

Calibration for ICT & FC

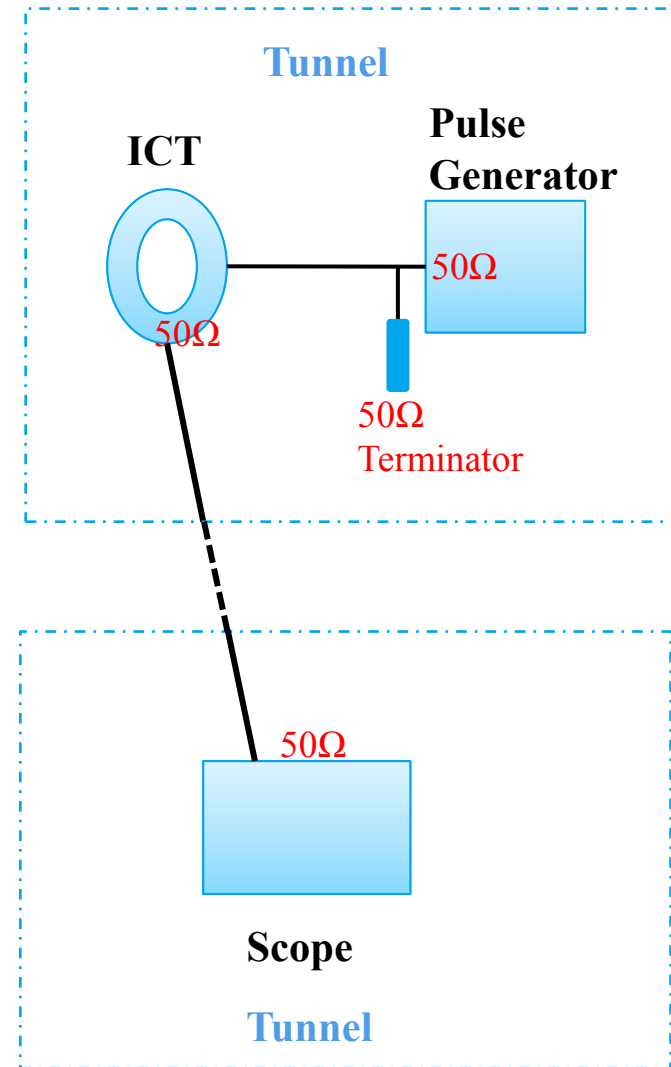
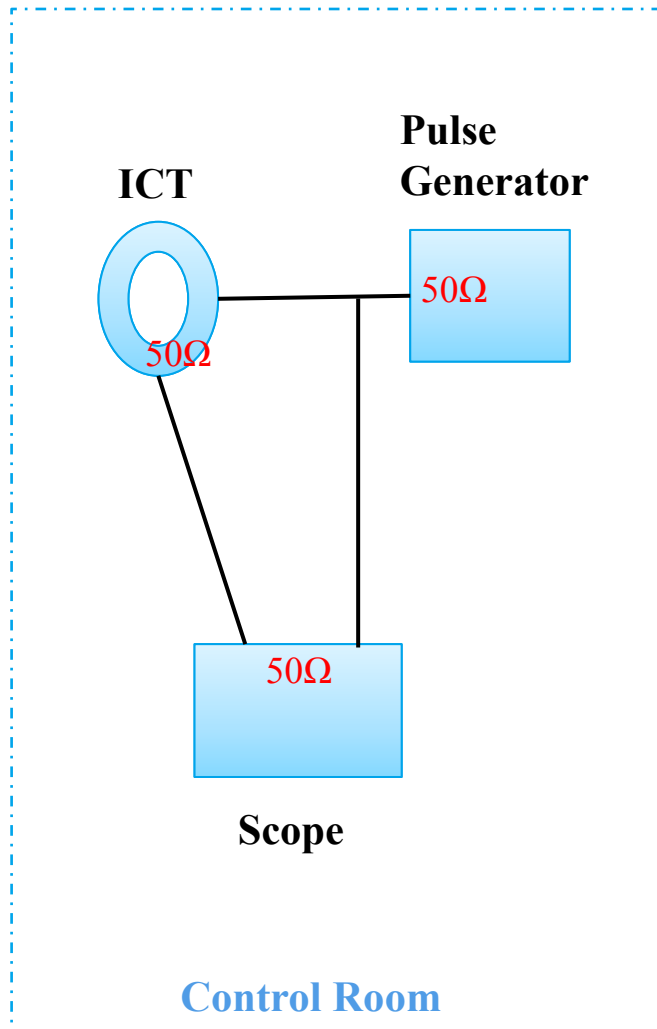
- **Calibration setup**
- **Calibration result**

Xin Li

PPS

Desy, 20.10.2016

Calibration setup



Calibration setup and steps

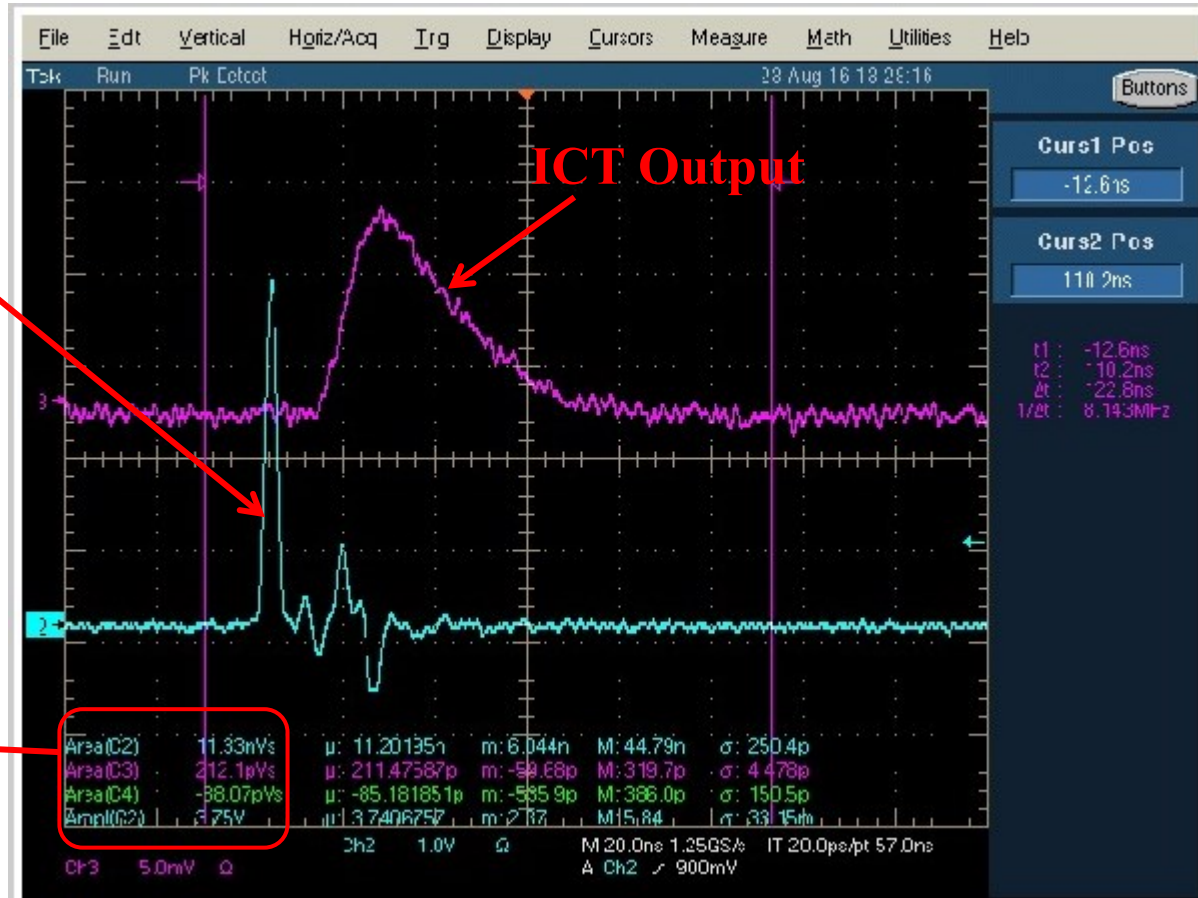
ICT Input:

- Rising(2ns)
- Width (10ns)
- Amplitude(0~10V)

Matlab script

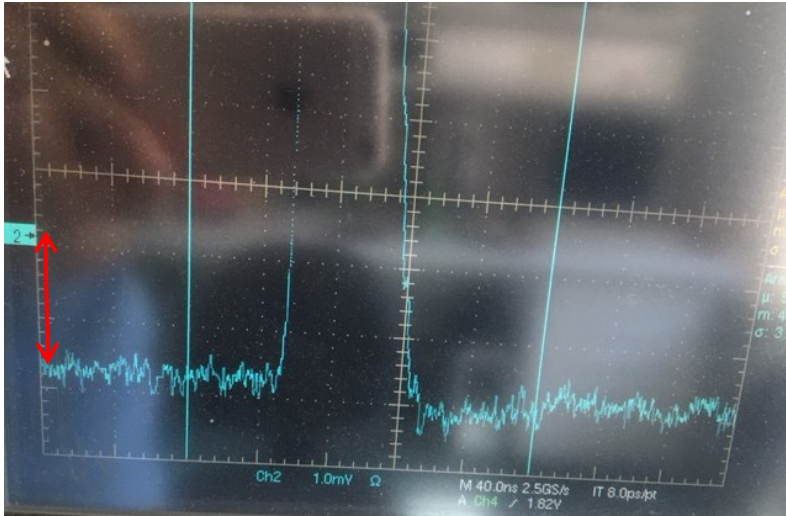
ICT:

$$Q = \frac{\text{Area}}{50\Omega} \times 40$$

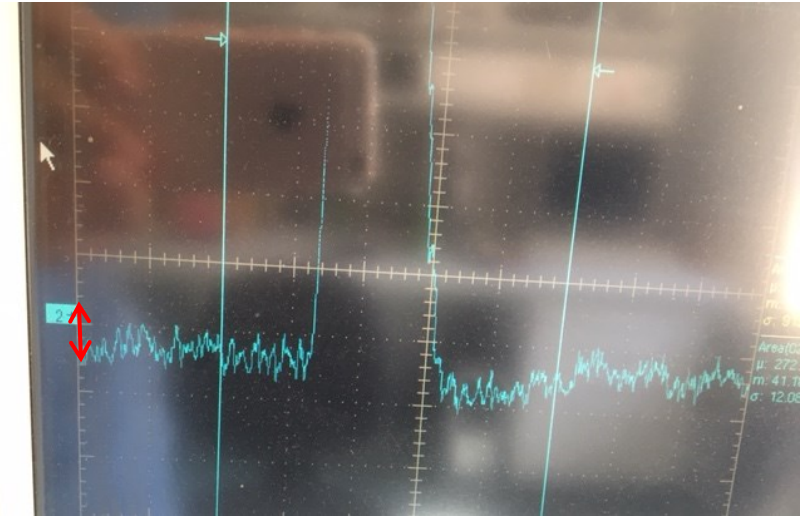


ICT offset

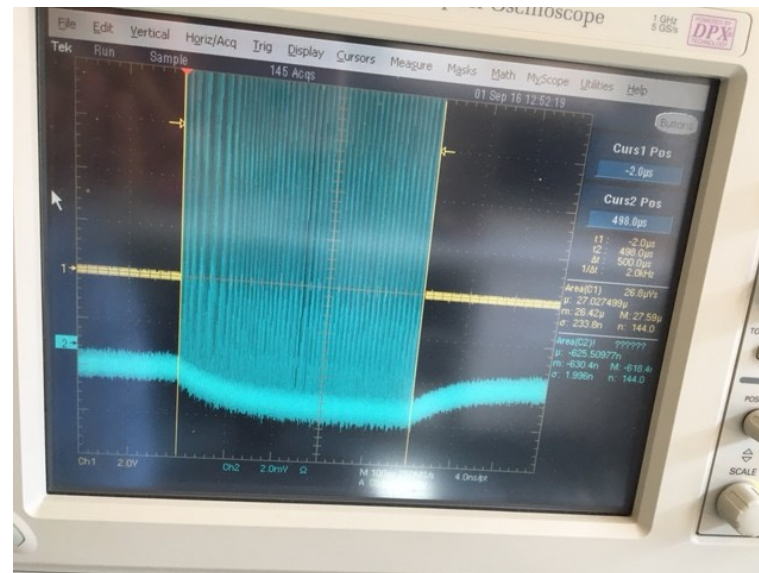
1 MHz



10 Hz

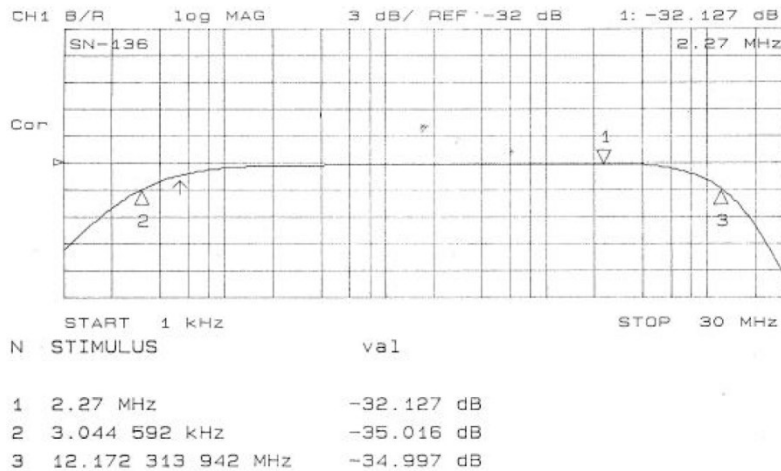


500 pulses train
1 MHz

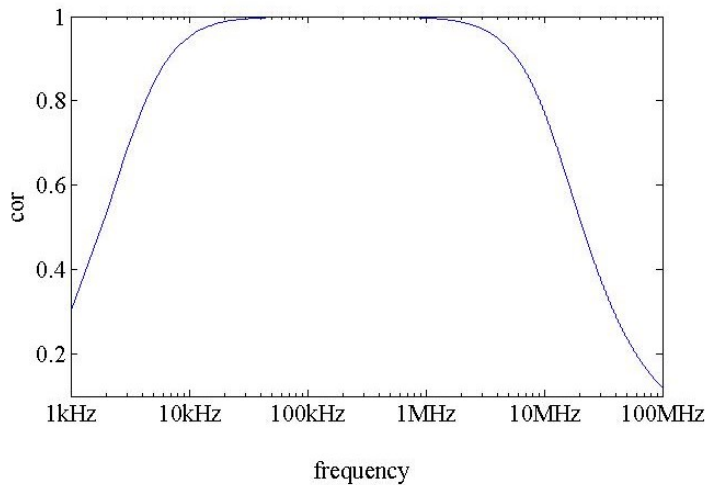


ICT offset simulation

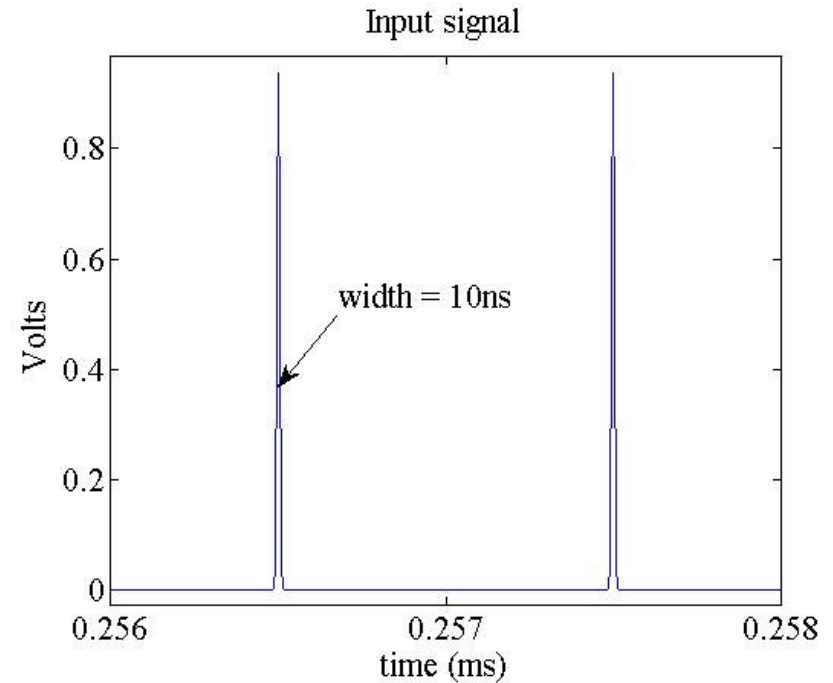
Bergoz's ICT



Act as a bandpass filter



ICT in Matlab Sim

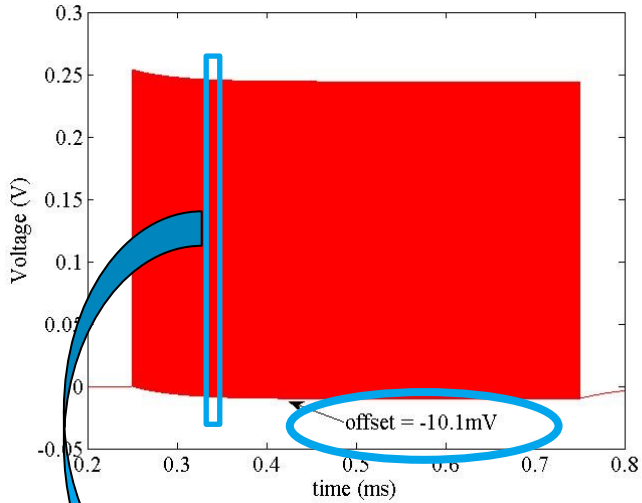


Input pulse train

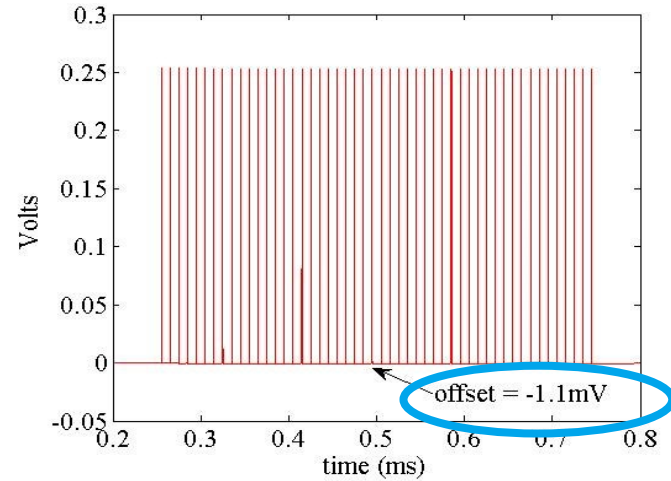


ICT offset simulation

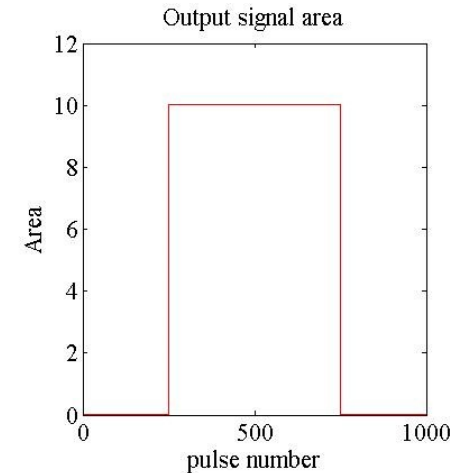
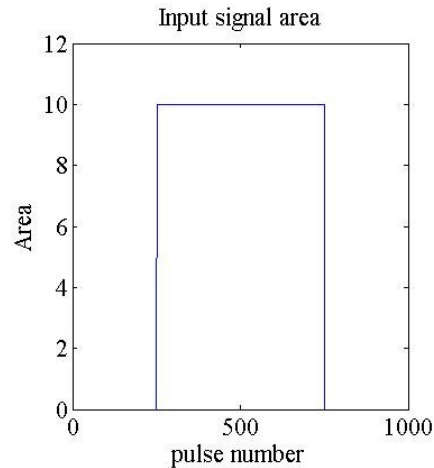
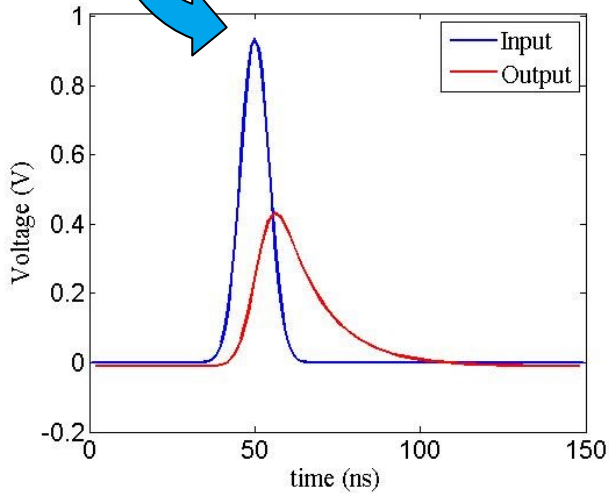
Pulse repetition rate @1MHz



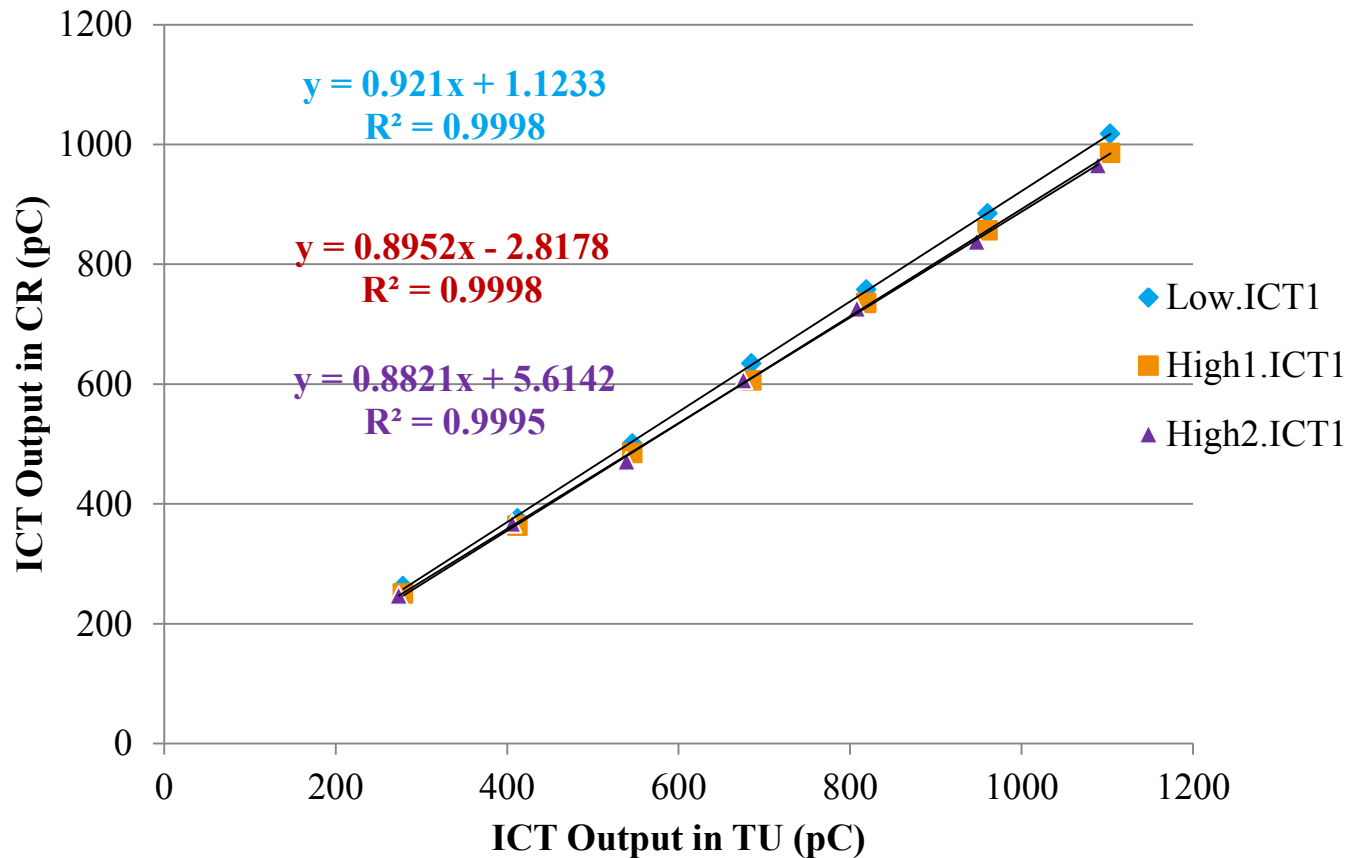
Pulse repetition rate @100kHz



Offset is independent on the pulse shape.



Cable loss of ICTs



Cable loss

Low.ICT1: 8%

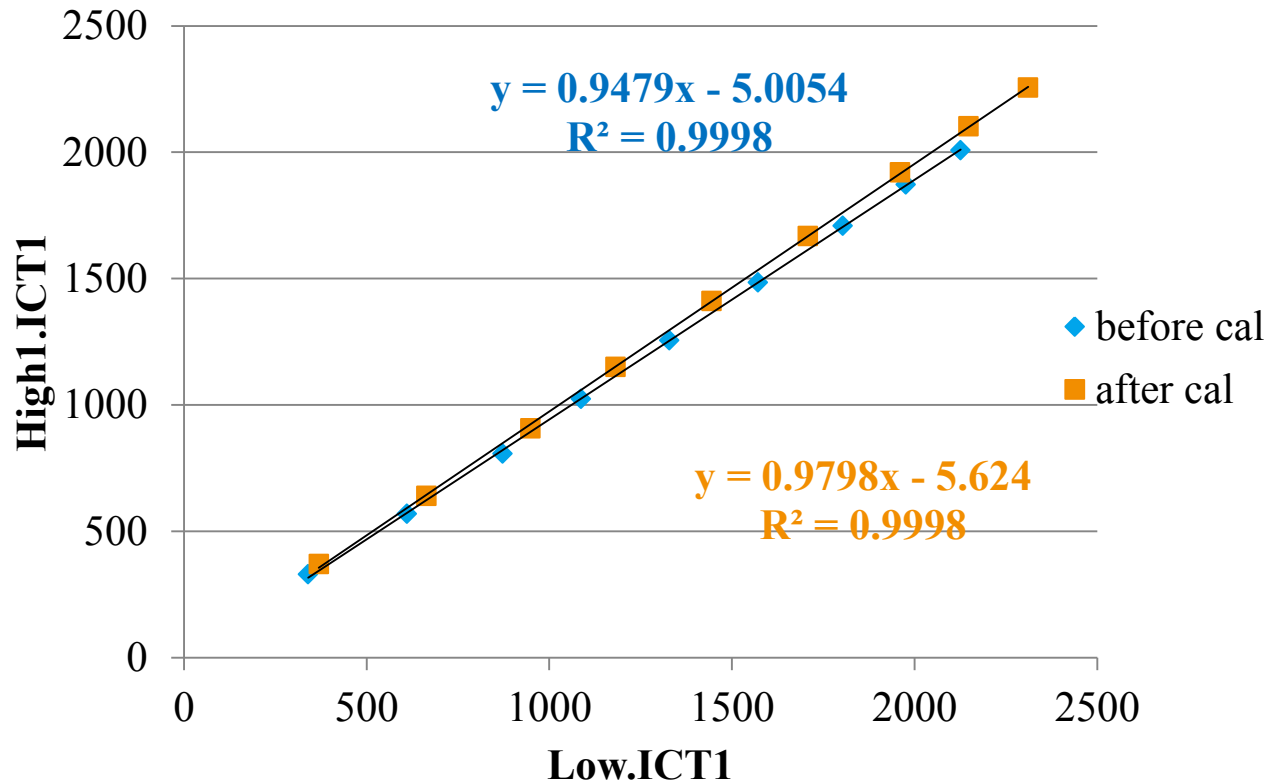
High1.ICT1: 11%

High2.ICT1: 12%



ICT calibration result

Low.ICT1 vs High1.ICT1@BSA 2.5mm

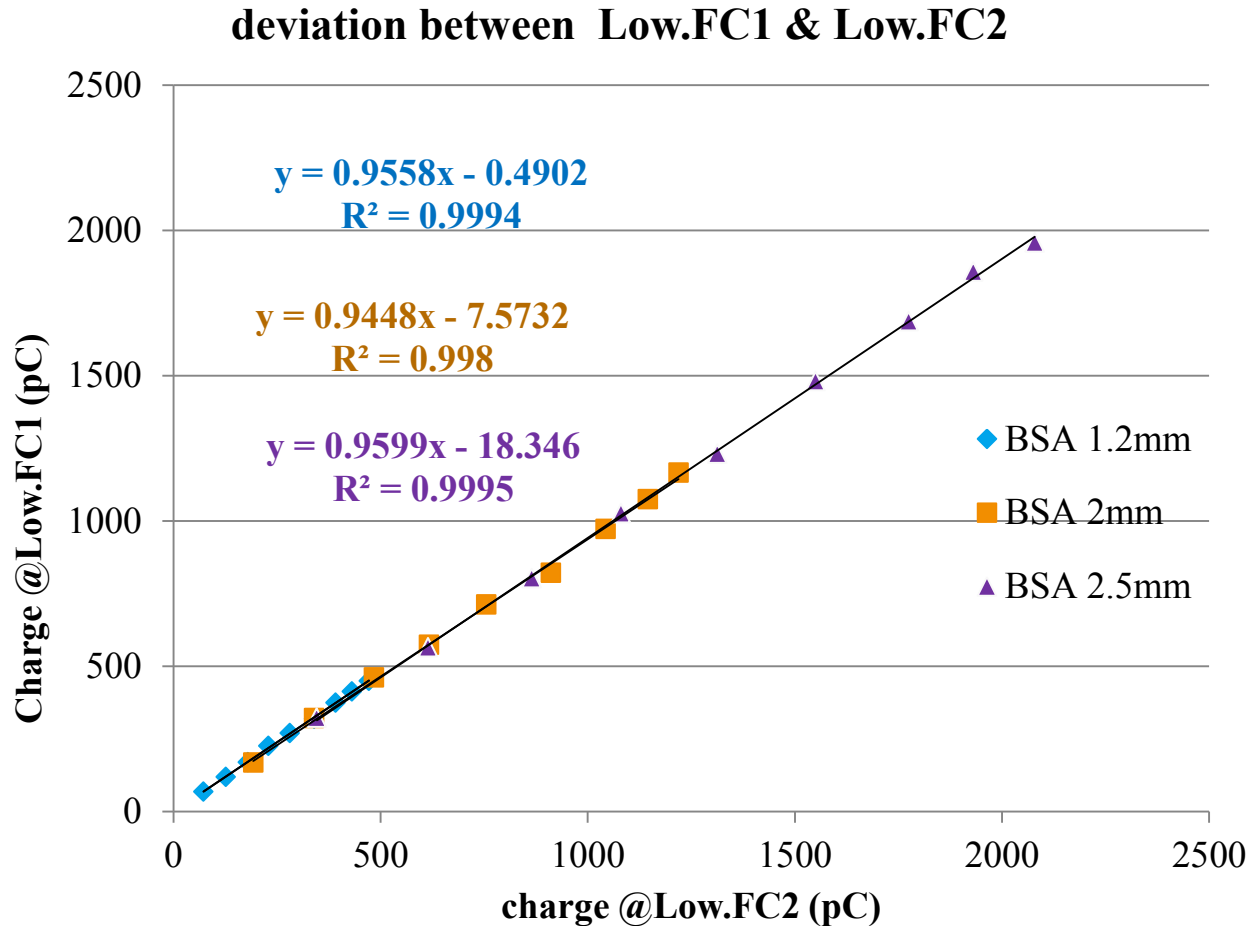


After calibration, the deviation between Low.ICT1 & High1.ICT1 is smaller.



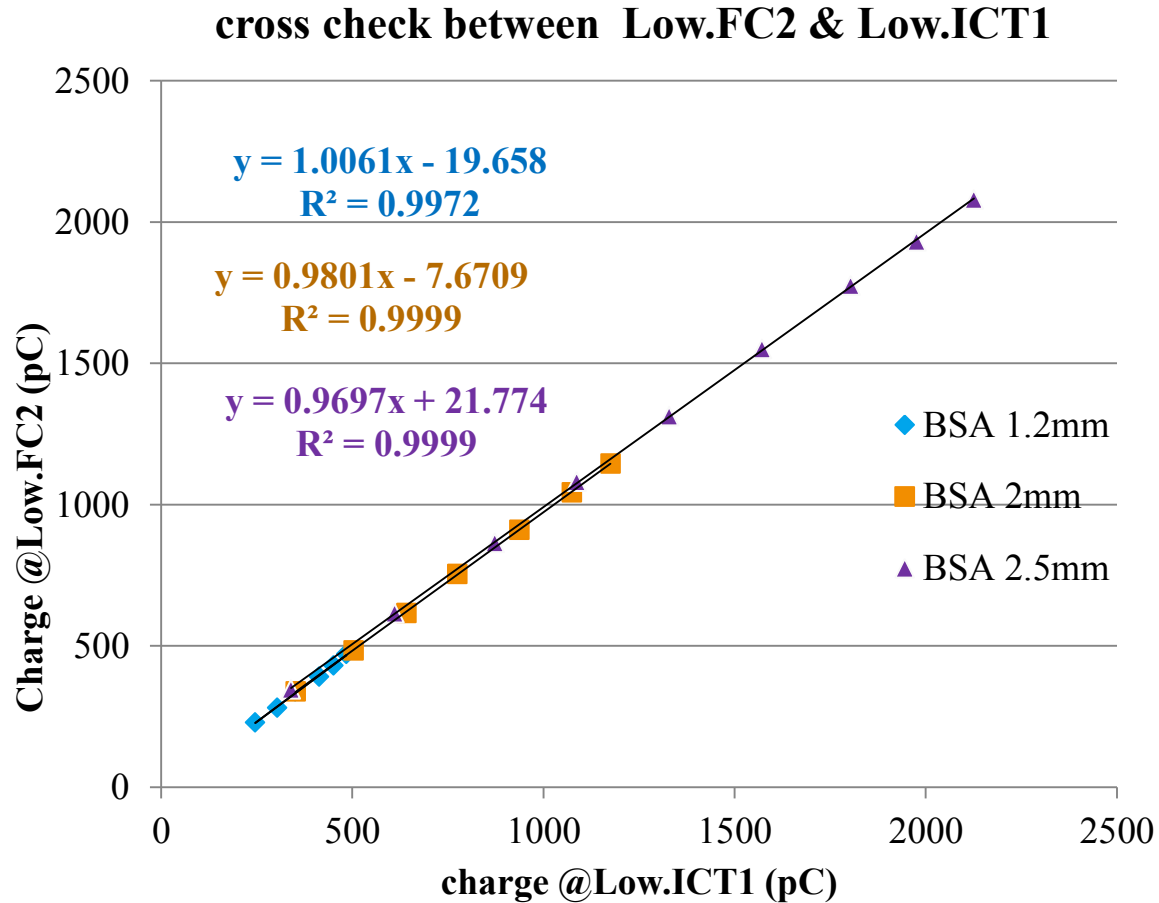
FC calibration problem

Charge measured @Low.FC1 is 5% smaller than charge @ Low.FC2



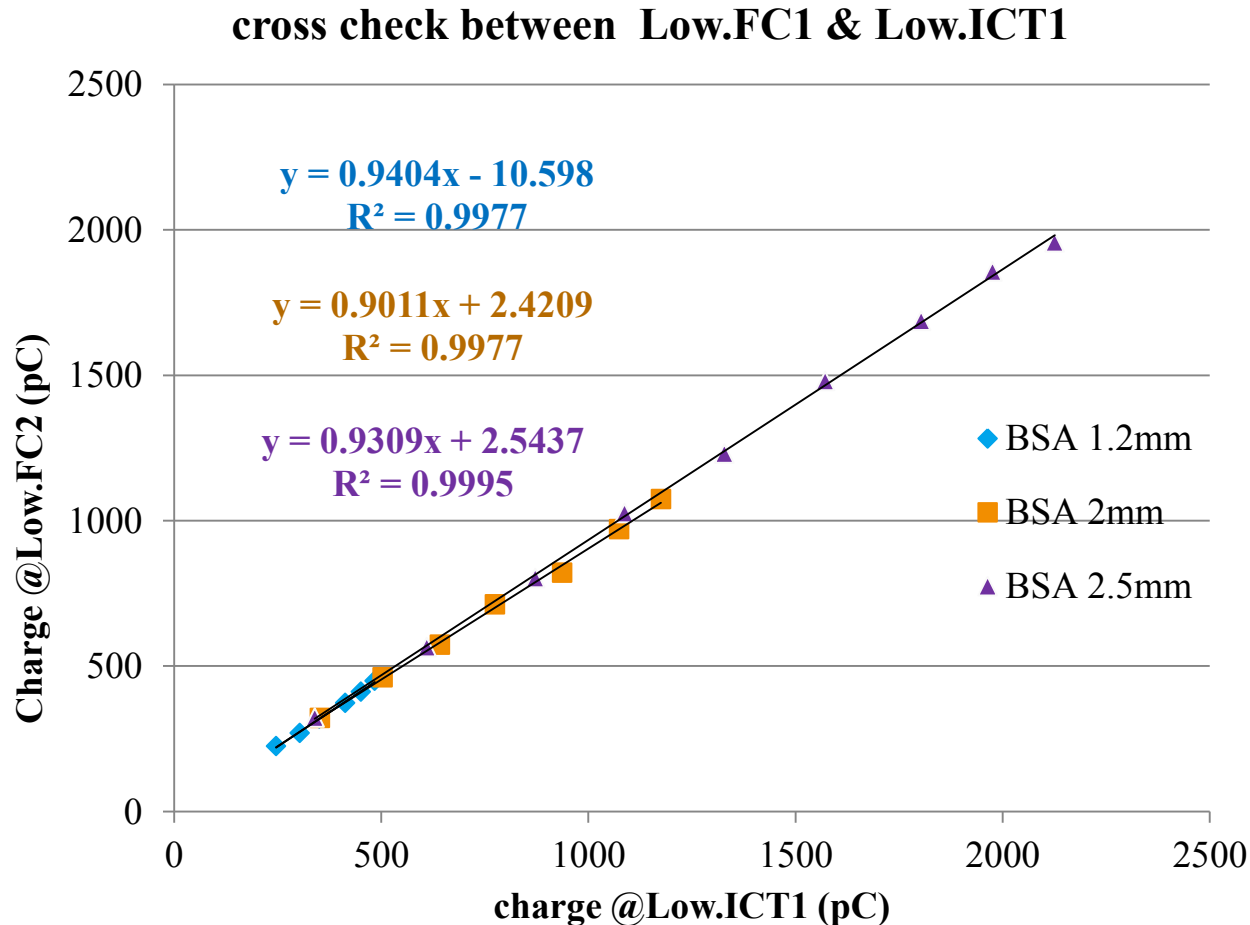
FC calibration problem

Try to calibrate the FCs by Low.ICT1. The beam is focus on the screen before the charge measured by FCs.



FC calibration problem

Try to calibrate the FCs by Low.ICT1. The beam is focus on the screen before the charge measured by FCs.



Tips in charge measurement

FC

| | Mean(pVs) | Error(pVs) |
|-----------------------|-----------|------------|
| 500mV, 122ns | -570 | 150 |
| 1V, 122 ns | -5750 | 230 |
| 1V, position up | -2800 | 260 |
| 500mV, 170ns | -700 | 150 |

ICT

| | Mean(pVs) | Error(pVs) |
|-------------------------|-----------|------------|
| 5mV, 122ns | -74 | 3 |
| 10mV, 122 ns | -68 | 3 |
| 10mV, position up | -61 | 3 |
| 5mV, 170ns | -103 | 3 |

- Fix the ROI of scope;
- Make the signal big enough on the scope, but not cut the signal
- Attenuator scan script should be adjusted



Conclusion

- Calibration for ICTs are done, the matlab script can be adjusted.
- Calibration for FCs are still ongoing.

