



Conclusion on temperature measurements

Insights from Energy Calibration and Fake Hit rate Analysis

Conversion factor vs temperature

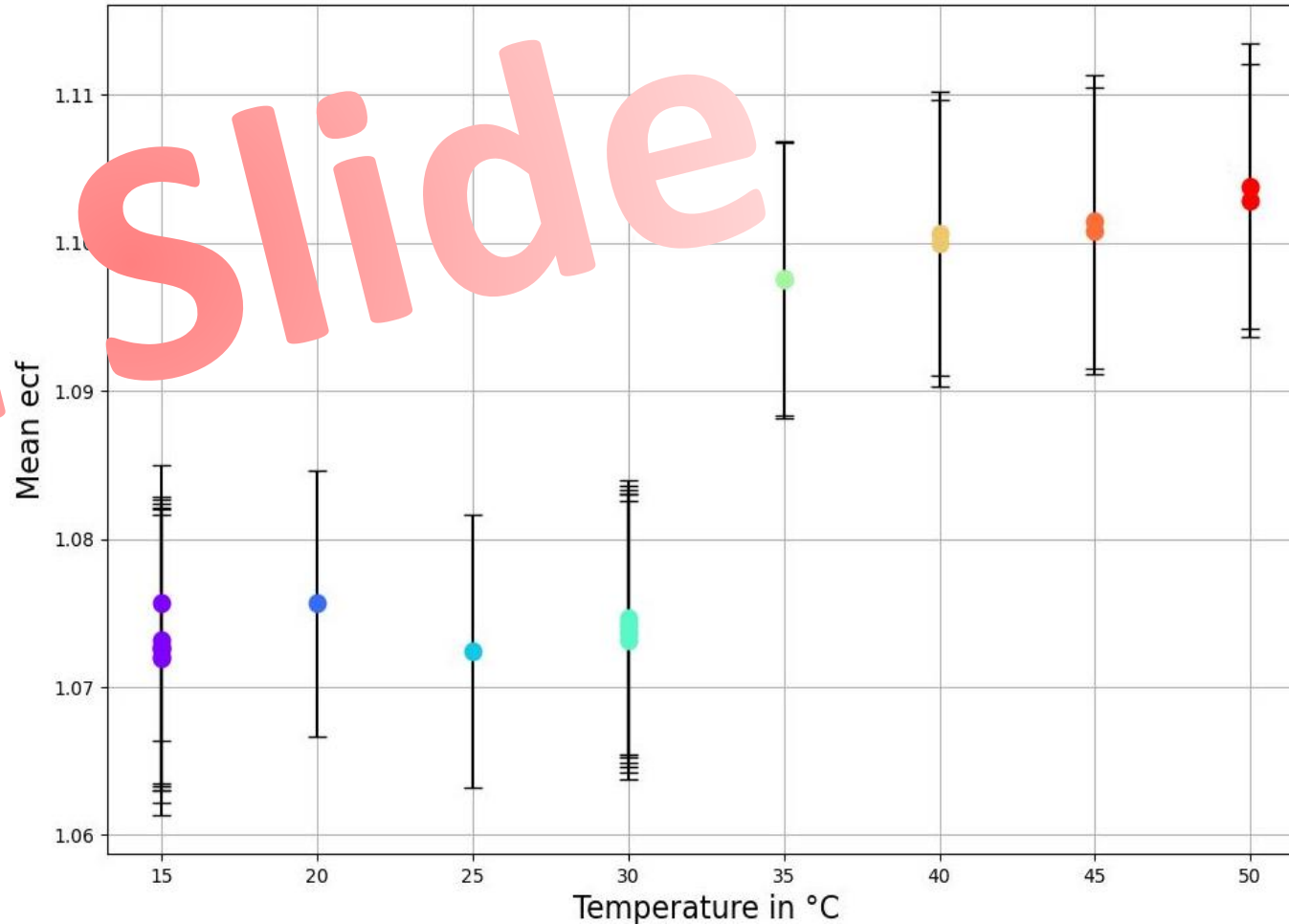


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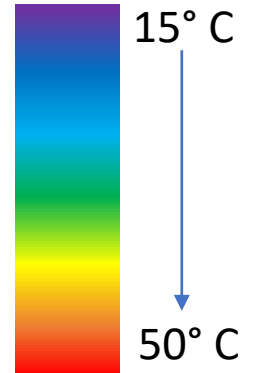
Mean Energy Calibration Factor vs Temperature

- Big Jump between 30°C and 35°C

Old Slide



LBNL Setup
DPTSXW22B33
wafer: 22
chip: 33
version: X
split: 4 (opt.)
T = 15 °C
 $I_{reset} = 10 \text{ pA}$
 $I_{bias} = 100 \text{ nA}$
 $I_{biasn} = 10 \text{ nA}$
 $I_{db} = 100 \text{ nA}$
 $V_{casn} = 300 \text{ mV}$
 $V_{pwell} = V_{sub} = -1.2 \text{ V}$



● VCASB 250mV
+ VCASB 300mV

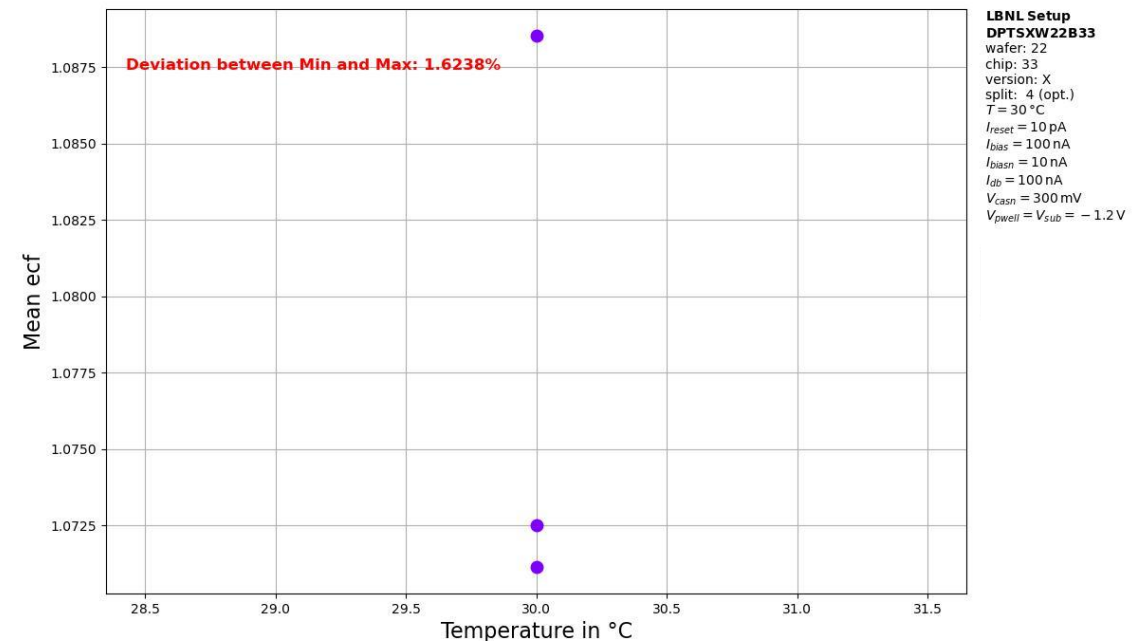
New Approach

- Are ToT datasets taken under the same conditions ($v_{casb} = 250$ mv) identical?

No!

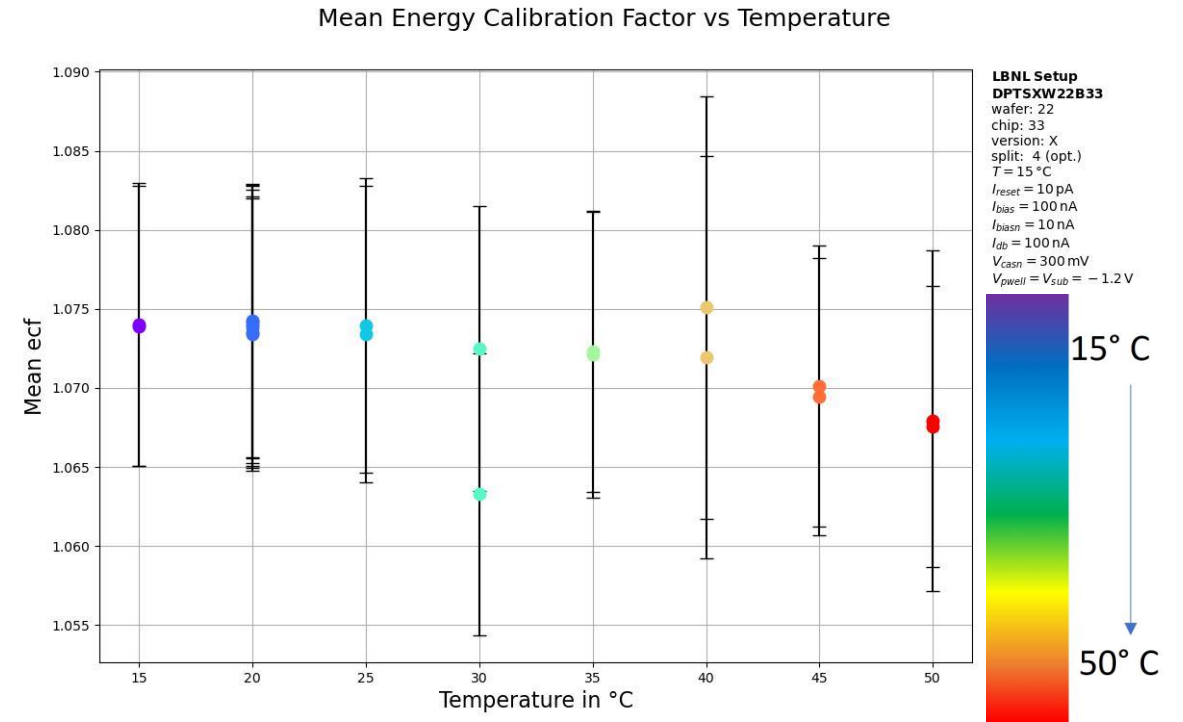
- Using different ToT datasets leads to different Energy calibration factors

Mean Energy Calibration Factor calibrated with different tot Datasets at 30°C



New Calibration of source data

- Choosing calibration data not just from the same parameters but closest in time (when data was taken)
- We have no close calibration datasets for our first measurements
 - > Exclude this datasets



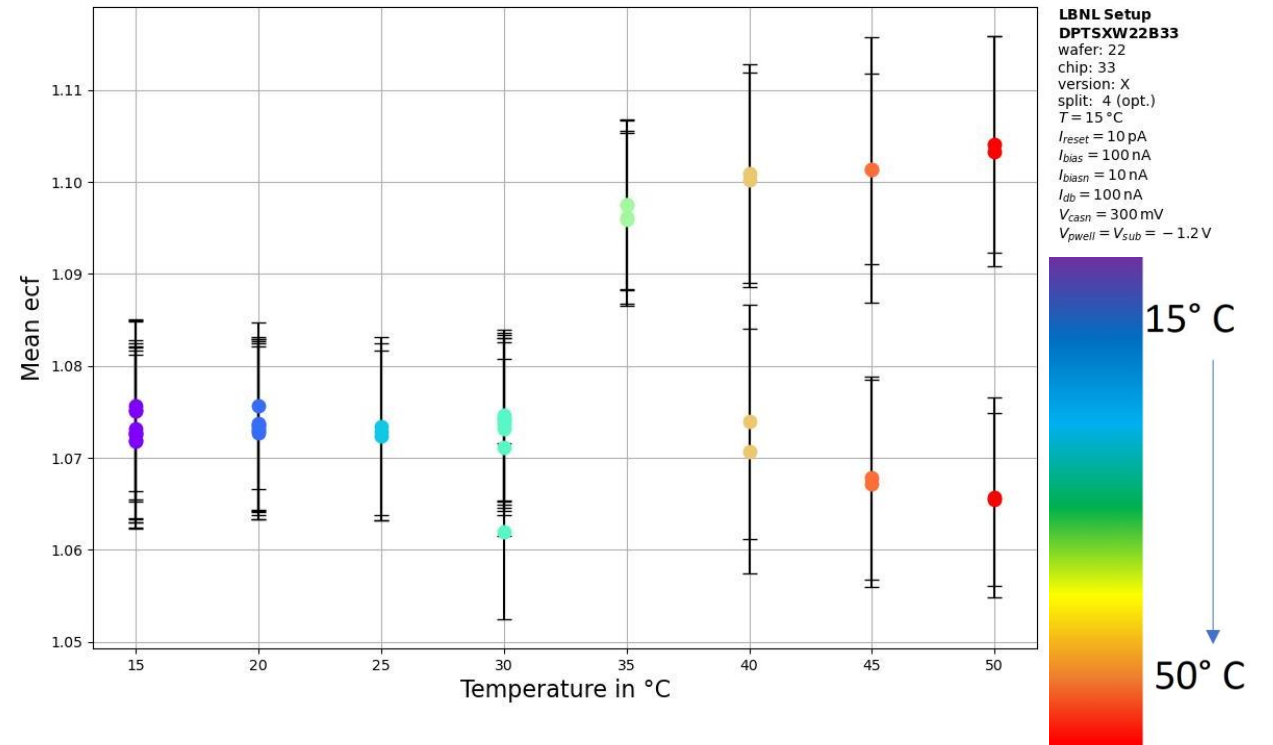
-> No Jump anymore

Further studies

- Comparing energy calibration factor for timewise closest and furthest calibration datasets

Furthest calibration data

Mean Energy Calibration Factor vs Temperature

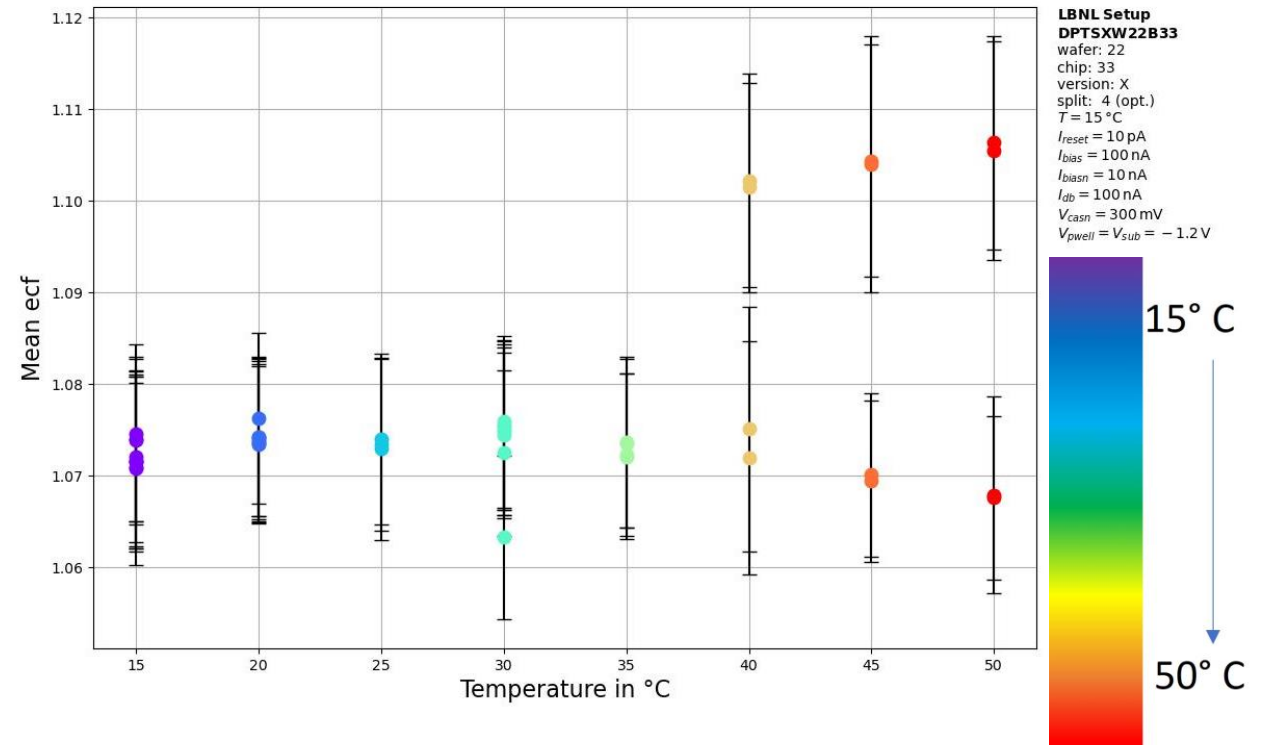


Further studies

- Comparing energy calibration factor for timewise closest and furthest calibration datasets

Closest calibration data

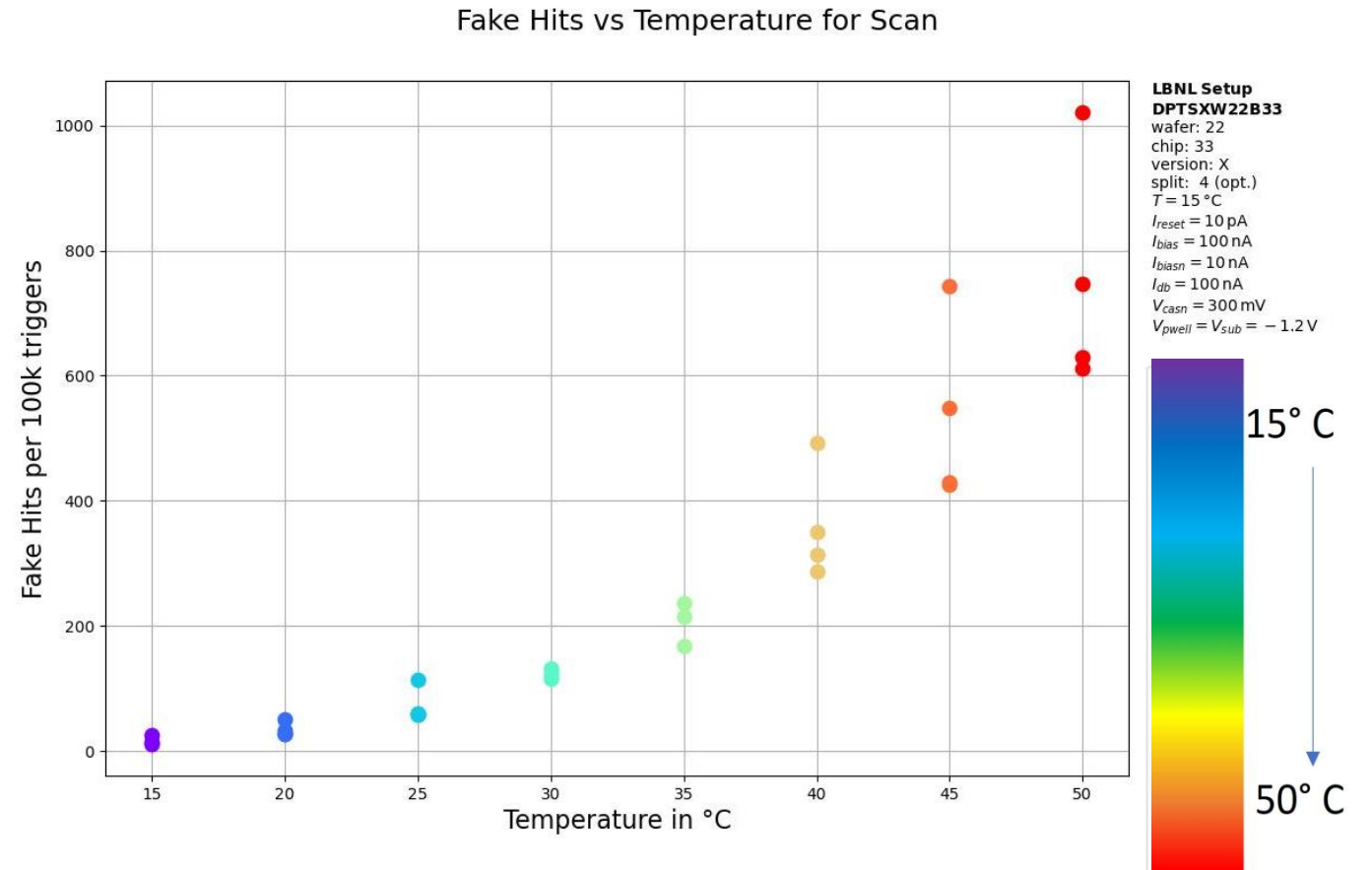
Mean Energy Calibration Factor vs Temperature





Fake Hit rate

- Earlier observed:
 - Also differences between datasets at same conditions
- Taken at $v_{casb}=300$ mV

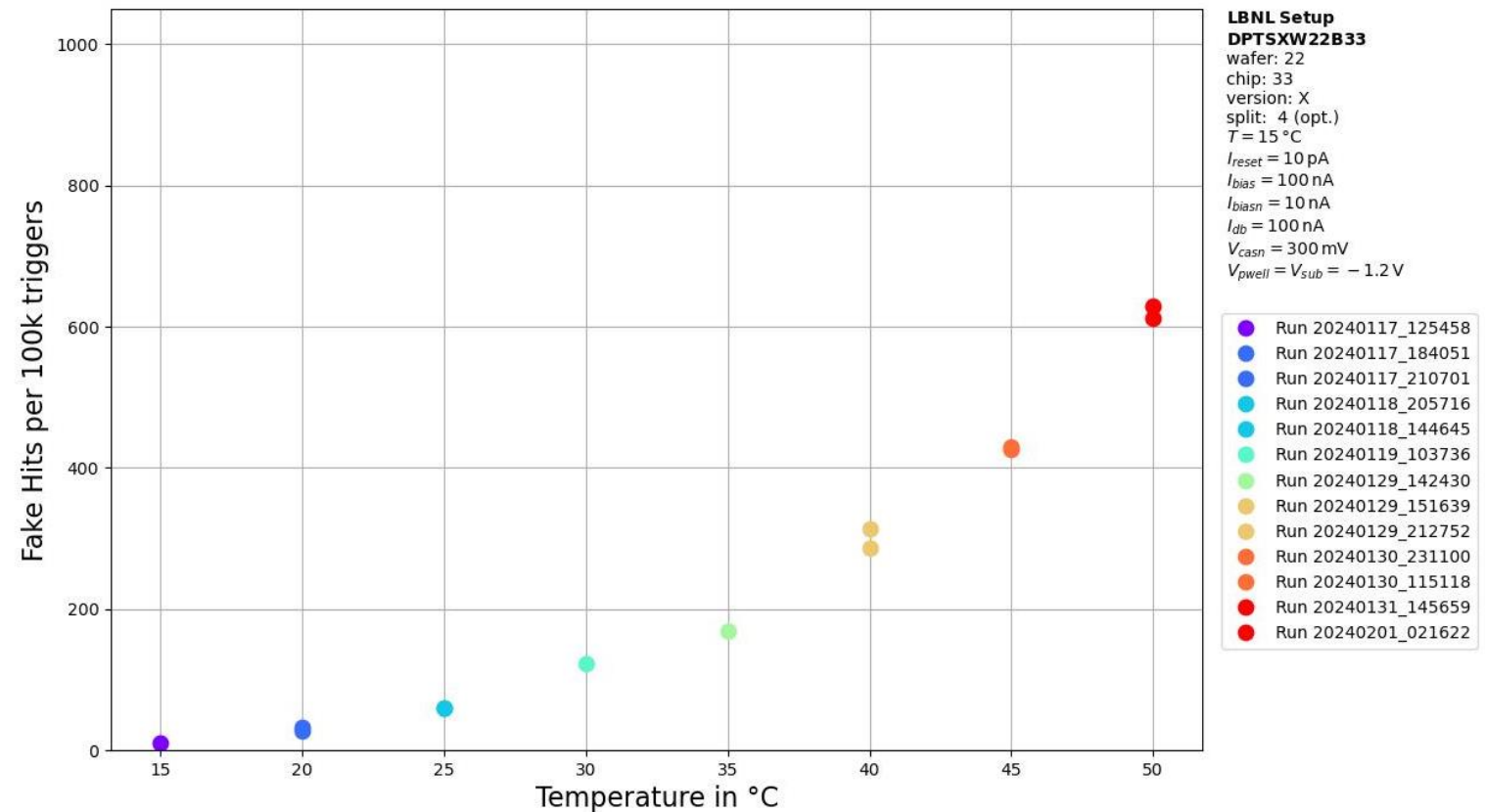




Three Sets of data

- Set 1: January

Fake Hits vs Temperature for Scan

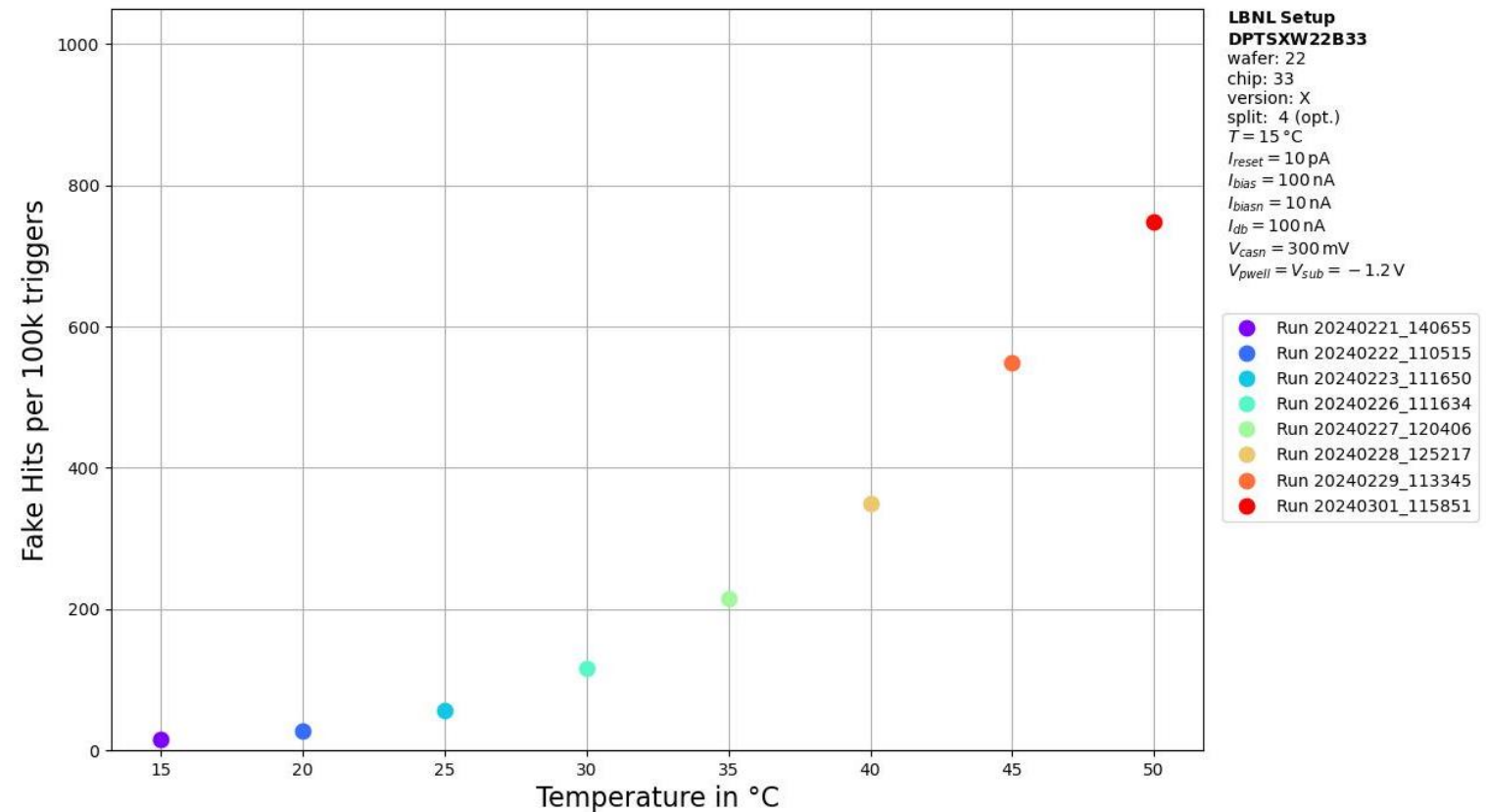




Three Sets of data

- Set 2: February

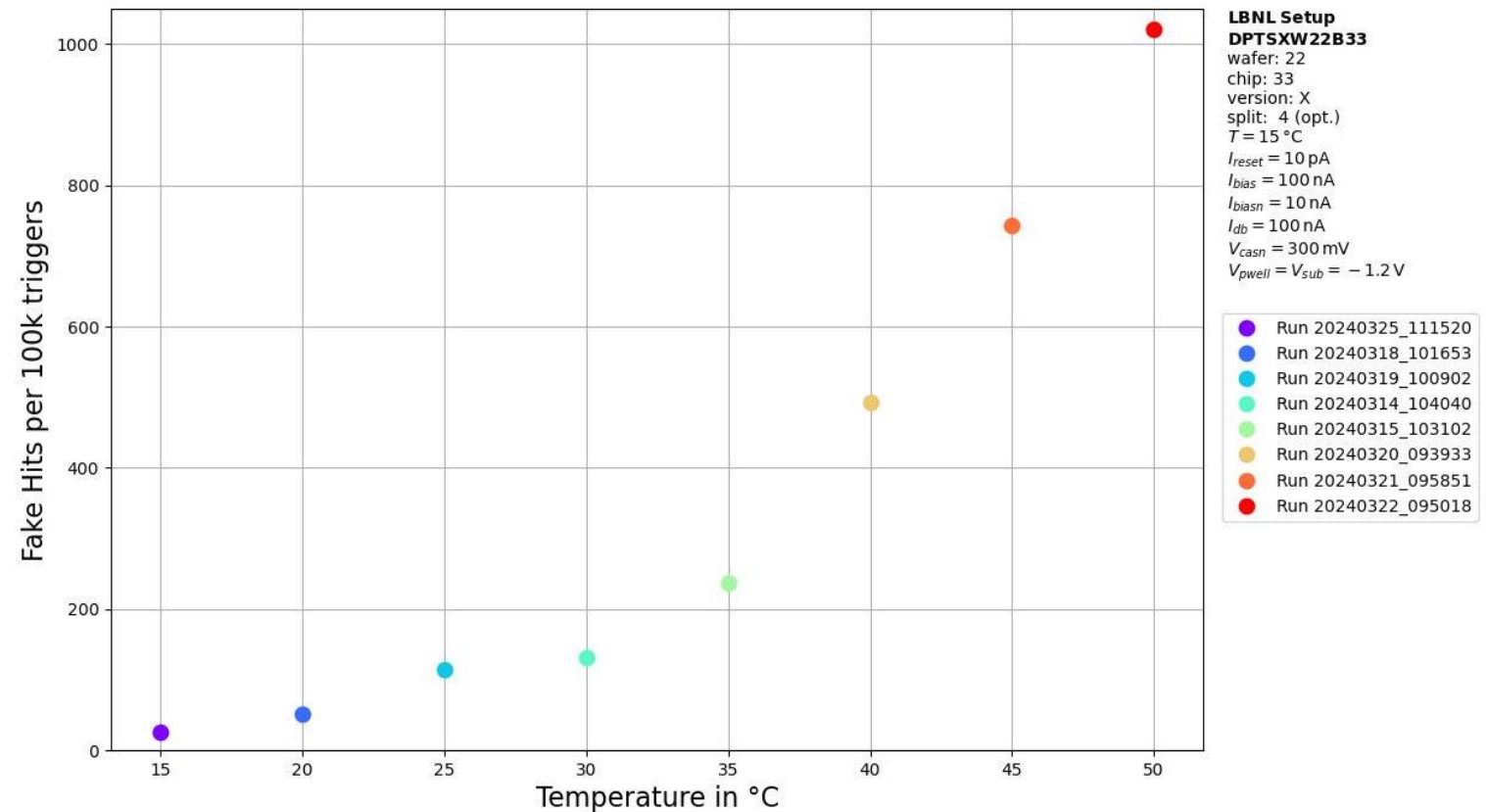
Fake Hits vs Temperature for Scan





Three Sets of data

Fake Hits vs Temperature for Scan



- Set 3: March

Conclusion

- We see a difference between December and March ToT datasets
 - Especially at 30°C & 35°C
- ToT fluctuation explains earlier observed jump in the Energy Calibration
- The Fake Hit Rate is increasing over time from January to March
- The Energy calibration factor is stable if we have close calibration datasets
 - Slightly decreasing for high temperatures



Bye Bye