

# KIC 005436502

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005436502-01	OBS	0834.01	23.653692	147.722190	3377.2	8.267	188.4	191.2	1.38	5739	8.05	67.78
005436502-02	OBS	0834.02	13.233523	140.323222	503.0	6.992	34.3	37.0	1.38	5739	3.44	147.04
005436502-03	OBS	0834.03	6.155685	134.808570	276.3	5.405	26.3	27.6	1.38	5739	2.83	407.97
005436502-04	OBS	0834.05	50.447402	178.491327	405.1	7.636	15.2	15.7	1.38	5739	3.17	24.69
005436502-05	OBS	0834.04	2.090786	132.090330	110.1	3.505	14.9	15.7	1.38	5739	1.73	1721.54

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005436502-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
005436502-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT
005436502-03	OBS	PC	1.00	0	0	0	0	NO_COMMENT
005436502-04	OBS	PC	0.99	0	0	0	0	NO_COMMENT
005436502-05	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.

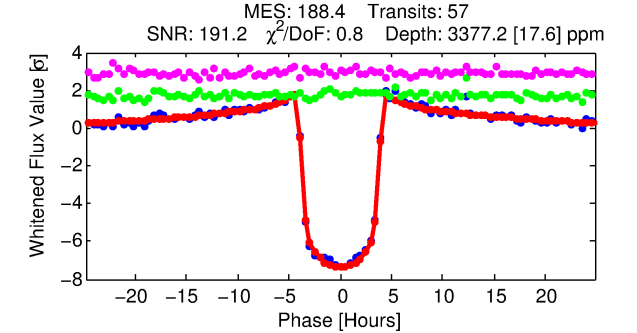
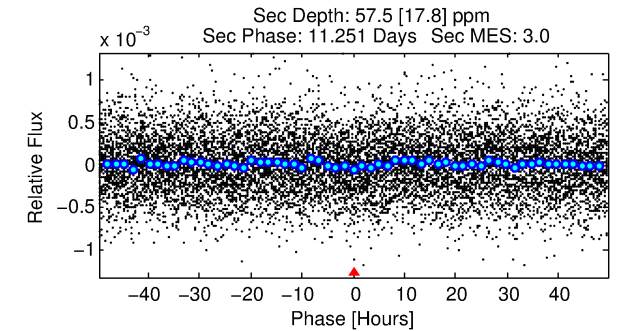
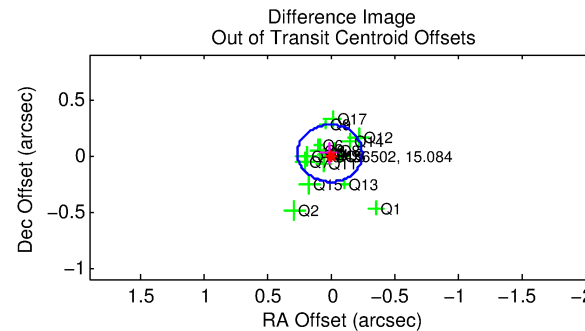
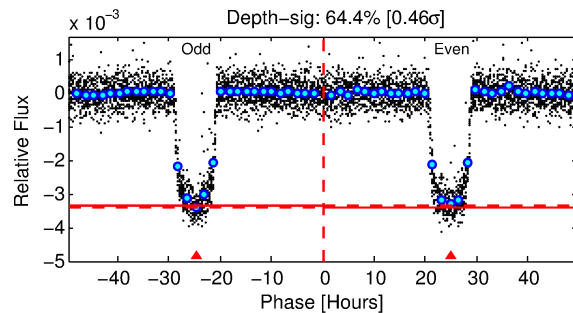
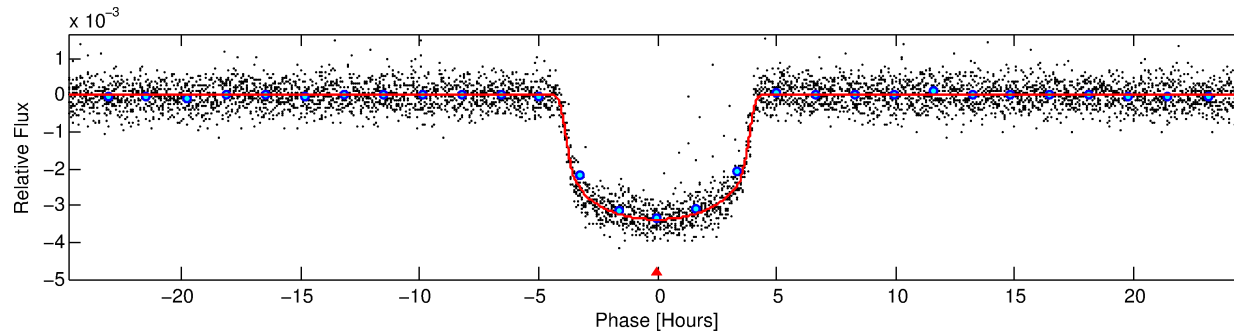
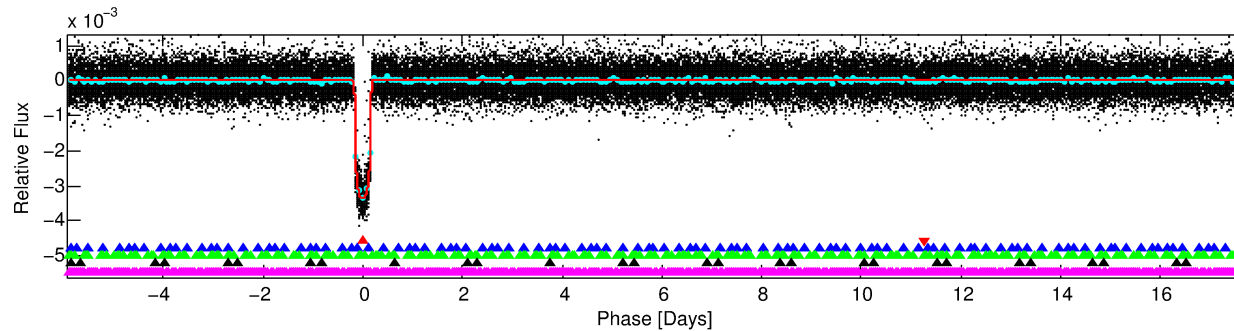
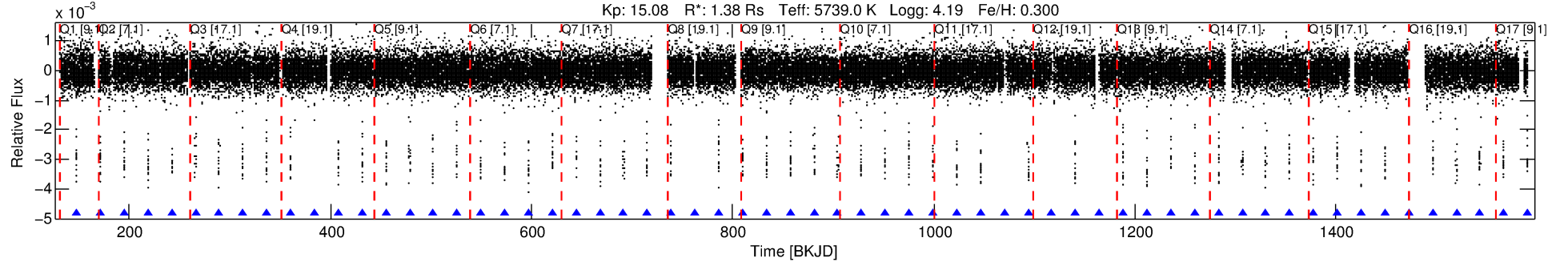
Ephemeris Match Information For 005436502-01

No Significant Match Found

# DV One-Page Summary

KIC: 5436502 Candidate: 1 of 5 Period: 23.654 d  
KOI: K00834.01 Name: Kepler-238e Corr: 0.997

Kp: 15.08 R\*: 1.38 Rs Teff: 5739.0 K Logg: 4.19 Fe/H: 0.300



## DV Fit Results:

Period = 23.65369 [0.00002] d  
Epoch = 147.7222 [0.0007] BKJD  
Rp/R\* = 0.0533 [0.0012]  
a/R\* = 21.70 [1.97]  
b = 0.35 [0.23]  
Seff = 67.78 [19.71]  
Teq = 732 [53] K  
Rp = 8.05 [1.56] Re  
a = 0.1657 [0.0296] AU  
Ag = 13.41 [5.63] [2.20σ]  
Teffp = 2165 [175] K [7.83σ]

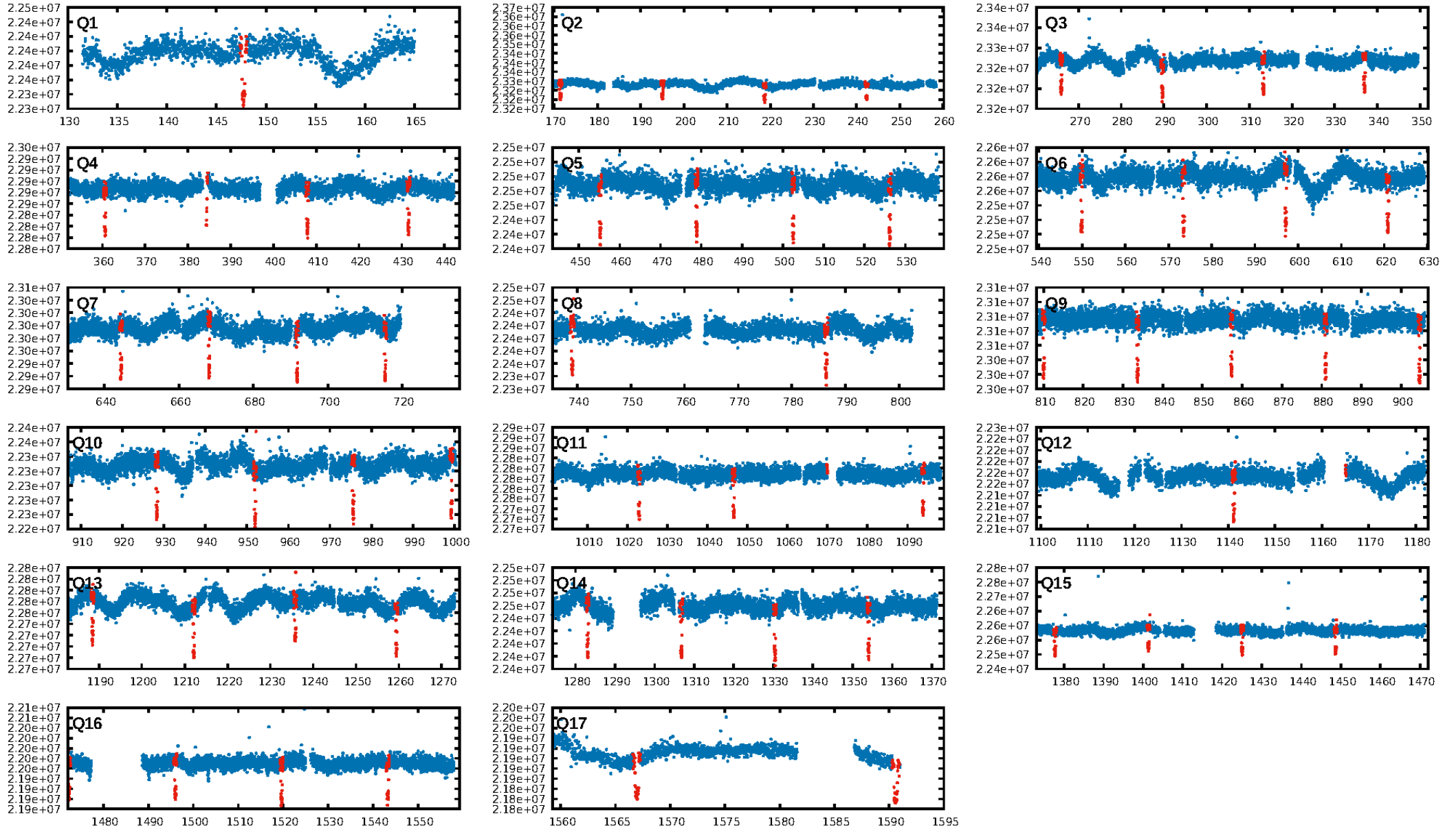
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [23.10σ]  
LongPeriod-sig: 100.0% [57.14σ]  
ModelChiSquare2-sig: 69.3%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [54/54]  
GhostDiagnostic-chr: 5.622  
Centroid-sig: 3.2%  
Centroid-so: 0.112 arcsec [2.27σ]  
OotOffset-rm: 0.020 arcsec [0.24σ]  
KicOffset-rm: 0.070 arcsec [0.77σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 0.41 [7/17]

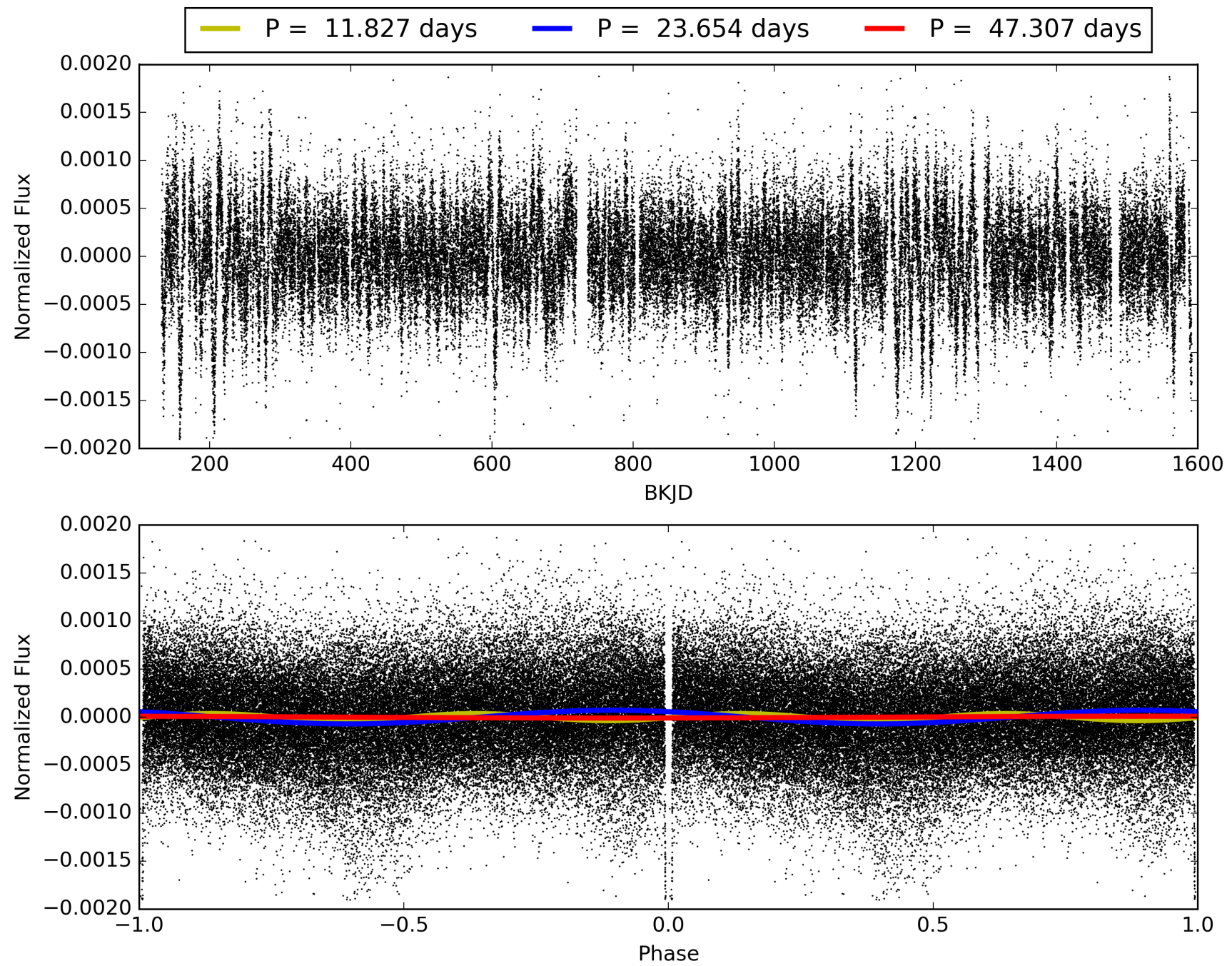
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 12:49:46 Z

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

# TCE 005436502-01, PDC Light Curves



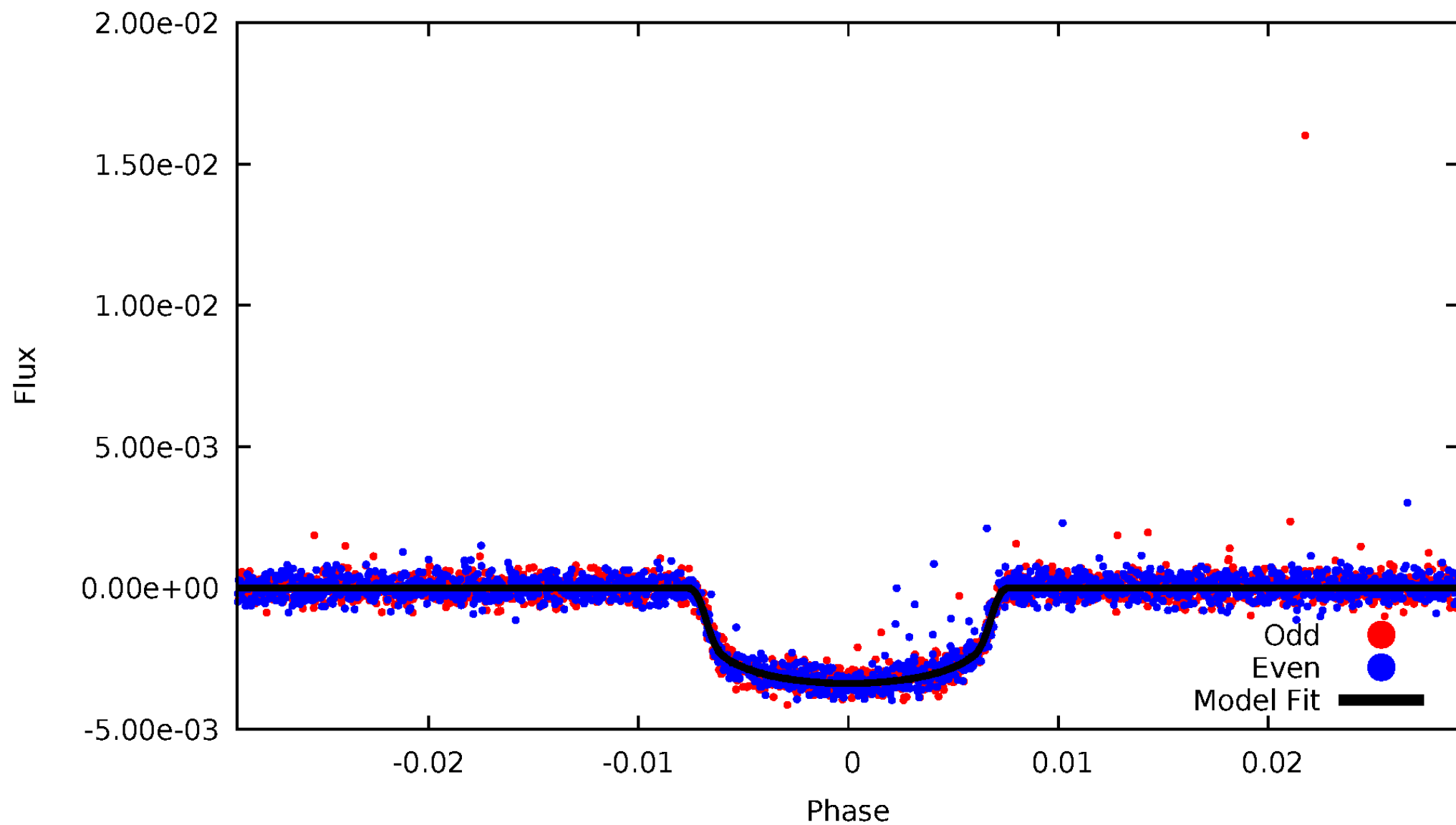
TCE 005436502-01





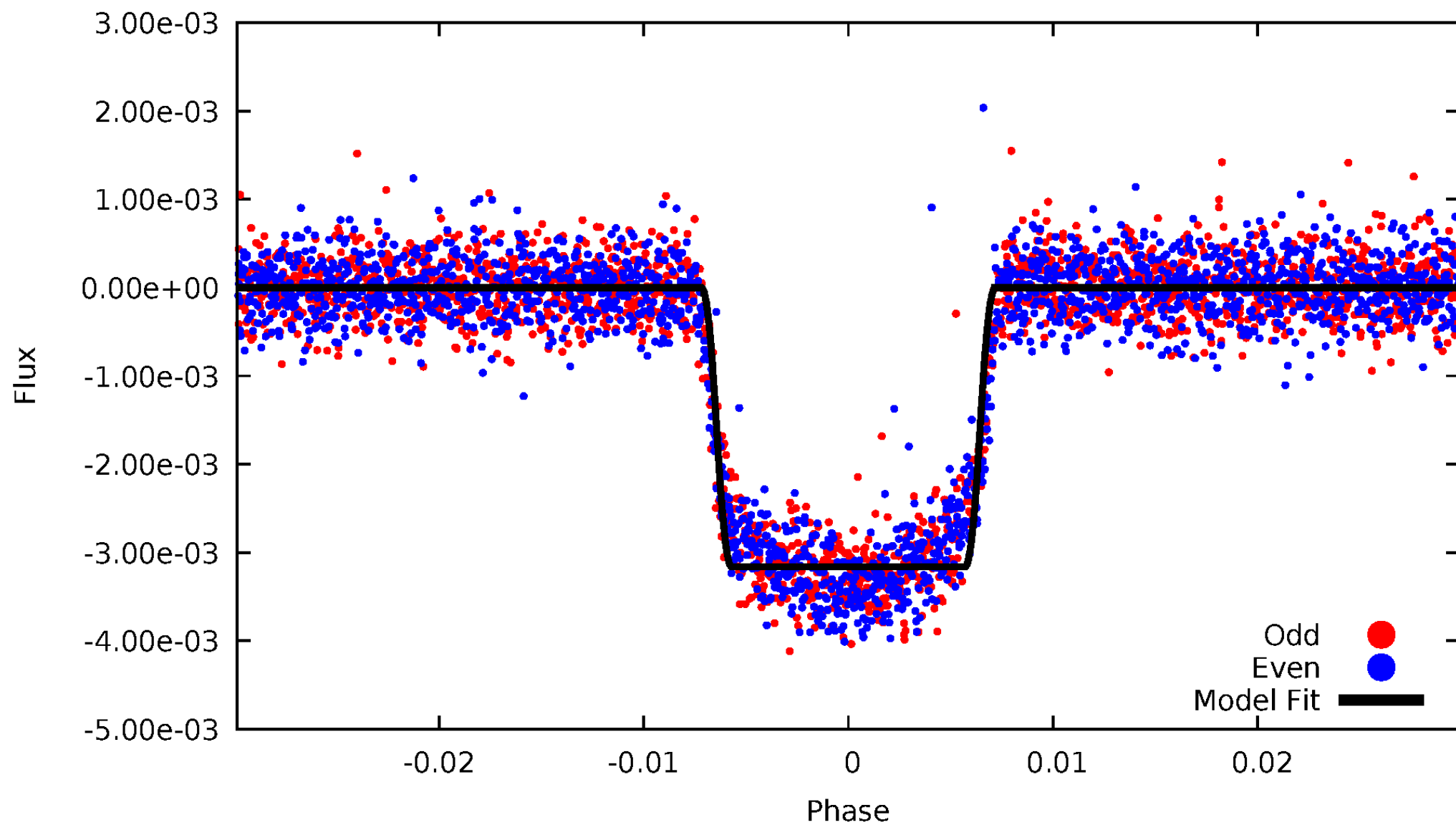
# DV Odd/Even

TCE 005436502-01



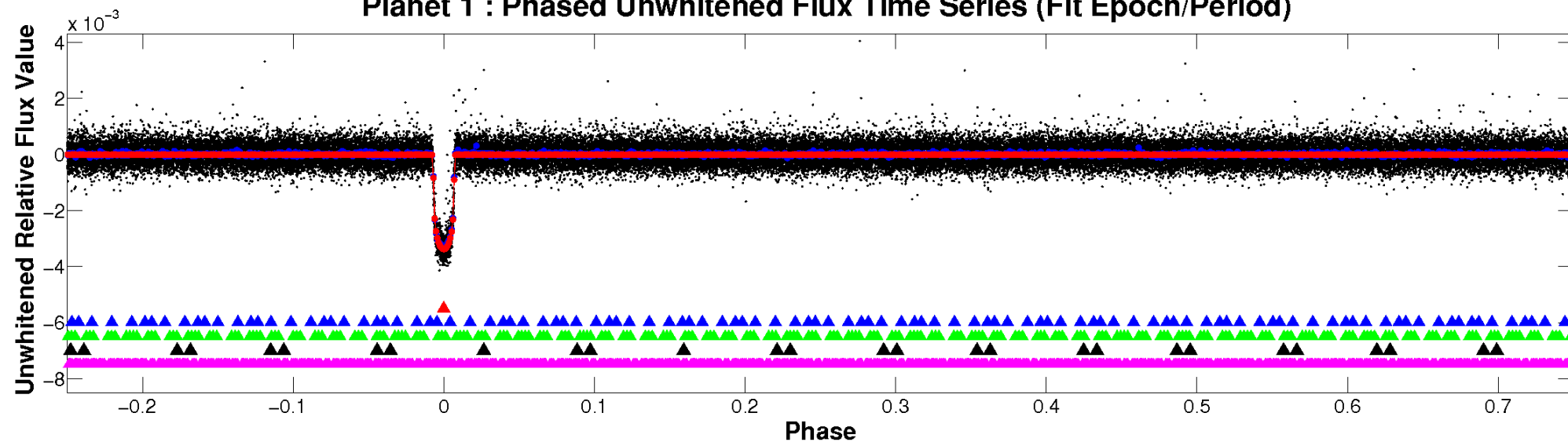
# ALT Odd/Even

TCE 005436502-01

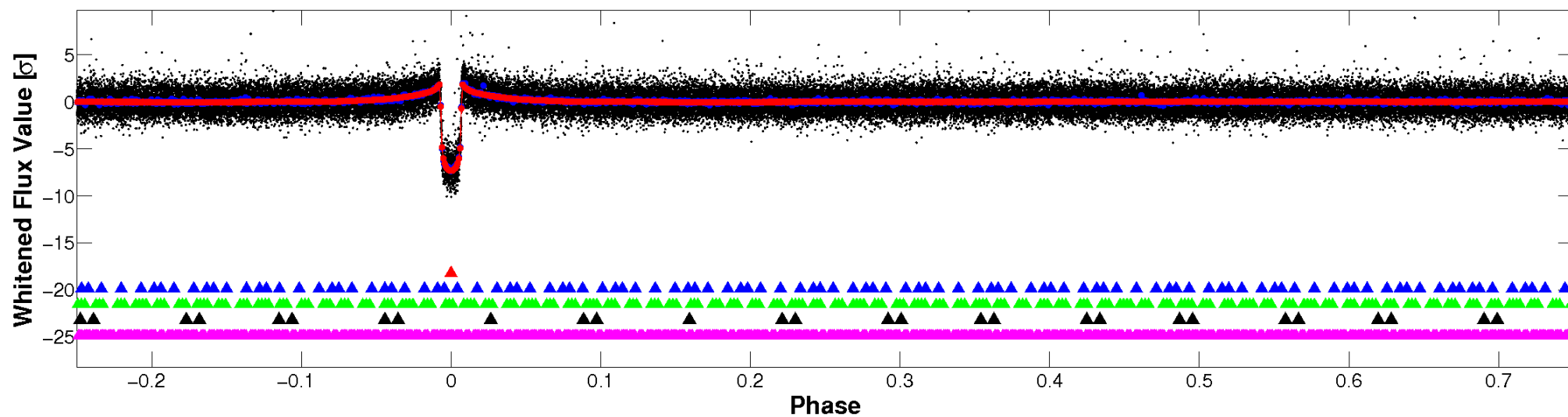


# Non-Whitened Vs. Whitened Light Curve

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

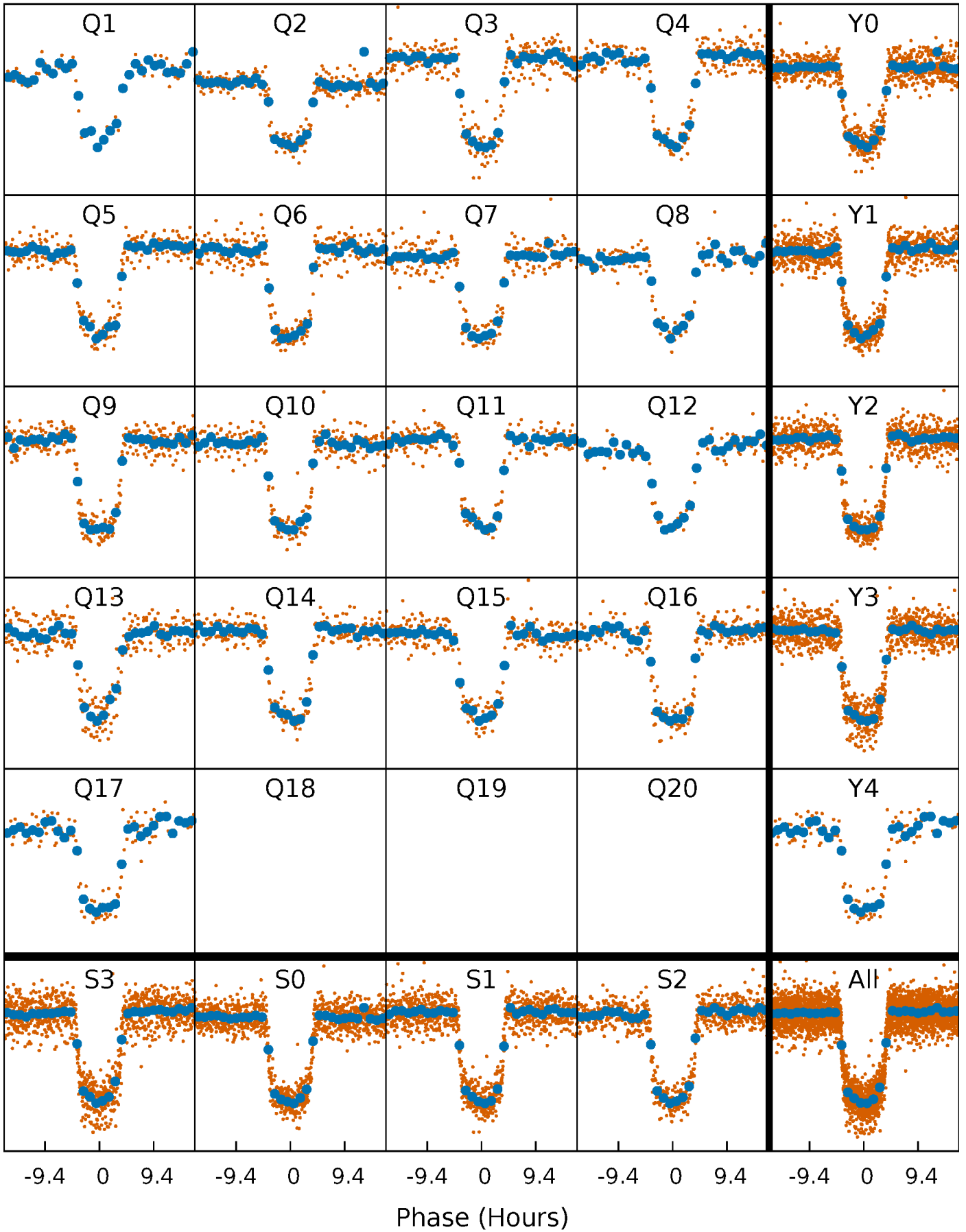


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

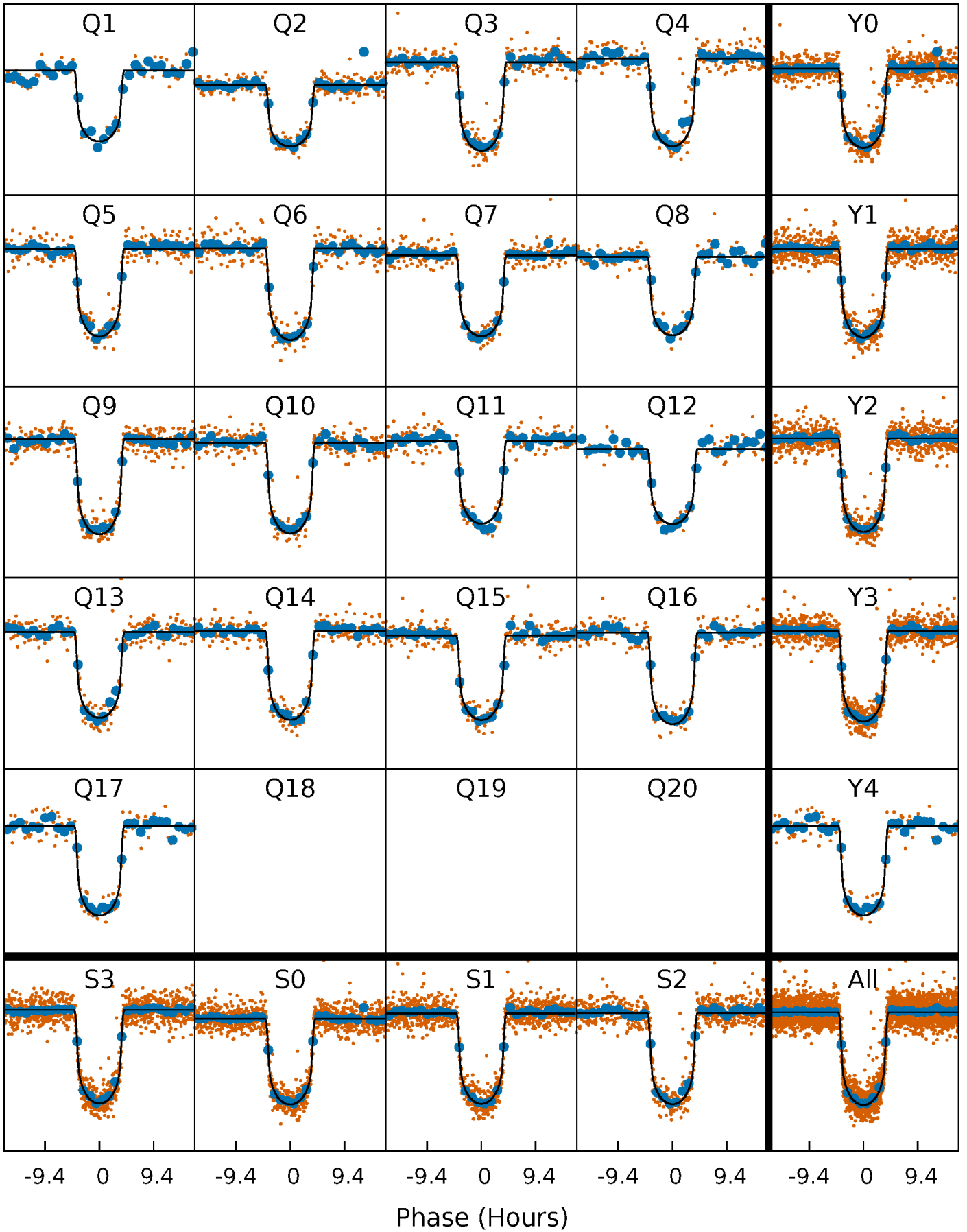
TCE 005436502-01 P= 23.653692 Days  $T_0=147.722190$  (BKJD)





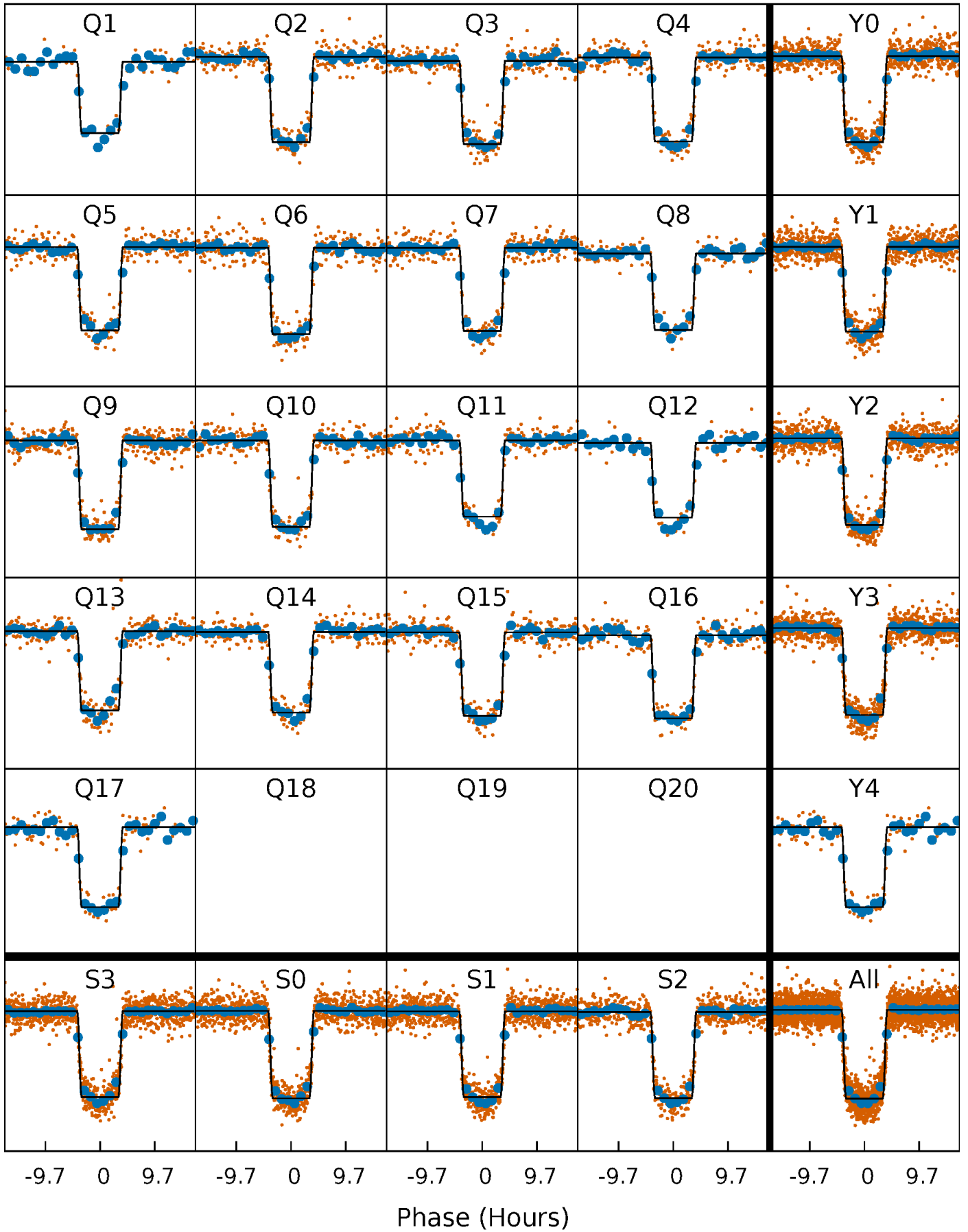
# DV Quarter-Phased Transit Curves

TCE 005436502-01 P= 23.653692 Days  $T_0=147.722190$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

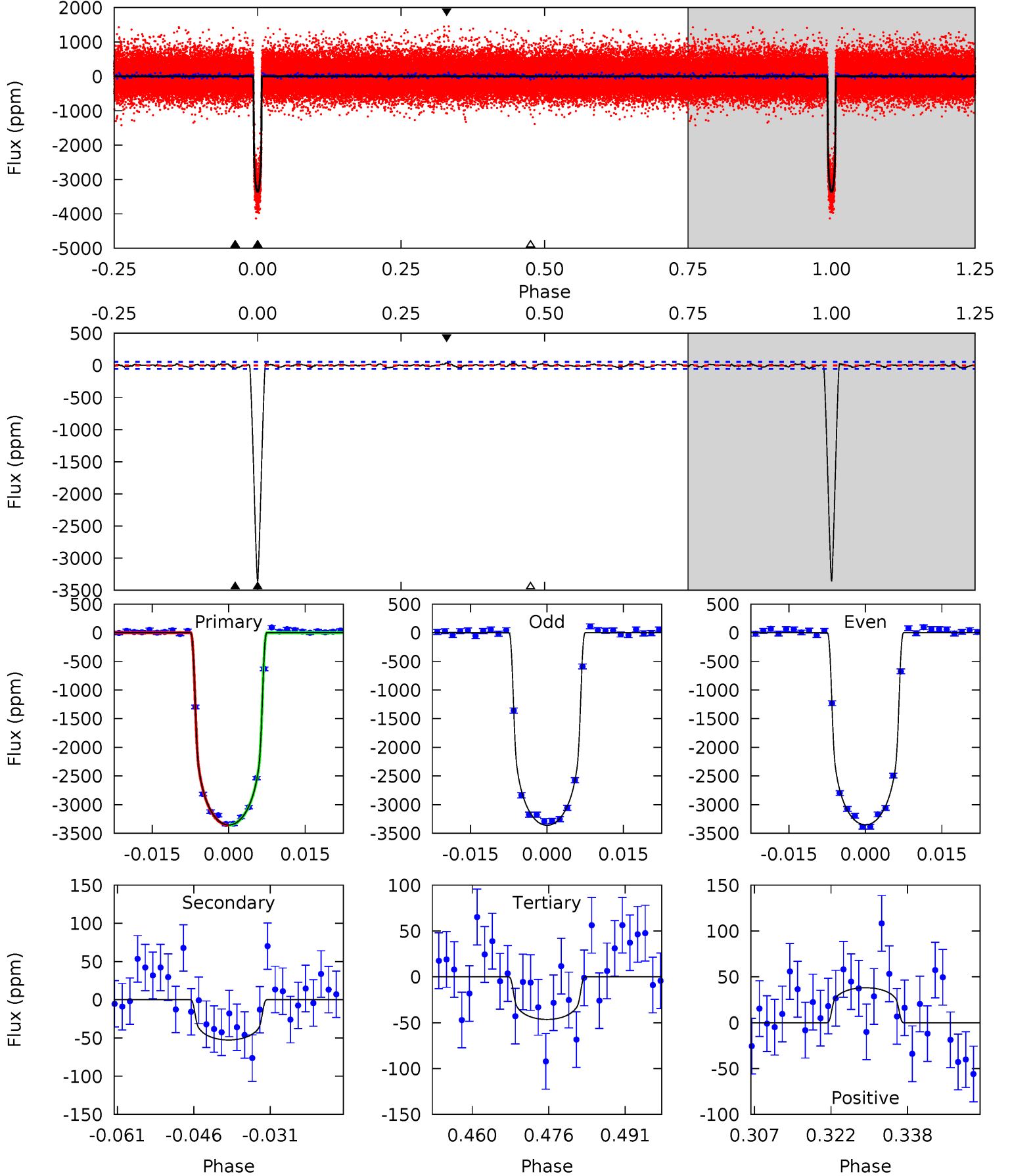
TCE 005436502-01 P= 23.653742 Days  $T_0=147.720168$  (BKJD)



# DV Model-Shift Uniqueness Test

005436502-01, P = 23.653692 Days, E = 124.068498 Days

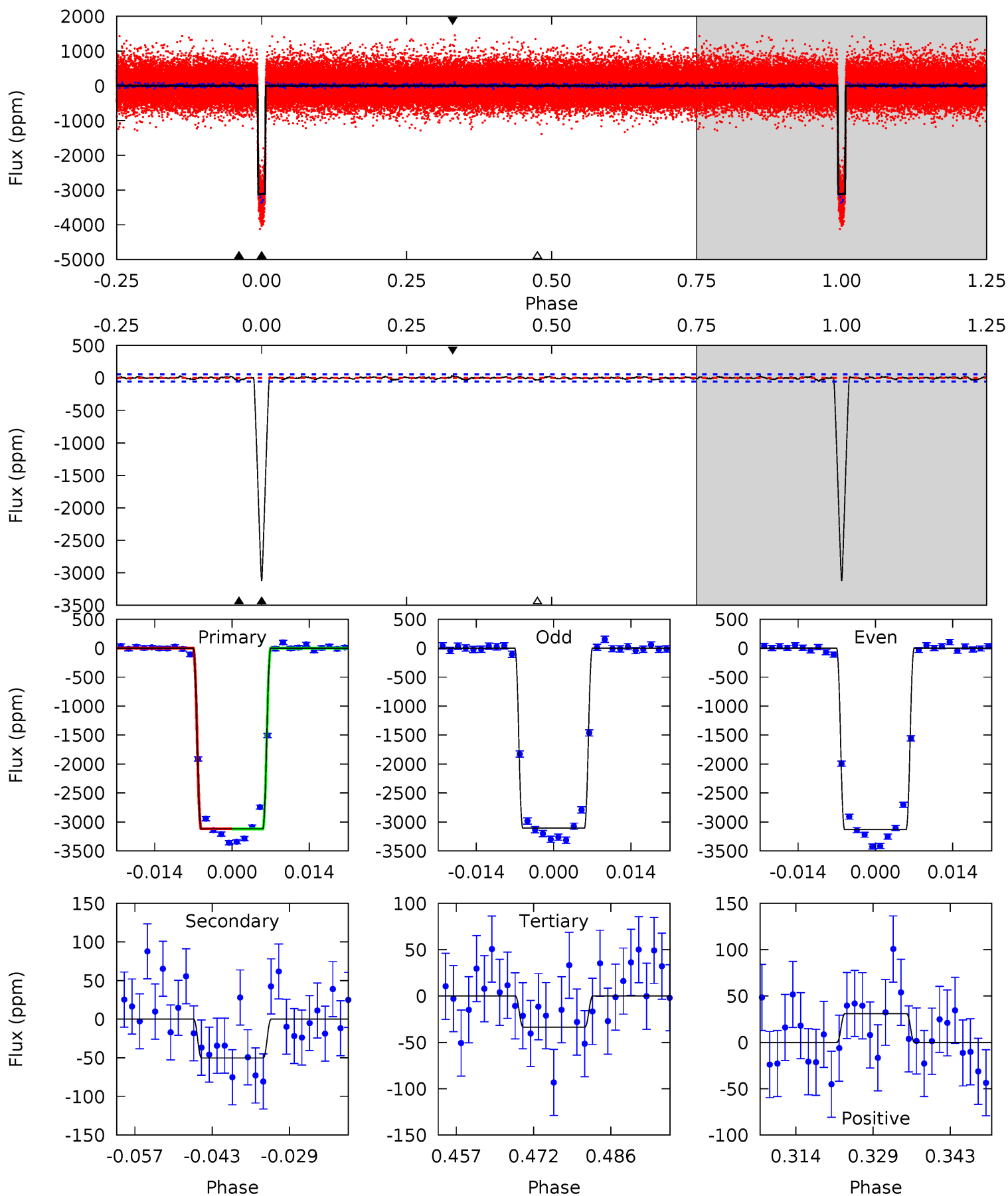
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
307.8	4.83	4.26	3.49	4.94	2.42	1.27	303.5	304.3	0.56	1.33	0.37	0.99	0.01	0.12



# Alt Model-Shift Uniqueness Test

005436502-01, P = 23.653742 Days, E = 124.066426 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
283.2	4.56	3.05	2.82	4.96	2.45	0.98	280.2	280.4	1.51	1.74	1.01	1.01	0.01	0.04





### Stellar Parameters For KIC 005436502

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5739^{+114}_{-103}$	$4.191^{+0.162}_{-0.108}$	$0.300^{+0.100}_{-0.150}$	$1.384^{+0.242}_{-0.266}$	$1.083^{+0.100}_{-0.075}$	$0.576^{+0.460}_{-0.187}$
	+2%/-2%	+4%/-3%	+33%/-50%	+17%/-19%	+9%/-7%	+80%/-33%
Source	SPE58	SPE58	SPE58	DSEP		

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

### Secondary Eclipse Parameters for KIC 005436502-01 / KOI 0834.01

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-53 \pm 11$	$8.04^{+0.83}_{-0.85}$	$1021^{+52}_{-53}$	$2833^{+84}_{-99}$	$12^{+4}_{-3}$
Alt.	$-50 \pm 11$	$8.39^{+0.86}_{-0.88}$	$1018^{+47}_{-61}$	$2777^{+84}_{-97}$	$11^{+4}_{-3}$

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

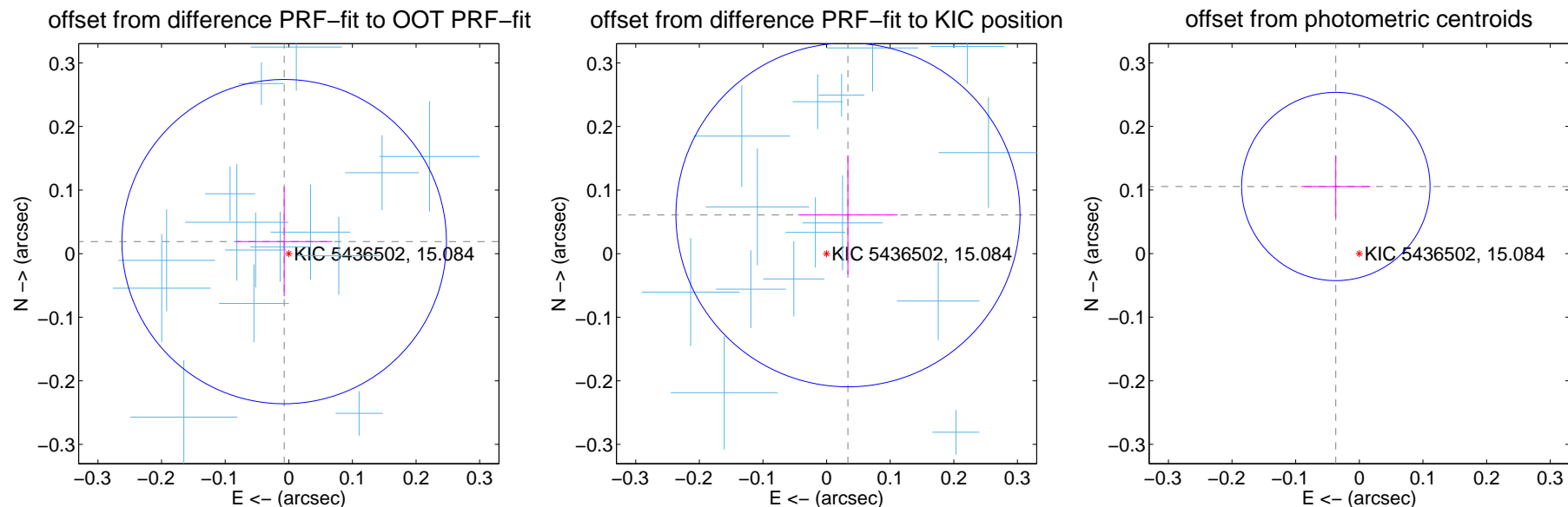
## DV Centroid Data

Supplemental centroid analysis for 005436502-01. Kepler magnitude: 15.08. Transit SNR 191.19

There are 17 quarters with good PRF difference image offsets

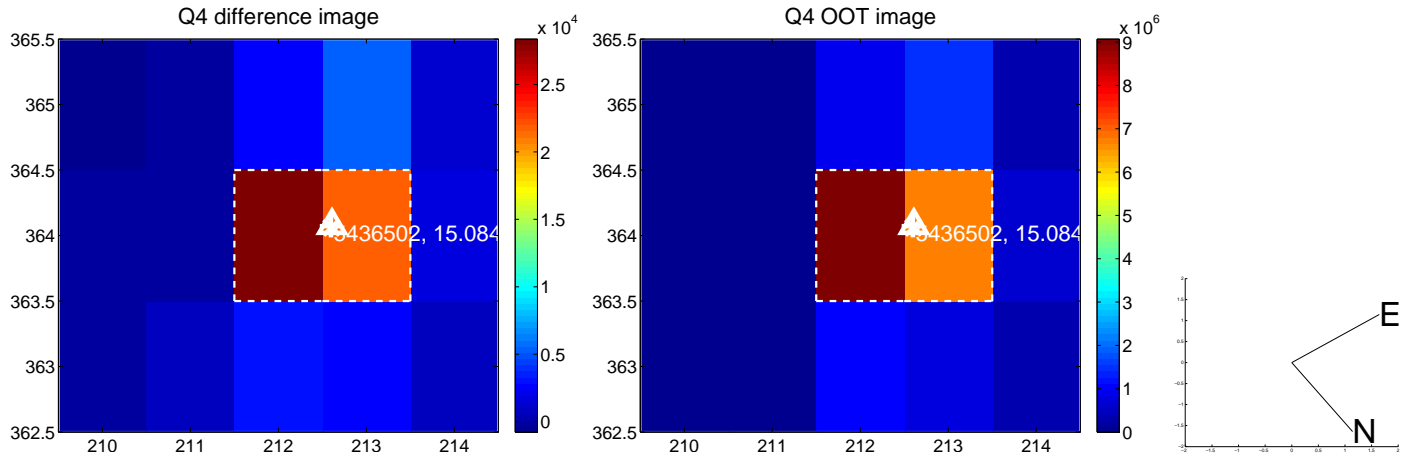
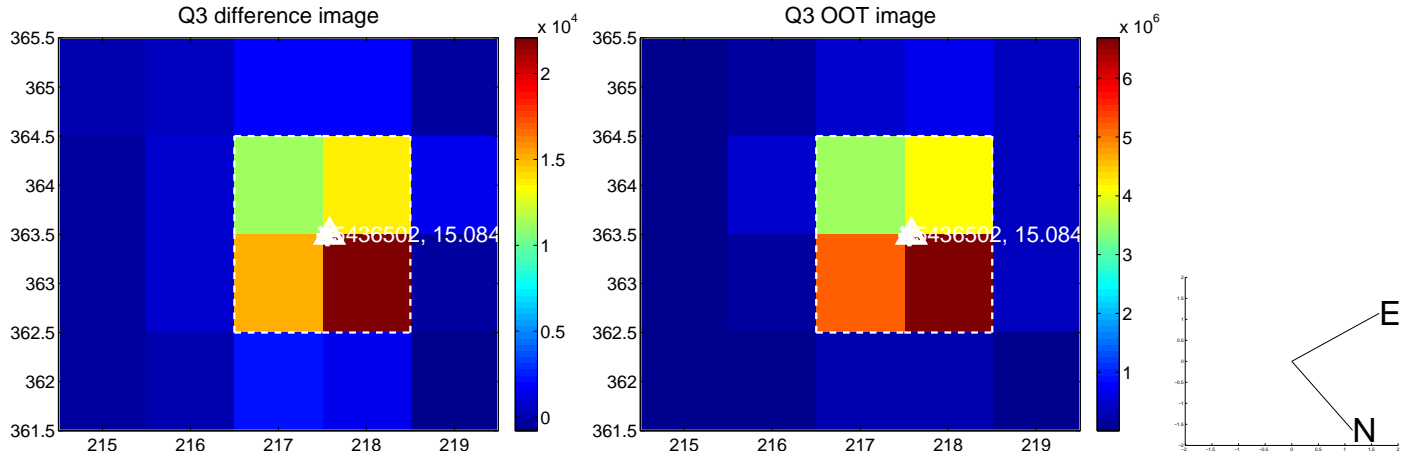
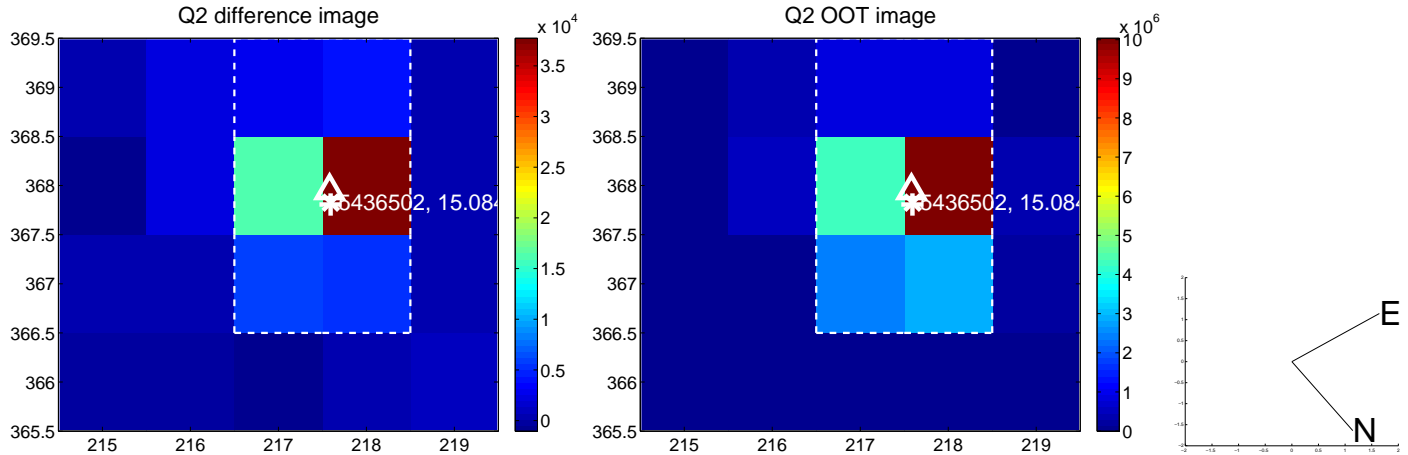
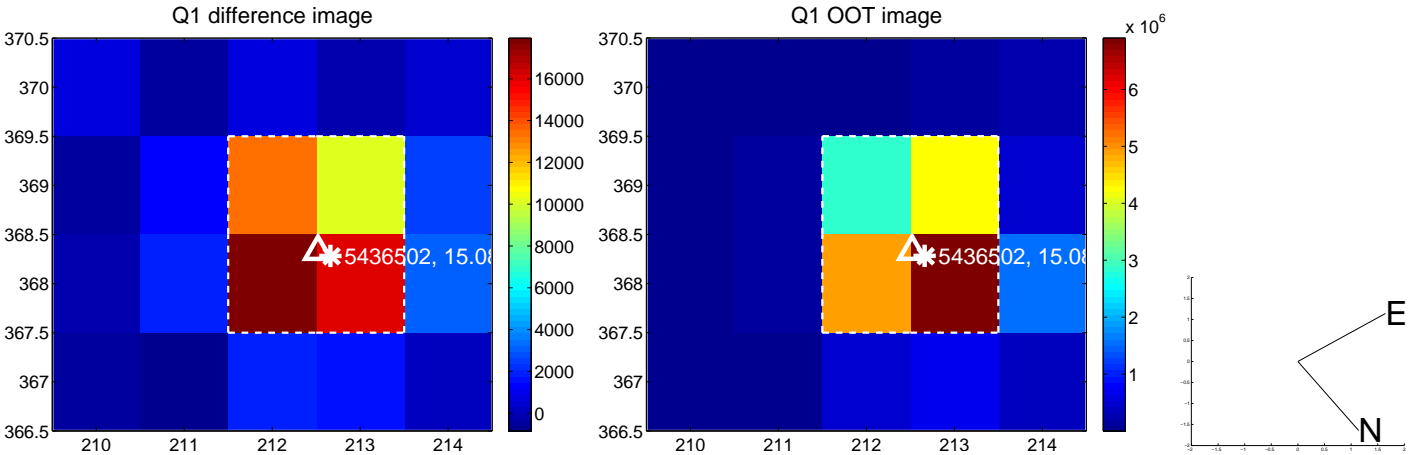
The direct PRF centroid is offset from the target star catalog position by about 0.06 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.020 \pm 0.085$	0.24	$0.007 \pm 0.076$	$0.019 \pm 0.086$
PRF-fit source offset from KIC position	$0.070 \pm 0.090$	0.77	$-0.034 \pm 0.078$	$0.061 \pm 0.094$
photometric centroid source offset	$0.11 \pm 0.05$	2.27	$0.04 \pm 0.05$	$0.11 \pm 0.05$

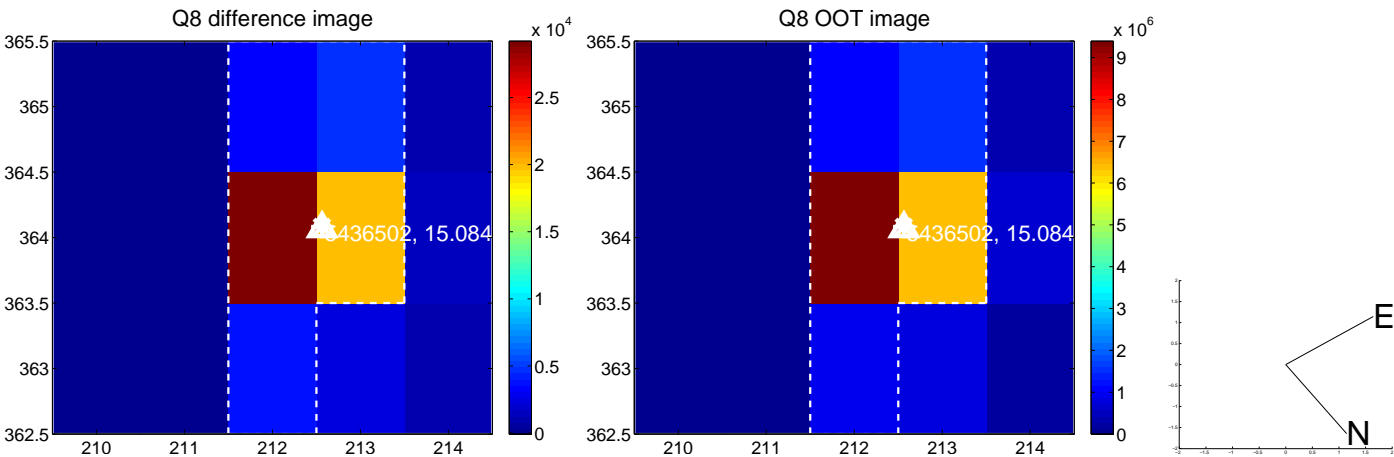
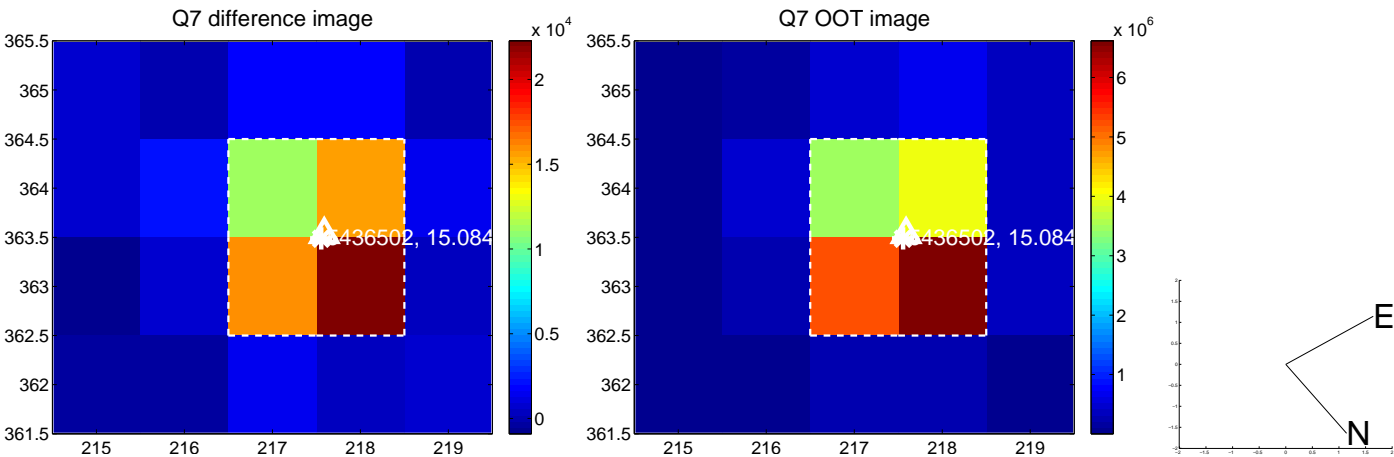
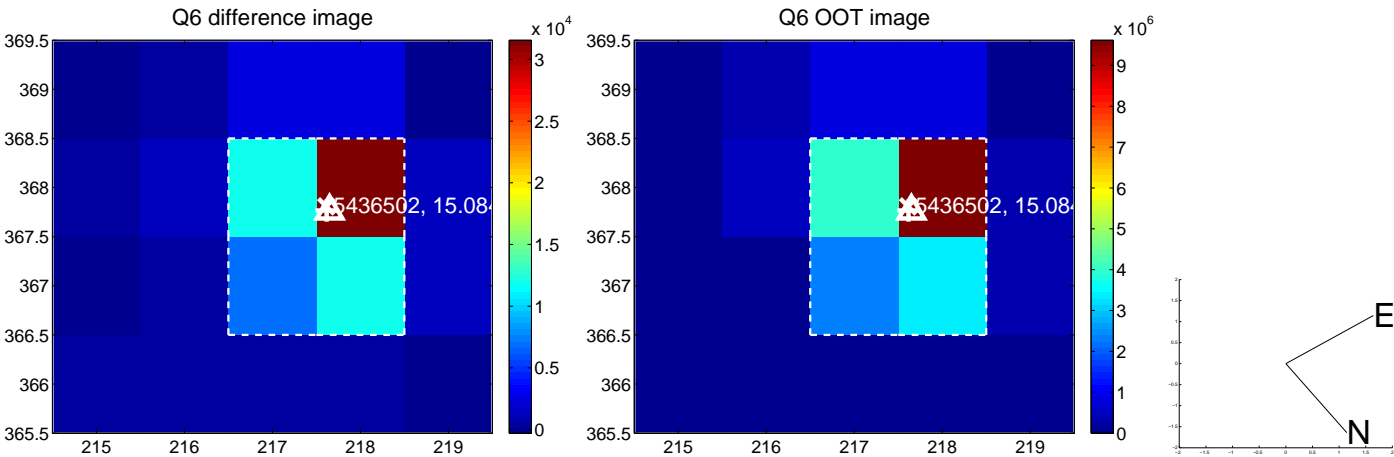
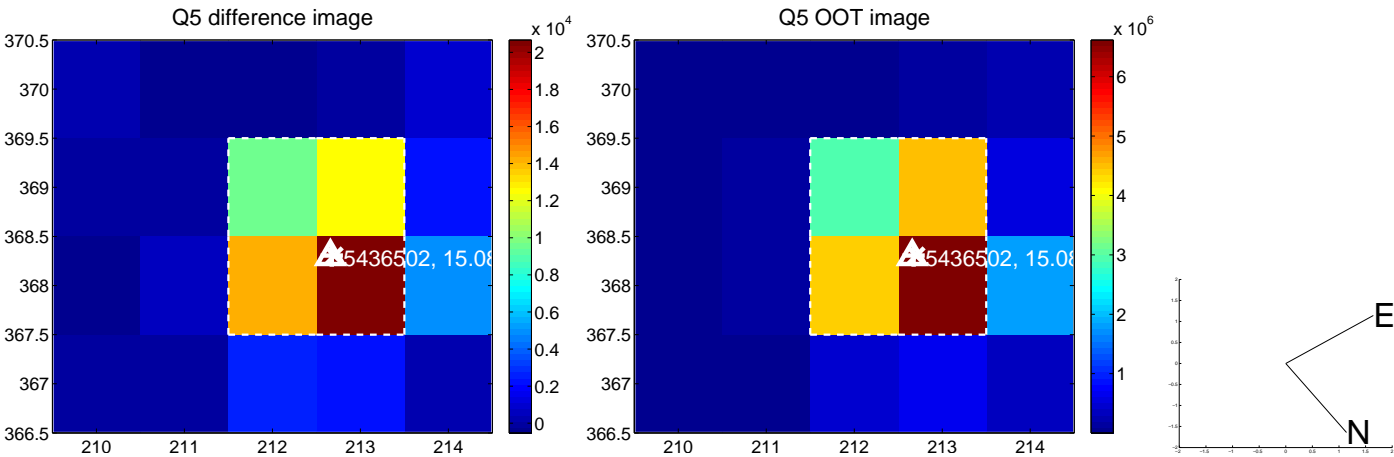


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

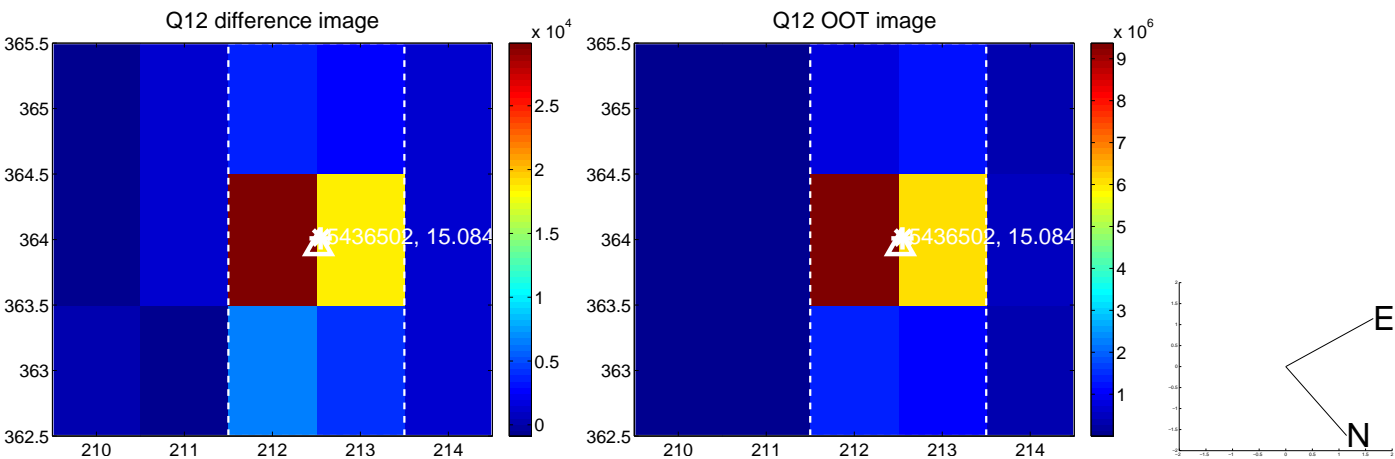
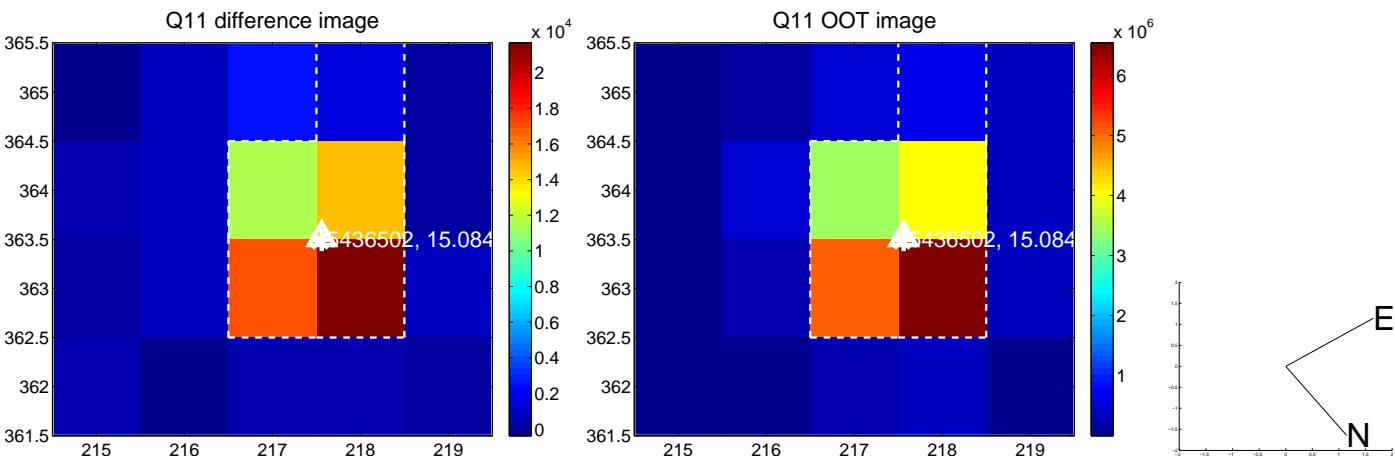
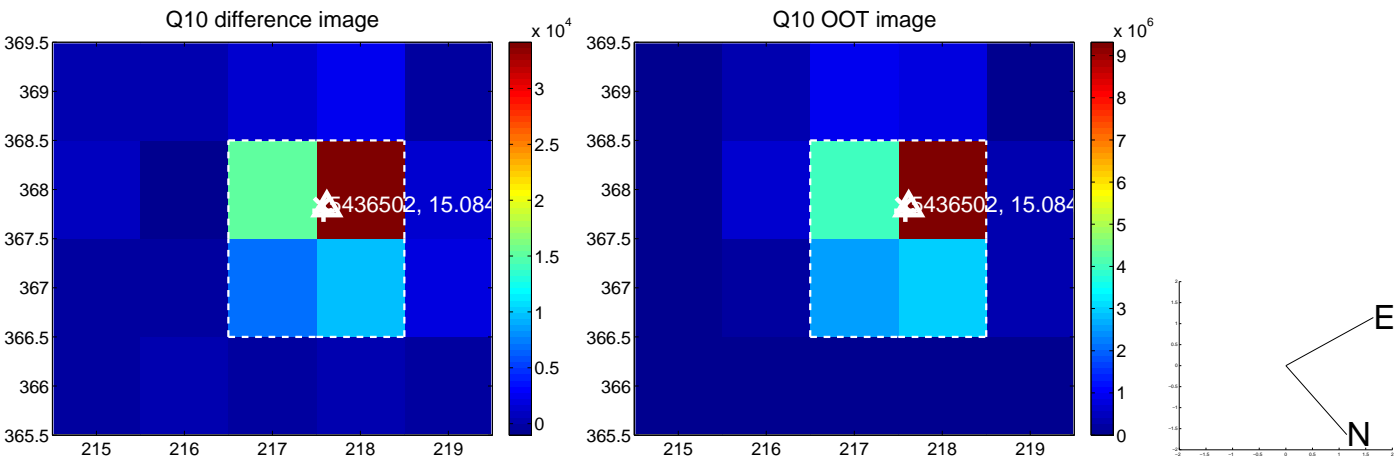
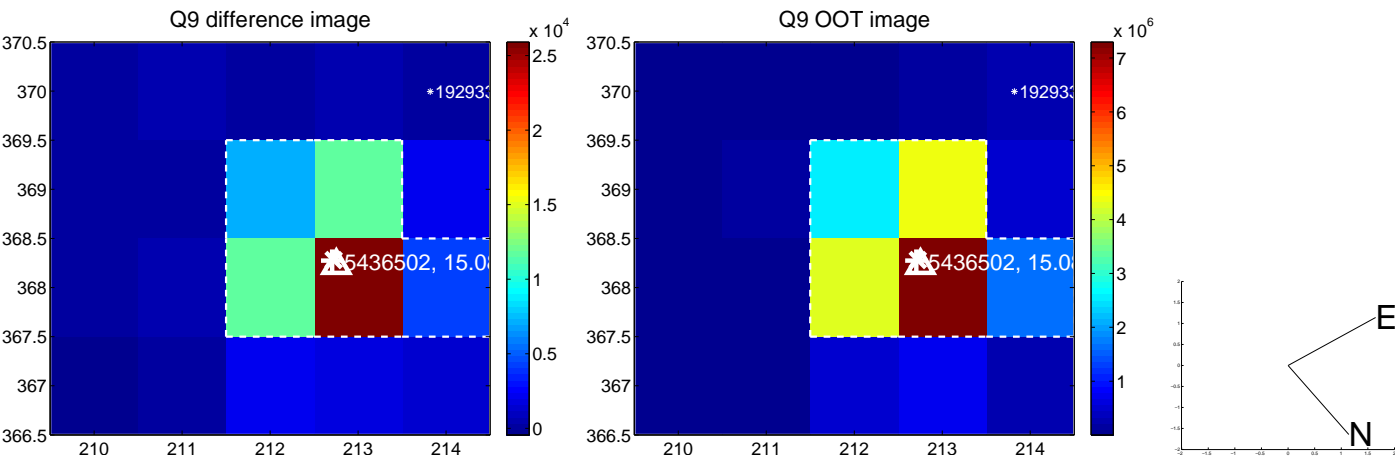


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

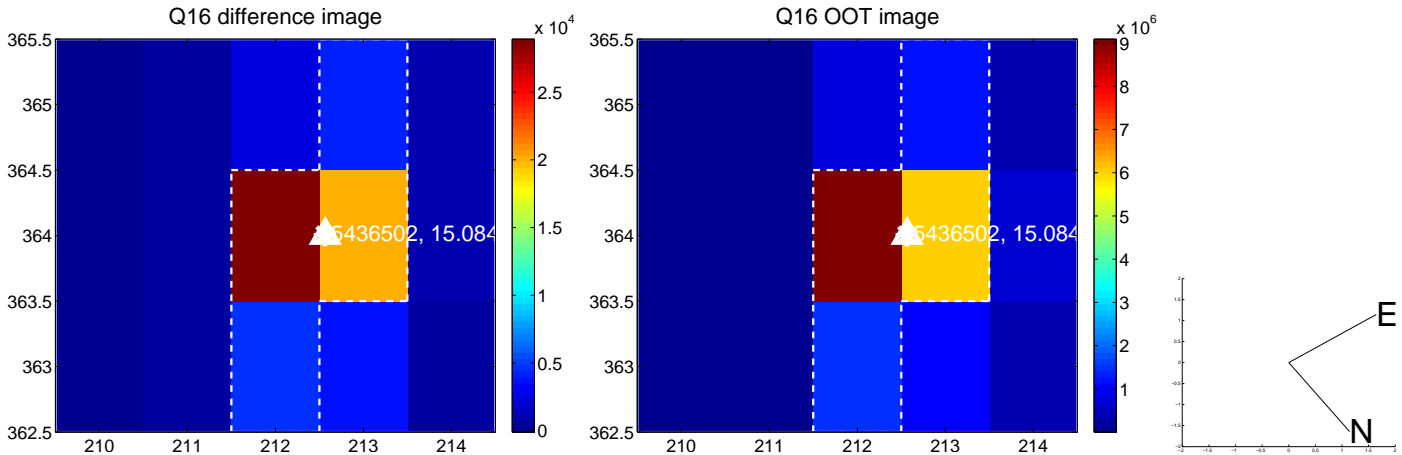
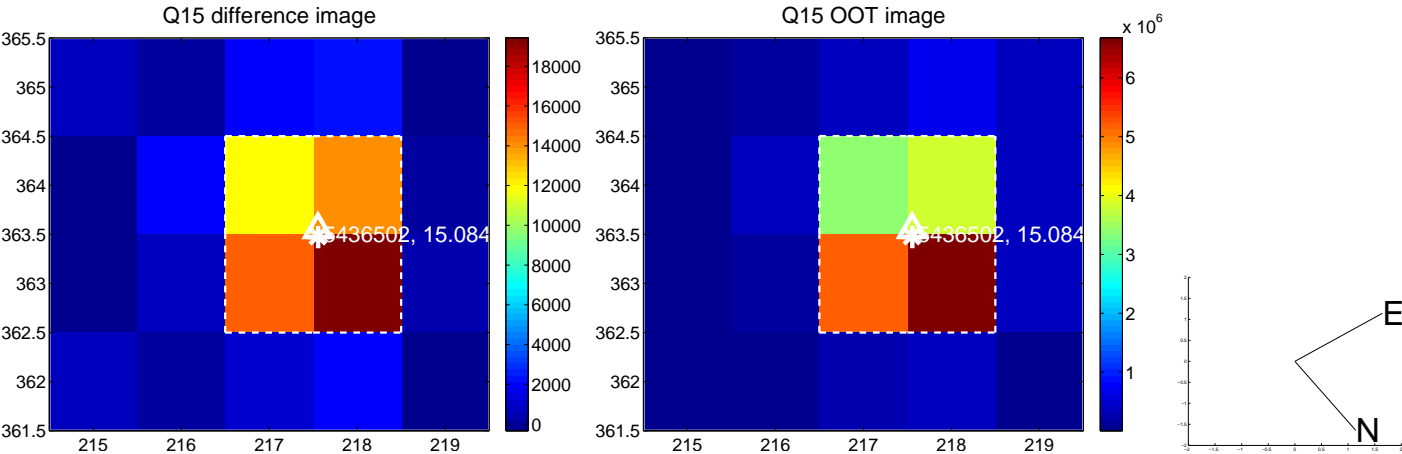
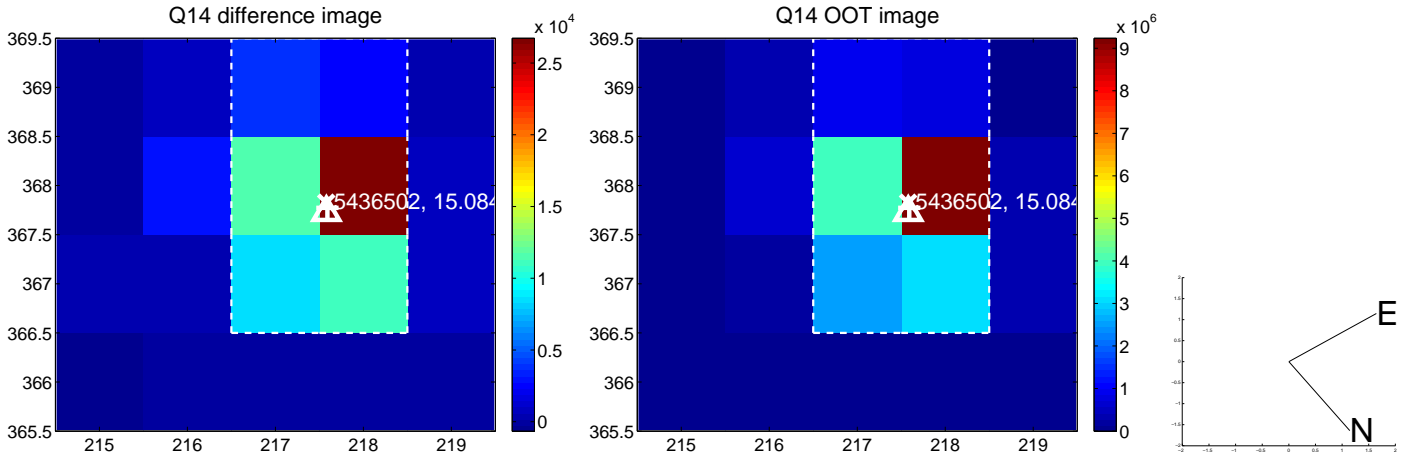
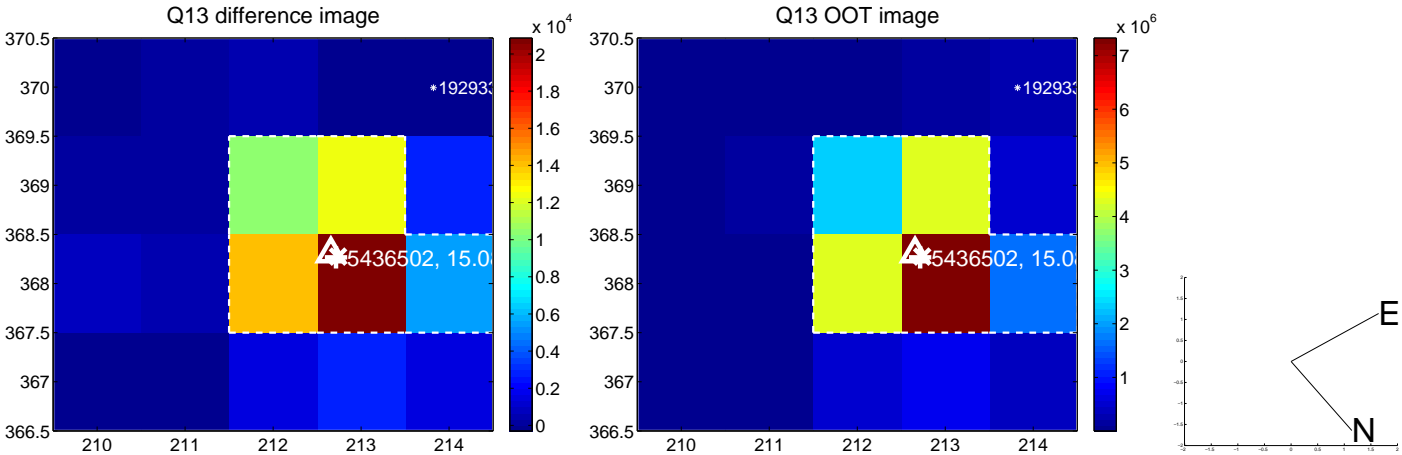




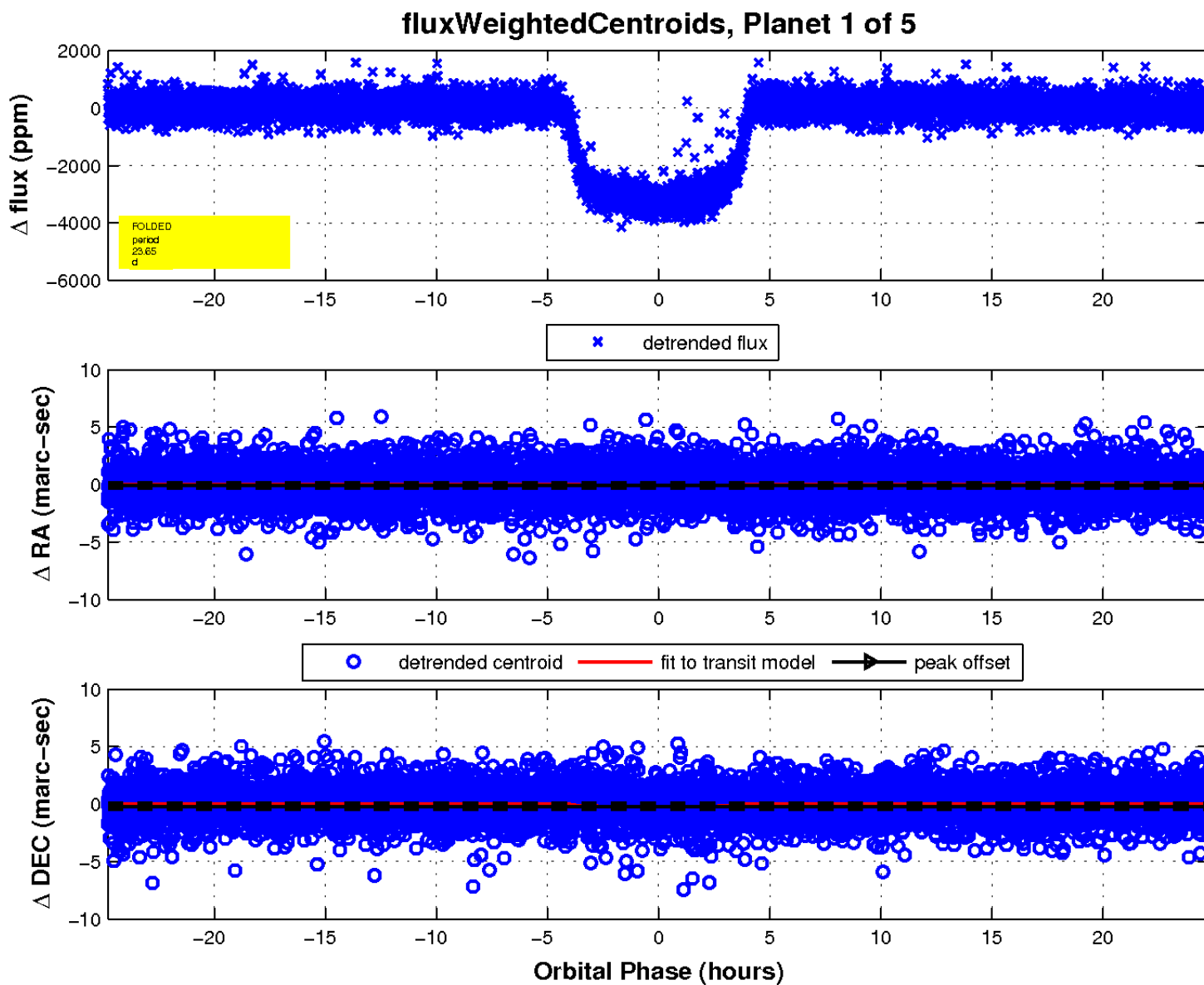
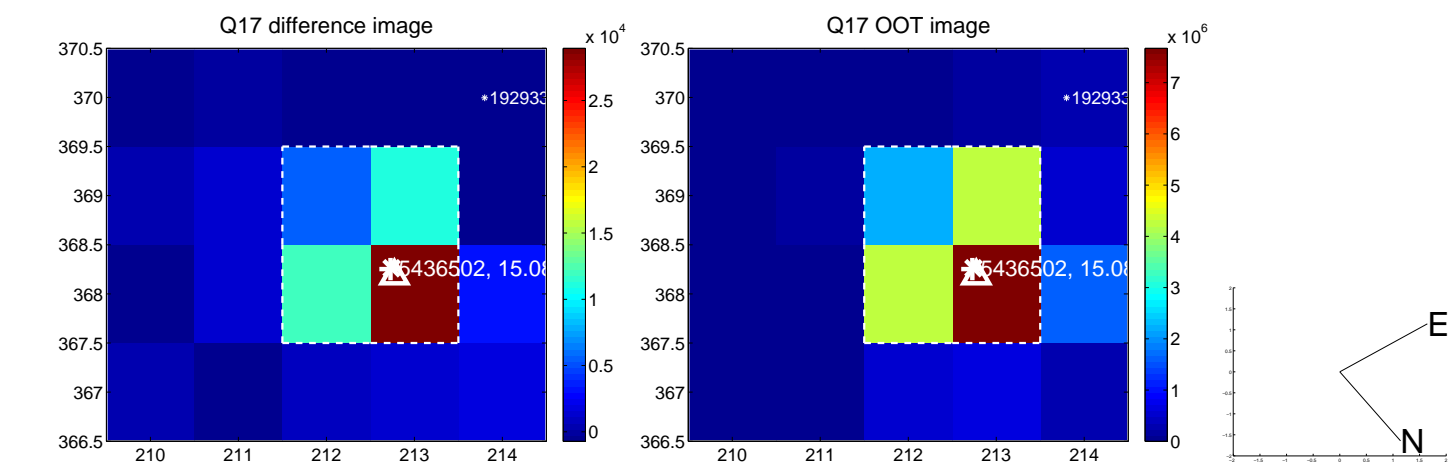
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

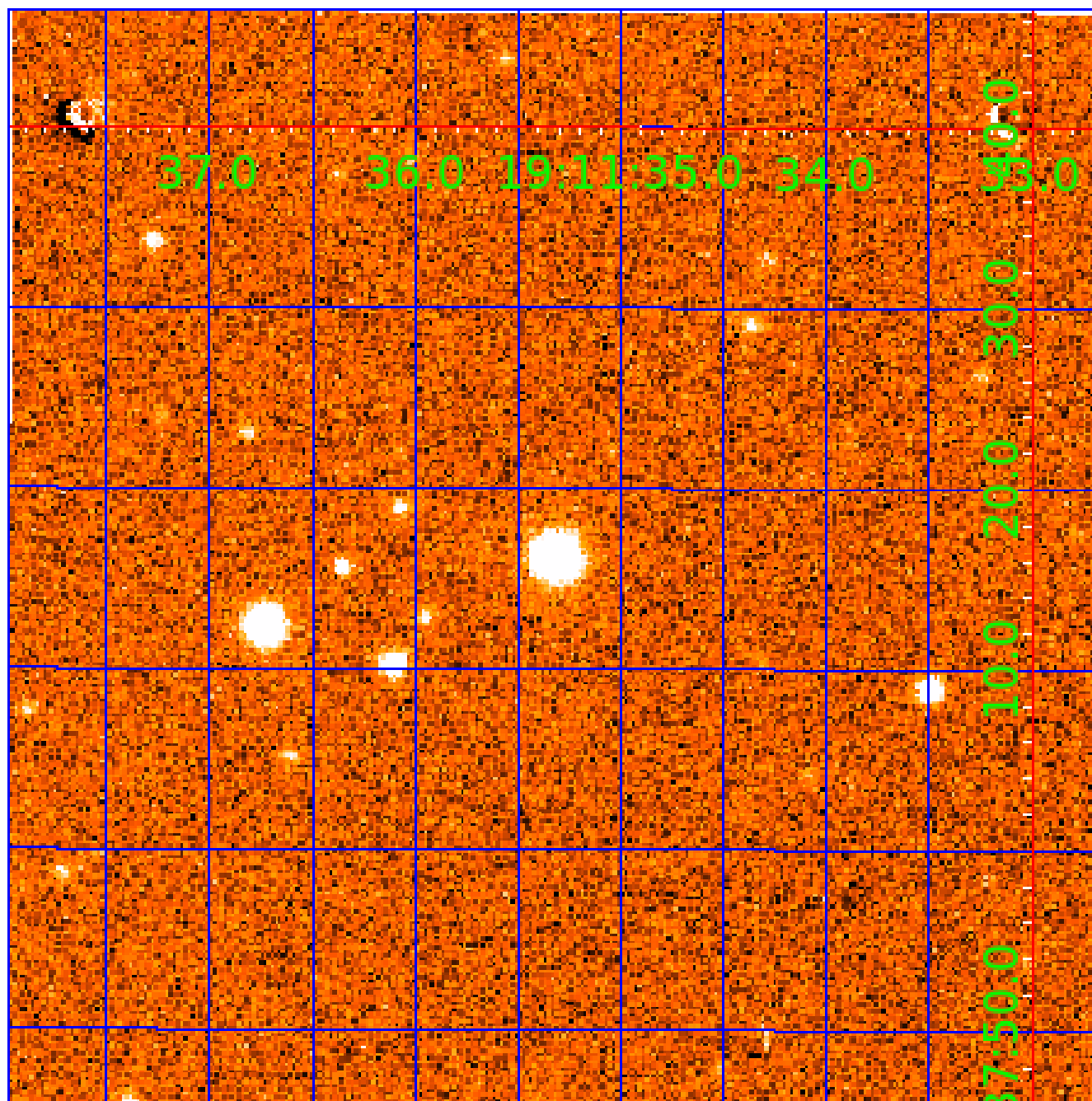


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



# UKIRT Image

Declination



# KIC 005436502

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005436502-01	OBS	0834.01	23.653692	147.722190	3377.2	8.267	188.4	191.2	1.38	5739	8.05	67.78
005436502-02	OBS	0834.02	13.233523	140.323222	503.0	6.992	34.3	37.0	1.38	5739	3.44	147.04
005436502-03	OBS	0834.03	6.155685	134.808570	276.3	5.405	26.3	27.6	1.38	5739	2.83	407.97
005436502-04	OBS	0834.05	50.447402	178.491327	405.1	7.636	15.2	15.7	1.38	5739	3.17	24.69
005436502-05	OBS	0834.04	2.090786	132.090330	110.1	3.505	14.9	15.7	1.38	5739	1.73	1721.54

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005436502-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
005436502-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT
005436502-03	OBS	PC	1.00	0	0	0	0	NO_COMMENT
005436502-04	OBS	PC	0.99	0	0	0	0	NO_COMMENT
005436502-05	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.

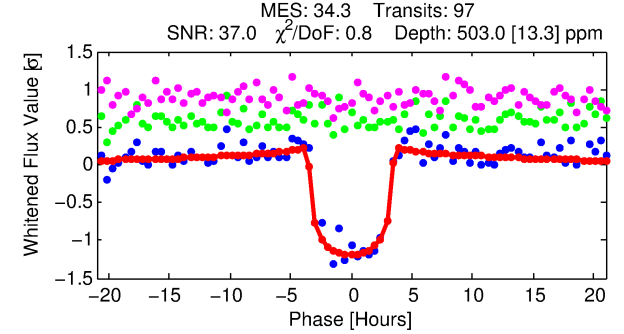
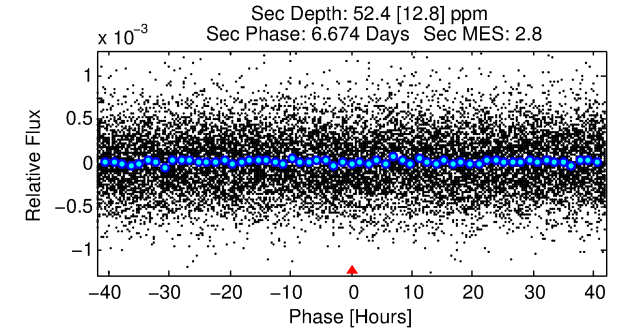
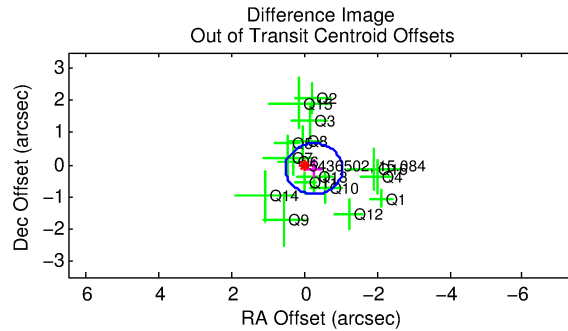
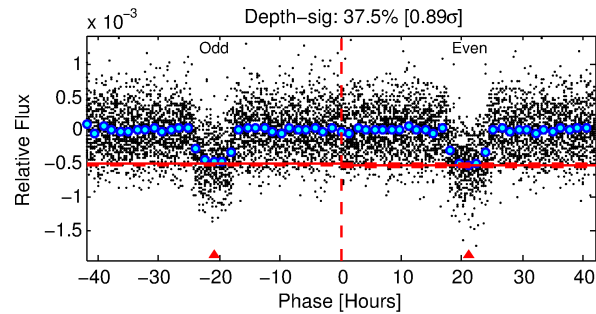
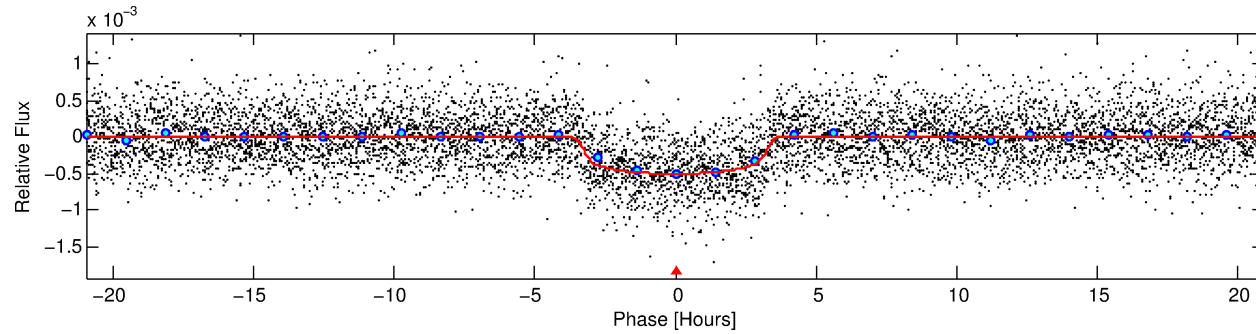
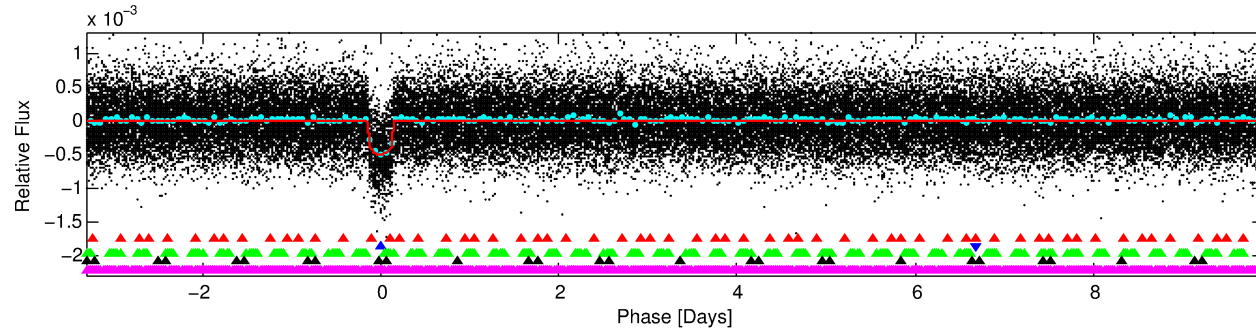
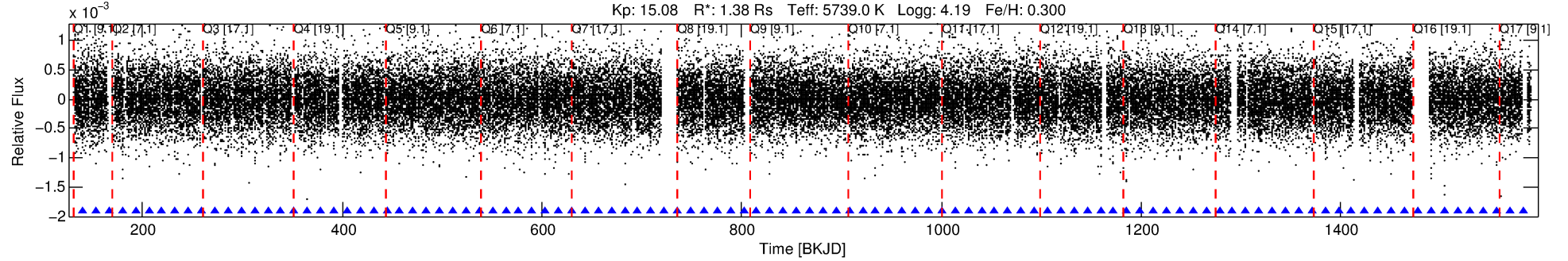
## Ephemeris Match Information For 005436502-02

No Significant Match Found

# DV One-Page Summary

KIC: 5436502 Candidate: 2 of 5 Period: 13.234 d  
KOI: K00834.02 Name: Kepler-238d Corr: 0.982

Kp: 15.08 R\*: 1.38 Rs Teff: 5739.0 K Logg: 4.19 Fe/H: 0.300



## DV Fit Results:

Period = 13.23352 [0.00005] d  
Epoch = 140.3232 [0.0032] BKJD  
Rp/R\* = 0.0228 [0.0024]  
a/R\* = 9.37 [4.13]  
b = 0.79 [0.21]  
Seff = 147.04 [42.76]  
Teq = 888 [65] K  
Rp = 3.44 [0.75] Re  
a = 0.1125 [0.0201] AU  
Ag = 30.85 [13.18] [2.26σ]  
Teffp = 3235 [269] K [8.49σ]

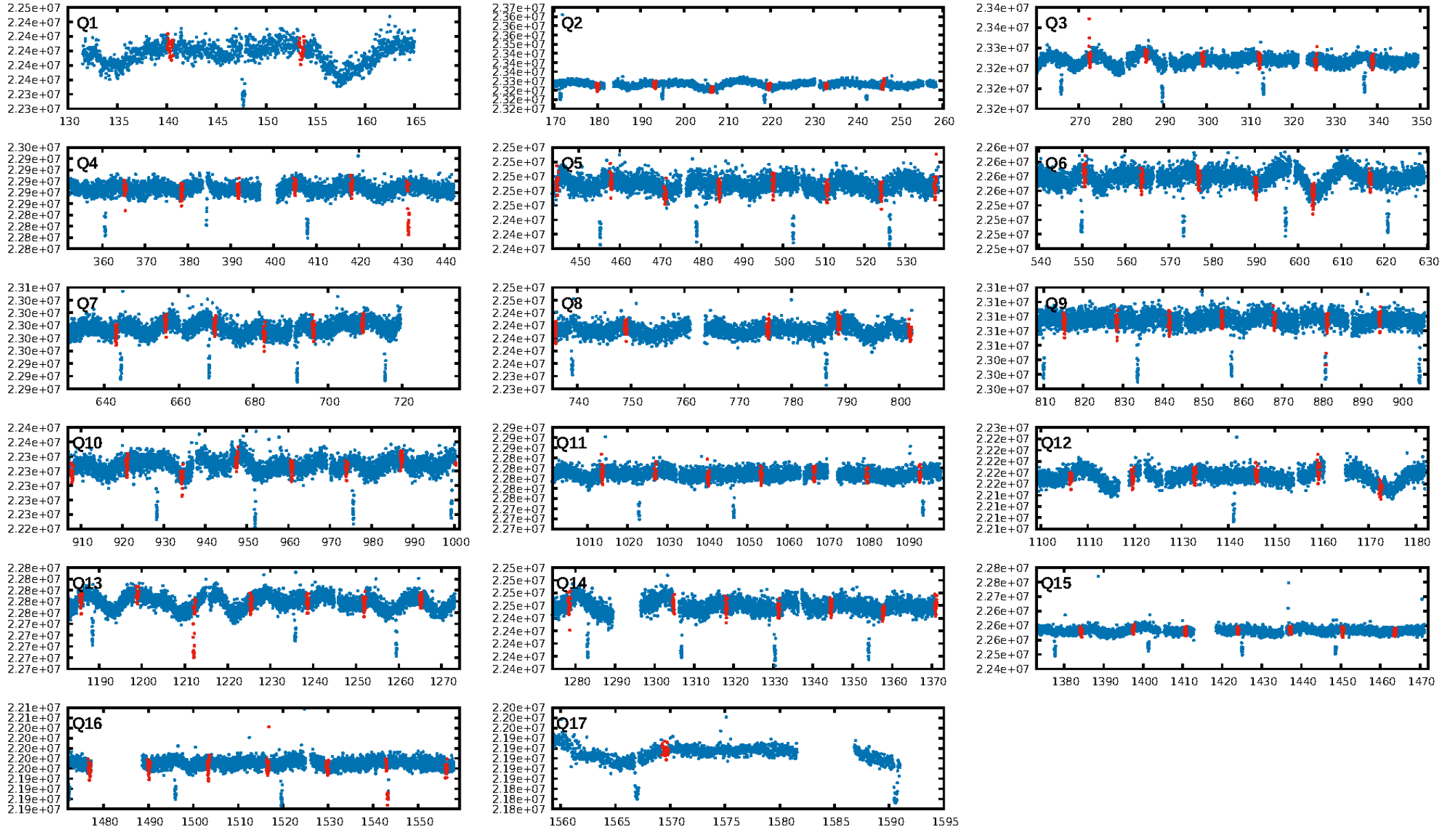
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [19.22σ]  
LongPeriod-sig: 100.0% [23.10σ]  
ModelChiSquare2-sig: 99.9%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 1.46e-242  
RollingBand-fgt: 1.00 [94/94]  
GhostDiagnostic-chr: 3.688  
Centroid-sig: 5.5%  
Centroid-so: 0.477 arcsec [1.63σ]  
OotOffset-rm: 0.290 arcsec [1.10σ]  
KicOffset-rm: 0.330 arcsec [1.27σ]  
OotOffset-st: 4/4/4/4 [16]  
KicOffset-st: 4/4/4/4 [16]  
DiffImageQuality-fgm: 1.00 [16/16]  
DiffImageOverlap-fno: 0.82 [14/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 12:49:53 Z

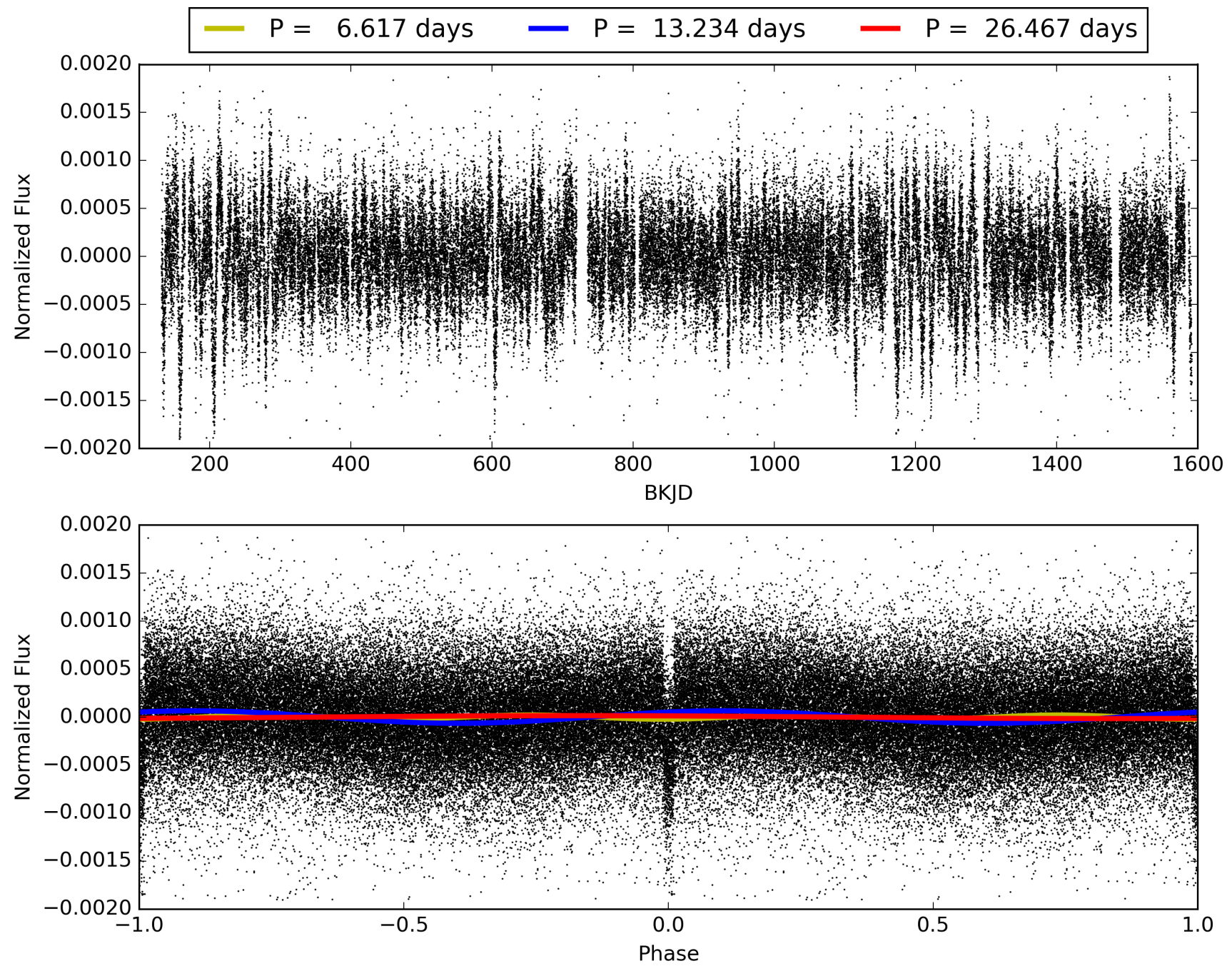
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 005436502-02, PDC Light Curves





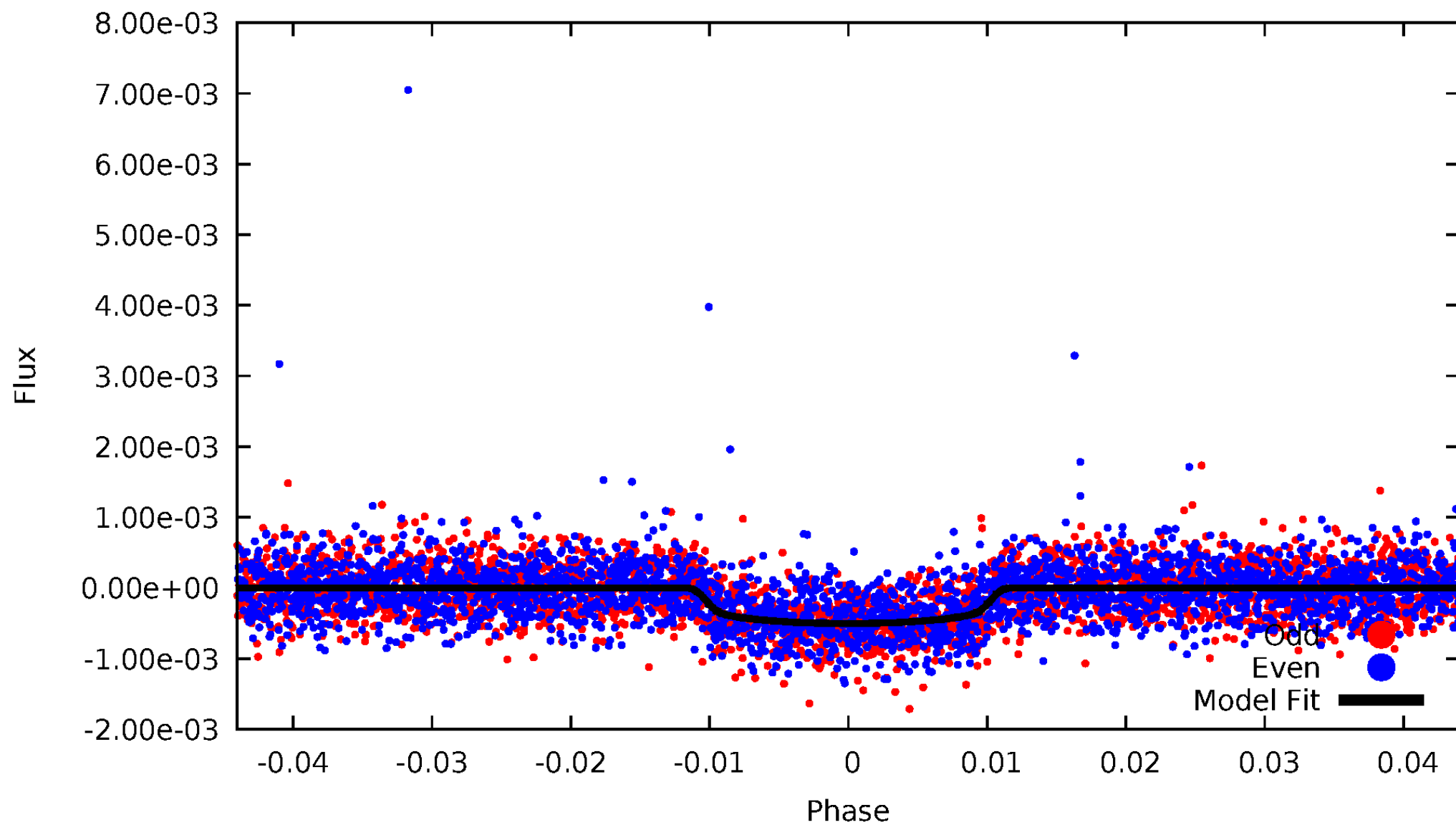
# TCE 005436502-02





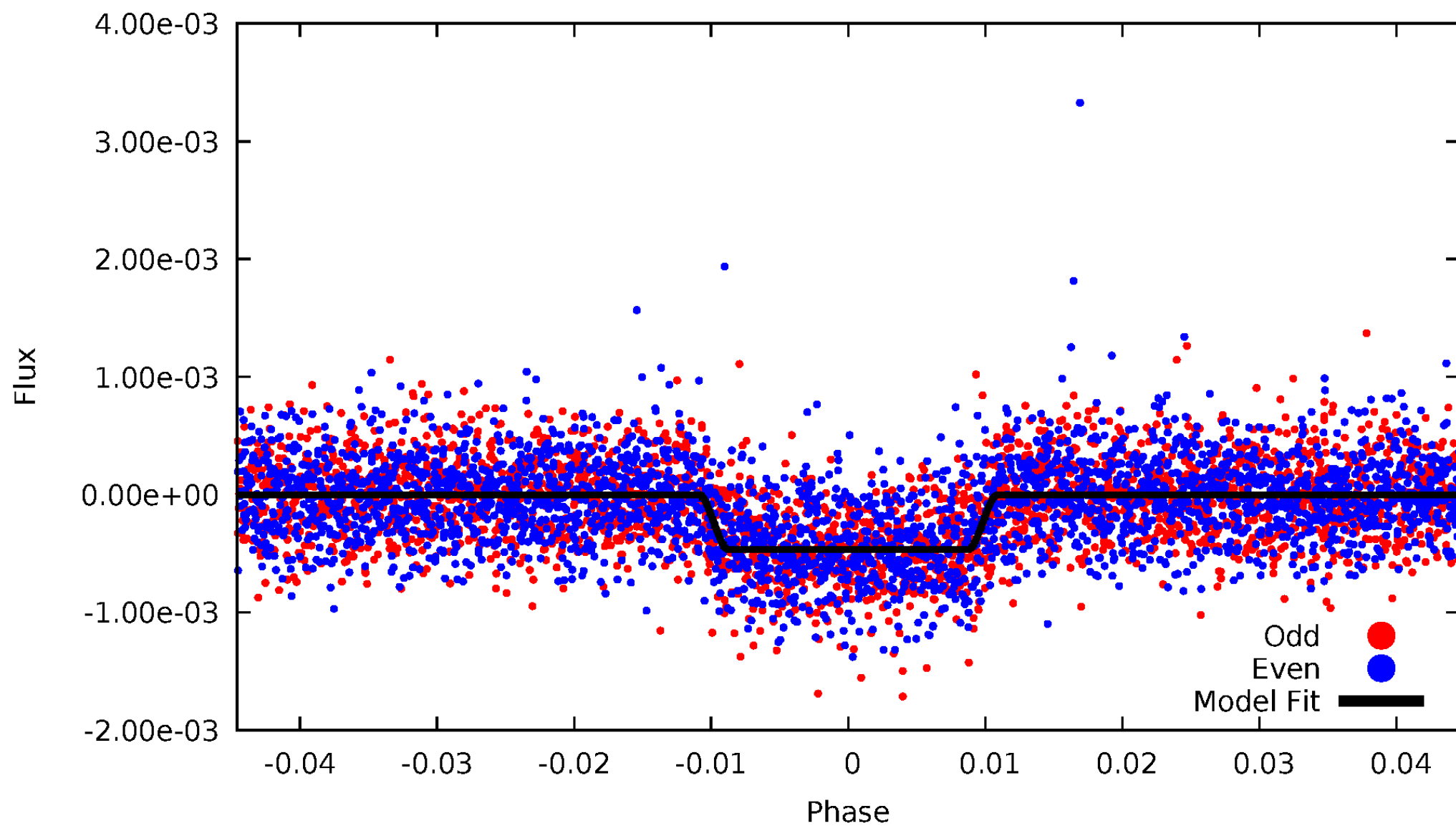
# DV Odd/Even

TCE 005436502-02



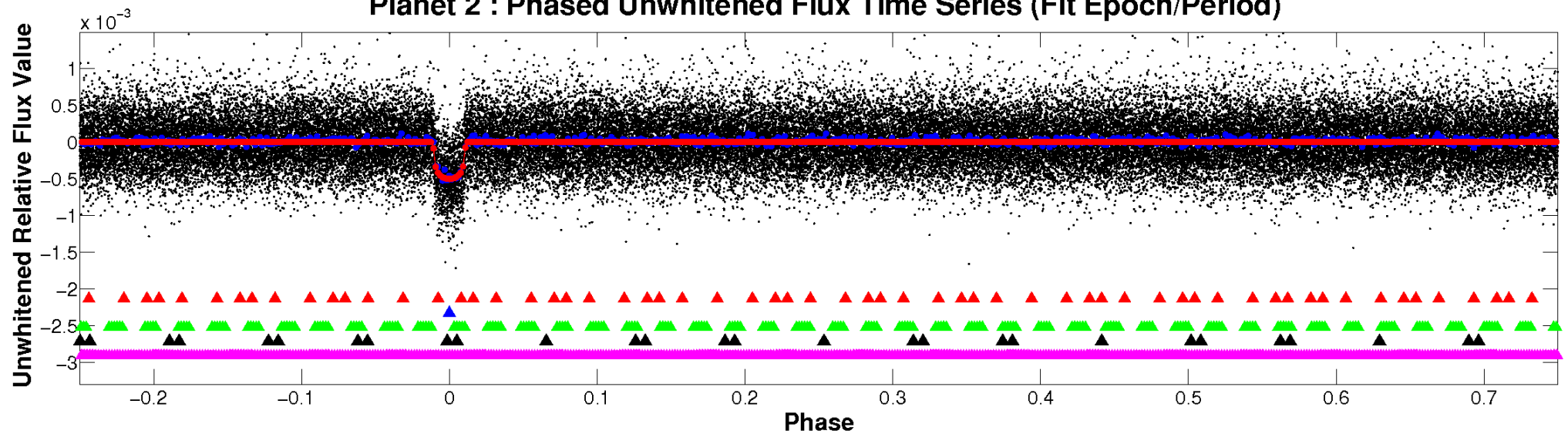
# ALT Odd/Even

TCE 005436502-02

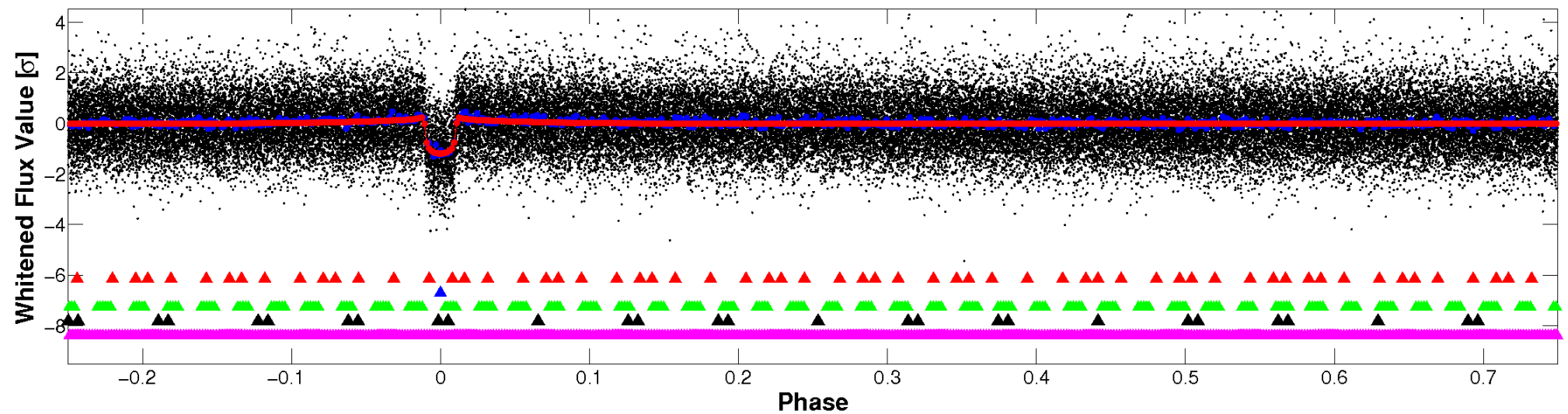


# Non-Whitened Vs. Whitened Light Curve

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

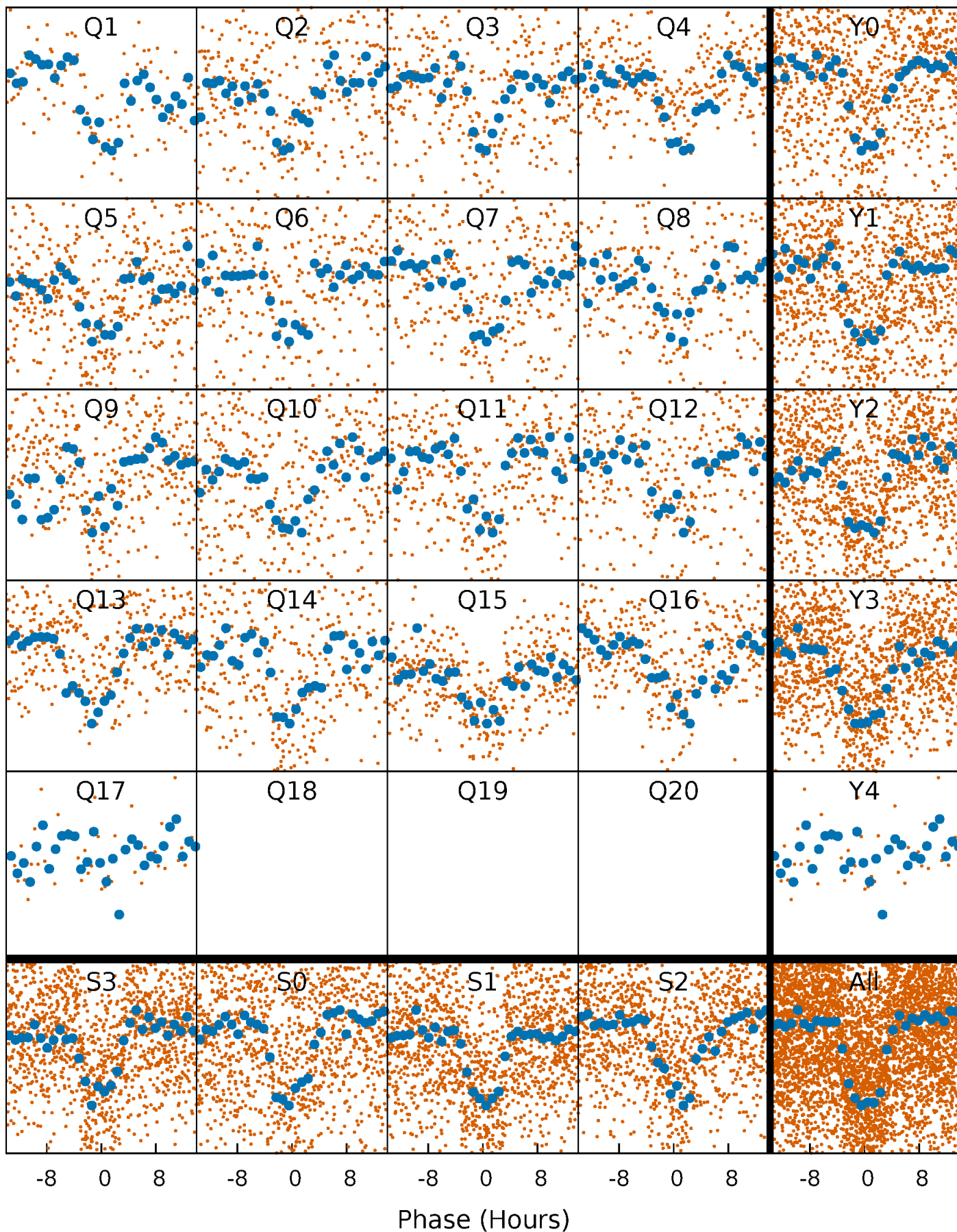


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



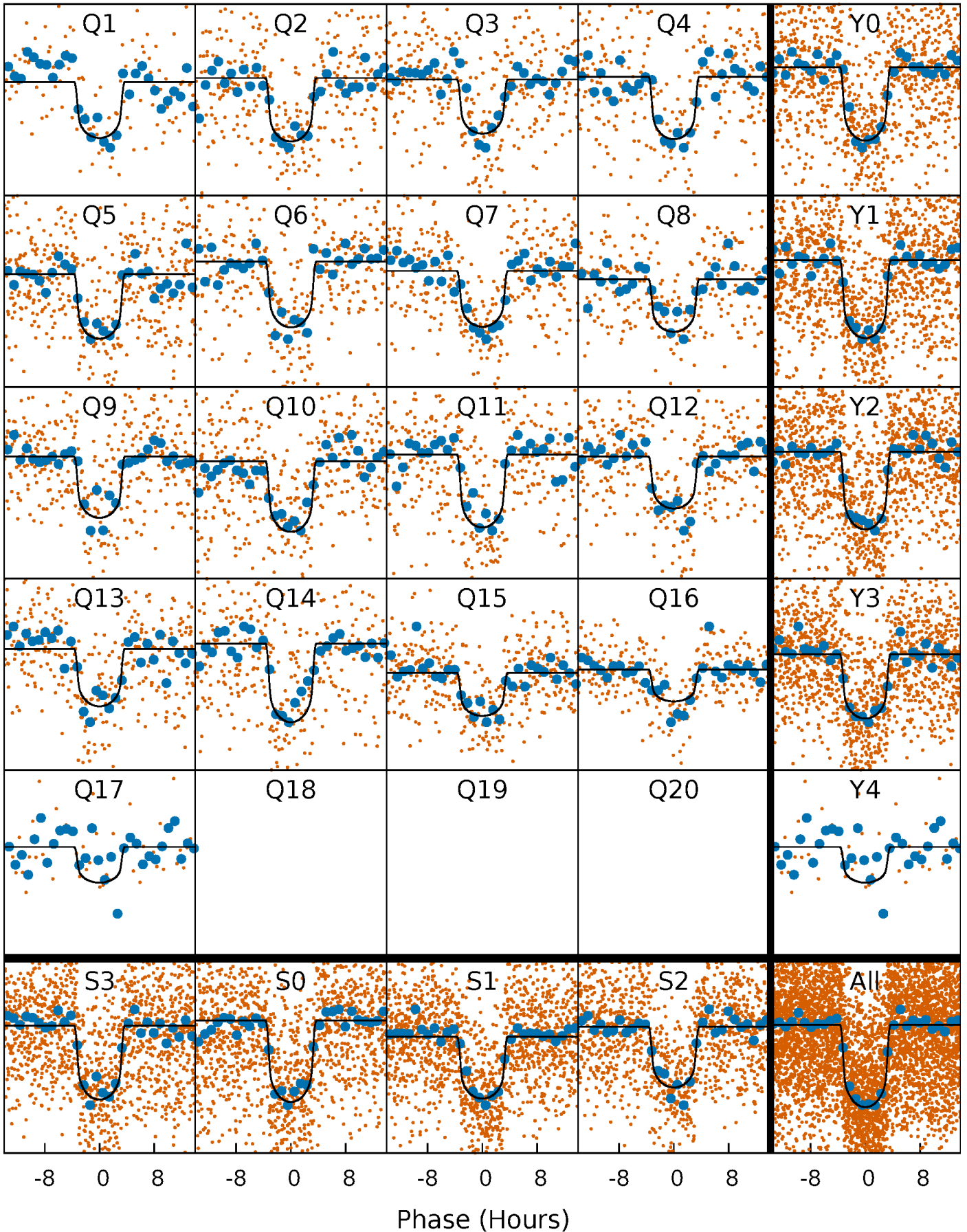
# PDC Quarter-Phased Transit Curves

TCE 005436502-02 P= 13.233523 Days  $T_0=140.323222$  (BKJD)



# DV Quarter-Phased Transit Curves

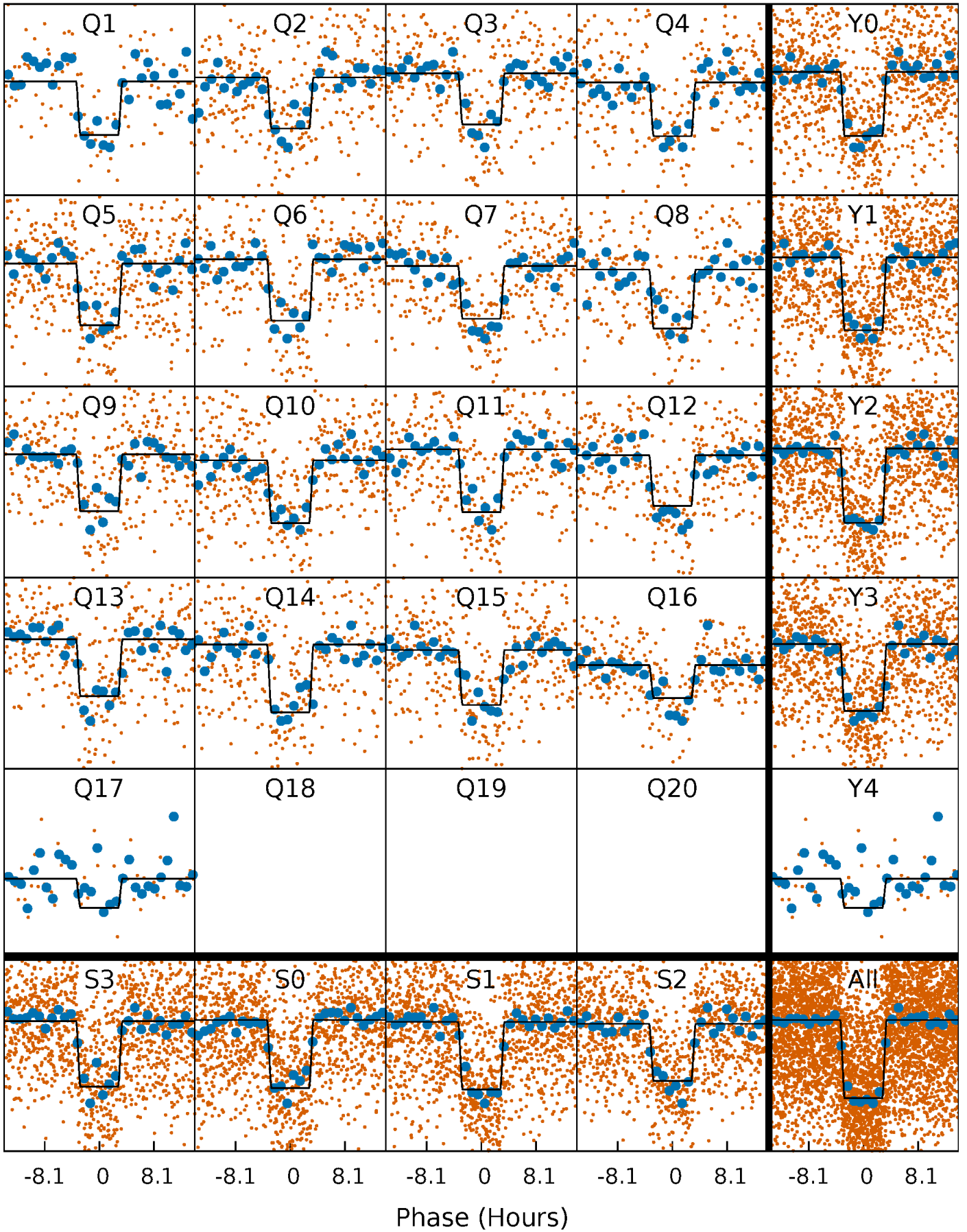
TCE 005436502-02 P= 13.233523 Days  $T_0=140.323222$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

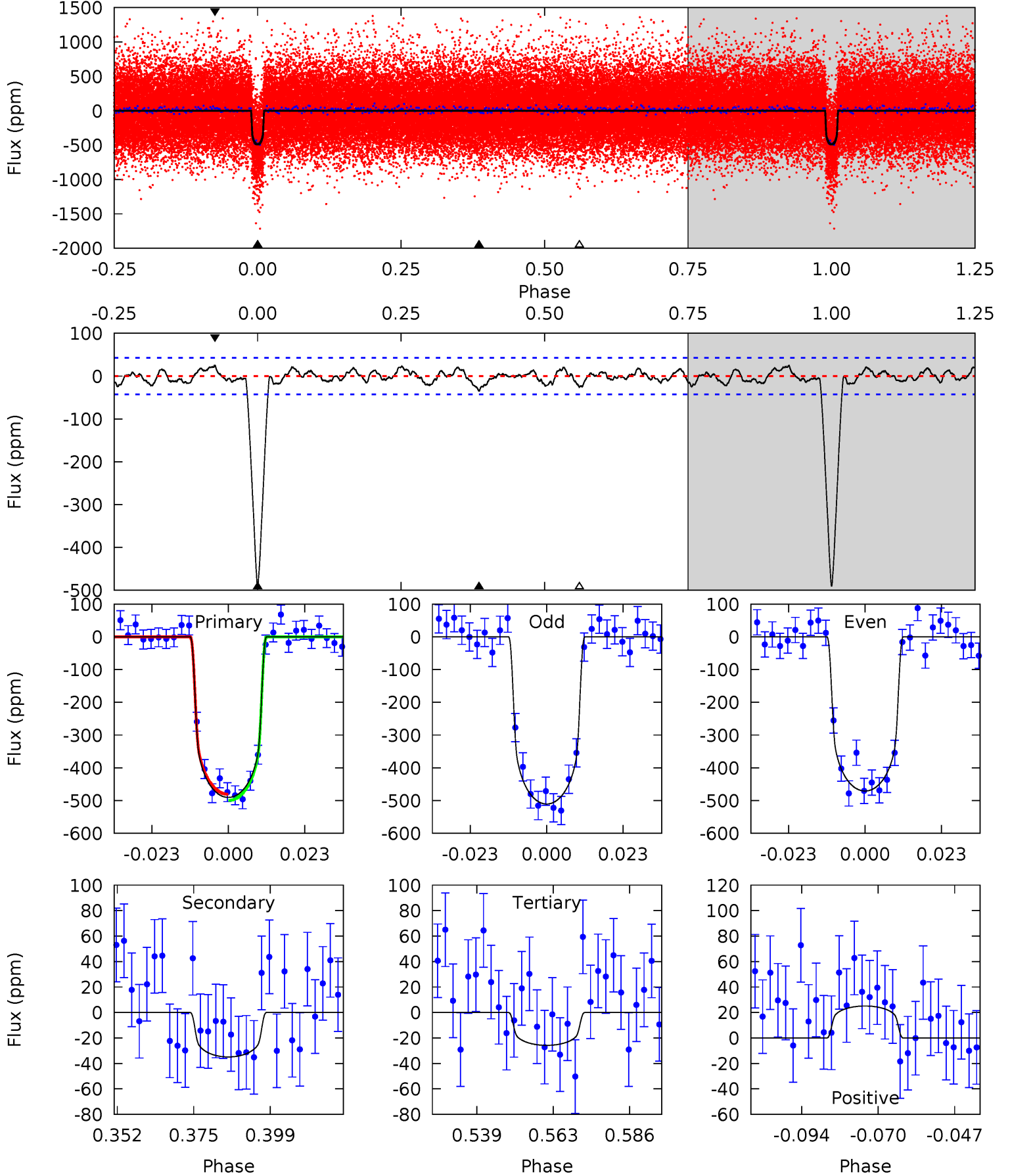
TCE 005436502-02 P= 13.233367 Days  $T_0=140.331500$  (BKJD)



# DV Model-Shift Uniqueness Test

005436502-02,  $P = 13.233523$  Days,  $E = 127.089699$  Days

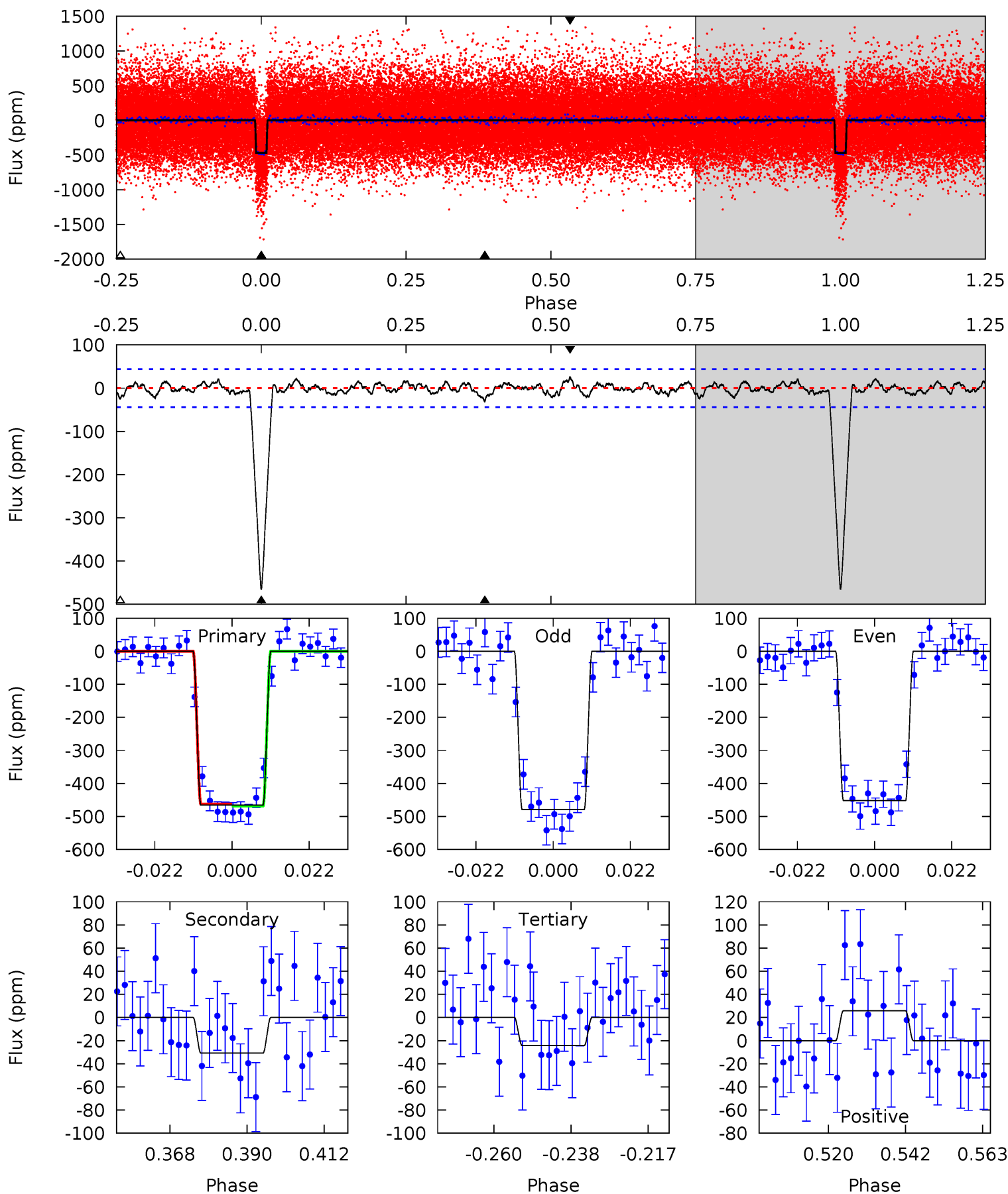
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
55.8	3.97	2.93	2.85	4.86	2.27	1.23	52.8	52.9	1.04	1.12	2.26	1.02	0.05	1.07



# Alt Model-Shift Uniqueness Test

005436502-02, P = 13.233367 Days, E = 127.098133 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
51.7	3.42	2.69	2.87	4.88	2.30	1.02	49.0	48.8	0.73	0.55	1.49	1.06	0.05	0.31





### Stellar Parameters For KIC 005436502

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5739^{+114}_{-103}$	$4.191^{+0.162}_{-0.108}$	$0.300^{+0.100}_{-0.150}$	$1.384^{+0.242}_{-0.266}$	$1.083^{+0.100}_{-0.075}$	$0.576^{+0.460}_{-0.187}$
	+2%/-2%	+4%/-3%	+33%/-50%	+17%/-19%	+9%/-7%	+80%/-33%
Source	SPE58	SPE58	SPE58	DSEP		

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

### Secondary Eclipse Parameters for KIC 005436502-02 / KOI 0834.02

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-35 \pm 9$	$3.40^{+0.52}_{-0.47}$	$1236^{+60}_{-69}$	$3417^{+187}_{-182}$	$21^{+10}_{-7}$
Alt.	$-31 \pm 9$	$3.22^{+0.48}_{-0.46}$	$1235^{+64}_{-66}$	$3400^{+216}_{-211}$	$20^{+12}_{-7}$

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

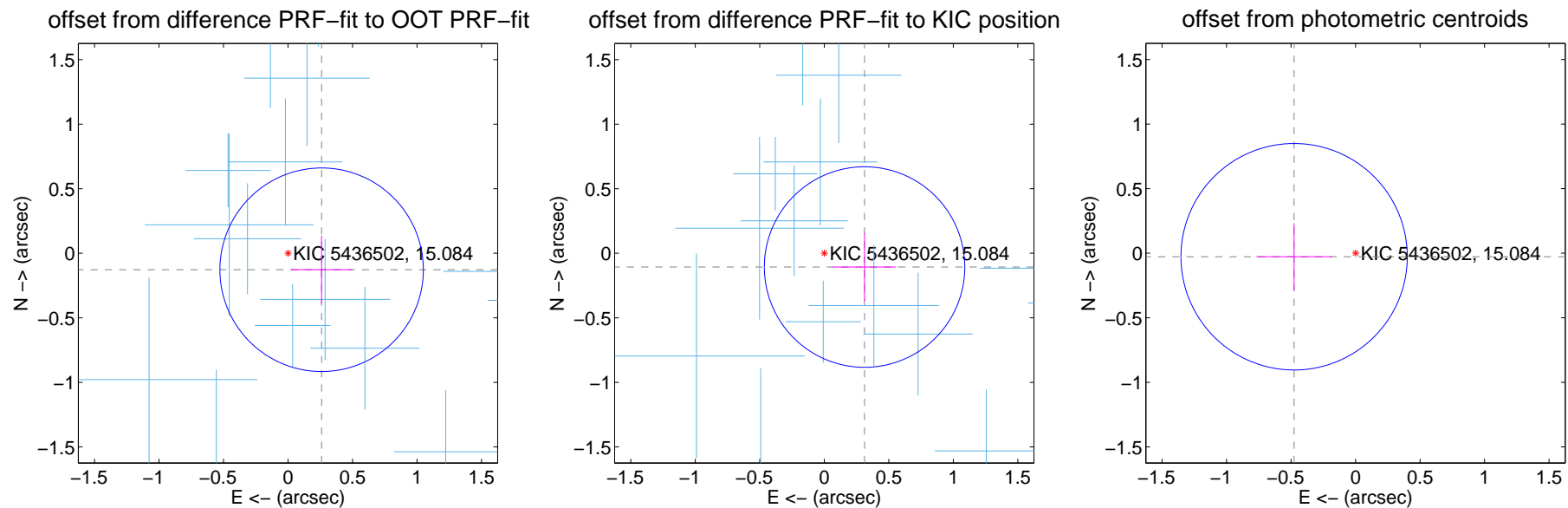
## DV Centroid Data

Supplemental centroid analysis for 005436502-02. Kepler magnitude: 15.08. Transit SNR 37.00

There are 16 quarters with good PRF difference image offsets

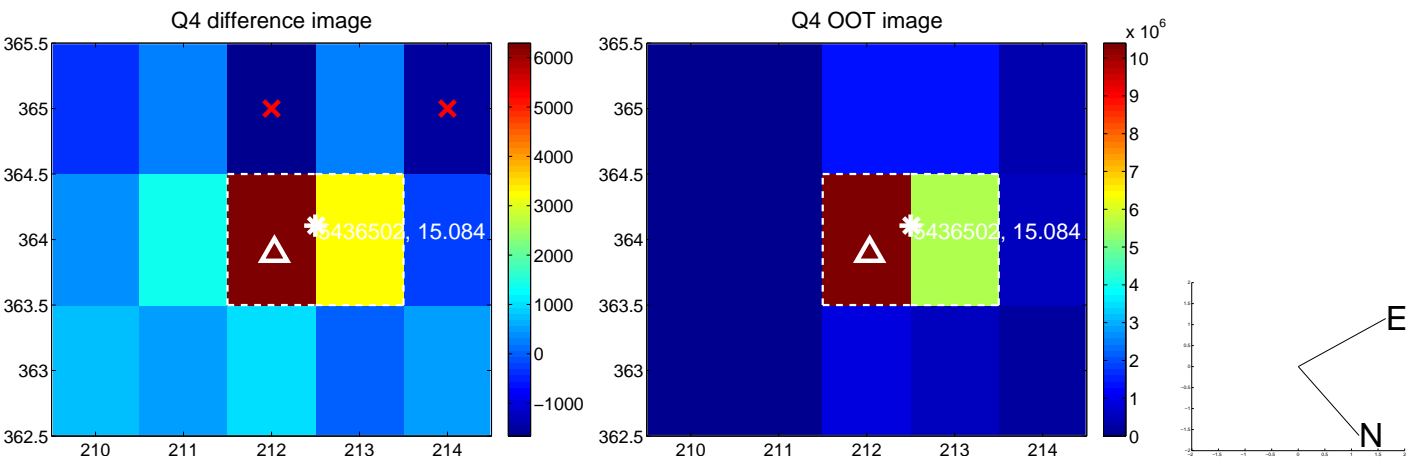
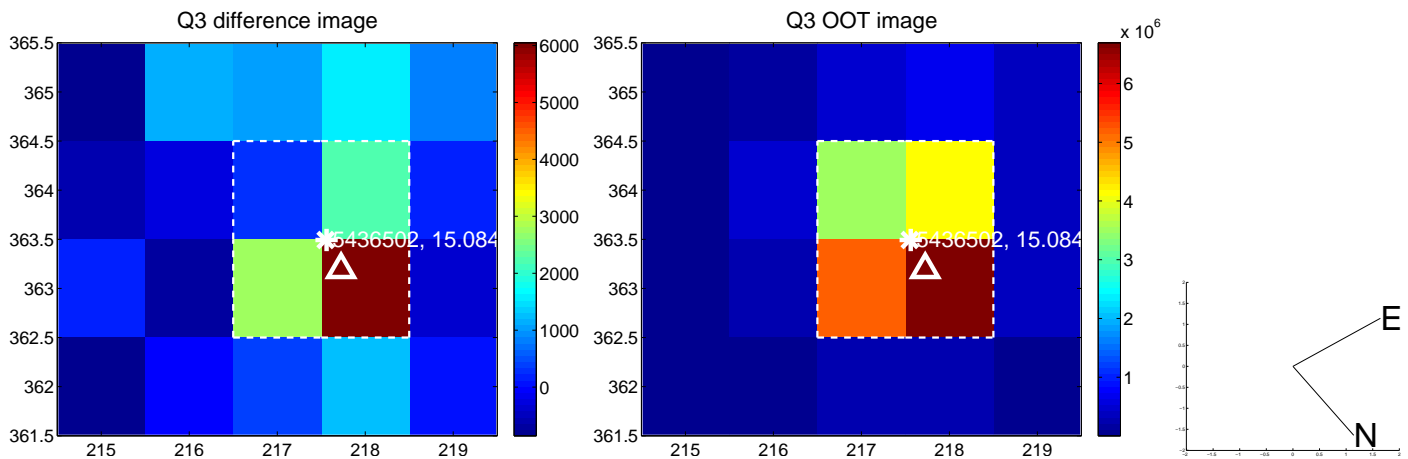
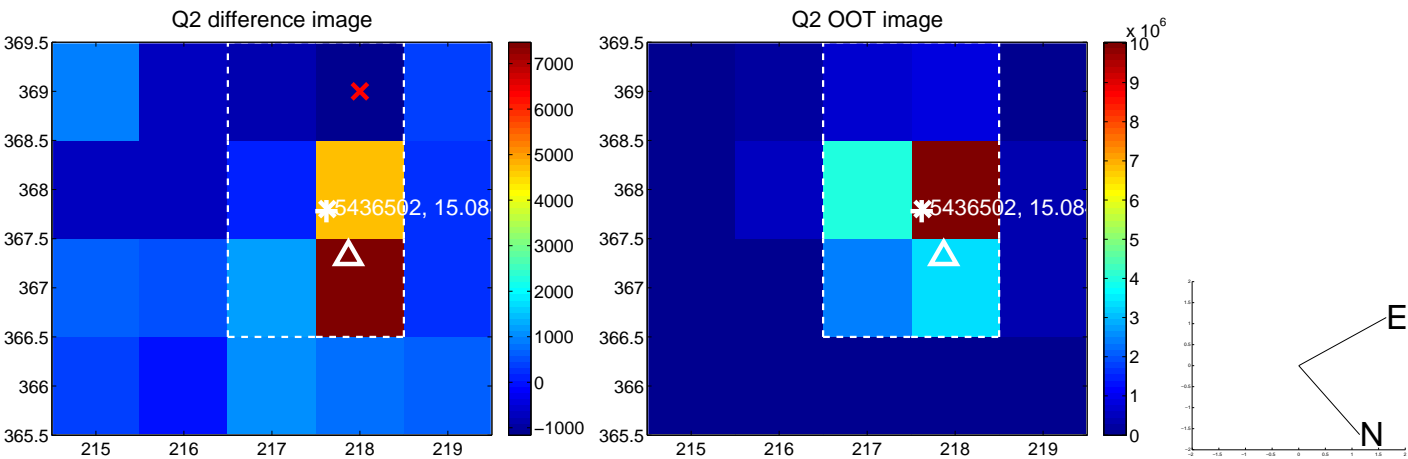
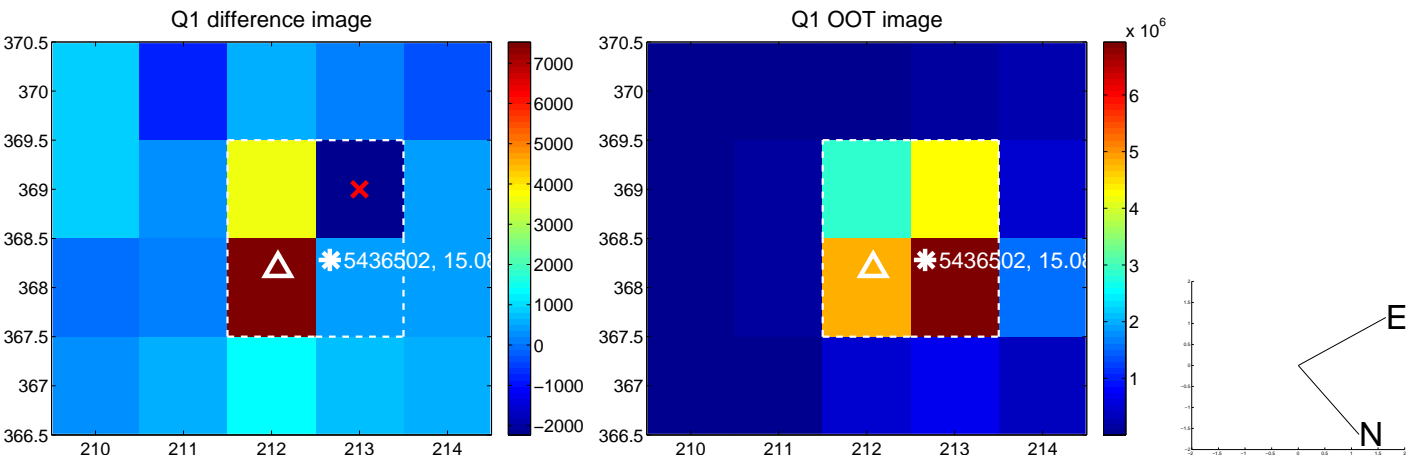
The direct PRF centroid is offset from the target star catalog position by about 0.02 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.290 \pm 0.263$	1.10	$-0.261 \pm 0.237$	$-0.128 \pm 0.264$
PRF-fit source offset from KIC position	$0.330 \pm 0.259$	1.27	$-0.312 \pm 0.246$	$-0.107 \pm 0.264$
photometric centroid source offset	$0.48 \pm 0.29$	1.63	$0.48 \pm 0.29$	$-0.03 \pm 0.26$

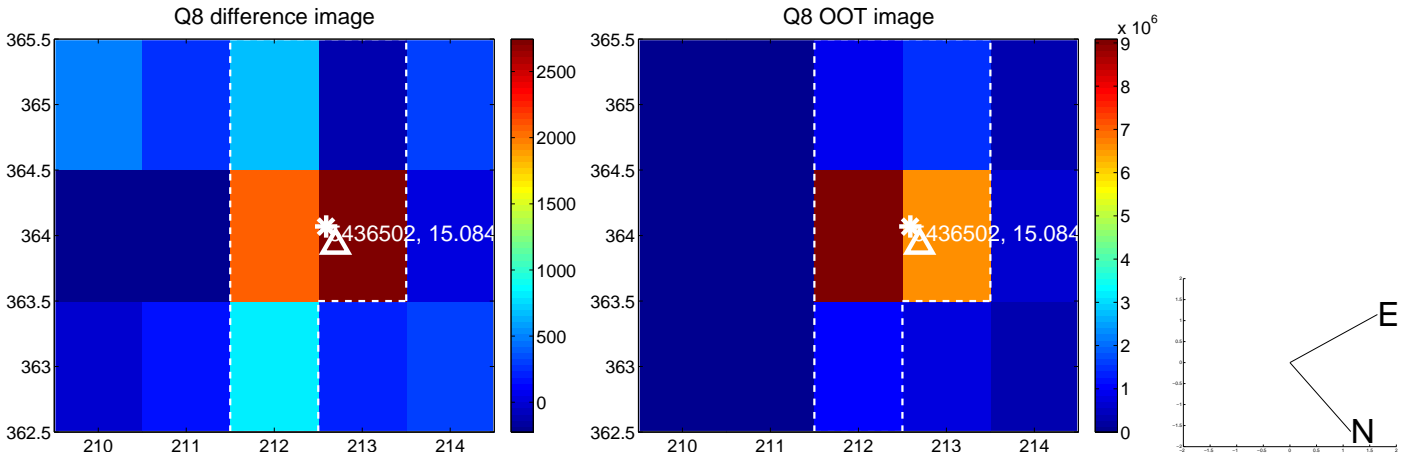
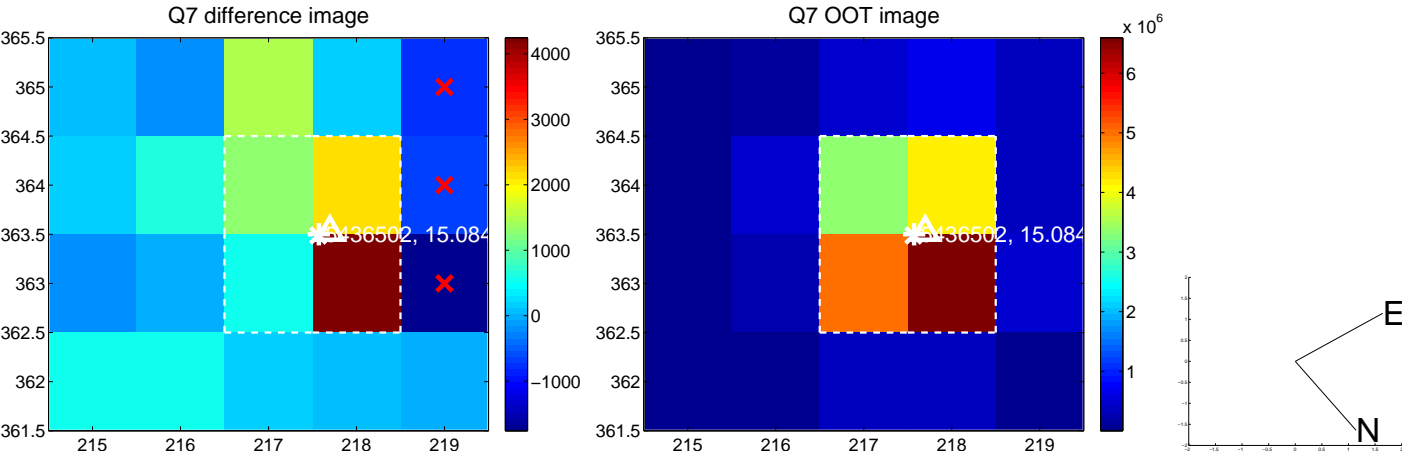
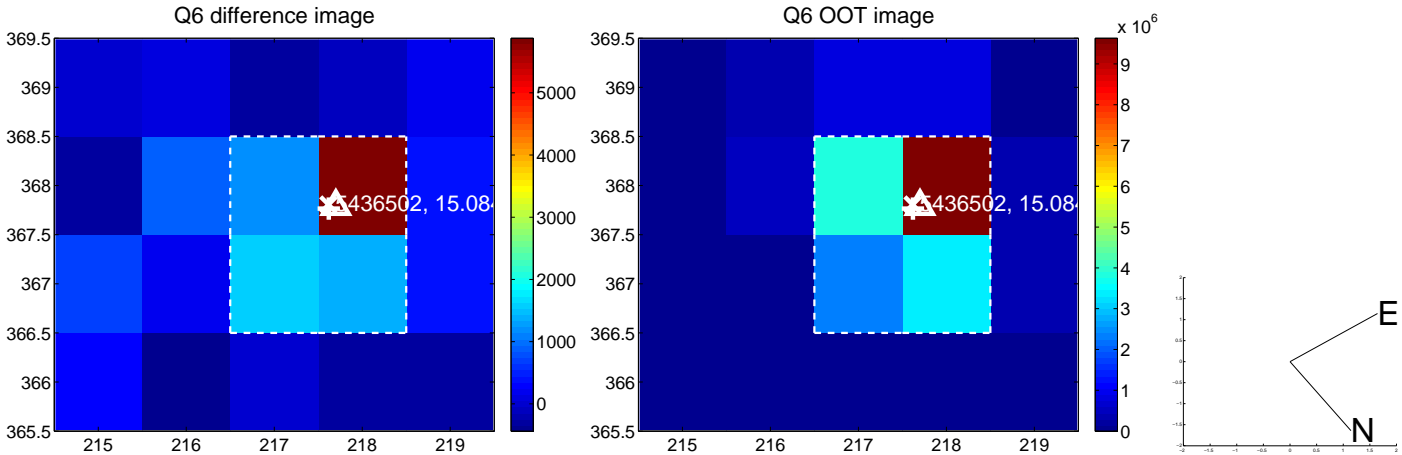
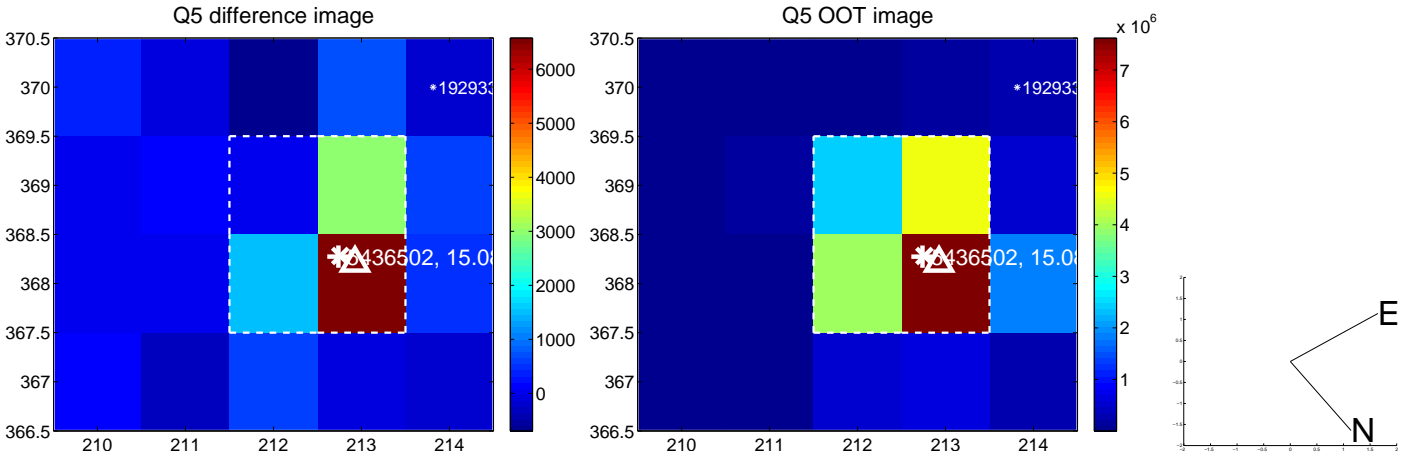


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

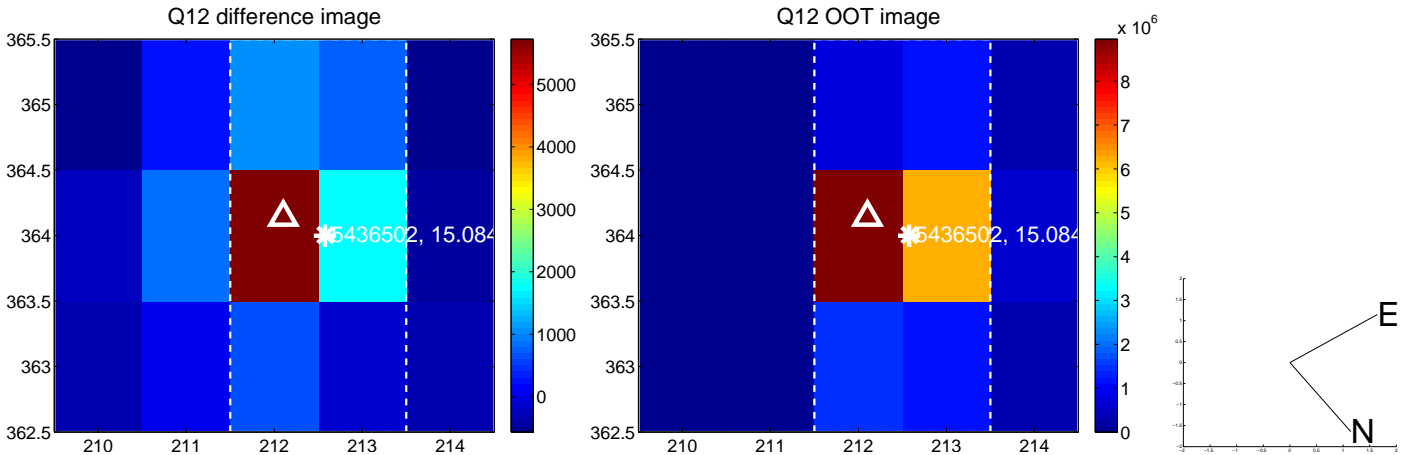
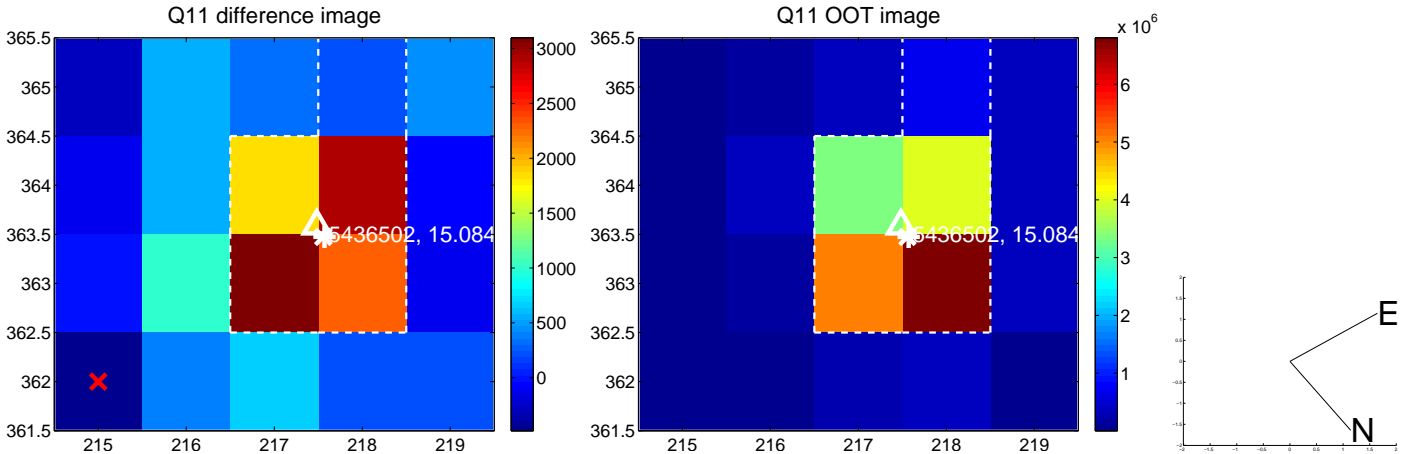
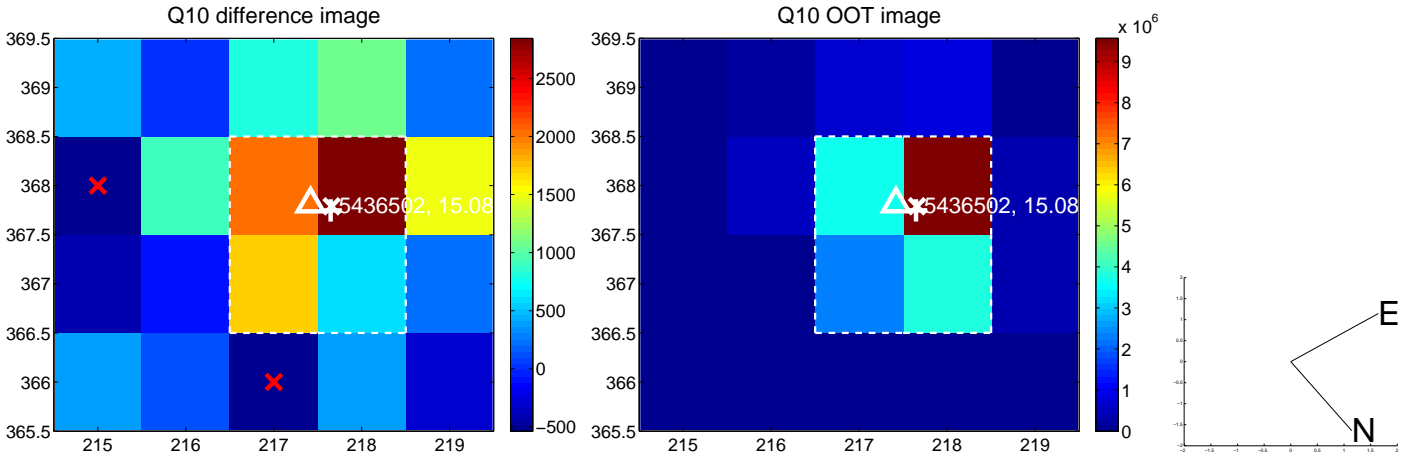
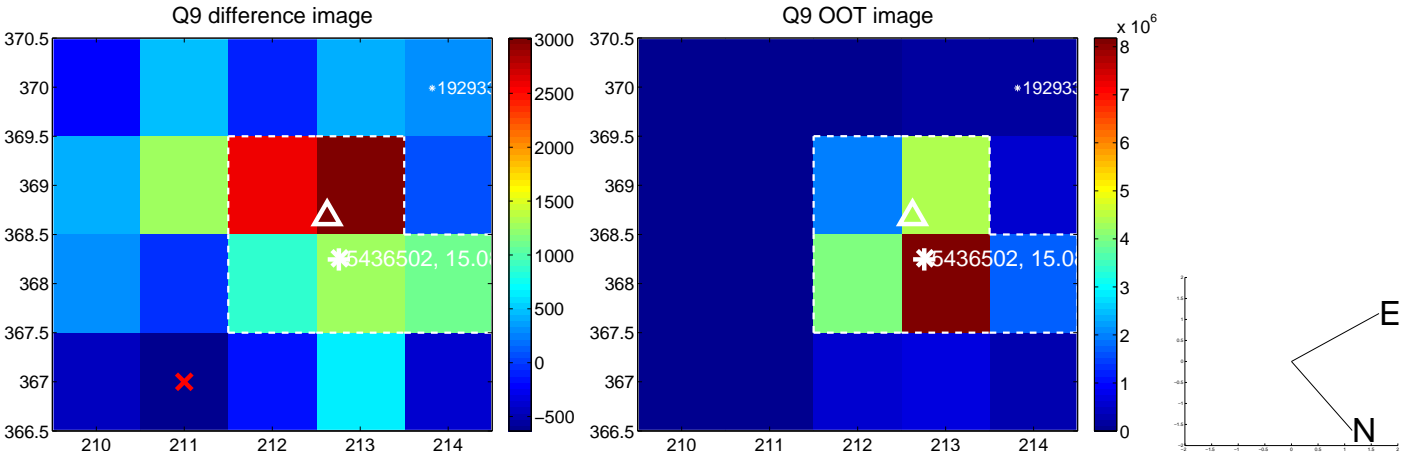
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



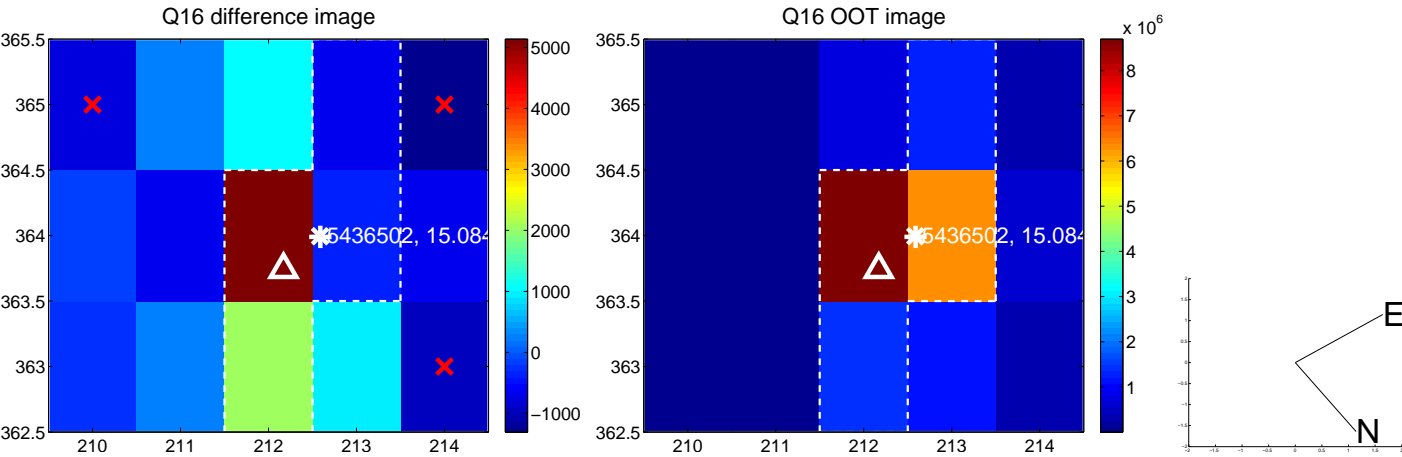
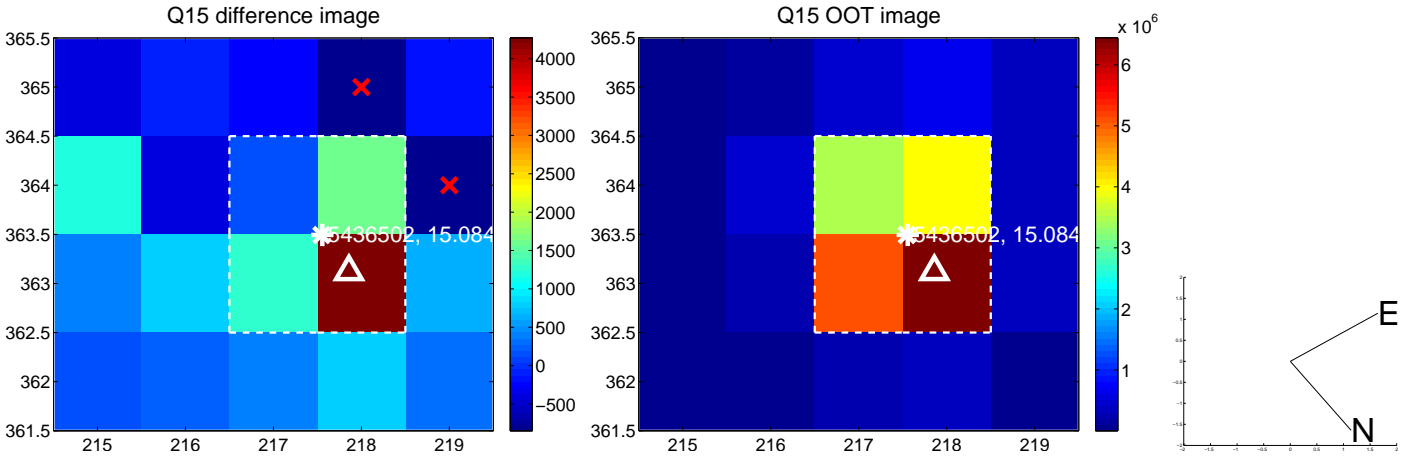
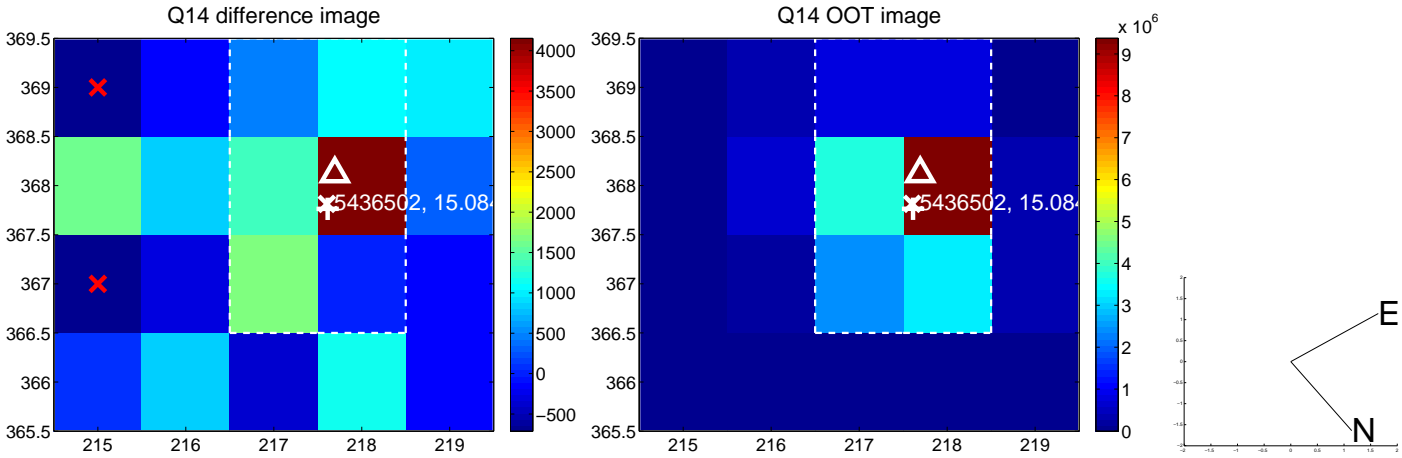
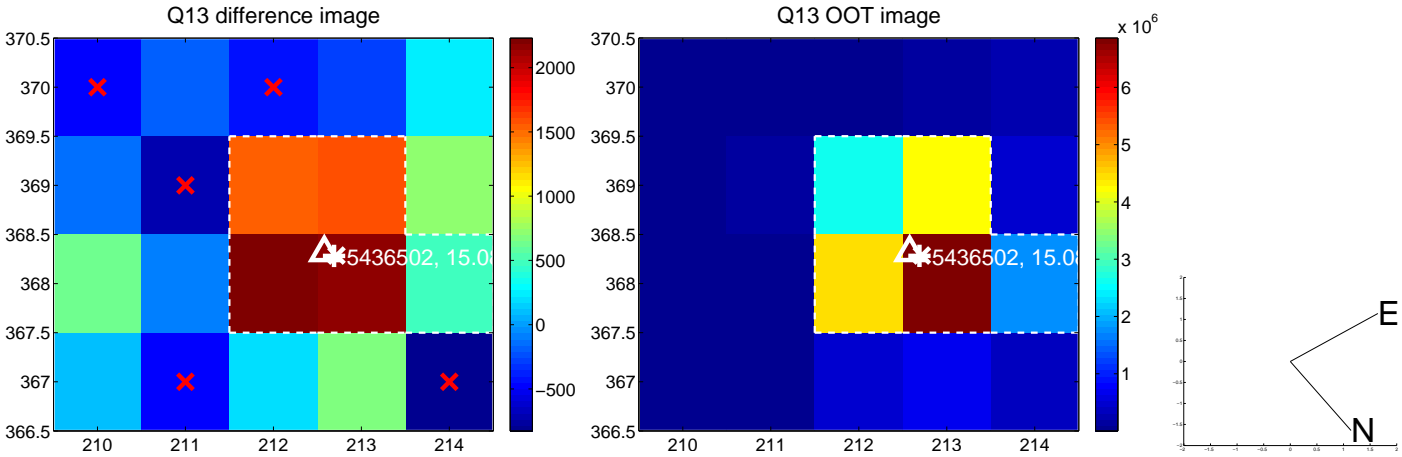
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



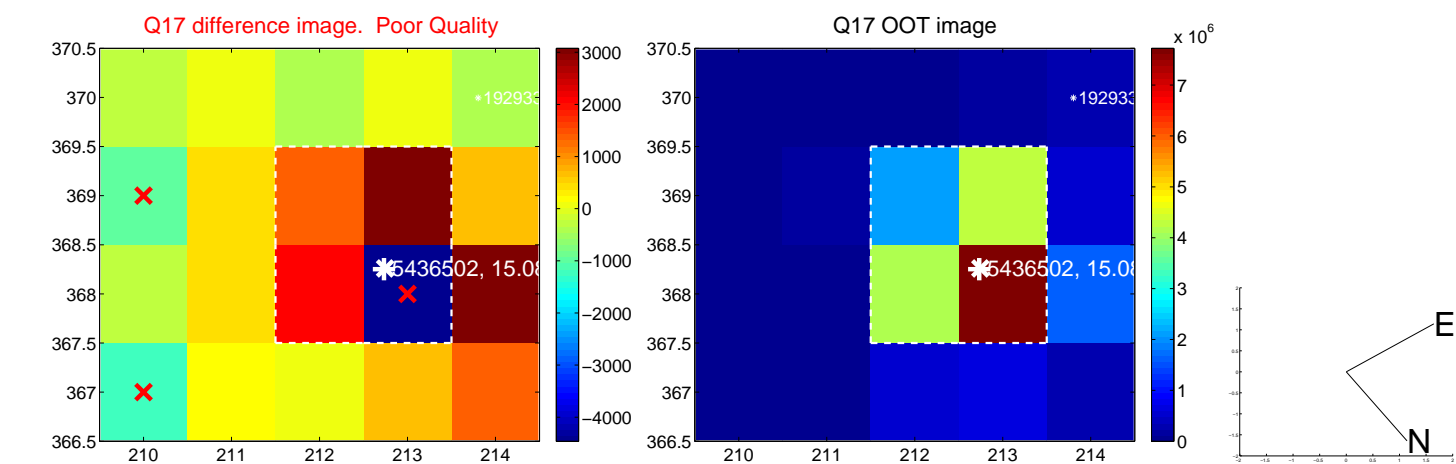
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



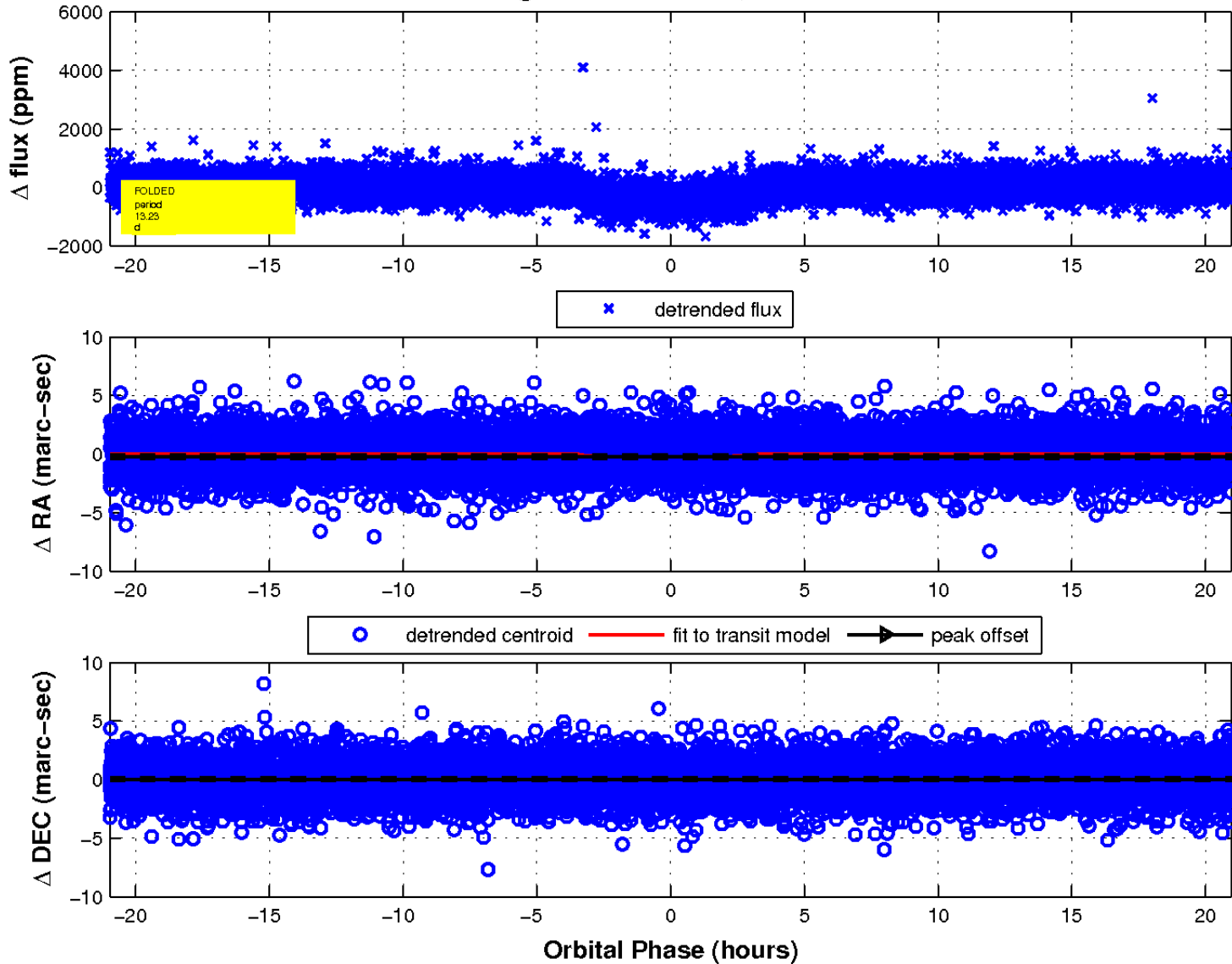
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

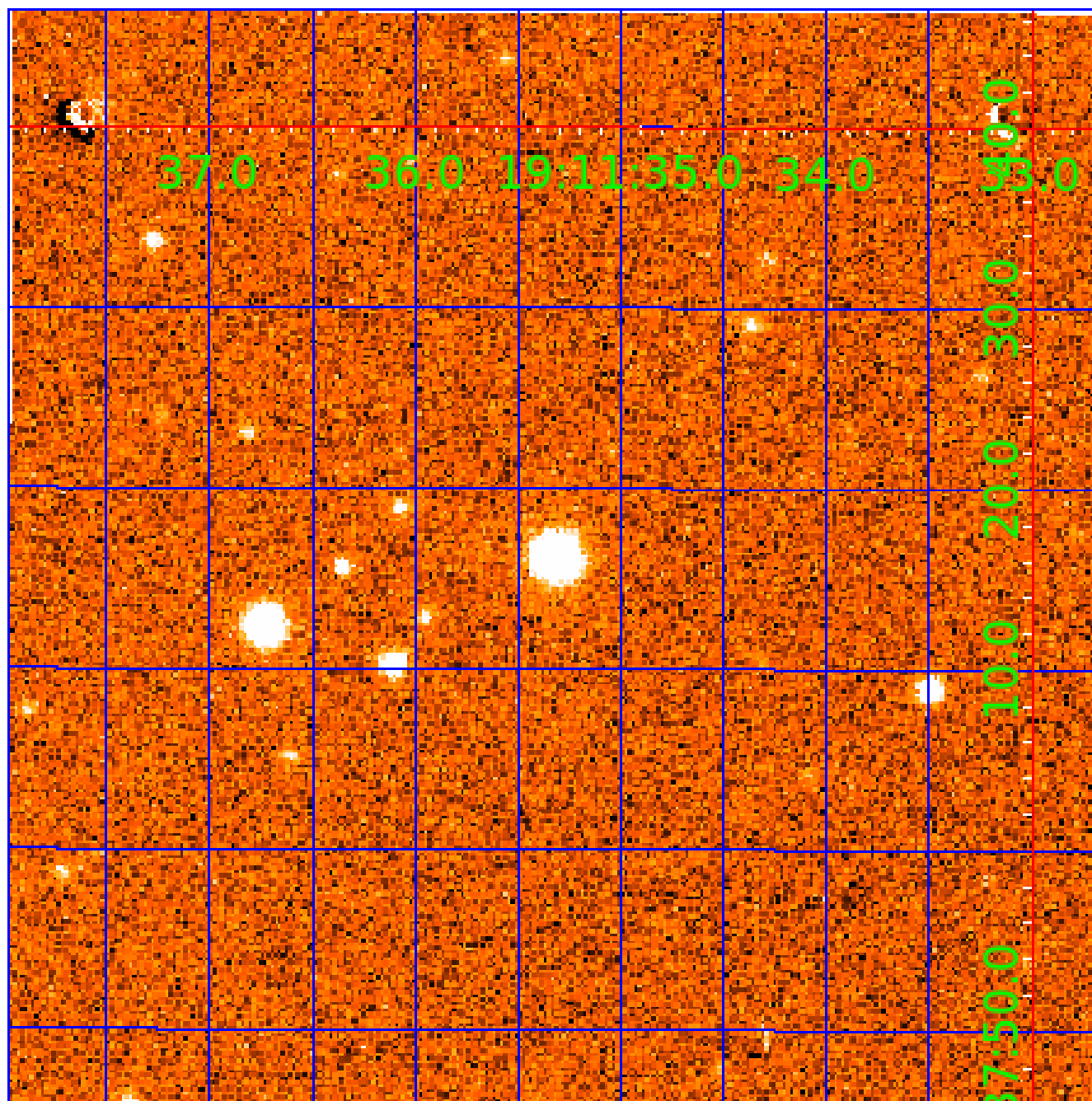


fluxWeightedCentroids, Planet 2 of 5



# UKIRT Image

Declination





# KIC 005436502

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005436502-01	OBS	0834.01	23.653692	147.722190	3377.2	8.267	188.4	191.2	1.38	5739	8.05	67.78
005436502-02	OBS	0834.02	13.233523	140.323222	503.0	6.992	34.3	37.0	1.38	5739	3.44	147.04
005436502-03	OBS	0834.03	6.155685	134.808570	276.3	5.405	26.3	27.6	1.38	5739	2.83	407.97
005436502-04	OBS	0834.05	50.447402	178.491327	405.1	7.636	15.2	15.7	1.38	5739	3.17	24.69
005436502-05	OBS	0834.04	2.090786	132.090330	110.1	3.505	14.9	15.7	1.38	5739	1.73	1721.54

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005436502-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
005436502-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT
005436502-03	OBS	PC	1.00	0	0	0	0	NO_COMMENT
005436502-04	OBS	PC	0.99	0	0	0	0	NO_COMMENT
005436502-05	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.

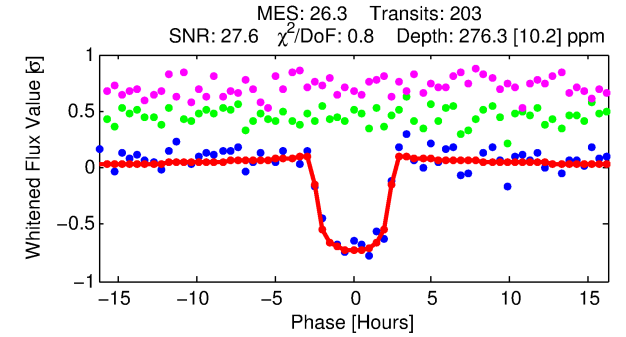
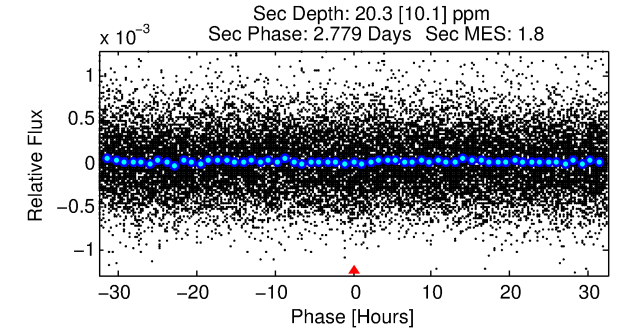
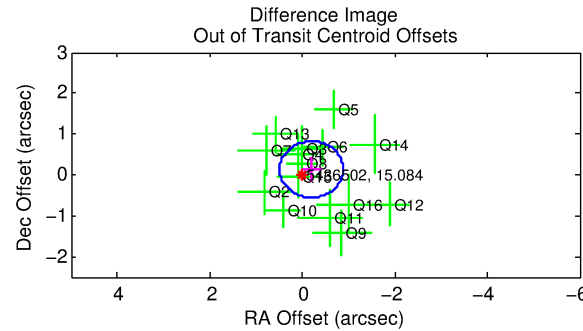
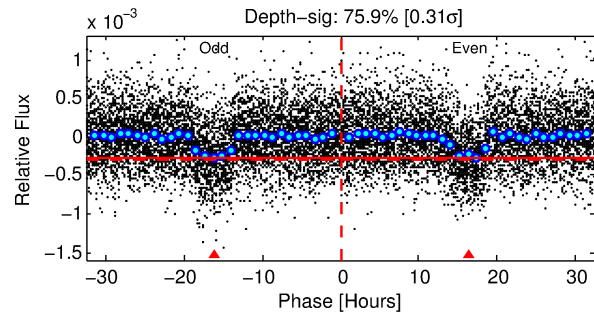
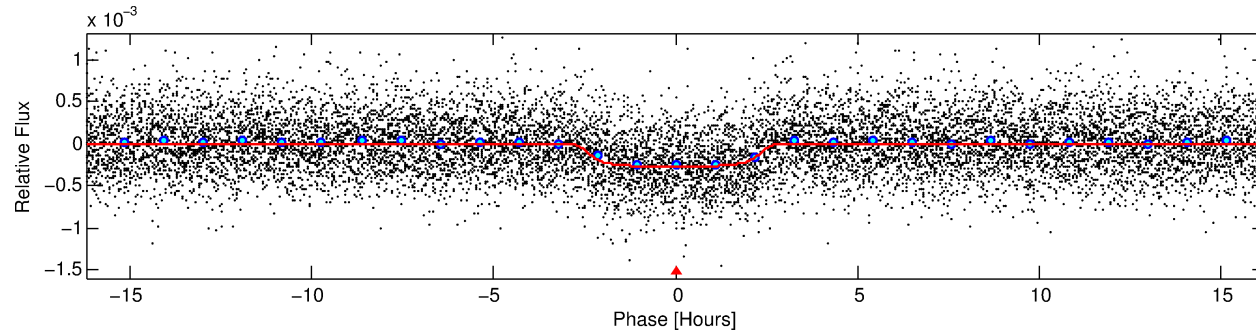
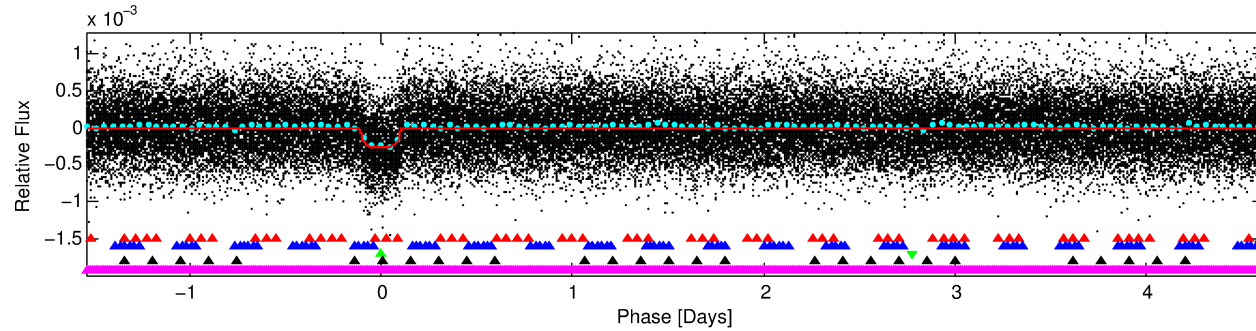
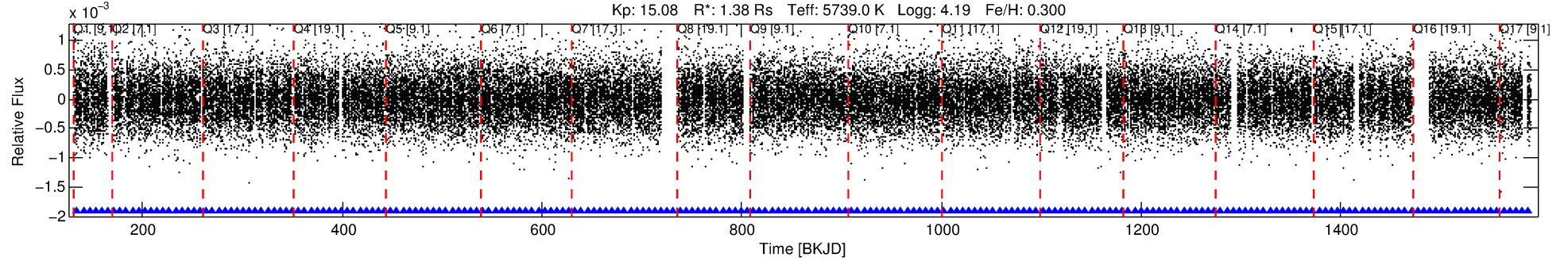
## Ephemeris Match Information For 005436502-03

No Significant Match Found

# DV One-Page Summary

KIC: 5436502 Candidate: 3 of 5 Period: 6.156 d  
KOI: K00834.03 Name: Kepler-238c Corr: 0.959

Kp: 15.08 R\*: 1.38 Rs Teff: 5739.0 K Logg: 4.19 Fe/H: 0.300



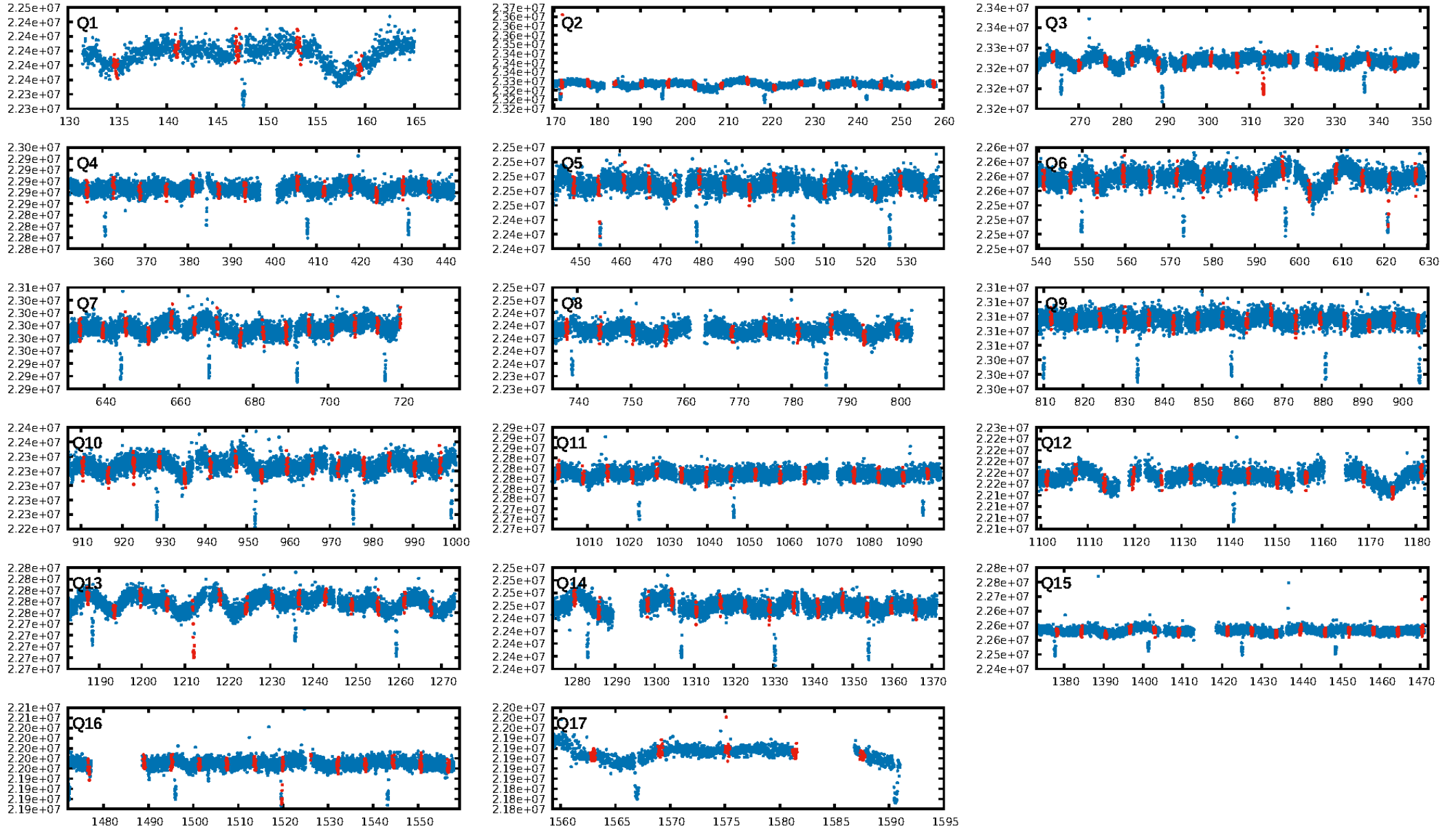
## DV Fit Results:

Period = 6.15568 [0.00003] d  
Epoch = 134.8086 [0.0034] BKJD  
Rp/R\* = 0.0187 [0.0012]  
a/R\* = 3.84 [1.03]  
b = 0.92 [0.05]  
Seff = 407.97 [118.64]  
Teq = 1146 [83] K  
Rp = 2.83 [0.57] Re  
a = 0.0676 [0.0121] AU  
Ag = 6.37 [3.74] [1.44σ]  
Teffp = 2815 [367] K [4.43σ]

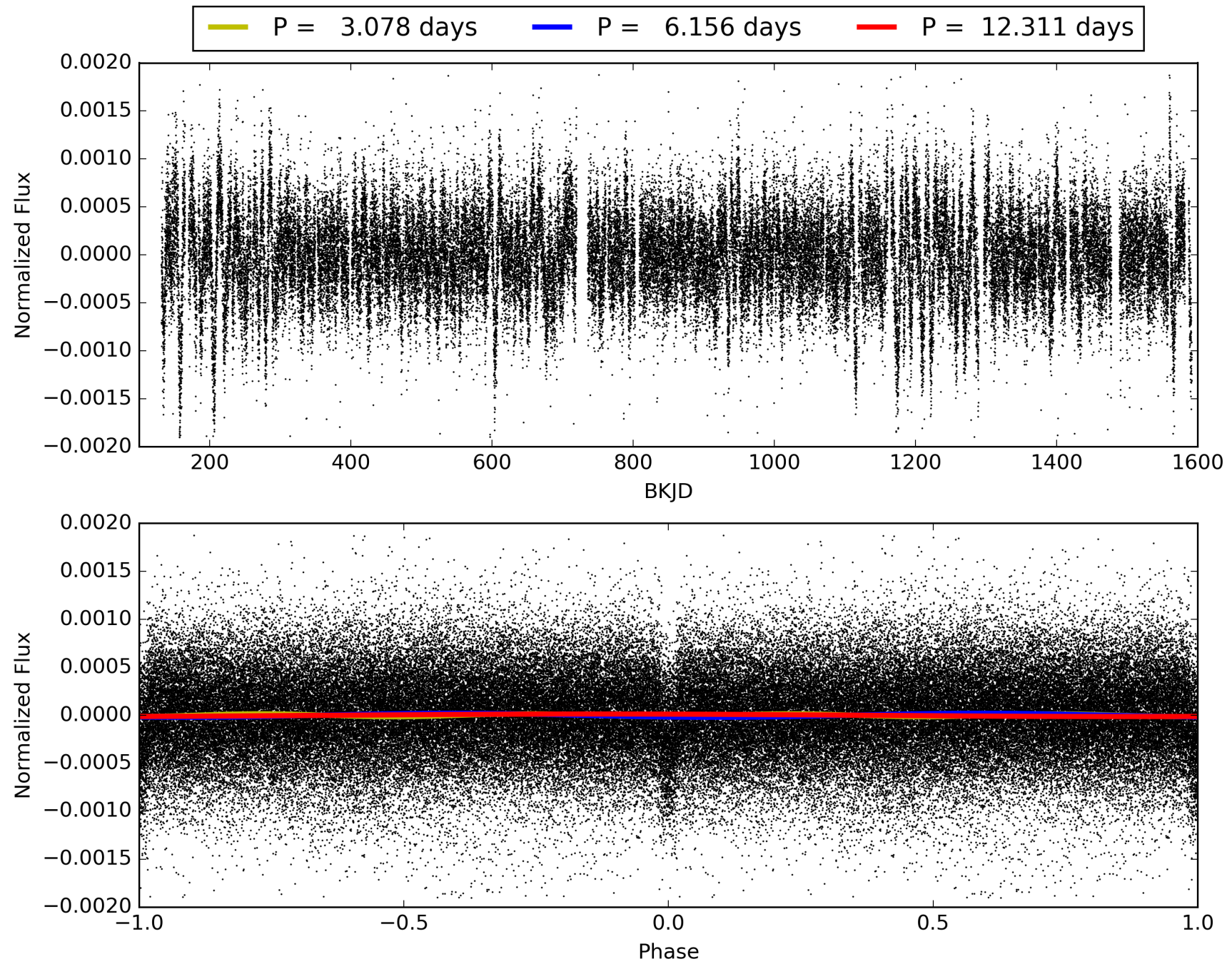
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [15.14σ]  
LongPeriod-sig: 100.0% [19.22σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 2.80e-147  
RollingBand-fgt: 1.00 [194/194]  
GhostDiagnostic-chr: 2.981  
Centroid-sig: 0.0%  
Centroid-so: 0.889 arcsec [2.31σ]  
OotOffset-rm: 0.233 arcsec [1.02σ]  
KicOffset-rm: 0.282 arcsec [1.22σ]  
OotOffset-st: 4/4/4/3 [15]  
KicOffset-st: 4/4/4/3 [15]  
DiffImageQuality-fgm: 0.93 [14/15]  
DiffImageOverlap-fno: 1.00 [17/17]

# TCE 005436502-03, PDC Light Curves



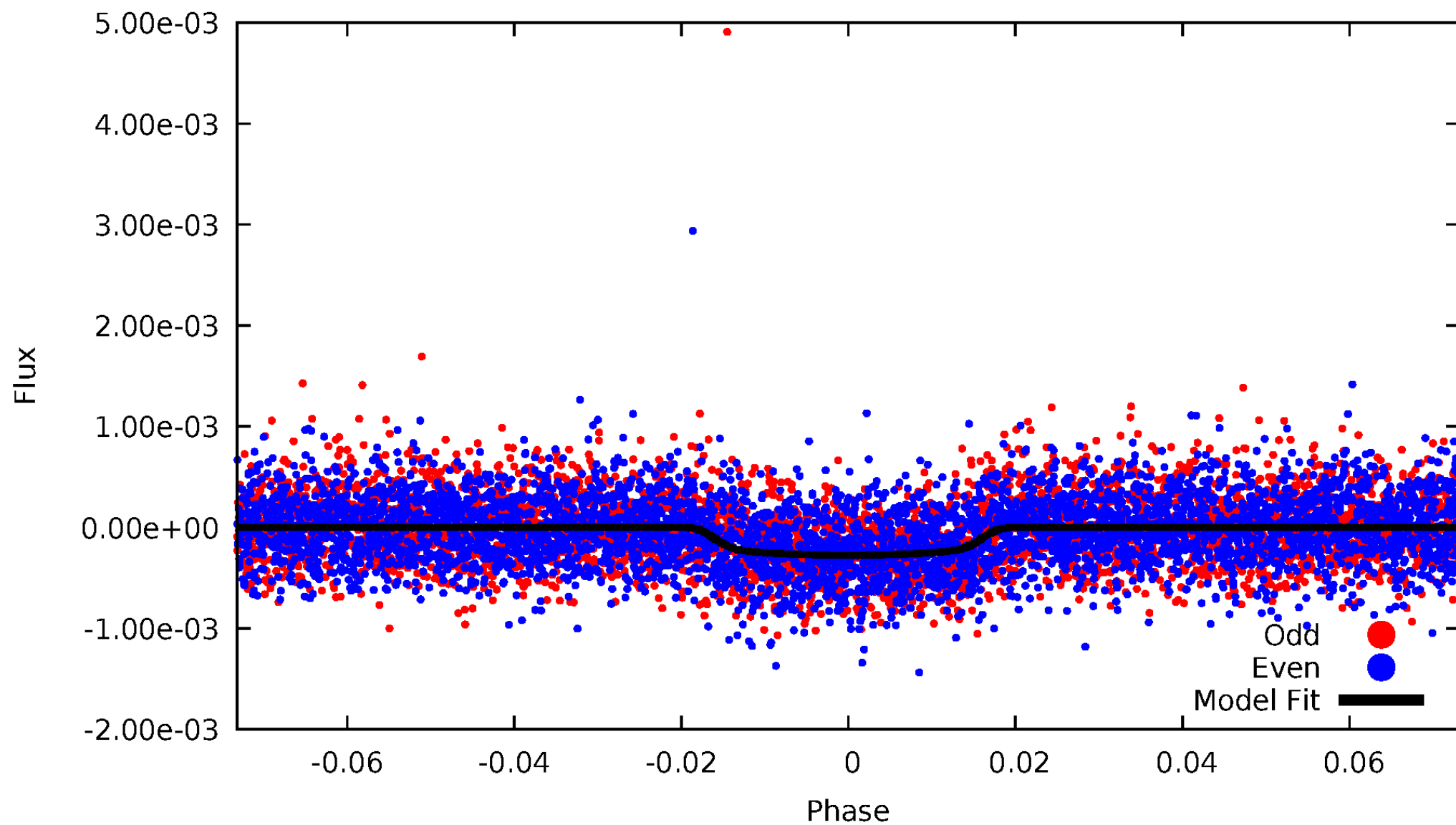
TCE 005436502-03





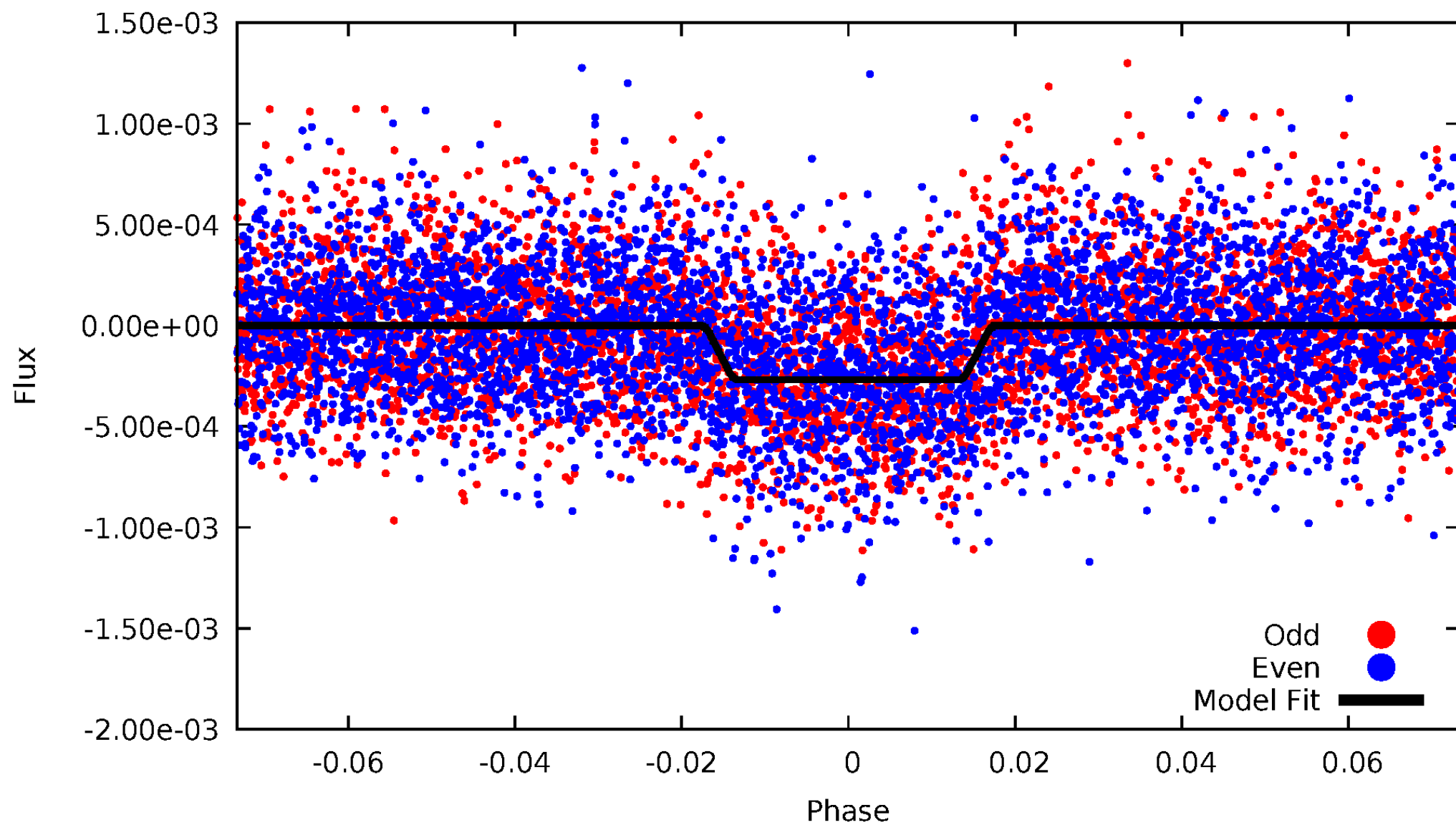
# DV Odd/Even

TCE 005436502-03



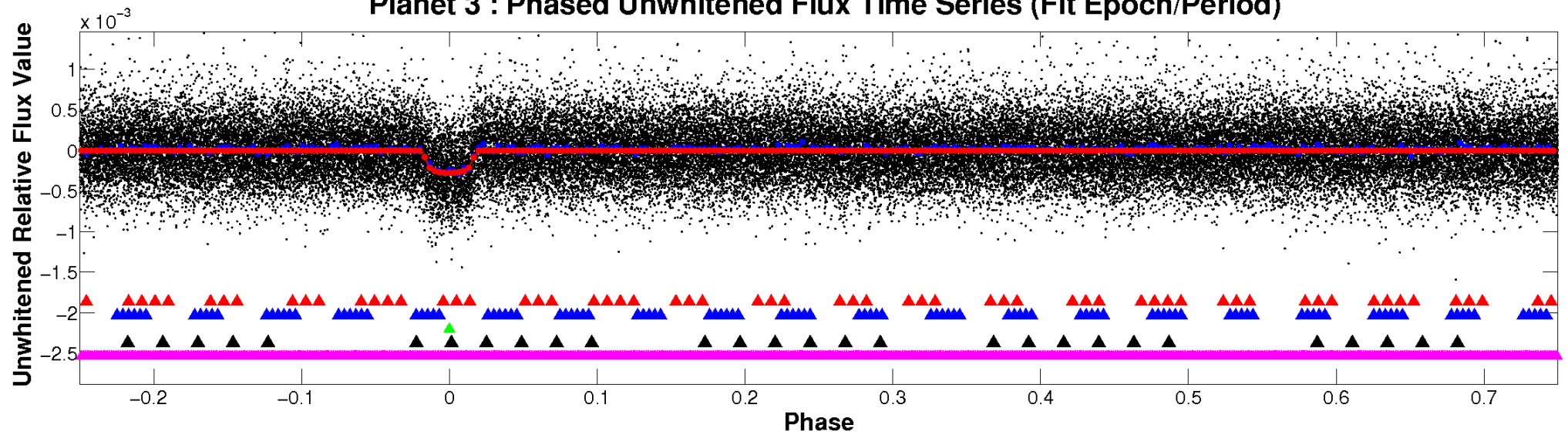
# ALT Odd/Even

TCE 005436502-03

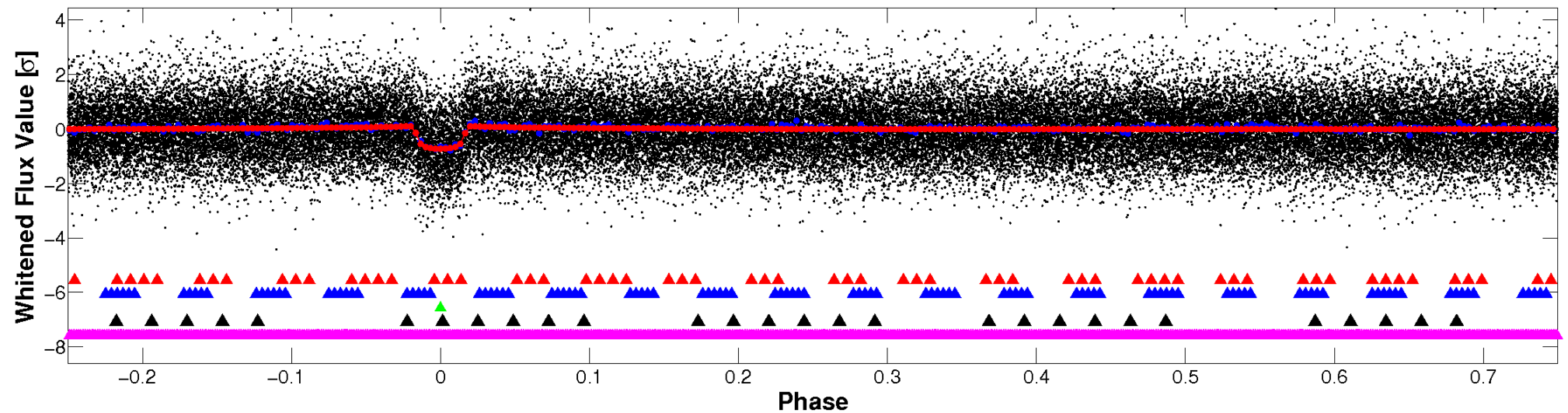


# Non-Whitened Vs. Whitened Light Curve

## Planet 3 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

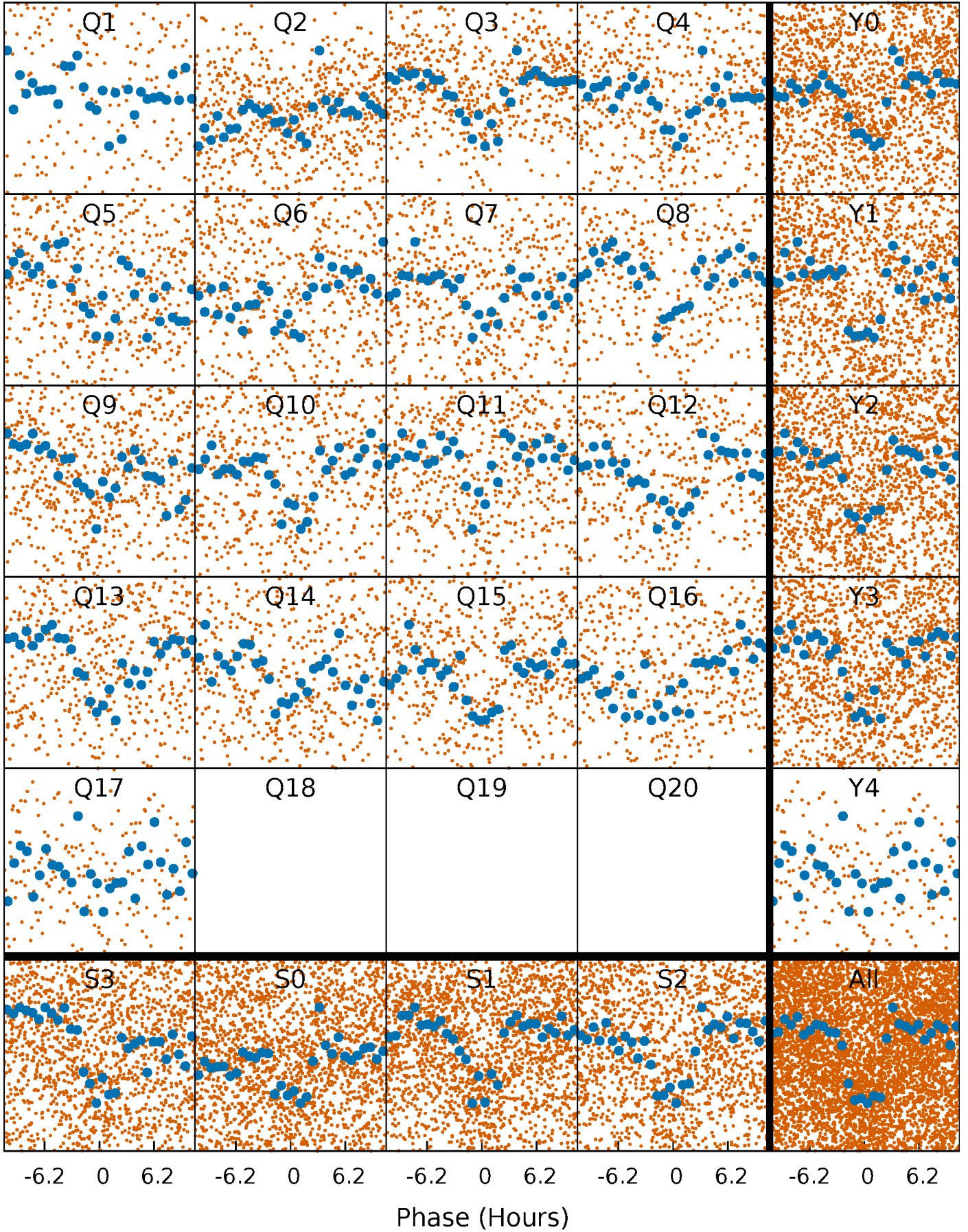


## Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

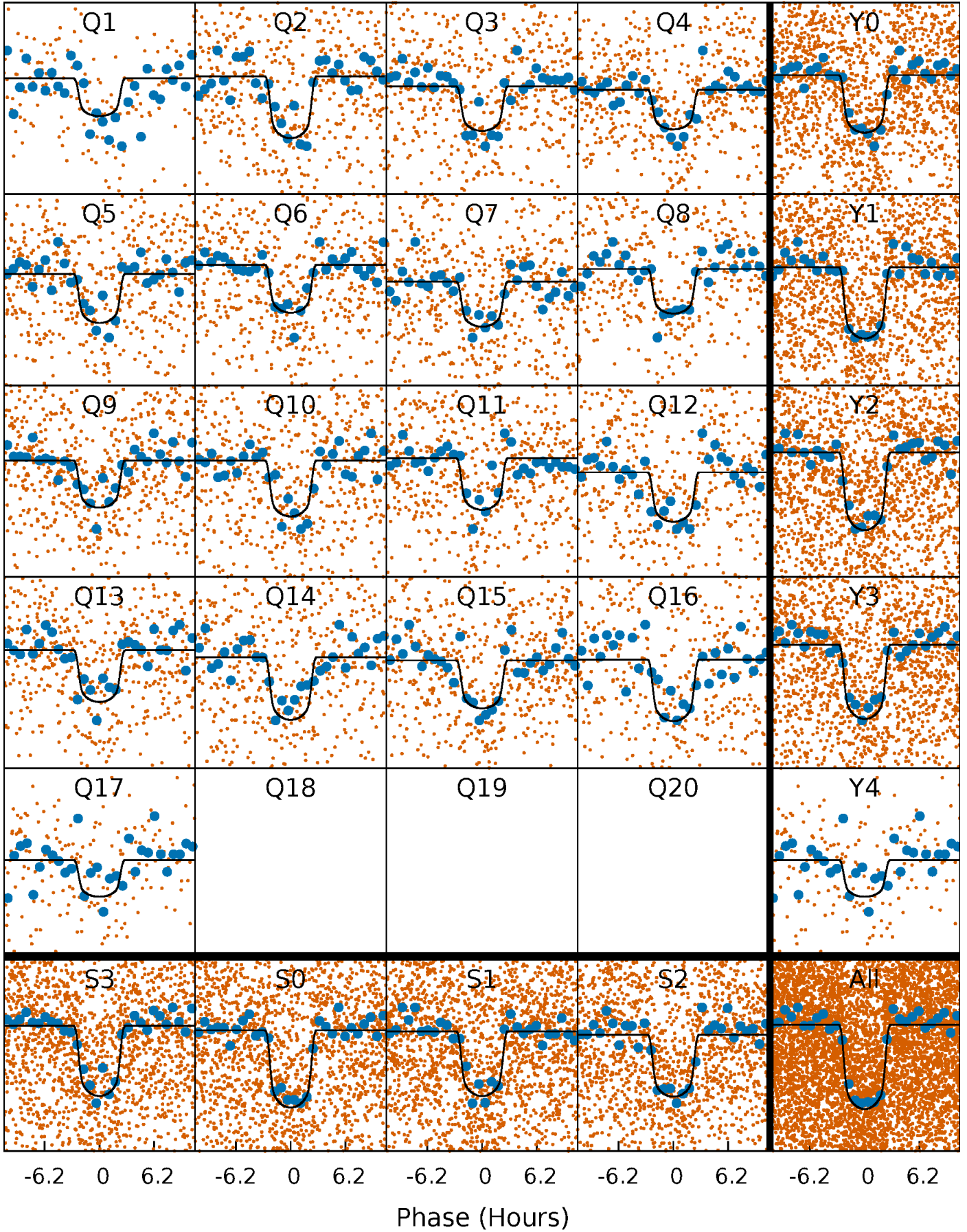
TCE 005436502-03 P= 6.155685 Days  $T_0=134.808570$  (BKJD)





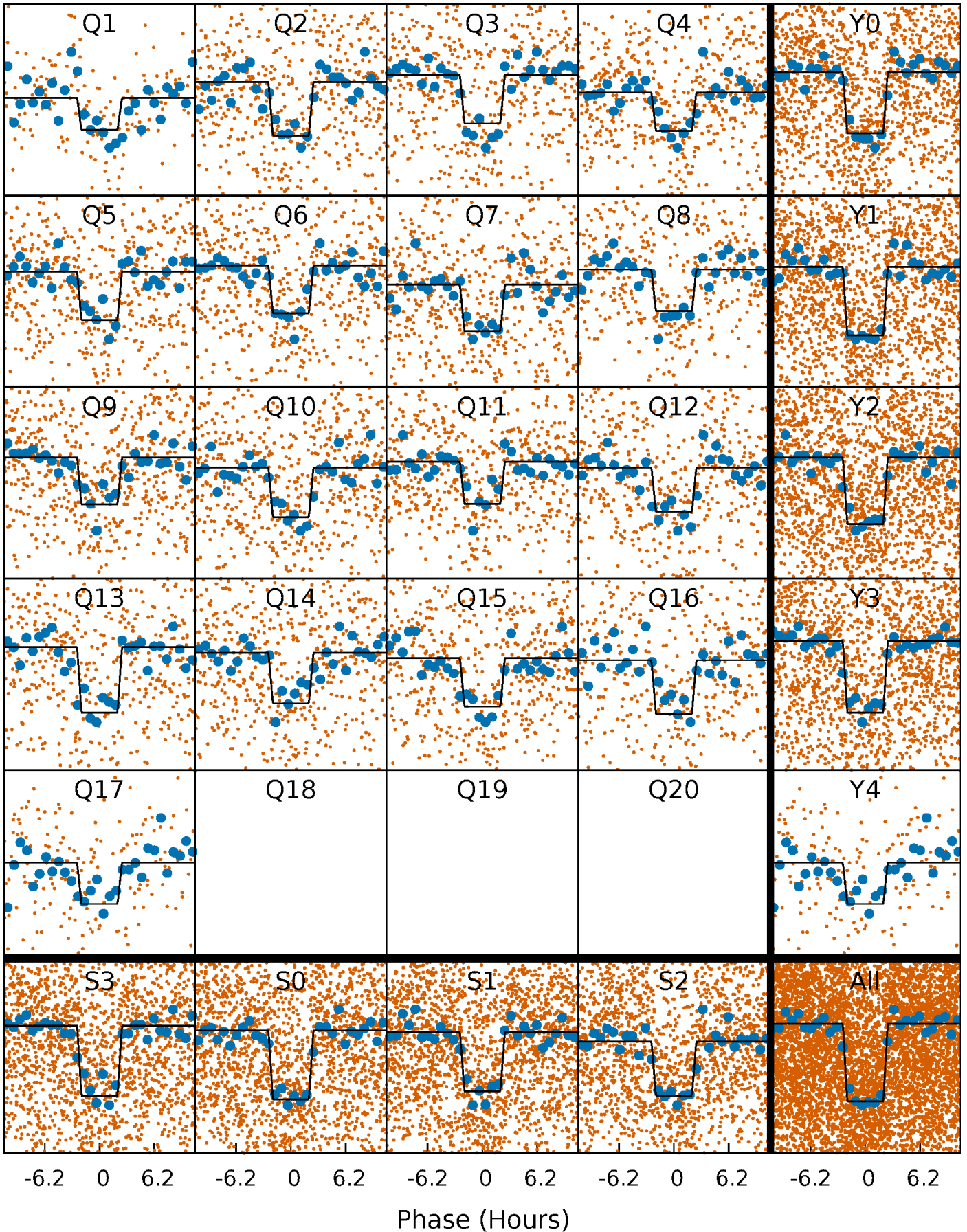
# DV Quarter-Phased Transit Curves

TCE 005436502-03   P= 6.155685 Days    $T_0=134.808570$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

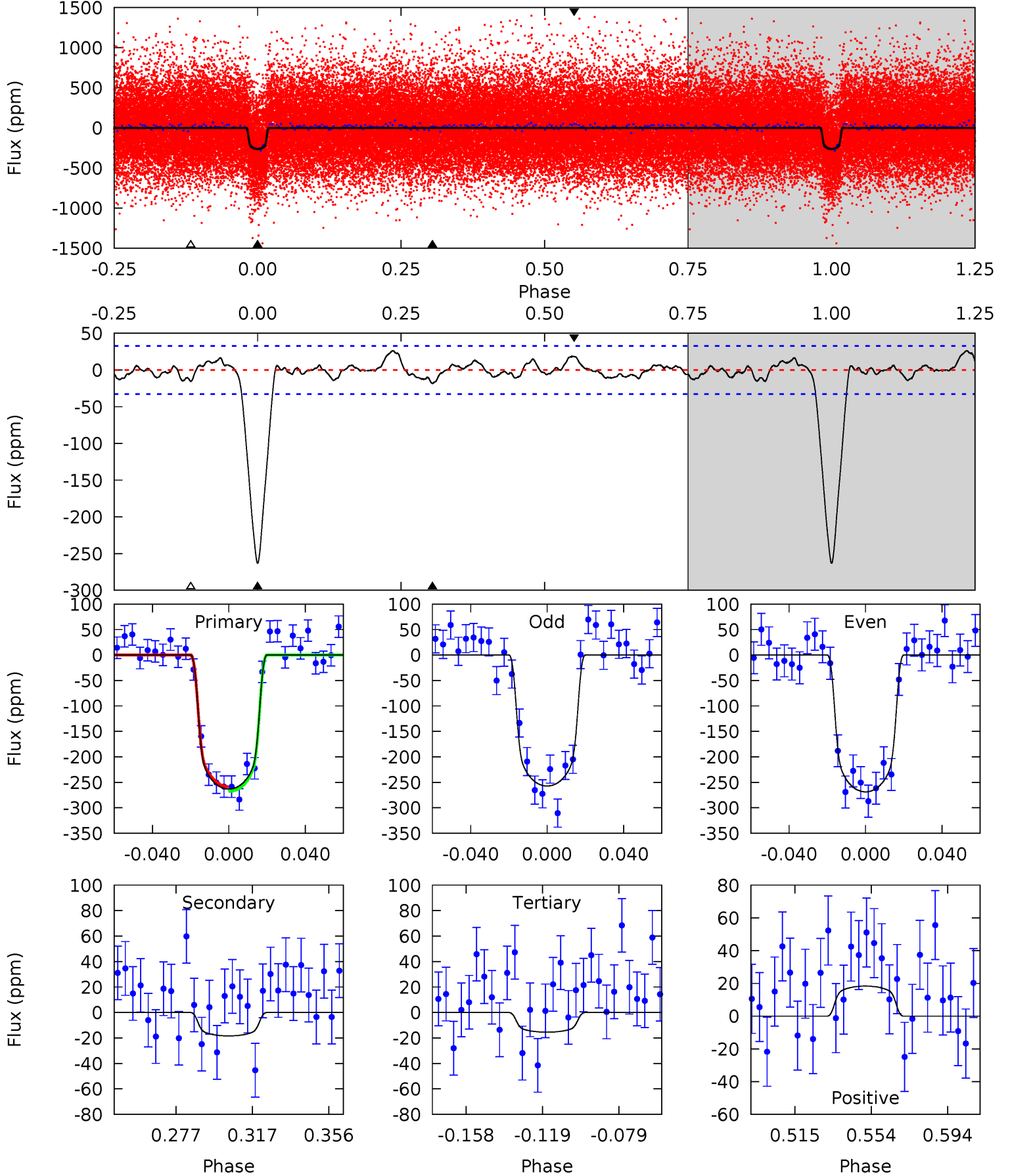
TCE 005436502-03     $P = 6.155648$  Days     $T_0 = 134.812793$  (BKJD)



# DV Model-Shift Uniqueness Test

005436502-03, P = 6.155685 Days, E = 128.652885 Days

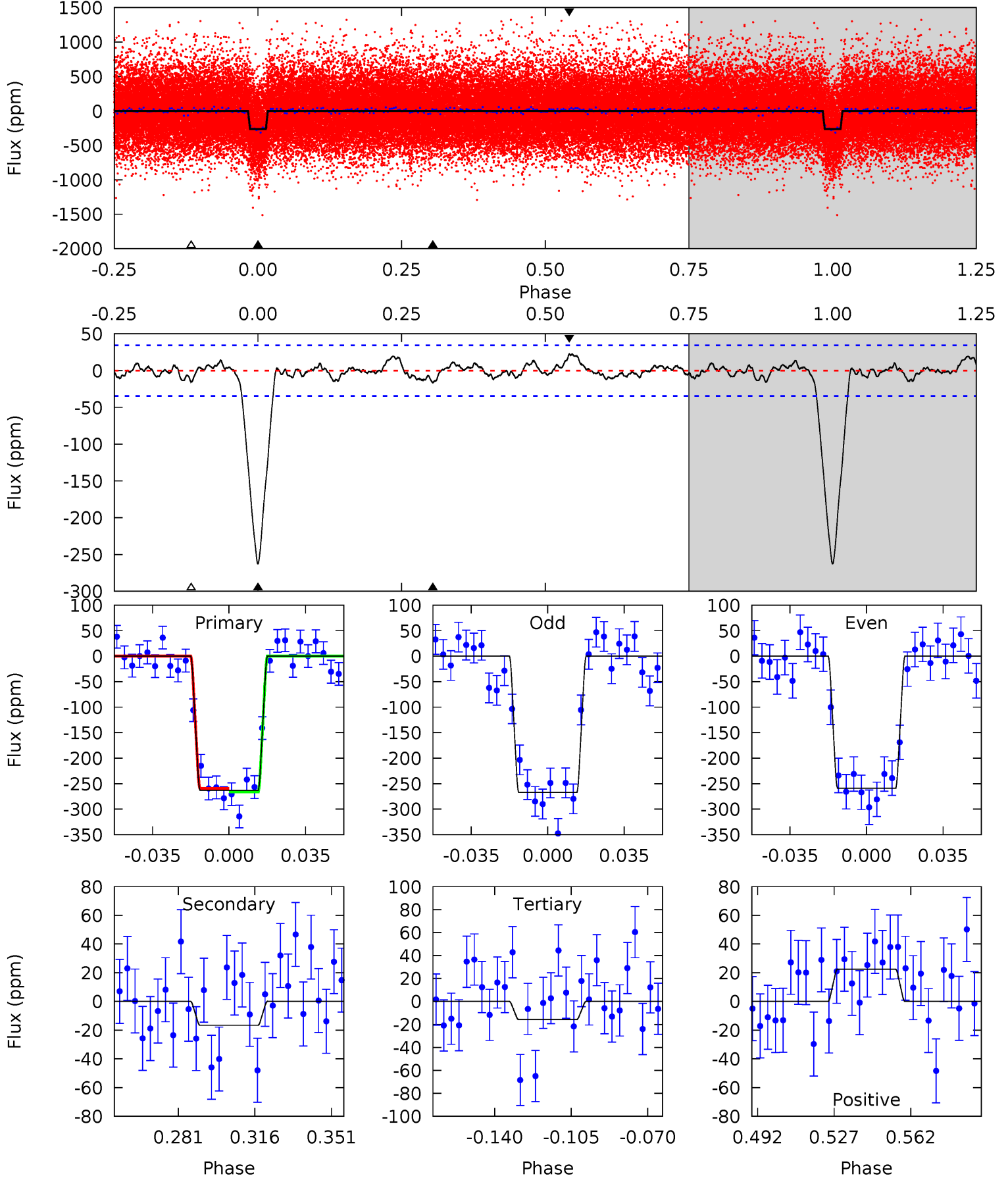
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
38.3	2.67	2.25	2.67	4.76	2.06	1.18	36.0	35.6	0.43	0.00	0.84	1.03	0.09	0.65



# Alt Model-Shift Uniqueness Test

005436502-03, P = 6.155648 Days, E = 128.657145 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
36.5	2.30	2.18	3.12	4.78	2.11	1.00	34.3	33.4	0.12	-0.82	0.58	1.04	0.08	0.48





### Stellar Parameters For KIC 005436502

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5739^{+114}_{-103}$	$4.191^{+0.162}_{-0.108}$	$0.300^{+0.100}_{-0.150}$	$1.384^{+0.242}_{-0.266}$	$1.083^{+0.100}_{-0.075}$	$0.576^{+0.460}_{-0.187}$
	+2%/-2%	+4%/-3%	+33%/-50%	+17%/-19%	+9%/-7%	+80%/-33%
Source	SPE58	SPE58	SPE58	DSEP		

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

### Secondary Eclipse Parameters for KIC 005436502-03 / KOI 0834.03

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-18 \pm 7$	$2.79^{+0.38}_{-0.31}$	$1593^{+79}_{-77}$	$3264^{+205}_{-239}$	$5.801^{+3.024}_{-2.471}$
Alt.	$-17 \pm 7$	$2.46^{+0.32}_{-0.30}$	$1598^{+69}_{-80}$	$3350^{+224}_{-287}$	$6.684^{+4.022}_{-2.895}$

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

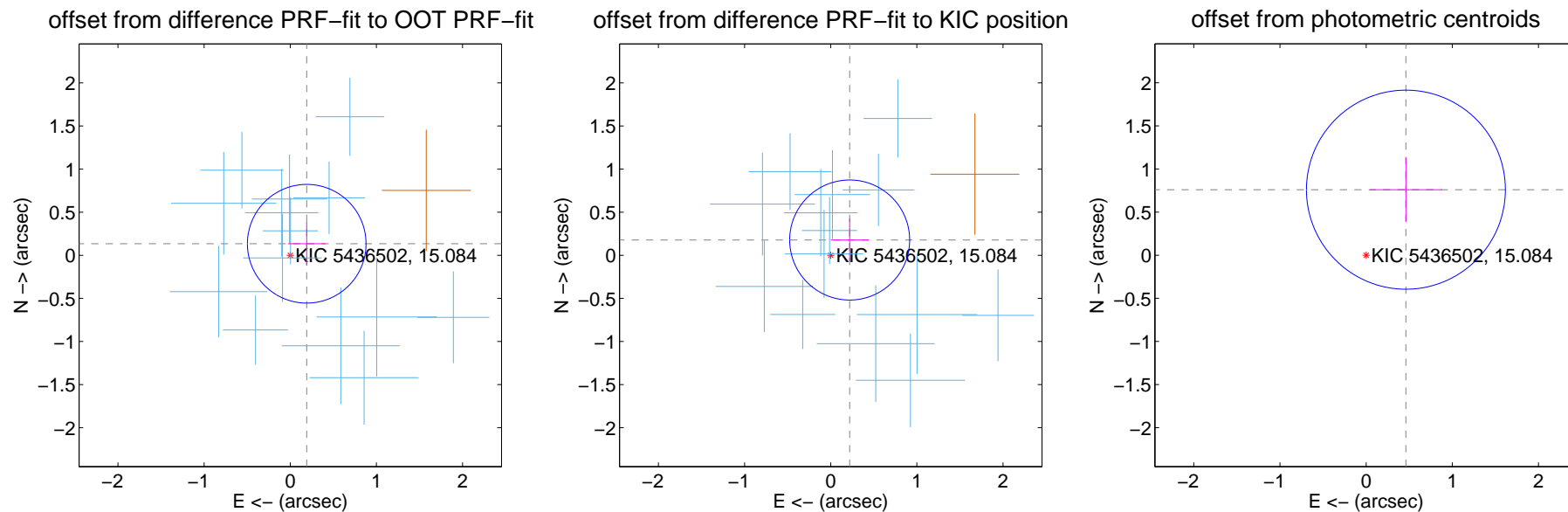
## DV Centroid Data

Supplemental centroid analysis for 005436502-03. Kepler magnitude: 15.08. Transit SNR 27.62

There are 14 quarters with good PRF difference image offsets

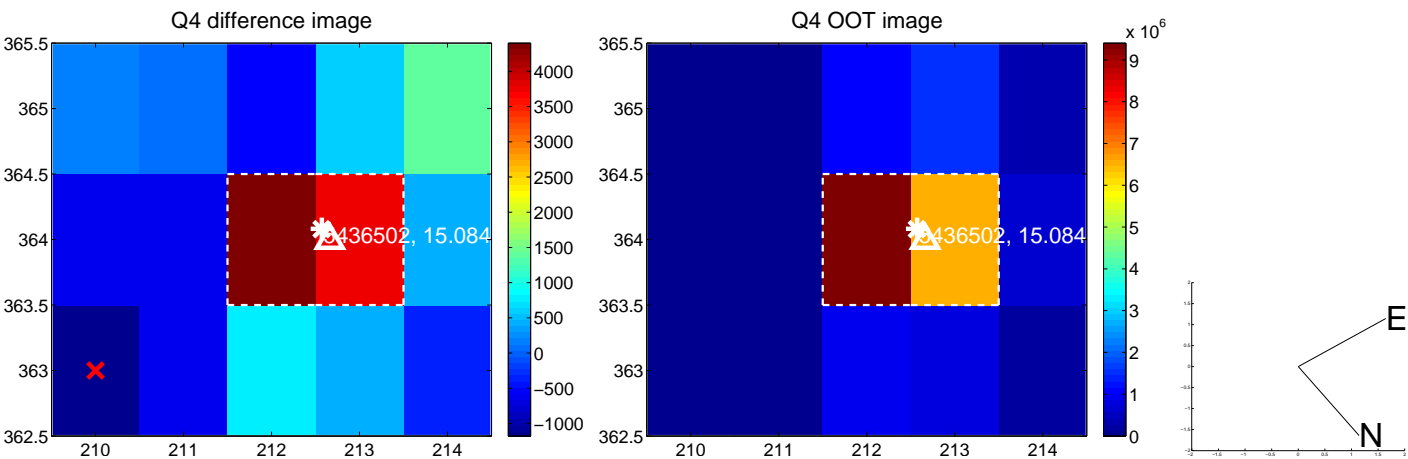
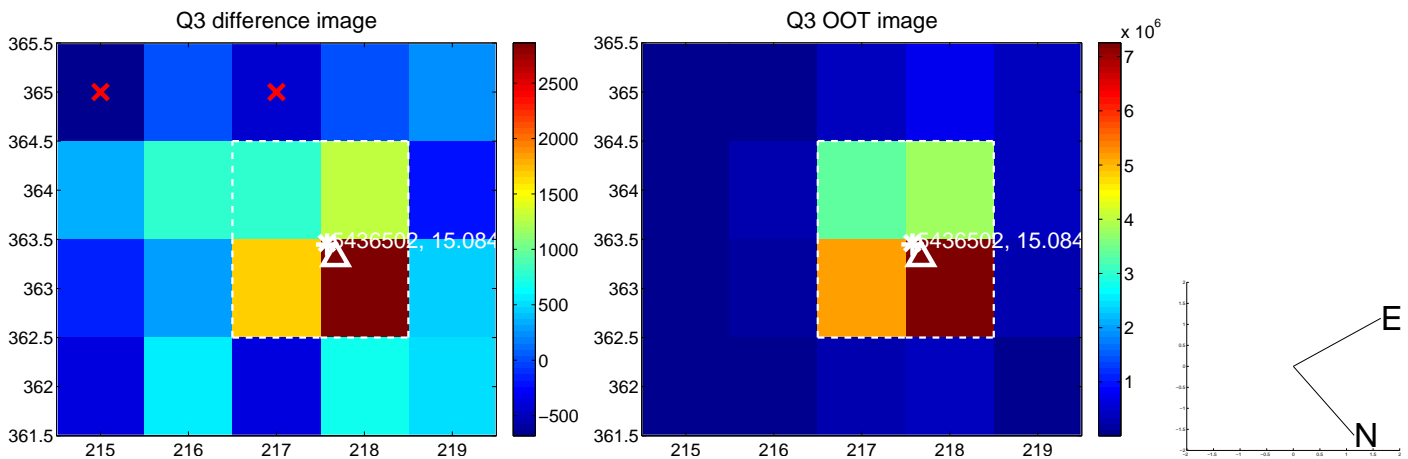
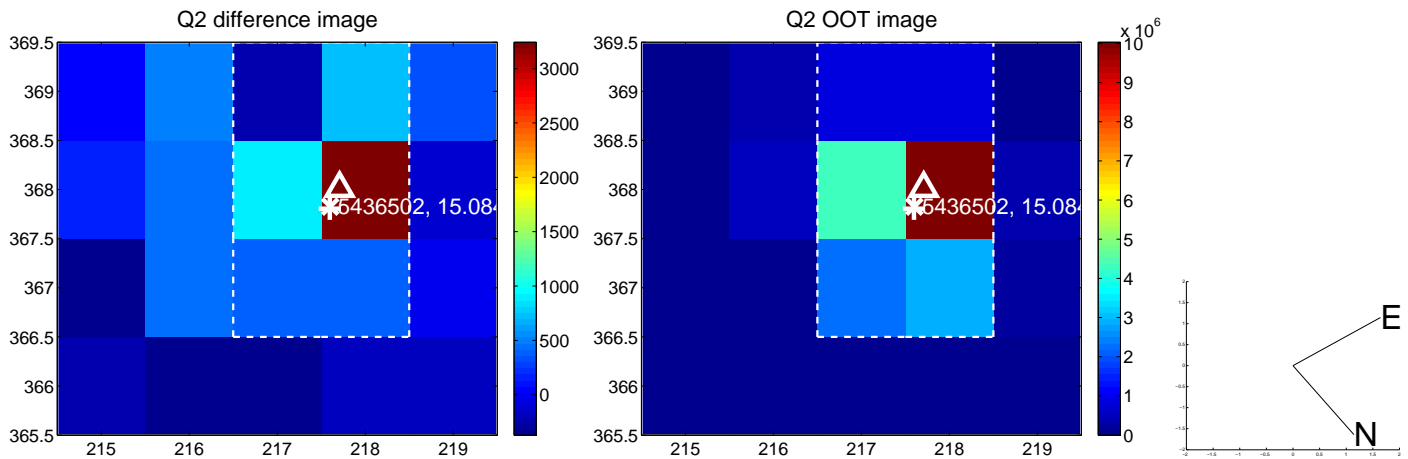
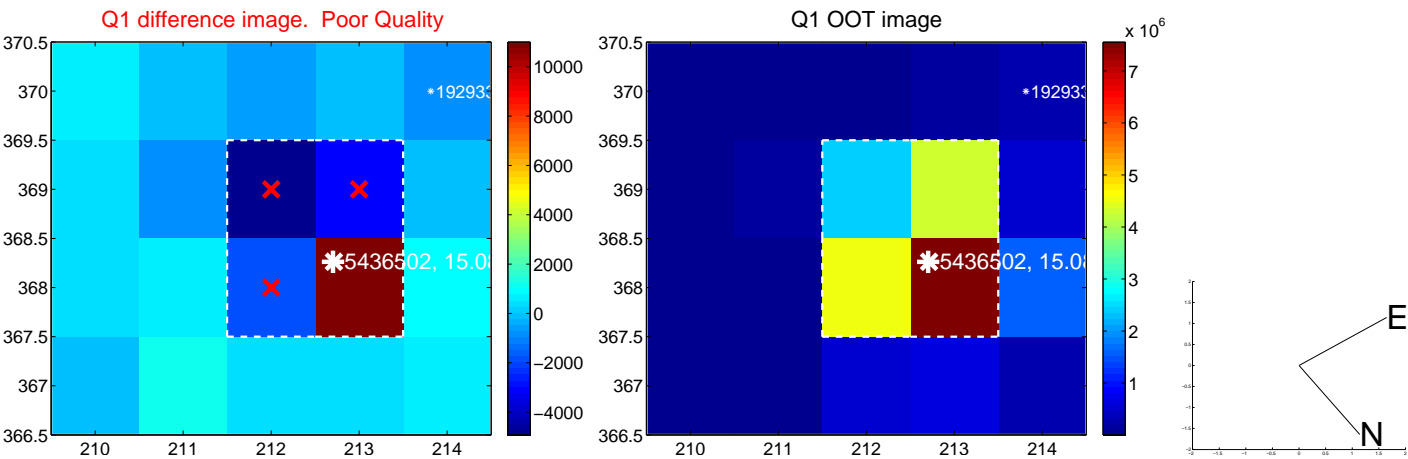
The direct PRF centroid is offset from the target star catalog position by about 0.03 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.233 \pm 0.229$	1.02	$-0.191 \pm 0.216$	$0.134 \pm 0.254$
PRF-fit source offset from KIC position	$0.282 \pm 0.232$	1.22	$-0.220 \pm 0.221$	$0.177 \pm 0.249$
photometric centroid source offset	$0.89 \pm 0.38$	2.31	$-0.46 \pm 0.42$	$0.76 \pm 0.37$



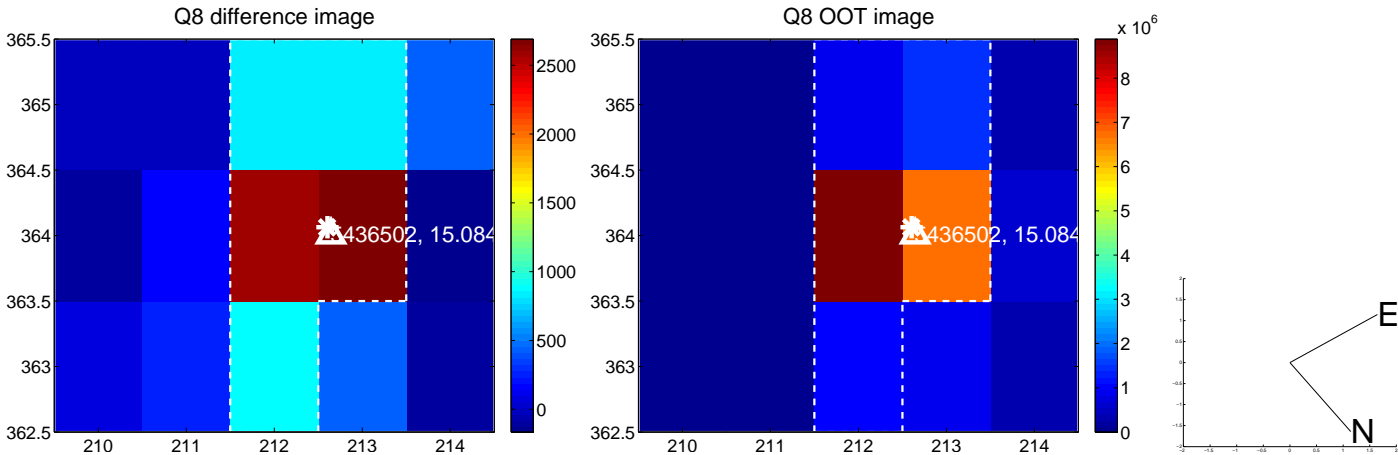
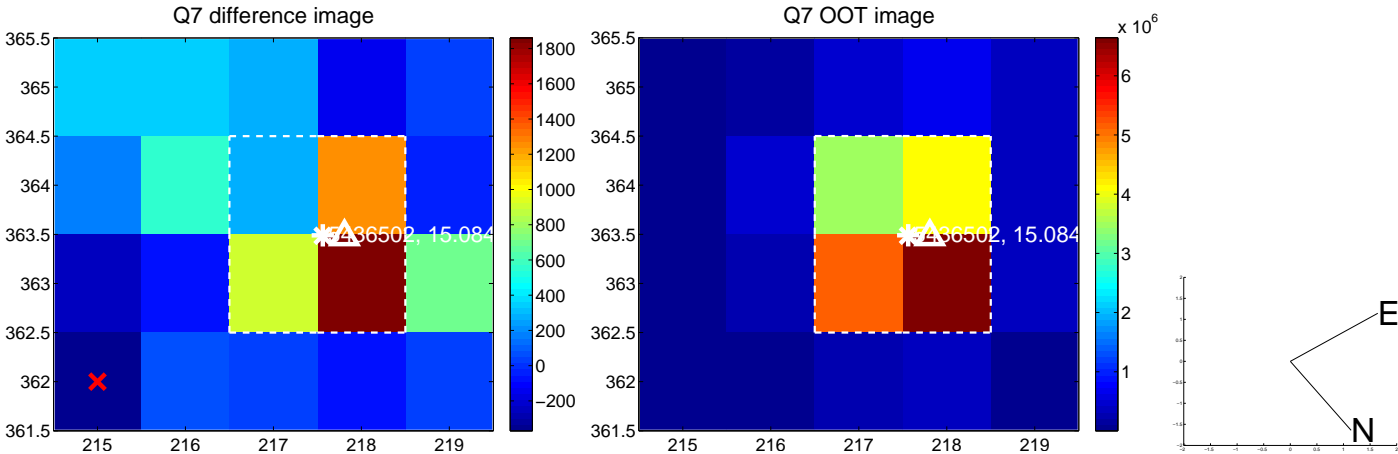
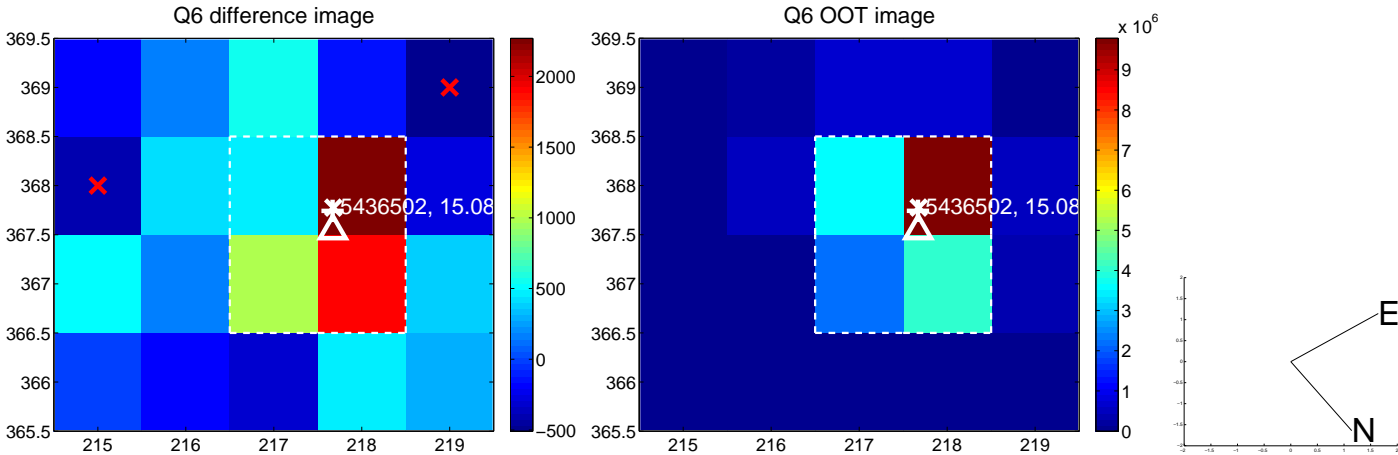
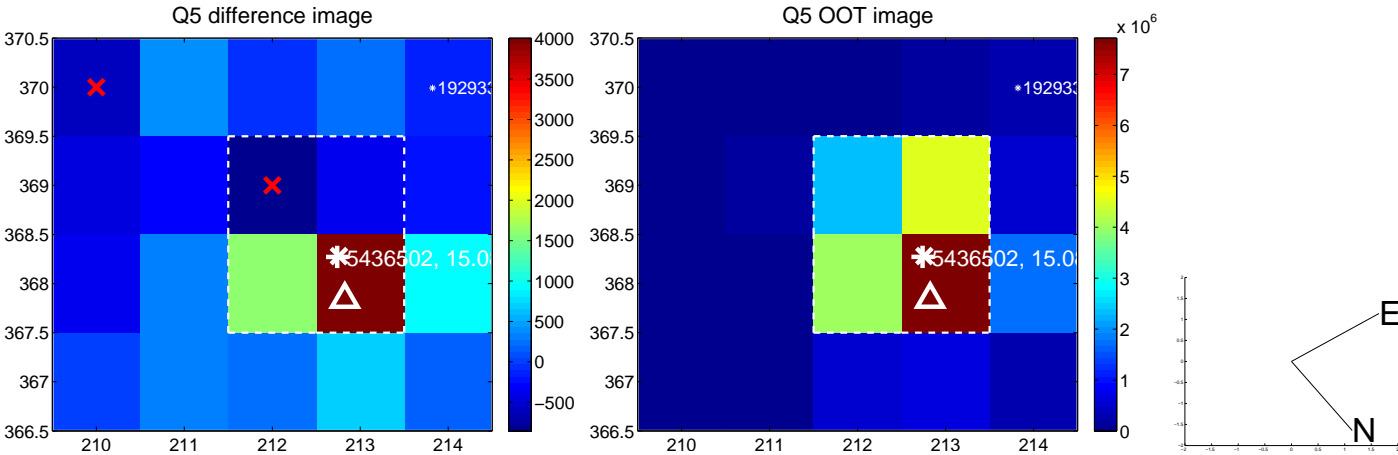
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

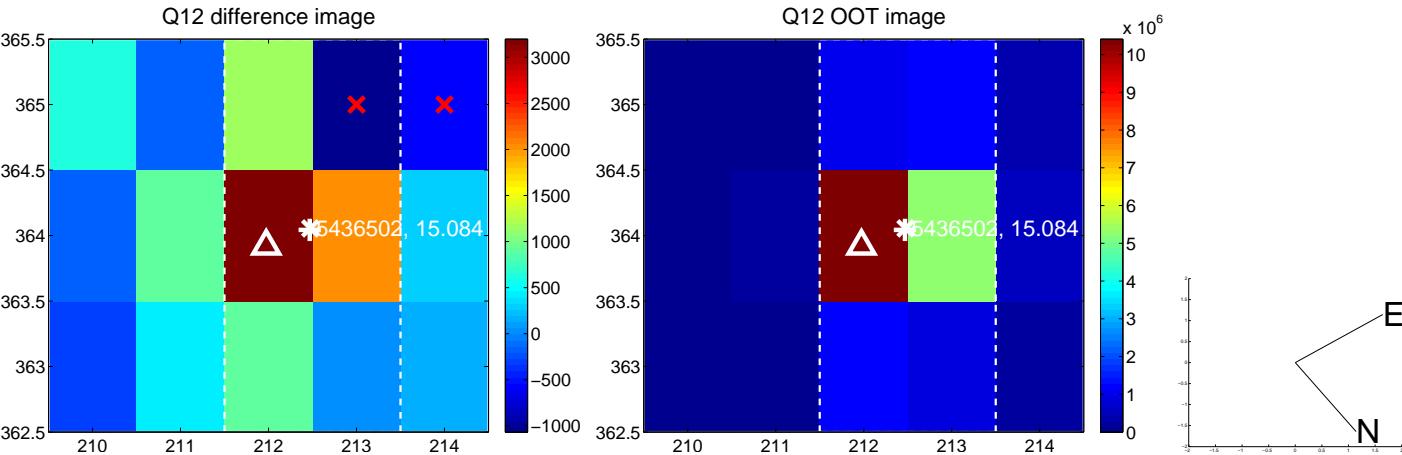
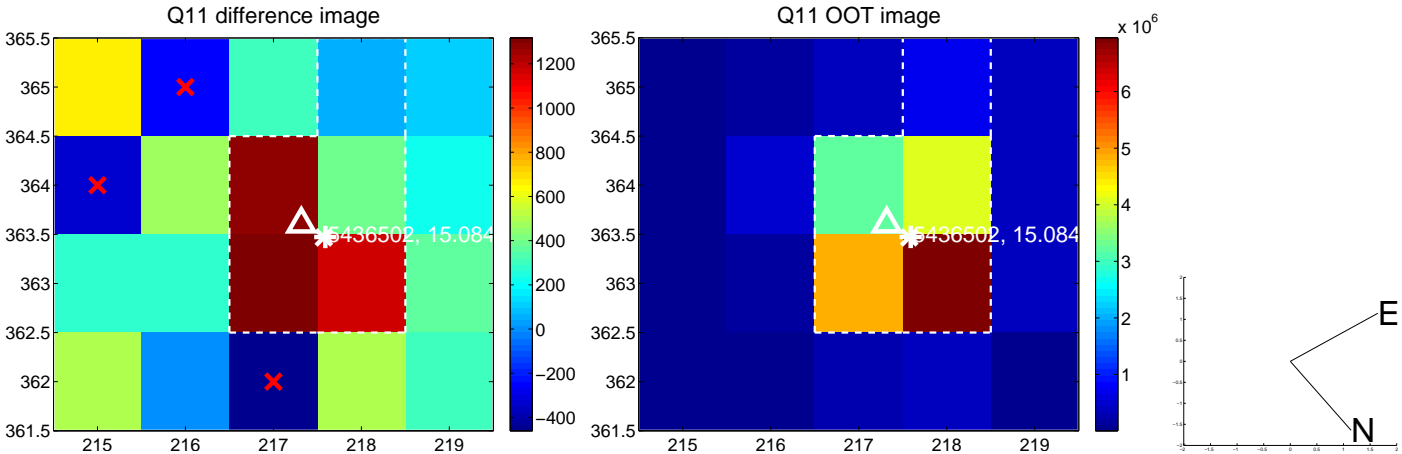
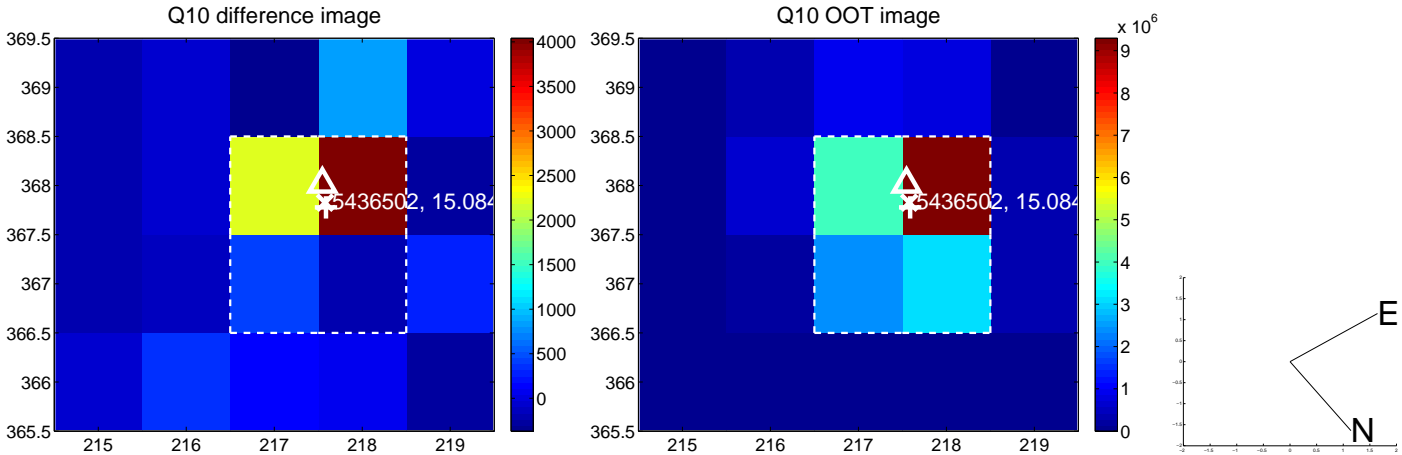
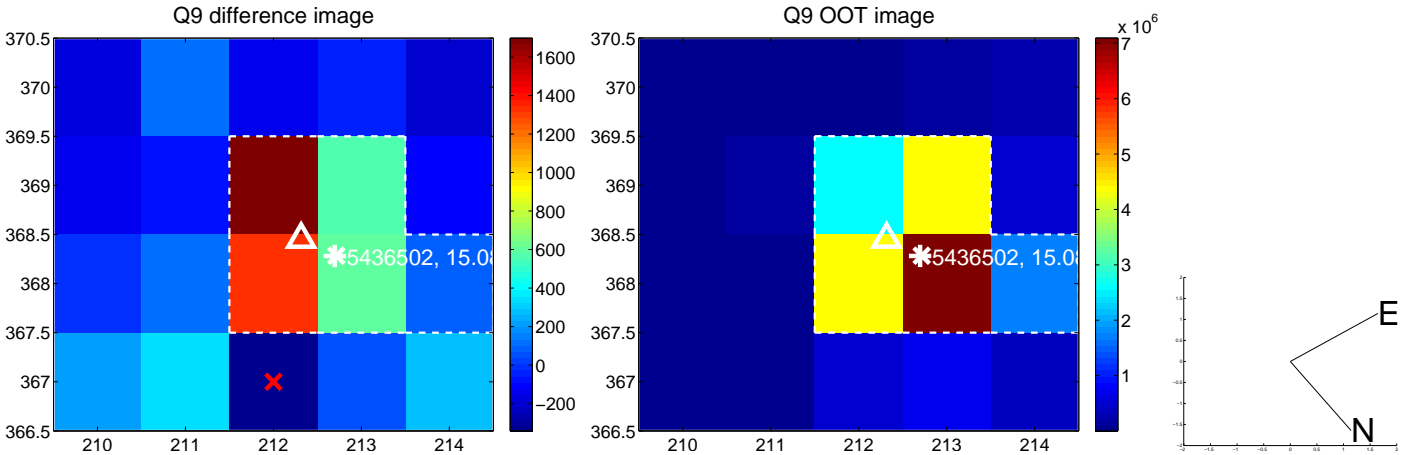




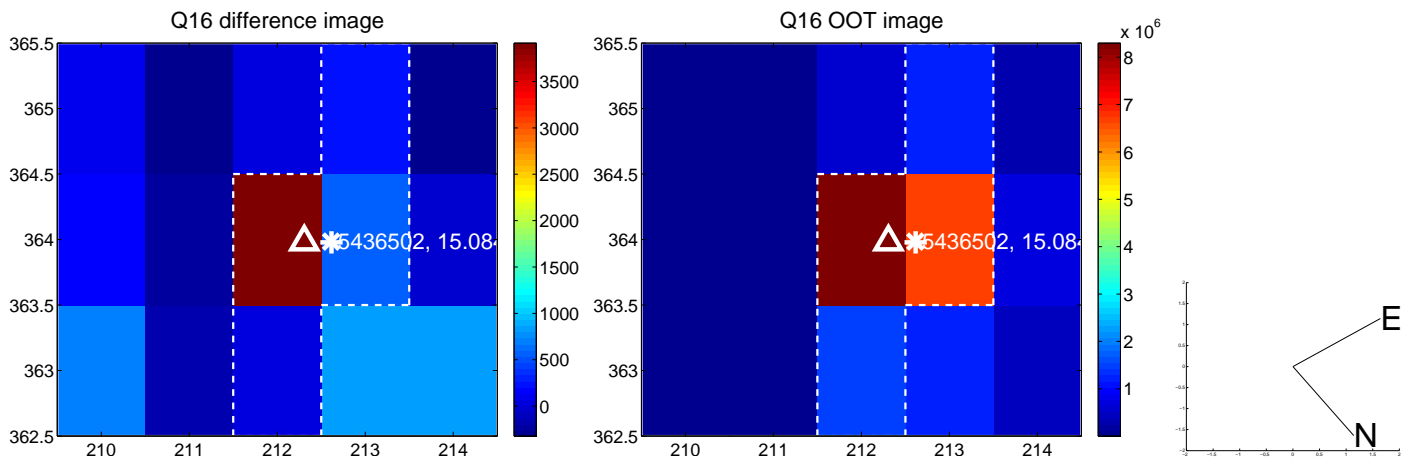
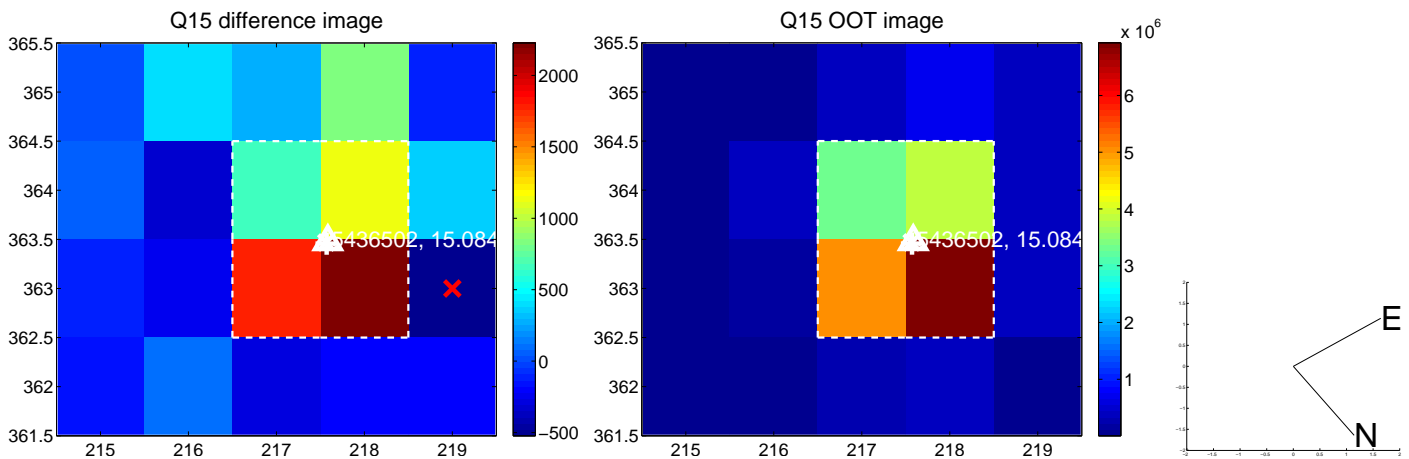
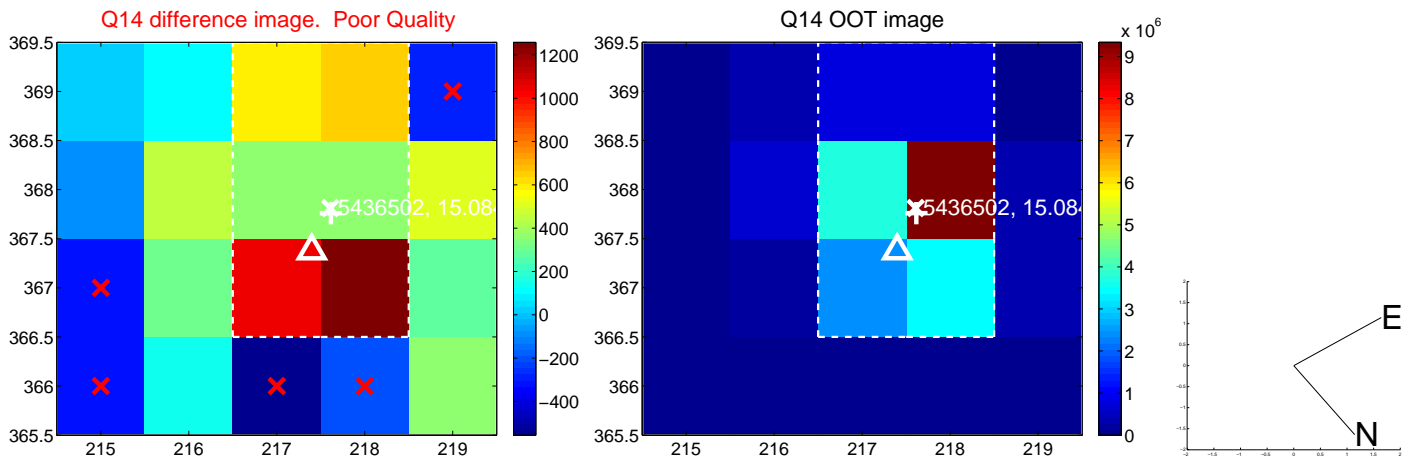
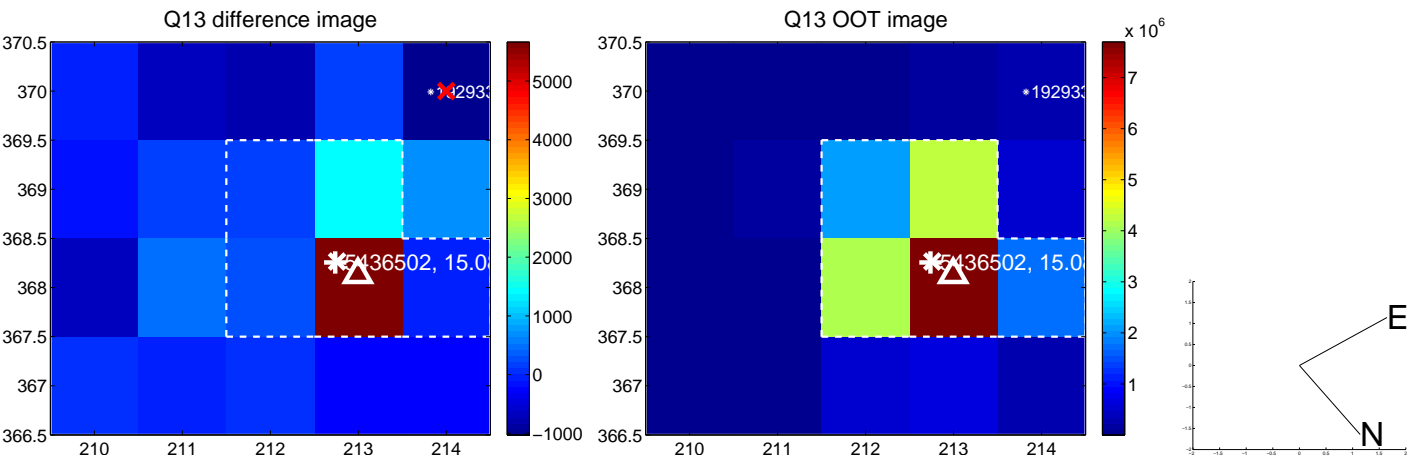
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



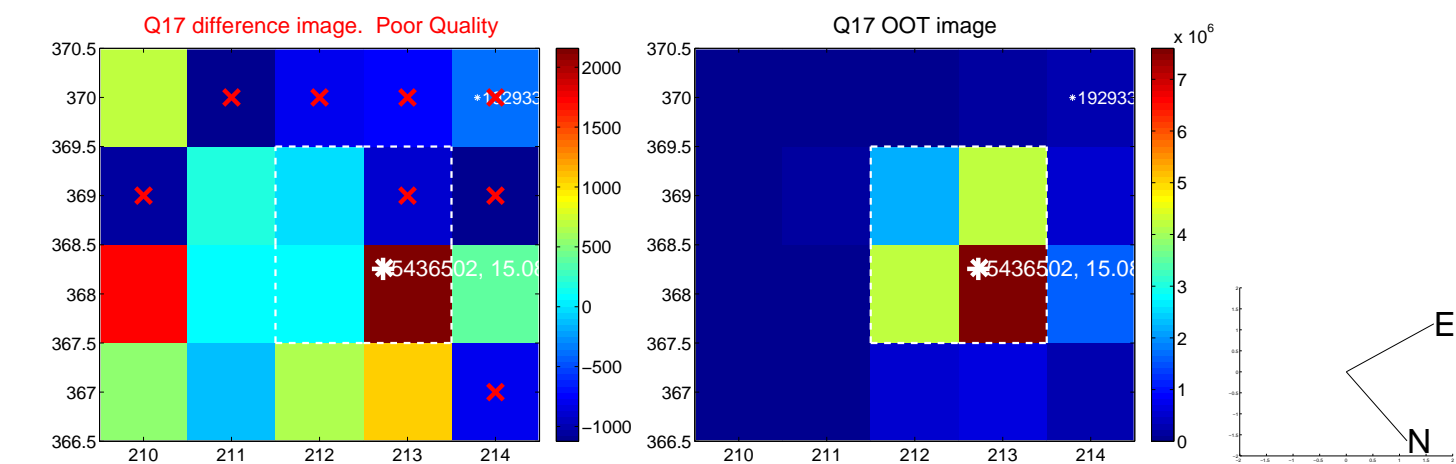
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



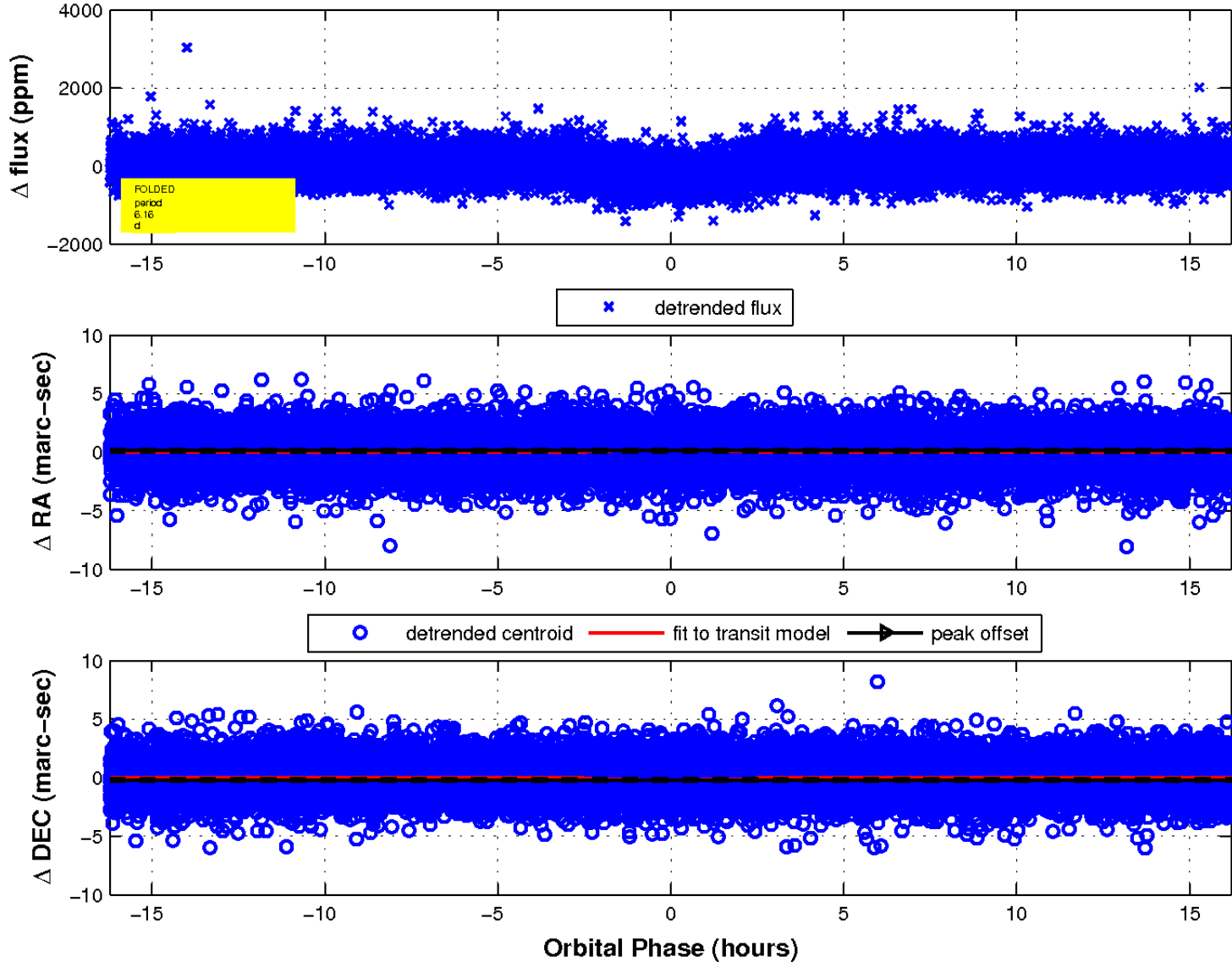
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

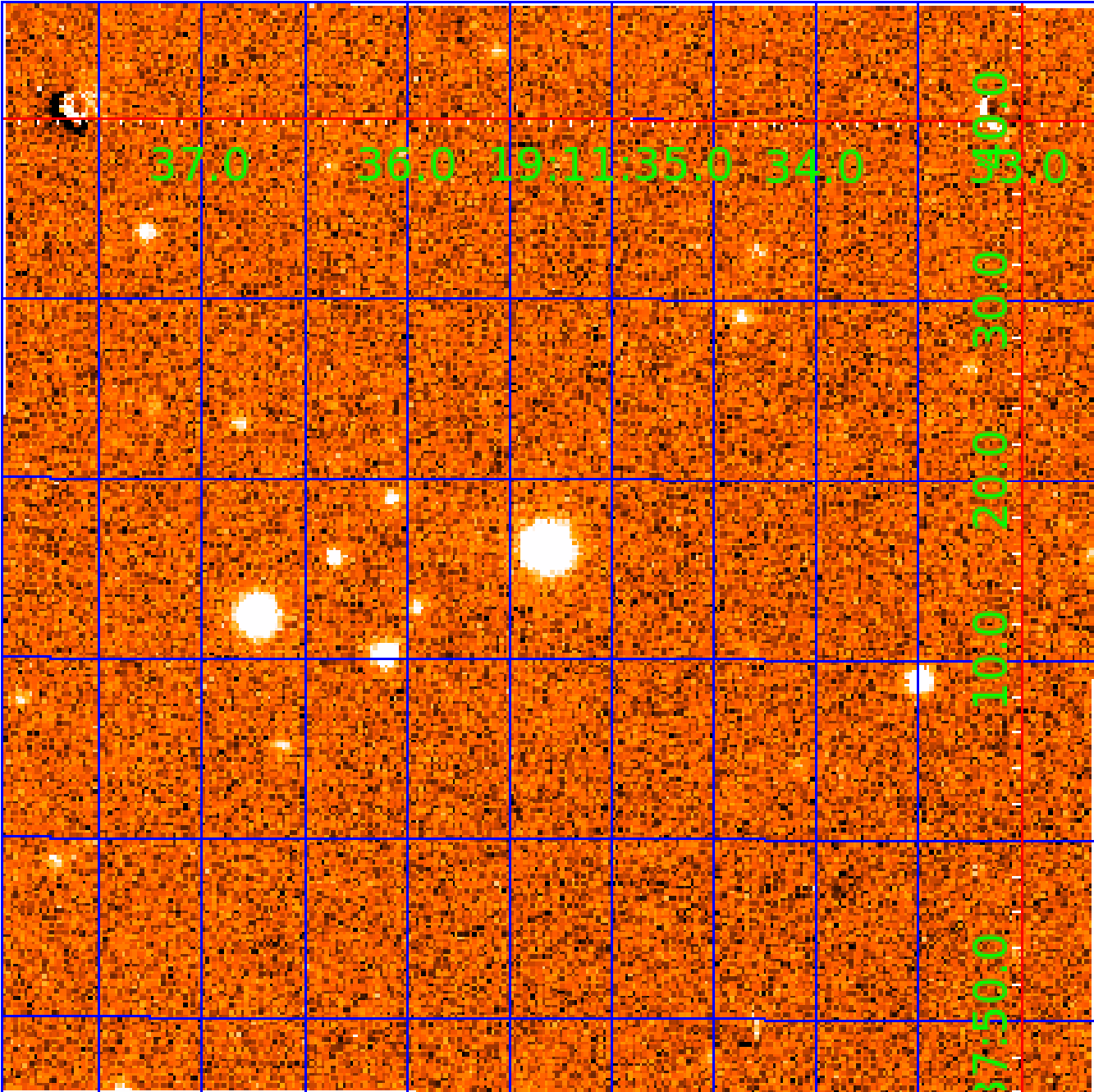


fluxWeightedCentroids, Planet 3 of 5



UKIRT Image

Declination



# KIC 005436502

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005436502-01	OBS	0834.01	23.653692	147.722190	3377.2	8.267	188.4	191.2	1.38	5739	8.05	67.78
005436502-02	OBS	0834.02	13.233523	140.323222	503.0	6.992	34.3	37.0	1.38	5739	3.44	147.04
005436502-03	OBS	0834.03	6.155685	134.808570	276.3	5.405	26.3	27.6	1.38	5739	2.83	407.97
005436502-04	OBS	0834.05	50.447402	178.491327	405.1	7.636	15.2	15.7	1.38	5739	3.17	24.69
005436502-05	OBS	0834.04	2.090786	132.090330	110.1	3.505	14.9	15.7	1.38	5739	1.73	1721.54

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005436502-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
005436502-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT
005436502-03	OBS	PC	1.00	0	0	0	0	NO_COMMENT
005436502-04	OBS	PC	0.99	0	0	0	0	NO_COMMENT
005436502-05	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.

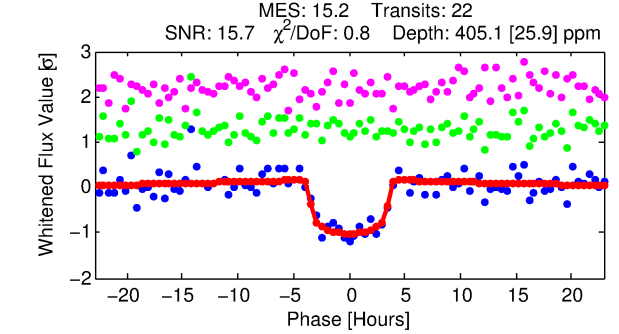
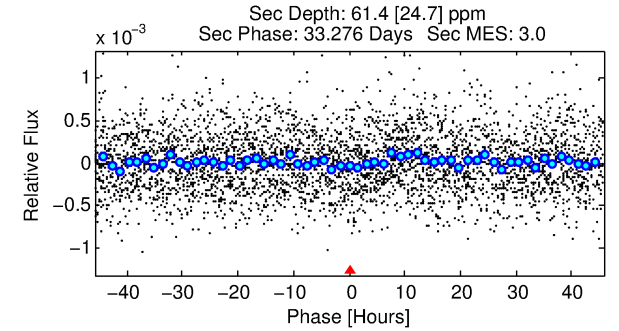
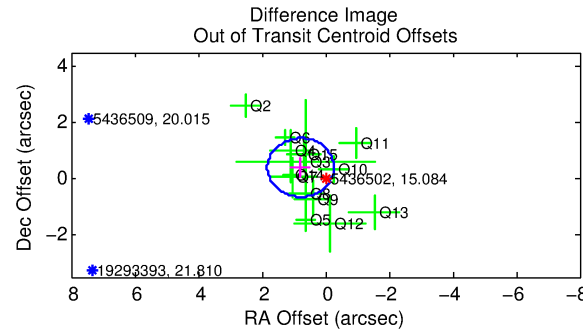
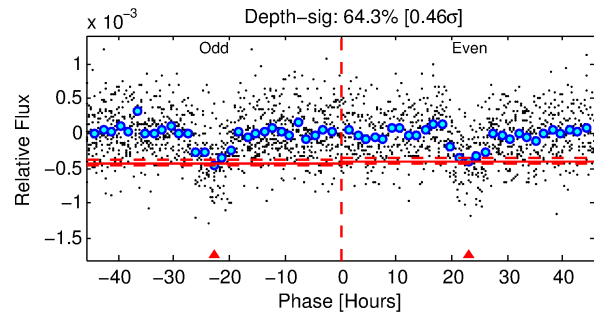
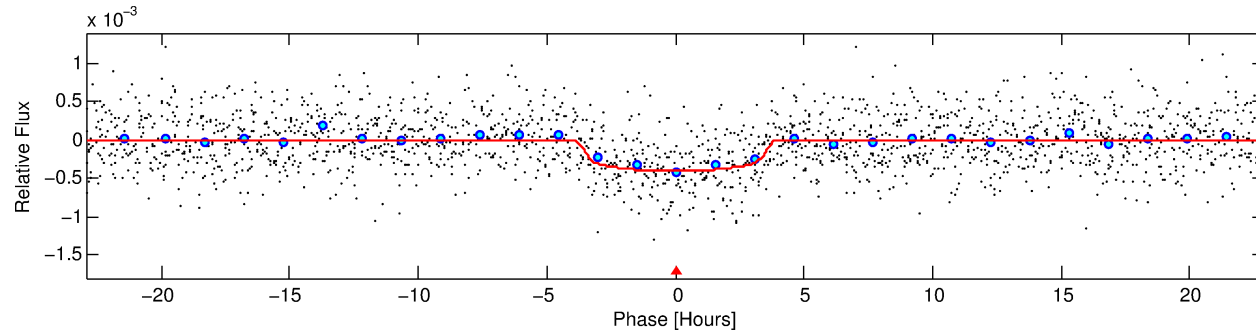
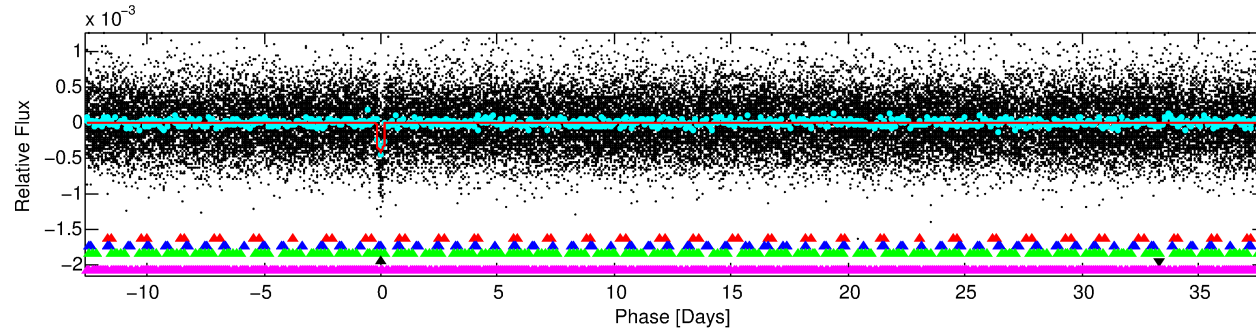
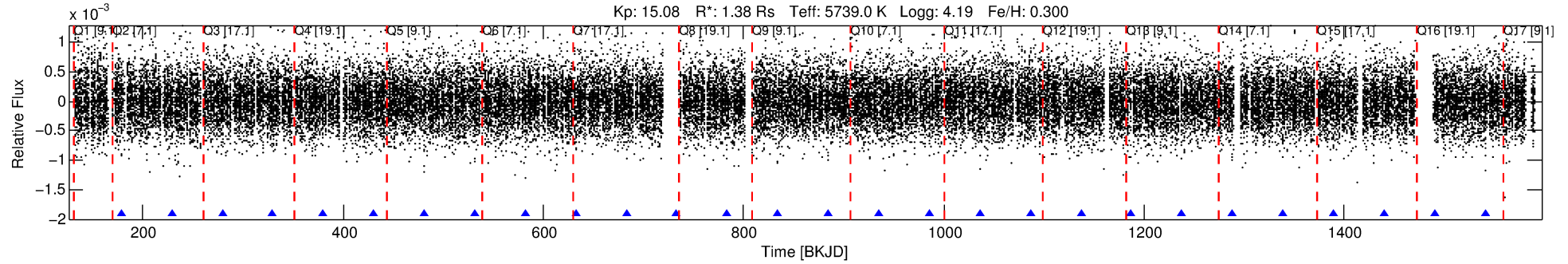
## Ephemeris Match Information For 005436502-04

No Significant Match Found



# DV One-Page Summary

KIC: 5436502 Candidate: 4 of 5 Period: 50.447 d  
KOI: K00834.05 Name: Kepler-238f Corr: 0.987



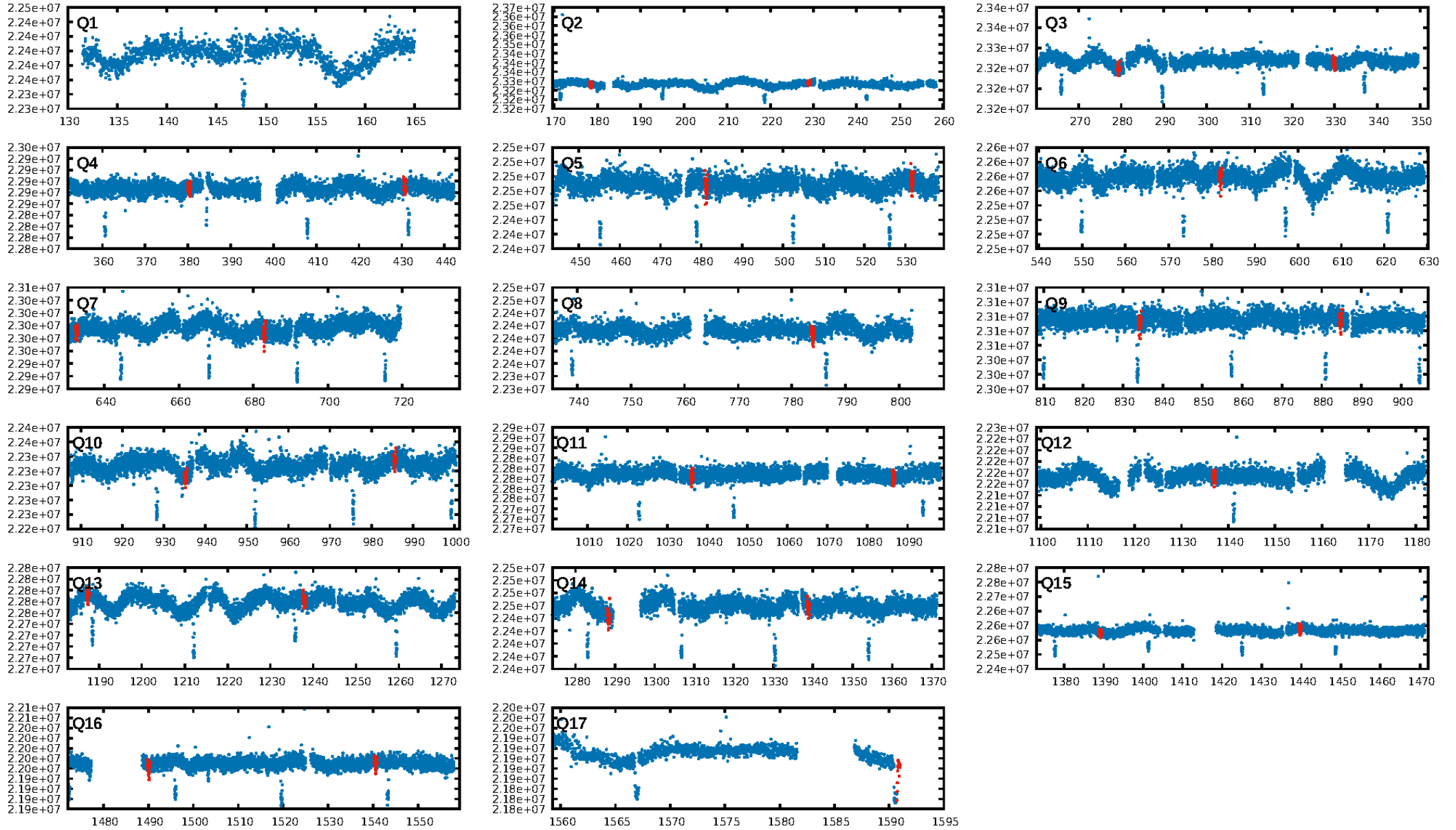
## DV Fit Results:

Period = 50.44740 [0.00054] d  
Epoch = 178.4913 [0.0081] BKJD  
Rp/R\* = 0.0210 [0.0041]  
a/R\* = 29.36 [24.58]  
b = 0.84 [0.30]  
Seff = 24.69 [7.18]  
Teq = 568 [41] K  
Rp = 3.17 [0.87] Re  
a = 0.2746 [0.0490] AU  
Ag = 253.93 [159.46] [1.59 $\sigma$ ]  
Teffp = 3508 [498] K [5.88 $\sigma$ ]

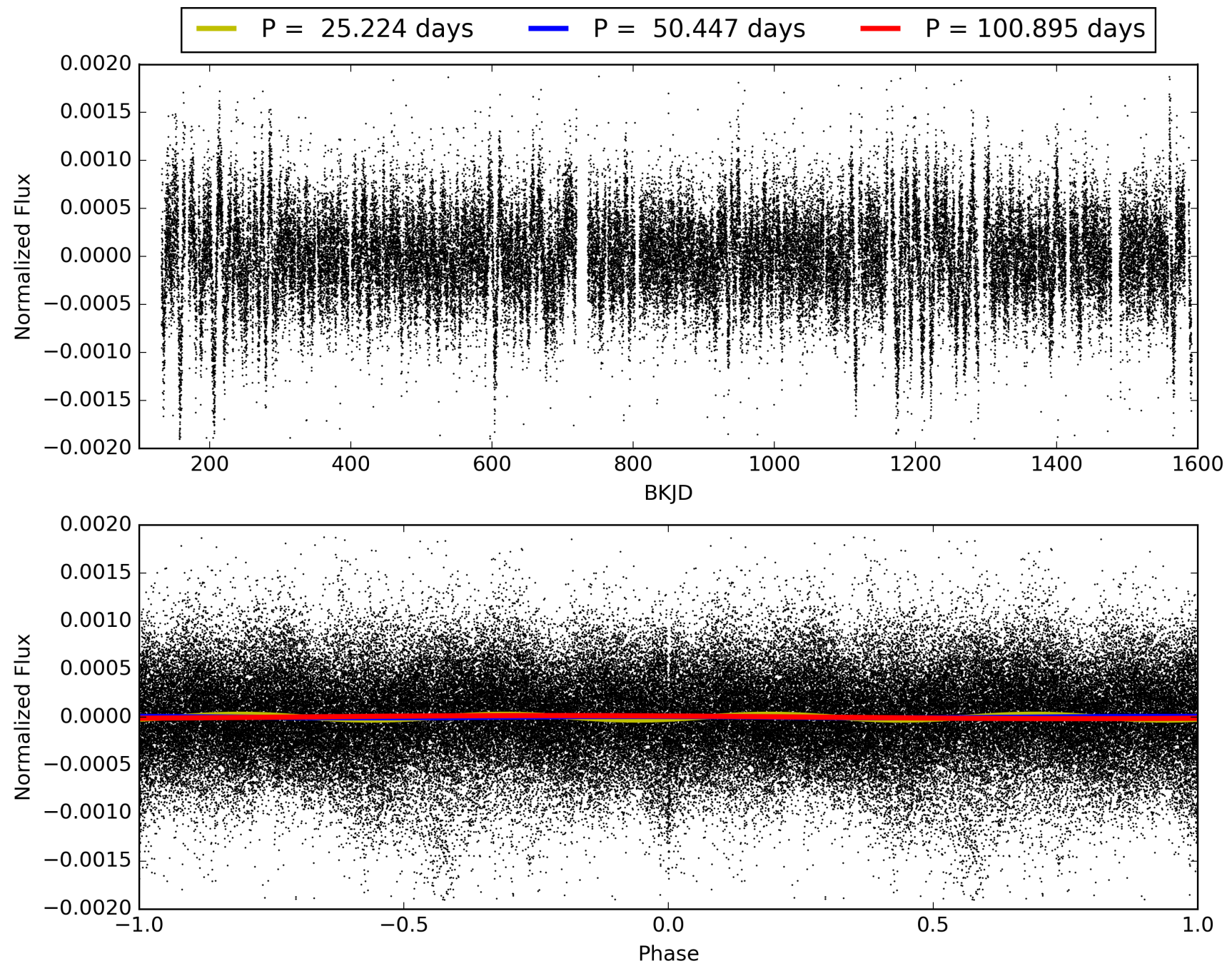
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [57.14 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 63.4%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 7.85e-49  
RollingBand-fgt: 1.00 [22/22]  
GhostDiagnostic-chr: 3.894  
Centroid-sig: 39.4%  
Centroid-so: 0.536 arcsec [0.86 $\sigma$ ]  
OotOffset-rm: 0.877 arcsec [2.52 $\sigma$ ]  
KicOffset-rm: 0.869 arcsec [2.63 $\sigma$ ]  
OotOffset-st: 4/4/3/3 [14]  
KicOffset-st: 4/4/3/3 [14]  
DiffImageQuality-fgm: 0.86 [12/14]  
DiffImageOverlap-fno: 0.33 [5/15]

# TCE 005436502-04, PDC Light Curves

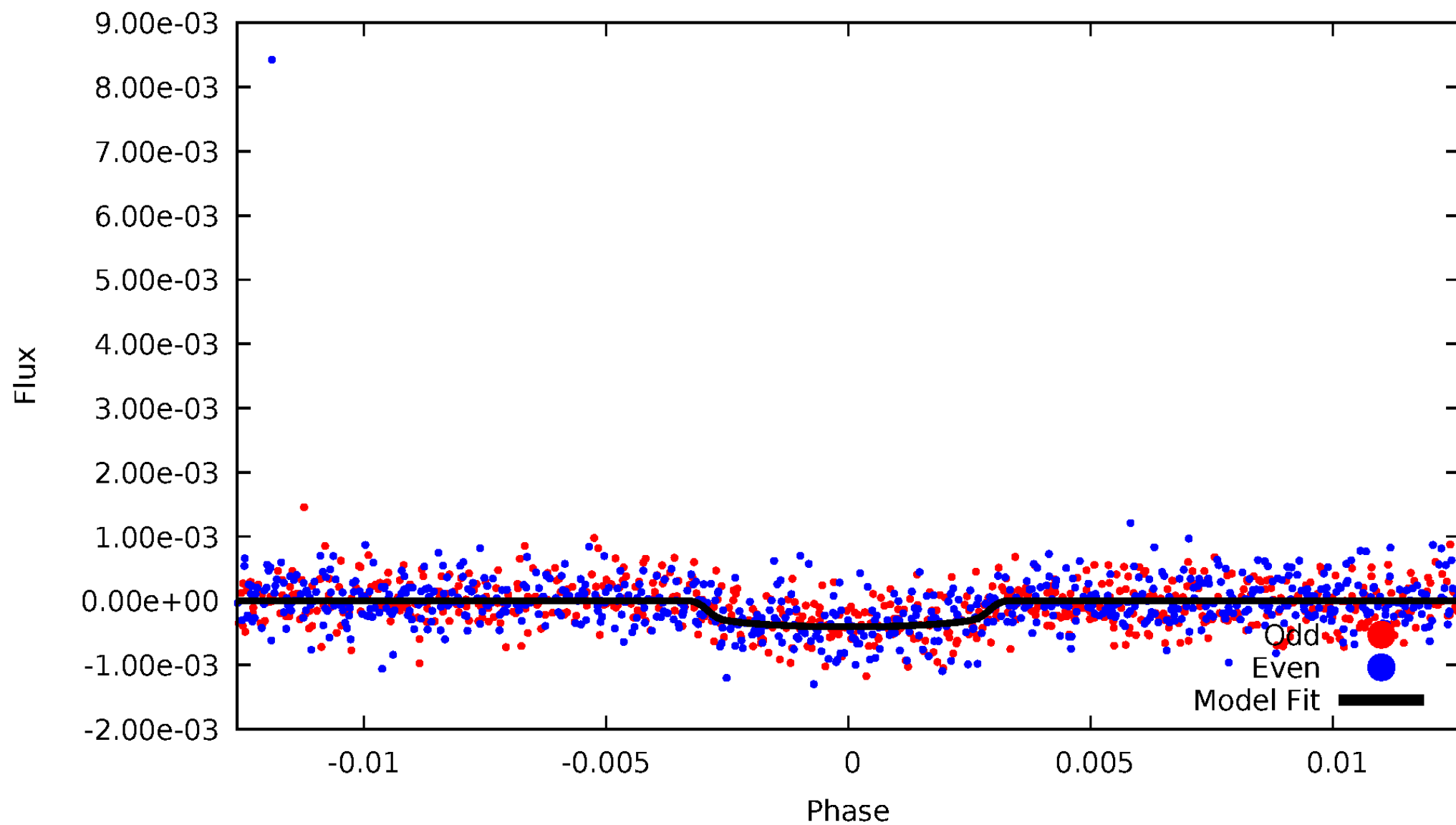


TCE 005436502-04



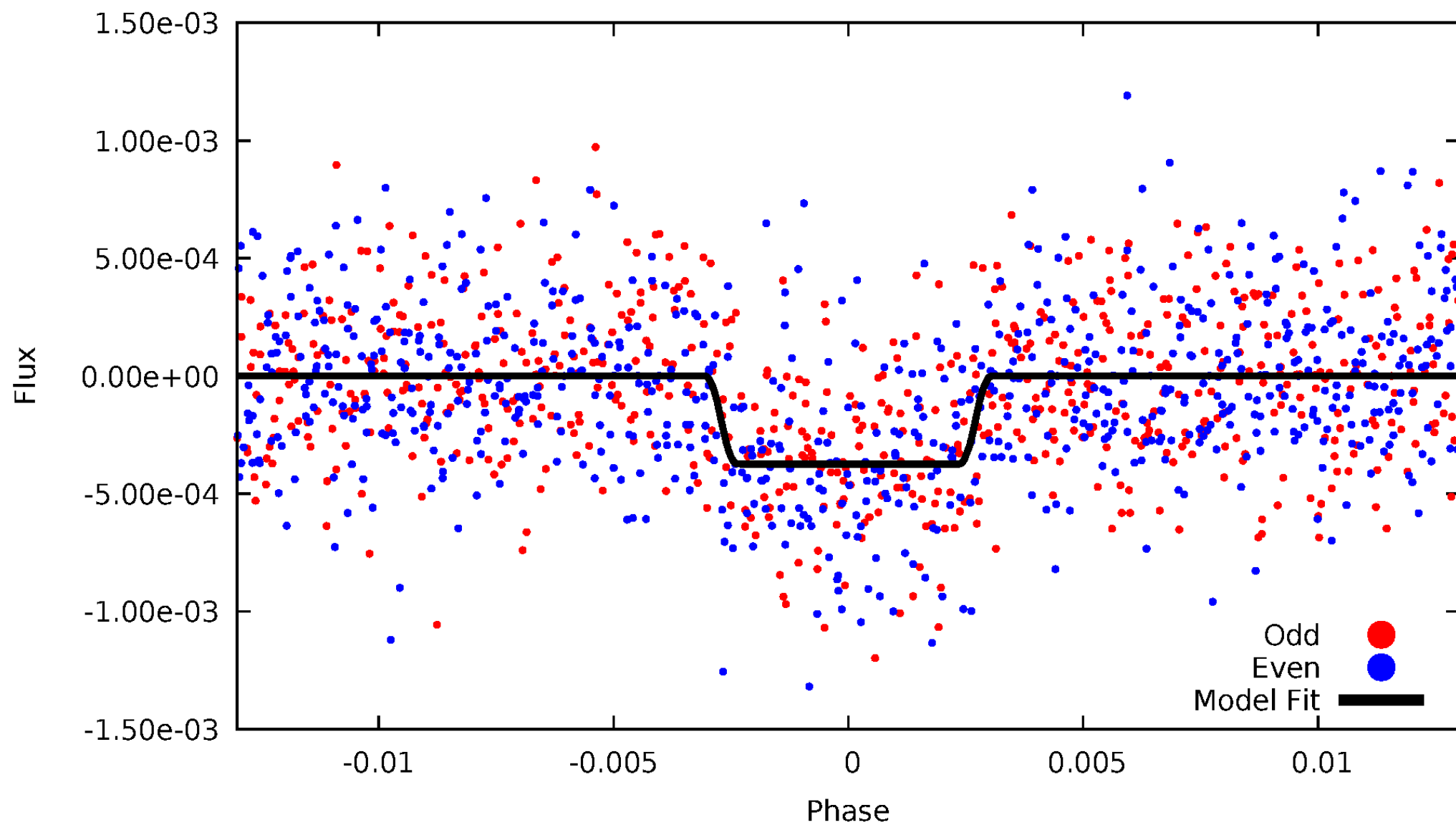
# DV Odd/Even

TCE 005436502-04



# ALT Odd/Even

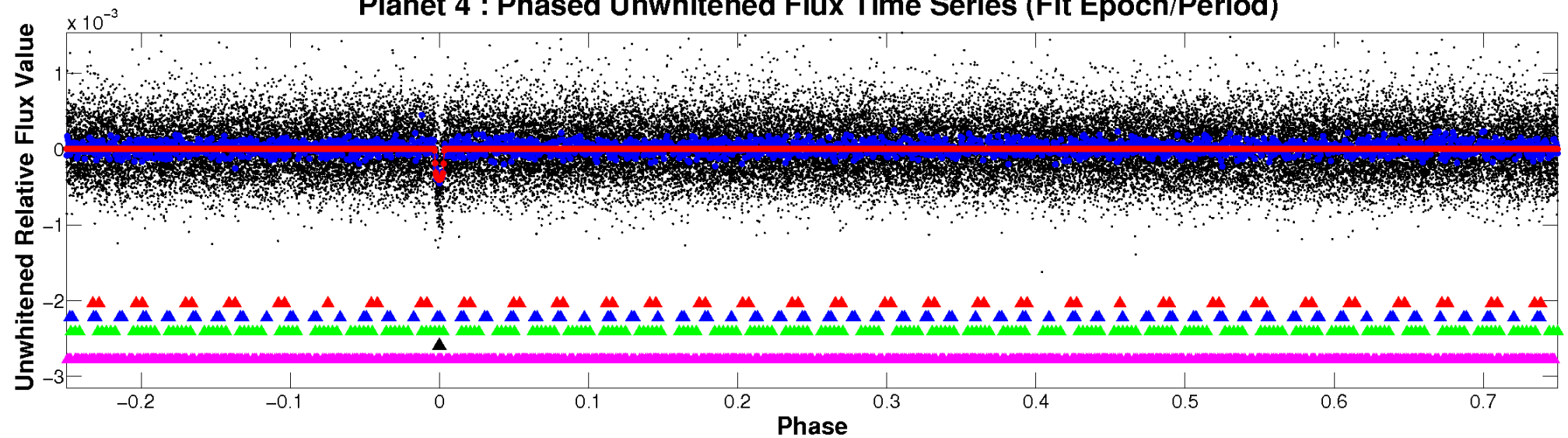
TCE 005436502-04



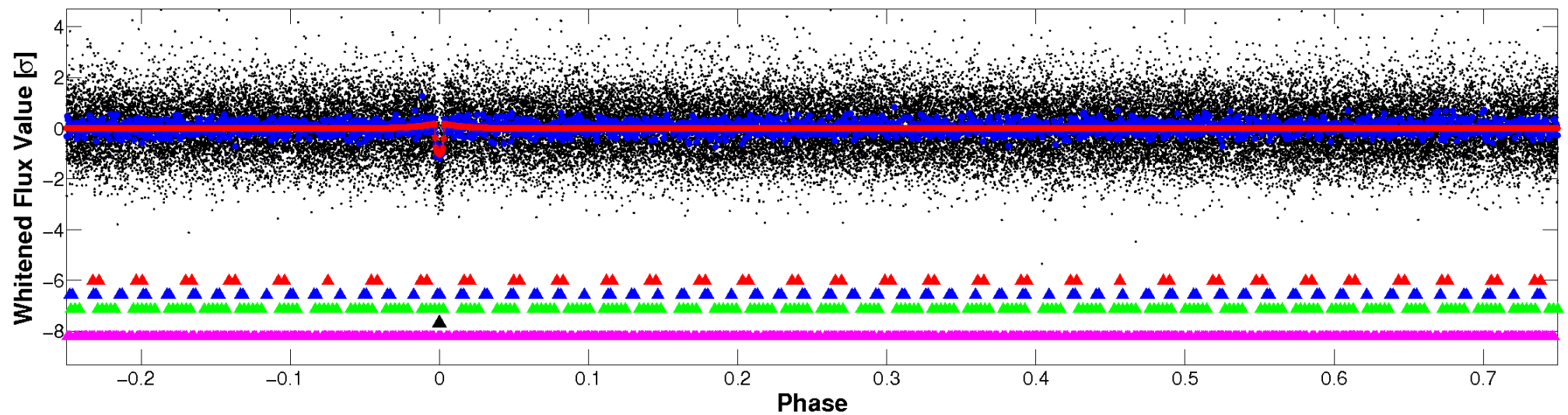


# Non-Whitened Vs. Whitened Light Curve

## Planet 4 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)



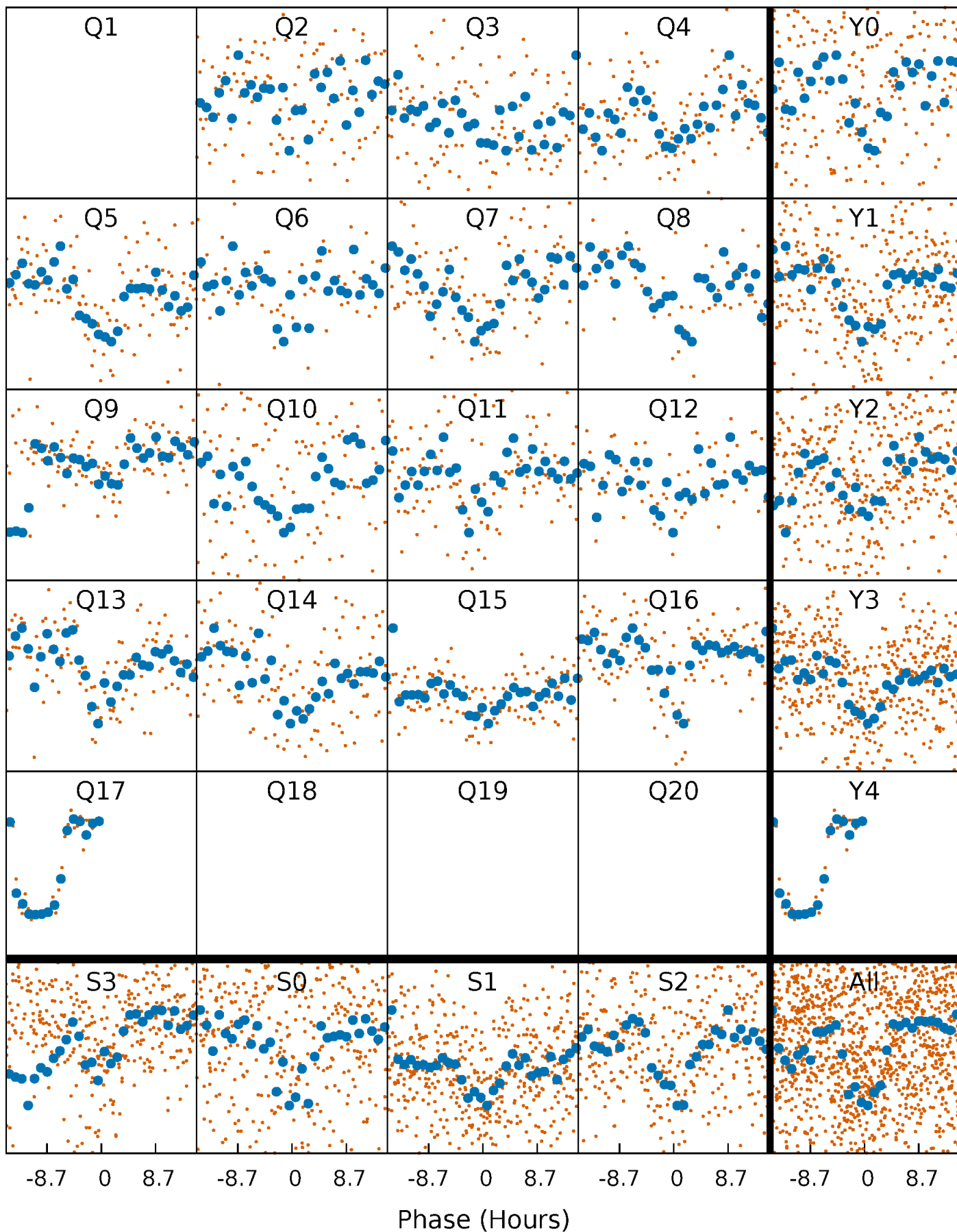
## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)





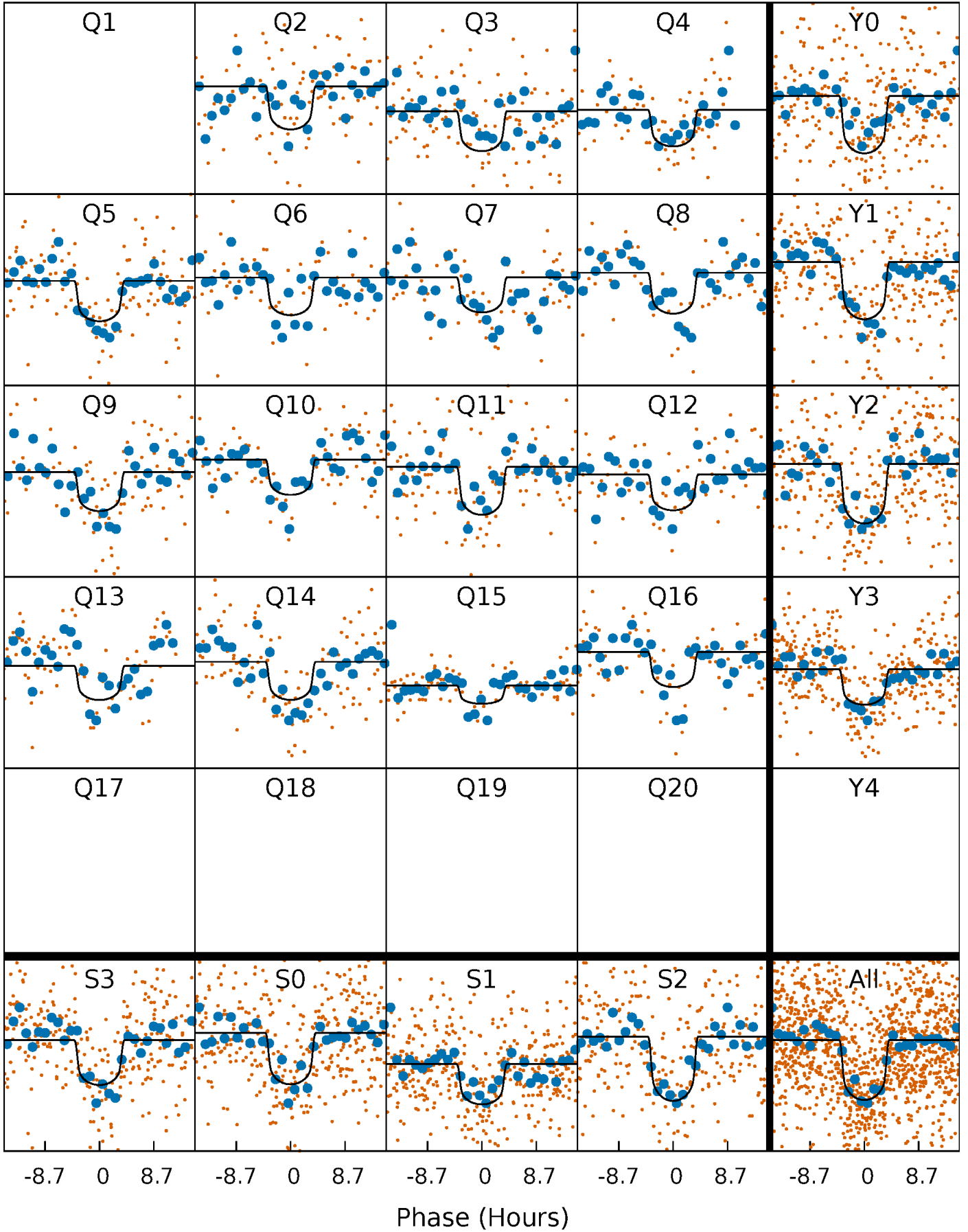
# PDC Quarter-Phased Transit Curves

TCE 005436502-04 P= 50.447402 Days  $T_0=178.491327$  (BKJD)



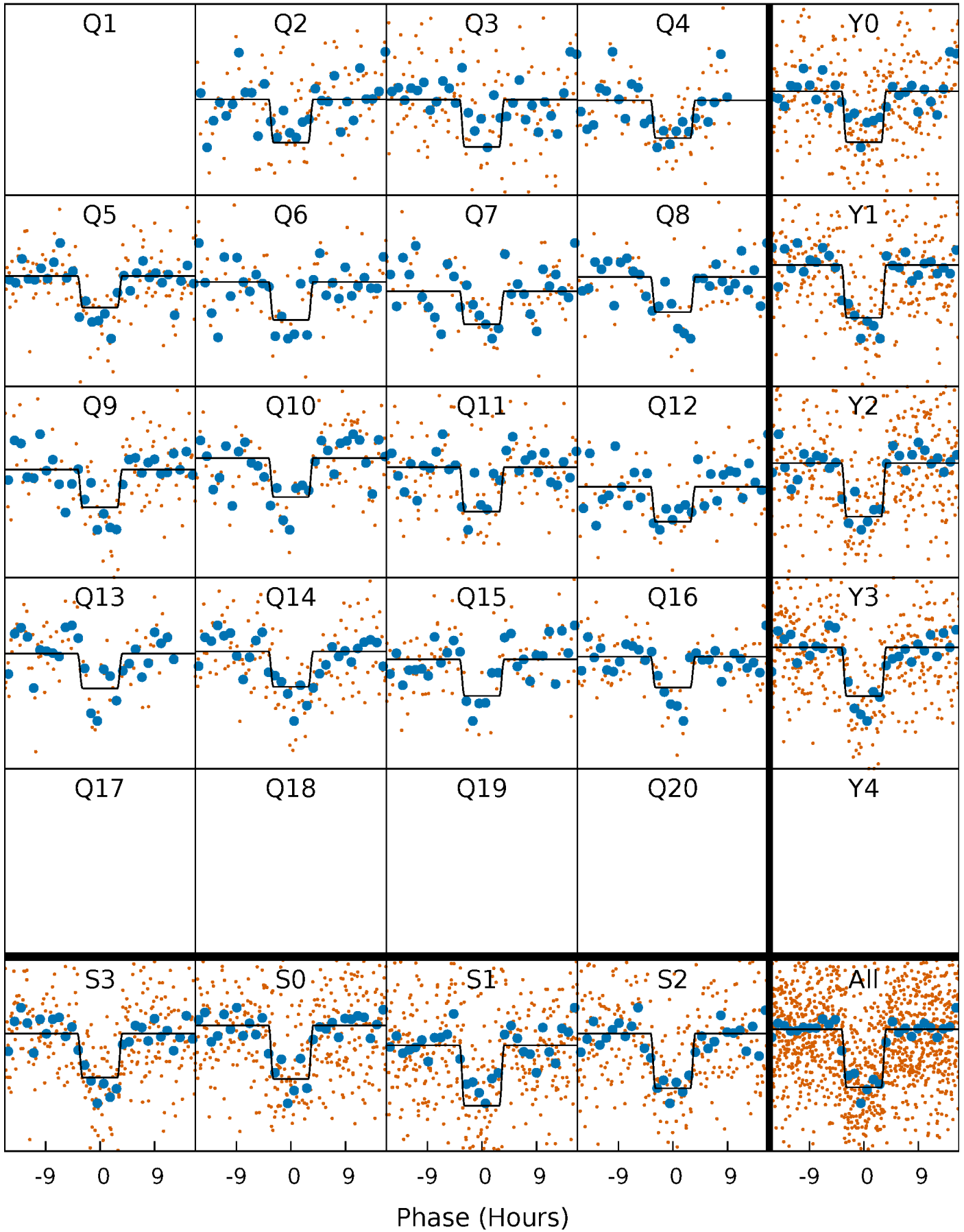
# DV Quarter-Phased Transit Curves

TCE 005436502-04 P= 50.447402 Days  $T_0=178.491327$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

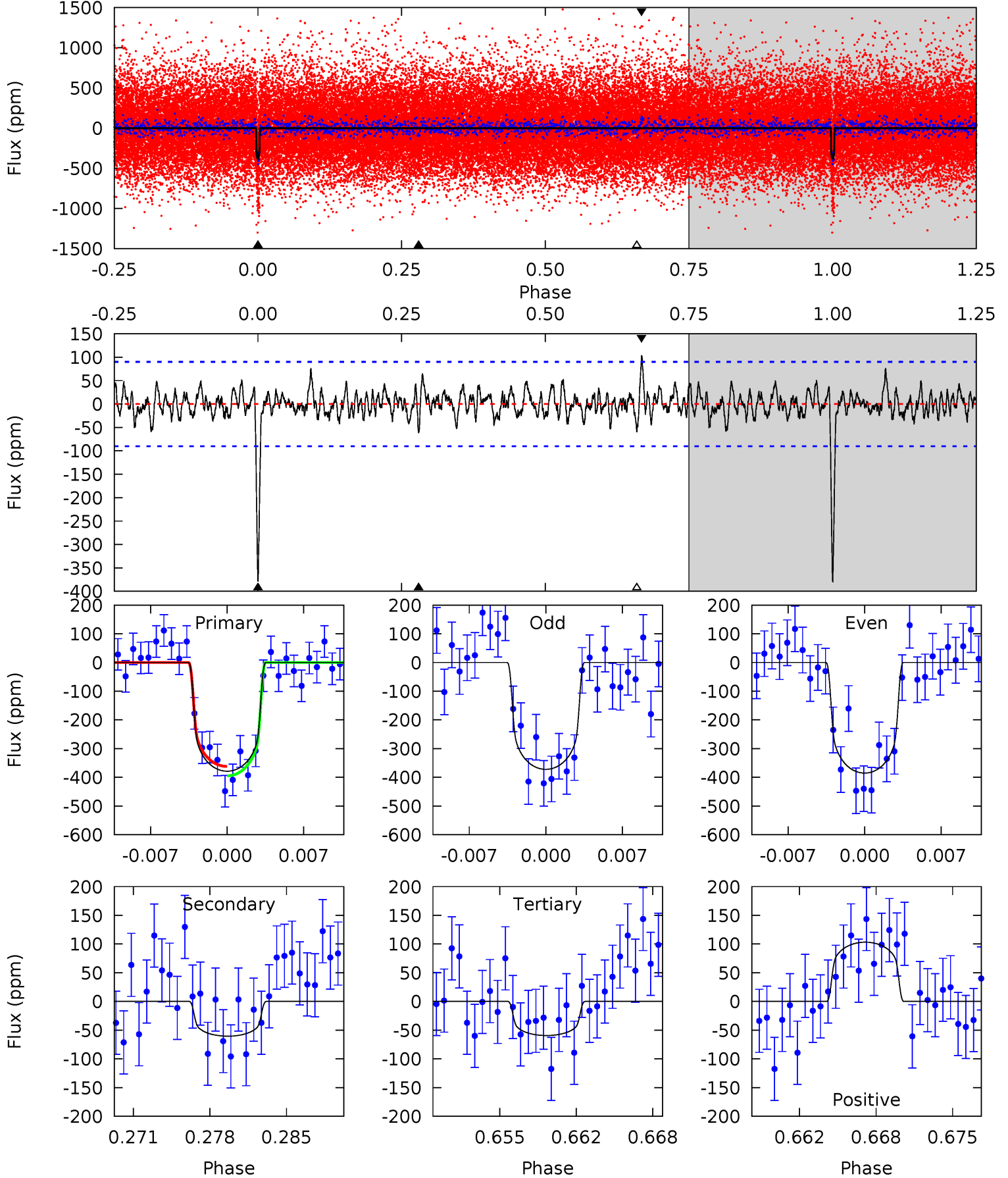
TCE 005436502-04 P= 50.446563 Days  $T_0=178.504075$  (BKJD)



# DV Model-Shift Uniqueness Test

005436502-04, P = 50.447402 Days, E = 128.043925 Days

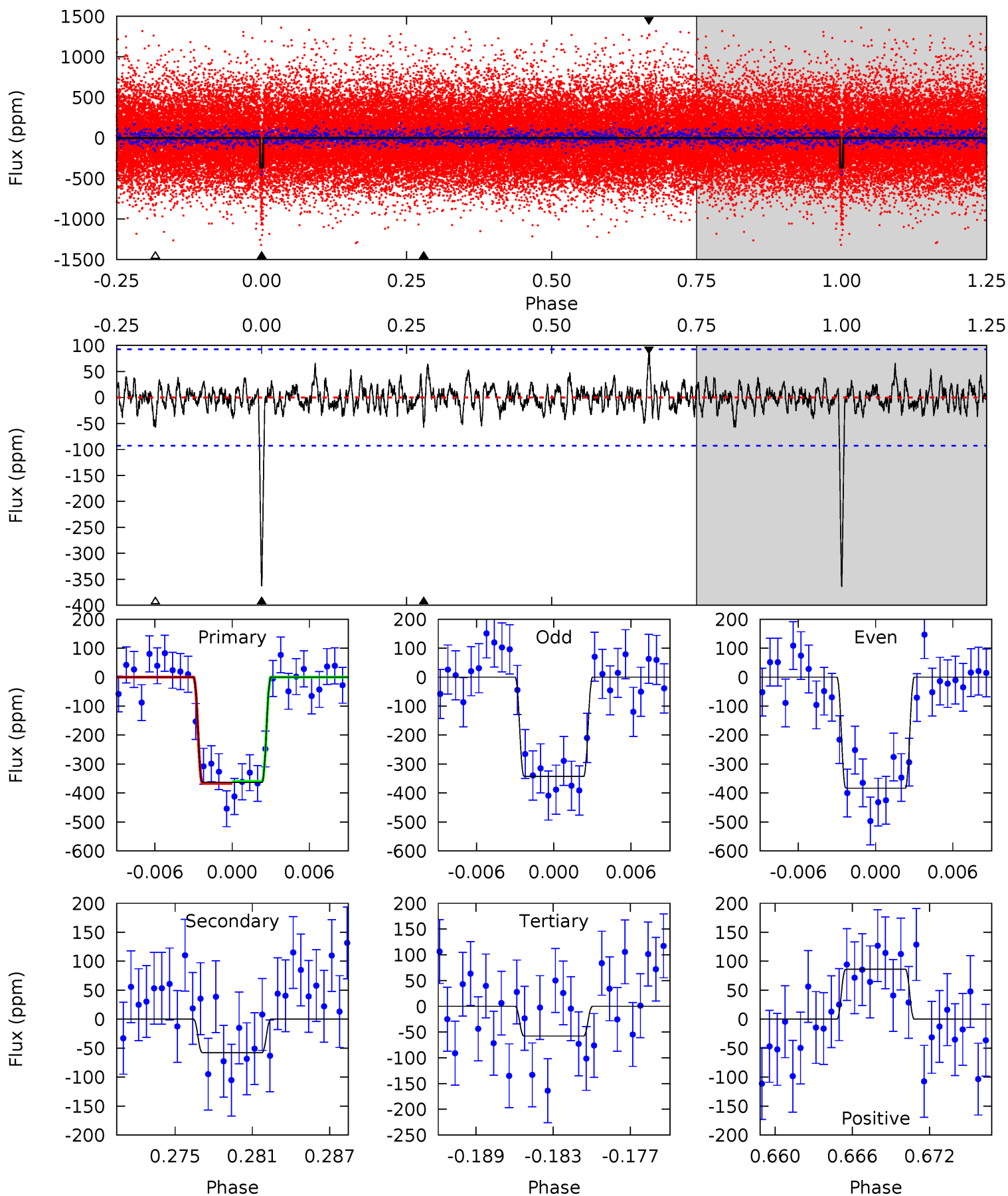
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
21.5	3.43	3.36	5.85	5.10	2.72	1.23	18.1	15.6	0.06	-2.42	0.37	0.93	0.21	0.93



# Alt Model-Shift Uniqueness Test

005436502-04, P = 50.446563 Days, E = 128.057512 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
20.0	3.19	3.19	4.75	5.12	2.74	1.06	16.9	15.3	0.00	-1.56	1.12	0.95	0.19	0.17



### Stellar Parameters For KIC 005436502

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5739^{+114}_{-103}$	$4.191^{+0.162}_{-0.108}$	$0.300^{+0.100}_{-0.150}$	$1.384^{+0.242}_{-0.266}$	$1.083^{+0.100}_{-0.075}$	$0.576^{+0.460}_{-0.187}$
	+2%/-2%	+4%/-3%	+33%/-50%	+17%/-19%	+9%/-7%	+80%/-33%
Source	SPE58	SPE58	SPE58	DSEP		

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

### Secondary Eclipse Parameters for KIC 005436502-04 / KOI 0834.05

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-60 \pm 18$	$3.13^{+0.77}_{-0.72}$	$790^{+44}_{-45}$	$3844^{+355}_{-285}$	$252^{+189}_{-99}$
Alt.	$-58 \pm 18$	$2.83^{+0.77}_{-0.67}$	$790^{+43}_{-44}$	$3940^{+445}_{-387}$	$291^{+253}_{-133}$

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



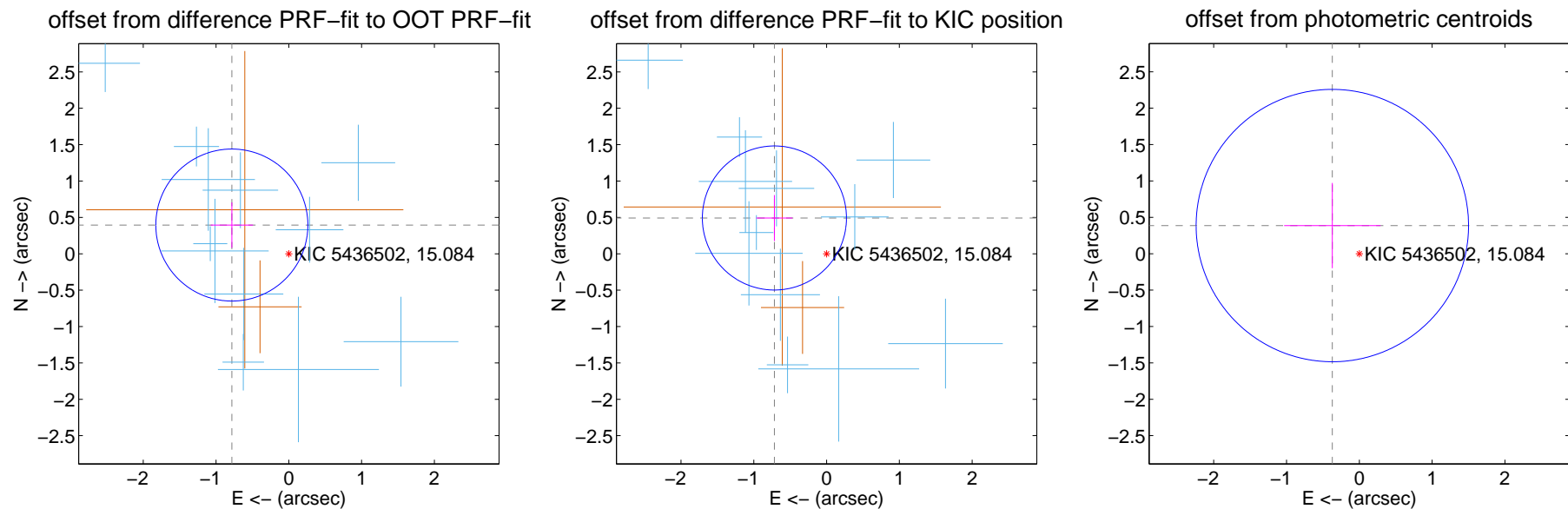
## DV Centroid Data

Supplemental centroid analysis for 005436502-04. Kepler magnitude: 15.08. Transit SNR 15.69

There are 12 quarters with good PRF difference image offsets

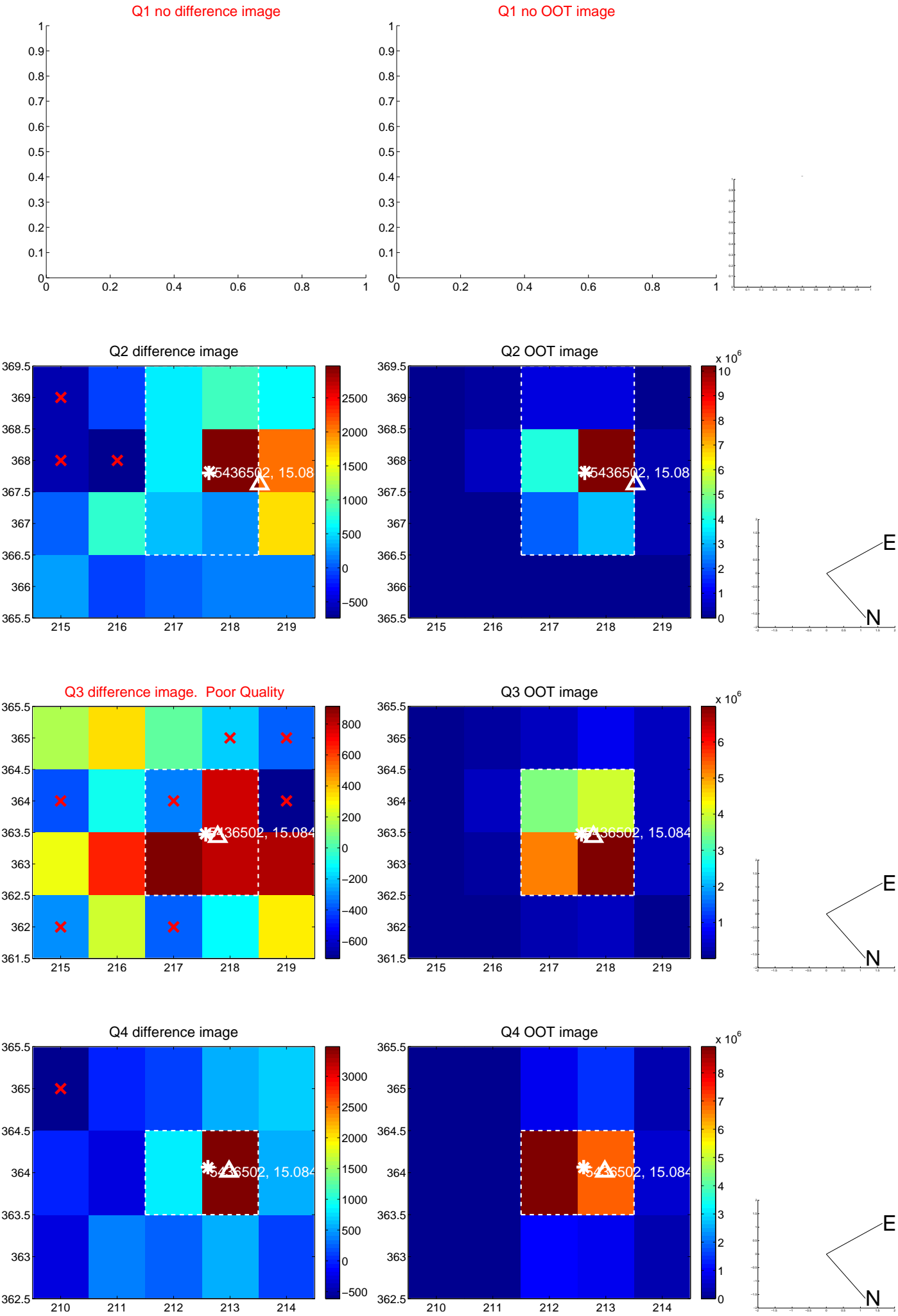
The direct PRF centroid is offset from the target star catalog position by about 0.03 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.877 \pm 0.348$	2.52	$0.783 \pm 0.291$	$0.395 \pm 0.312$
PRF-fit source offset from KIC position	$0.869 \pm 0.330$	2.63	$0.717 \pm 0.249$	$0.492 \pm 0.316$
photometric centroid source offset	$0.54 \pm 0.62$	0.86	$0.37 \pm 0.66$	$0.39 \pm 0.59$

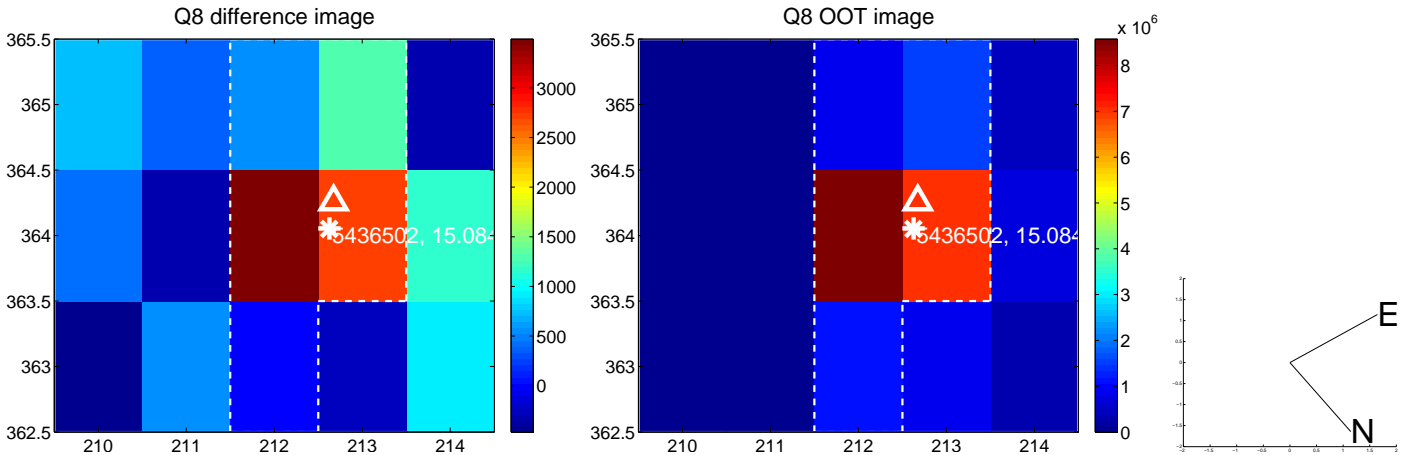
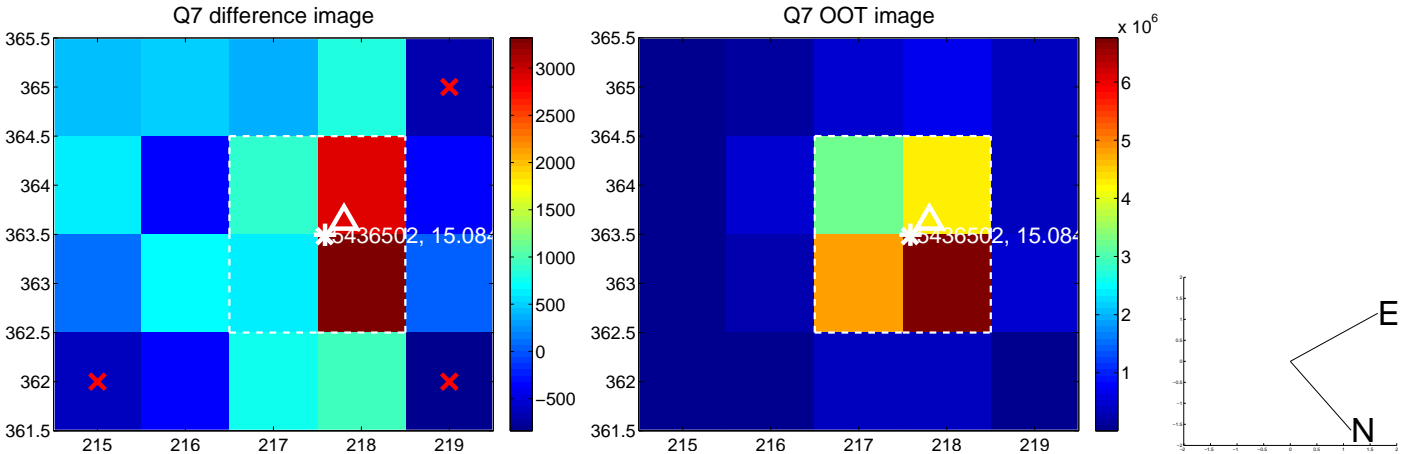
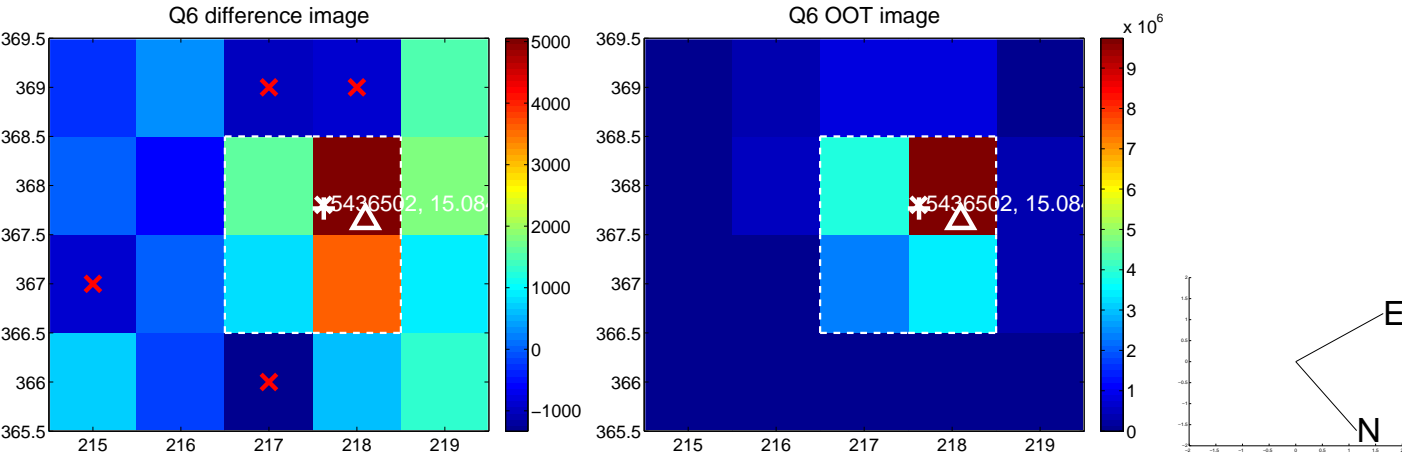
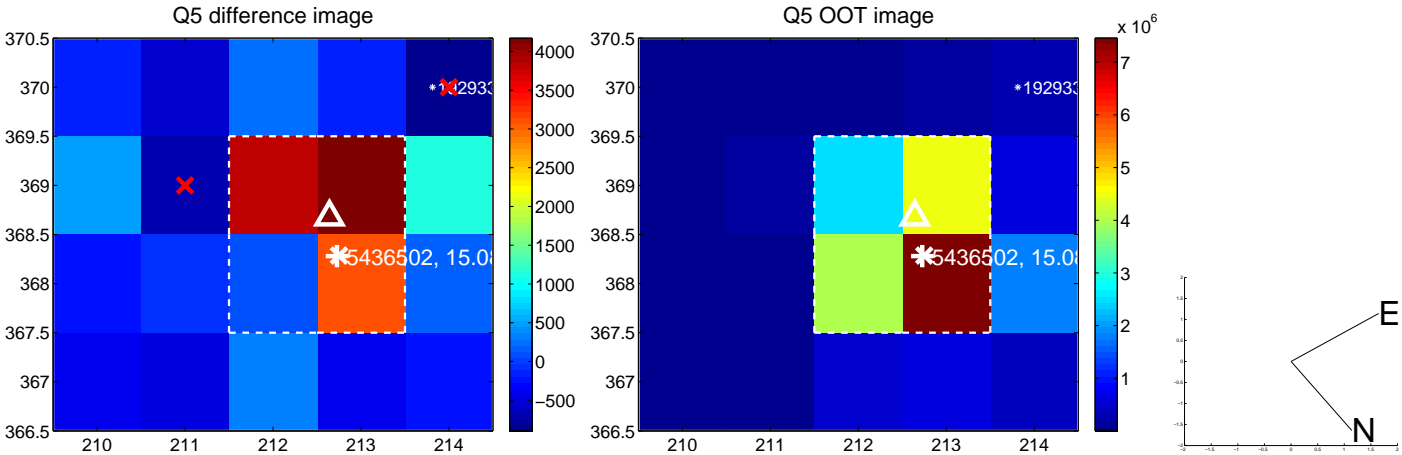


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

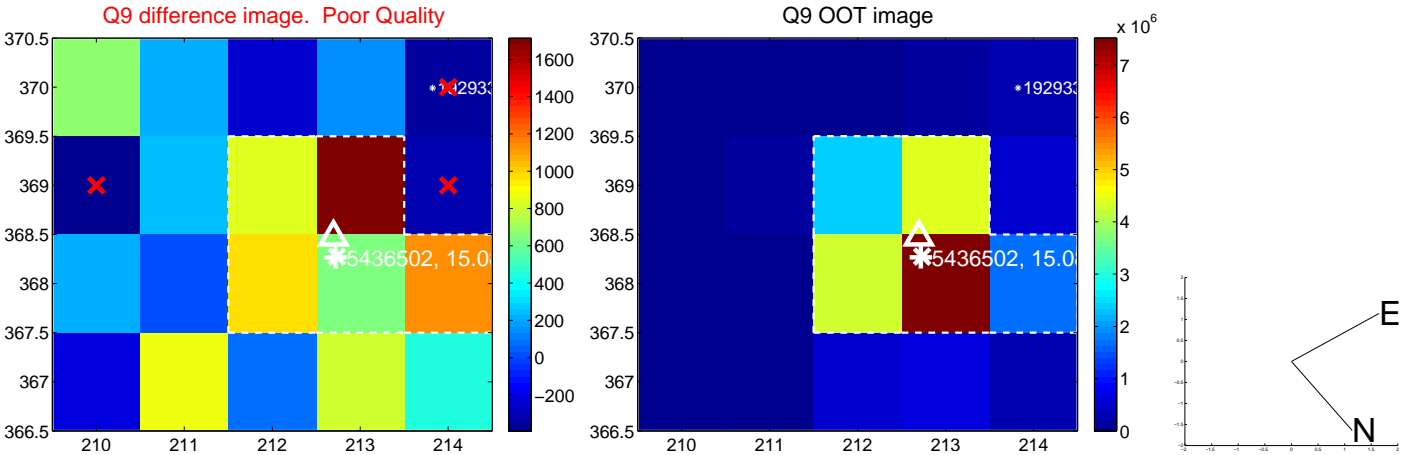
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



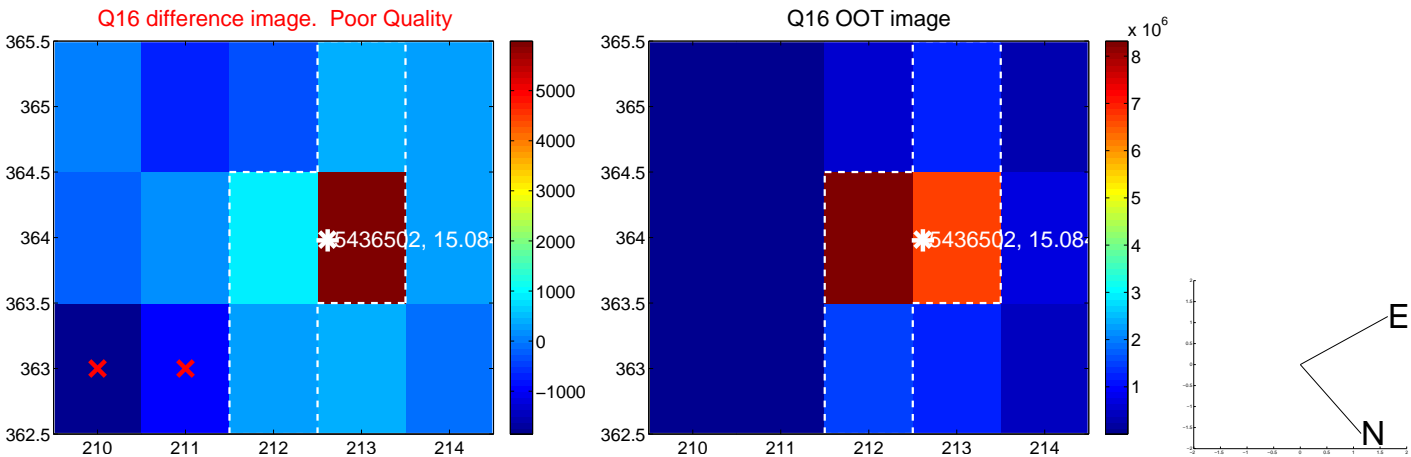
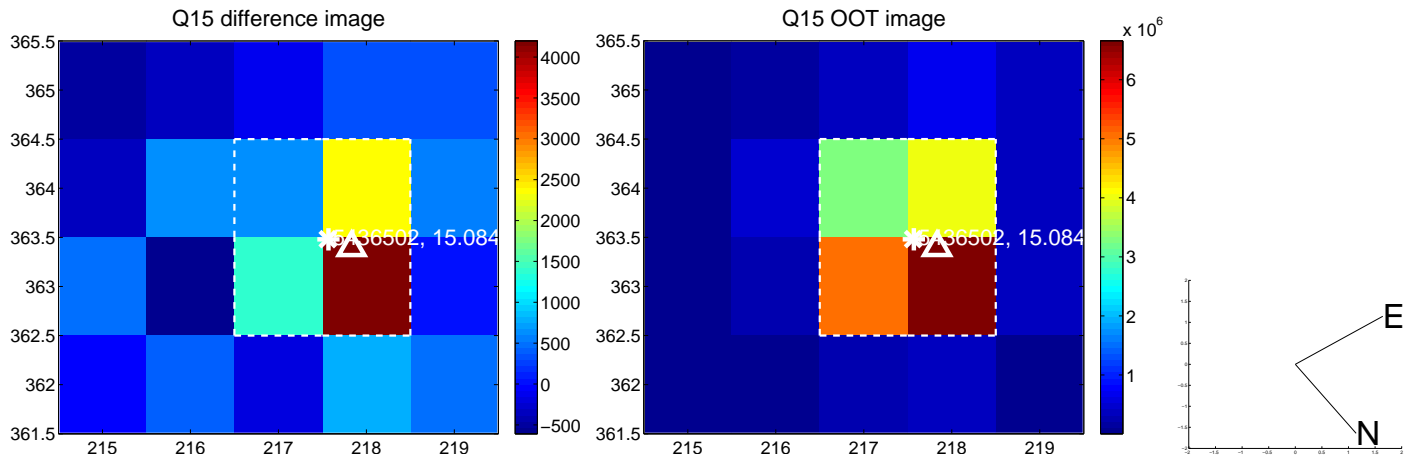
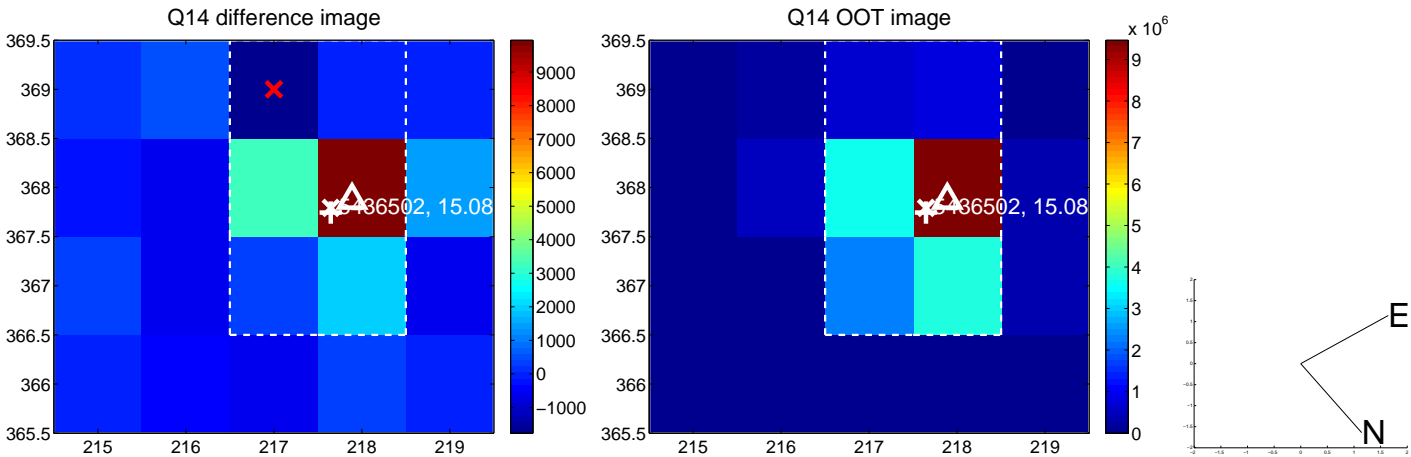
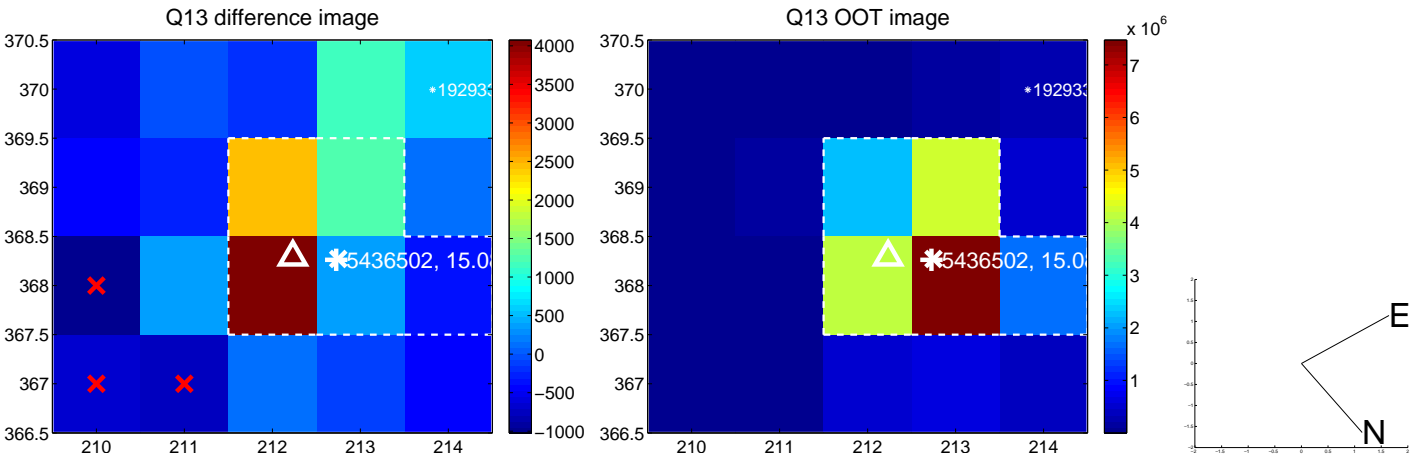
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



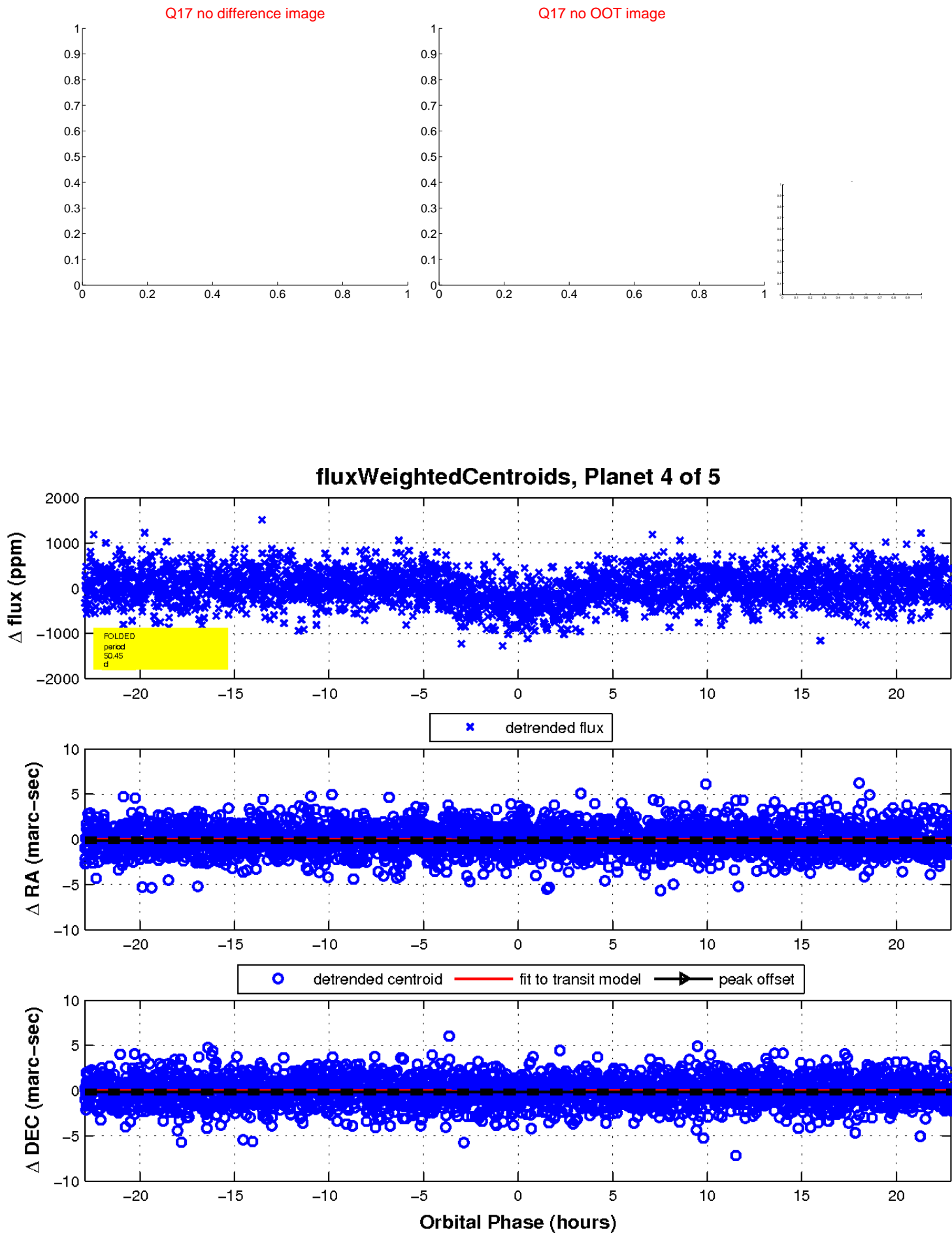
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

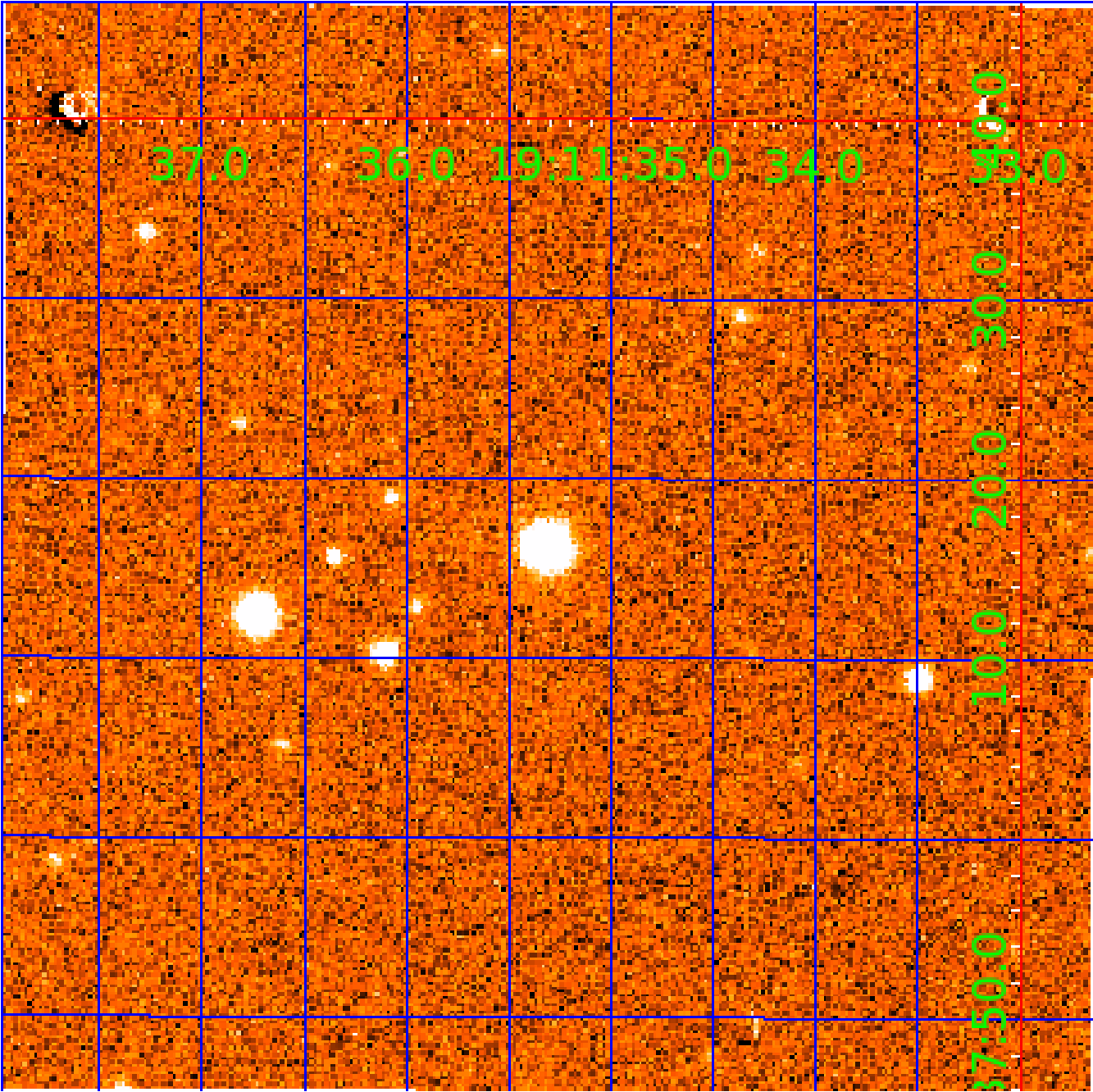


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 005436502

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005436502-01	OBS	0834.01	23.653692	147.722190	3377.2	8.267	188.4	191.2	1.38	5739	8.05	67.78
005436502-02	OBS	0834.02	13.233523	140.323222	503.0	6.992	34.3	37.0	1.38	5739	3.44	147.04
005436502-03	OBS	0834.03	6.155685	134.808570	276.3	5.405	26.3	27.6	1.38	5739	2.83	407.97
005436502-04	OBS	0834.05	50.447402	178.491327	405.1	7.636	15.2	15.7	1.38	5739	3.17	24.69
005436502-05	OBS	0834.04	2.090786	132.090330	110.1	3.505	14.9	15.7	1.38	5739	1.73	1721.54

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005436502-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
005436502-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT
005436502-03	OBS	PC	1.00	0	0	0	0	NO_COMMENT
005436502-04	OBS	PC	0.99	0	0	0	0	NO_COMMENT
005436502-05	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.

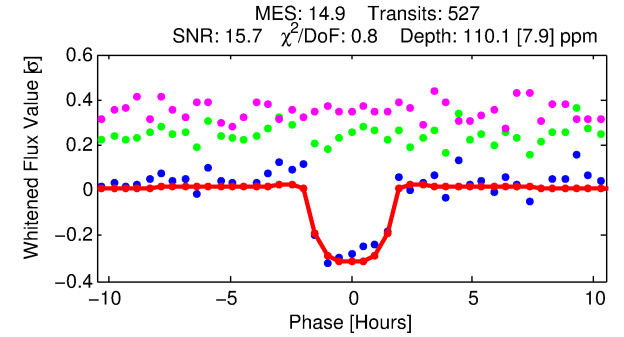
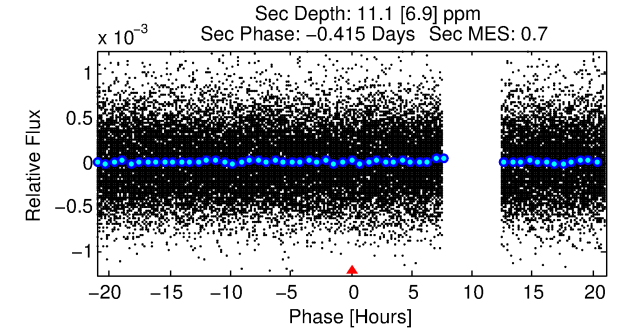
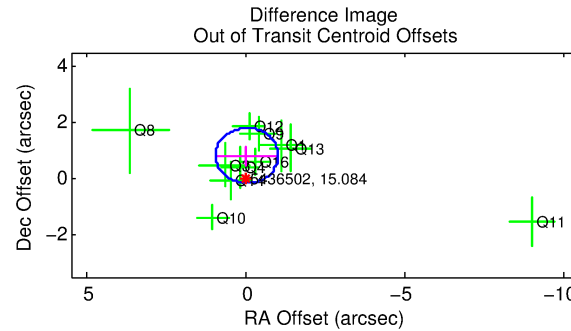
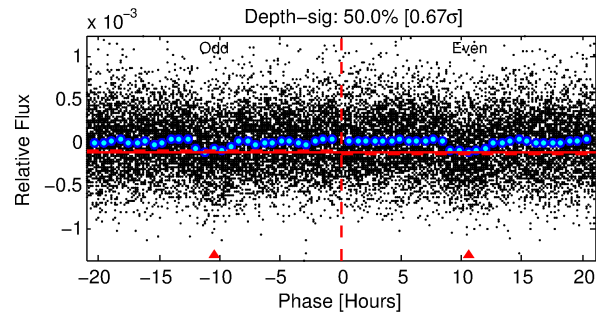
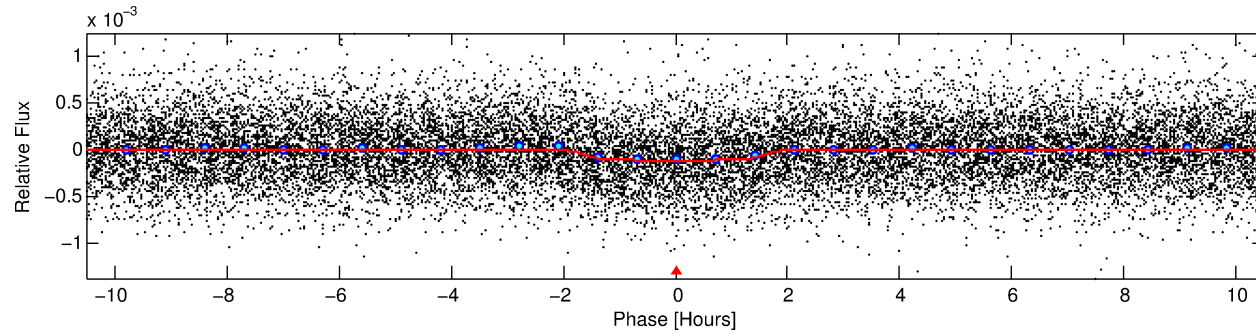
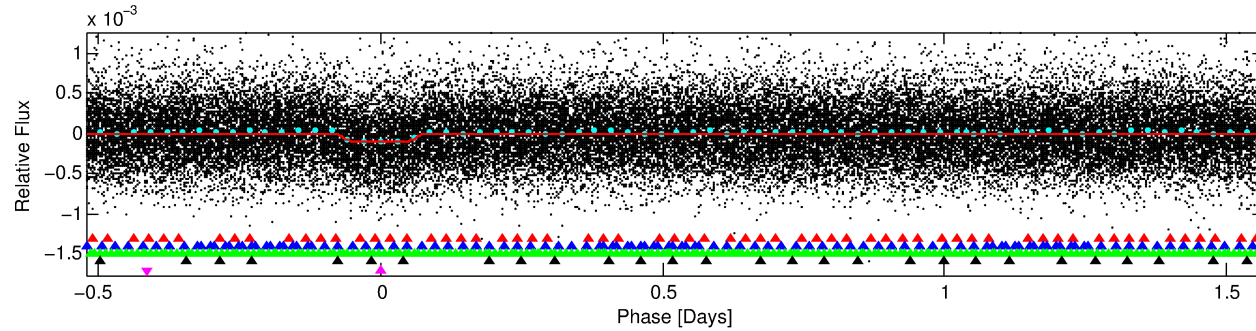
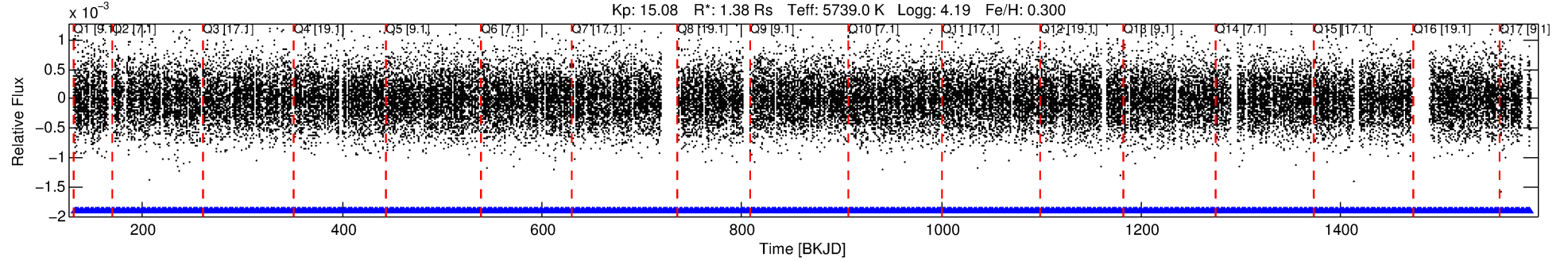
## Ephemeris Match Information For 005436502-05

No Significant Match Found

# DV One-Page Summary

KIC: 5436502 Candidate: 5 of 5 Period: 2.091 d  
KOI: K00834.04 Name: Kepler-238b Corr: 0.960

Kp: 15.08 R\*: 1.38 Rs T<sub>eff</sub>: 5739.0 K Logg: 4.19 Fe/H: 0.300



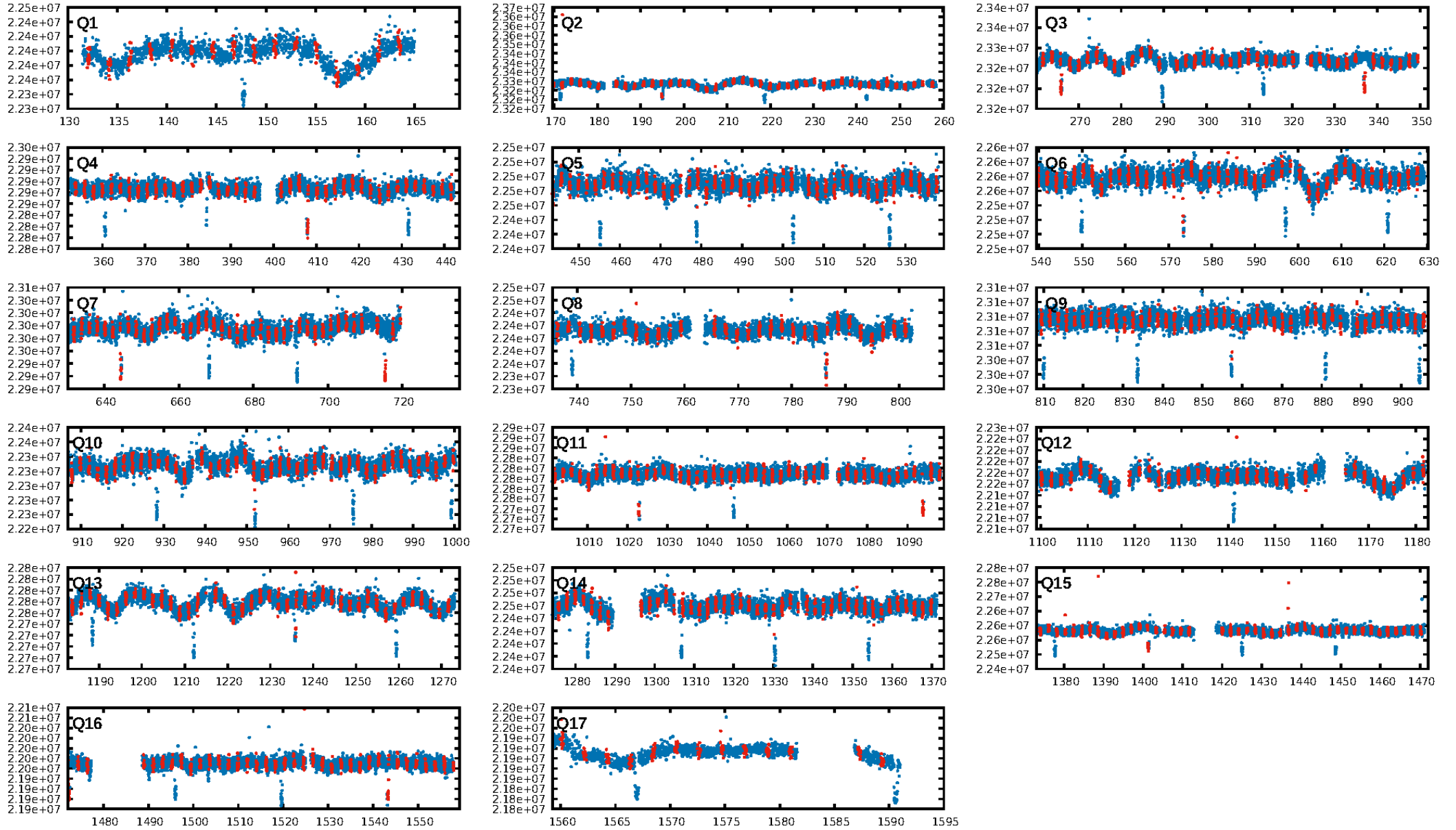
## DV Fit Results:

Period = 2.09079 [0.00001] d  
Epoch = 132.0903 [0.0031] BKJD  
Rp/R\* = 0.0114 [0.0048]  
a/R\* = 2.34 [3.68]  
b = 0.90 [0.43]  
Seff = 1721.54 [500.65]  
T<sub>eq</sub> = 1643 [119] K  
Rp = 1.73 [0.79] R<sub>e</sub>  
a = 0.0329 [0.0059] AU  
Ag = 2.21 [2.39] [0.51σ]  
T<sub>eff</sub> = 3097 [810] K [1.78σ]

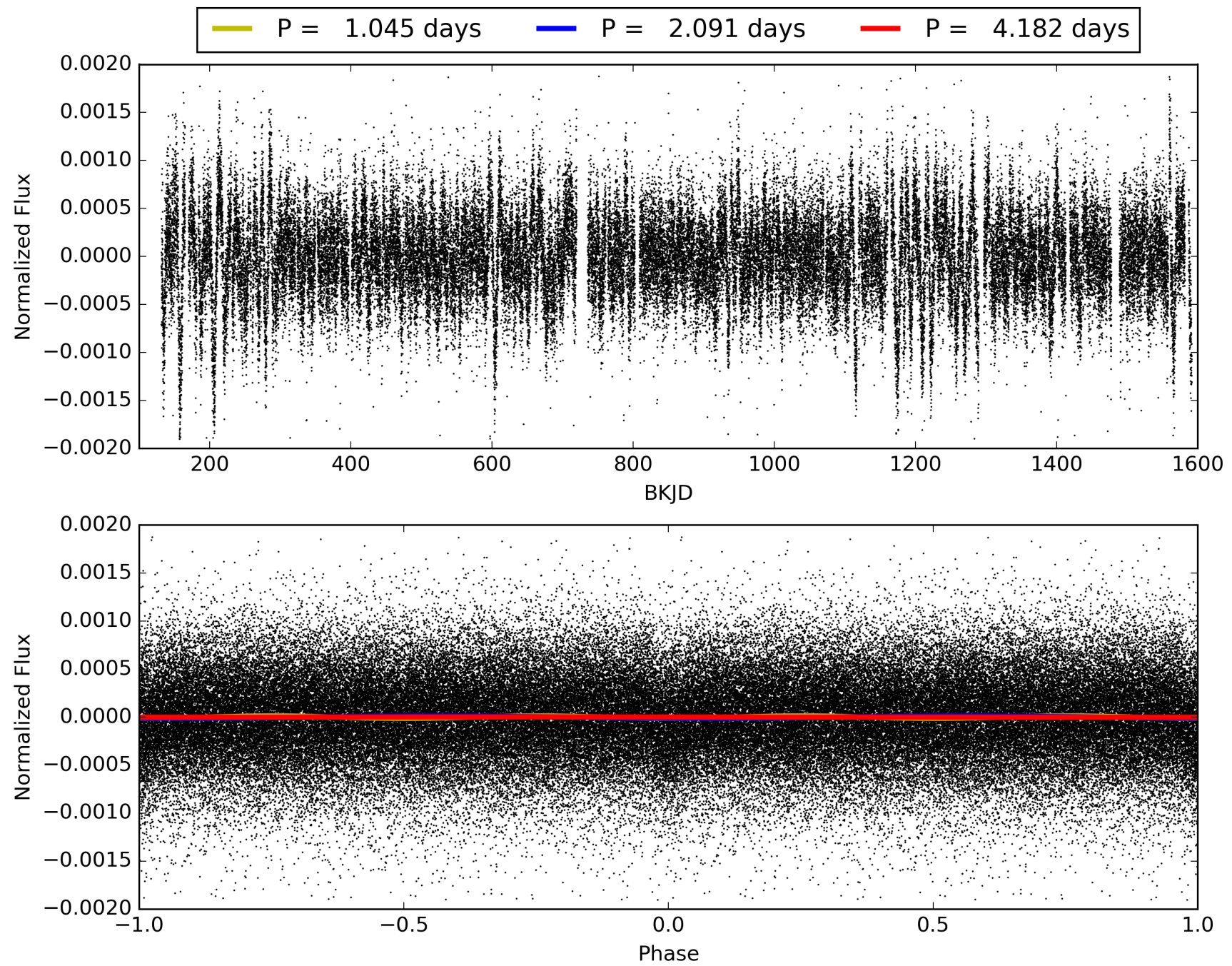
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [15.14σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 8.23e-51  
RollingBand-fgt: 1.00 [501/501]  
GhostDiagnostic-chr: 1.587  
Centroid-sig: 0.7%  
Centroid-so: 1.369 arcsec [1.90σ]  
OotOffset-rm: 0.823 arcsec [2.51σ]  
KicOffset-rm: 0.850 arcsec [2.85σ]  
OotOffset-st: 2/2/4/3 [11]  
KicOffset-st: 2/2/4/3 [11]  
DiffImageQuality-fgm: 0.73 [8/11]  
DiffImageOverlap-fno: 1.00 [17/17]

# TCE 005436502-05, PDC Light Curves



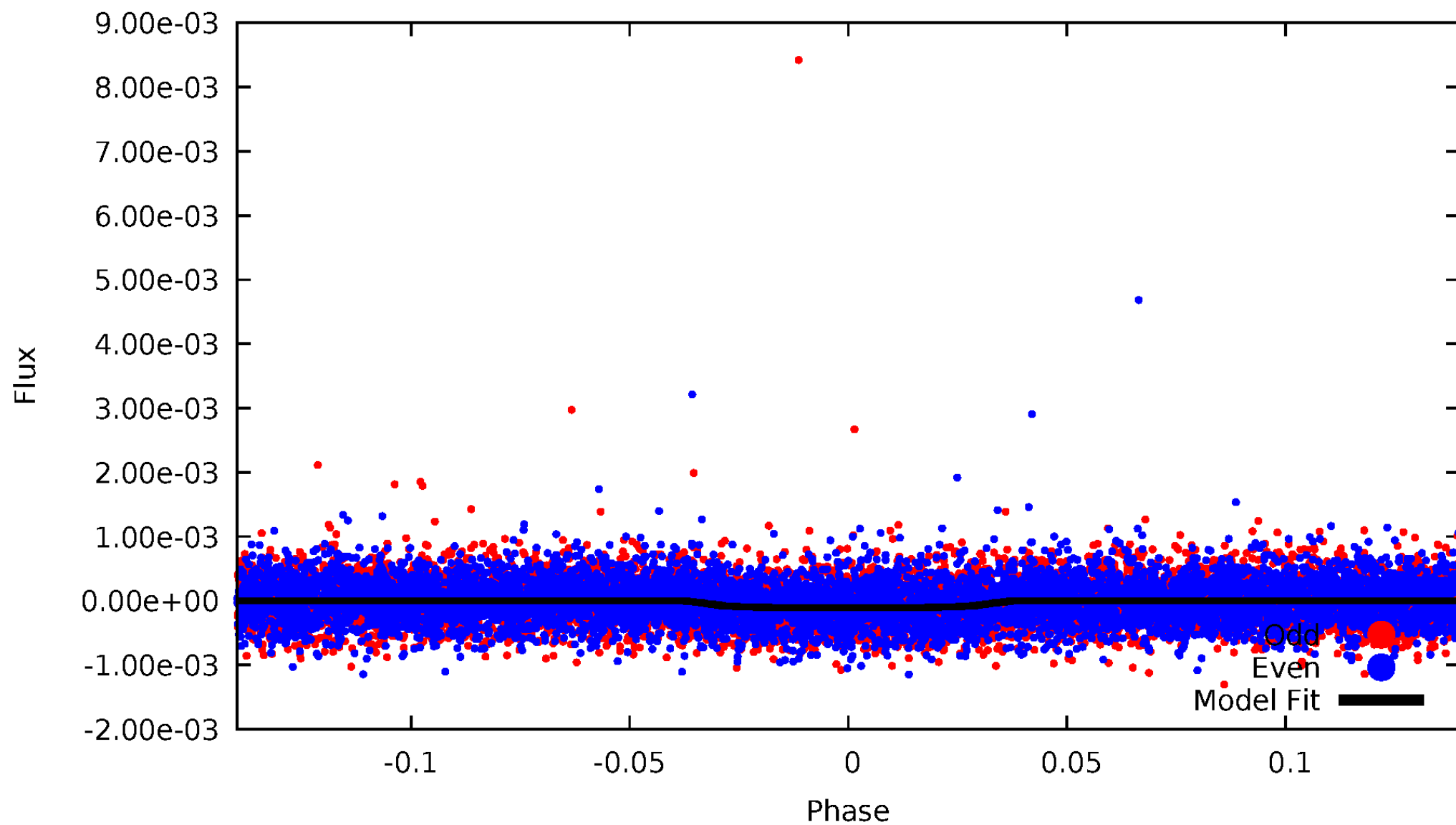
TCE 005436502-05





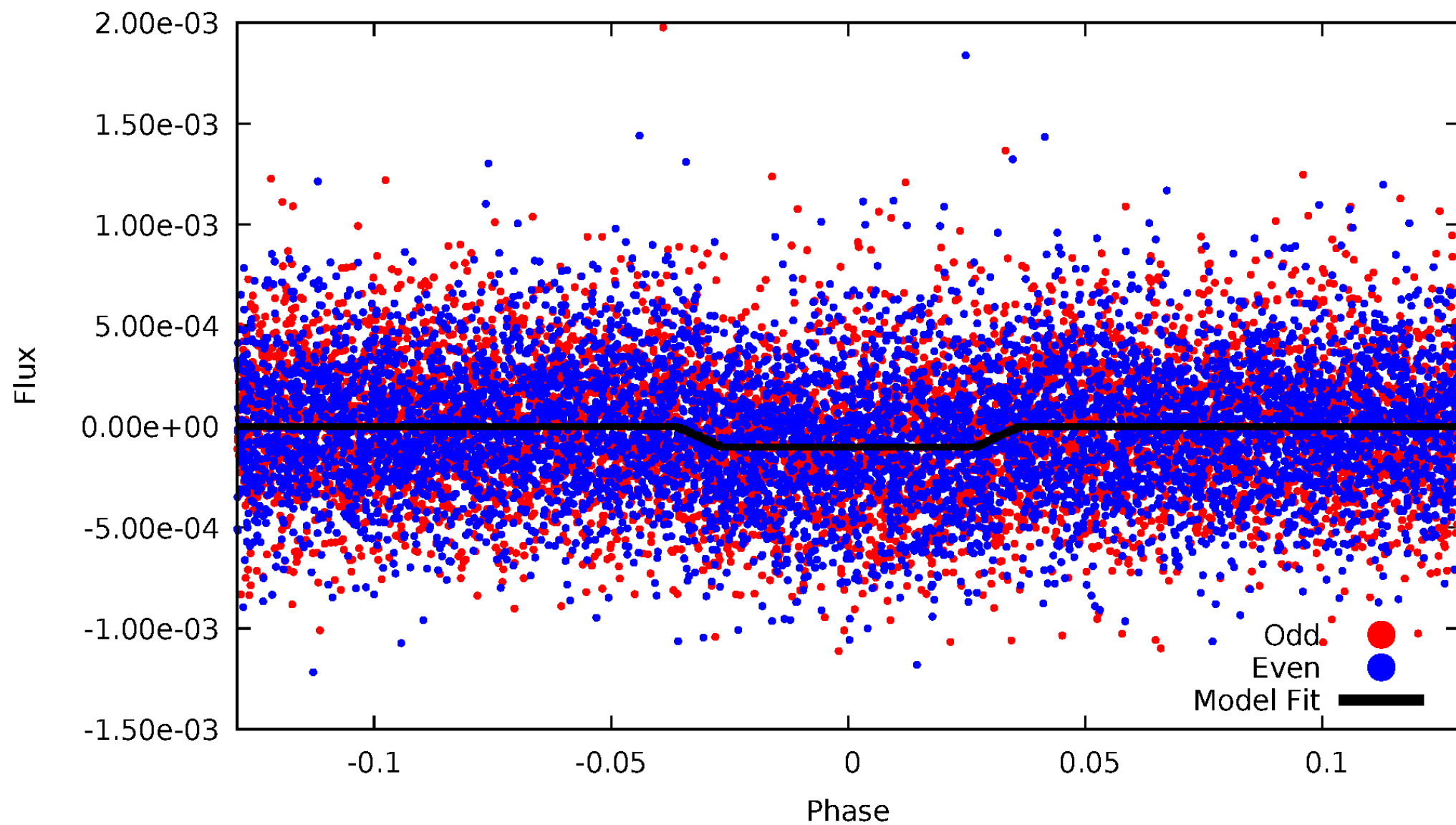
# DV Odd/Even

TCE 005436502-05

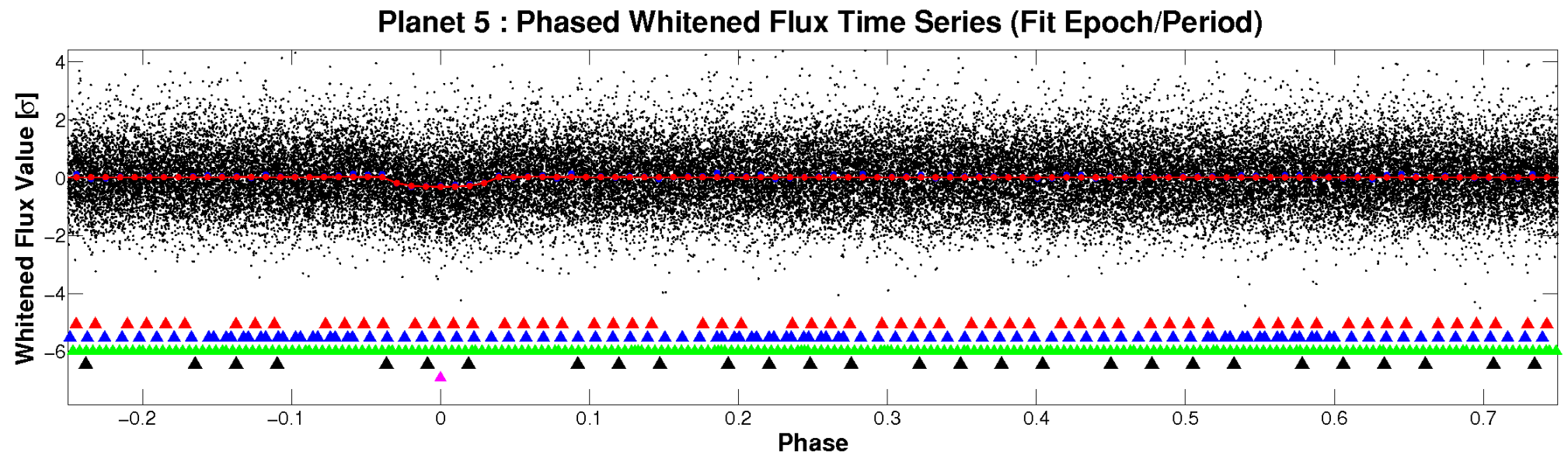
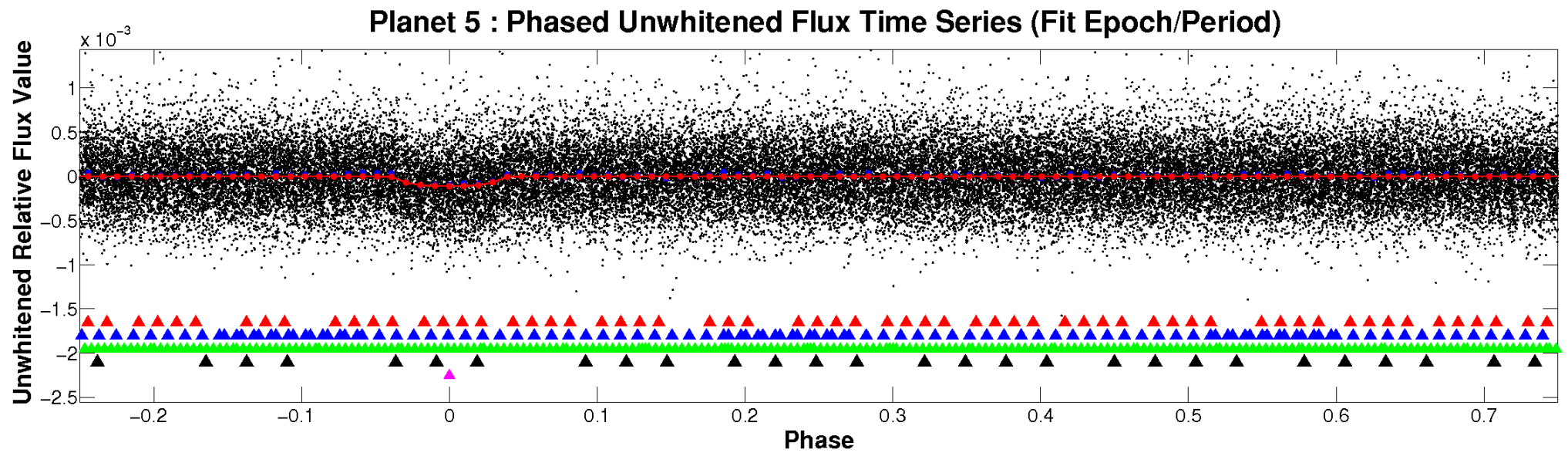


# ALT Odd/Even

TCE 005436502-05



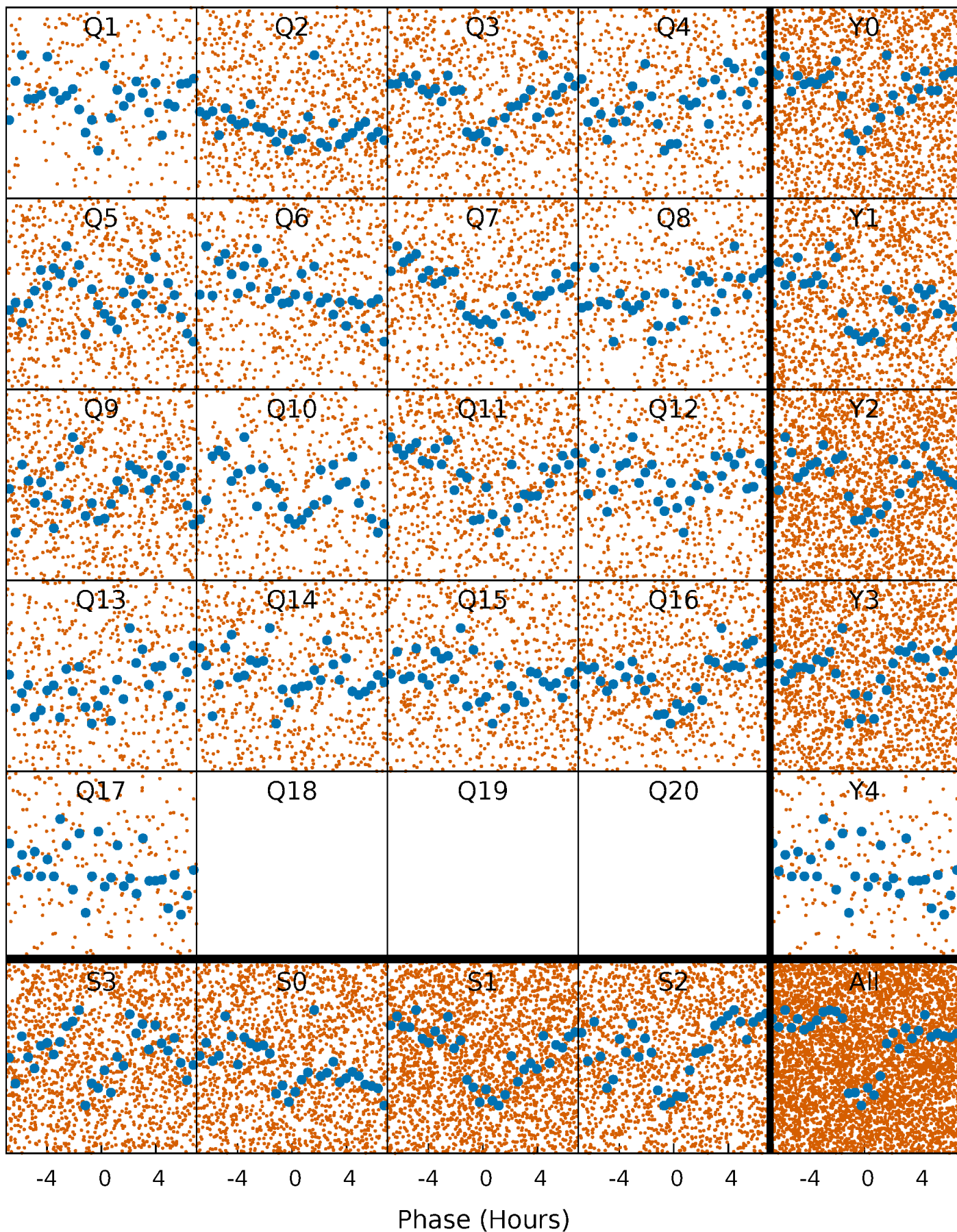
# Non-Whitened Vs. Whitened Light Curve





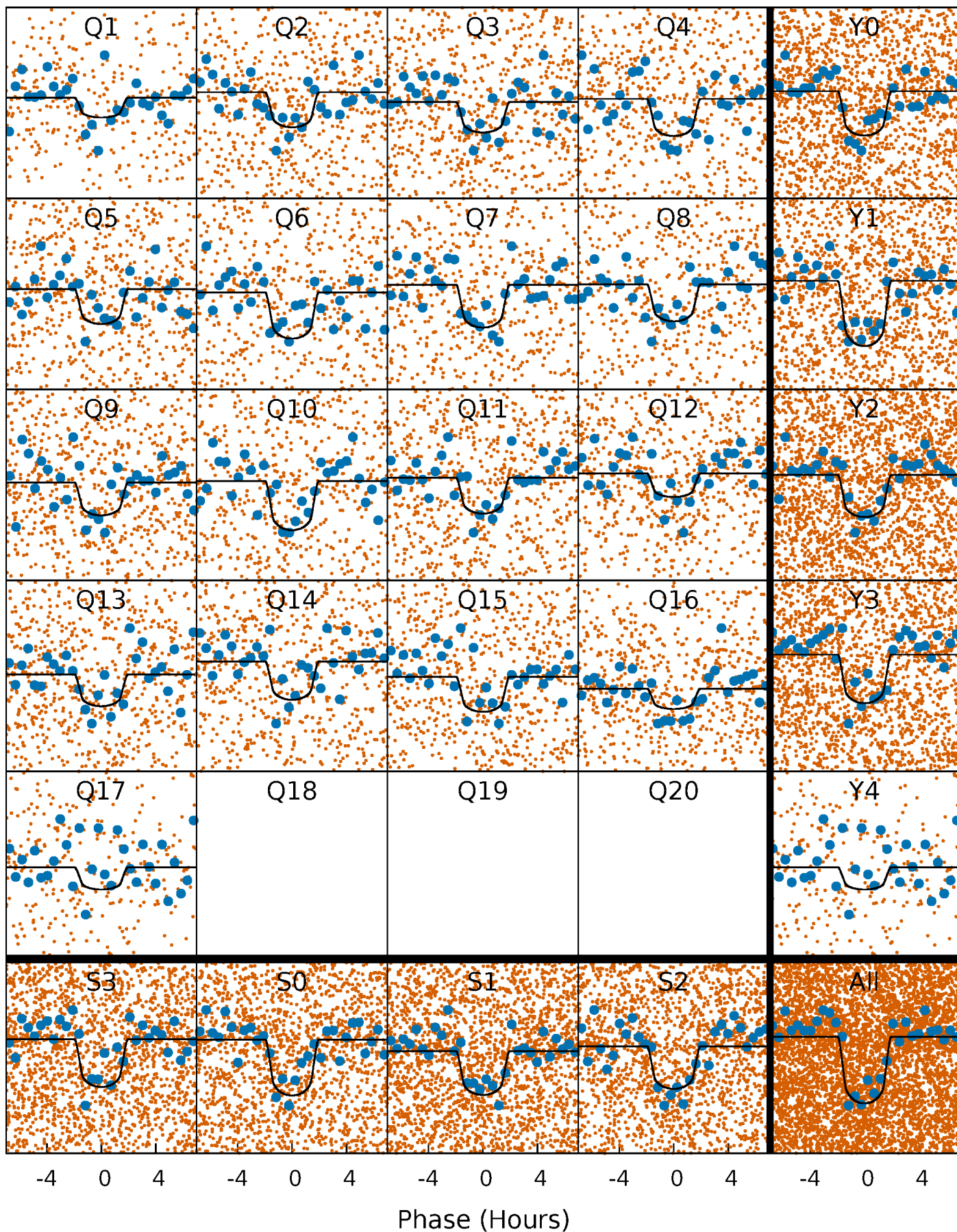
# PDC Quarter-Phased Transit Curves

TCE 005436502-05   P= 2.090786 Days    $T_0=132.090330$  (BKJD)



# DV Quarter-Phased Transit Curves

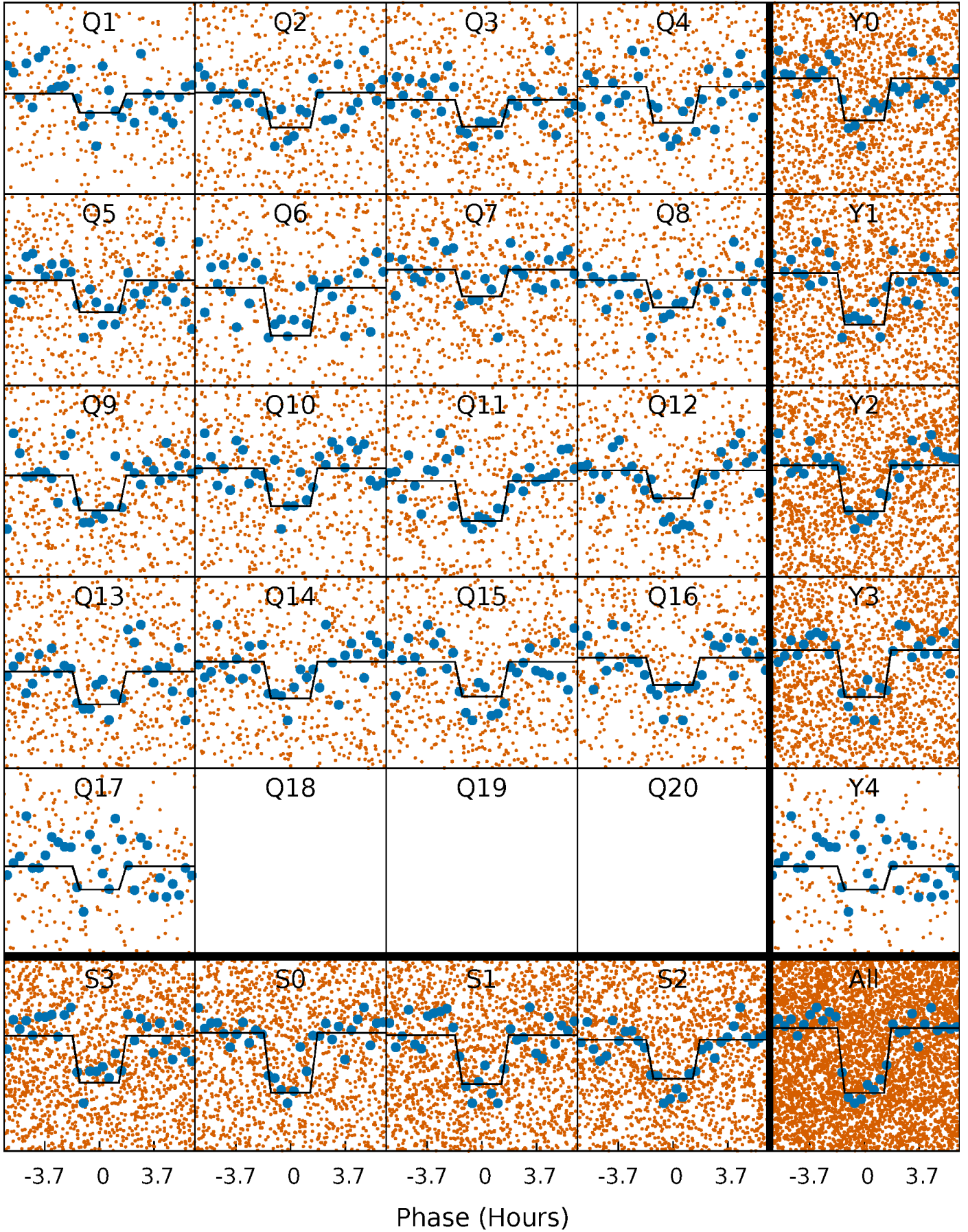
TCE 005436502-05     $P = 2.090786$  Days     $T_0 = 132.090330$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

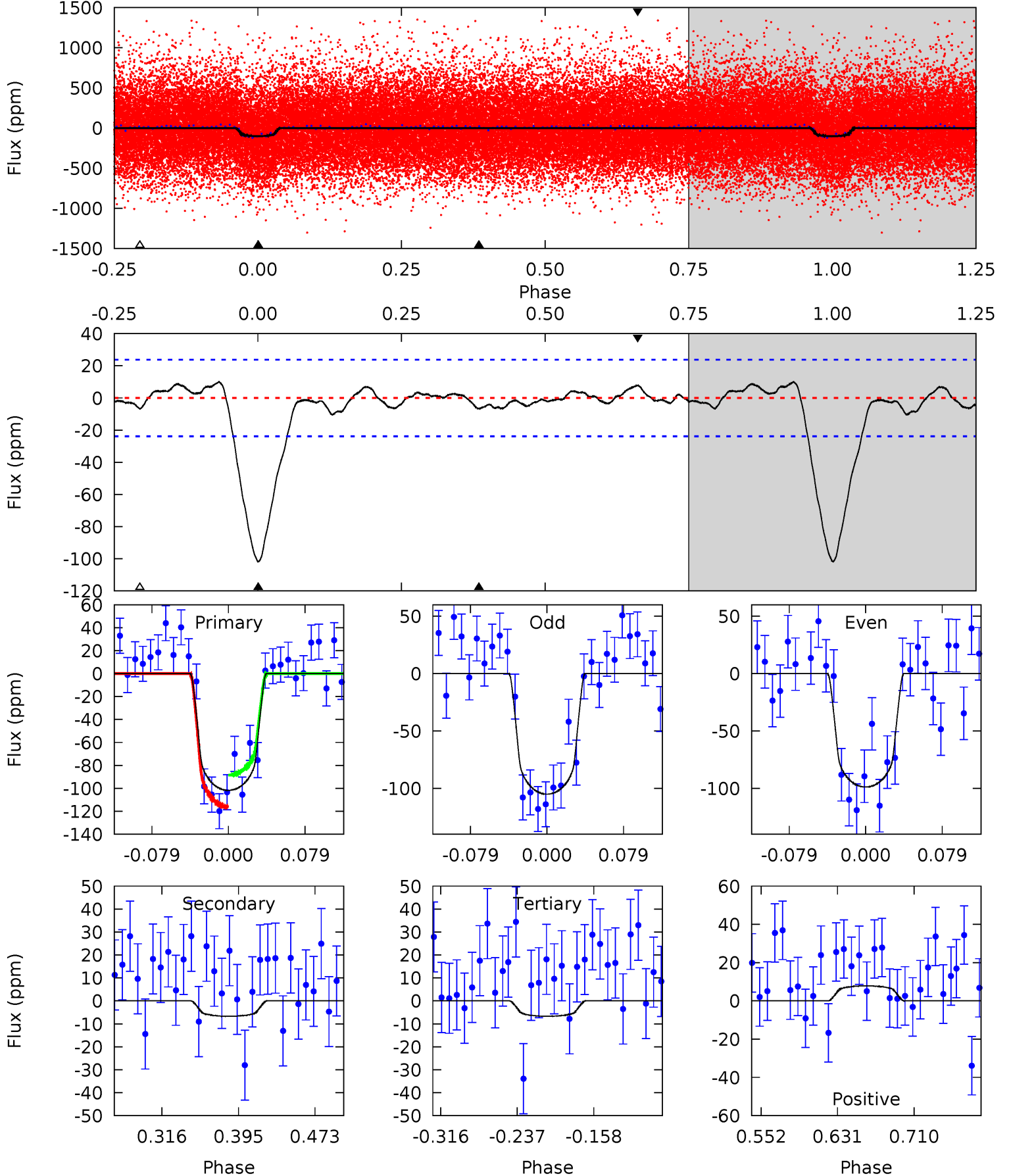
TCE 005436502-05     $P = 2.090805$  Days     $T_0 = 132.084914$  (BKJD)



# DV Model-Shift Uniqueness Test

005436502-05, P = 2.090786 Days, E = 129.999544 Days

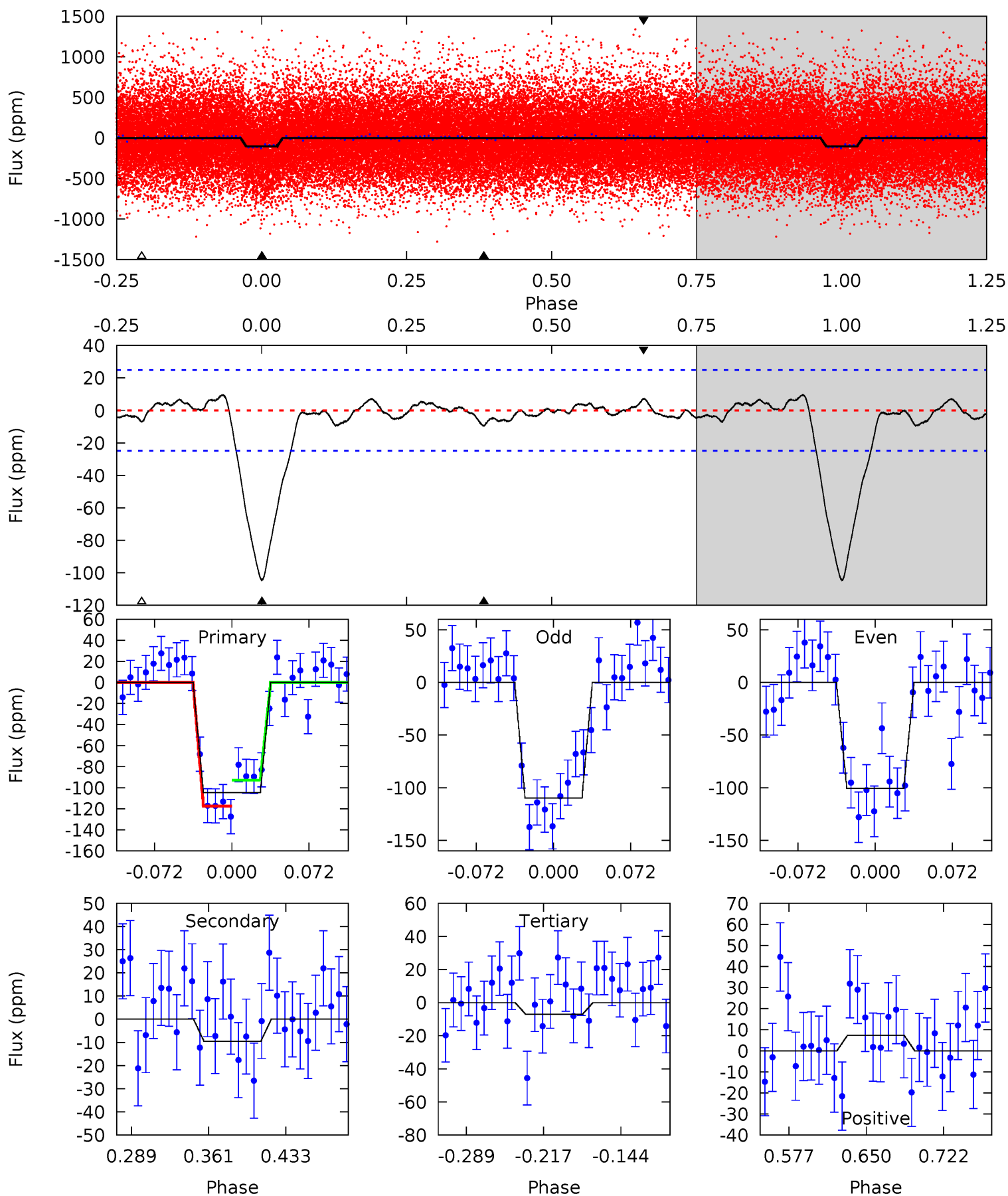
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
19.7	1.31	1.30	1.52	4.61	1.76	0.80	18.4	18.2	0.00	-0.22	0.60	0.93	0.09	2.67



# Alt Model-Shift Uniqueness Test

005436502-05, P = 2.090805 Days, E = 129.994109 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
19.4	1.78	1.31	1.36	4.63	1.80	0.70	18.1	18.1	0.47	0.42	0.84	0.91	0.08	2.29



### Stellar Parameters For KIC 005436502

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5739^{+114}_{-103}$	$4.191^{+0.162}_{-0.108}$	$0.300^{+0.100}_{-0.150}$	$1.384^{+0.242}_{-0.266}$	$1.083^{+0.100}_{-0.075}$	$0.576^{+0.460}_{-0.187}$
	+2%/-2%	+4%/-3%	+33%/-50%	+17%/-19%	+9%/-7%	+80%/-33%
Source	SPE58	SPE58	SPE58	DSEP		

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

### Secondary Eclipse Parameters for KIC 005436502-05 / KOI 0834.04

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-7 \pm 5$	$1.67^{+0.77}_{-0.69}$	$2288^{+104}_{-117}$	$3167^{+746}_{-1007}$	$1.363^{+3.130}_{-1.014}$
Alt.	$-10 \pm 5$	$1.56^{+0.70}_{-0.69}$	$2281^{+112}_{-120}$	$3423^{+927}_{-655}$	$2.091^{+5.023}_{-1.394}$

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



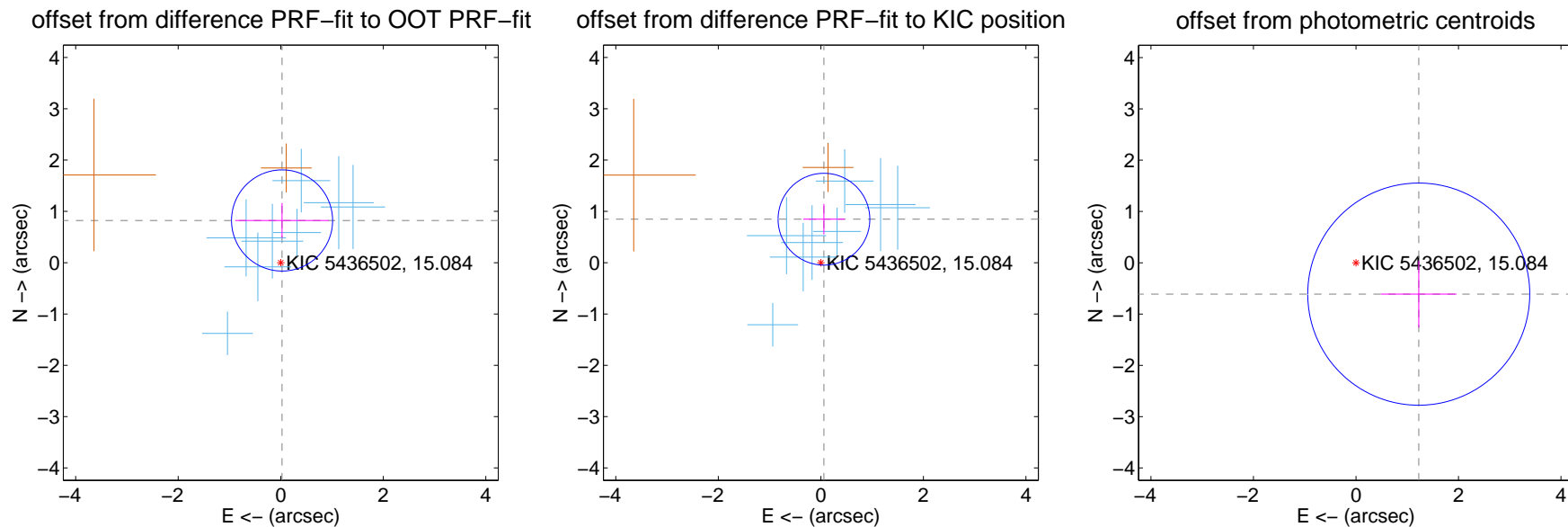
## DV Centroid Data

Supplemental centroid analysis for 005436502-05. Kepler magnitude: 15.08. Transit SNR 15.69

There are 8 quarters with good PRF difference image offsets

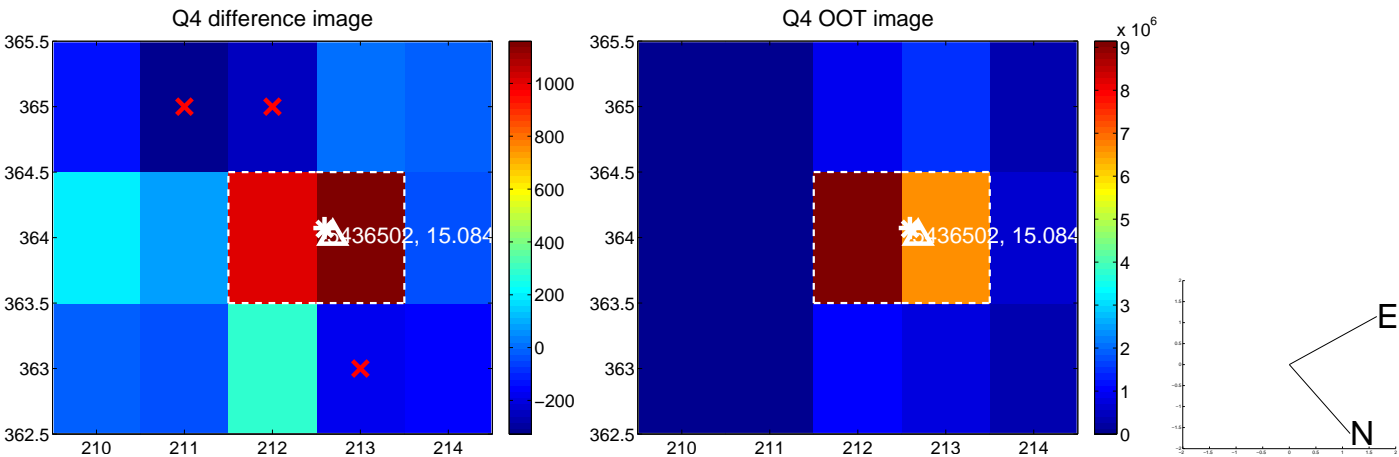
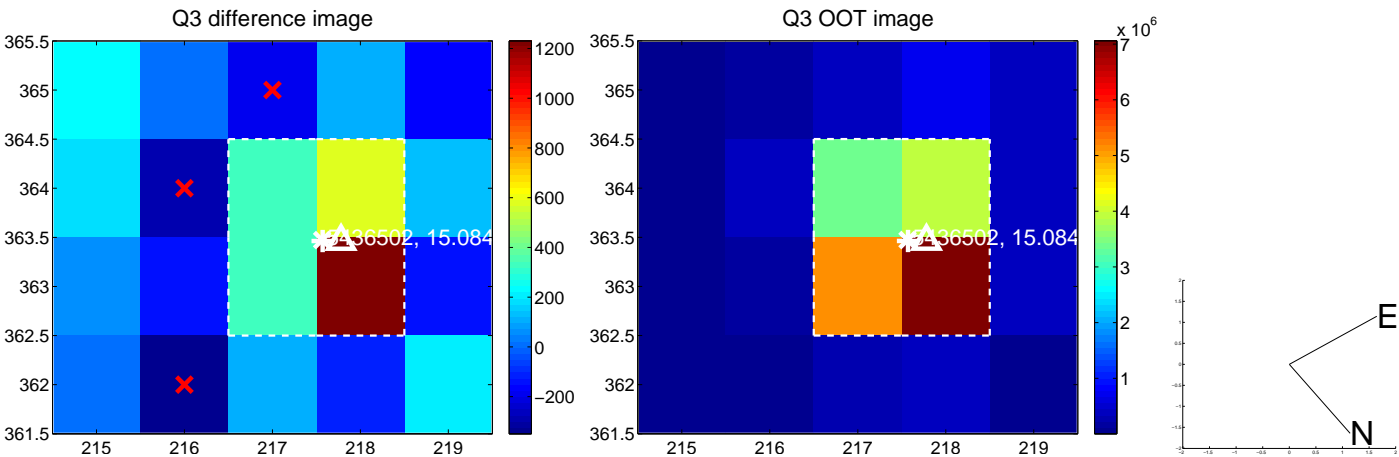
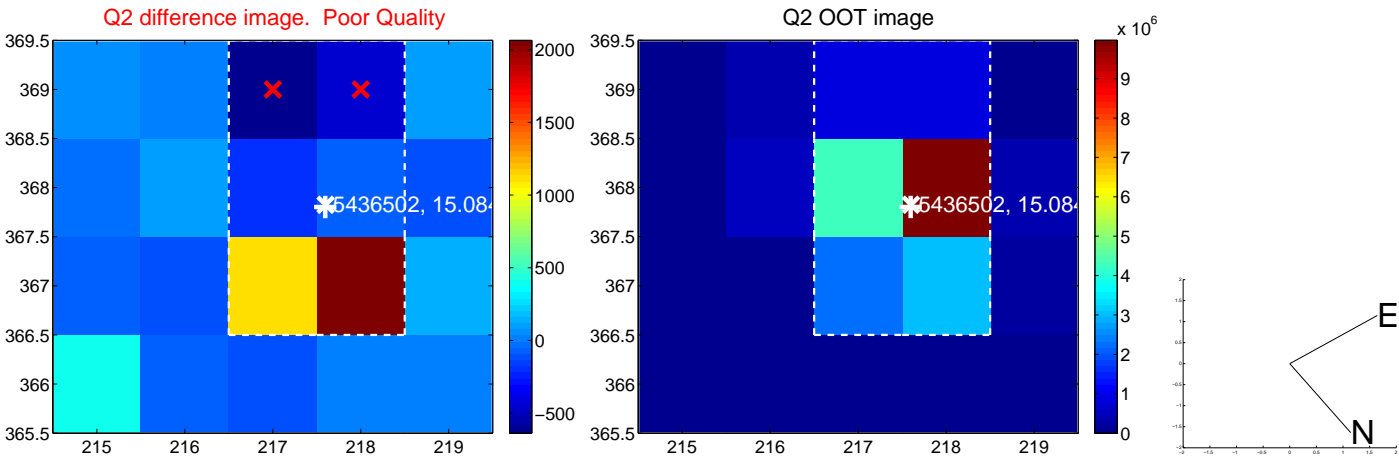
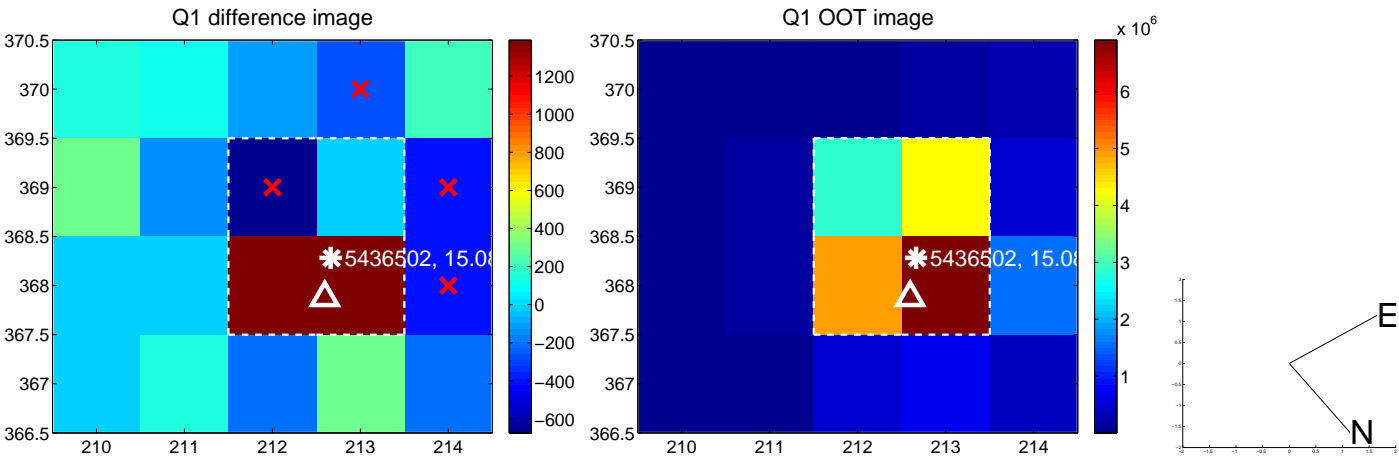
The direct PRF centroid is offset from the target star catalog position by about 0.02 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.823 \pm 0.329$	2.51	$-0.026 \pm 0.914$	$0.823 \pm 0.340$
PRF-fit source offset from KIC position	$0.850 \pm 0.298$	2.85	$-0.060 \pm 0.403$	$0.848 \pm 0.298$
photometric centroid source offset	$1.37 \pm 0.72$	1.90	$-1.22 \pm 0.74$	$-0.61 \pm 0.65$

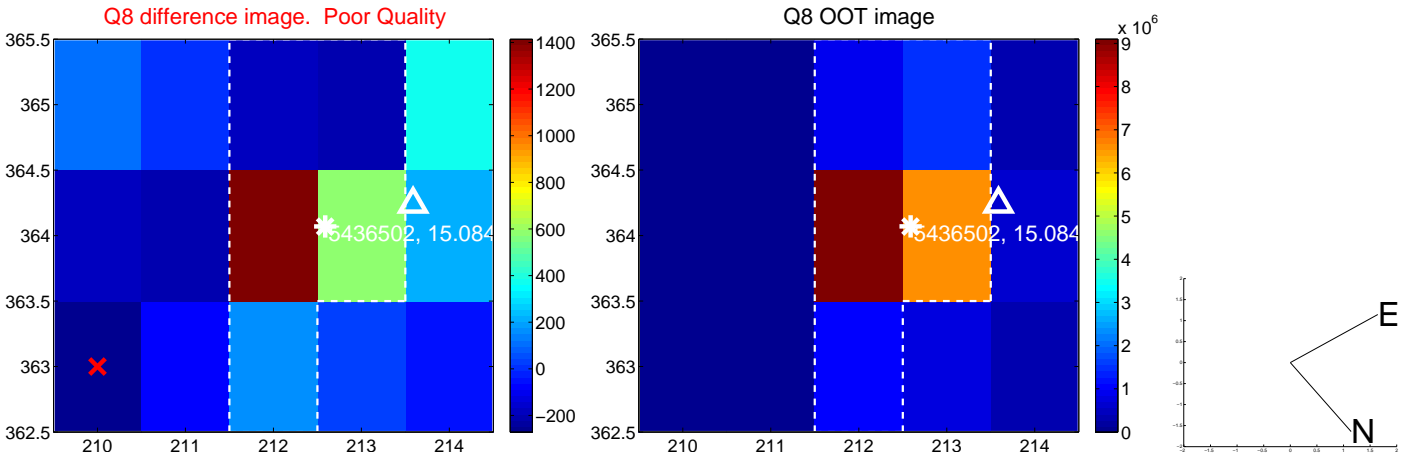
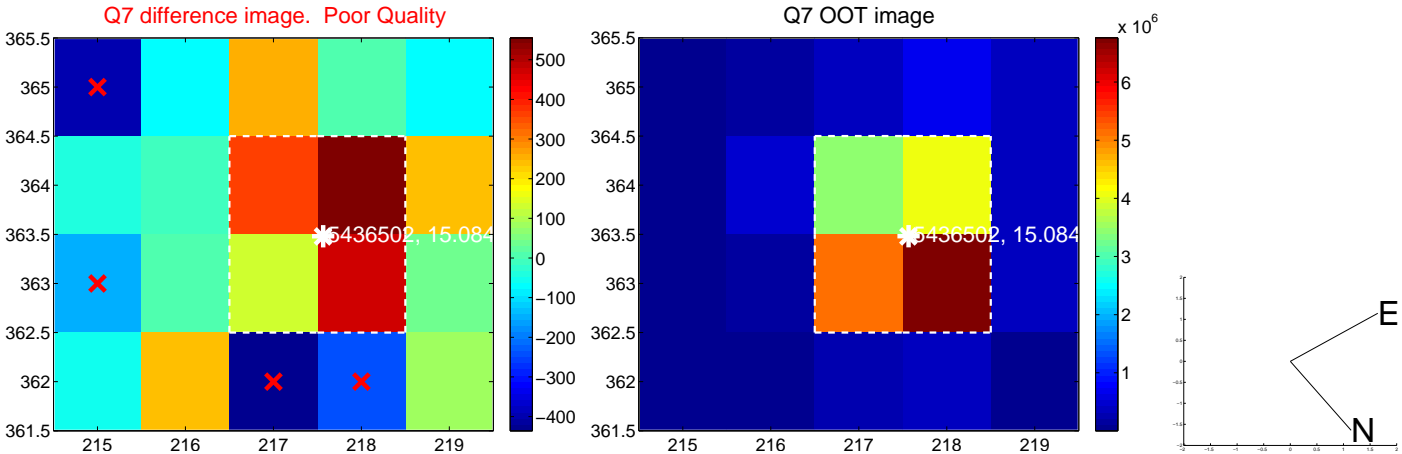
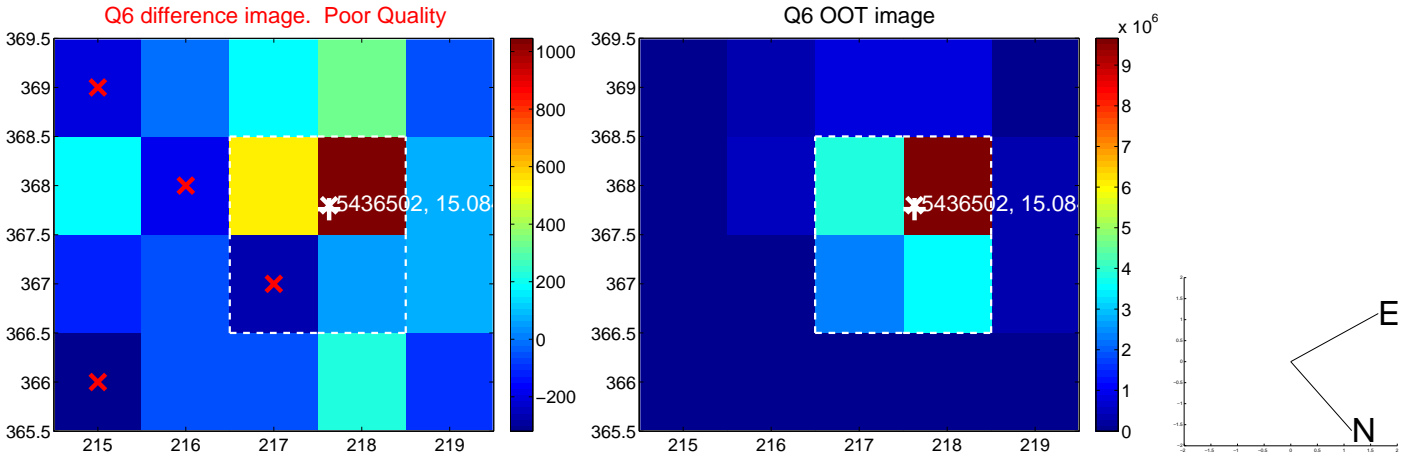
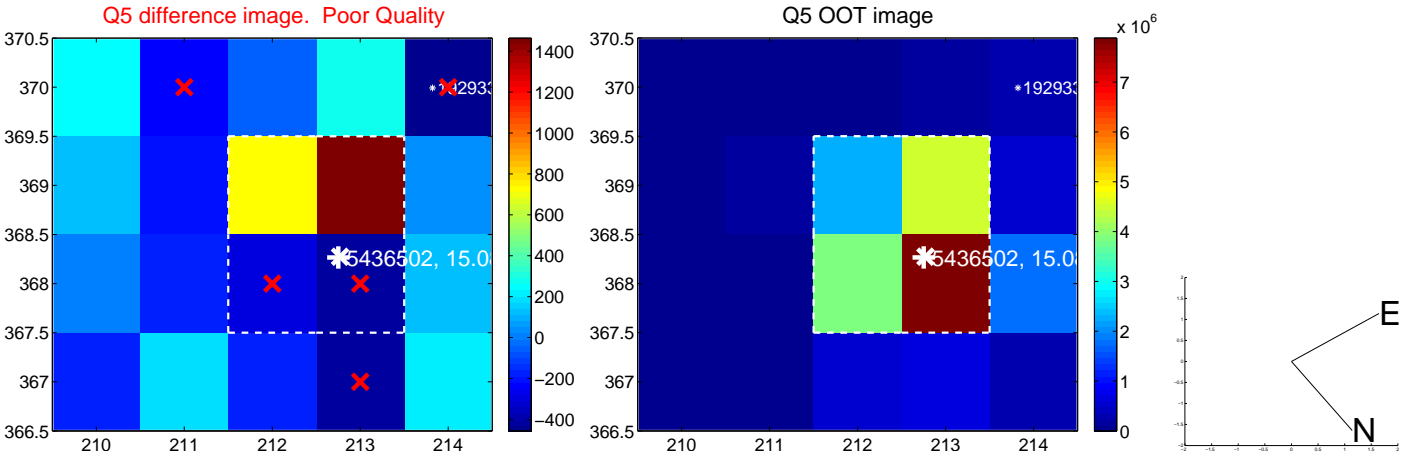


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

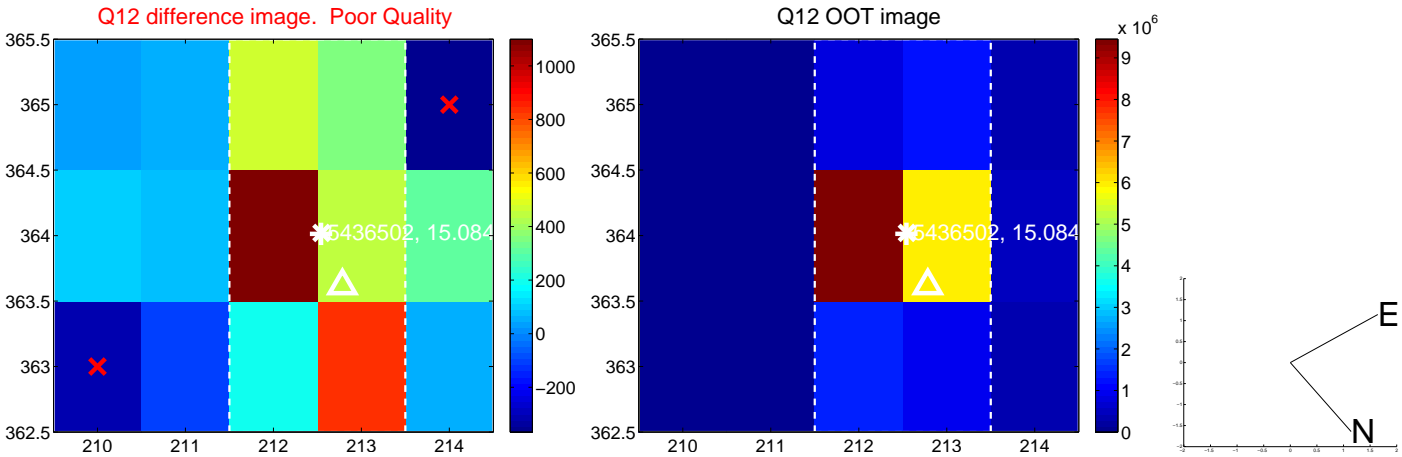
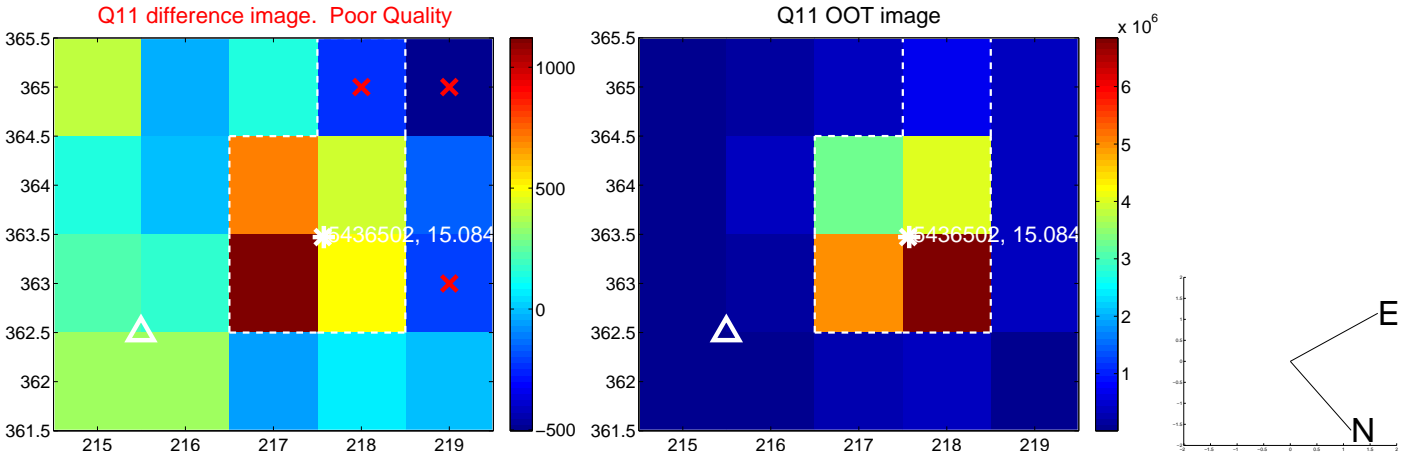
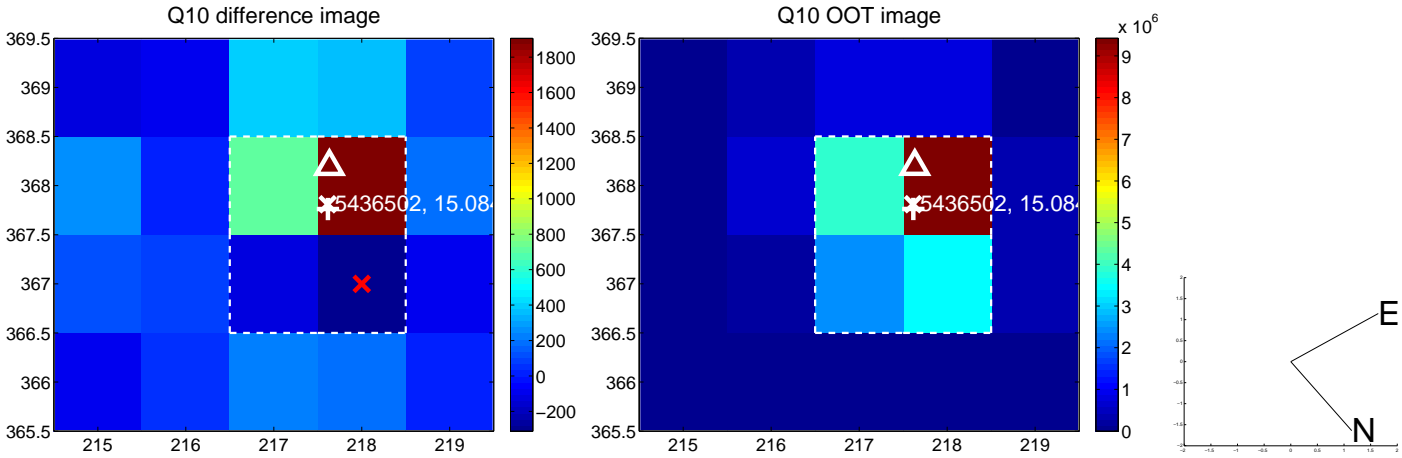
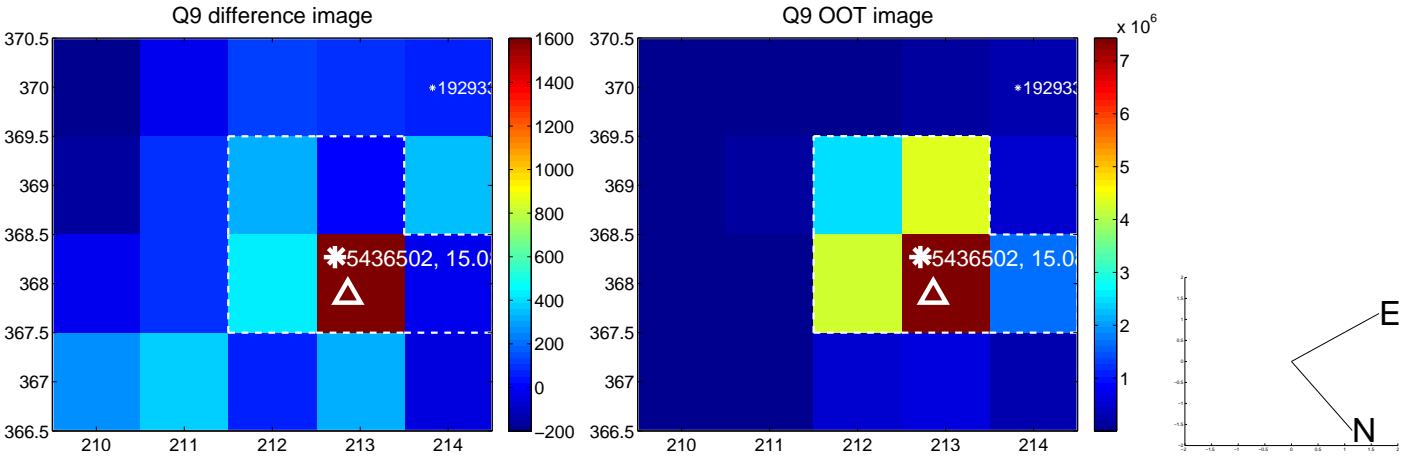
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



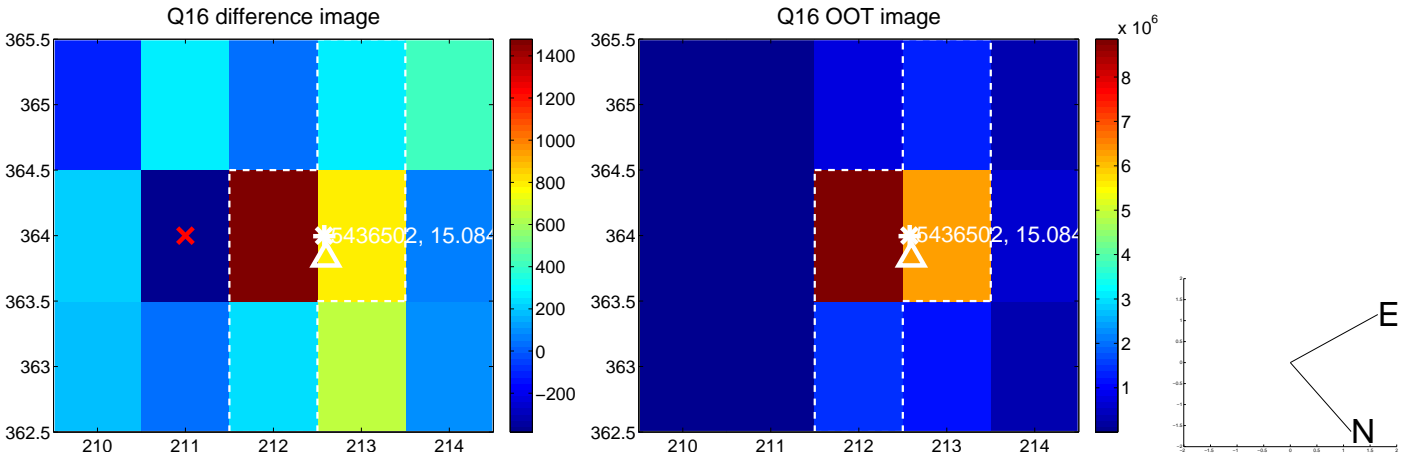
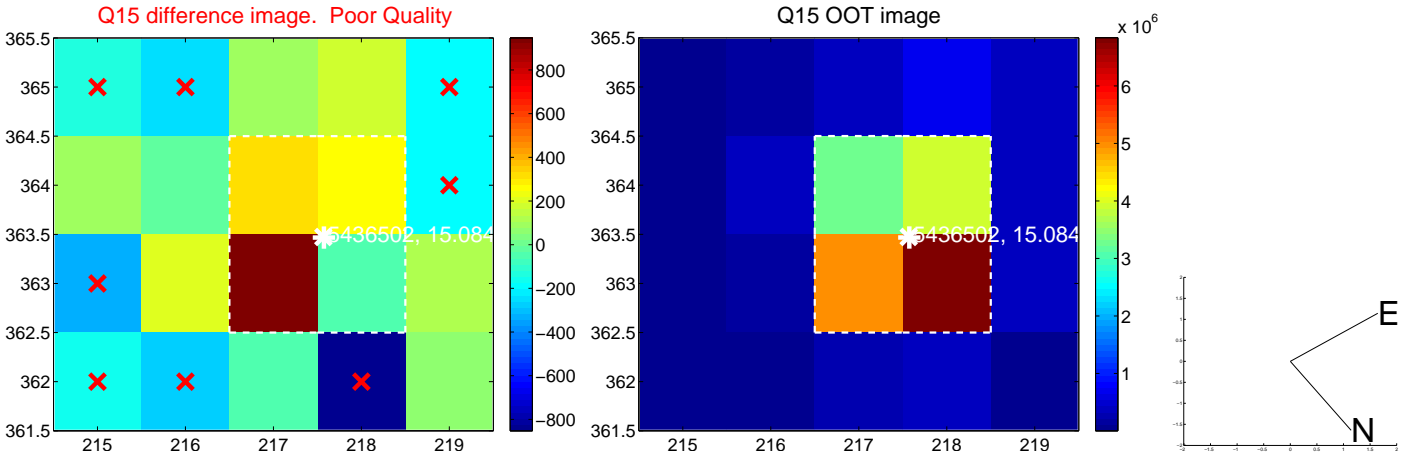
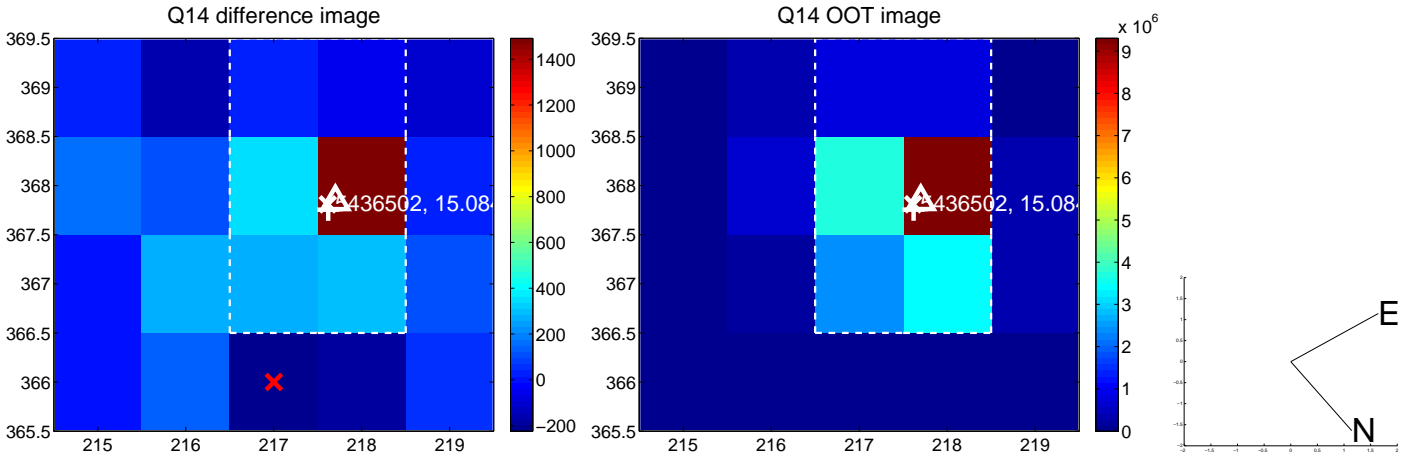
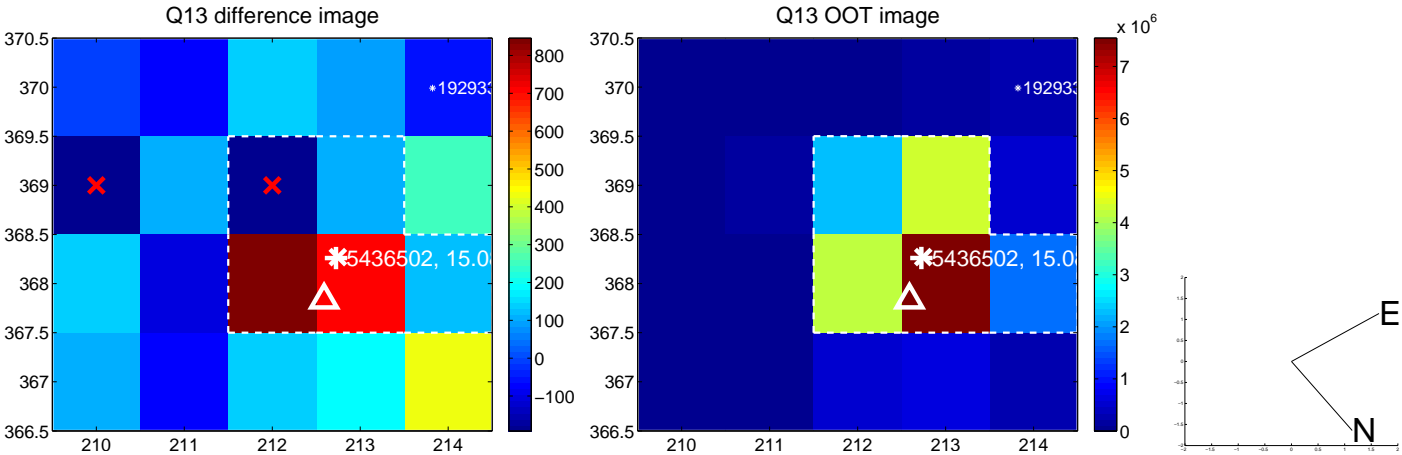
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



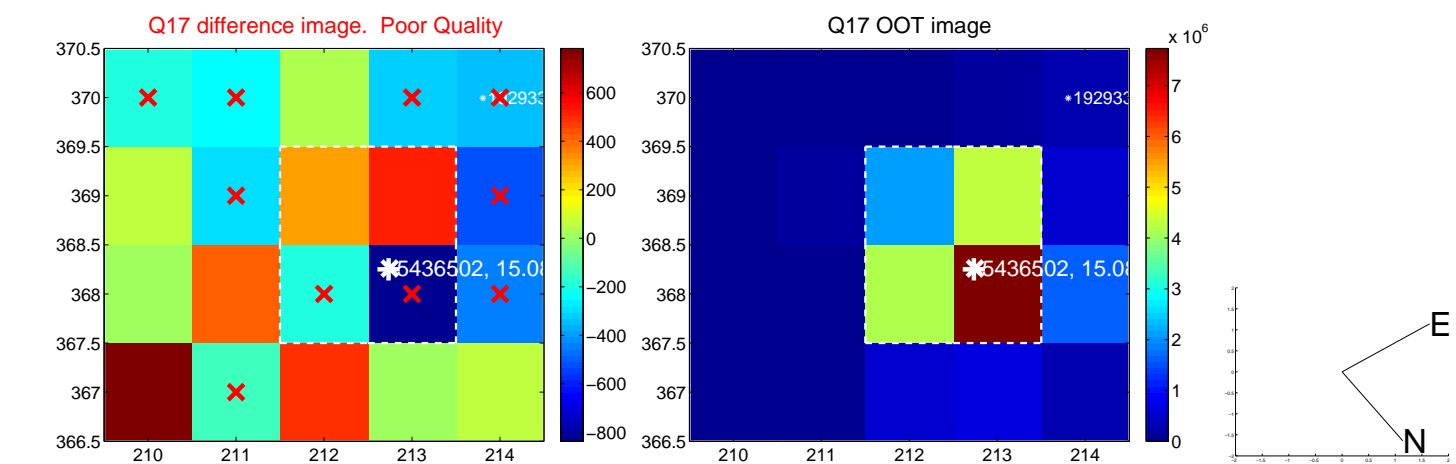
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



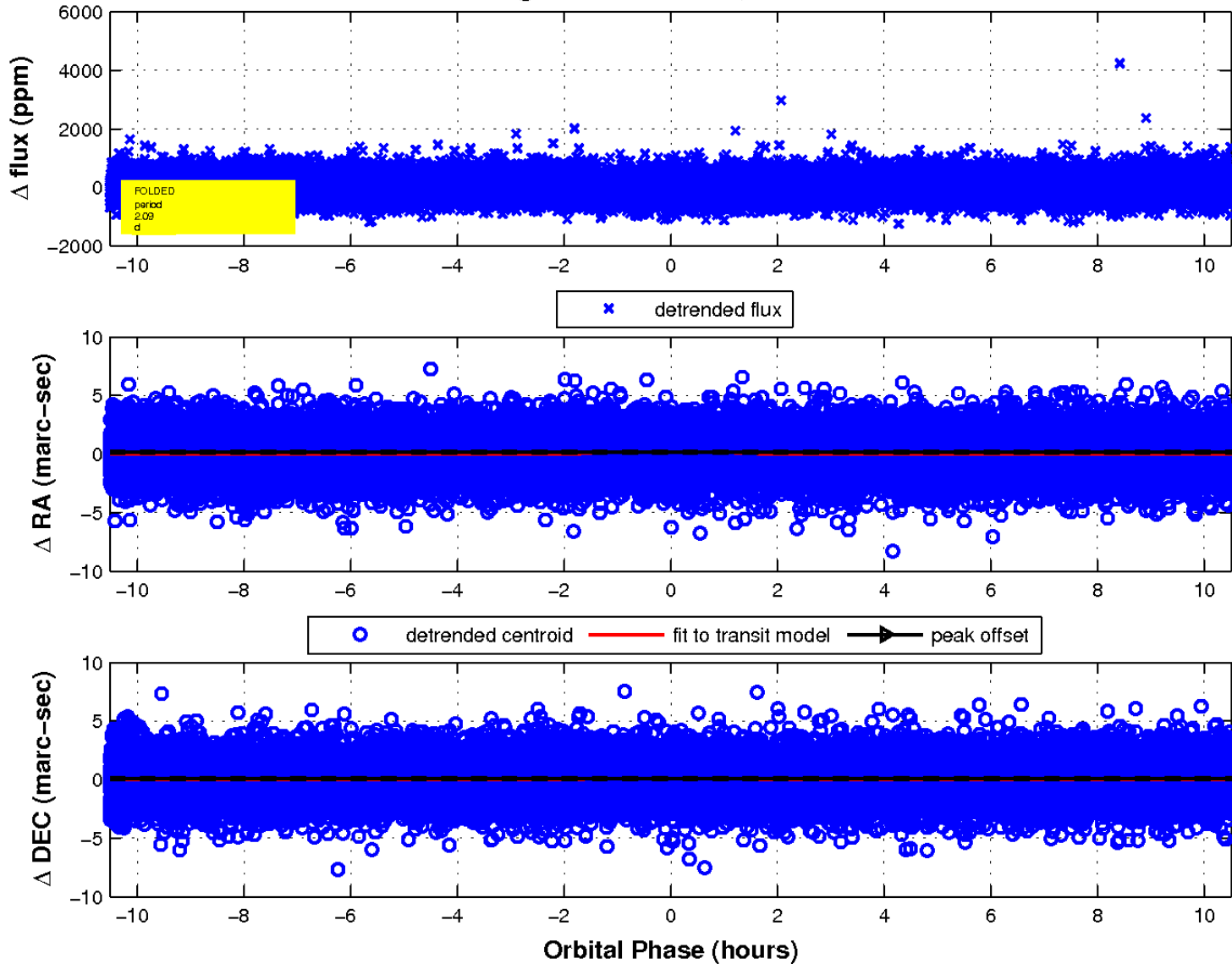
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 5 of 5



# UKIRT Image

Declination

