

# KIC 009639021

## Q1-17 DR25 TCE Parameters

TCE	Run Type	KOI?	Period (Days)	Epoch (BKJD)	Depth (ppm)	Duration (Hours)	MES	SNR	$R_{\star}$ ( $R_{\odot}$ )	$T_{\star}$ (K)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009639021-01	OBS	7950.01	2.215660	132.272517	38.6	1.764	7.4	8.4	0.84	5349	0.63	553.08

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009639021-01	OBS	FP	0.15	0	0	1	0	CENT_UNRESOLVED_OFFSET

**Notes:** OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.

N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

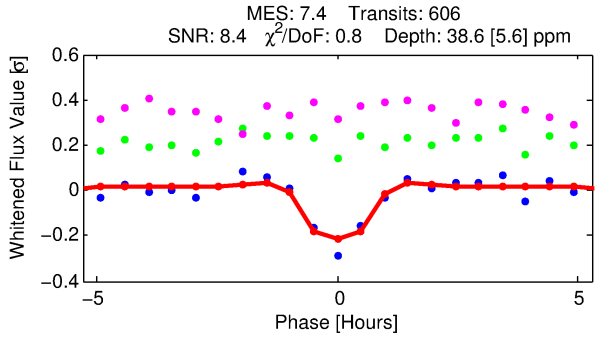
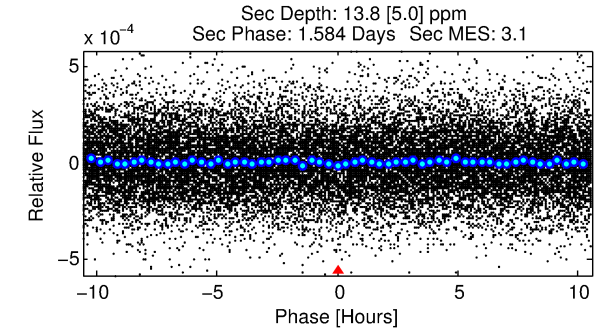
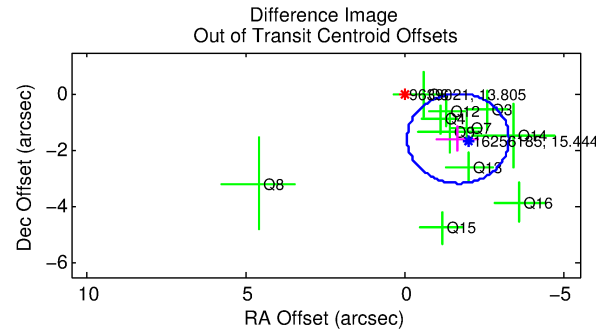
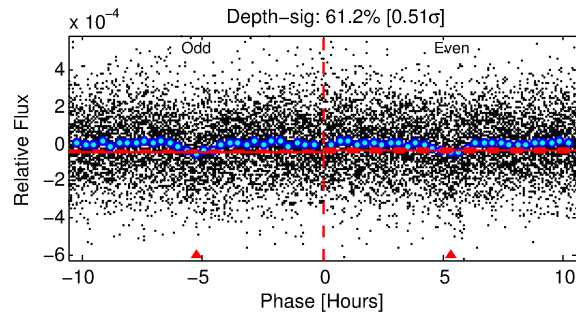
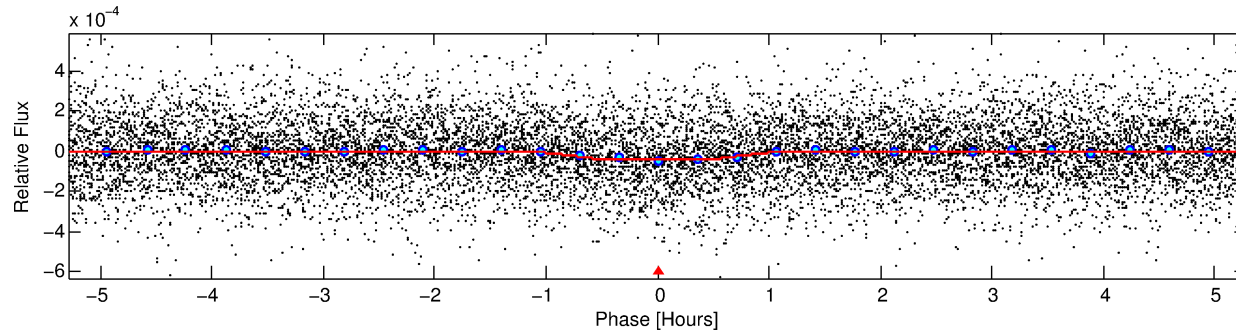
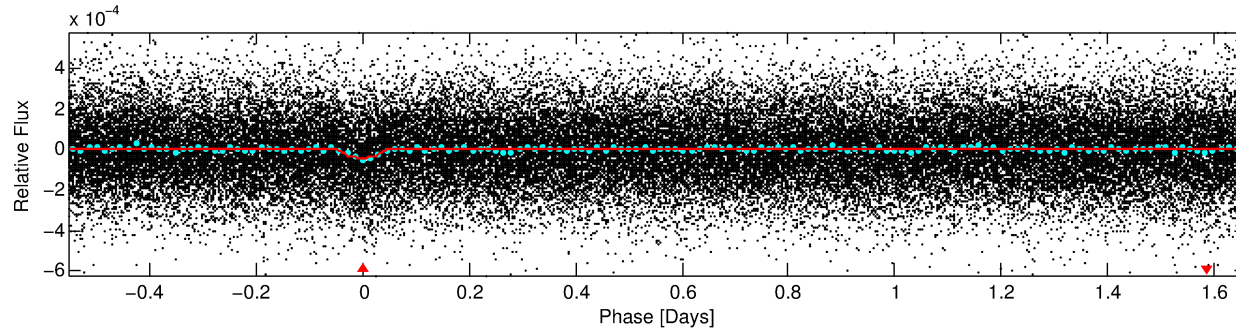
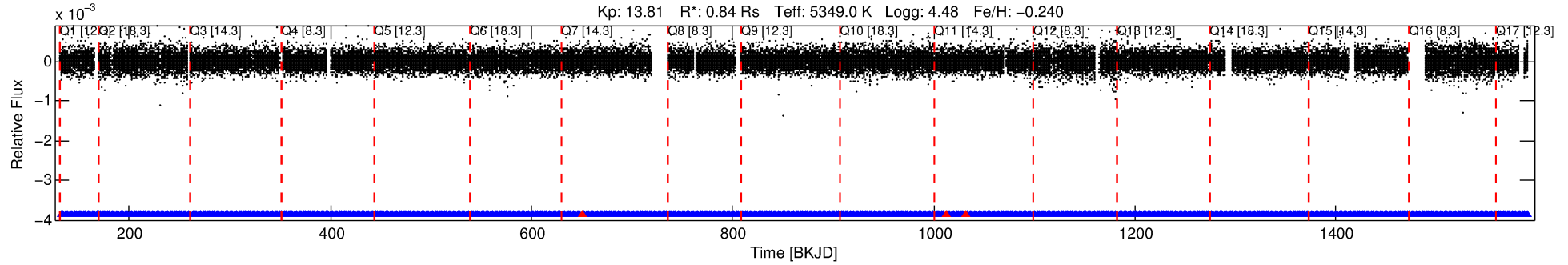
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009639021-01

No Significant Match Found

# DV One-Page Summary

KIC: 9639021 Candidate: 1 of 1 Period: 2.216 d



## DV Fit Results:

Period = 2.21566 [0.00002] d  
Epoch = 132.2725 [0.0031] BKJD  
Rp/R\* = 0.0069 [0.0048]  
a/R\* = 4.35 [12.92]  
b = 0.90 [0.65]  
Seff = 553.08 [130.94]  
Teq = 1237 [73] K  
Rp = 0.63 [0.45] Re  
a = 0.0304 [0.0041] AU  
Ag = 17.91 [26.22] [0.64 $\sigma$ ]  
Teffp = 3933 [1430] K [1.88 $\sigma$ ]

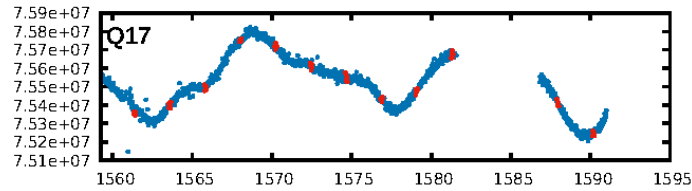
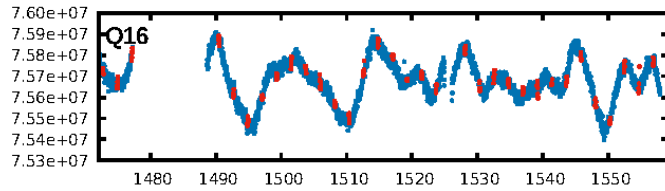
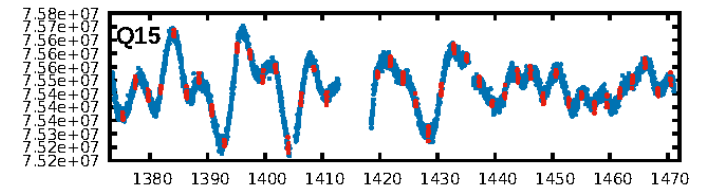
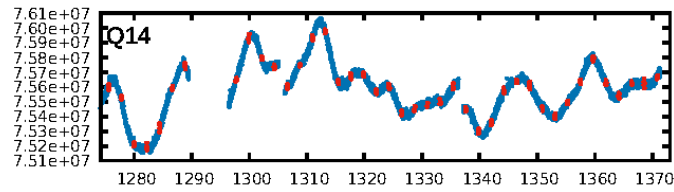
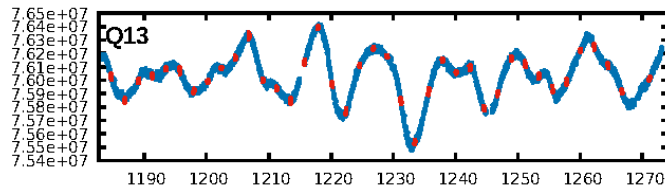
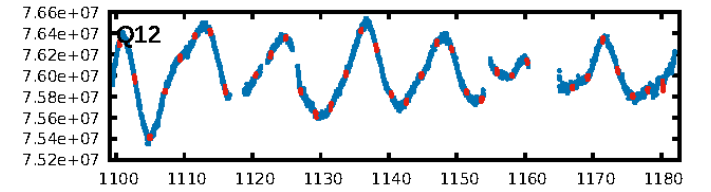
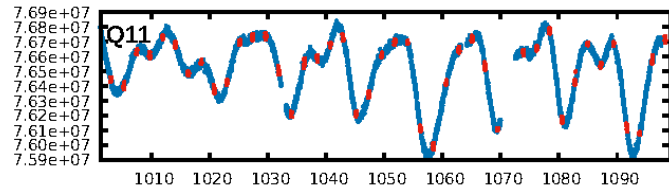
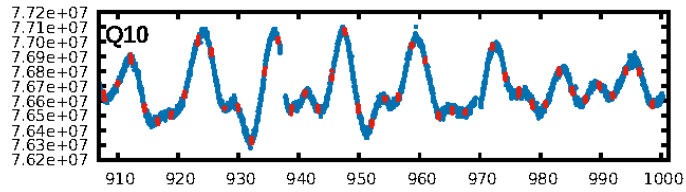
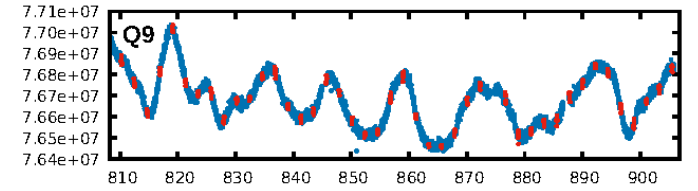
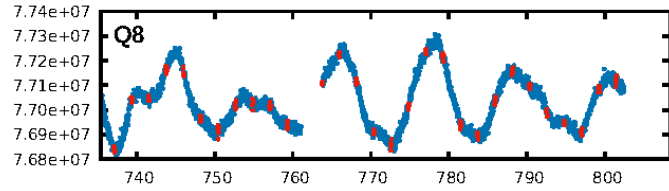
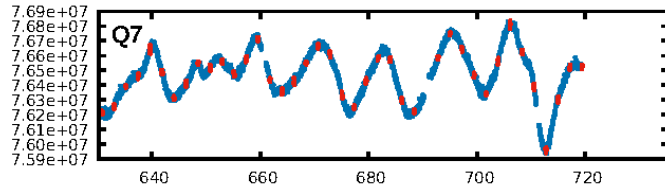
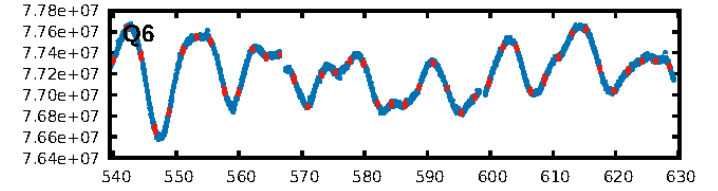
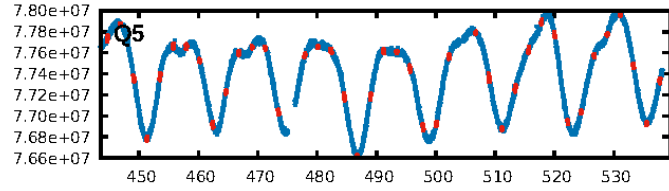
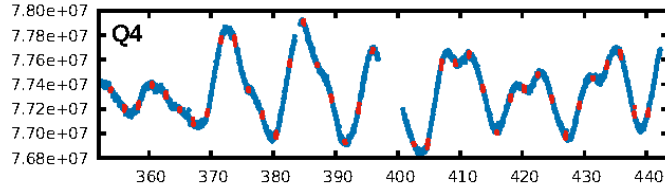
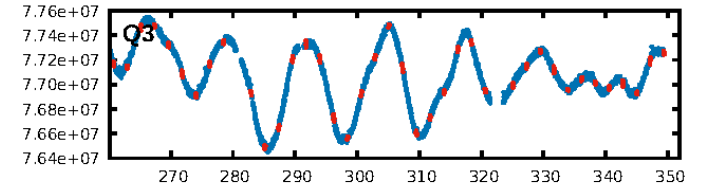
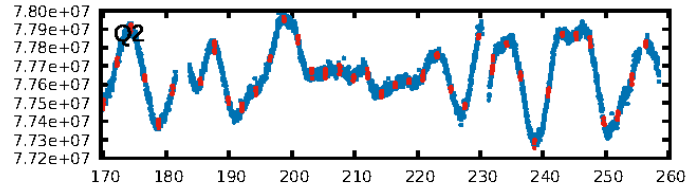
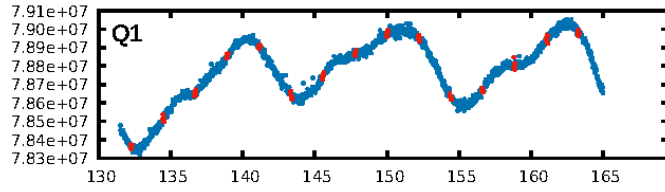
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 4.46e-13  
RollingBand-fgt: 0.99 [576/579]  
**GhostDiagnostic-chr: 0.3662**  
Centroid-sig: 12.7%  
Centroid-so: 1.689 arcsec [1.34 $\sigma$ ]  
**OotOffset-rm: 2.291 arcsec [4.30 $\sigma$ ]**  
**KicOffset-rm: 2.444 arcsec [4.64 $\sigma$ ]**  
OotOffset-st: 2/3/4/2 [11]  
KicOffset-st: 2/3/4/2 [11]  
DiffImageQuality-fgm: 0.36 [4/11]  
DiffImageOverlap-fno: 1.00 [17/17]

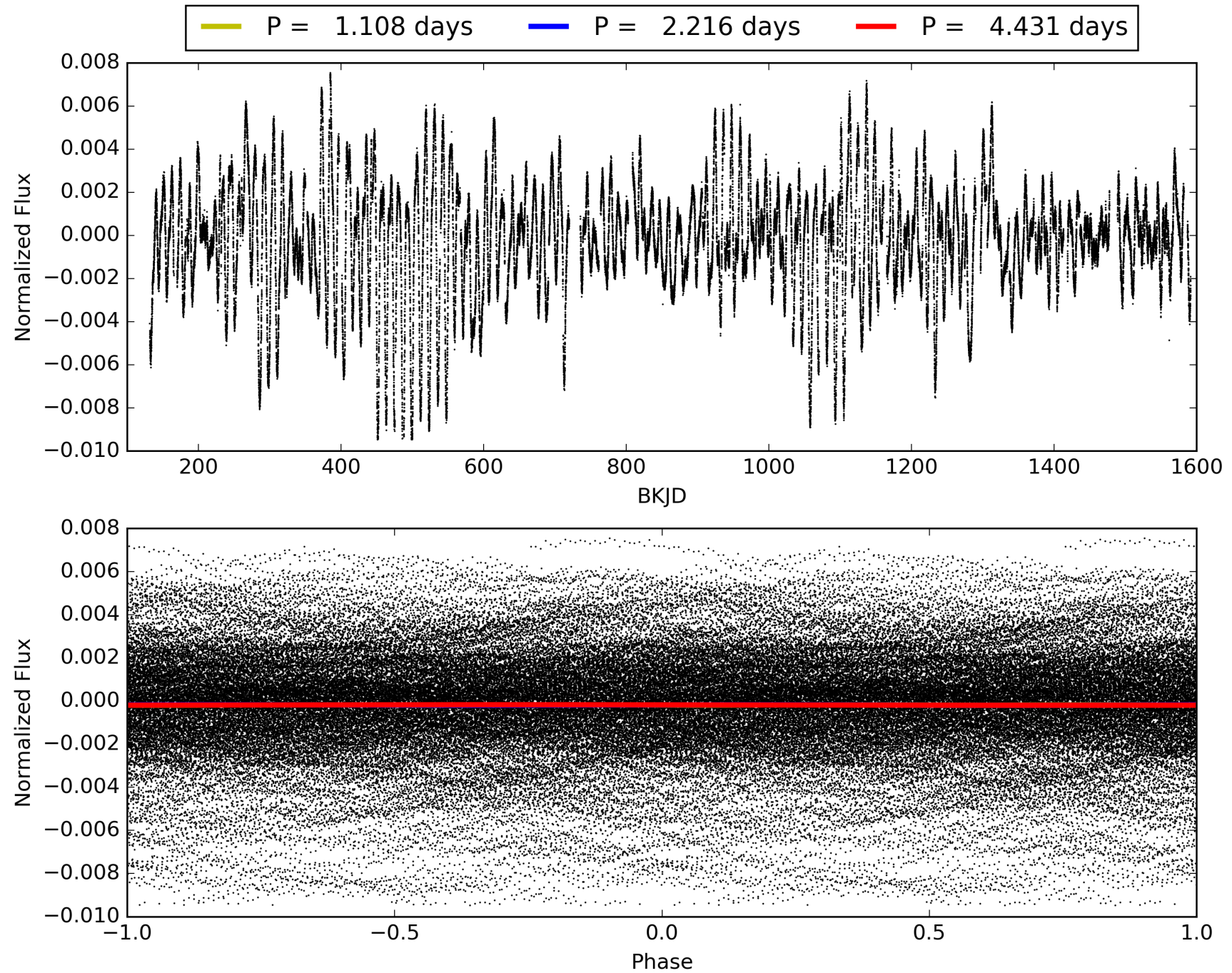
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 28-Jan-2016 22:43:03 Z

This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 009639021-01, PDC Light Curves

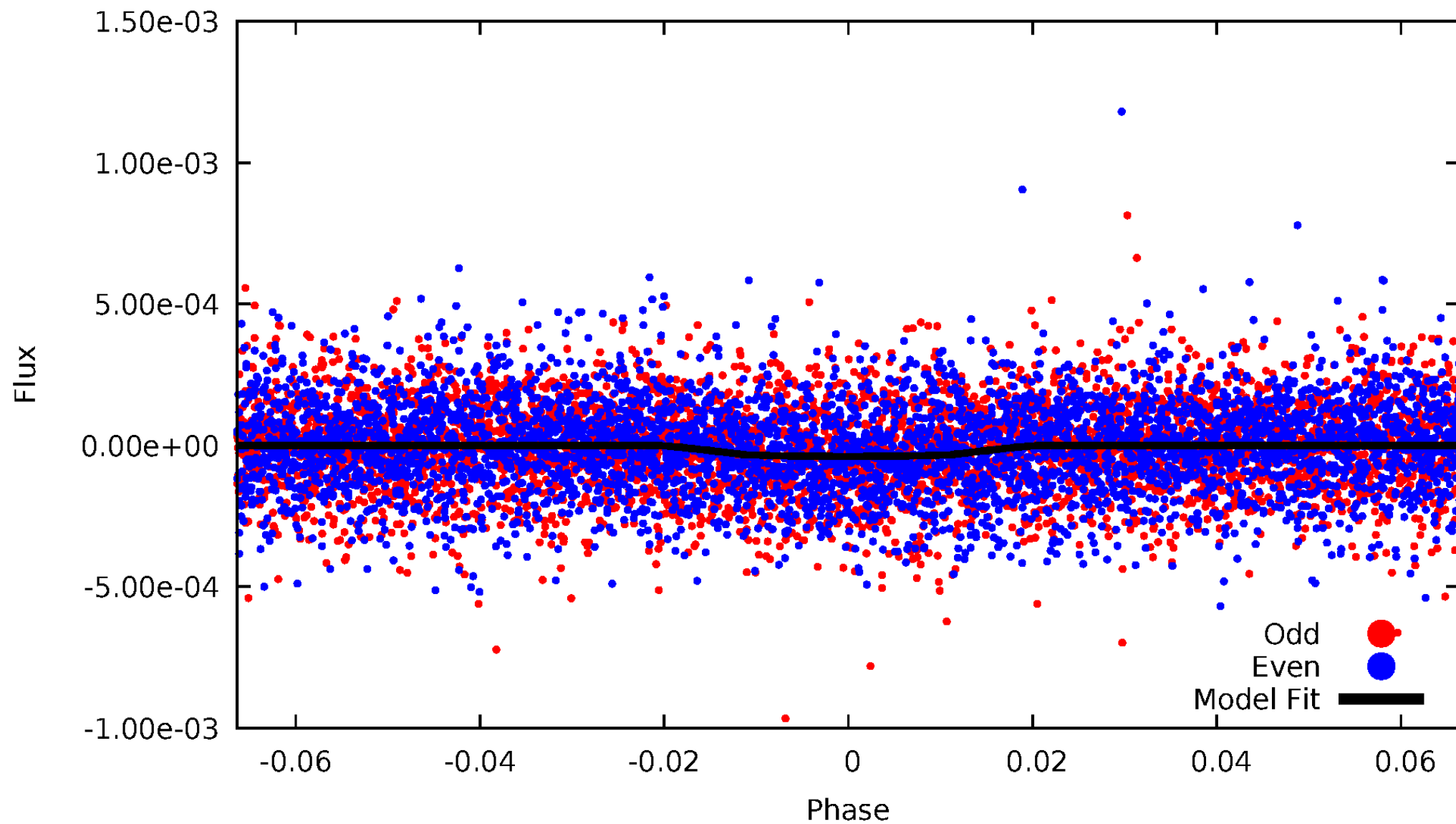


TCE 009639021-01



# DV Odd/Even

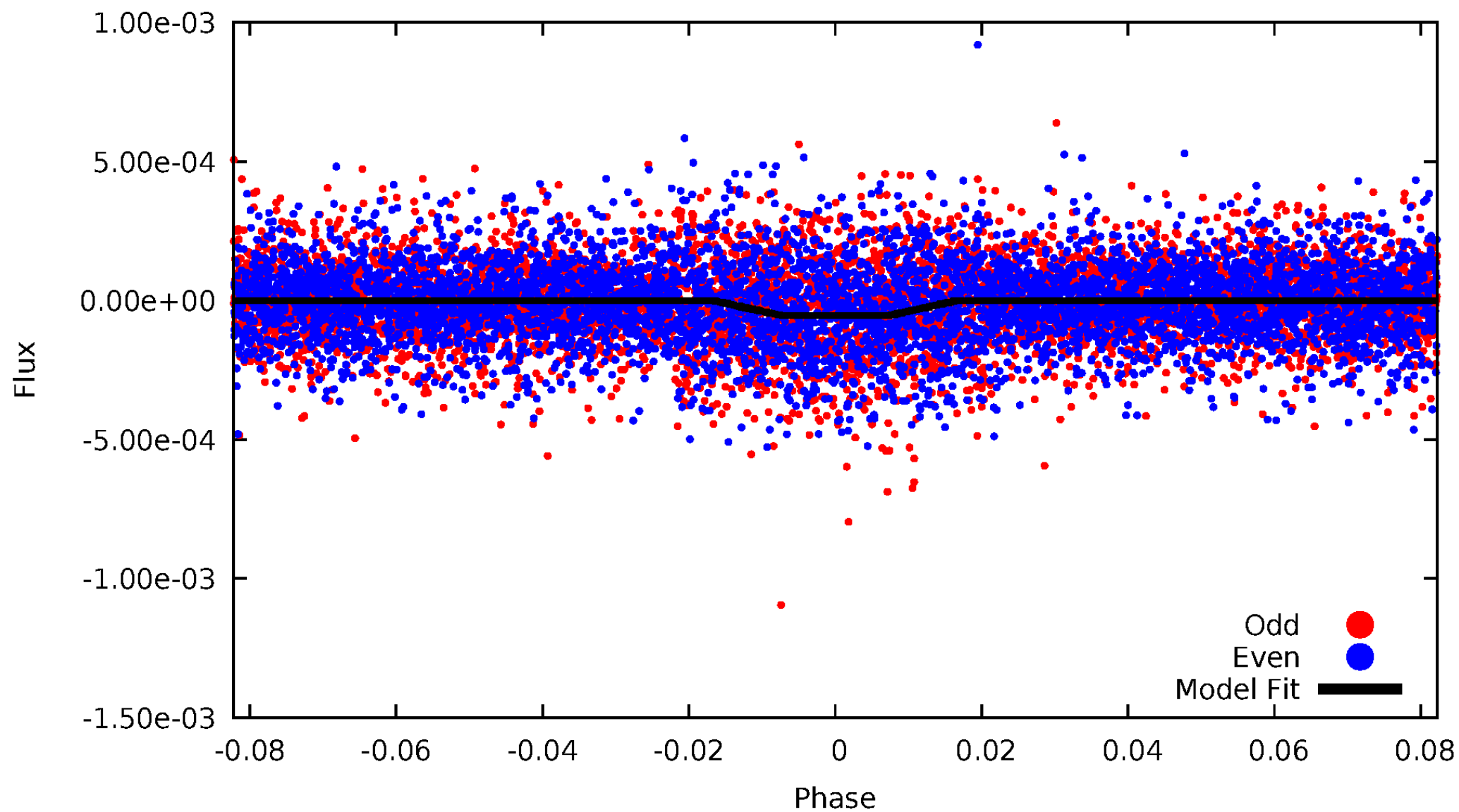
TCE 009639021-01





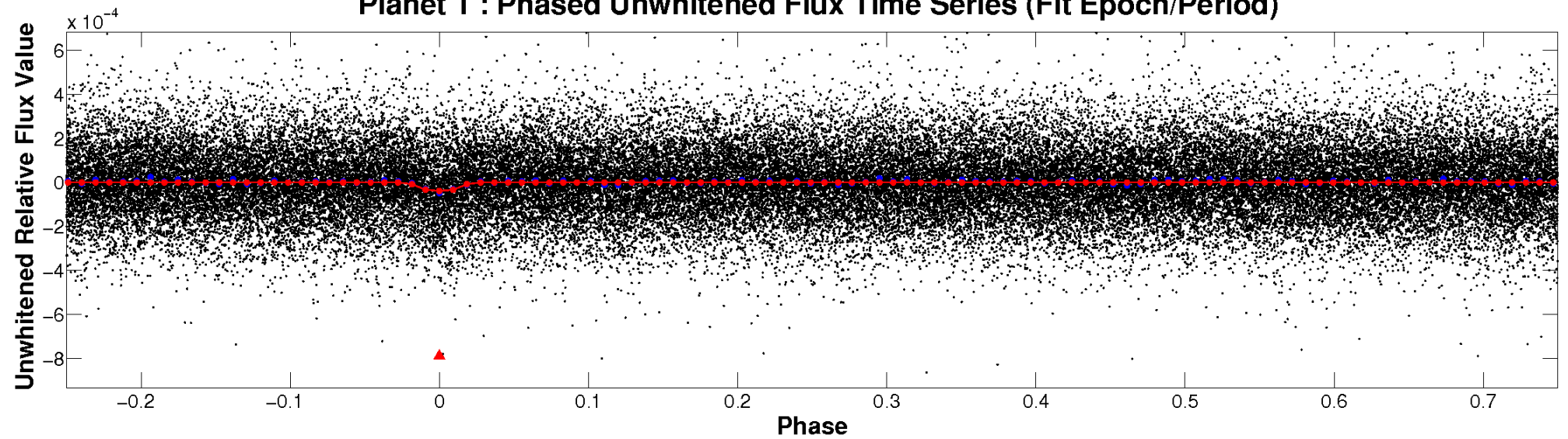
# ALT Odd/Even

TCE 009639021-01

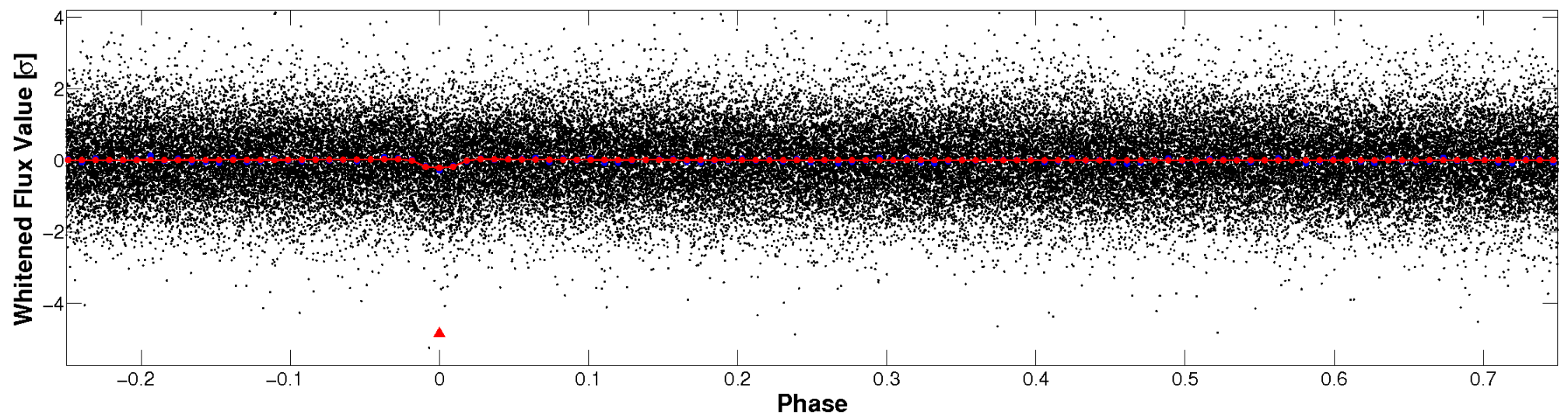


# Non-Whitened Vs. Whitened Light Curve

**Planet 1 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)**

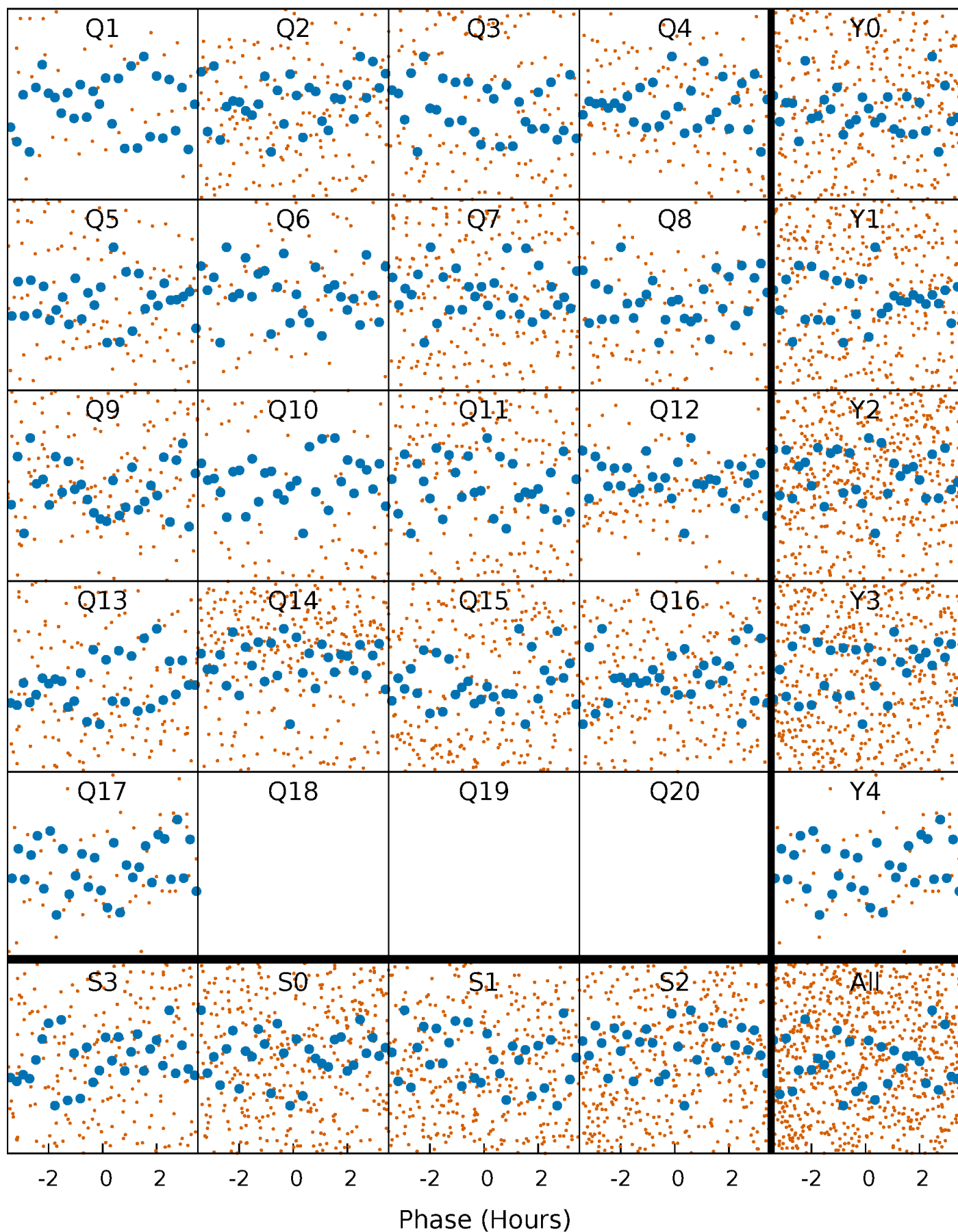


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

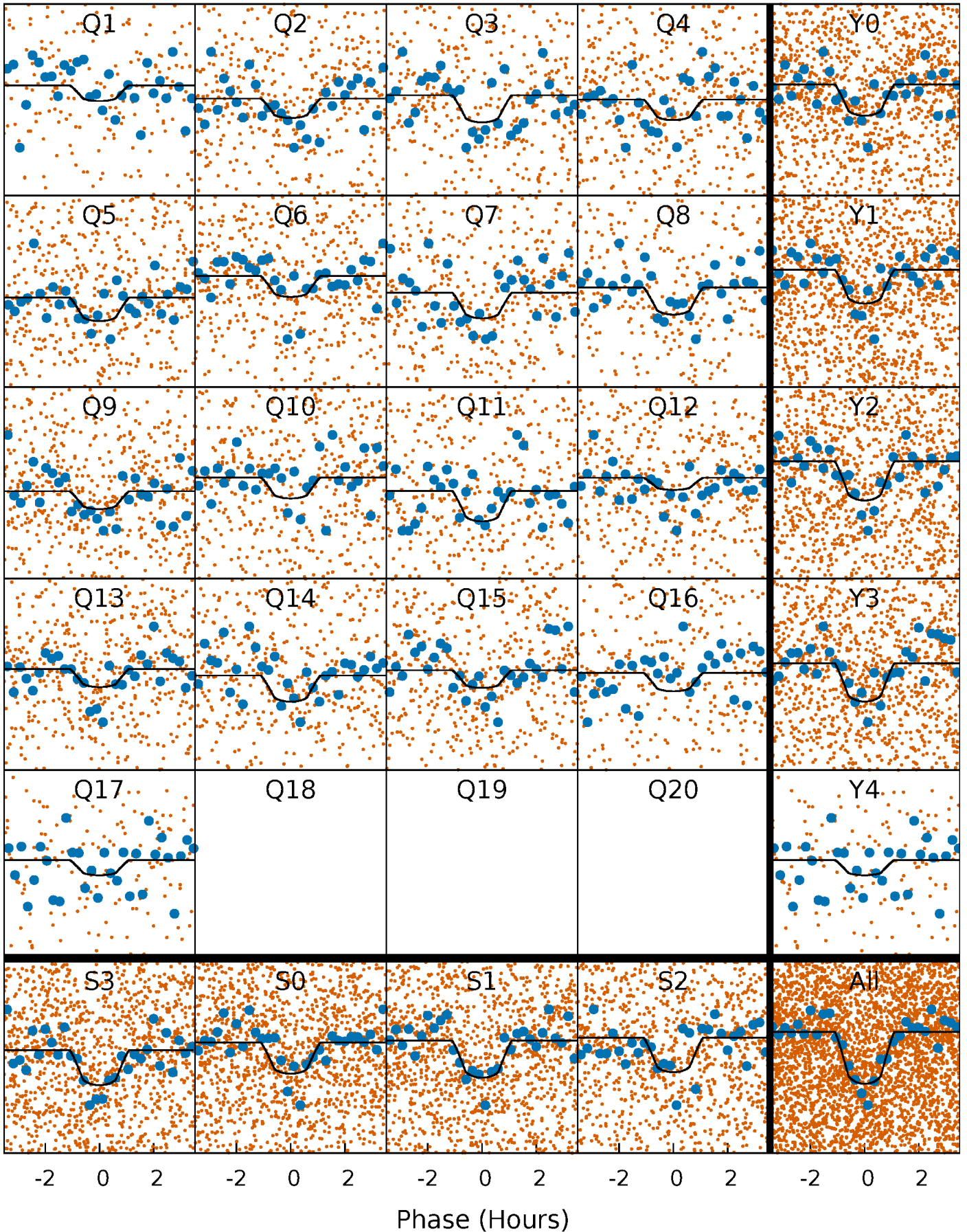
TCE 009639021-01 P= 2.215660 Days  $T_0=132.272517$  (BKJD)





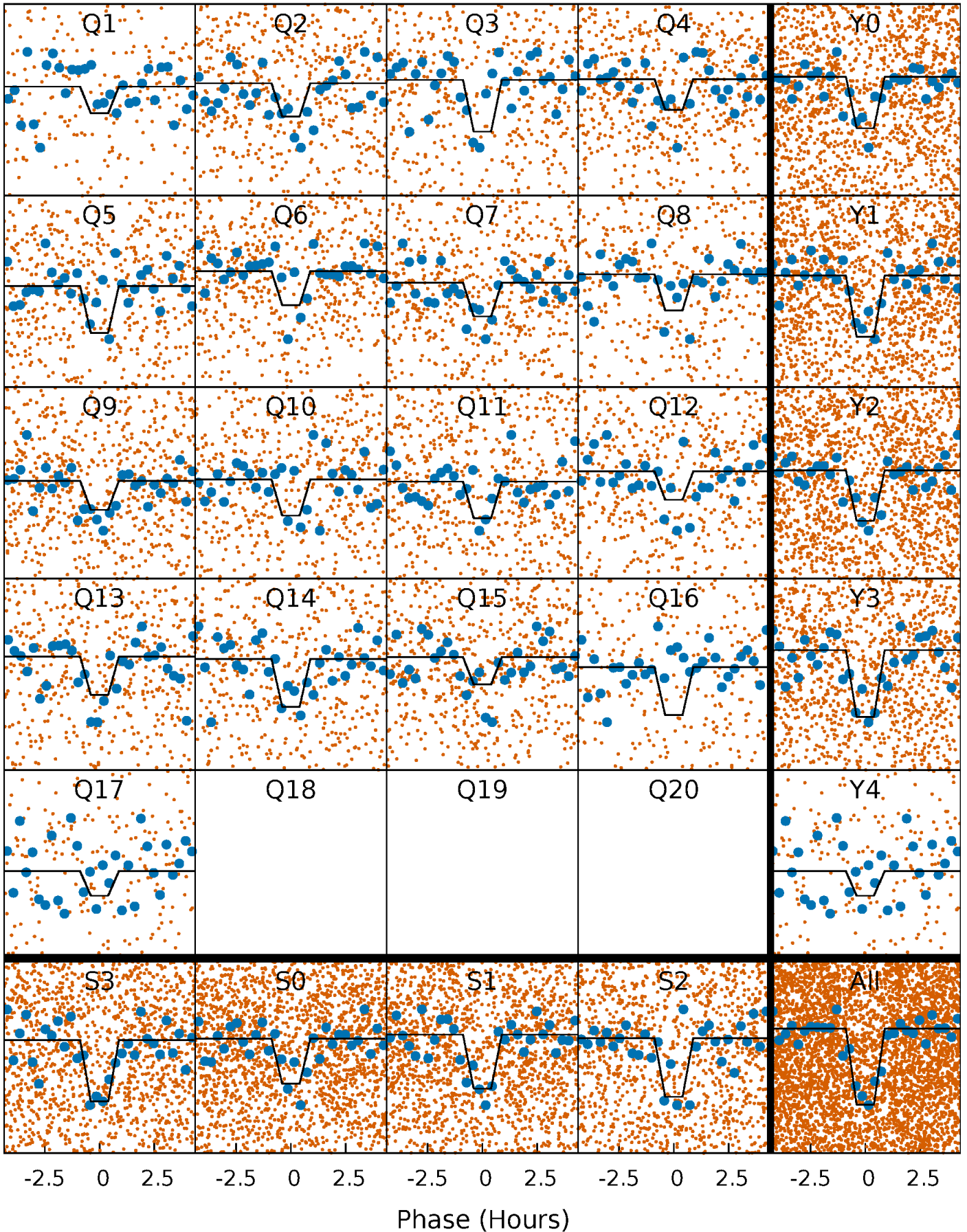
# DV Quarter-Phased Transit Curves

TCE 009639021-01 P= 2.215660 Days  $T_0=132.272517$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

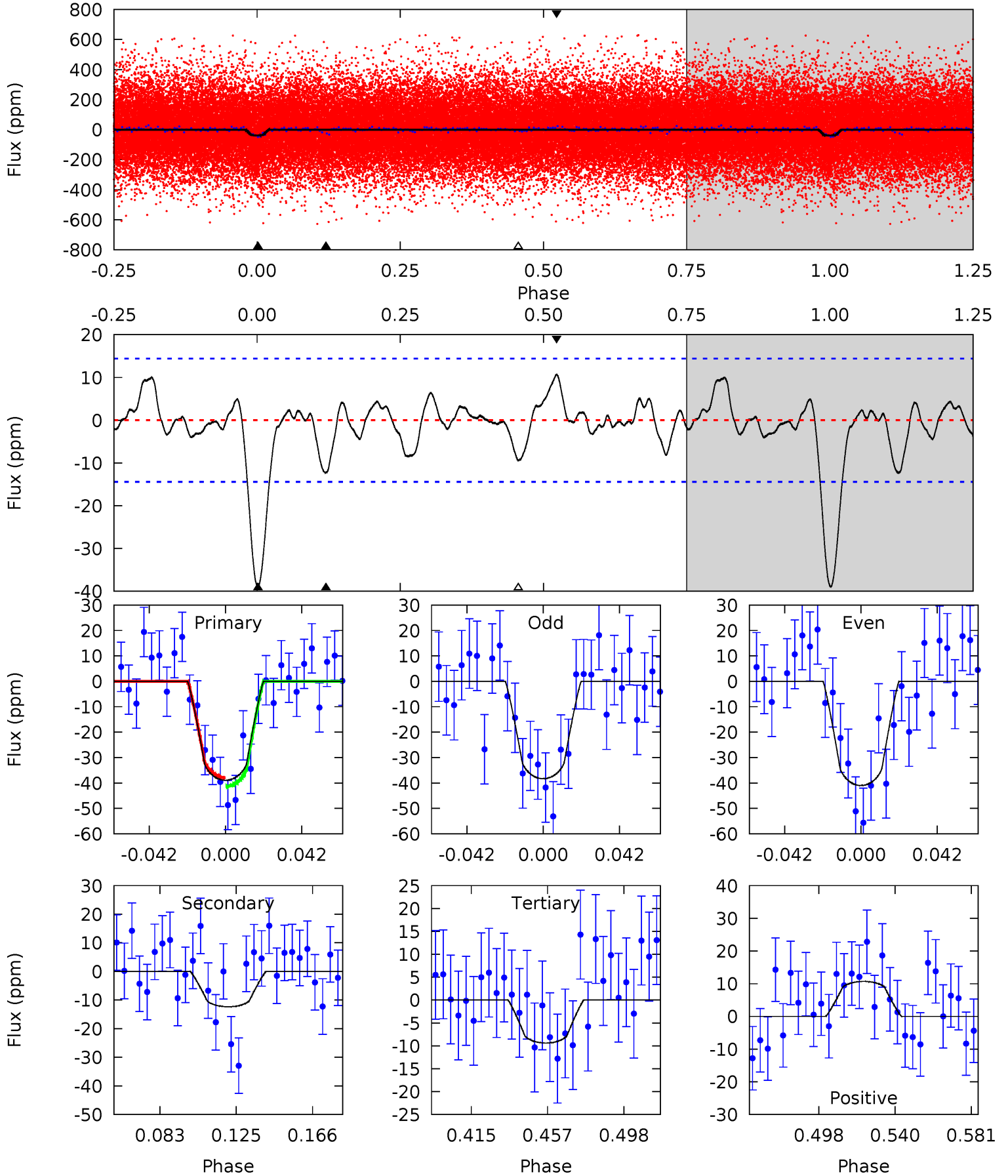
TCE 009639021-01 P= 2.215668 Days  $T_0=132.270226$  (BKJD)



# DV Model-Shift Uniqueness Test

009639021-01, P = 2.215660 Days, E = 130.056857 Days

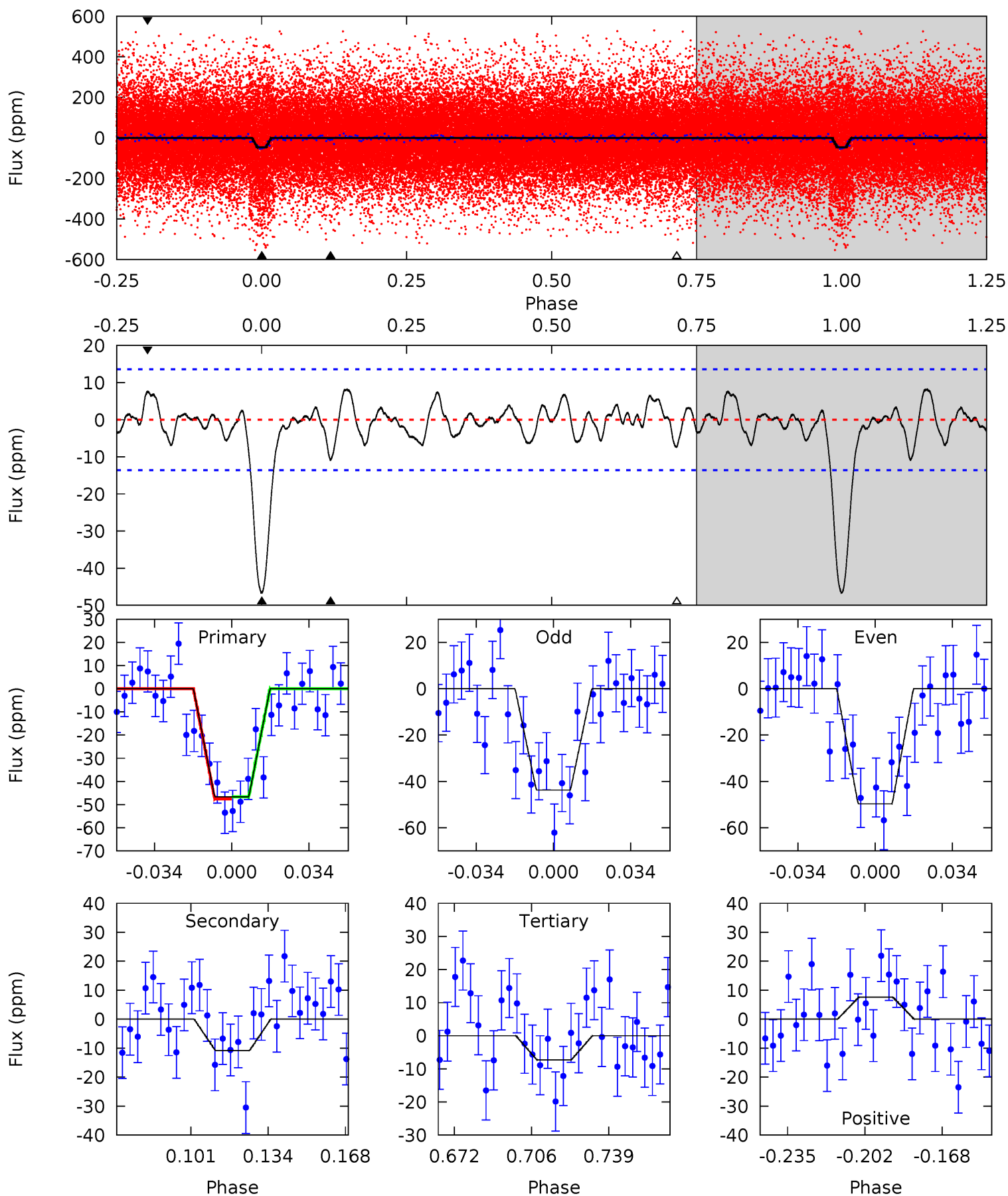
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.8	4.07	3.09	3.52	4.75	2.04	1.27	9.73	9.30	0.98	0.55	0.44	0.93	0.22	0.56



# Alt Model-Shift Uniqueness Test

009639021-01, P = 2.215668 Days, E = 130.054558 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
16.4	3.81	2.58	2.67	4.79	2.12	1.14	13.9	13.8	1.23	1.15	1.05	0.84	0.15	0.16





### Stellar Parameters For KIC 009639021

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5349^{+159}_{-159}$	$4.478^{+0.115}_{-0.115}$	$-0.240^{+0.300}_{-0.300}$	$0.836^{+0.130}_{-0.106}$	$0.767^{+0.113}_{-0.052}$	$1.847^{+0.861}_{-0.589}$
	+3%/-3%	+3%/-3%	+125%/-125%	+16%/-13%	+15%/-7%	+47%/-32%
Source	PHO1	KIC0	KIC0	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 009639021-01 / KOI 7950.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-12 \pm 3$	$0.67^{+0.46}_{-0.39}$	$1737^{+84}_{-87}$	$4033^{+1775}_{-693}$	$15^{+73}_{-10}$
Alt.	$-11 \pm 3$	$0.71^{+0.46}_{-0.40}$	$1733^{+90}_{-85}$	$3790^{+1467}_{-567}$	$11^{+48}_{-7}$

$T_{max}$  = Theoretical Maximum Planetary Temperature

$T_{obs}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )

$A_{obs}$  = Observed Albedo (Assuming  $T=0$ )

If a secondary eclipse is present, the system is likely an EB if  $T_{obs} \gg T_{max}$  AND  $A_{obs} \gg 1.0$



## DV Centroid Data

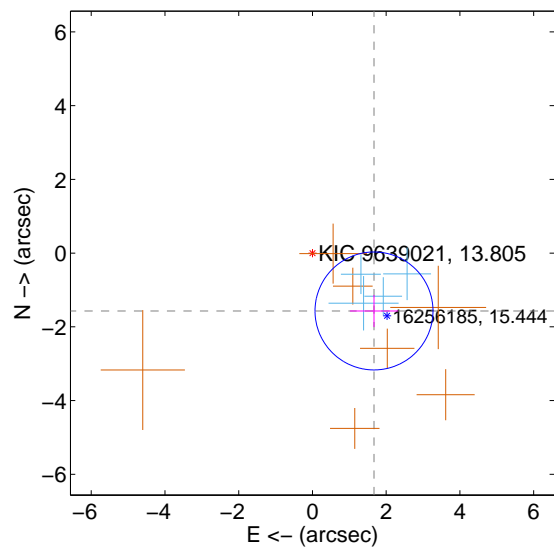
Supplemental centroid analysis for 009639021-01. Kepler magnitude: 13.80. Transit SNR 8.40

There are 4 quarters with good PRF difference image offsets

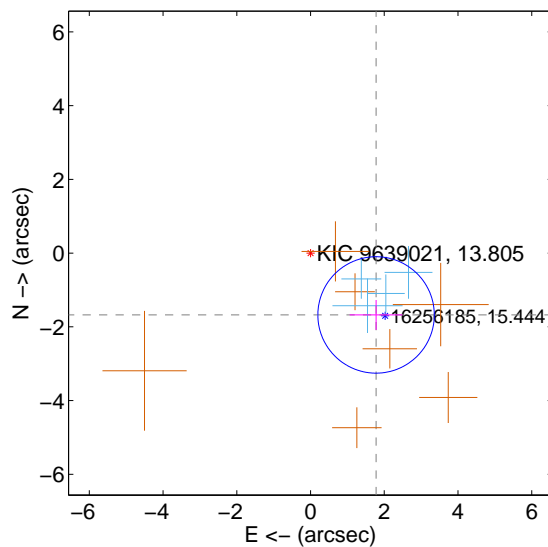
The direct PRF centroid is offset from the target star catalog position by about 0.14 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.291 \pm 0.533$	4.30	$-1.669 \pm 0.652$	$-1.569 \pm 0.435$
PRF-fit source offset from KIC position	$2.444 \pm 0.526$	4.64	$-1.778 \pm 0.716$	$-1.677 \pm 0.407$
photometric centroid source offset	$1.69 \pm 1.26$	1.34	$1.43 \pm 1.27$	$-0.89 \pm 1.23$

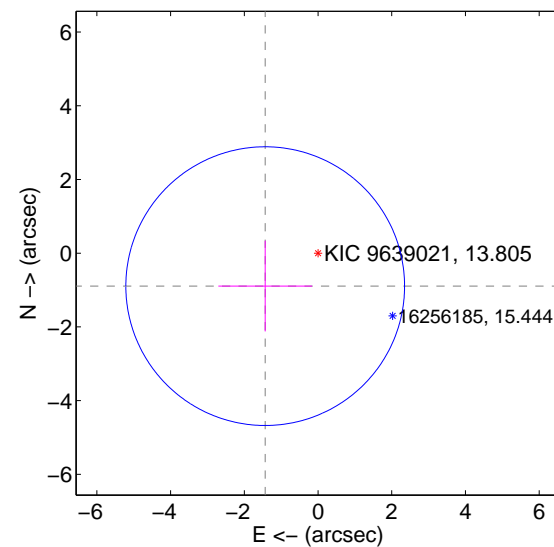
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

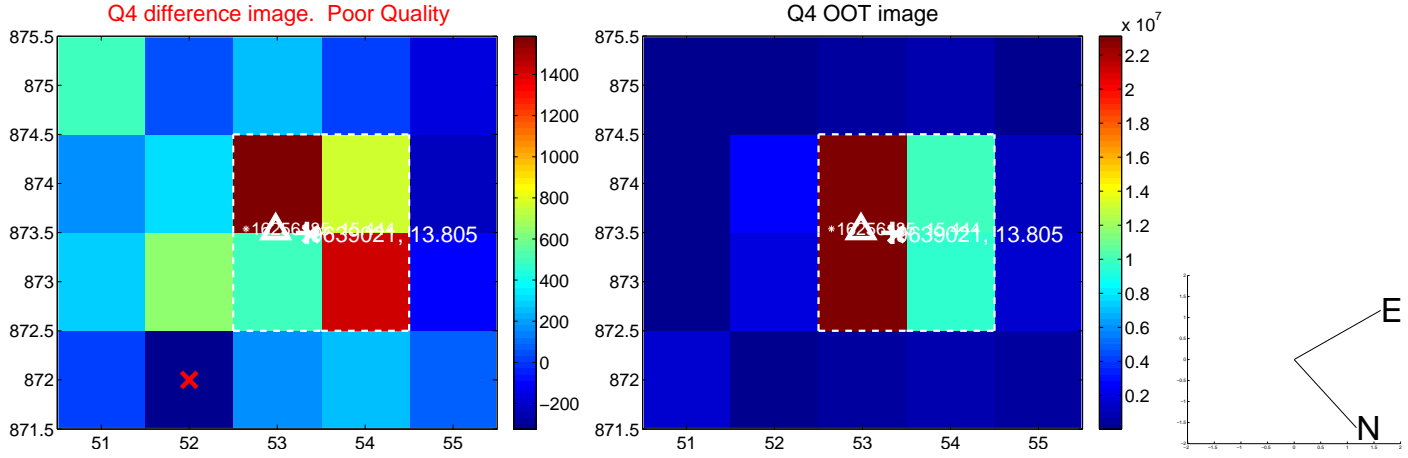
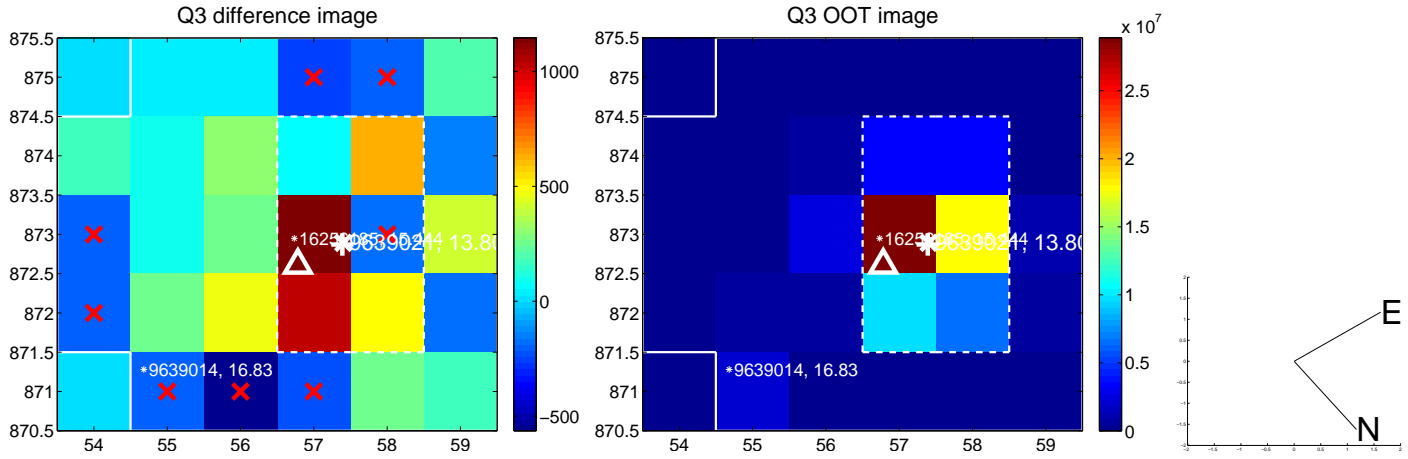
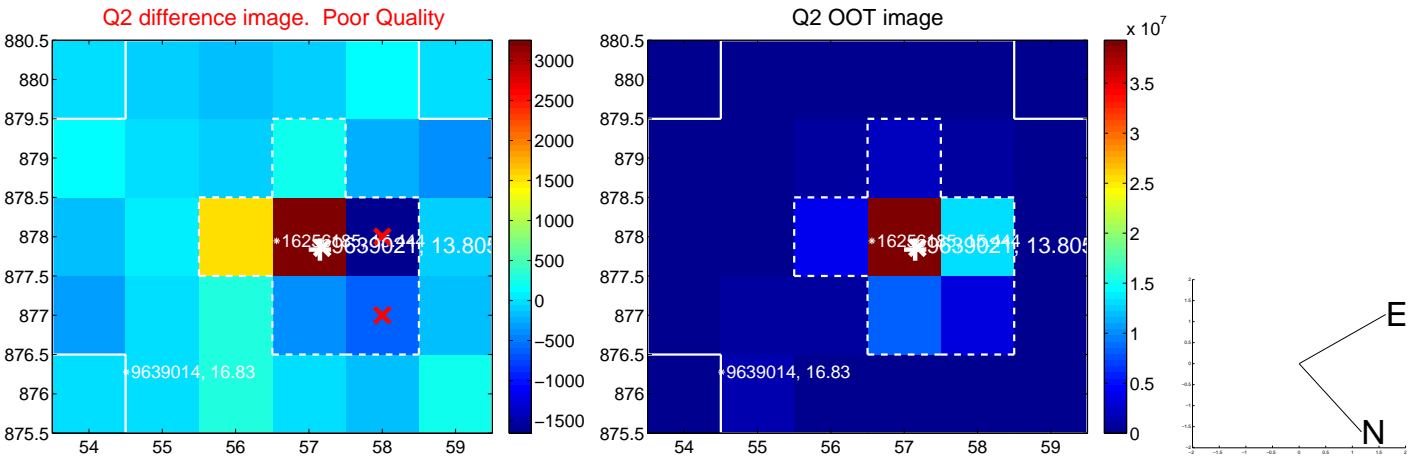
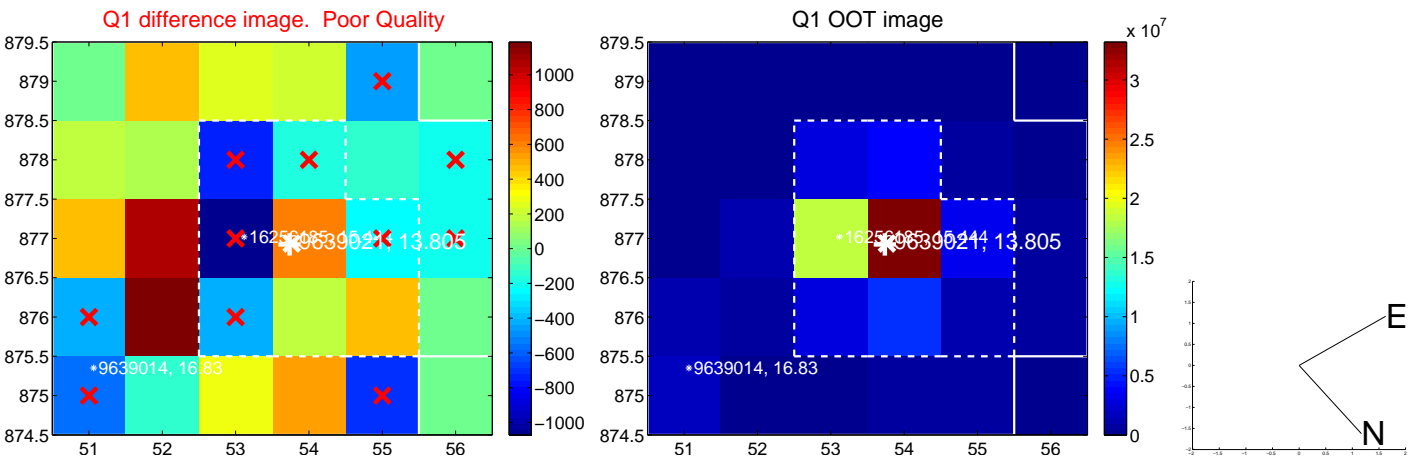


offset from photometric centroids

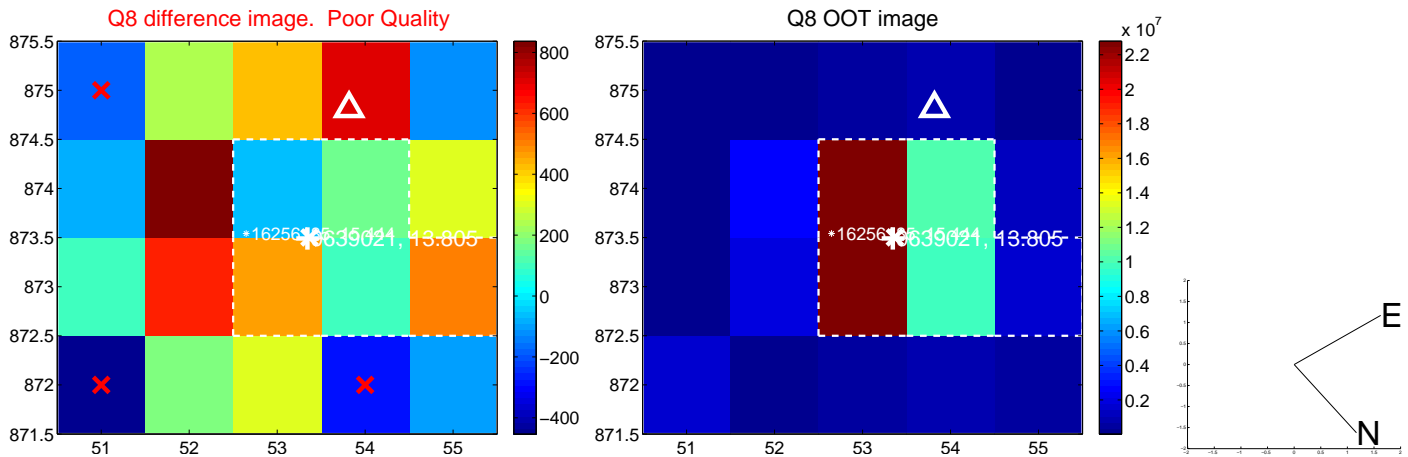
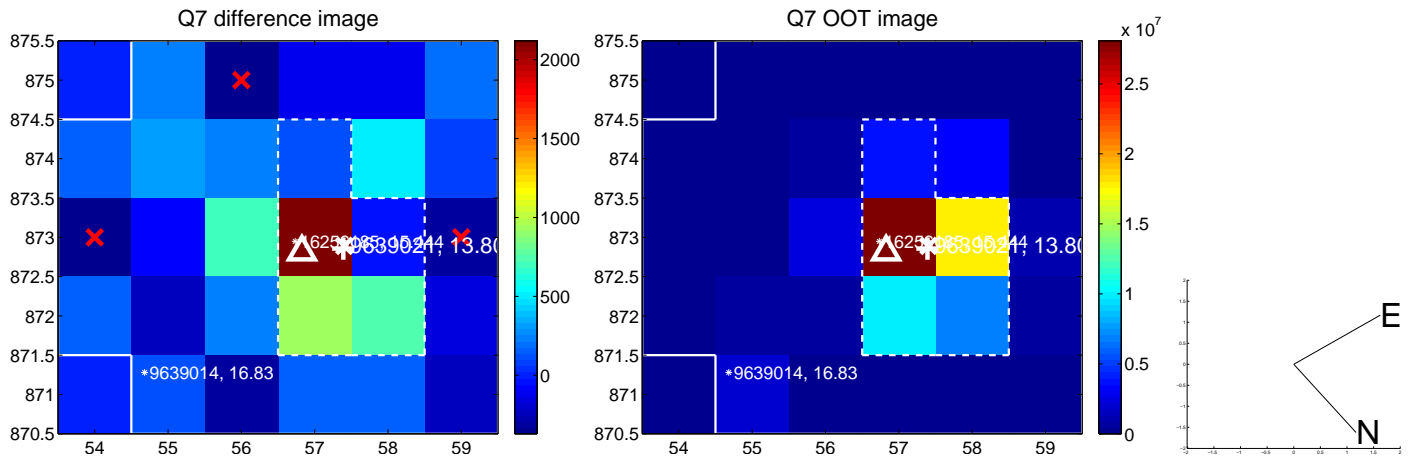
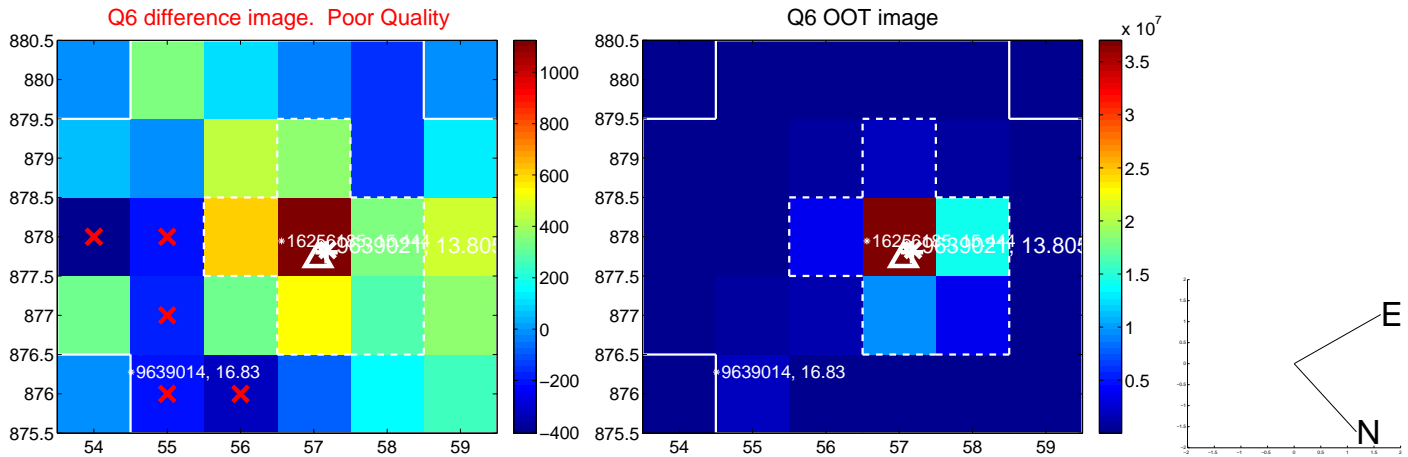
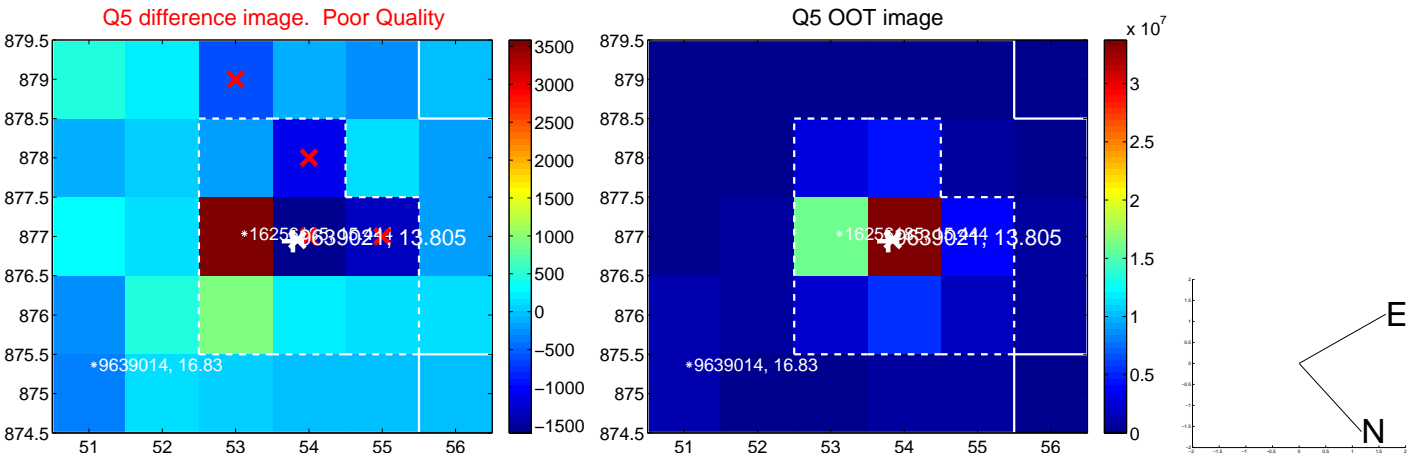


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three- $\sigma$ . Red \*: target star. Blue \*: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

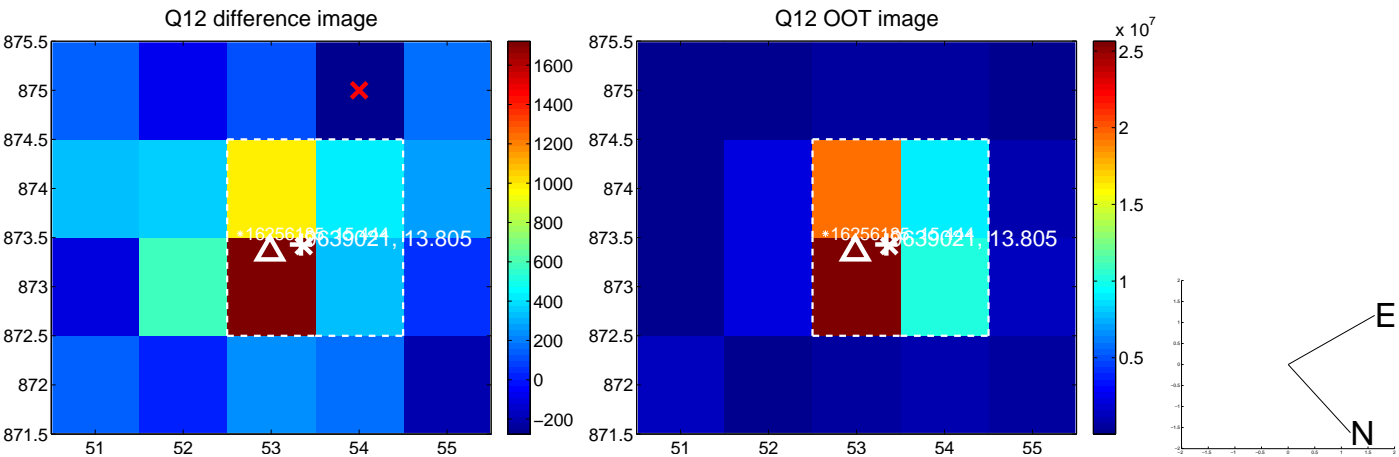
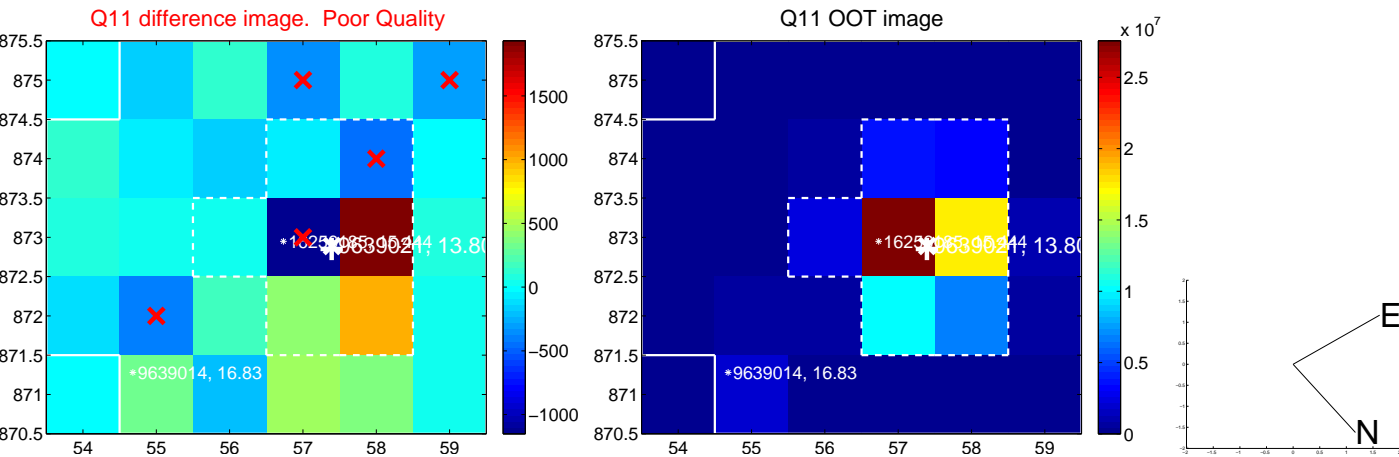
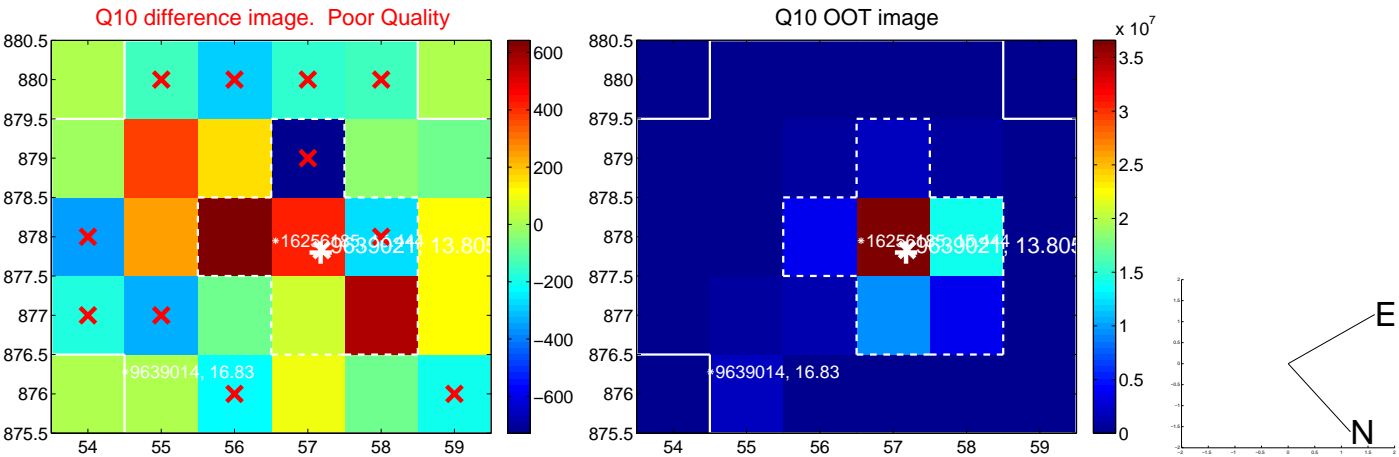
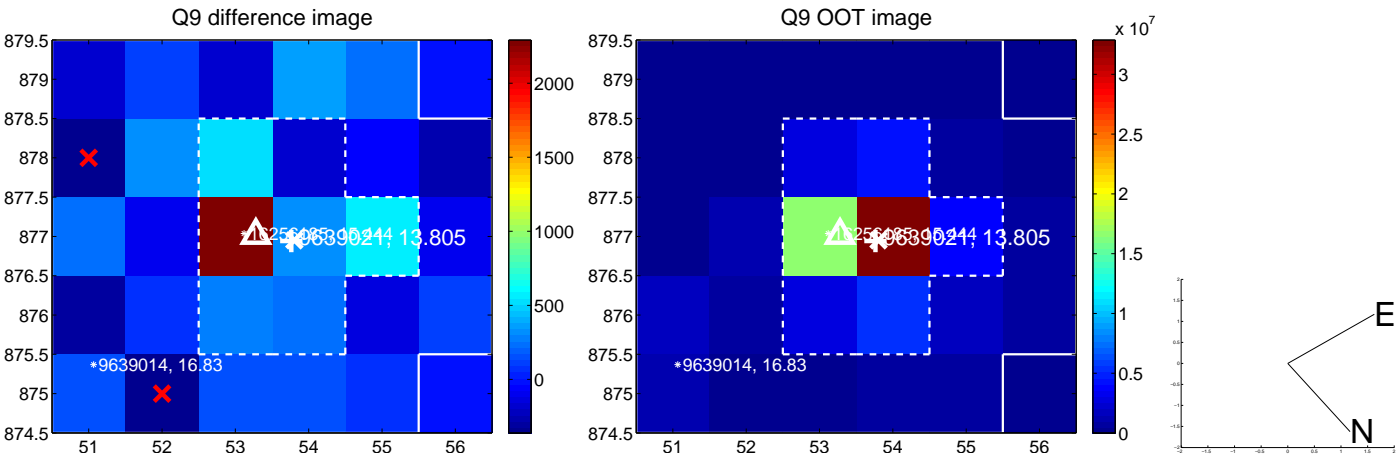
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



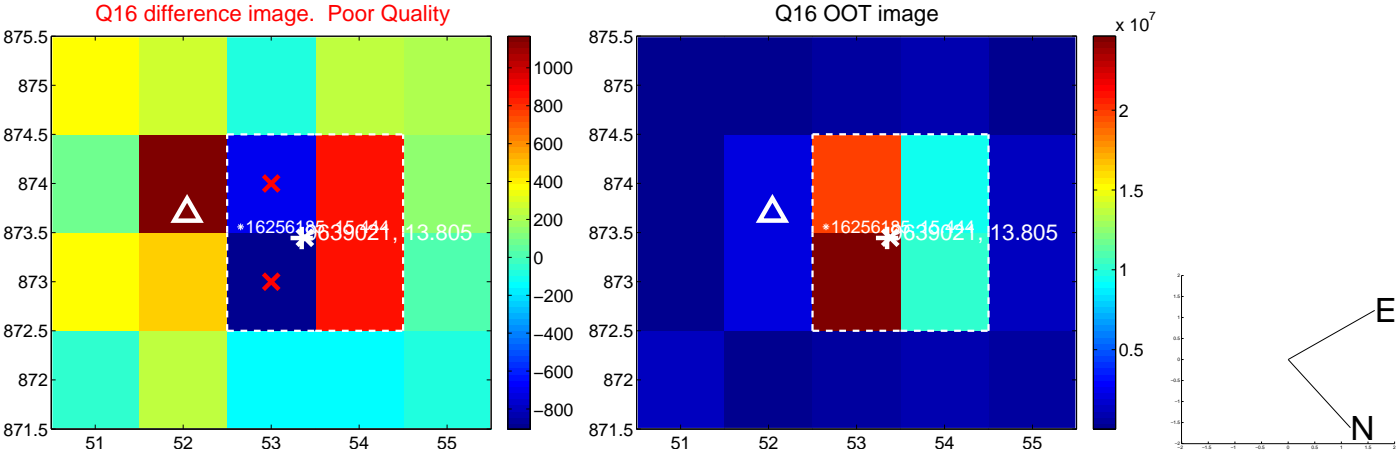
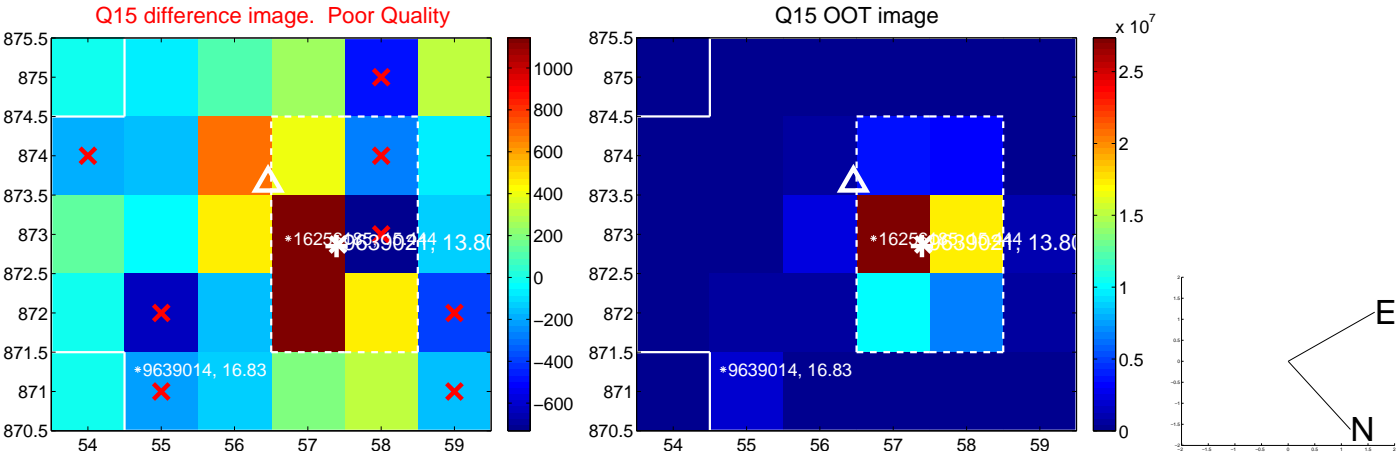
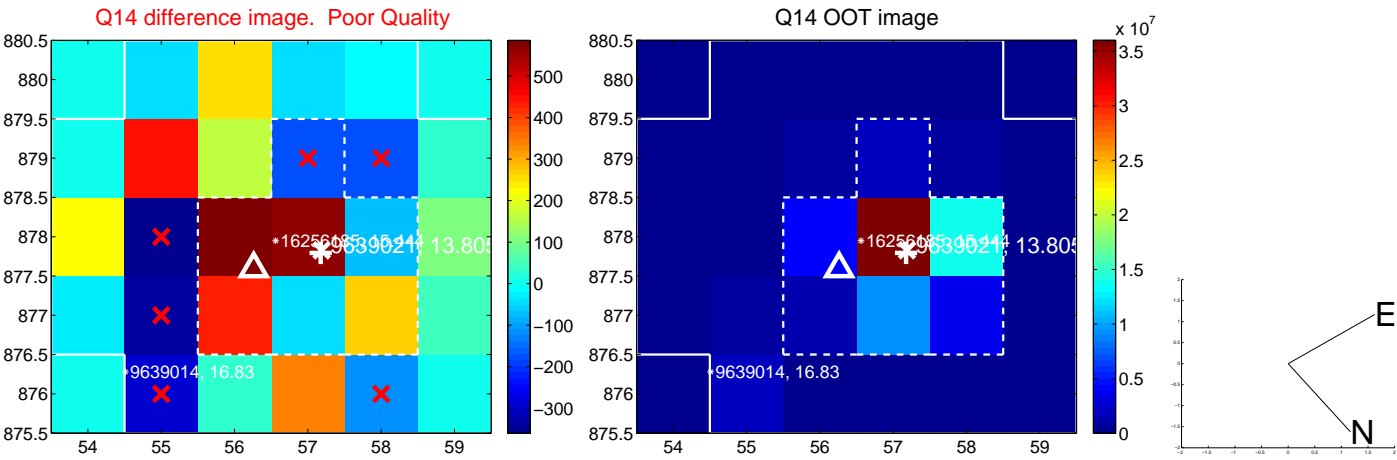
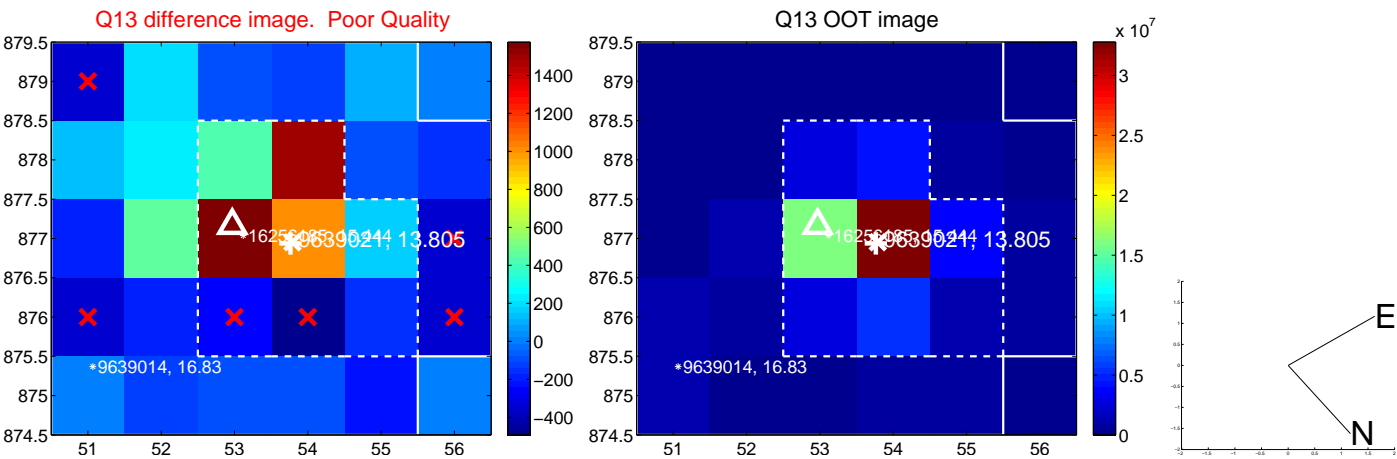
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white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

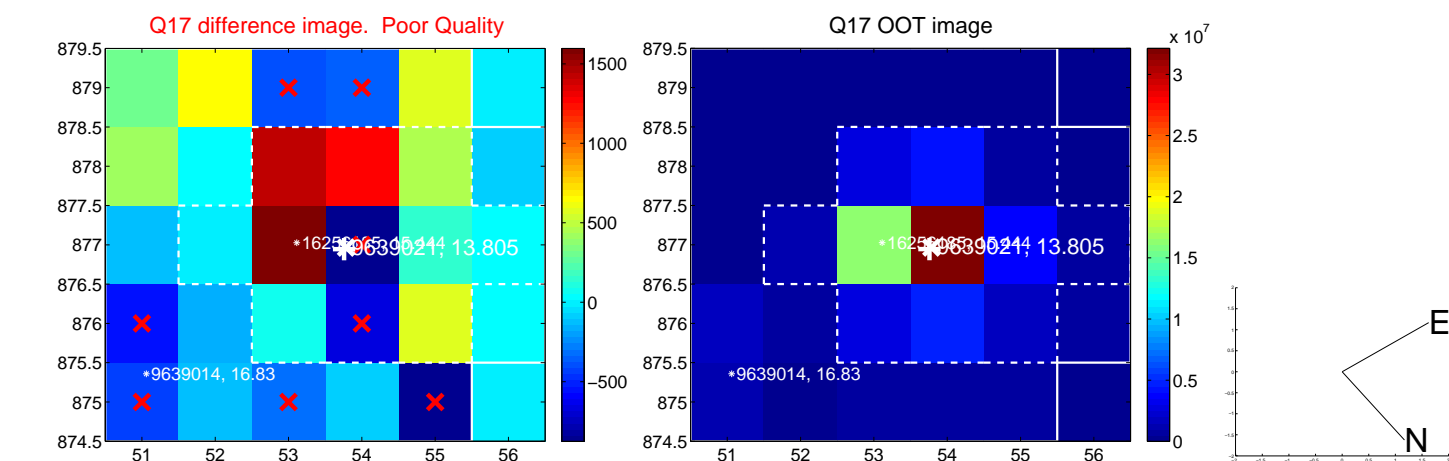


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

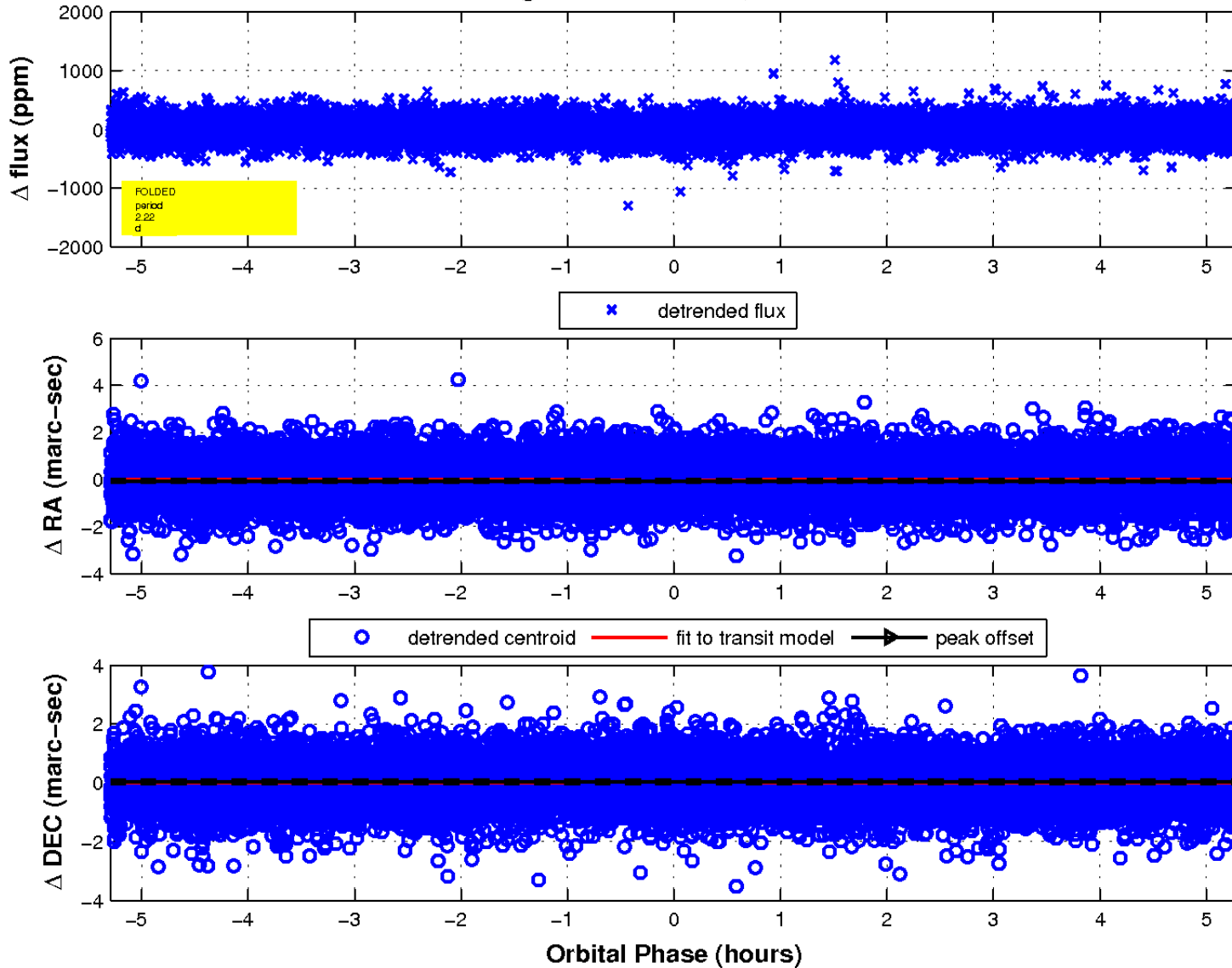




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



fluxWeightedCentroids, Planet 1 of 1



UKIRT Image

Declination

