

# KIC 008320630

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008320630-01	OBS	4846.02	32.526643	137.304631	176.7	6.964	7.5	7.8	0.87	5668	1.24	17.95
008320630-02	OBS	4846.01	19.254467	148.019716	155.9	4.820	7.3	7.3	0.87	5668	1.25	36.11

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008320630-01	OBS	PC	0.86	0	0	0	0	NO_COMMENT
008320630-02	OBS	FP	0.00	0	0	1	0	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 008320630-01

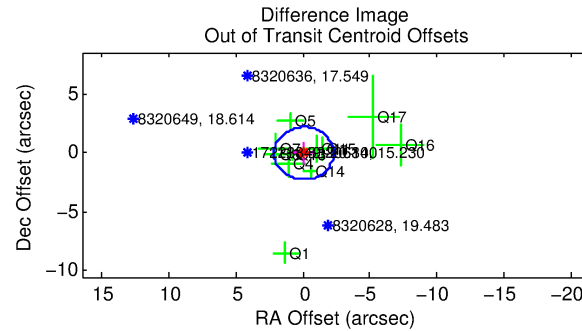
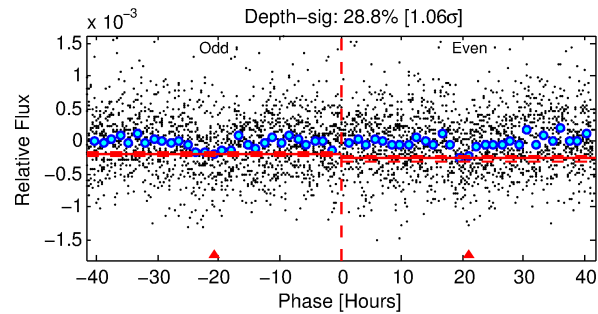
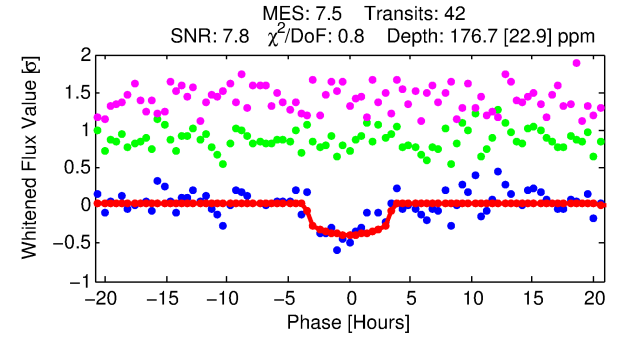
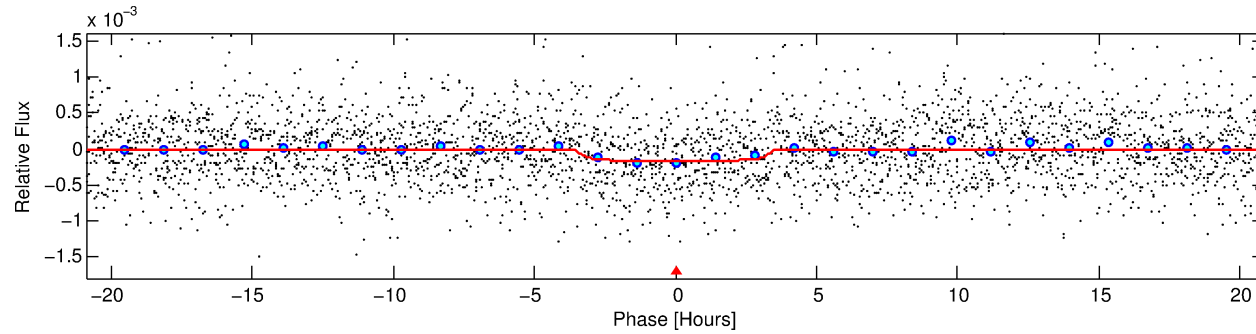
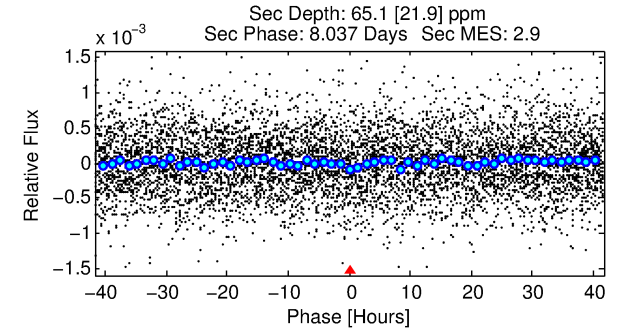
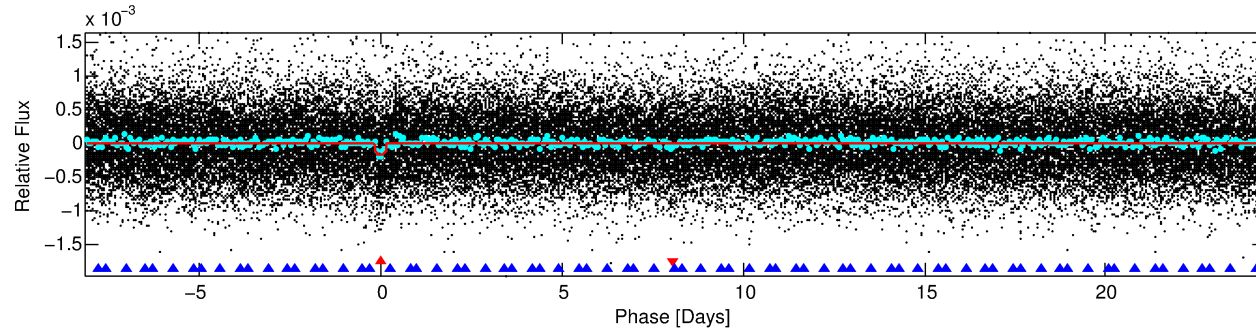
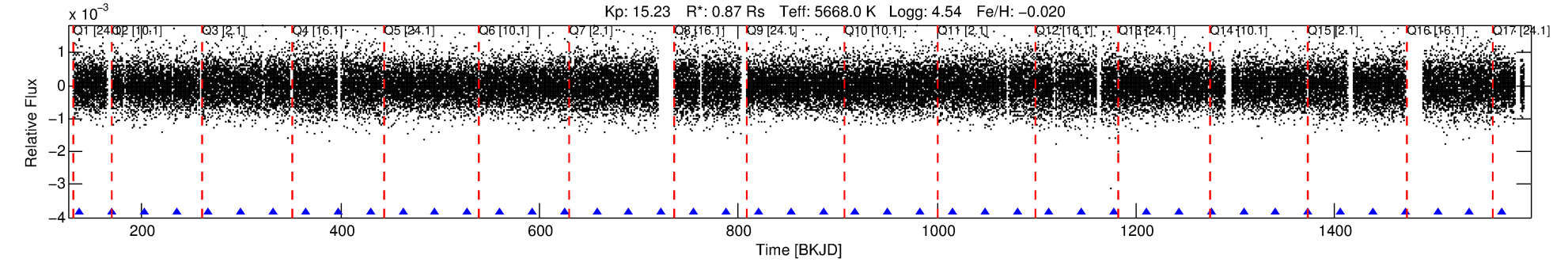
No Significant Match Found

# DV One-Page Summary

KIC: 8320630 Candidate: 1 of 2 Period: 32.527 d

KOI: K04846 Corr: No Ephemeris Match

Kp: 15.23 R\*: 0.87 Rs Teff: 5668.0 K Logg: 4.54 Fe/H: -0.020



## DV Fit Results:

Period = 32.52664 [0.00062] d  
Epoch = 137.3046 [0.0163] BKJD  
Rp/R\* = 0.0131 [0.0139]  
a/R\* = 25.06 [114.19]  
b = 0.73 [2.95]  
Seff = 17.95 [6.51]  
Teff = 525 [48] K  
Rp = 1.24 [1.36] Re  
a = 0.1970 [0.0452] AU  
Ag = 898.20 [1947.10] [0.46σ]  
Teffp = 4442 [2382] K [1.64σ]

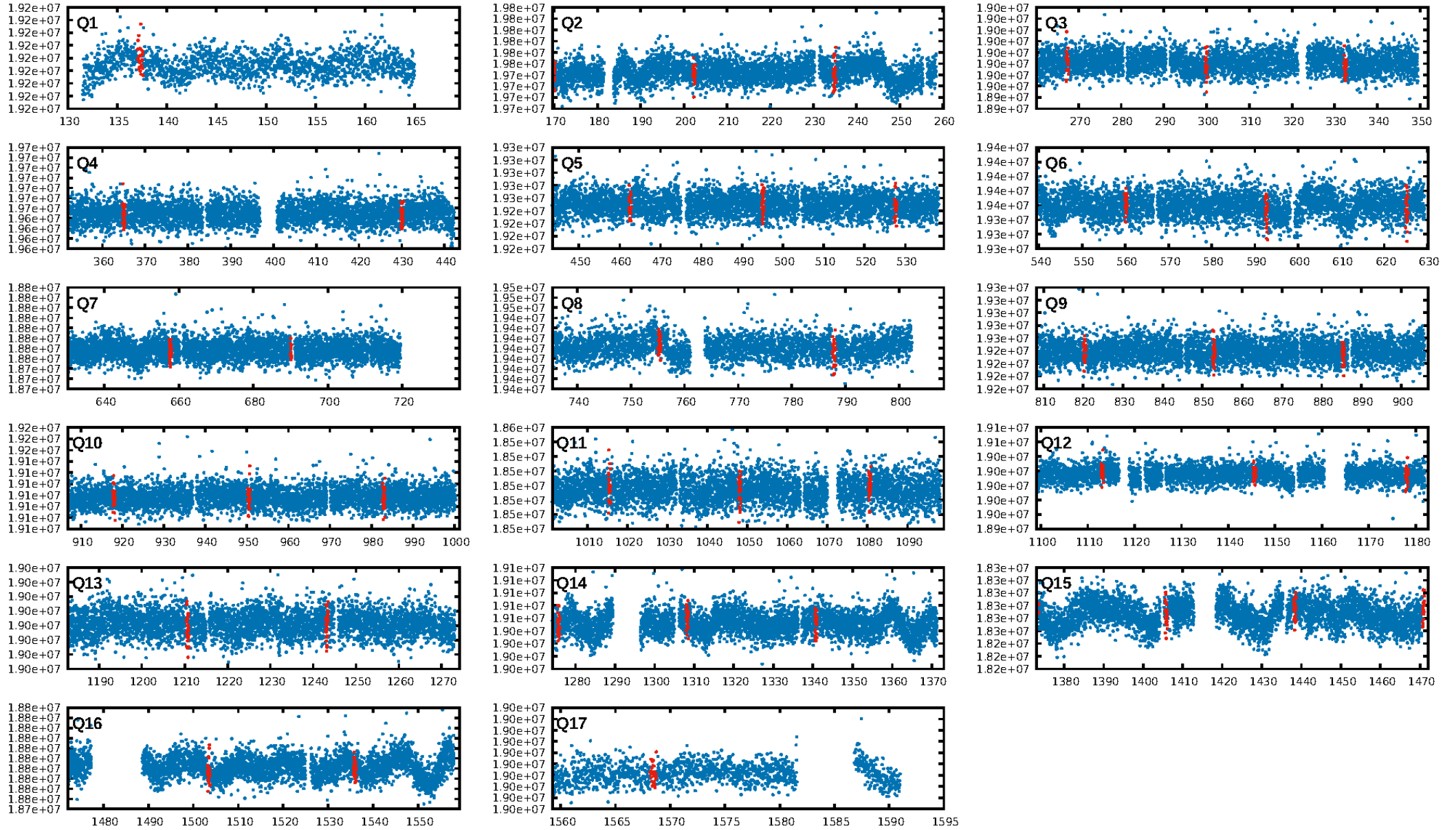
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [37.61σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 96.1%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 3.60e-14  
RollingBand-fgt: 1.00 [40/40]  
GhostDiagnostic-chr: 3.344  
Centroid-sig: 29.2%  
Centroid-so: 1.684 arcsec [0.87σ]  
OotOffset-rm: 0.070 arcsec [0.09σ]  
KicOffset-rm: 0.222 arcsec [0.30σ]  
OotOffset-st: 2/3/2/4 [11]  
KicOffset-st: 2/3/2/4 [11]  
DiffImageQuality-fgm: 0.18 [2/11]  
DiffImageOverlap-fno: 0.94 [16/17]

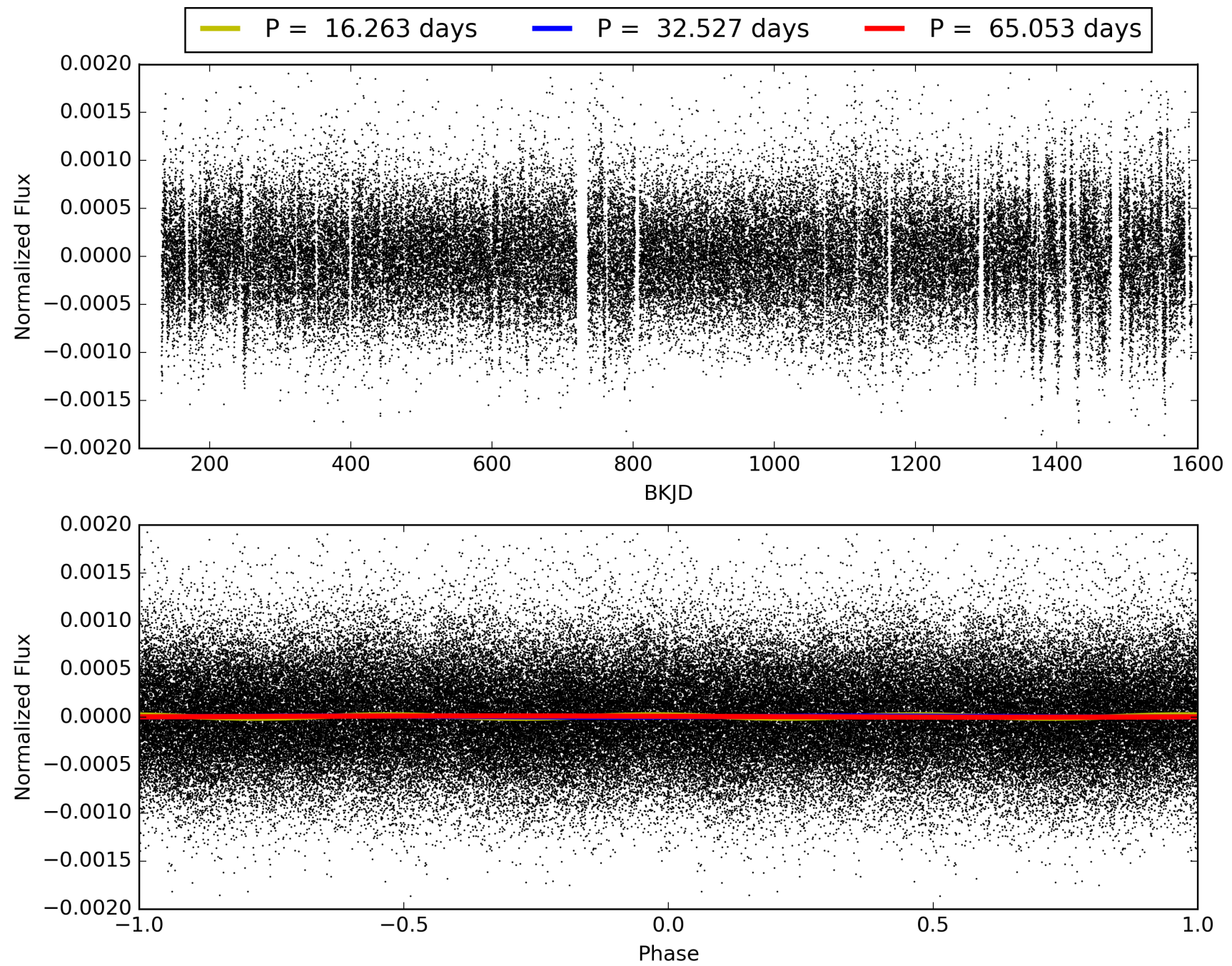
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 16:49:11 Z

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

# TCE 008320630-01, PDC Light Curves



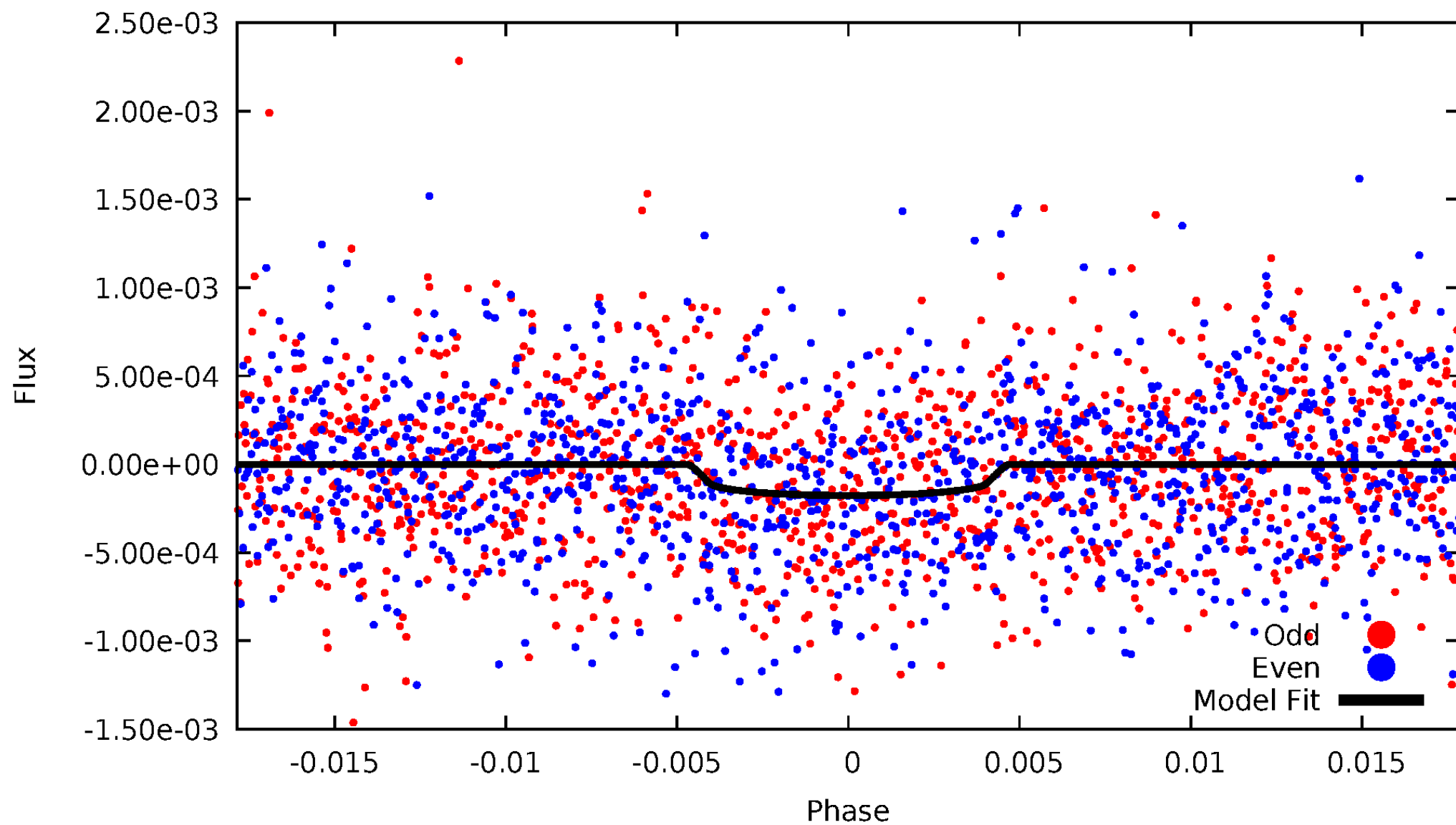
TCE 008320630-01





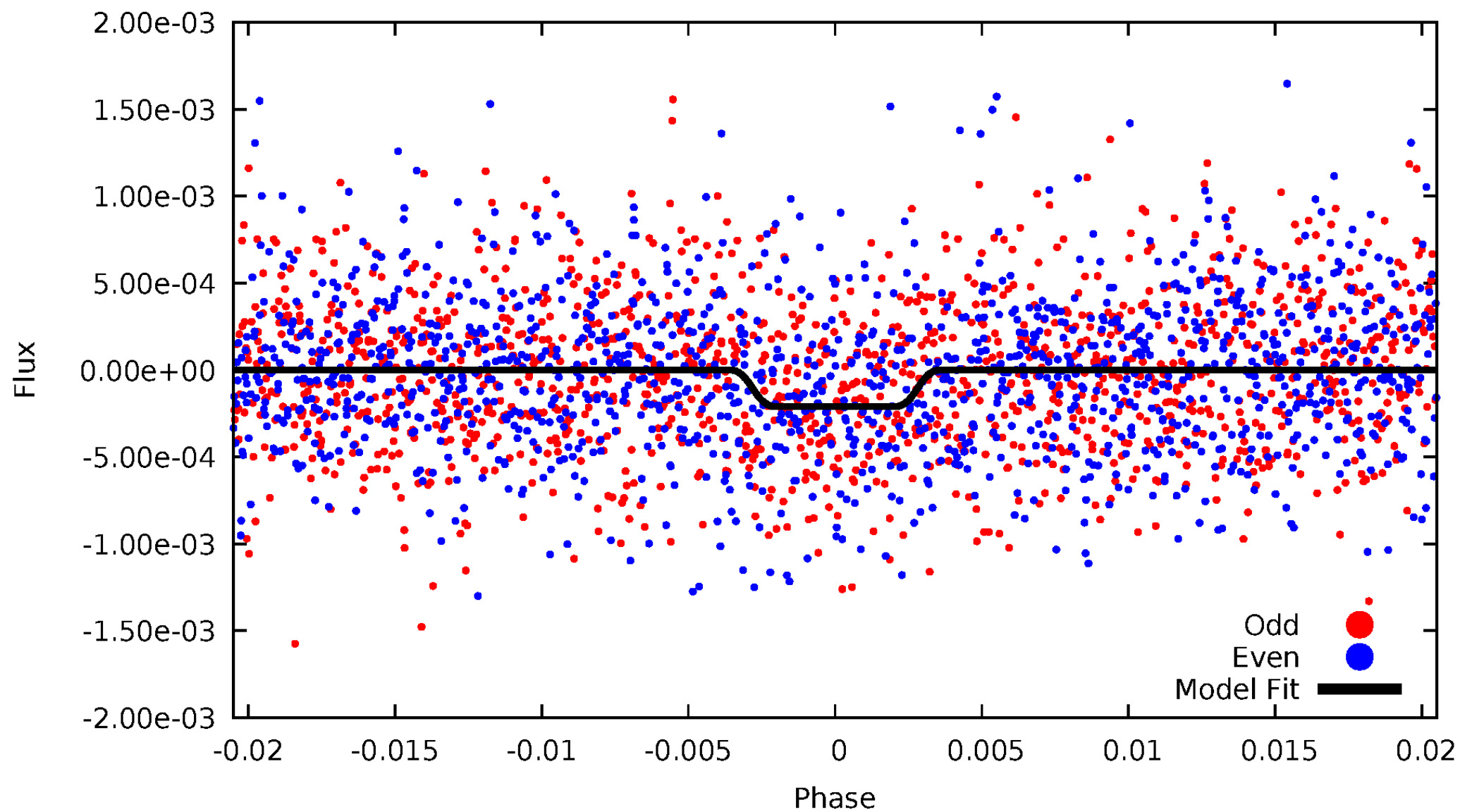
# DV Odd/Even

TCE 008320630-01



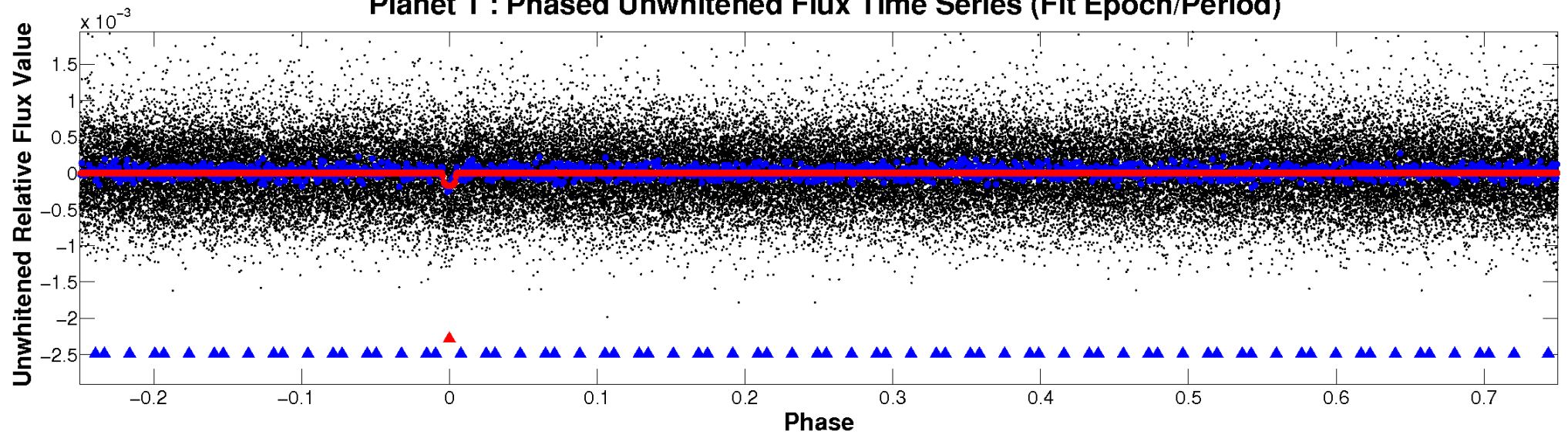
# ALT Odd/Even

TCE 008320630-01

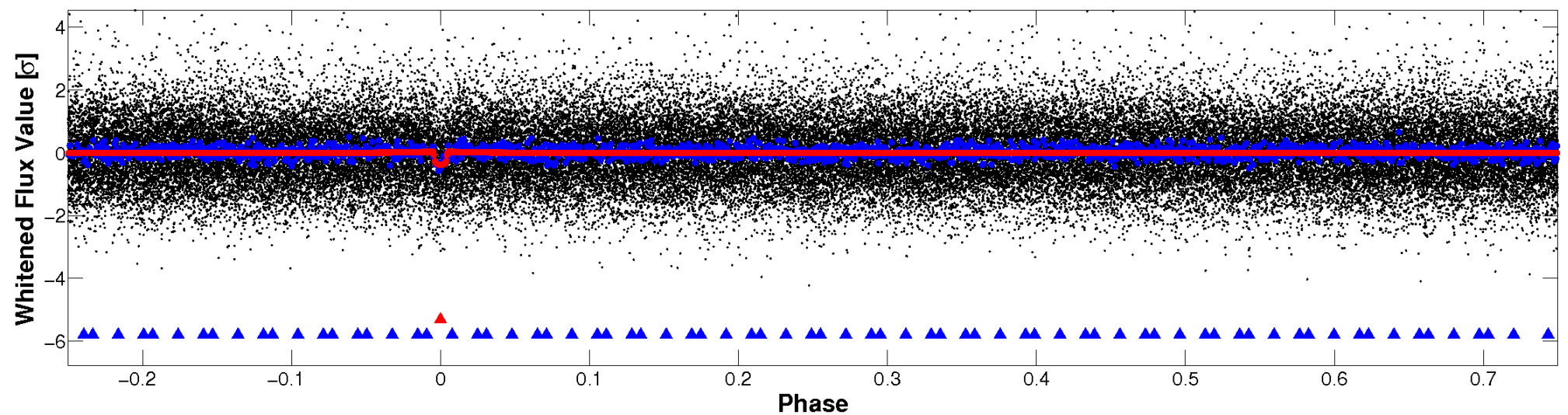


# Non-Whitened Vs. Whitened Light Curve

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

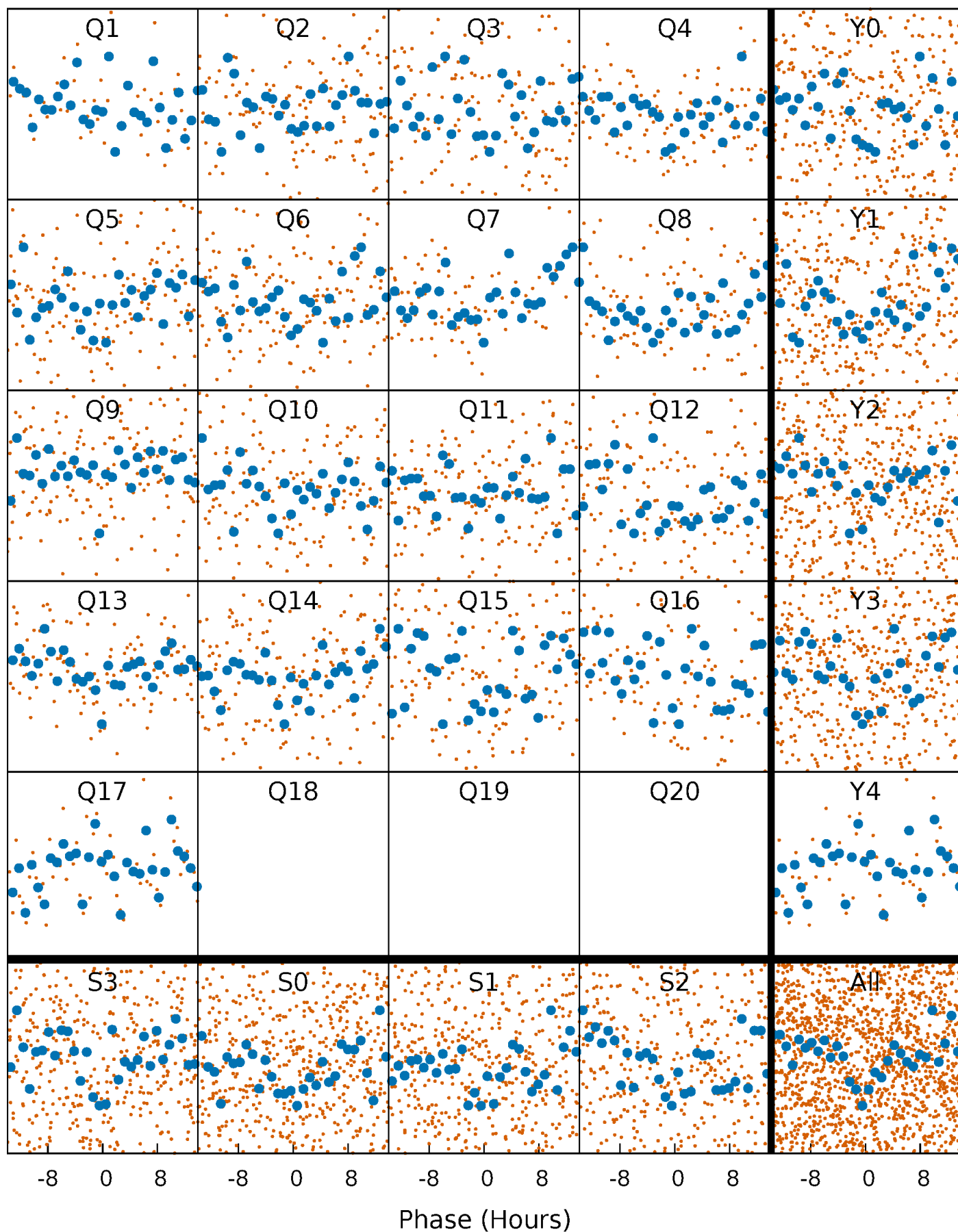


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

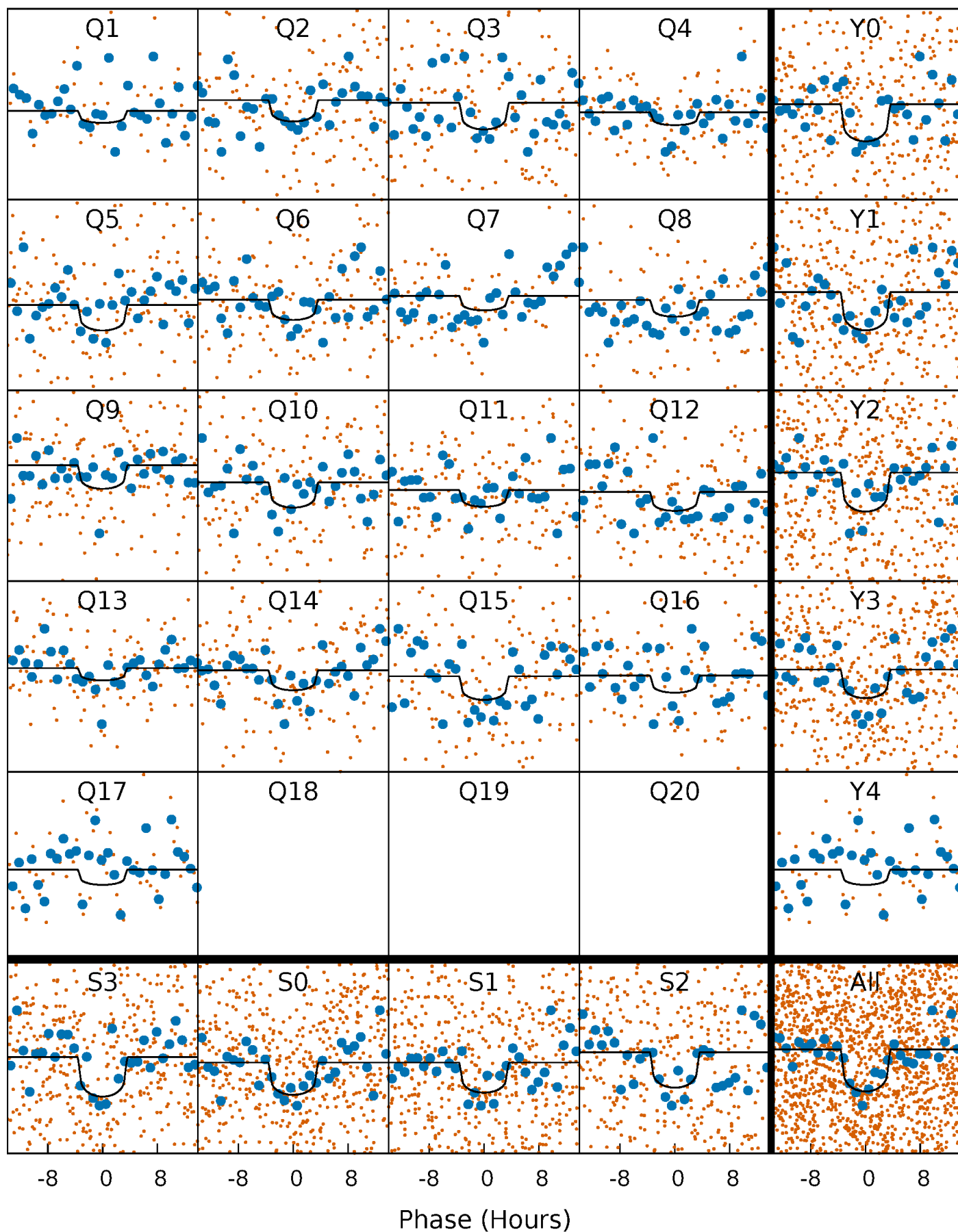
TCE 008320630-01 P= 32.526643 Days  $T_0=137.304631$  (BKJD)





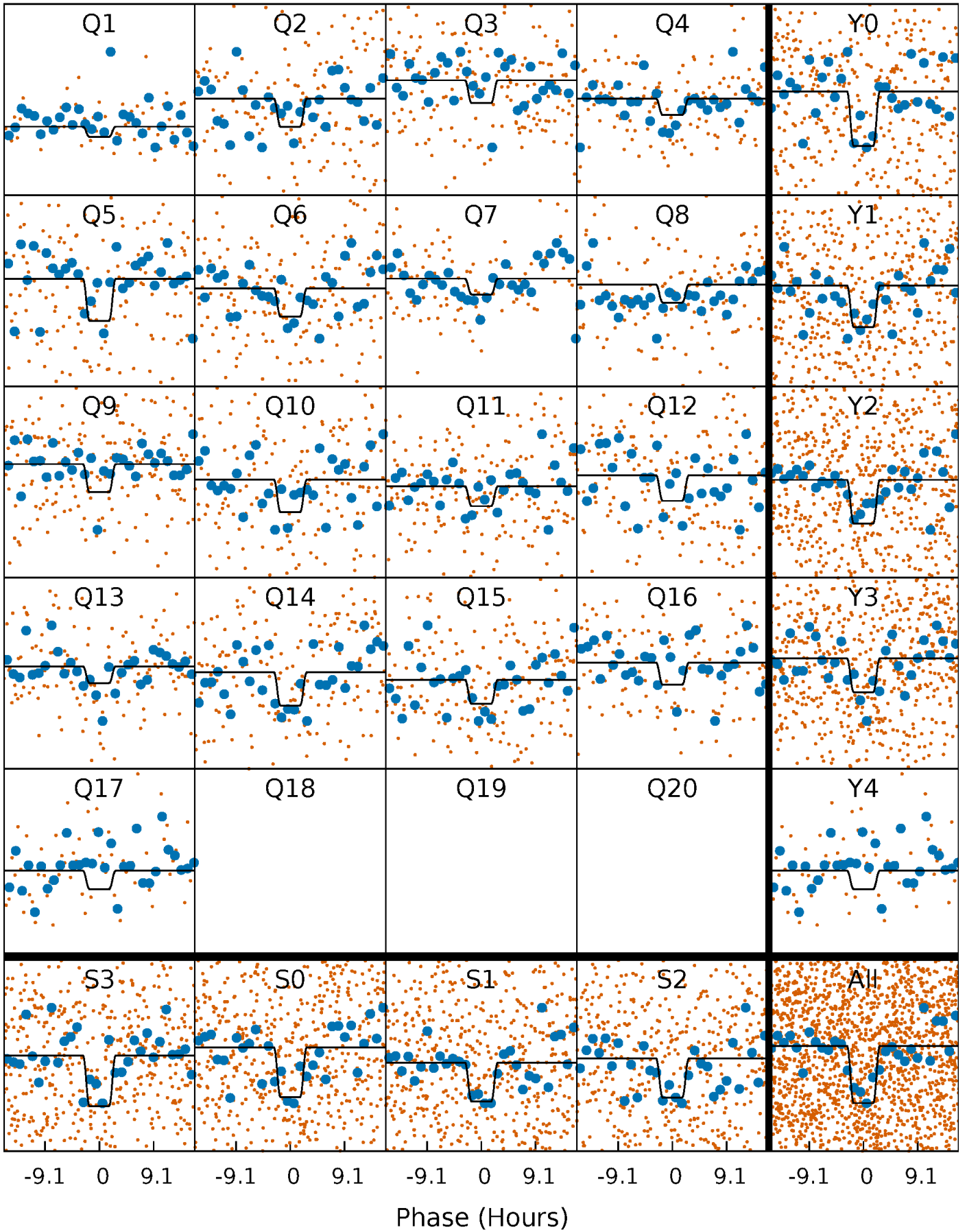
# DV Quarter-Phased Transit Curves

TCE 008320630-01 P= 32.526643 Days  $T_0=137.304631$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

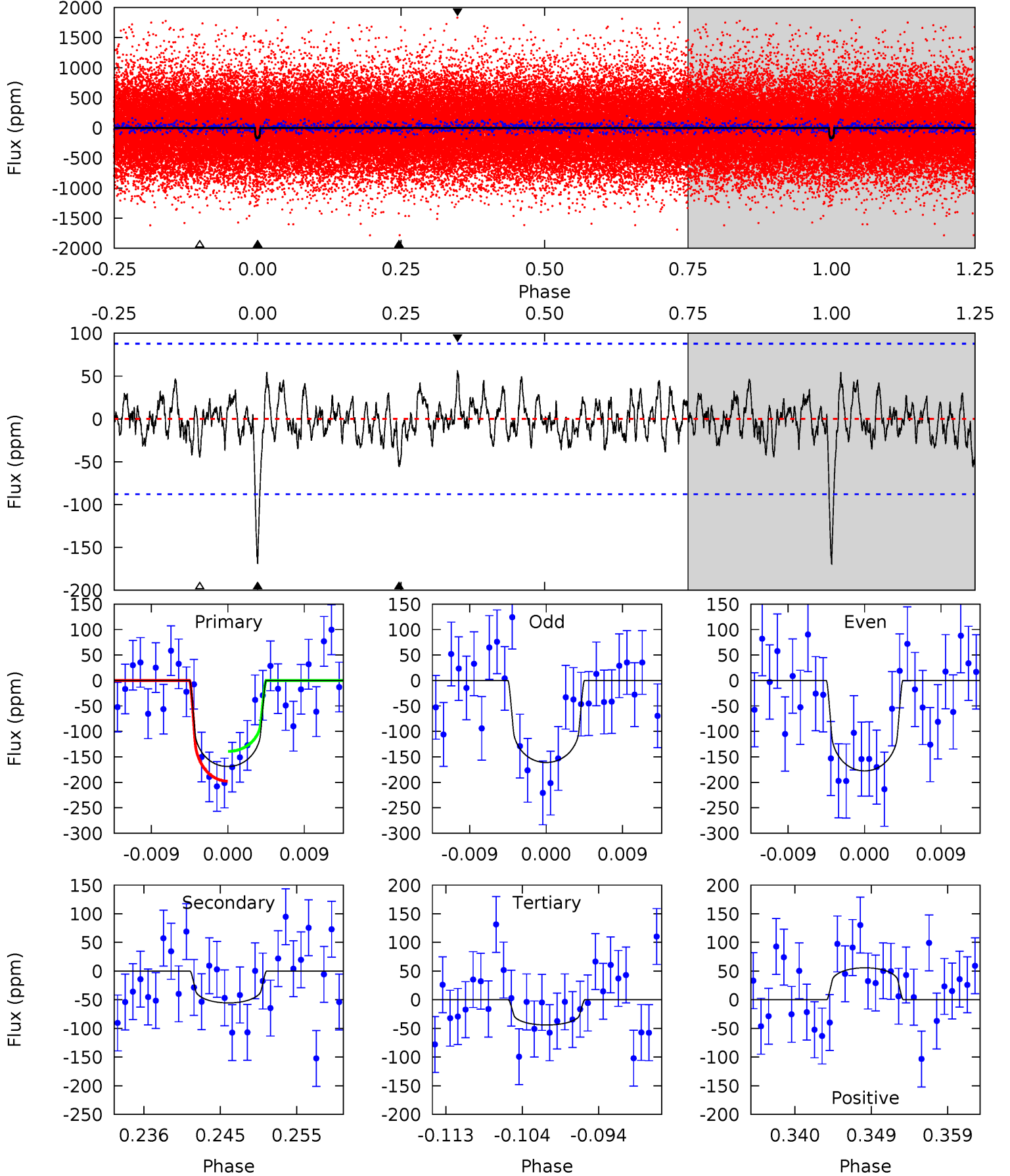
TCE 008320630-01 P= 32.526439 Days  $T_0=137.294816$  (BKJD)



# DV Model-Shift Uniqueness Test

008320630-01, P = 32.526643 Days, E = 104.777988 Days

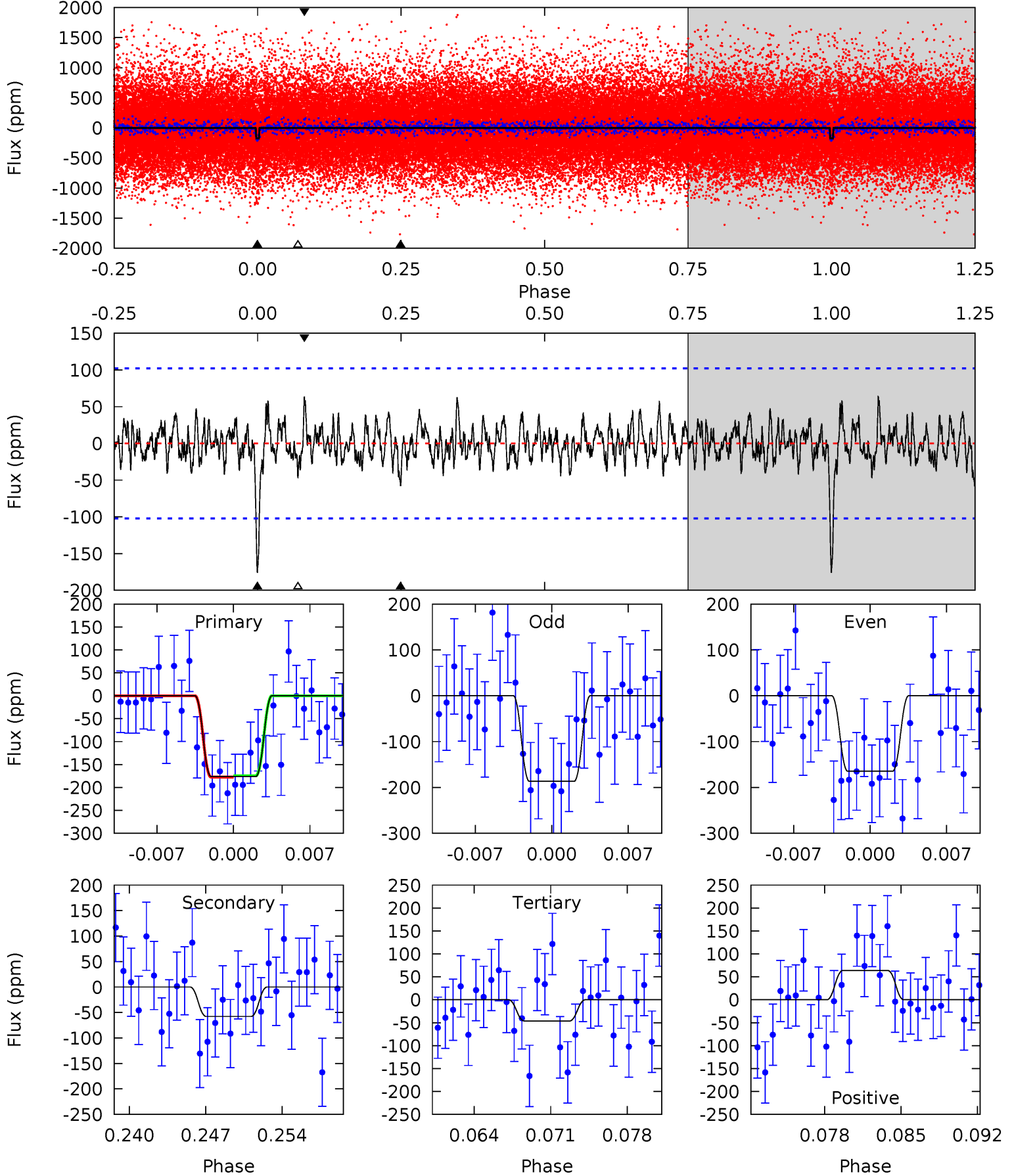
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.69	3.18	2.52	3.20	5.04	2.60	1.03	7.17	6.49	0.66	-0.01	0.48	1.03	0.25	1.68



# Alt Model-Shift Uniqueness Test

008320630-01,  $P = 32.526439$  Days,  $E = 104.768377$  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
8.78	2.88	2.32	3.18	5.09	2.69	0.97	6.47	5.61	0.57	-0.29	0.55	0.92	0.27	0.07



### Stellar Parameters For KIC 008320630

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5668^{+169}_{-186}$	$4.545^{+0.033}_{-0.187}$	$-0.020^{+0.300}_{-0.300}$	$0.868^{+0.233}_{-0.078}$	$0.963^{+0.094}_{-0.115}$	$2.073^{+0.368}_{-0.991}$
	+3%/-3%	+1%/-4%	+1500%/-1500%	+27%/-9%	+10%/-12%	+18%/-48%
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 008320630-01 / KOI 4846.02

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-56 \pm 17$	$1.60^{+1.39}_{-0.96}$	$755^{+48}_{-36}$	$4114^{+2128}_{-799}$	$448^{+2506}_{-332}$
Alt.	$-58 \pm 20$	$1.73^{+1.30}_{-1.07}$	$752^{+45}_{-34}$	$4018^{+1901}_{-654}$	$392^{+2088}_{-262}$

$T_{\text{max}}$  = 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

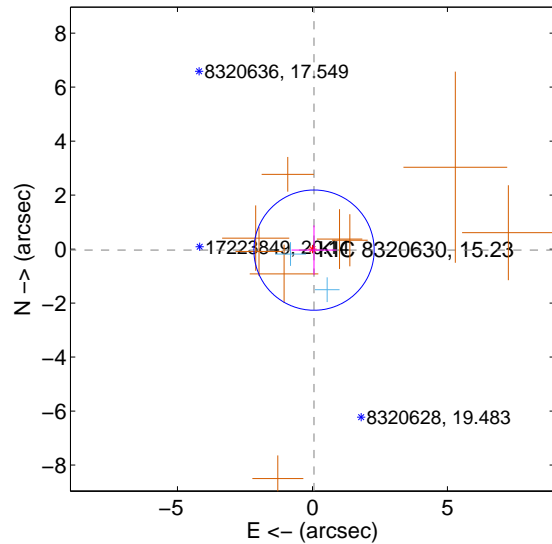
Supplemental centroid analysis for 008320630-01. Kepler magnitude: 15.23. Transit SNR 7.80

There are 2 quarters with good PRF difference image offsets

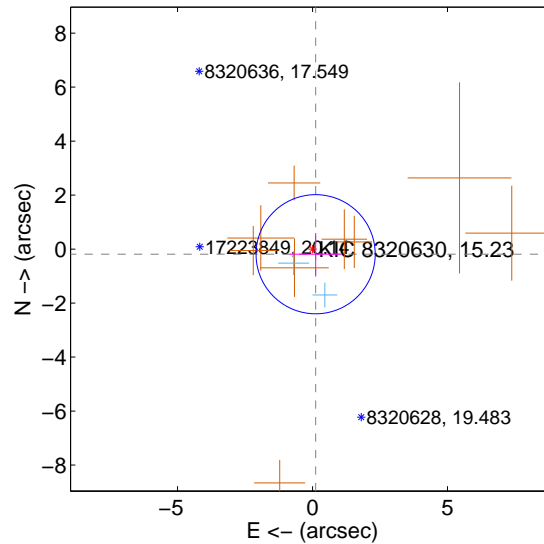
The direct PRF centroid is offset from the target star catalog position by about 0.42 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.070 \pm 0.742$	0.09	$-0.059 \pm 0.832$	$-0.038 \pm 0.913$
PRF-fit source offset from KIC position	$0.222 \pm 0.735$	0.30	$-0.115 \pm 0.960$	$-0.190 \pm 0.788$
photometric centroid source offset	$1.68 \pm 1.93$	0.87	$-0.56 \pm 1.91$	$1.59 \pm 1.93$

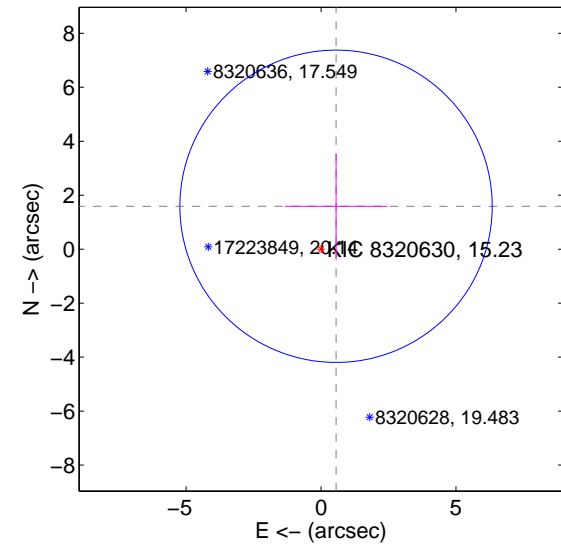
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

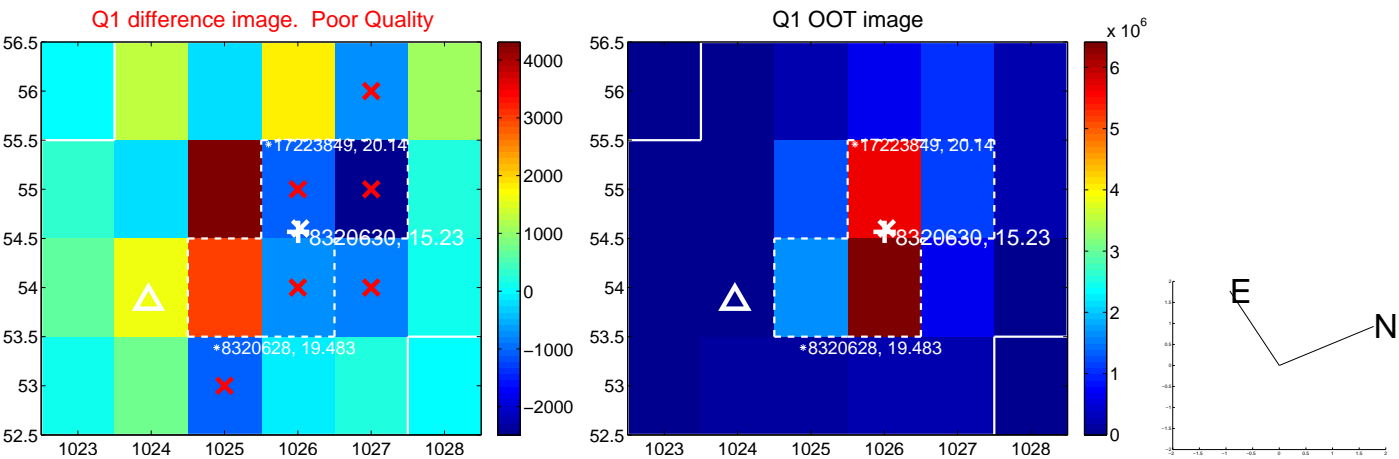


offset from photometric centroids



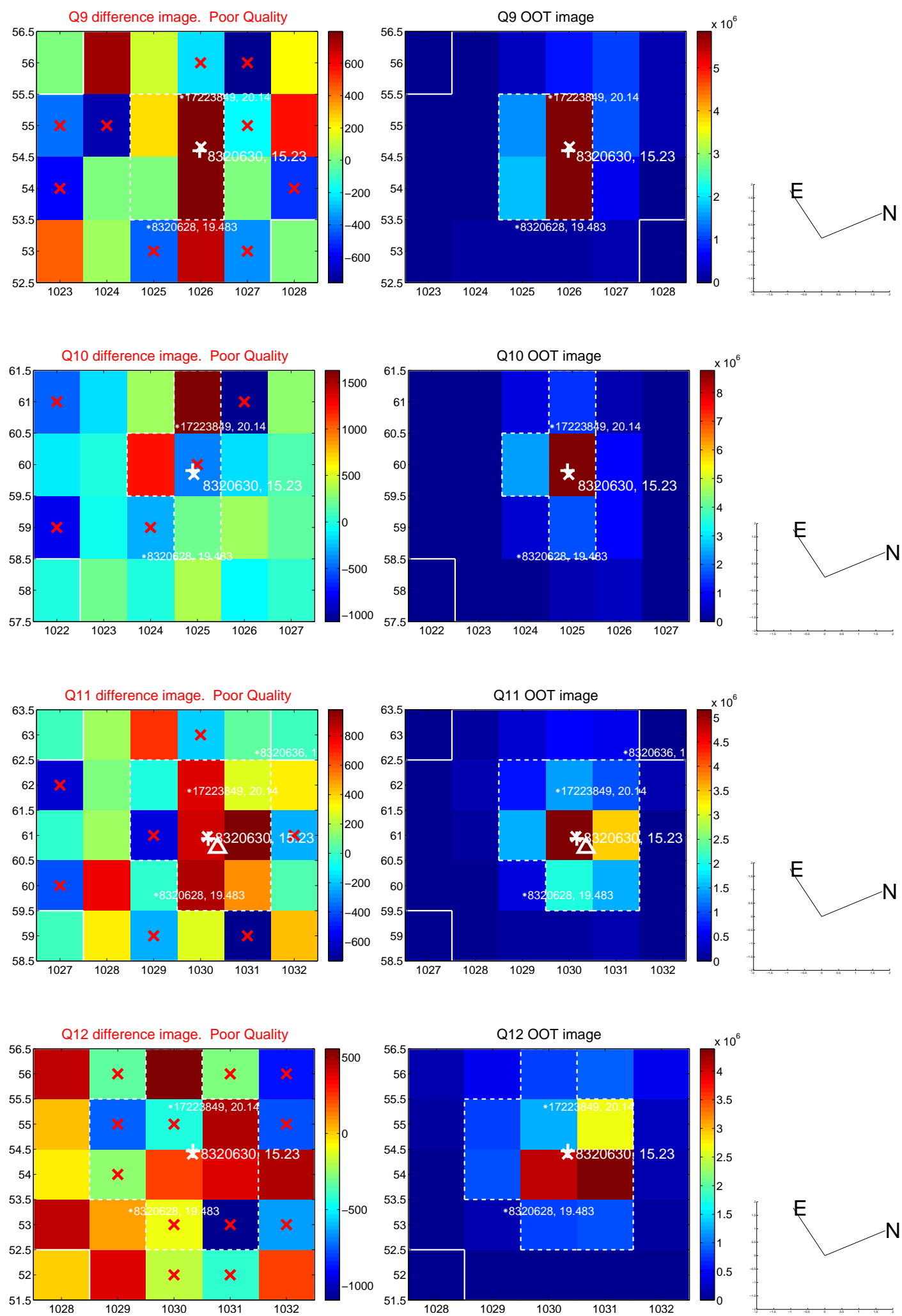
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

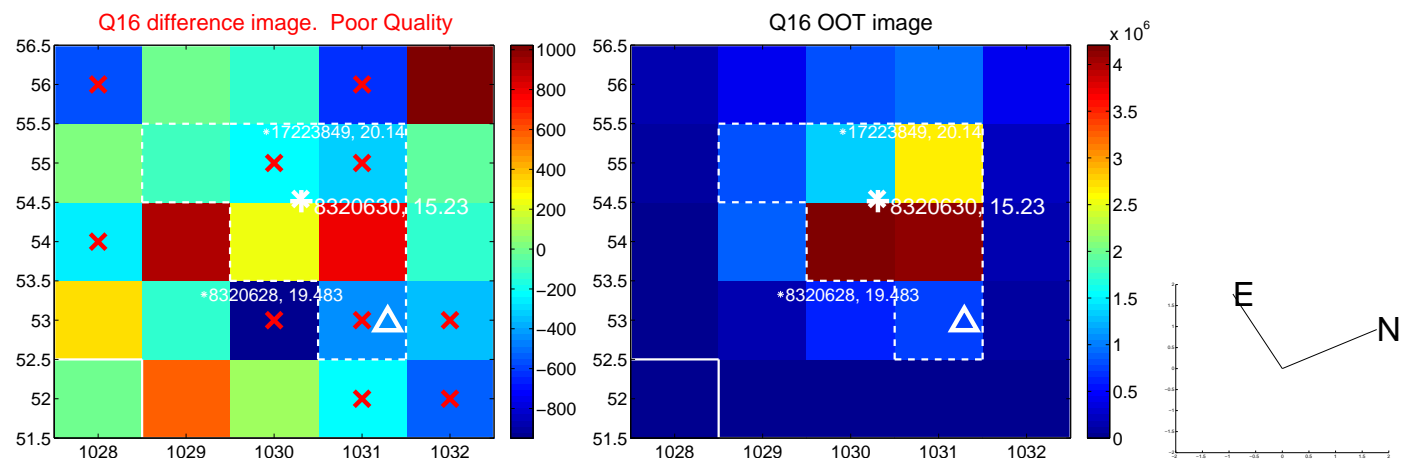
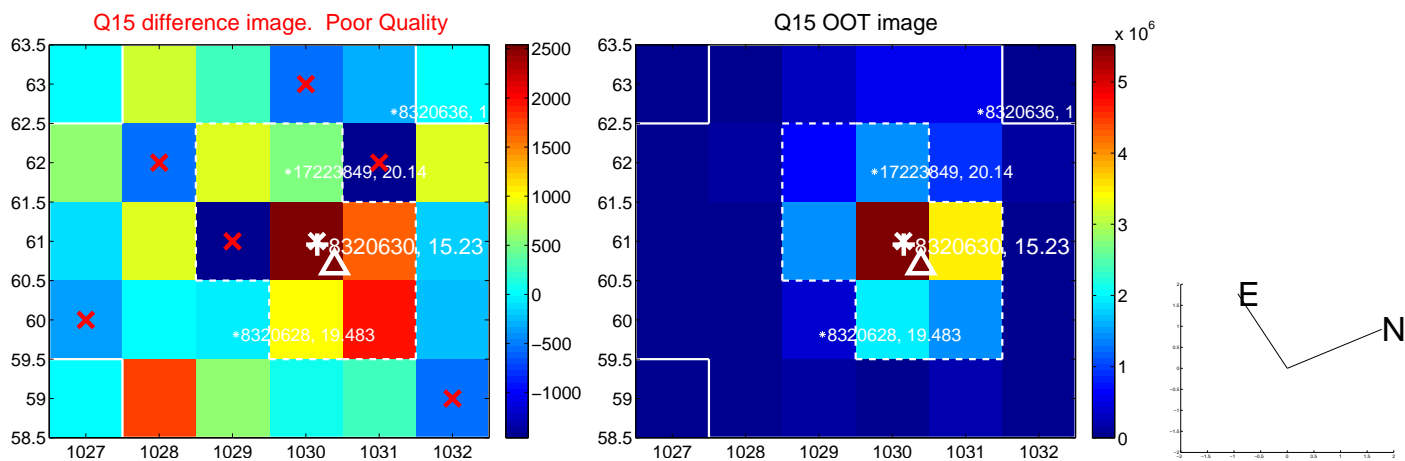
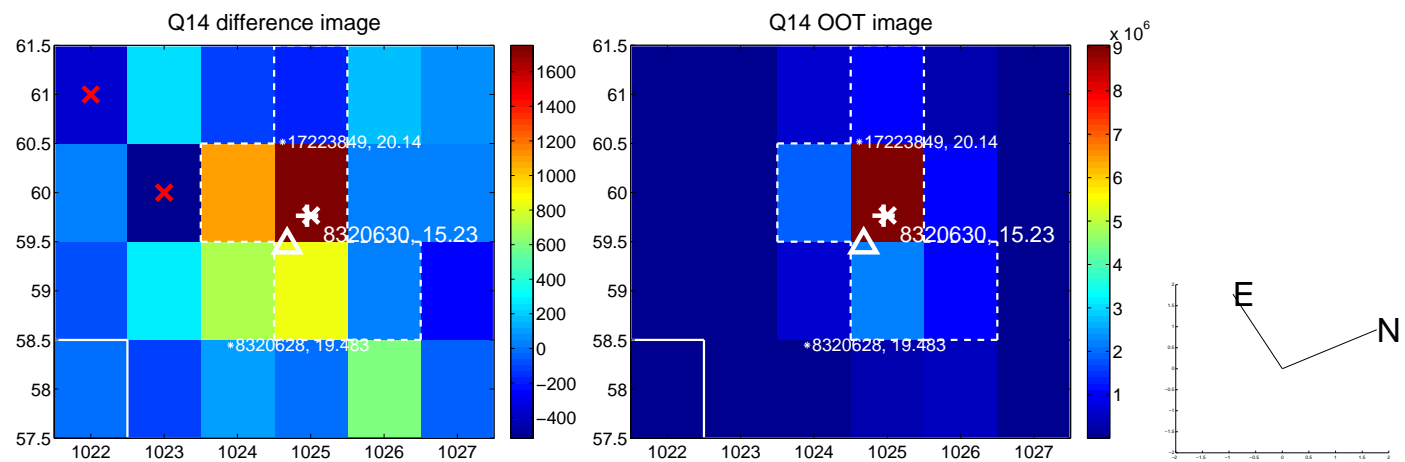
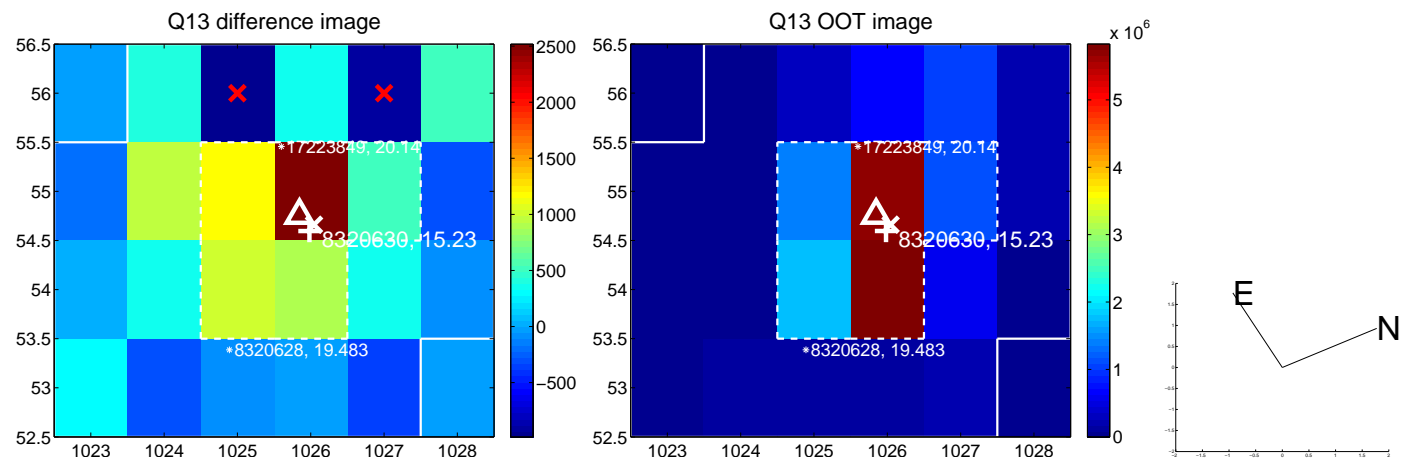




white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

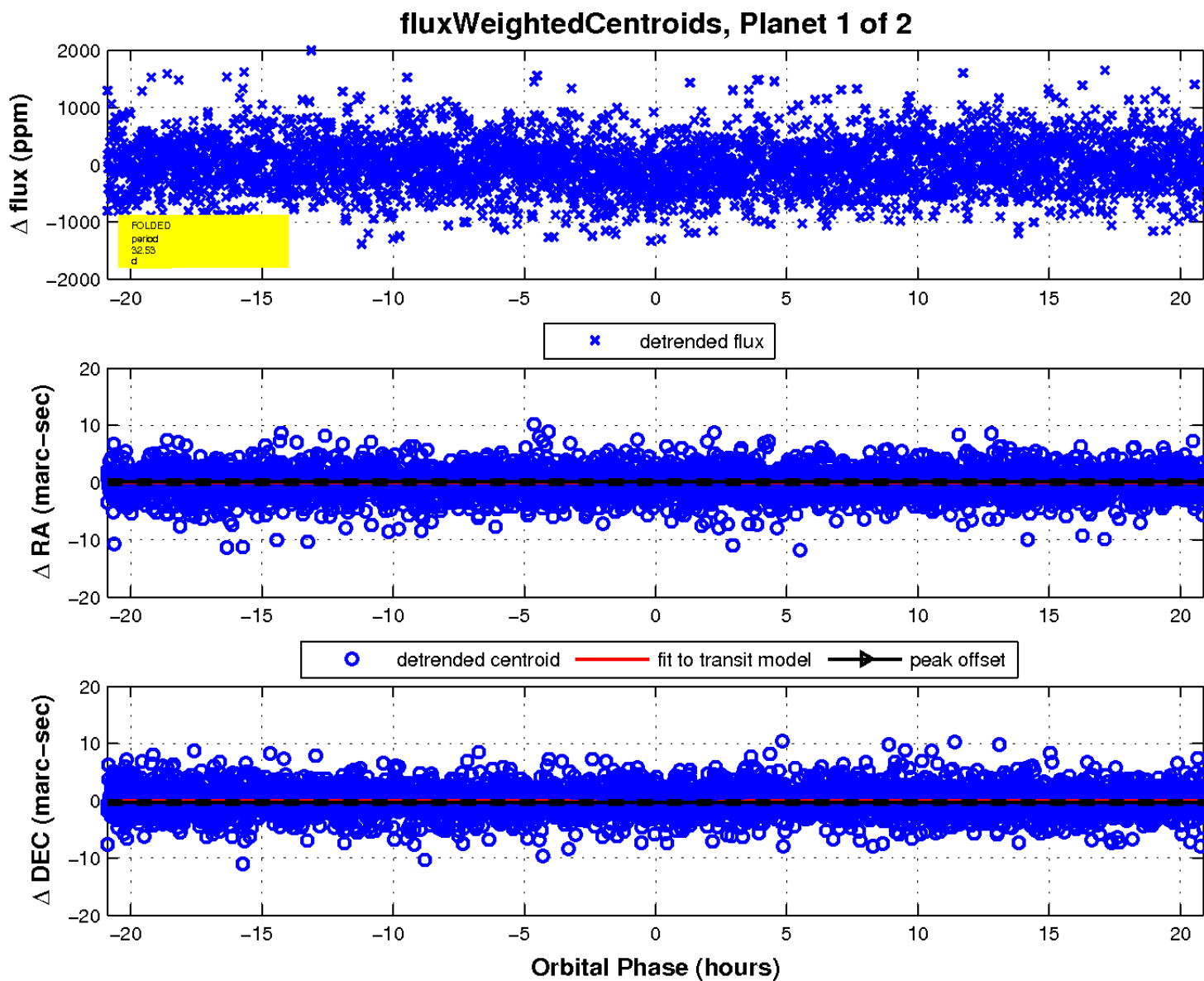
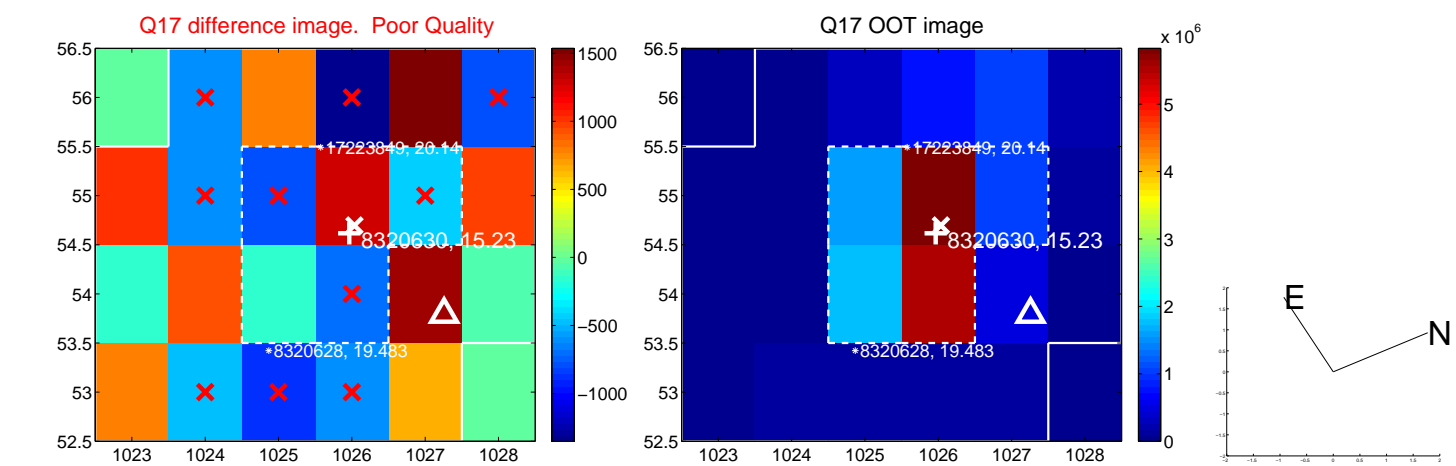


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



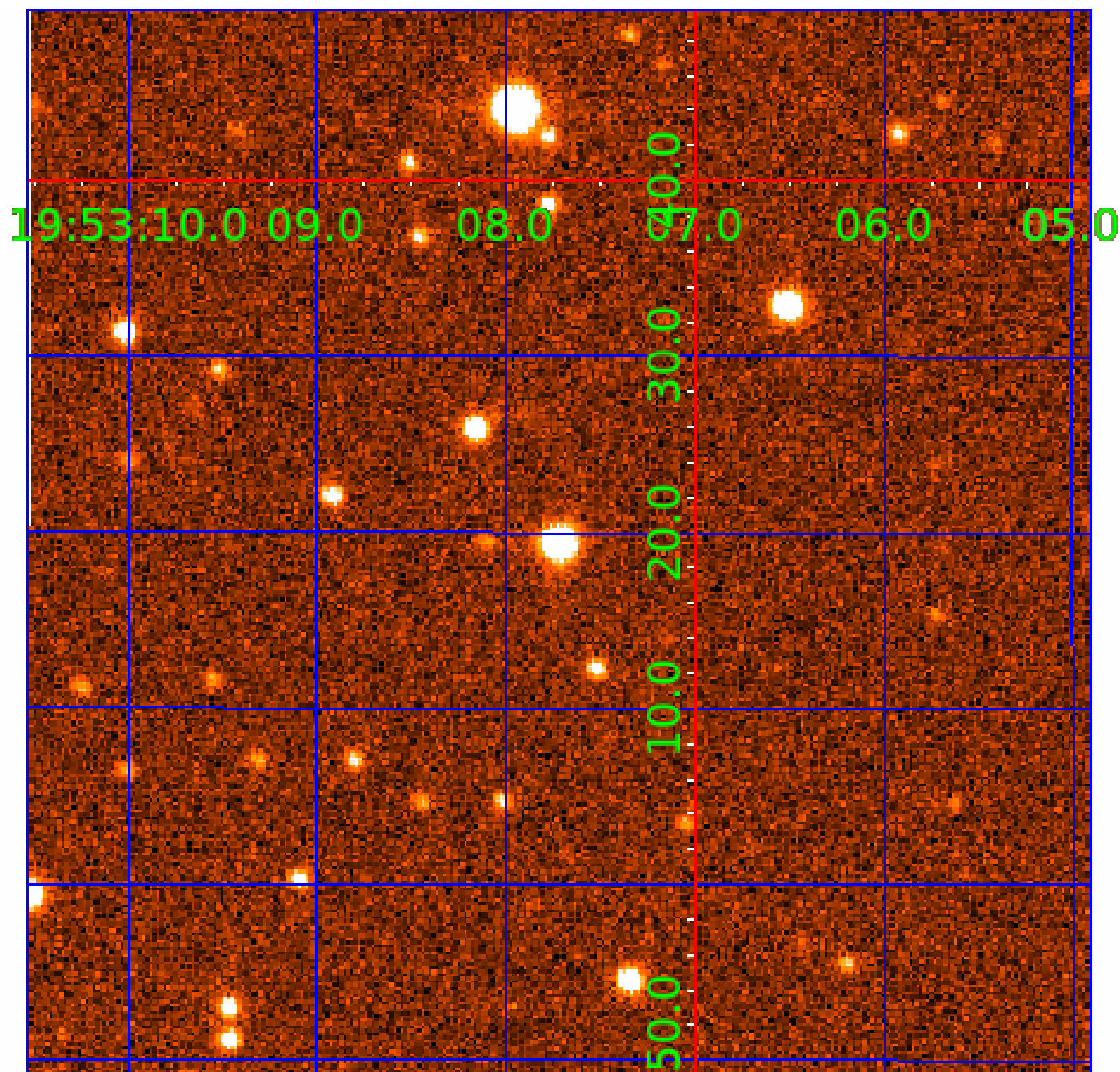


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 008320630

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008320630-01	OBS	4846.02	32.526643	137.304631	176.7	6.964	7.5	7.8	0.87	5668	1.24	17.95
008320630-02	OBS	4846.01	19.254467	148.019716	155.9	4.820	7.3	7.3	0.87	5668	1.25	36.11

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008320630-01	OBS	PC	0.86	0	0	0	0	NO_COMMENT
008320630-02	OBS	FP	0.00	0	0	1	0	HALO_GHOST

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

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

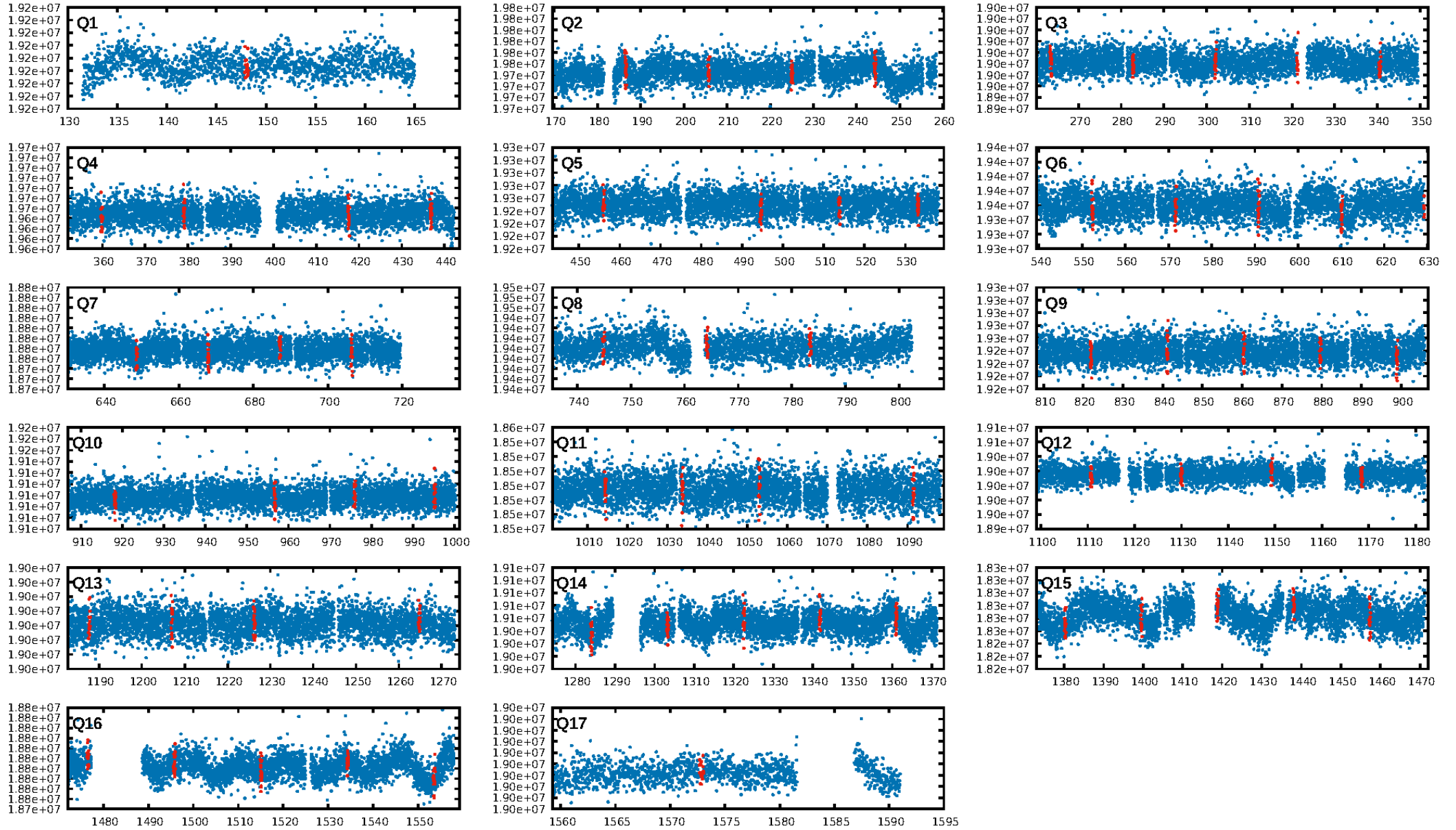
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 008320630-02

No Significant Match Found

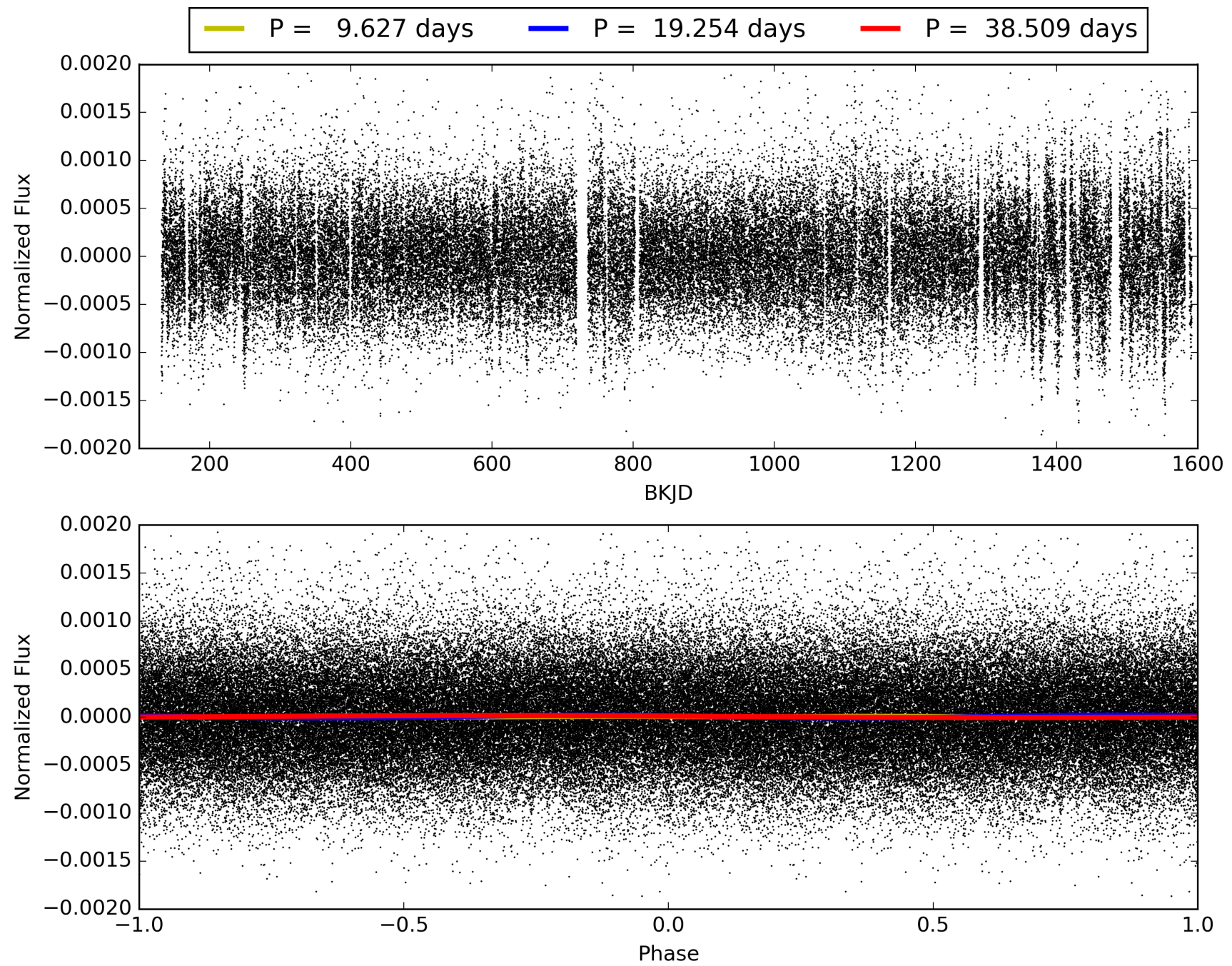
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 008320630-02, PDC Light Curves



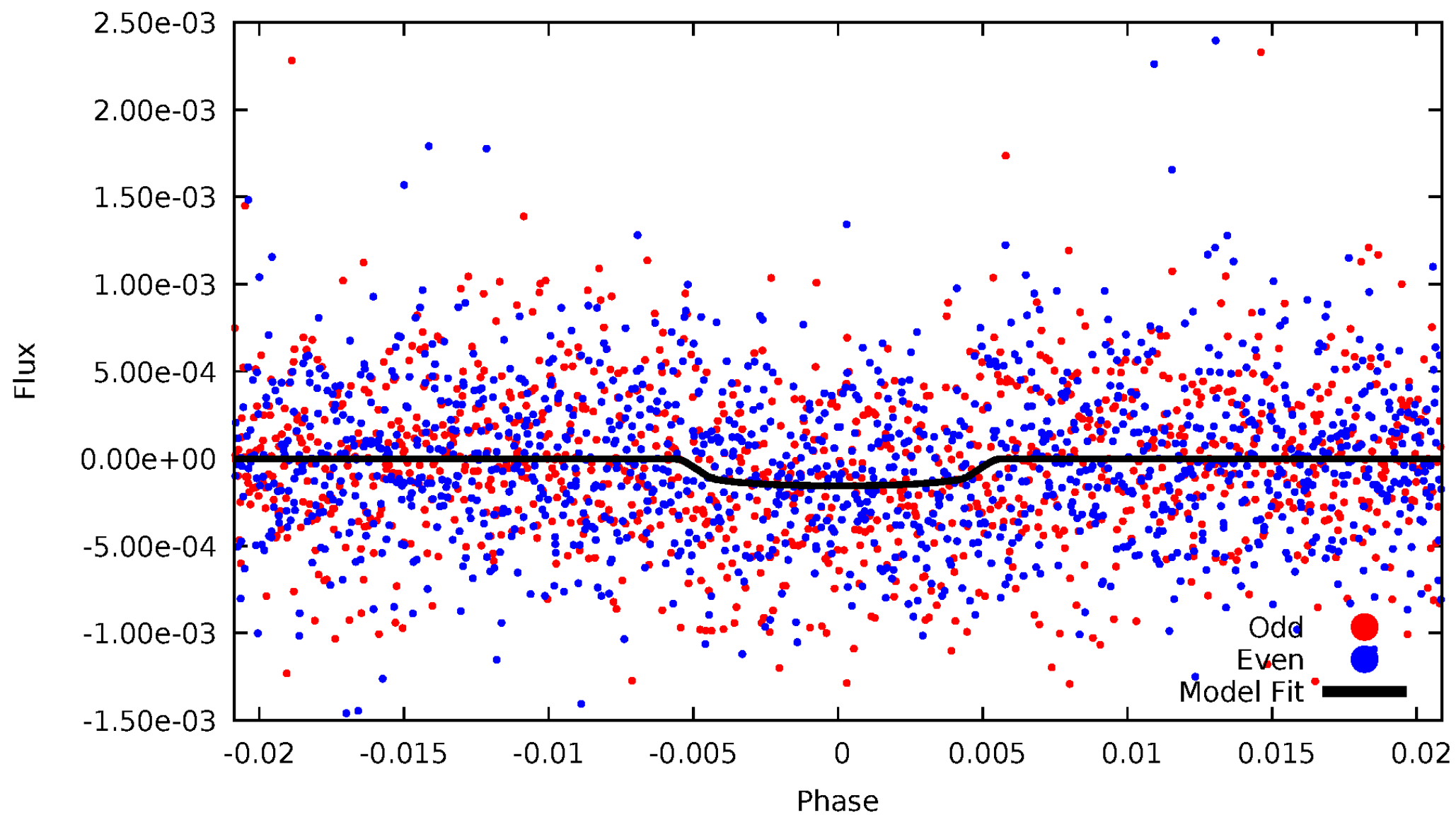


# TCE 008320630-02



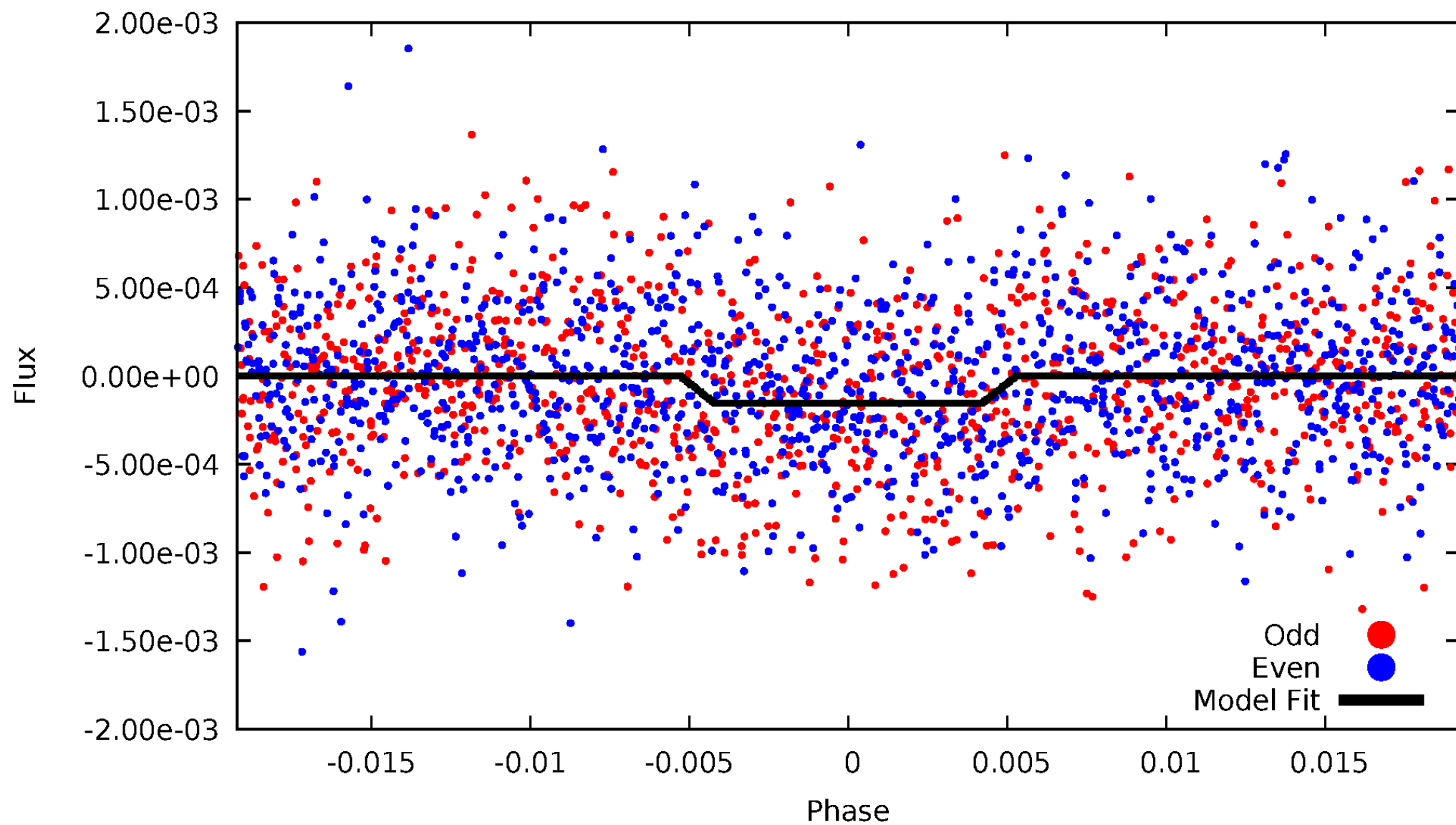
# DV Odd/Even

TCE 008320630-02



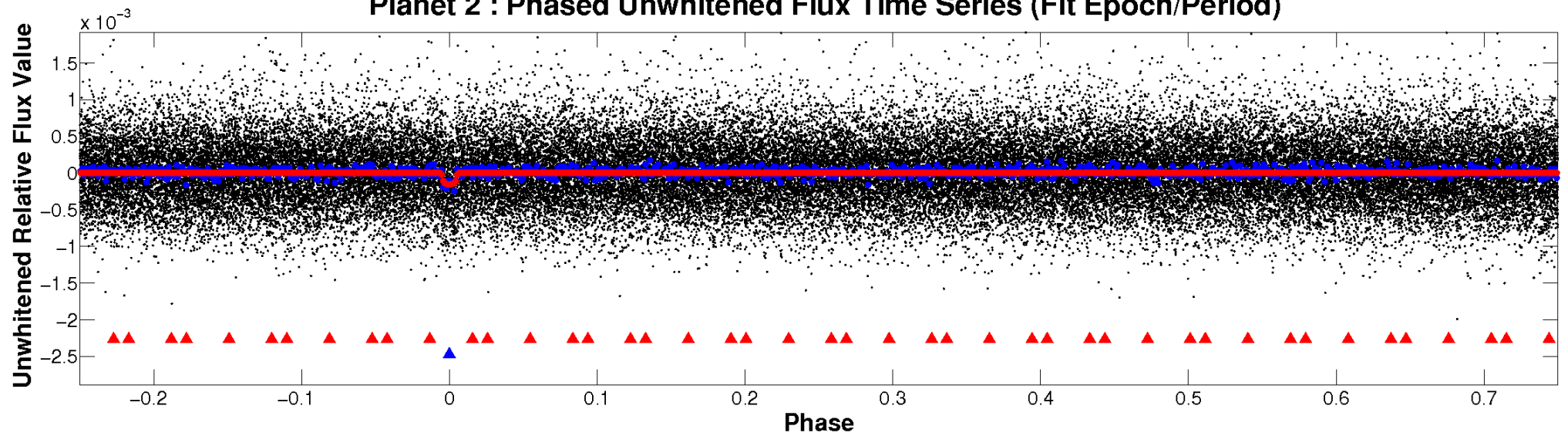
# ALT Odd/Even

TCE 008320630-02

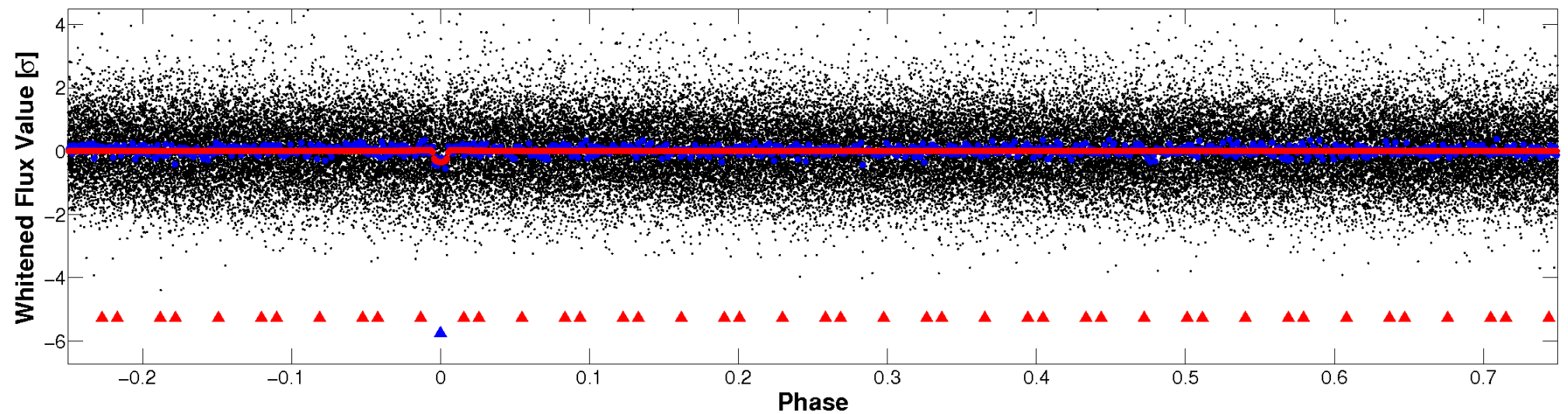


# Non-Whitened Vs. Whitened Light Curve

## Planet 2 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)



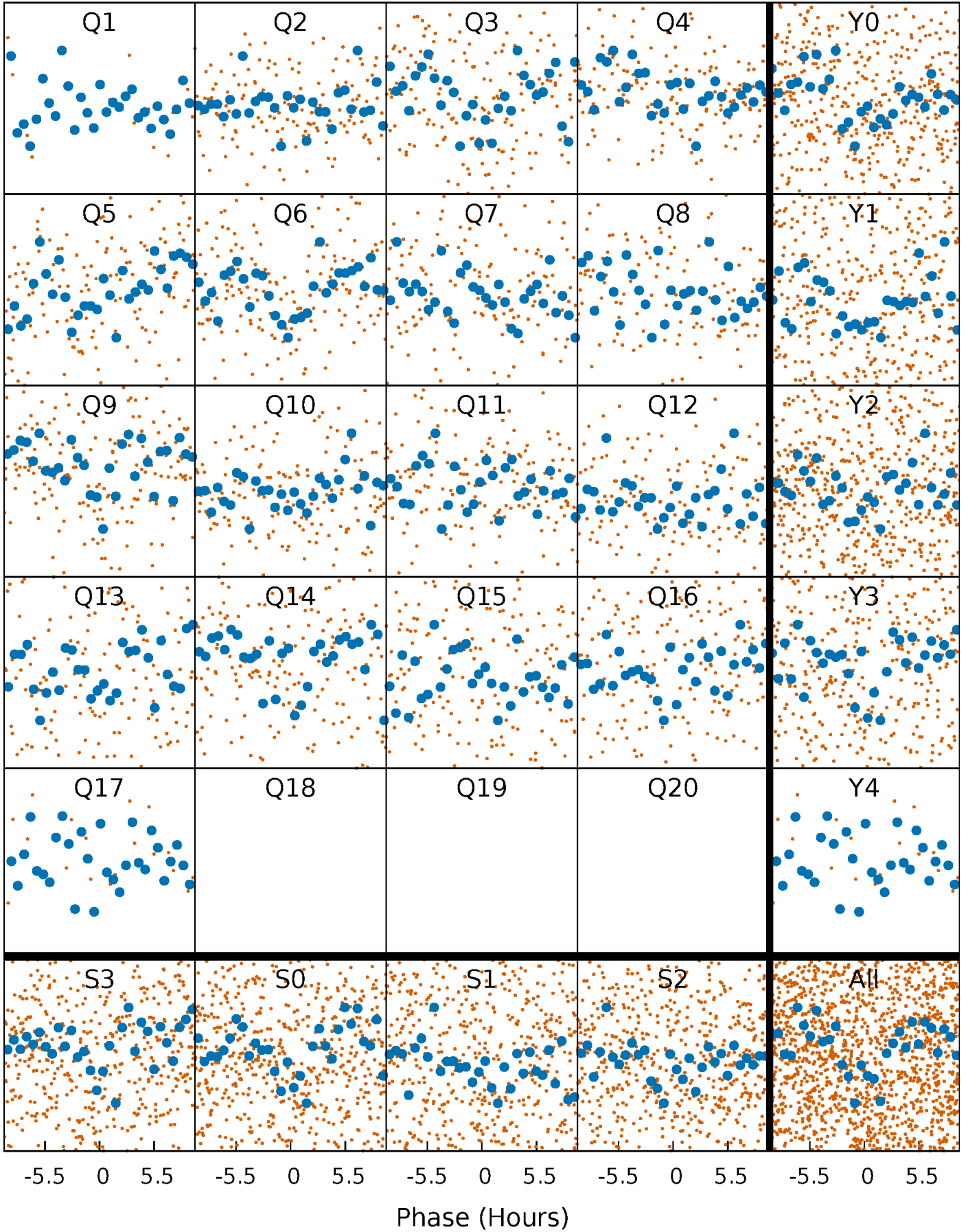
## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)





# PDC Quarter-Phased Transit Curves

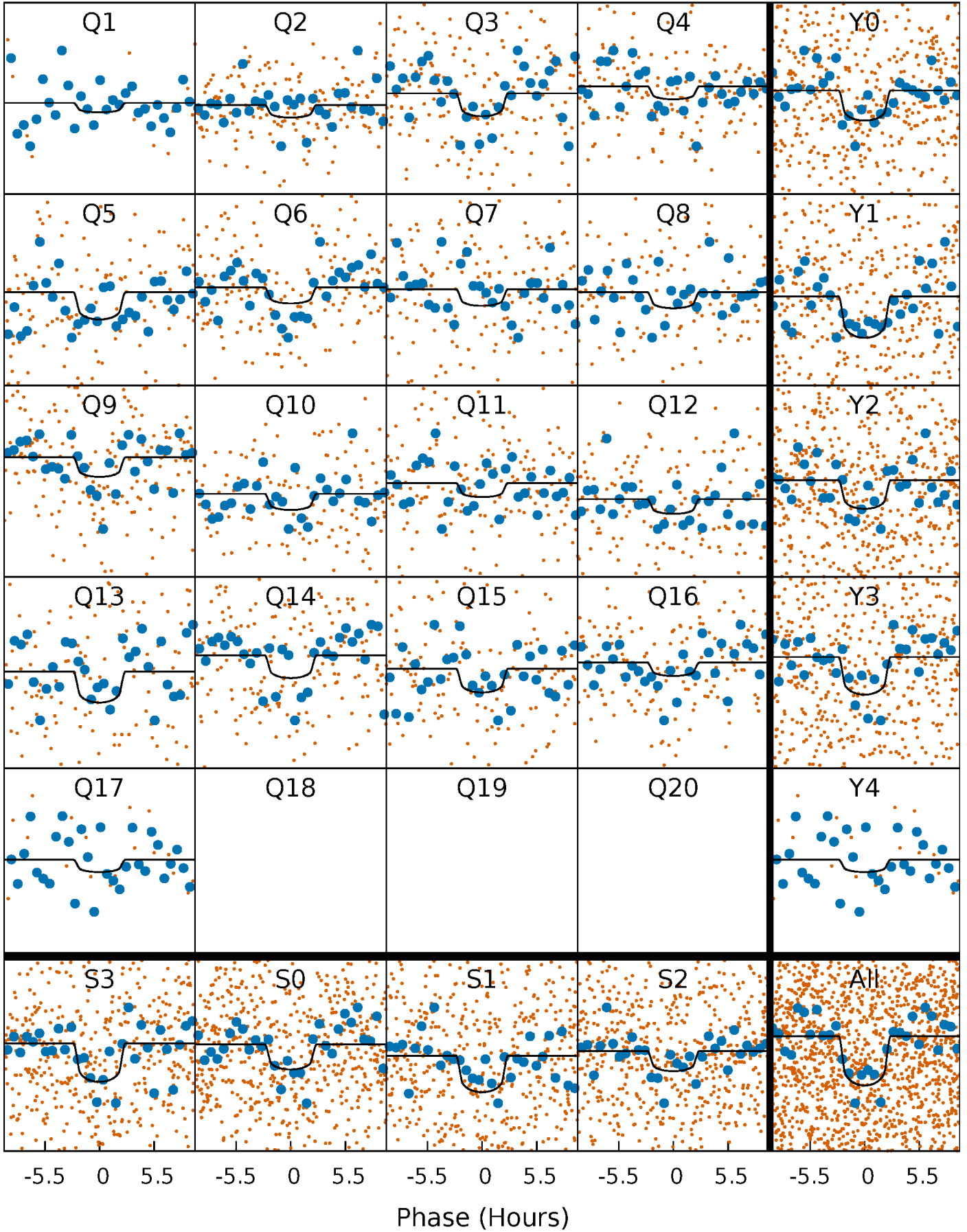
TCE 008320630-02 P= 19.254467 Days  $T_0=148.019716$  (BKJD)





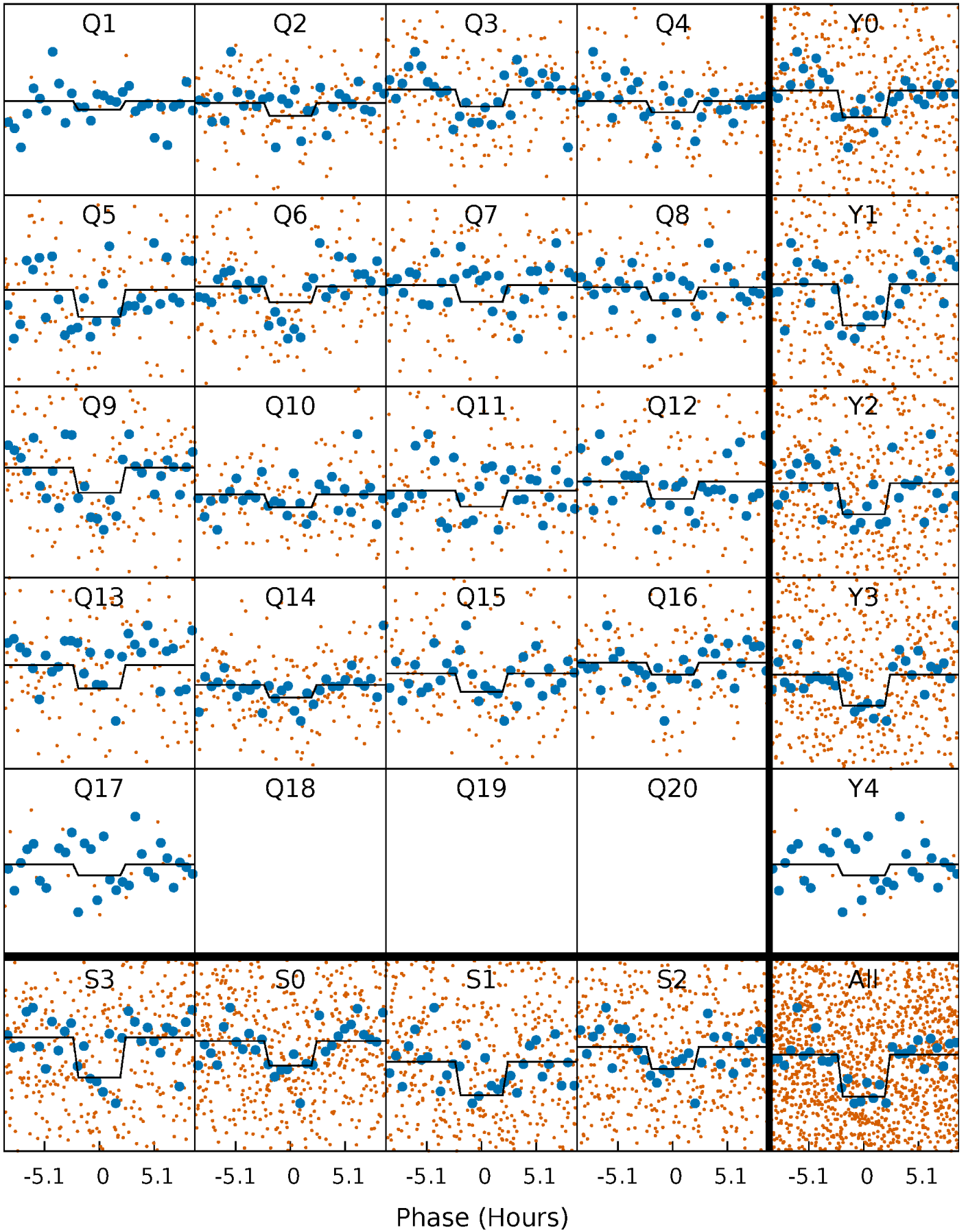
# DV Quarter-Phased Transit Curves

TCE 008320630-02 P= 19.254467 Days  $T_0=148.019716$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

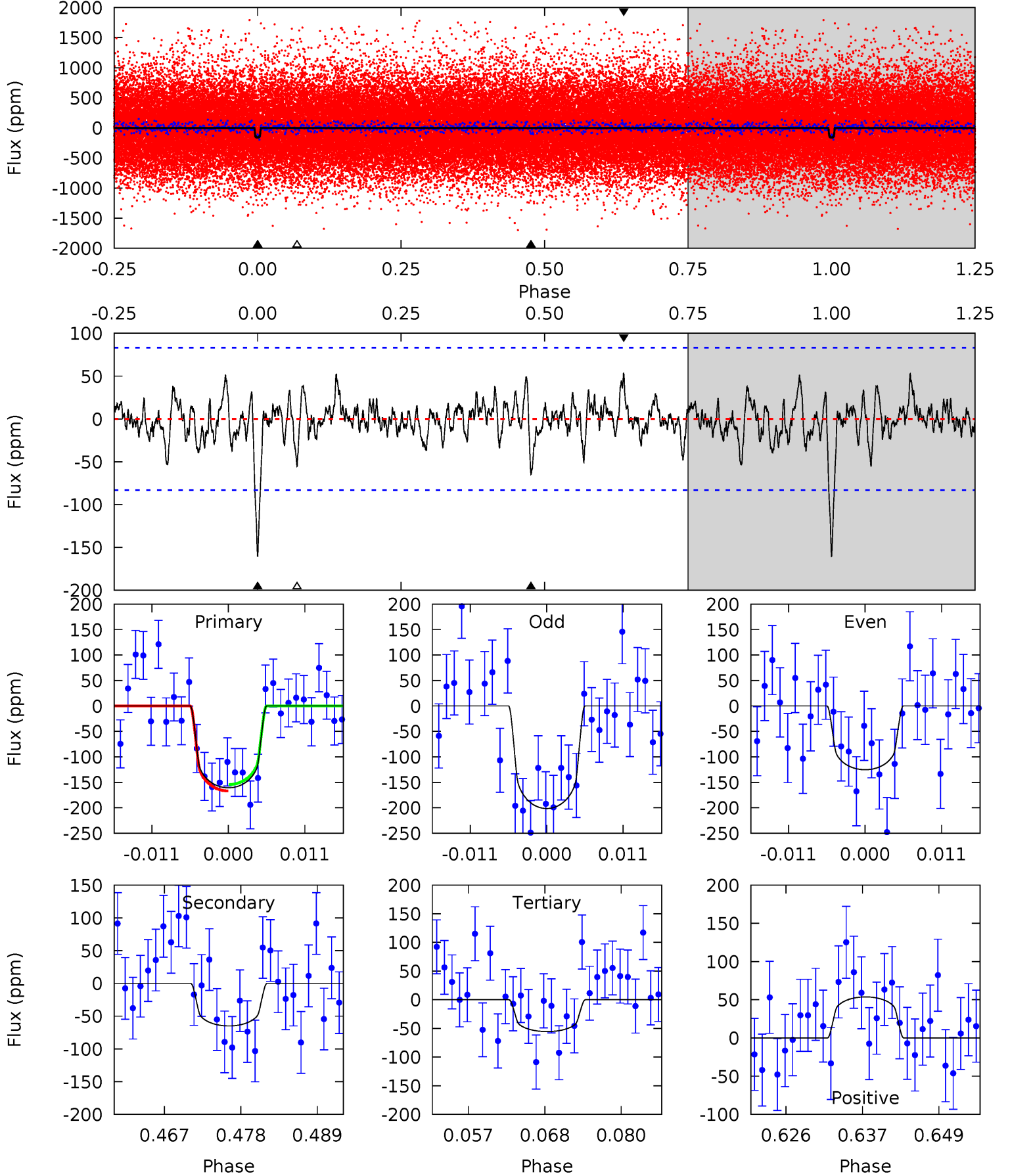
TCE 008320630-02 P= 19.253942 Days  $T_0=148.041177$  (BKJD)



# DV Model-Shift Uniqueness Test

008320630-02,  $P = 19.254467$  Days,  $E = 128.765249$  Days

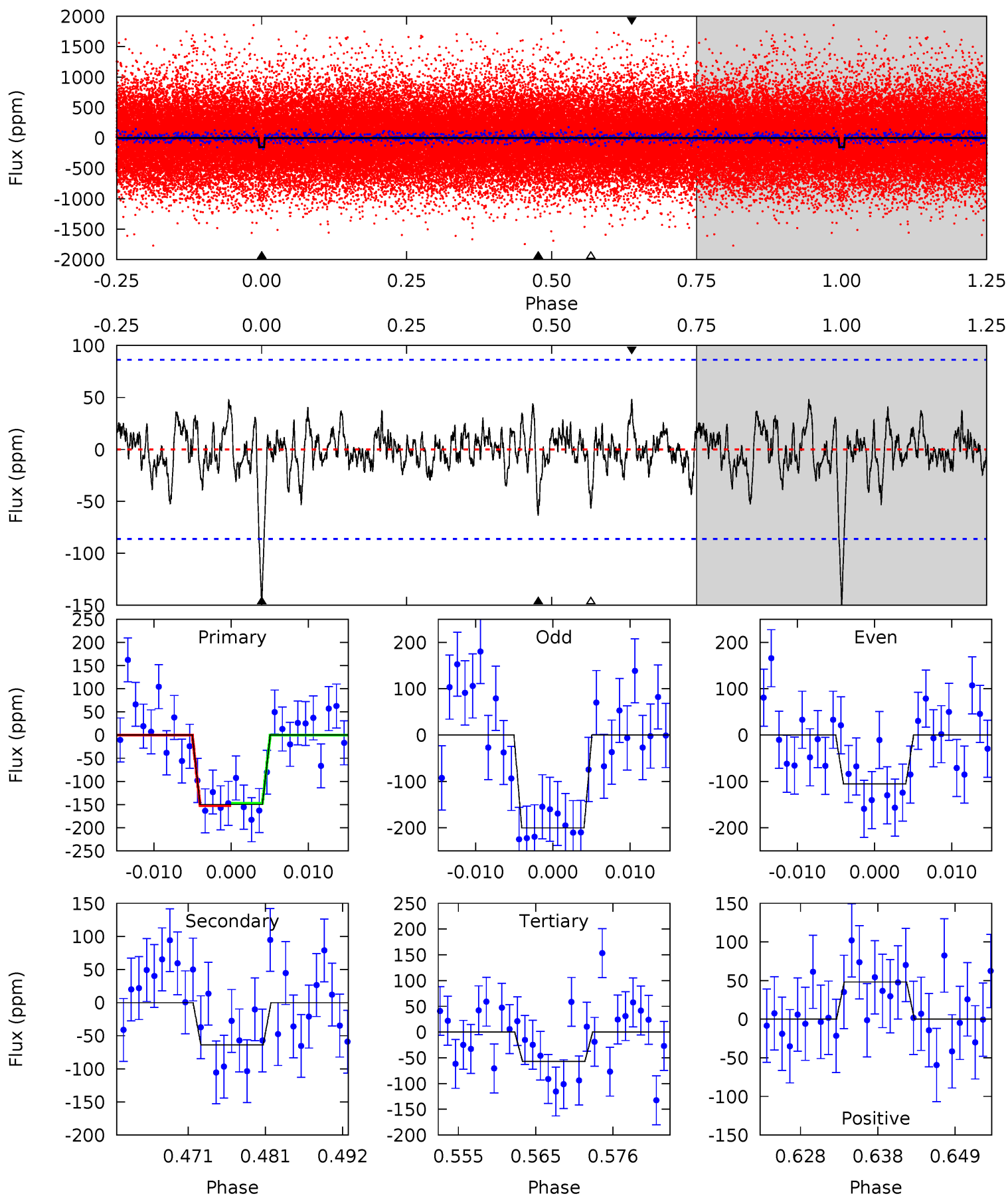
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.68	3.91	3.34	3.24	5.00	2.53	1.02	6.34	6.44	0.57	0.68	2.29	0.97	0.25	0.38



# Alt Model-Shift Uniqueness Test

008320630-02, P = 19.253942 Days, E = 128.787235 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
8.71	3.71	3.32	2.81	5.02	2.56	0.94	5.39	5.91	0.39	0.90	2.76	0.98	0.24	0.14



### Stellar Parameters For KIC 008320630

	$T_{\text{eff}} (K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5668^{+169}_{-186}$	$4.545^{+0.033}_{-0.187}$	$-0.020^{+0.300}_{-0.300}$	$0.868^{+0.233}_{-0.078}$	$0.963^{+0.094}_{-0.115}$	$2.073^{+0.368}_{-0.991}$
	+3%/-3%	+1%/-4%	+1500%/-1500%	+27%/-9%	+10%/-12%	+18%/-48%
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 008320630-02 / KOI 4846.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-65 \pm 17$	$1.56^{+1.11}_{-0.92}$	$893^{+54}_{-42}$	$4271^{+2063}_{-770}$	$276^{+1309}_{-185}$
Alt.	$-64 \pm 17$	$1.52^{+1.07}_{-0.98}$	$892^{+60}_{-40}$	$4357^{+2259}_{-829}$	$288^{+1738}_{-199}$

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

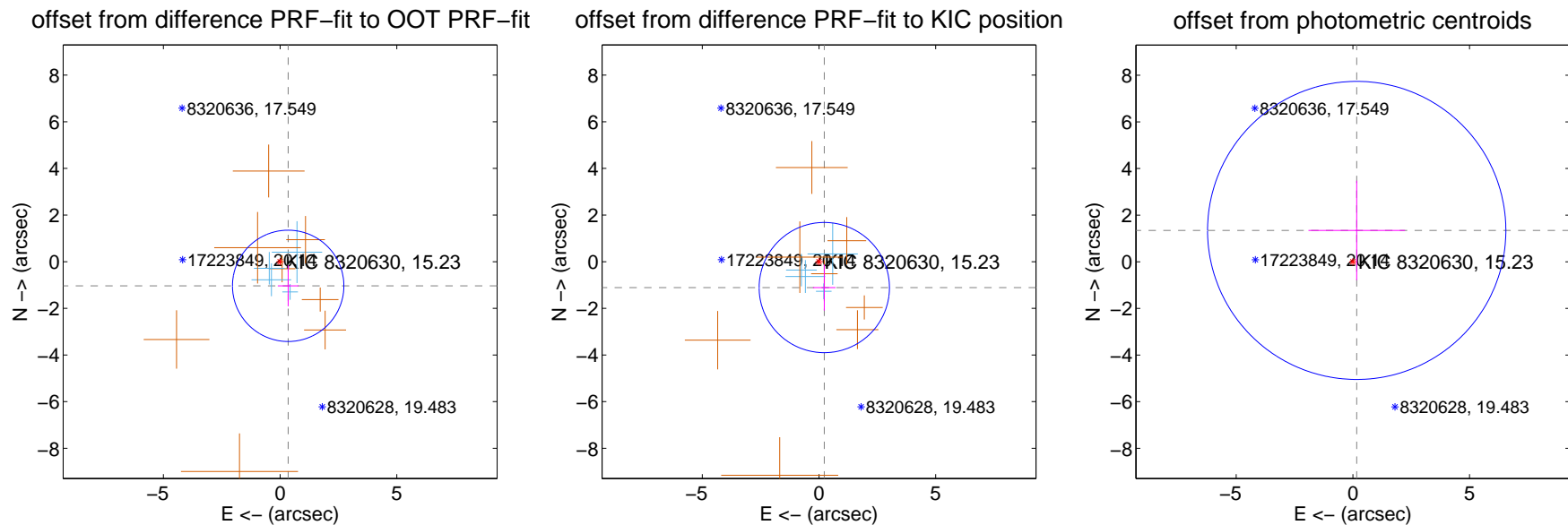
## DV Centroid Data

Supplemental centroid analysis for 008320630-02. Kepler magnitude: 15.23. Transit SNR 7.26

There are 4 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.43 arcsec

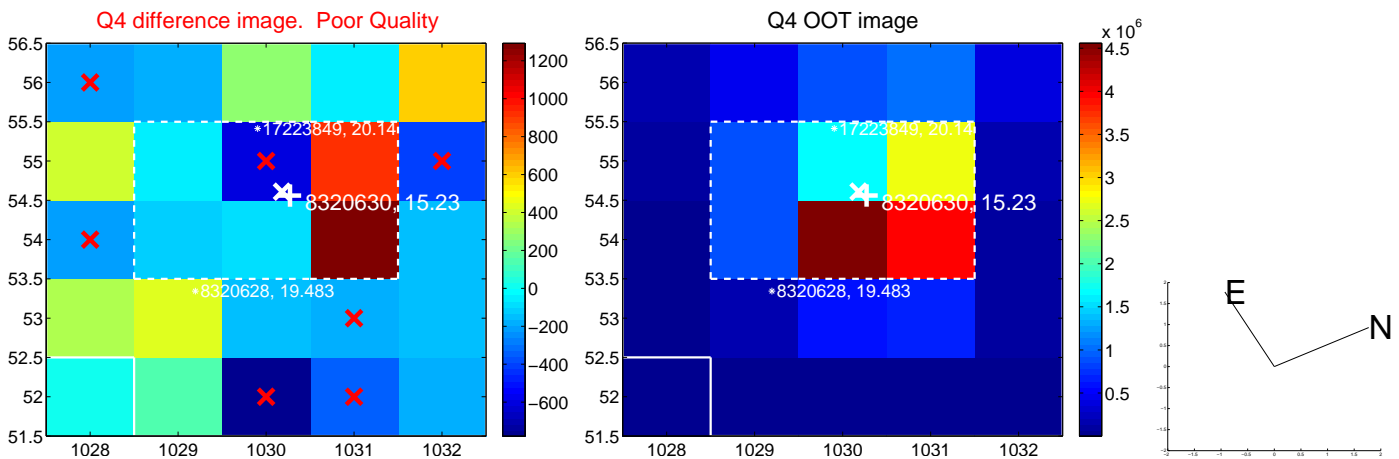
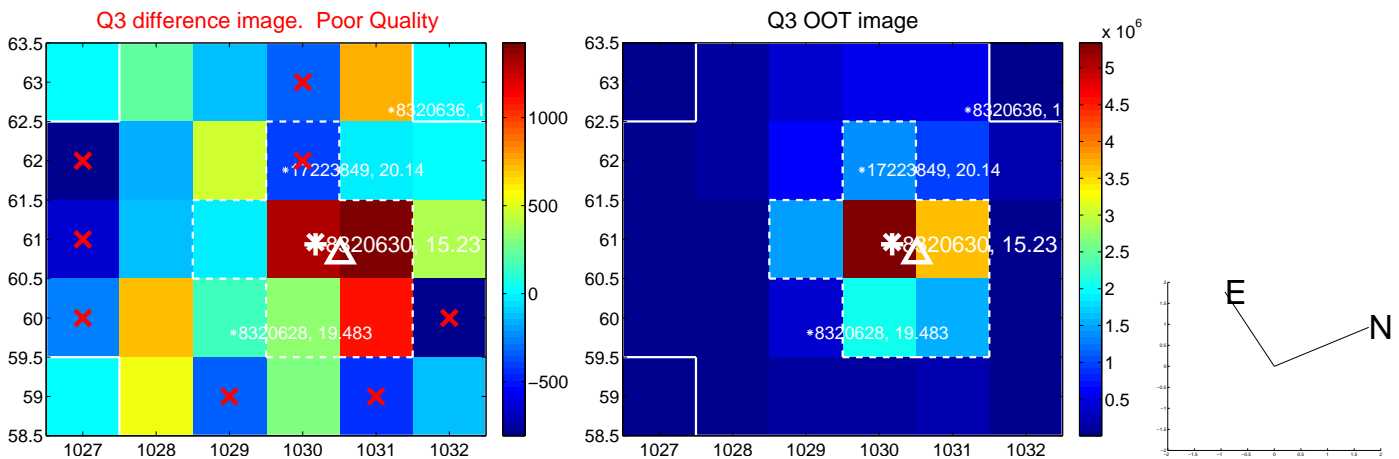
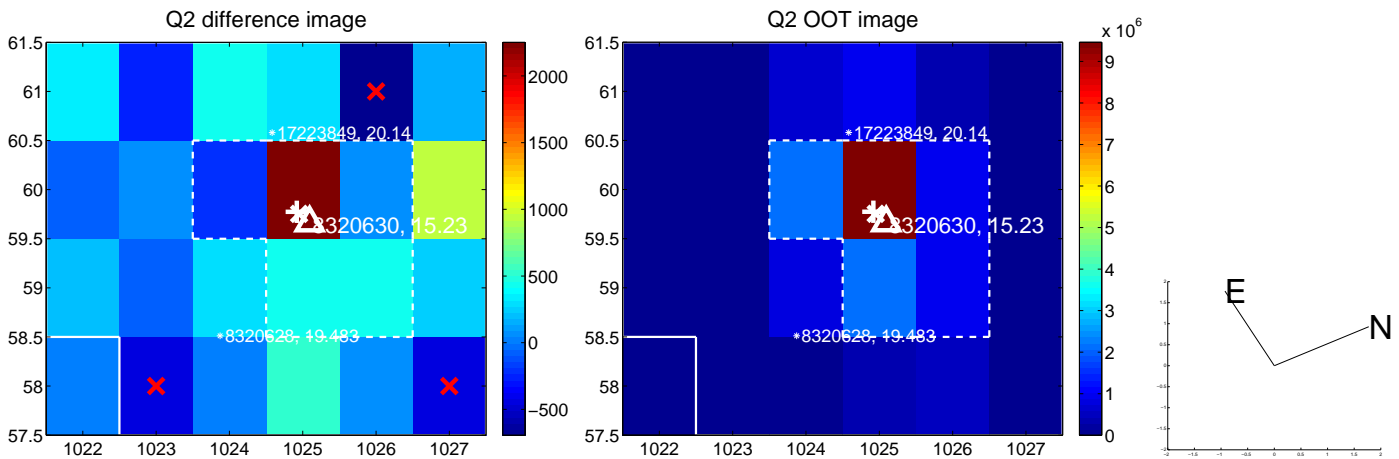
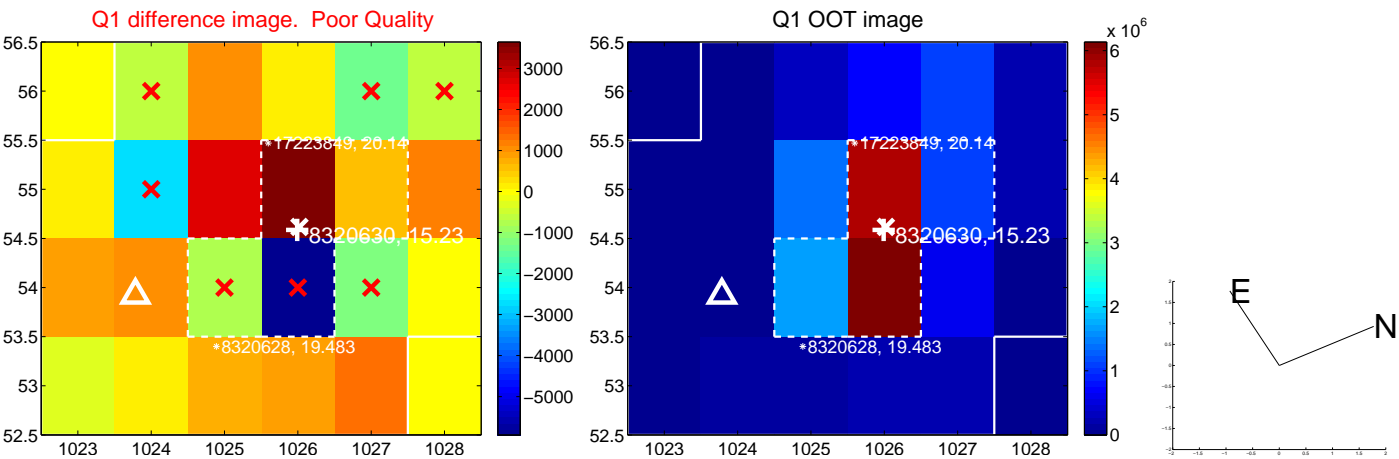
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.092 \pm 0.795$	1.37	$-0.345 \pm 0.443$	$-1.035 \pm 0.877$
PRF-fit source offset from KIC position	$1.132 \pm 0.930$	1.22	$-0.227 \pm 0.483$	$-1.109 \pm 0.985$
photometric centroid source offset	$1.35 \pm 2.13$	0.64	$-0.16 \pm 2.07$	$1.34 \pm 2.13$



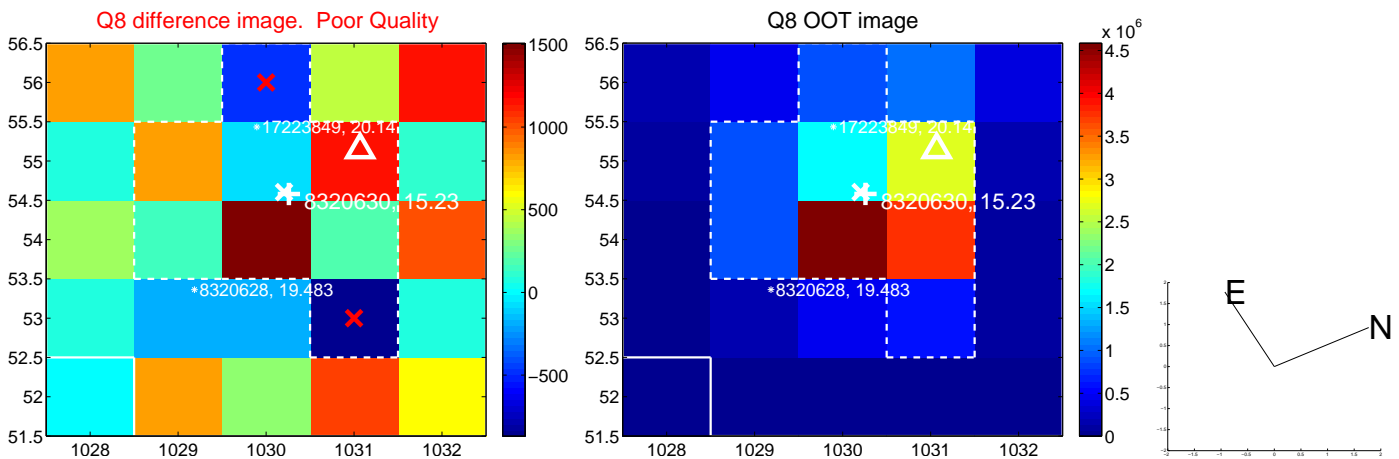
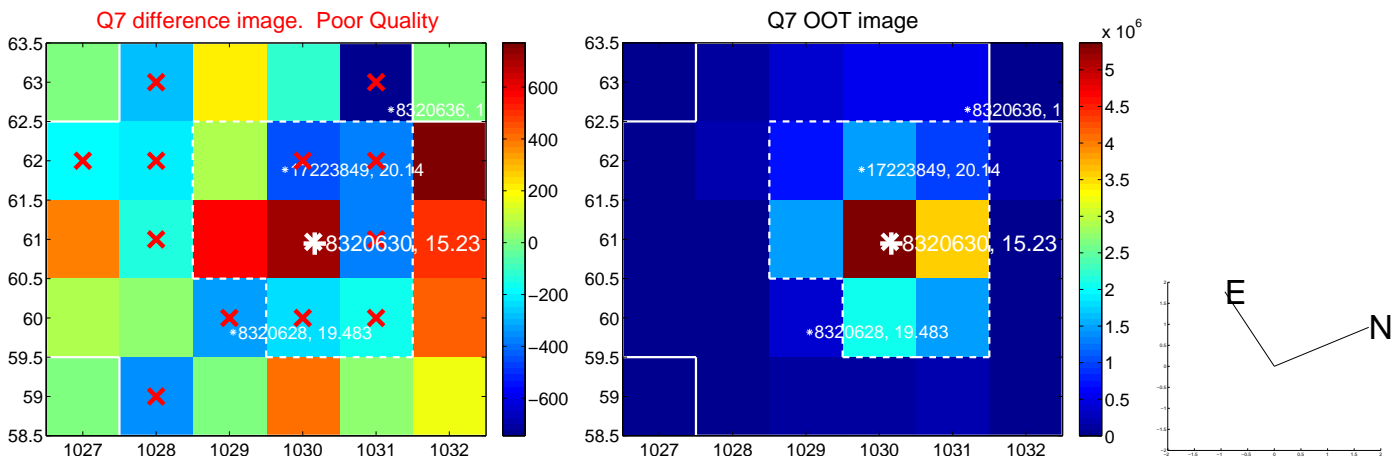
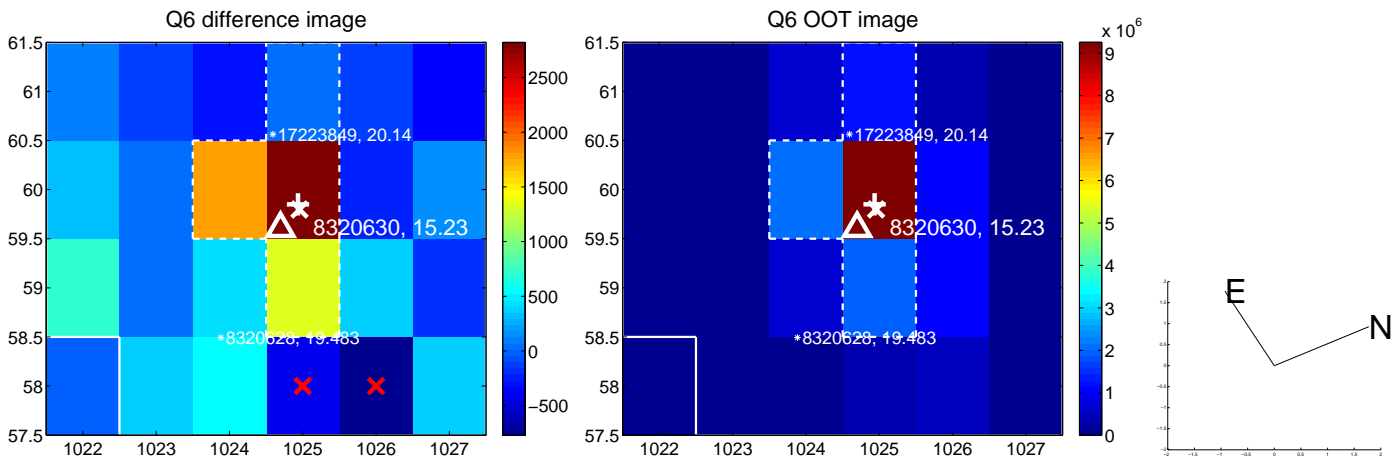
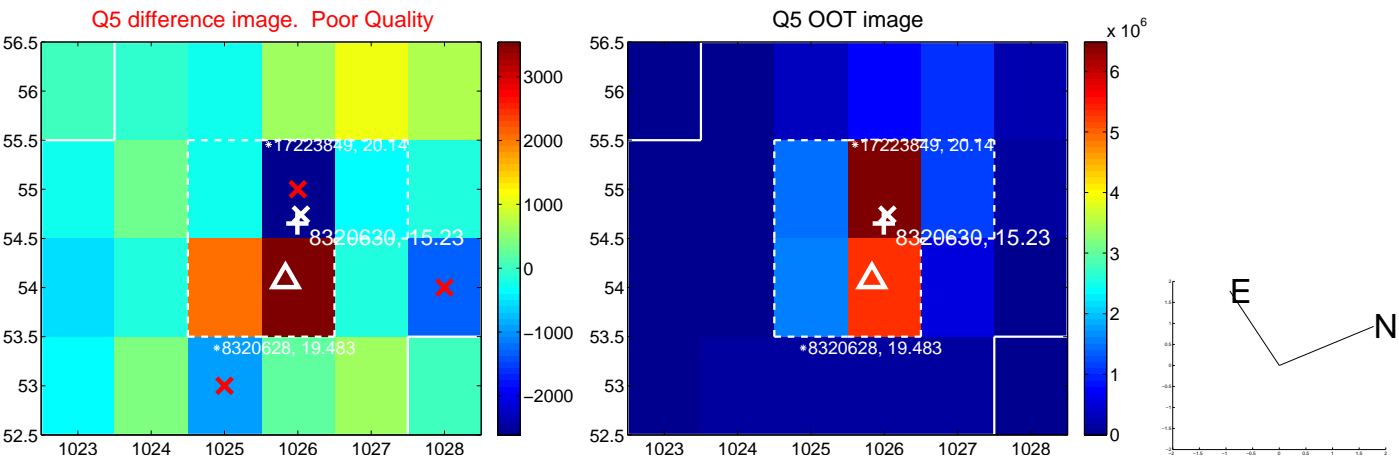
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



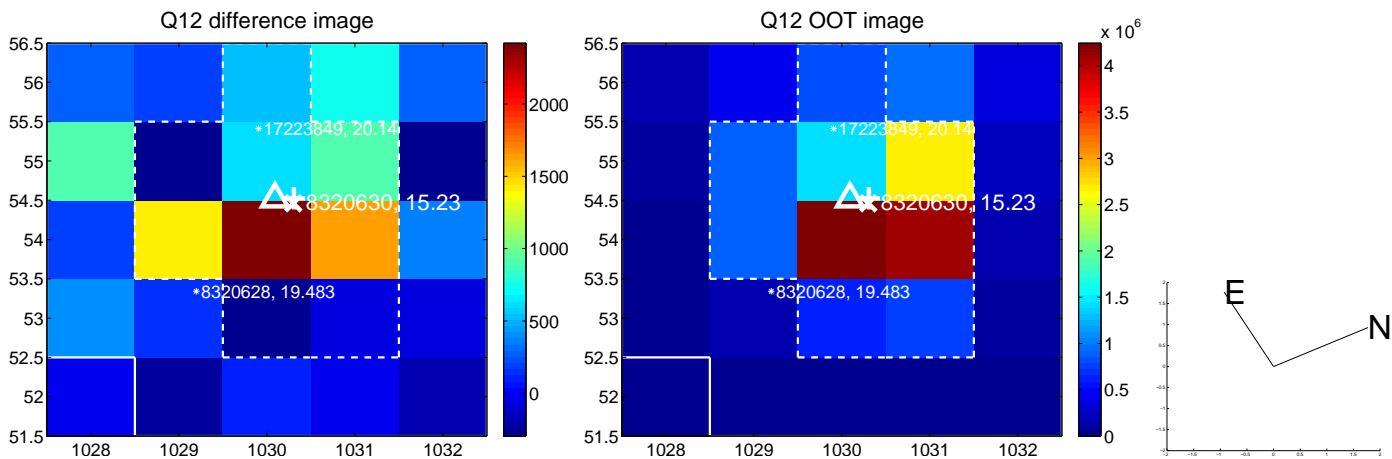
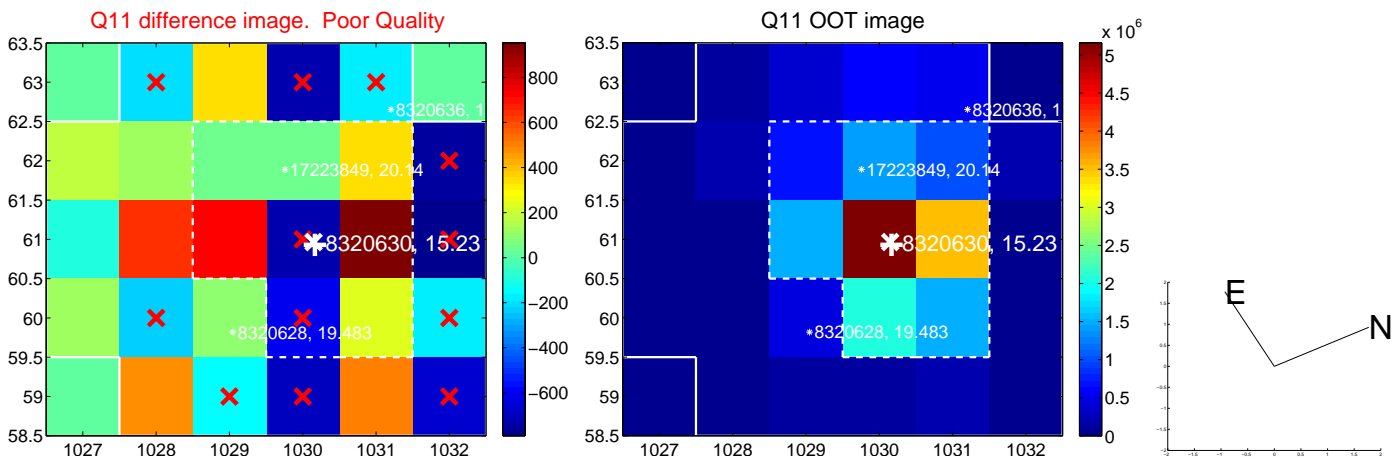
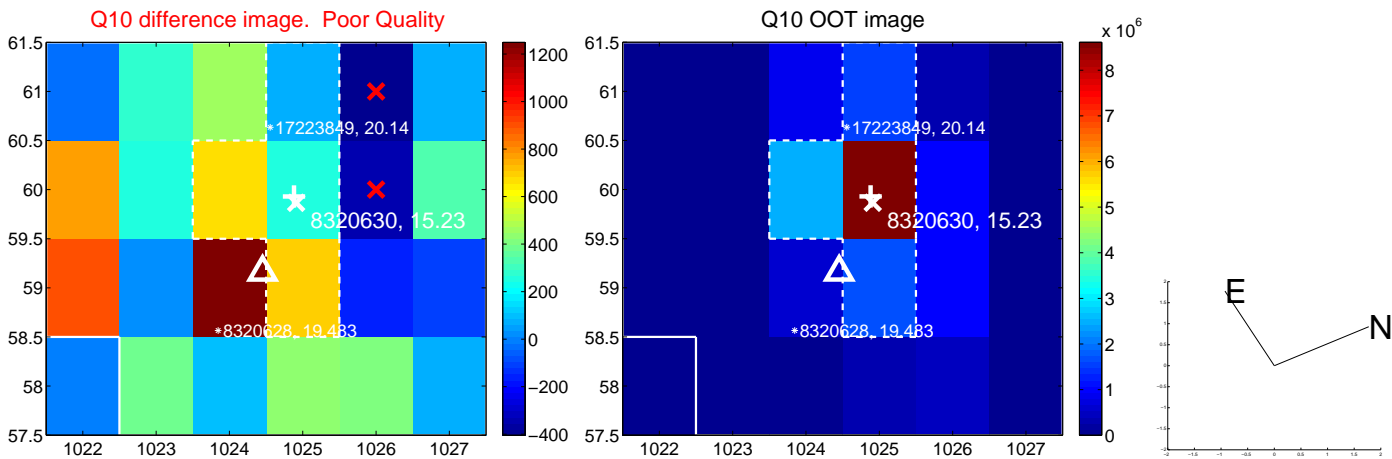
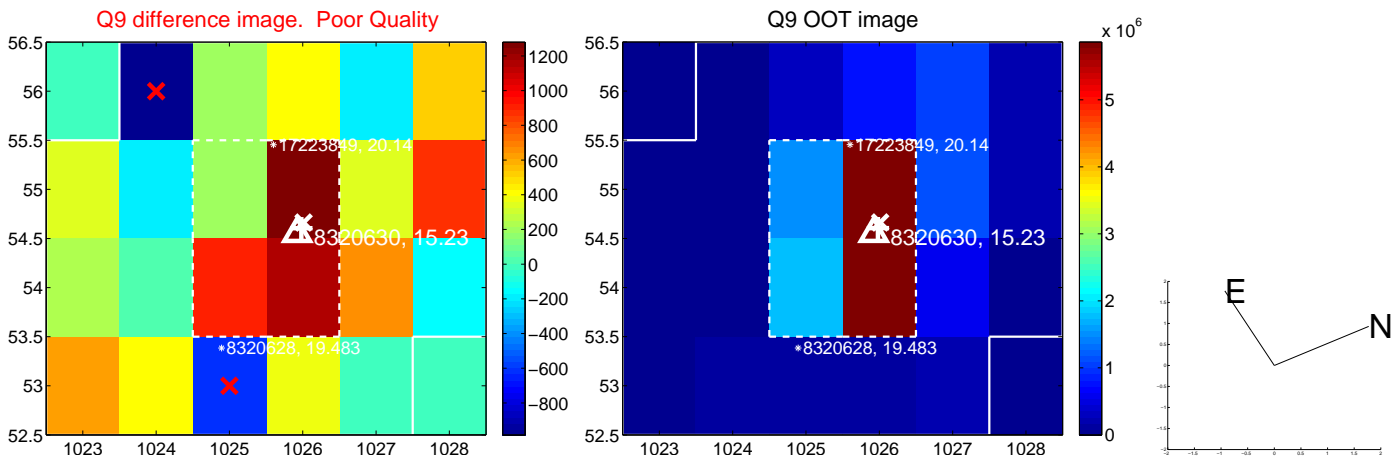
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



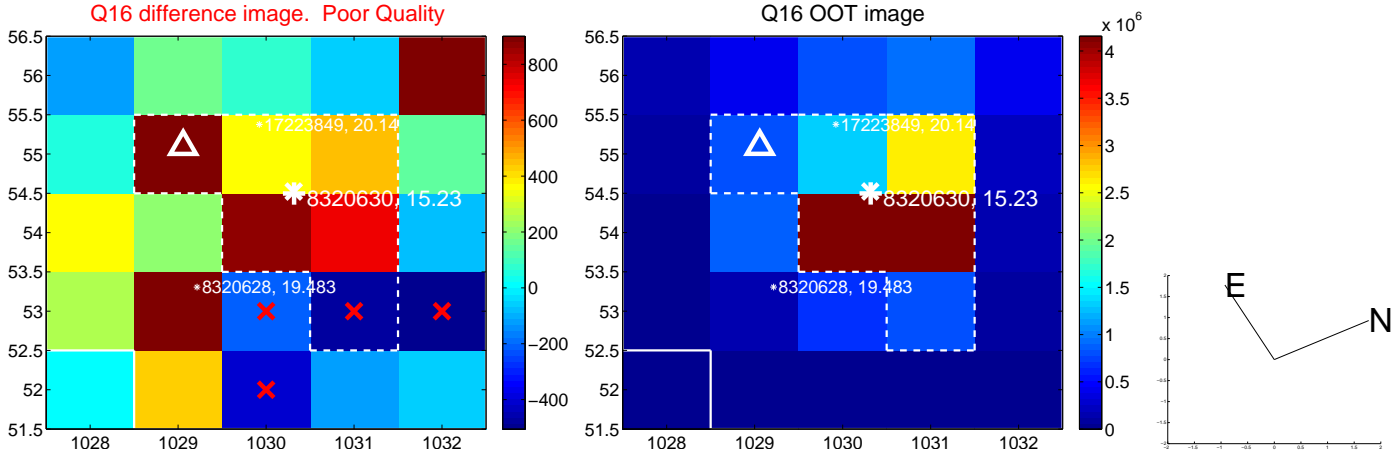
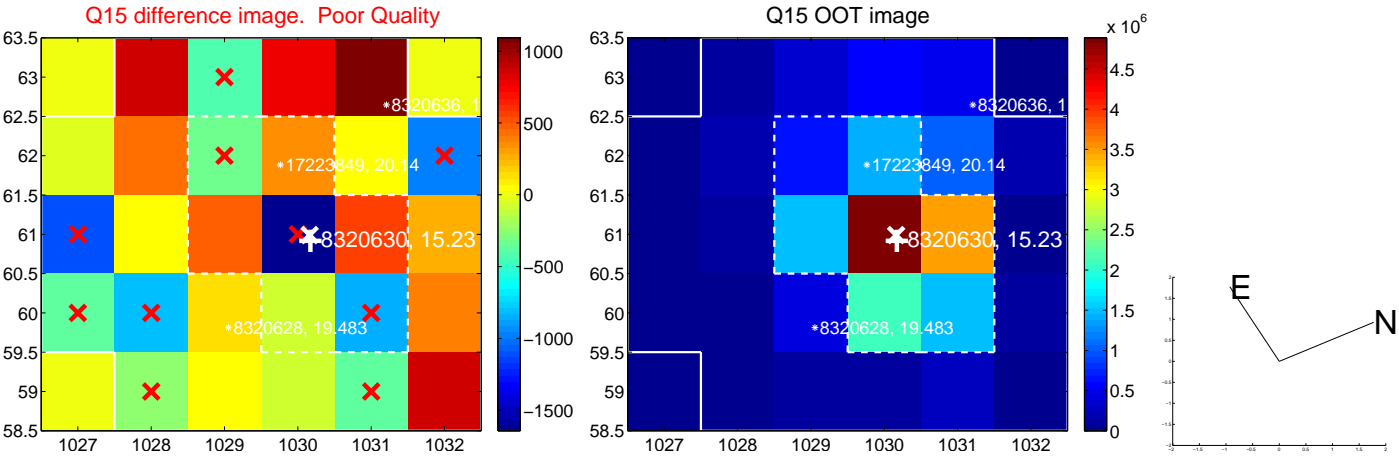
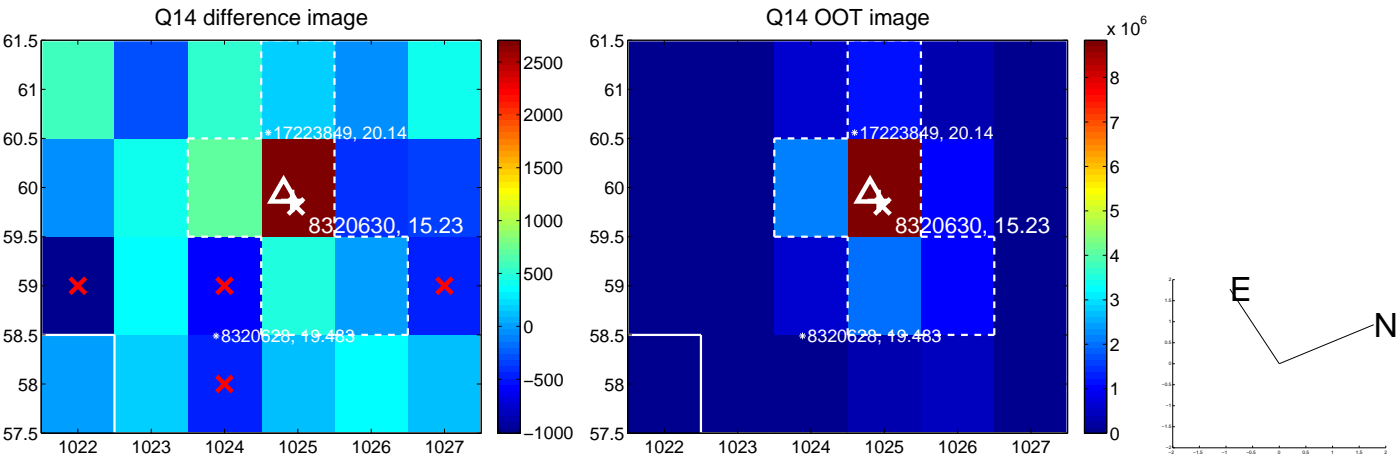
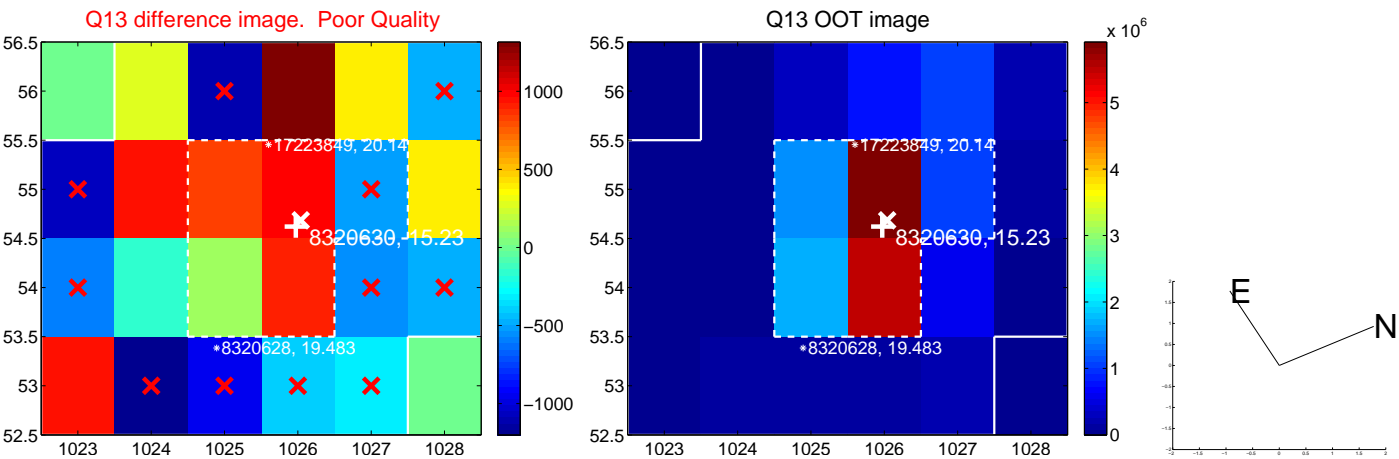
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



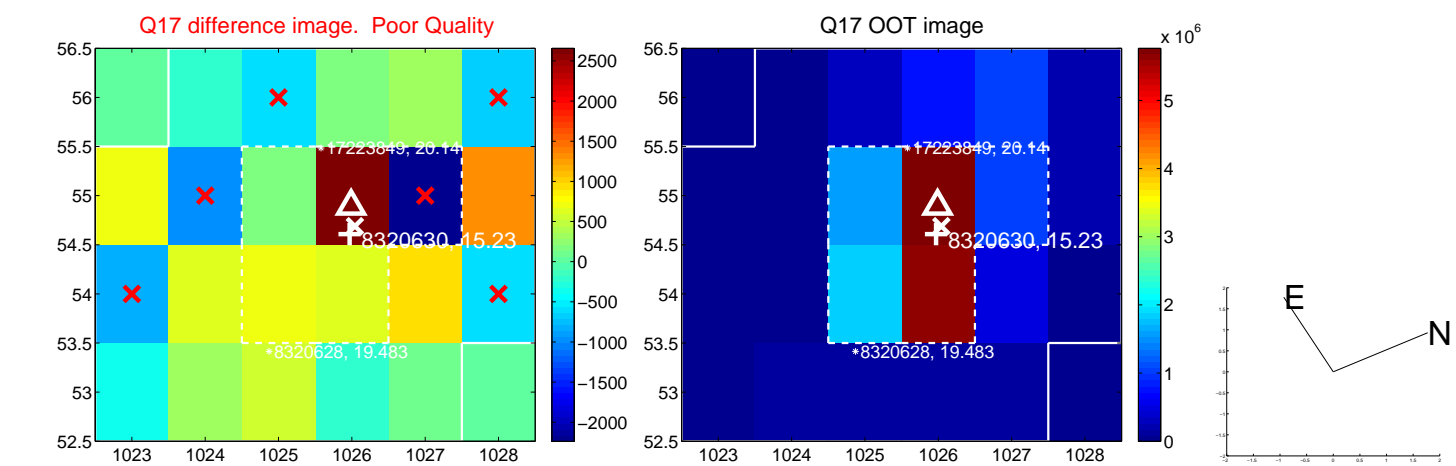
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



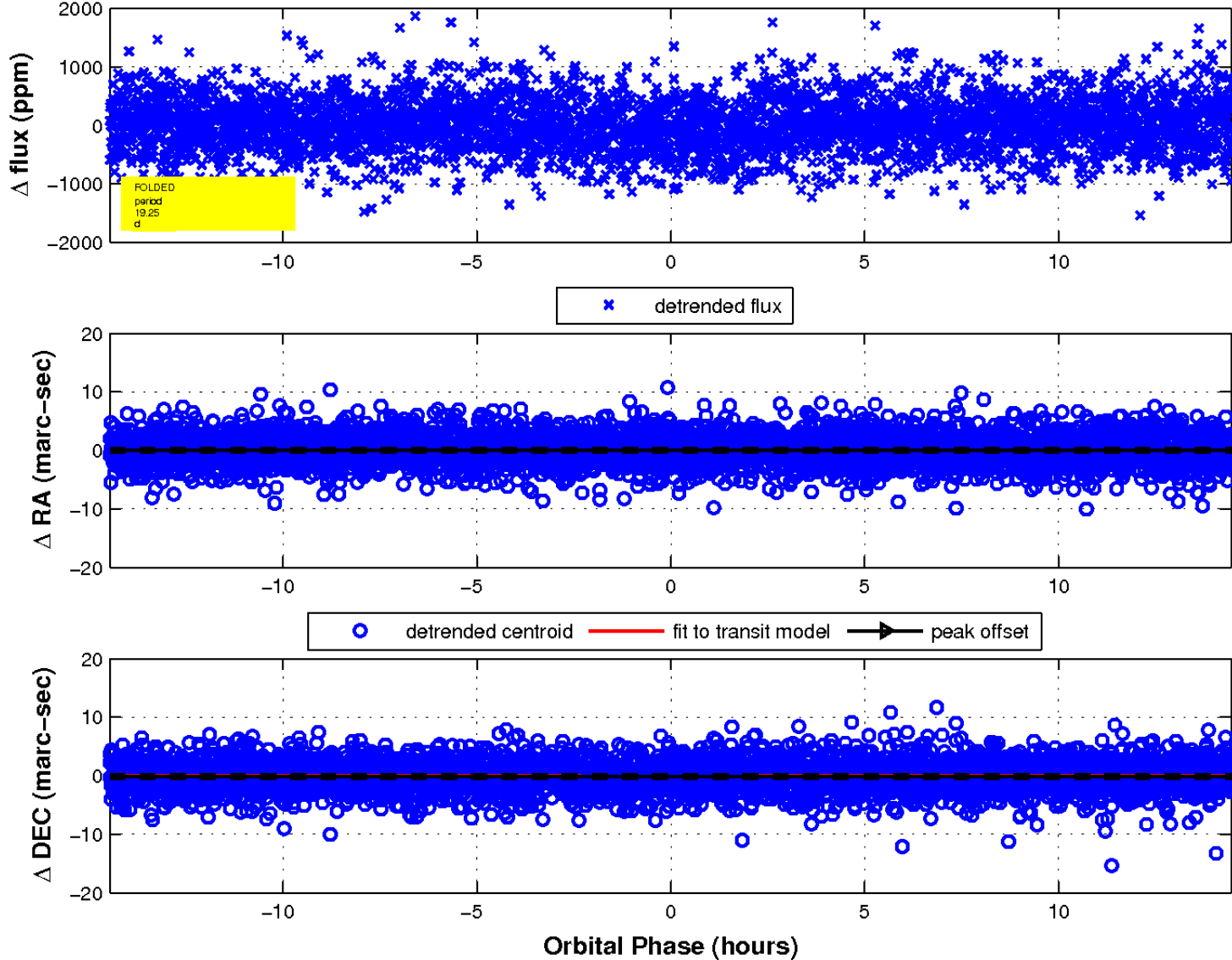
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

