

# KIC 002570773

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
002570773-01	OBS	4376.01	1.891314	132.656931	954.2	4.952	17.6	19.9	0.71	4700	2.95	299.60

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002570773-01	OBS	FP	0.00	0	0	1	1	CENT_UNRESOLVED_OFFSET—EPHEM_MATCH

**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.

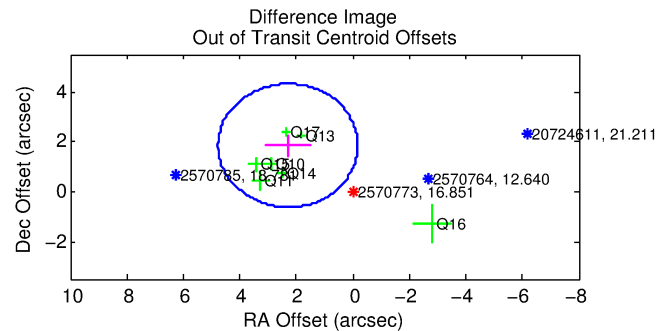
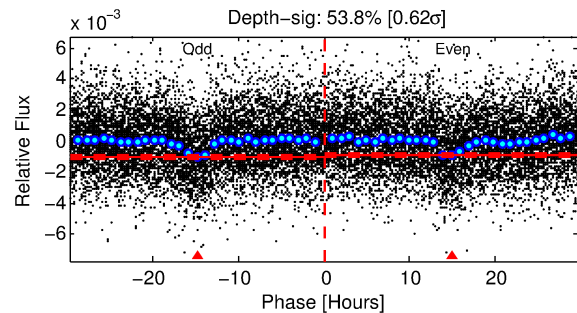
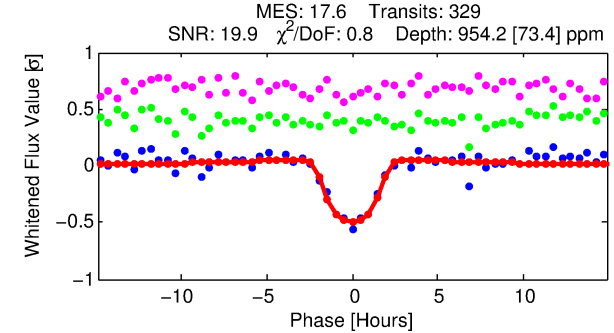
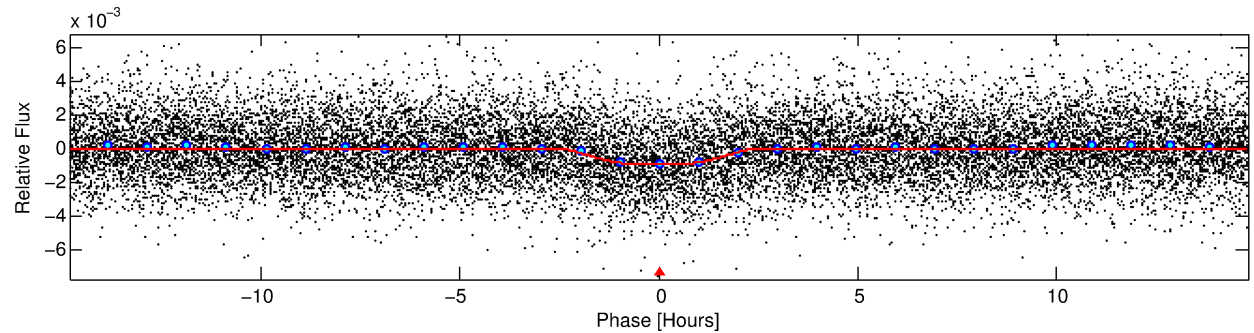
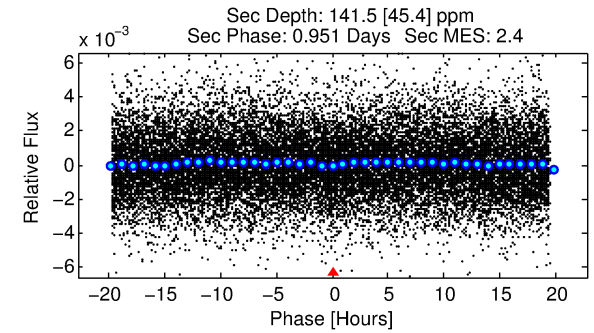
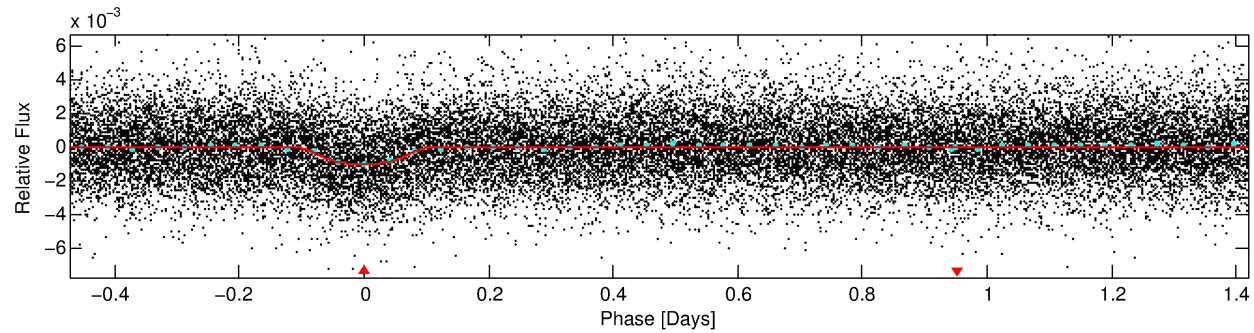
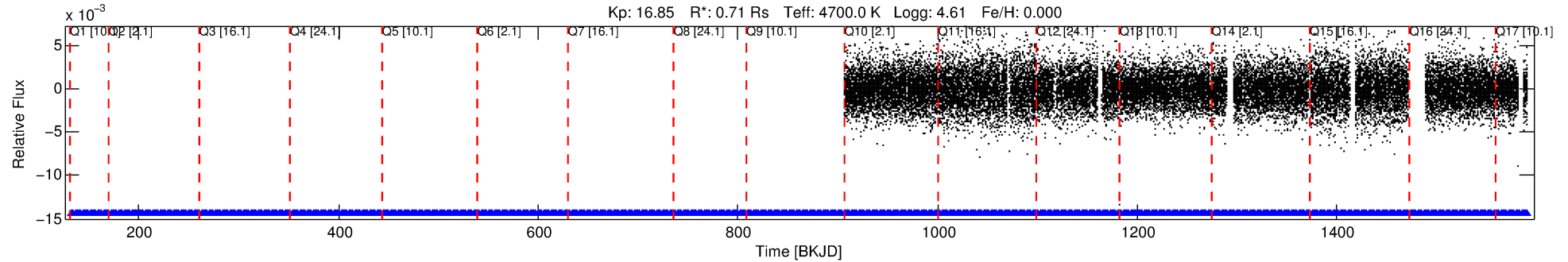
## Ephemeris Match Information For 002570773-01

TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ( $''$ )	$\Delta$ Row	$\Delta$ Col	$m_2$	$m_1$	$D_2/D_1$	Mechanism	Flag	$\sigma_P$	$\sigma_T$
002570773-01	2570773	6286.01	2708156	1:1	231.8	58	0	10.67	16.85	671.81	Direct-PRF	0	1.76	1.53

**Notes:**  $P_1:P_2$  is the period ratio. Dist is the distance in arcseconds.  $\Delta$ Row and  $\Delta$ Col are the number of pixels apart in row and column.  $m_2$  and  $m_1$  are the magnitudes of the parent and child.  $D_2/D_1$  is the parent's transit depth divided by the child's.  $\sigma_P$  and  $\sigma_T$  are the significance of the match in period and epoch. For a match to be considered significant  $\sigma_P < 5.0$  and  $\sigma_T < 5.0$ . Matches which have  $\sigma_P$  and  $\sigma_T$  very close to this cutoff should receive extra scrutiny, especially if the period ratio is very large.

# DV One-Page Summary

KIC: 2570773 Candidate: 1 of 1 Period: 1.891 d  
KOI: K04376.01 Corr: 0.882



## DV Fit Results:

Period = 1.89131 [0.00001] d  
Epoch = 132.6569 [0.0046] BKJD  
Rp/R\* = 0.0382 [0.0023]  
a/R\* = 1.55 [0.12]  
b = 0.95 [0.01]  
Seff = 299.60 [49.19]  
Teq = 1061 [44] K  
Rp = 2.95 [0.30] Re  
a = 0.0270 [0.0017] AU  
Ag = 6.54 [2.30] [2.41σ]  
Teffp = 2623 [243] K [6.33σ]

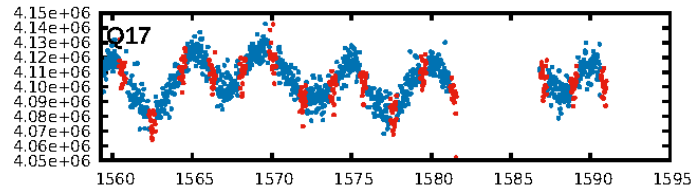
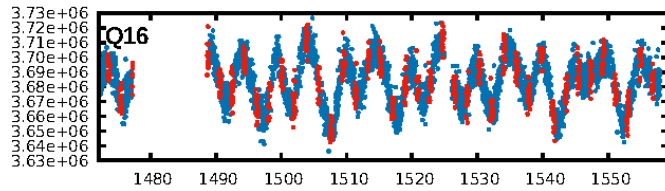
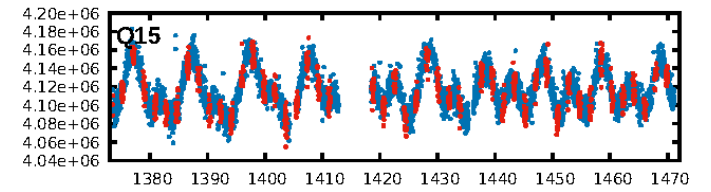
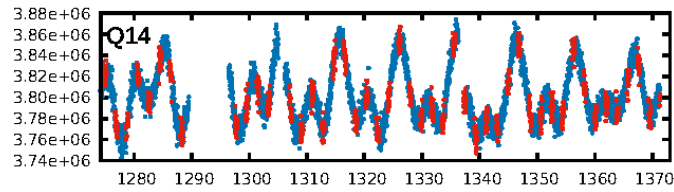
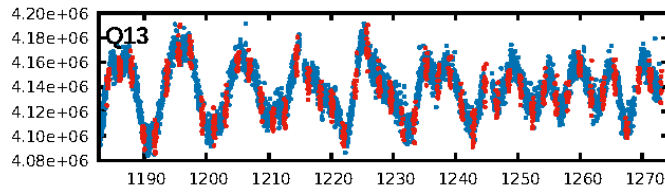
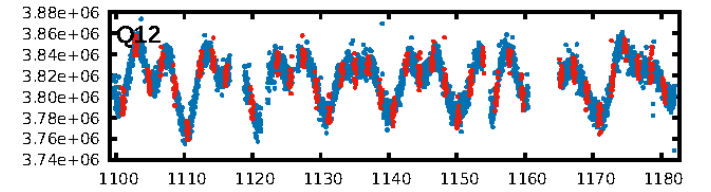
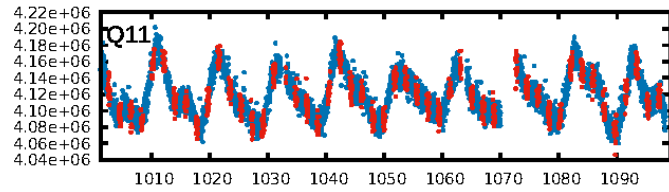
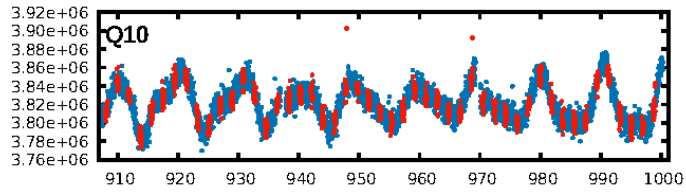
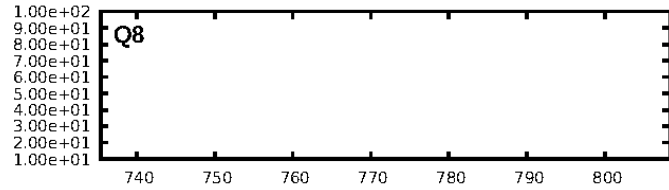
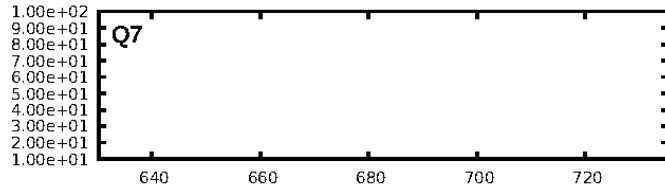
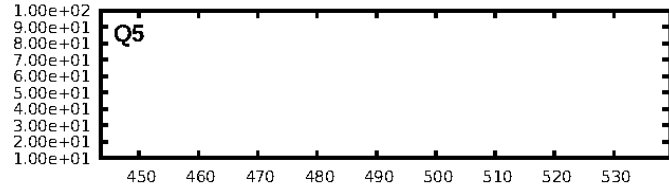
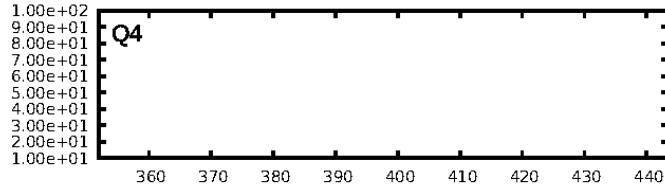
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 3.98e-65  
RollingBand-fgt: 1.00 [314/314]  
GhostDiagnostic-chr: 0.5342  
Centroid-sig: 0.0%  
Centroid-so: 2.060 arcsec [2.88σ]  
OotOffset-rm: 2.951 arcsec [3.58σ]  
KicOffset-rm: 3.030 arcsec [3.41σ]  
OotOffset-st: 2/2/1/2 [7]  
KicOffset-st: 2/2/1/2 [7]  
DiffImageQuality-fgm: 0.57 [4/7]  
DiffImageOverlap-fno: 1.00 [8/8]

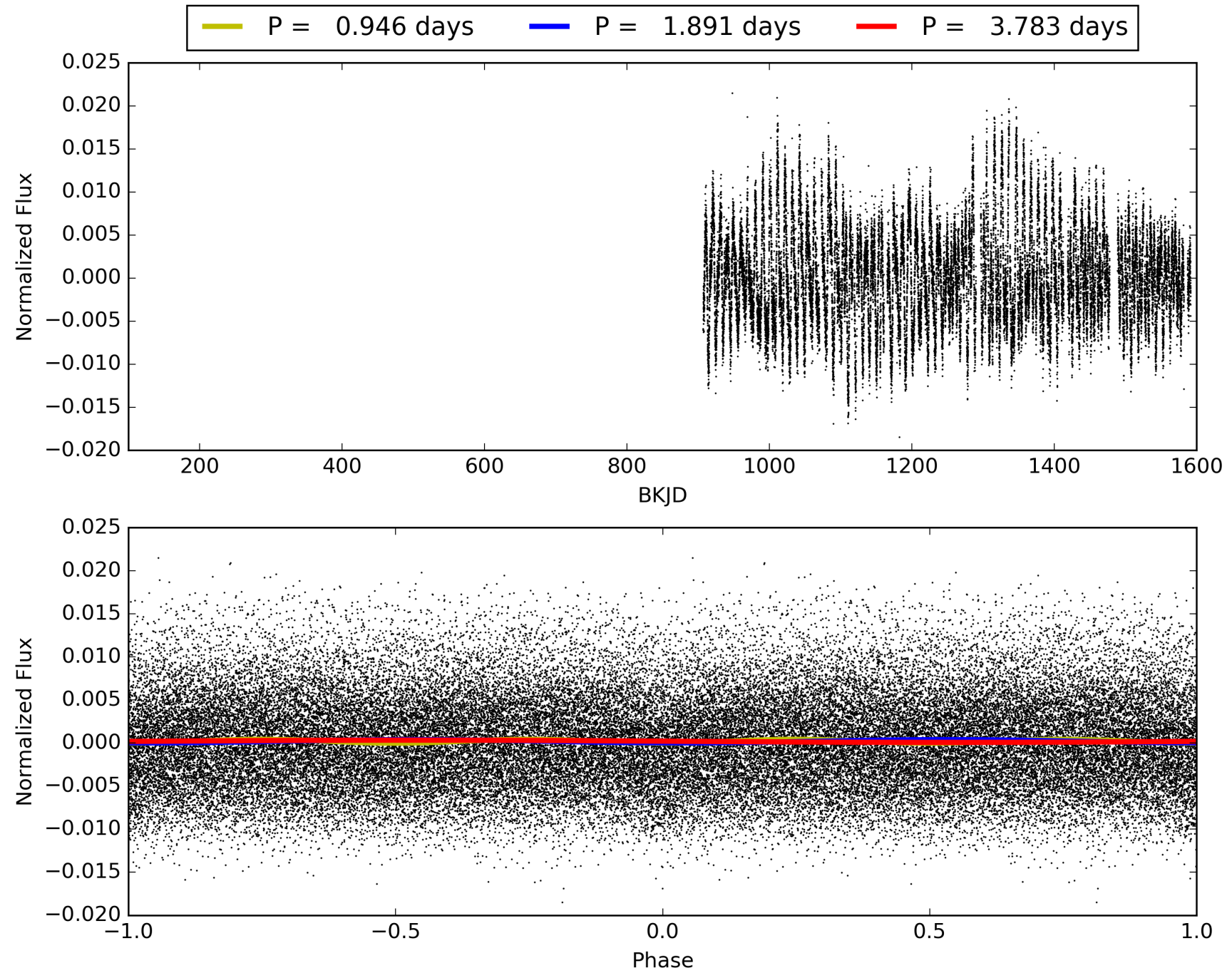
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 20:43:38 Z

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

# TCE 002570773-01, PDC Light Curves

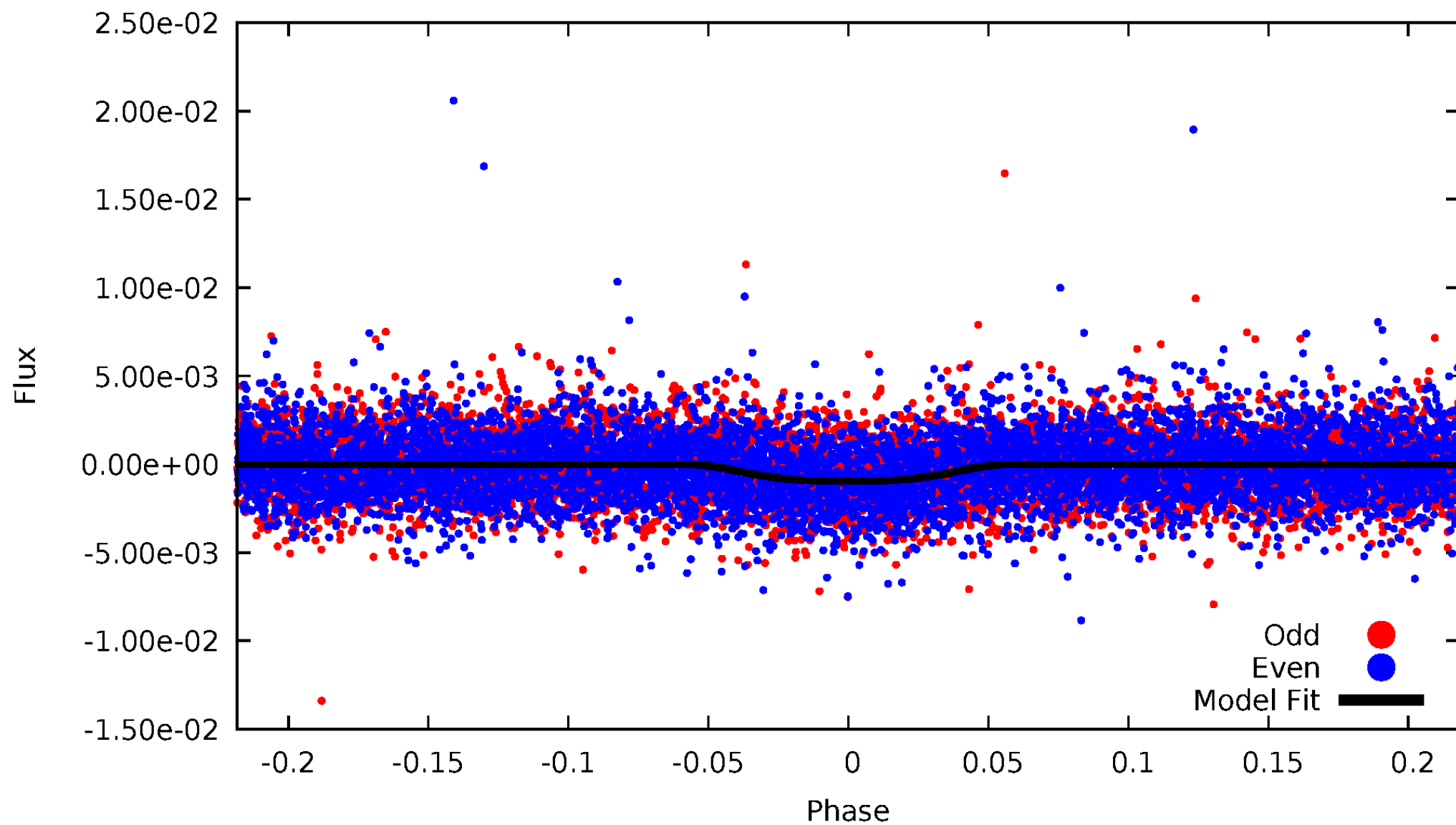


TCE 002570773-01



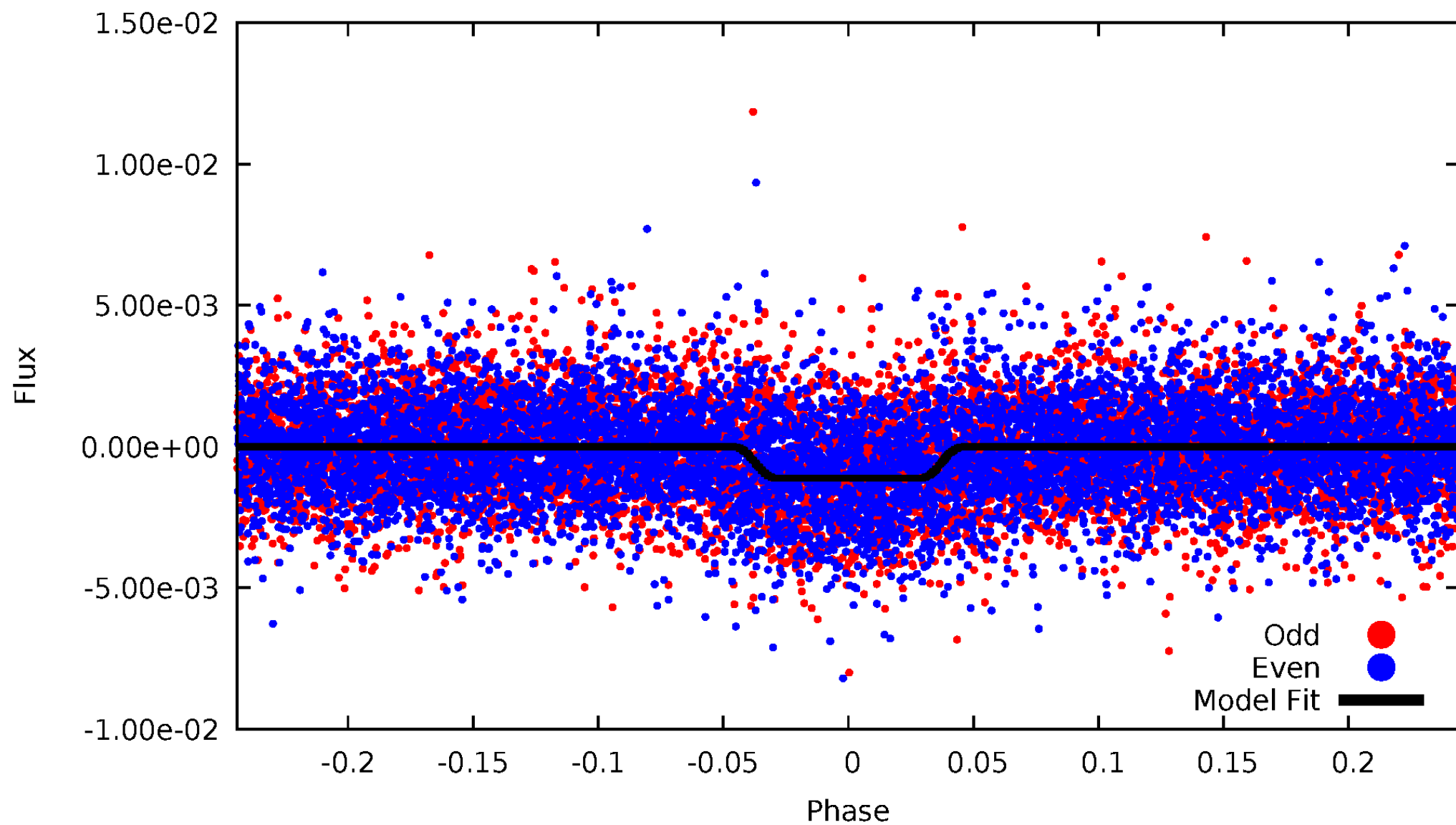
# DV Odd/Even

TCE 002570773-01



# ALT Odd/Even

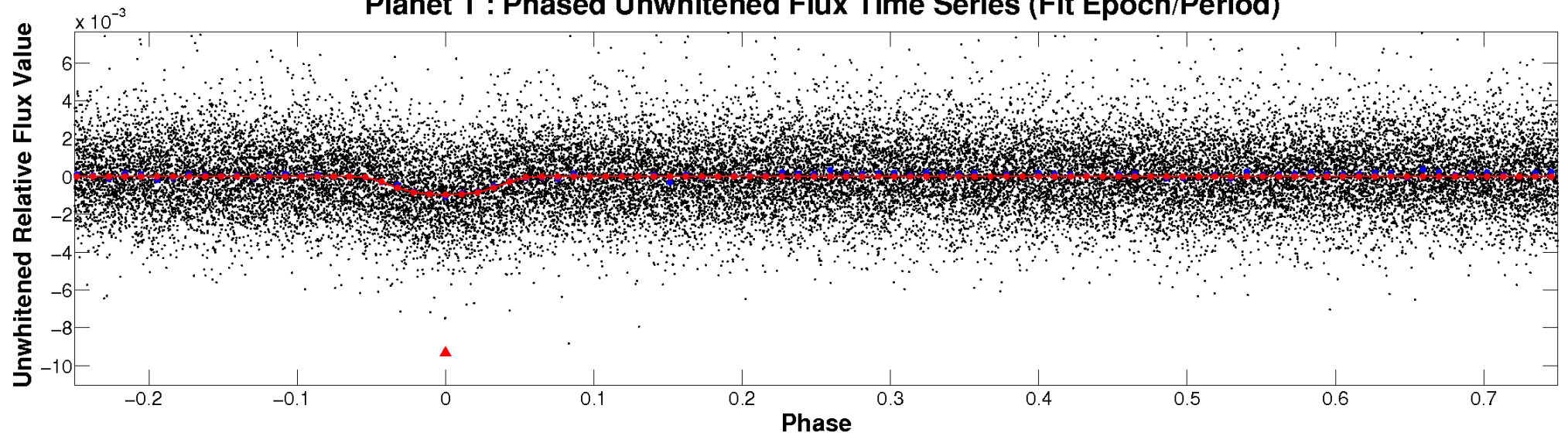
TCE 002570773-01



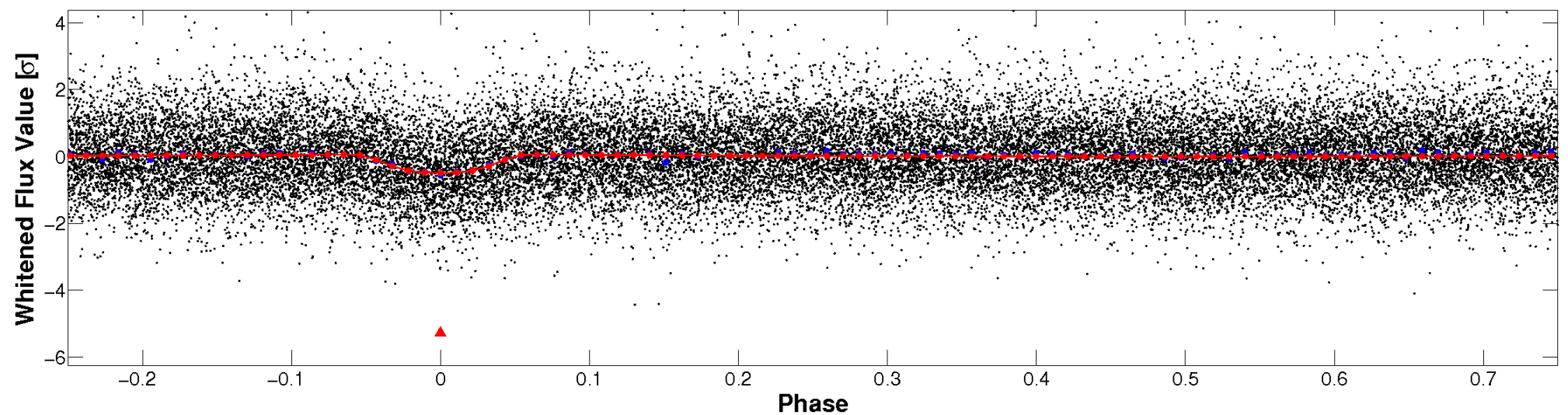


# Non-Whitened Vs. Whitened Light Curve

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

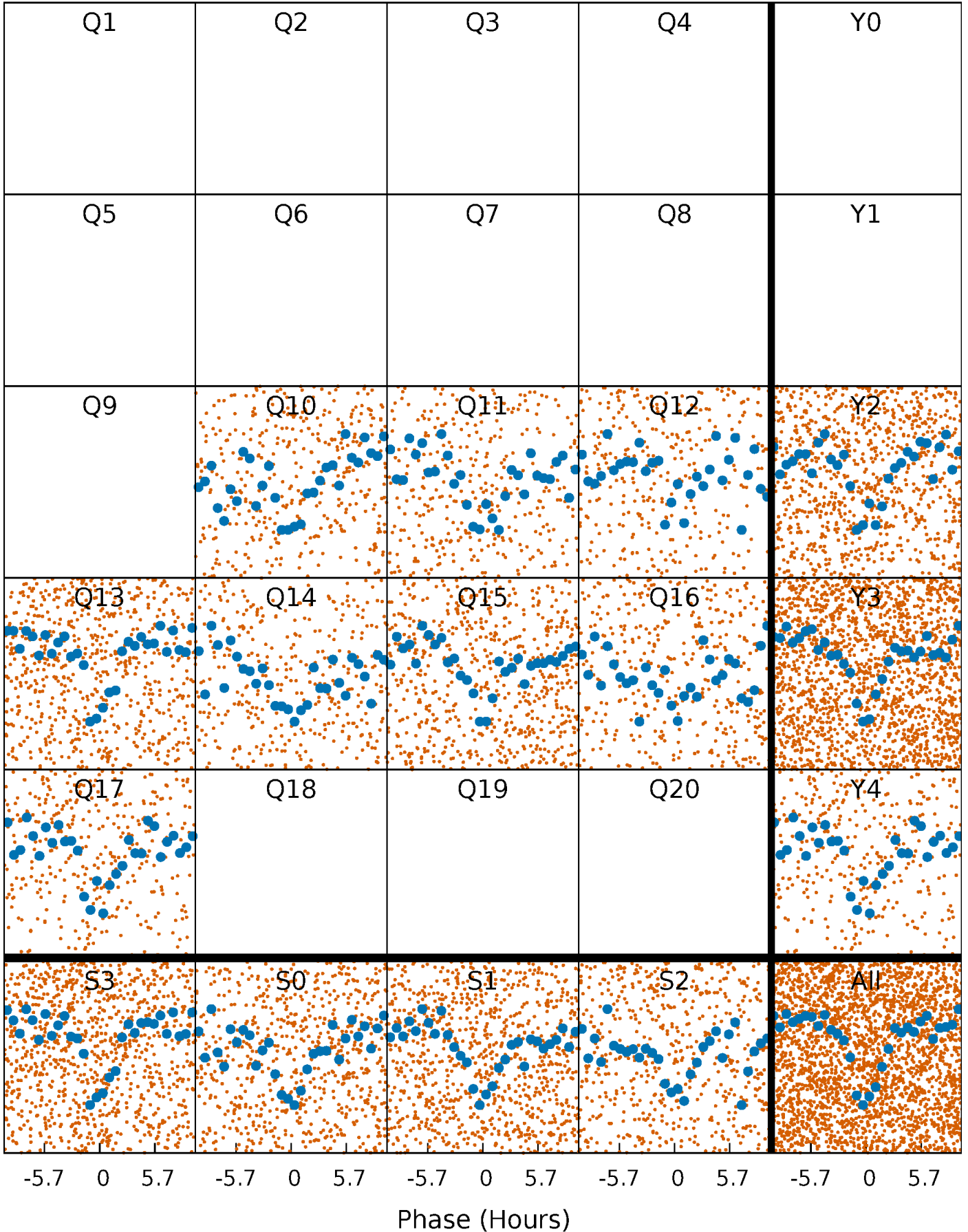


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

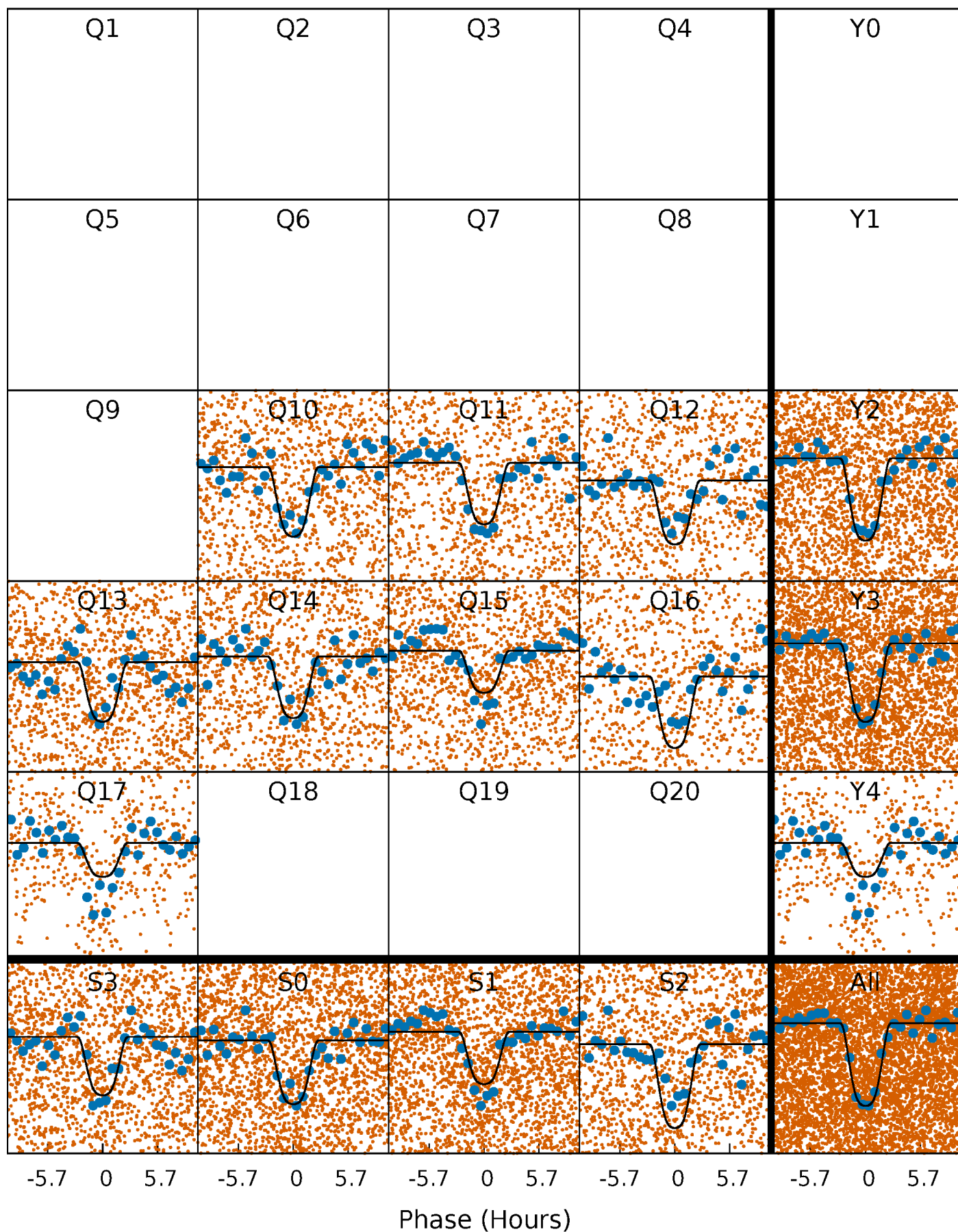
TCE 002570773-01 P= 1.891314 Days  $T_0=132.656931$  (BKJD)





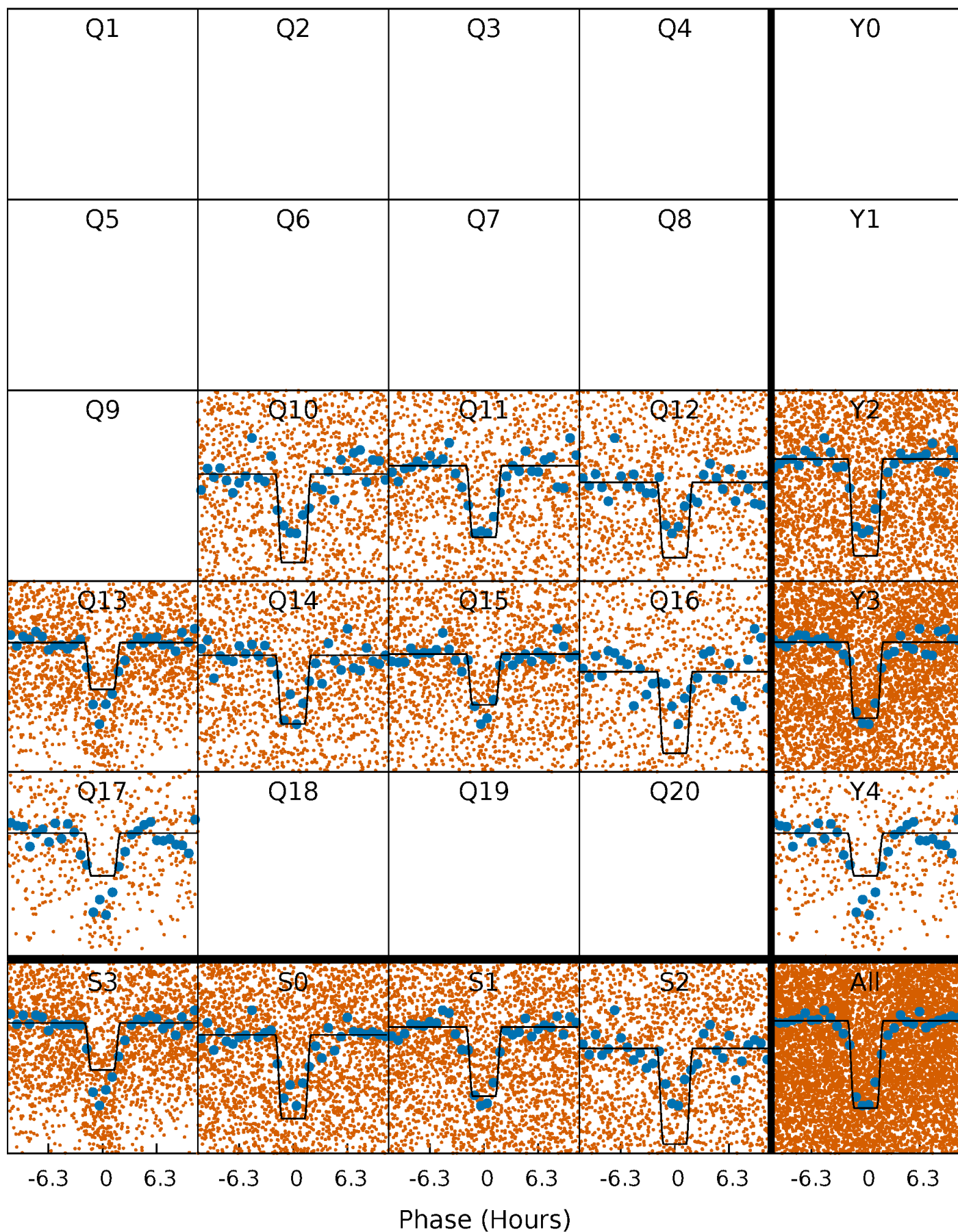
# DV Quarter-Phased Transit Curves

TCE 002570773-01   P= 1.891314 Days    $T_0=132.656931$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

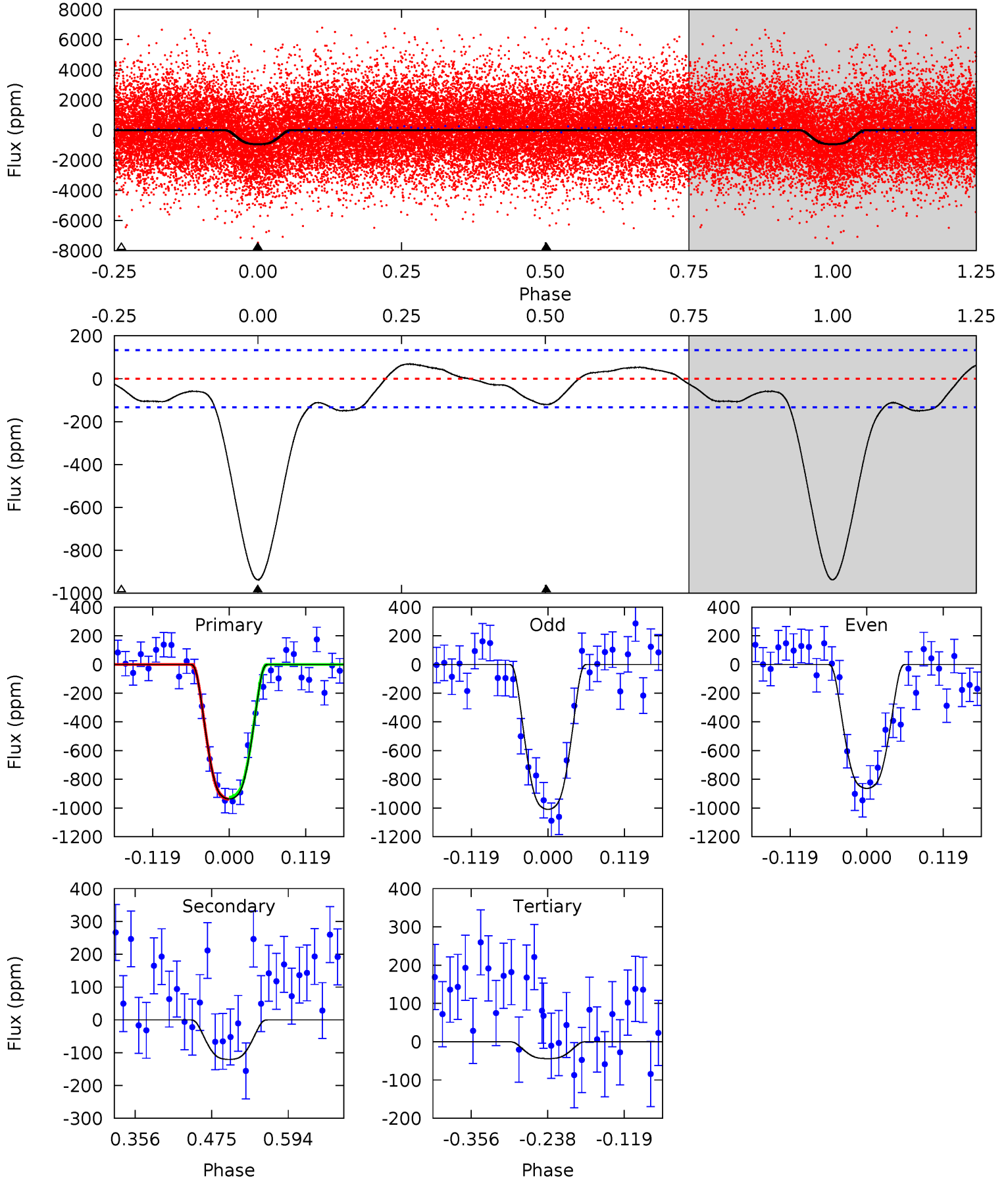
TCE 002570773-01   P= 1.891291 Days    $T_0=132.672508$  (BKJD)



# DV Model-Shift Uniqueness Test

002570773-01, P = 1.891314 Days, E = 132.656931 Days

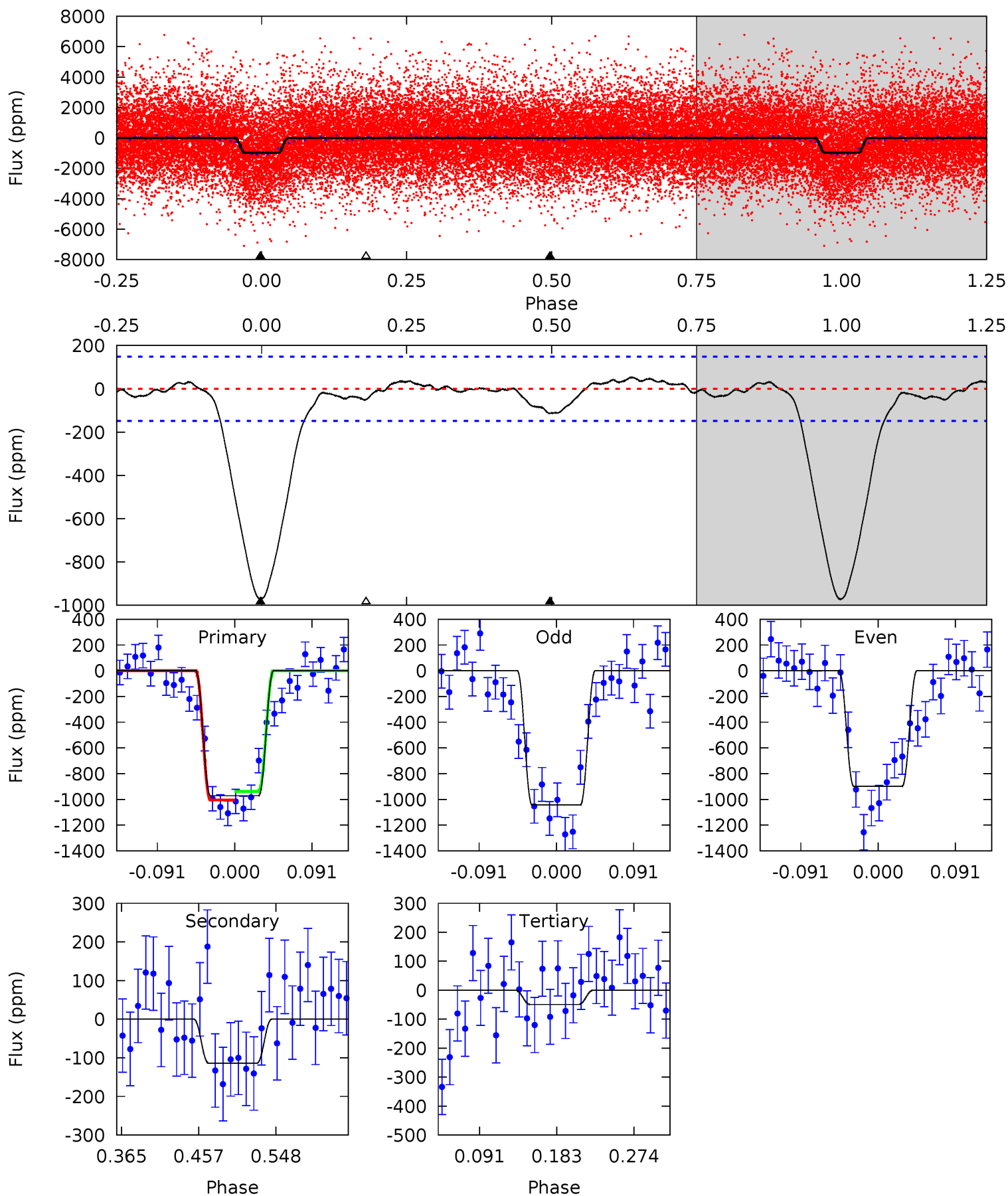
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
31.8	4.10	1.50	0	4.53	1.56	2.44	30.3	31.8	2.60	4.10	2.49	1.00	0.07	0.21



# Alt Model-Shift Uniqueness Test

002570773-01, P = 1.891291 Days, E = 132.672508 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
30.0	3.51	1.52	0	4.58	1.69	0.83	28.5	30.0	1.99	3.51	2.25	1.08	0.05	1.03



### Stellar Parameters For KIC 002570773

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4700^{+167}_{-167}$	$4.605^{+0.036}_{-0.040}$	$0.000^{+0.300}_{-0.300}$	$0.707^{+0.058}_{-0.058}$	$0.734^{+0.064}_{-0.064}$	$2.924^{+0.547}_{-0.417}$
	+4%/-4%	+1%/-1%	+inf%/-inf%	+8%/-8%	+9%/-9%	+19%/-14%
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 002570773-01 / KOI 4376.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-121 \pm 29$	$2.96^{+0.21}_{-0.22}$	$1484^{+56}_{-56}$	$3052^{+143}_{-148}$	$5.538^{+1.609}_{-1.446}$
Alt.	$-114 \pm 32$	$2.59^{+0.21}_{-0.21}$	$1486^{+59}_{-55}$	$3148^{+178}_{-189}$	$6.720^{+2.400}_{-2.167}$

$T_{\text{max}}$  = 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  $A_{\text{obs}} \gg 1.0$



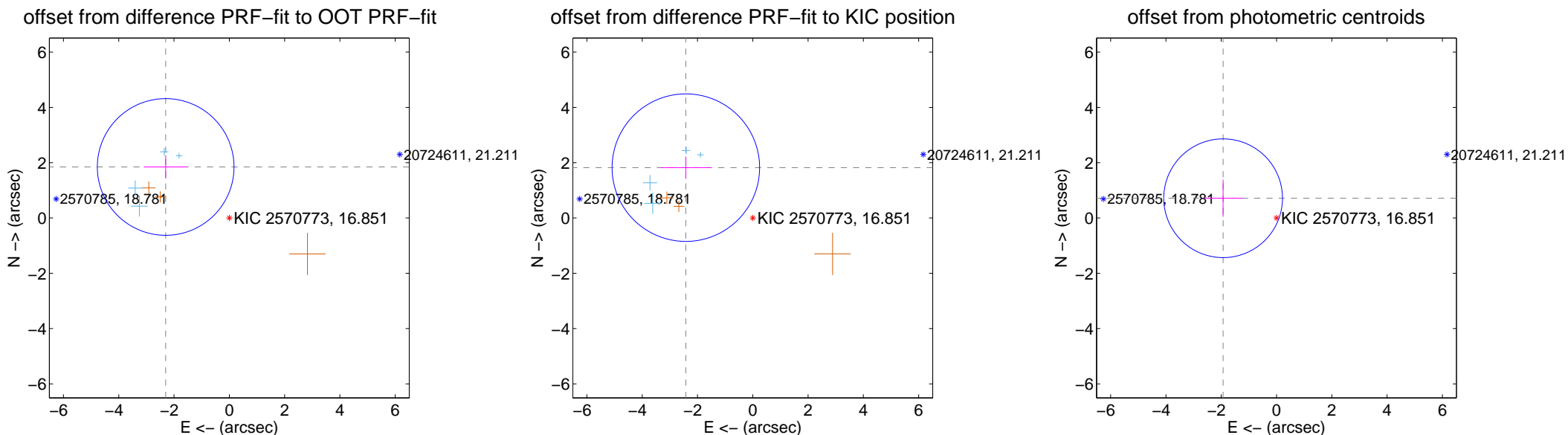
## DV Centroid Data

Supplemental centroid analysis for 002570773-01. Kepler magnitude: 16.85. Transit SNR 19.89

There are 4 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.07 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.951 \pm 0.824$	$3.58$	$2.302 \pm 0.791$	$1.846 \pm 0.425$
PRF-fit source offset from KIC position	$3.030 \pm 0.889$	$3.41$	$2.422 \pm 0.905$	$1.821 \pm 0.405$
photometric centroid source offset	$2.06 \pm 0.72$	2.88	$1.93 \pm 0.72$	$0.71 \pm 0.67$



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.

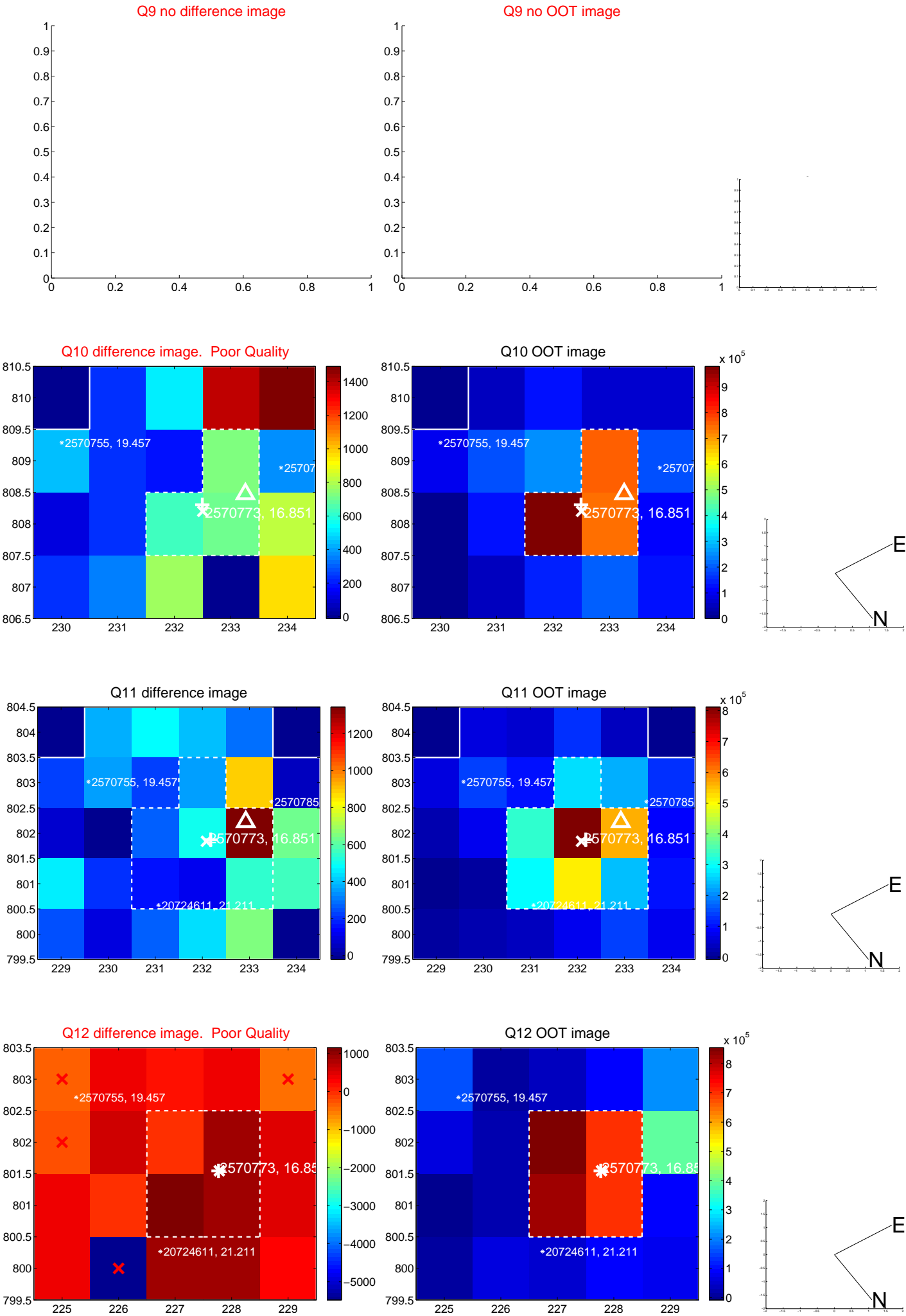
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



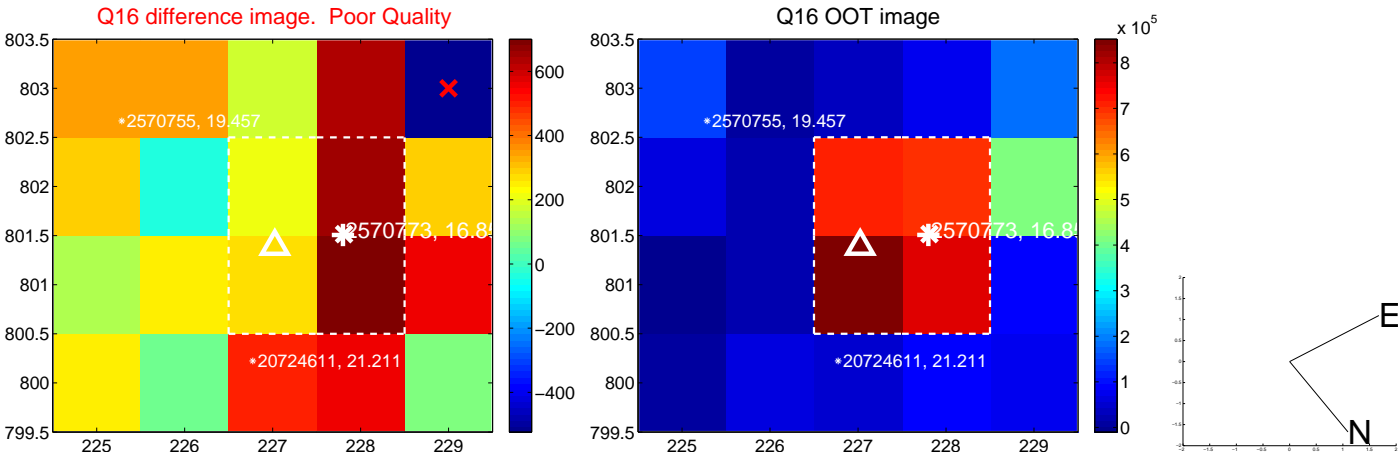
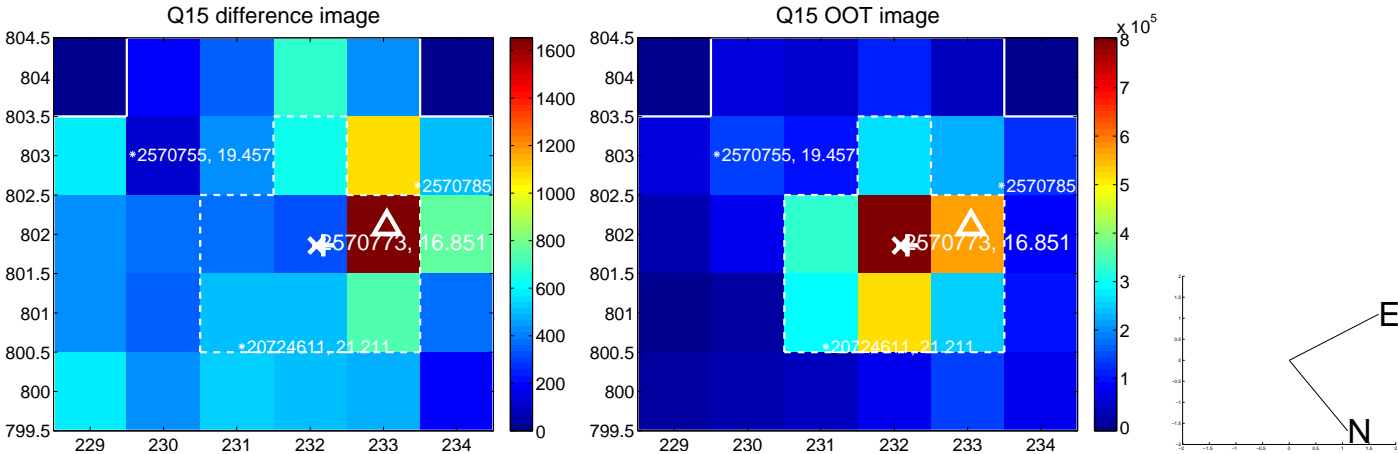
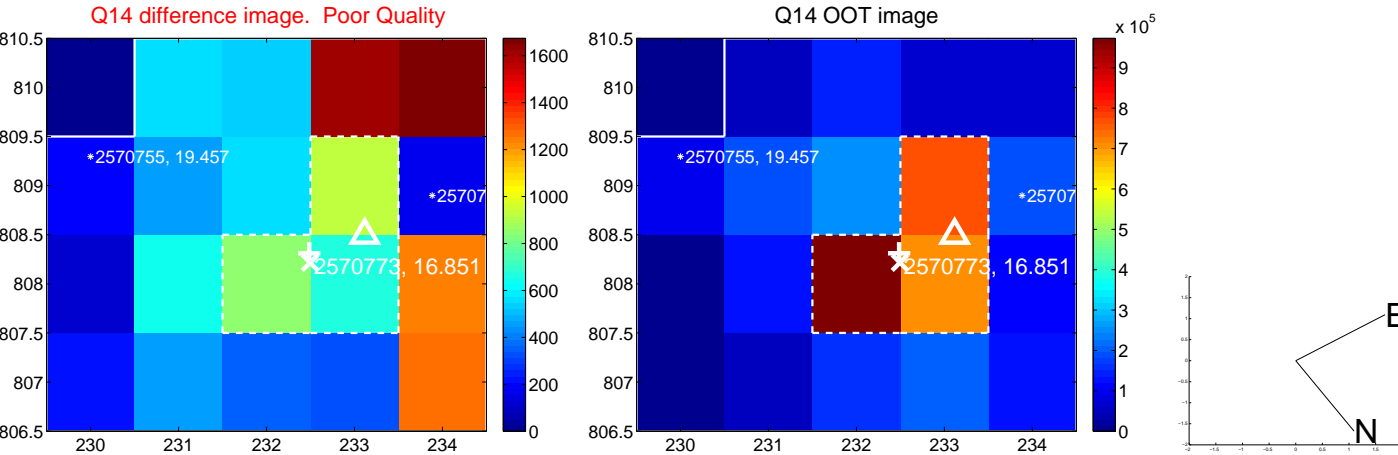
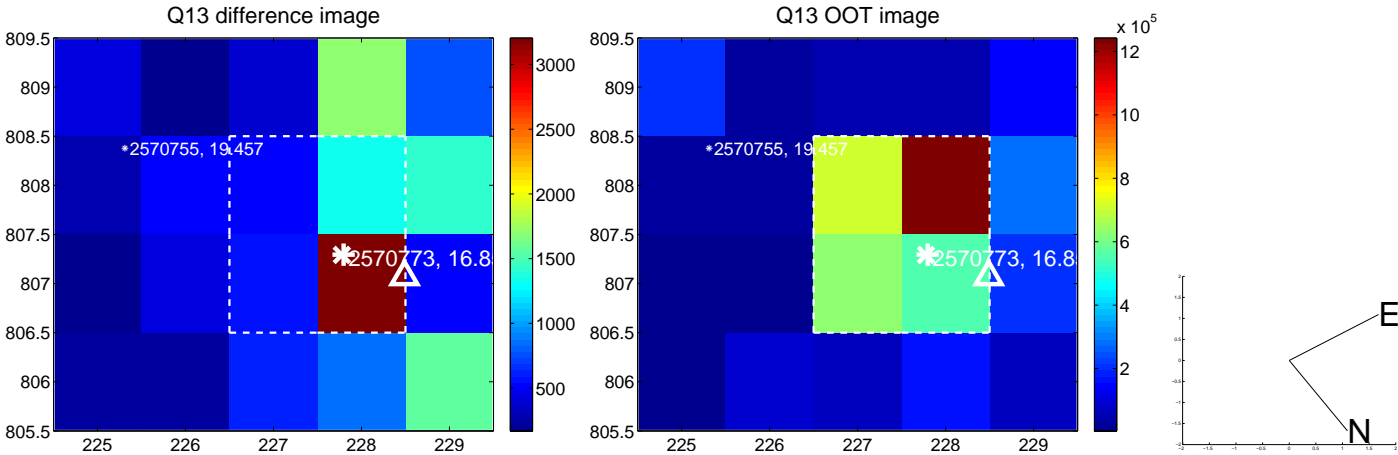
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

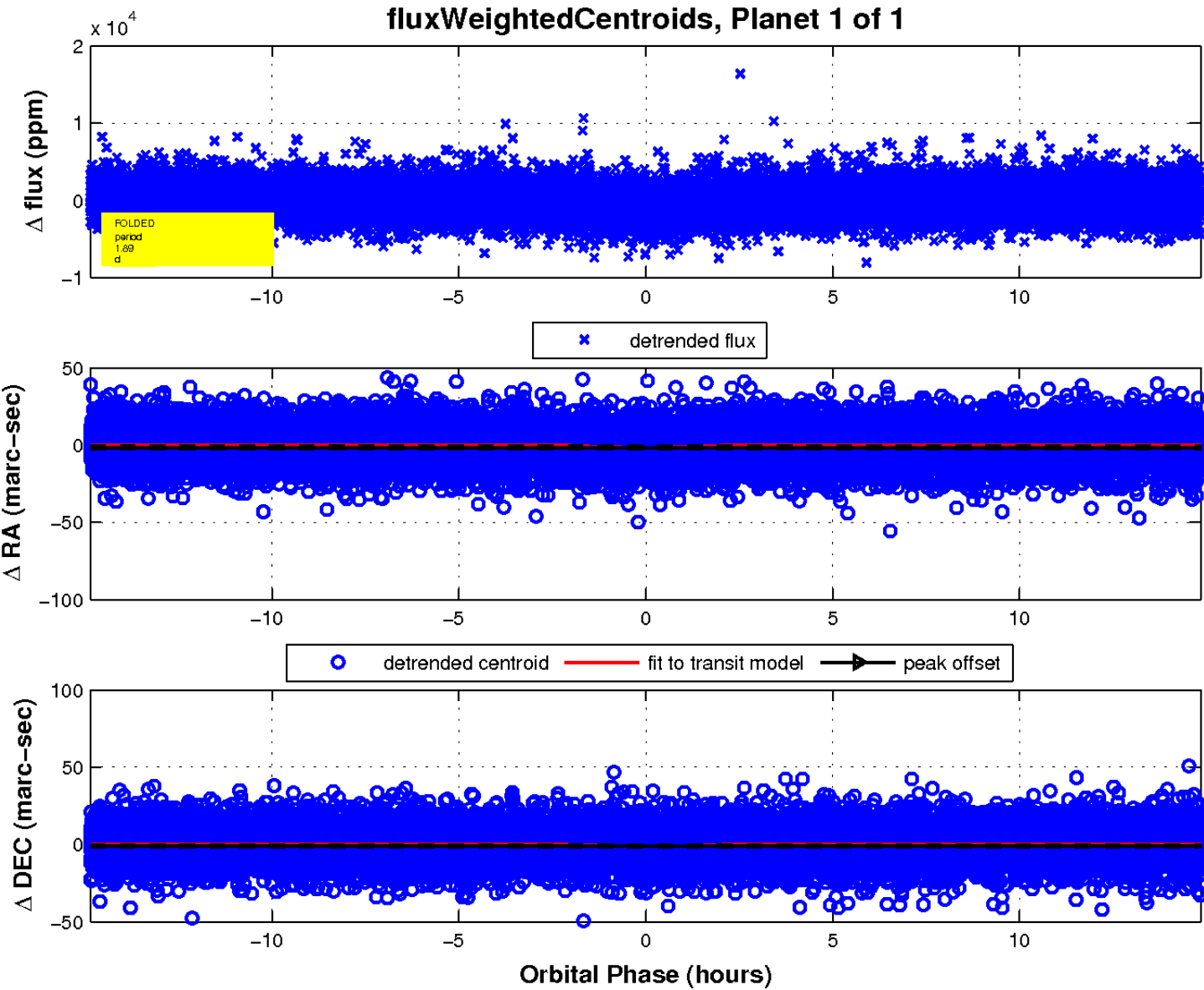
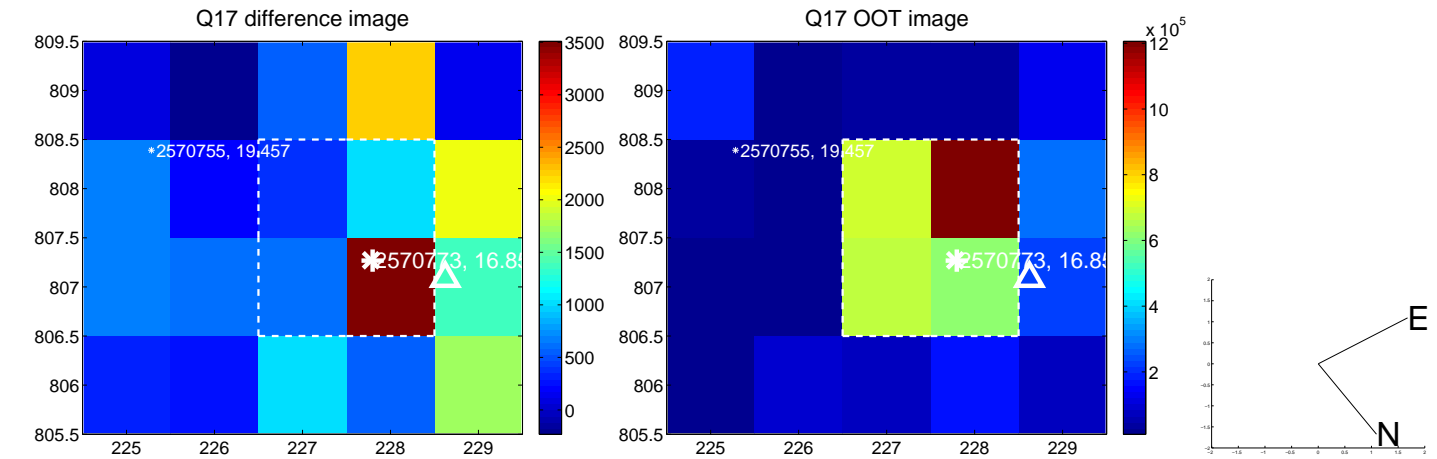


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





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



UKIRT Image

Declination

