

# KIC 005450814

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005450814-01	OBS	1780.01	6.487523	137.625355	19830.9	2.445	556.4	526.6	0.48	4481	11.15	29.20
005450814-02	OBS	No	6.487509	134.268036	2782.5	1.300	58.5	67.1	0.48	4481	3.27	29.20

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005450814-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—DEEP_V_SHAPED—HAS_SEC_TCE
005450814-02	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.

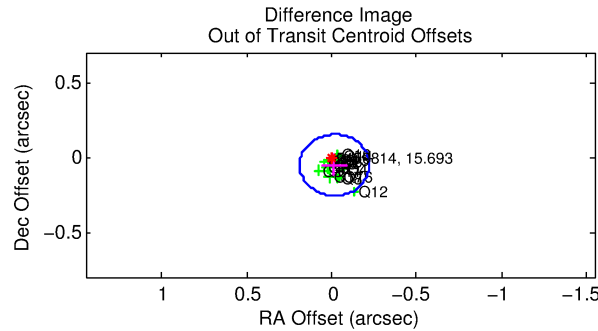
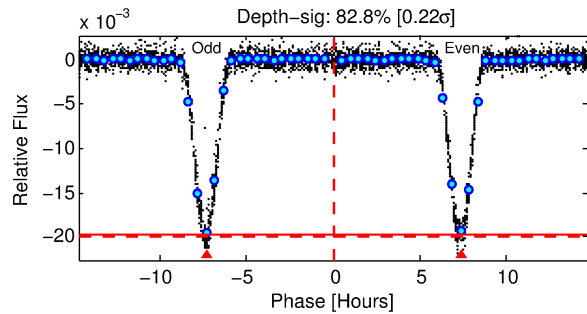
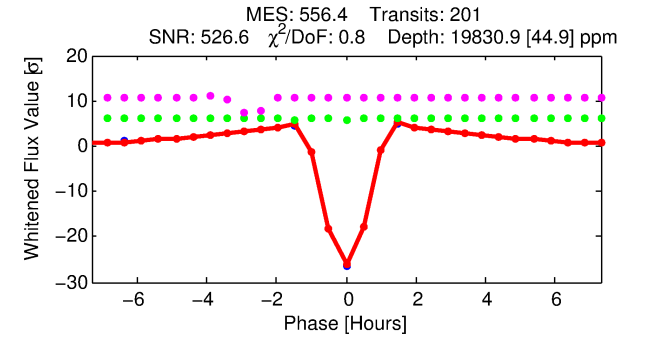
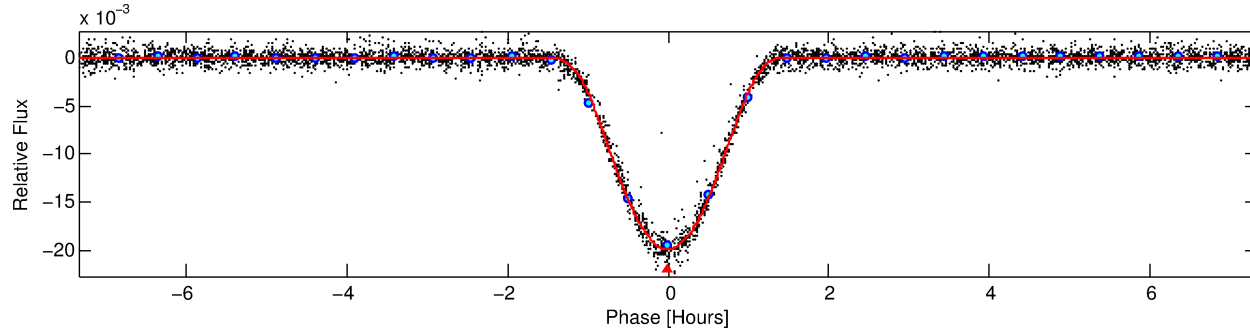
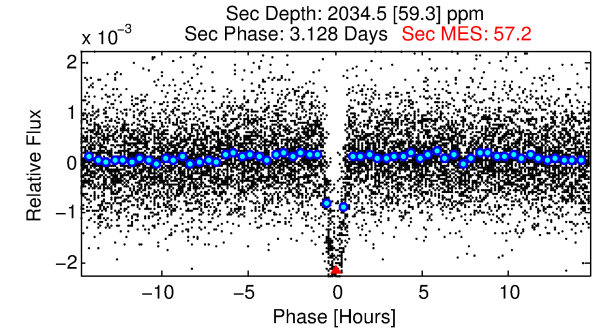
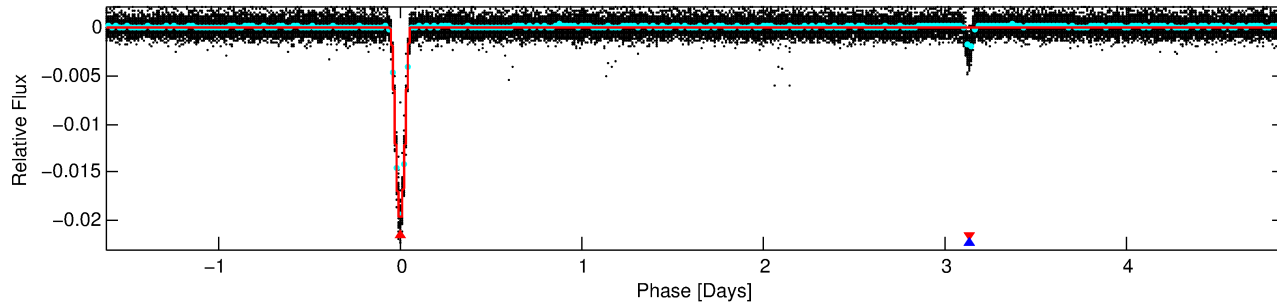
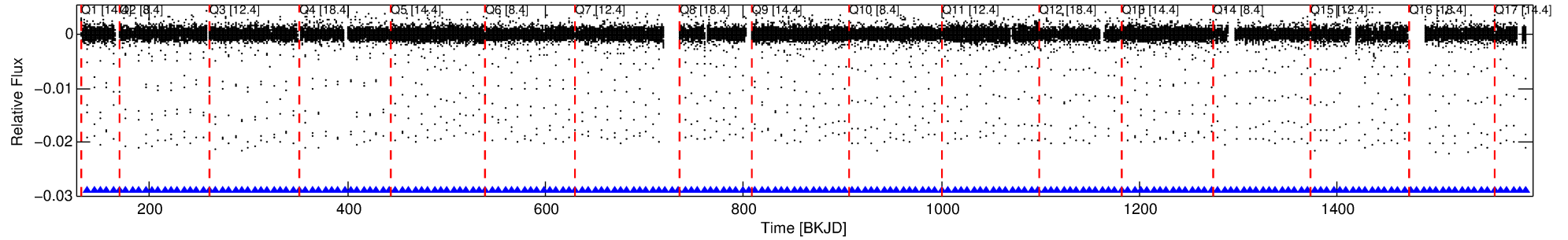
## Ephemeris Match Information For 005450814-01

No Significant Match Found

# DV One-Page Summary

KIC: 5450814 Candidate: 1 of 2 Period: 6.488 d  
KOI: K01780.01 Corr: 0.999

Kp: 15.69 R\*: 0.48 Rs Teff: 4481.0 K Logg: 4.76 Fe/H: -1.480



## DV Fit Results:

Period = 6.48752 [0.00000] d  
Epoch = 137.6254 [0.0001] BKJD  
Rp/R\* = 0.2107 [0.0183]  
a/R\* = 14.68 [0.17]  
b = 0.97 [0.03]  
Seff = 29.20 [4.97]  
Teq = 593 [25] K  
Rp = 11.15 [1.37] Re  
a = 0.0539 [0.0040] AU  
Ag = 26.19 [5.40] [4.66σ]  
Teff = 2073 [114] K [12.67σ]

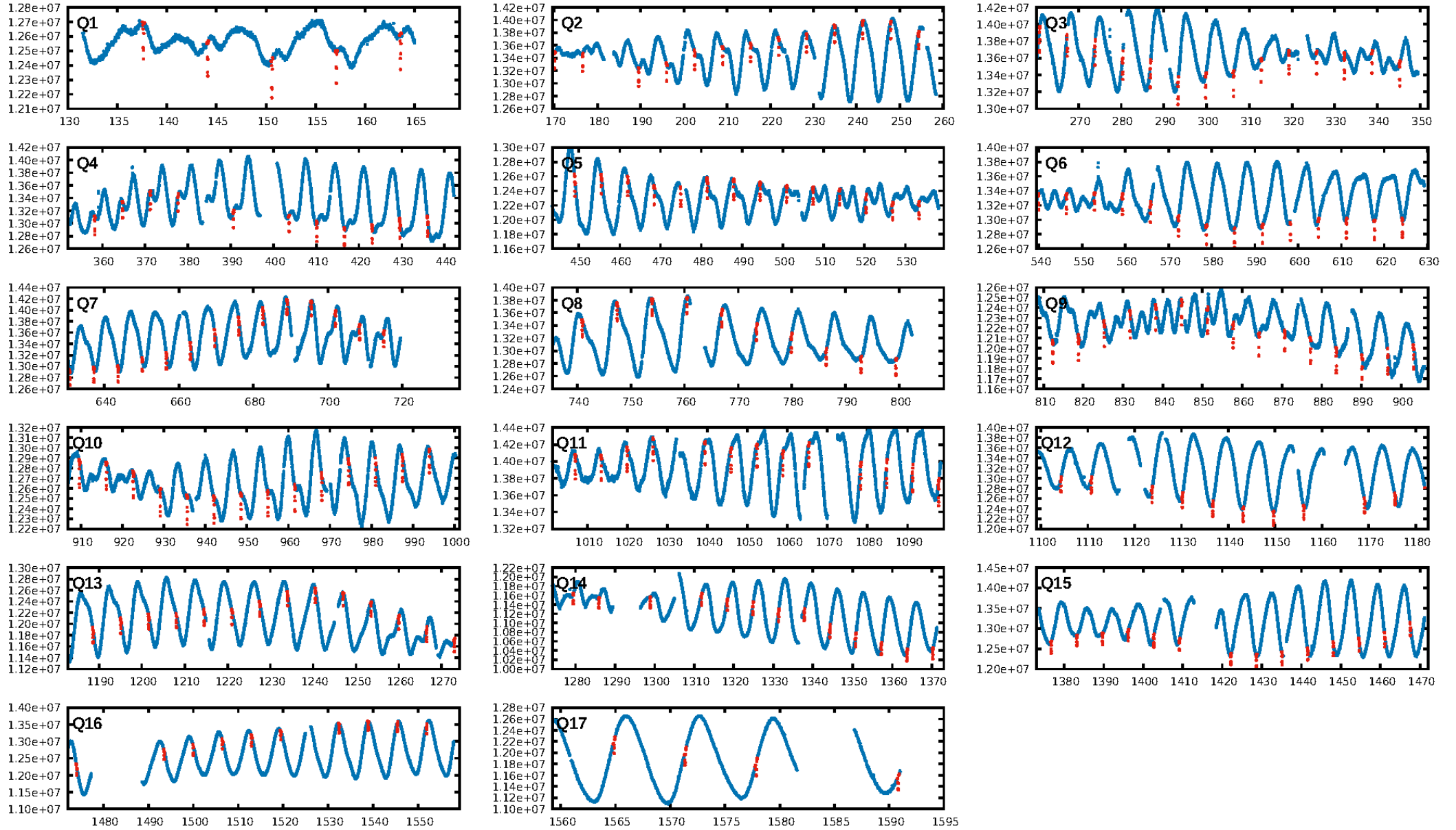
## DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [192/192]  
GhostDiagnostic-chr: 1.889  
Centroid-sig: 0.0%  
Centroid-so: 0.384 arcsec [19.21σ]  
OotOffset-rm: 0.055 arcsec [0.81σ]  
KicOffset-rm: 0.320 arcsec [4.56σ]  
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]

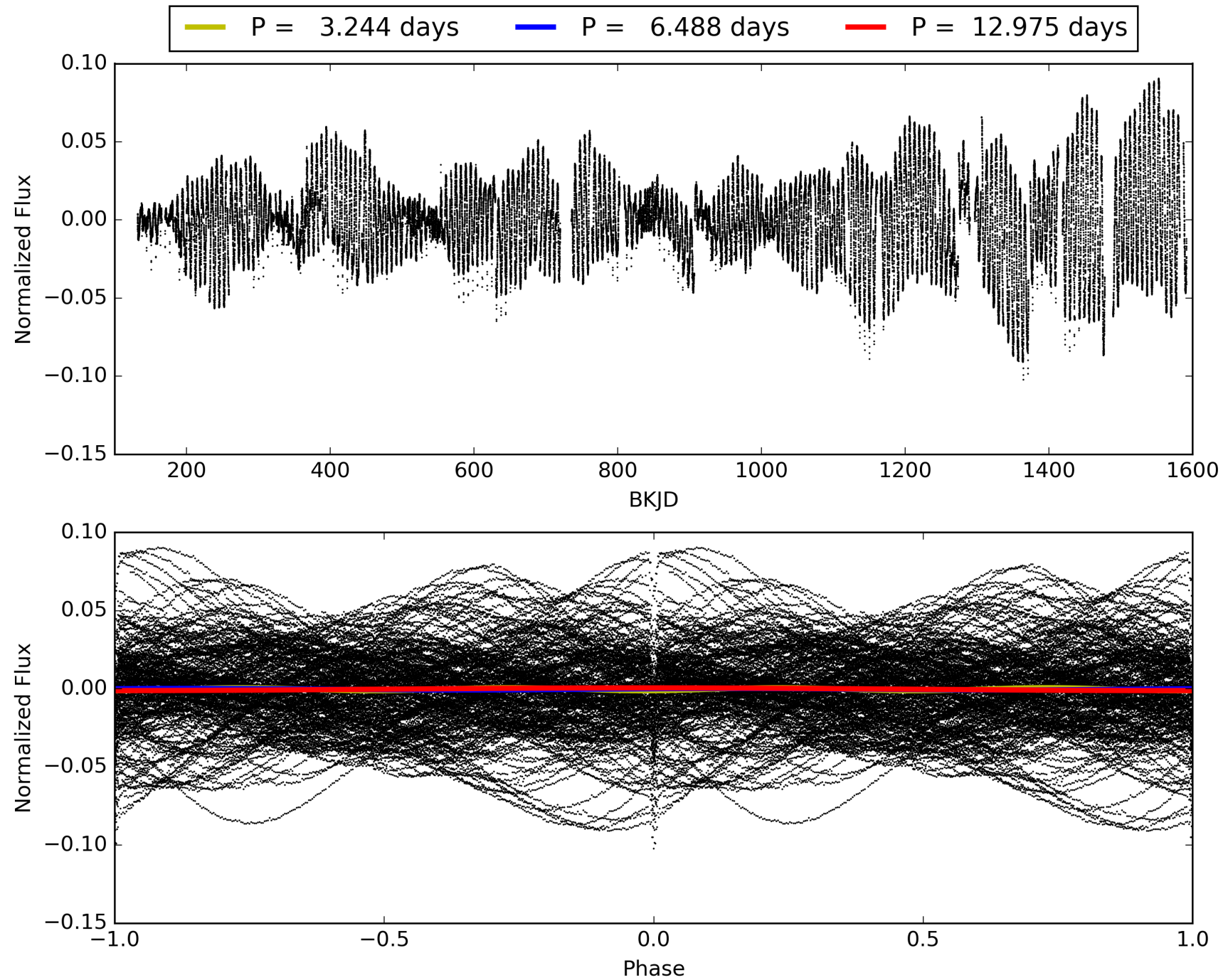
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 03:46:56 Z

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

# TCE 005450814-01, PDC Light Curves

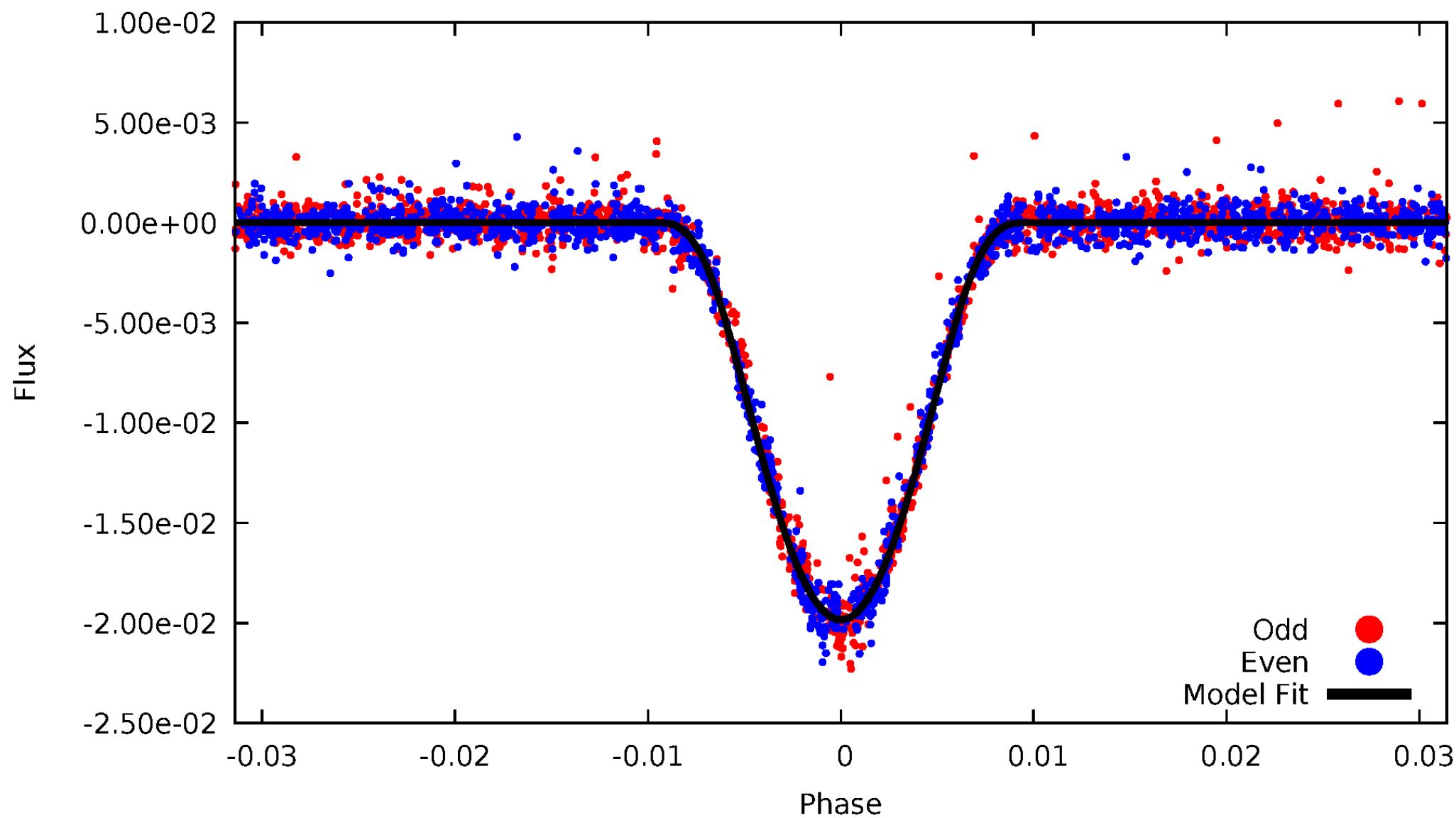


TCE 005450814-01



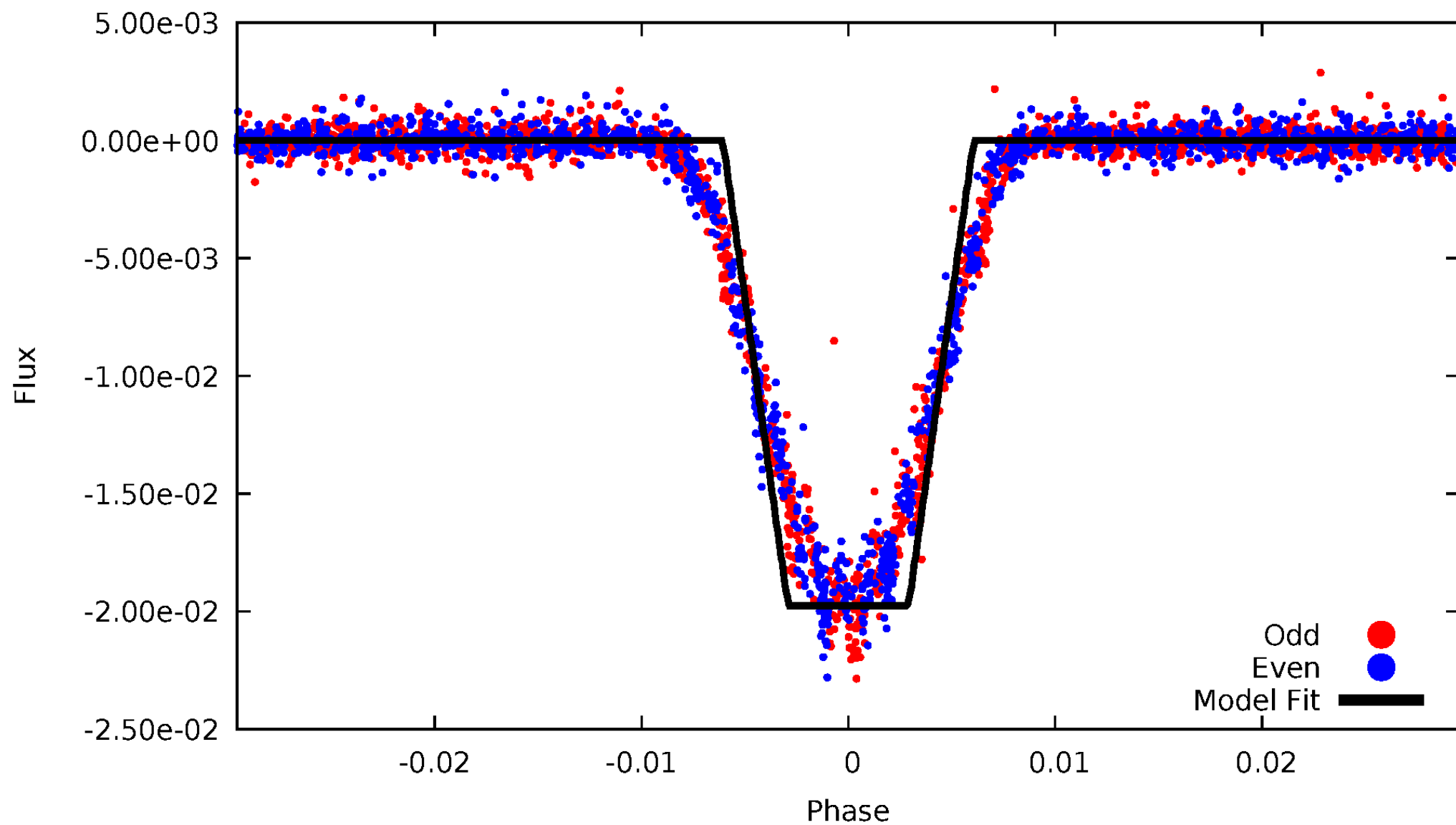
# DV Odd/Even

TCE 005450814-01



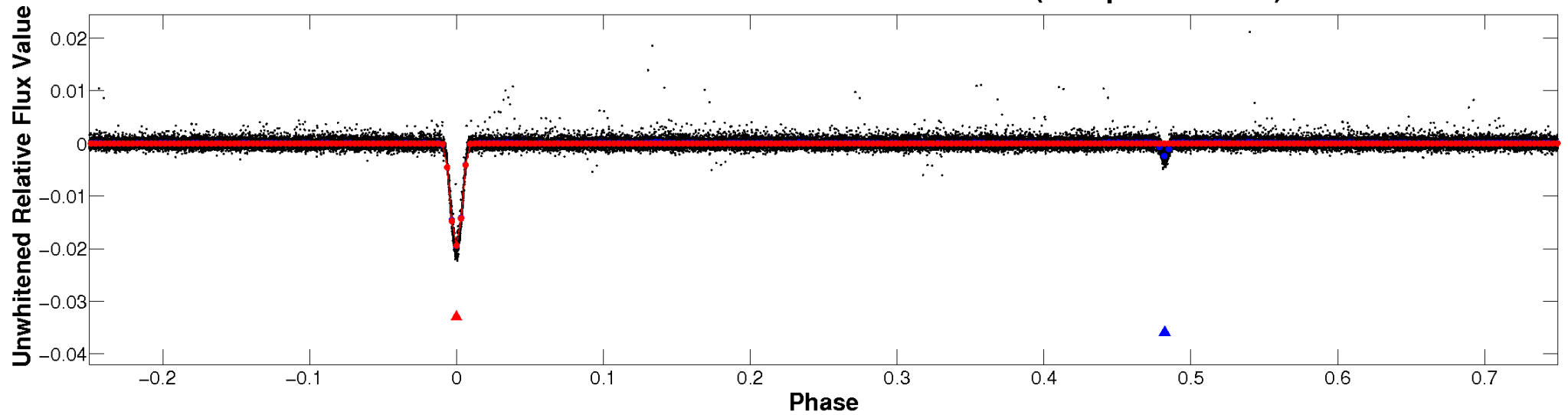
# ALT Odd/Even

TCE 005450814-01

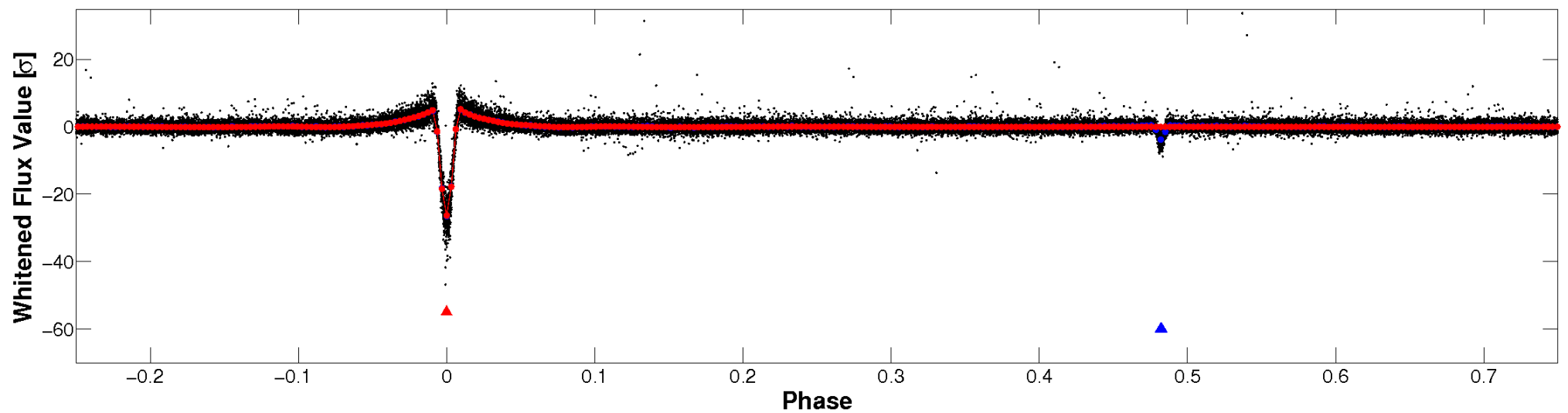


# Non-Whitened Vs. Whitened Light Curve

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



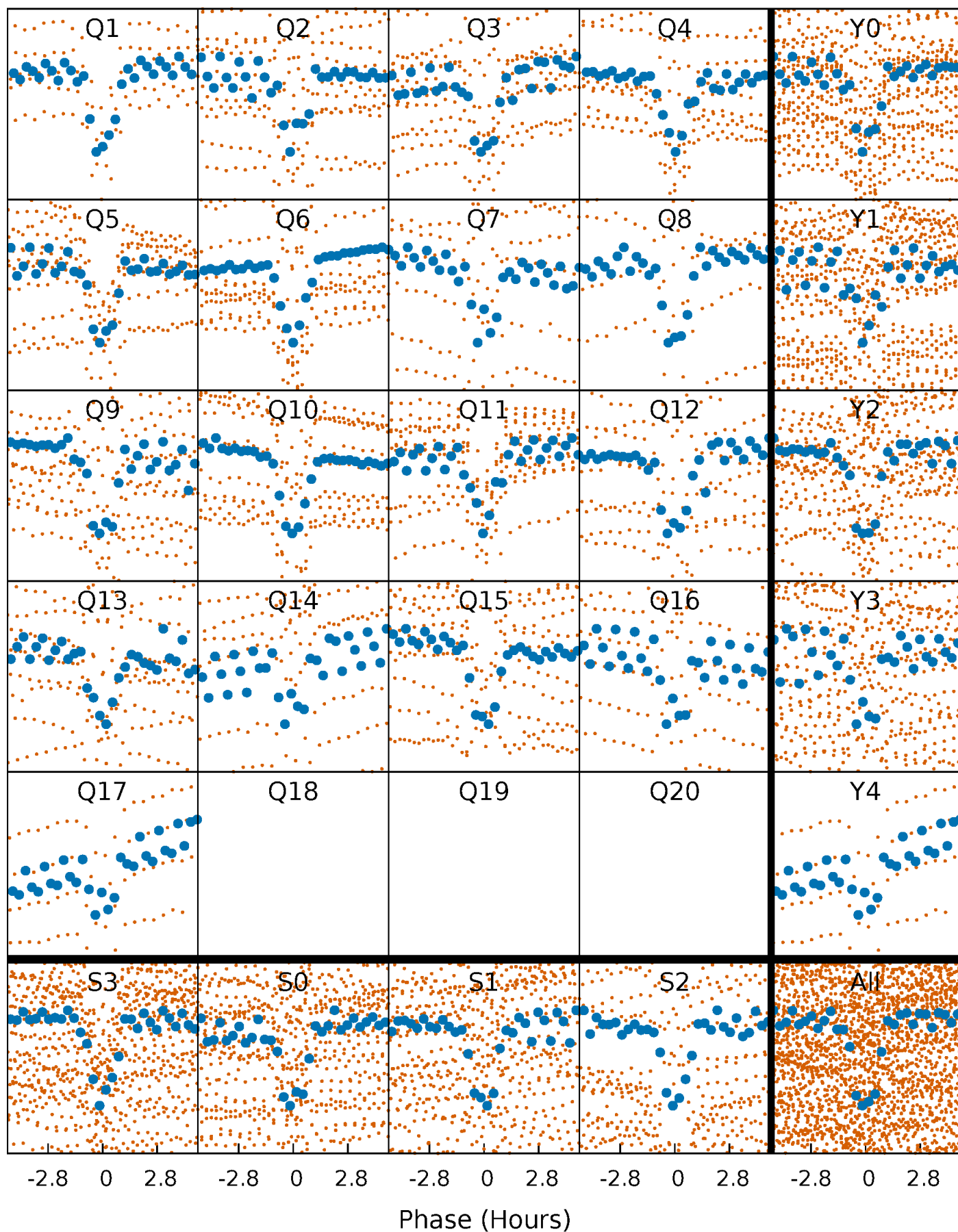
**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**





# PDC Quarter-Phased Transit Curves

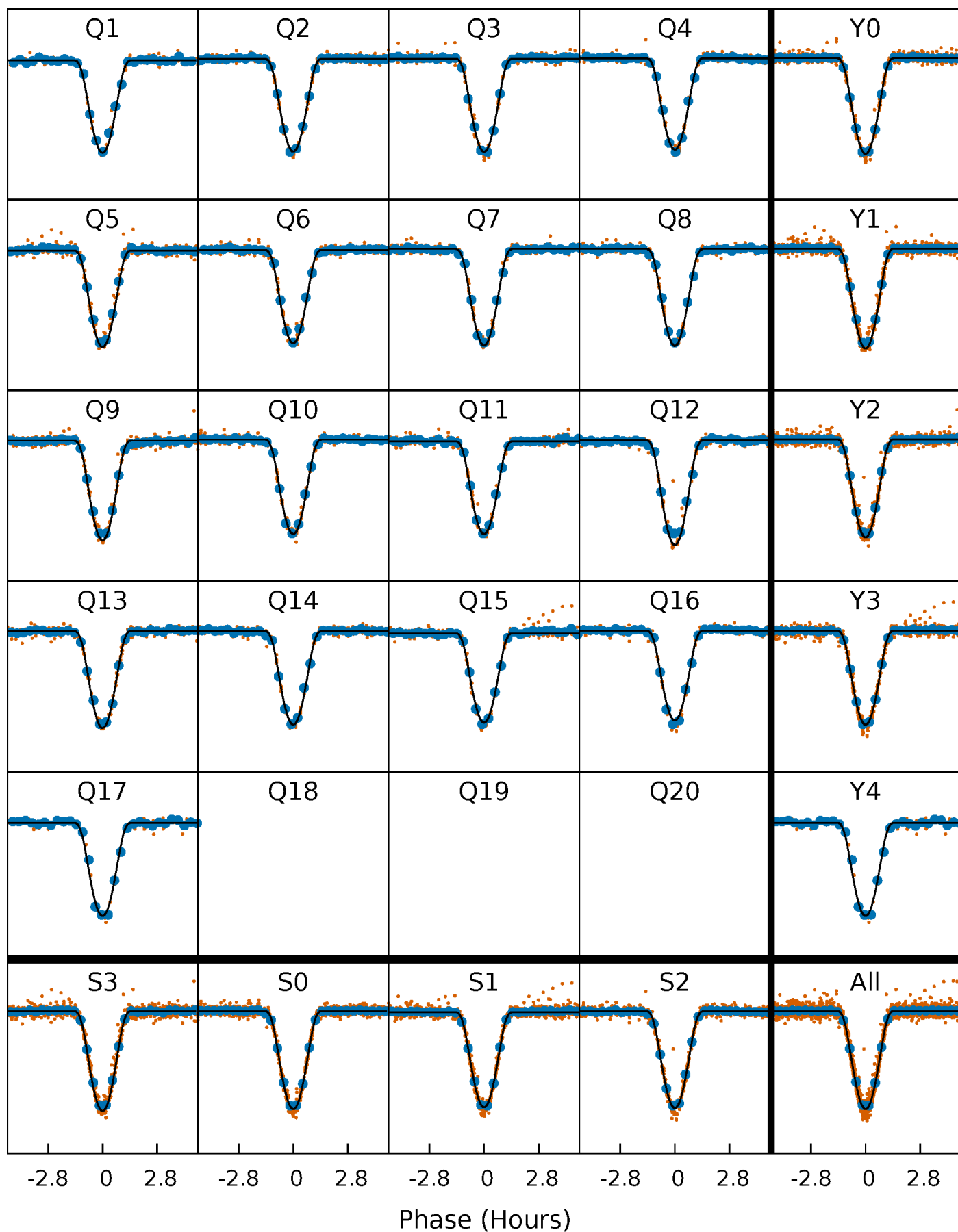
TCE 005450814-01 P= 6.487523 Days  $T_0=137.625355$  (BKJD)





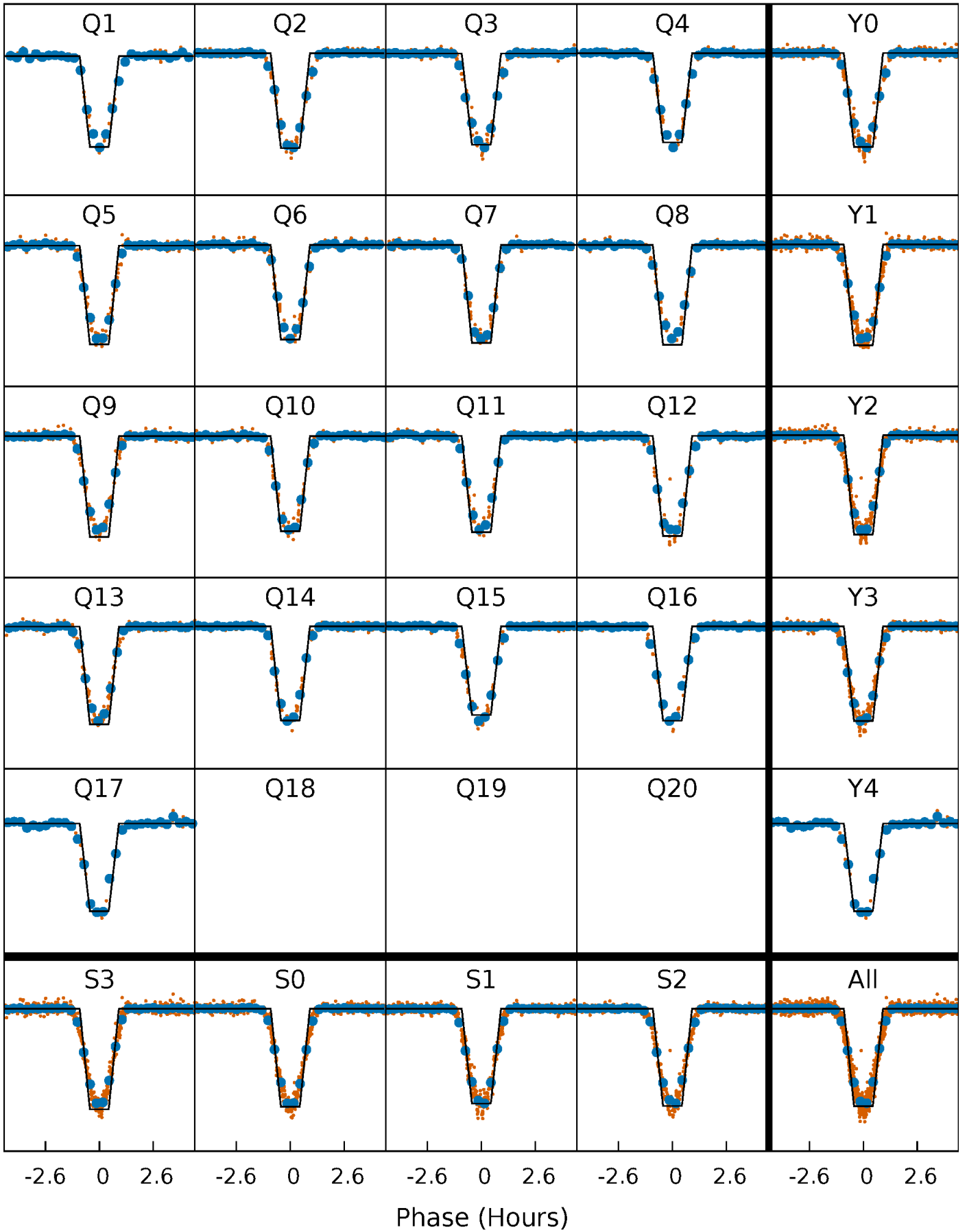
# DV Quarter-Phased Transit Curves

TCE 005450814-01 P= 6.487523 Days  $T_0=137.625355$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

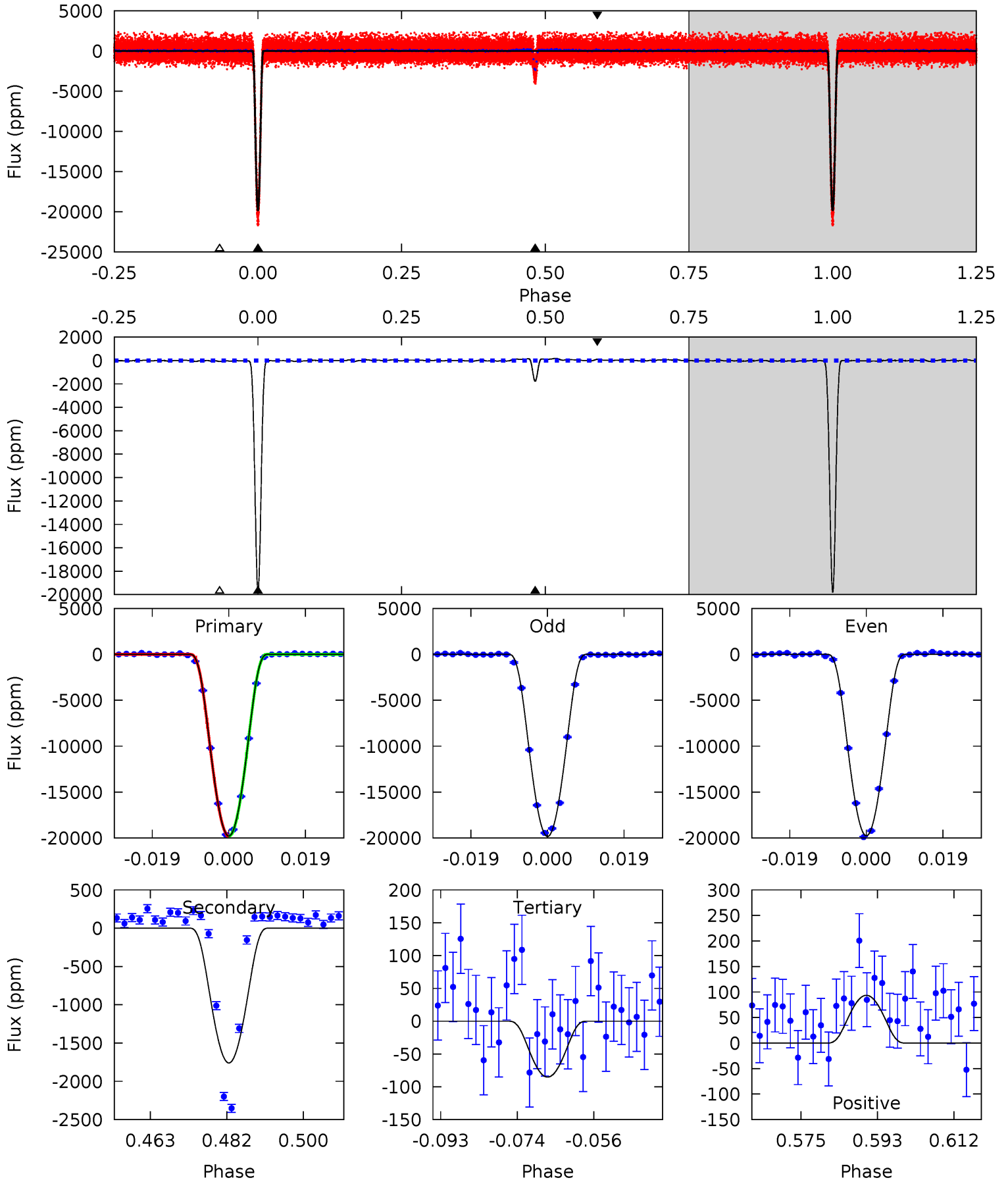
TCE 005450814-01 P= 6.487543 Days  $T_0=137.623074$  (BKJD)



# DV Model-Shift Uniqueness Test

005450814-01, P = 6.487523 Days, E = 131.137832 Days

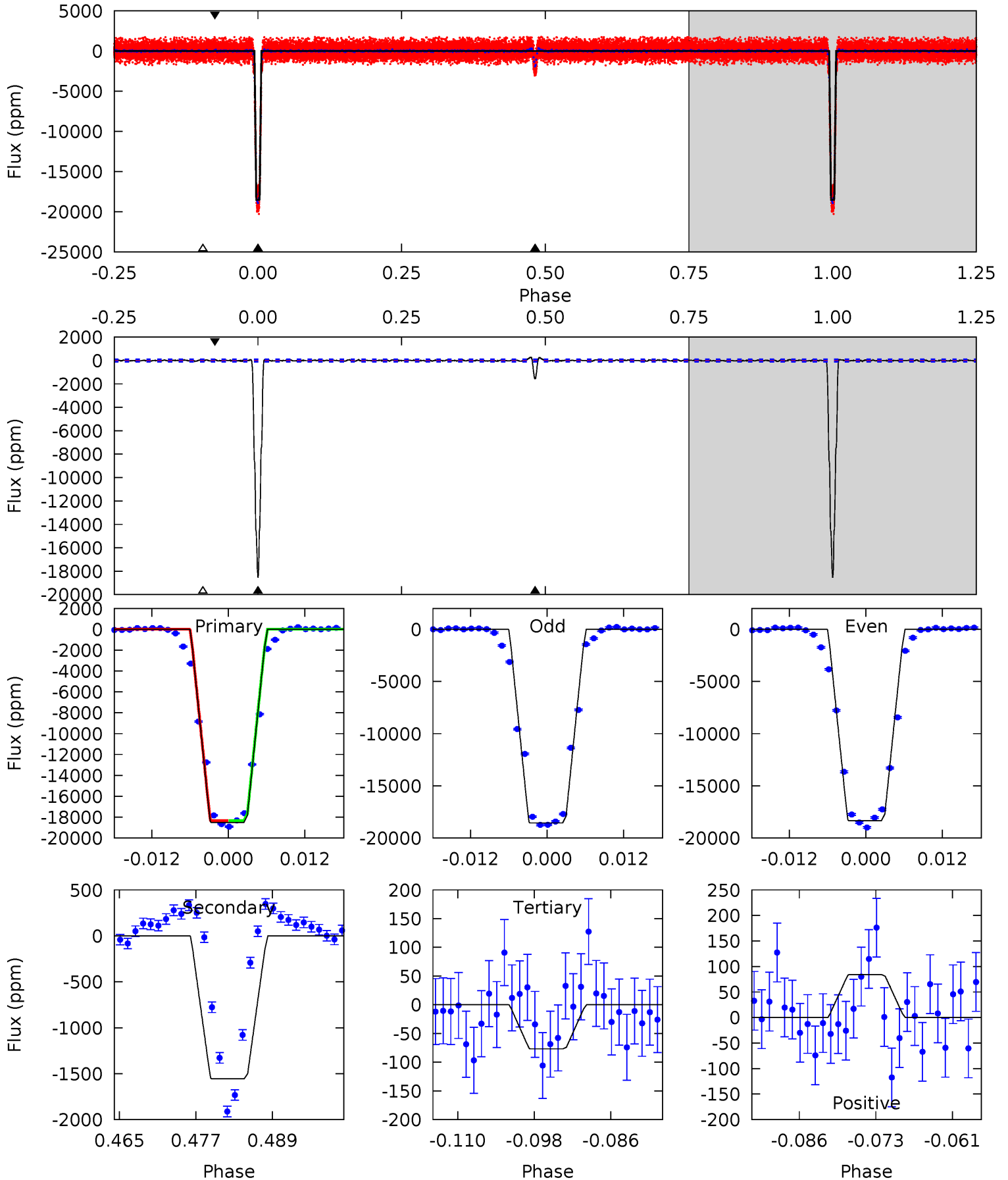
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1115	99.2	4.81	5.27	4.91	2.35	2.39	1111	1110	94.4	93.9	2.02	1.00	0.01	0.59



# Alt Model-Shift Uniqueness Test

005450814-01, P = 6.487543 Days, E = 131.135531 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
853.6	71.7	3.54	3.87	4.99	2.51	1.21	850.0	849.7	68.1	67.8	4.88	0.99	0.02	0.18



### Stellar Parameters For KIC 005450814

	$T_{\text{eff}} (K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (g \cdot \text{cm}^{-3})$
	$4481^{+121}_{-148}$	$4.763^{+0.059}_{-0.027}$	$-1.480^{+0.300}_{-0.300}$	$0.485^{+0.027}_{-0.042}$	$0.498^{+0.034}_{-0.031}$	$6.135^{+1.548}_{-0.700}$
	+3%/-3%	+1%/-1%	+20%/-20%	+6%/-9%	+7%/-6%	+25%/-11%
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 005450814-01 / KOI 1780.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-1760 \pm 18$	$11.07^{+1.10}_{-1.04}$	$820^{+27}_{-29}$	$2686^{+87}_{-73}$	$23^{+5}_{-4}$
Alt.	$-1555 \pm 22$	$7.39^{+1.02}_{-1.00}$	$824^{+24}_{-31}$	$2955^{+125}_{-116}$	$46^{+15}_{-10}$

$T_{\text{max}}$  = Theoretical Maximum Planetary Temperature

$T_{\text{obs}}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )

$A_{\text{obs}}$  = Observed Albedo (Assuming  $T=0$ )

If a secondary eclipse is present, the system is likely an EB if  $T_{\text{obs}} \gg T_{\text{max}}$  AND  $A_{\text{obs}} \gg 1.0$

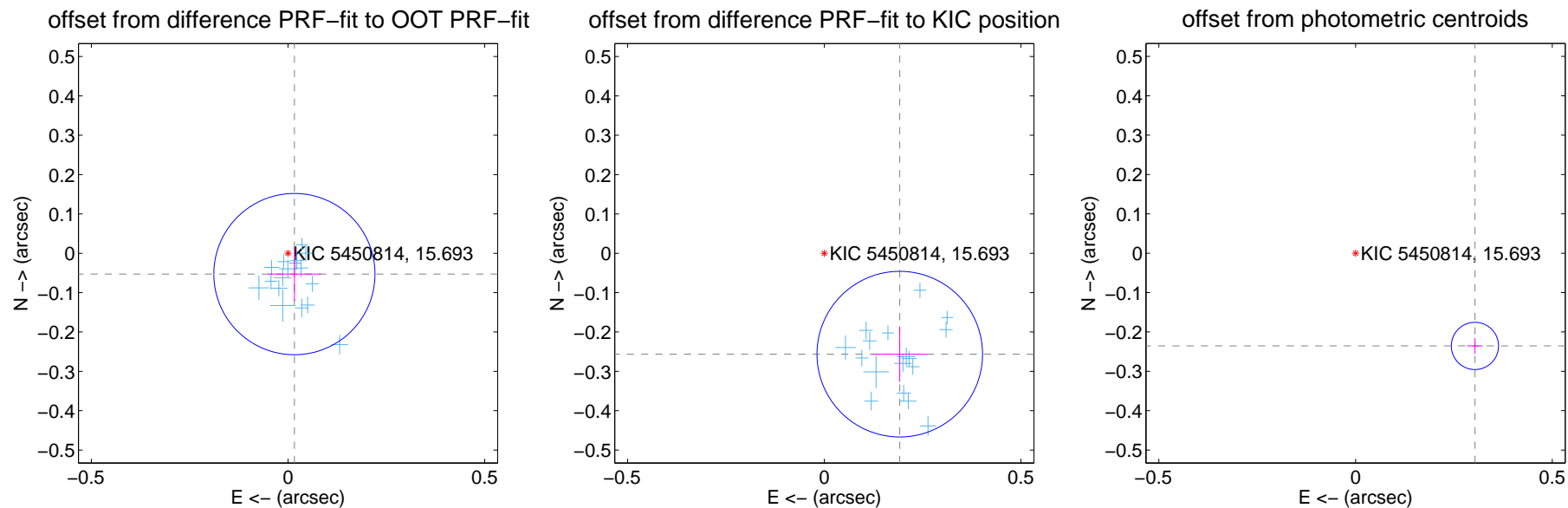
## DV Centroid Data

Supplemental centroid analysis for 005450814-01. Kepler magnitude: 15.69. Transit SNR 526.61

There are 17 quarters with good PRF difference image offsets

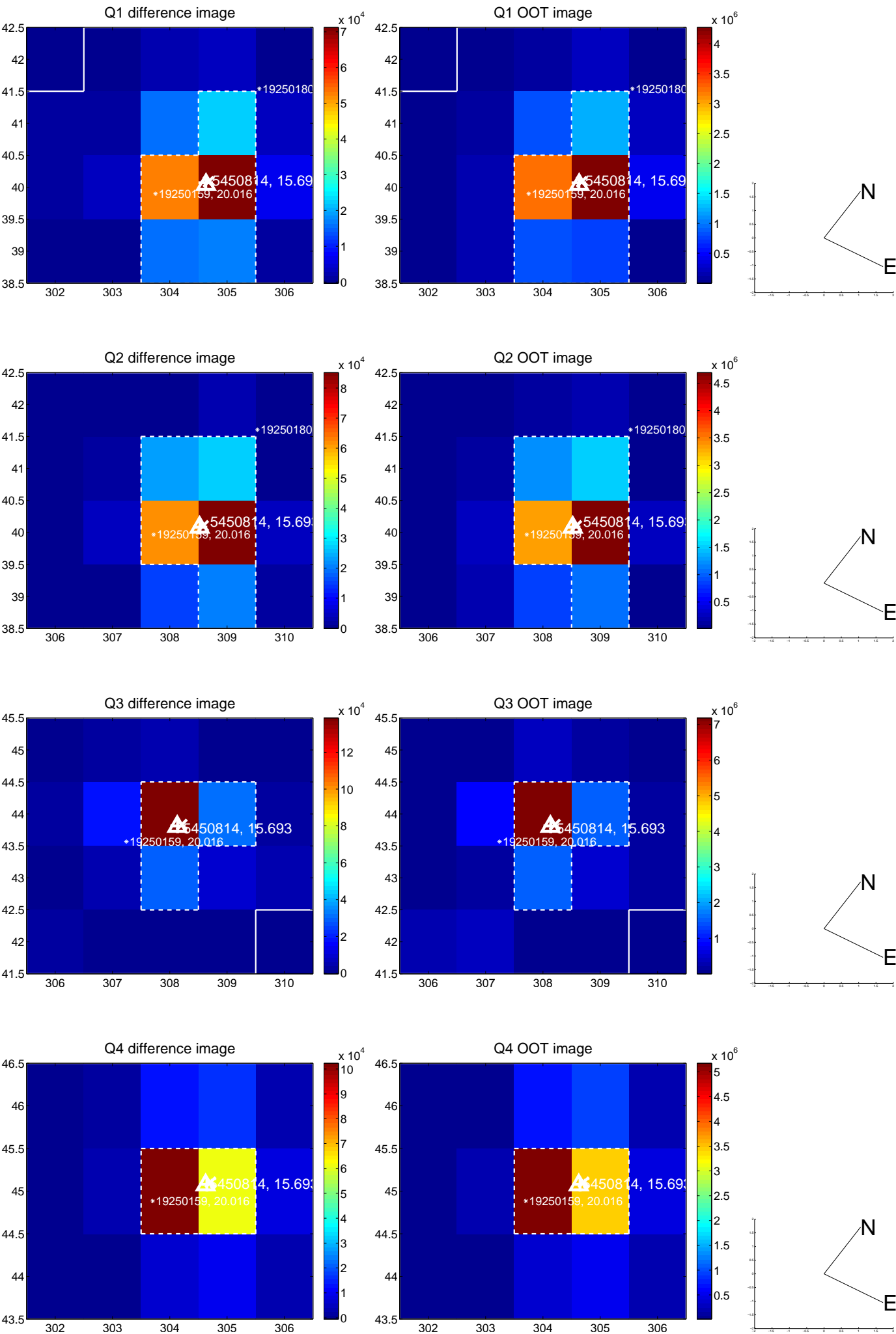
The direct PRF centroid is offset from the target star catalog position by about 0.22 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.055 \pm 0.068$	0.81	$-0.016 \pm 0.067$	$-0.053 \pm 0.068$
PRF-fit source offset from KIC position	$0.320 \pm 0.070$	4.56	$-0.192 \pm 0.070$	$-0.256 \pm 0.070$
photometric centroid source offset	$0.38 \pm 0.02$	19.21	$-0.30 \pm 0.02$	$-0.24 \pm 0.02$



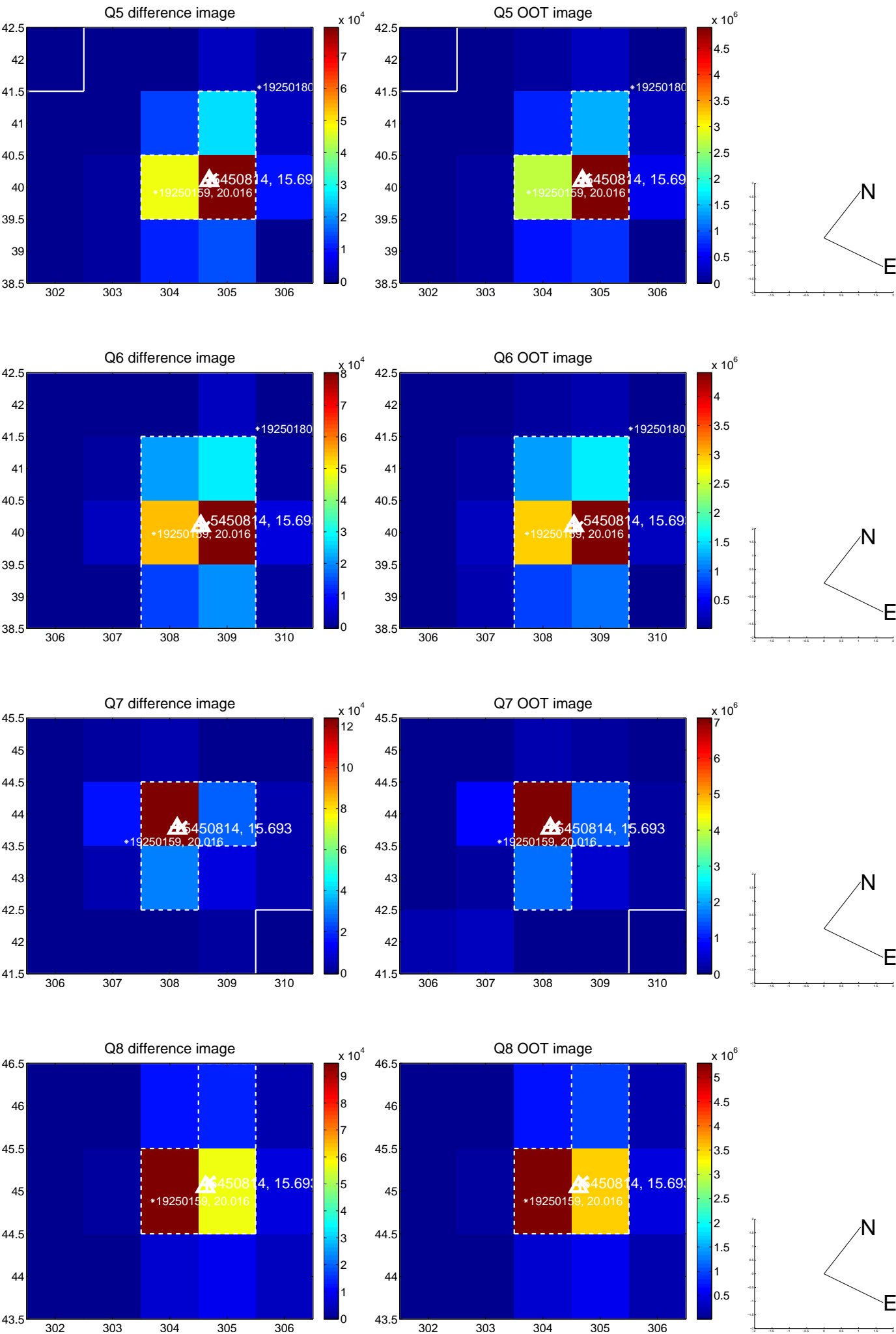
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

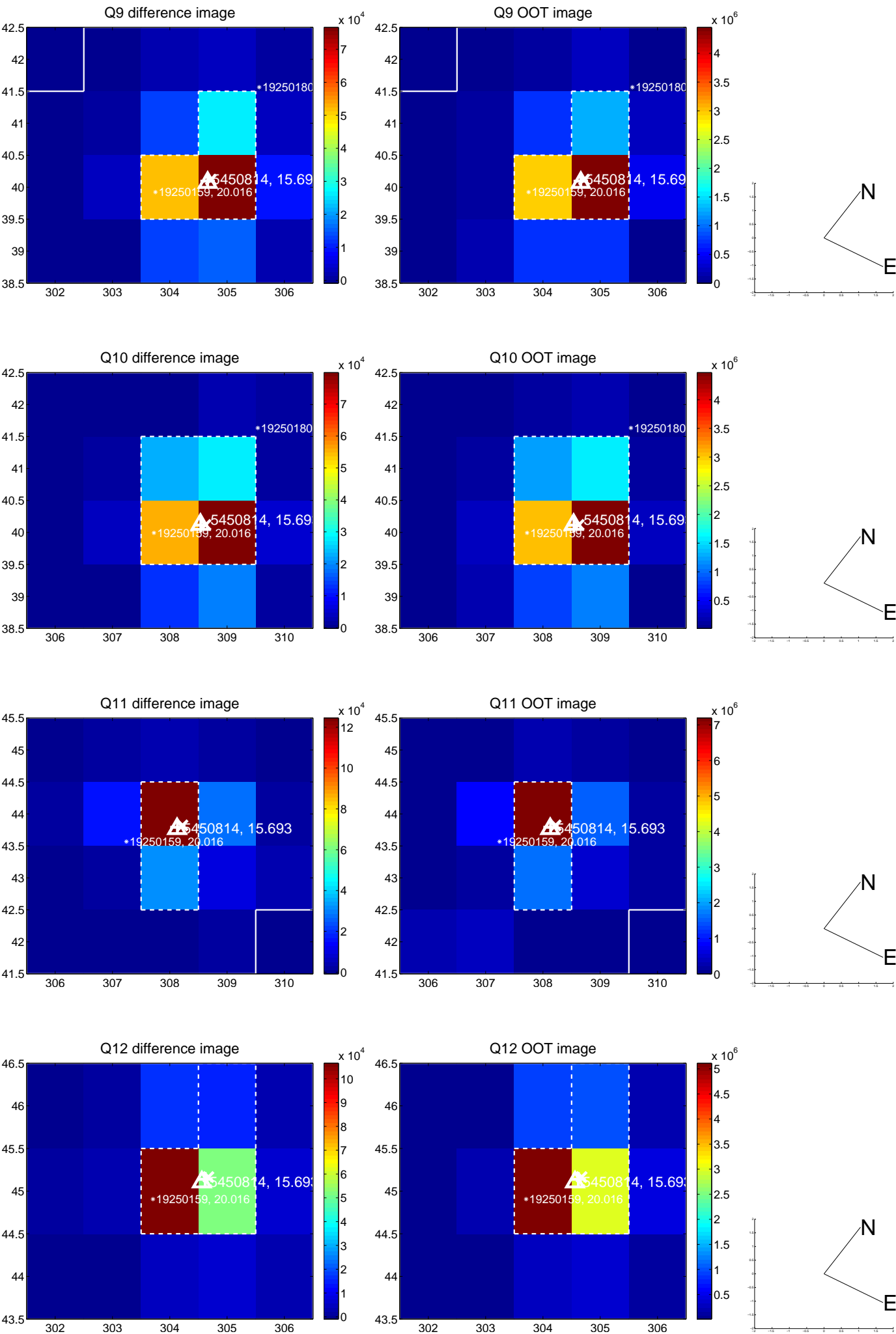




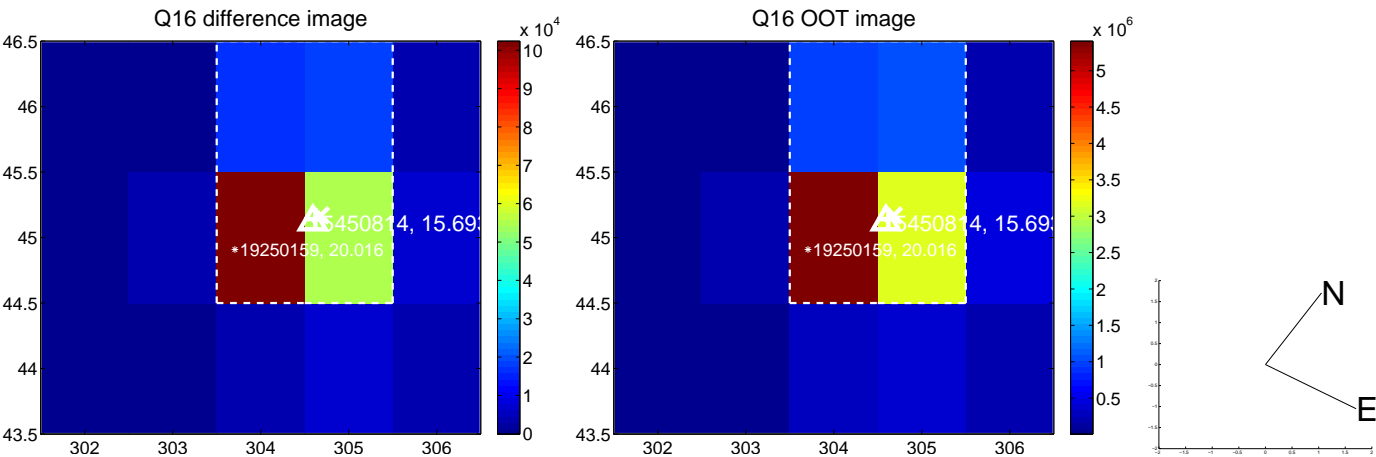
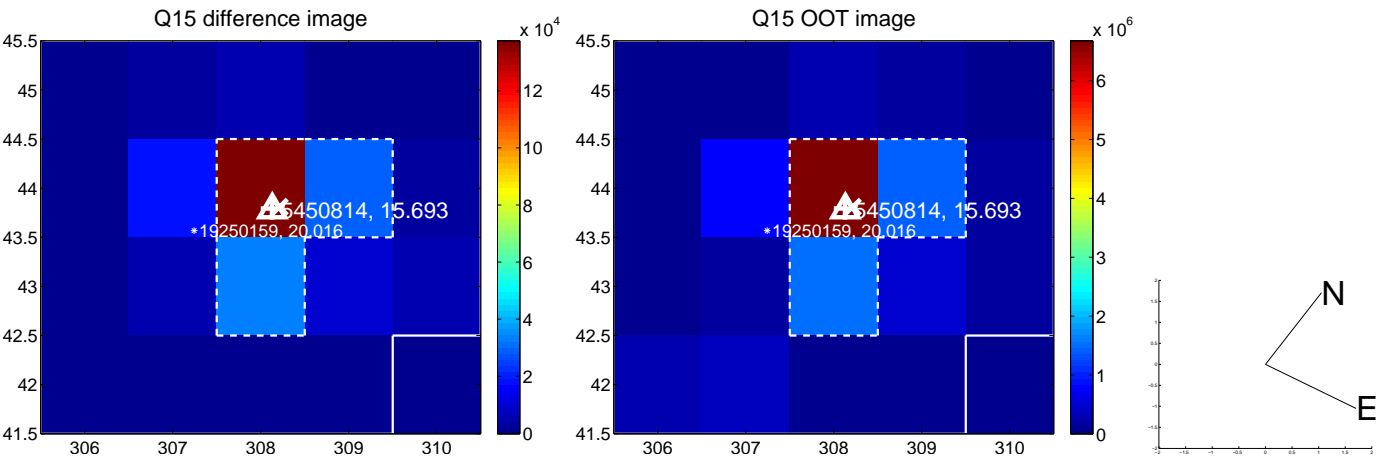
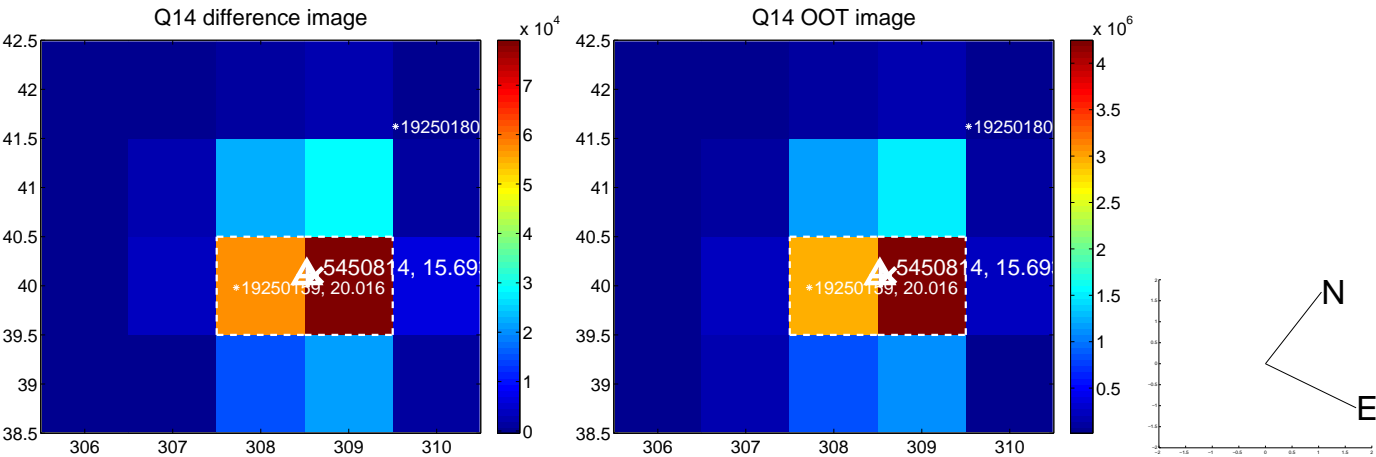
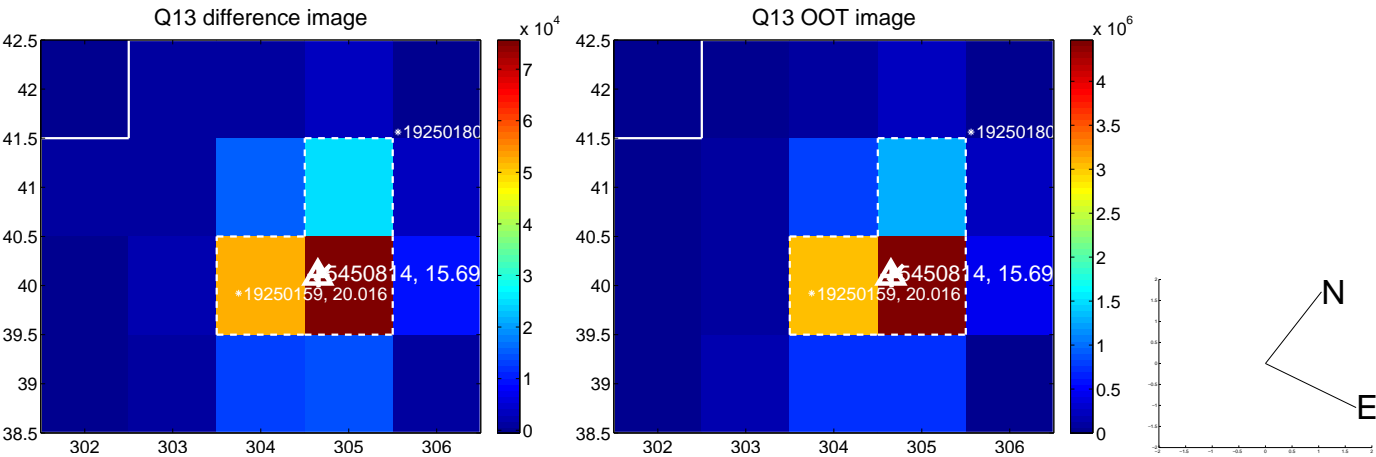
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



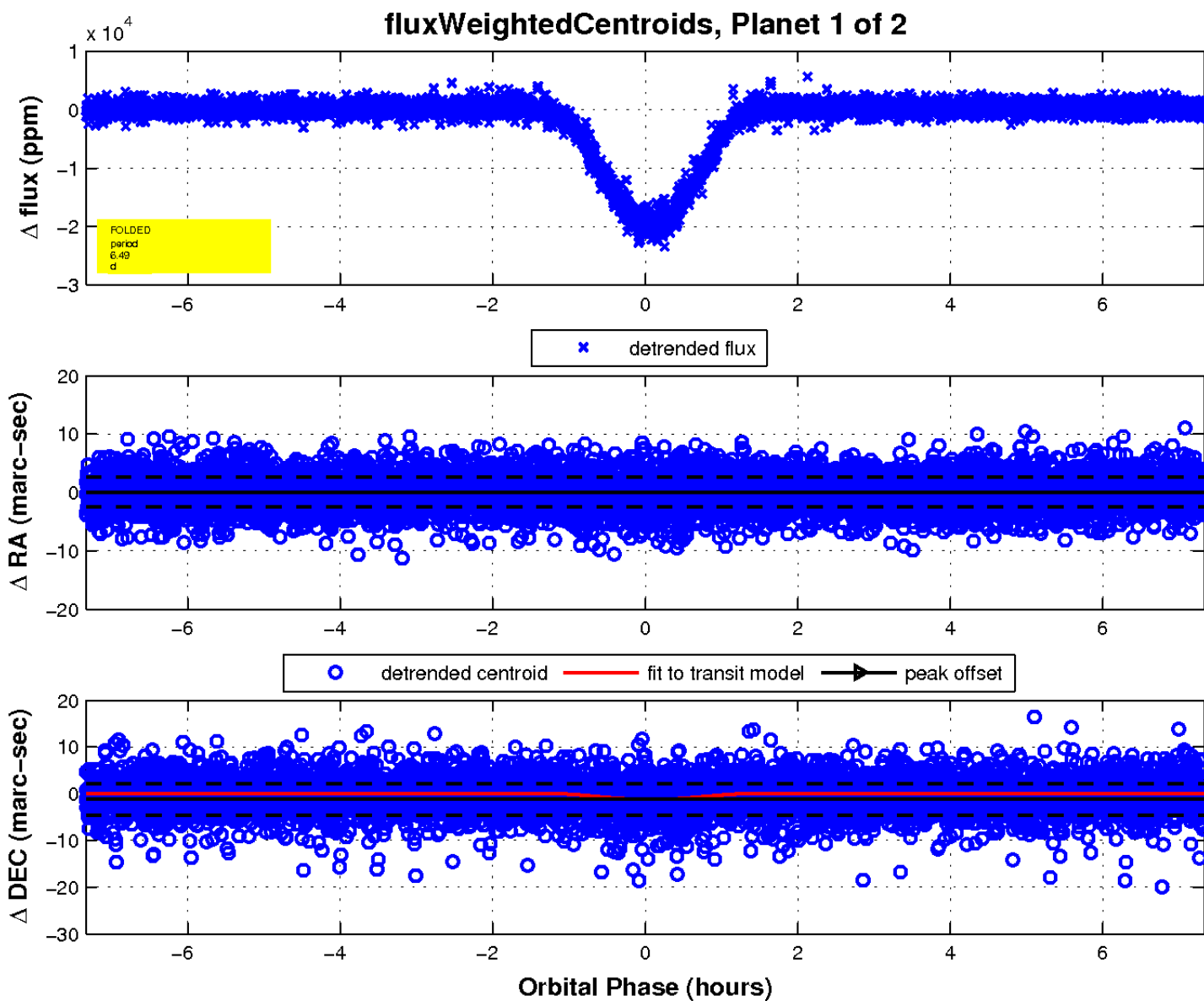
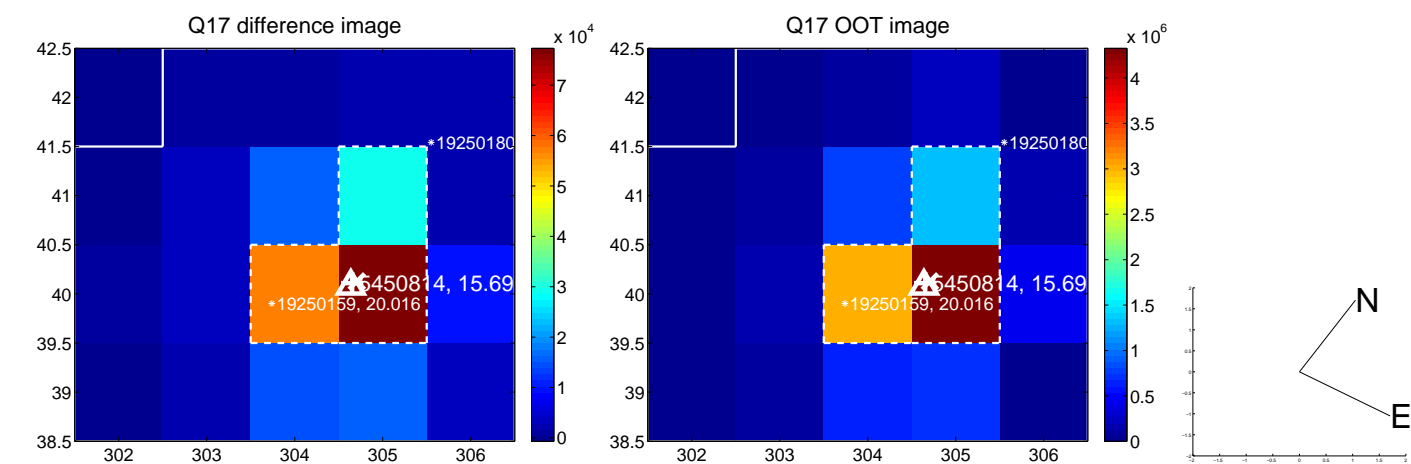
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

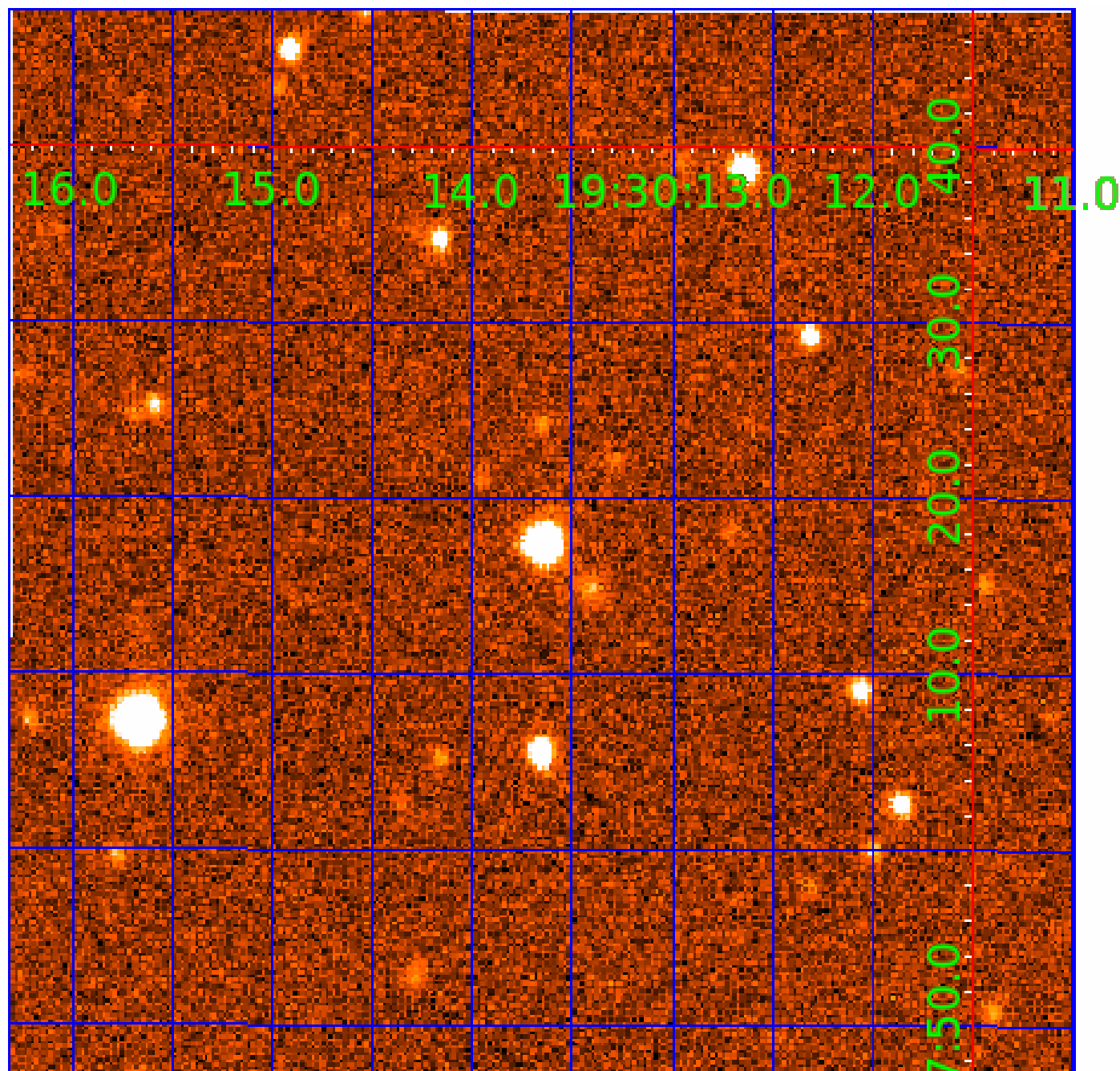


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 005450814

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005450814-01	OBS	1780.01	6.487523	137.625355	19830.9	2.445	556.4	526.6	0.48	4481	11.15	29.20
005450814-02	OBS	No	6.487509	134.268036	2782.5	1.300	58.5	67.1	0.48	4481	3.27	29.20

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005450814-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—DEEP_V_SHAPED—HAS_SEC_TCE
005450814-02	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 005450814-02

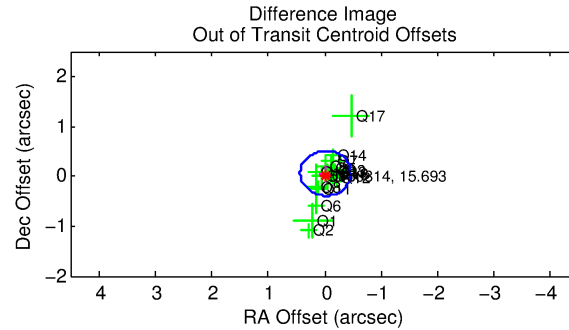
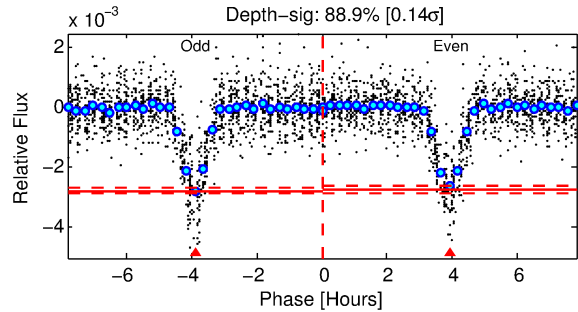
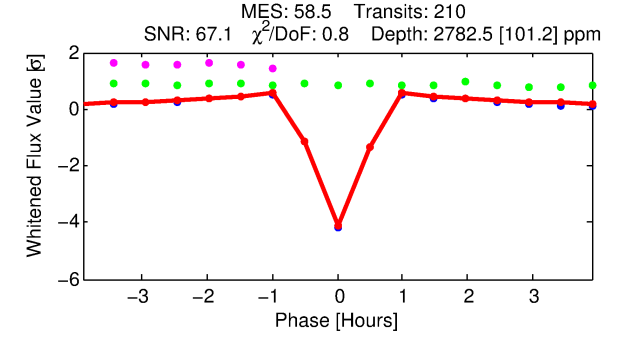
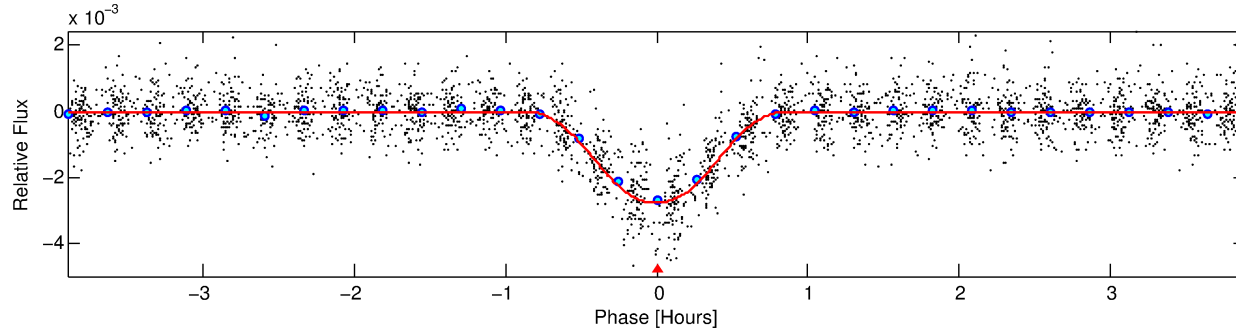
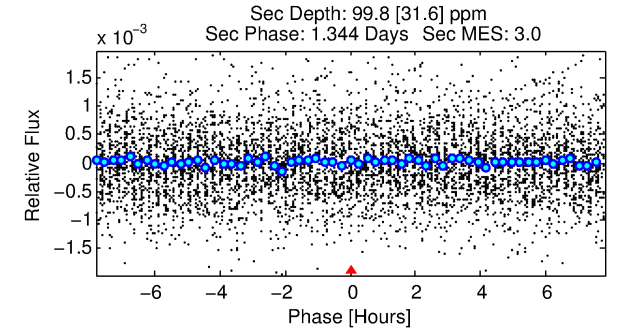
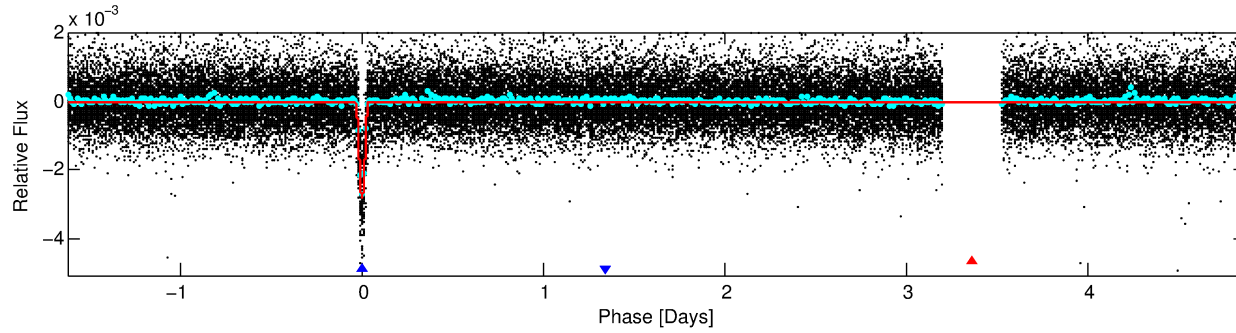
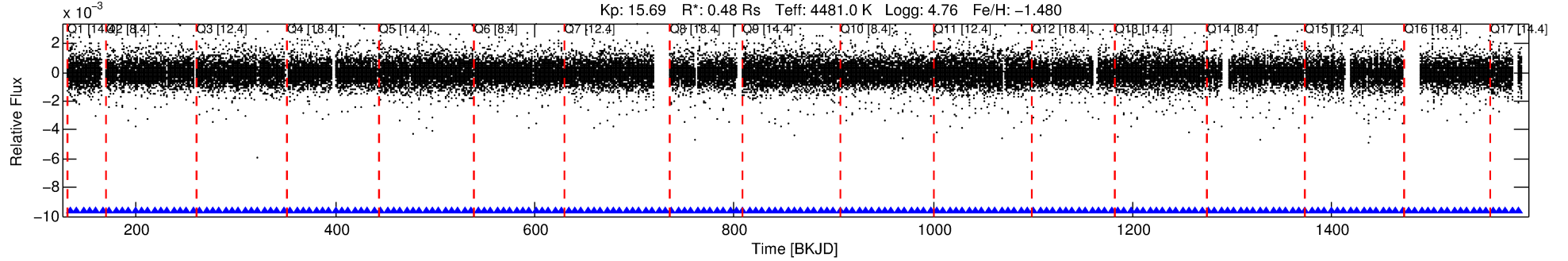
No Significant Match Found

# DV One-Page Summary

KIC: 5450814 Candidate: 2 of 2 Period: 6.488 d

KOI: K01780 Corr: No Ephemeris Match

Kp: 15.69 R\*: 0.48 Rs Teff: 4481.0 K Logg: 4.76 Fe/H: -1.480



## DV Fit Results:

Period = 6.48751 [0.00000] d  
Epoch = 134.2680 [0.0004] BKJD  
Rp/R\* = 0.0619 [0.0044]  
a/R\* = 19.11 [2.00]  
b = 0.94 [0.02]  
Seff = 29.20 [4.97]  
Teq = 593 [25] K  
Rp = 3.27 [0.37] Re  
a = 0.0539 [0.0040] AU  
Ag = 14.90 [5.41] [2.57σ]  
Teffp = 1801 [167] K [7.15σ]

## DV Diagnostic Results:

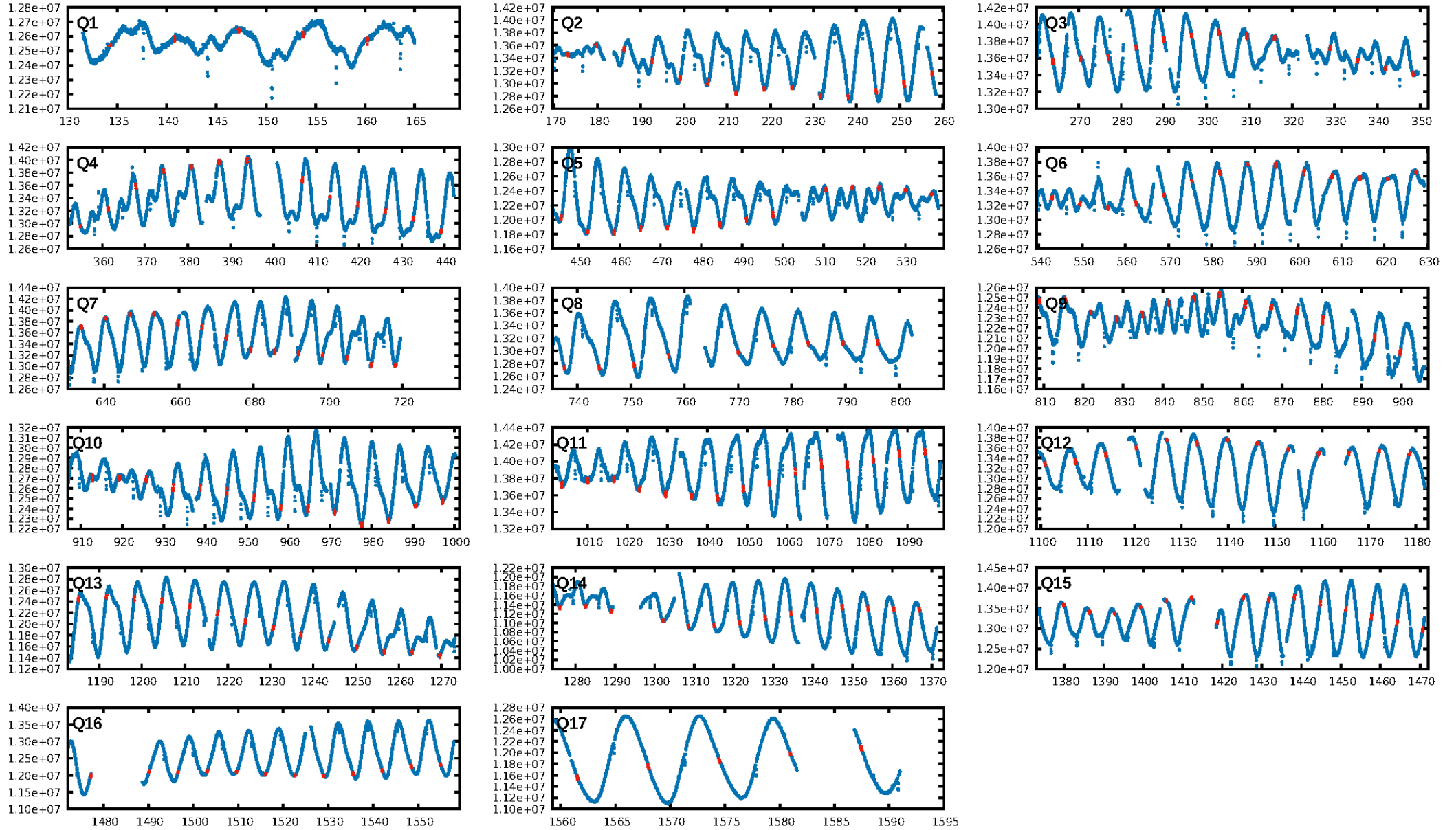
ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [200/200]  
GhostDiagnostic-chr: 1.508  
Centroid-sig: 0.7%  
Centroid-so: 0.507 arcsec [2.87σ]  
OotOffset-rm: 0.057 arcsec [0.38σ]  
KicOffset-rm: 0.279 arcsec [2.90σ]  
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 03:47:03 Z

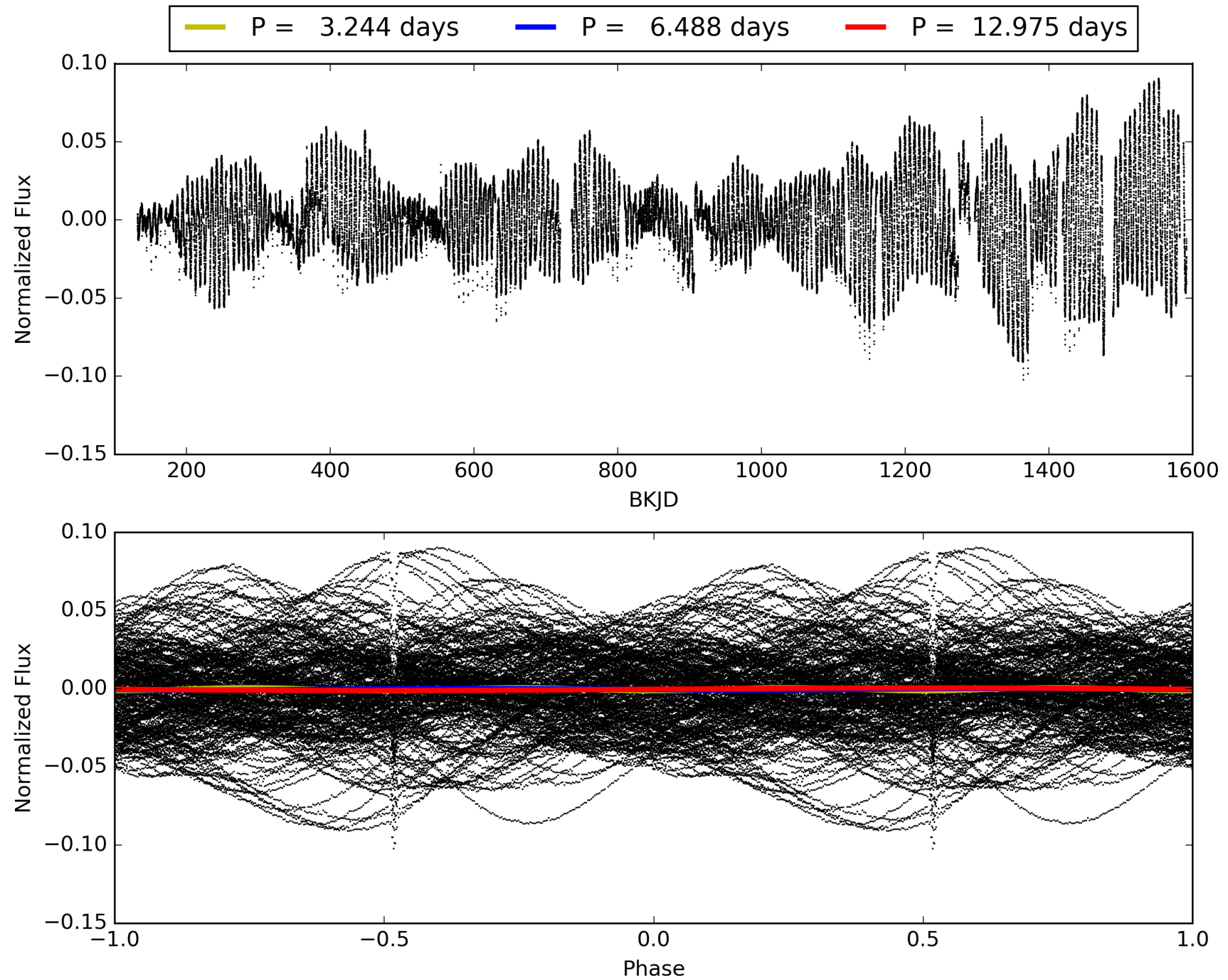
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 005450814-02, PDC Light Curves

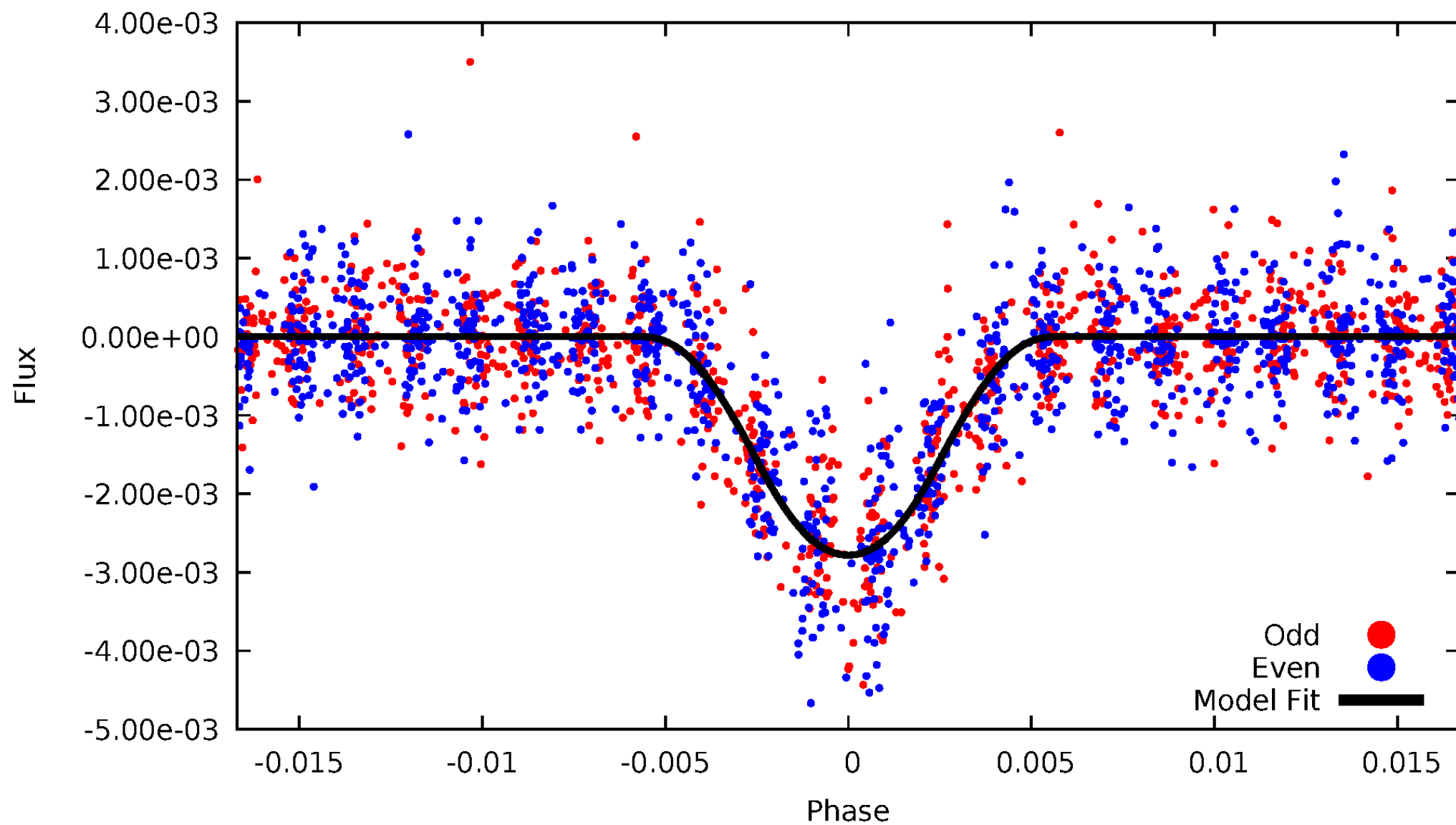


TCE 005450814-02



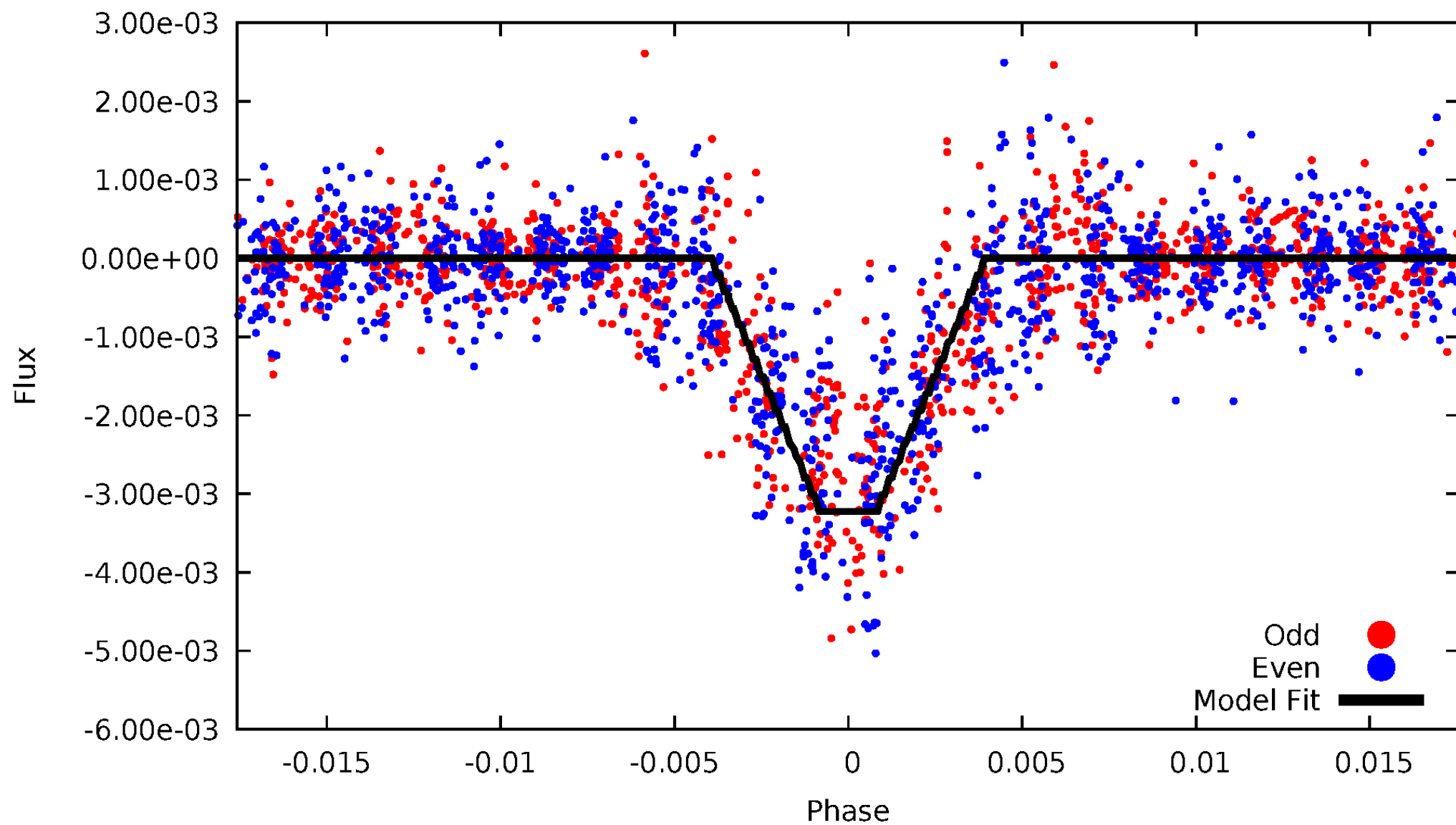
# DV Odd/Even

TCE 005450814-02



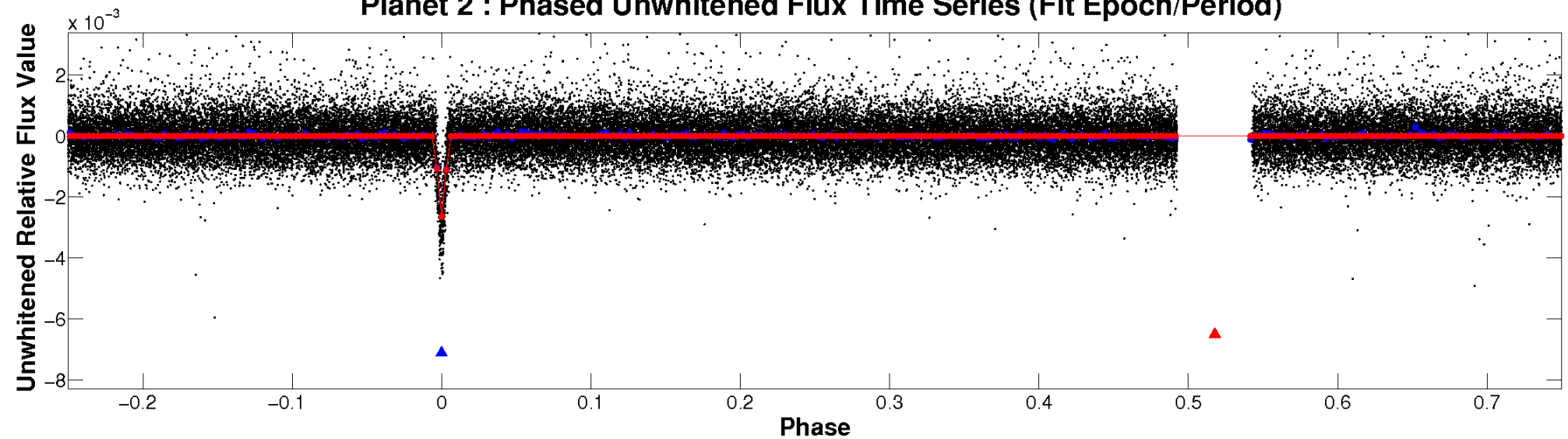
# ALT Odd/Even

TCE 005450814-02

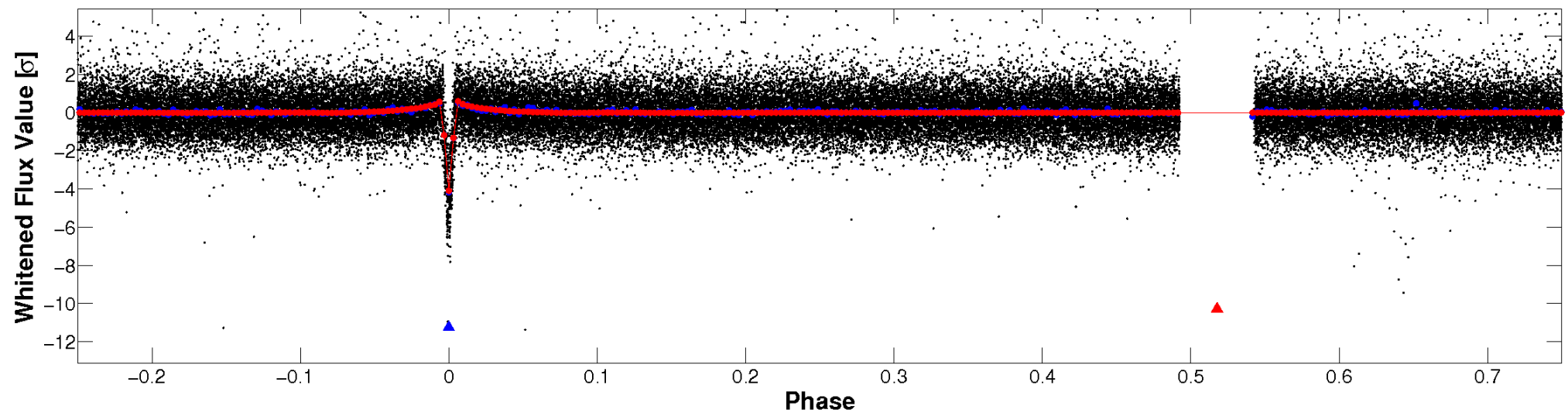


# Non-Whitened Vs. Whitened Light Curve

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

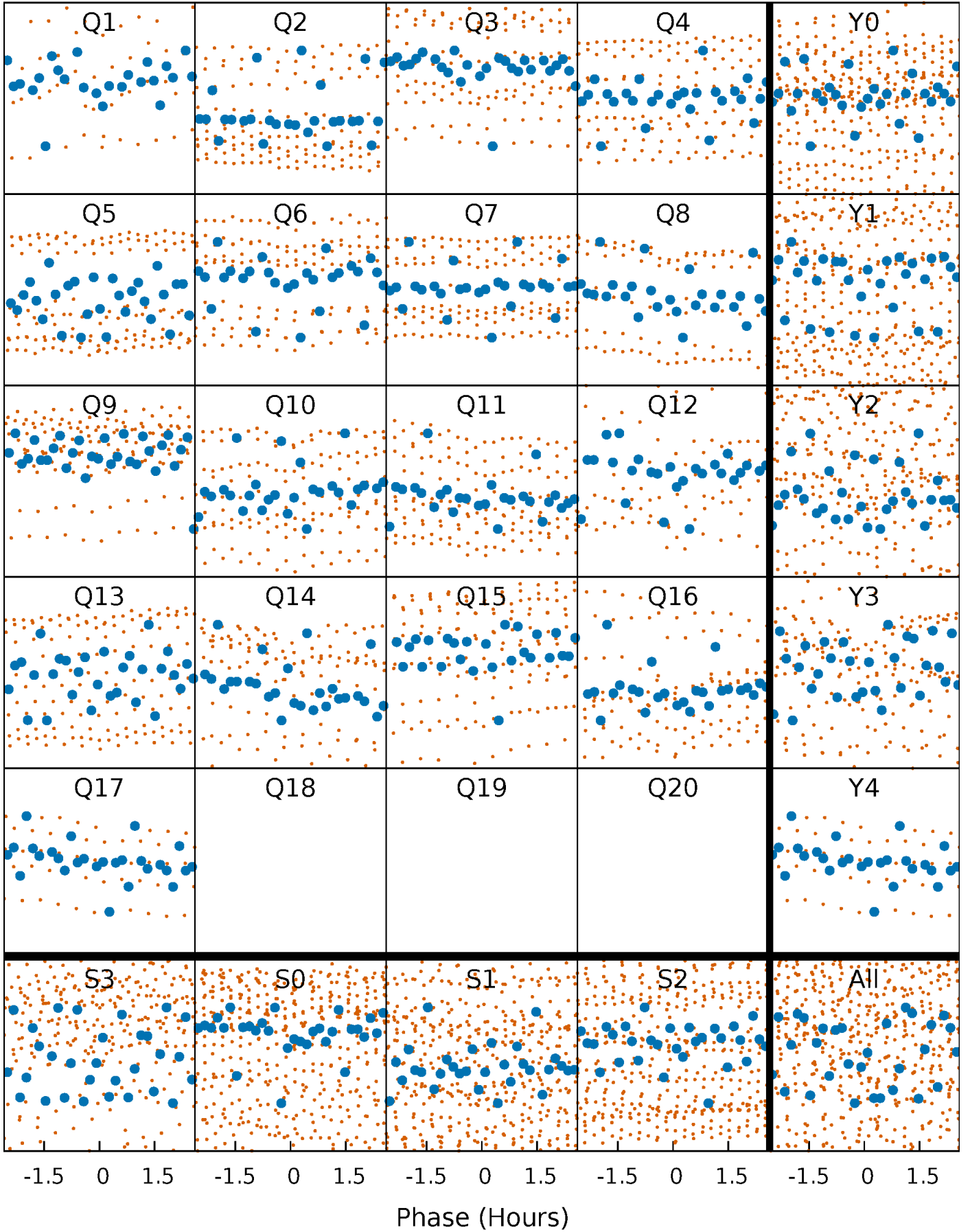


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

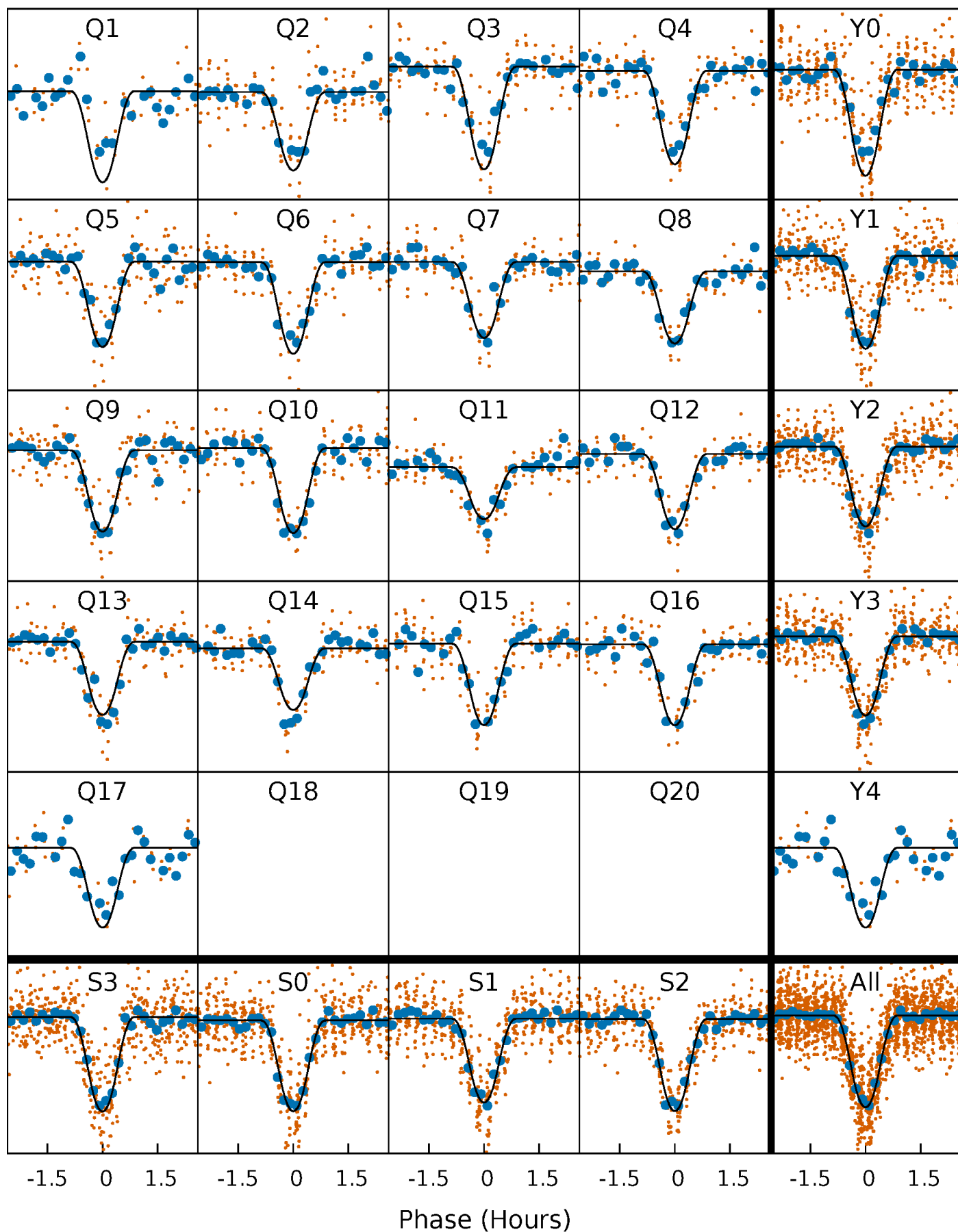
TCE 005450814-02   P= 6.487509 Days    $T_0=134.268036$  (BKJD)





# DV Quarter-Phased Transit Curves

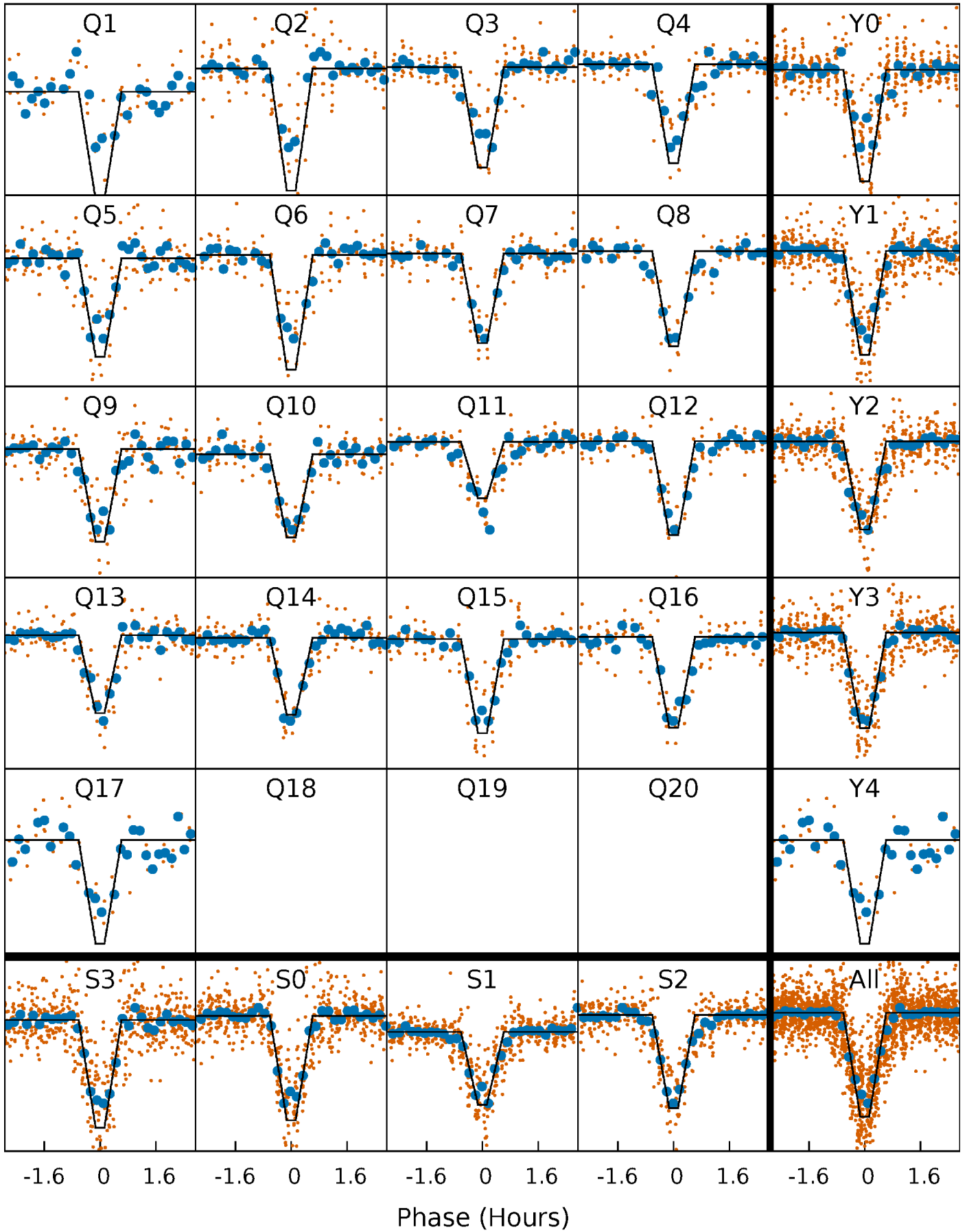
TCE 005450814-02   P= 6.487509 Days    $T_0=134.268036$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

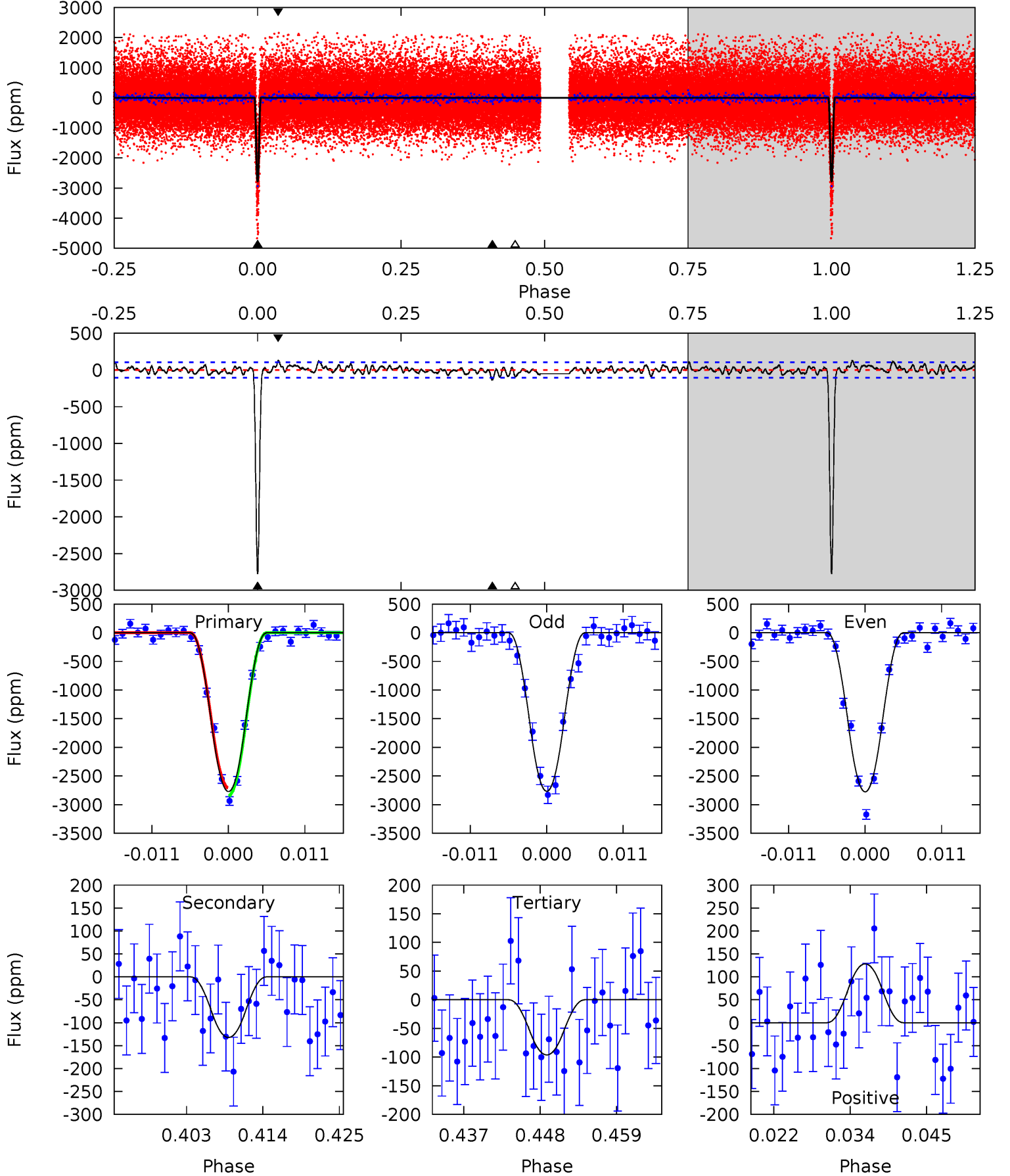
TCE 005450814-02   P= 6.487516 Days    $T_0=134.267124$  (BKJD)



# DV Model-Shift Uniqueness Test

005450814-02, P = 6.487509 Days, E = 127.780527 Days

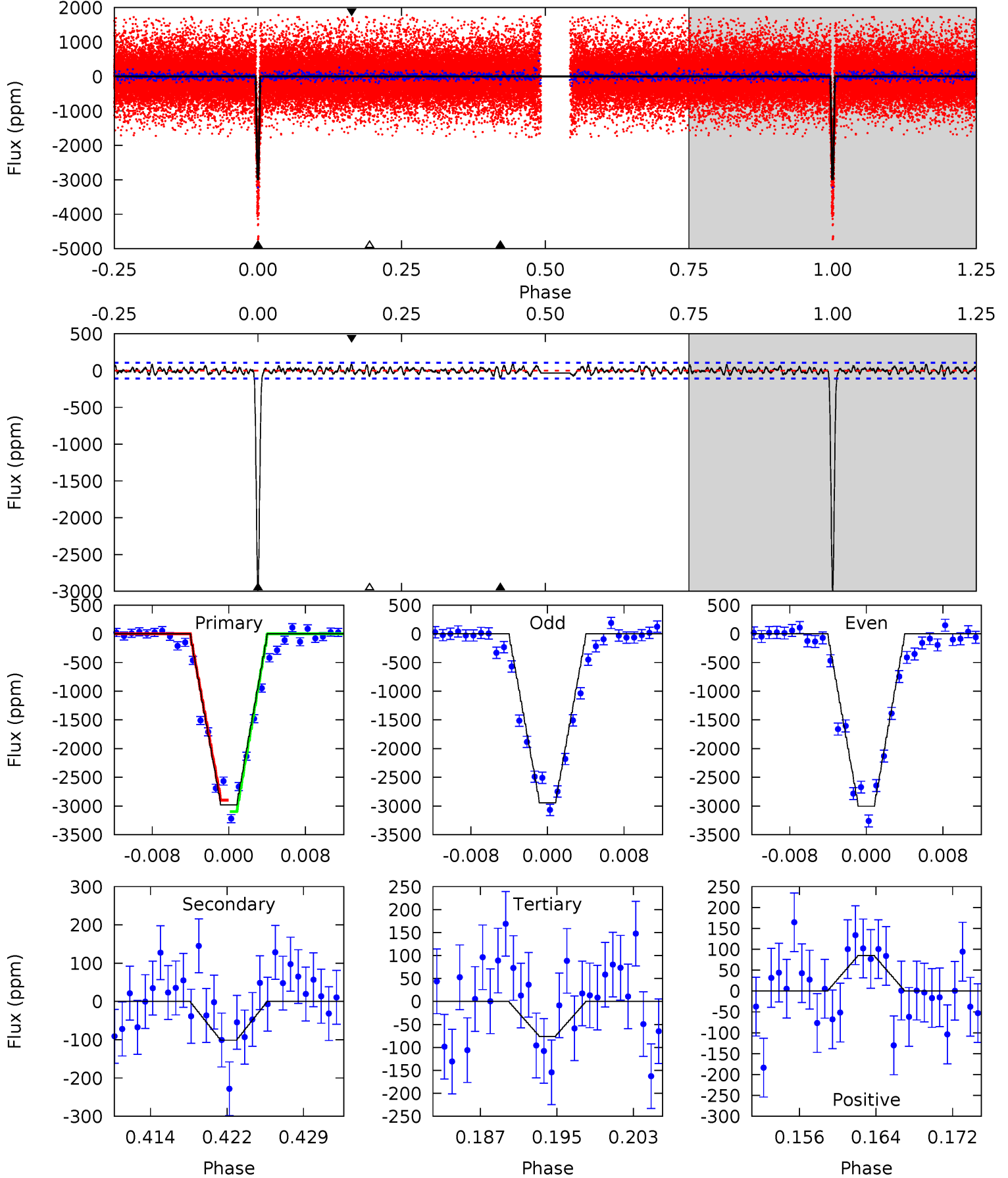
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
132.0	6.30	4.58	6.11	5.00	2.54	1.70	127.4	125.9	1.72	0.19	0.23	0.99	0.04	3.26



# Alt Model-Shift Uniqueness Test

005450814-02, P = 6.487516 Days, E = 127.779608 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
140.9	4.78	3.59	4.03	5.07	2.66	1.37	137.3	136.9	1.19	0.75	1.41	1.00	0.03	4.69



### Stellar Parameters For KIC 005450814

	$T_{\text{eff}} (K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (g \cdot \text{cm}^{-3})$
	$4481^{+121}_{-148}$	$4.763^{+0.059}_{-0.027}$	$-1.480^{+0.300}_{-0.300}$	$0.485^{+0.027}_{-0.042}$	$0.498^{+0.034}_{-0.031}$	$6.135^{+1.548}_{-0.700}$
	+3%/-3%	+1%/-1%	+20%/-20%	+6%/-9%	+7%/-6%	+25%/-11%
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 005450814-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-132 \pm 21$	$3.25^{+0.25}_{-0.27}$	$820^{+29}_{-29}$	$2640^{+88}_{-90}$	$20^{+5}_{-4}$
Alt.	$-101 \pm 21$	$2.99^{+0.26}_{-0.28}$	$822^{+27}_{-30}$	$2605^{+102}_{-100}$	$18^{+5}_{-5}$

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

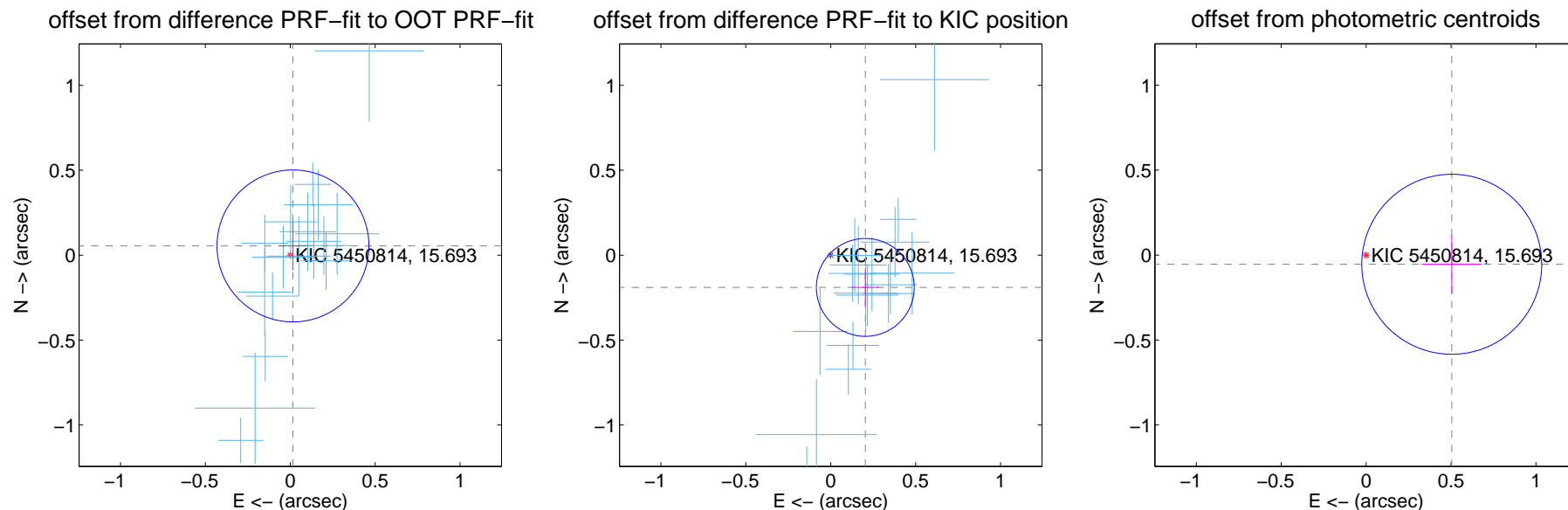
## DV Centroid Data

Supplemental centroid analysis for 005450814-02. Kepler magnitude: 15.69. Transit SNR 67.11

There are 17 quarters with good PRF difference image offsets

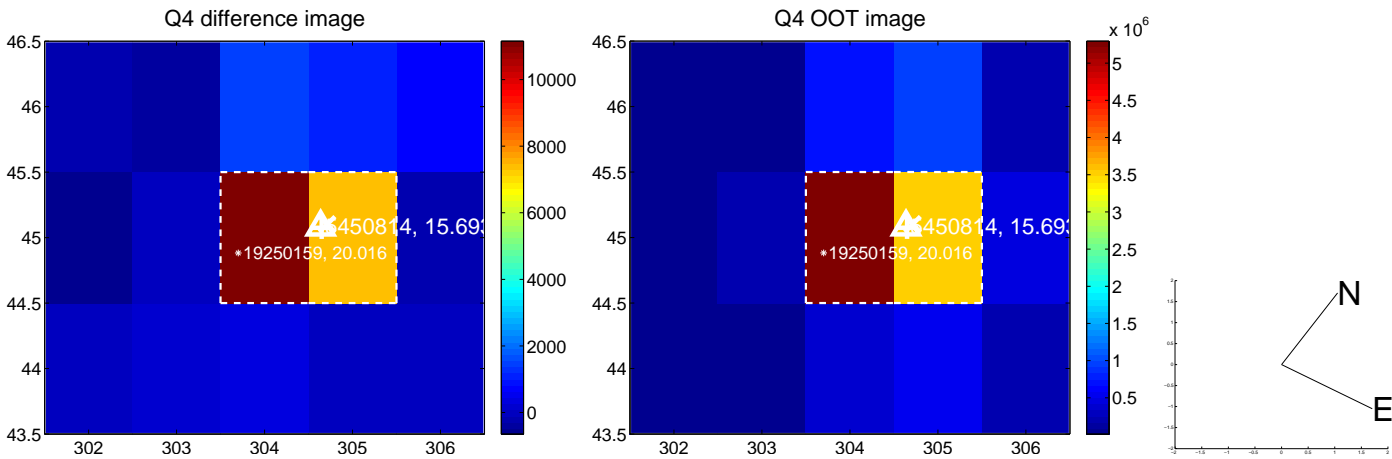
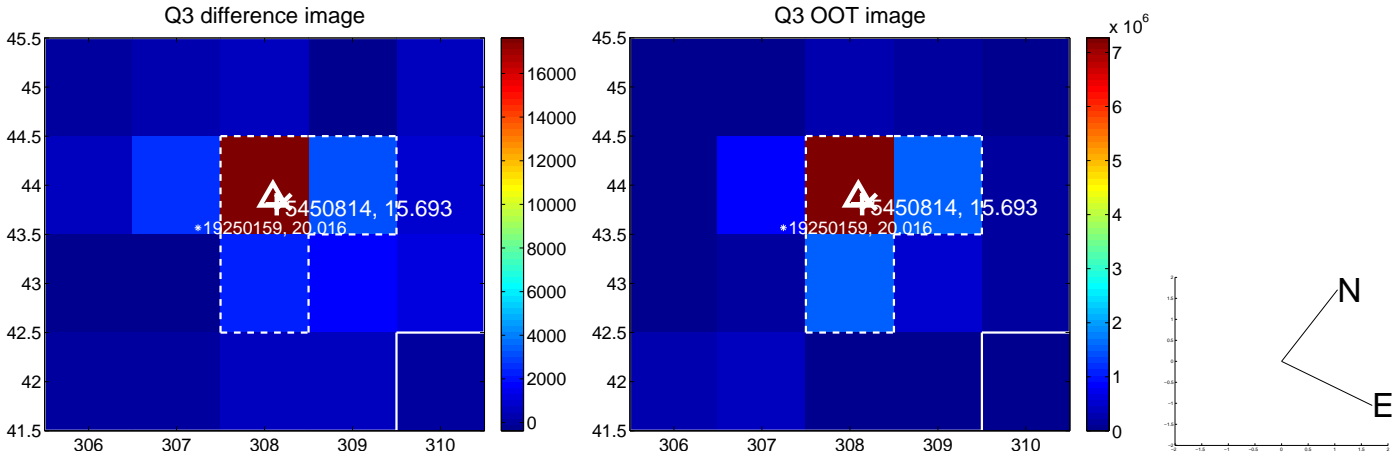
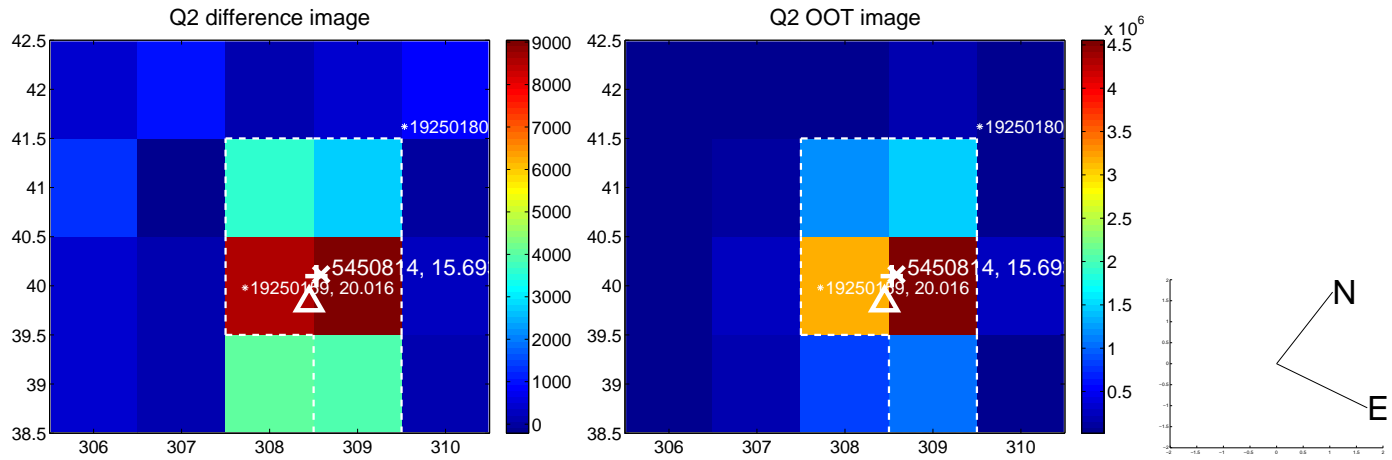
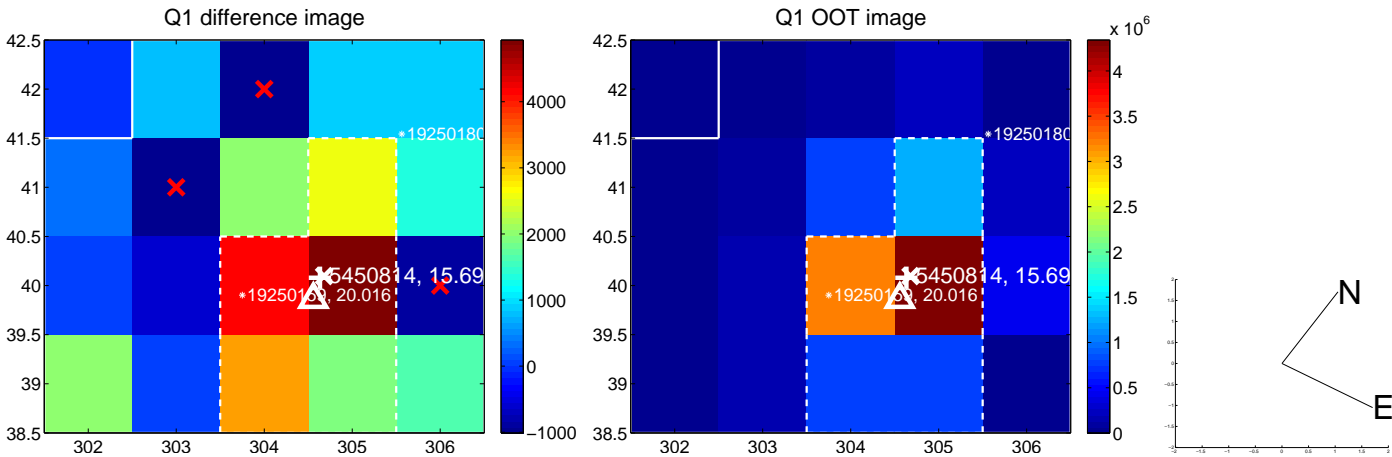
The direct PRF centroid is offset from the target star catalog position by about 0.22 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.057 \pm 0.149$	0.38	$-0.016 \pm 0.083$	$0.054 \pm 0.143$
PRF-fit source offset from KIC position	$0.279 \pm 0.096$	2.90	$-0.204 \pm 0.081$	$-0.190 \pm 0.111$
photometric centroid source offset	$0.51 \pm 0.18$	2.87	$-0.50 \pm 0.18$	$-0.05 \pm 0.17$

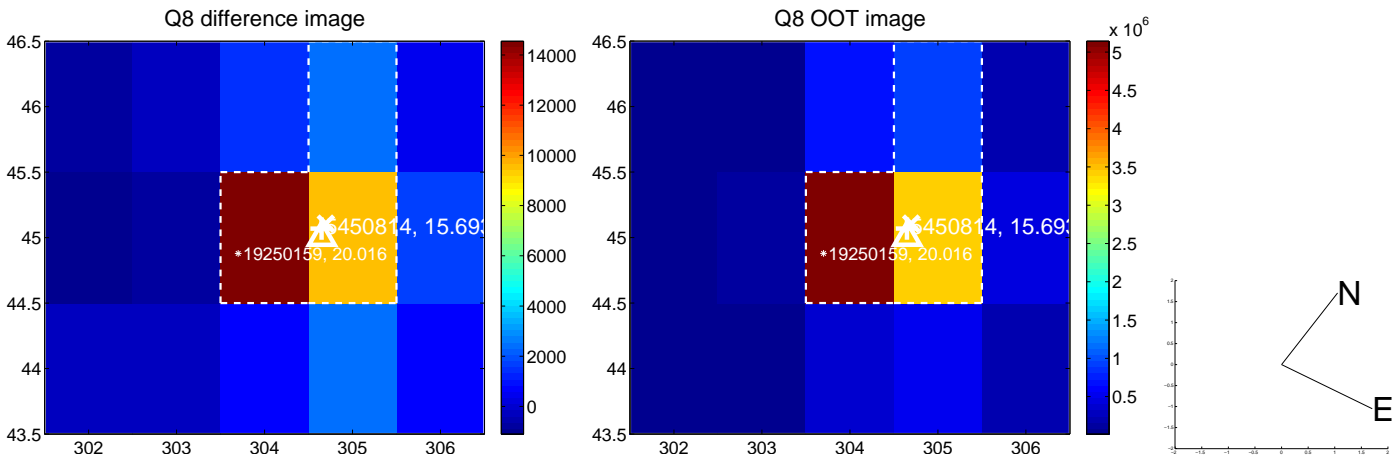
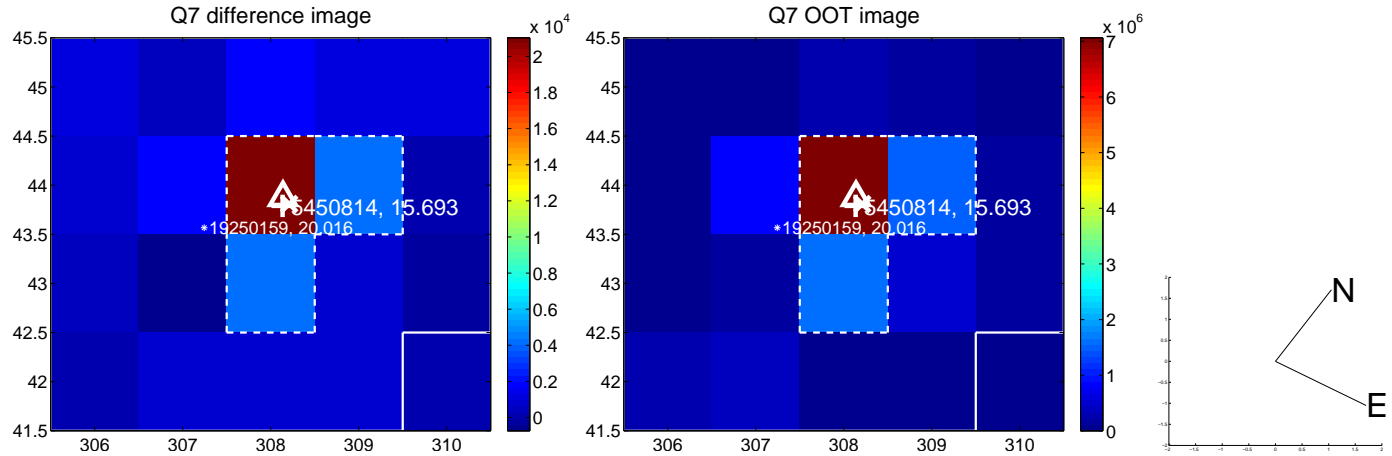
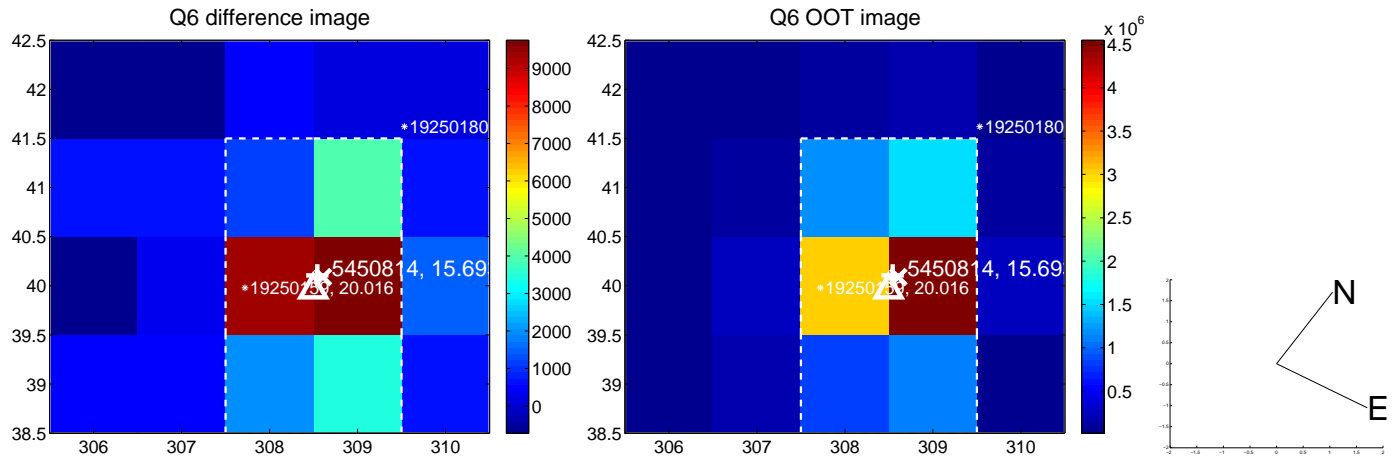
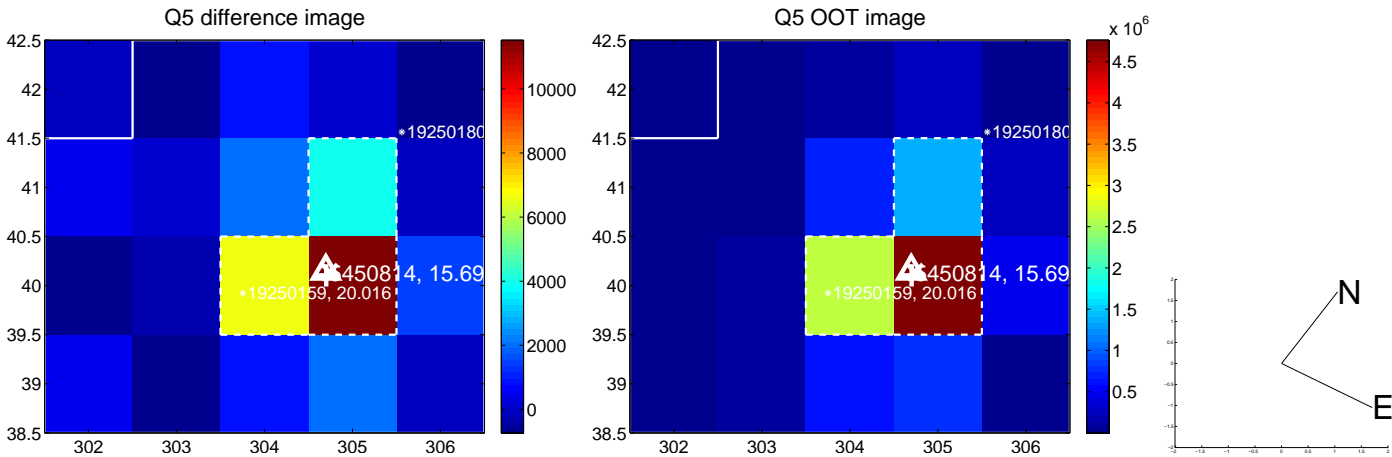


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

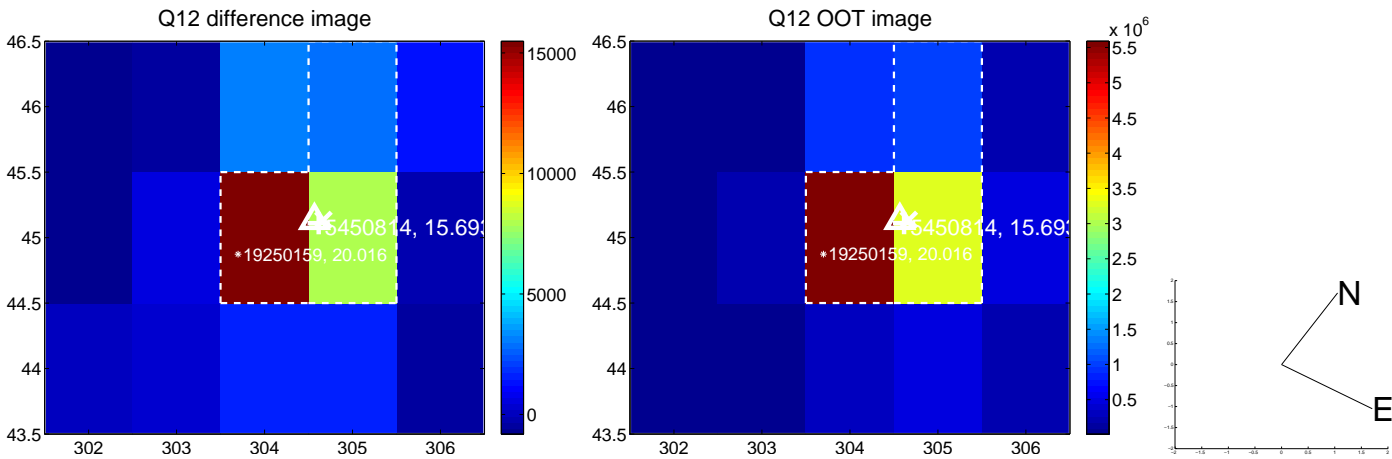
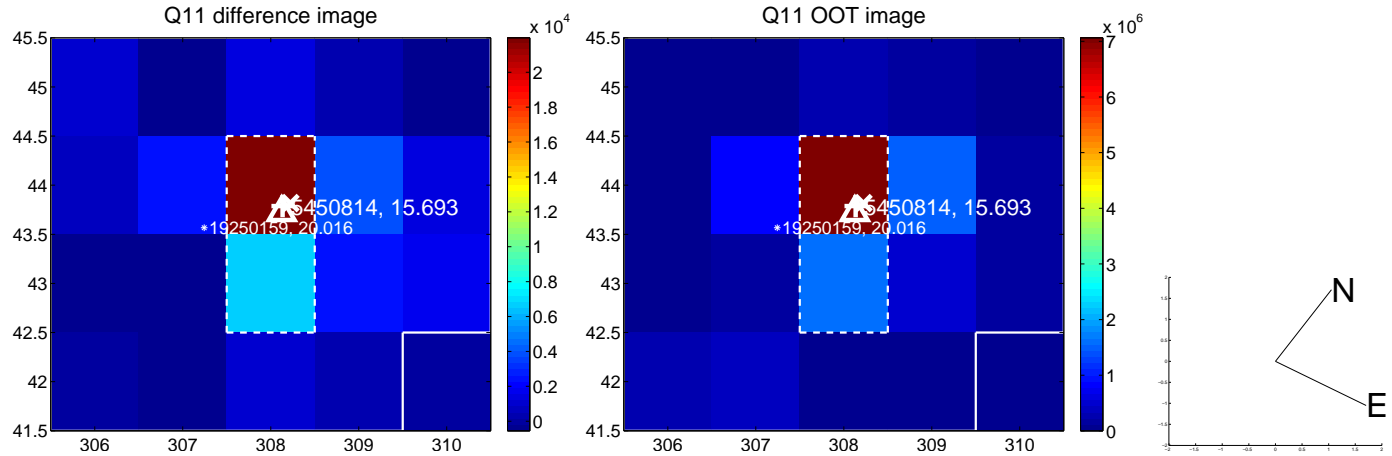
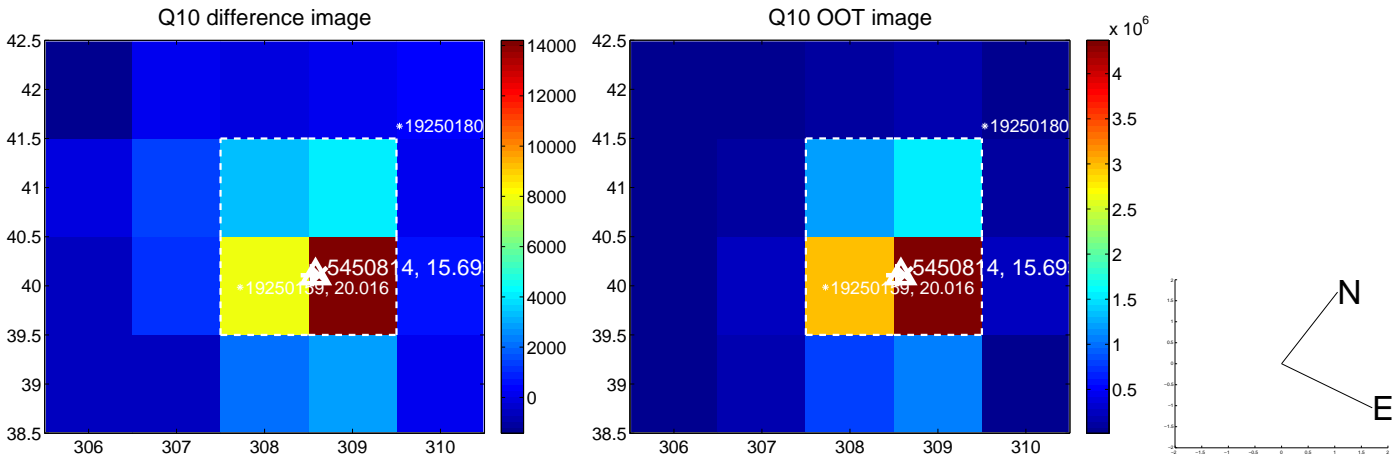
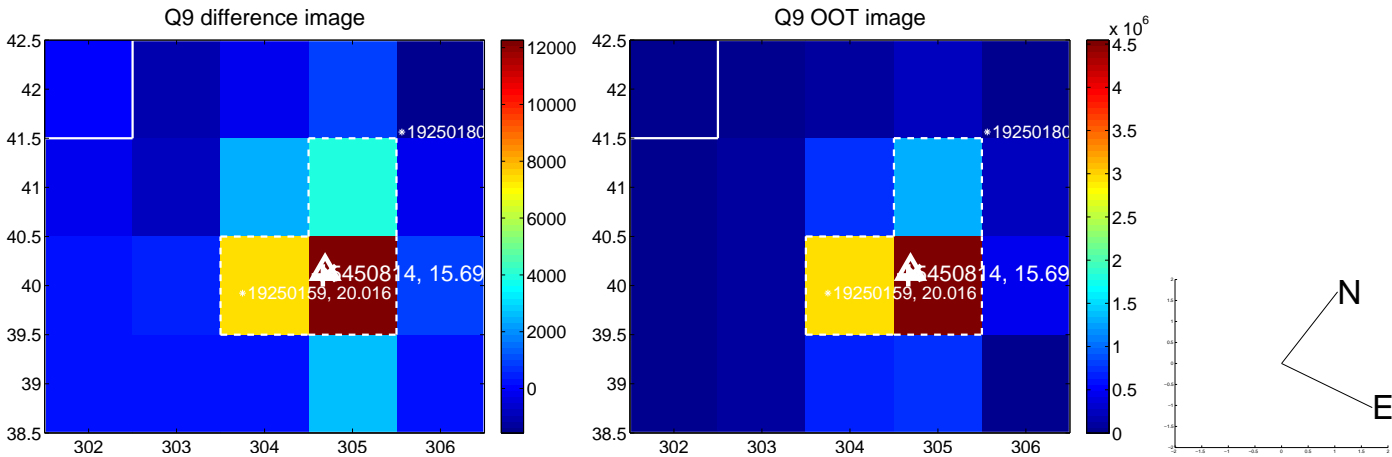


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

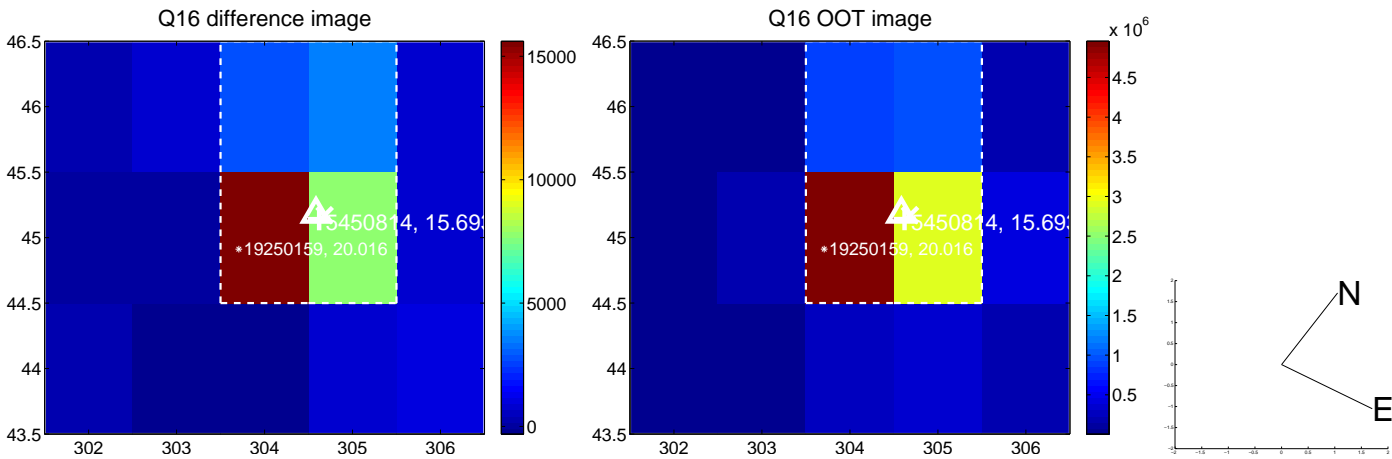
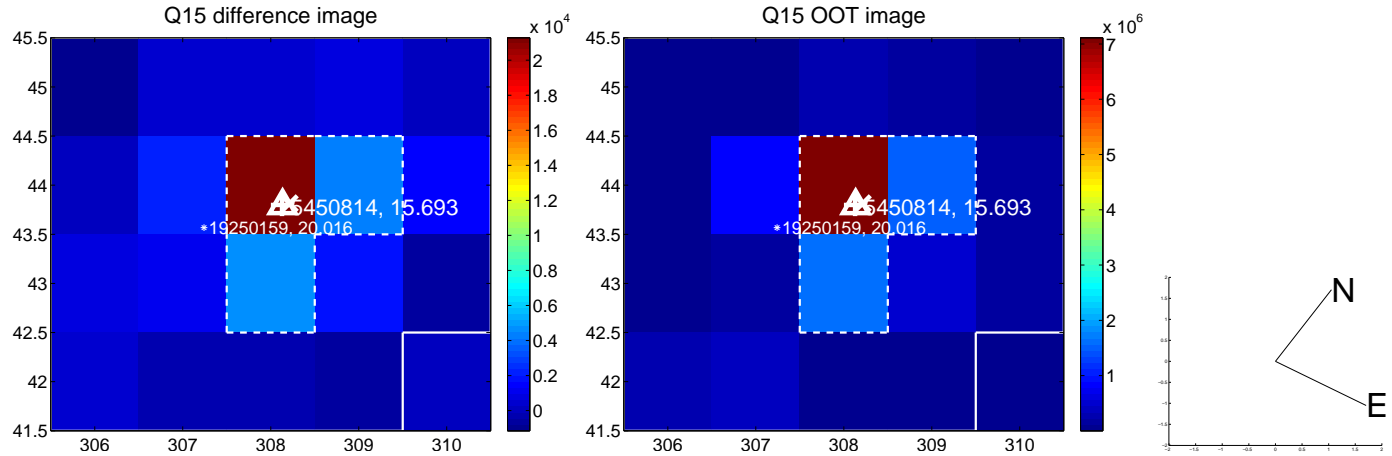
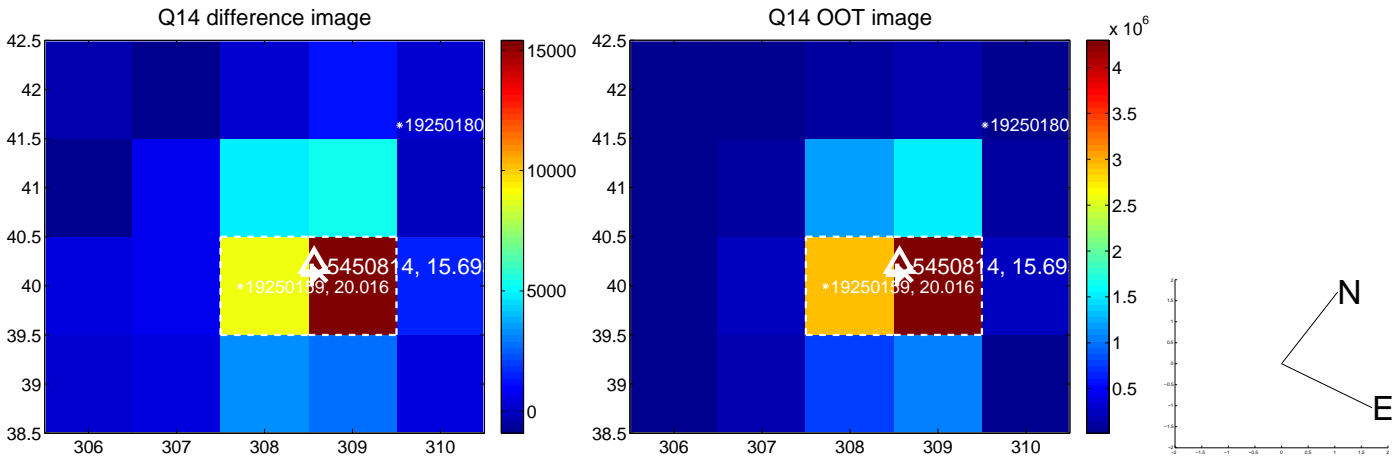
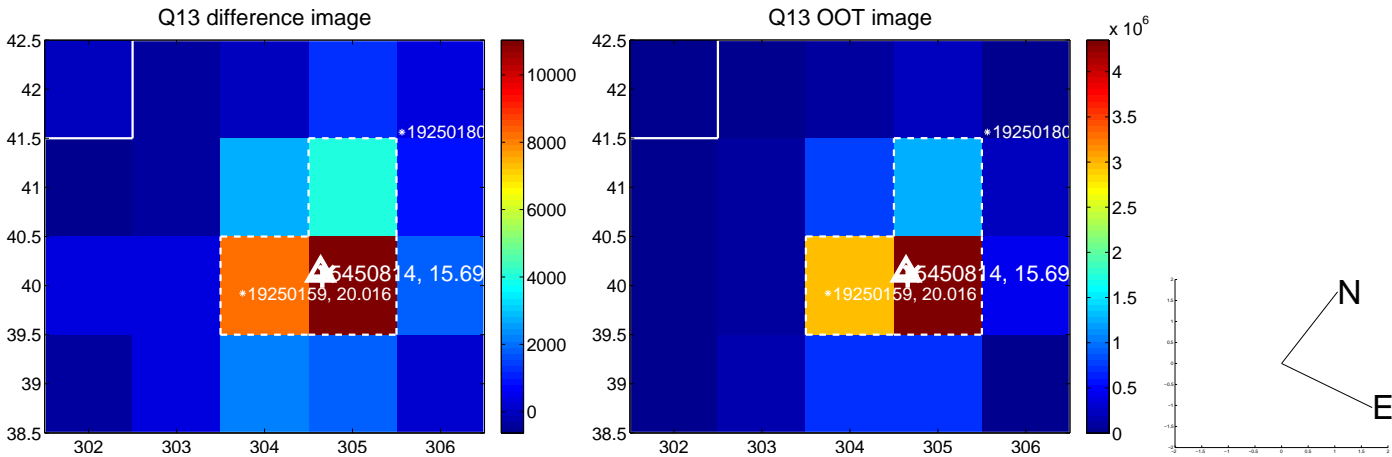




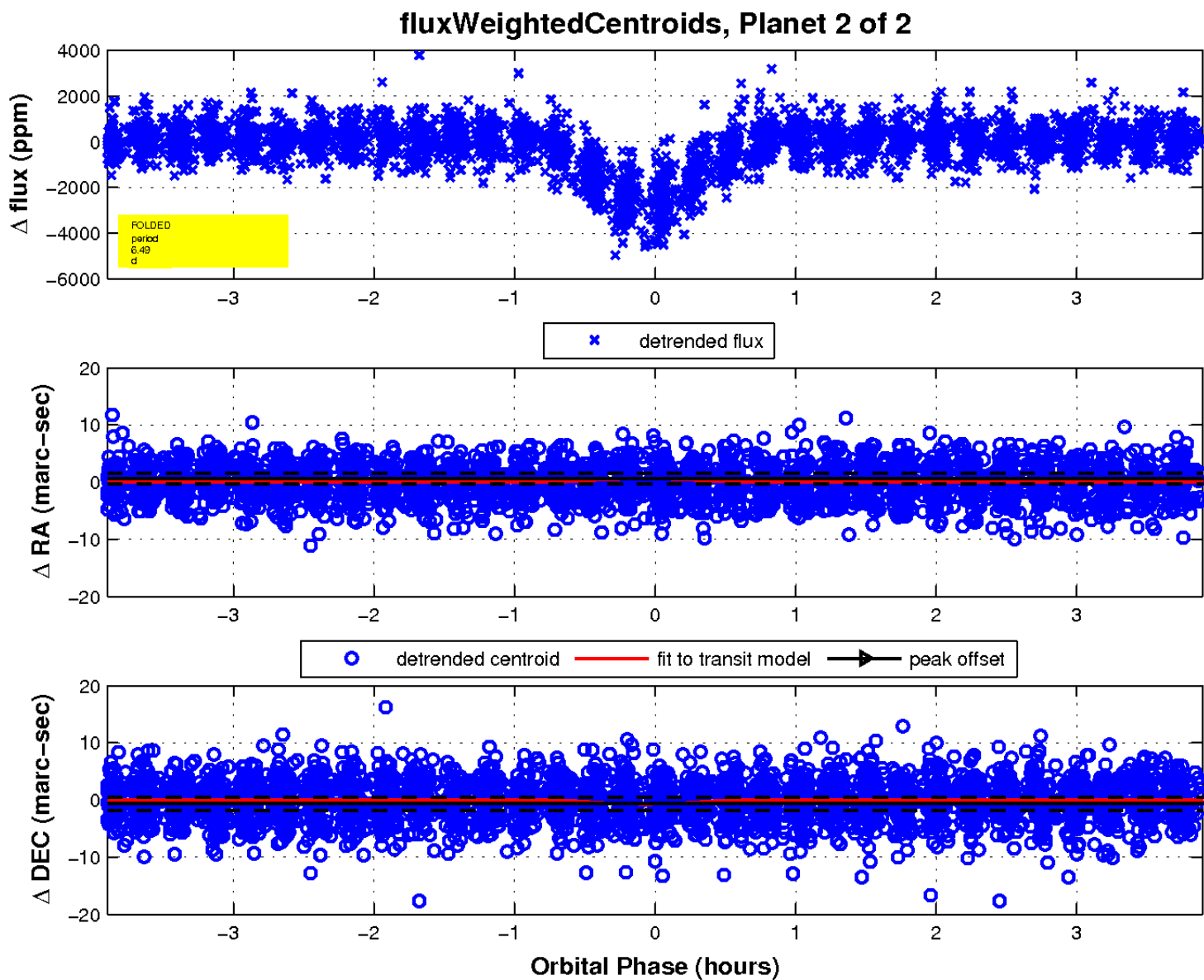
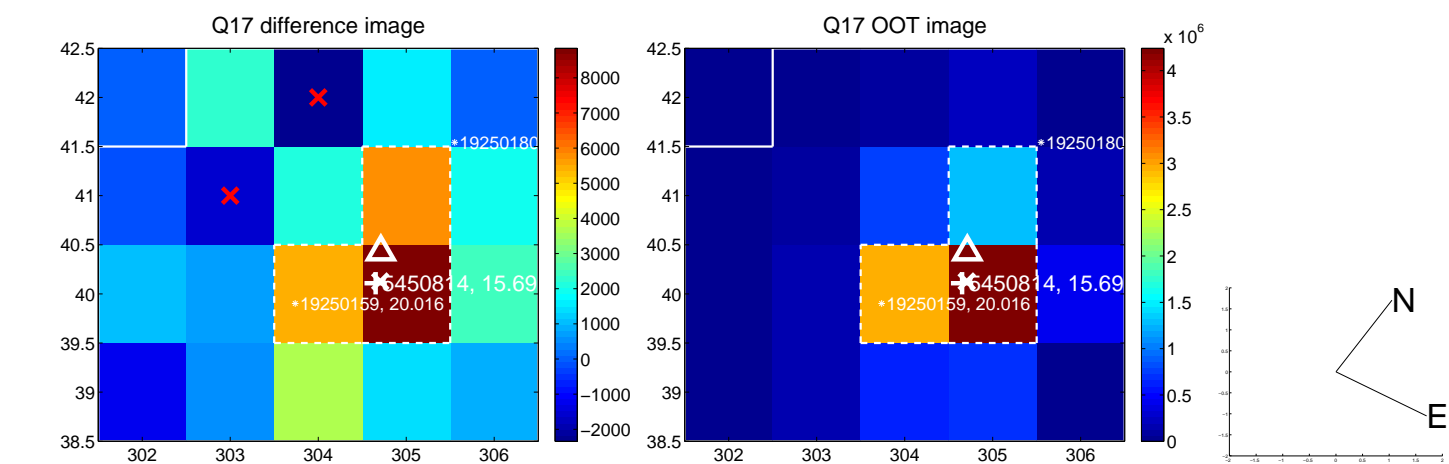
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

