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Meeting

December  
15-16,  
2016

# Advanced Camera for Surveys: Update



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ACS Instrument Team  
Instruments Division



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# Outline

- 1) WFC Monitoring: Read Noise; Dark Current
- 2) Advancements in Absolute Flux Calibration
- 3) Quantifying the SBC PSF Extended Halo
- 4) Revised WFC MDRIZTAB for DrizzlePac
- 5) ACS Documentation Updates & Additions

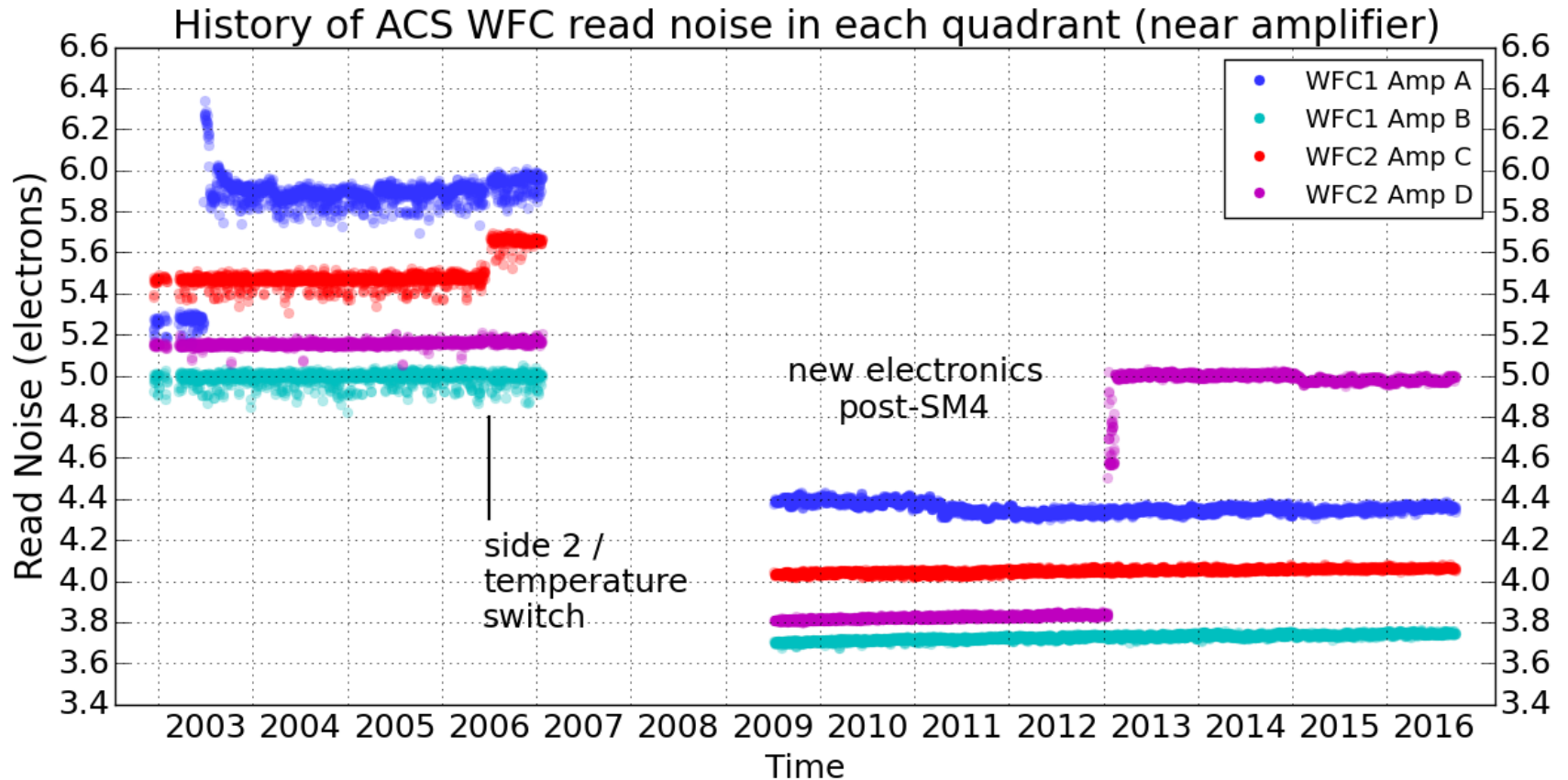


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# WFC Read Noise Monitoring

- All WFC amps' read noise have been stable since Jan'13 anomaly
- AmpB (lowest noise) still recommended for subarray observations



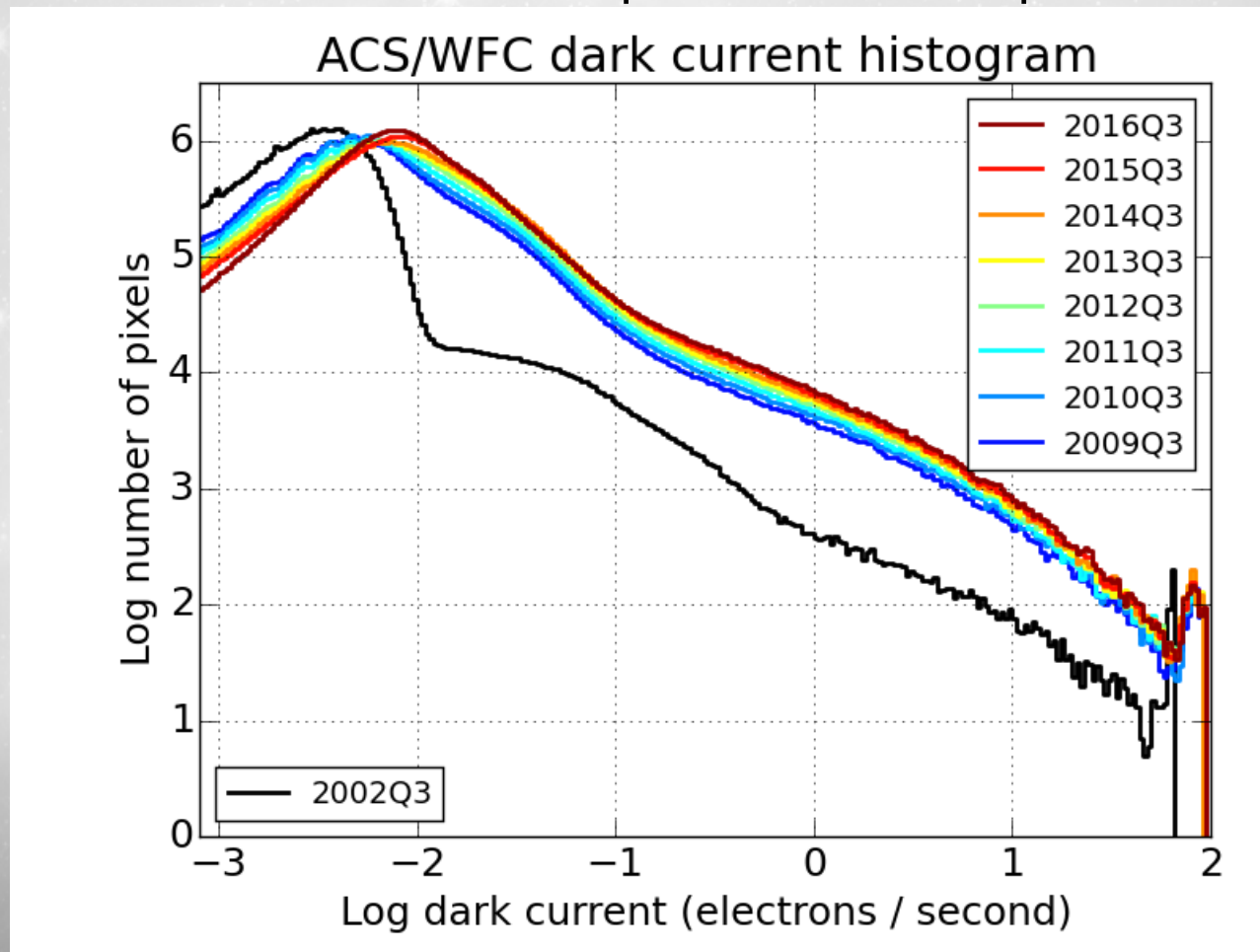


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# WFC Dark Current Monitoring

- WFC dark current histogram is trending smoothly
- CTE-mitigating LED post-flash ongoing since mid-Cyc22
  - Now 4wk rather than 2wk “superdarks” to dampen flash-noise





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# WFC Abs. Flux Calibrations. I.

- Long-term monitoring of spectrophot. standards:
  - External uncertainty for the absolute flux is  $\sim 1\%$ , while the internal consistency of the sensitivities in the broadband ACS filters is  $\sim 0.3\%$  among the three primary WD flux stds.
  - For stars as cool as K type, the agreement with the CALSPEC standards is within 1% at the WFC1-1K subarray position, which achieves the 1% precision goal for the first time.
  - Revised encircled energies and absolute sensitivities replace seminal results published in Sirianni et al. (2005).
  - Synthetic predictions of WFC & HRC count-rates for the mean of 3 primary WD stds. agree w/ observations to 0.1%.
- (Small) changes made to ACS ETC, ZP webtool

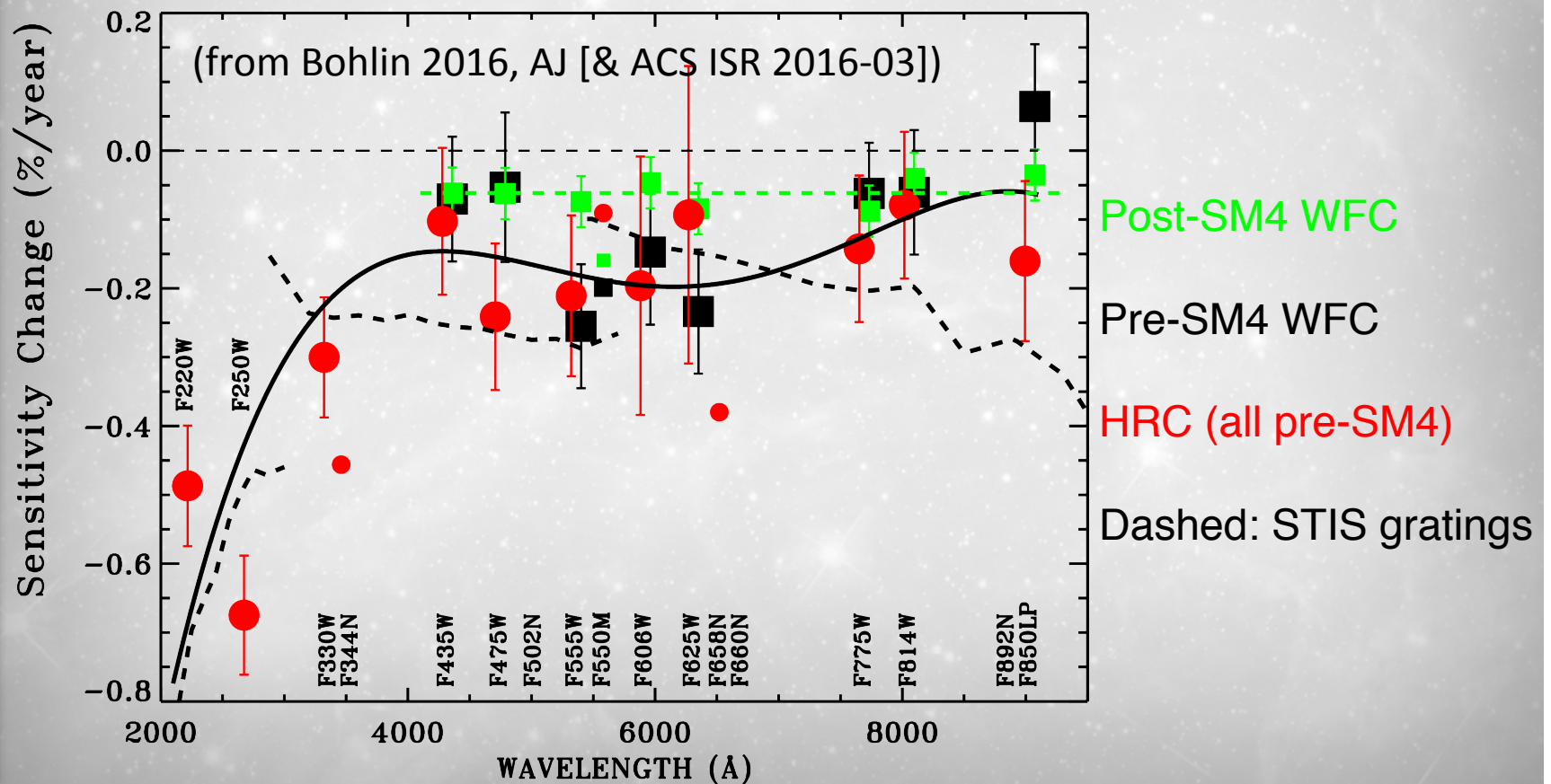


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# WFC Abs. Flux Calibrations. II.

- Revised post-SM4 WFC sensitivity degradation measurements
  - Largely filter-independent value:  $-0.061\%/yr$  after SM4. [green dashed]



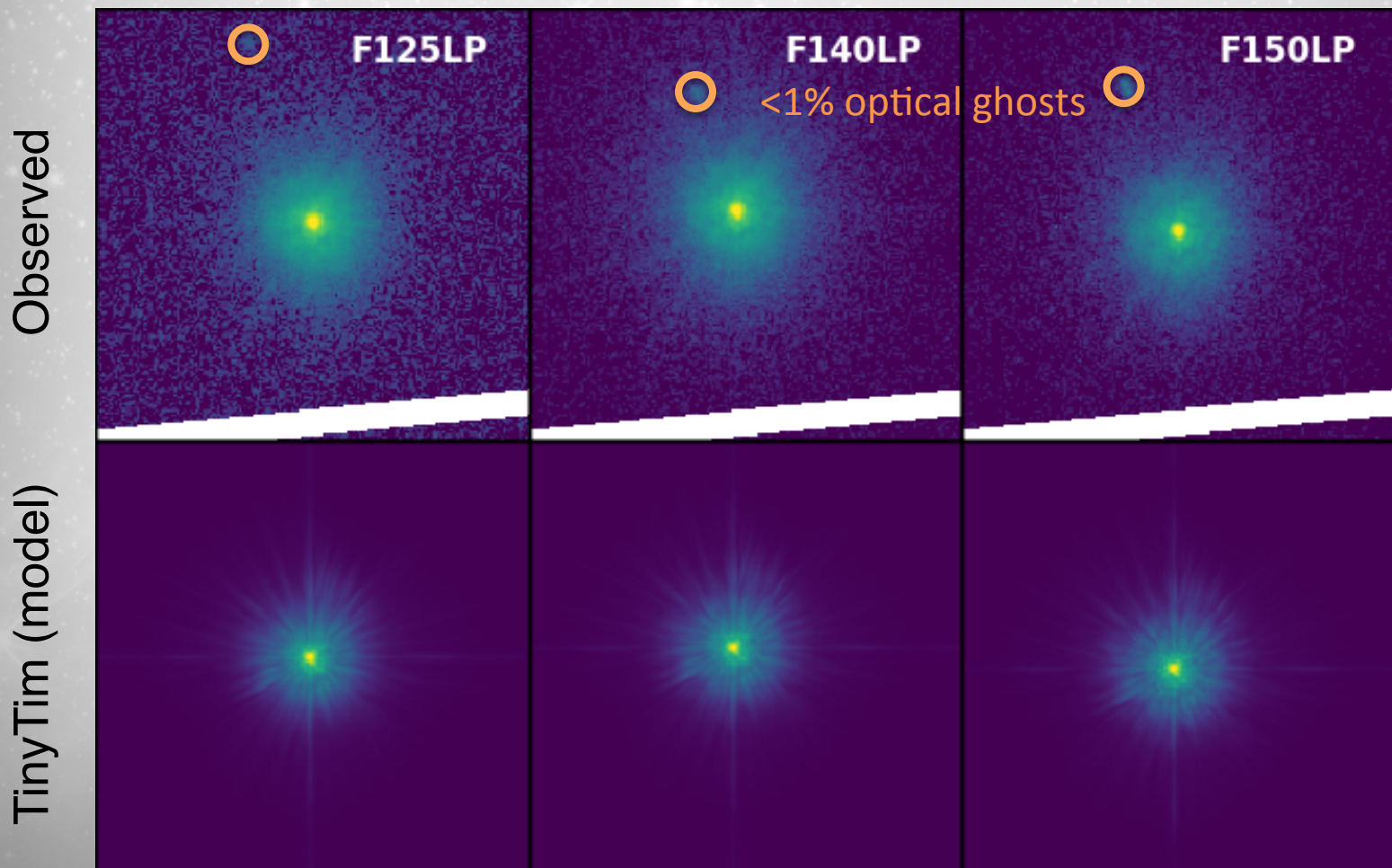


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# SBC Encircled Energies. I.

- Cyc23 CAL program: isolated WD,  $T_{\text{eff}} = 13390$  K
  - Goal is to properly measure halo omitted by TinyTim



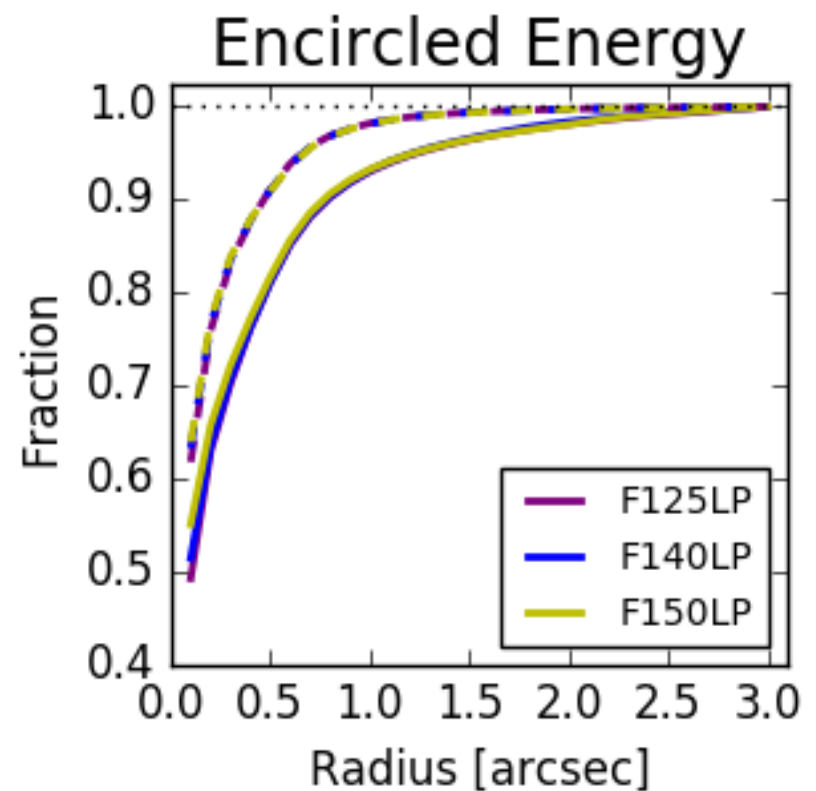
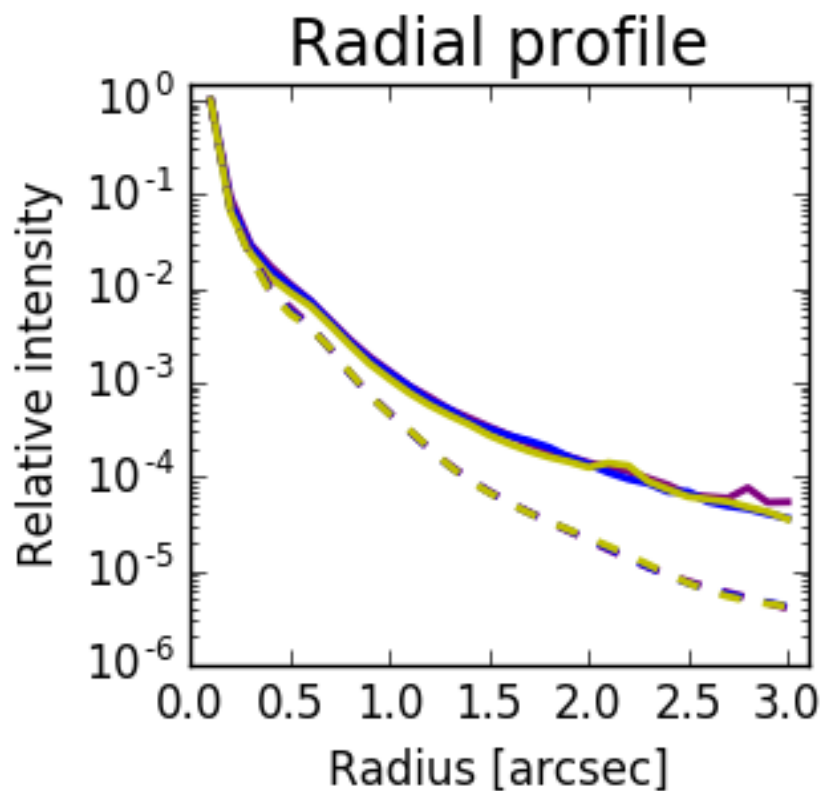


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# SBC Encircled Energies. II.

- SOLID: Observed; DASHED: TinyTim (model)







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# Revised MDRIZTAB. I.

- Most ACS observations are taken with multiple dithers: multiple FLC images
- Dithers can be combined using the STScI DrizzlePac software: single DRC mosaic
- Default drizzling configurations used by MAST are encoded in “MDRIZTAB” file
- Recent investigations have suggested that 2-dither drizzle configuration results in overly aggressive cosmic-ray clipping of stars  
[see next slide, for quantitative before/after]



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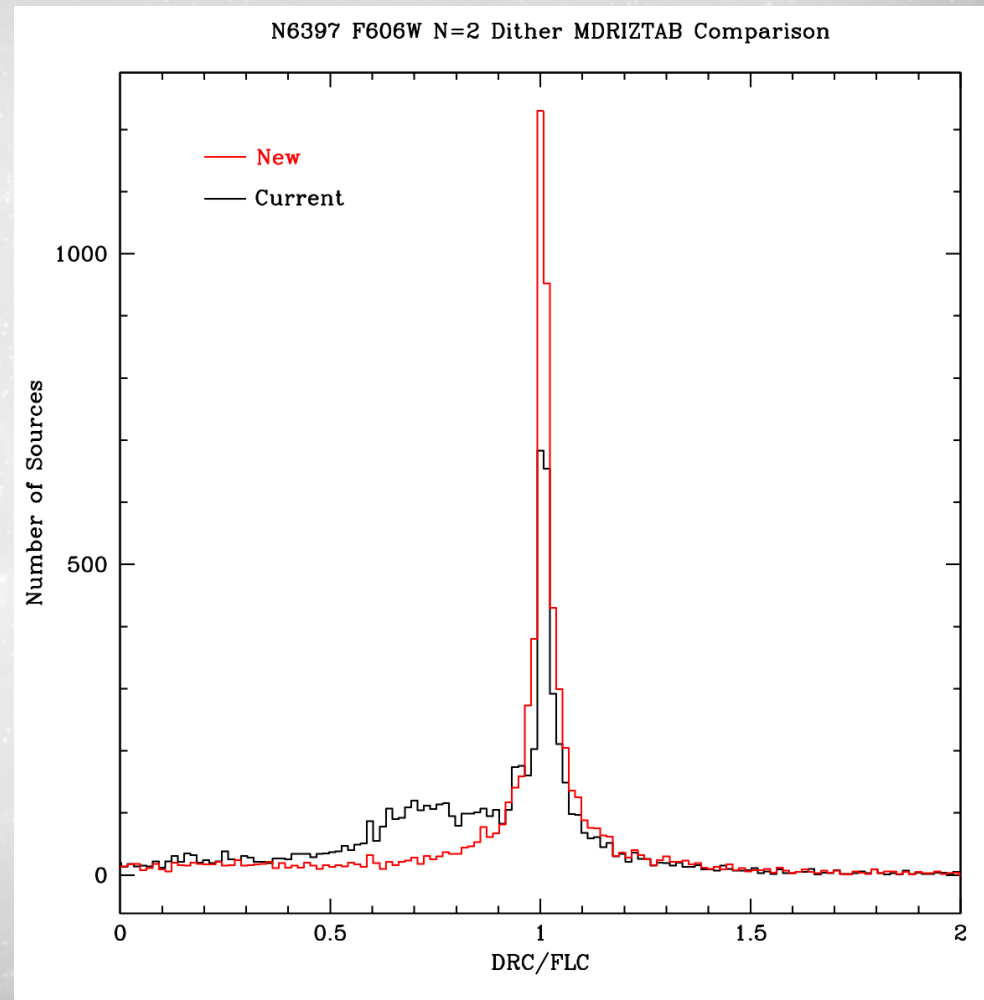
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# Revised MDRIZTAB. II.

Flux ratios of globular cluster photometry on CTE-corrected *drizzled* mosaics (DRCs) versus *undrizzled* images (FLCs) with only two dithers.

Note improvement with newly revised MDRIZTAB (red).





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# ACS Documentation Updates

- Recent ACS Team Instrument Science Reports:
  - ACS ISR 2016-06 : “*Here Be Dragons: Characterization of ACS/WFC Scattered Light Anomalies*”
  - ACS ISR 2016-05 : “*Photometric Aperture Corrections for the ACS/SBC*”
  - ACS ISR 2016-03 : “*Perfecting the Photometric Calibration of the ACS CCD Cameras I. HST's Advanced Camera for Surveys*”
  - ACS ISR 2016-02 : “*SBC Internal Lamp P-flat Monitoring*”
- Instrument Handbook (Cycle 25): appearing Jan'17
- Data Handbook major revision (v8.0; Apr'16)