

# KIC 009428078

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009428078-01	OBS	No	1.652383	131.547153	14.7	7.185	8.7	9.0	1.89	7311	0.87	9095.12

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009428078-01	OBS	FP	0.00	1	0	1	0	LPP_DV—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.

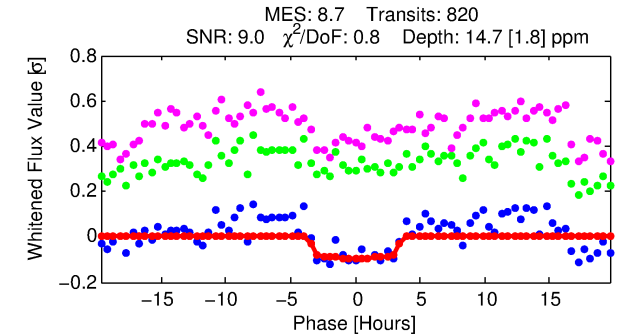
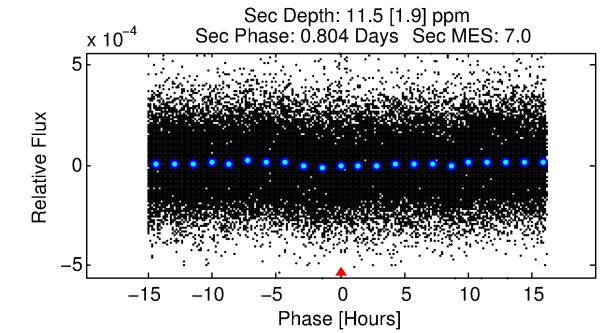
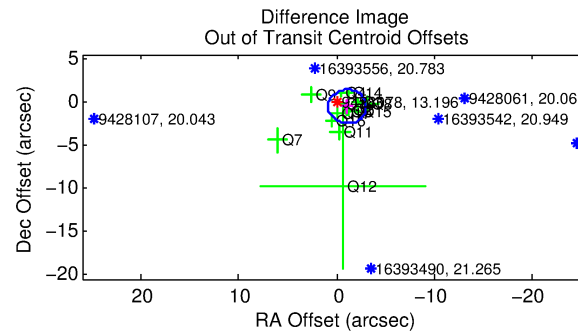
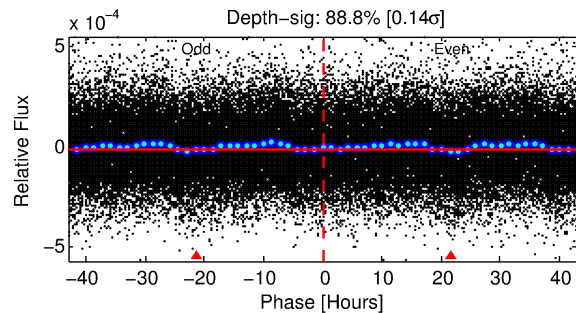
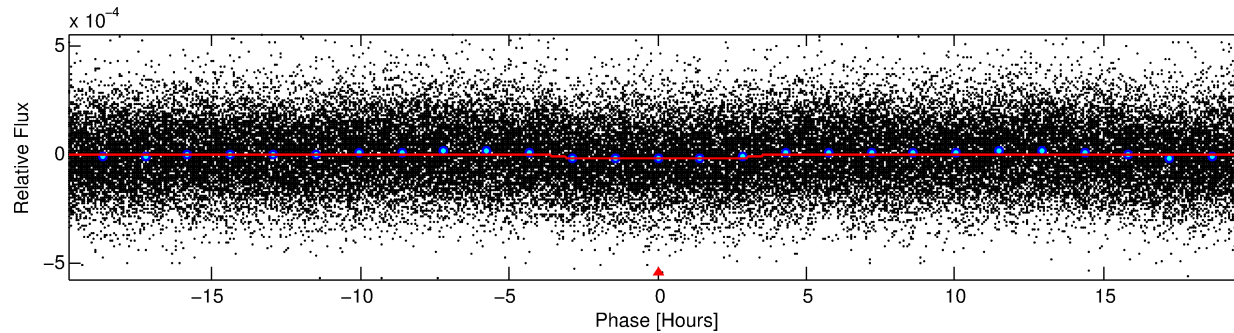
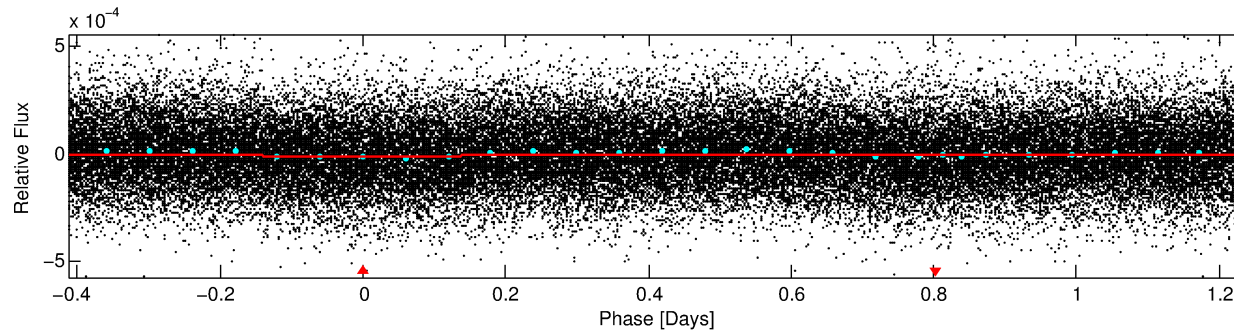
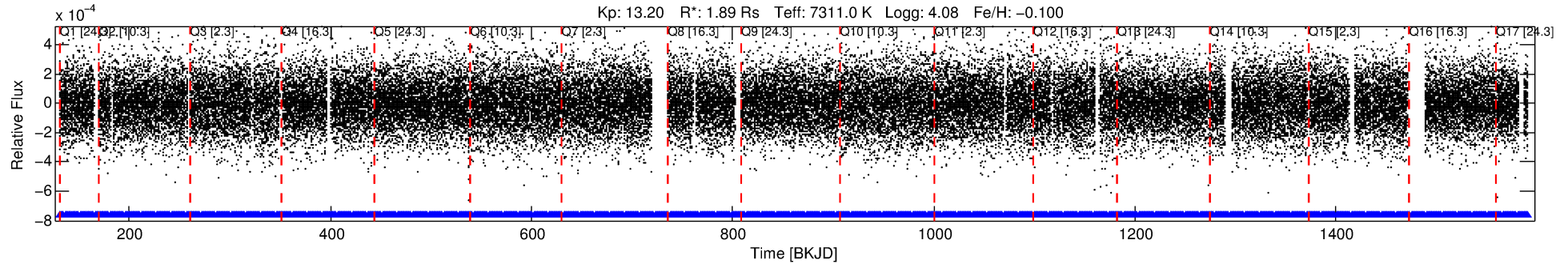
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009428078-01

No Significant Match Found

# DV One-Page Summary

KIC: 9428078 Candidate: 1 of 1 Period: 1.652 d



## DV Fit Results:

Period = 1.65238 [0.00003] d  
Epoch = 131.5472 [0.0080] BKJD  
Rp/R\* = 0.0042 [0.0012]  
a/R\* = 1.14 [0.50]  
b = 0.94 [0.23]  
Seff = 9095.12 [3378.27]  
Teq = 2490 [231] K  
Rp = 0.87 [0.35] Re  
a = 0.0317 [0.0074] AU  
Ag = 8.34 [5.60] [1.31 $\sigma$ ]  
Teffp = 6543 [1005] K [3.93 $\sigma$ ]

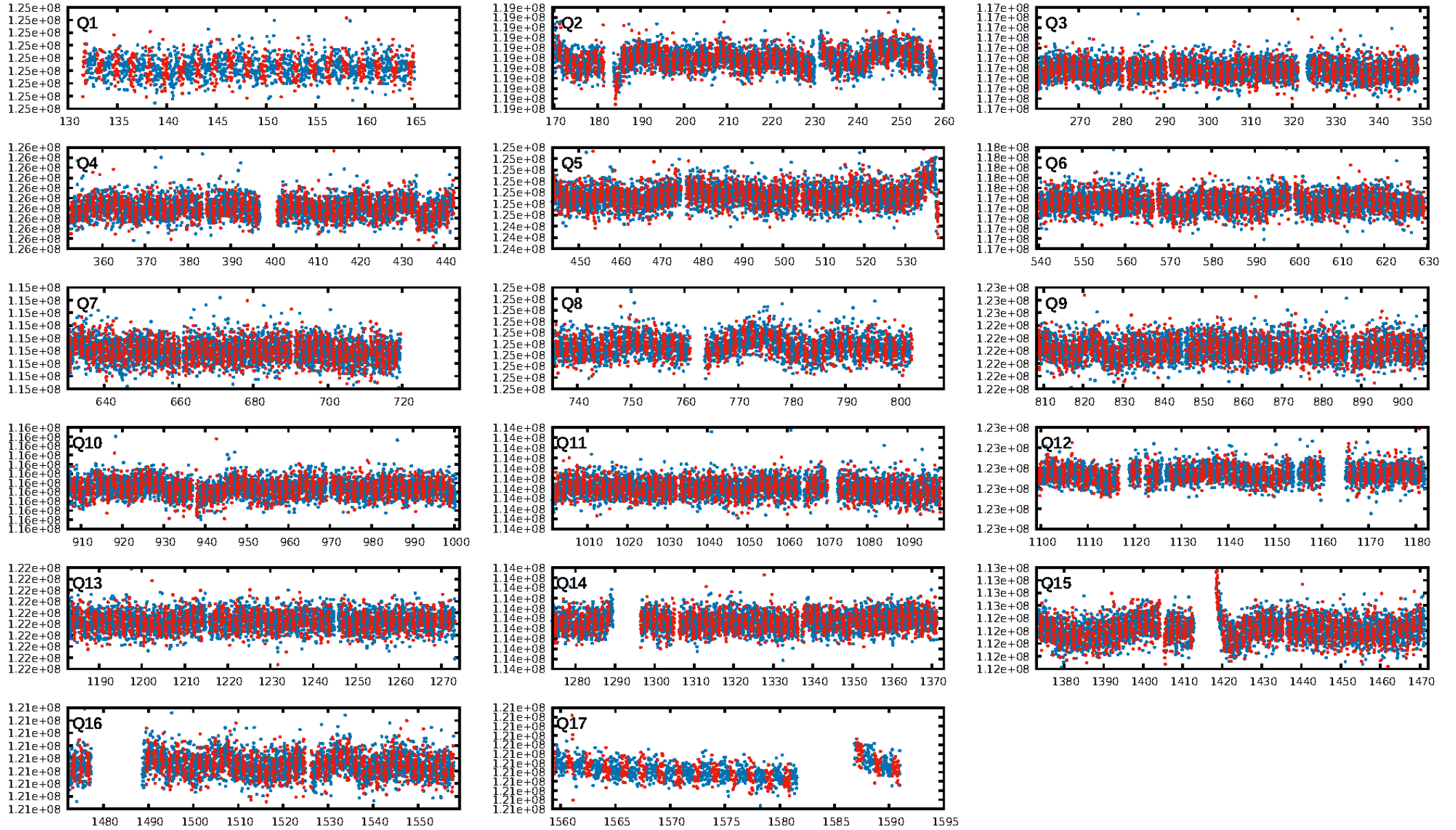
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 2.85e-16  
RollingBand-fgt: 1.00 [782/782]  
GhostDiagnostic-chr: 1.2  
Centroid-sig: 0.6%  
Centroid-so: 2.543 arcsec [1.67 $\sigma$ ]  
OotOffset-rm: 1.202 arcsec [1.85 $\sigma$ ]  
KicOffset-rm: 1.308 arcsec [2.01 $\sigma$ ]  
OotOffset-st: 4/4/4/2 [14]  
KicOffset-st: 4/4/4/2 [14]  
DiffImageQuality-fgm: 0.64 [9/14]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 06:14:35 Z

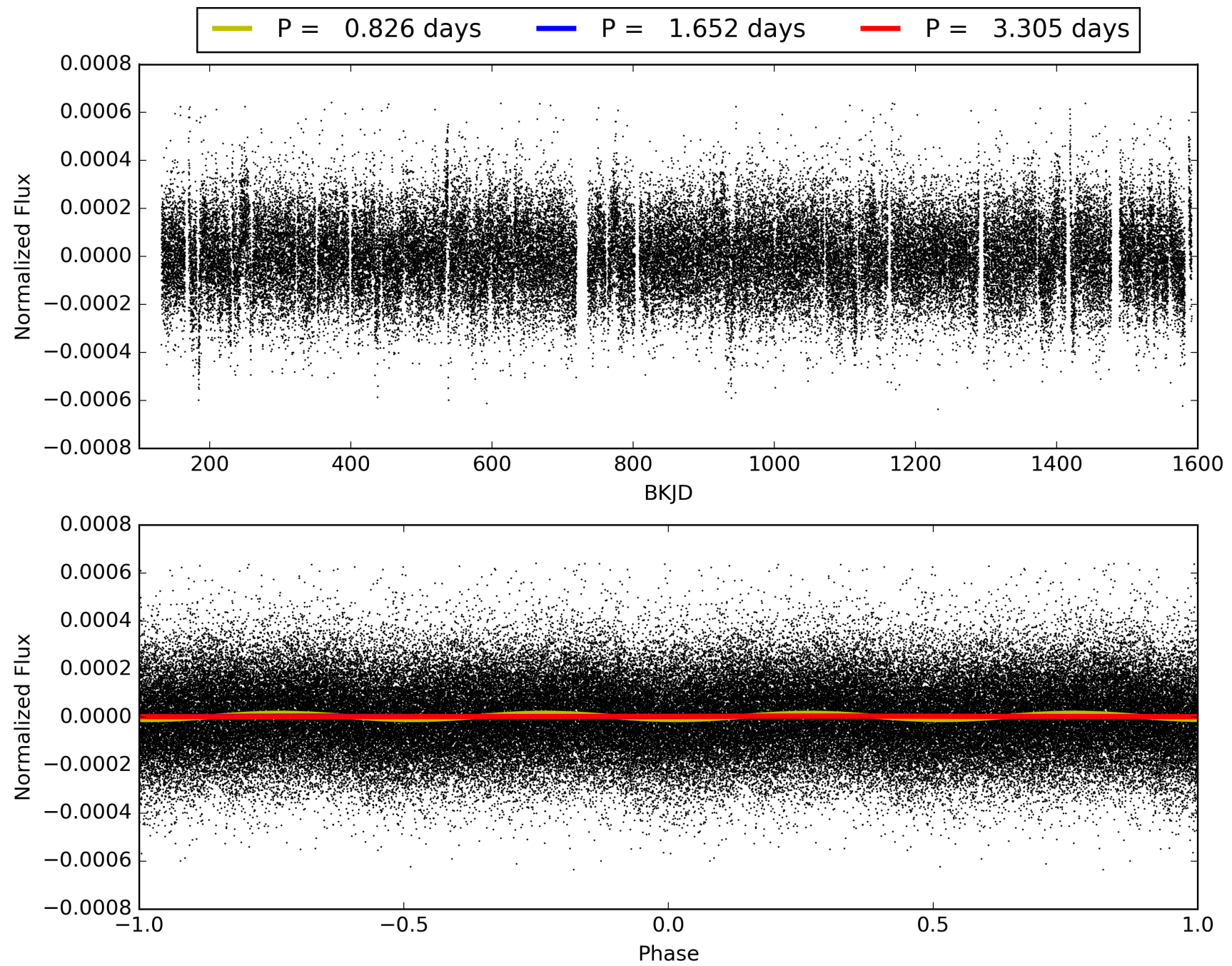
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 009428078-01, PDC Light Curves



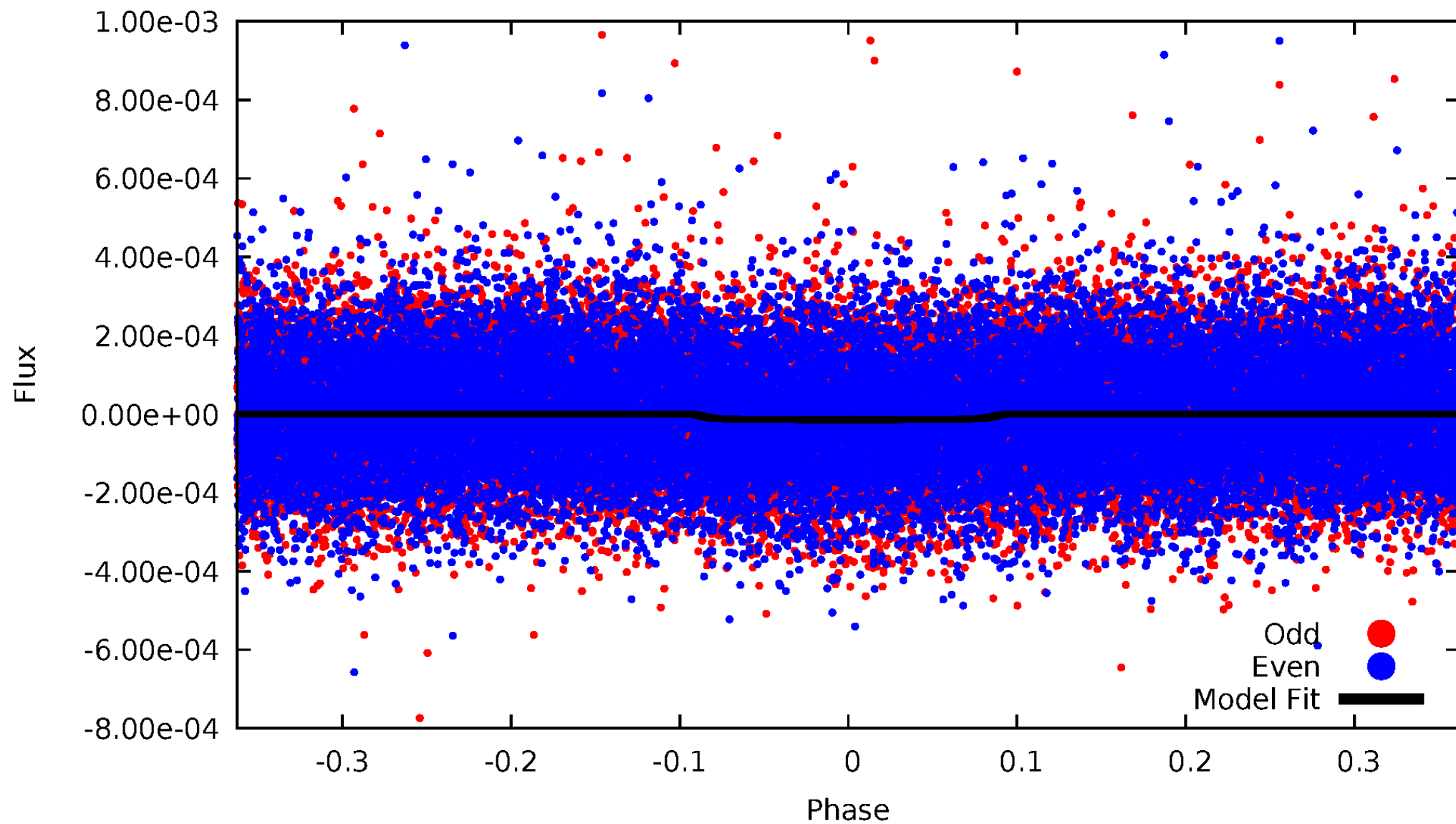


TCE 009428078-01



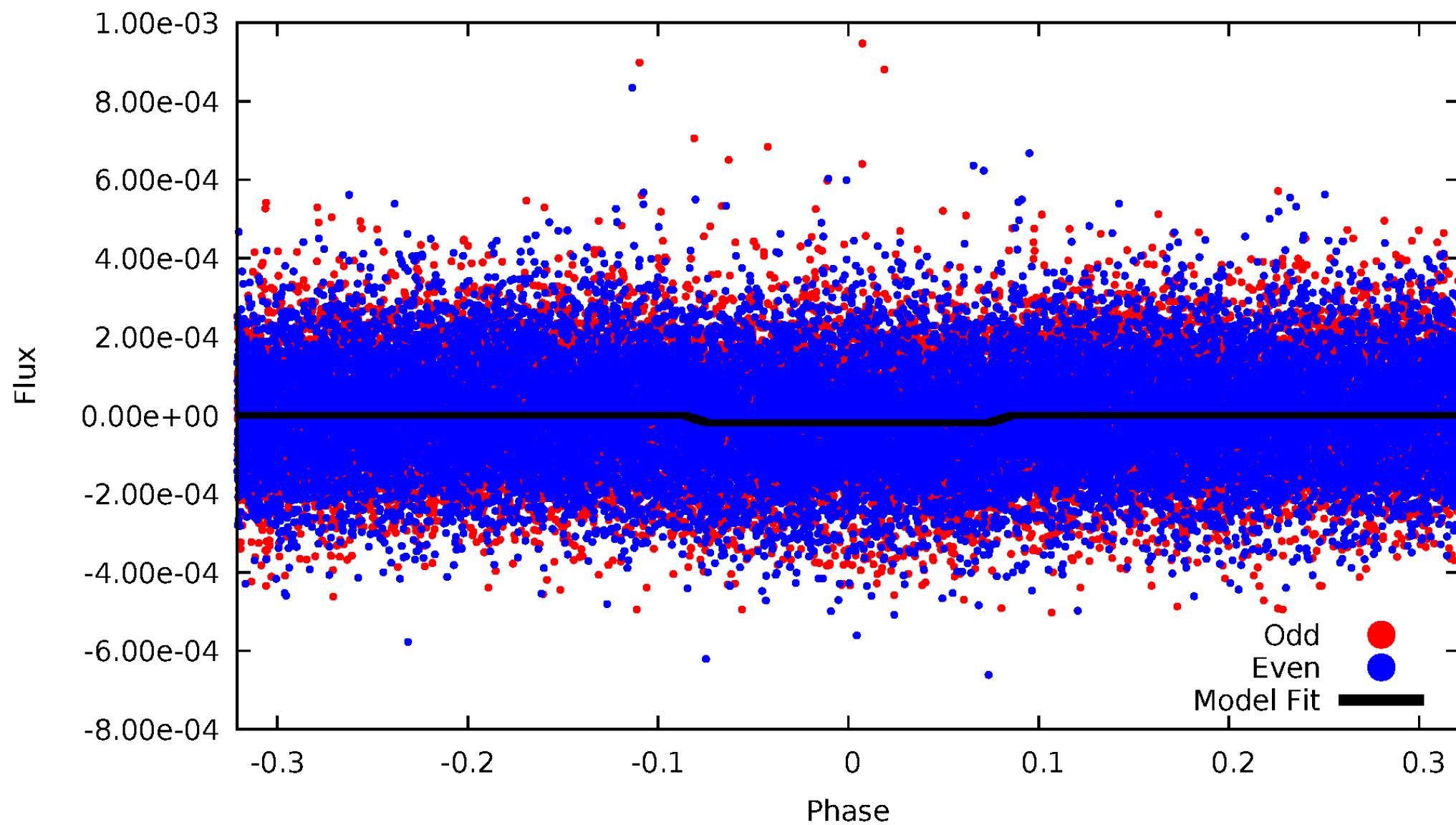
# DV Odd/Even

TCE 009428078-01



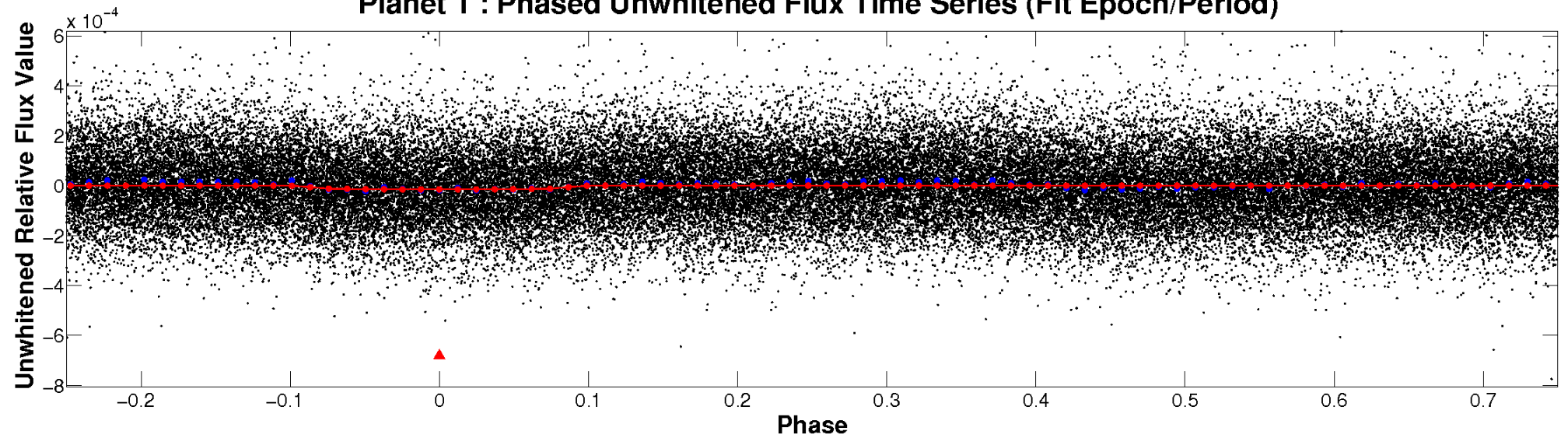
# ALT Odd/Even

TCE 009428078-01

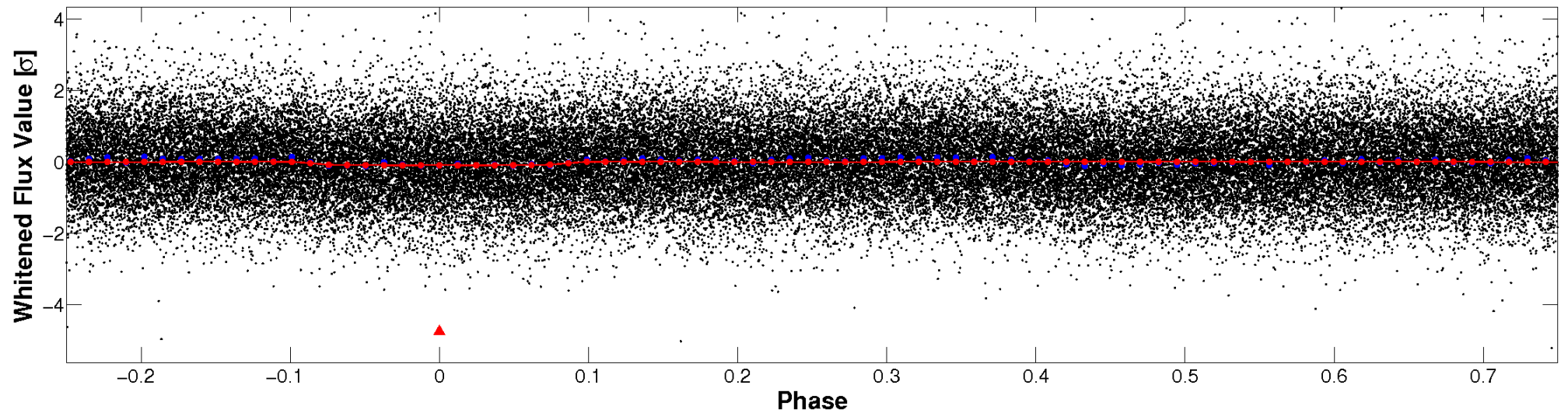


# Non-Whitened Vs. Whitened Light Curve

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



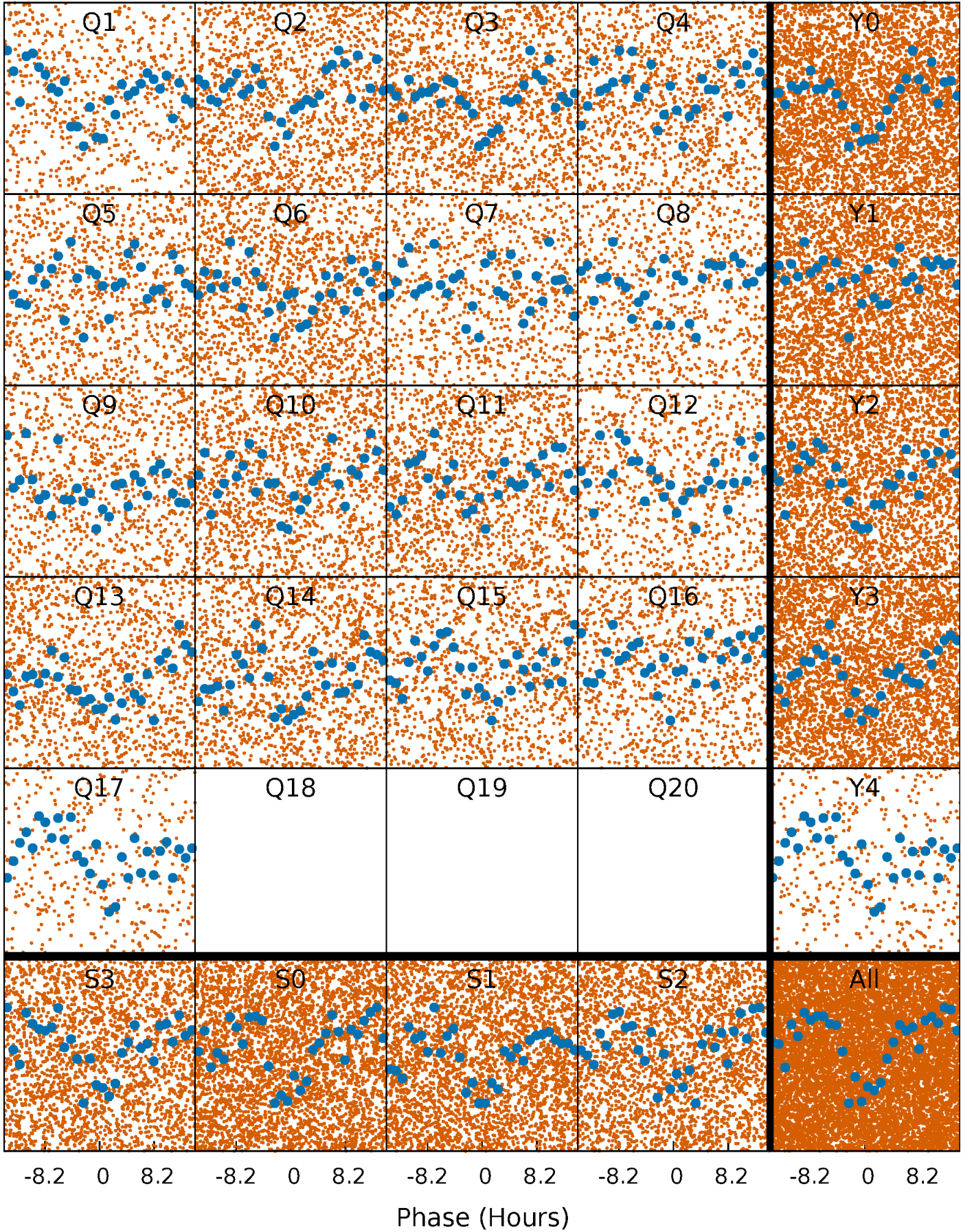
**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**





# PDC Quarter-Phased Transit Curves

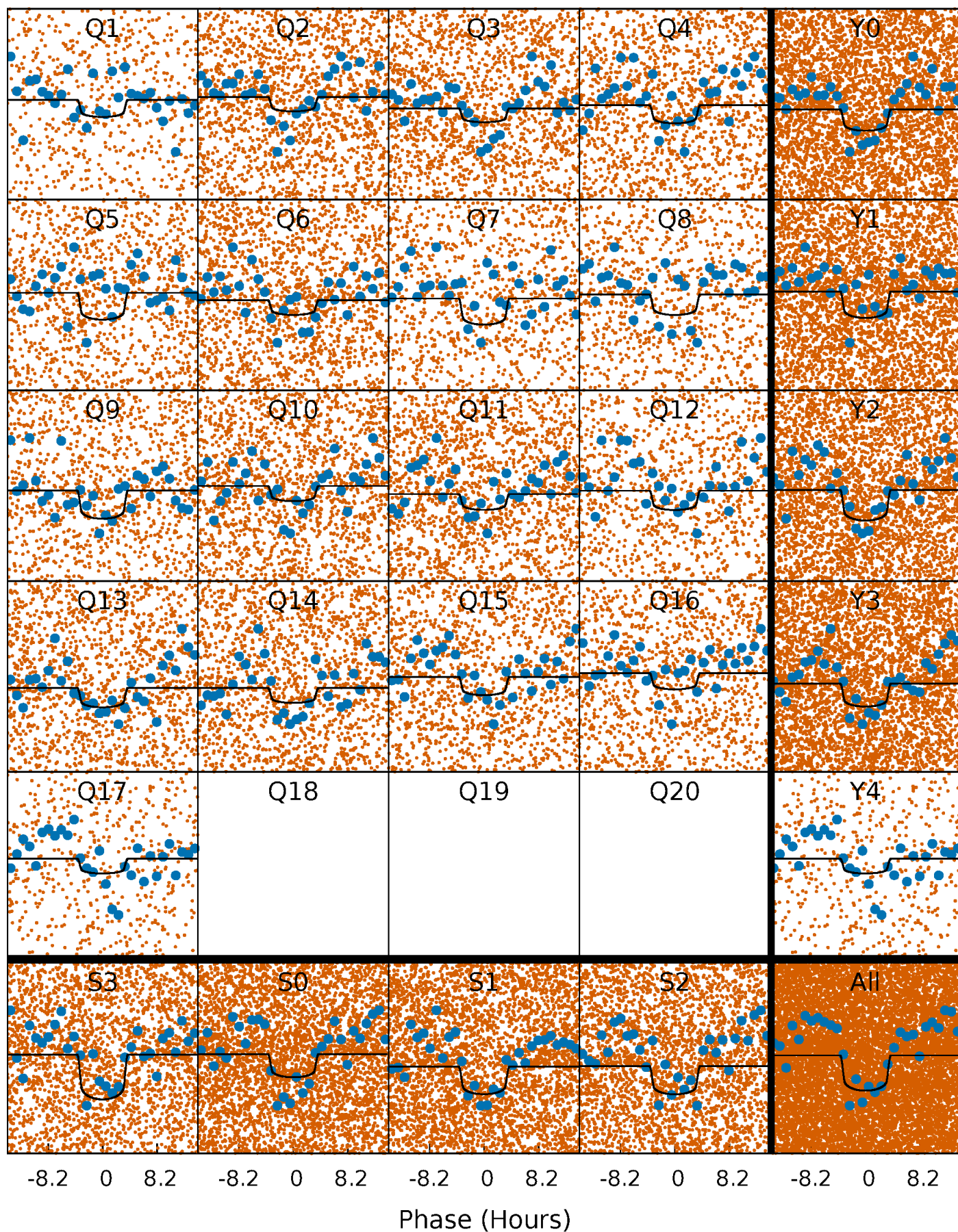
TCE 009428078-01 P= 1.652383 Days  $T_0=131.547153$  (BKJD)





# DV Quarter-Phased Transit Curves

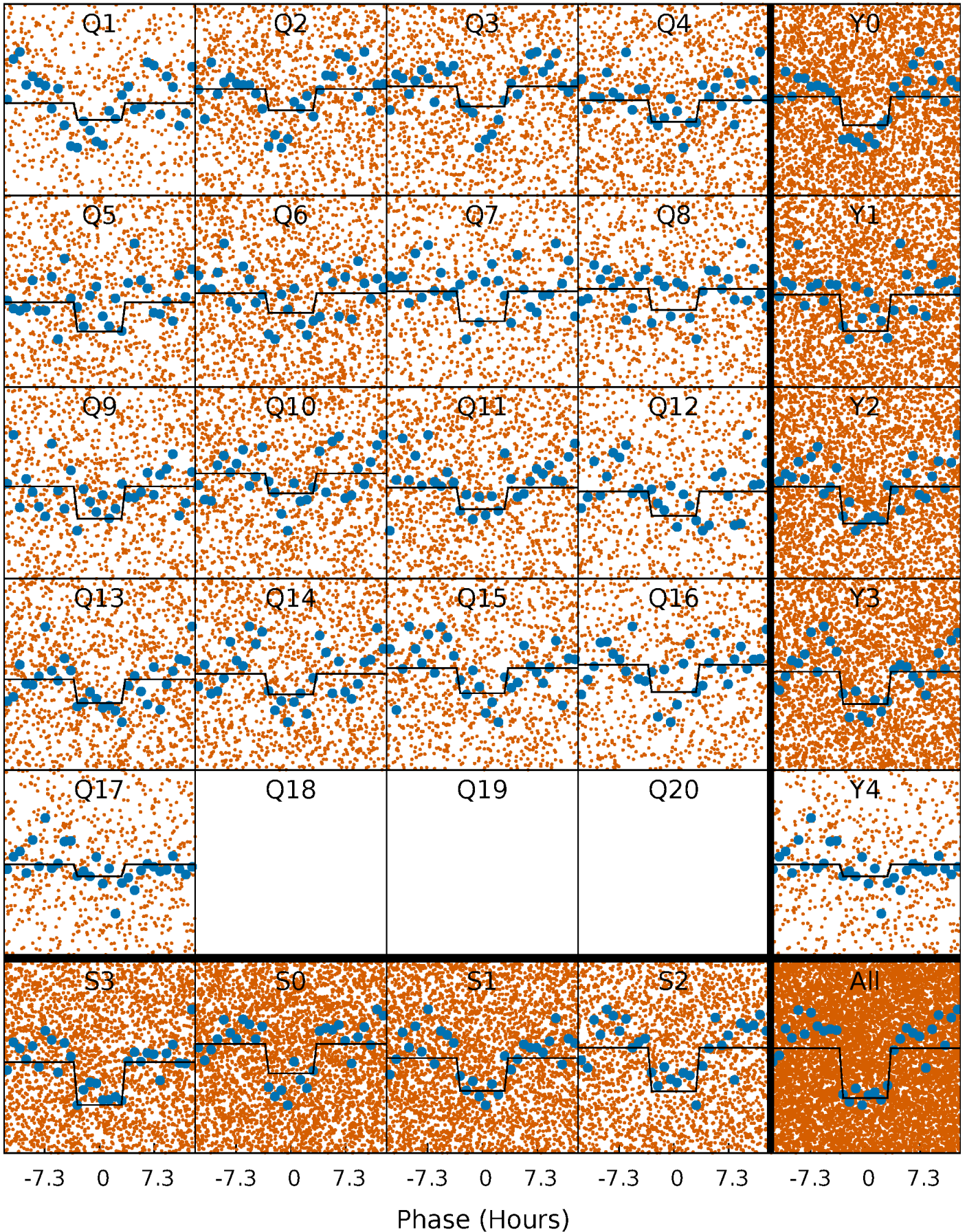
TCE 009428078-01 P= 1.652383 Days  $T_0=131.547153$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

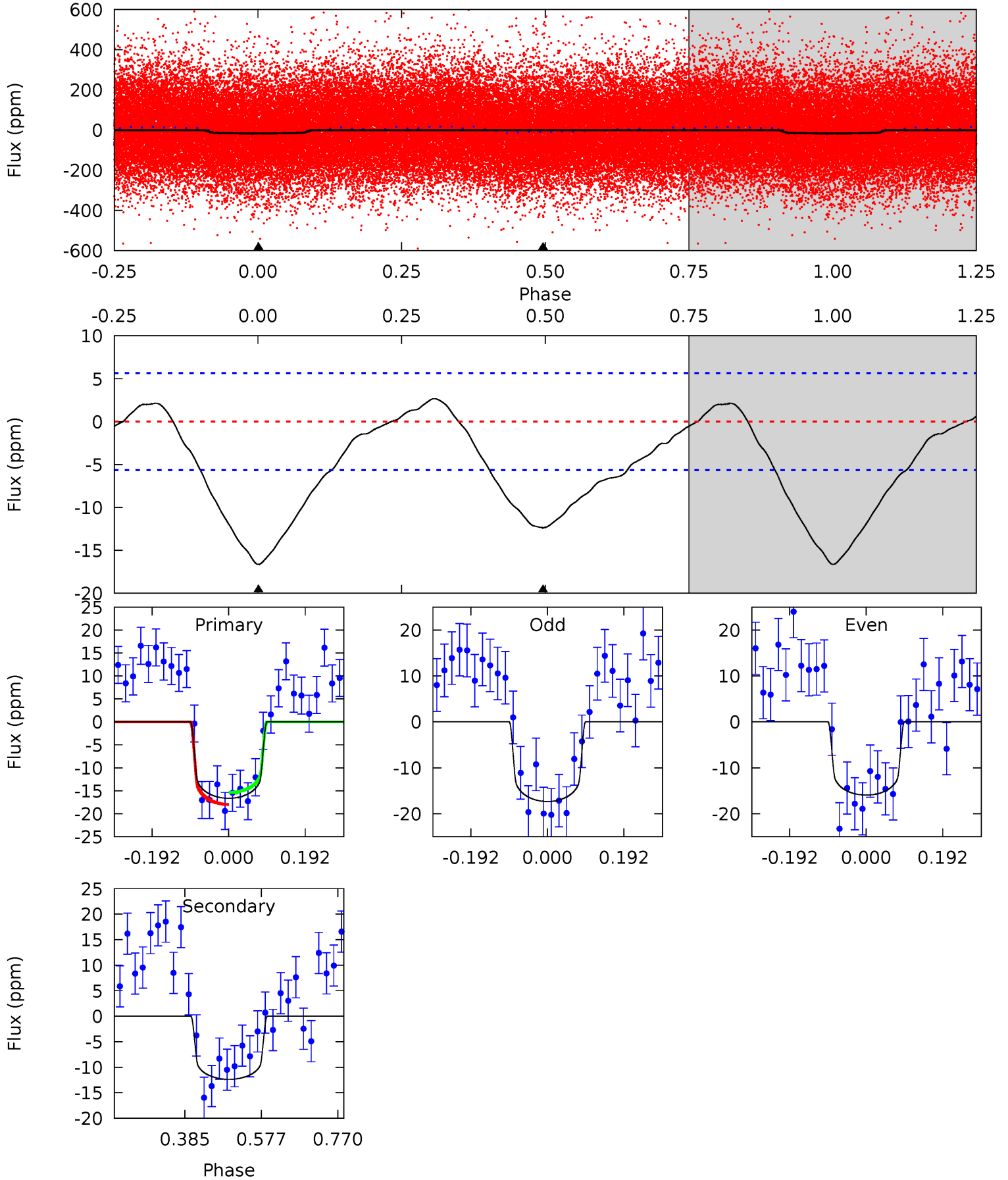
TCE 009428078-01 P= 1.652351 Days  $T_0=131.562152$  (BKJD)



# DV Model-Shift Uniqueness Test

009428078-01, P = 1.652383 Days, E = 129.894770 Days

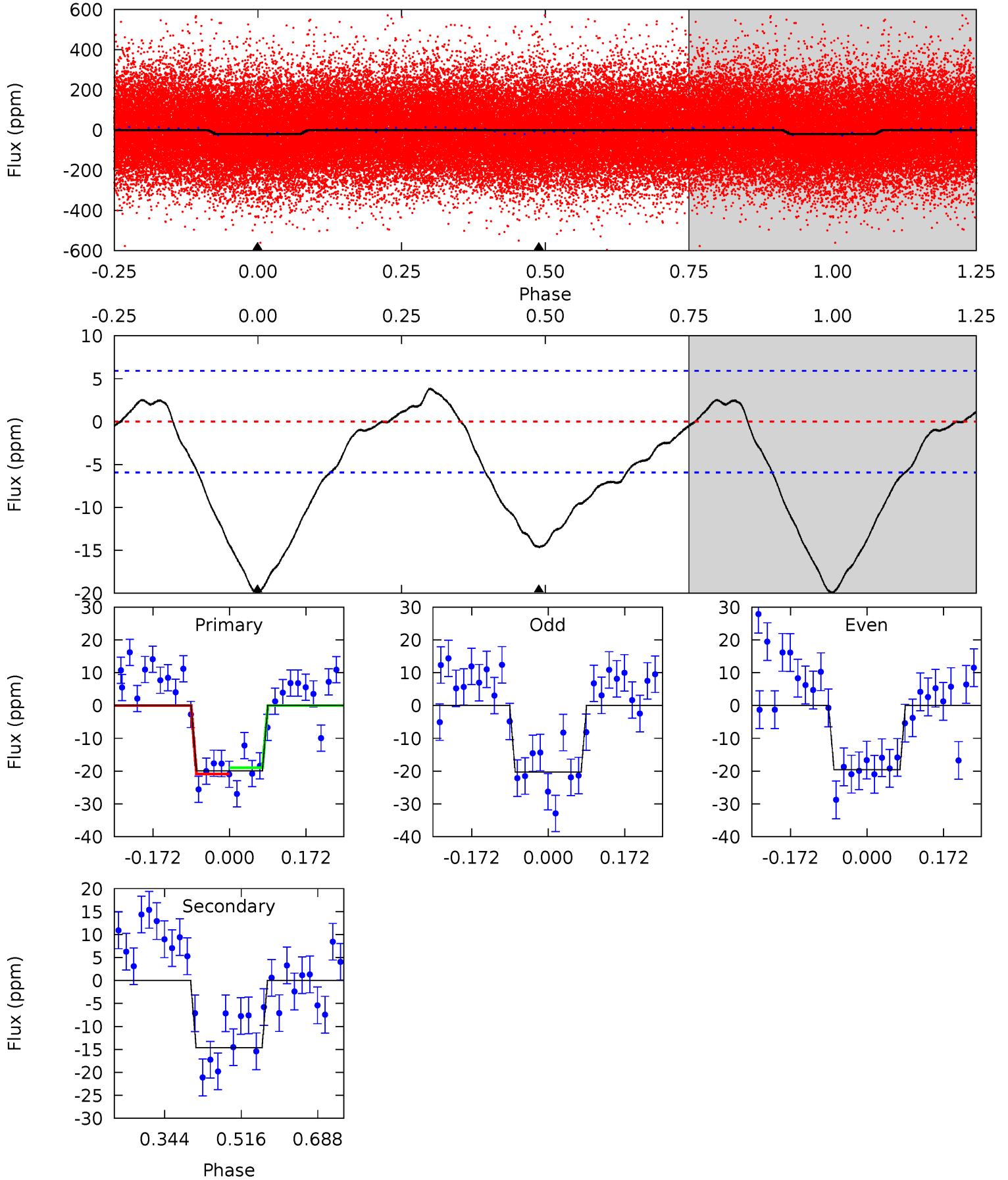
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.0	9.68	0	0	4.43	1.30	1.19	13.0	13.0	9.68	9.68	0.55	0.93	0.14	1.02



# Alt Model-Shift Uniqueness Test

009428078-01, P = 1.652351 Days, E = 129.909801 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
15.0	11.0	0	0	4.45	1.37	1.68	15.0	15.0	11.0	11.0	0.29	1.04	0.16	0.71





### Stellar Parameters For KIC 009428078

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7311^{+228}_{-330}$	$4.077^{+0.170}_{-0.170}$	$-0.100^{+0.250}_{-0.350}$	$1.889^{+0.547}_{-0.448}$	$1.551^{+0.211}_{-0.257}$	$0.324^{+0.296}_{-0.153}$
	+3%/-5%	+4%/-4%	+250%/-350%	+29%/-24%	+14%/-17%	+91%/-47%
Source	KIC0	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 009428078-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-12 \pm 1$	$0.86^{+0.29}_{-0.26}$	$3468^{+264}_{-250}$	$6482^{+1446}_{-807}$	$9.081^{+9.514}_{-4.117}$
Alt.	$-15 \pm 1$	$0.91^{+0.27}_{-0.28}$	$3466^{+260}_{-251}$	$6689^{+1516}_{-854}$	$9.902^{+10.138}_{-3.924}$

$T_{\text{max}}$  = Theoretical Maximum Planetary Temperature  
 $T_{\text{obs}}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )  
 $A_{\text{obs}}$  = Observed Albedo (Assuming  $T=0$ )

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

## DV Centroid Data

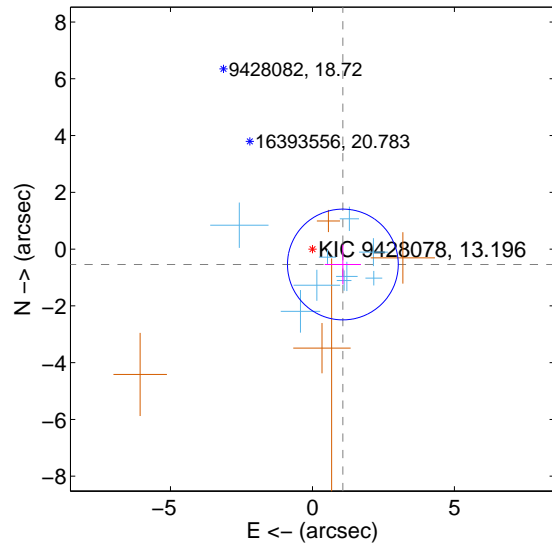
Supplemental centroid analysis for 009428078-01. Kepler magnitude: 13.20. Transit SNR 8.96

There are 9 quarters with good PRF difference image offsets

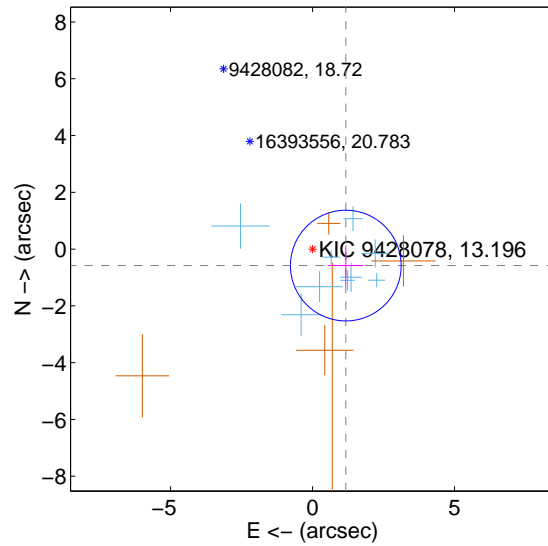
The direct PRF centroid is offset from the target star catalog position by about 0.11 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.202 \pm 0.650$	1.85	$-1.072 \pm 0.637$	$-0.543 \pm 0.701$
PRF-fit source offset from KIC position	$1.308 \pm 0.650$	2.01	$-1.172 \pm 0.637$	$-0.581 \pm 0.701$
photometric centroid source offset	$2.54 \pm 1.52$	1.67	$0.54 \pm 1.80$	$2.49 \pm 1.51$

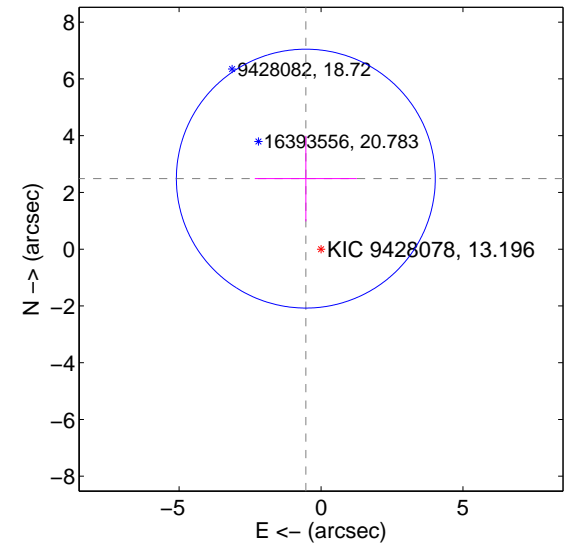
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

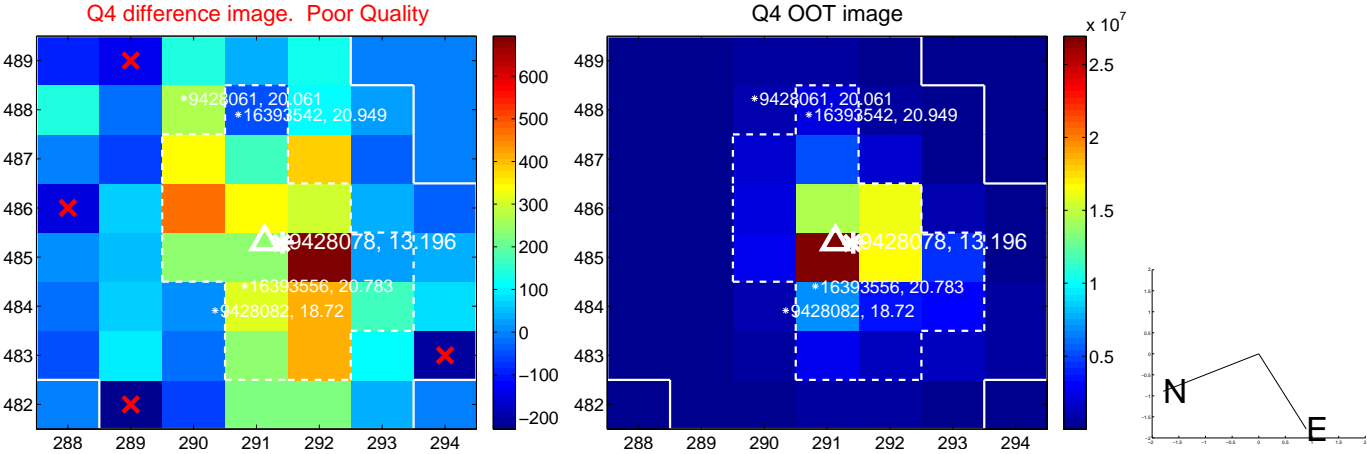
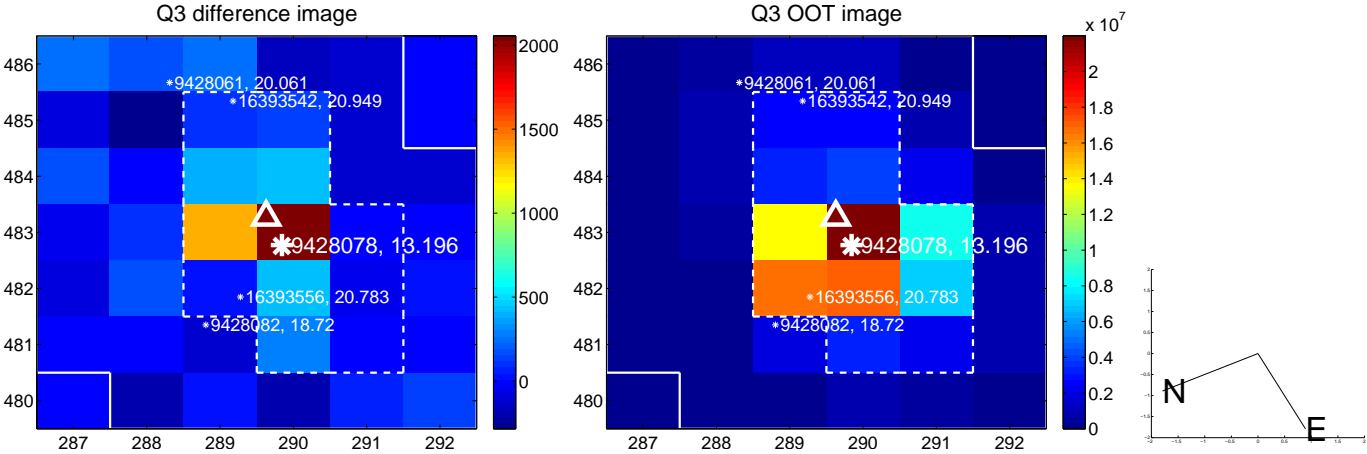
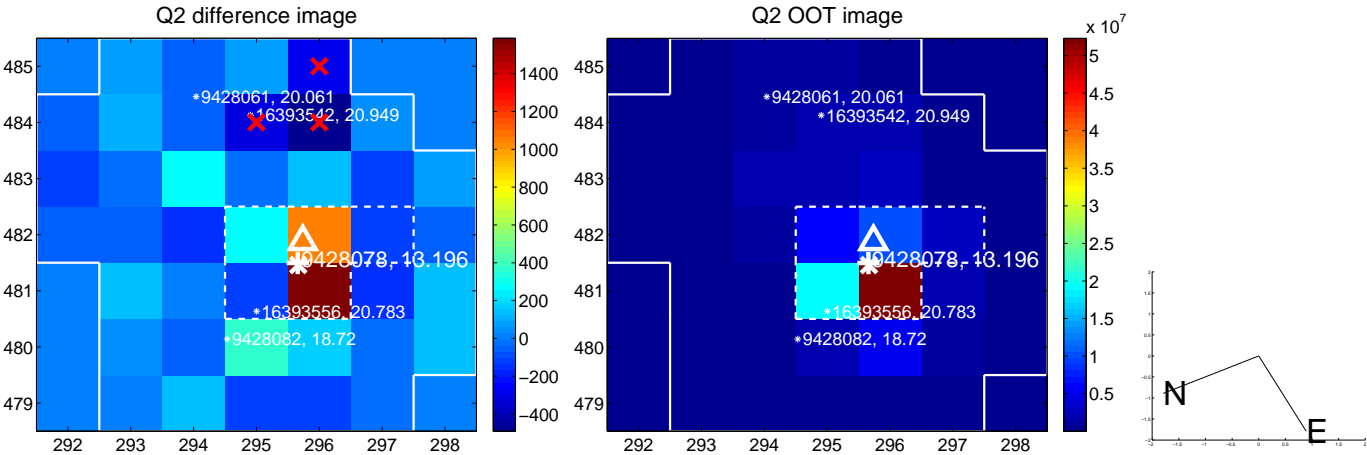
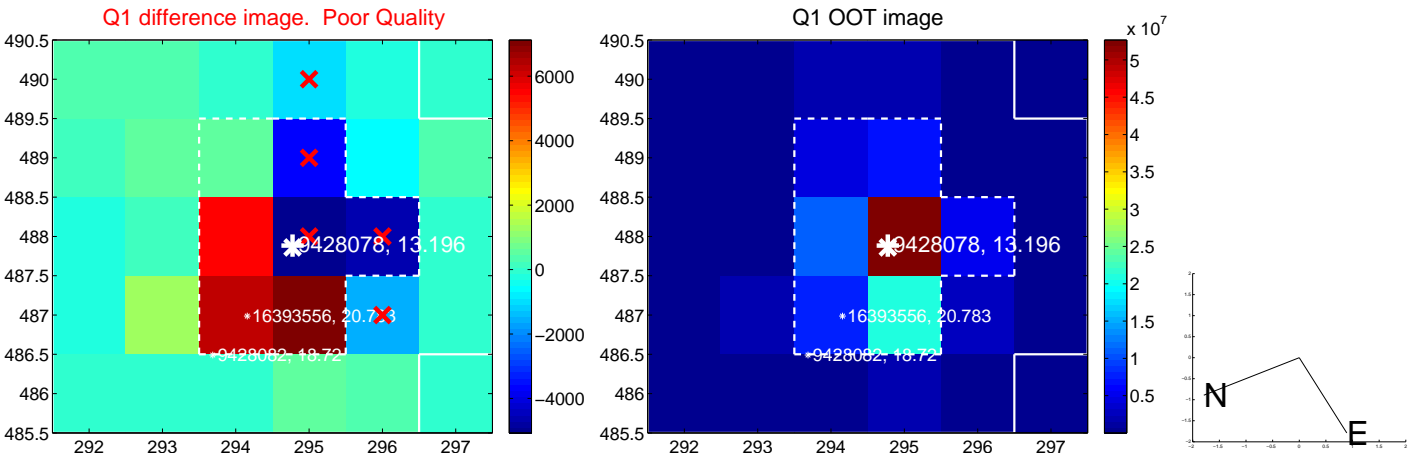


offset from photometric centroids

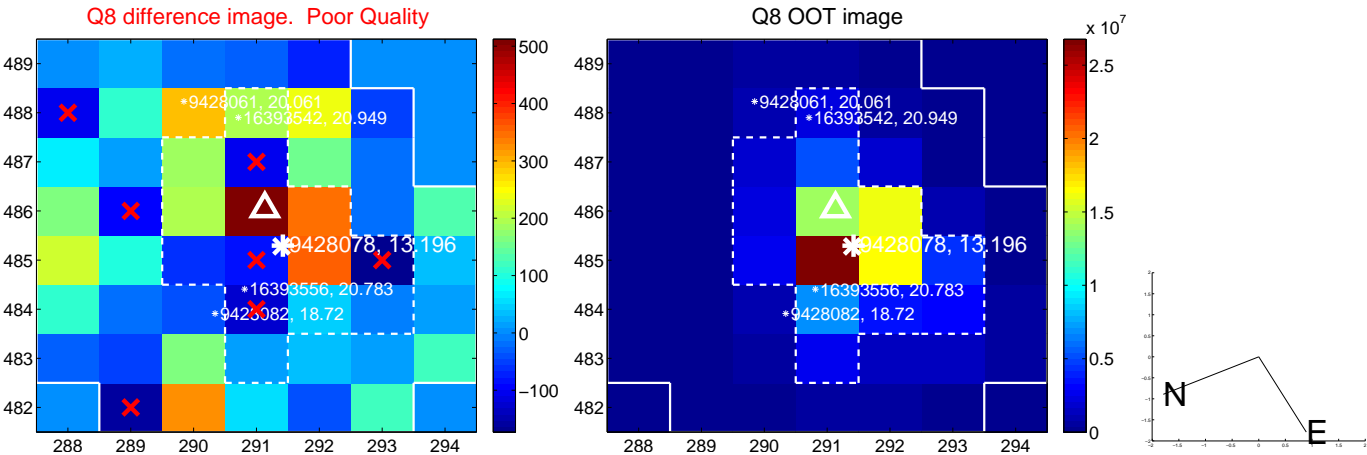
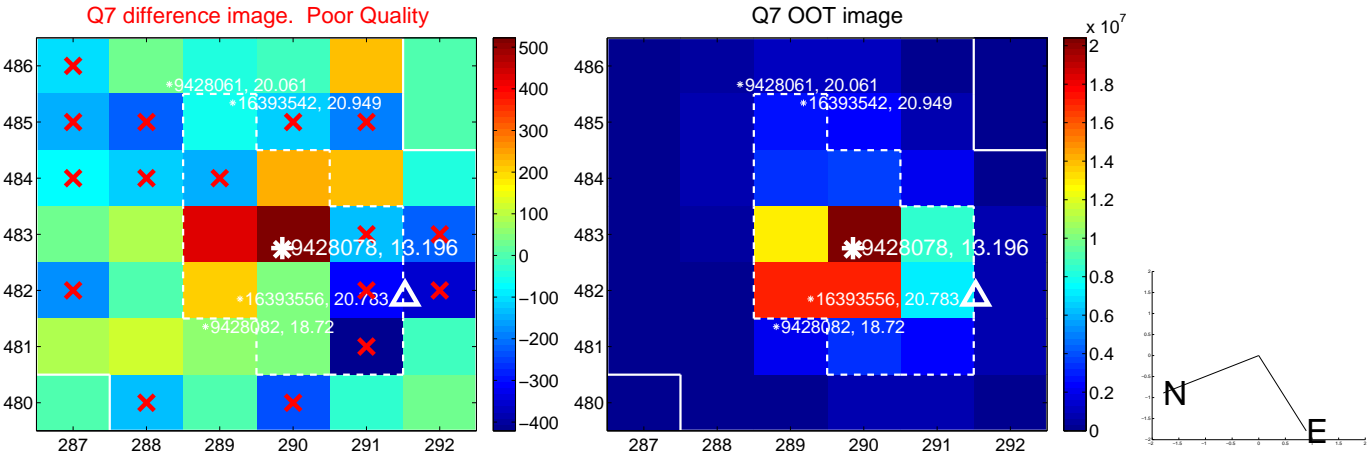
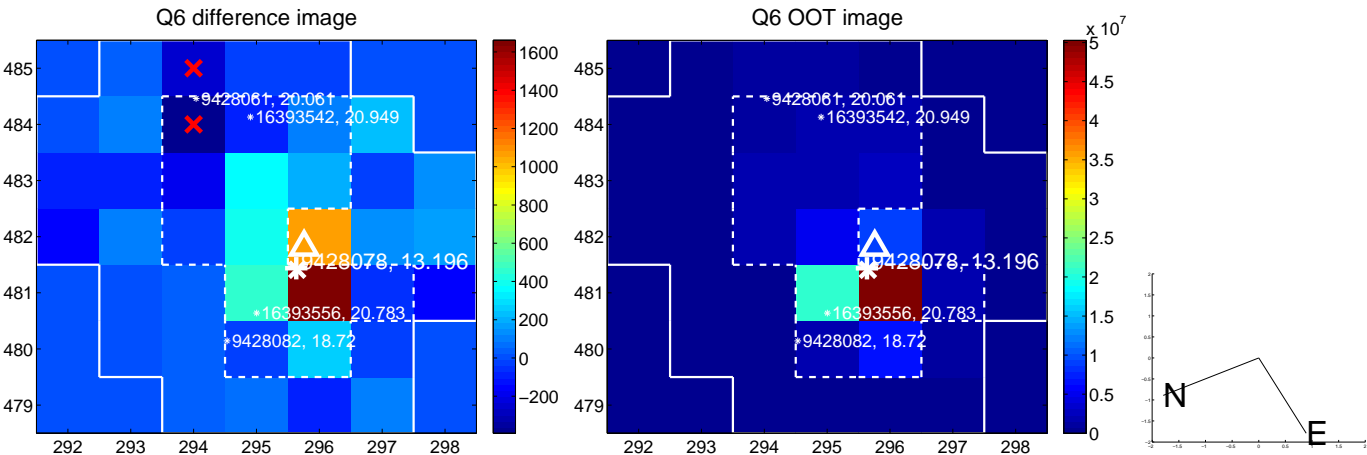
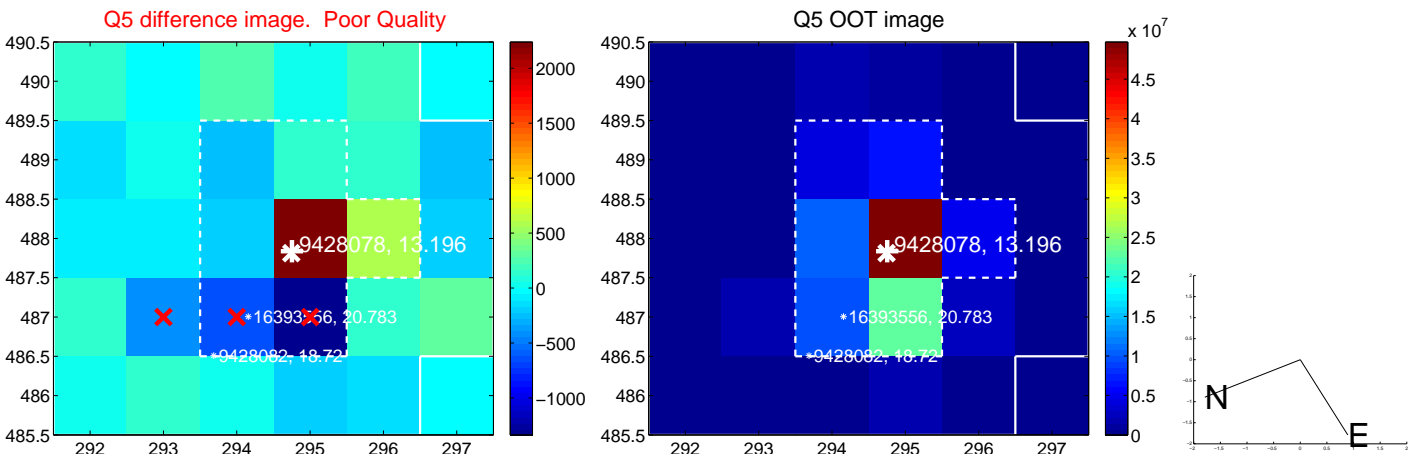


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: 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.

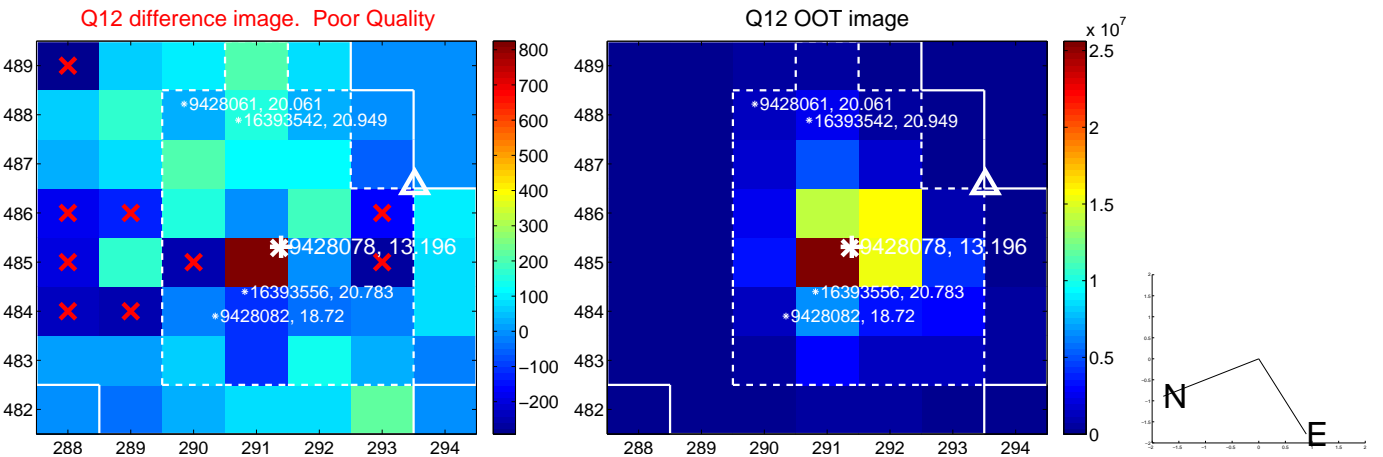
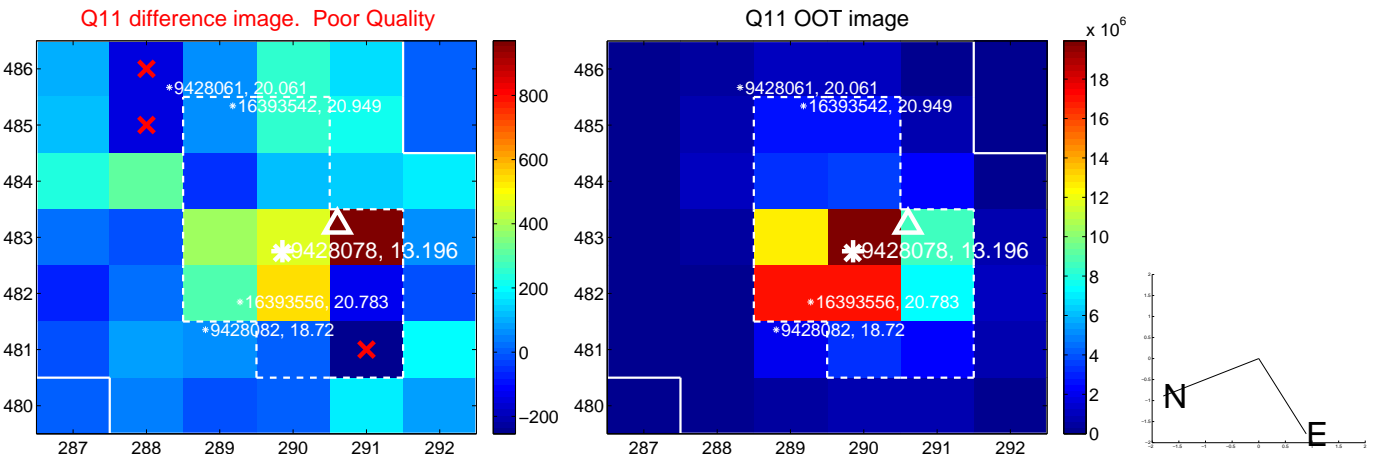
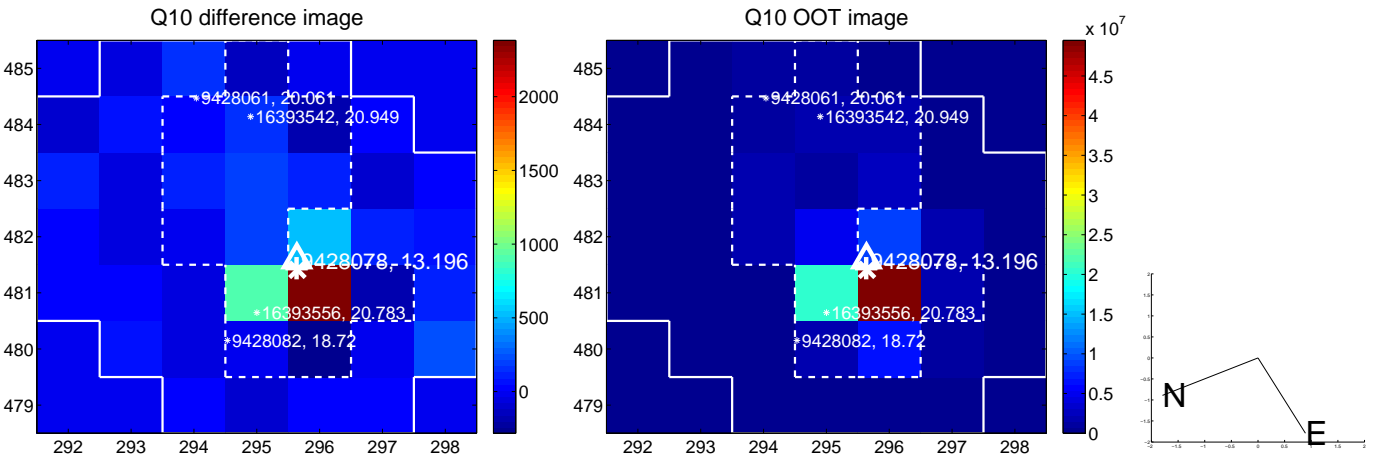
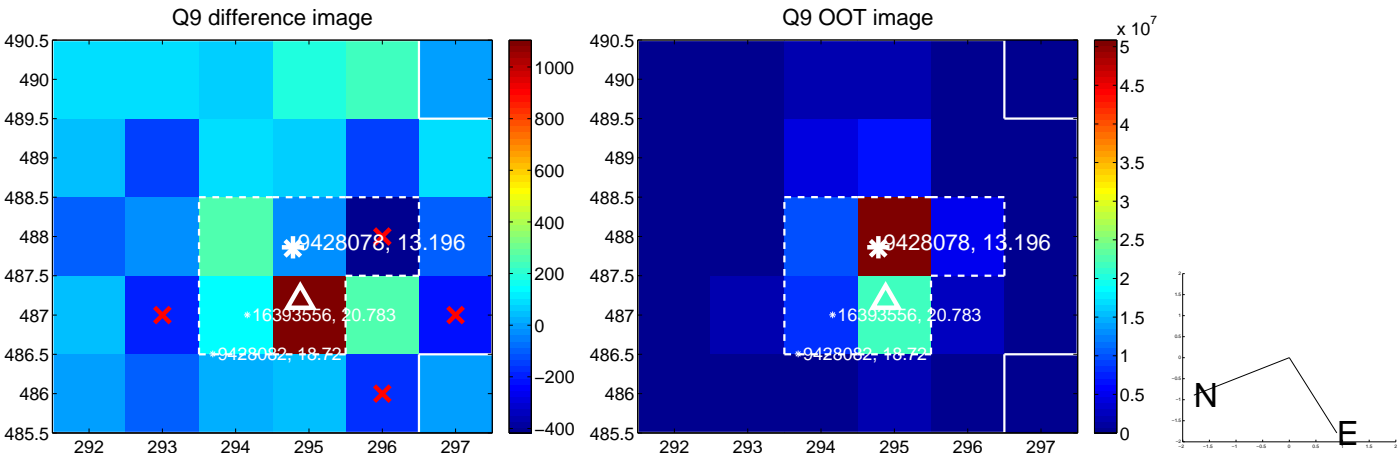


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

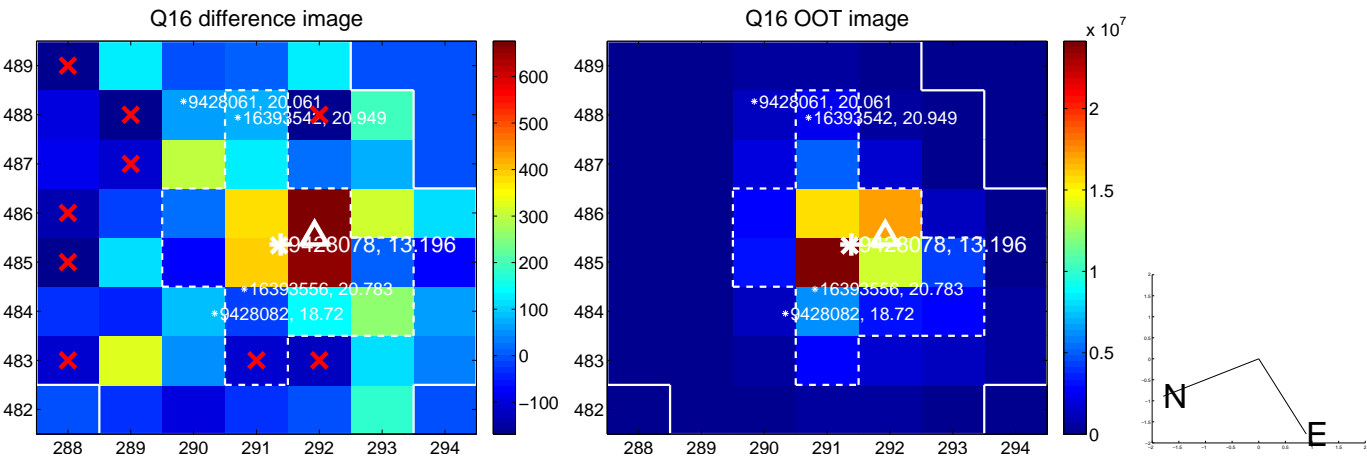
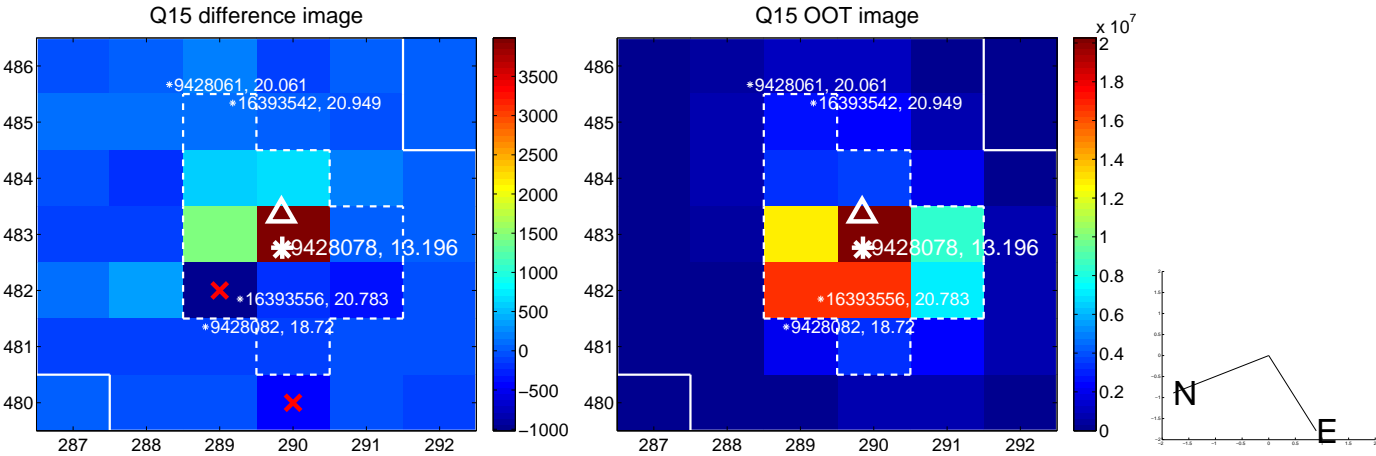
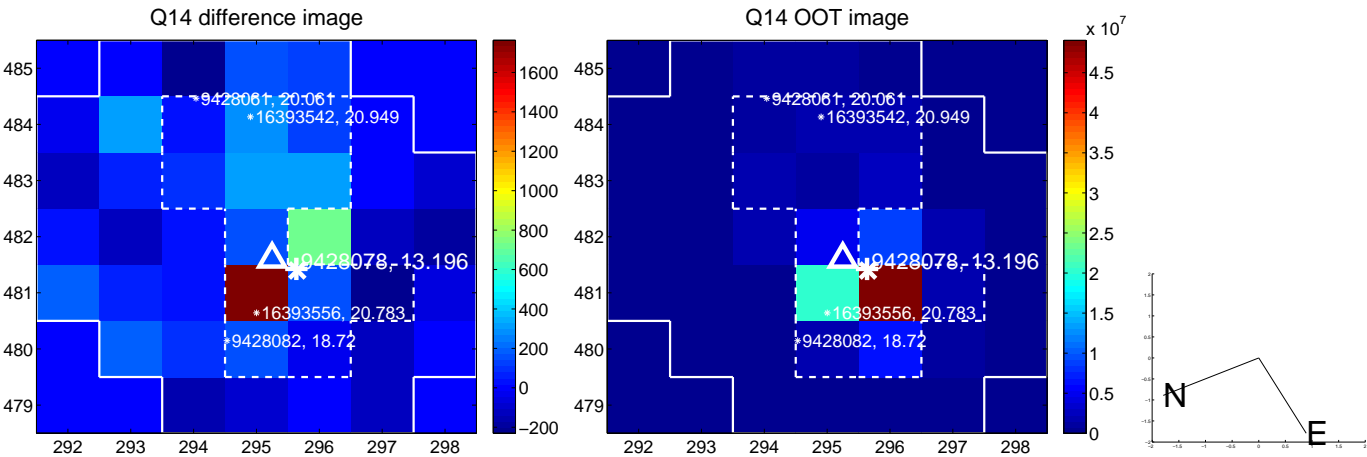
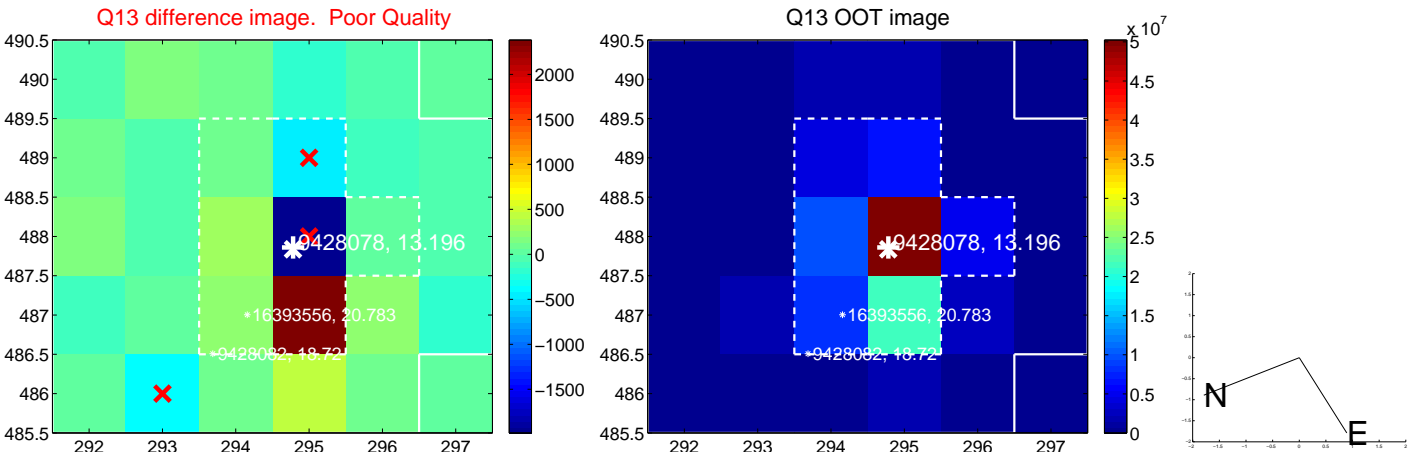




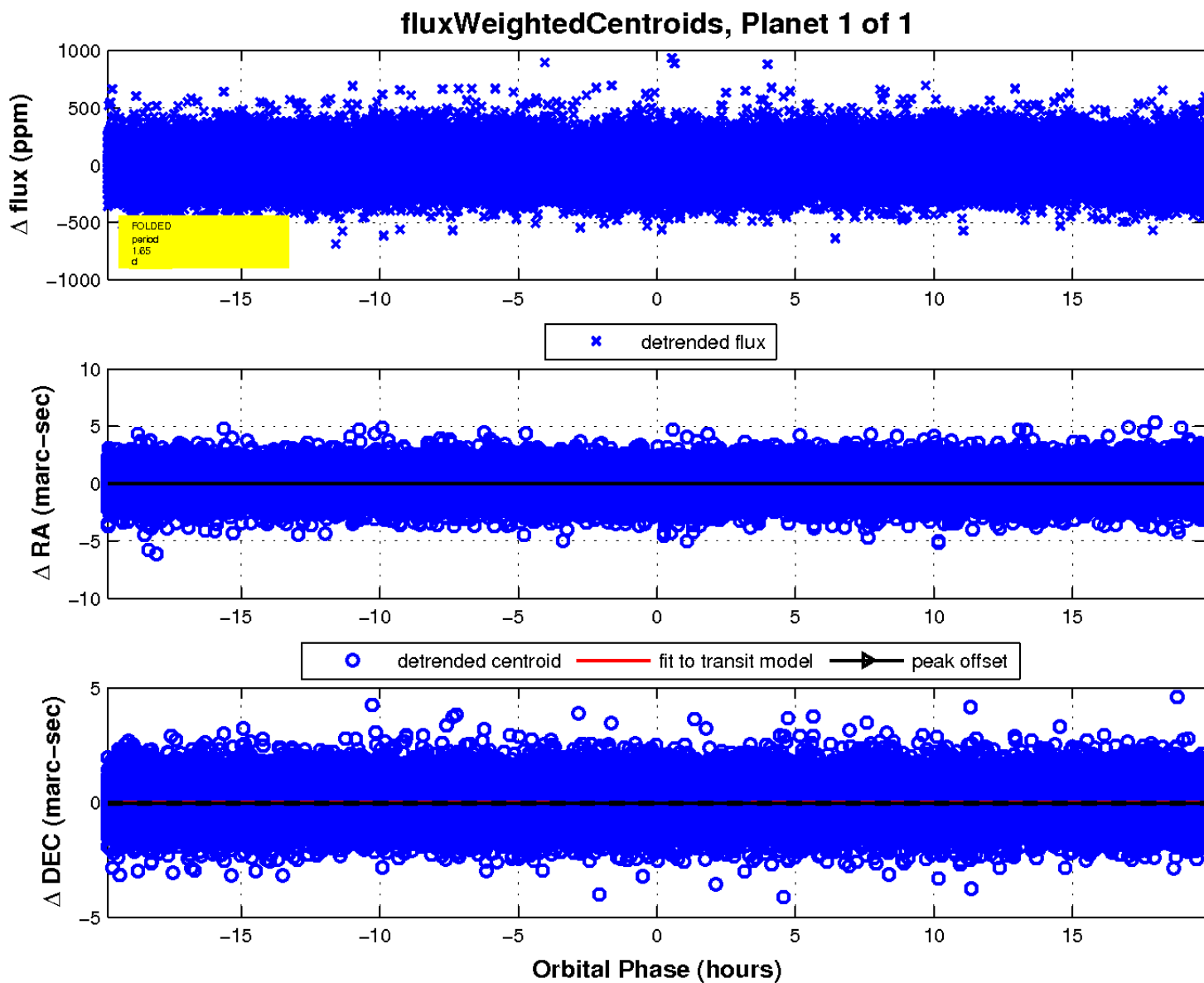
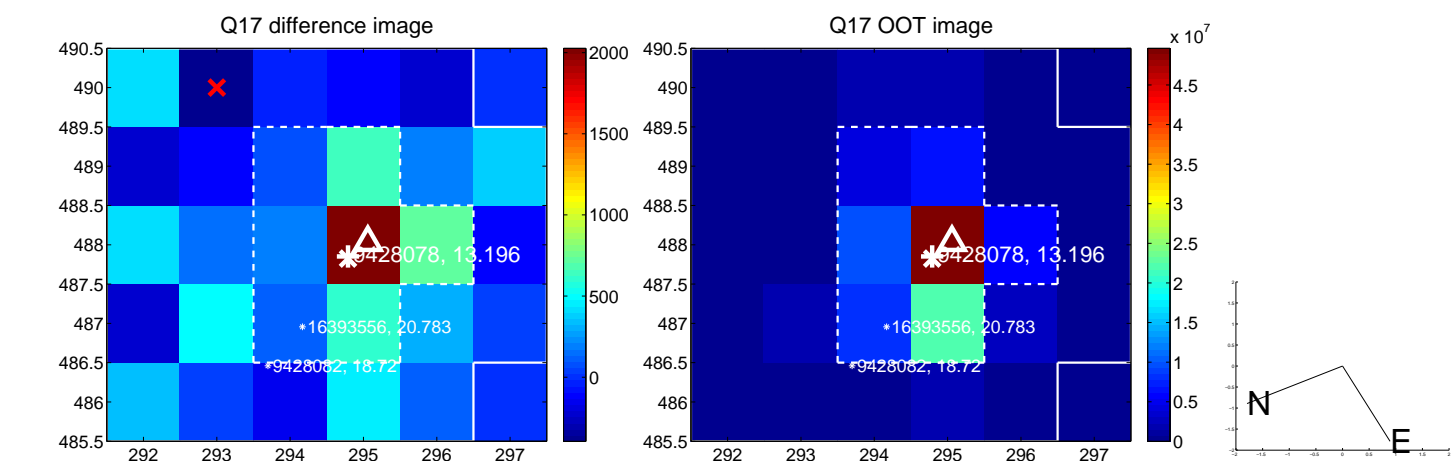
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



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



UKIRT Image

