

# KIC 009718379

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009718379-01	OBS	2379.01	40.009036	141.740739	581.1	3.523	18.3	20.0	1.02	6237	4.42	27.70
009718379-02	OBS	No	40.008795	137.228919	418.1	3.694	13.1	14.3	1.02	6237	3.83	27.70

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009718379-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE
009718379-02	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.

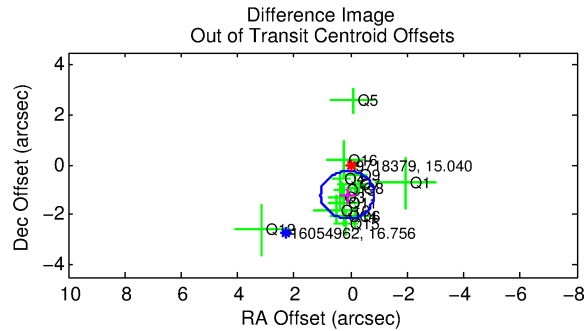
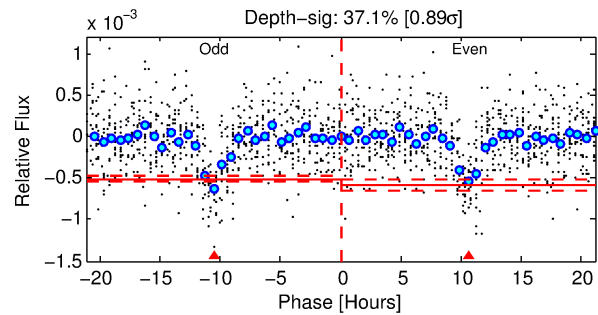
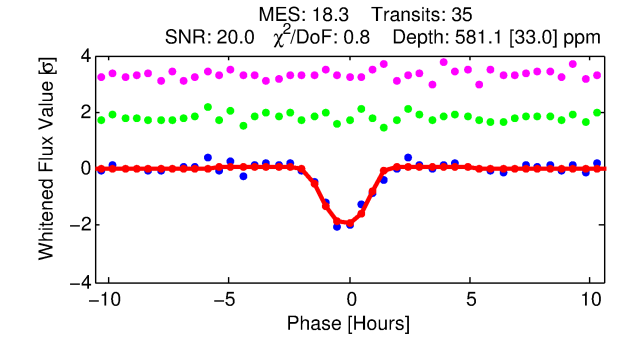
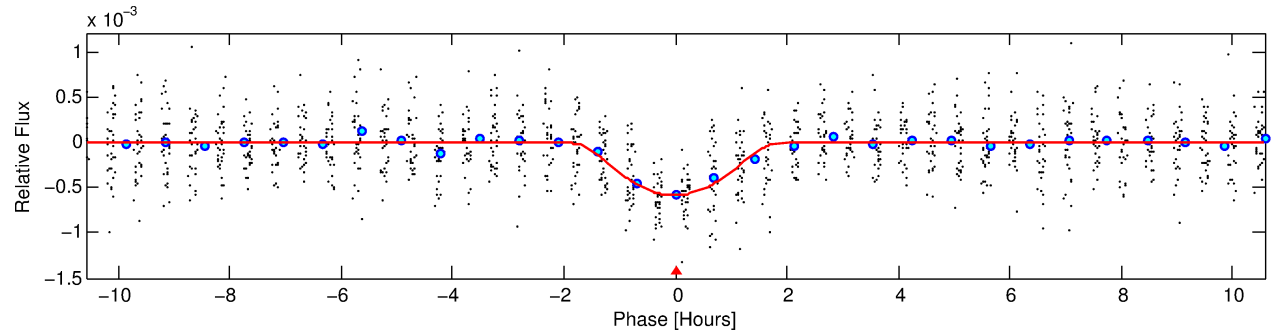
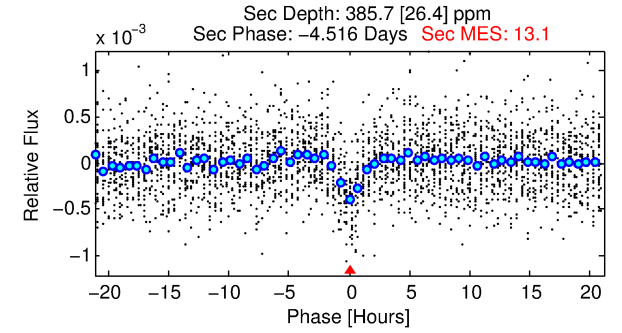
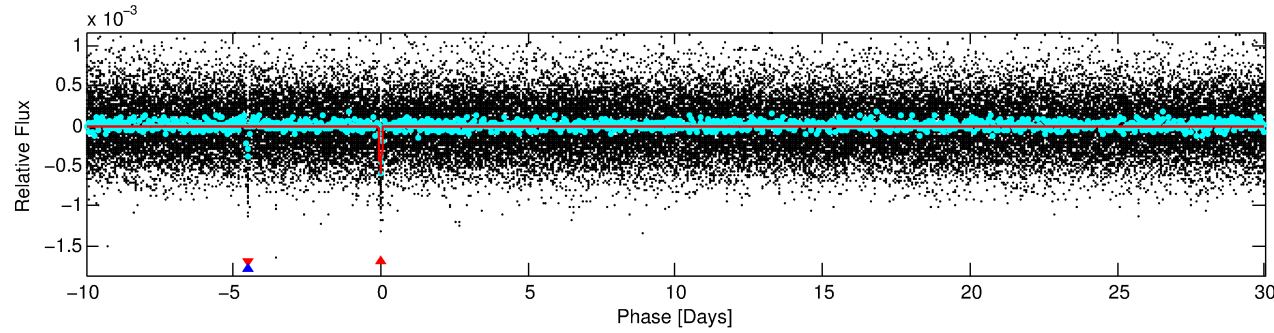
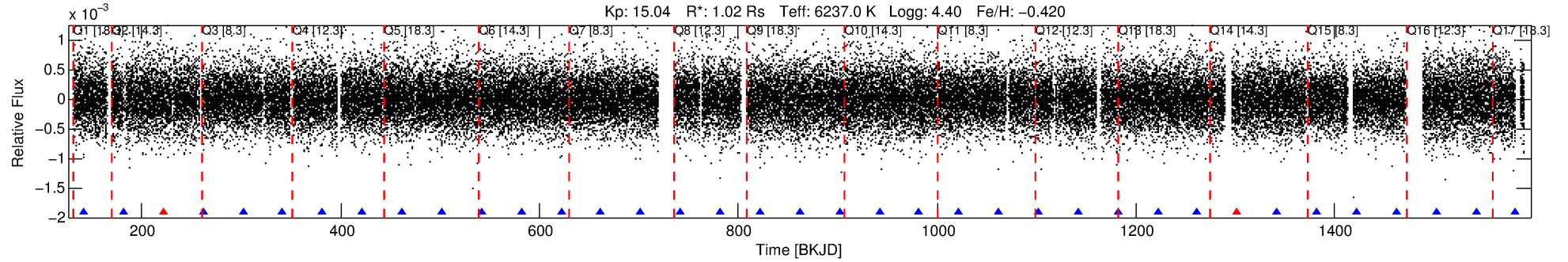
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009718379-01

No Significant Match Found

# DV One-Page Summary

KIC: 9718379 Candidate: 1 of 2 Period: 40.009 d  
KOI: K02379.01 Corr: 0.978



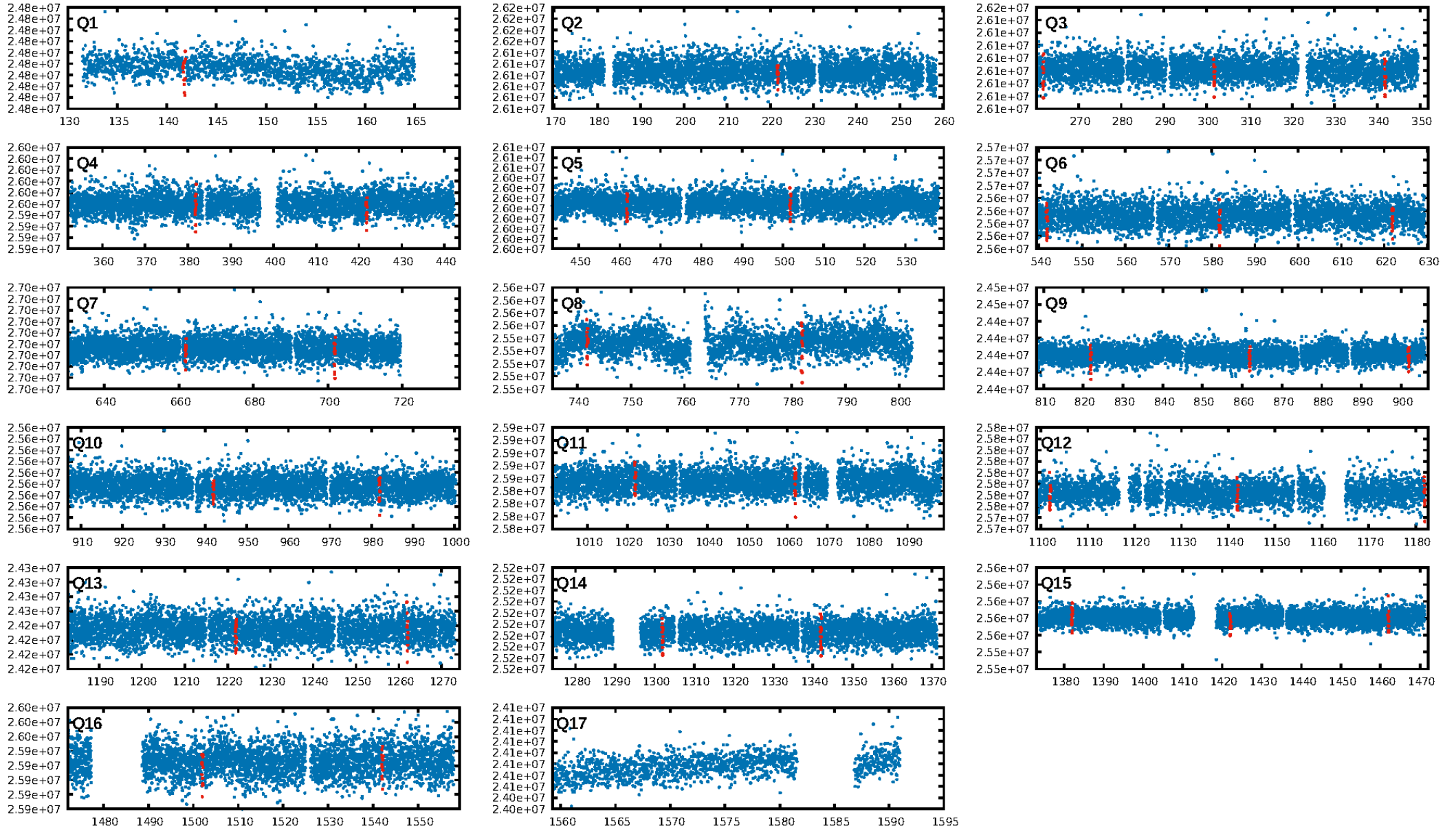
## DV Fit Results:

Period = 40.00904 [0.00021] d  
Epoch = 141.7407 [0.0043] BKJD  
Rp/R\* = 0.0396 [0.0646]  
a/R\* = 26.13 [12.27]  
b = 1.00 [0.10]  
Seff = 27.70 [10.40]  
Teff = 585 [55] K  
Rp = 4.42 [7.32] Re  
a = 0.2263 [0.0548] AU  
Ag = 557.16 [1829.99] [0.30 $\sigma$ ]  
Teffp = 4394 [3591] K [1.06 $\sigma$ ]

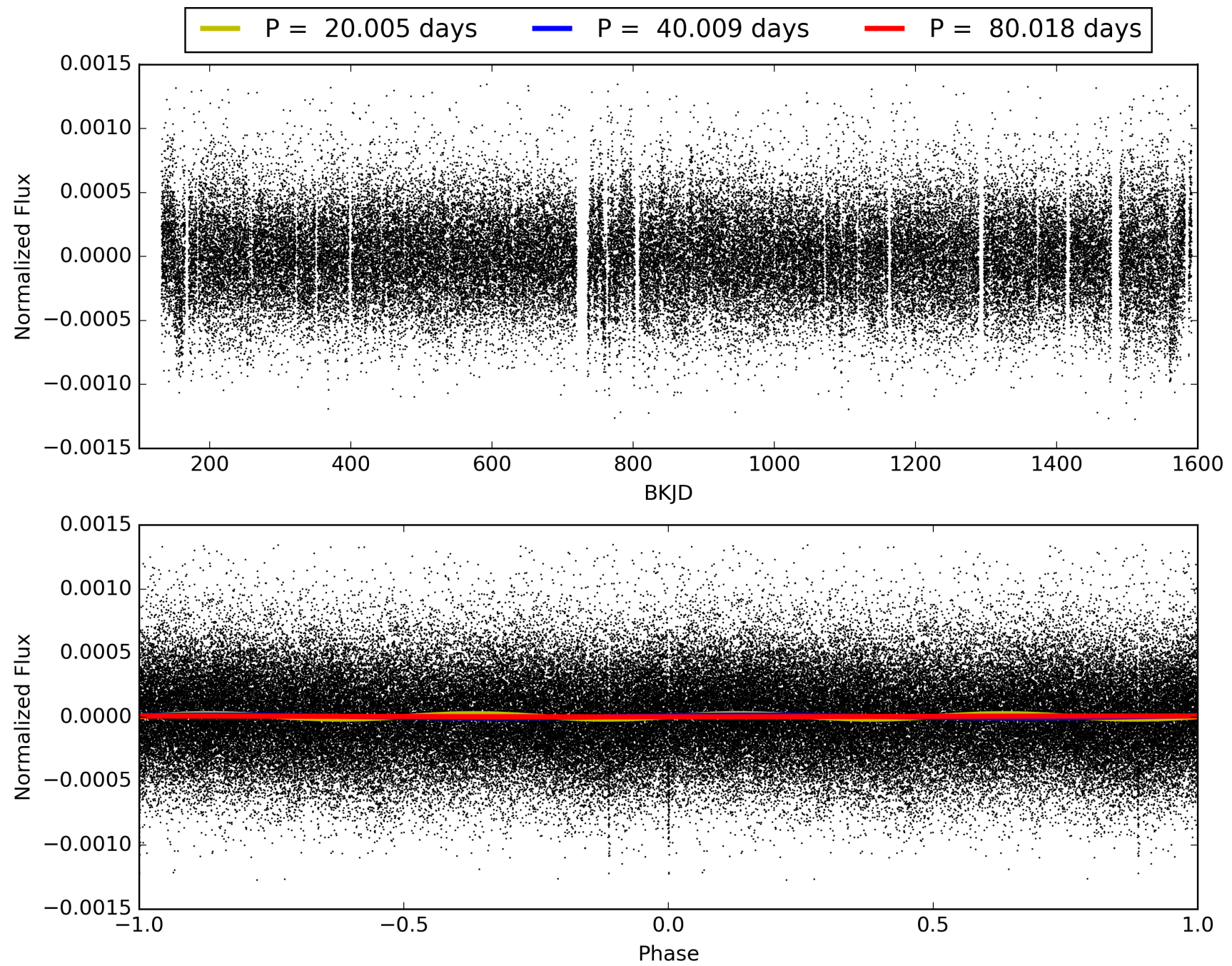
## DV Diagnostic Results:

ShortPeriod-sig: 0.1% [0.00 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 97.6%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 1.69e-72  
RollingBand-fgt: 0.94 [32/34]  
GhostDiagnostic-chr: 1.942  
Centroid-sig: 0.0%  
Centroid-so: 3.890 arcsec [5.76 $\sigma$ ]  
OotOffset-rm: 1.216 arcsec [3.85 $\sigma$ ]  
KicOffset-rm: 1.694 arcsec [5.61 $\sigma$ ]  
OotOffset-st: 3/4/4/4 [15]  
KicOffset-st: 3/4/4/4 [15]  
DiffImageQuality-fgm: 1.00 [15/15]  
DiffImageOverlap-fno: 1.00 [16/16]

# TCE 009718379-01, PDC Light Curves

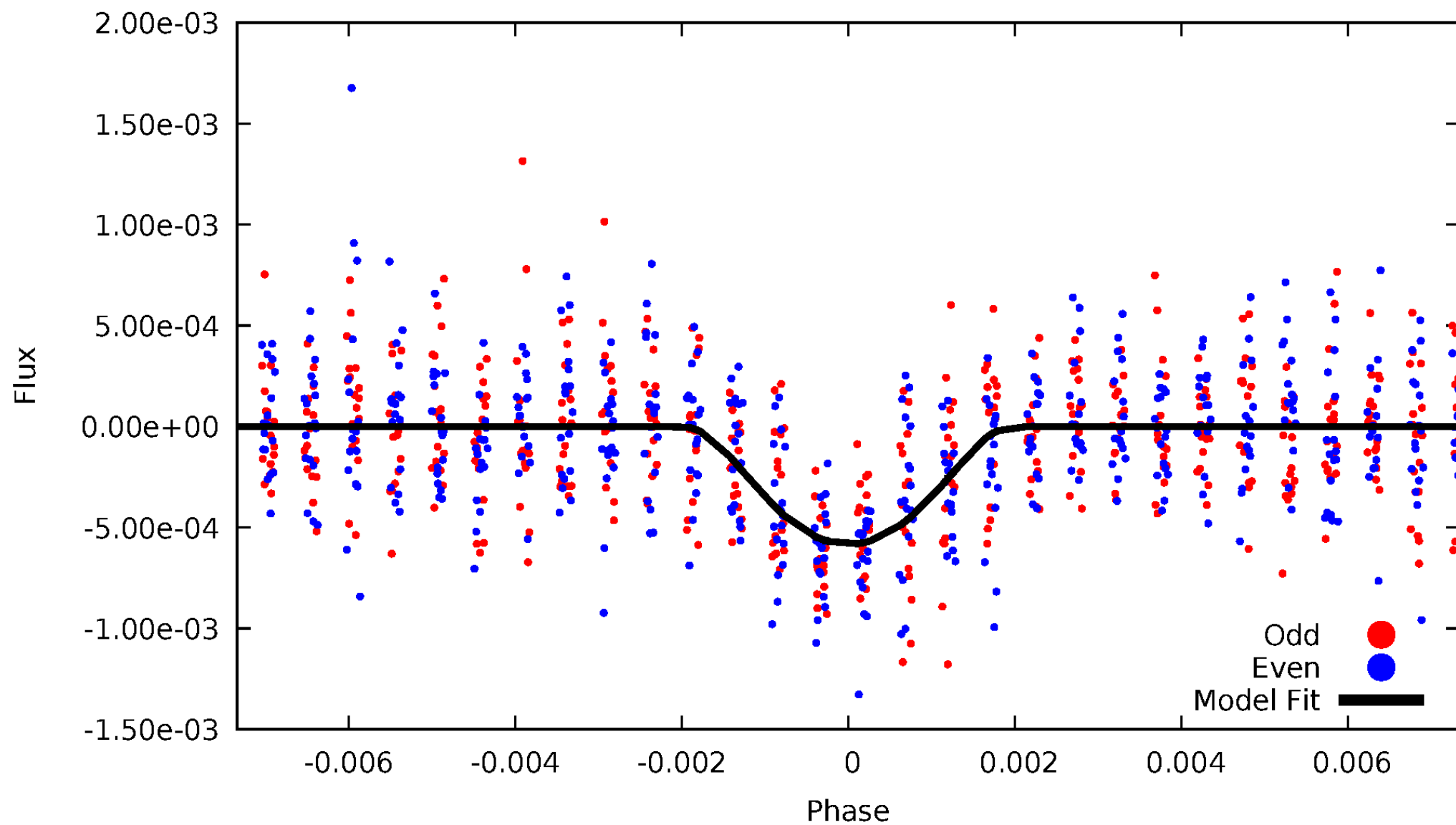


TCE 009718379-01



# DV Odd/Even

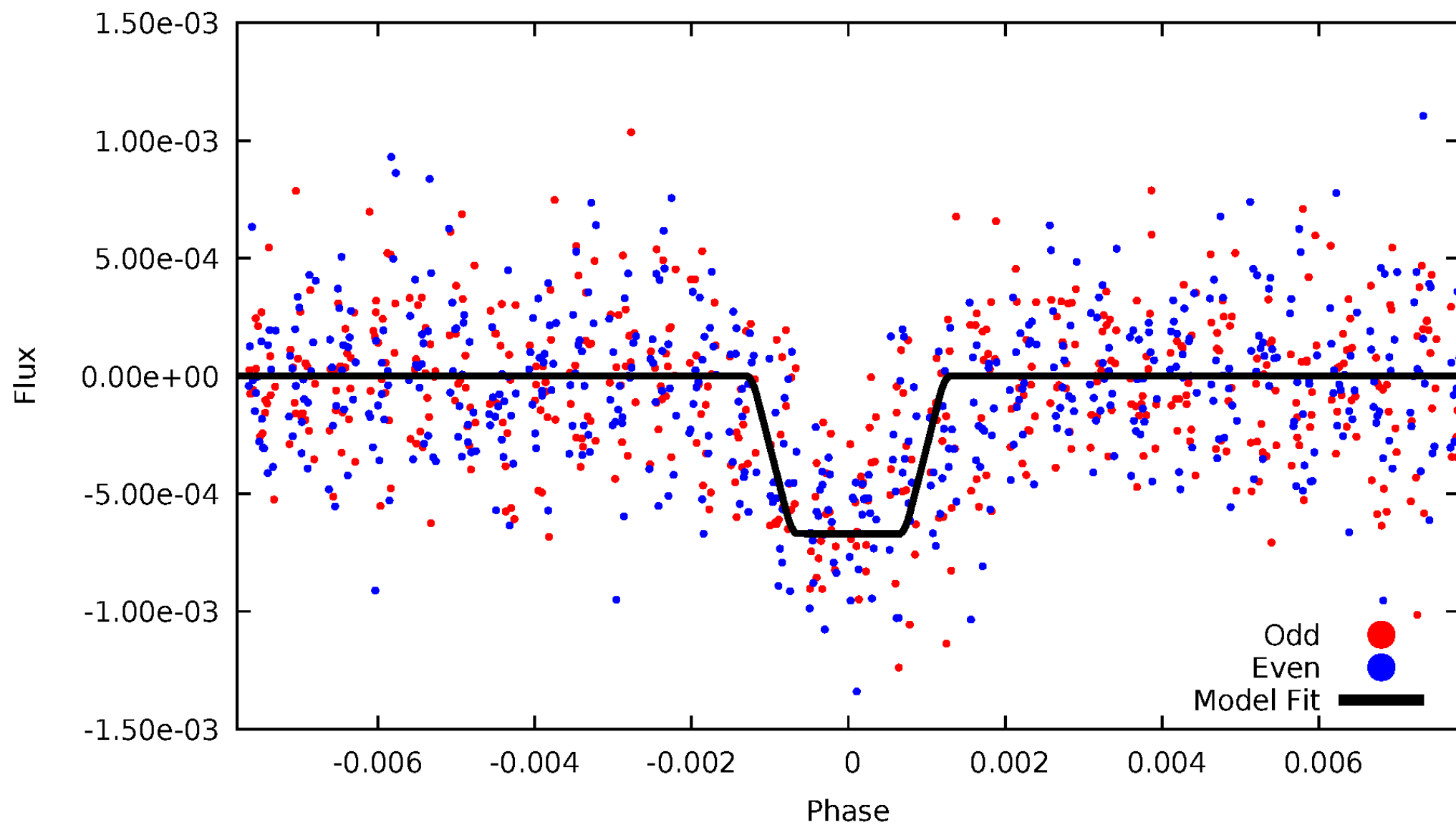
TCE 009718379-01





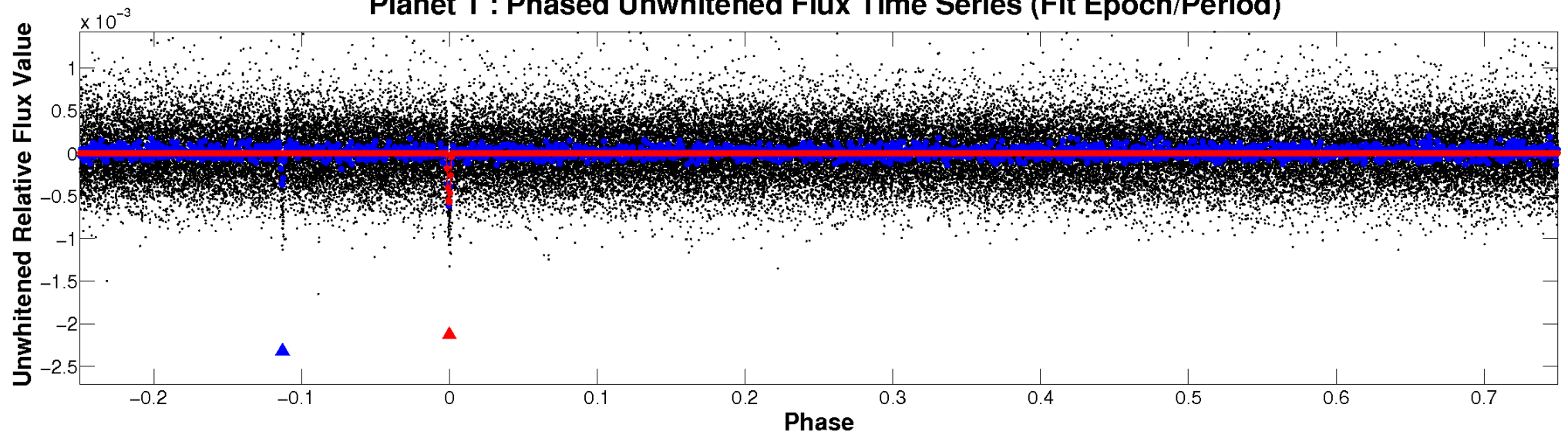
# ALT Odd/Even

TCE 009718379-01

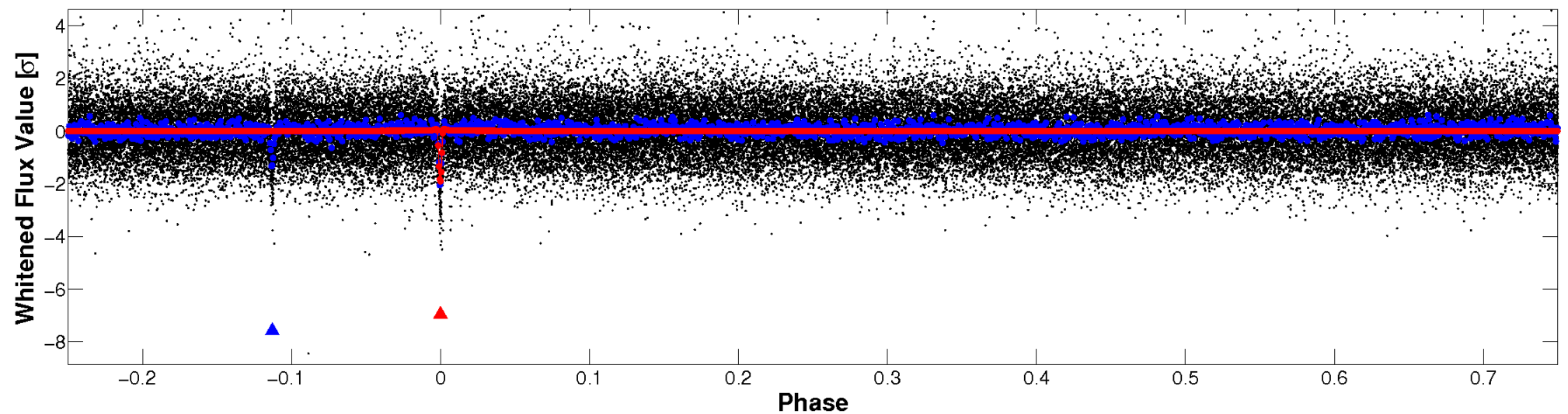


# Non-Whitened Vs. Whitened Light Curve

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

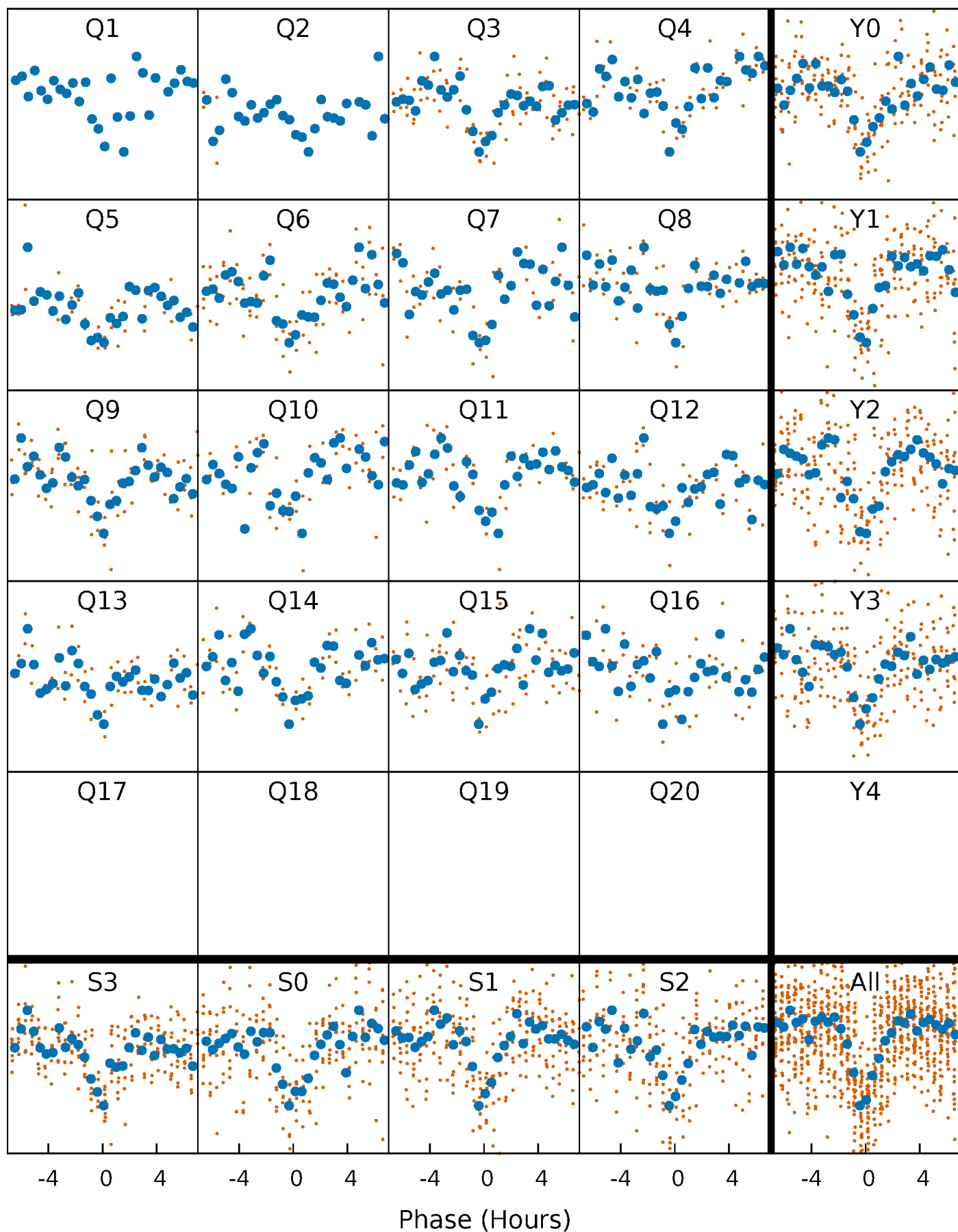


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

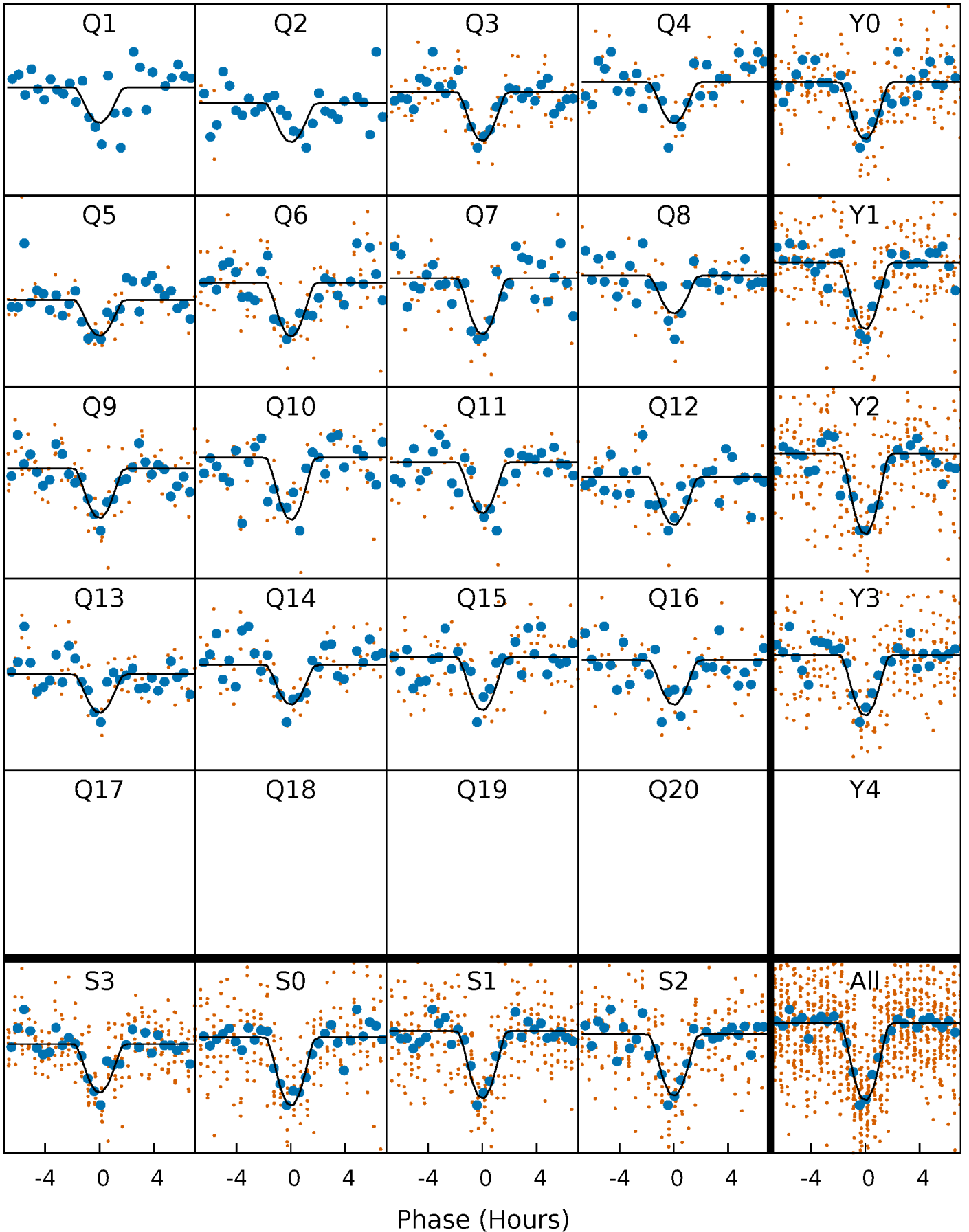
TCE 009718379-01 P= 40.009036 Days  $T_0=141.740739$  (BKJD)





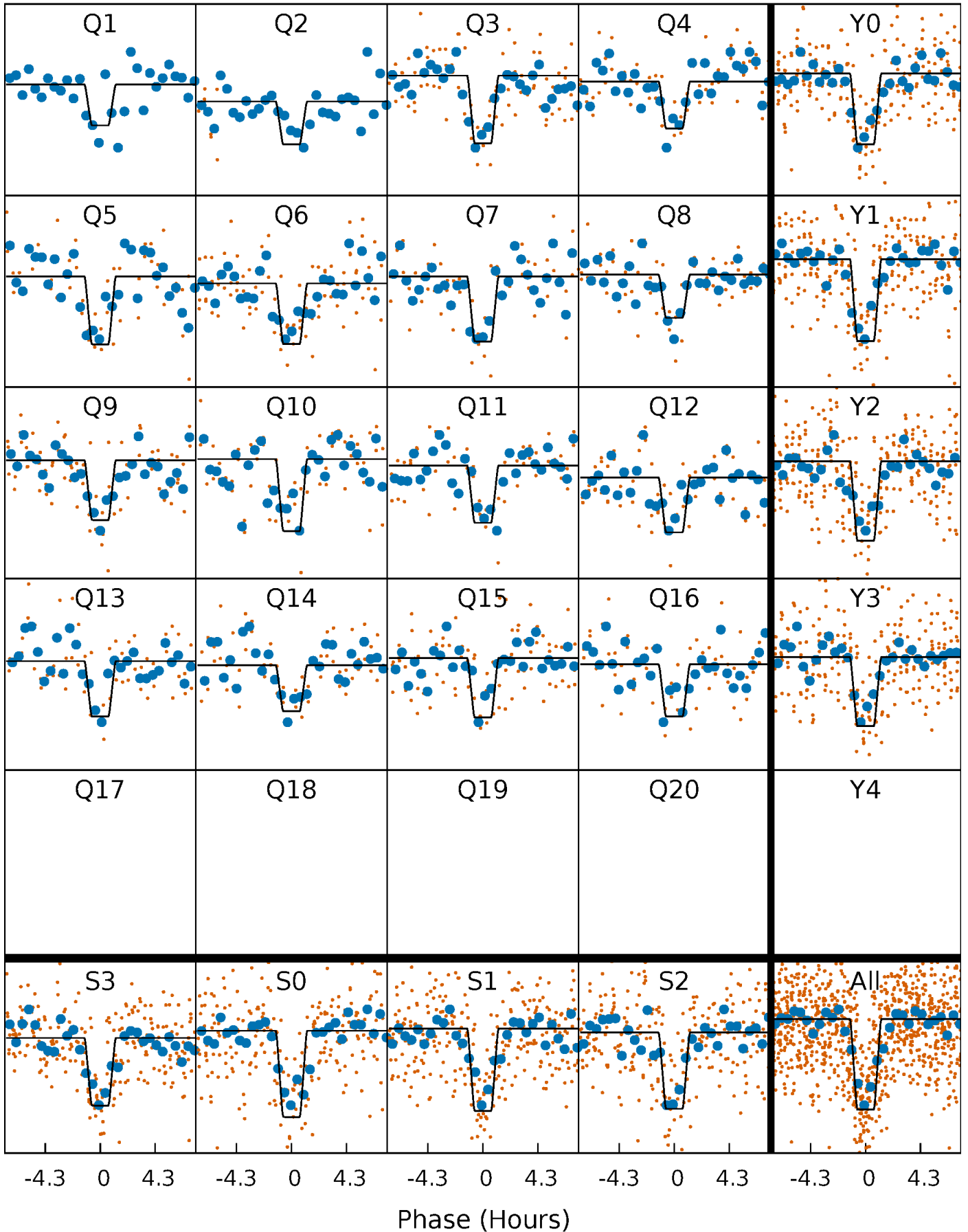
# DV Quarter-Phased Transit Curves

TCE 009718379-01 P= 40.009036 Days  $T_0=141.740739$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

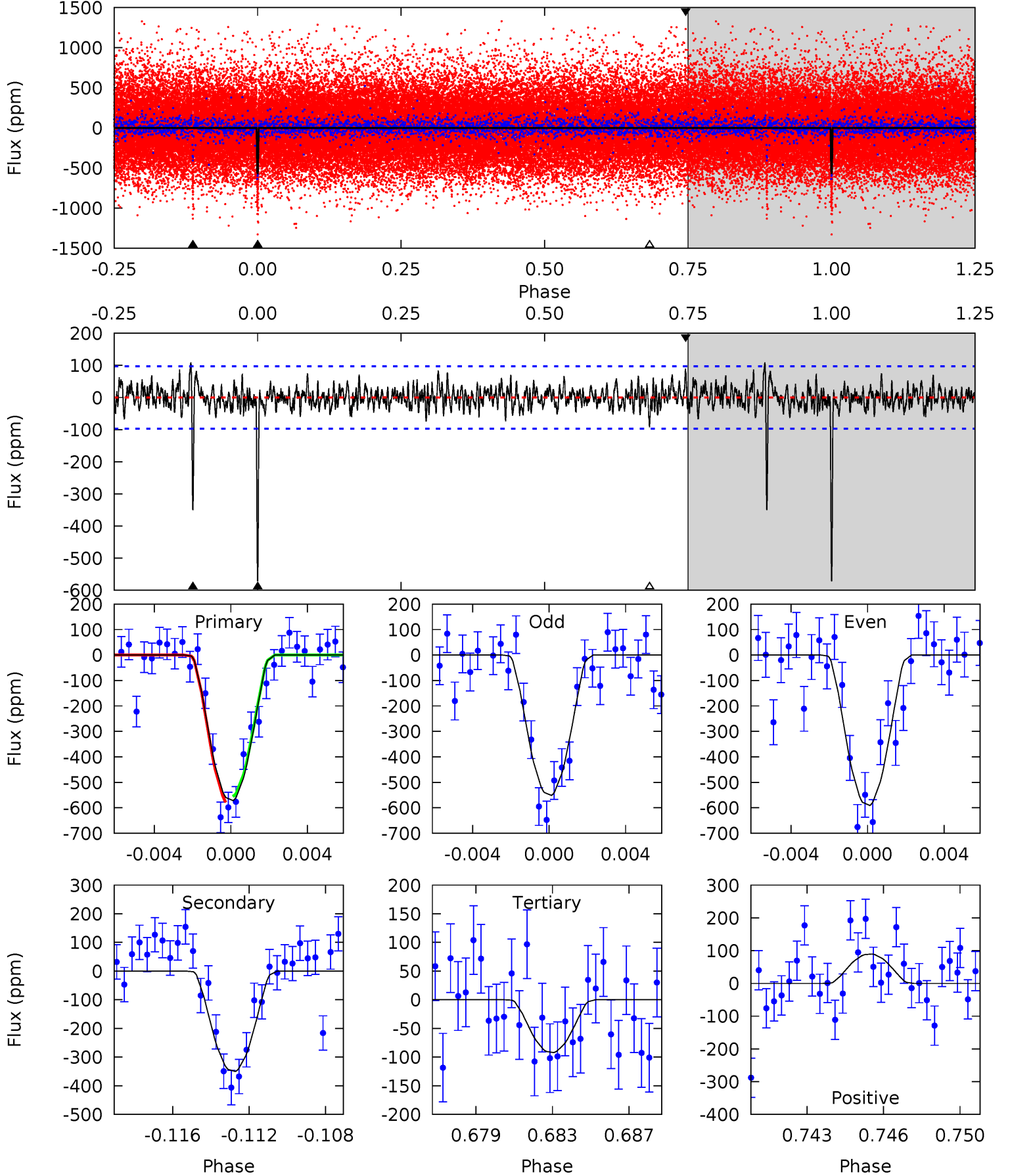
TCE 009718379-01 P= 40.008610 Days  $T_0=141.748387$  (BKJD)



# DV Model-Shift Uniqueness Test

009718379-01, P = 40.009036 Days, E = 101.731703 Days

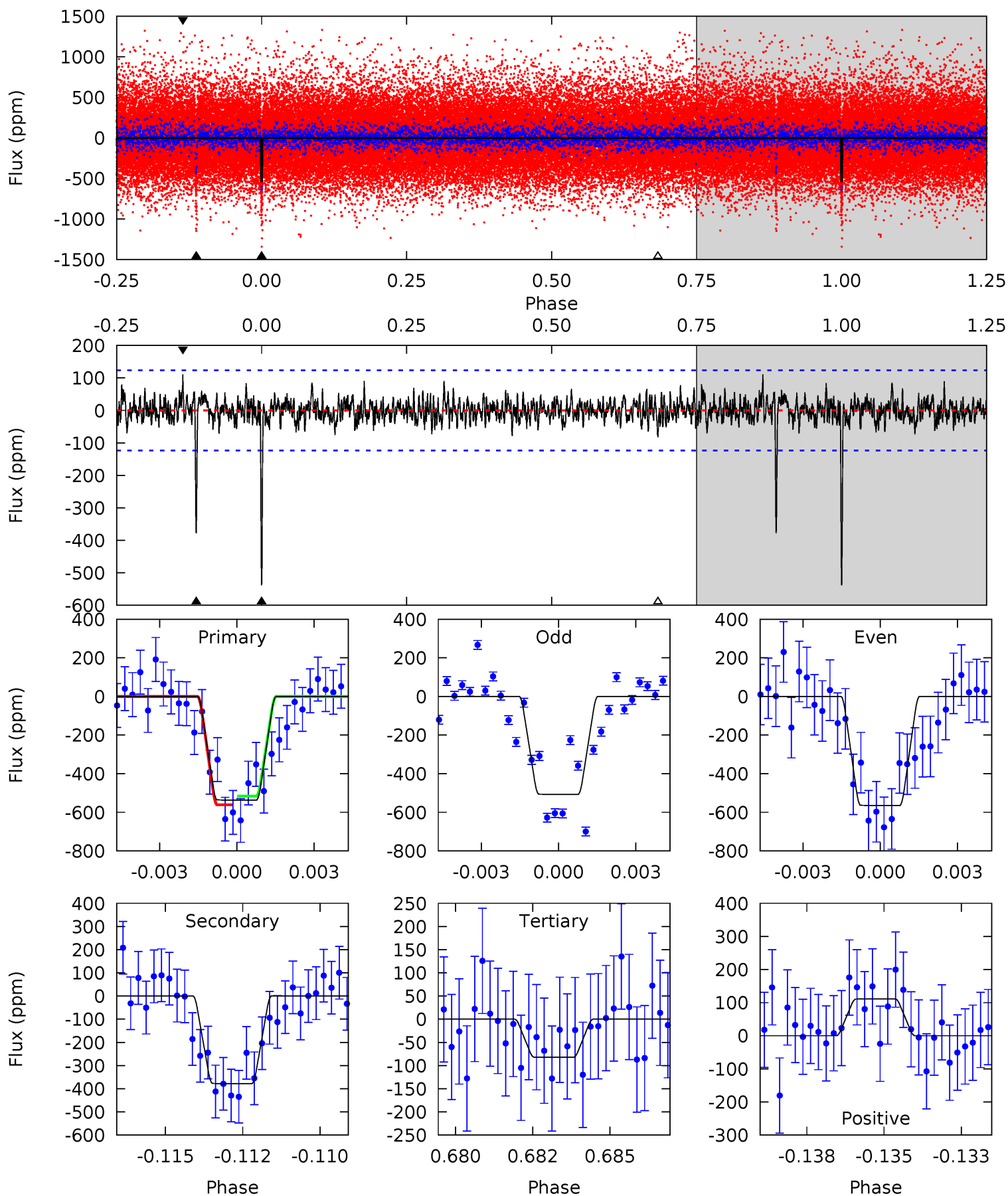
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
30.8	18.9	4.96	4.82	5.21	2.90	1.44	25.8	25.9	13.9	14.0	1.07	1.06	0.16	0.61



# Alt Model-Shift Uniqueness Test

009718379-01,  $P = 40.008610$  Days,  $E = 101.739777$  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	16.2	3.52	4.75	5.28	3.02	1.14	19.5	18.2	12.7	11.4	1.23	1.05	0.17	0.98



### Stellar Parameters For KIC 009718379

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6237^{+176}_{-220}$	$4.403^{+0.101}_{-0.188}$	$-0.420^{+0.300}_{-0.300}$	$1.023^{+0.298}_{-0.149}$	$0.964^{+0.135}_{-0.111}$	$1.270^{+0.568}_{-0.630}$
	+3%/-4%	+2%/-4%	+71%/-71%	+29%/-15%	+14%/-12%	+45%/-50%
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 009718379-01 / KOI 2379.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-350 \pm 19$	$7.62^{+6.77}_{-5.18}$	$826^{+54}_{-48}$	$3719^{+2129}_{-662}$	$167^{+1531}_{-119}$
Alt.	$-378 \pm 23$	$6.52^{+5.98}_{-4.63}$	$827^{+59}_{-45}$	$3992^{+2983}_{-789}$	$255^{+2618}_{-187}$

$T_{\text{max}}$  = 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

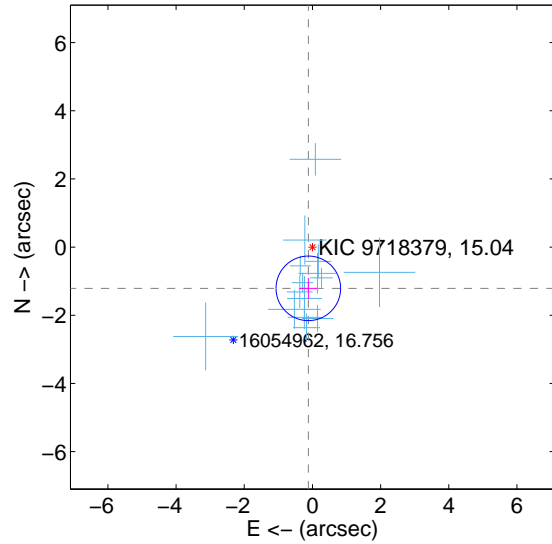
Supplemental centroid analysis for 009718379-01. Kepler magnitude: 15.04. Transit SNR 19.98

There are 15 quarters with good PRF difference image offsets

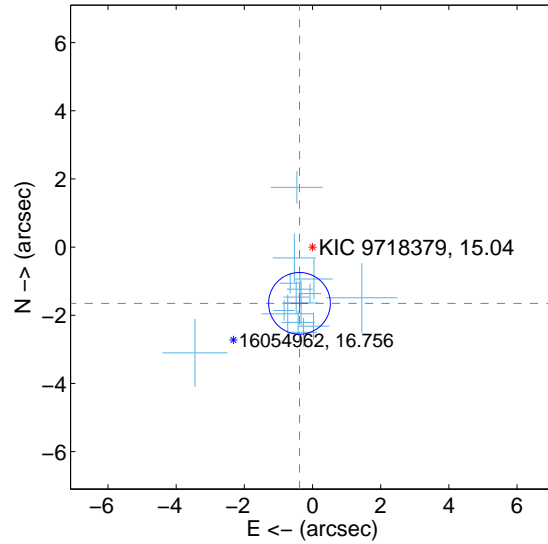
The direct PRF centroid is offset from the target star catalog position by about 0.61 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.216 \pm 0.316$	3.85	$0.120 \pm 0.256$	$-1.210 \pm 0.307$
PRF-fit source offset from KIC position	$1.694 \pm 0.302$	5.61	$0.383 \pm 0.256$	$-1.651 \pm 0.288$
photometric centroid source offset	$3.89 \pm 0.68$	5.76	$1.37 \pm 0.66$	$-3.64 \pm 0.68$

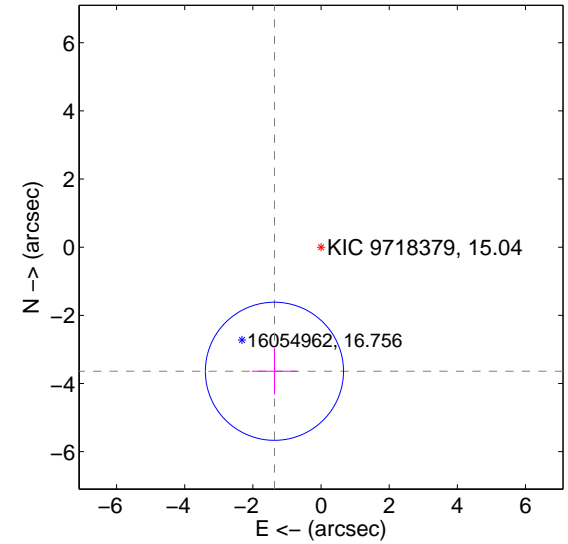
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



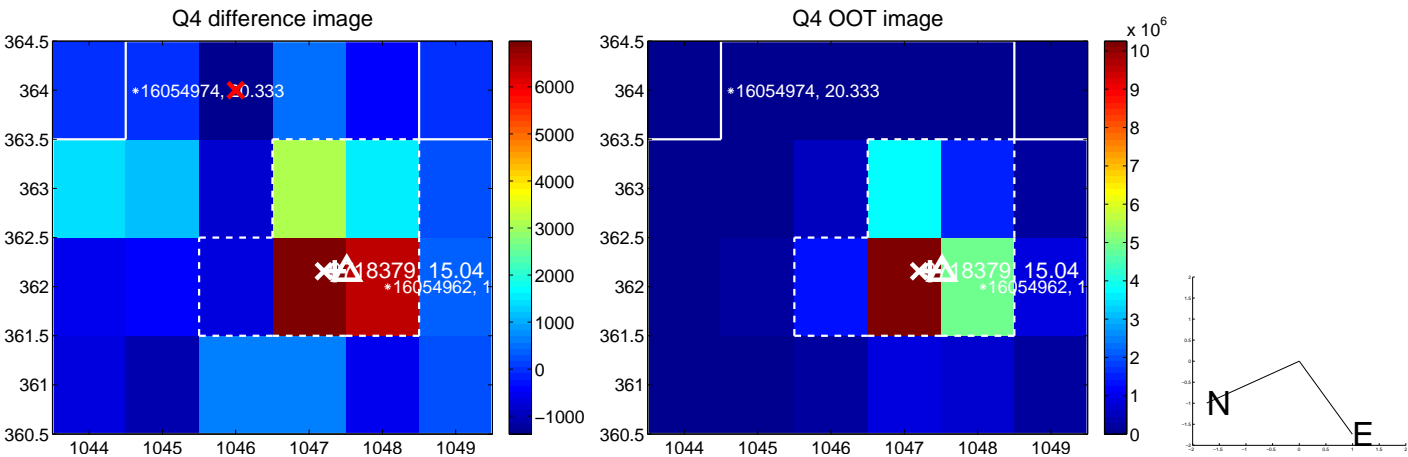
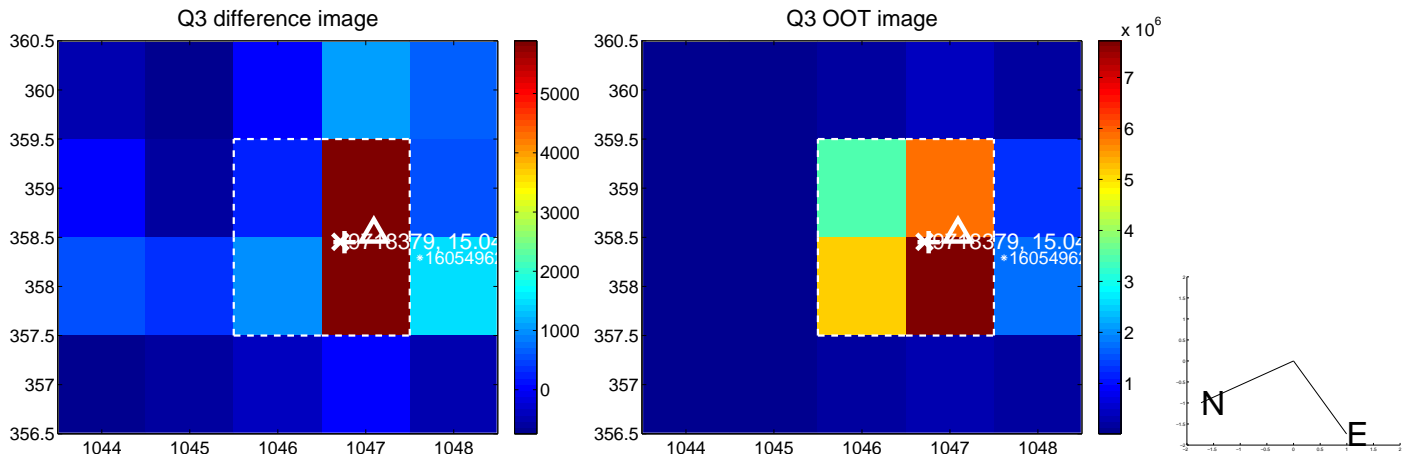
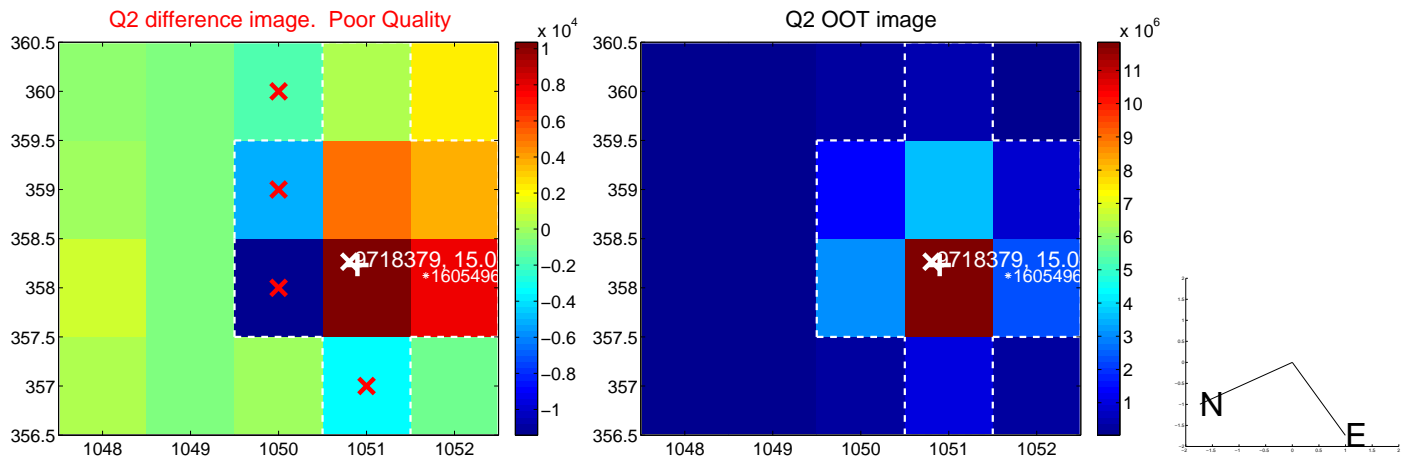
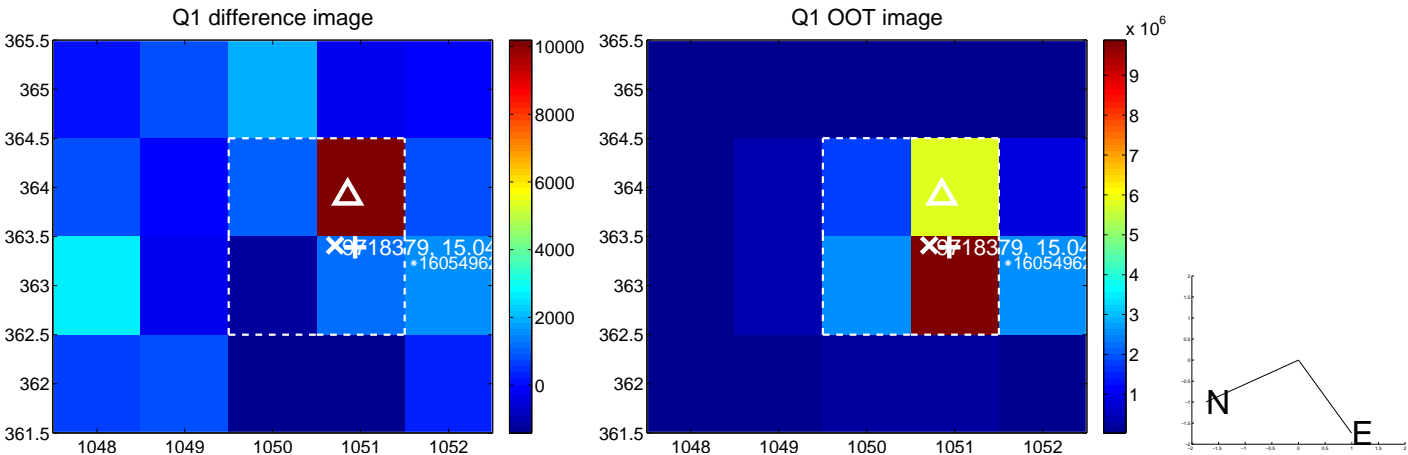
offset from photometric centroids



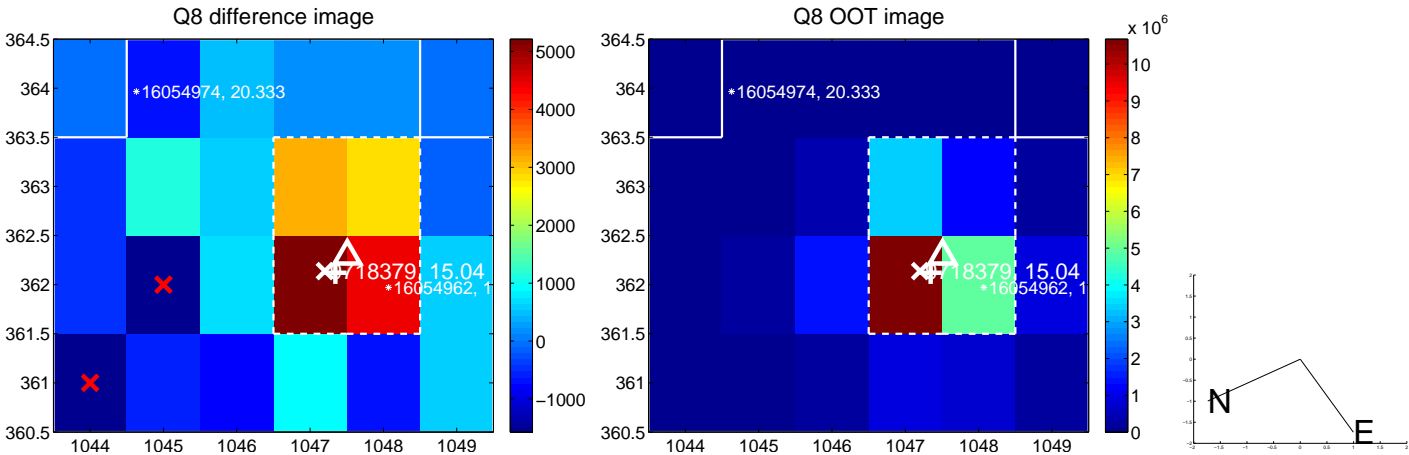
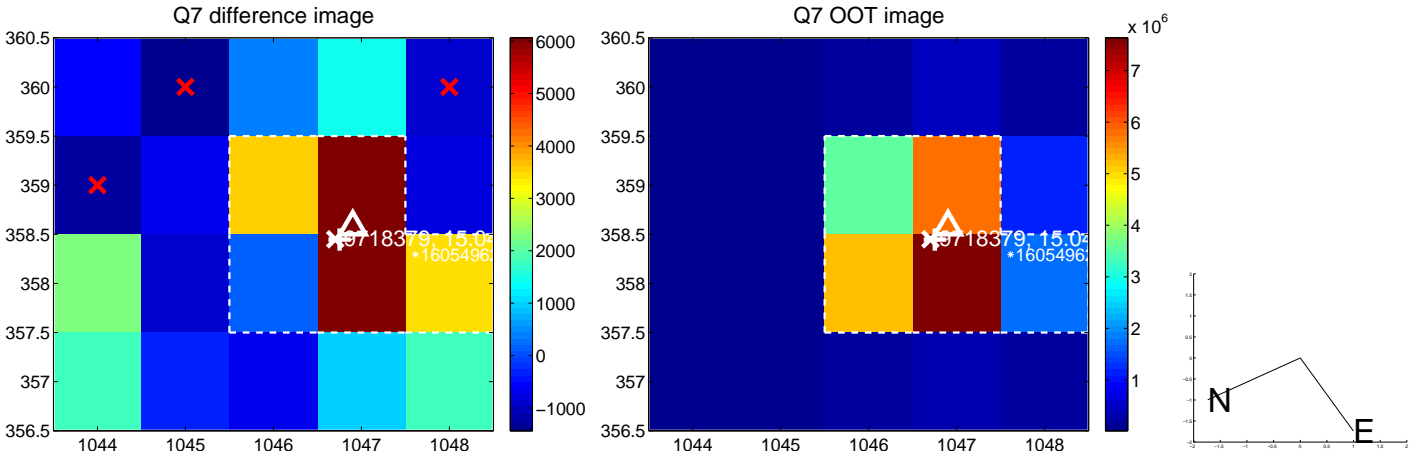
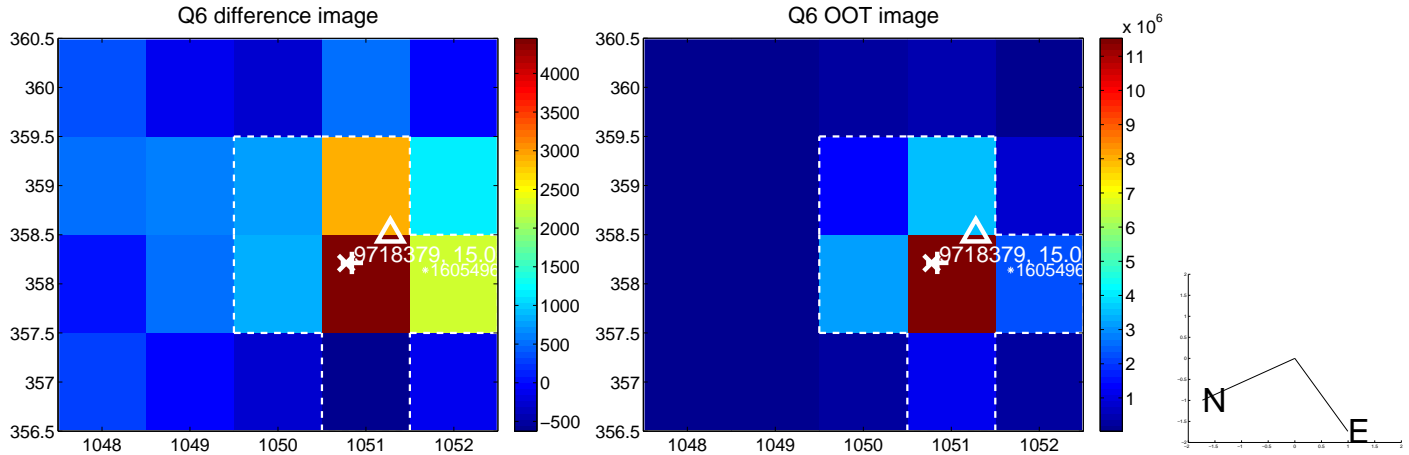
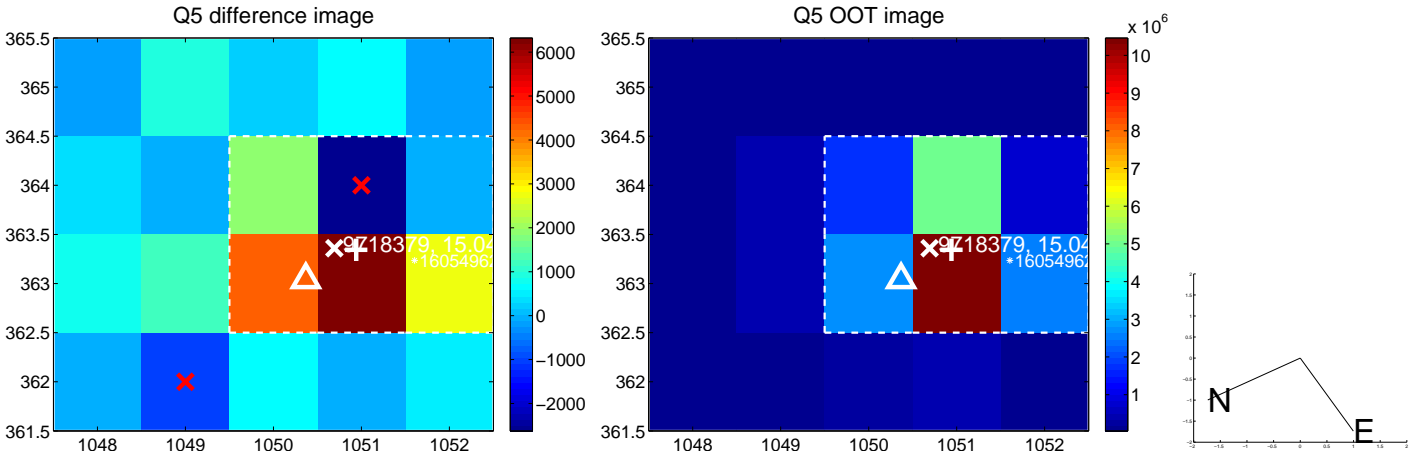
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



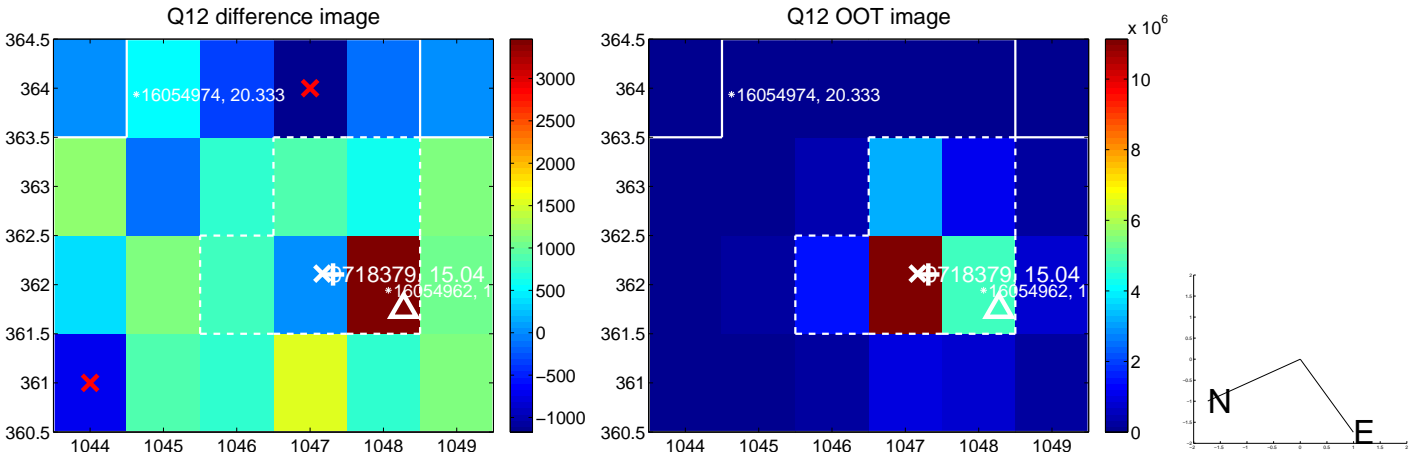
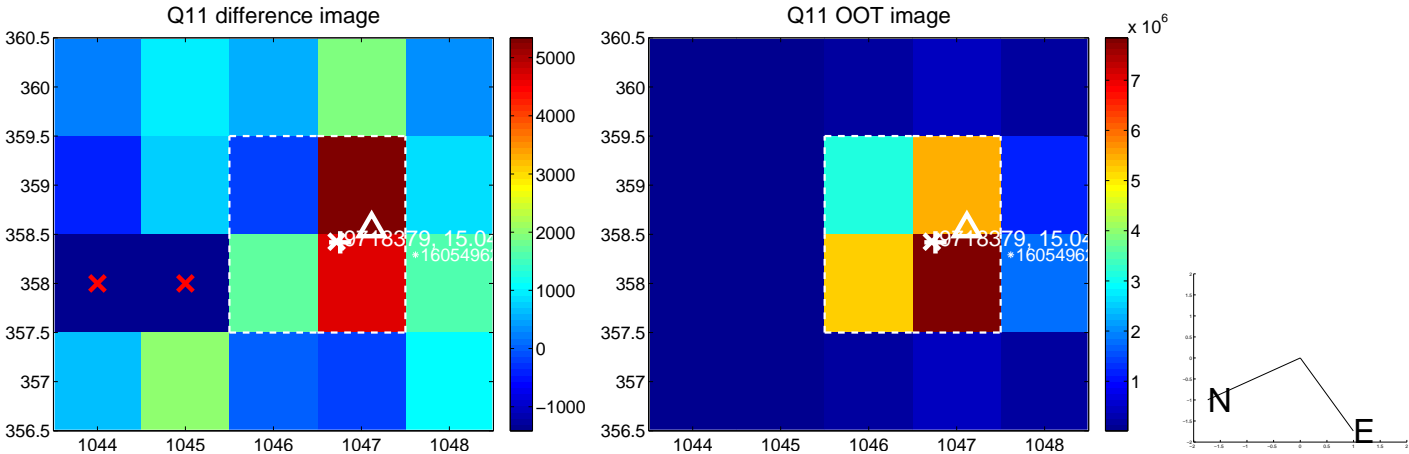
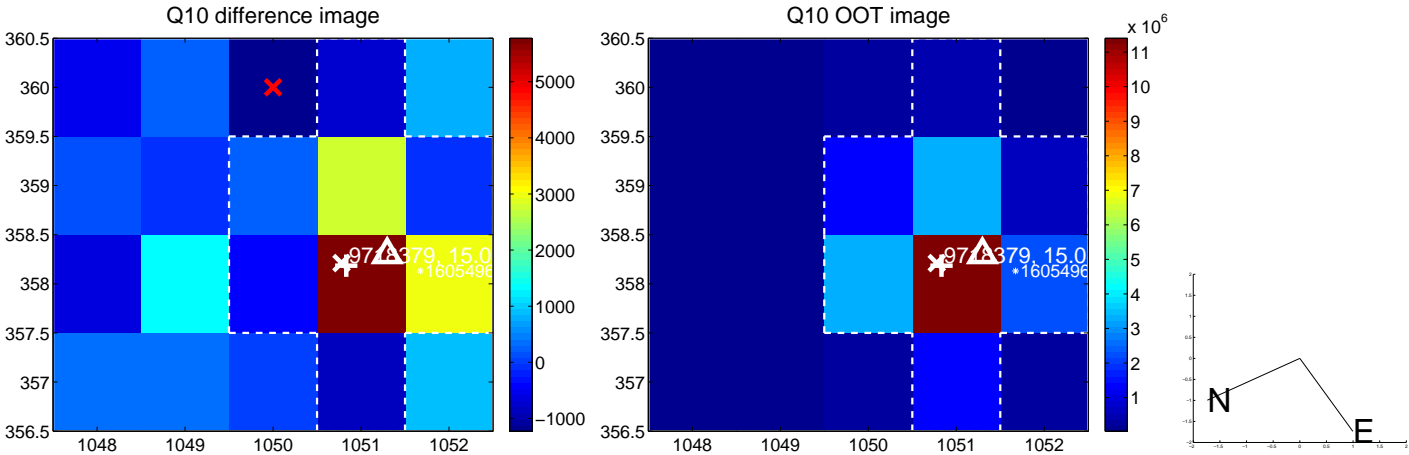
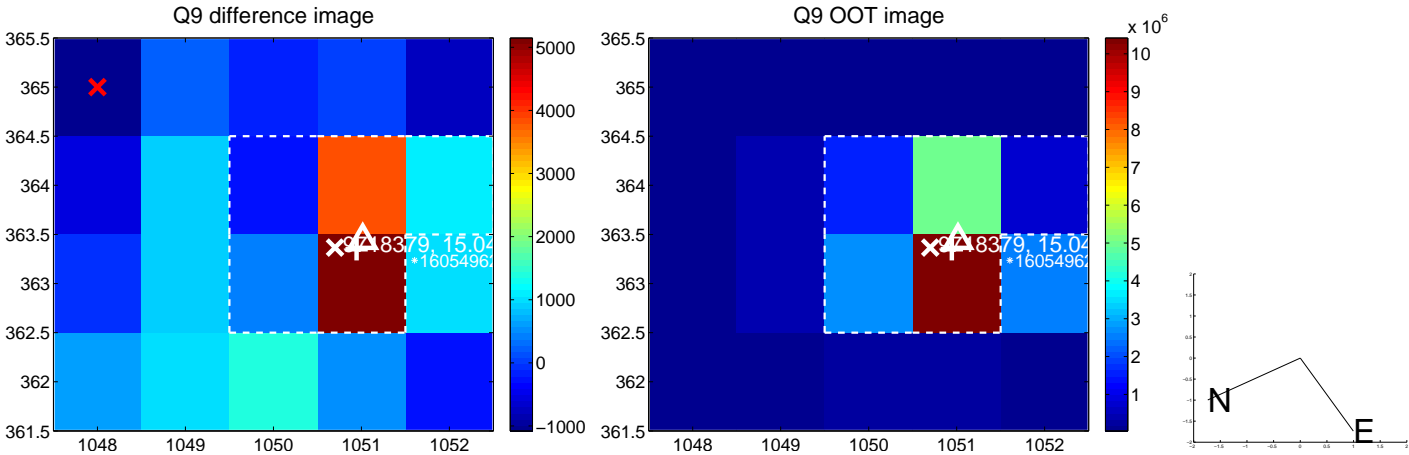
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



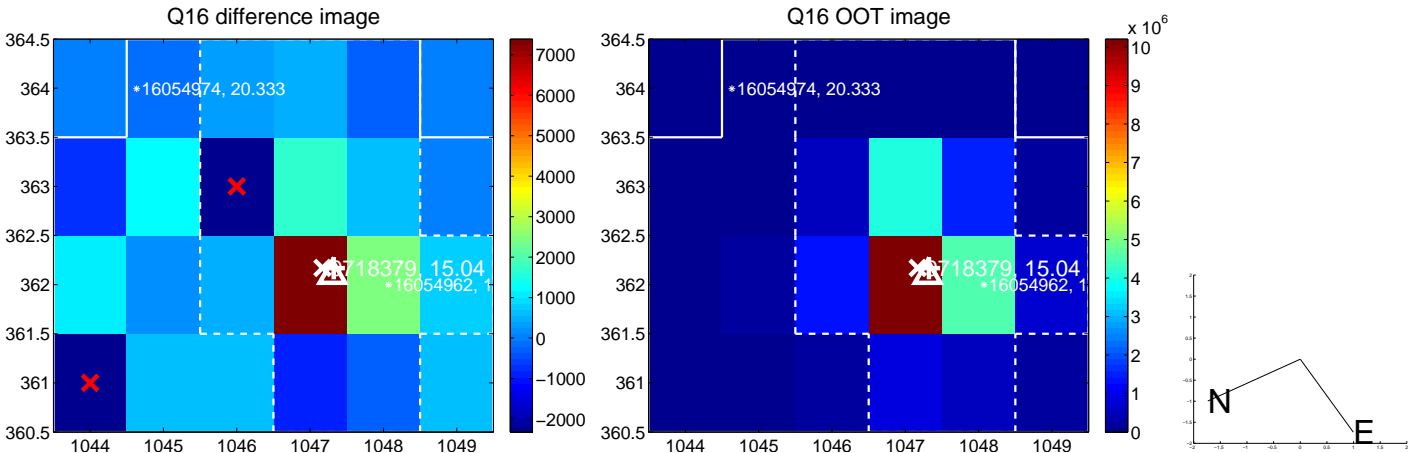
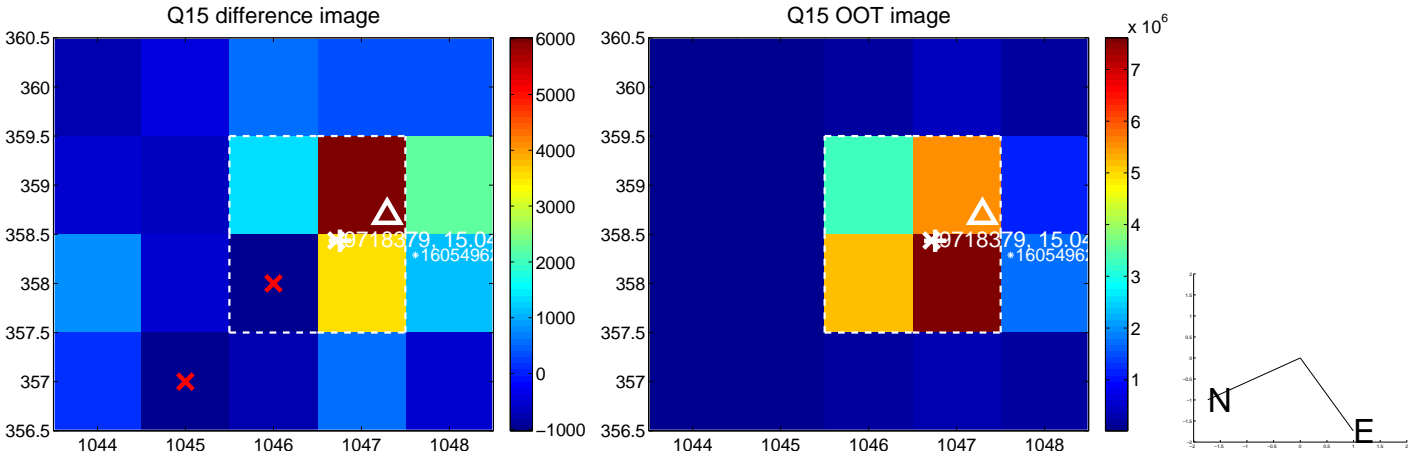
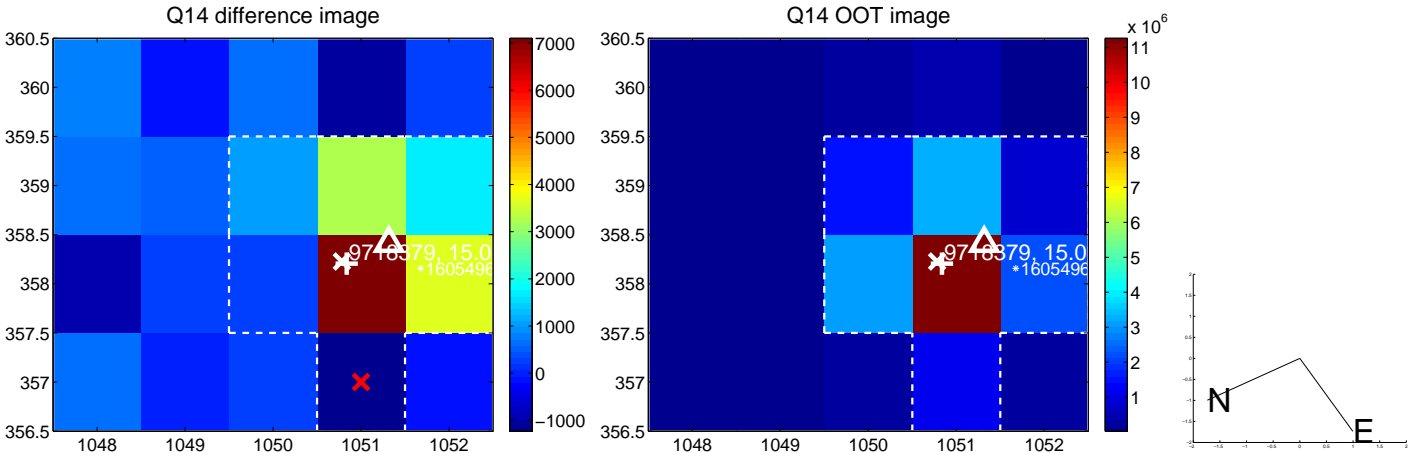
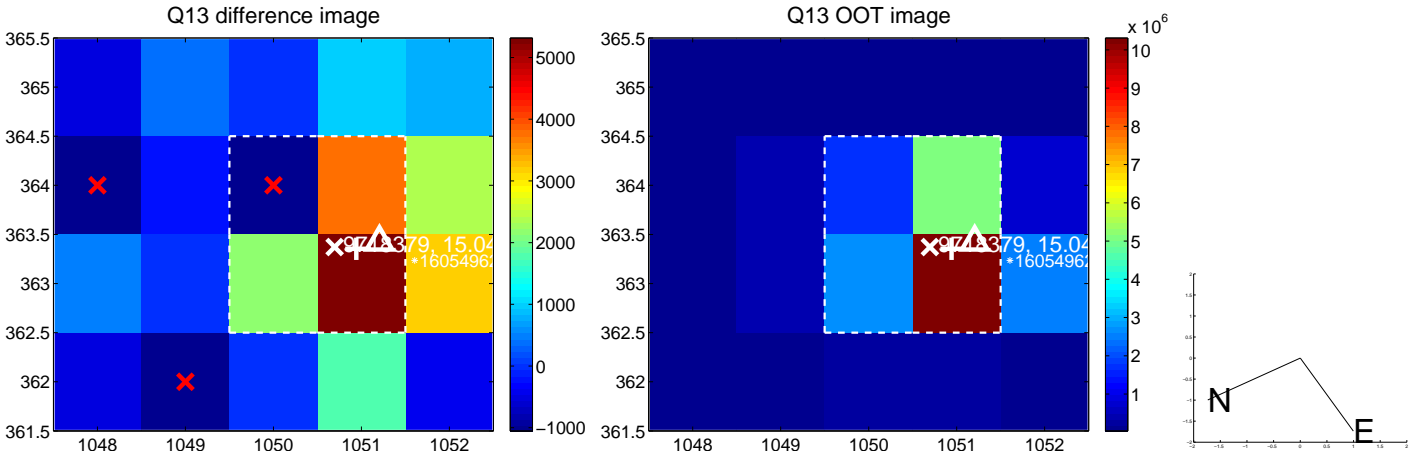
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



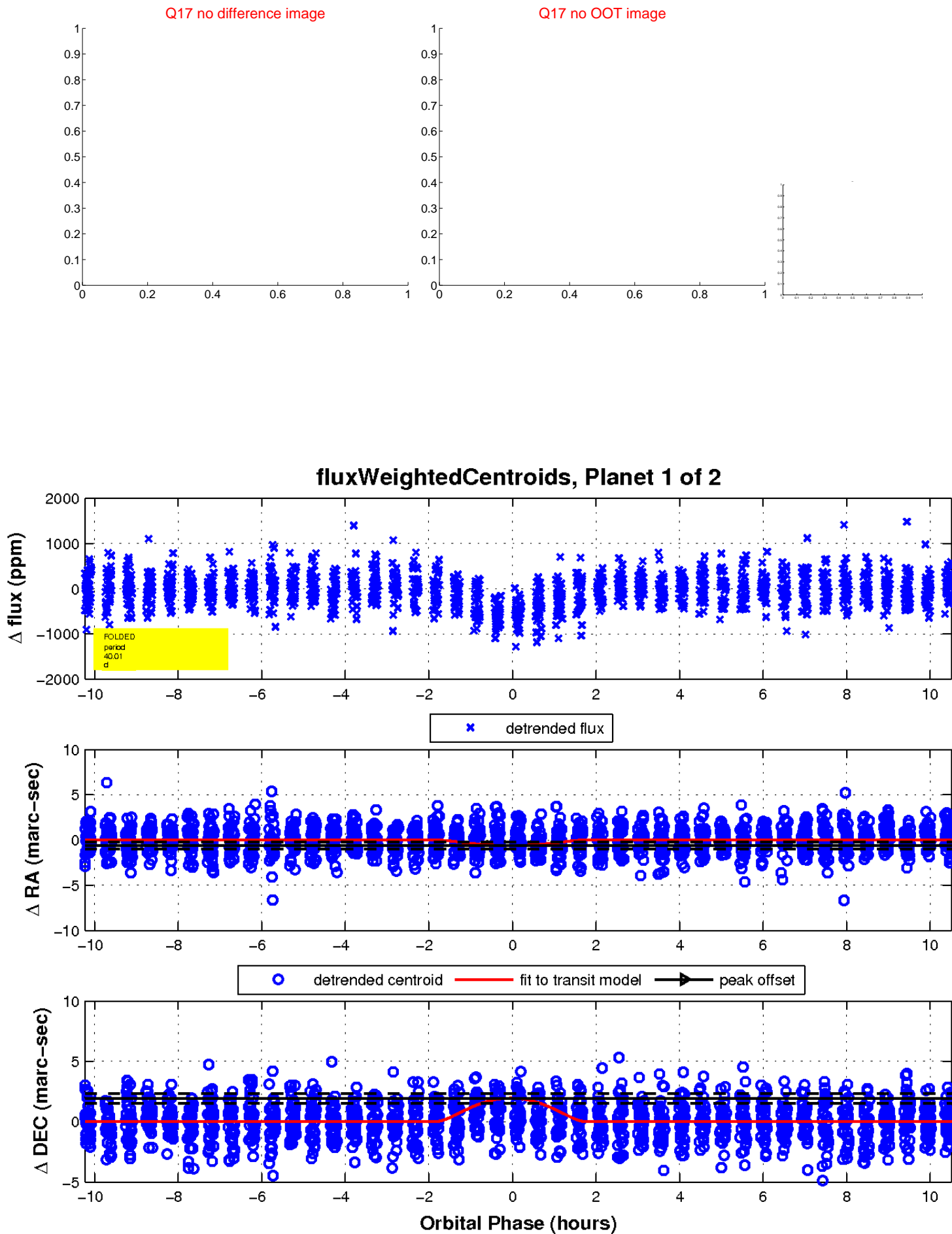
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

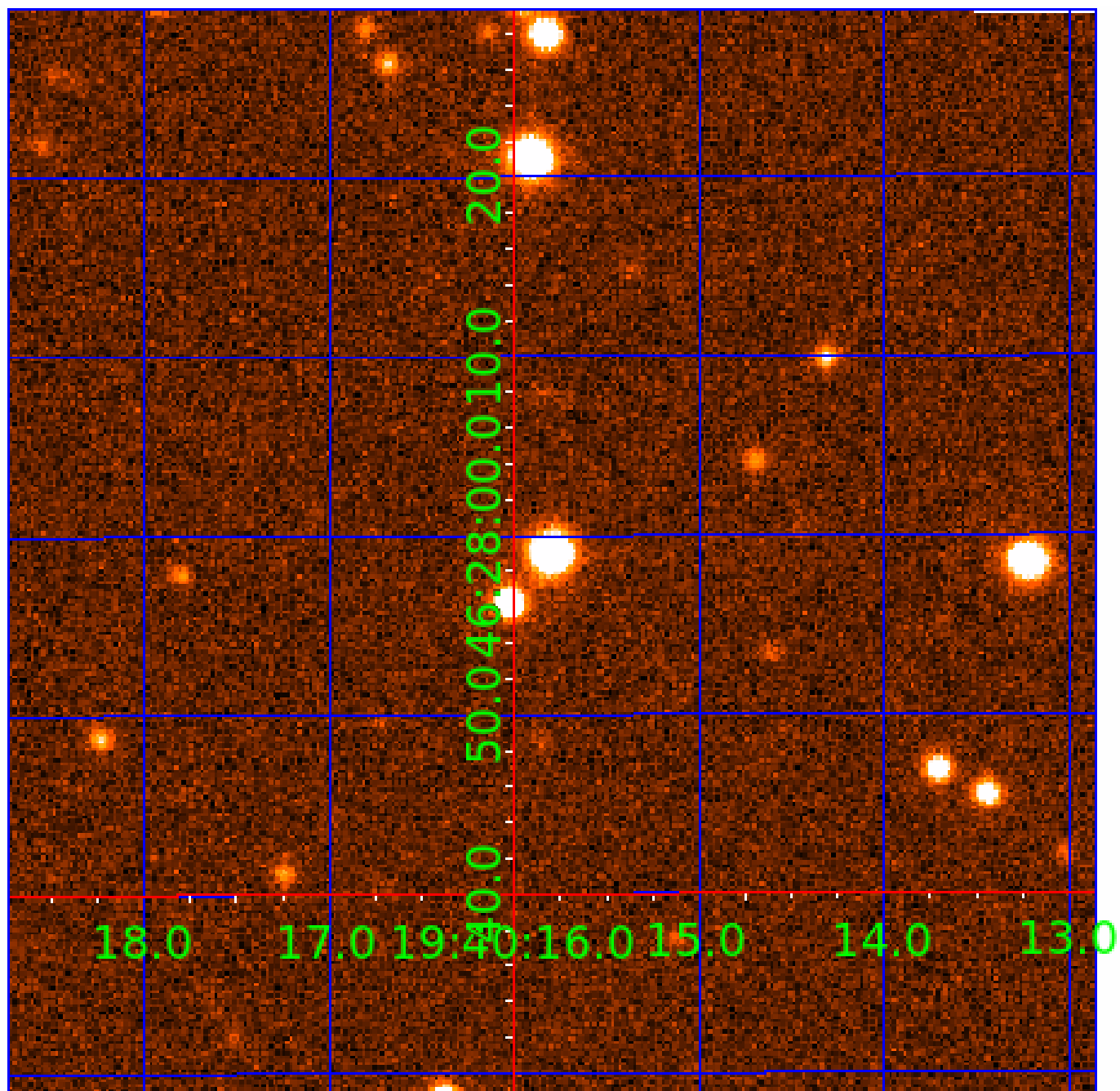


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 009718379

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009718379-01	OBS	2379.01	40.009036	141.740739	581.1	3.523	18.3	20.0	1.02	6237	4.42	27.70
009718379-02	OBS	No	40.008795	137.228919	418.1	3.694	13.1	14.3	1.02	6237	3.83	27.70

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009718379-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE
009718379-02	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 009718379-02

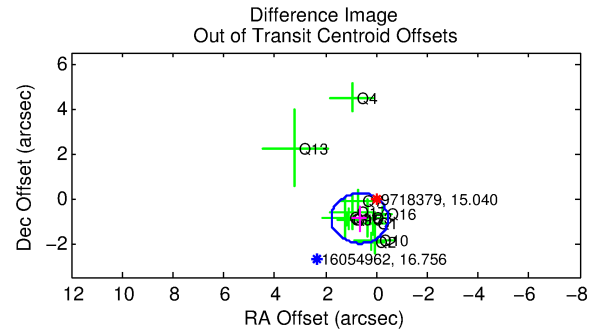
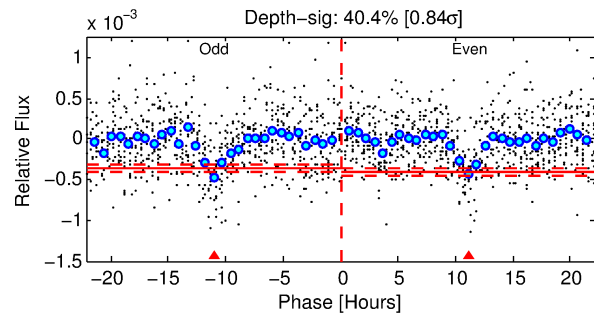
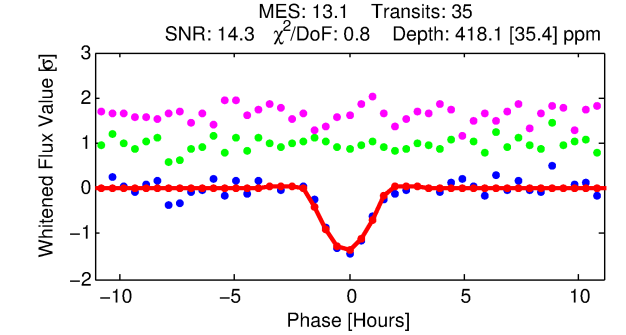
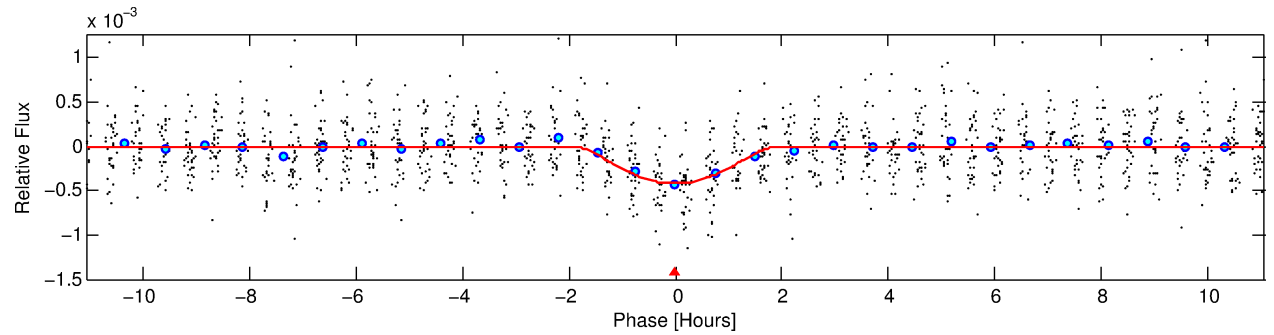
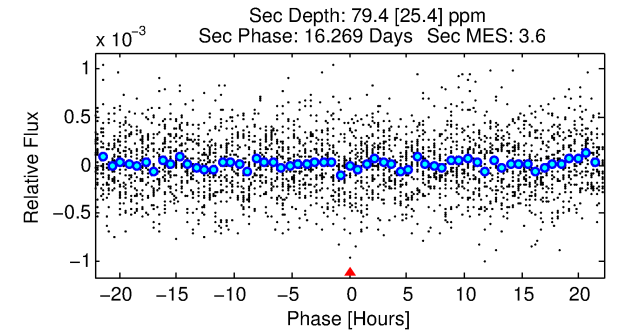
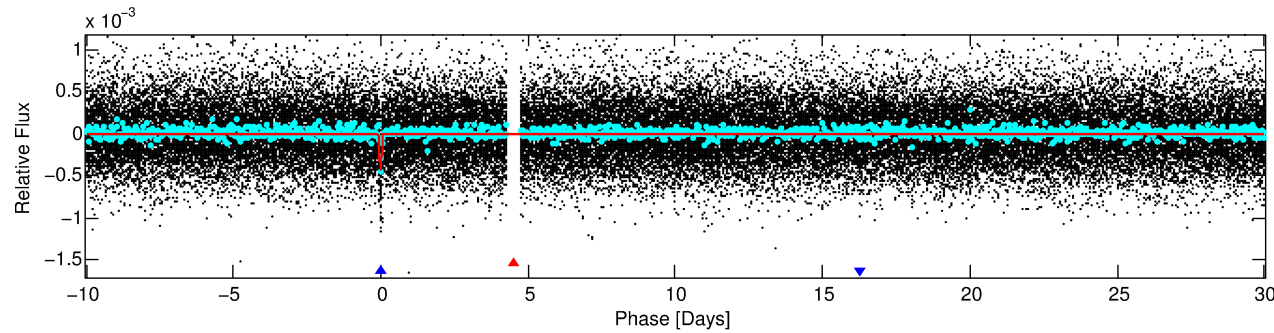
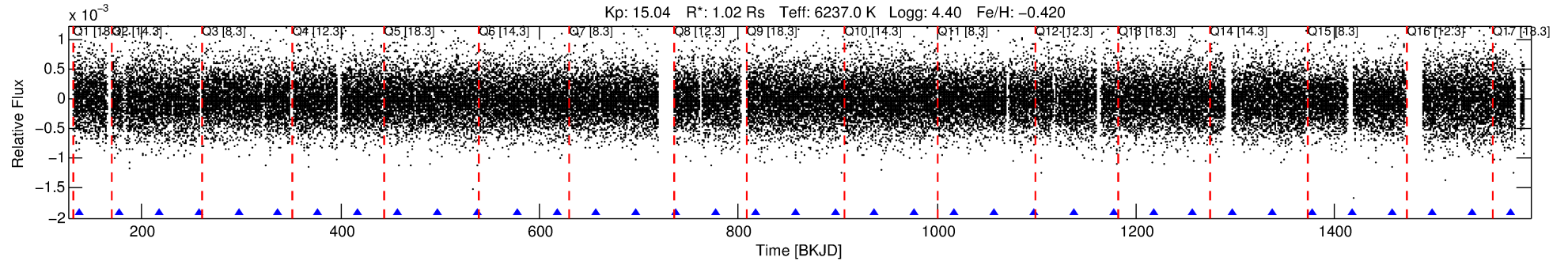
No Significant Match Found

# DV One-Page Summary

KIC: 9718379 Candidate: 2 of 2 Period: 40.009 d

KOI: K02379 Corr: No Ephemeris Match

Kp: 15.04 R\*: 1.02 Rs Teff: 6237.0 K Logg: 4.40 Fe/H: -0.420



## DV Fit Results:

Period = 40.00879 [0.00030] d  
Epoch = 137.2289 [0.0062] BKJD  
Rp/R\* = 0.0343 [0.0802]  
a/R\* = 22.94 [15.21]  
b = 1.00 [0.13]  
Seff = 27.70 [10.40]  
Teq = 585 [55] K  
Rp = 3.83 [9.02] Re  
a = 0.2263 [0.0548] AU  
Ag = 152.18 [714.41] [0.21σ]  
Teff = 3177 [3720] K [0.70σ]

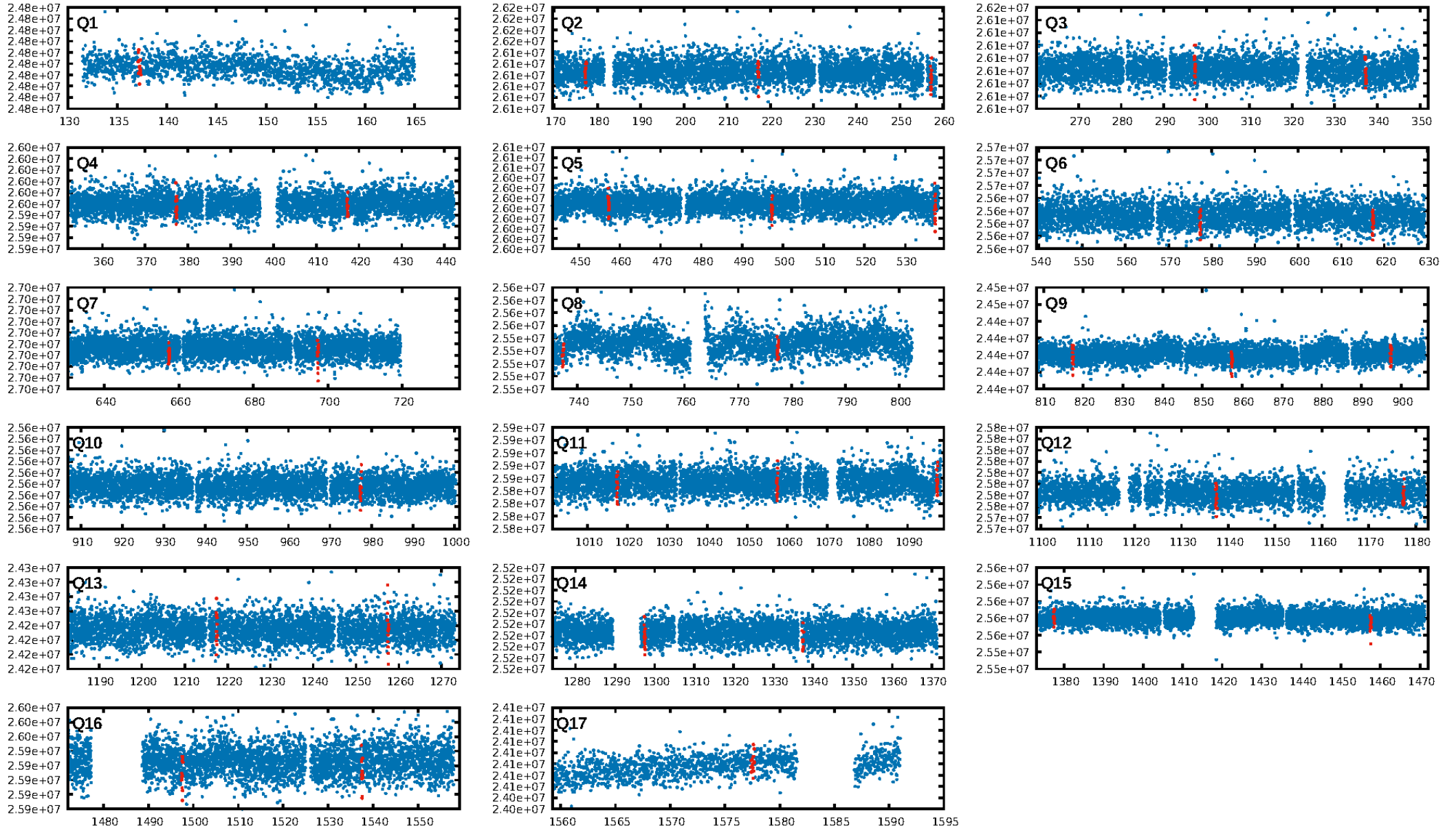
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.1% [0.00σ]  
ModelChiSquare2-sig: 97.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 8.16e-38  
RollingBand-fgt: 1.00 [33/33]  
GhostDiagnostic-chr: -8.365  
Centroid-sig: 3.2%  
Centroid-so: 2.189 arcsec [2.43σ]  
OotOffset-rm: 1.108 arcsec [2.98σ]  
KicOffset-rm: 1.768 arcsec [4.65σ]  
OotOffset-st: 2/4/2/4 [12]  
KicOffset-st: 2/4/2/4 [12]  
DiffImageQuality-fgm: 0.67 [8/12]  
DiffImageOverlap-fno: 1.00 [17/17]

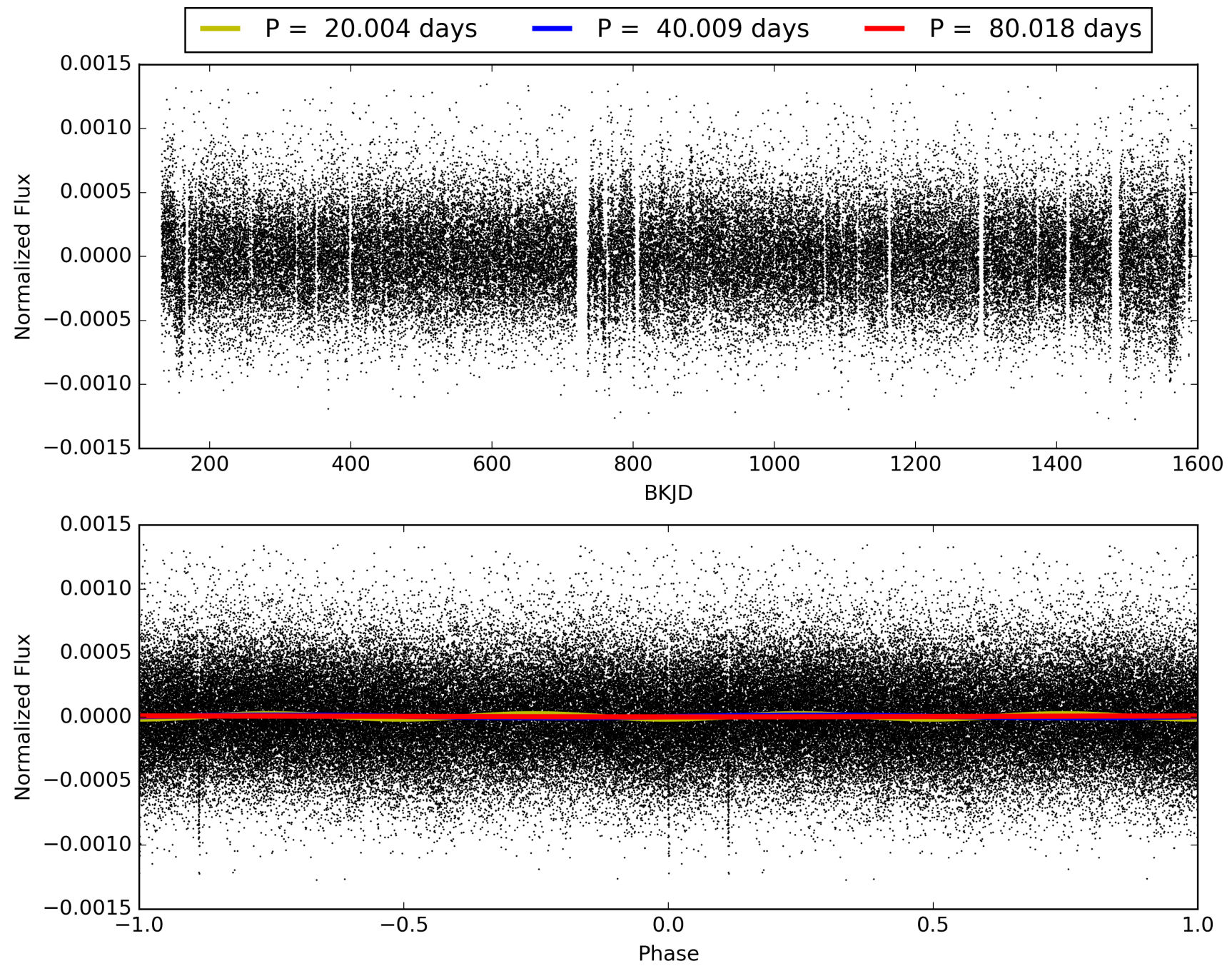
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 19:50:34 Z

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

# TCE 009718379-02, PDC Light Curves

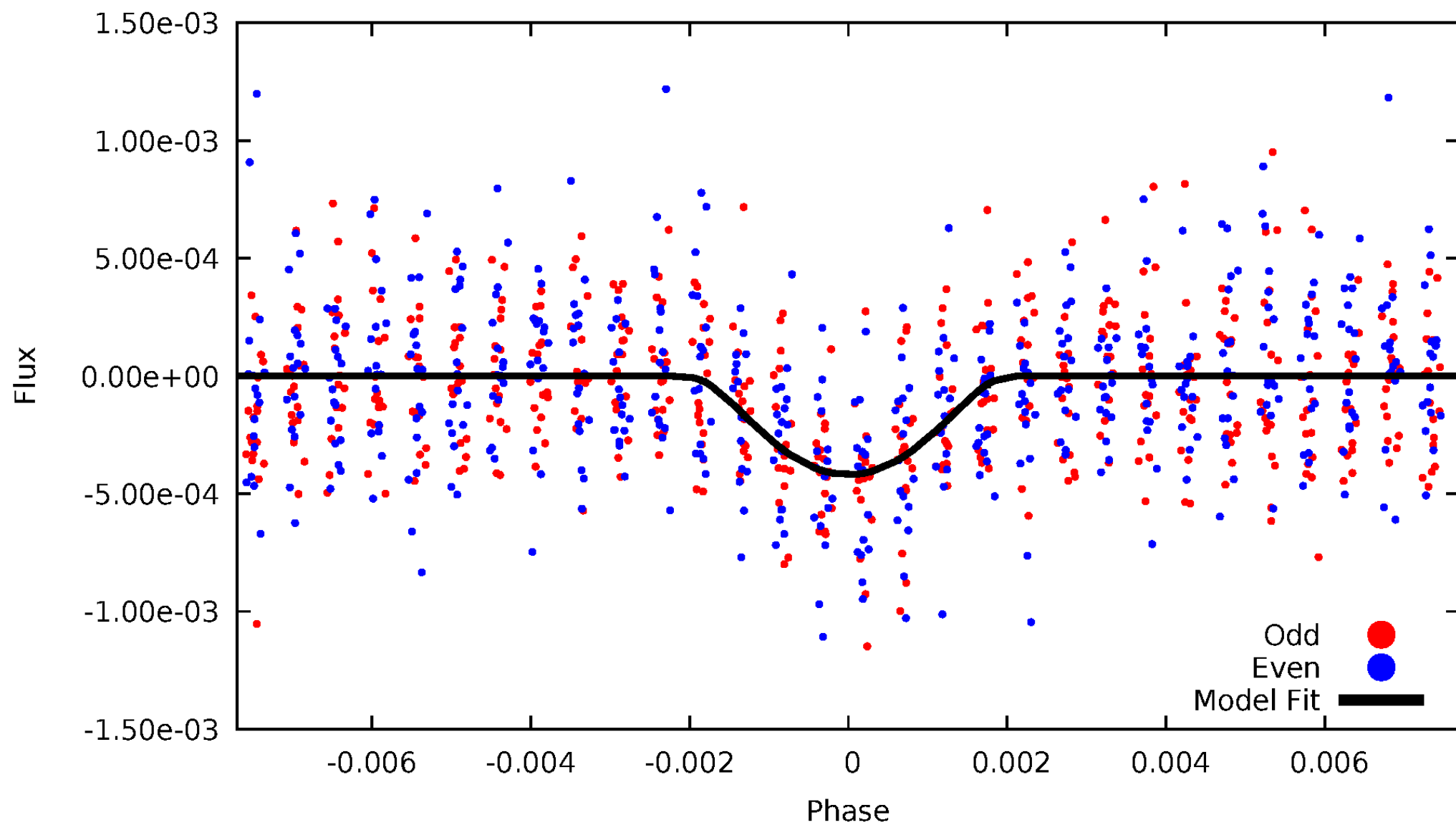


TCE 009718379-02



DV Odd/Even

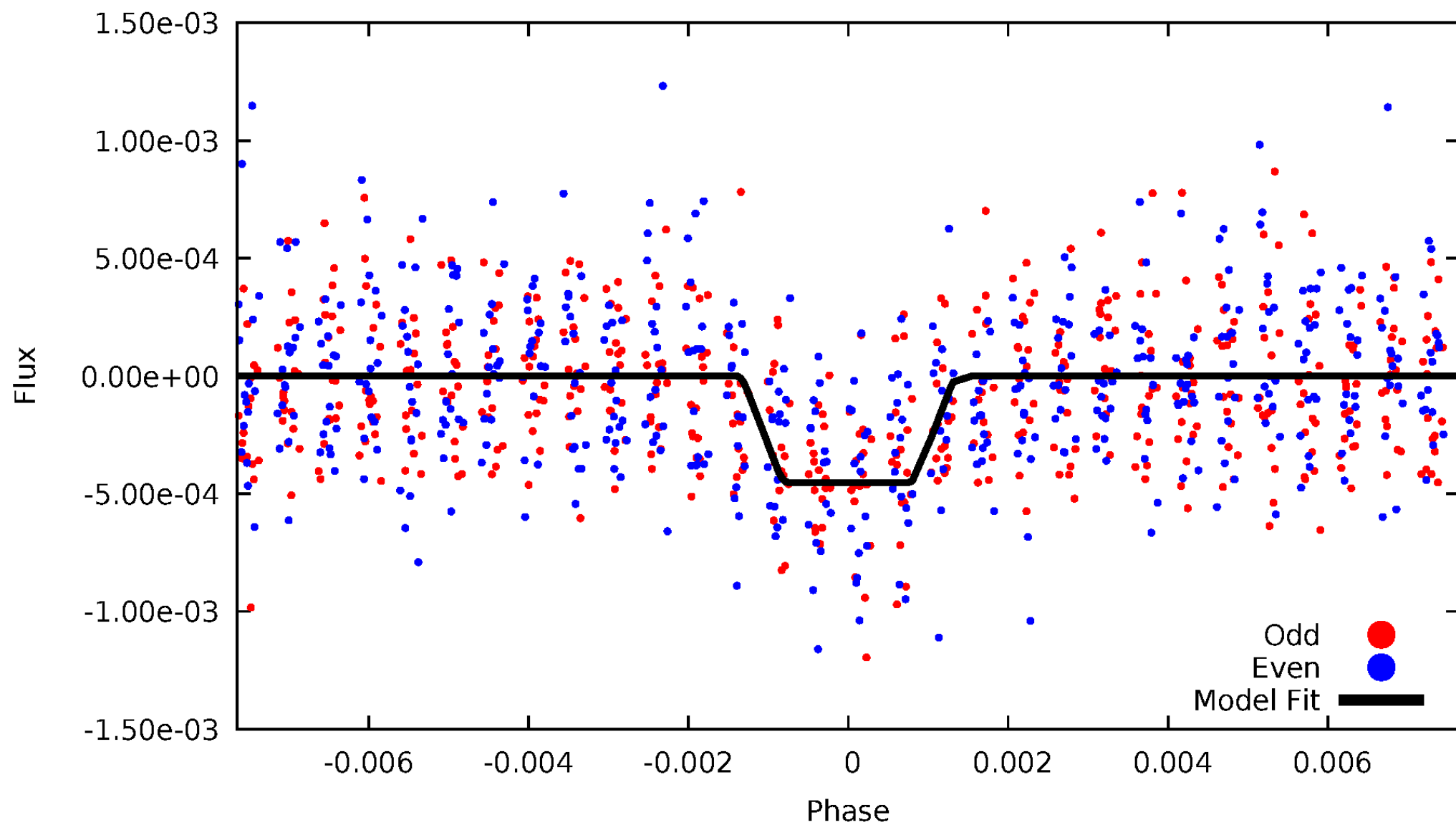
TCE 009718379-02





# ALT Odd/Even

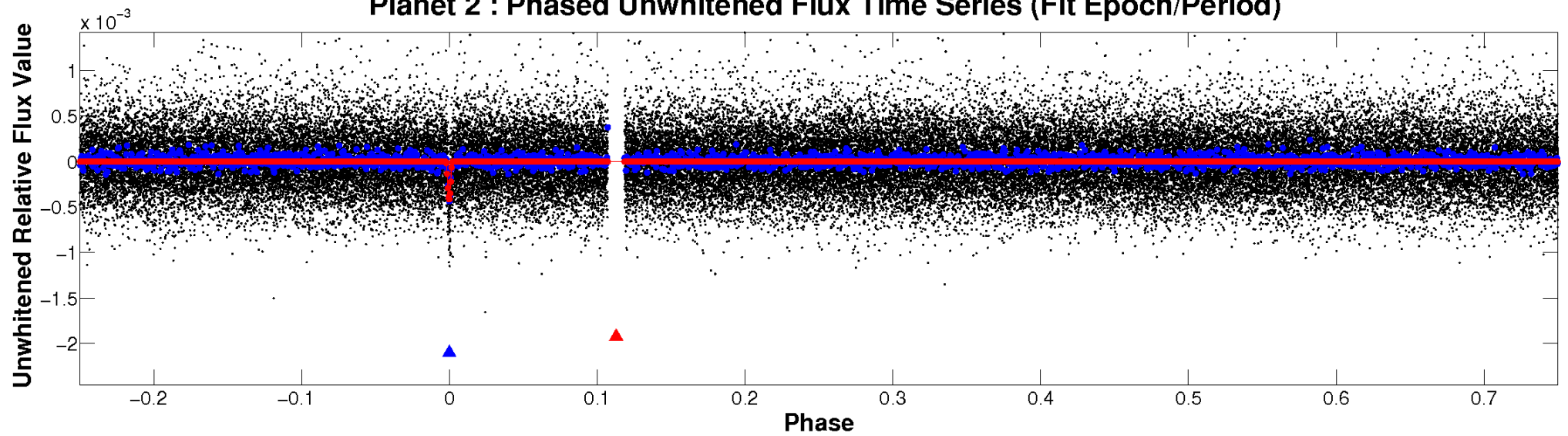
TCE 009718379-02



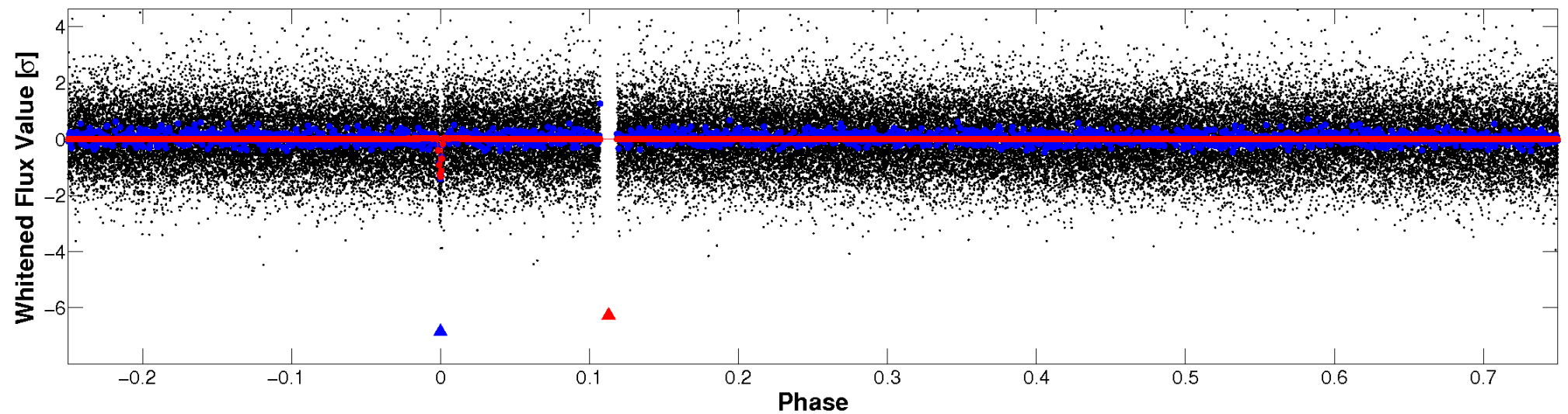


# Non-Whitened Vs. Whitened Light Curve

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

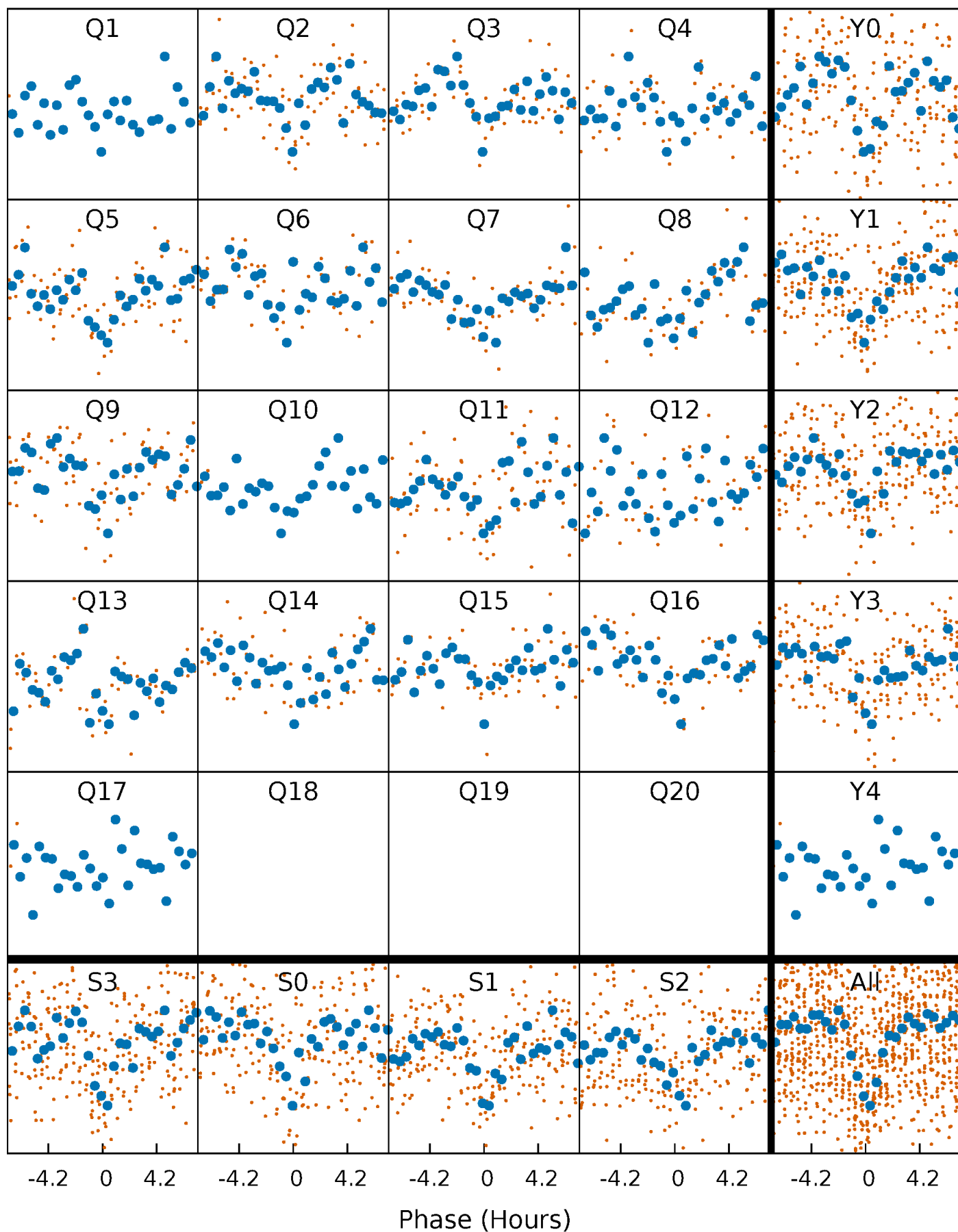


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



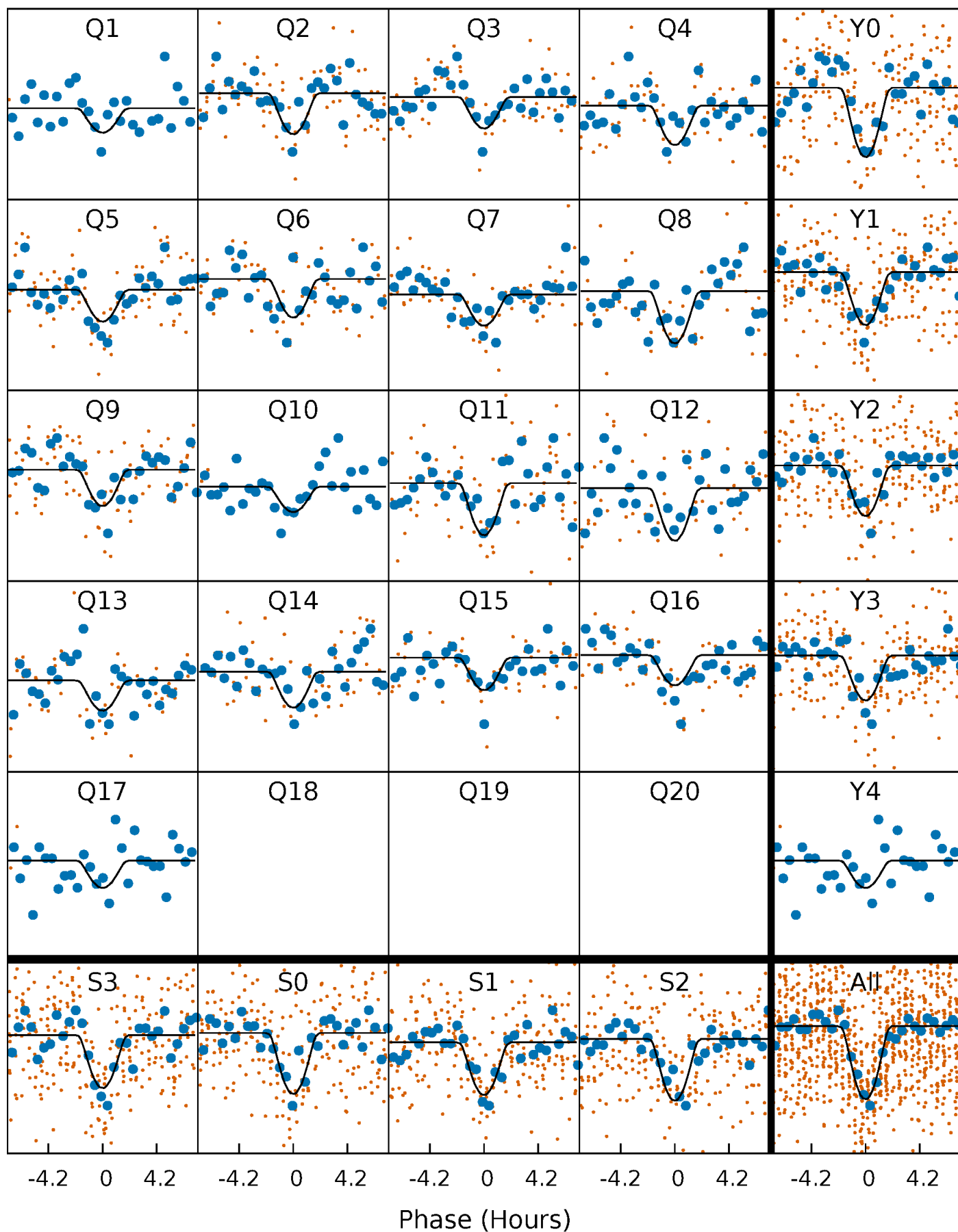
# PDC Quarter-Phased Transit Curves

TCE 009718379-02   P= 40.008795 Days    $T_0=137.228919$  (BKJD)



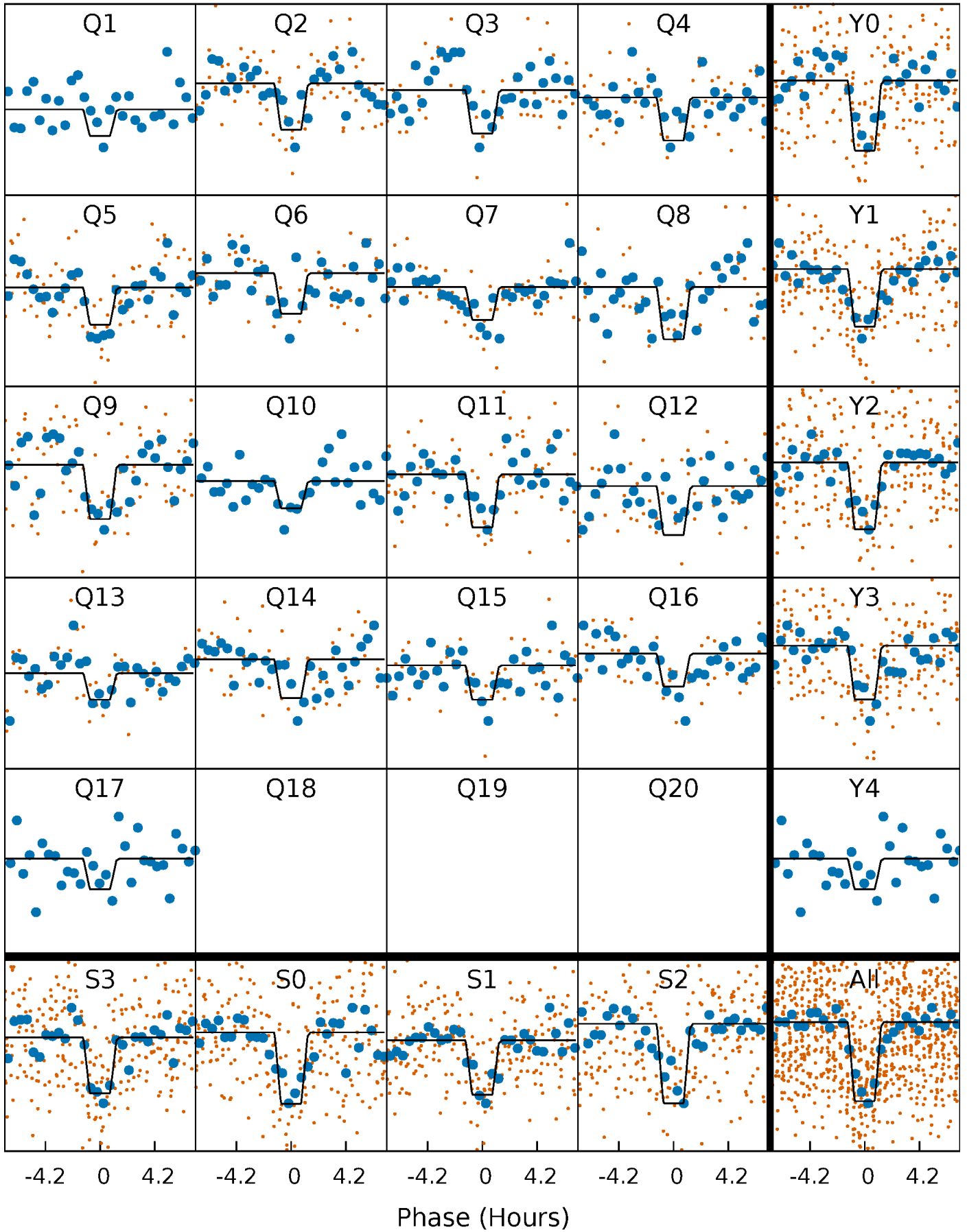
# DV Quarter-Phased Transit Curves

TCE 009718379-02   P= 40.008795 Days    $T_0=137.228919$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

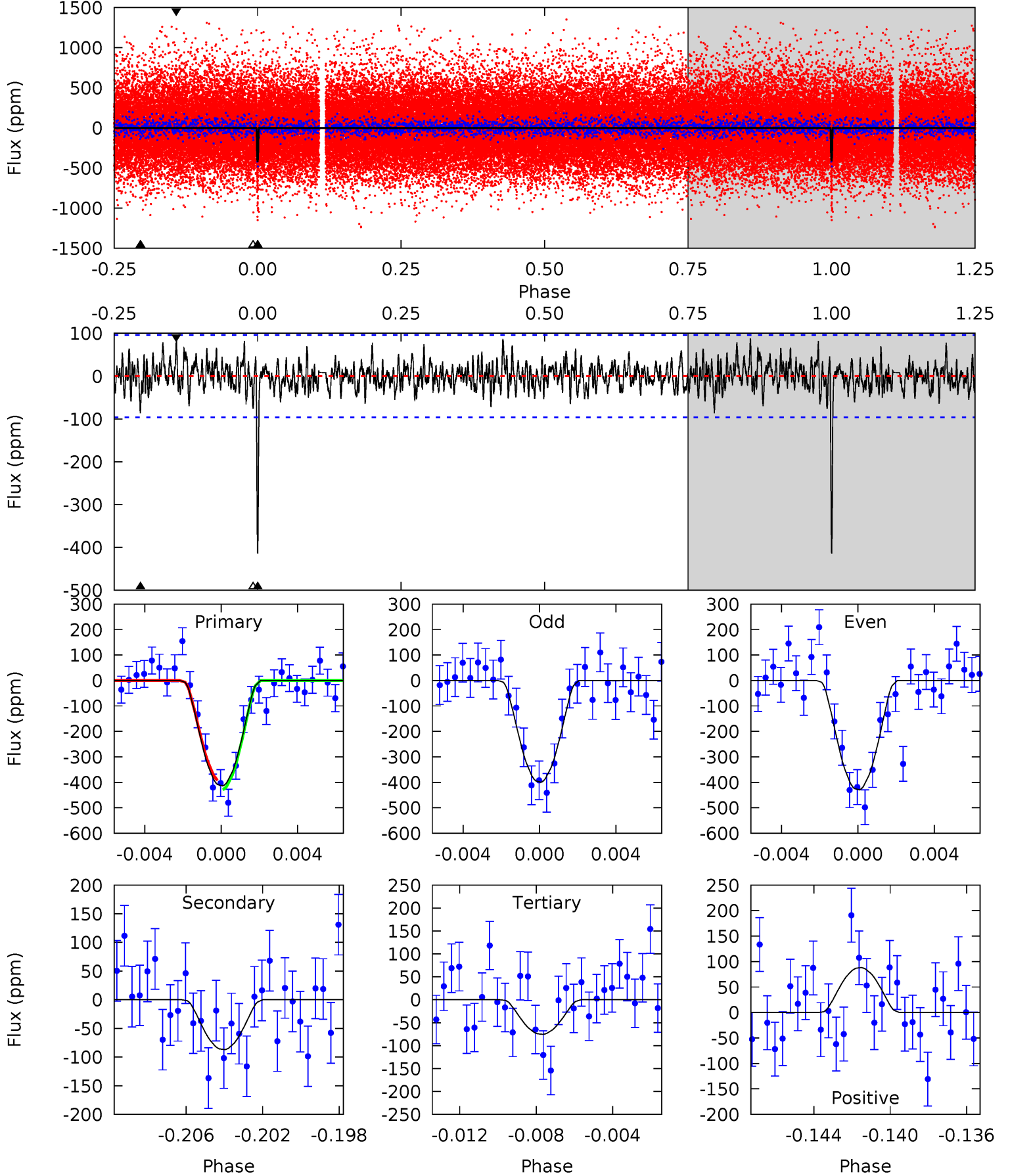
TCE 009718379-02 P= 40.008711 Days  $T_0=137.232152$  (BKJD)



# DV Model-Shift Uniqueness Test

009718379-02, P = 40.008795 Days, E = 97.220124 Days

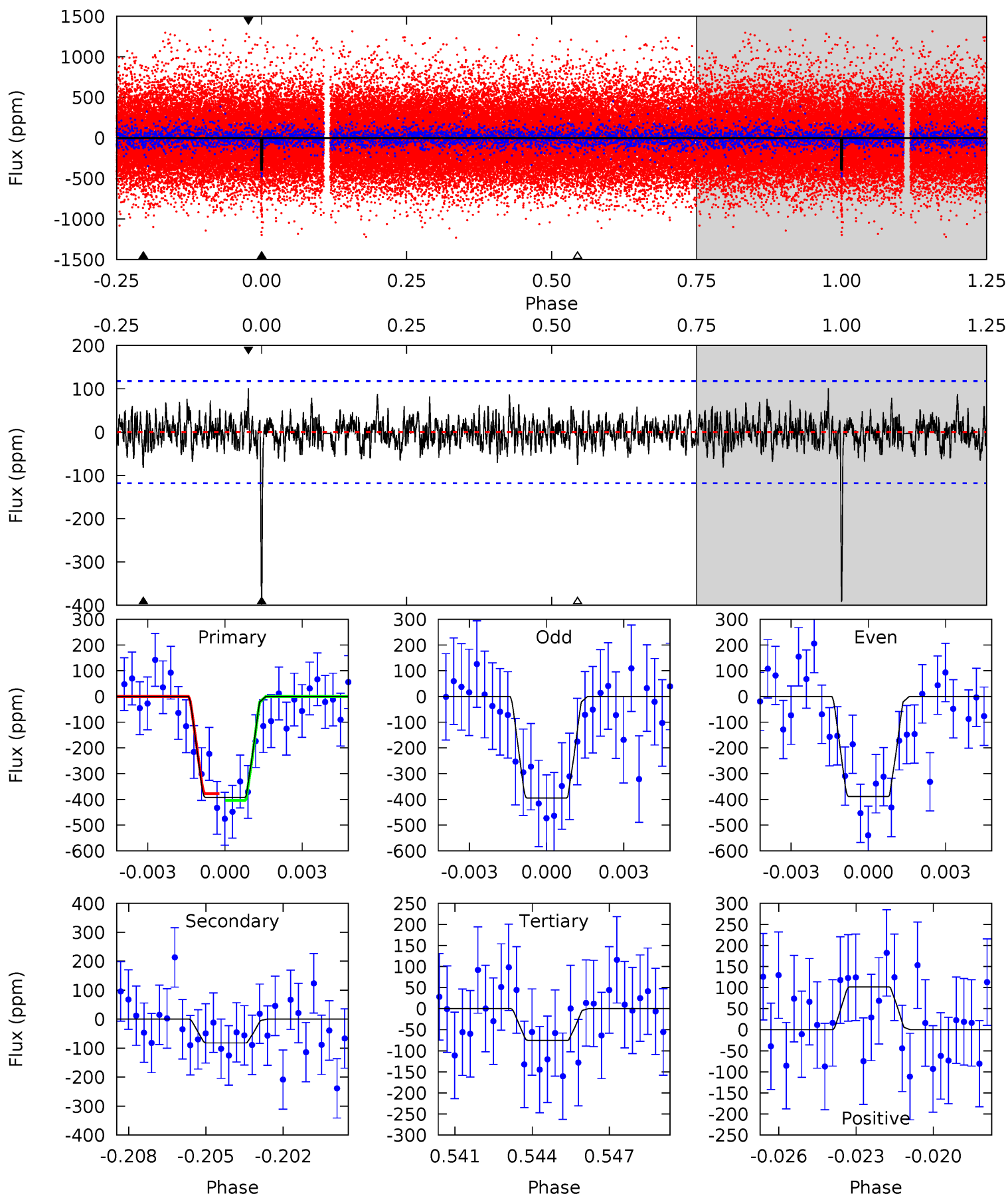
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
22.4	4.70	4.07	4.76	5.19	2.87	1.37	18.3	17.6	0.63	-0.06	0.80	1.09	0.18	1.00



# Alt Model-Shift Uniqueness Test

009718379-02, P = 40.008711 Days, E = 97.223441 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
17.4	3.65	3.35	4.51	5.26	2.98	1.10	14.1	12.9	0.30	-0.86	0.12	1.04	0.21	0.58





### Stellar Parameters For KIC 009718379

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6237^{+176}_{-220}$	$4.403^{+0.101}_{-0.188}$	$-0.420^{+0.300}_{-0.300}$	$1.023^{+0.298}_{-0.149}$	$0.964^{+0.135}_{-0.111}$	$1.270^{+0.568}_{-0.630}$
	+3%/-4%	+2%/-4%	+71%/-71%	+29%/-15%	+14%/-12%	+45%/-50%
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 009718379-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-87 \pm 19$	$7.83^{+7.85}_{-5.11}$	$823^{+69}_{-46}$	$2957^{+1110}_{-494}$	$40^{+253}_{-30}$
Alt.	$-82 \pm 22$	$7.25^{+7.48}_{-4.84}$	$825^{+54}_{-41}$	$2975^{+1335}_{-504}$	$41^{+358}_{-32}$

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

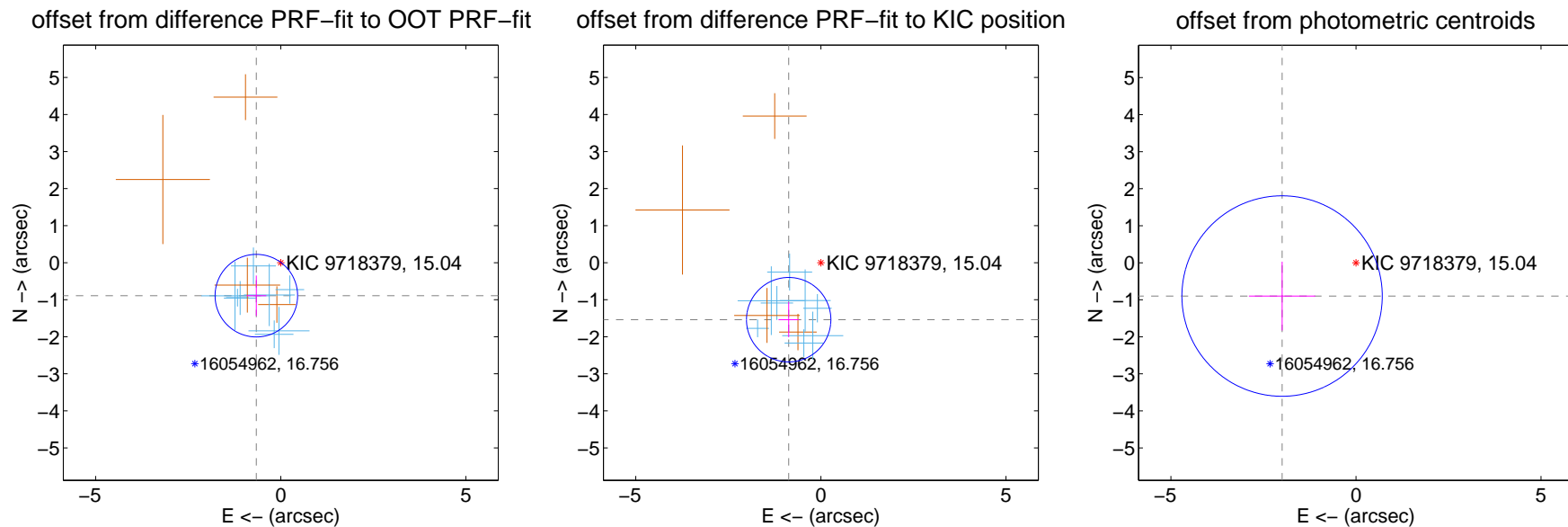
## DV Centroid Data

Supplemental centroid analysis for 009718379-02. Kepler magnitude: 15.04. Transit SNR 14.28

There are 8 quarters with good PRF difference image offsets

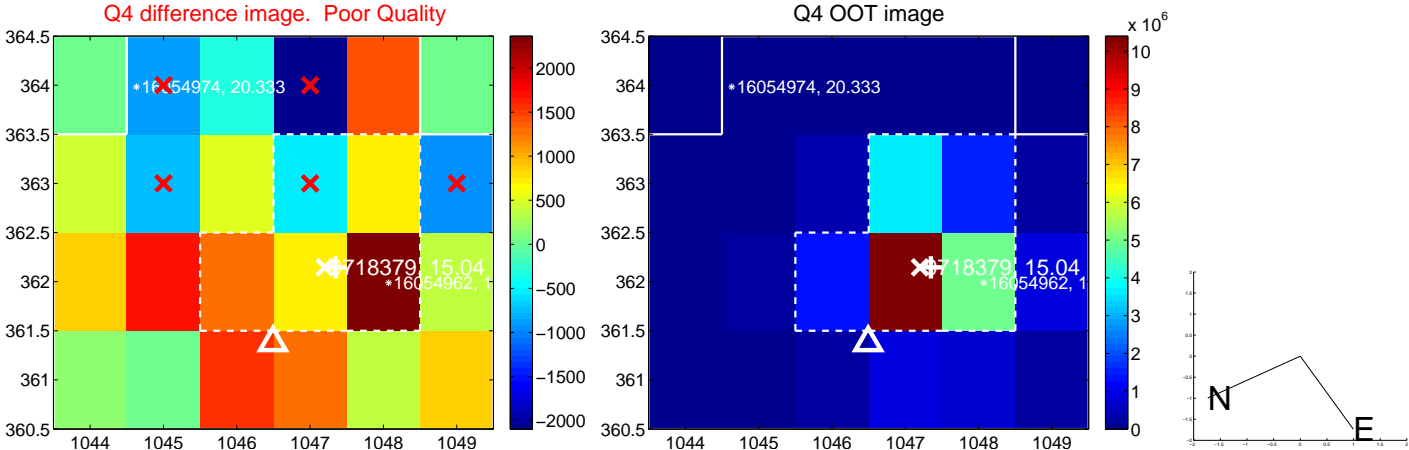
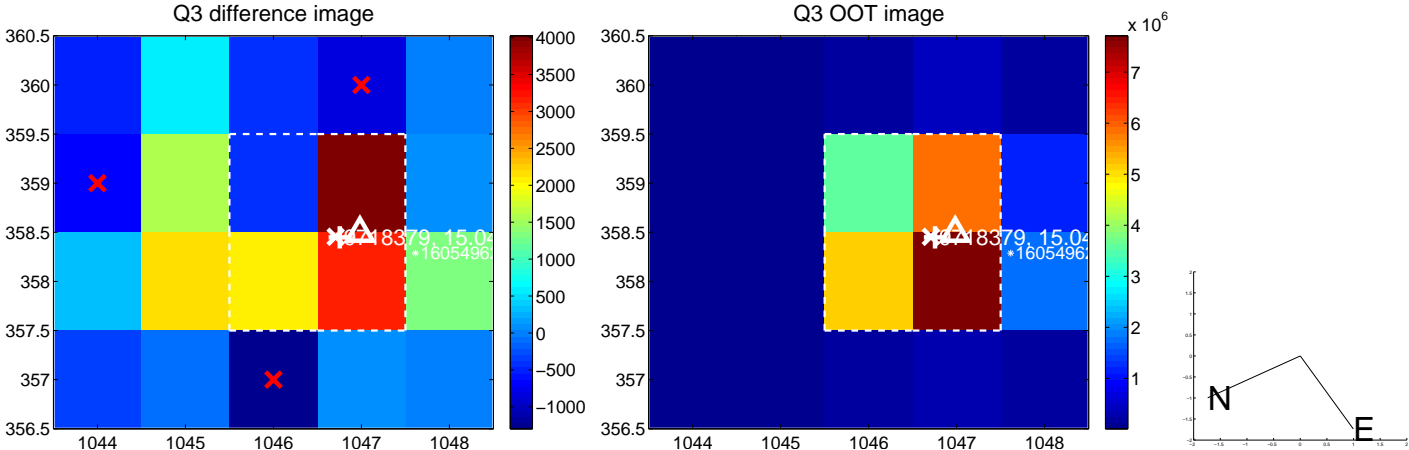
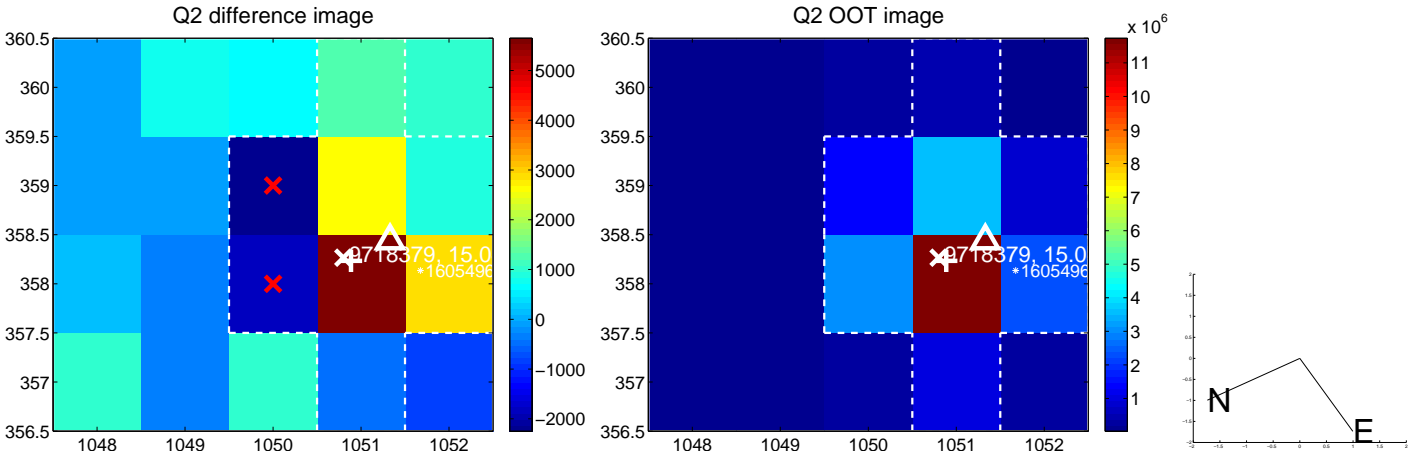
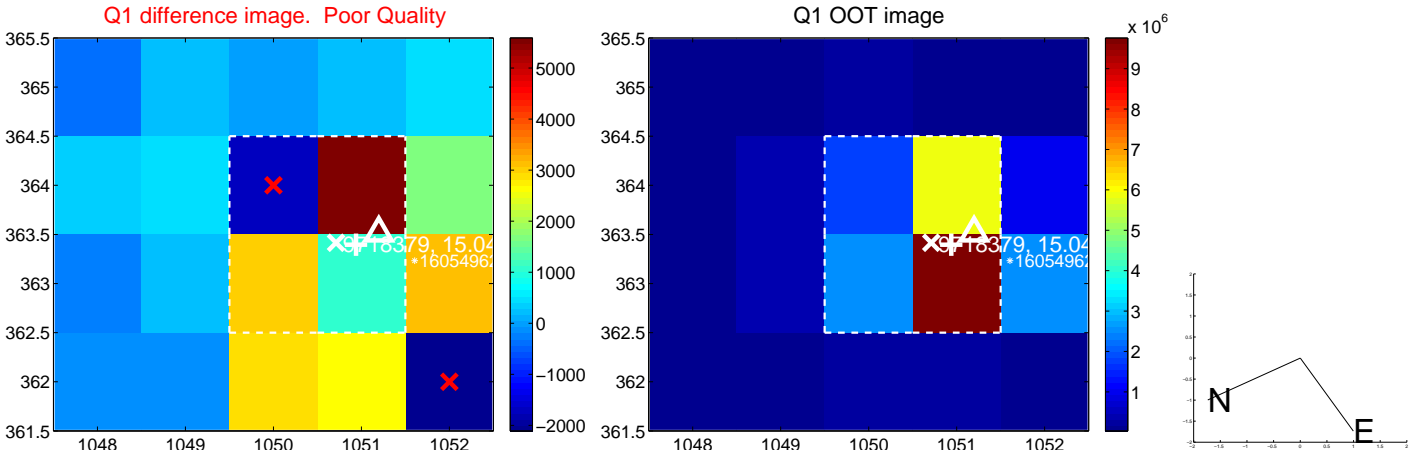
The direct PRF centroid is offset from the target star catalog position by about 0.99 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.108 \pm 0.372$	2.98	$0.660 \pm 0.269$	$-0.890 \pm 0.543$
PRF-fit source offset from KIC position	<b><math>1.768 \pm 0.380</math></b>	<b>4.65</b>	$0.870 \pm 0.276$	$-1.539 \pm 0.474$
photometric centroid source offset	$2.19 \pm 0.90$	2.43	$2.00 \pm 0.90$	$-0.90 \pm 0.93$

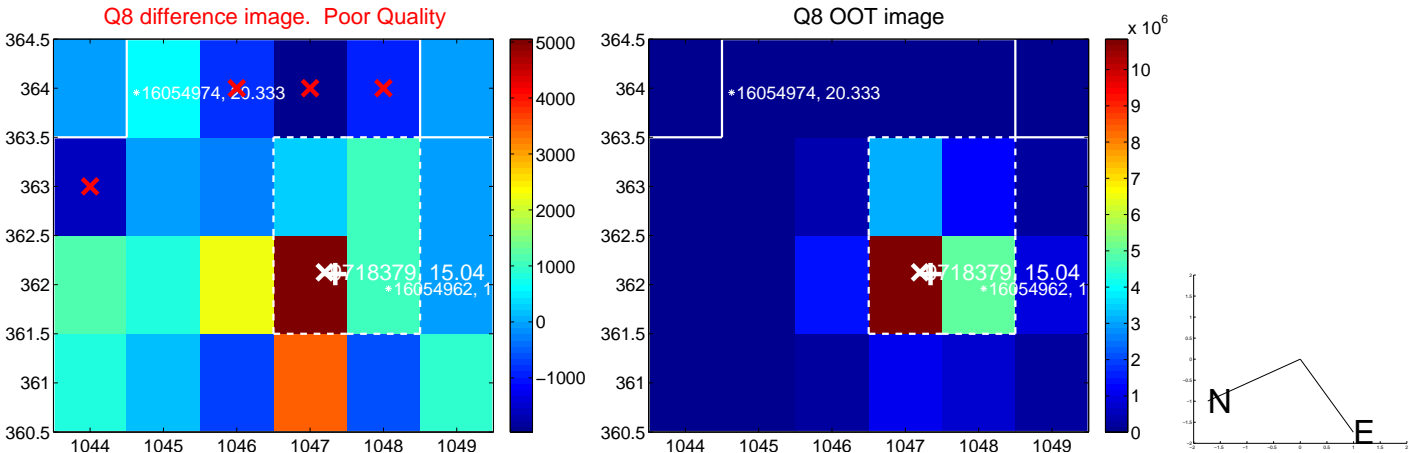
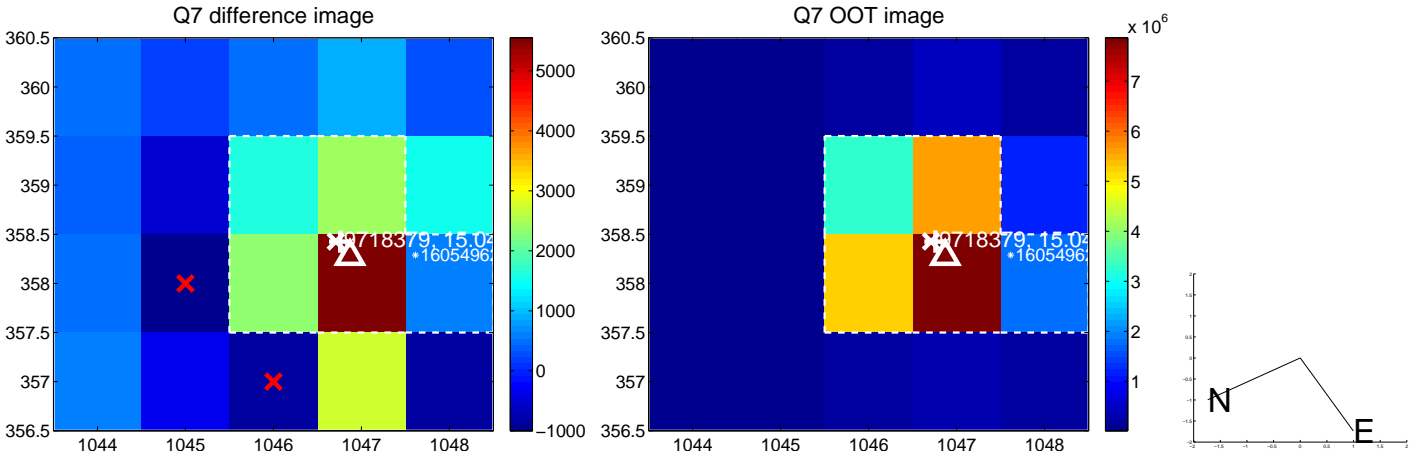
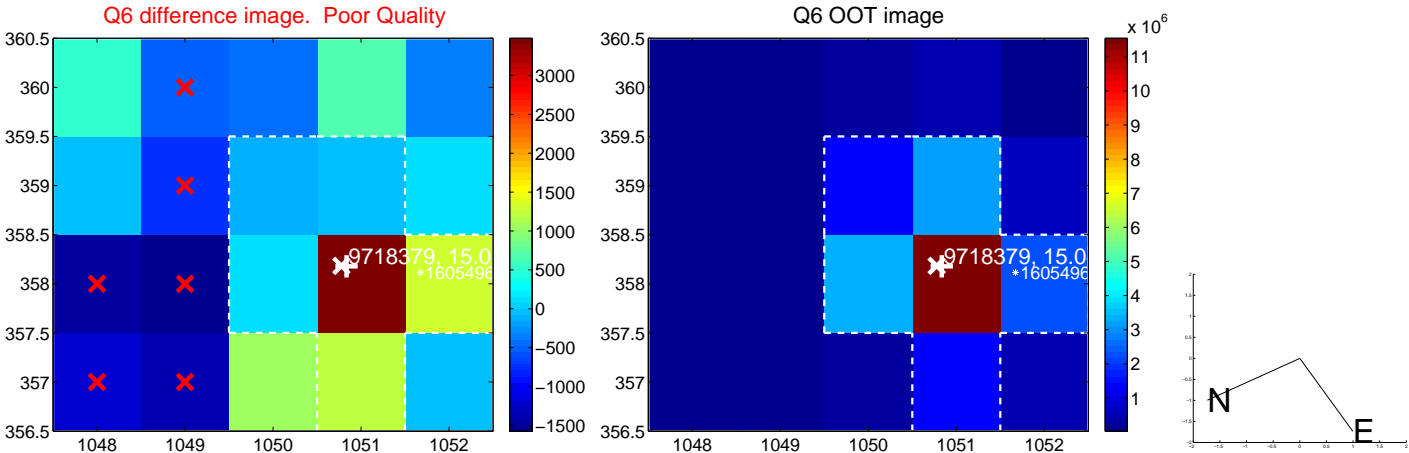
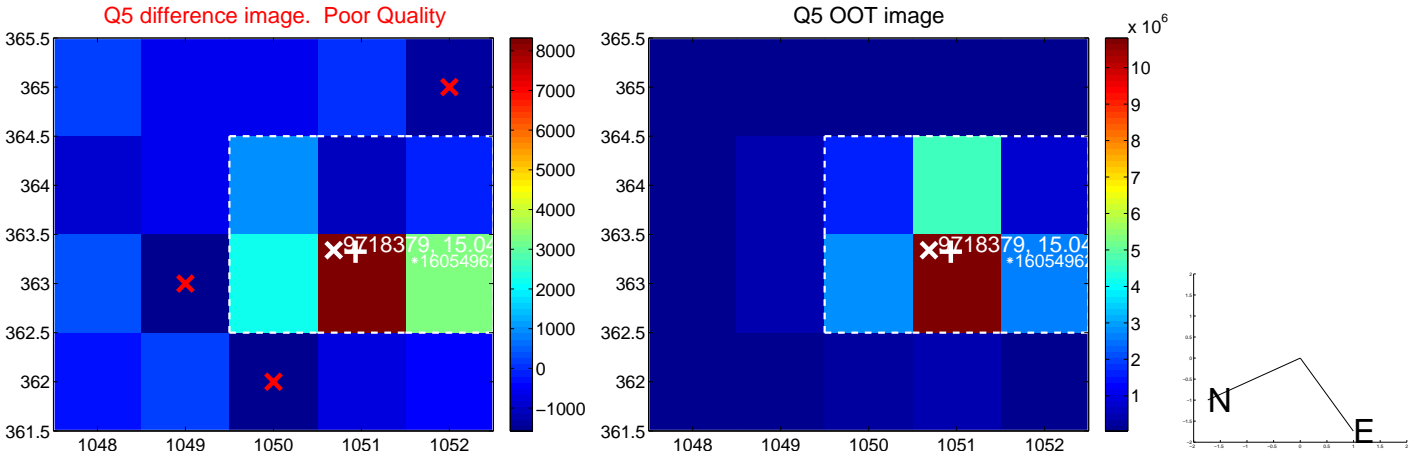


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

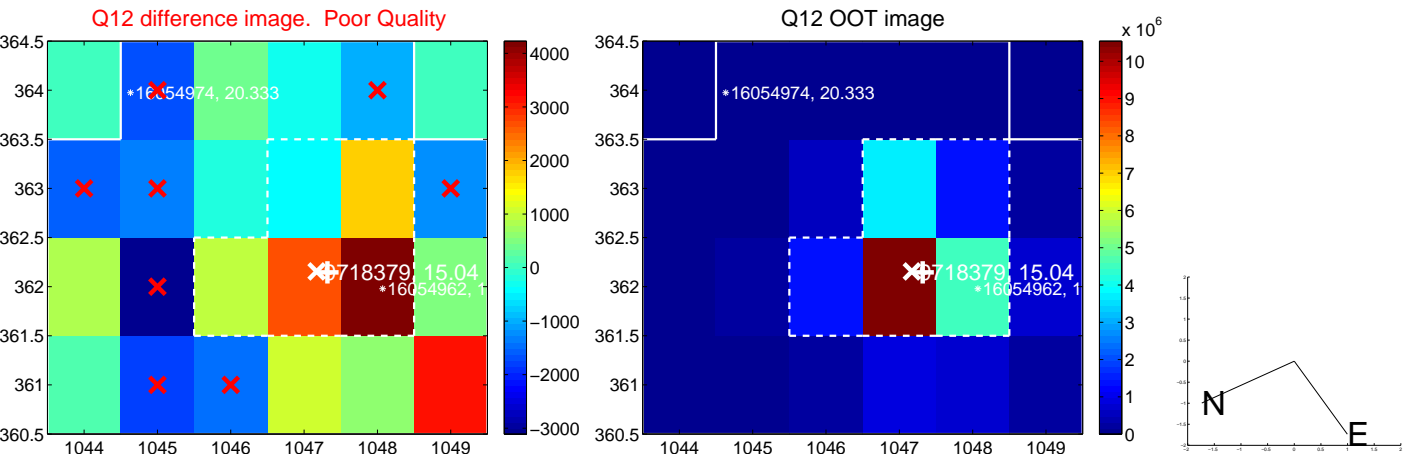
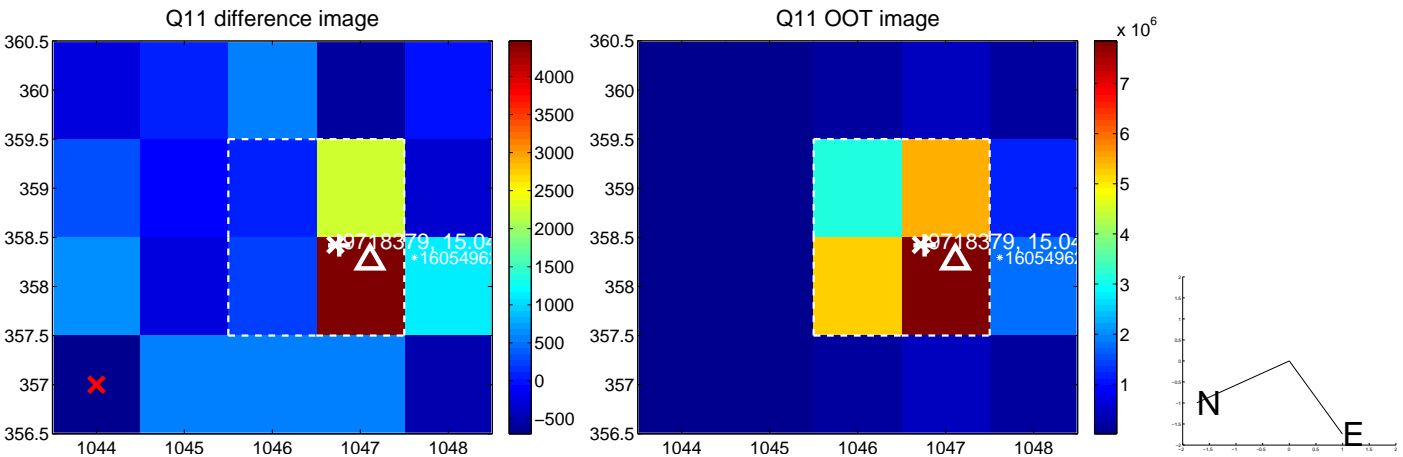
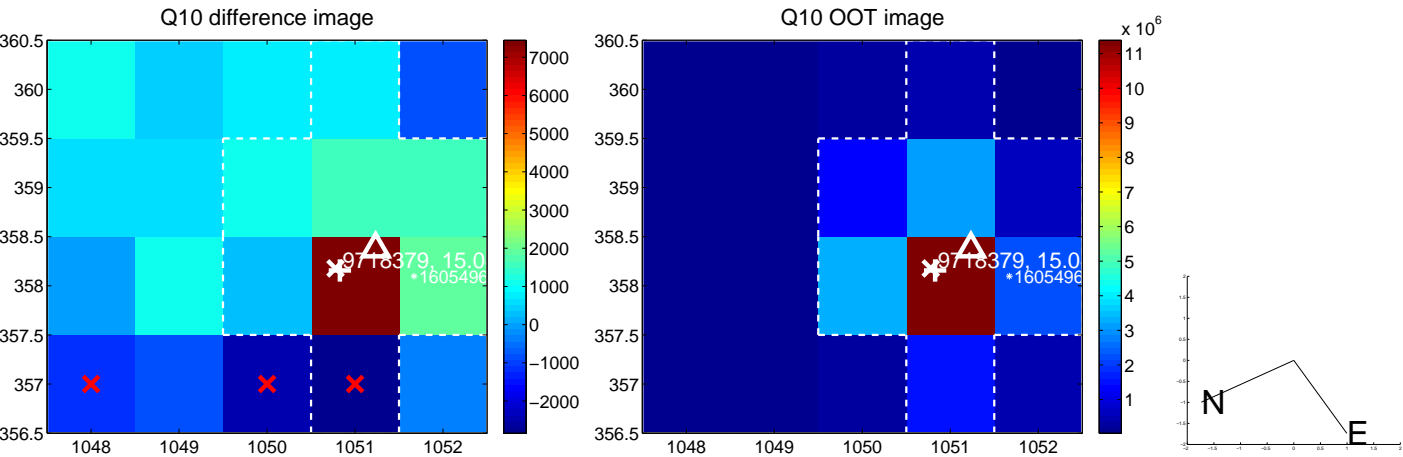
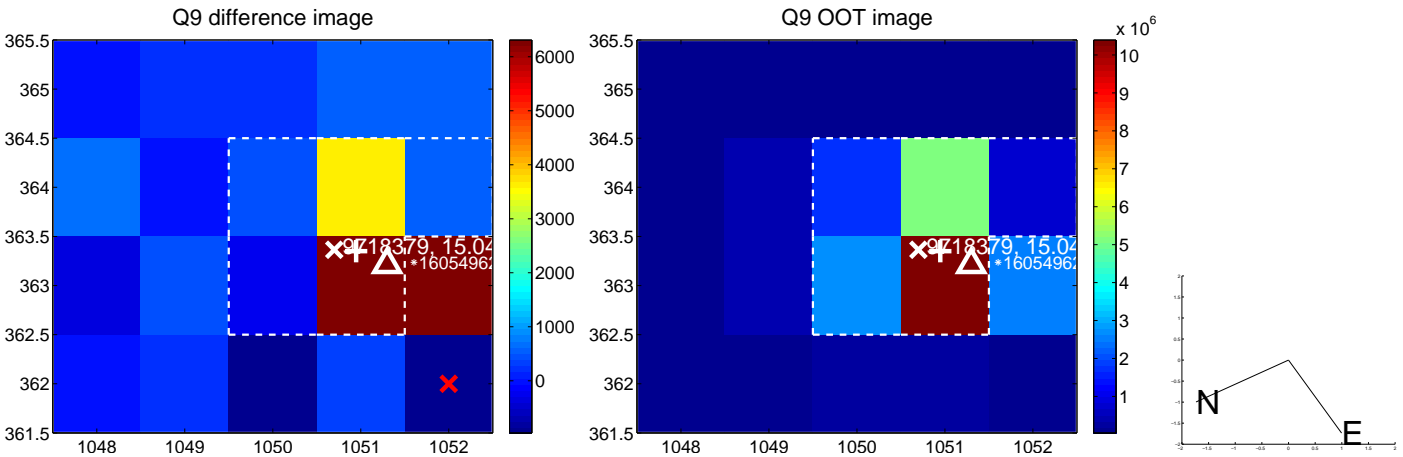
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



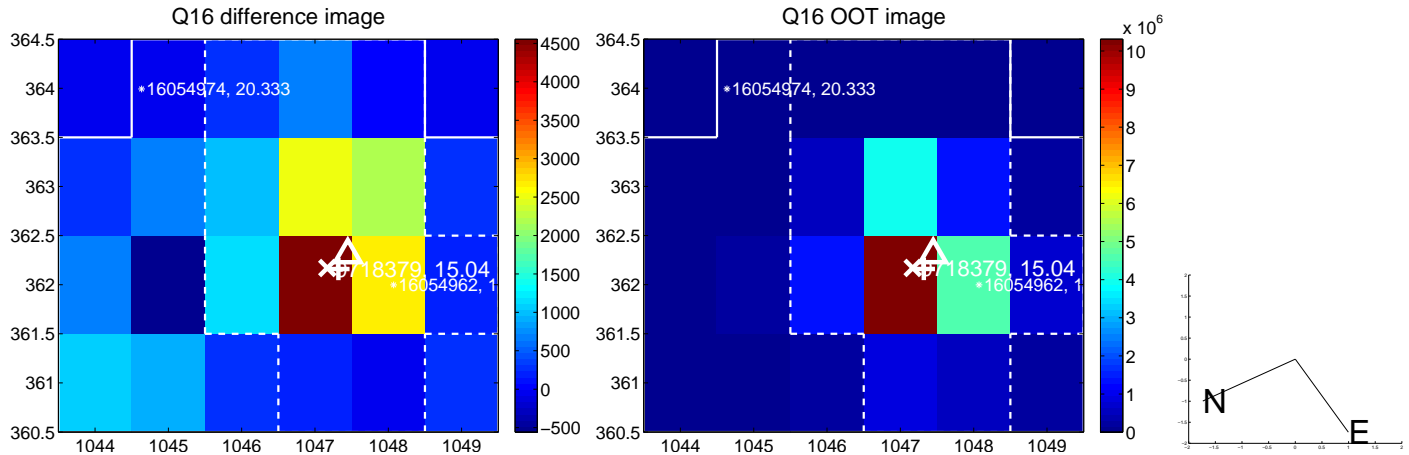
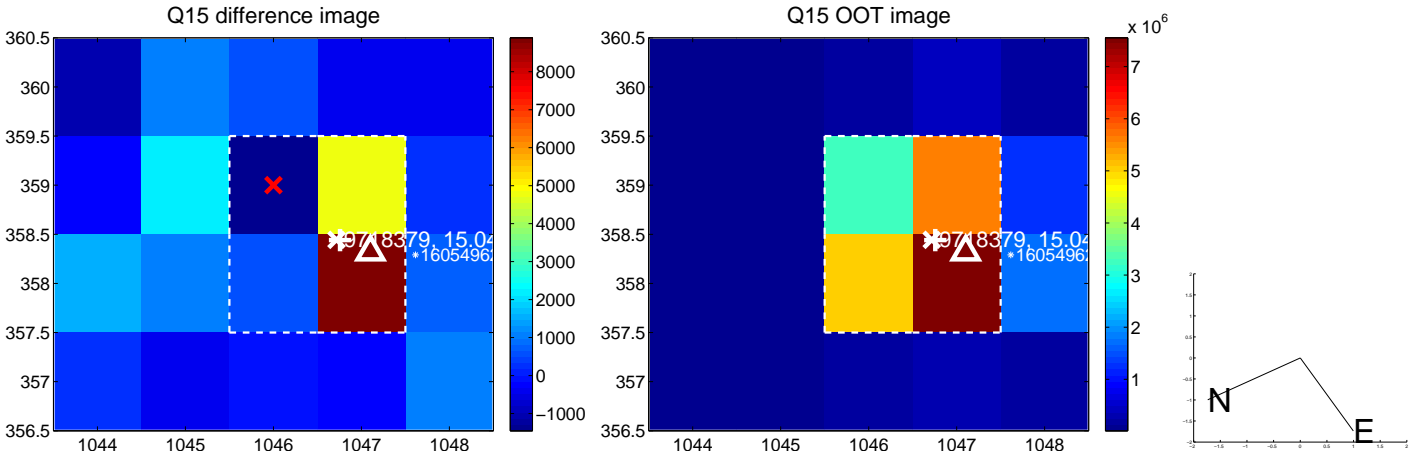
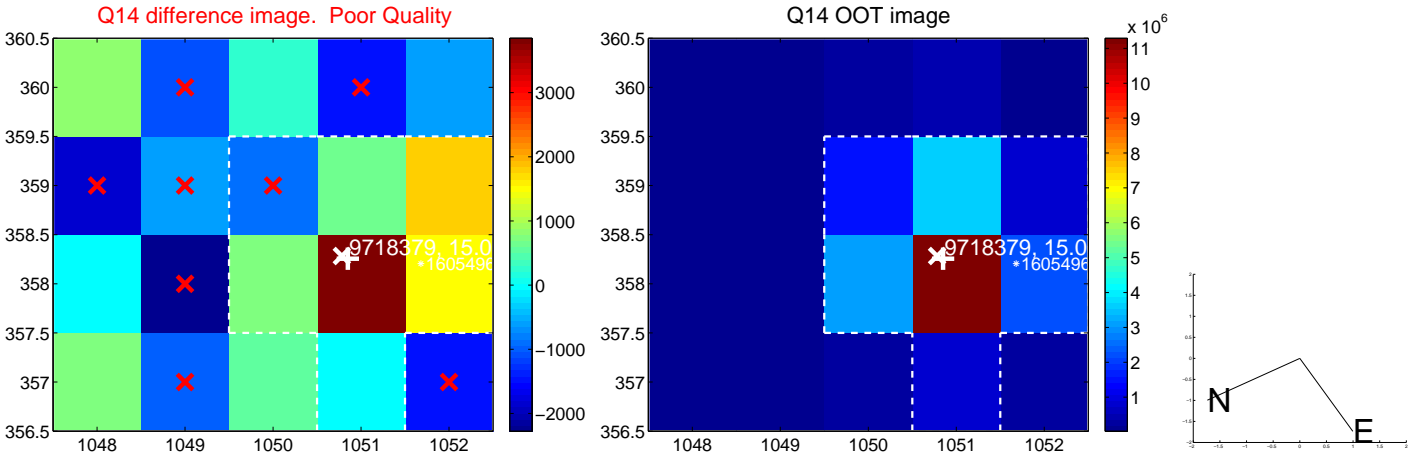
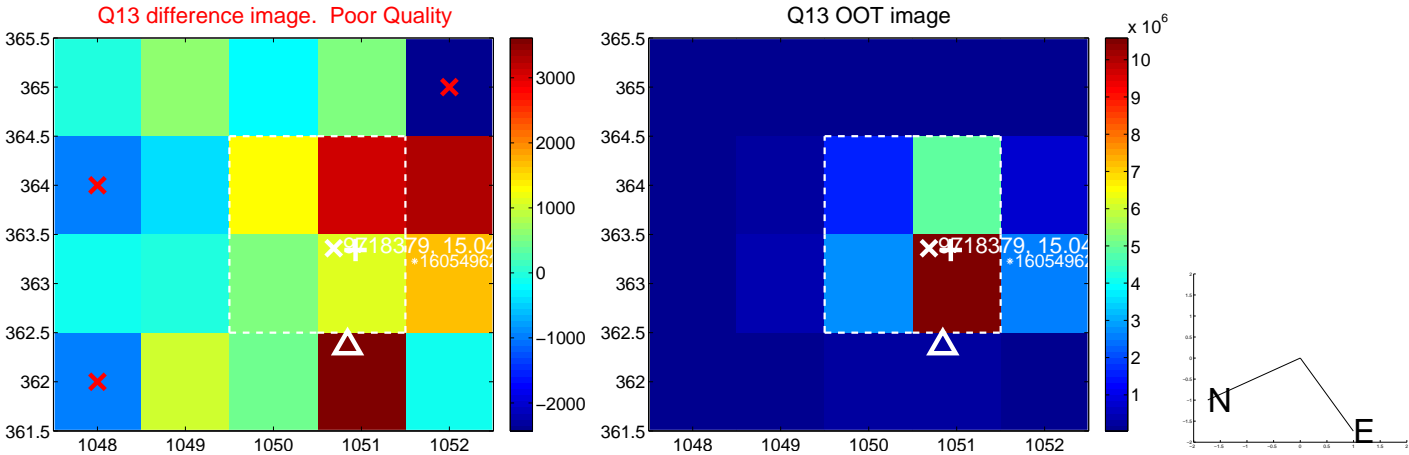
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



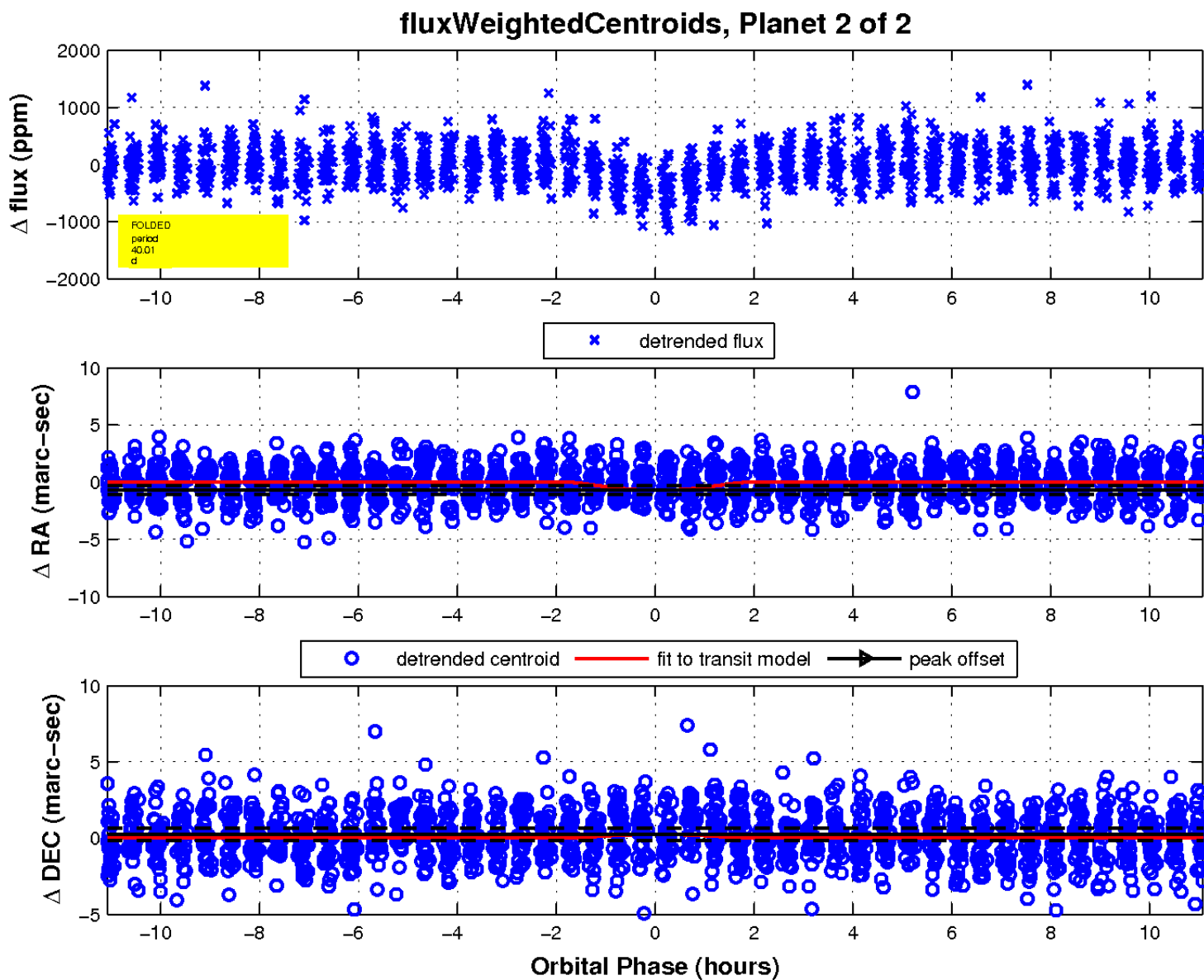
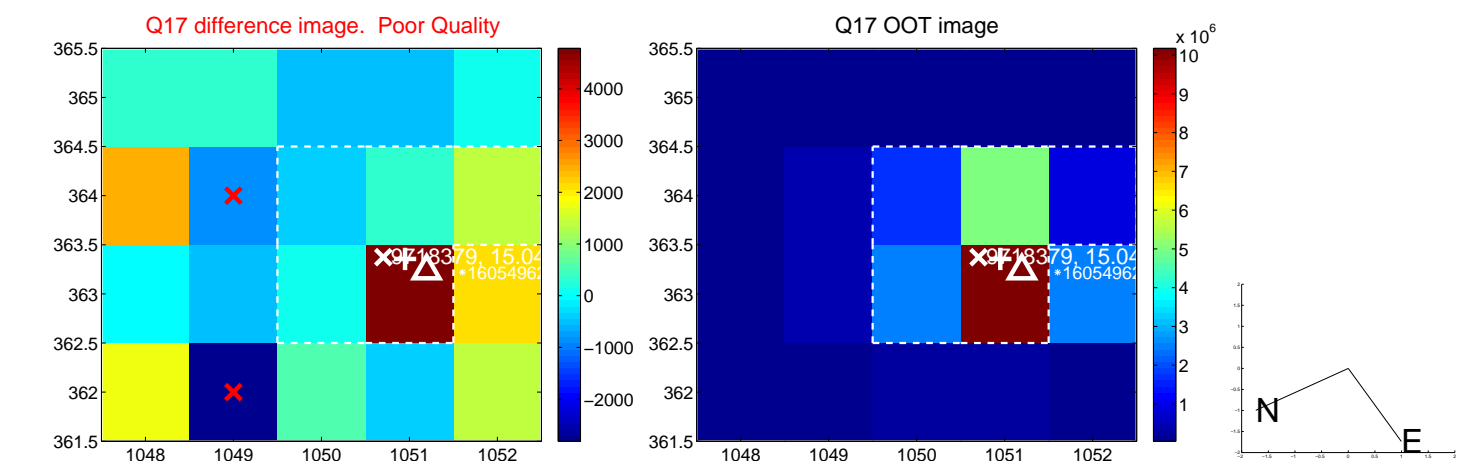
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

