

# KIC 010337517

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010337517-01	OBS	1165.01	7.053948	136.356253	515.1	1.712	48.3	55.7	0.86	5357	2.35	117.67
010337517-02	OBS	1165.02	4.292669	134.796082	64.6	2.505	9.9	10.6	0.86	5357	0.83	228.18

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010337517-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
010337517-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT

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

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

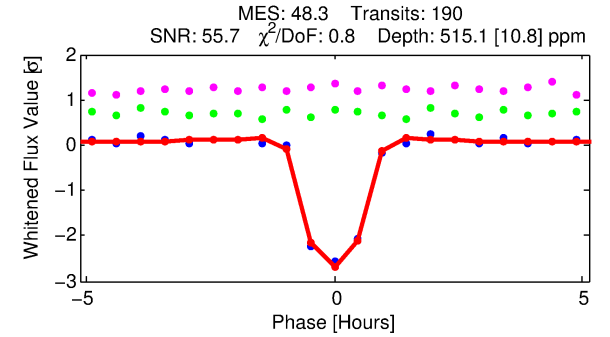
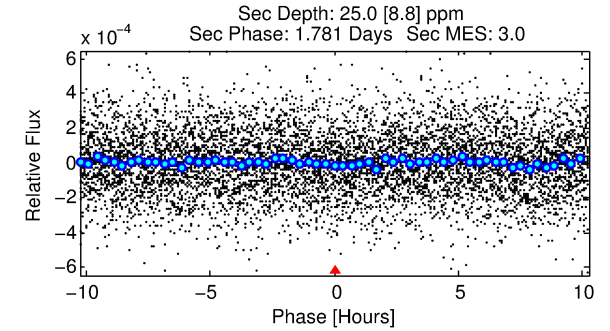
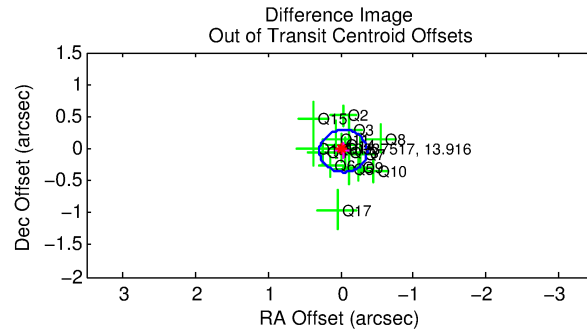
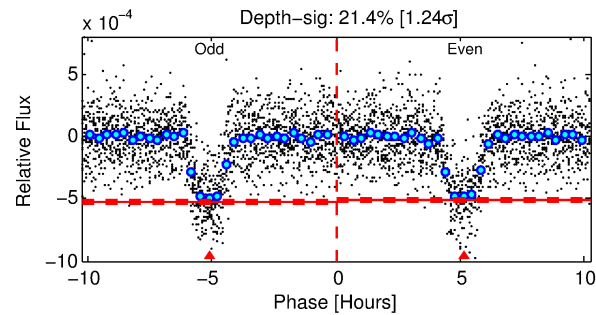
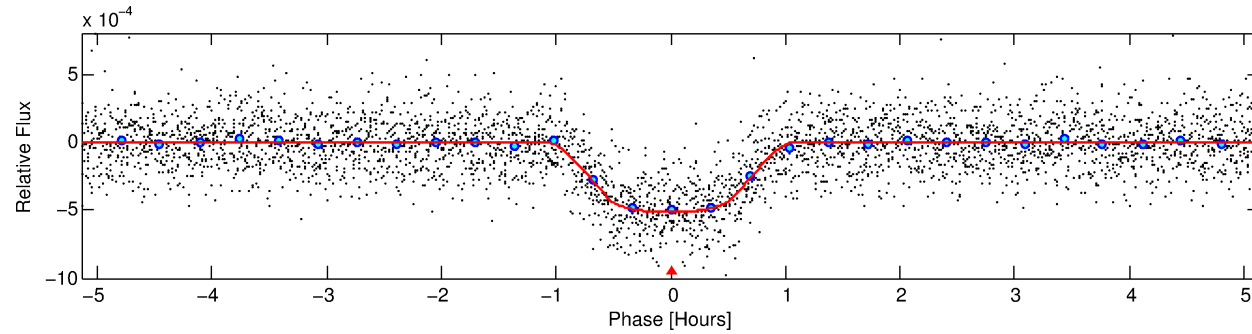
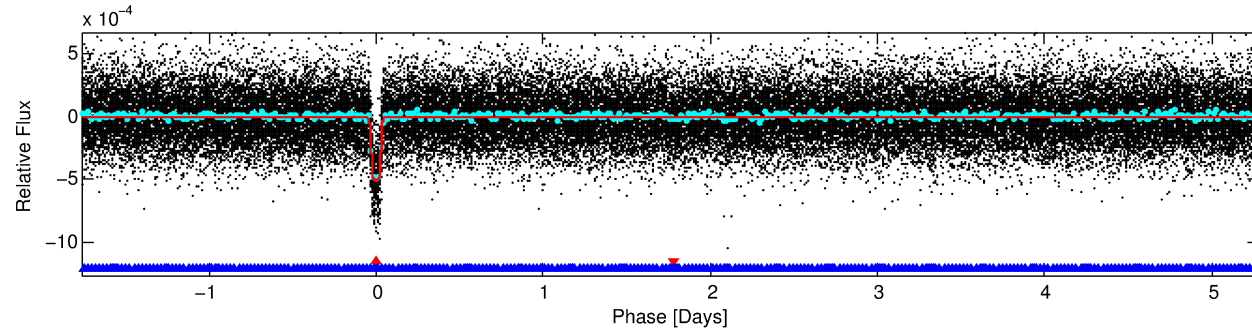
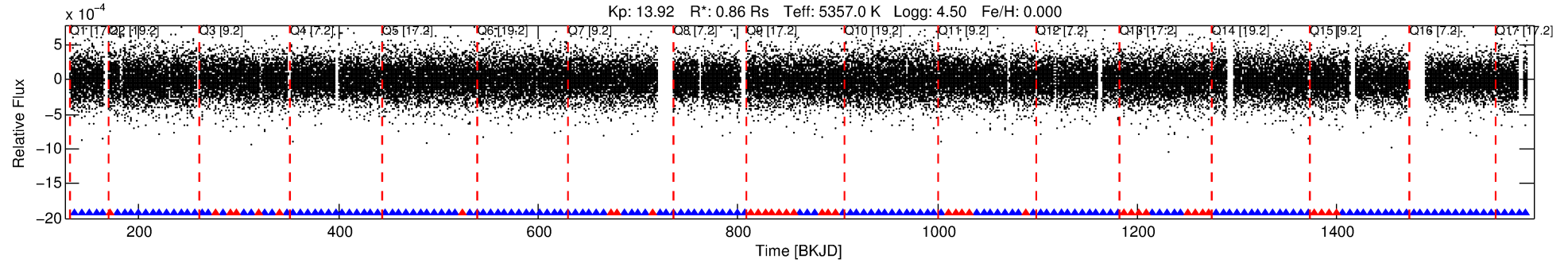
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 010337517-01

No Significant Match Found

# DV One-Page Summary

KIC: 10337517 Candidate: 1 of 2 Period: 7.054 d  
KOI: K01165.01 Corr: 0.960



## DV Fit Results:

Period = 7.05395 [0.00001] d  
Epoch = 136.3563 [0.0007] BKJD  
Rp/R\* = 0.0250 [0.0030]  
a/R\* = 15.85 [7.96]  
b = 0.89 [0.12]  
Seff = 117.67 [16.44]  
Teff = 840 [29] K  
Rp = 2.35 [0.35] Re  
a = 0.0683 [0.0051] AU  
Ag = 11.62 [5.15] [2.06 $\sigma$ ]  
Teffp = 2397 [261] K [5.93 $\sigma$ ]

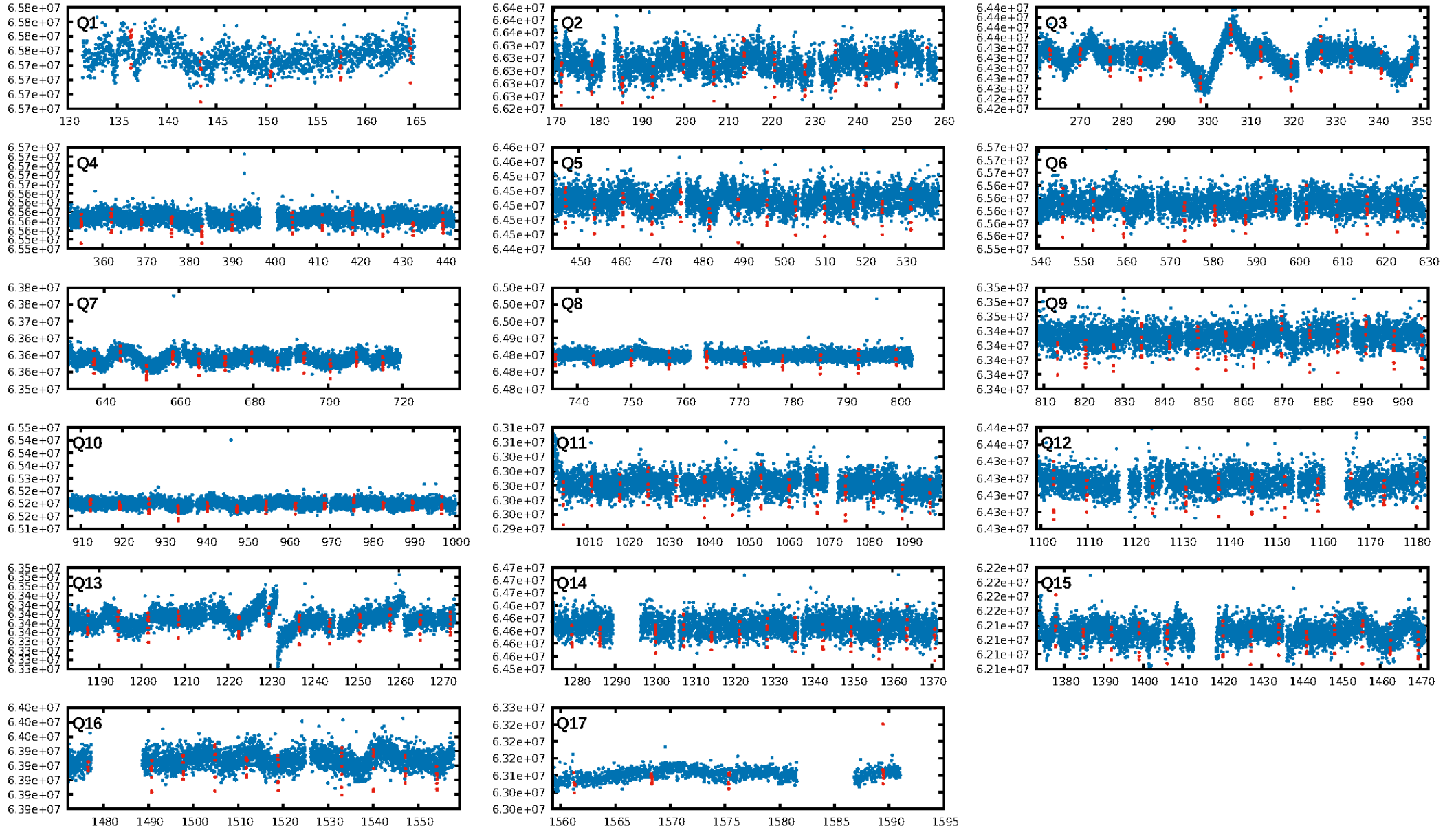
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [21.84 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 100.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 0.80 [144/181]  
GhostDiagnostic-chr: 9.902  
Centroid-sig: 18.9%  
Centroid-so: 0.260 arcsec [1.15 $\sigma$ ]  
OotOffset-rm: 0.052 arcsec [0.48 $\sigma$ ]  
KicOffset-rm: 0.167 arcsec [1.69 $\sigma$ ]  
OotOffset-st: 4/4/4/4 [16]  
KicOffset-st: 4/4/4/4 [16]  
DiffImageQuality-fgm: 1.00 [16/16]  
DiffImageOverlap-fno: 1.00 [17/17]

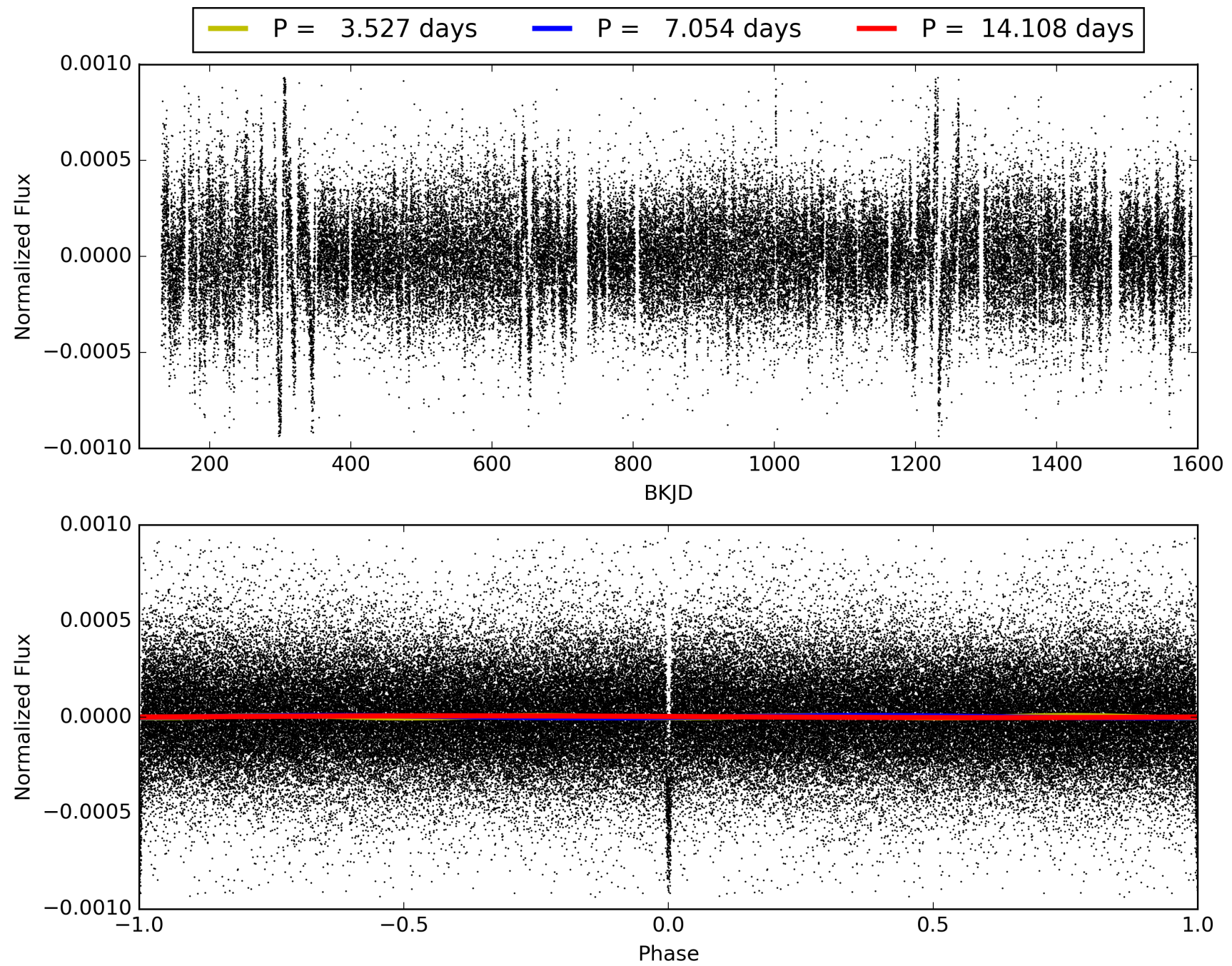
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 05:25:10 Z

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

# TCE 010337517-01, PDC Light Curves

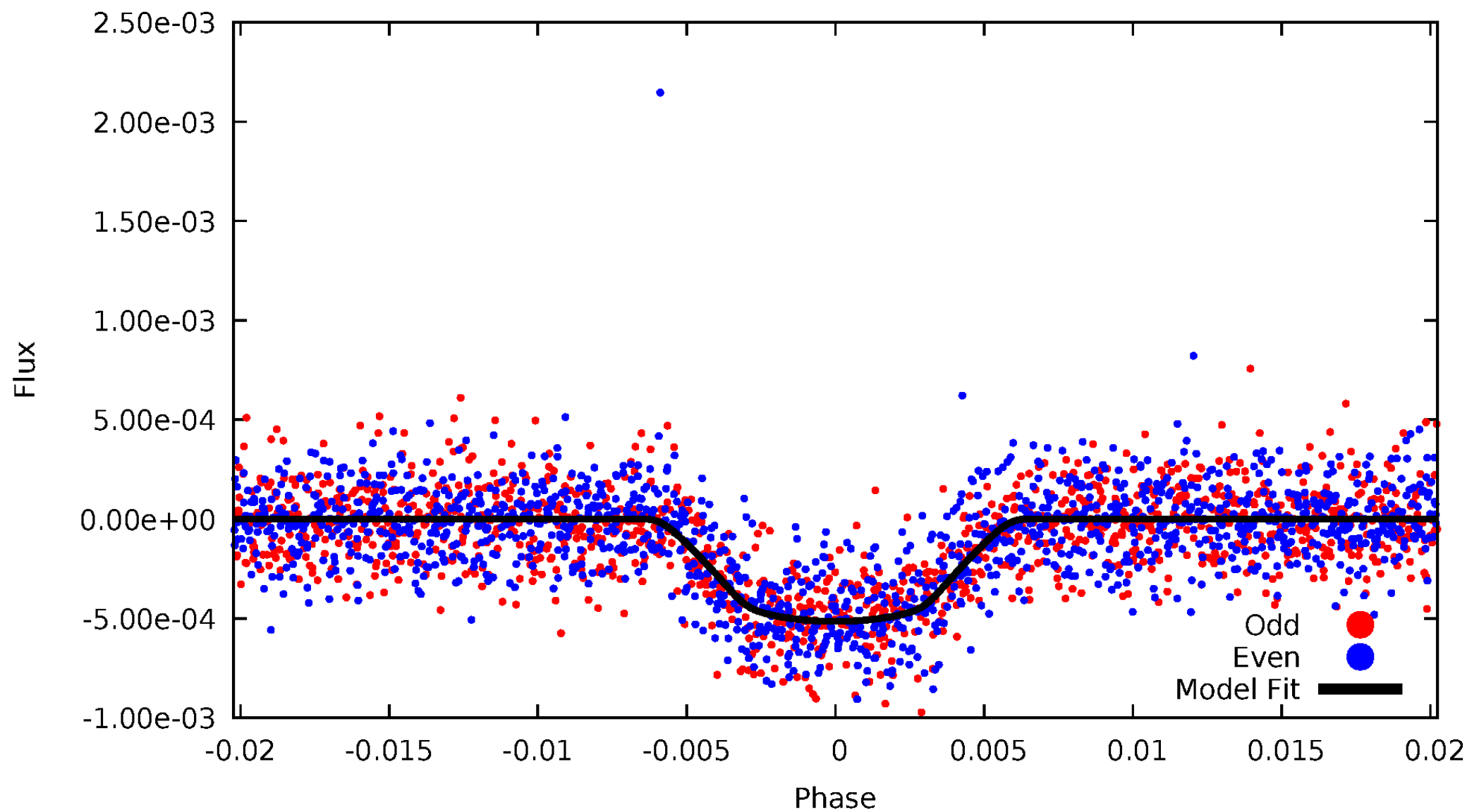


TCE 010337517-01



# DV Odd/Even

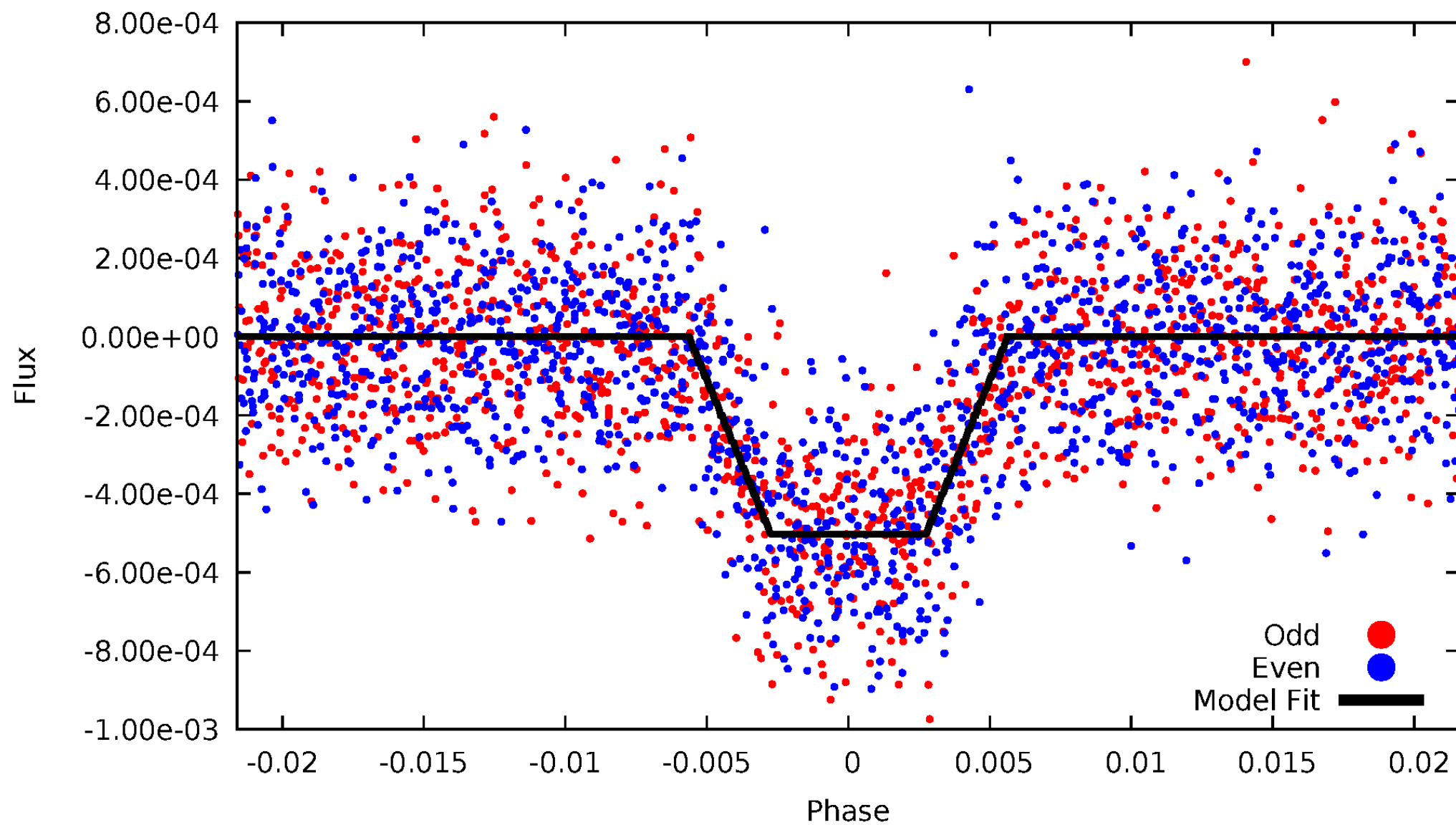
TCE 010337517-01





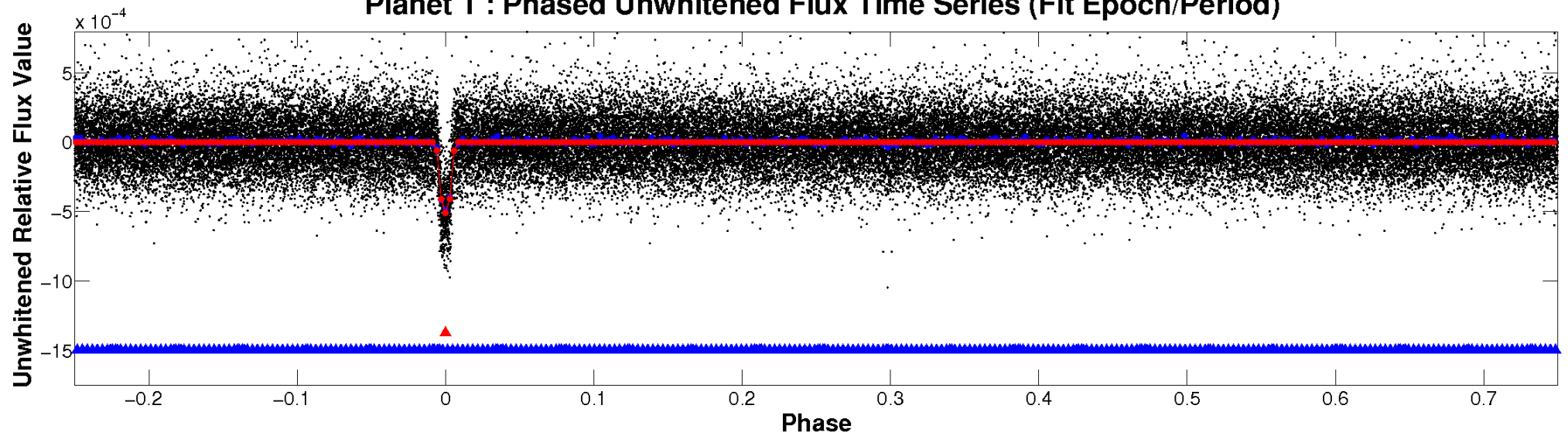
# ALT Odd/Even

TCE 010337517-01

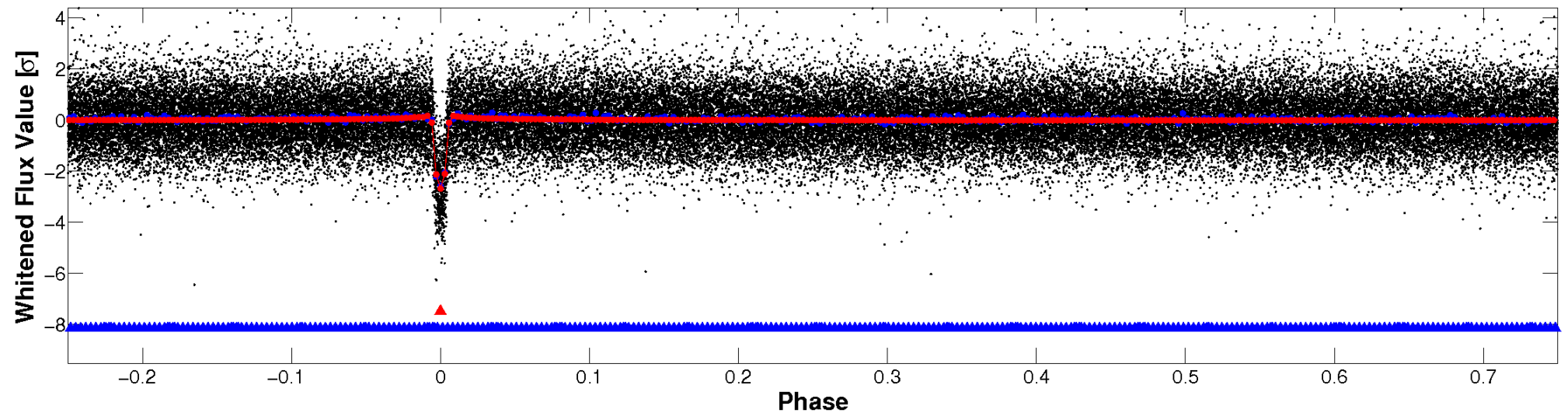


# Non-Whitened Vs. Whitened Light Curve

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

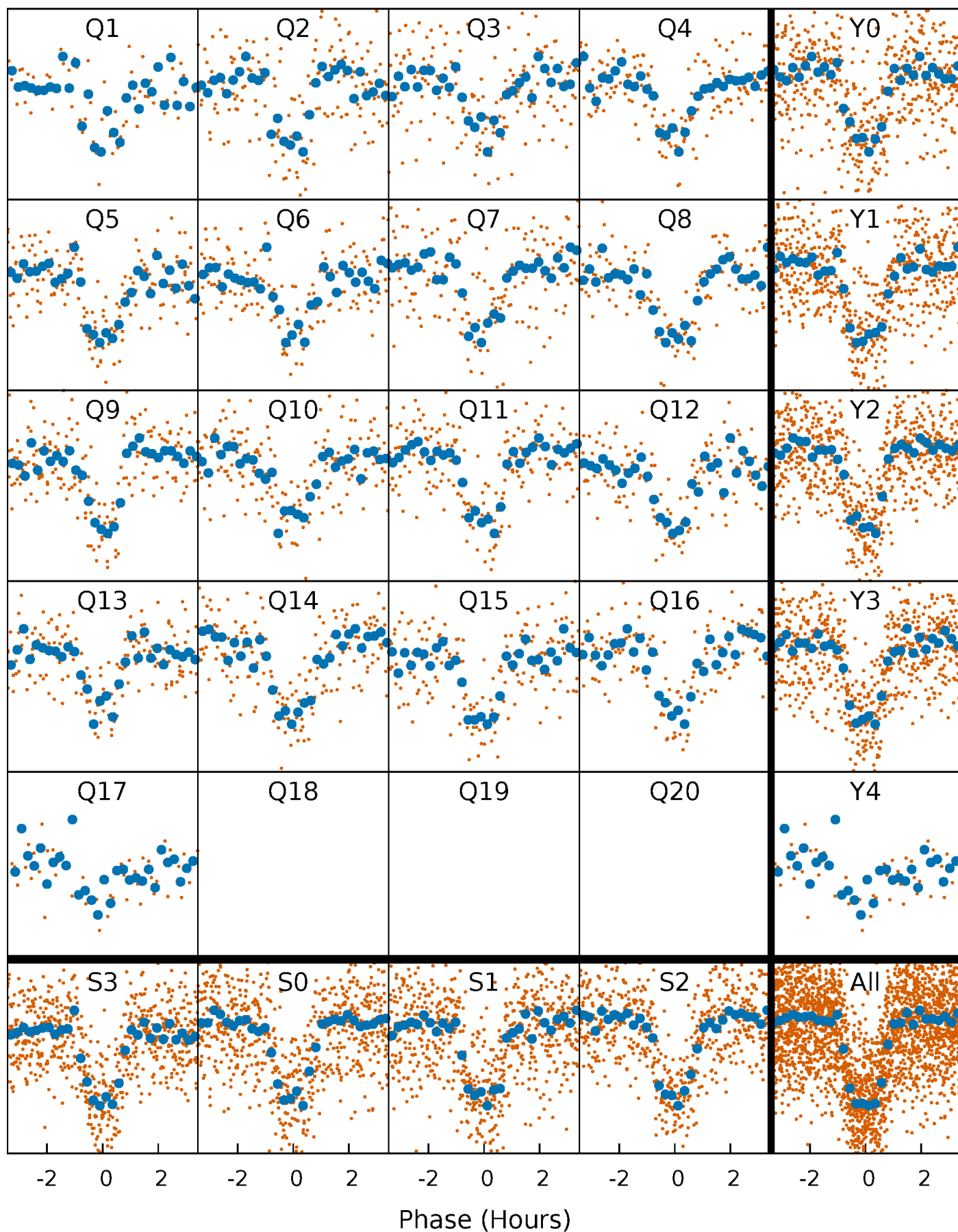


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

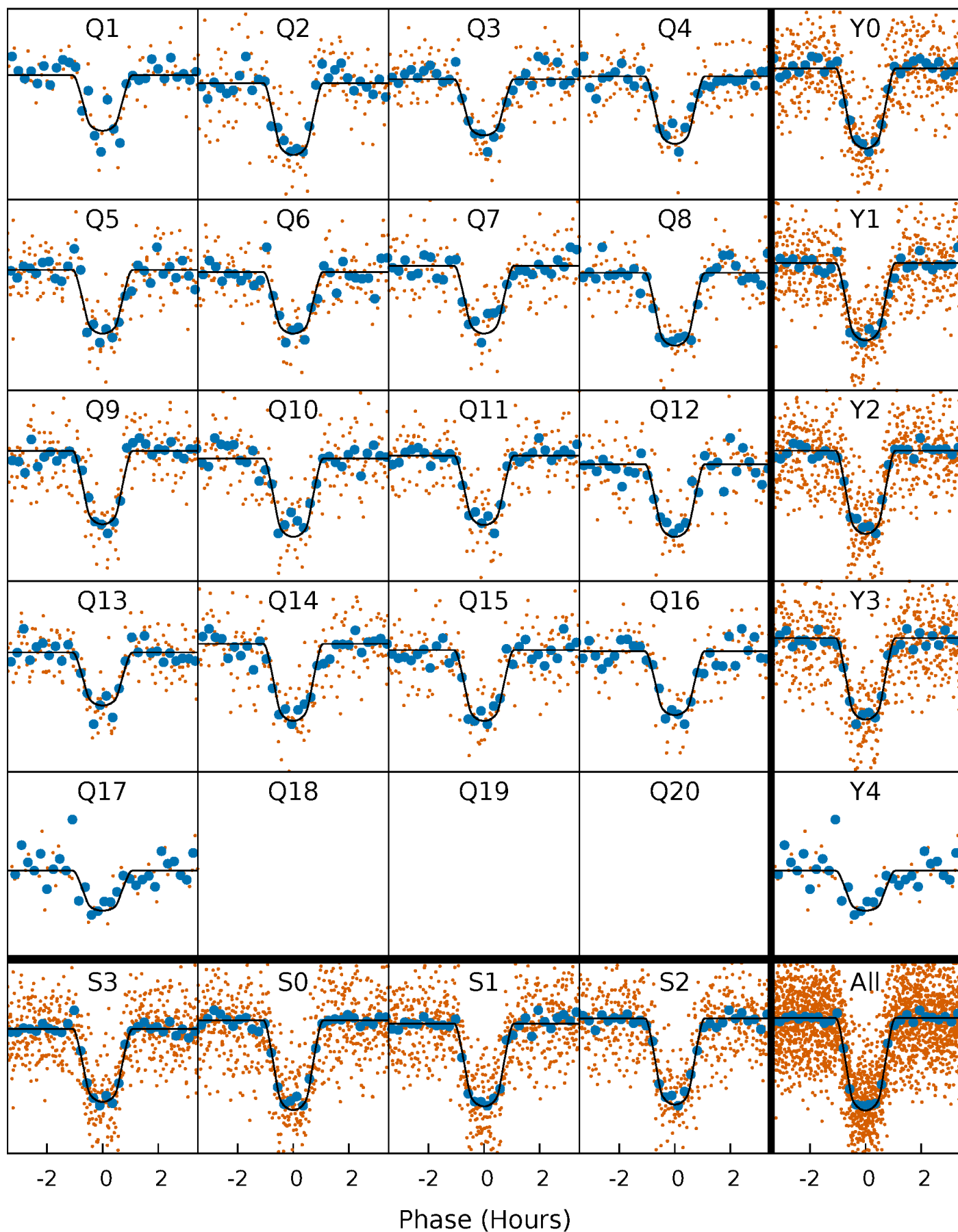
TCE 010337517-01 P= 7.053948 Days  $T_0=136.356253$  (BKJD)





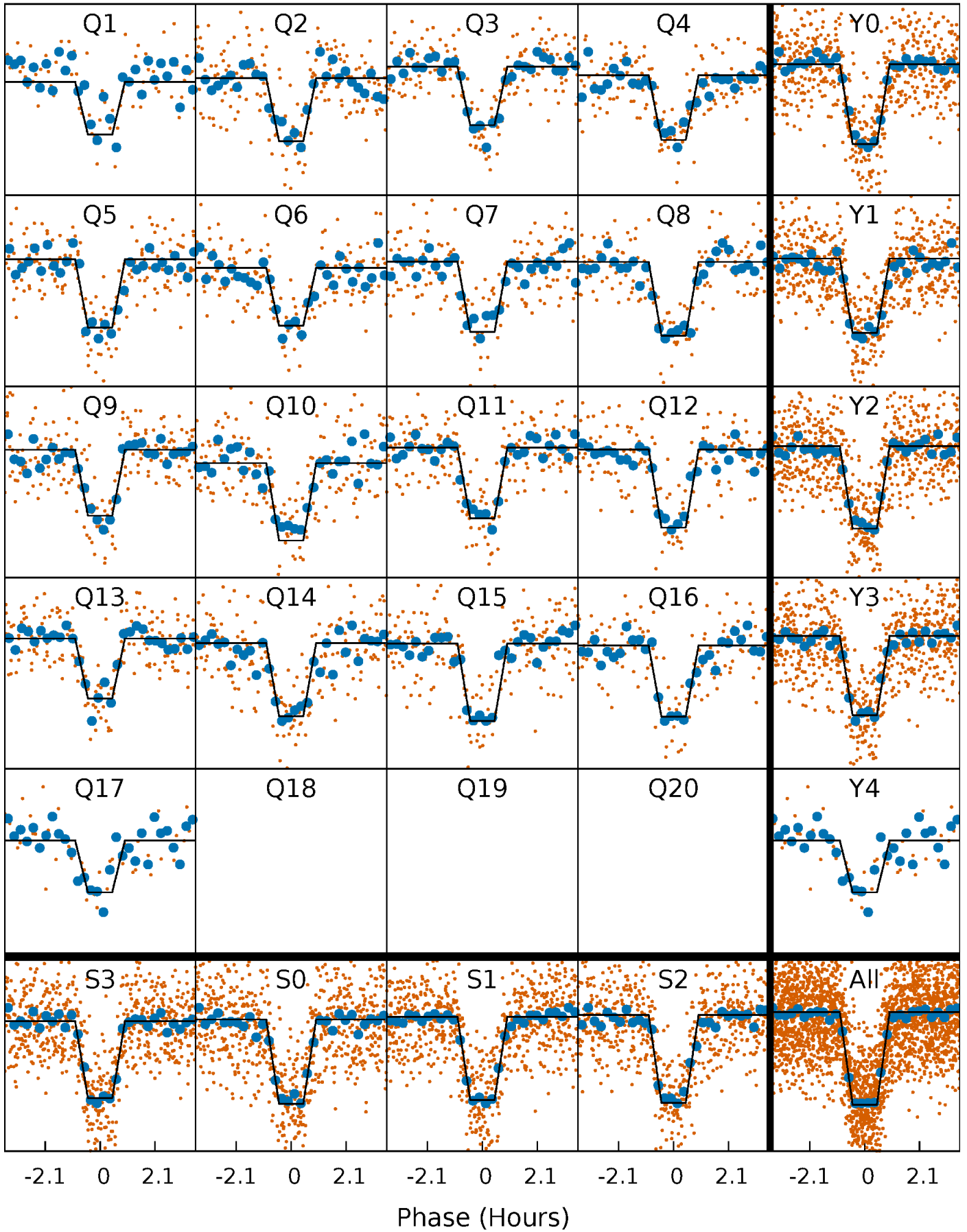
# DV Quarter-Phased Transit Curves

TCE 010337517-01 P= 7.053948 Days  $T_0=136.356253$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

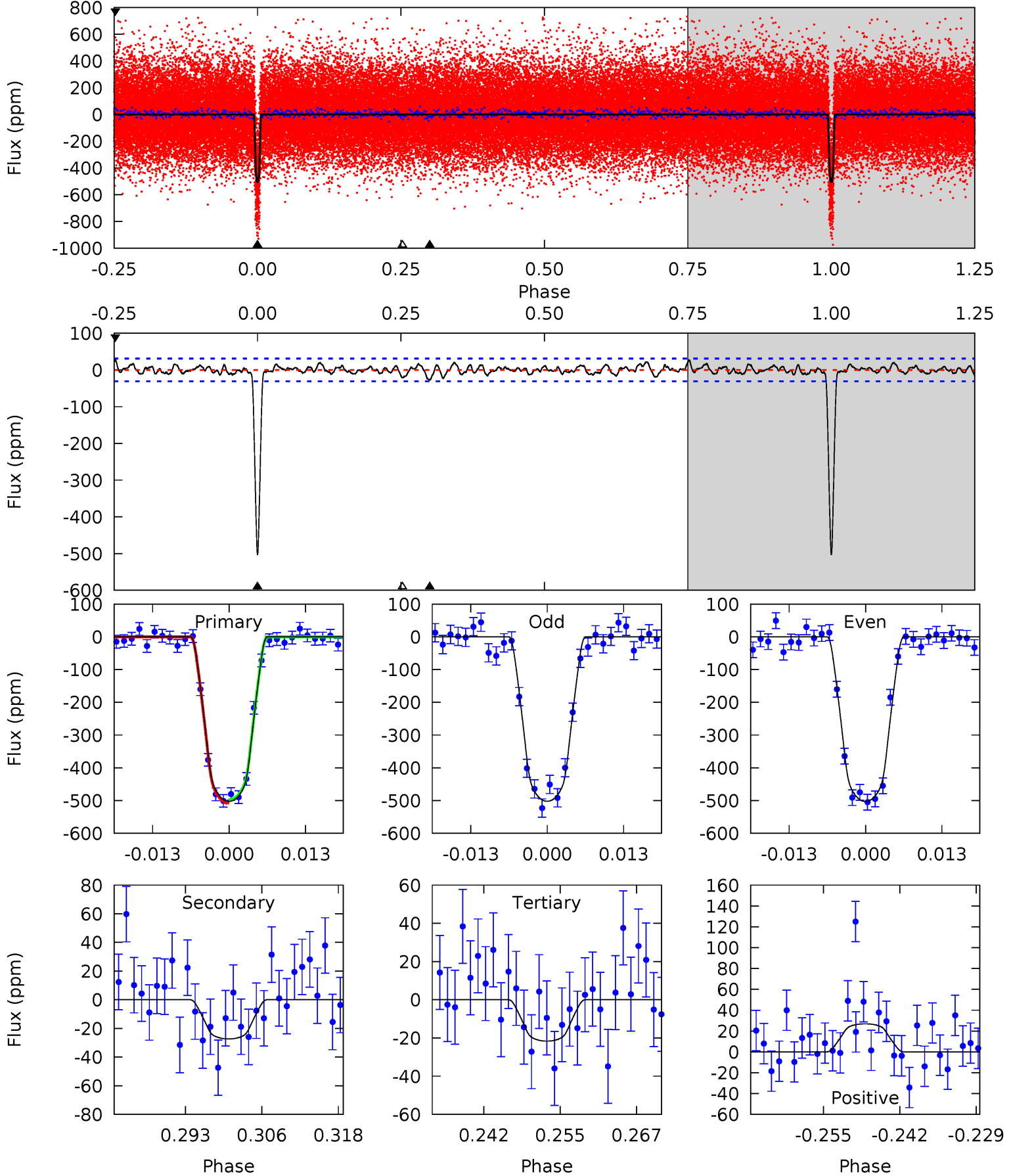
TCE 010337517-01   P= 7.053952 Days    $T_0=136.355469$  (BKJD)



# DV Model-Shift Uniqueness Test

010337517-01, P = 7.053948 Days, E = 129.302305 Days

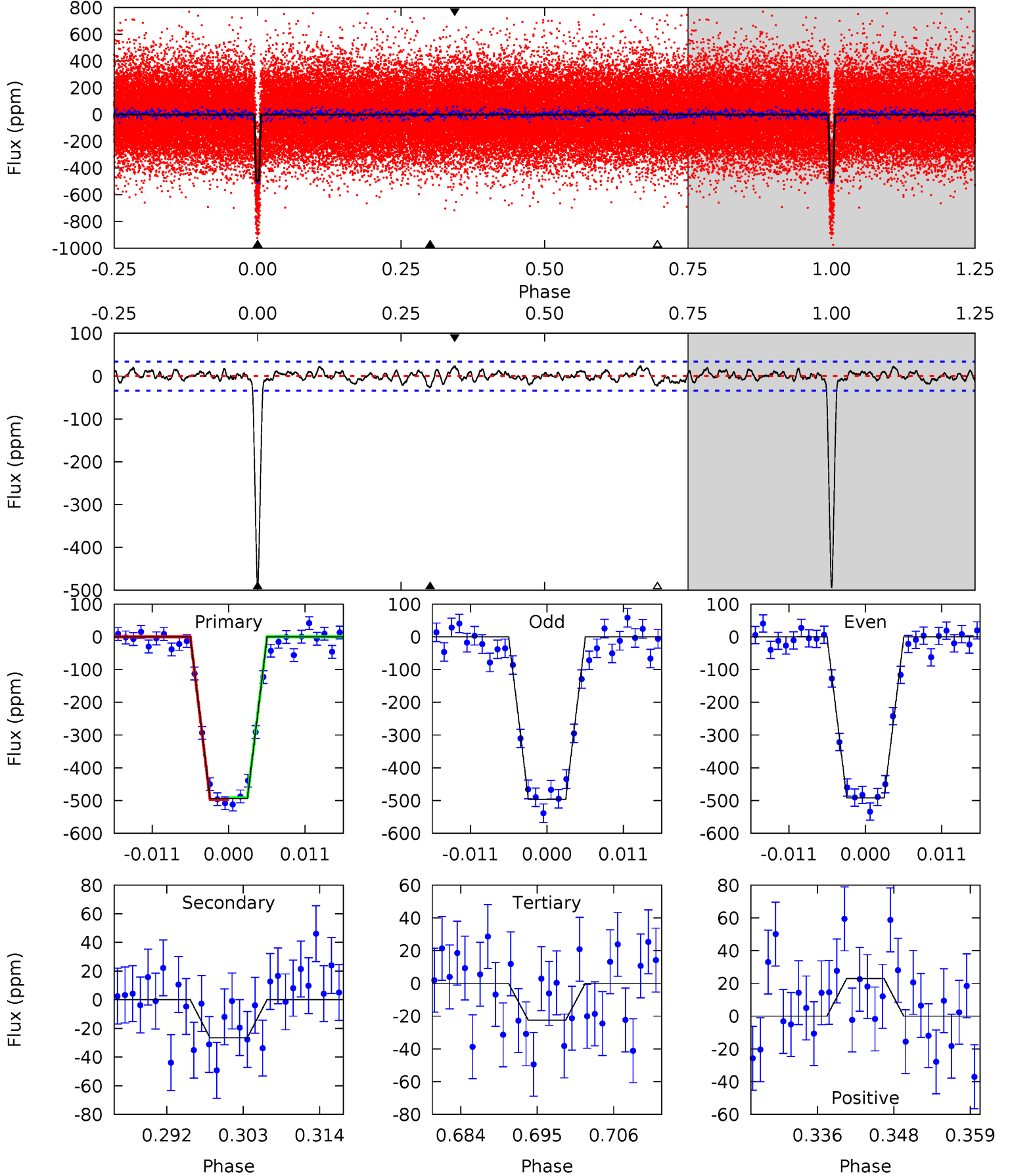
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
81.0	4.41	3.49	4.33	4.98	2.49	1.35	77.5	76.6	0.92	0.07	0.04	1.00	0.05	0.76



# Alt Model-Shift Uniqueness Test

010337517-01, P = 7.053952 Days, E = 129.301517 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
72.7	3.91	3.31	3.38	5.00	2.54	1.30	69.4	69.4	0.60	0.53	0.36	1.01	0.04	0.37



### Stellar Parameters For KIC 010337517

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5357^{+107}_{-107}$	$4.498^{+0.058}_{-0.065}$	$0.000^{+0.150}_{-0.150}$	$0.863^{+0.073}_{-0.065}$	$0.854^{+0.054}_{-0.045}$	$1.873^{+0.454}_{-0.397}$
	+2%/-2%	+1%/-1%	+inf%/-inf%	+8%/-8%	+6%/-5%	+24%/-21%
Source	SPE57	SPE57	SPE57	DSEP		

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

### Secondary Eclipse Parameters for KIC 010337517-01 / KOI 1165.01

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-27 \pm 6$	$2.35^{+0.33}_{-0.29}$	$1179^{+33}_{-37}$	$3064^{+158}_{-153}$	$13^{+5}_{-4}$
Alt.	$-27 \pm 7$	$2.13^{+0.31}_{-0.33}$	$1173^{+35}_{-31}$	$3139^{+190}_{-178}$	$15^{+7}_{-5}$

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



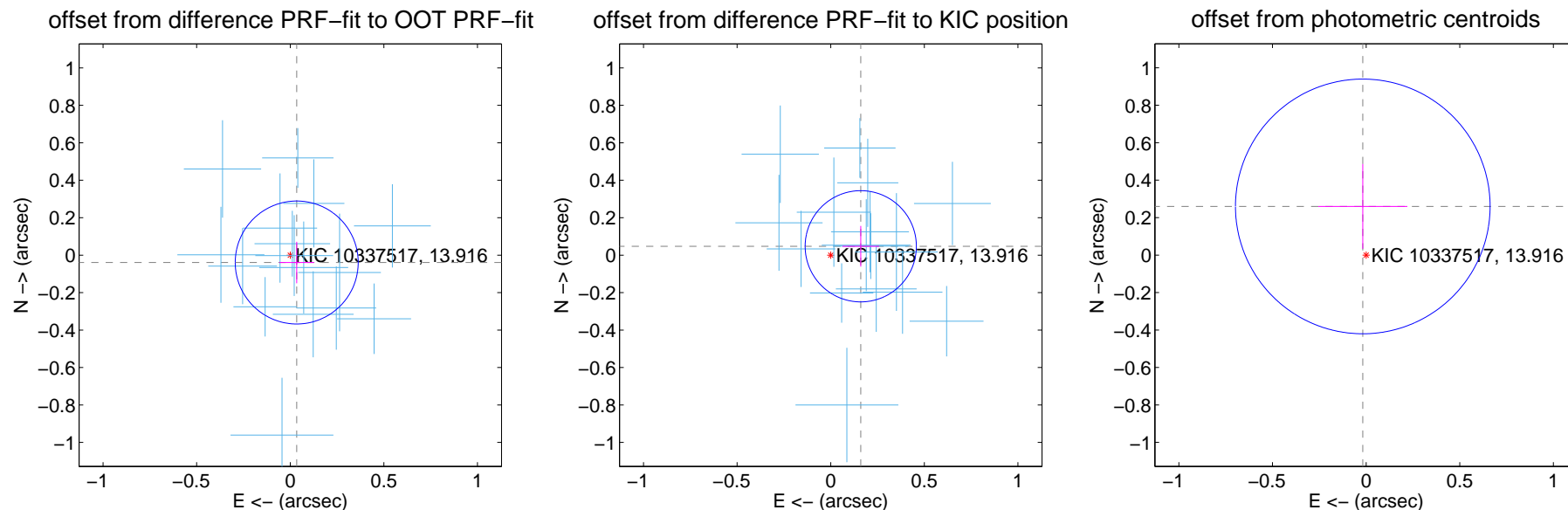
## DV Centroid Data

Supplemental centroid analysis for 010337517-01. Kepler magnitude: 13.92. Transit SNR 55.65

There are 16 quarters with good PRF difference image offsets

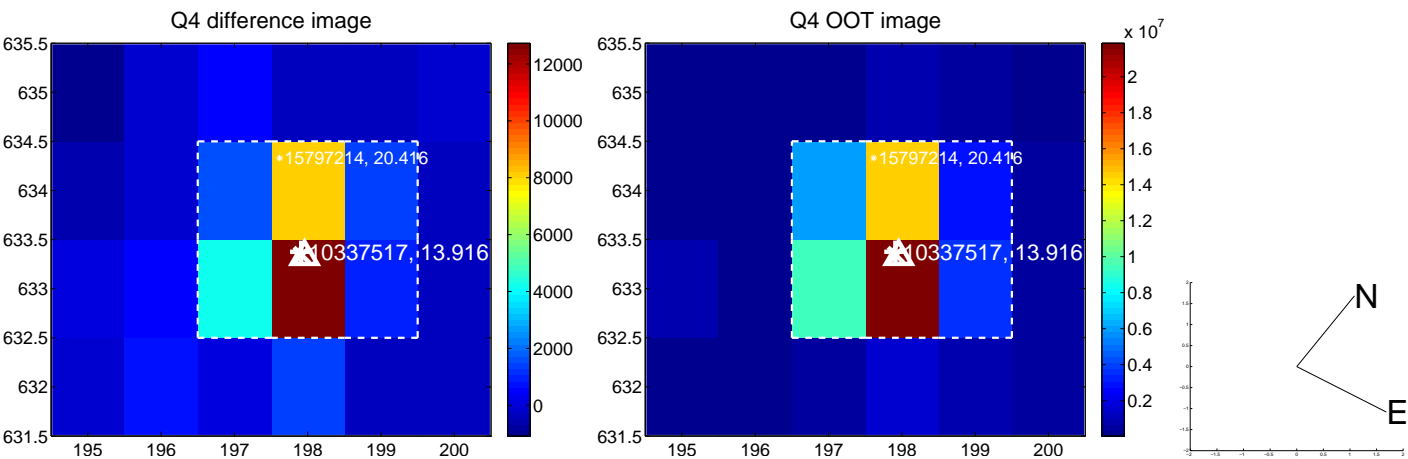
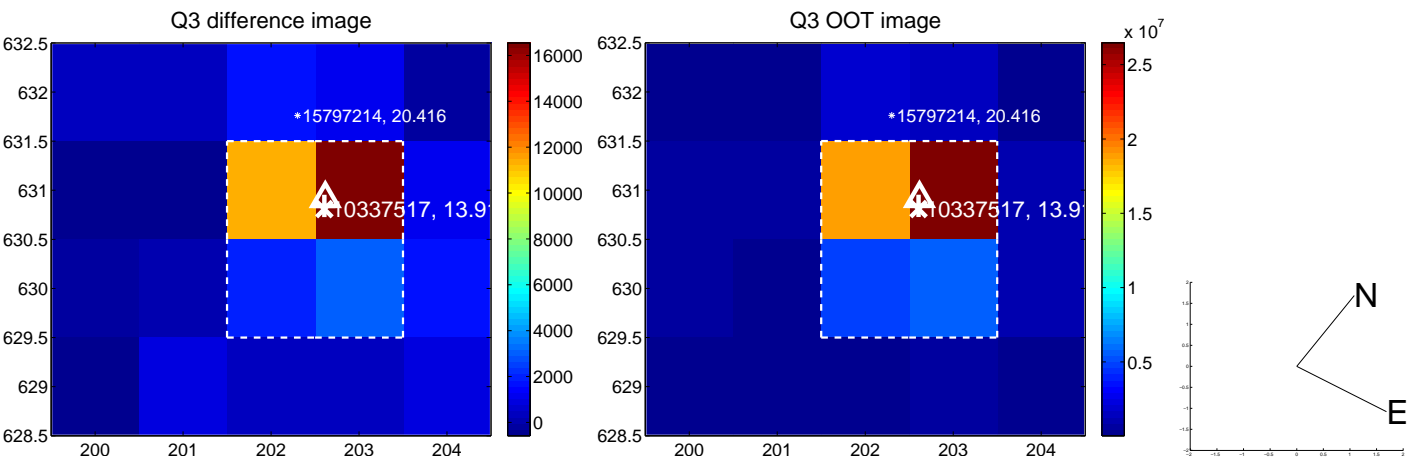
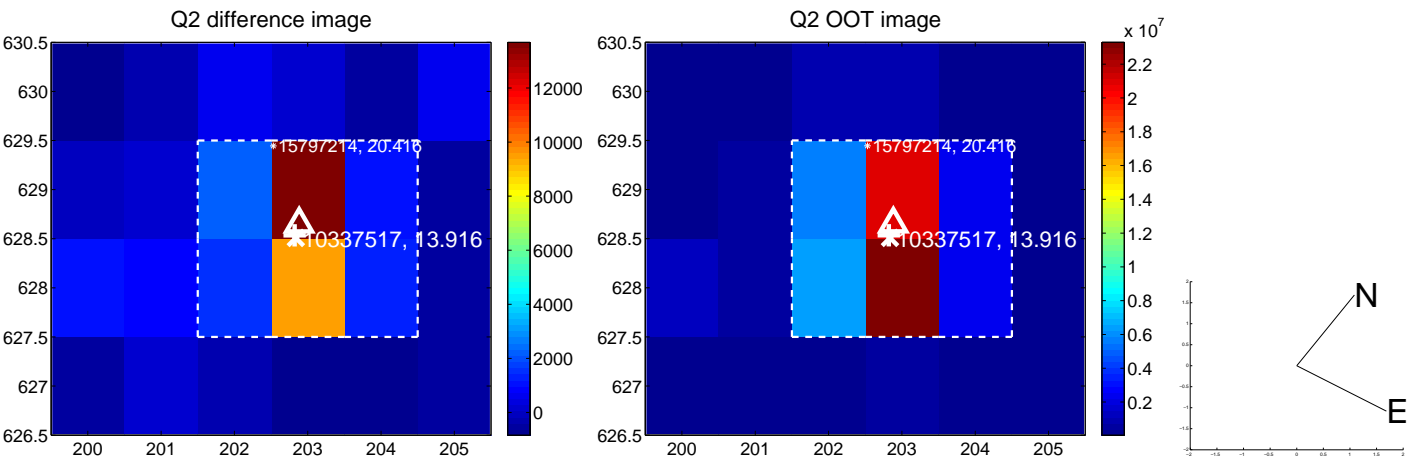
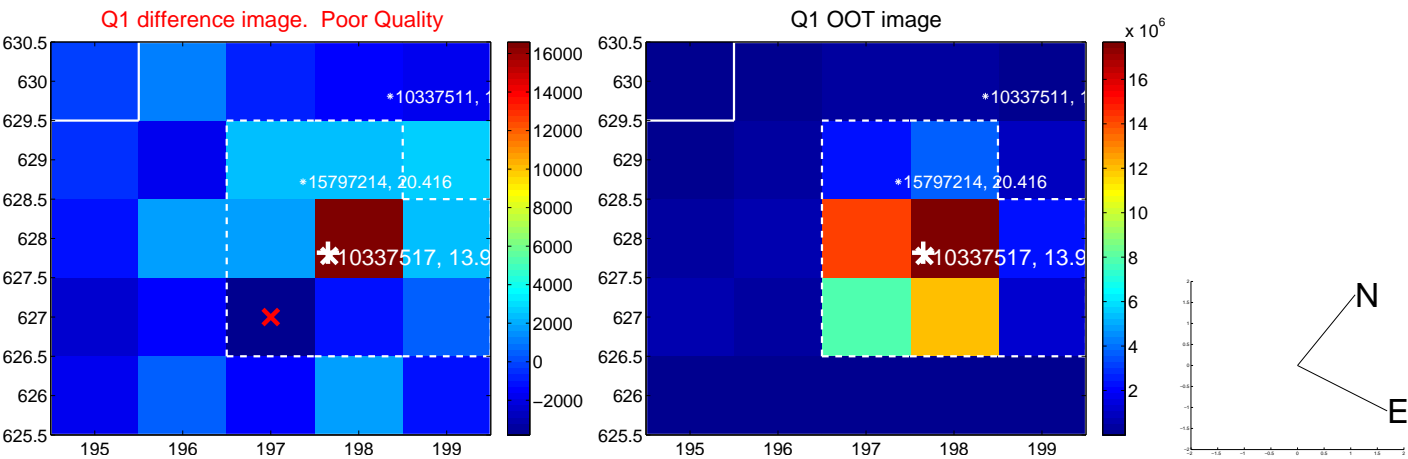
The direct PRF centroid is offset from the target star catalog position by about 0.21 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.052 \pm 0.109$	0.48	$-0.035 \pm 0.093$	$-0.039 \pm 0.111$
PRF-fit source offset from KIC position	$0.167 \pm 0.099$	1.69	$-0.160 \pm 0.098$	$0.047 \pm 0.109$
photometric centroid source offset	$0.26 \pm 0.23$	1.15	$0.02 \pm 0.24$	$0.26 \pm 0.23$

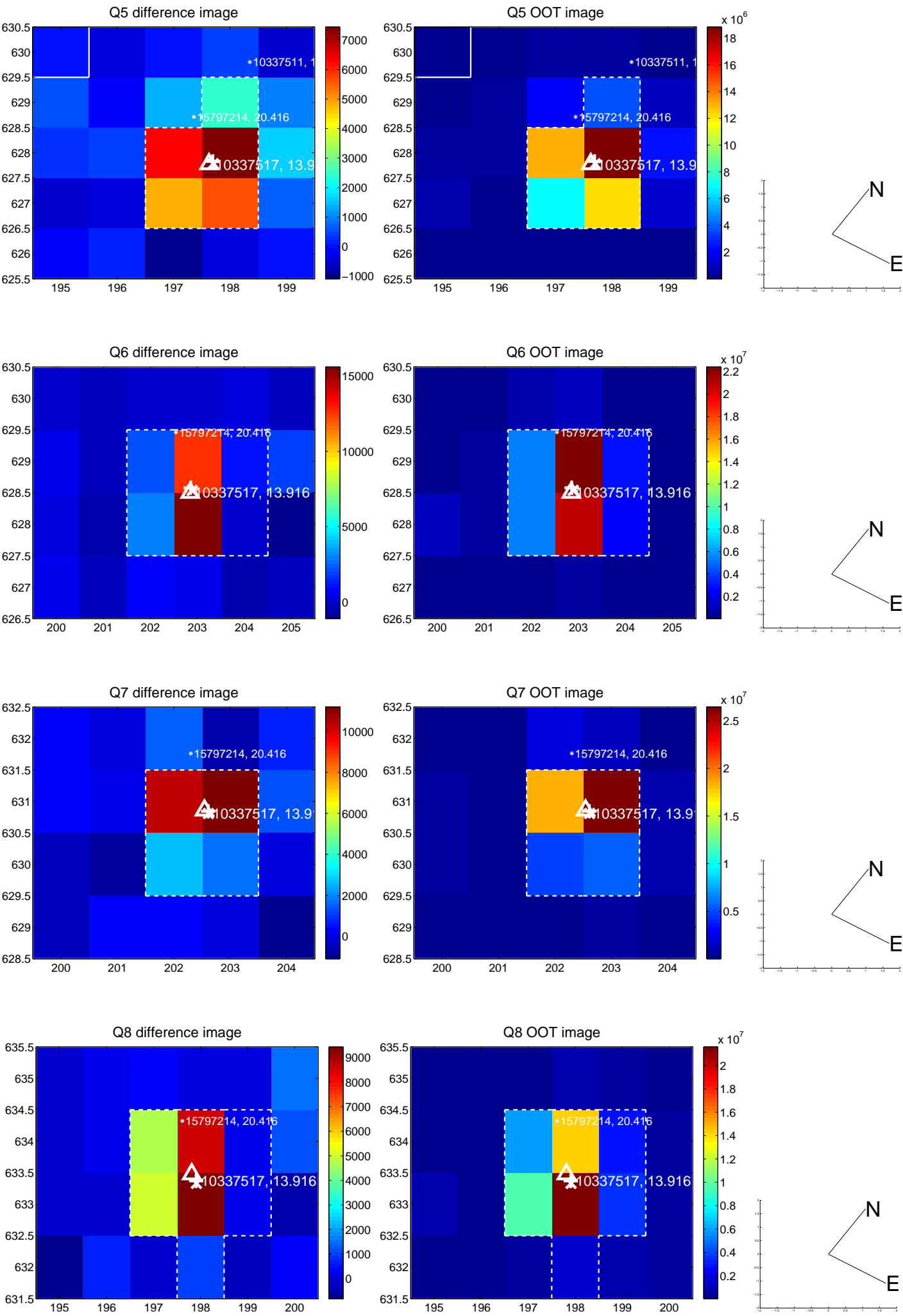


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

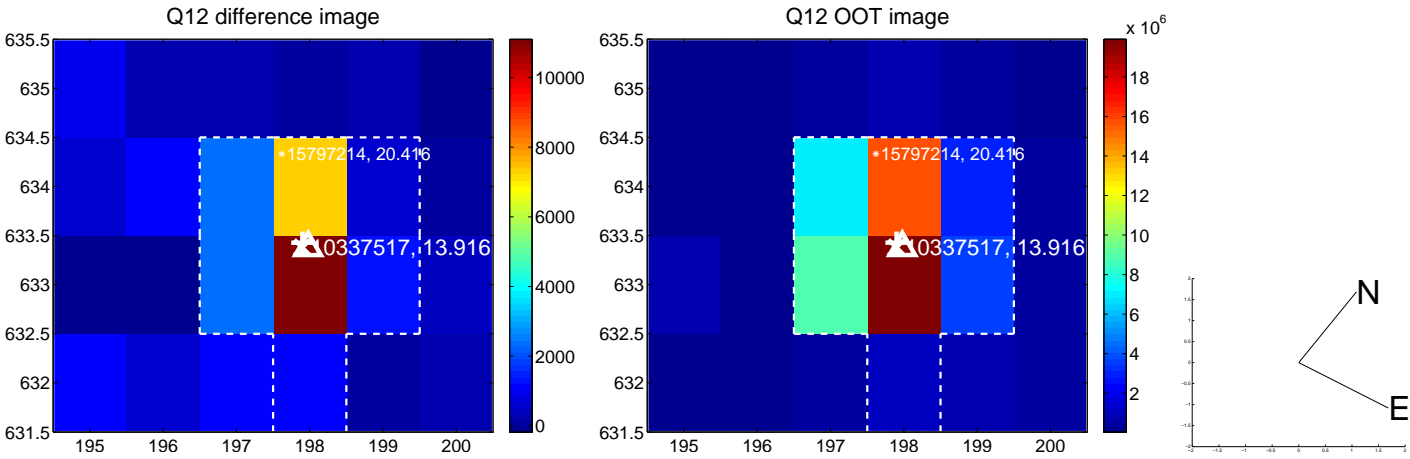
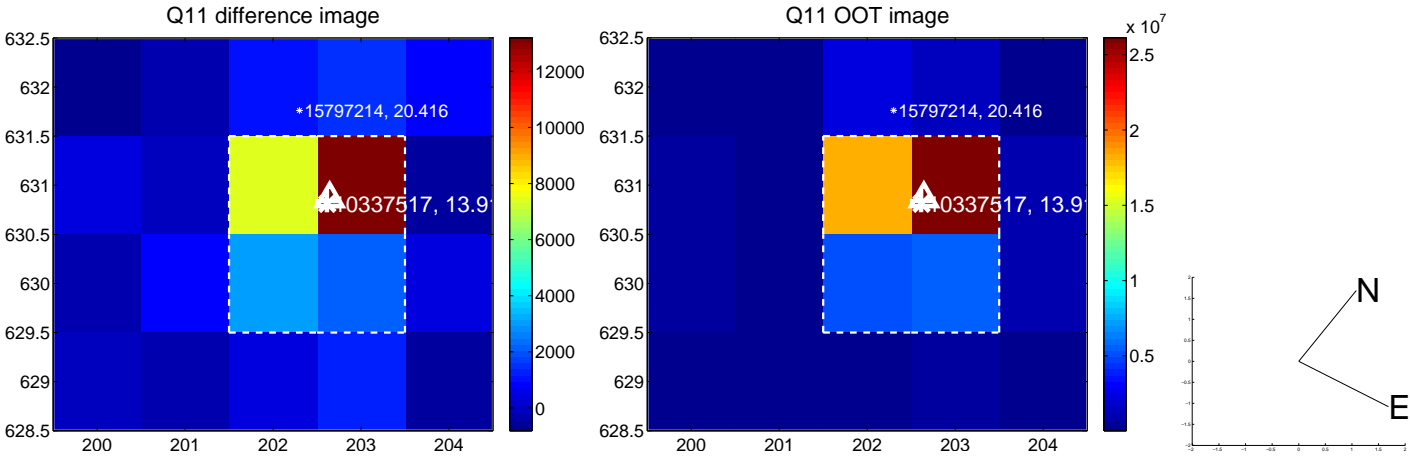
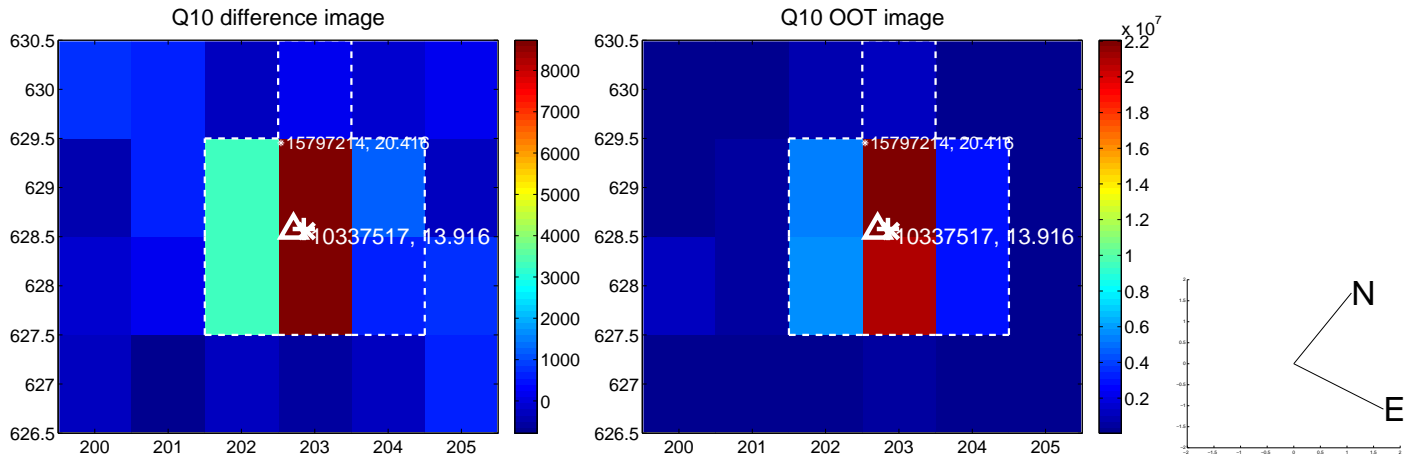
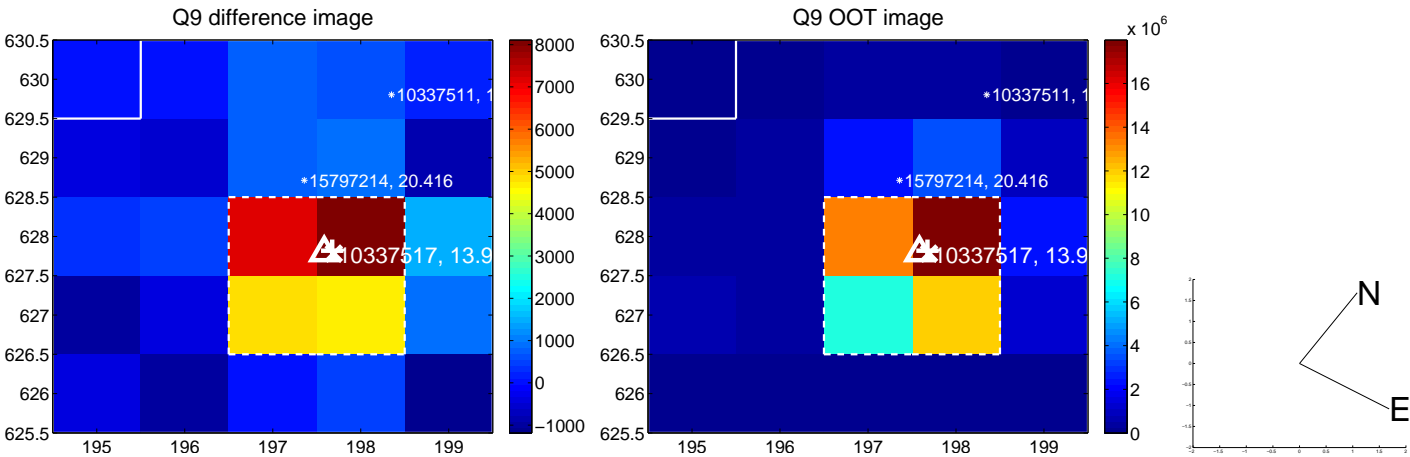
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



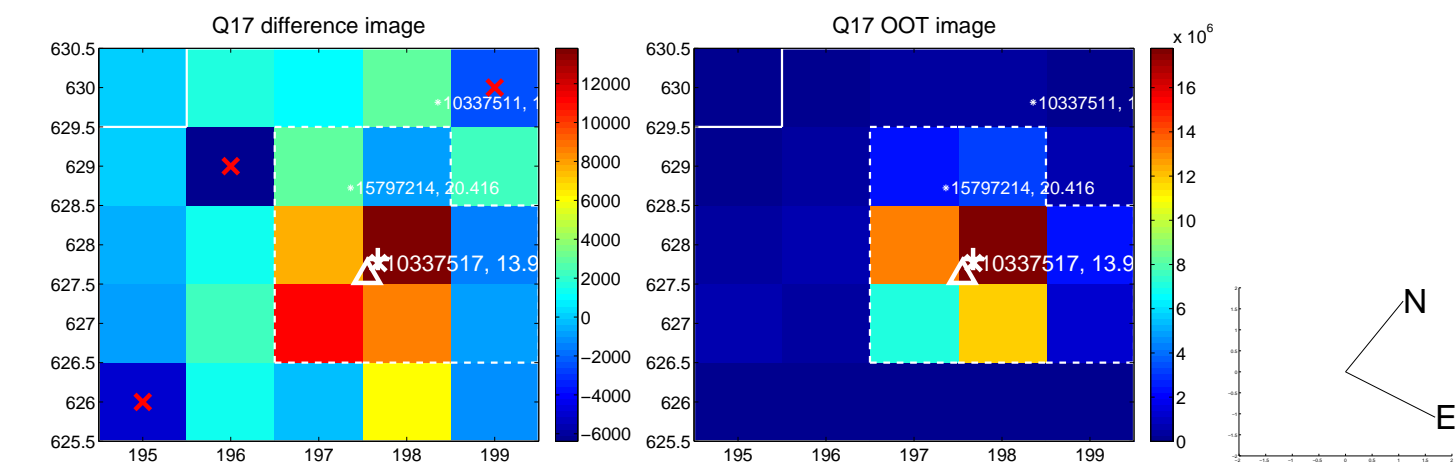
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



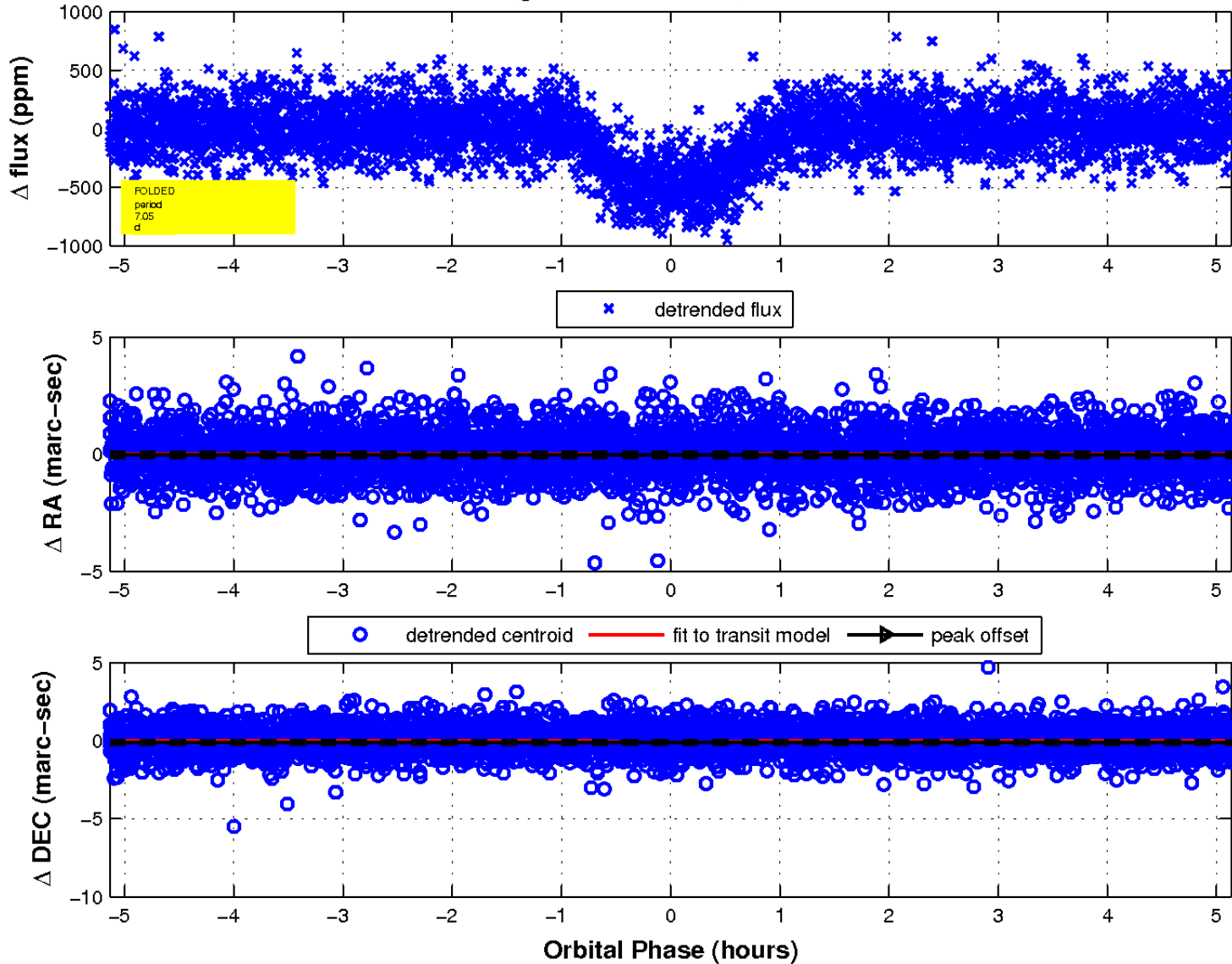




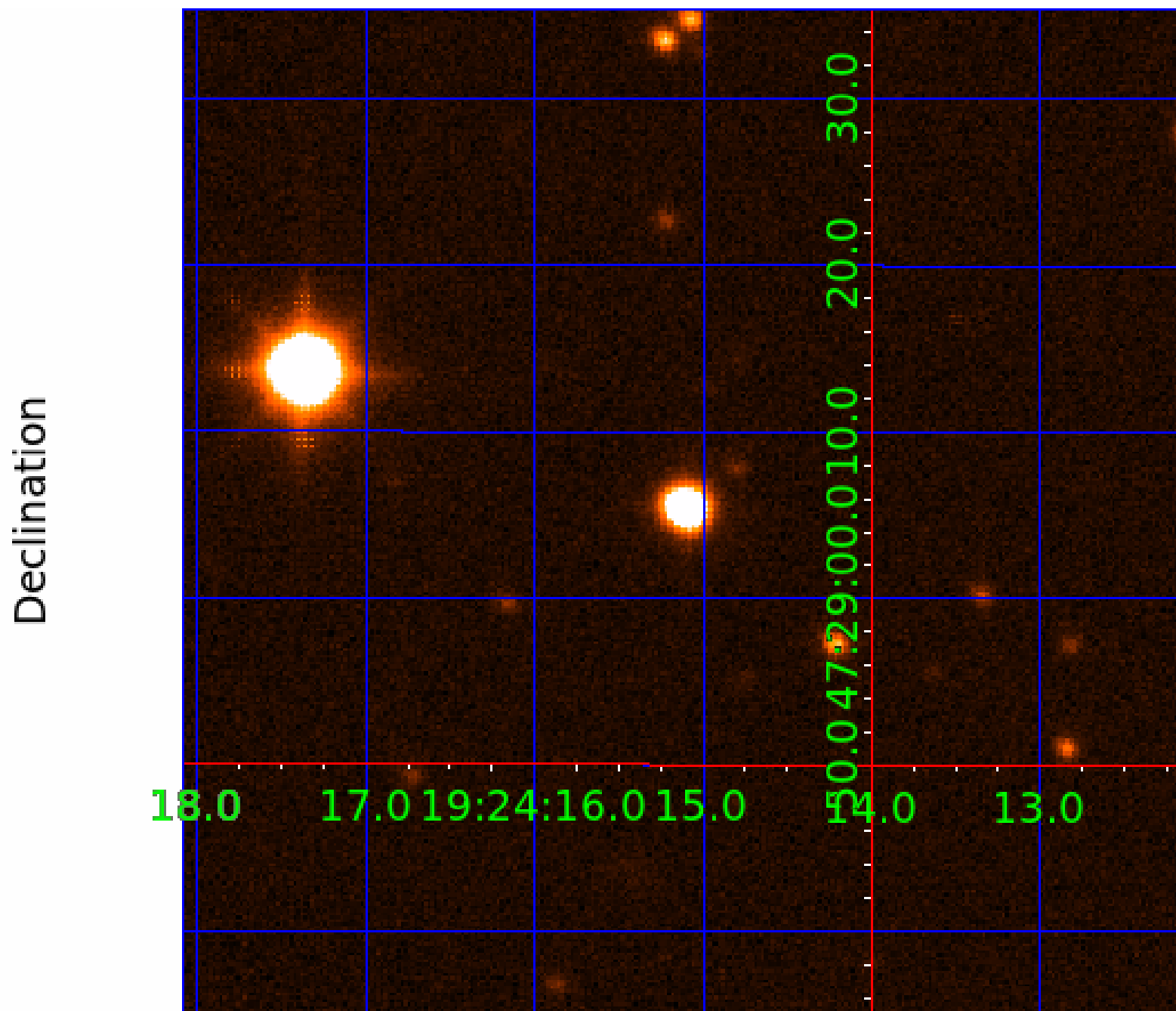
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



fluxWeightedCentroids, Planet 1 of 2



UKIRT Image



# KIC 010337517

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010337517-01	OBS	1165.01	7.053948	136.356253	515.1	1.712	48.3	55.7	0.86	5357	2.35	117.67
010337517-02	OBS	1165.02	4.292669	134.796082	64.6	2.505	9.9	10.6	0.86	5357	0.83	228.18

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010337517-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
010337517-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT

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

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

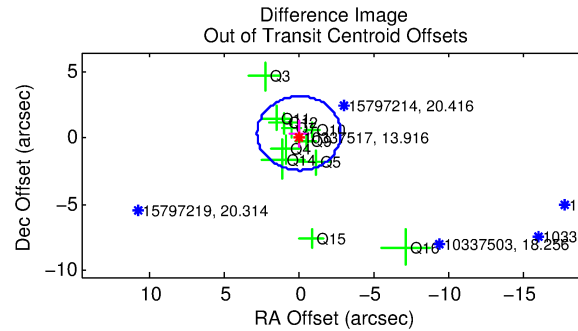
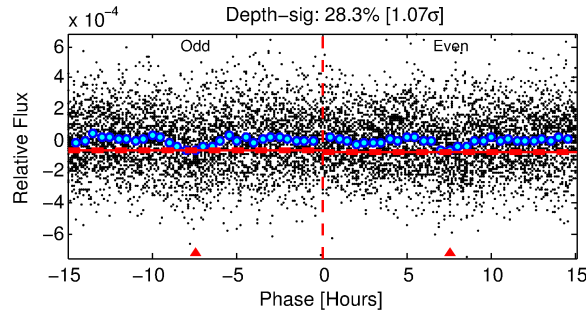
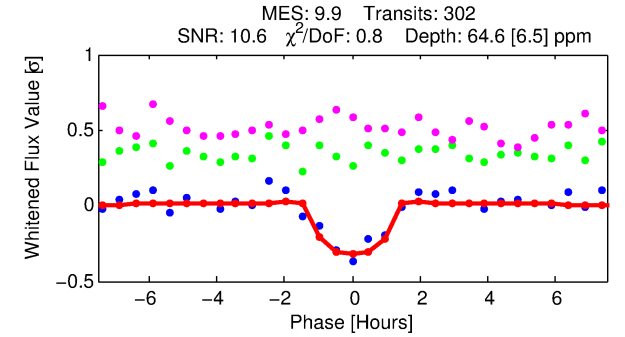
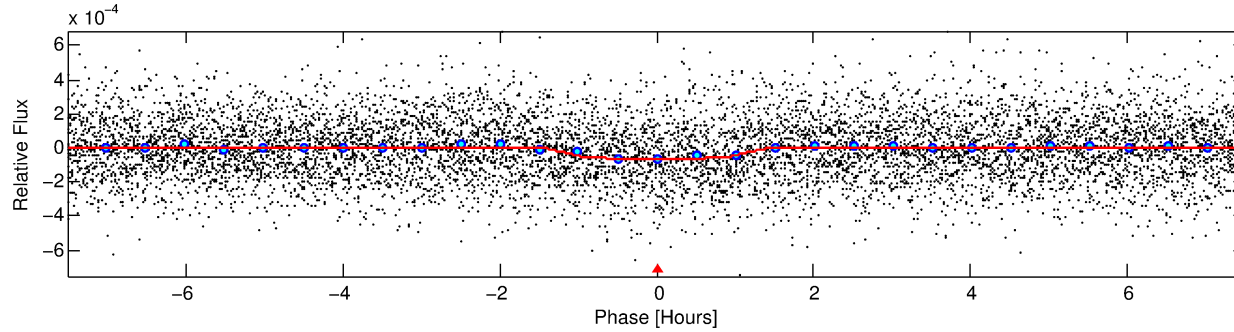
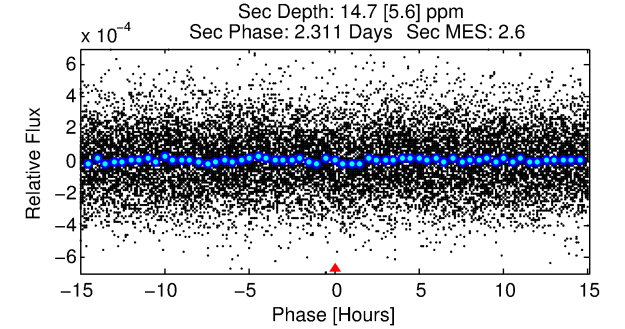
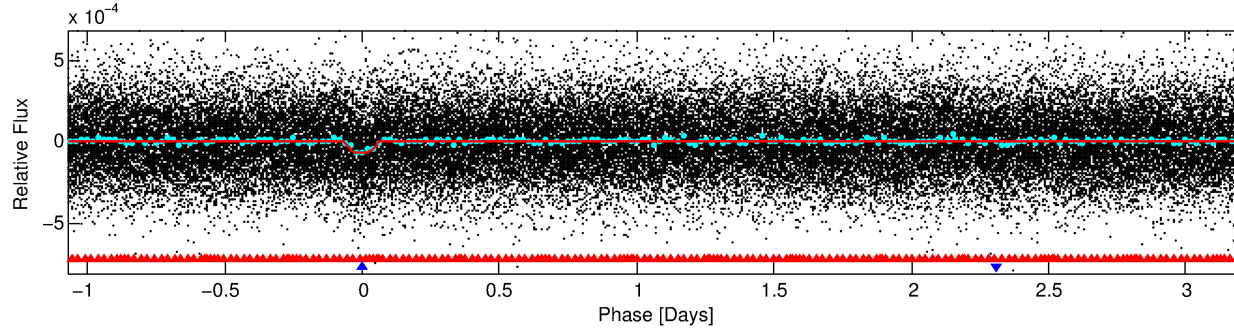
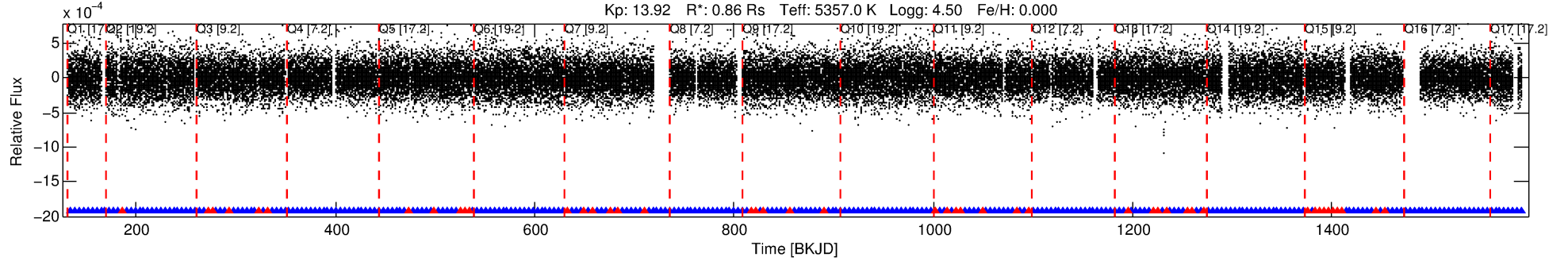
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 010337517-02

No Significant Match Found

# DV One-Page Summary

KIC: 10337517 Candidate: 2 of 2 Period: 4.293 d  
KOI: K01165.02 Corr: 0.968



## DV Fit Results:

Period = 4.29267 [0.00003] d  
Epoch = 134.7961 [0.0041] BKJD  
Rp/R\* = 0.0089 [0.0059]  
a/R\* = 6.08 [17.01]  
b = 0.90 [0.63]  
Seff = 228.18 [31.88]  
Teq = 991 [35] K  
Rp = 0.83 [0.56] Re  
a = 0.0491 [0.0037] AU  
Ag = 27.99 [38.69] [0.70σ]  
Teffp = 3525 [1216] K [2.08σ]

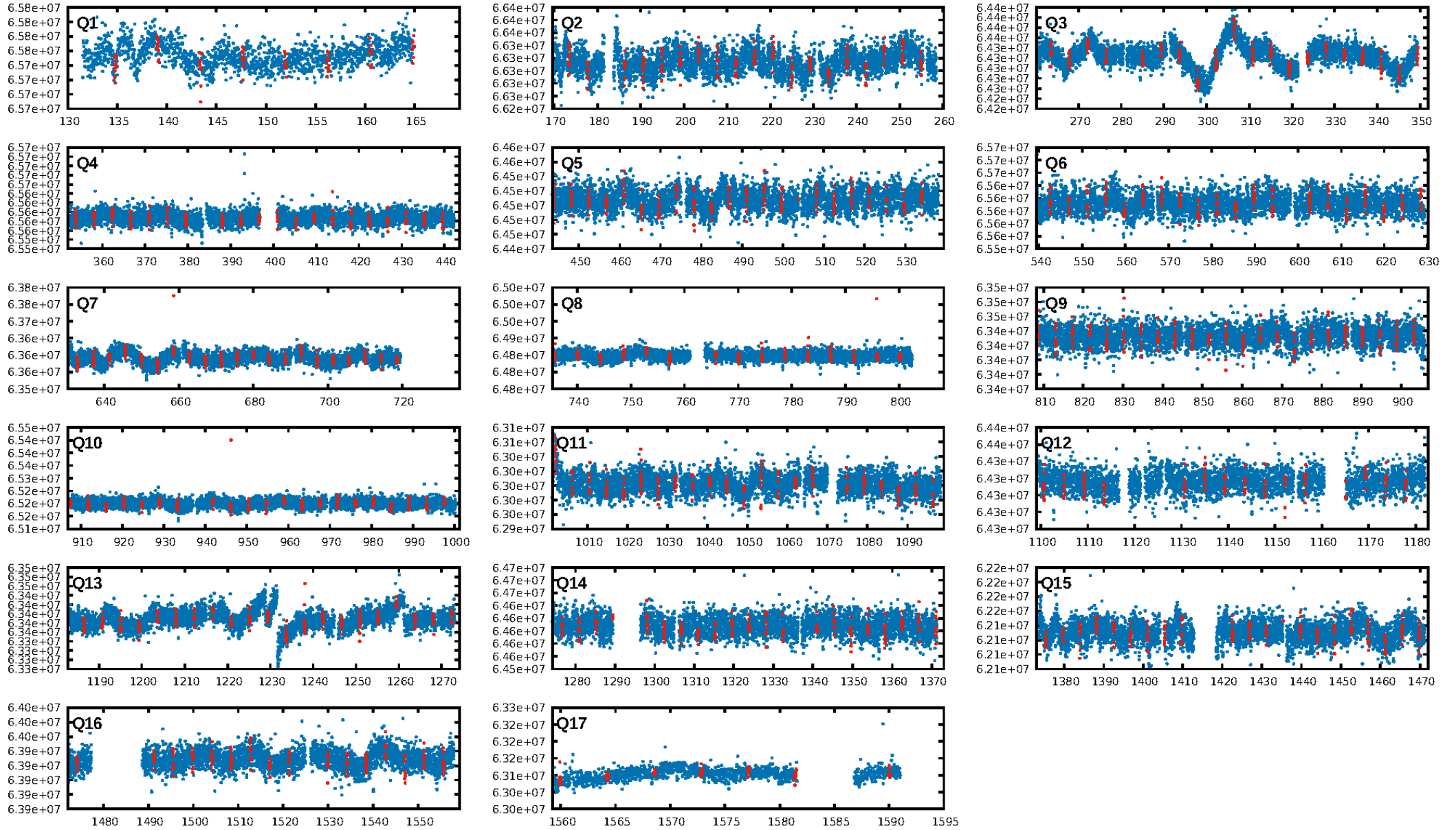
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [21.84σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.13e-22  
RollingBand-fgt: 0.84 [242/288]  
GhostDiagnostic-chr: 6.468  
Centroid-sig: 73.1%  
Centroid-so: 0.540 arcsec [0.45σ]  
OotOffset-rm: 0.374 arcsec [0.40σ]  
OotOffset-st: 2/4/3/2 [11]  
KicOffset-rm: 0.467 arcsec [0.57σ]  
KicOffset-st: 2/4/3/2 [11]  
DiffImageQuality-fgm: 0.73 [8/11]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 05:25:16 Z

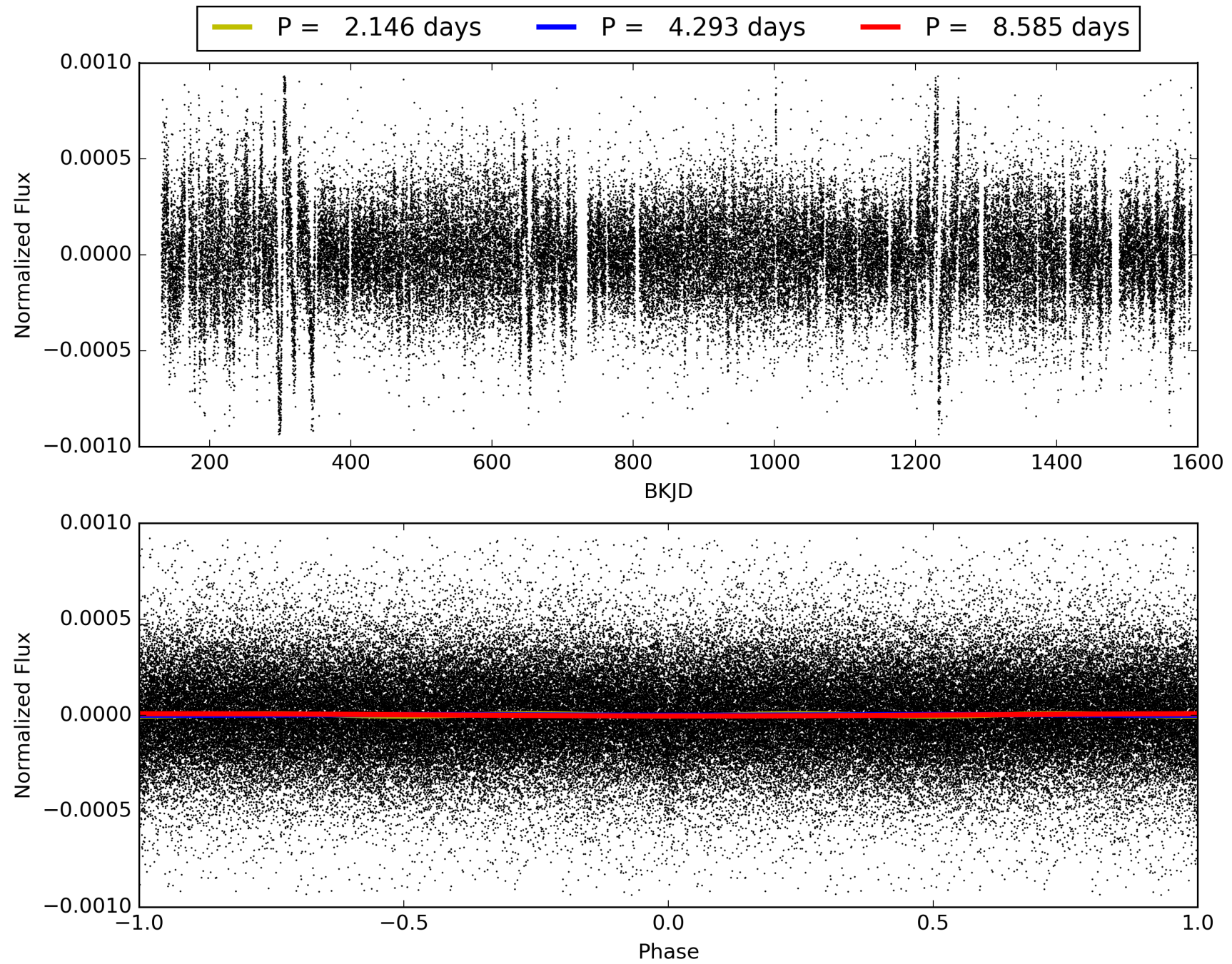
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 010337517-02, PDC Light Curves



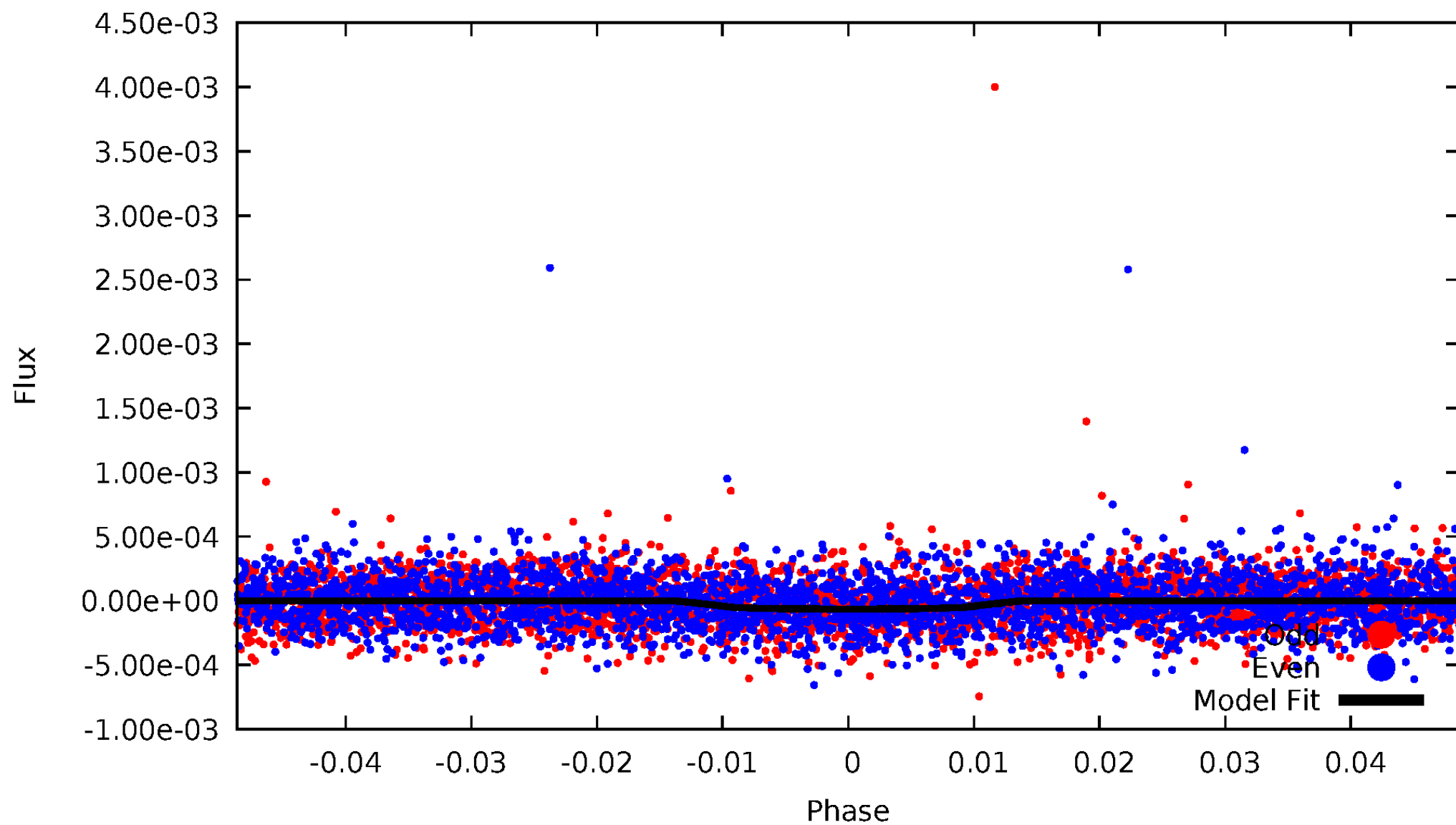


TCE 010337517-02



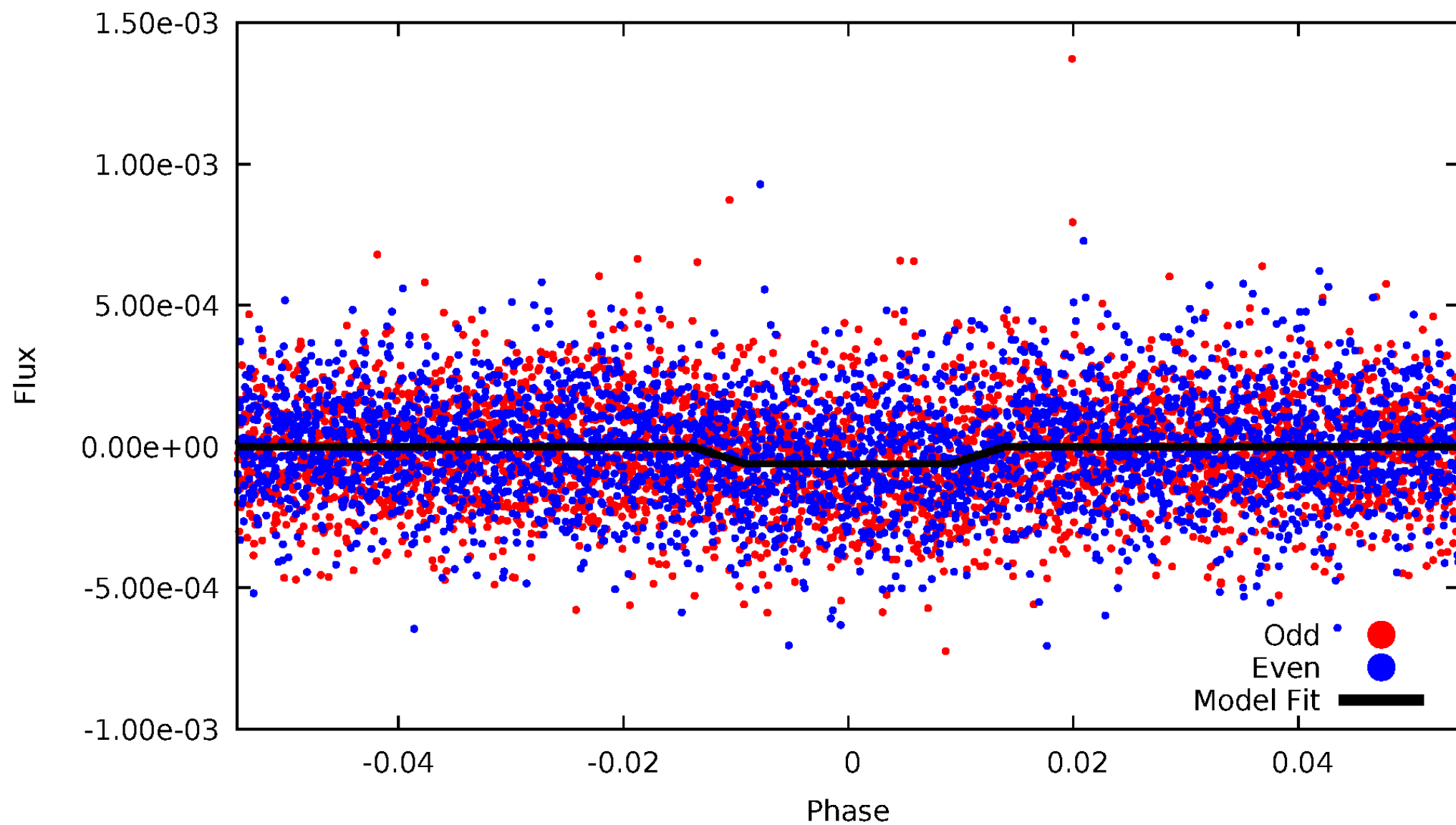
# DV Odd/Even

TCE 010337517-02



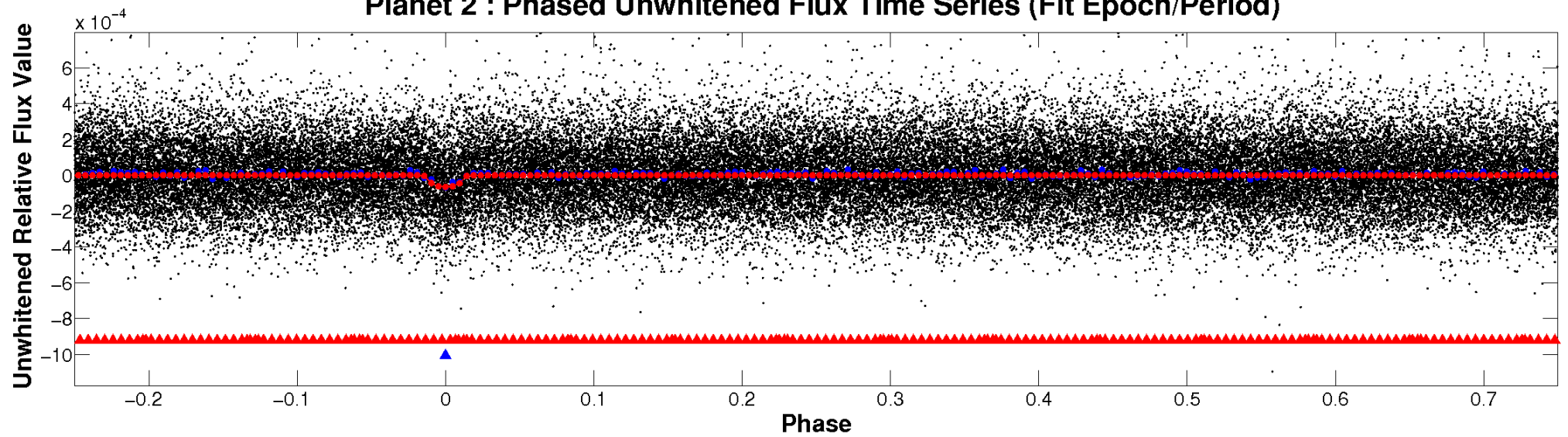
# ALT Odd/Even

TCE 010337517-02

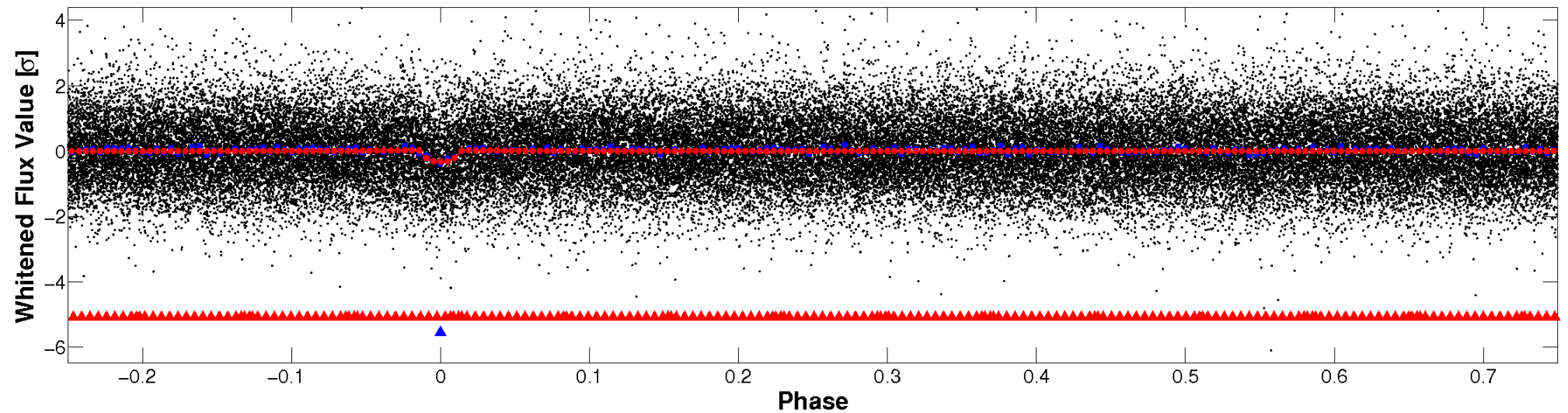


# Non-Whitened Vs. Whitened Light Curve

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



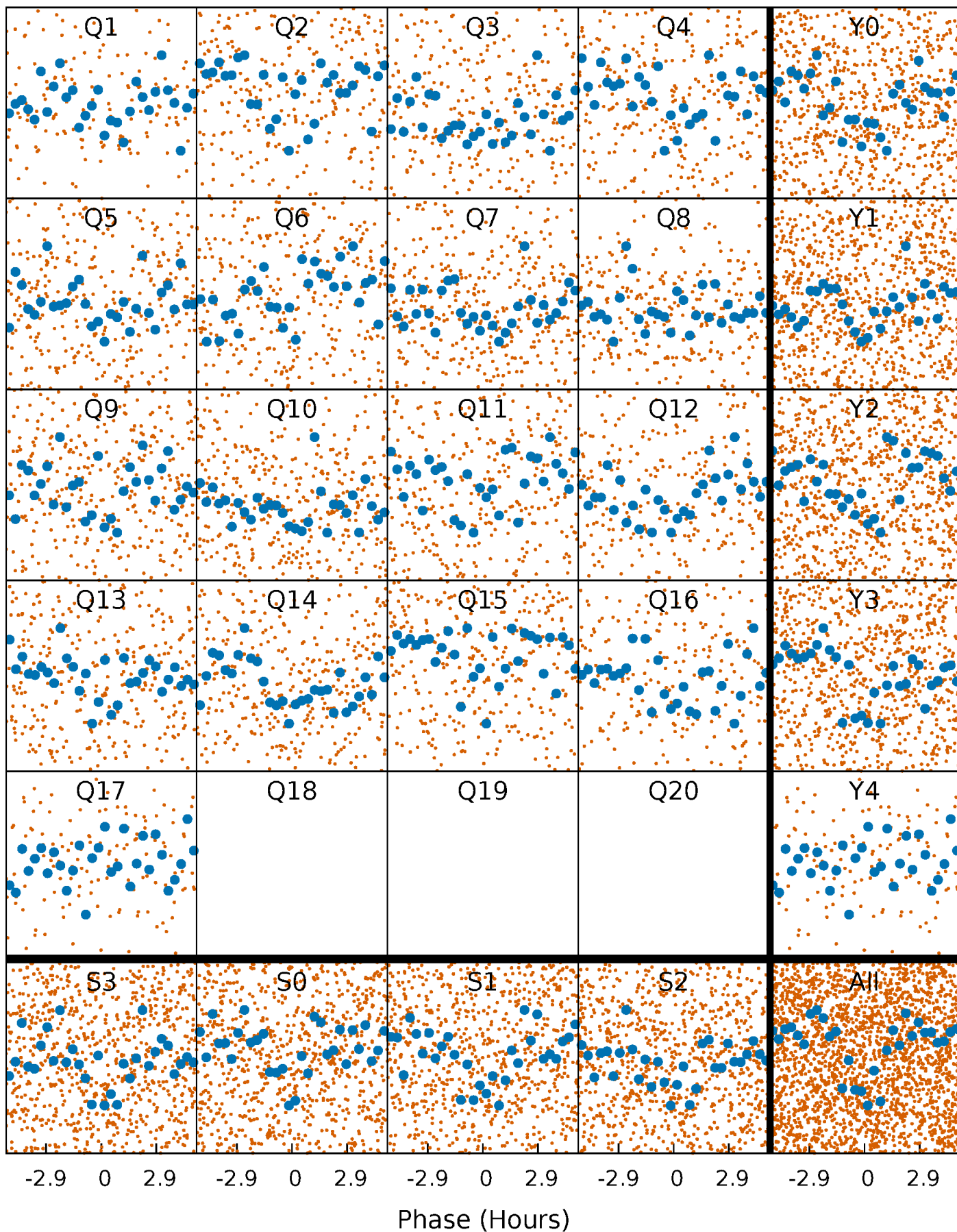
## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)





# PDC Quarter-Phased Transit Curves

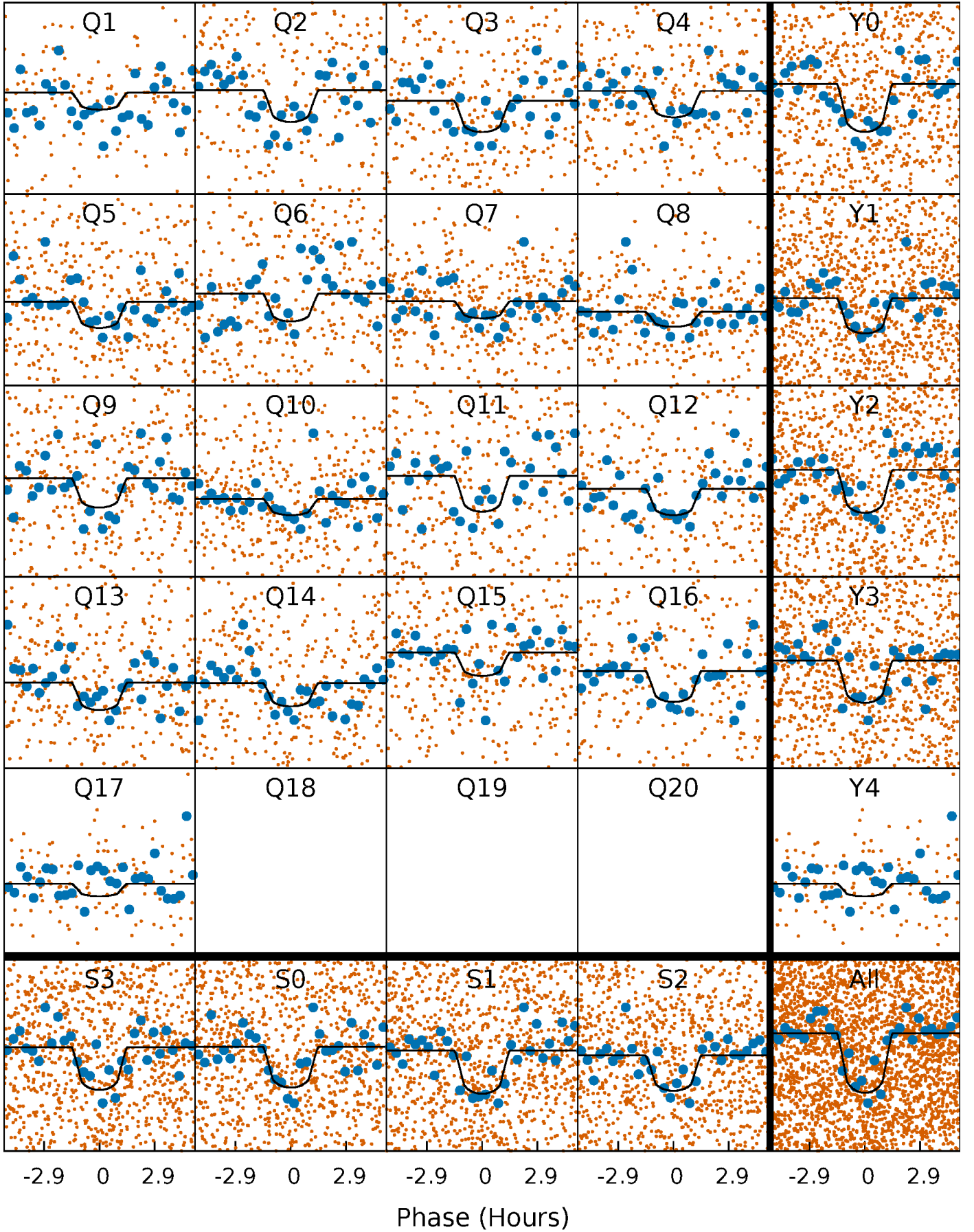
TCE 010337517-02   P= 4.292669 Days    $T_0=134.796082$  (BKJD)





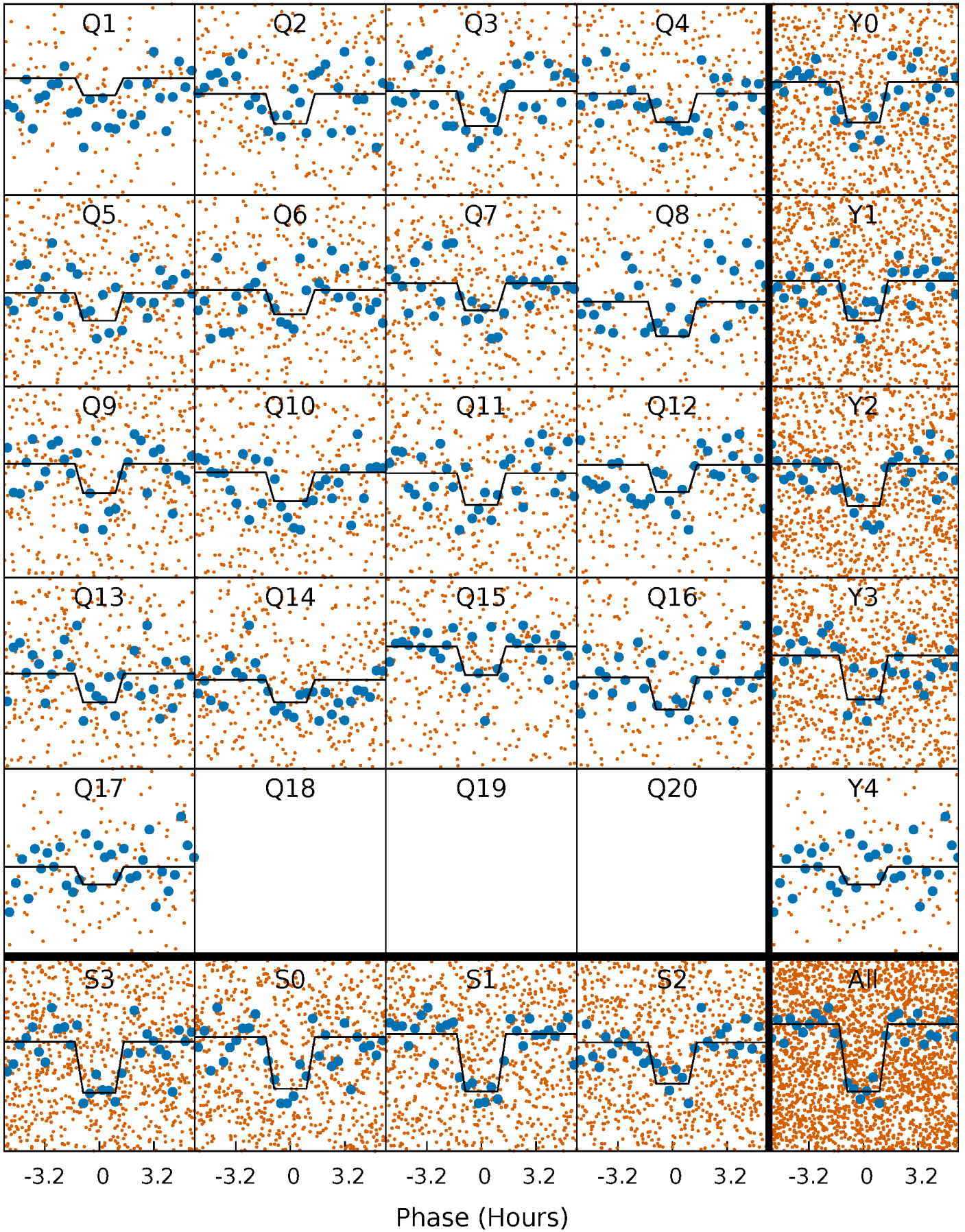
# DV Quarter-Phased Transit Curves

TCE 010337517-02     $P = 4.292669$  Days     $T_0 = 134.796082$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

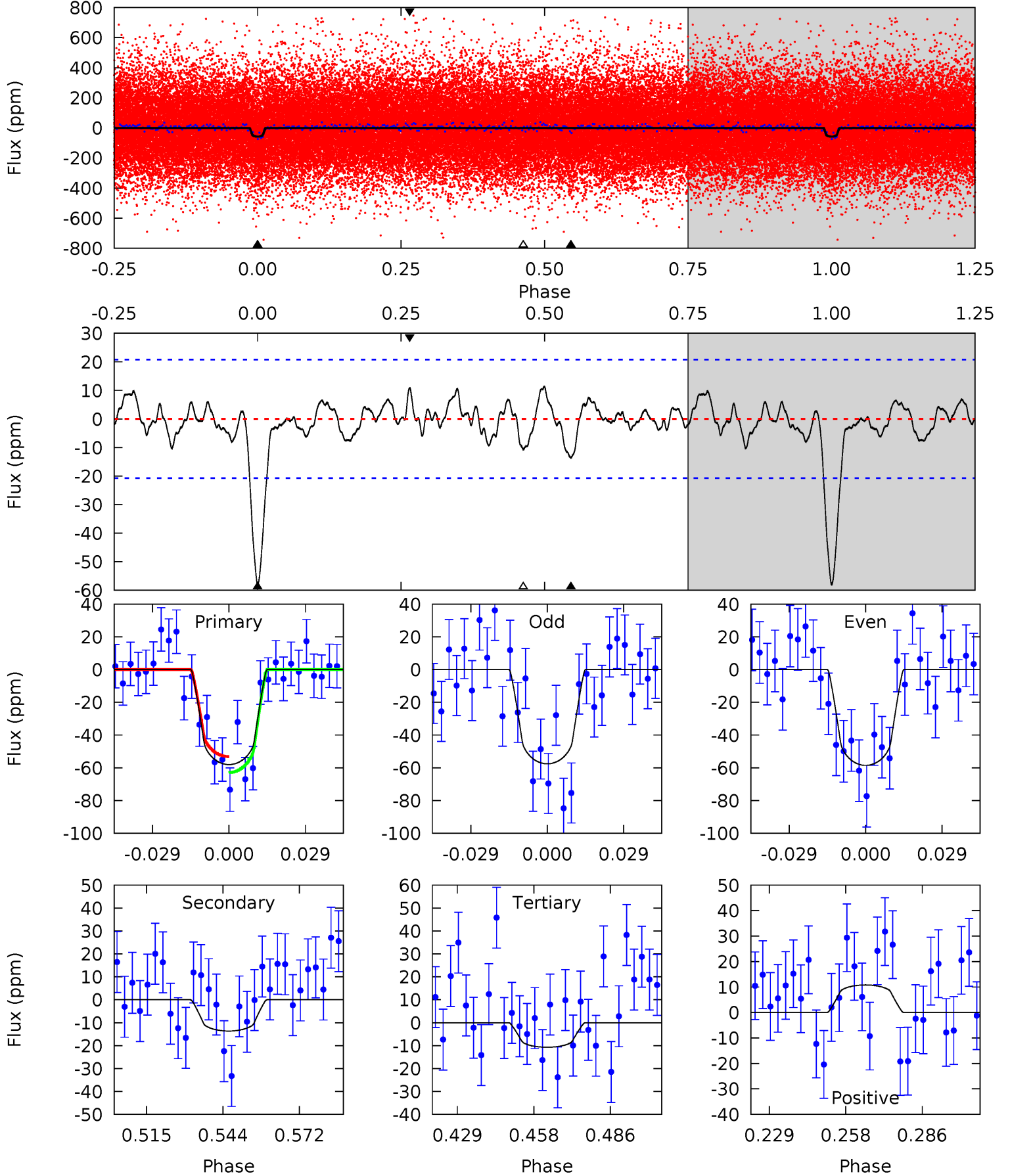
TCE 010337517-02     $P = 4.292621$  Days     $T_0 = 134.804390$  (BKJD)



# DV Model-Shift Uniqueness Test

010337517-02, P = 4.292669 Days, E = 130.503413 Days

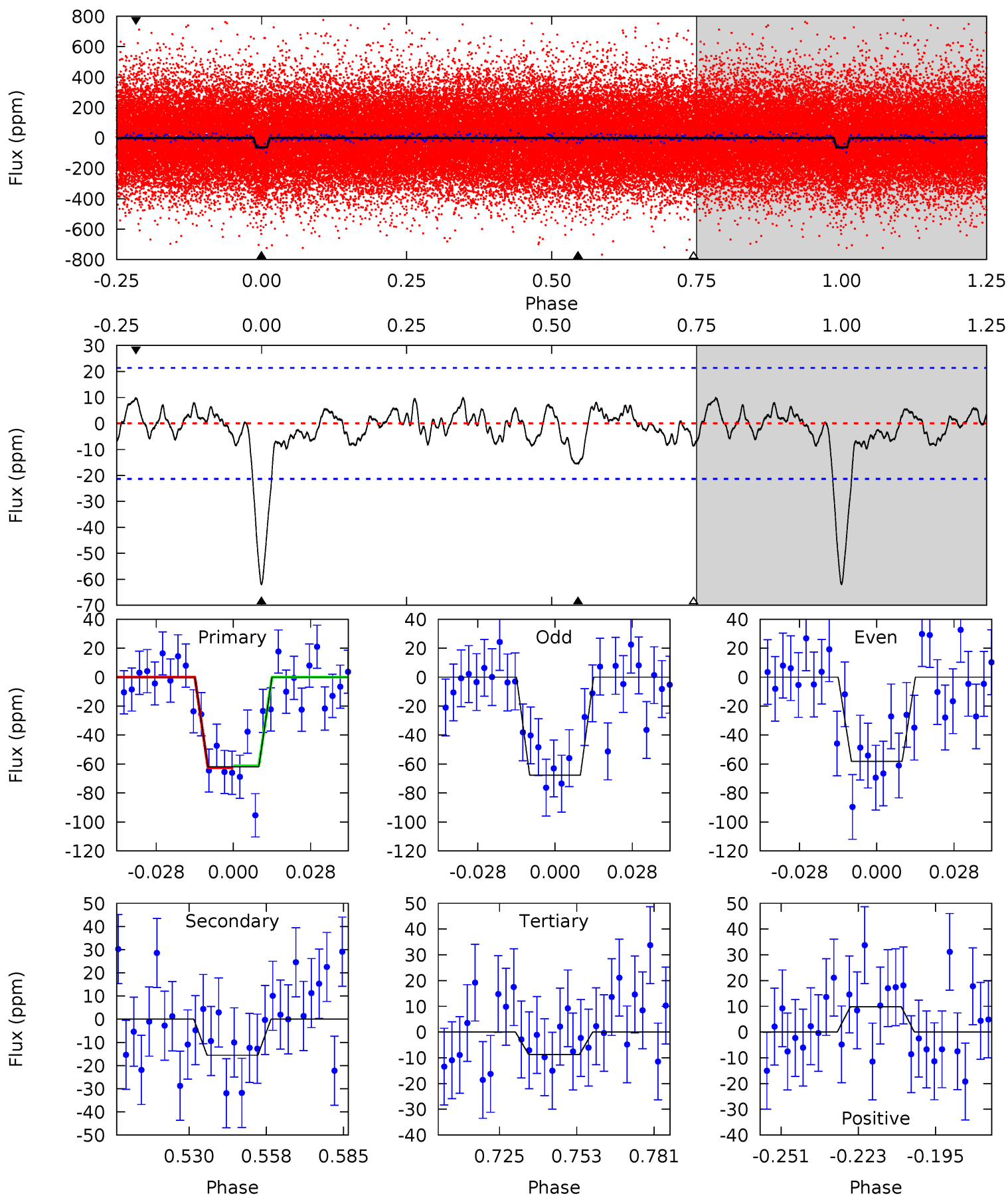
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.5	3.17	2.49	2.51	4.82	2.19	1.04	11.0	11.0	0.68	0.66	0.11	0.85	0.16	1.13



# Alt Model-Shift Uniqueness Test

010337517-02, P = 4.292621 Days, E = 130.511769 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
14.0	3.51	1.97	2.23	4.83	2.20	1.01	12.0	11.7	1.54	1.28	1.07	0.83	0.14	0.17



### Stellar Parameters For KIC 010337517

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5357^{+107}_{-107}$	$4.498^{+0.058}_{-0.065}$	$0.000^{+0.150}_{-0.150}$	$0.863^{+0.073}_{-0.065}$	$0.854^{+0.054}_{-0.045}$	$1.873^{+0.454}_{-0.397}$
	+2%/-2%	+1%/-1%	+inf%/-inf%	+8%/-8%	+6%/-5%	+24%/-21%
Source	SPE57	SPE57	SPE57	DSEP		

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

### Secondary Eclipse Parameters for KIC 010337517-02 / KOI 1165.02

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-14 \pm 4$	$0.82^{+0.59}_{-0.44}$	$1384^{+45}_{-41}$	$3789^{+1310}_{-616}$	$26^{+89}_{-17}$
Alt.	$-16 \pm 4$	$0.75^{+0.58}_{-0.46}$	$1388^{+44}_{-44}$	$4018^{+2020}_{-701}$	$35^{+216}_{-24}$

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

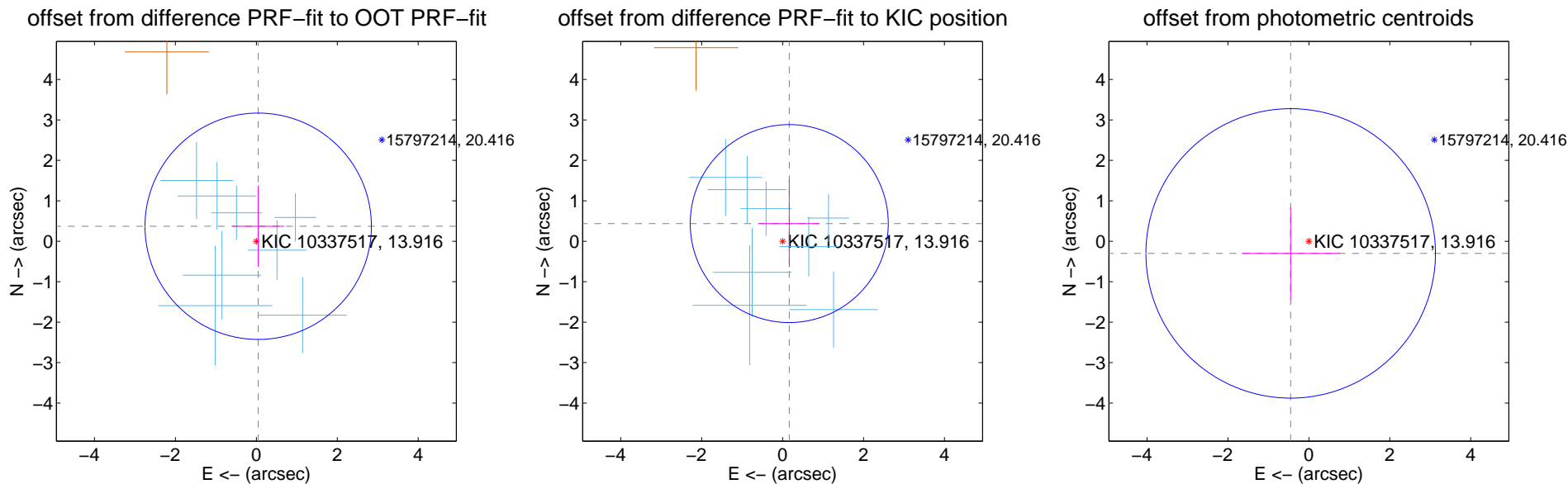
## DV Centroid Data

Supplemental centroid analysis for 010337517-02. Kepler magnitude: 13.92. Transit SNR 10.56

There are 8 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.23 arcsec

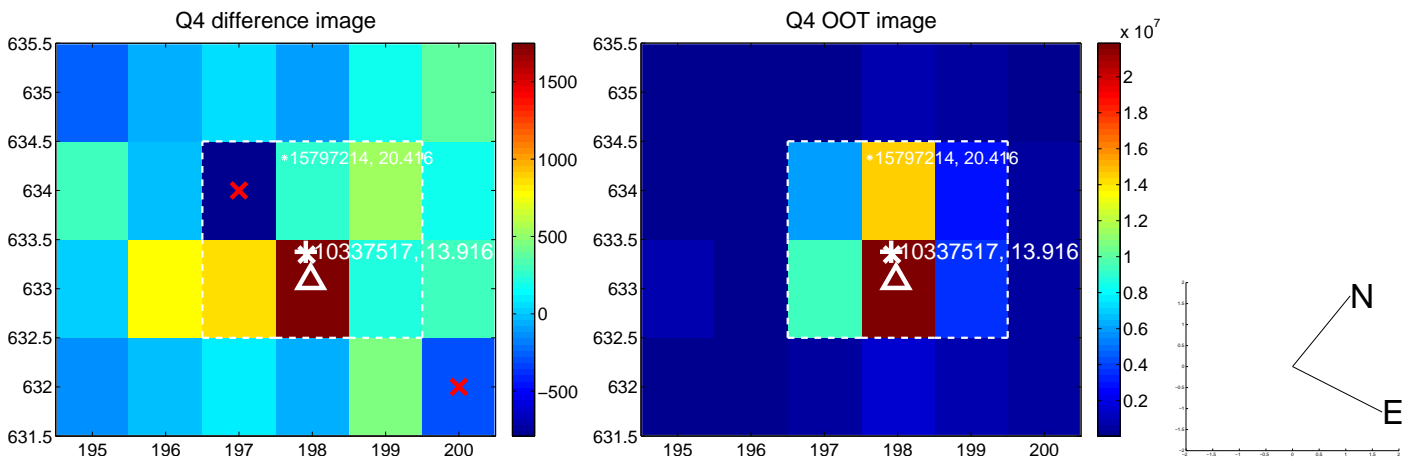
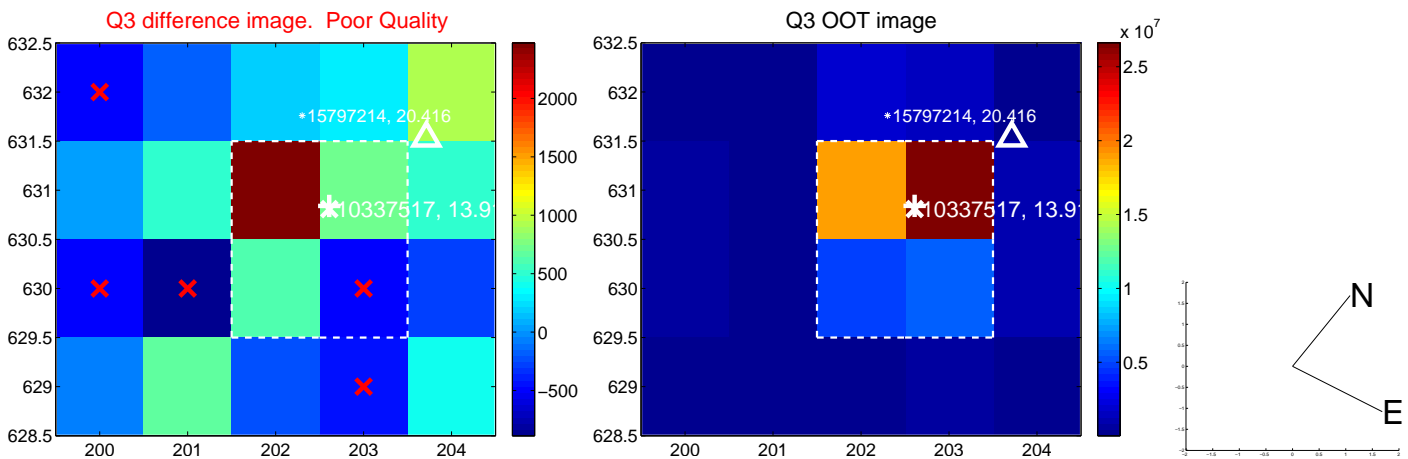
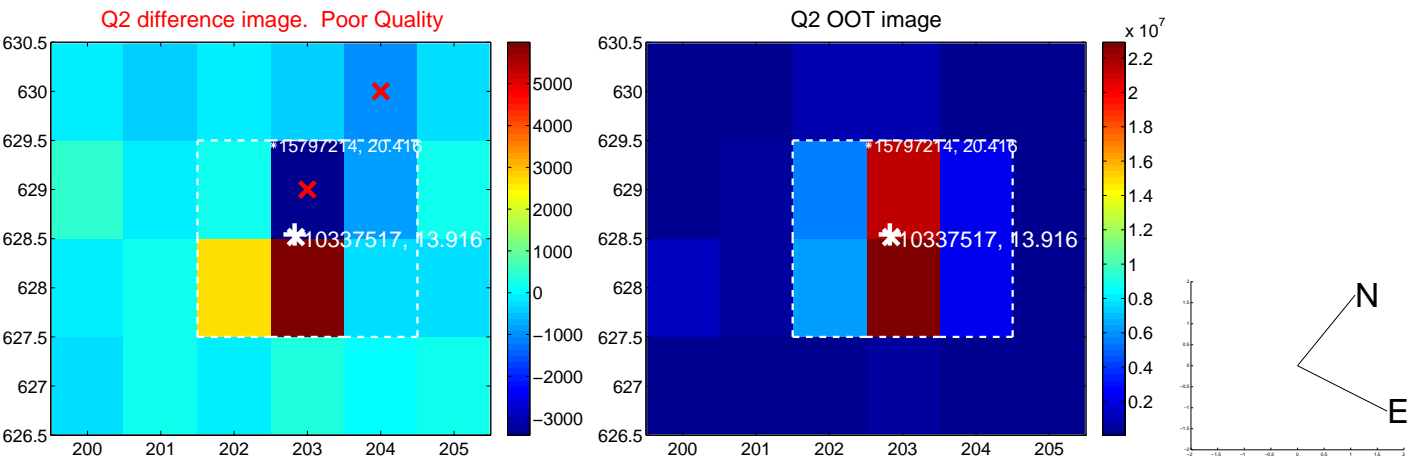
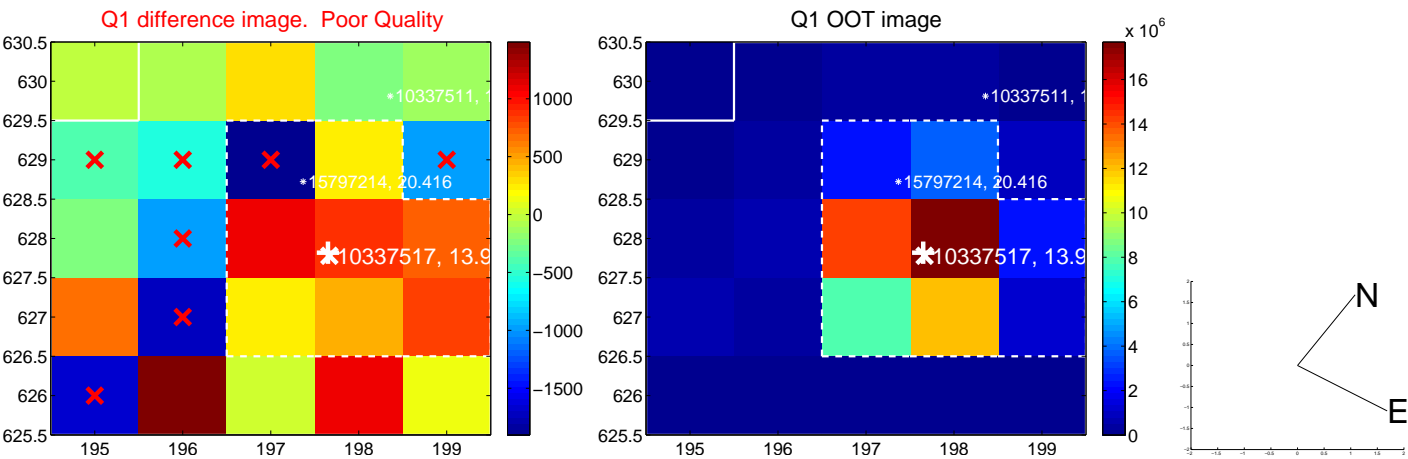
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.374 \pm 0.933$	0.40	$-0.046 \pm 0.645$	$0.371 \pm 1.000$
PRF-fit source offset from KIC position	$0.467 \pm 0.816$	0.57	$-0.164 \pm 0.750$	$0.437 \pm 1.075$
photometric centroid source offset	$0.54 \pm 1.19$	0.45	$0.45 \pm 1.21$	$-0.30 \pm 1.14$



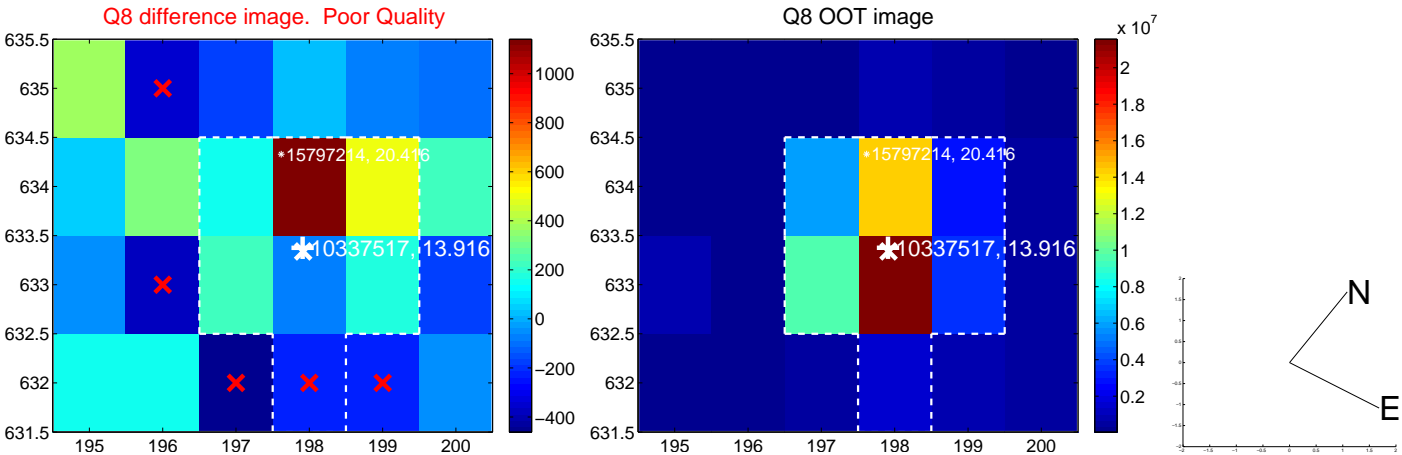
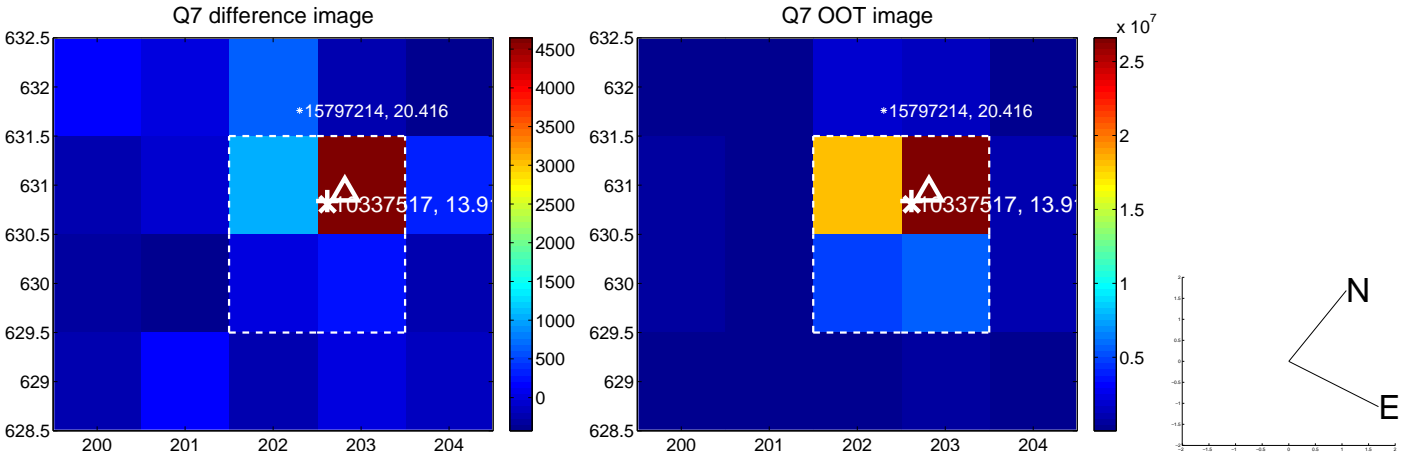
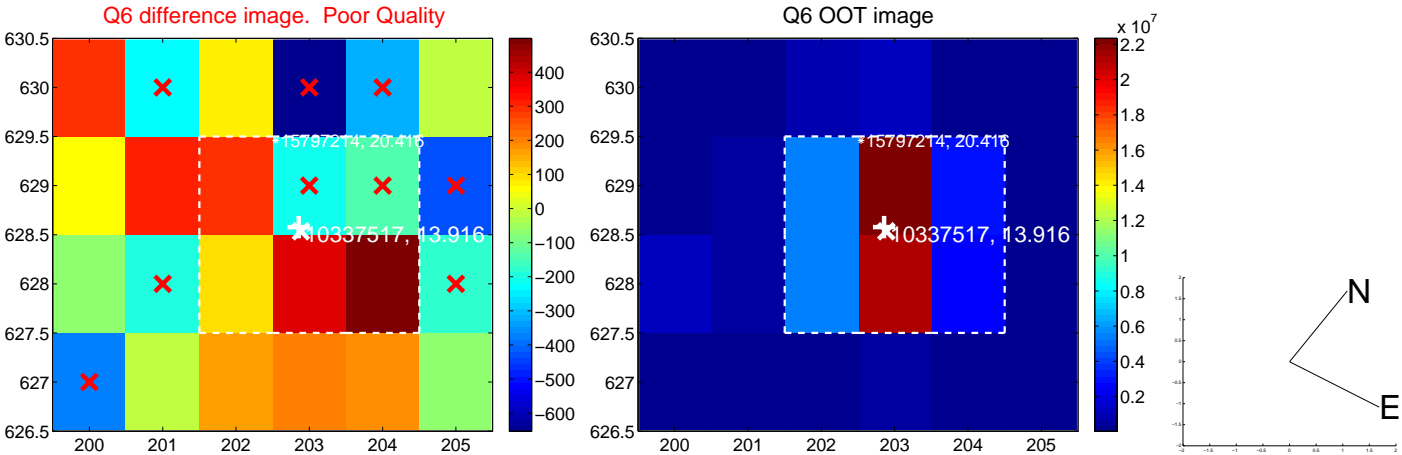
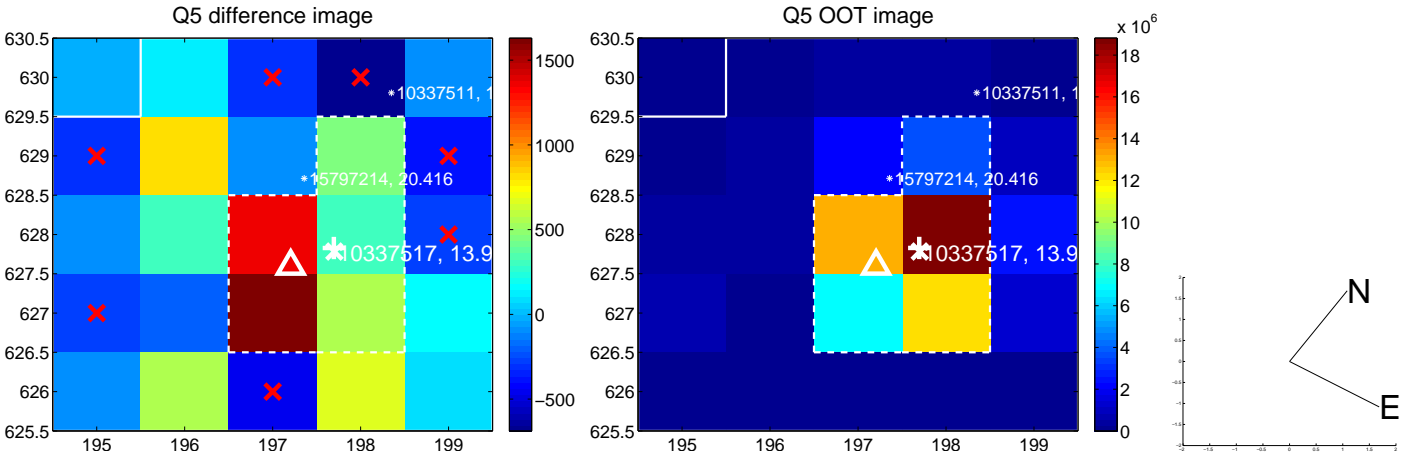
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



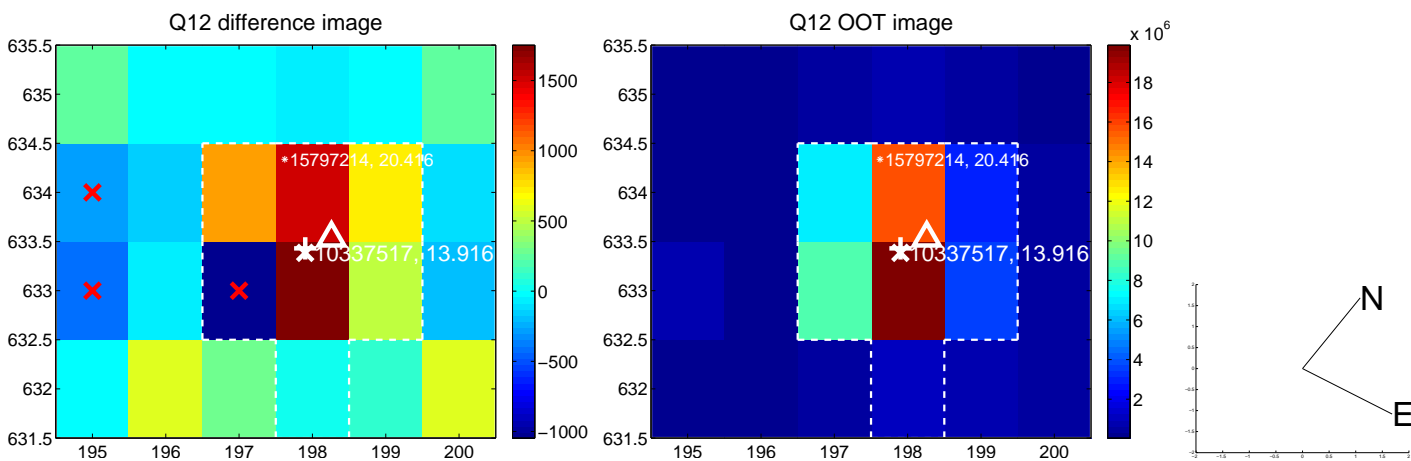
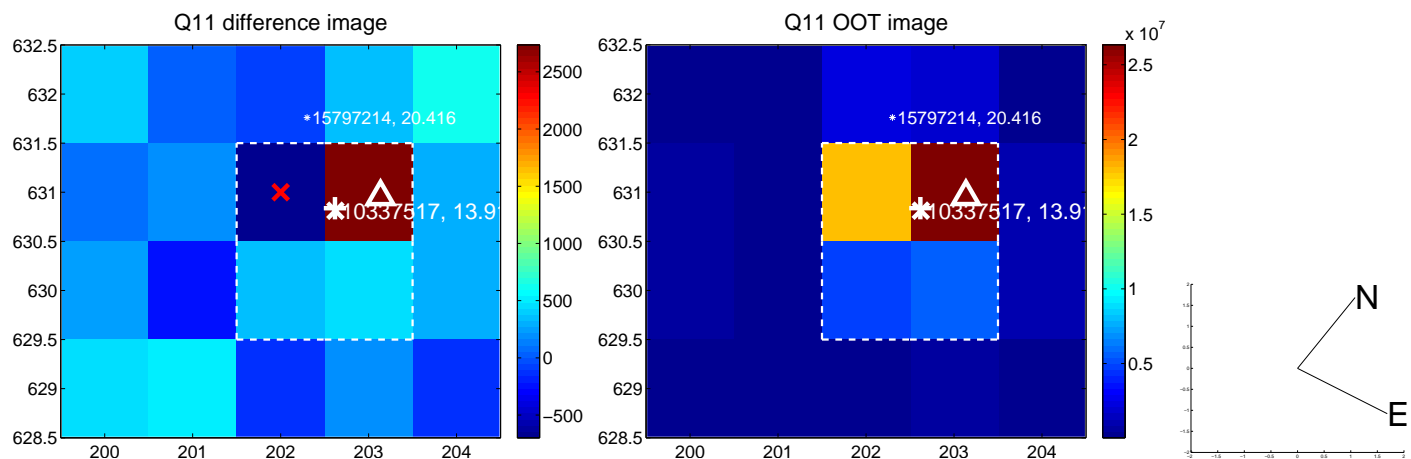
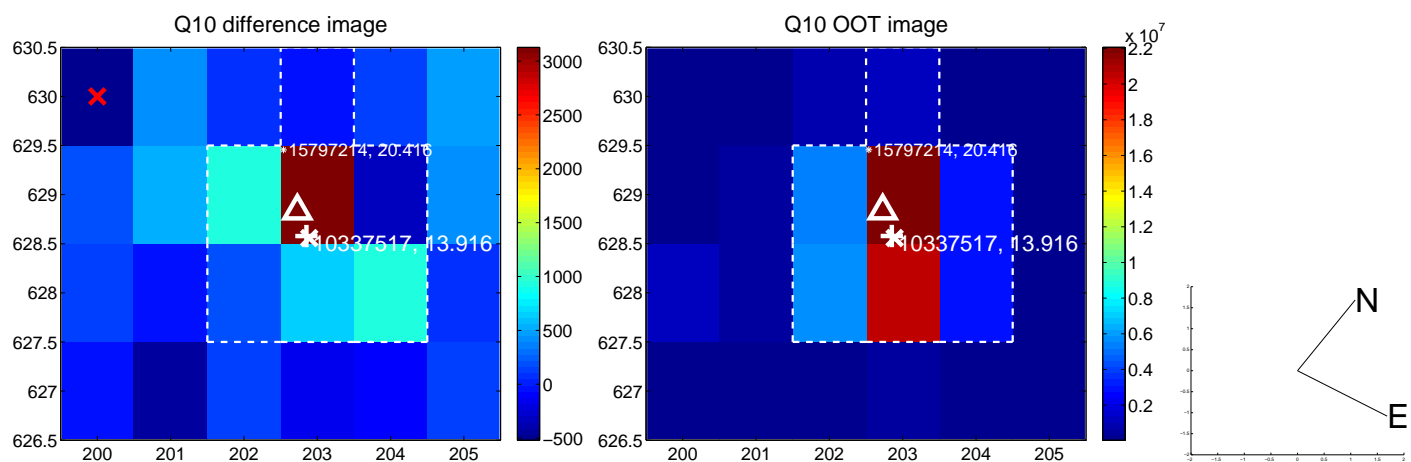
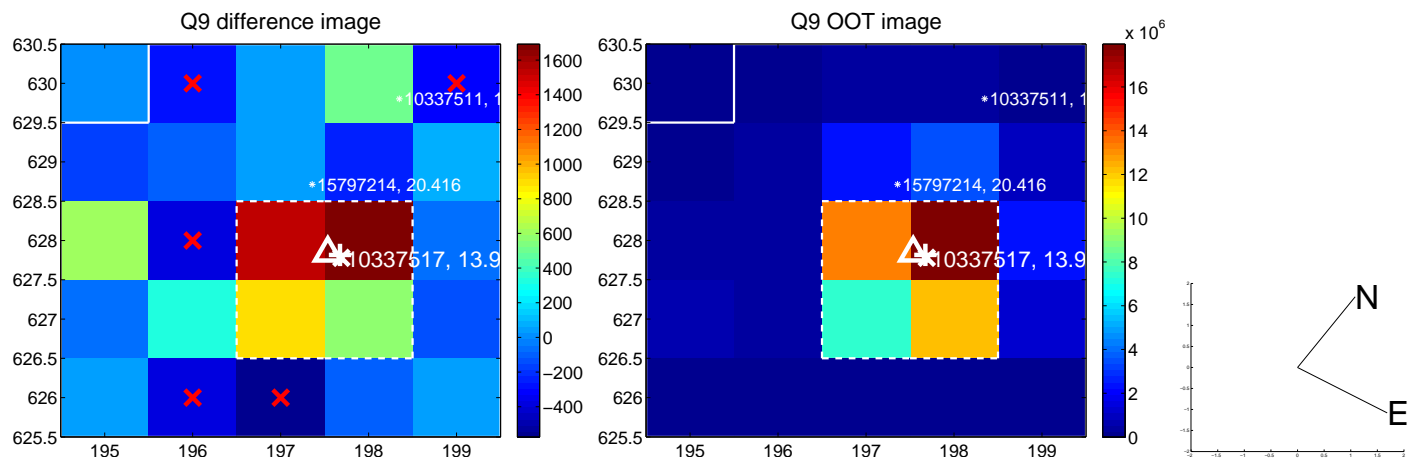
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



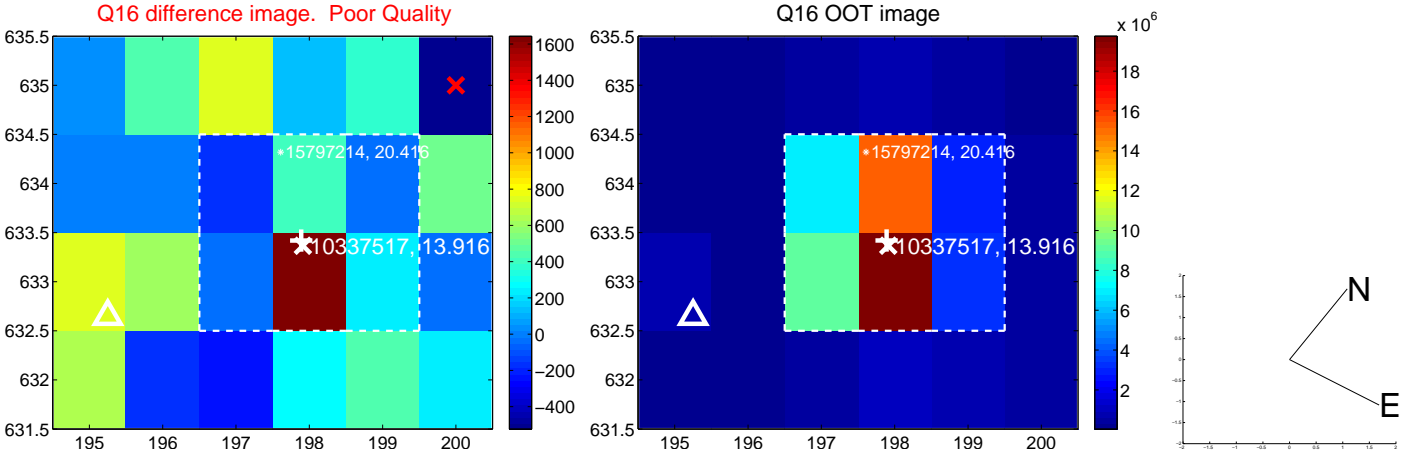
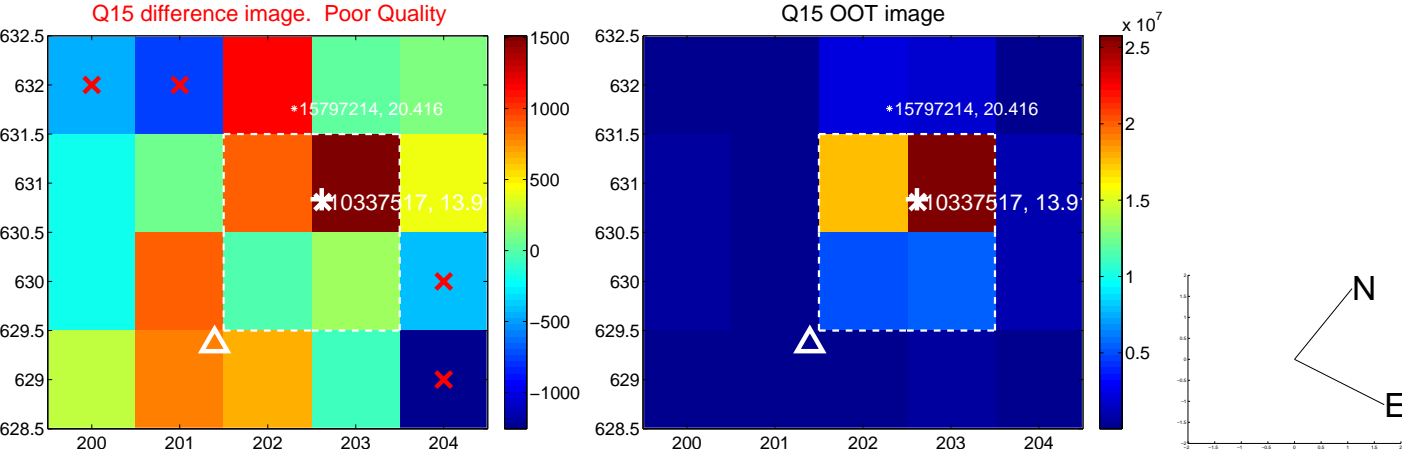
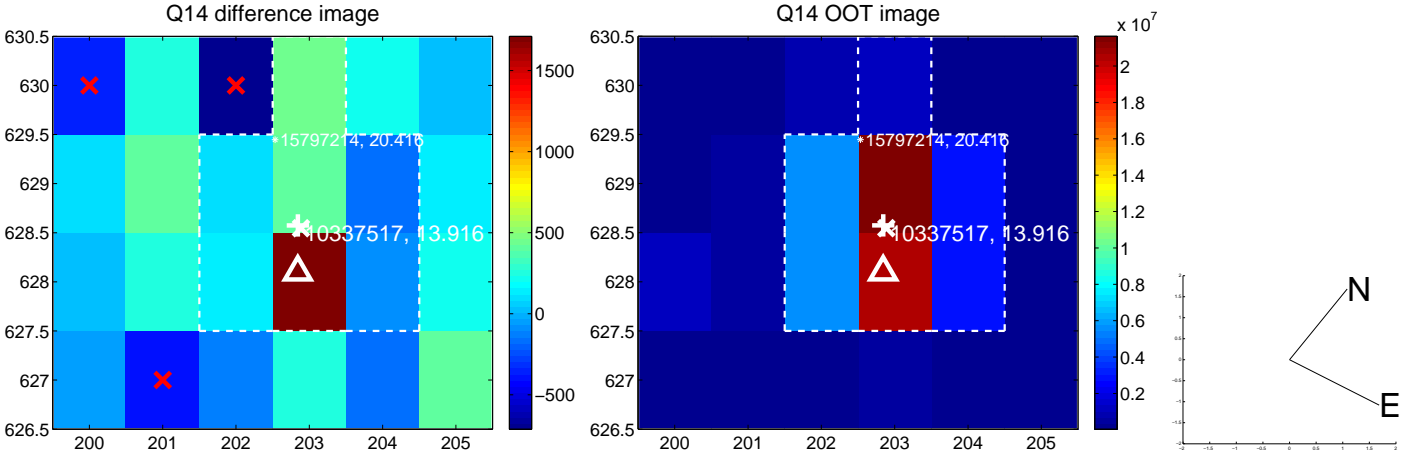
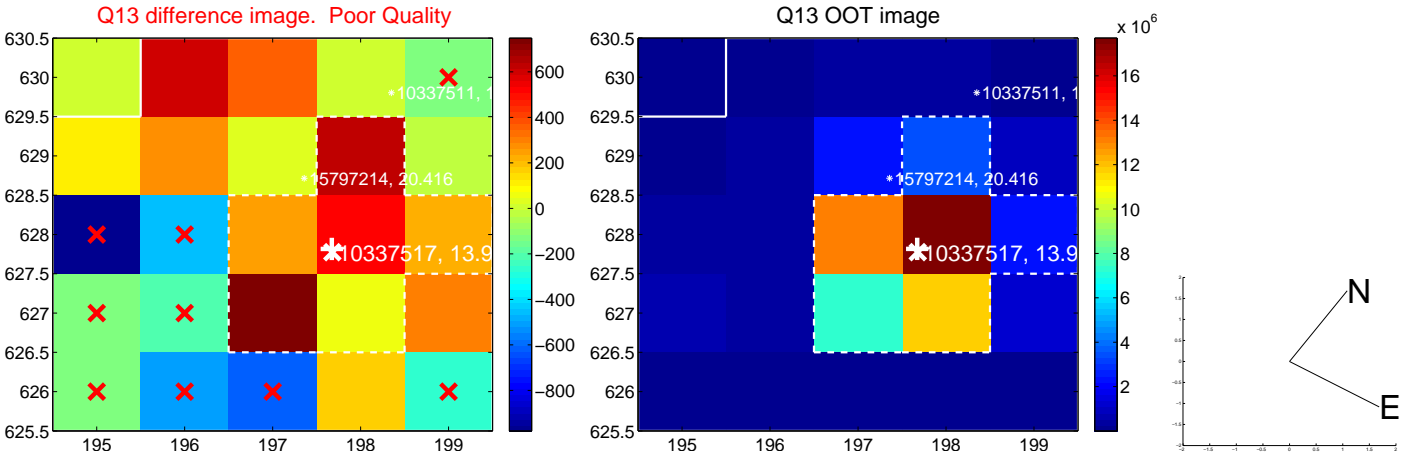
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



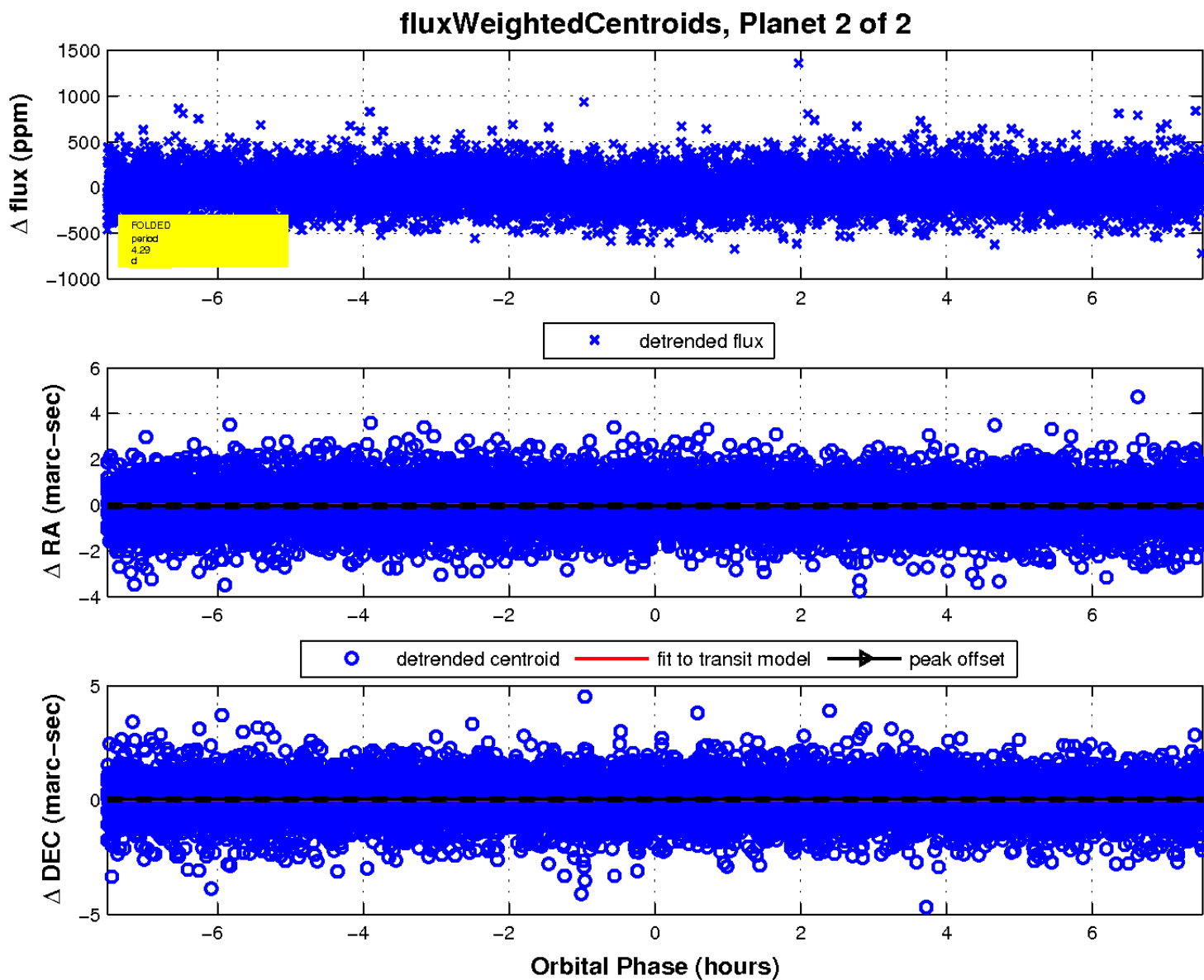
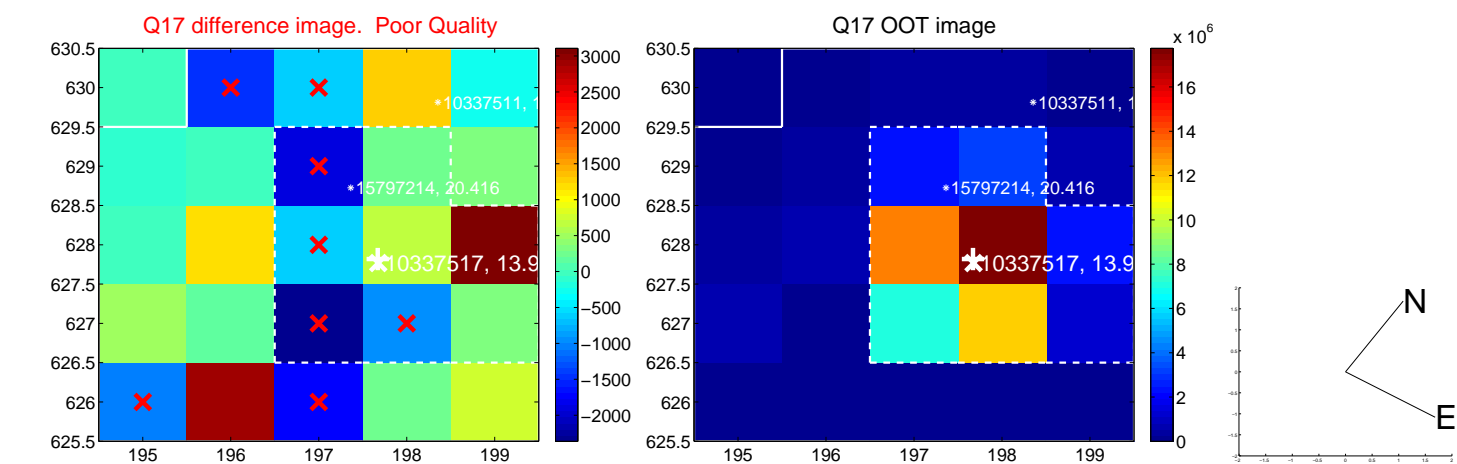
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

