

Focal Plane Signatures & Removal

Aaron Roodman

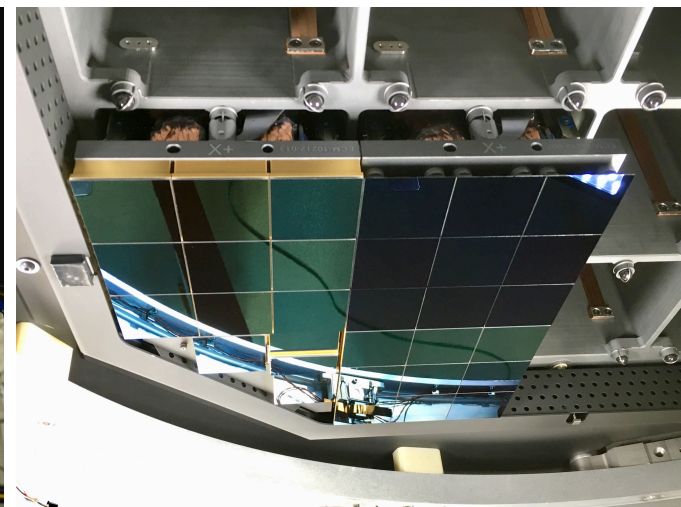
LSST Project & Community Workshop

August 13, 2019



Agenda

- ◆ Goals for this Session
- ◆ Talks
 - ◆ Deferred Charge & Serial Traps (A. Snyder)
 - ◆ Spatial Variations in QE, Correlated Noise (Y. Utsumi)
 - ◆ Dust Spots (E. Charles)
 - ◆ Astrometric Shifts (A. Bradshaw)
 - ◆ Gain & Thermal Stability (AR)
 - ◆ DM Needs & Thoughts (A. Plazas)
 - ◆ Communication between Camera & DM (S. Ritz)
- ◆ Discussion



Scope & Goals for this Session

◆ Scope:

- ◆ Summary of Focal Plane effects that might not be (fully) captured in DM *Instrument Signature Removal* plans
 - ◆ eg. Brighter-Fatter has been extensively covered
 - ◆ Other effects, eg Bias shifts, Tearing will be mitigated
- ◆ See Tuesday morning SAWG or CVT meetings for more detailed presentations

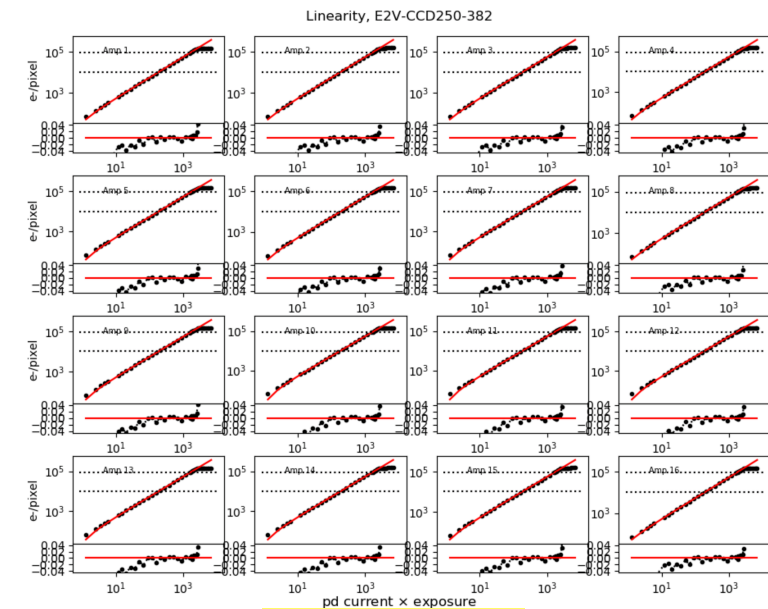
◆ Goals:

- ◆ Identify if there are Focal Plane effects which need additional ISR code
- ◆ Identify additional Focal Plane measurements needed, either in Camera I&T, Commissioning or Engineering
- ◆ Improve communication on these issues

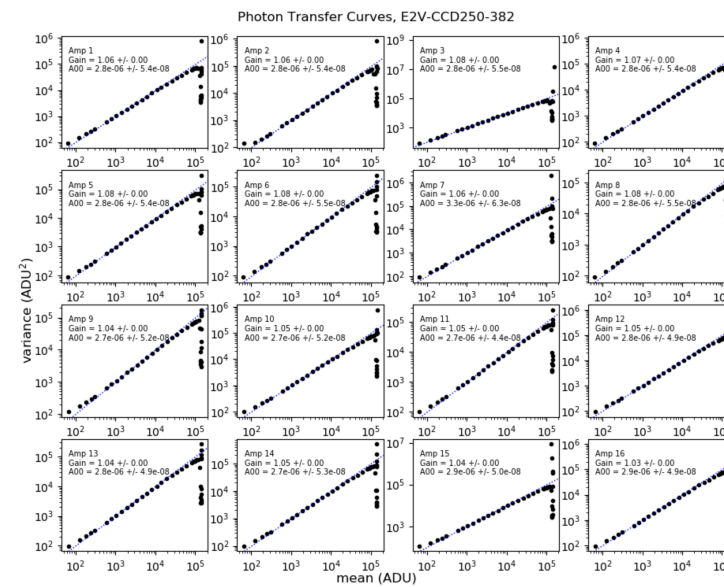
Focal Plane Electro-Optical Testing

- ◆ Comprehensive Image Acquisition & Analysis
 - ◆ Must demonstrate that Camera requirements are met
 - ◆ Rich data set to enable deeper Focal Plane investigations
 - ◆ Straightforward access to data (SLAC or NCSA) & extensive analysis code available
- ◆ *Cryostat* Test Imaging Runs
 - ◆ 2 ETUs: more than 20k images collected in Mar-Apr & June
 - ◆ 9 Science Rafts + 4 Corner rafts: will occur in Sept-Oct
 - ◆ Complete Focal Plane: roughly Dec-Jan
- ◆ *Camera* Test Imaging
 - ◆ More limited image collection, Fall 2020

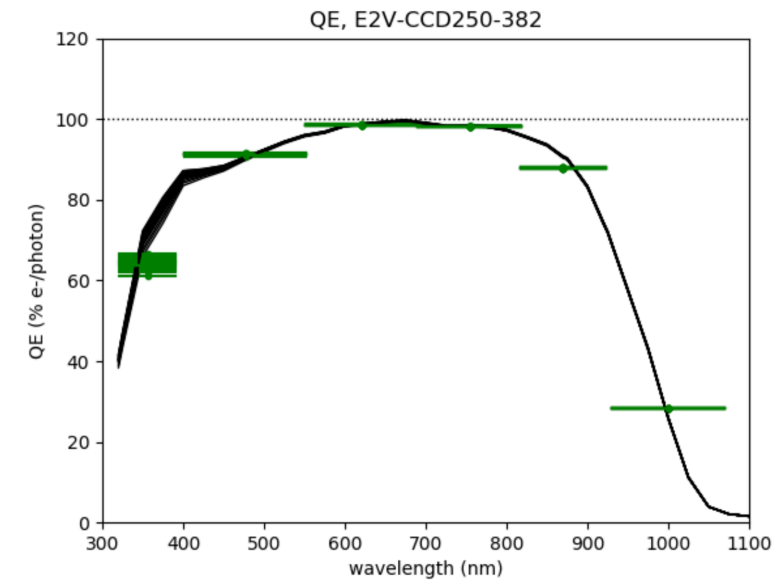
Gallery of Raft and Focal Plane Testing



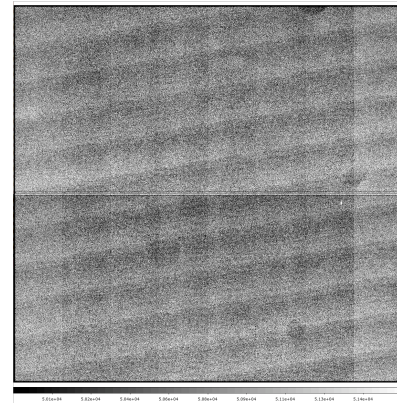
Linearity



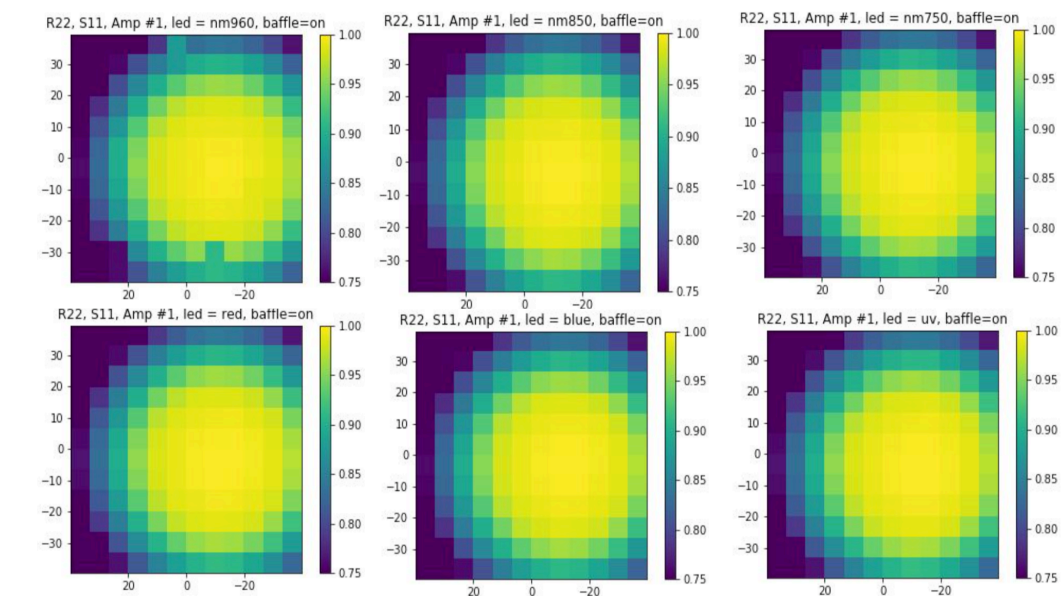
Photon Transfer



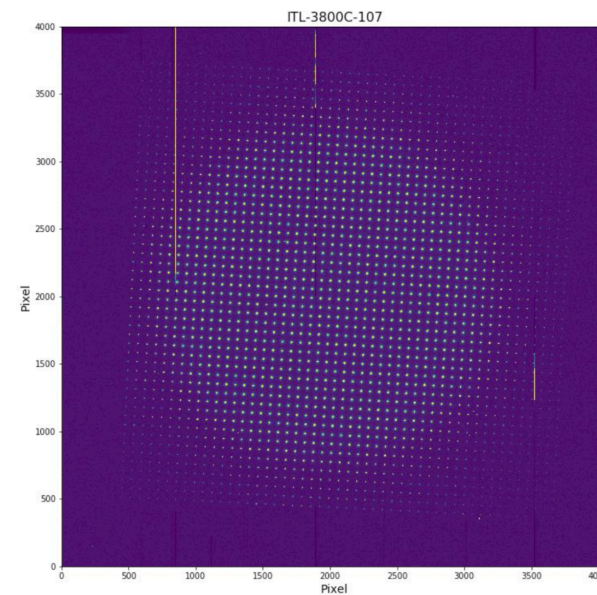
Quantum Efficiency



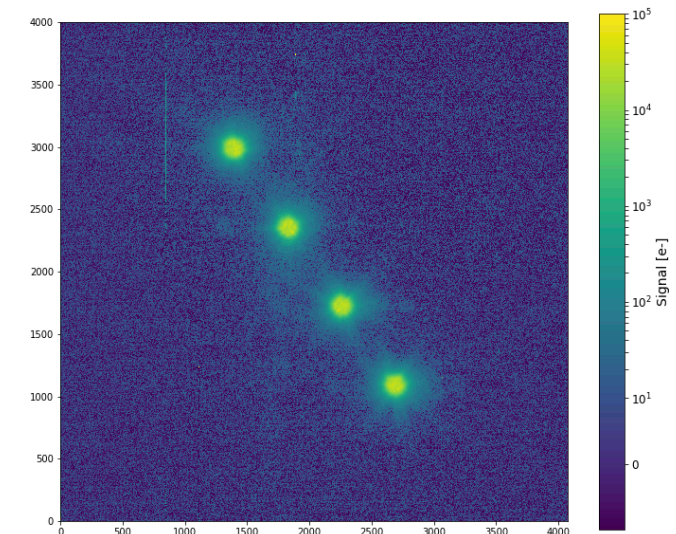
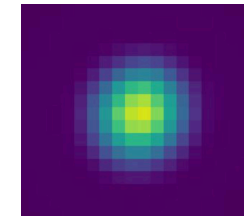
Flat Field



Calibrated Beam - Wide



Spots



Xtalk

Focal Plane test data is available for study, in coordination with the Camera team.

Camera Calibration and ISR

- ◆ Camera I&T Focal Plane Calibration products include:
 - ◆ Noise, Gain, Diffusion, Linearity, PTC by Amplifier
 - ◆ SuperBias Image
 - ◆ SuperDark Image
 - ◆ Bad Pixel Map
 - ◆ Xtalk Matrix
 - ◆ Synthesized Flat Fields in 6 bands
 - ◆ Focal Plane Height map
- ◆ I&T Analysis uses *eotest* code base: built on DM objects, but different than DM ISR or Calibration code
- ◆ Todo: Compare Camera I&T generated calibration products with DM generated products