

TFPX General Meeting

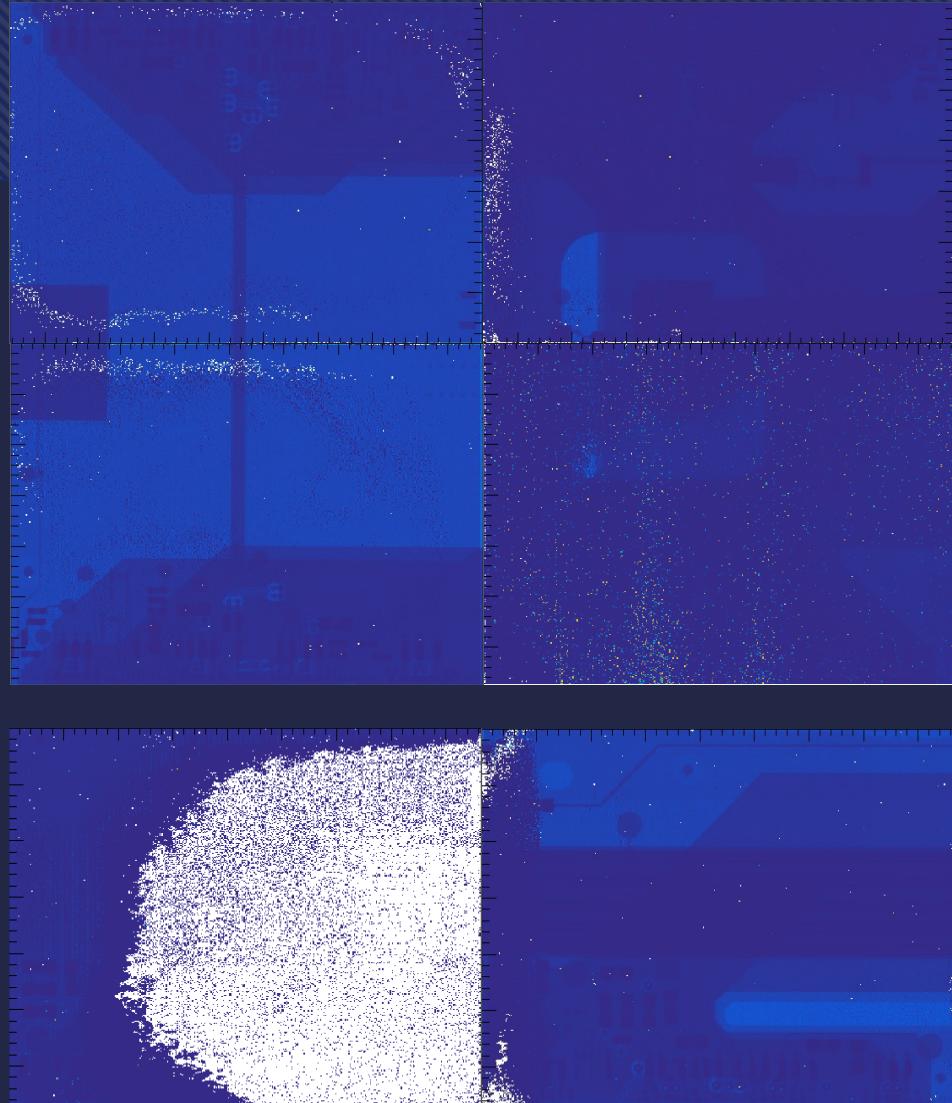
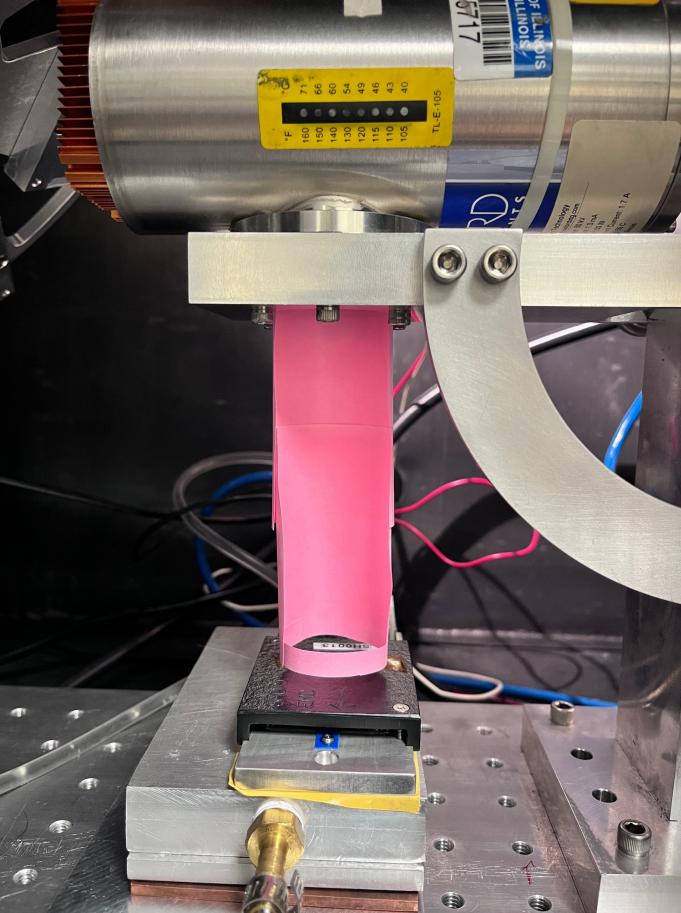
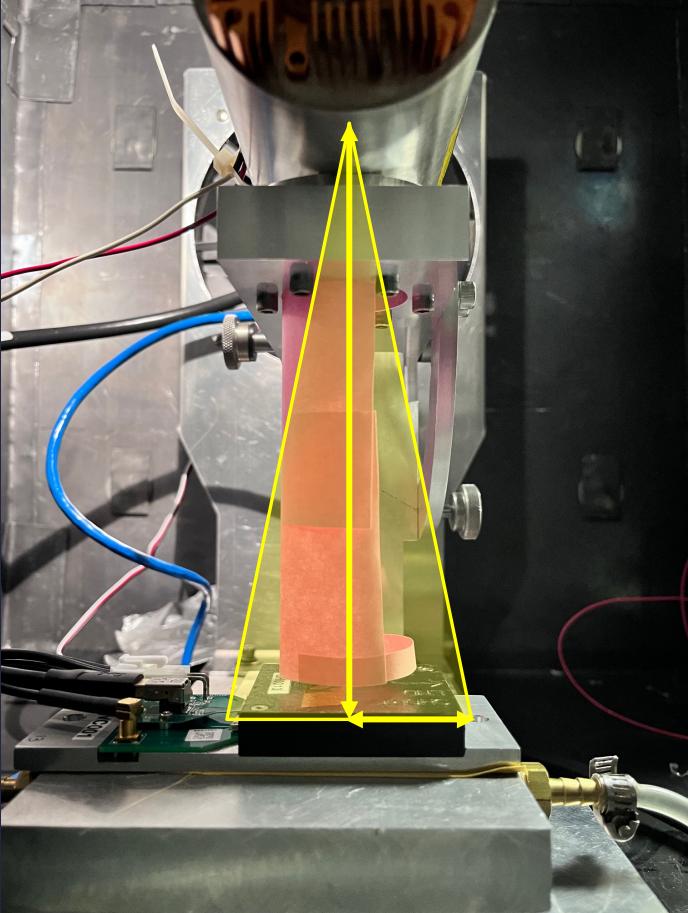
July 12, 2024

Open-bump Tests for Kick-off Modules

Ricardo Escobar, Anatoly Evdokimov, Cecilia E. Gerber, Beren Ozek, Titas Roy

X-ray Test

- Xray Parameters: 40 kV, 0.8 mA
- Occupancy scans shows no sign of xray cone edge.

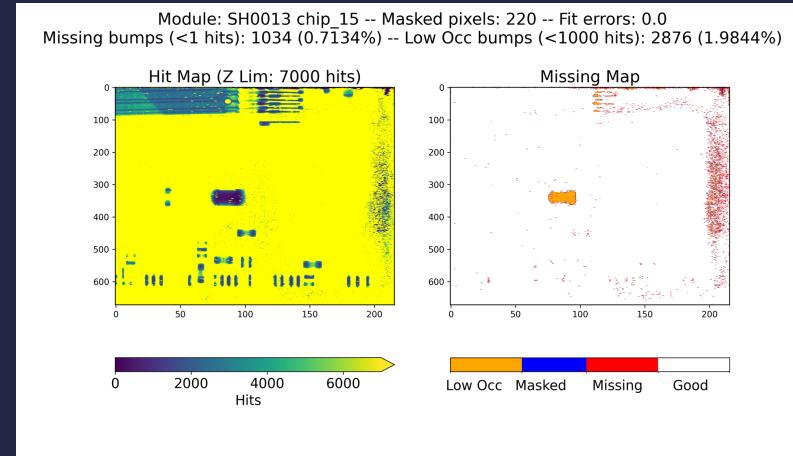
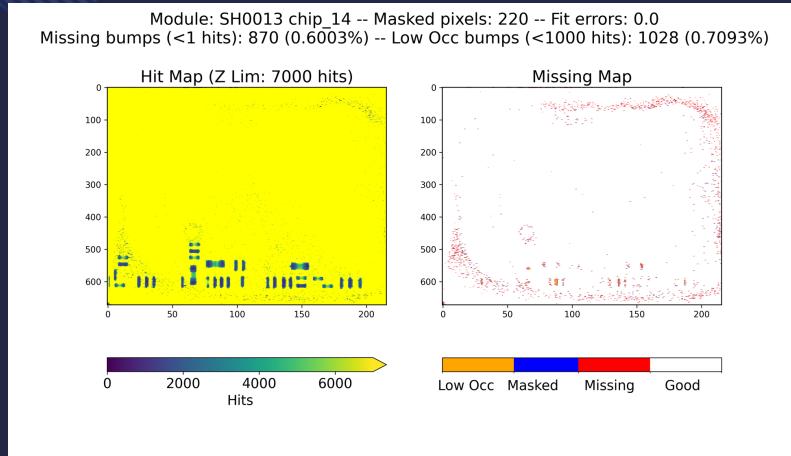


SH0013: HPK-TMicro/Micross-CROCv1 Quad X-ray Test

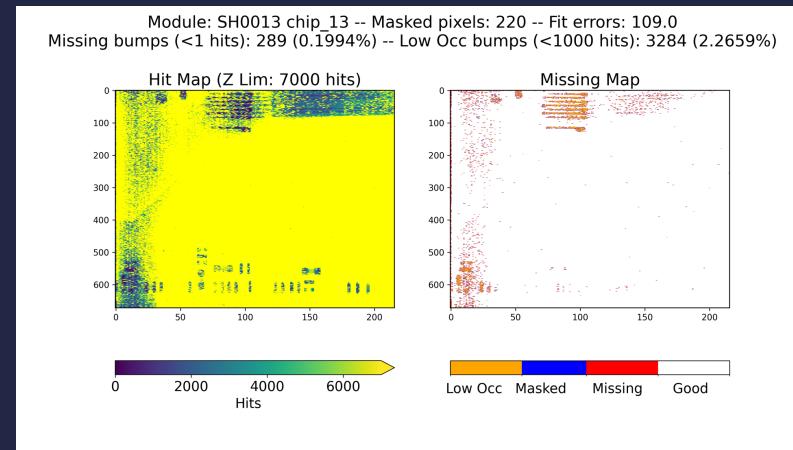
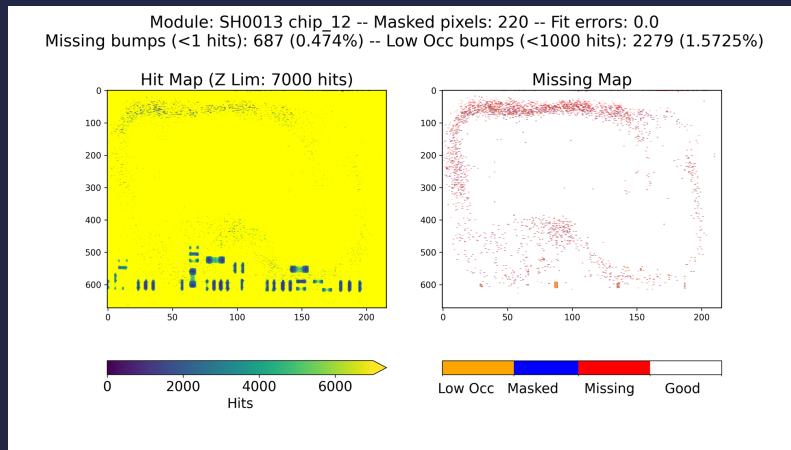


- With the help of Massimiliano at UH, Beren Ozek began analyzing initial X-ray results for RH0016 and presented in the TFPX General Meeting June 28th (see [here](#)).
- Definition of Missing Bumps** was changed from having <100 hits to having **<1 hit** (i.e. not hits).

chip14
870 (0.60%)
missing bumps



chip15
1034 (0.71%)
missing bumps



chip13
289 (0.20%)
missing bumps

RH0026: HPK-TMicro/Micross-CROCv1 Dual X-ray Test



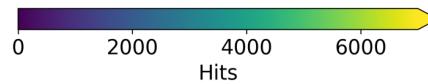
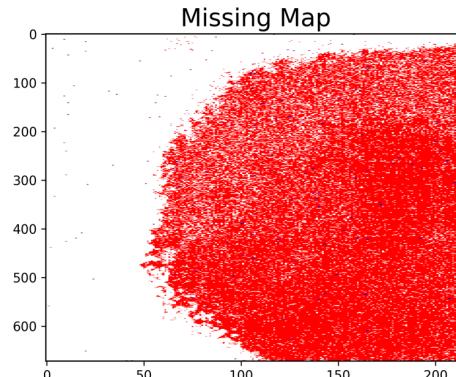
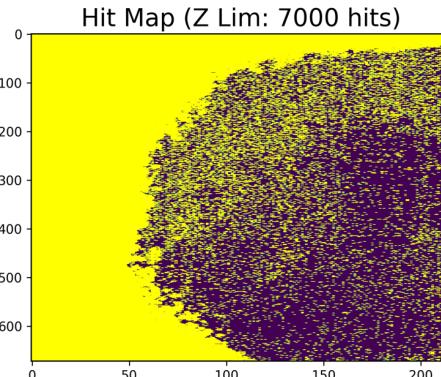
- Definition of a Missing Bumps is a pixel (not masked by Pixelalive) with **no hits at all**.

chip12

74604 (51.49%)

missing bumps

Module: RH0026 chip_12 -- Masked pixels: 269 -- Fit errors: 0.0
Missing bumps (<1 hits): 74604 (51.4926%) -- Low Occ bumps (<1000 hits): 0 (0.0%)

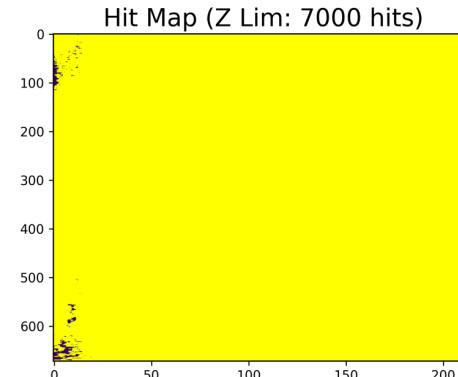


chip13

1034 (0.71%)

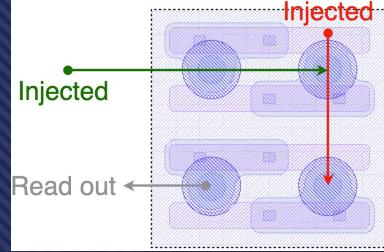
missing bumps

Module: RH0026 chip_13 -- Masked pixels: 327 -- Fit errors: 0.0
Missing bumps (<1 hits): 1034 (0.714%) -- Low Occ bumps (<1000 hits): 0 (0.0%)

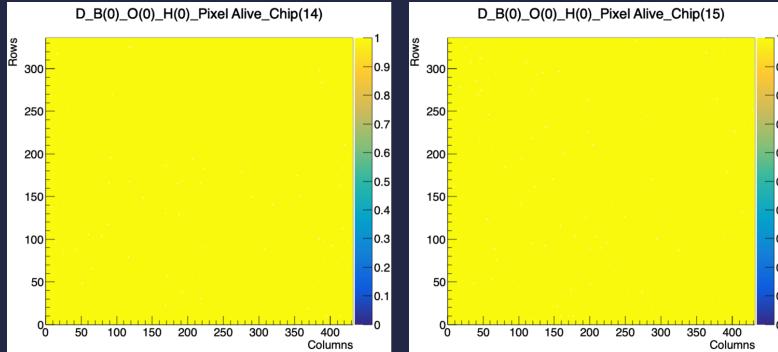


SH0013: HPK-TMicro/Micross-CROCv1 Quad X-talk Test

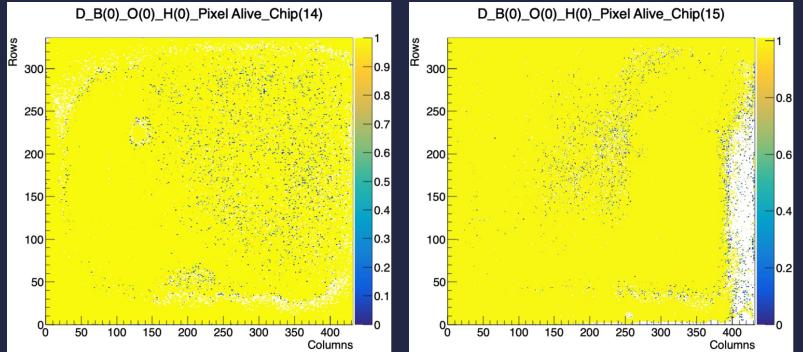
- Nominal Pixelalive with $\Delta\text{VCAL} = 39k$ to determine the dead pixels at chip level.
- Coupled Pixelalive with same ΔVCAL but INJtype = 5 to inject the **coupled** pixel.
- Decoupled Pixelalive with same ΔVCAL but INJtype = 6 to inject the **decoupled** pixel.



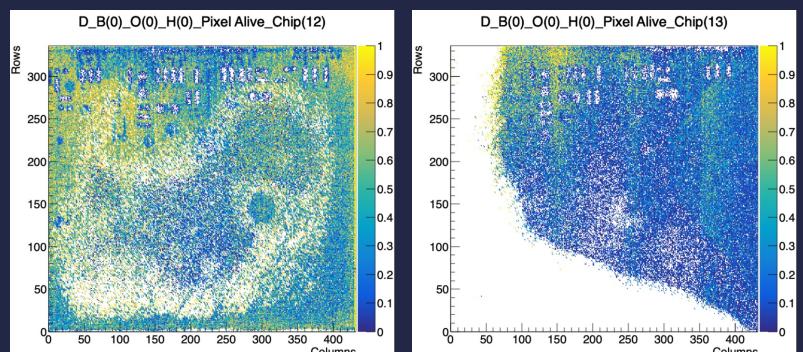
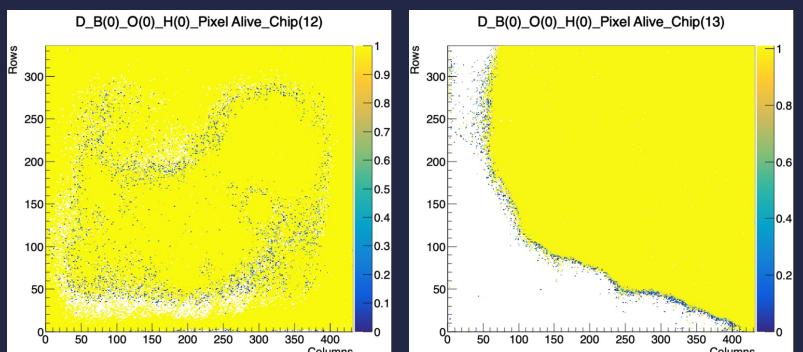
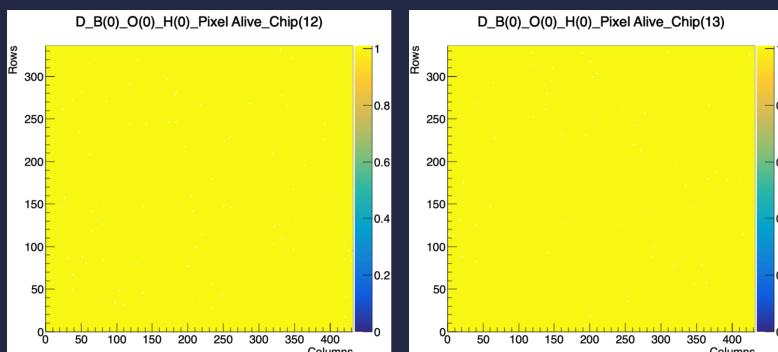
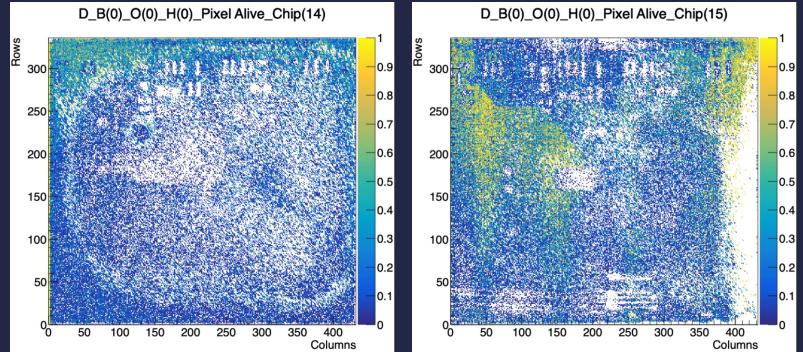
Nominal



Coupled



Decoupled



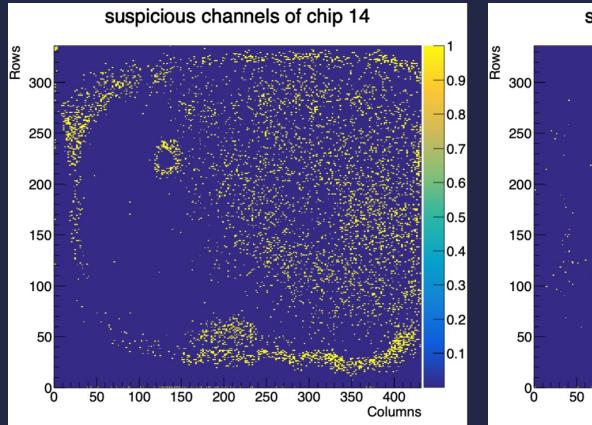
SH0013: HPK-TMicro/Micross-CROCv1 Quad X-talk Test



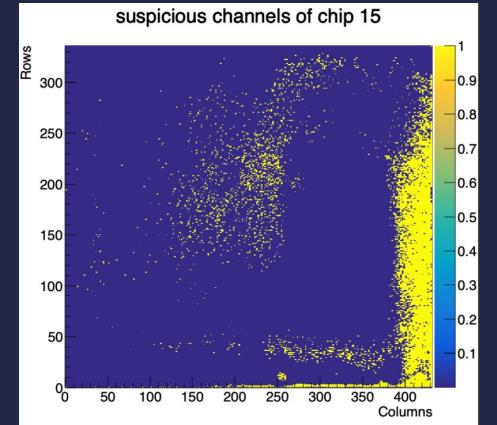
Thank you
Arash Jofrehei
(UZH)

- Pixels with > 90% efficiency in nominal Pixelalive and:
 - < 50% in **coupled** scan, the pixel is labeled as “suspicious”
 - < 50% in **coupled** scan **and** < 30% in **decoupled** scan, the pixel is labeled as “confirmed”

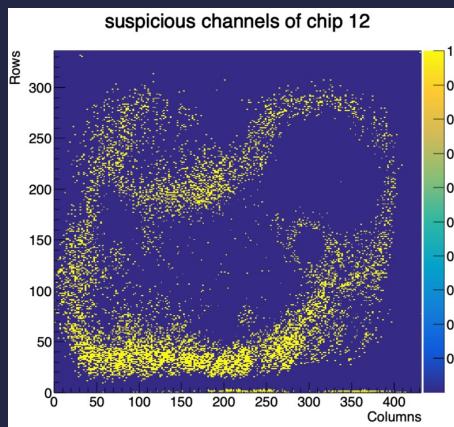
chip15
dead: 168
suspicious: 11318



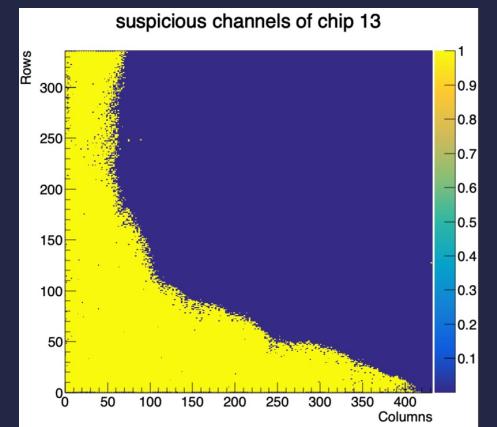
chip14
dead: 111
suspicious: 8058



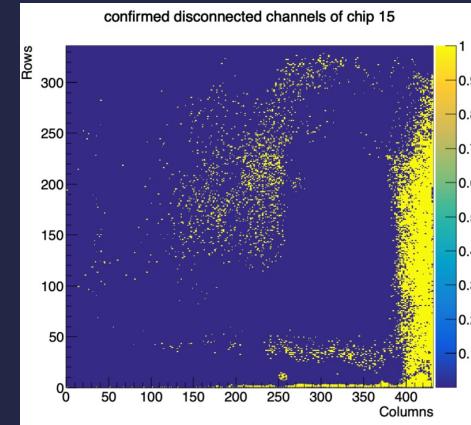
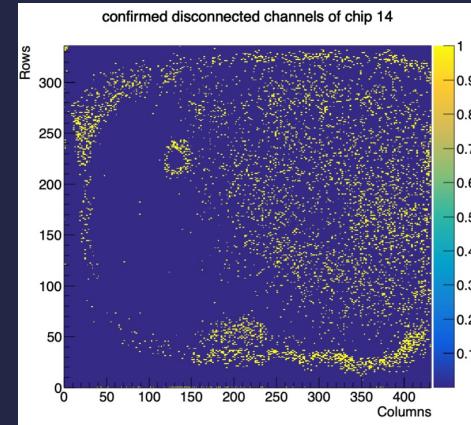
chip13
dead: 174
suspicious: 43081



chip12
dead: 220
suspicious: 12556



Confirmed



chip15
dead: 168
confirmed: 10871

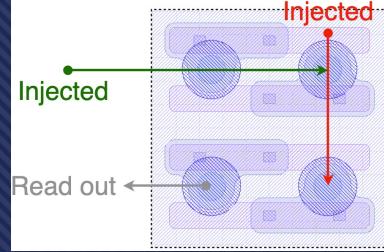
chip14
dead: 111
confirmed: 7105

chip13
dead: 174
confirmed: 42939

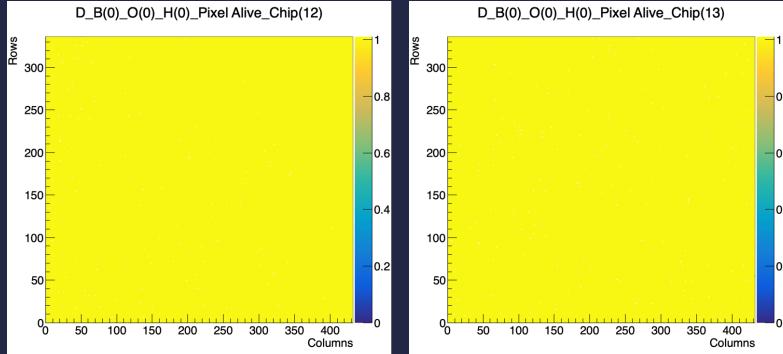
chip12
dead: 220
confirmed: 9694

RH0026: HPK-TMicro/Micross-CROCv1 Dual X-talk Test

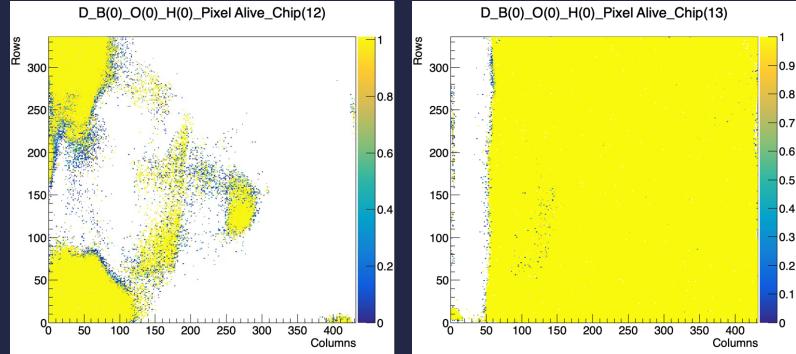
- Nominal Pixelalive with $\Delta\text{VCAL} = 39k$ to determine the dead pixels at chip level.
- Coupled Pixelalive with same ΔVCAL but INJtype = 5 to inject the **coupled** pixel.
- Decoupled Pixelalive with same ΔVCAL but INJtype = 6 to inject the **decoupled** pixel.



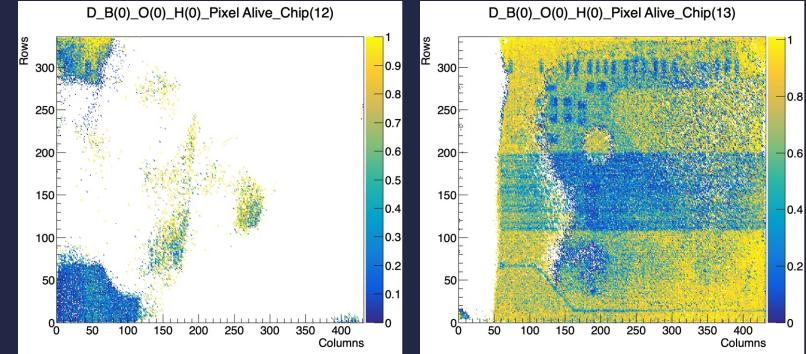
Nominal



Coupled



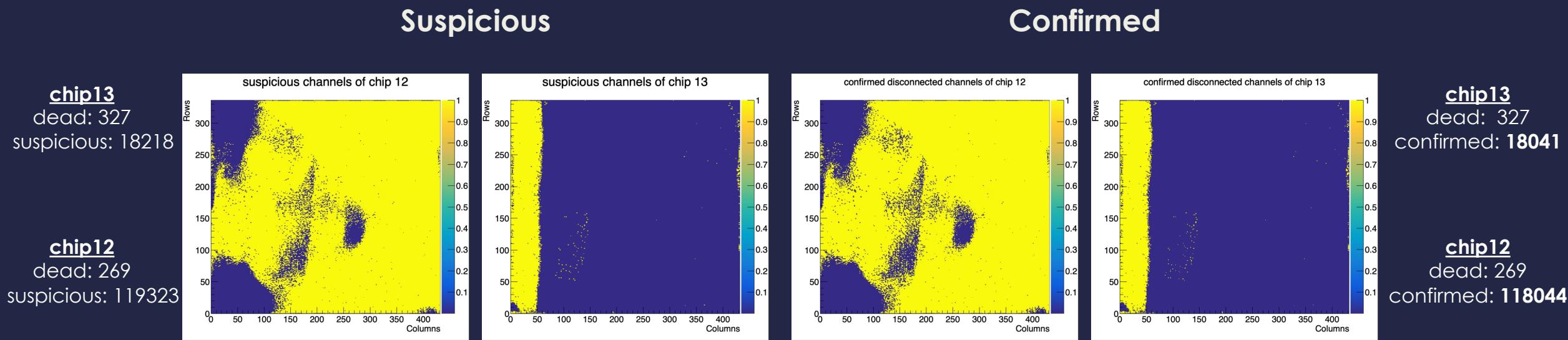
Decoupled



RH0026: HPK-TMicro/Micross-CROCv1 Dual X-talk Test

- Pixels with > 90% efficiency in nominal Pixelalive and:
 - < 50% in **coupled** scan, the pixel is labeled as “suspicious”
 - < 50% in **coupled** scan **and** < 30% in **decoupled** scan, the pixel is labeled as “confirmed”

Thank you
Arash Jofrehei
(UZH)



Missing bumps comparison

- X-ray analysis seems to label less open-bumps than X-talk test

Module

SH0013

RH0026

Open-bumps

as reported by X-ray:

chip12: 687

chip13: 289

chip14: 870

chip15: 1034

chip12: 74604

chip13: 1034

Open-bumps

as reported by X-talk:

chip12: 10871

chip13: 7105

chip14: 42939

chip15: 9694

chip12: 118044

chip13: 18041

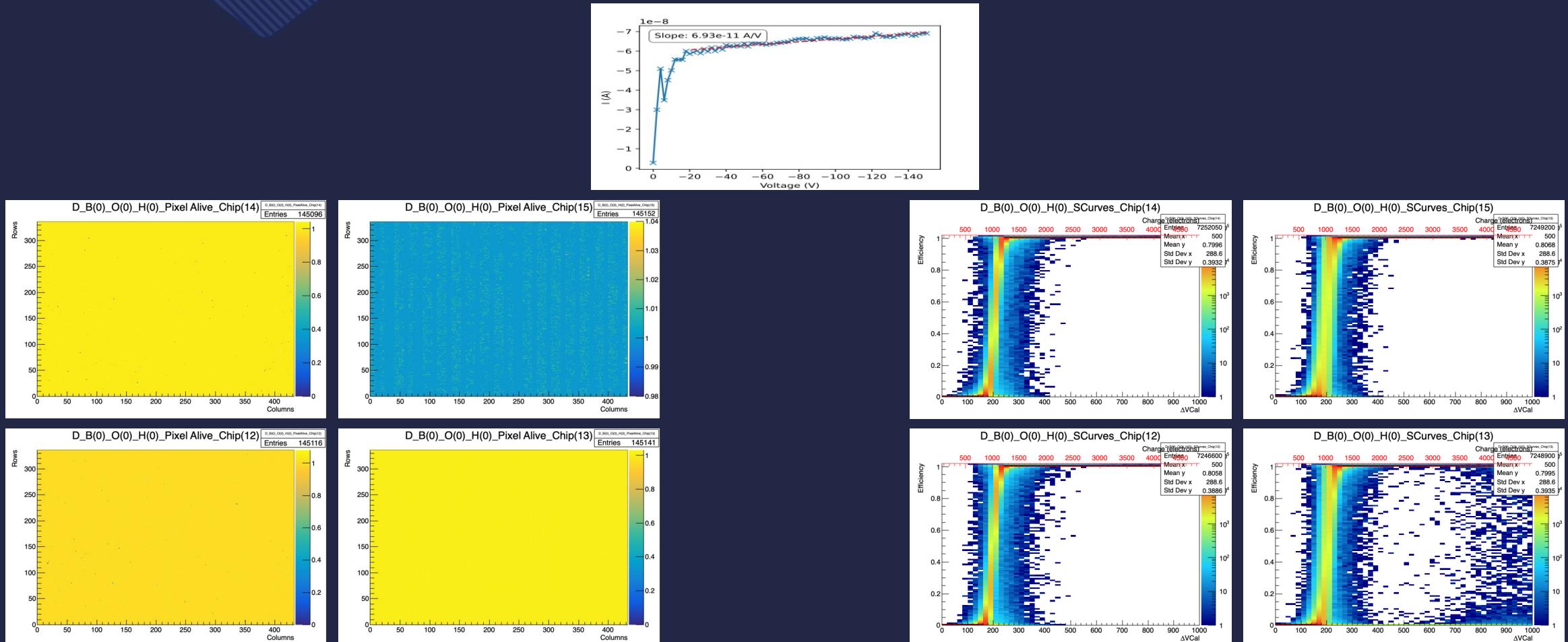


Thank You

SH0013: T-Micro/Micross/HPK-CROCv1 Quad



- Module received sealed with desiccant.
- Visual inspection showed no obvious signs of damage during transport.
- QuickTest and Tuning (1k e⁻) performed at 10% RH and 0°C set temp. using UIC Coldbox and OSU GUI:



SH0013: T-Micro/Micross/HPK-CROCv1 Quad

- Module Parameters: LV = 1.89 V, 8.0 A; HV = -80 V, -5.2 μ A \rightarrow -10.7 μ A with xray on
- Xray Parameters: 40 kV, 0.8 mA
- ~1hour Occupancy scan shows no sign of xray cone edge.

