

# KIC 005471010

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005471010-01	OBS	6583.01	12.425445	141.510383	205.8	21.185	12.3	14.3	0.81	5497	1.26	52.03
005471010-02	OBS	No	12.423191	134.144772	228.4	30.209	13.2	16.9	0.81	5497	1.68	52.05

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005471010-01	OBS	FP	0.00	1	0	1	1	LPP_DV—CENT_FEW_DIFFS—HALO_GHOST—EPHEM_MATCH
005471010-02	OBS	FP	0.00	1	0	1	1	LPP_DV—SAME_NTL_PERIOD—CENT_FEW_DIFFS—HALO_GHOST—EPHEM_MATCH

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

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

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

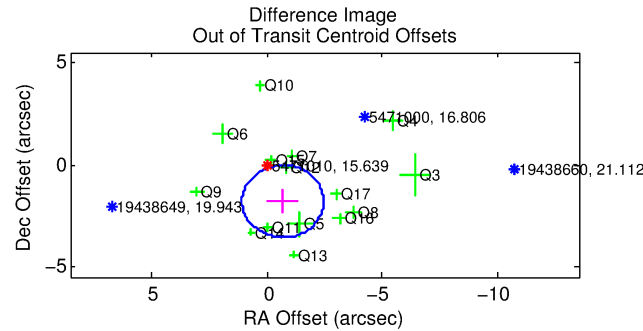
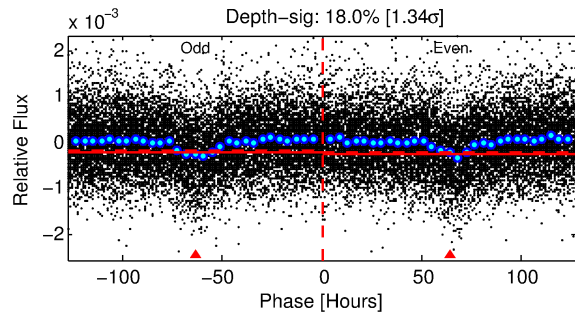
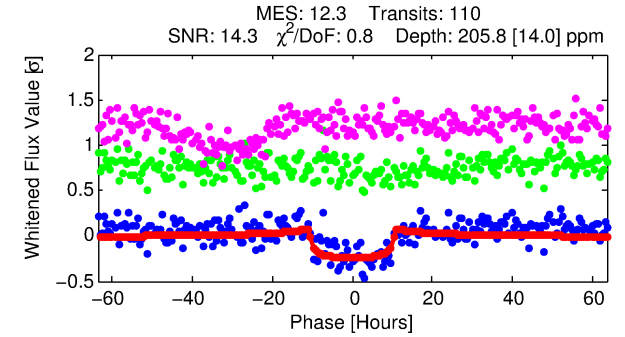
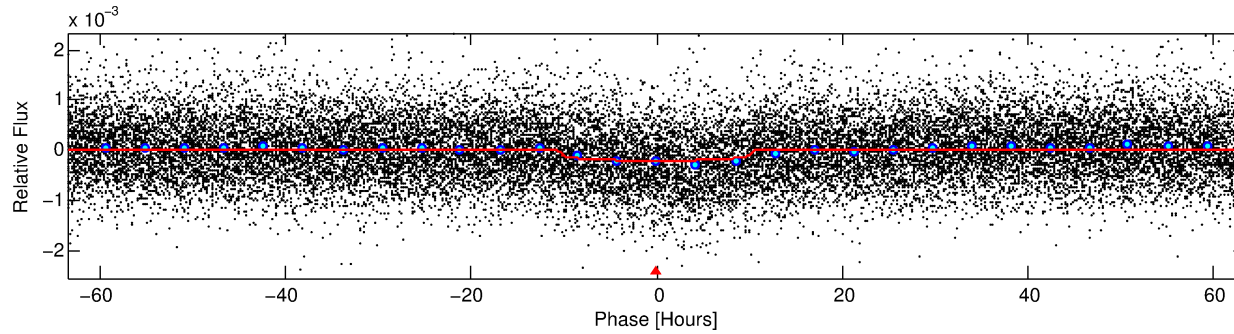
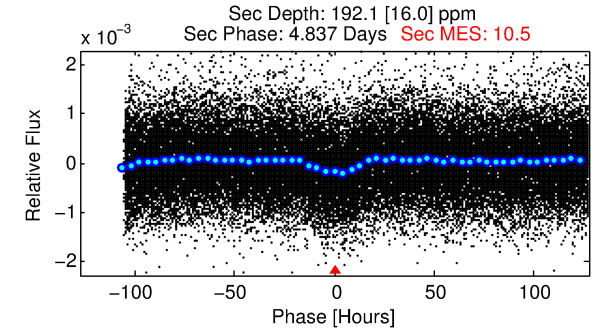
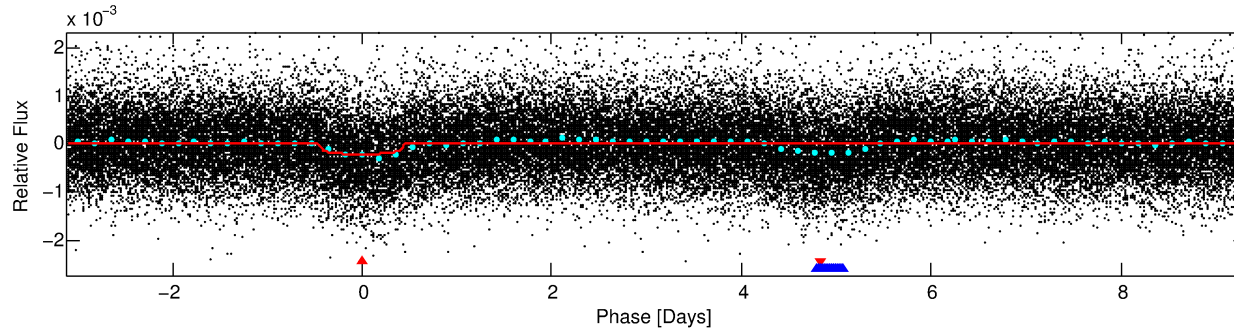
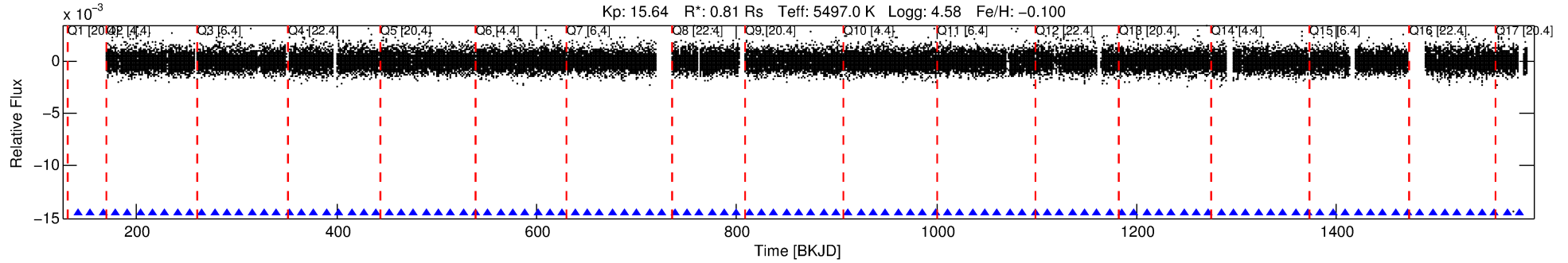
## Ephemeris Match Information For 005471010-01

TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ( $''$ )	$\Delta$ Row	$\Delta$ Col	$m_2$	$m_1$	$D_2/D_1$	Mechanism	Flag	$\sigma_P$	$\sigma_T$
005471010-01	5471010	V380-Cyg-pri	5385723	1:1	301.9	48	-58	5.77	15.64	703.56	Direct-PRF	0	0.79	0.92

**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: 5471010 Candidate: 1 of 2 Period: 12.425 d  
KOI: K06583.01 Corr: 0.889



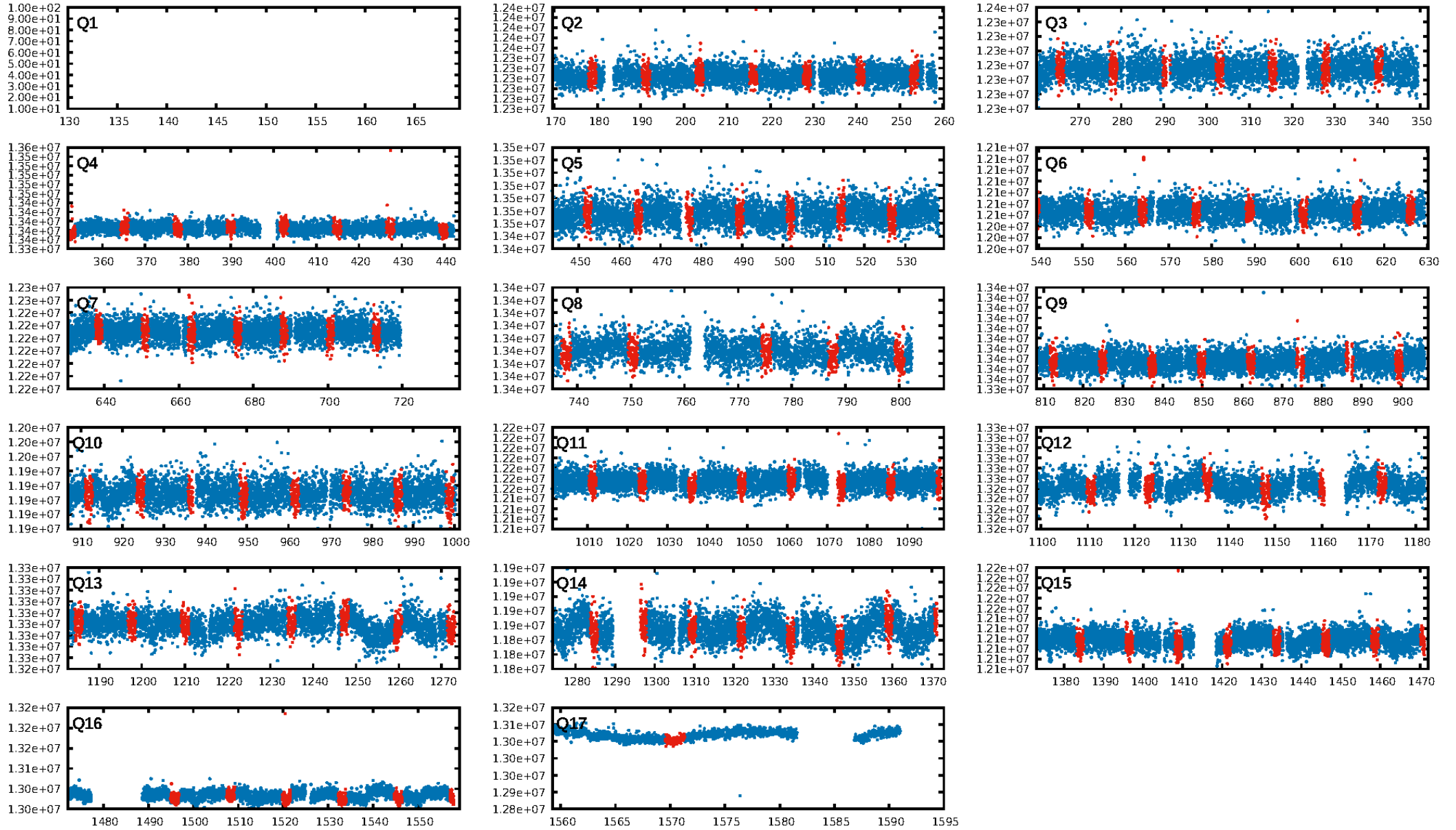
## DV Fit Results:

Period = 12.42544 [0.00026] d  
Epoch = 141.5104 [0.0172] BKJD  
Rp/R\* = 0.0142 [0.0026]  
a/R\* = 3.22 [2.23]  
b = 0.74 [0.47]  
Seff = 52.03 [15.39]  
Teq = 685 [51] K  
Rp = 1.26 [0.36] Re  
a = 0.1014 [0.0185] AU  
Ag = 689.30 [320.04] [2.15σ]  
Teffp = 5425 [547] K [8.64σ]

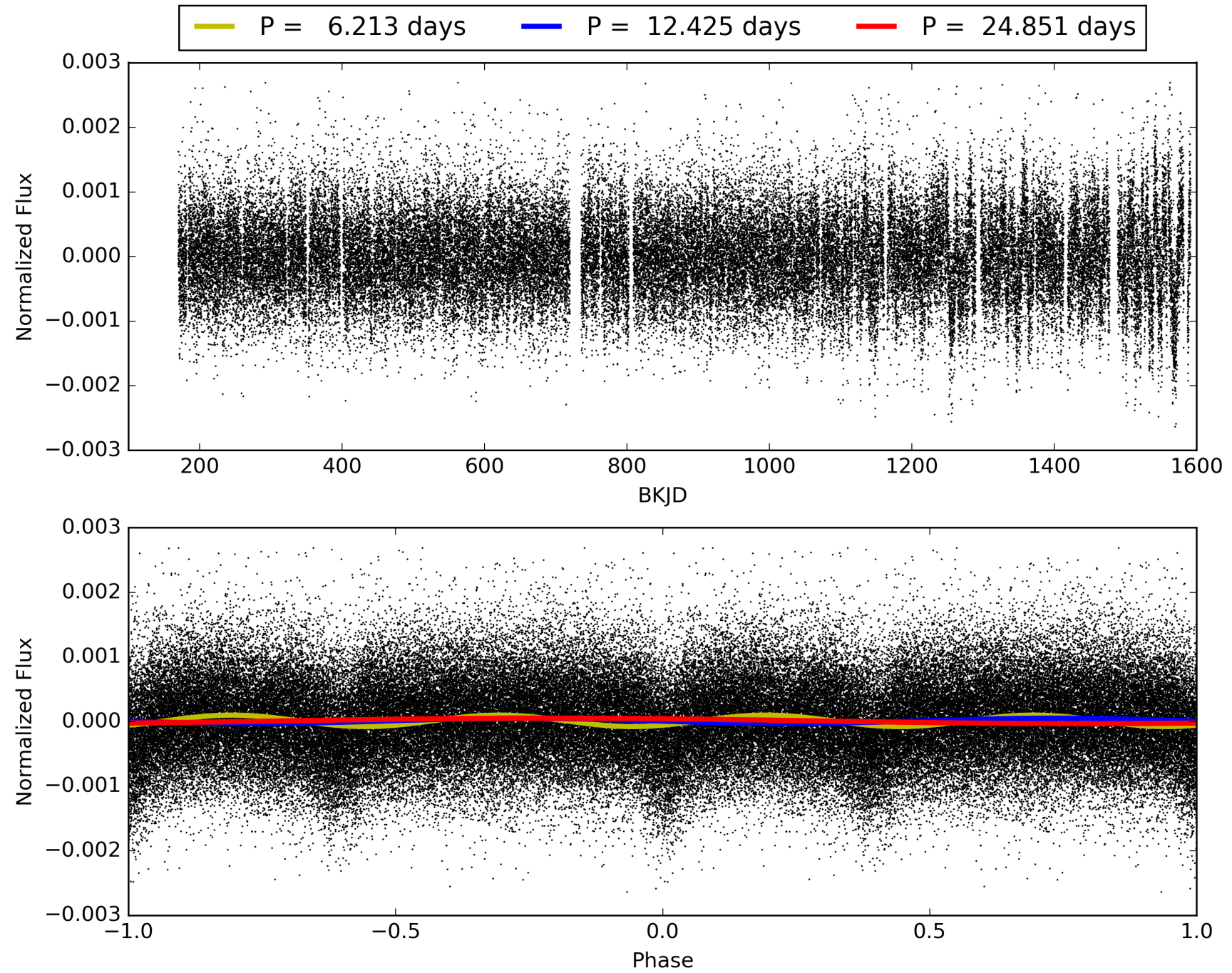
## DV Diagnostic Results:

ShortPeriod-sig: 0.1% [0.00σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 3.2%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 1.04e-39  
RollingBand-fgt: 1.00 [109/109]  
GhostDiagnostic-chr: 0.1285  
Centroid-sig: 0.0%  
Centroid-so: 2.009 arcsec [3.14σ]  
OotOffset-rm: 1.926 arcsec [3.27σ]  
KicOffset-rm: 1.973 arcsec [3.40σ]  
OotOffset-st: 3/4/4/4 [15]  
KicOffset-st: 3/4/4/4 [15]  
DiffImageQuality-fgm: 0.40 [6/15]  
DiffImageOverlap-fno: 1.00 [16/16]

# TCE 005471010-01, PDC Light Curves

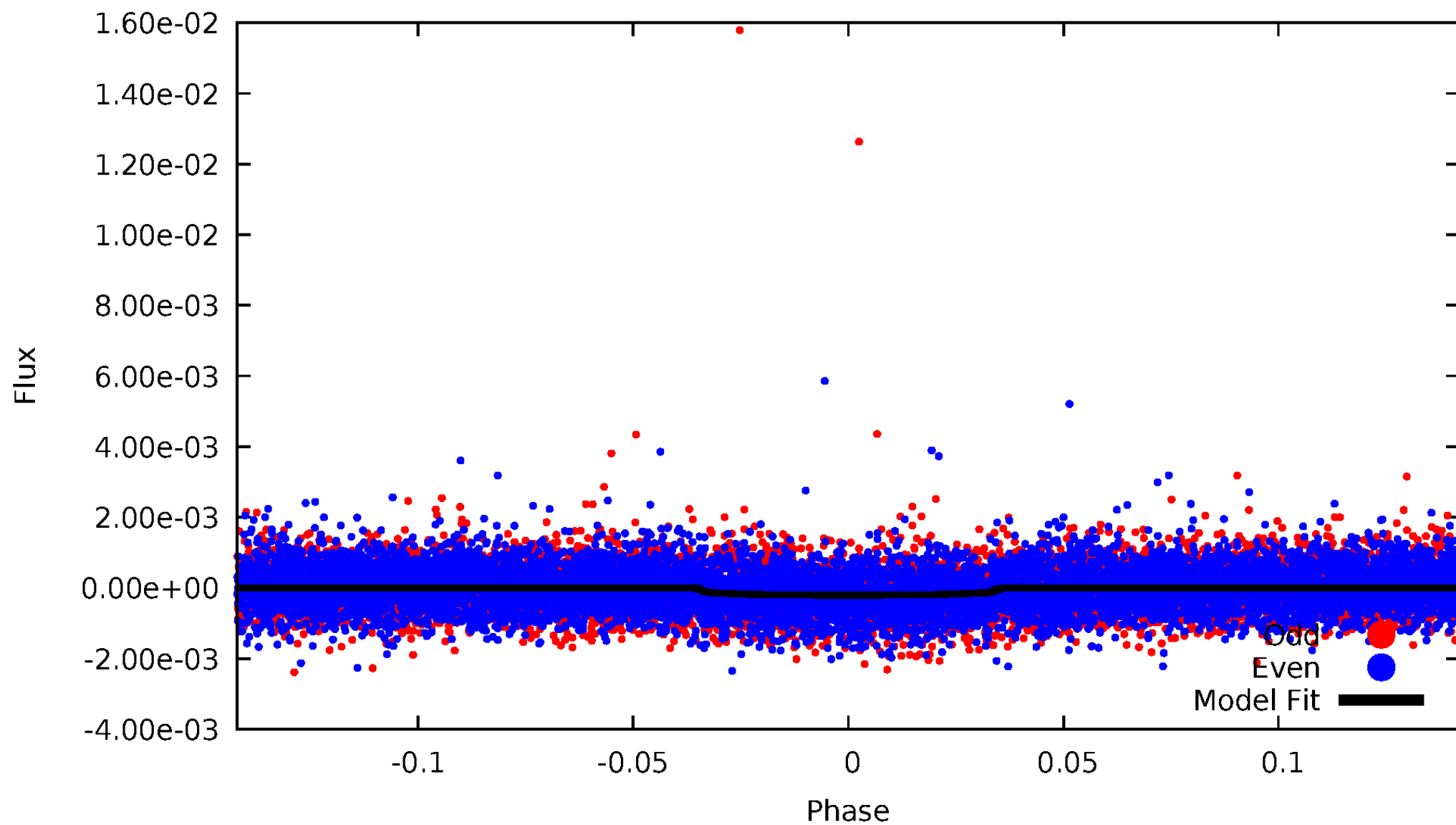


TCE 005471010-01



# DV Odd/Even

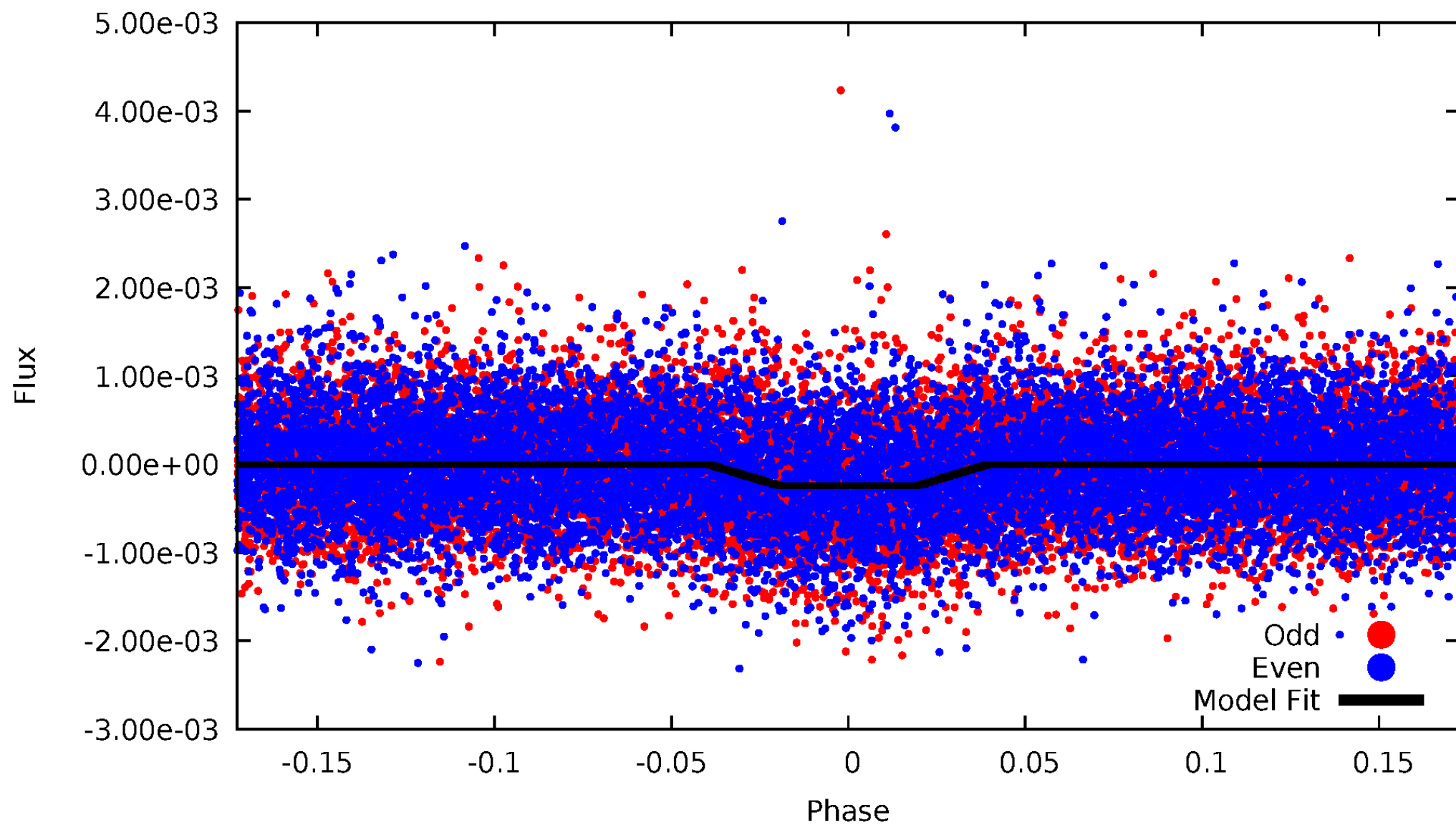
TCE 005471010-01





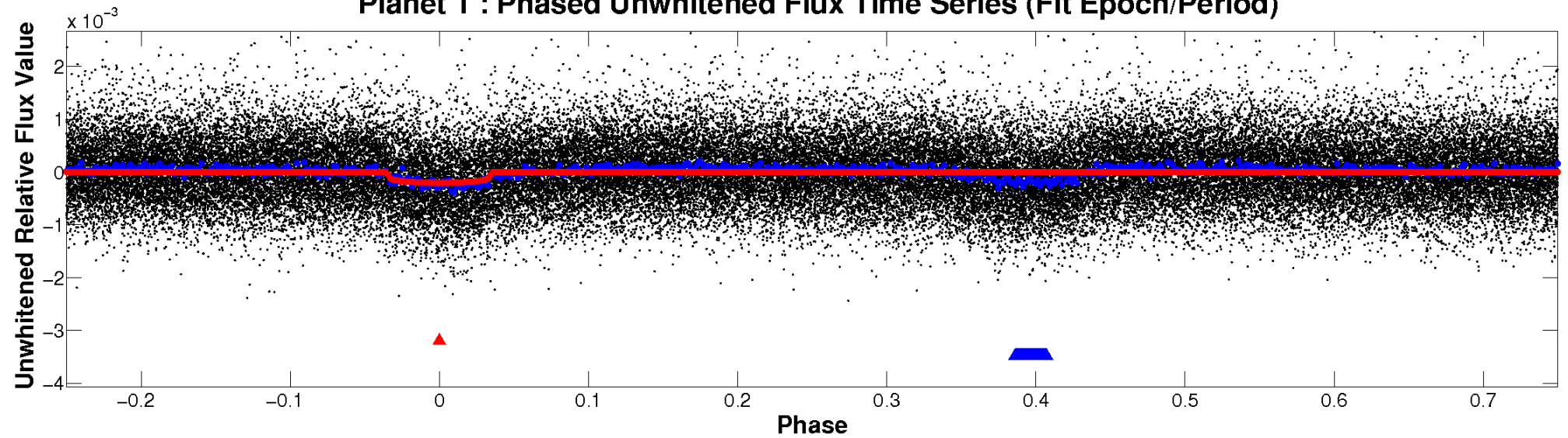
# ALT Odd/Even

TCE 005471010-01

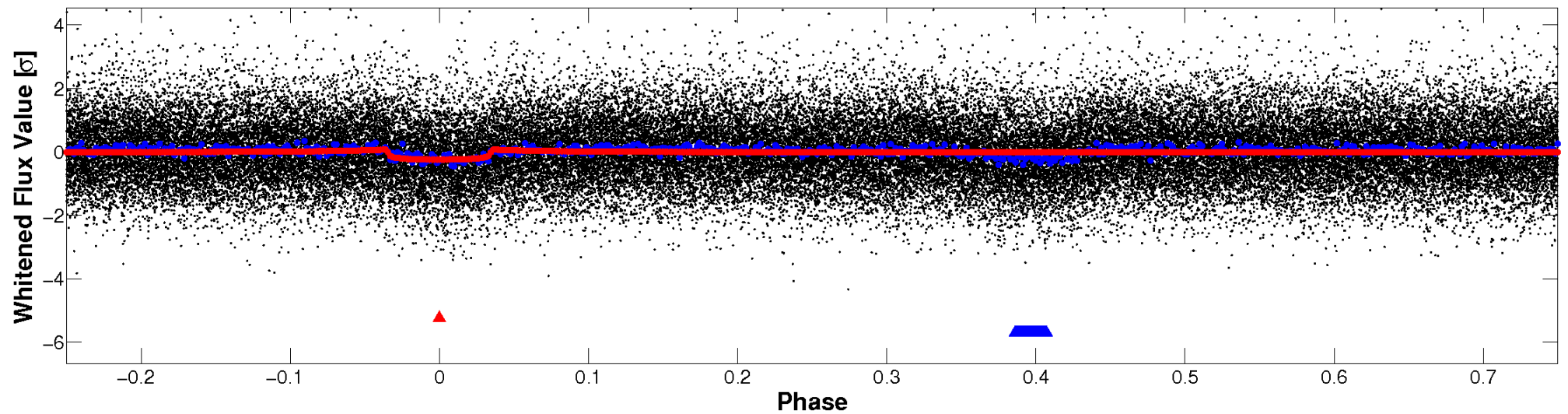


# Non-Whitened Vs. Whitened Light Curve

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

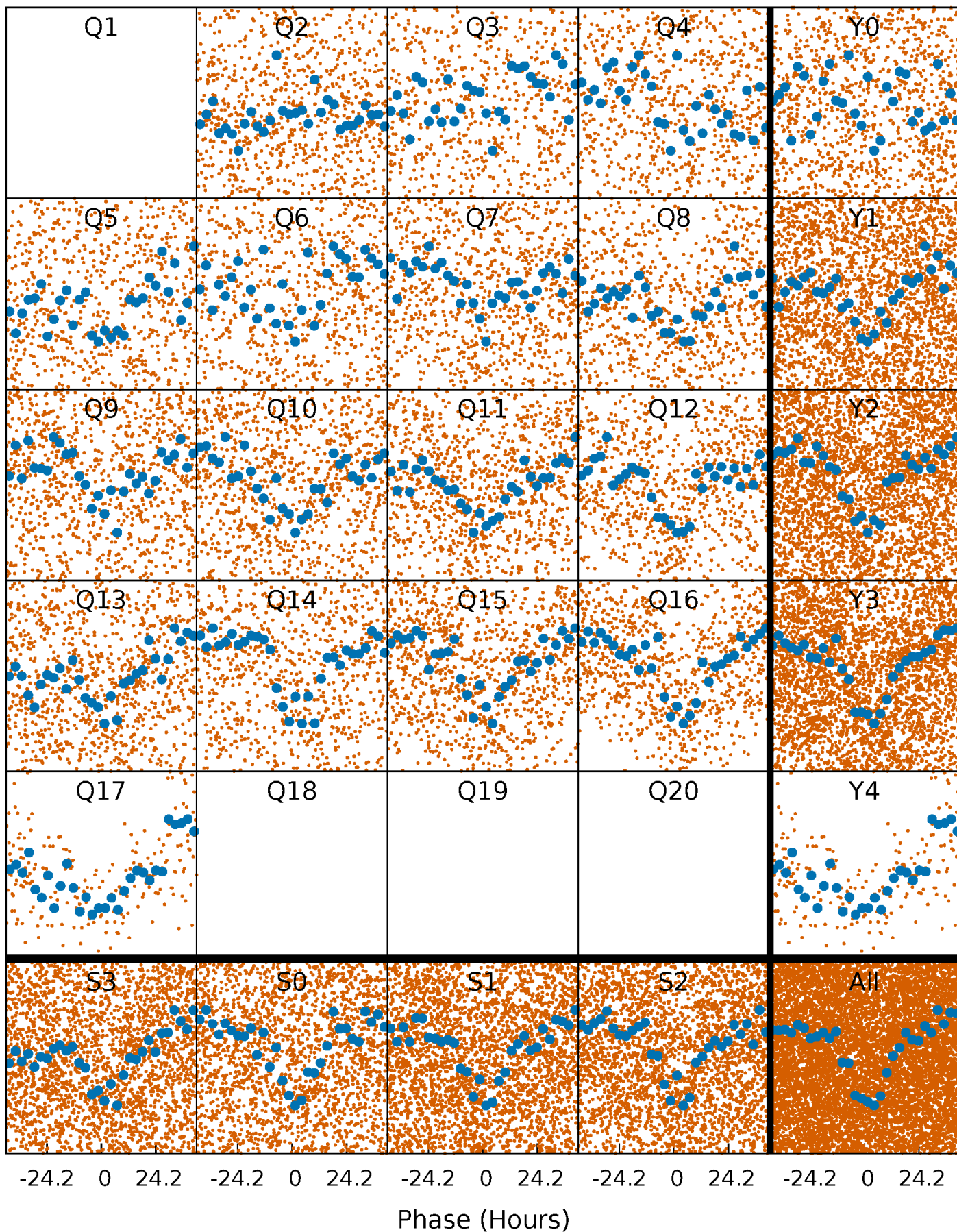


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

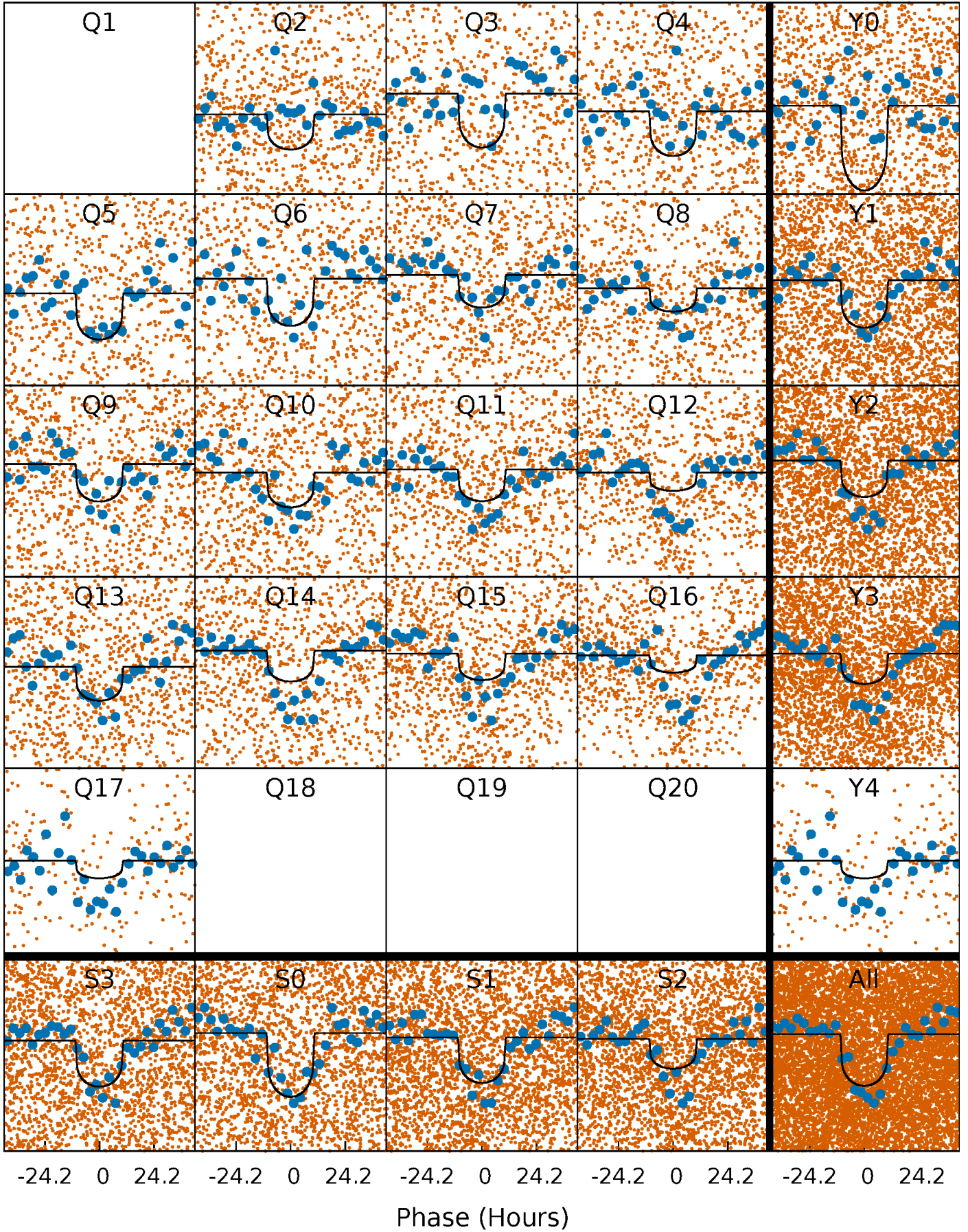
TCE 005471010-01 P= 12.425445 Days  $T_0=141.510383$  (BKJD)





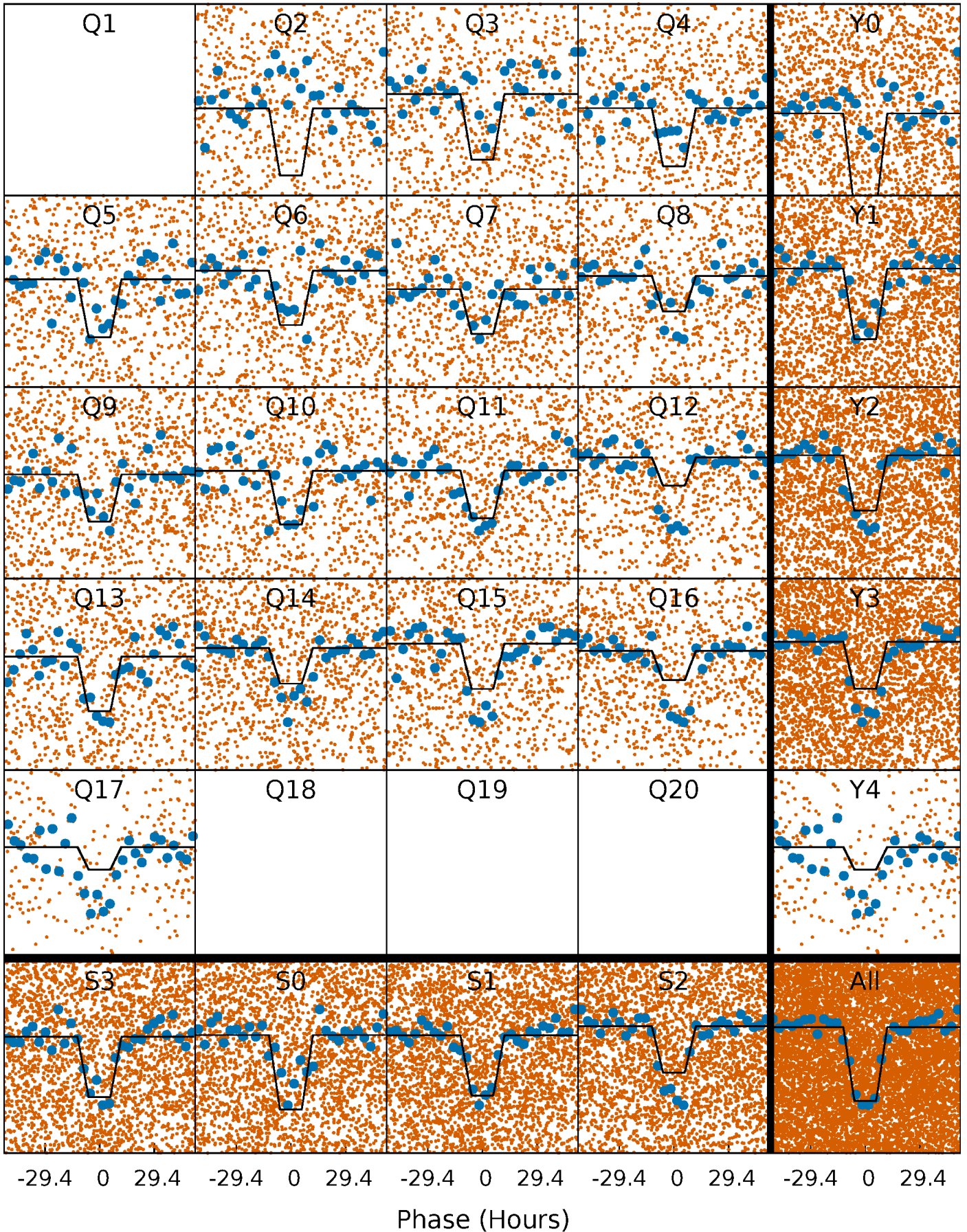
# DV Quarter-Phased Transit Curves

TCE 005471010-01 P= 12.425445 Days  $T_0=141.510383$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 005471010-01 P= 12.424613 Days  $T_0=141.634237$  (BKJD)

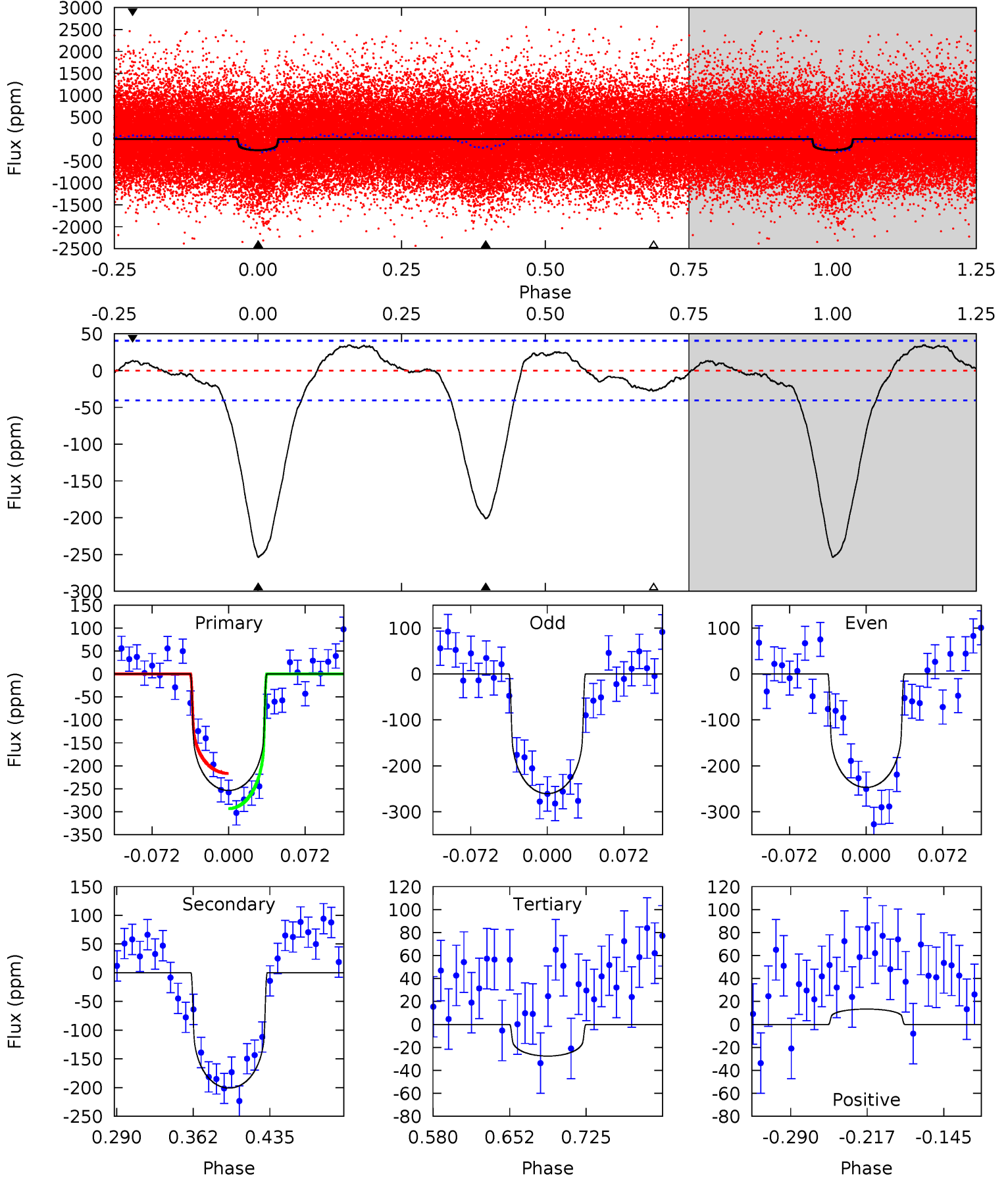




# DV Model-Shift Uniqueness Test

005471010-01,  $P = 12.425445$  Days,  $E = 141.510383$  Days

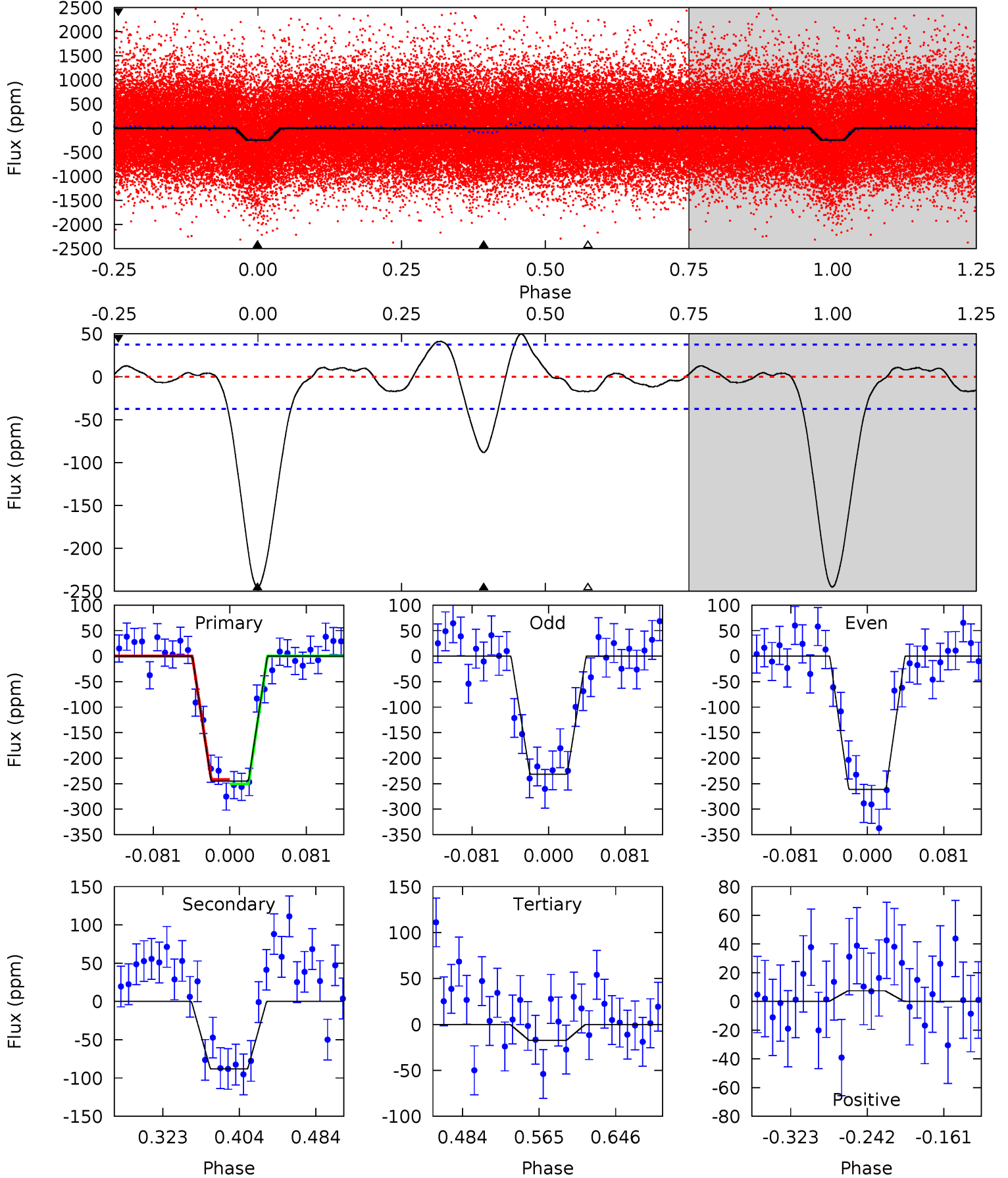
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
28.9	22.9	3.14	1.52	4.63	1.80	1.99	25.8	27.4	19.8	21.4	0.78	0.97	0.12	4.35



# Alt Model-Shift Uniqueness Test

005471010-01, P = 12.424613 Days, E = 141.634237 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
30.1	10.8	2.14	0.91	4.61	1.75	1.41	28.0	29.2	8.71	9.93	1.83	1.20	0.17	0.52





### Stellar Parameters For KIC 005471010

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5497^{+164}_{-180}$	$4.577^{+0.034}_{-0.145}$	$-0.100^{+0.300}_{-0.300}$	$0.809^{+0.175}_{-0.075}$	$0.907^{+0.073}_{-0.110}$	$2.412^{+0.449}_{-0.962}$
	+3%/-3%	+1%/-3%	+300%/-300%	+22%/-9%	+8%/-12%	+19%/-40%
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 005471010-01 / KOI 6583.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-201 \pm 9$	$1.31^{+0.26}_{-0.26}$	$973^{+50}_{-39}$	$5475^{+611}_{-417}$	$654^{+357}_{-186}$
Alt.	$-88 \pm 8$	$1.42^{+0.29}_{-0.25}$	$976^{+56}_{-43}$	$4449^{+377}_{-299}$	$243^{+119}_{-76}$

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

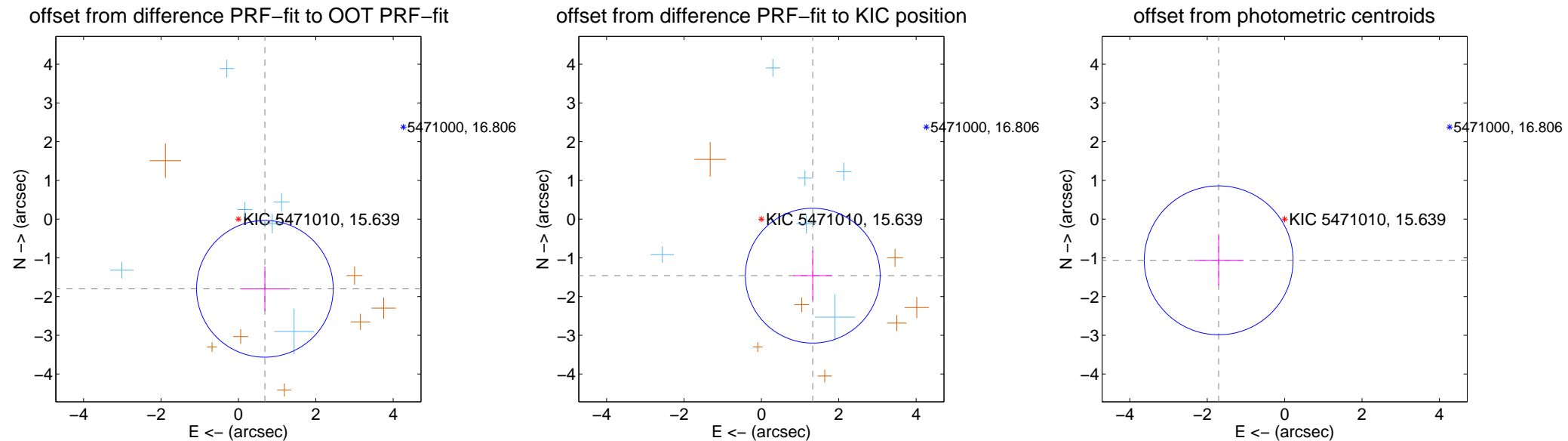
## DV Centroid Data

Supplemental centroid analysis for 005471010-01. Kepler magnitude: 15.64. Transit SNR 14.34

There are 6 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.64 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.926 \pm 0.588$	<b>3.27</b>	$-0.685 \pm 0.638$	$-1.800 \pm 0.574$
PRF-fit source offset from KIC position	$1.973 \pm 0.580$	<b>3.40</b>	$-1.327 \pm 0.501$	$-1.460 \pm 0.638$
photometric centroid source offset	$2.01 \pm 0.64$	<b>3.14</b>	$1.70 \pm 0.64$	$-1.06 \pm 0.65$



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.

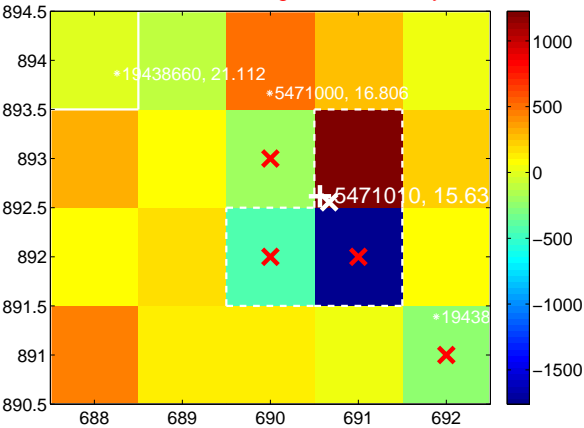
Q1 no difference image



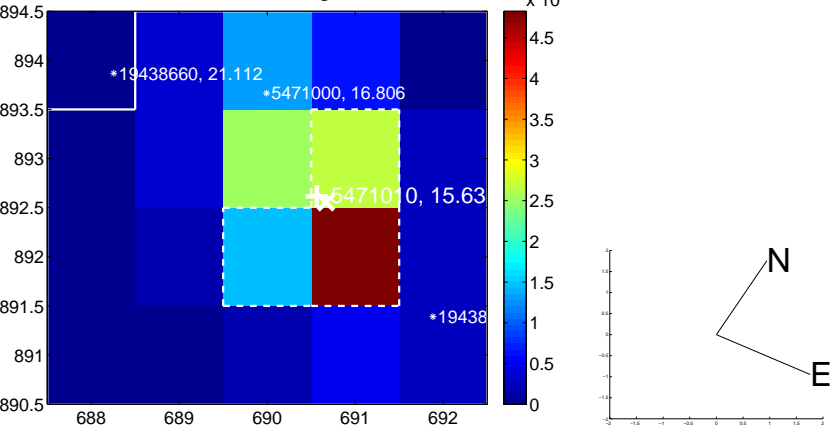
Q1 no OOT image



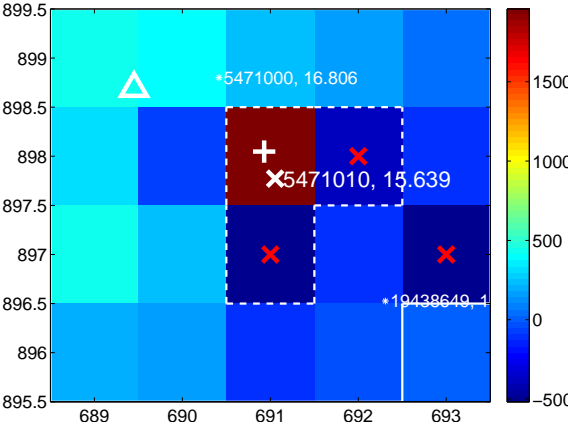
Q2 difference image. Poor Quality



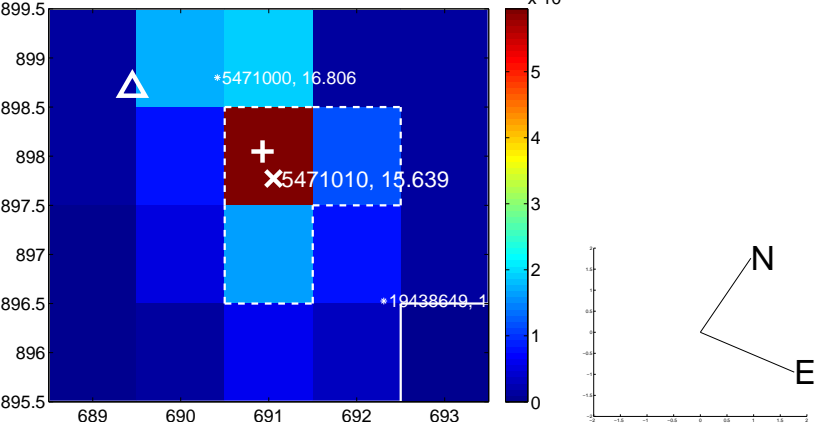
Q2 OOT image



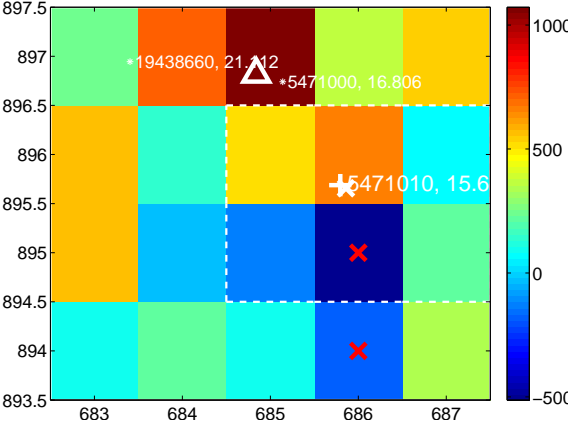
Q3 difference image. Poor Quality



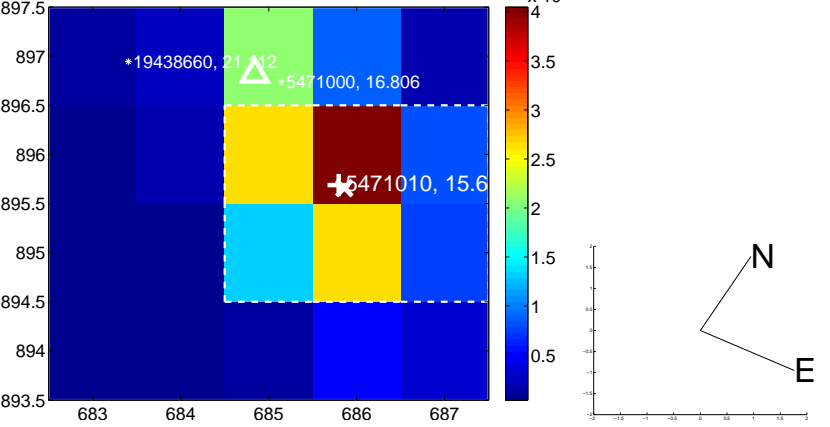
Q3 OOT image



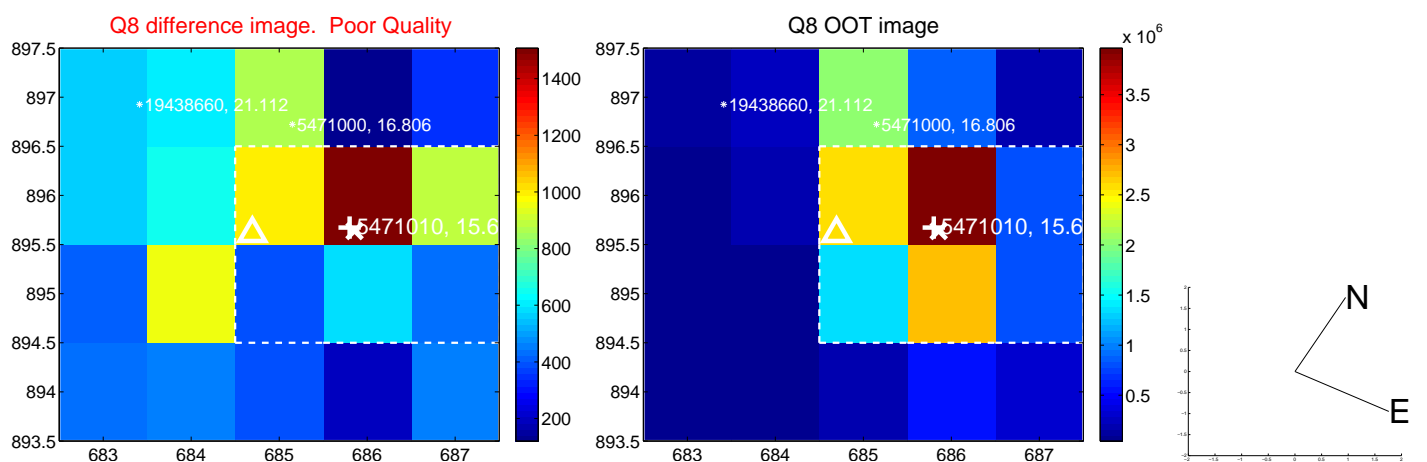
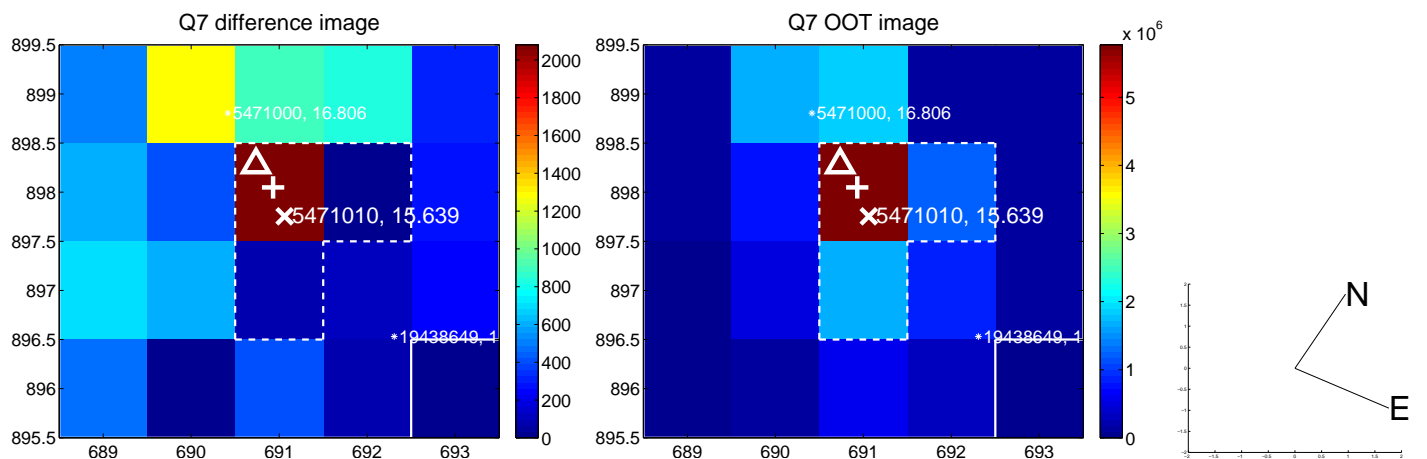
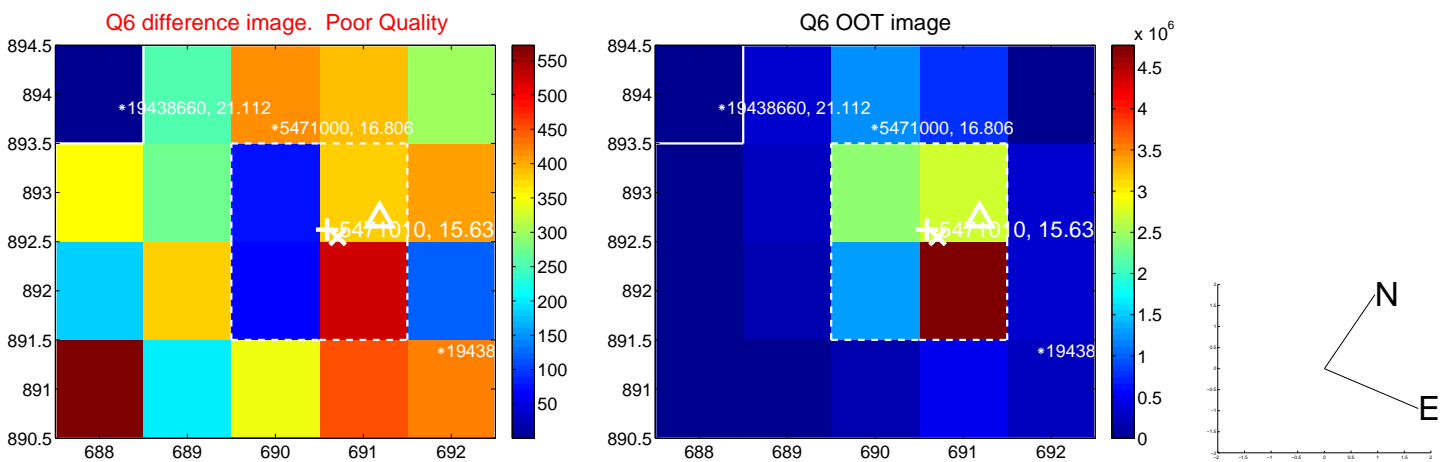
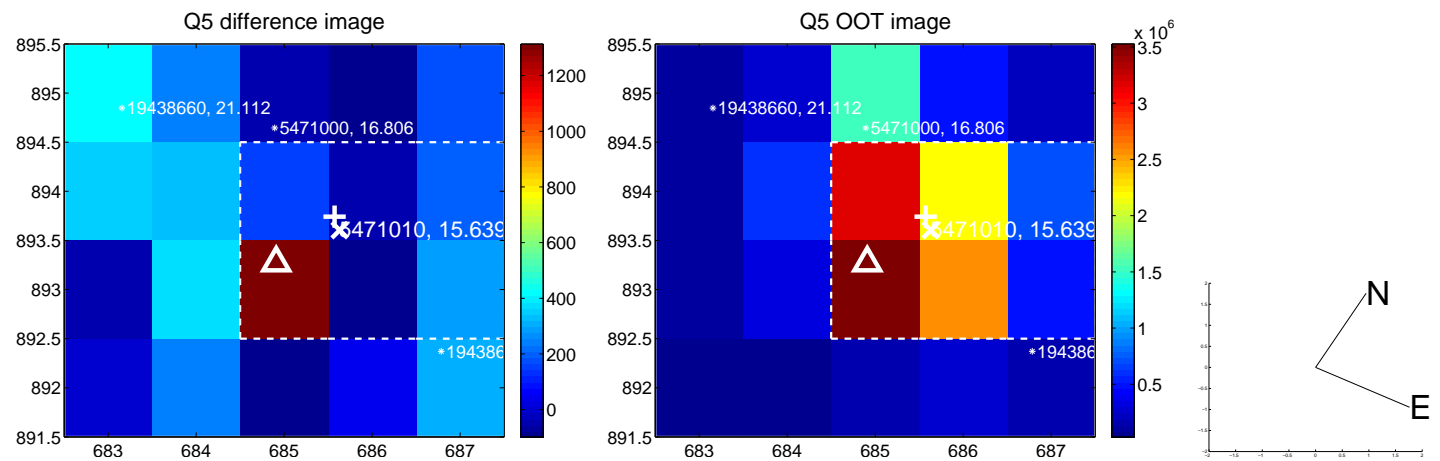
Q4 difference image. Poor Quality



Q4 OOT image

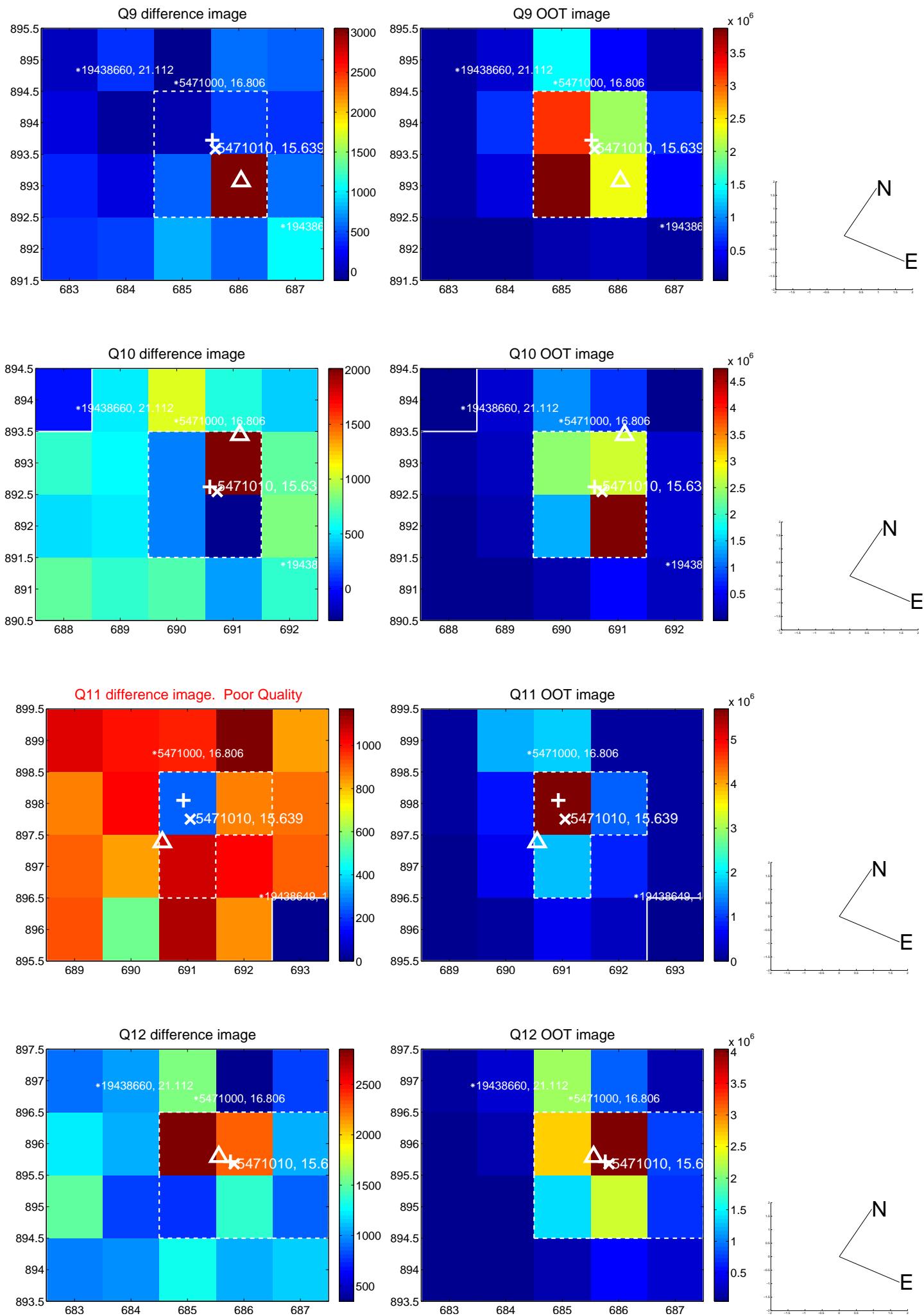


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

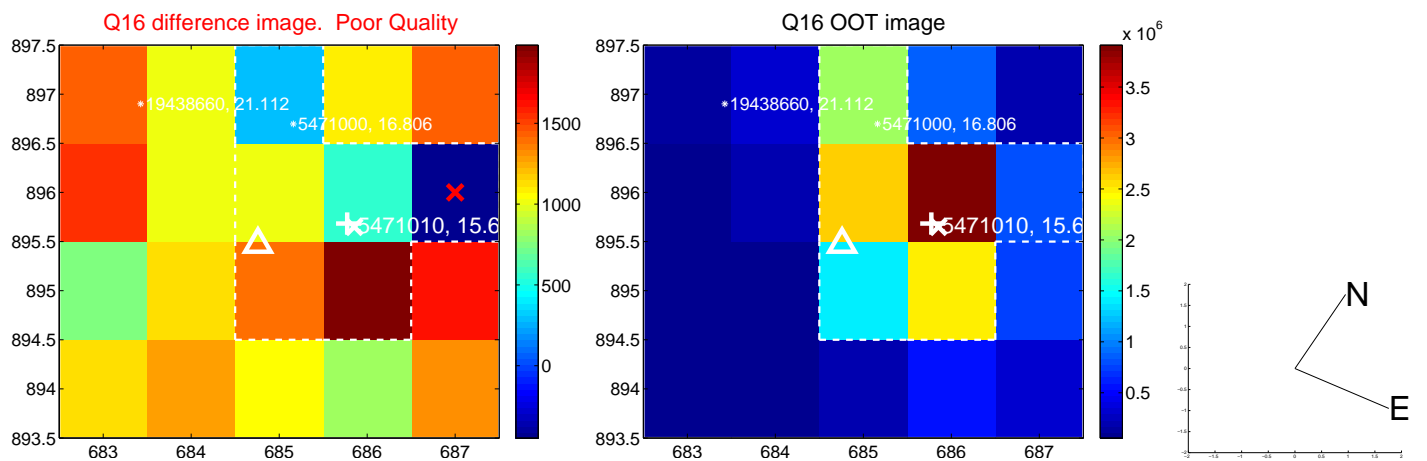
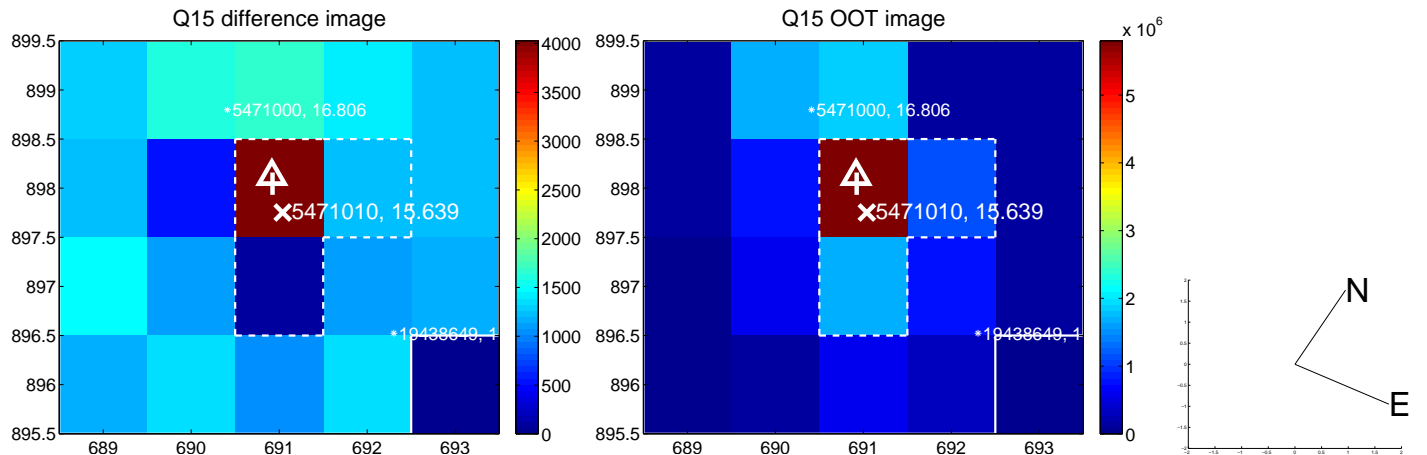
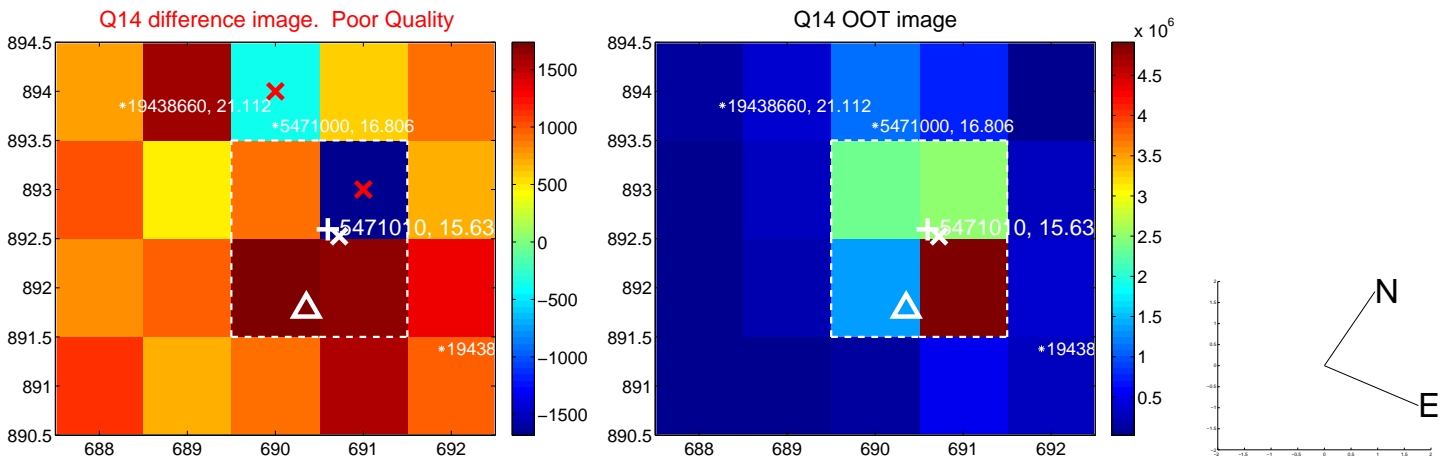
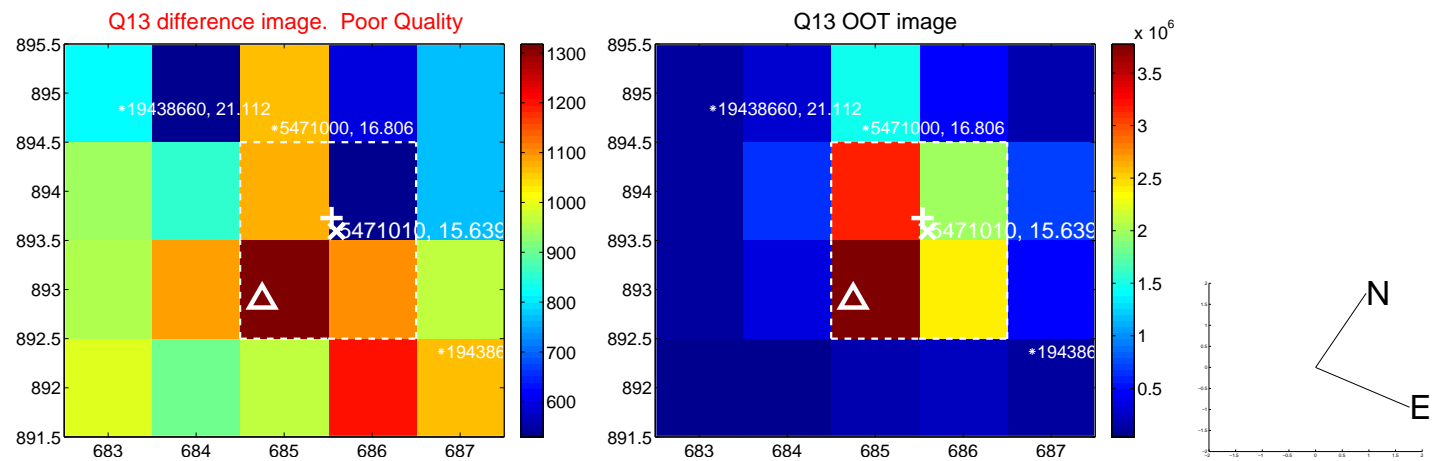




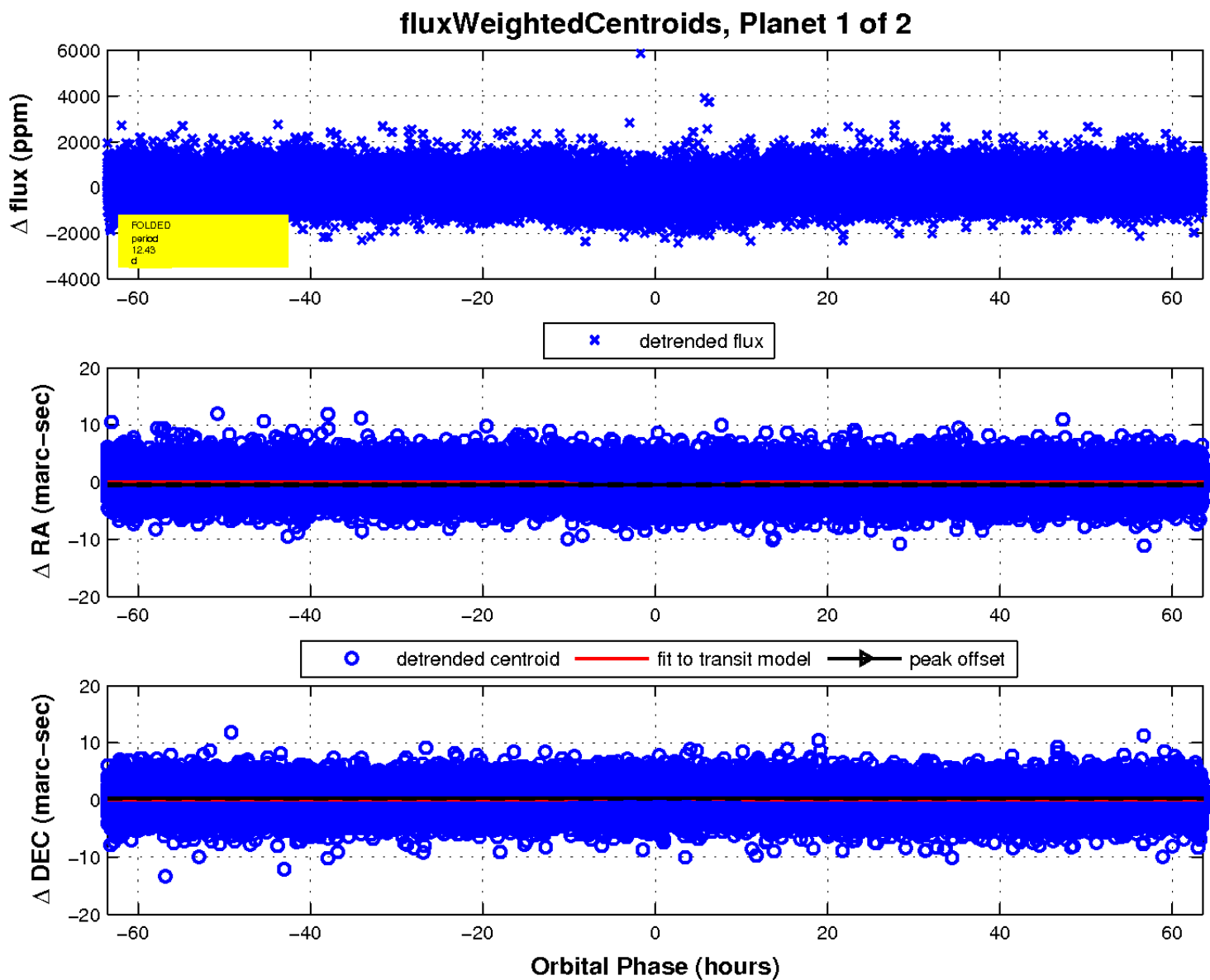
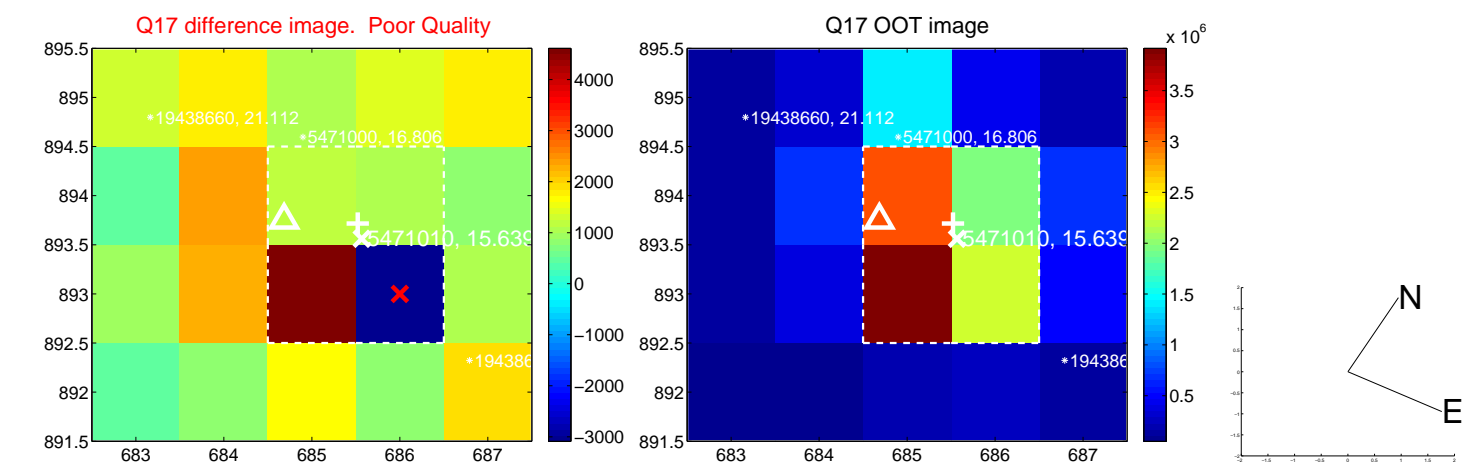
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

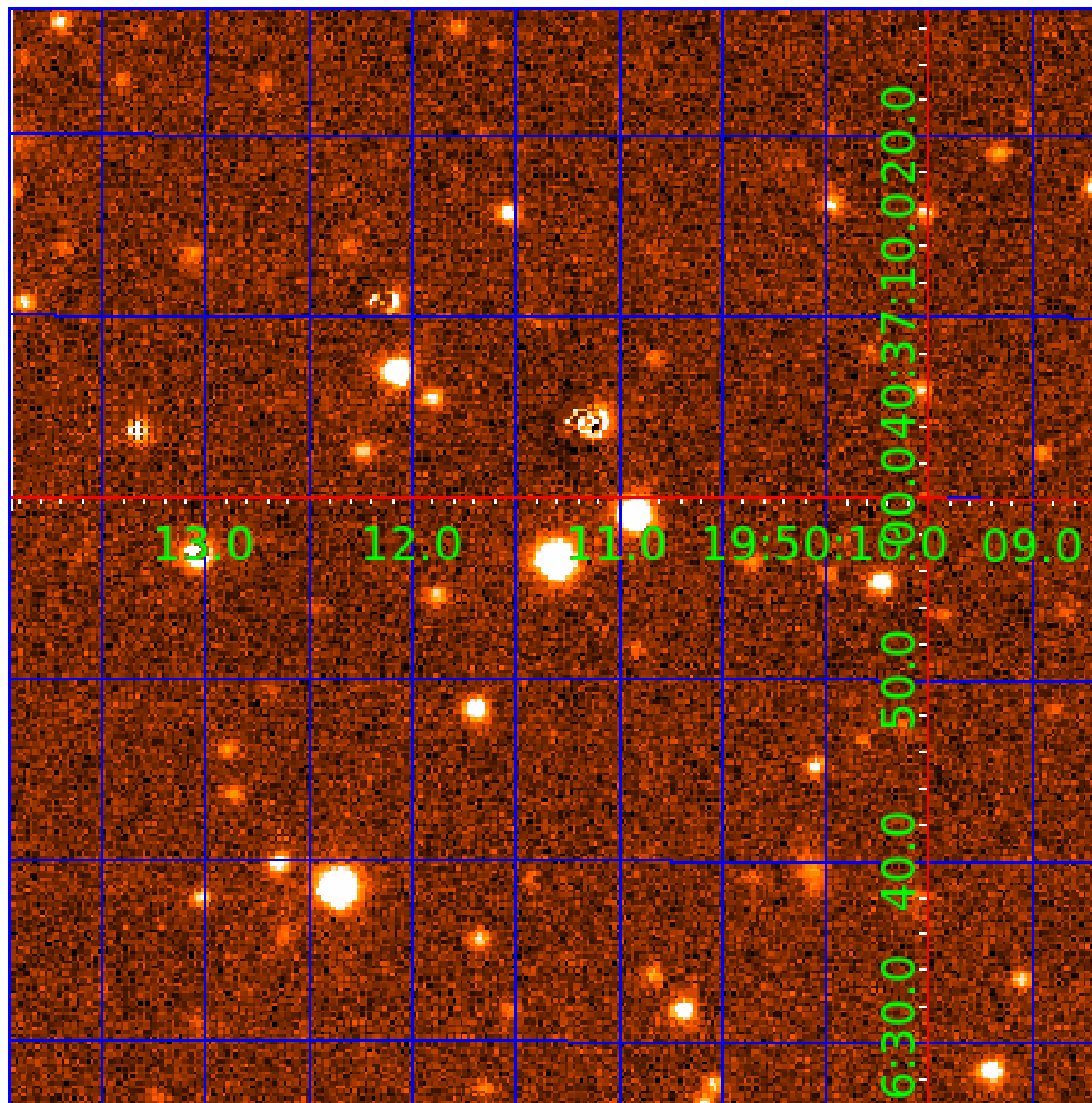


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 005471010

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005471010-01	OBS	6583.01	12.425445	141.510383	205.8	21.185	12.3	14.3	0.81	5497	1.26	52.03
005471010-02	OBS	No	12.423191	134.144772	228.4	30.209	13.2	16.9	0.81	5497	1.68	52.05

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005471010-01	OBS	FP	0.00	1	0	1	1	LPP_DV—CENT_FEW_DIFFS—HALO_GHOST—EPHEM_MATCH
005471010-02	OBS	FP	0.00	1	0	1	1	LPP_DV—SAME_NTL_PERIOD—CENT_FEW_DIFFS—HALO_GHOST—EPHEM_MATCH

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

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

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

## Ephemeris Match Information For 005471010-02

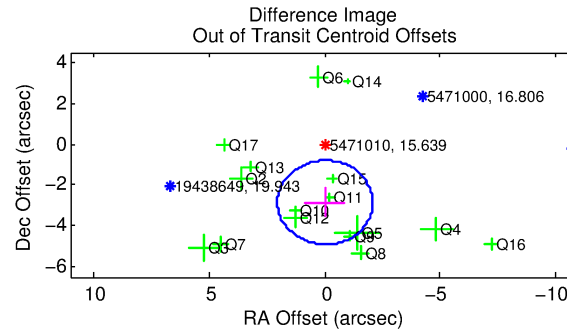
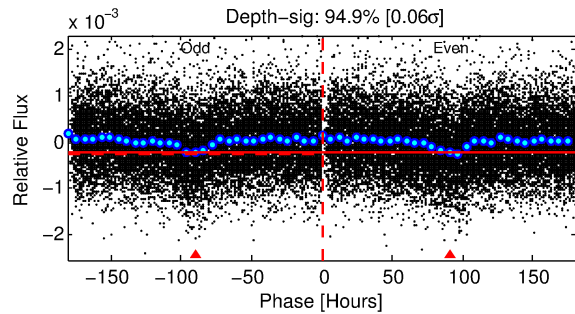
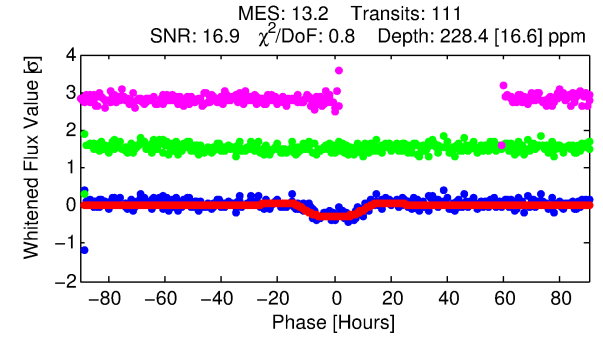
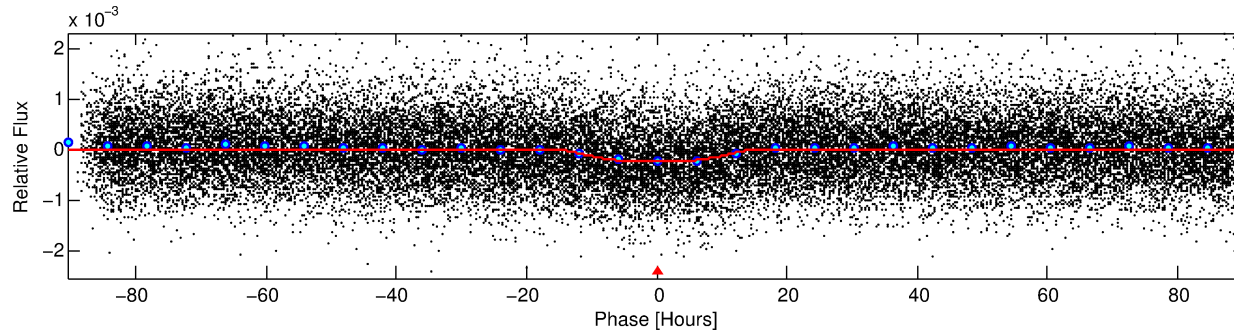
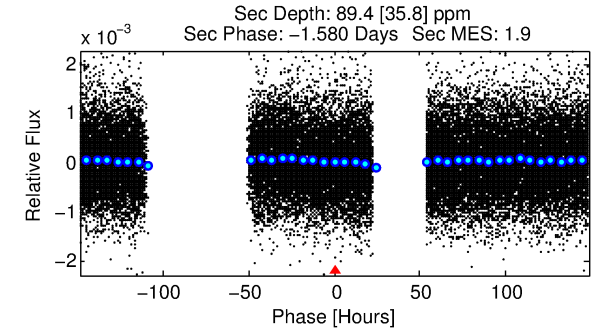
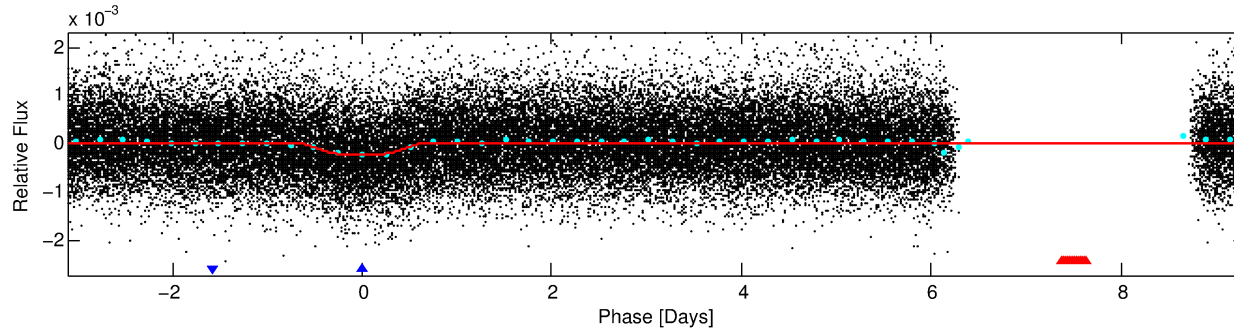
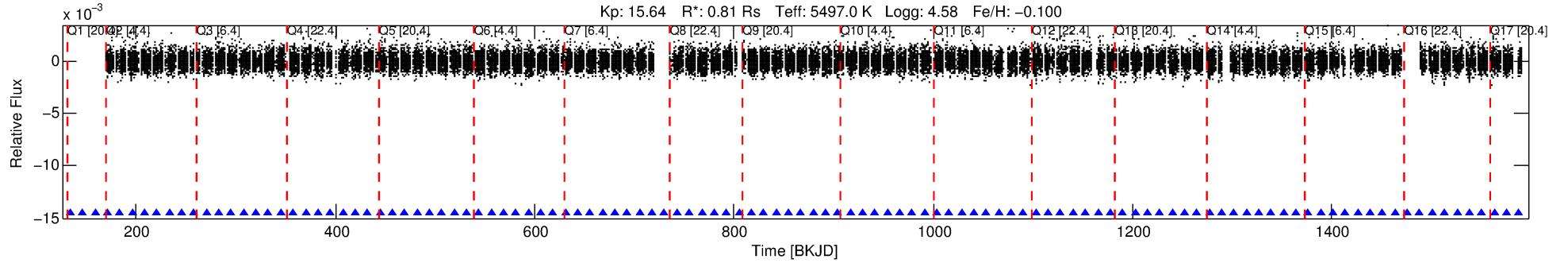
TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ( $''$ )	$\Delta$ Row	$\Delta$ Col	$m_2$	$m_1$	$D_2/D_1$	Mechanism	Flag	$\sigma_P$	$\sigma_T$
005471010-02	5471010	005385509-02	5385509	1:1	337.1	85	1	15.71	15.64	1.12	Col-Anomaly	1	0.87	0.10

**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: 5471010 Candidate: 2 of 2 Period: 12.423 d

KOI: K06583 Corr: No Ephemeris Match



## DV Fit Results:

Period = 12.42319 [0.00057] d  
Epoch = 134.1448 [0.0375] BKJD  
Rp/R\* = 0.0191 [0.0010]  
a/R\* = 1.35 [0.06]  
b = 0.98 [0.01]  
Seff = 52.05 [15.39]  
Teq = 685 [51] K  
Rp = 1.68 [0.37] Re  
a = 0.1014 [0.0185] AU  
Ag = 178.32 [87.48] [2.03σ]  
Teffp = 3870 [419] K [7.55σ]

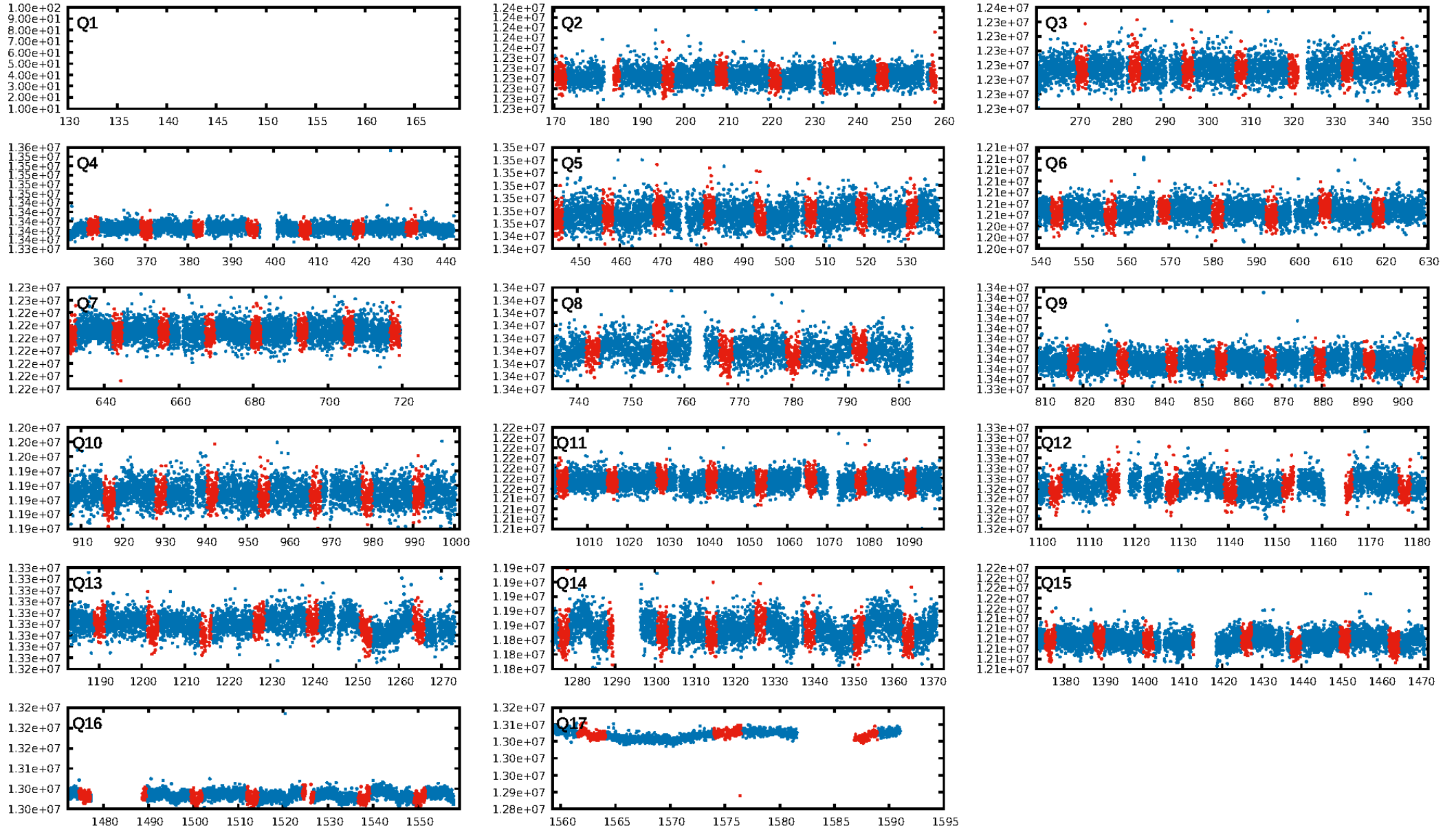
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.1% [0.00σ]  
ModelChiSquare2-sig: 24.2%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 5.29e-45  
RollingBand-fgt: 1.00 [108/108]  
GhostDiagnostic-chr: 0.09547  
Centroid-sig: 0.0%  
Centroid-so: 2.095 arcsec [3.71σ]  
OotOffset-rm: 2.853 arcsec [4.16σ]  
KicOffset-rm: 2.528 arcsec [3.70σ]  
OotOffset-st: 4/4/4/4 [16]  
KicOffset-st: 4/4/4/4 [16]  
DiffImageQuality-fgm: 0.25 [4/16]  
DiffImageOverlap-fno: 1.00 [16/16]

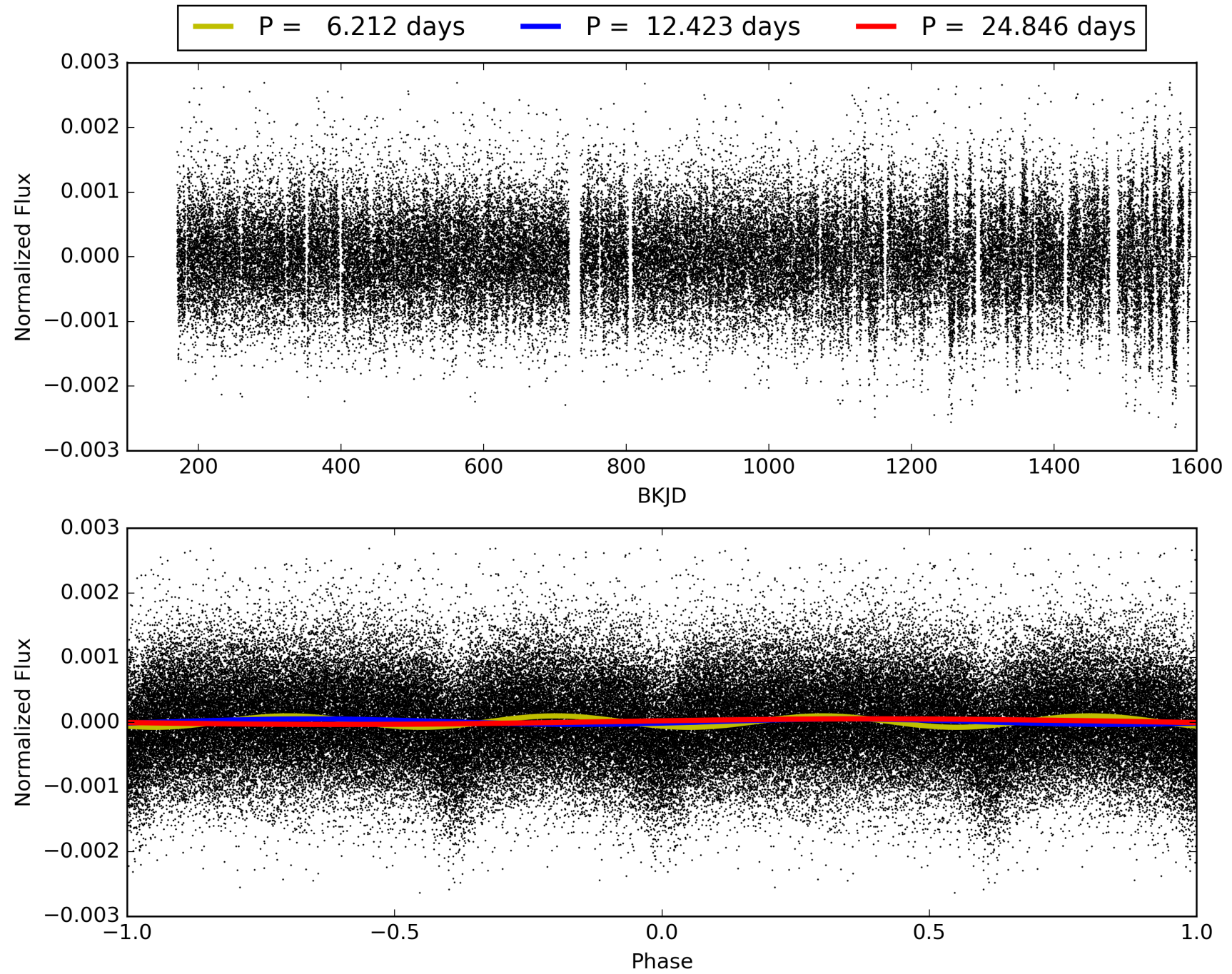
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 15:42:47 Z

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

# TCE 005471010-02, PDC Light Curves

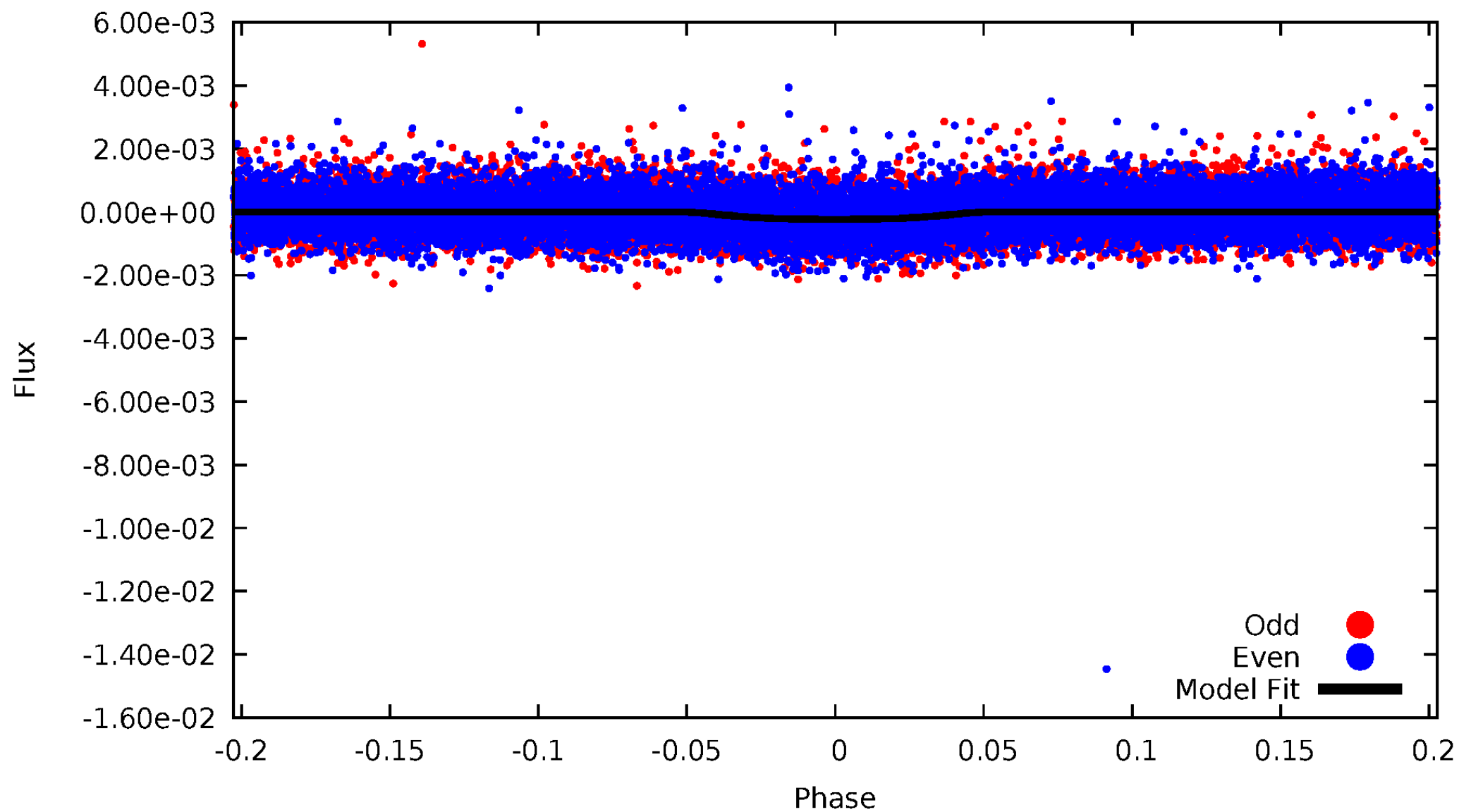


TCE 005471010-02



# DV Odd/Even

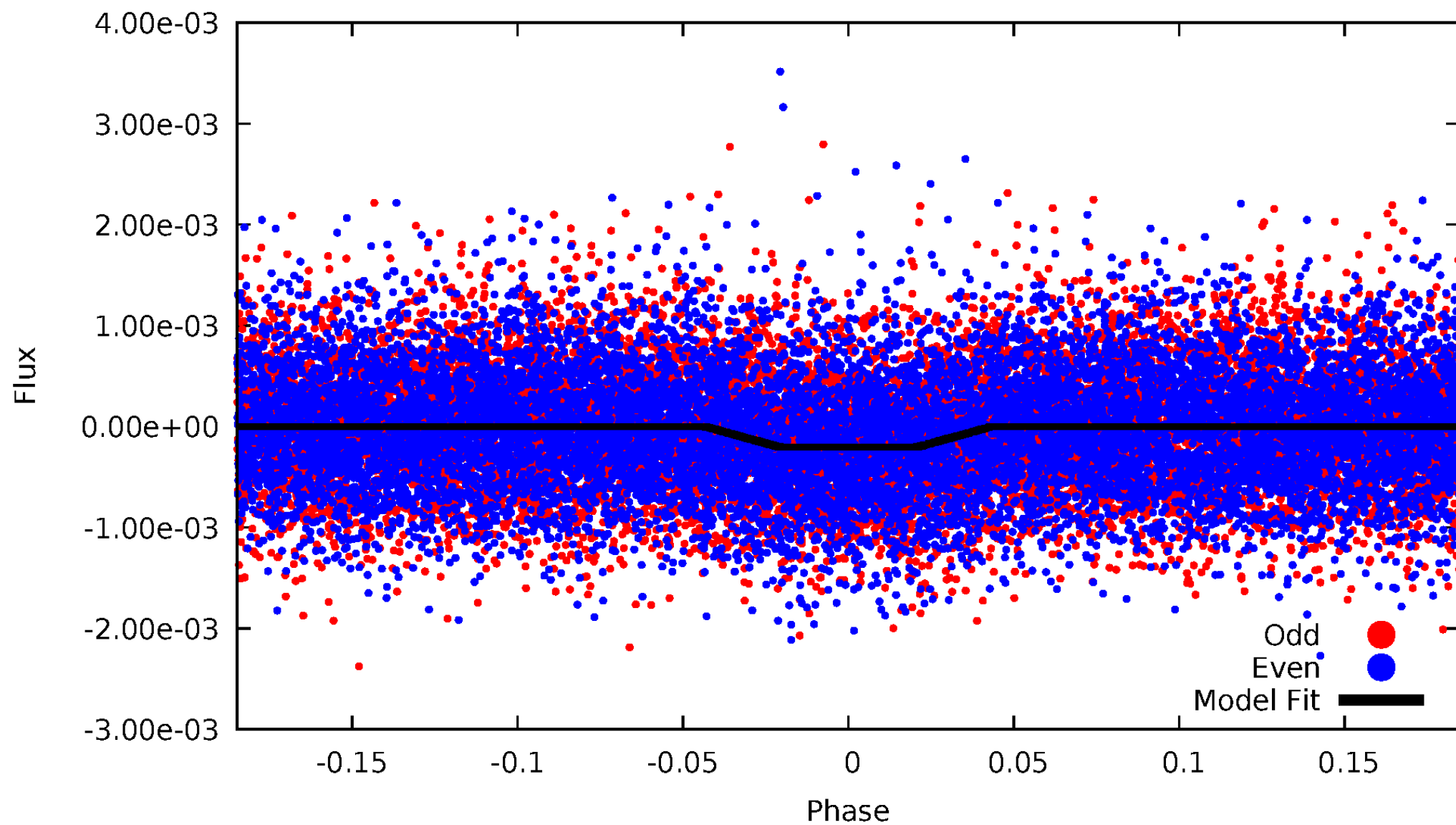
TCE 005471010-02





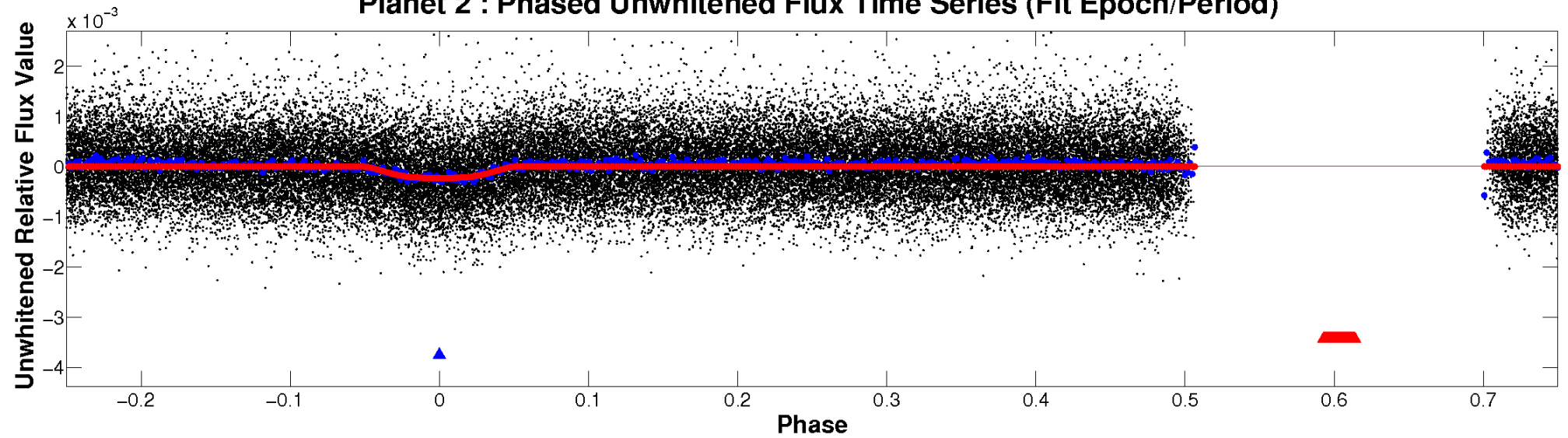
# ALT Odd/Even

TCE 005471010-02

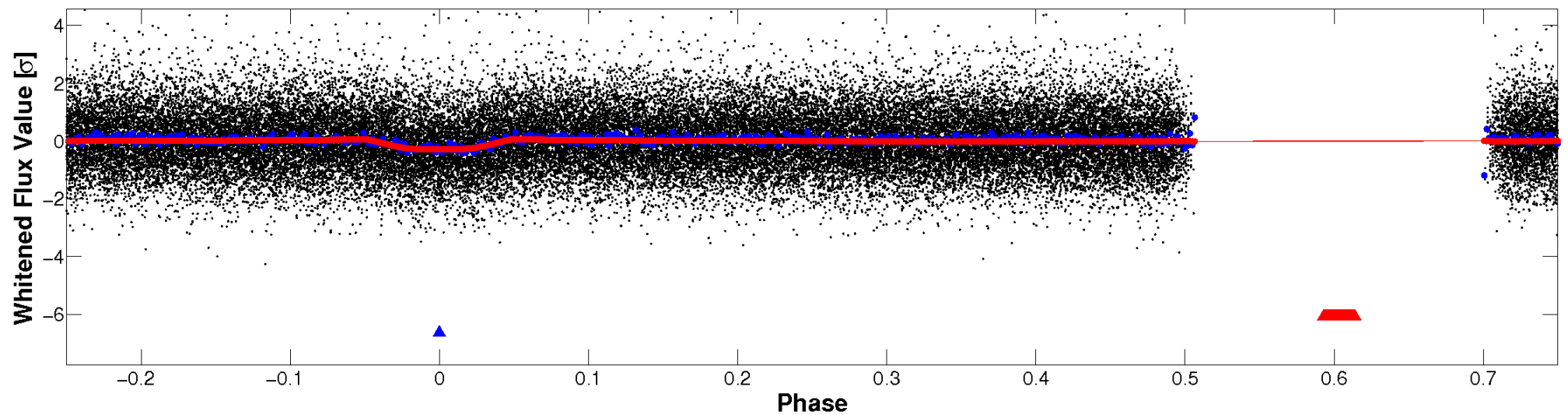


# Non-Whitened Vs. Whitened Light Curve

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

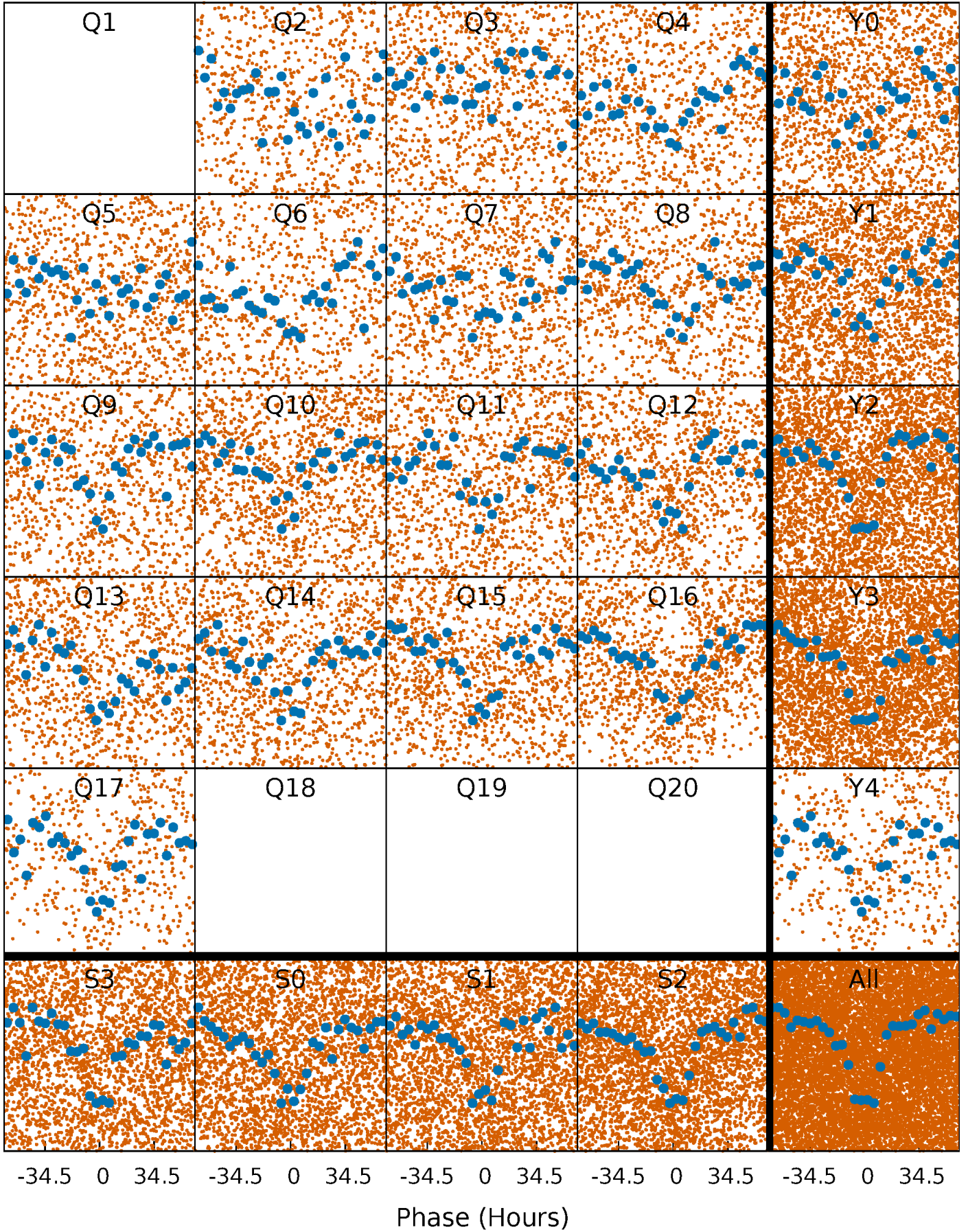


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

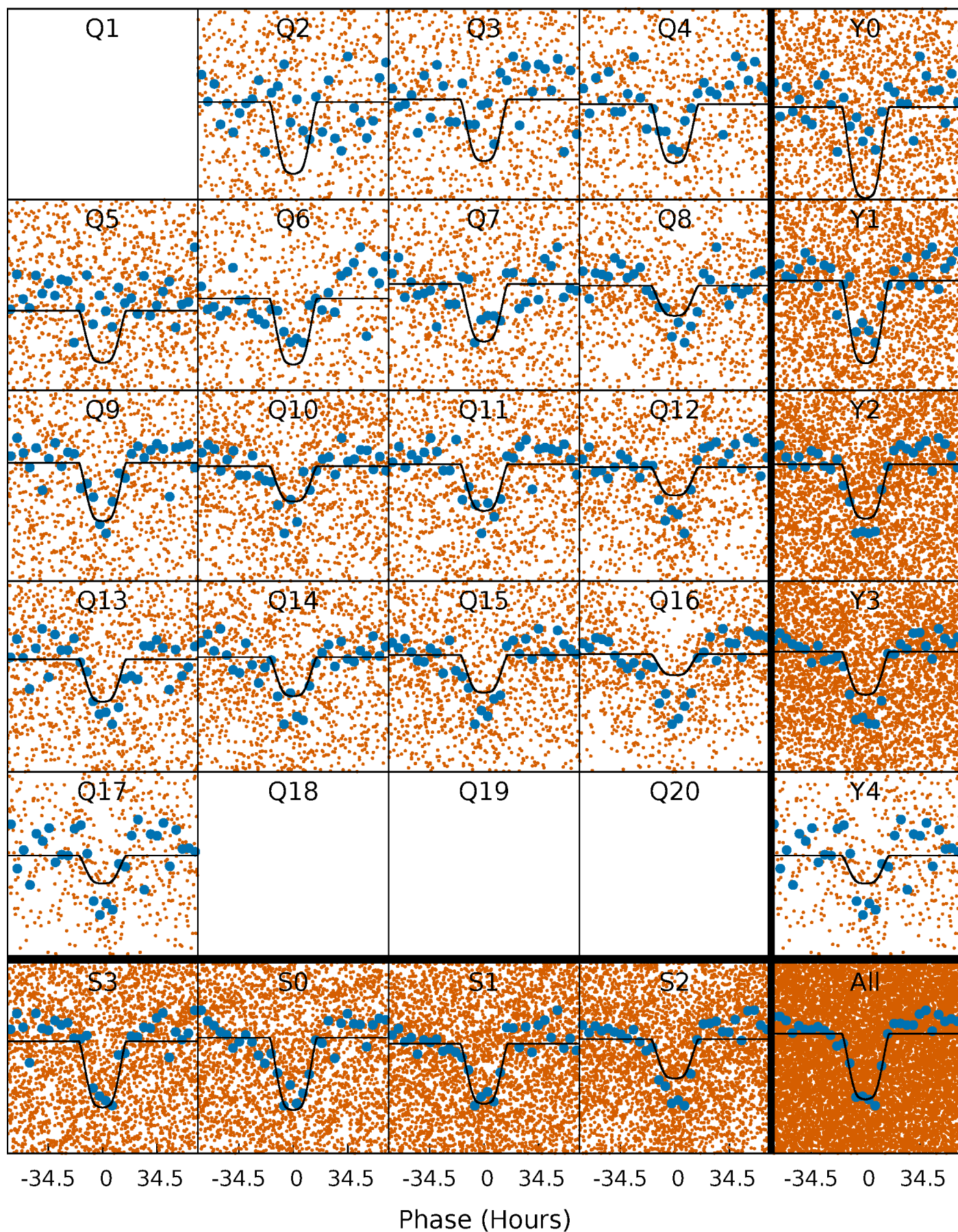
TCE 005471010-02 P= 12.423191 Days  $T_0=134.144772$  (BKJD)





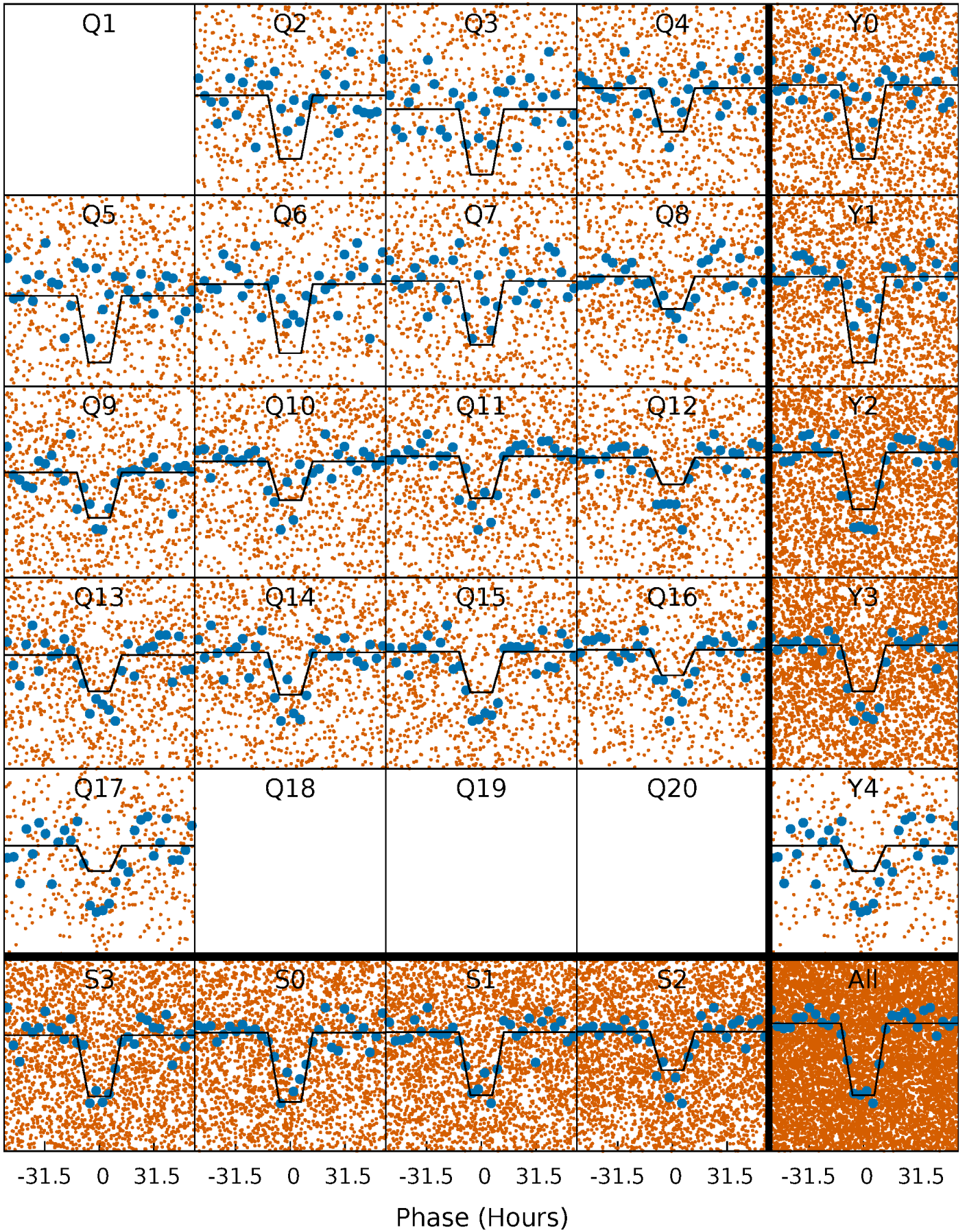
# DV Quarter-Phased Transit Curves

TCE 005471010-02 P= 12.423191 Days  $T_0=134.144772$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 005471010-02 P= 12.422494 Days  $T_0=134.213007$  (BKJD)

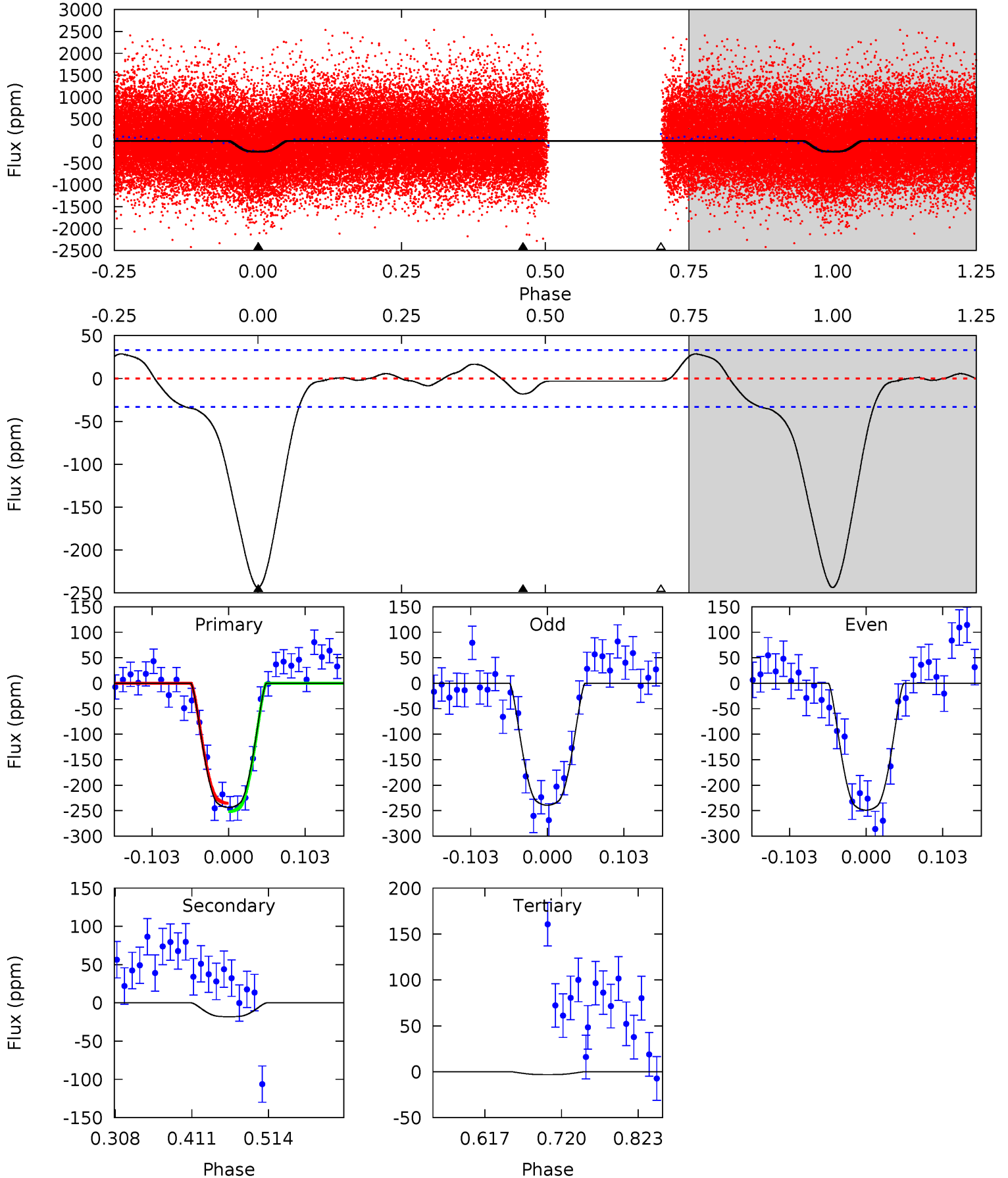




# DV Model-Shift Uniqueness Test

005471010-02, P = 12.423191 Days, E = 134.144772 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
33.5	2.49	0.43	0	4.56	1.63	2.12	33.1	33.5	2.07	2.49	0.67	0.88	0.11	1.12

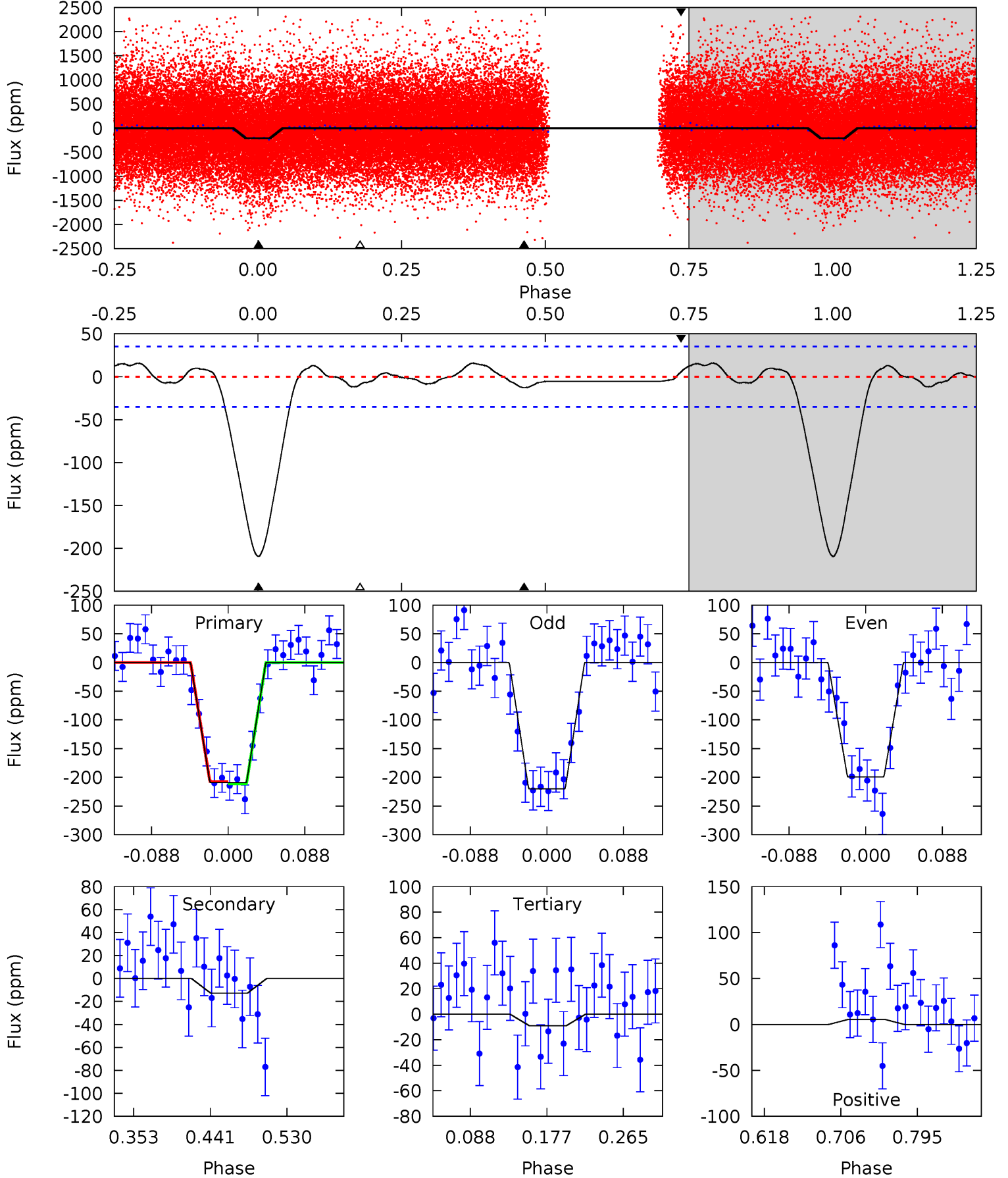




# Alt Model-Shift Uniqueness Test

005471010-02, P = 12.422494 Days, E = 134.213007 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
27.3	1.68	1.19	0.71	4.59	1.70	1.01	26.2	26.6	0.49	0.96	1.37	0.96	0.07	0.25



### Stellar Parameters For KIC 005471010

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5497^{+164}_{-180}$	$4.577^{+0.034}_{-0.145}$	$-0.100^{+0.300}_{-0.300}$	$0.809^{+0.175}_{-0.075}$	$0.907^{+0.073}_{-0.110}$	$2.412^{+0.449}_{-0.962}$
	+3%/-3%	+1%/-3%	+300%/-300%	+22%/-9%	+8%/-12%	+19%/-40%
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 005471010-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-18 \pm 7$	$1.74^{+0.21}_{-0.15}$	$976^{+54}_{-42}$	$3181^{+190}_{-238}$	$33^{+16}_{-14}$
Alt.	$-13 \pm 8$	$1.29^{+0.17}_{-0.12}$	$977^{+50}_{-43}$	$3293^{+295}_{-406}$	$41^{+30}_{-25}$

$T_{\text{max}}$  = 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

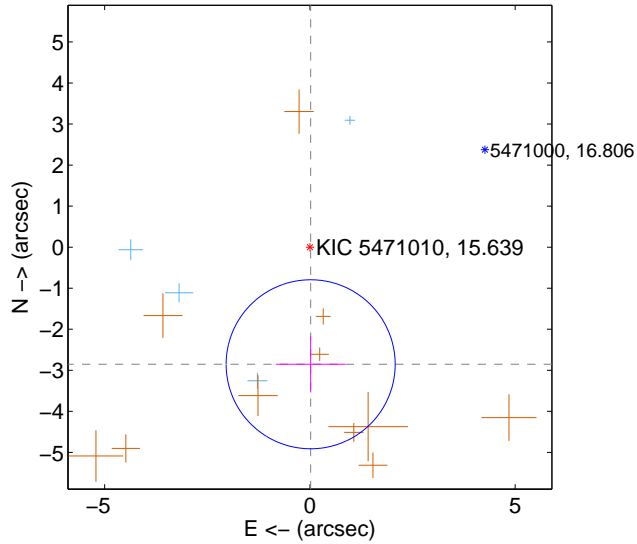
Supplemental centroid analysis for 005471010-02. Kepler magnitude: 15.64. Transit SNR 16.90

There are 4 quarters with good PRF difference image offsets

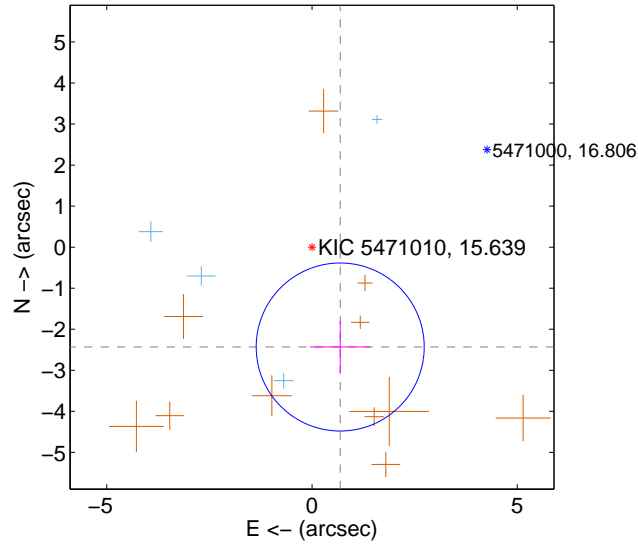
The direct PRF centroid is offset from the target star catalog position by about 0.62 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.853 \pm 0.686$	4.16	$-0.018 \pm 0.848$	$-2.853 \pm 0.685$
PRF-fit source offset from KIC position	$2.528 \pm 0.682$	3.70	$-0.687 \pm 0.738$	$-2.432 \pm 0.632$
photometric centroid source offset	$2.09 \pm 0.56$	3.71	$0.02 \pm 0.56$	$-2.09 \pm 0.56$

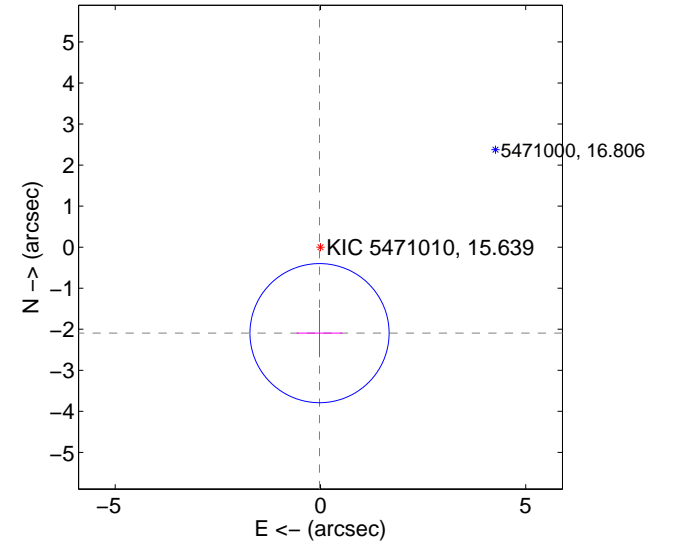
offset from difference PRF-fit to OOT PRF-fit



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.

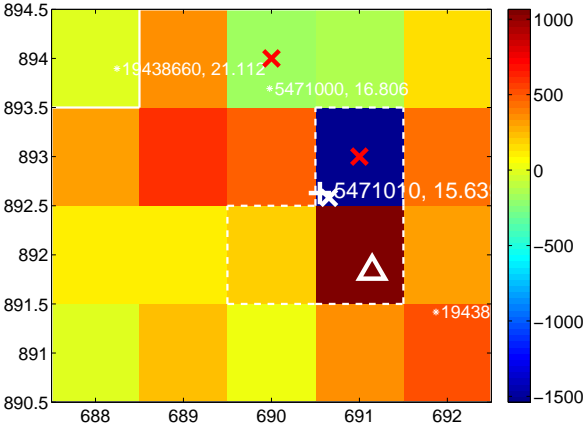
Q1 no difference image



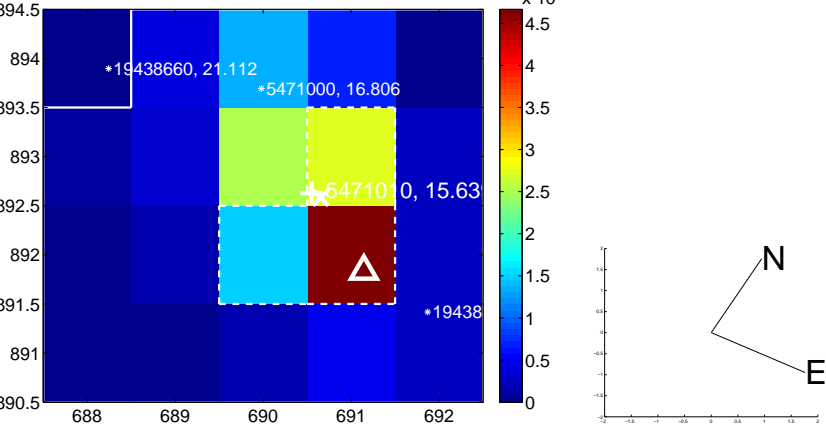
Q1 no OOT image



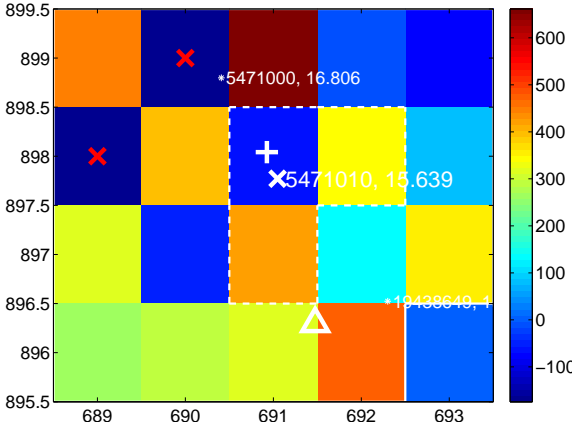
Q2 difference image. Poor Quality



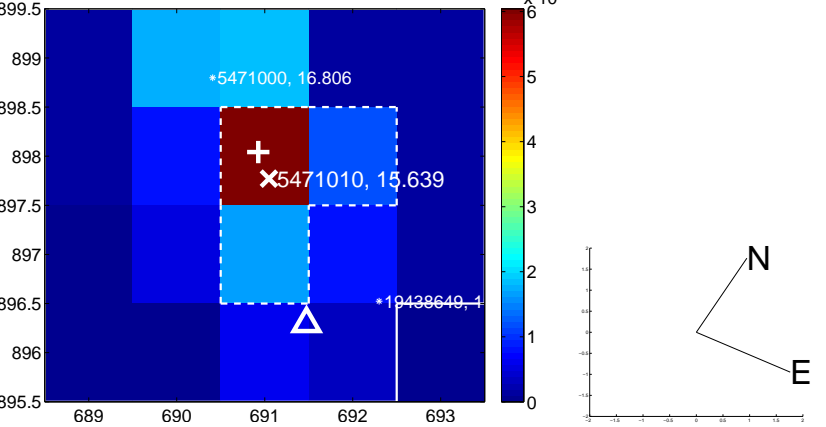
Q2 OOT image



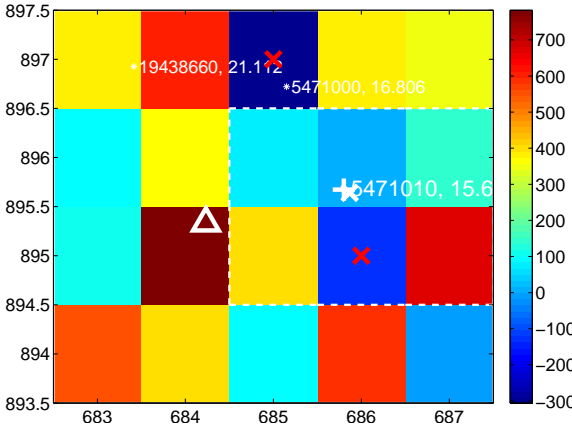
Q3 difference image. Poor Quality



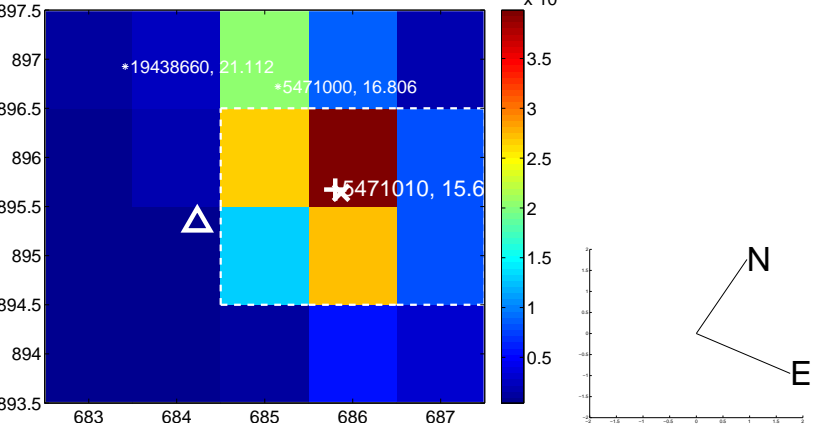
Q3 OOT image



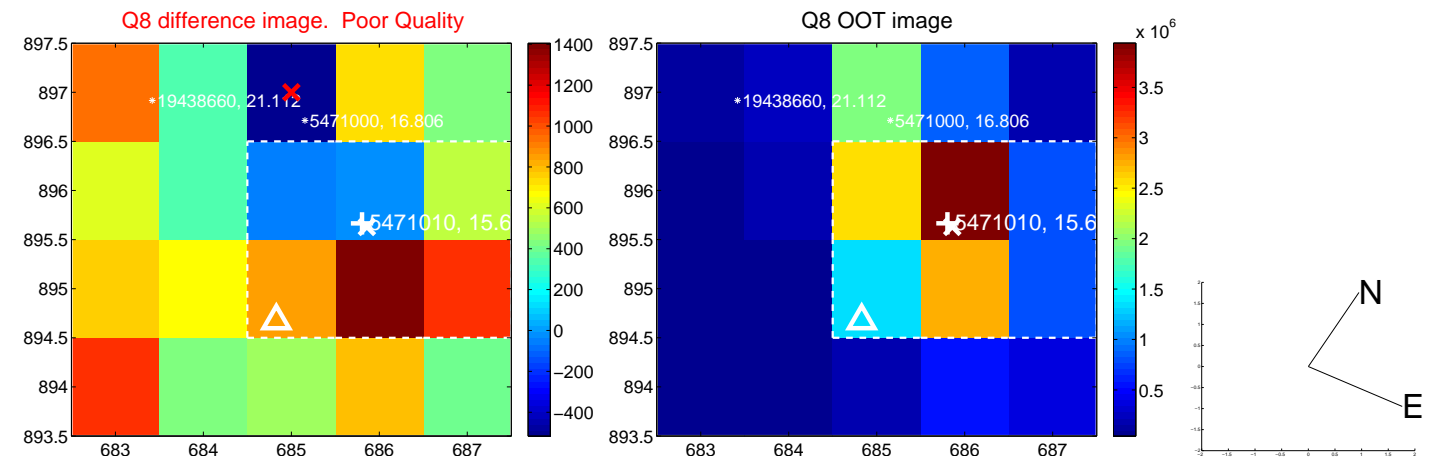
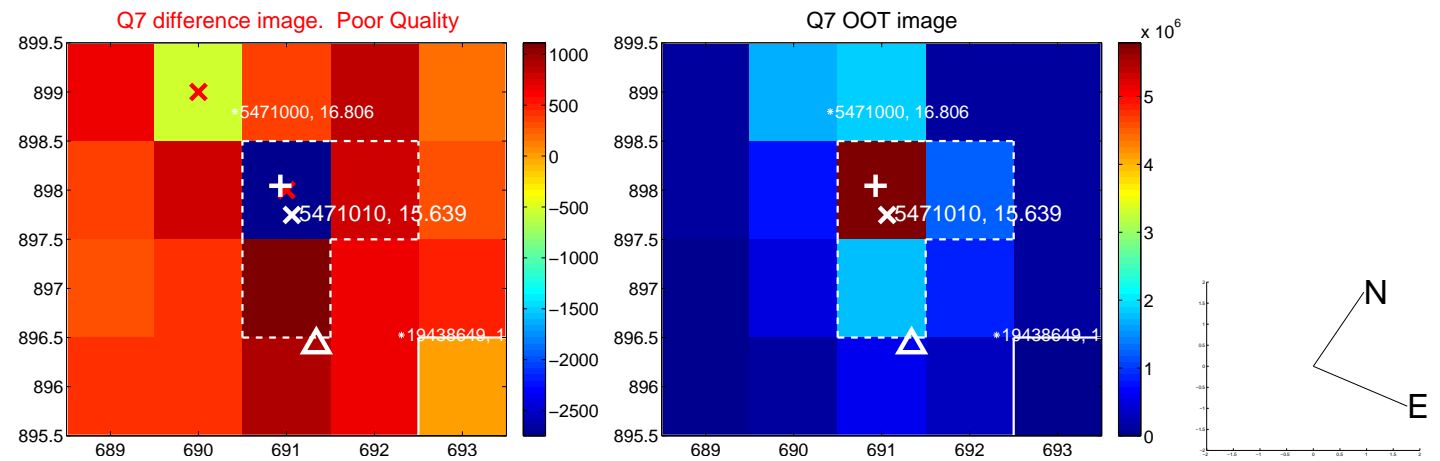
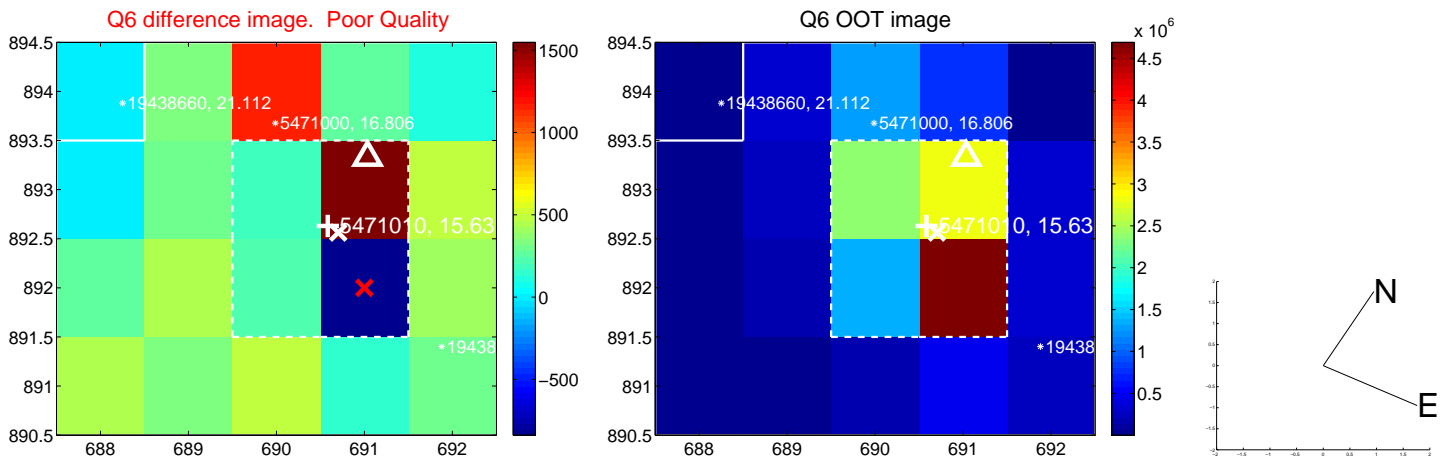
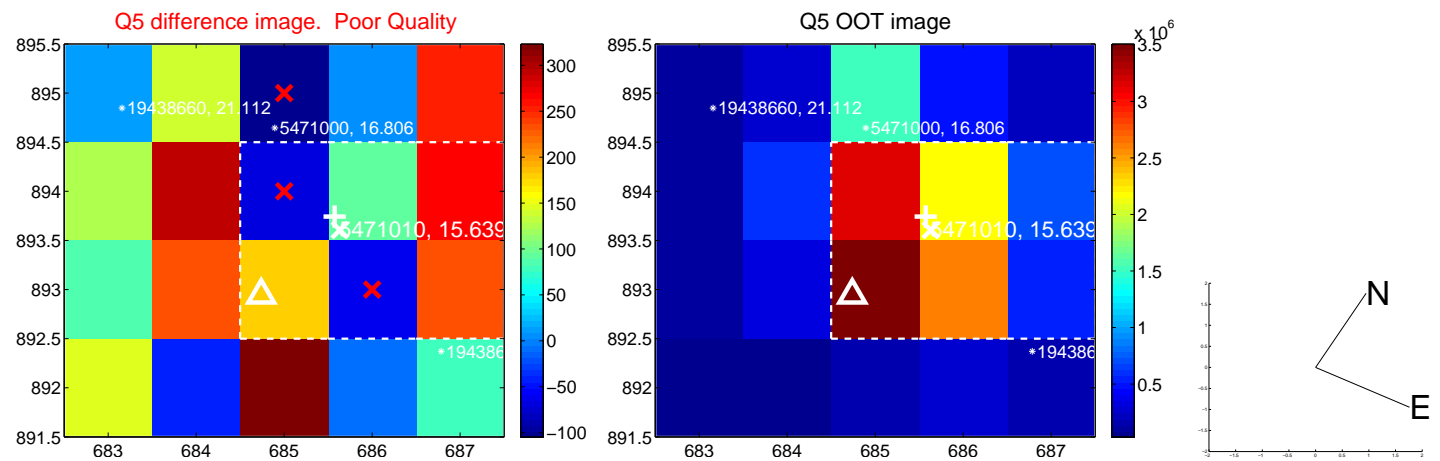
Q4 difference image. Poor Quality



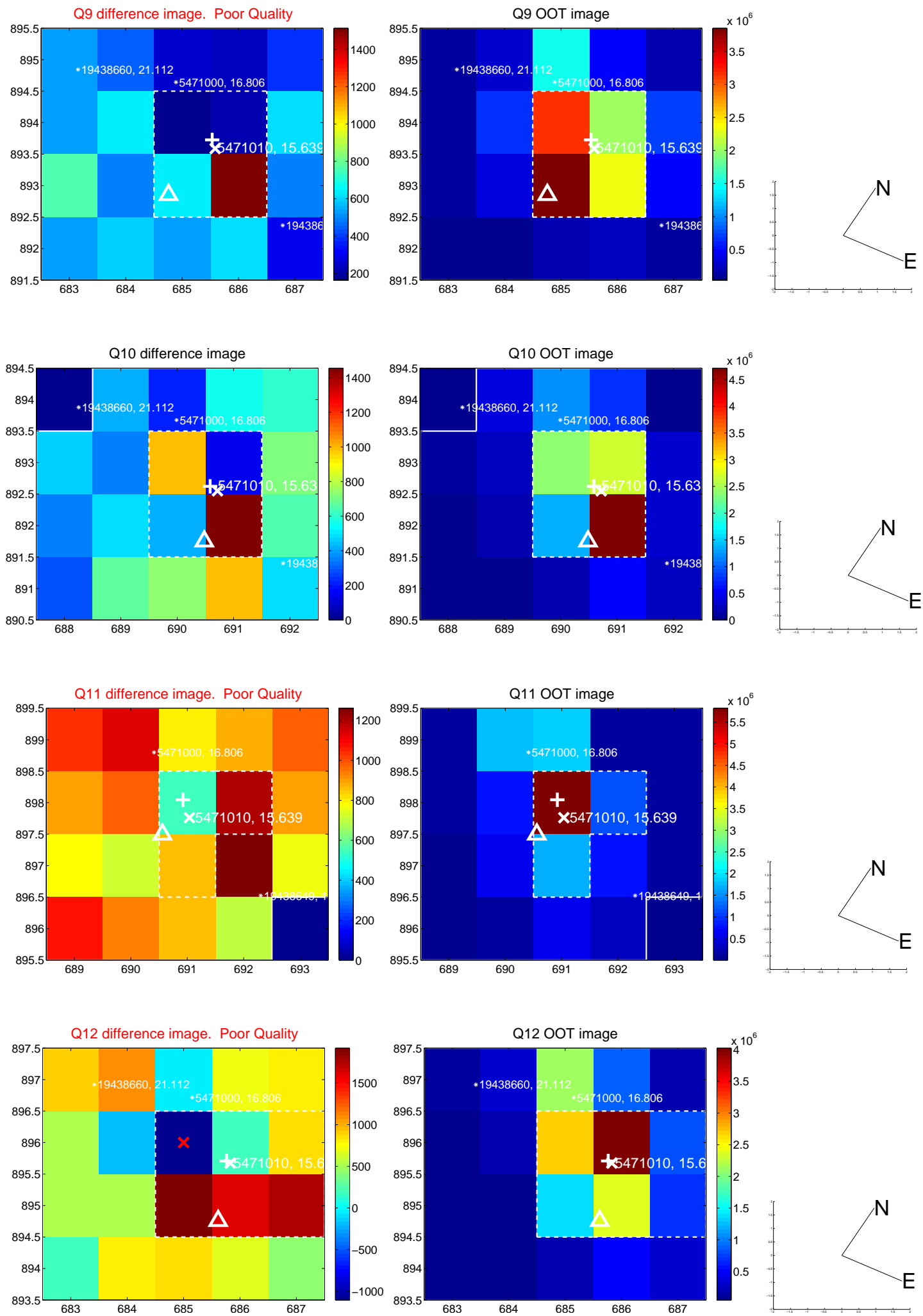
Q4 OOT image



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

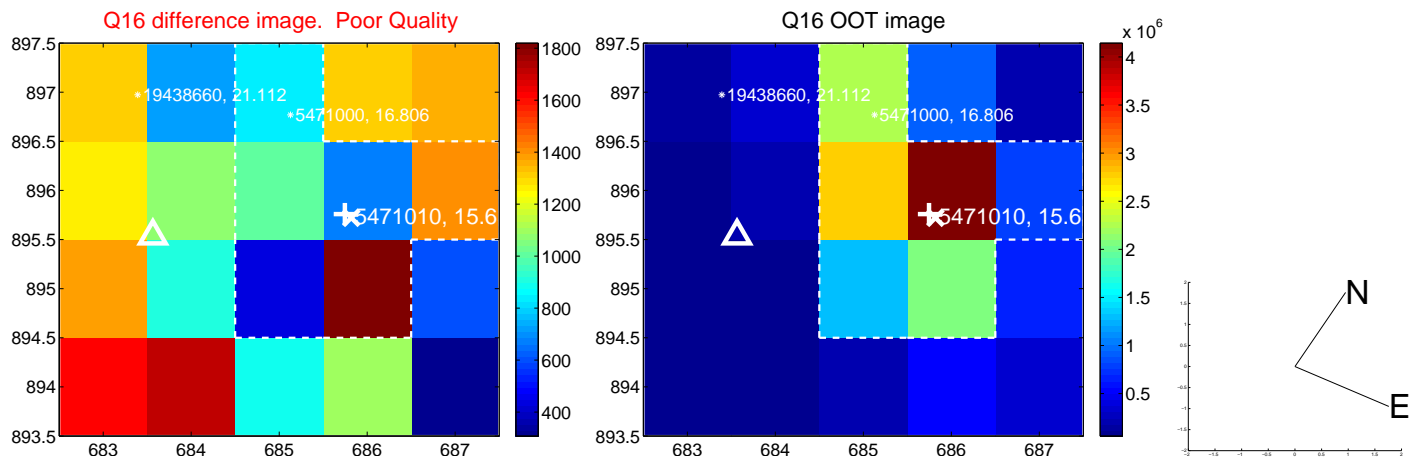
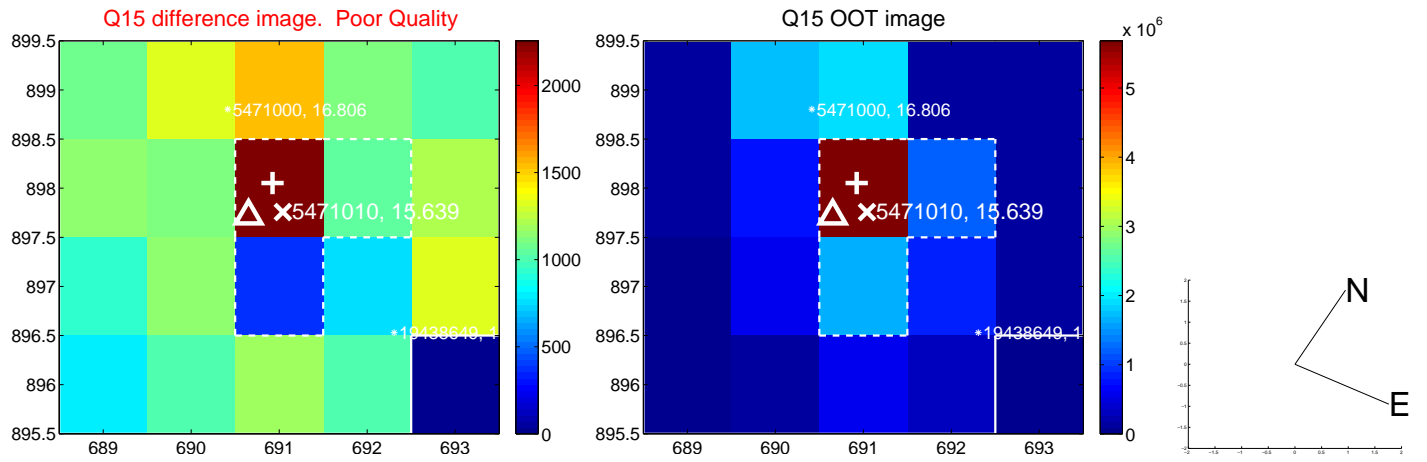
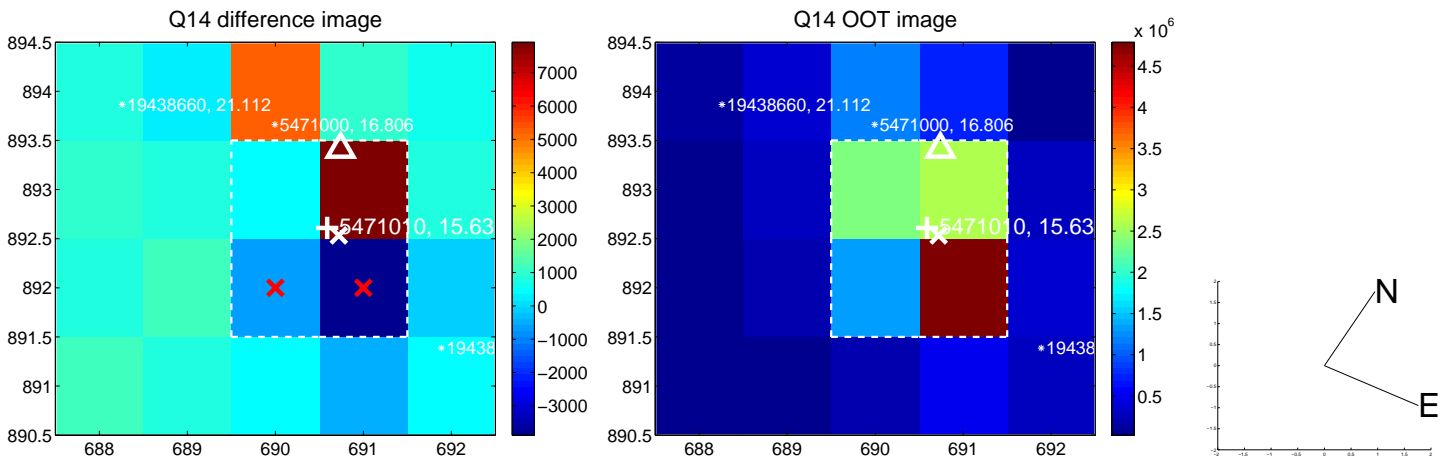
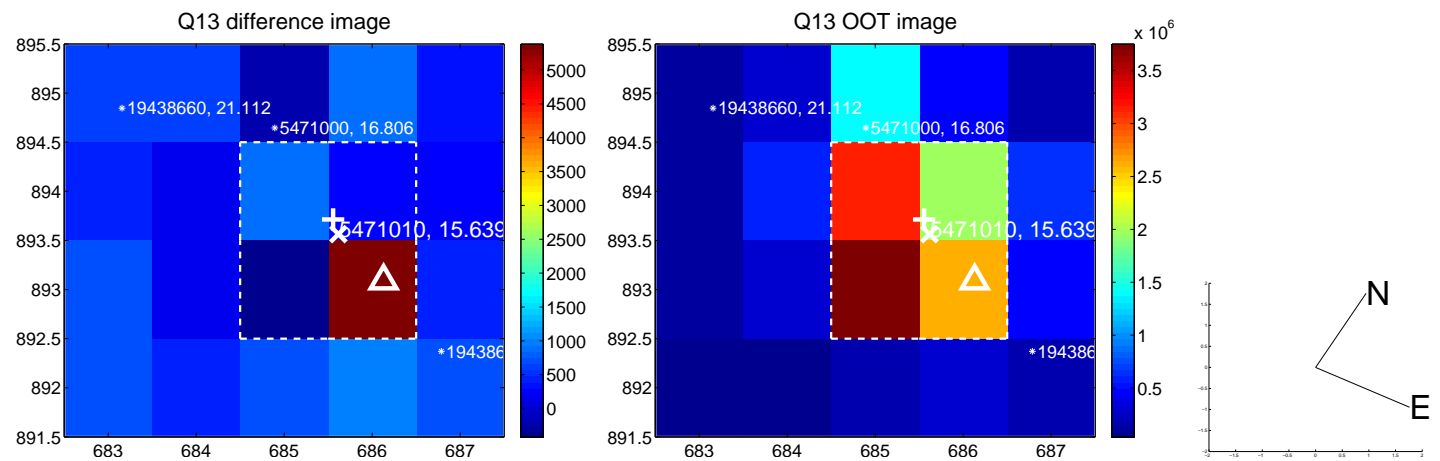


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

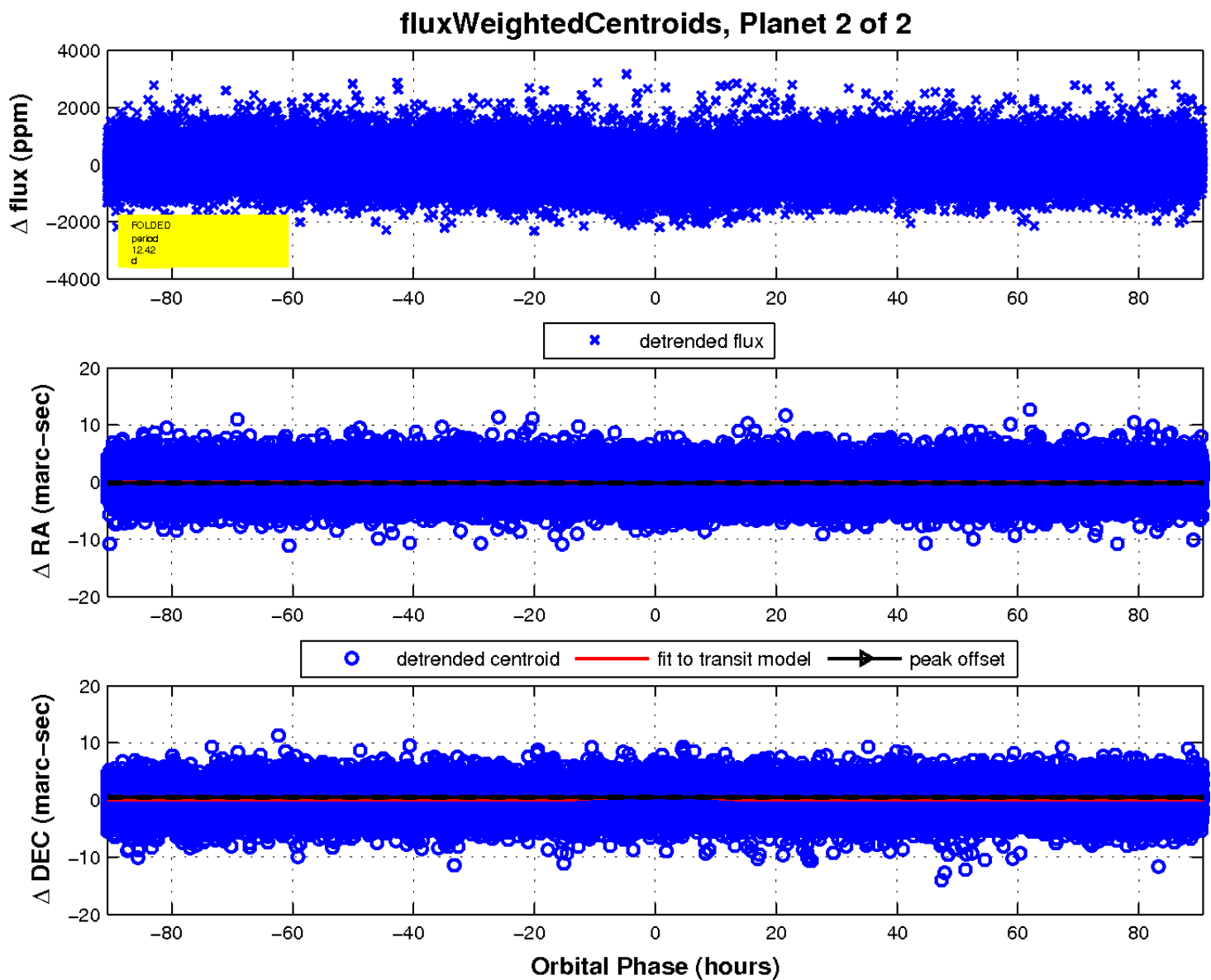
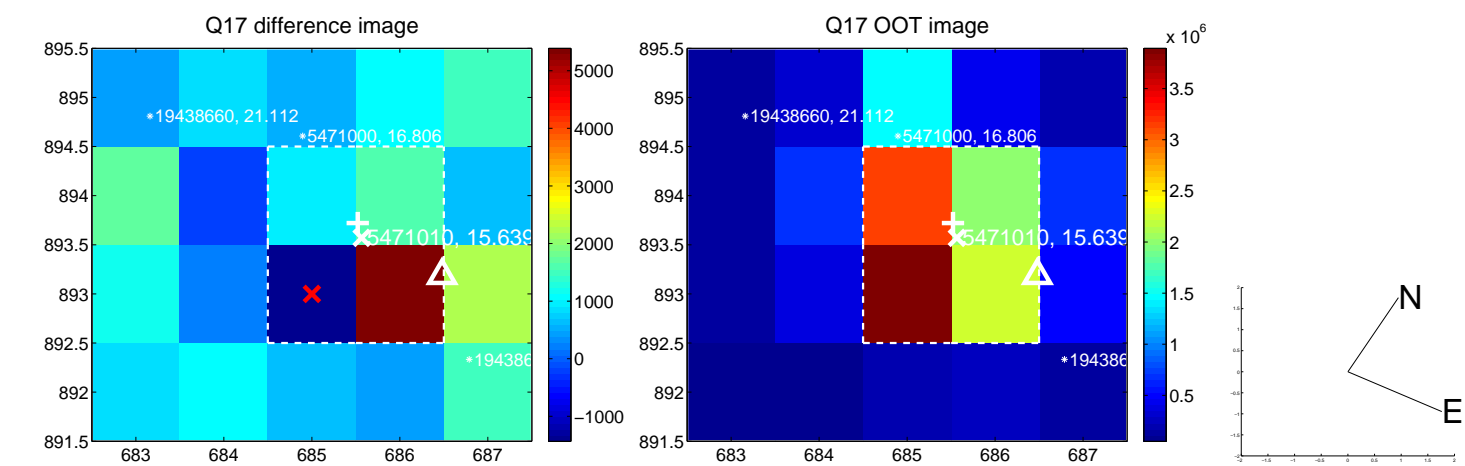




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



# UKIRT Image

Declination

