



中国科学院高能物理研究所  
*Institute of High Energy Physics*  
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# TaichuPix-3 test

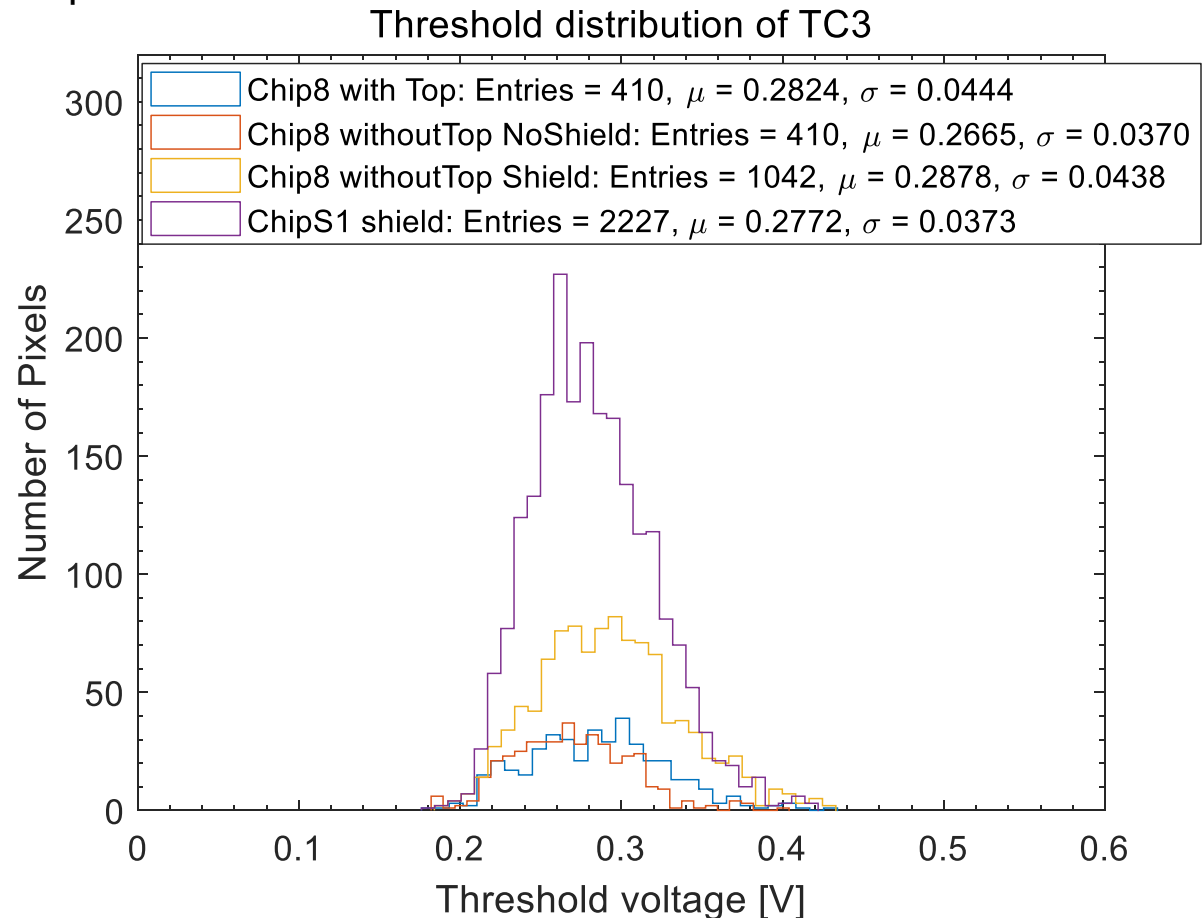
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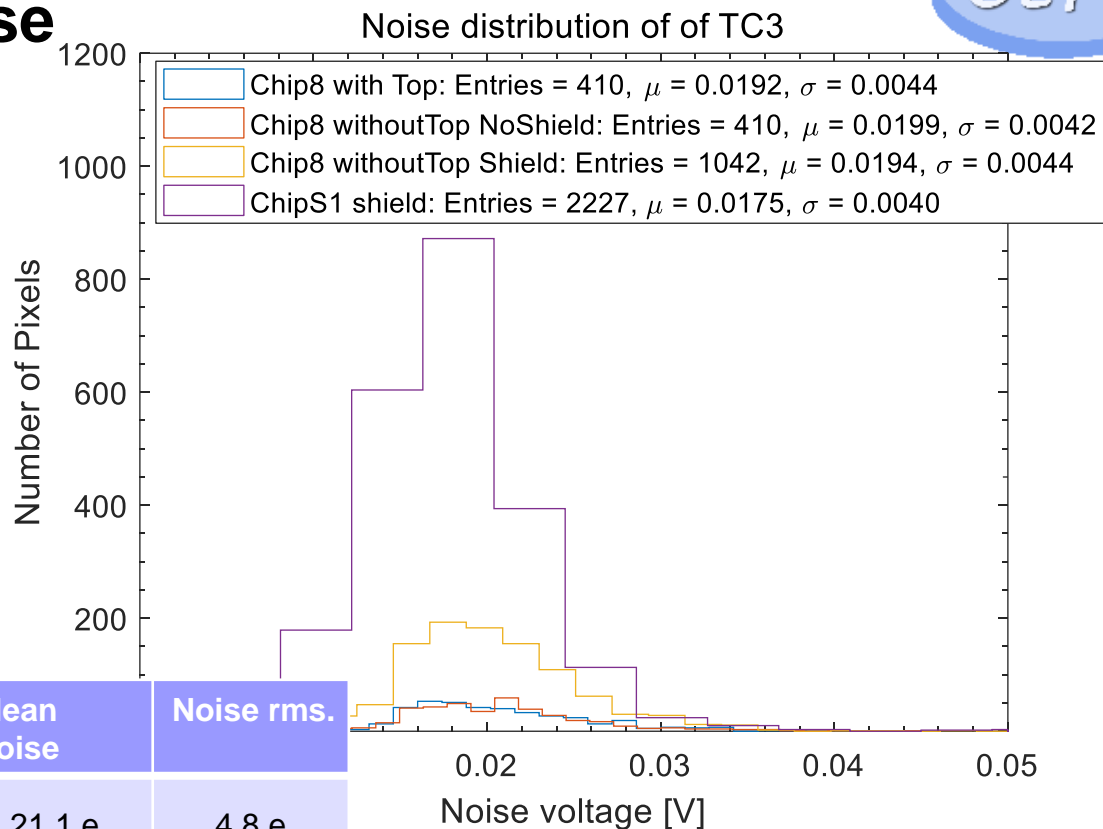
# Effect of top IO

## ■ Comparison of Chip8 and ChipS1 @ ITHR=32 (TC2 nominal)

- Chip8 has top IO, all IOs were wire-bonded in the beginning, cut after first test
- ChipS1 has NO top IO



# Comparison of Noise



	Mean threshold	Threshold rms.	Mean noise	Noise rms.
Chip8 with top	310.4 e	48.8 e	21.1 e	4.8 e
Chip8 without top No Shield	292.9 e	40.7 e	21.9 e	4.7 e
Chip8 without top shield	316.2 e	48.1 e	21.4 e	4.8 e
ChipS1 shield	304.6 e	41.0 e	19.3 e	4.4 e

# Preliminary fake hit rate test

## ■ Test setup

- ChipS1 with light-shield, no input
- 100s sampled with different mask configuration (ITHR=32)

Col. Row Counts

Col.	A	B	C
1	492	49	5
2	195	83	3
3	308	88	1
4	316	125	3
5	484	396	48
6	179	398	3
7	180	399	3
8	179	401	1
9	180	400	1
10	203	511	885
11	408	649	4
12	463	819	5
13	294	880	5
14	294	881	1
15	294	882	1
16	140	932	649191
17	400	997	48024
18			

Sum of counts = 698184  
With top 200 rows masked

Col.	A	B	C
1	492	49	5
2	195	83	3
3	316	125	4
4	283	292	2
5	484	396	30
6	203	511	792
7	11	584	4
8	140	932	650499
9	400	997	46843
10			

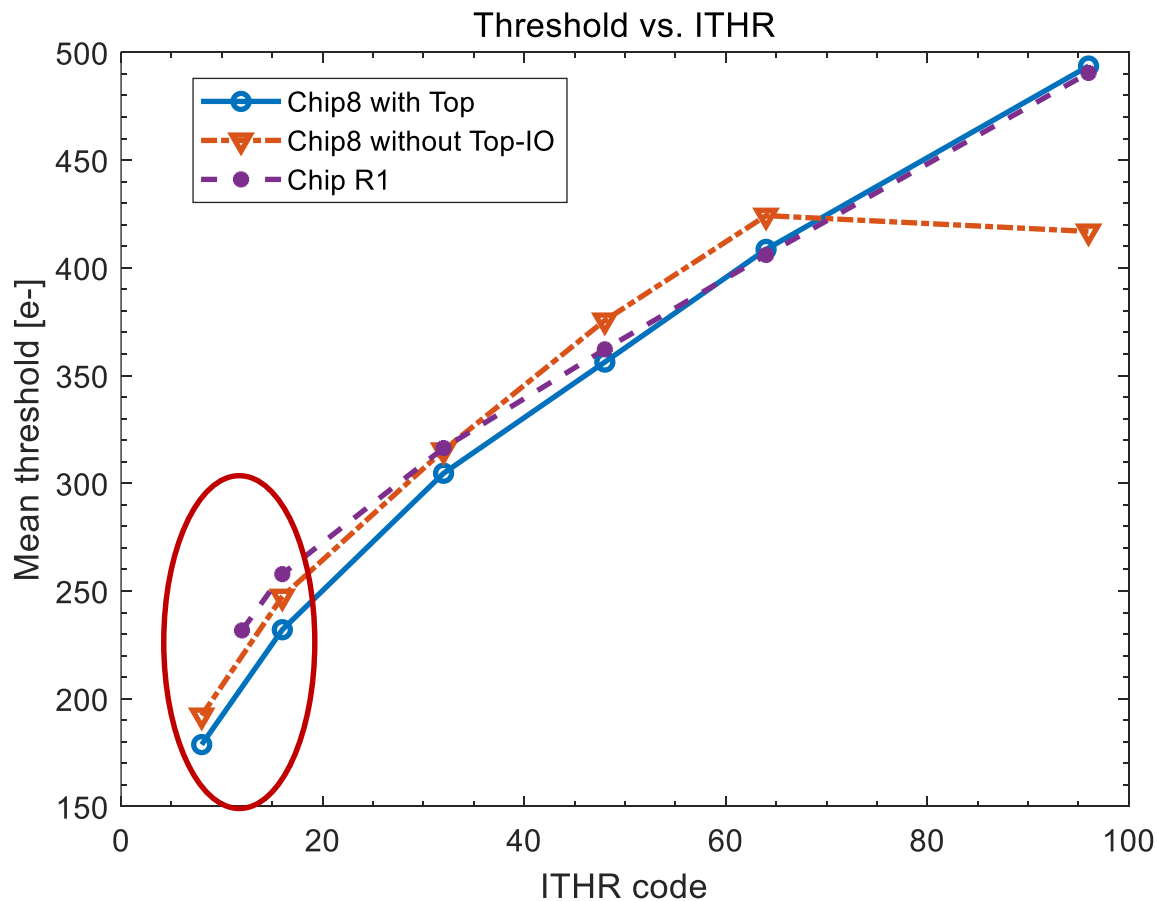
Sum of counts = 698182  
With all pixels unmasked

Col.	A	B	C
10	248	248	4
11	484	396	150
12	479	437	3
13	467	449	3
14	408	649	4
15	463	819	20
16	87	843	5
17	178	870	5
18	247	877	5
19	248	876	1
20	247	878	1
21	248	879	1
22	285	878	35
23	422	922	6
24	423	923	6
25	423	924	1
26	203	1011	18
27			

Sum of counts = 328  
With 3 pixels masked

# Effect of Top IO

## ■ ITHR scanning



# Preliminary fake hit rate test

## ■ Fake hit rate definition

➤ 
$$R_{fh} = \frac{N_{fh}}{N_{pix}N}$$

- $N_{fh}$ : fake hit counts
- $N_{pix}$ : total pixels for test
- $N$ : sampled frame counts = sampled time/25ns

	Fakehit	Sampled time (s)	Fakehit rate
Masked 3 pixels	323	100	1.7e-13
No masked	698182	100	3.3e-10

# Summary

- Removing top-IO connection has a lightly effect on the mean threshold, and threshold dispersion
- Chip without top IOs works normally
  - Functionality
  - Threshold scan, noise distribution
  - **Minimum mean threshold larger than chip with top-IO**
- Chip needed to be shielded from light, light makes chip easier to be oscillating