

# KIC 004840156

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004840156-01	OBS	7709.01	2.694856	131.598624	56.1	2.805	8.9	9.5	1.19	5823	0.96	1019.53

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004840156-01	OBS	FP	0.00	0	0	1	0	CENT_RESOLVED_OFFSET—HALO_GHOST

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

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

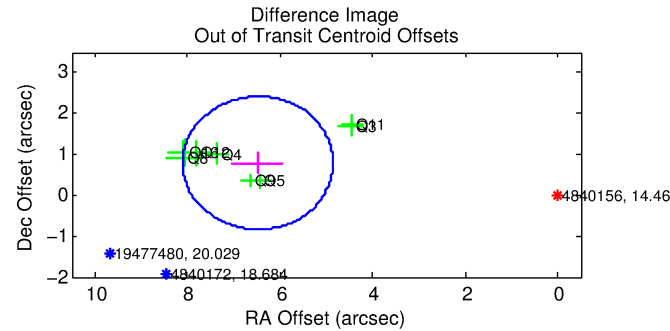
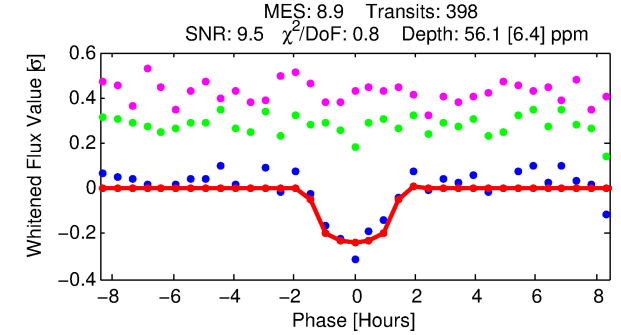
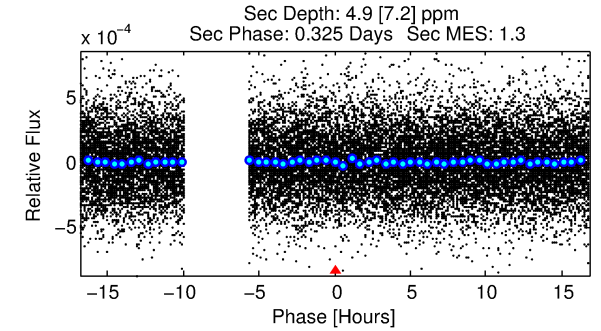
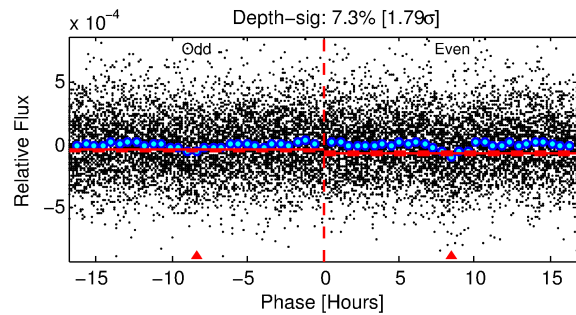
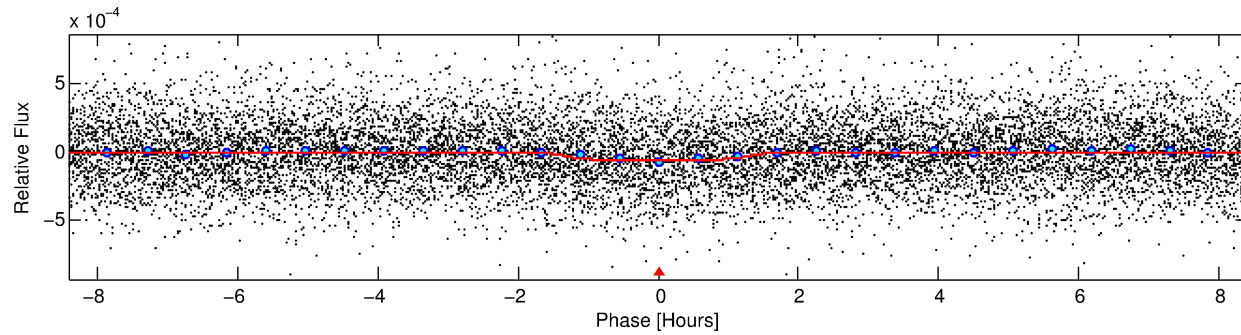
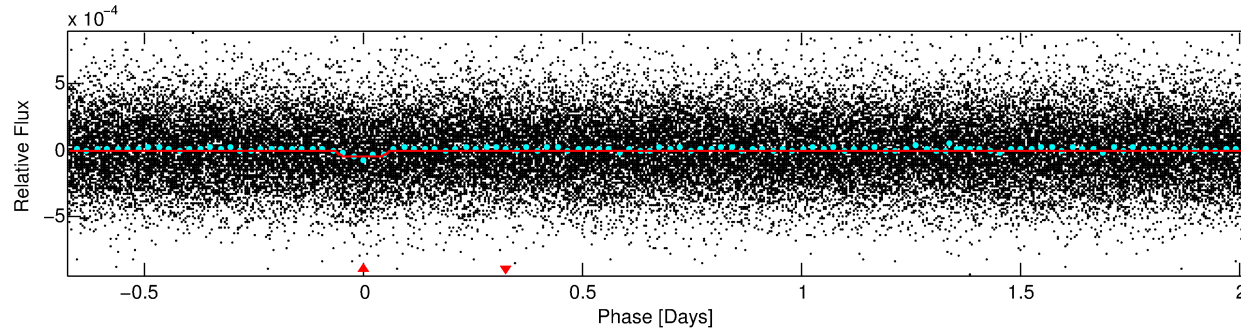
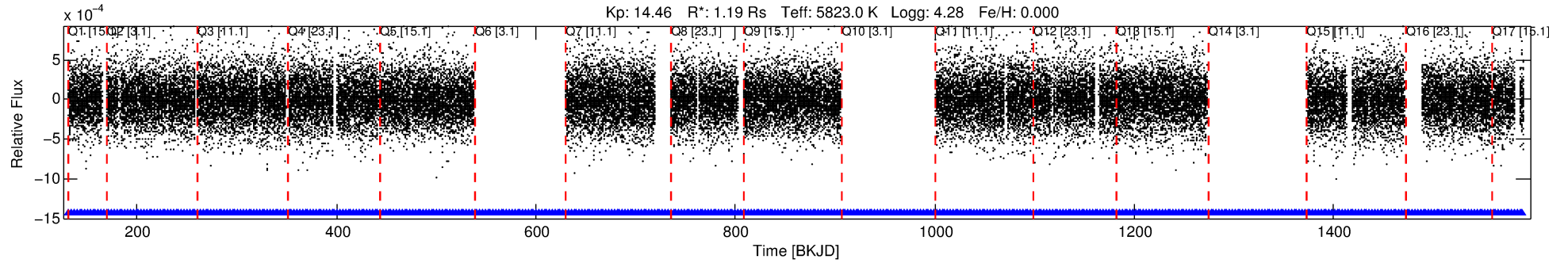
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 004840156-01

No Significant Match Found

# DV One-Page Summary

KIC: 4840156 Candidate: 1 of 1 Period: 2.695 d



## DV Fit Results:

Period = 2.69486 [0.00002] d  
Epoch = 131.5986 [0.0047] BKJD  
Rp/R\* = 0.0074 [0.0035]  
a/R\* = 5.10 [10.31]  
b = 0.74 [1.32]  
Seff = 1019.53 [360.02]  
Teq = 1441 [127] K  
Rp = 0.96 [0.52] Re  
a = 0.0377 [0.0087] AU  
Ag = 4.18 [7.38] [0.43 $\sigma$ ]  
Teffp = 3186 [1383] K [1.26 $\sigma$ ]

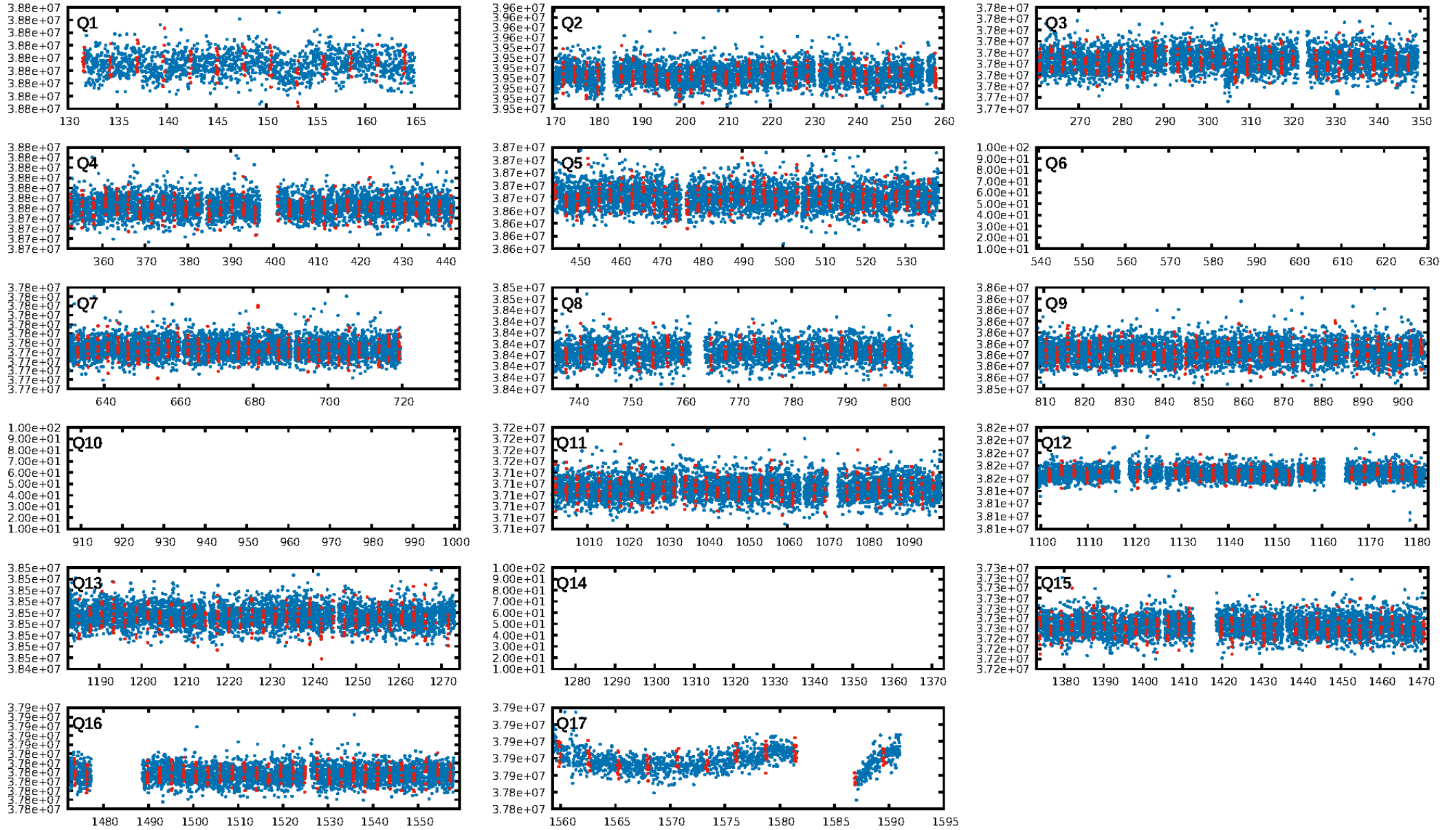
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 7.61e-19  
RollingBand-fgt: 1.00 [374/374]  
GhostDiagnostic-chr: -0.1921  
Centroid-sig: 0.0%  
Centroid-so: 14.923 arcsec [11.38 $\sigma$ ]  
OotOffset-rm: 6.528 arcsec [12.03 $\sigma$ ]  
KicOffset-rm: 6.580 arcsec [12.20 $\sigma$ ]  
OotOffset-st: 0/2/4/2 [8]  
KicOffset-st: 0/2/4/2 [8]  
DiffImageQuality-fgm: 1.00 [8/8]  
DiffImageOverlap-fno: 1.00 [14/14]

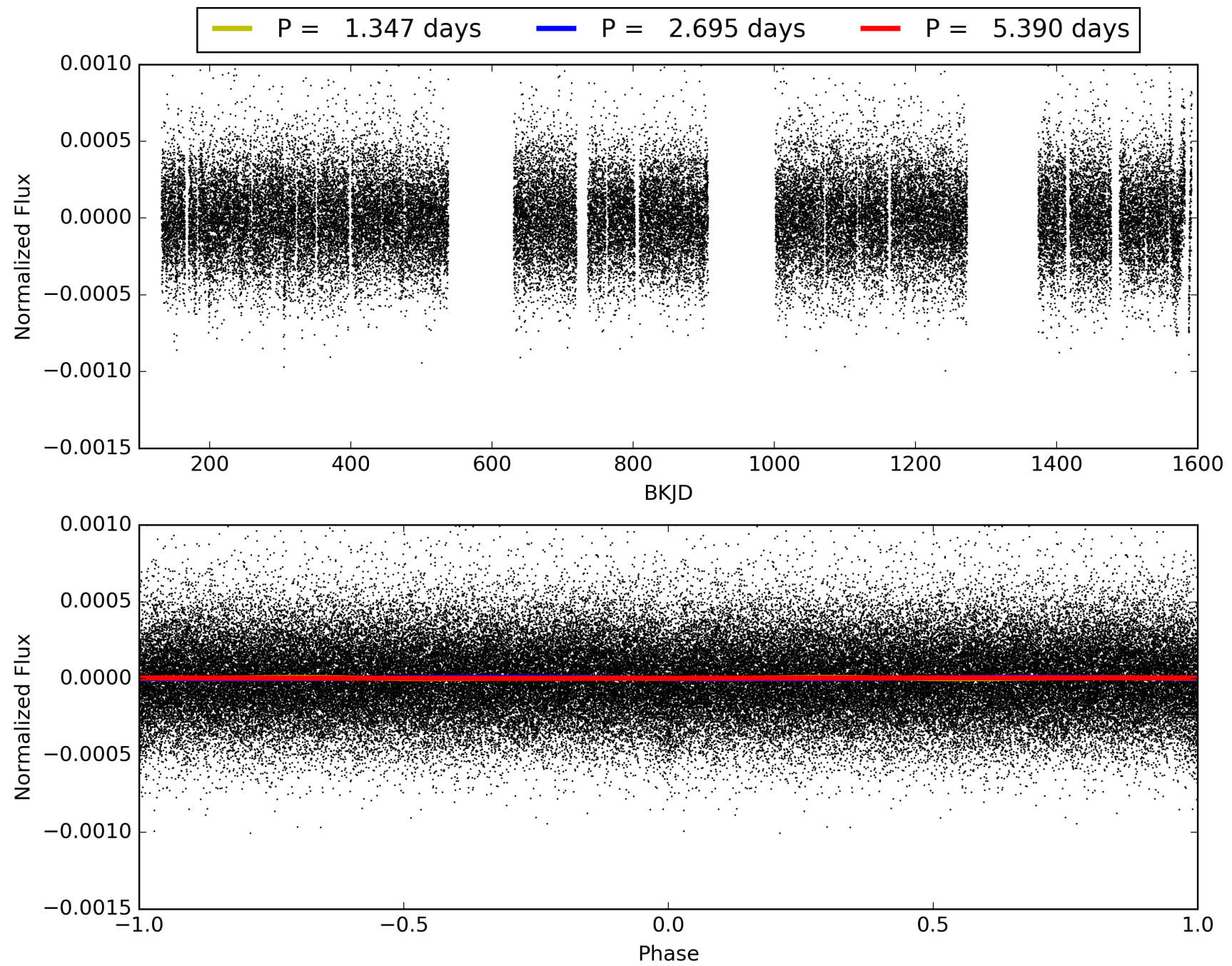
Software Revision: svn-ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 04:35:29 Z

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

# TCE 004840156-01, PDC Light Curves



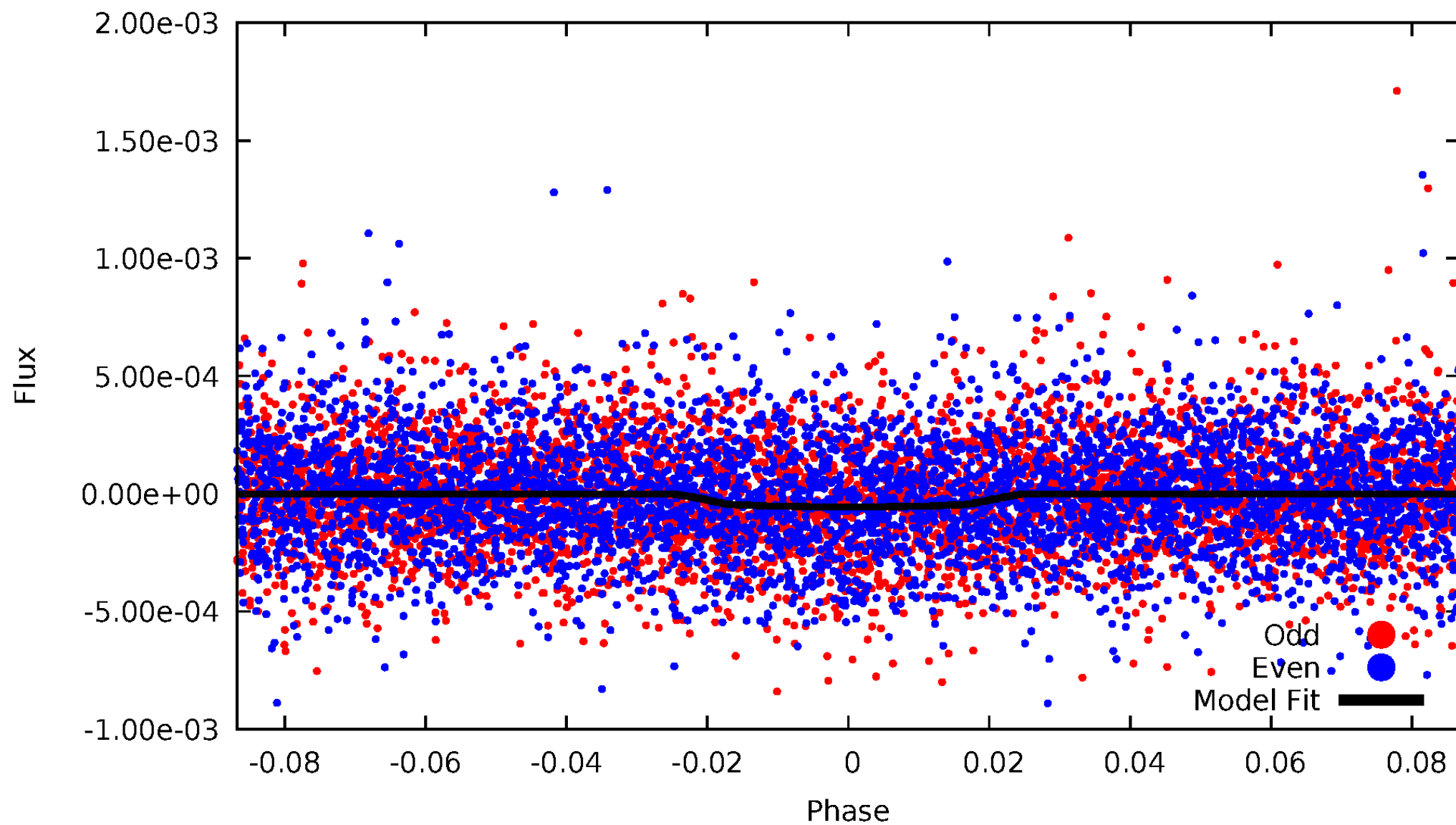
TCE 004840156-01





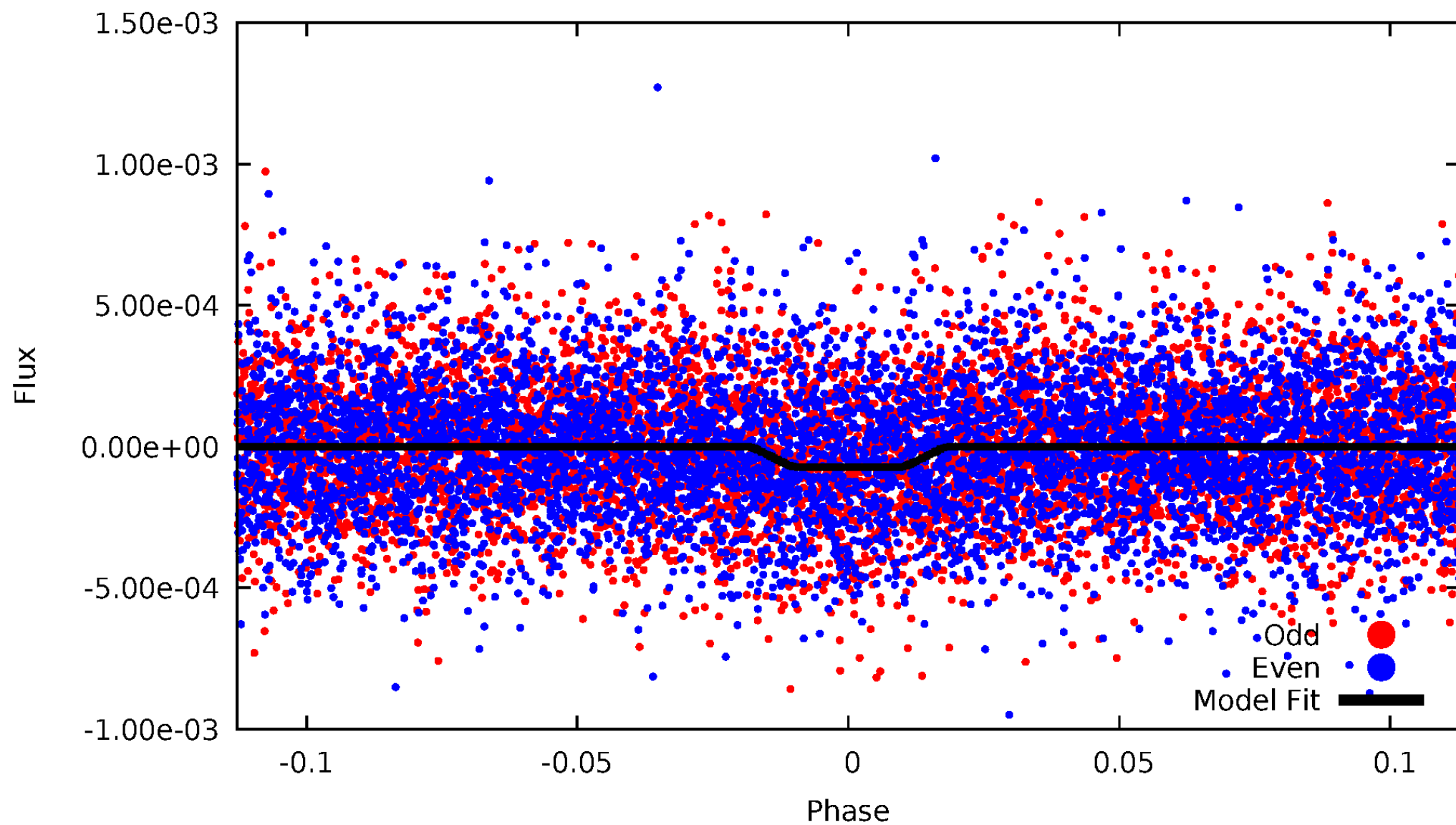
# DV Odd/Even

TCE 004840156-01



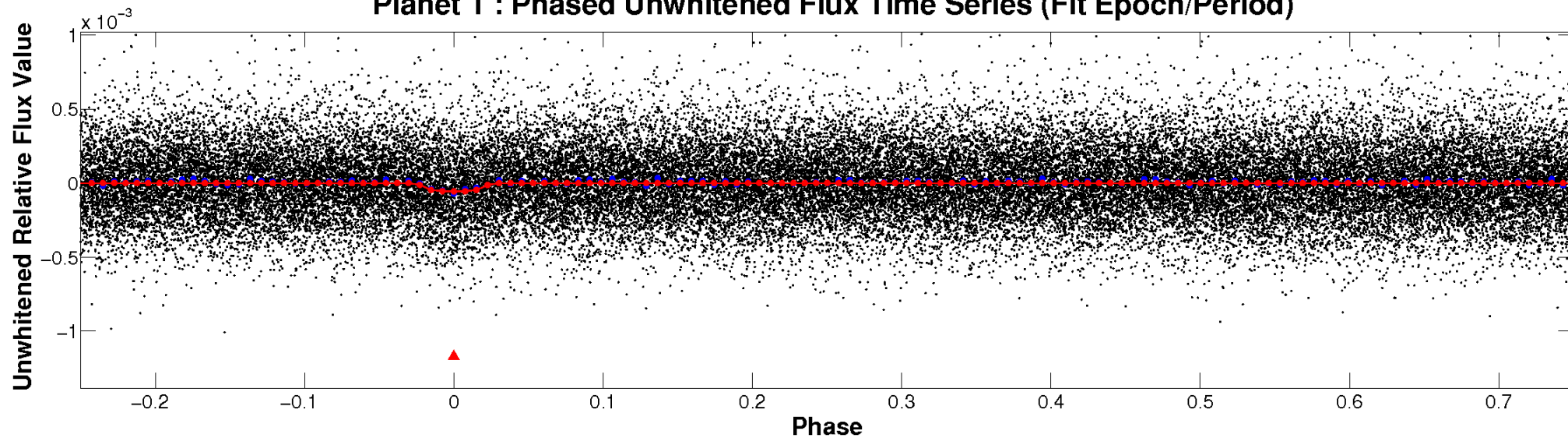
# ALT Odd/Even

TCE 004840156-01

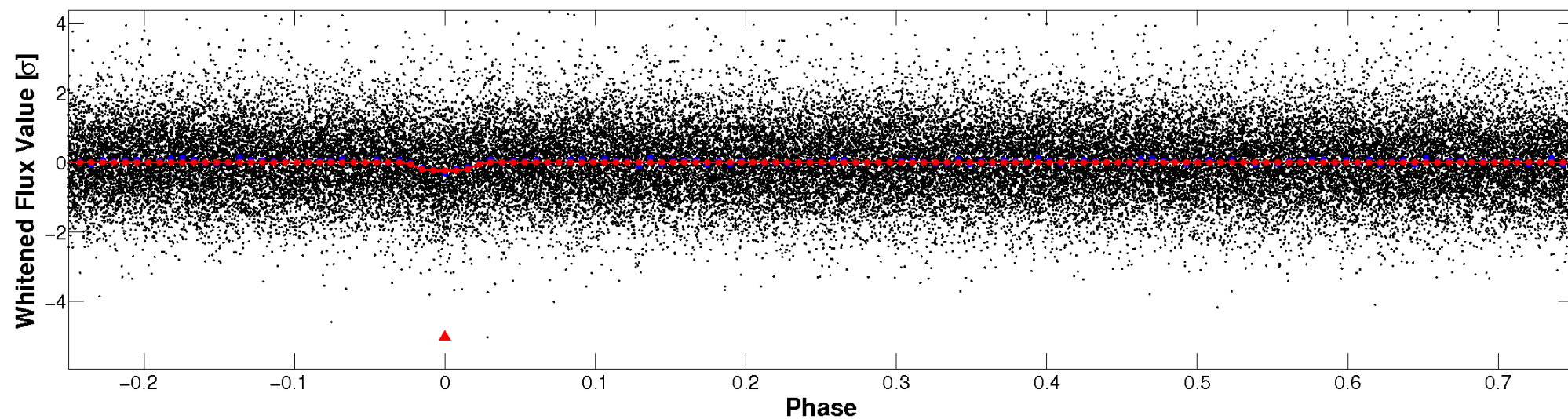


# Non-Whitened Vs. Whitened Light Curve

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

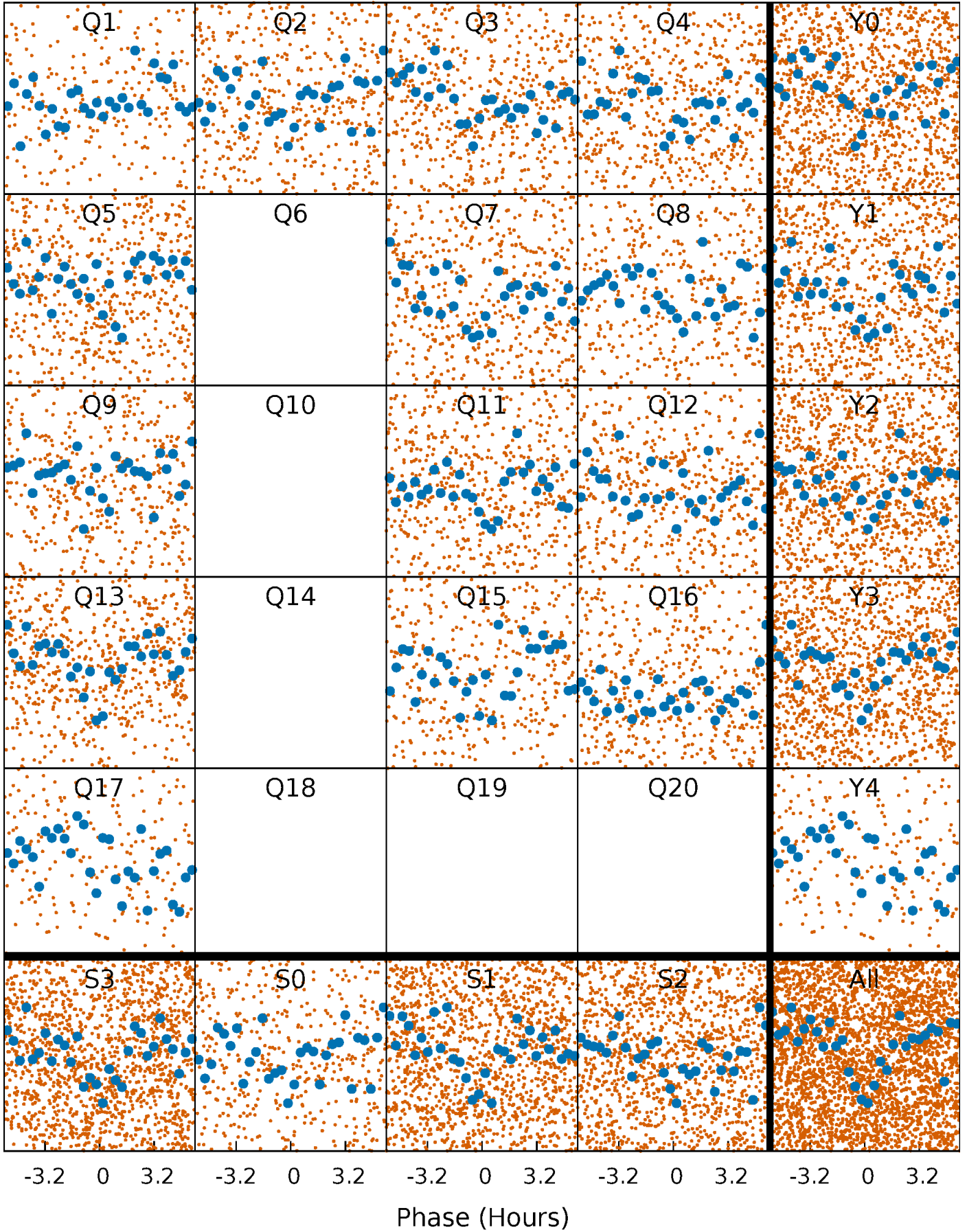


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

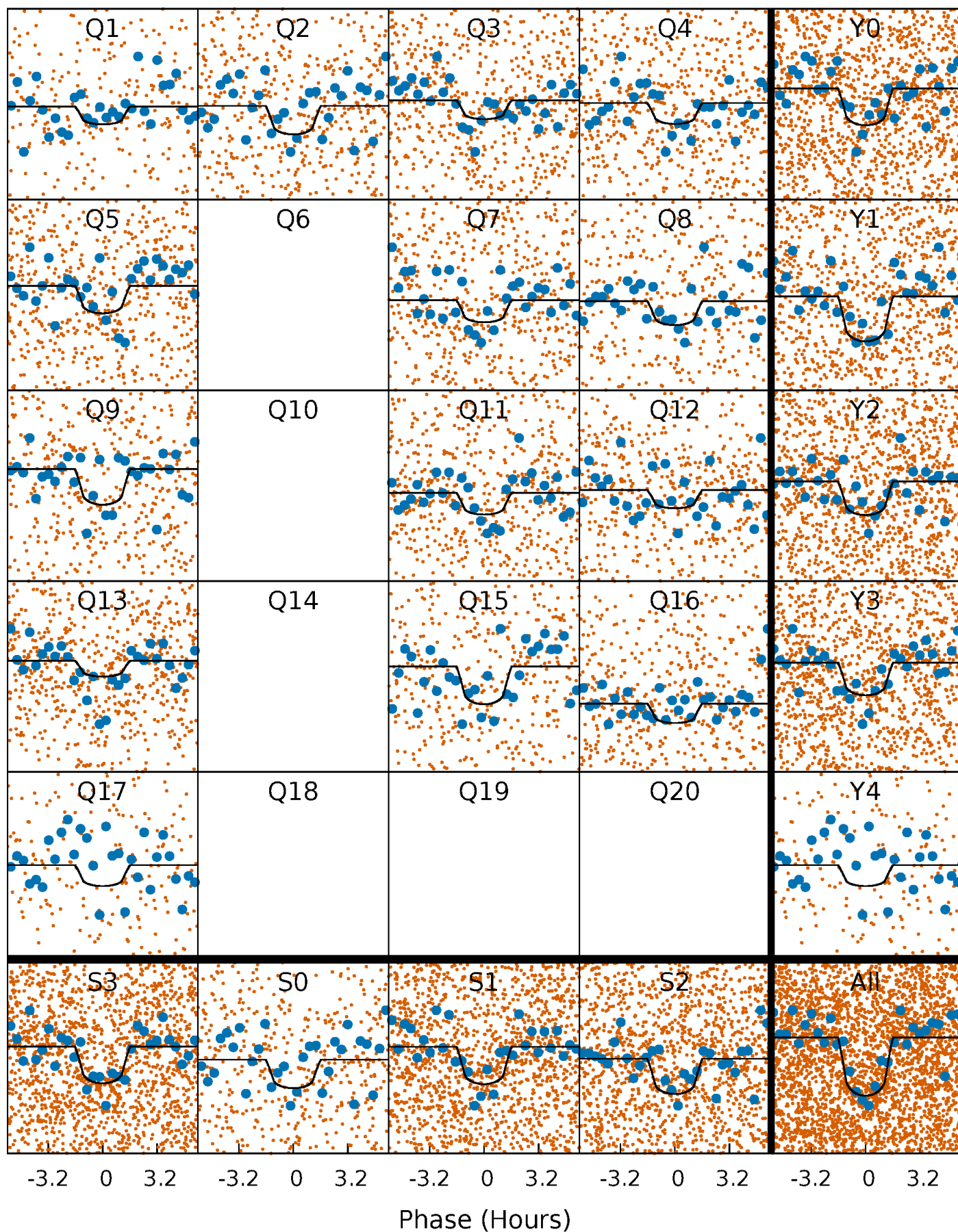
TCE 004840156-01 P= 2.694856 Days  $T_0=131.598624$  (BKJD)





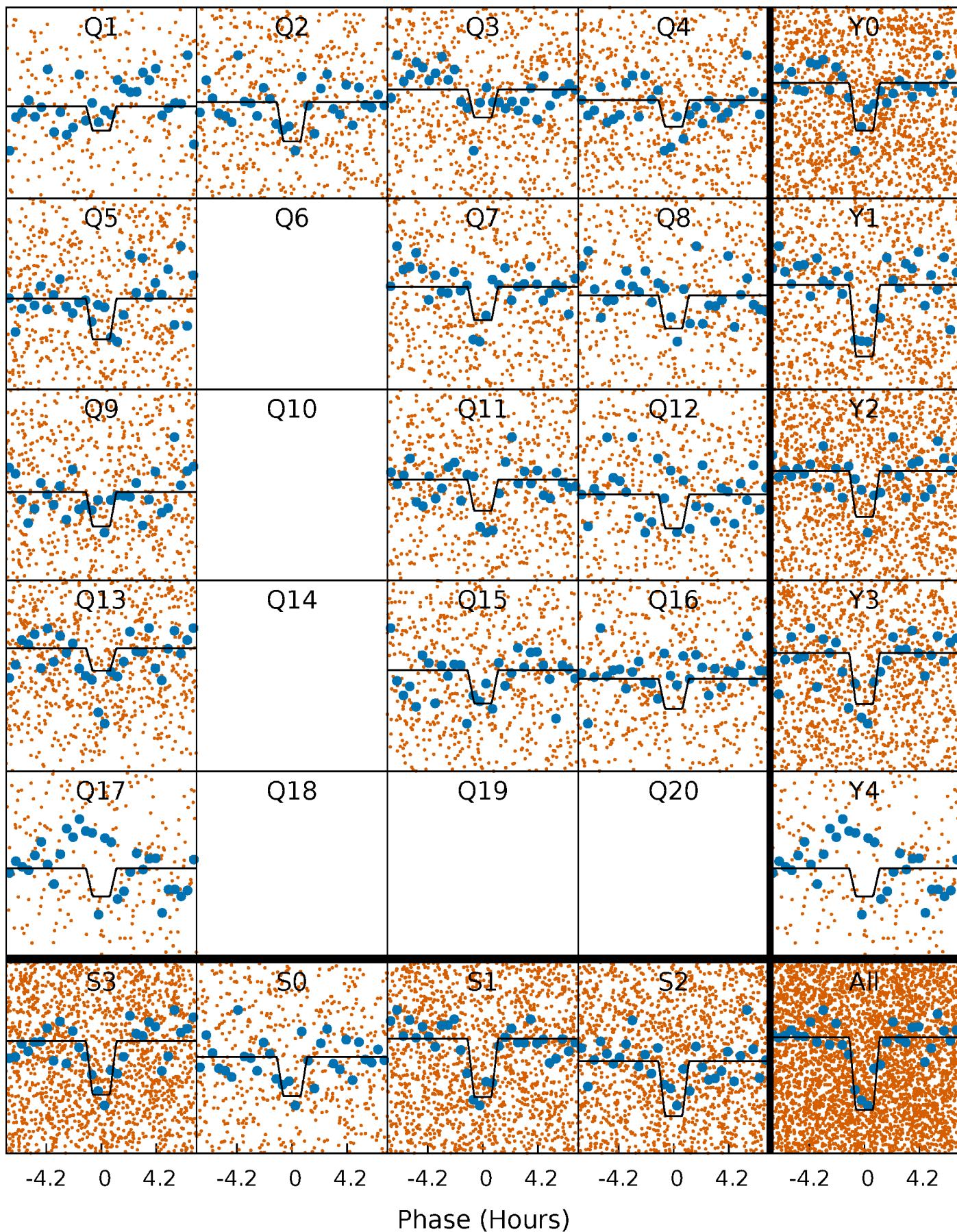
# DV Quarter-Phased Transit Curves

TCE 004840156-01 P= 2.694856 Days  $T_0=131.598624$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

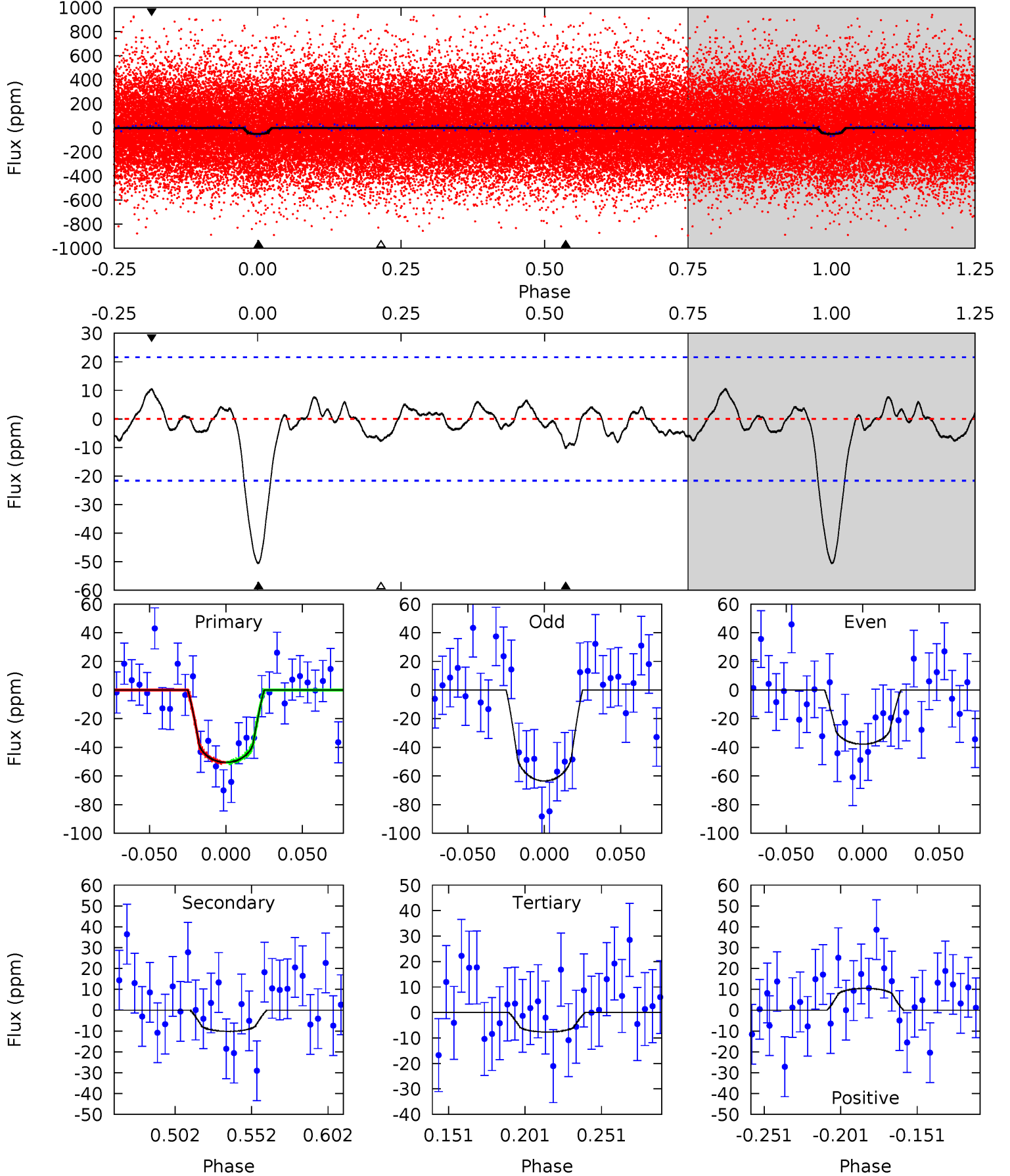
TCE 004840156-01 P= 2.694825 Days  $T_0=131.607575$  (BKJD)



# DV Model-Shift Uniqueness Test

004840156-01, P = 2.694856 Days, E = 128.903768 Days

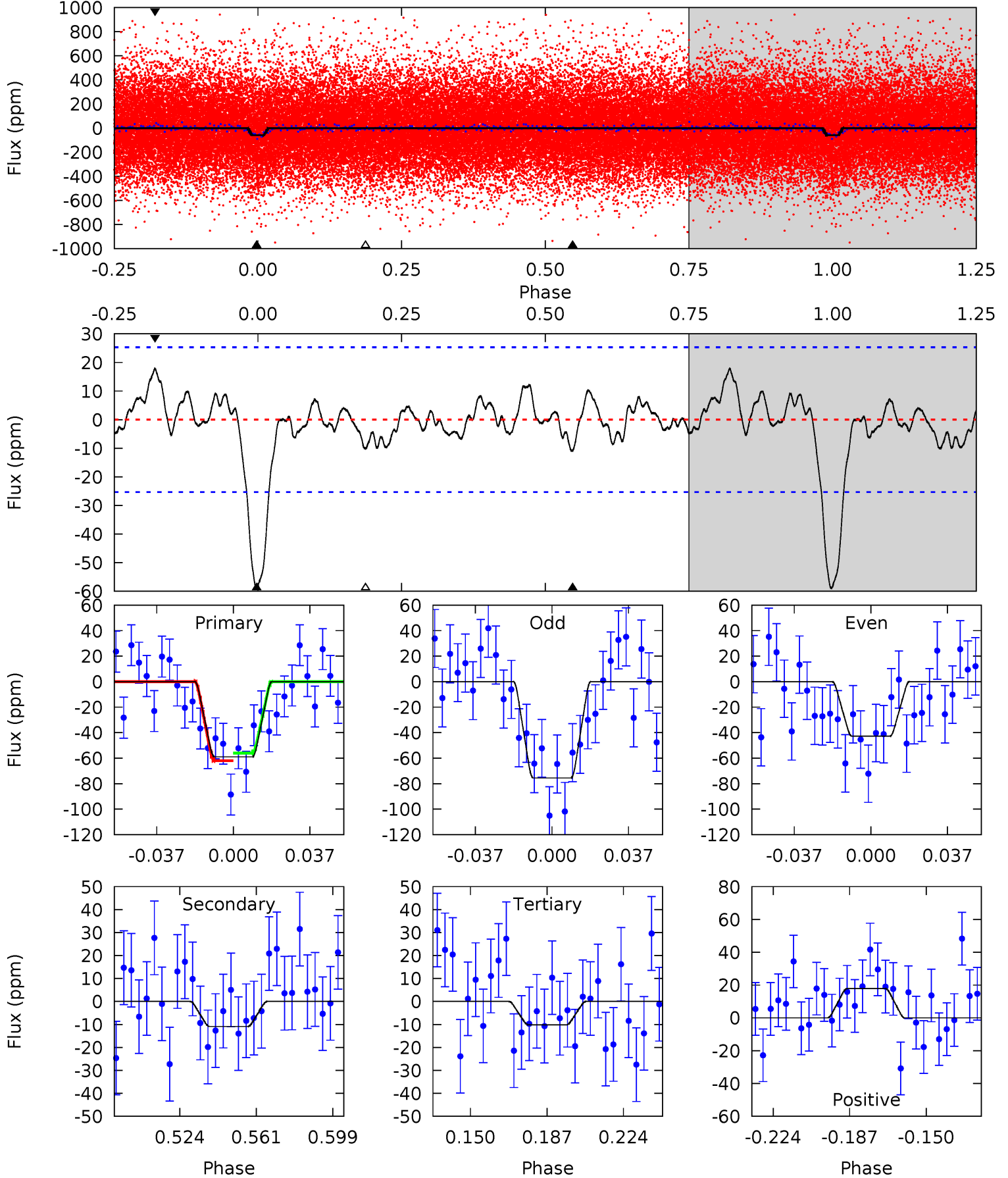
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.0	2.21	1.67	2.27	4.71	1.96	0.87	9.33	8.73	0.54	-0.06	2.79	1.06	0.17	0.01



# Alt Model-Shift Uniqueness Test

004840156-01, P = 2.694825 Days, E = 128.912750 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
11.1	2.06	1.91	3.37	4.77	2.08	0.99	9.19	7.74	0.14	-1.31	3.07	1.01	0.23	0.56





### Stellar Parameters For KIC 004840156

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5823^{+158}_{-176}$	$4.283^{+0.180}_{-0.180}$	$0.000^{+0.250}_{-0.300}$	$1.187^{+0.327}_{-0.238}$	$0.986^{+0.140}_{-0.115}$	$0.830^{+0.785}_{-0.407}$
	+3%/-3%	+4%/-4%	+inf%/-inf%	+28%/-20%	+14%/-12%	+95%/-49%
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 004840156-01 / KOI 7709.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-10 \pm 5$	$1.00^{+0.49}_{-0.47}$	$2014^{+142}_{-139}$	$3997^{+1064}_{-593}$	$7.878^{+18.671}_{-4.922}$
Alt.	$-11 \pm 5$	$1.12^{+0.53}_{-0.47}$	$2006^{+162}_{-129}$	$3831^{+916}_{-576}$	$6.305^{+13.463}_{-3.822}$

$T_{max}$  = 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

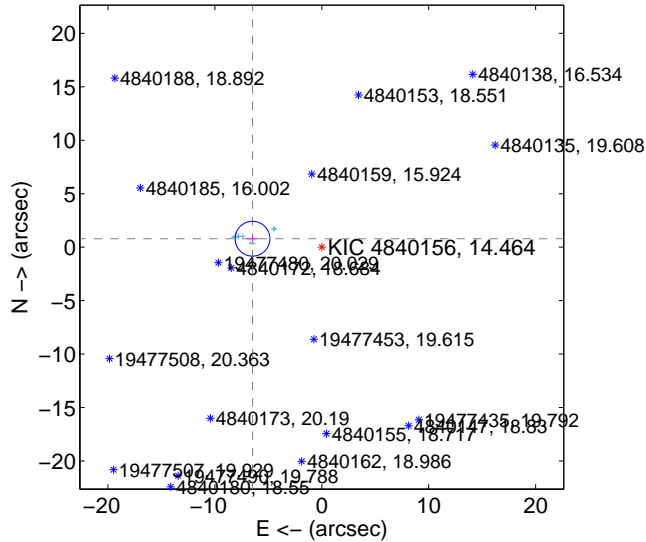
Supplemental centroid analysis for 004840156-01. Kepler magnitude: 14.46. Transit SNR 9.52

There are 8 quarters with good PRF difference image offsets

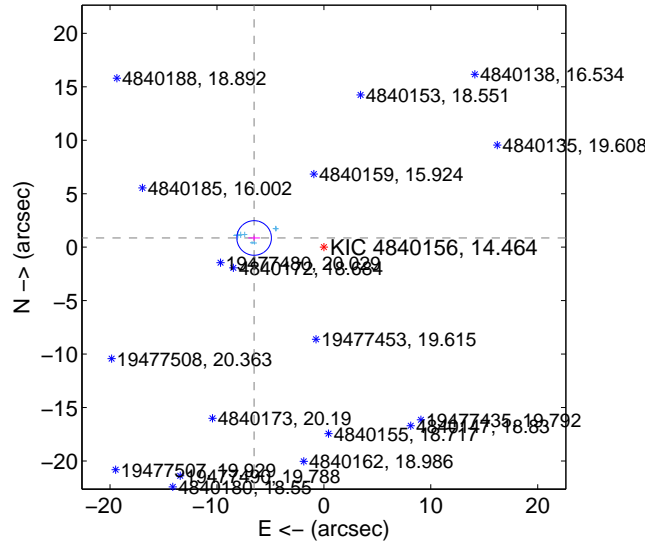
The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b>6.528 <math>\pm</math> 0.543</b>	<b>12.03</b>	6.480 $\pm$ 0.546	0.791 $\pm$ 0.234
PRF-fit source offset from KIC position	<b>6.580 <math>\pm</math> 0.539</b>	<b>12.20</b>	6.524 $\pm$ 0.543	0.860 $\pm$ 0.232
photometric centroid source offset	<b>14.92 <math>\pm</math> 1.31</b>	<b>11.38</b>	14.68 $\pm$ 1.31	2.69 $\pm$ 1.29

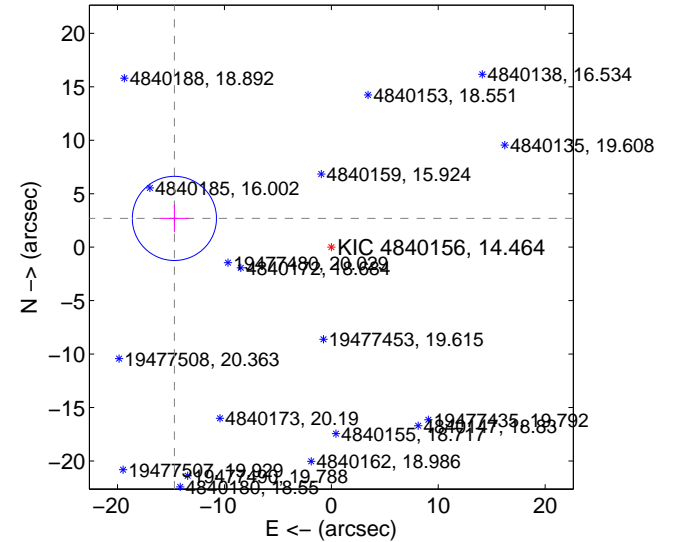
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

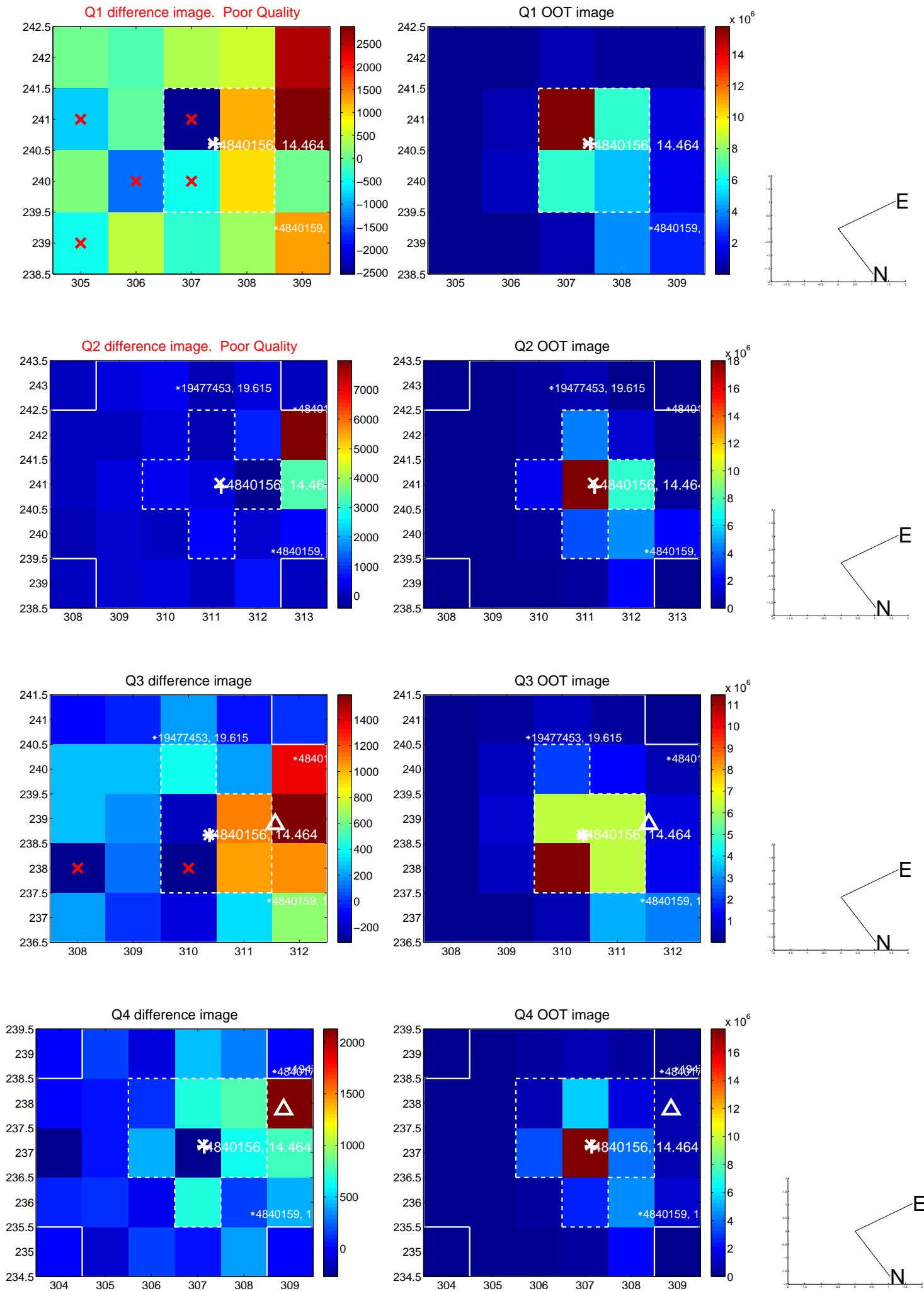


offset from photometric centroids

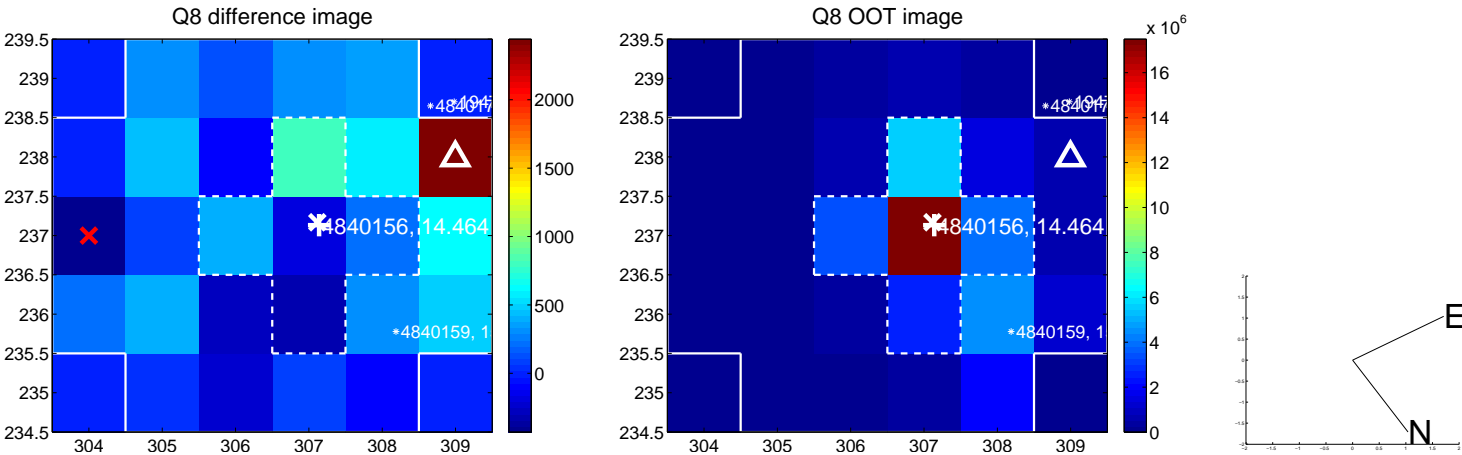
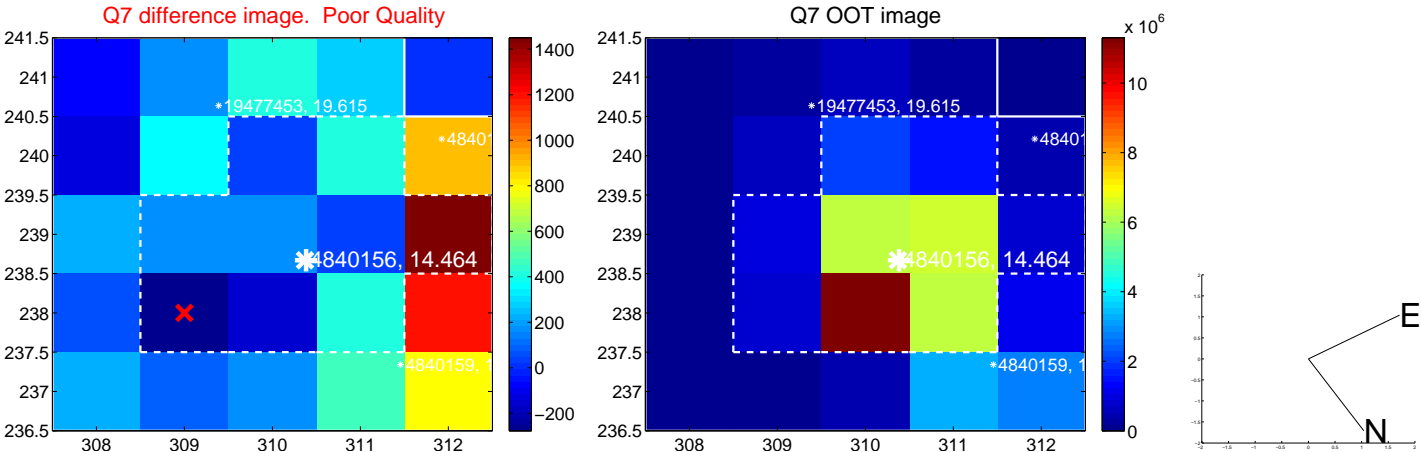
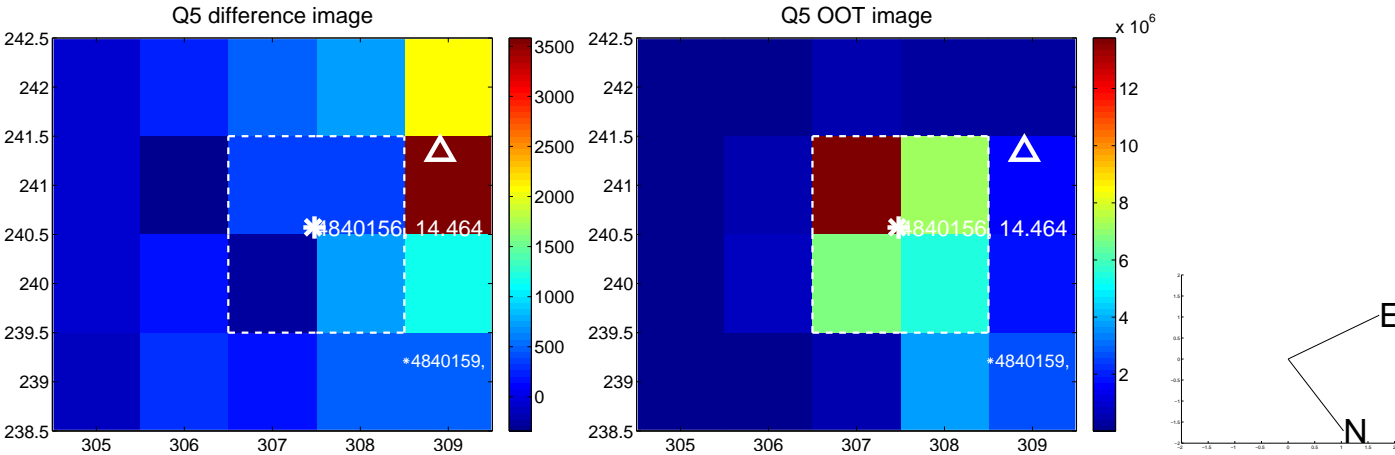


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

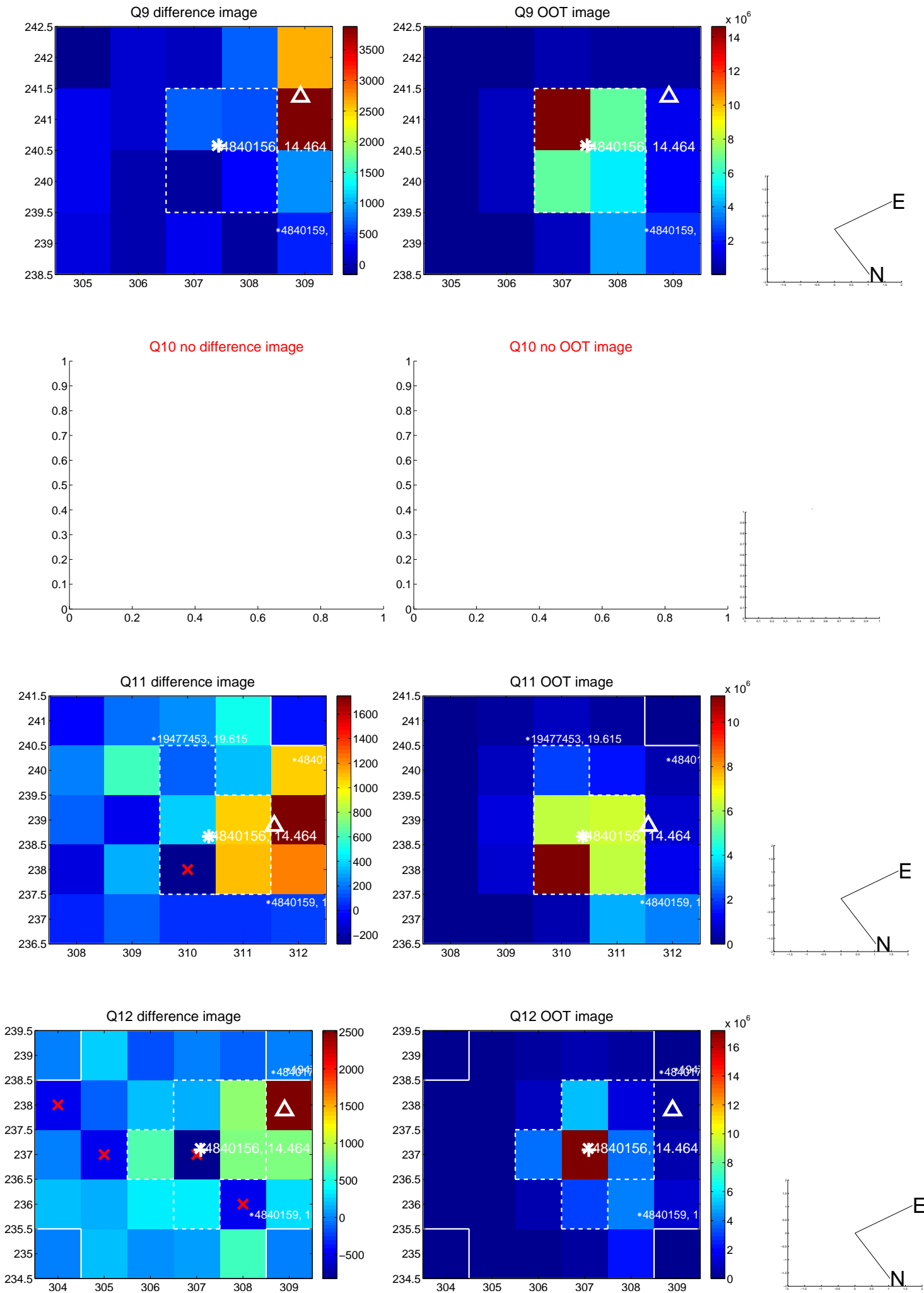


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

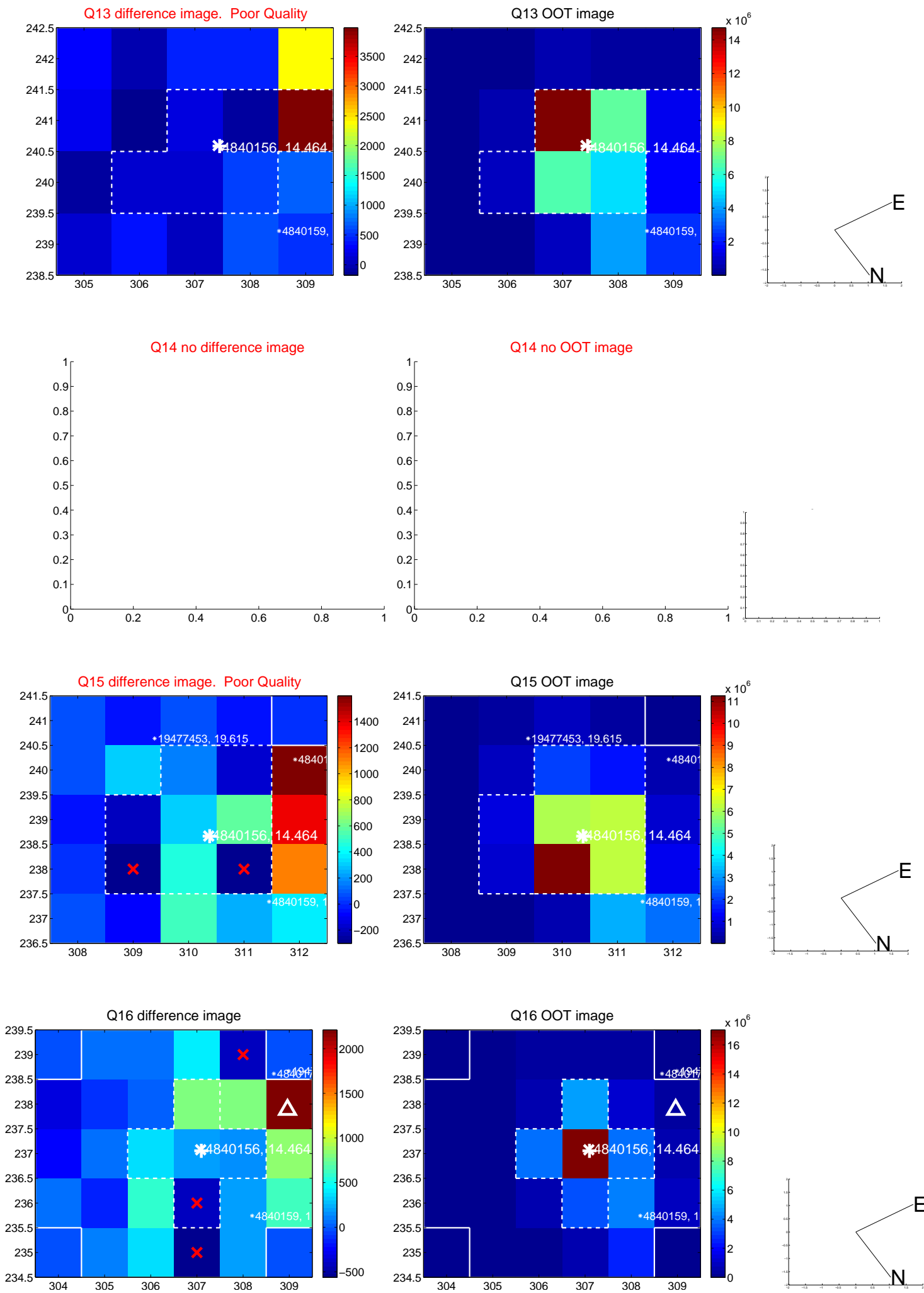




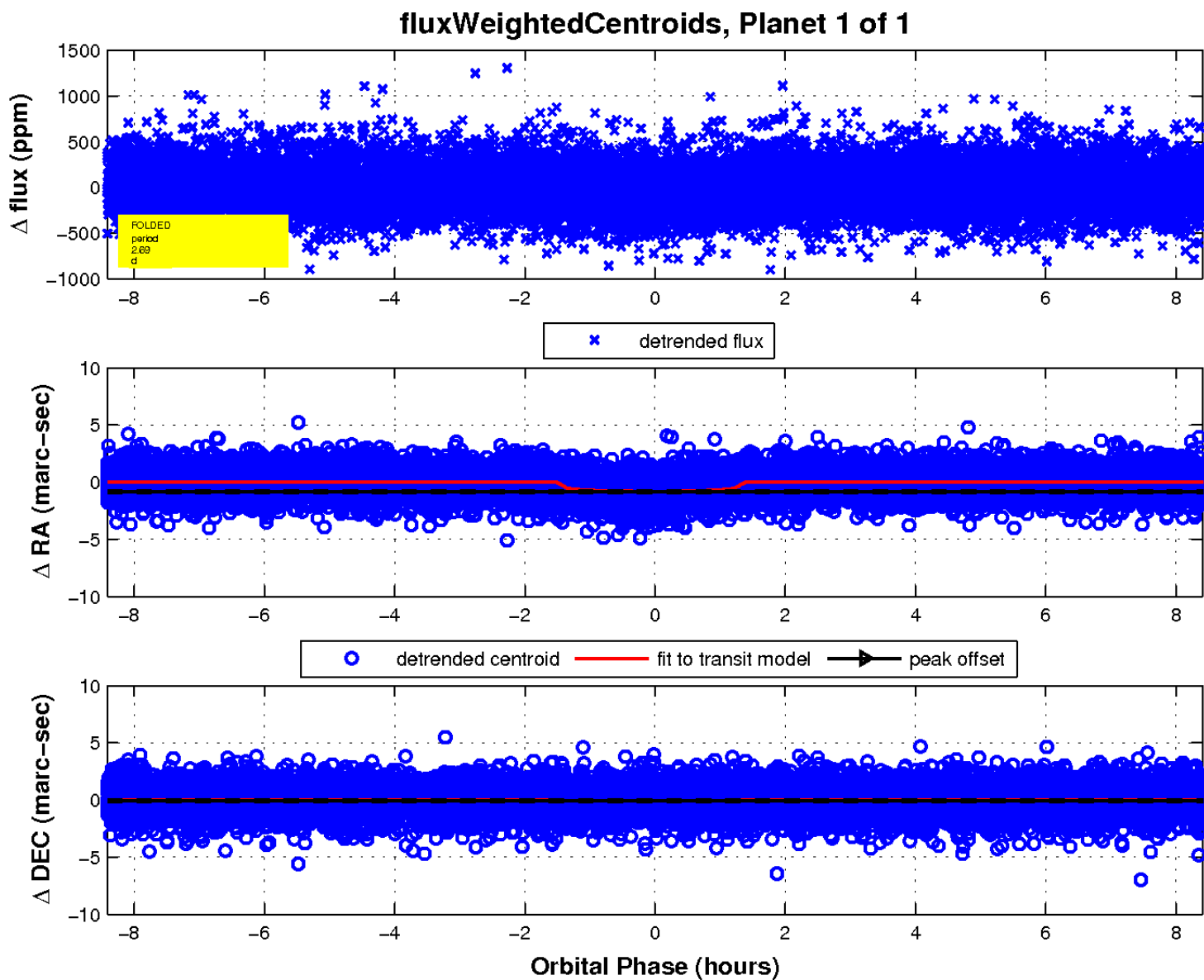
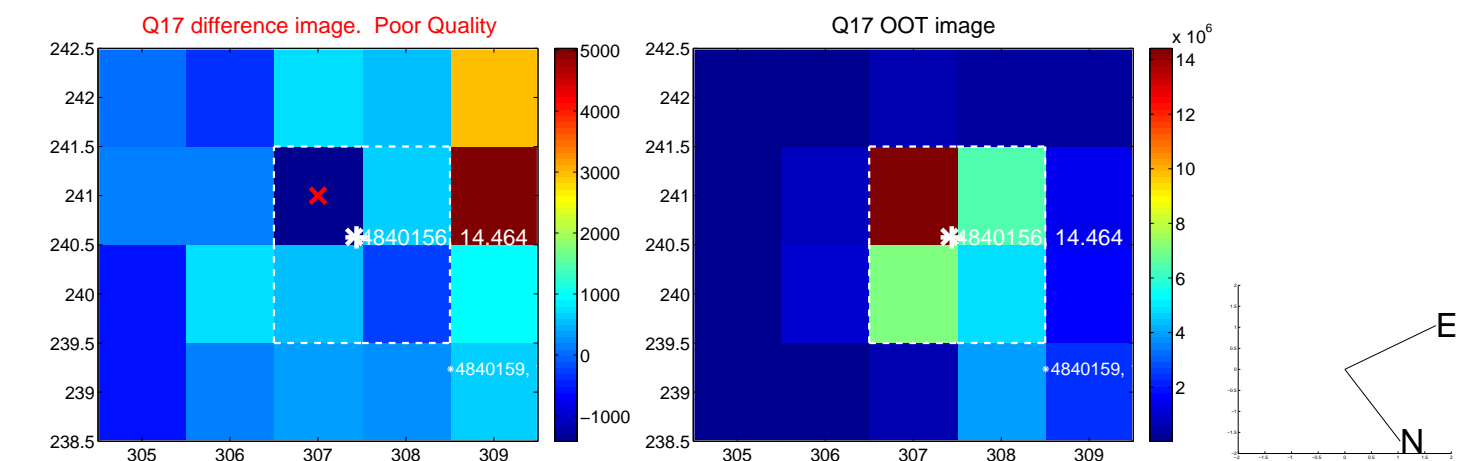
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



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



UKIRT Image

