

# KIC 009602431

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009602431-01	OBS	7202.01	3.556458	133.546536	66.7	6.594	8.5	9.0	0.63	4964	0.63	144.03

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009602431-01	OBS	FP	0.00	0	0	1	1	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 009602431-01

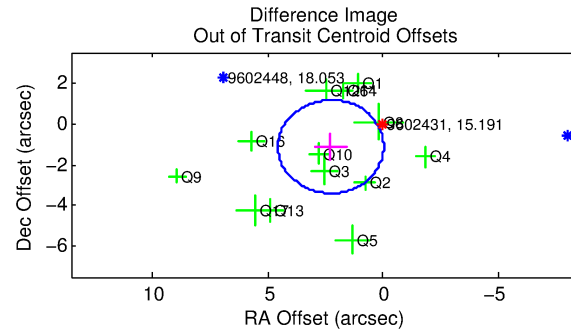
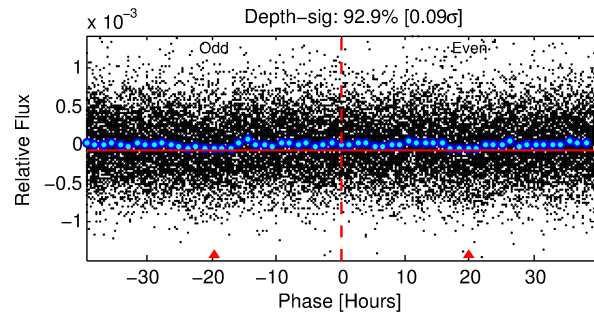
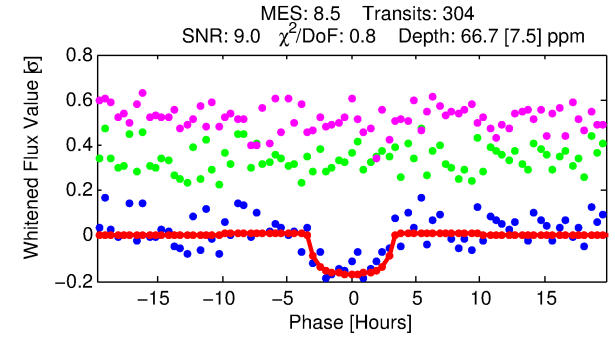
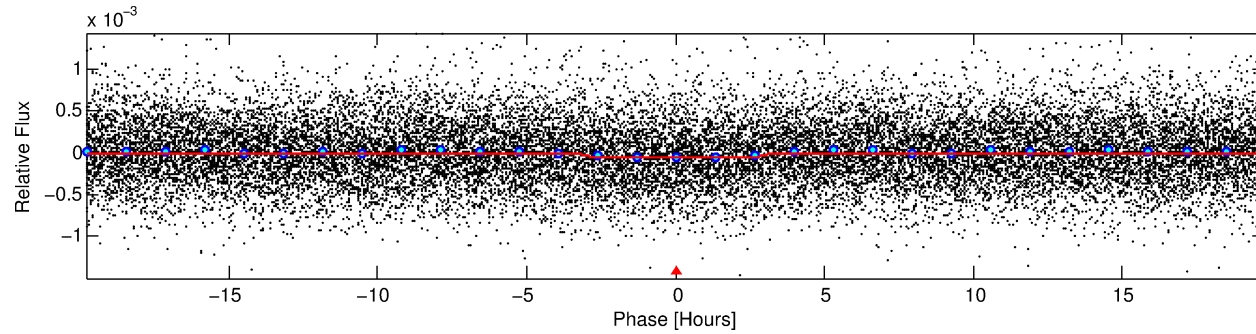
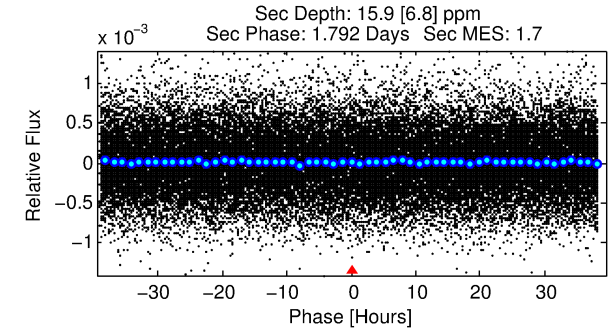
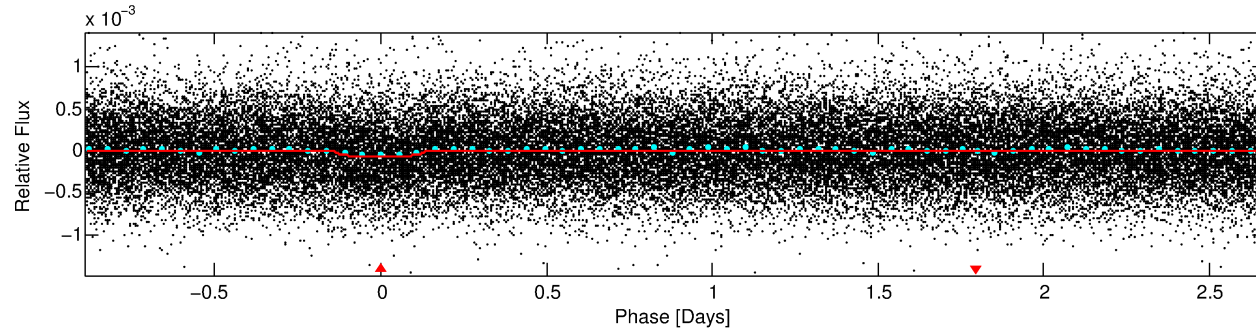
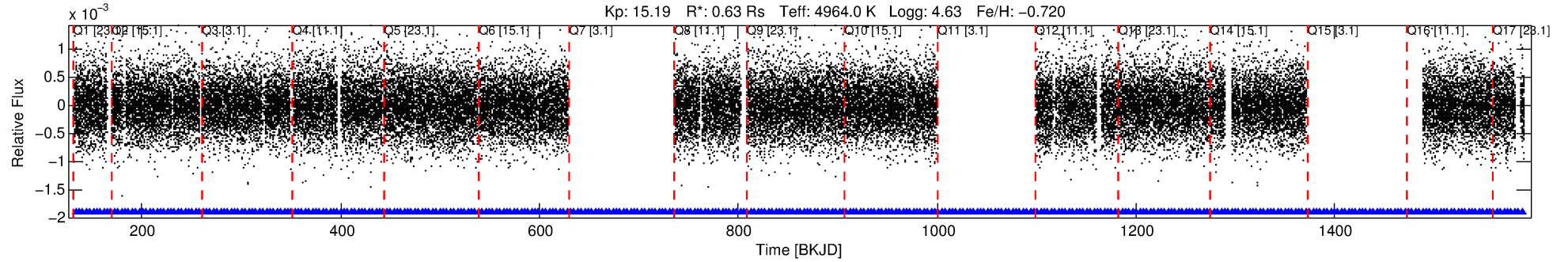
TCE (1)	KIC	Parent (2)	Parent KIC	P <sub>1</sub> :P <sub>2</sub>	Dist ( $''$ )	$\Delta$ Row	$\Delta$ Col	m <sub>2</sub>	m <sub>1</sub>	D <sub>2</sub> /D <sub>1</sub>	Mechanism	Flag	$\sigma_P$	$\sigma_T$
009602431-01	9602431	V995-Cyg-pri	9602595	1:1	123.0	-18	25	11.88	15.19	11506.00	Direct-PRF	0	1.05	1.16

**Notes:** P<sub>1</sub>:P<sub>2</sub> 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<sub>2</sub> and m<sub>1</sub> are the magnitudes of the parent and child. D<sub>2</sub>/D<sub>1</sub> 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: 9602431 Candidate: 1 of 1 Period: 3.556 d

KOI: K07202.01 Corr: 0.942



## DV Fit Results:

Period = 3.55646 [0.00005] d  
Epoch = 133.5465 [0.0097] BKJD  
Rp/R\* = 0.0091 [0.0047]  
b = 0.90 [0.45]  
Seff = 144.03 [23.90]  
Teq = 883 [37] K  
Rp = 0.63 [0.33] Re  
a = 0.0389 [0.0030] AU  
Ag = 33.79 [37.79] [0.87σ]  
Teffp = 3293 [921] K [2.61σ]

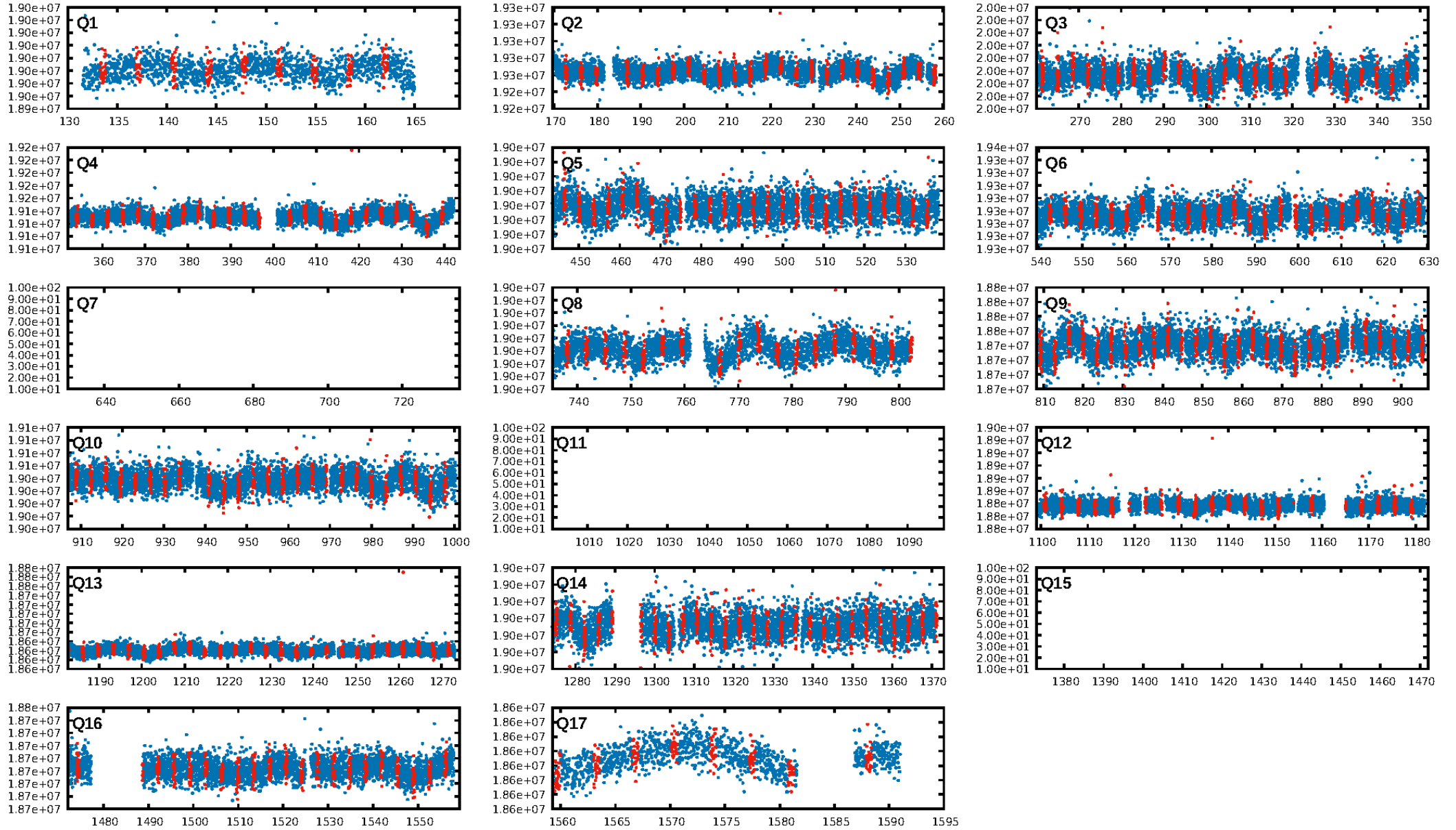
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.27e-17  
RollingBand-fgt: 1.00 [287/287]  
GhostDiagnostic-chr: 0.1793  
Centroid-sig: 14.5%  
Centroid-so: 1.991 arcsec [1.22σ]  
OotOffset-rm: 2.530 arcsec [3.32σ]  
KicOffset-rm: 2.651 arcsec [3.26σ]  
OotOffset-st: 4/1/4/5 [14]  
KicOffset-st: 4/1/4/5 [14]  
DiffImageQuality-fgm: 0.00 [0/14]  
DiffImageOverlap-fno: 1.00 [14/14]

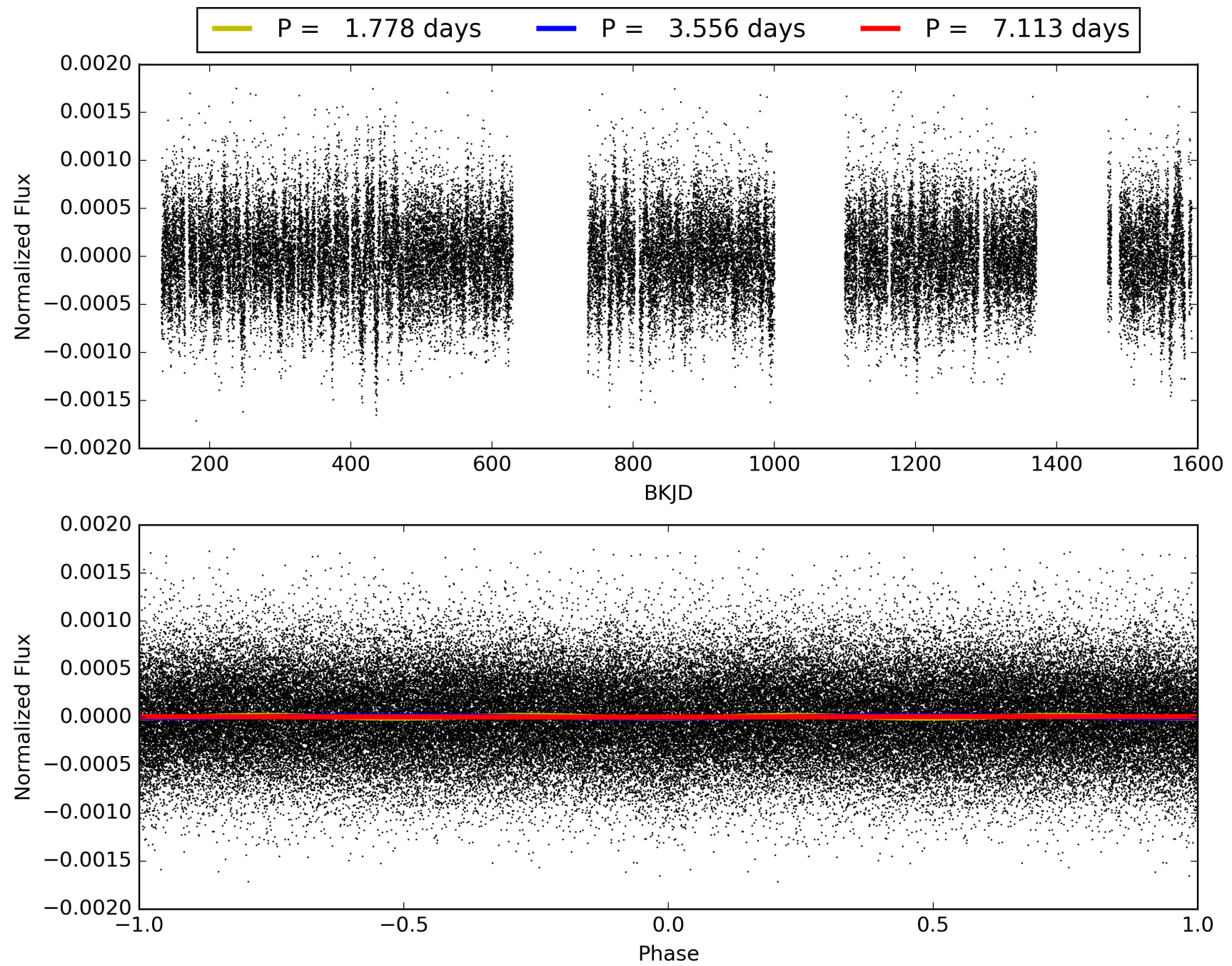
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 08:21:00 Z

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

# TCE 009602431-01, PDC Light Curves



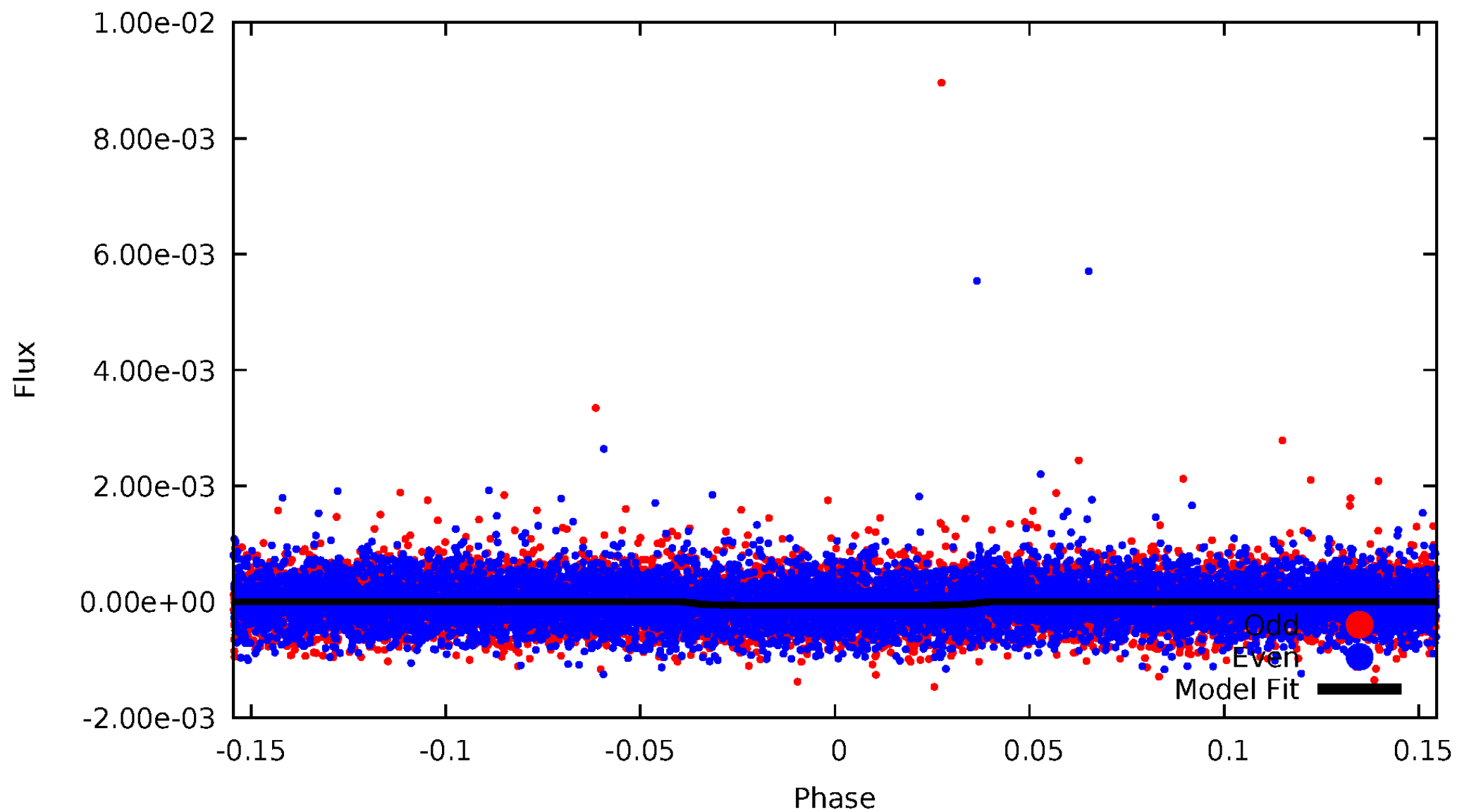
TCE 009602431-01





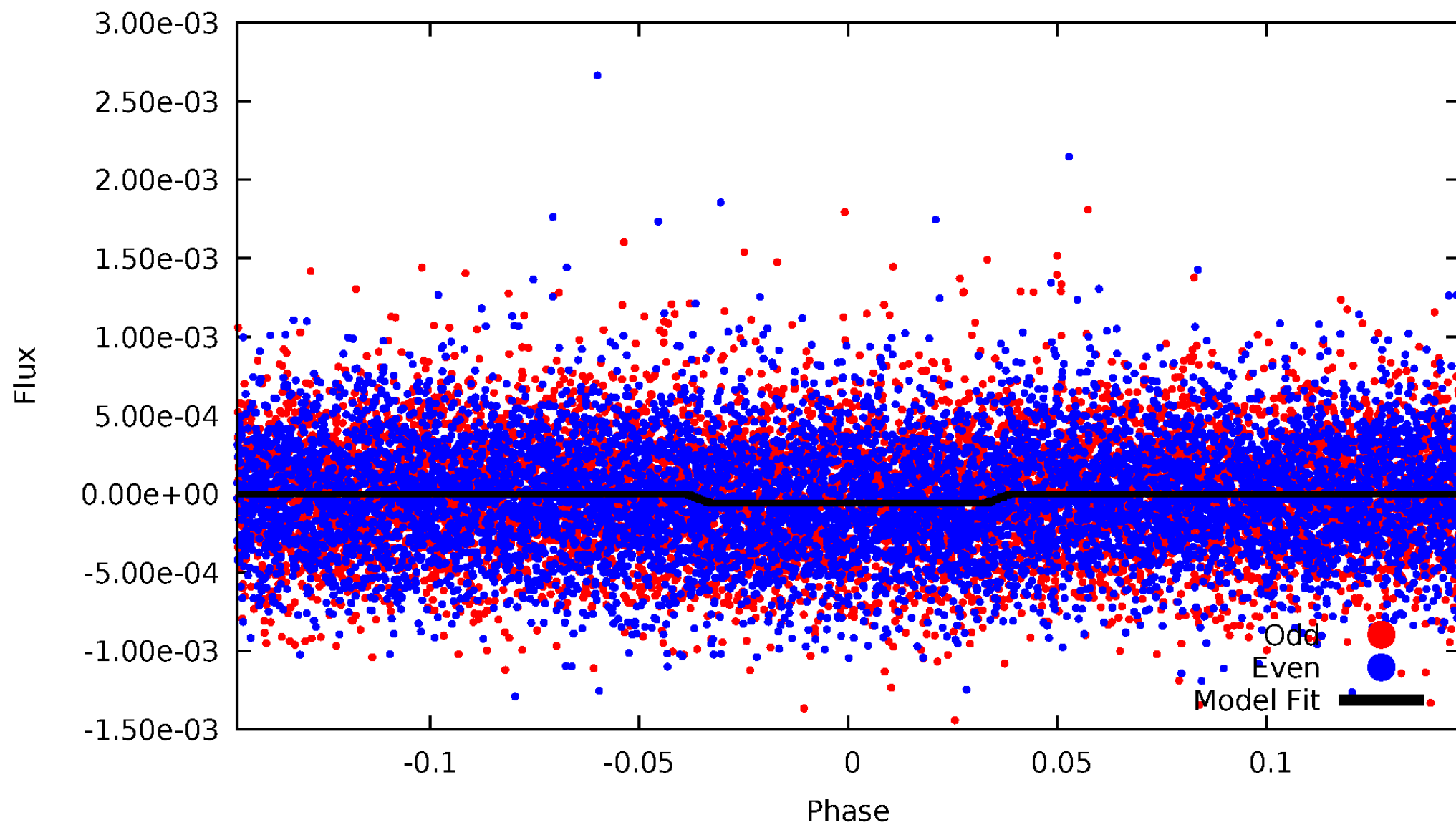
# DV Odd/Even

TCE 009602431-01



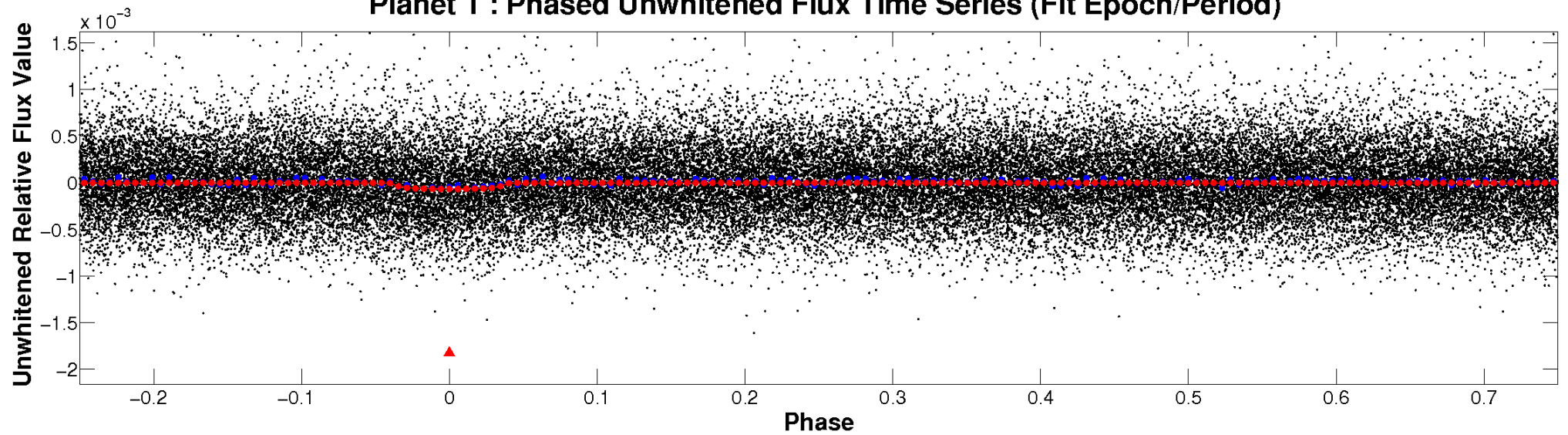
# ALT Odd/Even

TCE 009602431-01

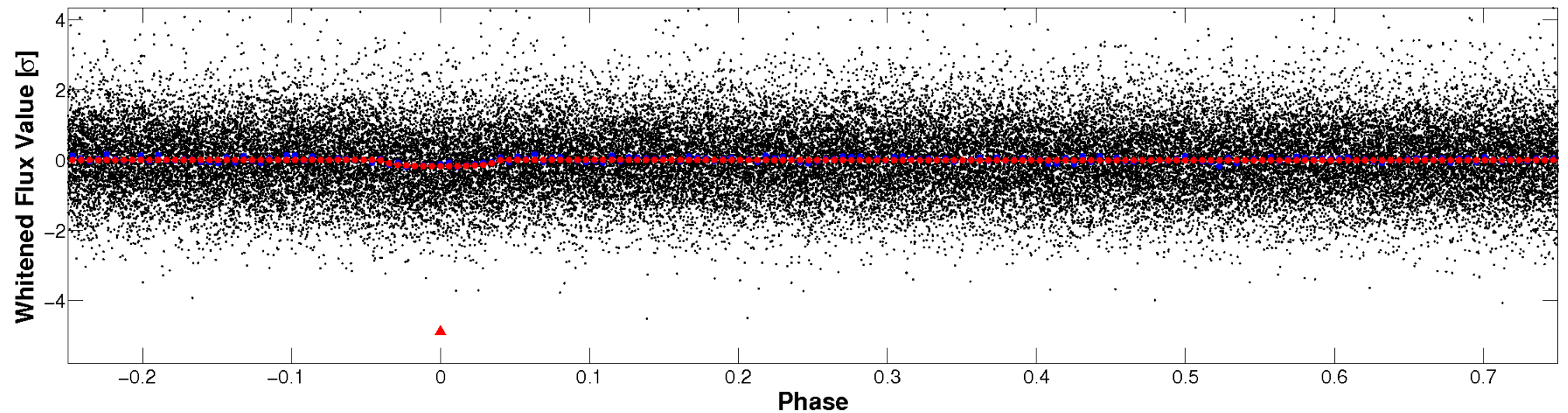


# Non-Whitened Vs. Whitened Light Curve

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

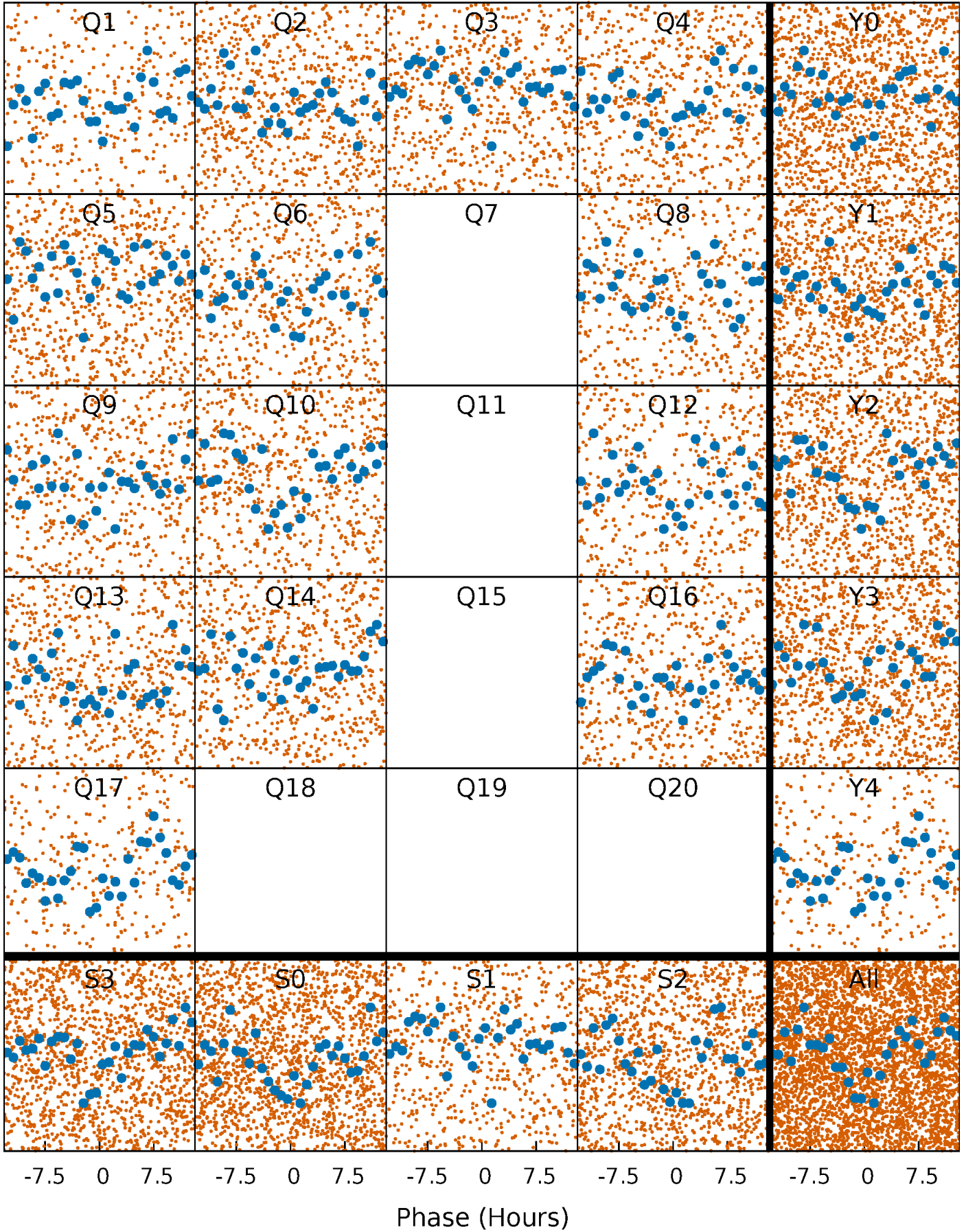


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

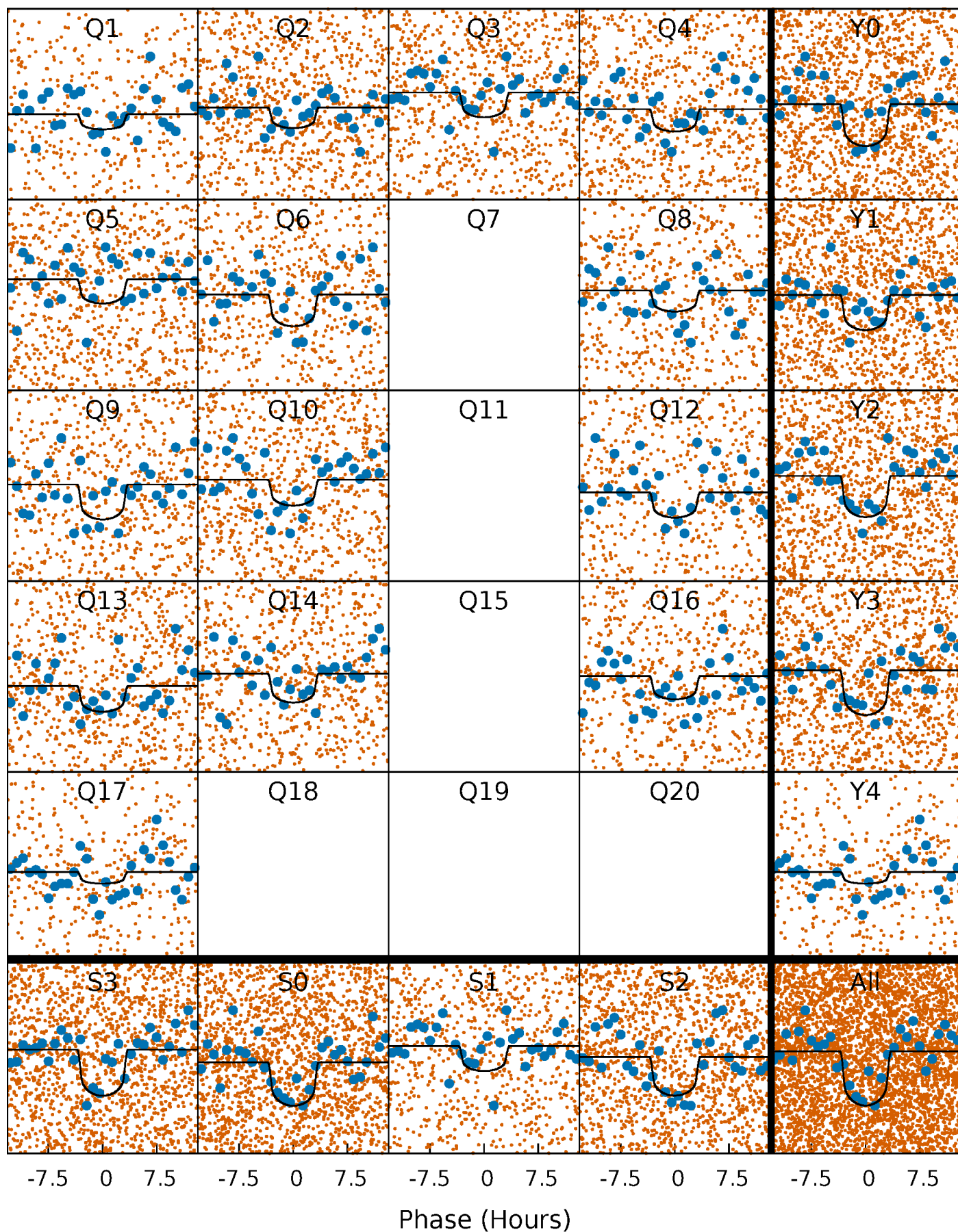
TCE 009602431-01 P= 3.556458 Days  $T_0=133.546536$  (BKJD)





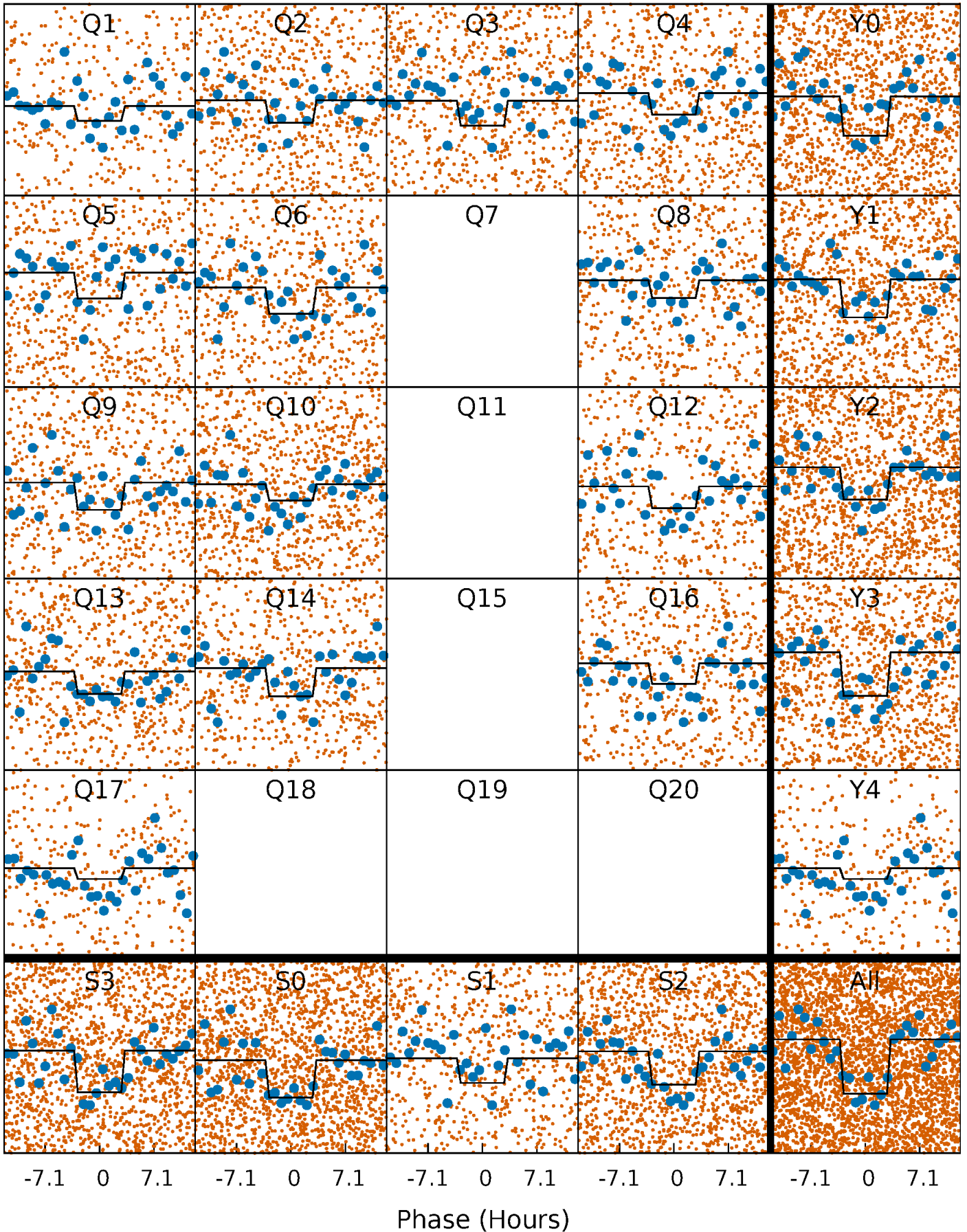
# DV Quarter-Phased Transit Curves

TCE 009602431-01 P= 3.556458 Days  $T_0=133.546536$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

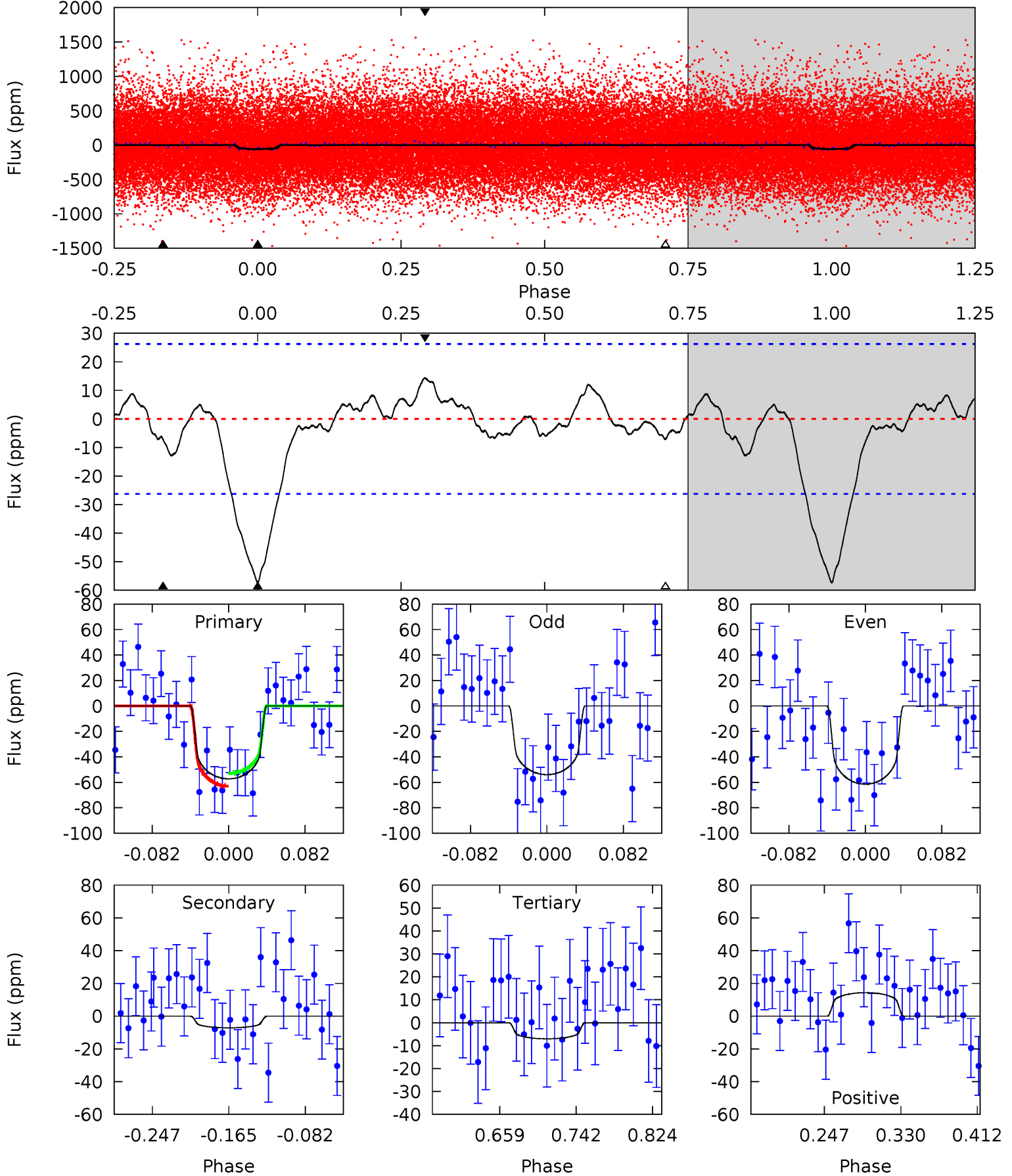
TCE 009602431-01 P= 3.556482 Days  $T_0=133.542210$  (BKJD)



# DV Model-Shift Uniqueness Test

009602431-01, P = 3.556458 Days, E = 129.990078 Days

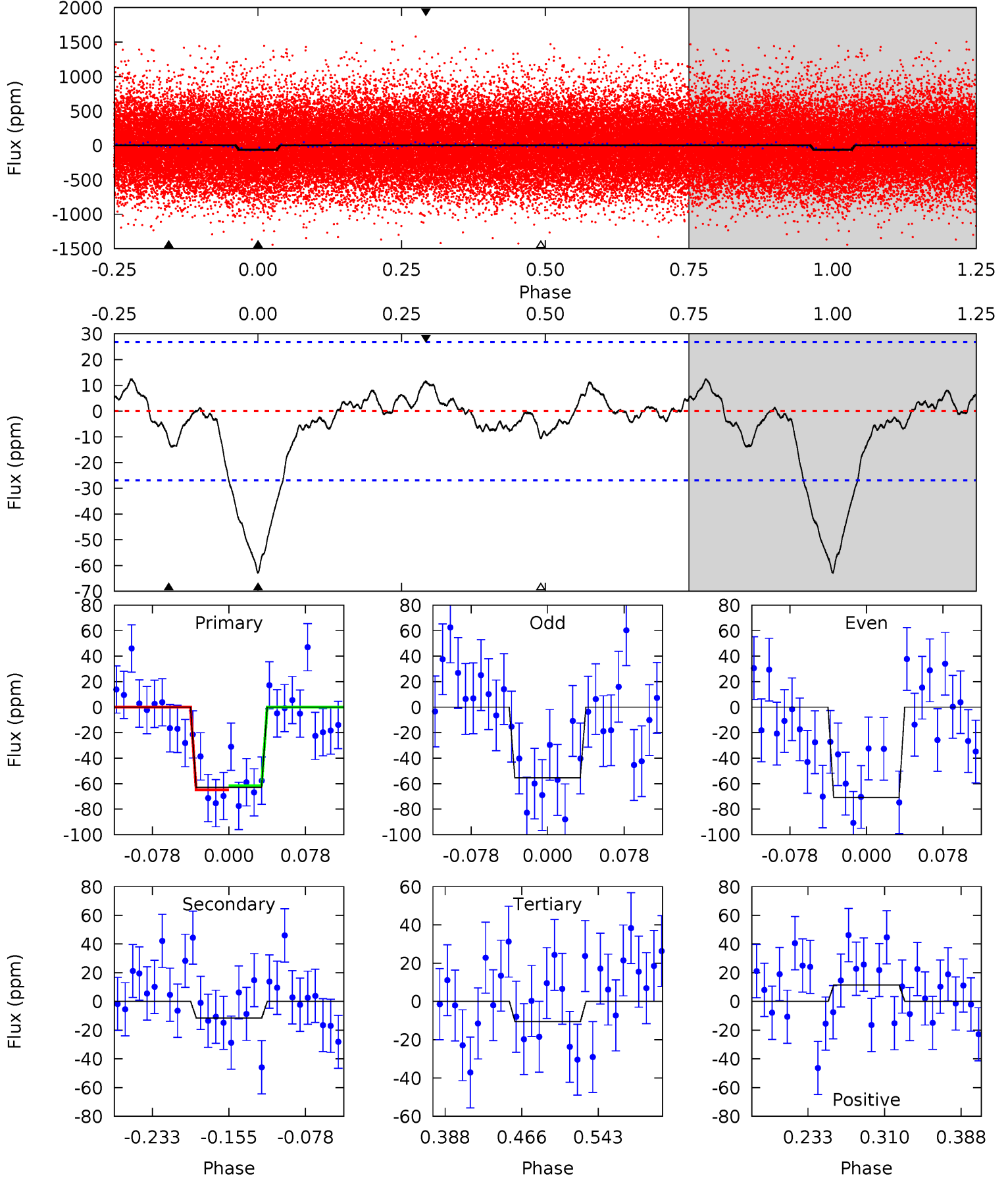
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.0	1.26	1.23	2.51	4.61	1.74	0.94	8.81	7.53	0.02	-1.26	0.66	1.01	0.20	0.88



# Alt Model-Shift Uniqueness Test

009602431-01, P = 3.556482 Days, E = 129.985728 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
10.8	1.99	1.80	1.97	4.62	1.76	0.85	8.99	8.83	0.19	0.02	1.32	1.08	0.16	0.29





### Stellar Parameters For KIC 009602431

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4964^{+148}_{-148}$	$4.628^{+0.065}_{-0.035}$	$-0.720^{+0.300}_{-0.300}$	$0.633^{+0.055}_{-0.055}$	$0.621^{+0.062}_{-0.031}$	$3.444^{+0.907}_{-0.496}$
	+3%/-3%	+1%/-1%	+42%/-42%	+9%/-9%	+10%/-5%	+26%/-14%
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 009602431-01 / KOI 7202.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-7 \pm 6$	$0.65^{+0.32}_{-0.30}$	$1230^{+43}_{-43}$	$3140^{+755}_{-833}$	$13^{+37}_{-12}$
Alt.	$-12 \pm 6$	$0.58^{+0.30}_{-0.31}$	$1225^{+45}_{-42}$	$3538^{+1160}_{-519}$	$28^{+110}_{-18}$

$T_{\text{max}}$  = 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

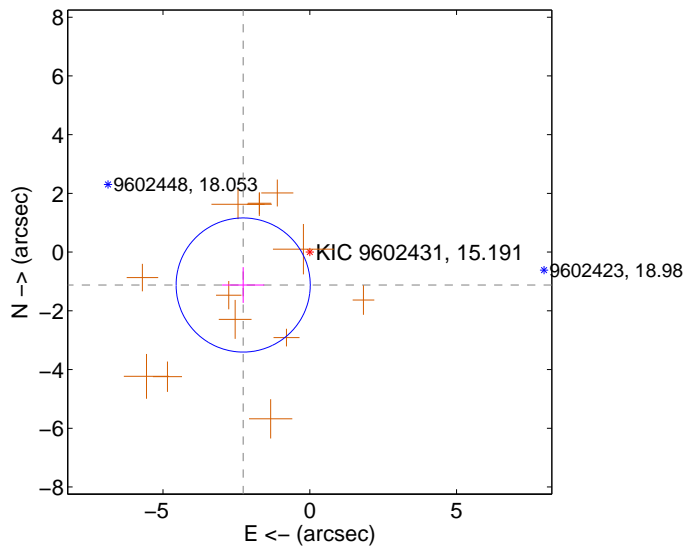
Supplemental centroid analysis for 009602431-01. Kepler magnitude: 15.19. Transit SNR 8.97

There are 0 quarters with good PRF difference image offsets

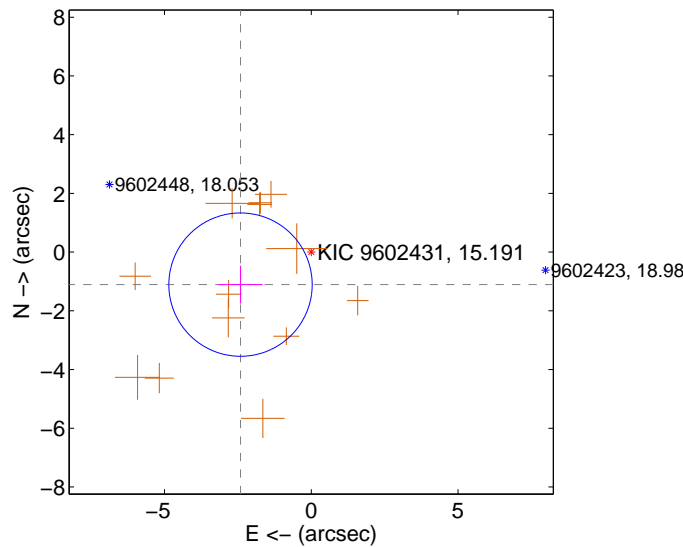
The direct PRF centroid is offset from the target star catalog position by about 0.36 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.530 \pm 0.761$	3.32	$2.268 \pm 0.716$	$-1.121 \pm 0.609$
PRF-fit source offset from KIC position	$2.651 \pm 0.814$	3.26	$2.409 \pm 0.754$	$-1.107 \pm 0.644$
photometric centroid source offset	$1.99 \pm 1.63$	1.22	$-1.93 \pm 1.62$	$0.50 \pm 1.64$

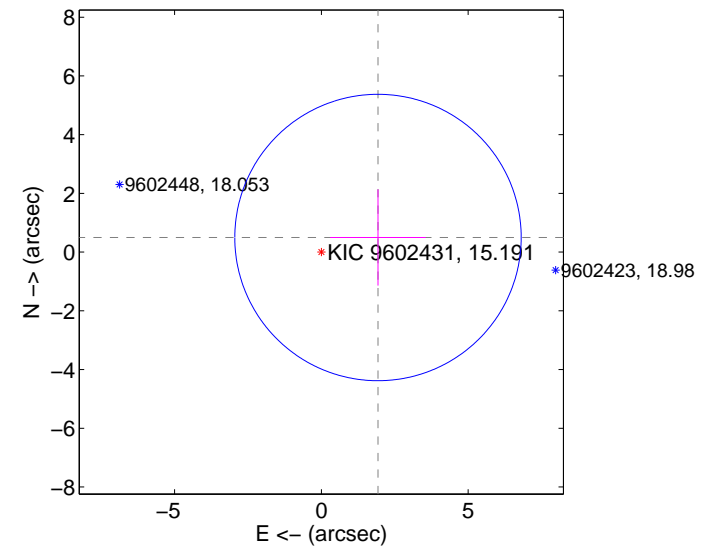
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

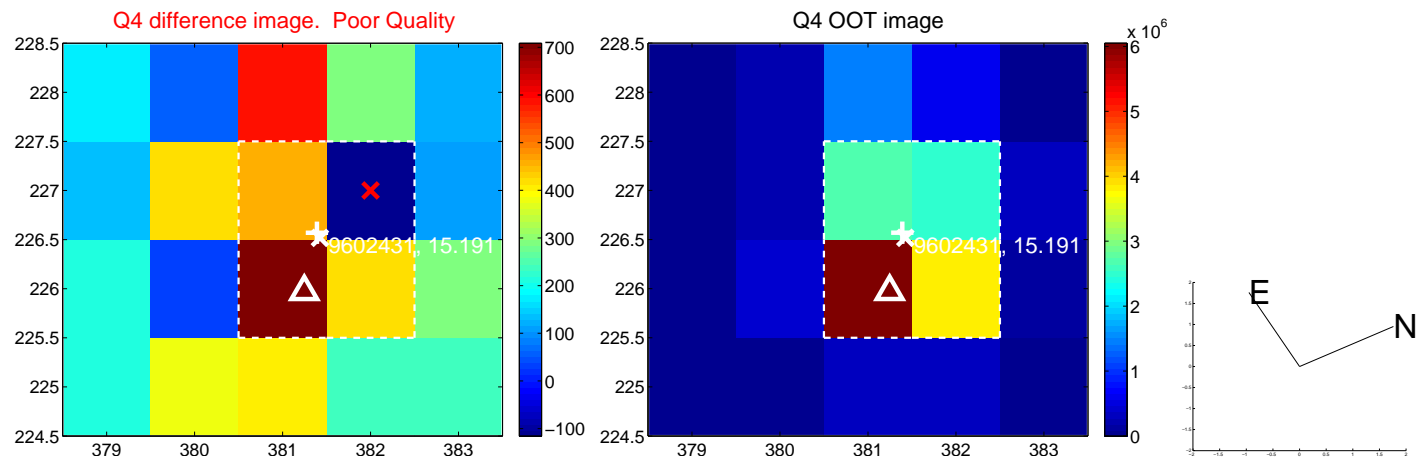
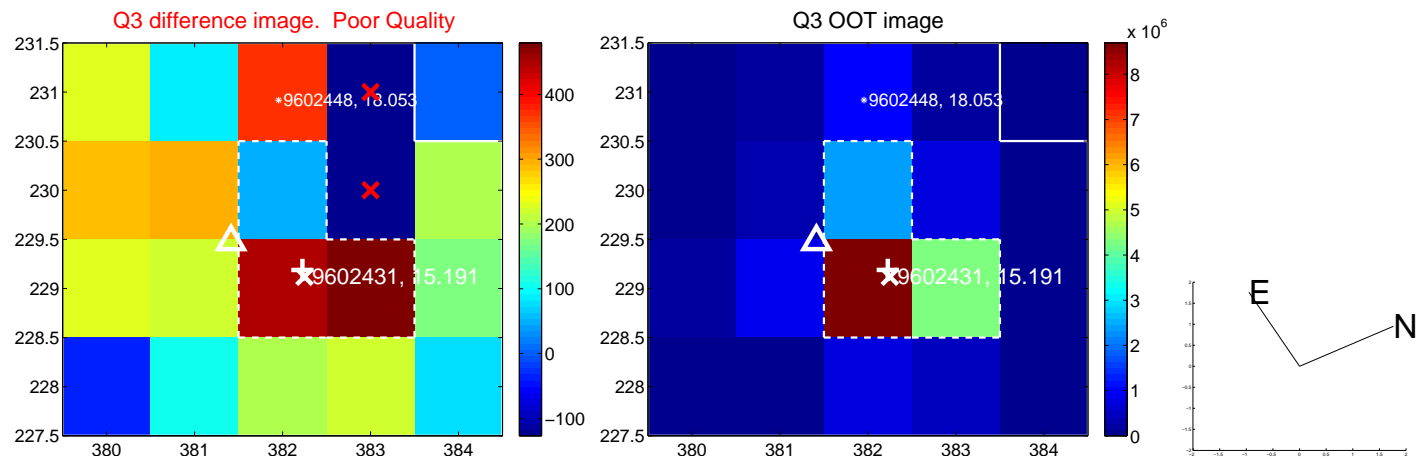
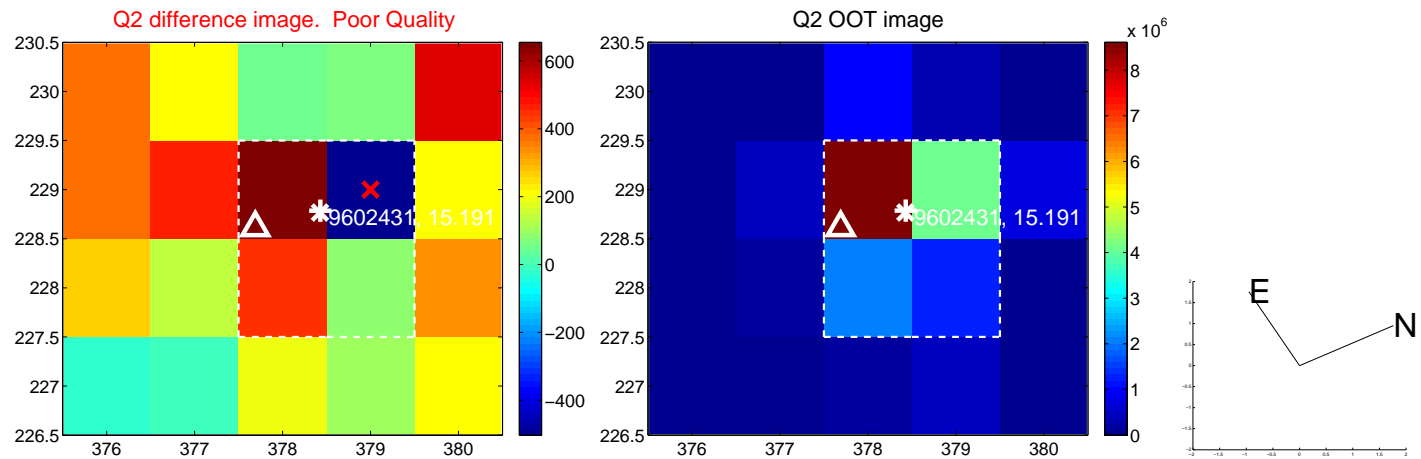
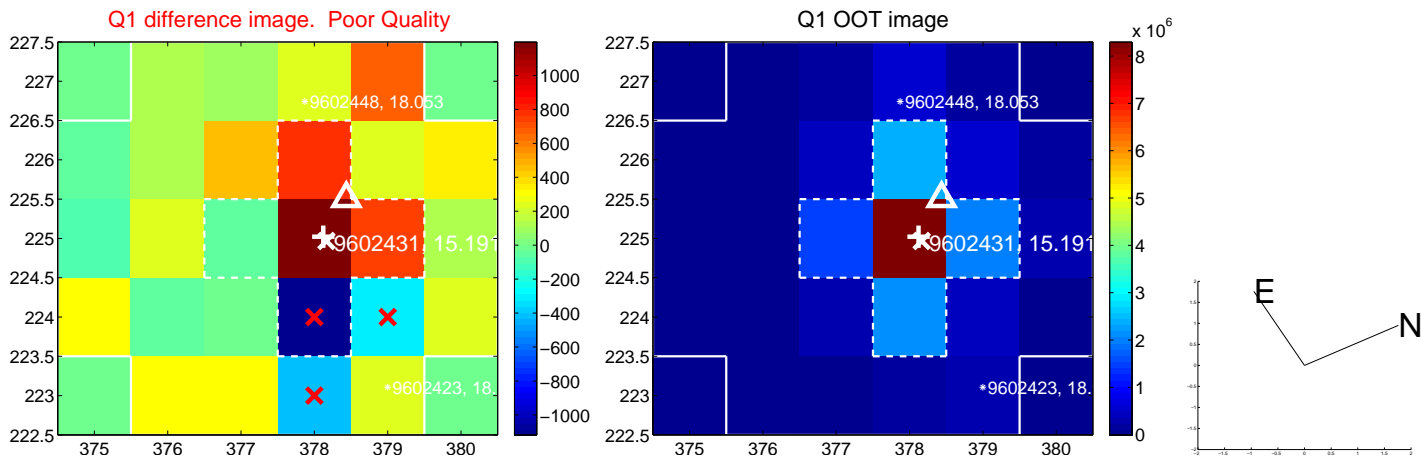


offset from photometric centroids

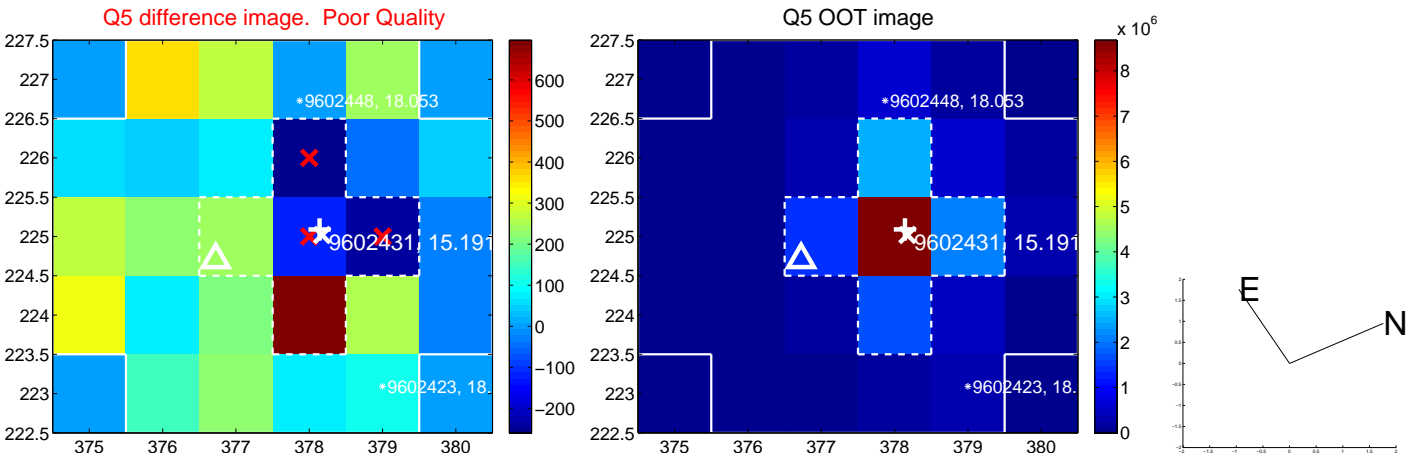


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

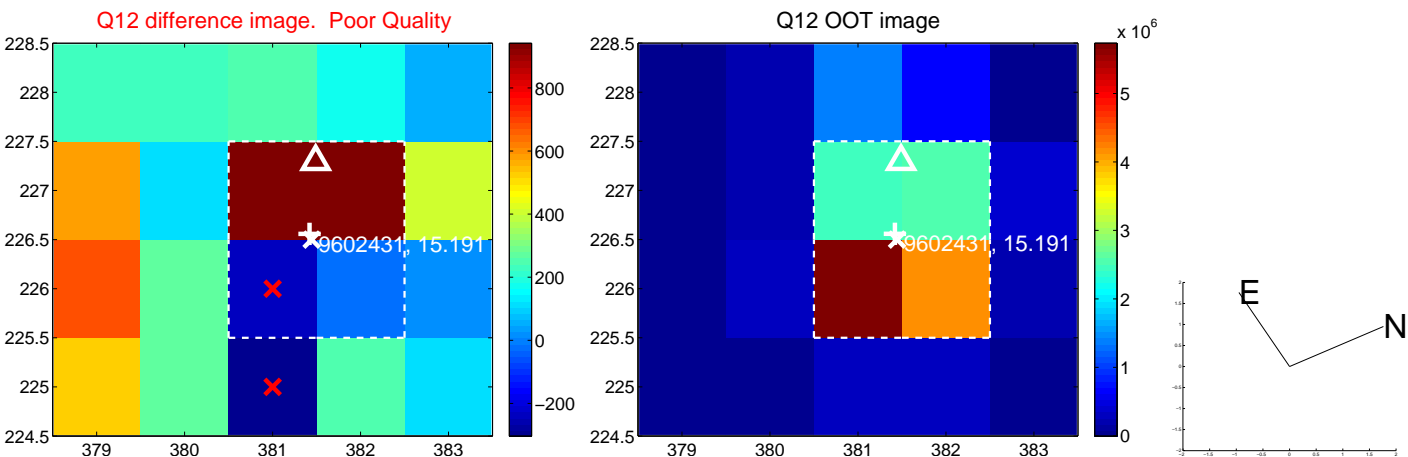
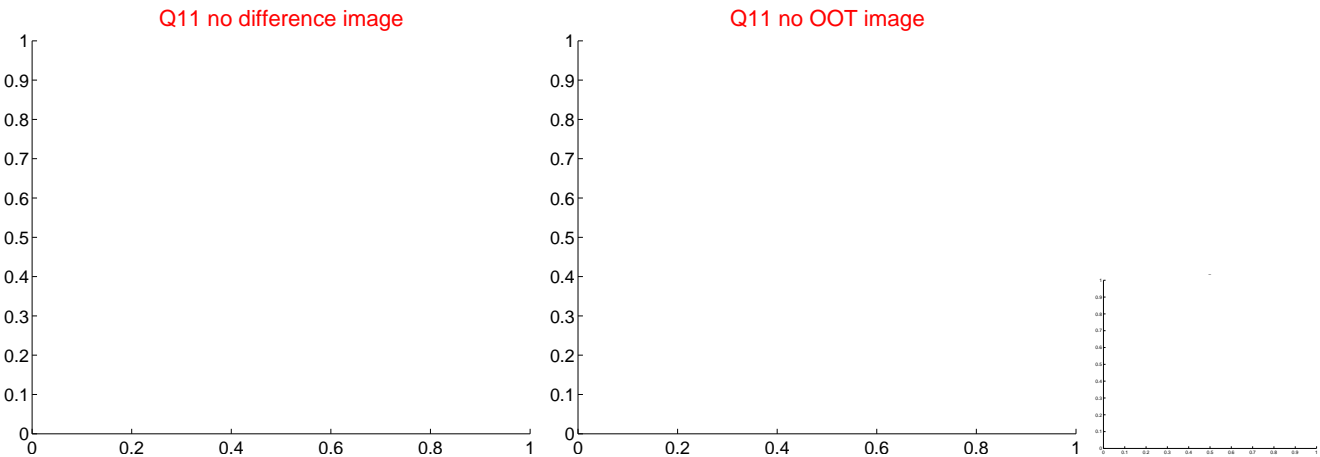
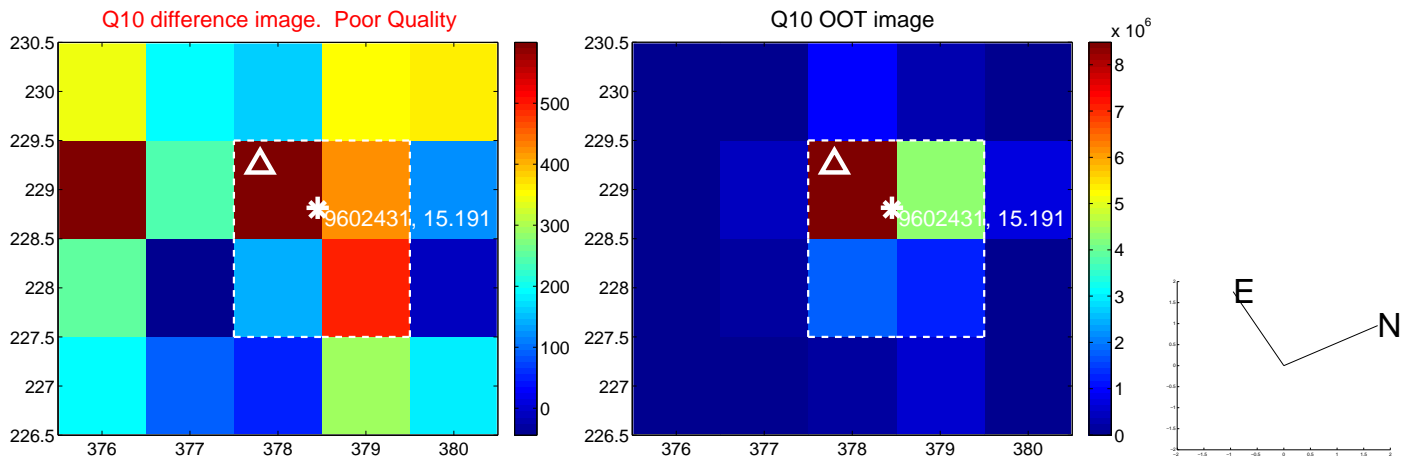
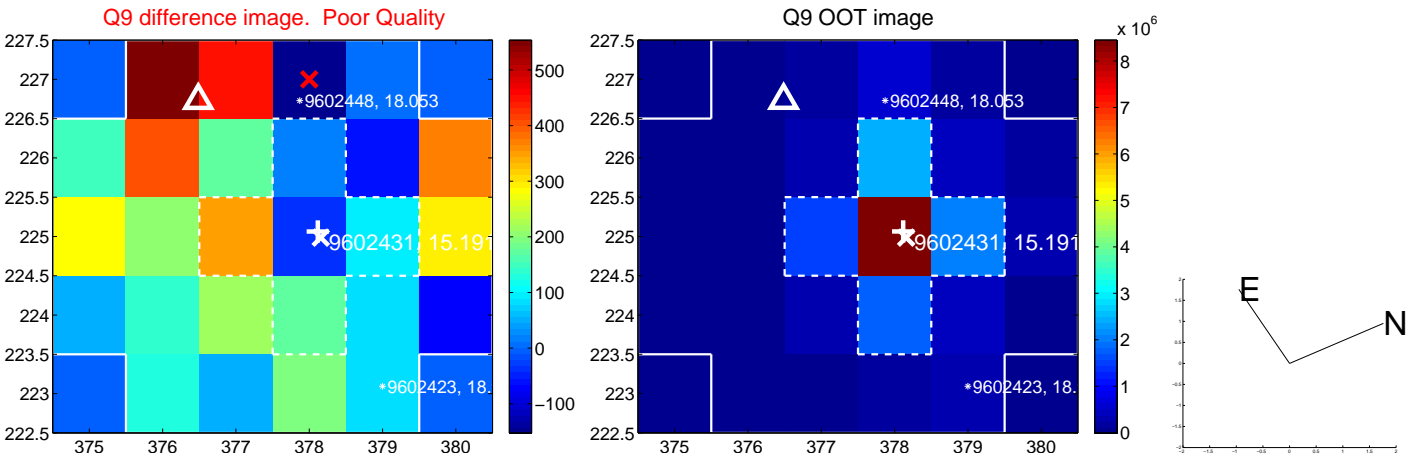


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

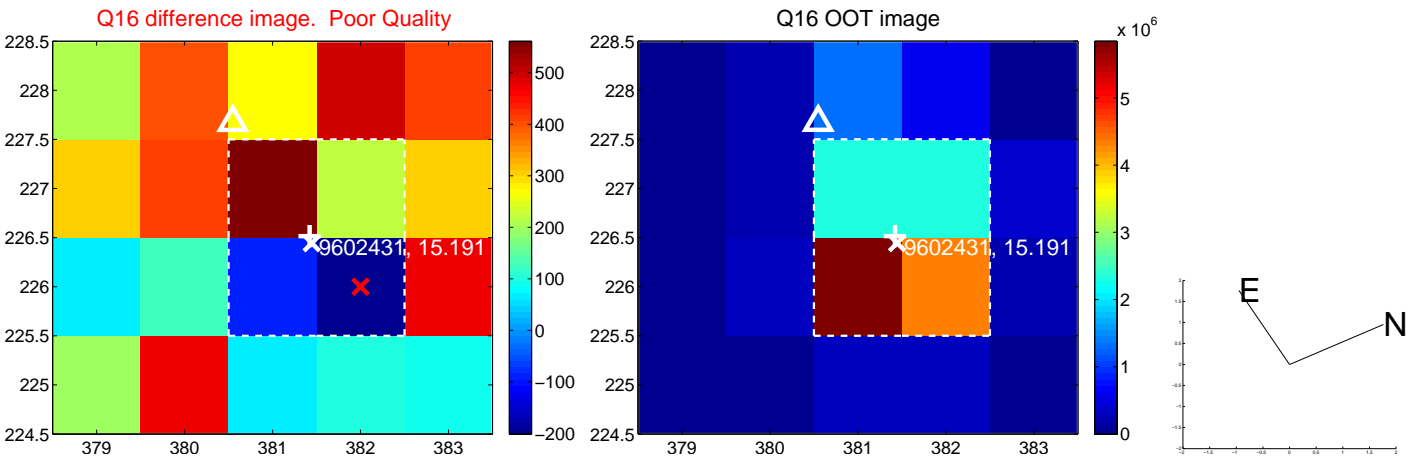
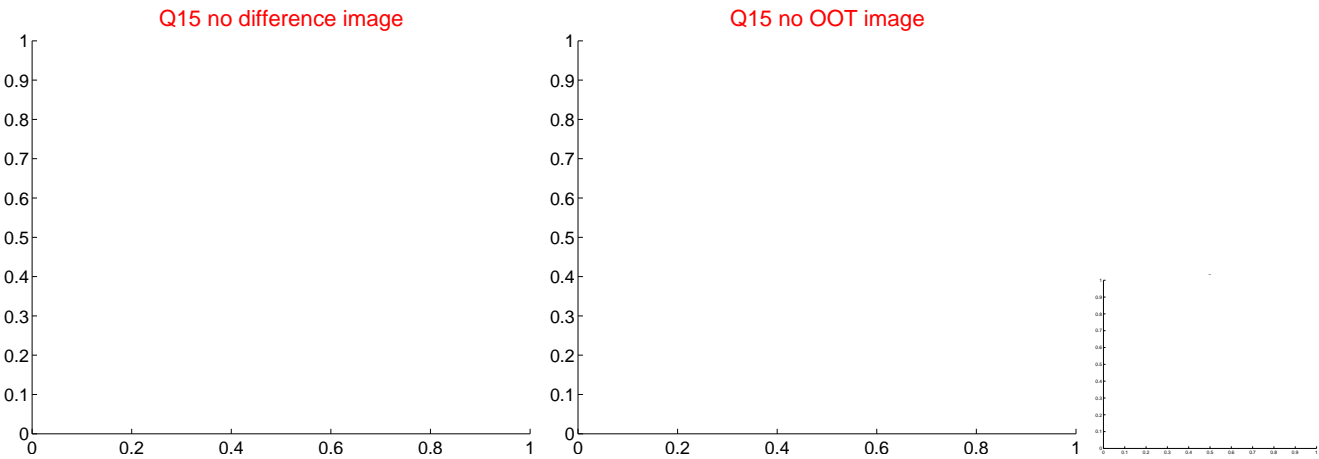
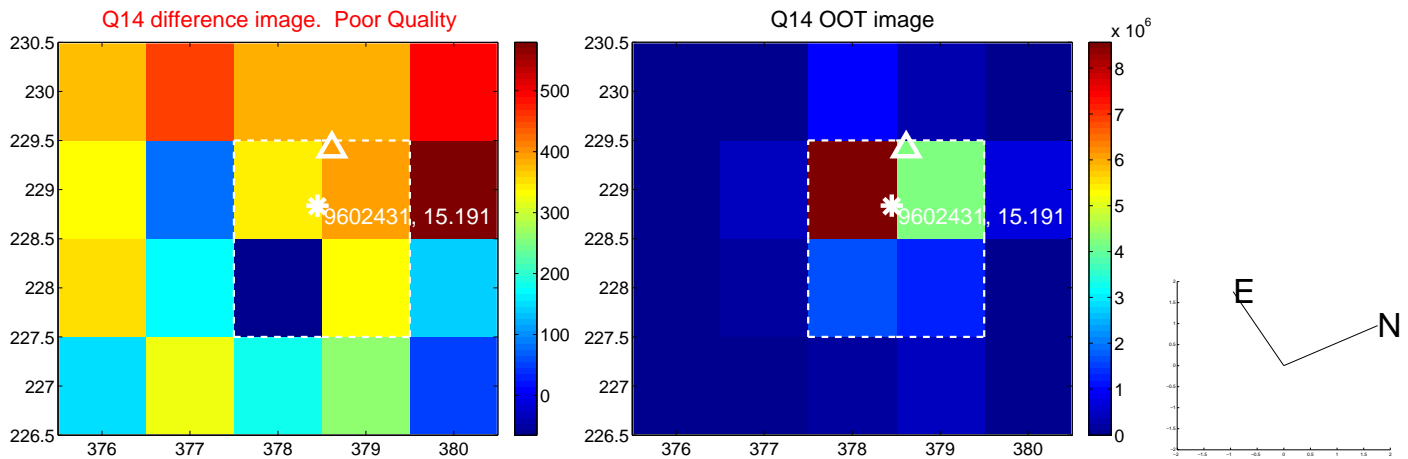
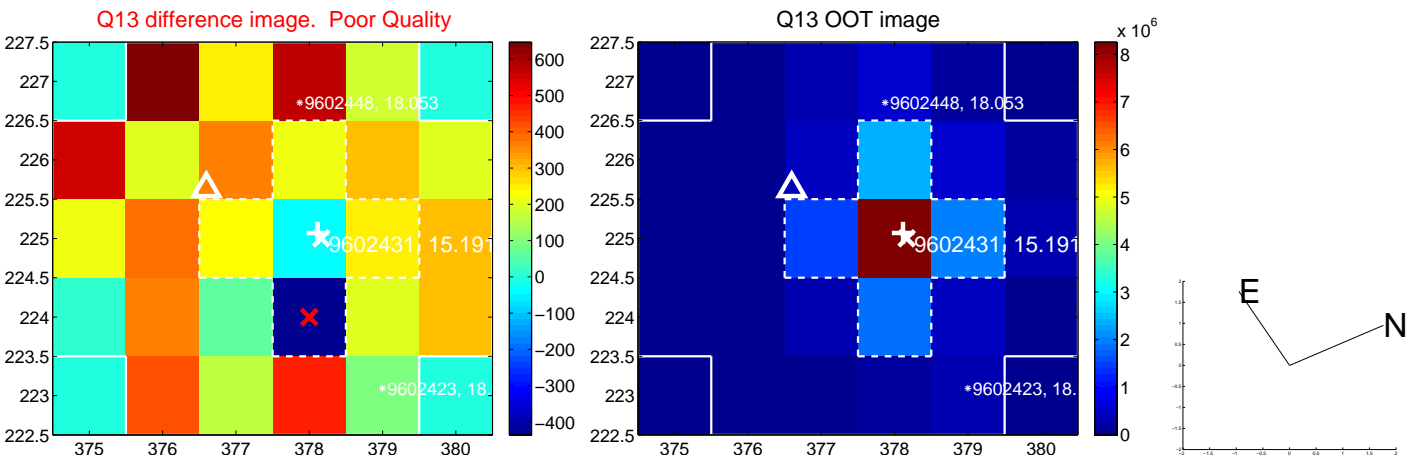




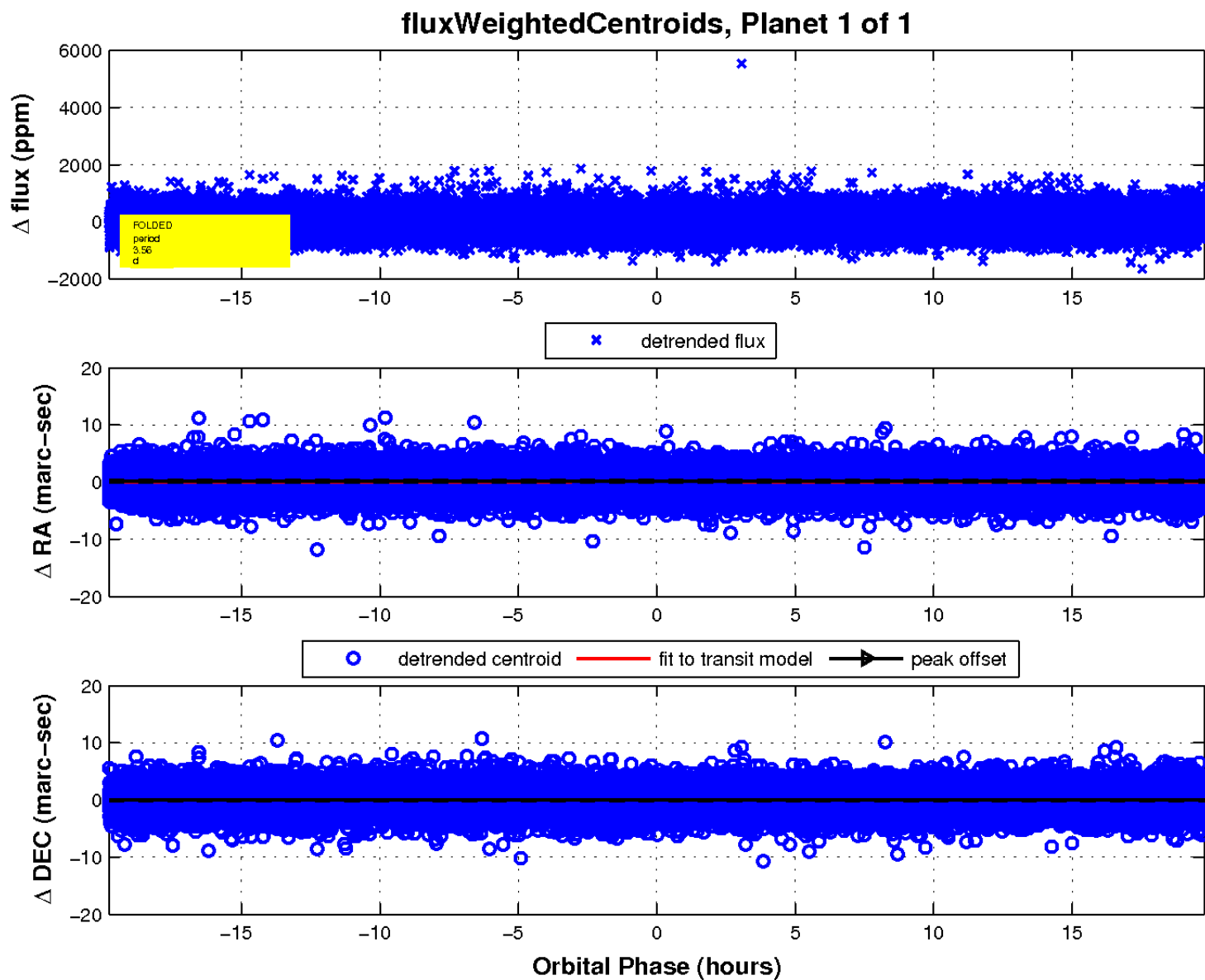
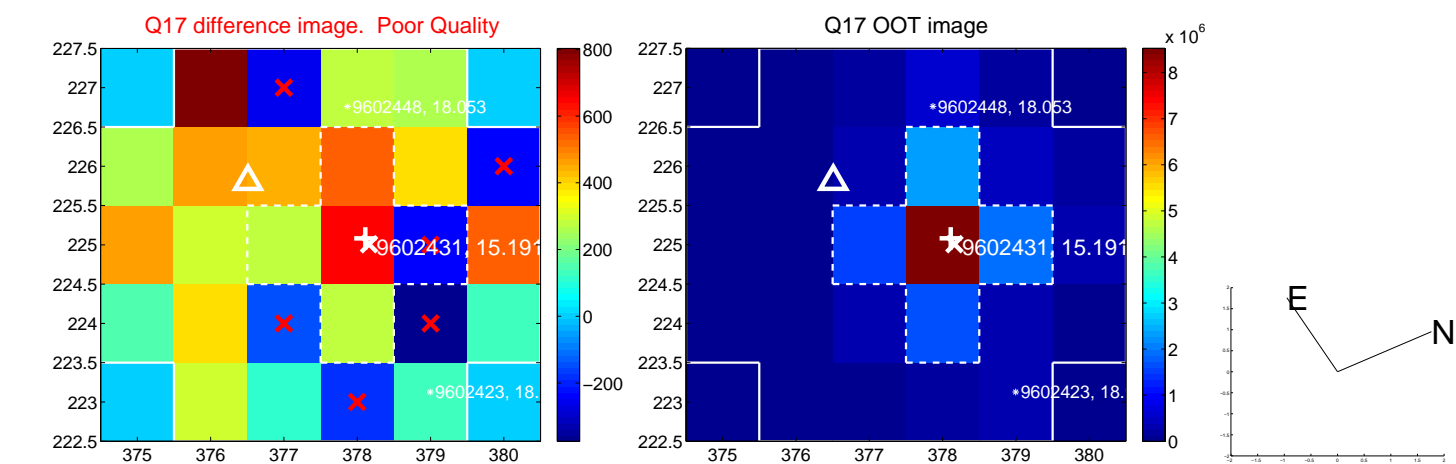
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



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



UKIRT Image

Declination

