INTT Sensor Test Result Check

NCU

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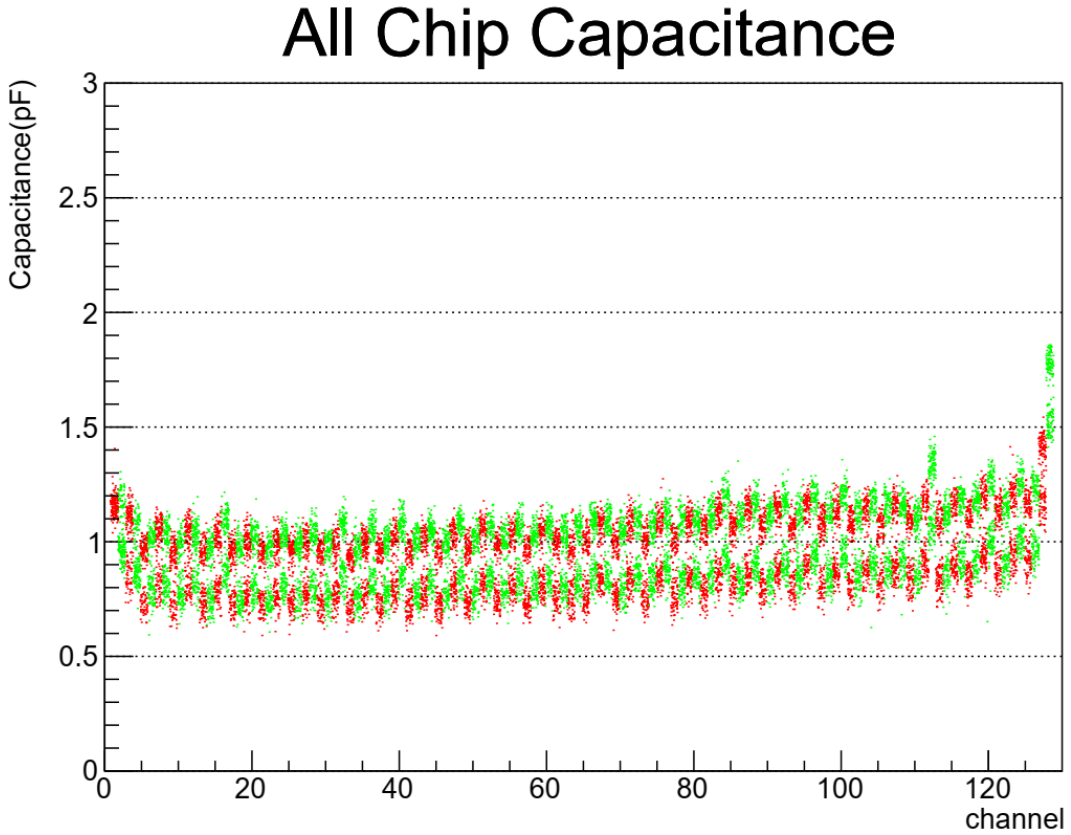
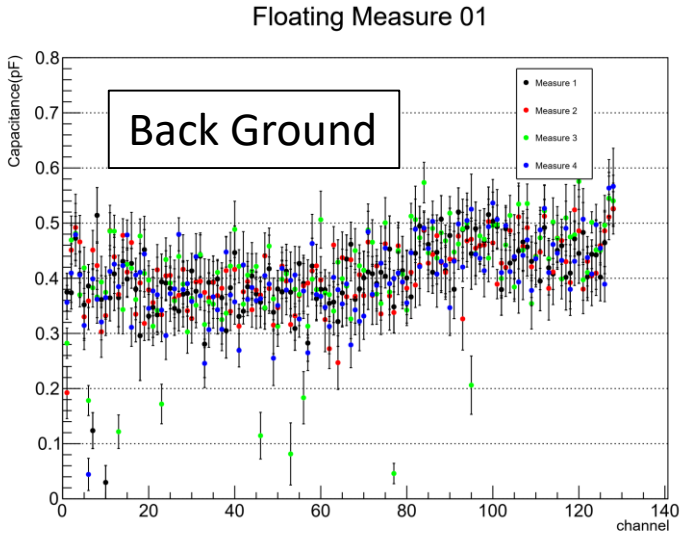
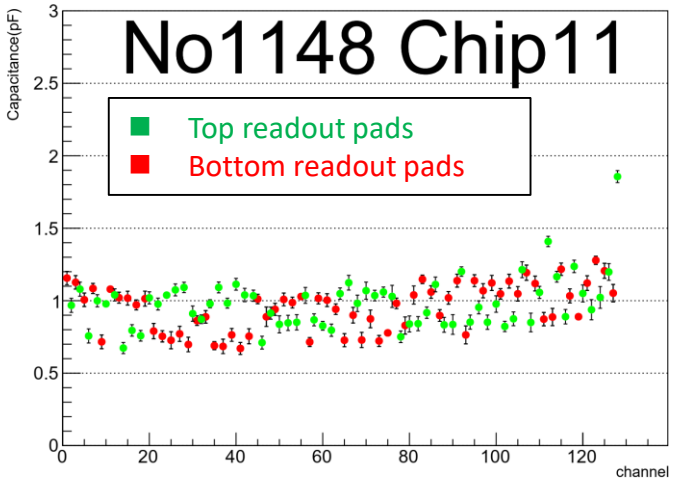
Two Trends

- In last meeting, I showed the histogram of all chips data. It showed there were two trends of measurement.
- According to geometry test result, this behavior is not caused by readout geometry, so I go to check the fluctuation of time function.

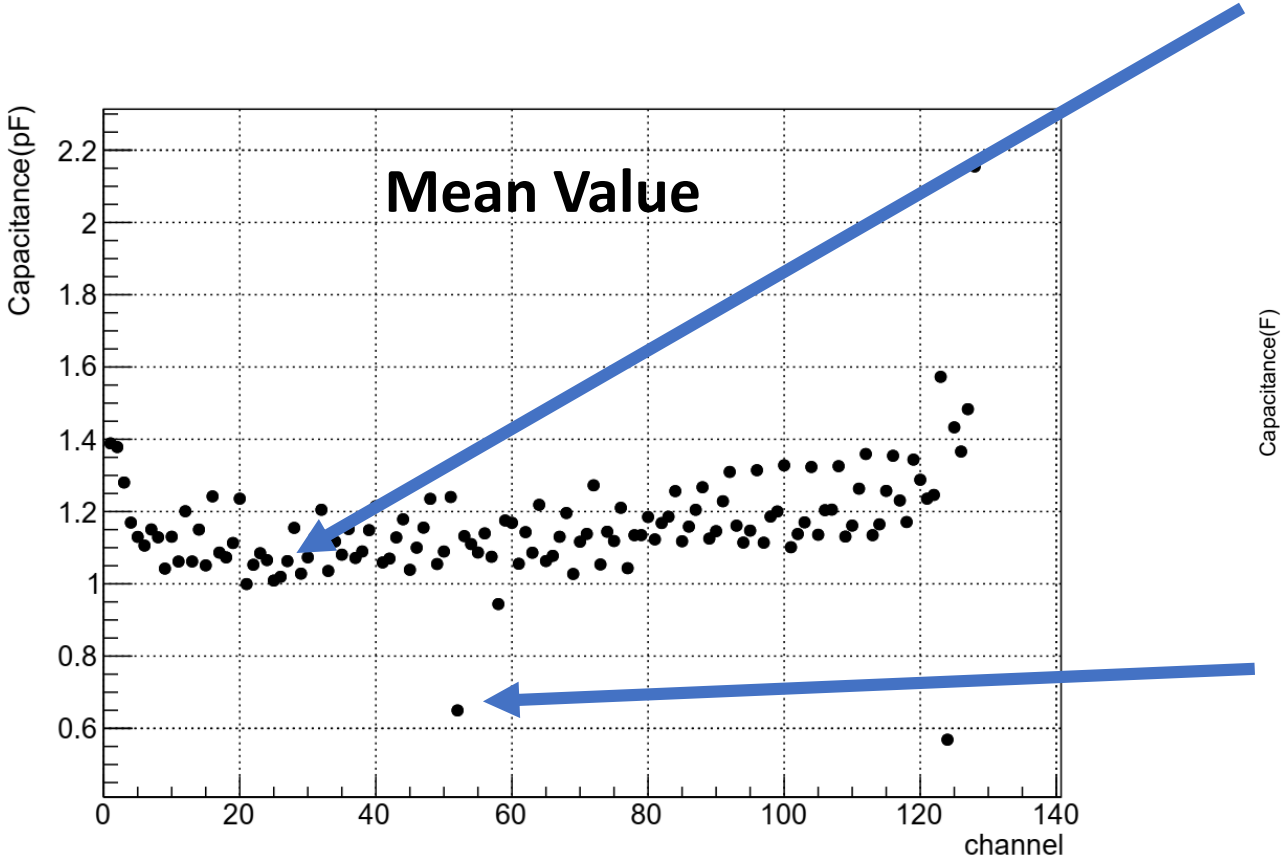


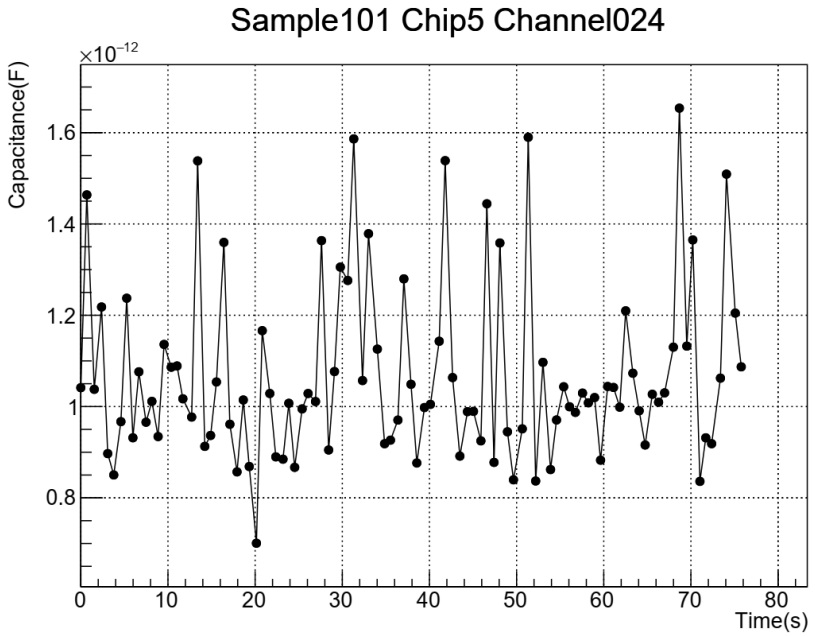


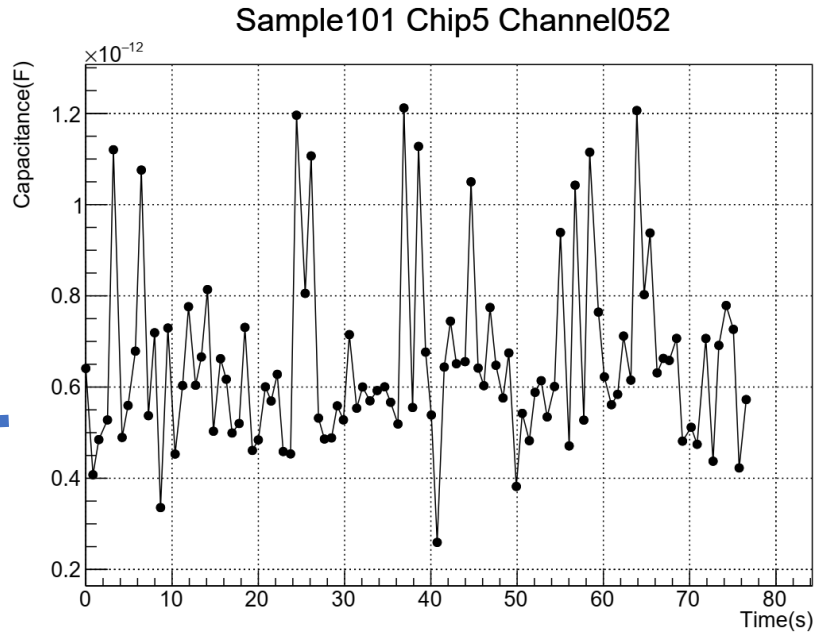


Fluctuation Check

- Measure the time function (100 samples) of each channel.
- The fluctuation is about 0.6pF. The left plot show the mean value of each time measurement, so I think trends is caused by timing.

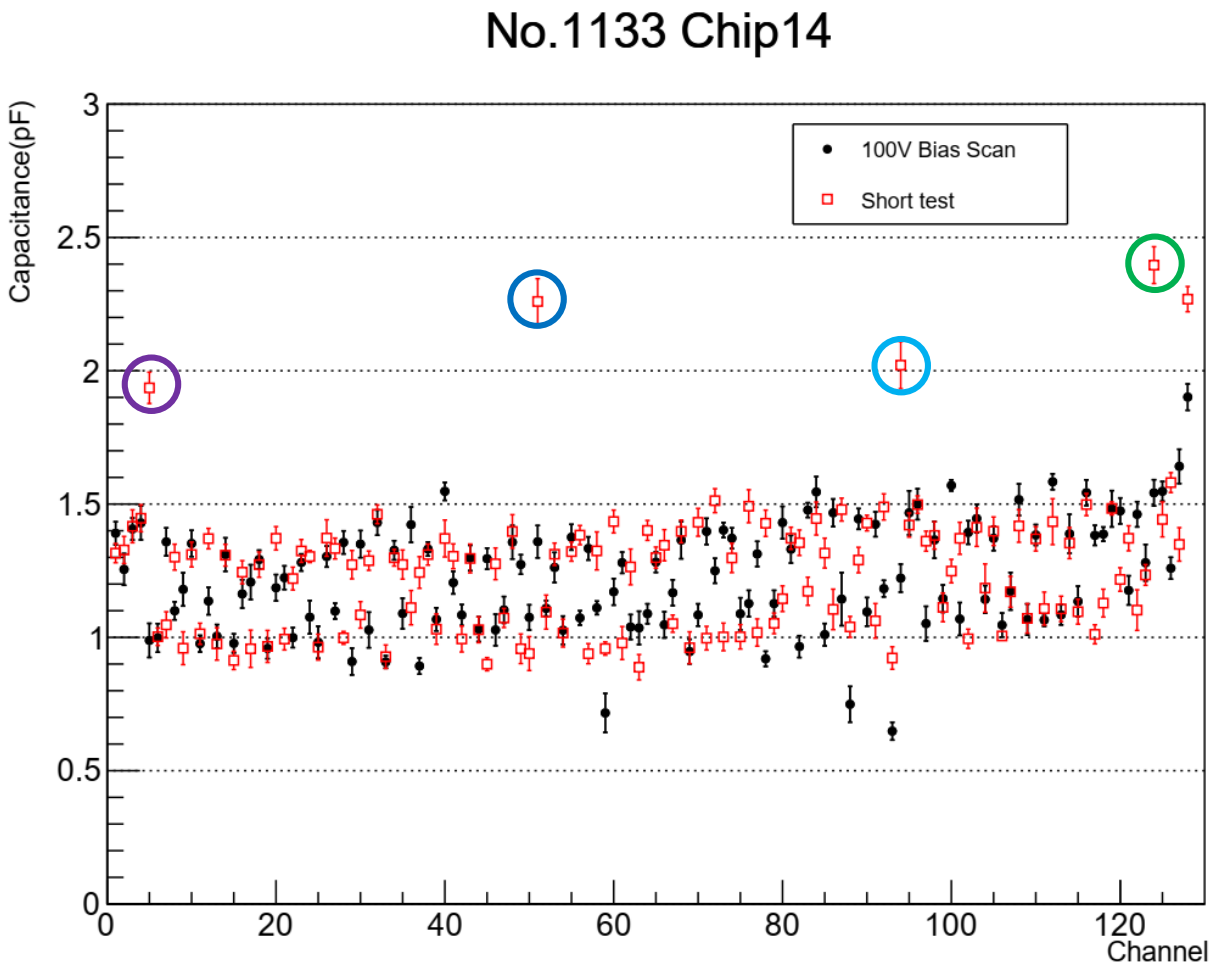




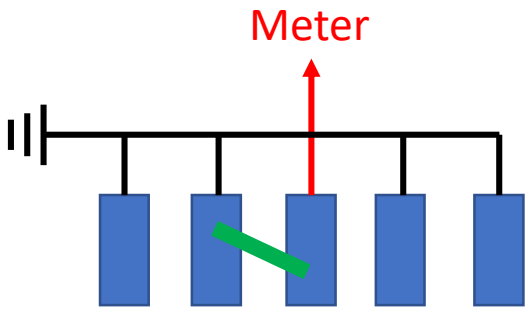


Short Test

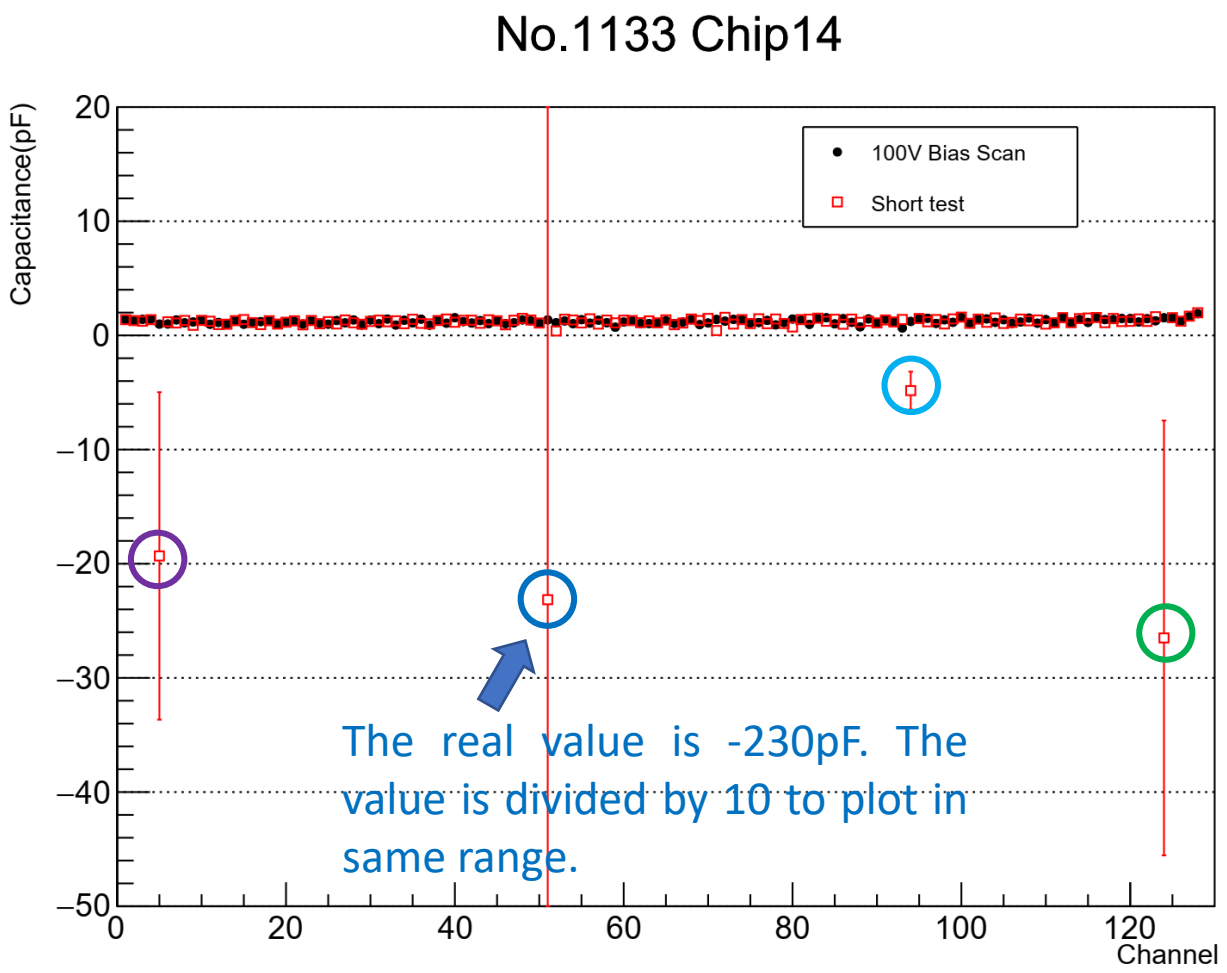
- I set the relay matrix to short two channels when measure channel 5, 51, 94 and 124.
- For example, when measure the channel 5, the meter is connected to channel 5 and 4 to simulate there are some short defect between channels, but setting of measurement channel 4 is normal.
- However, the situation is not the correct behavior if there are some short channels, because other channels are ground when I measure one channel. I will adjust setting in next slide.



Short Test



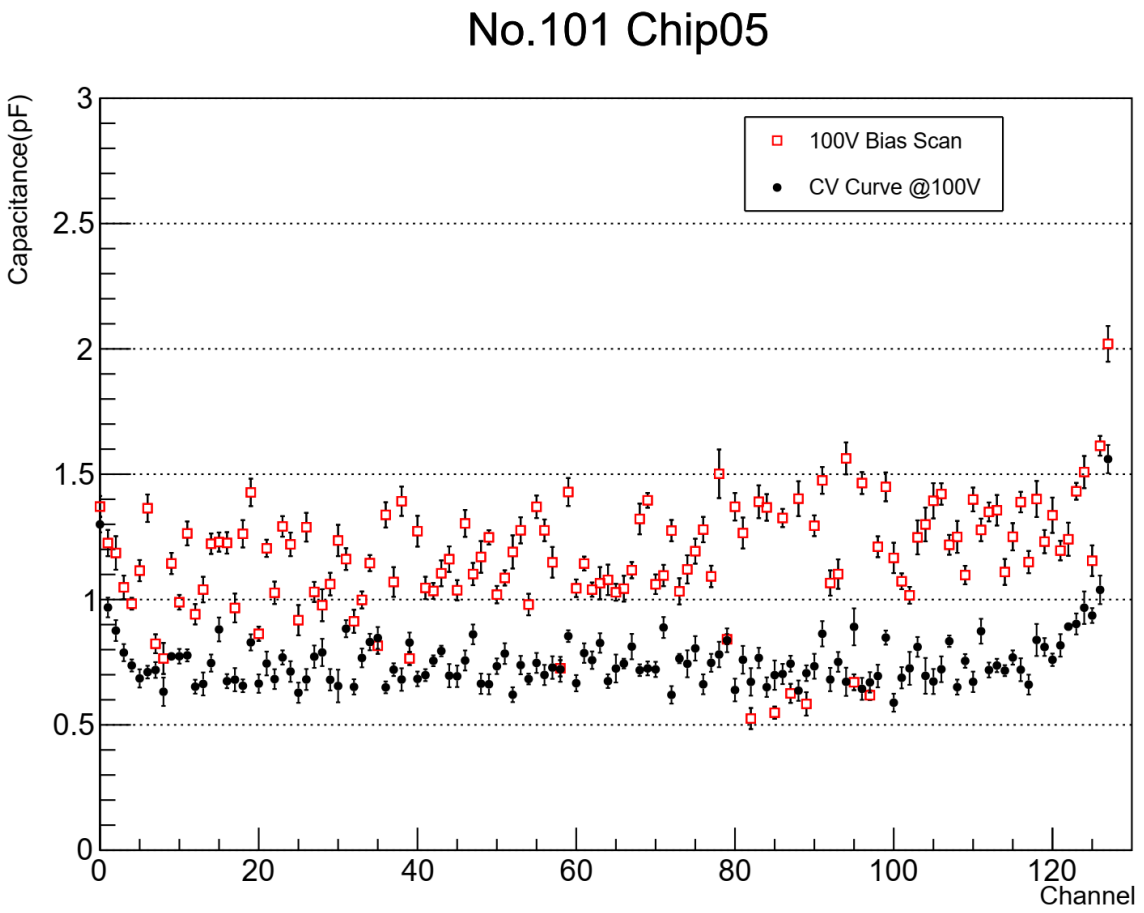
- Because other channels are ground, if the channel short to other channels, the situation is equal to short to ground together. Therefore, we can't sure what the current measured from current meter.
- The capacitance will very strange and different like right plot shows.
- Also choose channel 5, 51, 94 and 124 to test short situation.
- Therefore, if there are some short channels, we can easy to know.
- If there are some broken, the behavior should like background (~0.4pF)



Measure Capacitance with different methods

- During measure type B sensor, I found when I measure CV curve on single channel, the capacitance is obviously lower than keep 100V to scan each channel. Therefore, I measure the CV curve of all channels and compare with bias scan value.
- Each measurement point in CV or bias scan are measured 9 times to calculate average and rms.

	Parameters	Bias Scan	CV
Raise voltage	step	5V	5V
	delay	0.1s	0.01s
	sample	1	9
	Raise in	Channel 1	Each channel
Switch channel	delay	0.3s	0.3s
Measure at 100V	delay	0.01s	0.01s
	sample	9	9



Measure Capacitance with different methods

- The capacitances from CV method are lower than values from scan method, but It still can be divided from broken or short channels.

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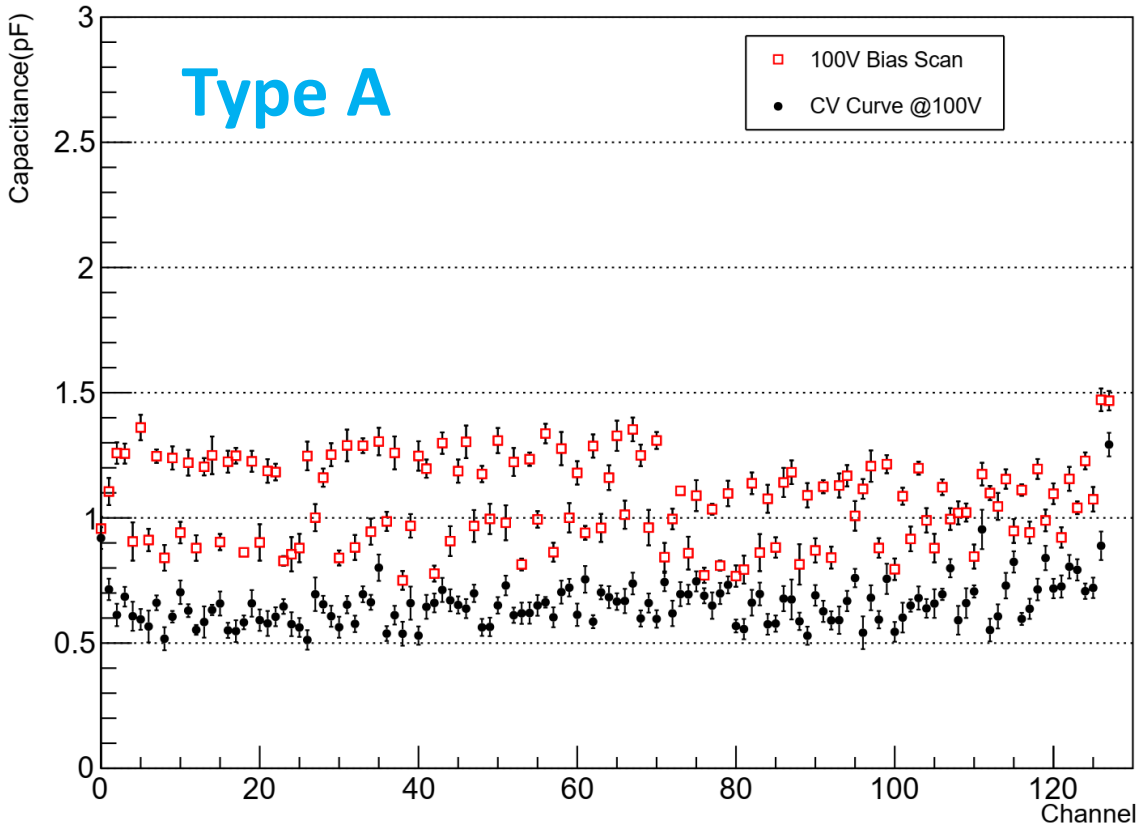

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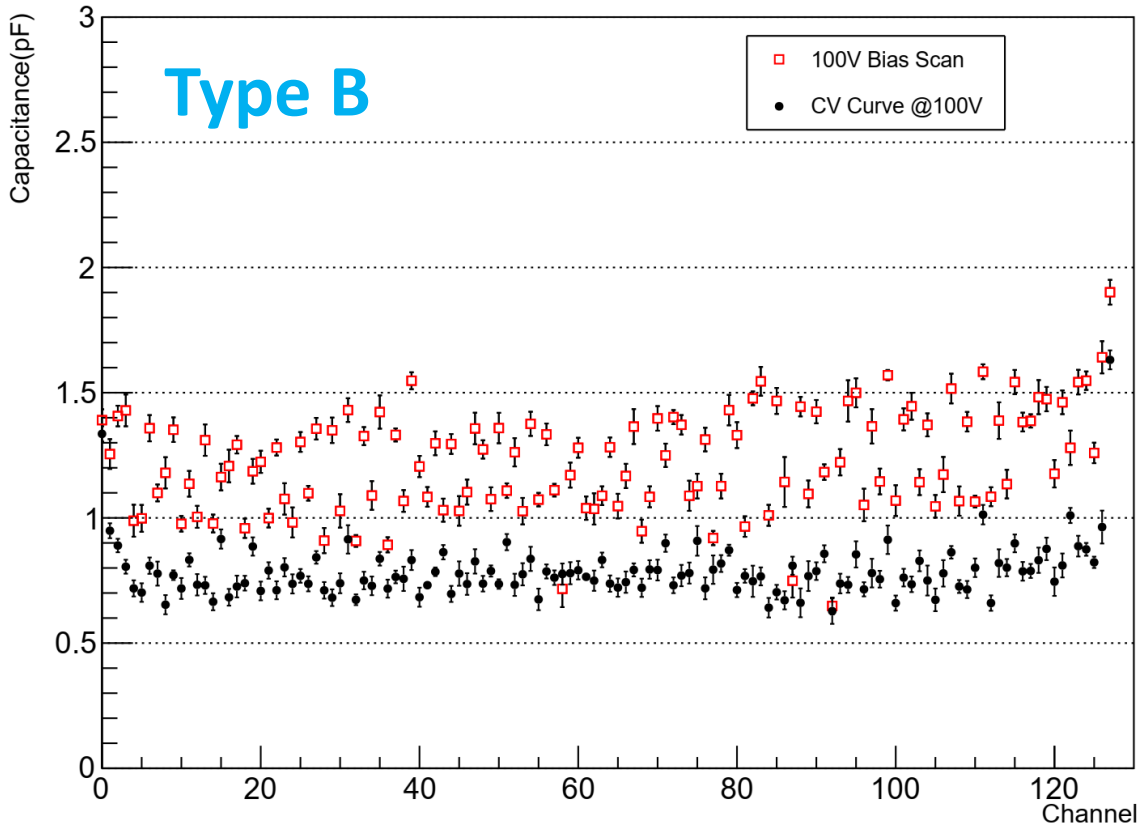

Summary

- The trend is seem to caused by timing. I check the all measurement each channel. There are some fluctuation during one measurement (9 samples), but what we see in the plot are almost caused by repeat measurement. I had tried to adjust hold time or measurement setting, but it didn’t improve the measurement.
- Because I use the CV method to do the single channel check, these values are lower than scan method, but still can divide from bad channel.
- From the short test, we can see the obvious variety in short channels. However, I don’t know how to test the situation of metal are shorted to silicon.
- Itaru’s mail wrote that the sphenix use the PostgreSQL. Seem .sql file produced from MySQL can’t directly import to PostgreSQL, but still can import table by table or by program. Should I change the database from MySQL to PostgreSQL?