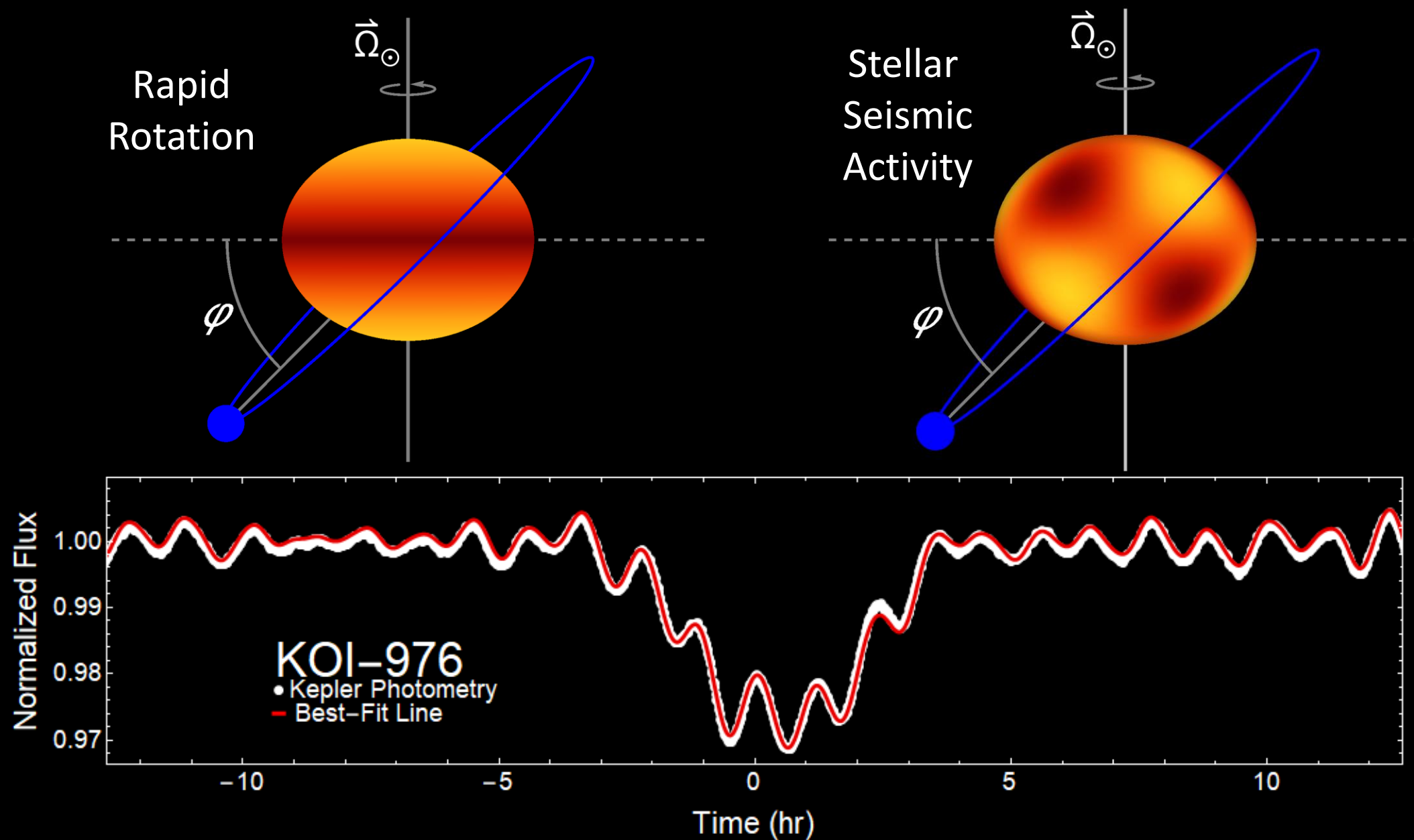


Observing Spin-Orbit Misalignment in Early-Type Systems

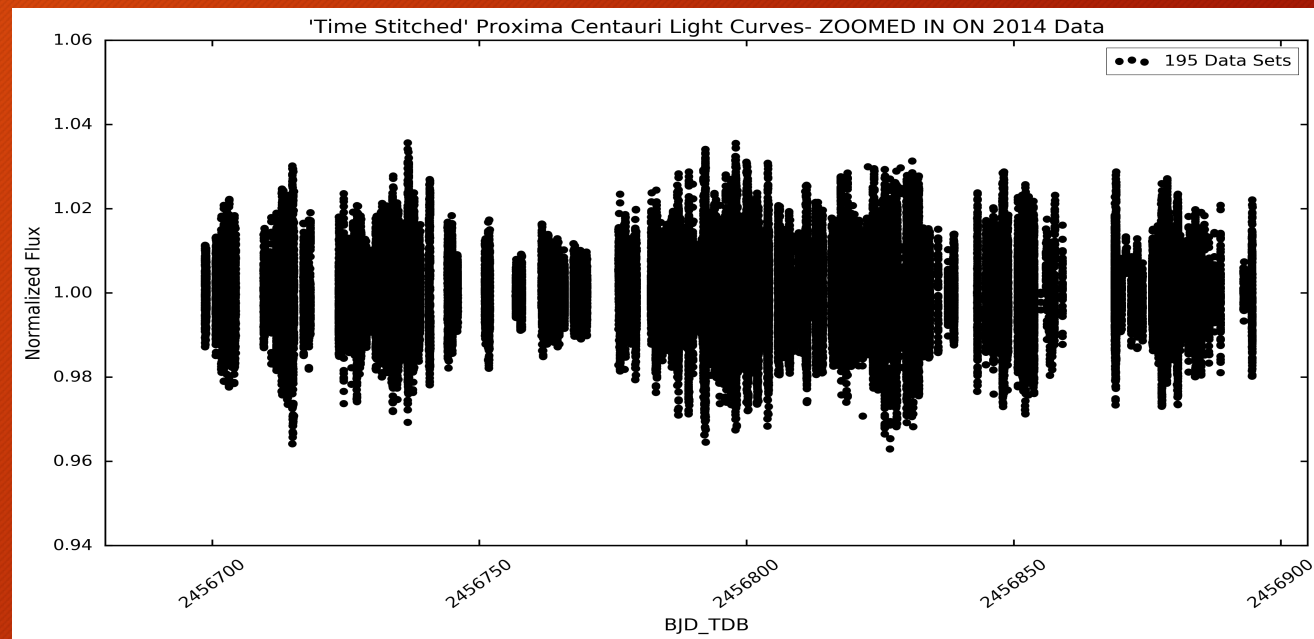
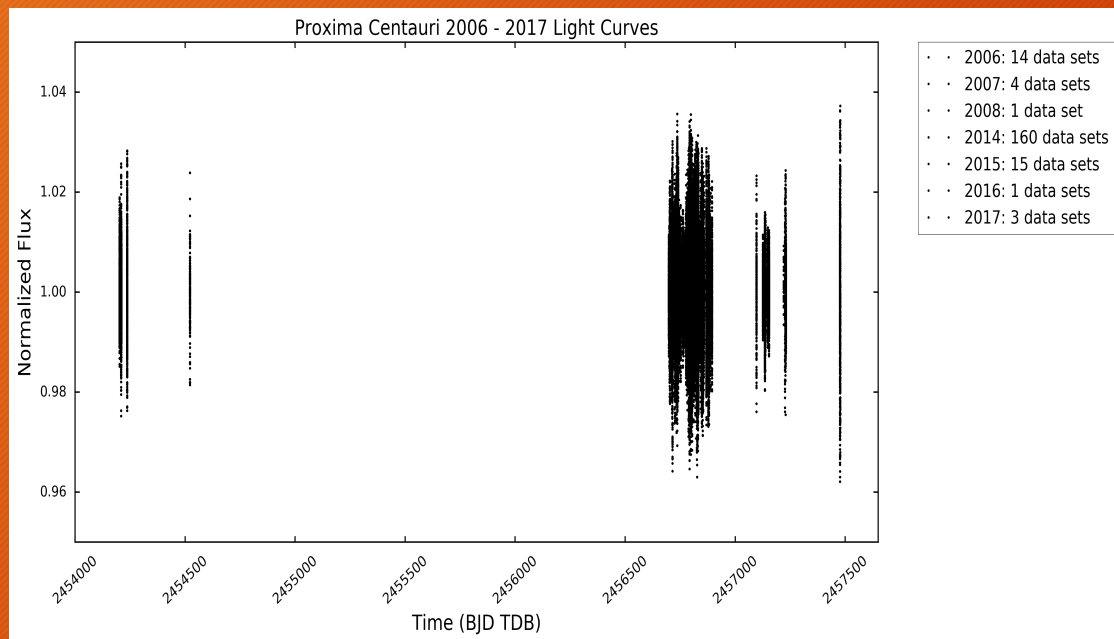


A Multi-Year Transit Search for Proxima Centauri b

Dax Feliz^[1,2], Karen Collins^[2], Keivan Stassun^[2], David Blank^[3], Graeme White^[3]

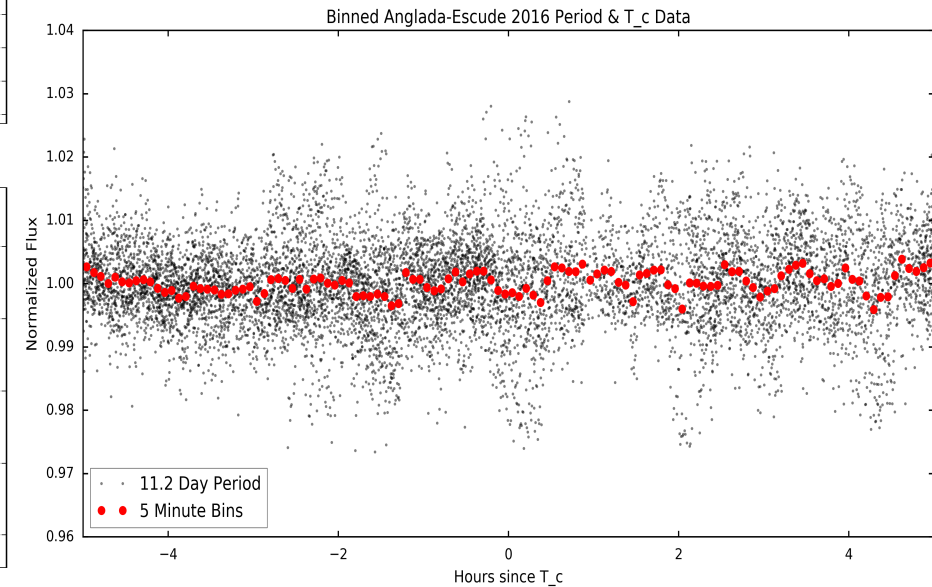
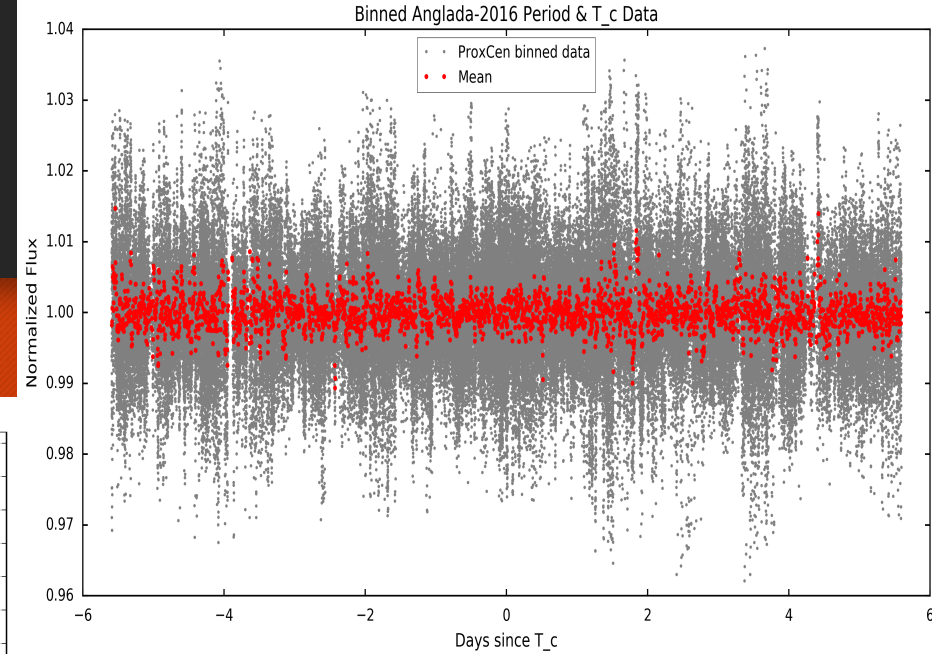
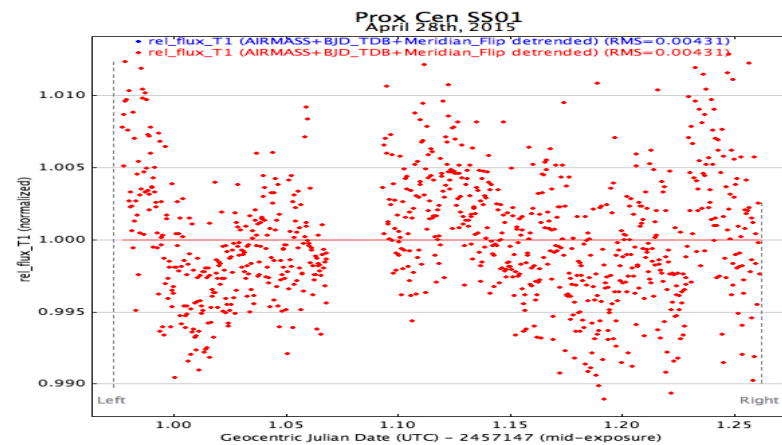
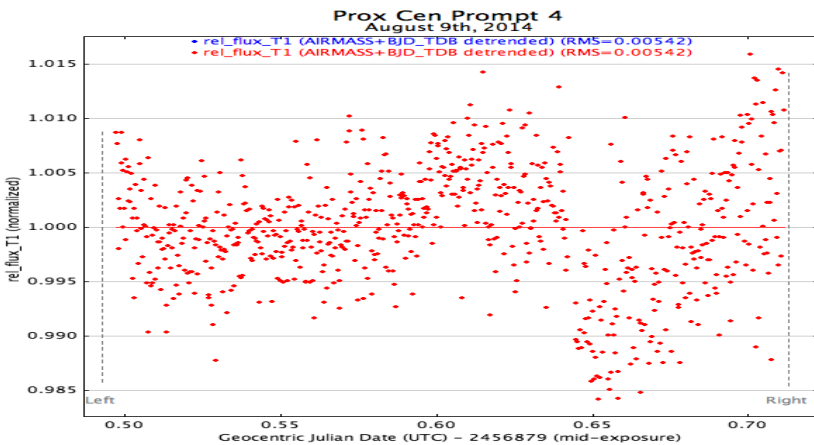
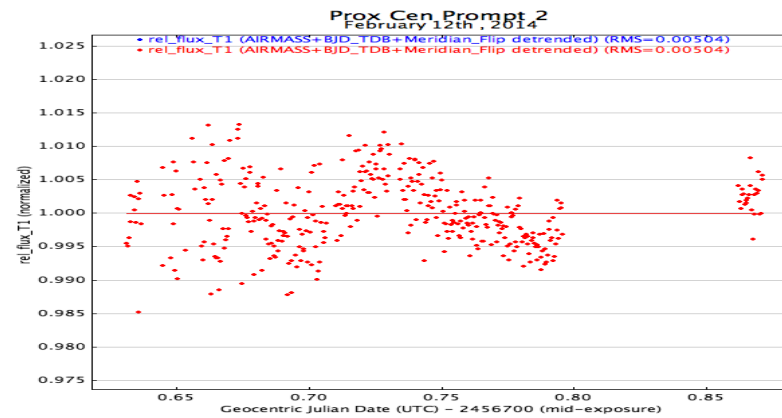
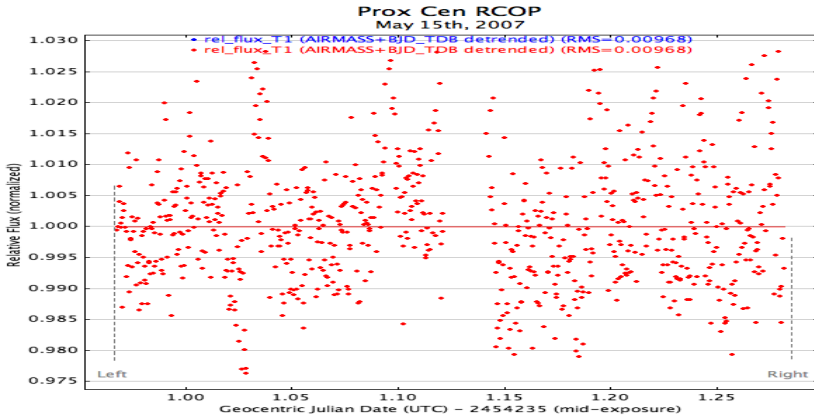
Fisk University^[1], Vanderbilt University^[2], University of Southern Queensland (Australia)^[3]

- Using a combination of SKYNET and KELT-FUN data spanning from 2006-2008, 2014-2017 we have ~ 332 nights of time series photometric observations of Proxima Centauri.
- We have combined our datasets and are in the process of running the BLS VARTOOLS algorithm to search for periodic events

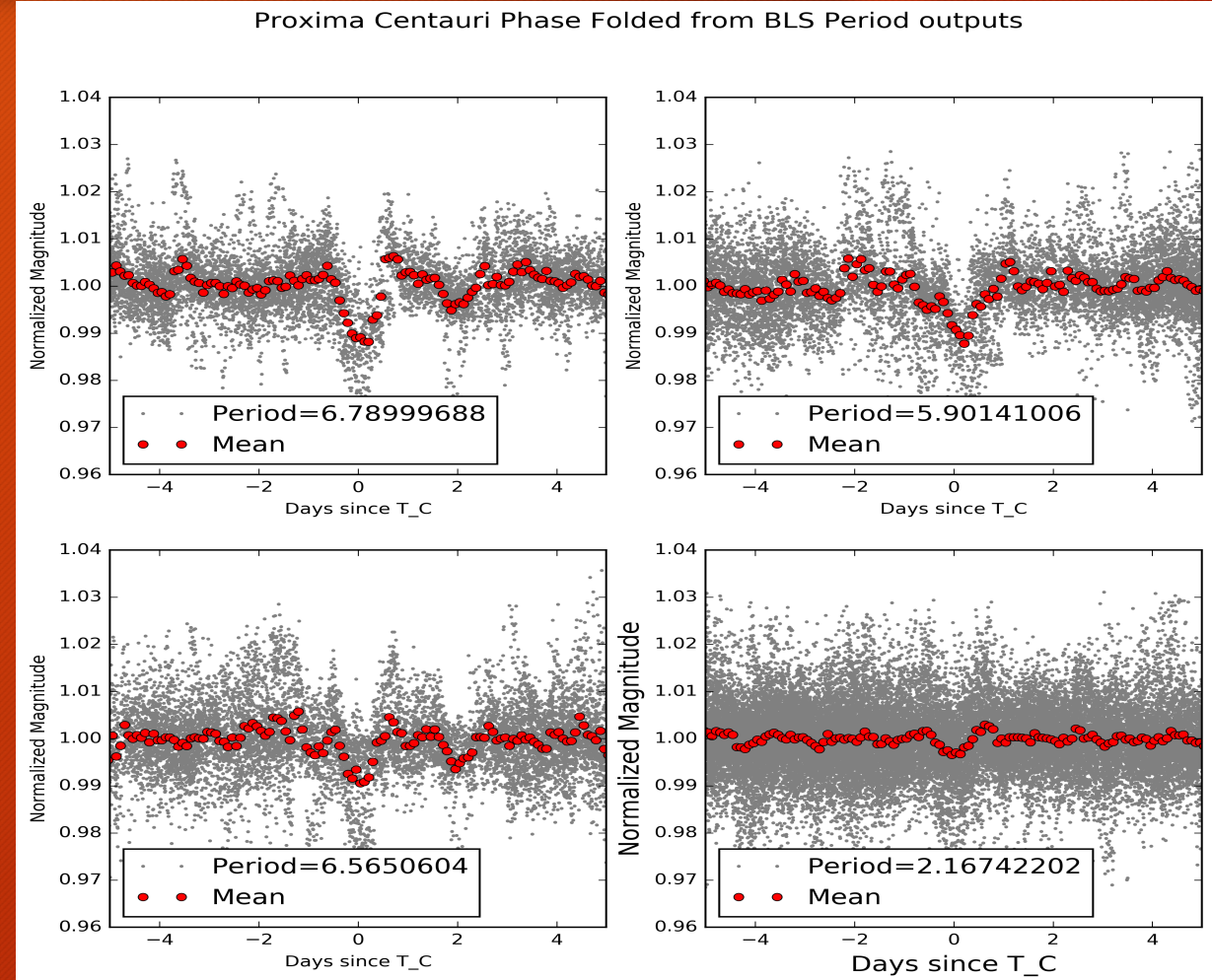
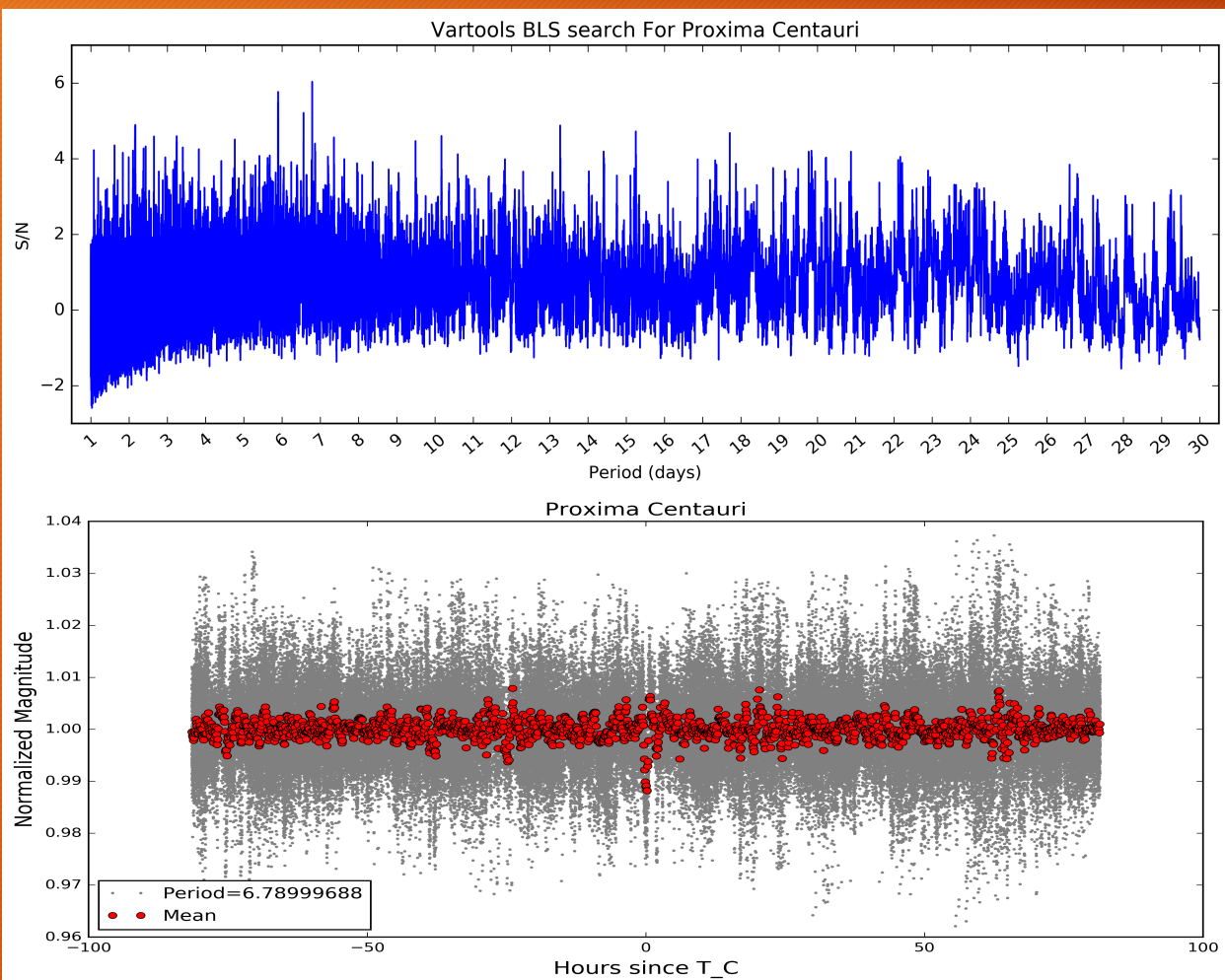


Some Example Light Curves

- Expected Transit Duration: ~ 1 to 2 hours
- Expected Transit Depth: 5 to 10 mmag



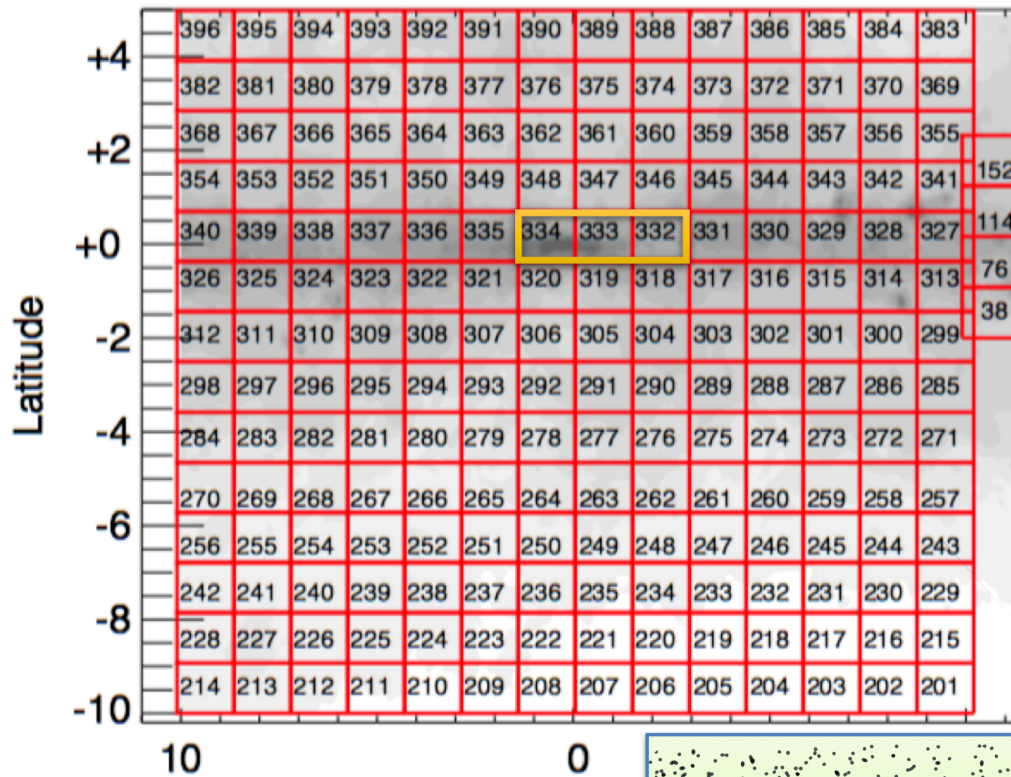
Preliminary BLS Search: 1-30 days



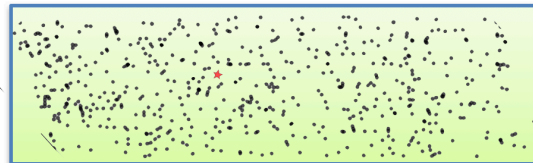
Microlensing Events in the Galactic Center with the VVV data

Gabriela Navarro

Supervisor: Dr. Dante Minniti



Catelan et al. 2013



The VVV Survey

VISTA telescope

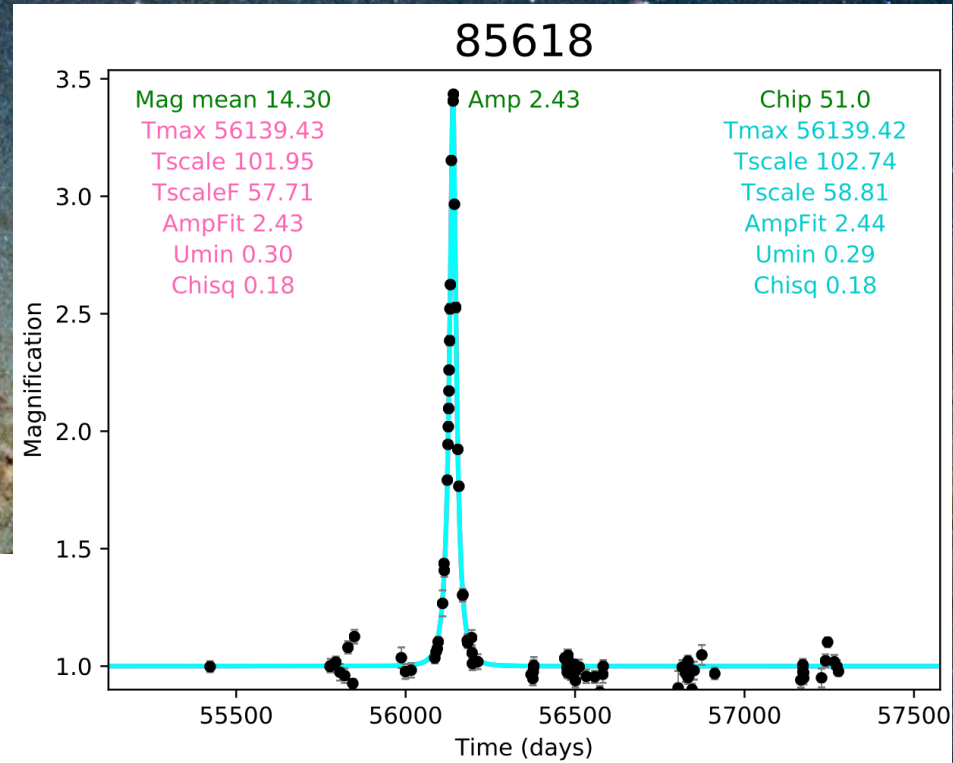
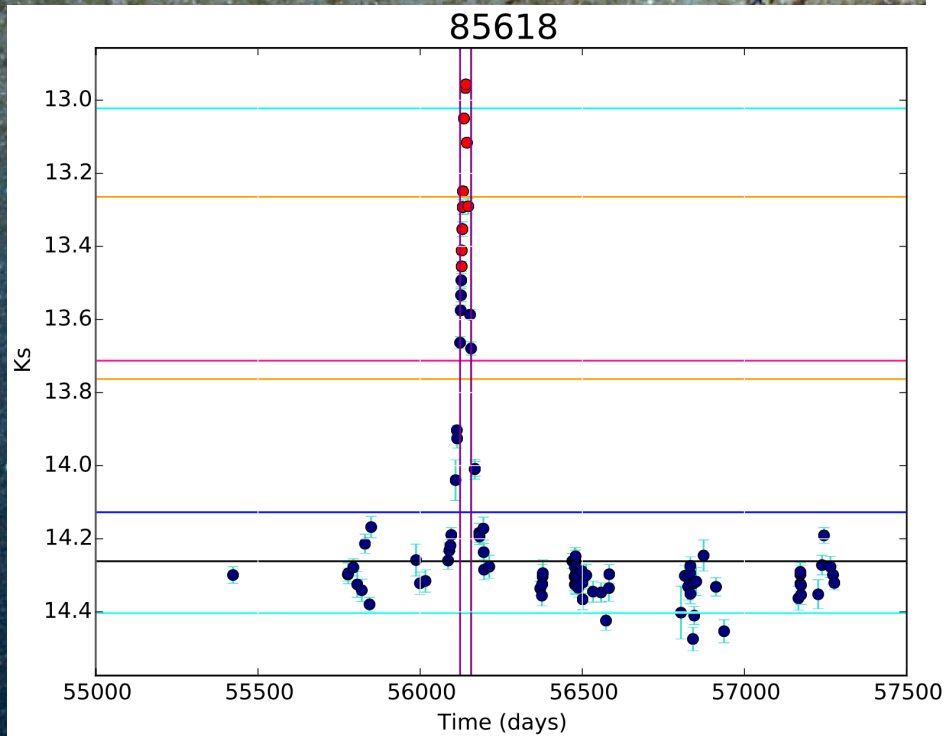
Diameter: 4m

Cerro Paranal

VIRCAM

FoV : 1.5 deg² (tile)

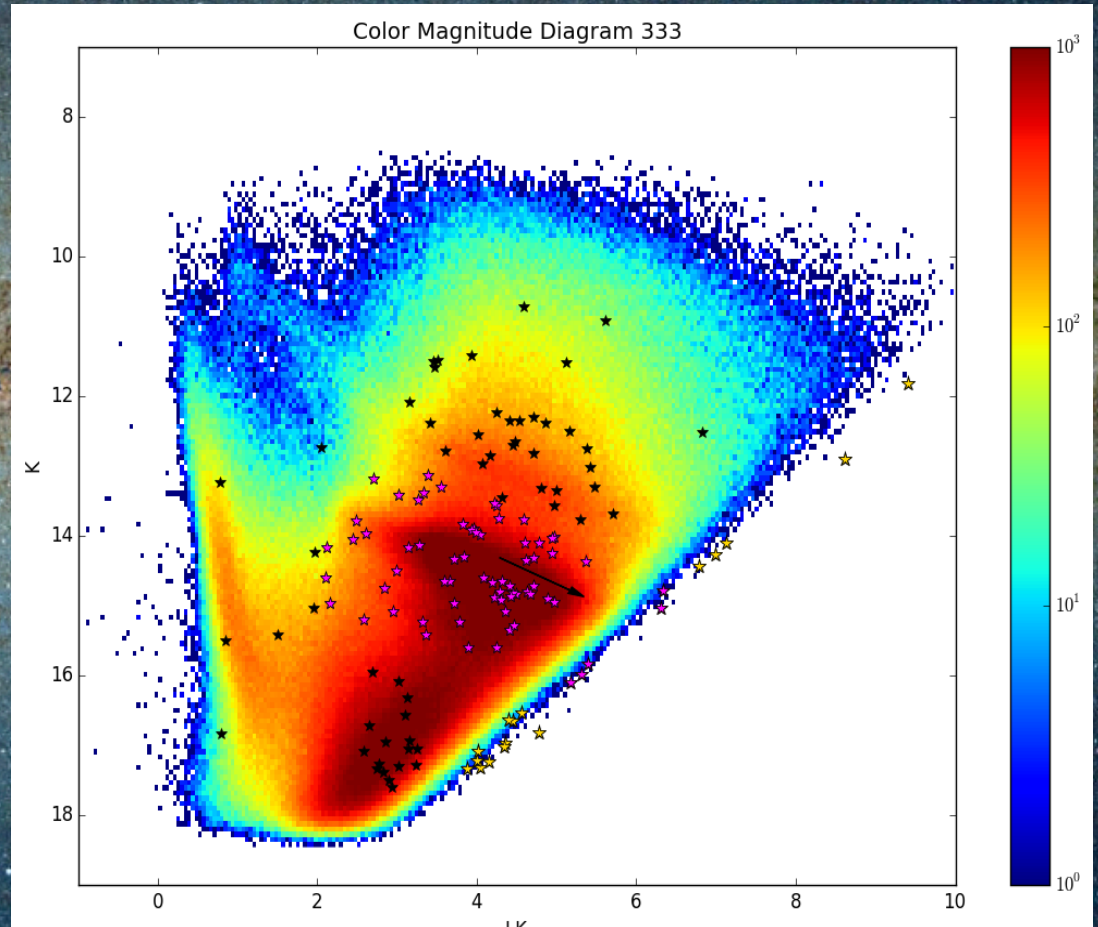
Detection and Fitting Procedure



Results
~ 200 microlensing events

Future Work

- Extend the sample
- Timescale analysis
- Optical depth



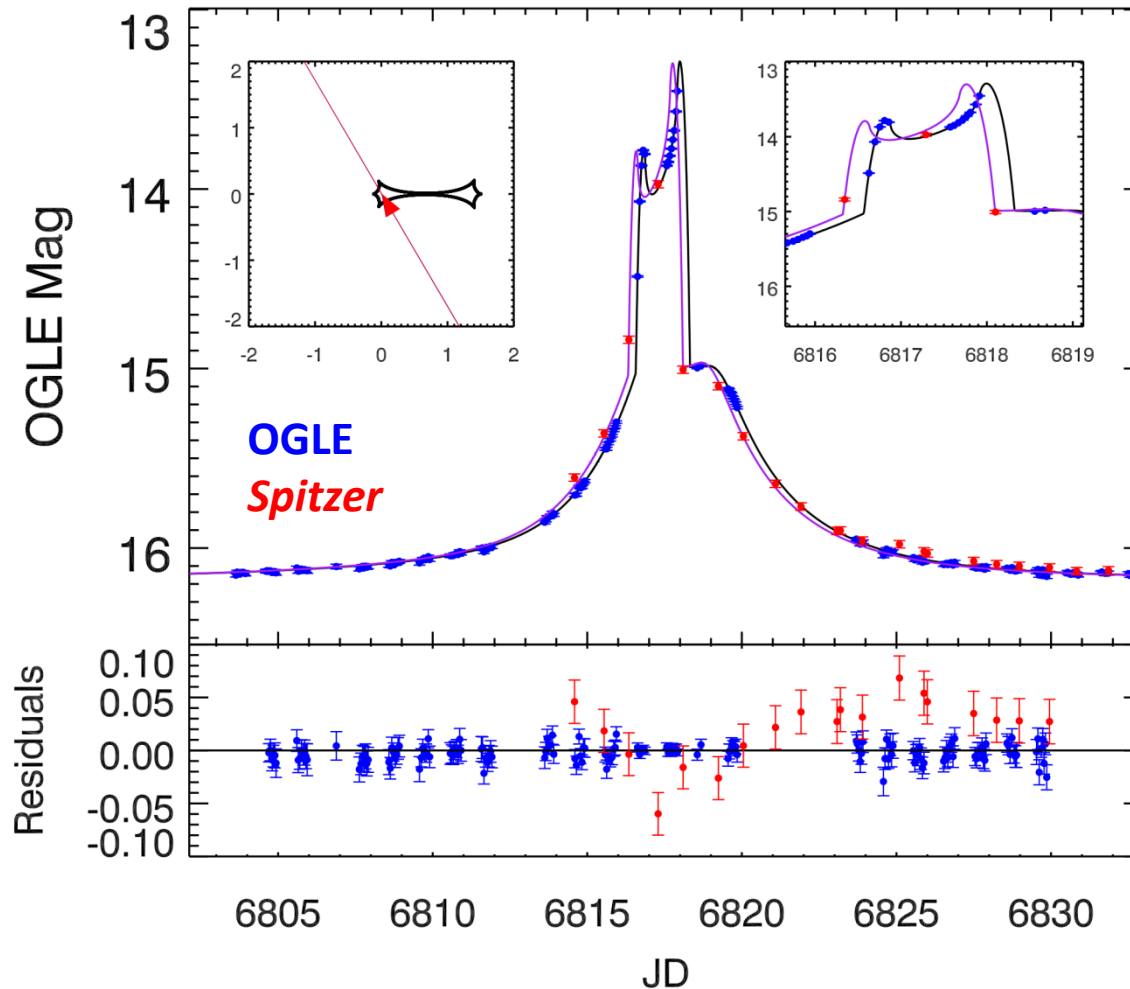
Acknowledgements:
"SOCHIAS grant through ALMA/
CONICYT Project #31160034

OGLE-2014-BLG-0962: Characterizing an M-dwarf Binary in the Galactic Bulge

Yutong Shan¹, Jennifer Yee², In-Gu Shin²

¹Harvard-Smithsonian Centre for Astrophysics

²Smithsonian Astrophysical Observatory

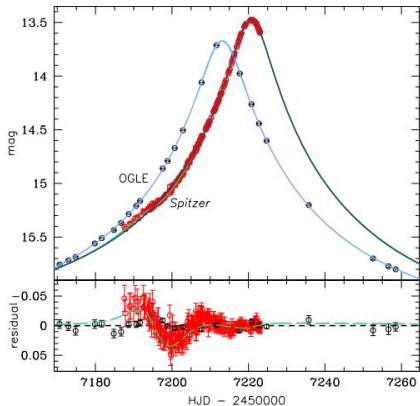




Detrending Spitzer Microlensing Light Curve using Pixel Level Decorrelation

OGLE-2015-BLG-0448

Spitzer Photometry obtained from PRF fitting pipeline (Calchi Novati et al. 2015)



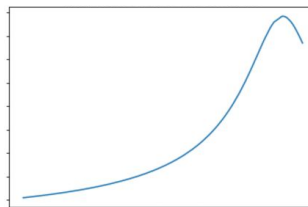
Poleski et al. (2016)

**Systematics
or
Astrophysics?**



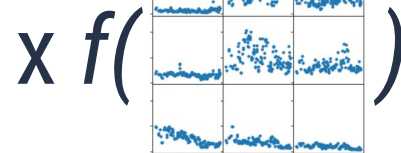
Pixel Level Decorrelation

Astrophysics



Flux (t) =

Fraction of total flux measured by each pixel



Systematics (Pointing, Intra-pixel sensitivity variation) affects the fraction of the total flux measured by each pixel
The astrophysics does not!

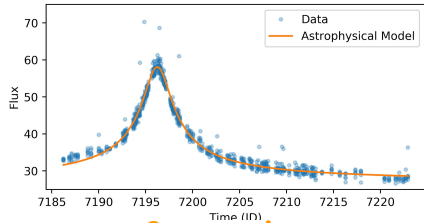




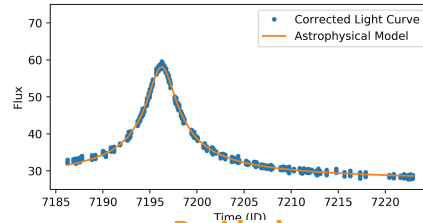
Detrending Spitzer Microlensing Light Curve using Pixel Level Decorrelation

OGLE-2015-BLG-0845

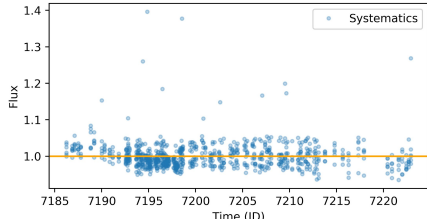
Before (RMS = 1.55)



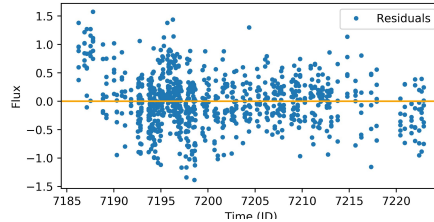
After (RMS = 0.46)



Systematics

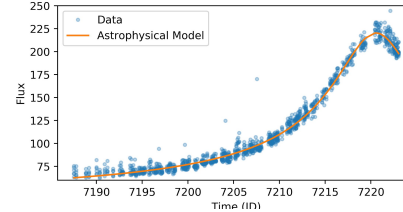


Residuals

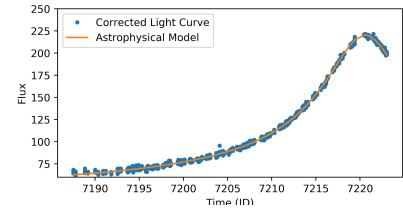


OGLE-2015-BLG-0448

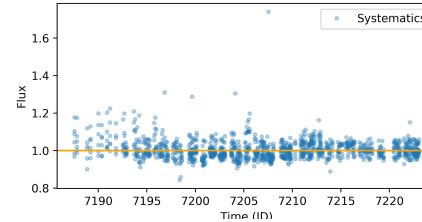
Before (RMS = 5.56)



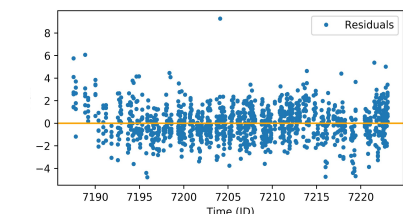
After (RMS = 1.46)



Systematics



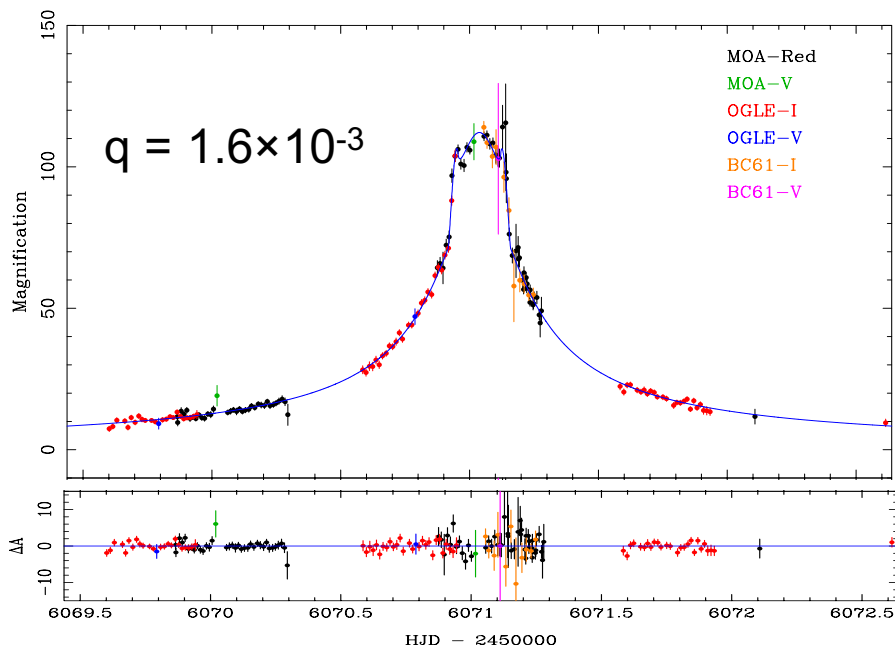
Residuals



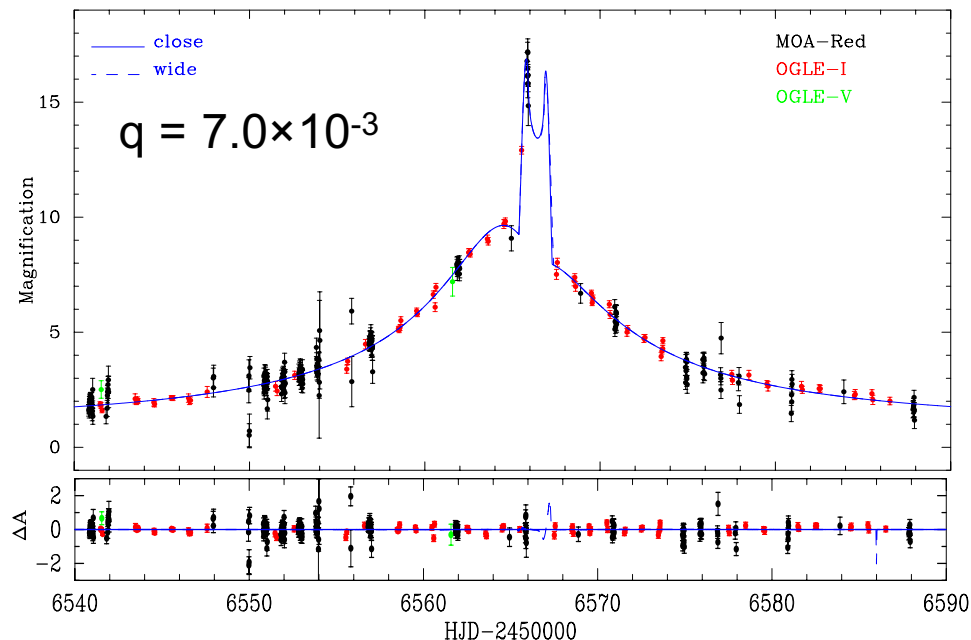
Modeling Planetary and Binary Microlensing Events



Yuki Hirao, Ph.D student, Osaka Univ.,
MOA collaboration



OGLE-2012-BLG-0724Lb (Hirao et al. 2016)
Saturn mass planet around an M dwarf



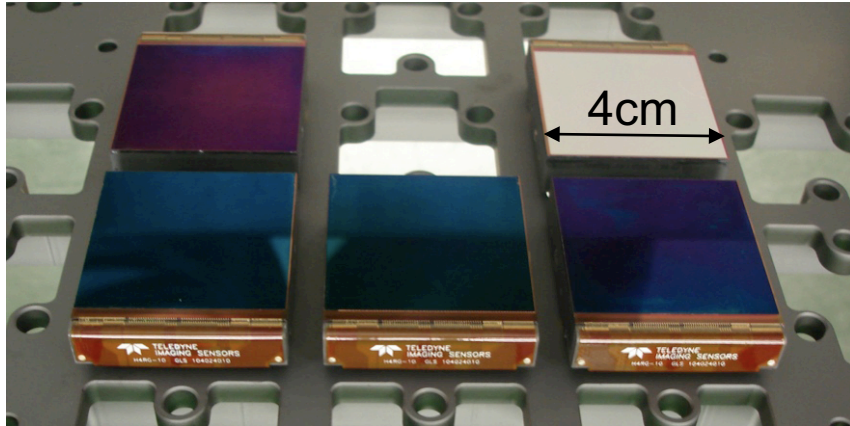
OGLE-2013-BLG-1761Lb (Hirao et al. 2017)
Massive planet around an M/K dwarf

- Real Time Modeling

<http://iral2.ess.sci.osaka-u.ac.jp/~moa/anomaly/2017/>

Preliminary Work

Designing the Wide FOV NIR Camera for *PRIME* (Prime Focus Infrared Microlensing Experiment) Telescope

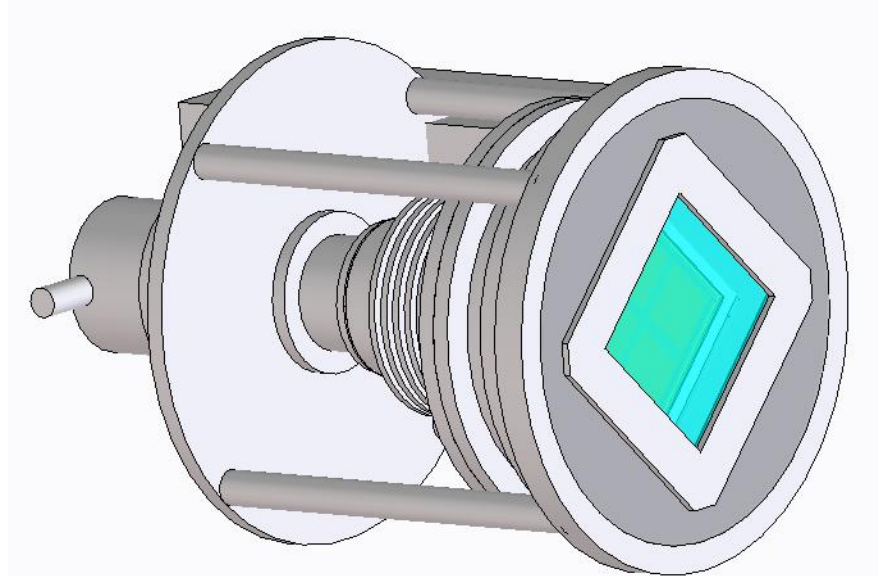


Four 4k×4k pixels H4RG-10 detectors



Developed at GSFC and Installed at SAAO

- Diameter: 1.8m (f/2.29)
- Image Area: 89.9mm × 89.9mm
- FOV: 1.25deg × 1.25deg = 1.56 deg²
- Operating Temperature: 80~100K



Conceptual Drawing of the Camera