

# KIC 012004656

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
012004656-01	OBS	8073.01	2.521189	132.879741	135.5	4.680	8.1	7.9	0.52	3932	0.96	65.75

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012004656-01	OBS	FP	0.00	1	0	1	1	MOD_NONUNIQ_ALT—CENT_RESOLVED_OFFSET—HALO_GHOST—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.

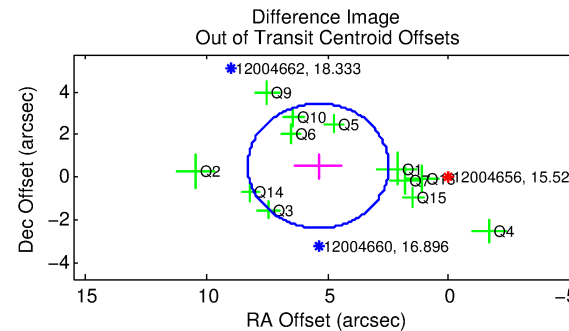
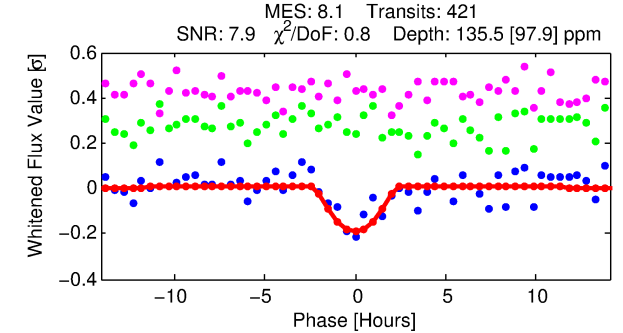
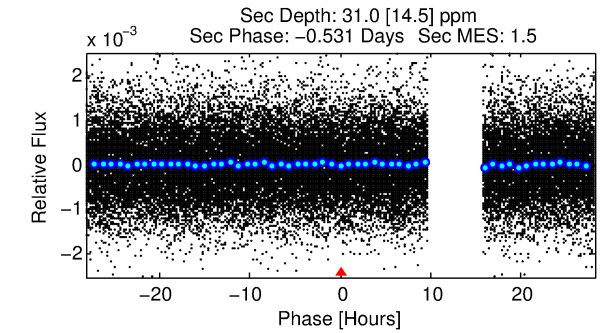
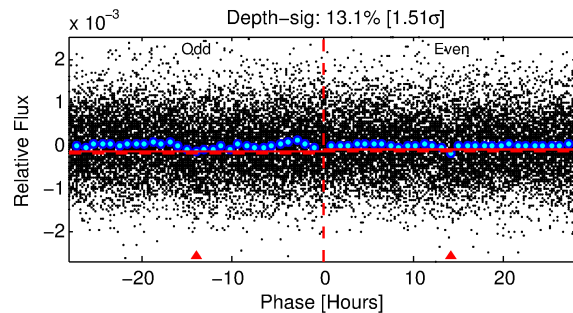
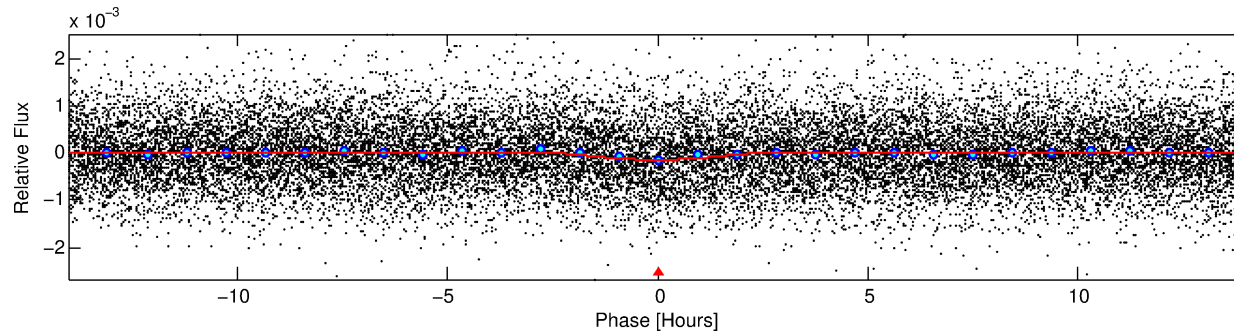
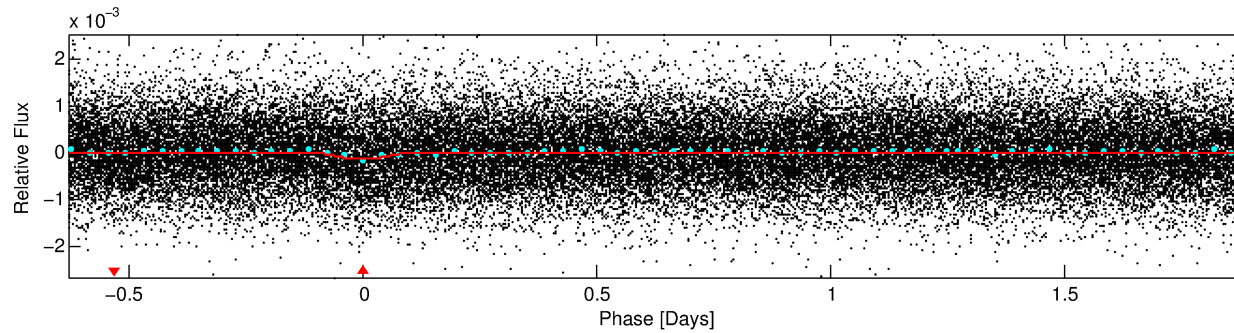
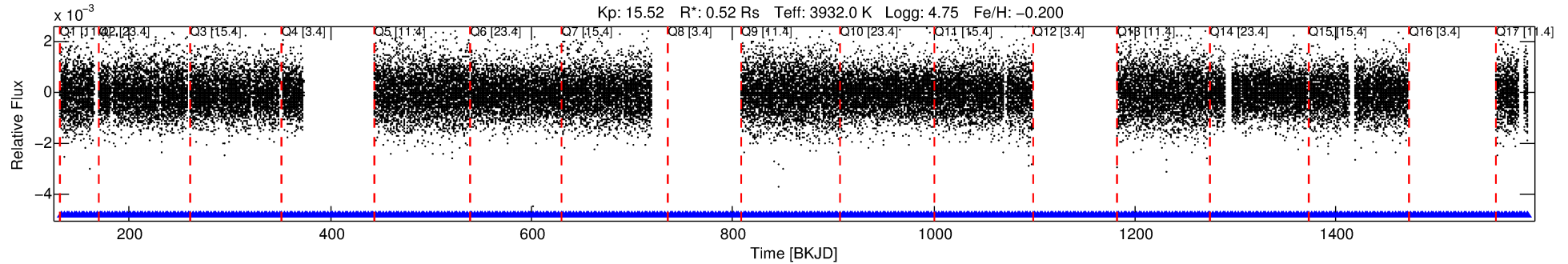
## Ephemeris Match Information For 012004656-01

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	$\sigma_P$	$\sigma_T$
012004656-01	12004656	012004679-pri	12004679	1:2	38.5	-7	7	13.23	15.52	3380.70	Direct-PRF	0	2.87	1.30

**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: 12004656 Candidate: 1 of 1 Period: 2.521 d



## DV Fit Results:

Period = 2.52119 [0.00004] d  
Epoch = 132.8797 [0.0115] BKJD  
Rp/R\* = 0.0169 [0.0190]  
a/R\* = 1.39 [0.38]  
b = 0.99 [0.04]  
Seff = 65.75 [23.89]  
Teq = 726 [66] K  
Rp = 0.96 [1.10] Re  
a = 0.0297 [0.0057] AU  
Ag = 16.39 [37.98] [0.41 $\sigma$ ]  
Teff = 2259 [1309] K [1.17 $\sigma$ ]

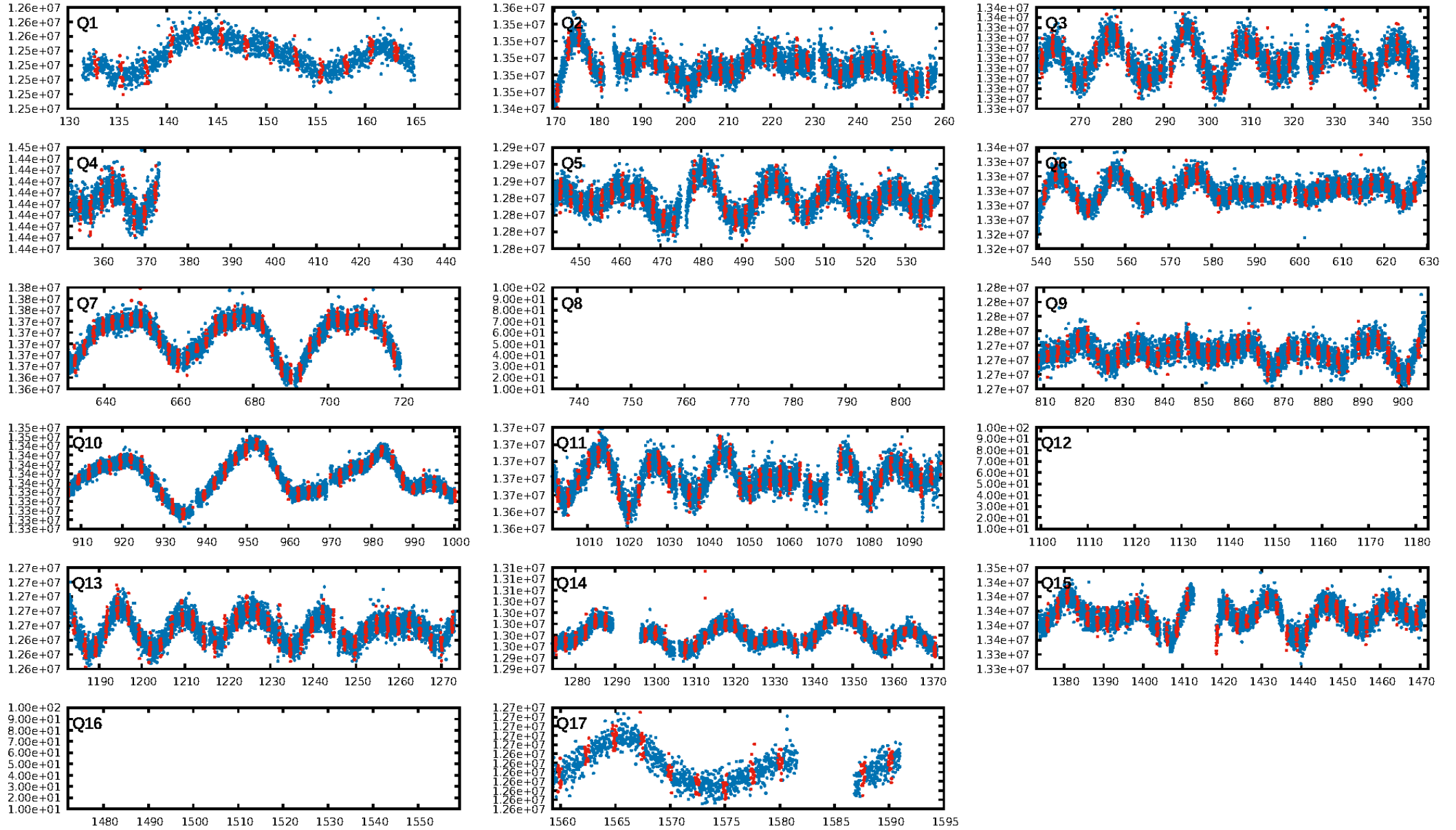
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 4.95e-15  
RollingBand-fgt: 1.00 [389/389]  
**GhostDiagnostic-chr: 0.2201**  
Centroid-sig: 0.4%  
Centroid-so: 2.883 arcsec [1.76 $\sigma$ ]  
**OotOffset-rm: 5.410 arcsec [5.57 $\sigma$ ]**  
**KicOffset-rm: 5.720 arcsec [5.40 $\sigma$ ]**  
OotOffset-st: 4/3/1/4 [12]  
KicOffset-st: 4/3/1/4 [12]  
DiffImageQuality-fgm: 0.25 [3/12]  
DiffImageOverlap-fno: 1.00 [14/14]

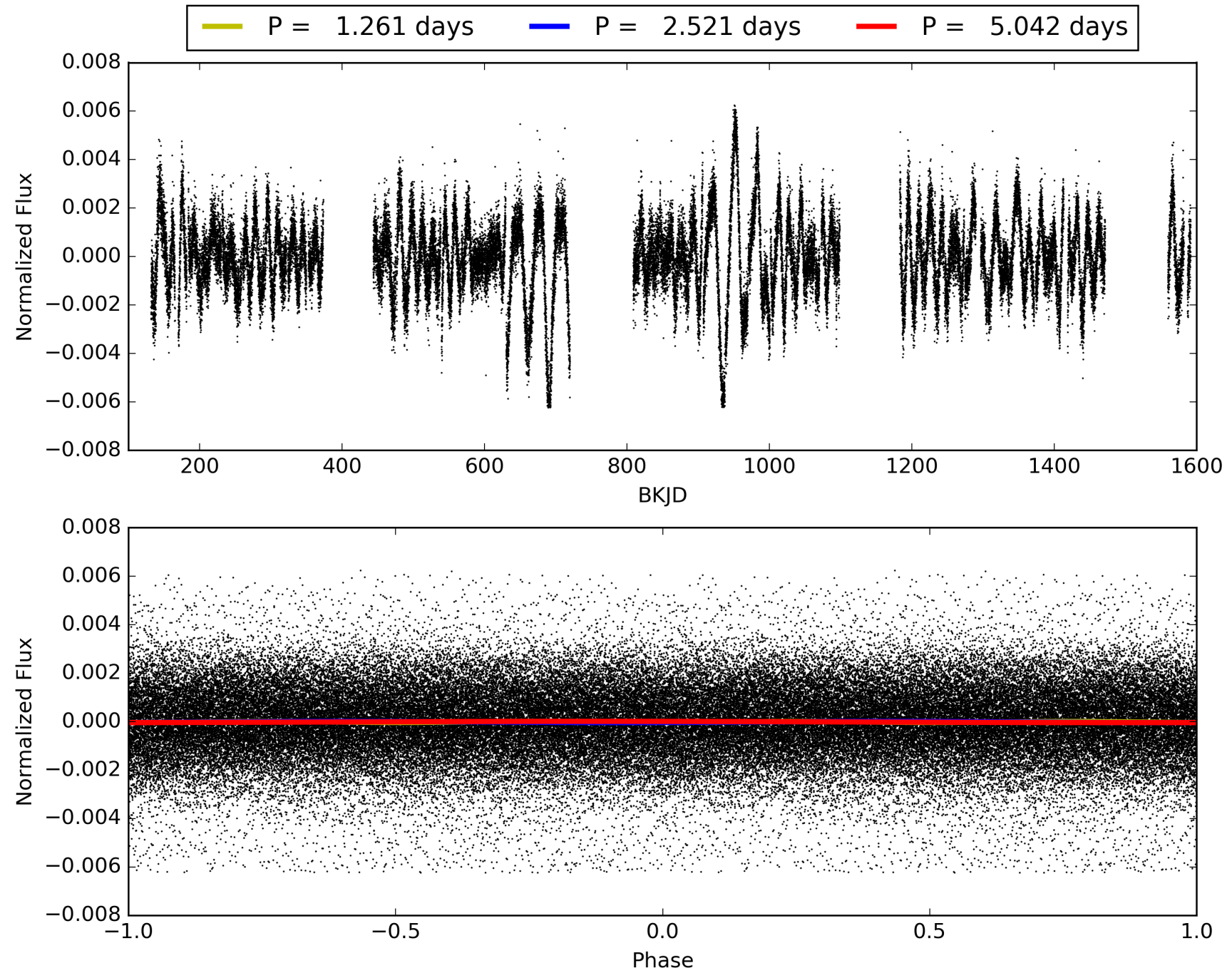
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 03:42:40 Z

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

# TCE 012004656-01, PDC Light Curves

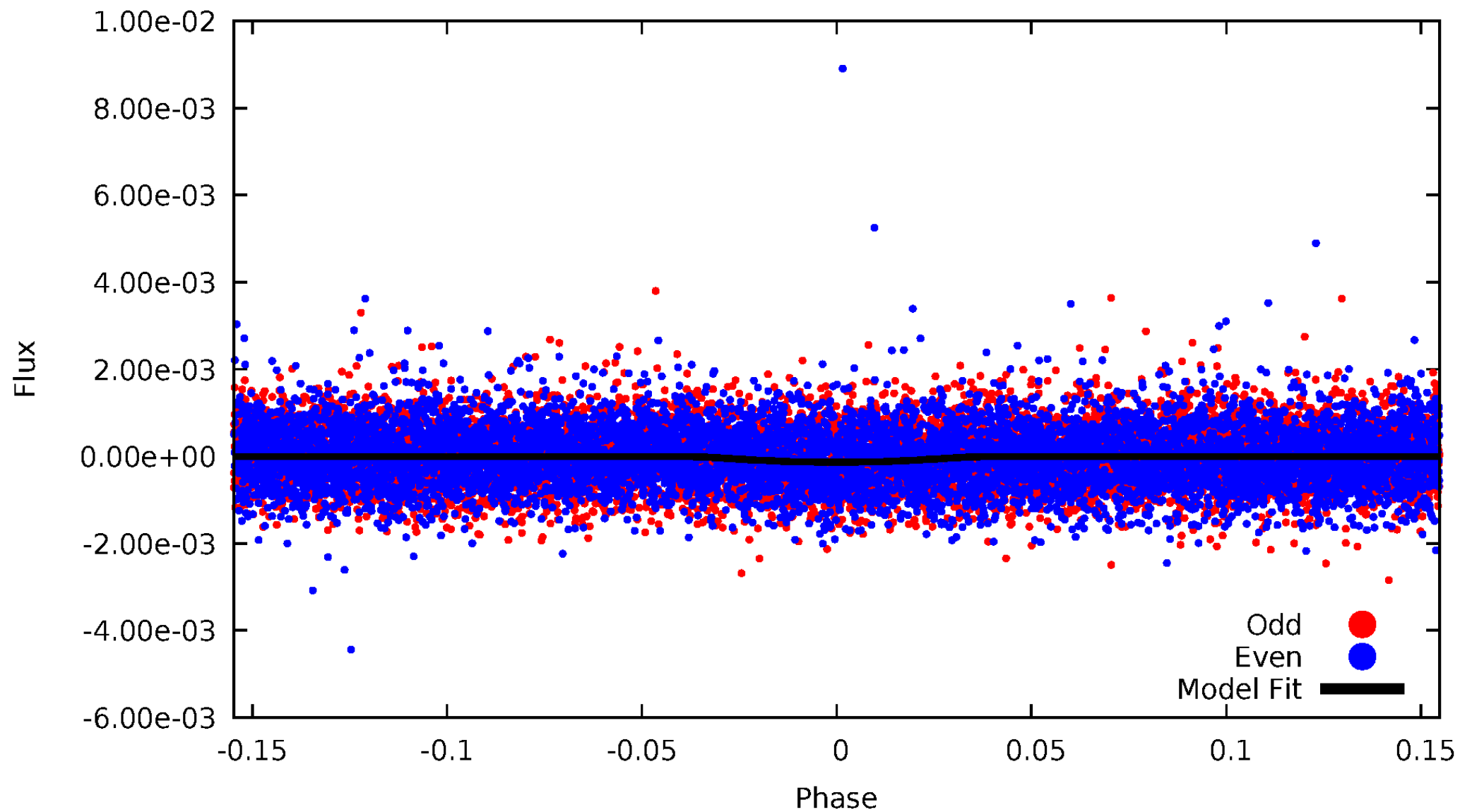


TCE 012004656-01



# DV Odd/Even

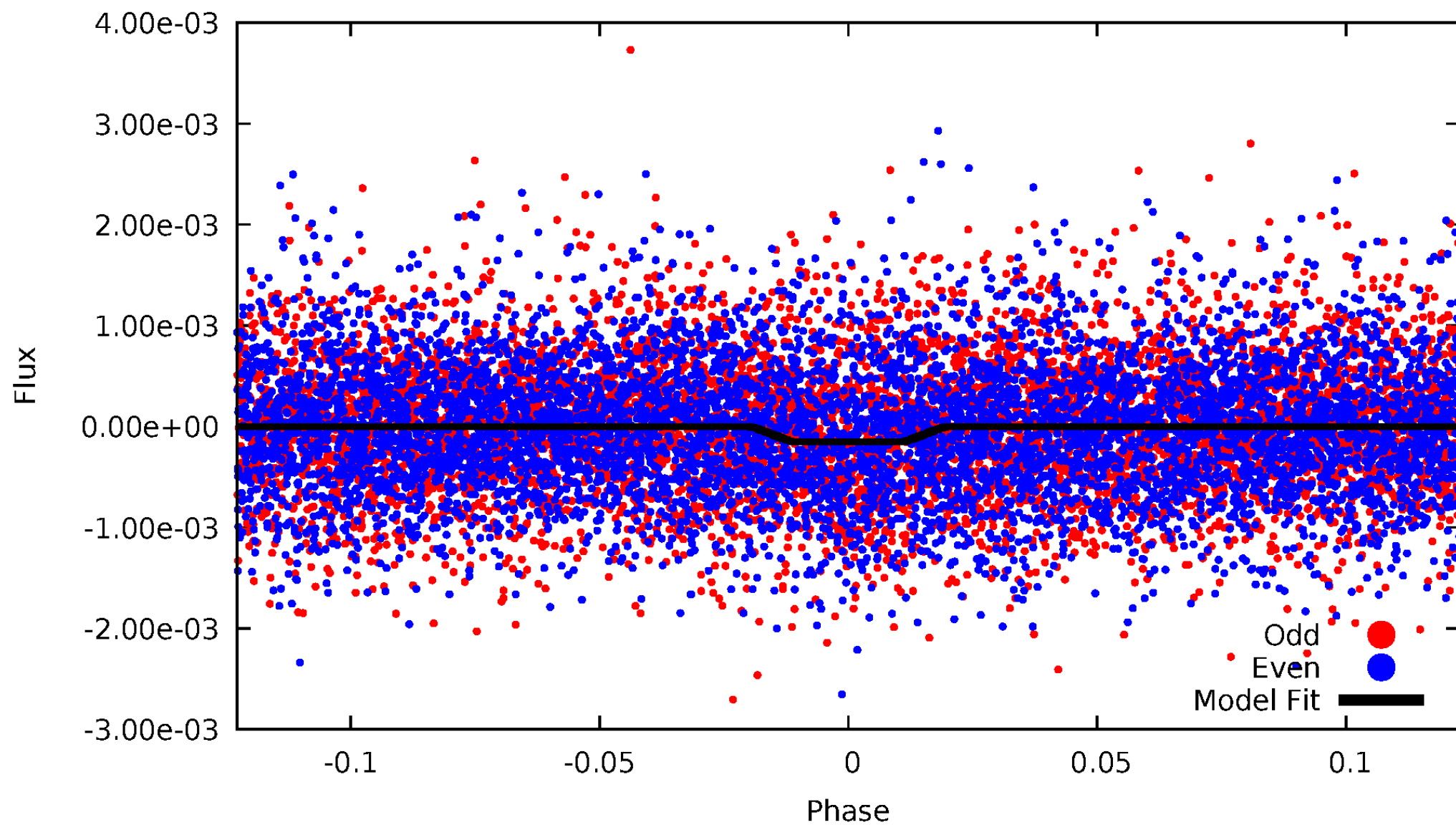
TCE 012004656-01



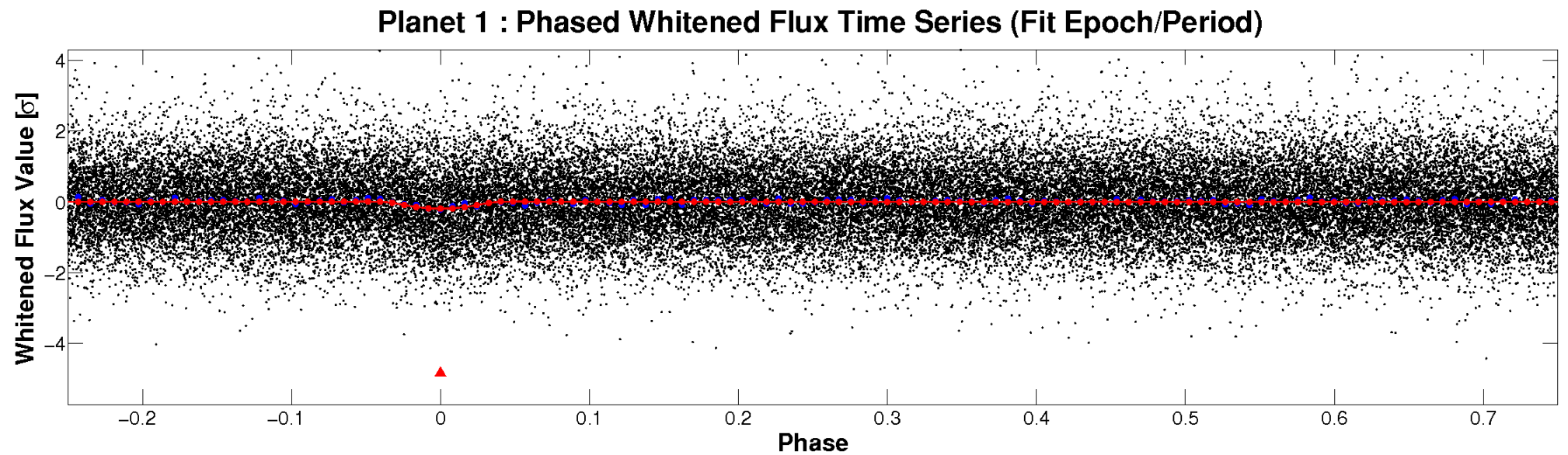
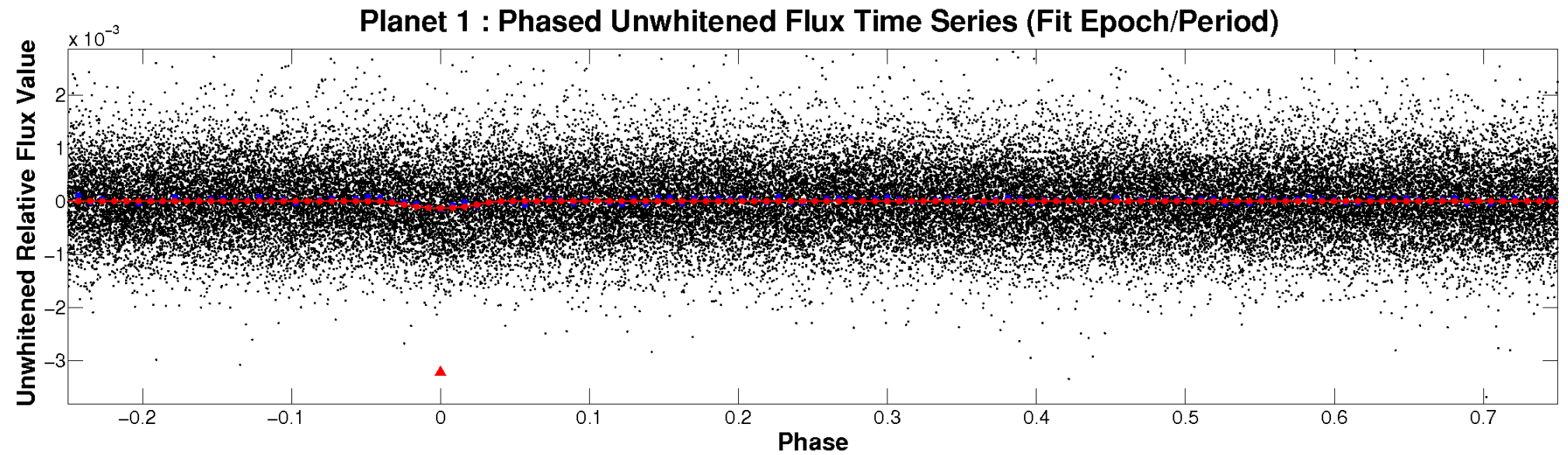


# ALT Odd/Even

TCE 012004656-01

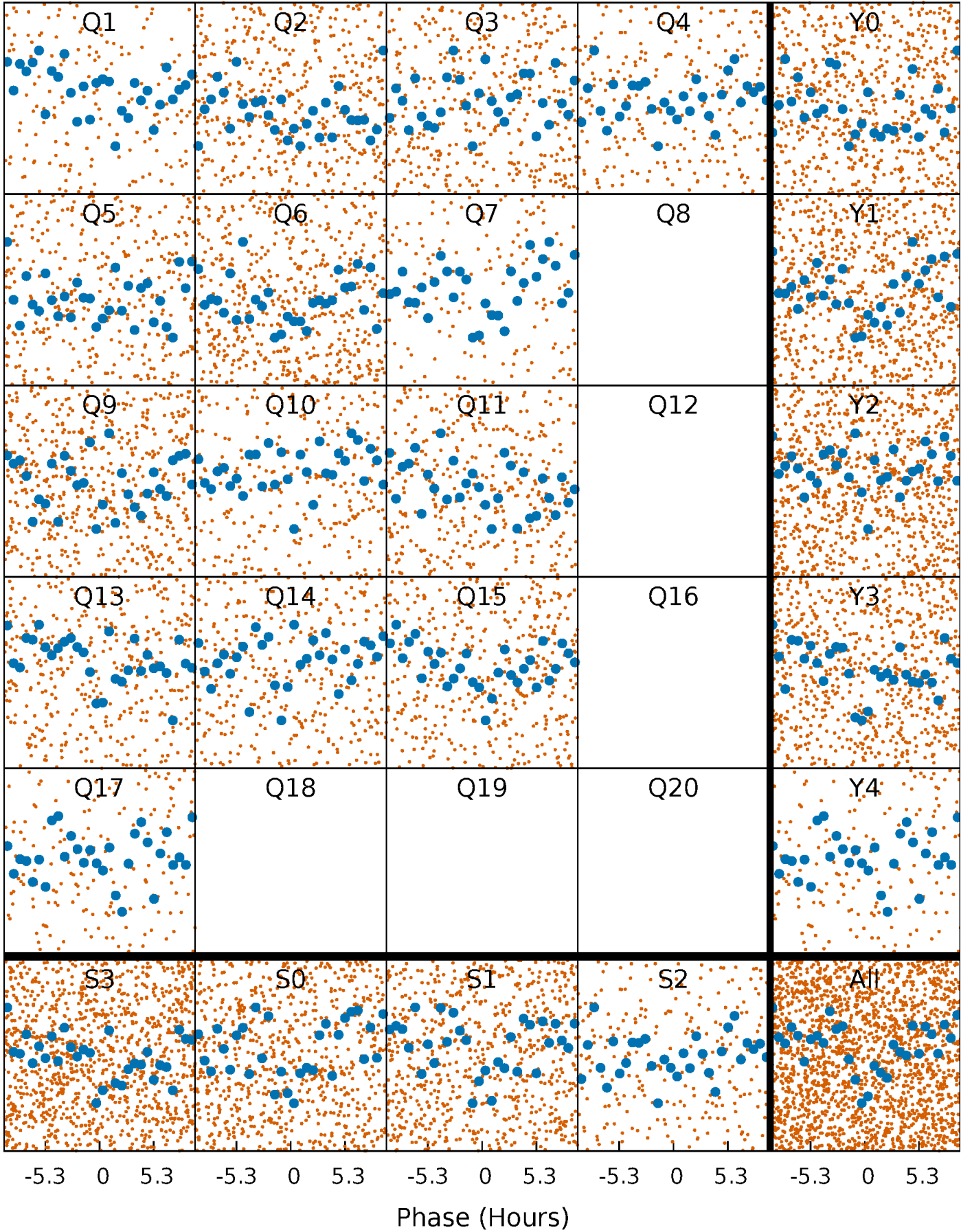


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

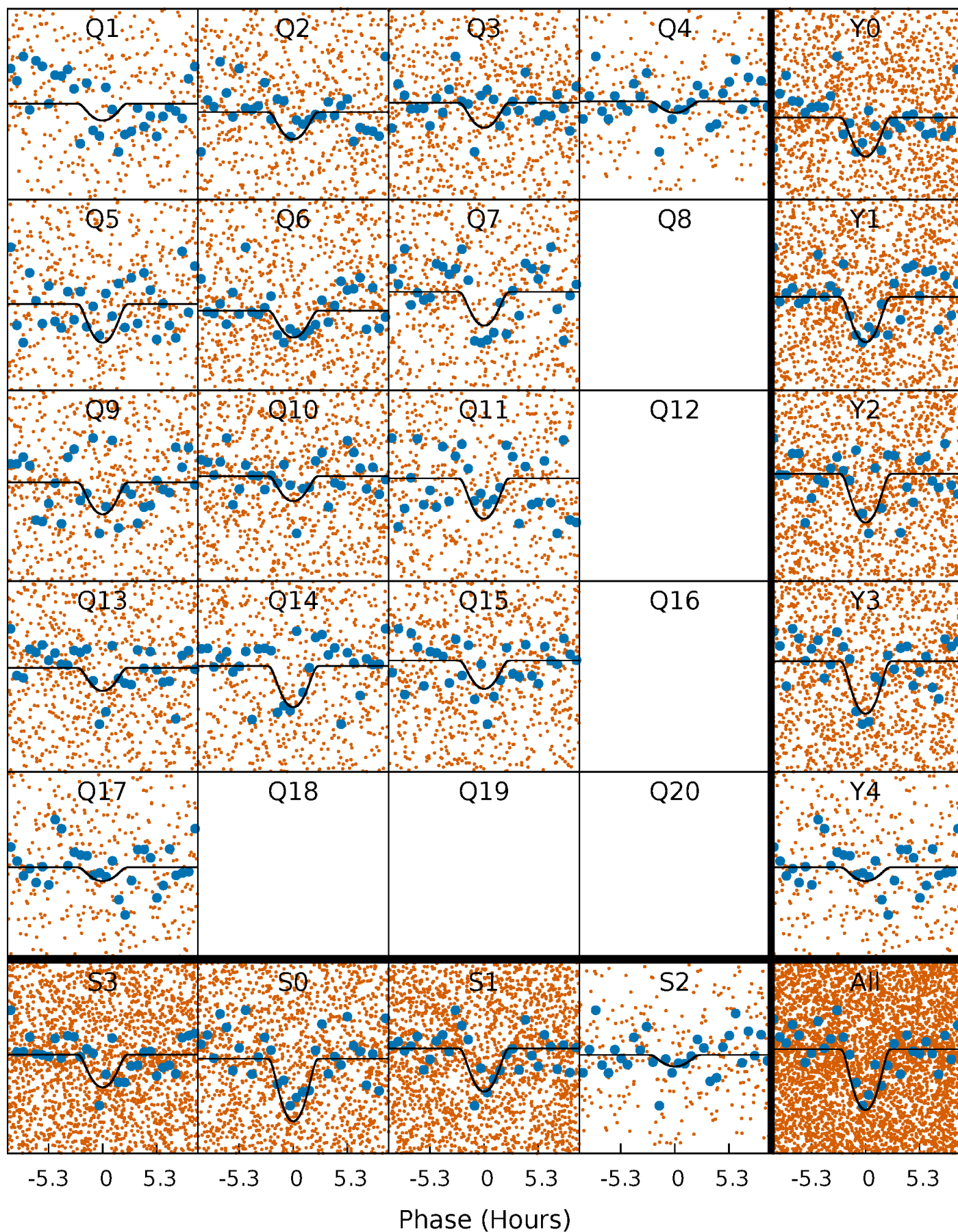
TCE 012004656-01   P= 2.521189 Days    $T_0=132.879741$  (BKJD)





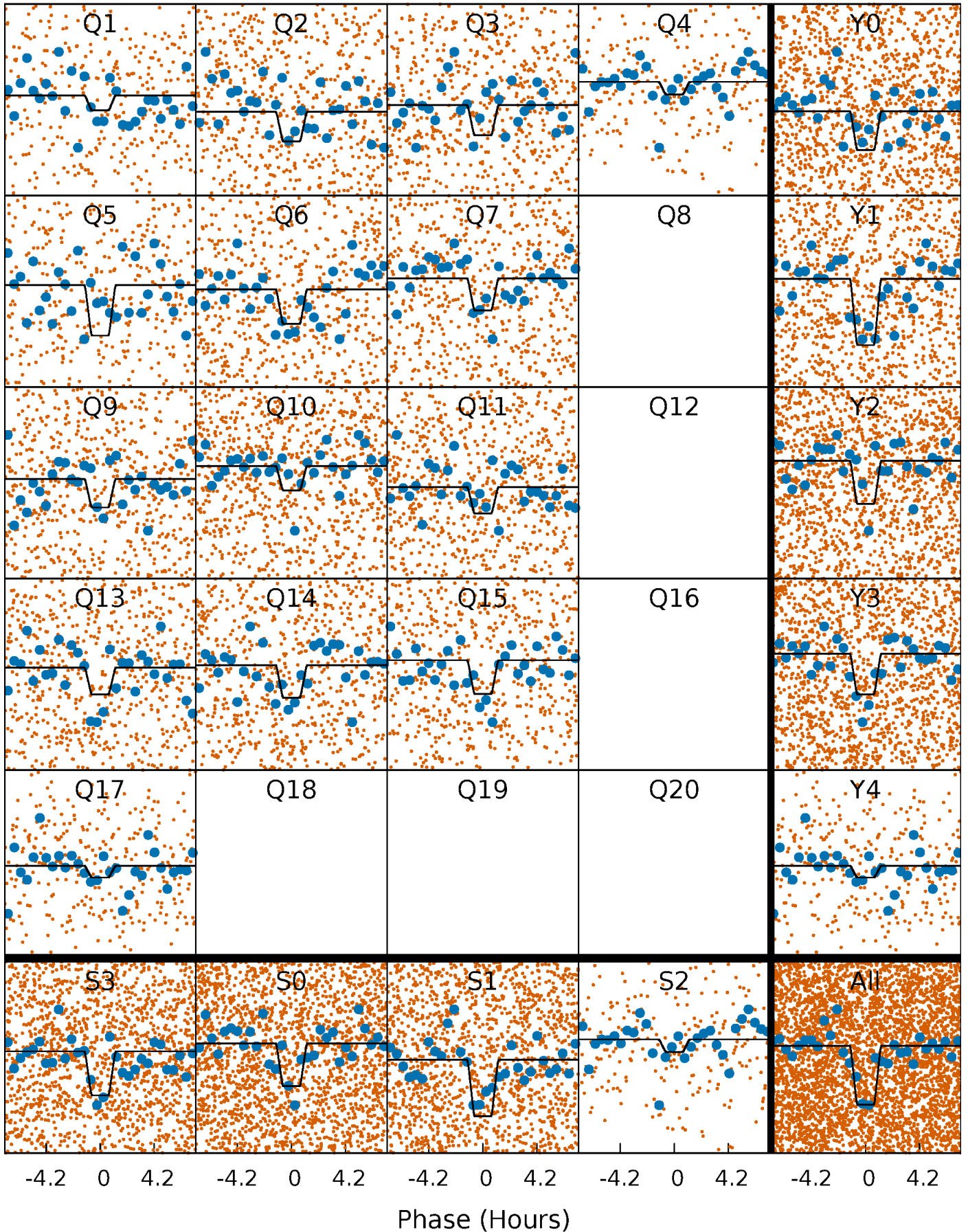
# DV Quarter-Phased Transit Curves

TCE 012004656-01 P= 2.521189 Days  $T_0=132.879741$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

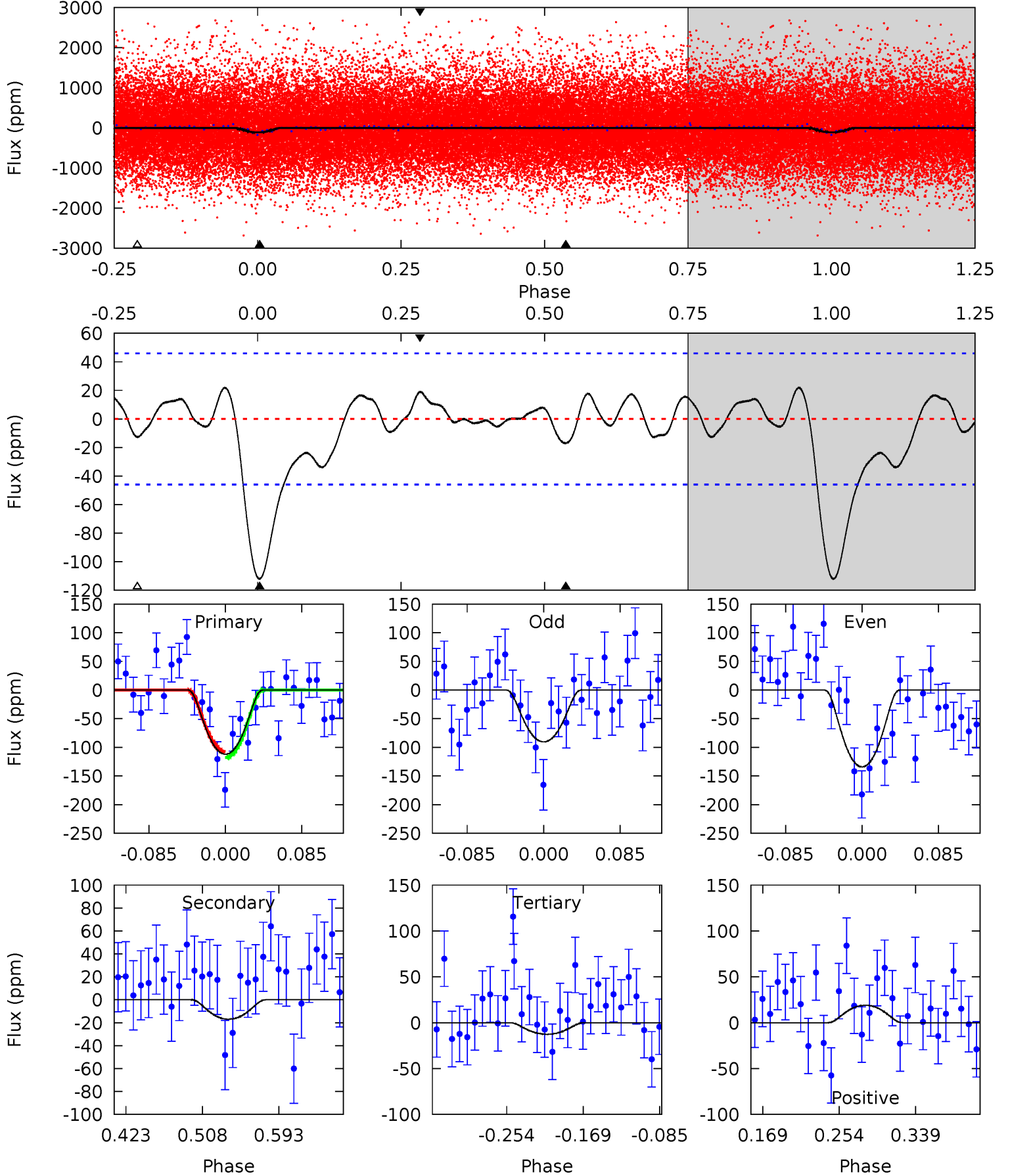
TCE 012004656-01 P= 2.521235 Days  $T_0=132.863574$  (BKJD)



# DV Model-Shift Uniqueness Test

012004656-01, P = 2.521189 Days, E = 130.358552 Days

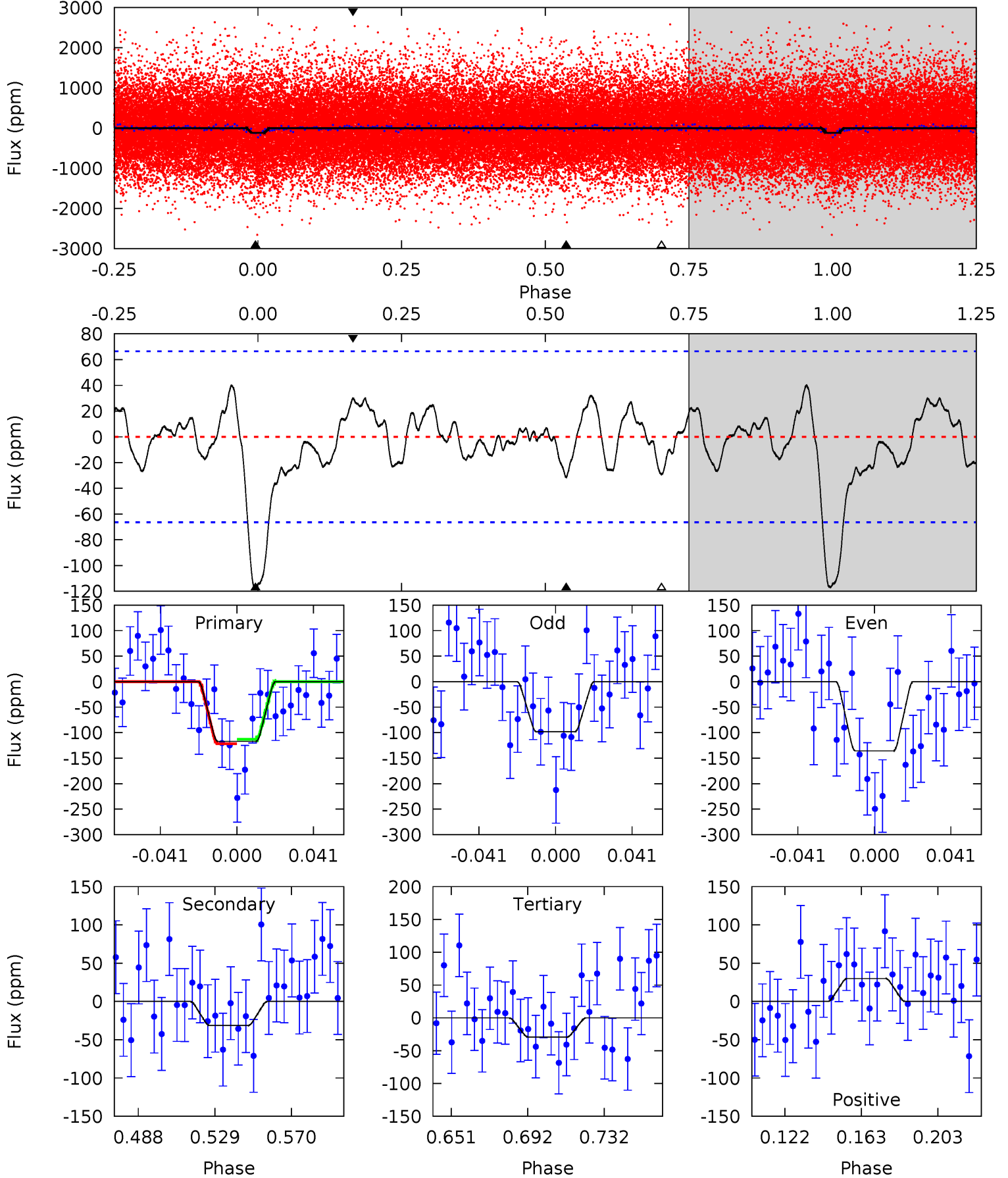
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.2	1.70	1.27	1.90	4.60	1.72	1.18	9.94	9.31	0.43	-0.20	2.19	0.94	0.16	0.52



# Alt Model-Shift Uniqueness Test

012004656-01, P = 2.521235 Days, E = 130.342339 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
8.36	2.25	2.10	2.14	4.75	2.05	1.12	6.27	6.23	0.15	0.11	1.34	0.86	0.26	0.31





### Stellar Parameters For KIC 012004656

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$3932^{+229}_{-252}$	$4.745^{+0.130}_{-0.070}$	$-0.200^{+0.400}_{-0.600}$	$0.520^{+0.085}_{-0.127}$	$0.548^{+0.074}_{-0.137}$	$5.498^{+4.420}_{-1.504}$
	+6%/-6%	+3%/-1%	+200%/-300%	+16%/-24%	+14%/-25%	+80%/-27%
Source	PHO2	PHO2	PHO2	DSEP		

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

### Secondary Eclipse Parameters for KIC 012004656-01 / KOI 8073.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-17 \pm 10$	$1.16^{+0.92}_{-0.74}$	$1002^{+71}_{-77}$	$2399^{+761}_{-422}$	$5.505^{+38.152}_{-4.288}$
Alt.	$-31 \pm 14$	$1.05^{+0.97}_{-0.71}$	$994^{+74}_{-76}$	$2709^{+1125}_{-492}$	$13^{+115}_{-10}$

$T_{\text{max}}$  = 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

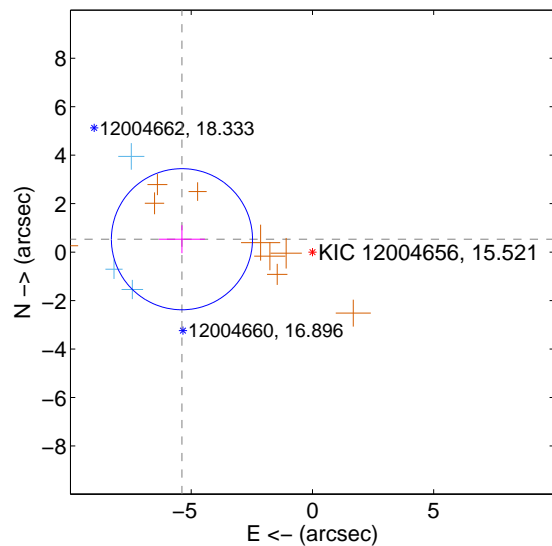
Supplemental centroid analysis for 012004656-01. Kepler magnitude: 15.52. Transit SNR 7.95

There are 3 quarters with good PRF difference image offsets

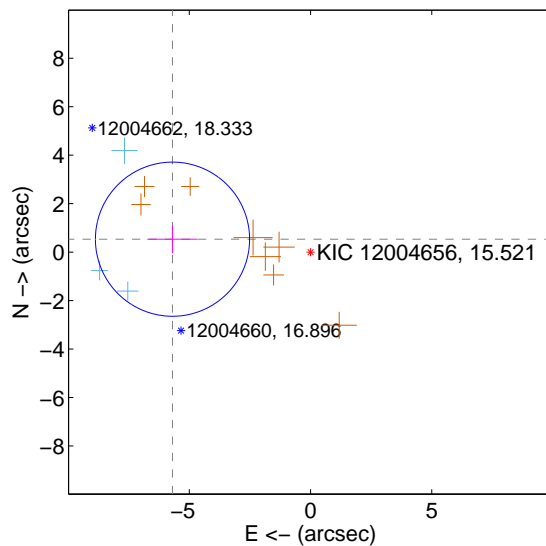
The direct PRF centroid is offset from the target star catalog position by about 0.07 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$5.410 \pm 0.970$	5.57	$5.384 \pm 0.951$	$0.531 \pm 0.578$
PRF-fit source offset from KIC position	$5.720 \pm 1.060$	5.40	$5.695 \pm 1.039$	$0.533 \pm 0.578$
photometric centroid source offset	$2.88 \pm 1.64$	1.76	$0.26 \pm 1.50$	$2.87 \pm 1.64$

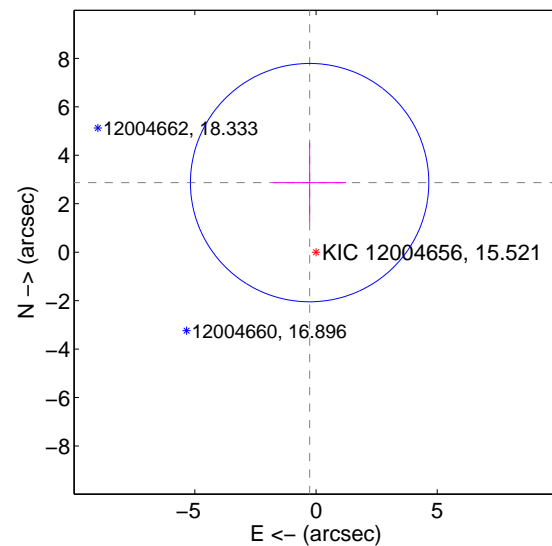
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

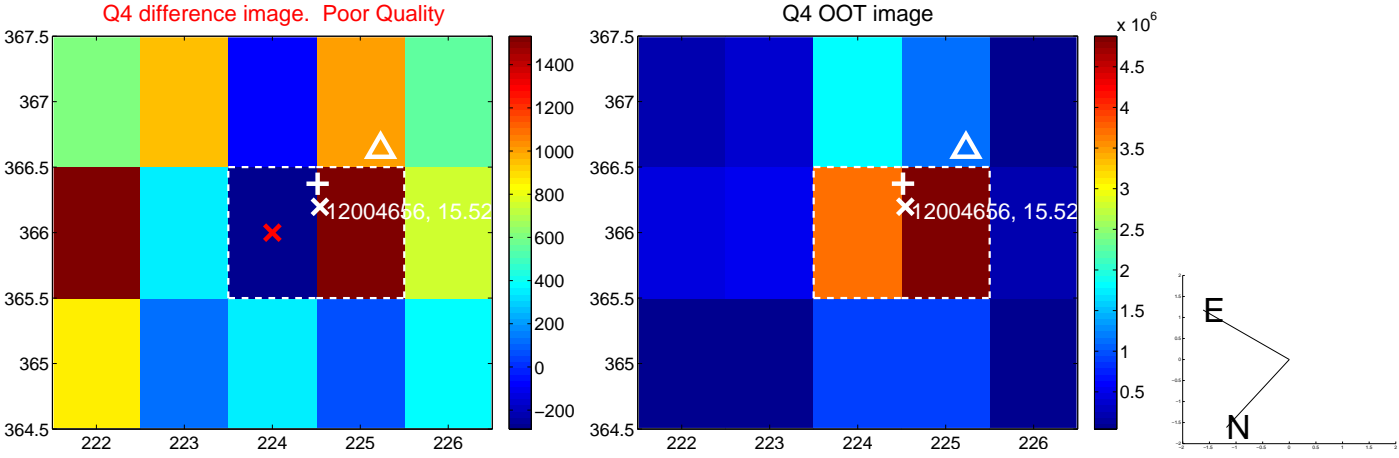
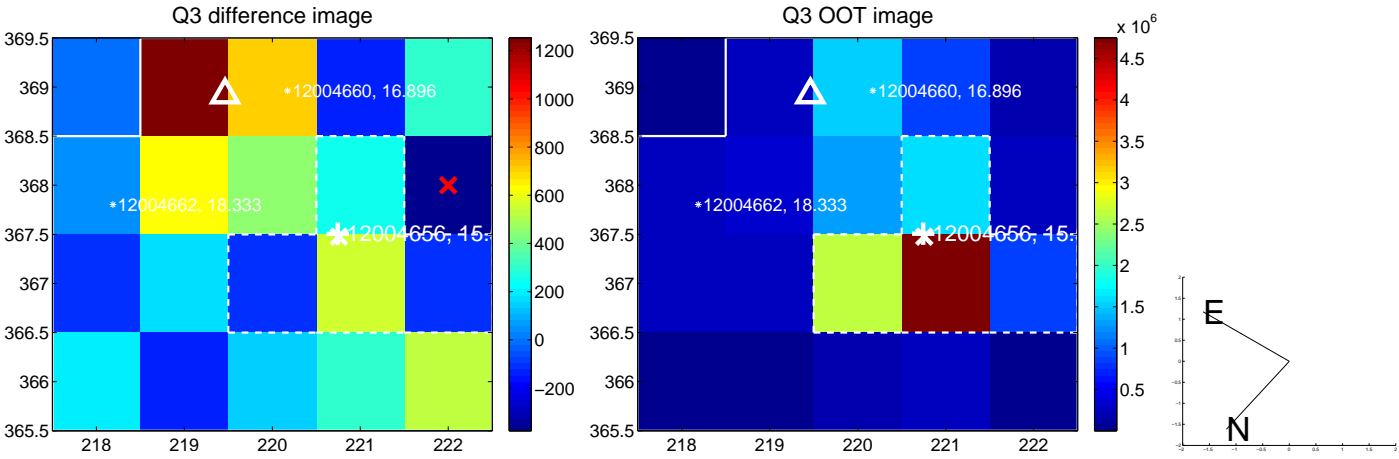
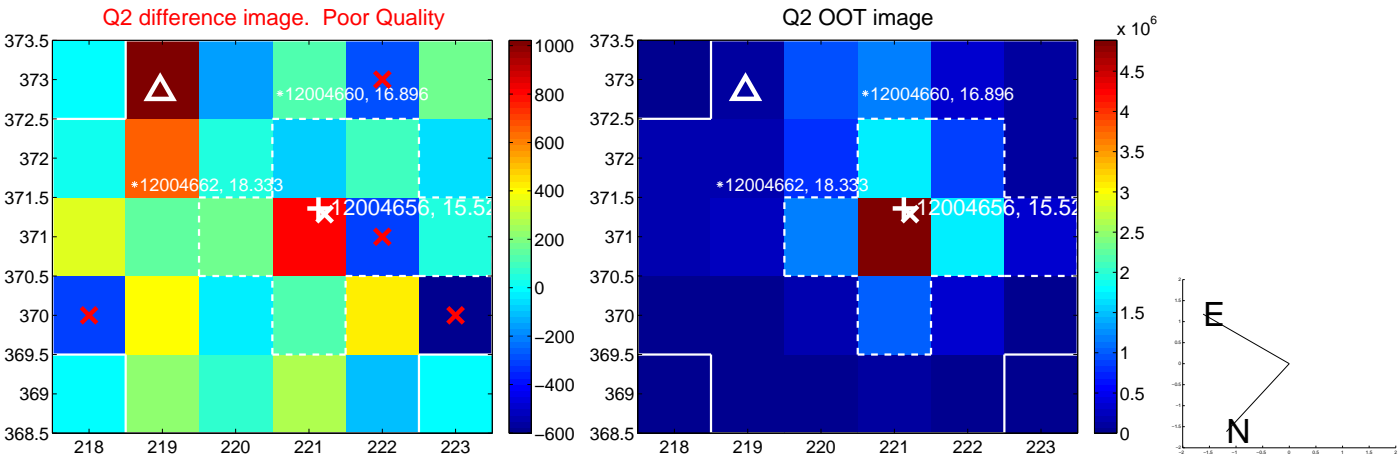
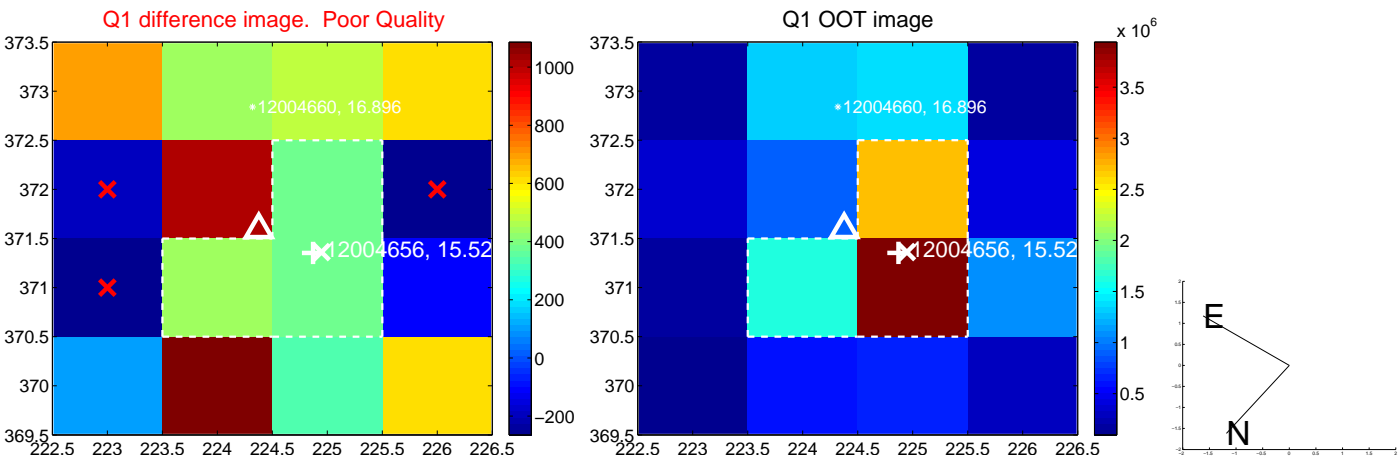


offset from photometric centroids

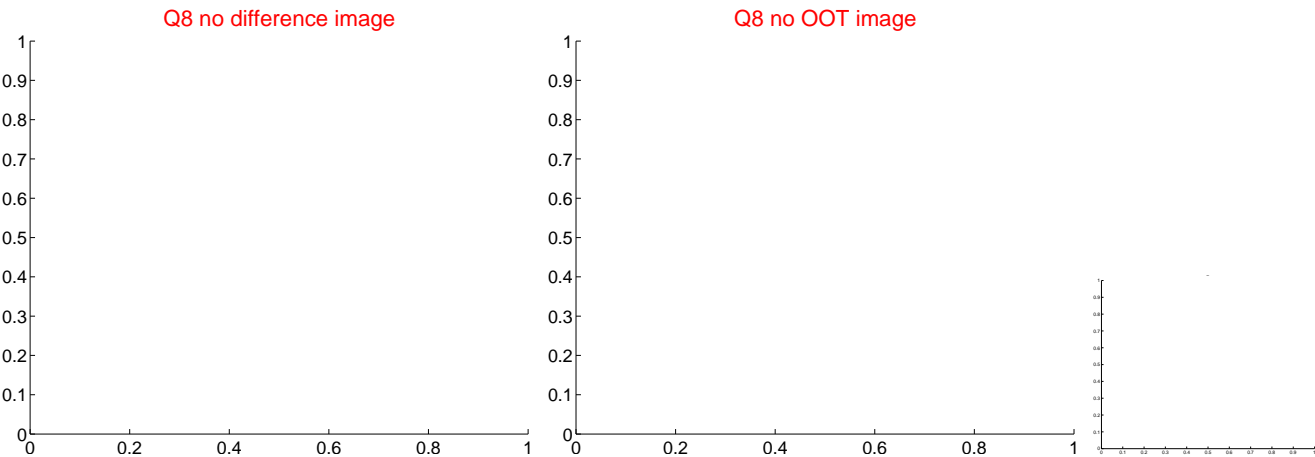
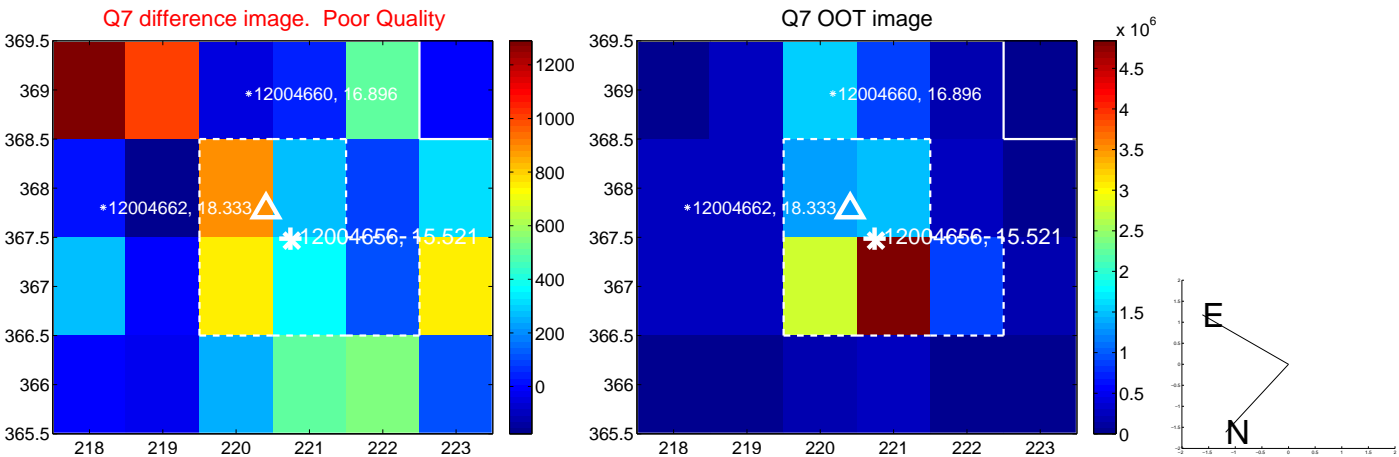
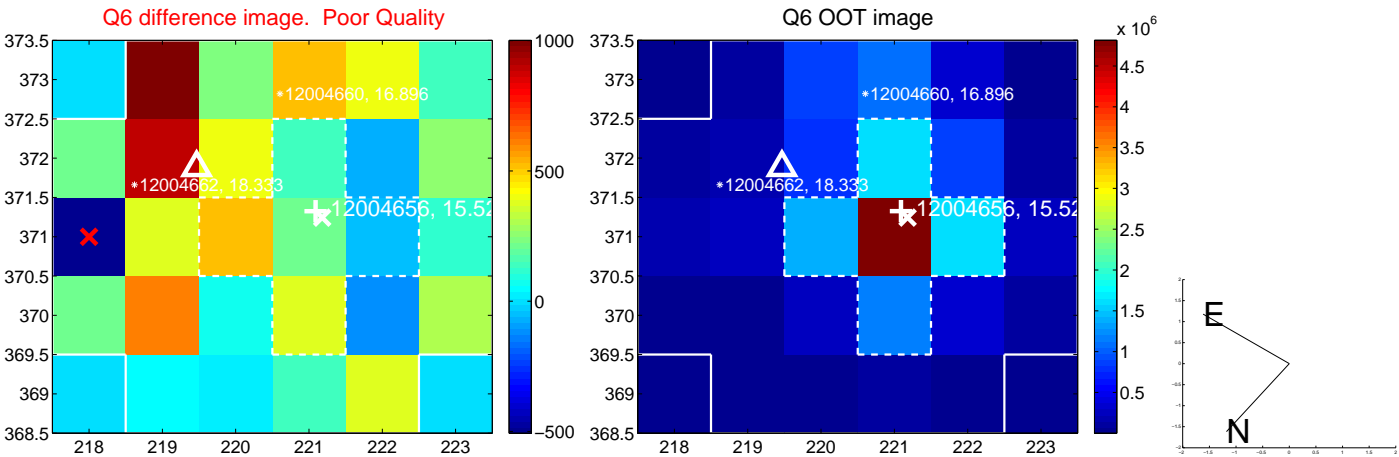
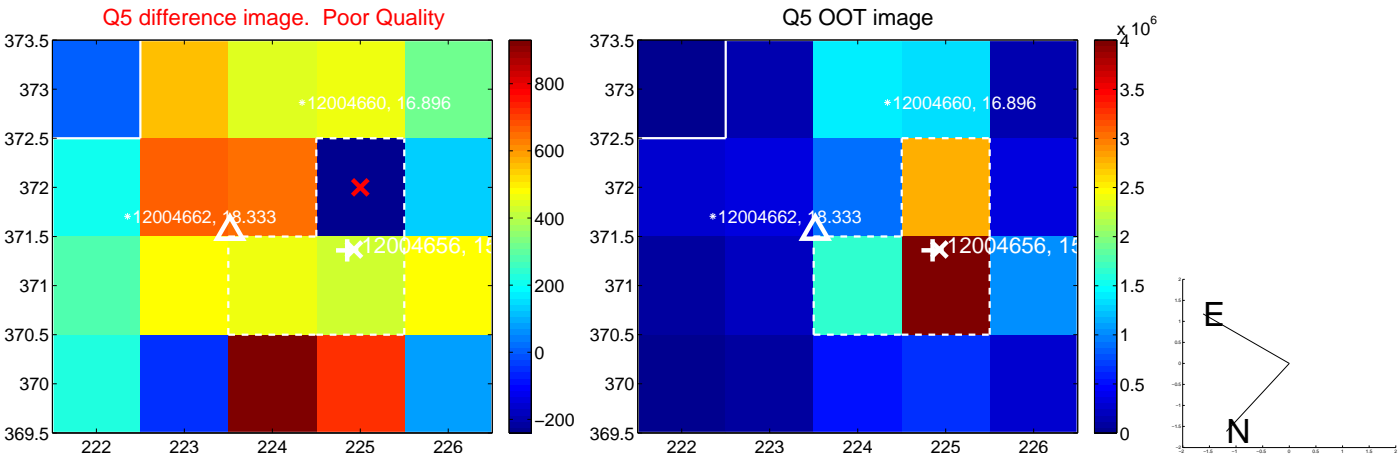


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

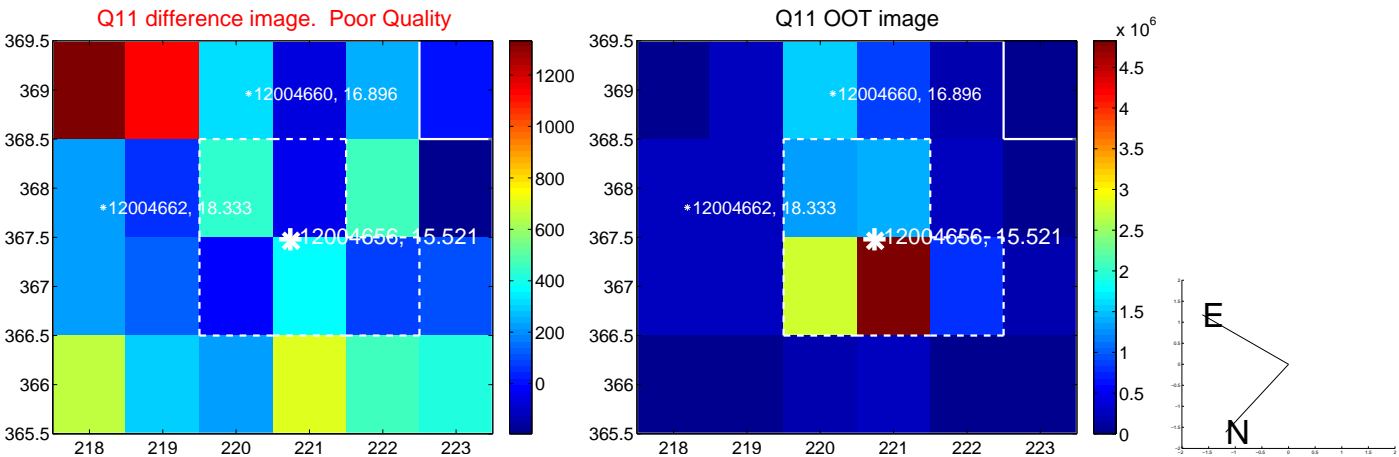
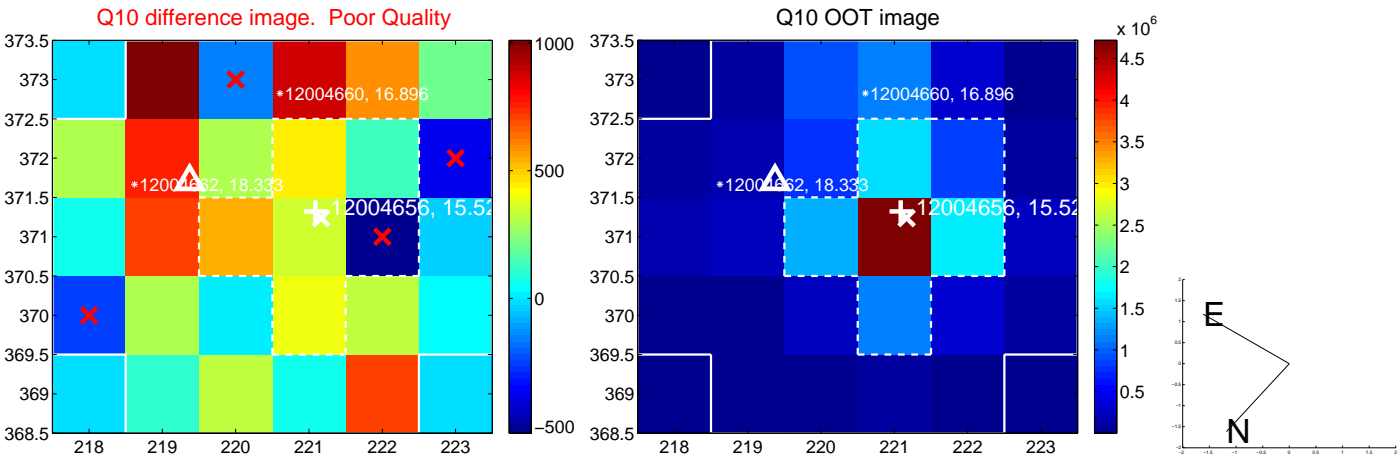
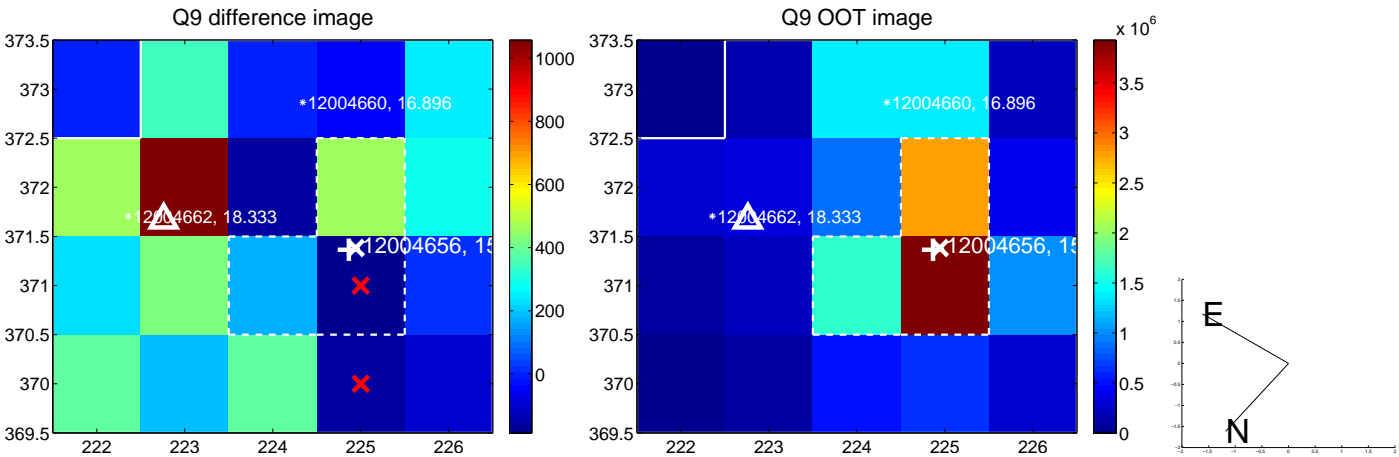
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



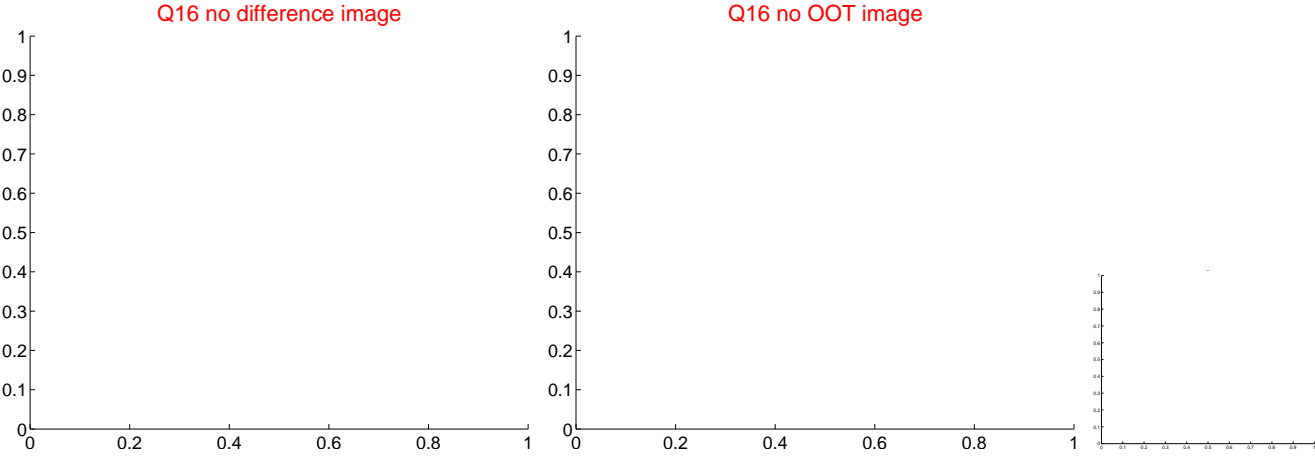
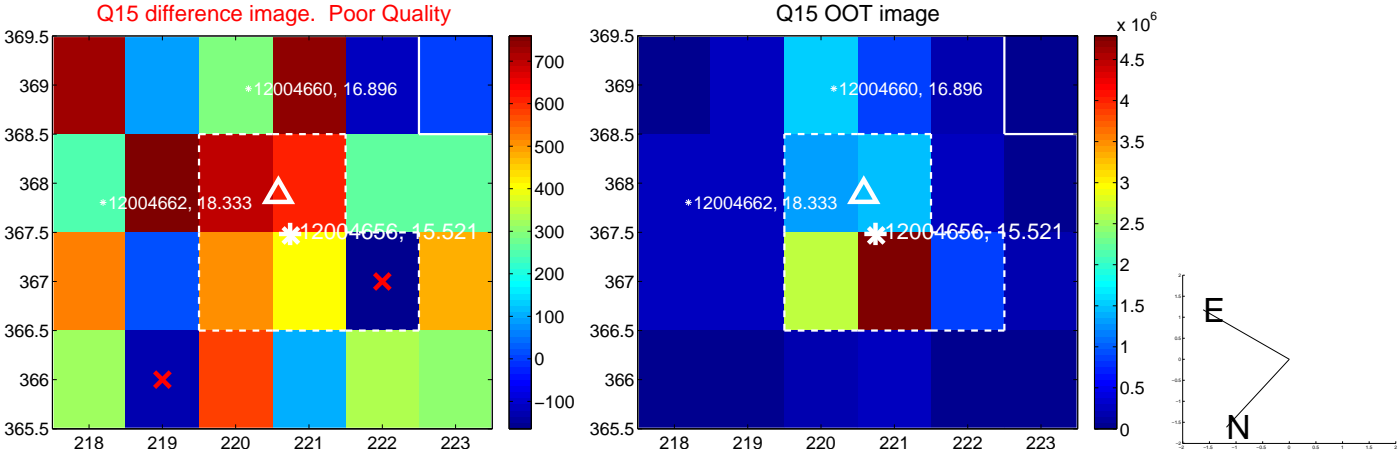
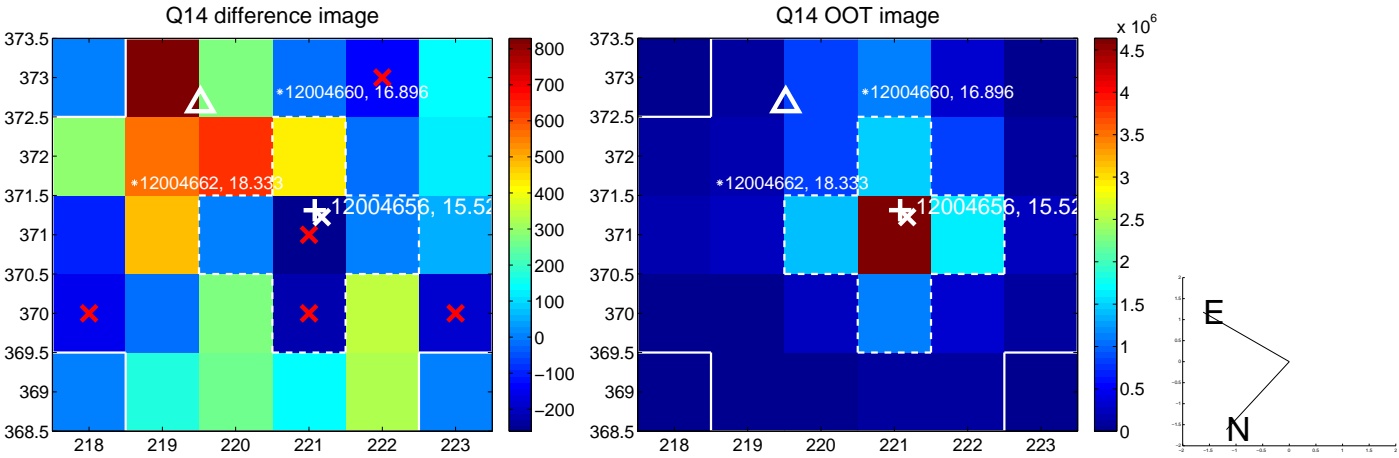
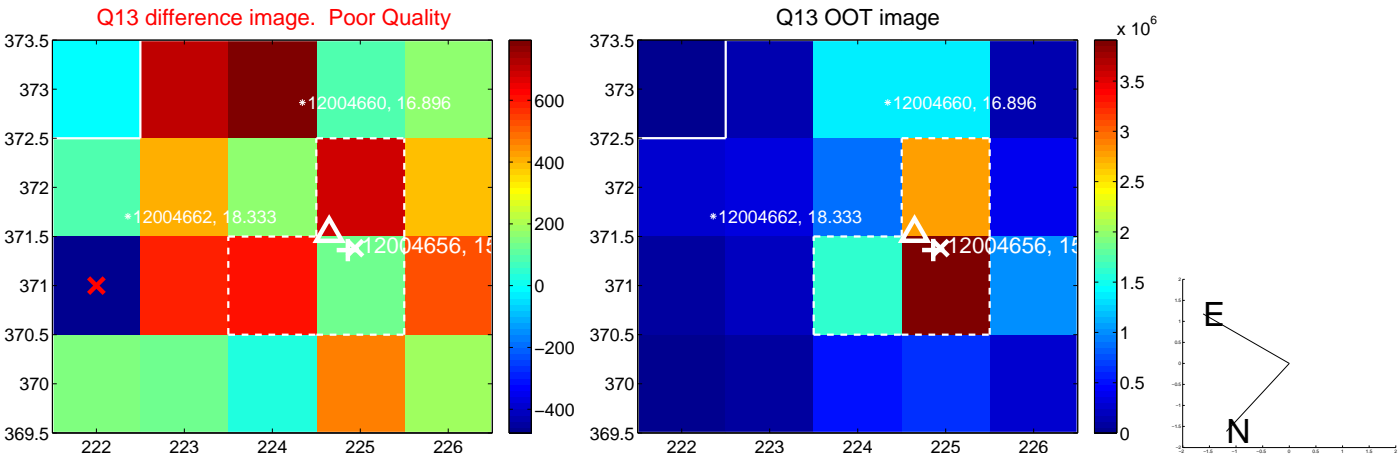
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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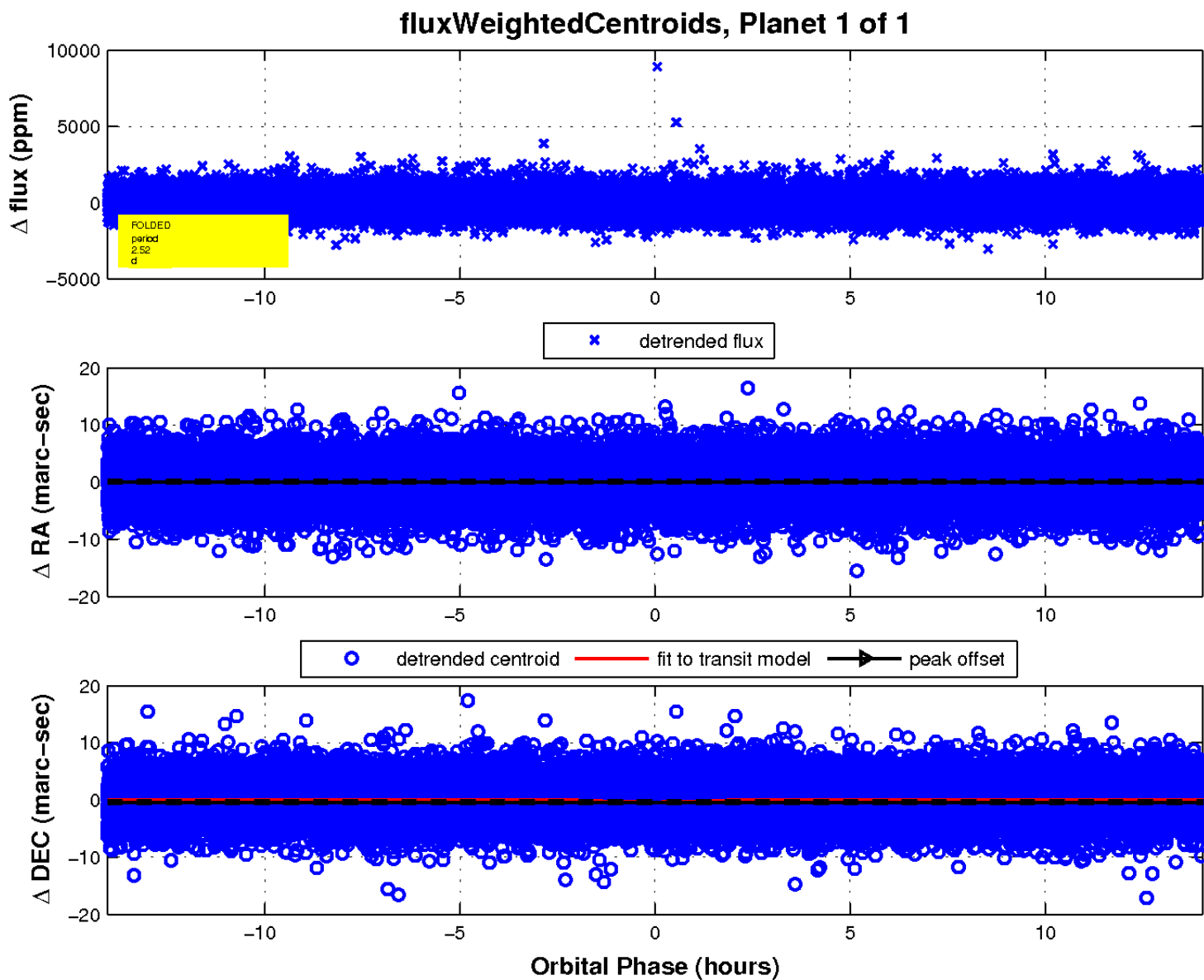
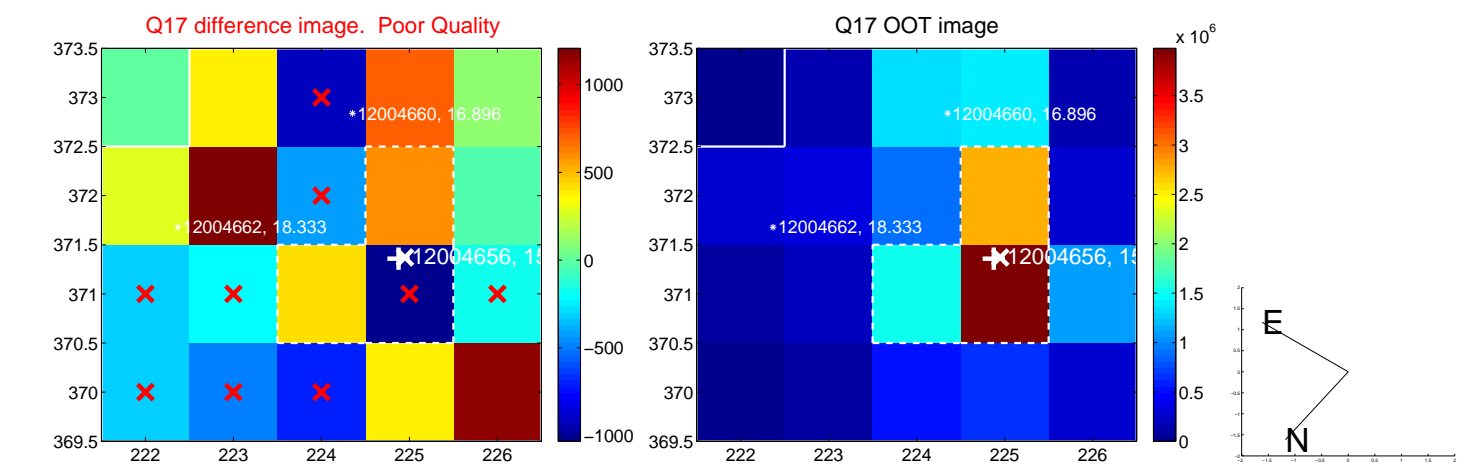


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





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



# UKIRT Image

Declination

