IV curve and Vbd estimation

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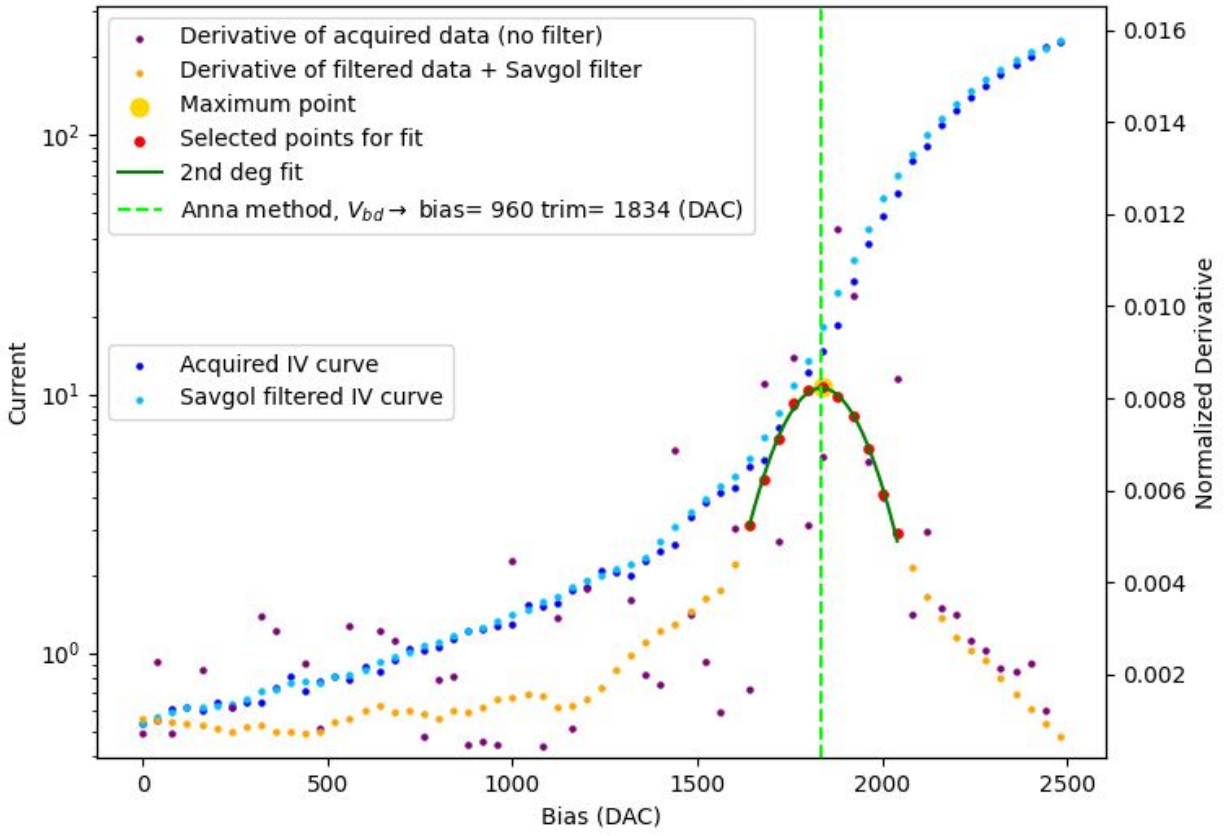
Activity update

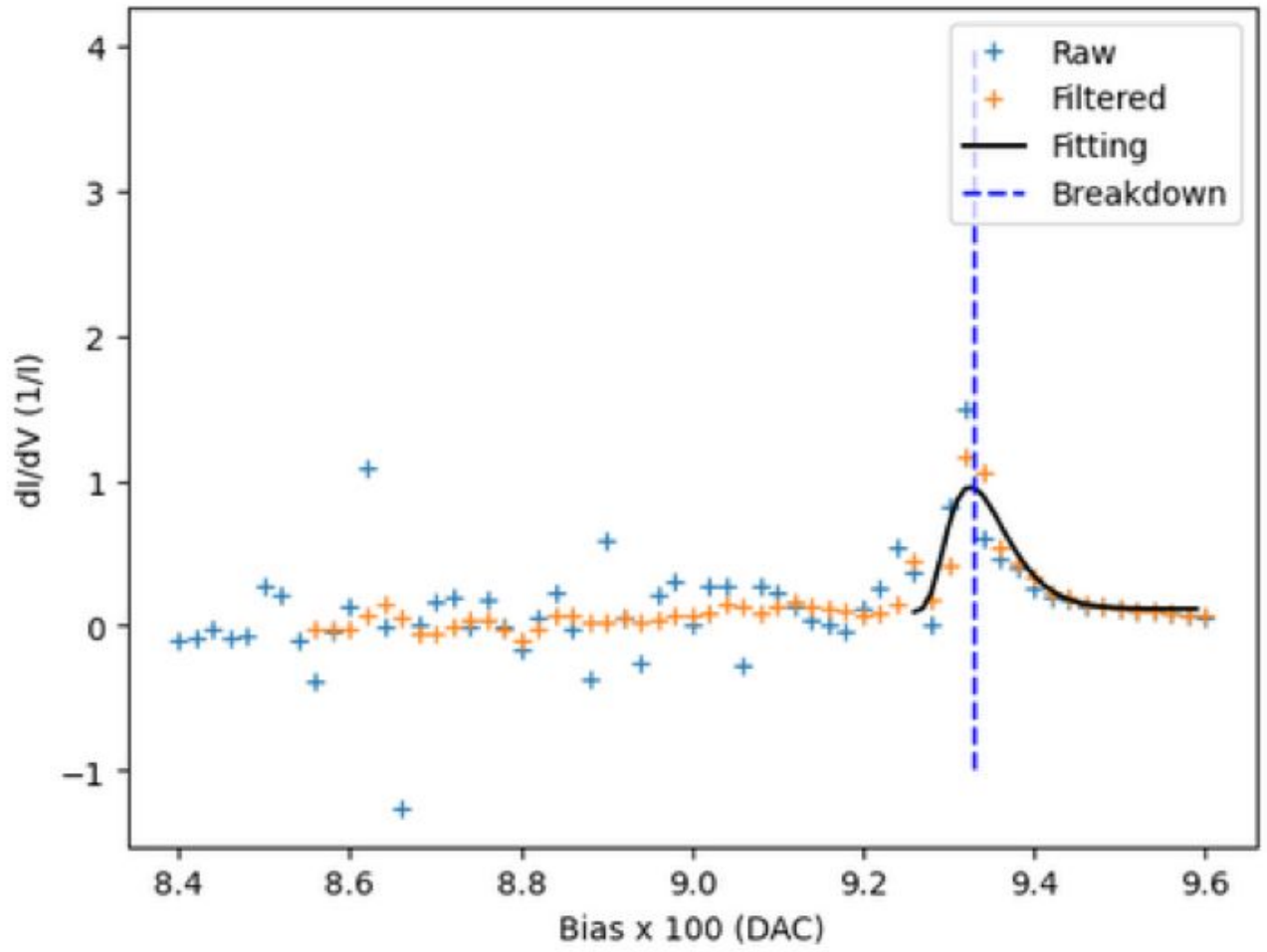
- We are monitoring the IV curves to understand how they vary with temperature
- The IV acquisition is being doing in two steps:
    1. With the bias input, we scan the current until we reach a certain current threshold limit
    2. We do a fine scan using trim to find out the breakdown voltage per channel
- Until now, we have two different methods to estimate the breakdown voltage, one that uses a 2nd order polynomial and another with a pulse shape fitting.

IV curves: 2nd order polynomial fit (by Anna)



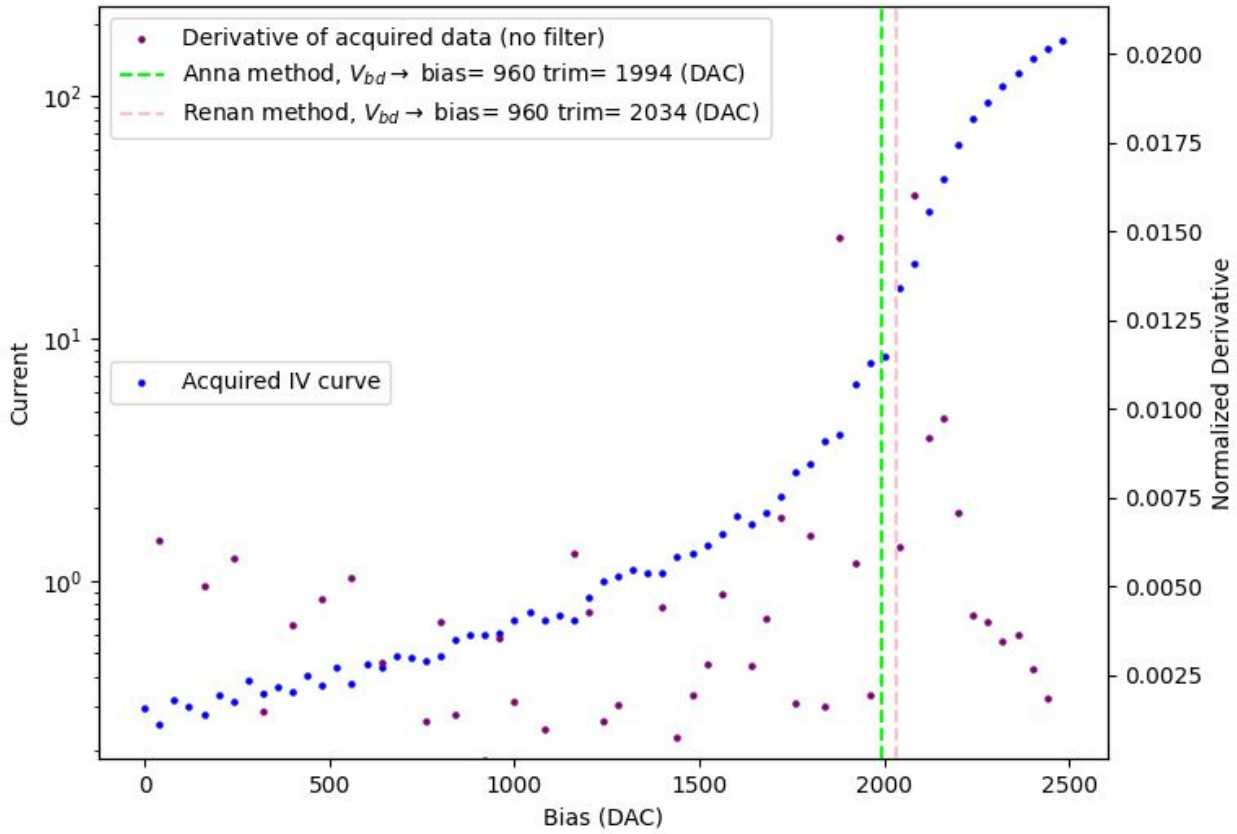
IV CURVE
Endpoint: 105 APA: 1
AFE: 0 CH: 4 SiPM: FBK
Data: 19/03/2024

IV curves: Pulse shape fit (by Renan)



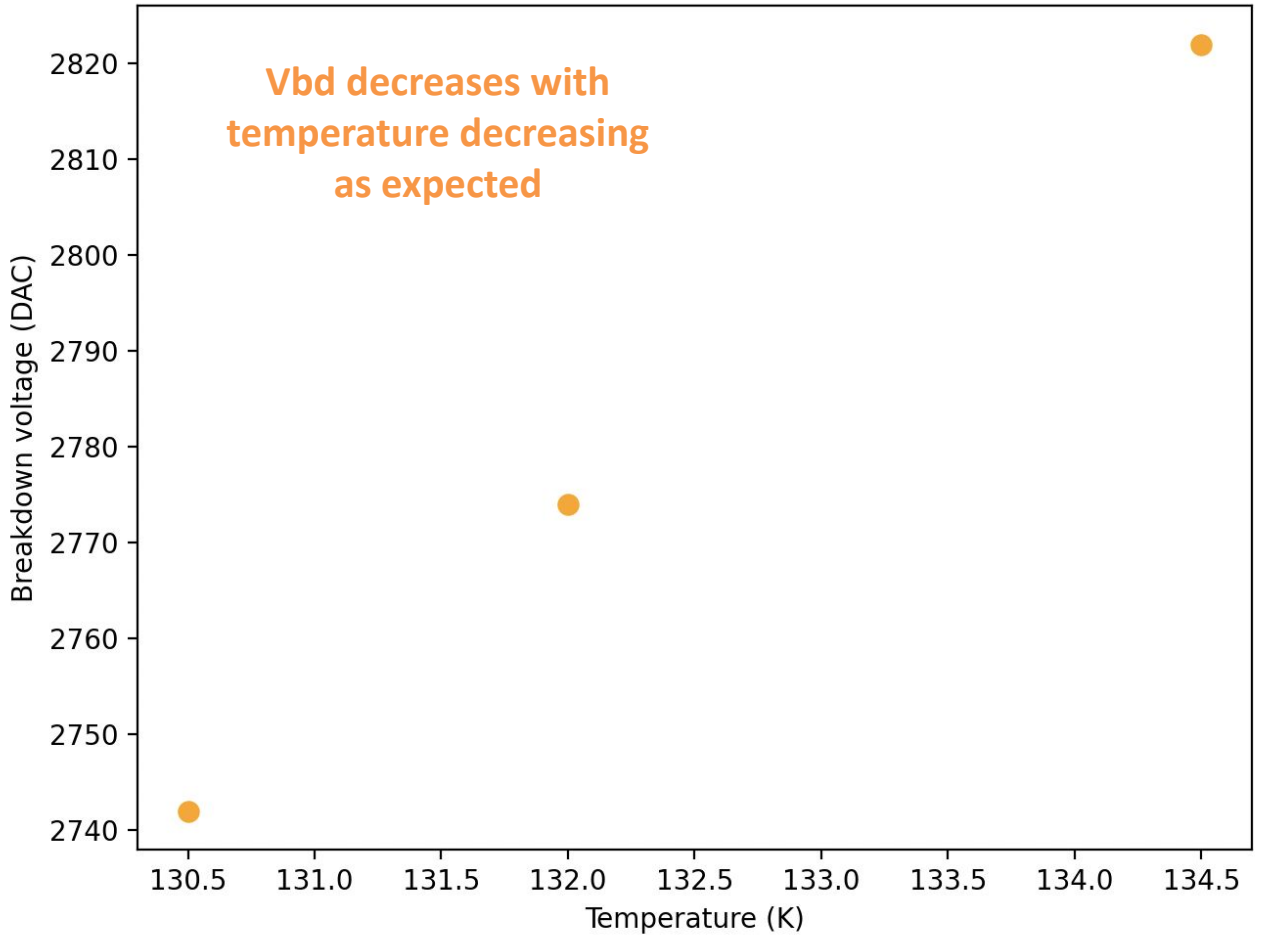
IV CURVE
Endpoint: 104 APA: 1
AFE: 0 CH: 4 SiPM: FBK
Data: 11/03/2024

Comparison between the two methods



IV CURVE
Endpoint: 105 APA: 1
AFE: 0 CH: 7 SiPM: FBK
Data: 19/03/2024

Vbd vs Temperature (first results)



Breakdown results:

17/03/2024 10:28
T = 130.5 K
Bias = 940 Trim = 1802

16/03/2024 10:28
T = 132 K
Bias = 940 Trim = 1834

15/03/2024 10:28
T = 134.5 K
Bias = 940 Trim = 1882

IV CURVE
Endpoint: 104 APA: 1
AFE: 0 CH: 0 SiPM: FBK

Next steps

- Verify the conditions which each fit method works
- Merge the two analysis methods
- Estimate the DAC - Bias voltage conversion per channel, in order to evaluate the correct bias voltage to set to SiPMs (Vbd+3V for HPK, Vbd + 4.5V for FBK)
- Analyze all data in order to study the temperature variation of Breakdown voltage

Thank you for the attention!