

# EPIX10KA2M issue with panel 6 in mfxp17518 2M.1 refurbished 2020-09-20

- [Complain](#)
- [Check of constants](#)
- [Plots for different gains](#)
- [Check charge injection algorithm for selected pixels](#)
  - [good pixel 2, 20, 97](#)
  - [bad pixel 6, 20, 97](#)
  - [pathological in a check-mark way 10, 218, 53](#)
  - [pathological in a check-mark way 2, 286, 207](#)
  - [BadWater 6, 175, 172](#)
  - [BadAir 6, 21, 150](#)
  - [BadWater 6, 168, 191](#)
  - [BadAir 6, 23, 159](#)
- [Chi2](#)
  - [Commands to generate plots](#)
  - [chi2 for AHL-H, AHL-L, AML-M, AML-L](#)
    - [panel 2](#)
    - [panel 2 tail of large values of chi2](#)
    - [panel 6](#)
    - [panel 6 tail of large values of chi2](#)
- [Gain](#)
  - [gain and negative tail for AML-L](#)
    - [panel 2](#)
    - [panel 6](#)
  - [gain for AHL-H, AHL-L, AML-M, AML-L](#)
    - [panel 6](#)
    - [panel 2](#)
    - [other panels vertically jammed on a single plot](#)
    - [panel 12](#)
- [References](#)

## Complain

- See [elog mfxp17518 run 108](#)
- Aaron B. reports some problems with the background and images in the region of the water ring. Images with this type of problem fail to index...

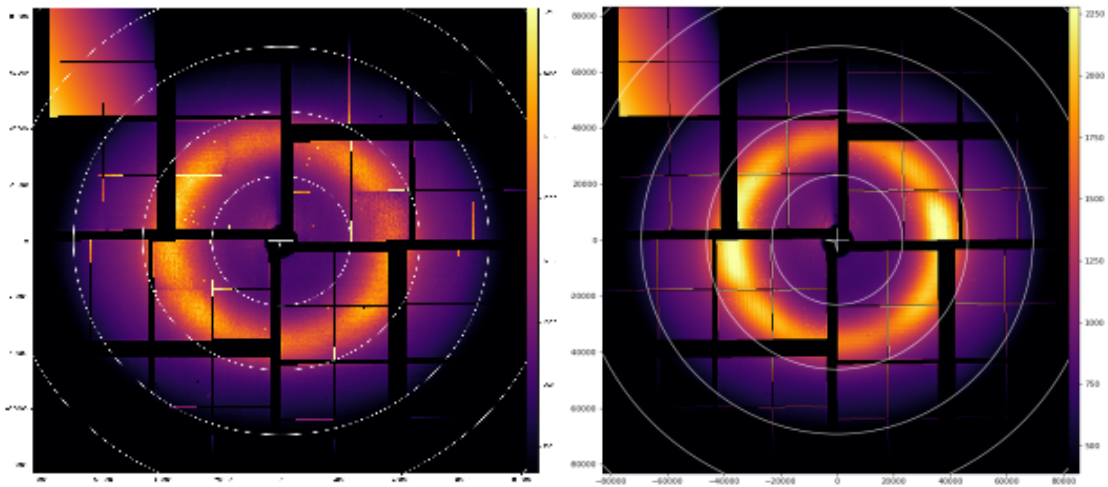
## Check of constants

- constants for mfxp17518 MfxEndstation.0:Epix10ka2M.0  

```
/reg/d/psdm/mfx/mfxp17518/calib/Epix10ka2M\:\CalibV1\MfxEndstation.0\Epix10ka2M.0/pedestals/  
/reg/d/psdm/mfx/mfxp17518/calib/Epix10ka2M\:\CalibV1\MfxEndstation.0\Epix10ka2M.0/pixel_gain/
```
- Pedestals and pixel gains were generated correctly.  
  
Offsets were taken from exp=mfxc00118:run=172  
  
pedestals from exp=mfxp17518:run=92  
  
pixel\_gain: [used constant gains](#)

## Plots for different gains

- constant gains
- gains from charge injection



## Check charge injection algorithm for selected pixels

Hart, Philip Adam <philiph@slac.stanford.edu>

Thu 9/24/2020 11:52 AM

To: O'Grady, Paul Christopher

Cc: Dubrovin, Mikhail

I'm working in the data frame, except I've flattened the array for some reason. So the standard bad behavior can be seen in module 6, pixel 7777 in my ntuple:

```
>>> 96*4
```

```
384
```

```
>>> 7777/384
```

```
20
```

```
>>> 7777%384
```

```
97
```

so [6, 20, 97] and all around there.

I see somewhat ok behavior in [14, 20, 97].

[2, 20, 97] and [10, 20, 97] seem plain ok.

[6, 4, 117] looks bad. [2, 4, 117] seems ok.

[10, 218, 53] is pathological in a check-mark way.

[2, 286, 207] is pathological in a check-mark way.

- Philip

=====

Hart, Philip Adam <philiph@slac.stanford.edu>

Fri 9/25/2020 10:38 AM

Here are some pixels which are problematic in (calibrated) AML-L in module 6 in both water and air scatter for the limited events I scanned in mfxp175 run 108 and mfxc00118 run 190, respectively:

```
module row col nBadWater nBadAir
```

```
6 175 172 21 150
```

```
6 176 107 116 174
```

```
6 156 191 25 174
```

```
6 268 177 161 150
```

```
6 175 161 25 155
```

```
6 95 191 21 108
```

```
6 93 69 183 508
```

```
6 175 180 30 202
```

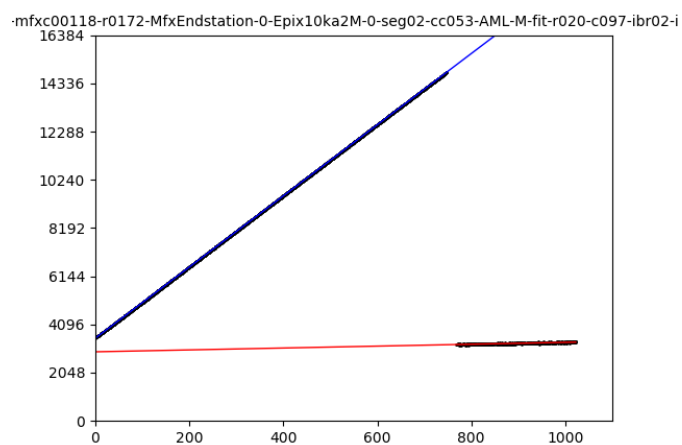
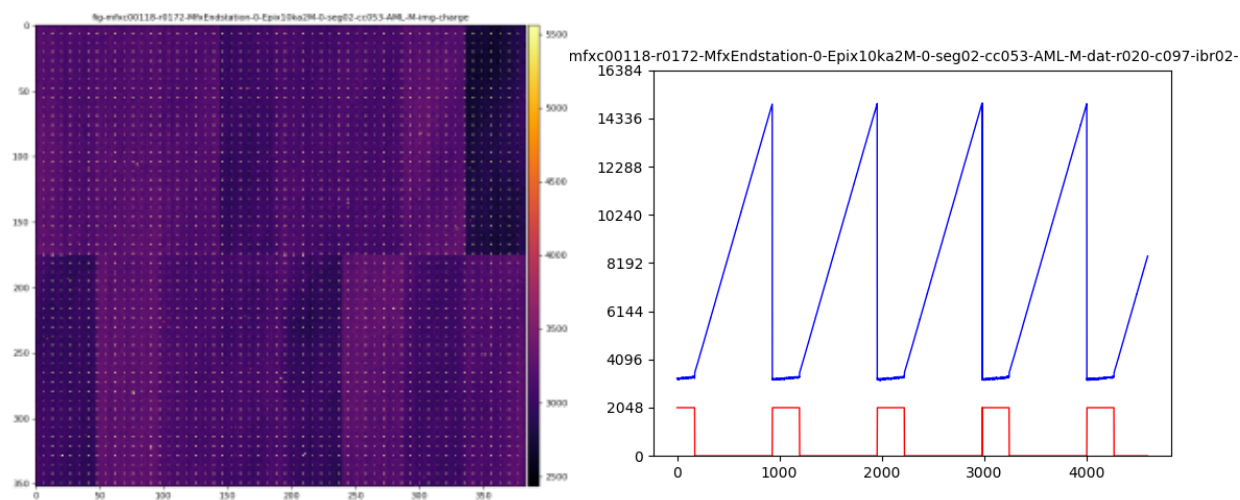
```
6 175 185 24 149
```

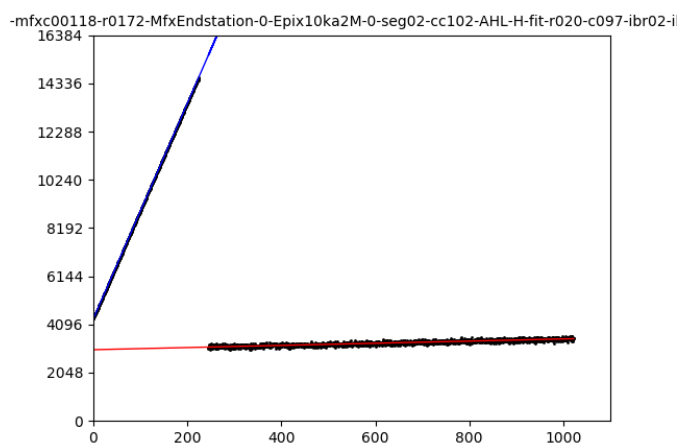
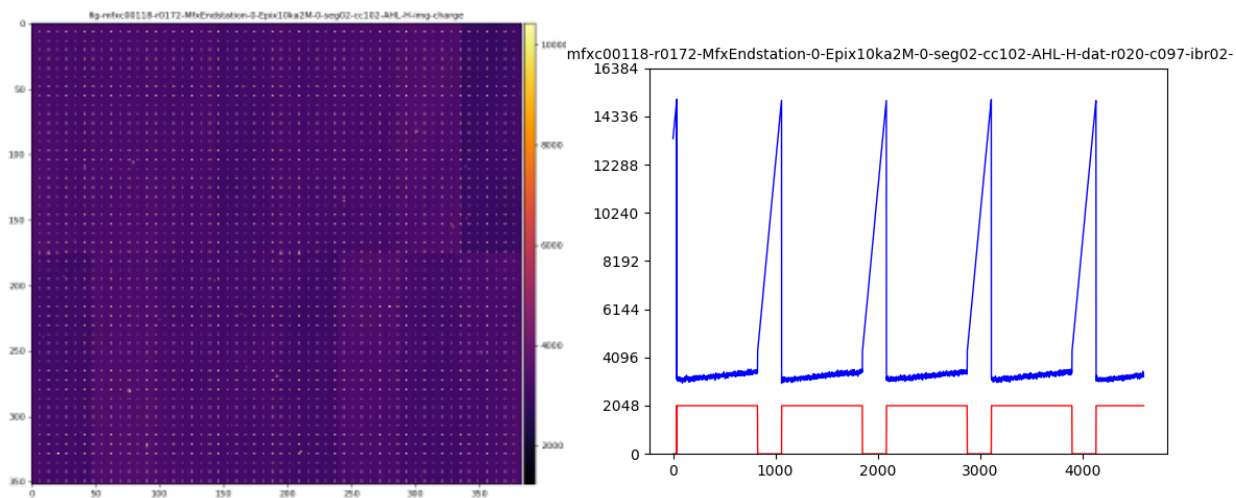
```
6 175 186 27 196
```

```
6 168 191 23 159
```

- Philip

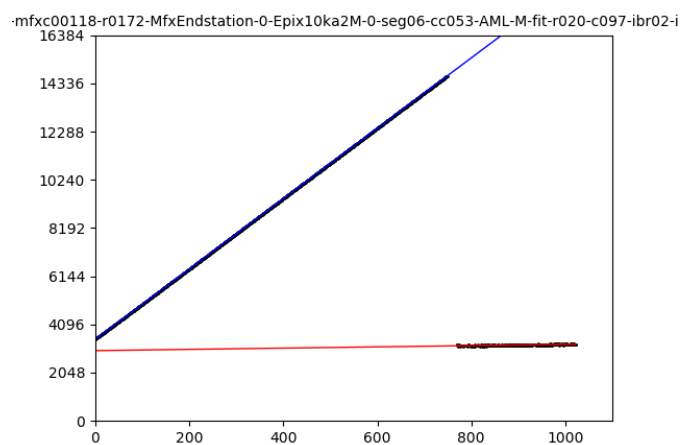
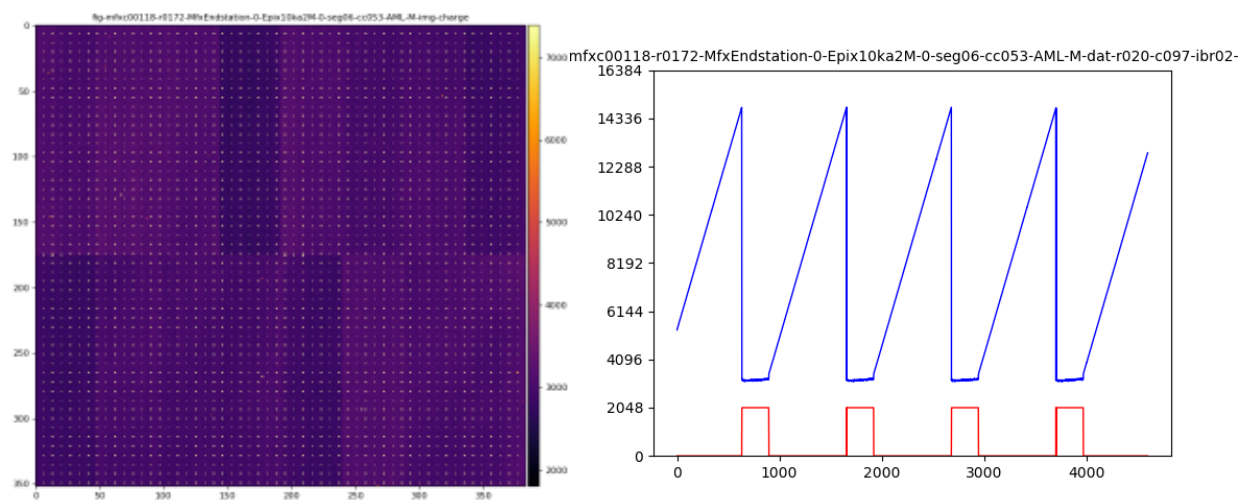
**good pixel 2, 20, 97**

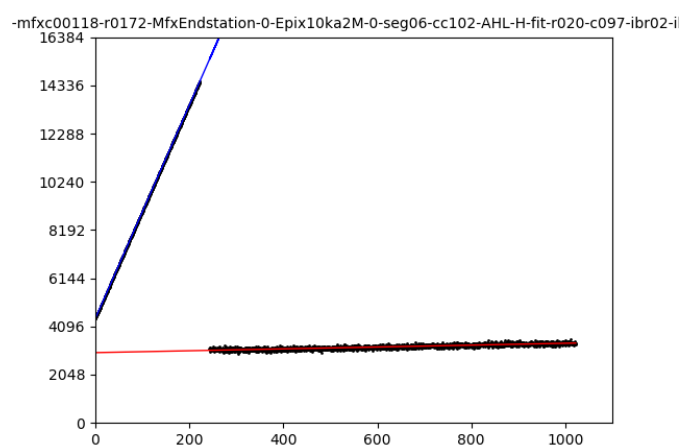
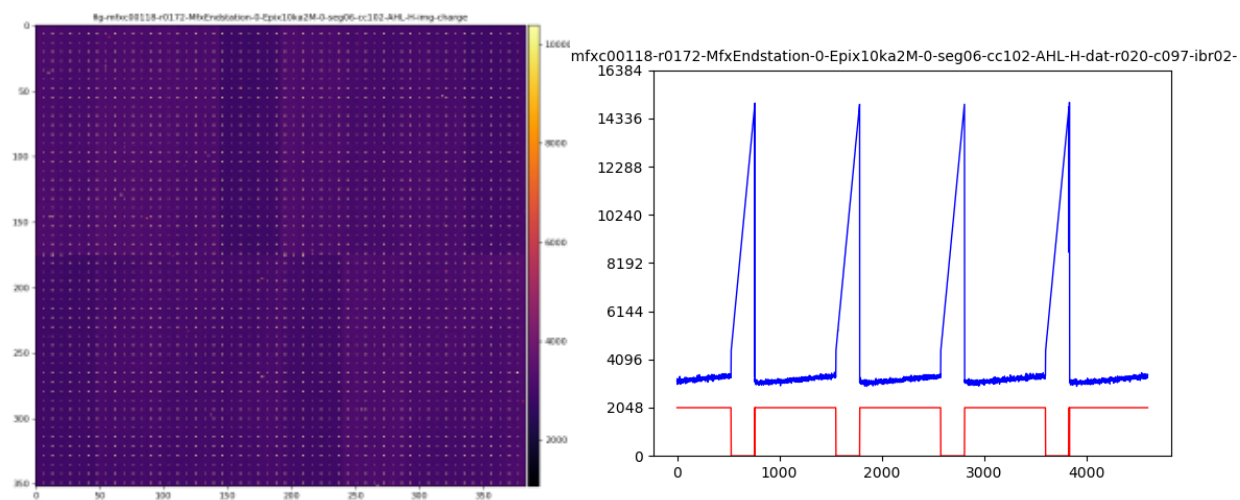




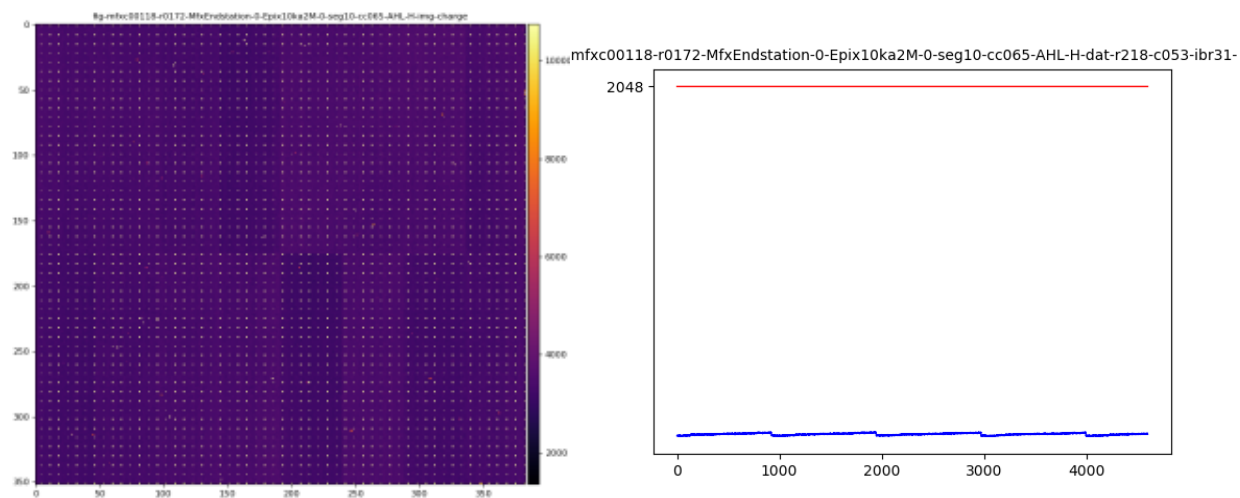
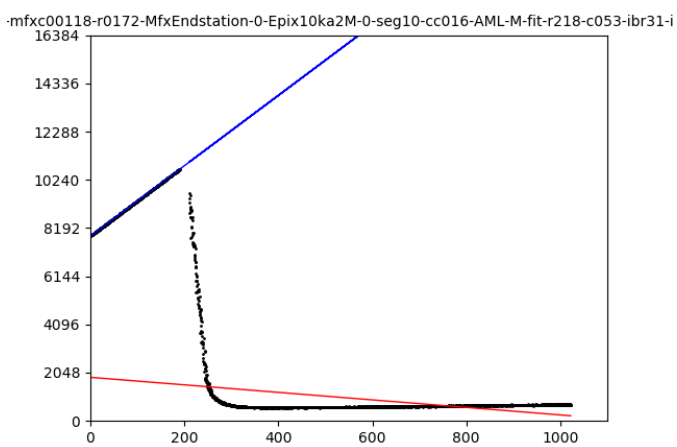
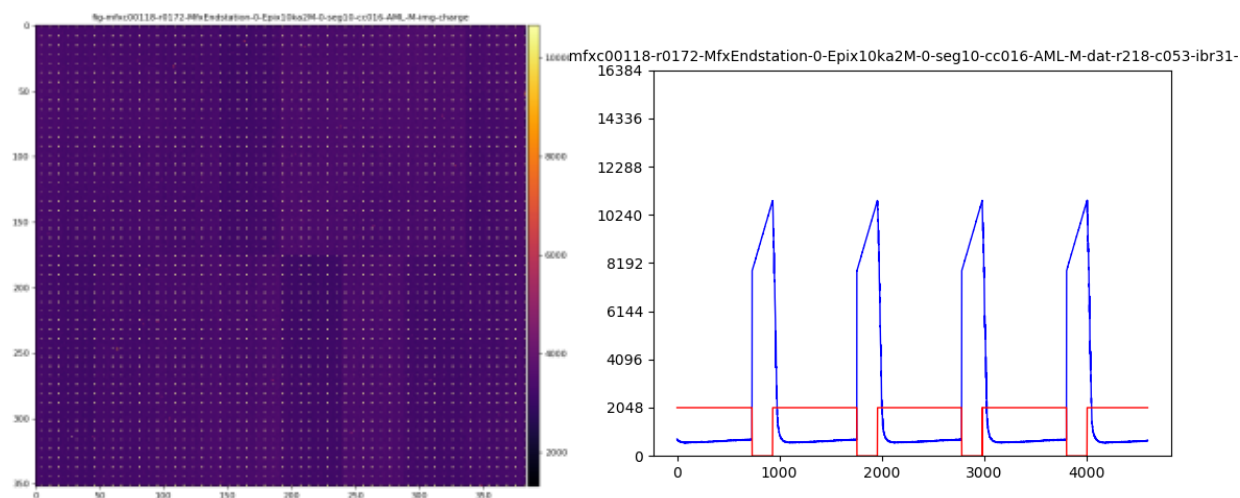
**bad pixel 6, 20, 97**

epix10ka\_offset\_calibration -e mfxc00118 -d MfxEndstation.0:Epix10ka2M.0 -r172 -o ./work1 -s5 -i6 -G20,97

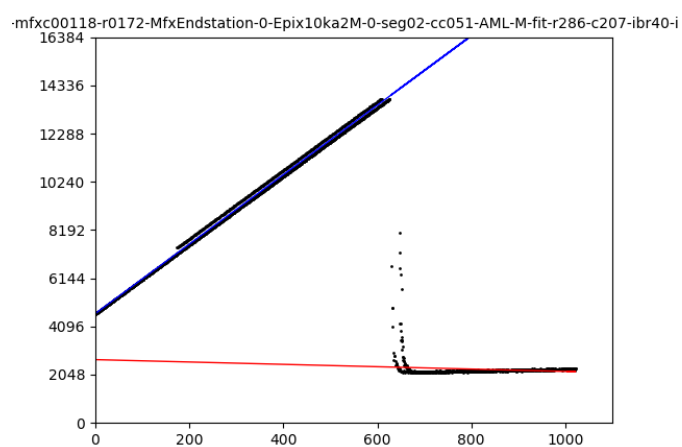
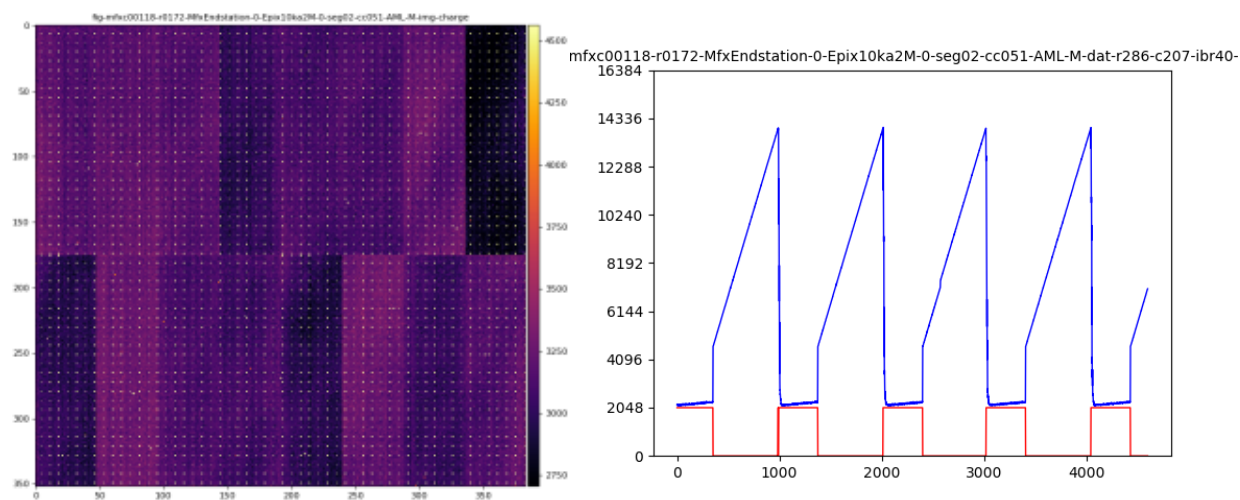




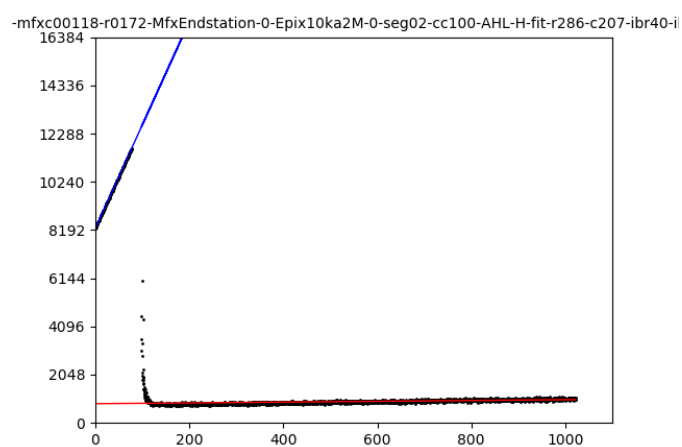
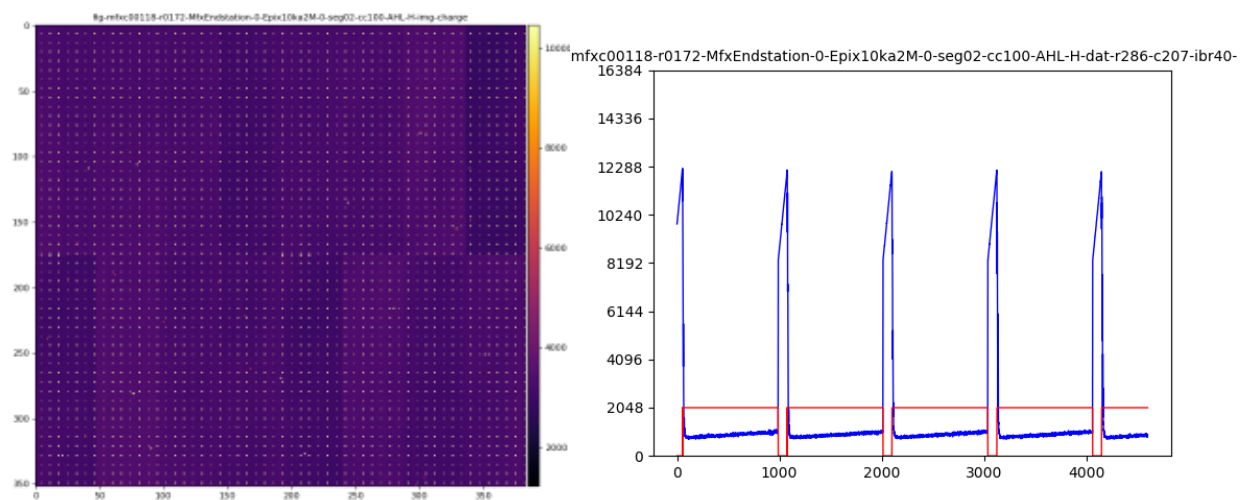
pathological in a check-mark way 10, 218, 53



pathological in a check-mark way 2, 286, 207

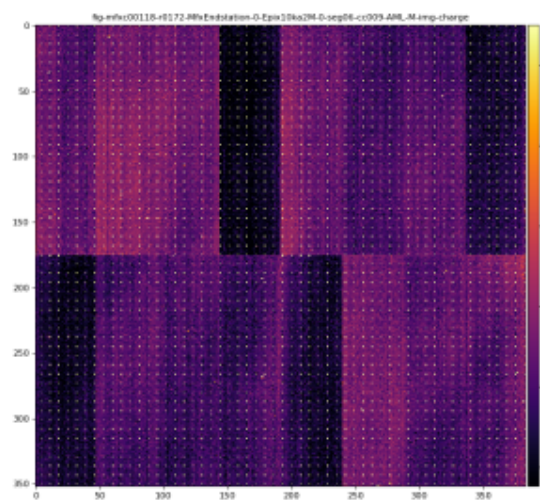




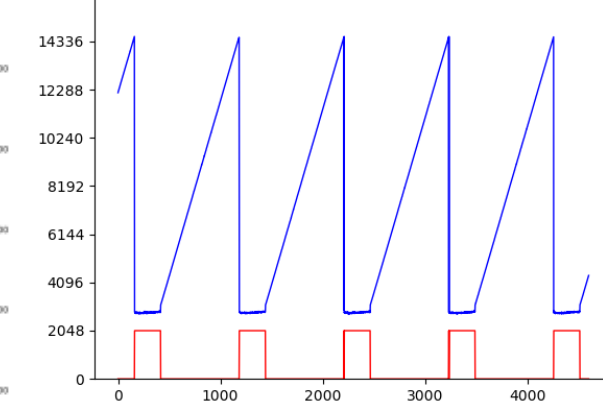


## BadWater 6, 175, 172

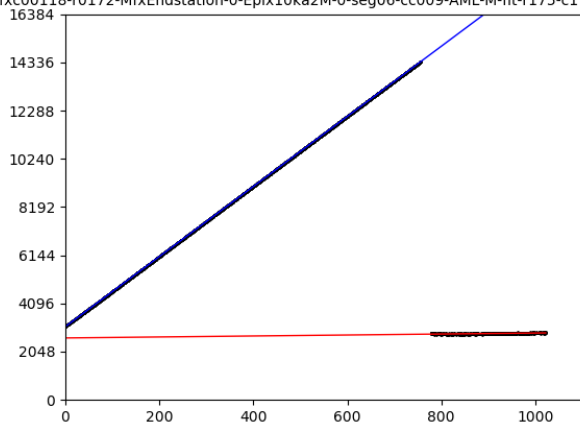
epix10ka\_offset\_calibration -e mfxc00118 -d MfxEndstation.0:Epix10ka2M.0 -r172 -o ./work1 -s5 -i6 -G175,172

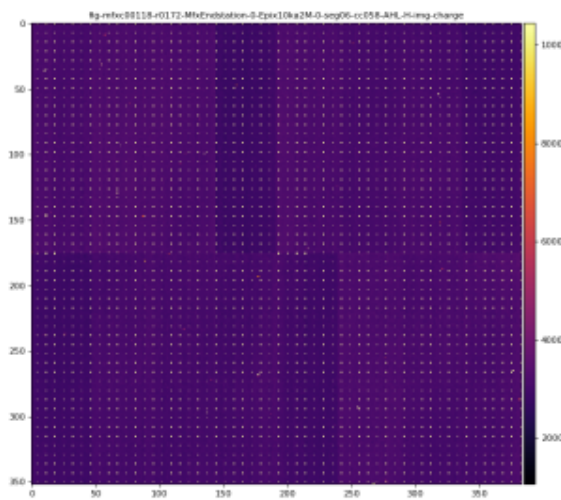


mfxc00118-r0172-MfxEndstation-0-Epox10ka2M-0-seg06-cc009-AML-M-dat-r175-c172-ibr25-16384

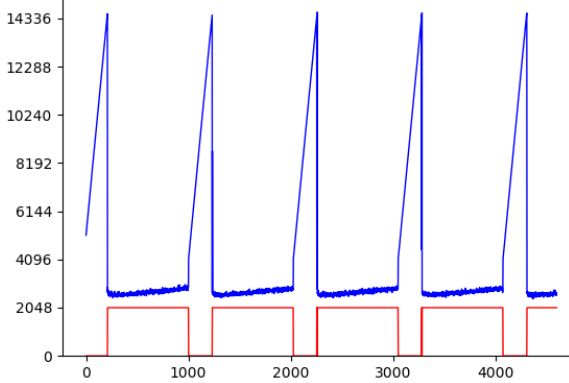


mfxc00118-r0172-MfxEndstation-0-Epox10ka2M-0-seg06-cc009-AML-M-fit-r175-c172-ibr25-i-16384

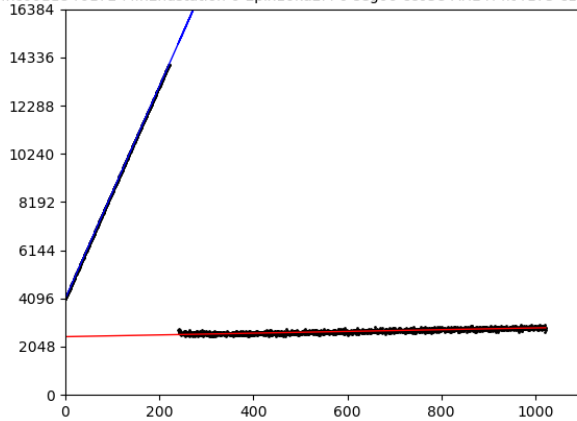




mfxc00118-r0172-MfxEndstation-0-Epix10ka2M-0-seg06-cc058-AHL-H-dat-r175-c172-ibr25-16384

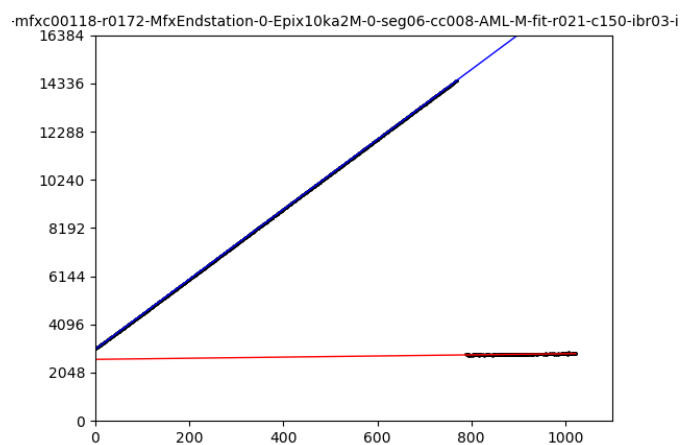
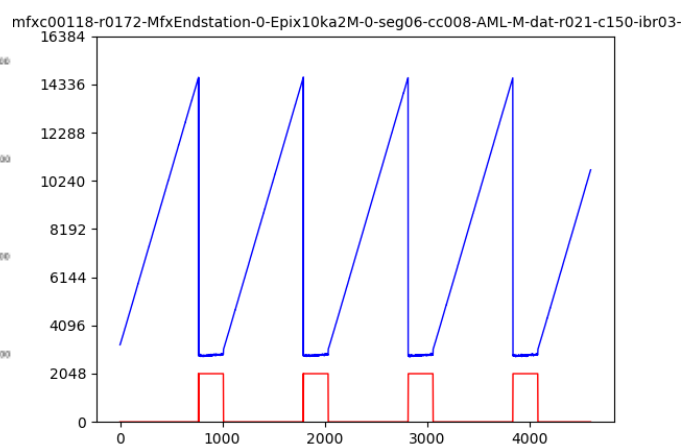
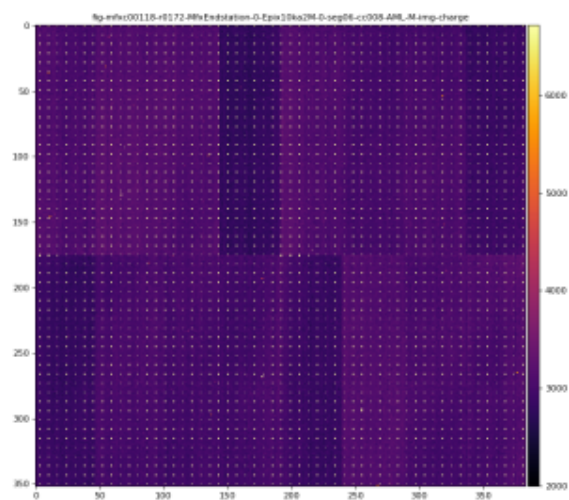


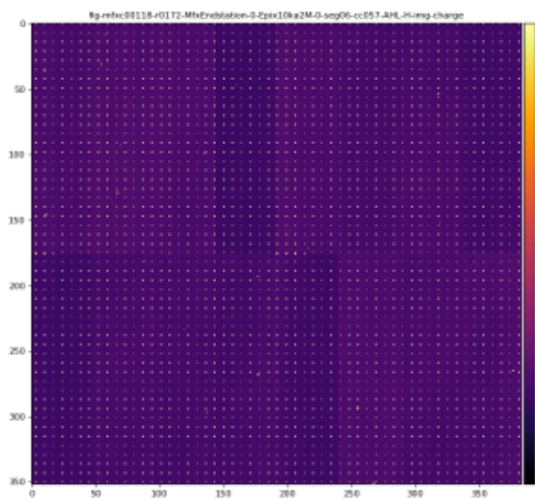
-mfxc00118-r0172-MfxEndstation-0-Epix10ka2M-0-seg06-cc058-AHL-H-fit-r175-c172-ibr25-i-16384



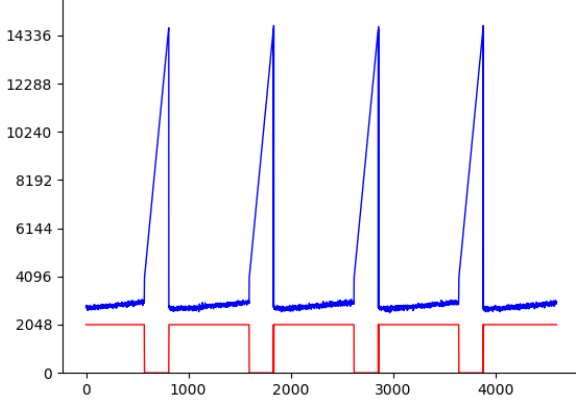
## BadAir 6, 21, 150

epix10ka\_offset\_calibration -e mfxc00118 -d MfxEndstation.0:Epix10ka2M.0 -r172 -o ./work1 -s5 -i6 -G21,150

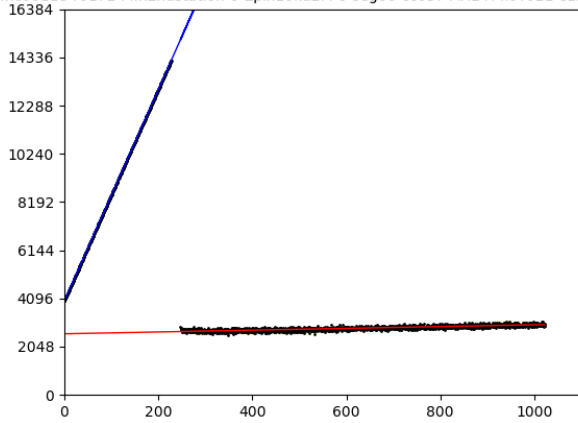




mfxc00118-r0172-MfxEndstation-0-Epix10ka2M-0-seg06-cc057-AHL-H-dat-r021-c150-ibr03-16384

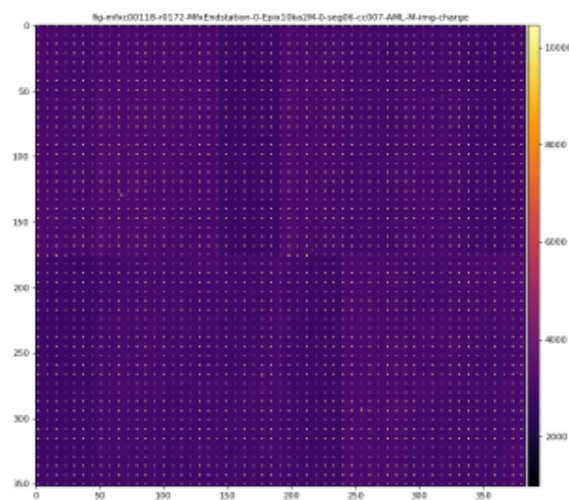


-mfxc00118-r0172-MfxEndstation-0-Epix10ka2M-0-seg06-cc057-AHL-H-fit-r021-c150-ibr03-i-16384

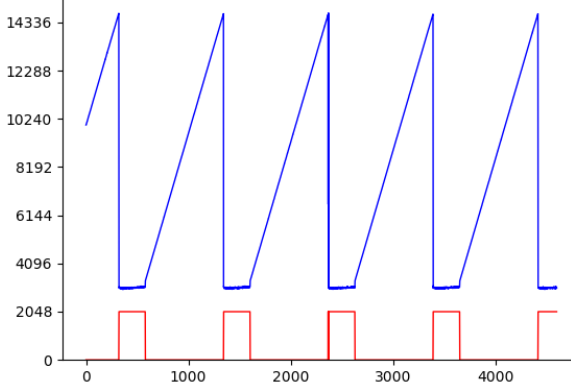


## BadWater 6, 168, 191

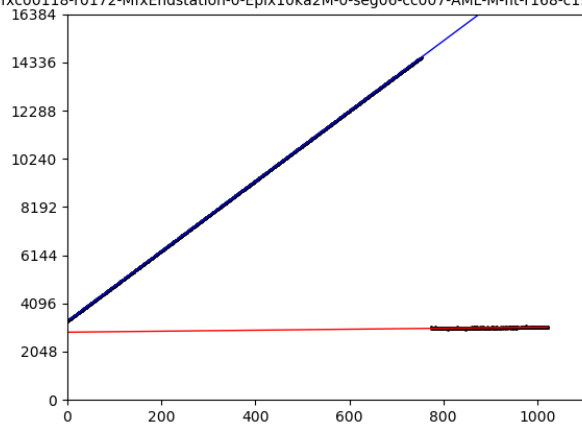
epix10ka\_offset\_calibration -e mfxc00118 -d MfxEndstation.0:Epix10ka2M.0 -r172 -o ./work1 -s5 -i6 -G168,191

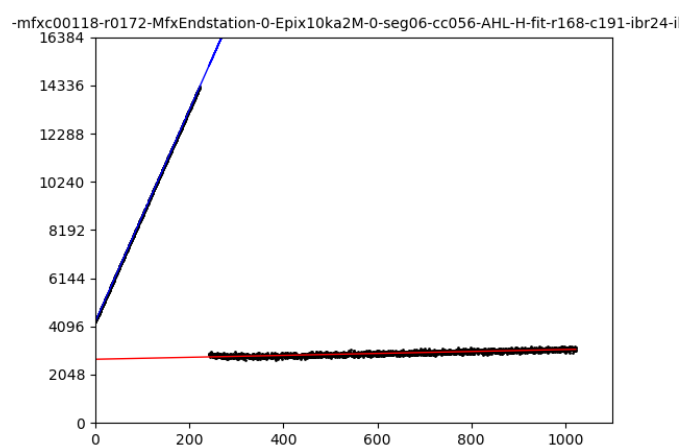
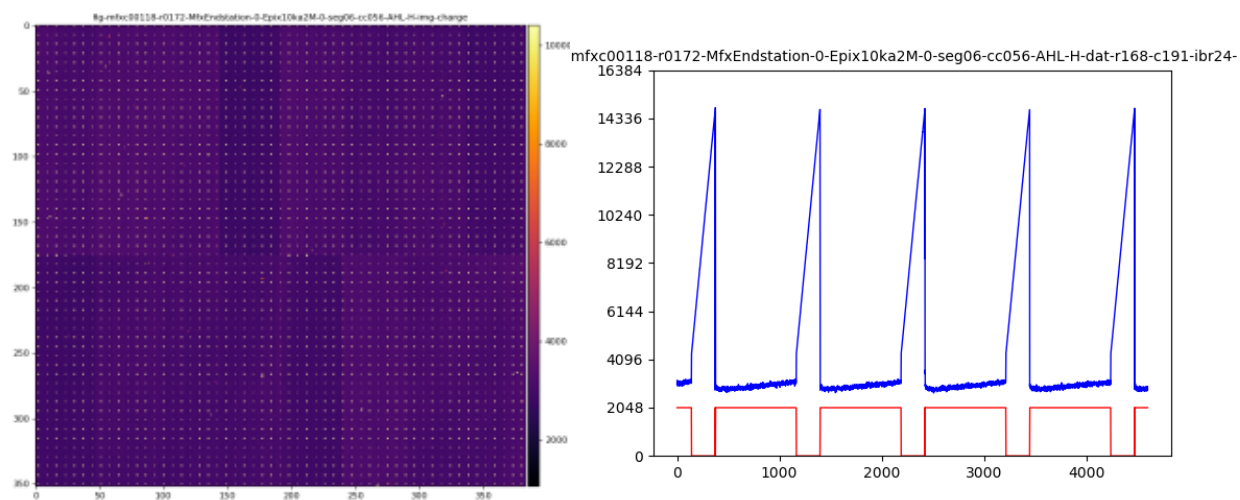


mfxc00118-r0172-MfxEndstation-0-Epix10ka2M-0-seg06-cc007-AML-M-dat-r168-c191-ibr24-16384



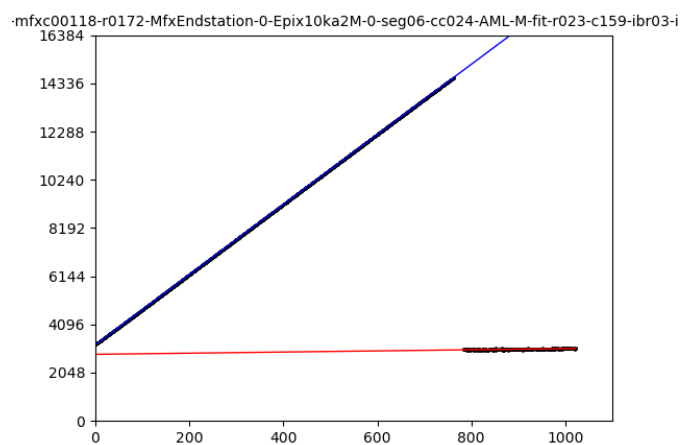
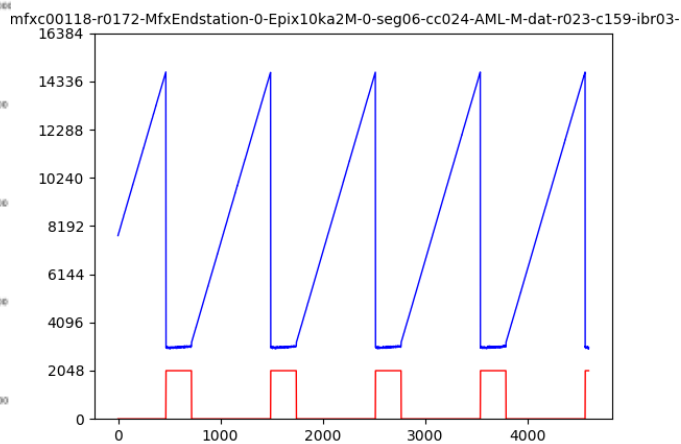
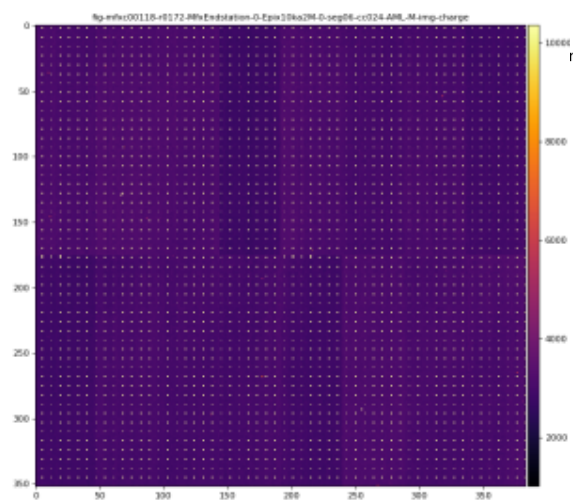
mfxc00118-r0172-MfxEndstation-0-Epix10ka2M-0-seg06-cc007-AML-M-fit-r168-c191-ibr24-i-16384



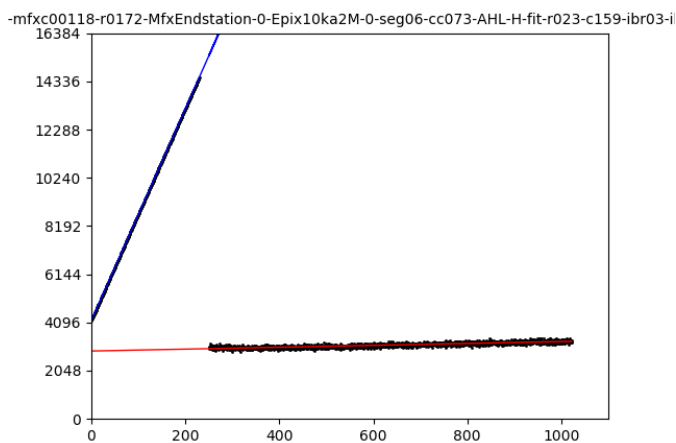
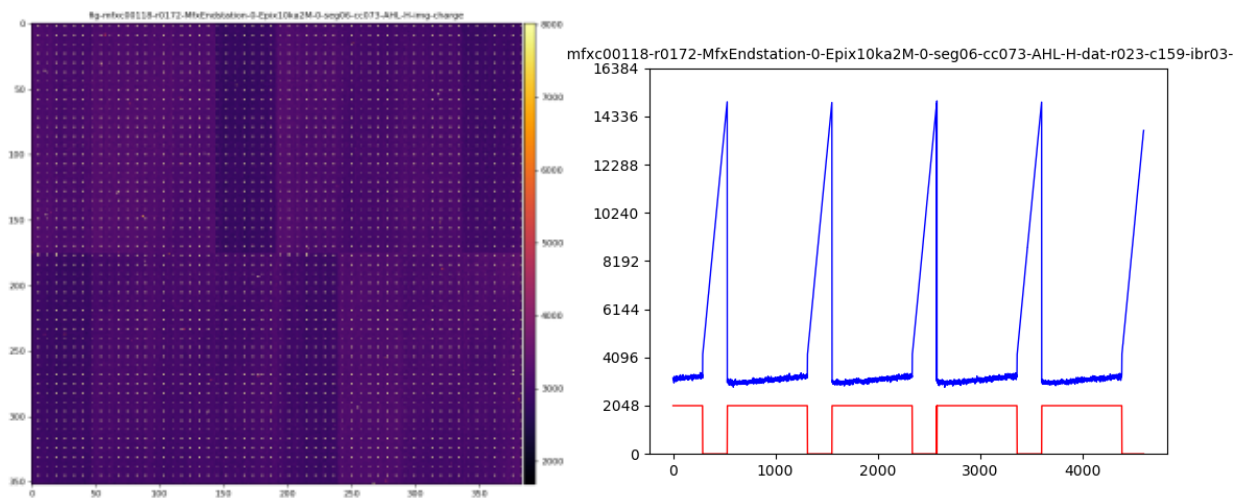


## BadAir 6, 23, 159

epix10ka\_offset\_calibration -e mfxc00118 -d MfxEndstation.0:Epix10ka2M.0 -r172 -o ./work1 -s5 -i6 -G23,159







## Chi2

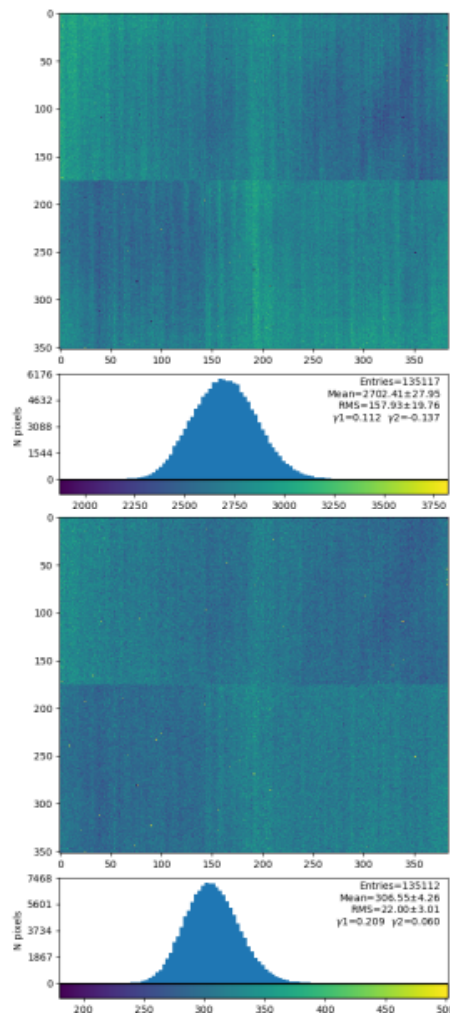
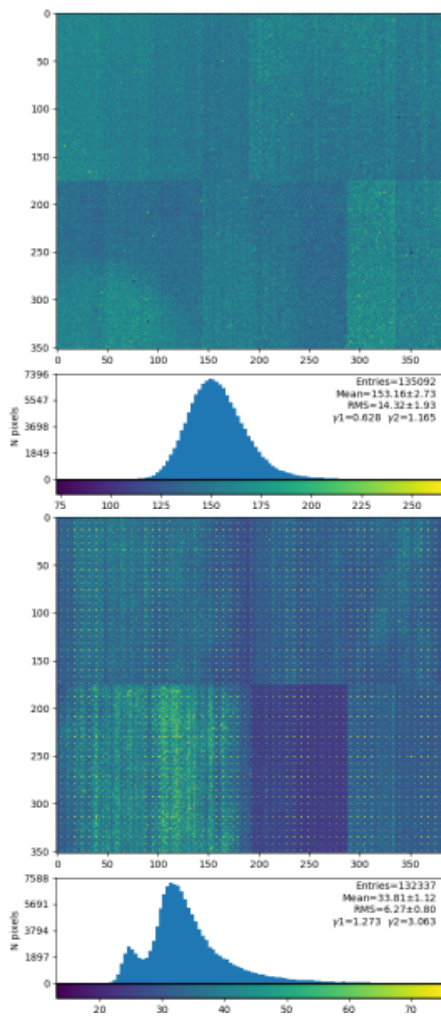
### Commands to generate plots

```
bsub -o 2020-09-28-mfxc00118-r0172-offset-log06 -q psanaq epix10ka_offset_calibration -e mfxc00118 -d MfxEndstation.0:Epix10ka2M.0 -r172 -o work -p -C -i6
```

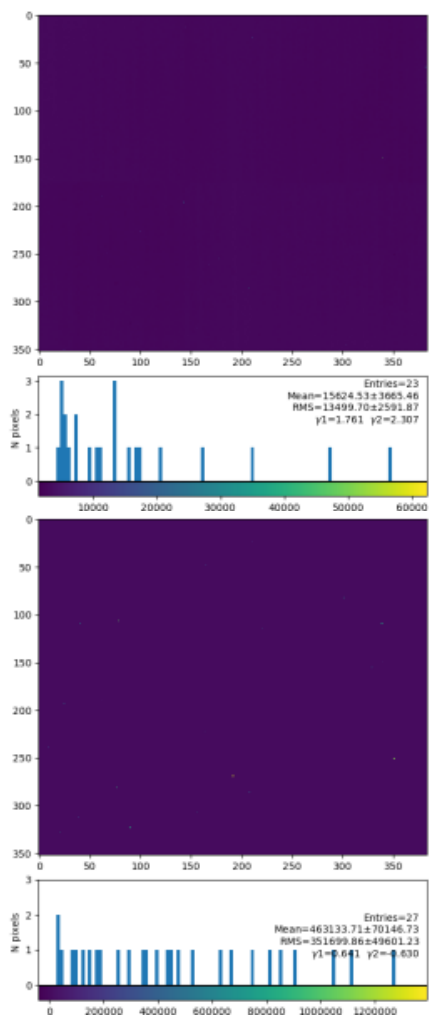
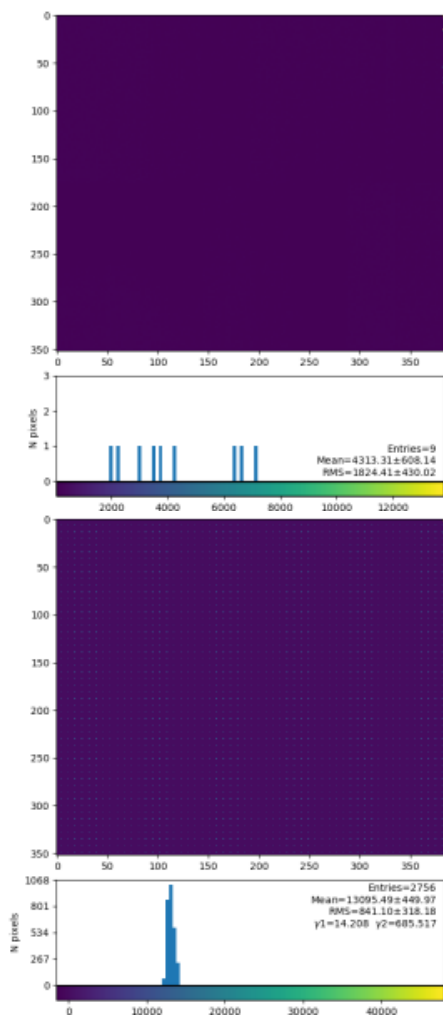
```
plims panels/0000000001-0176294657-0218103830-1010951301-0019435010-0000000000-0000000000/gain
/epix10ka_0069_20200915184723_mfxc00118_r0172_chi2ci_AHL-H.dat
plims panels/0000000001-0176294657-0218103830-1010951301-0019435010-0000000000-0000000000/gain
/epix10ka_0069_20200915184723_mfxc00118_r0172_chi2ci_AHL-L.dat
plims panels/0000000001-0176294657-0218103830-1010951301-0019435010-0000000000-0000000000/gain
/epix10ka_0069_20200915184723_mfxc00118_r0172_chi2ci_AML-L.dat
plims panels/0000000001-0176294657-0218103830-1010951301-0019435010-0000000000-0000000000/gain
/epix10ka_0069_20200915184723_mfxc00118_r0172_chi2ci_AML-M.dat
```

### chi2 for AHL-H, AHL-L, AML-M, AML-L

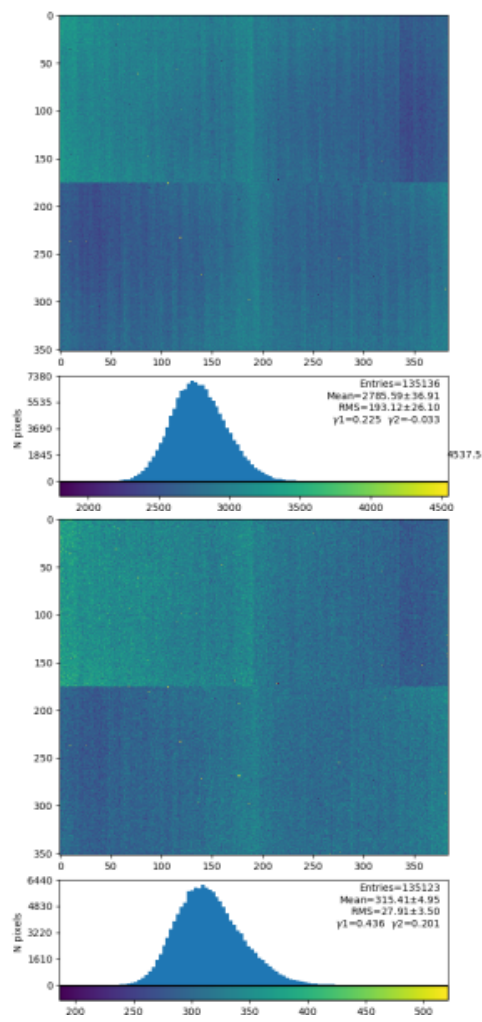
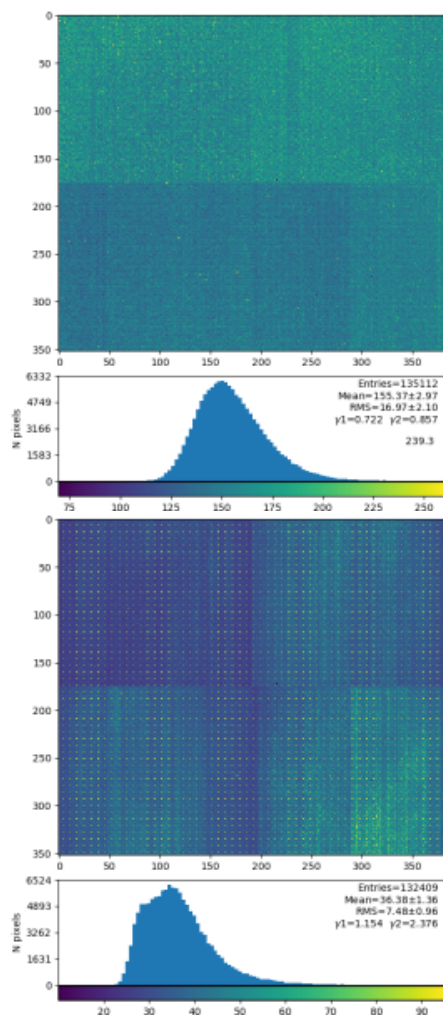
#### panel 2



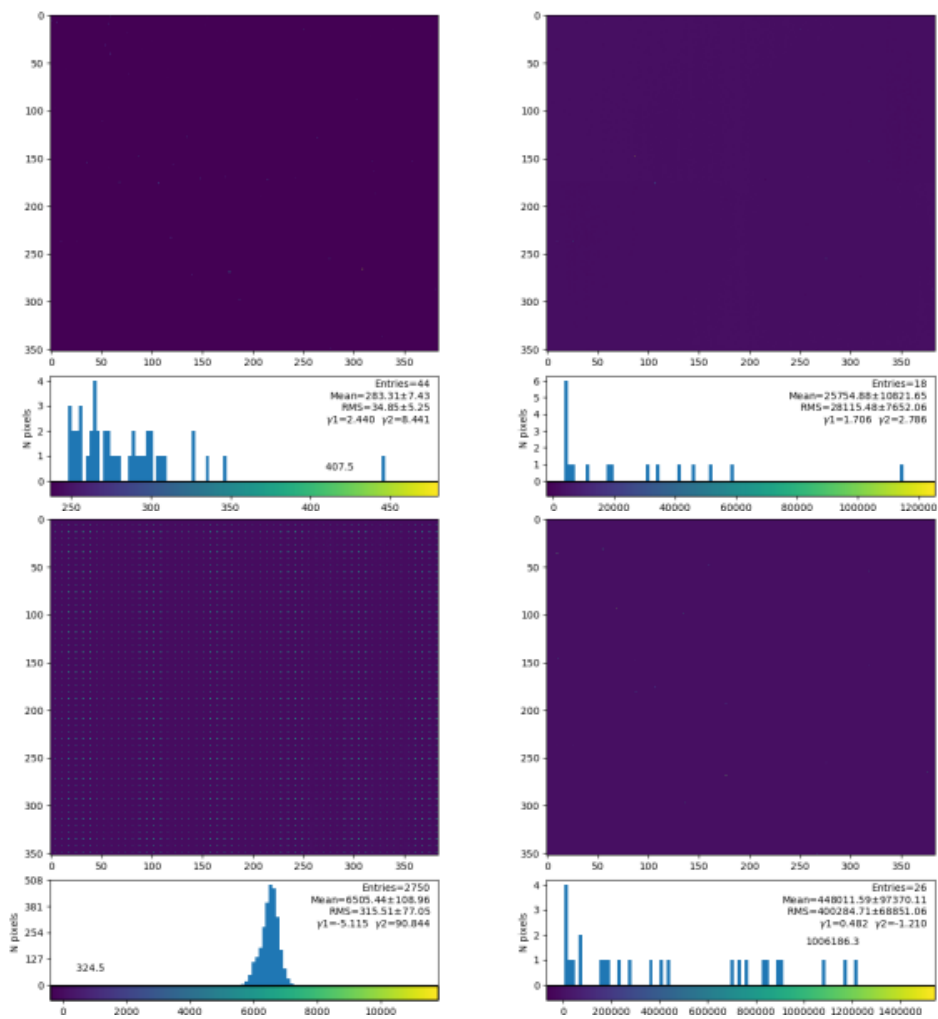
panel 2 tail of large values of  $\chi^2$



panel 6



panel 6 tail of large values of  $\chi^2$



## Gain

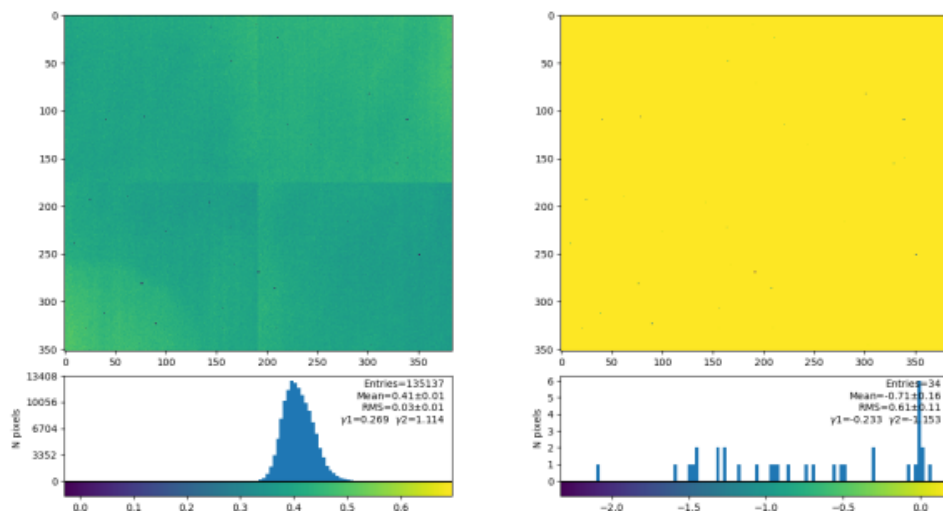


All single-panel gain is presented in raw units from the fit  $\text{ADU}/\langle\text{event-number}\rangle$ . In combined for detector plots gain is derived from calibration constants normalized on Gabriel's gain factors in  $\text{ADU}/\text{keV}$  (factor of 3 smaller than raw).

## gain and negative tail for AML-L

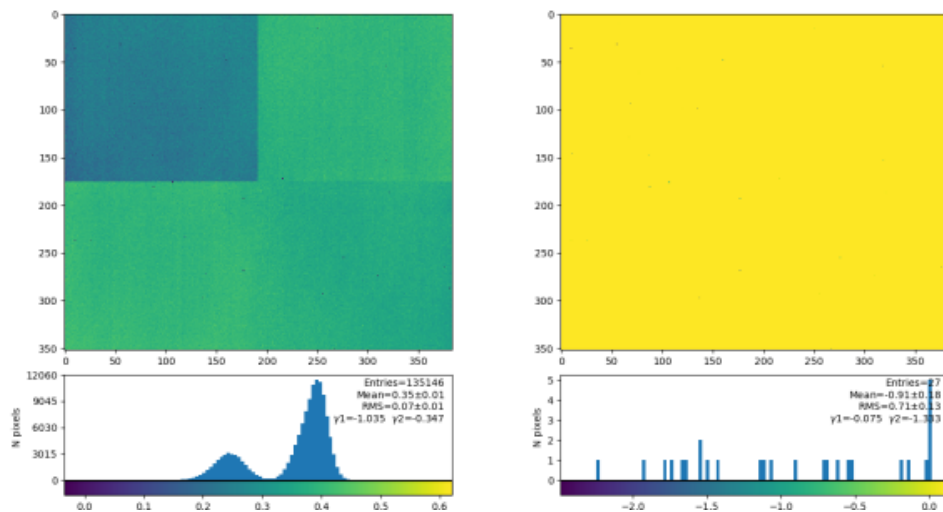
### panel 2

raw gain from fit in  $\text{ADU}/\text{event}$



panel 6

raw gain from fit in ADU/event

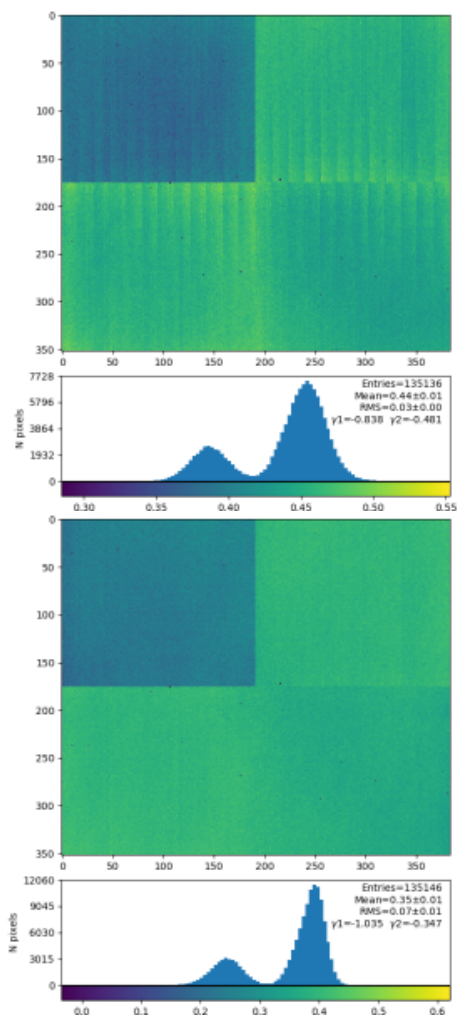
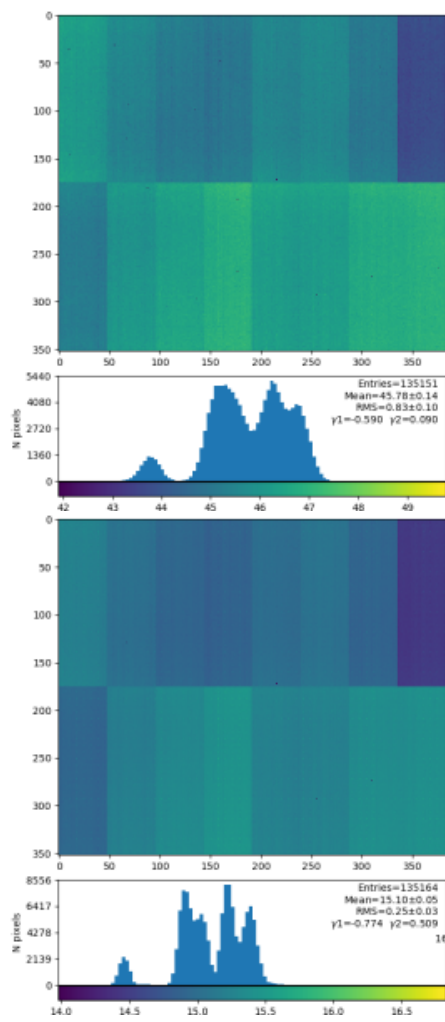


**WARNING:** panel 6 one ASIC gain is almost twice smaller than ion other 3 ASICS ... we replace it by constant 0.164 ADU/keV, see [Gain factors from Gabriel](#)

gain for AHL-H, AHL-L, AML-M, AML-L

panel 6

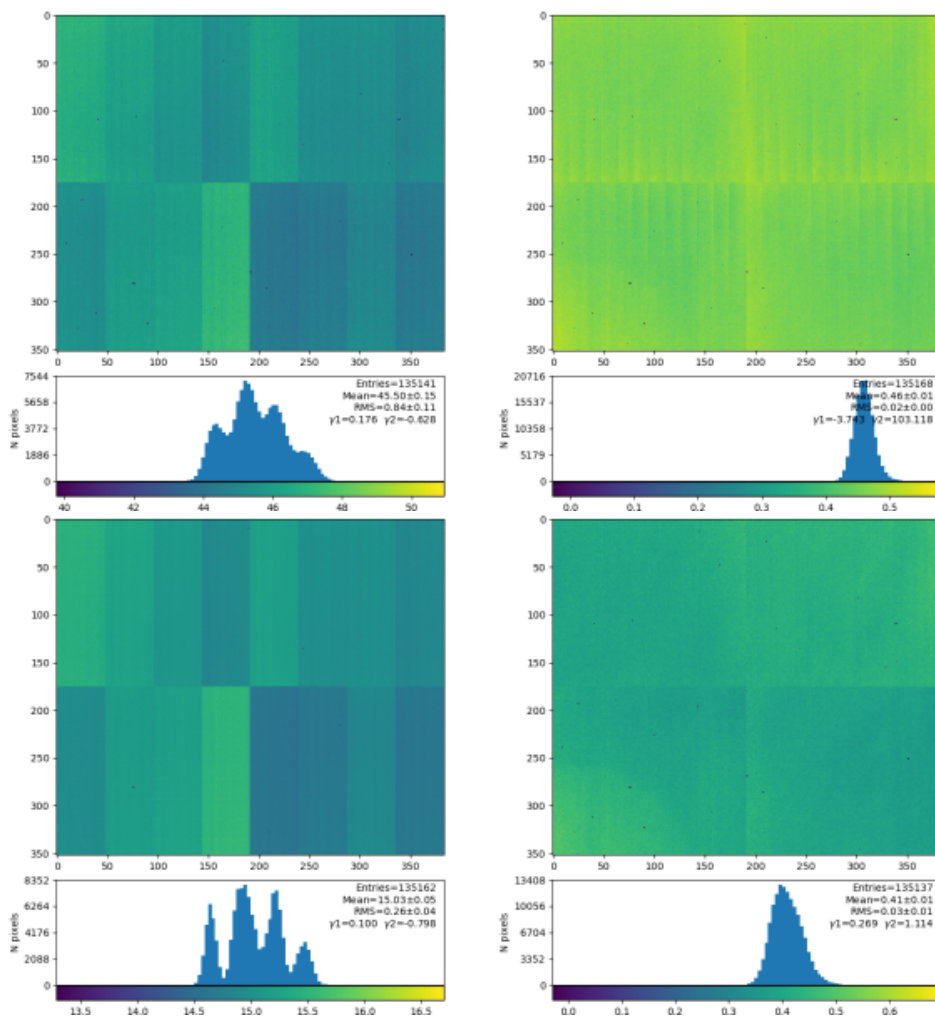
raw gain from fit in ADU/event



panel 2

raw gain from fit in ADU/event

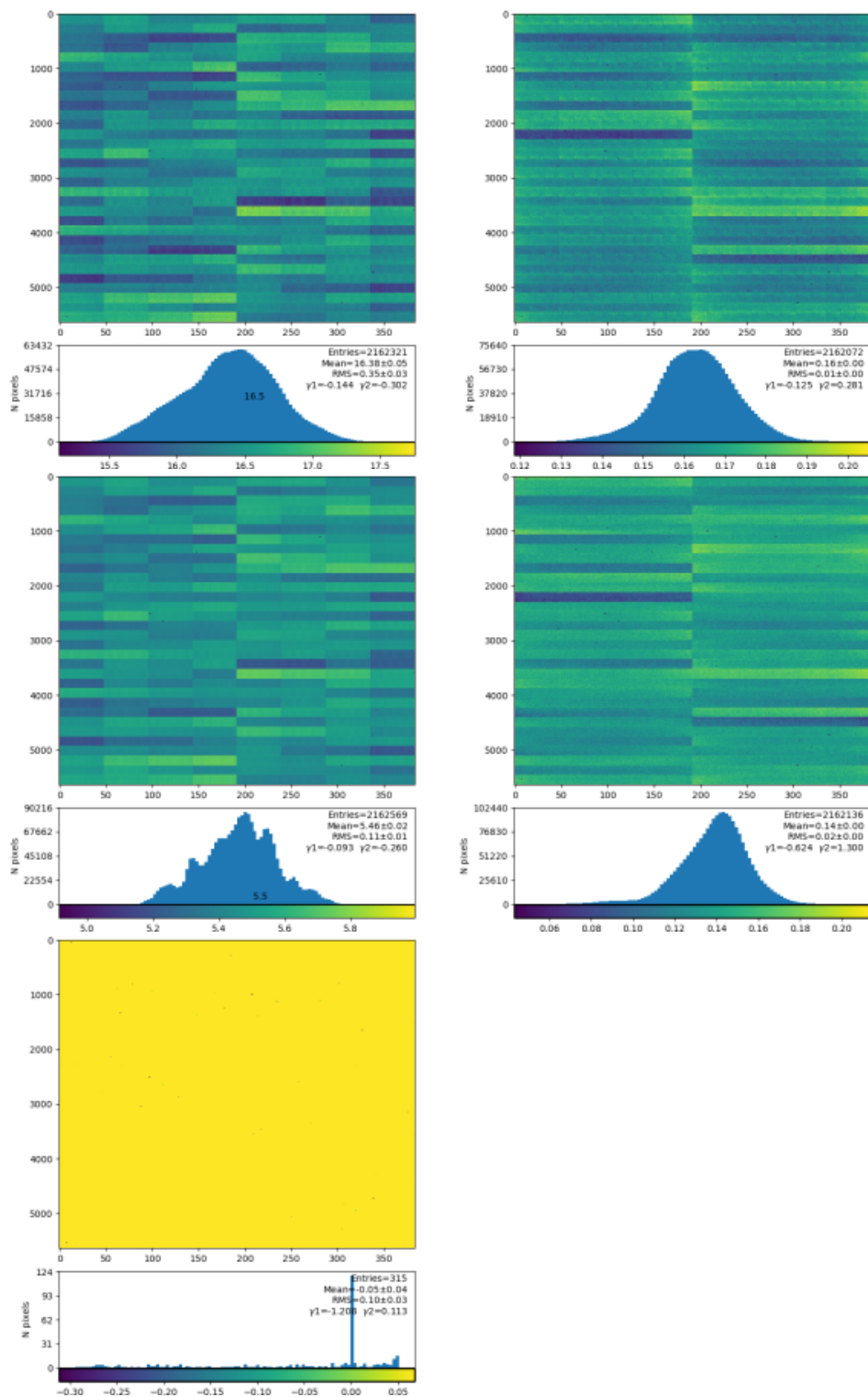




other panels vertically jammed on a single plot

normalized gain in ADU/keV for AHL-H, AHL-L, AML-M, AML-L and AML-L negative tail

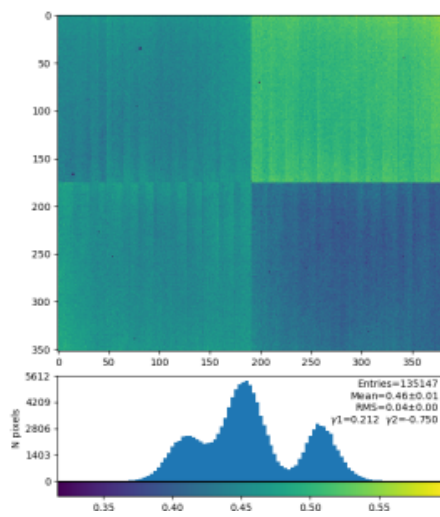
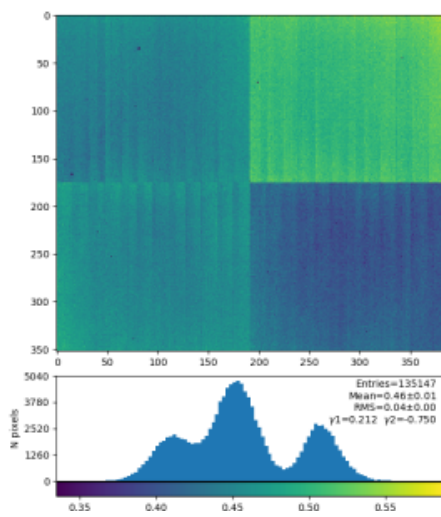




significant difference in ASIC gains is observed on panels 6 and 12

## panel 12

AHL-L and AML-L raw gain from fit in ADU/event



## References

- [EPIX10KA2M References](#)
- [EPIX10KA2M issue with panel 6 in mfxc00318](#)
- [EPIX10KA2M 2020-09-16 blob issue](#)