



Operations rehearsal

Thibault Guillemin (LAPP)

Focal plane meeting

June 20, 2024



USDF

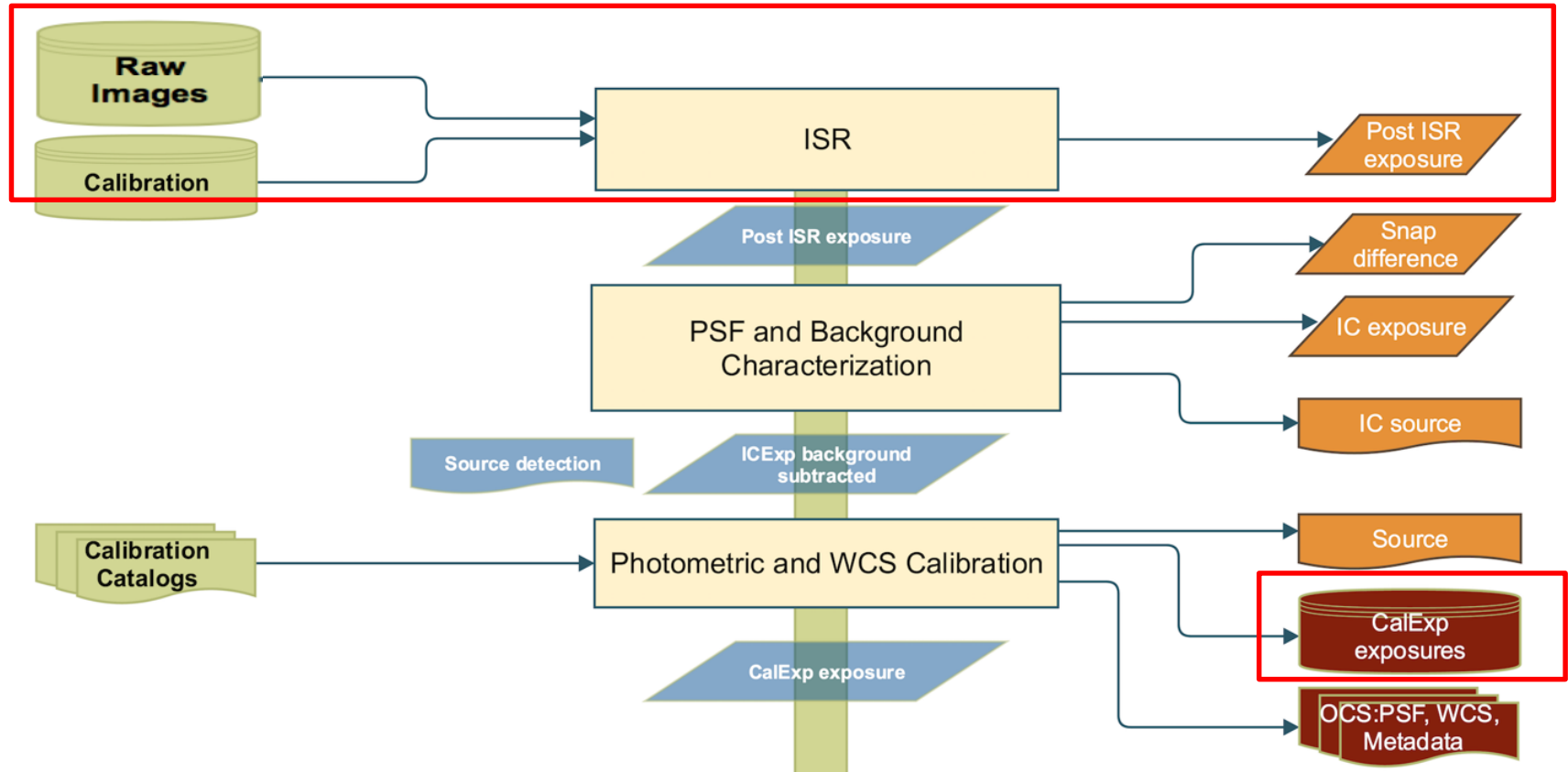
- Setting up analysis at USDF
 - Prepare 'ISR validation' on ComCam on-sky images
 - Need to access the exposures at different levels, the overscan regions in the raw, to be able to run ISR on raw with different configurations and/or calibrations, to process many exposures, to check calibrations, etc.

- OR3 data
 - Exposures
raw/postISRCCD/calexpBackground/calexp
 - Calibrations

- Butler embargo
 - Collections raw and nightlyvalidation

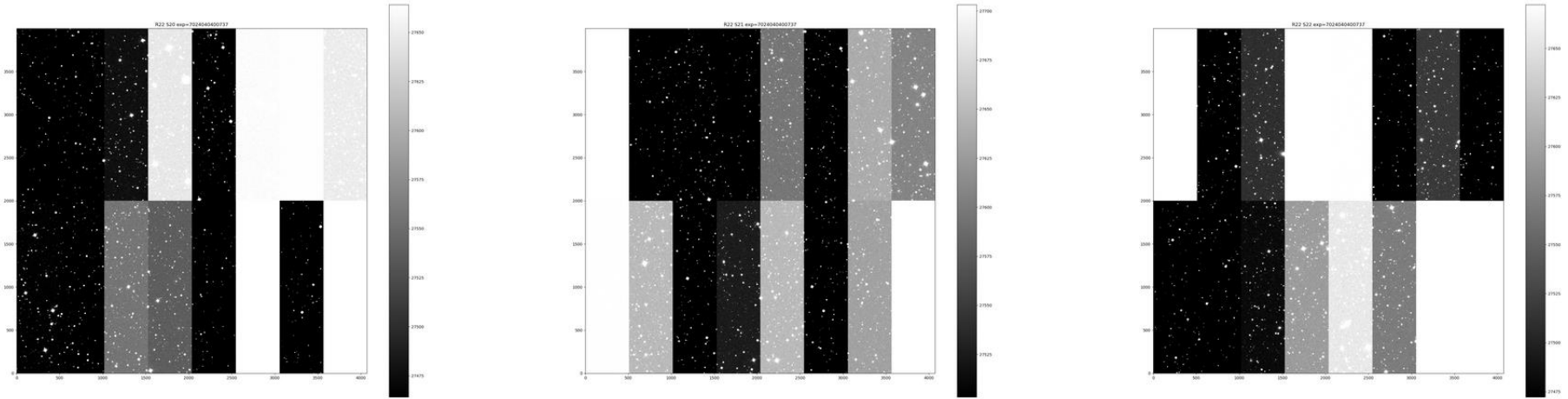
- Plots:
https://s3df.slac.stanford.edu/people/tguillem/Operations_Rehearsal/OR3/runs/test/exposures/

Single visit processing

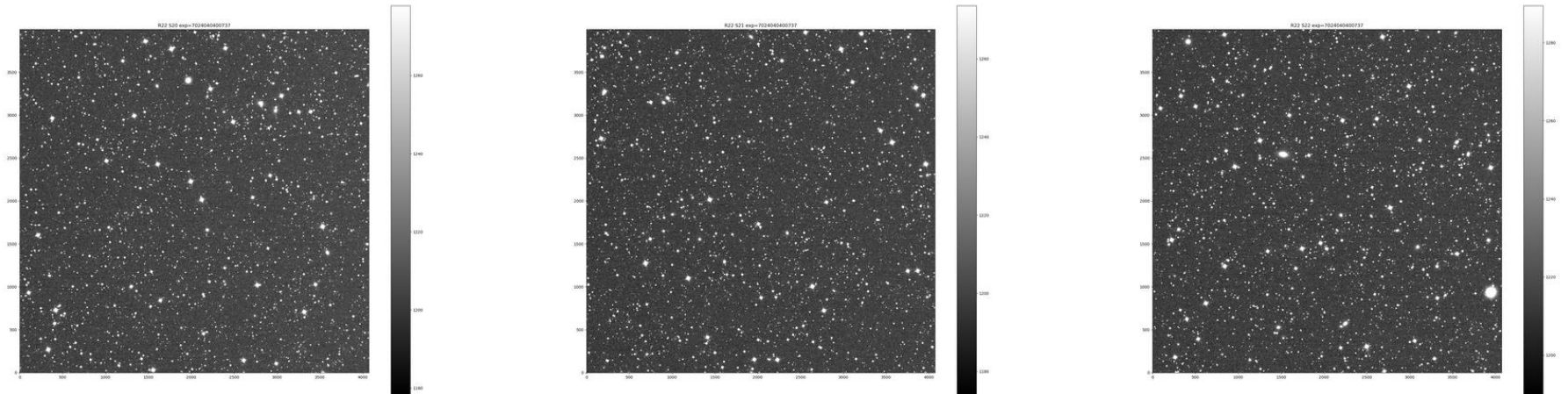


From raw to postISRCCD

raw



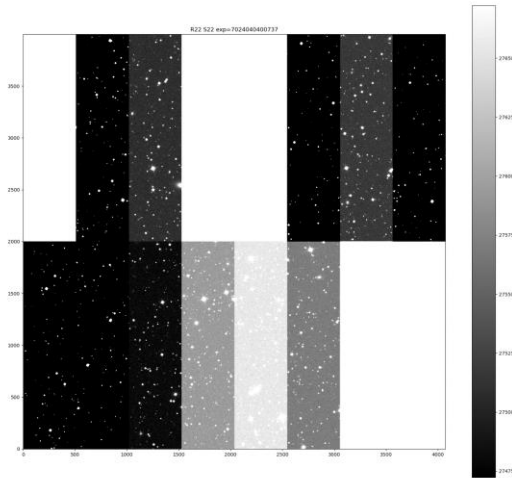
postISRCCD



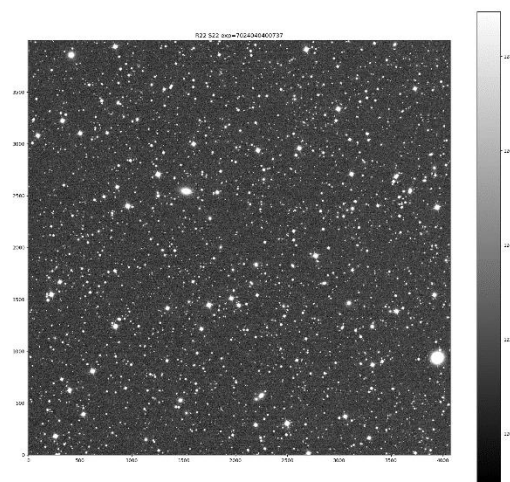
From raw to calexp

S22

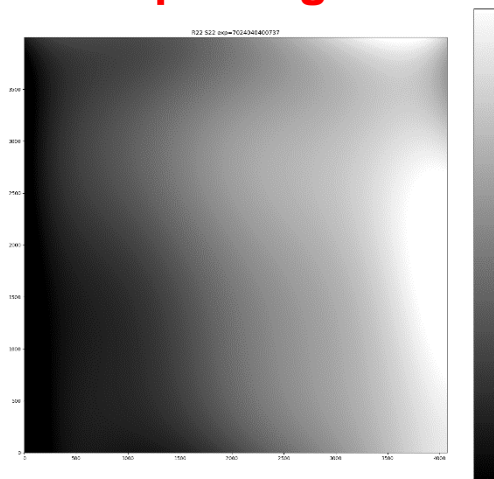
raw



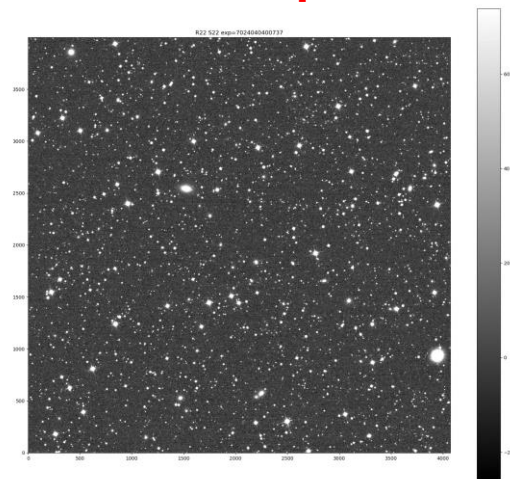
postISRCCD



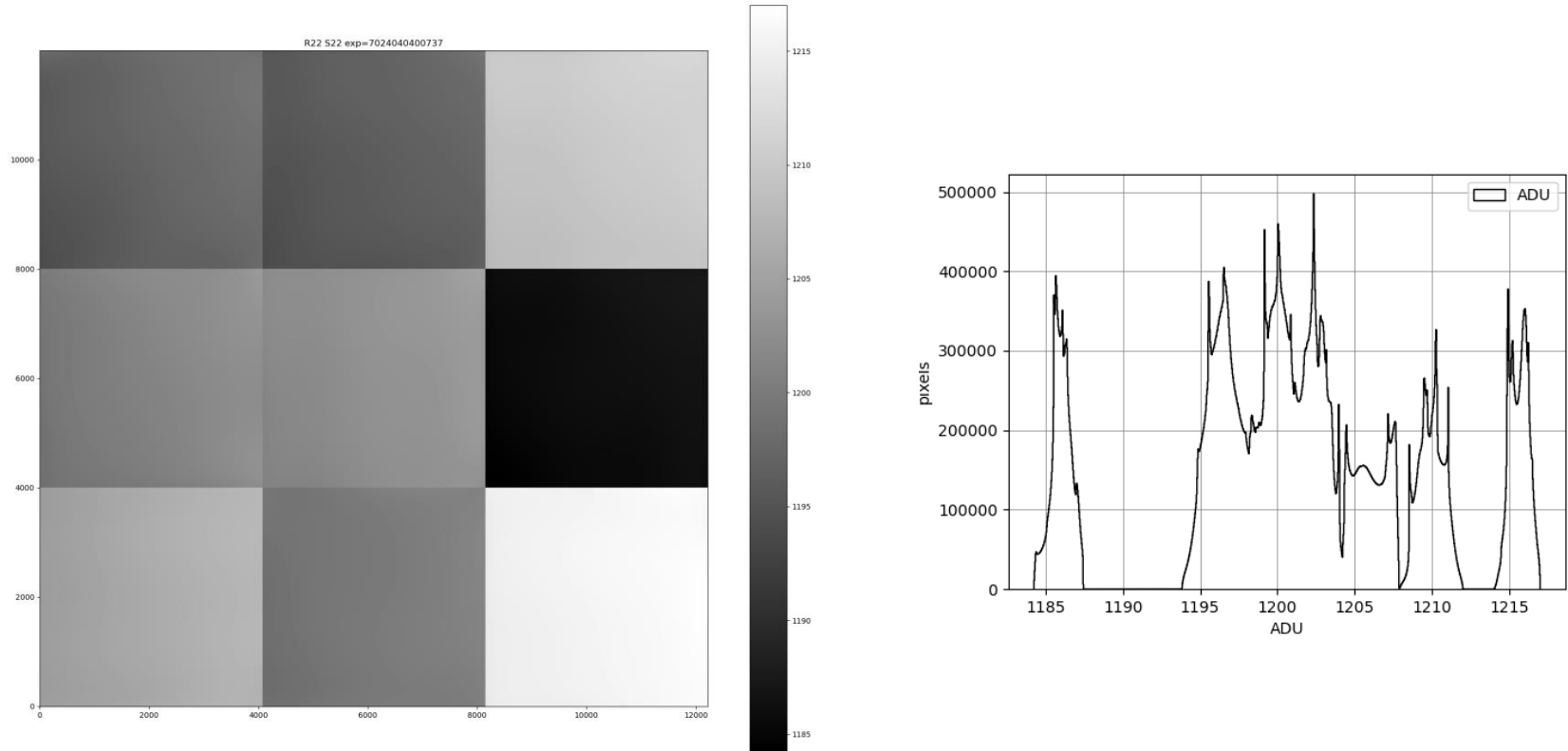
calexpBackground



calexp



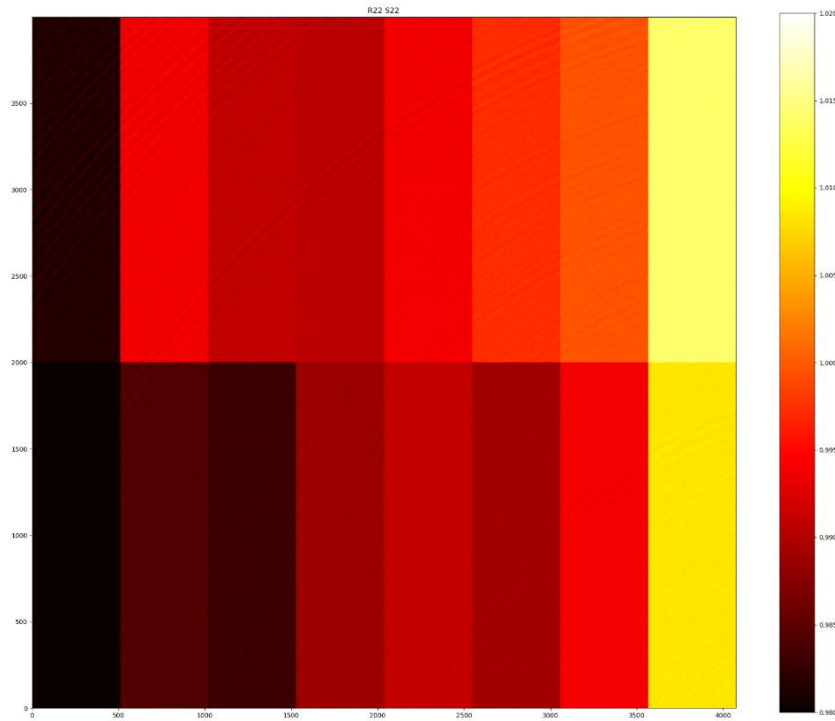
calexpBackground



Due to the per-CCD QE?

ComCamSim flat

imSim

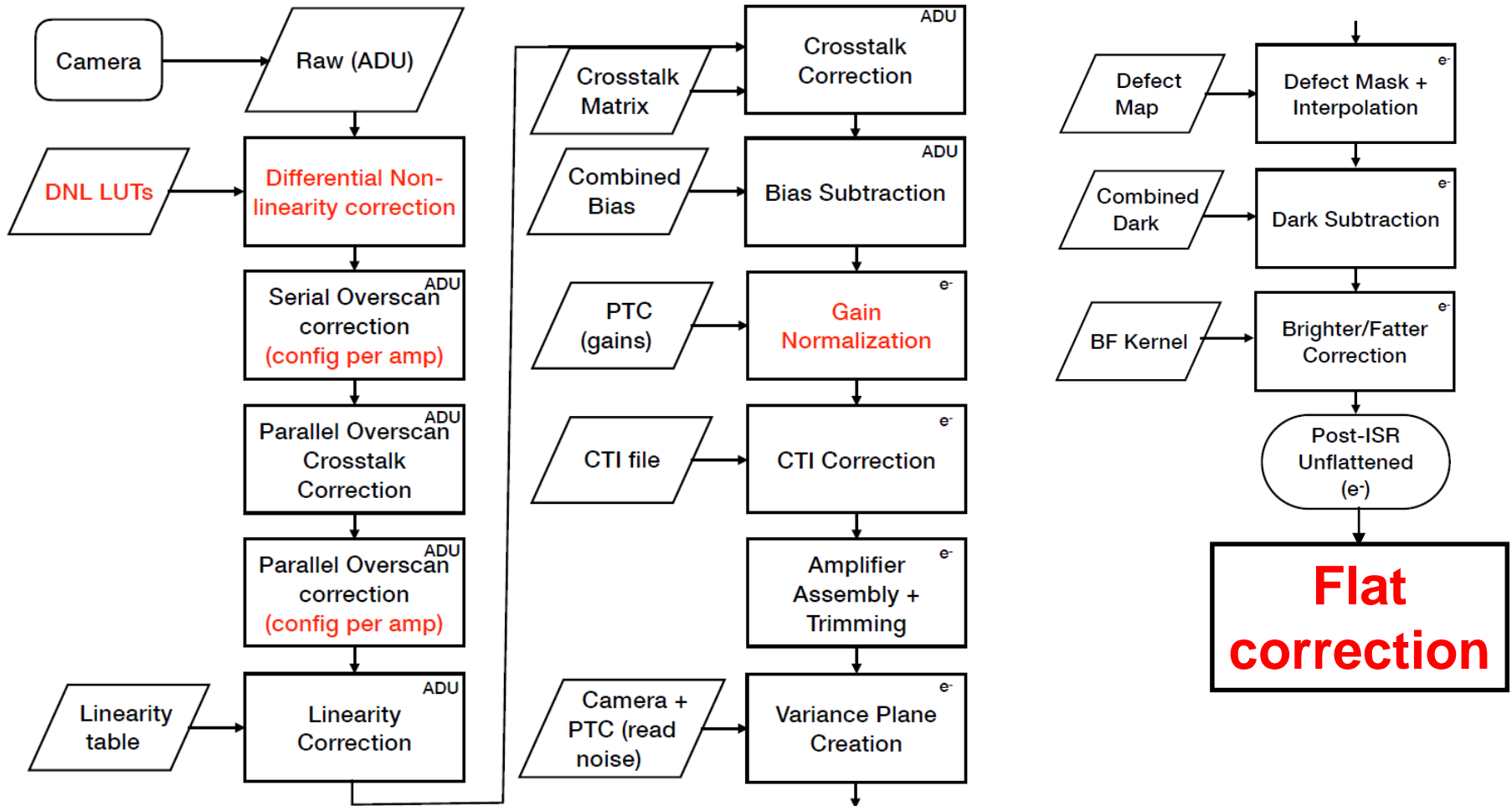


0.98-1.02

```
703 S22 :  
704 C10 : {  
705     gain : 1.71507,  
706     readNoise : 11.279,  
707     saturation : 134690,  
708 }  
709 C11 : {  
710     gain : 1.69390,  
711     readNoise : 12.553,  
712     saturation : 132262,  
713 }  
714 C12 : {  
715     gain : 1.69877,  
716     readNoise : 13.352,  
717     saturation : 129442,  
718 }  
719 C13 : {  
720     gain : 1.69932,  
721     readNoise : 13.829,  
722     saturation : 128034,
```

PTC gains are applied in ISR

ISR



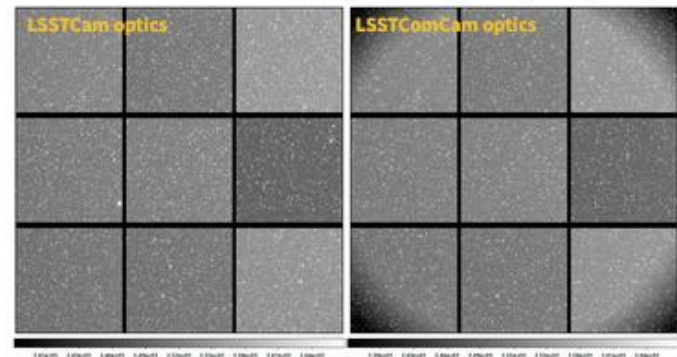
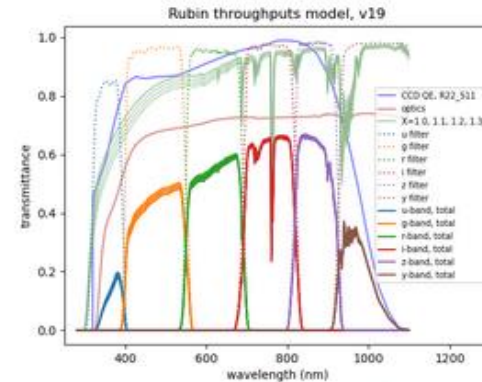
From E. Rykoff



ComCam Image Simulations (imSim)

Higher fidelity images compared to DC2 using the new major release of **imSim 2.0**:

- Airmass-dependent atmosphere transmission
- Updated instrumental throughput curves including: triple silver mirror reflectivity, as-measured filter transmission, per-detector QE curves, etc.
- Optical effects realism via ray-tracing with batoid: emergent distortions, diffraction spikes, ...
 - LSSTCam vignetting used for the OR3 sims. OR4 will use LSSTComCam distortion model.
- ComCamSim instrument model with CCD readout parameters measured from real ComCam calibration data.



Calibration aspects

<https://confluence.lsstcorp.org/pages/viewpage.action?pageId=248547428>

Camera

- Brighter-Fatter Effect ✓
- Tree rings - reduced by ~10x from defaults ✓
- y-band fringing ✓ (Not relevant for ops-rehearsal-3 sims)
- Gains, read noise, and saturation levels from comCamSim instrument in obs_lsst ✓
- CTI of 1e-6 in both parallel and serial transfer directions ✓
- Dark current: 0.02 e-/s/pixel for all amps ✓
- Bias levels from imSim, as measured from comCam calibration data ✓
- No defects ✓
- No crosstalk ✓
- No nonlinearity ✓
- Simulated cosmic-rays extracted from ITL sensor lab data. ✓
- Per-CCD QE curves from lab measurements of ITL raft R42 in LSSTCam ✓

Calibration Products

- The raw frames for the initial testing consist of
 - 20 bias frames
 - 20 100 s dark frames
 - 20 flats per g, r, i band, 50k e-/pixel
 - 100 flat pairs, with logarithmically spaced fluxes covering 30-100k e-/pixel
- Calibration products, generated from these raw frames using cp_pipe, are in the chained collection u/jchiang/bfk_70240217_w_2024_07. ✓
 - We will use hand-crafted BF kernels from Alex B. in u/abrought/bfk_70240217_w_2024_07_final
- Curated calibration data for transmission_[optics, filter, sensor] curves are available in obs_lsst_data for comCamSim ✓