Status report - Thursday, April 23nd

Threshold Scans and Data Evaluation

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23. April 2020

How things have been done

General Process - Flow Diagram

Perform a set of measurements in lab (Python) $\rightarrow$

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Perform a set of measurements in lab (Python) $\rightarrow$ Write results to .csv (done by hand) $\rightarrow$ Plot results (Python)

Working on a solution

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Simplyfying the process by writing a script that

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- Extracts the **timestamp** for each measurement and properly relates the .cfg to the .dat files
- performes analysis on ALL of the measurement data at once
- writes result to a csv file

Scripting in Bash

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```
for i in $(ls $PATHTOFILES | grep '.dat'); do
#Extract Timestamp
TIMESTAMP=$(echo $i | tail -c 18 | head -c 13)
CONFIG="ScanConfig_$TIMESTAMP.cfg"

#Then extract Parameters from config file (Later add VBB)
VCASN=$(cat $PATHTOFILES$CONFIG | grep 'VCASN' | awk -F ' ' '{print $2}' | head -1)
ITHR=$(cat $PATHTOFILES$CONFIG | grep 'ITHR' | awk -F ' ' '{print $2}')

TRSH=$(./thresh.py $PATHTOFILES$i)

# Write to csv file
printf '%s\n' "$TIMESTAMP" "$VCASN" "$ITHR" "$TRSH" | paste -sd ',' >> output.csv
done
```

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# Write to csv file
printf '%s\n' "$TIMESTAMP" "$VCASN" "$ITHR" "$TRSH" | paste -sd ',' >> output.csv
done
```

```
Timestamp,VCASN,ITHR,Threshold [DAC]
200121_193551,47,51,13.60355155825141
200121_193951,47,60,15.953068558715911
...
```

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New Problem

Data is not ordered, and the csv contains multiple entries for the same values of VCASN and ITHR

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Approach

Write a "sorting" algorithm, that automatically identifies the ranges chosen for VCASN and ITHR.

```
Timestamp,VCASN,ITHR,Threshold [DAC]
200323_134855,53,51,6.725833998523066
200323_135218,53,60,8.186236372633545
200323_135541,53,70,9.833234746846962
200323_132837,50,51,9.335578330893117
200323_133200,50,60,11.202496464178642
200323_133523,50,70,13.211766207119839
```

→

```
VCASN = array([50,53])
ITHR = array([51,60,70])
```

plotting

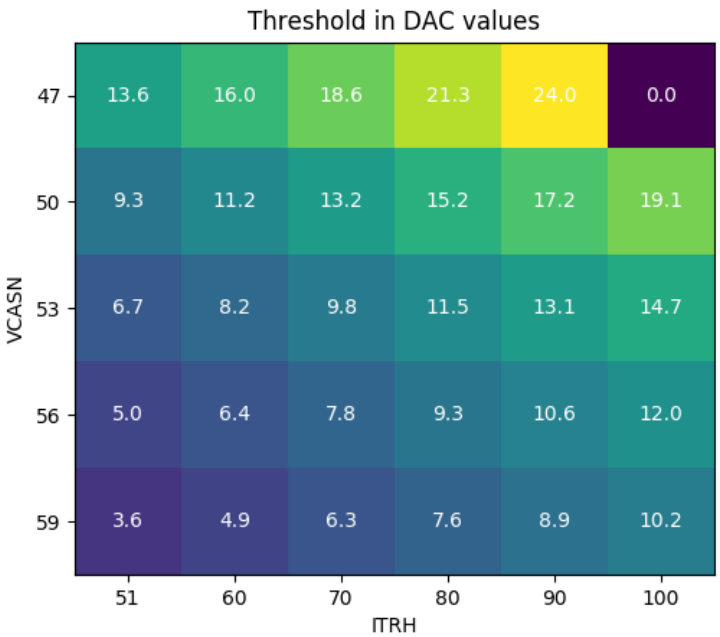
```
VCASN, ITHR, TRSH = np.loadtxt(csv, skiprows=1, usecols=(1,2,3), delimiter=",", unpack=True)

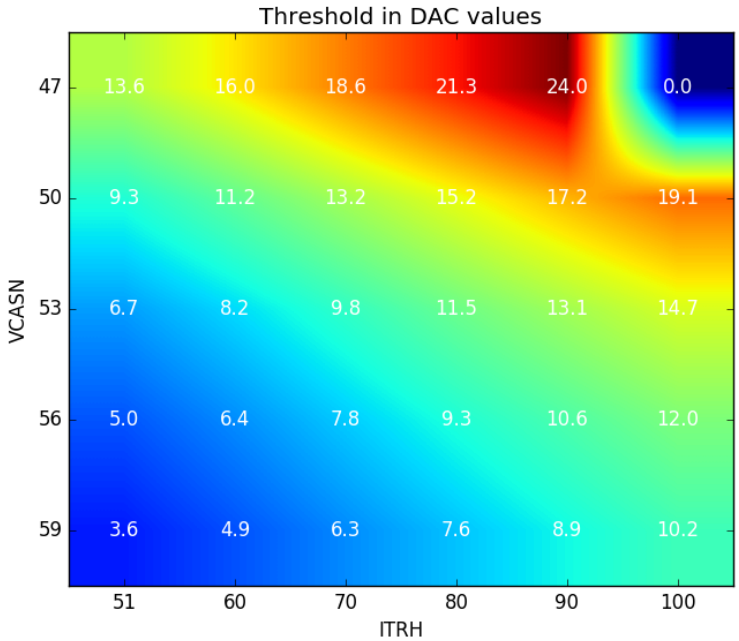
def getValues(array):
    #Create a temporary list
    temp = []
    #Write each unique entry into the temporary list
    for i in array:
        if i in temp: continue
        else: temp.append(i)
    #Since the array of values in this case is quite small, we can use temp.sort
    temp.sort()
    output = np.ndarray((len(temp)),dtype=int)
    for i in range(len(temp)):
        output[i] = int(temp[i])
    return output

VCASN_0 = getValues(VCASN)
ITHR_0 = getValues(ITHR)

##### Implement sorting algorithm #####
Threshold = np.ndarray((len(VCASN_0),len(ITHR_0)))
for i in range(len(VCASN_0)):
    for j in range(len(ITHR_0)):
        Threshold[i,j] = TRSH[(VCASN == VCASN_0[i]) & (ITHR == ITHR_0[j])]
#######################################
```

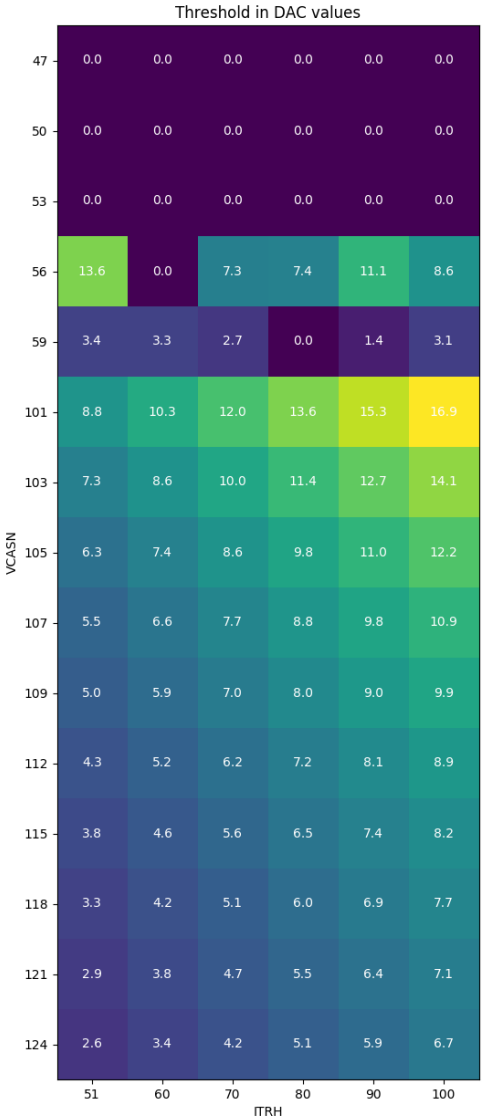
Results for 0 V Back Bias

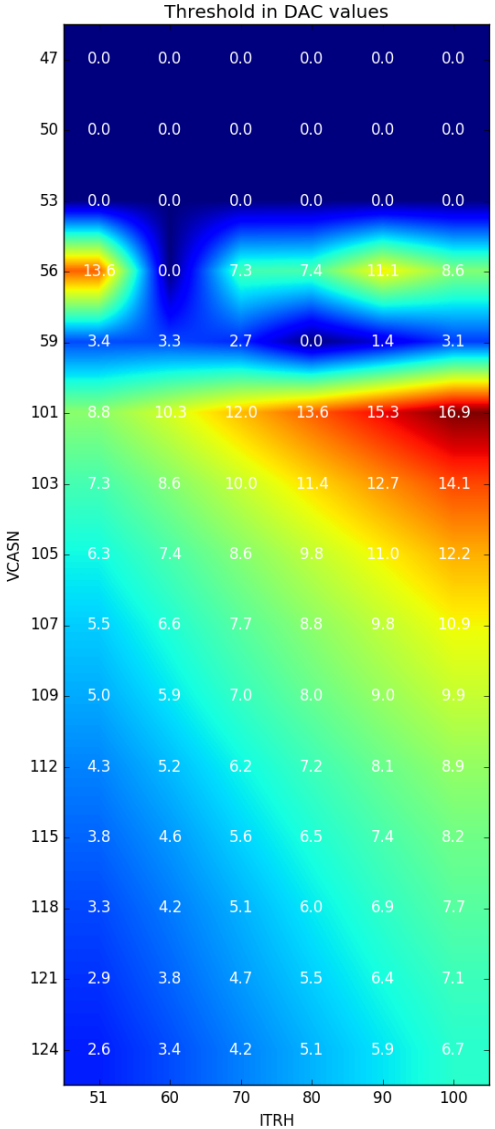




Note: Value for VCASN = 47 and ITHR = 100 is faulty, due to a premature stop of the measurement after about 7% of the injections. Threshold calculation fails there.

Results for 3 V Back Bias





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Thank you!