

# KIC 005130380

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005130380-01	OBS	3707.01	19.979081	137.147666	38472.5	10.563	387.7	358.8	1.13	5907	23.06	70.68
005130380-02	OBS	No	19.978743	146.368316	3427.2	10.338	34.4	38.9	1.13	5907	7.51	70.68

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005130380-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—CENT_KIC_POS
005130380-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE—CENT_KIC_POS

**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.

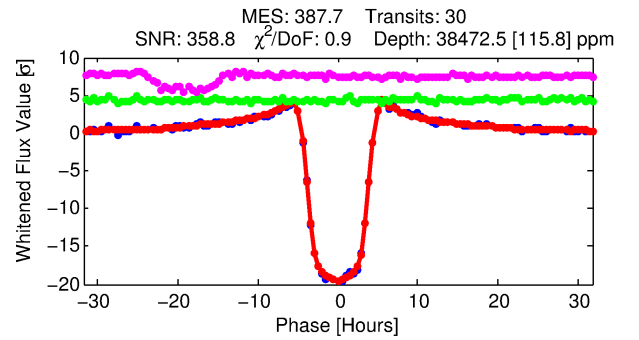
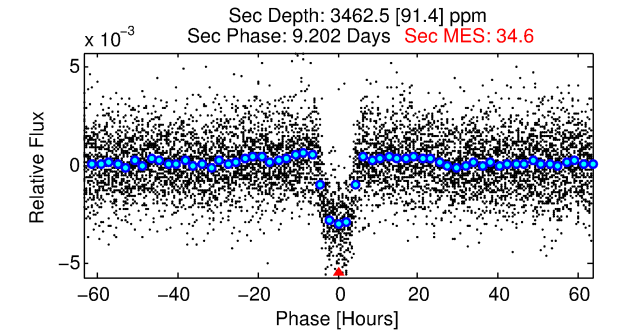
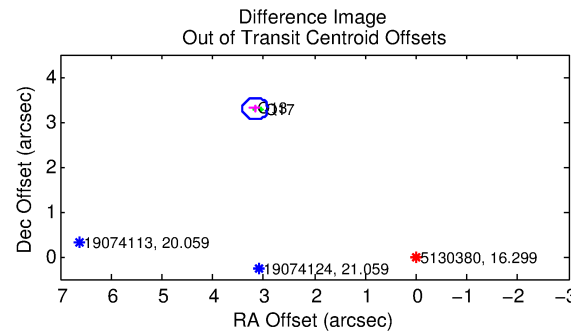
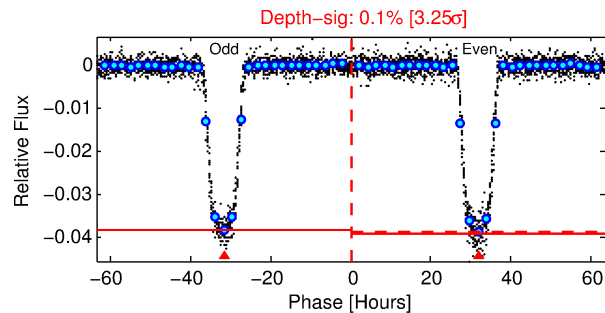
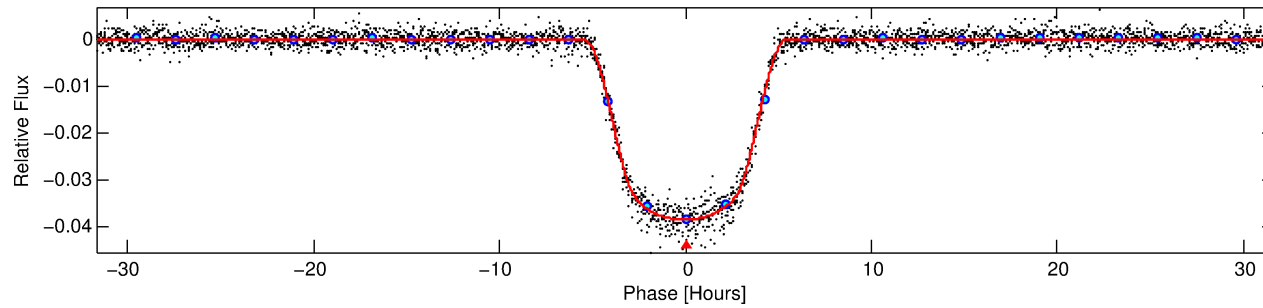
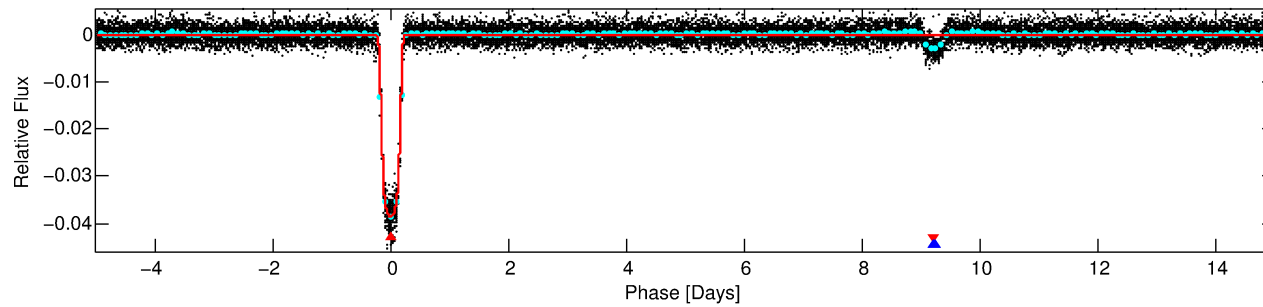
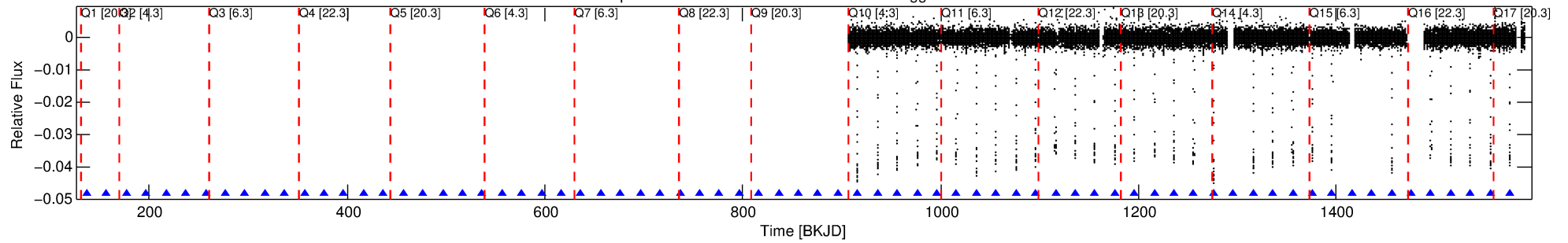
## Ephemeris Match Information For 005130380-01

No Significant Match Found

# DV One-Page Summary

KIC: 5130380 Candidate: 1 of 2 Period: 19.979 d  
KOI: K03707.01 Corr: 0.997

Kp: 16.30 R\*: 1.13 Rs Teff: 5907.0 K Logg: 4.30 Fe/H: -0.260



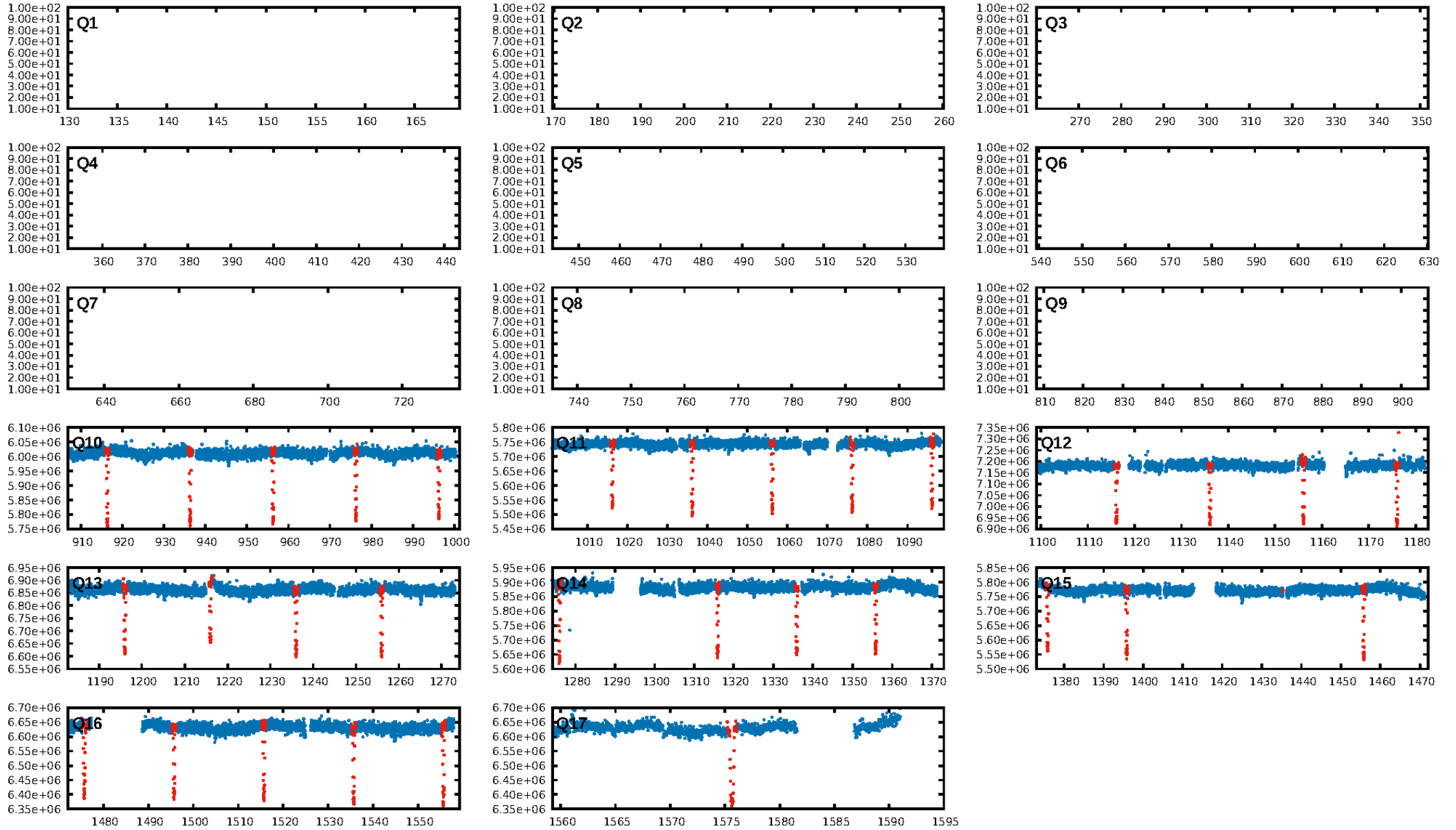
## DV Fit Results:

Period = 19.97908 [0.00003] d  
Epoch = 137.1477 [0.0016] BKJD  
Rp/R\* = 0.1877 [0.0005]  
a/R\* = 14.97 [0.10]  
b = 0.58 [0.01]  
Seff = 70.68 [27.74]  
Teq = 739 [73] K  
Rp = 23.06 [6.33] Re  
a = 0.1399 [0.0340] AU  
Ag = 70.09 [25.95] [2.66σ]  
Teffp = 3308 [112] K [19.25σ]

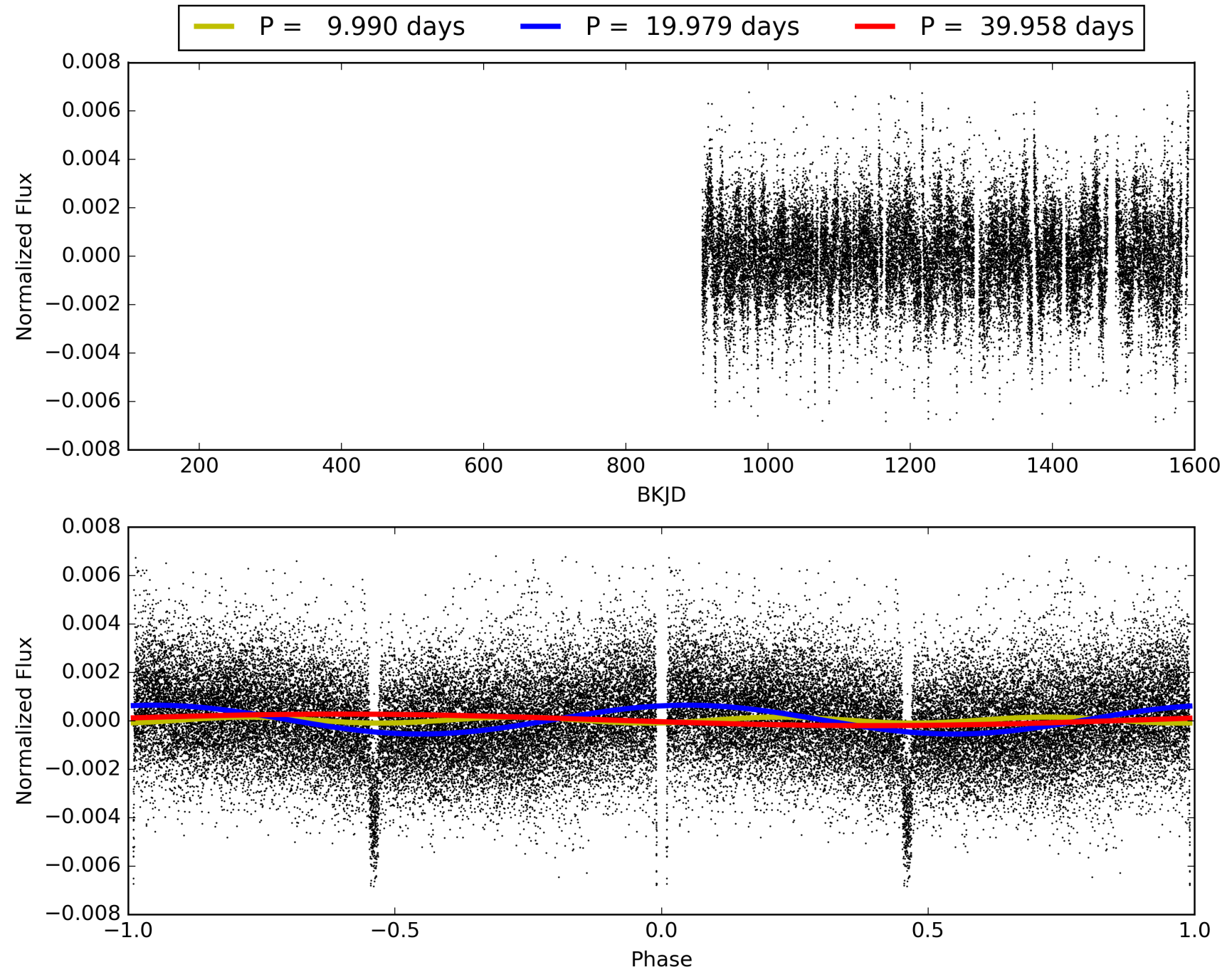
## DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [29/29]  
GhostDiagnostic-chr: 0.6932  
Centroid-sig: 0.0%  
Centroid-so: 3.013 arcsec [467.27σ]  
OotOffset-rm: 4.567 arcsec [55.57σ]  
KicOffset-rm: 0.061 arcsec [0.83σ]  
OotOffset-st: 0/0/0/2 [2]  
KicOffset-st: 2/2/2/2 [8]  
DiffImageQuality-fgm: 1.00 [8/8]  
DiffImageOverlap-fno: 1.00 [8/8]

# TCE 005130380-01, PDC Light Curves

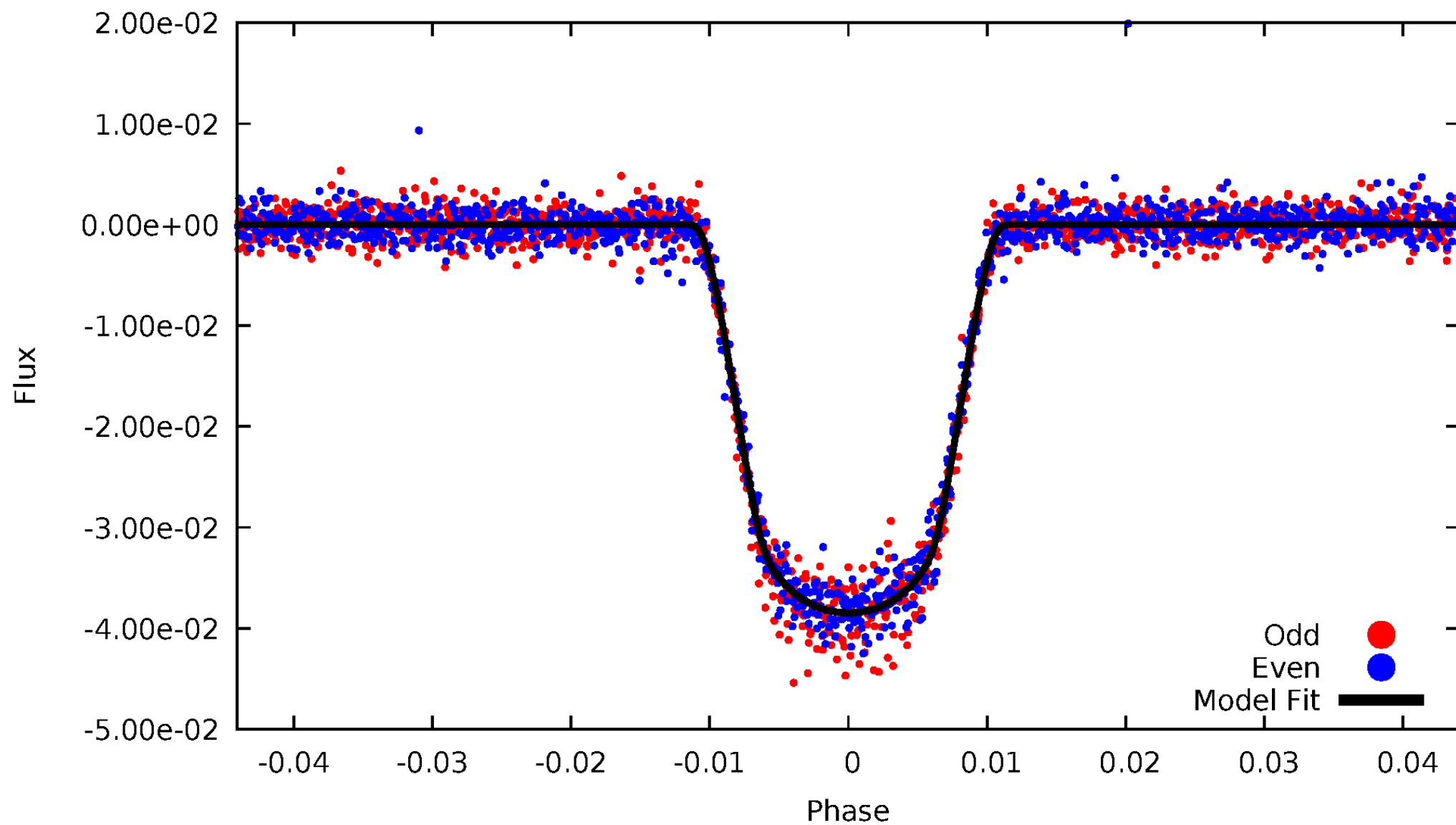


TCE 005130380-01



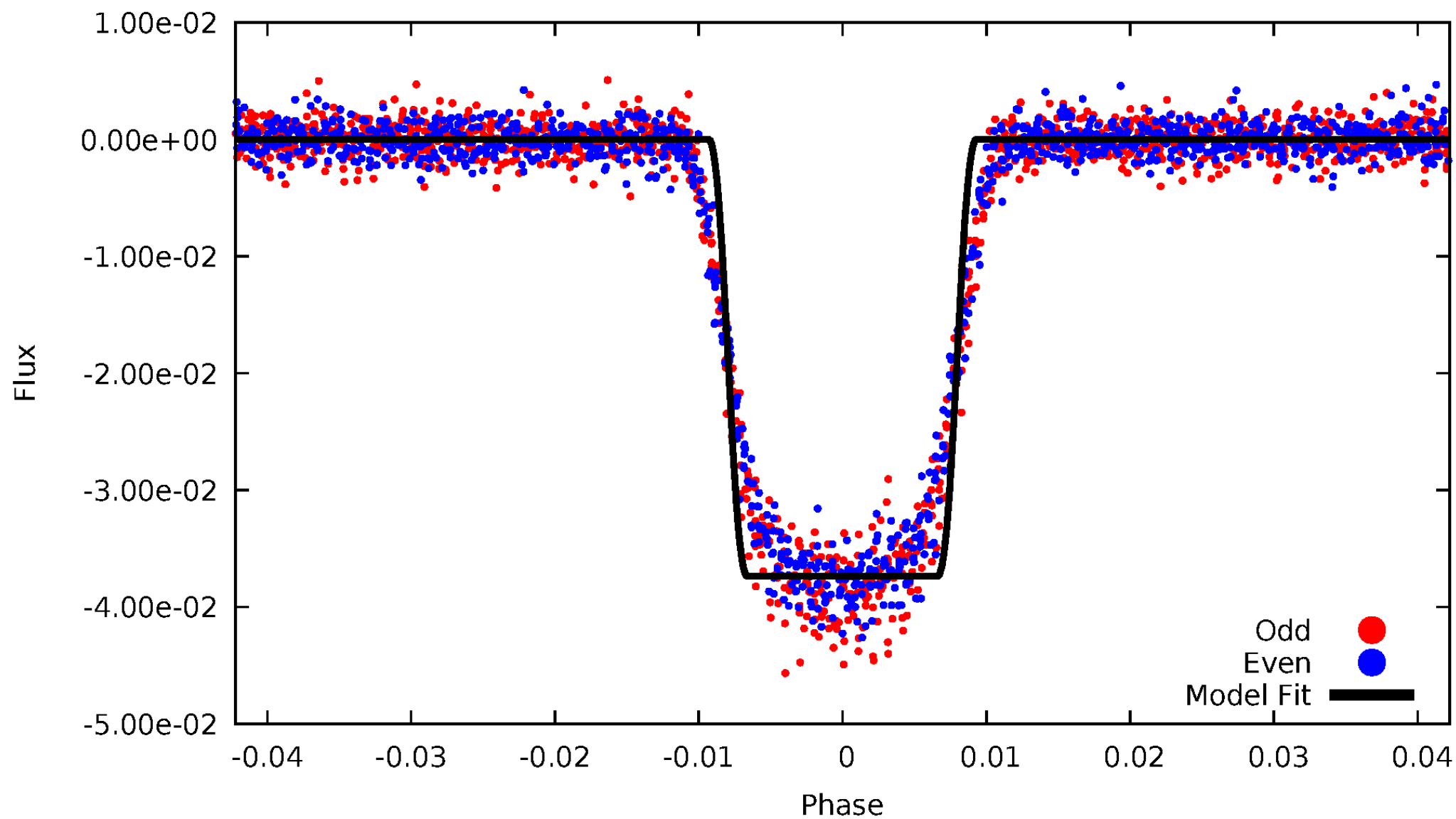
# DV Odd/Even

TCE 005130380-01



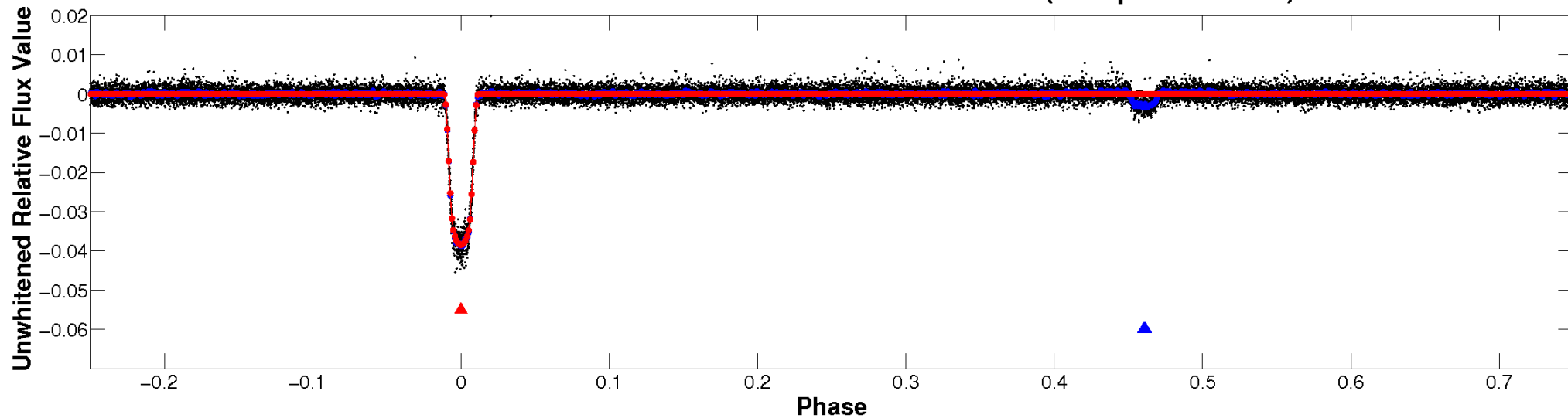
# ALT Odd/Even

TCE 005130380-01

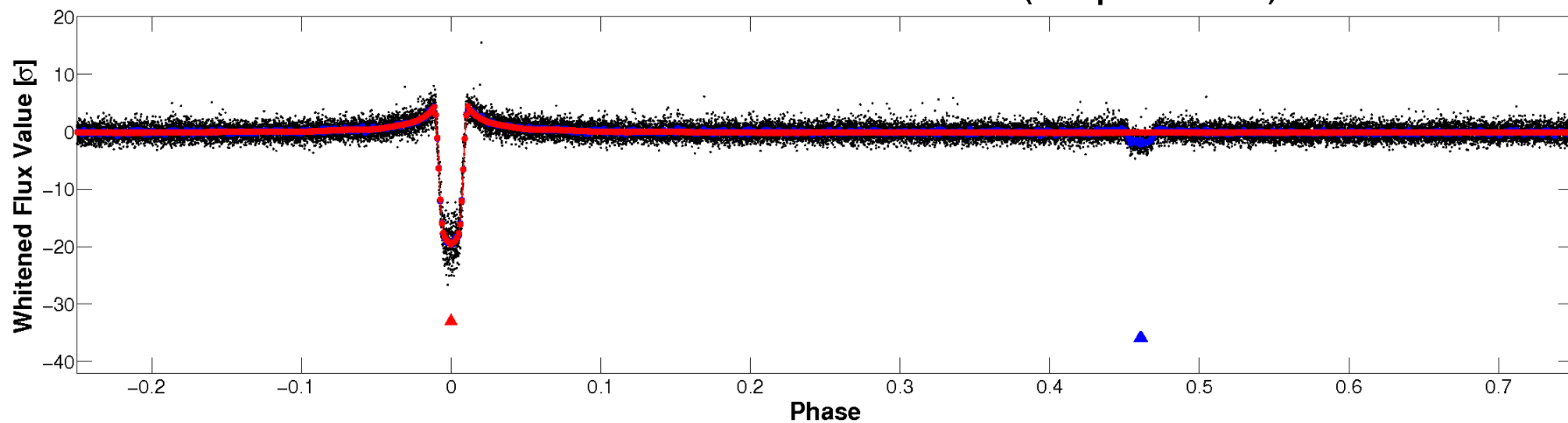


# Non-Whitened Vs. Whitened Light Curve

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

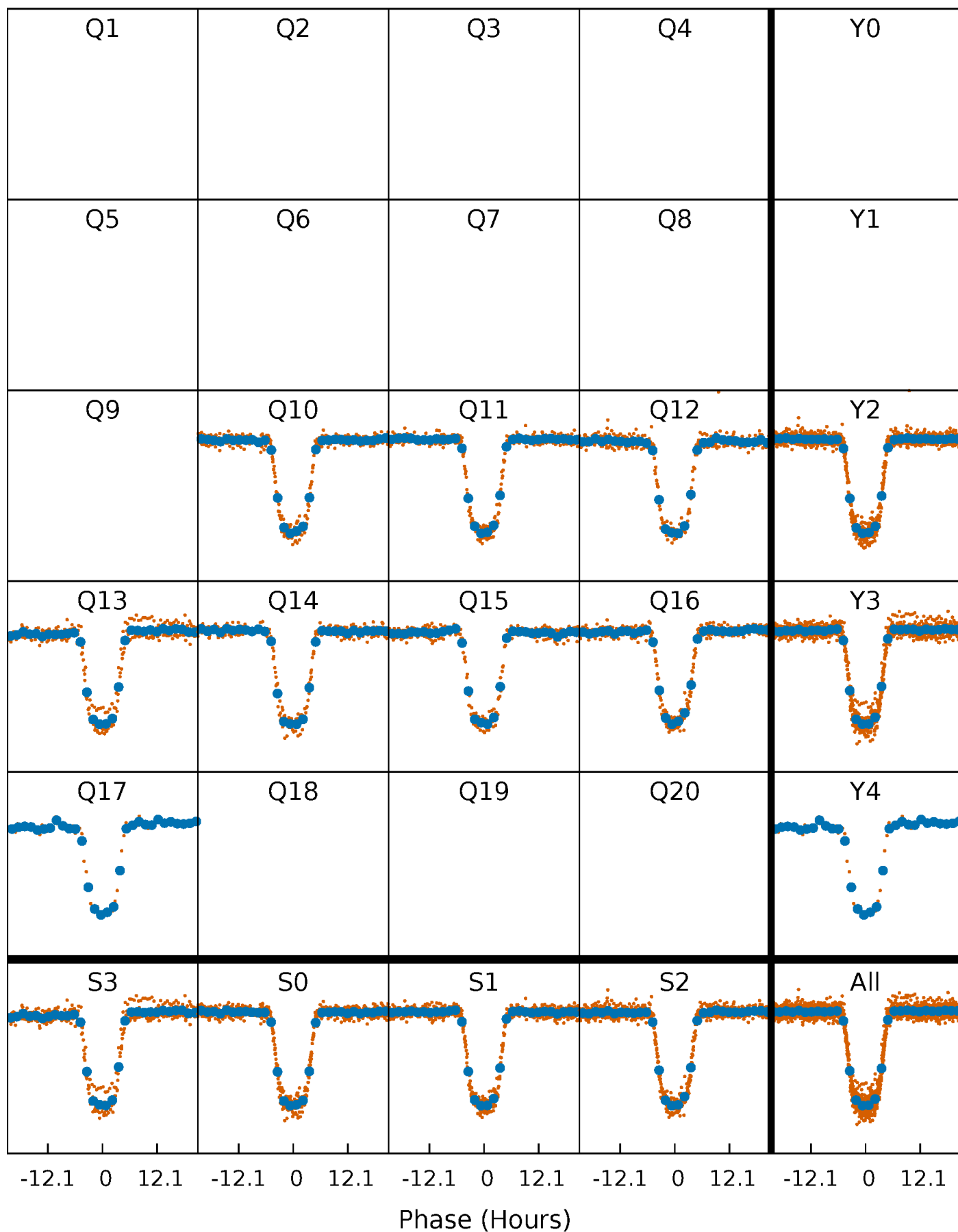


## Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

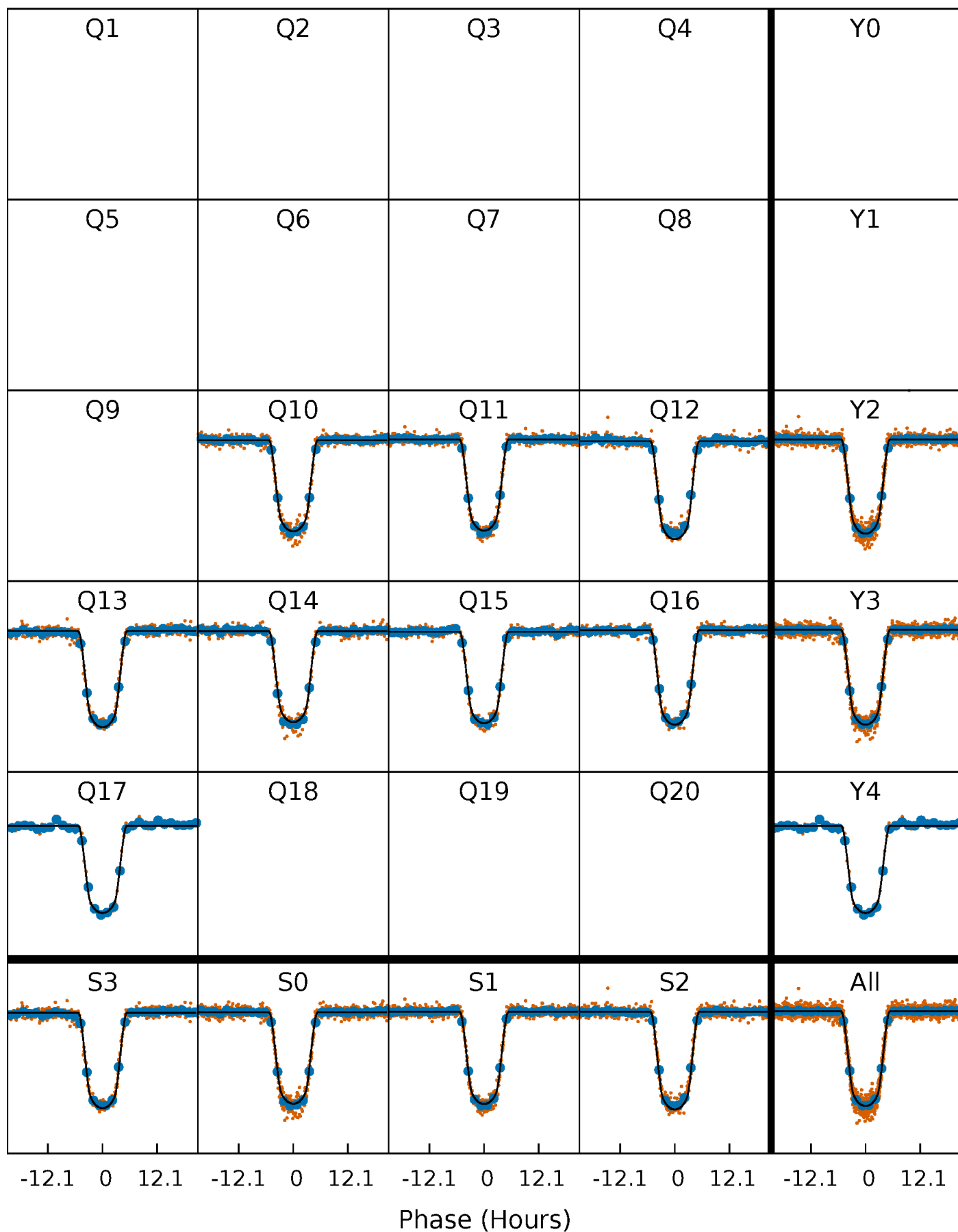
TCE 005130380-01 P= 19.979081 Days  $T_0=137.147667$  (BKJD)





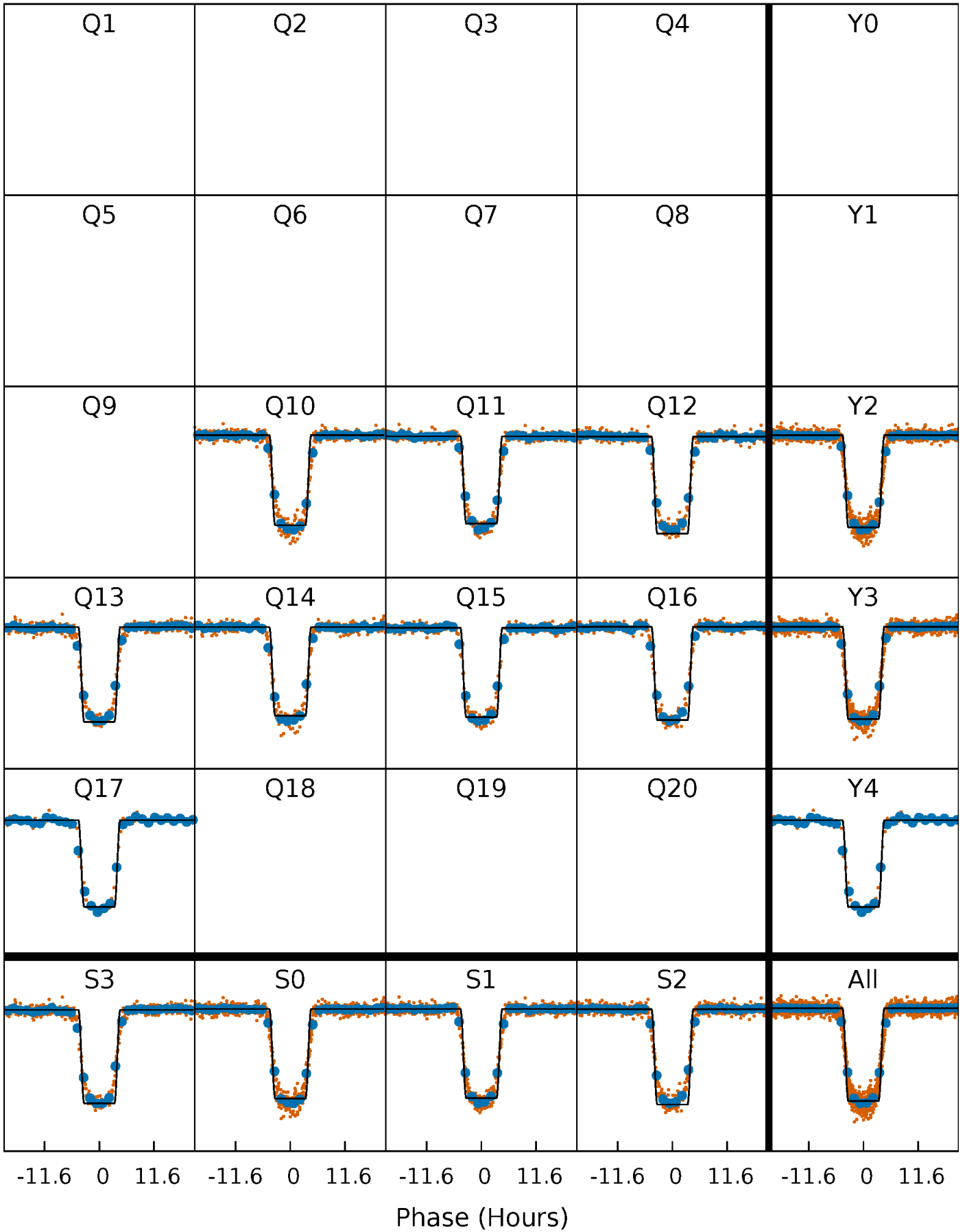
# DV Quarter-Phased Transit Curves

TCE 005130380-01 P= 19.979081 Days  $T_0=137.147667$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

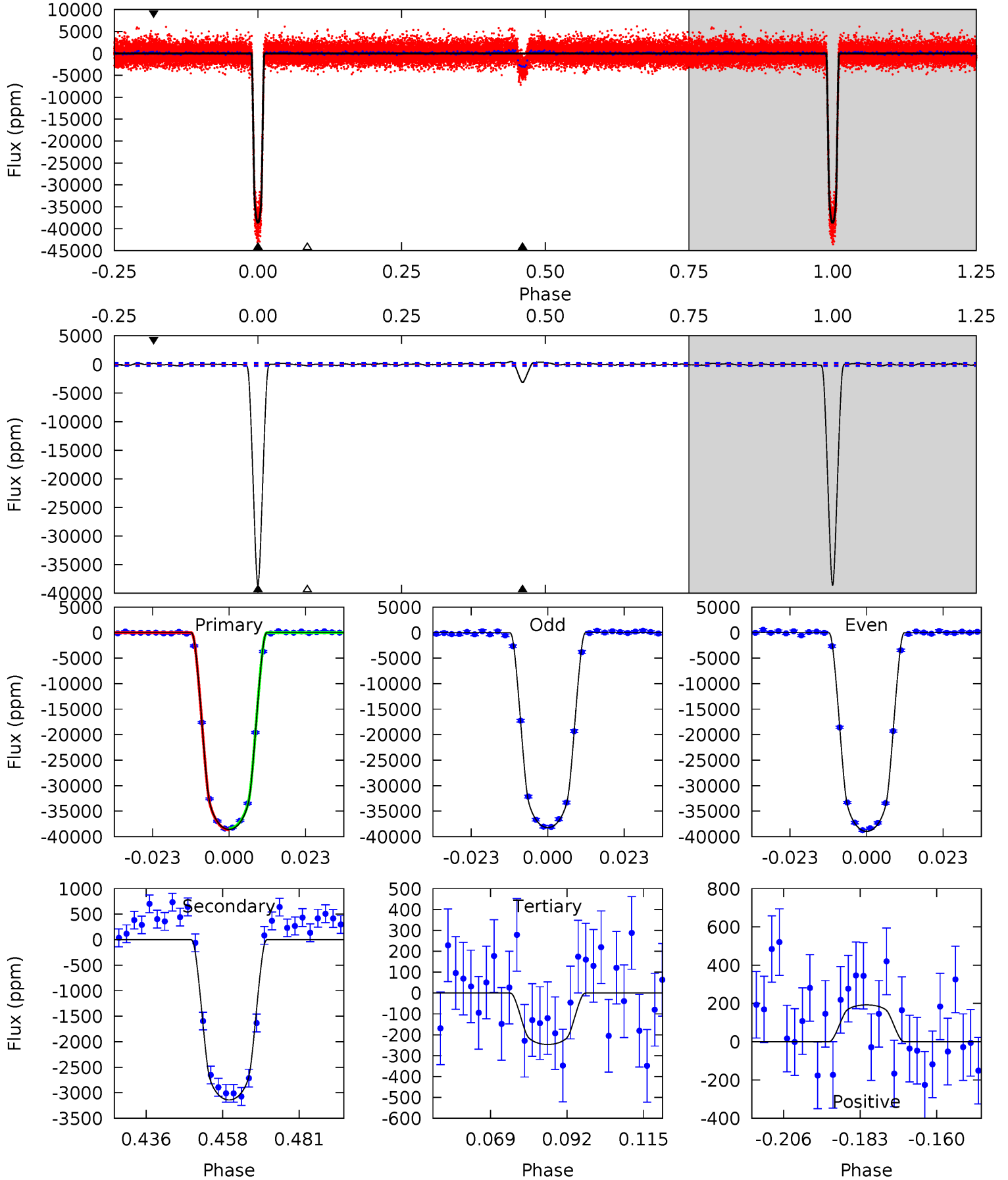
TCE 005130380-01 P= 19.979454 Days  $T_0=137.127177$  (BKJD)



# DV Model-Shift Uniqueness Test

005130380-01, P = 19.979081 Days, E = 137.147667 Days

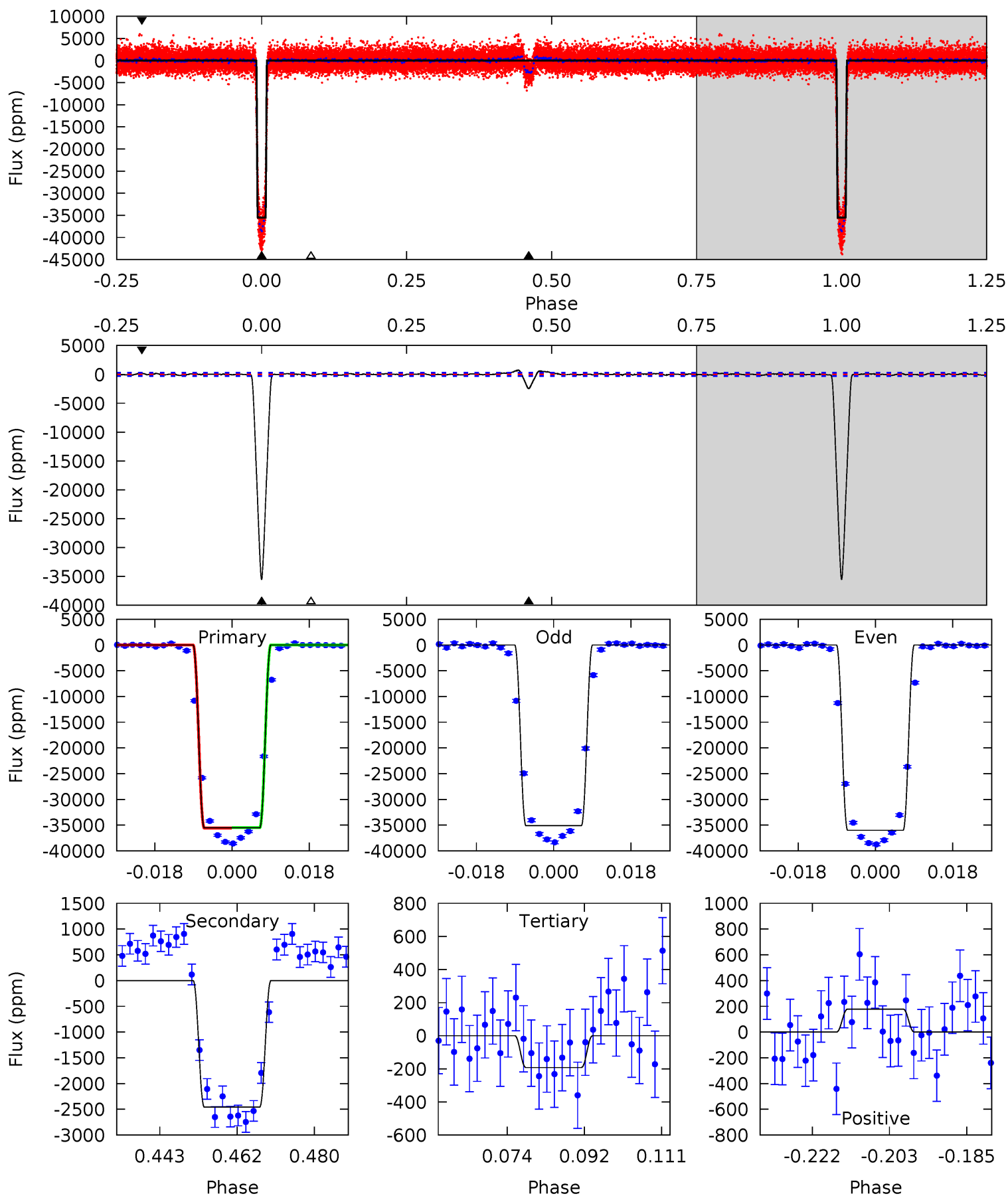
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
714.4	58.2	4.57	3.57	4.86	2.27	2.04	709.9	710.9	53.6	54.6	6.93	1.01	0.01	2.29



# Alt Model-Shift Uniqueness Test

005130380-01, P = 19.979454 Days, E = 137.127177 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
591.9	40.9	3.20	2.98	4.91	2.36	1.89	588.7	588.9	37.7	38.0	7.66	1.01	0.02	0.61



### Stellar Parameters For KIC 005130380

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5907^{+178}_{-196}$	$4.296^{+0.209}_{-0.190}$	$-0.260^{+0.300}_{-0.300}$	$1.126^{+0.309}_{-0.253}$	$0.915^{+0.142}_{-0.095}$	$0.902^{+0.892}_{-0.452}$
	+3%/-3%	+5%/-4%	+115%/-115%	+27%/-22%	+16%/-10%	+99%/-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 005130380-01 / KOI 3707.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-3141 \pm 54$	$23.23^{+3.85}_{-2.96}$	$1035^{+83}_{-79}$	$3657^{+70}_{-87}$	$63^{+19}_{-15}$
Alt.	$-2456 \pm 60$	$23.86^{+3.89}_{-3.09}$	$1035^{+79}_{-77}$	$3483^{+67}_{-82}$	$47^{+14}_{-11}$

$T_{\text{max}}$  = 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

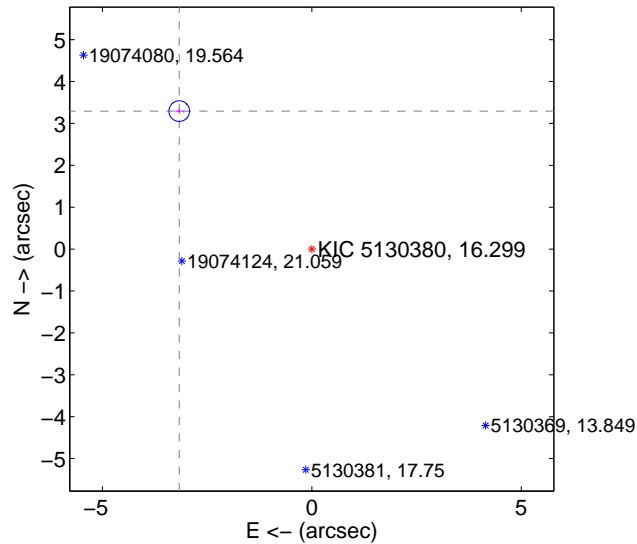
Supplemental centroid analysis for 005130380-01. Kepler magnitude: 16.30. Transit SNR 358.77

There are 8 quarters with good PRF difference image offsets

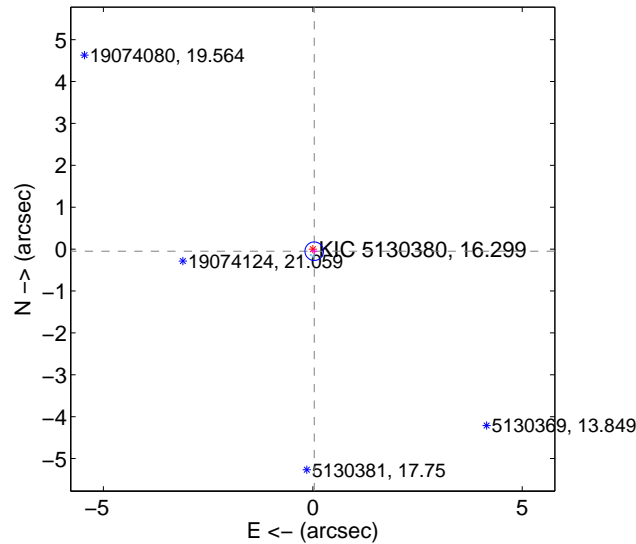
The OOT PRF centroid is offset from the target star catalog position by about 4.62 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$4.567 \pm 0.082$	55.57	$3.164 \pm 0.096$	$3.294 \pm 0.067$
PRF-fit source offset from KIC position	$0.061 \pm 0.074$	0.83	$-0.034 \pm 0.070$	$-0.051 \pm 0.075$
photometric centroid source offset	$3.01 \pm 0.01$	467.27	$-1.01 \pm 0.01$	$-2.84 \pm 0.01$

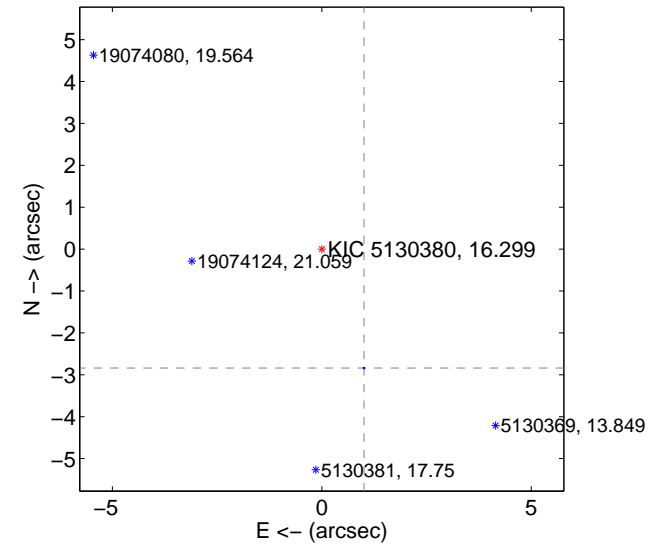
offset from difference PRF-fit to OOT PRF-fit



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.

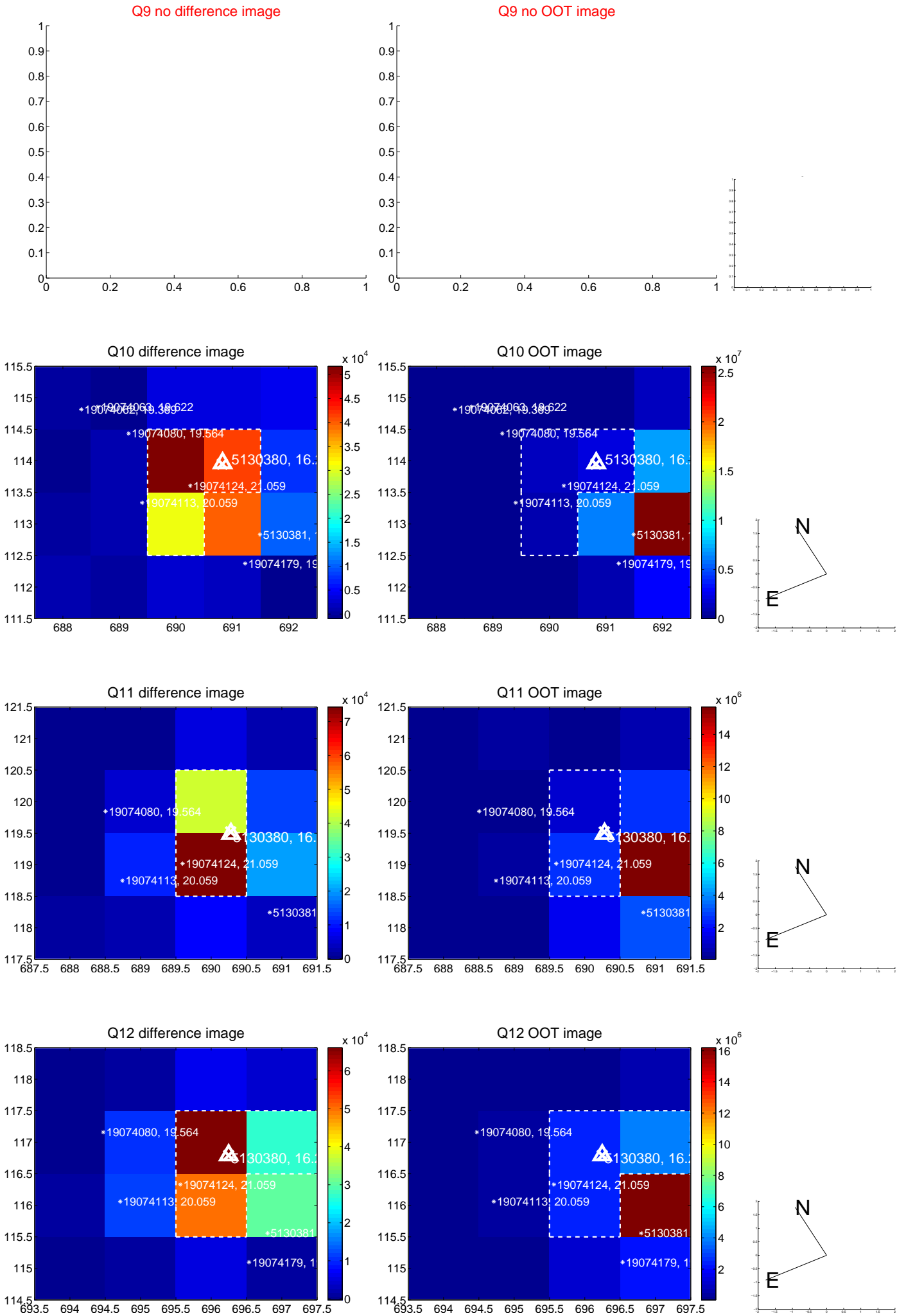


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

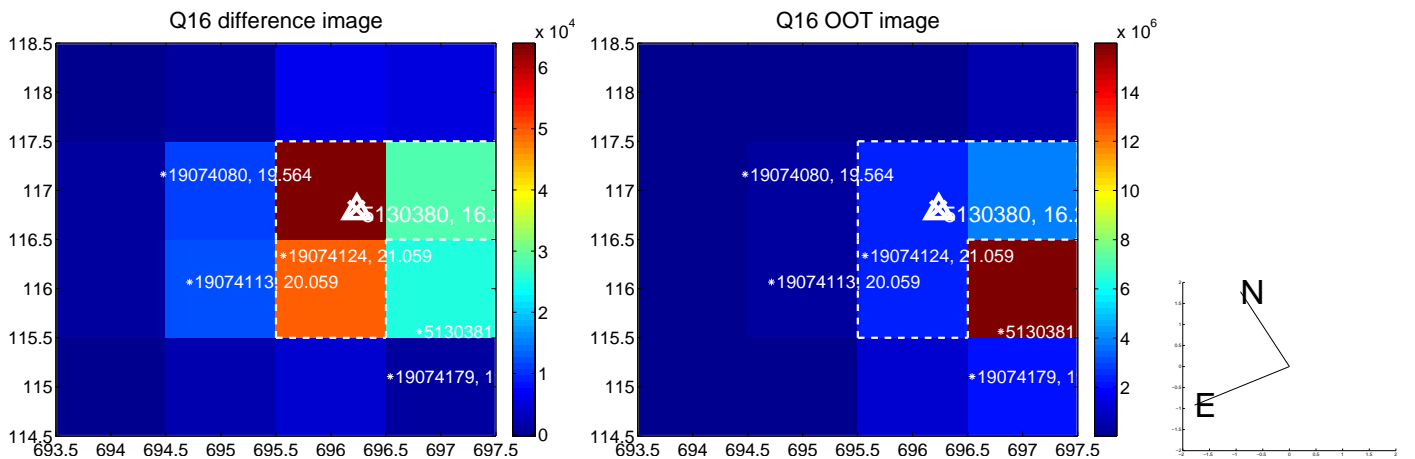
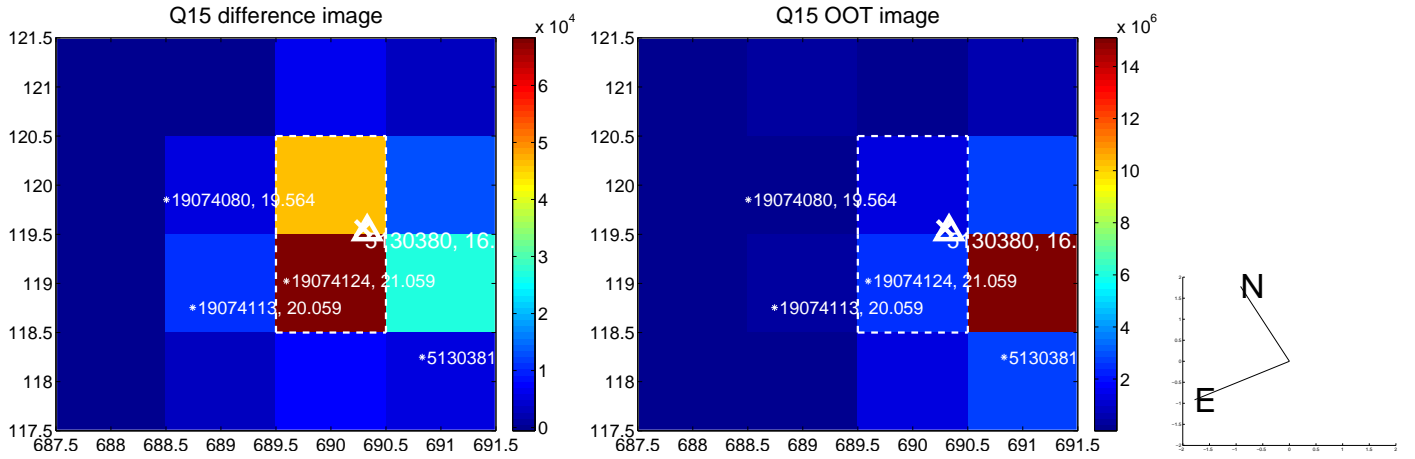
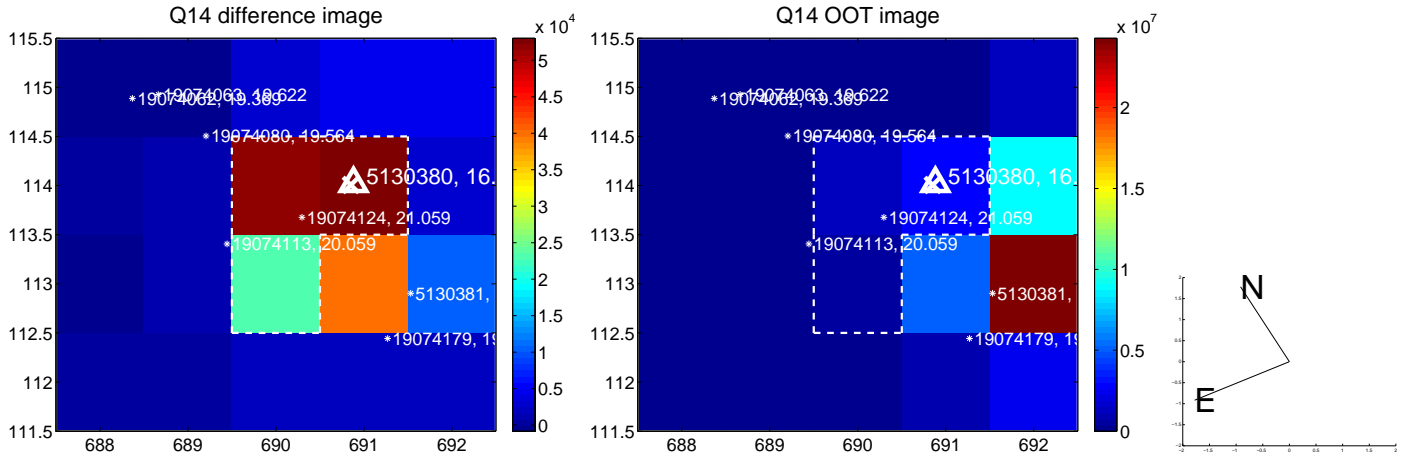
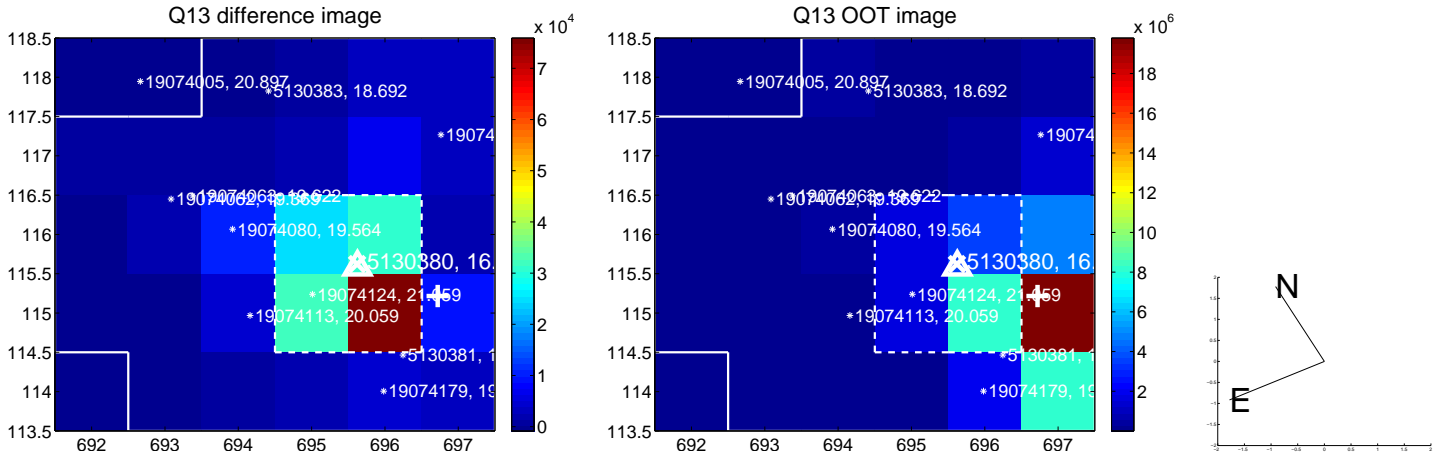




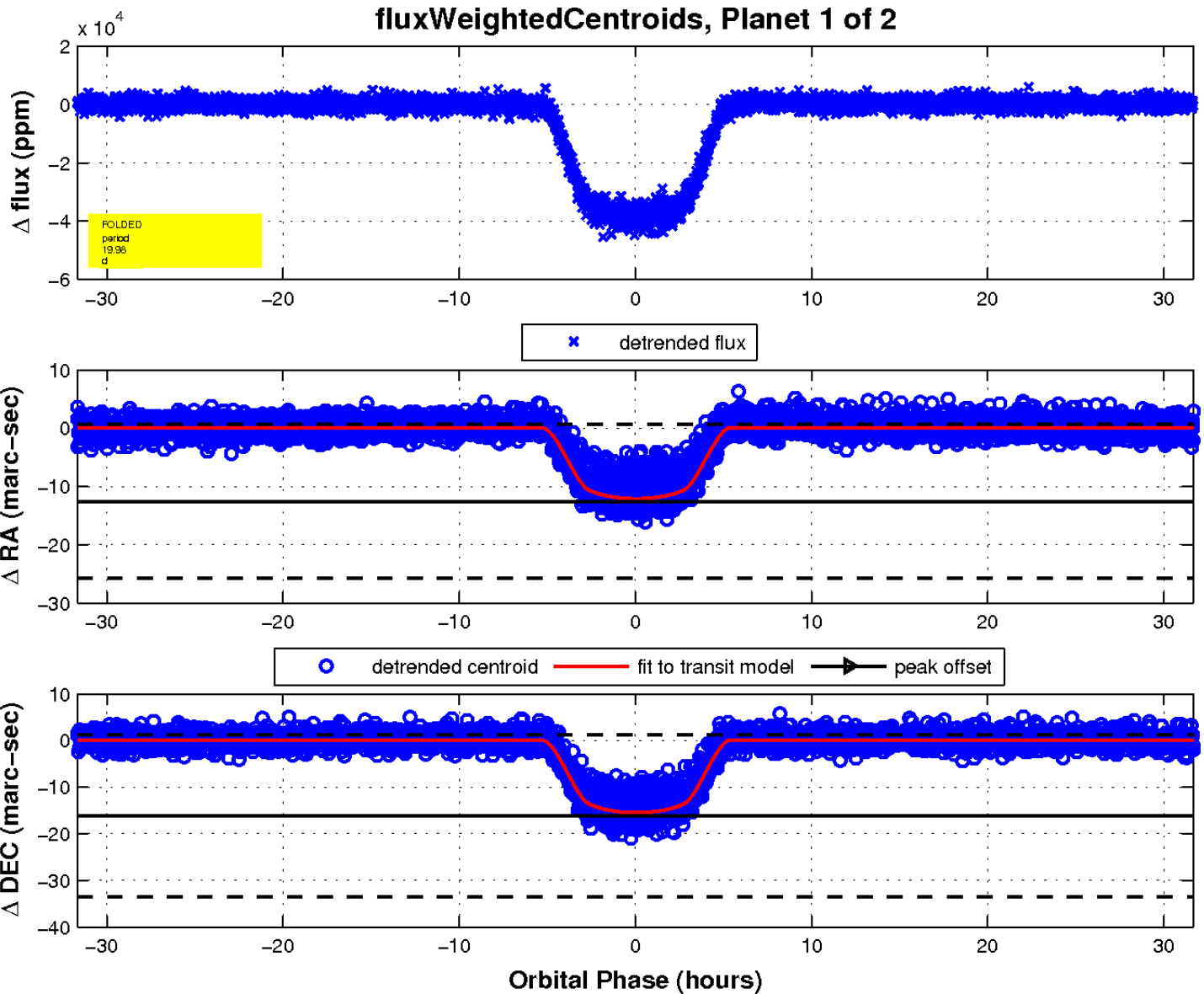
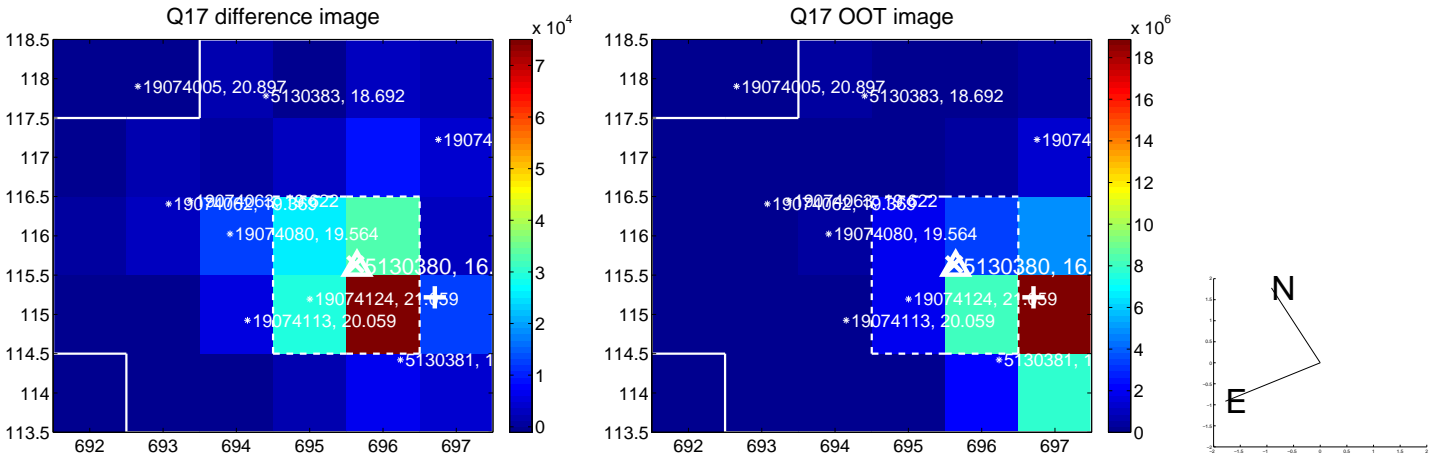
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

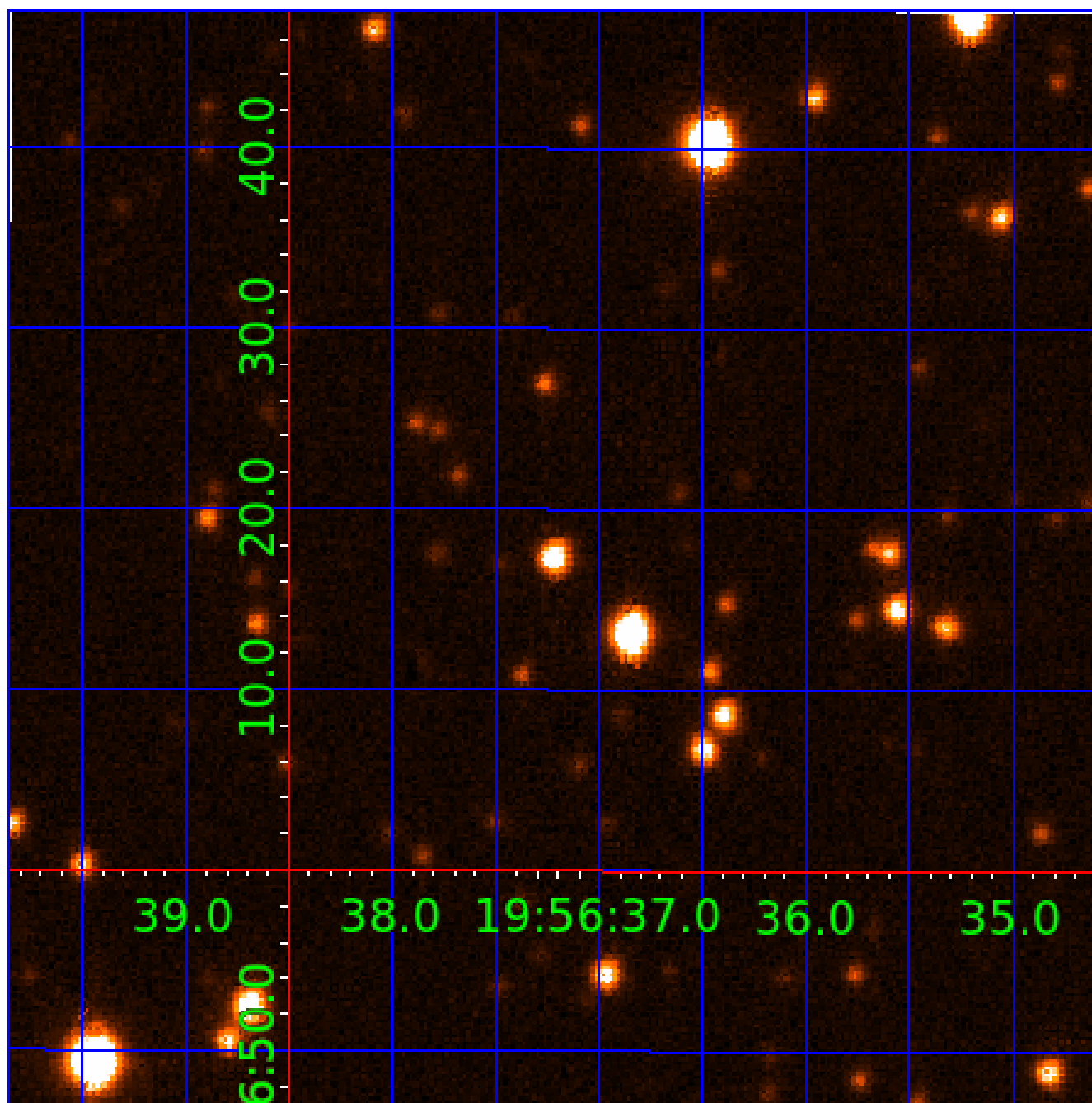


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 005130380

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005130380-01	OBS	3707.01	19.979081	137.147666	38472.5	10.563	387.7	358.8	1.13	5907	23.06	70.68
005130380-02	OBS	No	19.978743	146.368316	3427.2	10.338	34.4	38.9	1.13	5907	7.51	70.68

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005130380-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—CENT_KIC_POS
005130380-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE—CENT_KIC_POS

**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.

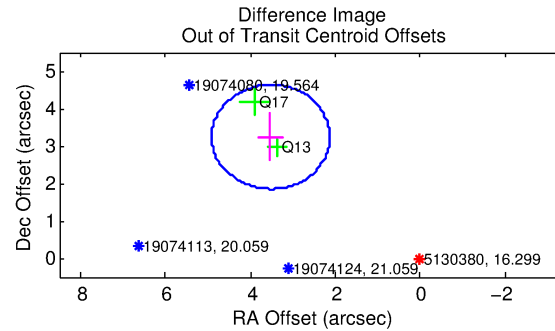
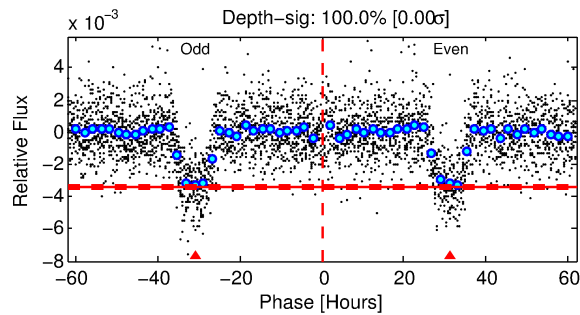
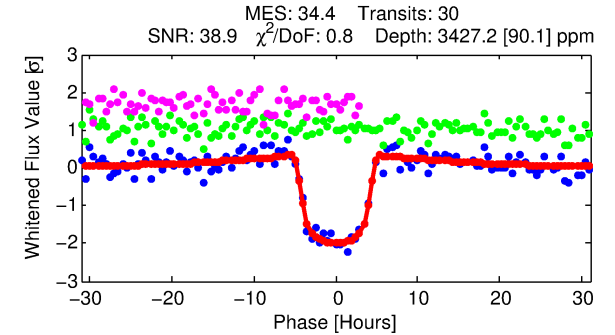
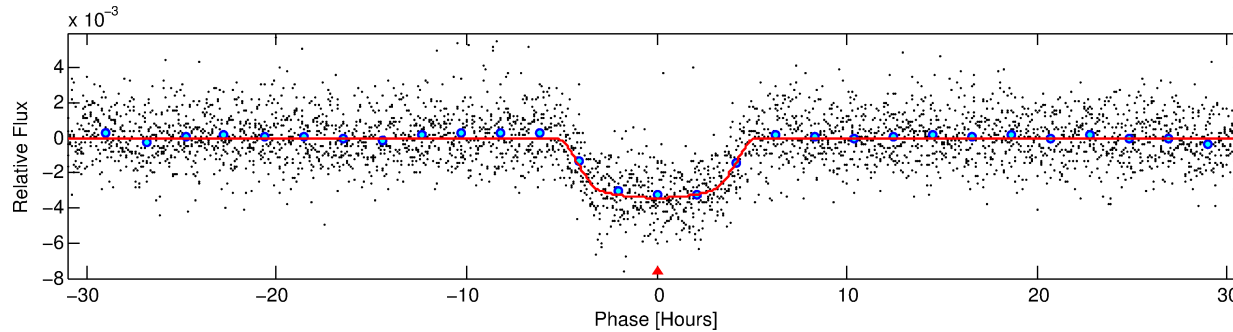
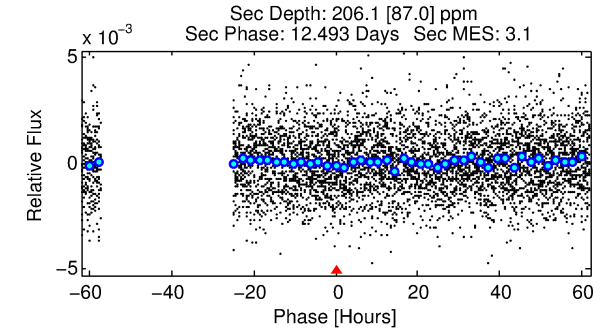
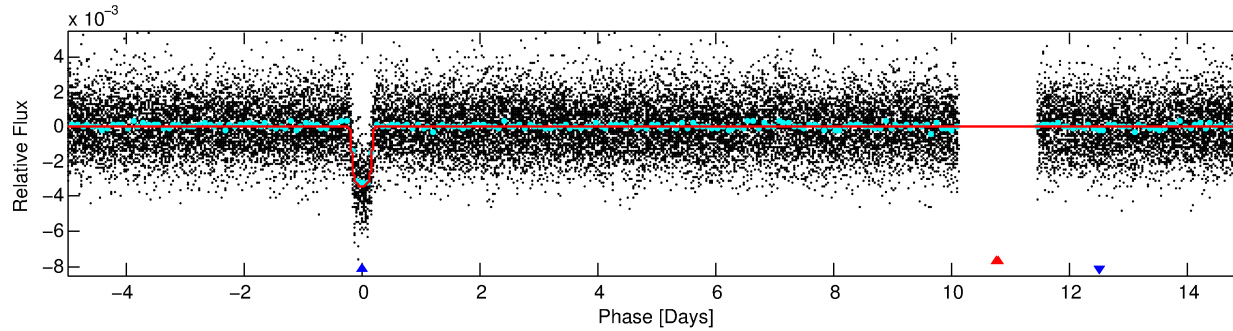
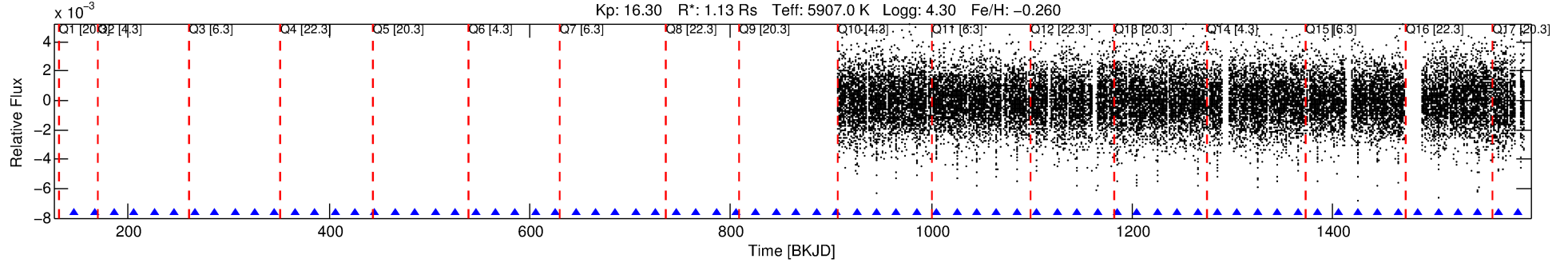
## Ephemeris Match Information For 005130380-02

No Significant Match Found

# DV One-Page Summary

KIC: 5130380 Candidate: 2 of 2 Period: 19.979 d  
KOI: K03707 Corr: No Ephemeris Match

Kp: 16.30 R\*: 1.13 Rs Teff: 5907.0 K Logg: 4.30 Fe/H: -0.260



## DV Fit Results:

Period = 19.97874 [0.00027] d  
Epoch = 146.3683 [0.0148] BKJD  
Rp/R\* = 0.0611 [0.0015]  
a/R\* = 9.40 [0.78]  
b = 0.85 [0.03]  
Seff = 70.68 [27.74]  
Teq = 739 [73] K  
Rp = 7.51 [2.07] Re  
a = 0.1399 [0.0340] AU  
Ag = 39.30 [22.13] [1.73σ]  
Teff = 2862 [319] K [6.50σ]

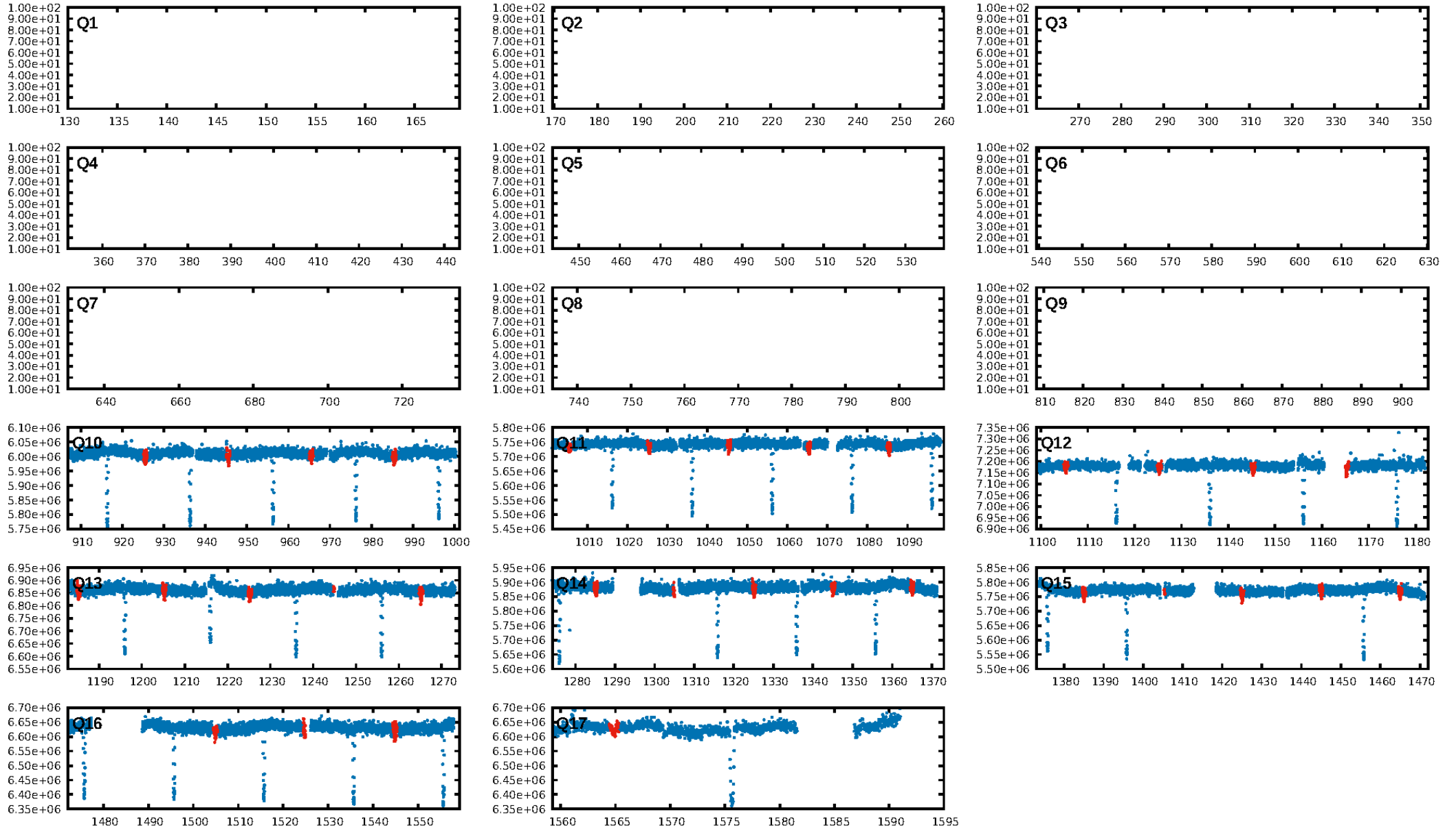
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: 68.0%  
ModelChiSquareGoF-sig: 100.0%  
Bootstrap-pfa: 1.02e-249  
RollingBand-fgt: 1.00 [29/29]  
GhostDiagnostic-chr: 3.147  
Centroid-sig: 0.0%  
Centroid-so: 3.001 arcsec [42.08σ]  
OotOffset-rm: 4.783 arcsec [10.30σ]  
KicOffset-rm: 0.360 arcsec [2.40σ]  
OotOffset-st: 0/0/0/2 [2]  
KicOffset-st: 2/2/2/2 [8]  
DiffImageQuality-fgm: 1.00 [8/8]  
DiffImageOverlap-fno: 1.00 [8/8]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 10:40:13 Z

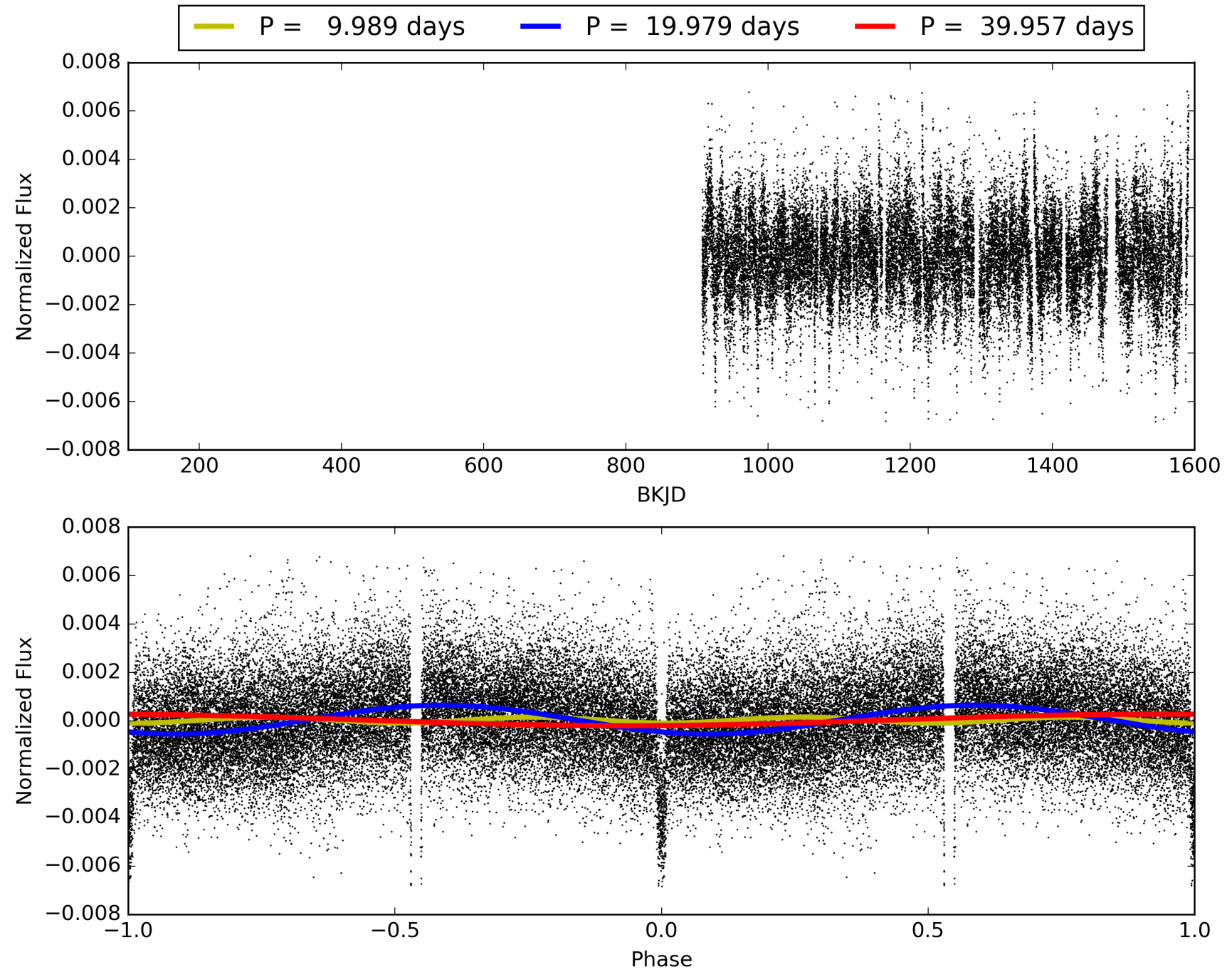
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 005130380-02, PDC Light Curves





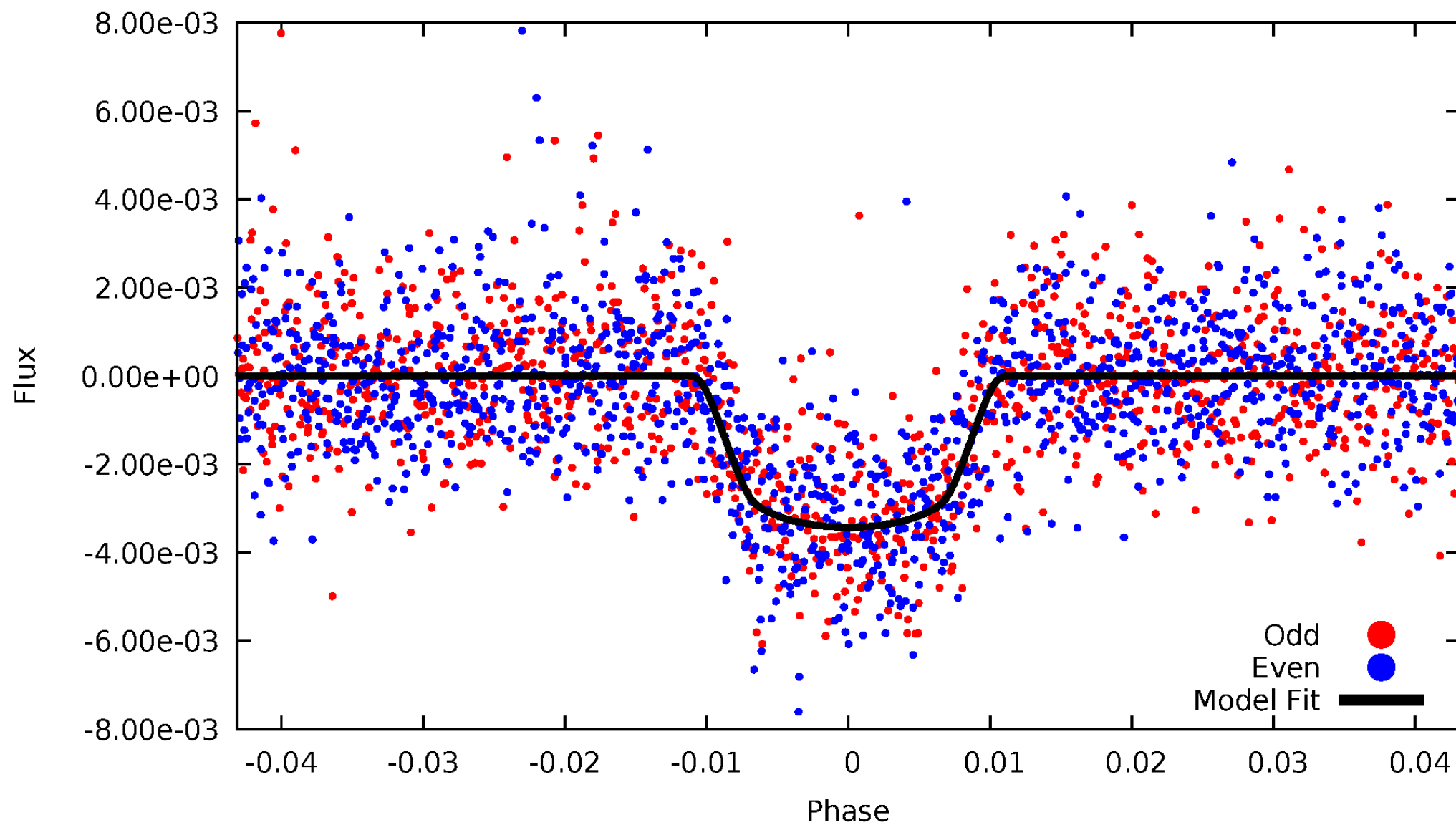
# TCE 005130380-02





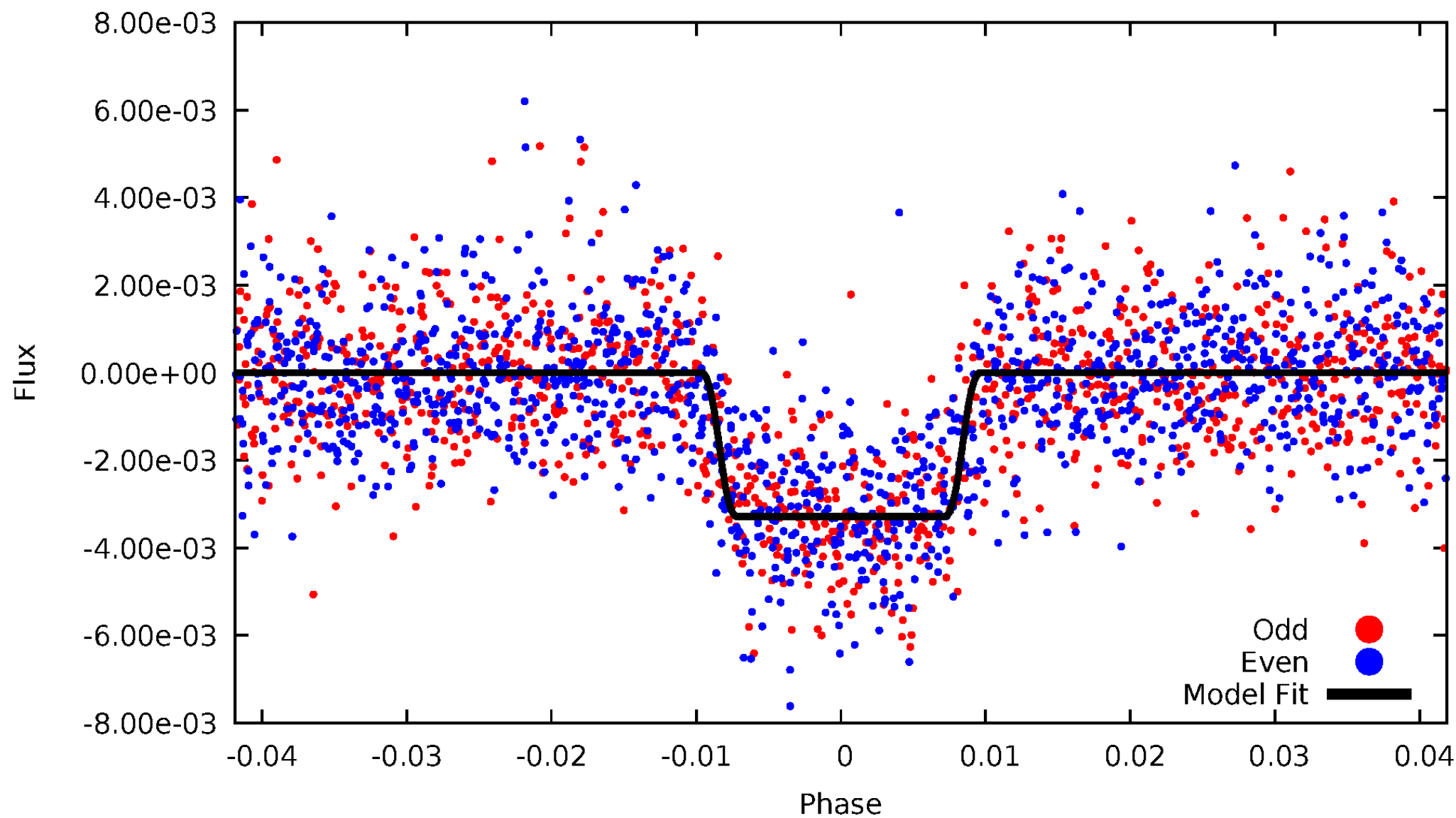
# DV Odd/Even

TCE 005130380-02



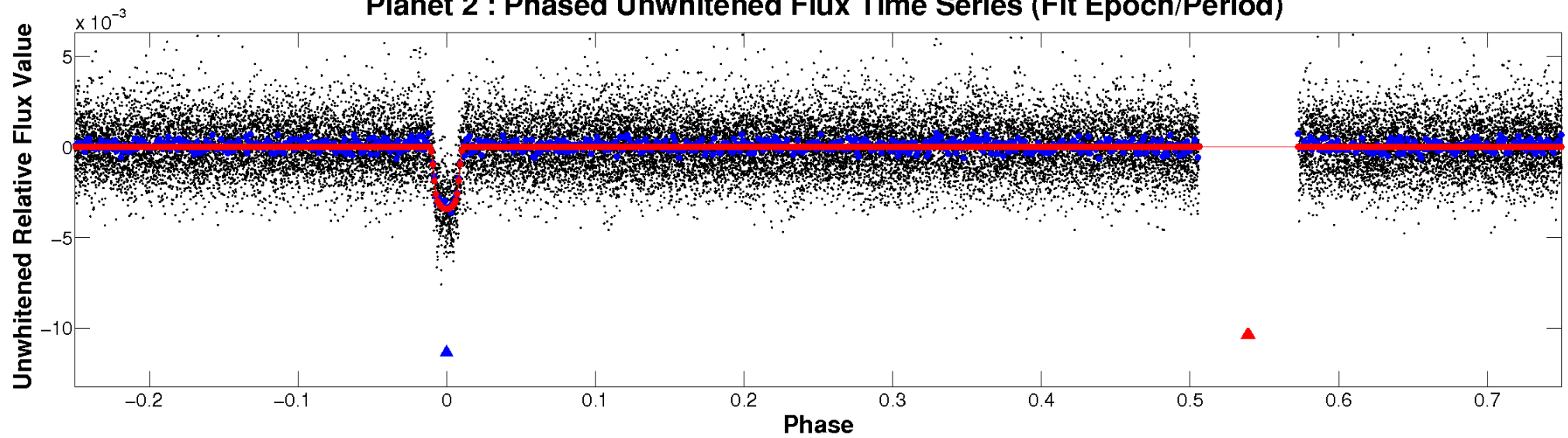
# ALT Odd/Even

TCE 005130380-02

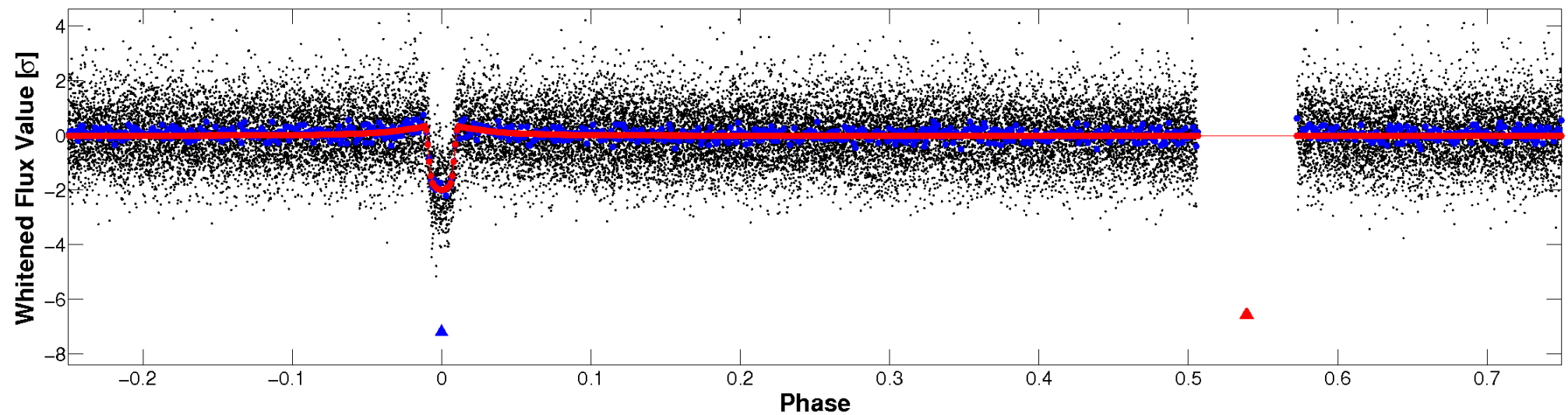


# Non-Whitened Vs. Whitened Light Curve

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

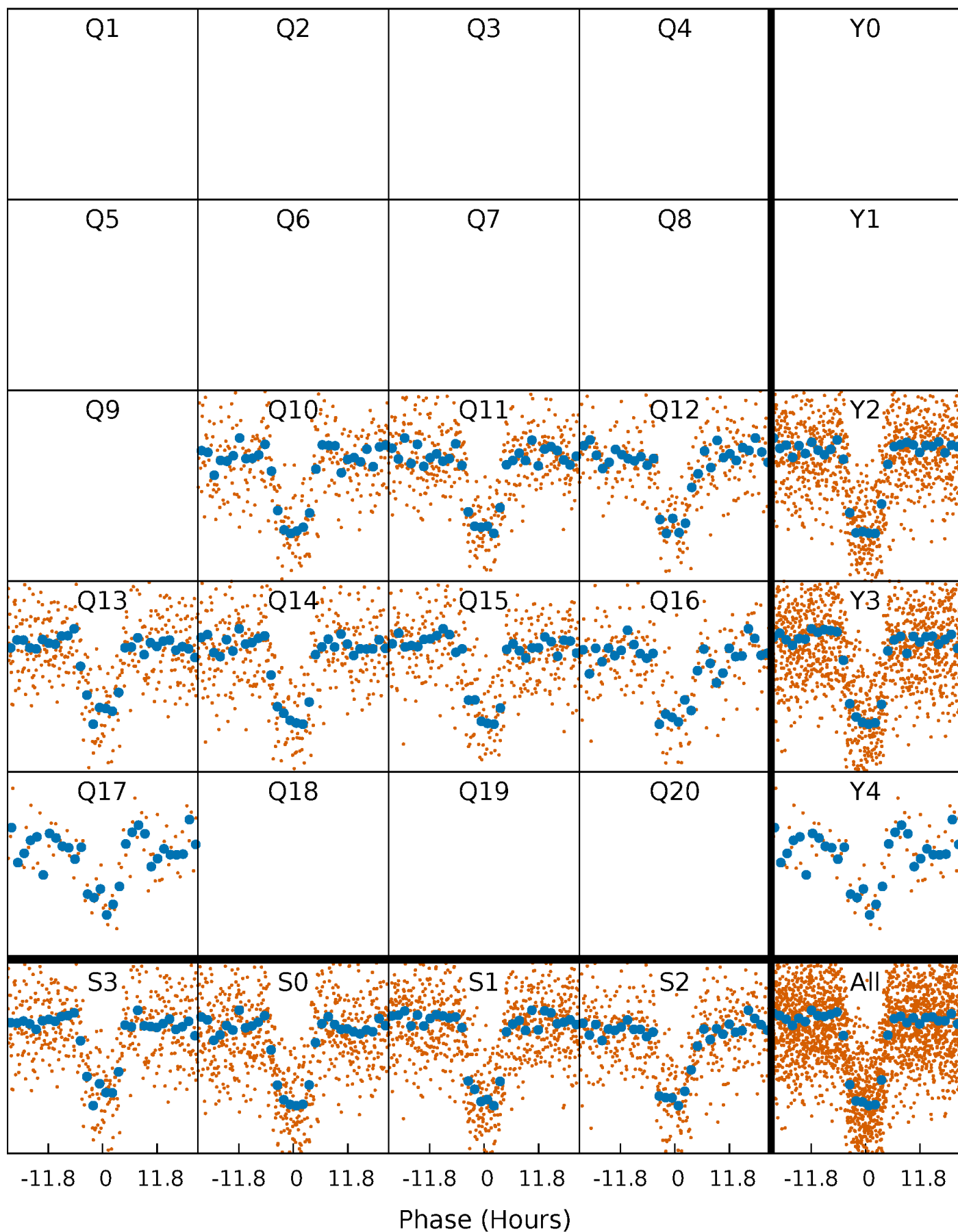


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



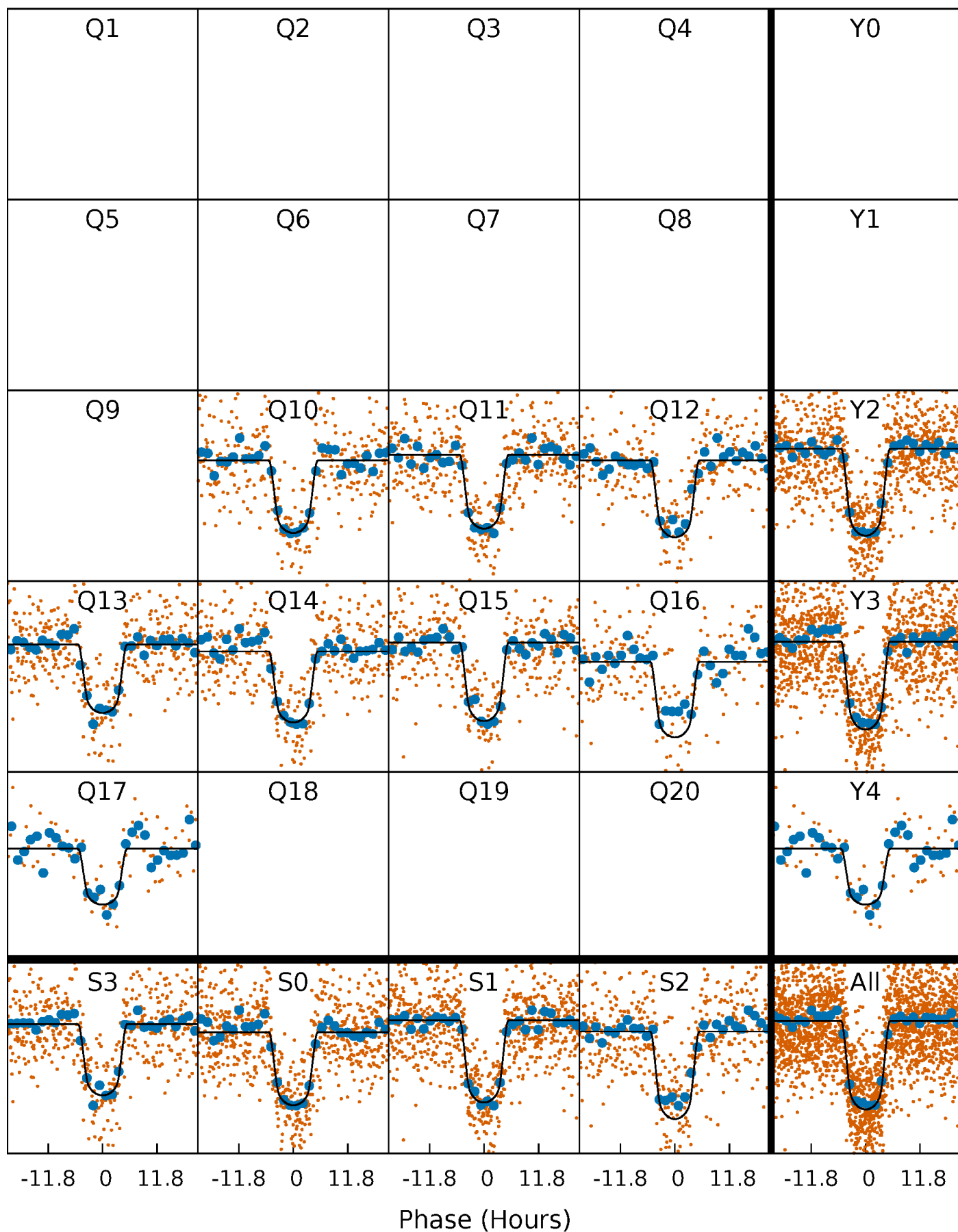
# PDC Quarter-Phased Transit Curves

TCE 005130380-02 P= 19.978743 Days  $T_0=146.368316$  (BKJD)



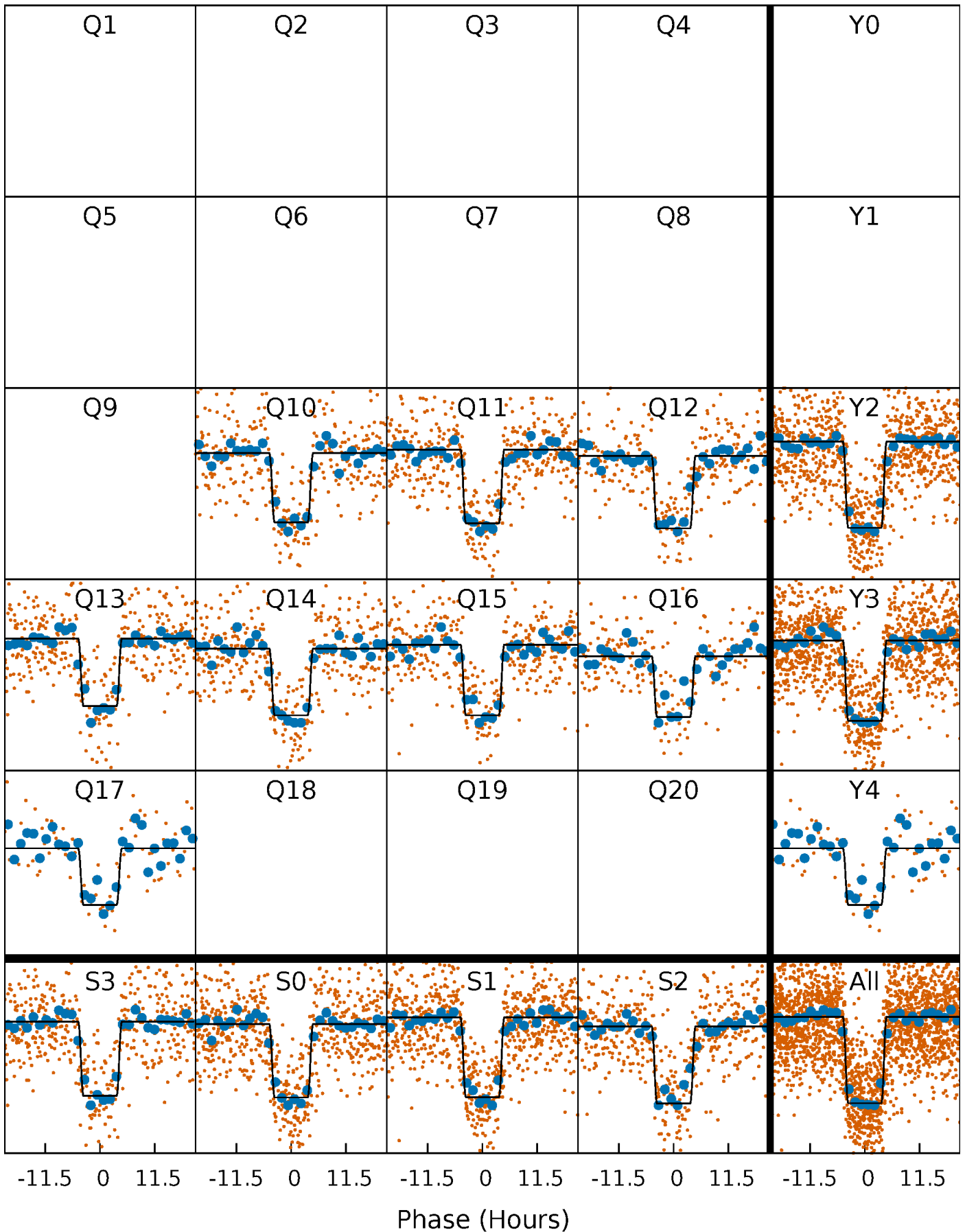
# DV Quarter-Phased Transit Curves

TCE 005130380-02 P= 19.978743 Days  $T_0=146.368316$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

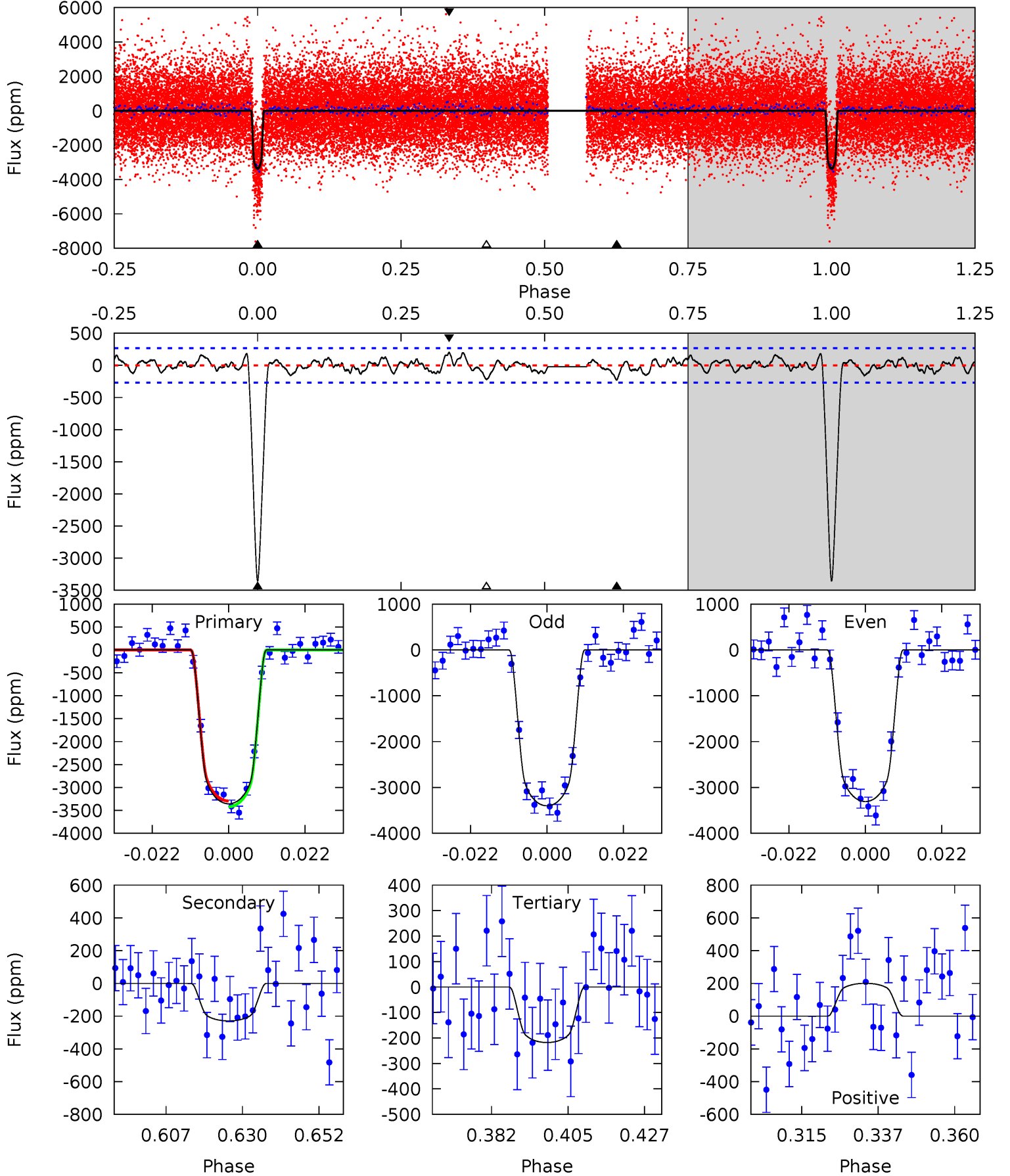
TCE 005130380-02 P= 19.978892 Days  $T_0=146.359497$  (BKJD)



# DV Model-Shift Uniqueness Test

005130380-02, P = 19.978743 Days, E = 146.368316 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
61.0	4.16	3.96	3.64	4.87	2.28	1.36	57.0	57.4	0.20	0.52	0.85	1.00	0.06	1.16

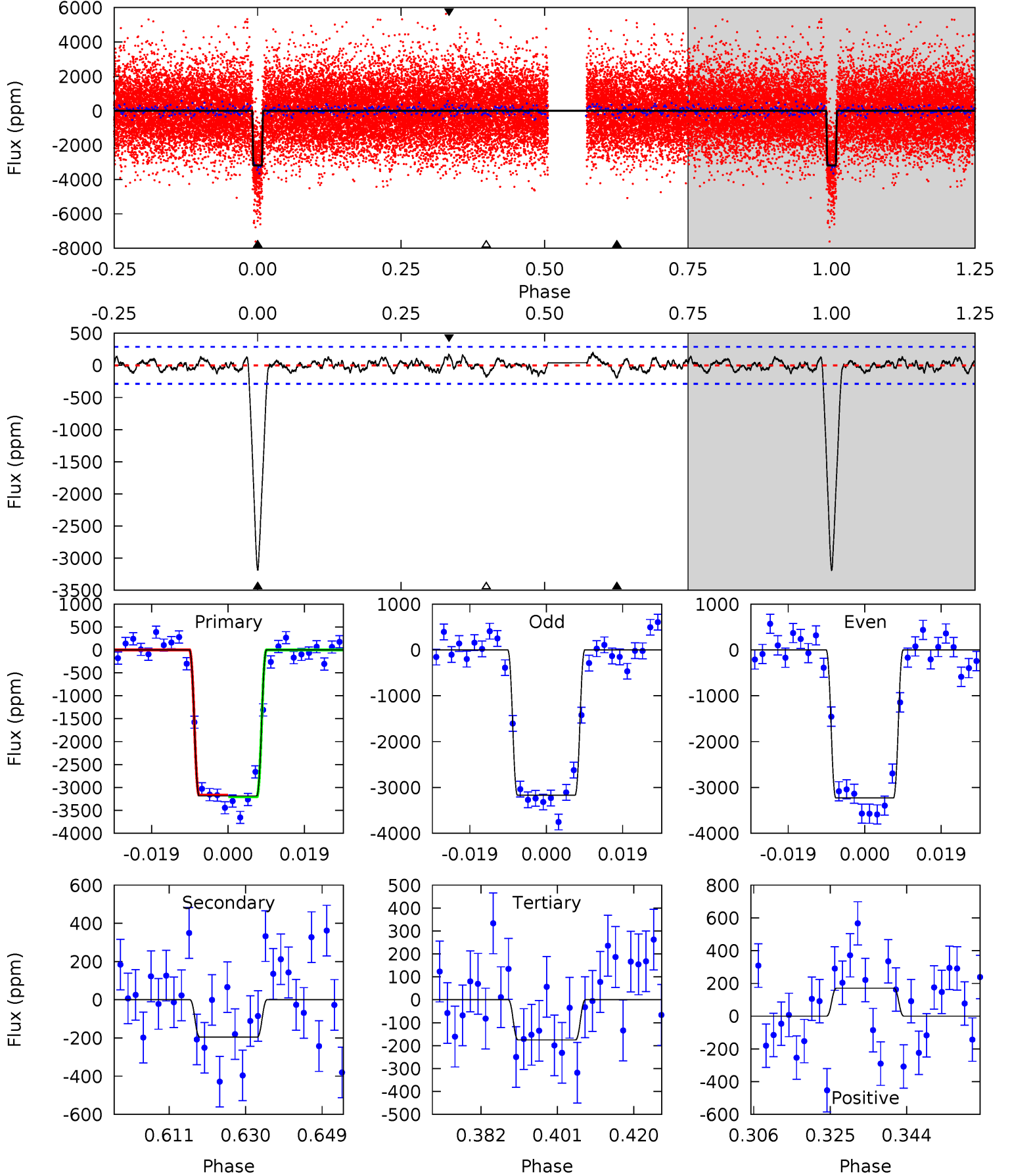




# Alt Model-Shift Uniqueness Test

005130380-02,  $P = 19.978892$  Days,  $E = 146.359497$  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
54.3	3.33	2.98	2.90	4.90	2.34	1.10	51.3	51.4	0.35	0.43	0.51	1.04	0.06	0.34





### Stellar Parameters For KIC 005130380

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5907^{+178}_{-196}$	$4.296^{+0.209}_{-0.190}$	$-0.260^{+0.300}_{-0.300}$	$1.126^{+0.309}_{-0.253}$	$0.915^{+0.142}_{-0.095}$	$0.902^{+0.892}_{-0.452}$
	+3%/-3%	+5%/-4%	+115%/-115%	+27%/-22%	+16%/-10%	+99%/-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 005130380-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-229 \pm 55$	$7.58^{+1.23}_{-1.06}$	$1033^{+85}_{-75}$	$3442^{+136}_{-168}$	$42^{+20}_{-12}$
Alt.	$-196 \pm 59$	$7.08^{+1.11}_{-0.95}$	$1036^{+74}_{-81}$	$3410^{+191}_{-209}$	$41^{+21}_{-16}$

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

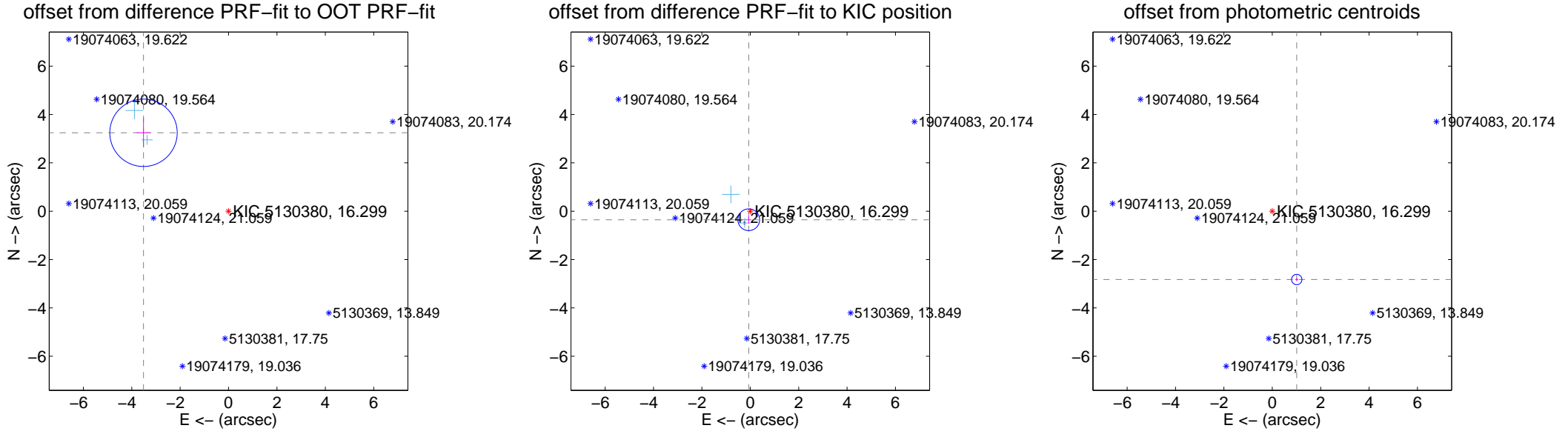
## DV Centroid Data

Supplemental centroid analysis for 005130380-02. Kepler magnitude: 16.30. Transit SNR 38.91

There are 8 quarters with good PRF difference image offsets

The OOT PRF centroid is offset from the target star catalog position by about 4.65 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	4.783 $\pm$ 0.464	10.30	3.516 $\pm$ 0.287	3.242 $\pm$ 0.610
PRF-fit source offset from KIC position	0.360 $\pm$ 0.150	2.40	0.065 $\pm$ 0.106	-0.354 $\pm$ 0.151
photometric centroid source offset	3.00 $\pm$ 0.07	42.08	-1.01 $\pm$ 0.06	-2.83 $\pm$ 0.07



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.

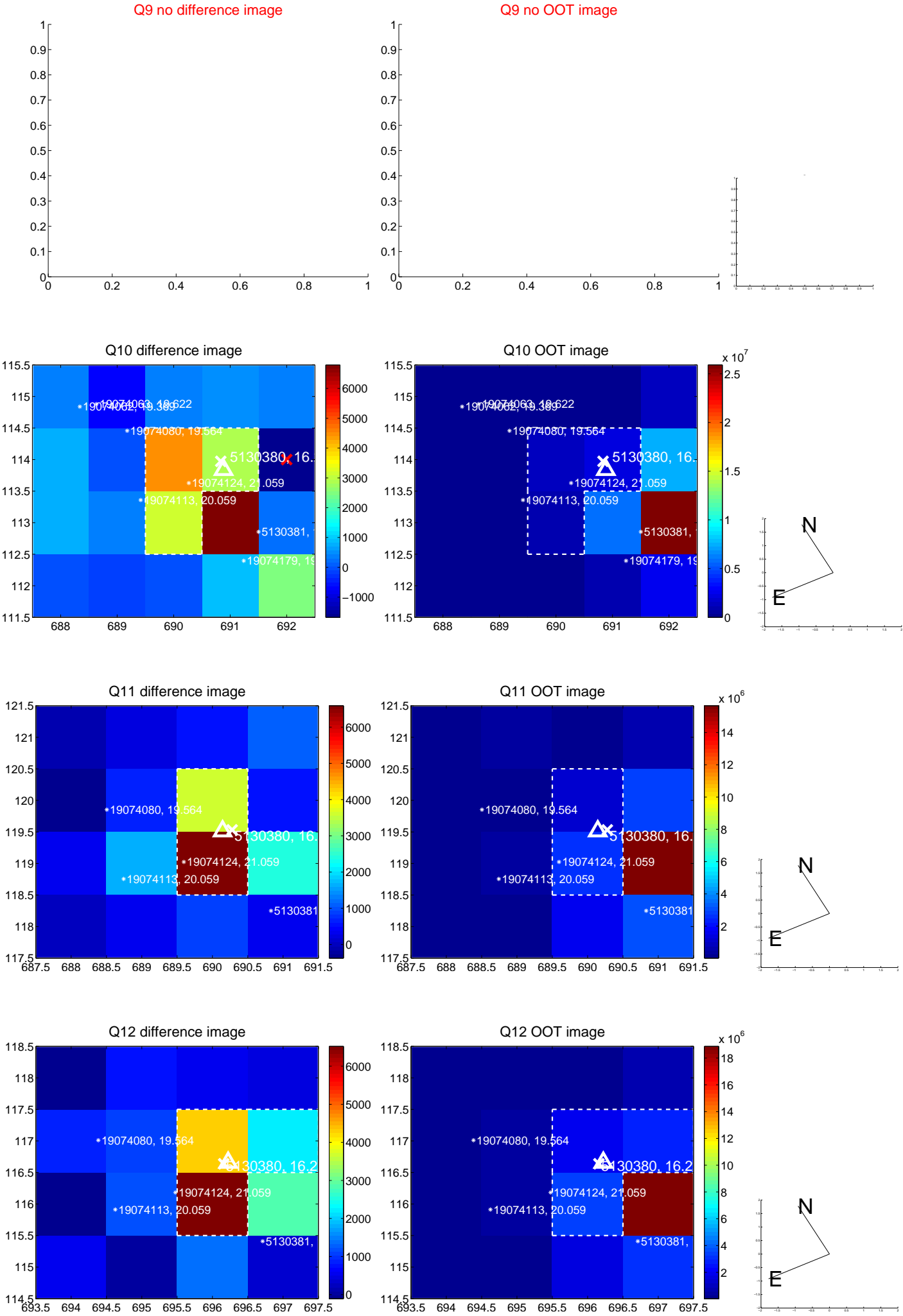
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



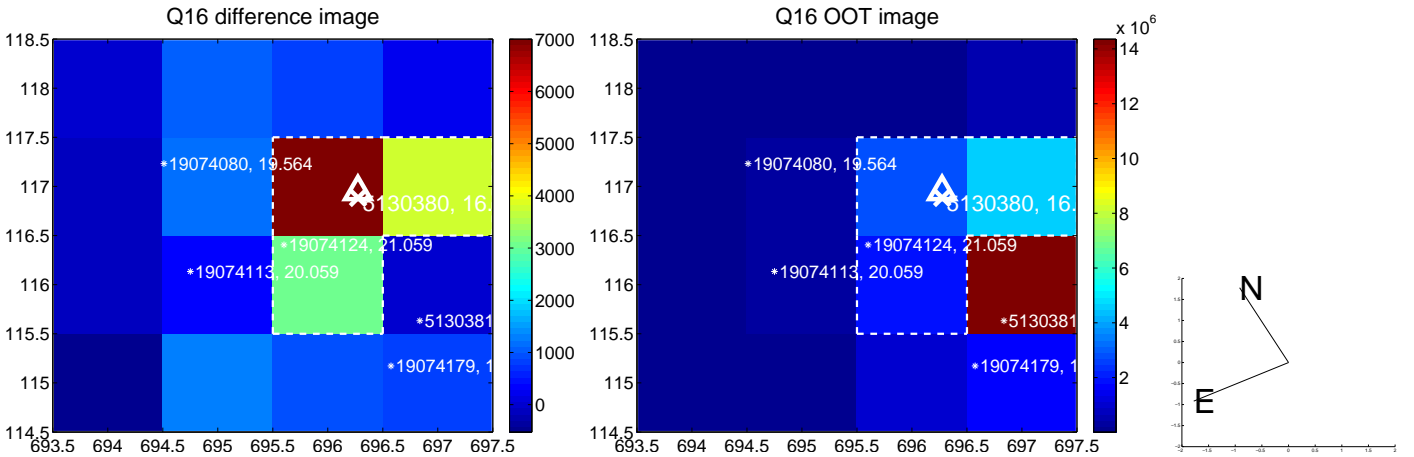
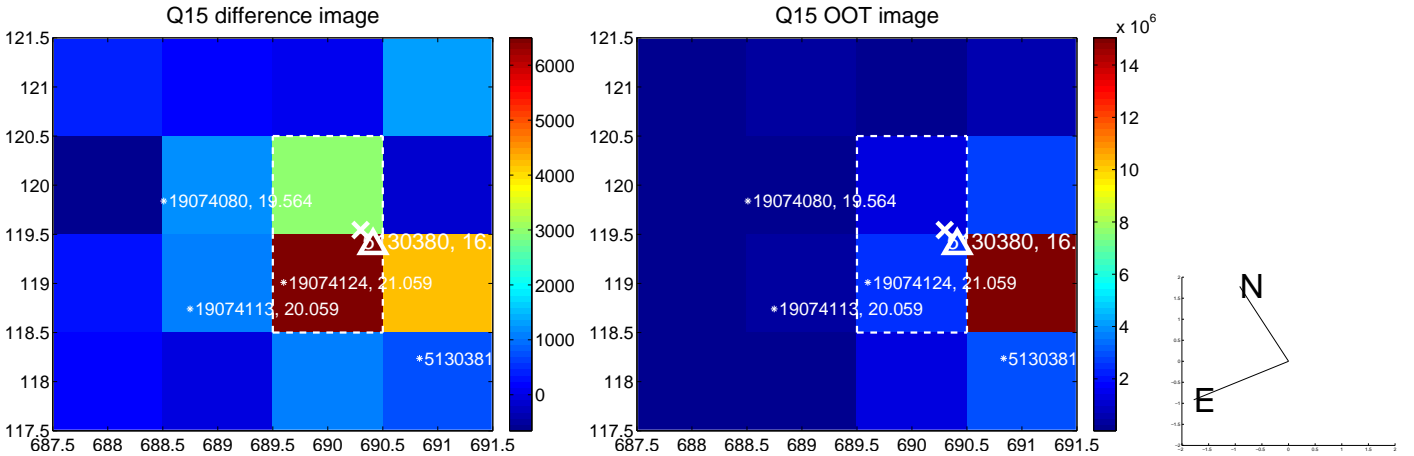
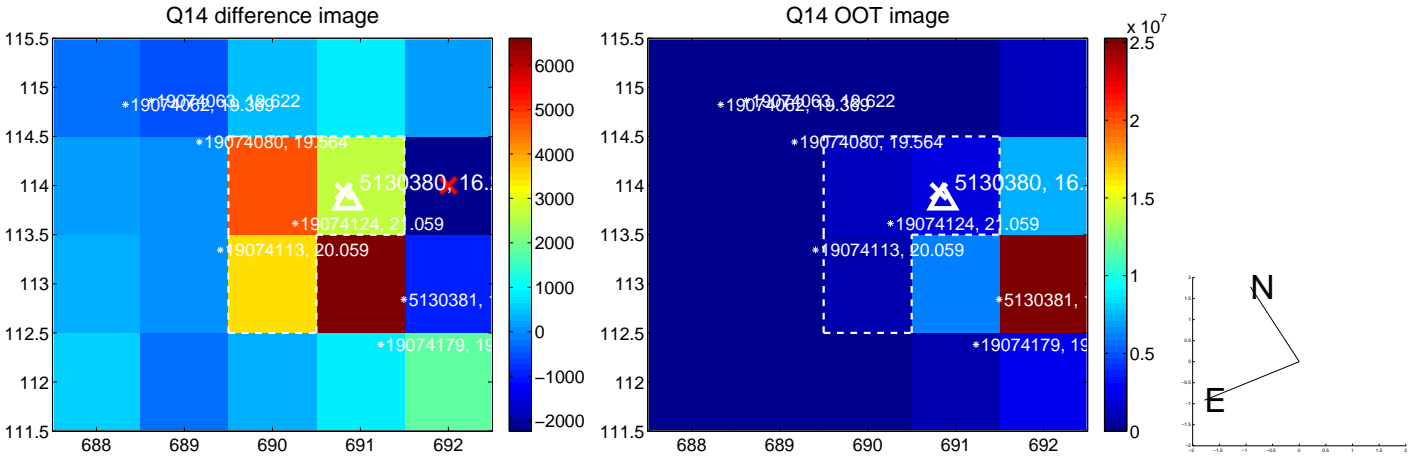
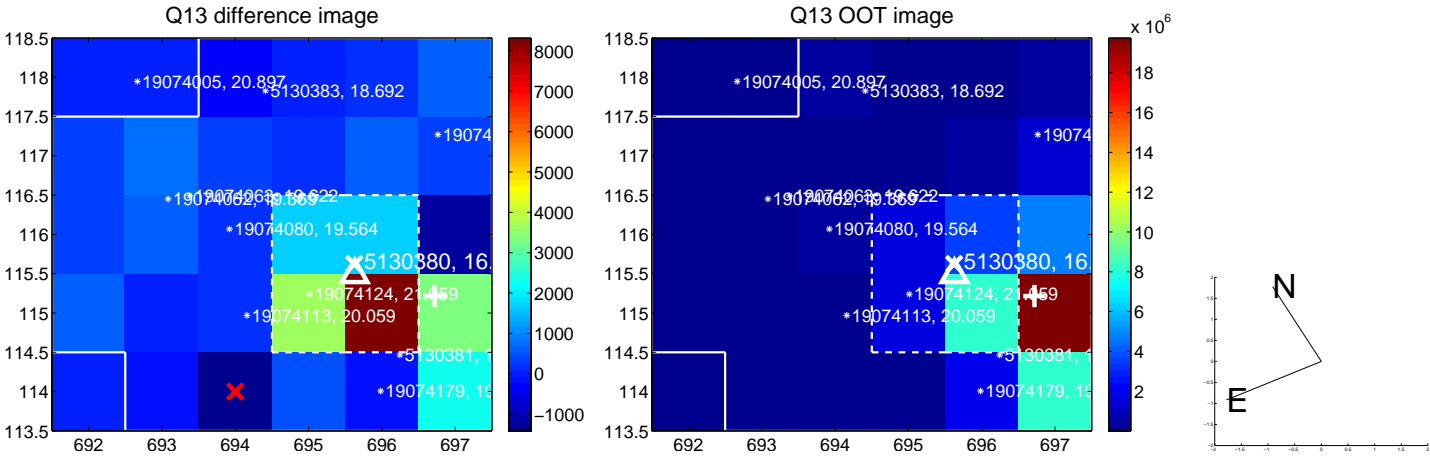
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



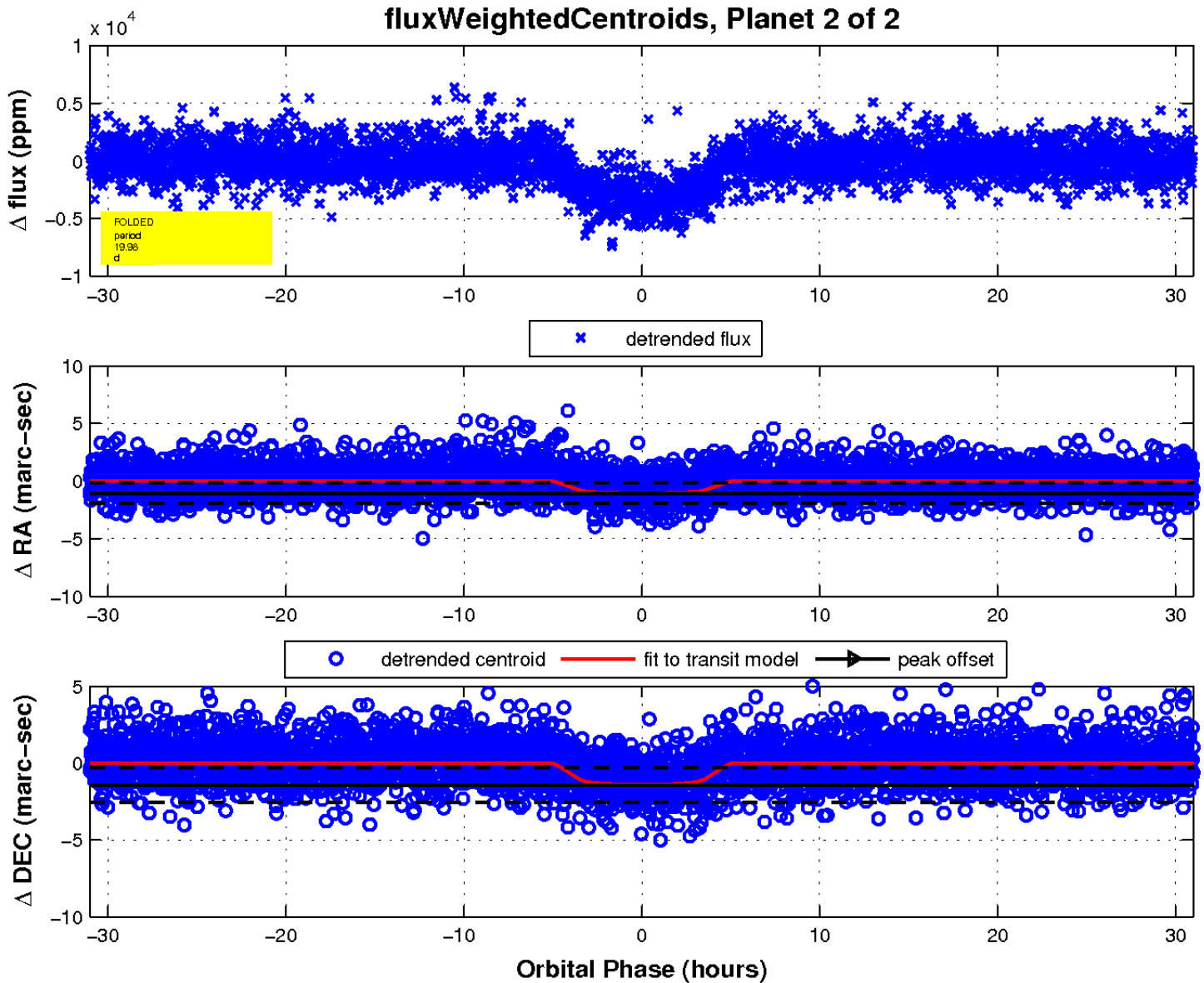
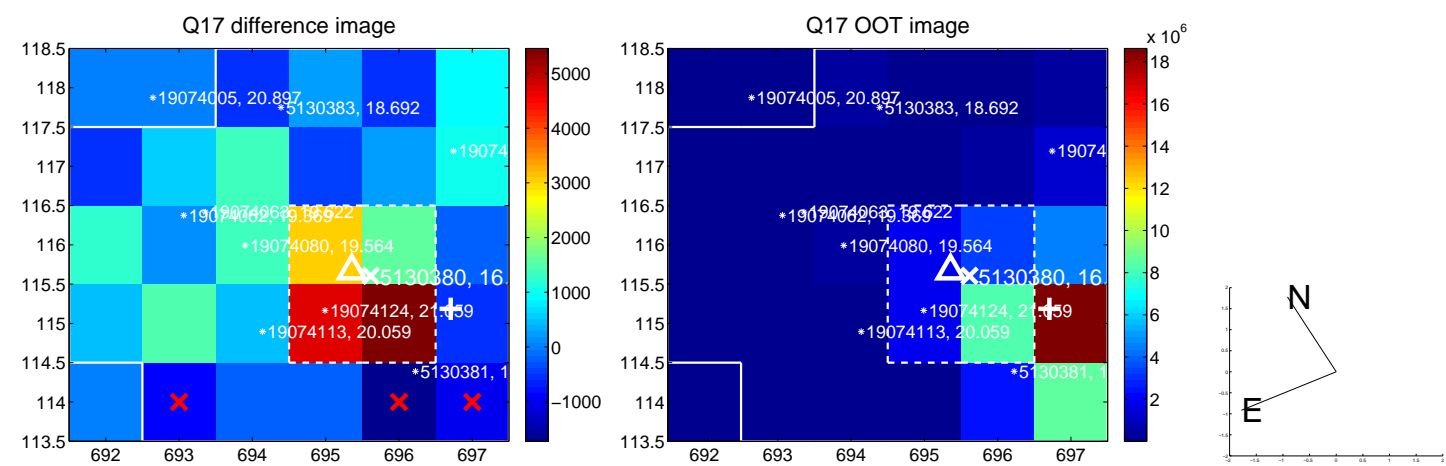
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

