

# KIC 008240123

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008240123-01	OBS	3826.01	2.301120	132.218080	1199.3	4.554	99.0	61.4	0.85	5641	4.10	585.26
008240123-02	OBS	No	2.301214	133.325777	1119.6	3.000	9.3	-1.0	0.85	5641	2.81	585.22

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008240123-01	OBS	FP	0.00	0	1	1	1	HAS_SEC_TCE—CENT_RESOLVED_OFFSET—EPHEM_MATCH
008240123-02	OBS	FP	0.00	1	1	0	1	IS_SEC_TCE—CENT_NOFITS—EPHEM_MATCH

**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 008240123-01

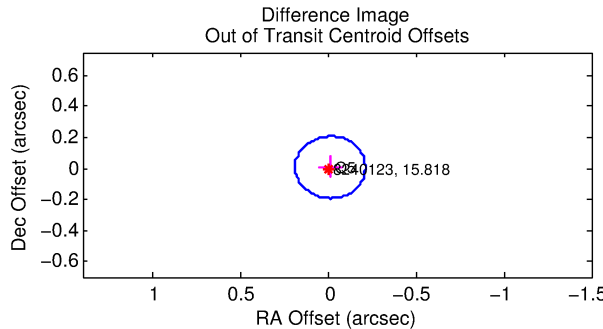
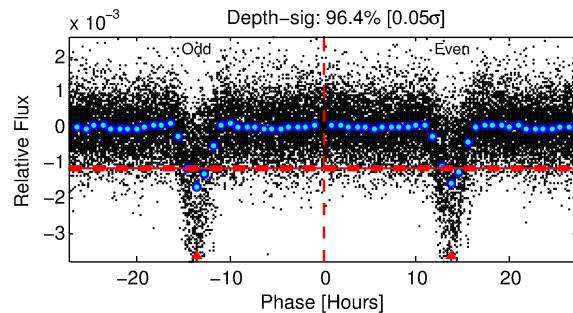
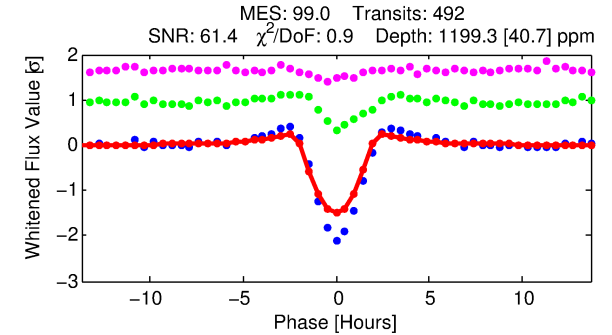
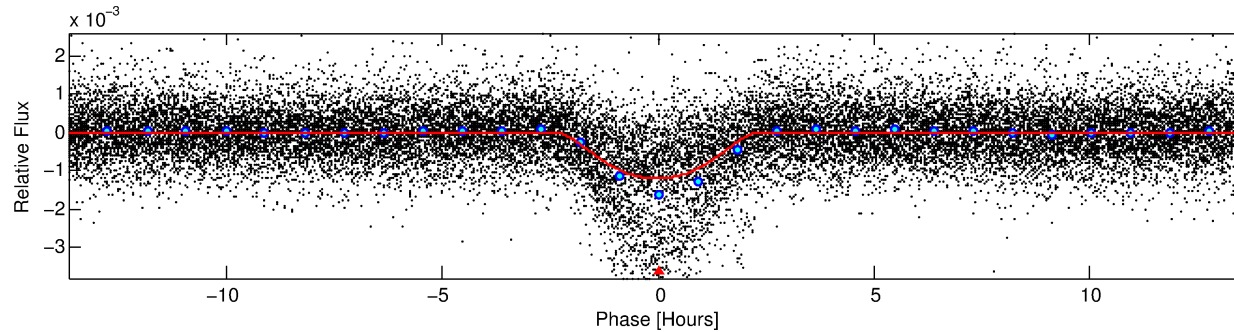
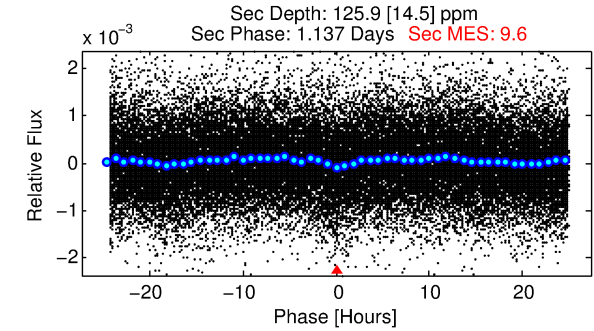
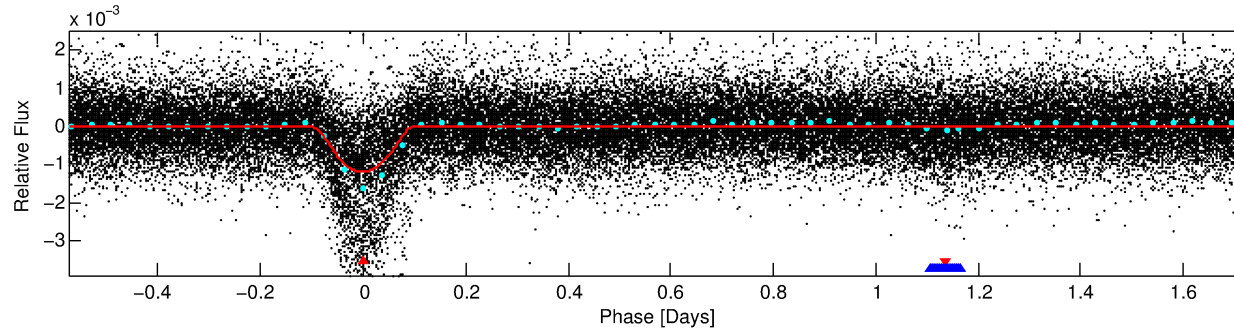
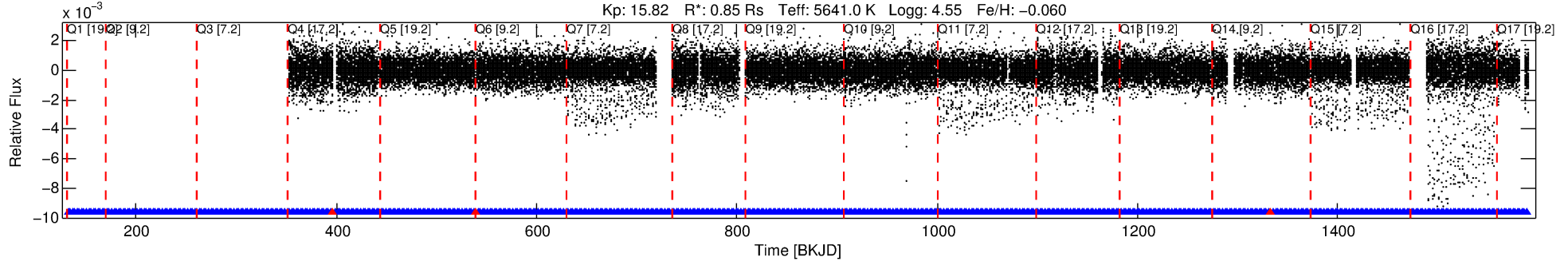
TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ( $''$ )	$\Delta$ Row	$\Delta$ Col	$m_2$	$m_1$	$D_2/D_1$	Mechanism	Flag	$\sigma_P$	$\sigma_T$
008240123-01	8240123	008240109-pri	8240109	1:1	11.7	2	2	13.49	15.82	94.16	Direct-PRF	0	2.00	1.52

**Notes:**  $P_1:P_2$  is the period ratio. Dist is the distance in arcseconds.  $\Delta$ Row and  $\Delta$ Col are the number of pixels apart in row and column.  $m_2$  and  $m_1$  are the magnitudes of the parent and child.  $D_2/D_1$  is the parent's transit depth divided by the child's.  $\sigma_P$  and  $\sigma_T$  are the significance of the match in period and epoch. For a match to be considered significant  $\sigma_P < 5.0$  and  $\sigma_T < 5.0$ . Matches which have  $\sigma_P$  and  $\sigma_T$  very close to this cutoff should receive extra scrutiny, especially if the period ratio is very large.

# DV One-Page Summary

KIC: 8240123 Candidate: 1 of 2 Period: 2.301 d  
KOI: K03826 Corr: No Ephemeris Match

Kp: 15.82 R\*: 0.85 Rs Teff: 5641.0 K Logg: 4.55 Fe/H: -0.060



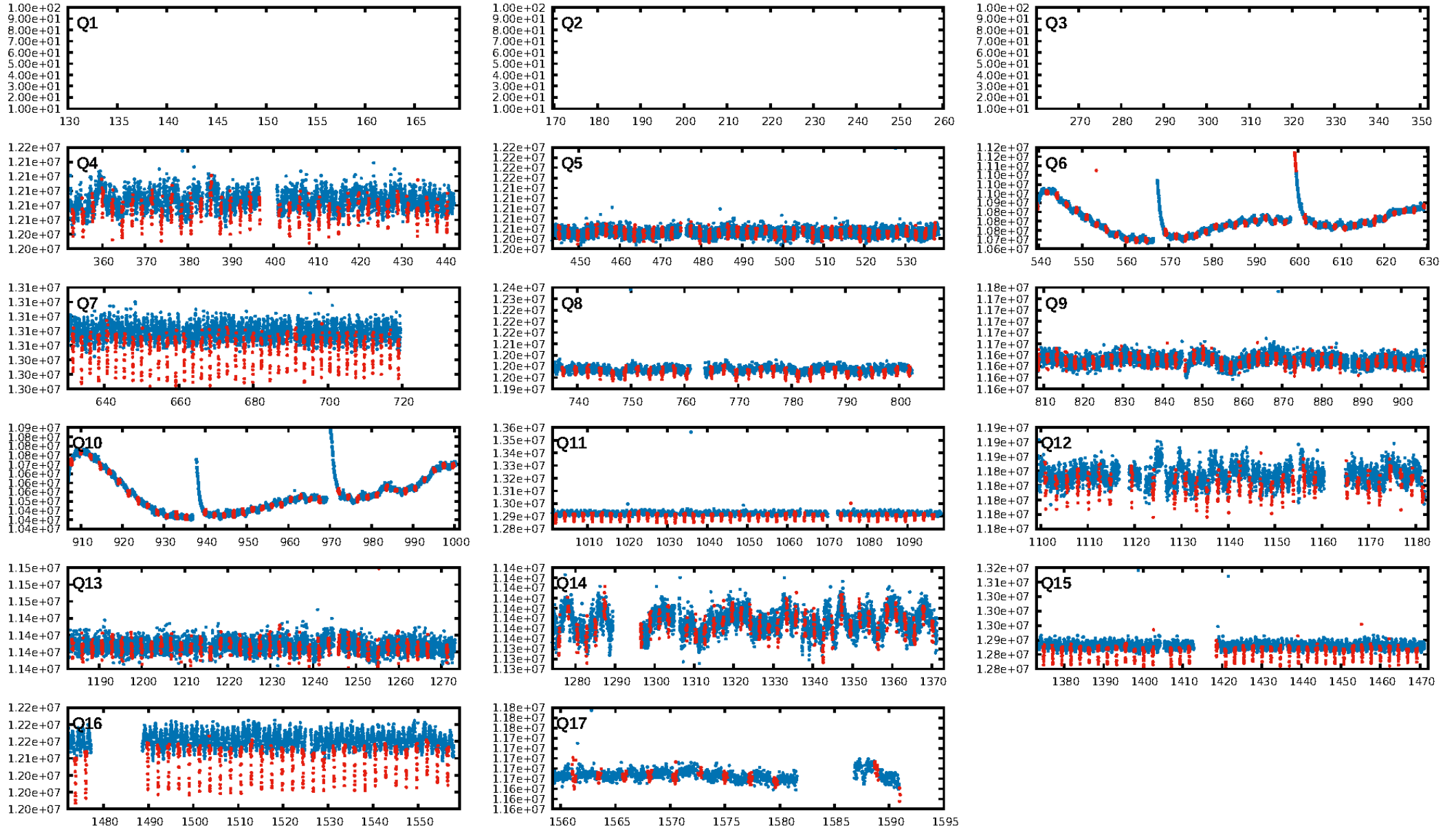
## DV Fit Results:

Period = 2.30112 [0.00000] d  
Epoch = 132.2181 [0.0014] BKJD  
Rp/R\* = 0.0442 [0.0039]  
a/R\* = 1.81 [0.07]  
b = 0.97 [0.01]  
Seff = 585.26 [223.44]  
Teq = 1254 [120] K  
Rp = 4.10 [1.25] Re  
a = 0.0335 [0.0082] AU  
Ag = 4.62 [1.92] [1.88σ]  
Teff = 2843 [177] K [7.42σ]

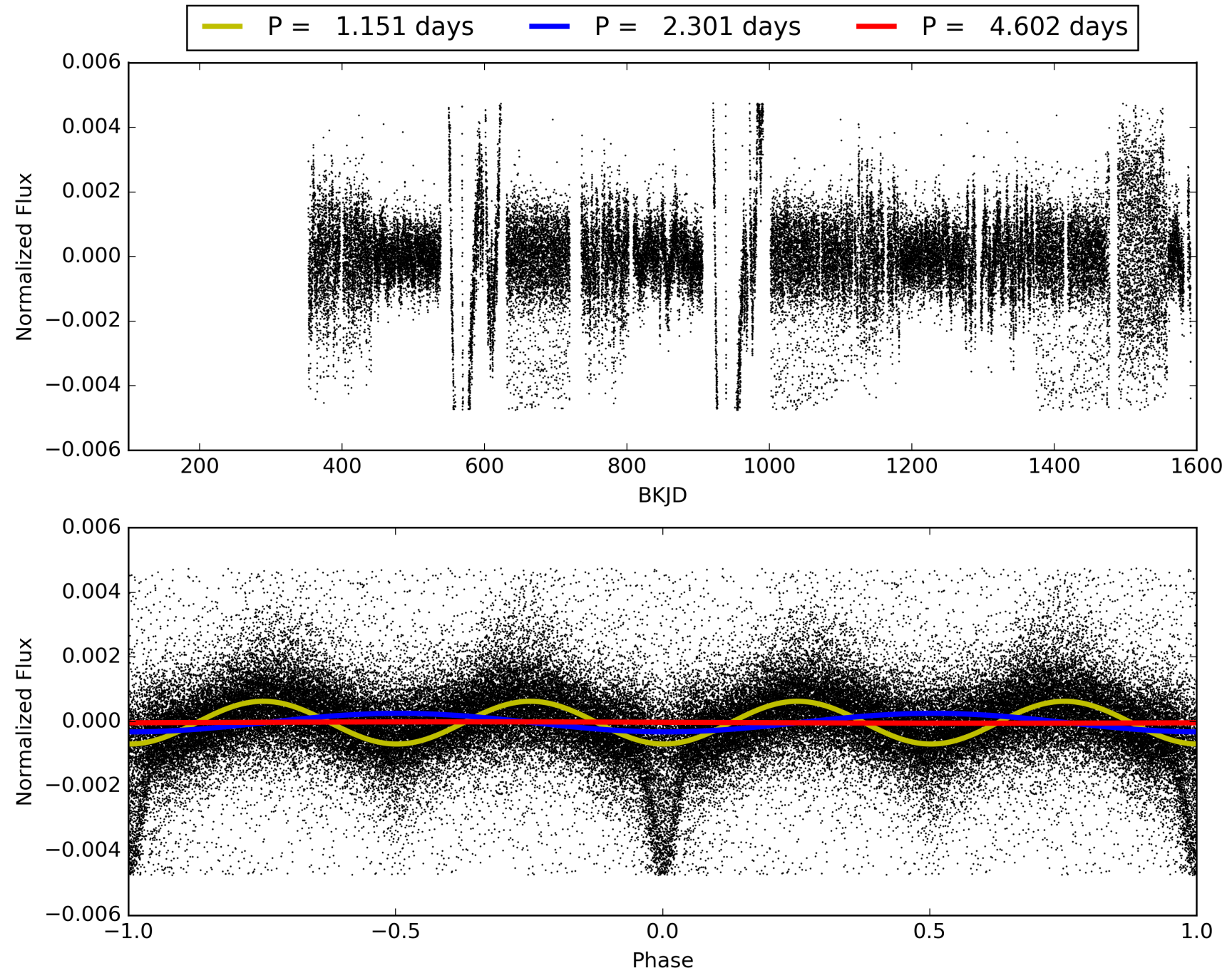
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 0.99 [479/482]  
GhostDiagnostic-chr: -0.588  
Centroid-sig: 0.0%  
Centroid-so: 63.543 arcsec [246.49σ]  
OotOffset-rm: 0.013 arcsec [0.20σ]  
KicOffset-rm: 11.398 arcsec [170.87σ]  
OotOffset-st: 0/0/0/1 [1]  
KicOffset-st: 0/0/0/1 [1]  
DiffImageQuality-fgm: 1.00 [1/1]  
DiffImageOverlap-fno: 1.00 [14/14]

# TCE 008240123-01, PDC Light Curves

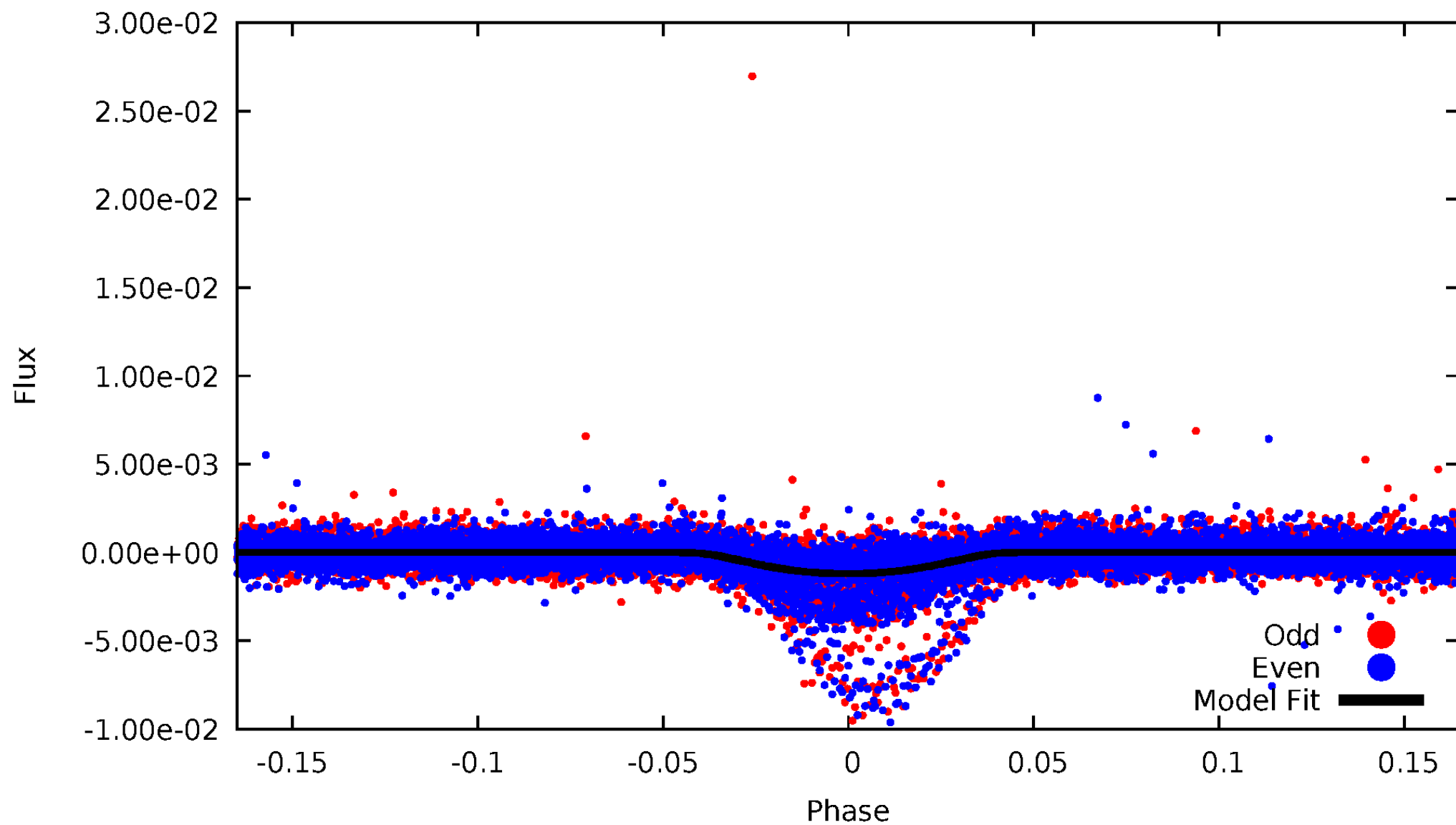


TCE 008240123-01



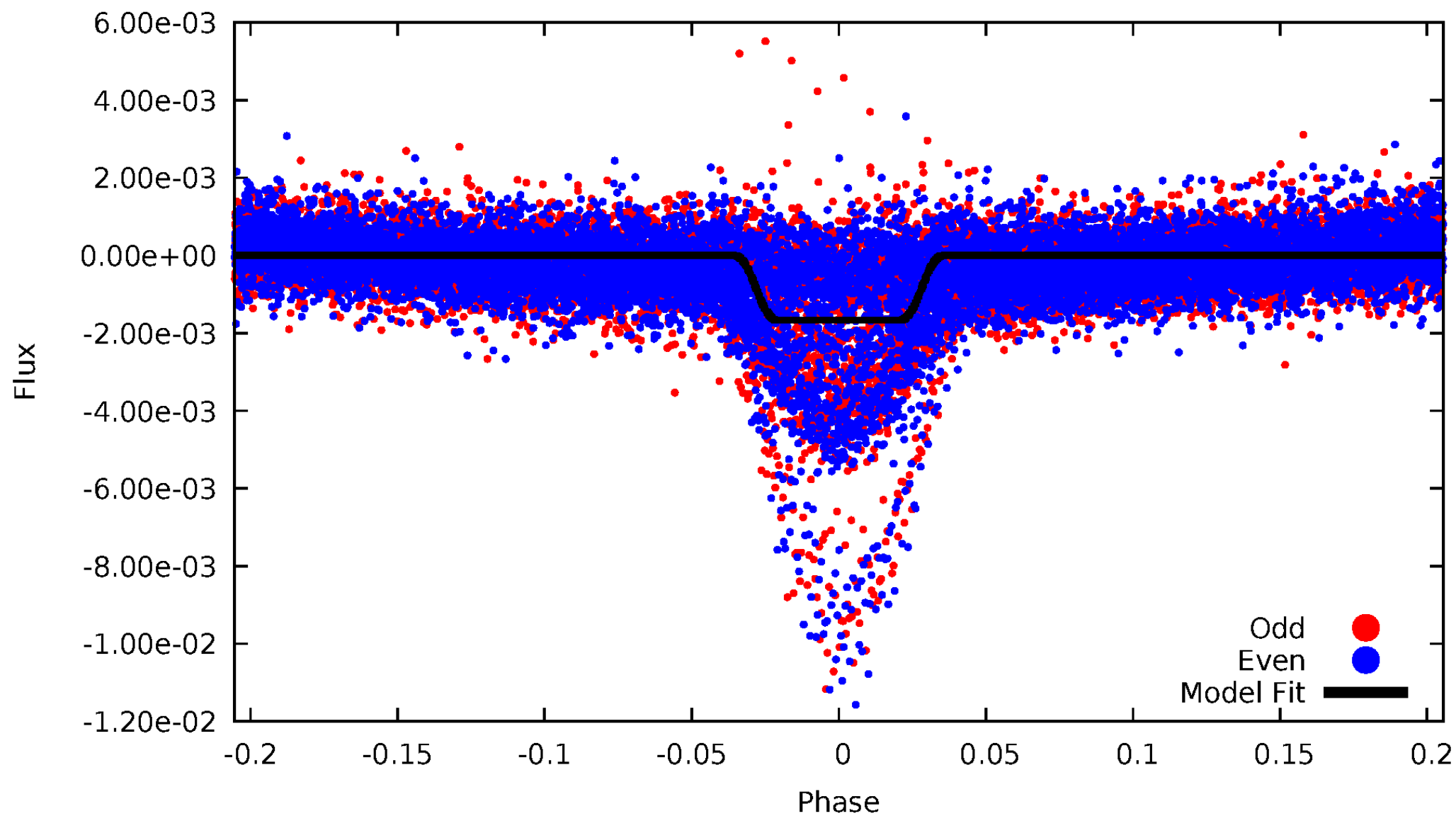
# DV Odd/Even

TCE 008240123-01



# ALT Odd/Even

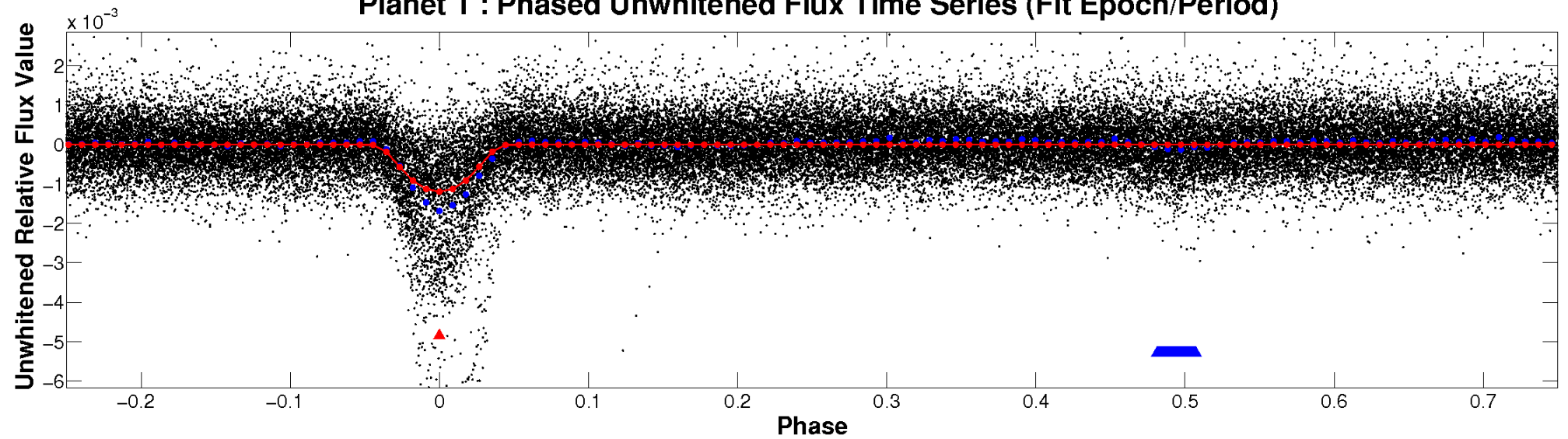
TCE 008240123-01



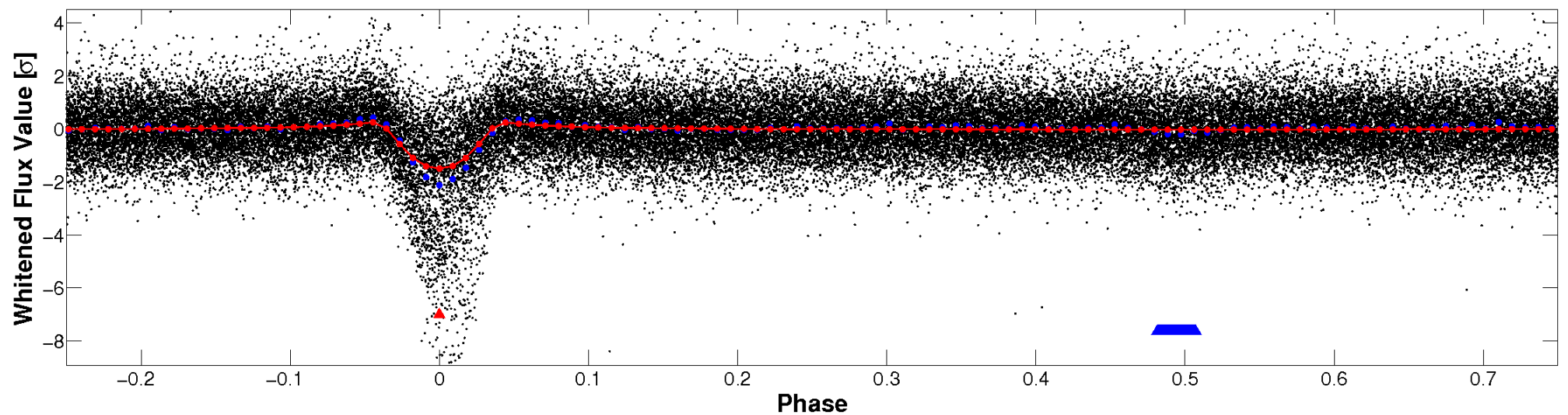


# Non-Whitened Vs. Whitened Light Curve

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

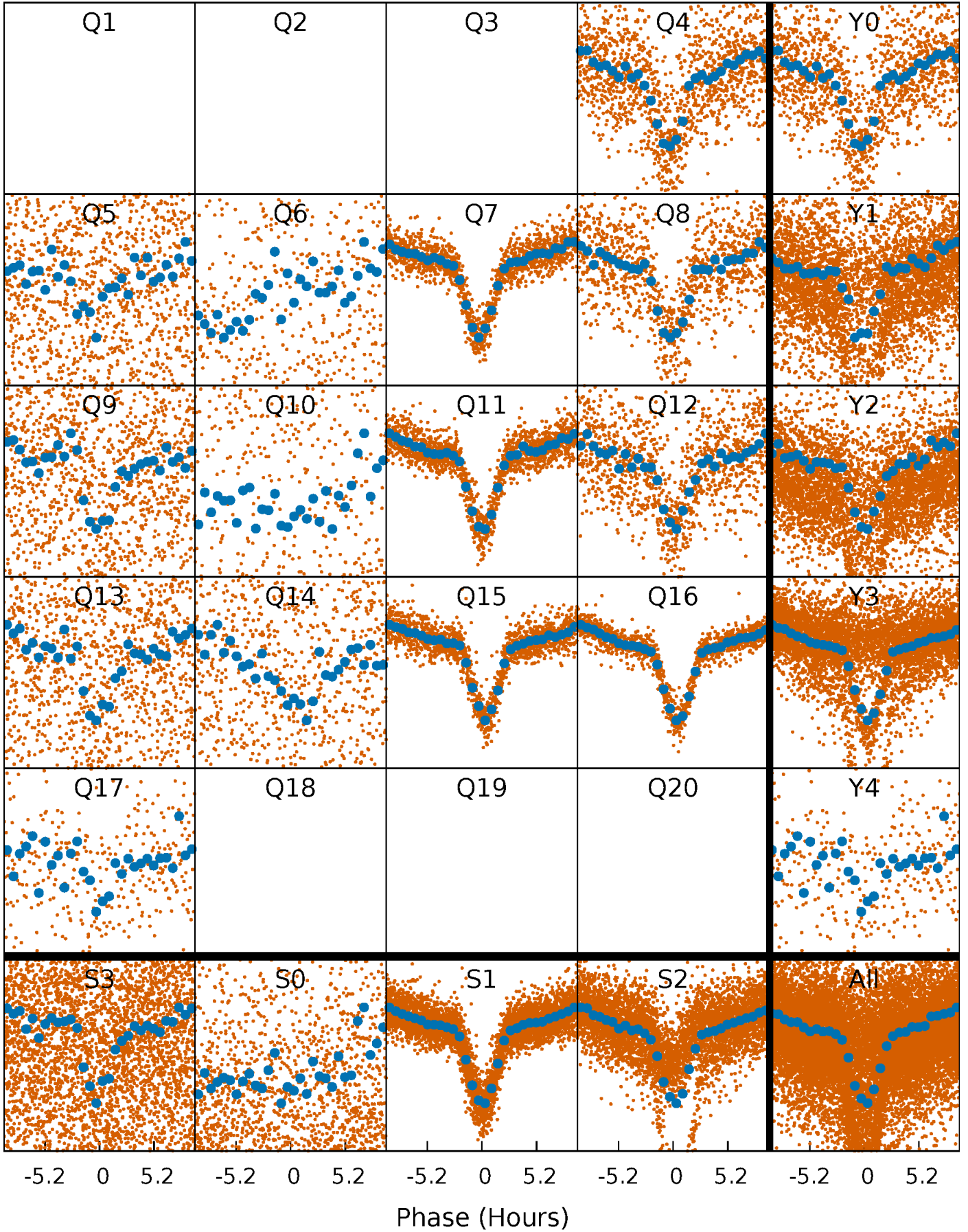


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

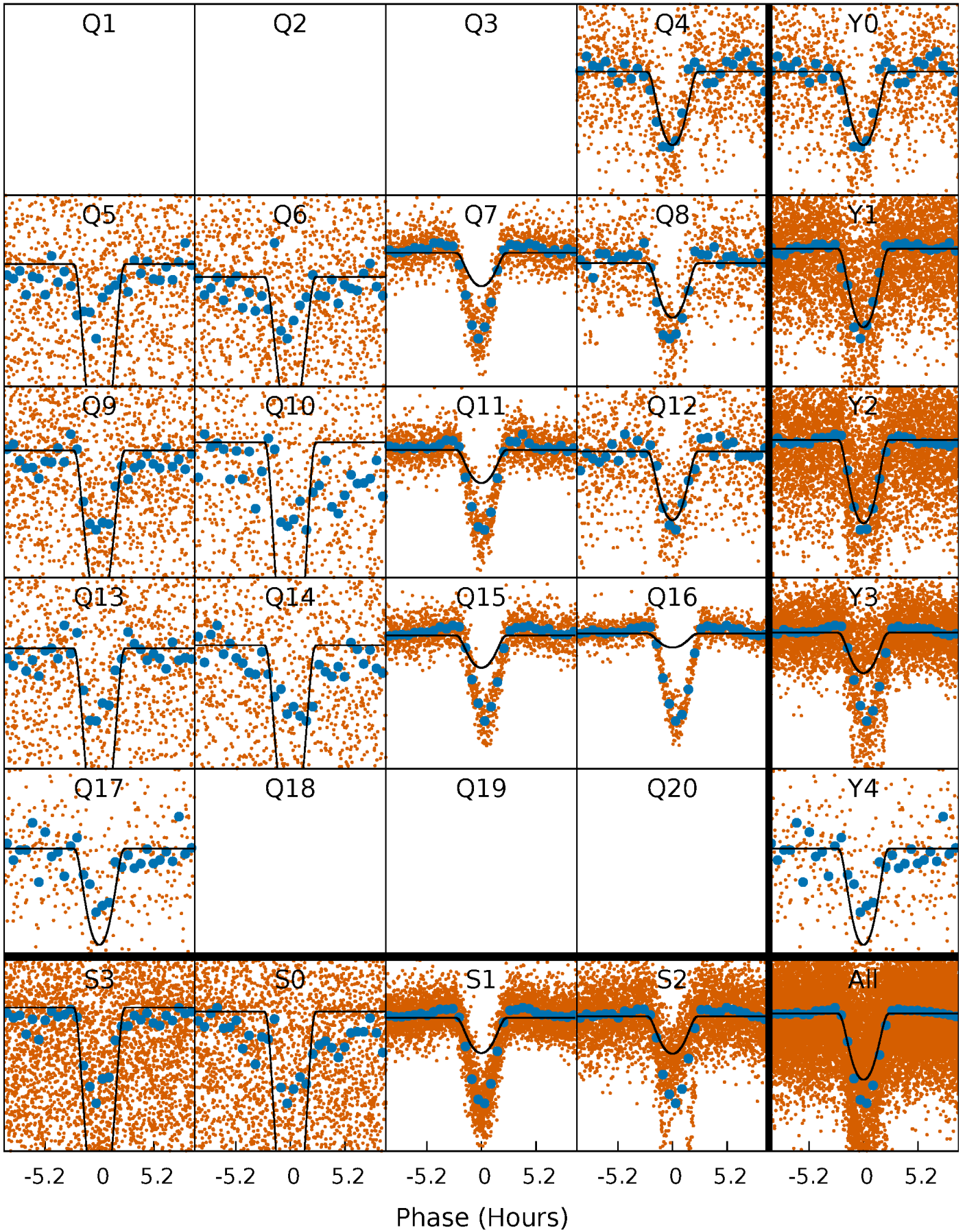
TCE 008240123-01 P= 2.301120 Days  $T_0=132.218080$  (BKJD)





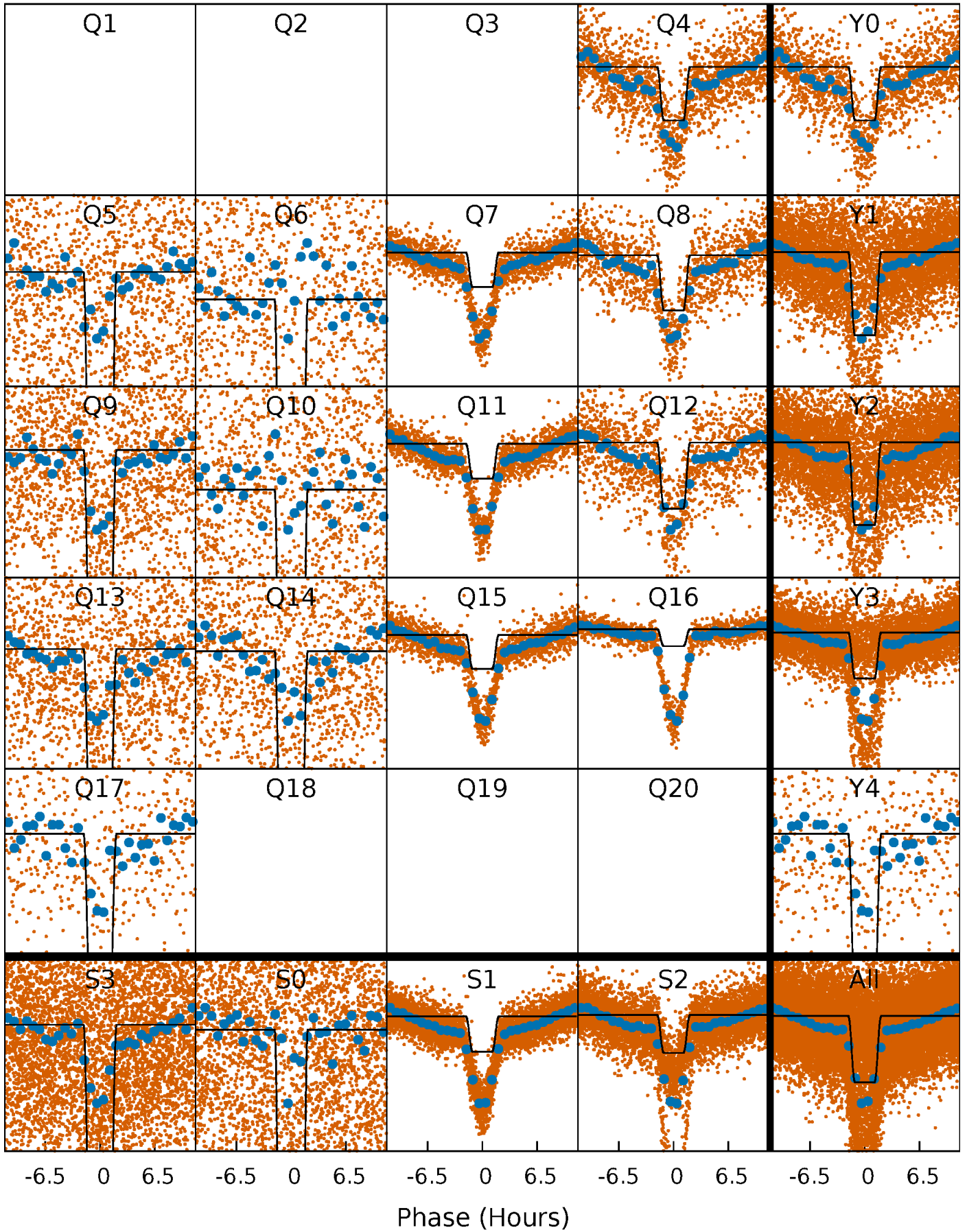
# DV Quarter-Phased Transit Curves

TCE 008240123-01 P= 2.301120 Days  $T_0=132.218080$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

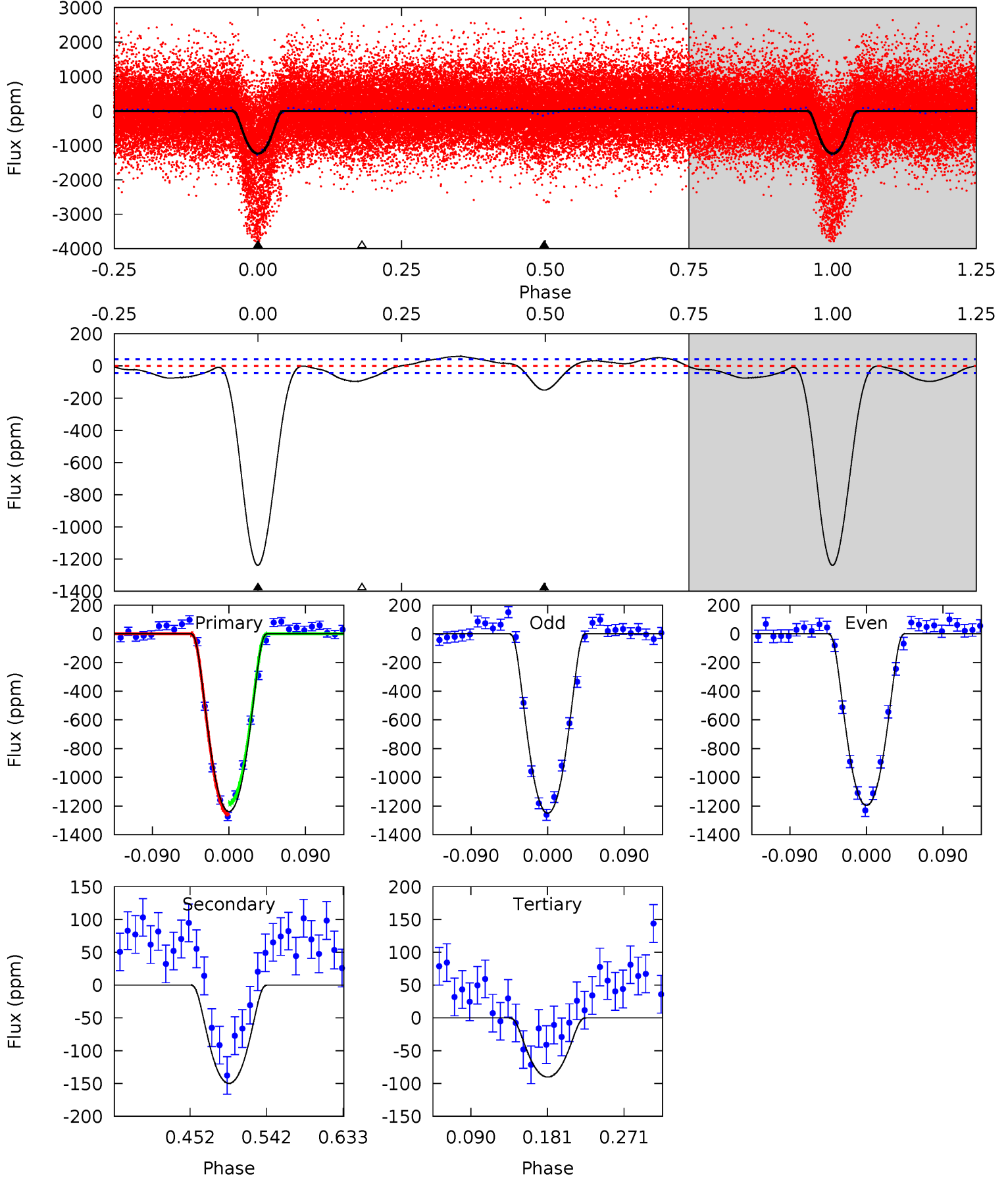
TCE 008240123-01 P= 2.301173 Days  $T_0=132.199509$  (BKJD)



# DV Model-Shift Uniqueness Test

008240123-01, P = 2.301120 Days, E = 132.218080 Days

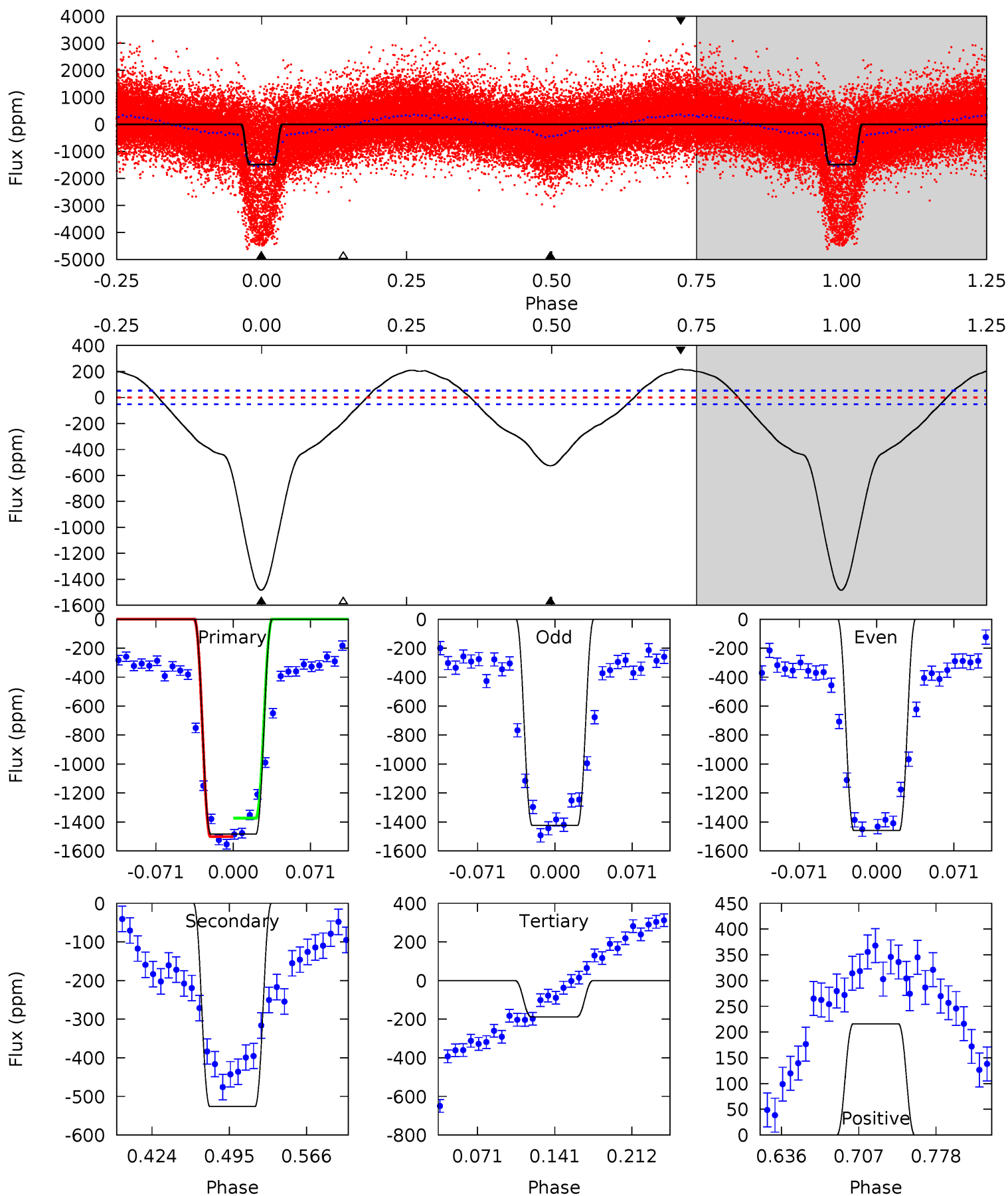
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
133.9	16.2	9.75	0	4.59	1.69	5.15	124.1	133.9	6.45	16.2	2.93	1.54	0.05	4.11



# Alt Model-Shift Uniqueness Test

008240123-01, P = 2.301173 Days, E = 132.199509 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
131.1	46.5	16.7	19.1	4.64	1.81	17.4	114.4	112.0	29.8	27.4	1.58	1.55	0.13	5.59



### Stellar Parameters For KIC 008240123

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5641^{+186}_{-186}$	$4.554^{+0.035}_{-0.196}$	$-0.060^{+0.300}_{-0.300}$	$0.850^{+0.248}_{-0.078}$	$0.944^{+0.094}_{-0.115}$	$2.168^{+0.405}_{-1.077}$
	+3%/-3%	+1%/-4%	+500%/-500%	+29%/-9%	+10%/-12%	+19%/-50%
Source	KIC0	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 008240123-01 / KOI 3826.01

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-150 \pm 9$	$4.30^{+0.72}_{-0.51}$	$1797^{+122}_{-86}$	$3423^{+136}_{-125}$	$4.905^{+1.408}_{-1.249}$
Alt.	$-526 \pm 11$	$3.97^{+0.63}_{-0.48}$	$1798^{+123}_{-86}$	$4408^{+211}_{-197}$	$21^{+5}_{-5}$

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



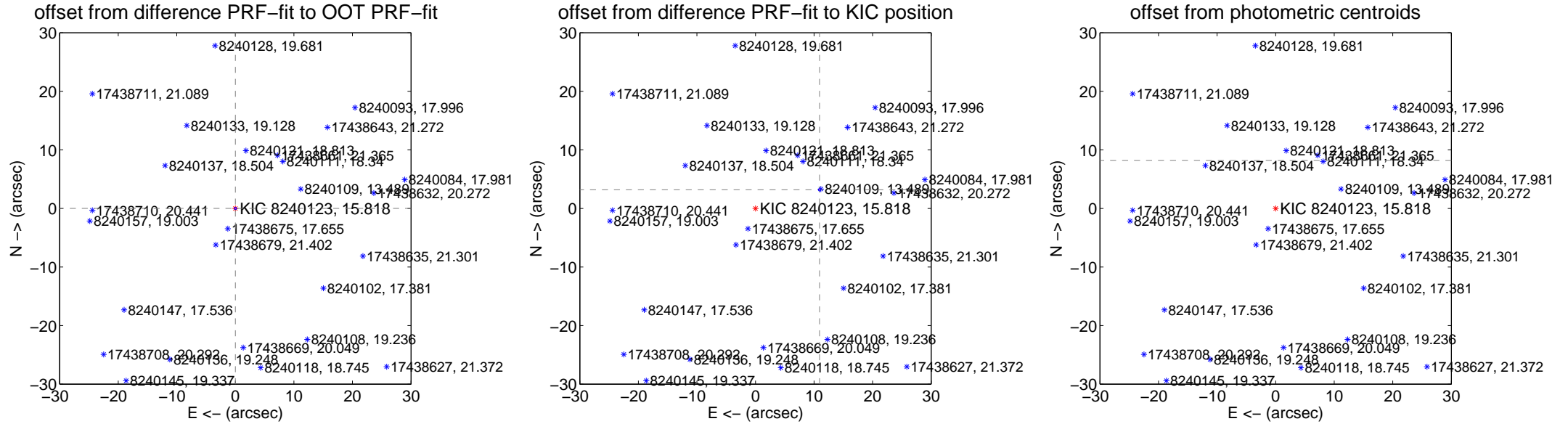
## DV Centroid Data

Supplemental centroid analysis for 008240123-01. Kepler magnitude: 15.82. Transit SNR 61.42

There are 1 quarters with good PRF difference image offsets

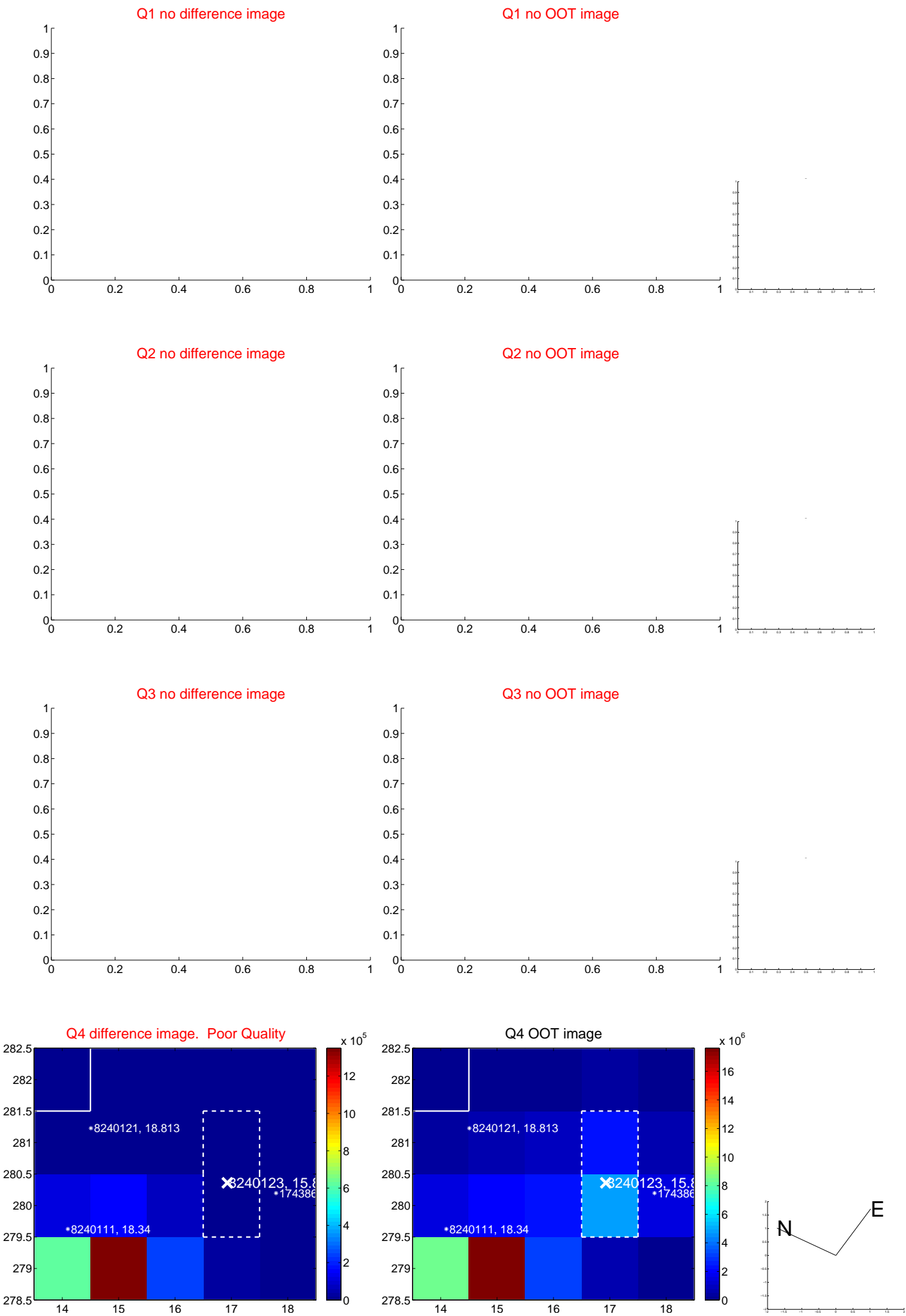
The OOT PRF centroid is offset from the target star catalog position by about 11.38 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.013 \pm 0.067$	0.20	$-0.011 \pm 0.067$	$0.008 \pm 0.067$
PRF-fit source offset from KIC position	<b><math>11.398 \pm 0.067</math></b>	<b>170.87</b>	$-10.945 \pm 0.067$	$3.181 \pm 0.067$
photometric centroid source offset	<b><math>63.54 \pm 0.26</math></b>	<b>246.49</b>	$-63.01 \pm 0.26$	$8.18 \pm 0.16$

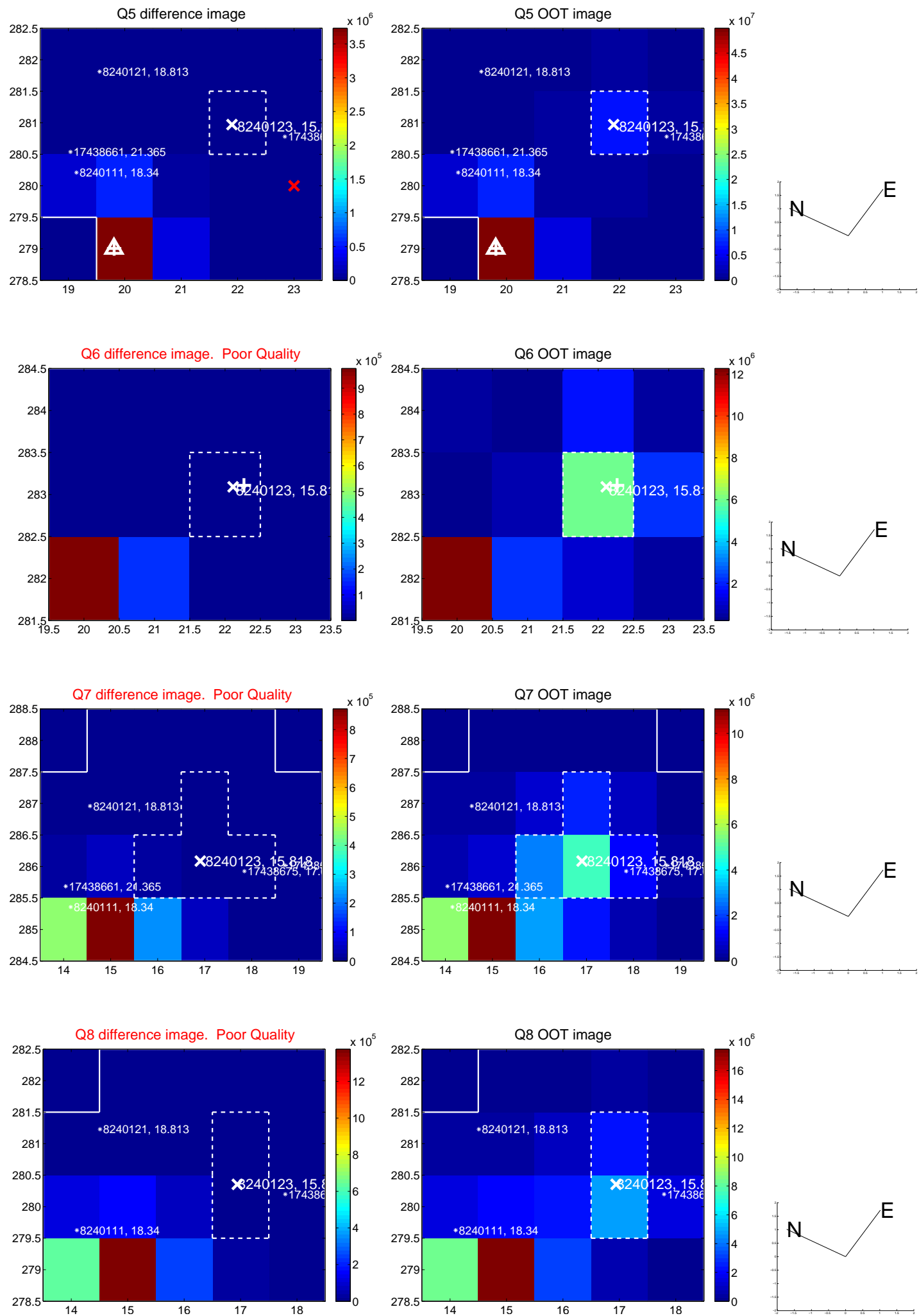


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

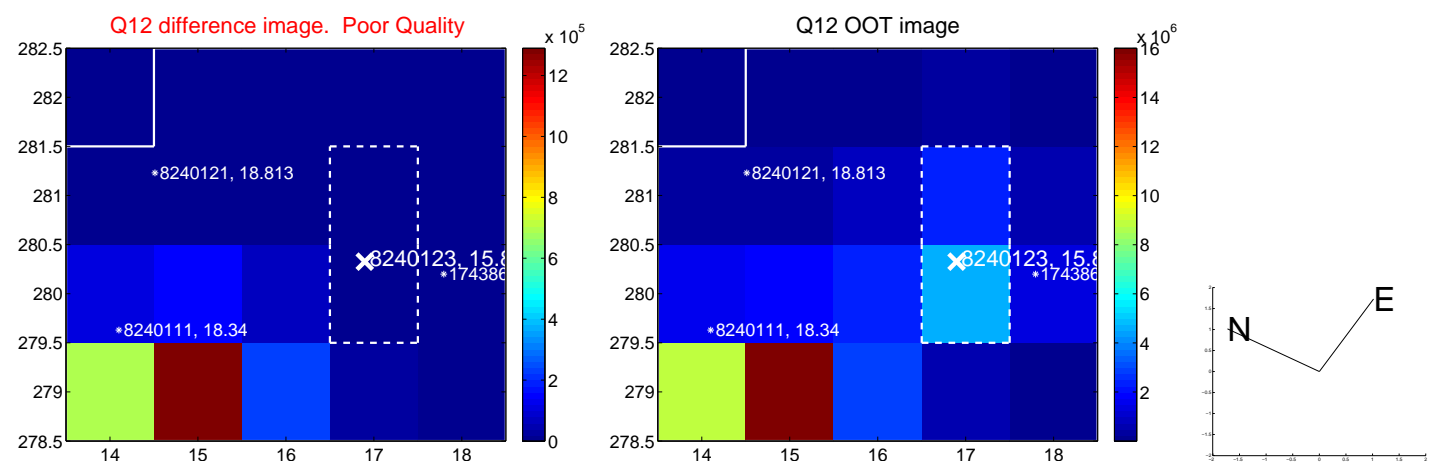
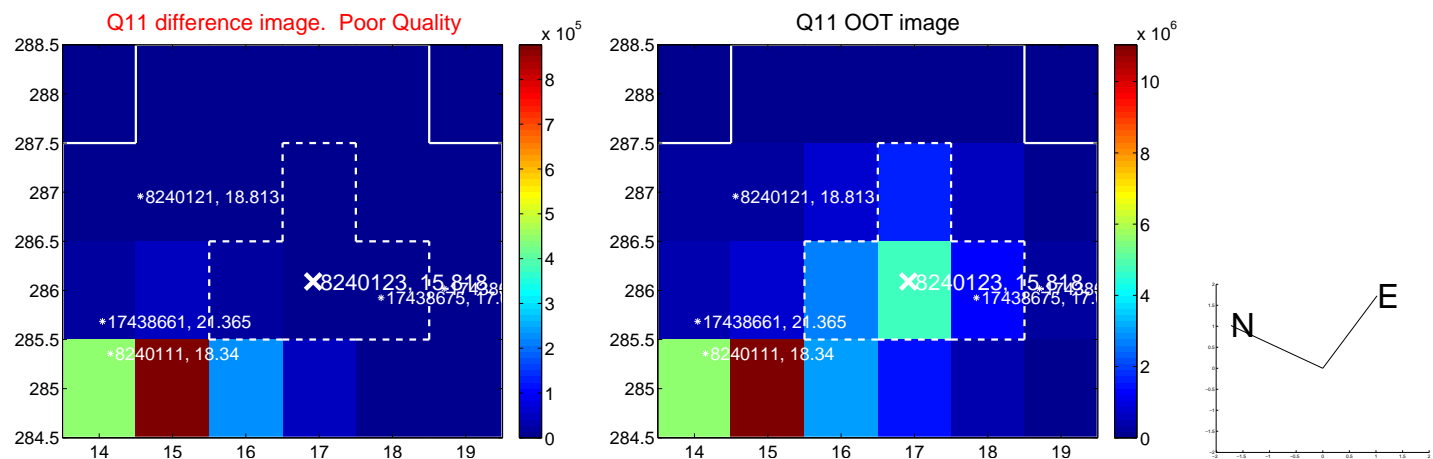
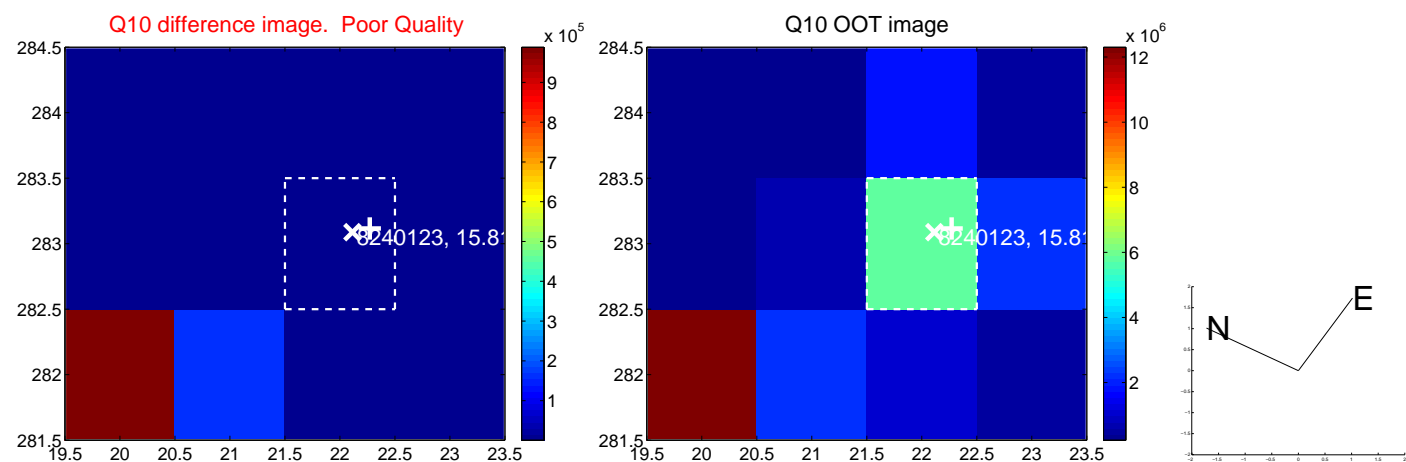
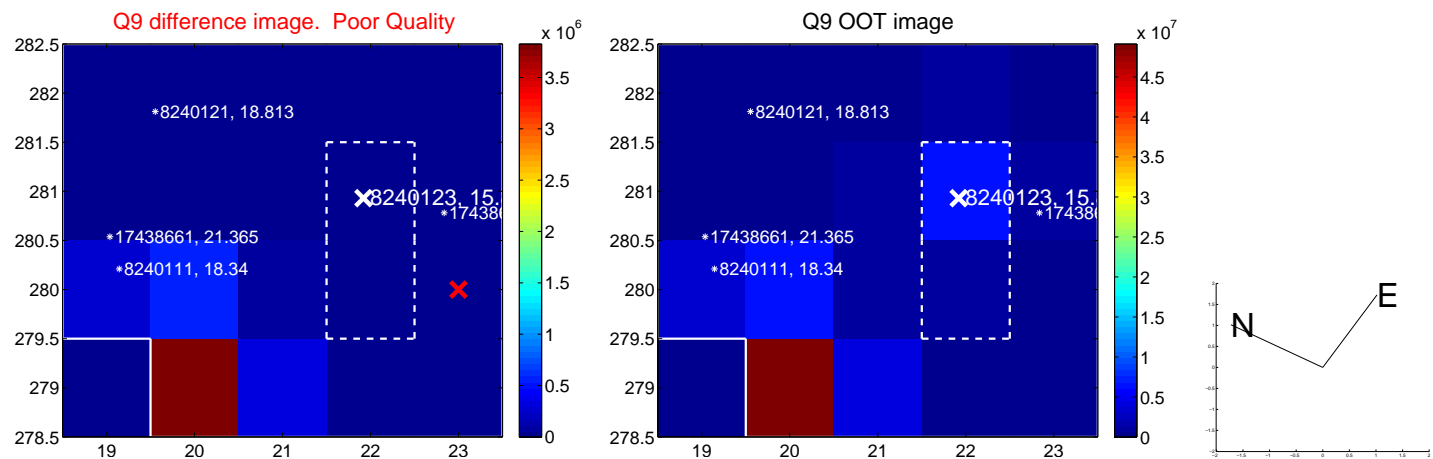
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



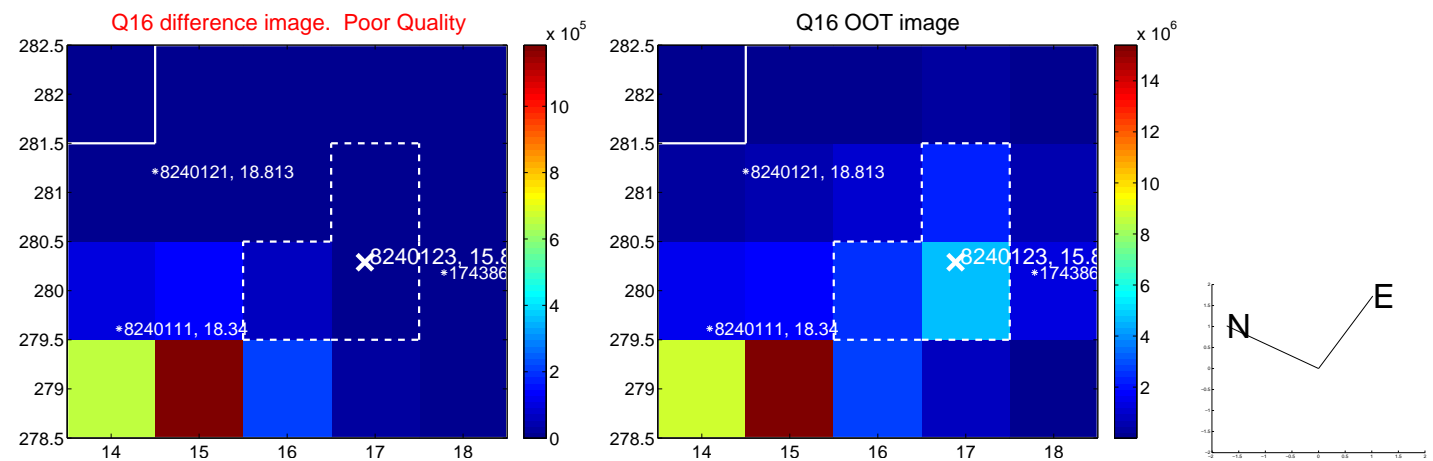
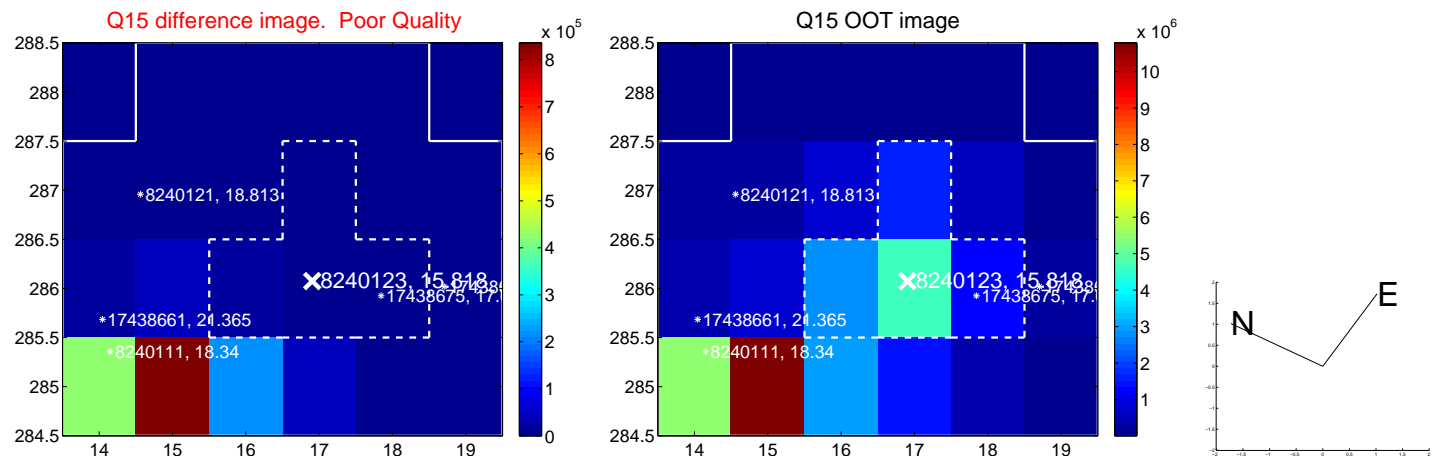
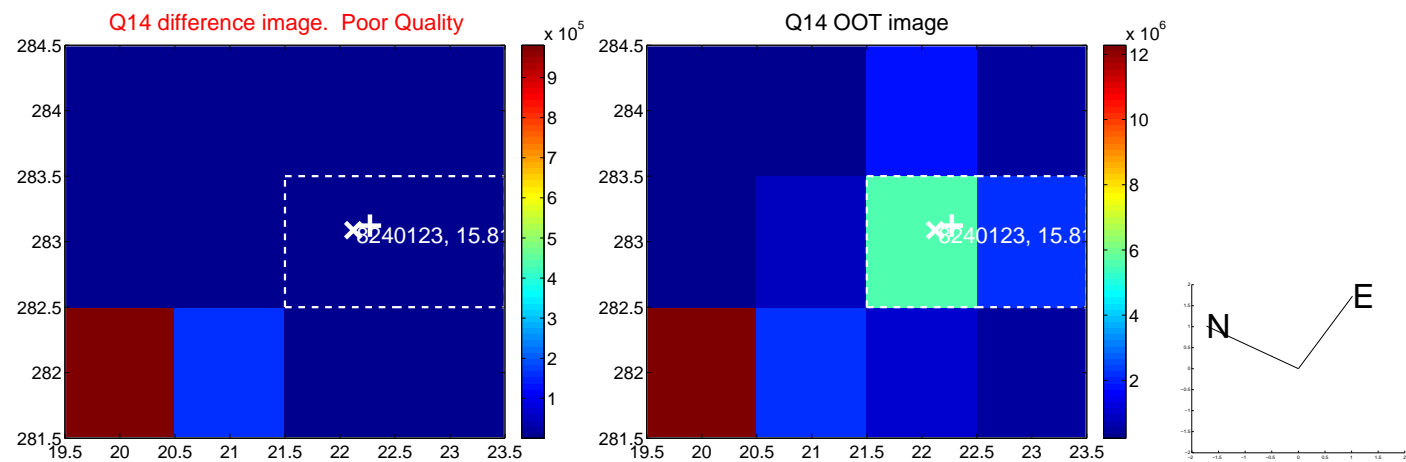
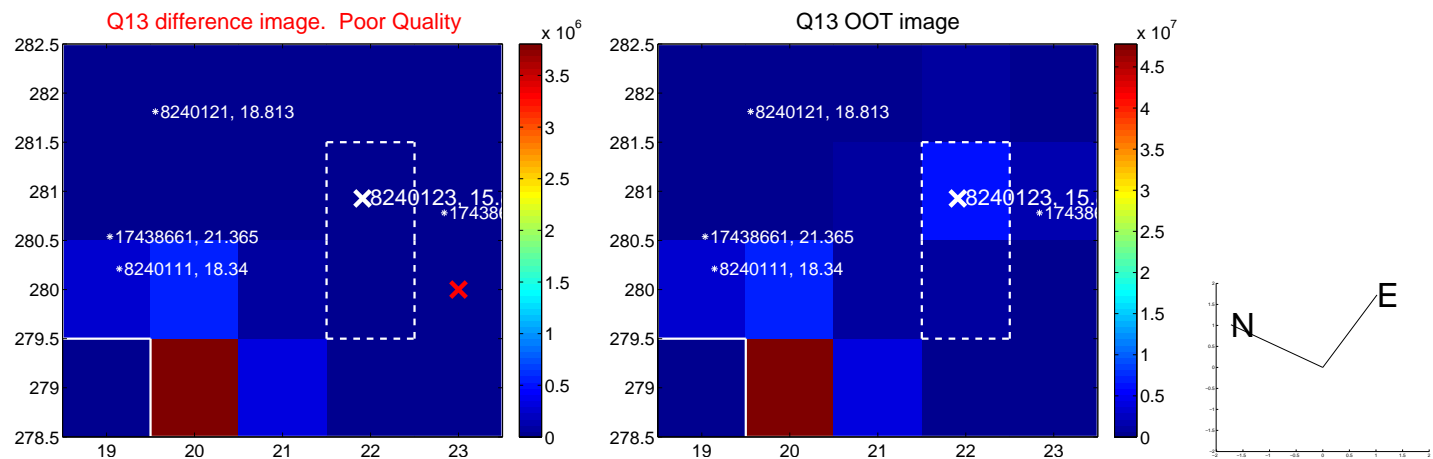
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

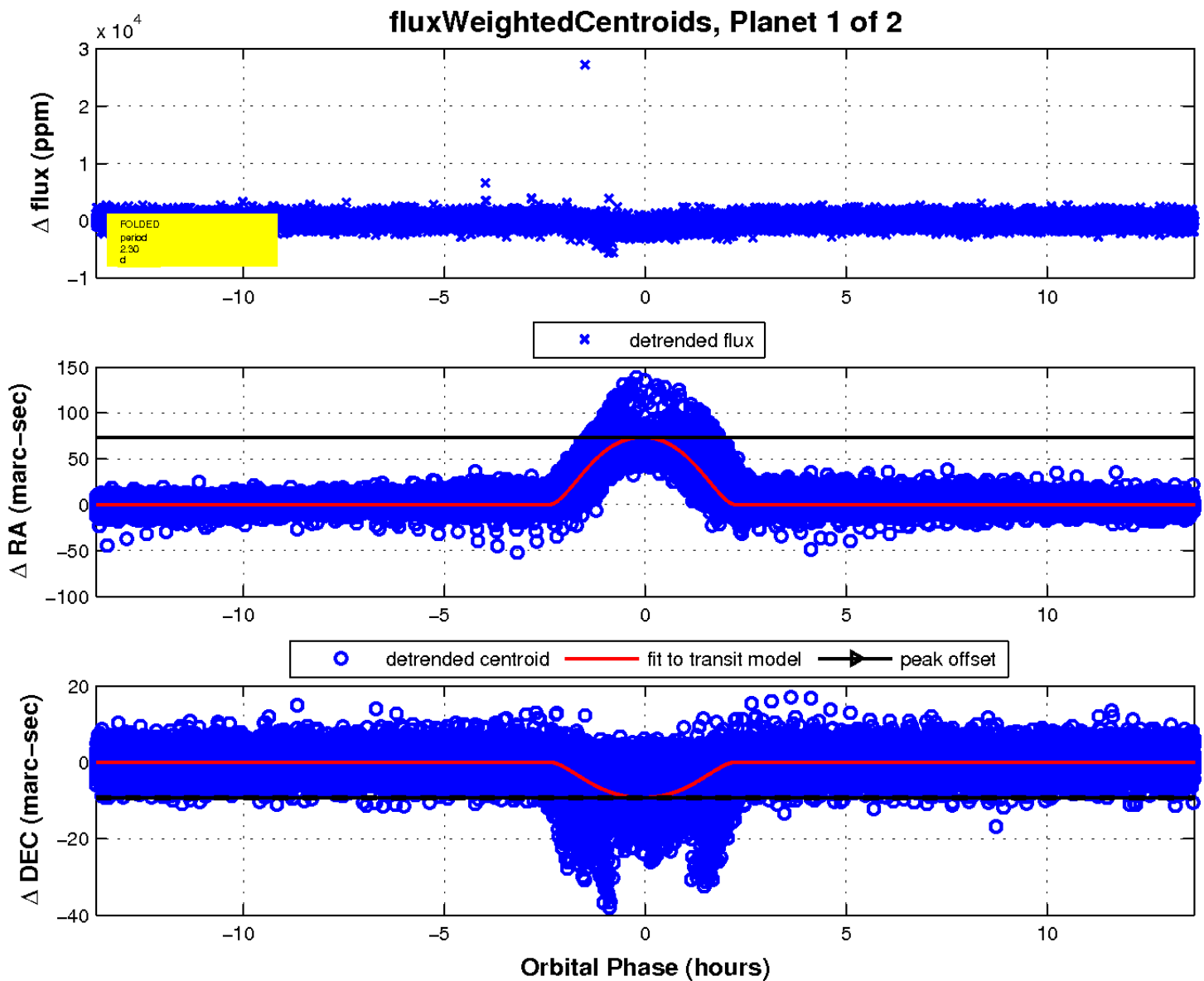
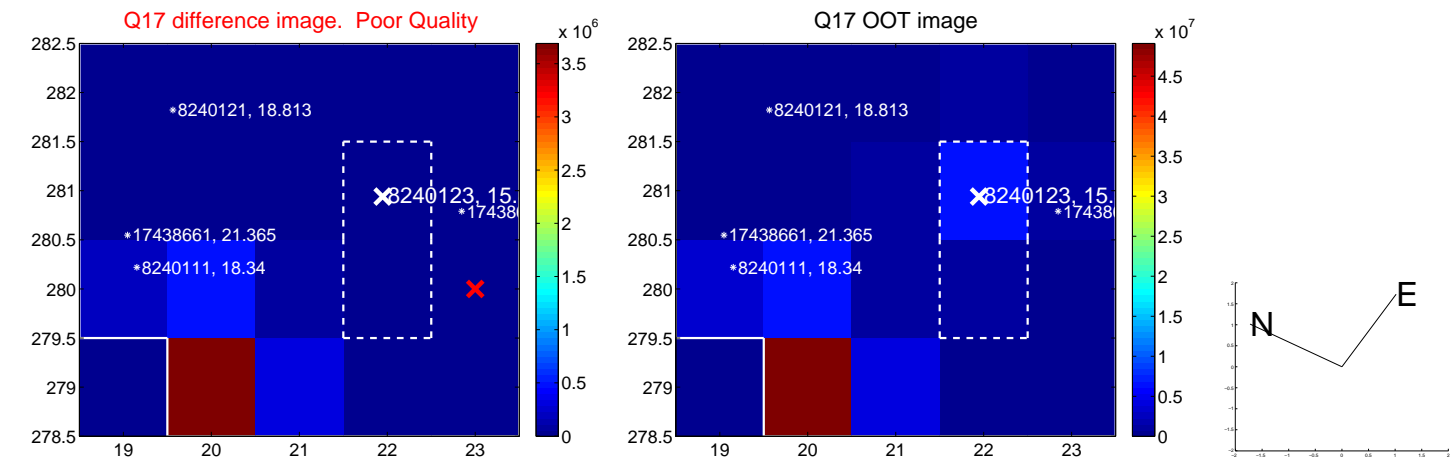


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



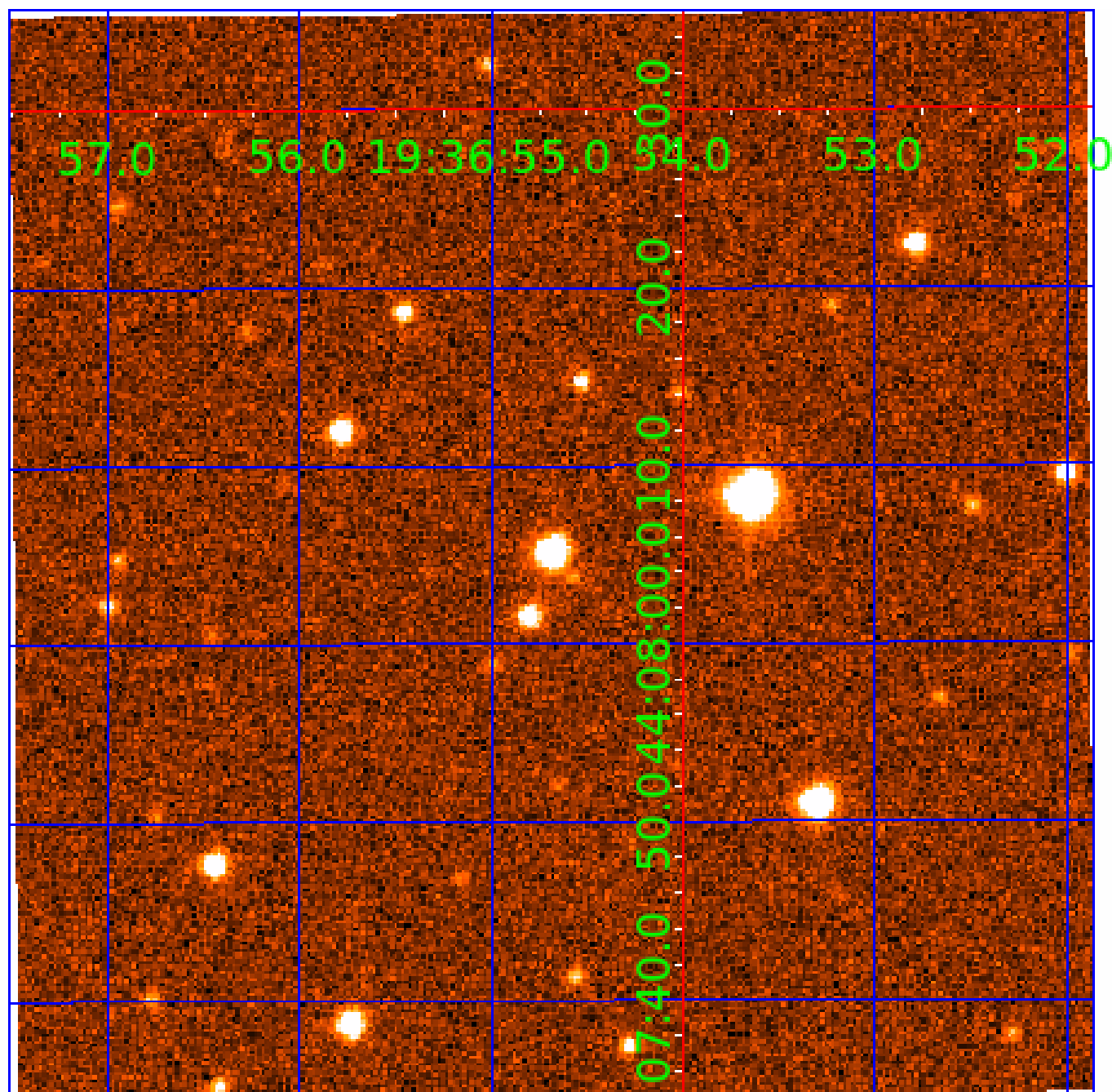


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 008240123

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008240123-01	OBS	3826.01	2.301120	132.218080	1199.3	4.554	99.0	61.4	0.85	5641	4.10	585.26
008240123-02	OBS	No	2.301214	133.325777	1119.6	3.000	9.3	-1.0	0.85	5641	2.81	585.22

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008240123-01	OBS	FP	0.00	0	1	1	1	HAS_SEC_TCE—CENT_RESOLVED_OFFSET—EPHEM_MATCH
008240123-02	OBS	FP	0.00	1	1	0	1	IS_SEC_TCE—CENT_NOFITS—EPHEM_MATCH

**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 008240123-02

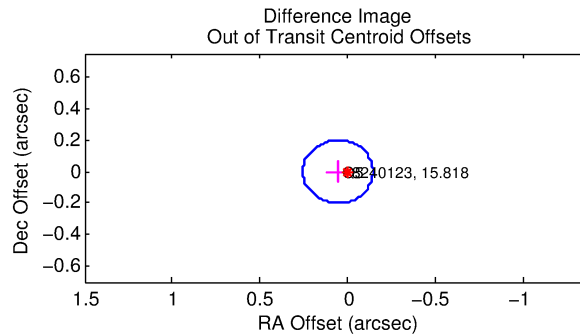
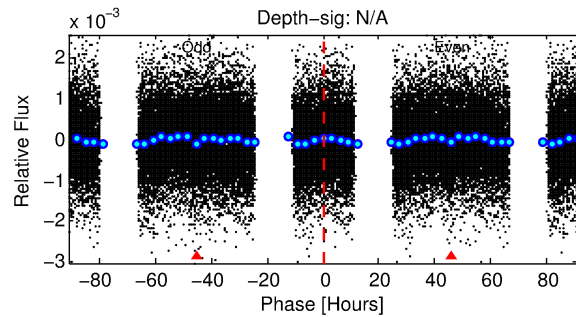
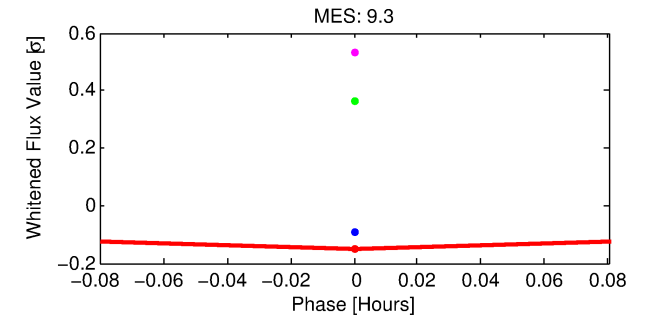
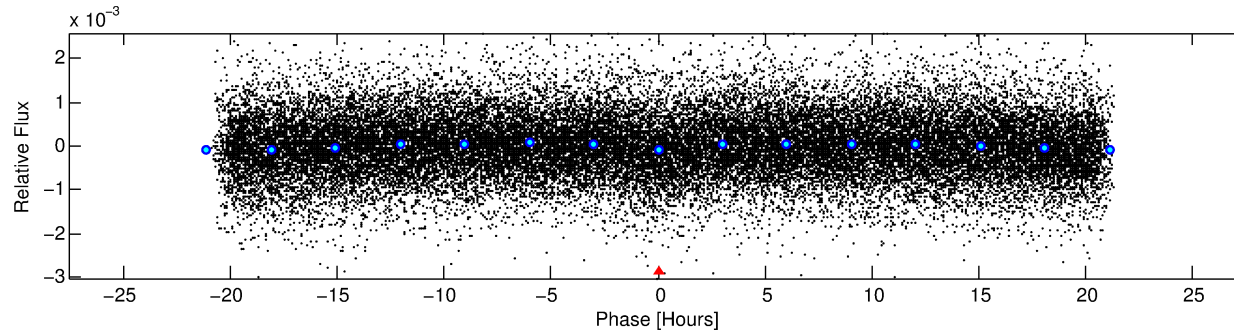
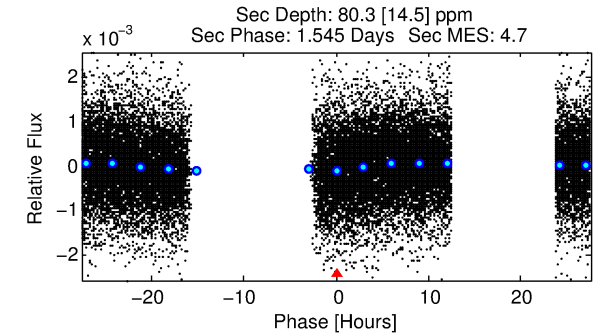
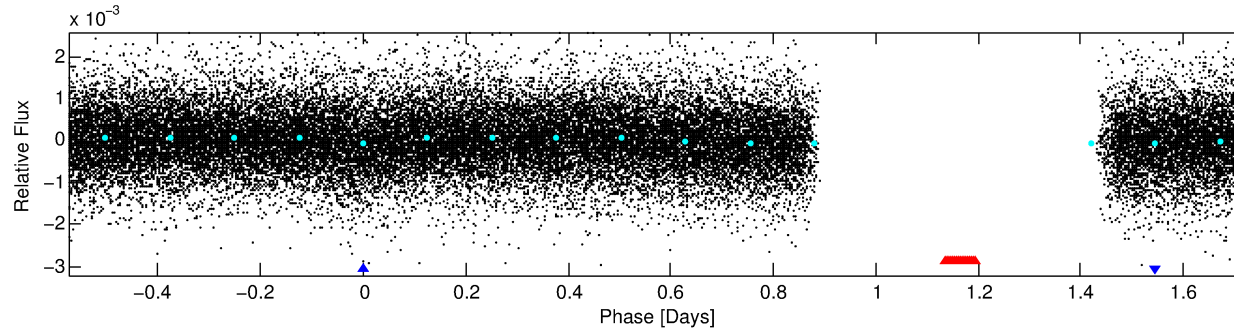
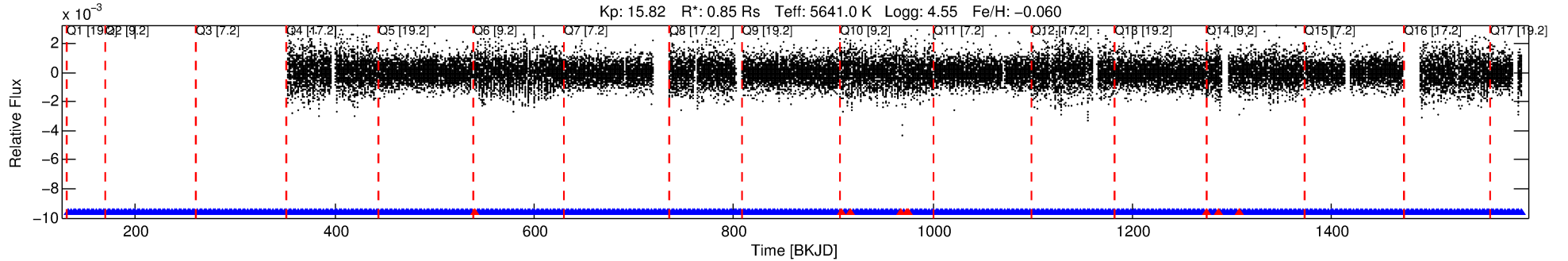
TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ( $''$ )	$\Delta$ Row	$\Delta$ Col	$m_2$	$m_1$	$D_2/D_1$	Mechanism	Flag	$\sigma_P$	$\sigma_T$
008240123-02	8240123	008240109-sec	8240109	1:1	11.7	2	2	13.49	15.82	32.14	Direct-PRF	0	0.75	0.70

**Notes:**  $P_1:P_2$  is the period ratio. Dist is the distance in arcseconds.  $\Delta$ Row and  $\Delta$ Col are the number of pixels apart in row and column.  $m_2$  and  $m_1$  are the magnitudes of the parent and child.  $D_2/D_1$  is the parent's transit depth divided by the child's.  $\sigma_P$  and  $\sigma_T$  are the significance of the match in period and epoch. For a match to be considered significant  $\sigma_P < 5.0$  and  $\sigma_T < 5.0$ . Matches which have  $\sigma_P$  and  $\sigma_T$  very close to this cutoff should receive extra scrutiny, especially if the period ratio is very large.

# DV One-Page Summary

KIC: 8240123 Candidate: 2 of 2 Period: 2.301 d  
KOI: K03826 Corr: No Ephemeris Match

Kp: 15.82 R\*: 0.85 Rs Teff: 5641.0 K Logg: 4.55 Fe/H: -0.060



## TPS TCE Results:

Period = 2.30121 d  
Epoch = 133.3258 BKJD

DV fit results are unavailable

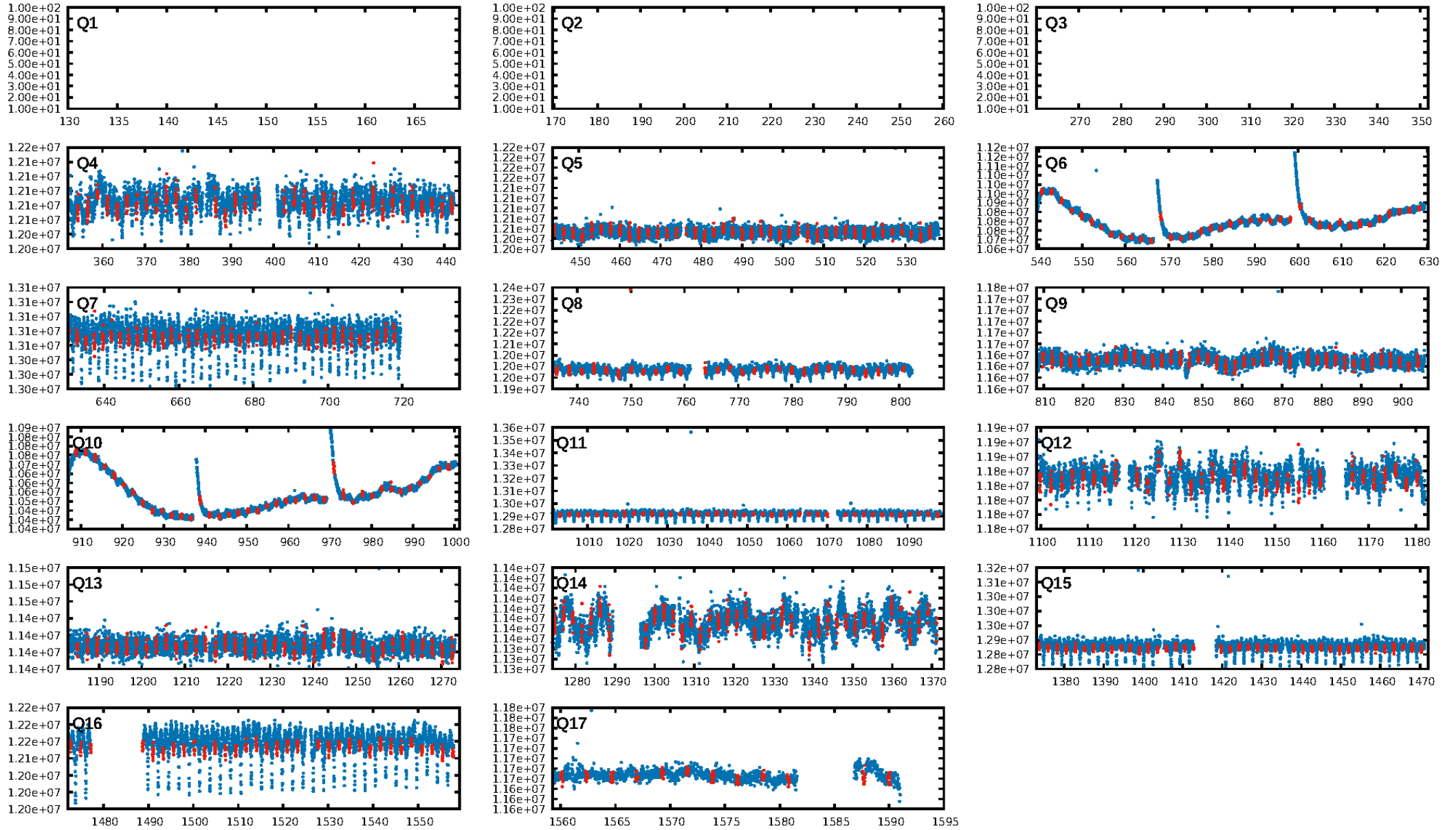
## DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGoF-sig: N/A  
Bootstrap-pfa: 1.27e-19  
RollingBand-fgt: 0.98 [481/490]  
GhostDiagnostic-chr: -1.417  
Centroid-sig: 0.1%  
Centroid-so: 1.258 arcsec [2.77σ]  
OotOffset-rm: 0.057 arcsec [0.85σ]  
KicOffset-rm: 11.309 arcsec [120.99σ]  
OotOffset-st: 0/0/1 [1]  
KicOffset-st: 0/0/2 [2]  
DiffImageQuality-fgm: 1.00 [2/2]  
DiffImageOverlap-fno: 0.00 [0/14]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 22:29:57 Z

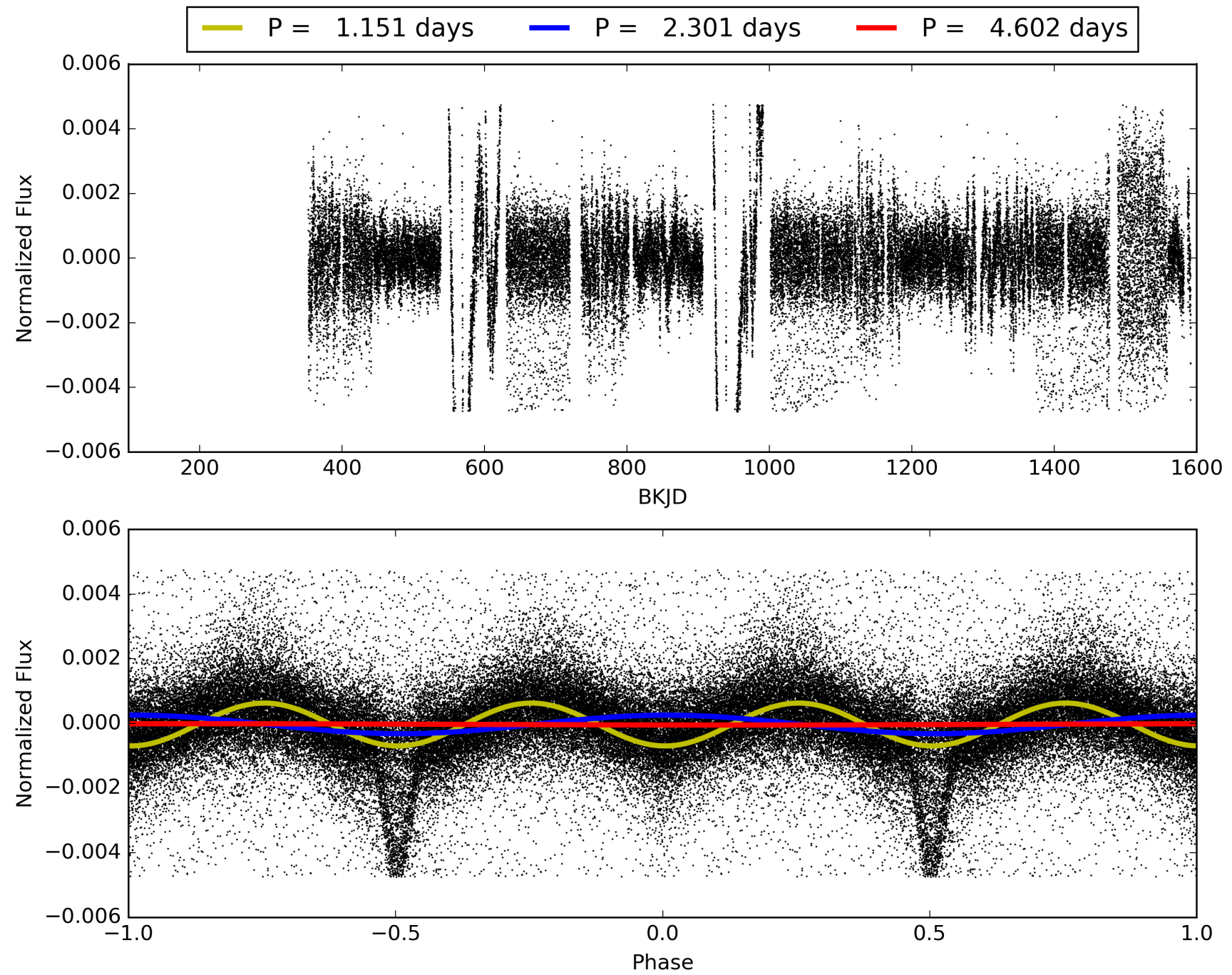
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 008240123-02, PDC Light Curves



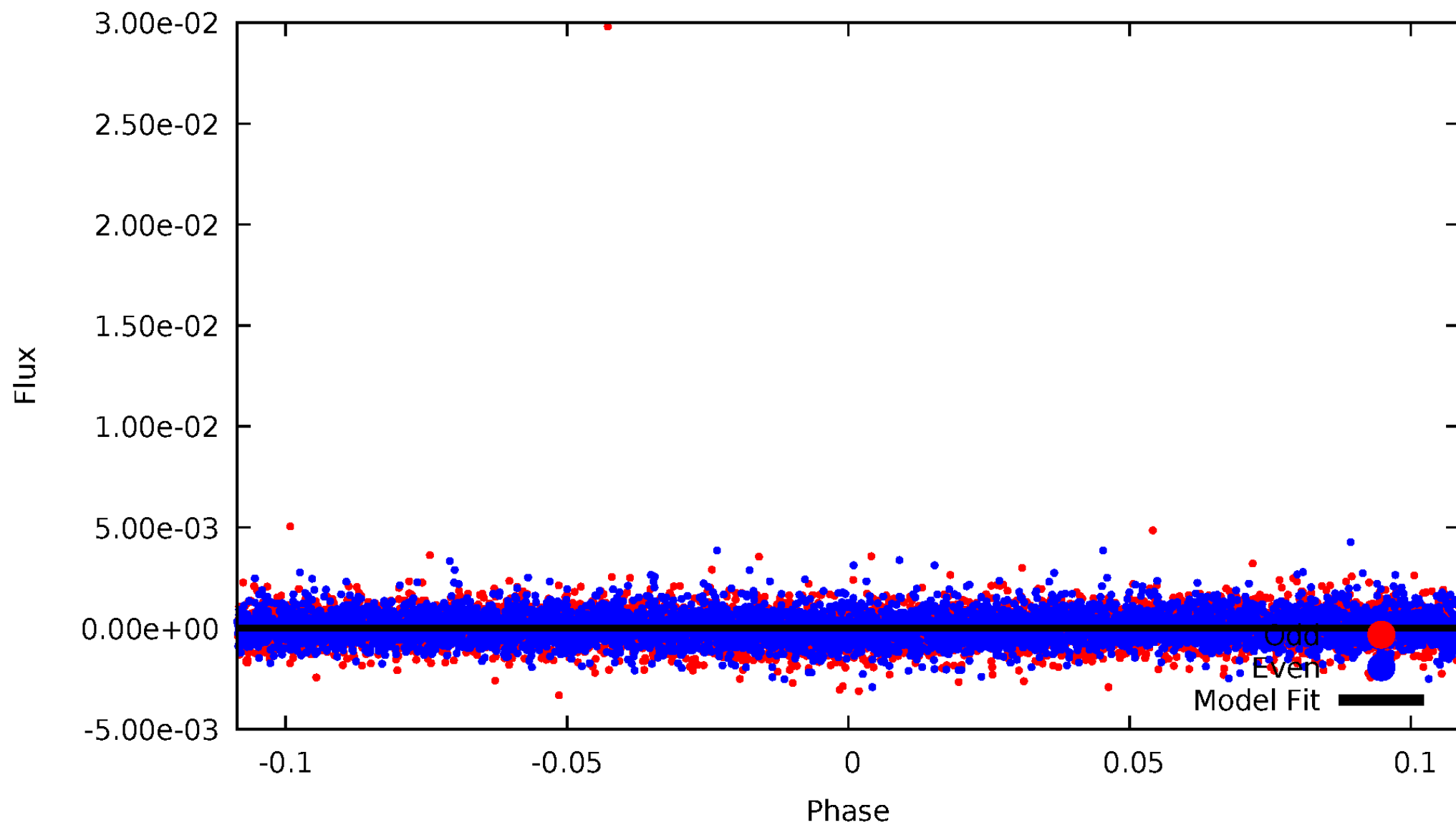


TCE 008240123-02



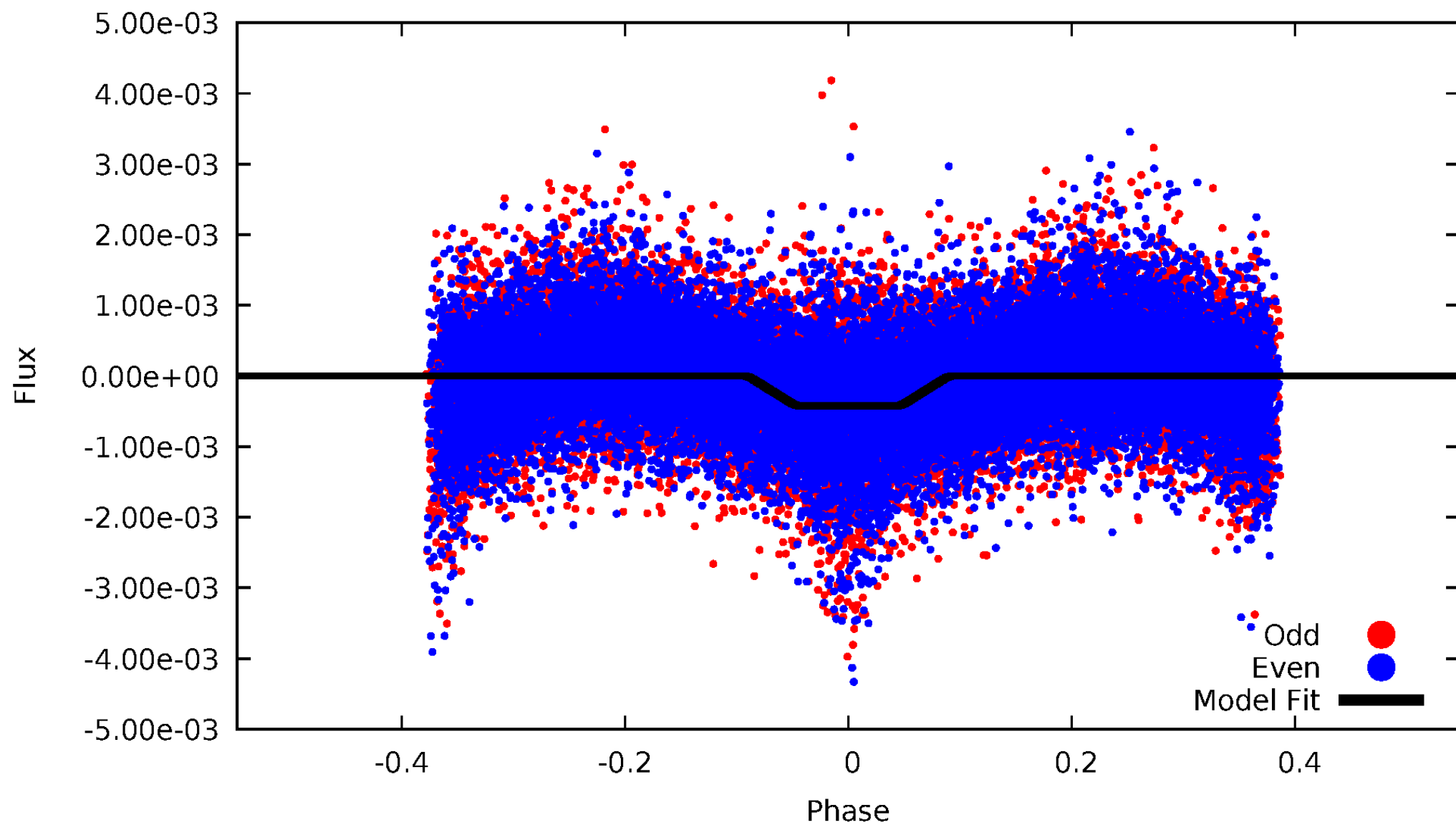
# DV Odd/Even

TCE 008240123-02



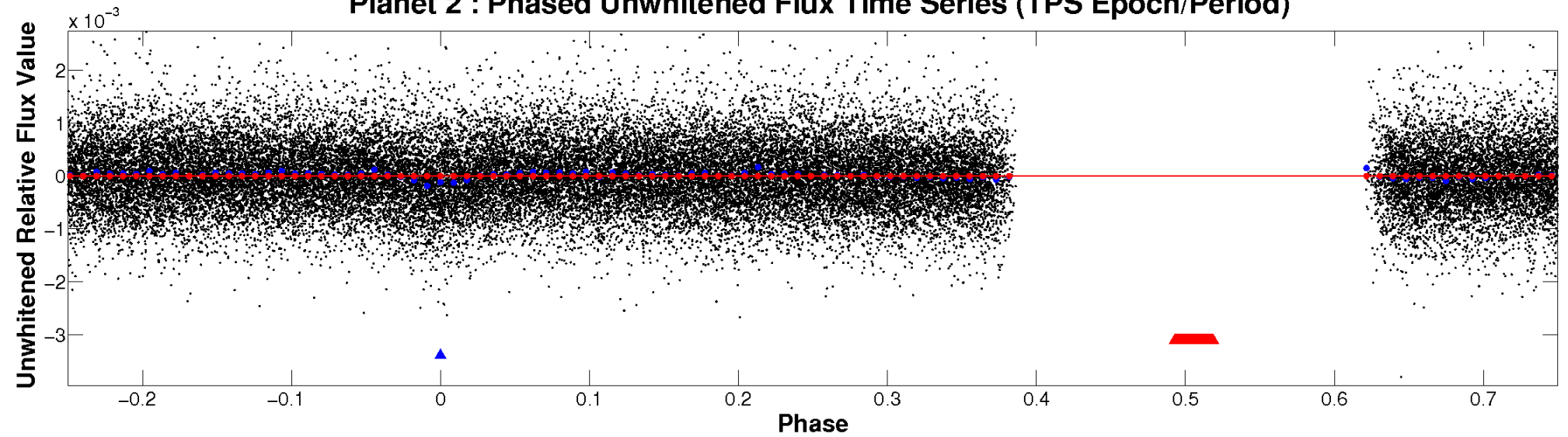
# ALT Odd/Even

TCE 008240123-02

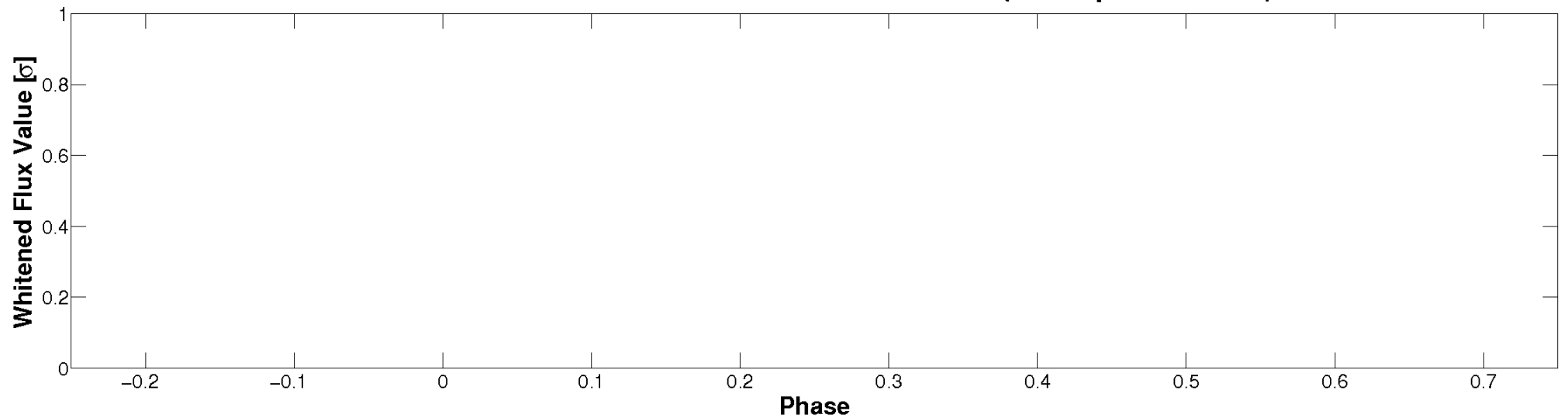


# Non-Whitened Vs. Whitened Light Curve

**Planet 2 : Phased Unwhitened Flux Time Series (TPS Epoch/Period)**

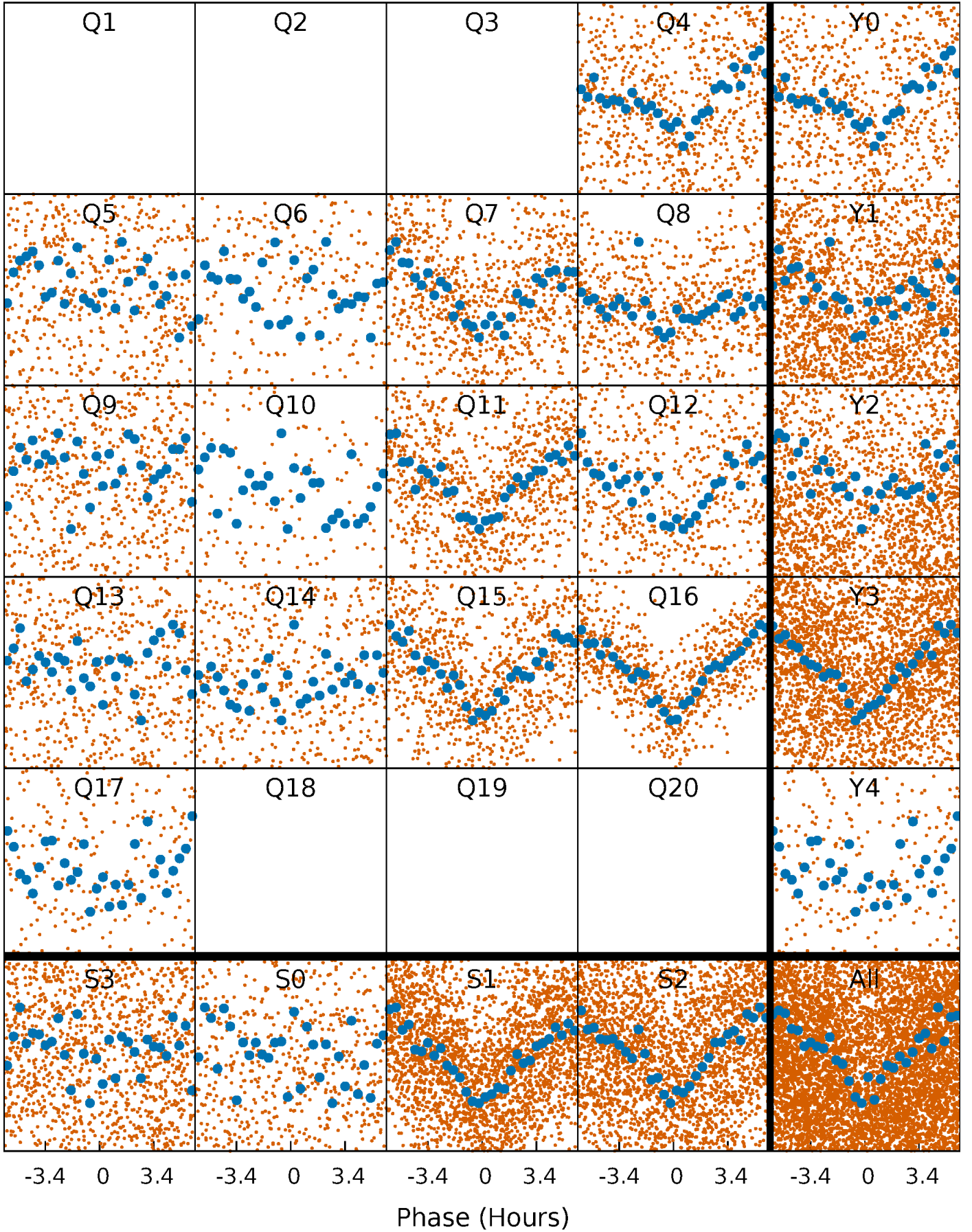


**Planet 2 : Phased Whitened Flux Time Series (TPS Epoch/Period)**



# PDC Quarter-Phased Transit Curves

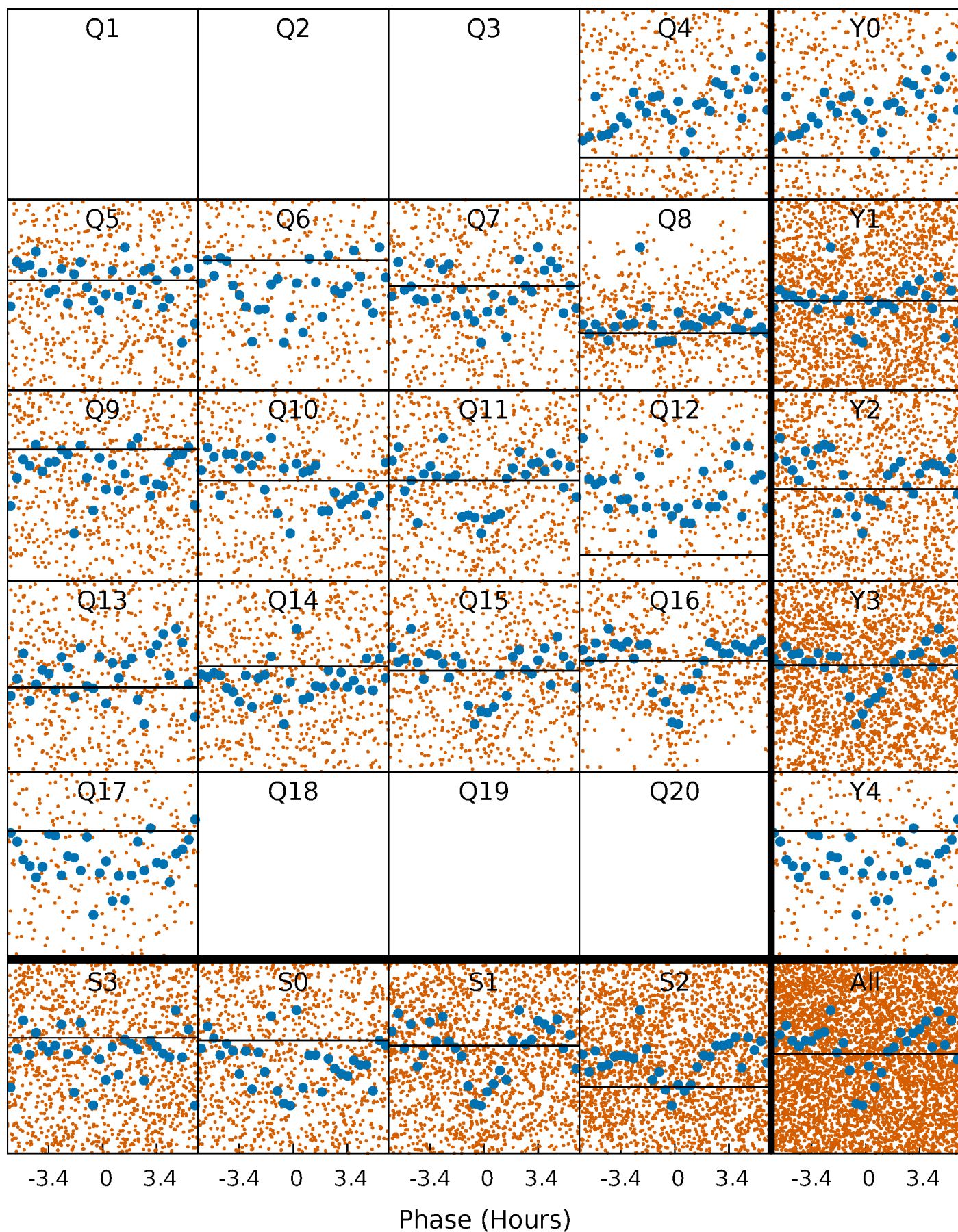
TCE 008240123-02   P= 2.301214 Days    $T_0=133.325777$  (BKJD)





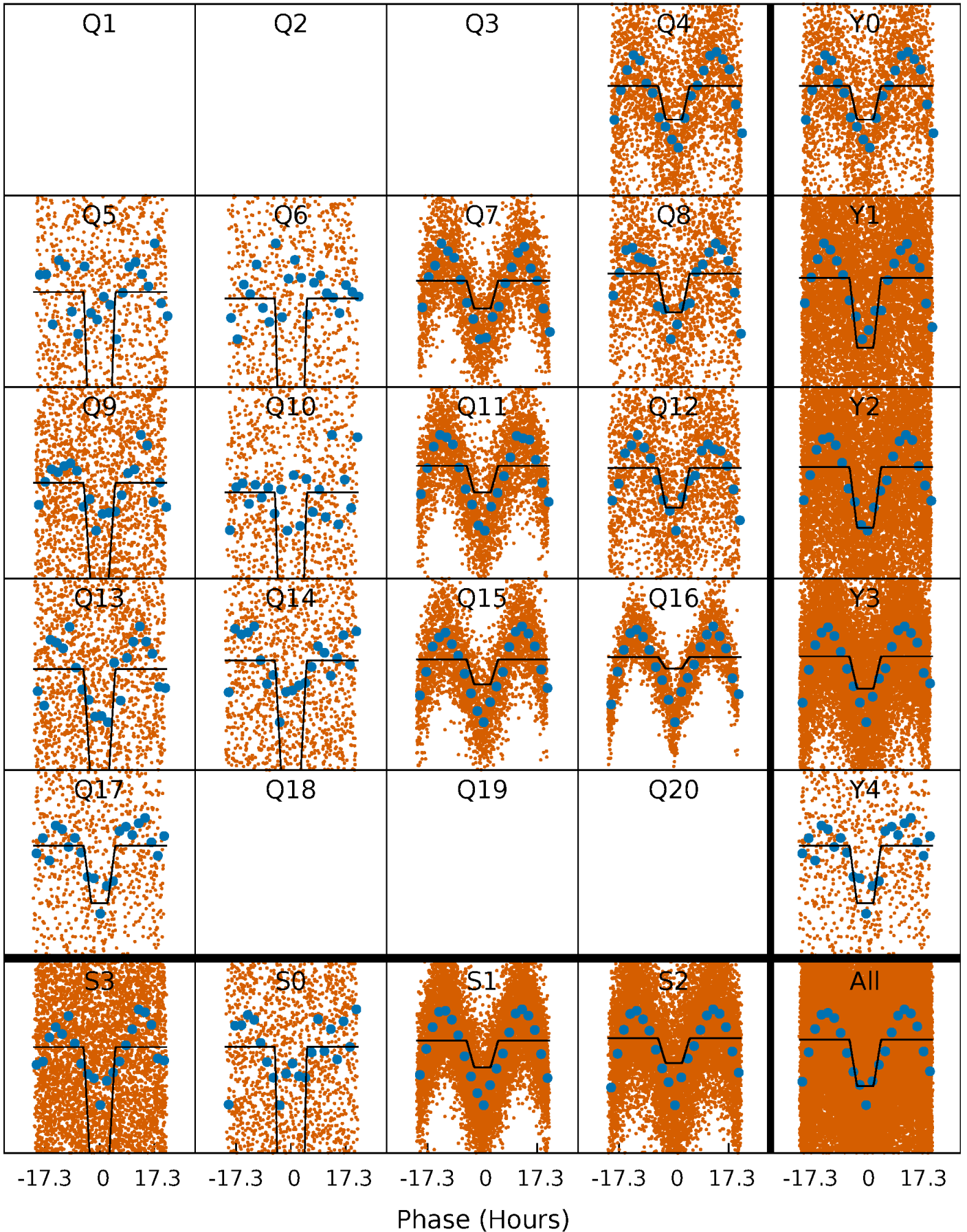
# DV Quarter-Phased Transit Curves

TCE 008240123-02 P= 2.301214 Days  $T_0=133.325777$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 008240123-02   P= 2.301214 Days    $T_0=133.324149$  (BKJD)

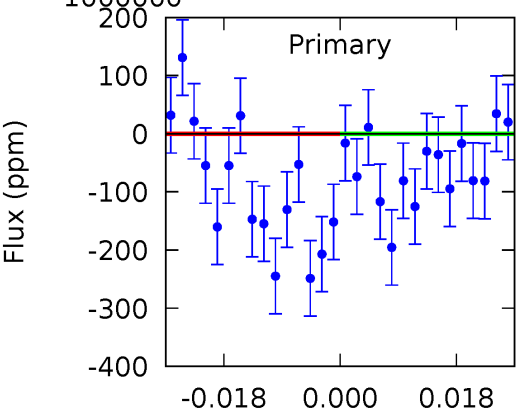
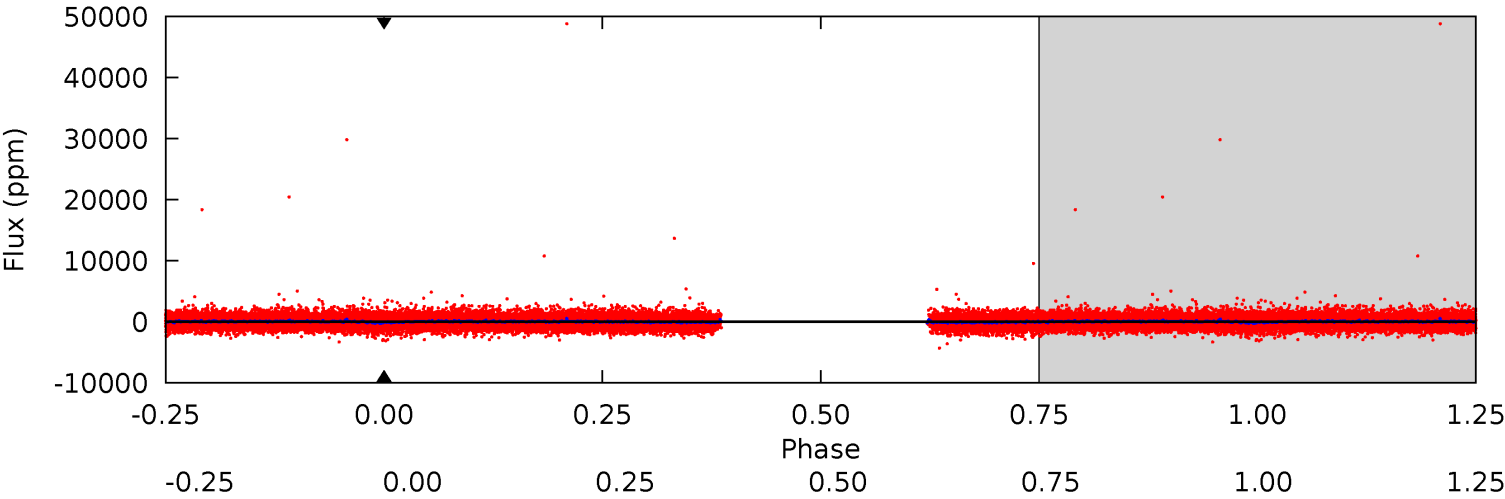




# DV Model-Shift Uniqueness Test

008240123-02, P = 2.301214 Days, E = 133.325777 Days

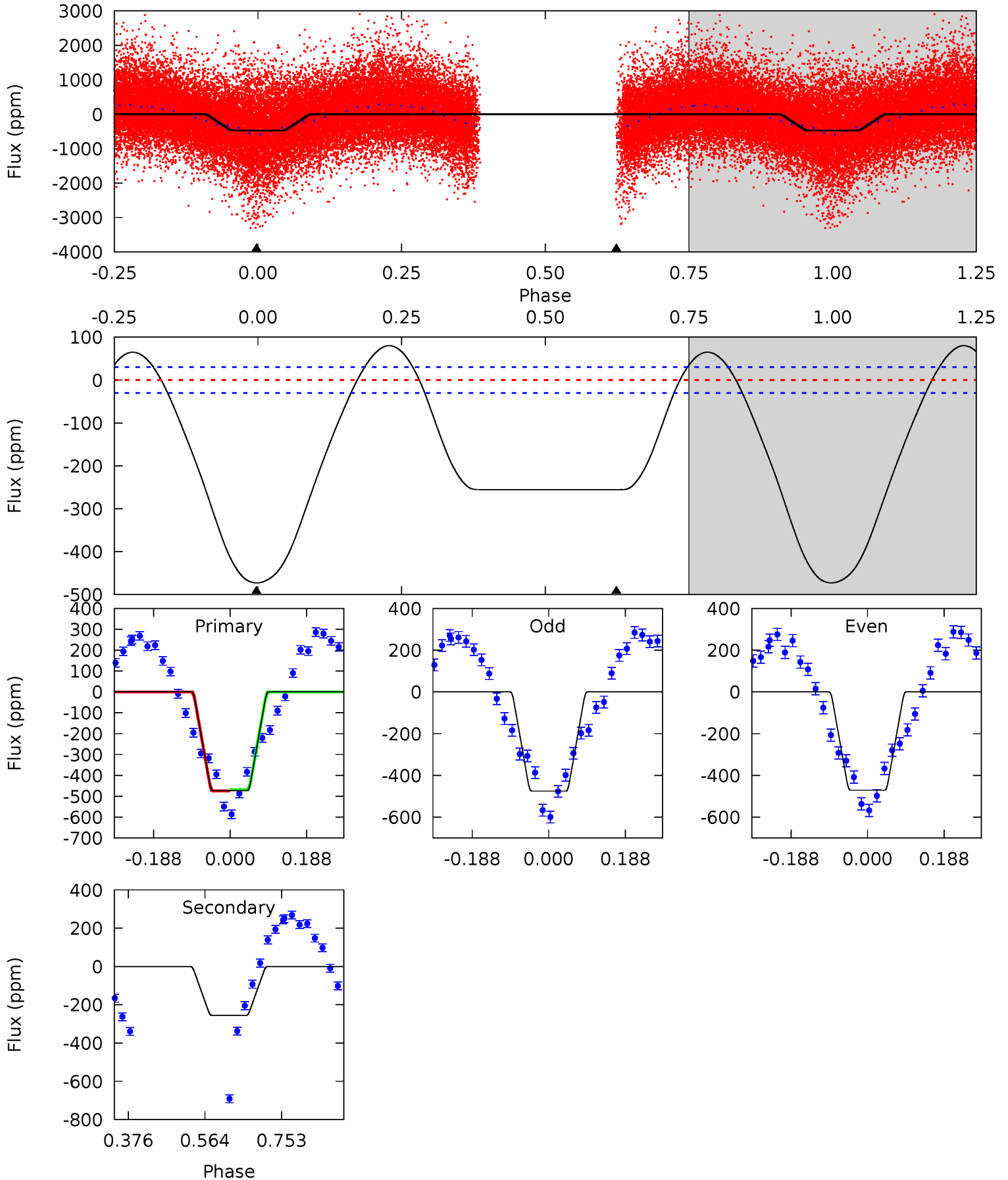
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



# Alt Model-Shift Uniqueness Test

008240123-02, P = 2.301214 Days, E = 133.324149 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
69.3	37.4	0	0	4.43	1.32	17.8	69.3	69.3	37.4	37.4	0.32	1.28	0.14	0.44



### Stellar Parameters For KIC 008240123

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5641^{+186}_{-186}$	$4.554^{+0.035}_{-0.196}$	$-0.060^{+0.300}_{-0.300}$	$0.850^{+0.248}_{-0.078}$	$0.944^{+0.094}_{-0.115}$	$2.168^{+0.405}_{-1.077}$
	+3%/-3%	+1%/-4%	+500%/-500%	+29%/-9%	+10%/-12%	+19%/-50%
Source	KIC0	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 008240123-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$0 \pm 1000000$	$8.21^{+7.59}_{-5.58}$	$1802^{+125}_{-88}$	$4067^{+13372}_{-19658}$	$11^{+1510}_{-1233}$
Alt.	$-255 \pm 7$	$7.07^{+7.99}_{-4.85}$	$1806^{+130}_{-92}$	$3181^{+1742}_{-738}$	$3.069^{+28.805}_{-2.385}$

$T_{max}$  = 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

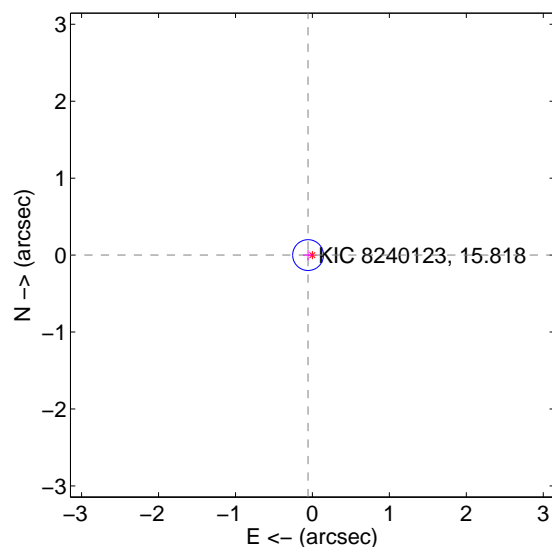
Supplemental centroid analysis for 008240123-02. Kepler magnitude: 15.82. Transit SNR -1.00

There are 2 quarters with good PRF difference image offsets

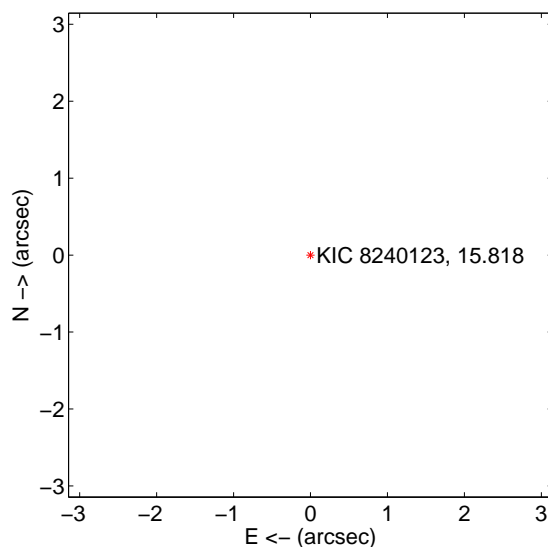
The OOT PRF centroid is offset from the target star catalog position by about 11.39 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.057 \pm 0.067$	0.85	$0.057 \pm 0.067$	$0.000 \pm 0.067$
PRF-fit source offset from KIC position	<b><math>11.309 \pm 0.093</math></b>	<b>120.99</b>	$-10.855 \pm 0.095$	$3.173 \pm 0.067$
photometric centroid source offset	$1.26 \pm 0.45$	2.77	$-0.73 \pm 0.62$	$1.02 \pm 0.34$

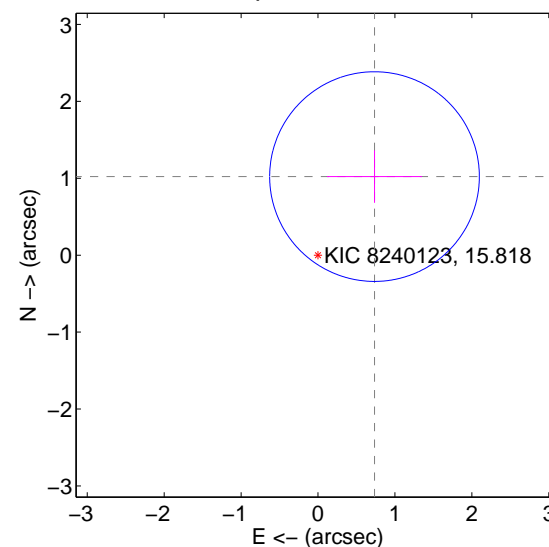
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

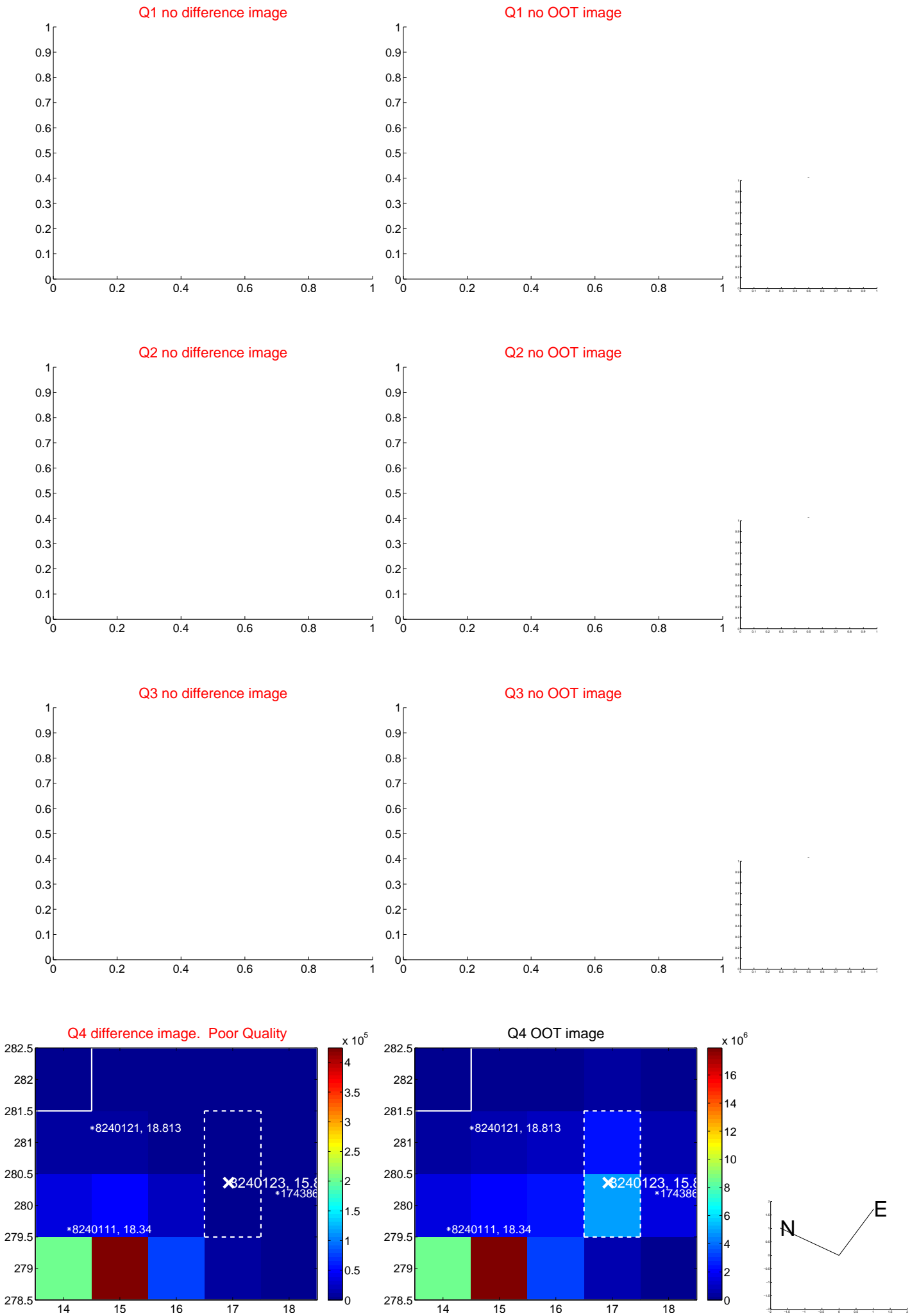


offset from photometric centroids

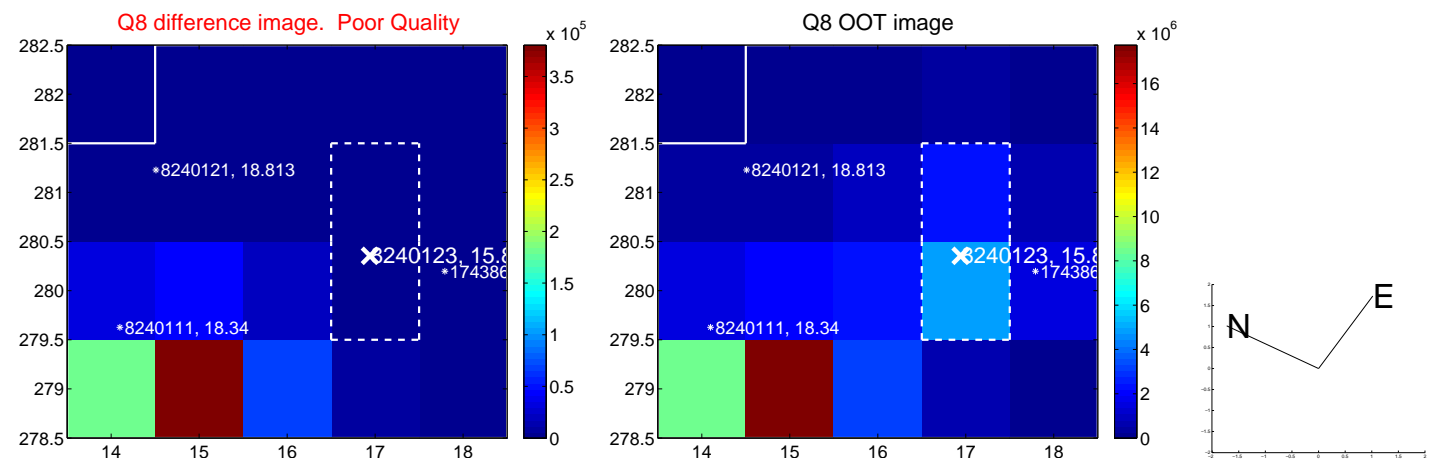
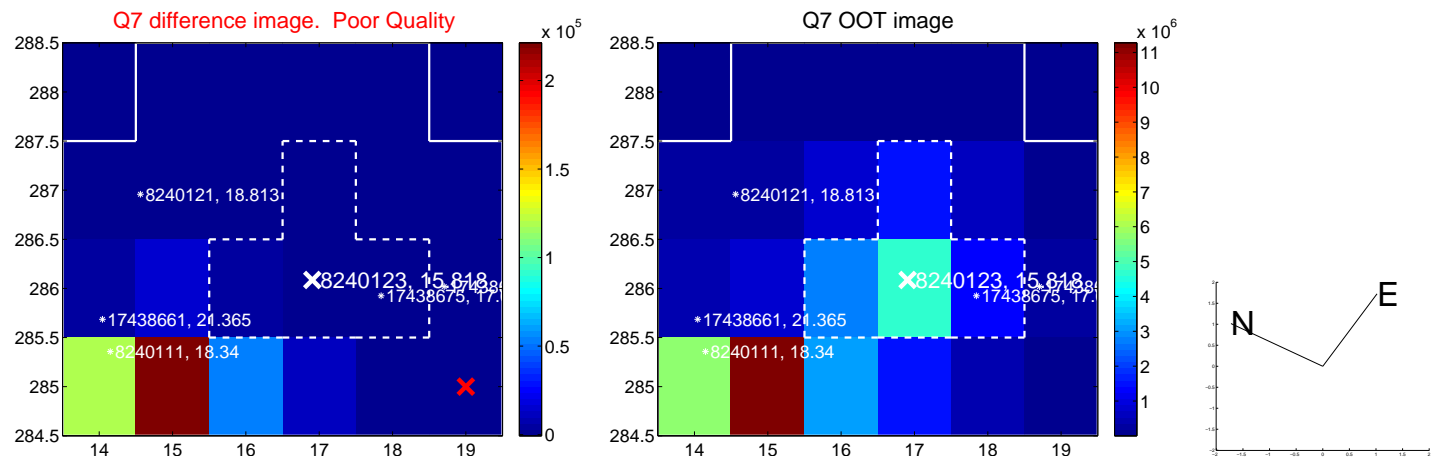
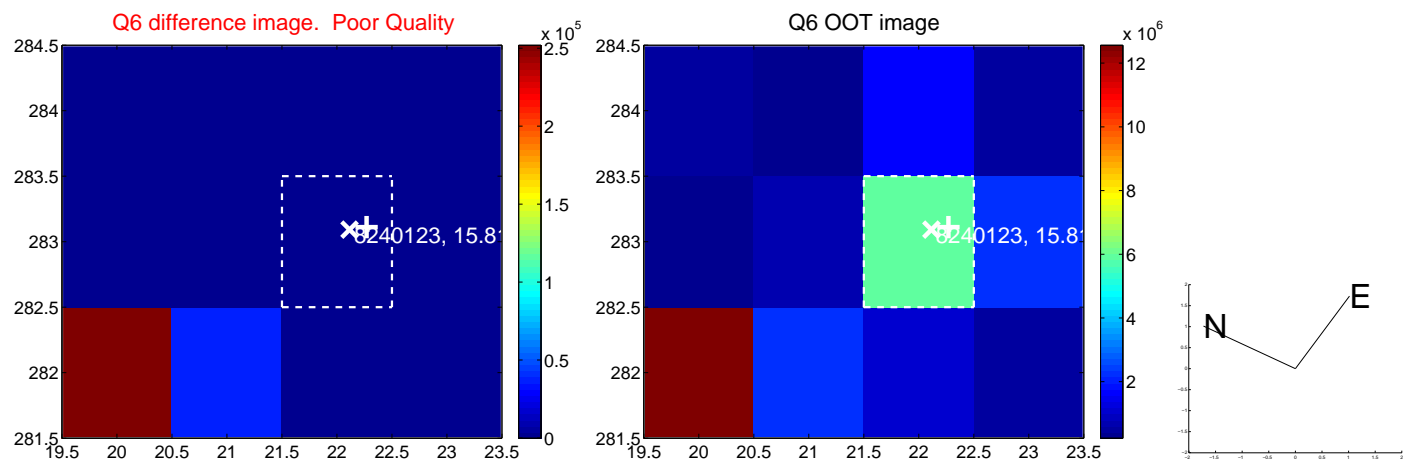
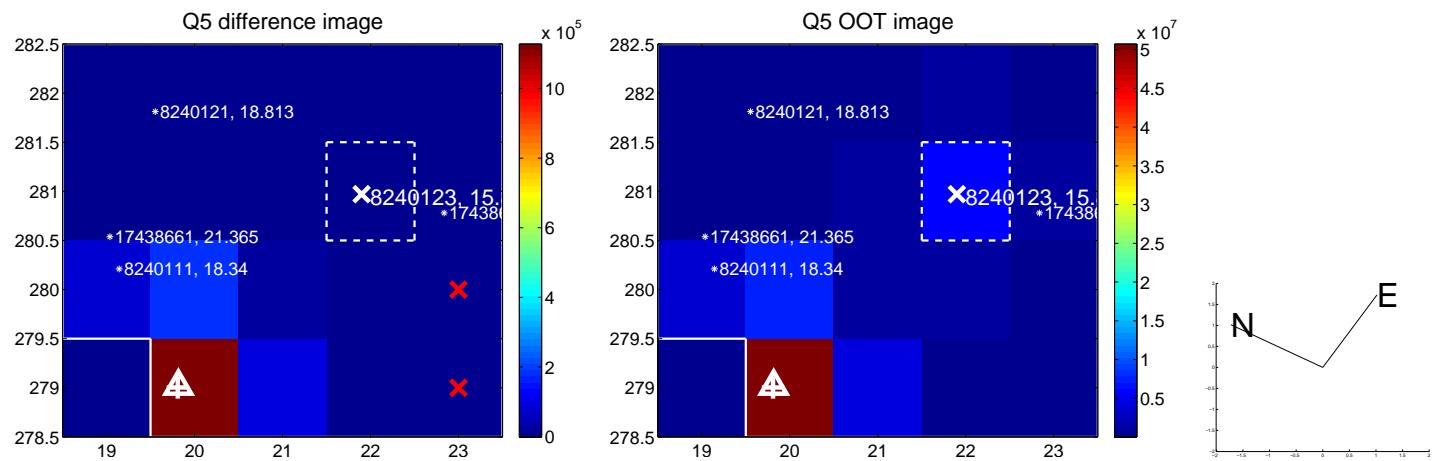


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

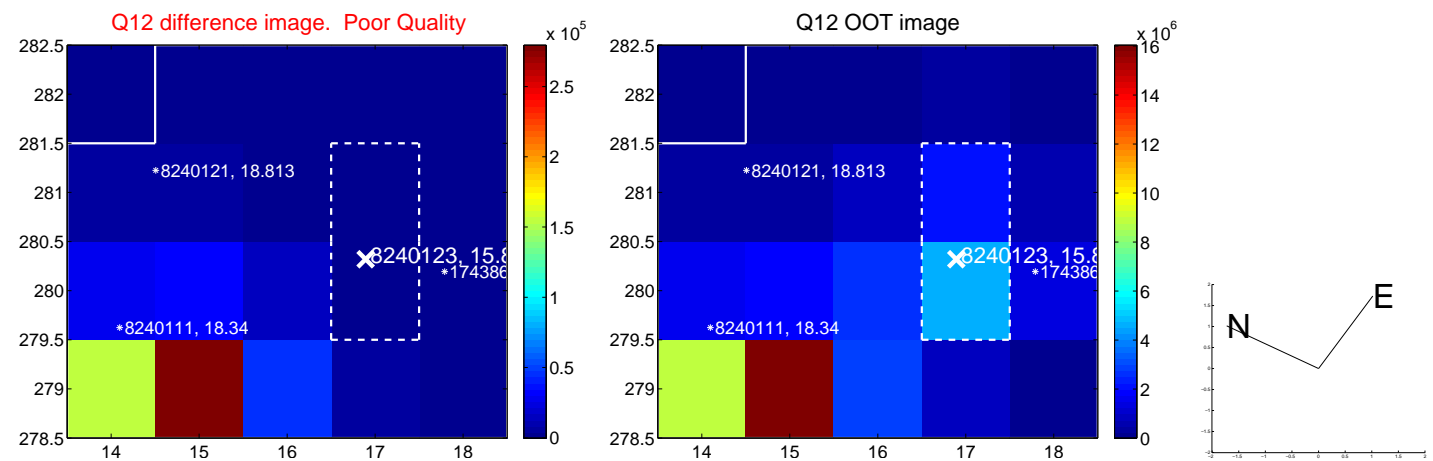
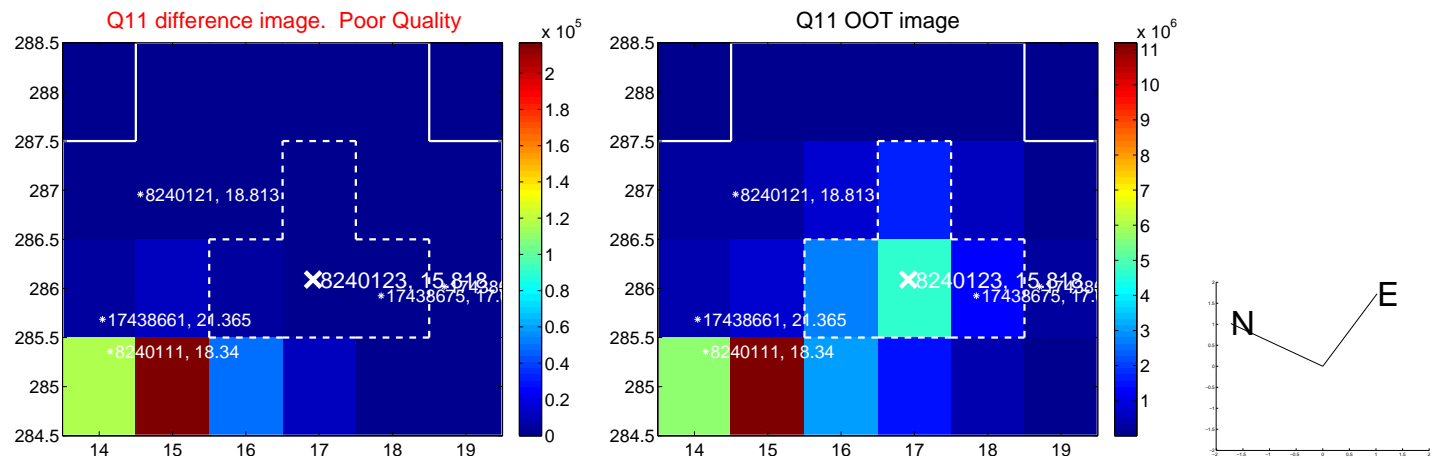
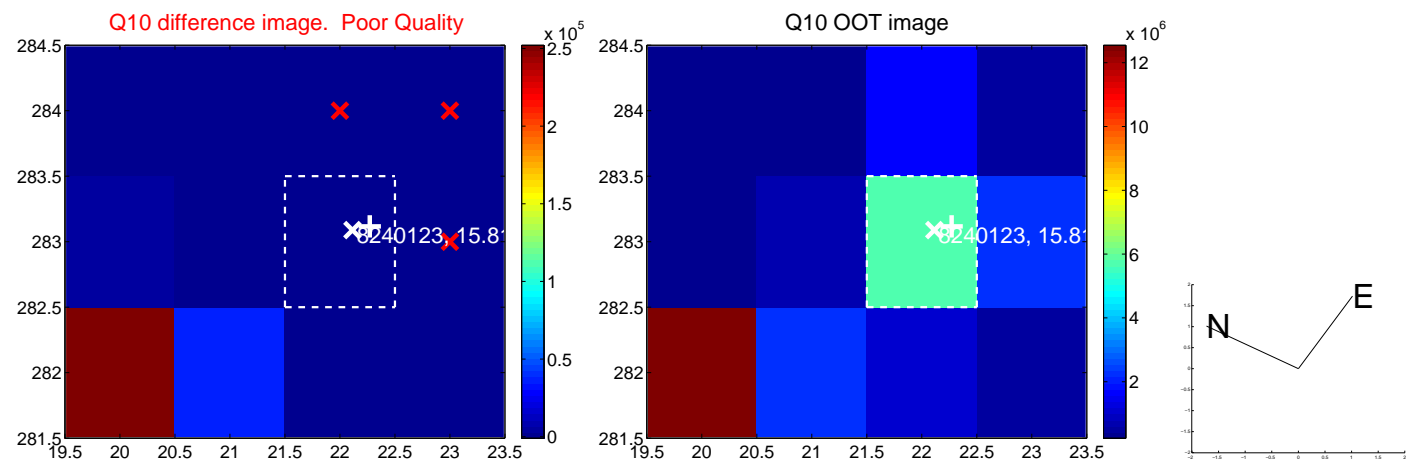
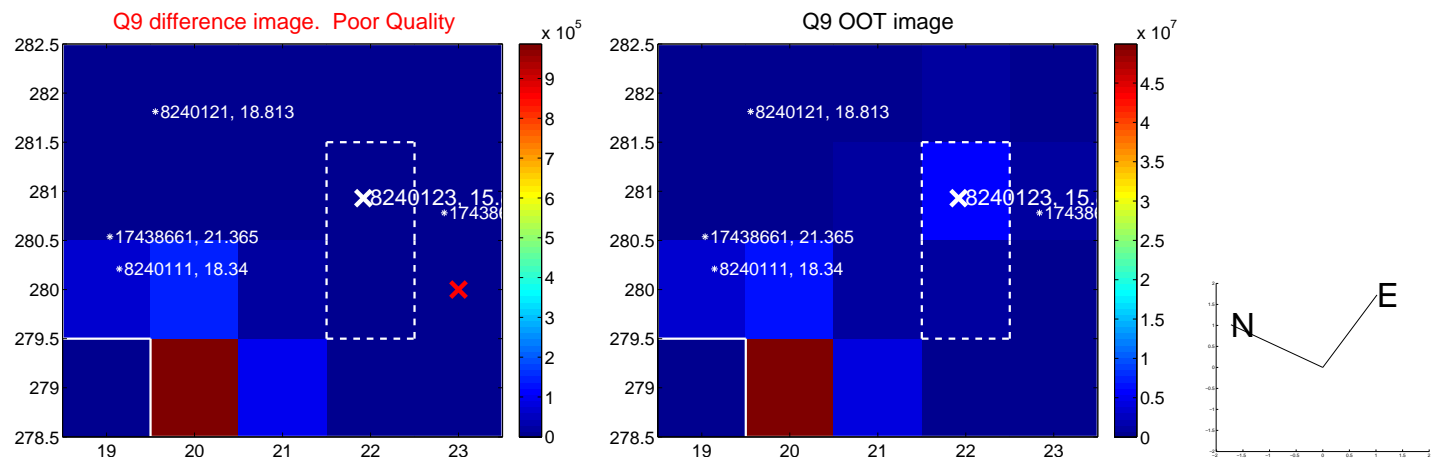
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

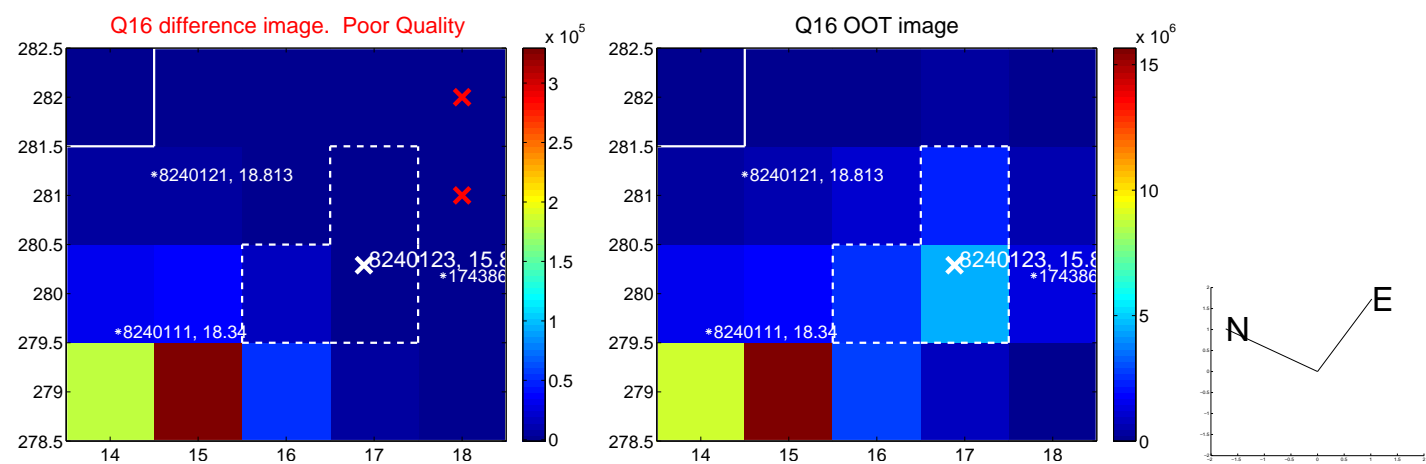
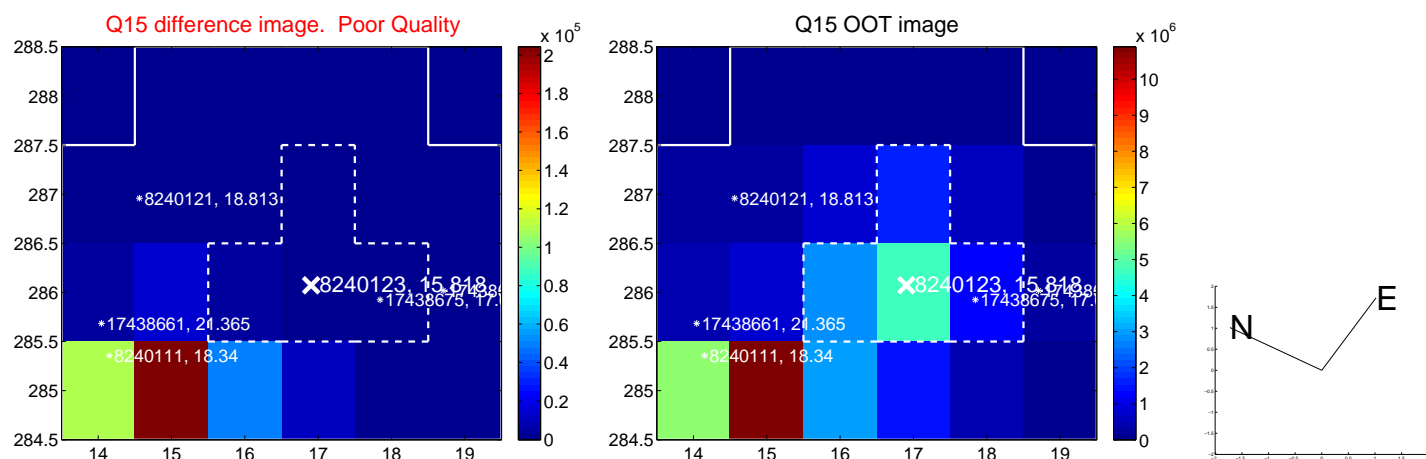
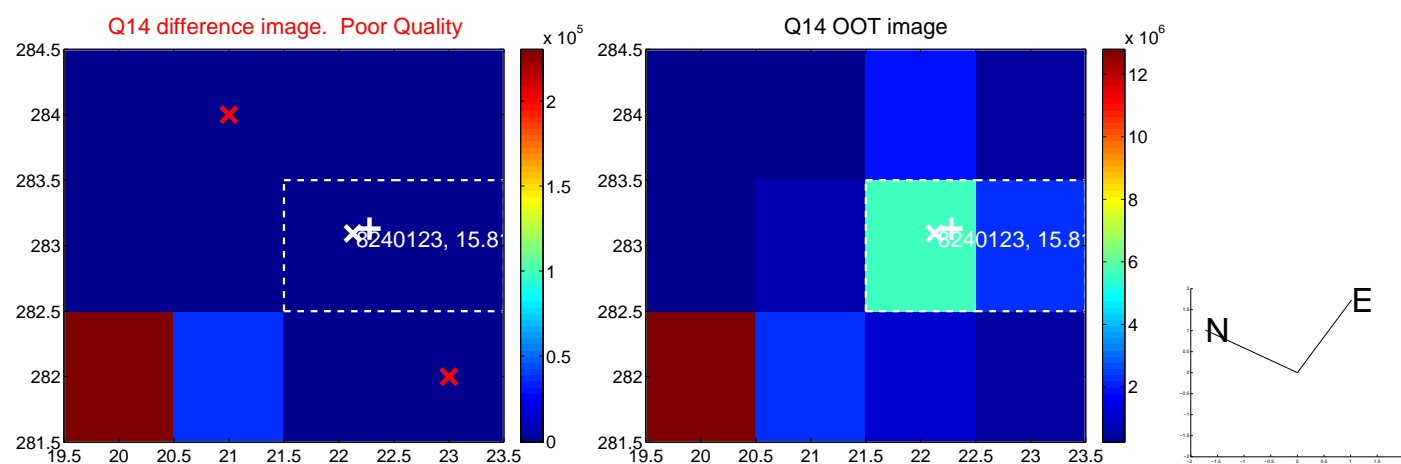
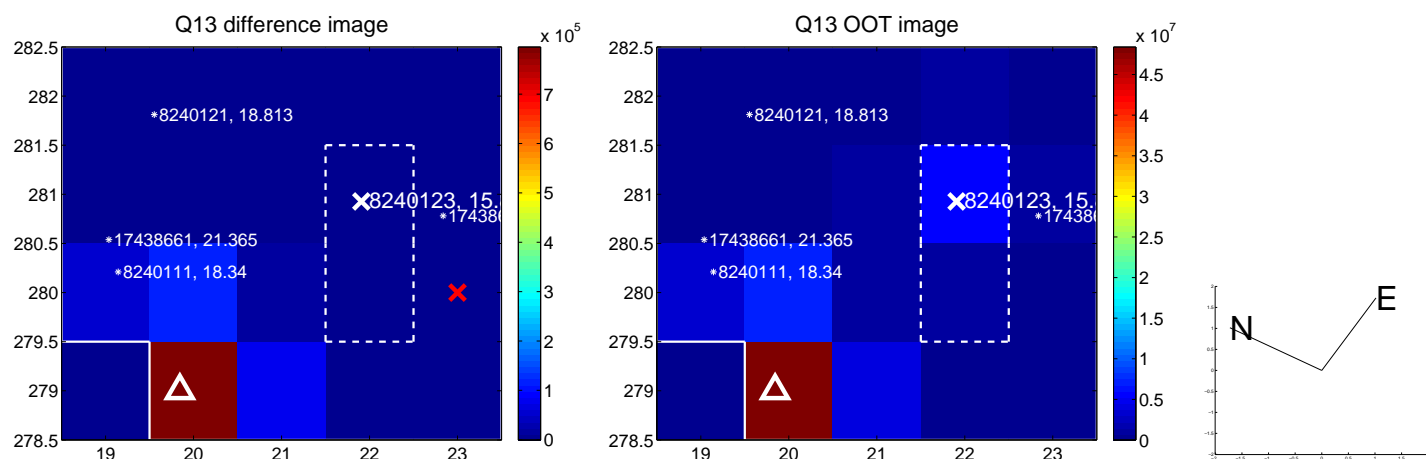


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

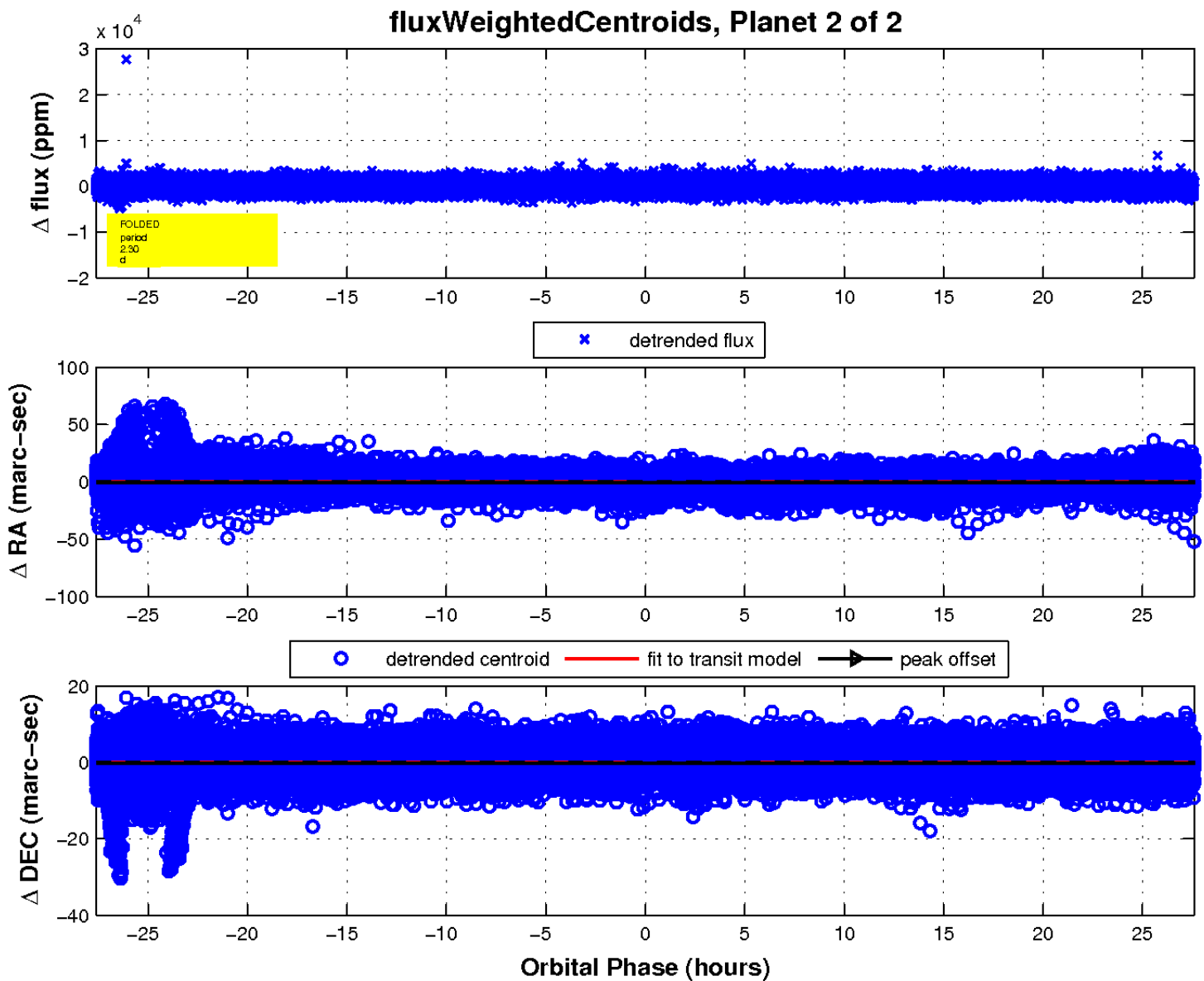
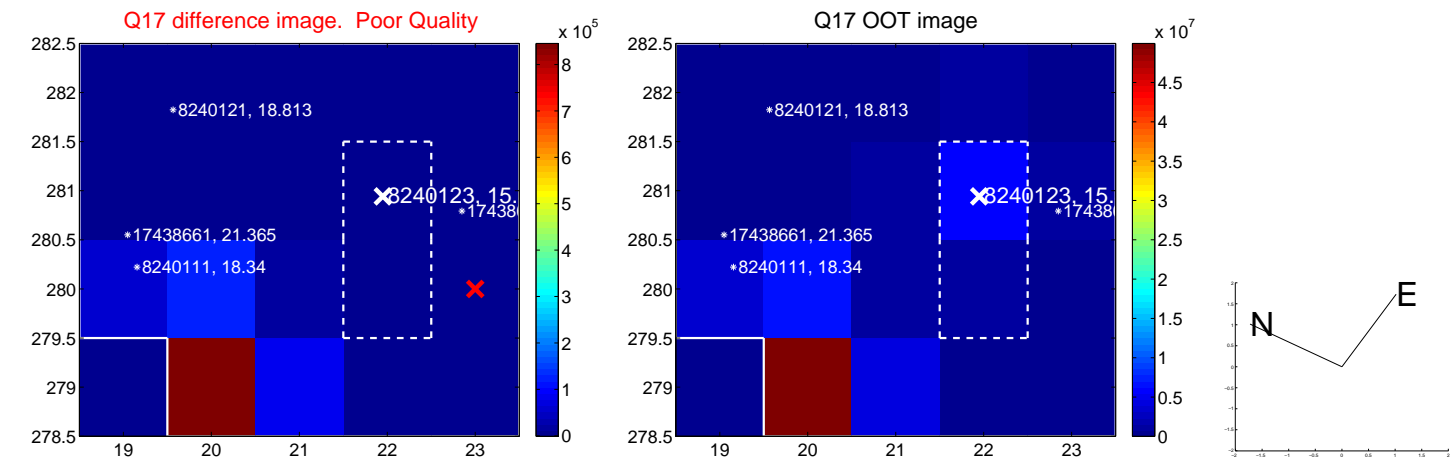




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



# UKIRT Image

Declination

