

# KIC 009851123

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009851123-01	OBS	6074.01	8.480246	135.858753	2424.4	6.830	456.5	80.8	0.81	5478	4.15	86.14
009851123-02	OBS	No	8.480356	132.704854	852.8	8.288	49.9	35.5	0.81	5478	2.77	86.14
009851123-03	OBS	No	477.383250	136.395905	888.2	12.368	8.4	7.0	0.81	5478	2.88	0.40

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009851123-01	OBS	FP	0.00	0	1	1	1	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—SEASONAL_DEPTH_DV—SEASONAL_DEPTH_ALT—CENT_RESOLVED_OFFSET—HALO_GHOST—EPHEM_MATCH
009851123-02	OBS	FP	0.00	1	1	0	1	IS_SEC_TCE—EPHEM_MATCH
009851123-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS

**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 009851123-01

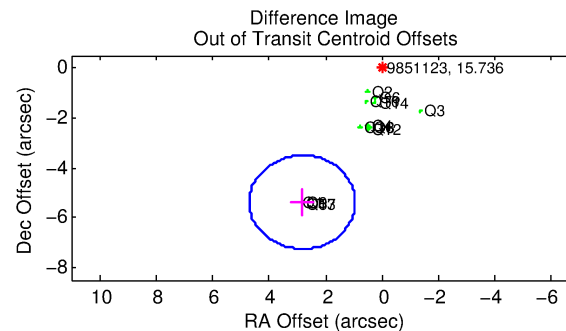
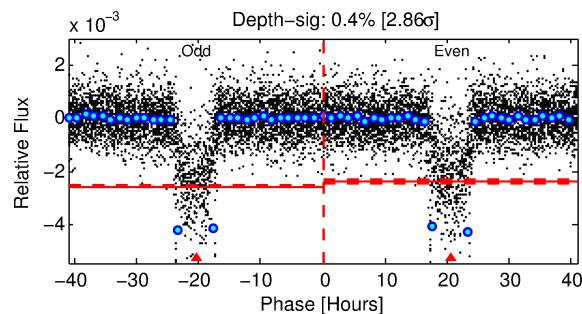
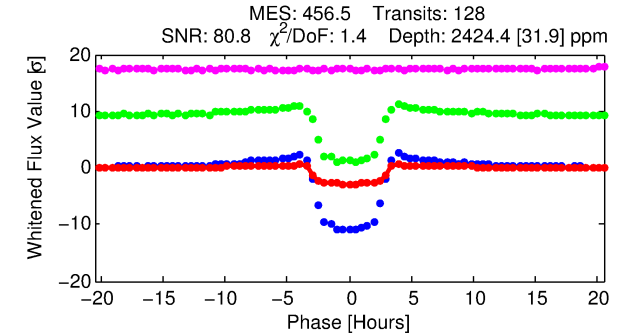
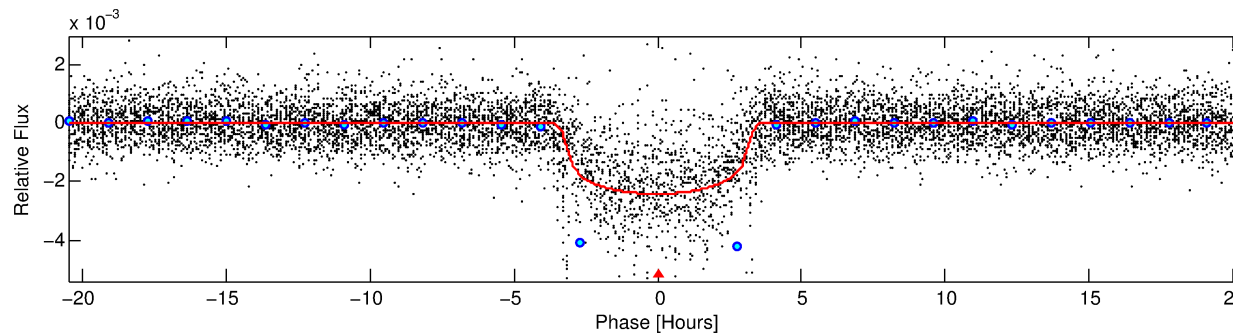
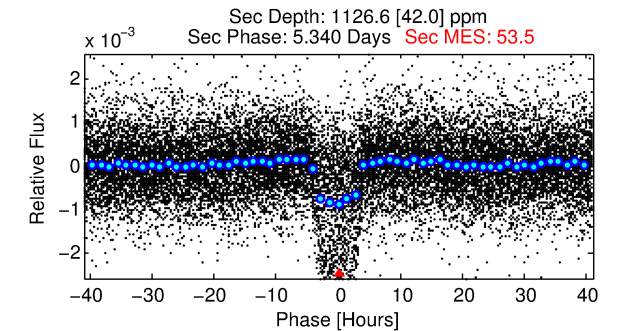
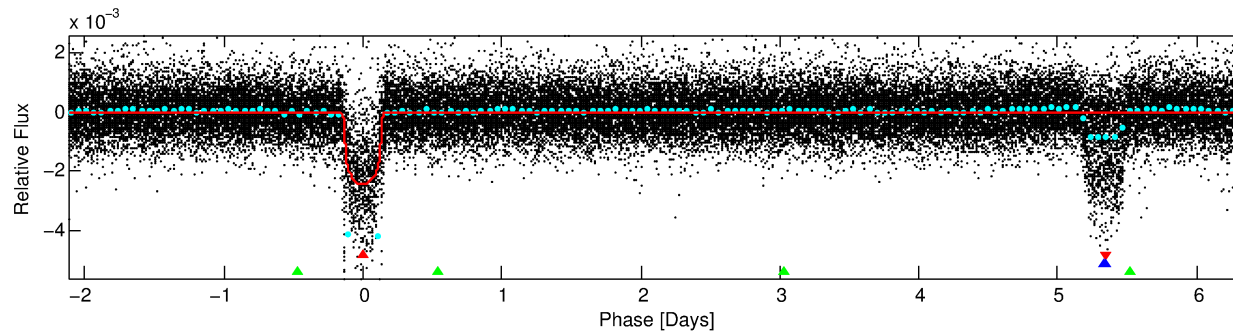
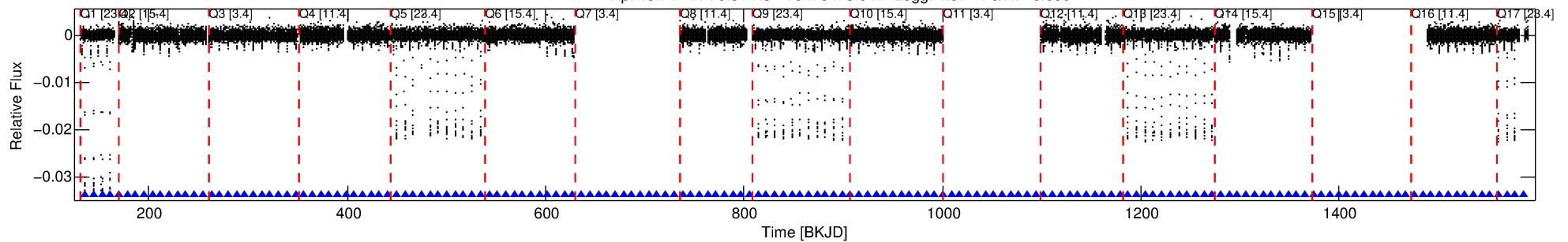
TCE (1)	KIC	Parent (2)	Parent KIC	P <sub>1</sub> :P <sub>2</sub>	Dist ( $''$ )	$\Delta$ Row	$\Delta$ Col	m <sub>2</sub>	m <sub>1</sub>	D <sub>2</sub> /D <sub>1</sub>	Mechanism	Flag	$\sigma_P$	$\sigma_T$
009851123-01	9851123	009851142-pri	9851142	1:1	56.7	-3	14	7.63	15.74	37.58	Direct-PRF	0	0.26	0.11

**Notes:** P<sub>1</sub>:P<sub>2</sub> 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<sub>2</sub> and m<sub>1</sub> are the magnitudes of the parent and child. D<sub>2</sub>/D<sub>1</sub> 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: 9851123 Candidate: 1 of 3 Period: 8.480 d  
KOI: K06074.01 Corr: 0.974

Kp: 15.74 R\*: 0.81 Rs Teff: 5478.0 K Logg: 4.57 Fe/H: -0.080



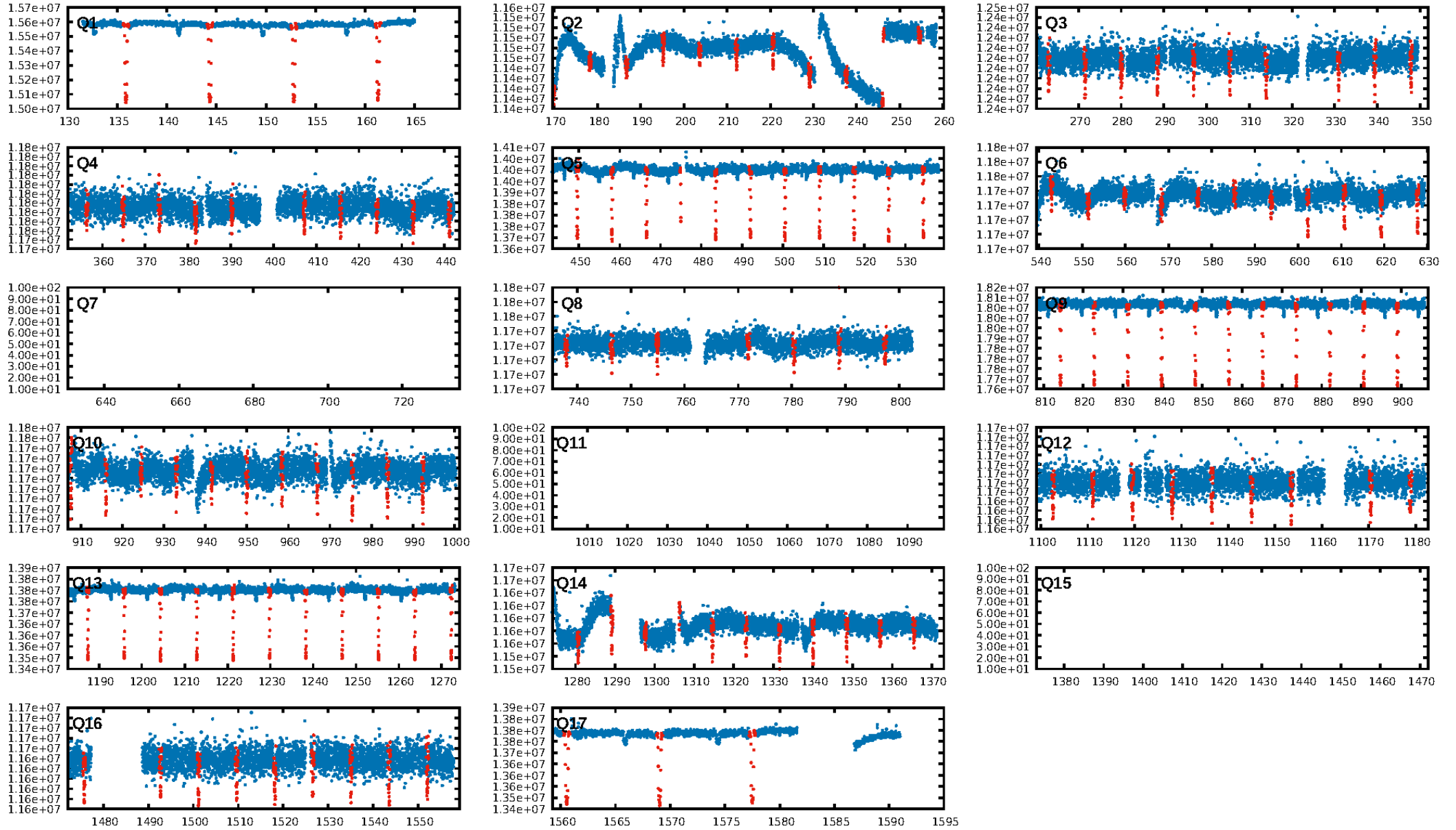
## DV Fit Results:

Period = 8.48025 [0.00002] d  
Epoch = 135.8588 [0.0013] BKJD  
Rp/R\* = 0.0468 [0.0025]  
a/R\* = 8.19 [1.67]  
b = 0.60 [0.23]  
Seff = 86.14 [25.64]  
Teff = 777 [58] K  
Rp = 4.15 [0.98] Re  
a = 0.0786 [0.0148] AU  
Ag = 222.66 [64.50] [3.44σ]  
Teffp = 4640 [200] K [18.52σ]

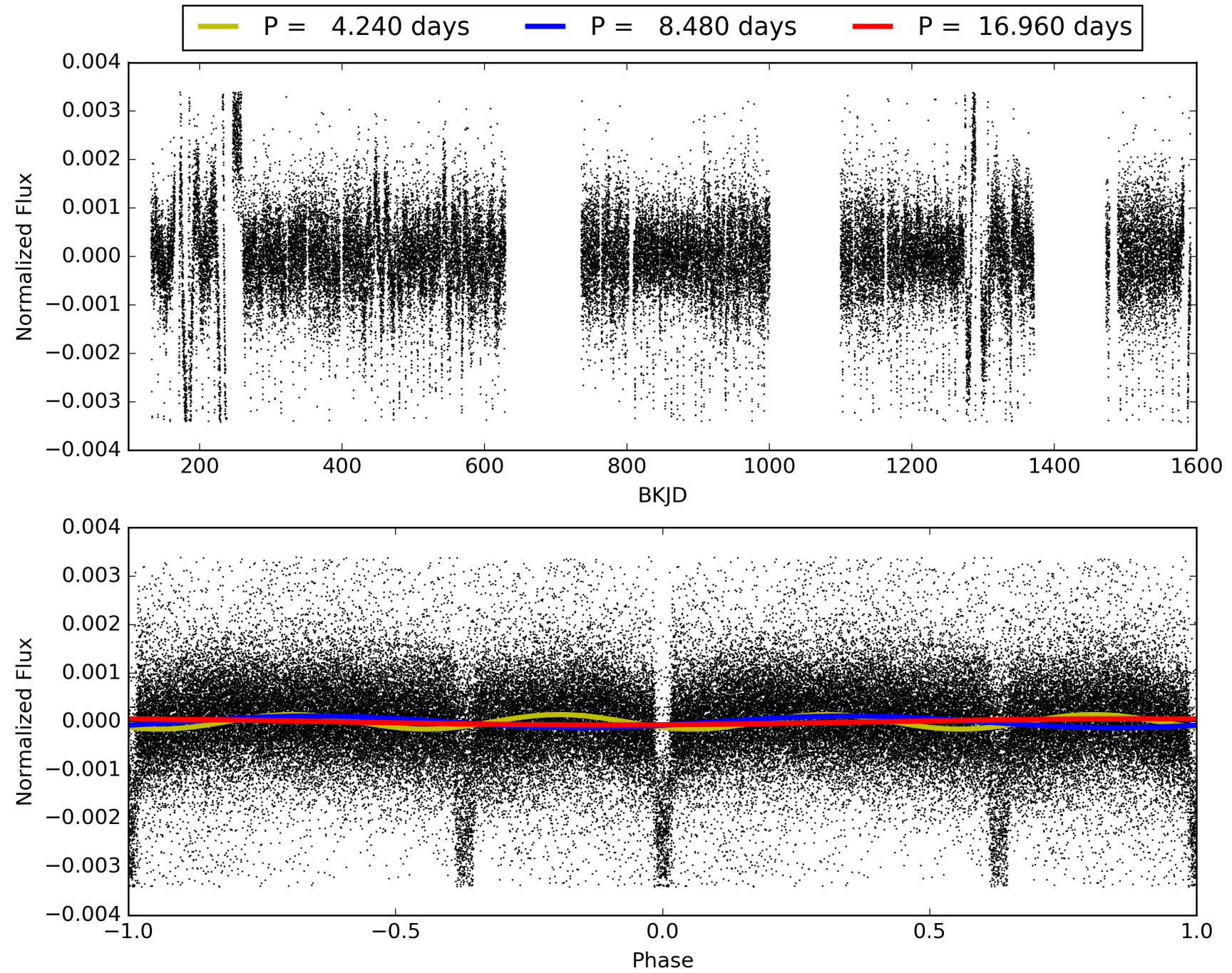
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [121/121]  
GhostDiagnostic-chr: -0.02836  
Centroid-sig: N/A  
Centroid-so: 3.330 arcsec [28.91σ]  
OotOffset-rm: 6.082 arcsec [9.74σ]  
KicOffset-rm: 7.745 arcsec [9.69σ]  
OotOffset-st: 4/1/4/5 [14]  
KicOffset-st: 4/1/4/5 [14]  
DiffImageQuality-fgm: 0.00 [0/14]  
DiffImageOverlap-fno: 1.00 [14/14]

# TCE 009851123-01, PDC Light Curves

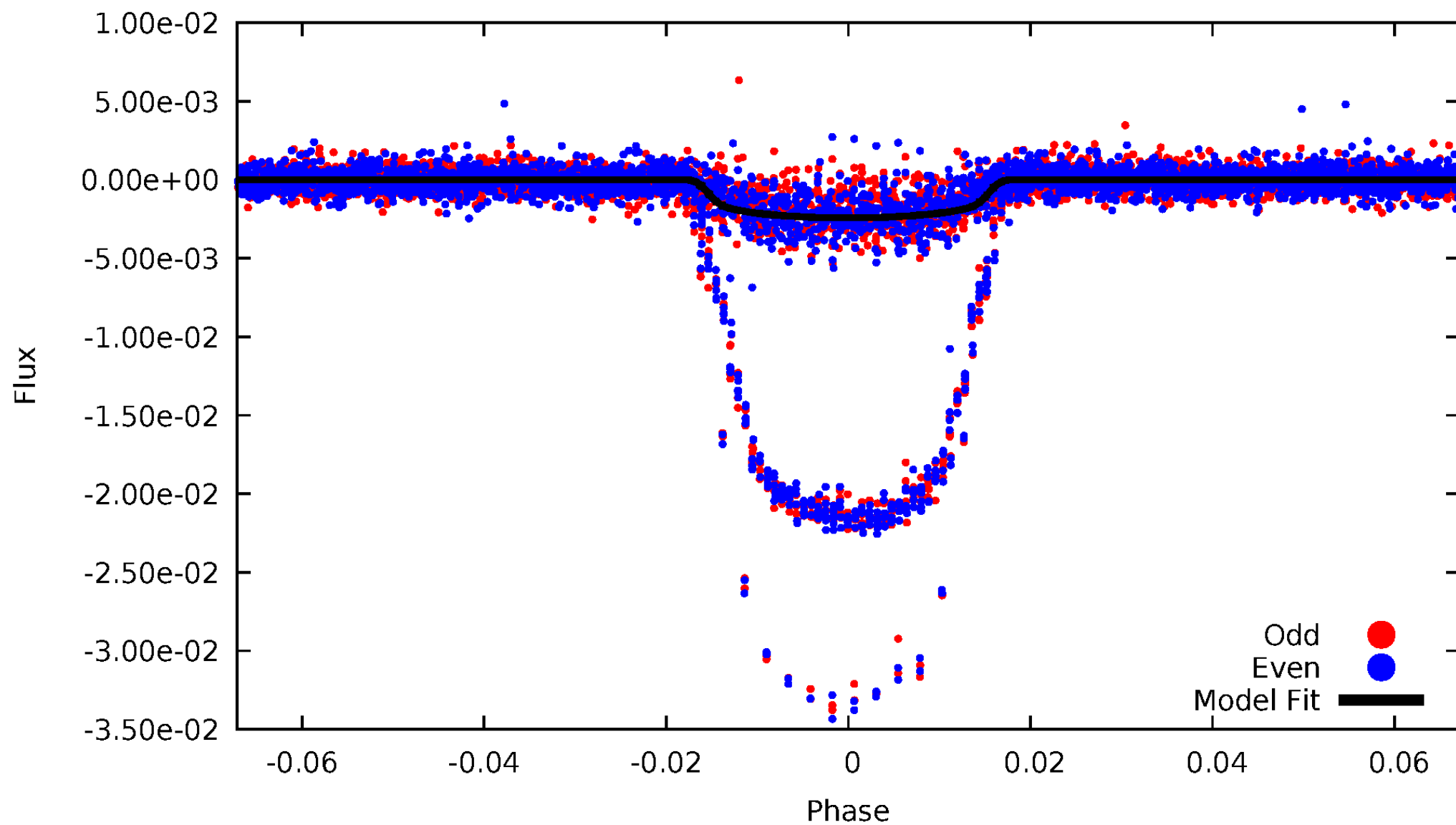


TCE 009851123-01



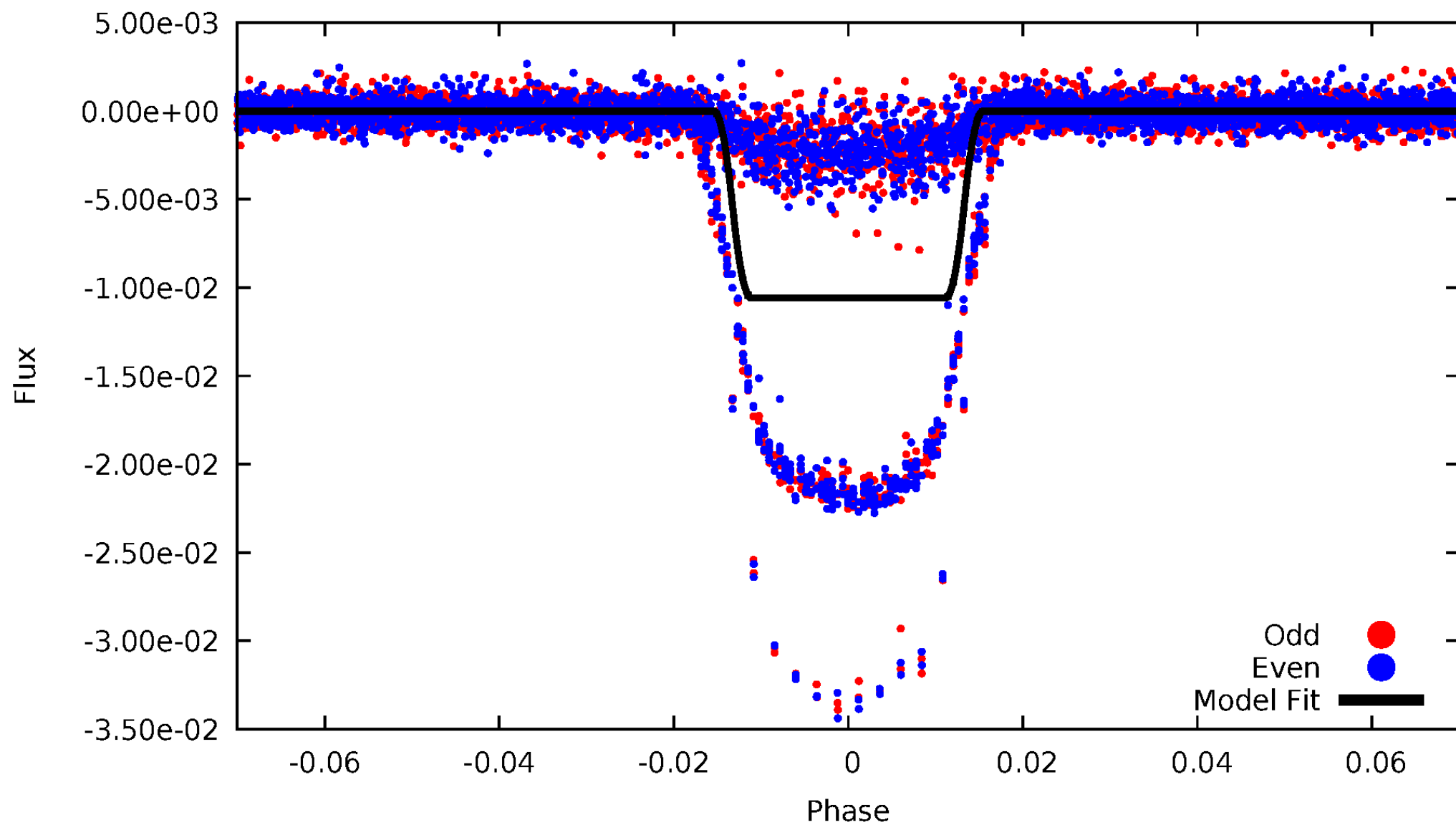
# DV Odd/Even

TCE 009851123-01



# ALT Odd/Even

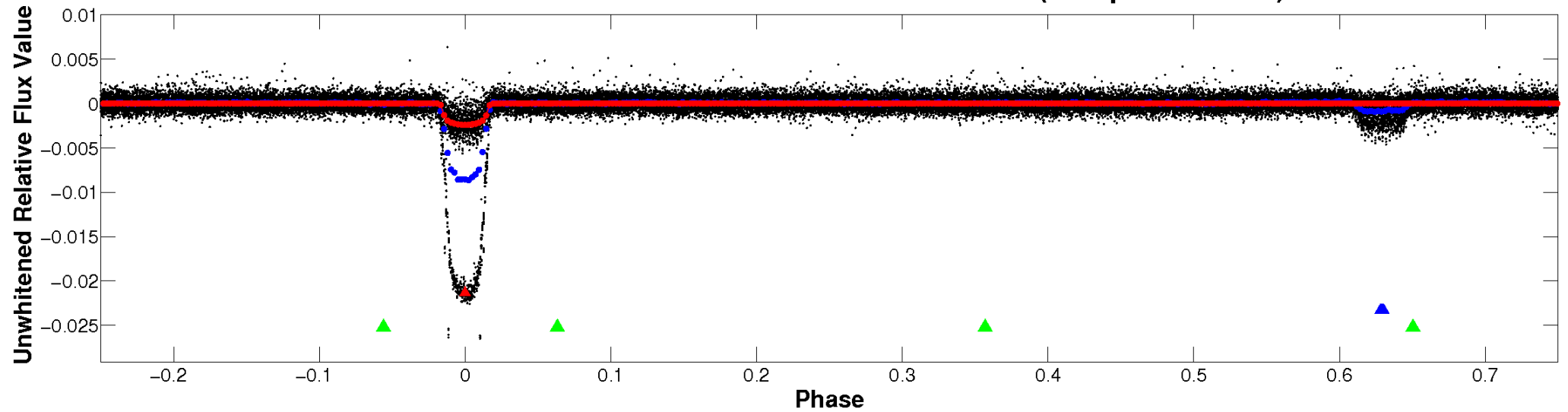
TCE 009851123-01



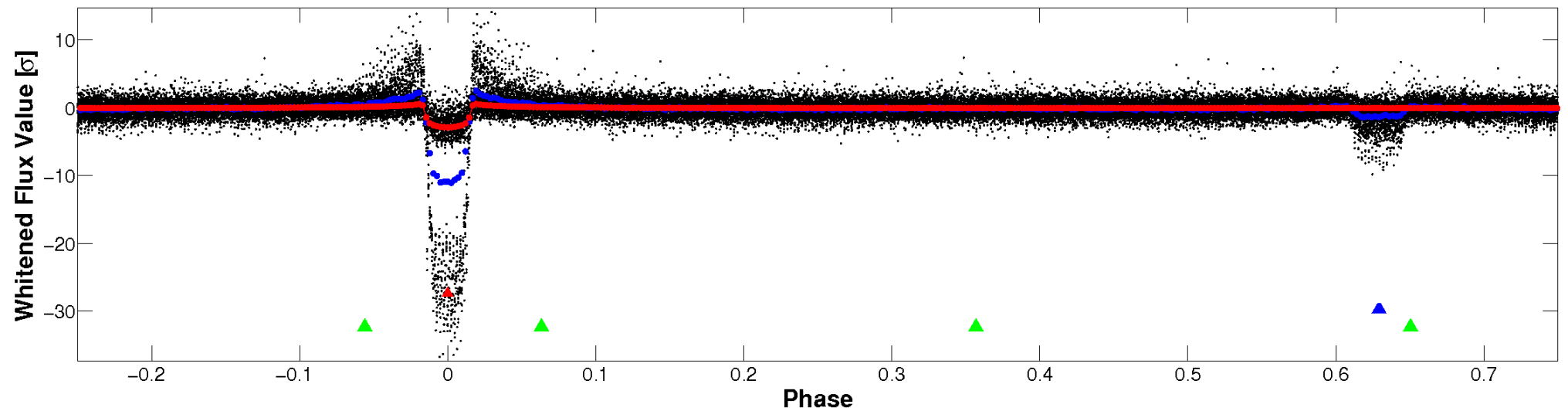


# Non-Whitened Vs. Whitened Light Curve

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

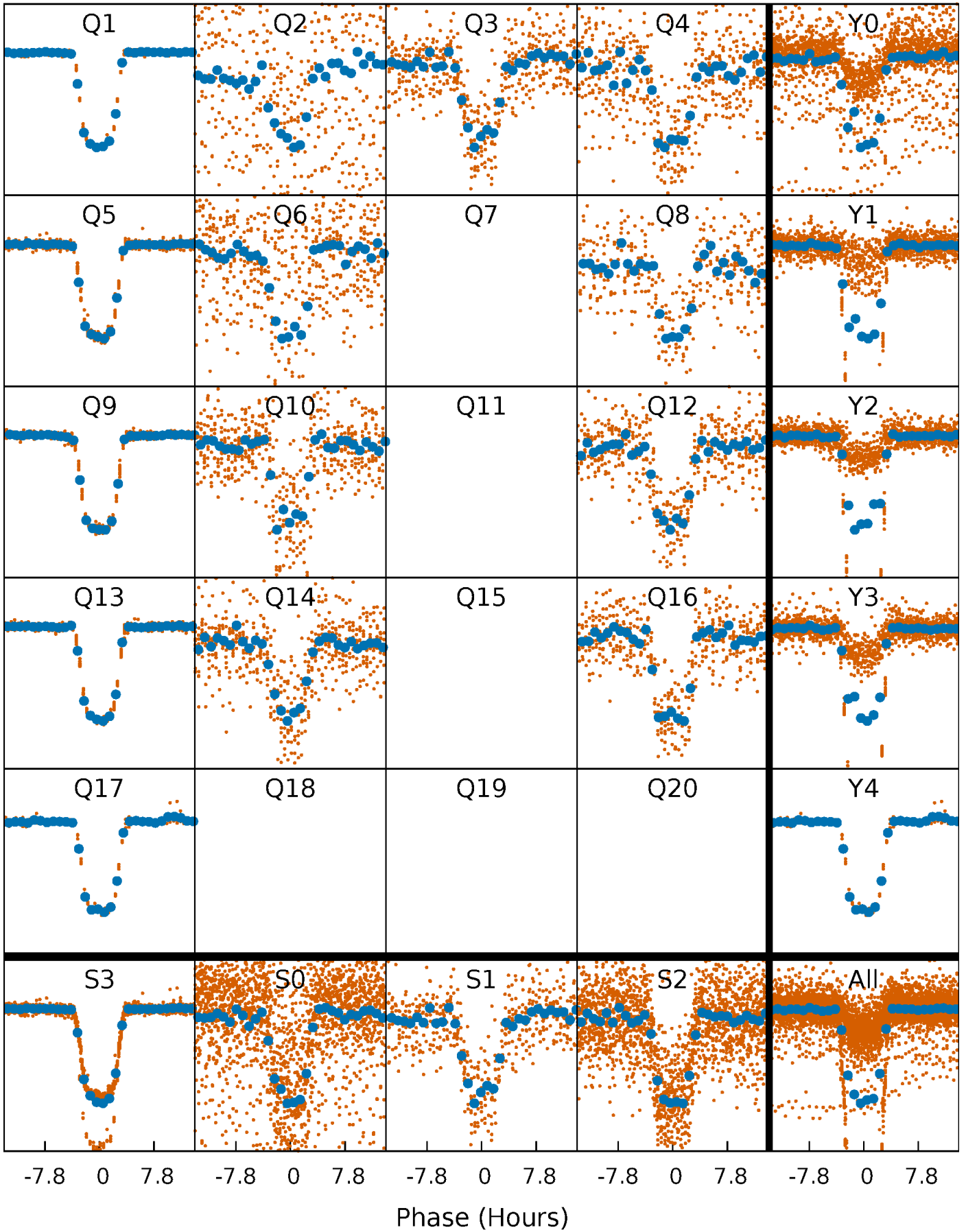


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

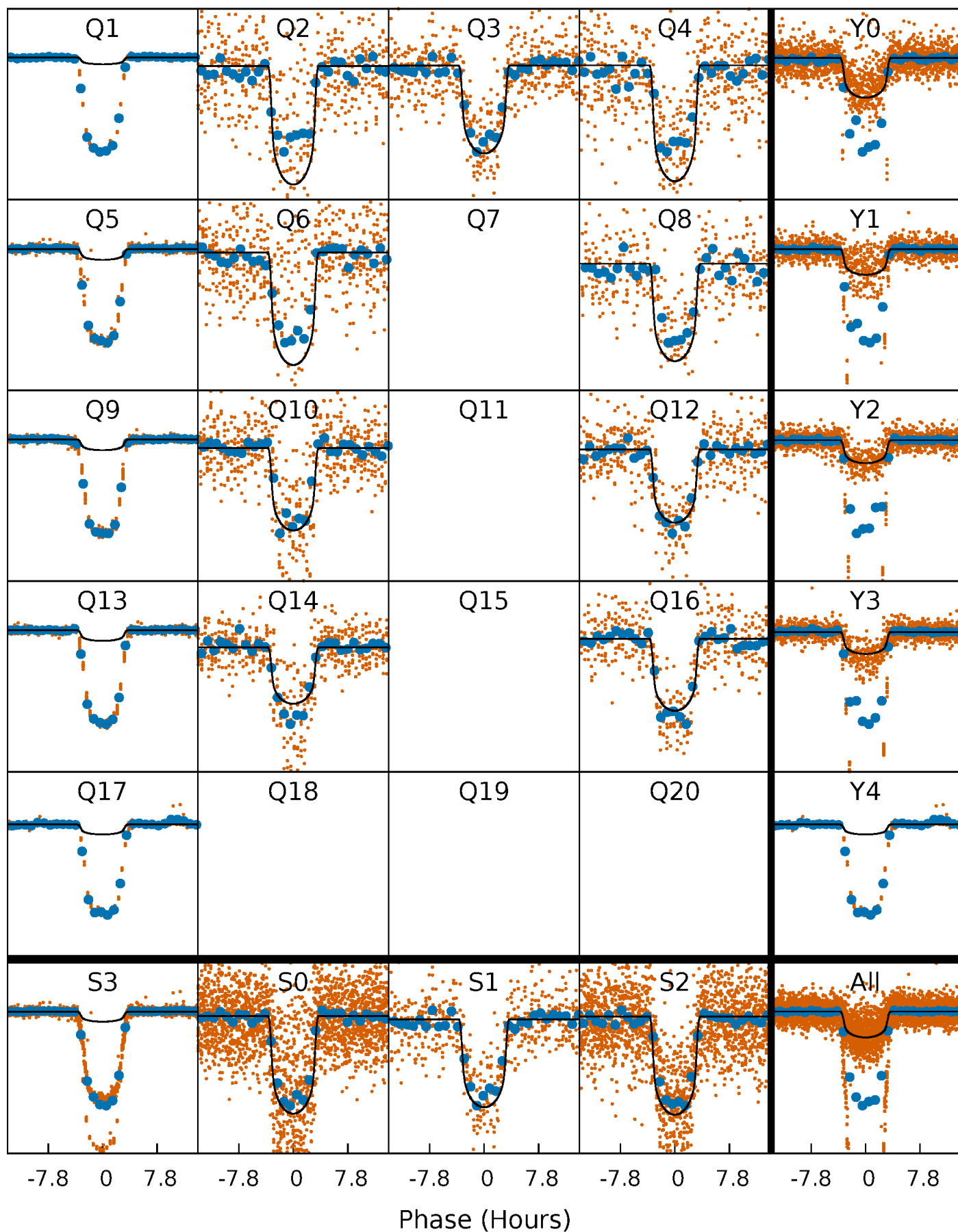
TCE 009851123-01 P= 8.480246 Days  $T_0=135.858753$  (BKJD)





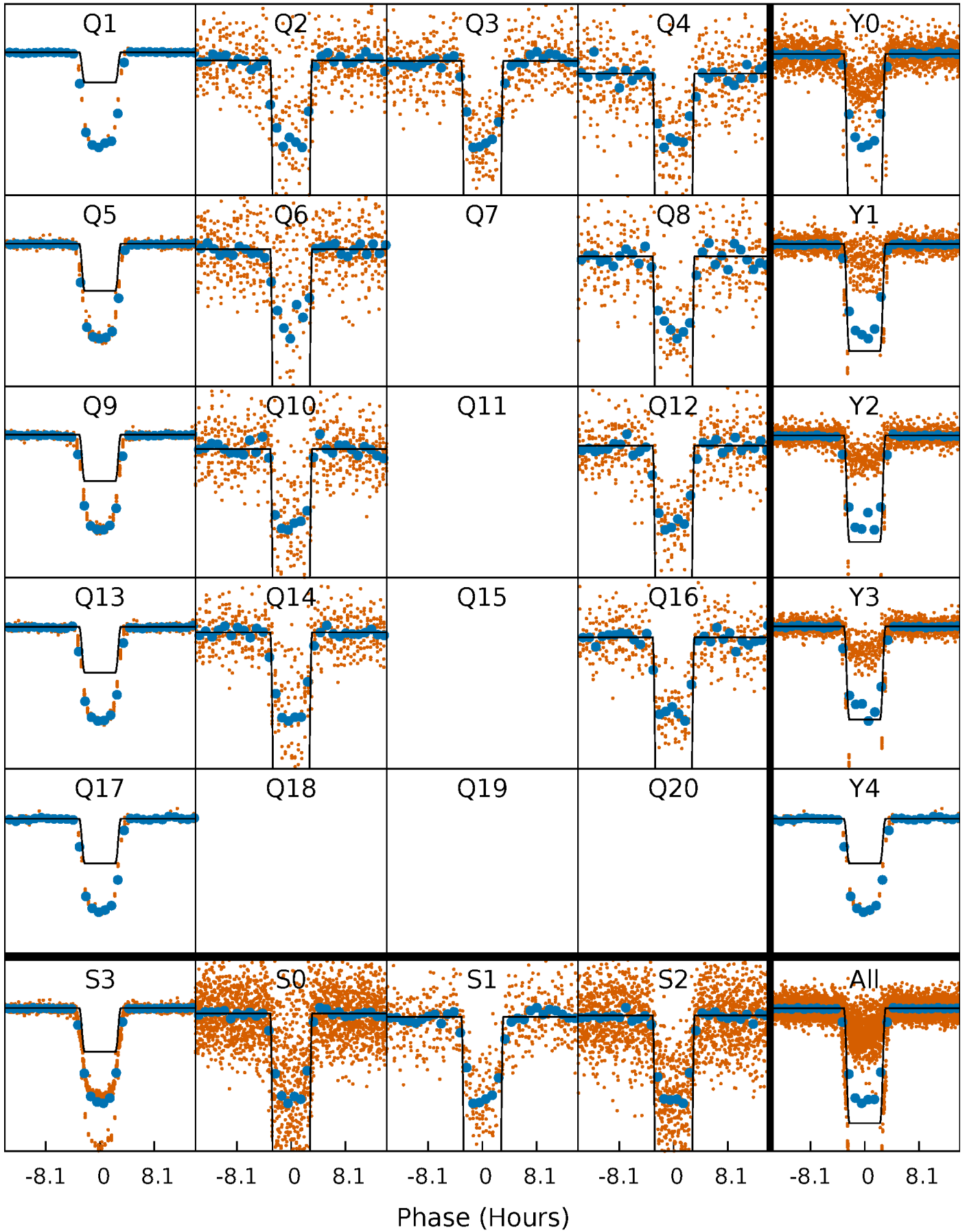
# DV Quarter-Phased Transit Curves

TCE 009851123-01 P= 8.480246 Days  $T_0=135.858753$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

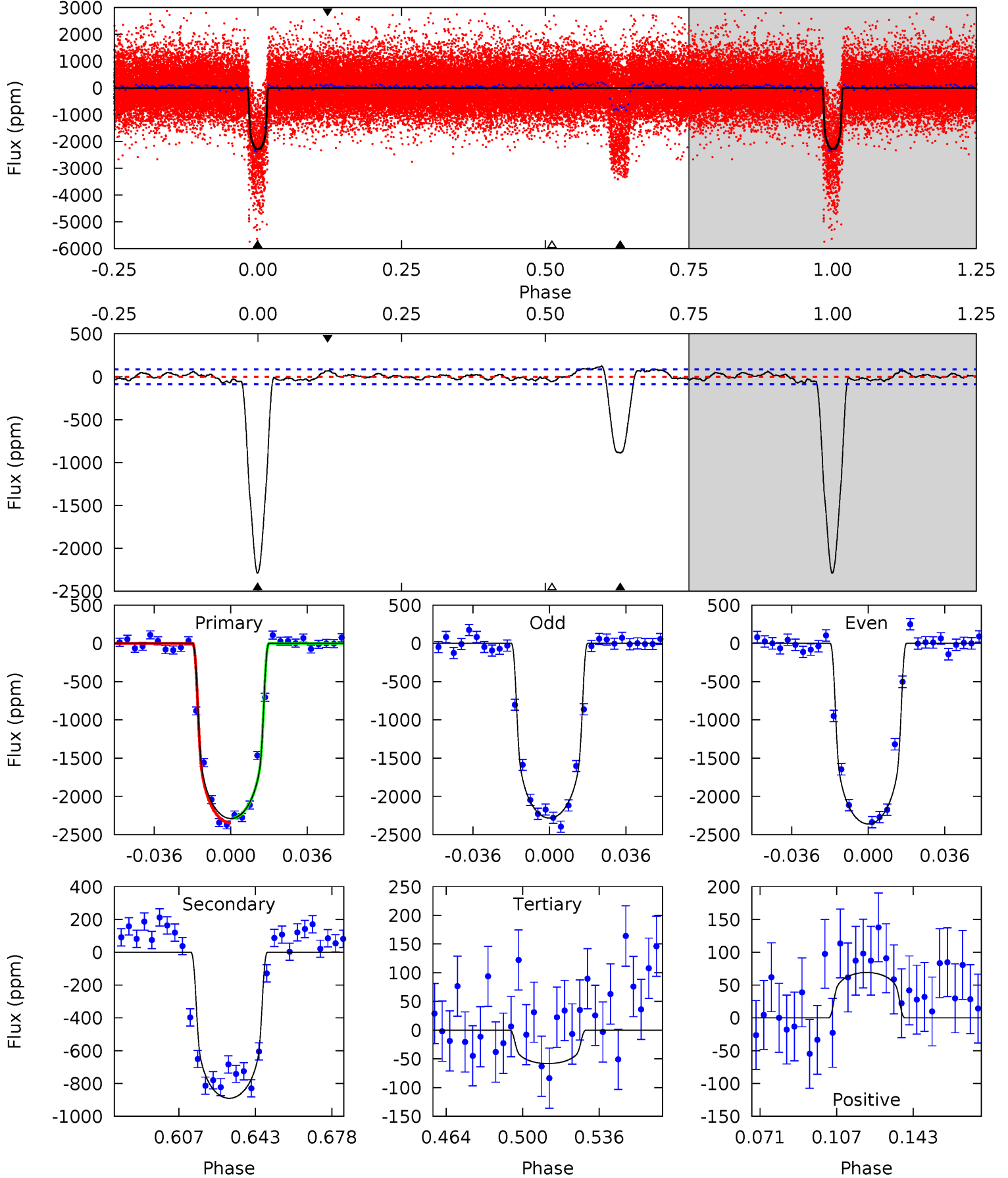
TCE 009851123-01 P= 8.480296 Days  $T_0=135.854126$  (BKJD)



# DV Model-Shift Uniqueness Test

009851123-01, P = 8.480246 Days, E = 127.378507 Days

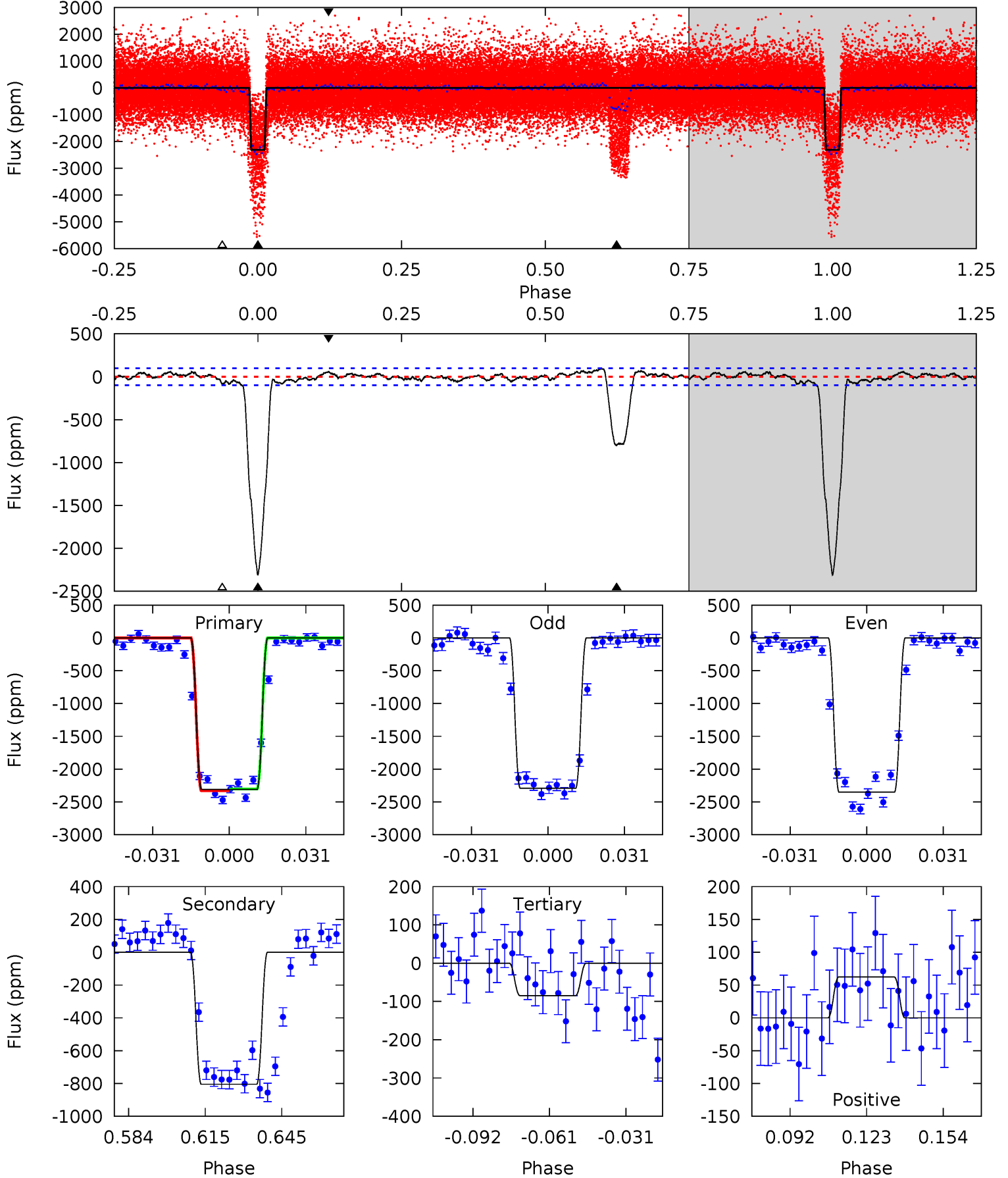
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
125.2	48.7	3.18	3.78	4.78	2.10	2.03	122.0	121.4	45.5	44.9	2.09	3.16	0.05	1.48



# Alt Model-Shift Uniqueness Test

009851123-01, P = 8.480296 Days, E = 127.373830 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
111.4	38.8	4.08	3.01	4.81	2.16	1.57	107.3	108.4	34.7	35.8	1.43	3.09	0.04	0



### Stellar Parameters For KIC 009851123

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5478^{+180}_{-164}$	$4.573^{+0.038}_{-0.142}$	$-0.080^{+0.300}_{-0.300}$	$0.812^{+0.188}_{-0.075}$	$0.906^{+0.081}_{-0.101}$	$2.382^{+0.454}_{-1.021}$
	+3%/-3%	+1%/-3%	+375%/-375%	+23%/-9%	+9%/-11%	+19%/-43%
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 009851123-01 / KOI 6074.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-890 \pm 18$	$4.29^{+0.52}_{-0.37}$	$1112^{+62}_{-50}$	$4534^{+162}_{-148}$	$162^{+29}_{-30}$
Alt.	$-804 \pm 21$	$9.30^{+1.14}_{-0.61}$	$1105^{+64}_{-47}$	$3382^{+85}_{-68}$	$31^{+4}_{-6}$

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

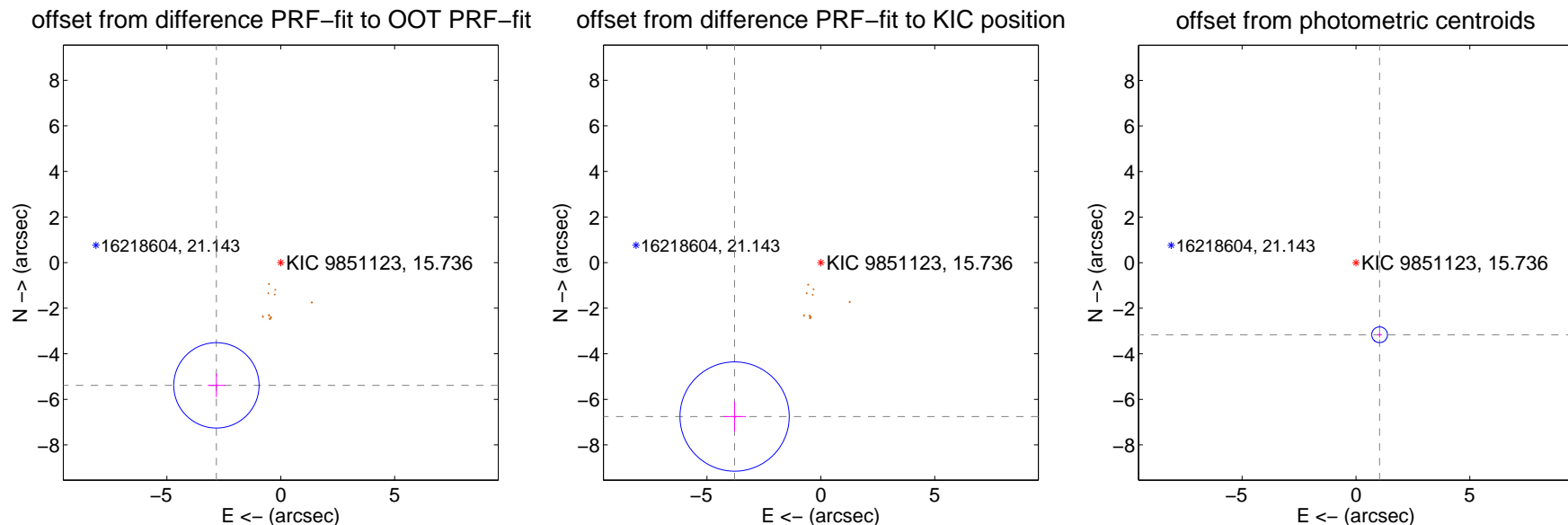
## DV Centroid Data

Supplemental centroid analysis for 009851123-01. Kepler magnitude: 15.74. Transit SNR 80.83

There are 0 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 1.62 arcsec

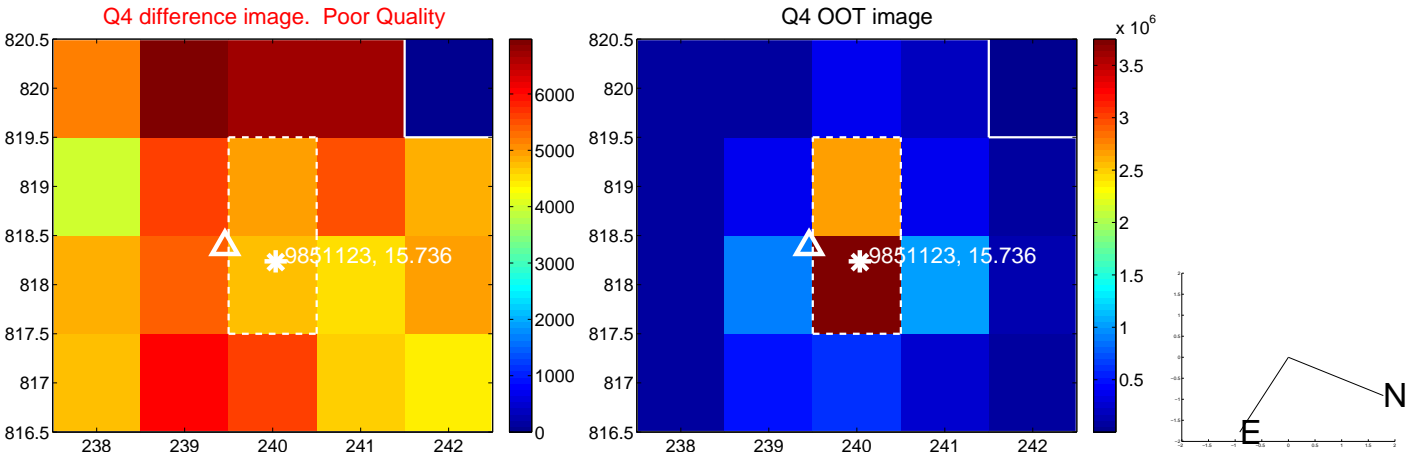
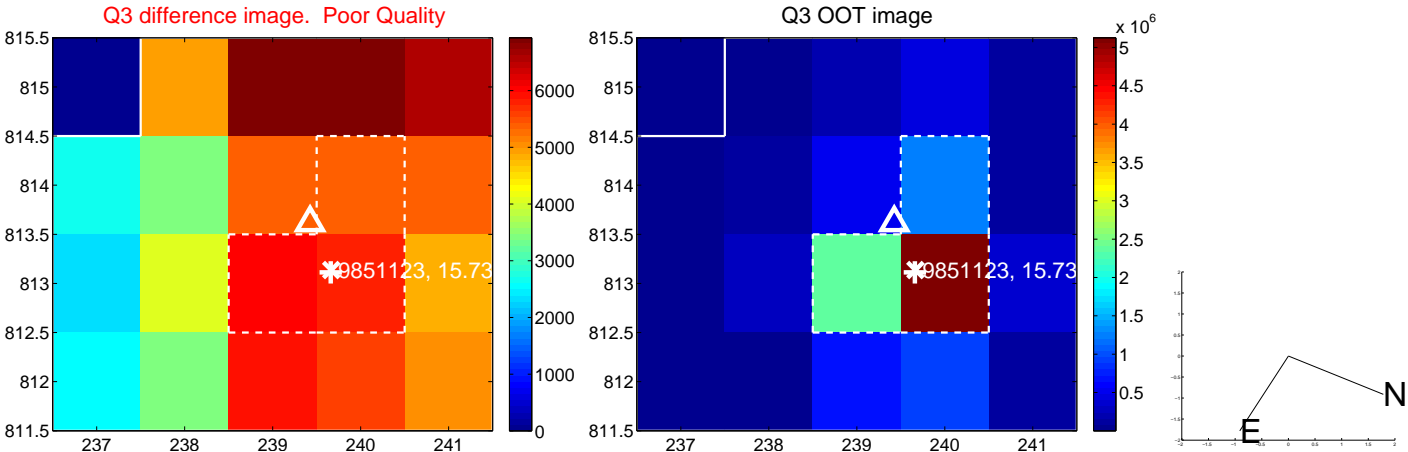
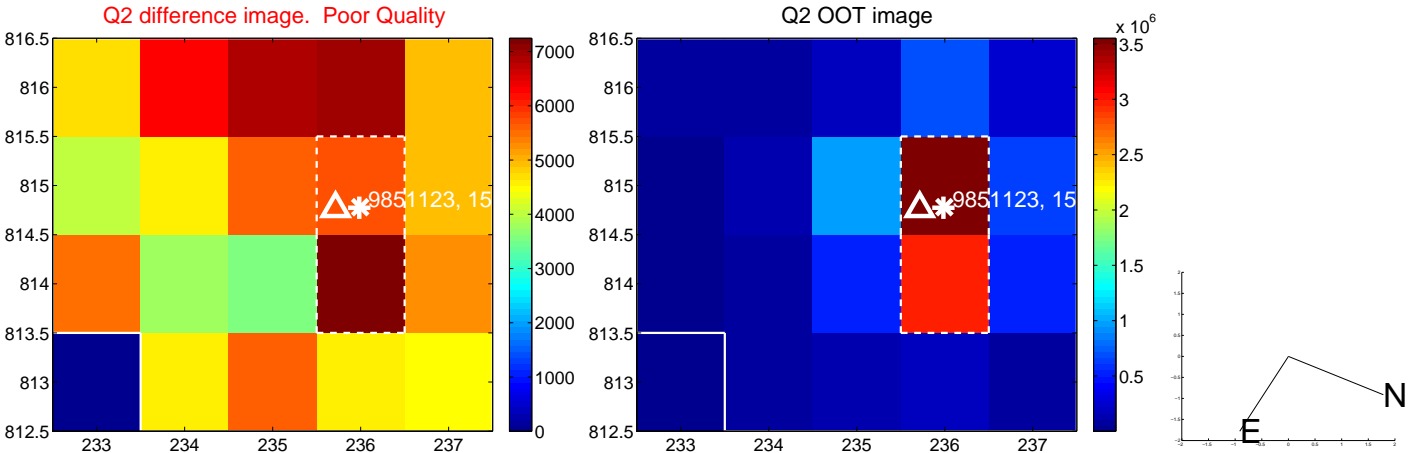
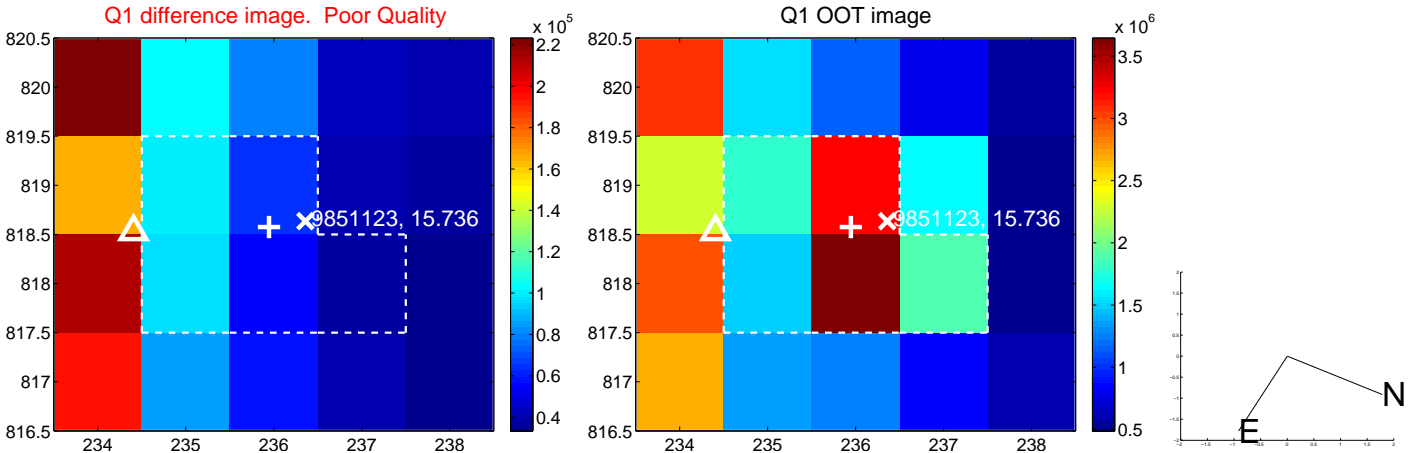
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$6.082 \pm 0.624$	9.74	$2.824 \pm 0.382$	$-5.387 \pm 0.517$
PRF-fit source offset from KIC position	$7.745 \pm 0.799$	9.69	$3.787 \pm 0.489$	$-6.756 \pm 0.652$
photometric centroid source offset	$3.33 \pm 0.12$	28.91	$-1.04 \pm 0.10$	$-3.16 \pm 0.12$



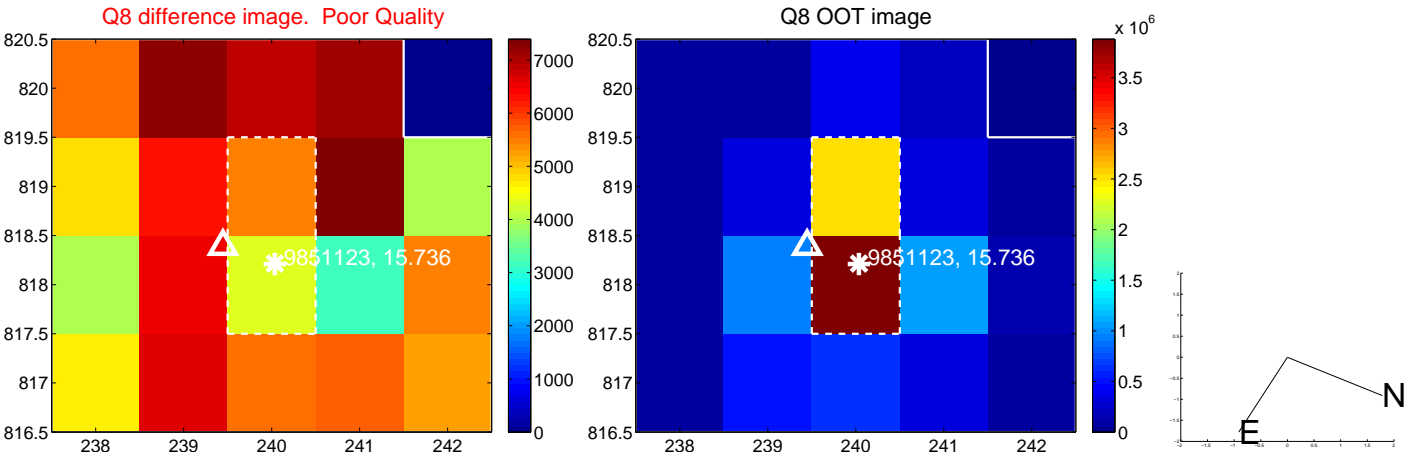
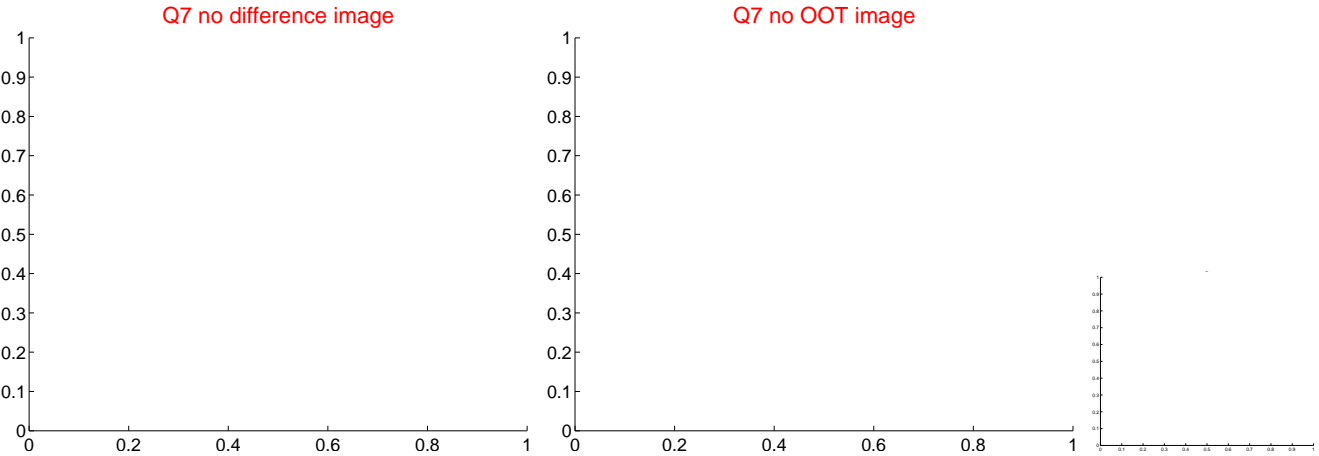
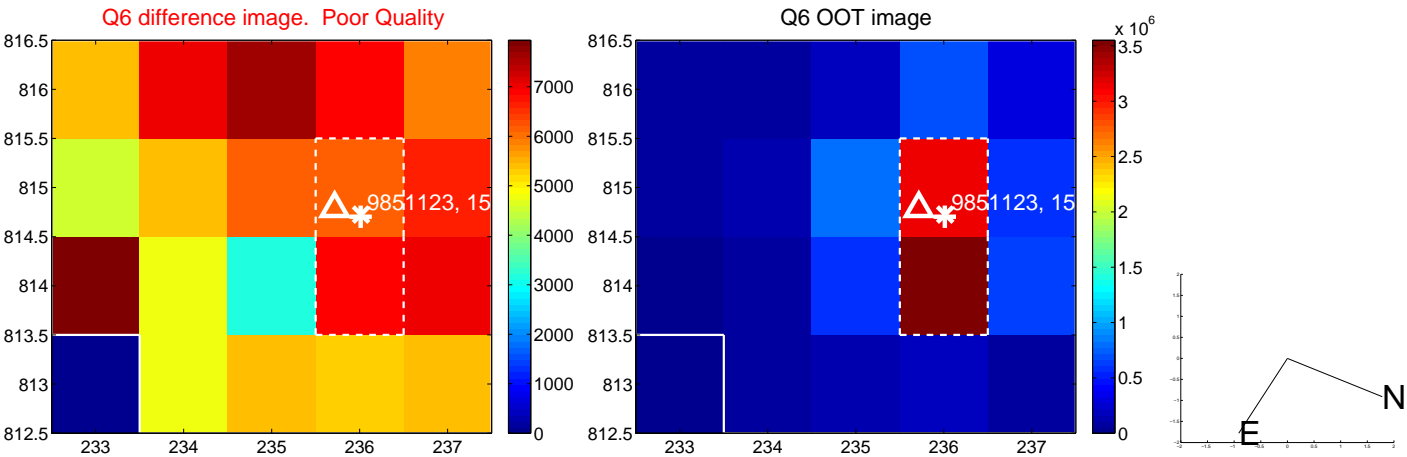
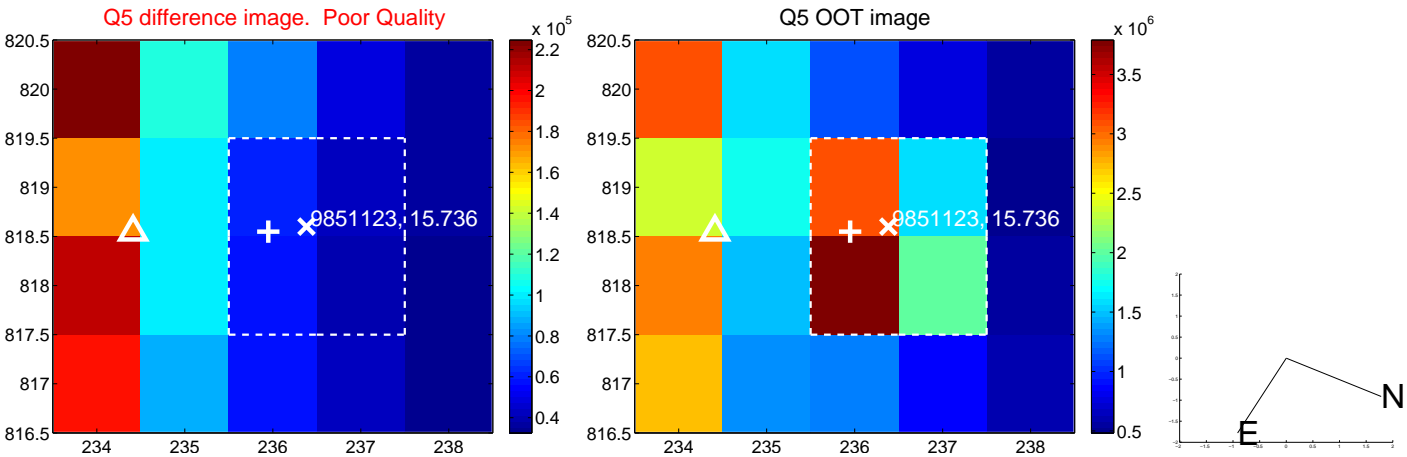
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



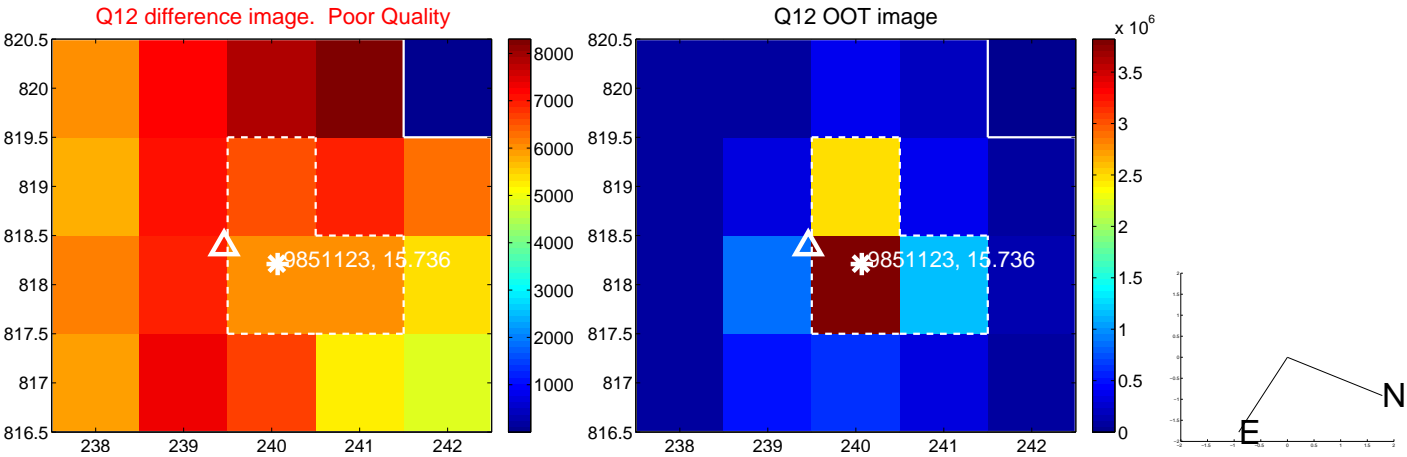
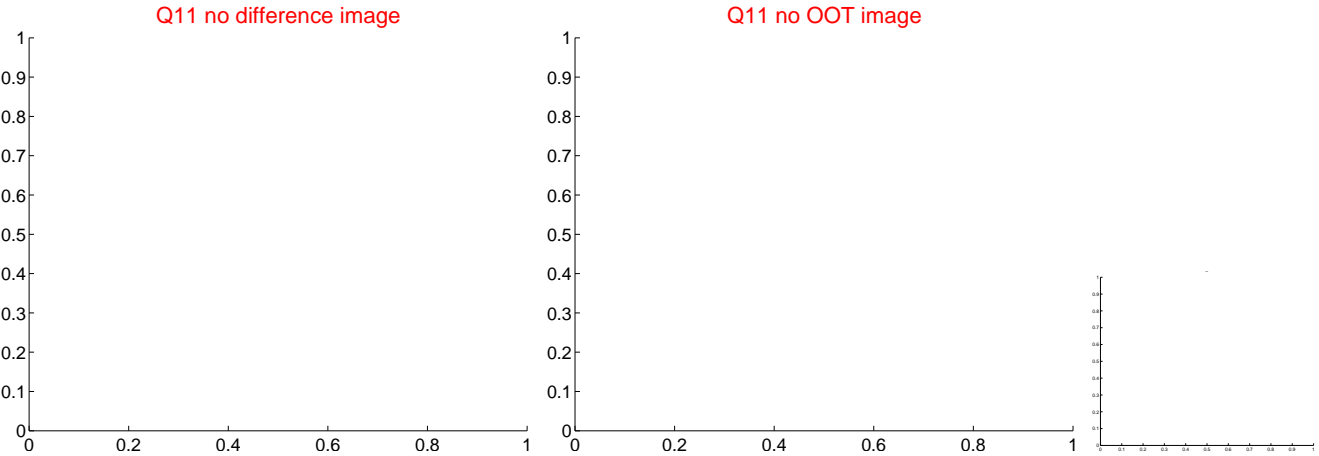
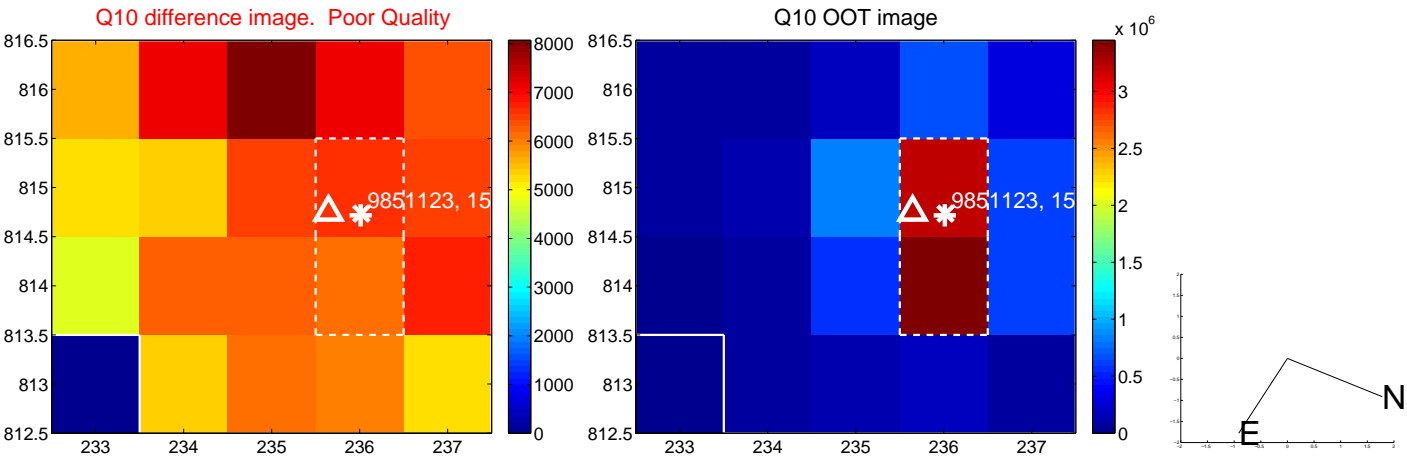
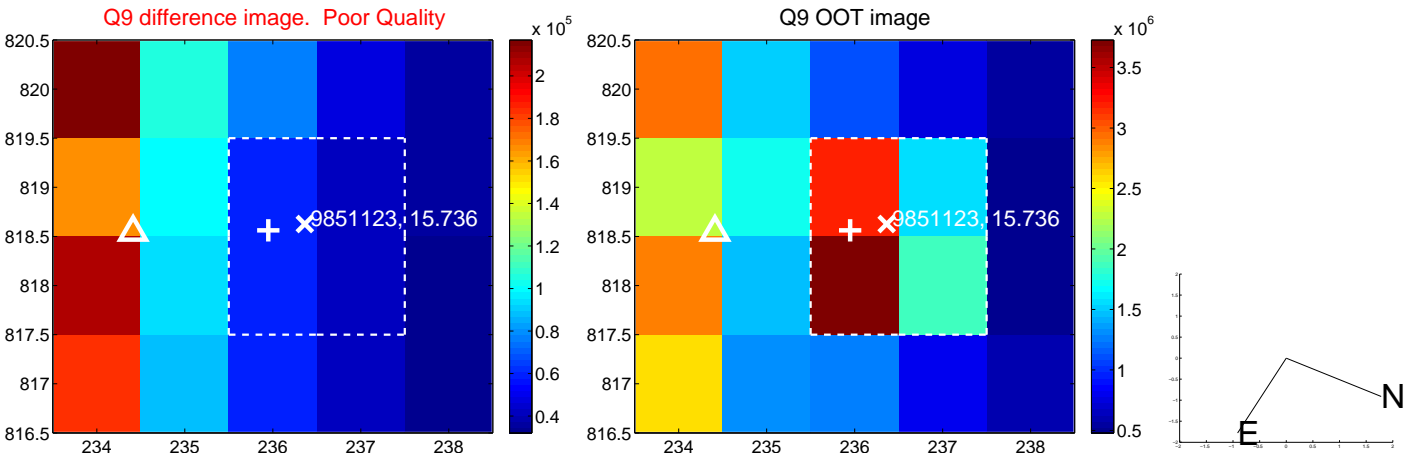
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



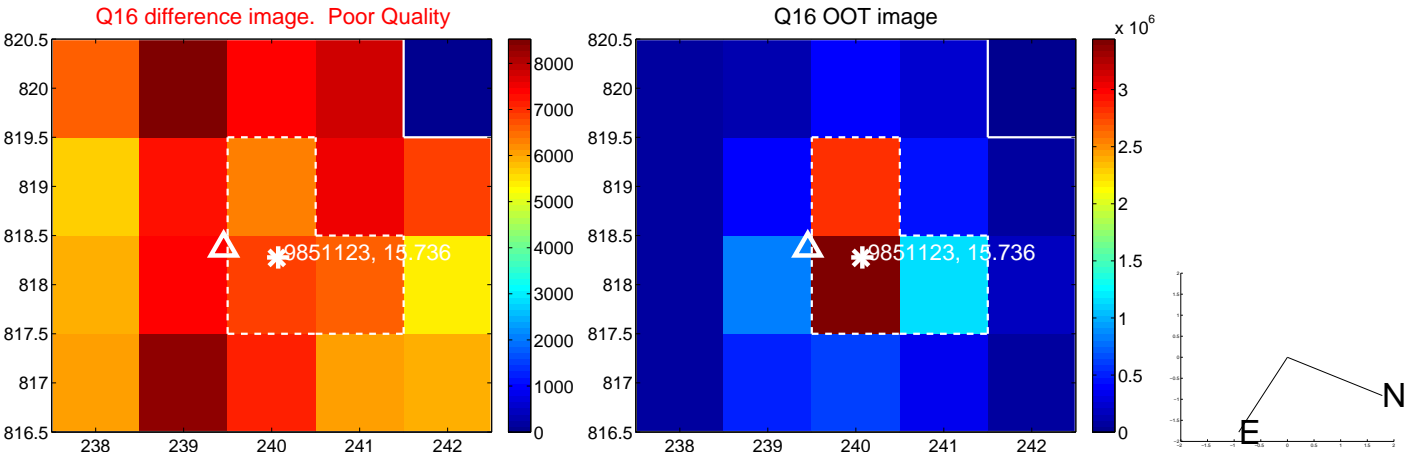
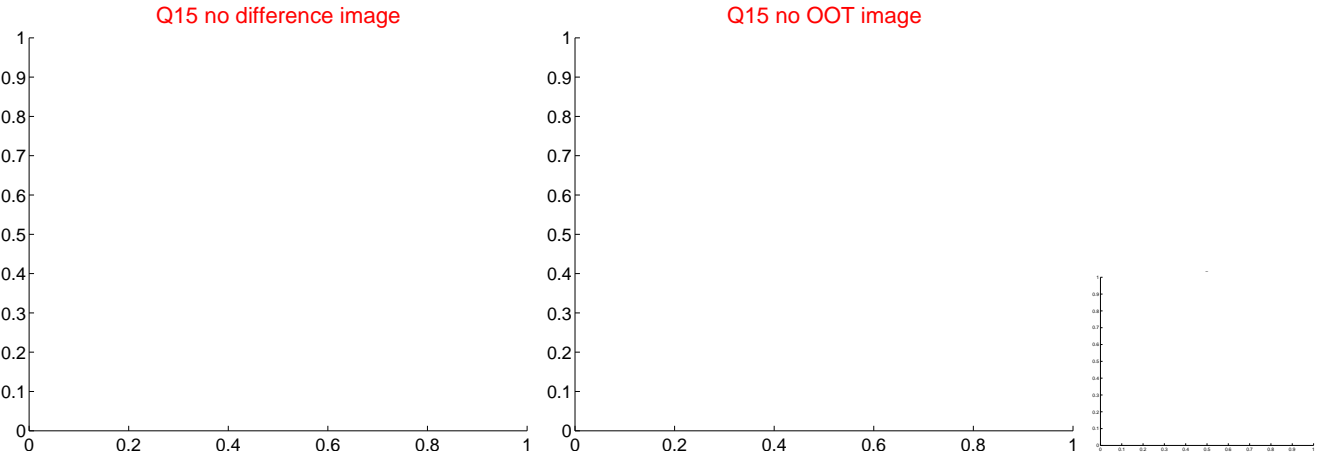
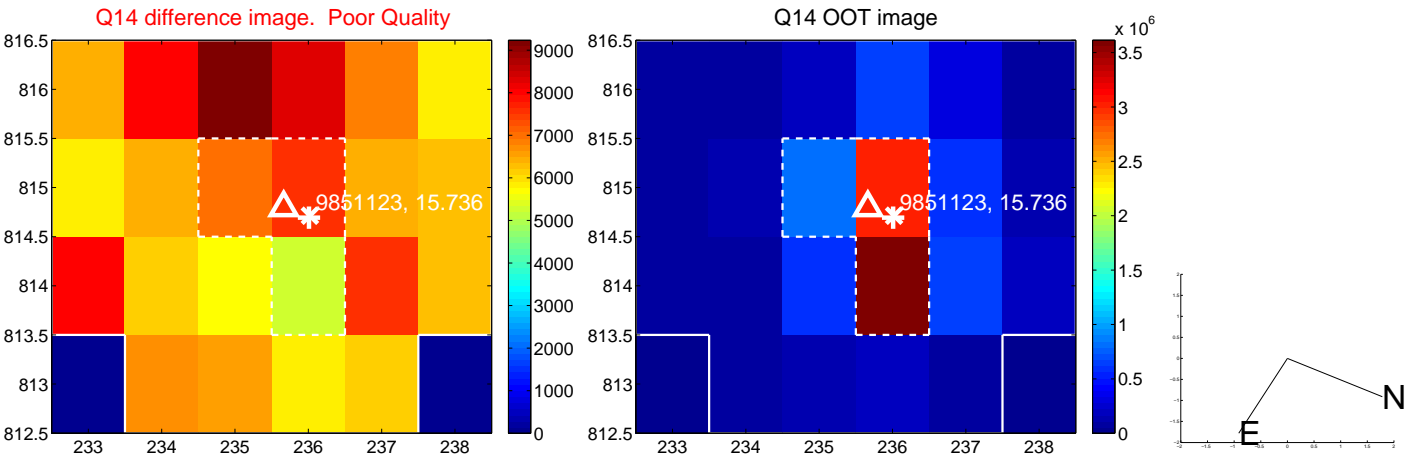
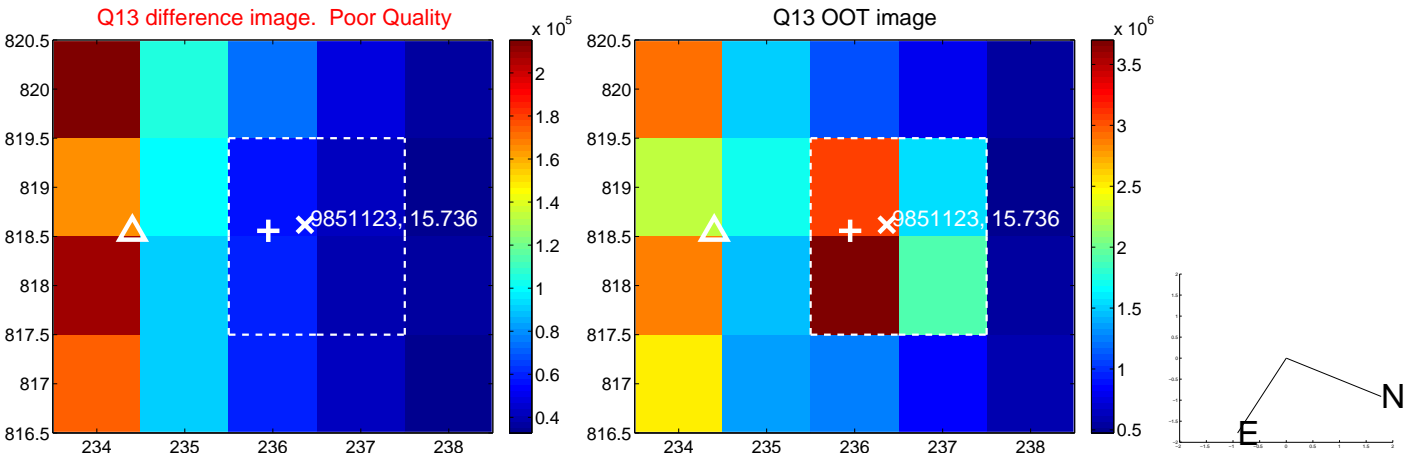
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



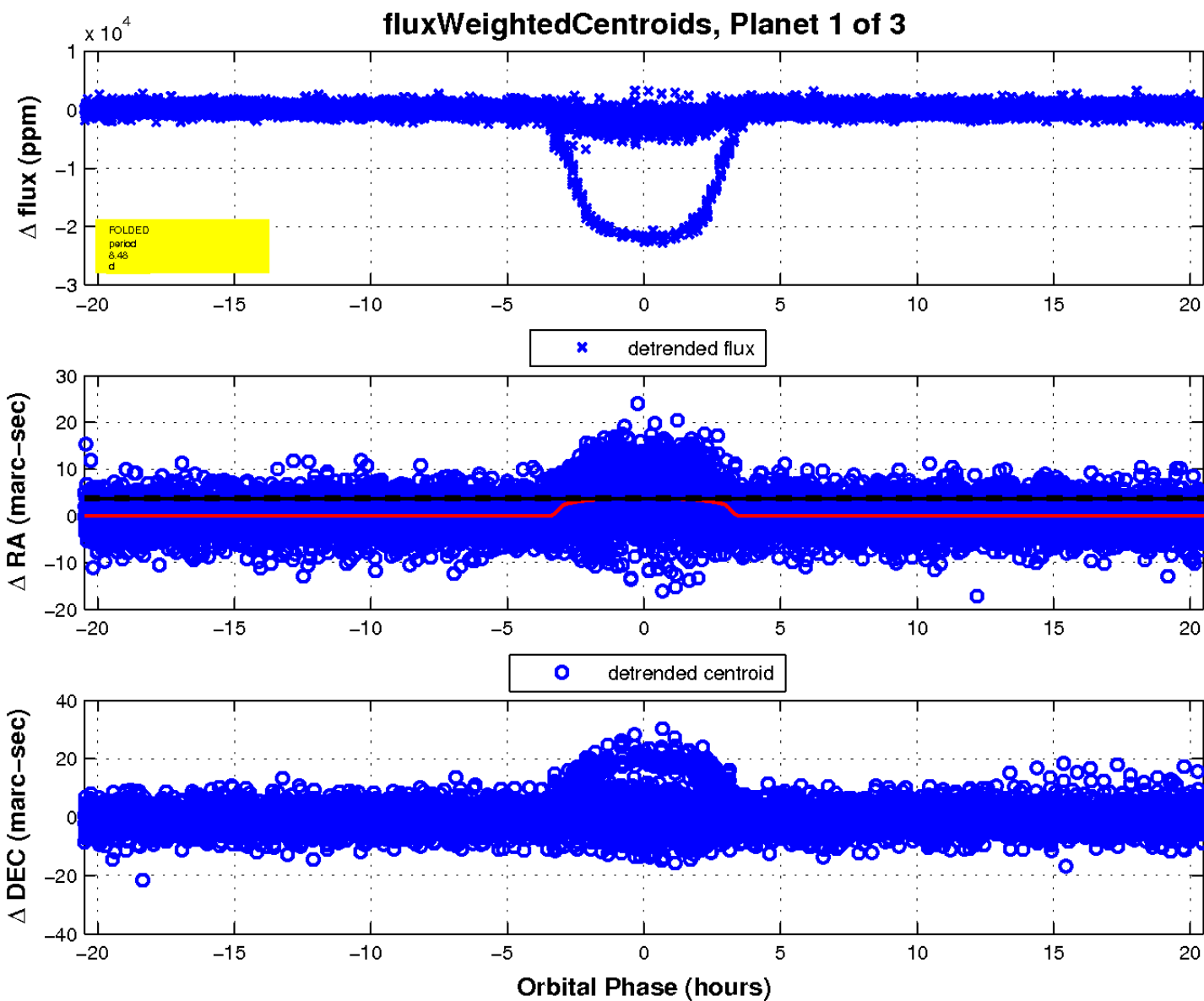
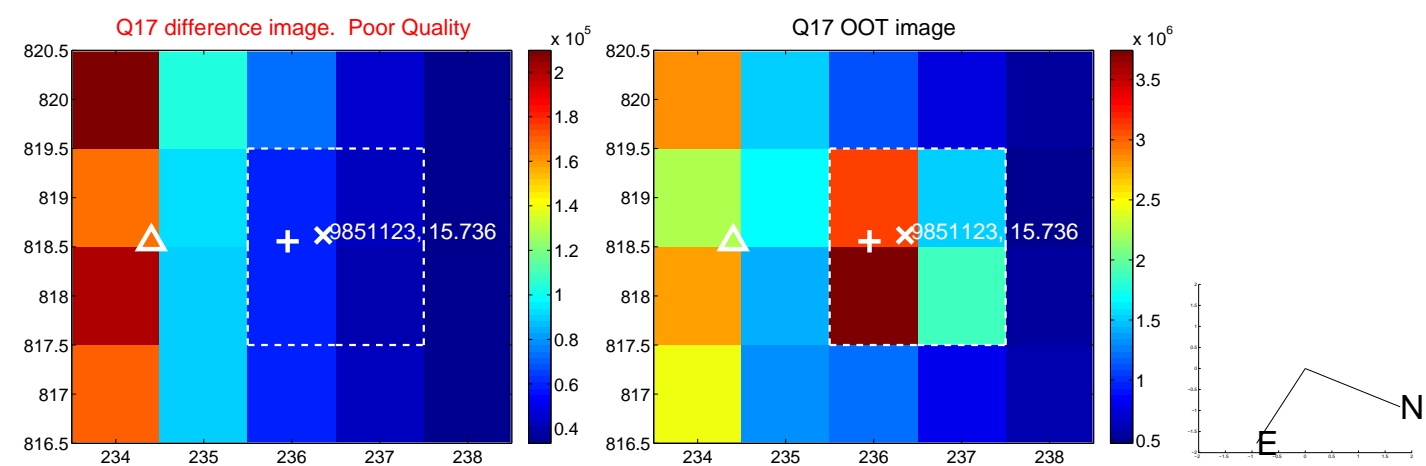
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

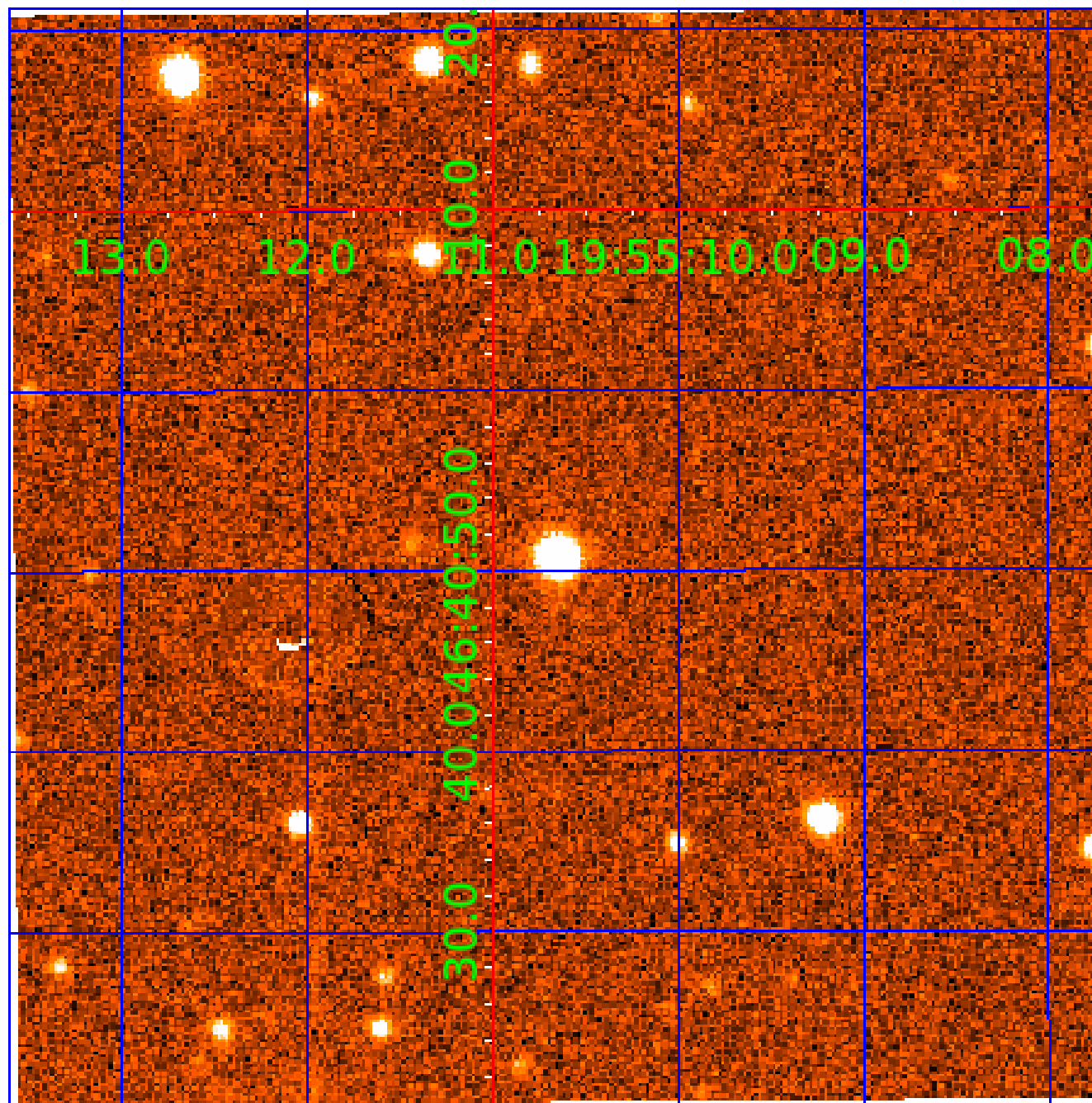


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 009851123

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
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009851123-03	OBS	No	477.383250	136.395905	888.2	12.368	8.4	7.0	0.81	5478	2.88	0.40

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009851123-01	OBS	FP	0.00	0	1	1	1	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—SEASONAL_DEPTH_DV—SEASONAL_DEPTH_ALT—CENT_RESOLVED_OFFSET—HALO_GHOST—EPHEM_MATCH
009851123-02	OBS	FP	0.00	1	1	0	1	IS_SEC_TCE—EPHEM_MATCH
009851123-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS

**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 009851123-02

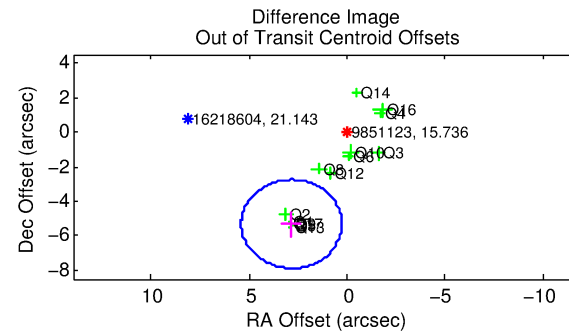
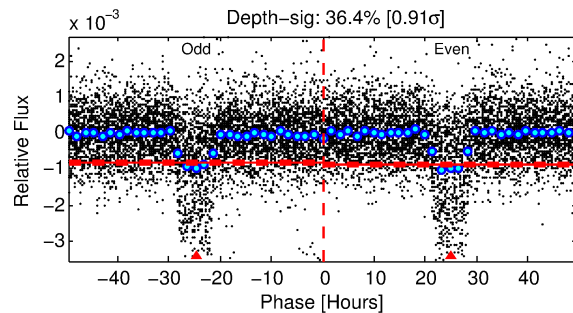
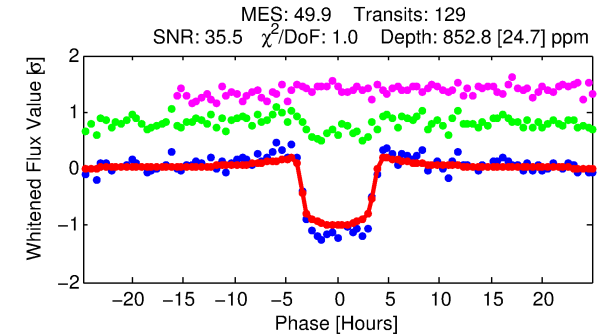
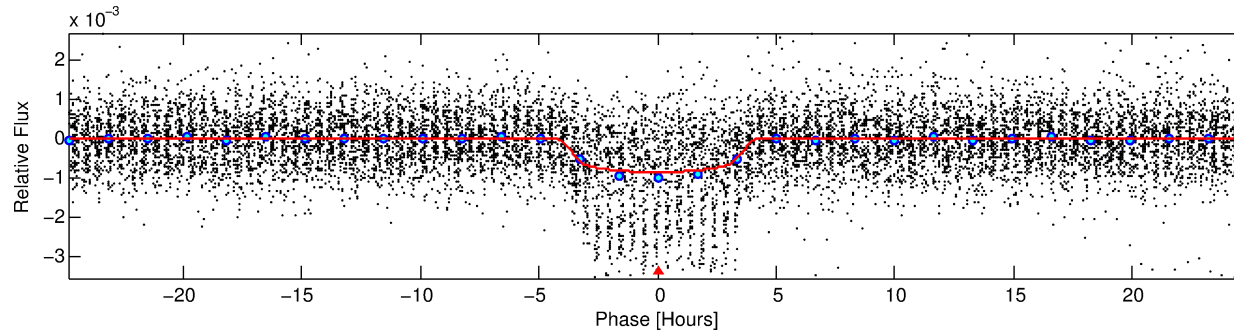
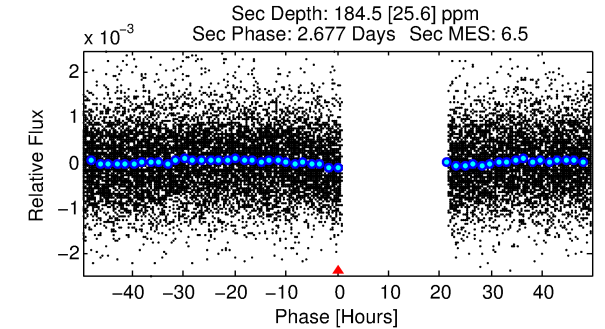
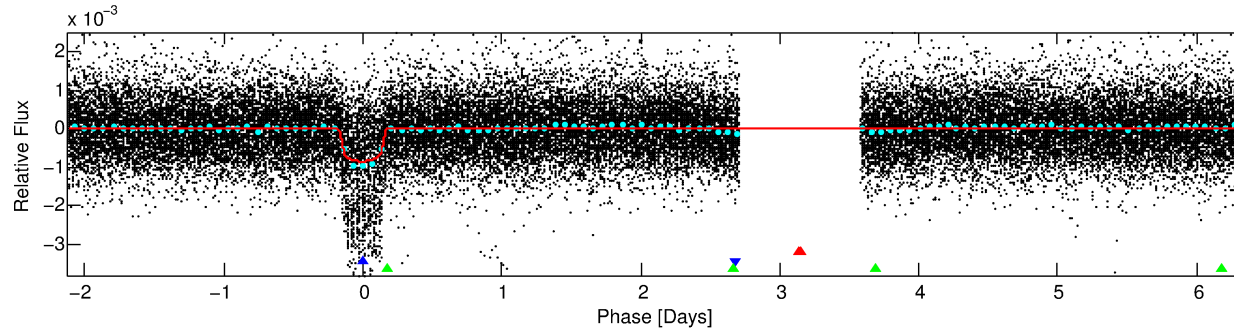
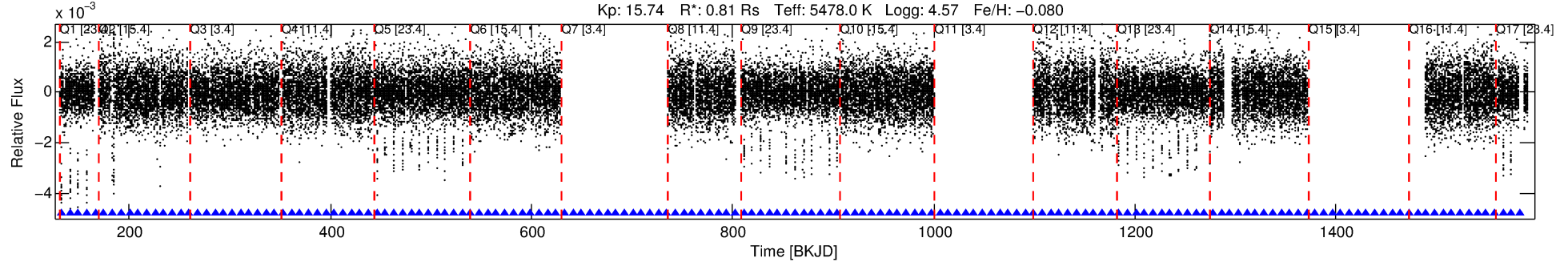
TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ( $''$ )	$\Delta$ Row	$\Delta$ Col	$m_2$	$m_1$	$D_2/D_1$	Mechanism	Flag	$\sigma_P$	$\sigma_T$
009851123-02	9851123	009851142-sec	9851142	1:1	56.7	-3	14	7.63	15.74	14.42	Direct-PRF	0	0.27	0.28

**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: 9851123 Candidate: 2 of 3 Period: 8.480 d  
KOI: K06074 Corr: No Ephemeris Match

Kp: 15.74 R\*: 0.81 Rs Teff: 5478.0 K Logg: 4.57 Fe/H: -0.080



## DV Fit Results:

Period = 8.48036 [0.00004] d  
Epoch = 132.7049 [0.0037] BKJD  
Rp/R\* = 0.0313 [0.0012]  
a/R\* = 4.39 [0.61]  
b = 0.87 [0.04]  
Seff = 86.14 [25.64]  
Teff = 777 [58] K  
Rp = 2.77 [0.65] Re  
a = 0.0786 [0.0148] AU  
Ag = 81.71 [25.39] [3.18σ]  
Teffp = 3611 [186] K [14.55σ]

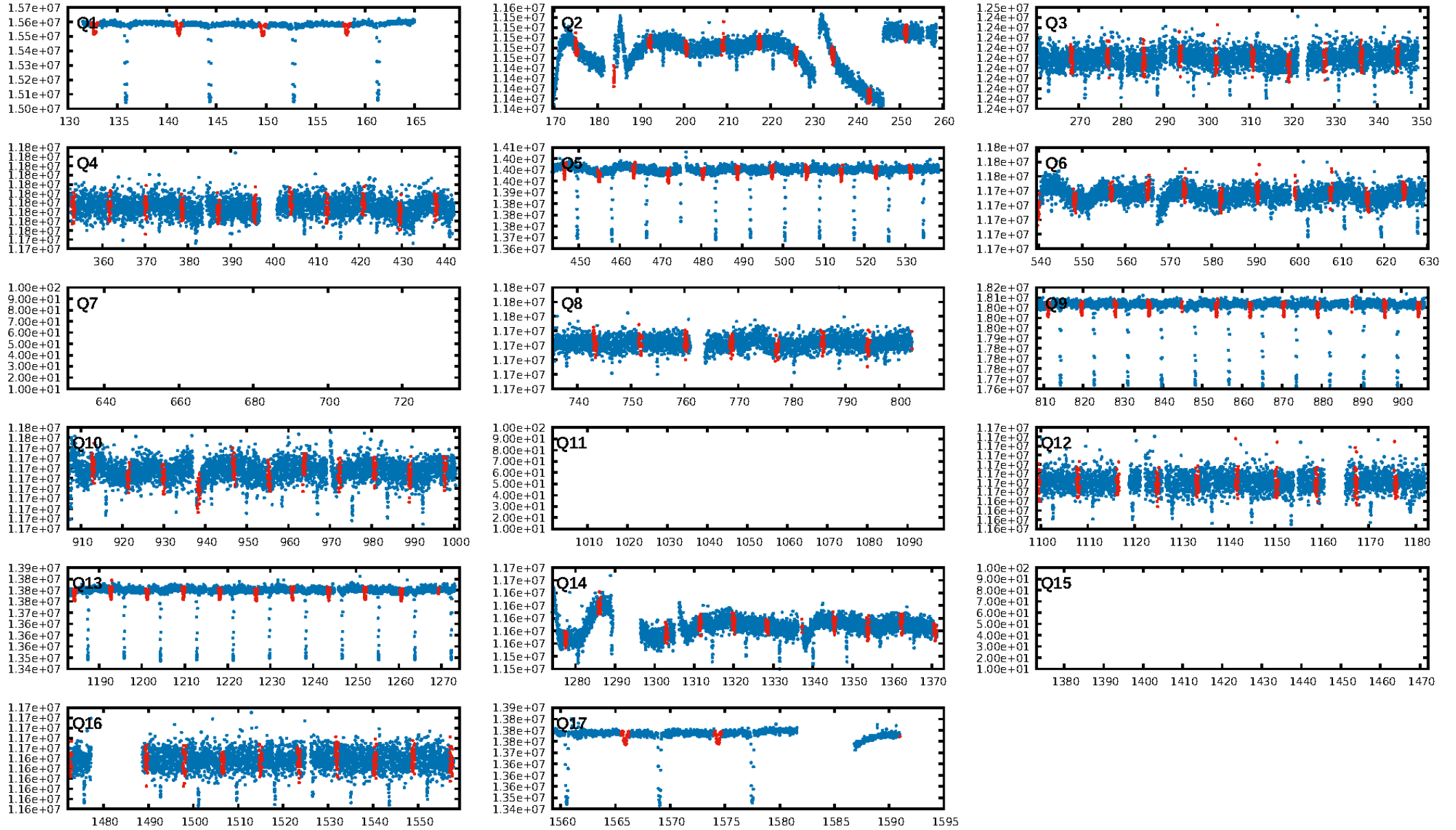
## DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]  
LongPeriod-sig: 100.0% [755.86σ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [123/123]  
GhostDiagnostic-chr: -0.3216  
Centroid-sig: N/A  
Centroid-so: 2.170 arcsec [6.75σ]  
OotOffset-rm: 6.033 arcsec [7.05σ]  
KicOffset-rm: 7.685 arcsec [6.87σ]  
OotOffset-st: 4/1/4/5 [14]  
KicOffset-st: 4/1/4/5 [14]  
DiffImageQuality-fgm: 0.00 [0/14]  
DiffImageOverlap-fno: 1.00 [14/14]

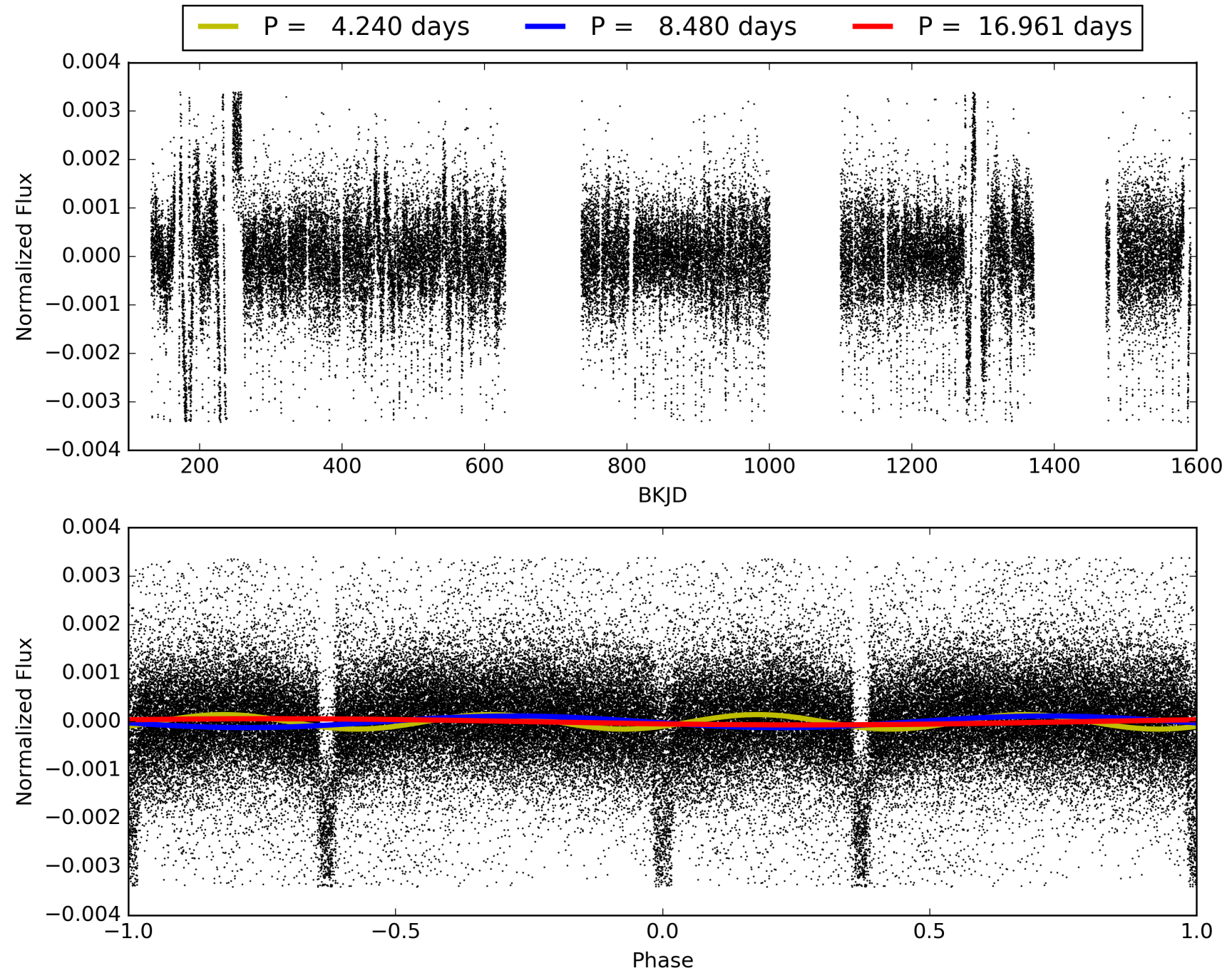
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 03:49:38 Z

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

# TCE 009851123-02, PDC Light Curves



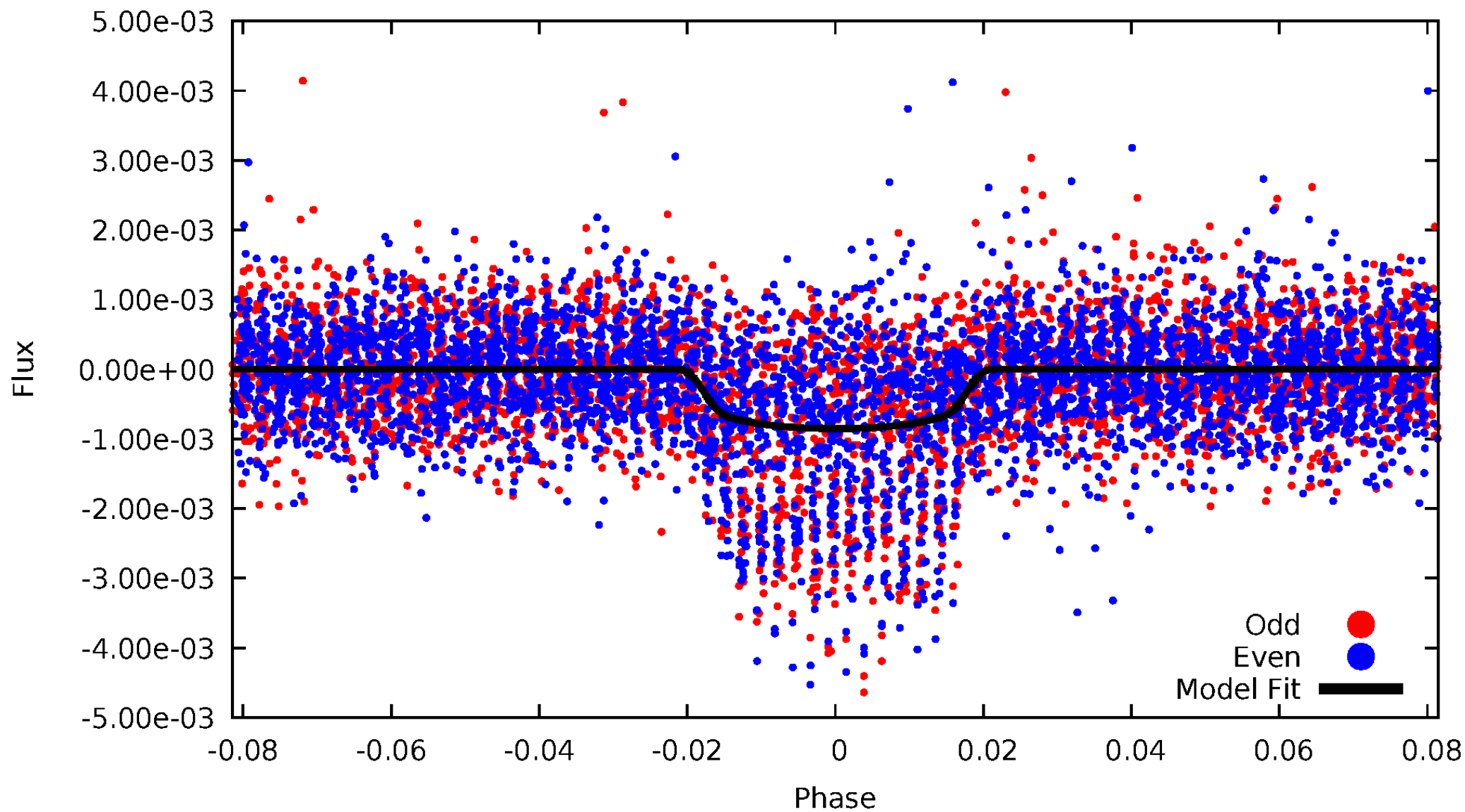
TCE 009851123-02





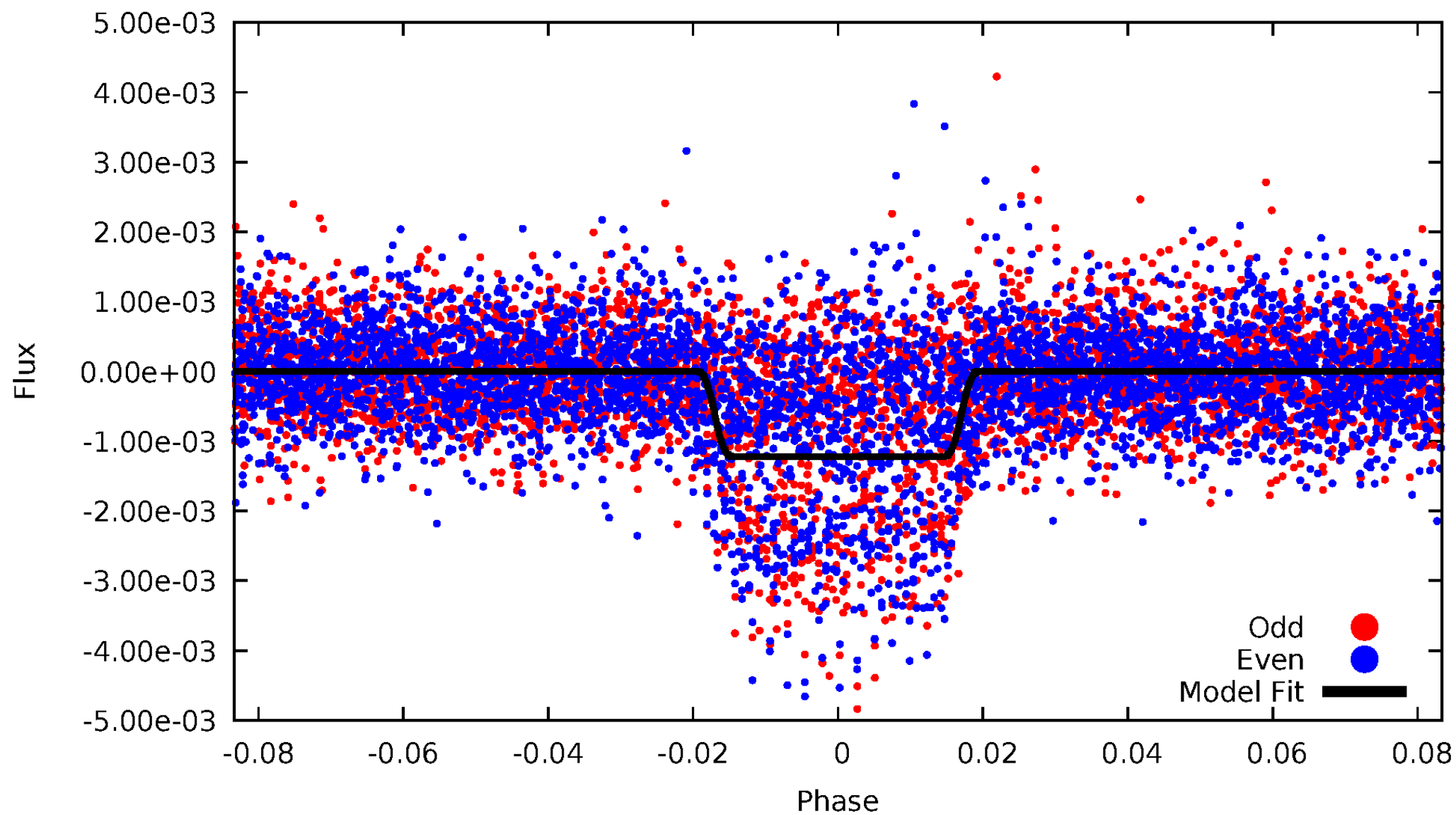
# DV Odd/Even

TCE 009851123-02



# ALT Odd/Even

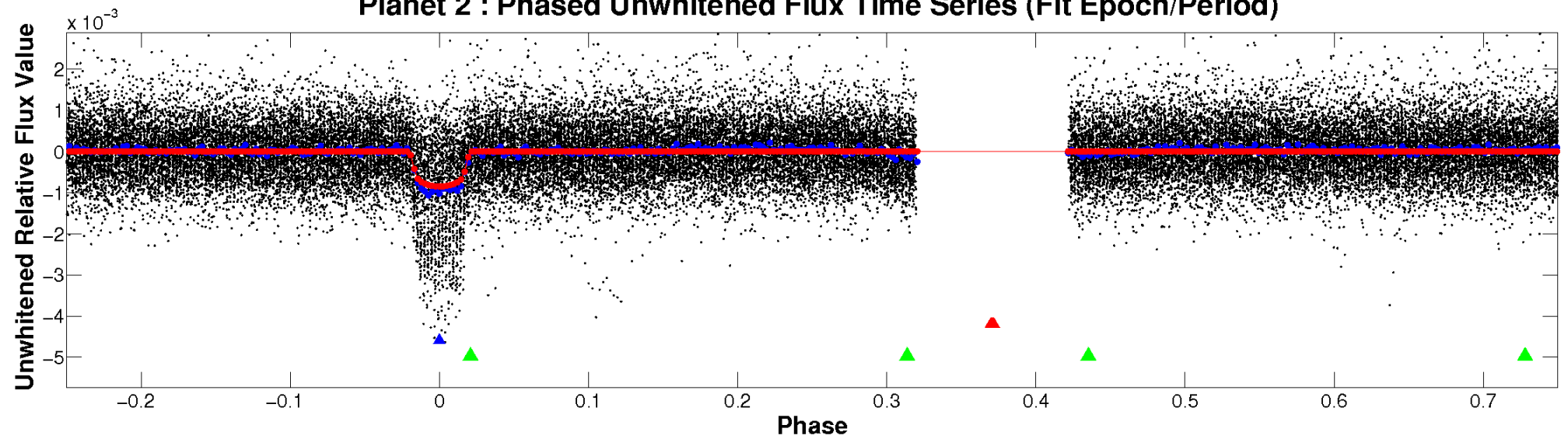
TCE 009851123-02



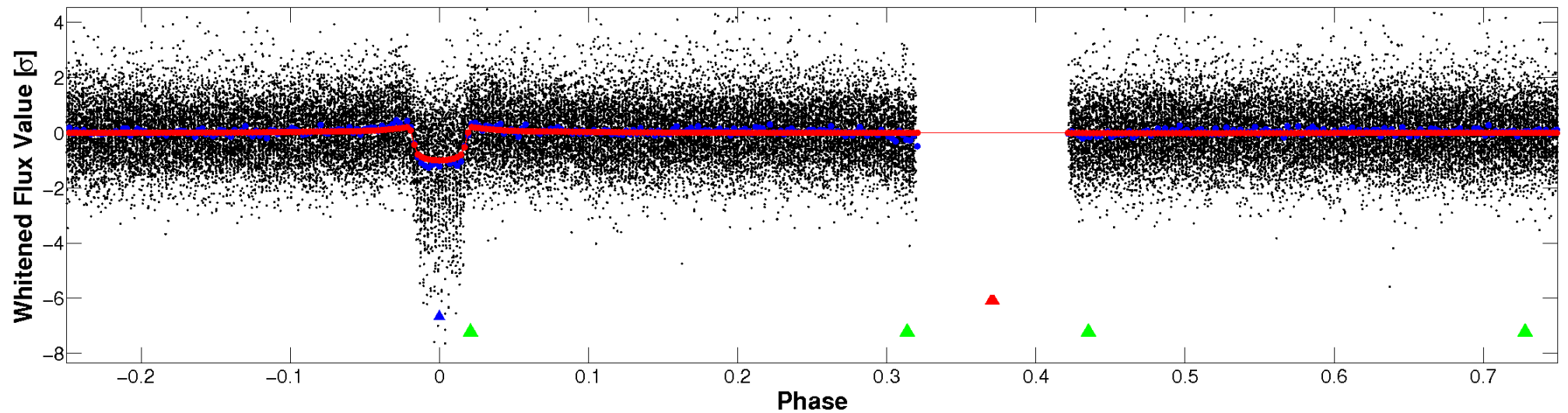


# Non-Whitened Vs. Whitened Light Curve

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

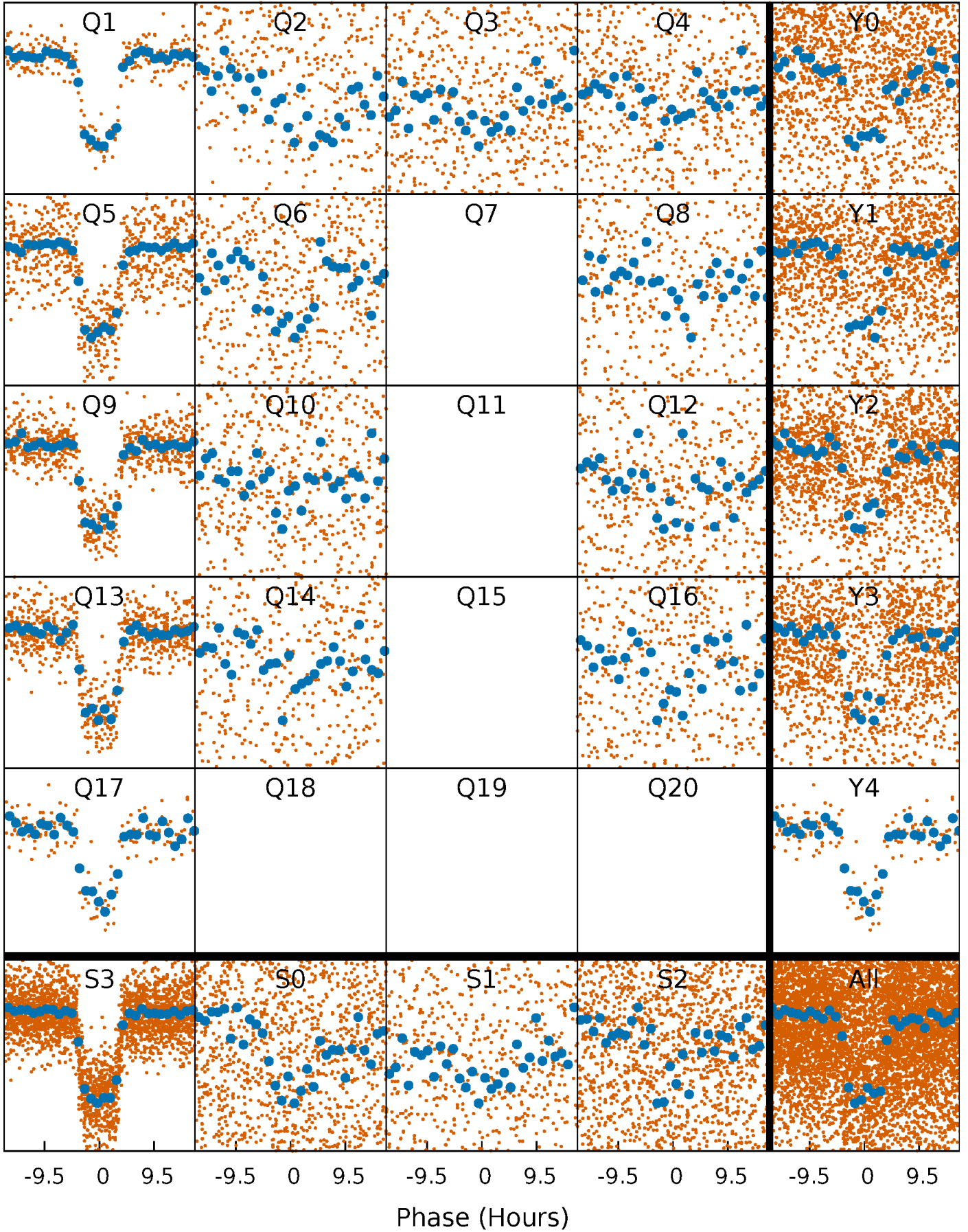


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



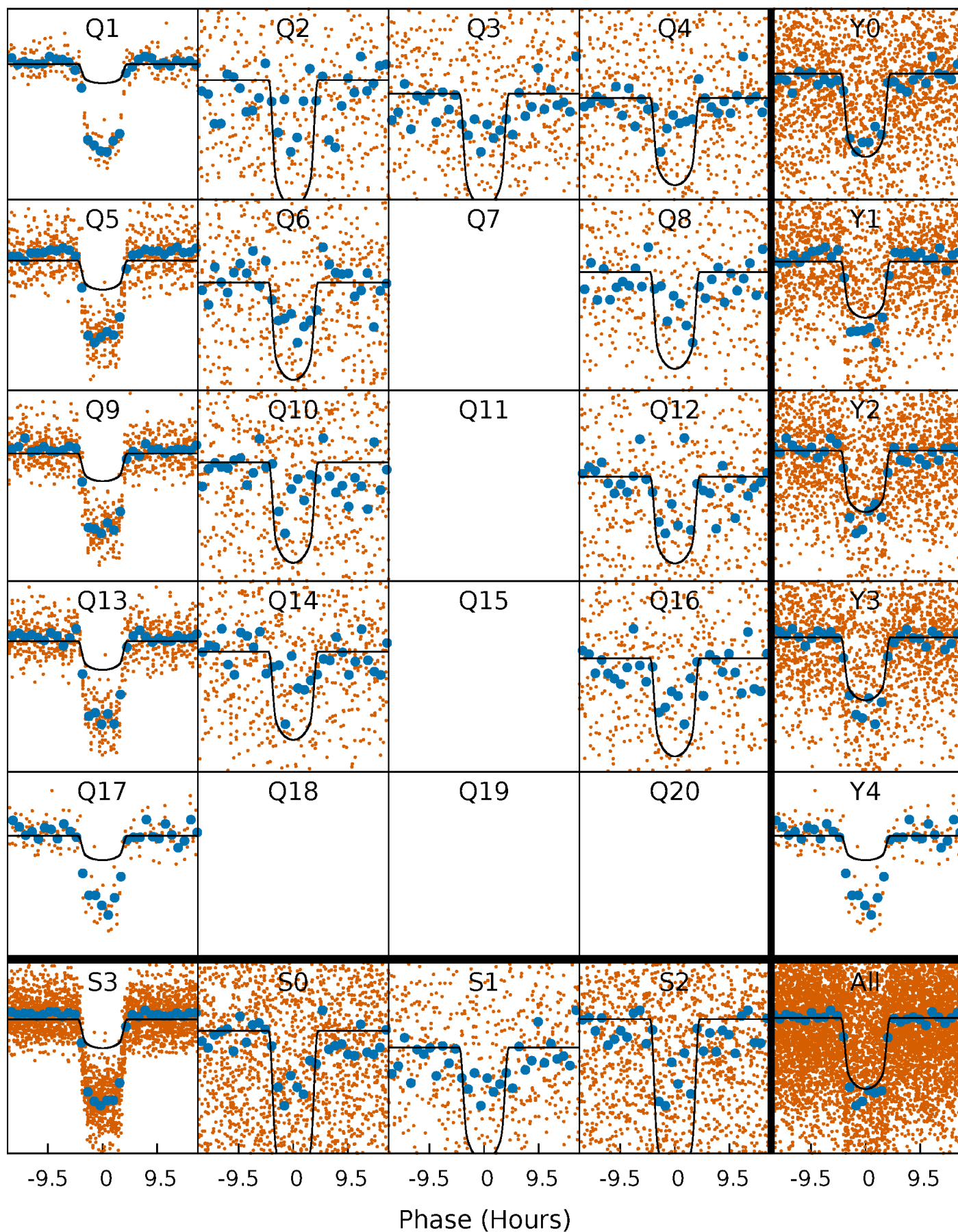
# PDC Quarter-Phased Transit Curves

TCE 009851123-02   P= 8.480356 Days    $T_0=132.704854$  (BKJD)



# DV Quarter-Phased Transit Curves

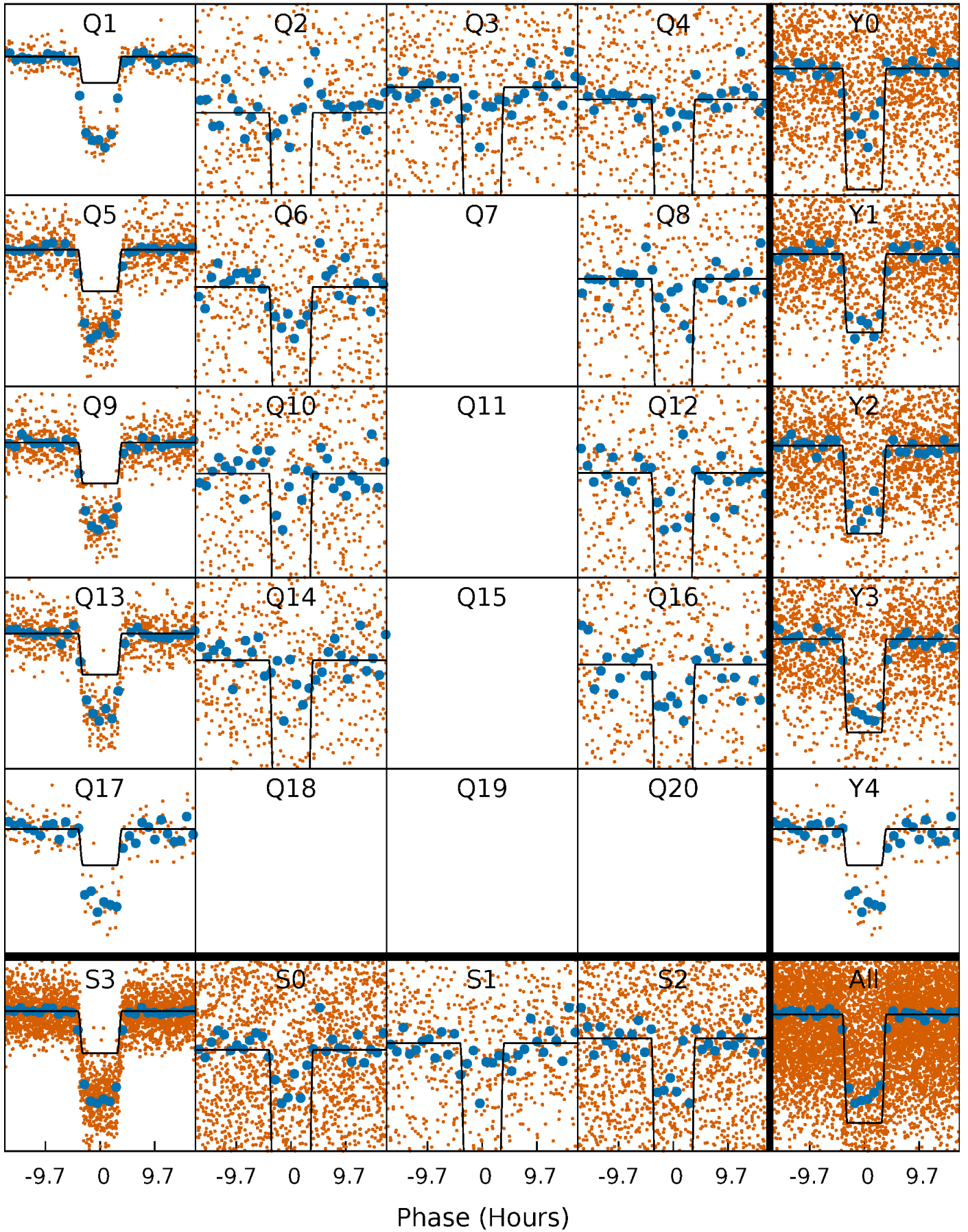
TCE 009851123-02 P= 8.480356 Days  $T_0=132.704854$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

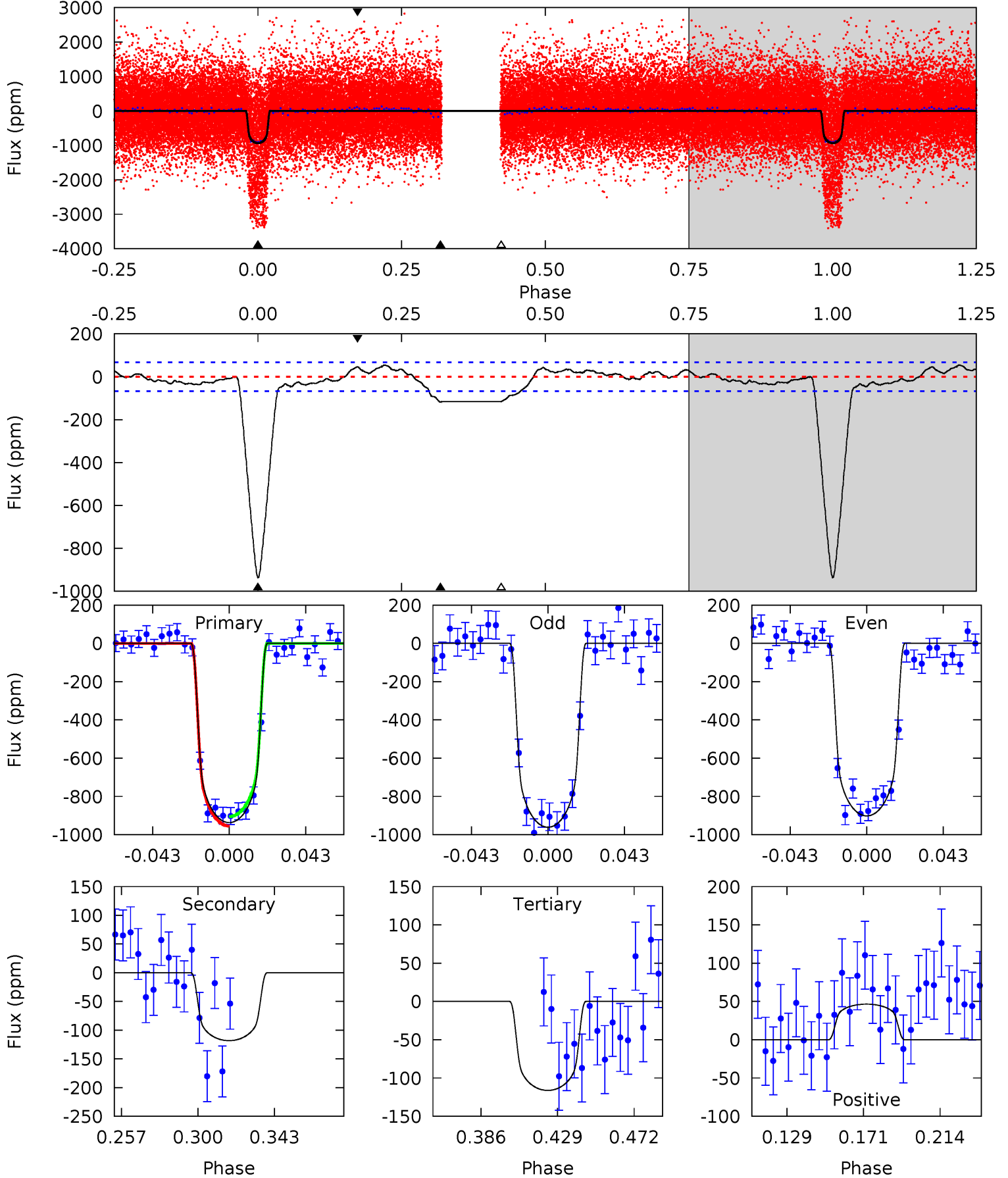
TCE 009851123-02 P= 8.480222 Days  $T_0=132.715360$  (BKJD)



# DV Model-Shift Uniqueness Test

009851123-02, P = 8.480356 Days, E = 124.224498 Days

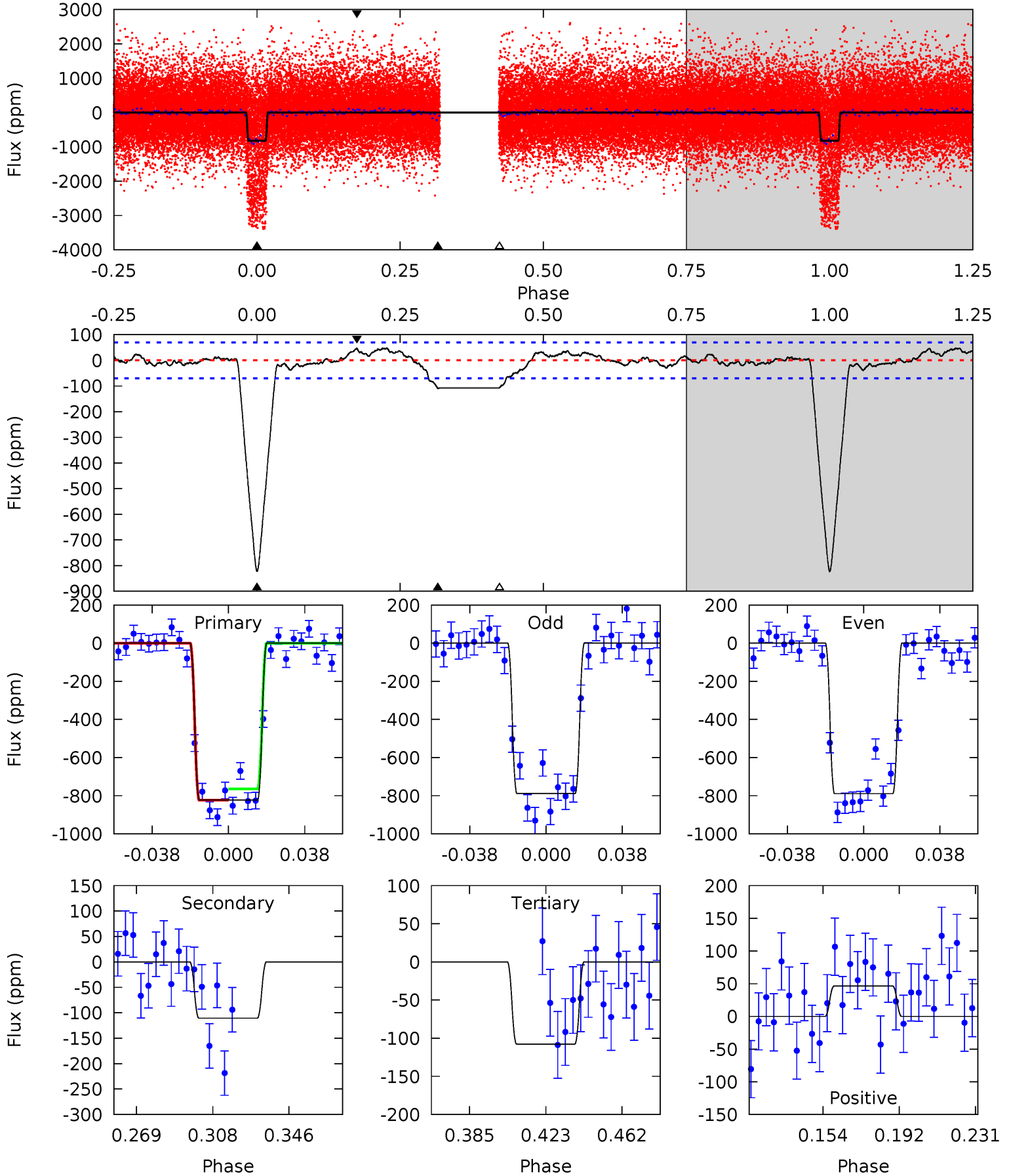
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
65.9	8.32	8.17	3.27	4.74	2.02	2.21	57.7	62.6	0.14	5.05	2.09	1.90	0.05	1.74



# Alt Model-Shift Uniqueness Test

009851123-02, P = 8.480222 Days, E = 124.235138 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
56.0	7.54	7.33	3.17	4.76	2.07	1.67	48.7	52.9	0.21	4.37	0.04	2.19	0.05	2.03





### Stellar Parameters For KIC 009851123

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5478^{+180}_{-164}$	$4.573^{+0.038}_{-0.142}$	$-0.080^{+0.300}_{-0.300}$	$0.812^{+0.188}_{-0.075}$	$0.906^{+0.081}_{-0.101}$	$2.382^{+0.454}_{-1.021}$
	+3%/-3%	+1%/-3%	+375%/-375%	+23%/-9%	+9%/-11%	+19%/-43%
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 009851123-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-118 \pm 14$	$2.84^{+0.34}_{-0.22}$	$1106^{+62}_{-46}$	$3645^{+119}_{-113}$	$49^{+9}_{-10}$
Alt.	$-111 \pm 15$	$3.18^{+0.36}_{-0.24}$	$1106^{+57}_{-48}$	$3468^{+126}_{-107}$	$36^{+8}_{-7}$

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

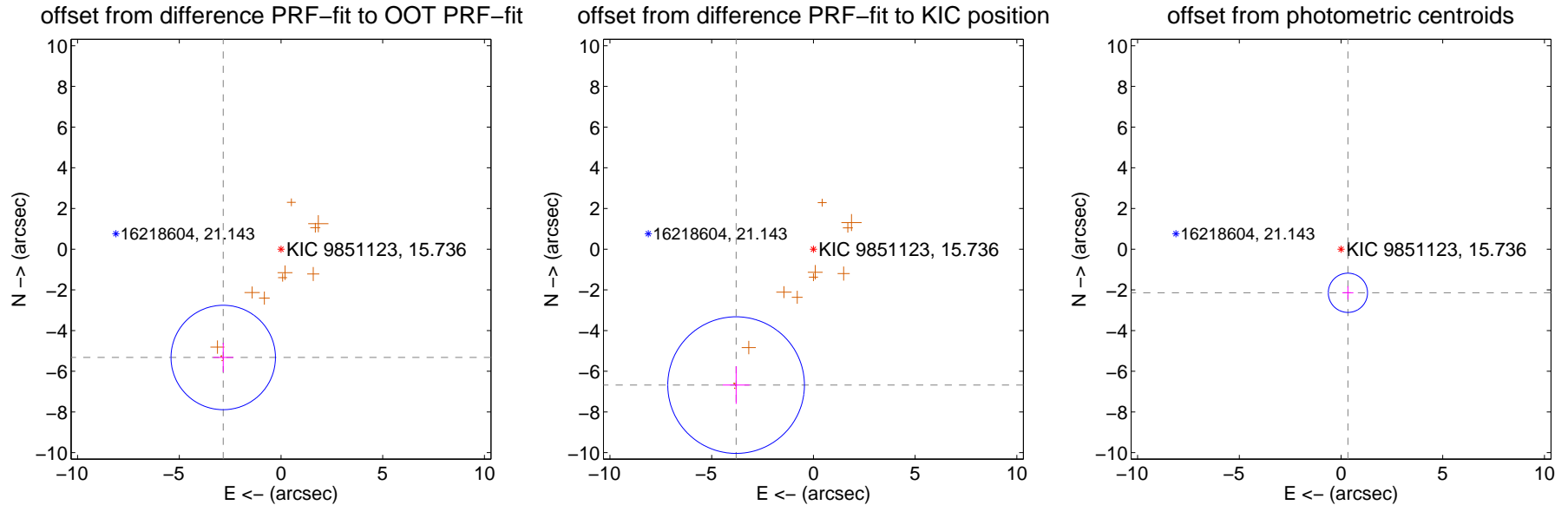
## DV Centroid Data

Supplemental centroid analysis for 009851123-02. Kepler magnitude: 15.74. Transit SNR 35.53

There are 0 quarters with good PRF difference image offsets

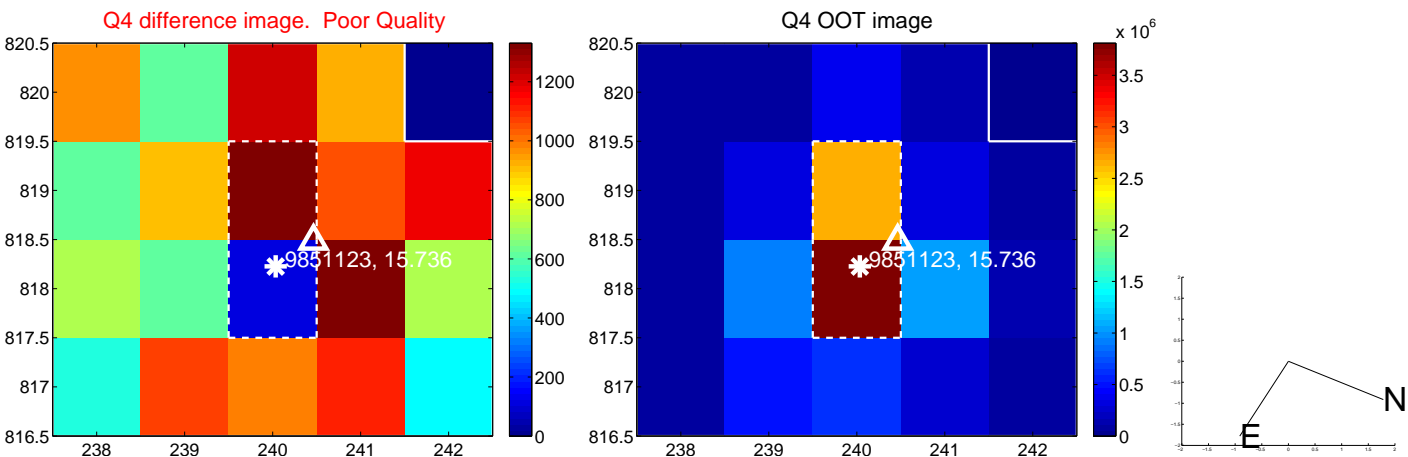
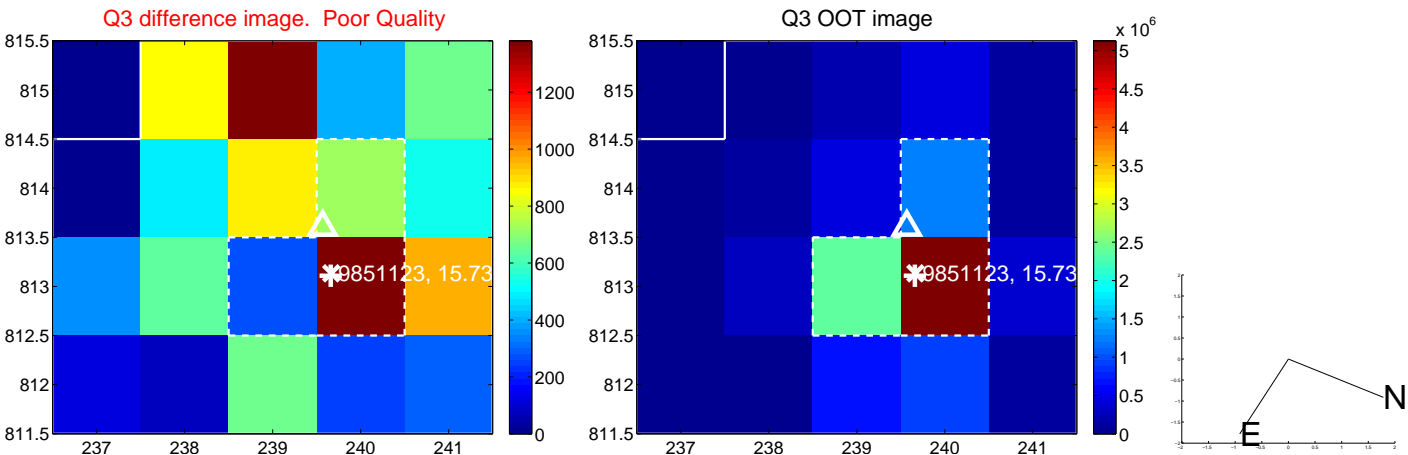
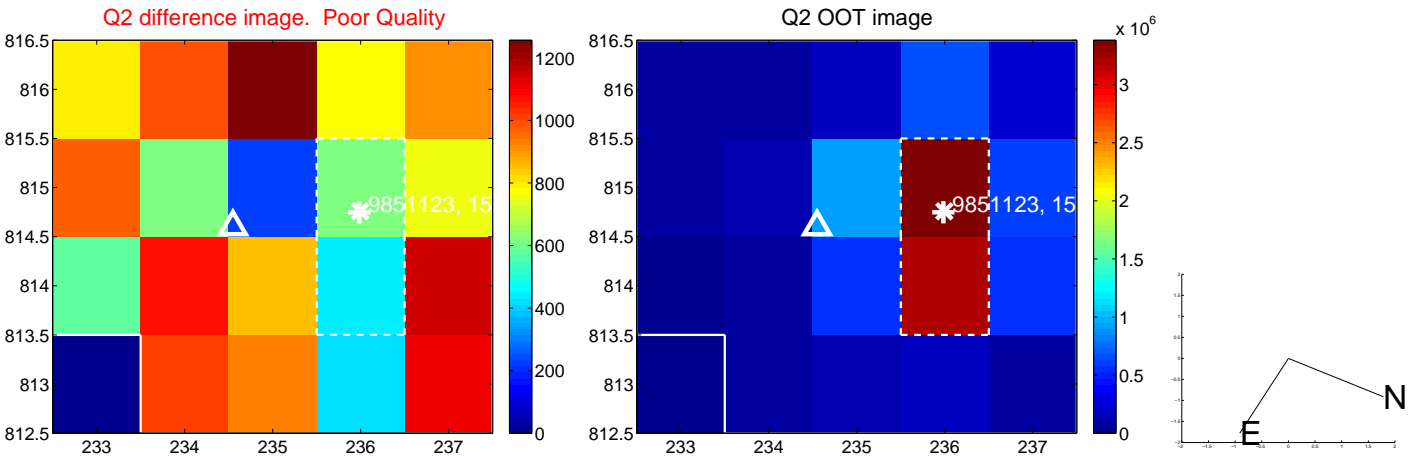
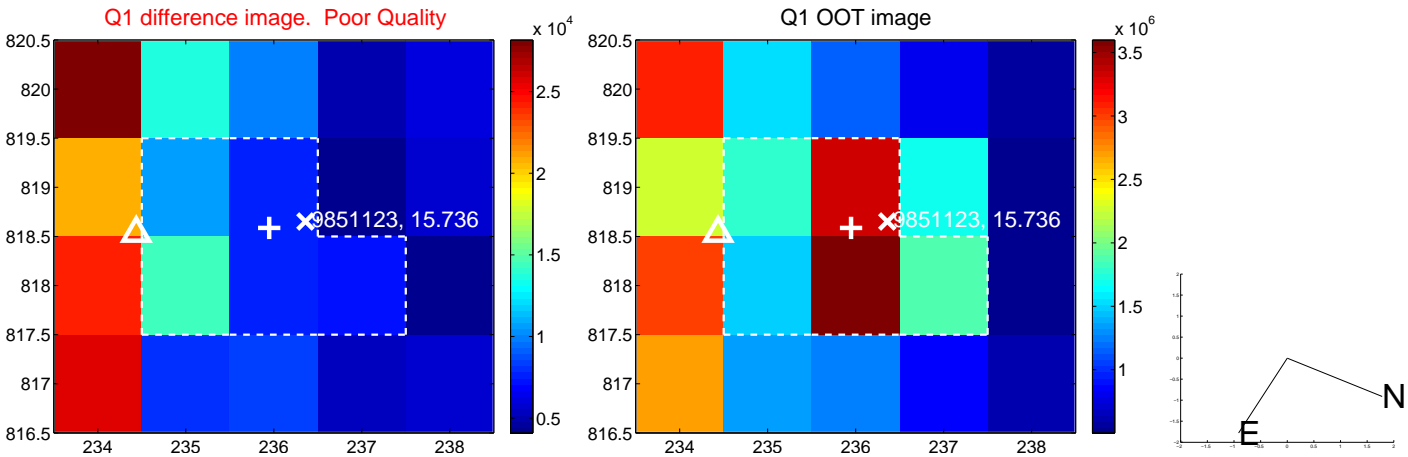
The direct PRF centroid is offset from the target star catalog position by about 1.62 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$6.033 \pm 0.855$	7.05	$2.839 \pm 0.498$	$-5.323 \pm 0.719$
PRF-fit source offset from KIC position	$7.685 \pm 1.119$	6.87	$3.799 \pm 0.657$	$-6.680 \pm 0.927$
photometric centroid source offset	$2.17 \pm 0.32$	6.75	$-0.34 \pm 0.27$	$-2.14 \pm 0.32$



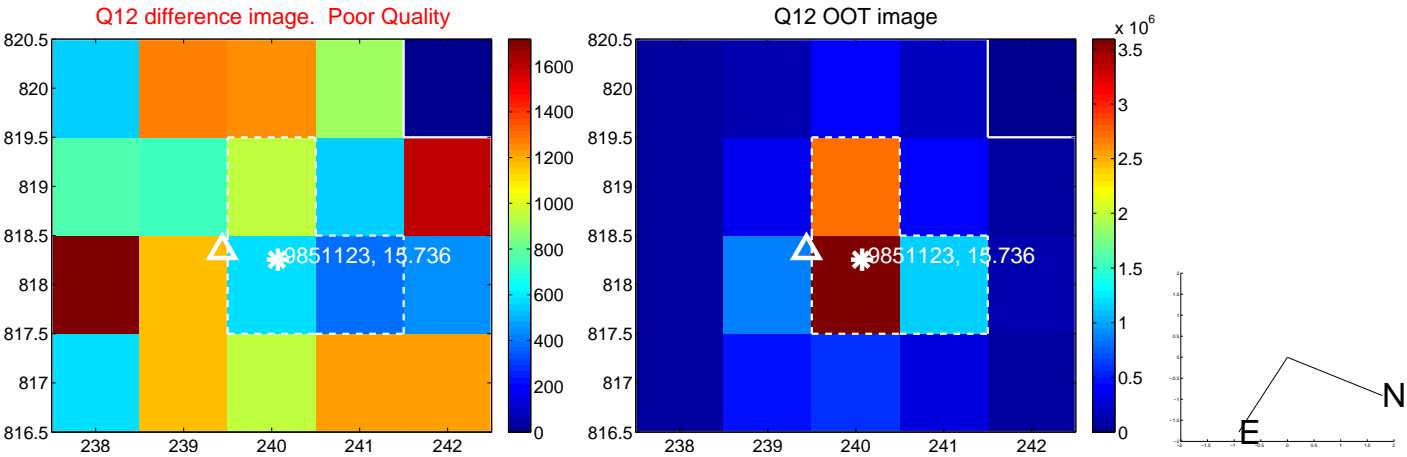
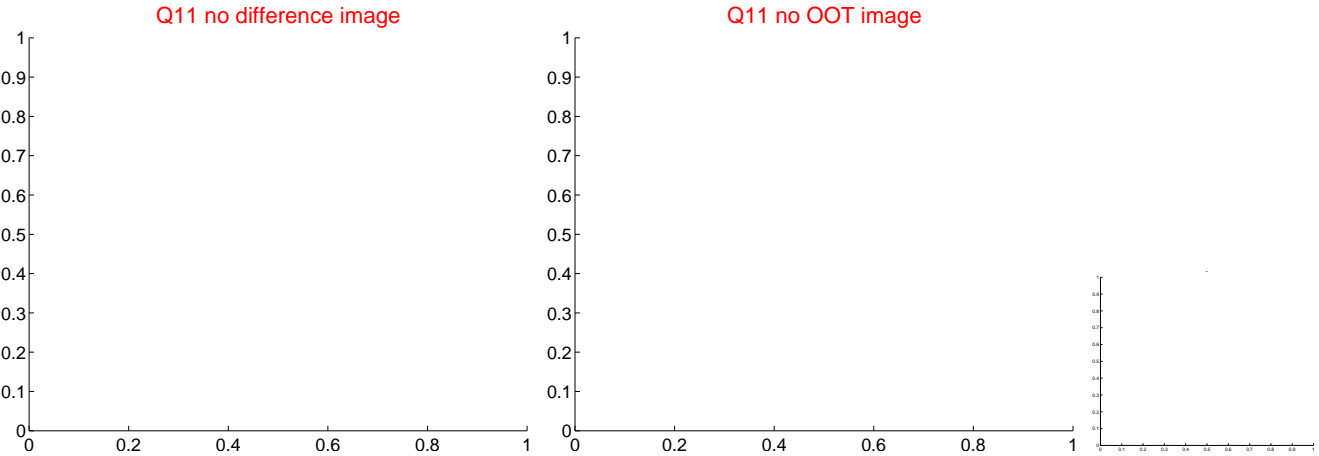
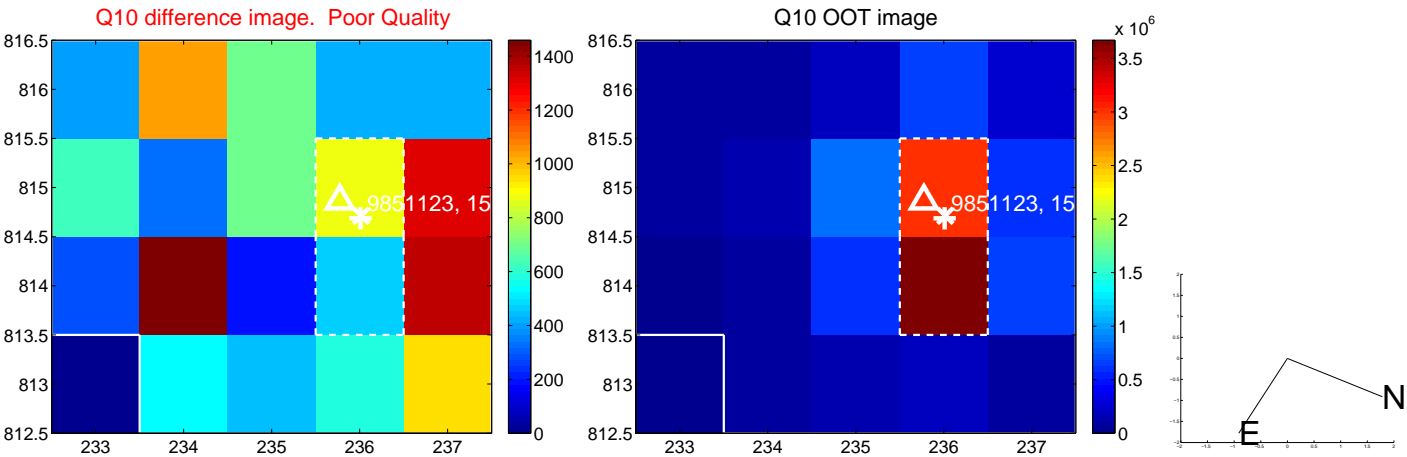
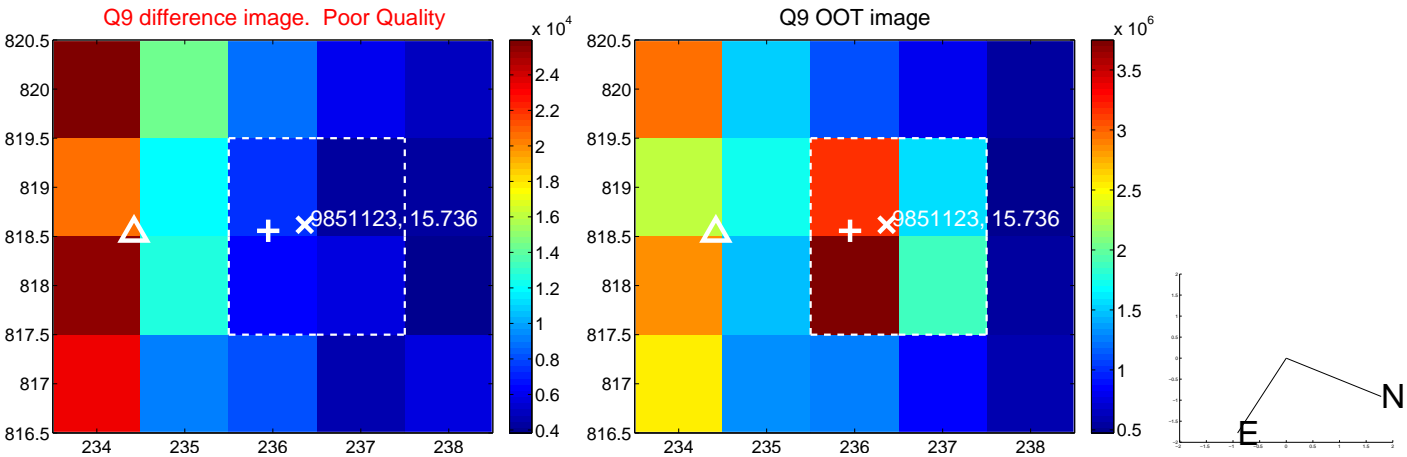
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

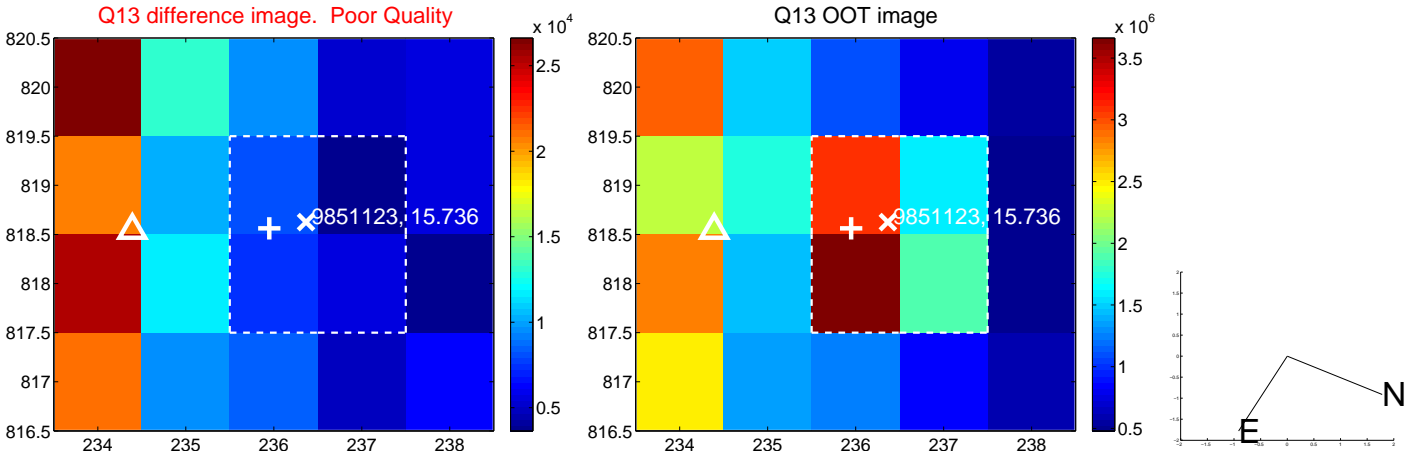




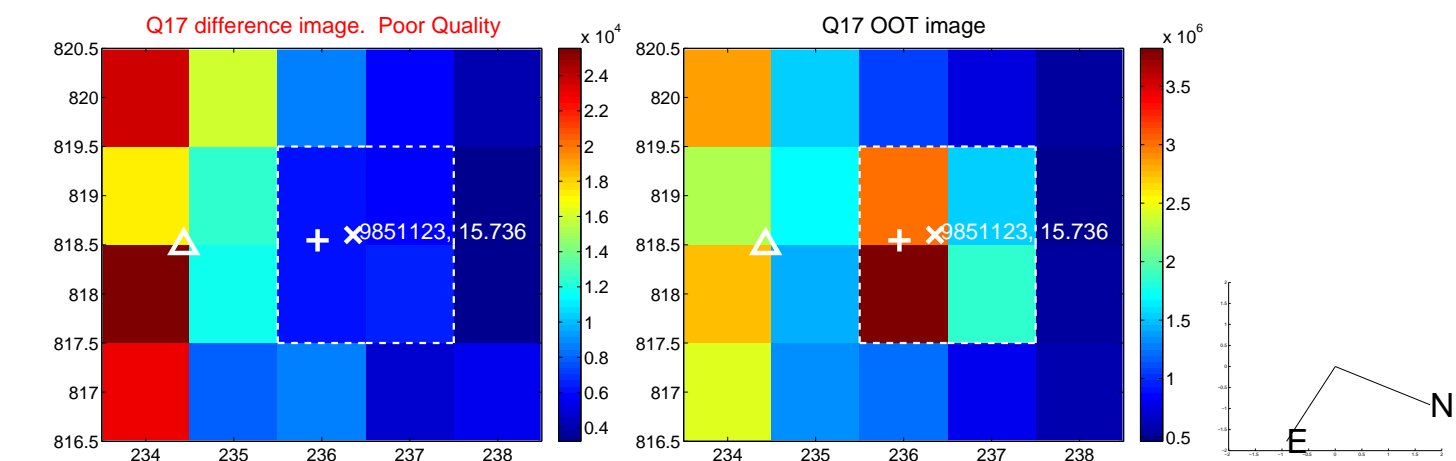
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



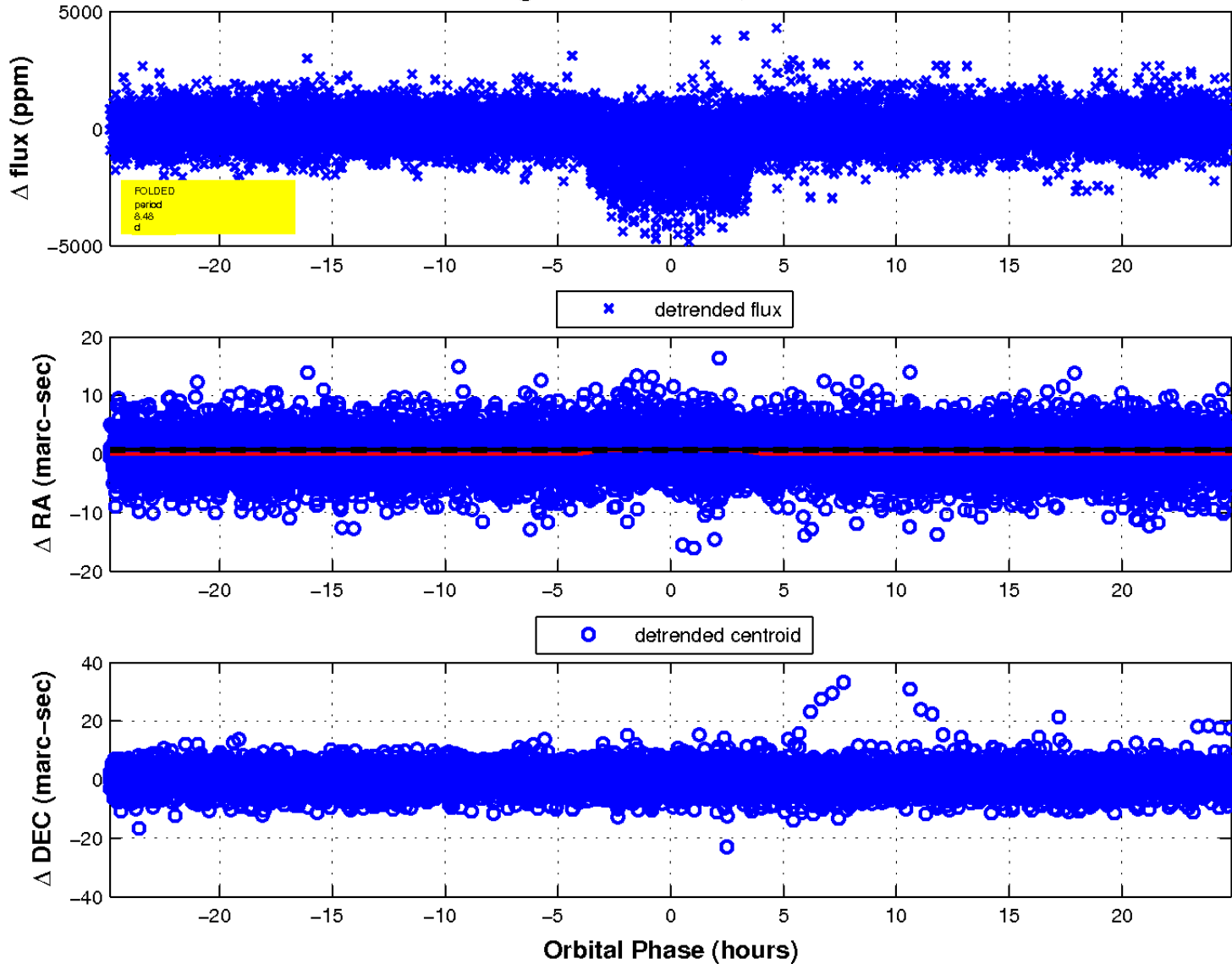
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



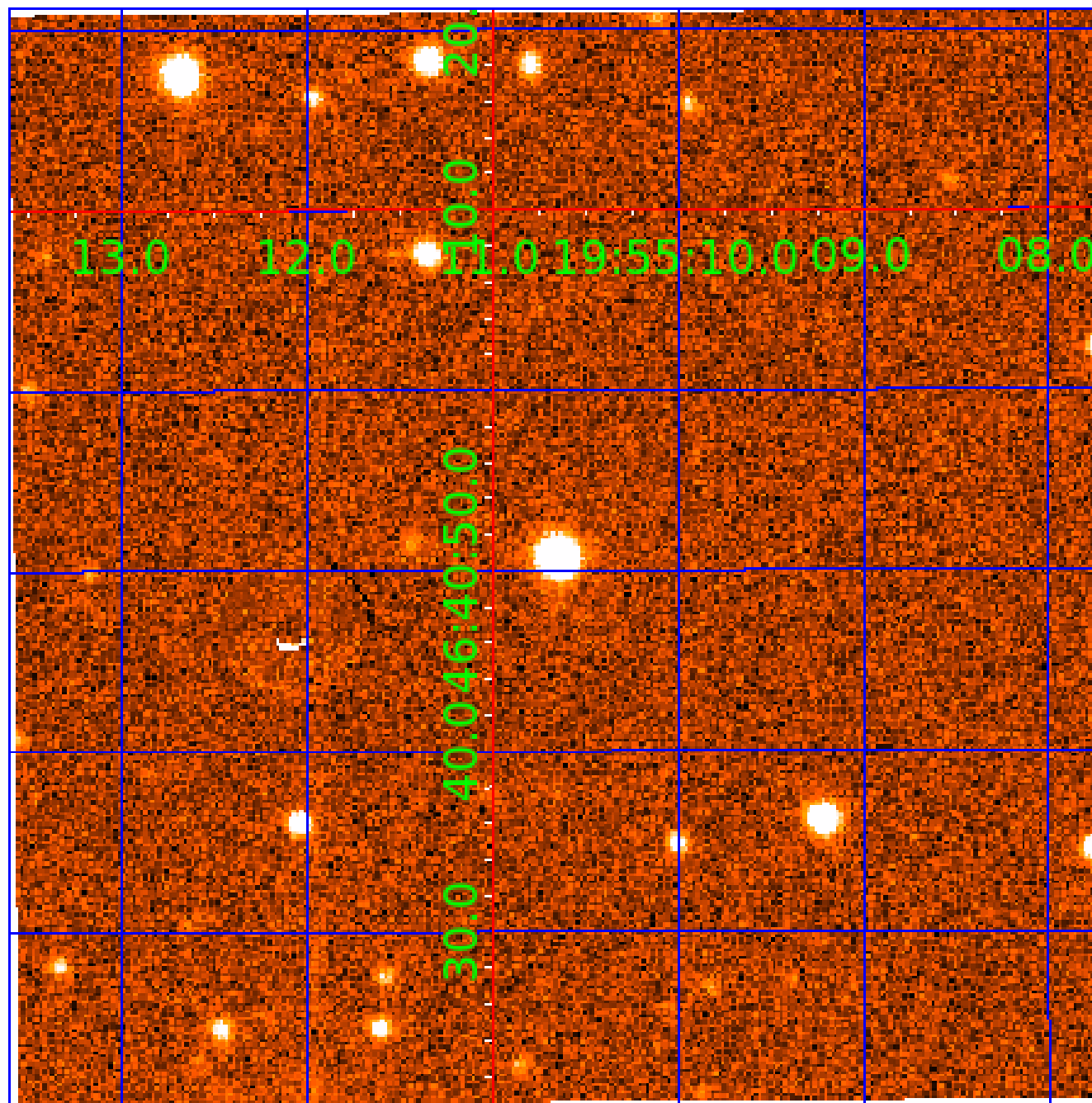
fluxWeightedCentroids, Planet 2 of 3





UKIRT Image

Declination



# KIC 009851123

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009851123-01	OBS	6074.01	8.480246	135.858753	2424.4	6.830	456.5	80.8	0.81	5478	4.15	86.14
009851123-02	OBS	No	8.480356	132.704854	852.8	8.288	49.9	35.5	0.81	5478	2.77	86.14
009851123-03	OBS	No	477.383250	136.395905	888.2	12.368	8.4	7.0	0.81	5478	2.88	0.40

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009851123-01	OBS	FP	0.00	0	1	1	1	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—SEASONAL_DEPTH_DV—SEASONAL_DEPTH_ALT—CENT_RESOLVED_OFFSET—HALO_GHOST—EPHEM_MATCH
009851123-02	OBS	FP	0.00	1	1	0	1	IS_SEC_TCE—EPHEM_MATCH
009851123-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS

**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.

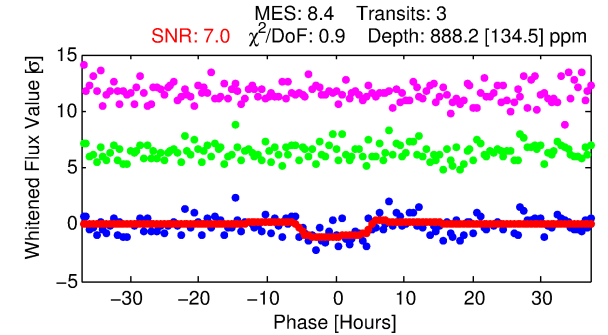
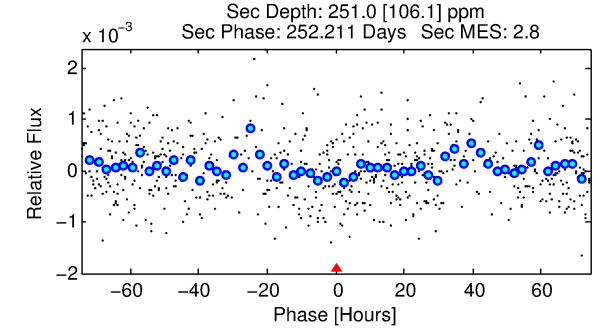
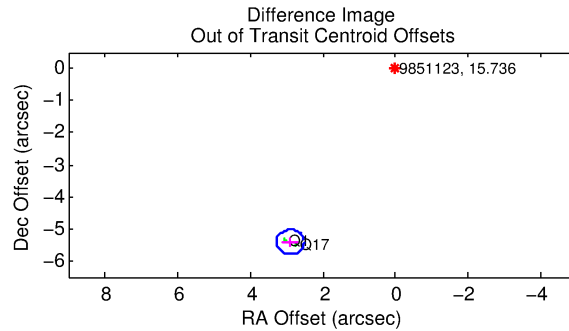
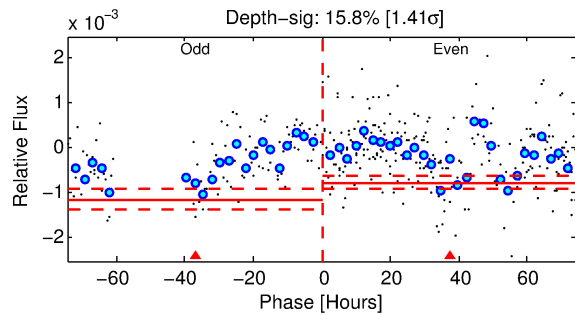
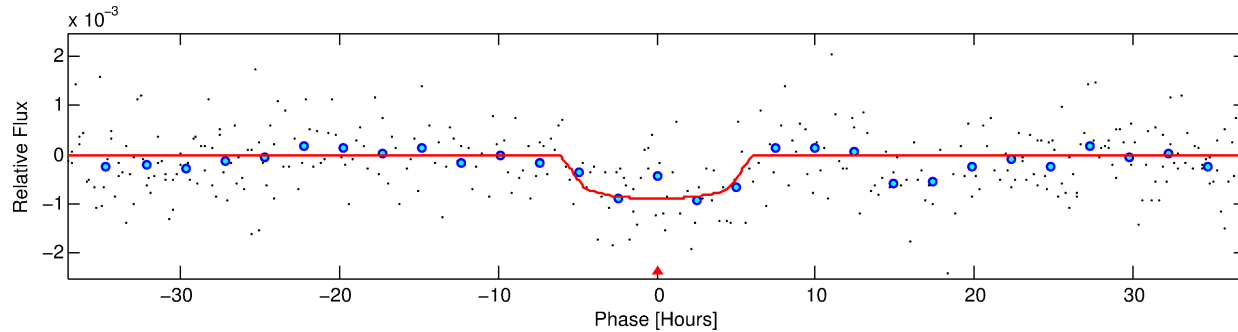
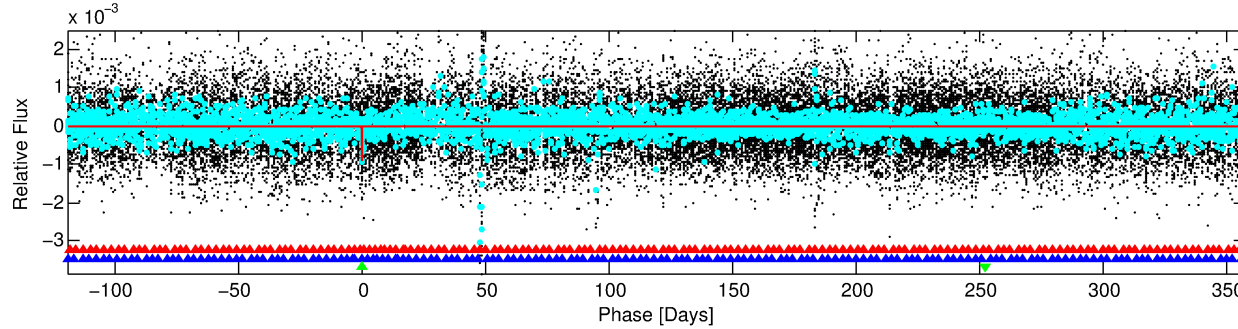
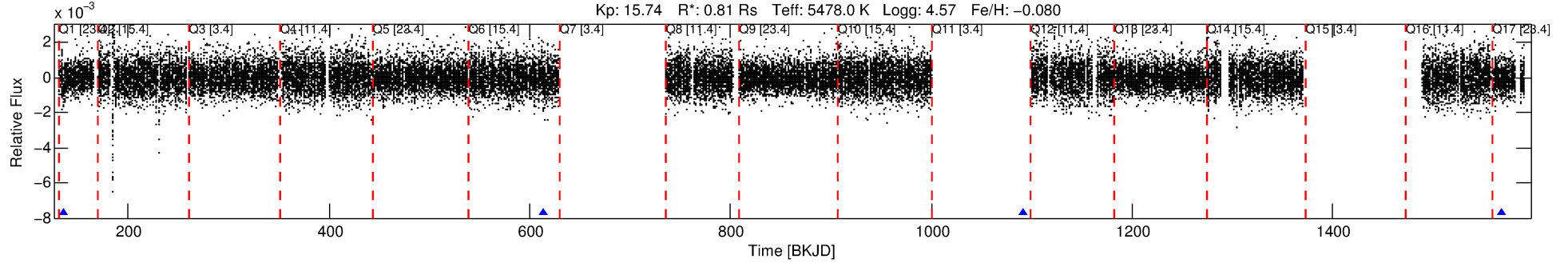
## Ephemeris Match Information For 009851123-03

No Significant Match Found

# DV One-Page Summary

KIC: 9851123 Candidate: 3 of 3 Period: 477.383 d  
KOI: K06074 Corr: No Ephemeris Match

Kp: 15.74 R\*: 0.81 Rs Teff: 5478.0 K Logg: 4.57 Fe/H: -0.080



## DV Fit Results:

Period = 477.38325 [0.02166] d  
Epoch = 136.3959 [0.0328] BKJD  
Rp/R\* = 0.0325 [0.0055]  
a/R\* = 153.26 [95.63]  
b = 0.89 [0.14]  
Seff = 0.40 [0.12]  
Teq = 203 [15] K  
Rp = 2.88 [0.82] Re  
a = 1.1543 [0.2181] AU  
Ag = 22236.02 [13422.07] [1.66σ]  
Teff = 3827 [533] K [6.80σ]

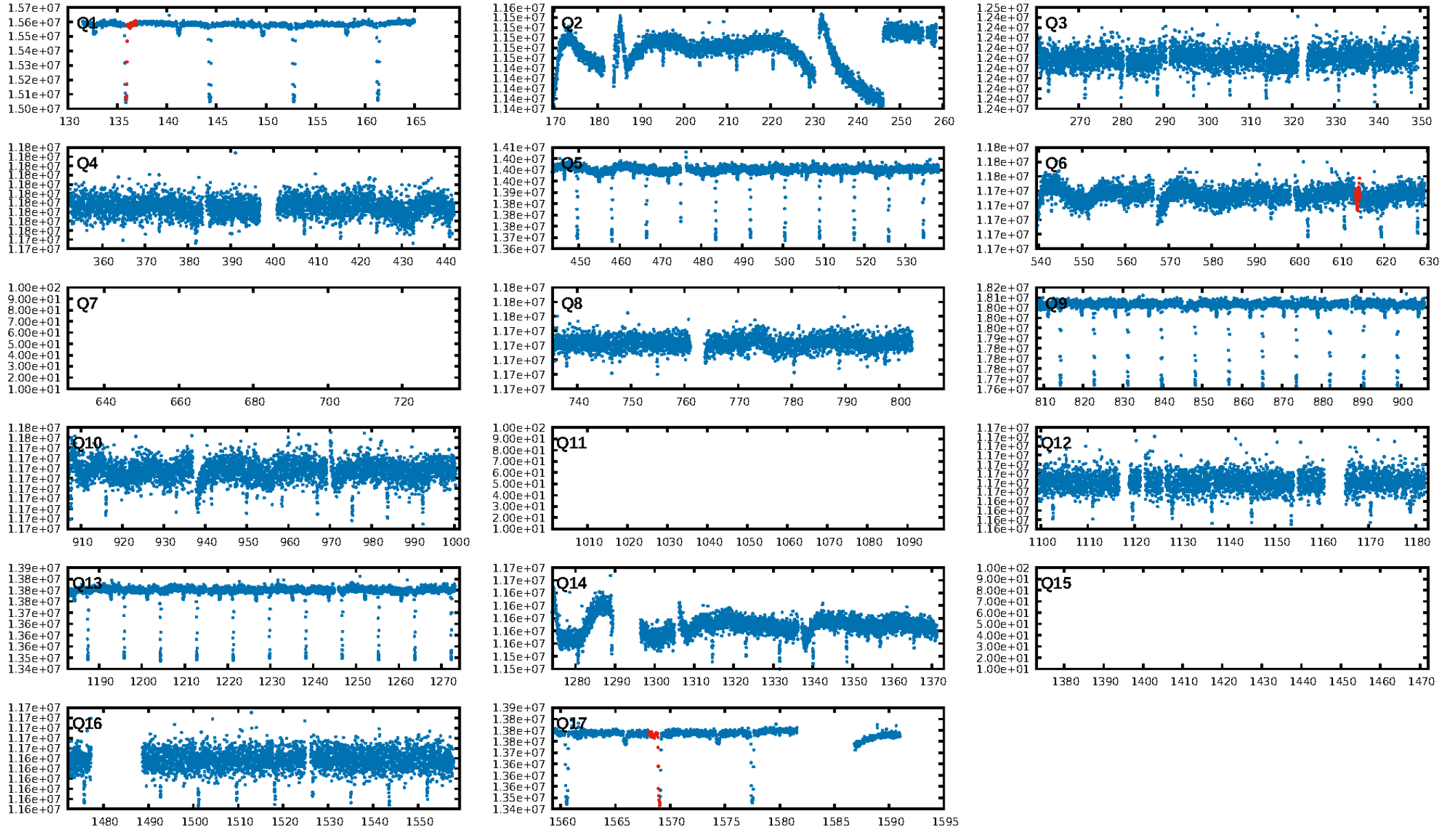
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [755.86σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 27.3%  
ModelChiSquareGoF-sig: 100.0%  
Bootstrap-pfa: 4.23e-16  
RollingBand-fgt: 1.00 [1/1]  
GhostDiagnostic-chr: 0.2634  
Centroid-sig: N/A  
Centroid-so: 2.623 arcsec [2.50σ]  
OotOffset-rm: 6.142 arcsec [47.76σ]  
KicOffset-rm: 7.758 arcsec [53.61σ]  
OotOffset-st: 0/0/0/2 [2]  
KicOffset-st: 0/0/0/2 [2]  
DiffImageQuality-fgm: 0.00 [0/2]  
DiffImageOverlap-fno: 0.33 [1/3]

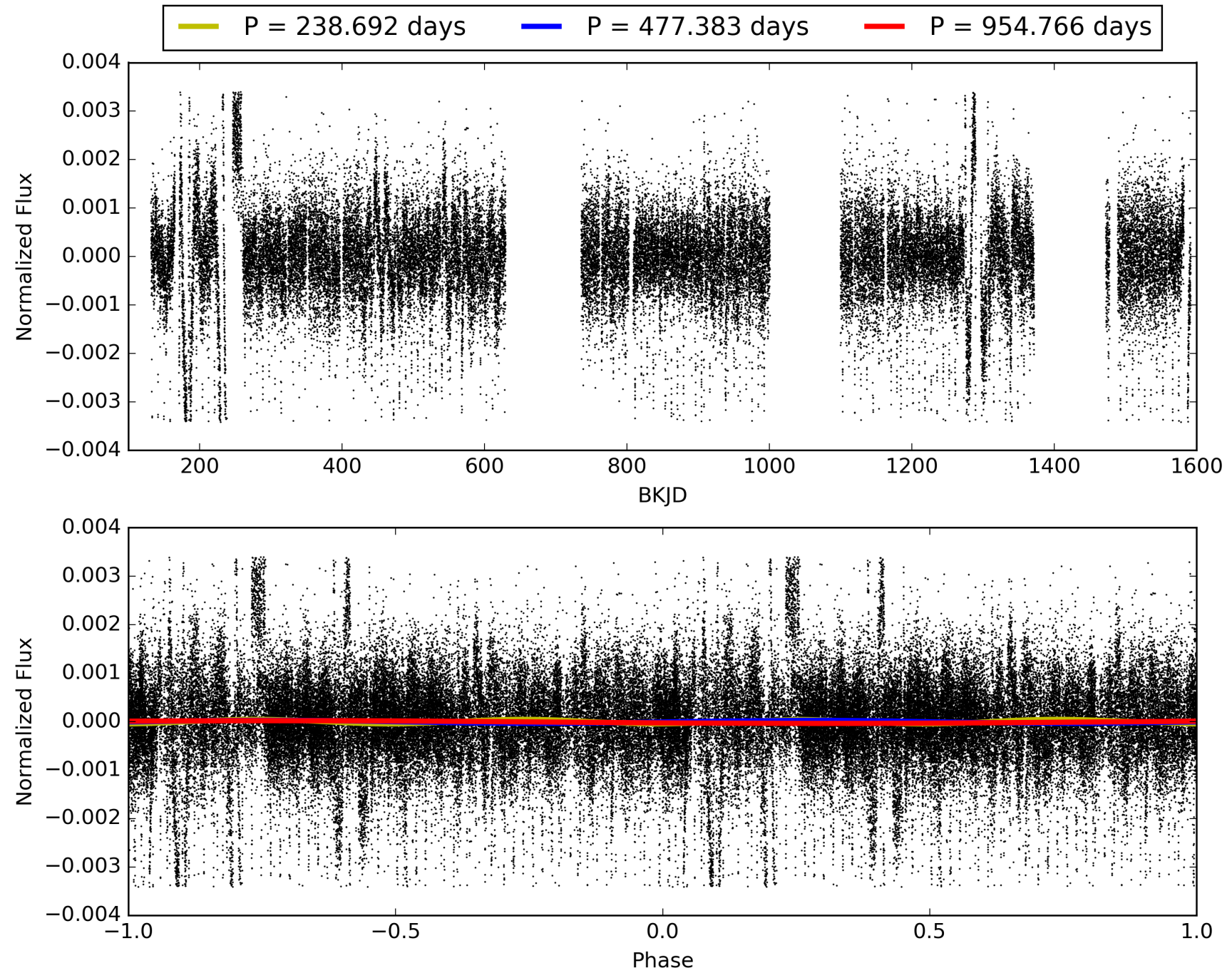
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 03:49:47 Z

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

# TCE 009851123-03, PDC Light Curves

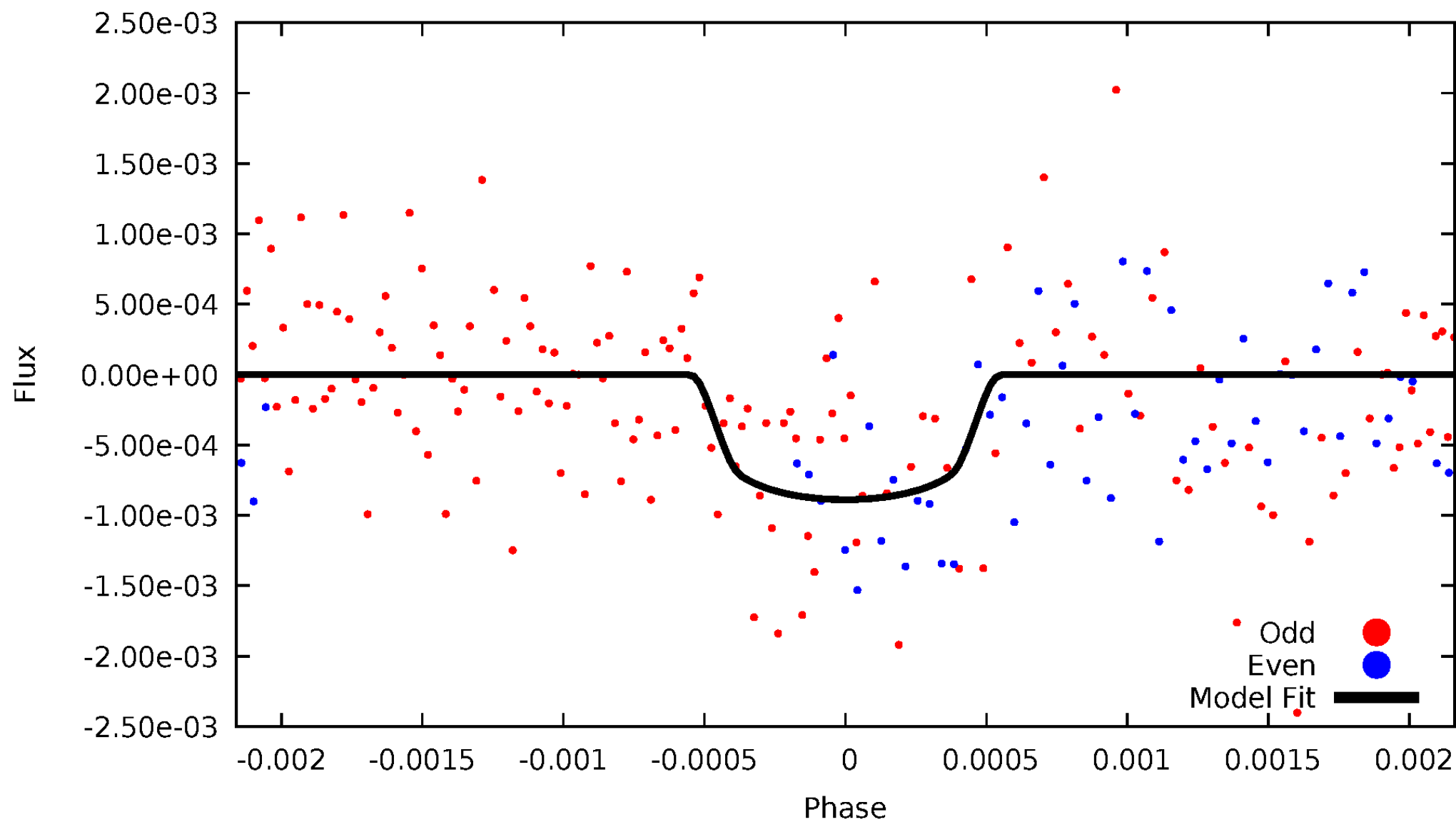


TCE 009851123-03



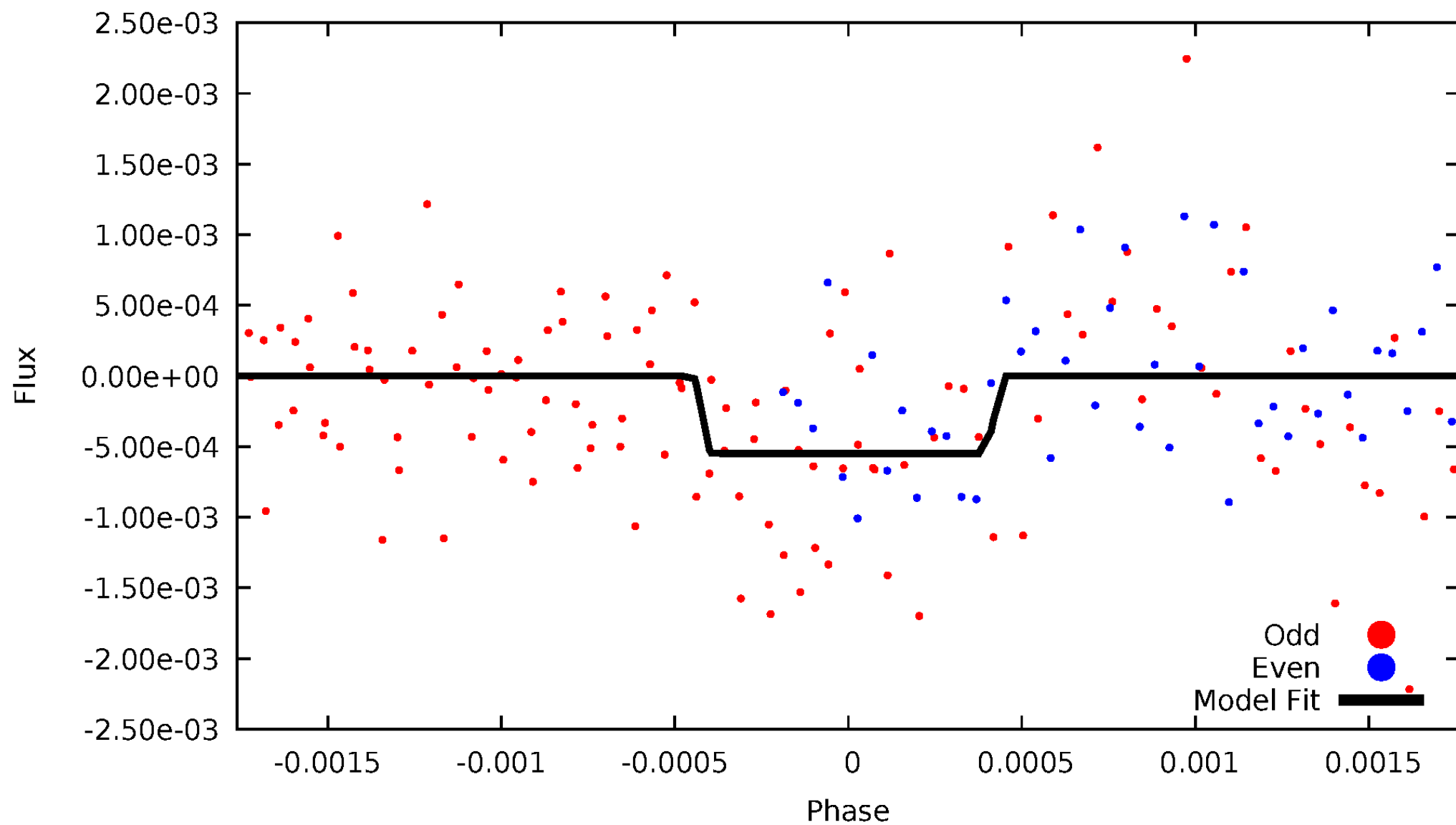
# DV Odd/Even

TCE 009851123-03



# ALT Odd/Even

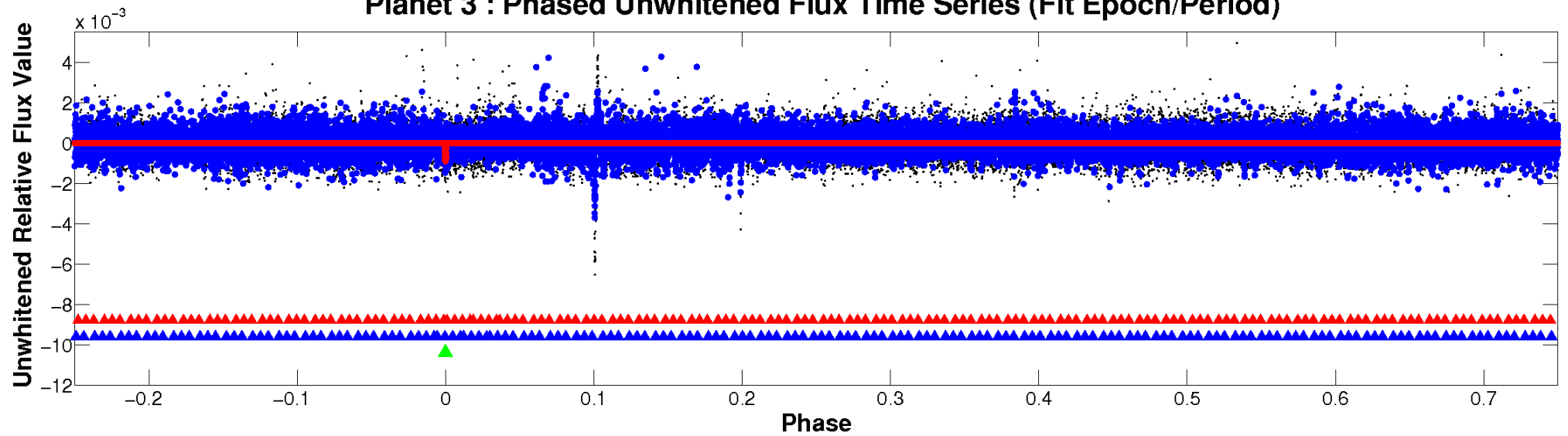
TCE 009851123-03



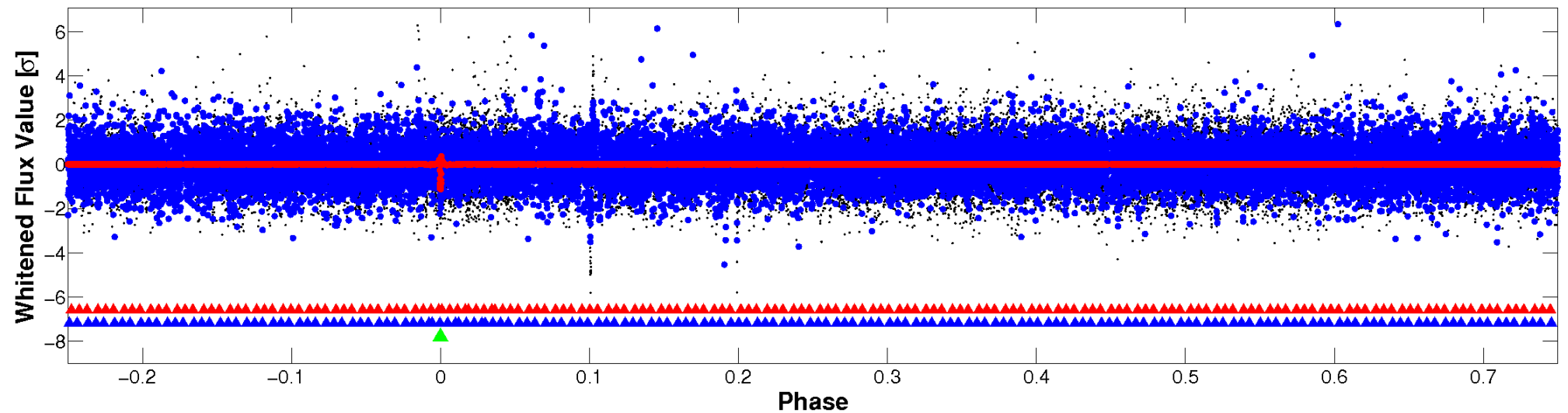


# Non-Whitened Vs. Whitened Light Curve

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 009851123-03 P=477.383250 Days  $T_0=136.395905$  (BKJD)



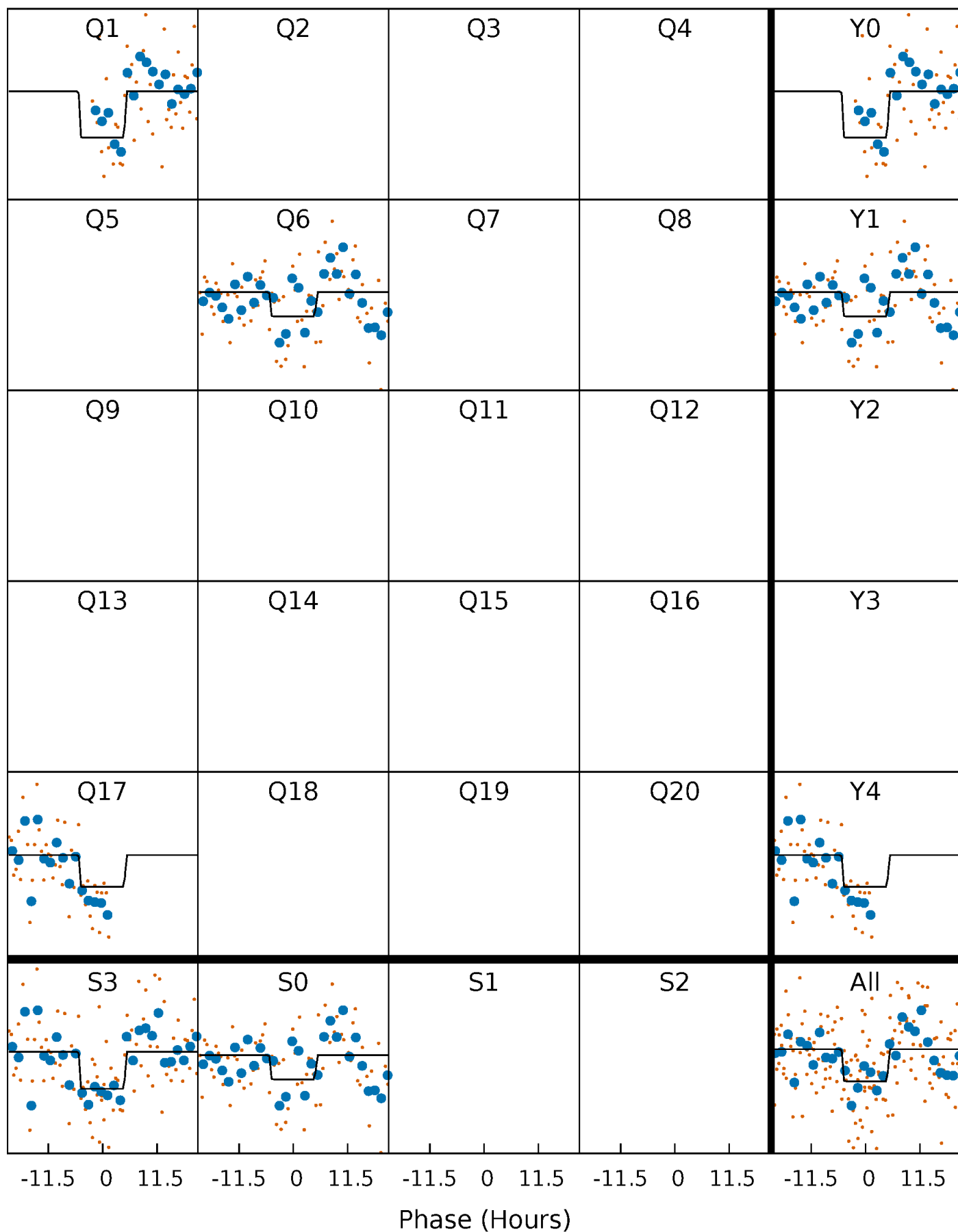
# DV Quarter-Phased Transit Curves

TCE 009851123-03   P=477.383250 Days    $T_0=136.395905$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

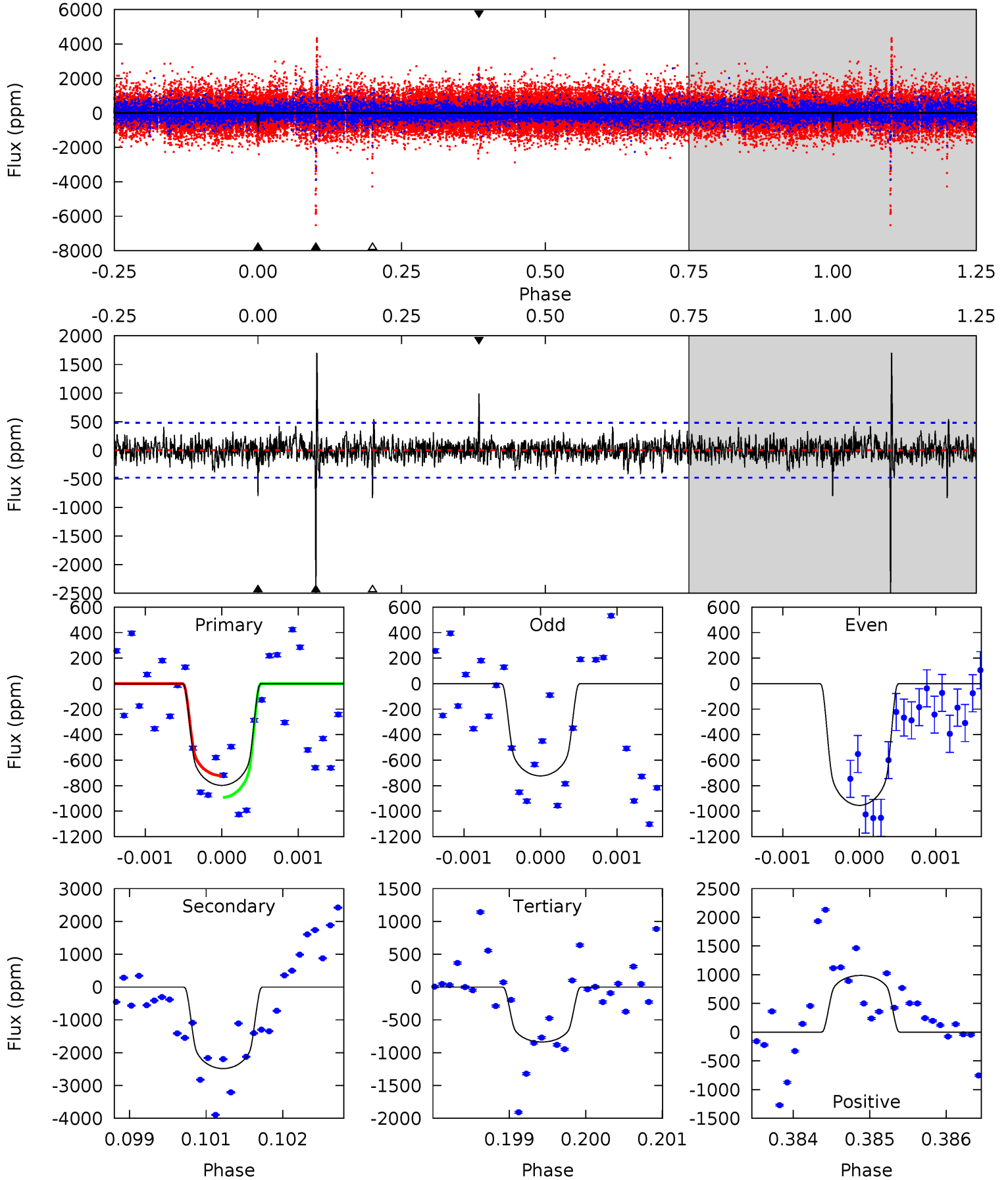
TCE 009851123-03     $P=477.368829$  Days     $T_0=136.403392$  (BKJD)



# DV Model-Shift Uniqueness Test

009851123-03, P = 477.383250 Days, E = 136.395905 Days

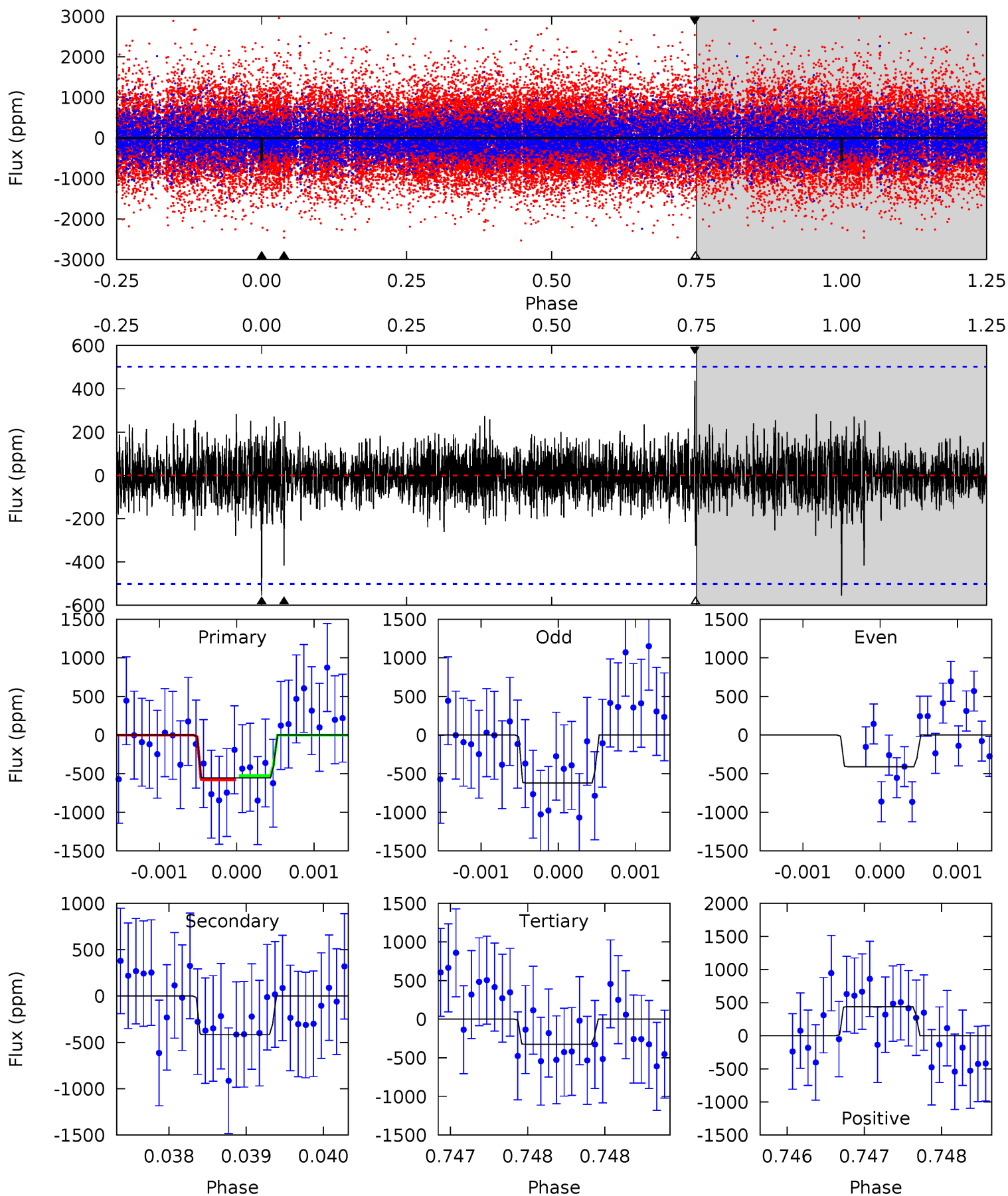
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.03	28.1	9.47	11.2	5.44	3.27	1.58	-0.45	-2.15	18.6	16.9	1.22	1.08	0.41	0.97



# Alt Model-Shift Uniqueness Test

009851123-03, P = 477.368829 Days, E = 136.403392 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
6.06	4.54	3.54	4.77	5.48	3.33	0.81	2.52	1.29	1.00	-0.24	1.07	1.16	0.44	0.28





### Stellar Parameters For KIC 009851123

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5478^{+180}_{-164}$	$4.573^{+0.038}_{-0.142}$	$-0.080^{+0.300}_{-0.300}$	$0.812^{+0.188}_{-0.075}$	$0.906^{+0.081}_{-0.101}$	$2.382^{+0.454}_{-1.021}$
	+3%/-3%	+1%/-3%	+375%/-375%	+23%/-9%	+9%/-11%	+19%/-43%
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 009851123-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-2484 \pm 88$	$2.96^{+0.62}_{-0.52}$	$289^{+15}_{-12}$	$6831^{+750}_{-610}$	$208425^{+93182}_{-66674}$
Alt.	$-416 \pm 92$	$2.15^{+0.58}_{-0.49}$	$288^{+17}_{-12}$	$5152^{+732}_{-528}$	$66331^{+45111}_{-28497}$

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

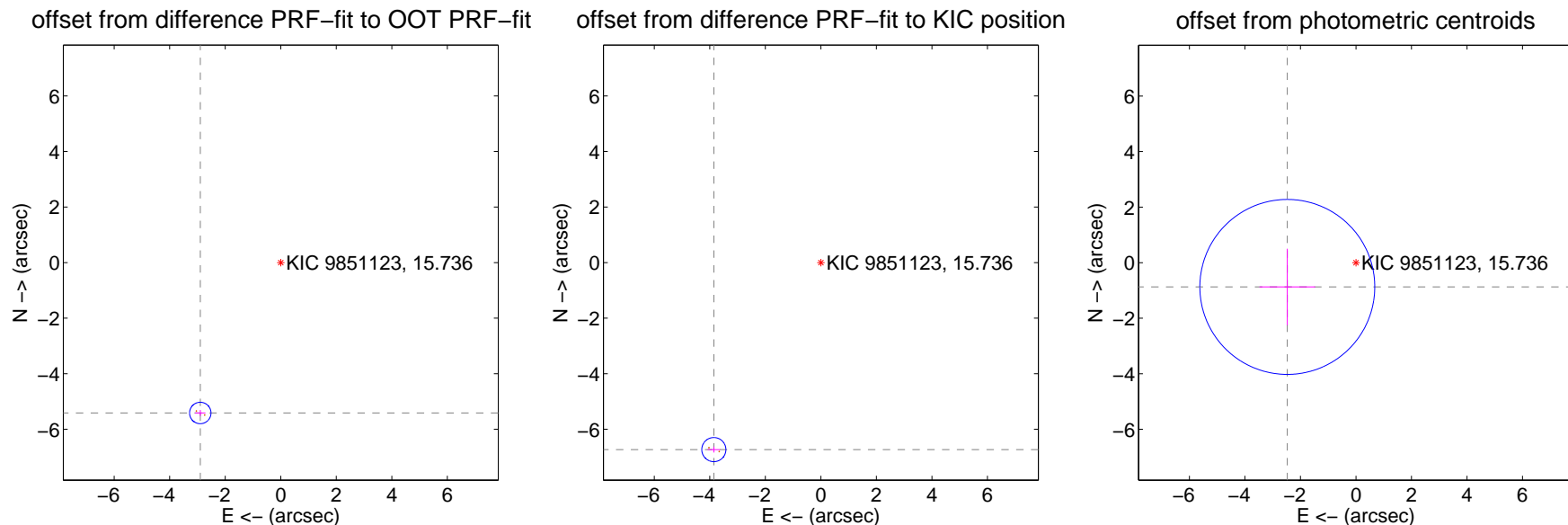
## DV Centroid Data

Supplemental centroid analysis for 009851123-03. Kepler magnitude: 15.74. Transit SNR 6.95

There are 0 quarters with good PRF difference image offsets

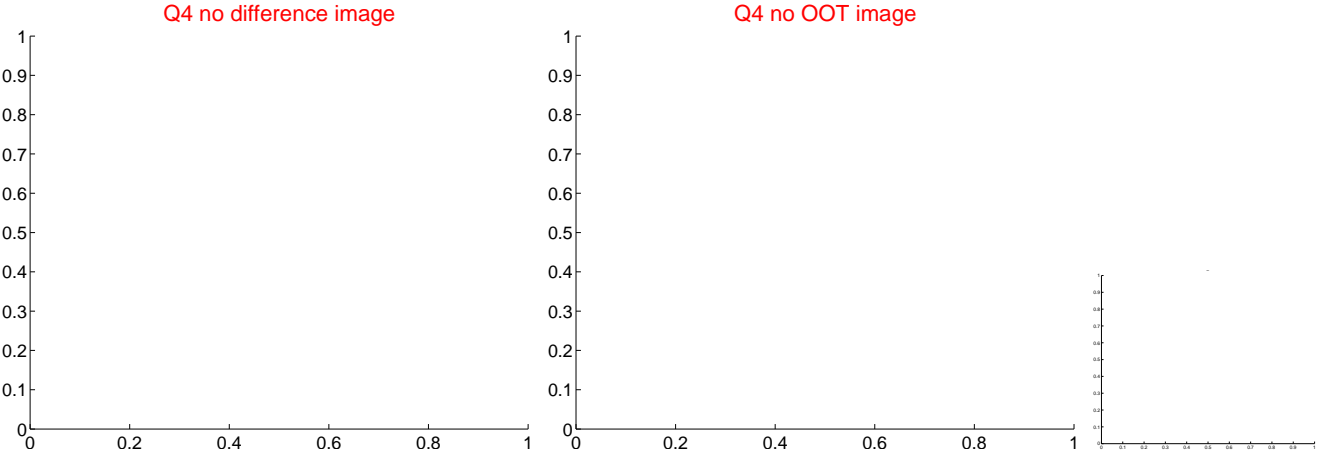
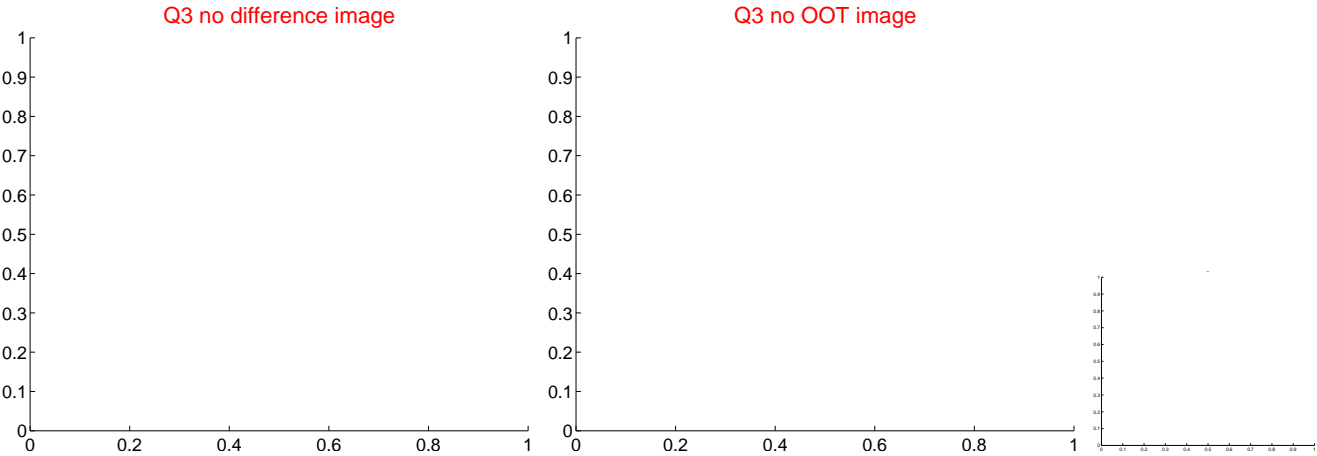
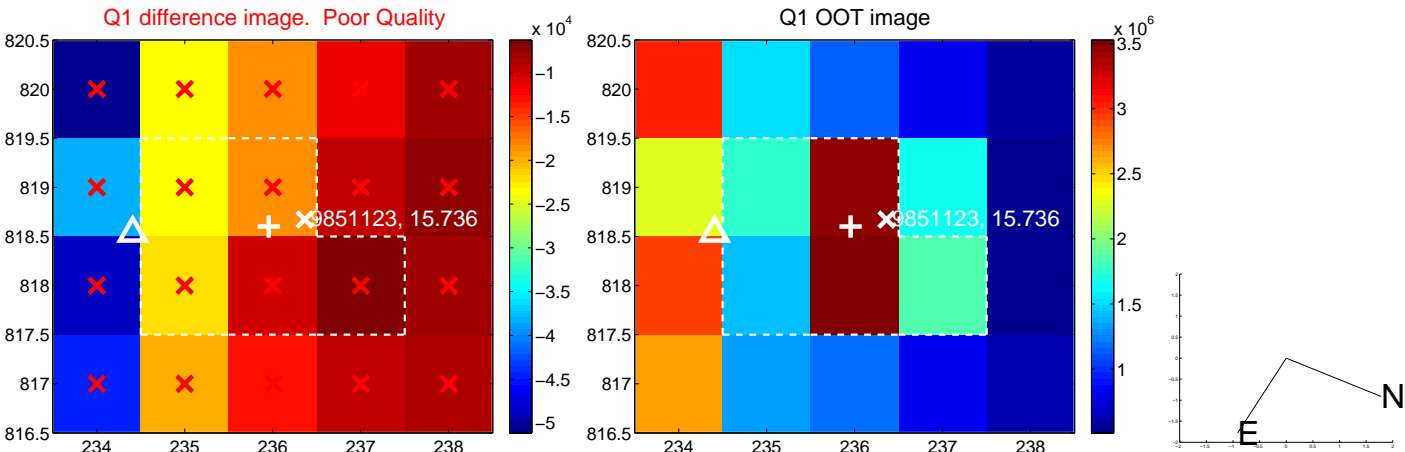
The direct PRF centroid is offset from the target star catalog position by about 1.61 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$6.142 \pm 0.129$	47.76	$2.898 \pm 0.186$	$-5.415 \pm 0.107$
PRF-fit source offset from KIC position	$7.758 \pm 0.145$	53.61	$3.855 \pm 0.226$	$-6.733 \pm 0.105$
photometric centroid source offset	$2.62 \pm 1.05$	2.50	$2.47 \pm 1.00$	$-0.87 \pm 1.38$



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.

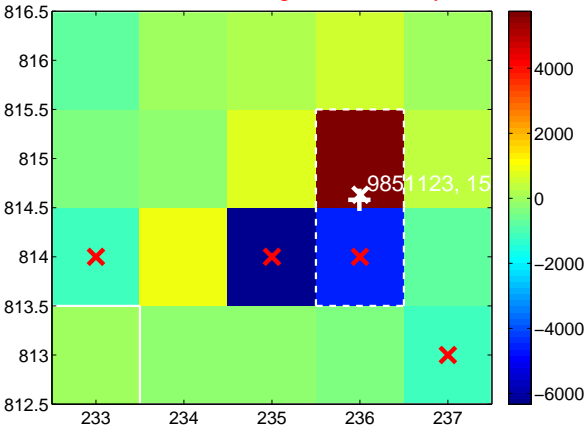
Q5 no difference image



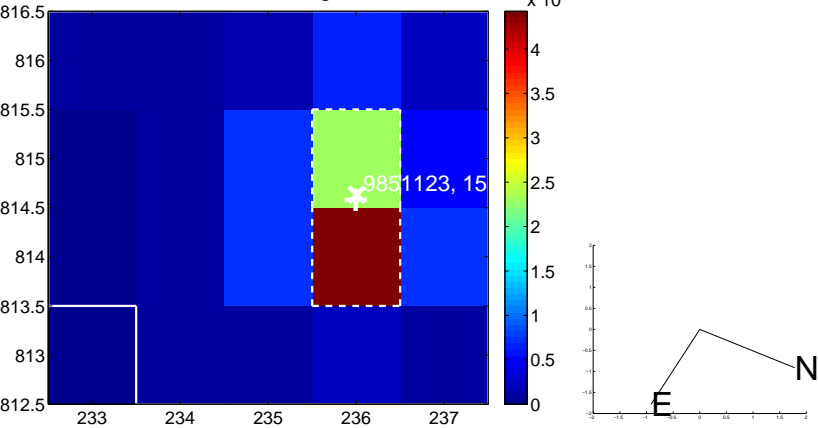
Q5 no OOT image



Q6 difference image. Poor Quality



Q6 OOT image



Q7 no difference image



Q7 no OOT image



Q8 no difference image



Q8 no OOT image



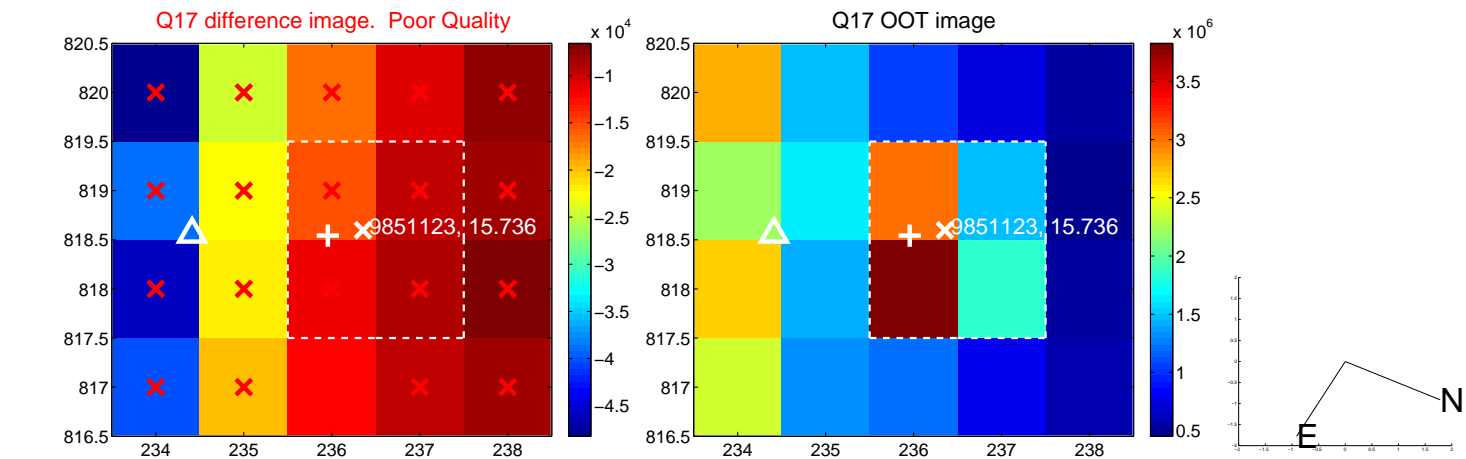
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



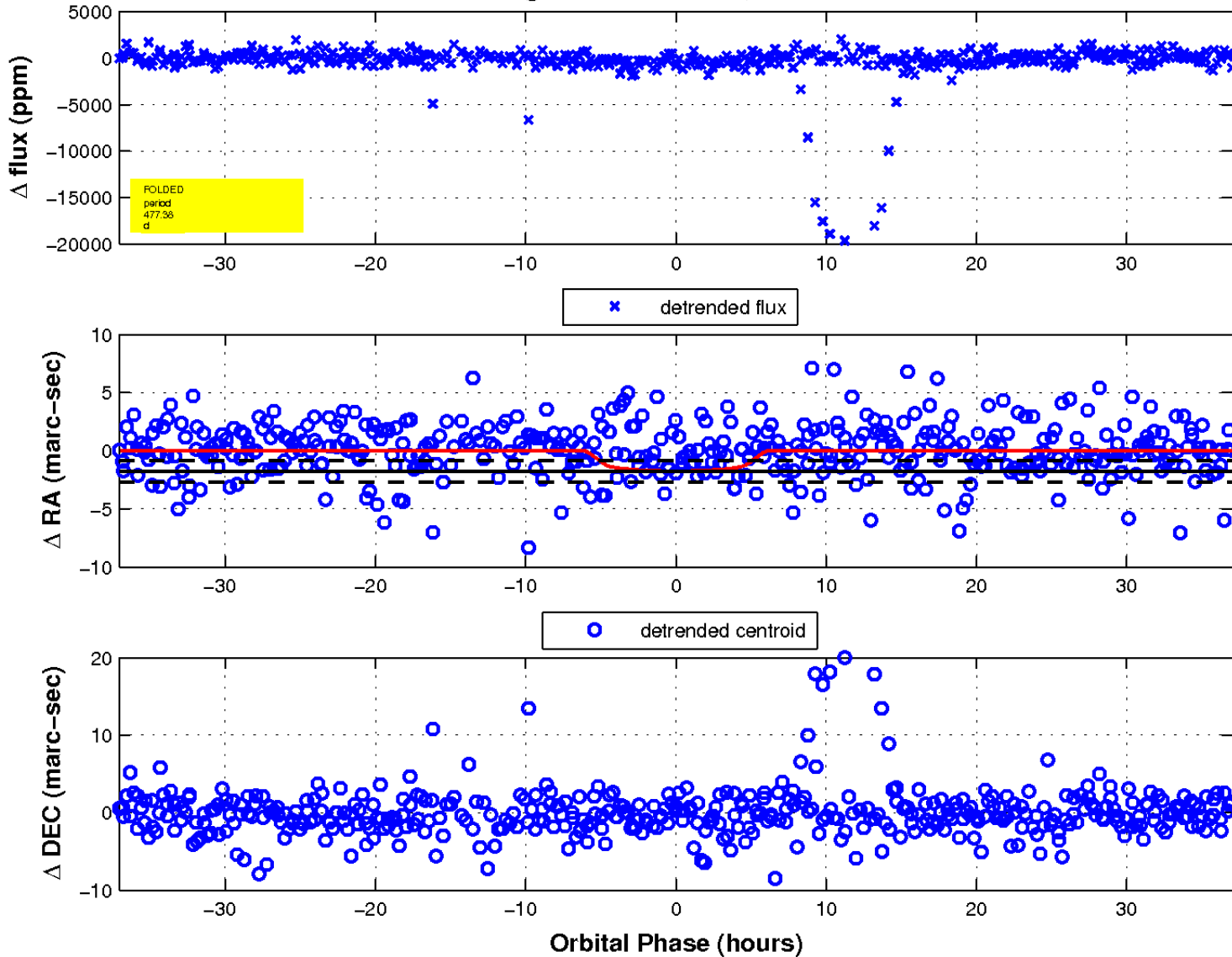
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 3 of 3





UKIRT Image

Declination

