

# KIC 008358008

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008358008-01	OBS	7022.01	10.064692	135.250874	10045.0	3.583	580.2	568.1	0.70	5185	12.97	50.23
008358008-02	OBS	No	10.064694	140.349020	5314.5	3.927	330.0	328.5	0.70	5185	9.64	50.23

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008358008-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—DEEP_V_SHAPED—HAS_SEC_TCE
008358008-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE

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

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

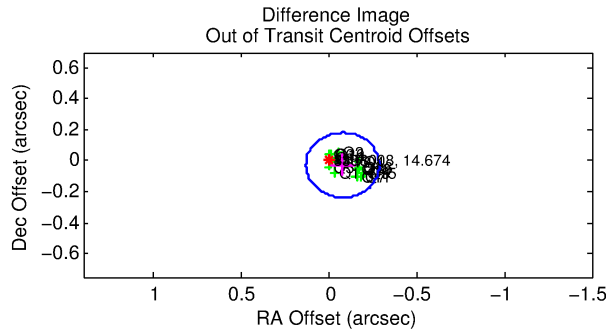
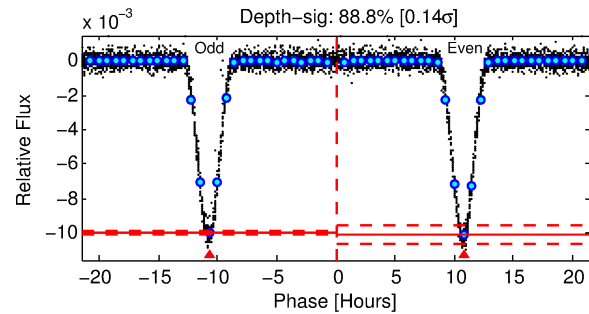
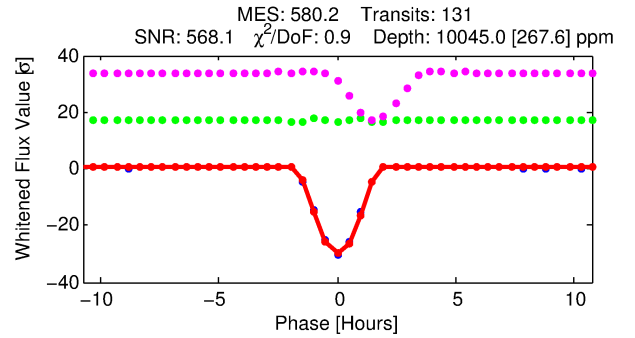
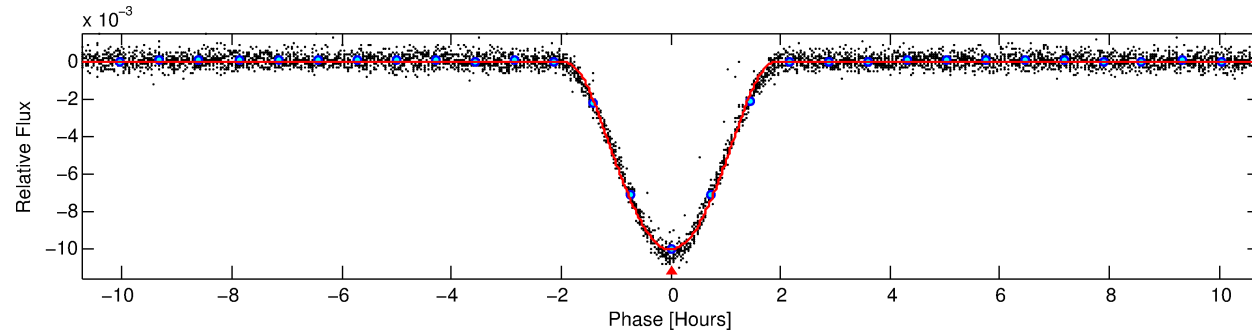
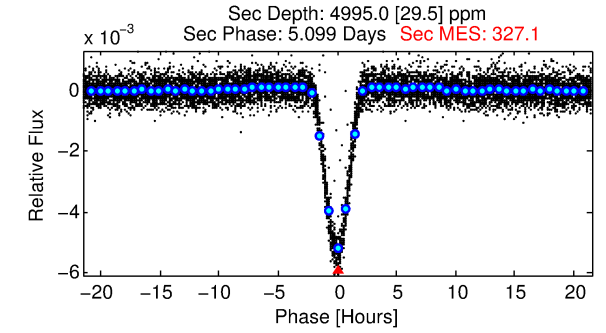
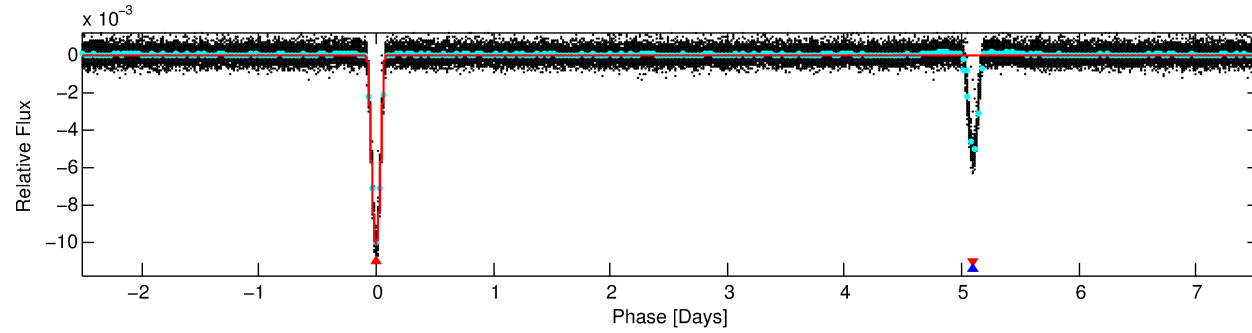
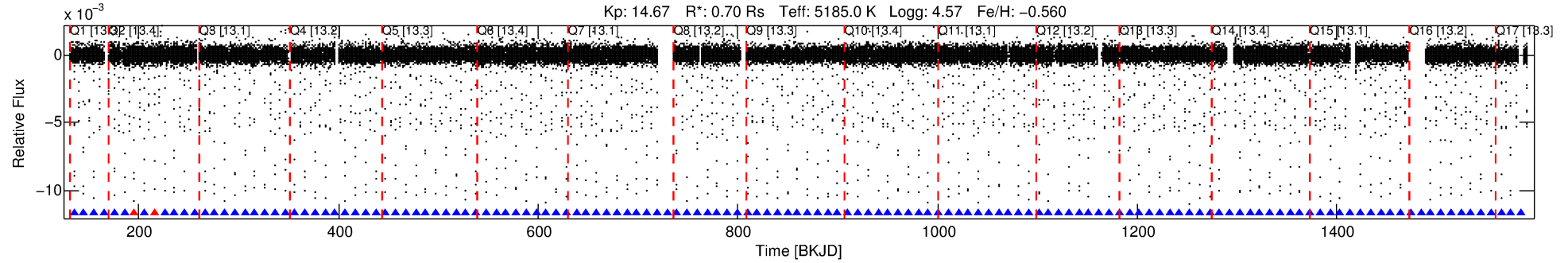
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 008358008-01

No Significant Match Found

# DV One-Page Summary

KIC: 8358008 Candidate: 1 of 2 Period: 10.065 d  
KOI: K07022.01 Corr: 0.998



## DV Fit Results:

Period = 10.06469 [0.00000] d  
Epoch = 135.2509 [0.0001] BKJD  
Rp/R\* = 0.1686 [0.0193]  
a/R\* = 13.02 [0.20]  
b = 1.00 [0.03]  
Seff = 50.23 [9.19]  
Teq = 679 [31] K  
Rp = 12.97 [2.03] Re  
a = 0.0800 [0.0074] AU  
Ag = 104.67 [28.01] [3.70 $\sigma$ ]  
Teffp = 3357 [217] K [12.20 $\sigma$ ]

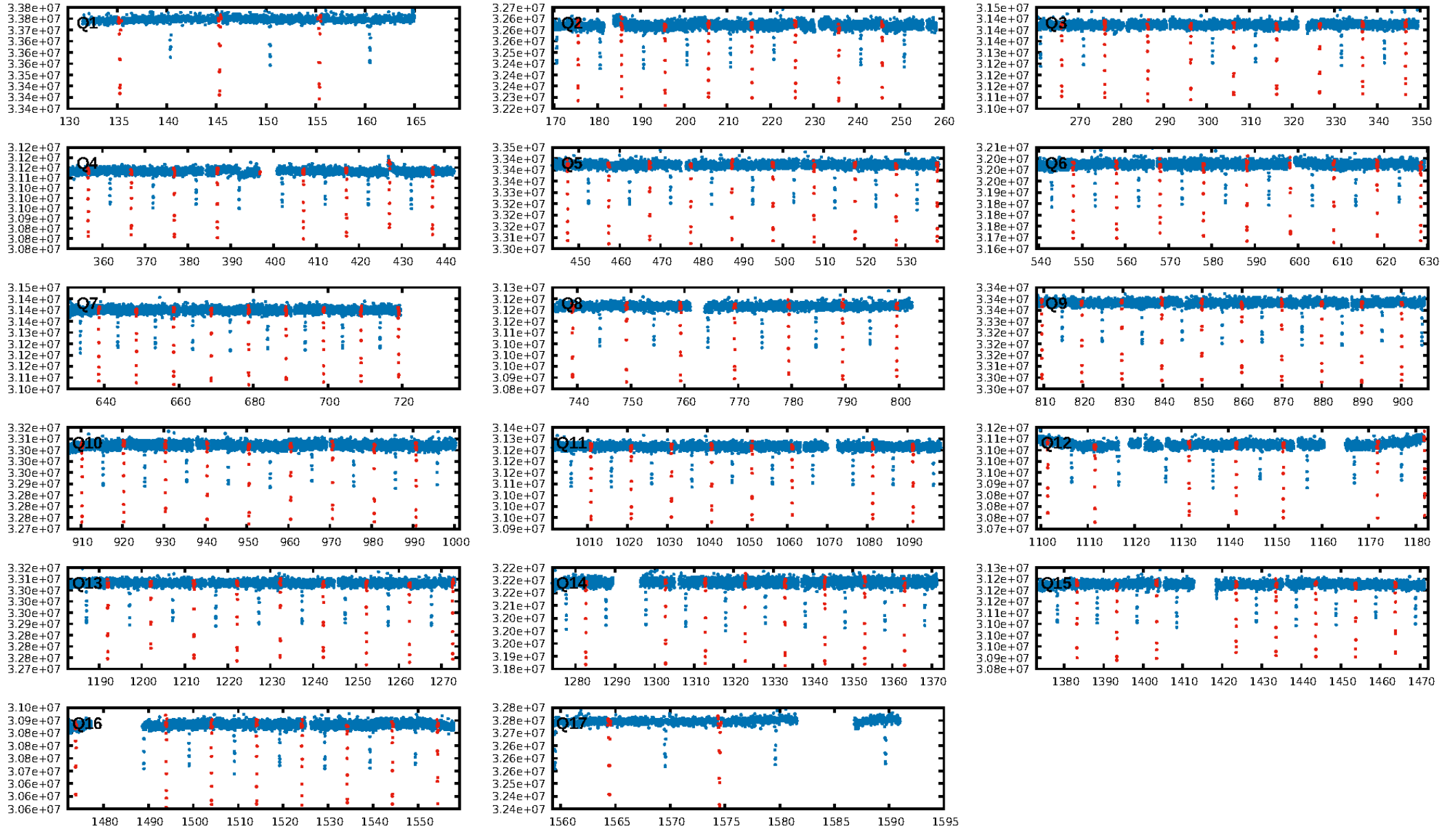
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00 $\sigma$ ]  
ModelChiSquare2-sig: 48.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 0.98 [124/126]  
GhostDiagnostic-chr: 4.925  
Centroid-sig: 0.0%  
Centroid-so: 0.366 arcsec [18.75 $\sigma$ ]  
OotOffset-rm: 0.083 arcsec [1.18 $\sigma$ ]  
KicOffset-rm: 0.113 arcsec [1.63 $\sigma$ ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 1.00 [17/17]

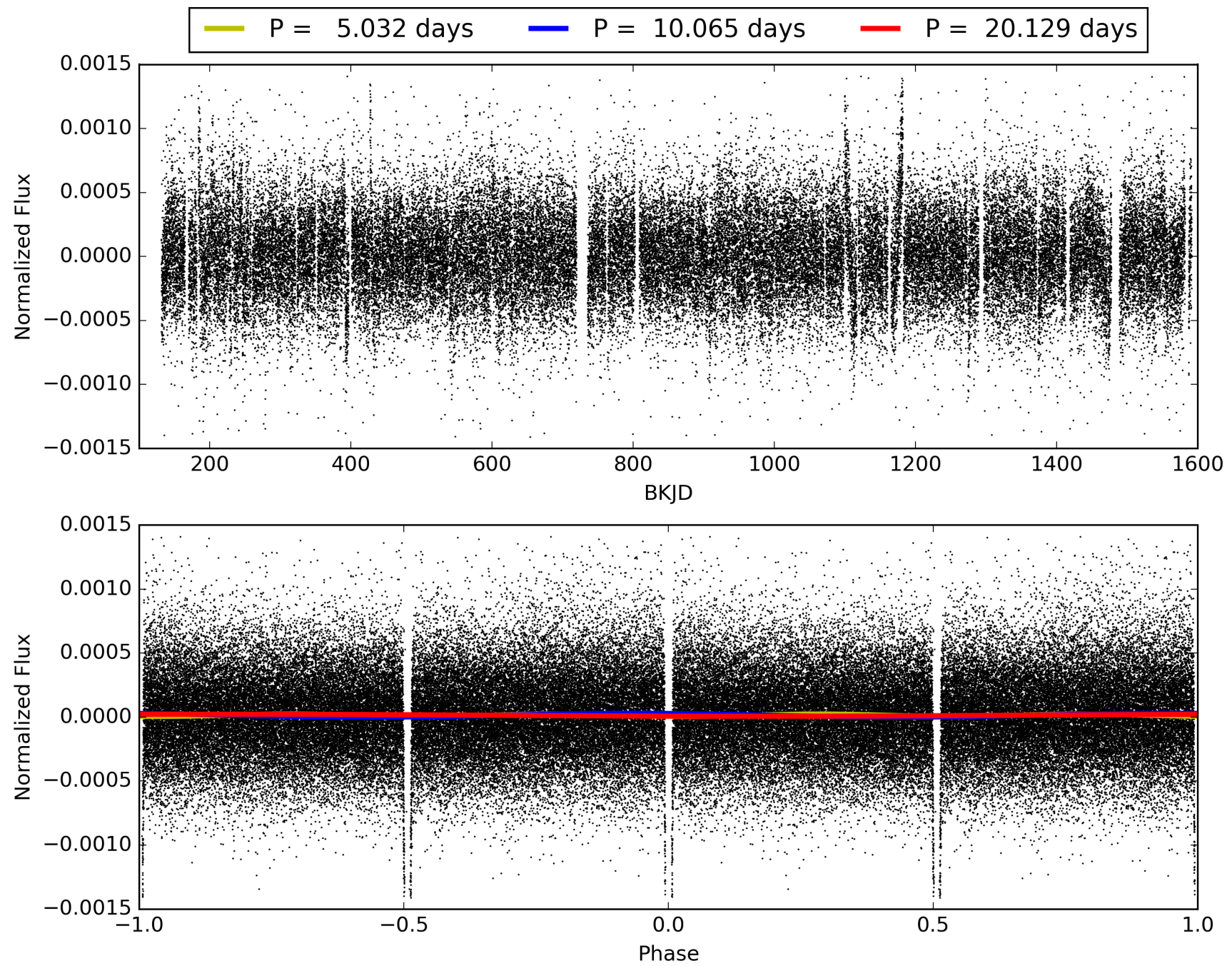
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 07:29:29 Z

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

# TCE 008358008-01, PDC Light Curves

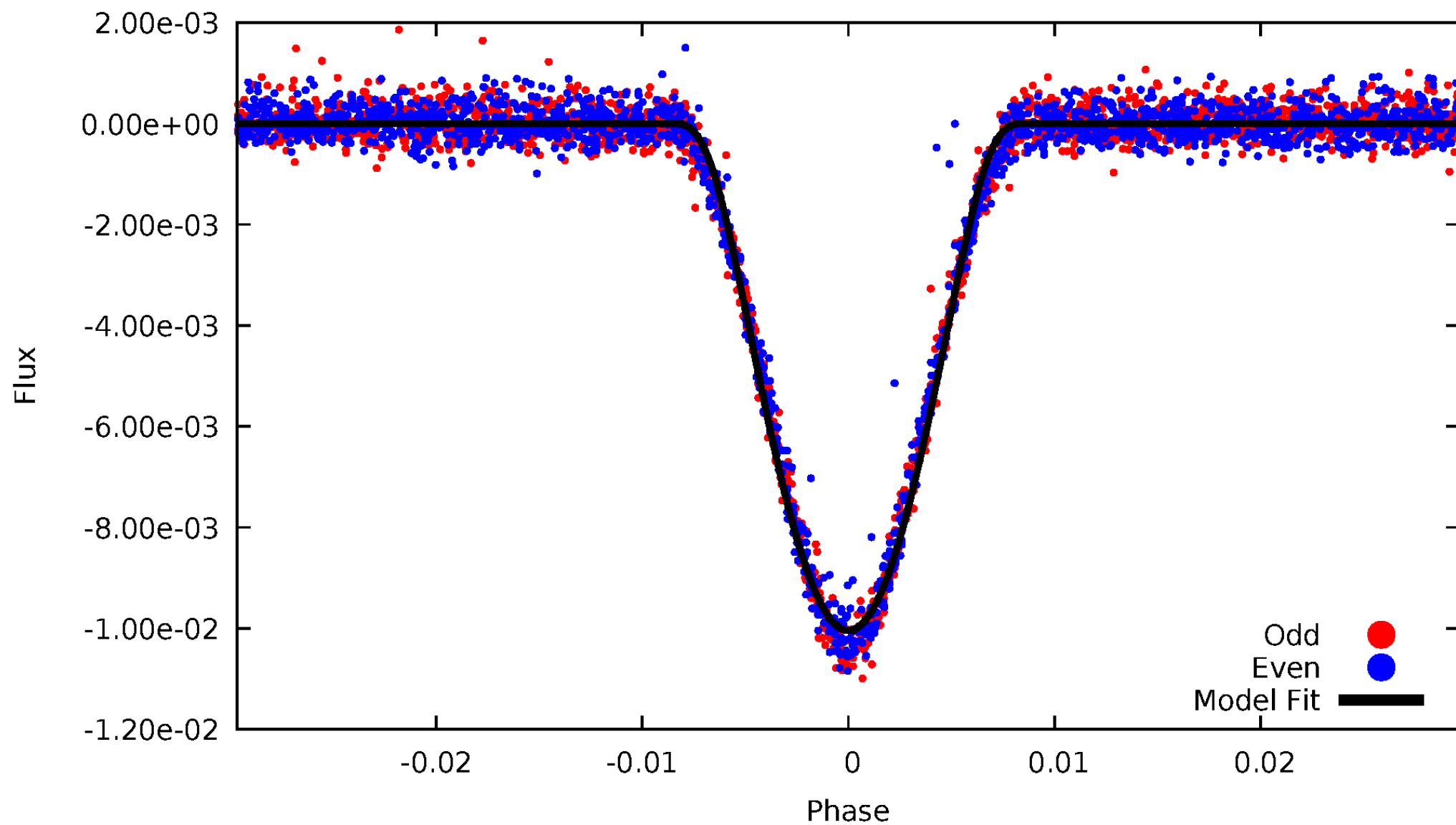


TCE 008358008-01



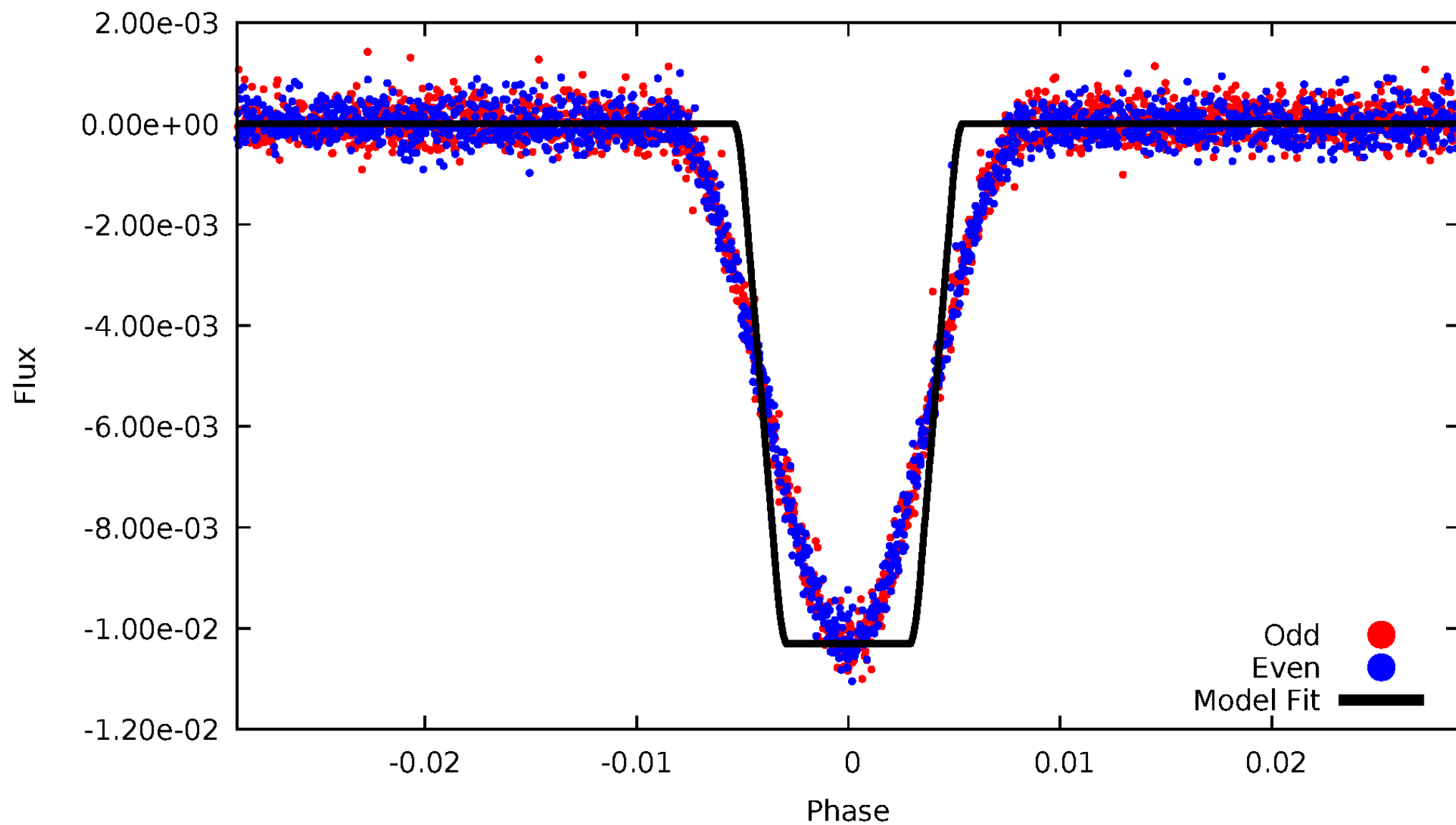
# DV Odd/Even

TCE 008358008-01

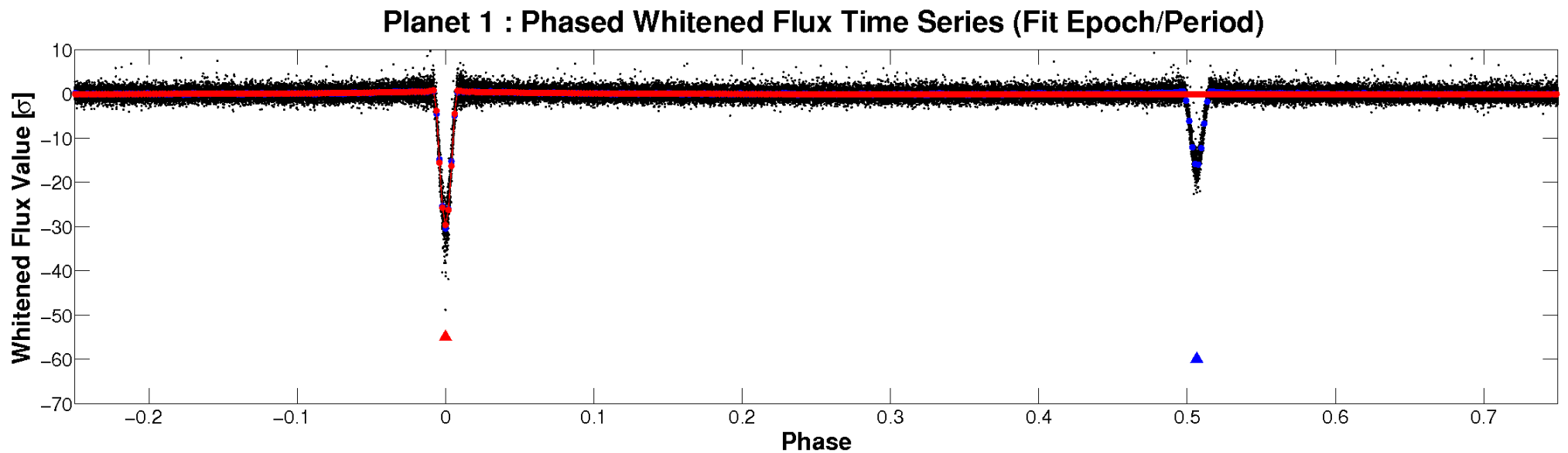
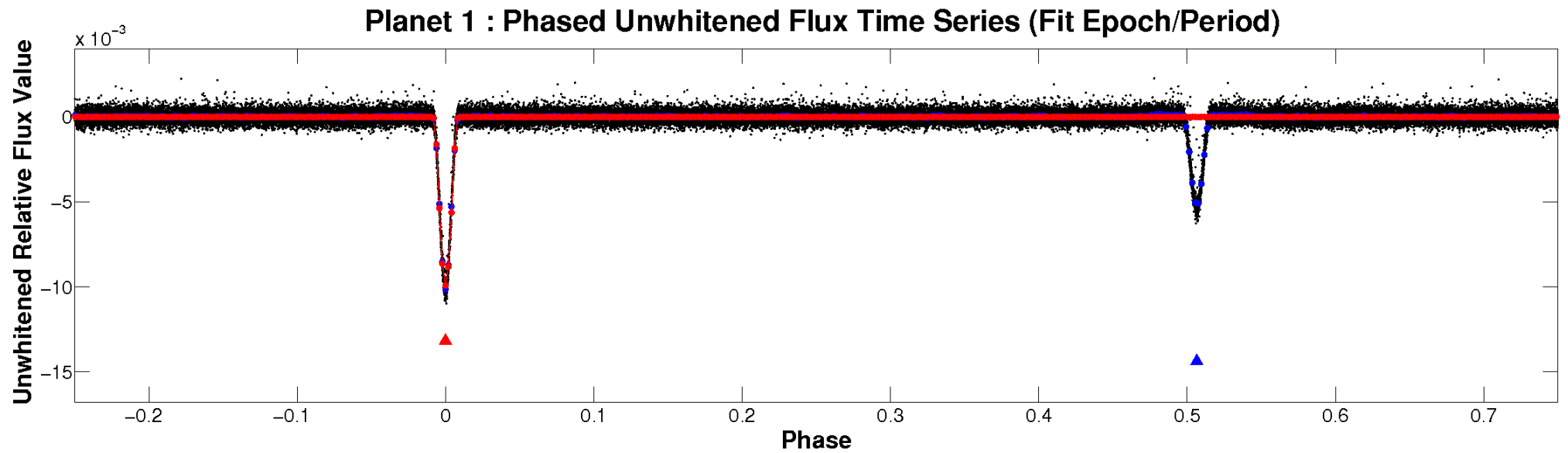


# ALT Odd/Even

TCE 008358008-01



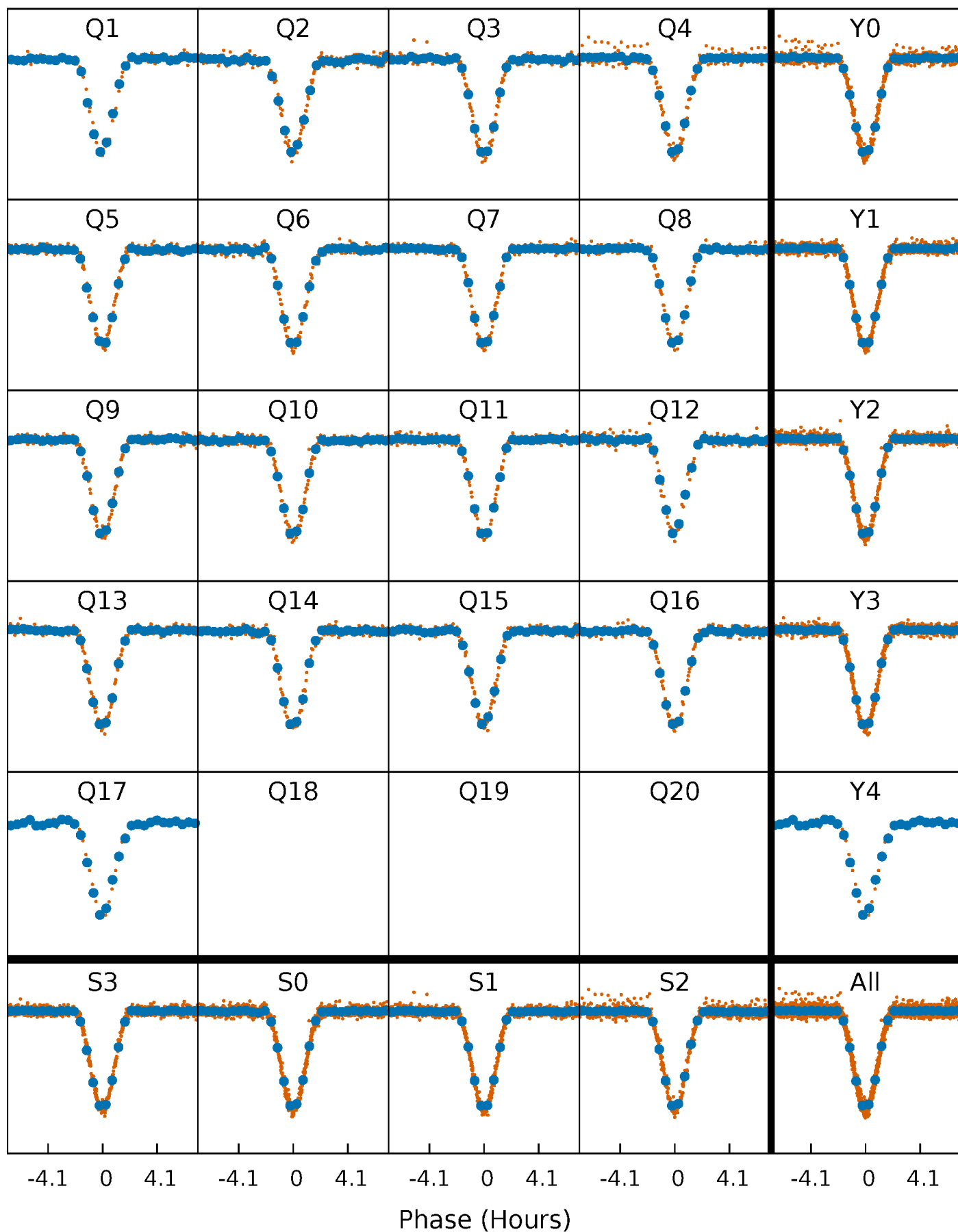
# Non-Whitened Vs. Whitened Light Curve





# PDC Quarter-Phased Transit Curves

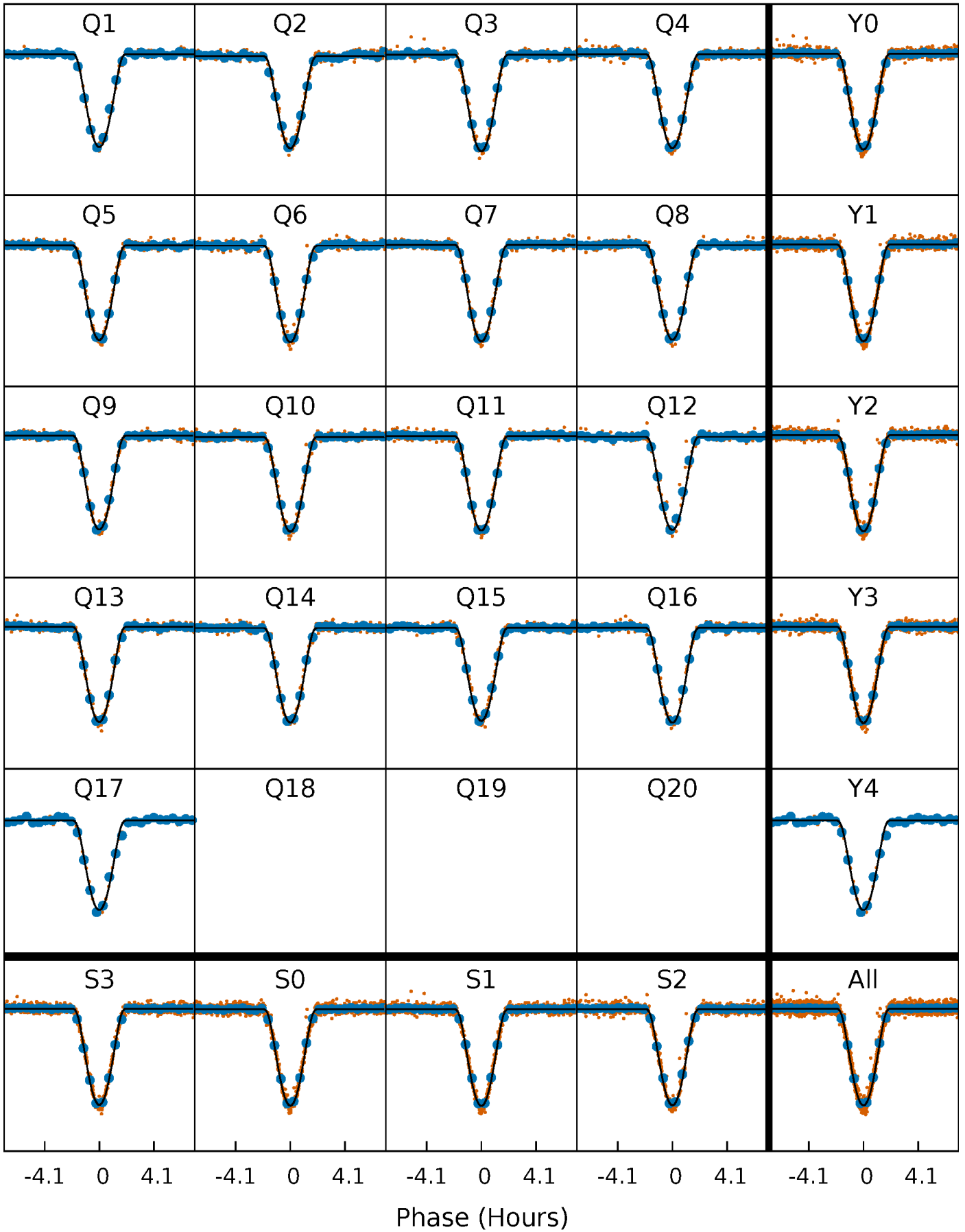
TCE 008358008-01   P= 10.064692 Days    $T_0=135.250874$  (BKJD)





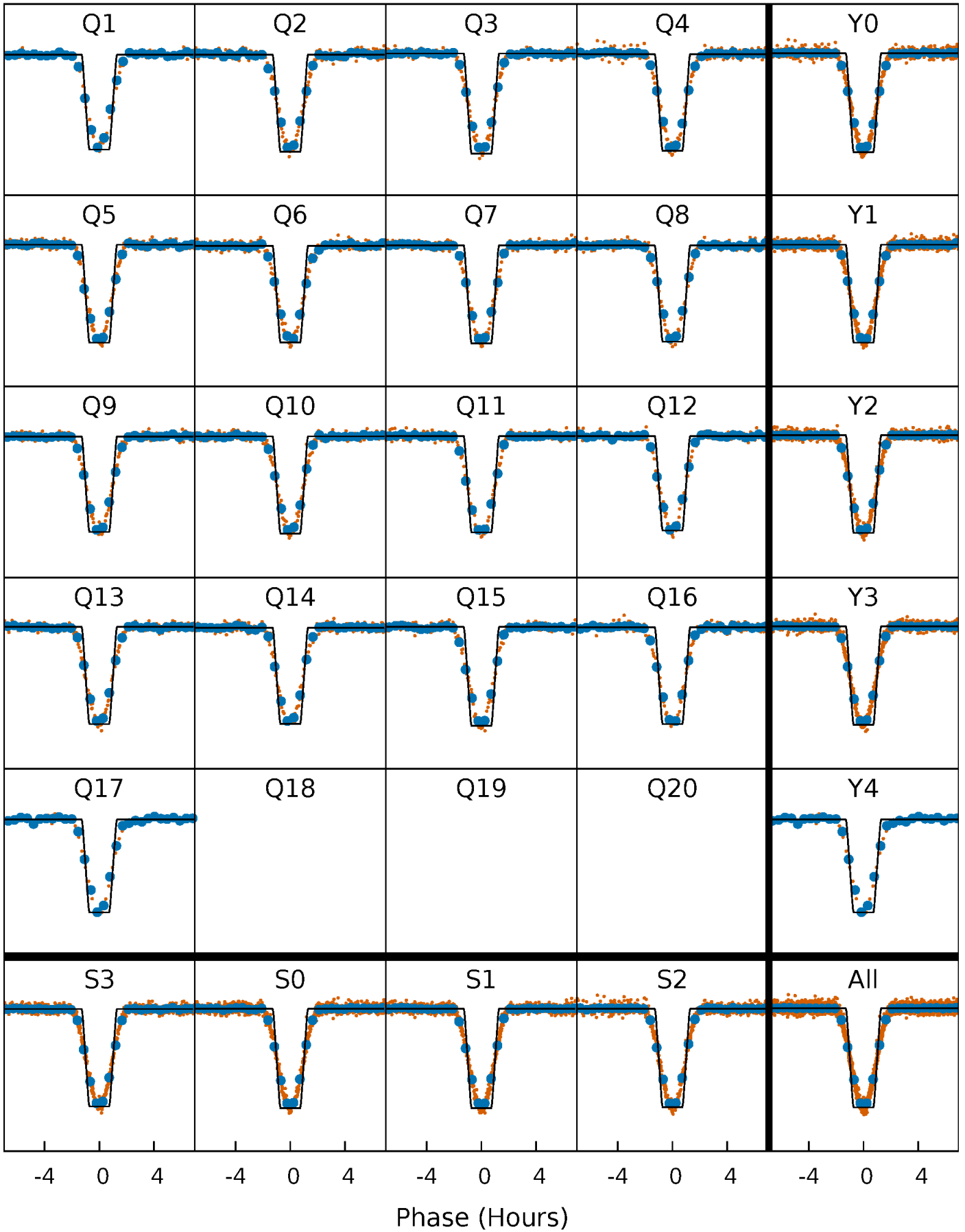
# DV Quarter-Phased Transit Curves

TCE 008358008-01 P= 10.064692 Days  $T_0=135.250874$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

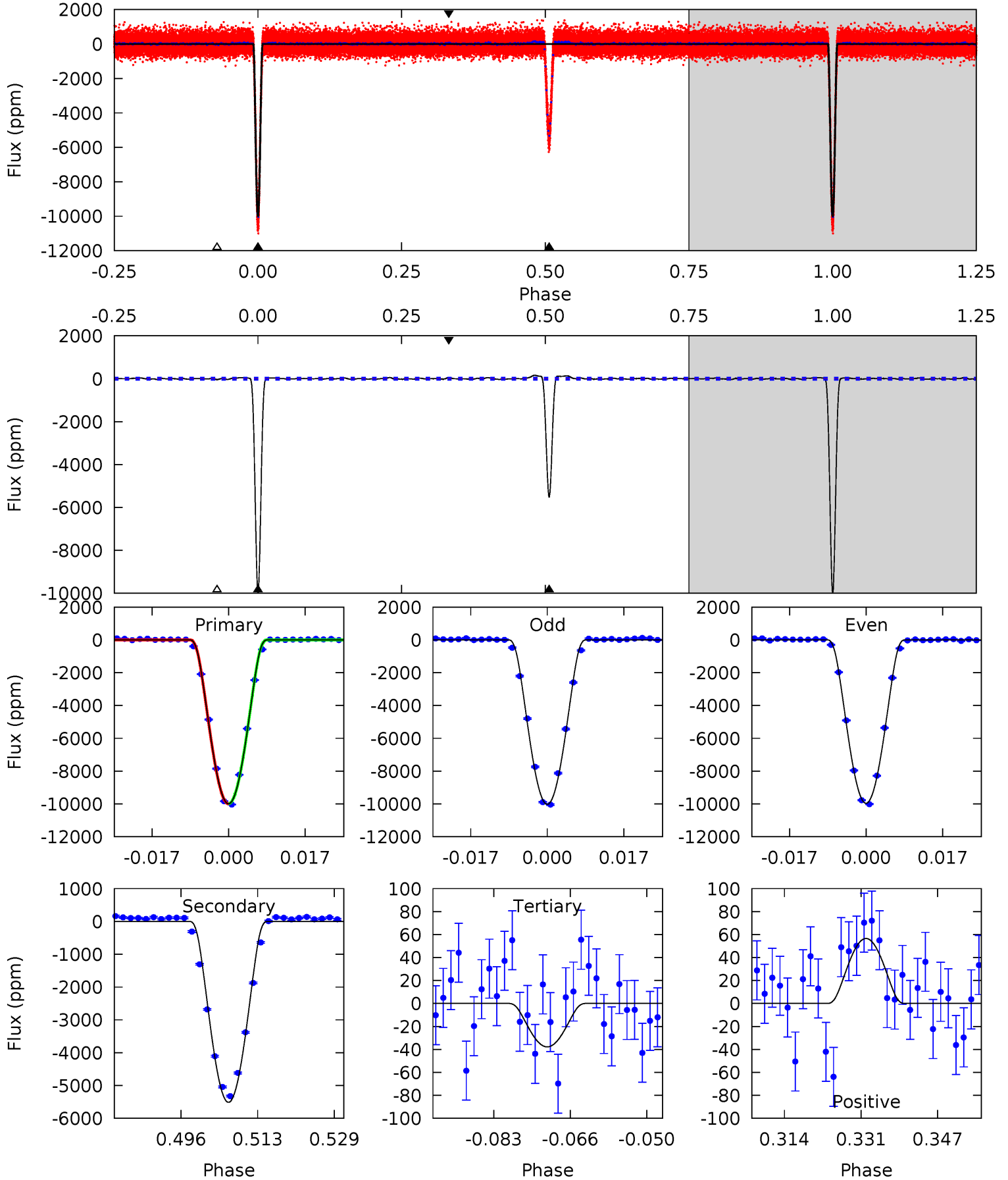
TCE 008358008-01 P= 10.064704 Days  $T_0=135.249933$  (BKJD)



# DV Model-Shift Uniqueness Test

008358008-01, P = 10.064692 Days, E = 125.186182 Days

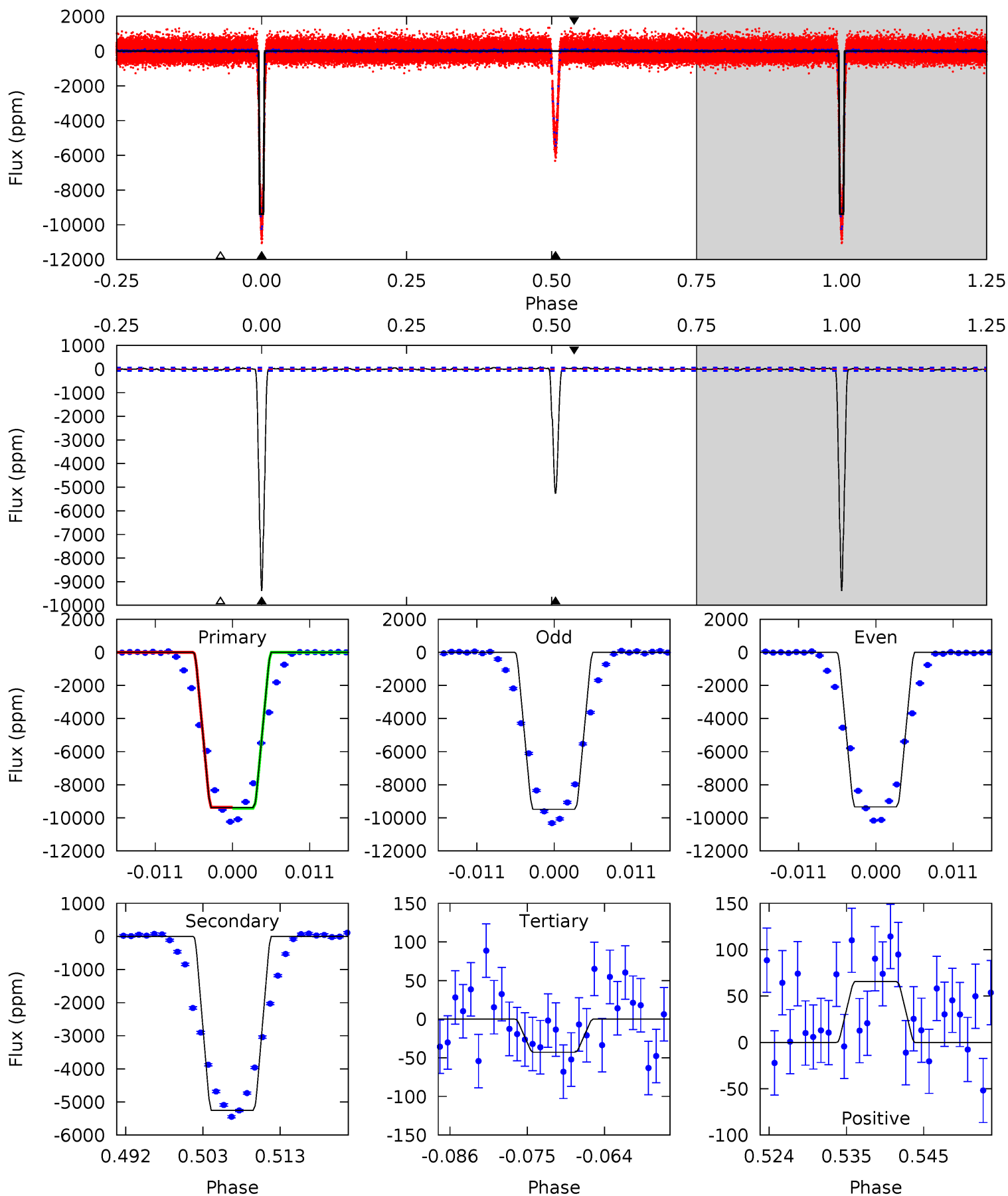
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1053	580.9	3.98	5.96	4.93	2.40	3.13	1049	1047	576.9	575.0	3.33	1.00	0.02	0.44



# Alt Model-Shift Uniqueness Test

008358008-01, P = 10.064704 Days, E = 125.185229 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
718.2	402.3	3.27	5.02	5.01	2.55	1.54	715.0	713.2	399.1	397.3	5.62	1.00	0.01	1.87



### Stellar Parameters For KIC 008358008

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5185^{+156}_{-140}$	$4.571^{+0.077}_{-0.056}$	$-0.560^{+0.350}_{-0.300}$	$0.705^{+0.075}_{-0.075}$	$0.673^{+0.090}_{-0.039}$	$2.709^{+0.871}_{-0.552}$
	+3%/-3%	+2%/-1%	+62%/-54%	+11%/-11%	+13%/-6%	+32%/-20%
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 008358008-01 / KOI 7022.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-5513 \pm 9$	$12.91^{+1.78}_{-1.70}$	$945^{+37}_{-36}$	$3795^{+183}_{-157}$	$119^{+37}_{-26}$
Alt.	$-5254 \pm 13$	$7.92^{+1.64}_{-1.55}$	$945^{+37}_{-34}$	$4496^{+405}_{-305}$	$302^{+163}_{-93}$

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

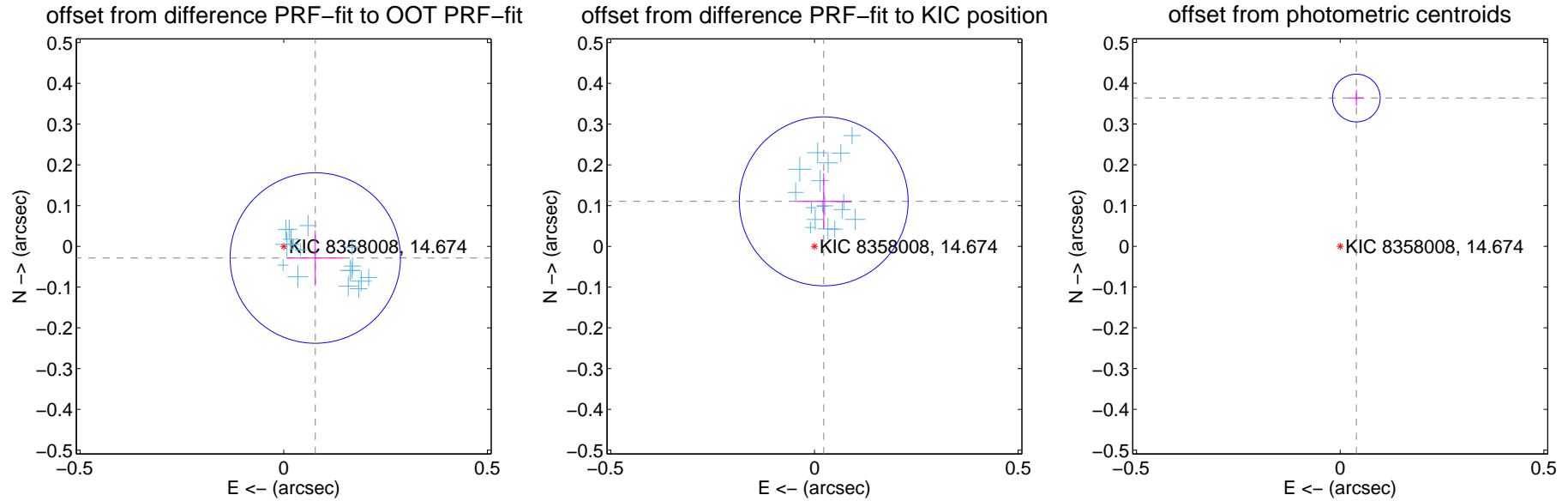
## DV Centroid Data

Supplemental centroid analysis for 008358008-01. Kepler magnitude: 14.67. Transit SNR 568.12

There are 17 quarters with good PRF difference image offsets

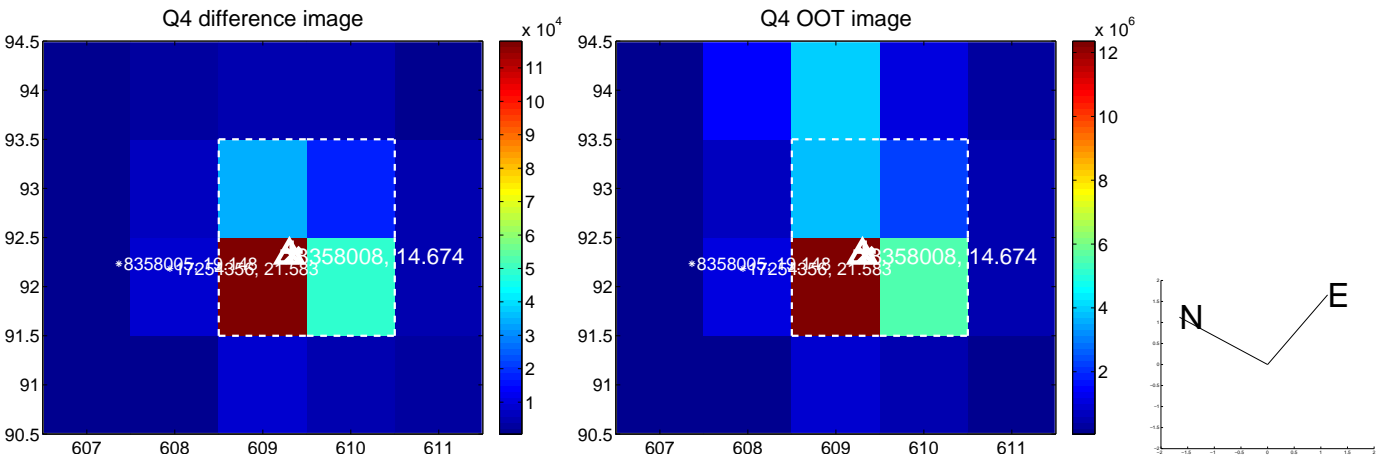
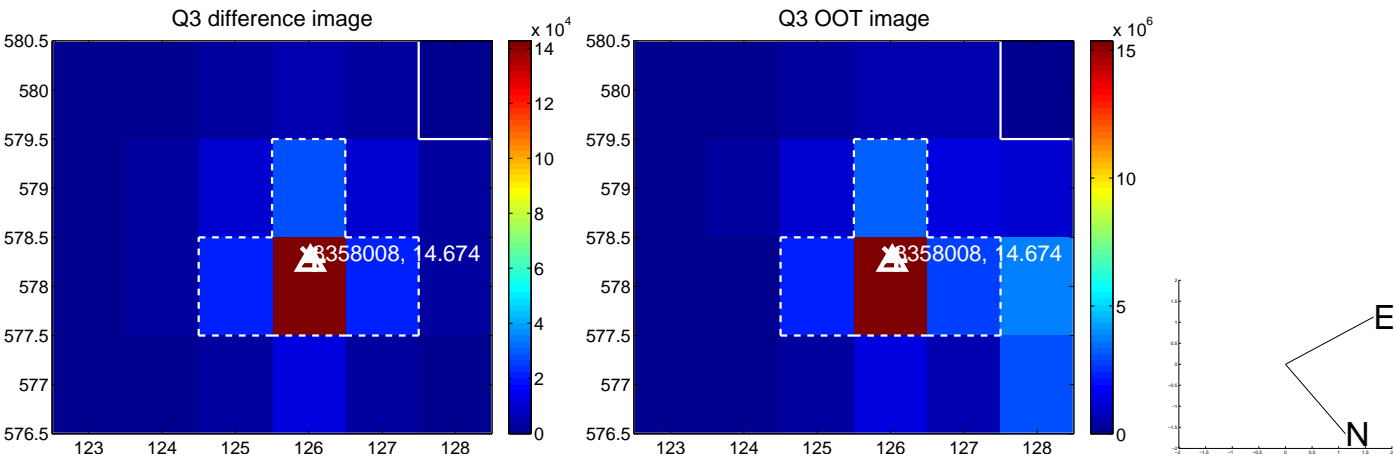
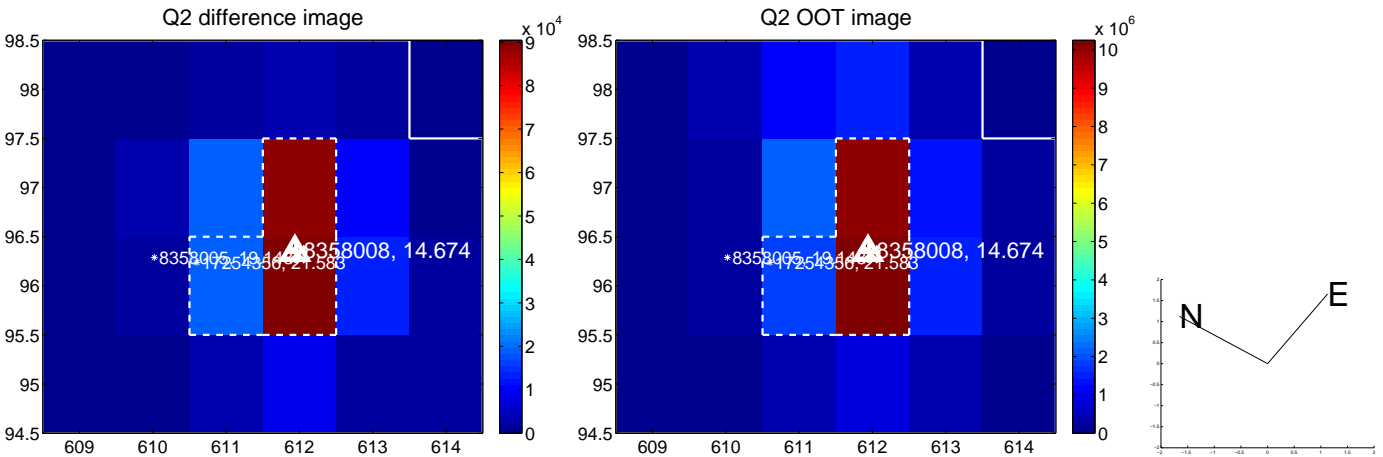
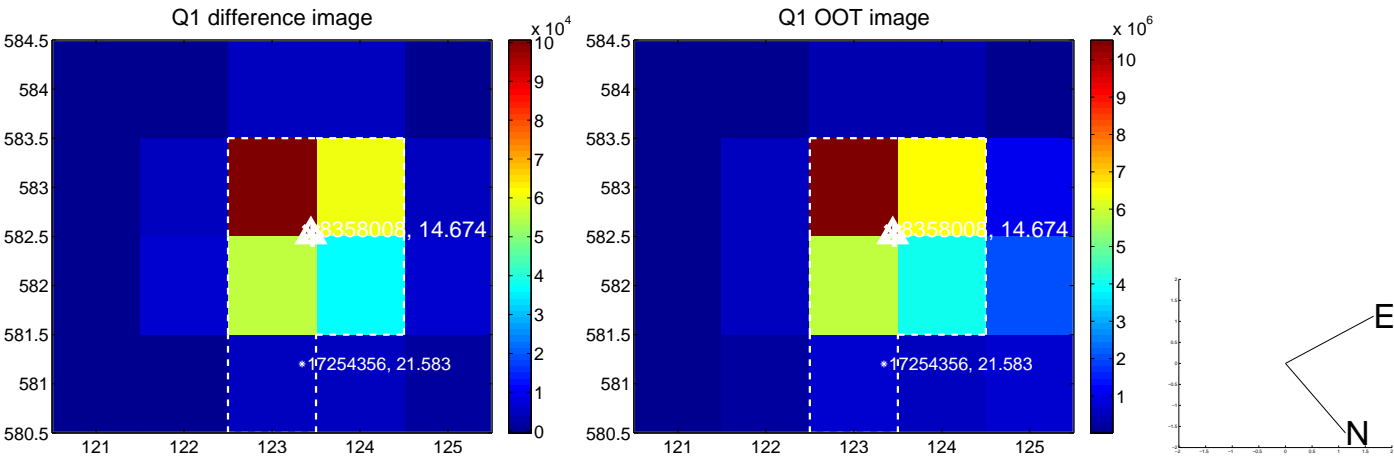
The direct PRF centroid is offset from the target star catalog position by about 0.19 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.083 \pm 0.070$	1.18	$-0.077 \pm 0.069$	$-0.029 \pm 0.068$
PRF-fit source offset from KIC position	$0.113 \pm 0.069$	1.63	$-0.023 \pm 0.067$	$0.110 \pm 0.069$
photometric centroid source offset	$0.37 \pm 0.02$	18.75	$-0.04 \pm 0.02$	$0.36 \pm 0.02$



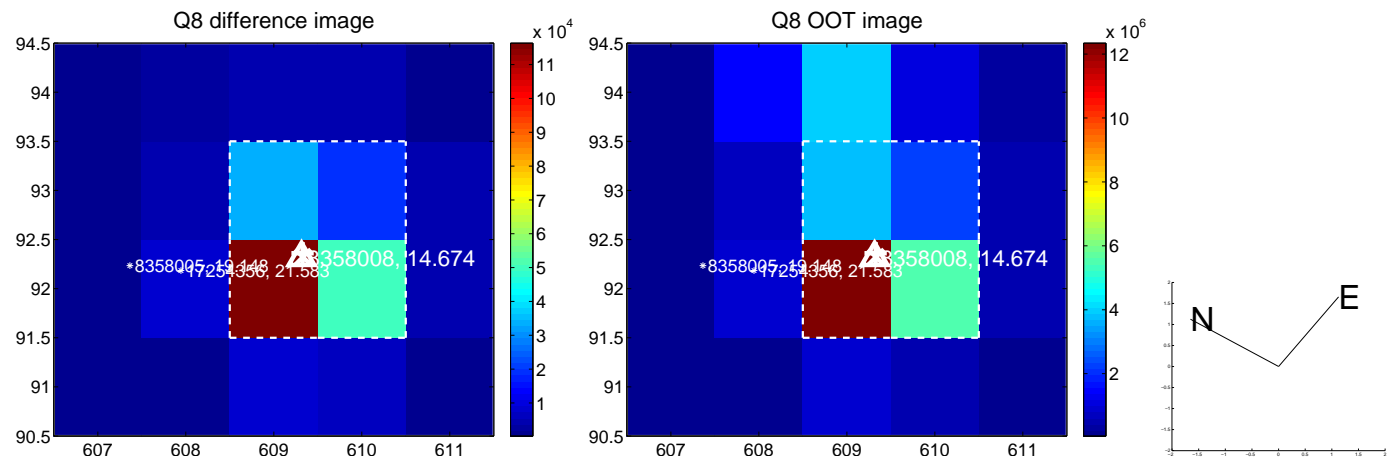
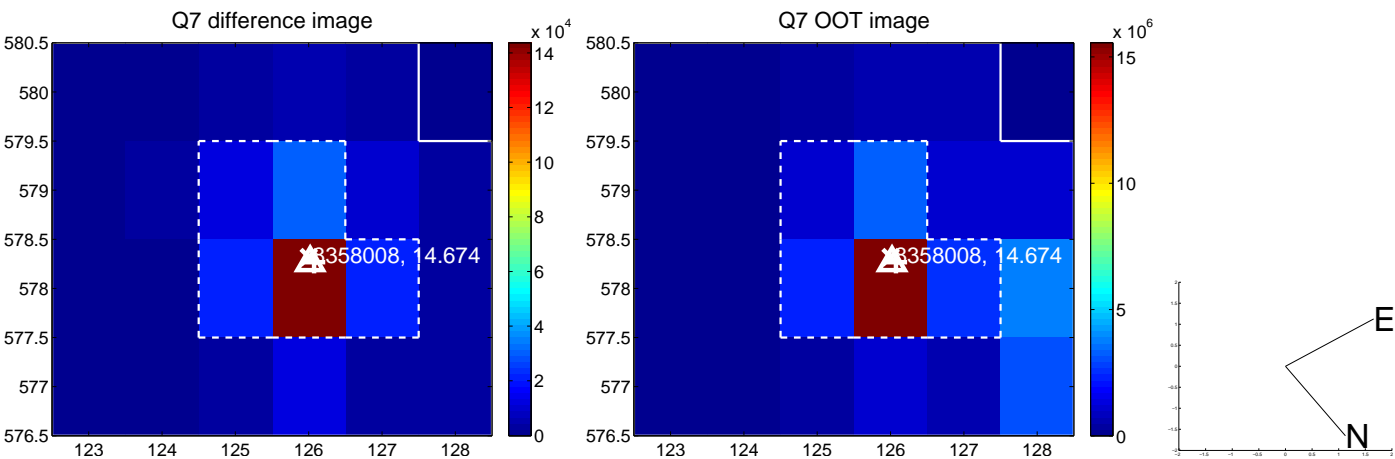
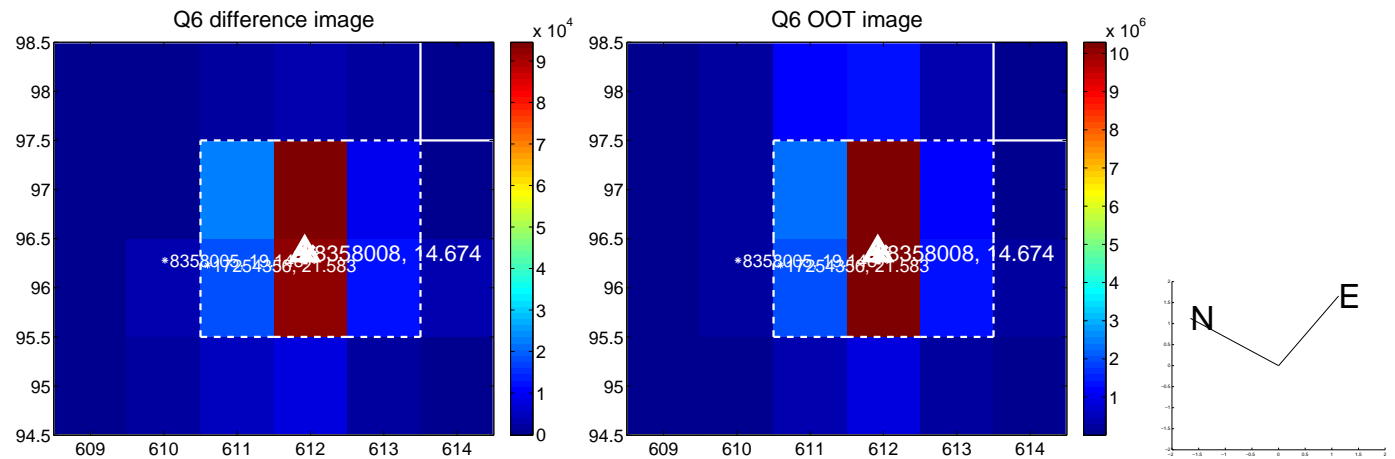
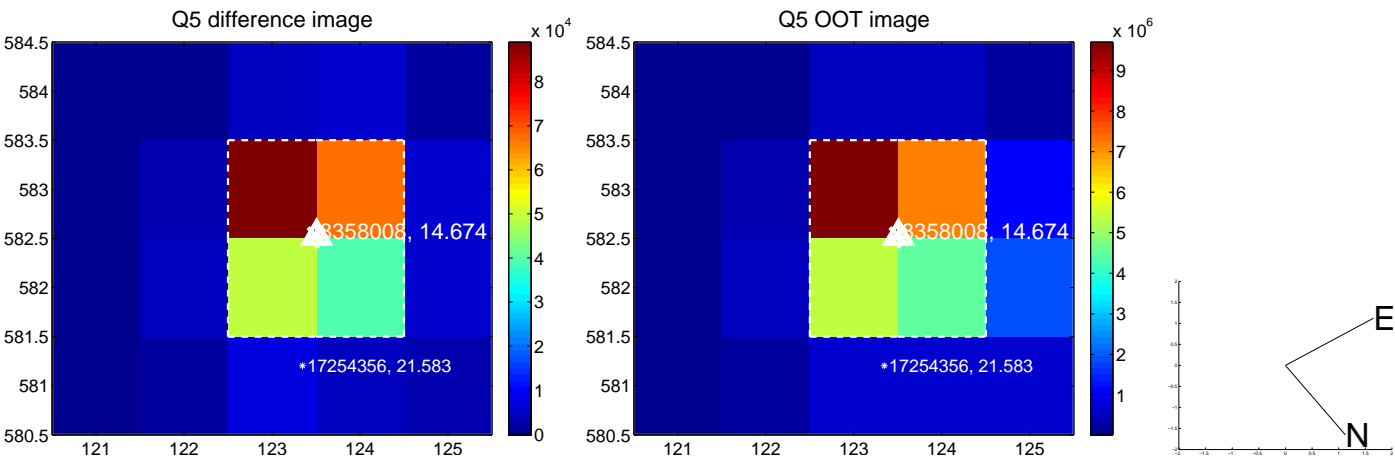
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

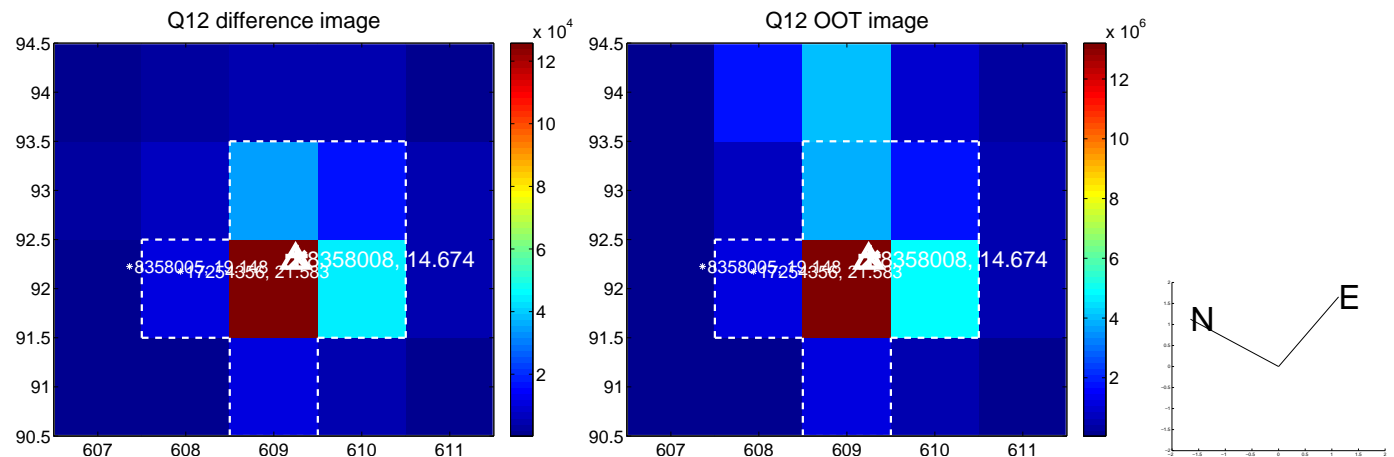
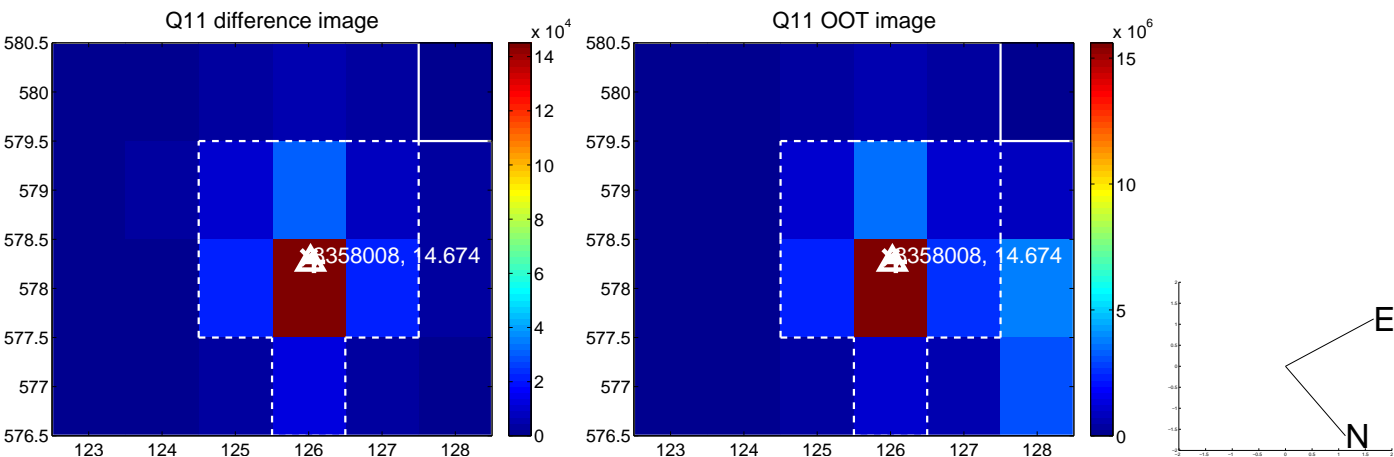
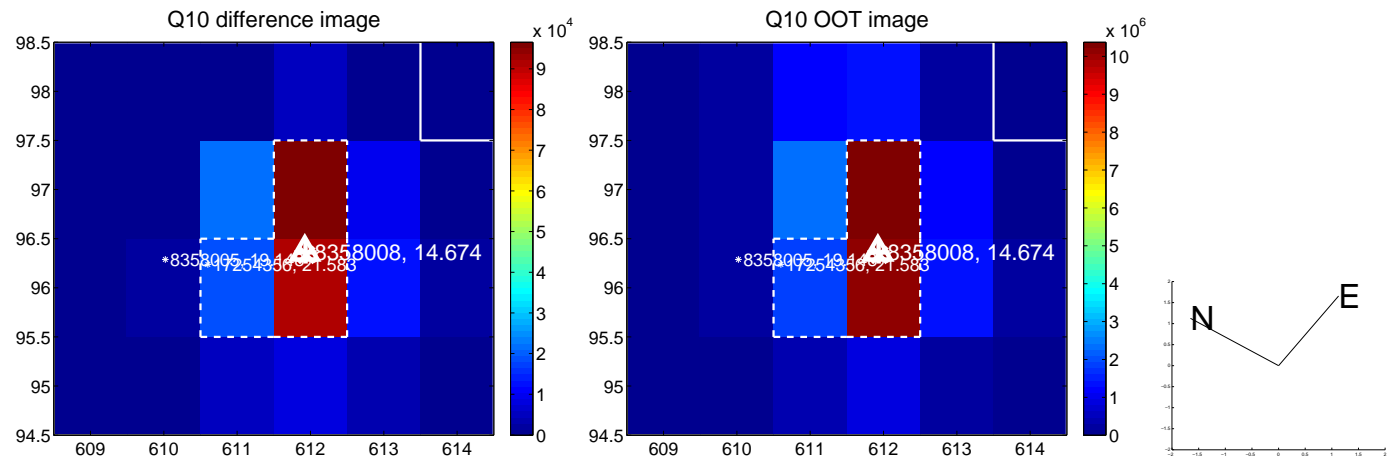
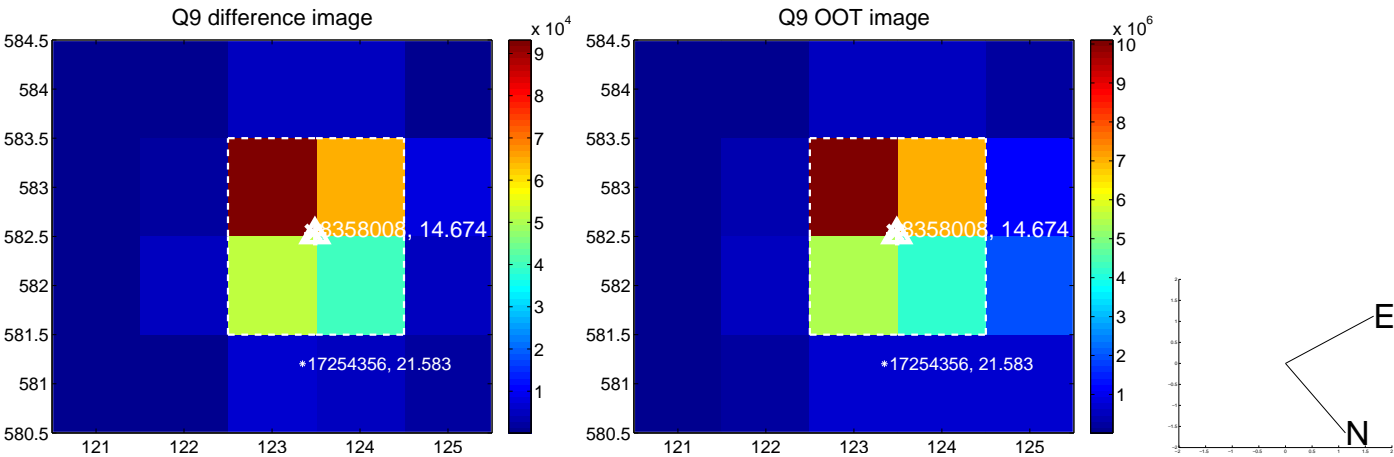




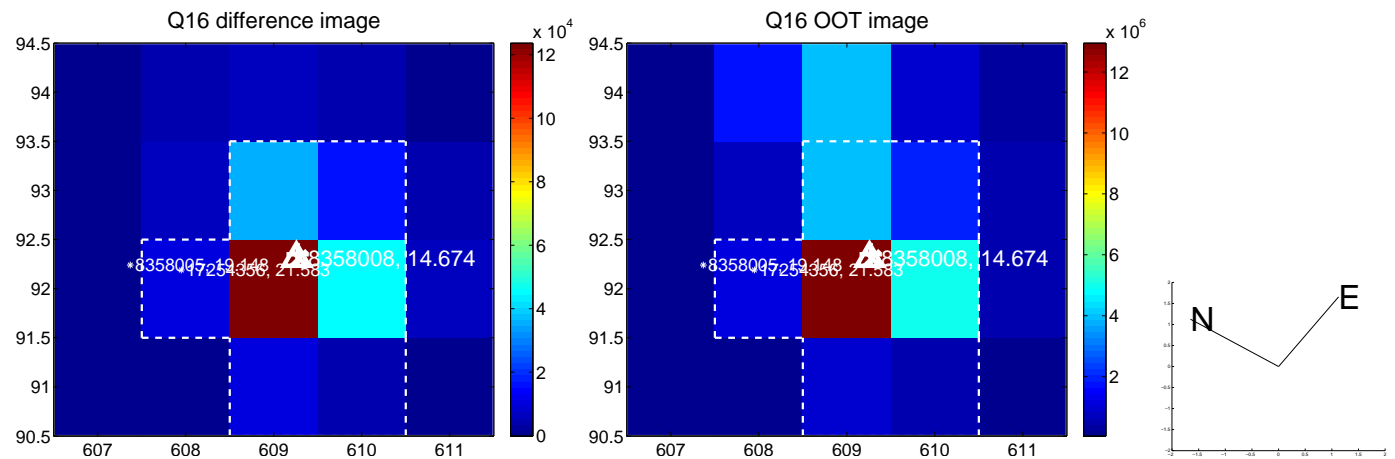
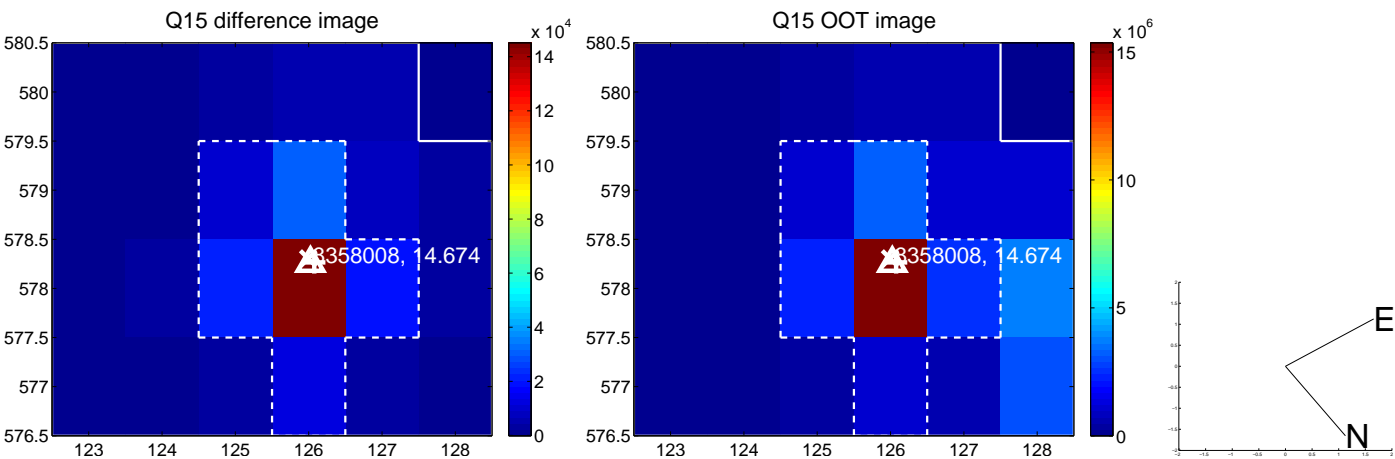
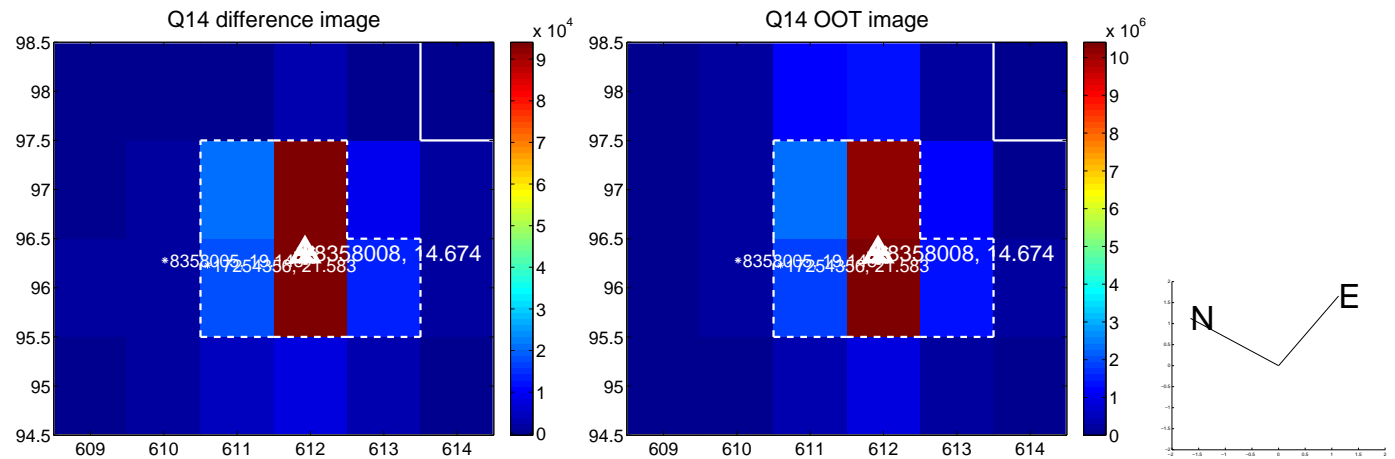
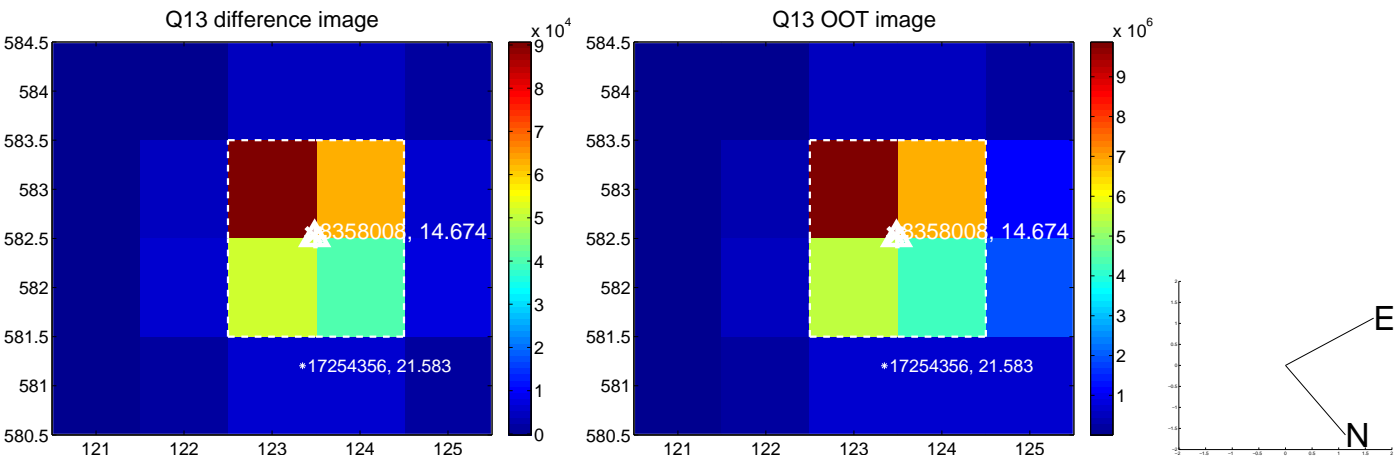
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



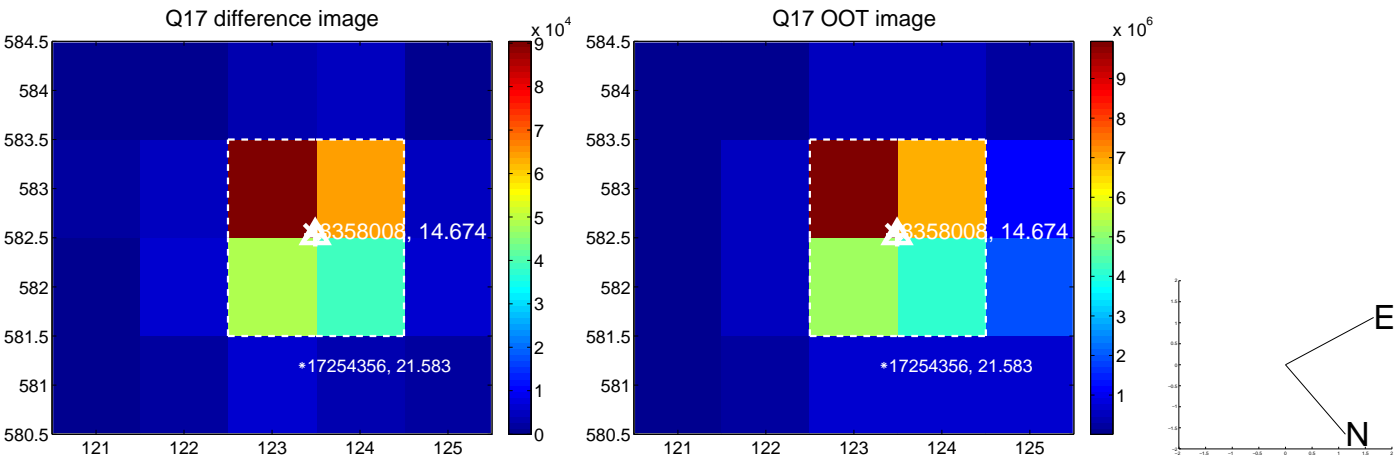
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



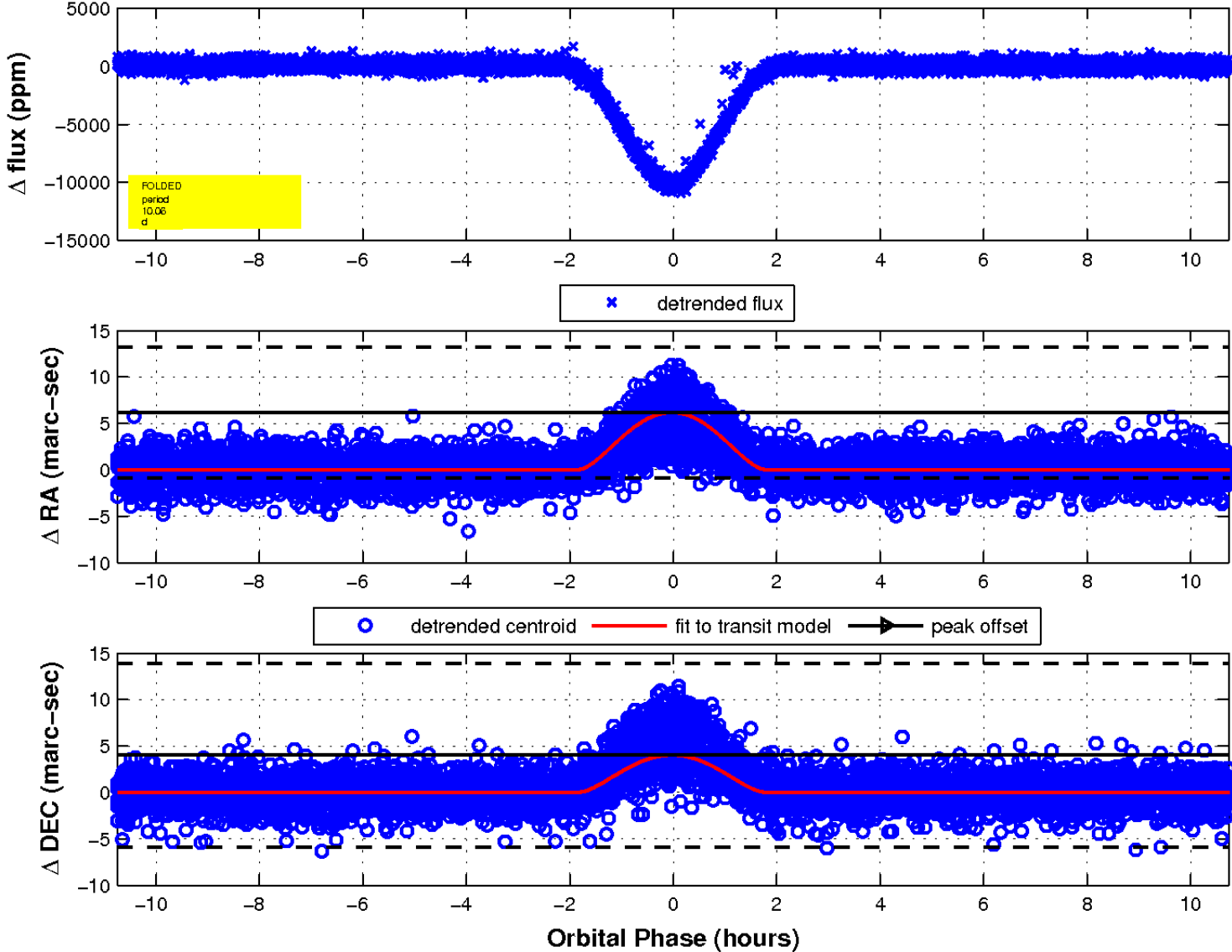
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

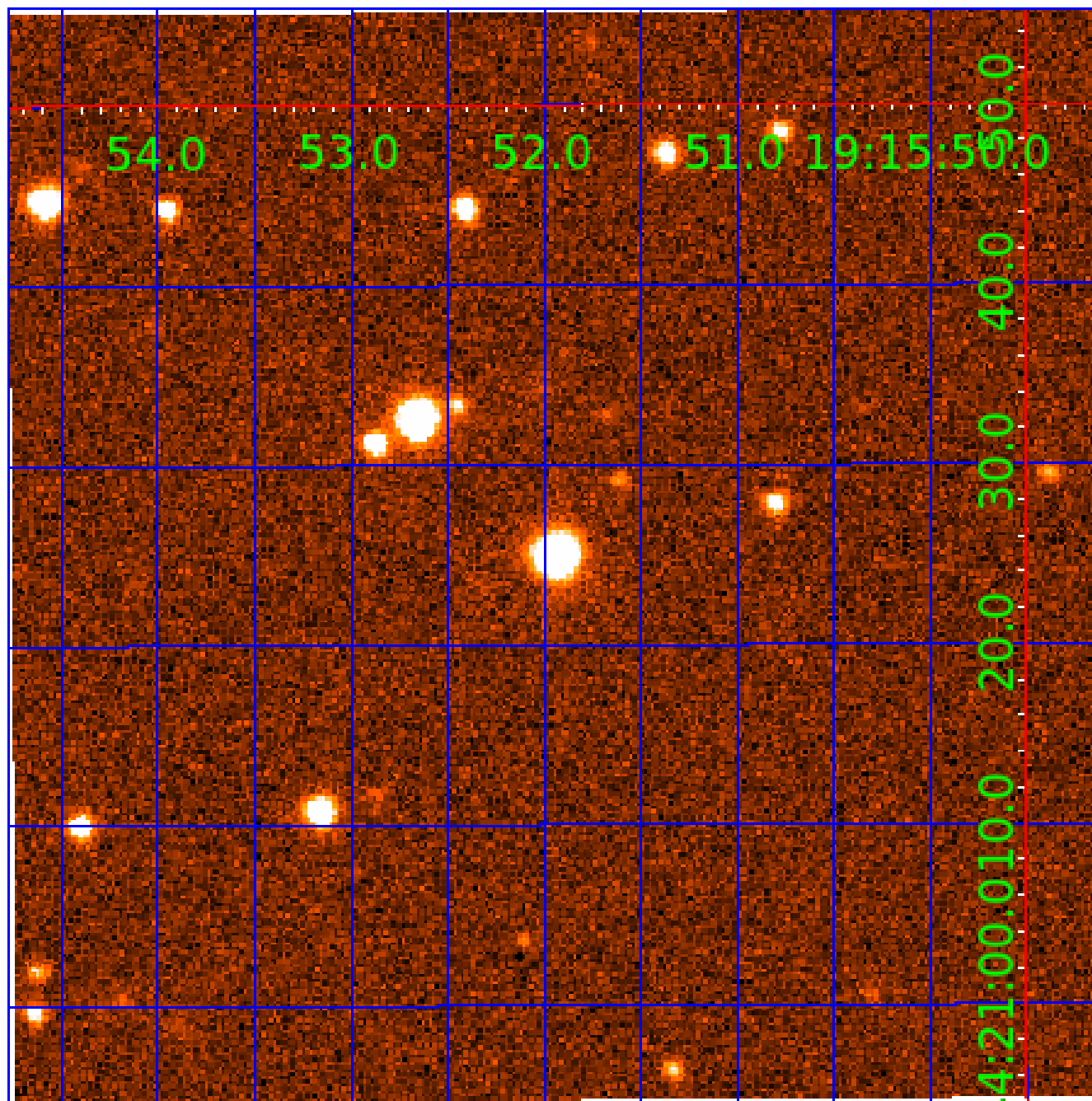


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination



# KIC 008358008

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008358008-01	OBS	7022.01	10.064692	135.250874	10045.0	3.583	580.2	568.1	0.70	5185	12.97	50.23
008358008-02	OBS	No	10.064694	140.349020	5314.5	3.927	330.0	328.5	0.70	5185	9.64	50.23

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008358008-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—DEEP_V_SHAPED—HAS_SEC_TCE
008358008-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE

**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.

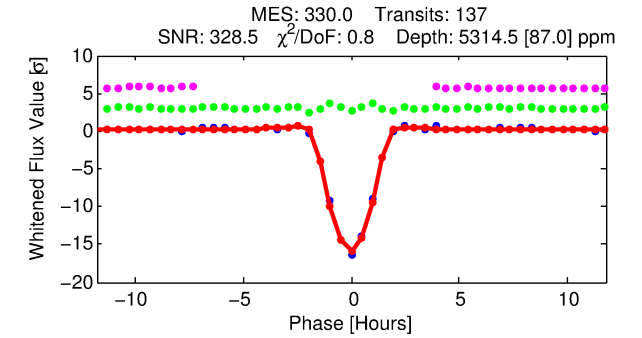
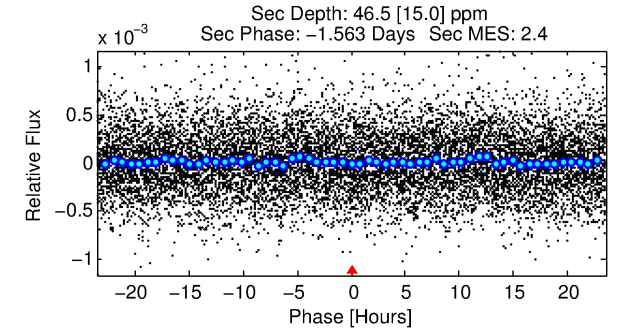
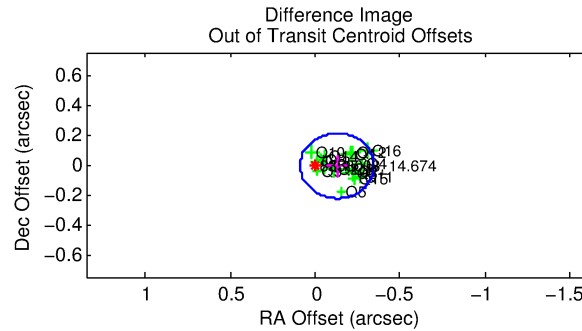
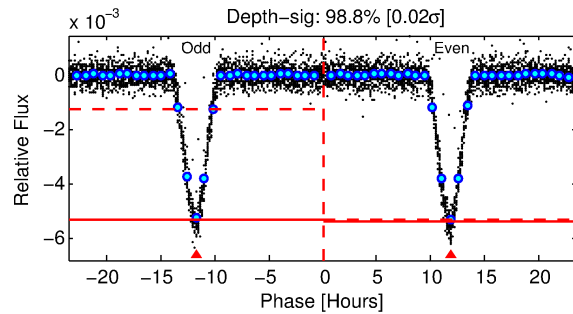
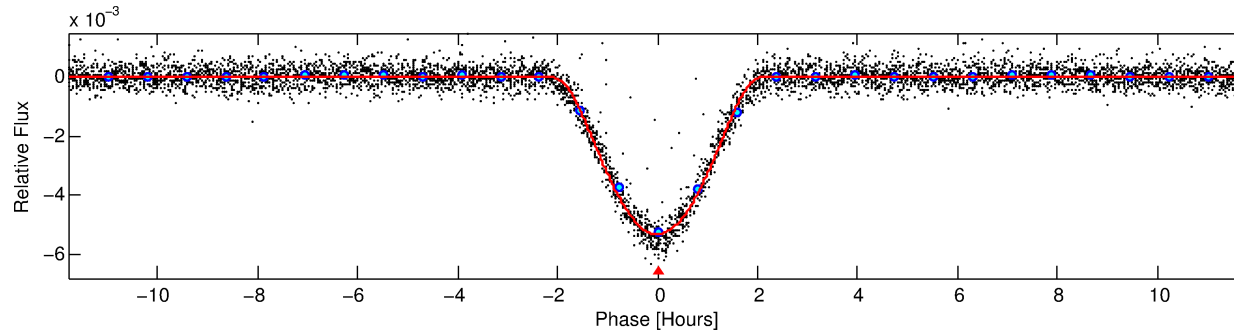
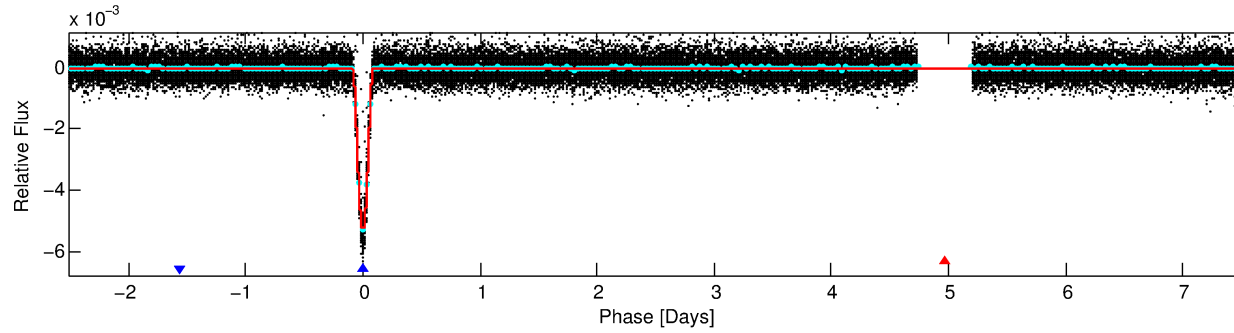
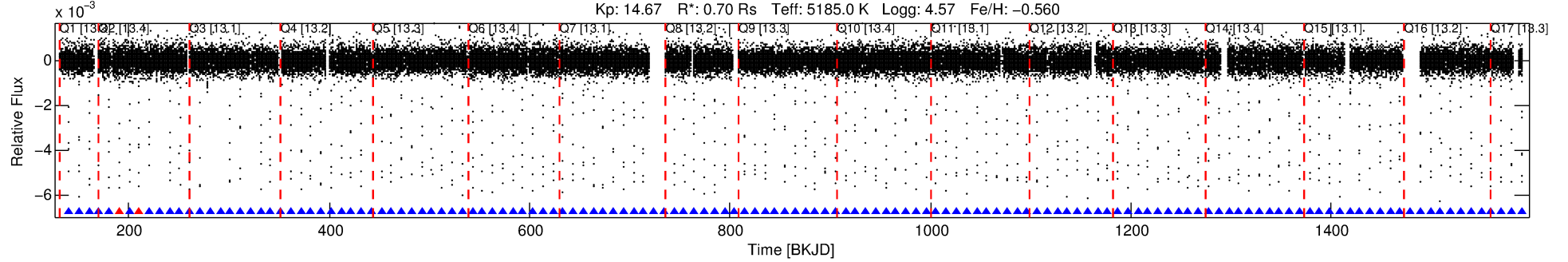
## Ephemeris Match Information For 008358008-02

No Significant Match Found

# DV One-Page Summary

KIC: 8358008 Candidate: 2 of 2 Period: 10.065 d  
KOI: K07022 Corr: No Ephemeris Match

Kp: 14.67 R\*: 0.70 Rs Teff: 5185.0 K Logg: 4.57 Fe/H: -0.560



## DV Fit Results:

Period = 10.06469 [0.00000] d  
Epoch = 140.3490 [0.0003] BKJD  
Rp/R\* = 0.1252 [0.0199]  
a/R\* = 10.17 [0.27]  
b = 1.00 [0.03]  
Seff = 50.23 [9.19]  
Teff = 679 [31] K  
Rp = 9.64 [1.84] Re  
a = 0.0800 [0.0074] AU  
Ag = 1.77 [0.84] [0.92σ]  
Teffp = 1210 [142] K [3.66σ]

## DV Diagnostic Results:

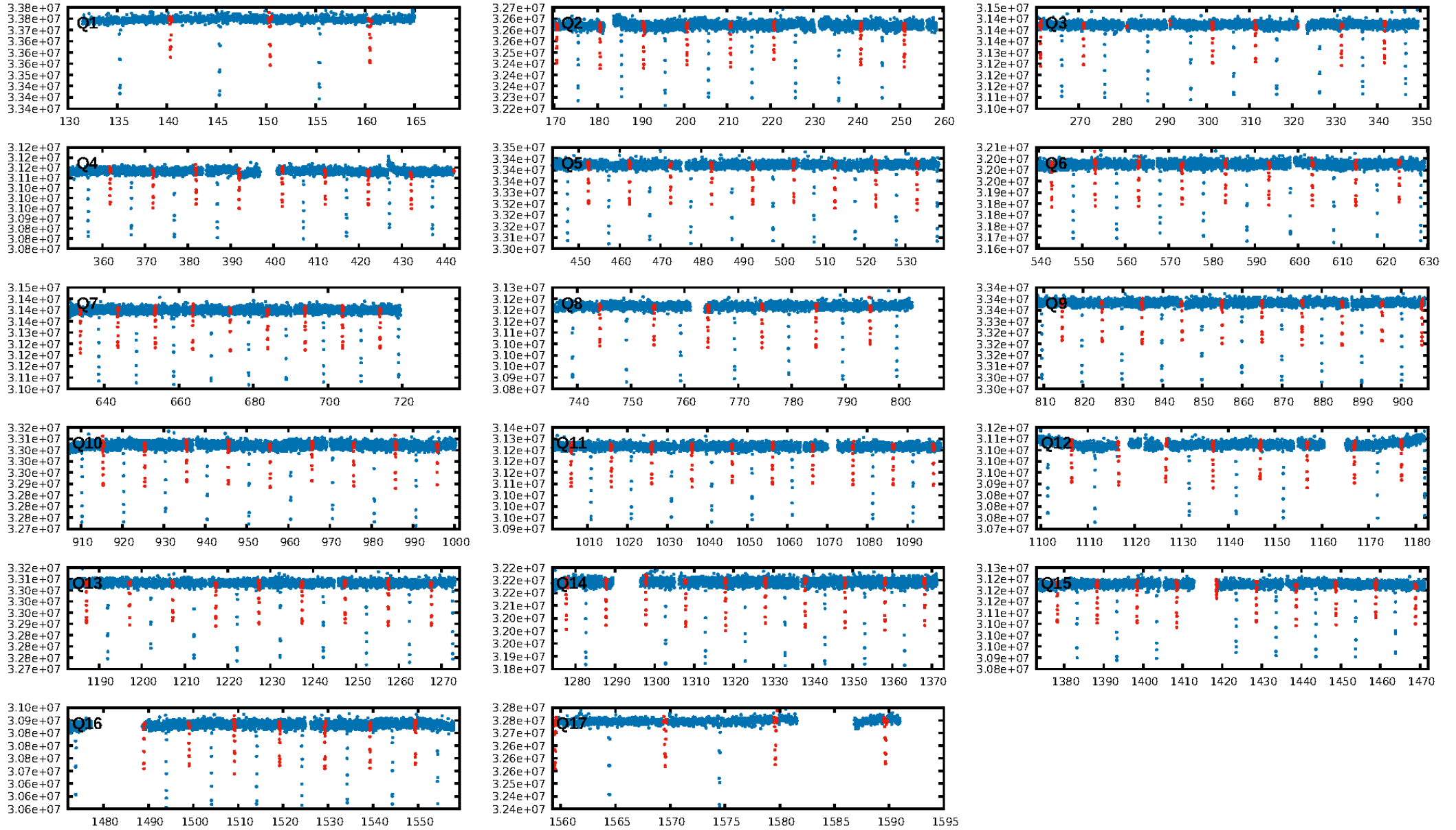
ShortPeriod-sig: 0.0% [0.00σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 99.8%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 0.98 [128/130]  
GhostDiagnostic-chr: 5.259  
Centroid-sig: 0.0%  
Centroid-so: 0.327 arcsec [9.46σ]  
OotOffset-rm: 0.130 arcsec [1.79σ]  
KicOffset-rm: 0.172 arcsec [2.42σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 07:29:35 Z

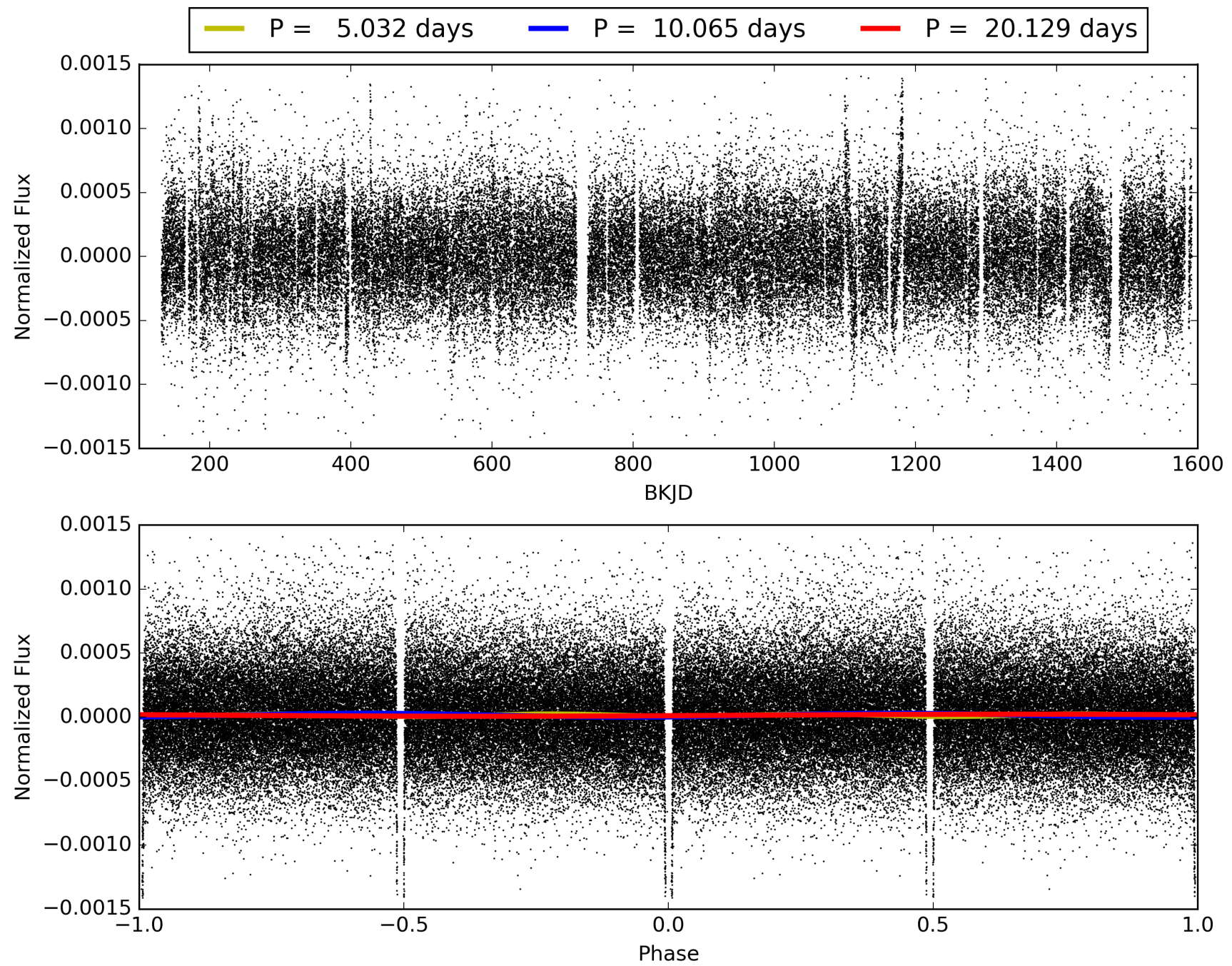
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 008358008-02, PDC Light Curves

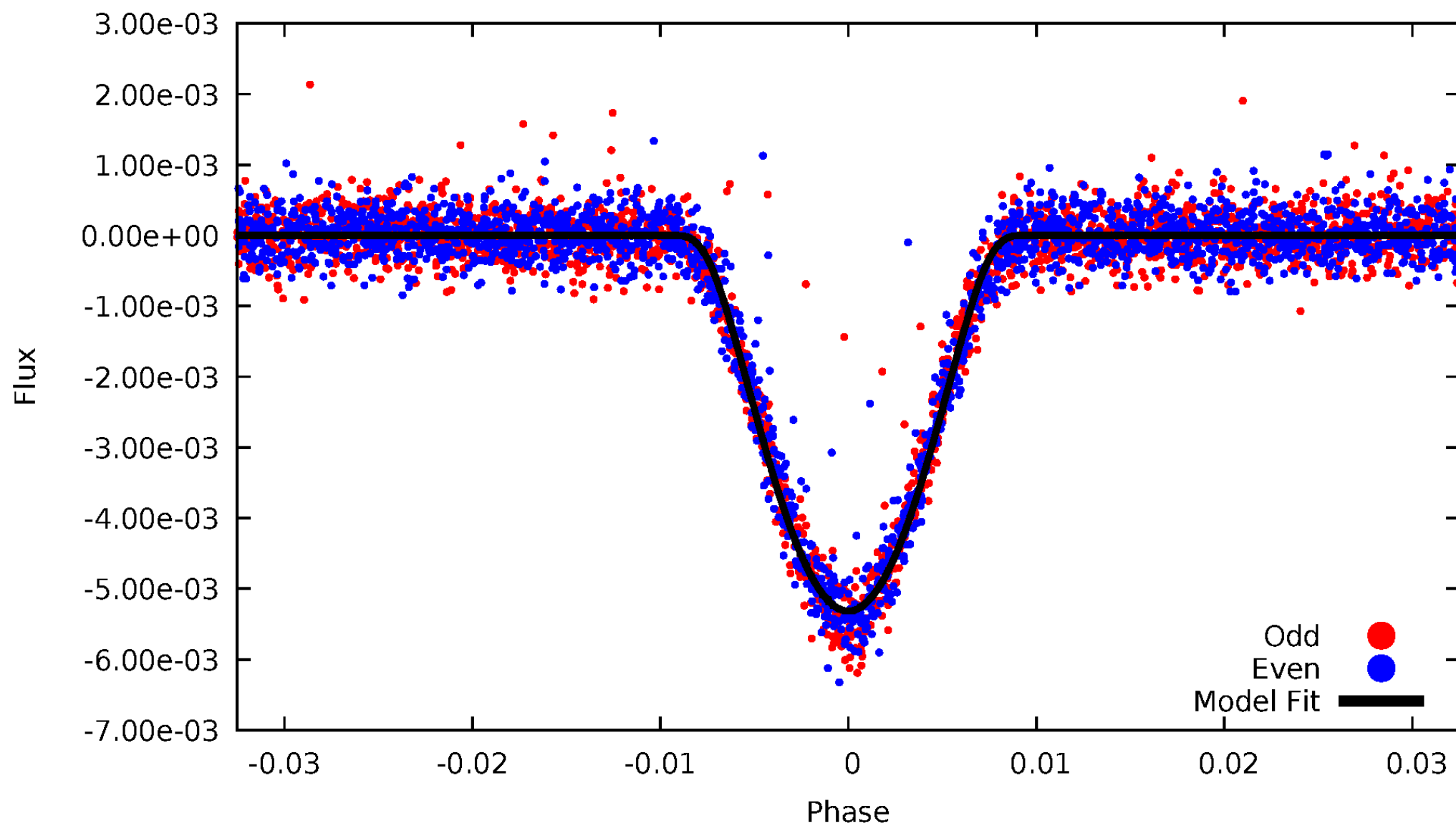


TCE 008358008-02



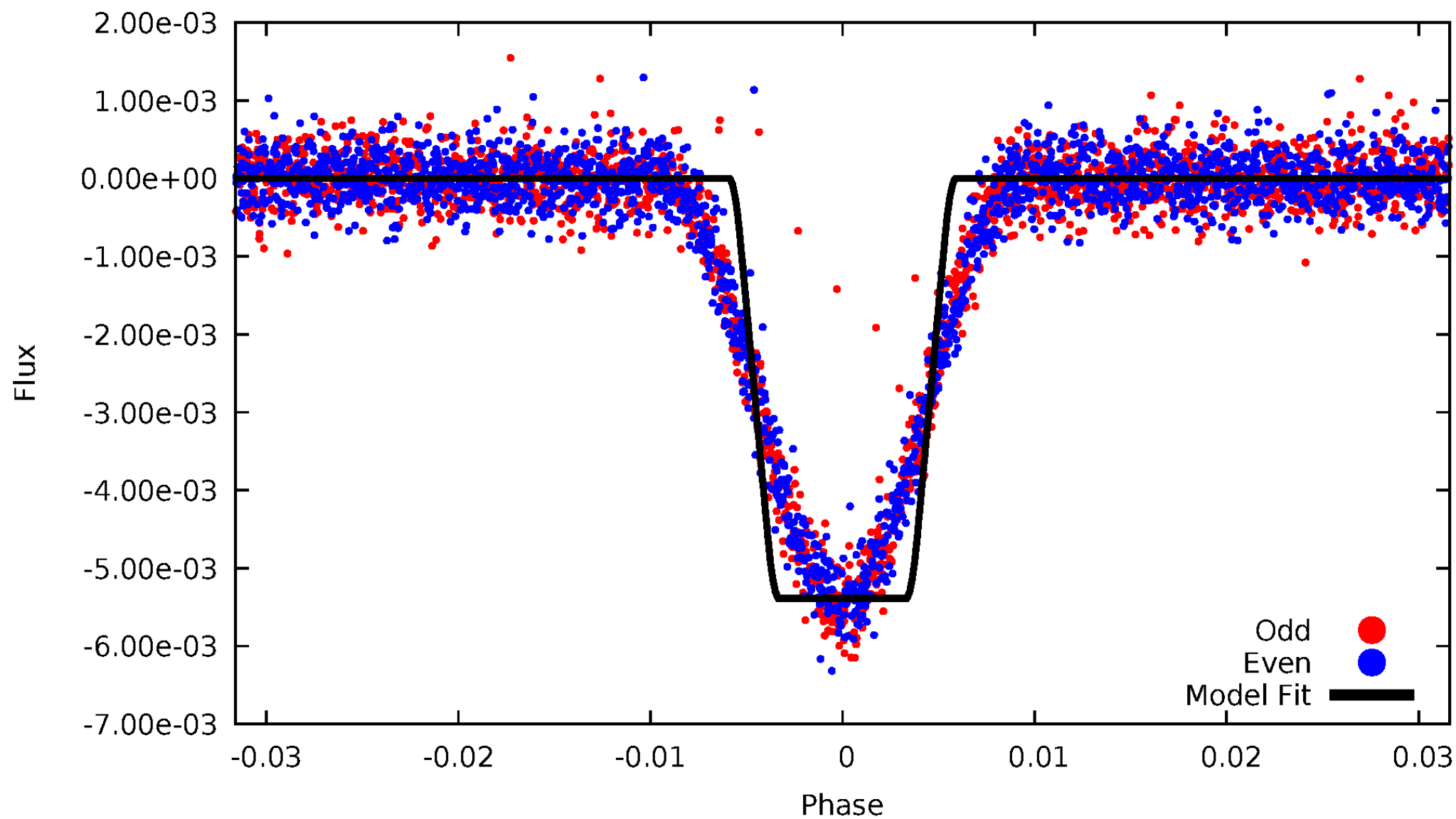
# DV Odd/Even

TCE 008358008-02



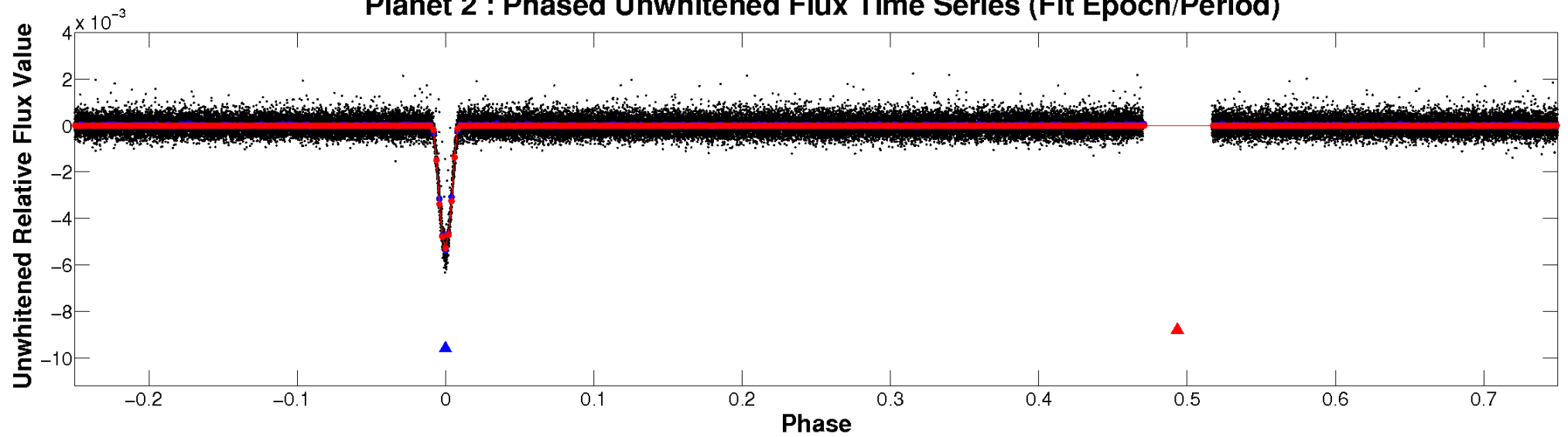
# ALT Odd/Even

TCE 008358008-02

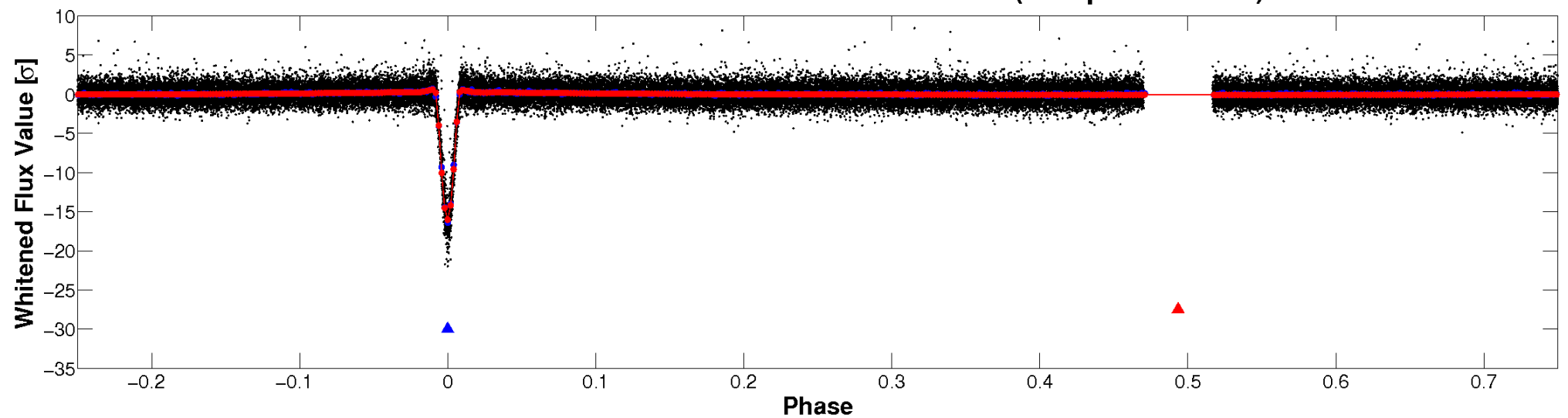


# Non-Whitened Vs. Whitened Light Curve

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

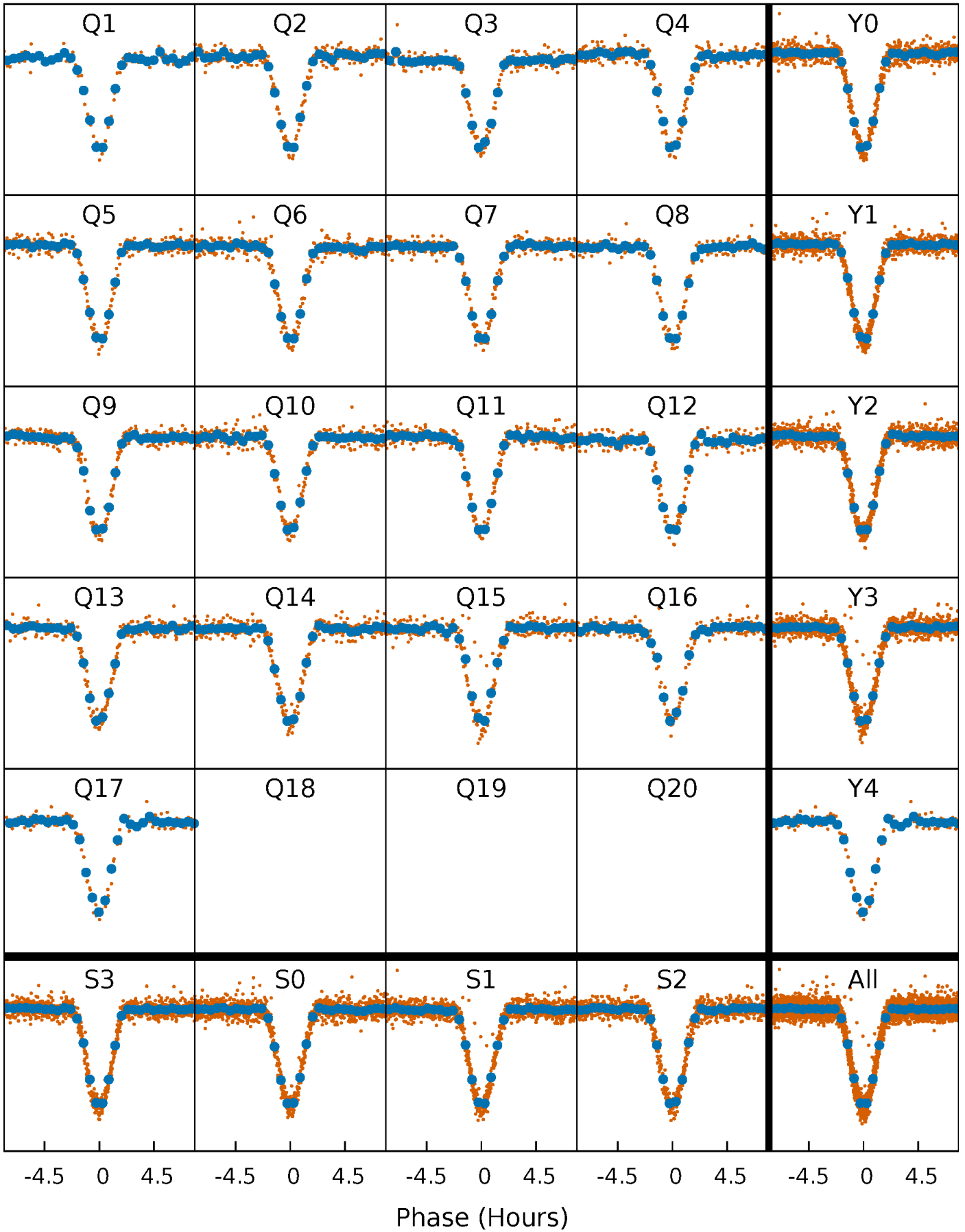


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



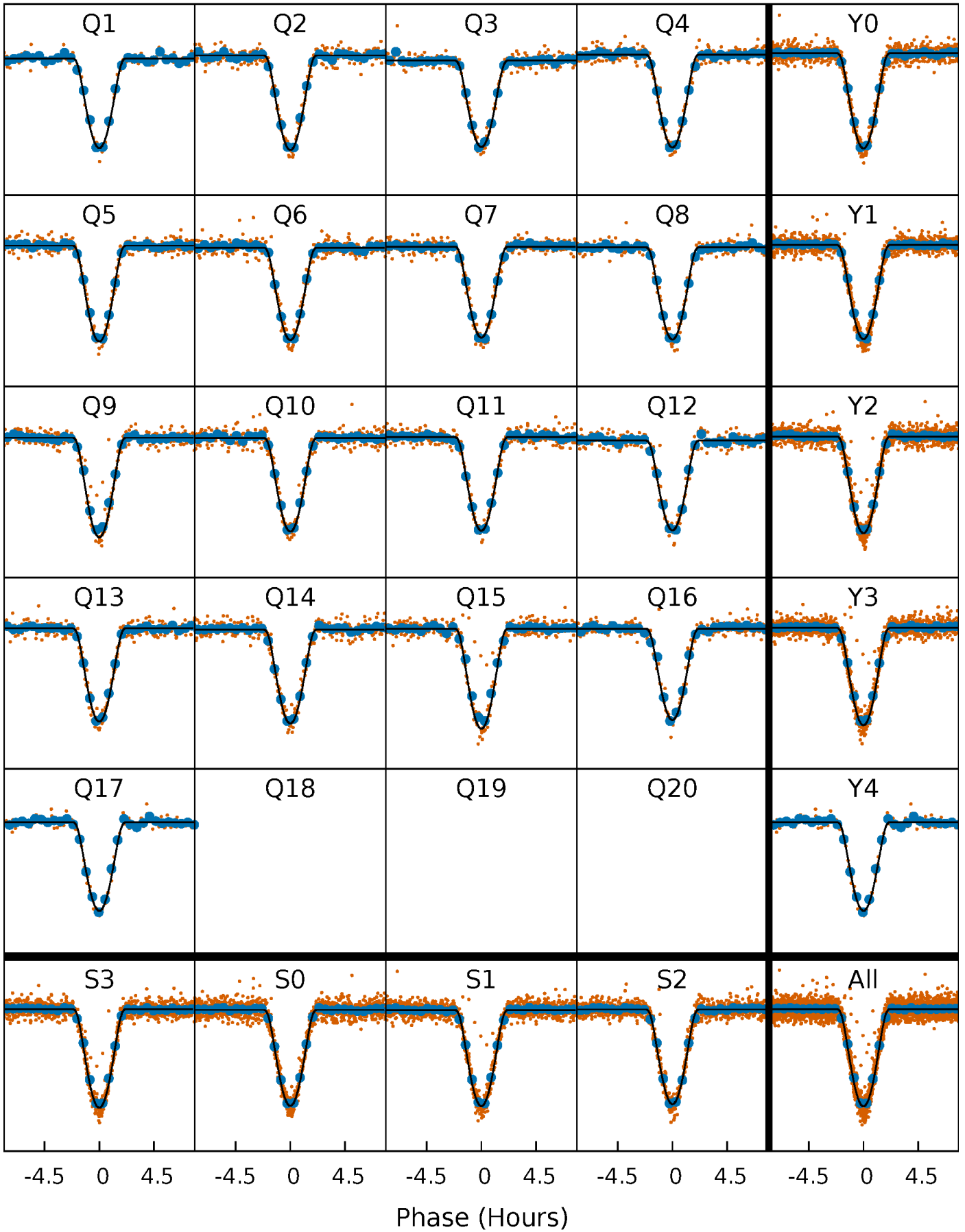
# PDC Quarter-Phased Transit Curves

TCE 008358008-02   P= 10.064694 Days    $T_0=140.349020$  (BKJD)



# DV Quarter-Phased Transit Curves

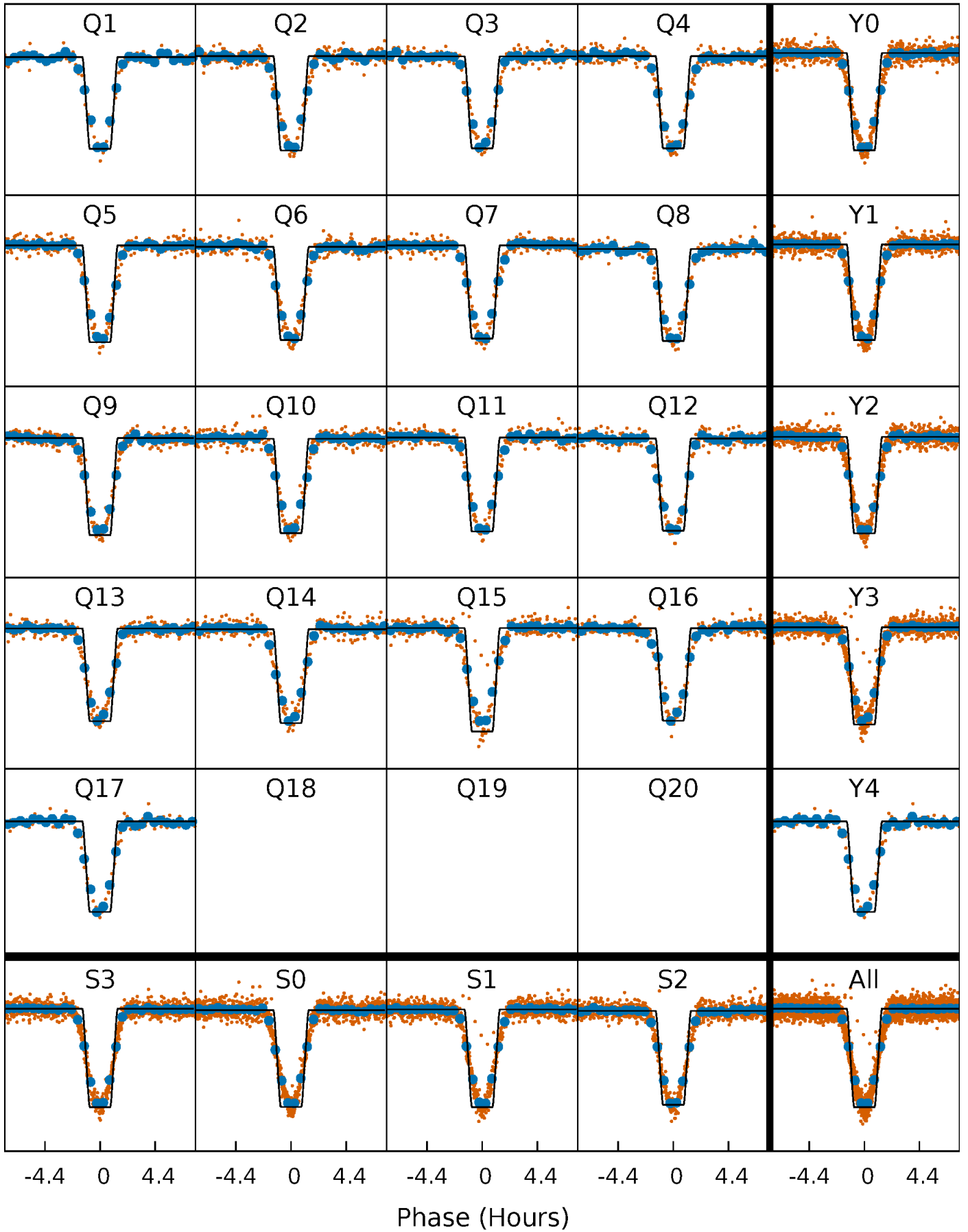
TCE 008358008-02   P= 10.064694 Days    $T_0=140.349020$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

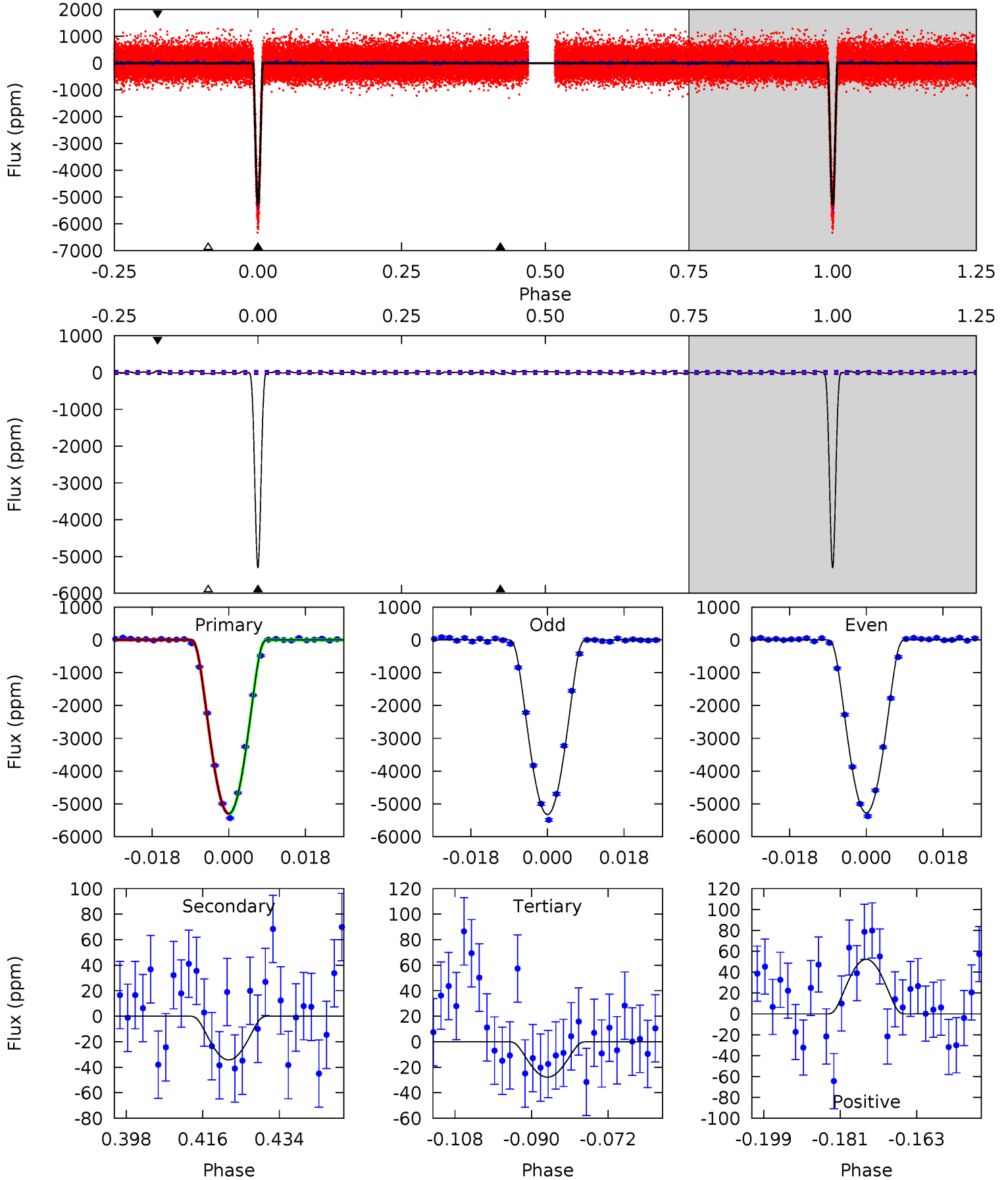
TCE 008358008-02   P= 10.064704 Days    $T_0=140.348406$  (BKJD)



# DV Model-Shift Uniqueness Test

008358008-02, P = 10.064694 Days, E = 130.284326 Days

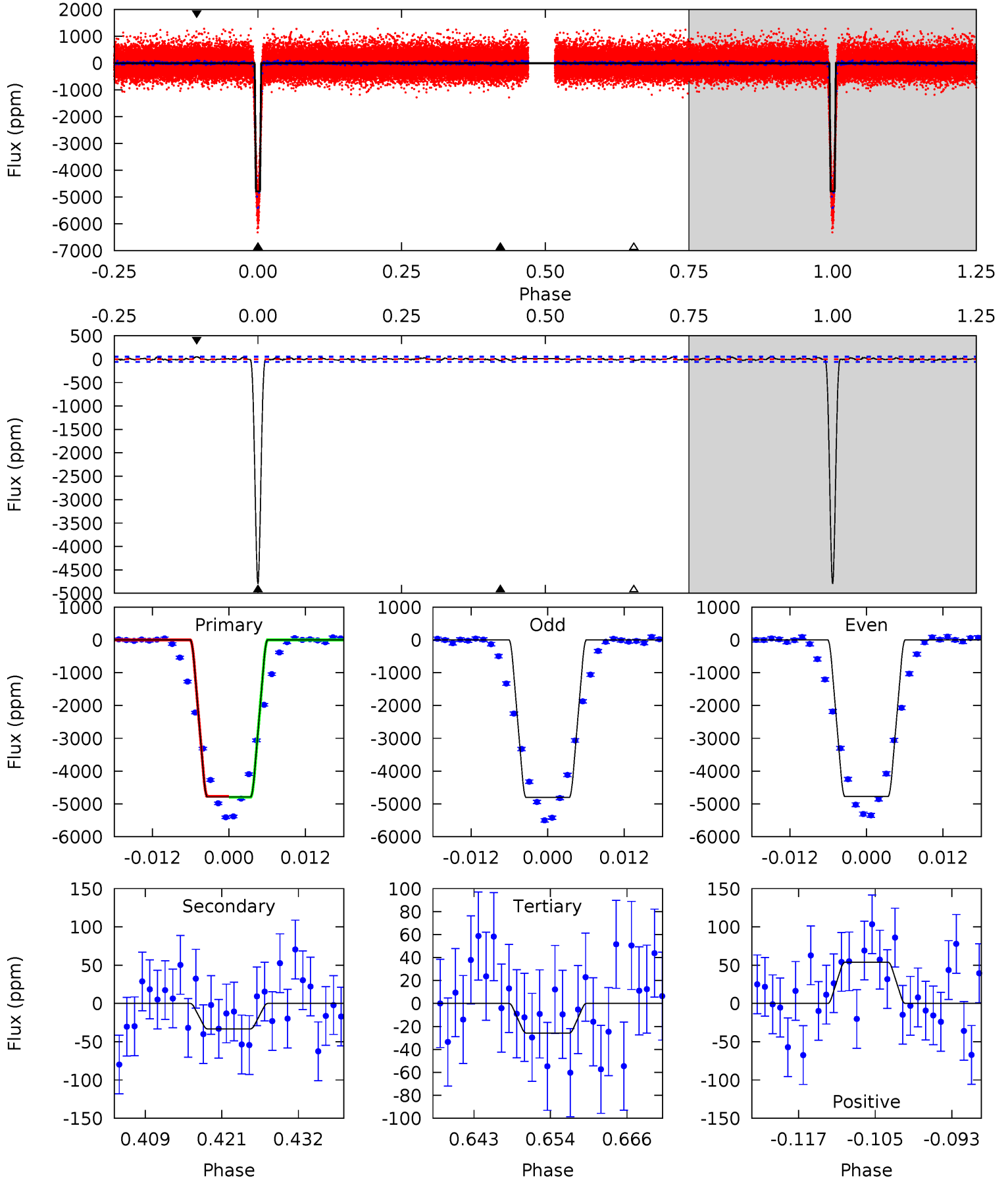
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
593.5	3.83	3.11	5.85	4.91	2.36	1.63	590.4	587.6	0.72	-2.02	2.79	0.99	0.01	0.73



# Alt Model-Shift Uniqueness Test

008358008-02,  $P = 10.064704$  Days,  $E = 130.283702$  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
429.9	2.98	2.31	4.83	5.00	2.52	1.22	427.5	425.0	0.67	-1.85	1.38	1.00	0.01	1.01



### Stellar Parameters For KIC 008358008

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5185^{+156}_{-140}$	$4.571^{+0.077}_{-0.056}$	$-0.560^{+0.350}_{-0.300}$	$0.705^{+0.075}_{-0.075}$	$0.673^{+0.090}_{-0.039}$	$2.709^{+0.871}_{-0.552}$
	+3%/-3%	+2%/-1%	+62%/-54%	+11%/-11%	+13%/-6%	+32%/-20%
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 008358008-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-34 \pm 9$	$9.58^{+1.63}_{-1.55}$	$944^{+38}_{-36}$	$2035^{+125}_{-123}$	$1.319^{+0.736}_{-0.460}$
Alt.	$-33 \pm 11$	$5.68^{+1.69}_{-1.59}$	$949^{+36}_{-37}$	$2303^{+217}_{-166}$	$3.563^{+3.690}_{-1.657}$

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

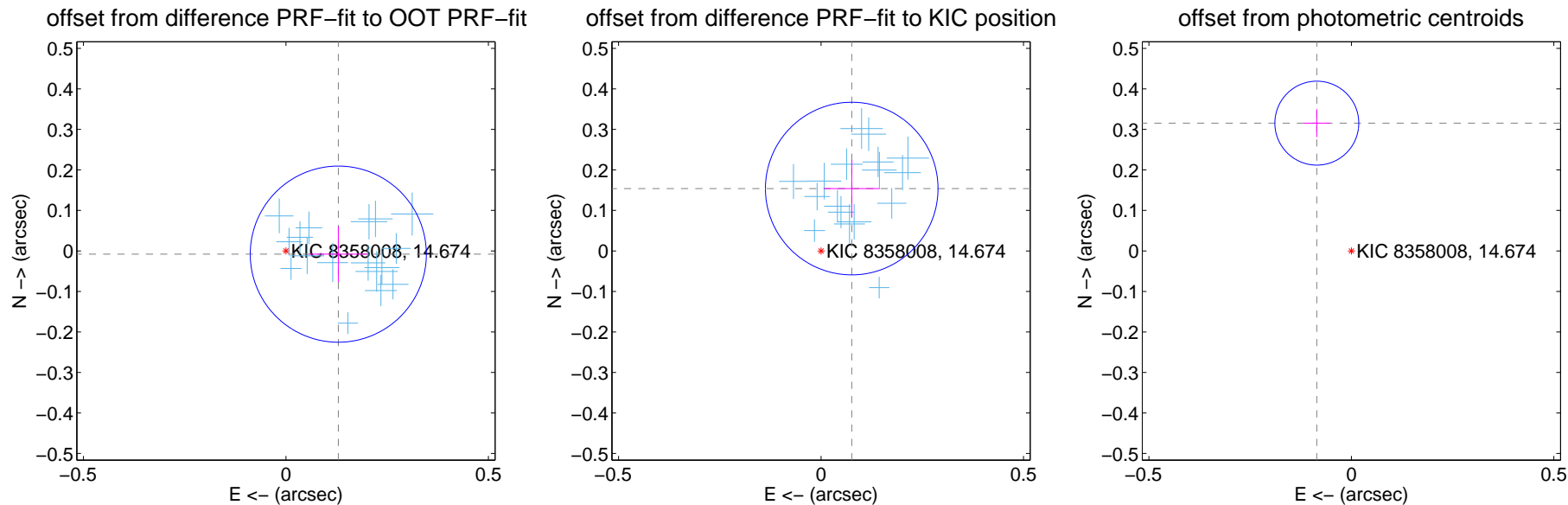
## DV Centroid Data

Supplemental centroid analysis for 008358008-02. Kepler magnitude: 14.67. Transit SNR 328.47

There are 17 quarters with good PRF difference image offsets

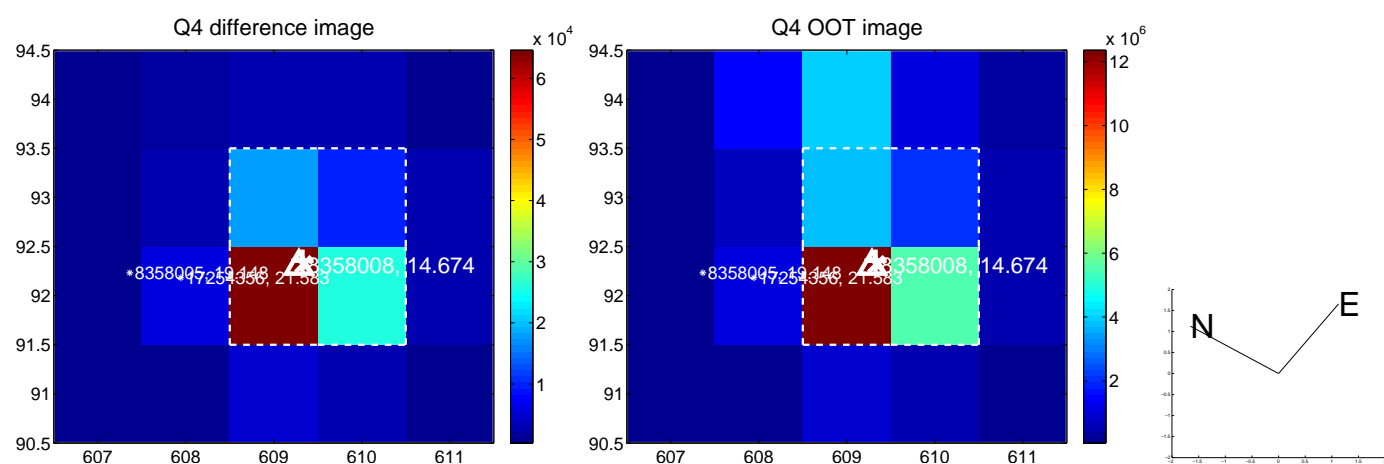
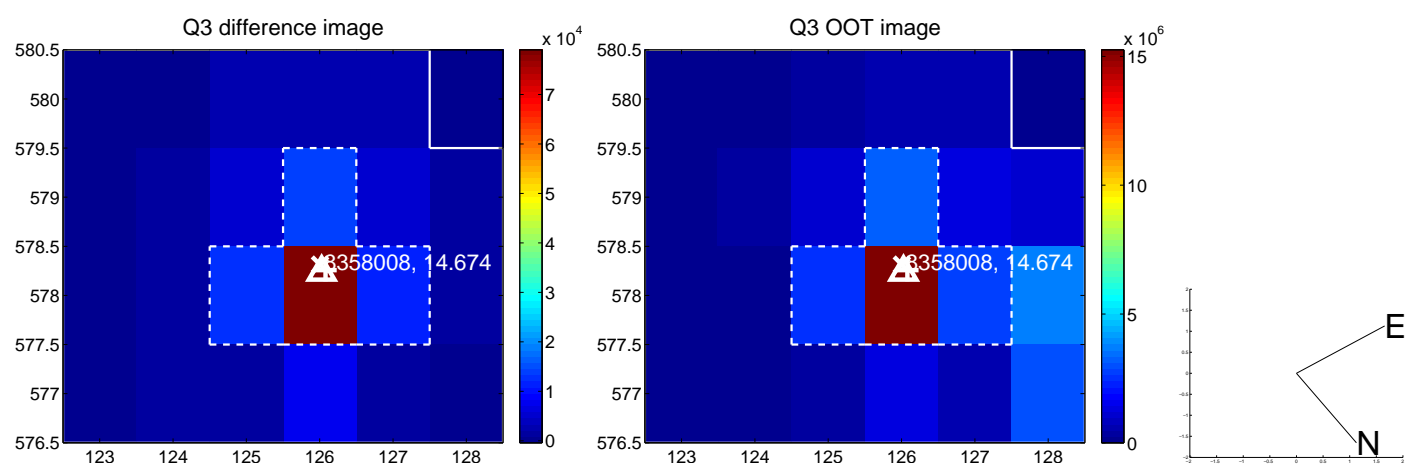
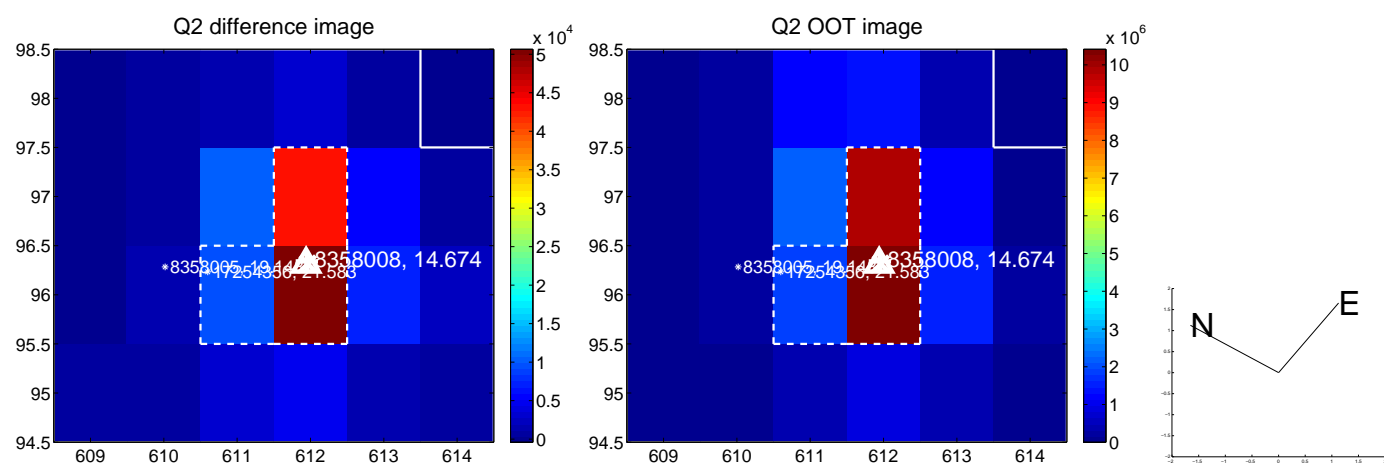
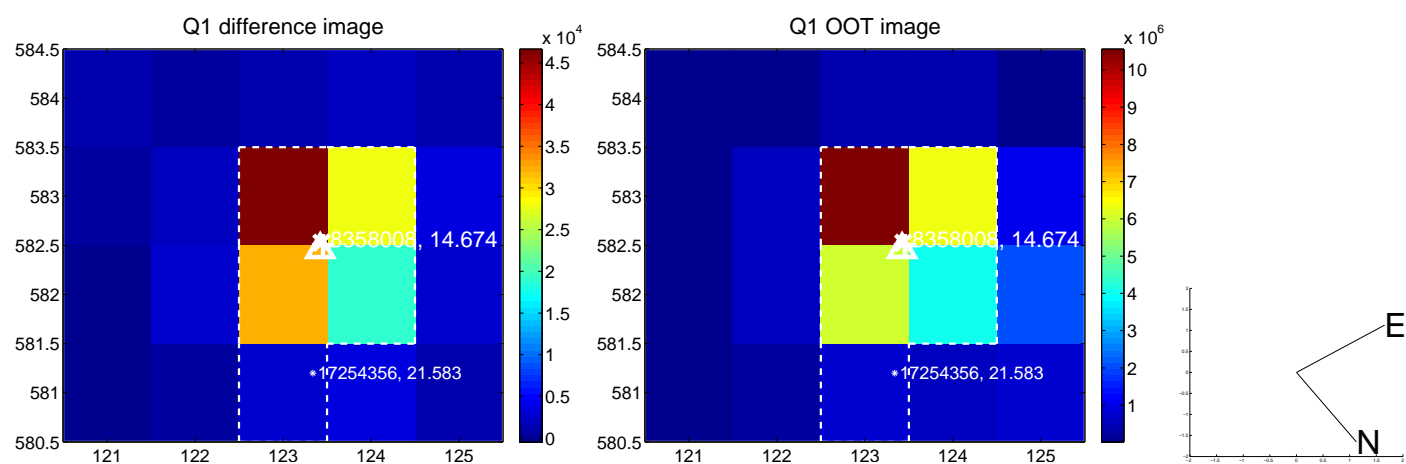
The direct PRF centroid is offset from the target star catalog position by about 0.19 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.130 \pm 0.072$	1.79	$-0.129 \pm 0.072$	$-0.008 \pm 0.069$
PRF-fit source offset from KIC position	$0.172 \pm 0.071$	2.42	$-0.076 \pm 0.069$	$0.154 \pm 0.071$
photometric centroid source offset	$0.33 \pm 0.03$	9.46	$0.09 \pm 0.03$	$0.32 \pm 0.03$

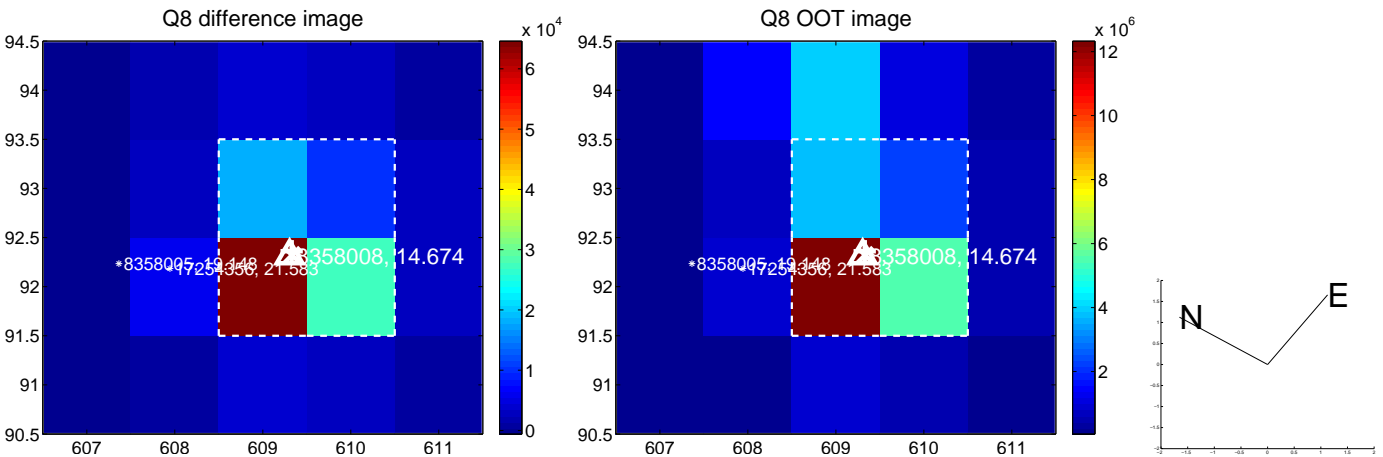
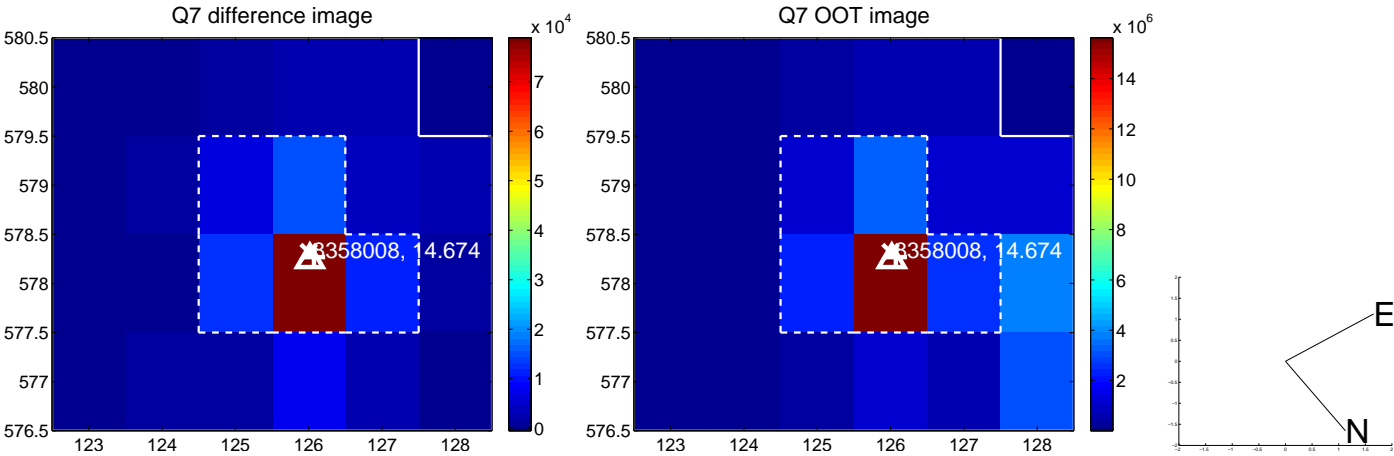
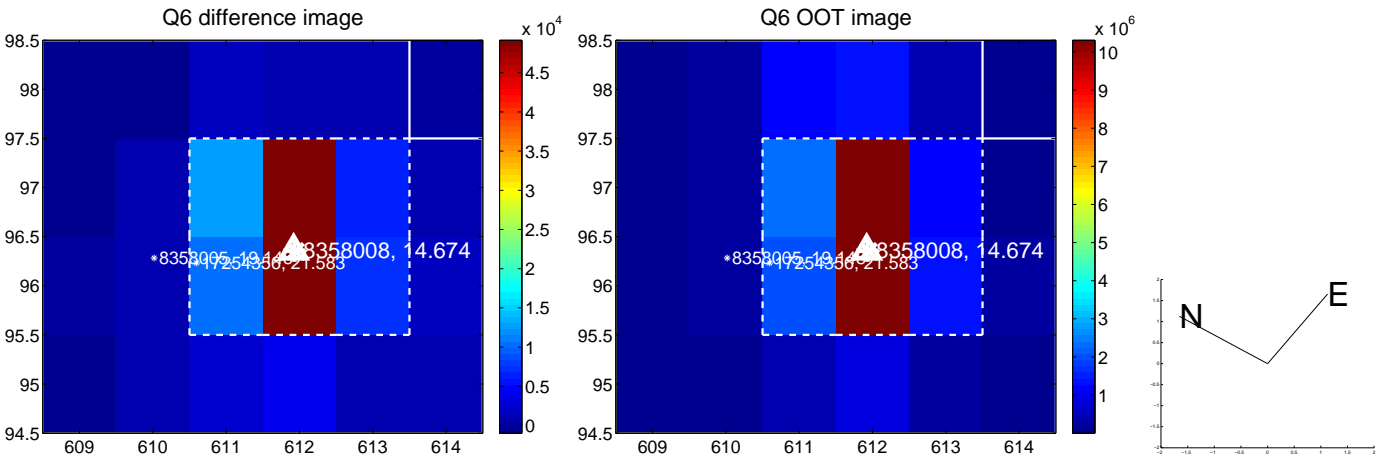
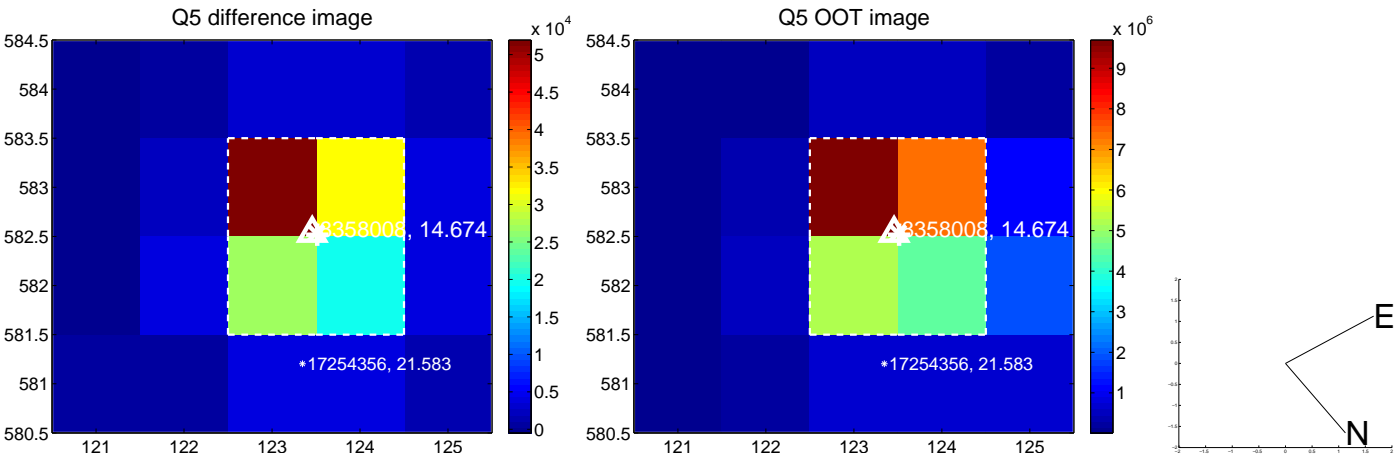


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

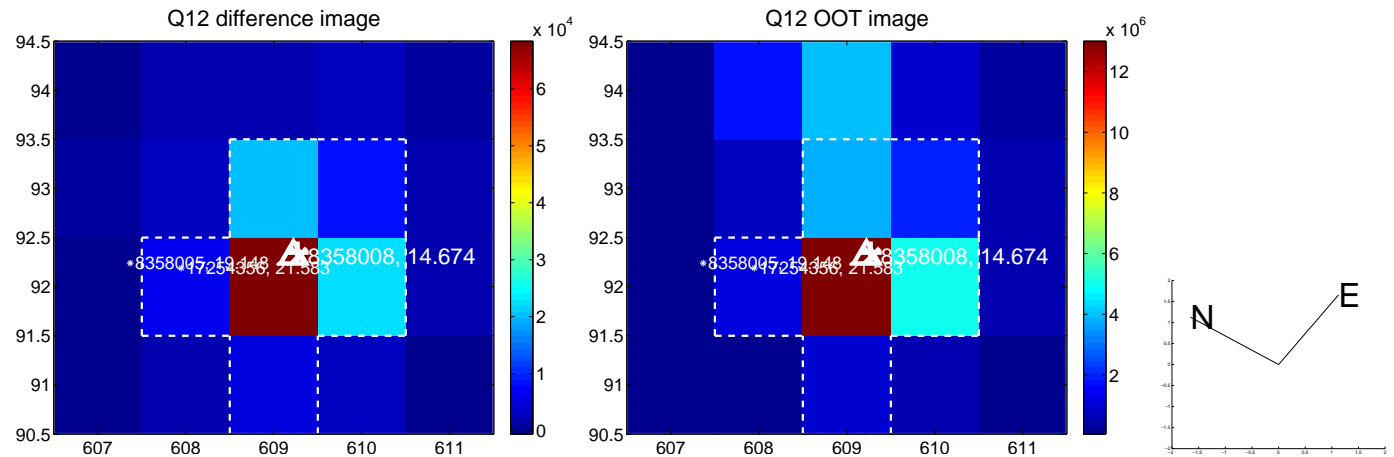
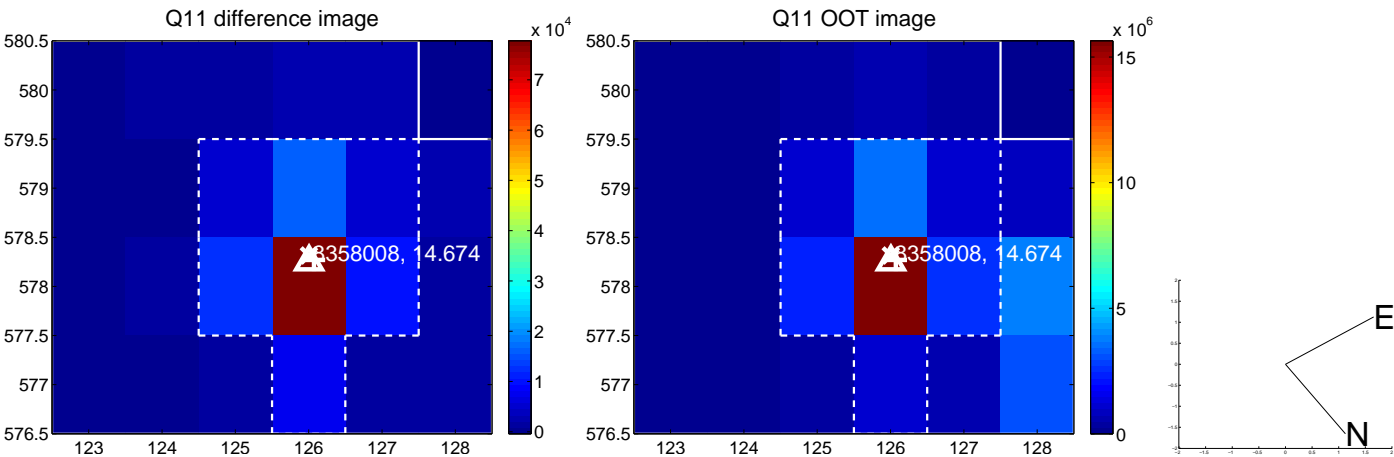
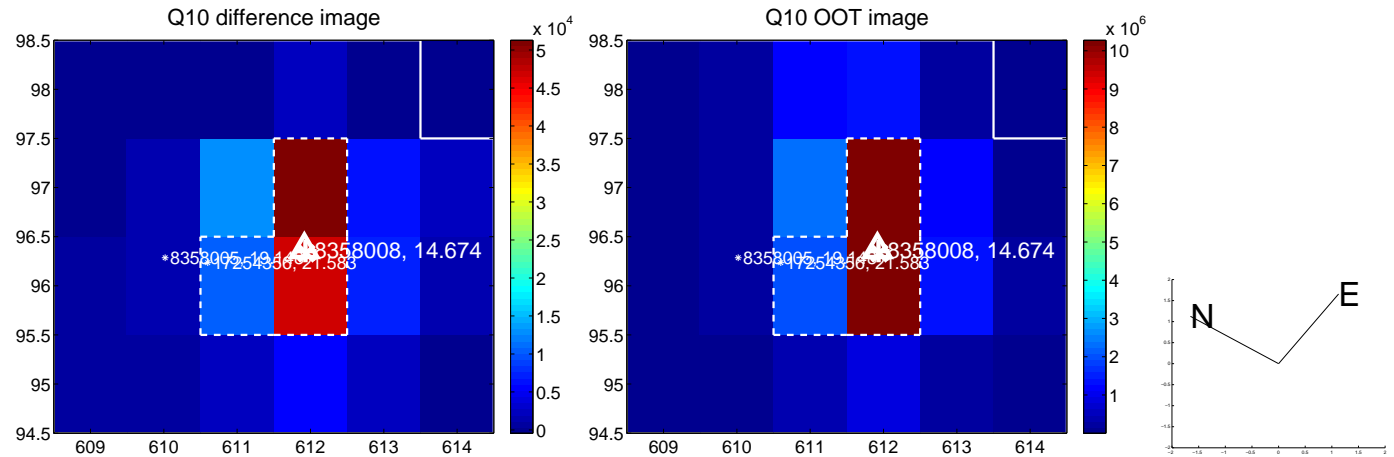
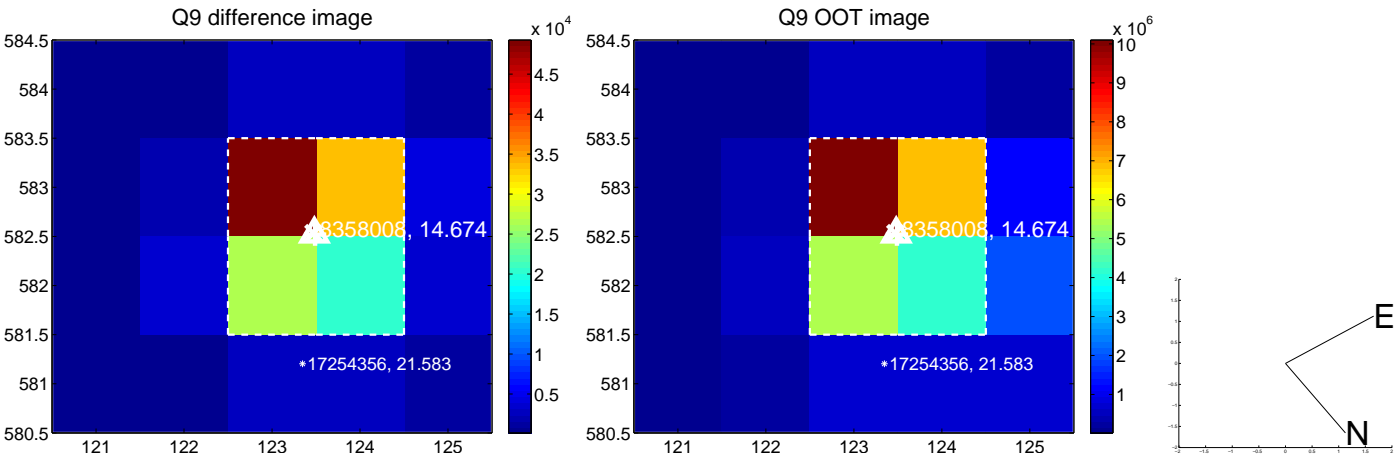


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

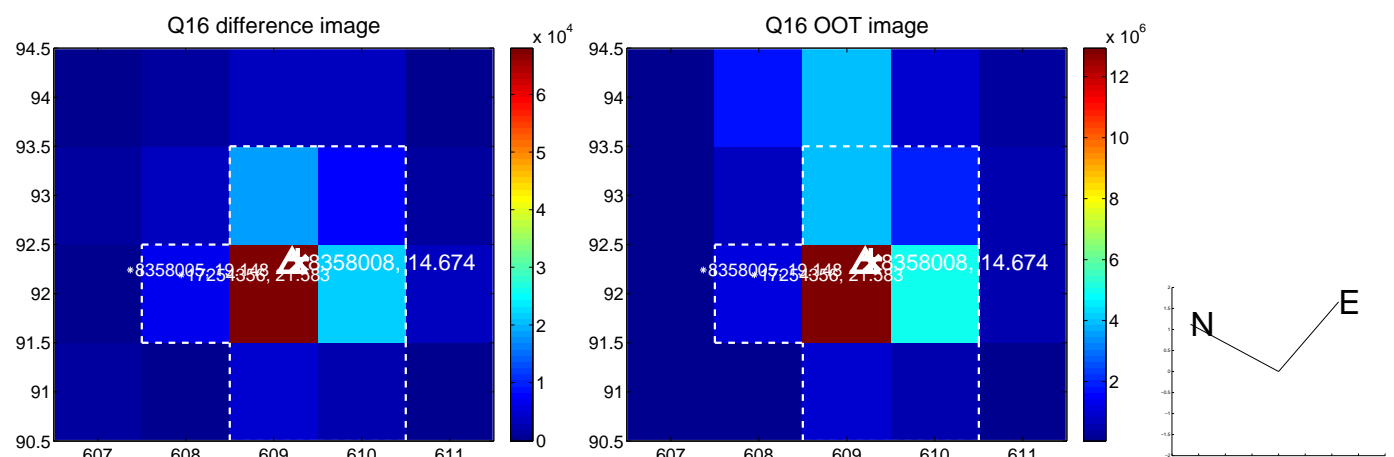
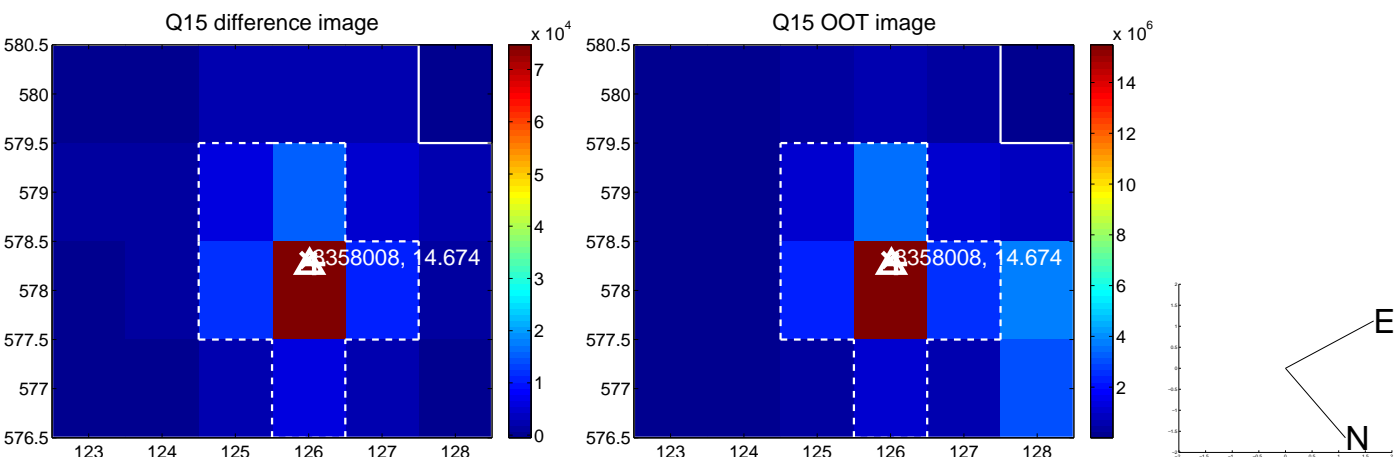
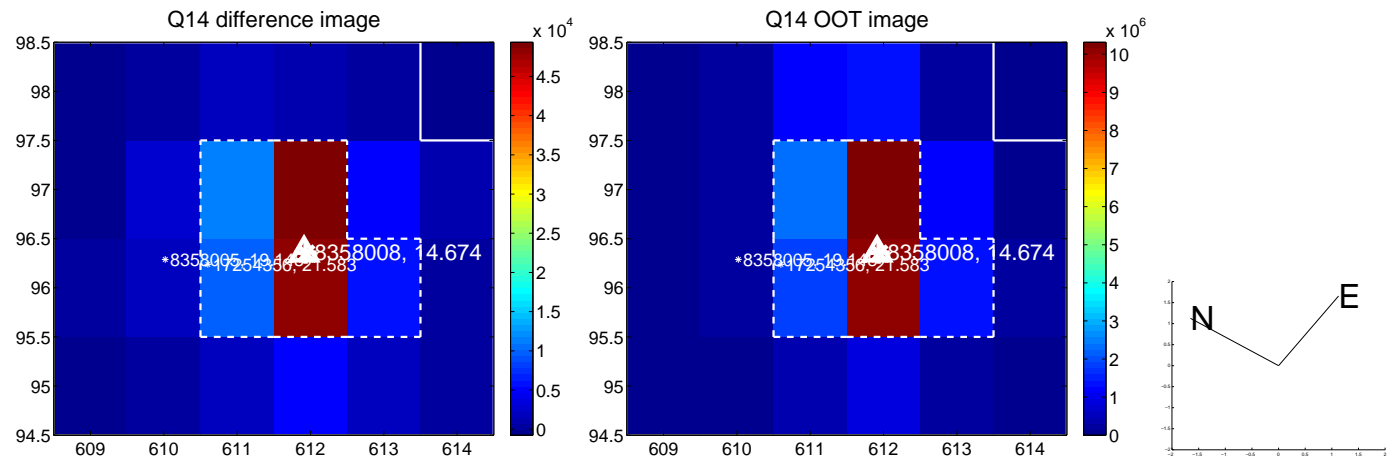
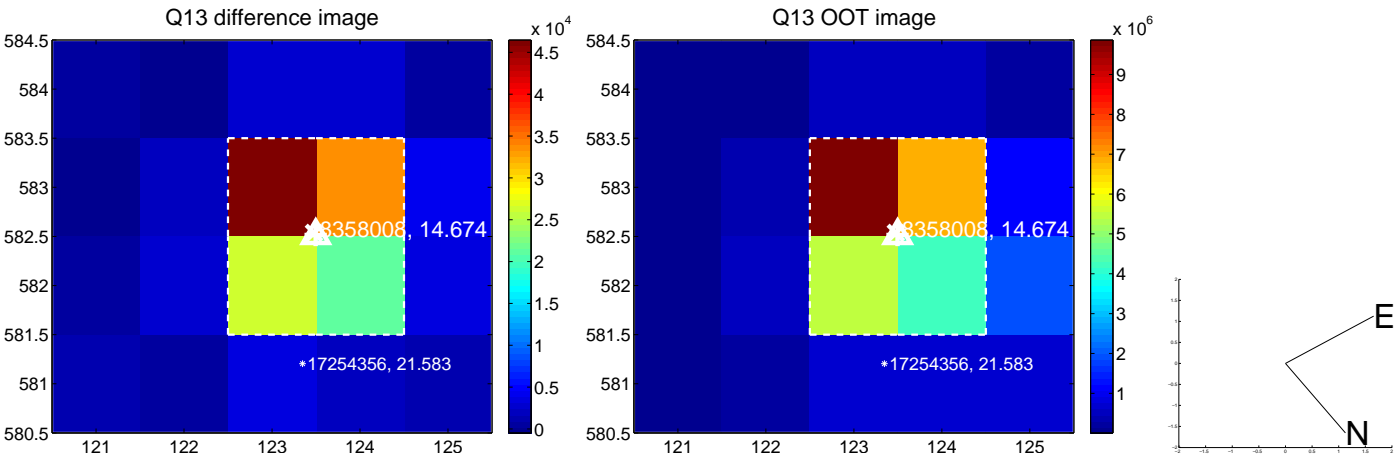




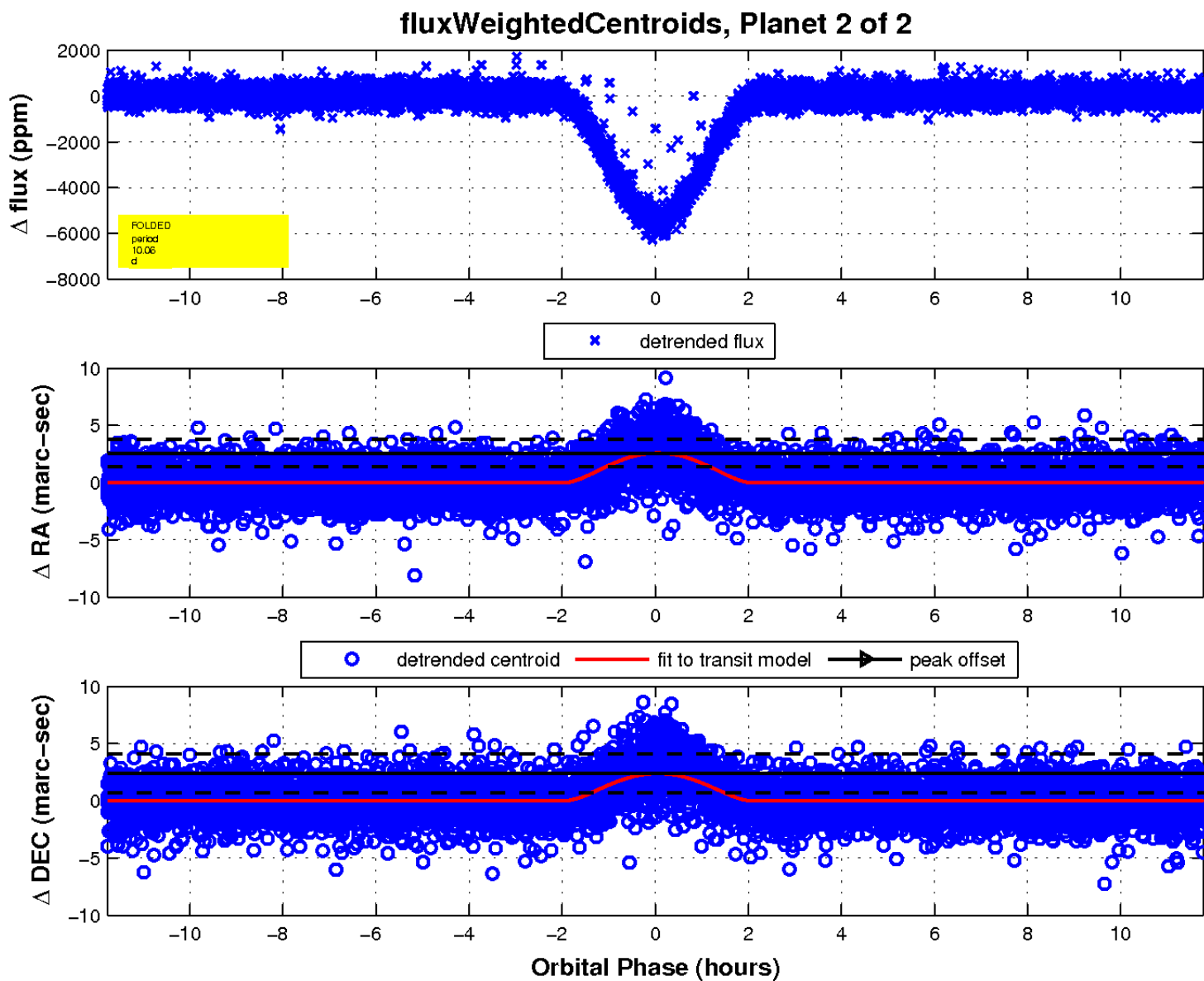
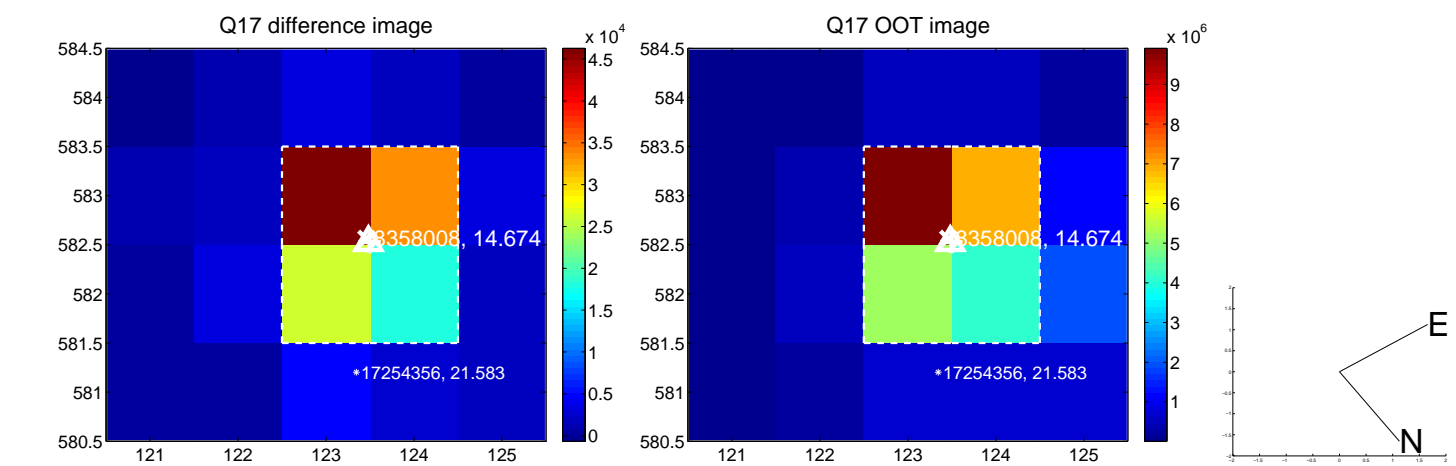
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

