

# KIC 010730034

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010730034-01	OBS	1305.01	2.633811	131.942717	257.4	2.072	20.7	22.6	0.88	5114	1.71	387.99
010730034-02	OBS	1305.02	6.186688	136.629905	185.3	3.260	11.2	12.0	0.88	5114	1.42	124.26

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010730034-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
010730034-02	OBS	PC	0.98	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.

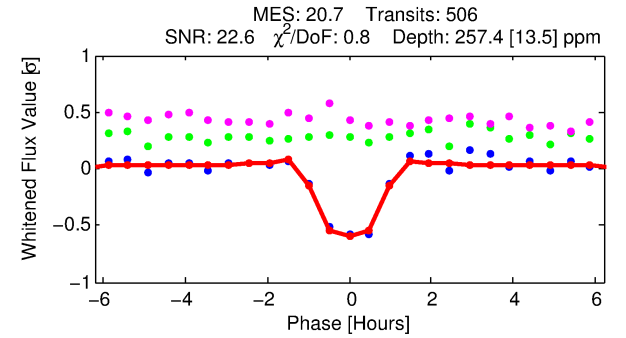
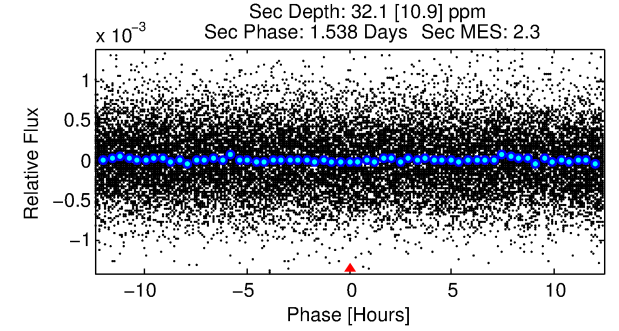
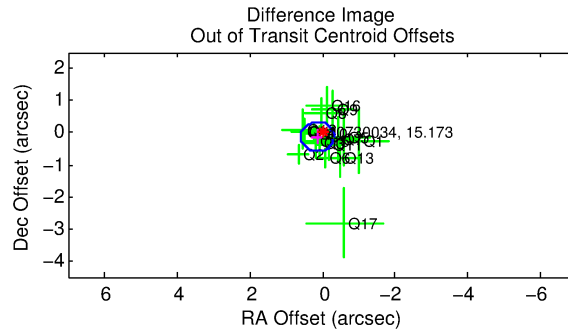
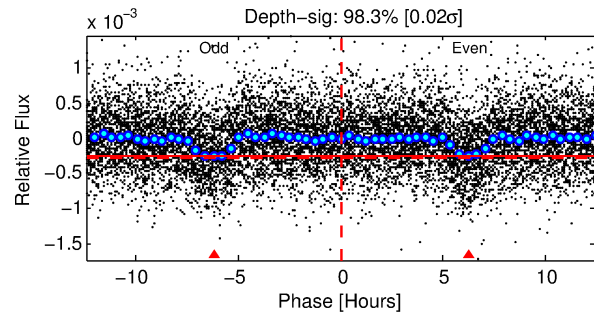
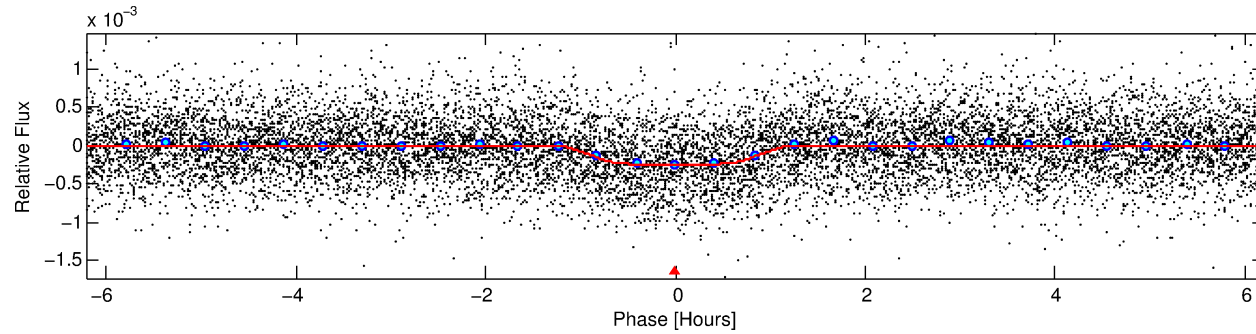
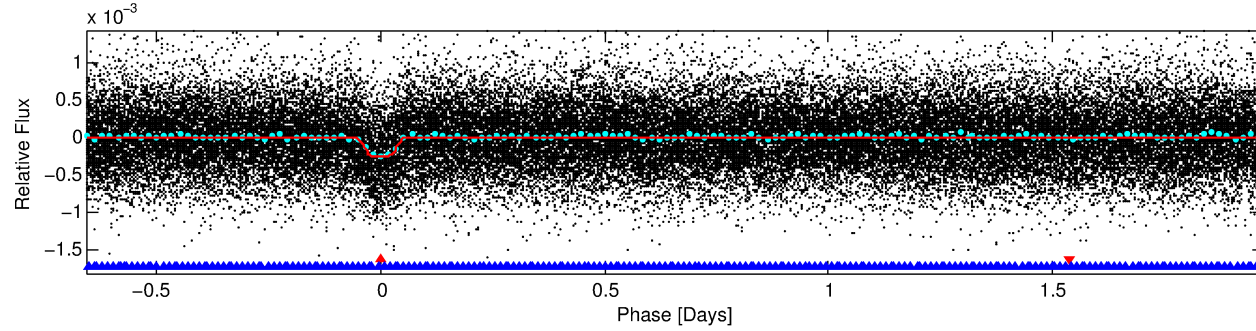
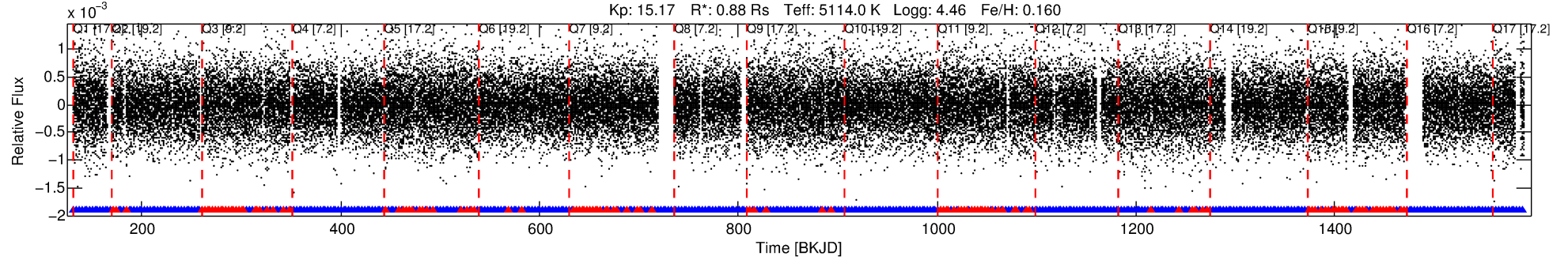
## Ephemeris Match Information For 010730034-01

No Significant Match Found

# DV One-Page Summary

KIC: 10730034 Candidate: 1 of 2 Period: 2.634 d  
KOI: K01305.01 Name: Kepler-285b Corr: 0.926

Kp: 15.17 R\*: 0.88 Rs Teff: 5114.0 K Logg: 4.46 Fe/H: 0.160



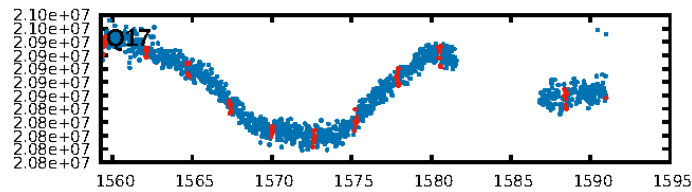
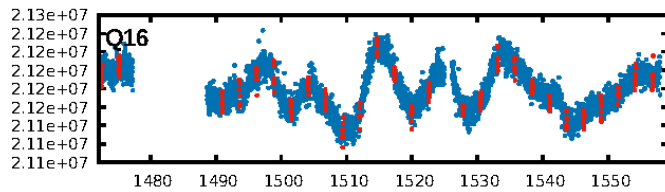
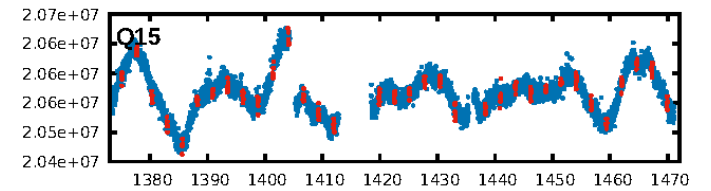
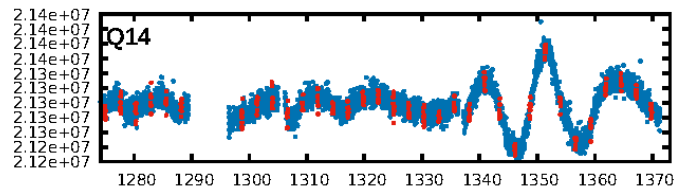
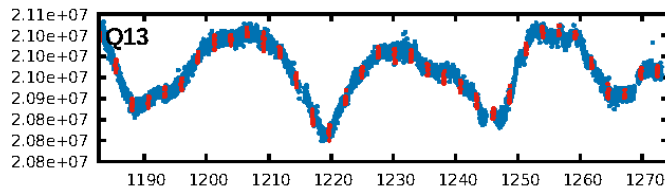
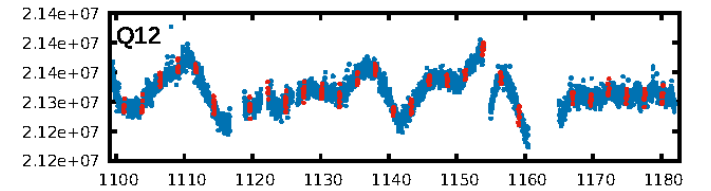
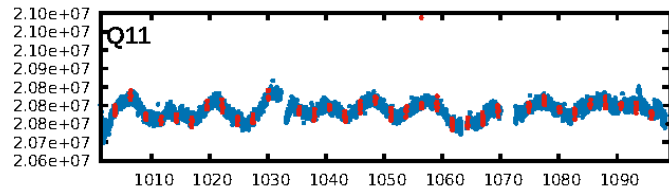
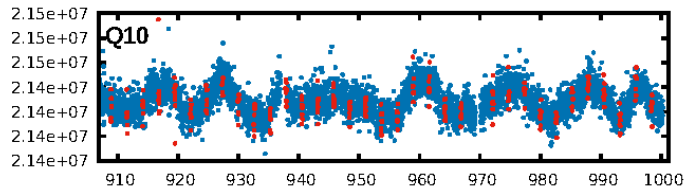
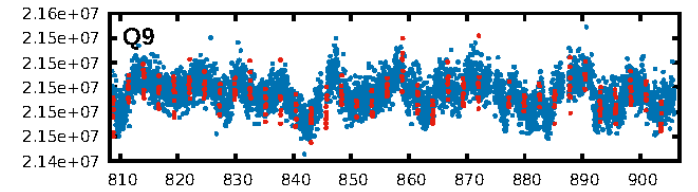
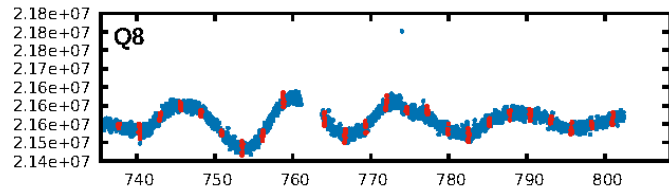
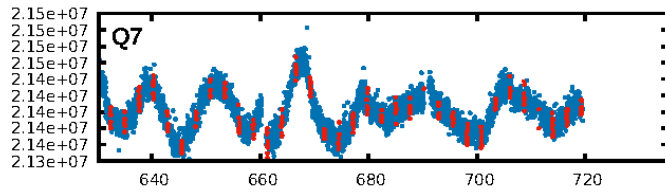
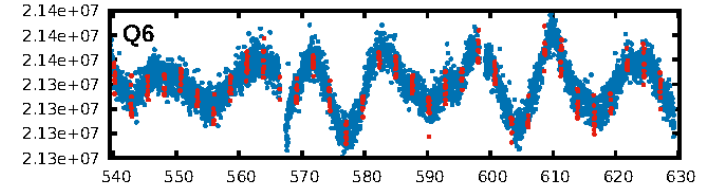
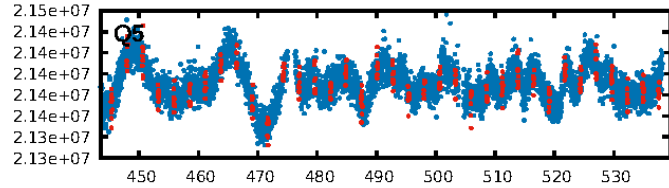
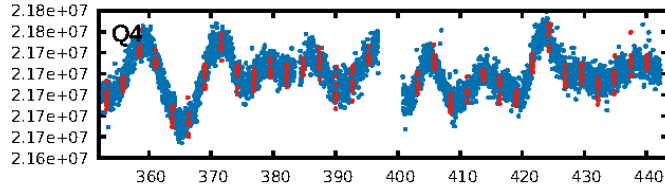
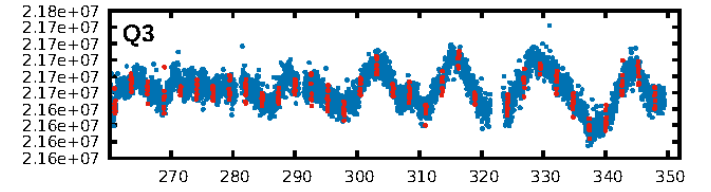
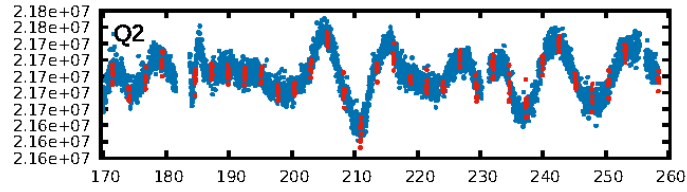
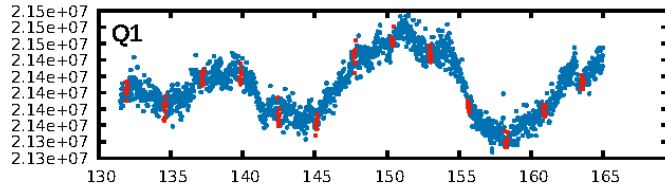
## DV Fit Results:

Period = 2.63381 [0.00001] d  
Epoch = 131.9427 [0.0014] BKJD  
Rp/R\* = 0.0179 [0.0060]  
a/R\* = 4.73 [6.09]  
b = 0.90 [0.30]  
Seff = 387.99 [63.44]  
Teff = 1132 [46] K  
Rp = 1.71 [0.60] Re  
a = 0.0349 [0.0031] AU  
Ag = 7.31 [5.62] [1.12σ]  
Teffp = 2877 [544] K [3.20σ]

## DV Diagnostic Results:

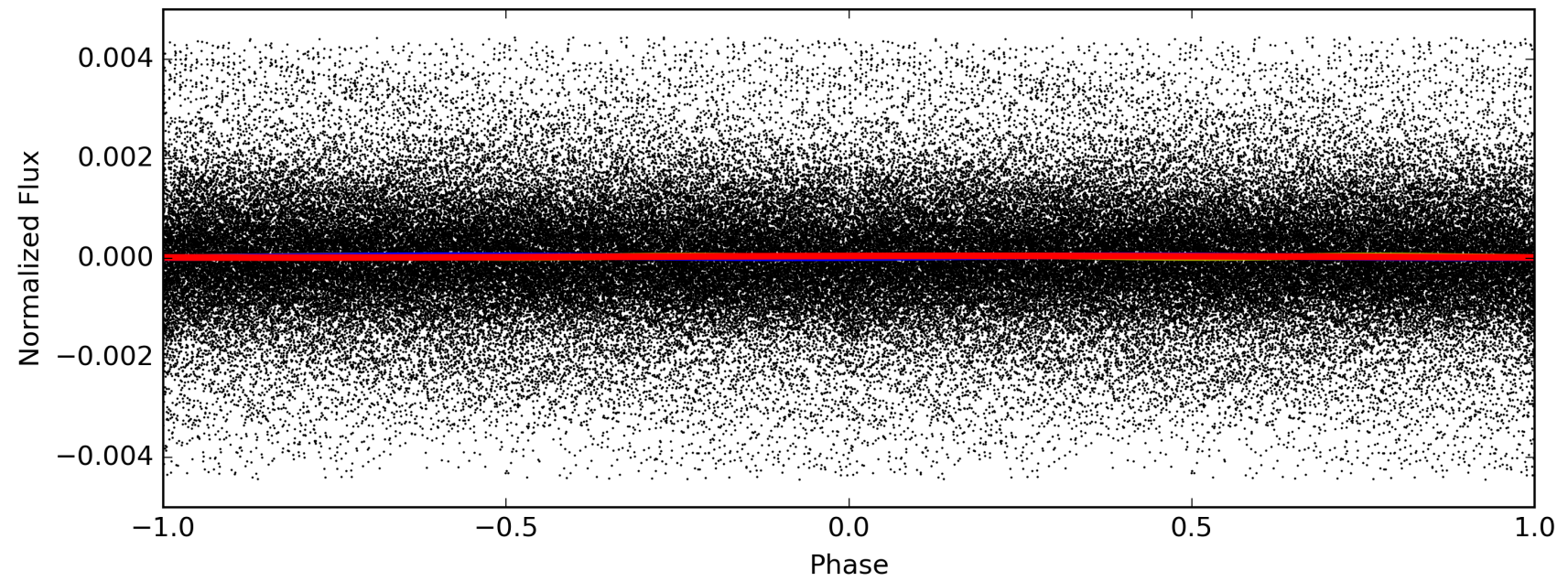
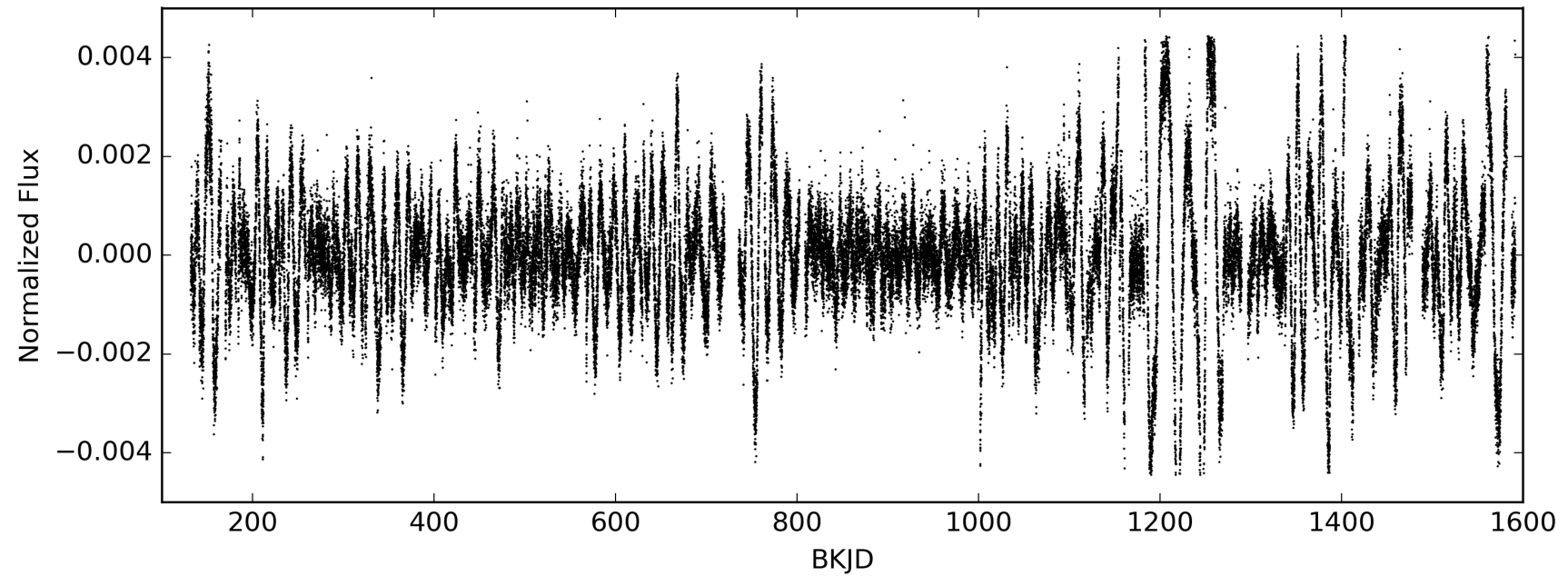
ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [22.07σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 3.88e-91  
RollingBand-fgt: 0.75 [360/483]  
GhostDiagnostic-chr: 2.252  
Centroid-sig: 1.0%  
Centroid-so: 0.910 arcsec [1.49σ]  
OotOffset-rm: 0.195 arcsec [1.27σ]  
KicOffset-rm: 0.303 arcsec [1.54σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.94 [16/17]  
DiffImageOverlap-fno: 1.00 [17/17]

# TCE 010730034-01, PDC Light Curves



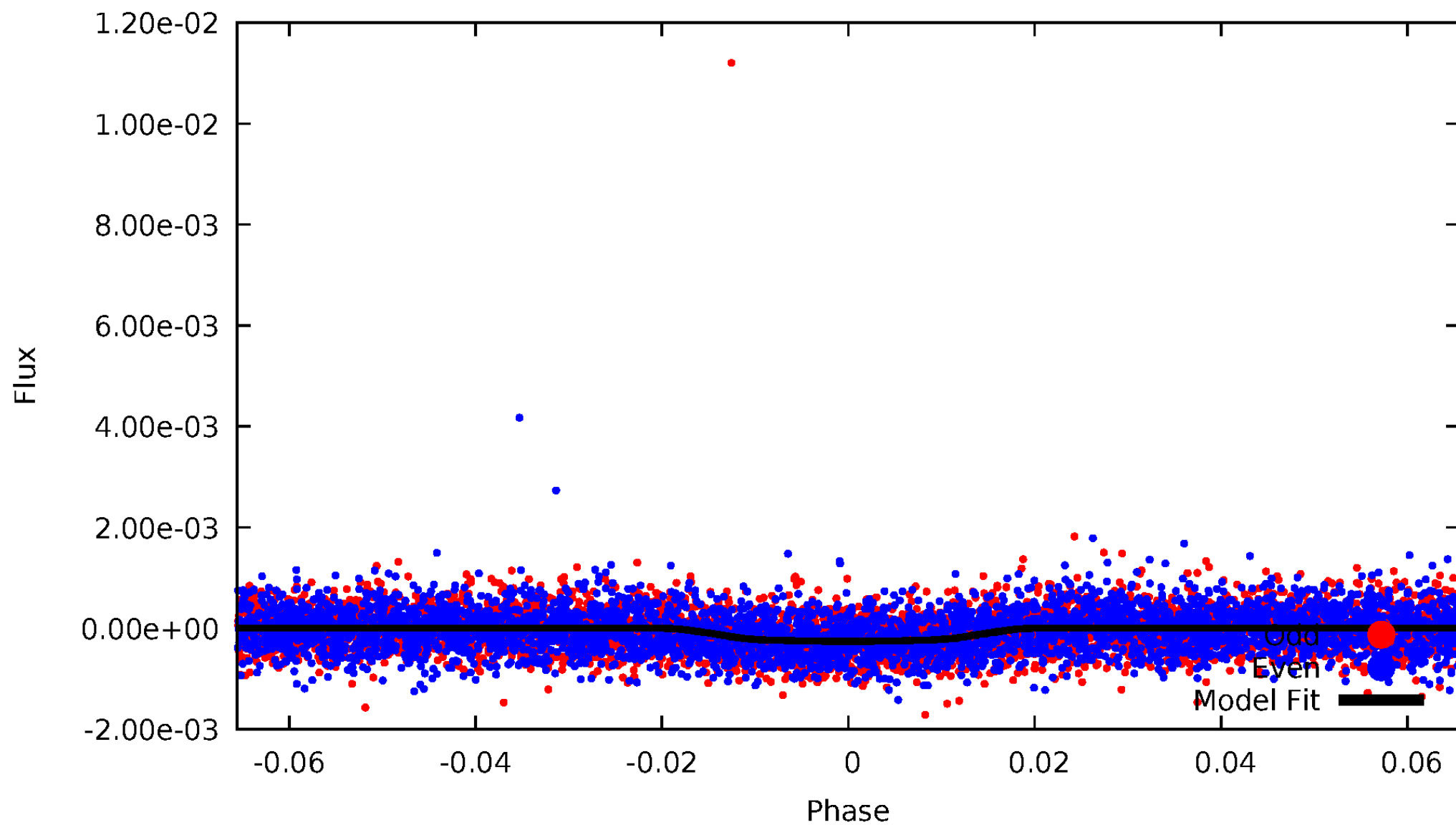
TCE 010730034-01

— P = 1.317 days — P = 2.634 days — P = 5.268 days



# DV Odd/Even

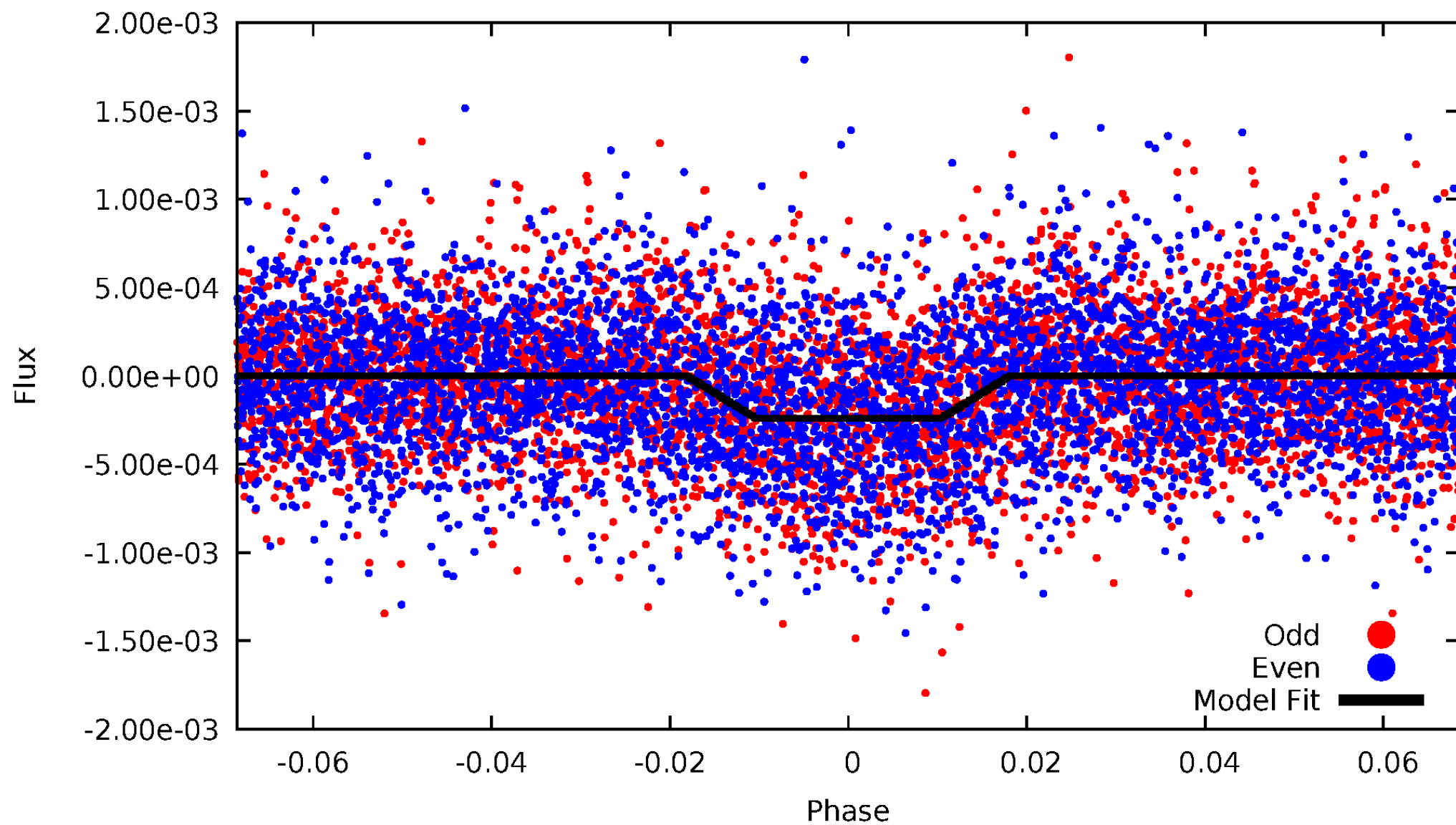
TCE 010730034-01





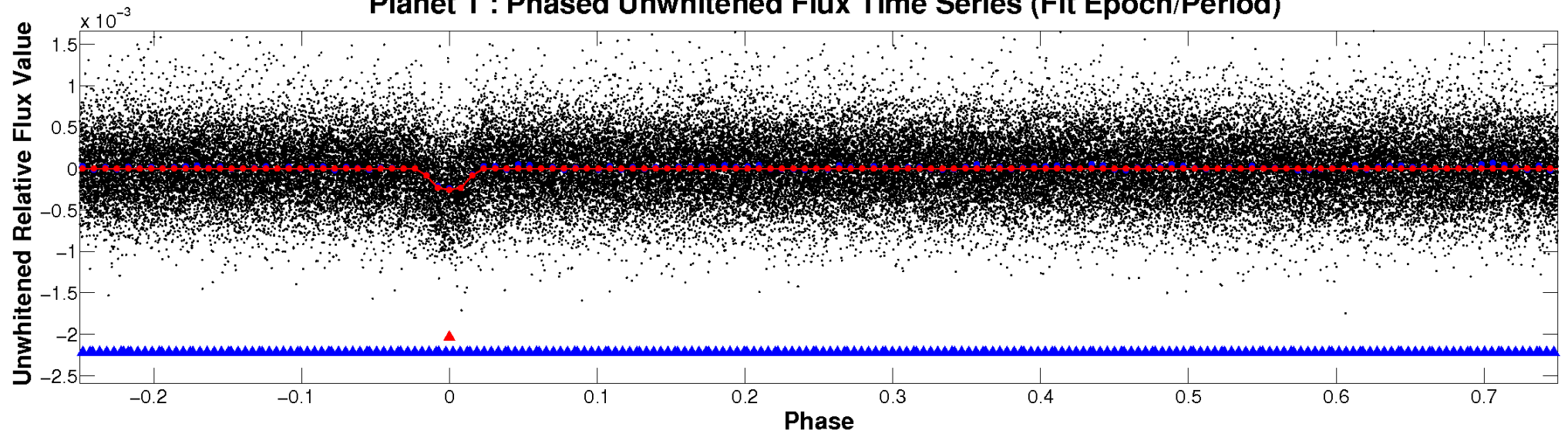
# ALT Odd/Even

TCE 010730034-01

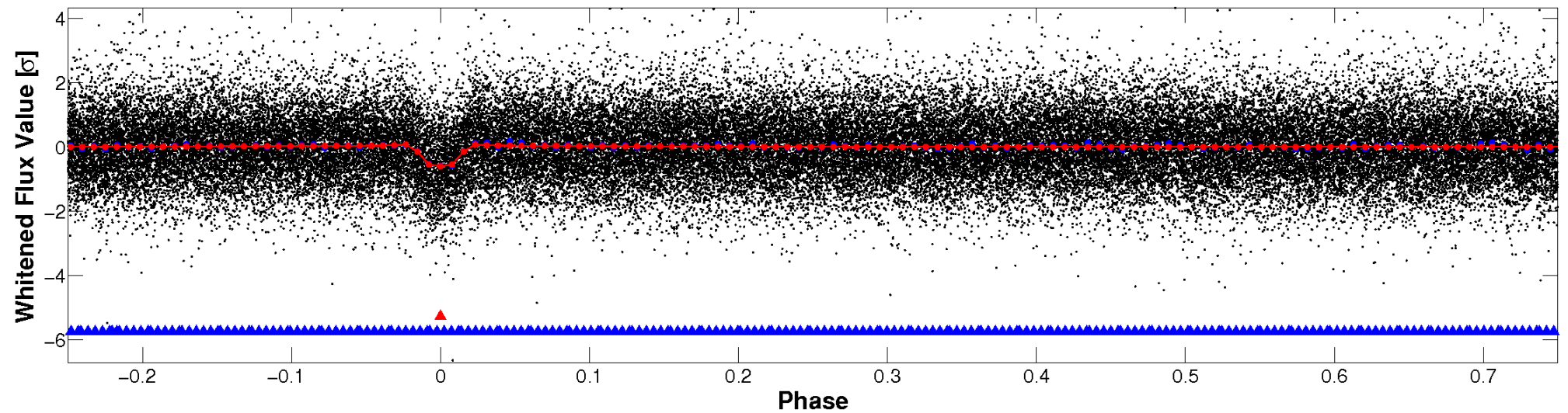


# Non-Whitened Vs. Whitened Light Curve

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

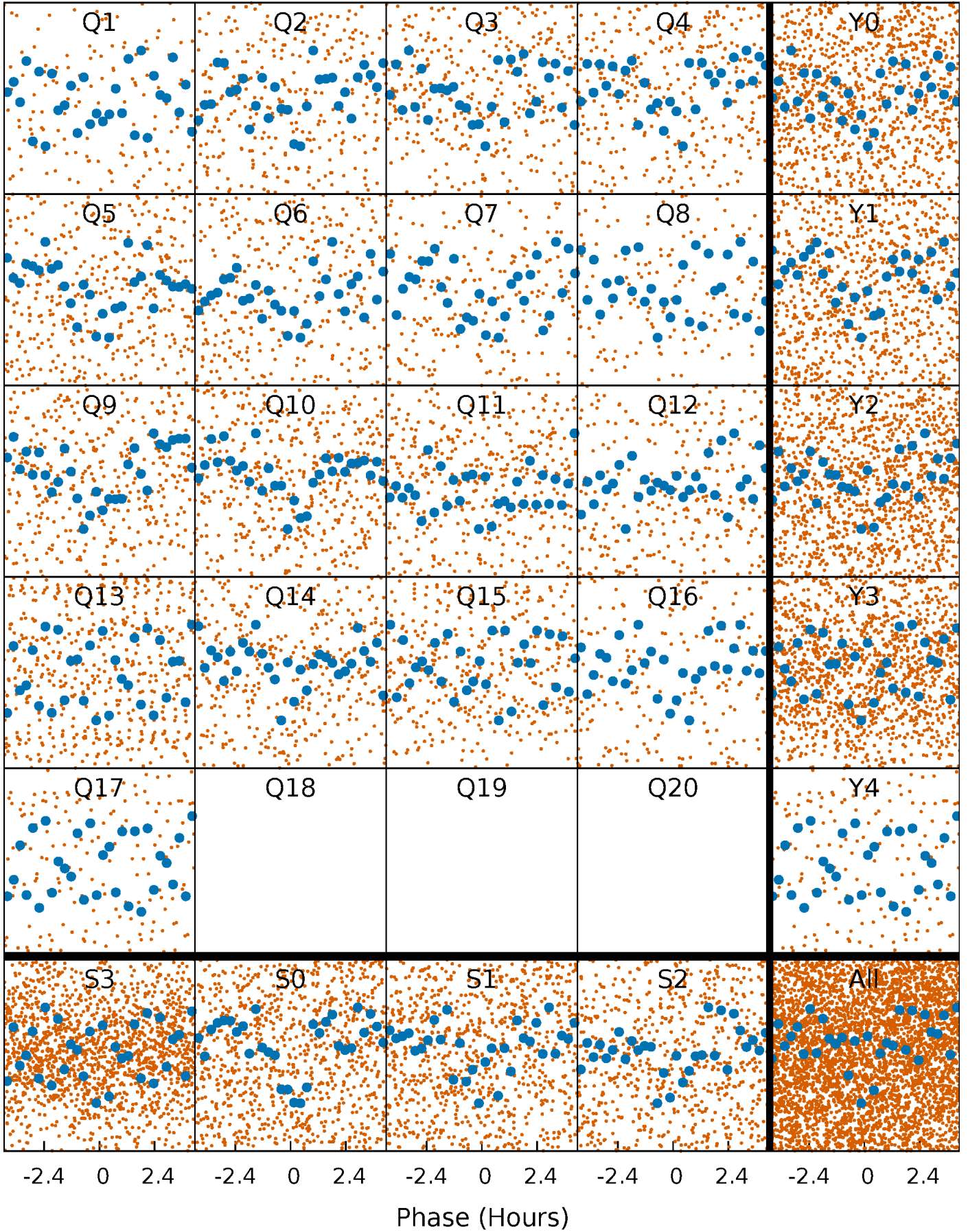


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

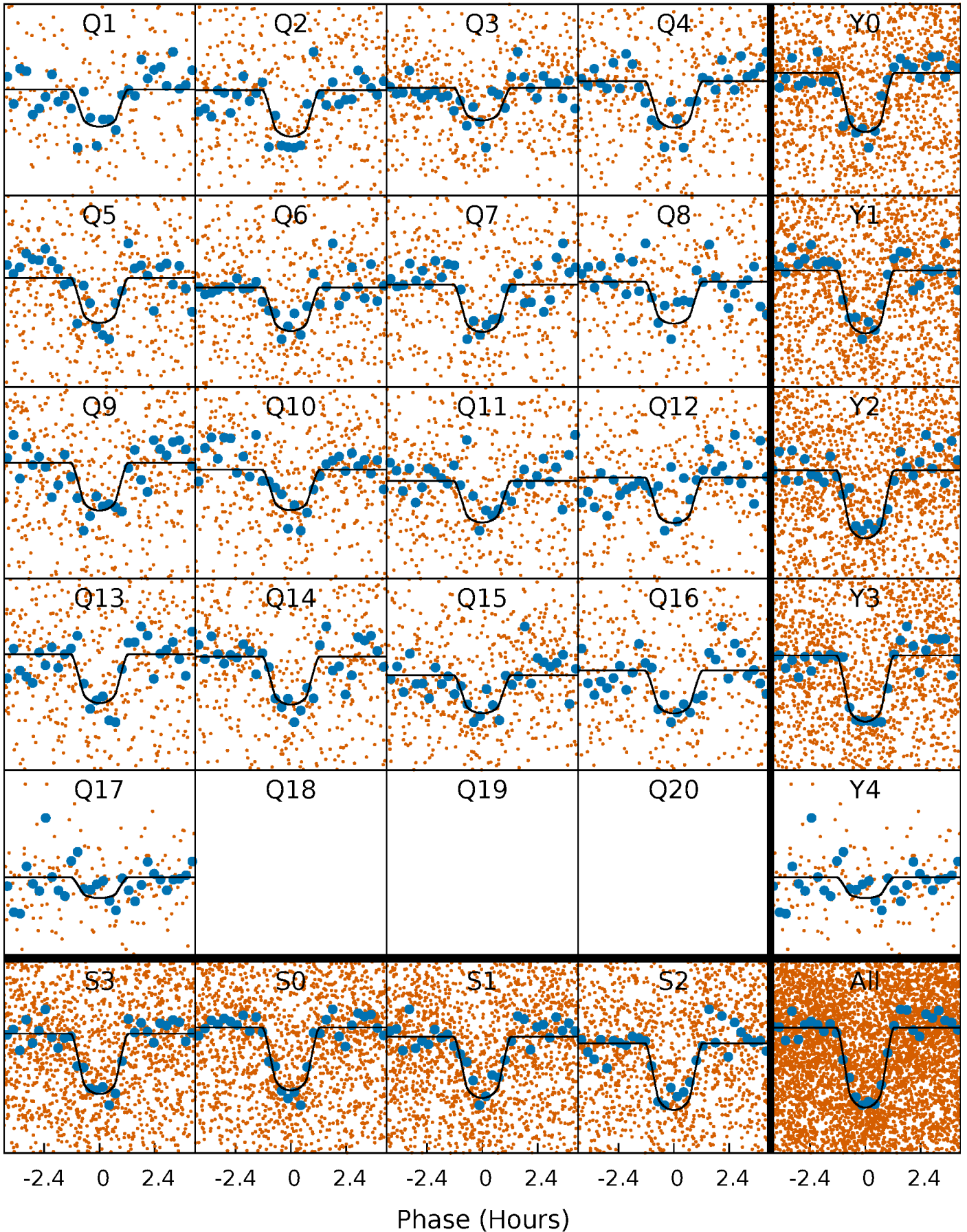
TCE 010730034-01 P= 2.633811 Days  $T_0=131.942717$  (BKJD)





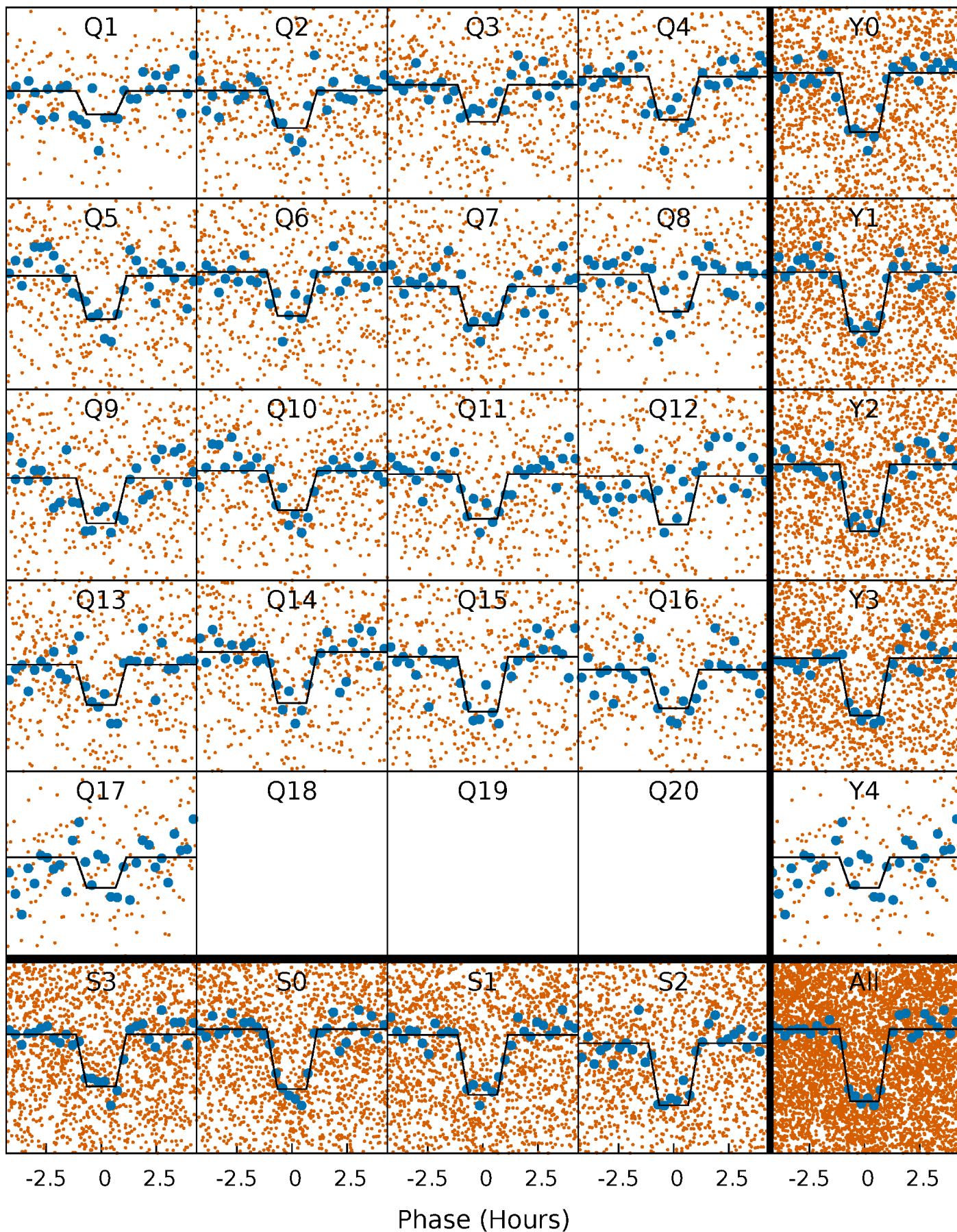
# DV Quarter-Phased Transit Curves

TCE 010730034-01 P= 2.633811 Days  $T_0=131.942717$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

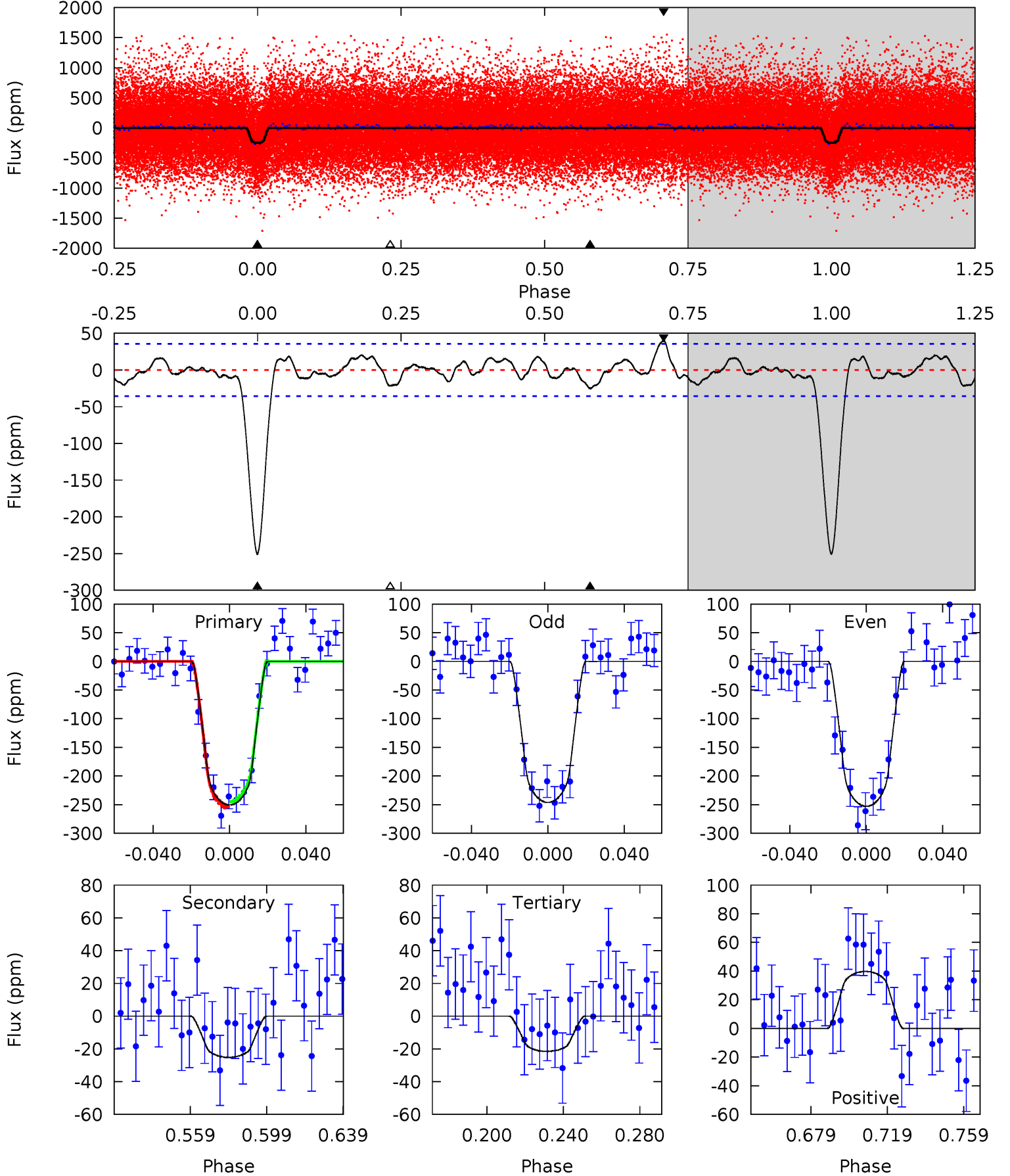
TCE 010730034-01 P= 2.633822 Days  $T_0=131.938166$  (BKJD)



# DV Model-Shift Uniqueness Test

010730034-01, P = 2.633811 Days, E = 129.308906 Days

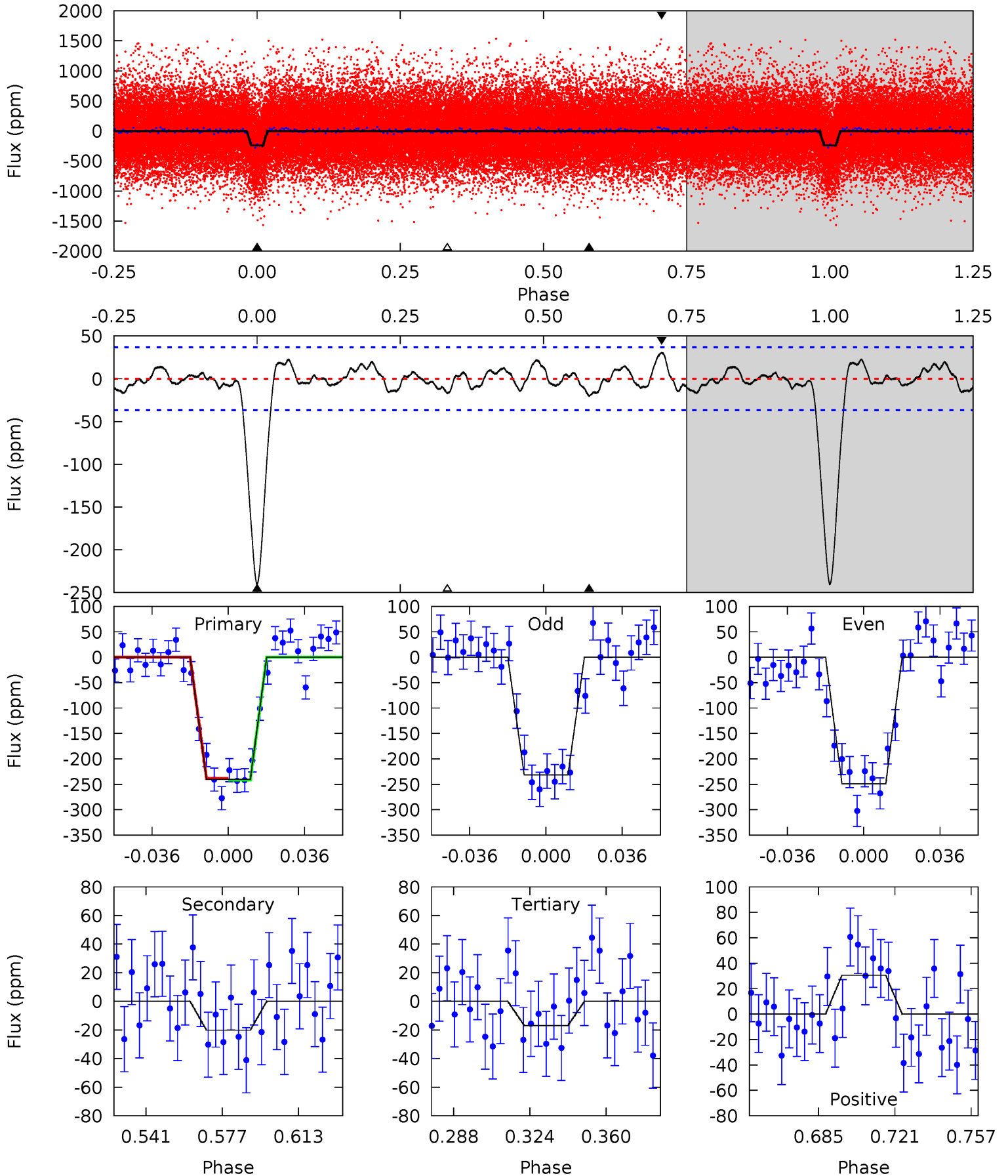
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
33.4	3.35	2.87	5.30	4.75	2.05	1.51	30.5	28.1	0.48	-1.95	0.44	0.92	0.14	0.62



# Alt Model-Shift Uniqueness Test

010730034-01, P = 2.633822 Days, E = 129.304344 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
31.2	2.62	2.19	3.95	4.77	2.10	1.28	29.0	27.2	0.43	-1.34	1.14	0.94	0.11	0.22





### Stellar Parameters For KIC 010730034

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5114^{+84}_{-76}$	$4.463^{+0.090}_{-0.036}$	$0.160^{+0.150}_{-0.150}$	$0.878^{+0.044}_{-0.076}$	$0.817^{+0.057}_{-0.026}$	$1.700^{+0.577}_{-0.200}$
	+2%/-1%	+2%/-1%	+94%/-94%	+5%/-9%	+7%/-3%	+34%/-12%
Source	SPE90	SPE90	SPE90	DSEP		

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

### Secondary Eclipse Parameters for KIC 010730034-01 / KOI 1305.01

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-25 \pm 7$	$1.70^{+0.58}_{-0.57}$	$1572^{+38}_{-46}$	$3195^{+507}_{-329}$	$5.603^{+7.888}_{-2.829}$
Alt.	$-20 \pm 8$	$1.51^{+0.58}_{-0.55}$	$1574^{+39}_{-44}$	$3233^{+576}_{-376}$	$5.847^{+10.397}_{-3.203}$

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

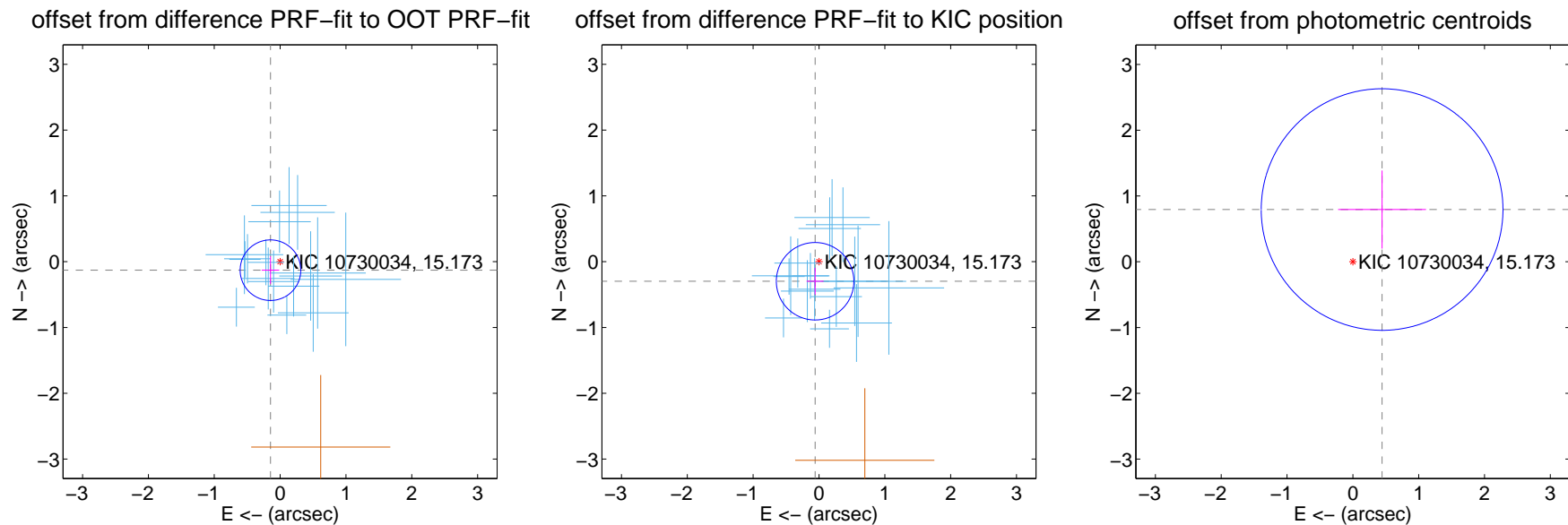
## DV Centroid Data

Supplemental centroid analysis for 010730034-01. Kepler magnitude: 15.17. Transit SNR 22.60

There are 16 quarters with good PRF difference image offsets

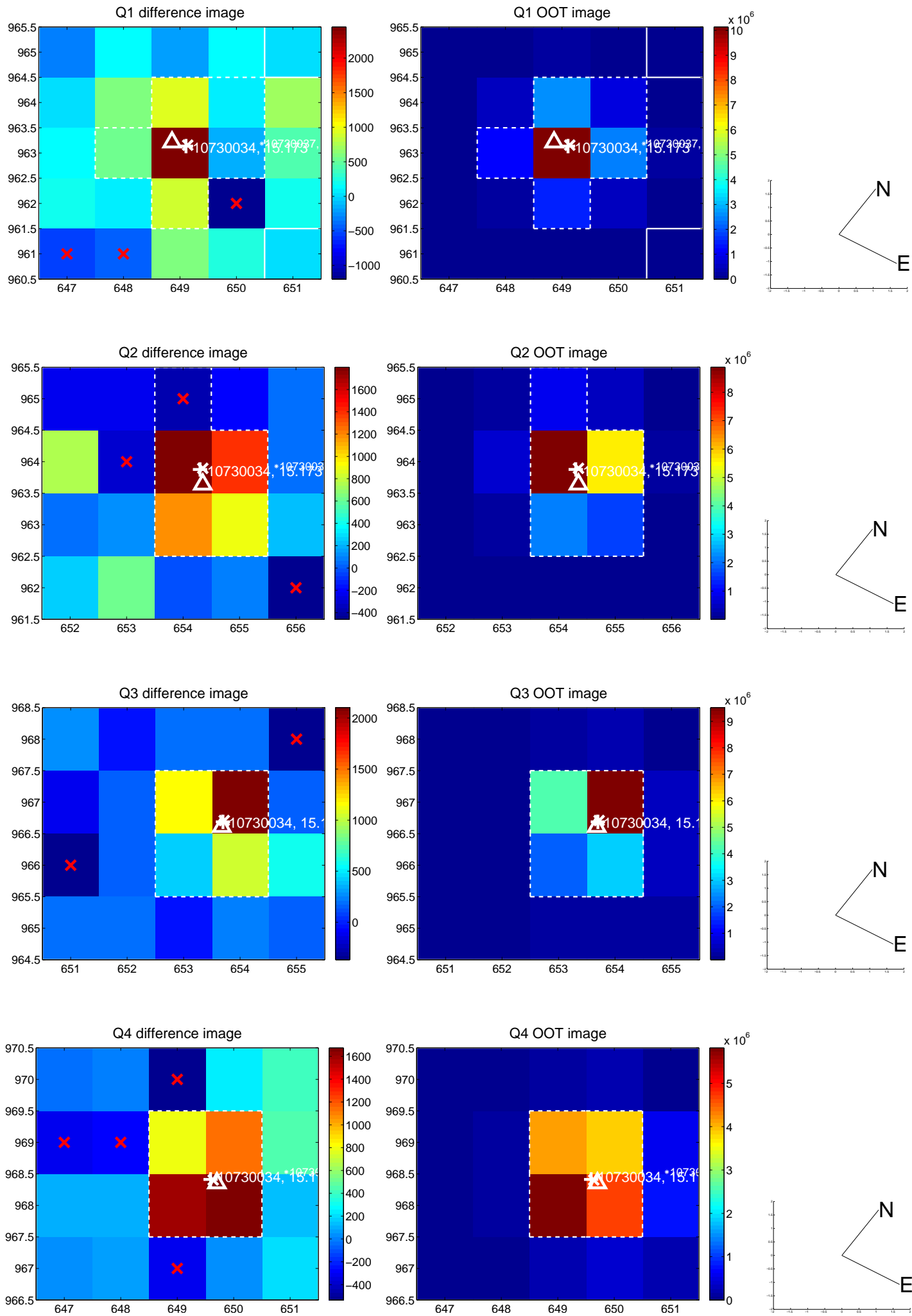
The direct PRF centroid is offset from the target star catalog position by about 0.22 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.195 \pm 0.153$	1.27	$0.146 \pm 0.133$	$-0.129 \pm 0.209$
PRF-fit source offset from KIC position	$0.303 \pm 0.196$	1.54	$0.059 \pm 0.129$	$-0.297 \pm 0.203$
photometric centroid source offset	$0.91 \pm 0.61$	1.49	$-0.44 \pm 0.67$	$0.79 \pm 0.59$

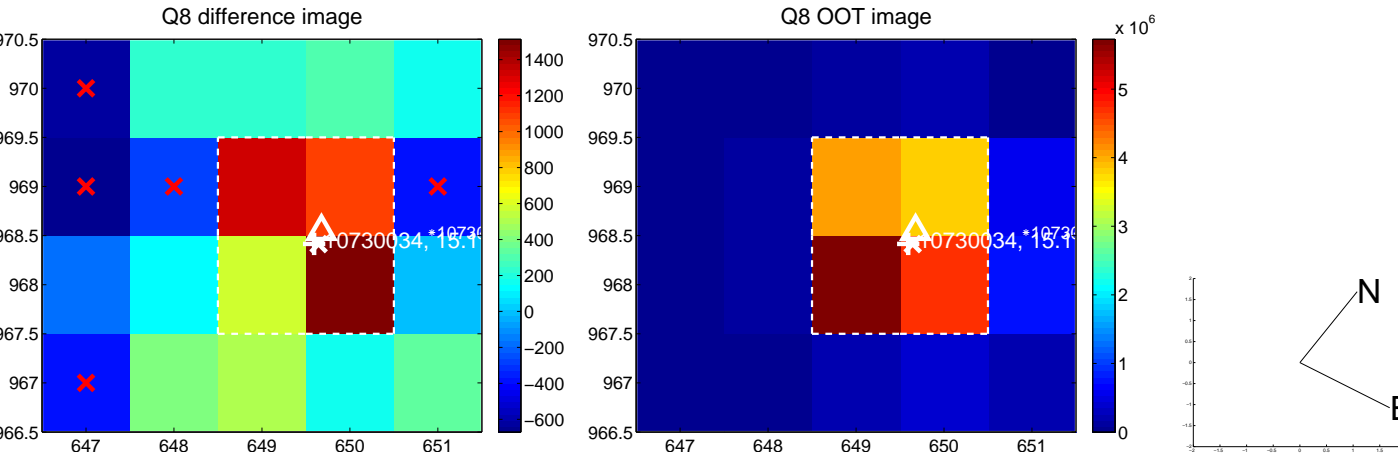
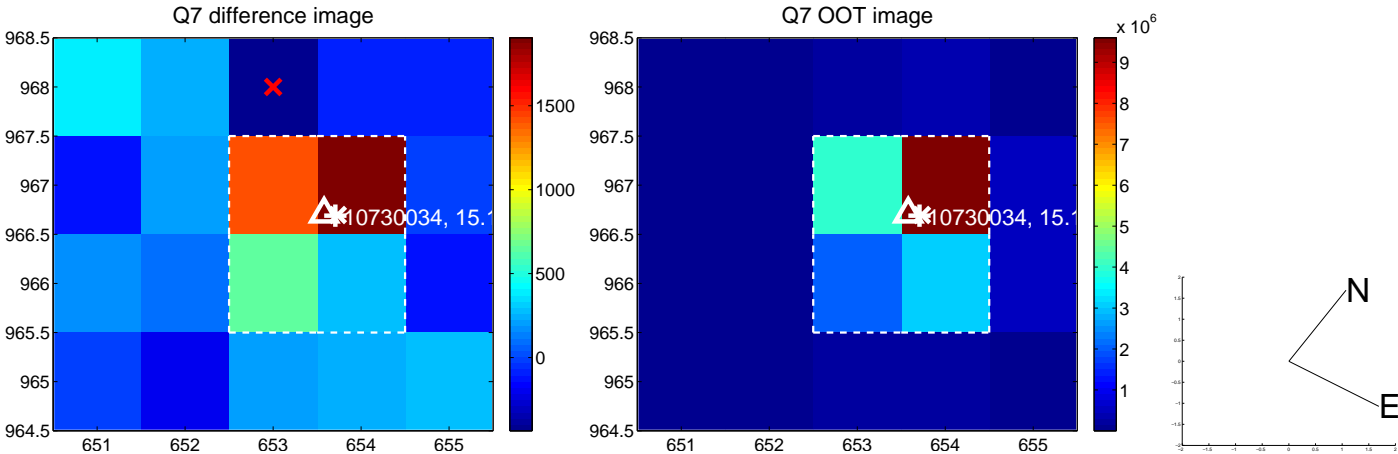
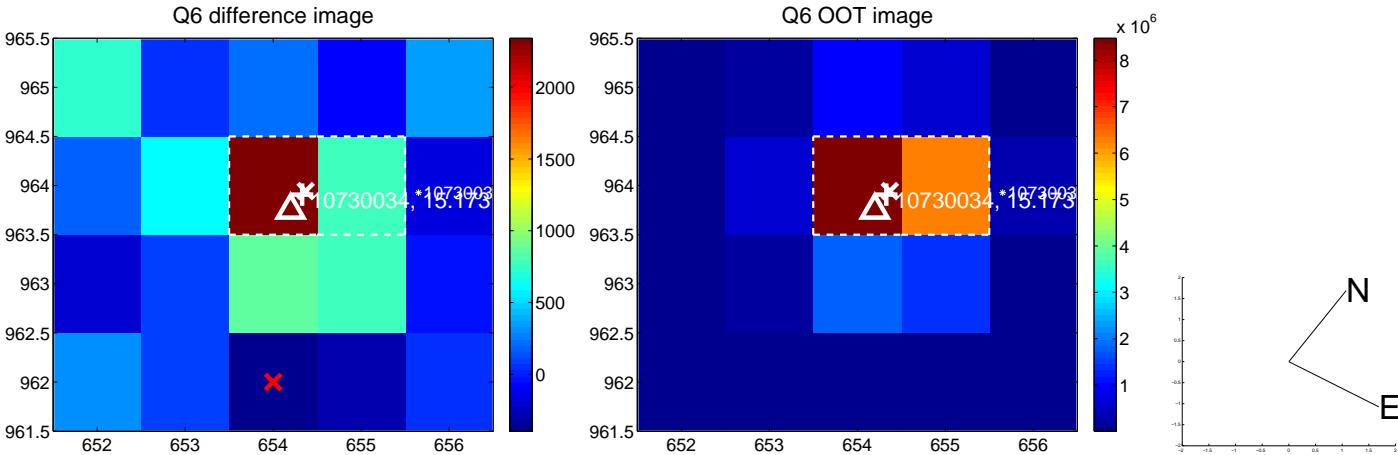
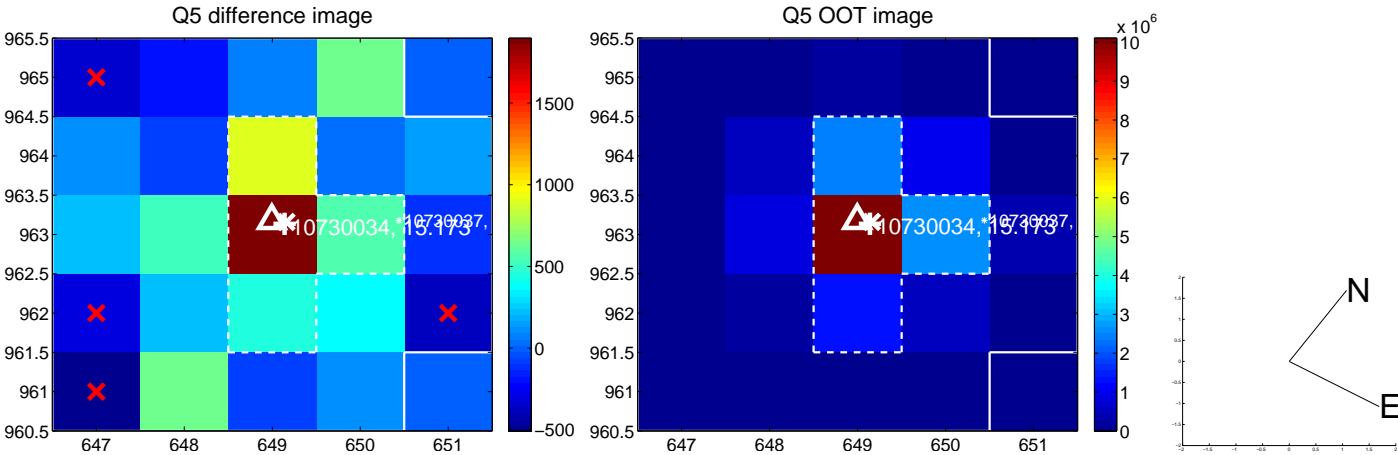


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



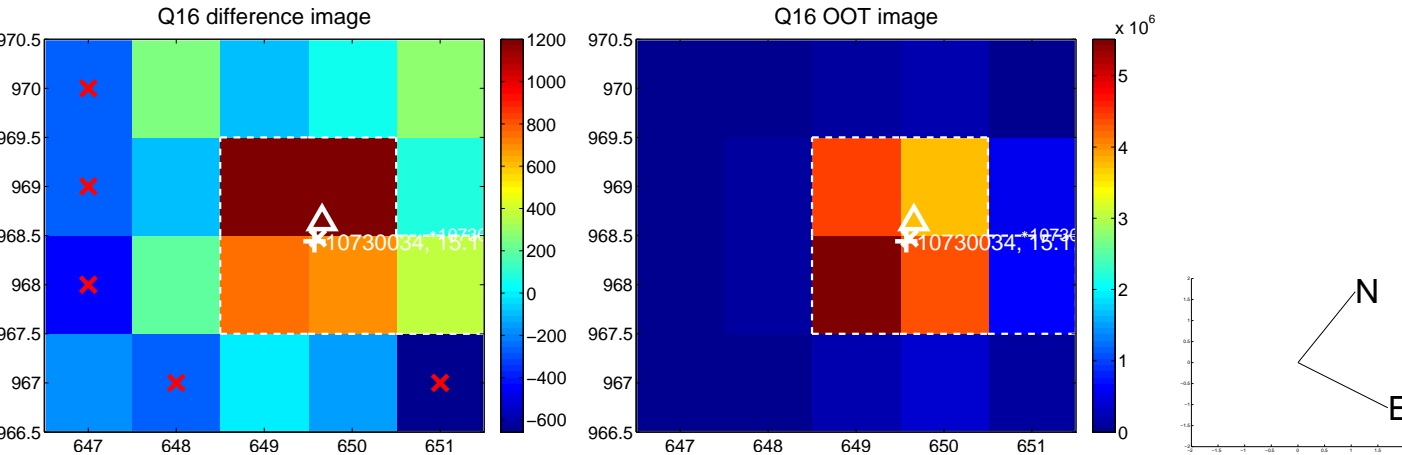
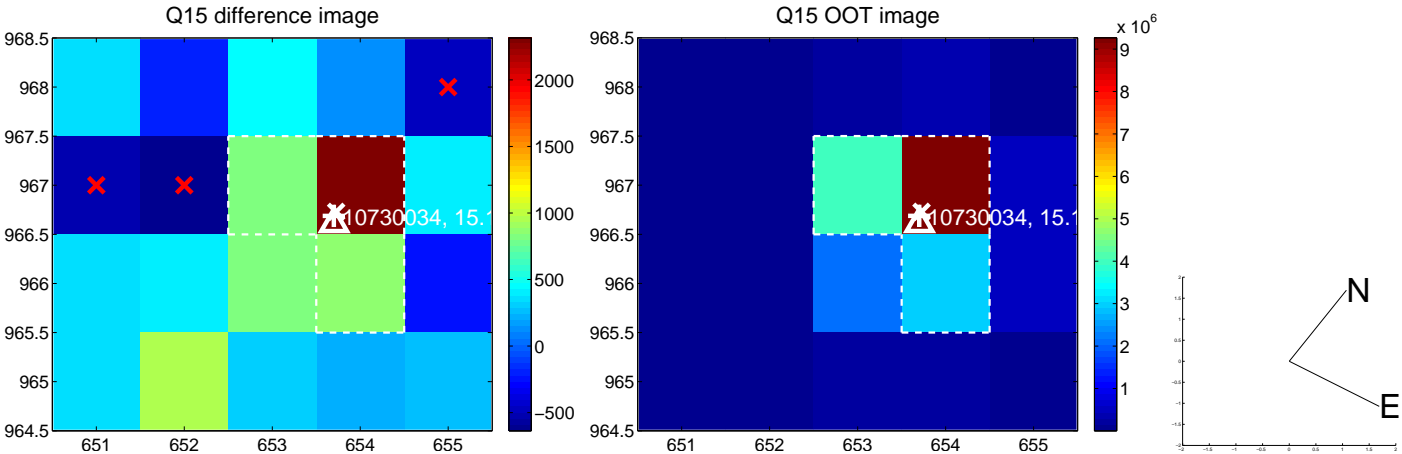
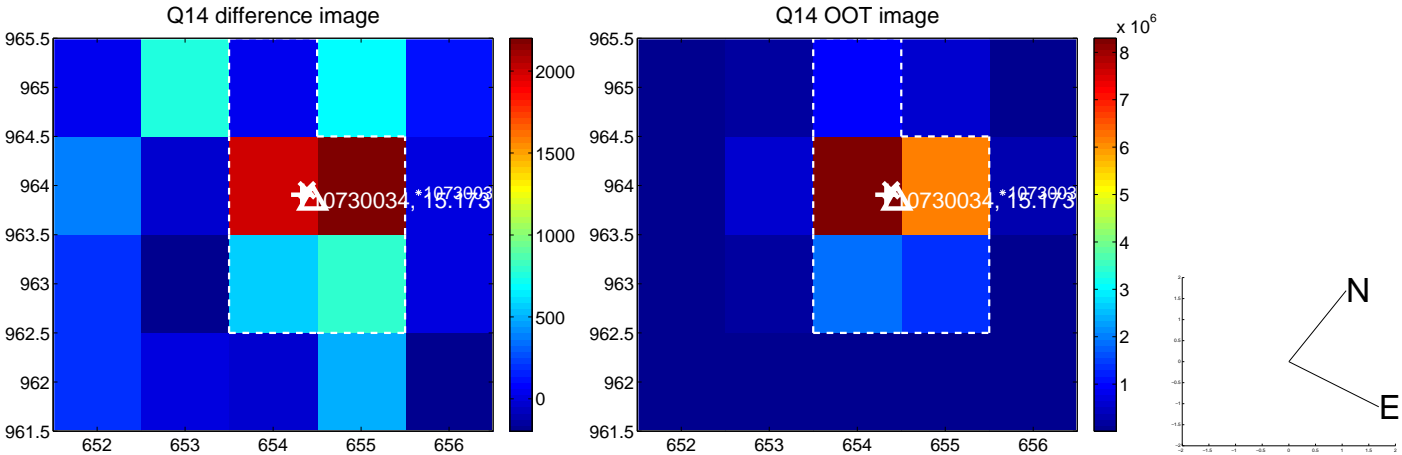
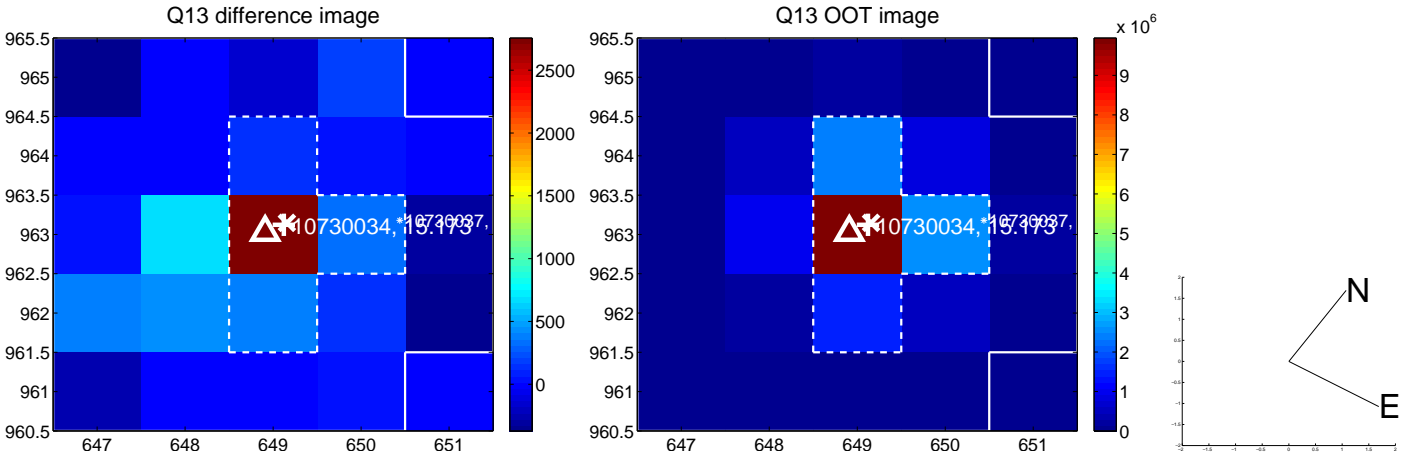
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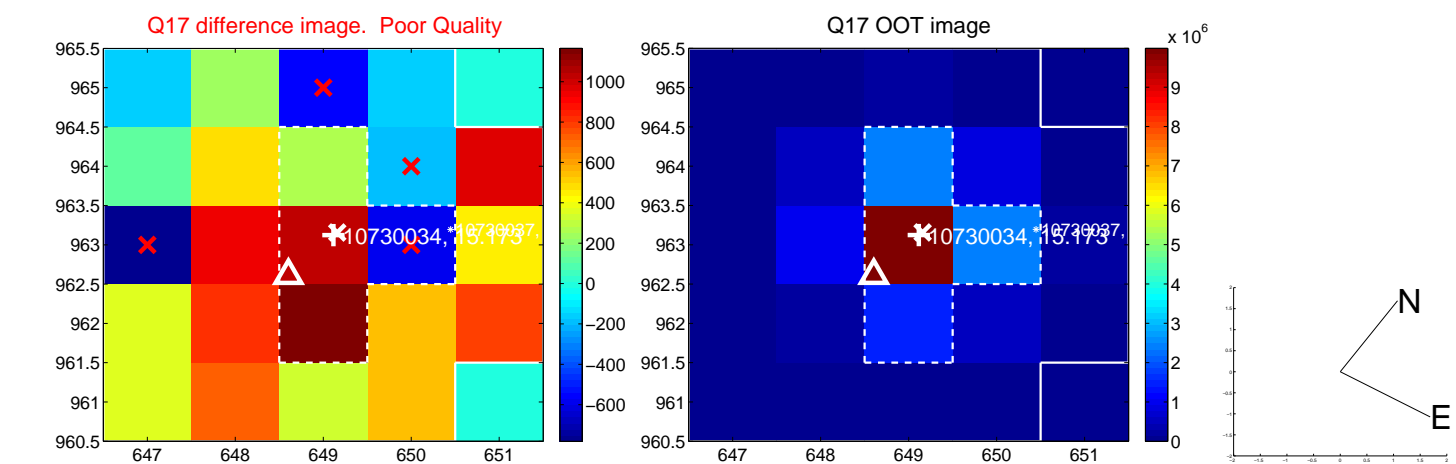




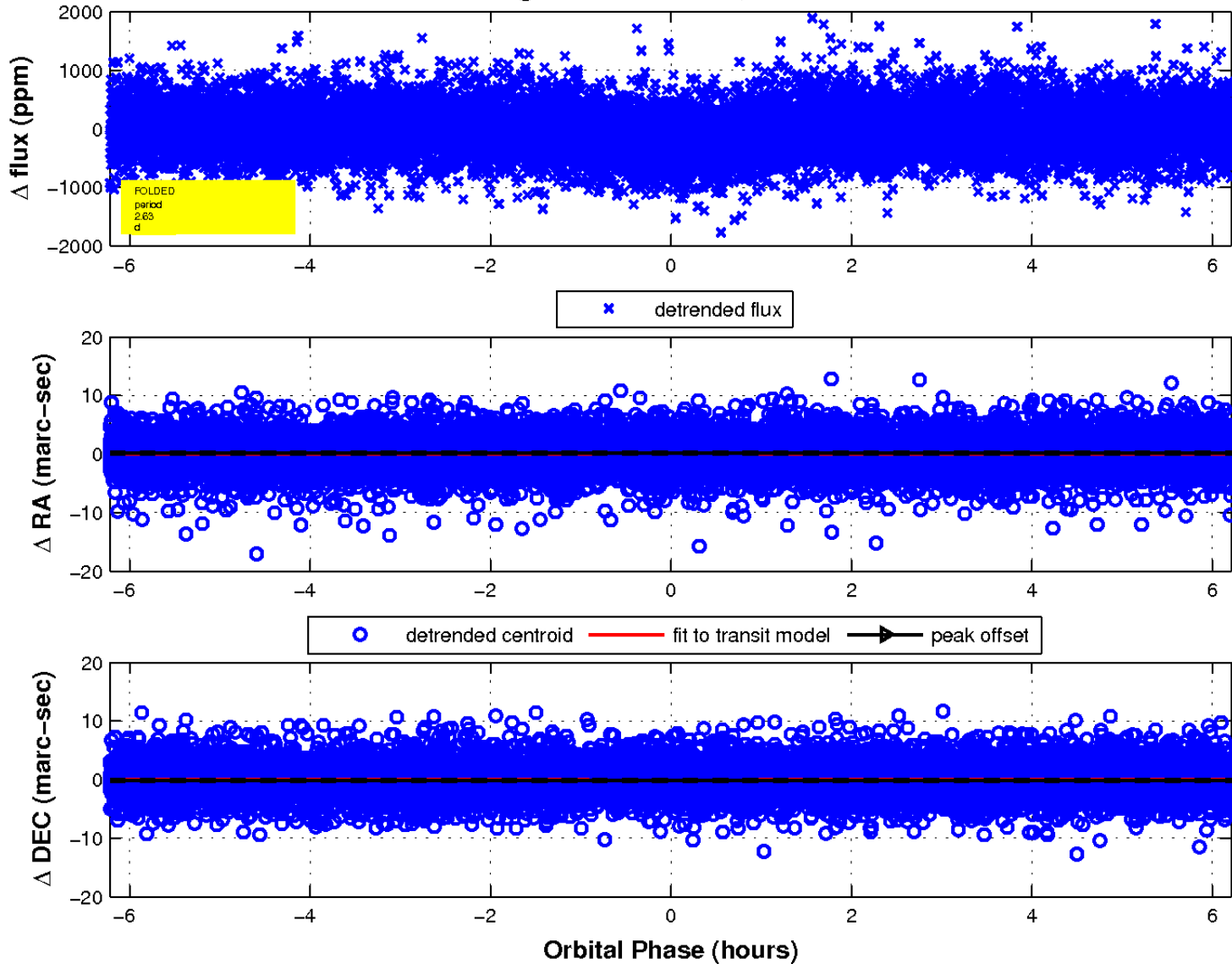
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white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

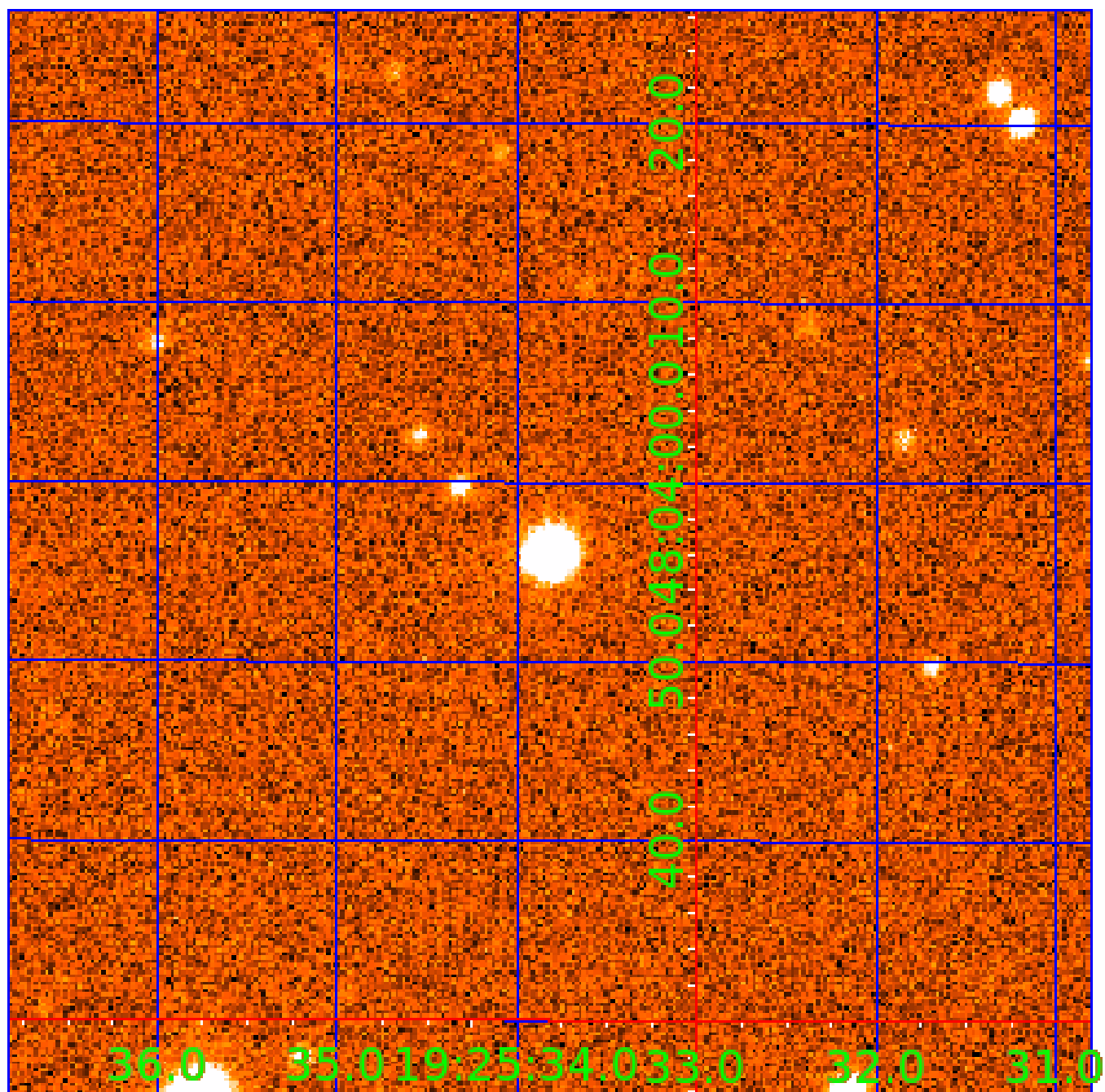


fluxWeightedCentroids, Planet 1 of 2



# UKIRT Image

Declination





# KIC 010730034

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010730034-01	OBS	1305.01	2.633811	131.942717	257.4	2.072	20.7	22.6	0.88	5114	1.71	387.99
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## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010730034-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
010730034-02	OBS	PC	0.98	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.

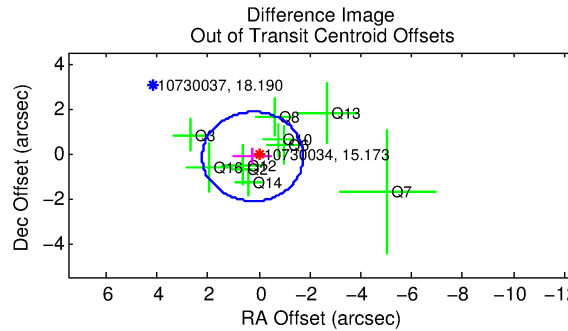
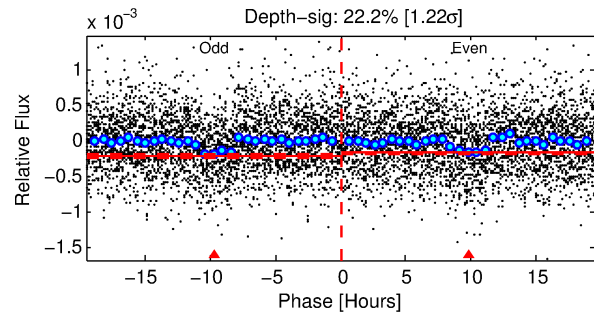
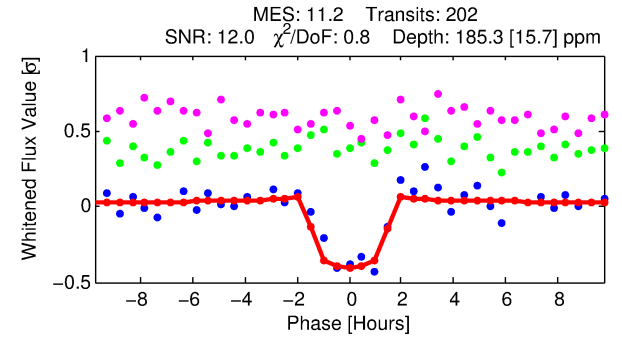
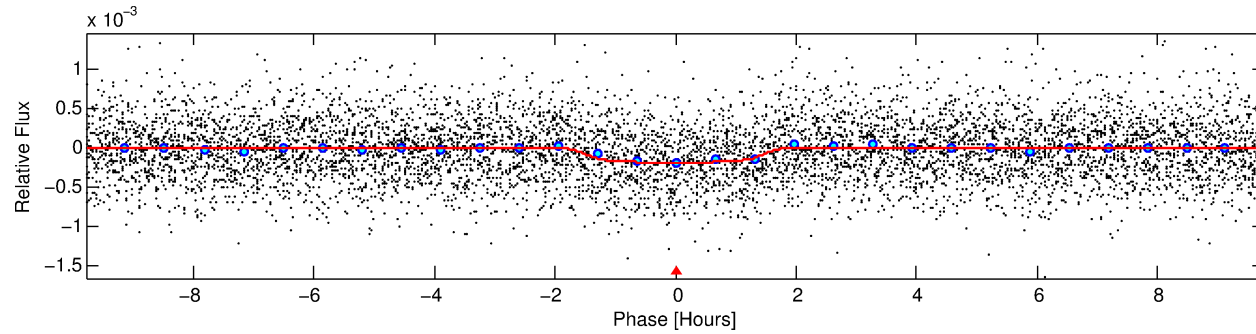
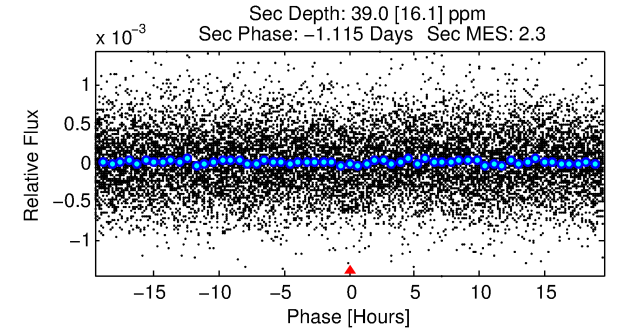
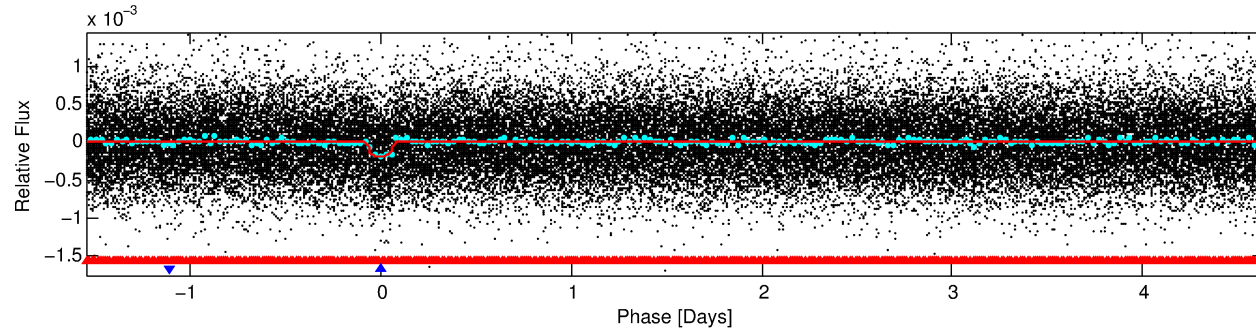
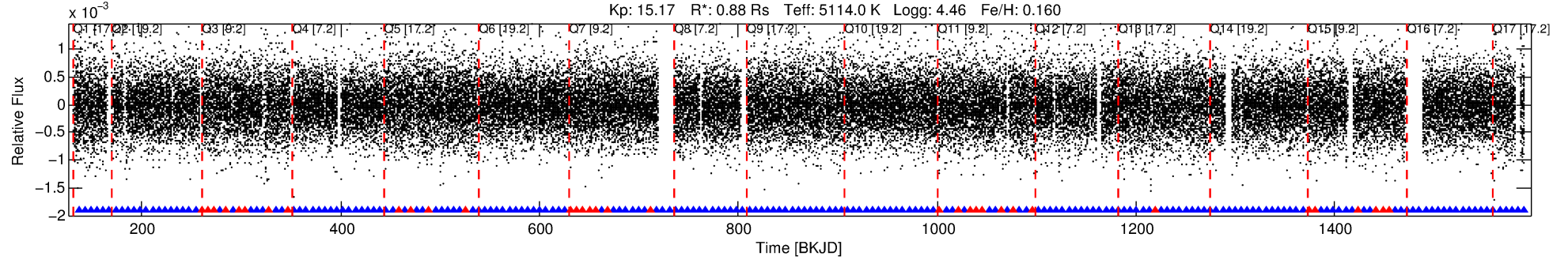
## Ephemeris Match Information For 010730034-02

No Significant Match Found

# DV One-Page Summary

KIC: 10730034 Candidate: 2 of 2 Period: 6.187 d  
KOI: K01305.02 Name: Kepler-285c Corr: 0.956

Kp: 15.17 R\*: 0.88 Rs Teff: 5114.0 K Logg: 4.46 Fe/H: 0.160



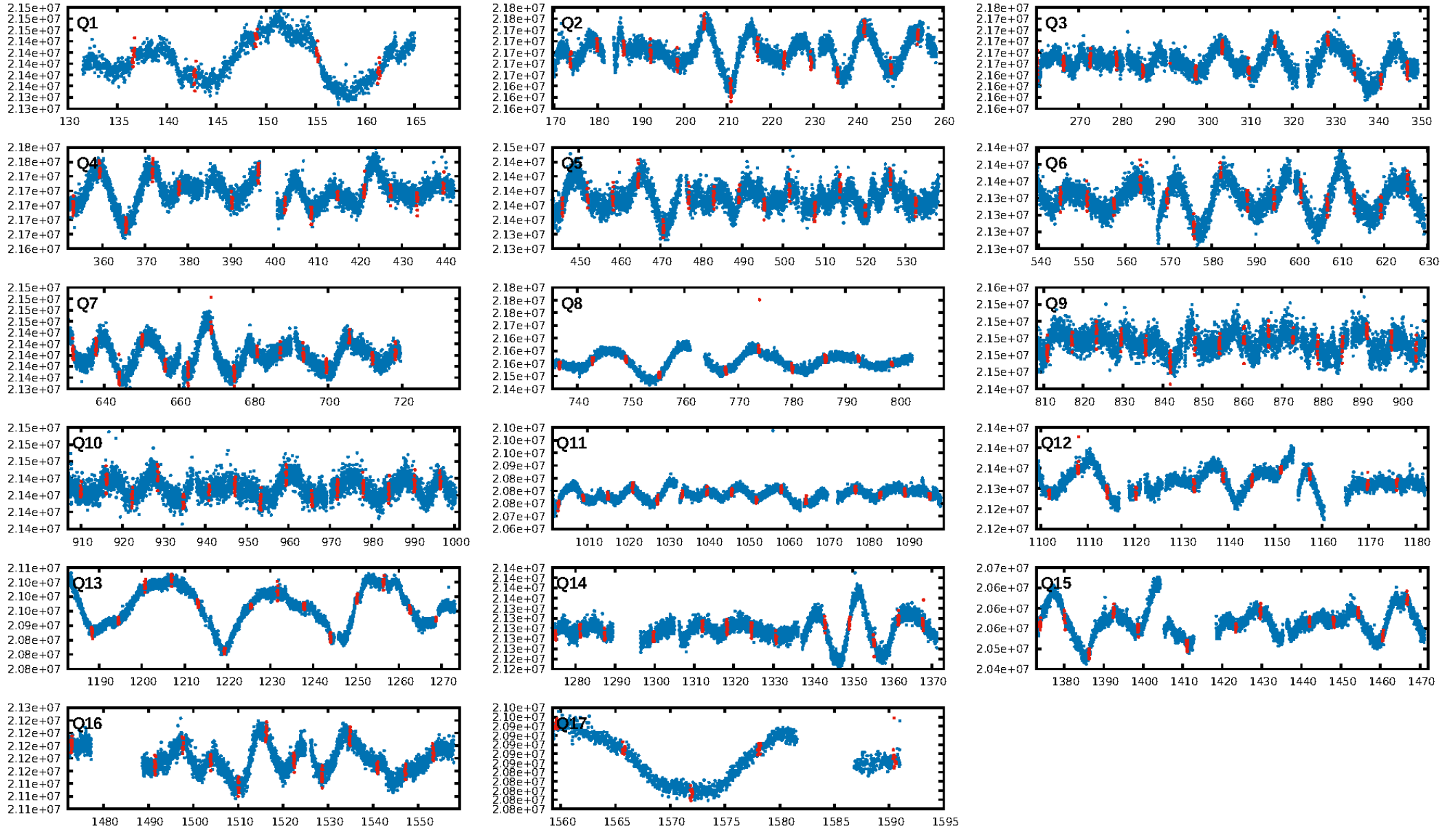
## DV Fit Results:

Period = 6.18669 [0.00004] d  
Epoch = 136.6299 [0.0045] BKJD  
Rp/R\* = 0.0148 [0.0090]  
a/R\* = 7.40 [17.51]  
b = 0.88 [0.64]  
Seff = 124.26 [20.32]  
Teff = 851 [35] K  
Rp = 1.42 [0.87] Re  
a = 0.0617 [0.0055] AU  
Ag = 40.31 [52.16] [0.75σ]  
Teffp = 3317 [1067] K [2.31σ]

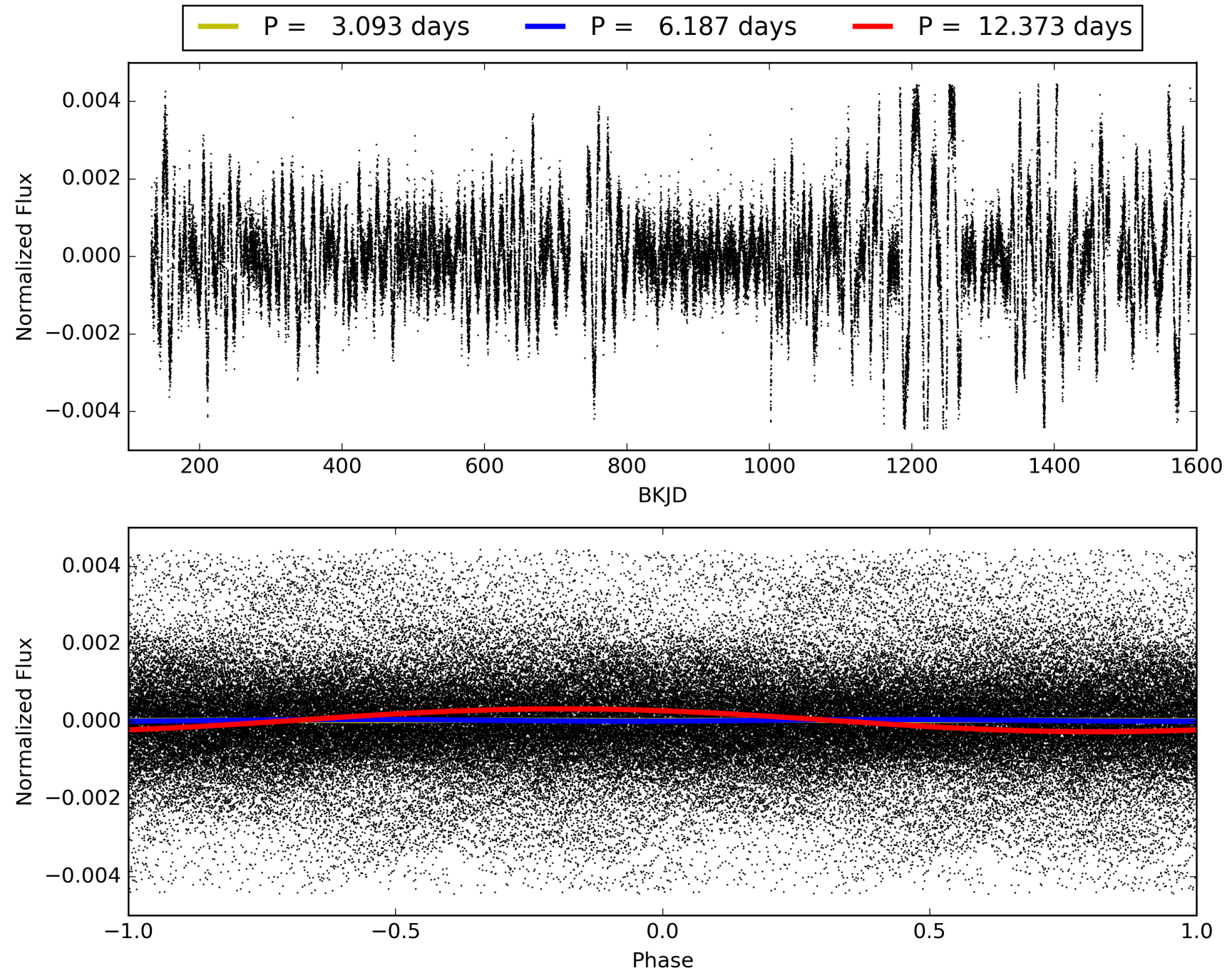
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [22.07σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 8.55e-28  
RollingBand-fgt: 0.82 [158/192]  
GhostDiagnostic-chr: 15.33  
Centroid-sig: 8.2%  
Centroid-so: 1.791 arcsec [1.56σ]  
OotOffset-rm: 0.277 arcsec [0.42σ]  
KicOffset-rm: 0.356 arcsec [0.91σ]  
OotOffset-st: 4/2/3/1 [10]  
KicOffset-st: 4/2/3/1 [10]  
DiffImageQuality-fgm: 0.70 [7/10]  
DiffImageOverlap-fno: 1.00 [17/17]

# TCE 010730034-02, PDC Light Curves



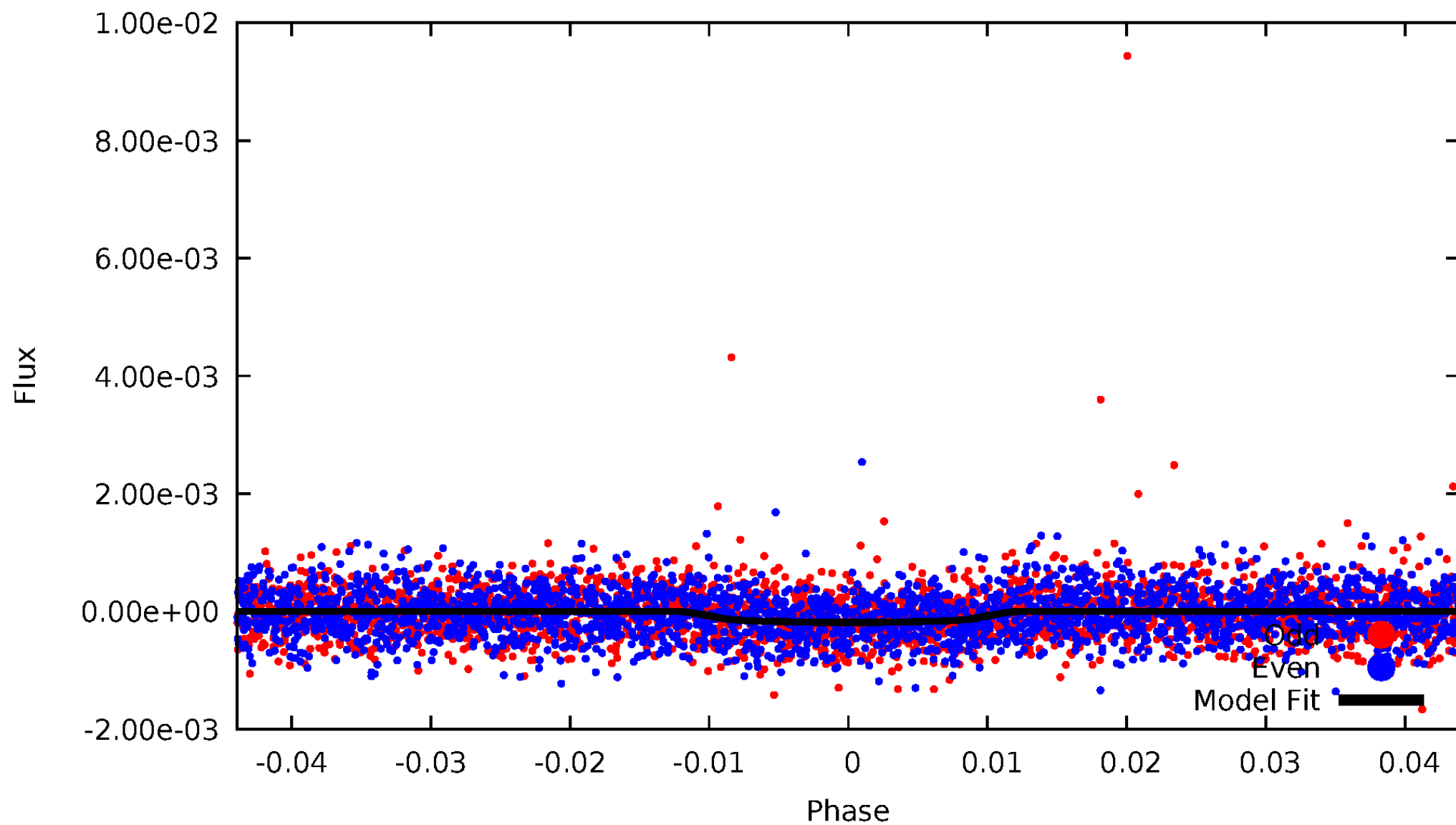
TCE 010730034-02





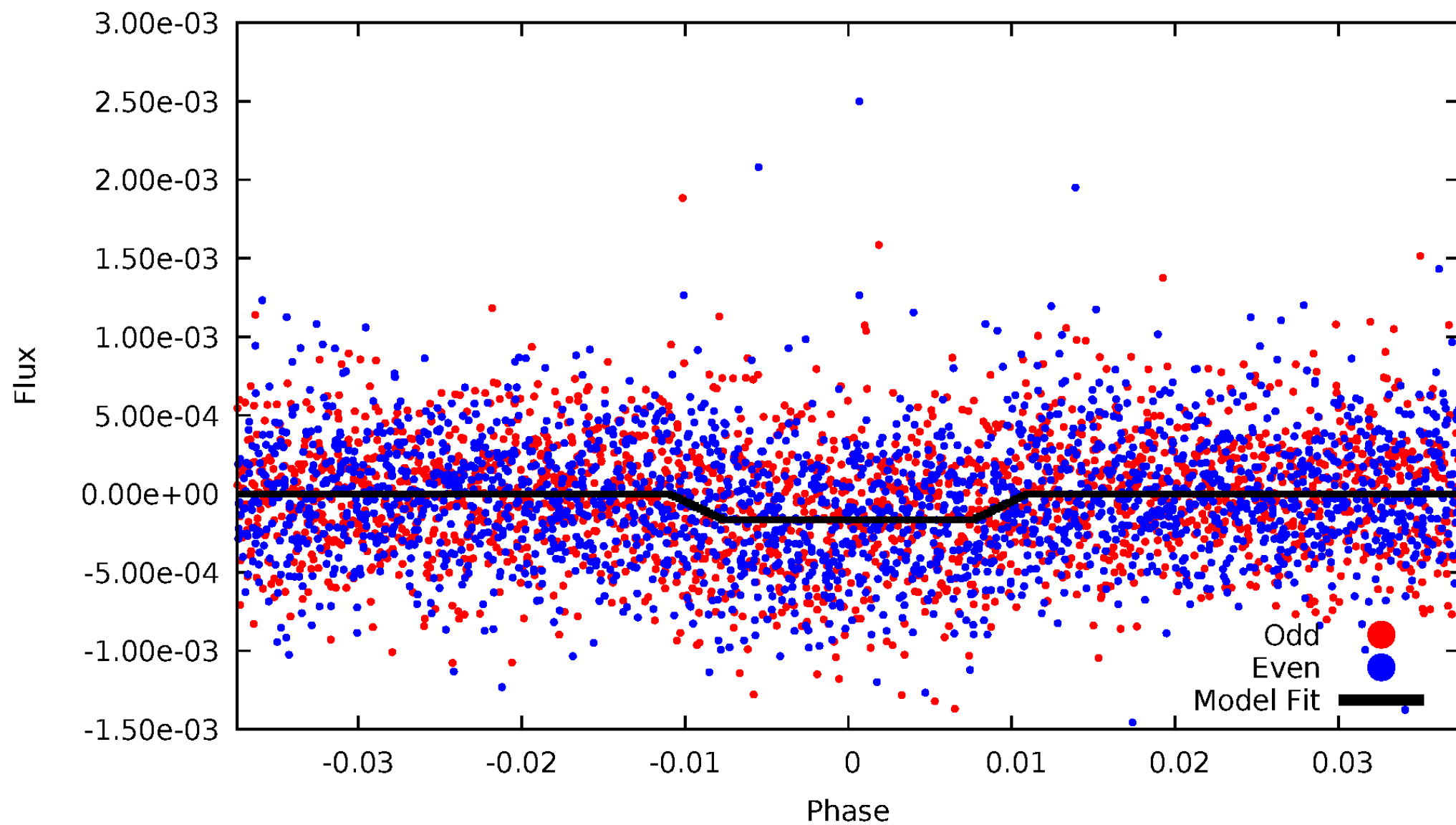
# DV Odd/Even

TCE 010730034-02



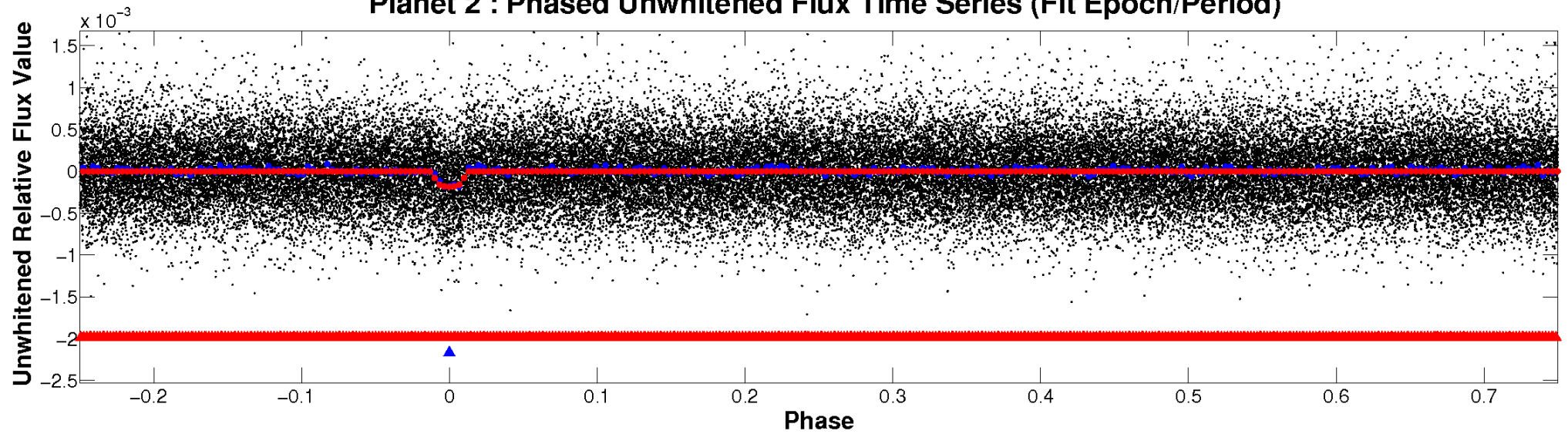
# ALT Odd/Even

TCE 010730034-02

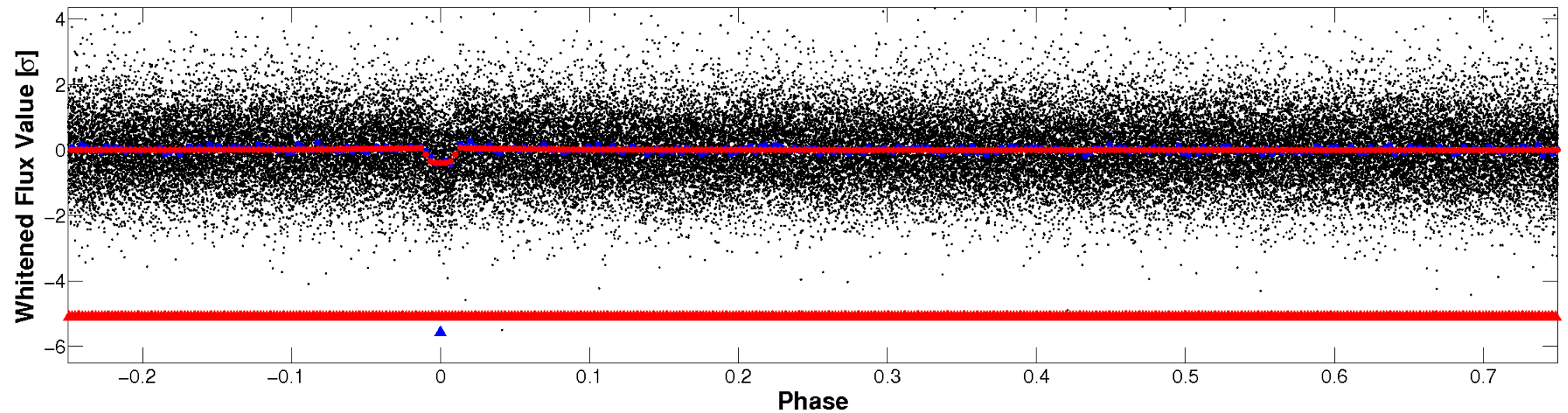


# Non-Whitened Vs. Whitened Light Curve

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

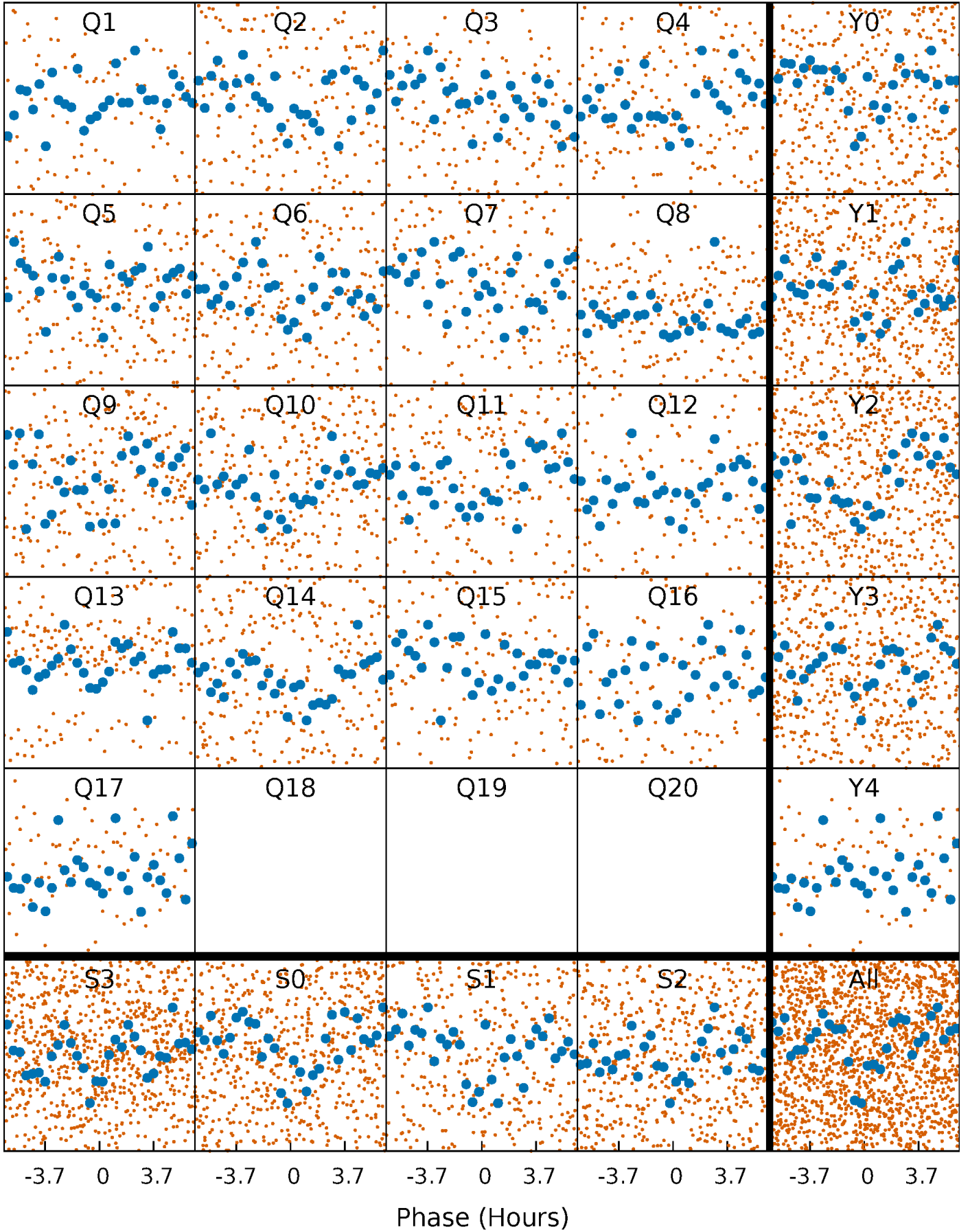


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



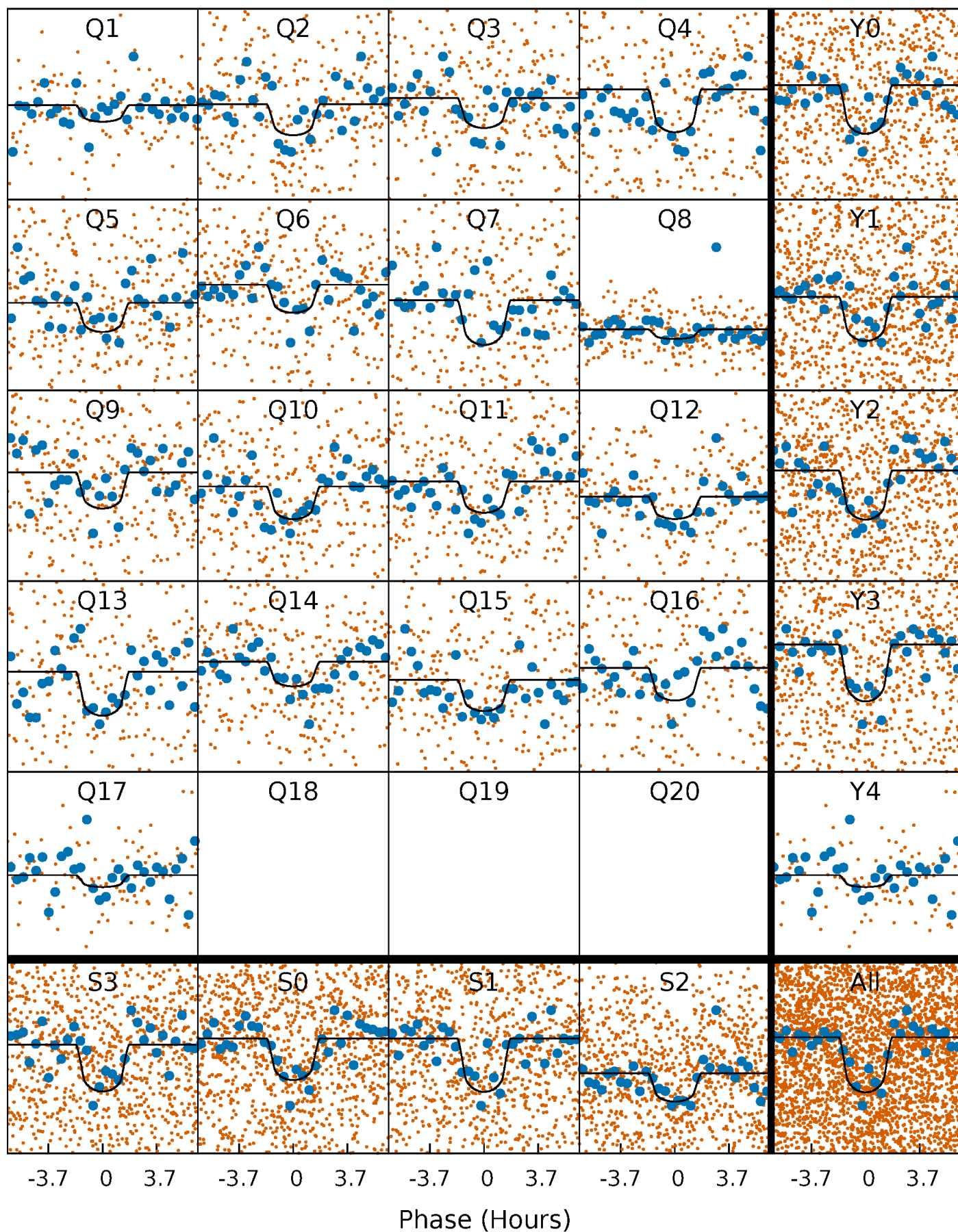
# PDC Quarter-Phased Transit Curves

TCE 010730034-02   P= 6.186688 Days    $T_0=136.629905$  (BKJD)



# DV Quarter-Phased Transit Curves

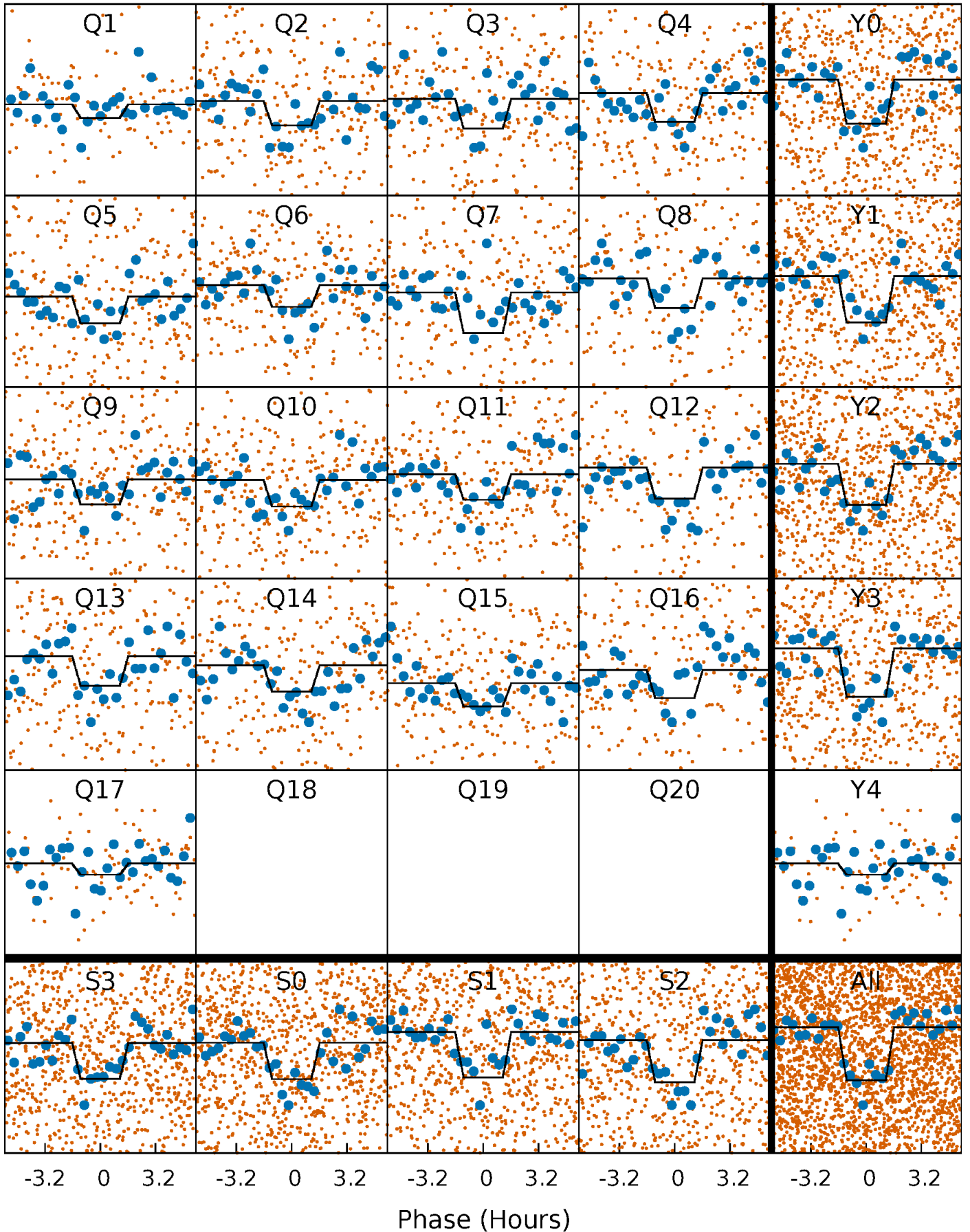
TCE 010730034-02   P= 6.186688 Days    $T_0=136.629905$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

TCE 010730034-02 P= 6.186720 Days  $T_0=136.629030$  (BKJD)

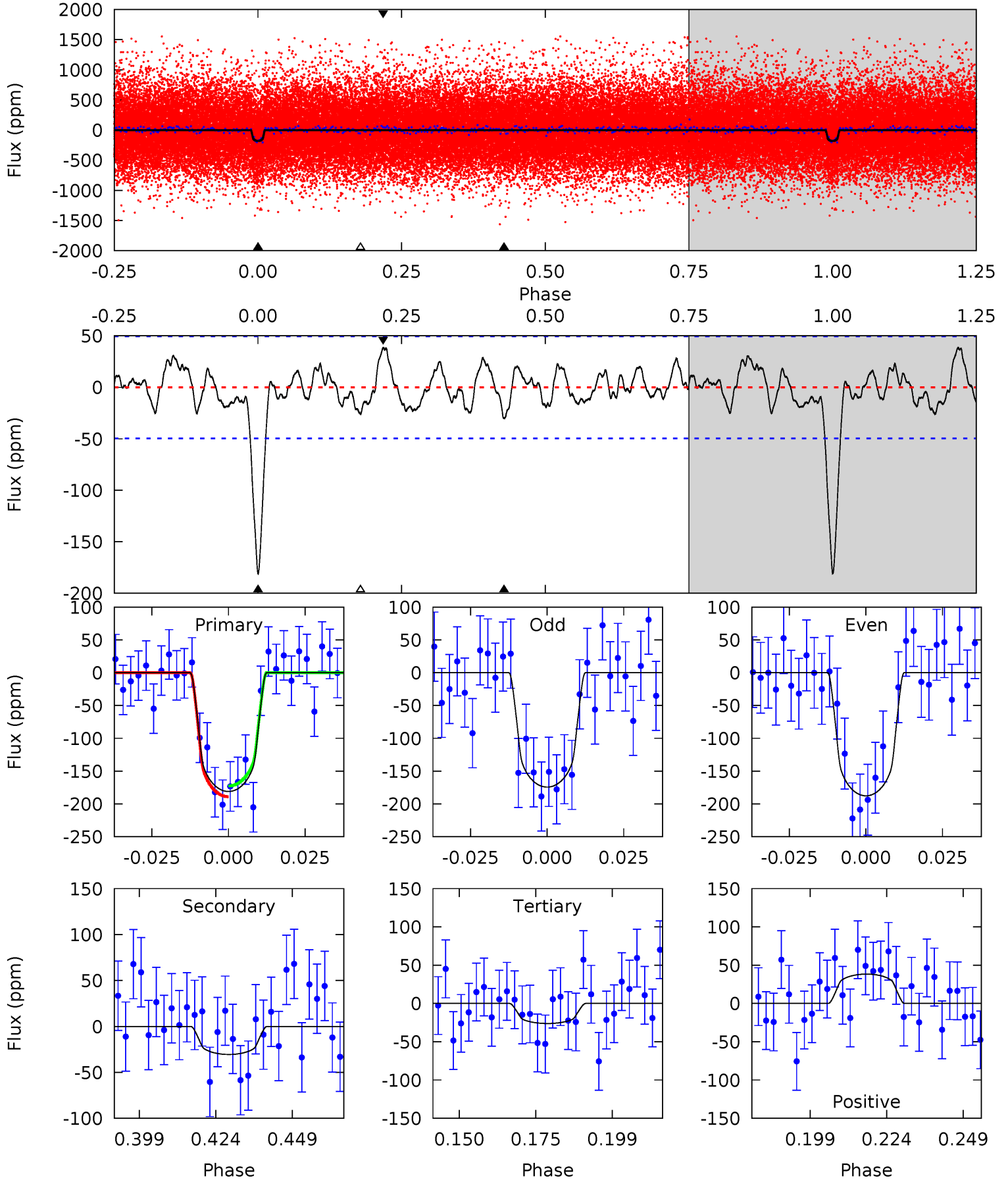




# DV Model-Shift Uniqueness Test

010730034-02, P = 6.186688 Days, E = 130.443217 Days

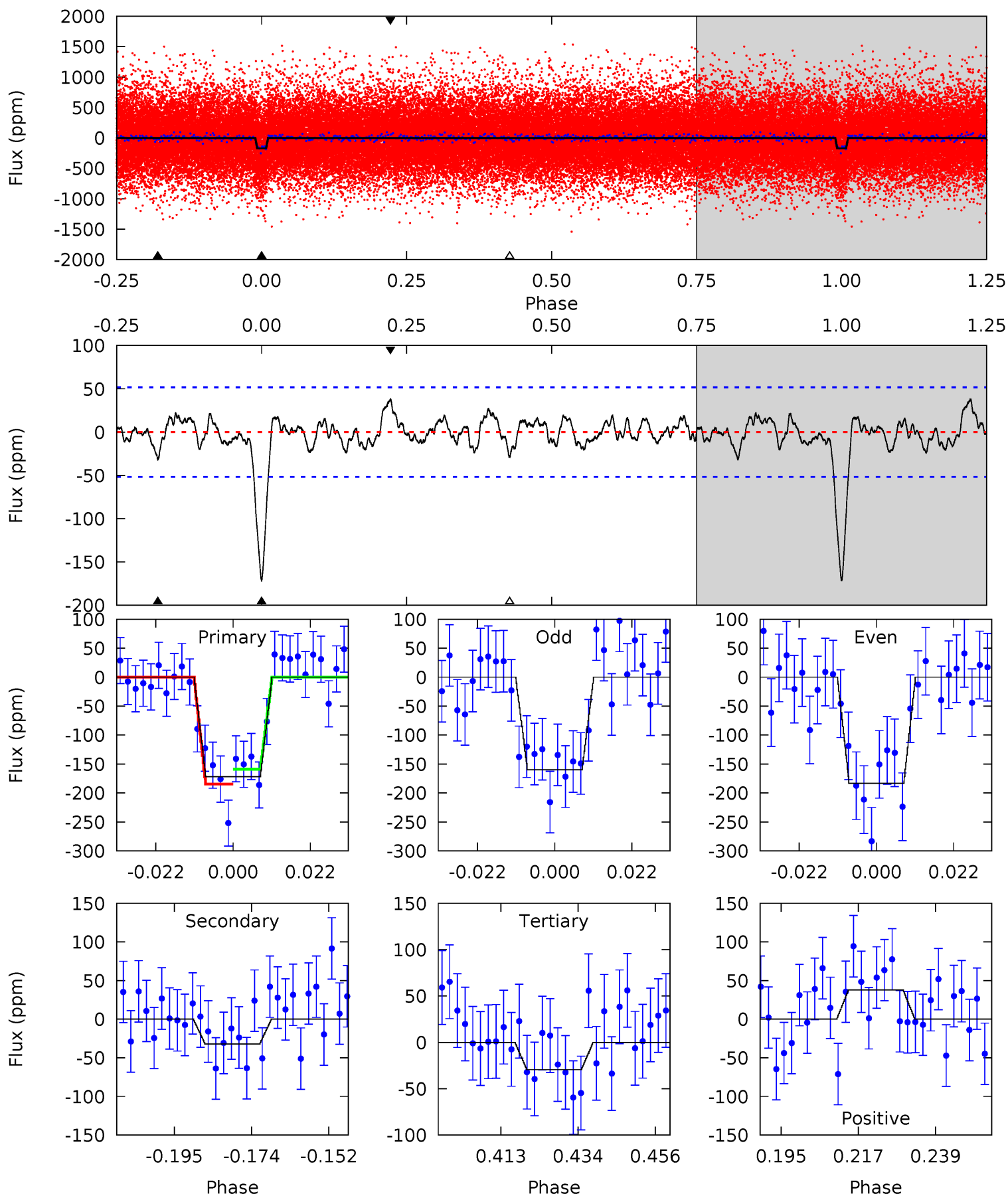
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
17.7	2.98	2.56	3.75	4.85	2.24	1.38	15.1	13.9	0.42	-0.77	0.65	0.96	0.17	0.80



# Alt Model-Shift Uniqueness Test

010730034-02, P = 6.186720 Days, E = 130.442310 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
16.2	3.03	2.77	3.59	4.88	2.30	1.11	13.4	12.6	0.26	-0.56	1.11	0.87	0.18	1.21



### Stellar Parameters For KIC 010730034

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5114^{+84}_{-76}$	$4.463^{+0.090}_{-0.036}$	$0.160^{+0.150}_{-0.150}$	$0.878^{+0.044}_{-0.076}$	$0.817^{+0.057}_{-0.026}$	$1.700^{+0.577}_{-0.200}$
	+2%/-1%	+2%/-1%	+94%/-94%	+5%/-9%	+7%/-3%	+34%/-12%
Source	SPE90	SPE90	SPE90	DSEP		

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

### Secondary Eclipse Parameters for KIC 010730034-02 / KOI 1305.02

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-31 \pm 10$	$1.46^{+0.85}_{-0.73}$	$1182^{+30}_{-34}$	$3456^{+987}_{-453}$	$28^{+93}_{-17}$
Alt.	$-32 \pm 11$	$1.29^{+0.76}_{-0.78}$	$1184^{+26}_{-34}$	$3642^{+1508}_{-537}$	$38^{+211}_{-25}$

$T_{\text{max}}$  = 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

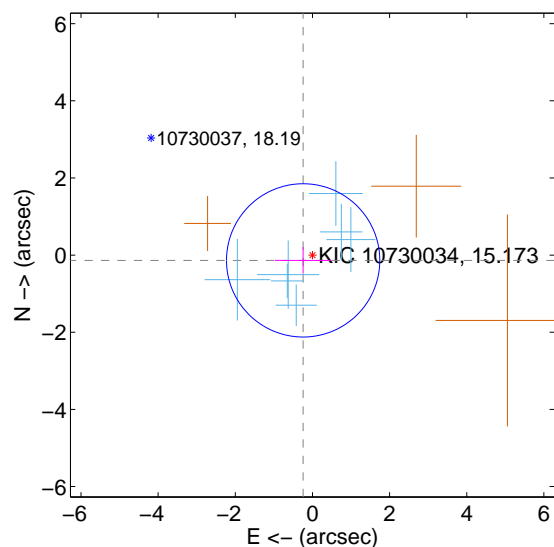
Supplemental centroid analysis for 010730034-02. Kepler magnitude: 15.17. Transit SNR 12.00

There are 7 quarters with good PRF difference image offsets

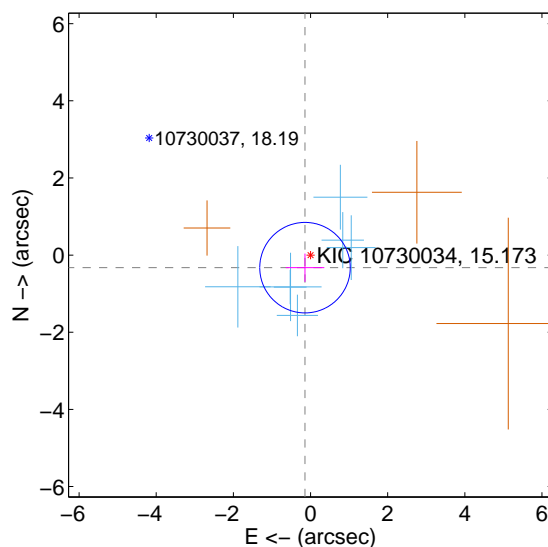
The direct PRF centroid is offset from the target star catalog position by about 0.20 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.277 \pm 0.662$	0.42	$0.241 \pm 0.733$	$-0.137 \pm 0.342$
PRF-fit source offset from KIC position	$0.356 \pm 0.391$	0.91	$0.143 \pm 0.501$	$-0.326 \pm 0.366$
photometric centroid source offset	$1.79 \pm 1.15$	1.56	$-1.72 \pm 1.16$	$0.50 \pm 1.02$

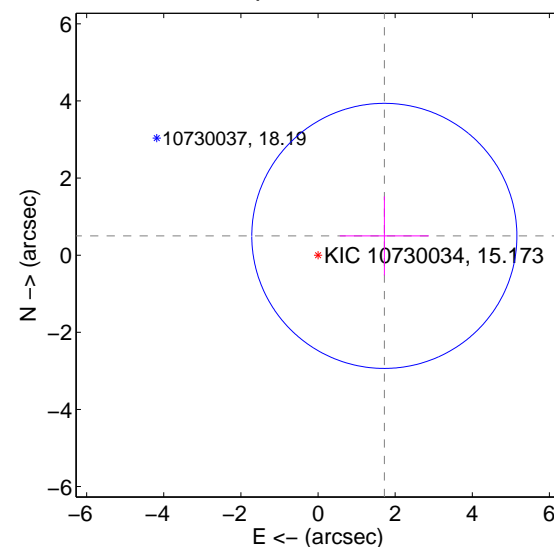
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

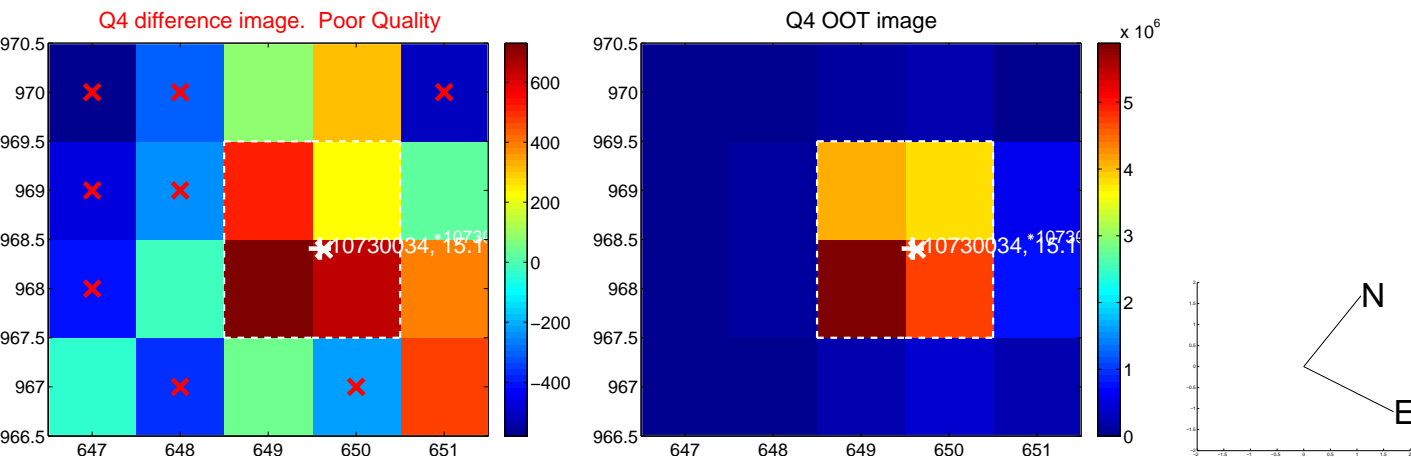
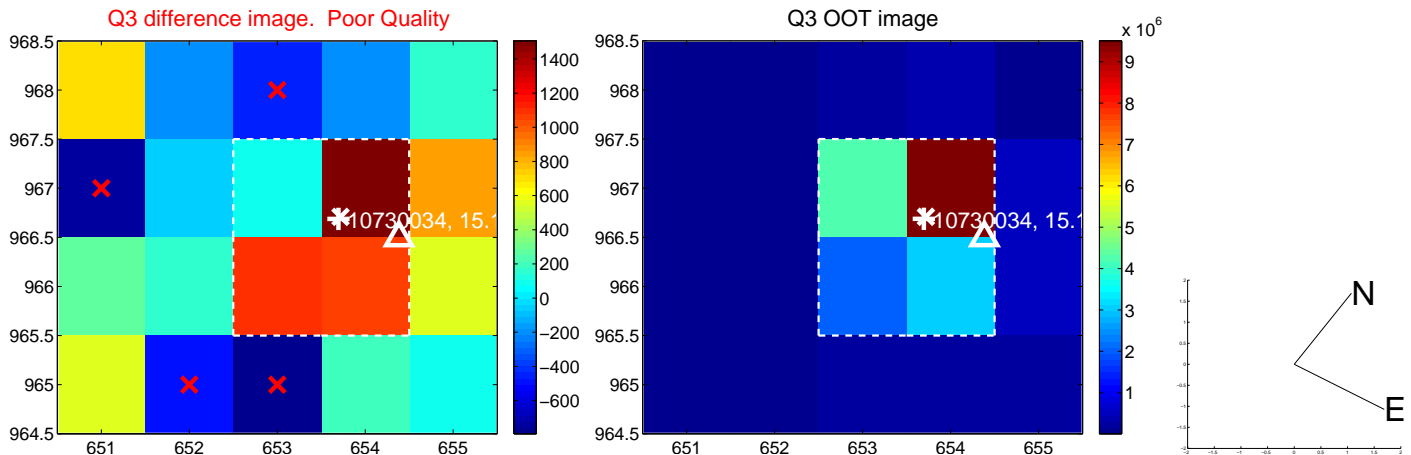
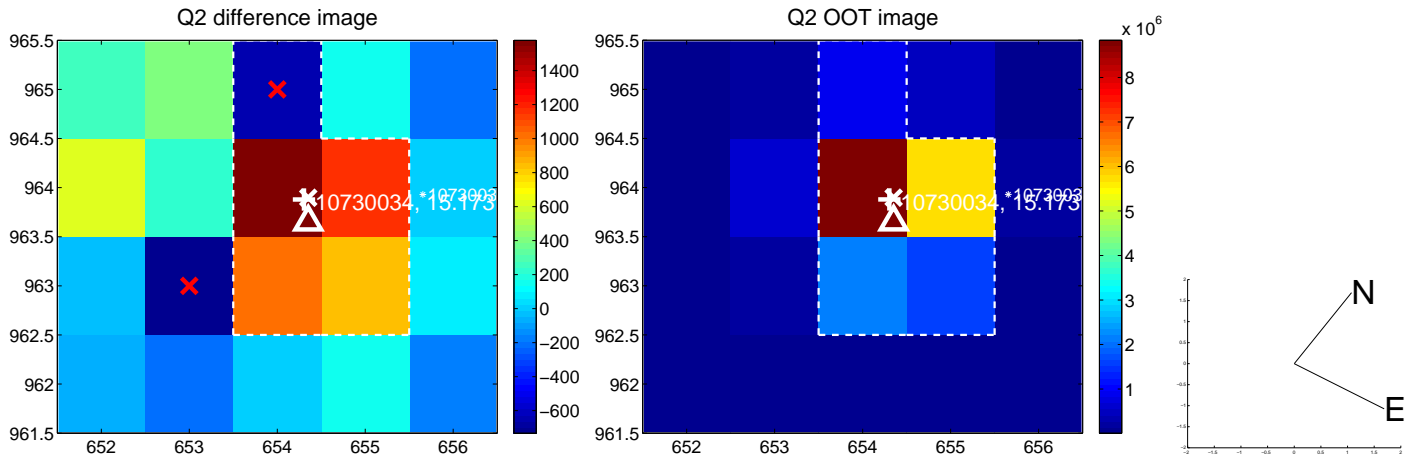
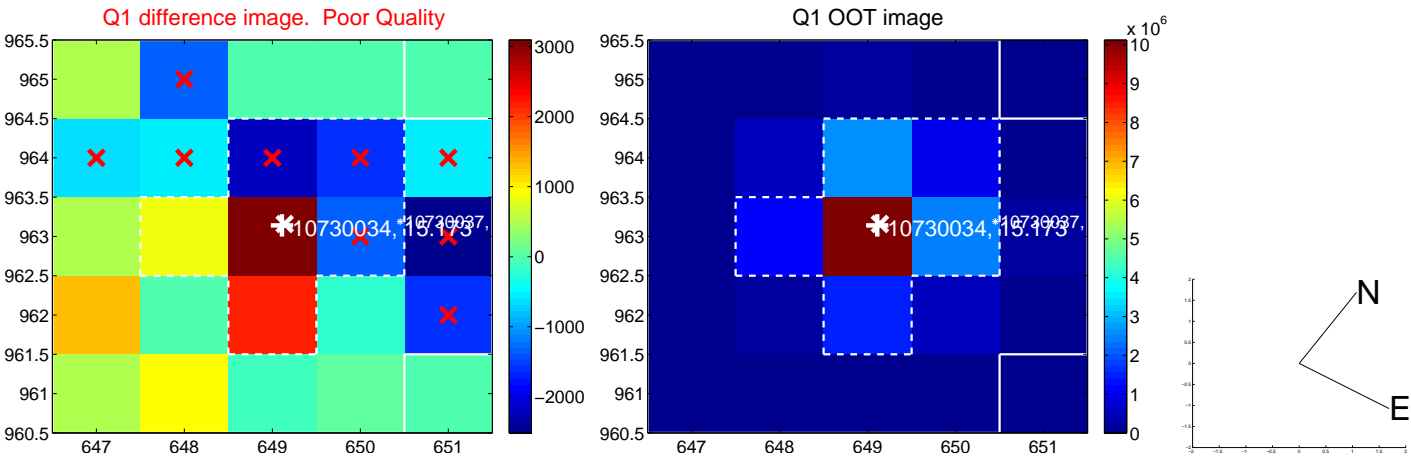


offset from photometric centroids

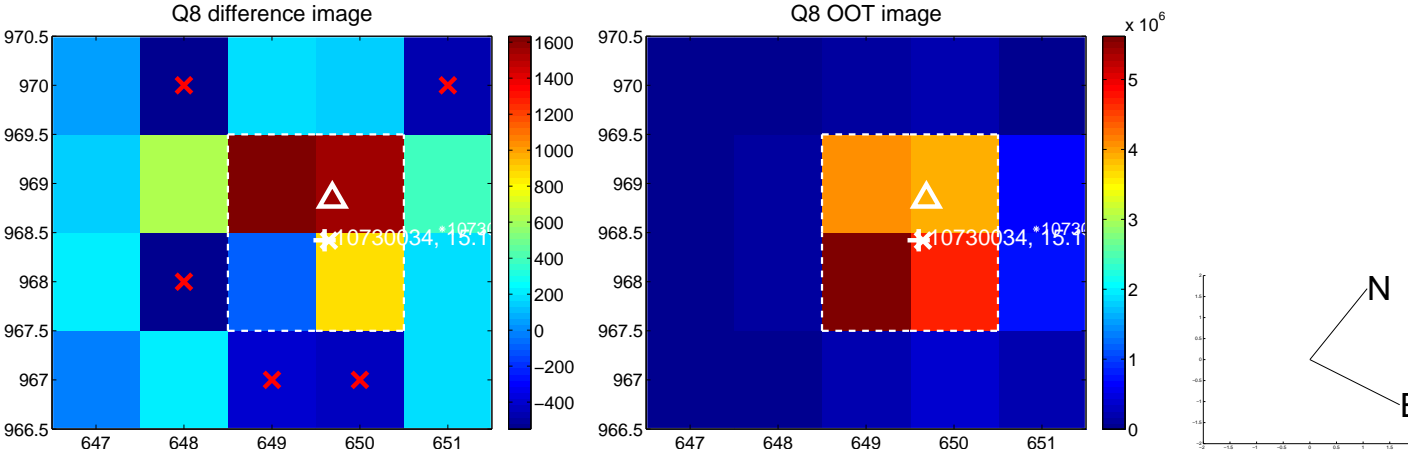
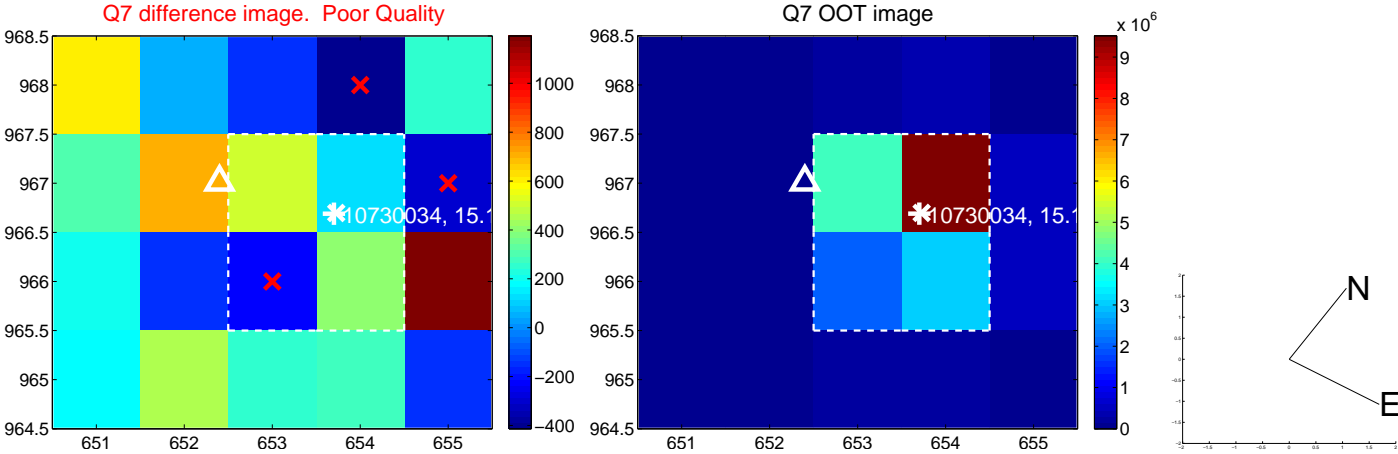
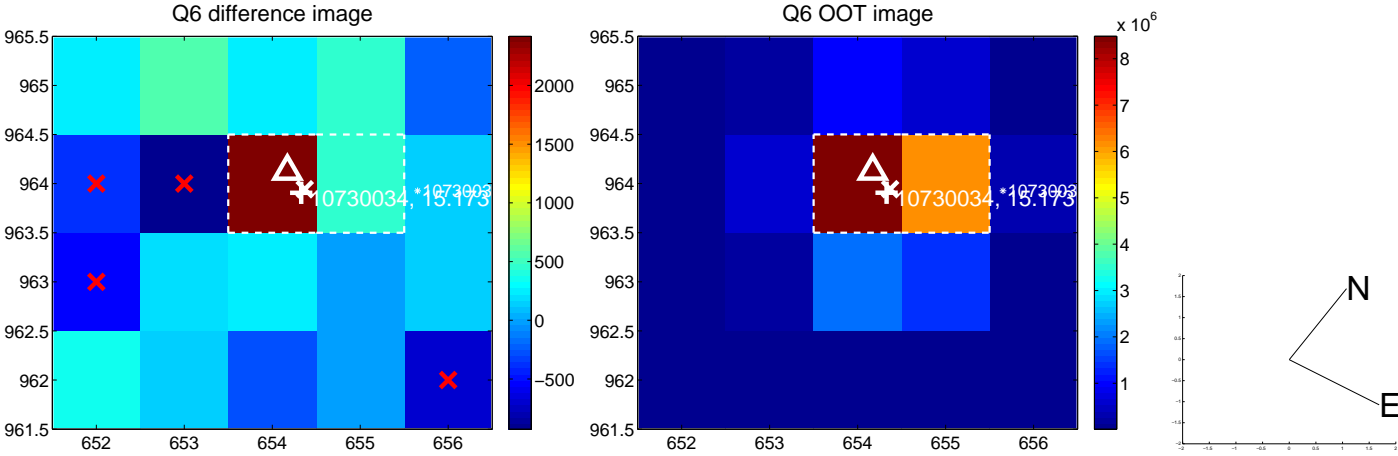
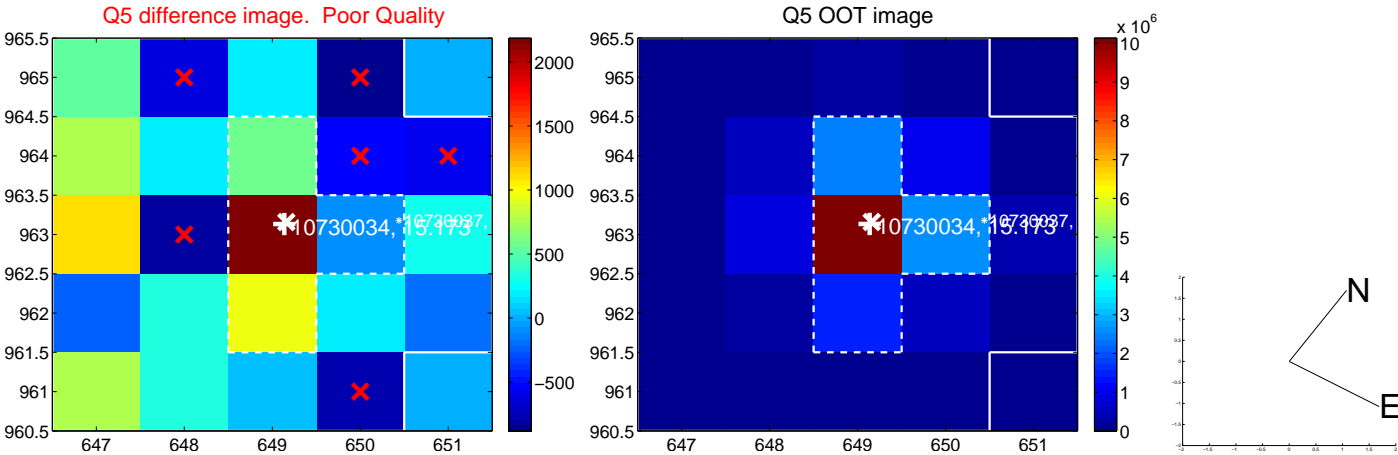


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three- $\sigma$ . Red \*: target star. Blue \*: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

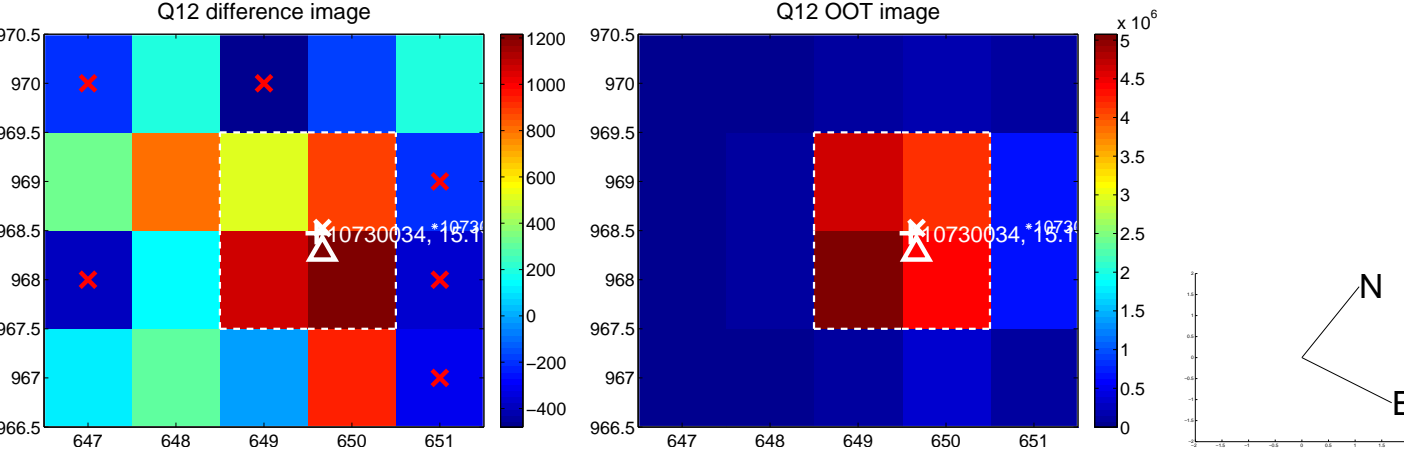
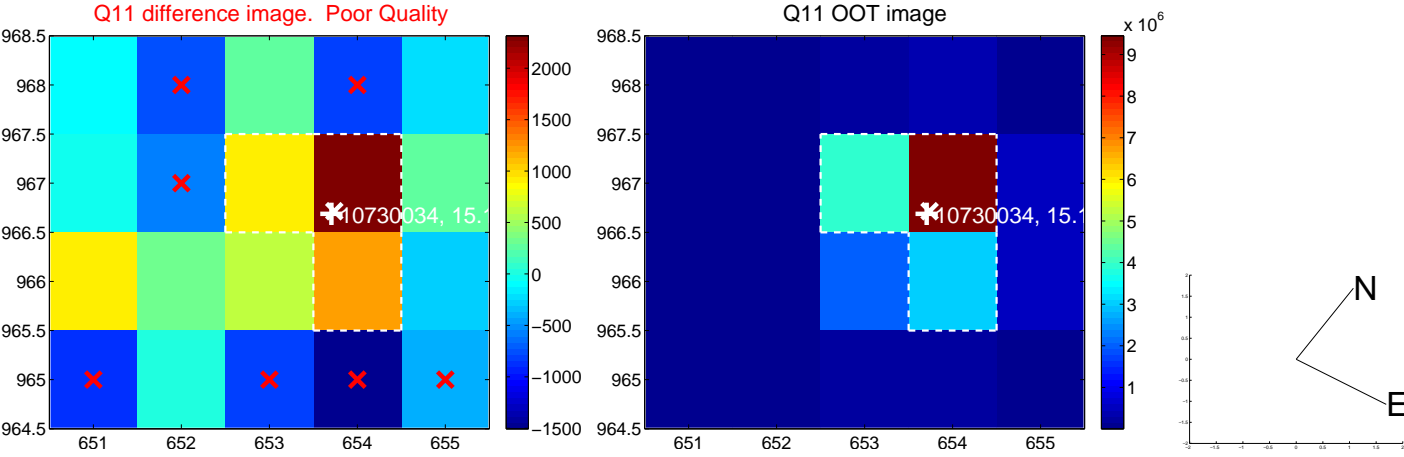
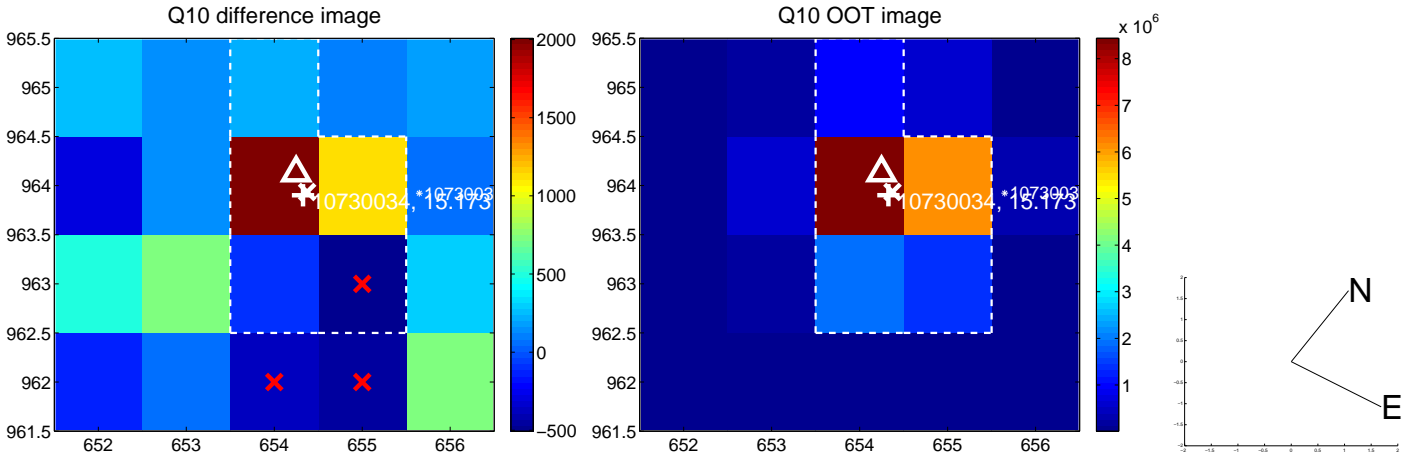
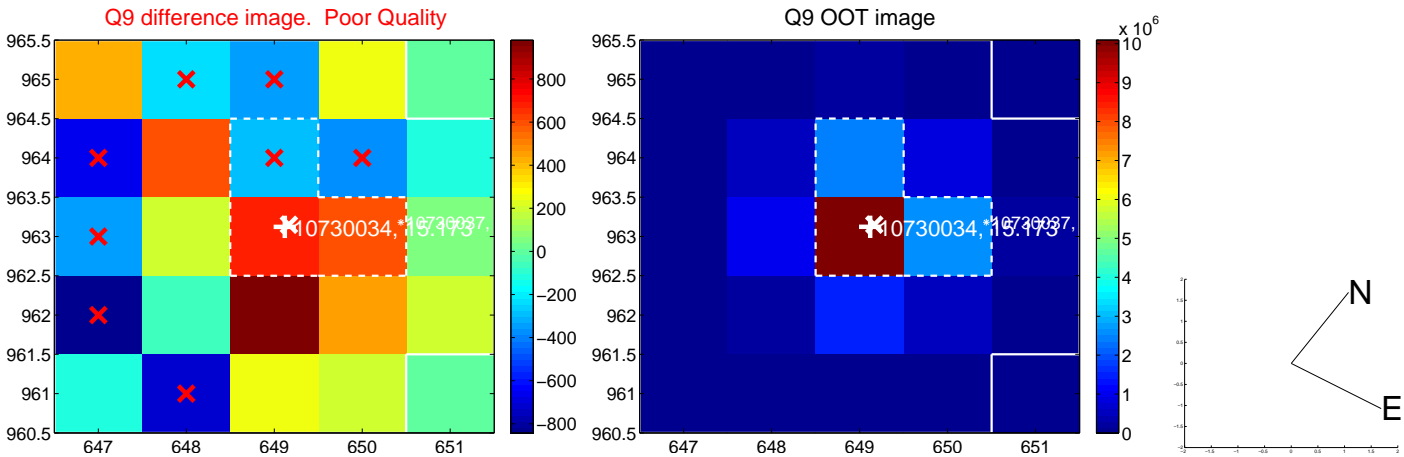
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

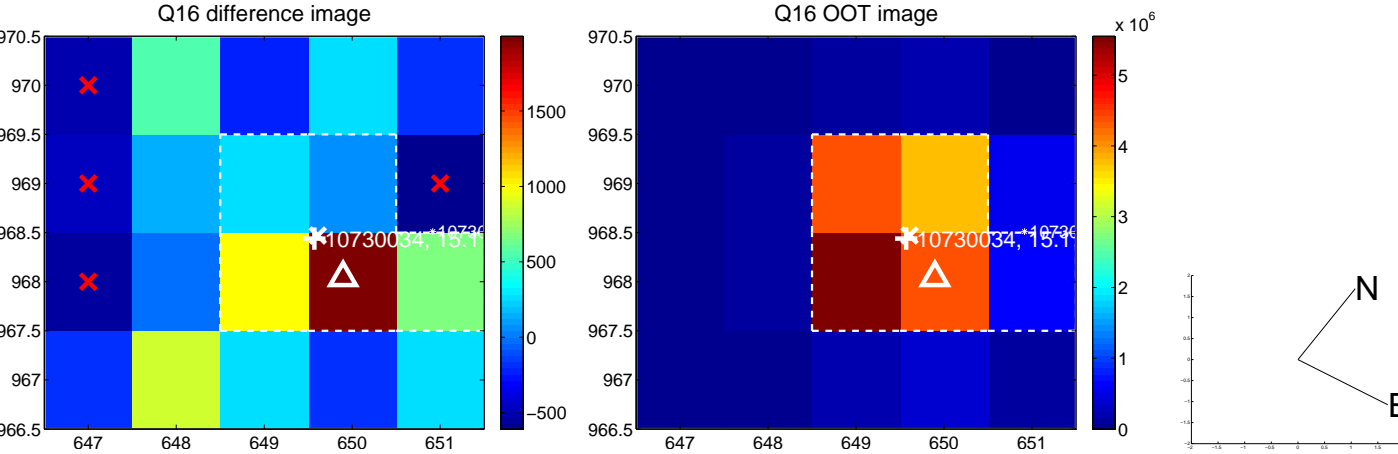
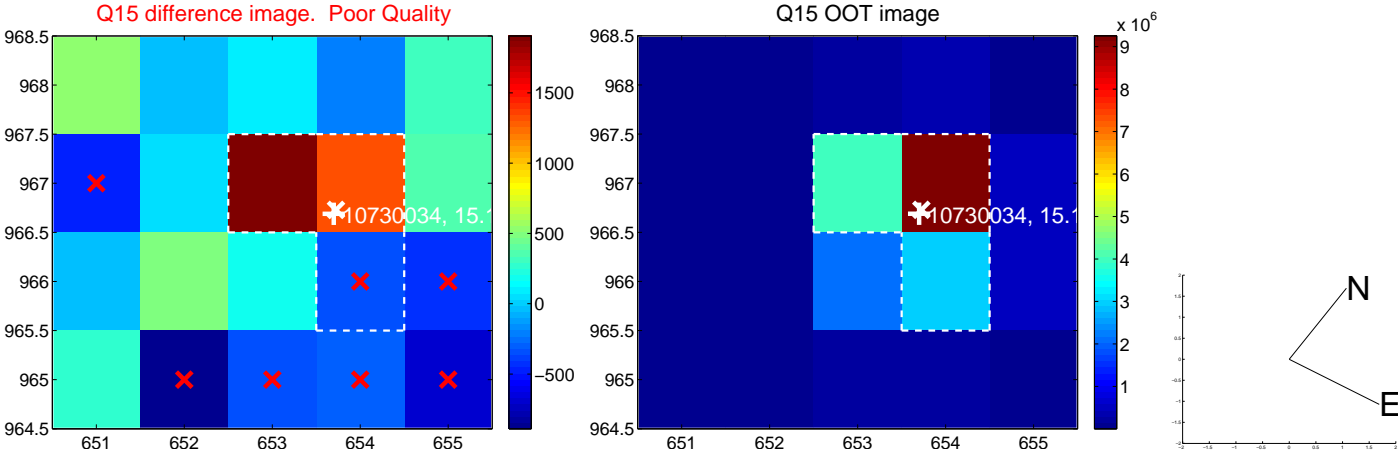
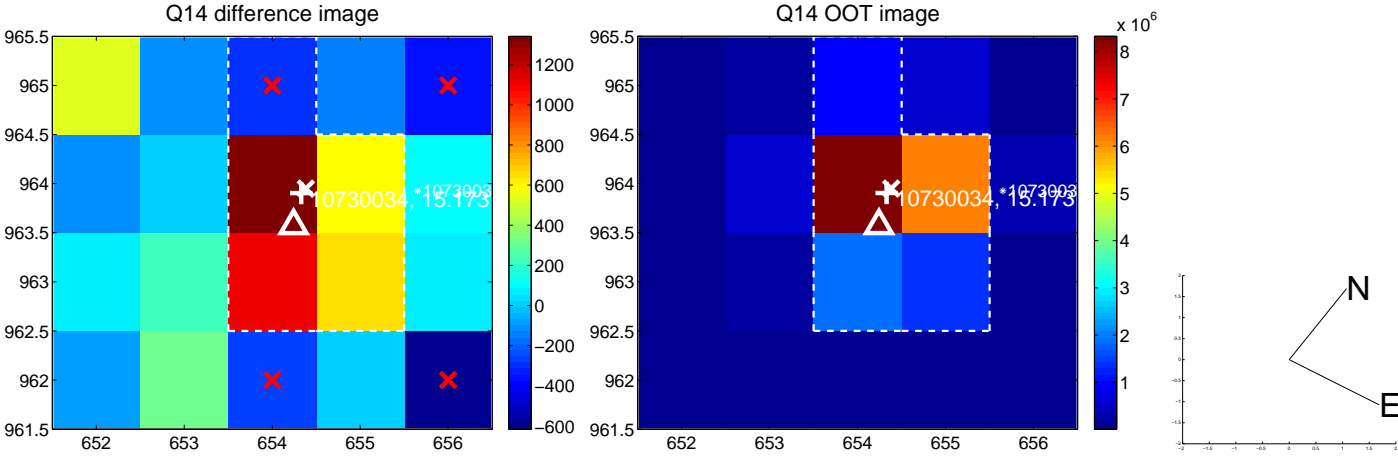
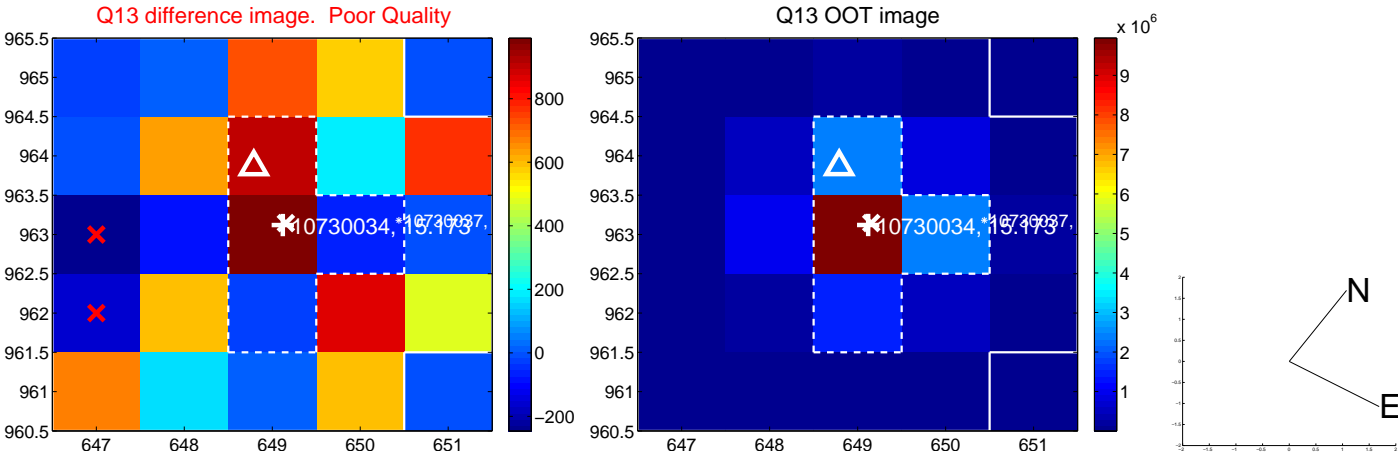


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

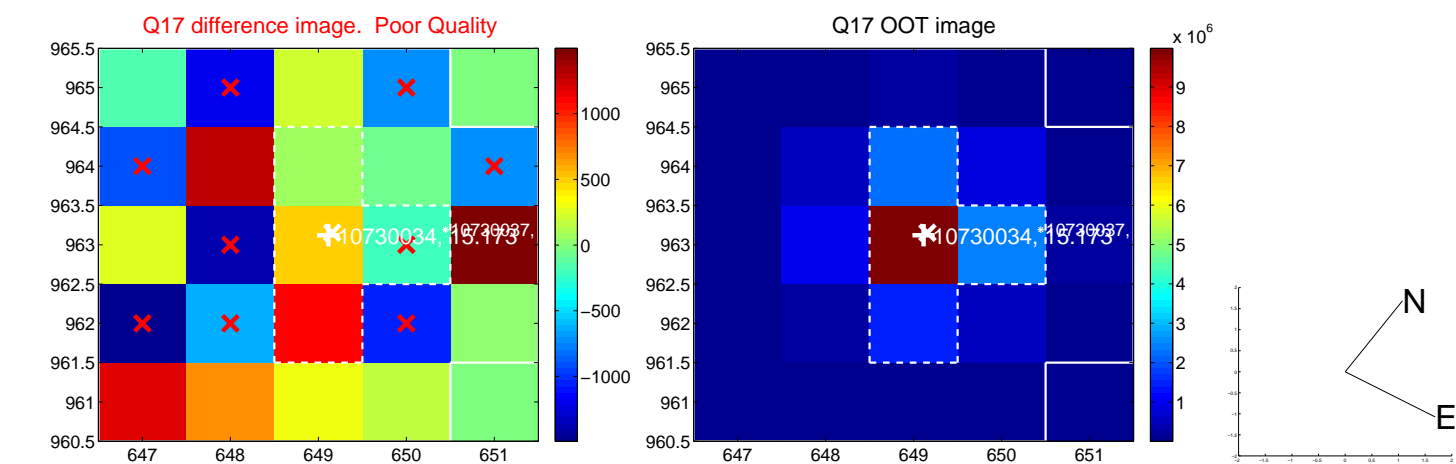




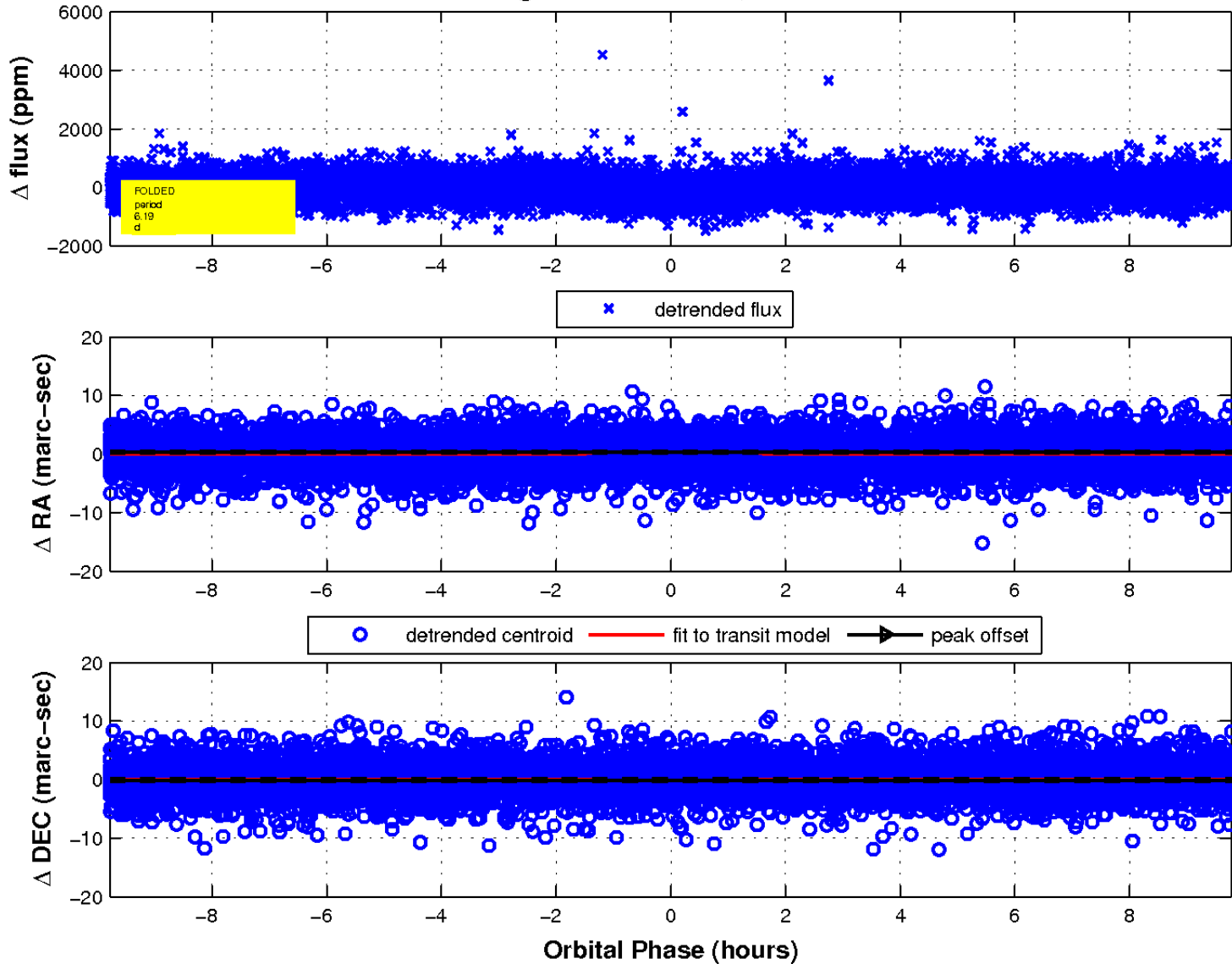
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



### fluxWeightedCentroids, Planet 2 of 2



# UKIRT Image

Declination

