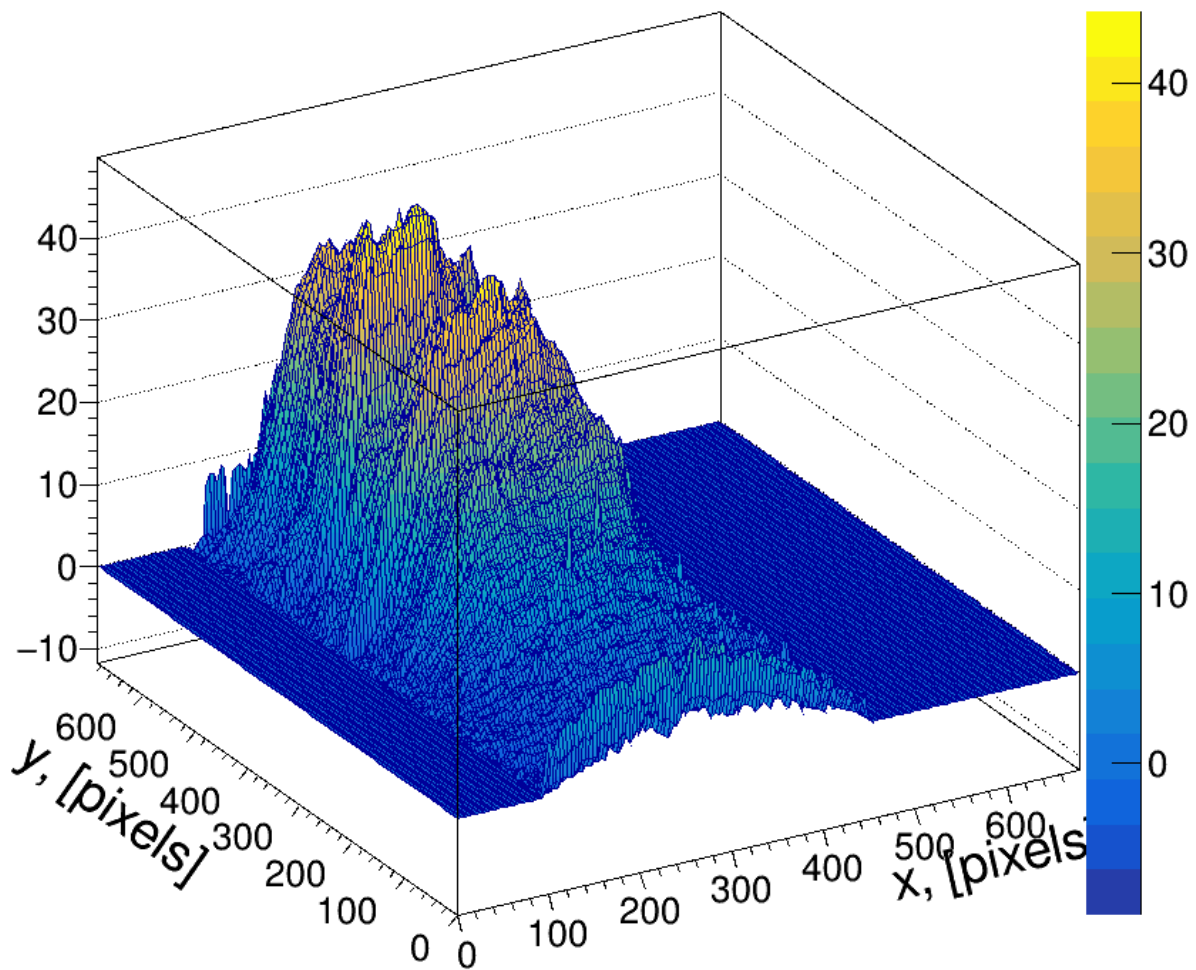


## Background distortion

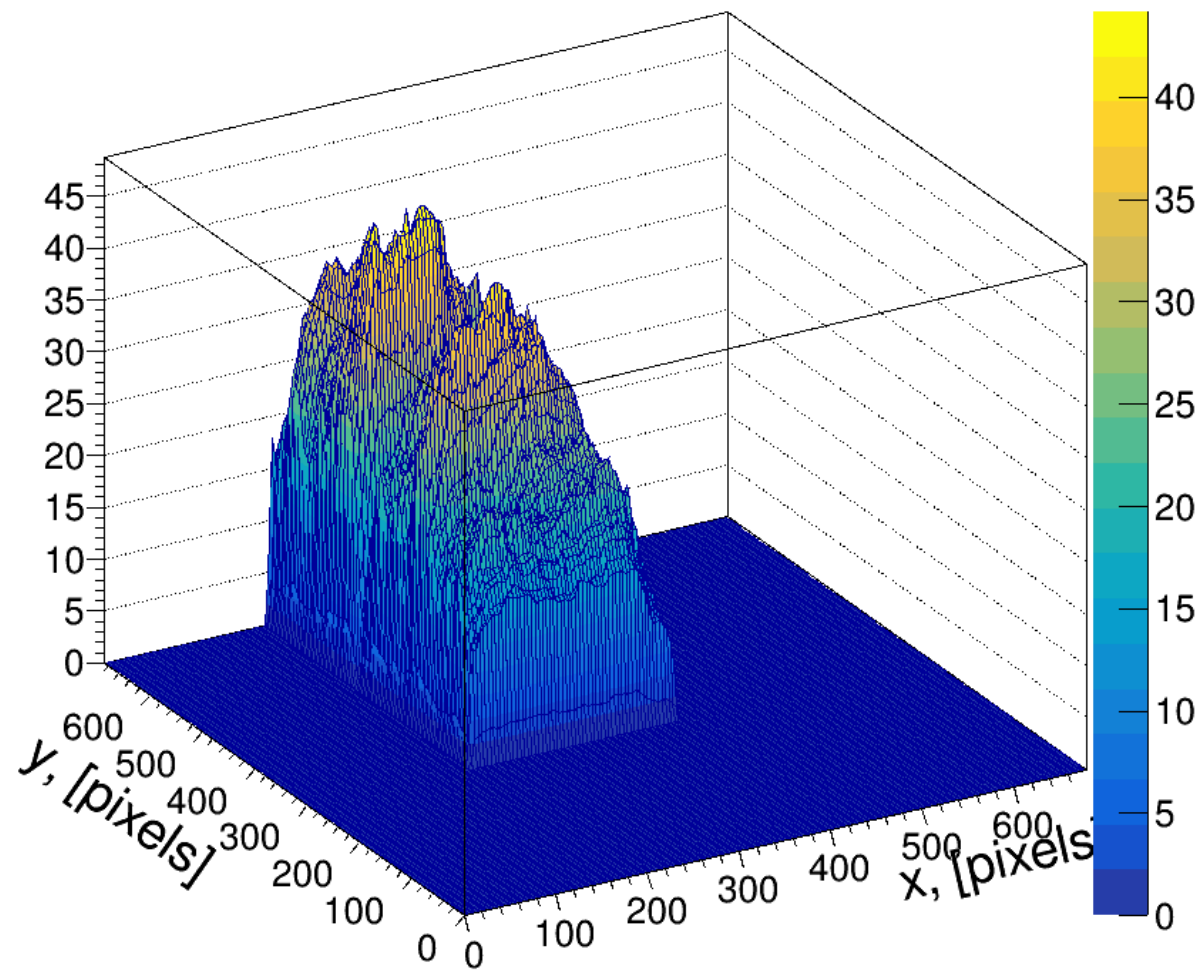


# 30 sec

Data without distortion

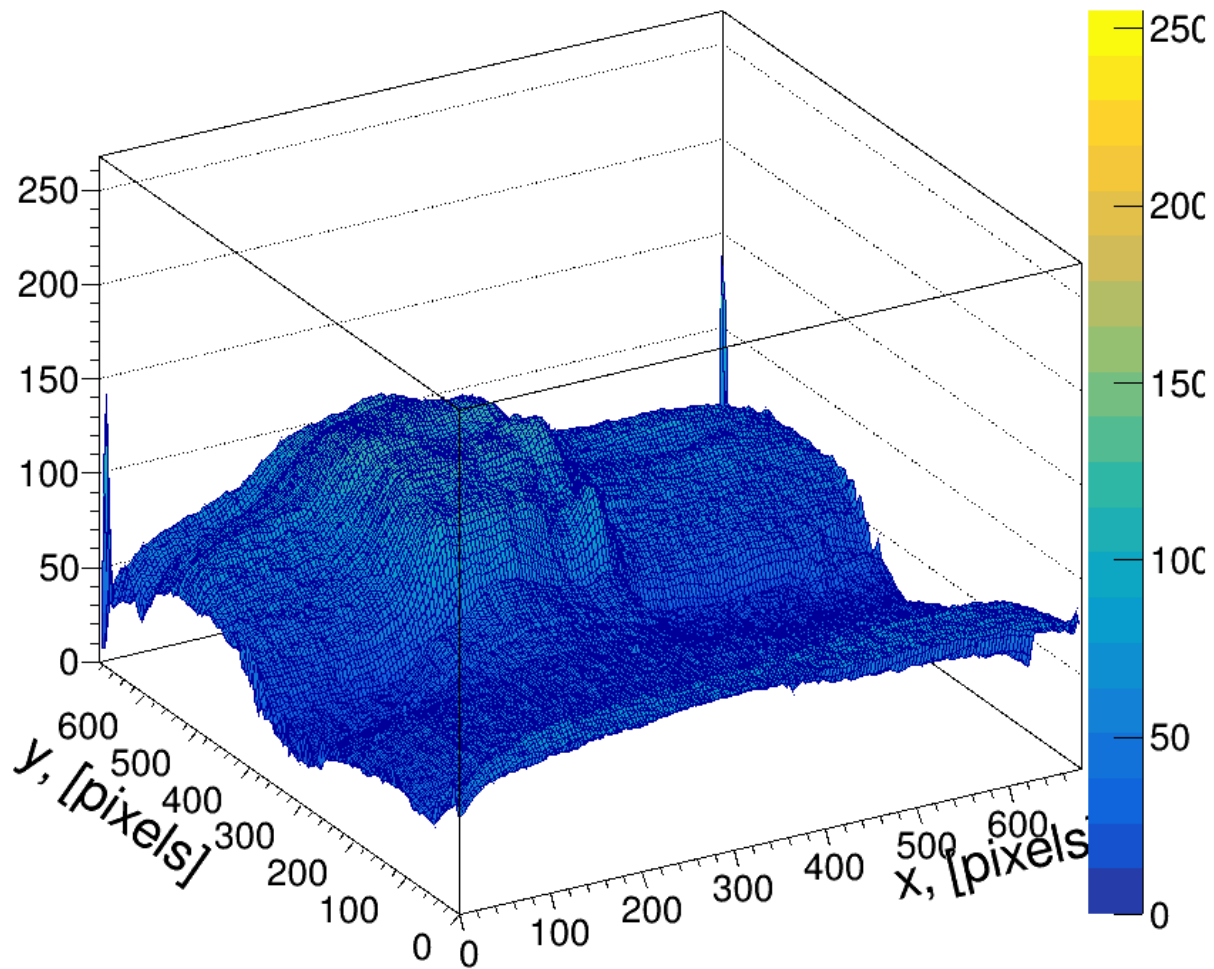


Data without distortion & negative values (cut applied)

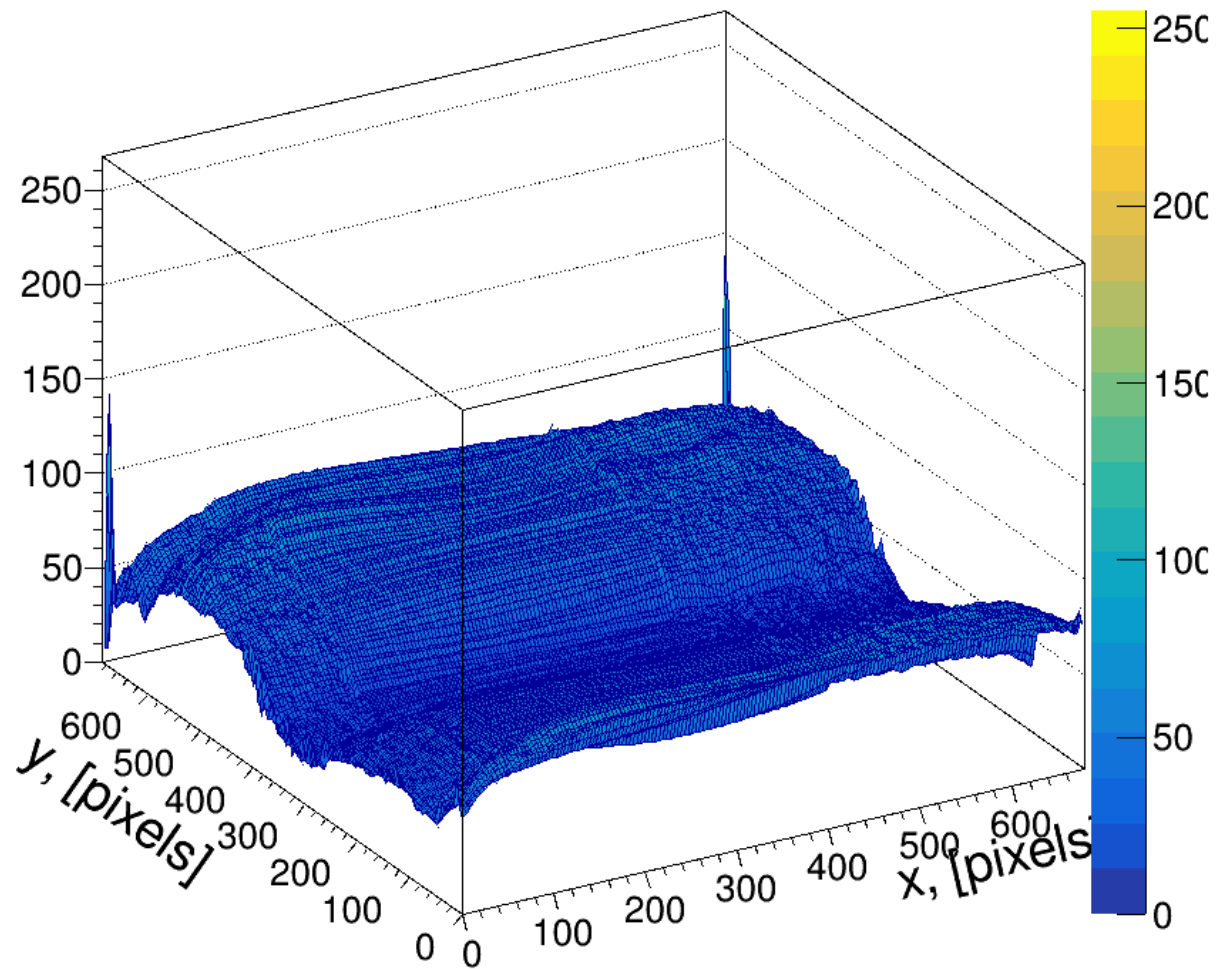


# 45 sec

## Original data

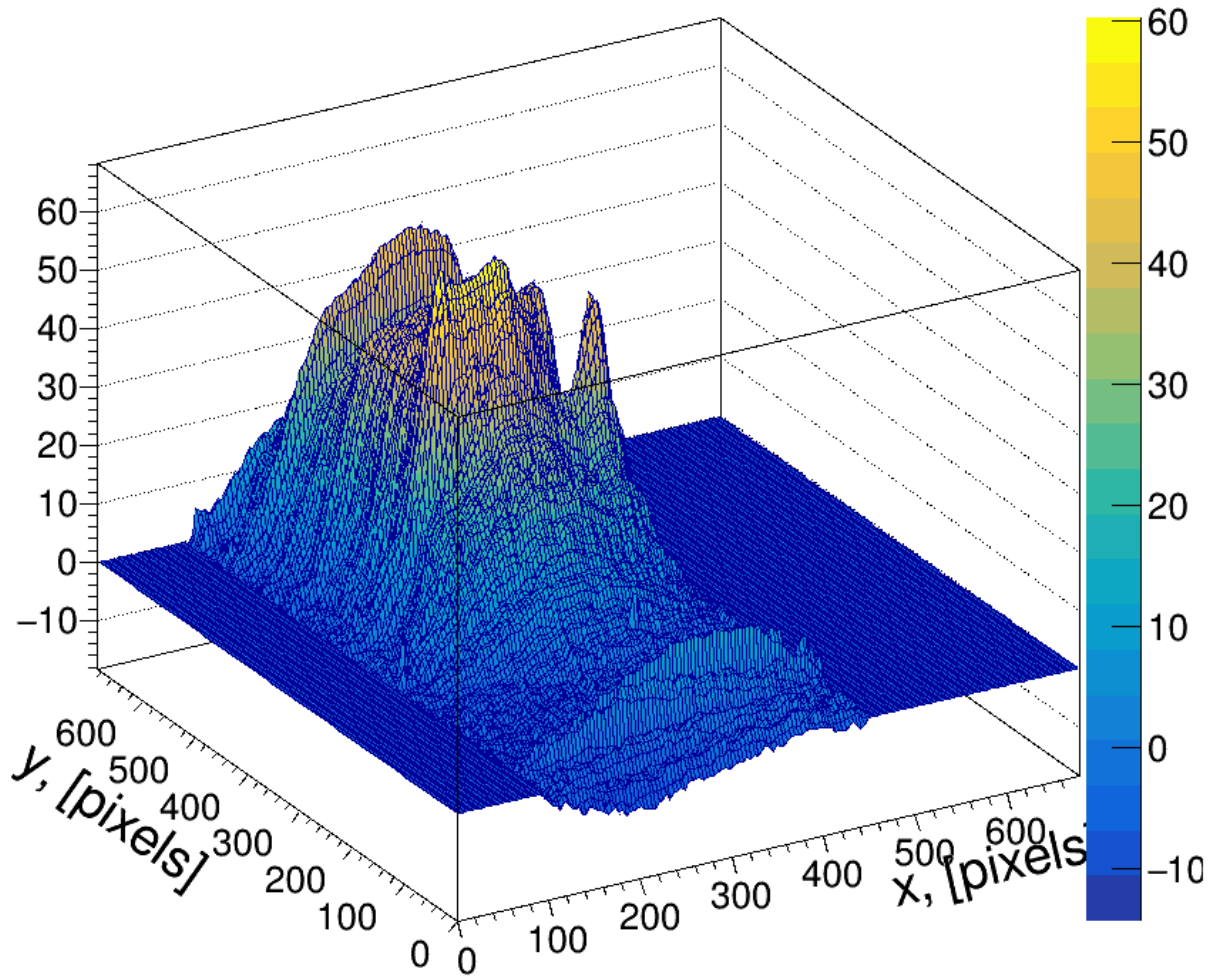


## Background distortion

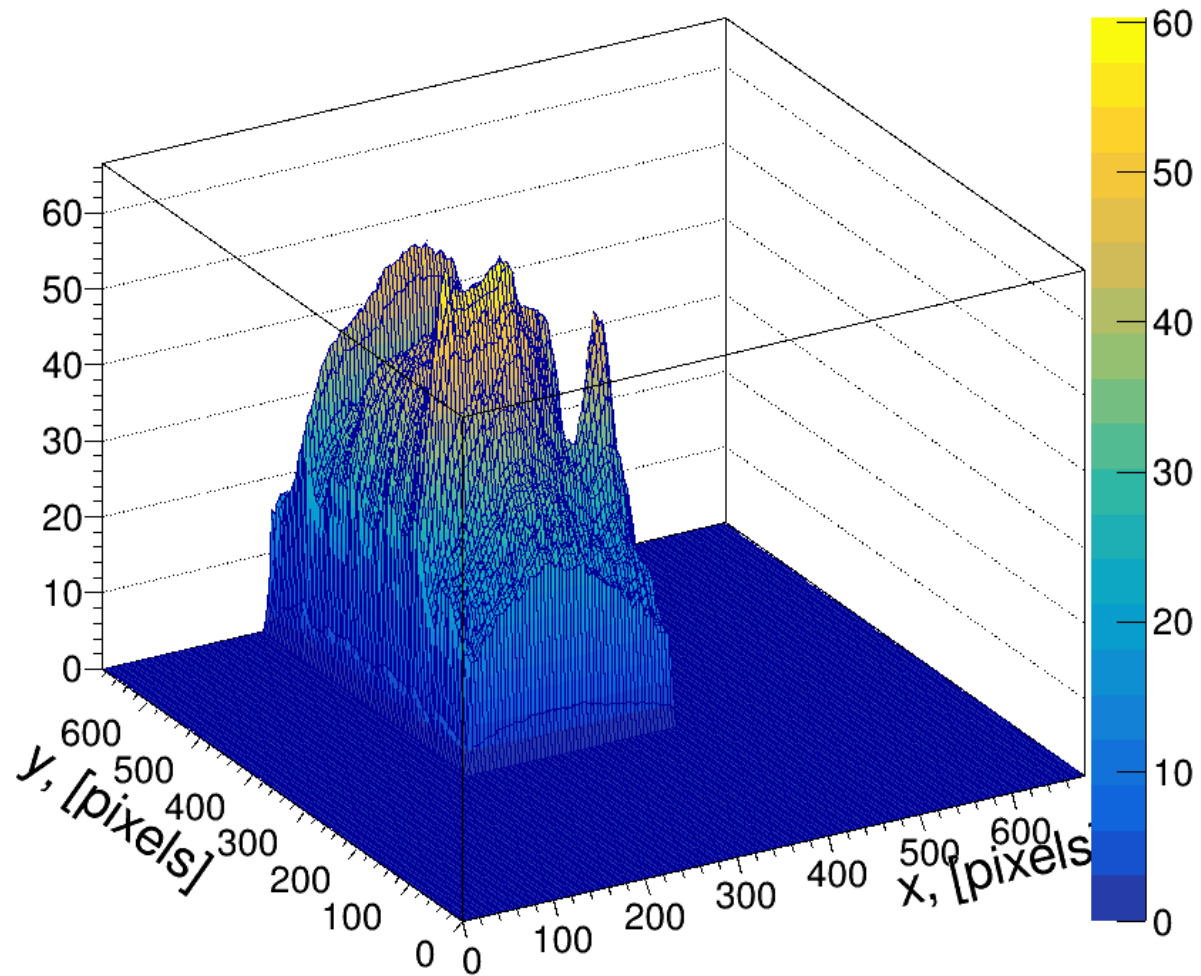


# 45 sec

Data without distortion

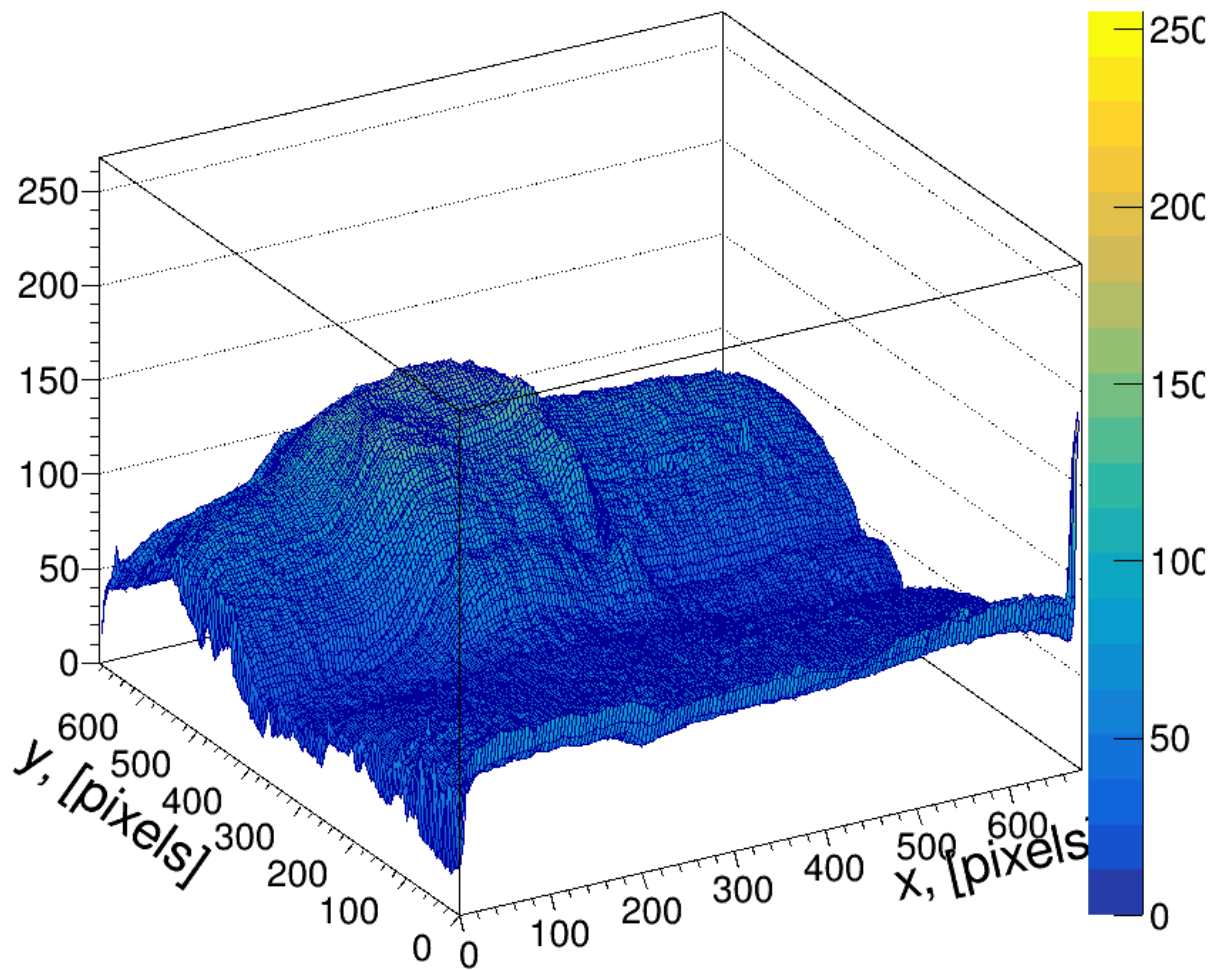


Data without distortion & negative values (cut applied)

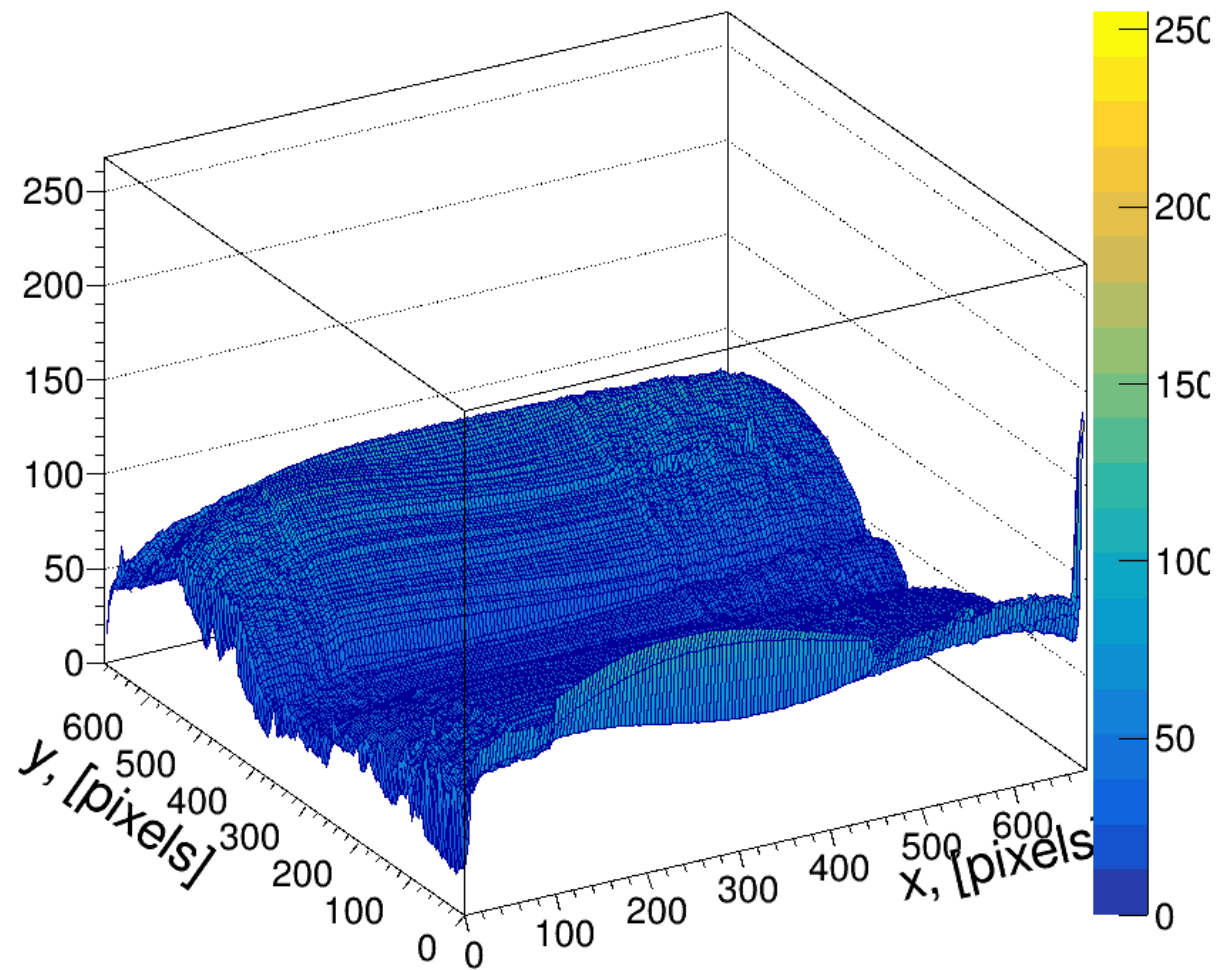


# 1 min

## Original data

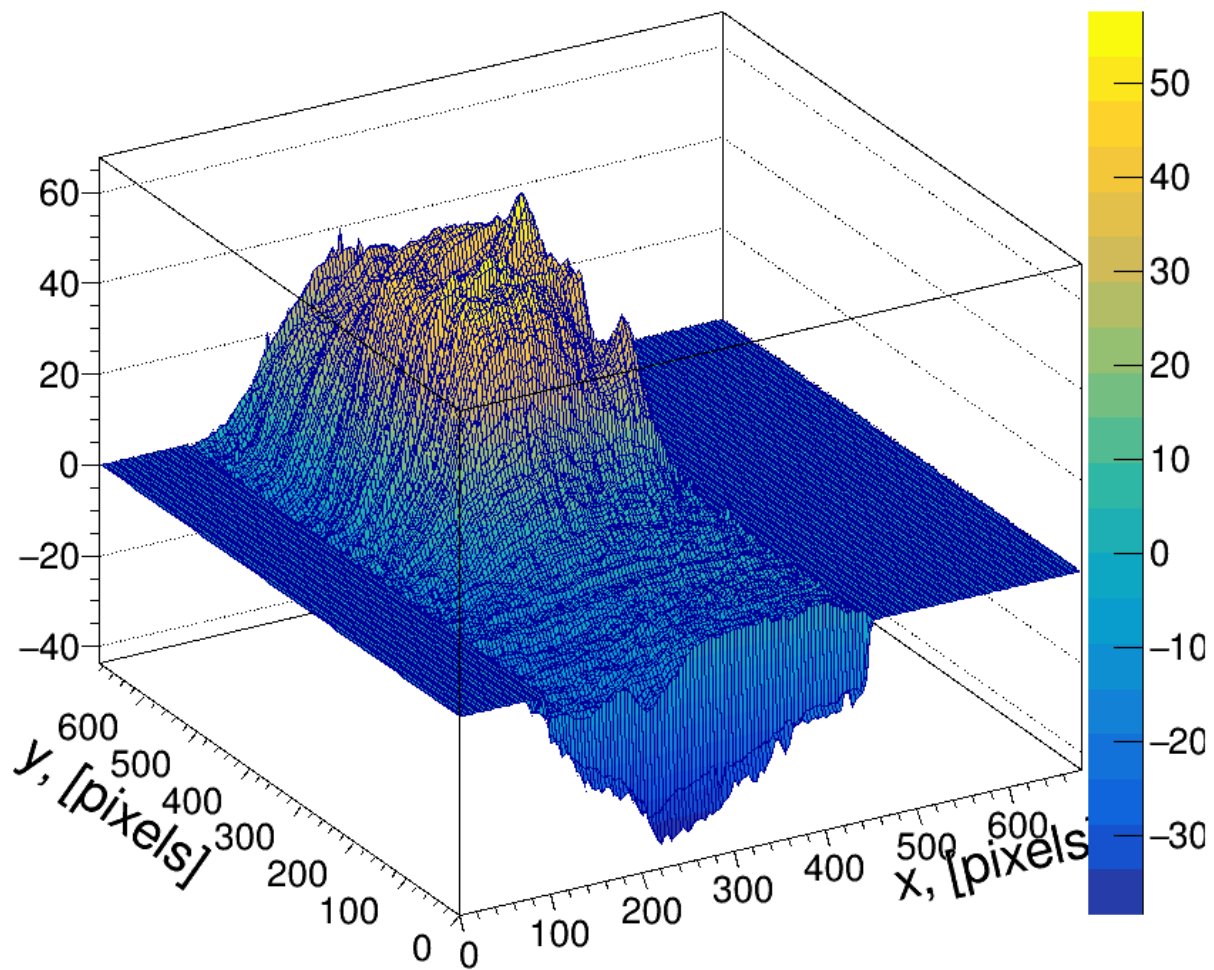


## Background distortion

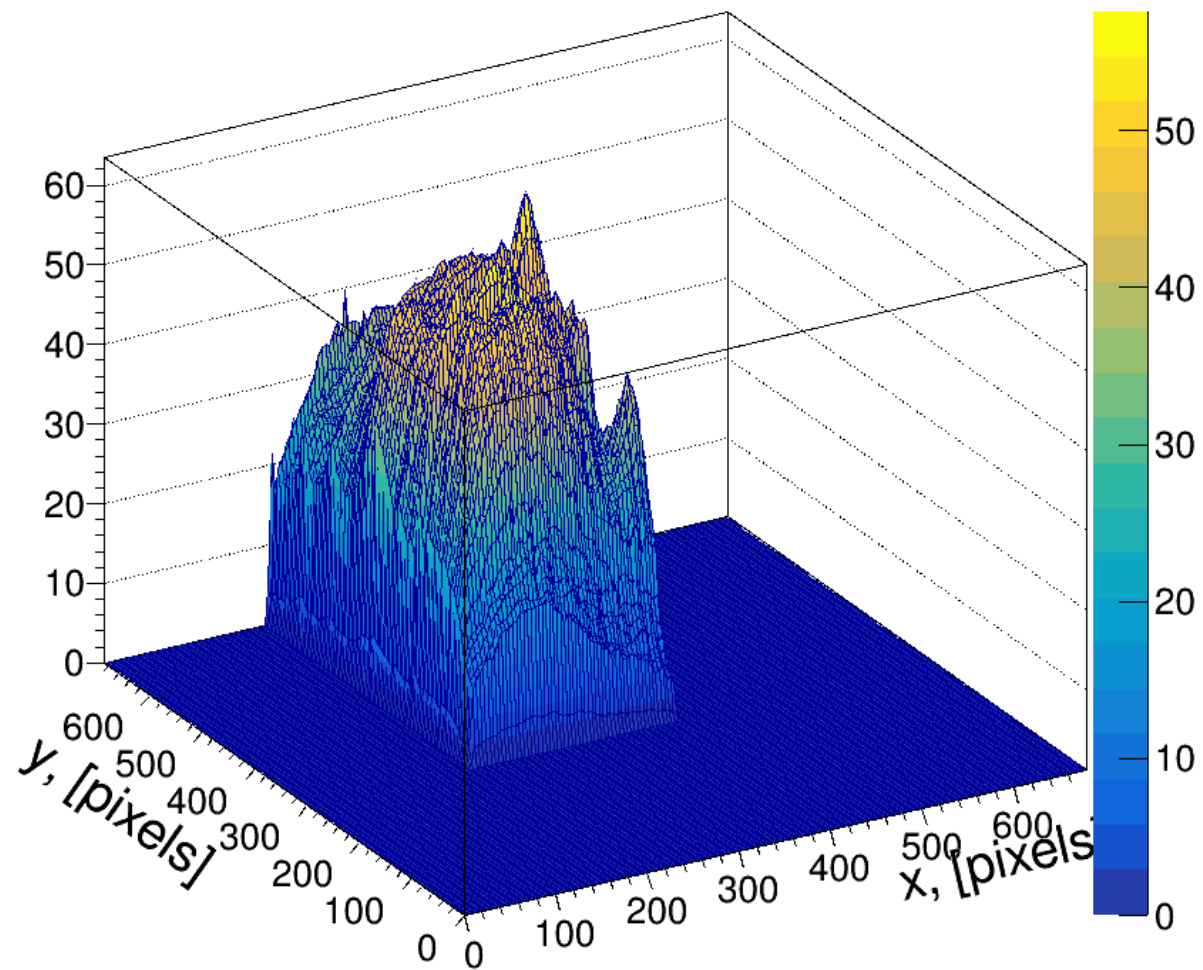


# 1 min

Data without distortion

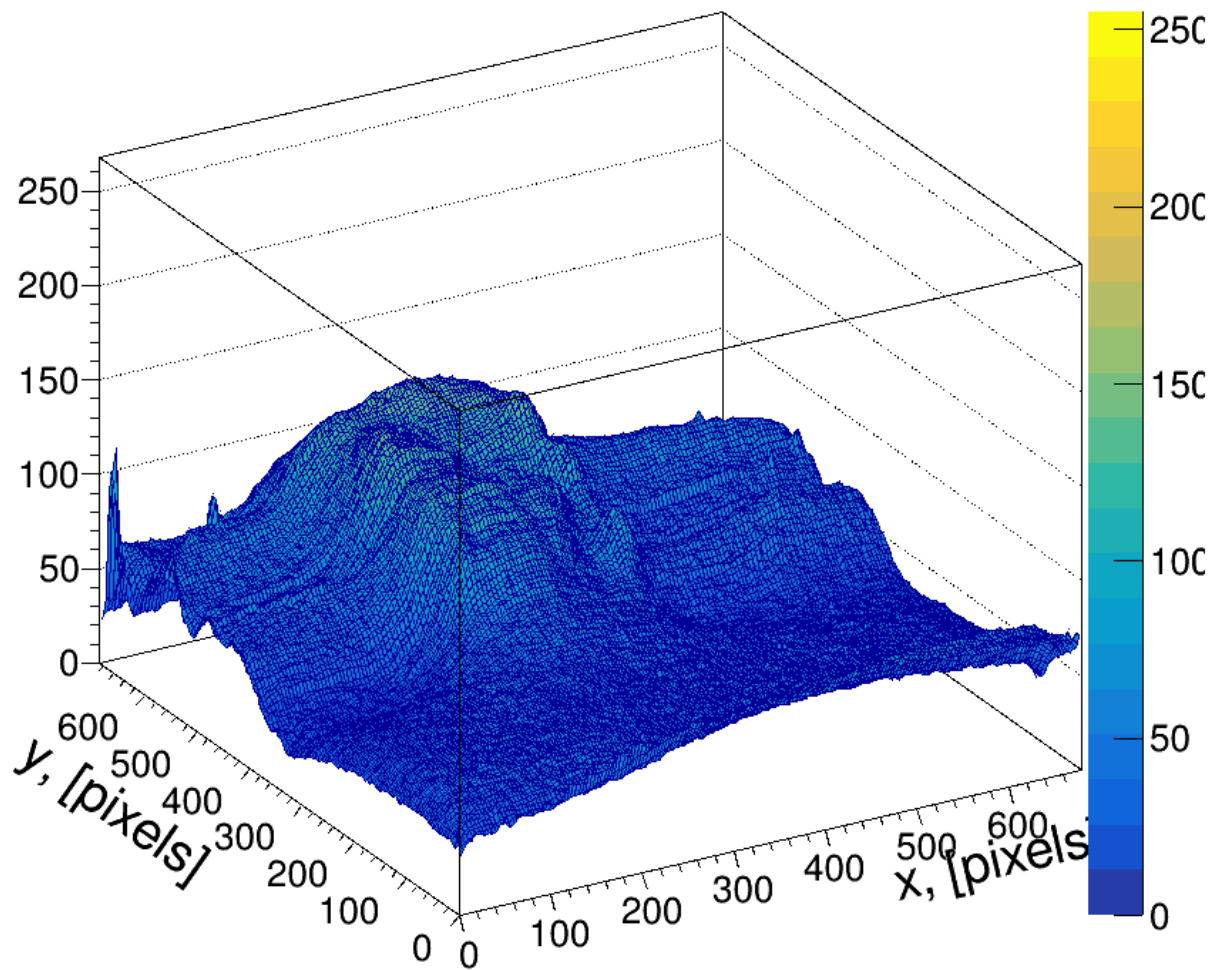


Data without distortion & negative values (cut applied)

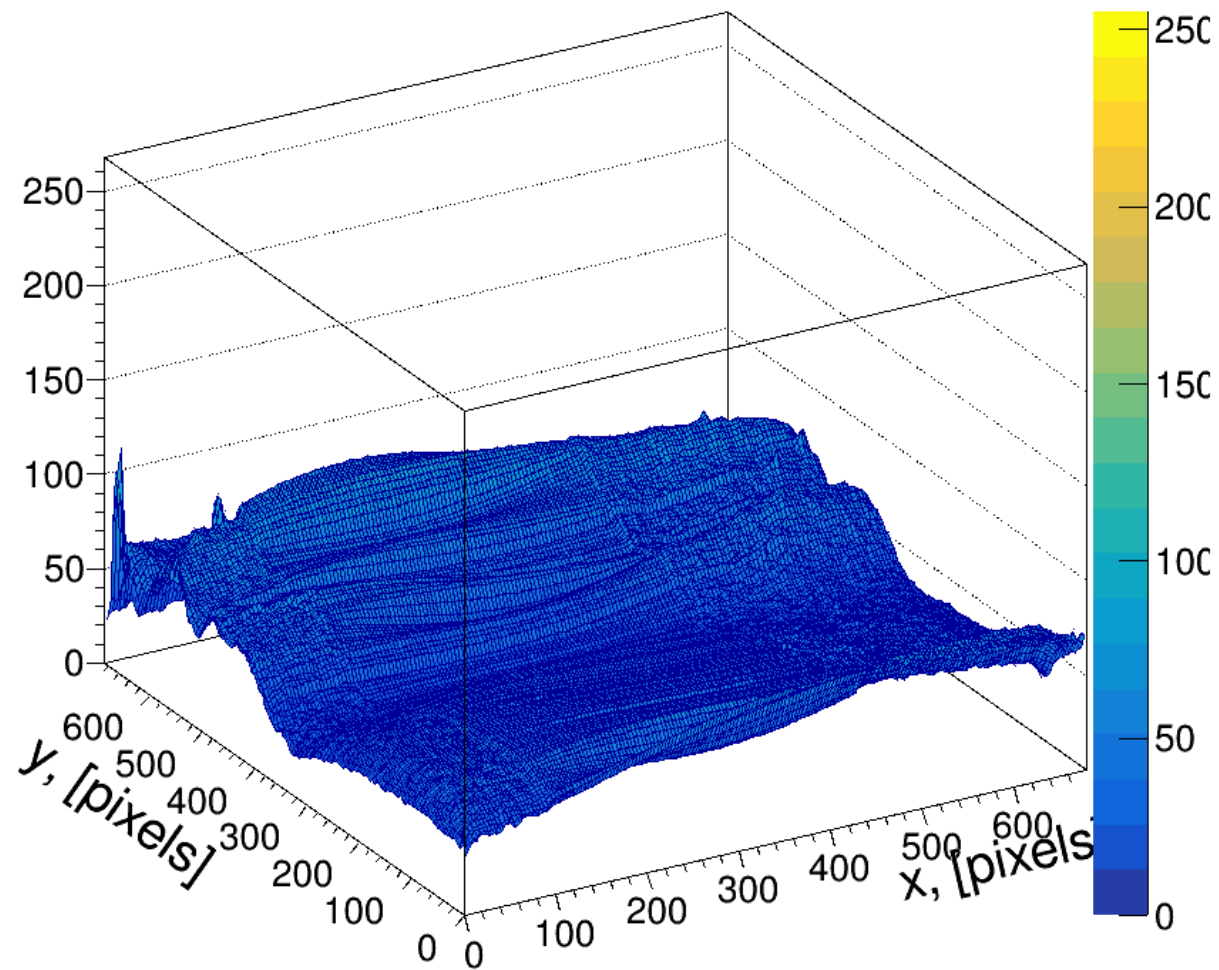


# 1 min 10 sec

## Original data



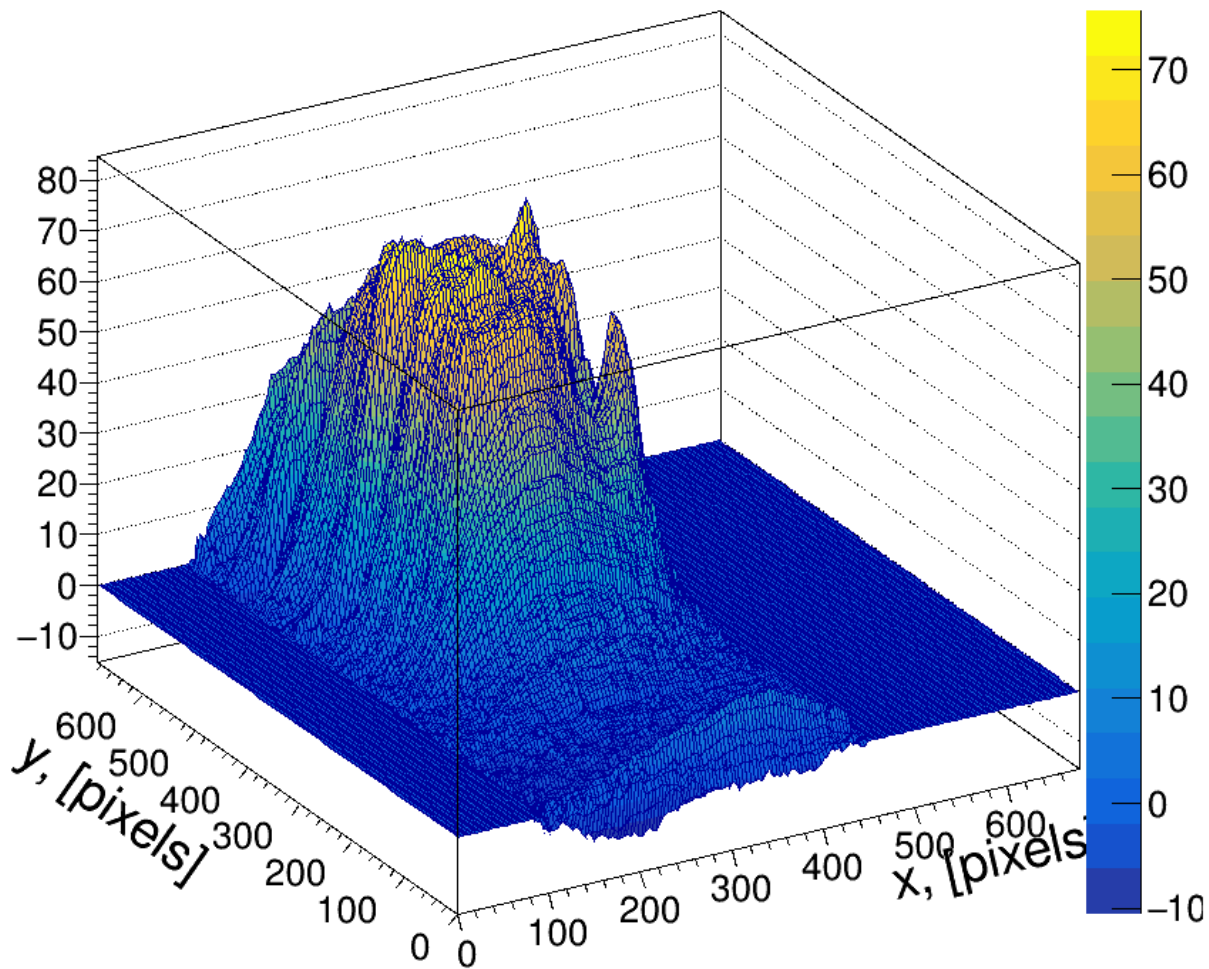
## Background distortion



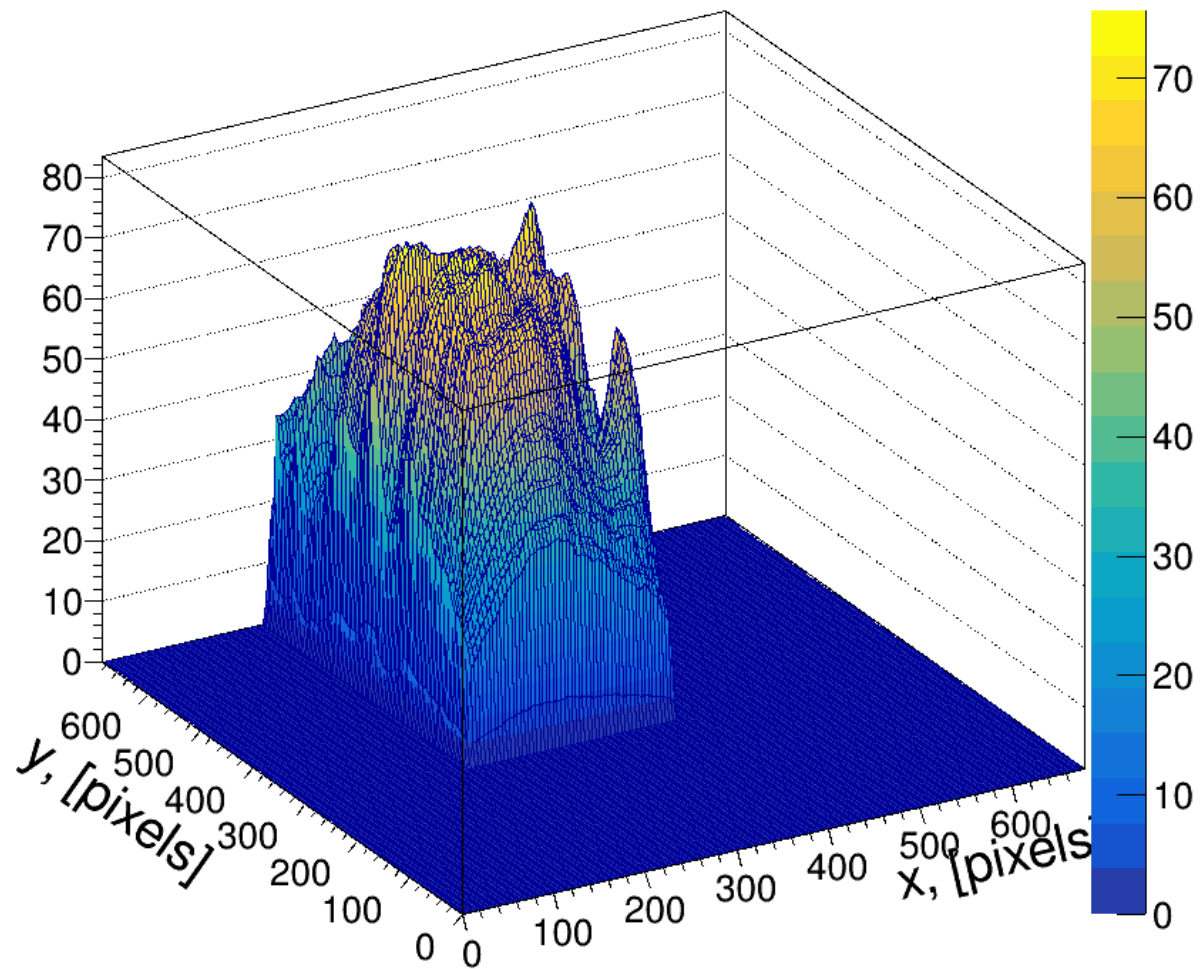


# 1 min 10 sec

Data without distortion

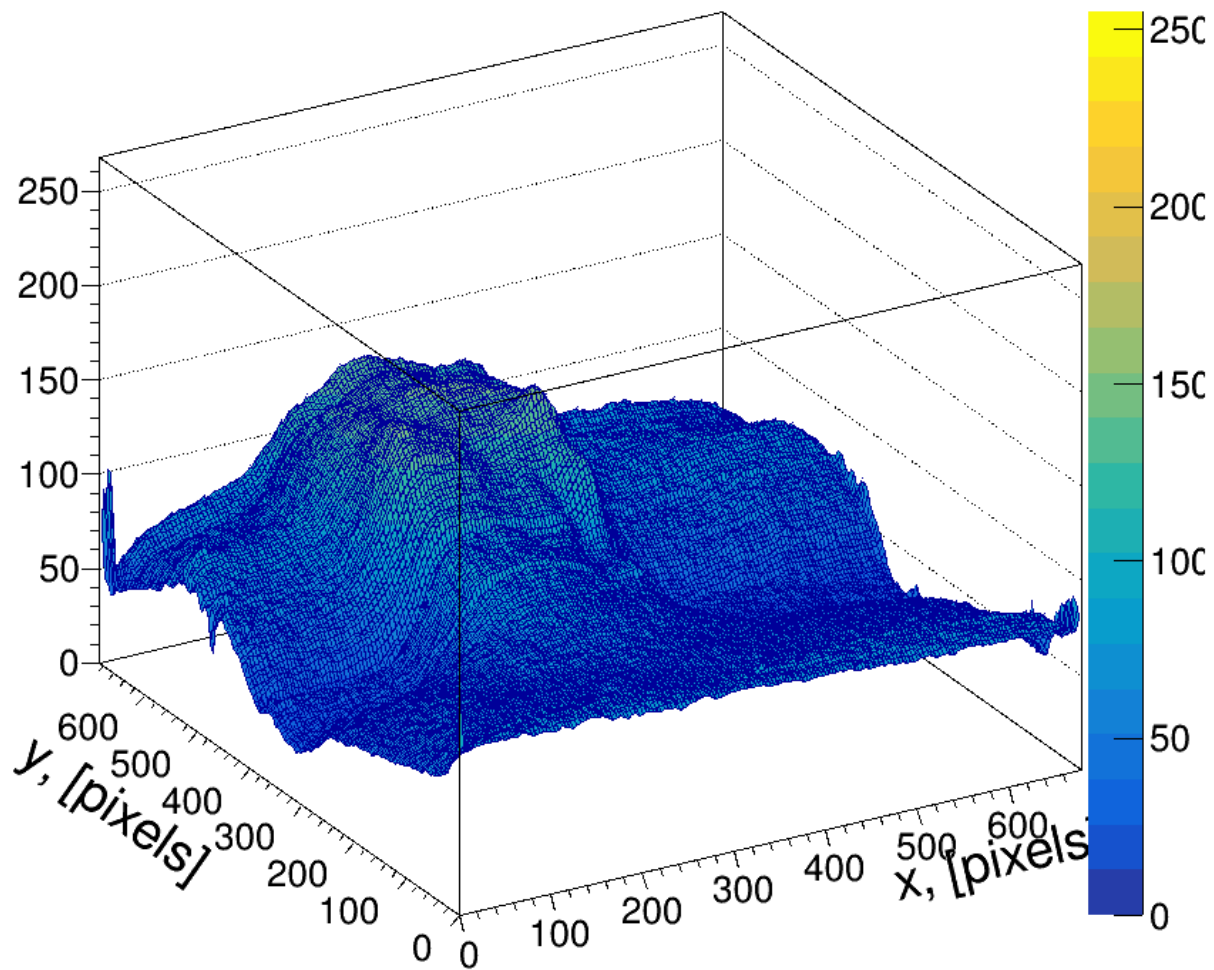


Data without distortion & negative values (cut applied)

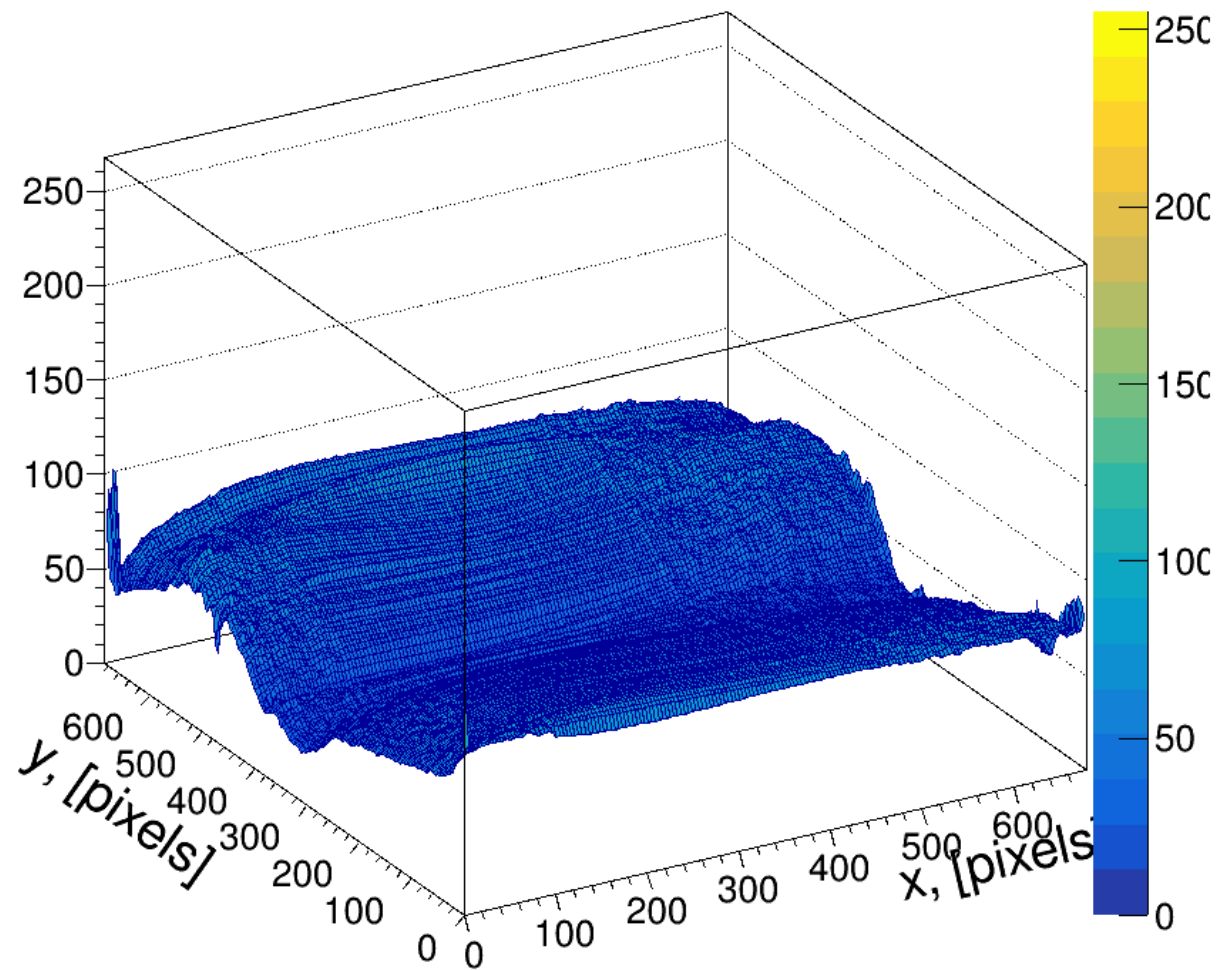


# 1 min 30 sec

## Original data

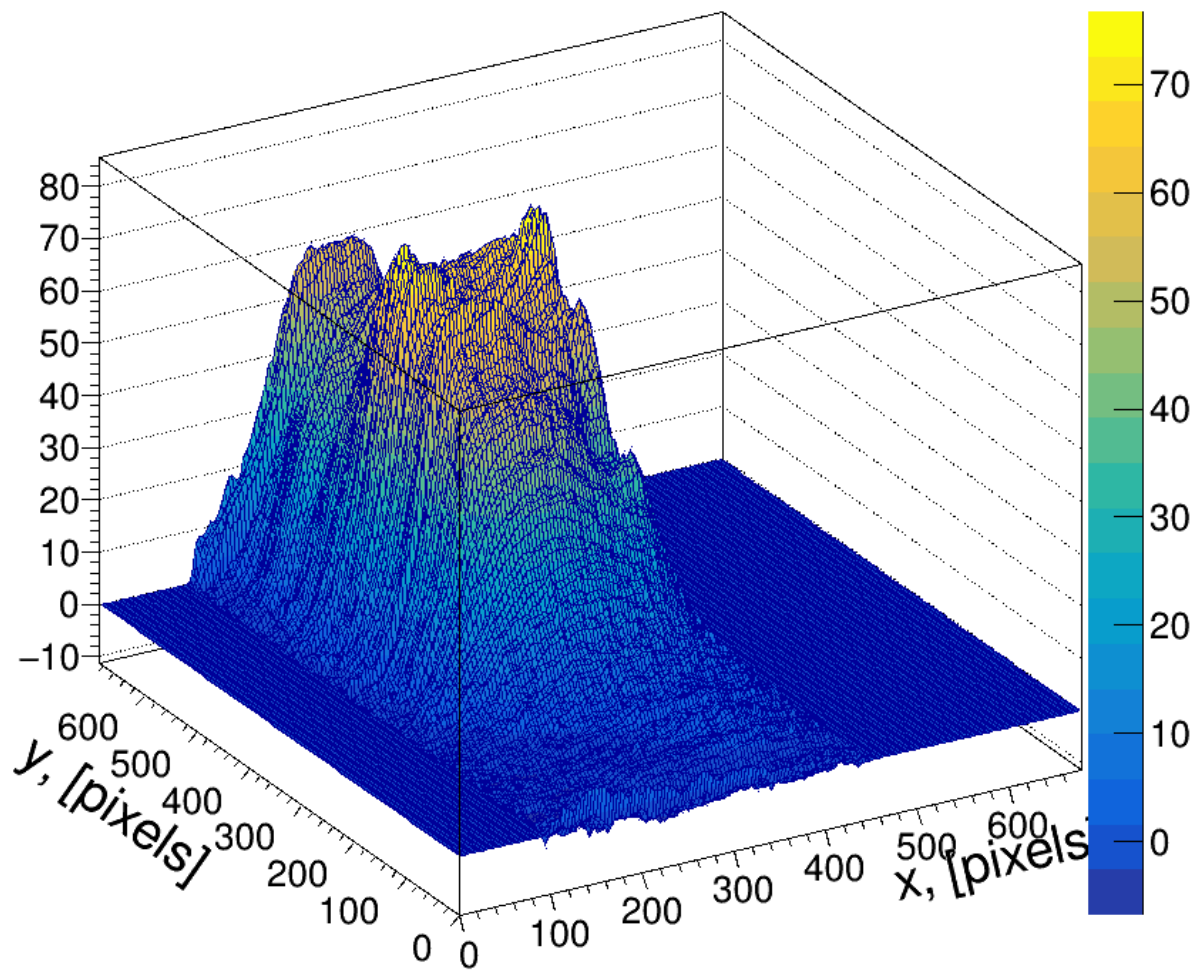


## Background distortion

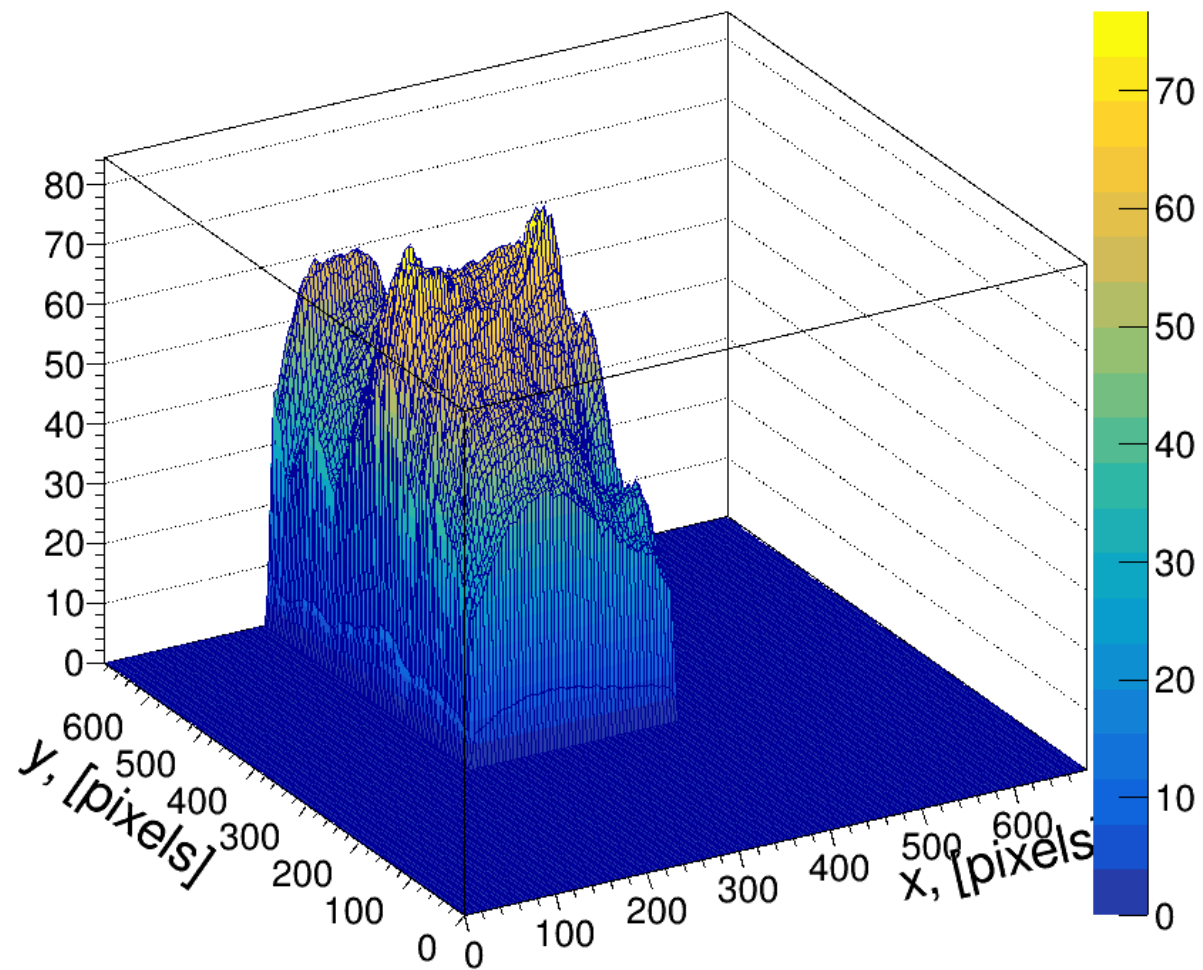


# 1 min 30 sec

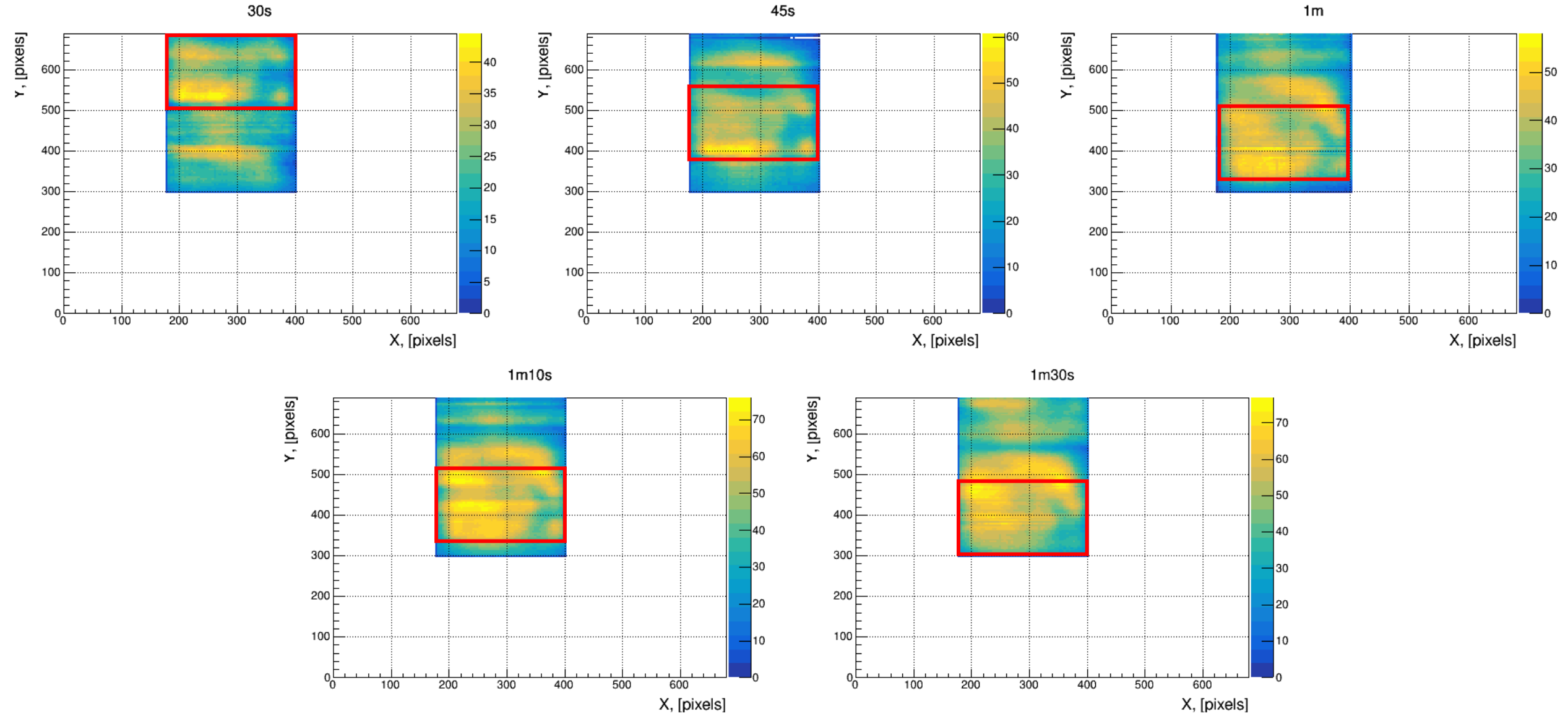
Data without distortion



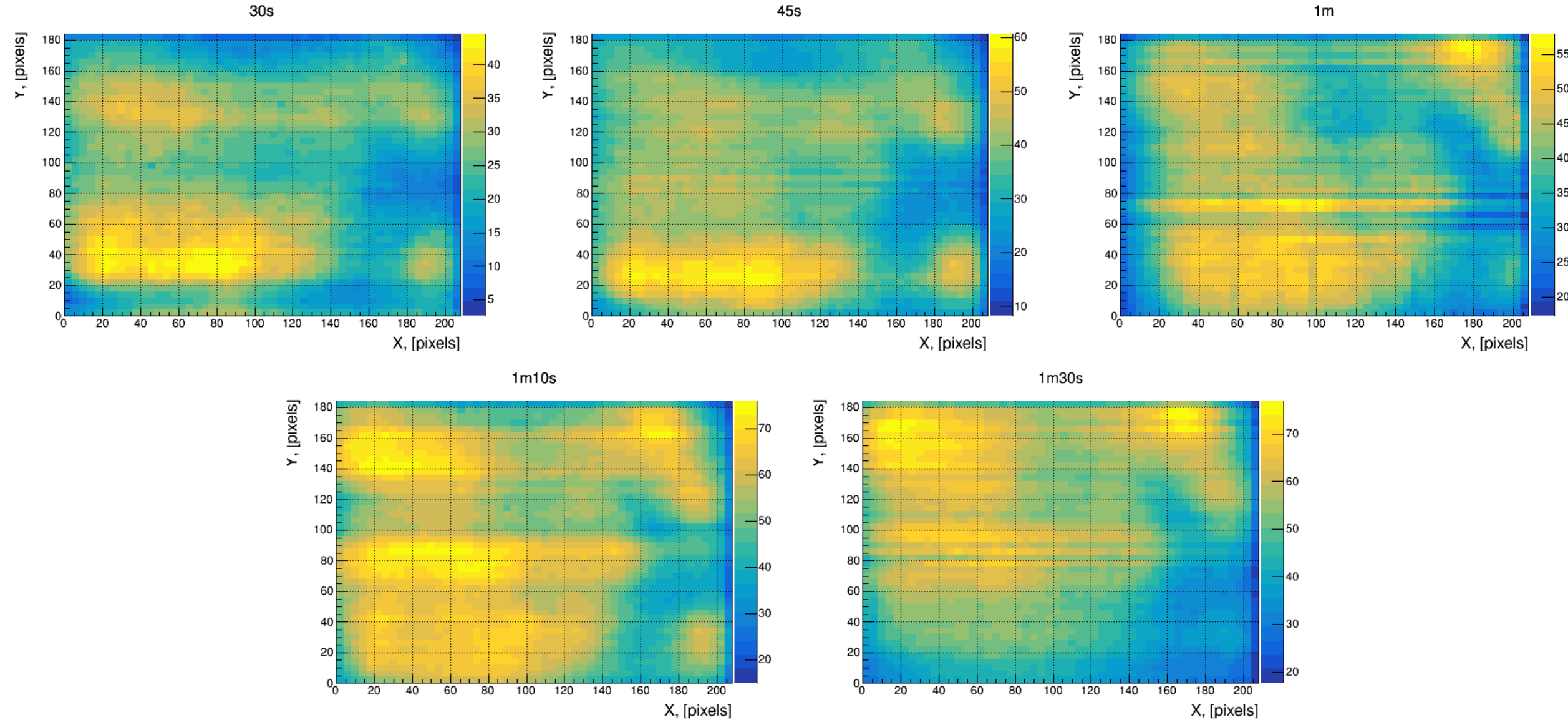
Data without distortion & negative values (cut applied)



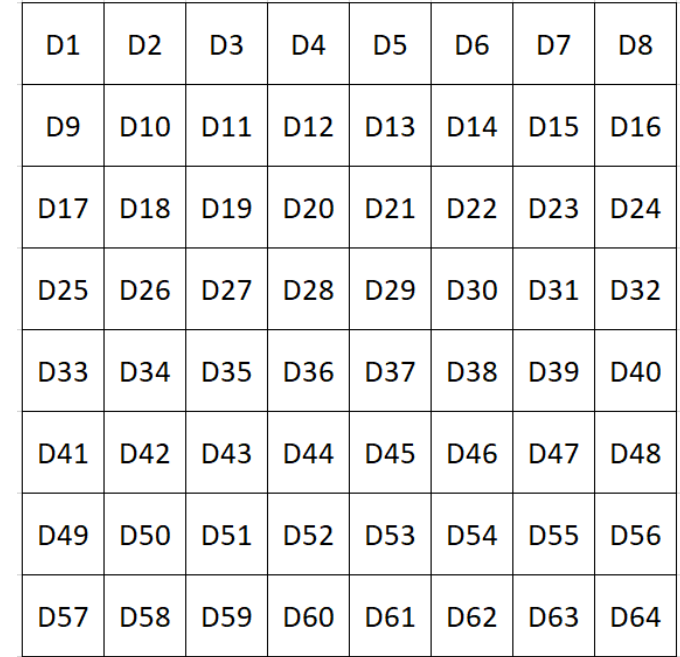
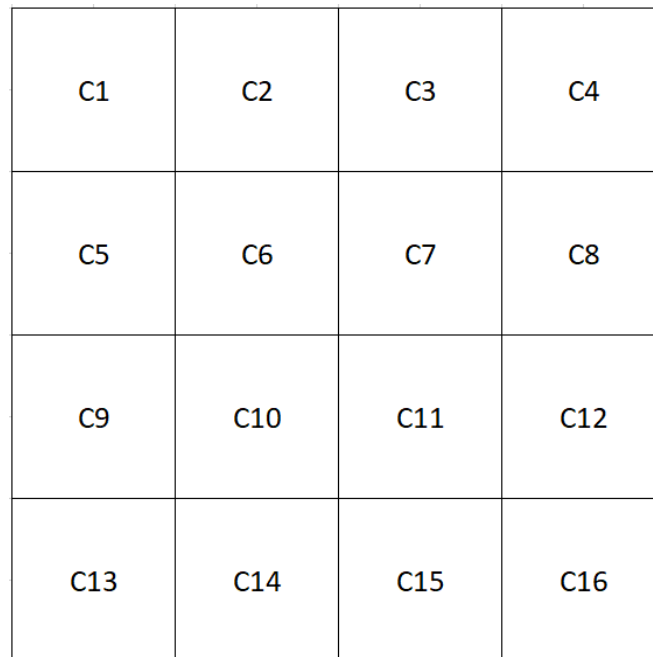
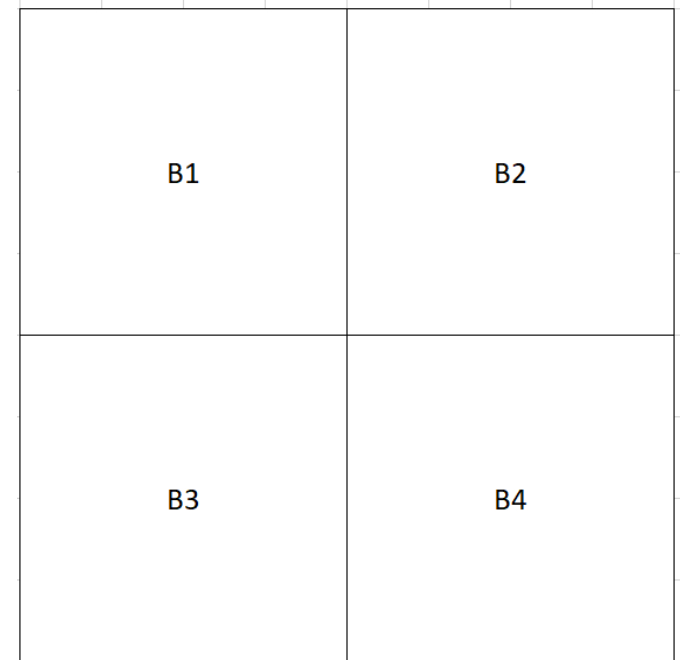
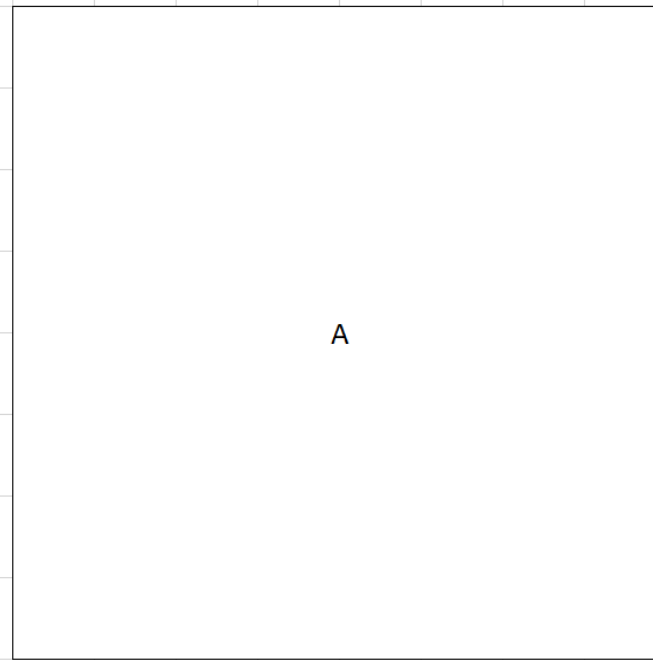
# Data (prepared for Intensity comparisons)



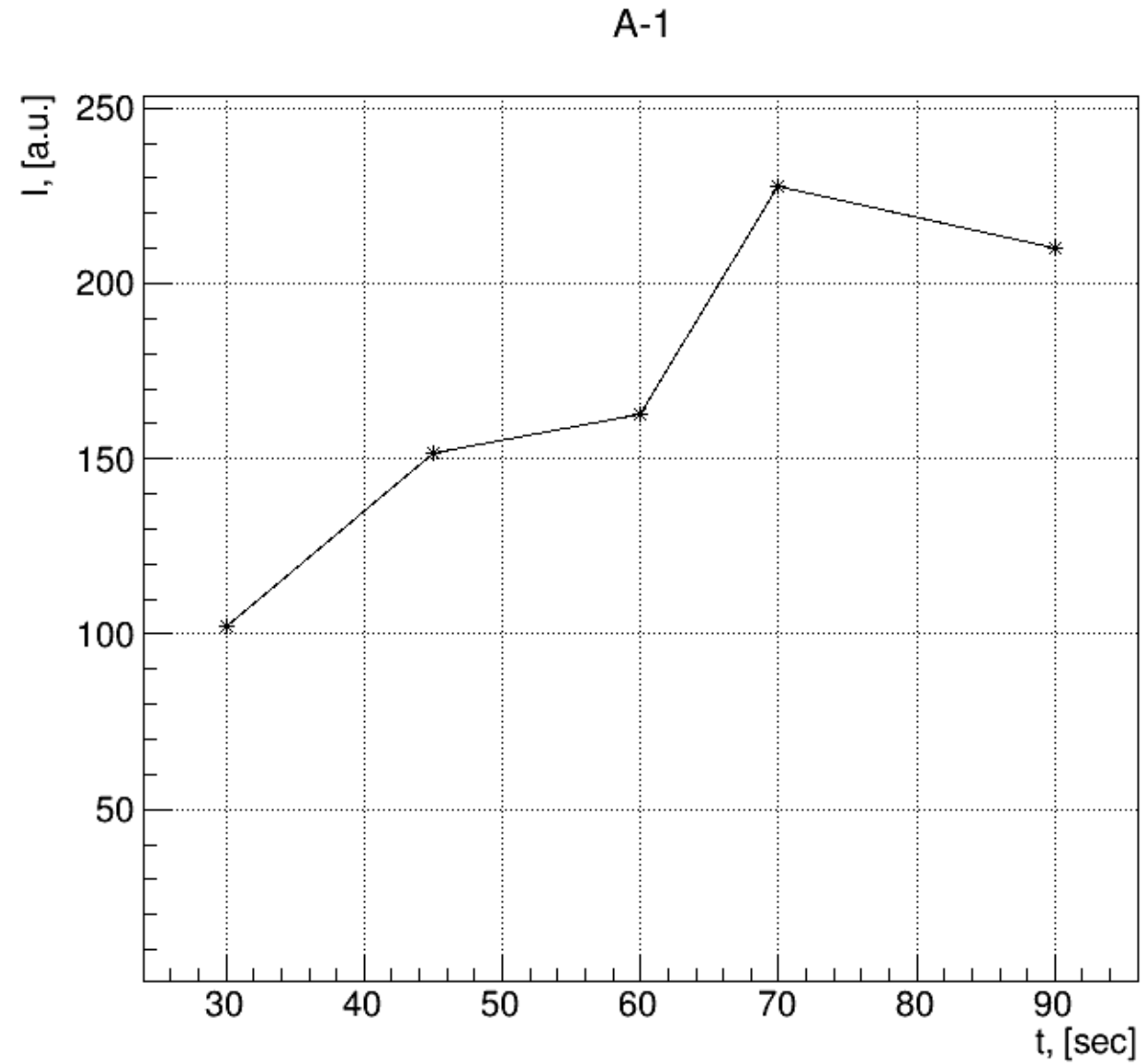
# Data (prepared for Intensity comparisons)



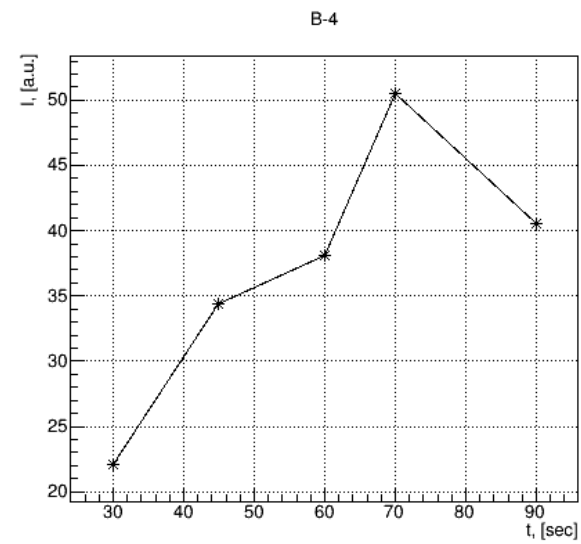
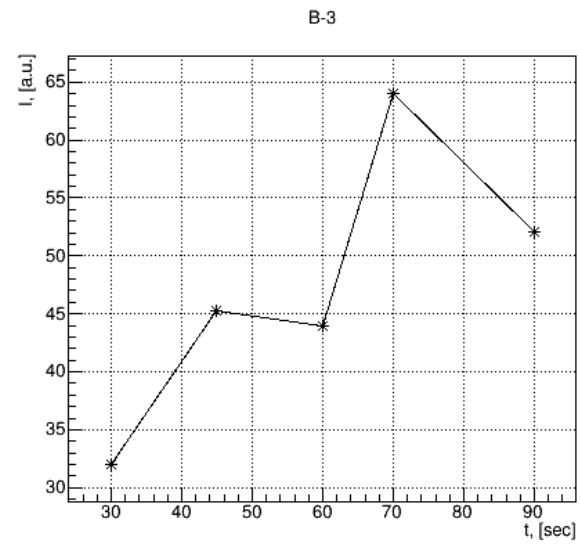
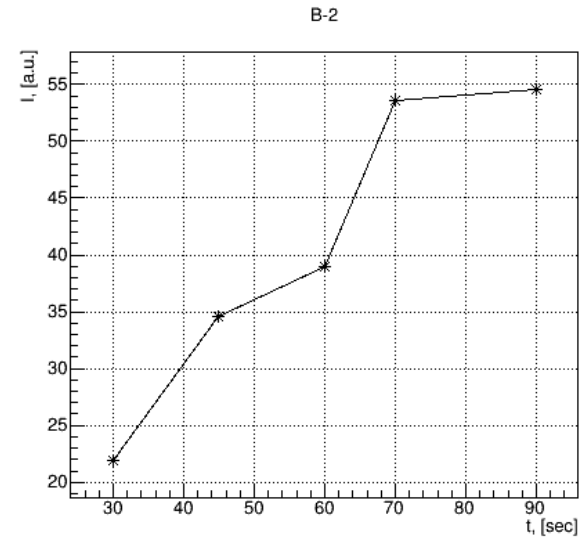
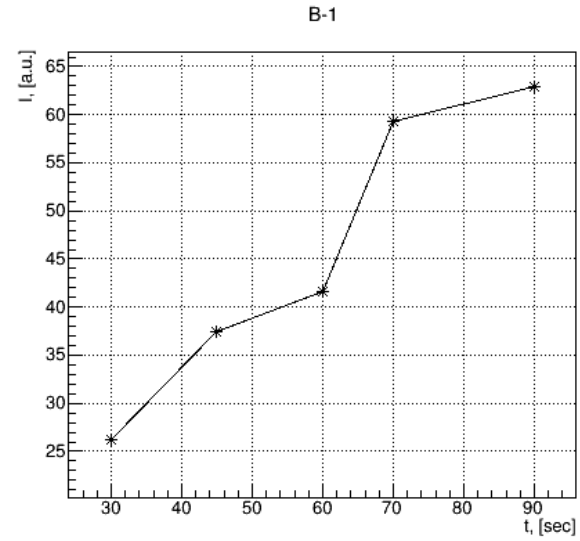
# Options of intensity plots



# Option A



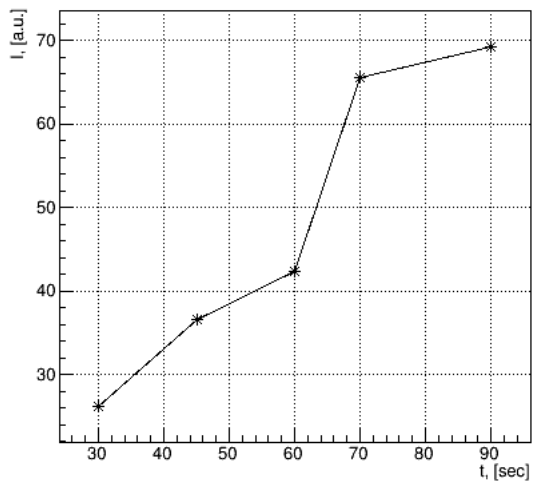
# Option B



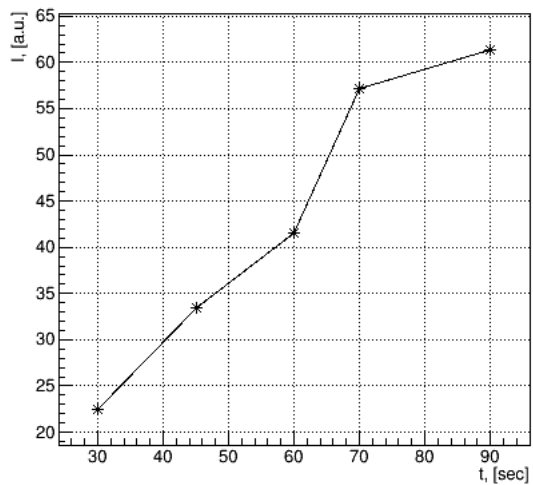


# Option C

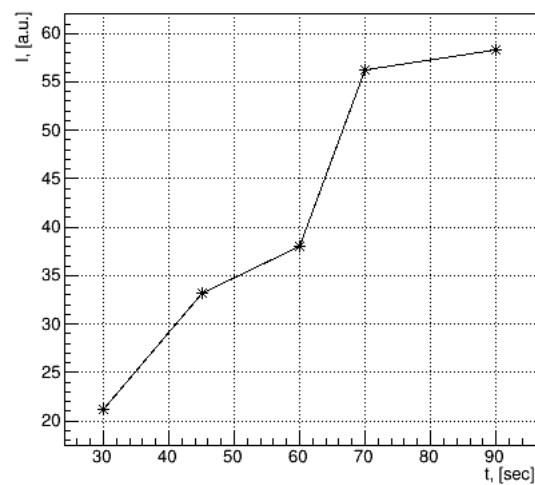
C-1



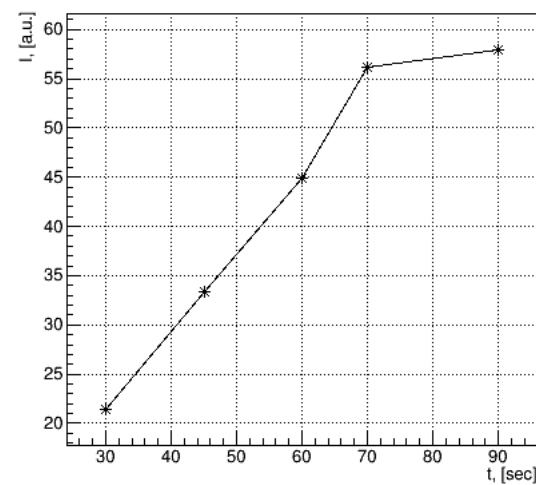
C-2



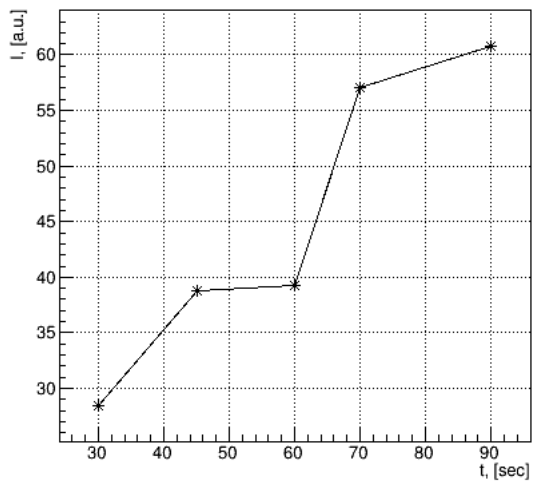
C-3



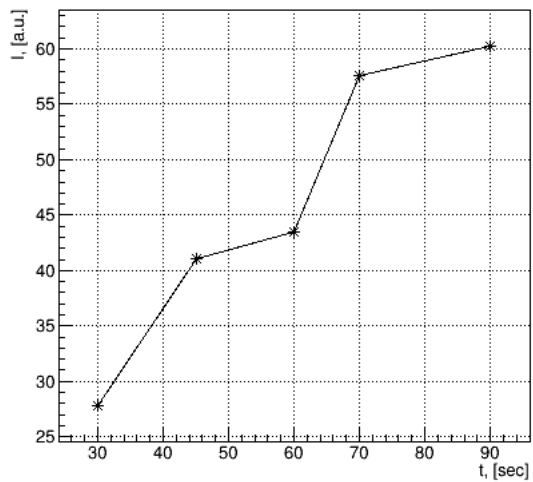
C-4



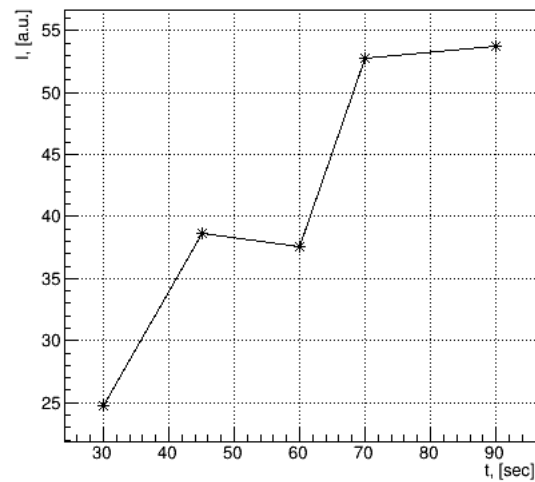
C-5



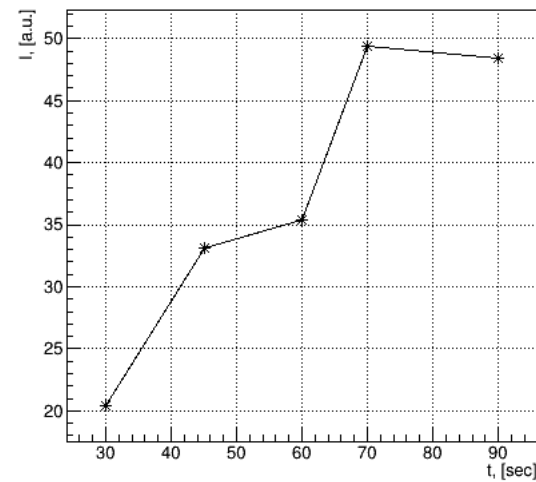
C-6



C-7

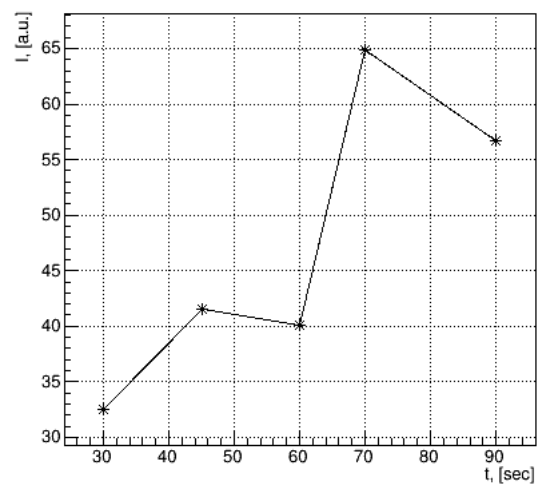


C-8

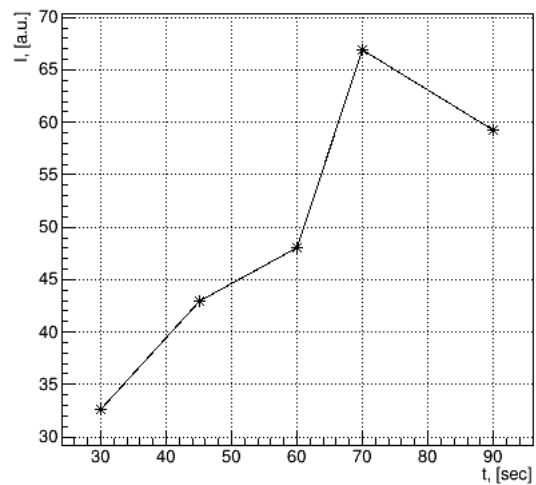


# Option C

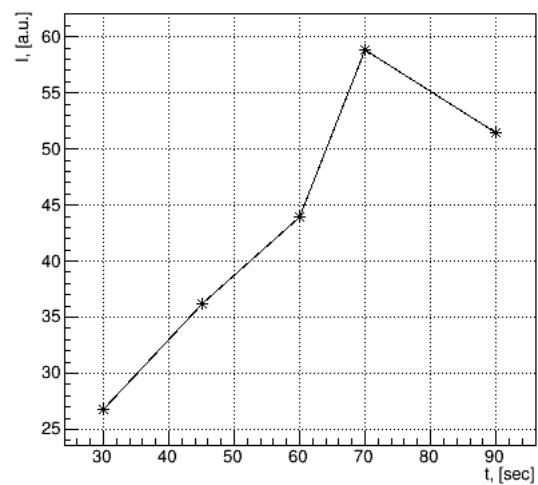
C-9



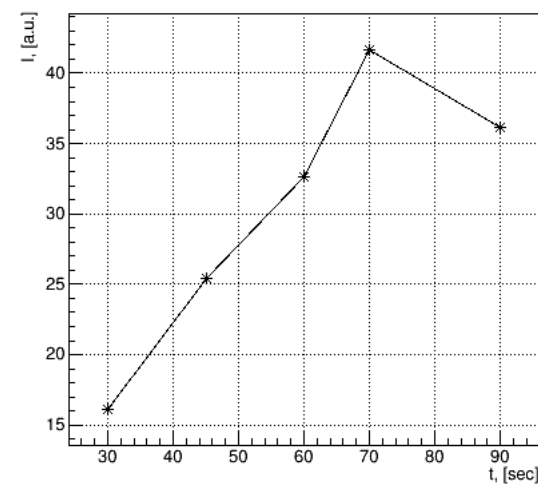
C-10



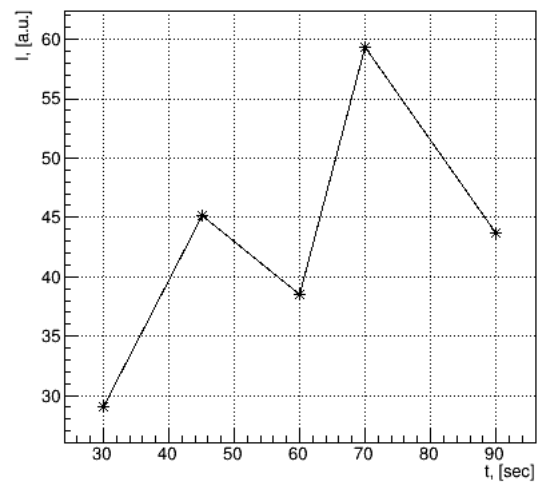
C-11



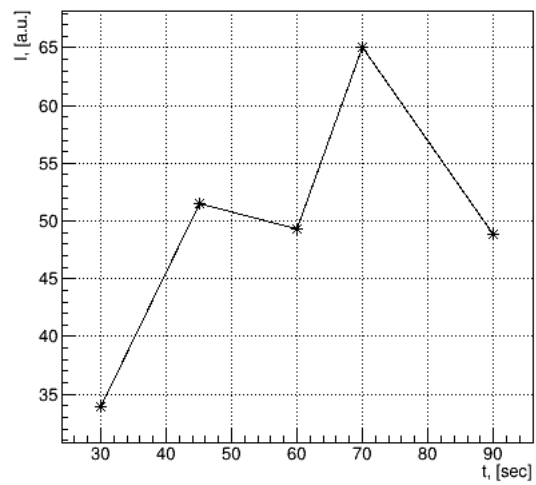
C-12



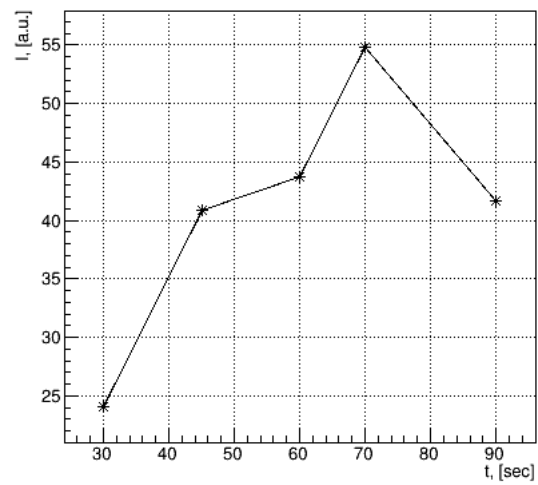
C-13



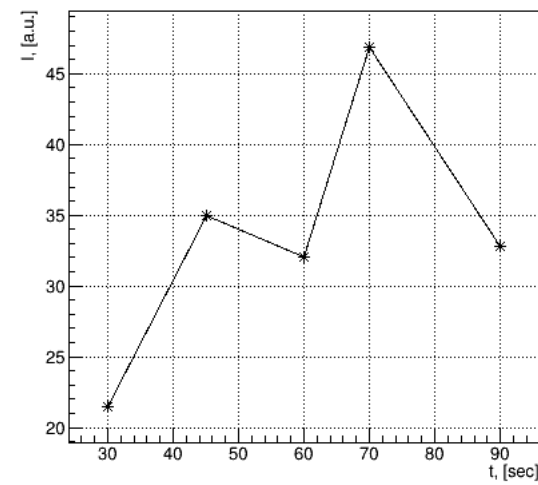
C-14



C-15

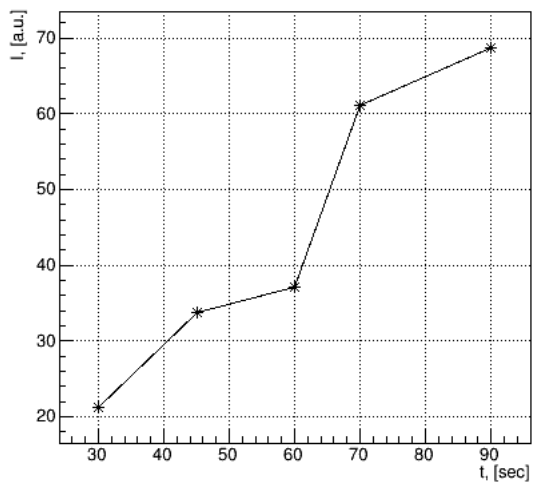


C-16

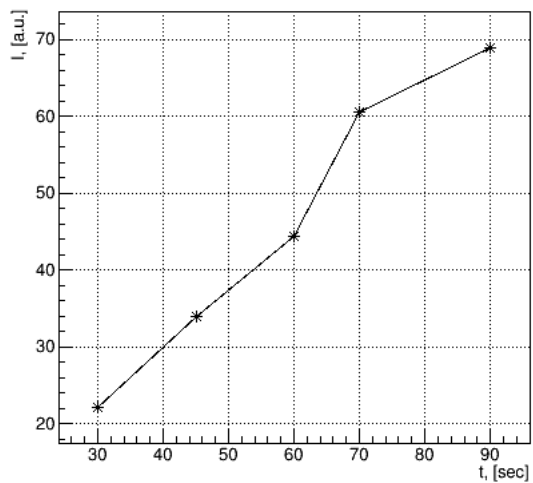


# Option D

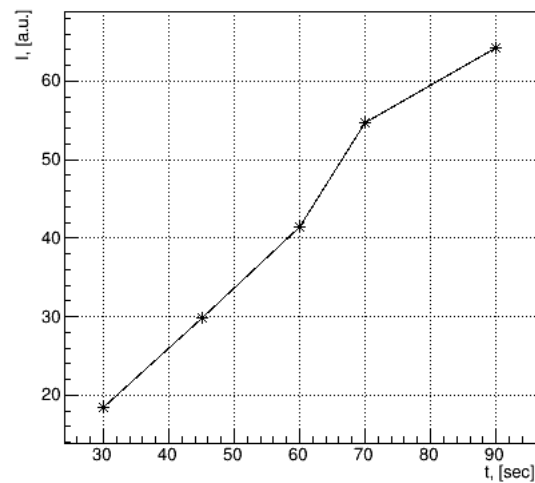
D-1



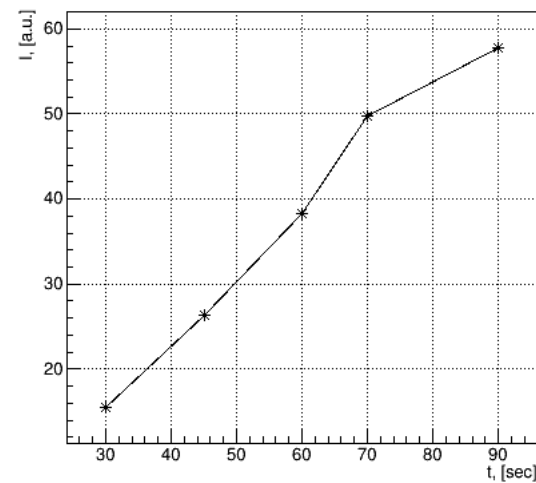
D-2



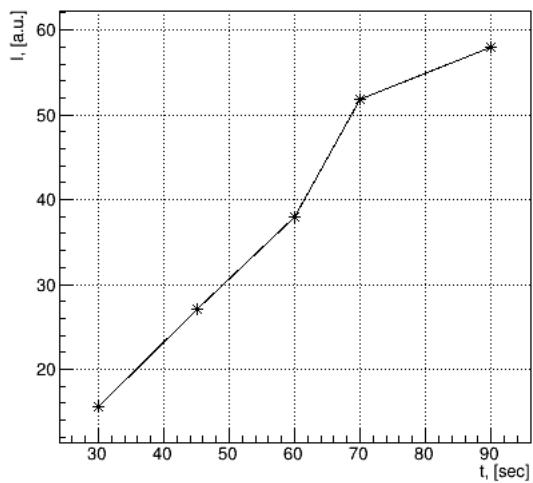
D-3



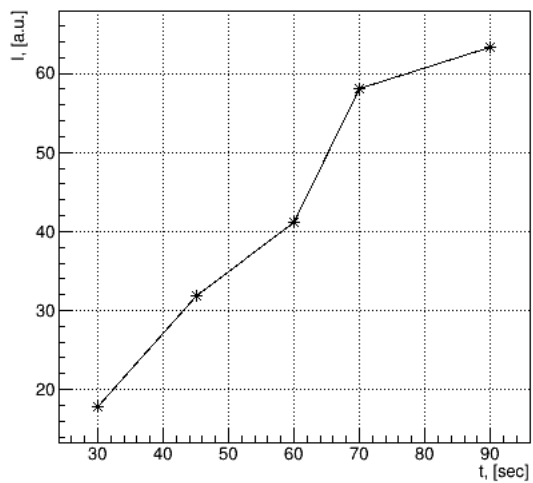
D-4



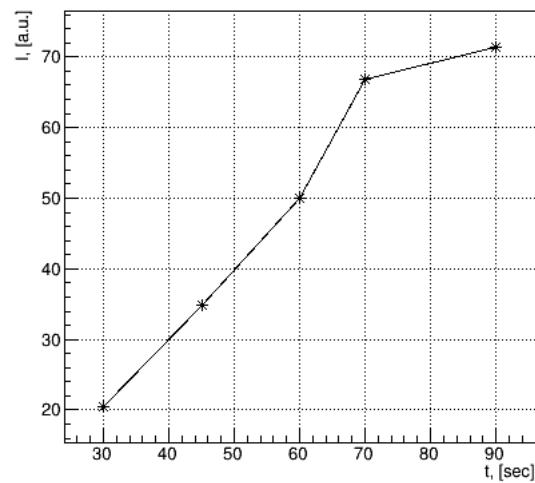
D-5



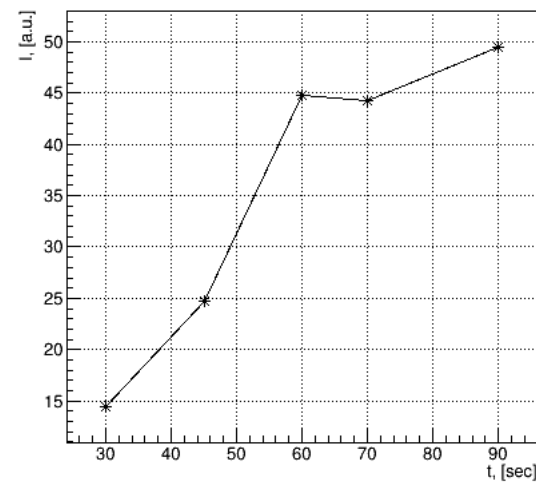
D-6



D-7

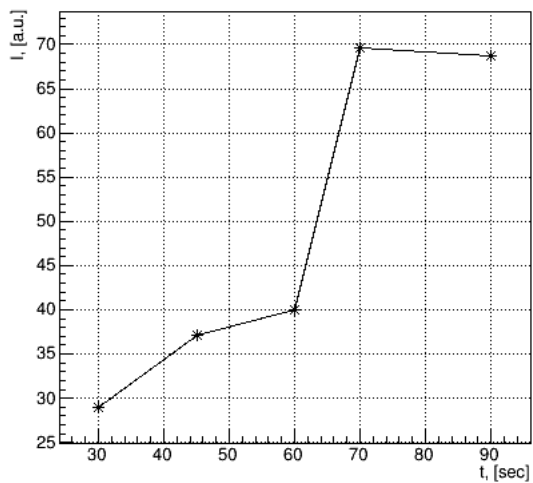


D-8

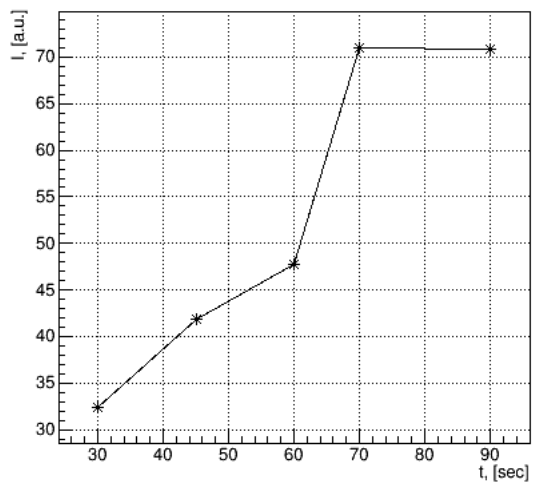


# Option D

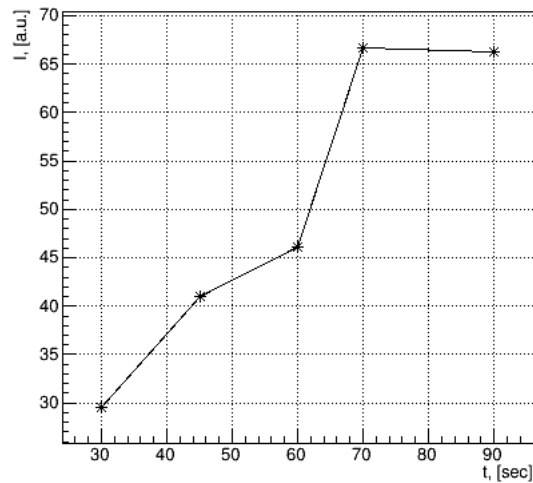
D-9



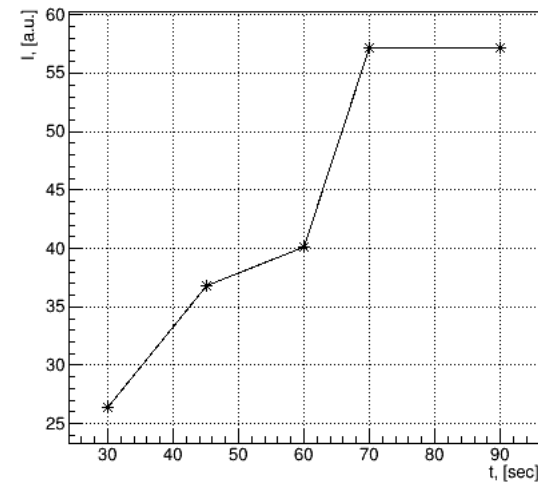
D-10



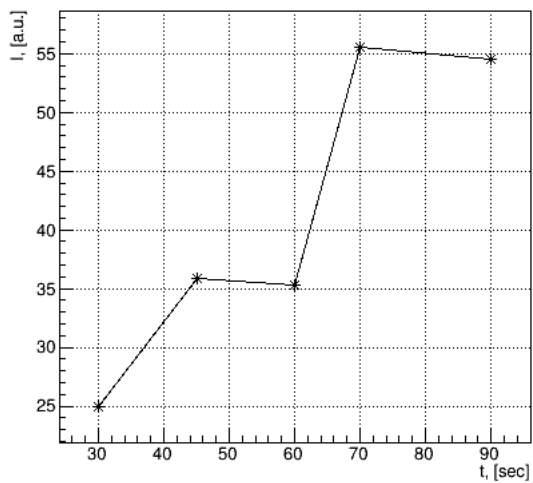
D-11



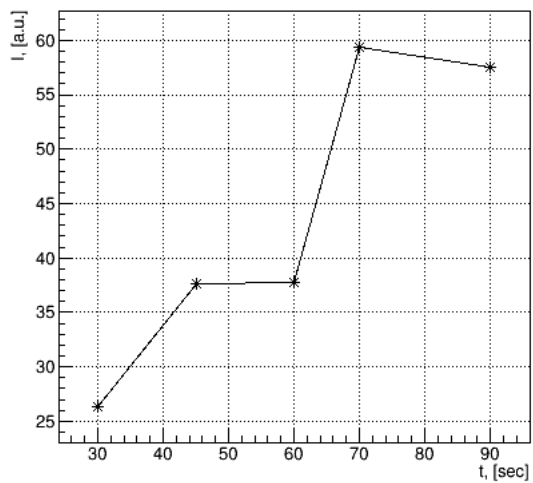
D-12



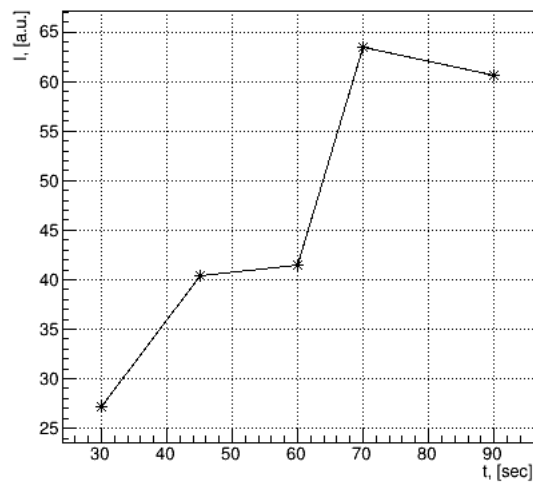
D-13



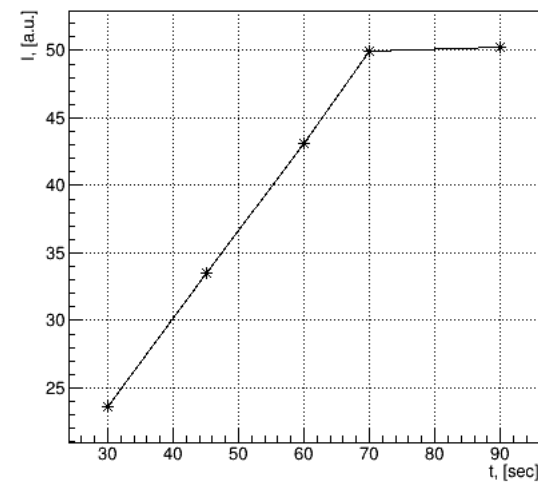
D-14



D-15

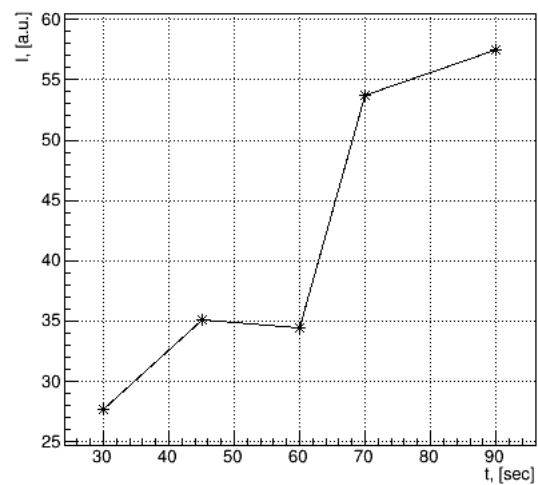


D-16

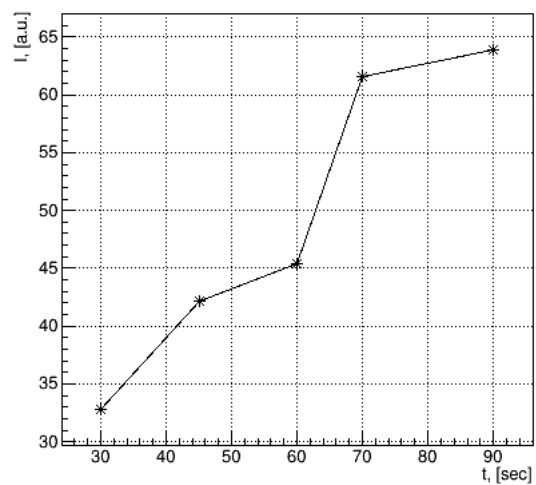


# Option D

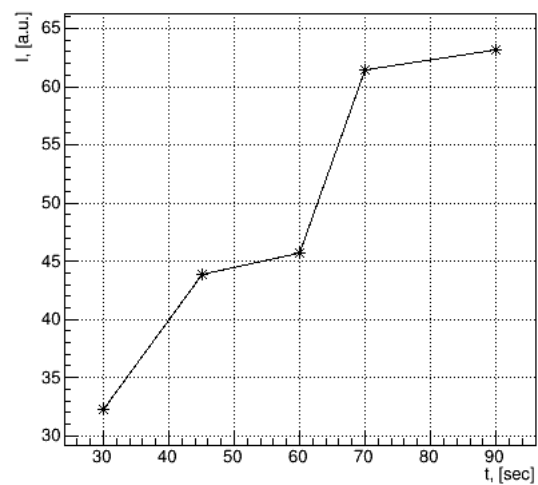
D-17



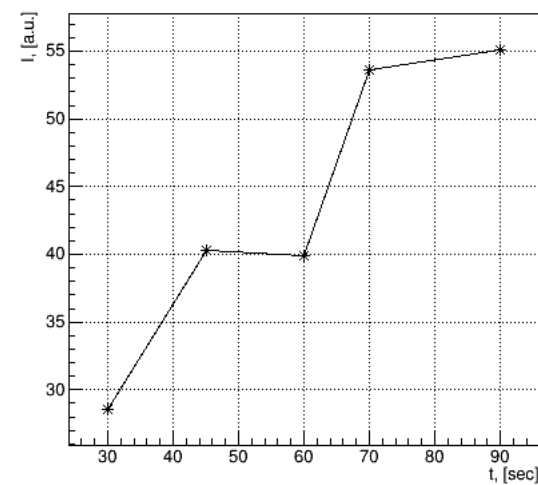
D-18



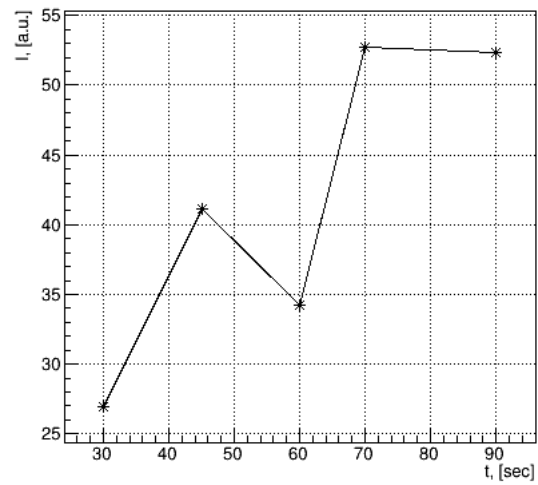
D-19



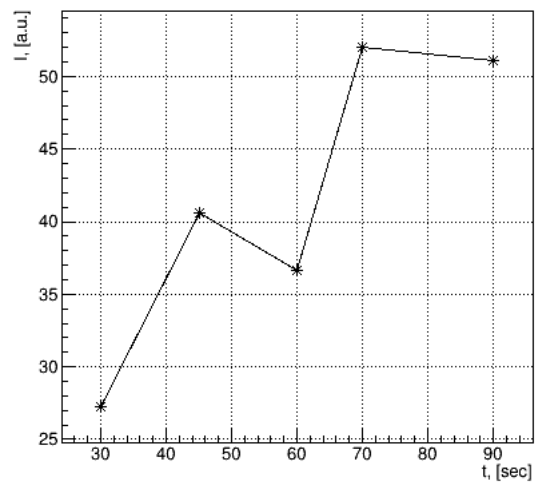
D-20



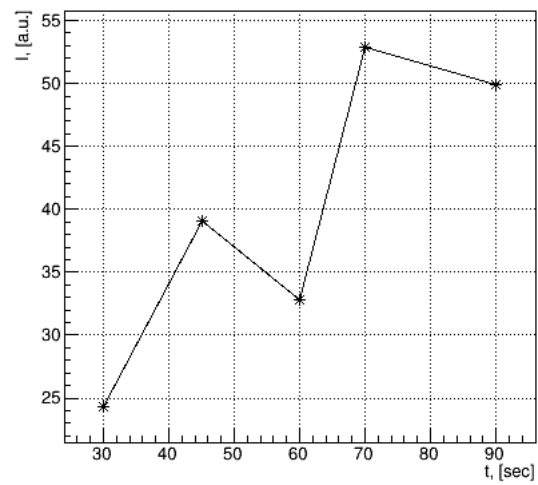
D-21



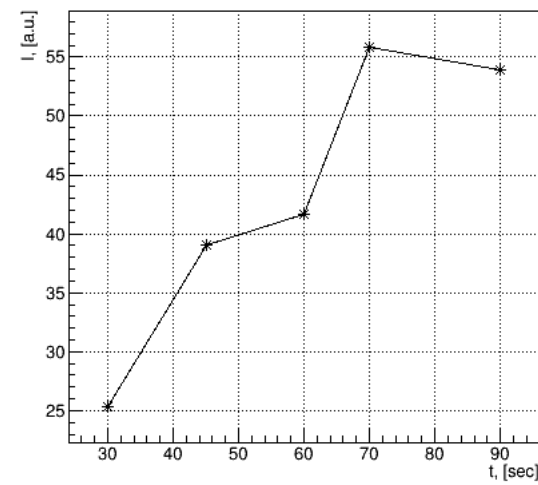
D-22



D-23

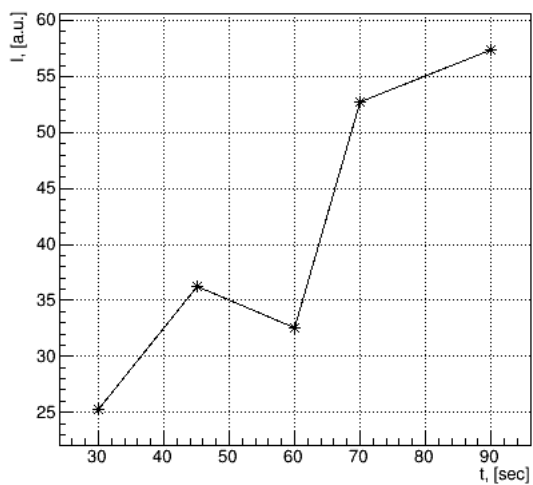


D-24

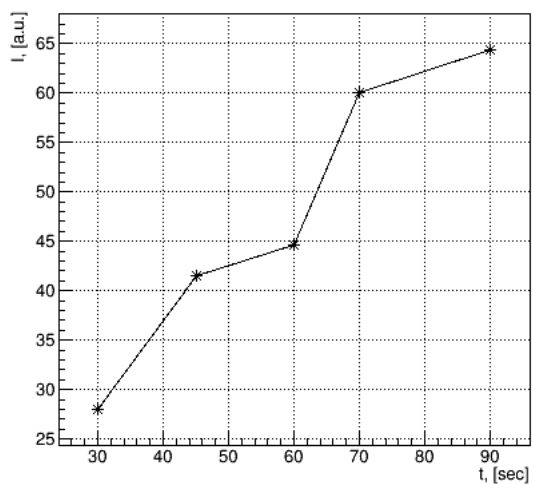


# Option D

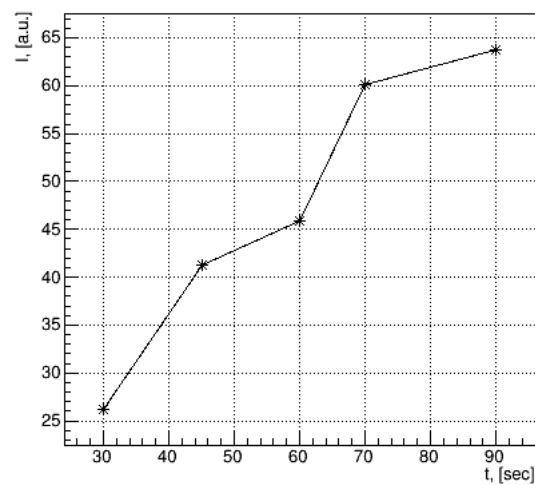
D-25



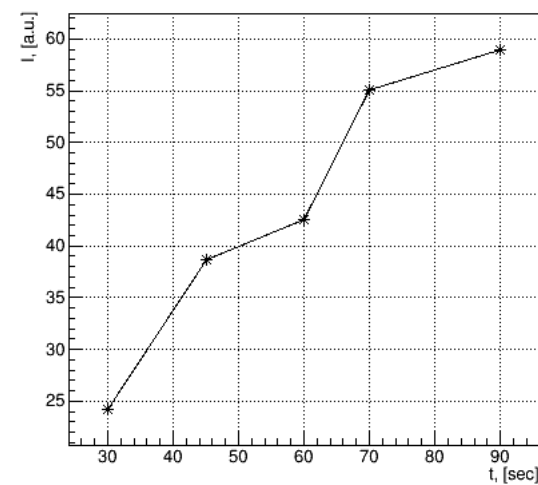
D-26



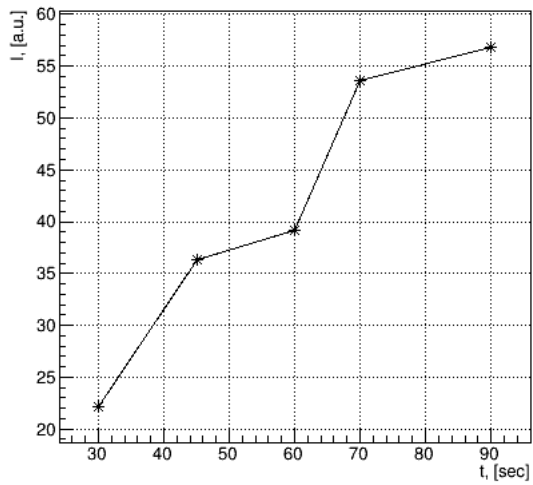
D-27



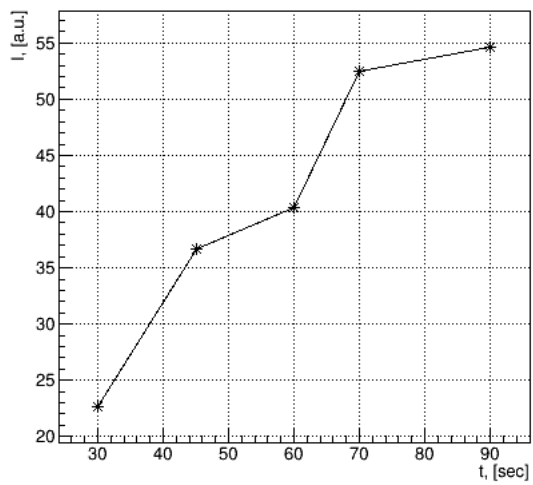
D-28



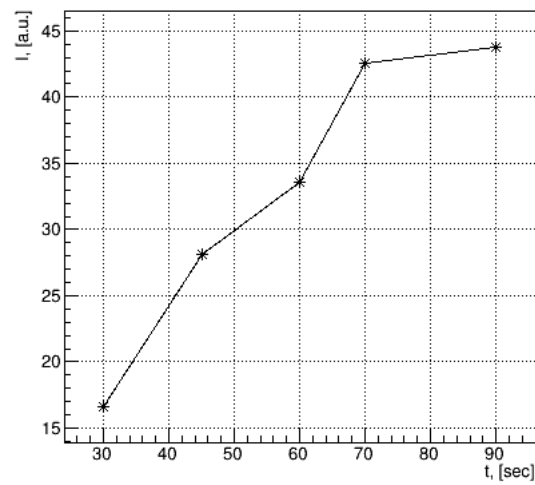
D-29



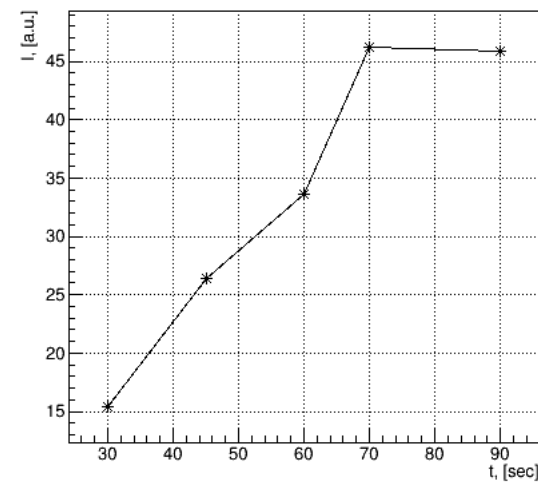
D-30



D-31

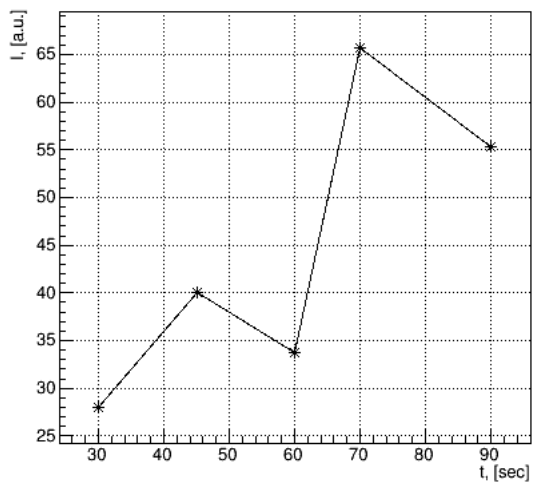


D-32

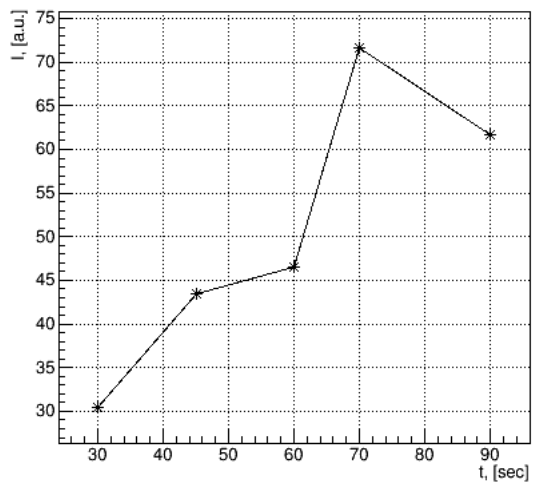


# Option D

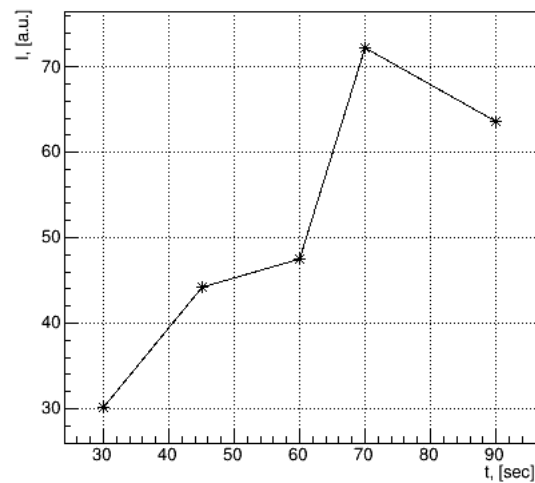
D-33



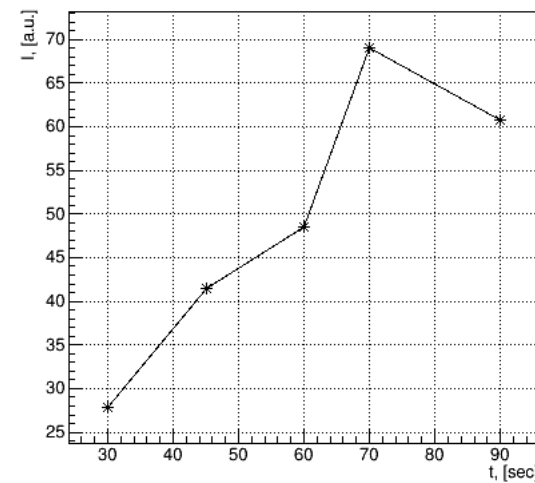
D-34



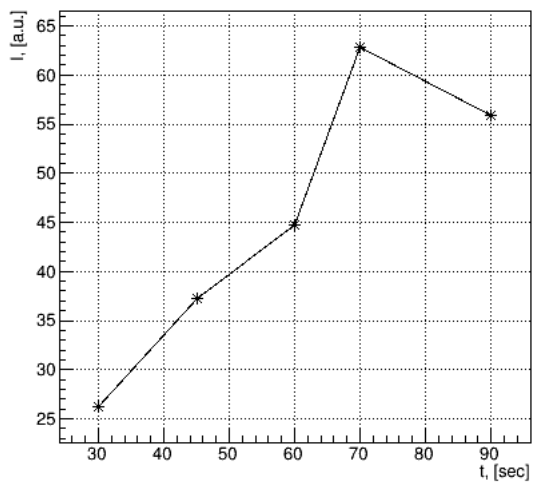
D-35



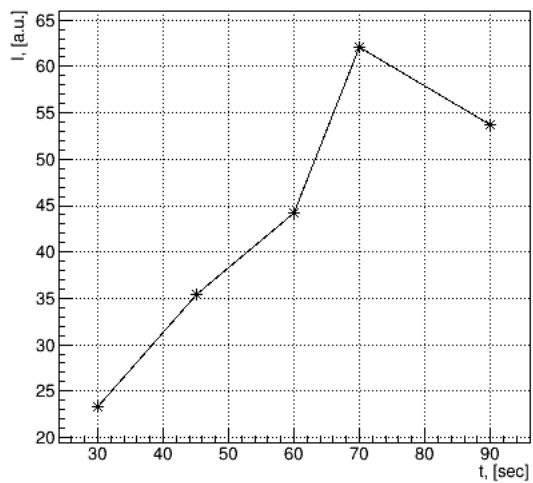
D-36



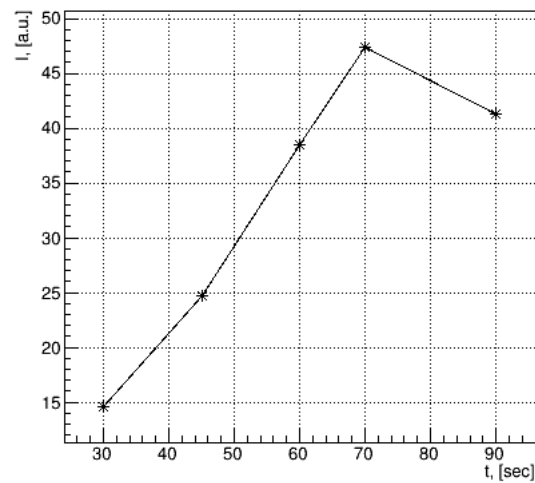
D-37



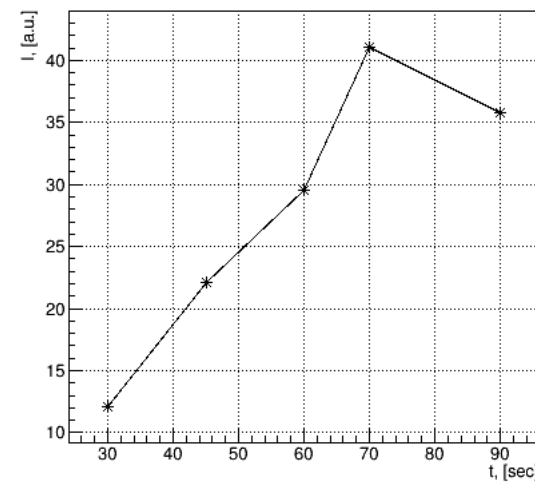
D-38



D-39

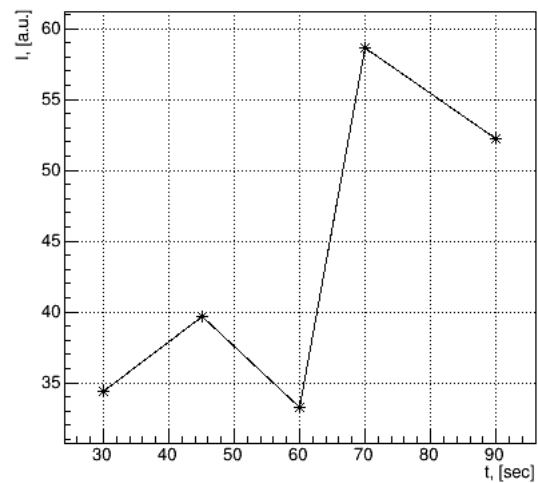


D-40

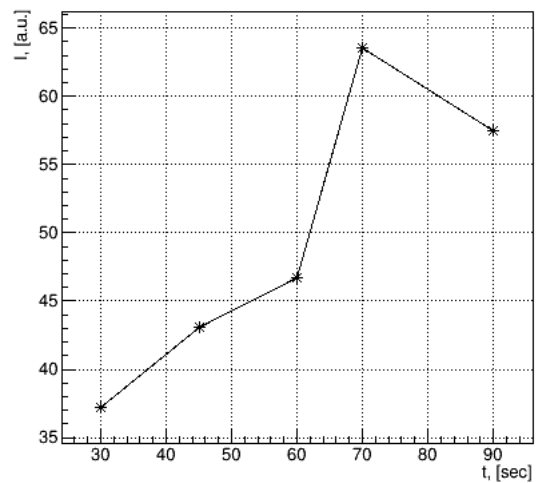


# Option D

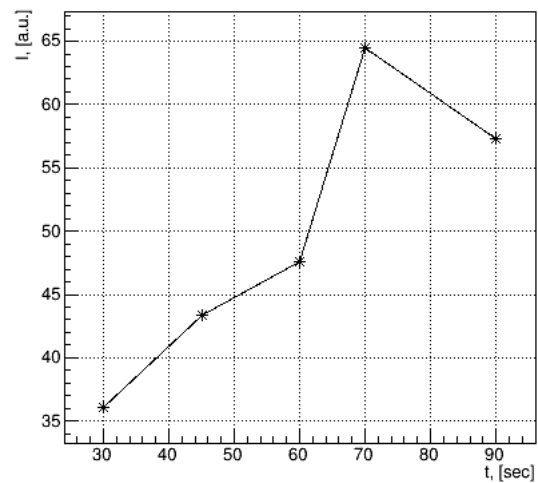
D-41



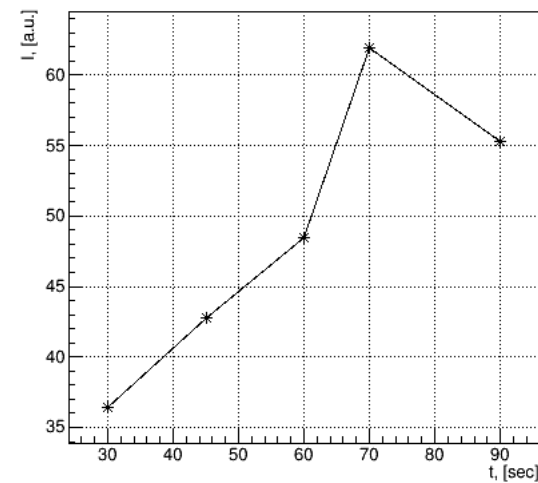
D-42



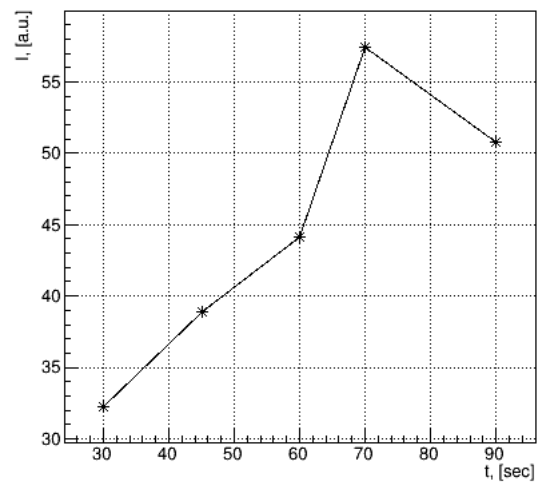
D-43



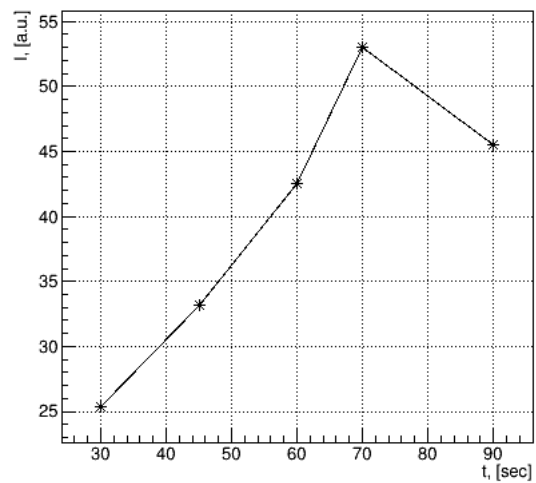
D-44



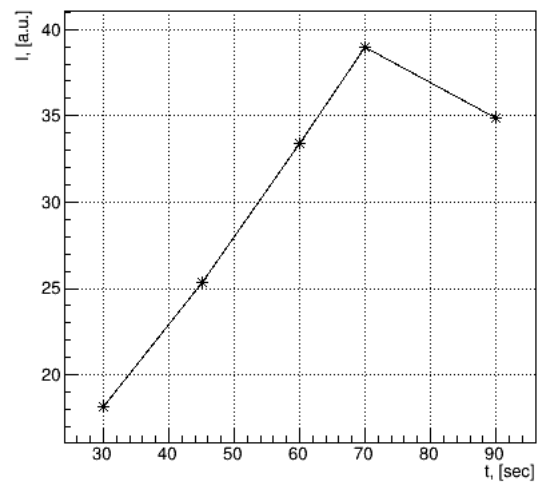
D-45



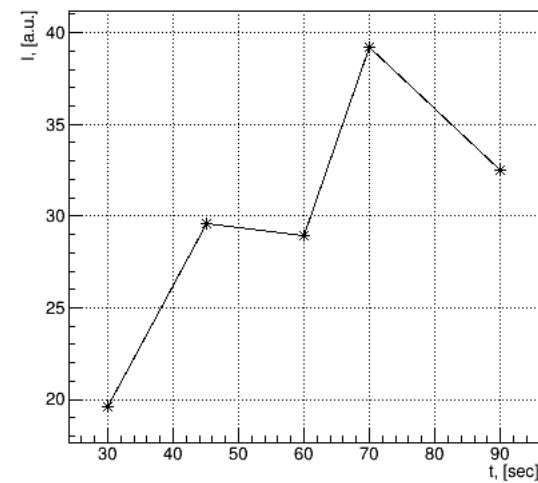
D-46



D-47



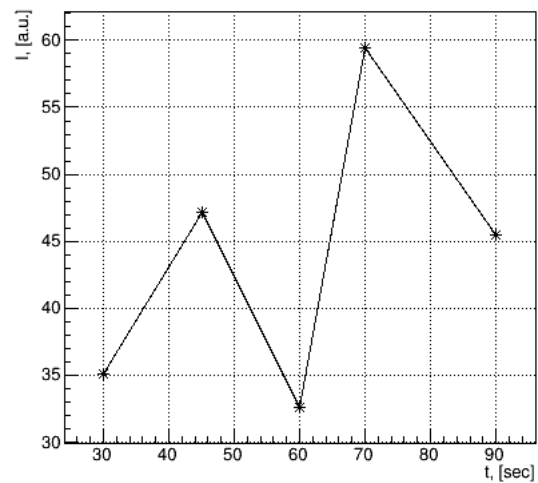
D-48



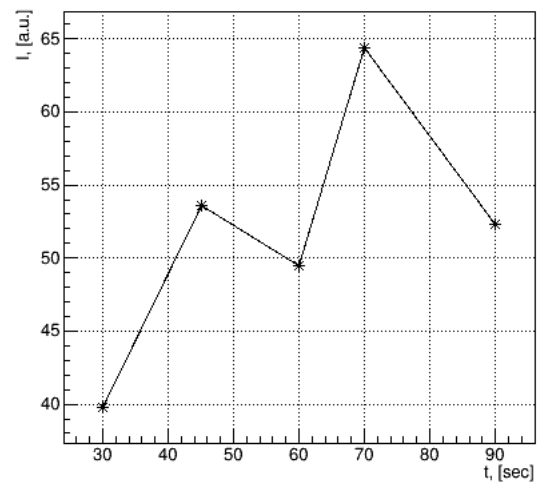


# Option D

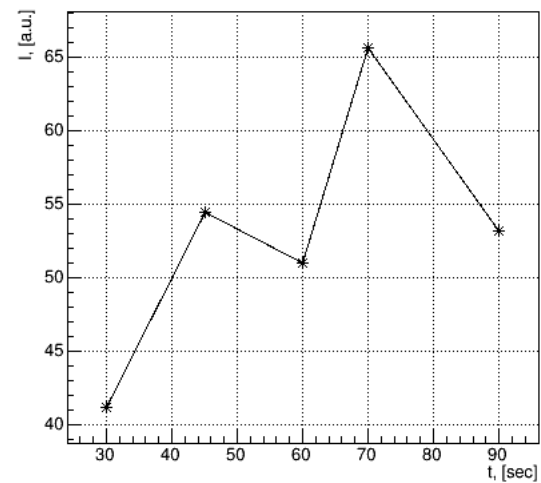
D-49



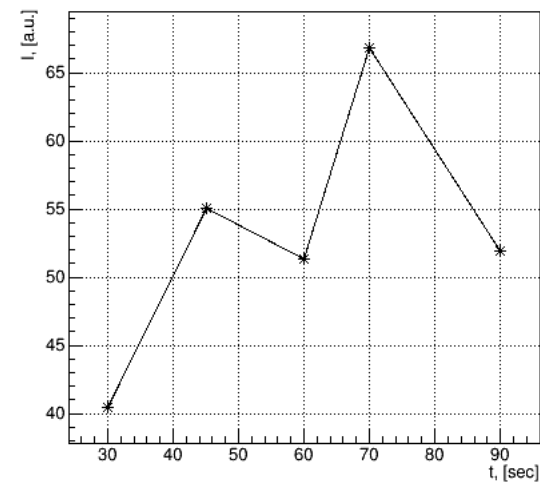
D-50



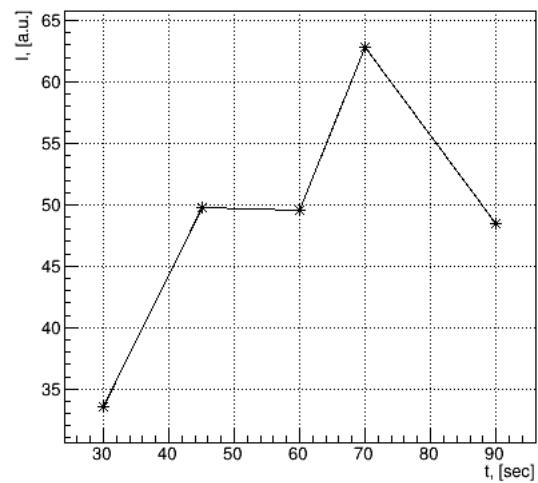
D-51



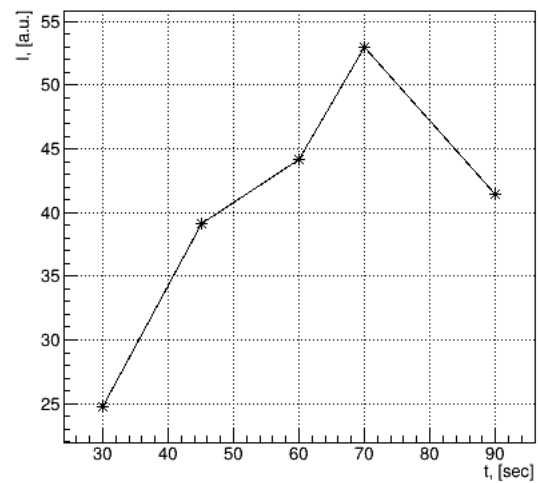
D-52



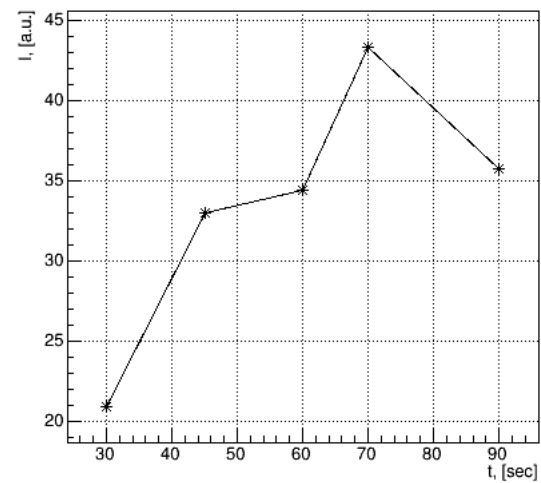
D-53



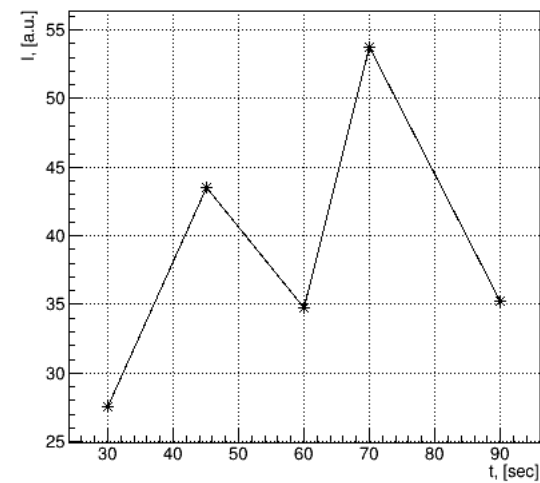
D-54



D-55

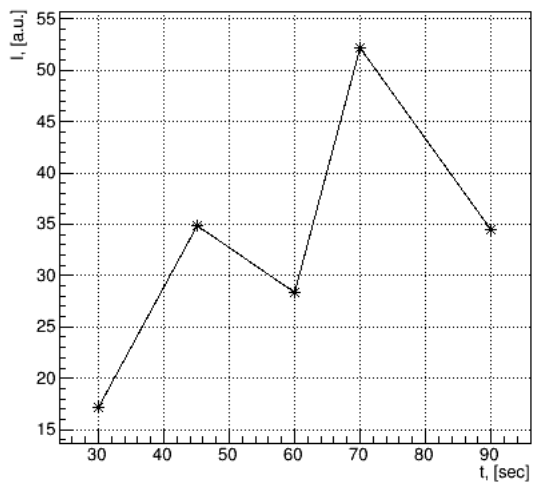


D-56

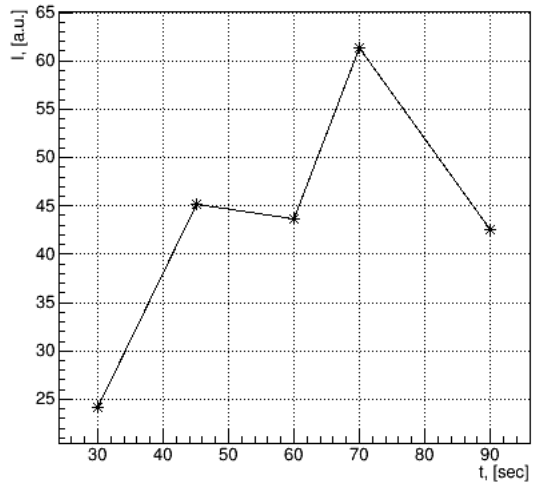


# Option D

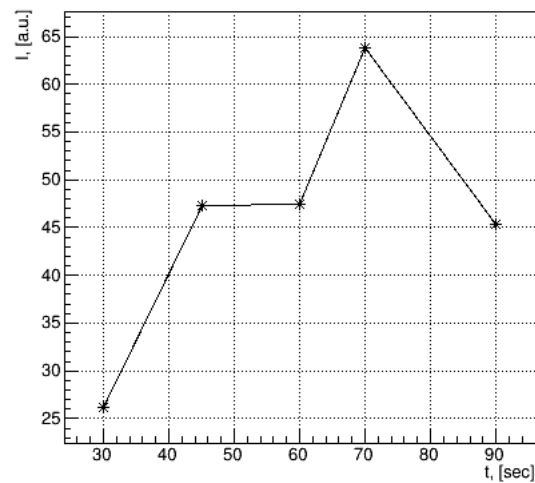
D-57



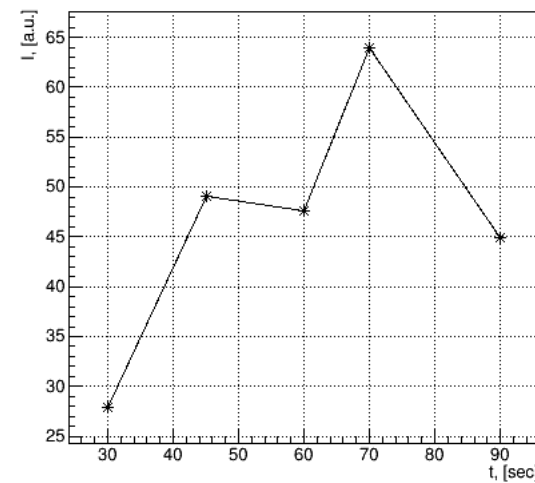
D-58



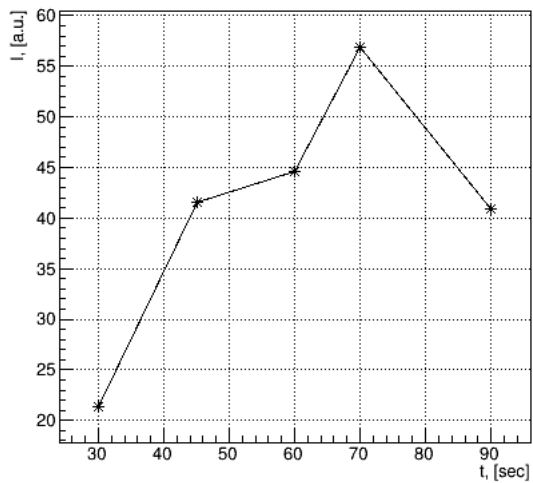
D-59



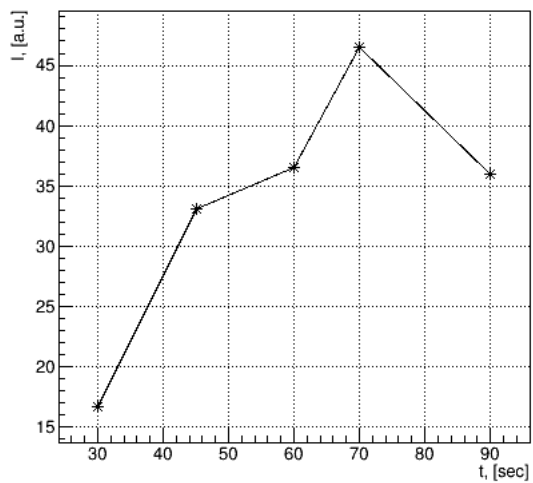
D-60



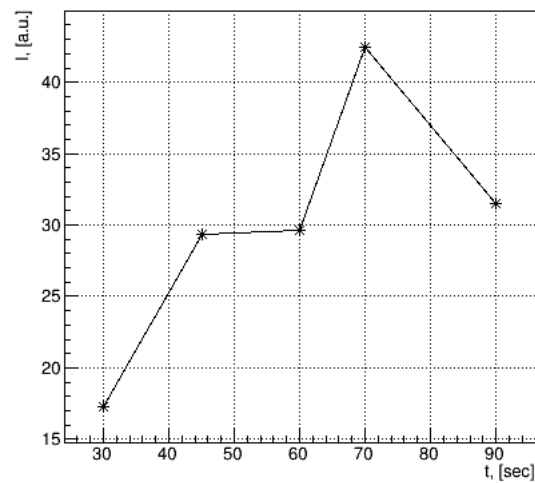
D-61



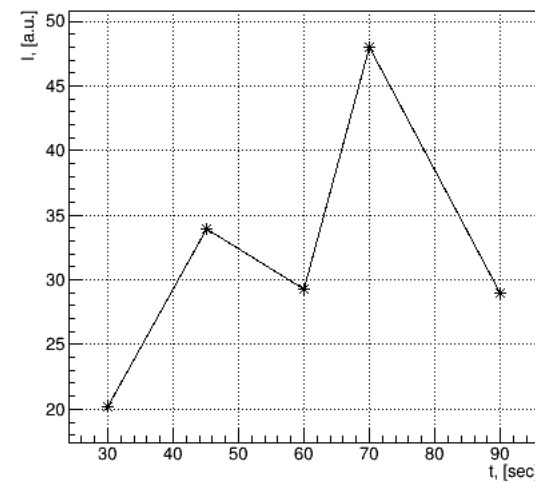
D-62



D-63



D-64



# Summary

- Background removal algorithm using **polynomial function** gave us reasonable results.
- Sample with **1 min 10s** shows significantly increased values on intensity plots.

Thank you!