

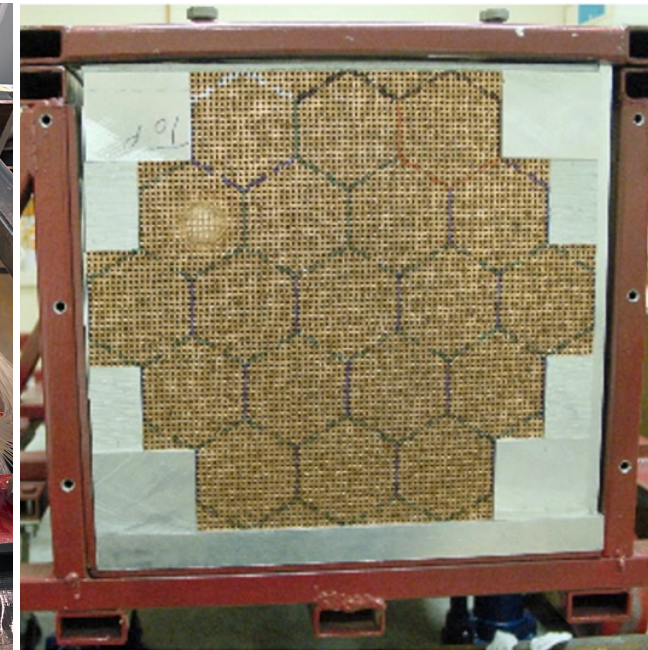
TTU Status Update

Test beam data analysis ongoing

Performing bench tests with (fast output) SiPMs

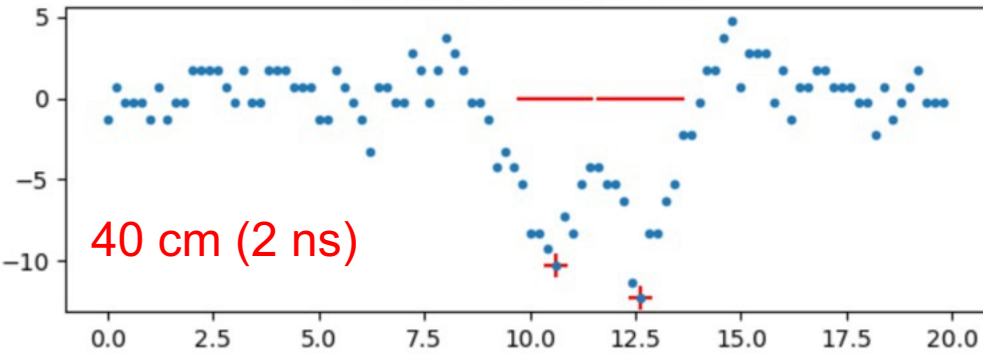
Received the DREAM module at TTU

Discussing different approaches (grouping, multiplexing, etc) to refurbishing the module in time for summer beam tests

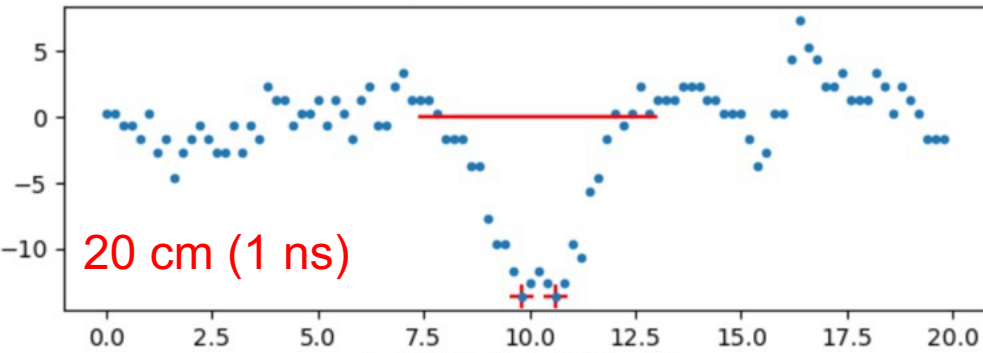


TB2023 CERN PS T9

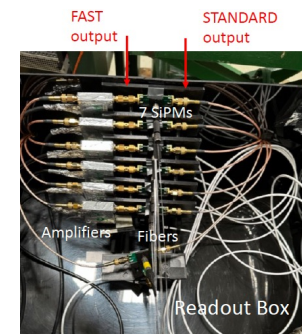
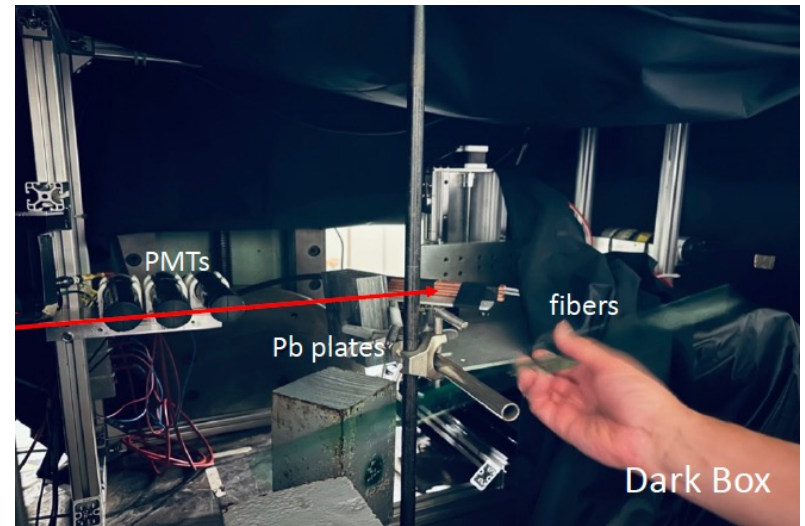
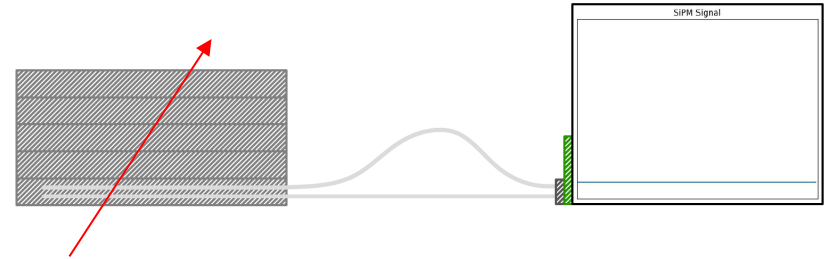
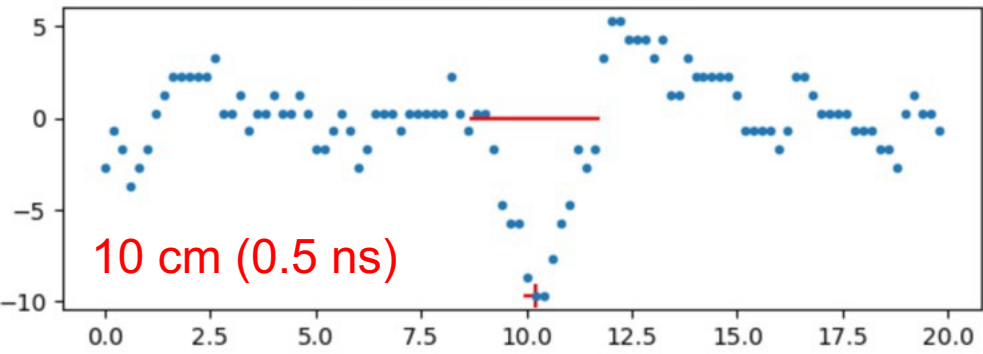
wd0002 event 1372 ch1



wd0005 event 2559 ch1

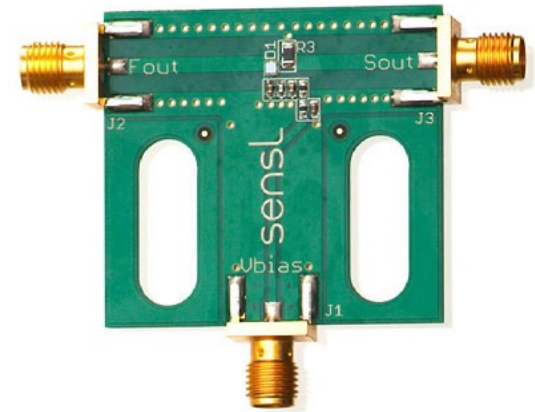


wd0006 event 369 ch1



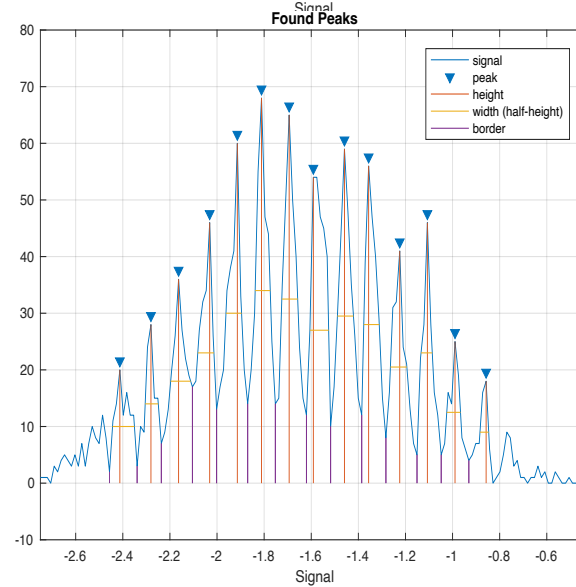
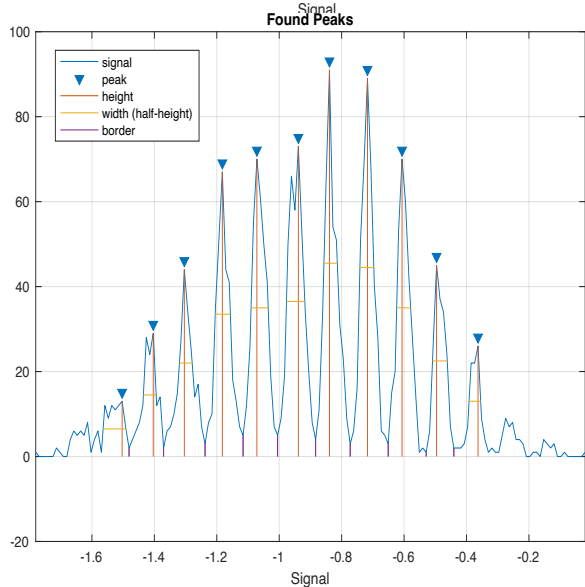
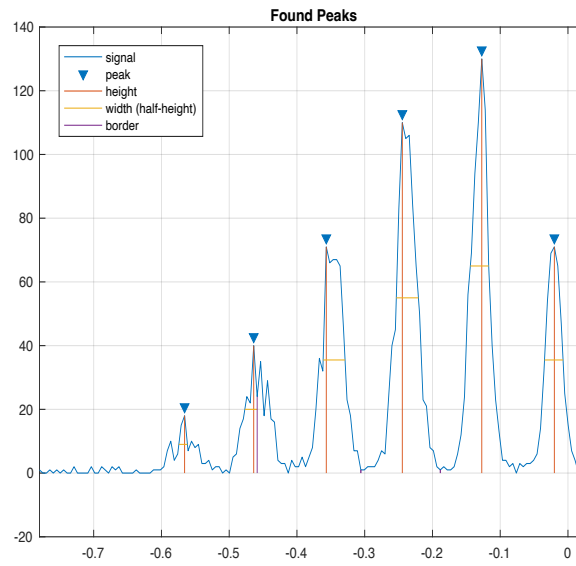
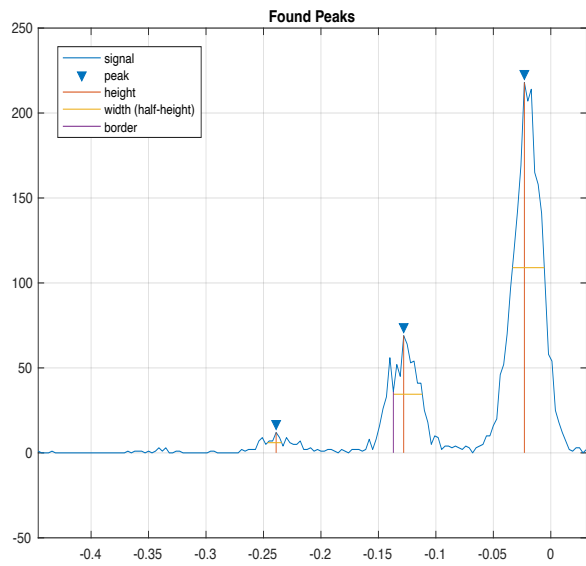
Update on 1 mm² OnSemi SiPM Characterization

1. 1 mm² OnSemi SiPM evaluation board ($V_{br} + V_o = 25.5 + 2.5V = 27 V$)
2. 10 um pitch (2,880 cells with 28% fill factor)
3. 1 MicroCircuits amplifier GaliS66+ (biased at 12.1 V)
4. 59 ps laser pulse width at 1 kHz at 438 nm
5. Neutral density filters to reduce light levels
 - » 4 runs with increasing level of light intensity
6. Each run contains 3,000 to 4,000 pulse traces
7. All results are preliminary and improved analysis is necessary

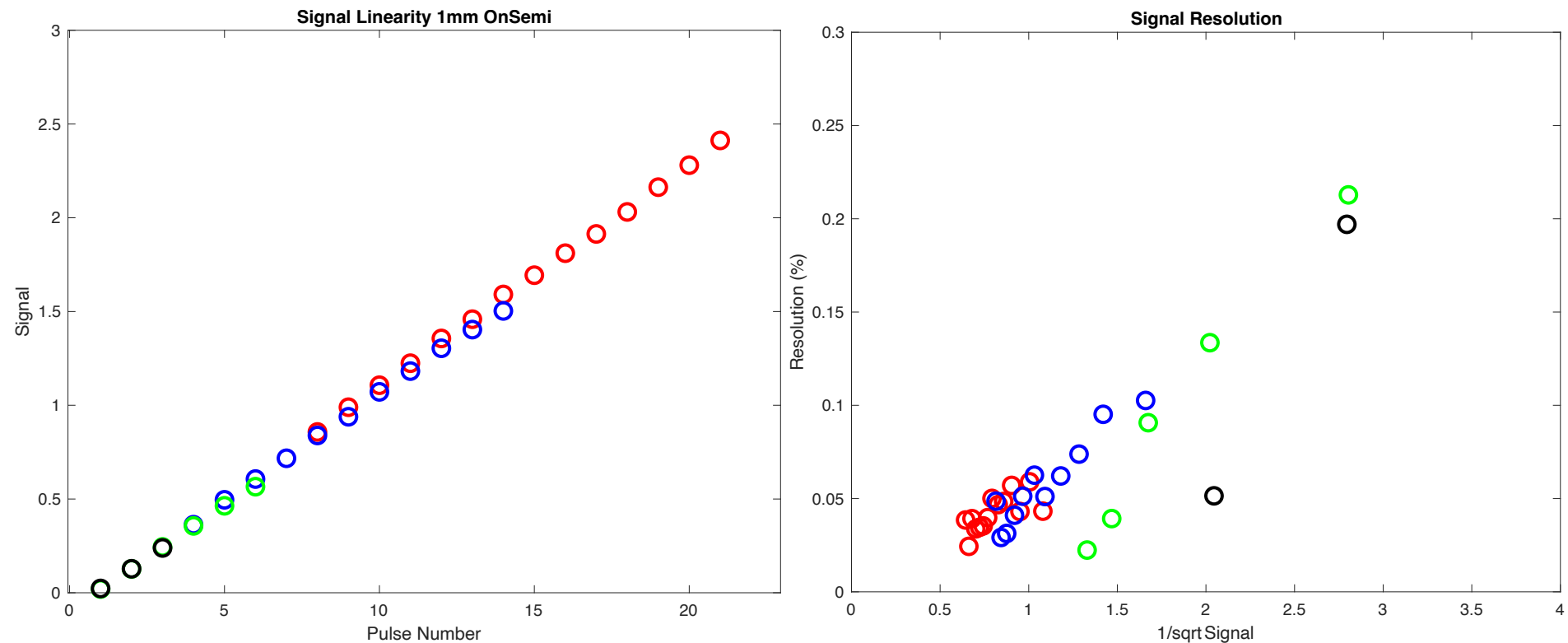


Ave Light Level (p)	No of found peaks	Halfwidth / STD (ps/ps)	Peak Location/STD (ns/ps)	Fall-time (10-90%)/STD (ps/ps)	Rise-time (10-90%)/STD (ps/ps)	Linearity slope (Signal/peak)
<1	3	485/163	12.85/317	216/99		0.108
~2	6	603/158	12.63/285	263/96		0.111
~8	11	667/93	12.62/49	291/49	763/104	0.112
~13	14	664/22	12.64/30	285/28	788/62	0.118

Photon Resolution



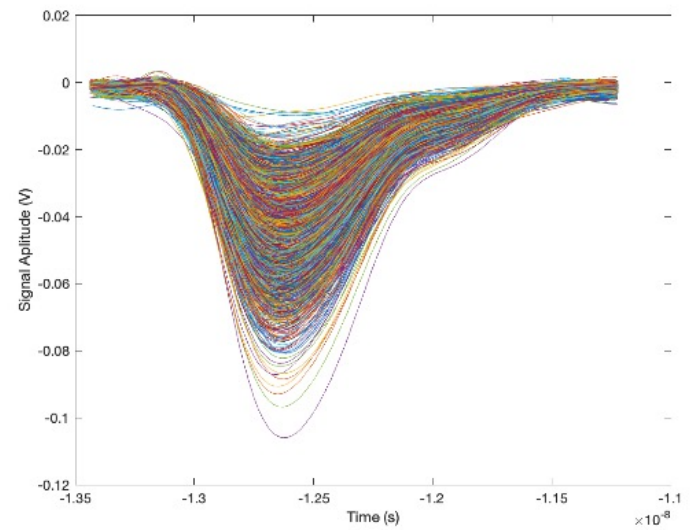
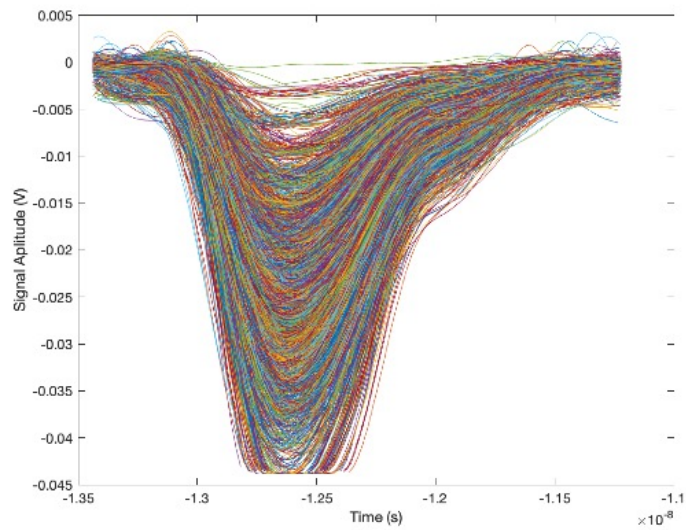
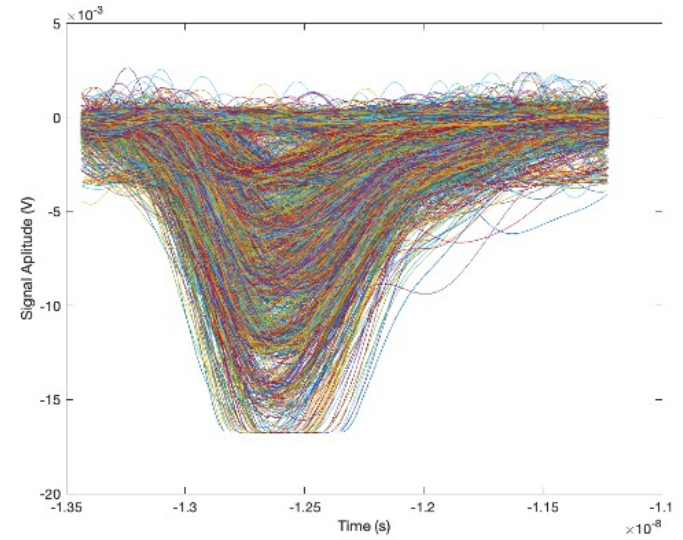
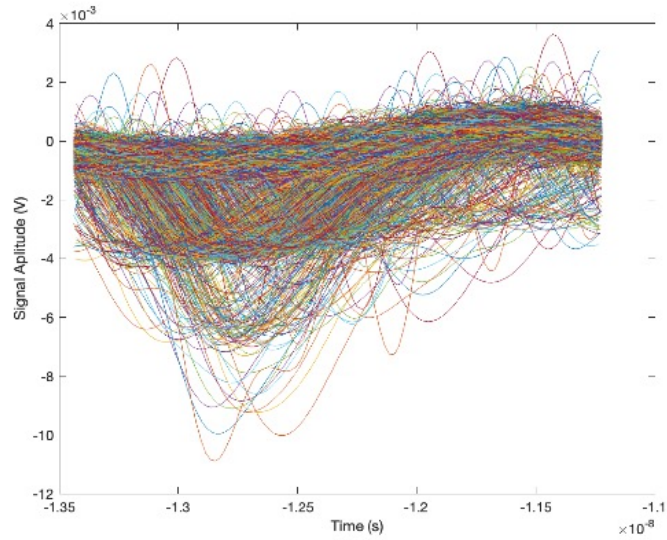
Signal Linearity and Resolution



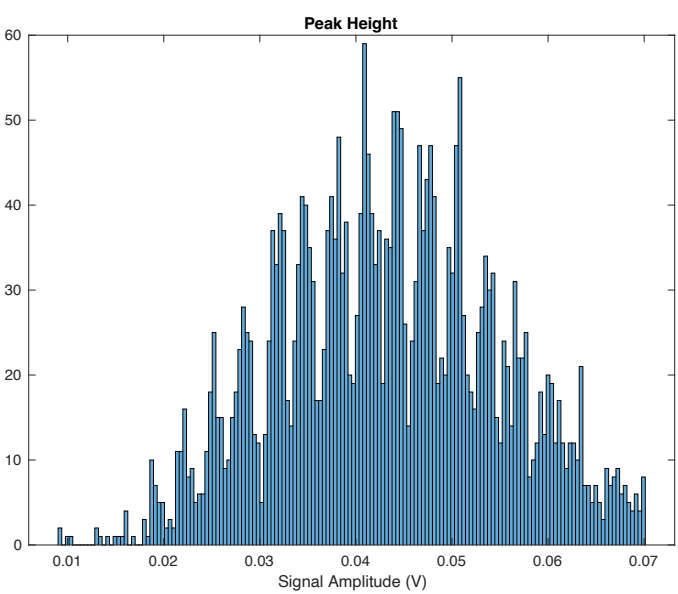
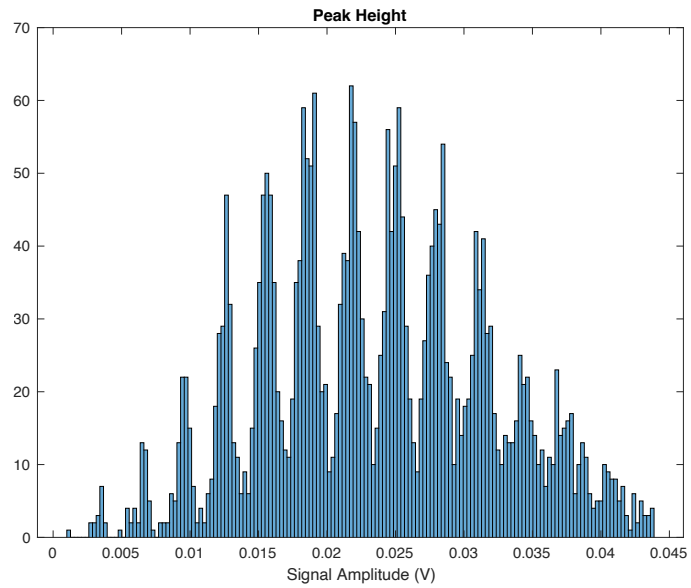
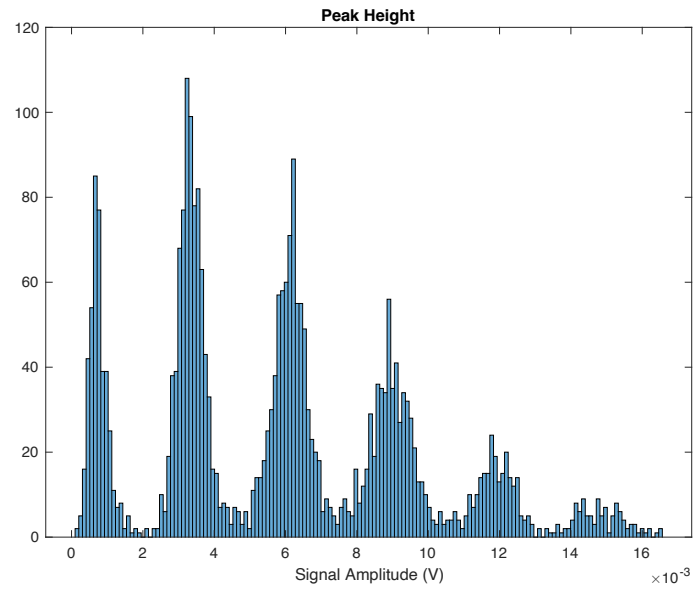
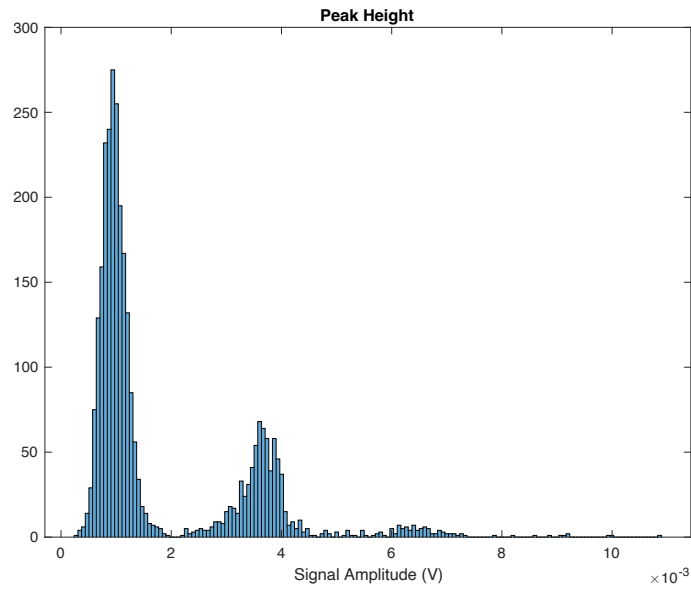
The response linearity is evaluated at peak of integral (no fits)

Similarly, the signal resolution is defined as charge distribution at half-width divided by the total charge for a given peak

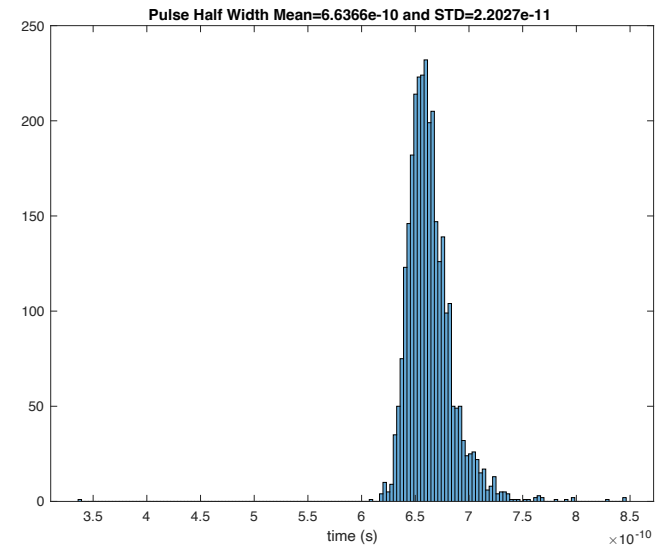
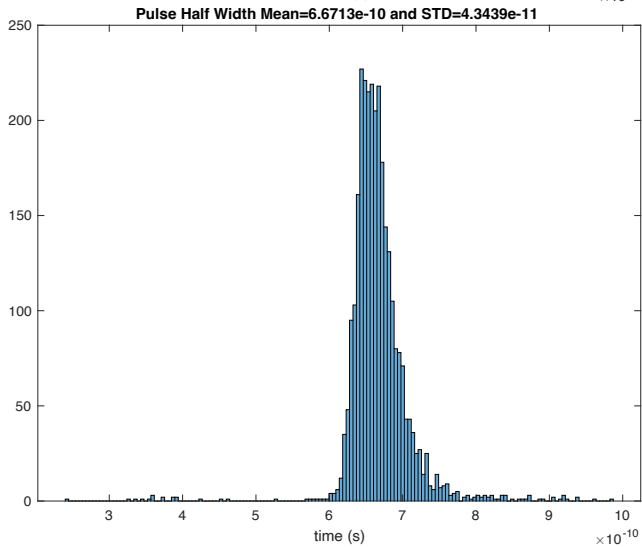
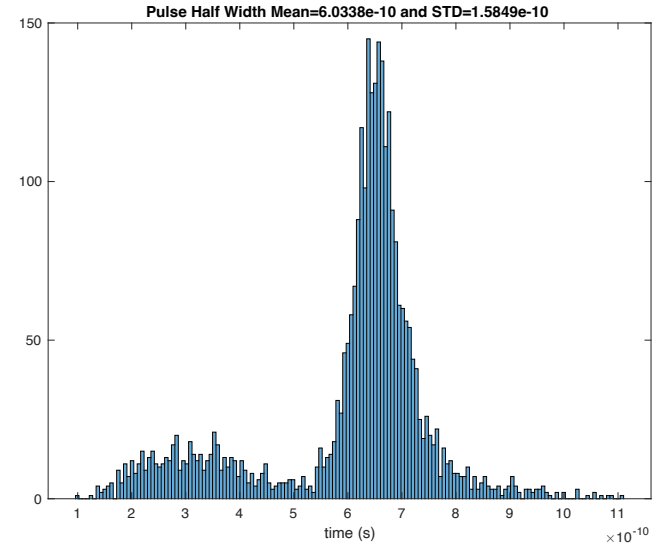
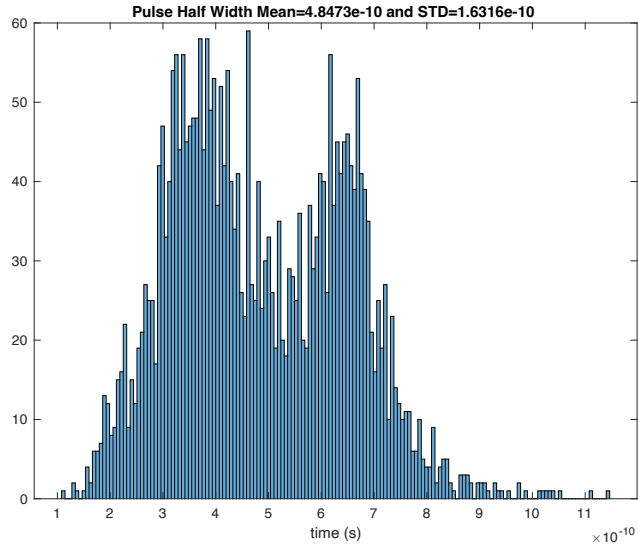
Pulse Shapes



Signal Amplitude (mV)

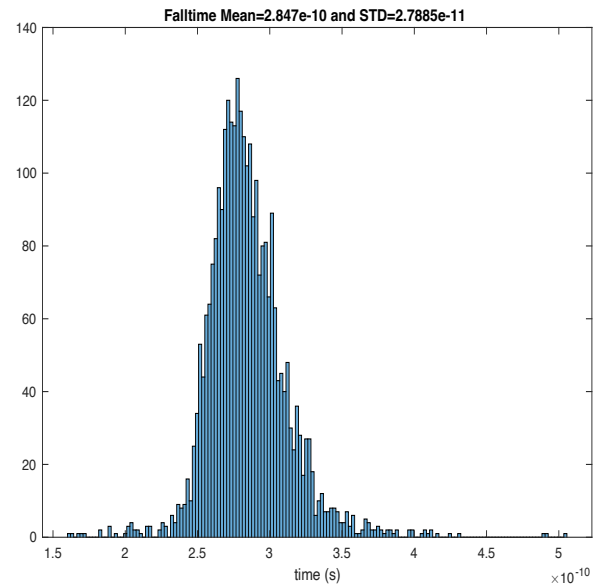
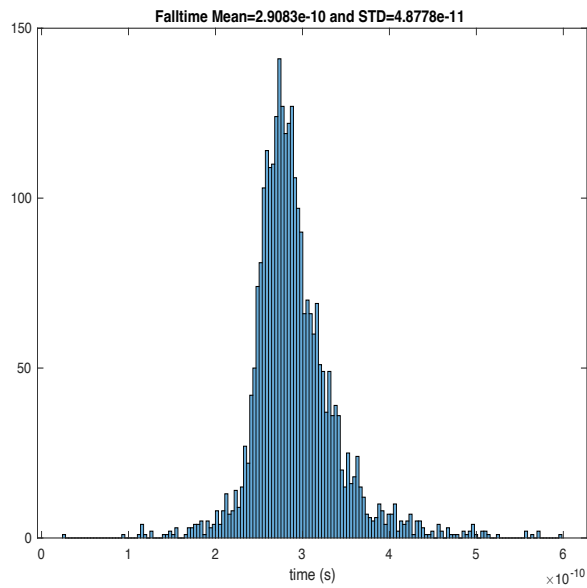
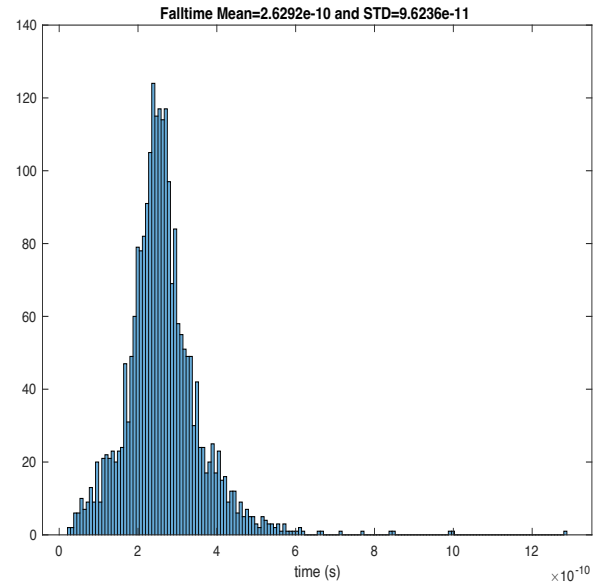
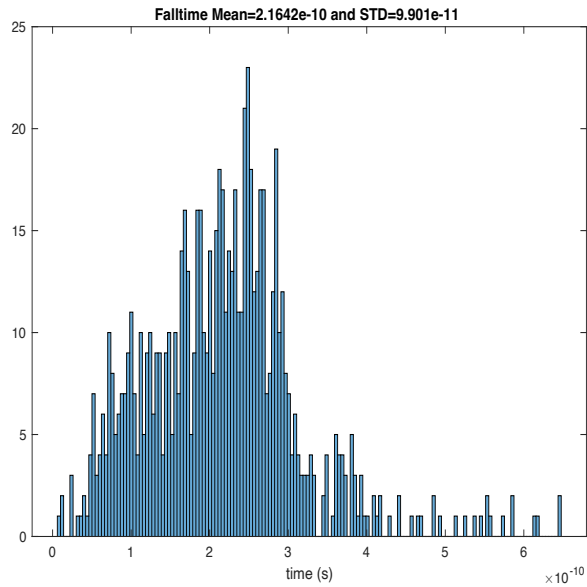


Pulse Halfwidth

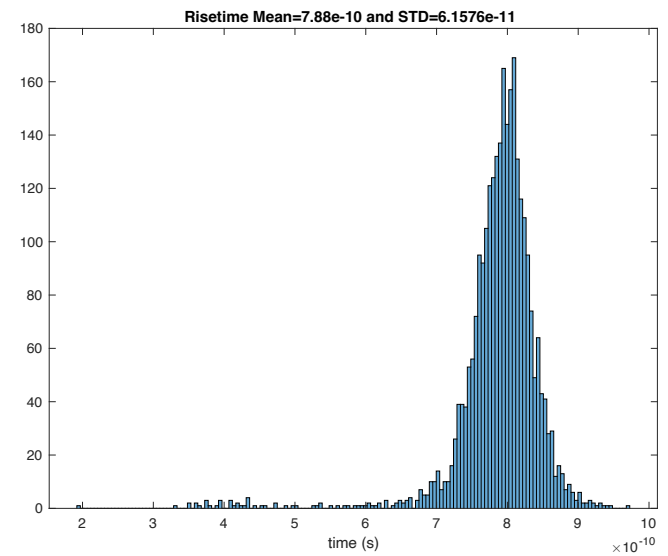
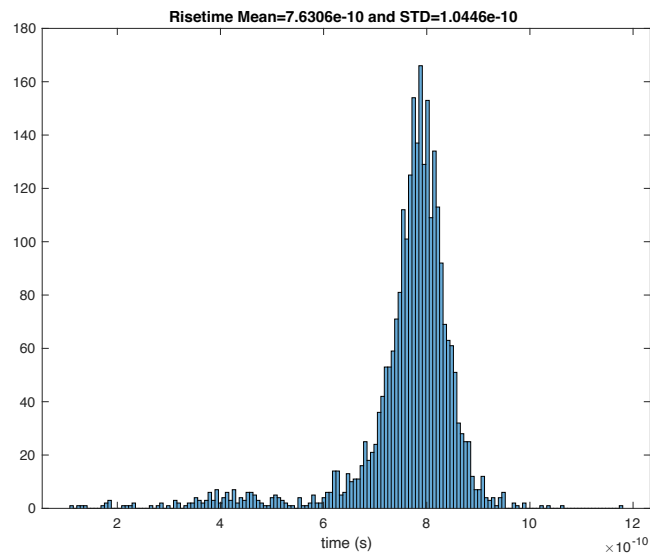
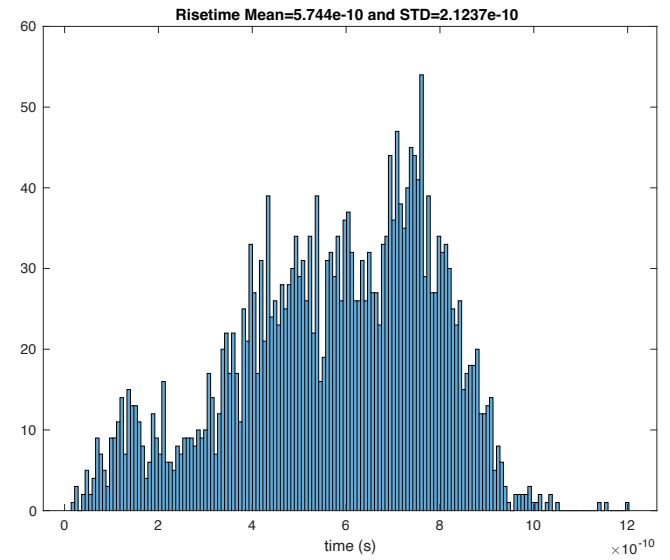
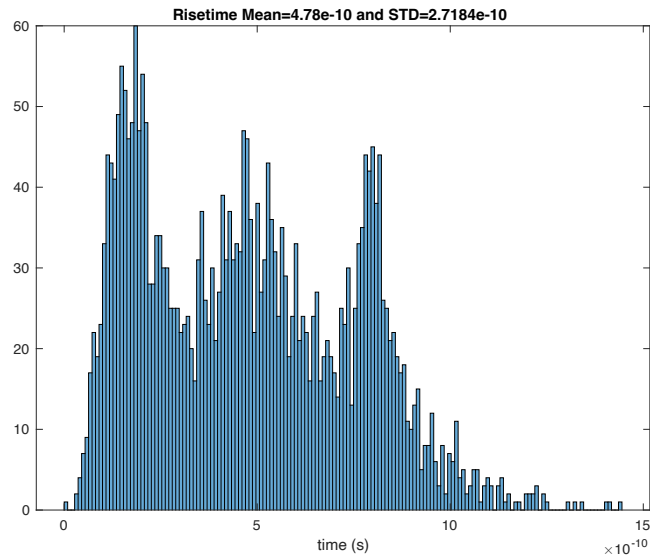


The calculation of pulse halfwidth needs better treatment at low light levels

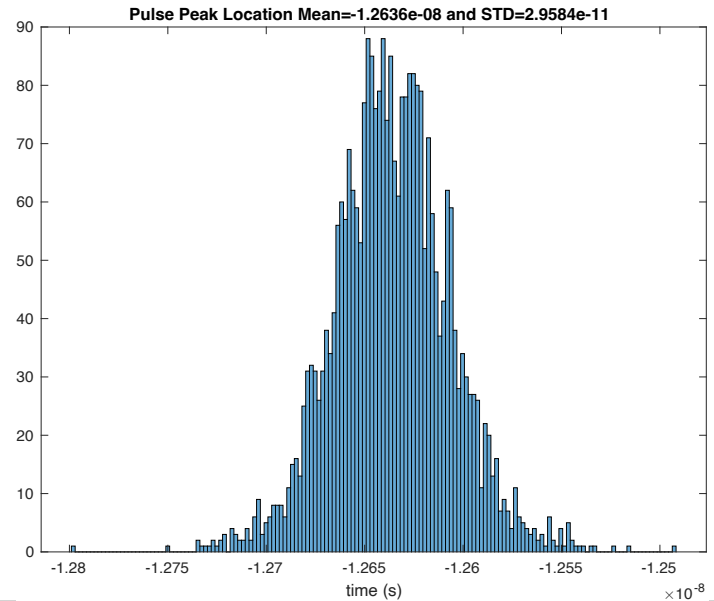
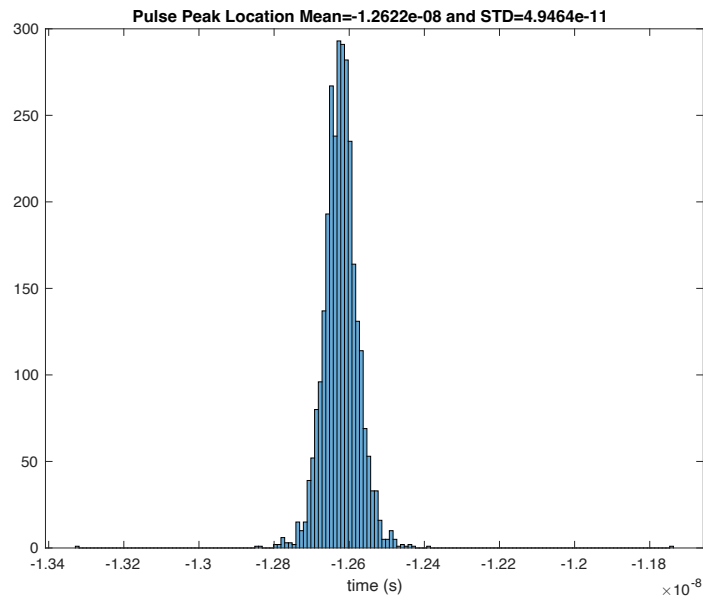
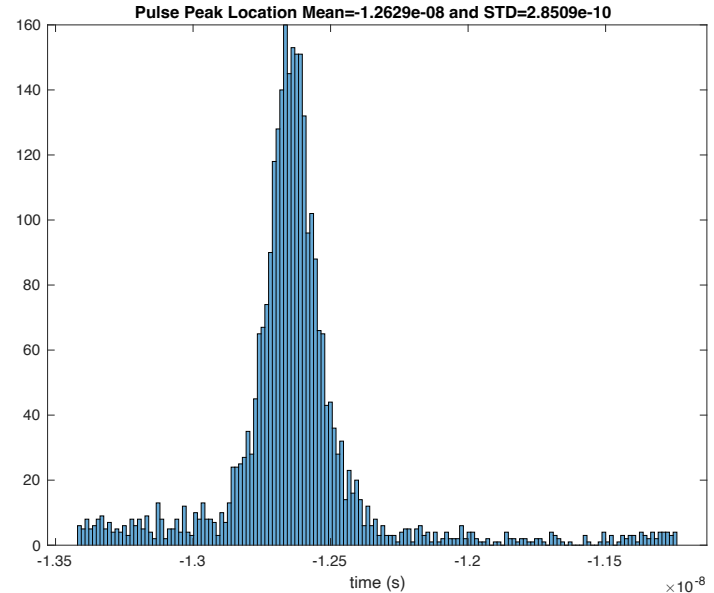
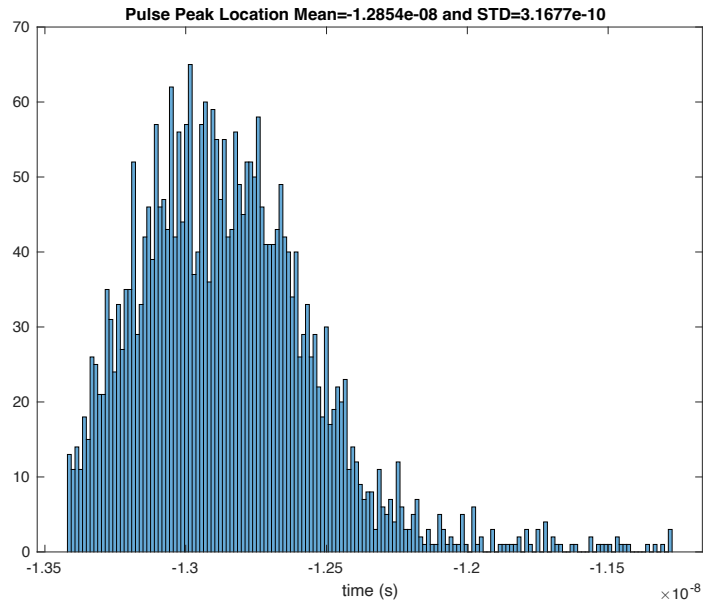
Pulse Fall-time (Leading edge)



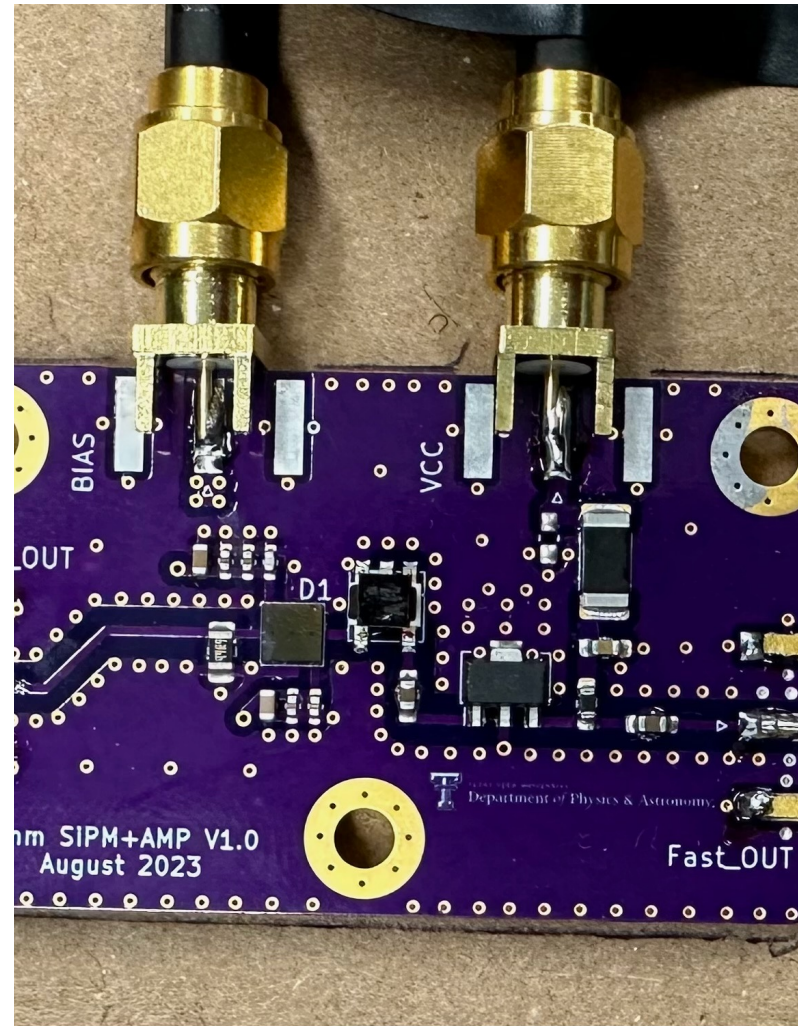
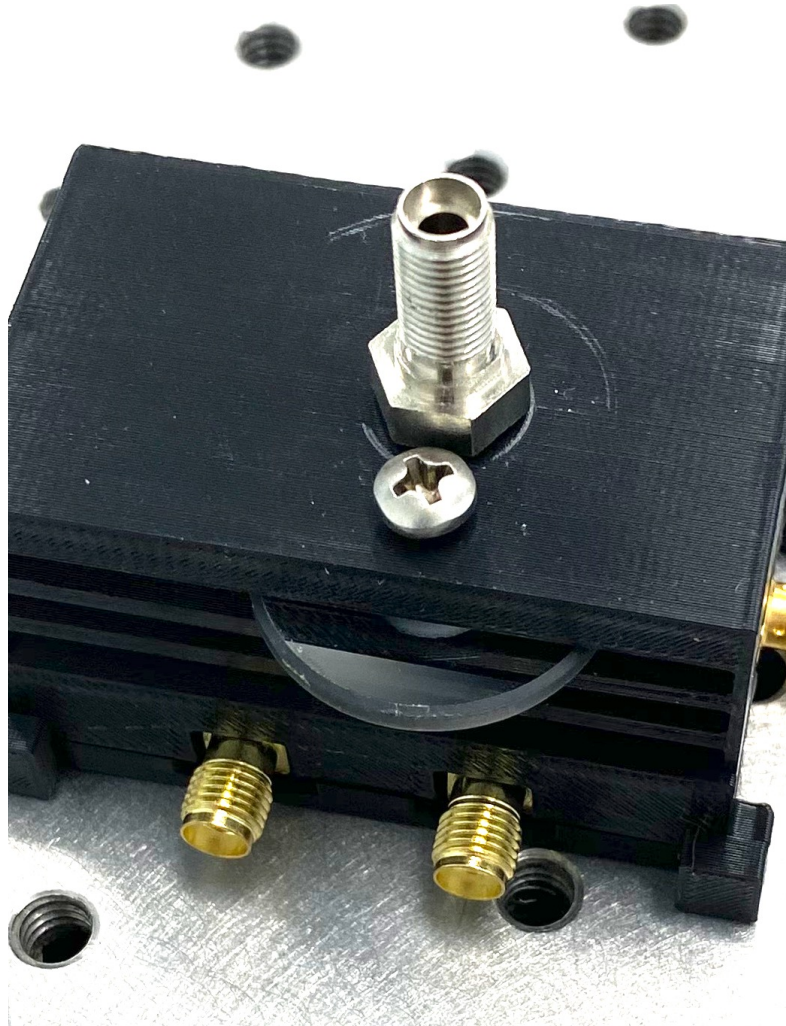
Pulse Risetime (Trailing edge)



Pulse Peak Location



3x3 mm² OnSemi SiPM Setup

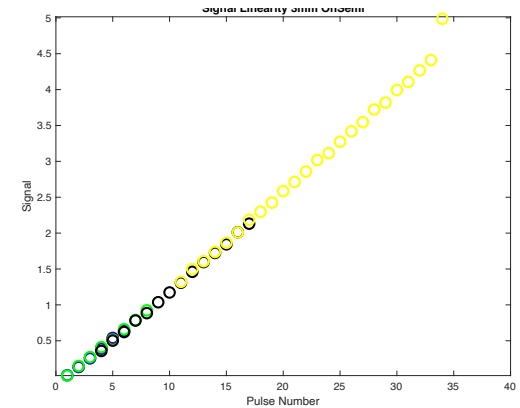
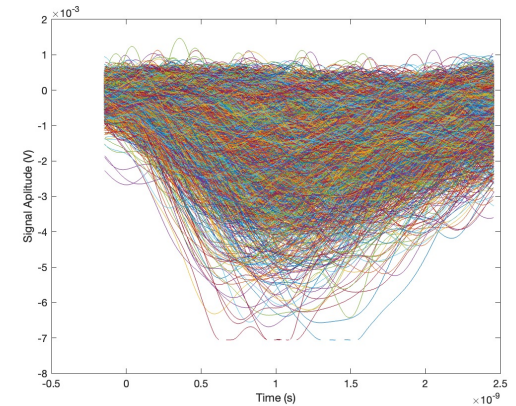
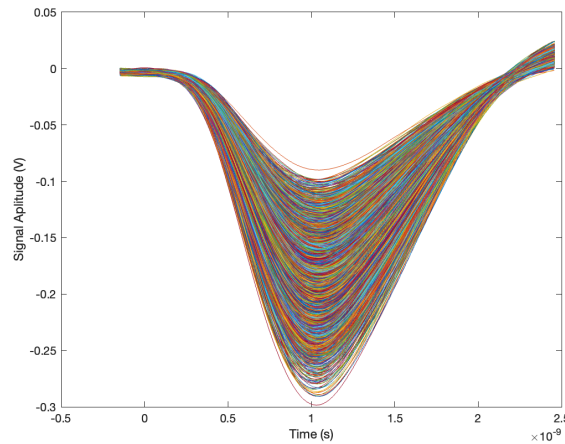
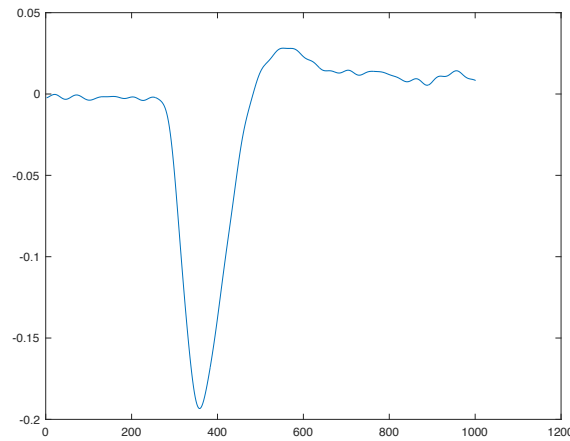


Update on 3x3 mm² OnSemi SiPM Characterization

1. 3x3 mm² OnSemi SiPM on MitchBoard ($V_{br} + V_o = 25.5 + 2.5V = +27 V$) which includes a MicroCircuit amplifier (12.1 V)
2. 35 um pitch (4,774 cells with 64% fill factor)
3. 59 ps laser pulse width at 1 kHz at 438 nm
4. Each run contains 4,000 pulse traces (except Run 7 at 16,000). Highlighted values are reliable

Ave Light Level (p)	No of found peaks	Halfwidth / STD (ps/ps)	Peak Location/STD (ns/ps)	Fall-time (10-90%)/STD (ps/ps)	Rise-time (10-90%)/STD (ps/ps)	Linearity slope (Signal/peak)
~2	5	580/288	1.2548/567	371/227	436/271	0.11
~2	6	588/297	1.2425/536	375/227	435/273	0.11
~4	8	736/327	1.1073/399	426/208	564/283	0.12
~7	15	x	0.996/76	517/109	828/178	0.13
~20	25	x	0.996/76	533/40	906/66	0.19
		1041/46	1.028/29	517/13	879/25	x
		1054/52	1.033/51	511/10	830/15	x

Observations/Misc



1. Setup/electronics works well
2. $3 \times 3 \text{ mm}^2$ pulse is slower compared to 1 mm^2 .
Roughly speaking:
 - FT (520 vs 285 ps)
 - RT (870 vs 770 ps)
 - HW (1.053 ns vs 665 ps)
3. Overshoot is being investigated
4. $6 \times 6 \text{ mm}^2$ array PCB is done and measurements underway

