IRAC 2nd Workshop on High Precision Time Series Photometry: Getting the Most out of Exoplanet and Brown Dwarf Light Curves – Wrap-up and Discussion

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Reminder!! Cycle-12

- Proposal deadline : 11 September 2015, 1600 PDT
- Total Observing time = 1000 hours
- Maximum proposal size = 100 hours
- DDT time available for proposals that don't fit into the rules in the call from proposals

- http://ssc.spitzer.caltech.edu/warmmission/propkit/cp/

What did we learn from the workshop today

- Are results repeatable? (is IRAC stable enough in time to give the same light curve for a system that stays the same)
  - Repeatability more important than reliability?
  - Literature suggests RMS/sigma ~ 1-1.5 (Carey)
  - Current techniques provide similar results
  - External observations increase confidence (WFC3) (Desert)
- What are the limitations in the data (Are we limited by methods or is there a noise floor?
  - Photometric stability (0.1%/0.05%) Long term (Krick)
  - Residual images exist but are tiny and changing *(systematic effect?*)

What did we learn from the workshop today?

- Is there a single best reduction method? Can different ones reach the same answer?
  - PLD/EXOFAST give similar with error bars (Dragonmir)
  - Non-parametric methods (ICA and GP) give robust (Morello/Evans)
  - Data challenge shows several methods are consistent within unc
- How do reduction methods affect results?
  - Multiple methods with similar answers give more confidence
  - Different parameters might effect how each method works
  - Working in pixel space better approach to take into account PSF
  - Learning the failure modes of each method?
- If so, what does it depend?
  - Pixel location, drift length/time, different systematics
  - Perhaps reduction assumptions/parameters?
  - Unknown parameters are hard to measure (jitter within integration)

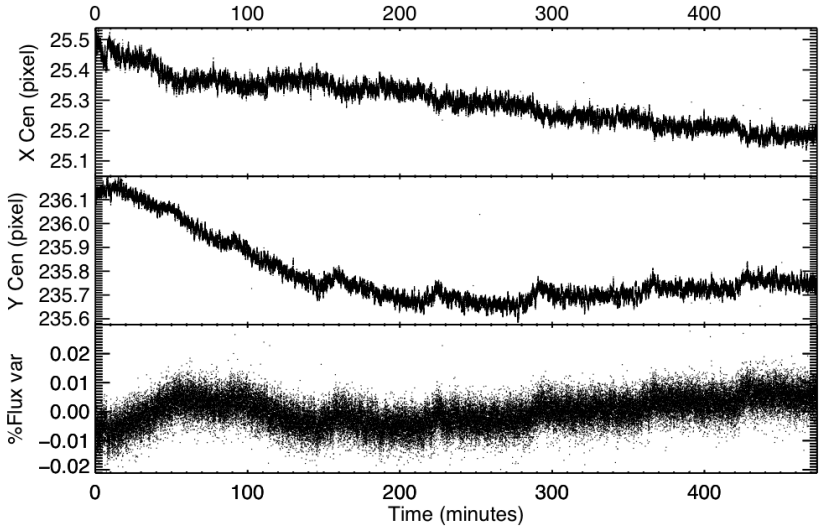
What the community would like to see from the SSC?

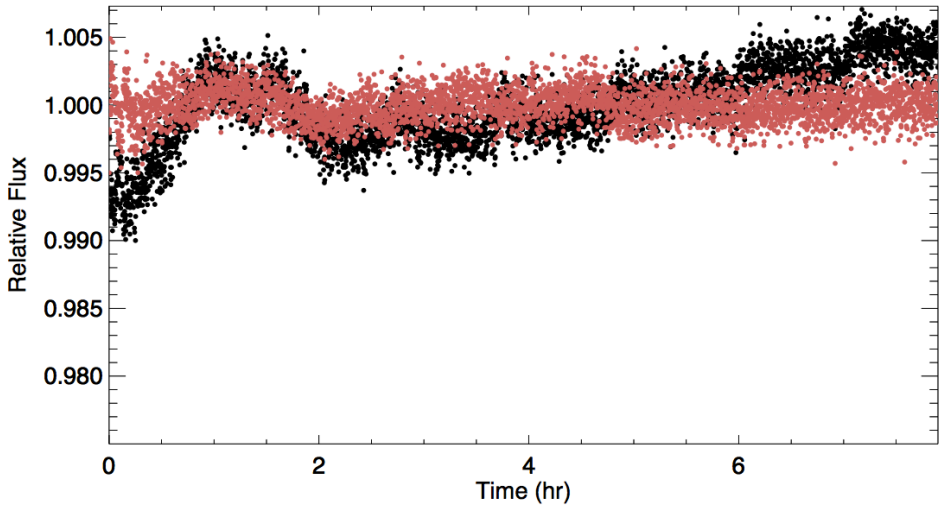
As we look to future:

- Best practices for designing observations?
  - Using non variable stars to map a new correction
  - Dither map at beginning/end for residual images
  - Investigate re-peak-up strategy for phase curves
  - Suggestion for simultaneous HST/Spitzer phase coverage
- Challenges of FY17/18
  - Increased thermal pointing drift will require some mitigation (more frequent peakups, reduction techniques)

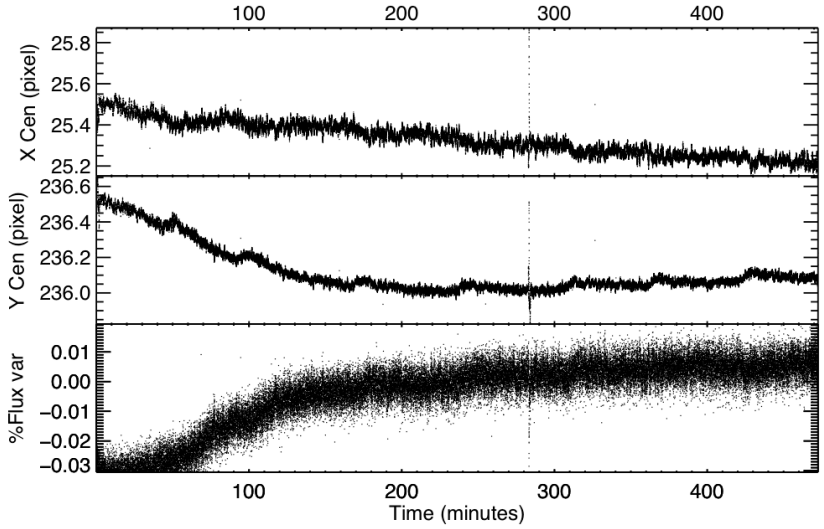
Thermal Drift

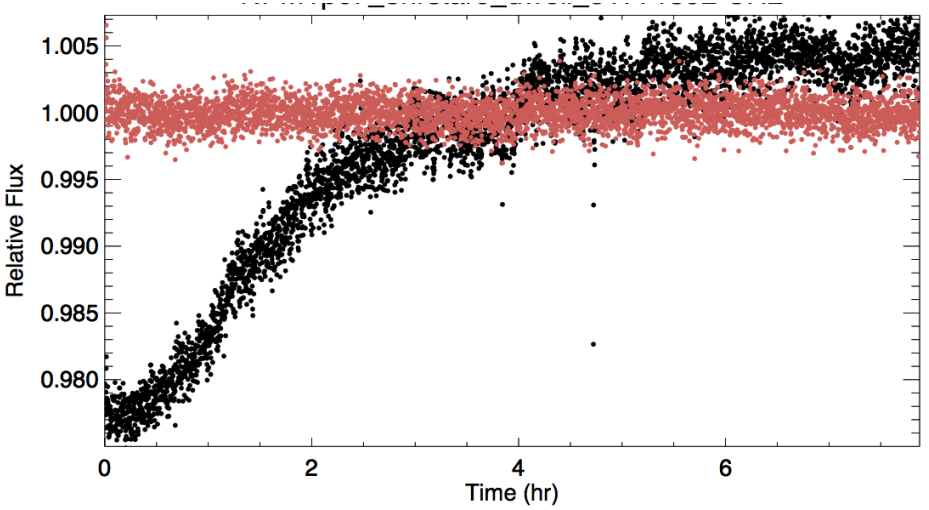
March 2014 Dwell Test





August 2014 Dwell Test





The Future?

- Planned operations through FY 2018
  - Contingent on next senior review
- Plan is for a large call (Cycle-13) for 10000+ hours over 2 years and Cycle-14 (~1000-2000) for the last year

- *Community input and support is vital for future operations*

Resources

- Website: irachpp.spitzer.caltech.edu
  - Has section for contributed code!
- Helpdesk: help@spitzer.caltech.edu
- Email listserv: https://lists.ipac.caltech.edu/mailman/listinfo/irac-hiprecphot