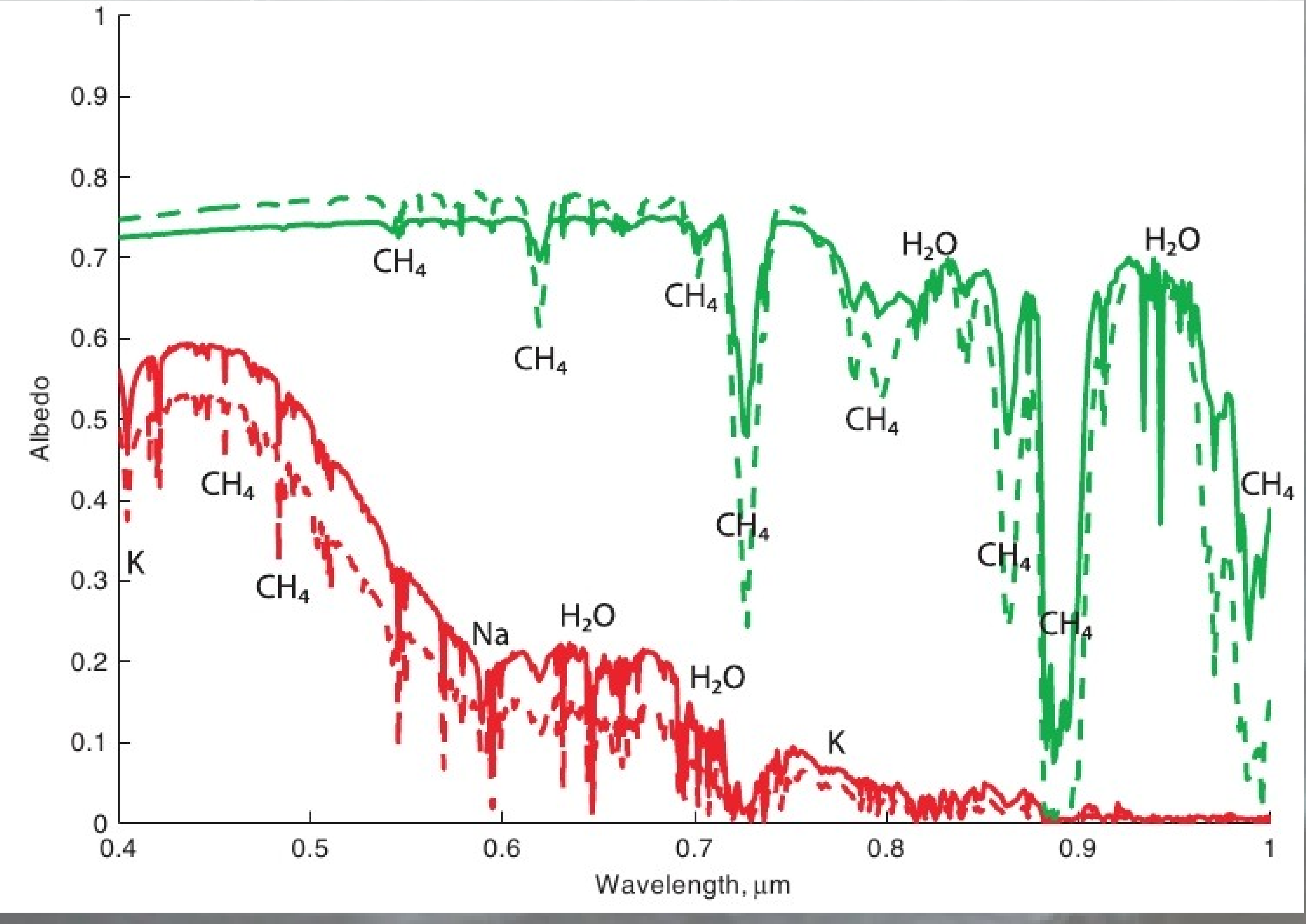
Observational Plans for the Upcoming Year

What strategy is most likely to pay off with observable results?

Maximum Flexibility to interpret models:

Spectroscopy can be binned to any wavelength range of interest- so this is the most flexible.

This is observing plan #1



Facilities of Interest

McDonald Obs (optical emphasis): Low-res spectrograph to 1 micron.

NOAO Facilities:

AAT (3.9m): IRIS2- R=2400 spectroscopy 1-2.5 microns

SOAR (4m): OSIRIS- IR spectroscopy 0.9-2.4 microns

Facilities of Interest

Steward Obs. Facilities:

Magellan(6.5m): MMIRS- long-slit IR spectroscopy

MMT(6.5m): ARIES: IR spec and Clio2: low-res IR spec

61” Kuiper: FSPED Infrared Spectrograph (Also 2 IR imagers)

Other?

Telescope Deadlines

McDonald Obs: Sept. 30 for Dec-Mar, 2015

NOAO: Sept. 25 for Jan-Jun, 2015

Steward: Oct 1 for Jan-July, 2015

Strategy:

Apply to observe as relatively large a planet as we can, which has not been extensively published.

Shannon found a fall/winter target- but unless we can get 'friend' time, it looks like we will be applying for spring.

Observing Plan #2

Continue to strive for that 'best' data set from Baker. We have several fields already observed, so can pick which targets are the most likely to produce results. Observe them under only optimal conditions.

We could try defocusing too

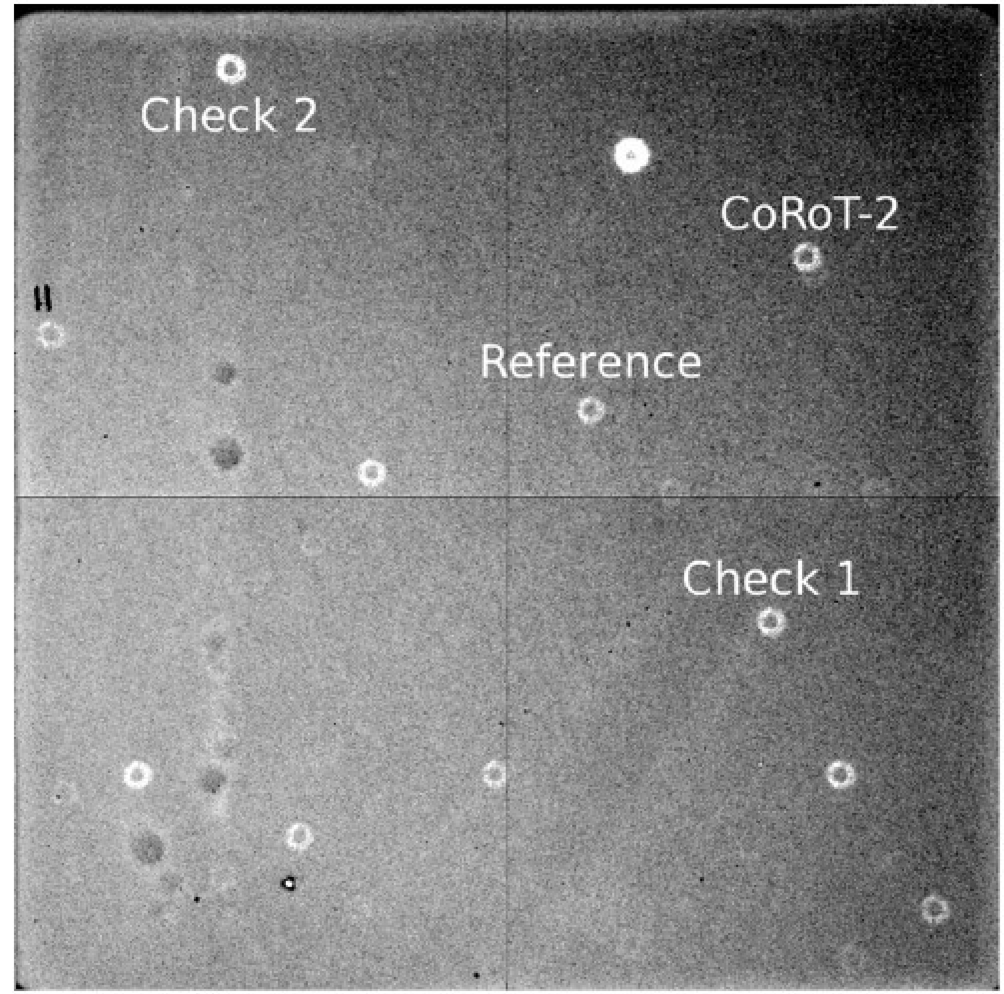
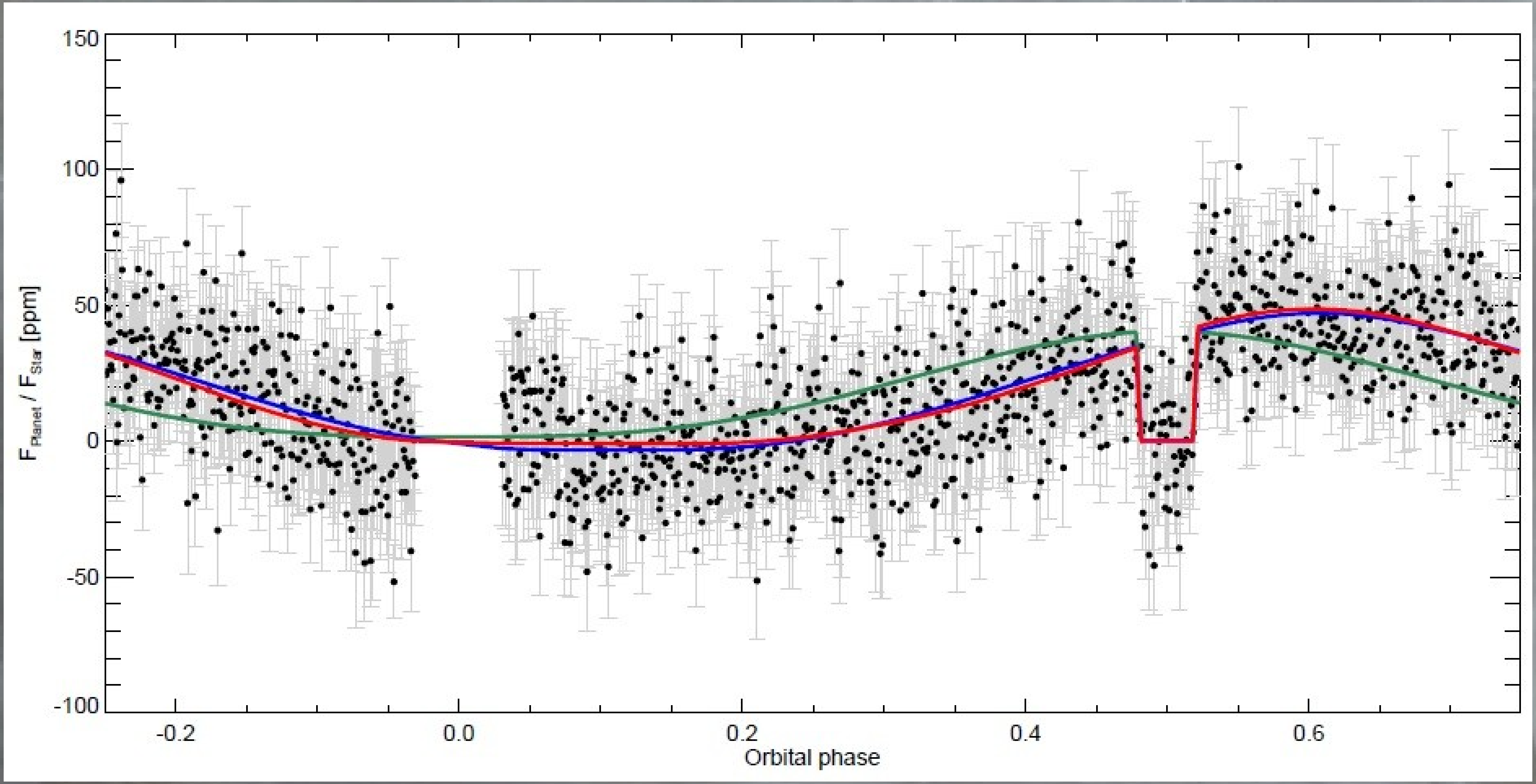
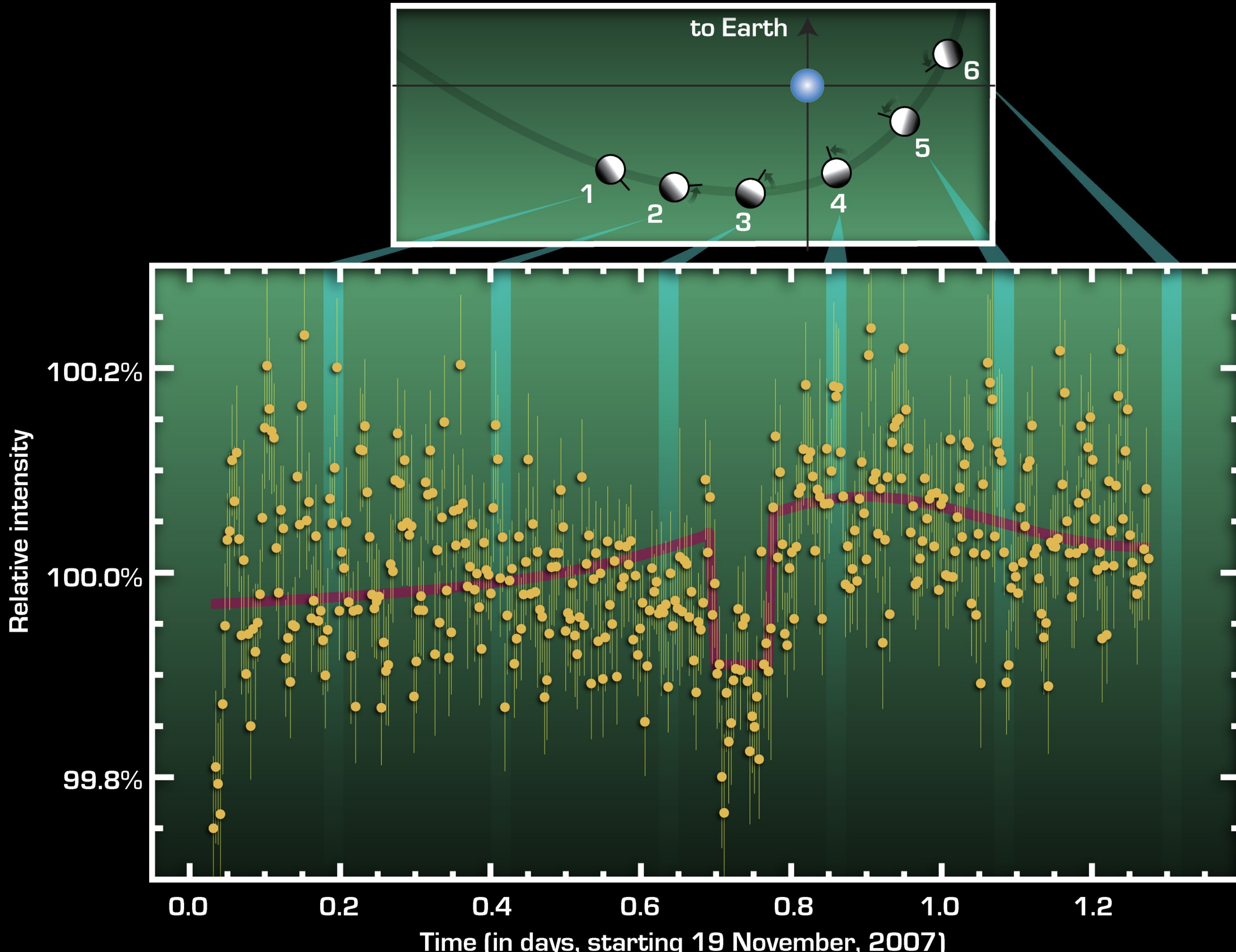


Figure 1. Sample raw image of the observed field in the K_s filter, showing the location of the target, the reference star used, and the two check stars that were used in Section 3.2 to estimate the effect of the systematic noises.

Observing Plan #3
Examine Kepler & CoRoT lightcurves to search for i) secondary eclipses, and ii) offset hot spots.





HD 80606 Infrared Light Curve

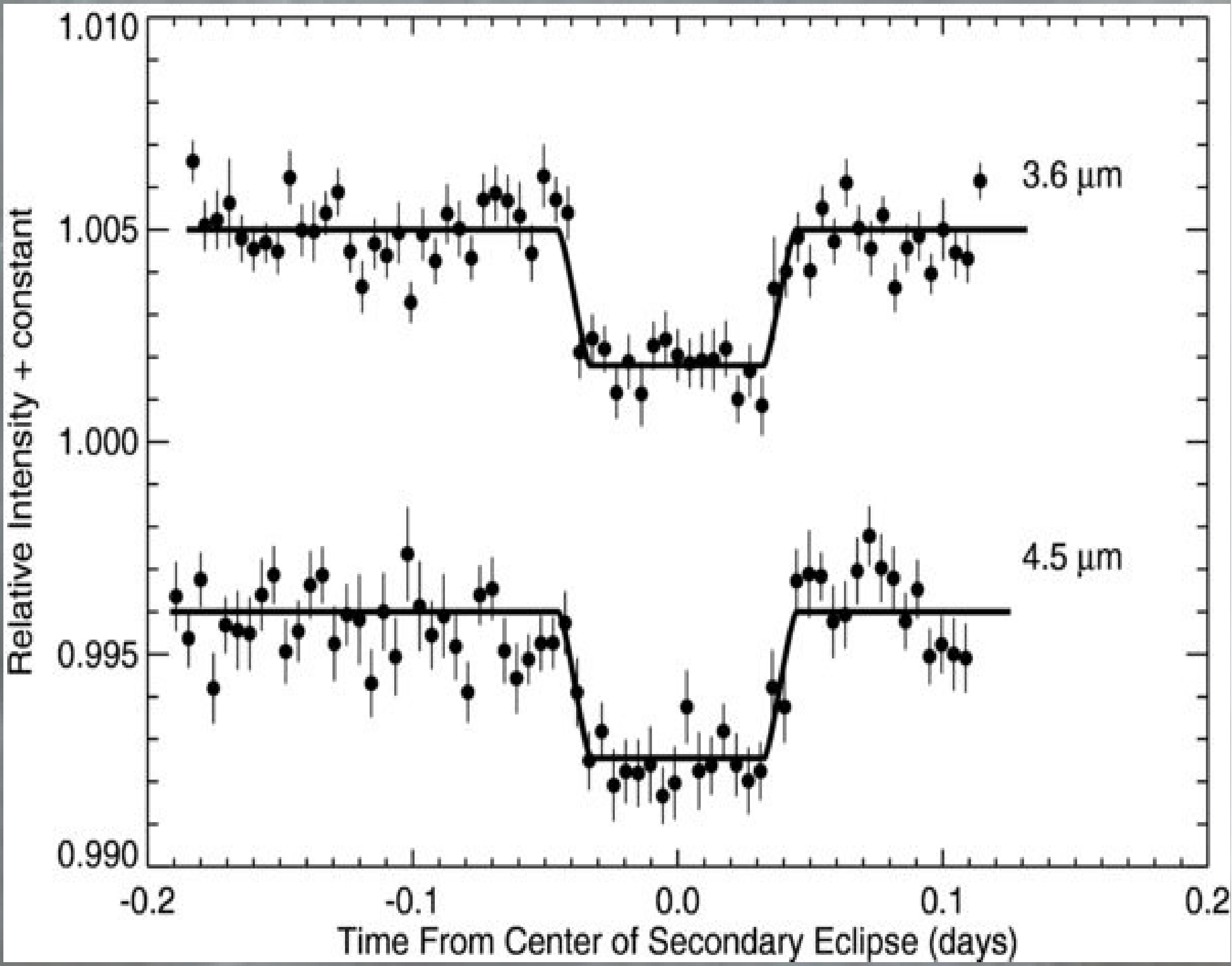
Spitzer Space Telescope • IRAC

NASA / JPL-Caltech / G. Laughlin (UCO/Lick Observatory)

ssc2009-02a

Photometrically observe in 2 wavebands to compare secondary eclipse depth to constrain temperature.

Another observing possibility



GROUND-BASED NEAR-INFRARED OBSERVATIONS OF THE SECONDARY ECLIPSE OF CoRoT-2b*

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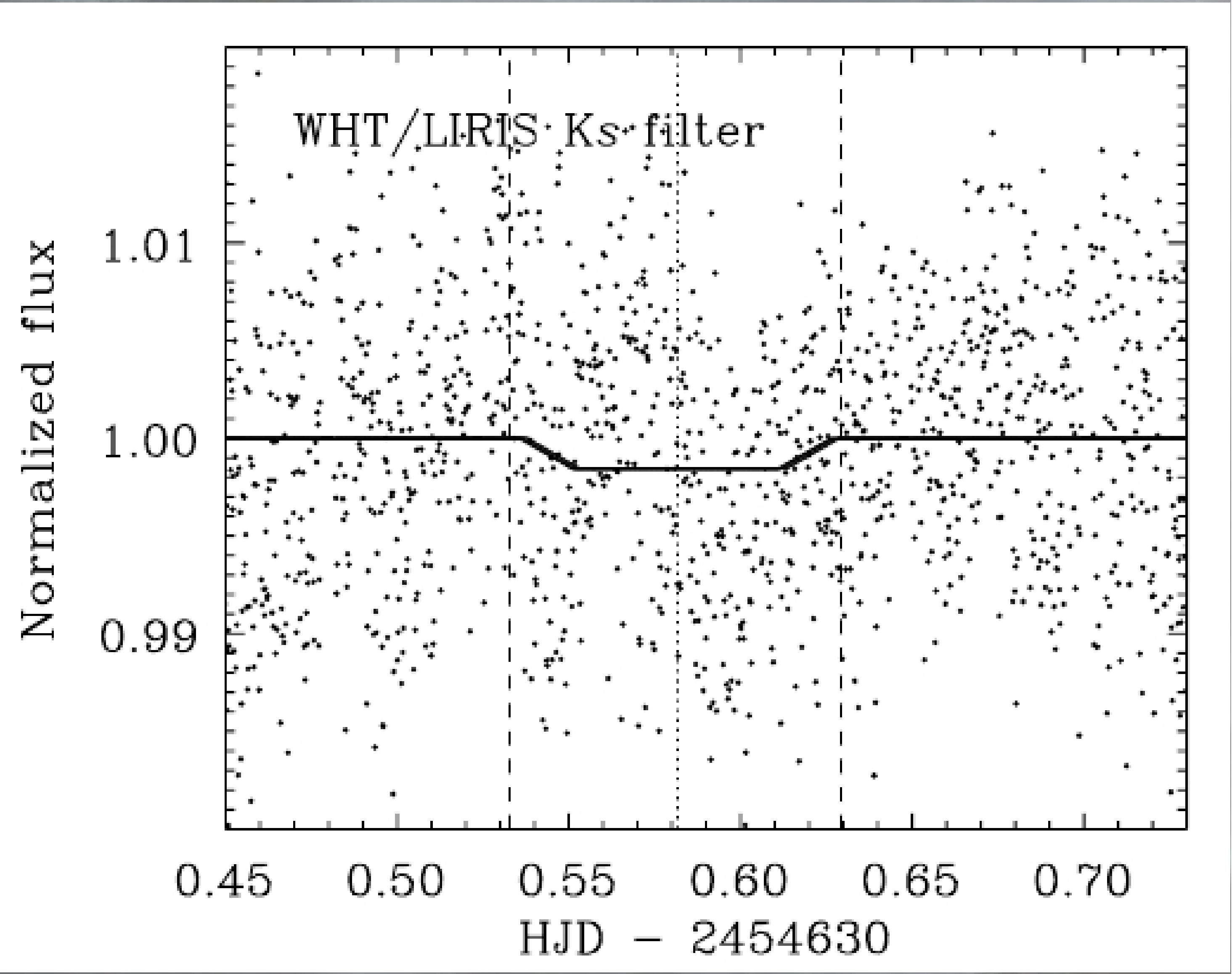
ABSTRACT

We present the results of a ground-based search for the secondary eclipse of the 3.3 $M_{\rm Jup}$ transiting planet CoRoT-2b. We performed near-infrared photometry using the LIRIS instrument on the 4.2 m William Herschel Telescope, in the H and K_s filters. We monitored the star around two expected secondary eclipses in two nights under very good observing conditions. For the depth of the secondary eclipse, in the H band we found a 3σ upper limit of 0.17%, whereas we detected a tentative eclipse with a depth of 0.16% ± 0.09% in the K_s band. These depths can be translated into brightness temperatures of $T_H < 2250$ K and $T_{K_s} = 1890^{+260}_{-350}$ K, which indicate an inefficient re-distribution of the incident stellar flux from the planet's day side to its night side. Our results are in agreement with the CoRoT optical measurement (Alonso et al.) and with *Spitzer* 4.5 and 8 μm results (Gillon et al.).

From 2 secondary eclipses (2 night's work), they constrain the planet's temperature.

Ground-based data: I find their results somewhat unconvincing.



Something to work with.

Table 2. Effective Temperature and Burrows et al. Model Parameters for Extrasolar Giant Planets

Name	T_{eff} (K) [a]	κ_e	P_n	Reference
TrES-3	2000	0.01	0.3	Fressin et al. (2010)
WASP-4b	2000	0.03	0.3	This paper
HD 189733b	1400	0.035	0.15	Grillmair et al. (2008)
HD 209458b	1700	0.1	0.3	Burrows et al. (2007b)
TrES-4	2100	0.1	0.3	Knutson et al. (2009a)
XO-1b	1400	0.1	0.3	Machalek et al. (2008)
XO-2b	1600	0.1	0.3	Machalek et al. (2009)
TrES-2	1800	0.3	0.3	Spiegel & Burrows (2010)
HAT-P-7b	2500	1.1	0.0	Spiegel & Burrows (2010)

Note. [a]Predicted blackbody temperature for the planet assuming an albedo of zero and no nightside redistribution of energy.

So maybe we target our observations around transits and secondary eclipses only.

Observing Plans:

1) IR spectroscopy.

2) Baker 'best data' limits.

3) Kepler & CoRoT data.

4) IR photometry of secondary eclipses.