

# **RD50-MPW2 timing measurements with Sr-90**

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# RD50-MPW2

Resistivity 1900  $\Omega\text{cm}$

Non-irradiated

Active pixel matrix

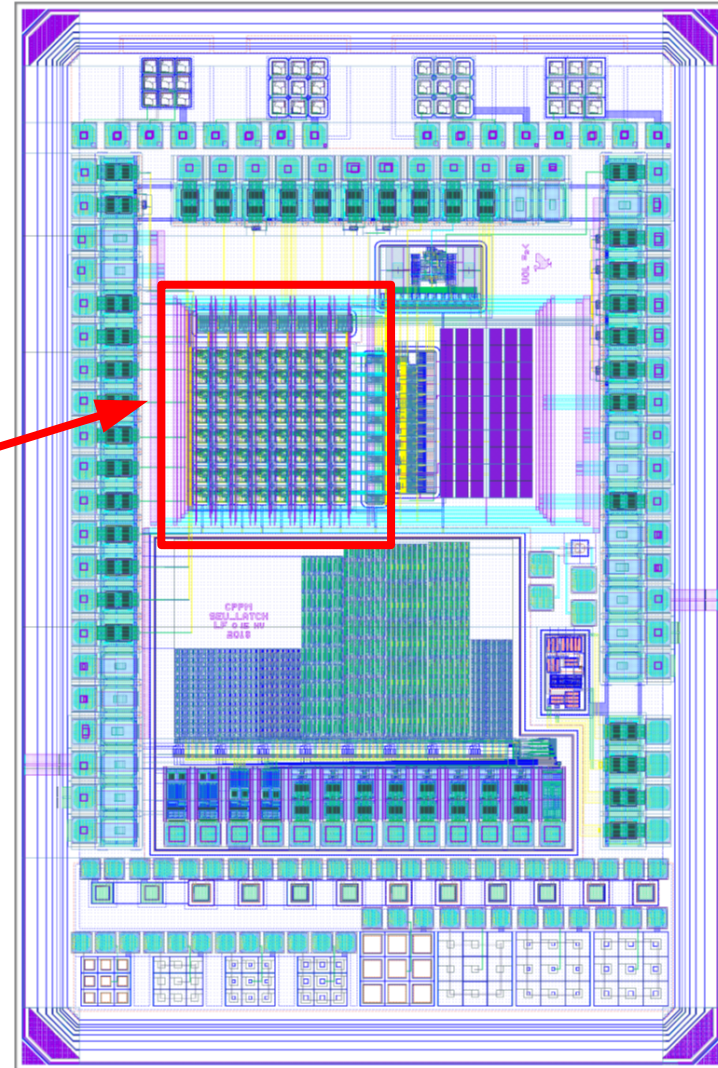
Continuous-reset pixel

Baseline = 900 mV

Threshold = 950 mV and 1000 mV

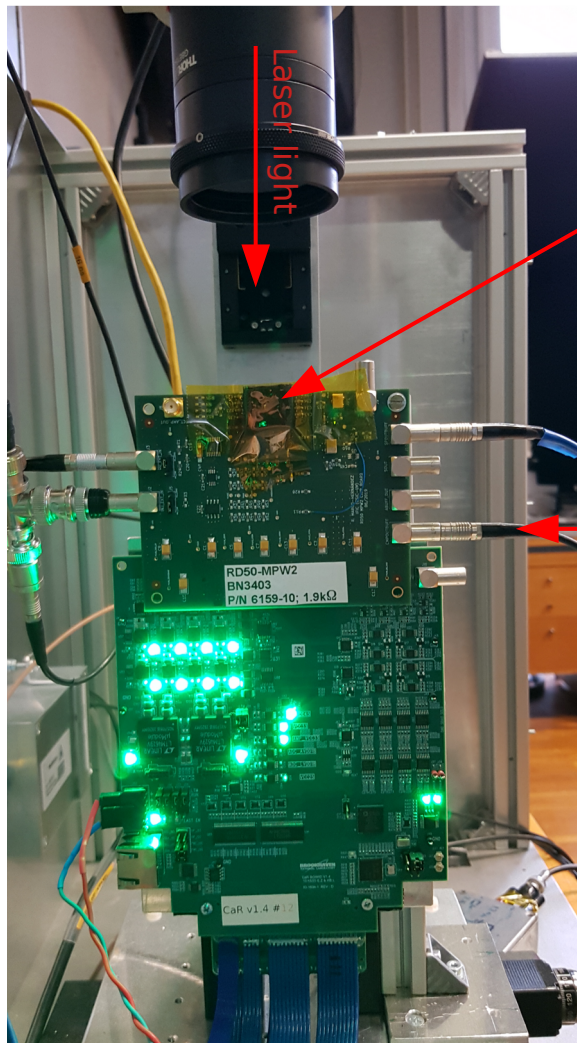
$V_{\text{bias}} = -100\text{ V}$

Time over threshold proportional to injected charge



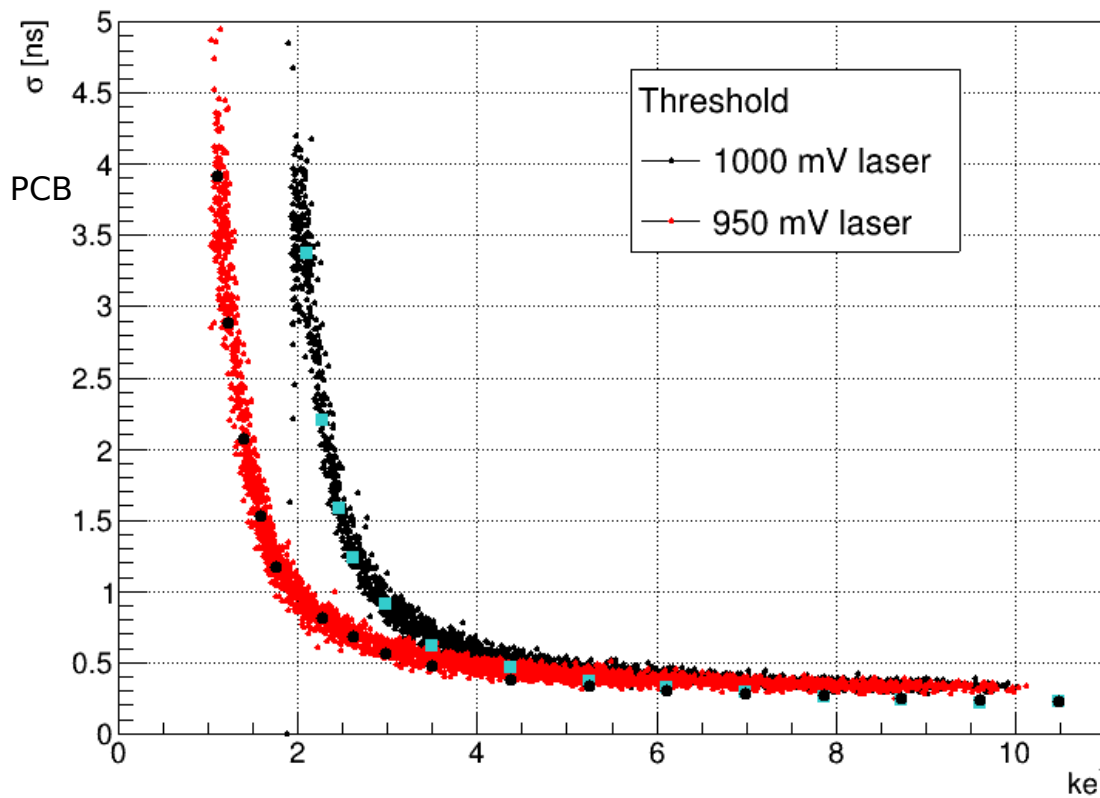
# Previous measurements

- Laser Edge-TCT measurements
- External charge injection with pulser



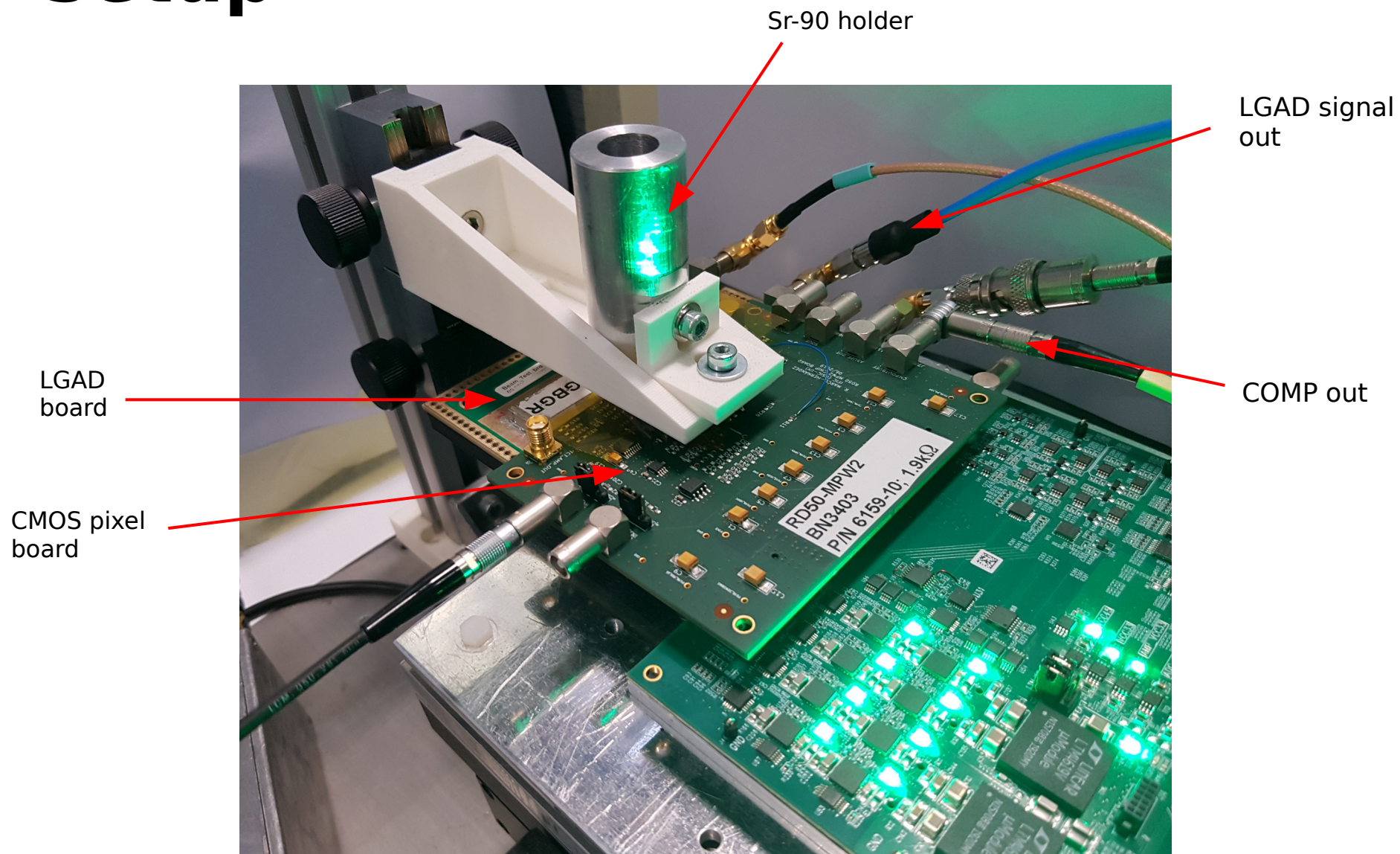
Sample under cap,  
mounted flat on the PCB

COMP OUT





# Setup



MPW2 board mounted on stages for alignment

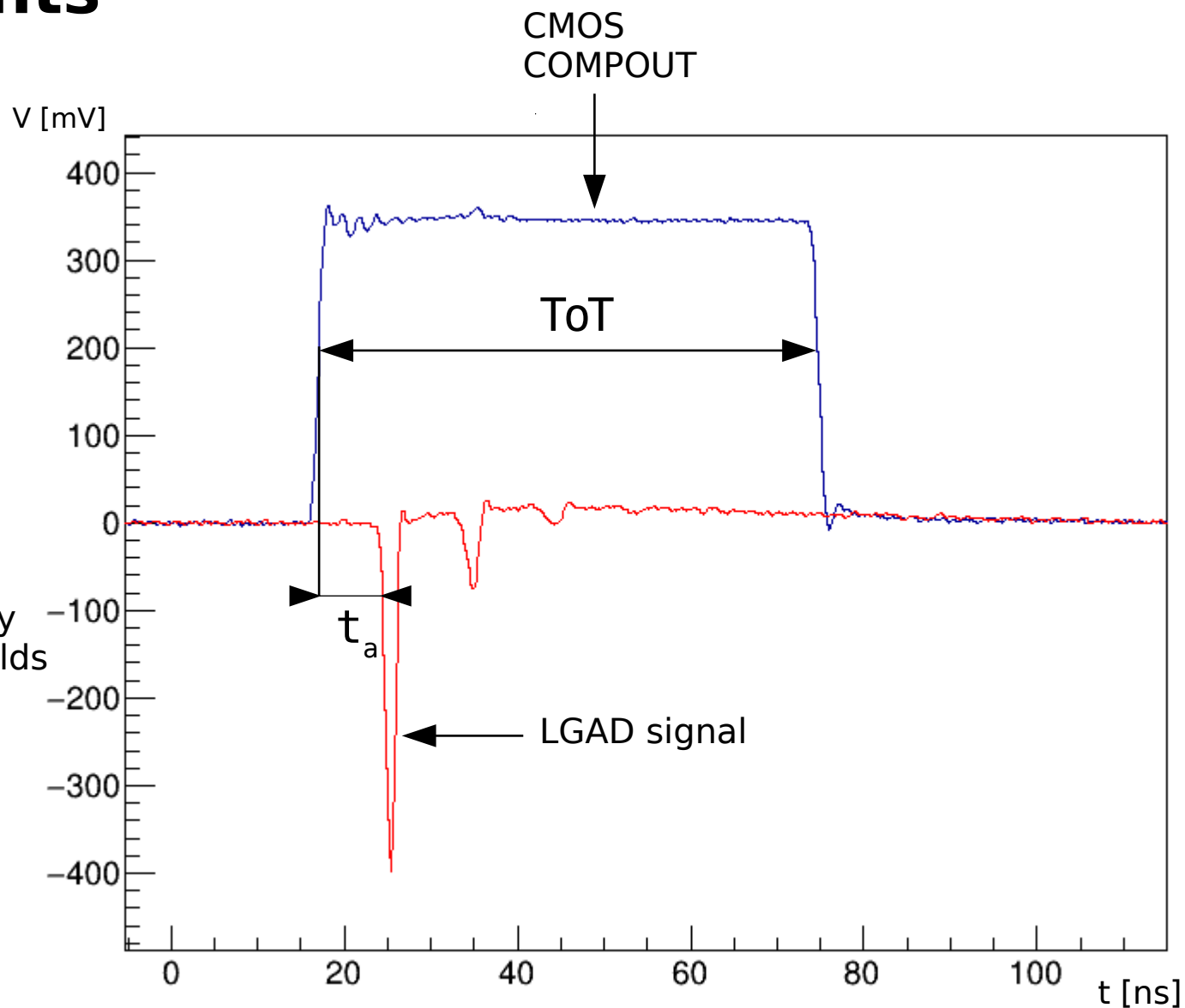


# Measurements

Thresholds:  
200 mV CMOS  
-80 mV LGAD

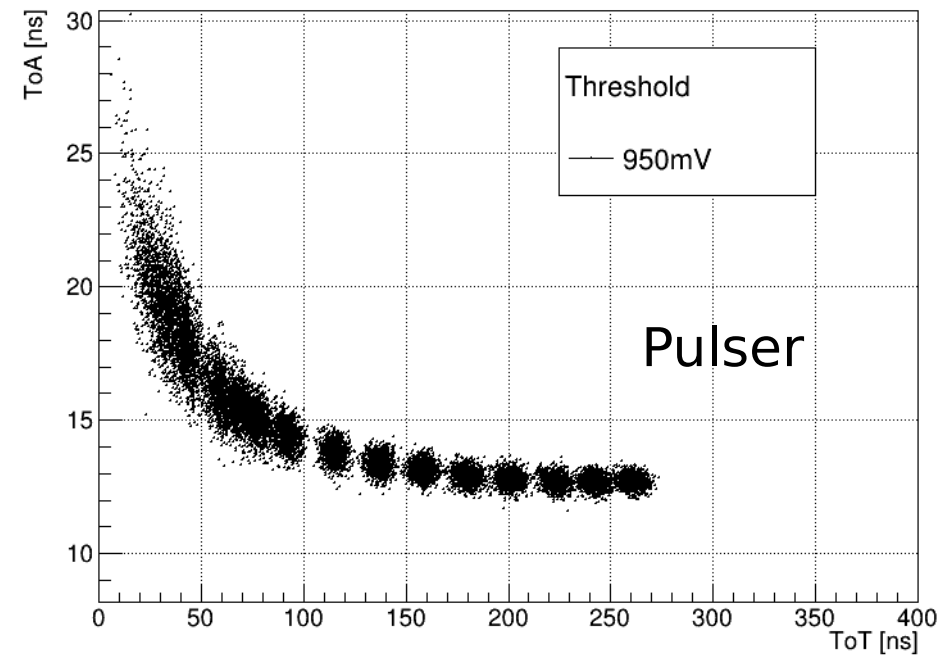
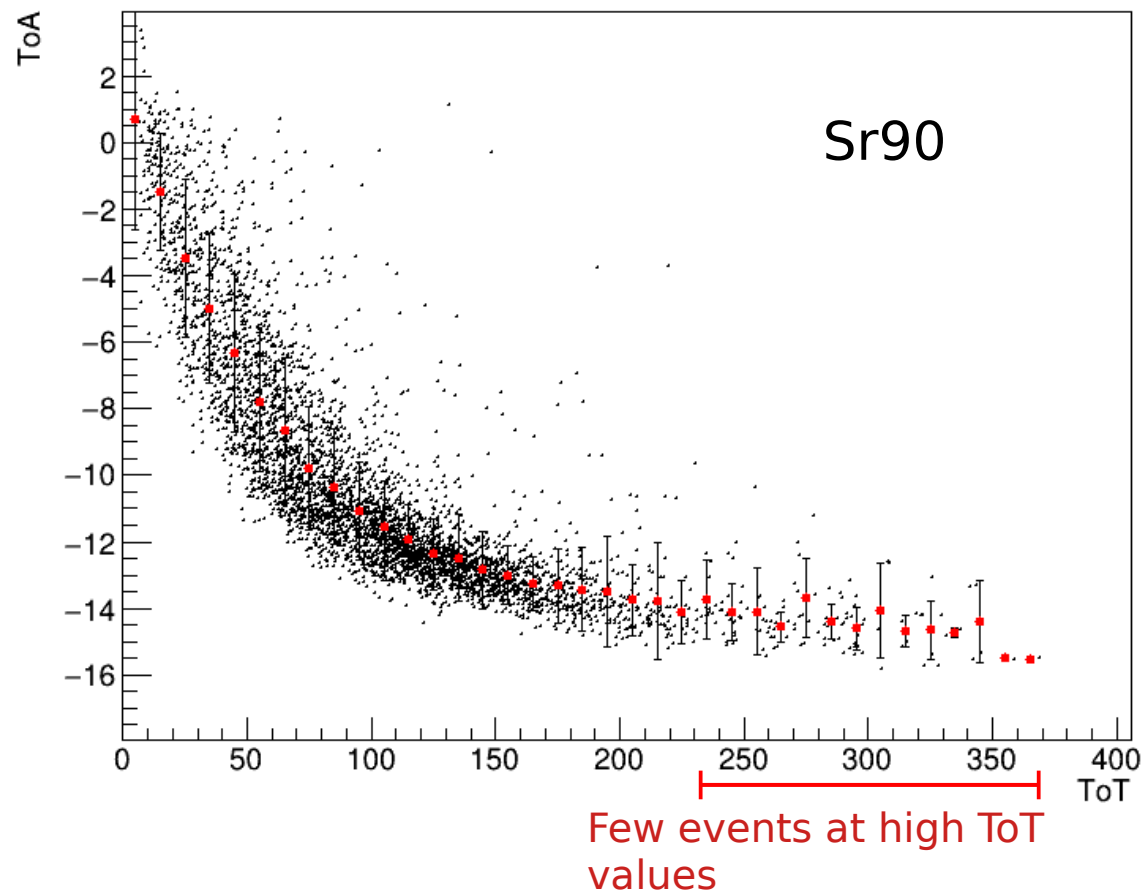
Trigger:  
Both channels simultaneously  
over their respective thresholds  
→ Coincidence event

Low rate:  $\sim 1$  event/min

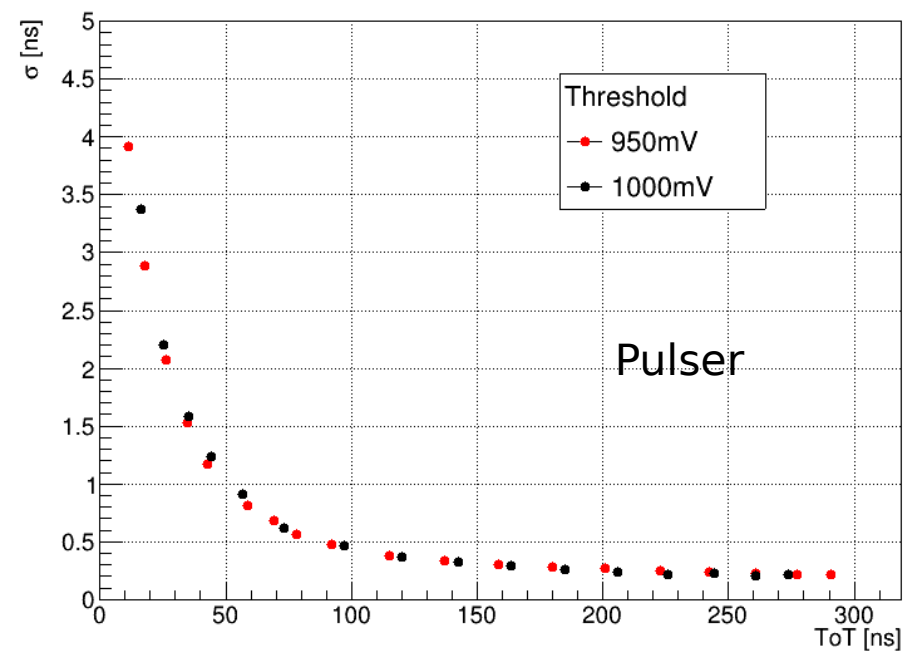
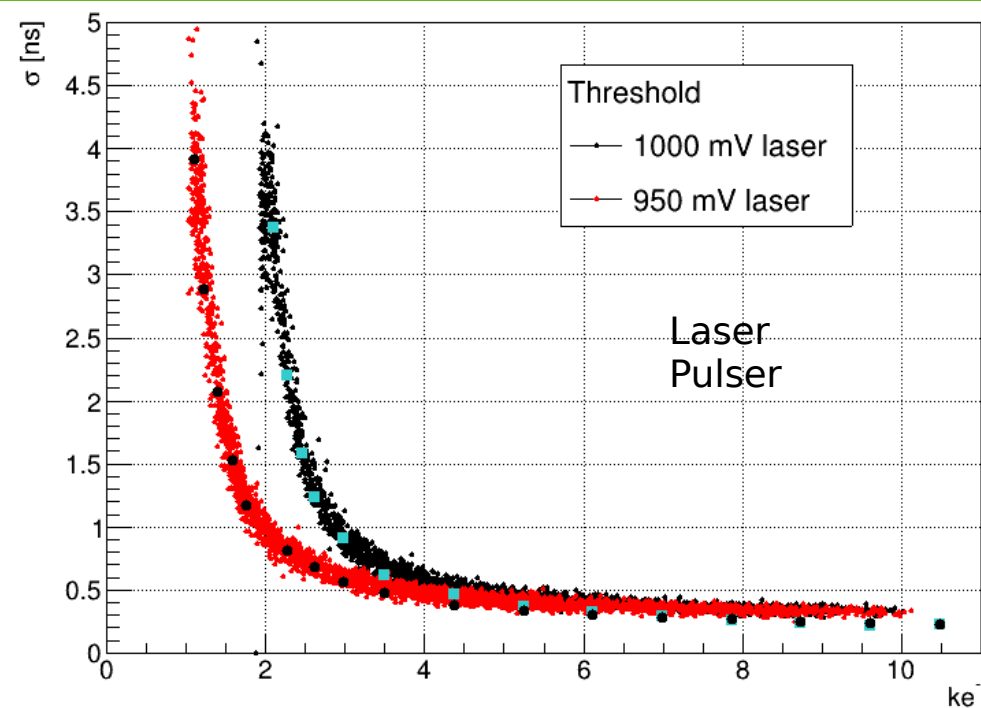
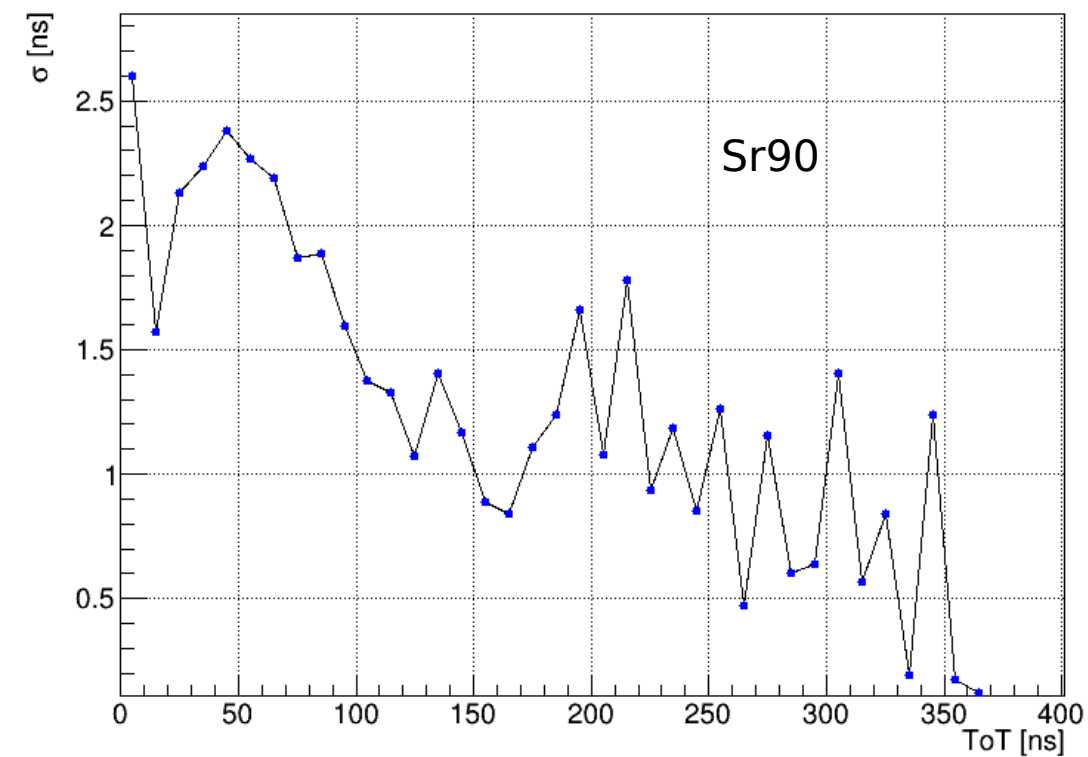


# Results

- Red dots represent averages for 10 ns bins



# Results





# Problem with shifted channels in DAQ

- DAQ software occasionally saves duplicate events
- Oscilloscope channels appear to be shifted by one event when saved in the file

0	ToT: 90.5564	CMOS Edge: 14.0017	LGAD Edge: 24.4244	ToA: -10.4227
1	ToT: 71.3643	CMOS Edge: 12.6208	LGAD Edge: 24.3387	ToA: -11.7178
2	ToT: 246.208	CMOS Edge: 9.74326	LGAD Edge: 24.4729	ToA: -14.7296
3	ToT: 104.295	CMOS Edge: 11.2535	LGAD Edge: 24.279	ToA: -13.0254
4	ToT: 65.3885	CMOS Edge: 16.4765	LGAD Edge: 24.3978	ToA: -7.92131
5	ToT: 65.3885	CMOS Edge: 16.4765	LGAD Edge: 24.3531	ToA: -7.87659
6	ToT: 43.1894	CMOS Edge: 21.1727	LGAD Edge: 24.3531	ToA: -3.18037
7	ToT: 61.2737	CMOS Edge: 17.1389	LGAD Edge: 24.3211	ToA: -7.1822
8	ToT: 45.923	CMOS Edge: 16.9694	LGAD Edge: 24.3642	ToA: -7.39484
9	ToT: 45.923	CMOS Edge: 16.9694	LGAD Edge: 24.3655	ToA: -7.39612
10	ToT: 65.0993	CMOS Edge: 15.6847	LGAD Edge: 24.3655	ToA: -8.68076
11	ToT: 130.741	CMOS Edge: 11.502	LGAD Edge: 24.3901	ToA: -12.8882
12	ToT: 126.745	CMOS Edge: 11.4919	LGAD Edge: 24.31	ToA: -12.818
13	ToT: 49.5838	CMOS Edge: 18.3158	LGAD Edge: 24.4306	ToA: -6.11477
14	ToT: 49.5838	CMOS Edge: 18.3158	LGAD Edge: 24.4508	ToA: -6.13496
15	ToT: 81.073	CMOS Edge: 14.0463	LGAD Edge: 24.4508	ToA: -10.4045
16	ToT: 126.56	CMOS Edge: 12.3445	LGAD Edge: 24.4255	ToA: -12.0809

← Duplicate event

Attempted correction in analysis  
stage → No significant differences

# Problem with shifted channels in DAQ

