Run 7 overview on focal plane commissioning

Camera operating conditions

- Voltages

  - Parallel swing change from 9.3 V to 8.0

- Sequencers - V30

  - ITL - v29 with different timing
  - E2V - no-pocket with serial flush

- NO idle flush
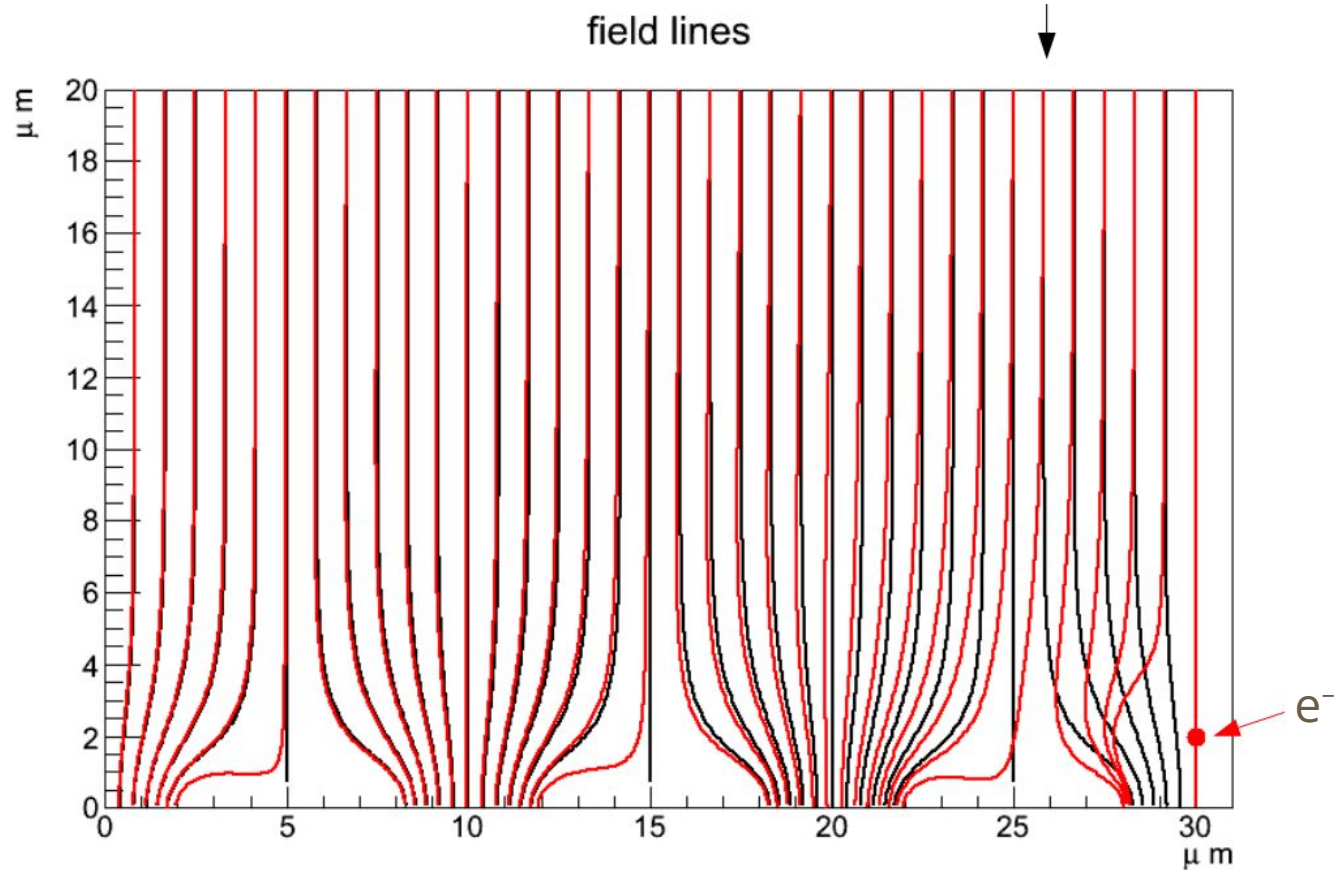
  - Better thermal stability with idle flush off

Brighter Fatter effect

In black empty ccd field lines

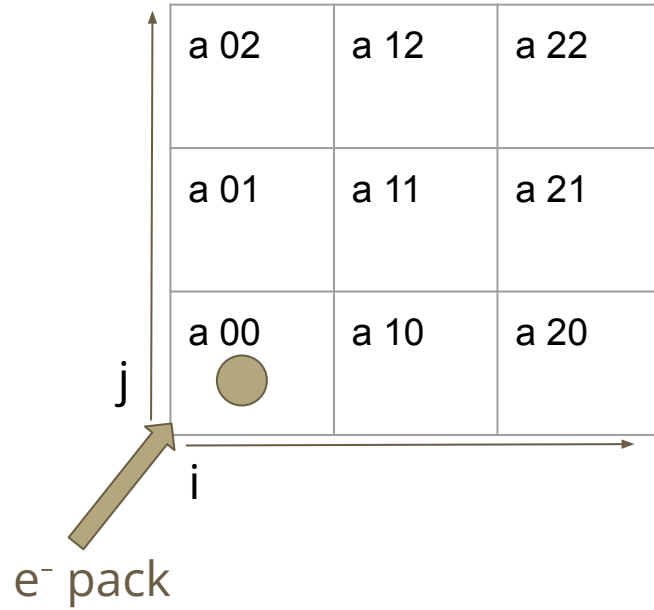In red field lines deformation by charge

Variation of pixels surface

field lines

e⁻

Brighter Fatter a_ij

px 02	px 12	px 22
px 01	px 11	px 21
px 00	px 10	px 20

j

i

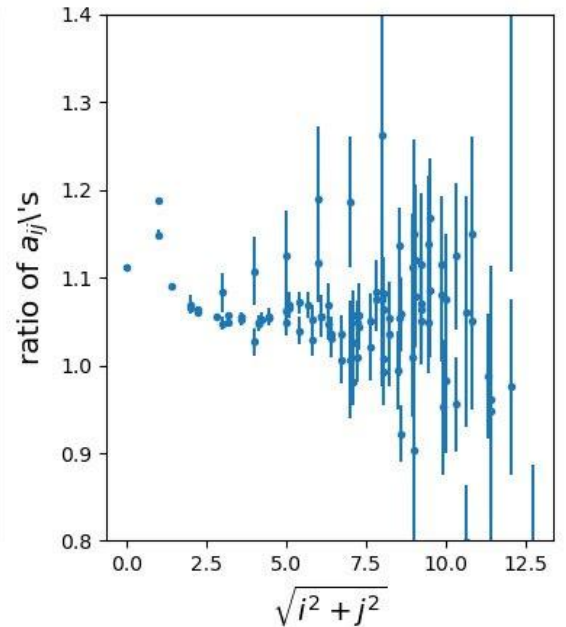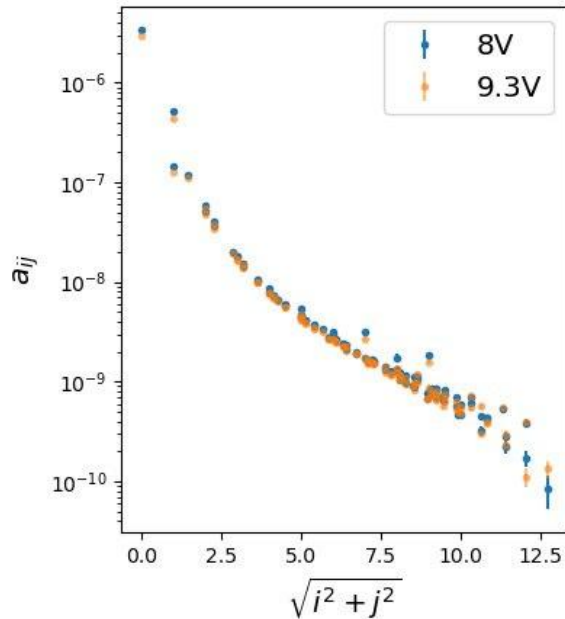| a 02 | a 12 | a 22 |
| a 01 | a 11 | a 21 |
| a 00 | a 10 | a 20 |

j

i

e⁻ pack

Voltage change and impact on brighter fatter

E1113 : Dense ptc red parallel swing 9.3 V
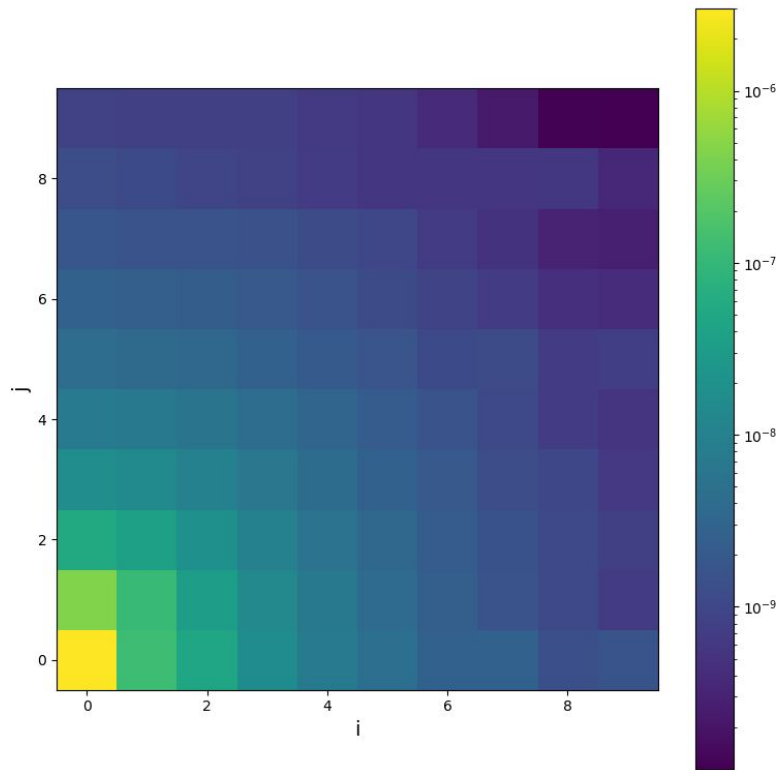
E1364 : Dense ptc red parallel swing 8 V

Small increase of BF effect
a ij ~ (5 to 20 %) ; a00 ~ 10%
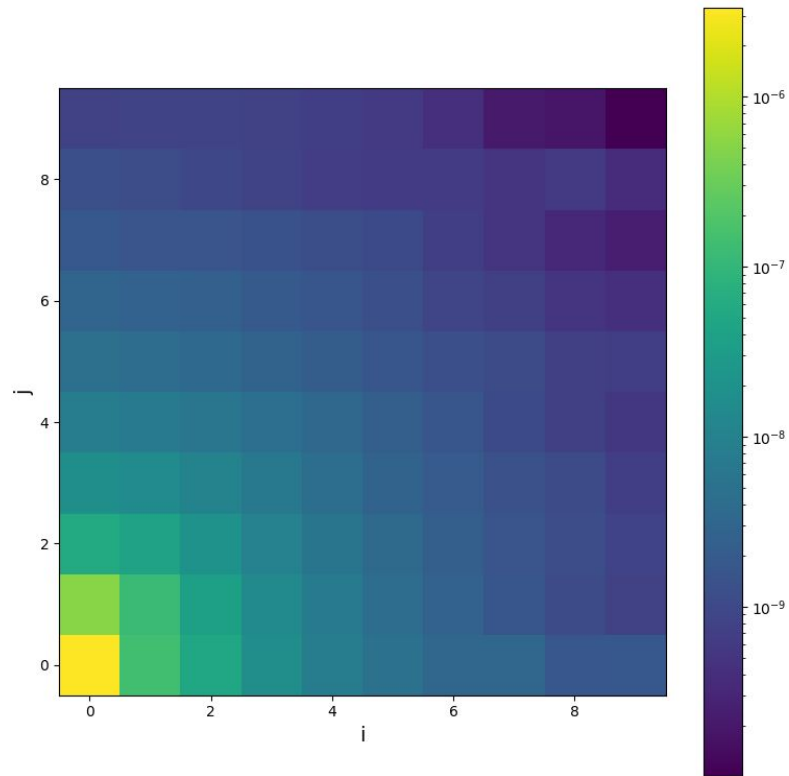
Comparison of a_{ij} with different // swings

Average aij

Phosphorescence in itl sensors

- Phosphorescence tests

  - Present on ComCam and 12-13 LSSTCam
  - Present in all wavelengths

- Caused by photo-resist wax residue from manufacturing

  - affect small pixel area ~ 1 amp per sensor

- A lot of data have been taken
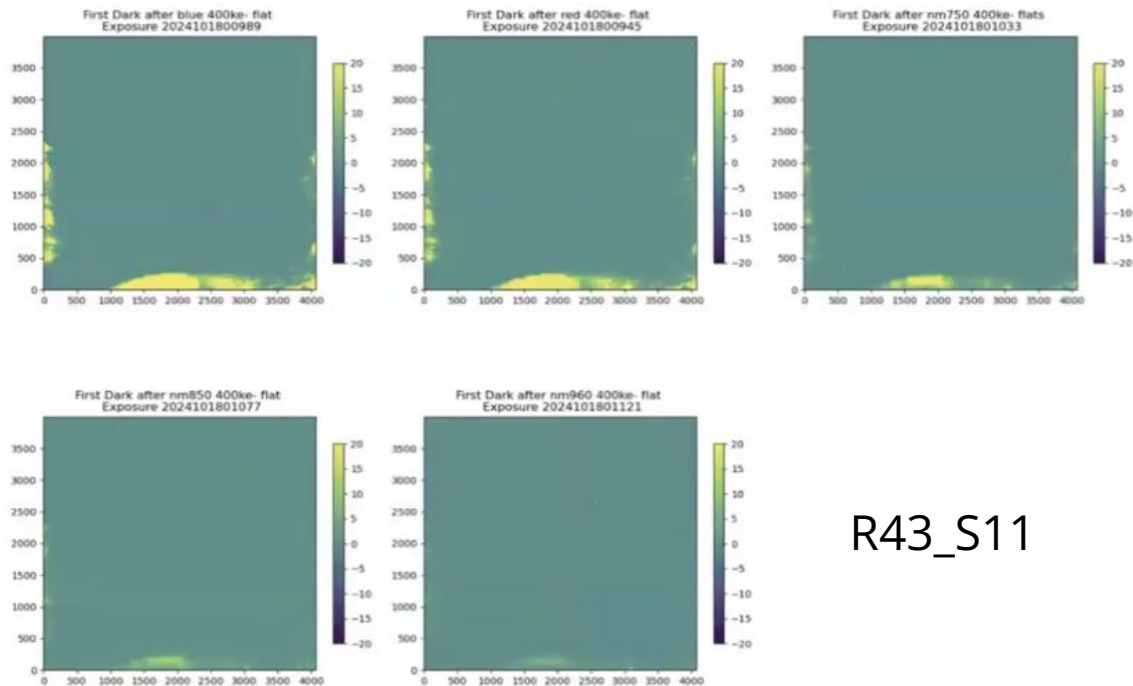 - Study on the subject are needed

First Dark after blue 400ke- flat
Exposure 2024101800989

First Dark after red 400ke- flat
Exposure 2024101800945

First Dark after nm750 400ke- flats
Exposure 2024101801033

First Dark after nm850 400ke- flat
Exposure 2024101801077

First Dark after nm960 400ke- flat
Exposure 2024101801121

Figure from John Banovetz

R43_S11

E2016 long red ptc

- For non linearity correction

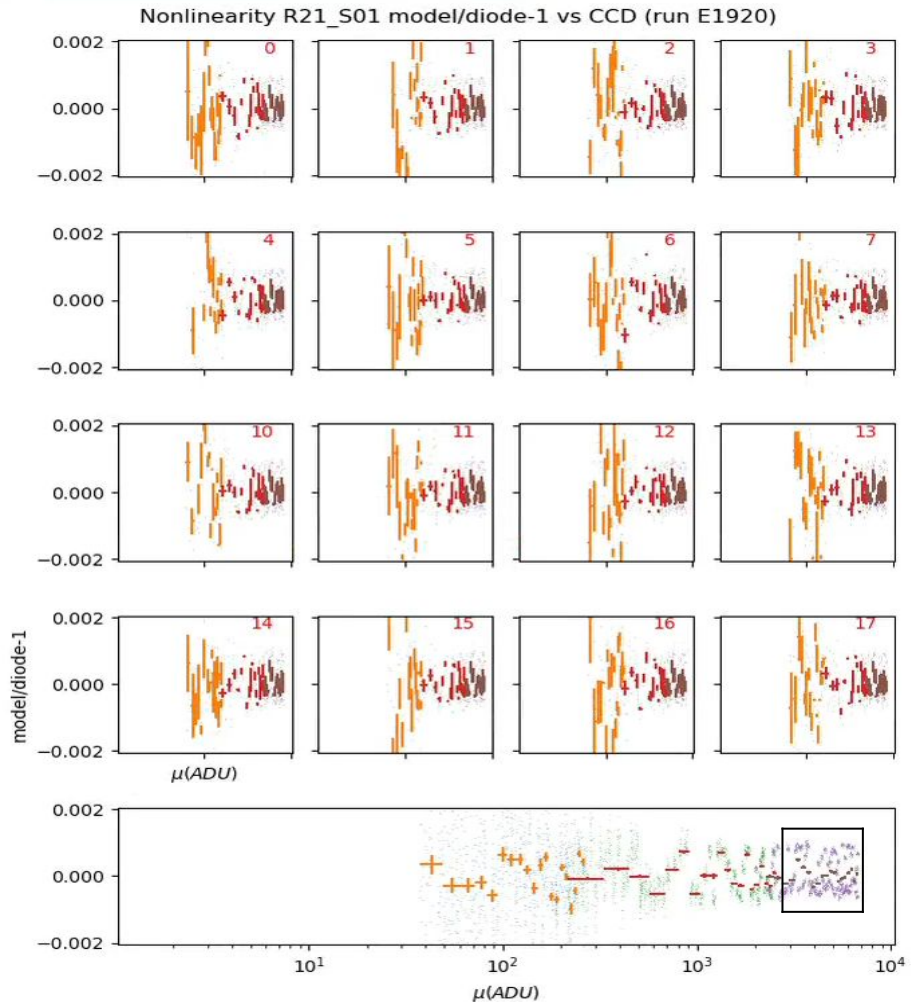 - Residuals ~ 10^{-4}

  - Our model reproduces the data accurately

Nonlinearity R22_S11 model/diode-1 vs CCD (run E2016)
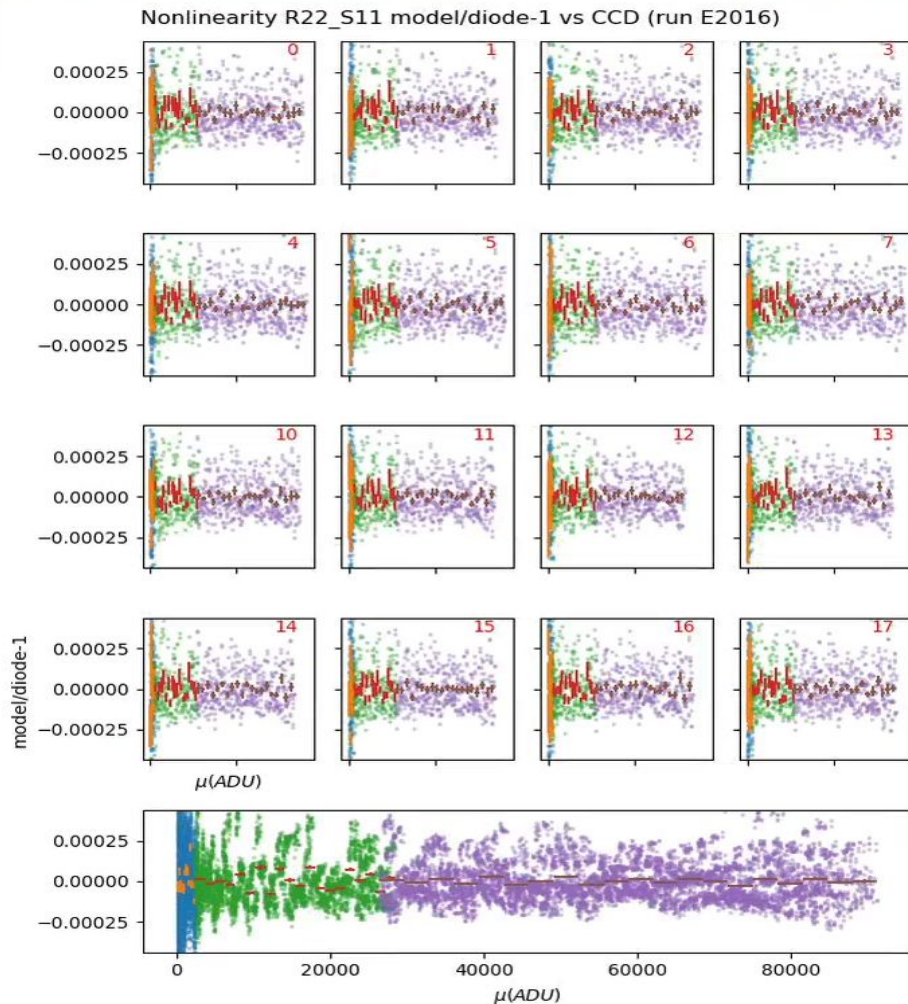
Low flux non-linearity E1920

E1920 dense red ptc with filter for low flux

The low flux non linearity is ~ 10^-3

Given the anticipated sky level (>100 electrons), the average residual would be about 1 electron

Nonlinearity R21_S01 model/diode-1 vs CCD (run E1920)

Spot projector data

- Bleeding effect have been noticed in ComCam
  - Highly saturated data cause bleeding
- We haven't found any bleeding in LSST Cam
  - Could be because we have bad contrast on the spot projector (should be better now)
- Spot data to study phosphorescence have been taken
 - Persistence analysis on this data is not yet complete
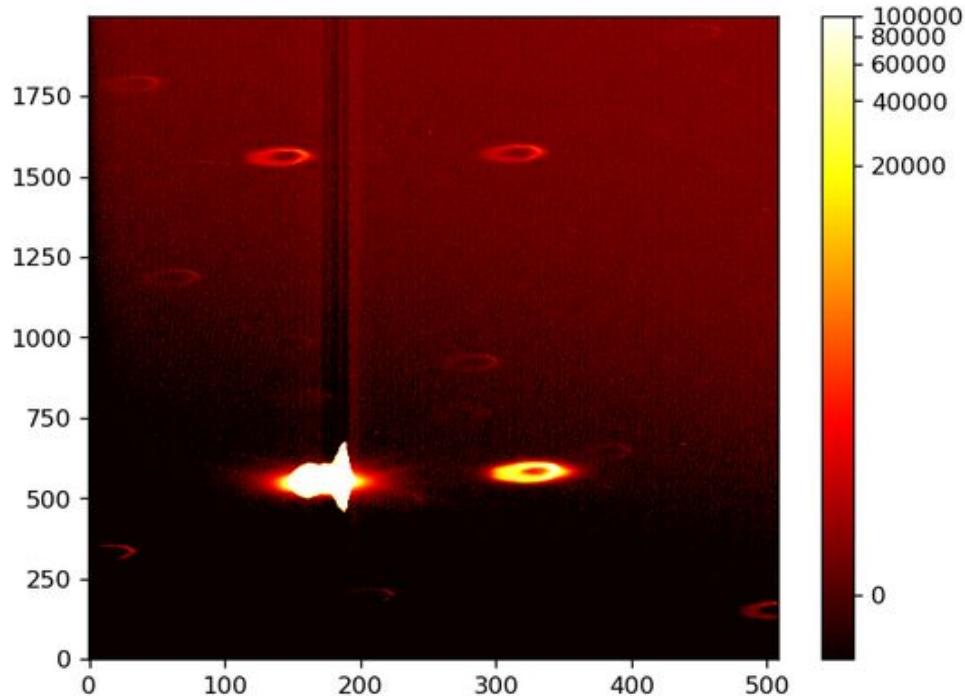
Spot projector data

- We found non static pattern on "sky" for spot data

  - Both exposures present different background pattern
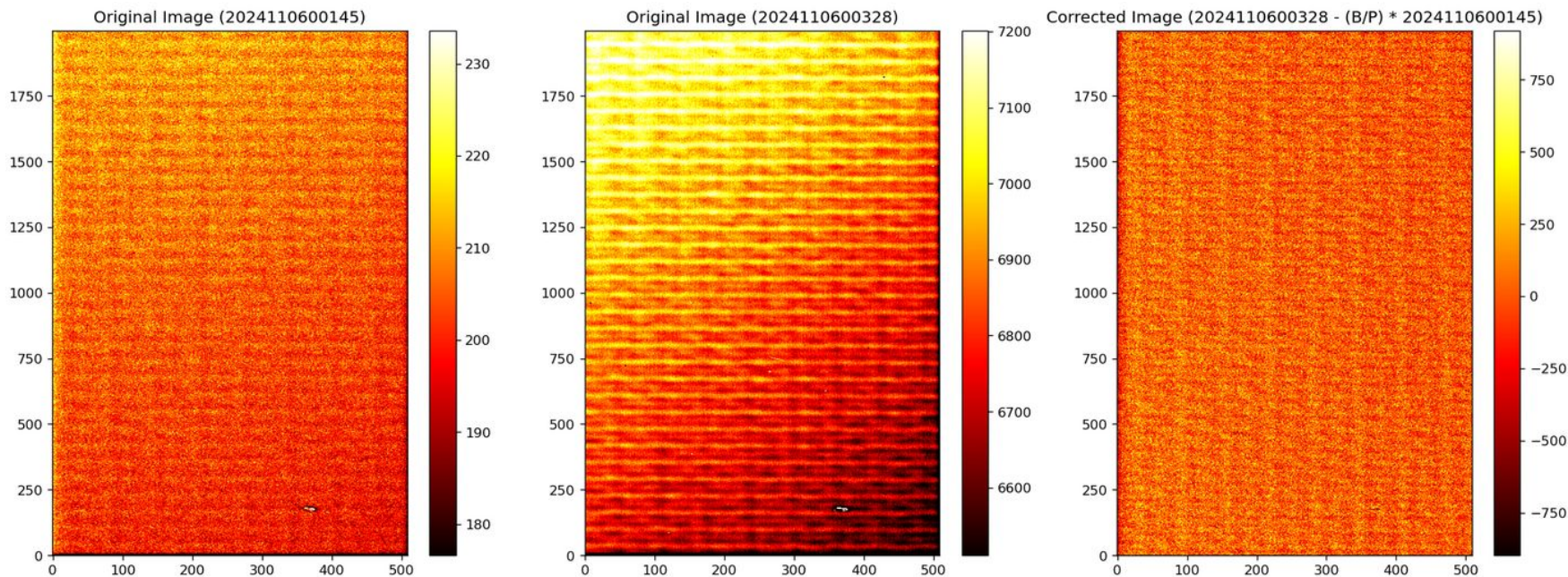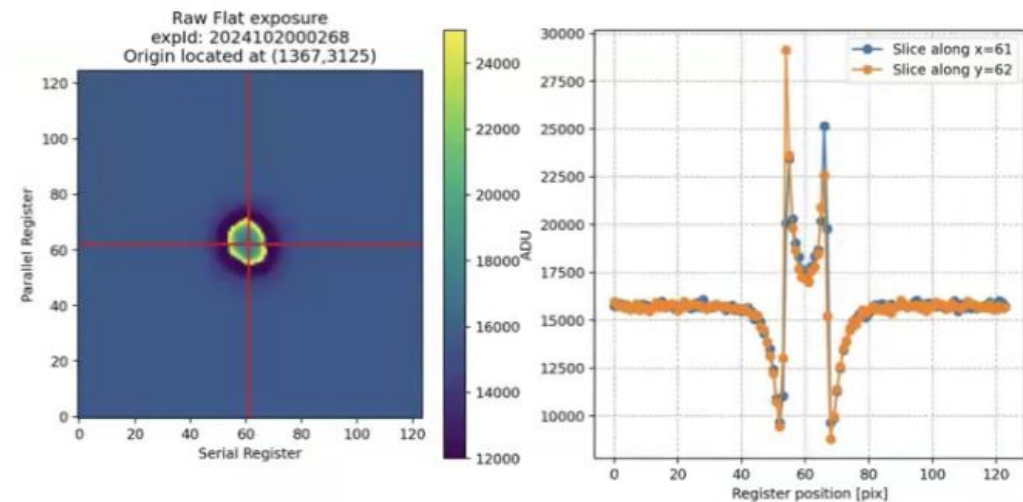
Bias Stability

- Several OCS runs used for bias stability

  - Analysis ongoing

- Delay between different exposures to test stability (darks only)

  - Bias instability of ~ 40 amplifiers by Thibault

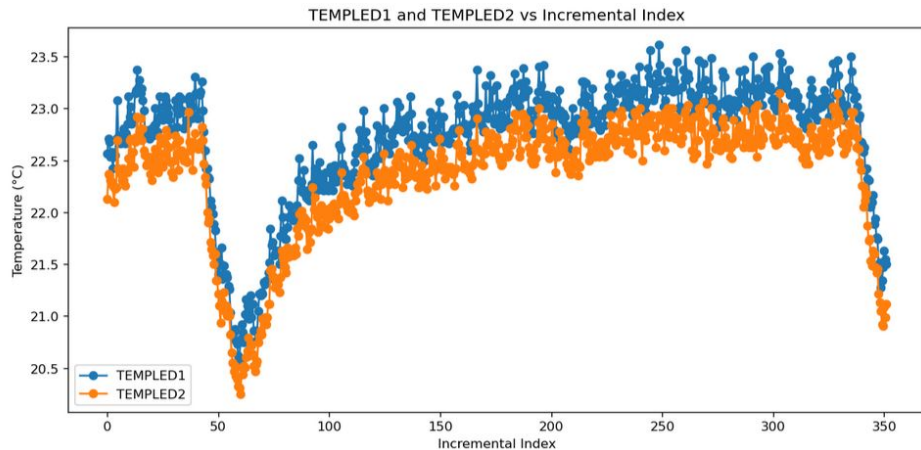bias stability, mean signal, acq. run E2330, R33
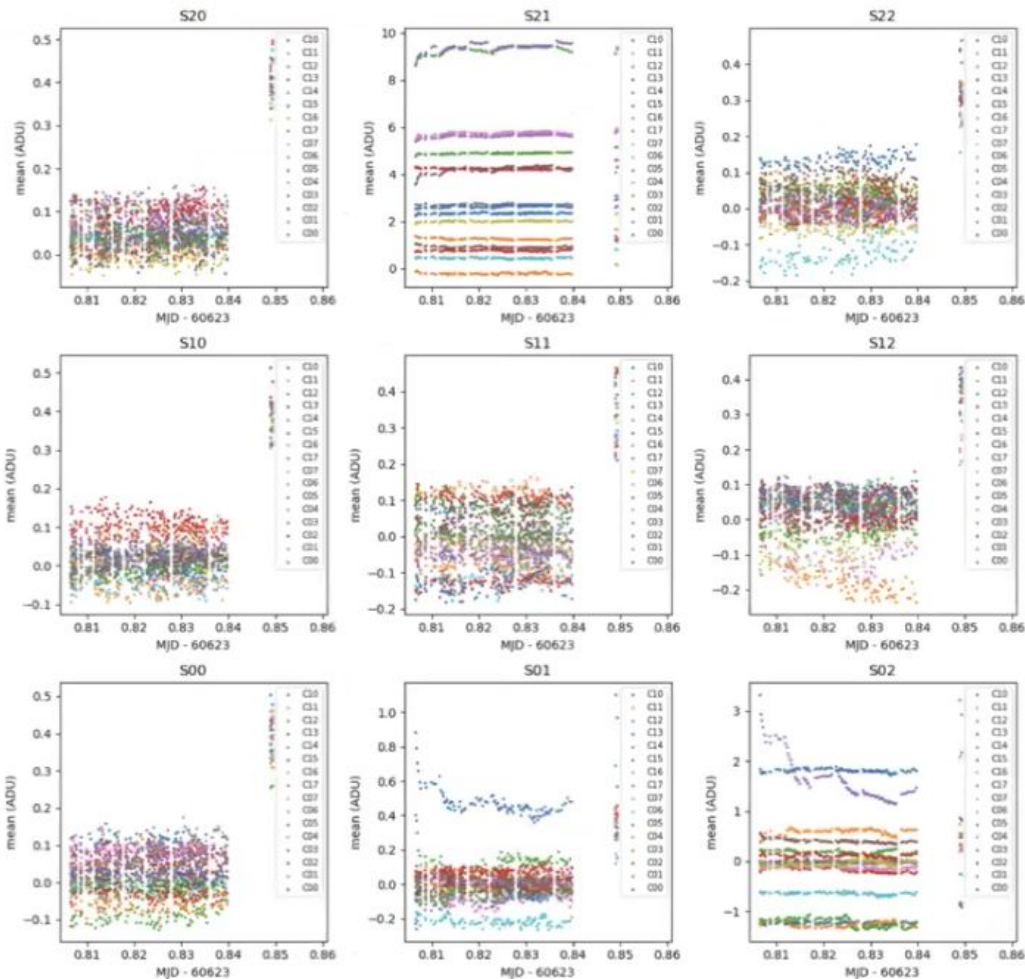
Vampire pixels

- High flux core with perimeter of depressed signal

  - For itl sensors
  - Present on ComCam and LSSTCam

- Itl only issue give us a lead

  - Issue still not completely understood

Raw Flat exposure
expId: 2024102000268
Origin located at (1367,3125)

done by Sean Patrick MacBride

Reproducibility : CCD / photodiode

TEMPLED1 and TEMPLED2 vs Incremental Index
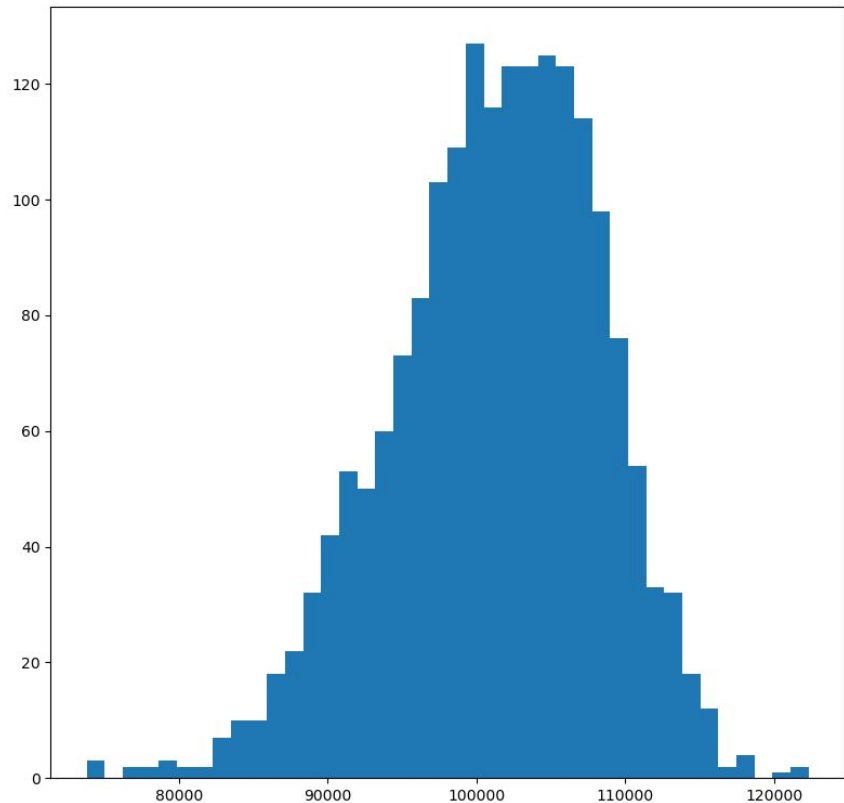
Pair's repeatability

~2.10⁻3

The temperature variation does not match the pattern of our observed variations.
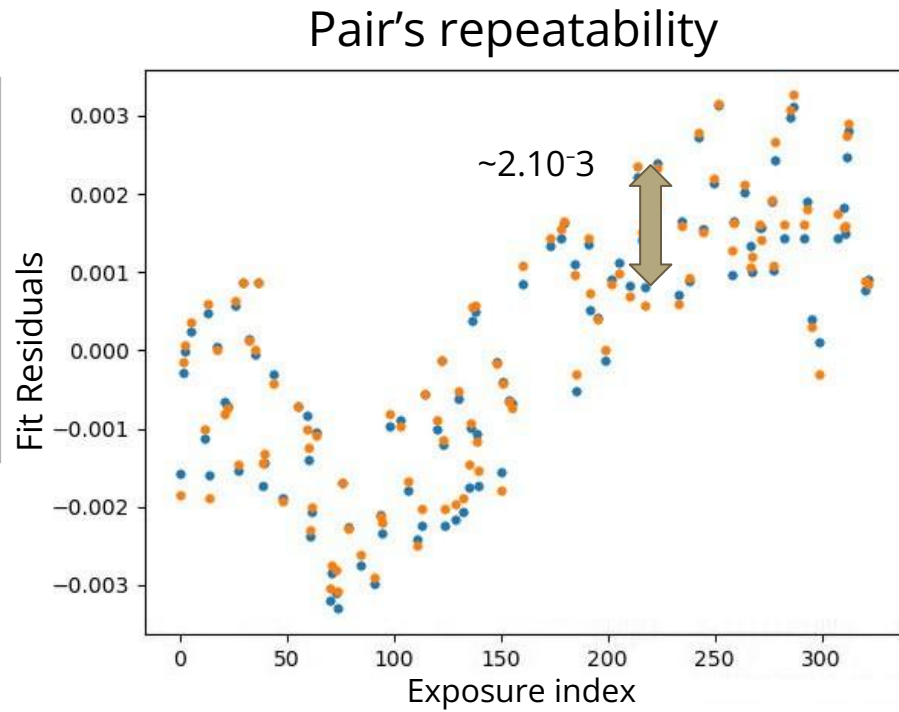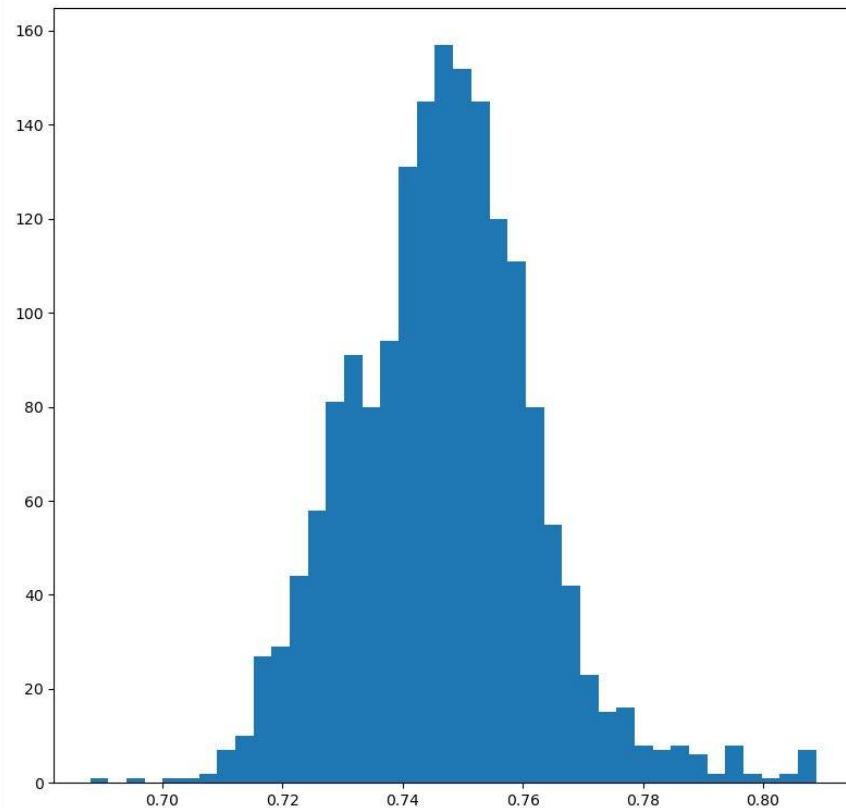
Voltage change and impact on full well

PTC turnoff (el) (E1364)

ptc turn off in electrons

Ratios of PTC turnoff (E1364/E1113)

~ 25% dynamics lost

Key Takeaways

- A lot of data have been taken and need to be analyzed

  - Need to quantify, understand and correct remaining issues

- To ensure precise analysis

  - It's essential to define and provide the specific characteristics required for additional runs

  - Exposure type, duration, flux levels, and environmental conditions, to align data collection with analytical objectives