

# KIC 003130548

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003130548-01	OBS	2773.01	0.878857	132.374296	257.6	1.015	16.8	23.4	0.94	5727	1.80	2861.14
003130548-02	OBS	No	0.878852	131.935494	125.3	1.431	12.4	14.2	0.94	5727	1.25	2861.16

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003130548-01	OBS	FP	0.00	0	1	1	0	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—CENT_UNRESOLVED_OFFSET
003130548-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE

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

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

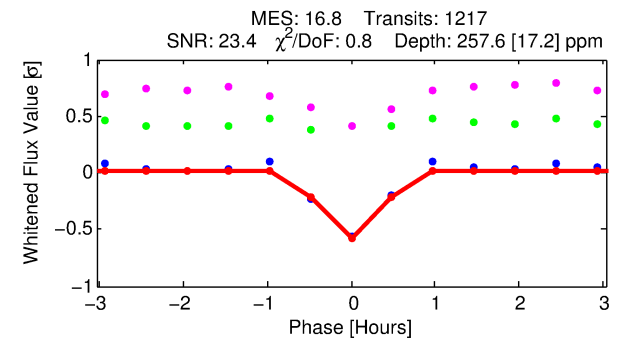
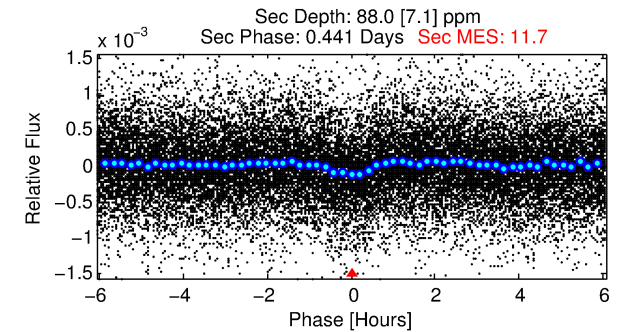
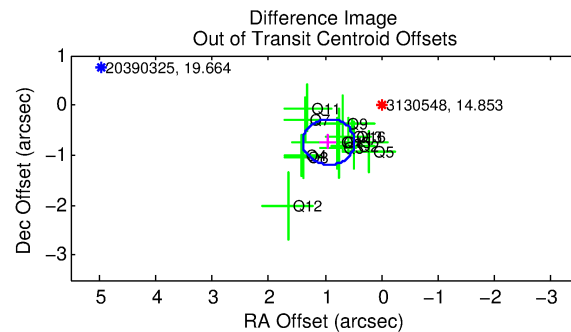
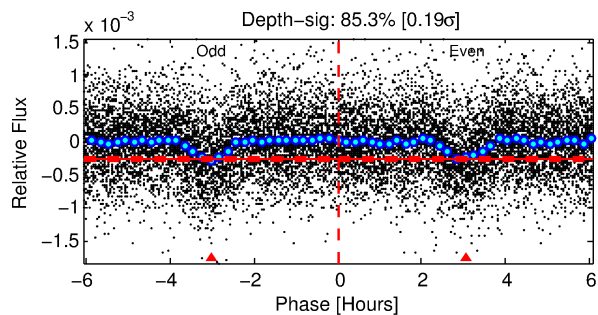
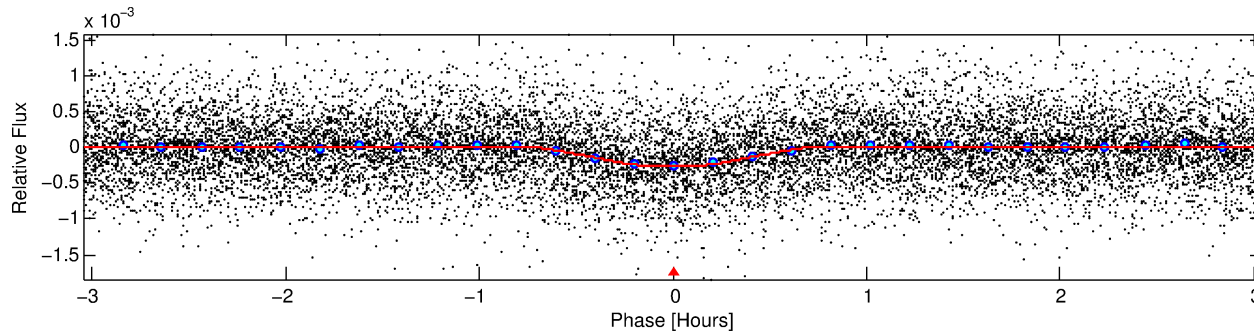
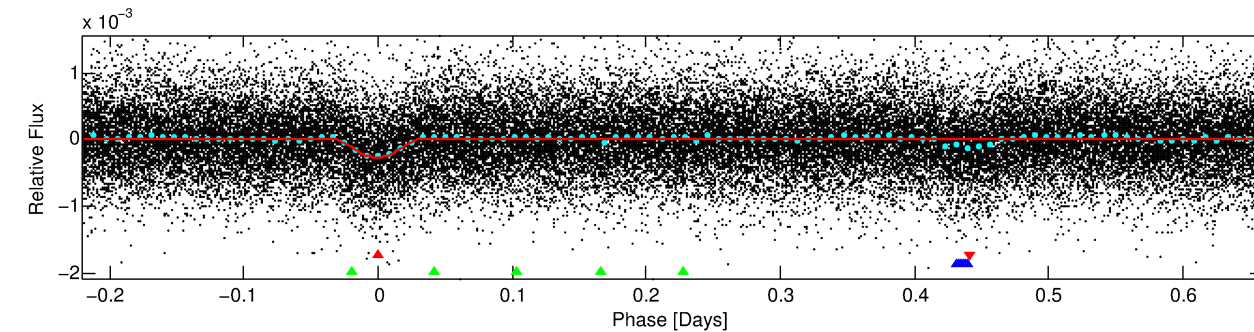
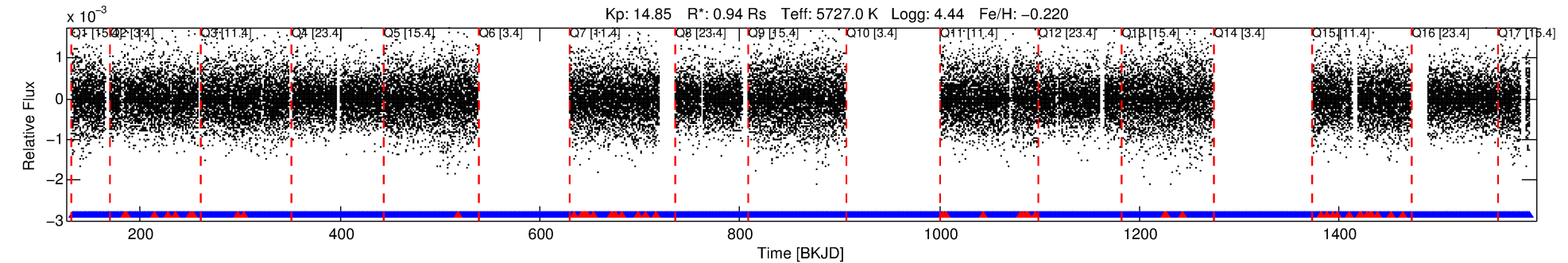
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 003130548-01

No Significant Match Found

# DV One-Page Summary

KIC: 3130548 Candidate: 1 of 3 Period: 0.879 d  
KOI: K02773.01 Corr: 0.968



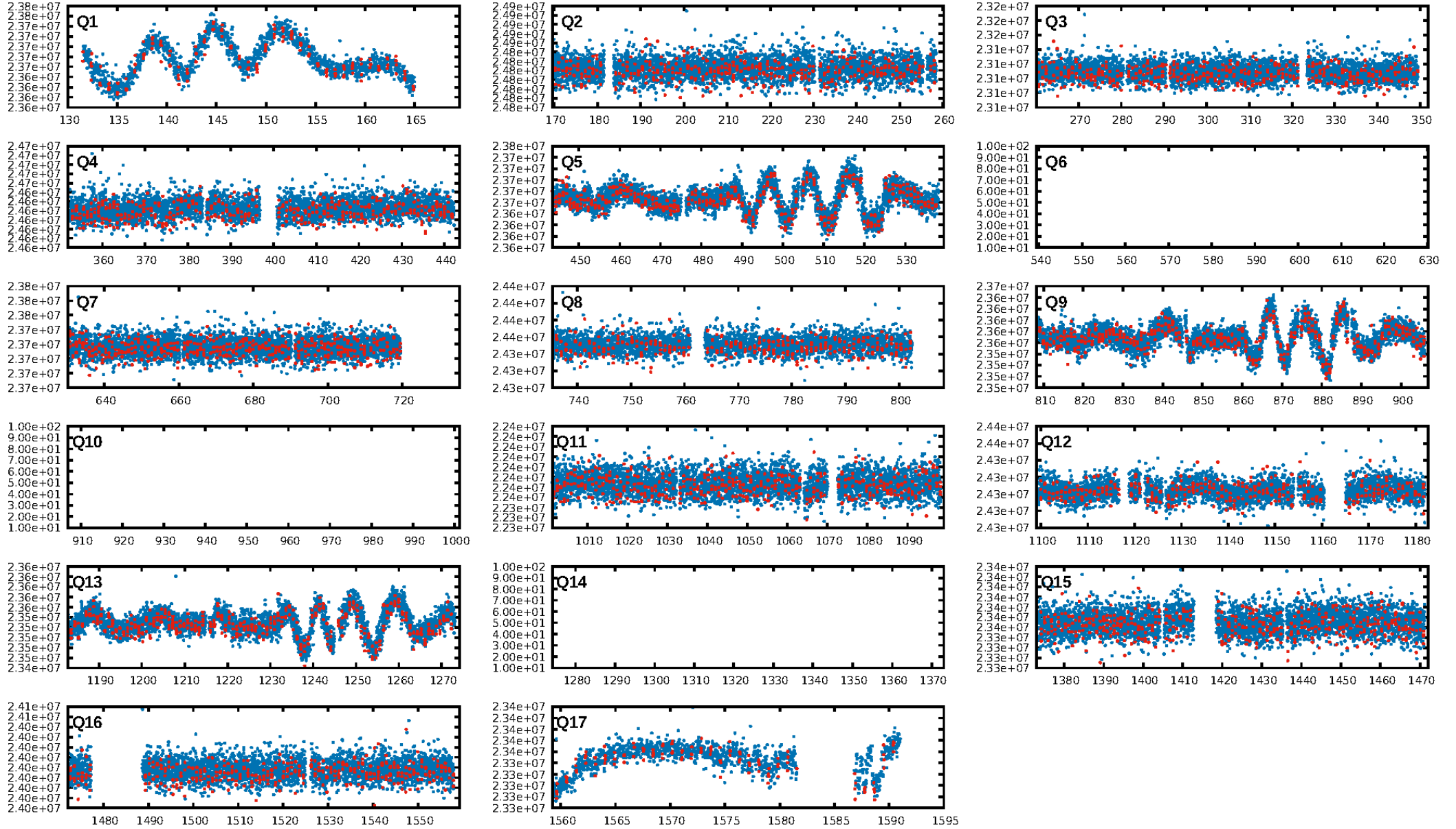
## DV Fit Results:

Period = 0.87886 [0.00000] d  
Epoch = 132.3743 [0.0007] BKJD  
Rp/R\* = 0.0176 [0.0052]  
a/R\* = 3.28 [4.21]  
b = 0.90 [0.31]  
Seff = 2861.14 [978.28]  
Teq = 1865 [159] K  
Rp = 1.80 [0.72] Re  
a = 0.0172 [0.0038] AU  
Ag = 4.41 [3.00] [1.14σ]  
Teffp = 4178 [639] K [3.51σ]

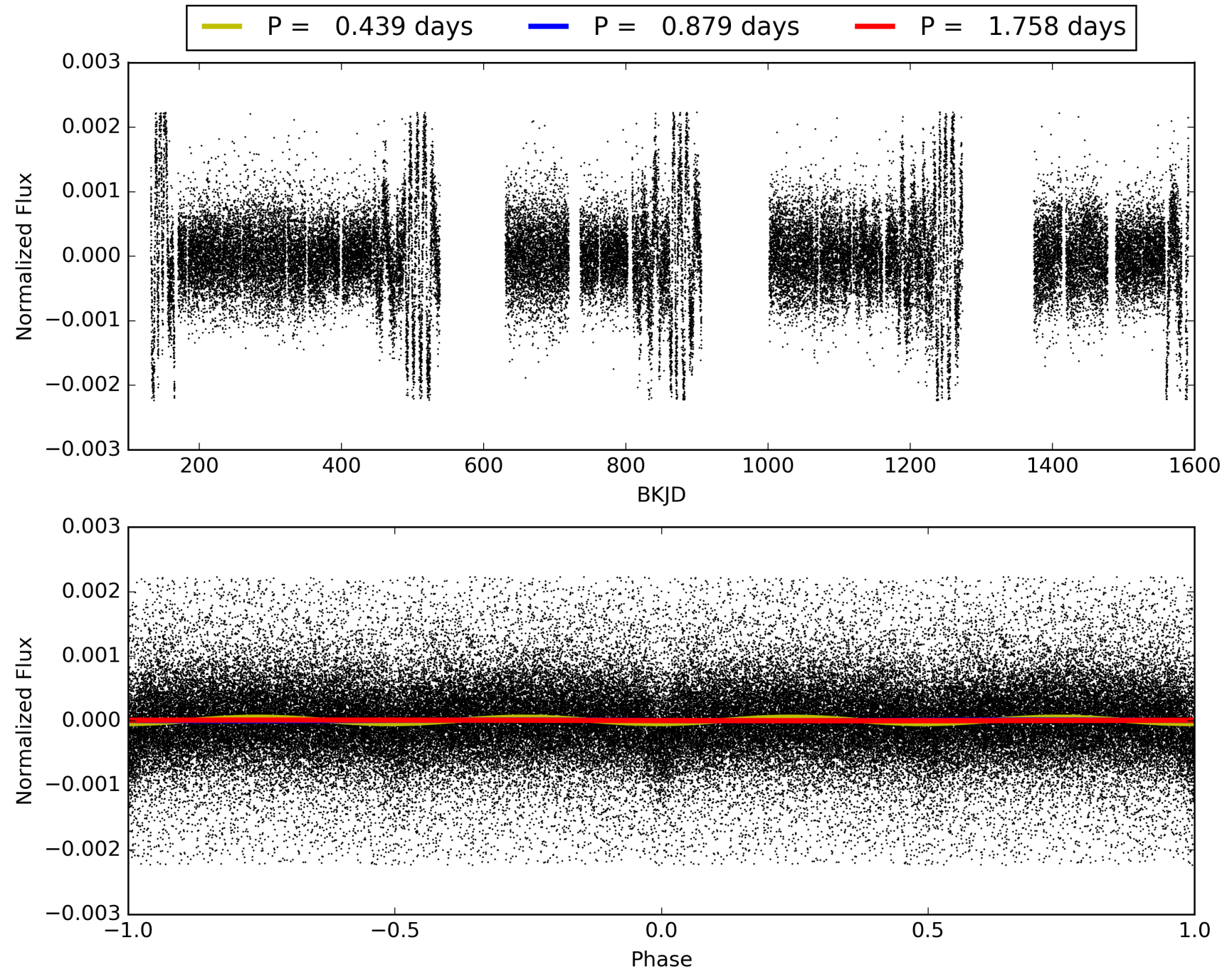
## DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]  
LongPeriod-sig: 100.0% [1299.09σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 4.64e-67  
RollingBand-fgt: 0.95 [1095/1147]  
GhostDiagnostic-chr: 5.236  
Centroid-sig: 0.0%  
Centroid-so: 2.281 arcsec [3.91σ]  
OotOffset-rm: 1.190 arcsec [7.81σ]  
KicOffset-rm: 1.102 arcsec [6.25σ]  
OotOffset-st: 1/4/4/4 [13]  
KicOffset-st: 1/4/4/4 [13]  
DiffImageQuality-fgm: 1.00 [13/13]  
DiffImageOverlap-fno: 1.00 [14/14]

# TCE 003130548-01, PDC Light Curves



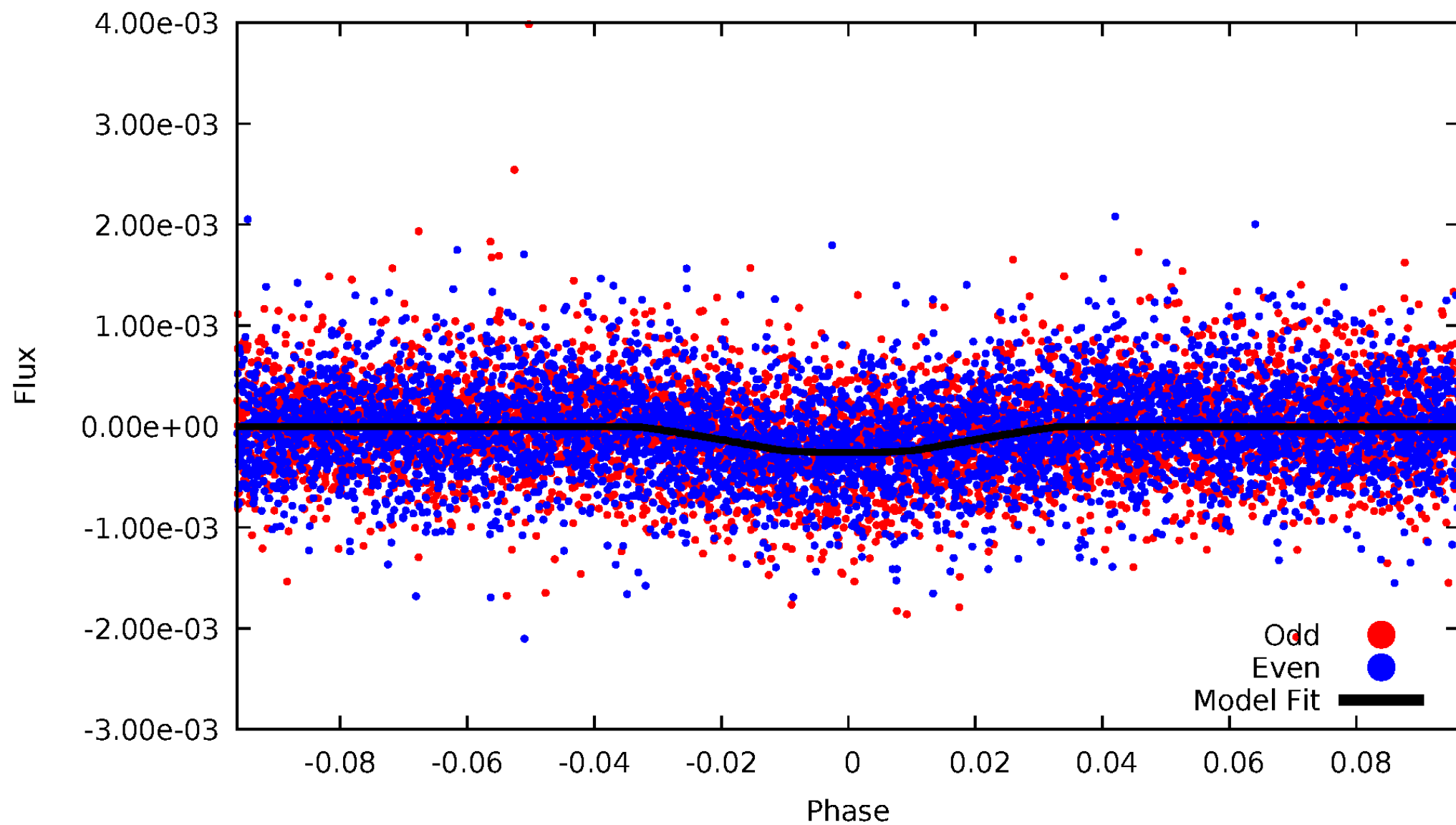
# TCE 003130548-01





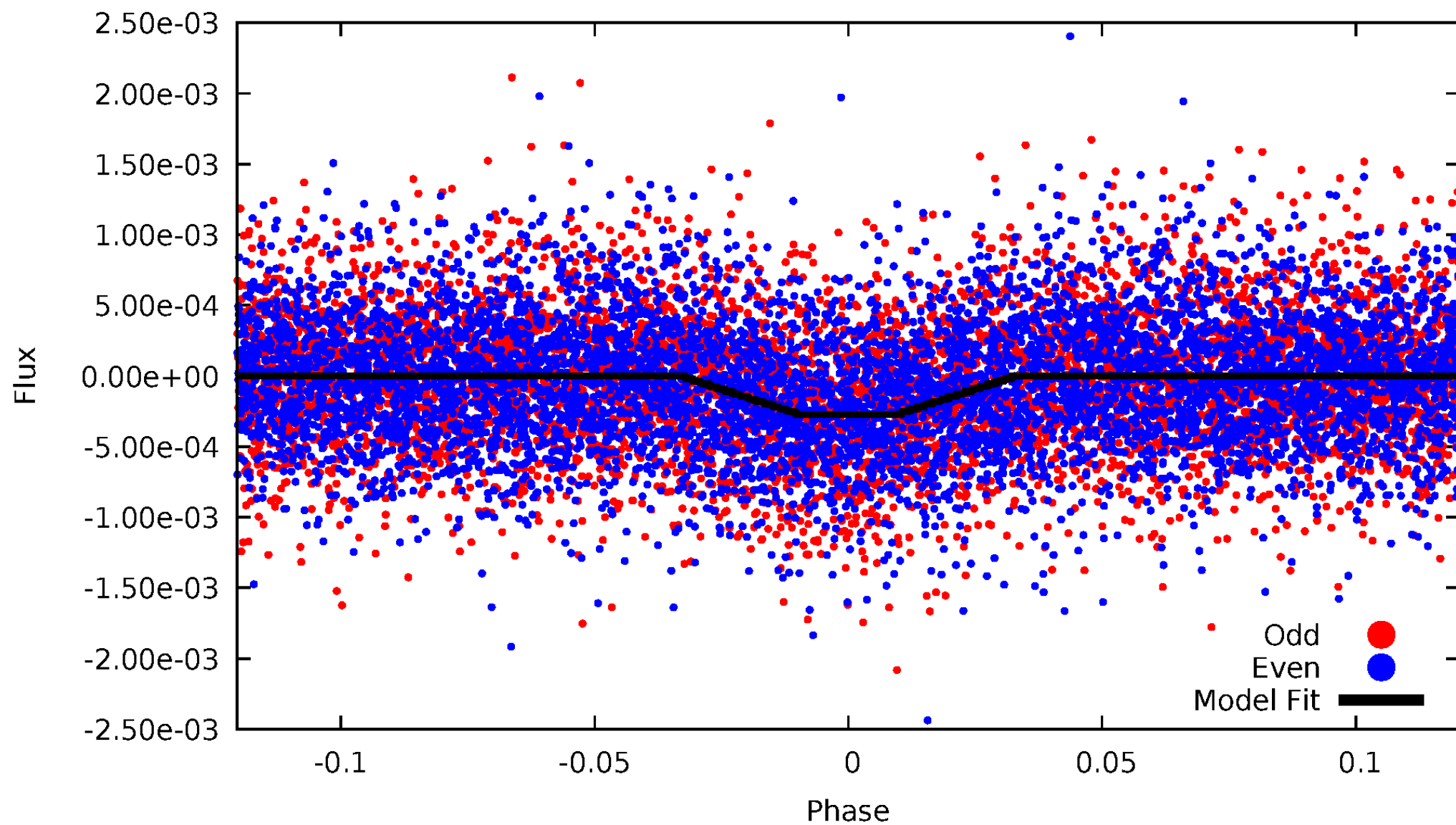
# DV Odd/Even

TCE 003130548-01

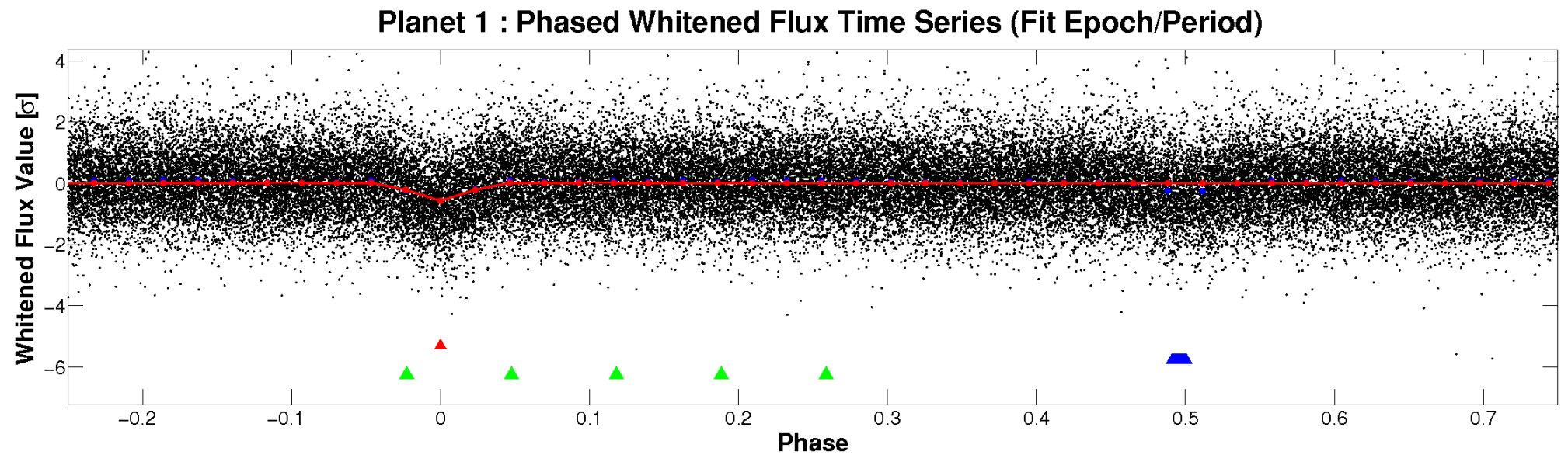
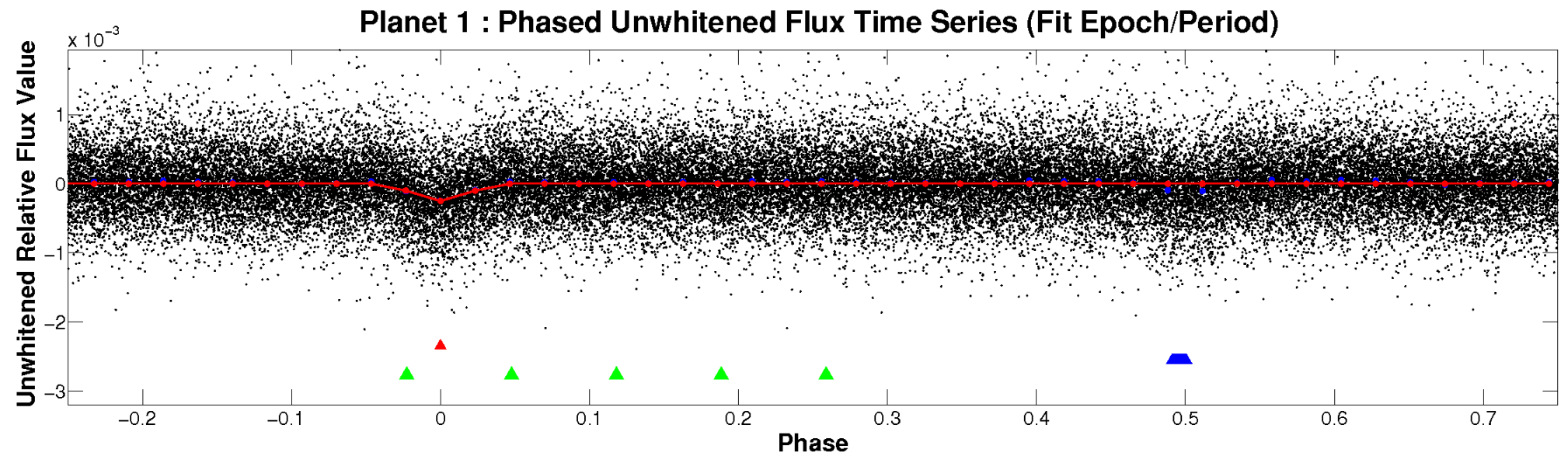


# ALT Odd/Even

TCE 003130548-01

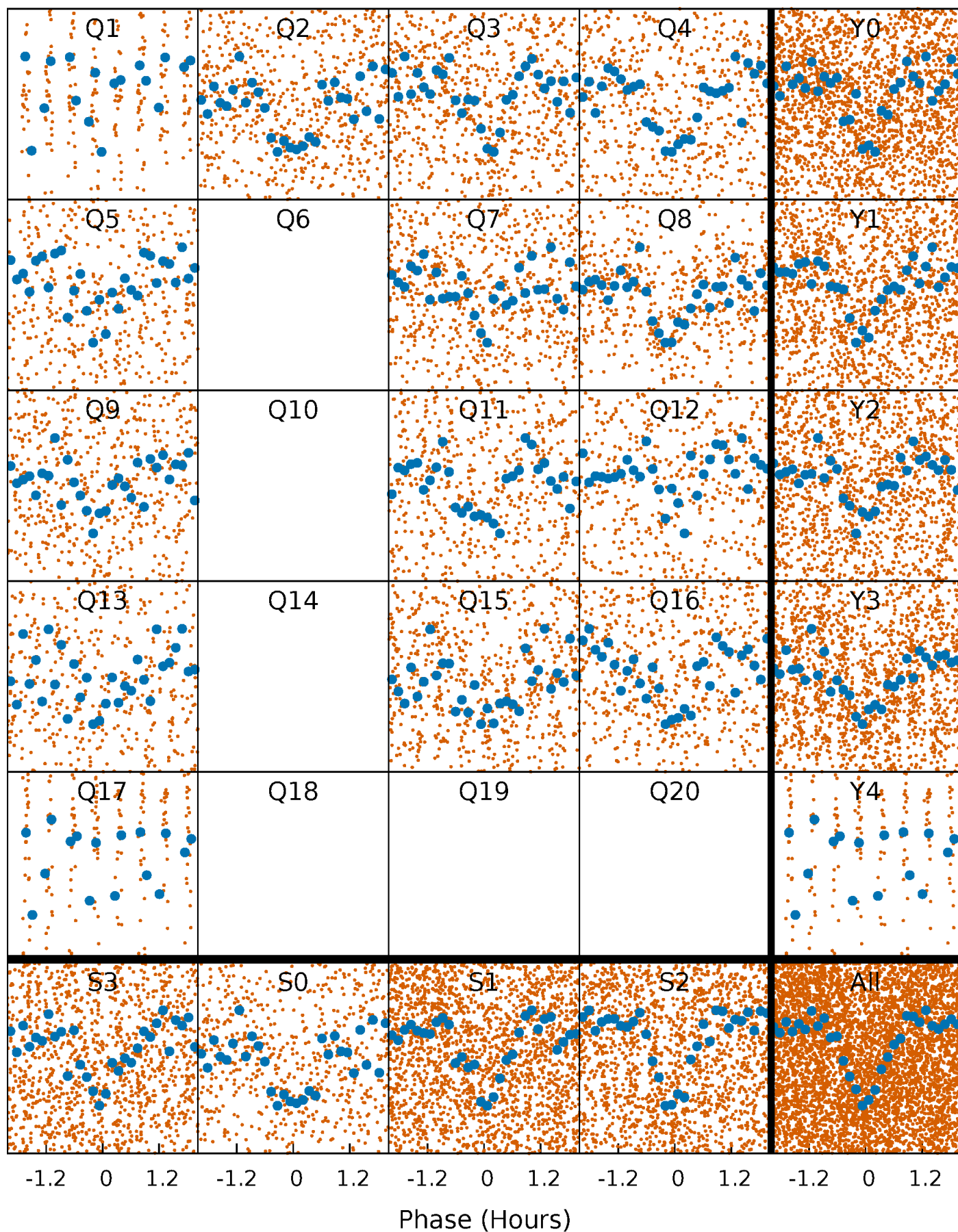


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

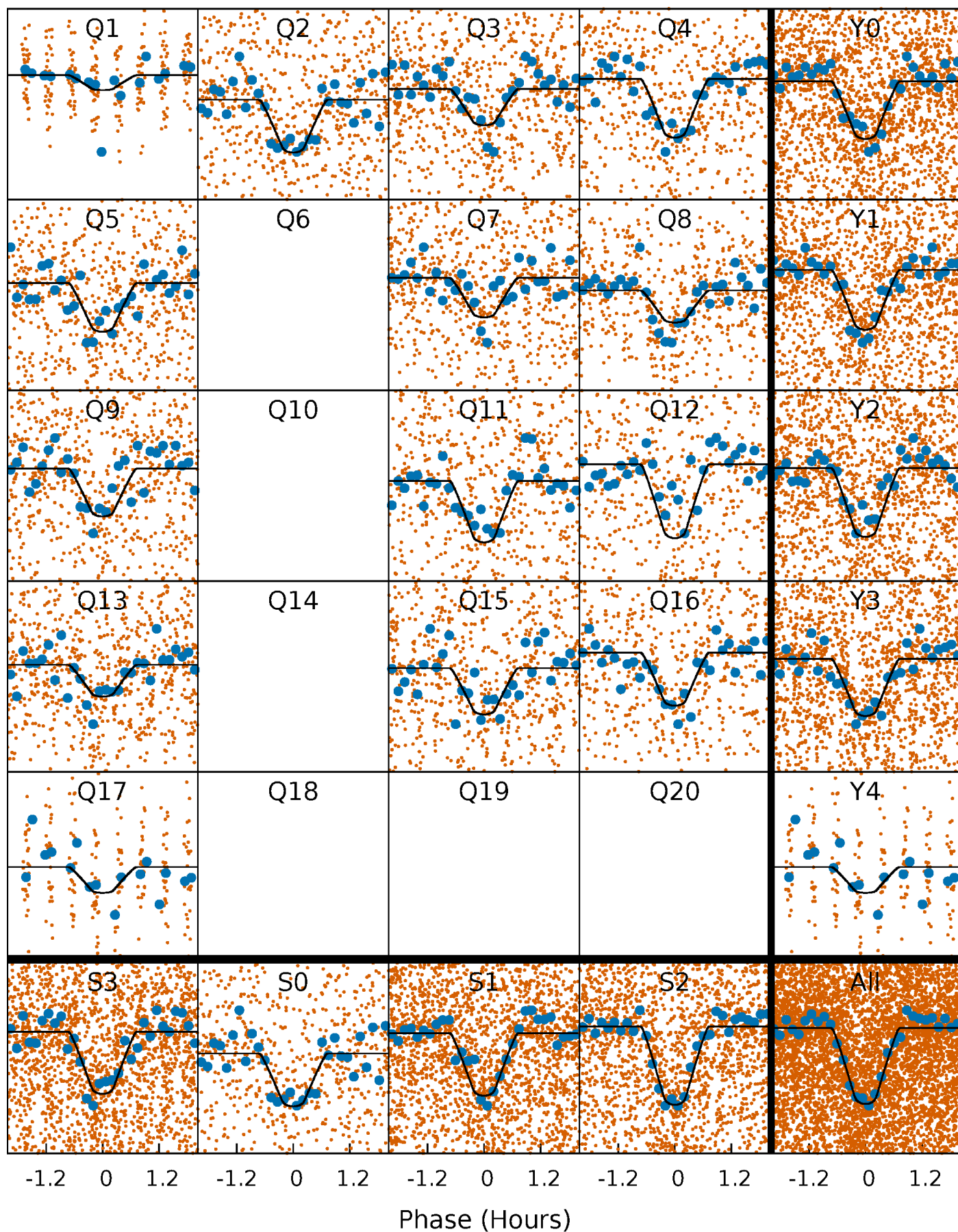
TCE 003130548-01 P= 0.878857 Days  $T_0=132.374296$  (BKJD)





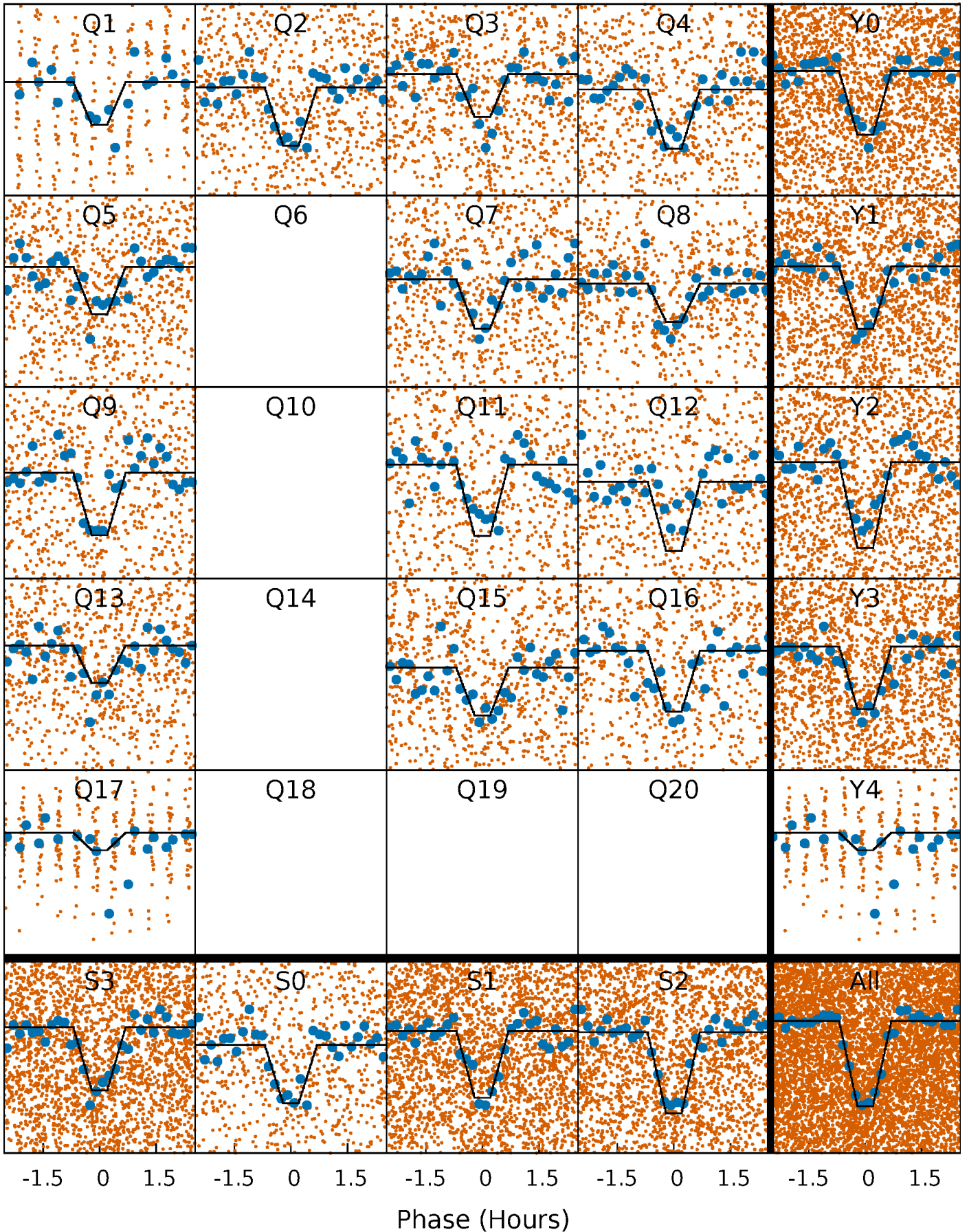
# DV Quarter-Phased Transit Curves

TCE 003130548-01 P= 0.878857 Days  $T_0=132.374296$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

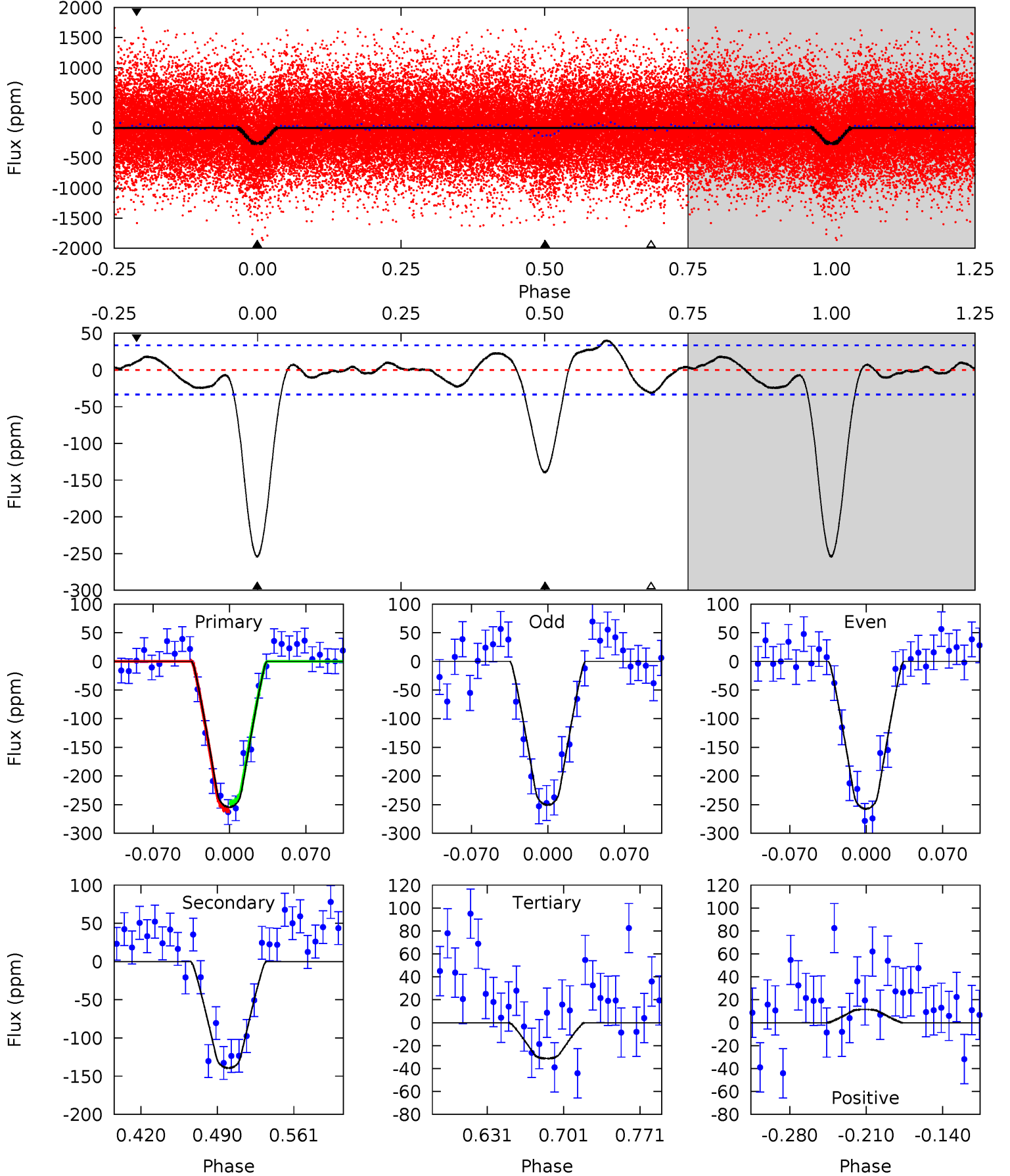
TCE 003130548-01 P= 0.878855 Days  $T_0=132.374536$  (BKJD)



# DV Model-Shift Uniqueness Test

003130548-01, P = 0.878857 Days, E = 131.495439 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
35.3	19.3	4.33	1.60	4.64	1.81	2.21	30.9	33.7	15.0	17.7	0.47	1.02	0.14	0.87

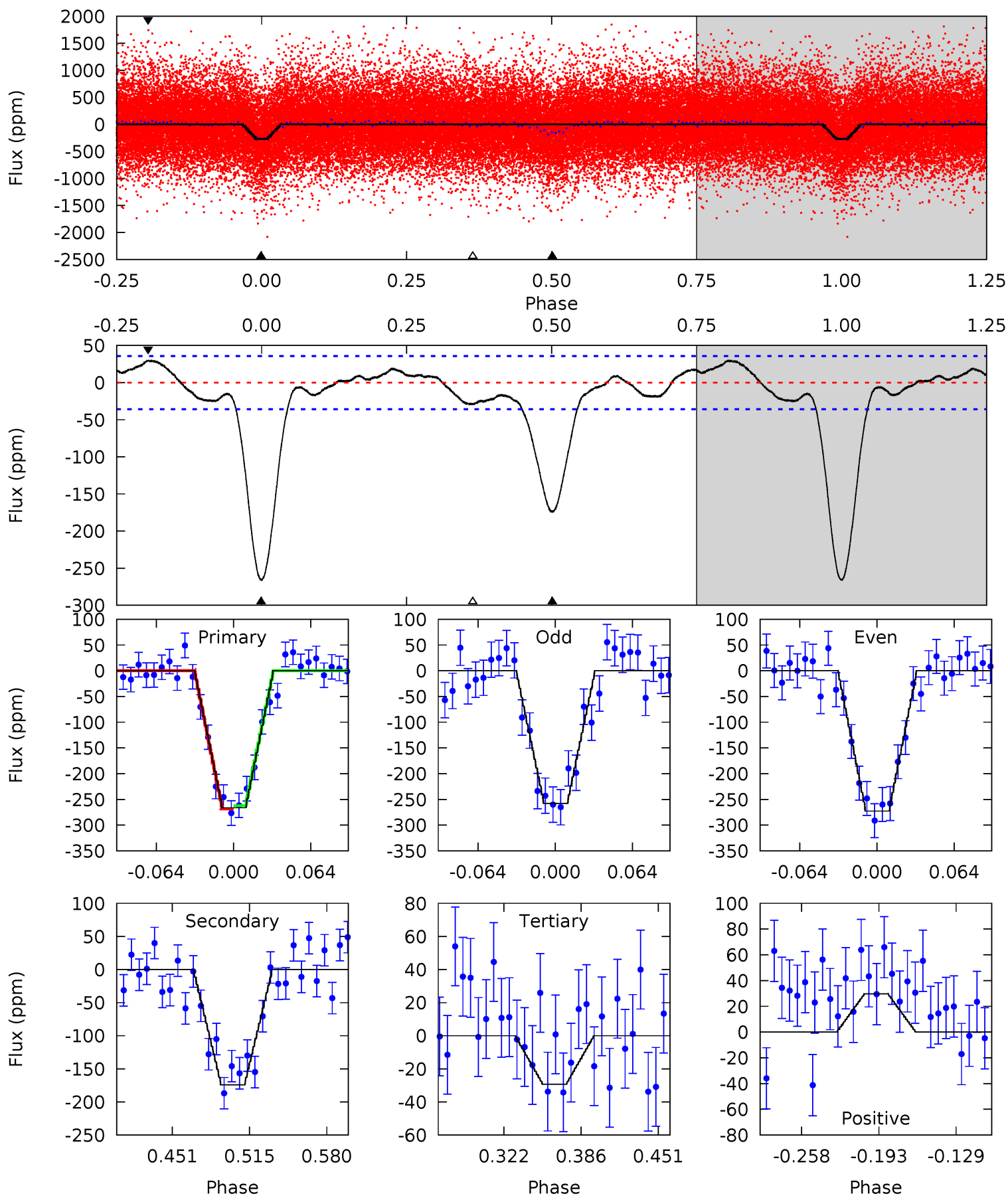




# Alt Model-Shift Uniqueness Test

003130548-01, P = 0.878855 Days, E = 131.495681 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
34.6	22.7	3.82	3.87	4.66	1.85	2.02	30.8	30.8	18.8	18.8	0.97	0.98	0.10	0.42





### Stellar Parameters For KIC 003130548

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5727^{+155}_{-172}$	$4.438^{+0.101}_{-0.174}$	$-0.220^{+0.300}_{-0.300}$	$0.937^{+0.248}_{-0.134}$	$0.877^{+0.120}_{-0.080}$	$1.502^{+0.662}_{-0.742}$
	+3%/-3%	+2%/-4%	+136%/-136%	+26%/-14%	+14%/-9%	+44%/-49%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 003130548-01 / KOI 2773.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-139 \pm 7$	$1.85^{+0.67}_{-0.56}$	$2622^{+165}_{-143}$	$4720^{+790}_{-516}$	$6.498^{+6.520}_{-2.863}$
Alt.	$-174 \pm 8$	$1.74^{+0.62}_{-0.55}$	$2634^{+170}_{-143}$	$5111^{+1035}_{-578}$	$9.433^{+11.106}_{-4.285}$

$T_{max}$  = 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

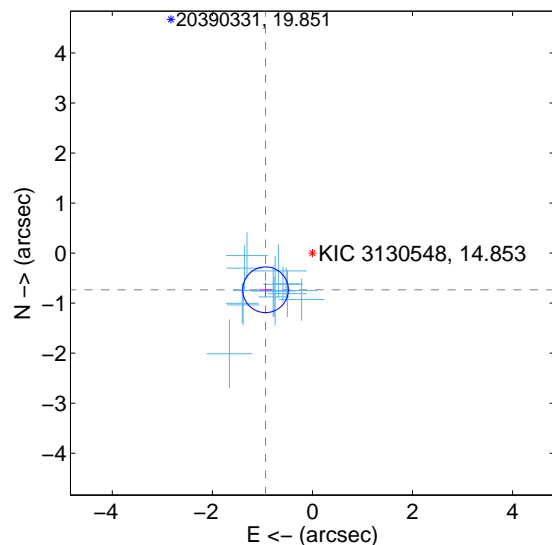
Supplemental centroid analysis for 003130548-01. Kepler magnitude: 14.85. Transit SNR 23.37

There are 13 quarters with good PRF difference image offsets

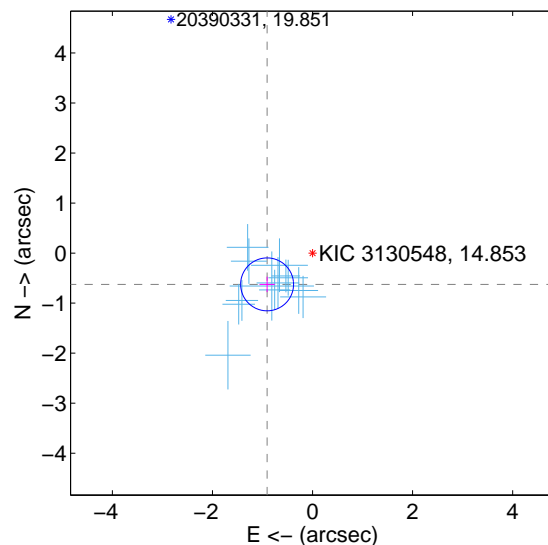
The direct PRF centroid is offset from the target star catalog position by about 0.16 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.190 \pm 0.152$	7.81	$0.937 \pm 0.136$	$-0.733 \pm 0.141$
PRF-fit source offset from KIC position	$1.102 \pm 0.176$	6.25	$0.908 \pm 0.153$	$-0.625 \pm 0.154$
photometric centroid source offset	$2.28 \pm 0.58$	3.91	$0.65 \pm 0.63$	$-2.19 \pm 0.58$

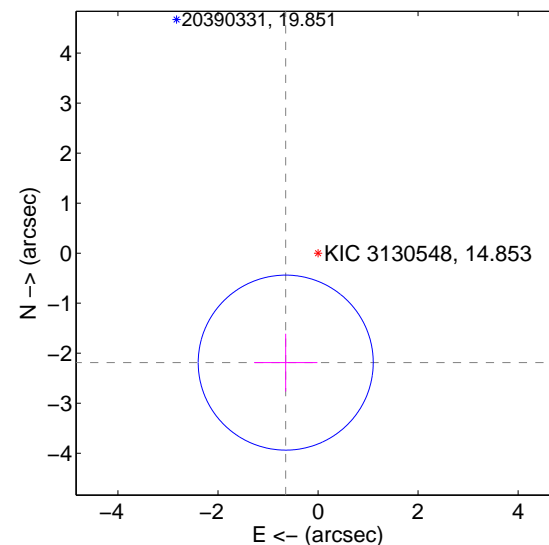
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

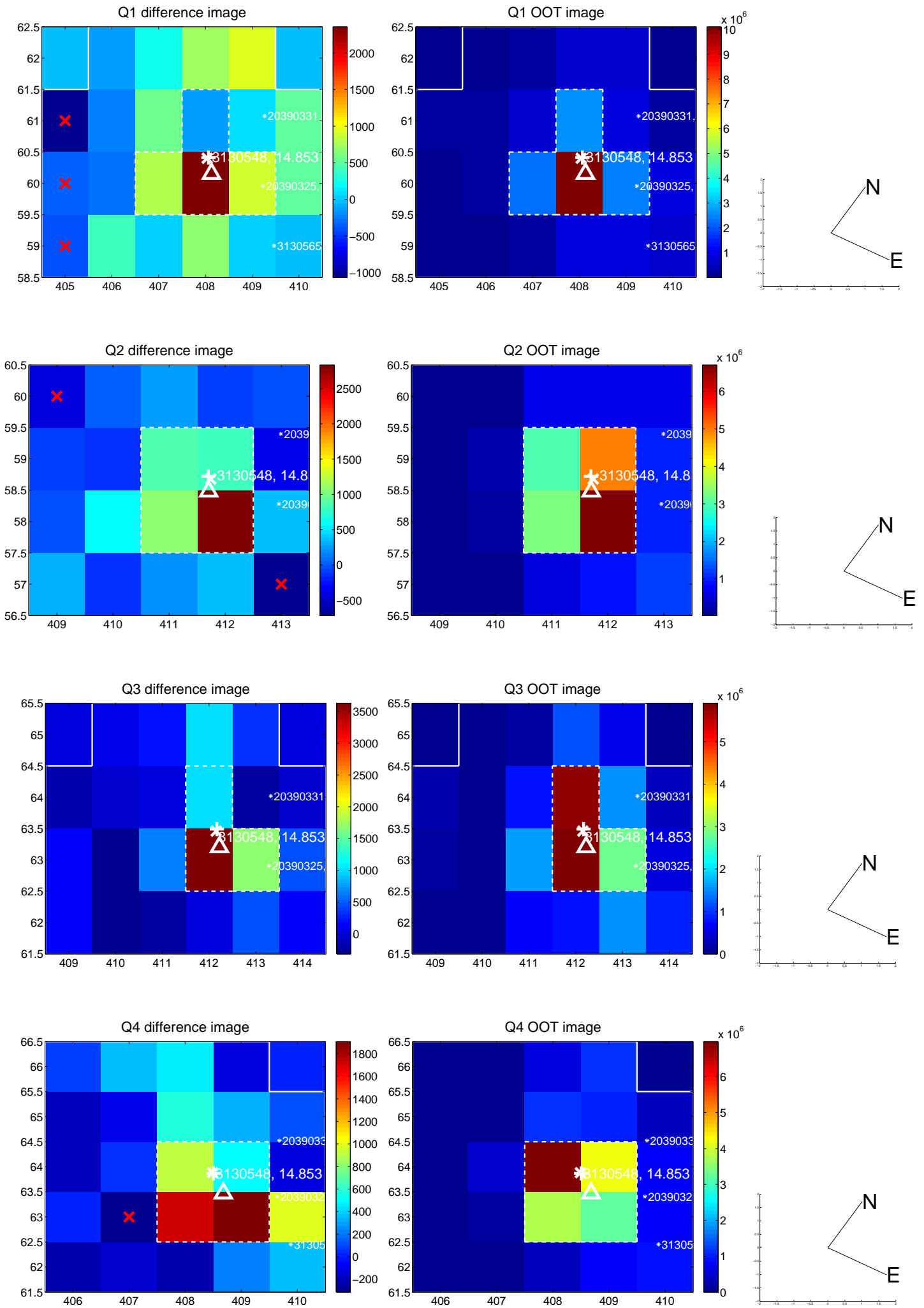


offset from photometric centroids

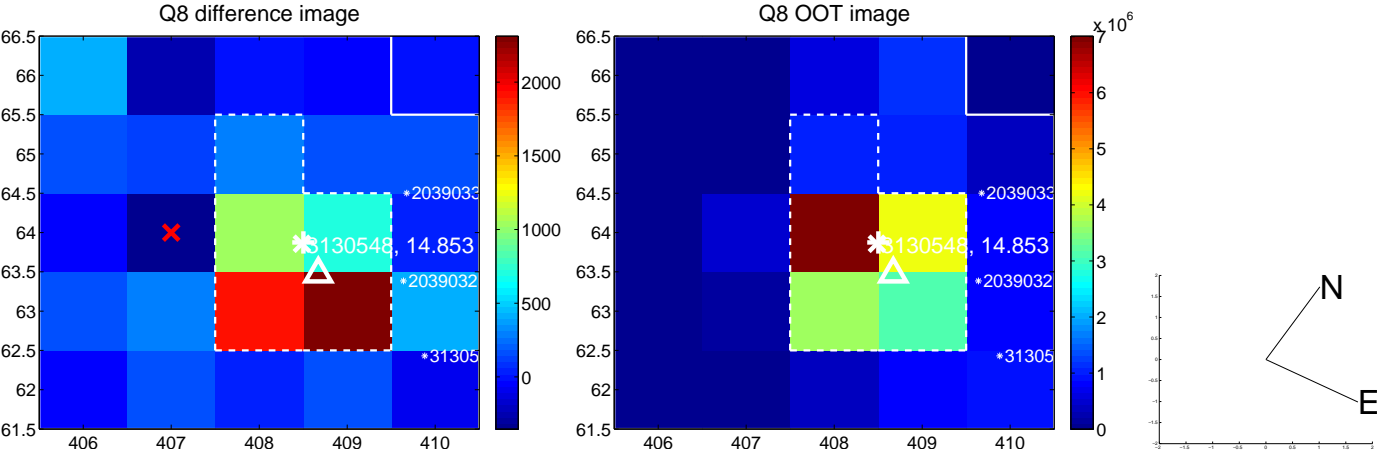
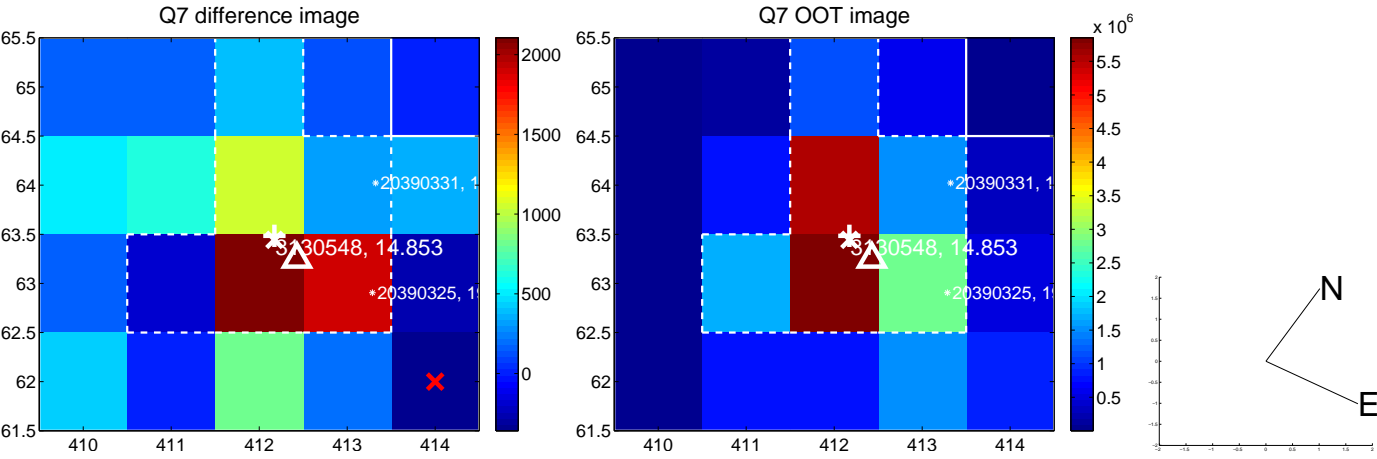
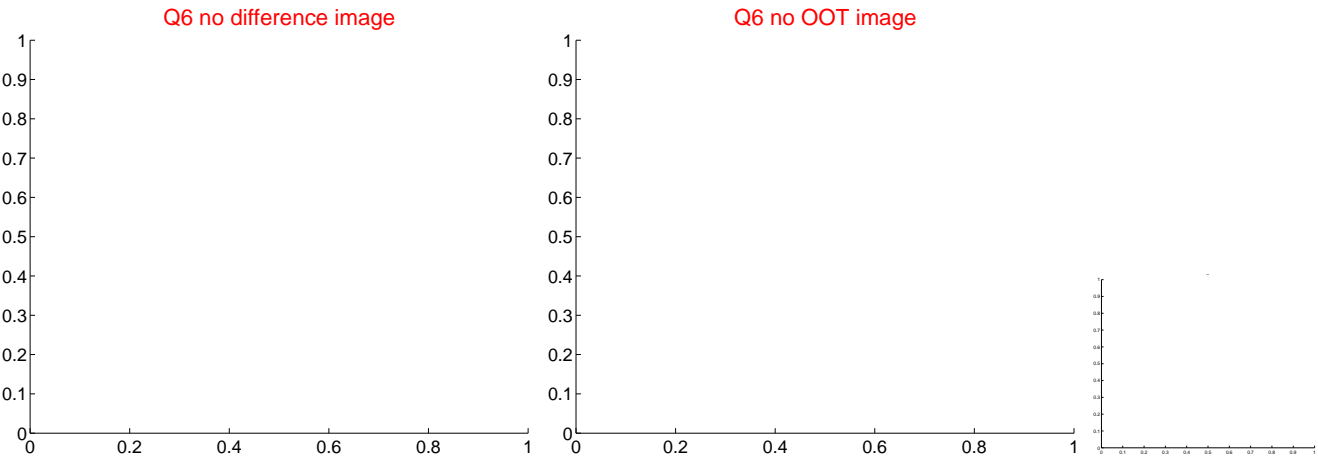
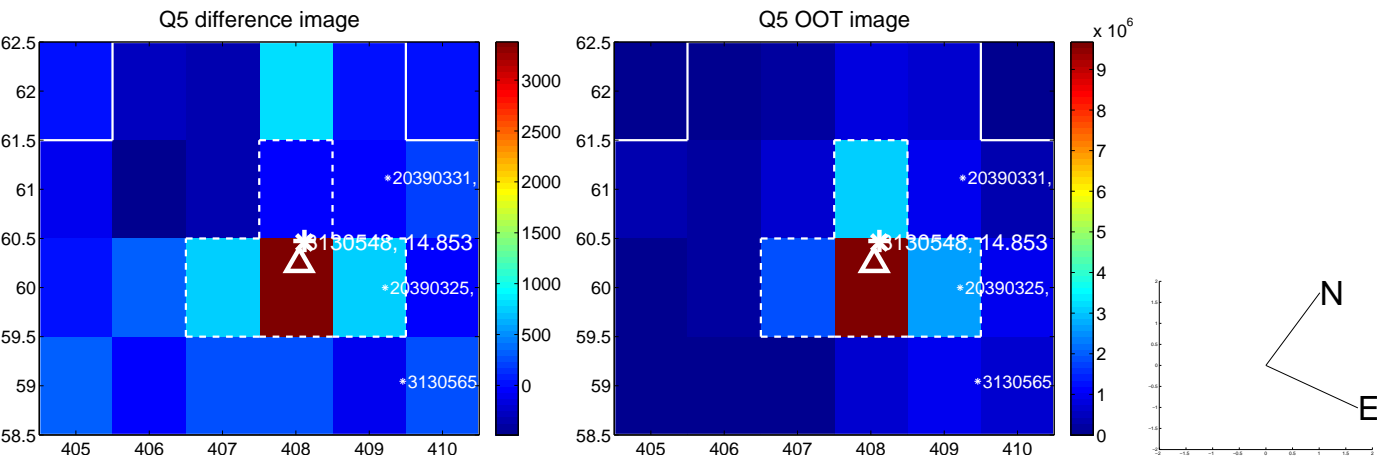


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

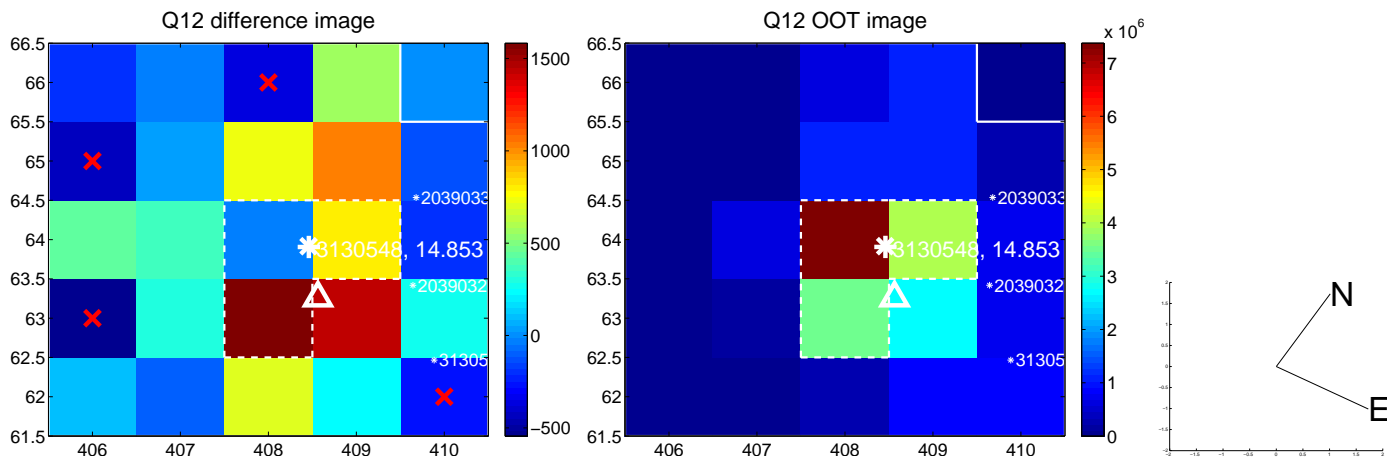
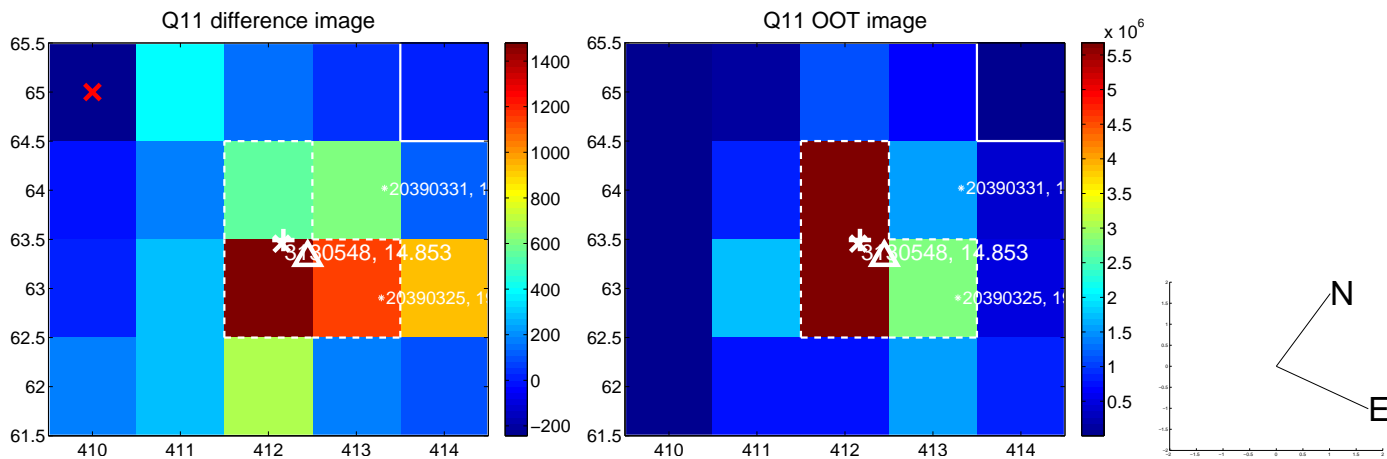
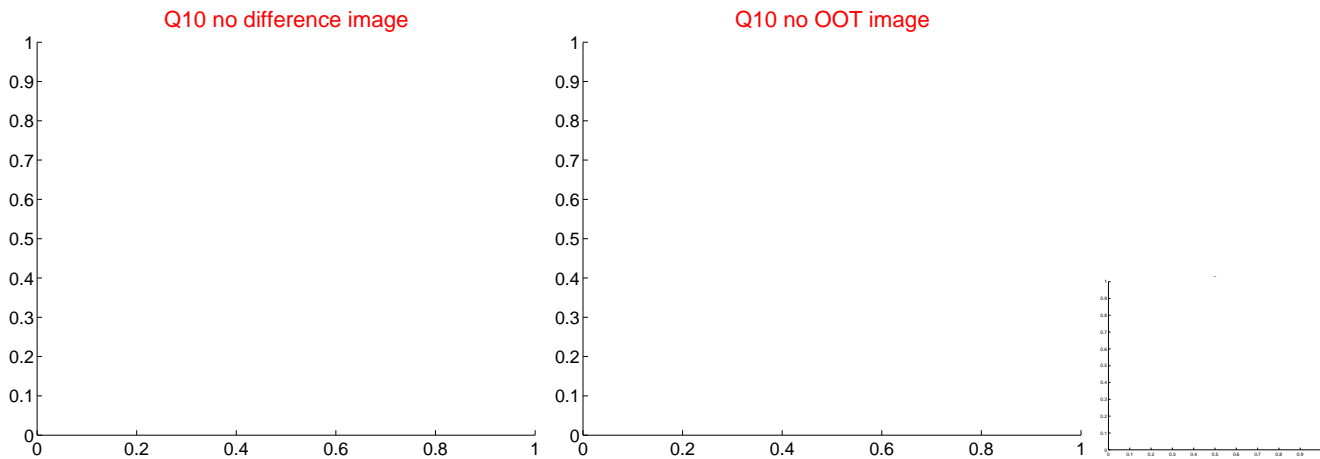
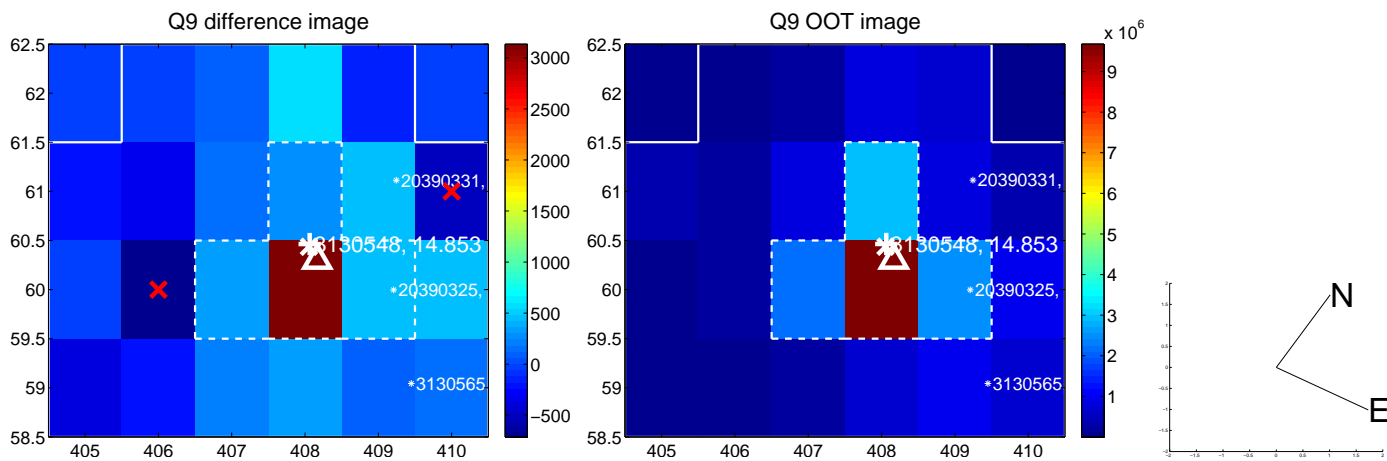


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

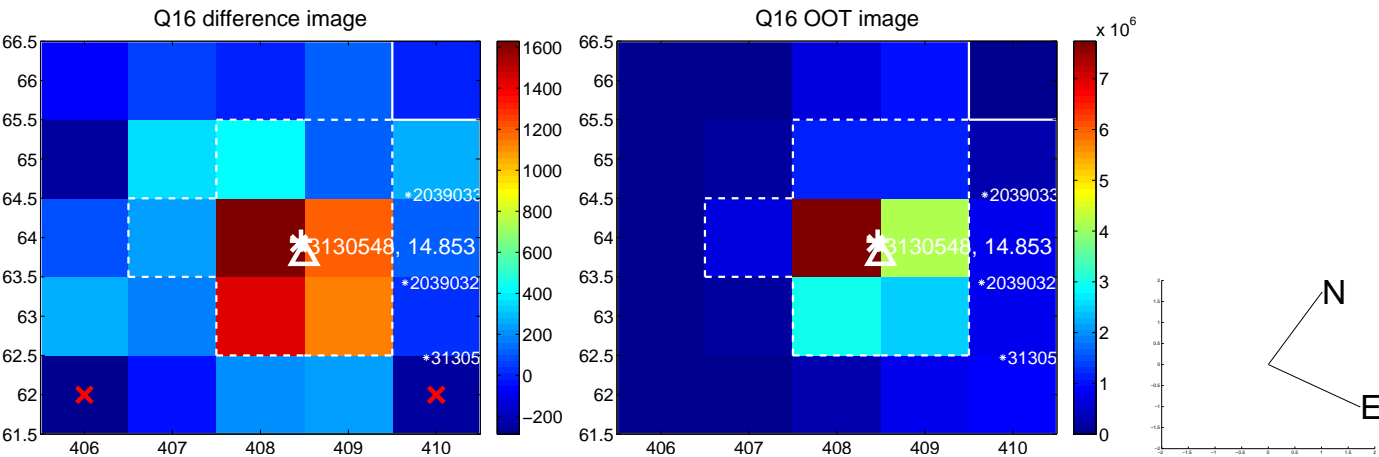
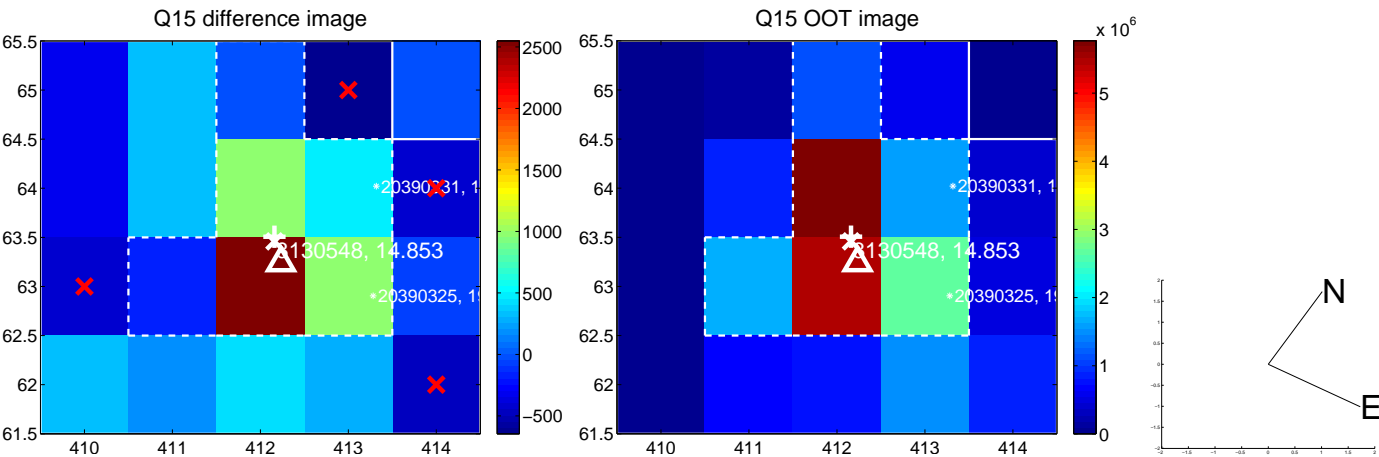
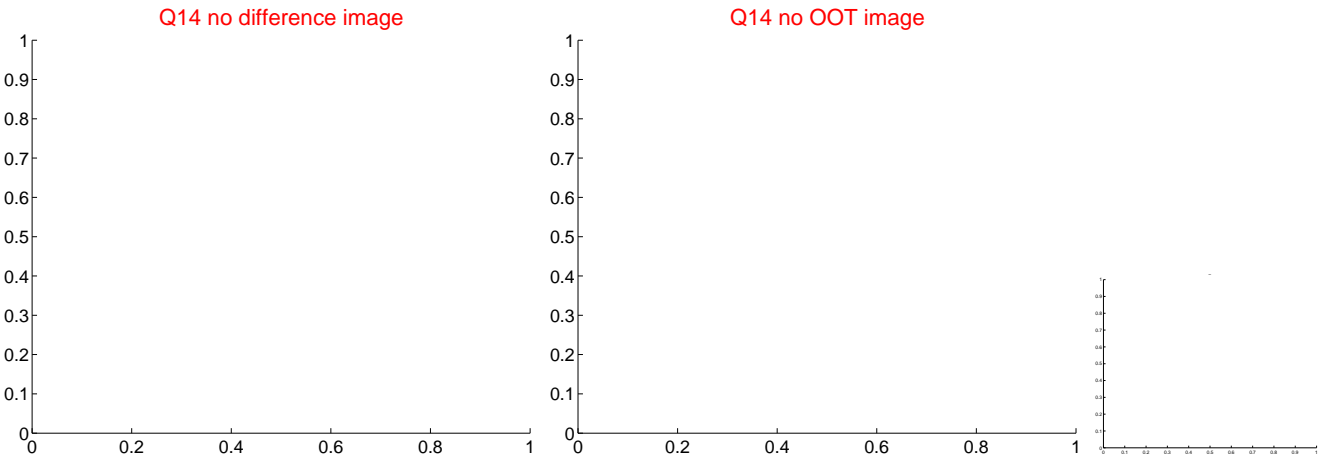
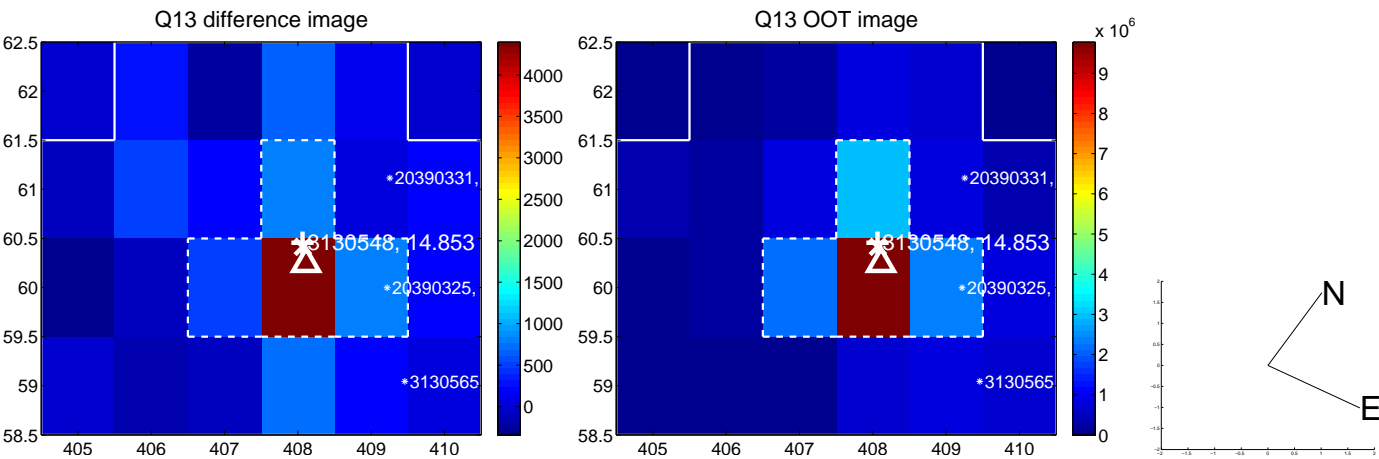




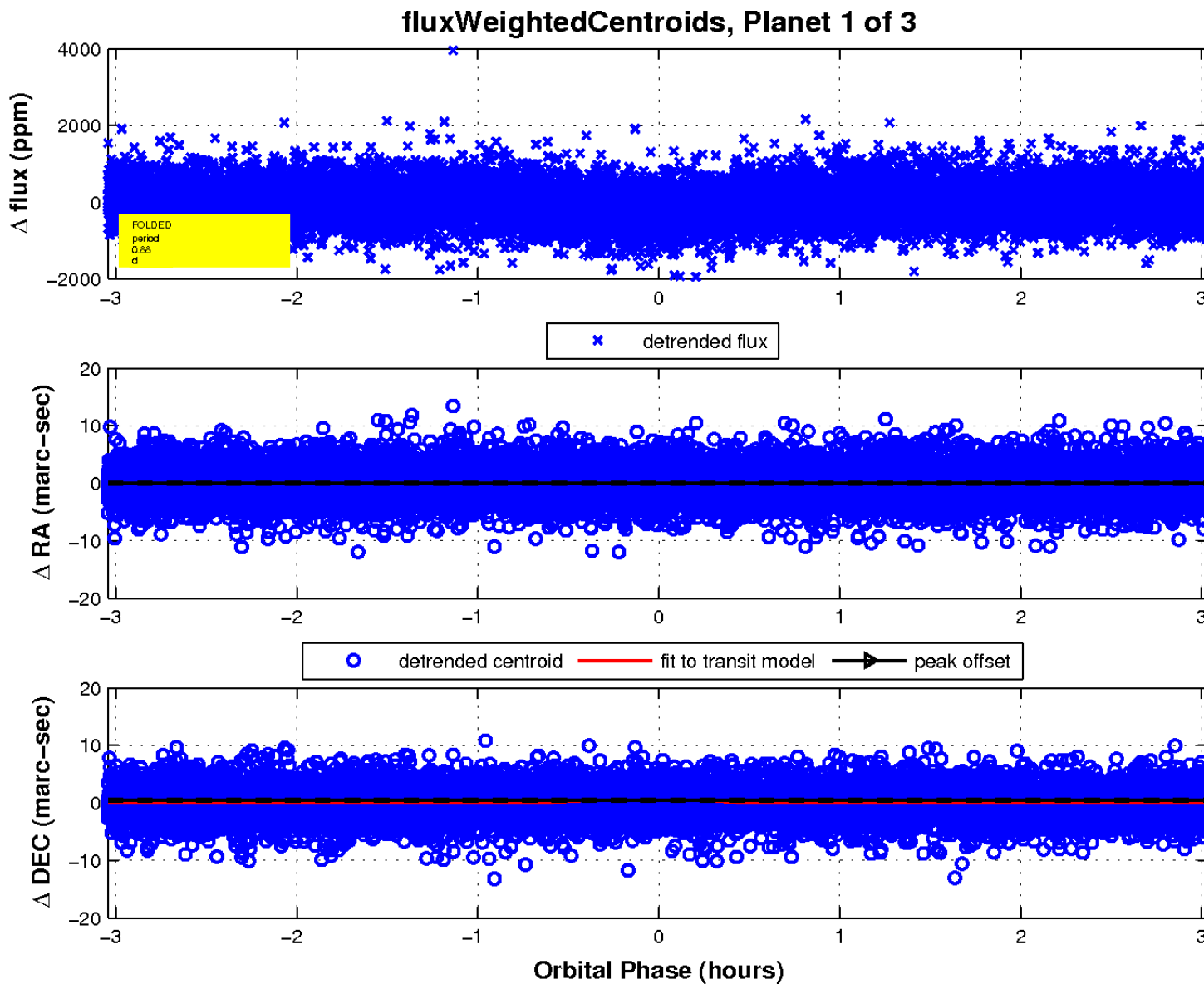
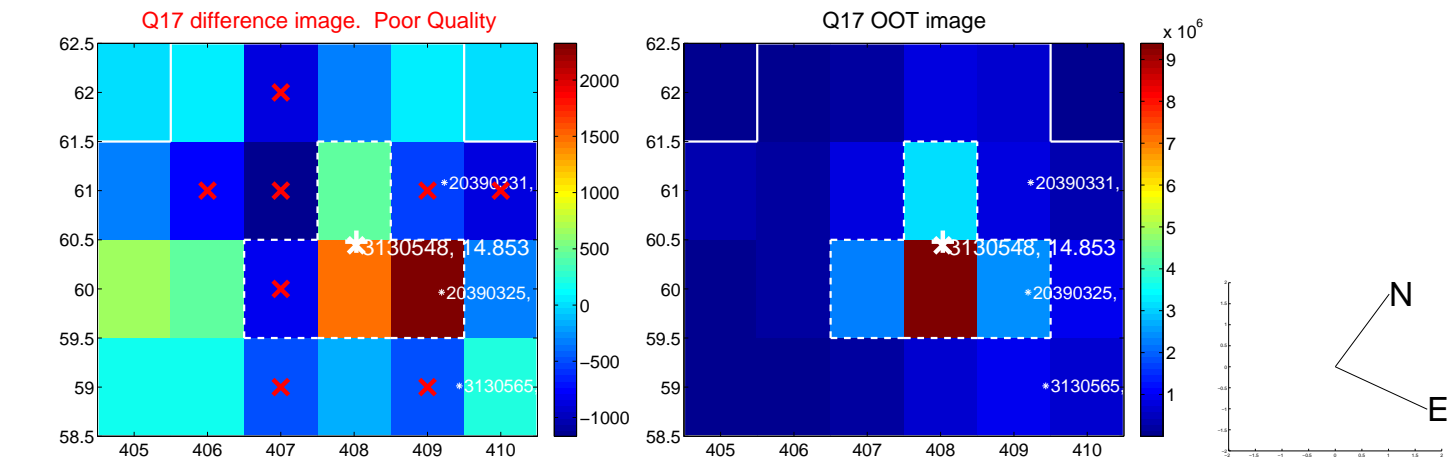
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



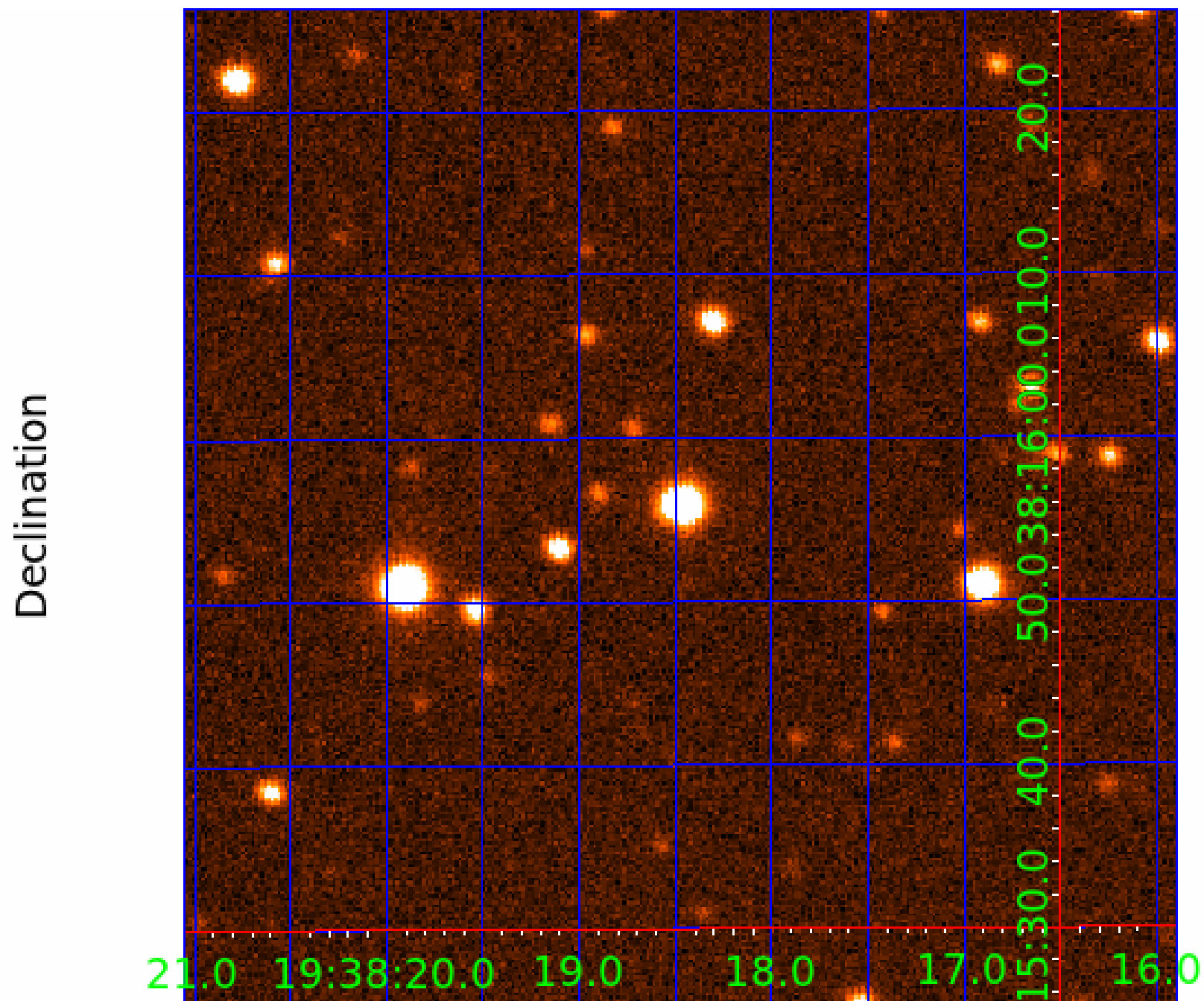
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image





# KIC 003130548

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003130548-01	OBS	2773.01	0.878857	132.374296	257.6	1.015	16.8	23.4	0.94	5727	1.80	2861.14
003130548-02	OBS	No	0.878852	131.935494	125.3	1.431	12.4	14.2	0.94	5727	1.25	2861.16

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003130548-01	OBS	FP	0.00	0	1	1	0	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—CENT_UNRESOLVED_OFFSET
003130548-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE

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

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

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

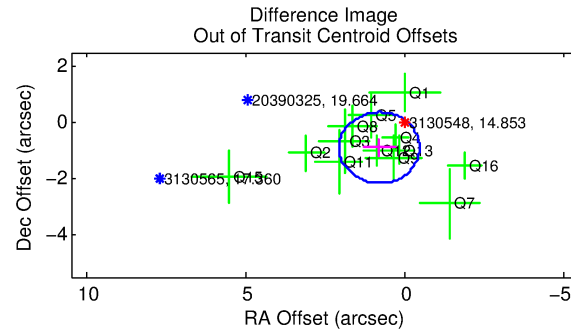
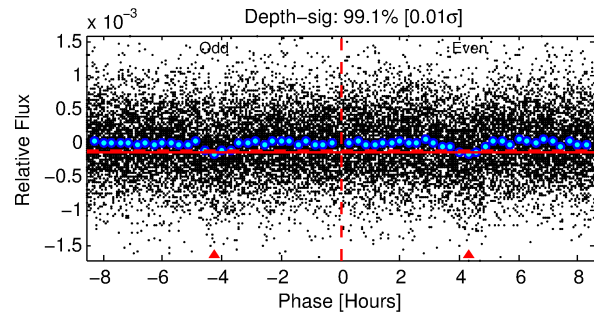
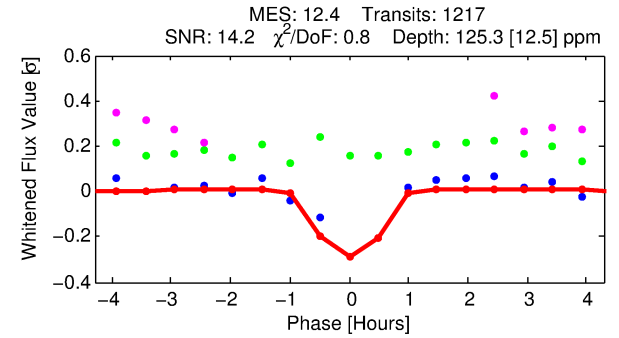
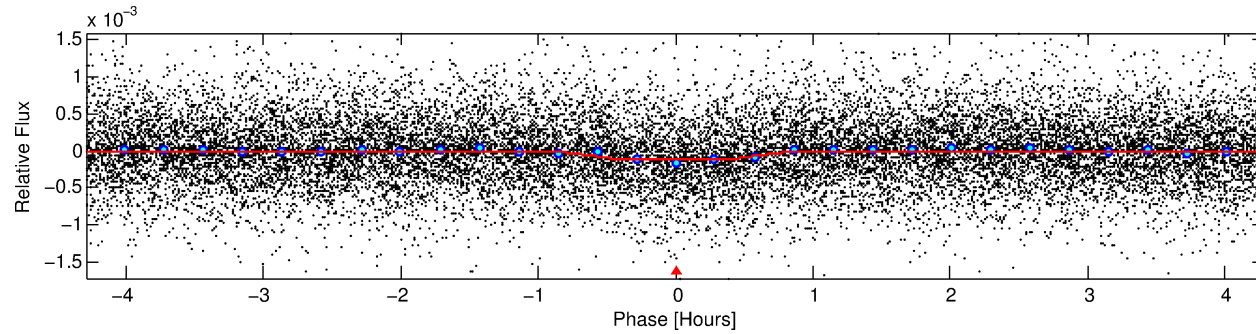
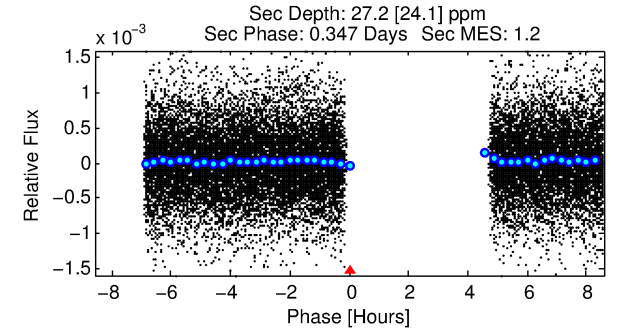
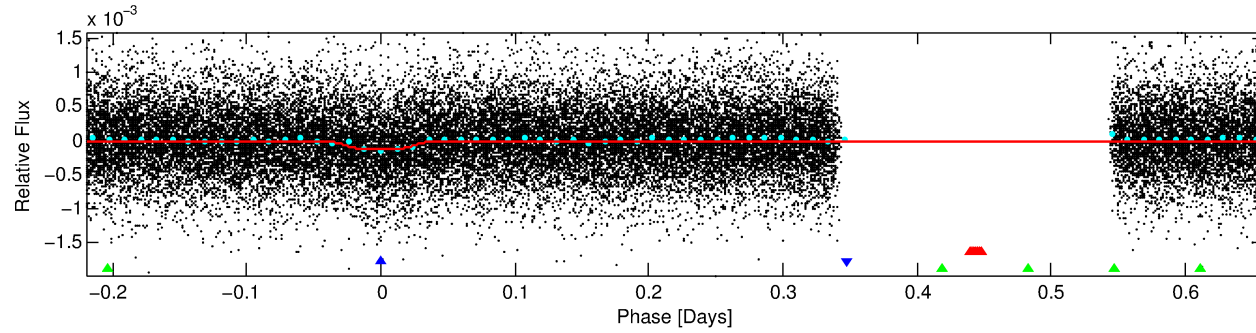
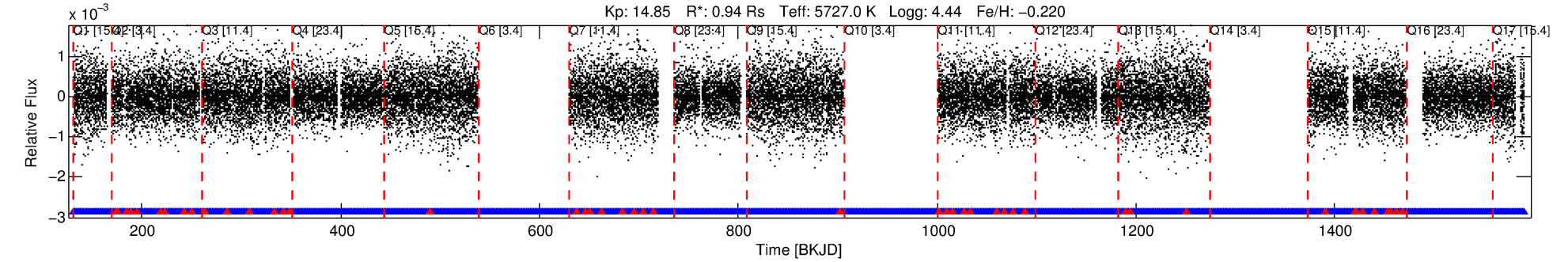
## Ephemeris Match Information For 003130548-02

No Significant Match Found

# DV One-Page Summary

KIC: 3130548 Candidate: 2 of 3 Period: 0.879 d

KOI: K02773 Corr: No Ephemeris Match



## DV Fit Results:

Period = 0.87885 [0.00001] d  
Epoch = 131.9355 [0.0016] BKJD  
Rp/R\* = 0.0122 [0.0060]  
a/R\* = 2.35 [4.55]  
b = 0.90 [0.50]  
Seff = 2861.16 [978.29]  
Teq = 1865 [159] K  
Rp = 1.25 [0.70] Re  
a = 0.0172 [0.0038] AU  
Ag = 2.82 [3.83] [0.48σ]  
Teffp = 3736 [1238] K [1.50σ]

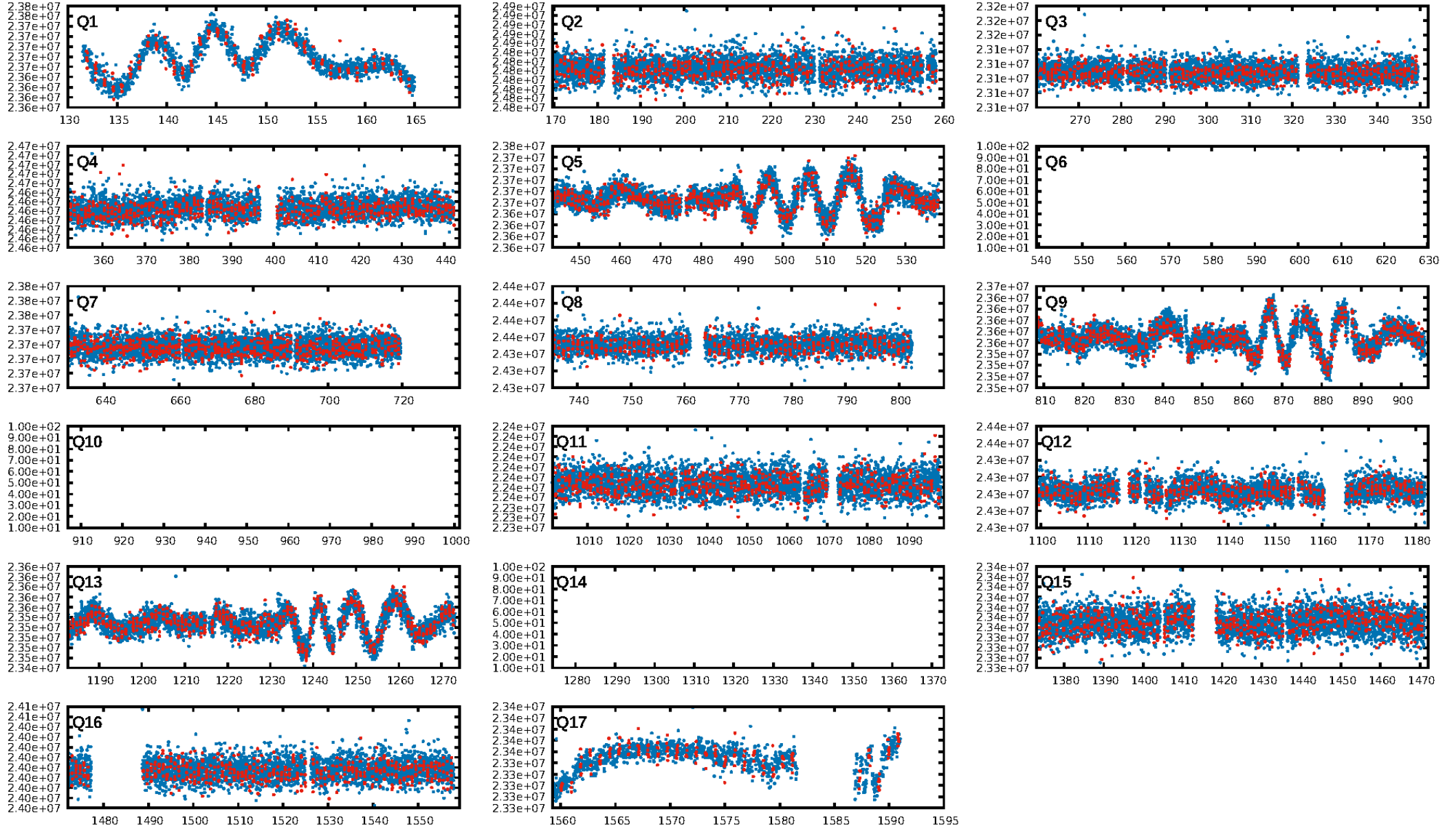
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.55e-37  
RollingBand-fgt: 0.96 [1100/1149]  
GhostDiagnostic-chr: 4.47  
Centroid-sig: 79.1%  
Centroid-so: 0.480 arcsec [0.48σ]  
OotOffset-rm: 1.209 arcsec [2.86σ]  
KicOffset-rm: 1.176 arcsec [2.99σ]  
OotOffset-st: 1/4/4/4 [13]  
KicOffset-st: 1/4/4/4 [13]  
DiffImageQuality-fgm: 0.77 [10/13]  
DiffImageOverlap-fno: 1.00 [14/14]

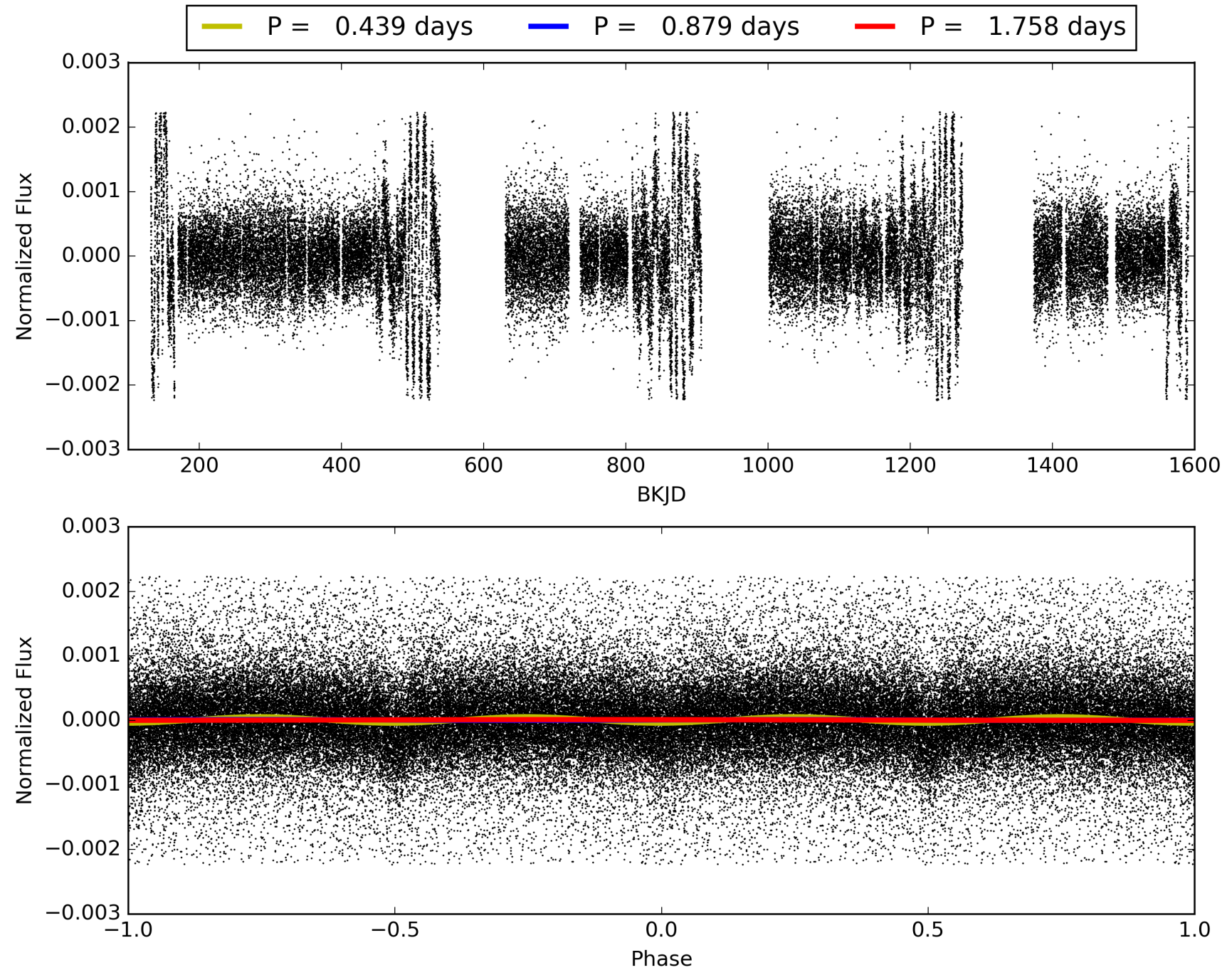
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 02:27:15 Z

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

# TCE 003130548-02, PDC Light Curves



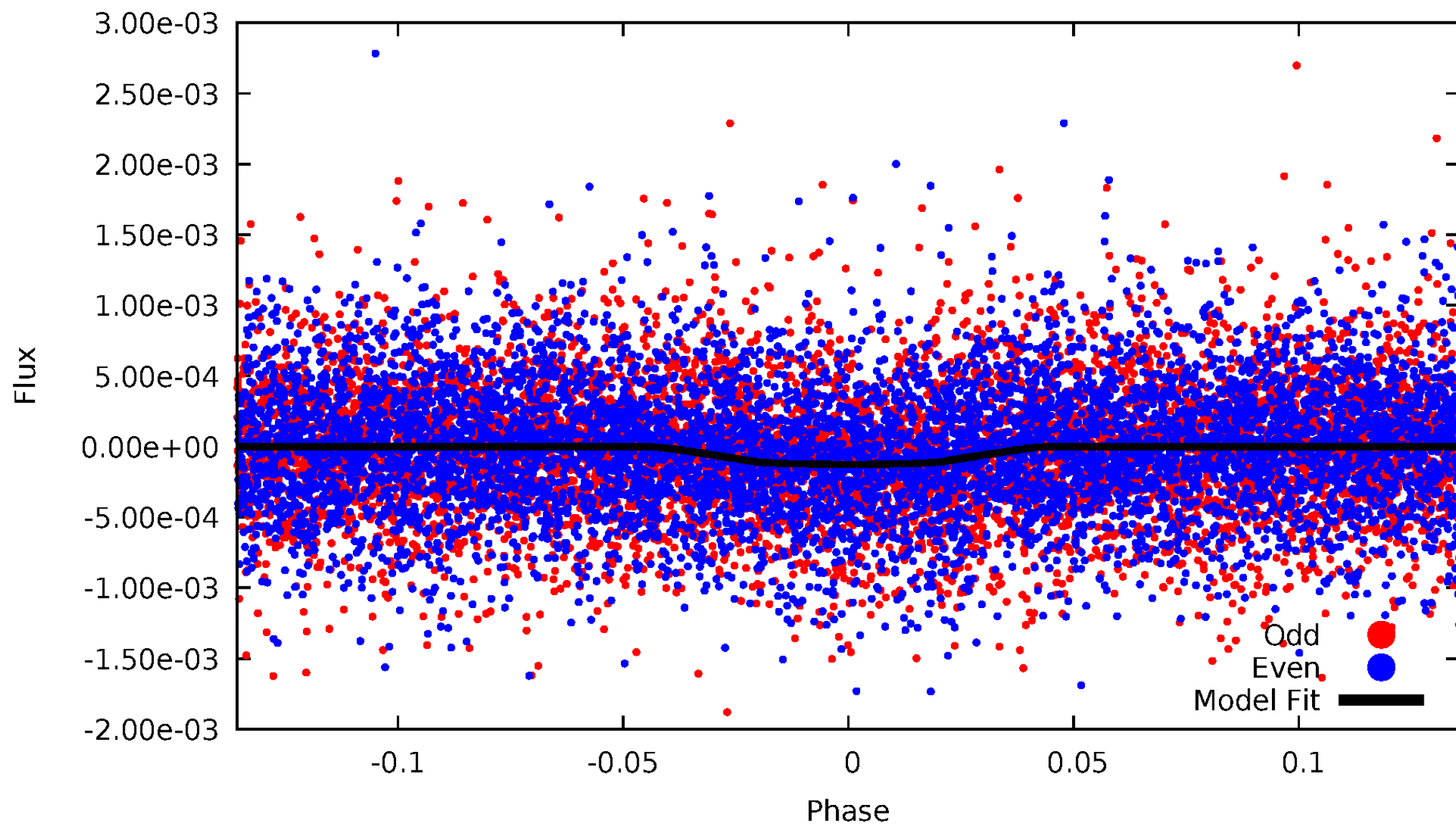
# TCE 003130548-02





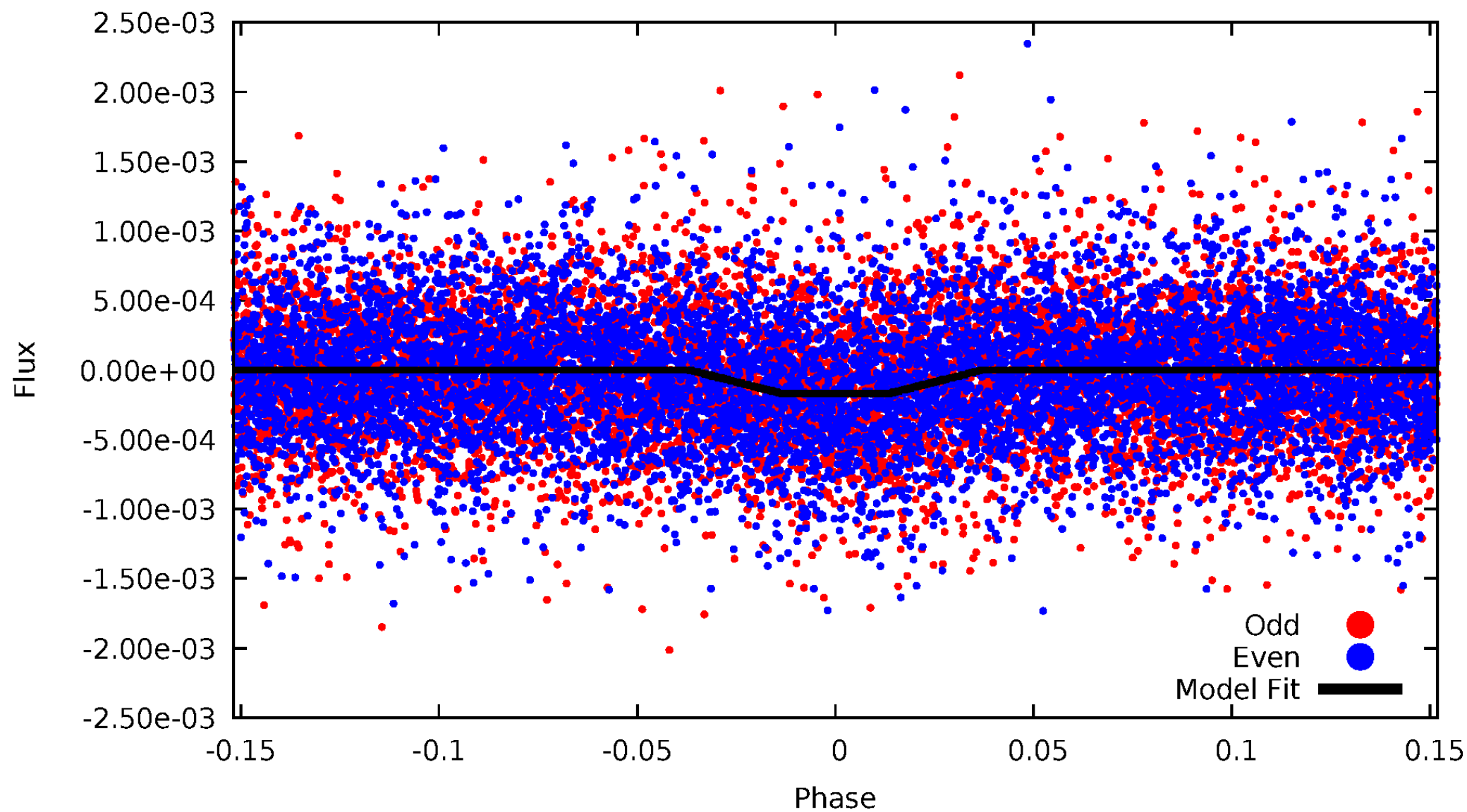
# DV Odd/Even

TCE 003130548-02



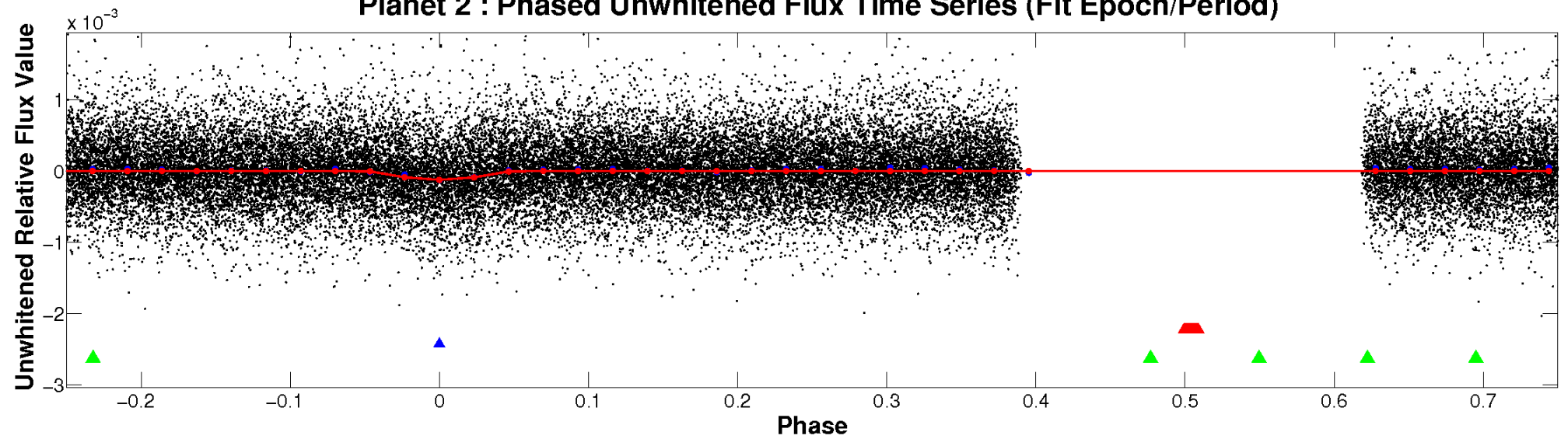
# ALT Odd/Even

TCE 003130548-02

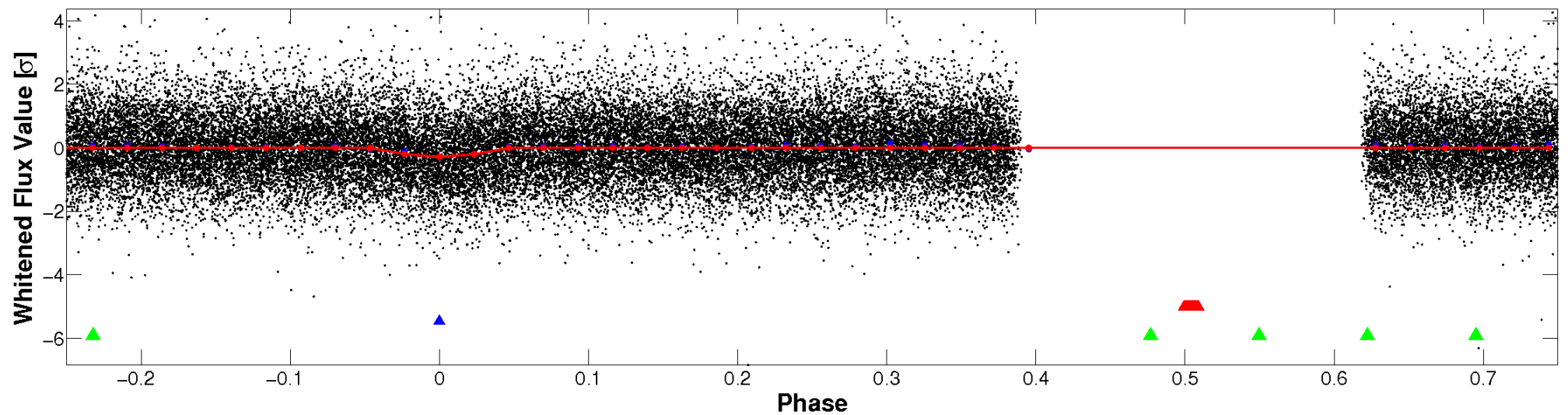


# Non-Whitened Vs. Whitened Light Curve

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

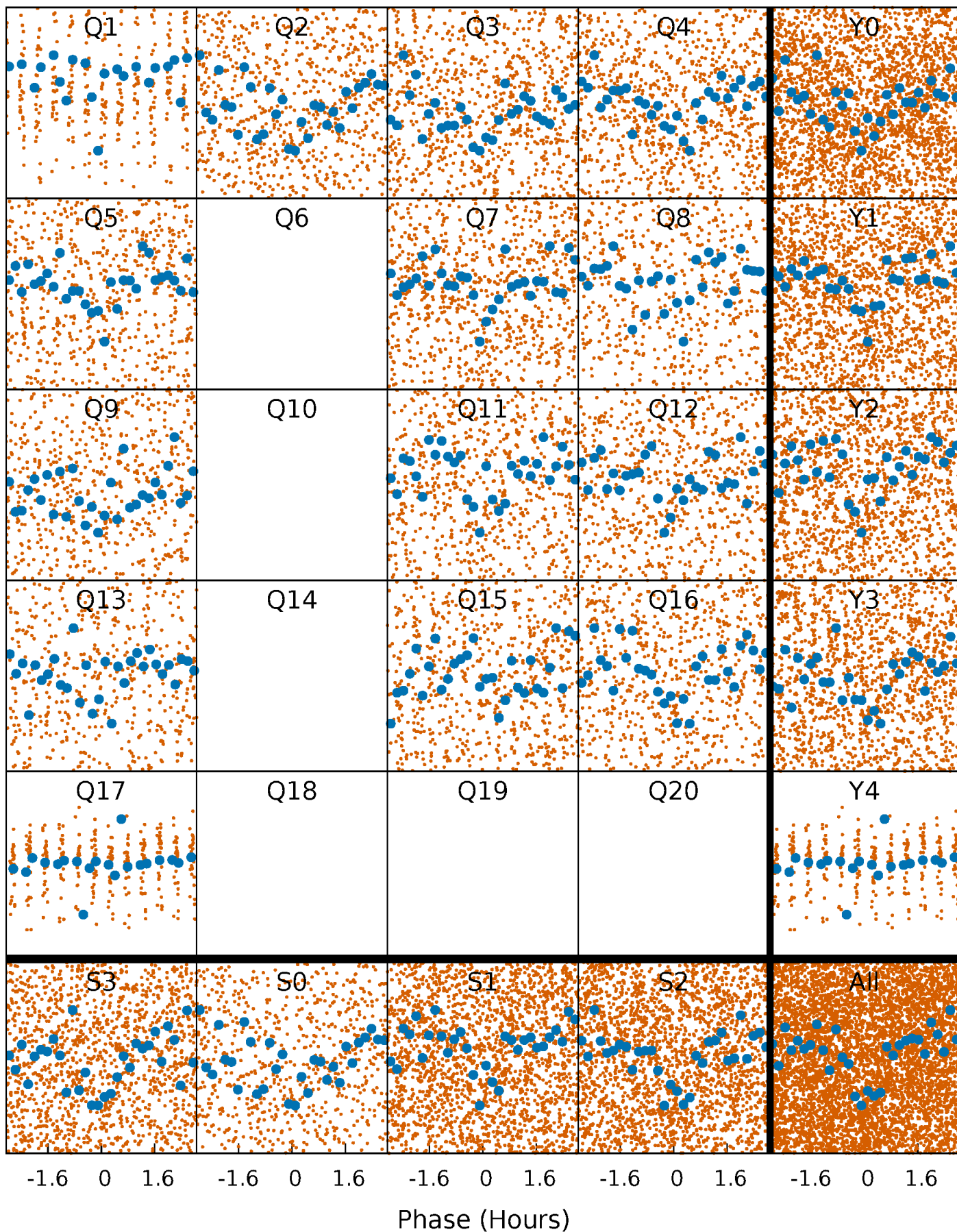


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

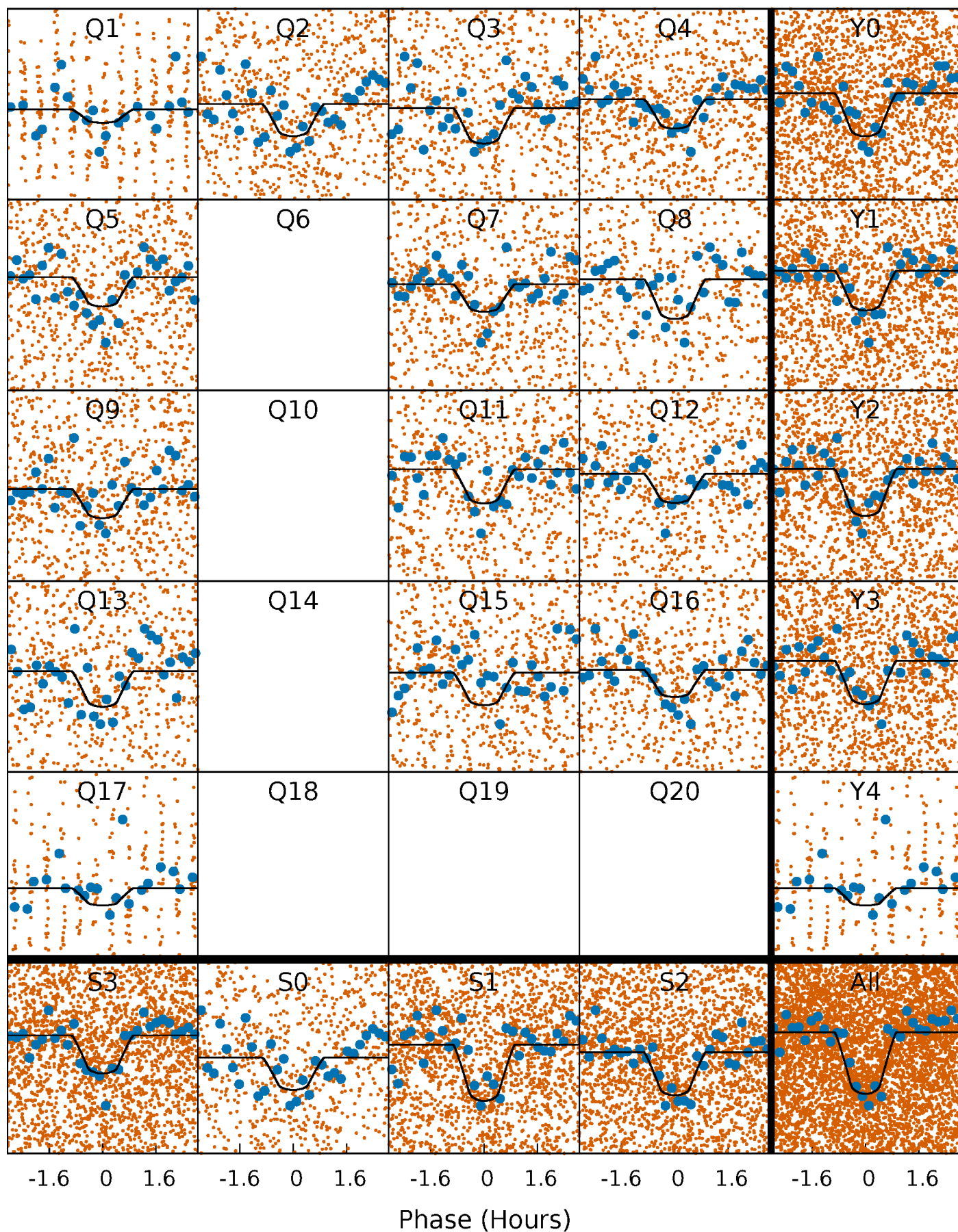
TCE 003130548-02   P= 0.878852 Days    $T_0=131.935494$  (BKJD)





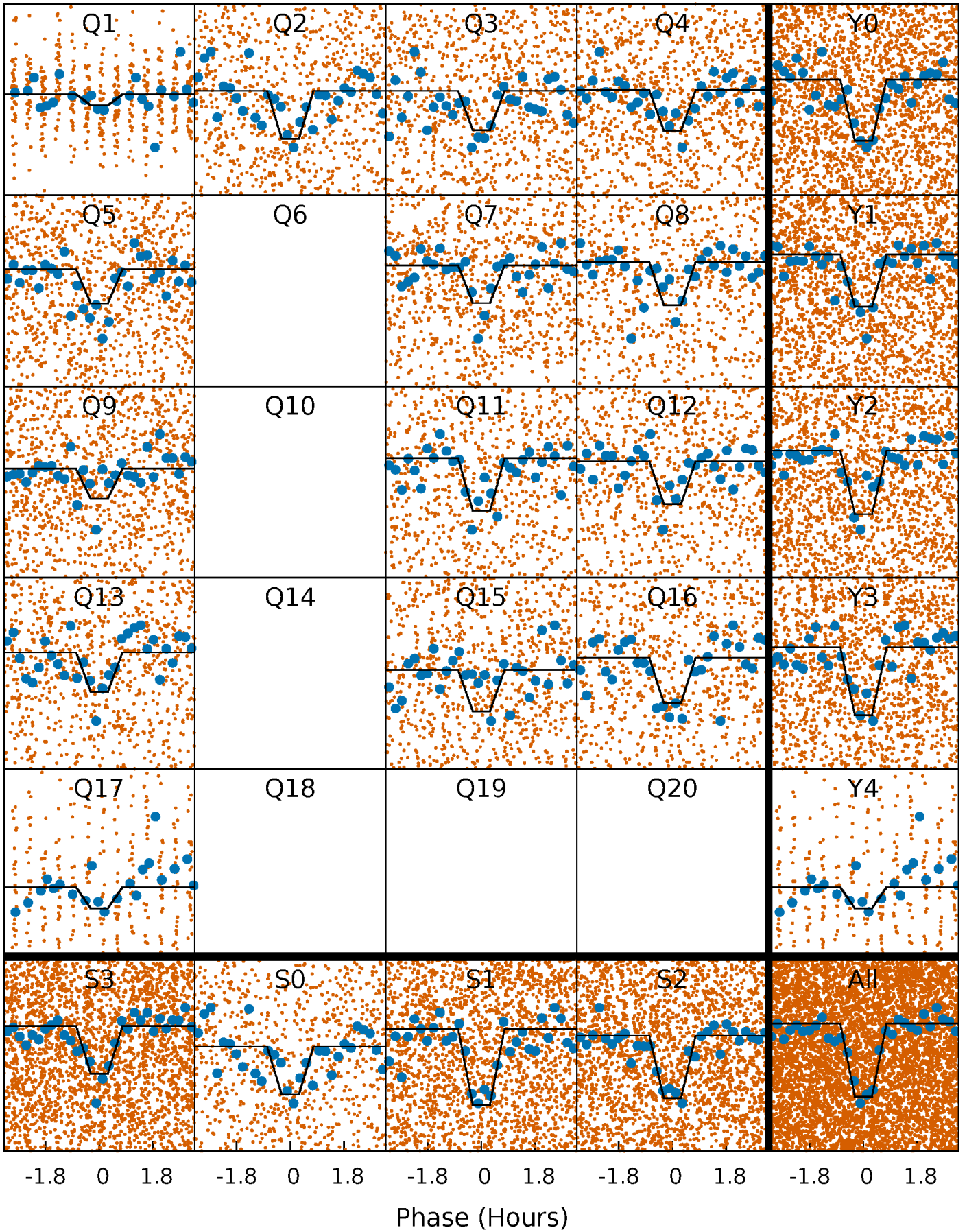
# DV Quarter-Phased Transit Curves

TCE 003130548-02 P= 0.878852 Days  $T_0=131.935494$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

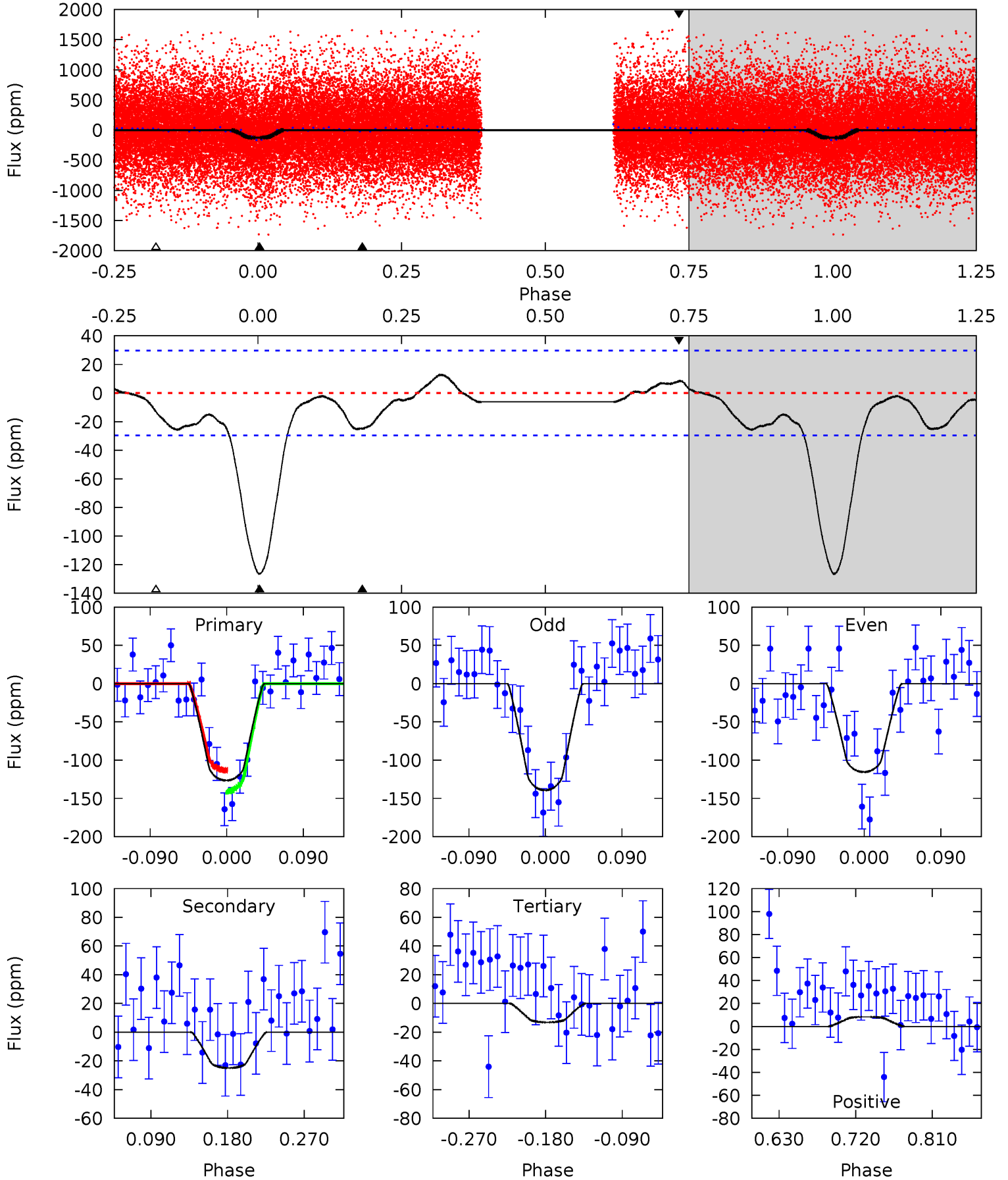
TCE 003130548-02 P= 0.878857 Days  $T_0=131.934819$  (BKJD)



# DV Model-Shift Uniqueness Test

003130548-02, P = 0.878852 Days, E = 131.056642 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
19.6	3.86	2.03	1.29	4.59	1.70	1.67	17.5	18.3	1.83	2.57	1.85	0.97	0.09	2.14

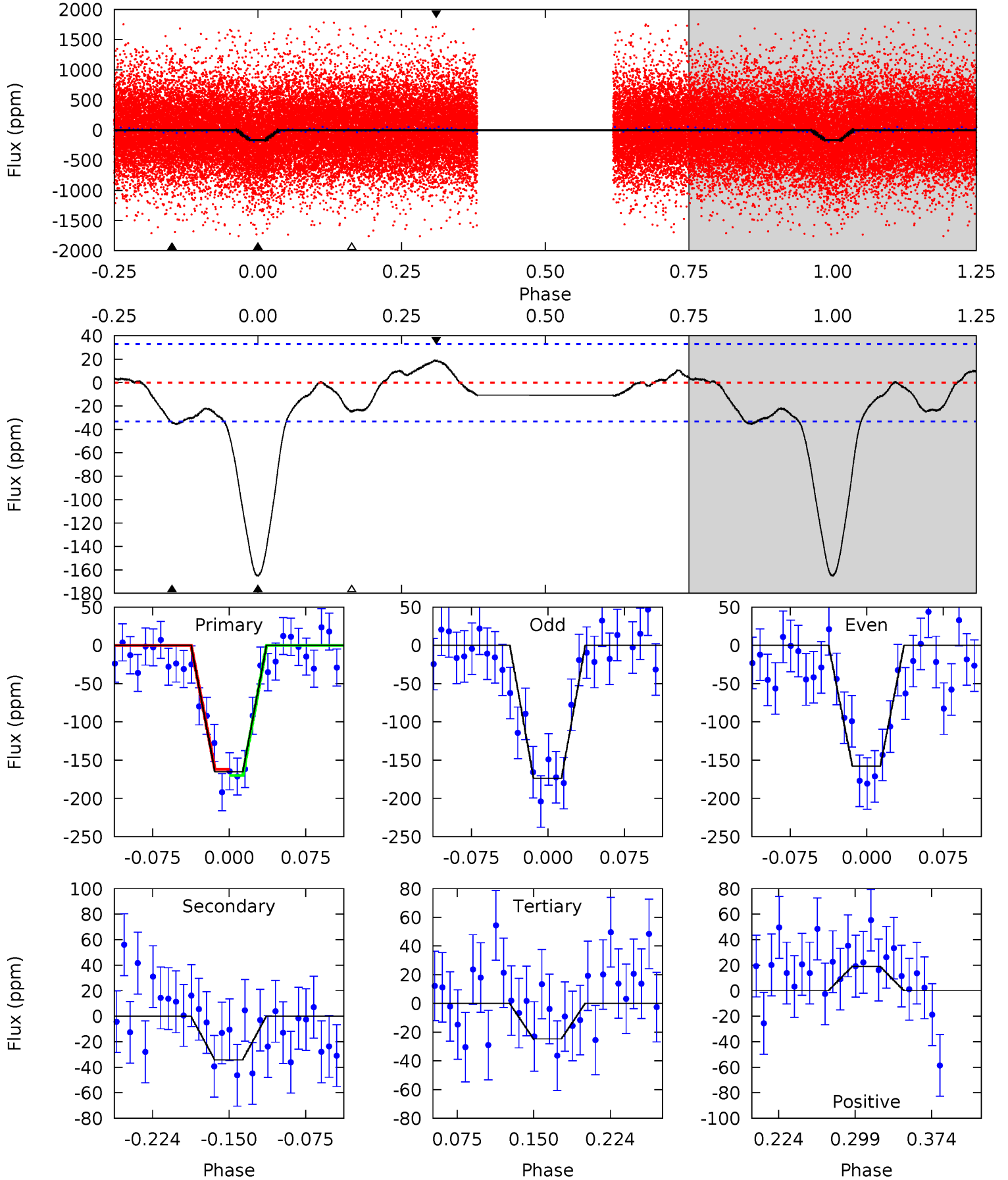




# Alt Model-Shift Uniqueness Test

003130548-02, P = 0.878857 Days, E = 131.055962 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
23.0	4.77	3.45	2.65	4.63	1.78	1.53	19.6	20.4	1.32	2.12	1.12	0.98	0.10	0.56



### Stellar Parameters For KIC 003130548

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5727^{+155}_{-172}$	$4.438^{+0.101}_{-0.174}$	$-0.220^{+0.300}_{-0.300}$	$0.937^{+0.248}_{-0.134}$	$0.877^{+0.120}_{-0.080}$	$1.502^{+0.662}_{-0.742}$
	+3%/-3%	+2%/-4%	+136%/-136%	+26%/-14%	+14%/-9%	+44%/-49%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 003130548-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-25 \pm 6$	$1.29^{+0.67}_{-0.62}$	$2625^{+160}_{-131}$	$3840^{+1193}_{-593}$	$2.350^{+6.745}_{-1.357}$
Alt.	$-34 \pm 7$	$1.35^{+0.70}_{-0.61}$	$2628^{+189}_{-124}$	$4034^{+1240}_{-602}$	$2.968^{+7.596}_{-1.655}$

$T_{max}$  = 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

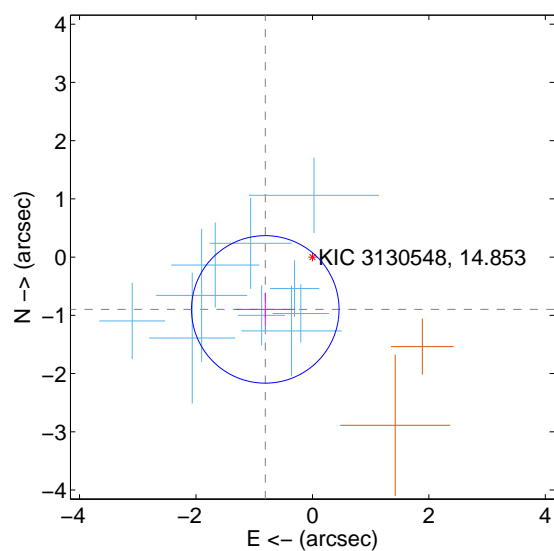
Supplemental centroid analysis for 003130548-02. Kepler magnitude: 14.85. Transit SNR 14.16

There are 10 quarters with good PRF difference image offsets

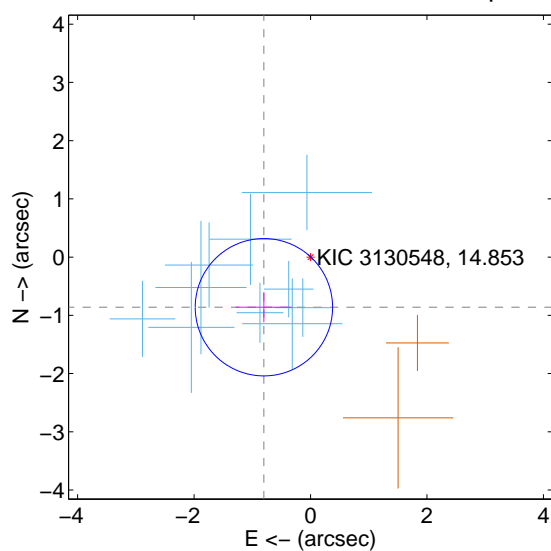
The direct PRF centroid is offset from the target star catalog position by about 0.08 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.209 \pm 0.422$	2.86	$0.810 \pm 0.509$	$-0.898 \pm 0.289$
PRF-fit source offset from KIC position	$1.176 \pm 0.393$	2.99	$0.801 \pm 0.486$	$-0.861 \pm 0.259$
photometric centroid source offset	$0.48 \pm 0.99$	0.48	$0.18 \pm 1.07$	$-0.44 \pm 0.98$

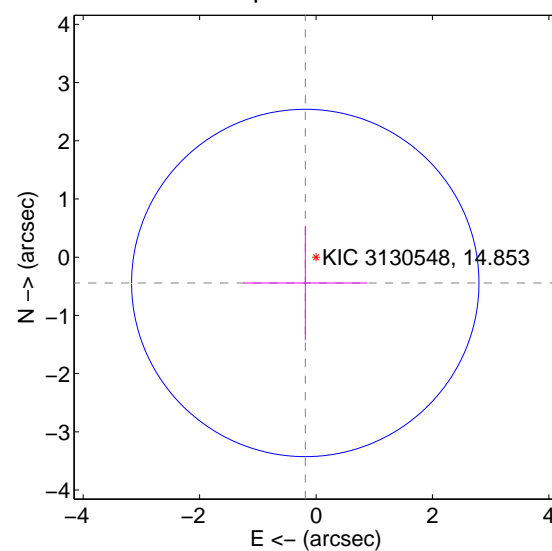
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

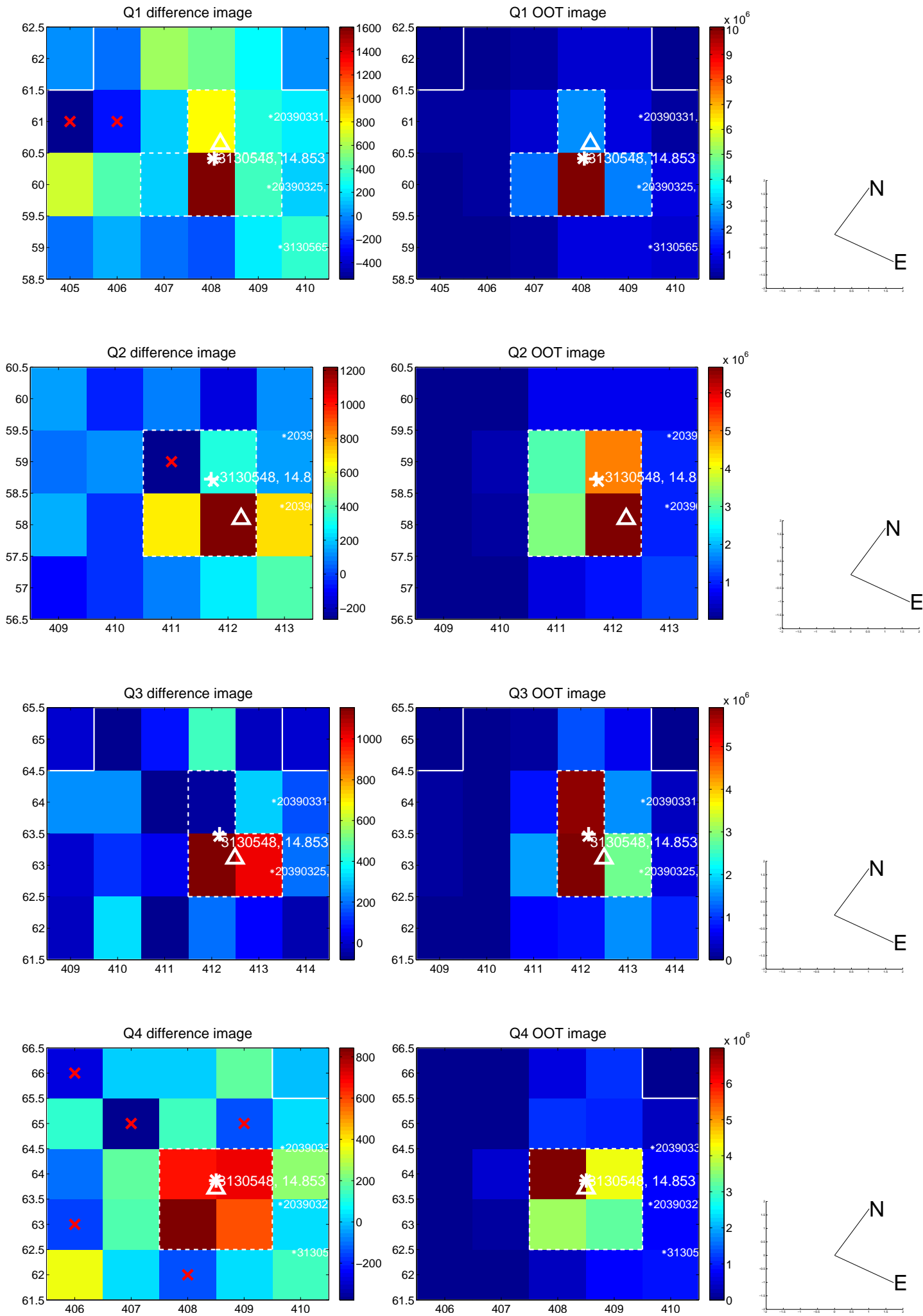


offset from photometric centroids

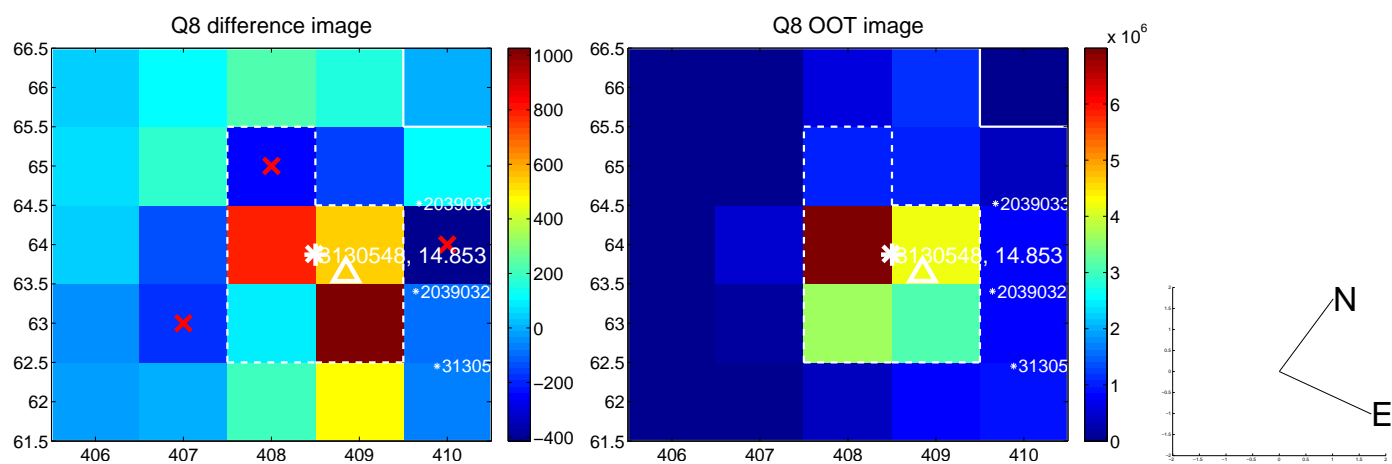
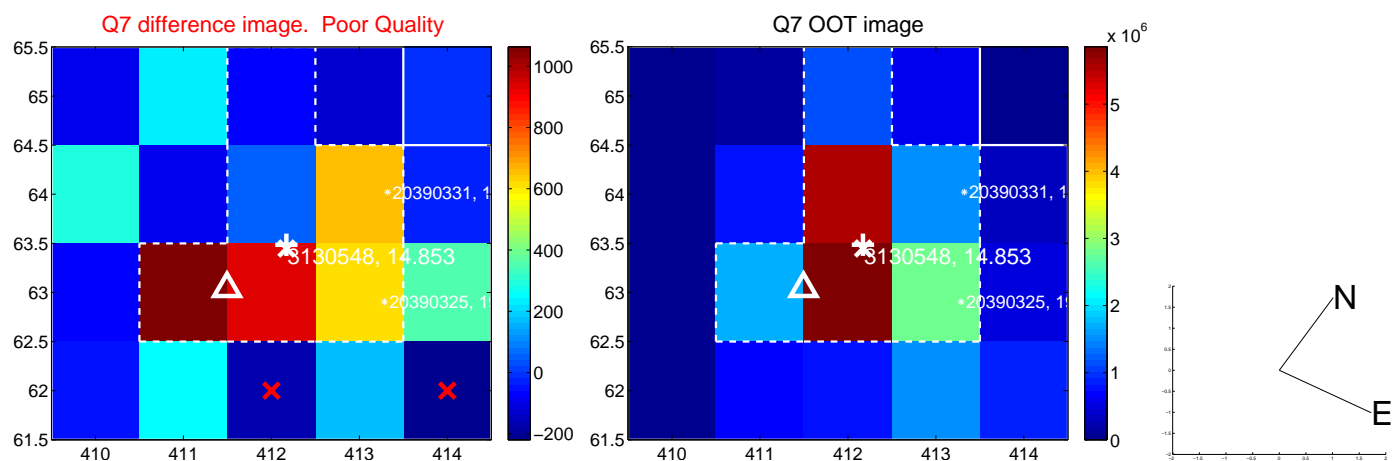
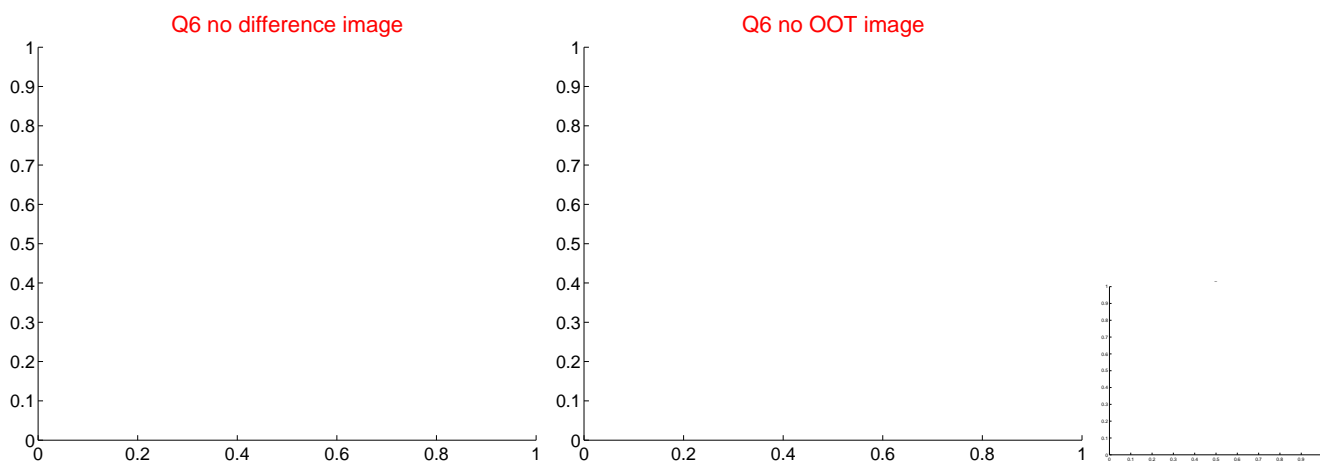
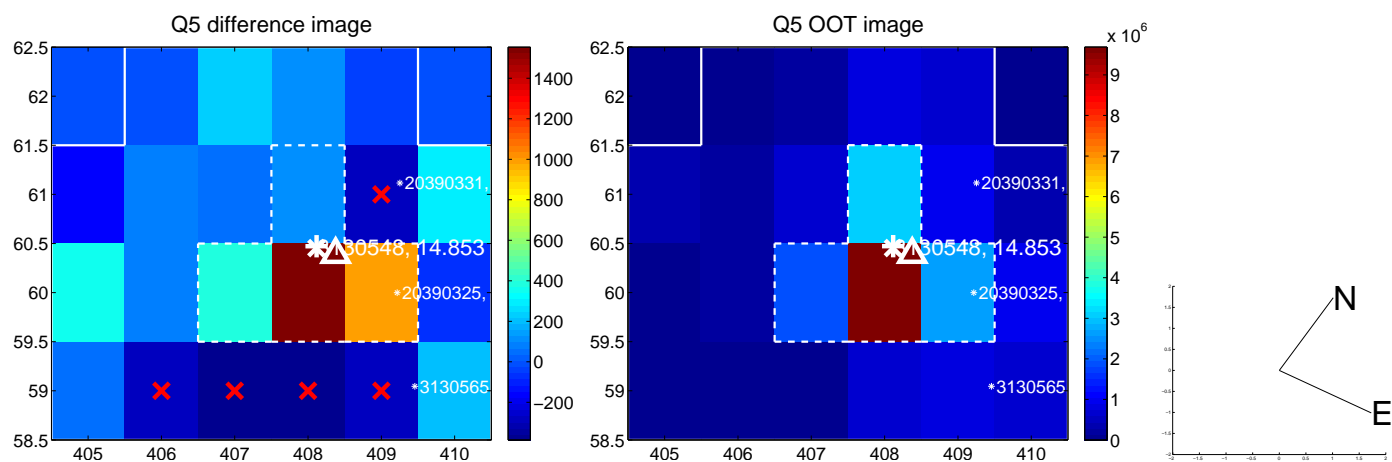


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

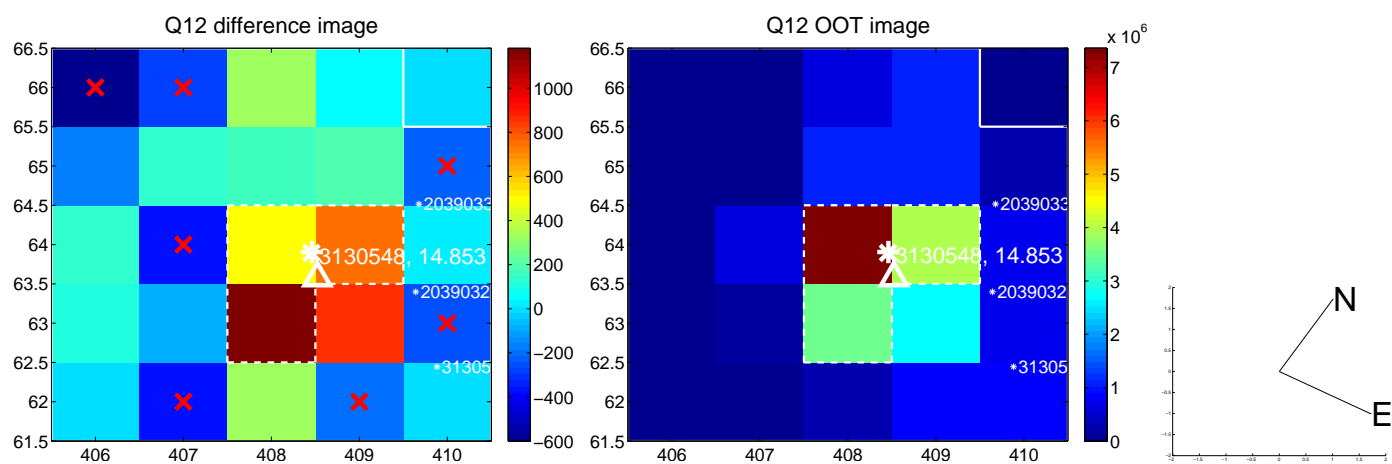
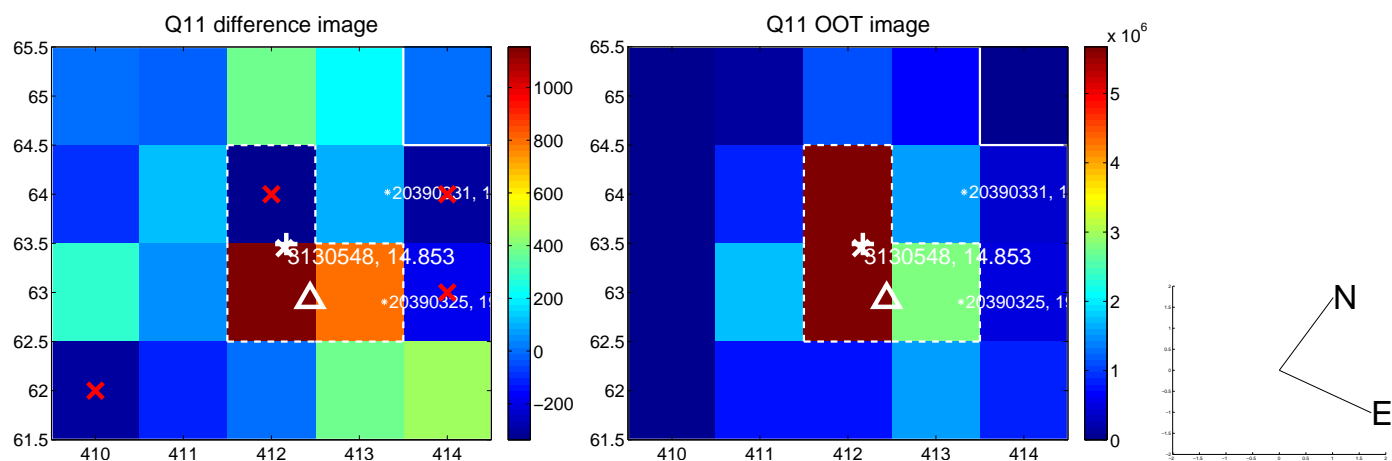
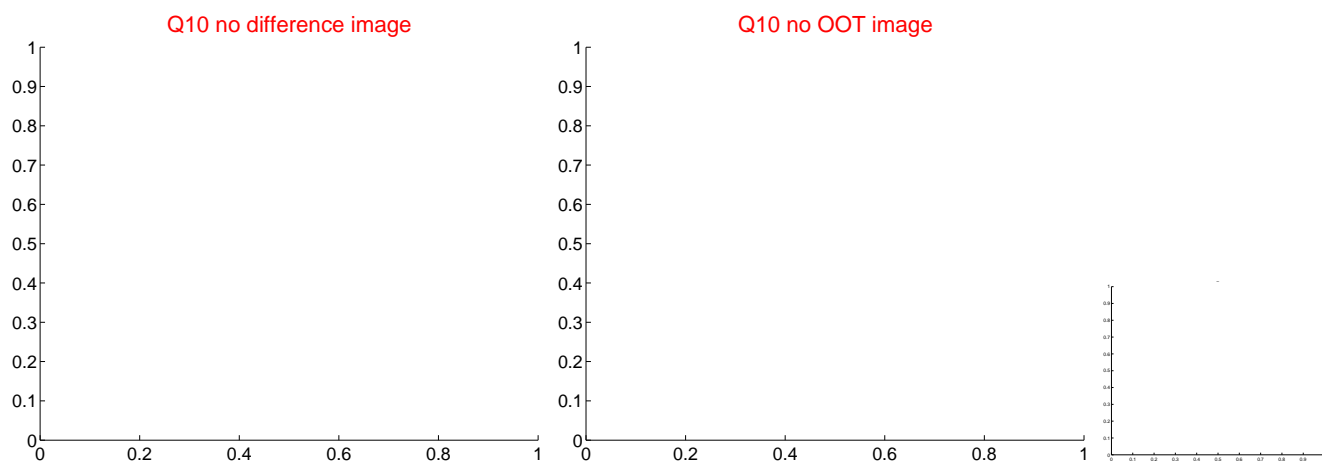
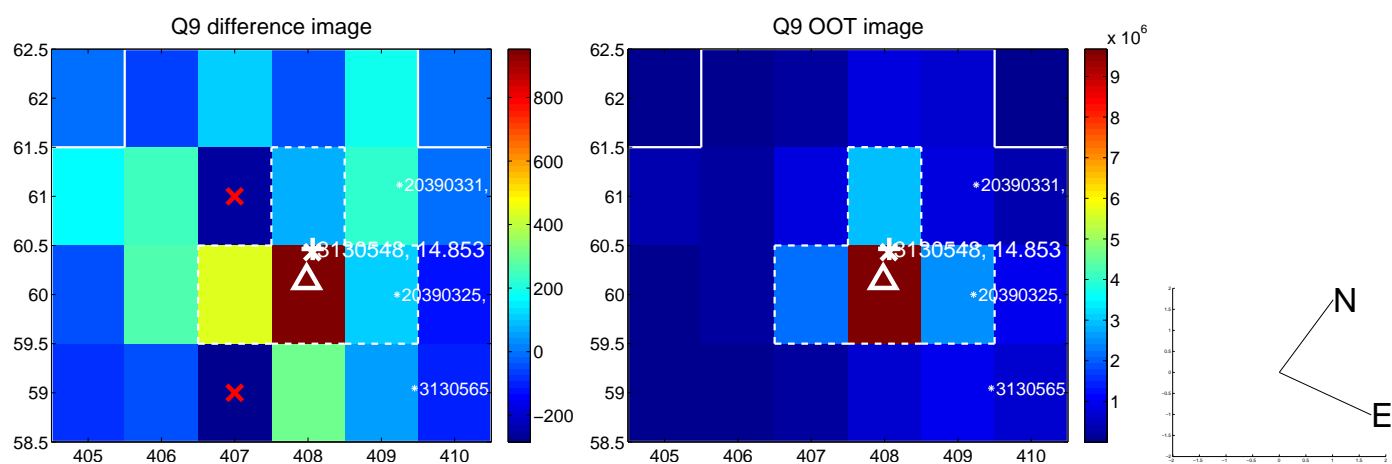
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



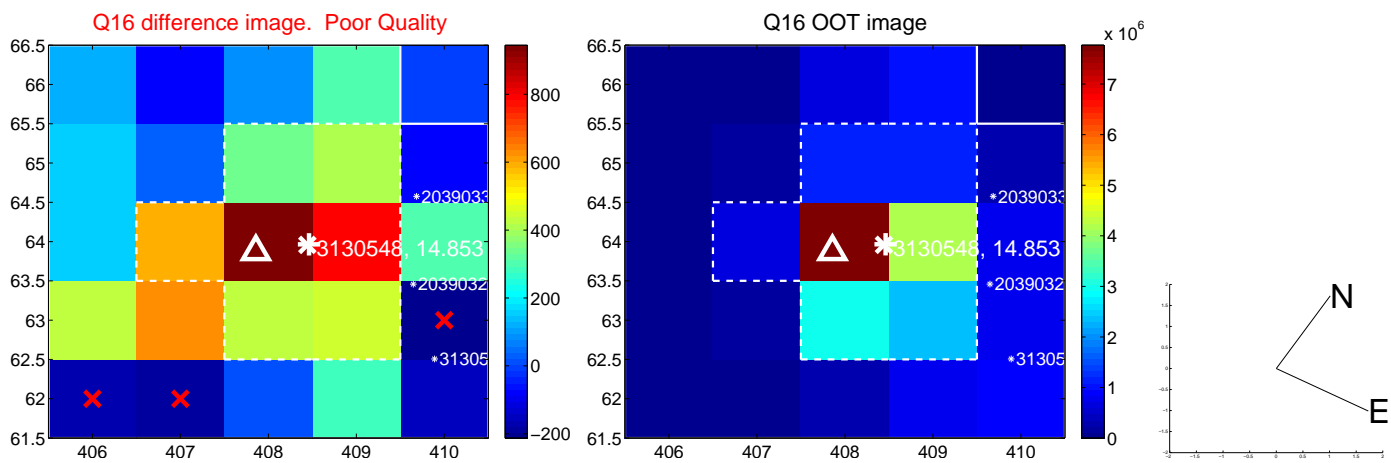
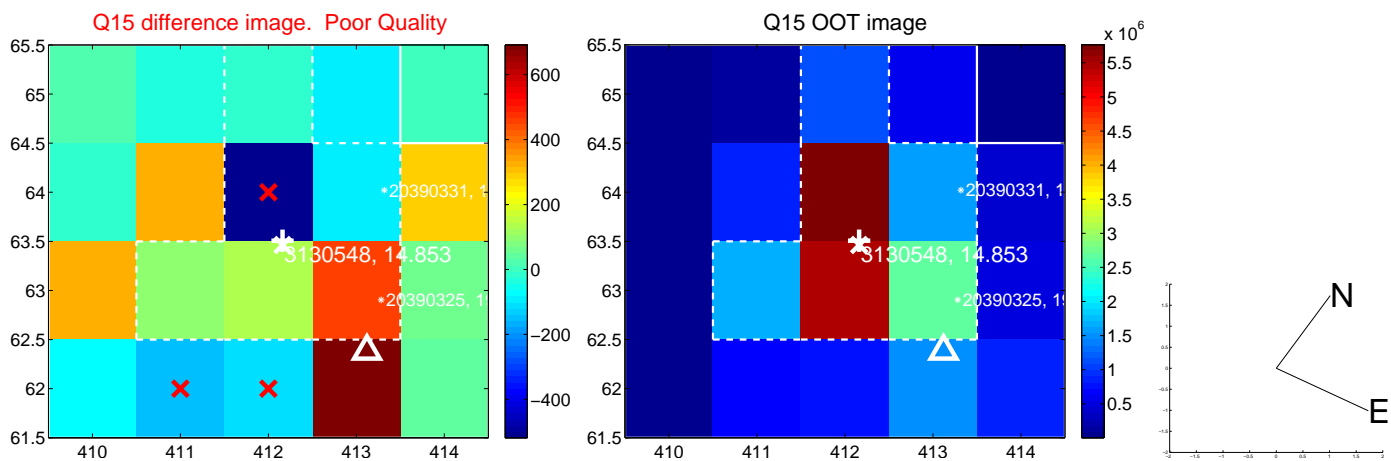
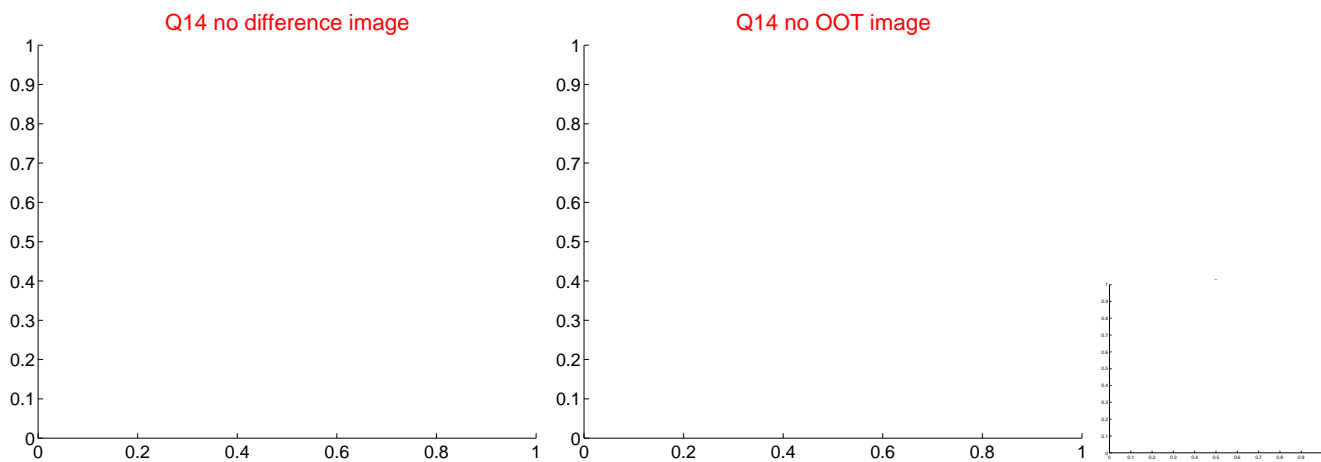
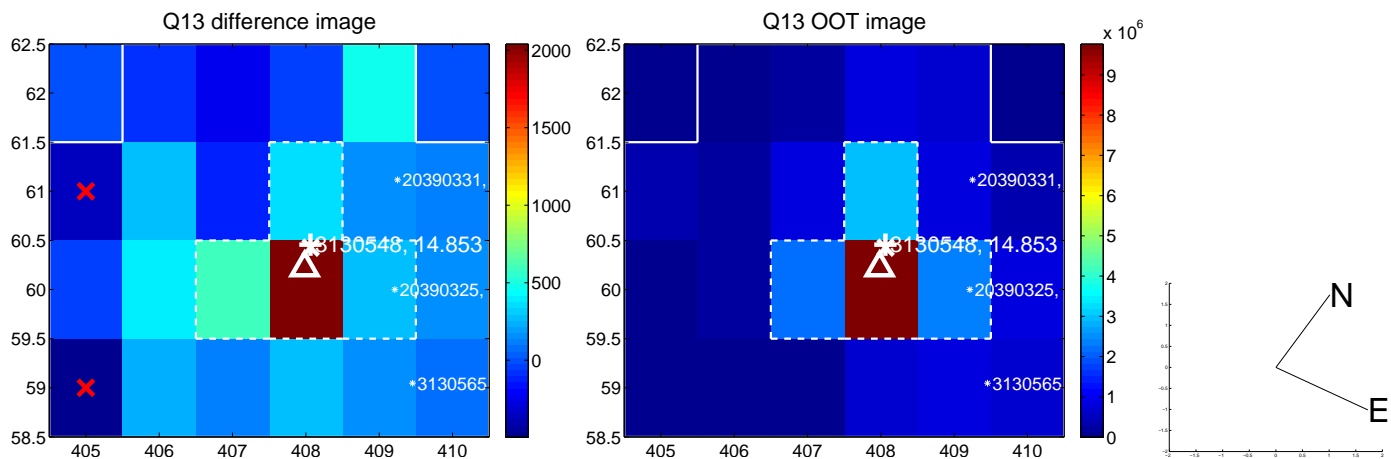
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

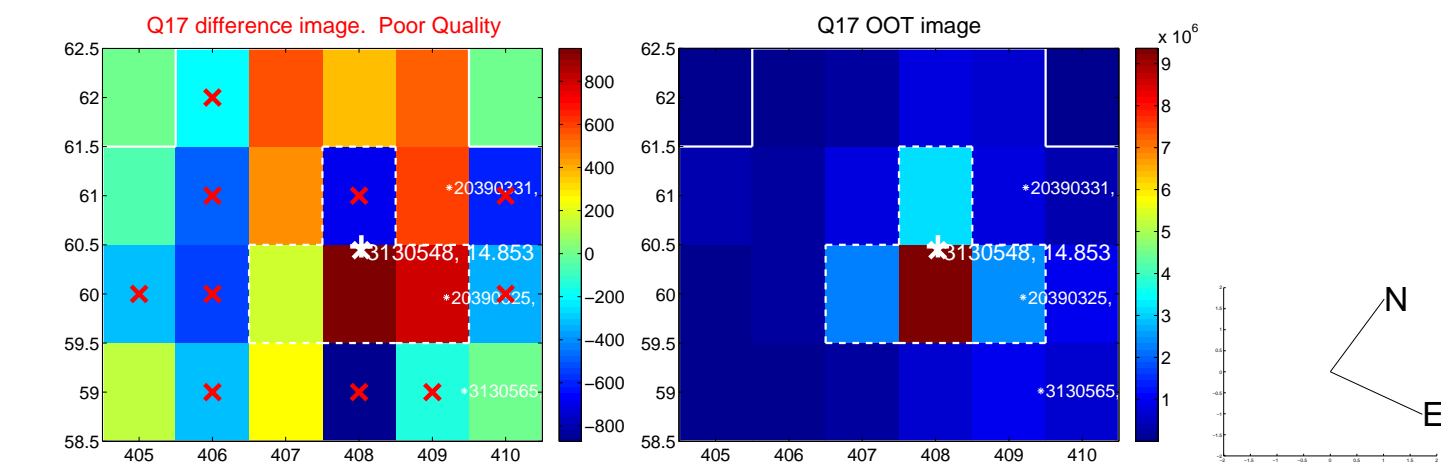


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

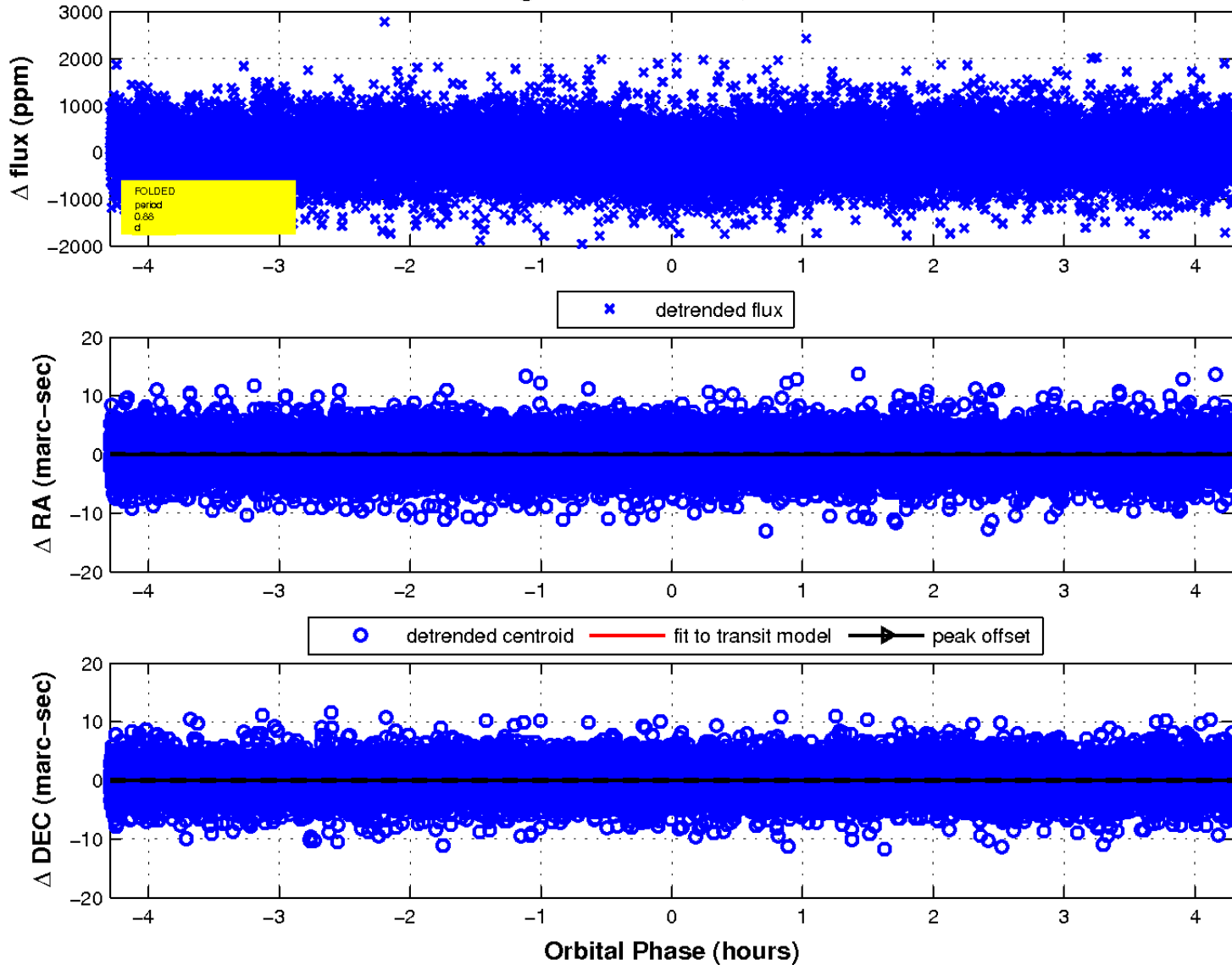




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



fluxWeightedCentroids, Planet 2 of 3



UKIRT Image

