

# KIC 008630081

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008630081-01	OBS	No	372.974551	342.221398	26.7	0.524	7.7	0.4	2.34	9354	1.28	20.96
008630081-02	OBS	No	372.972678	342.834487	137.9	4.199	7.4	4.7	2.34	9354	3.13	20.96

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008630081-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_TRACKER—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
008630081-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_TRACKER—LPP_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—SAME_NTL_PERIOD—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.

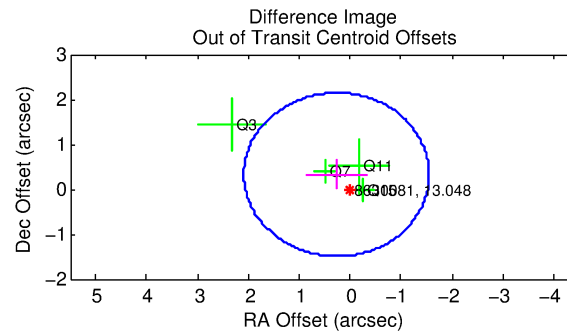
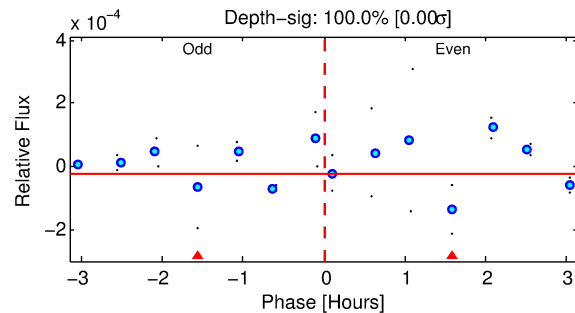
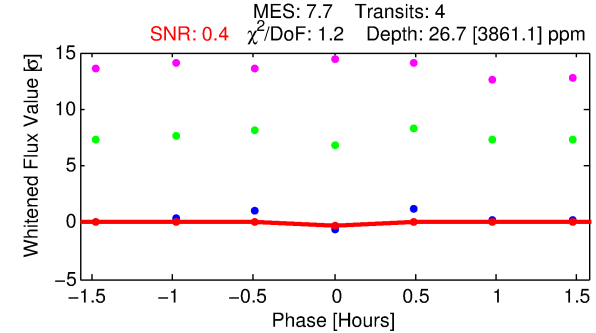
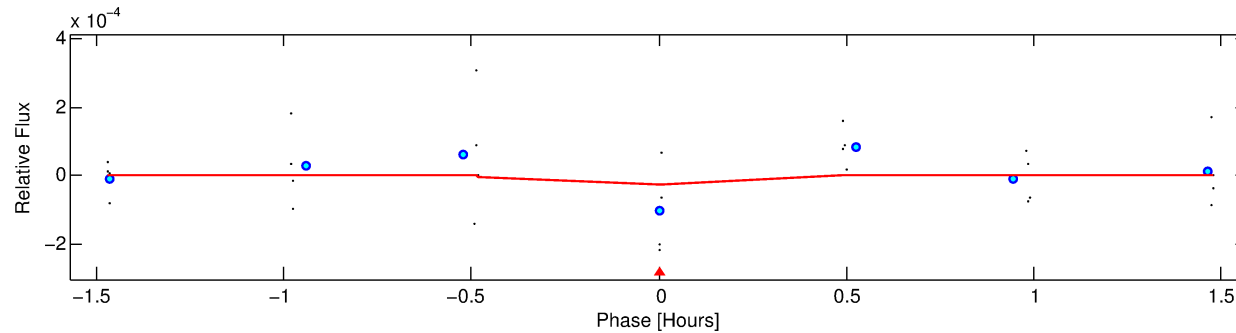
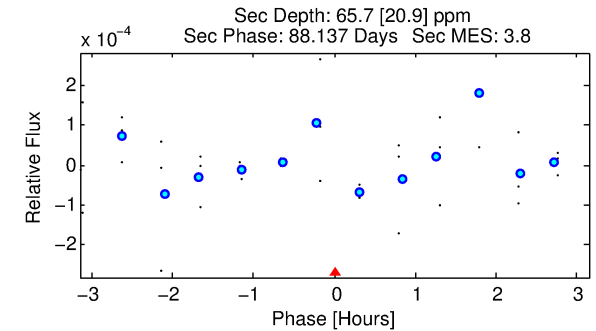
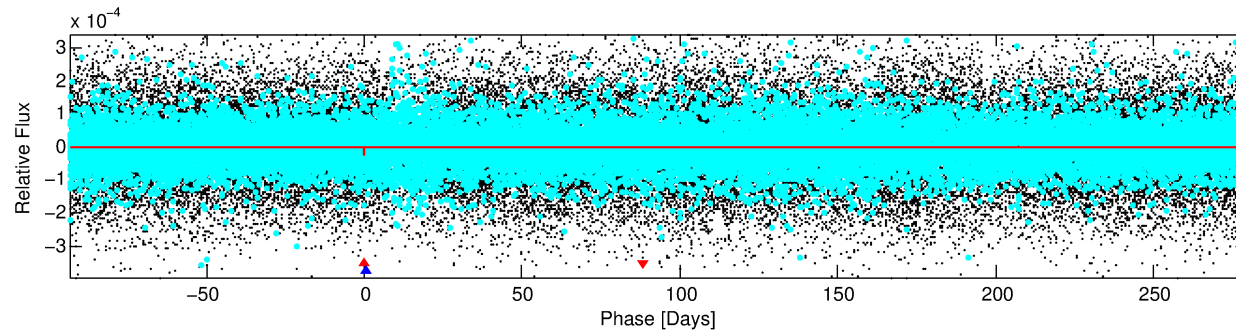
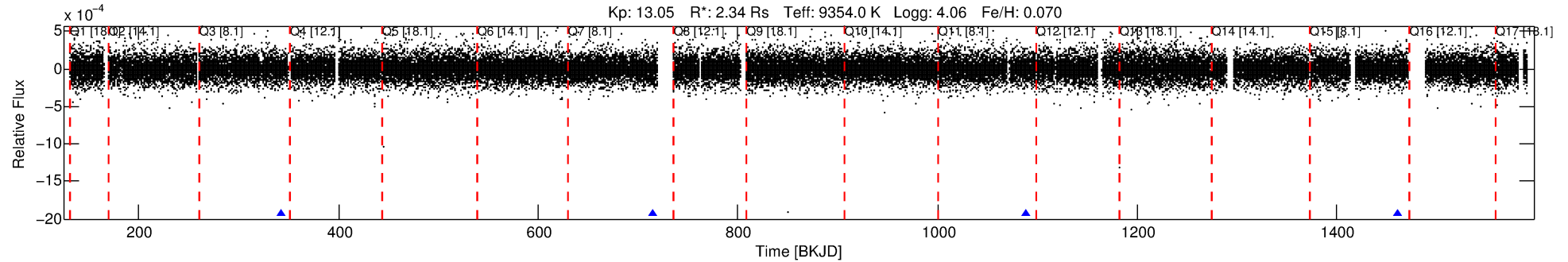
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 008630081-01

No Significant Match Found

# DV One-Page Summary

KIC: 8630081 Candidate: 1 of 2 Period: 372.975 d



## DV Fit Results:

Period = 372.97455 [0.03487] d  
Epoch = 342.2214 [0.0711] BKJD  
Rp/R\* = 0.0050 [17.6449]  
a/R\* = 5220.33 [129530567.99]  
b = 0.30 [73817.47]  
Seff = 20.96 [8.65]  
Teq = 546 [56] K  
Rp = 1.28 [4503.64] Re  
a = 1.3381 [0.3751] AU  
Ag = 39381.48 [276791781.16] [0.00σ]  
Teffp = 11883 [20879677] K [0.00σ]

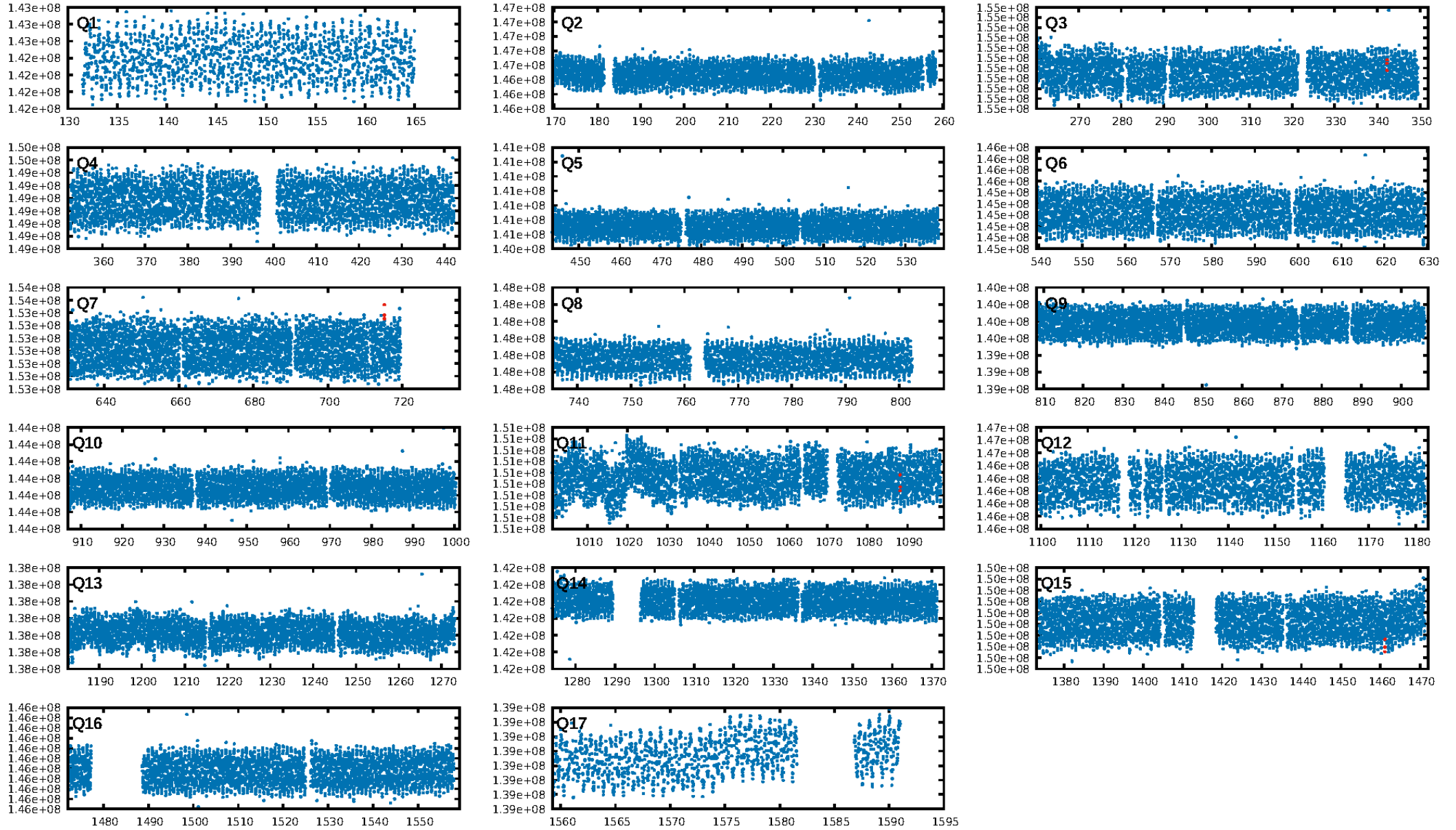
## DV Diagnostic Results:

ShortPeriod-sig: 0.8% [0.01σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 17.0%  
ModelChiSquareGof-sig: 37.8%  
**Bootstrap-pfa: 2.43e-10**  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: -16.69  
Centroid-sig: 85.2%  
Centroid-so: 7.540 arcsec [0.32σ]  
OotOffset-rm: 0.418 arcsec [0.69σ]  
KicOffset-rm: 0.453 arcsec [0.97σ]  
OotOffset-st: 0/4/0/0 [4]  
KicOffset-st: 0/4/0/0 [4]  
DiffImageQuality-fgm: 0.50 [2/4]  
DiffImageOverlap-fno: 1.00 [4/4]

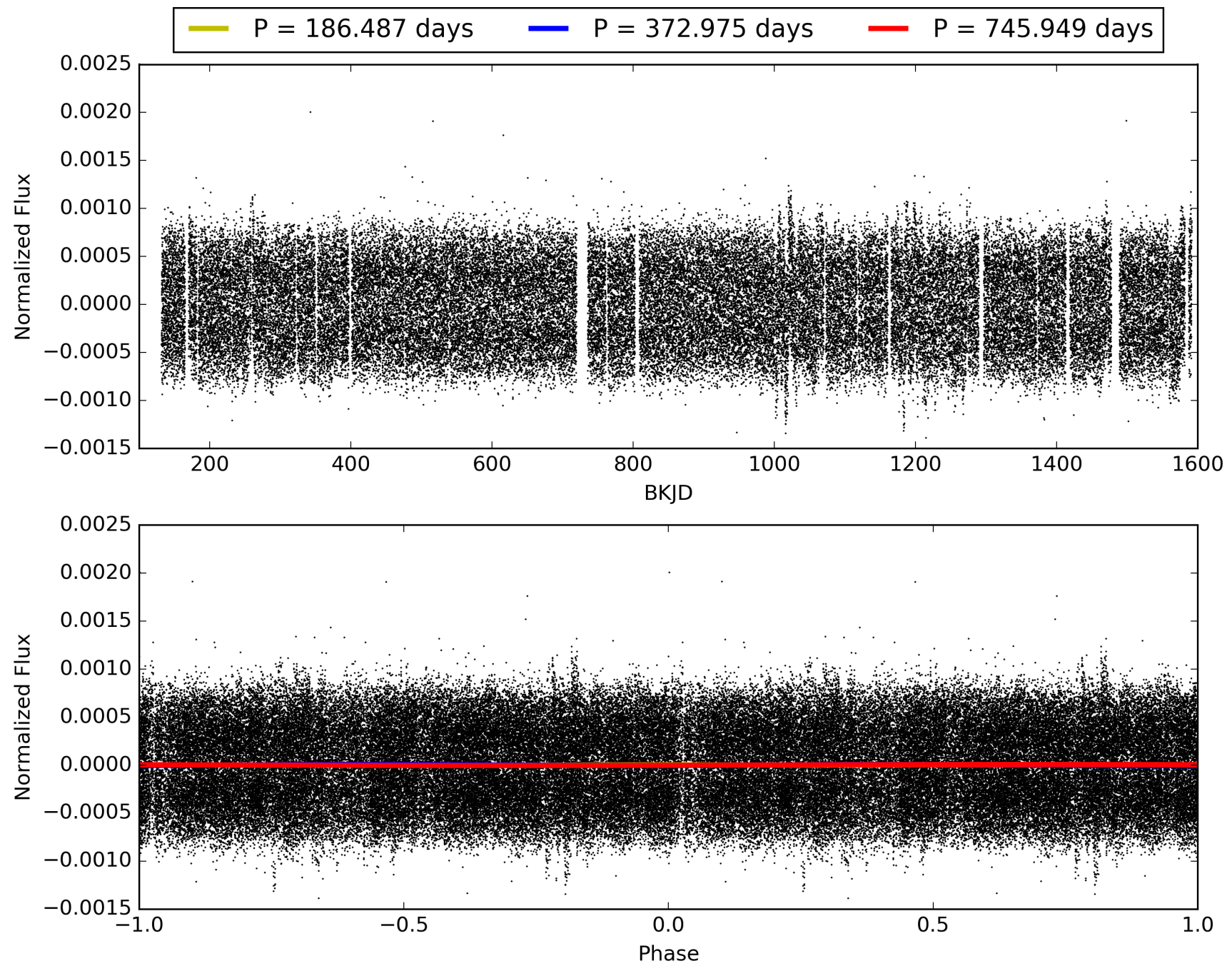
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 16:07:17 Z

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

# TCE 008630081-01, PDC Light Curves

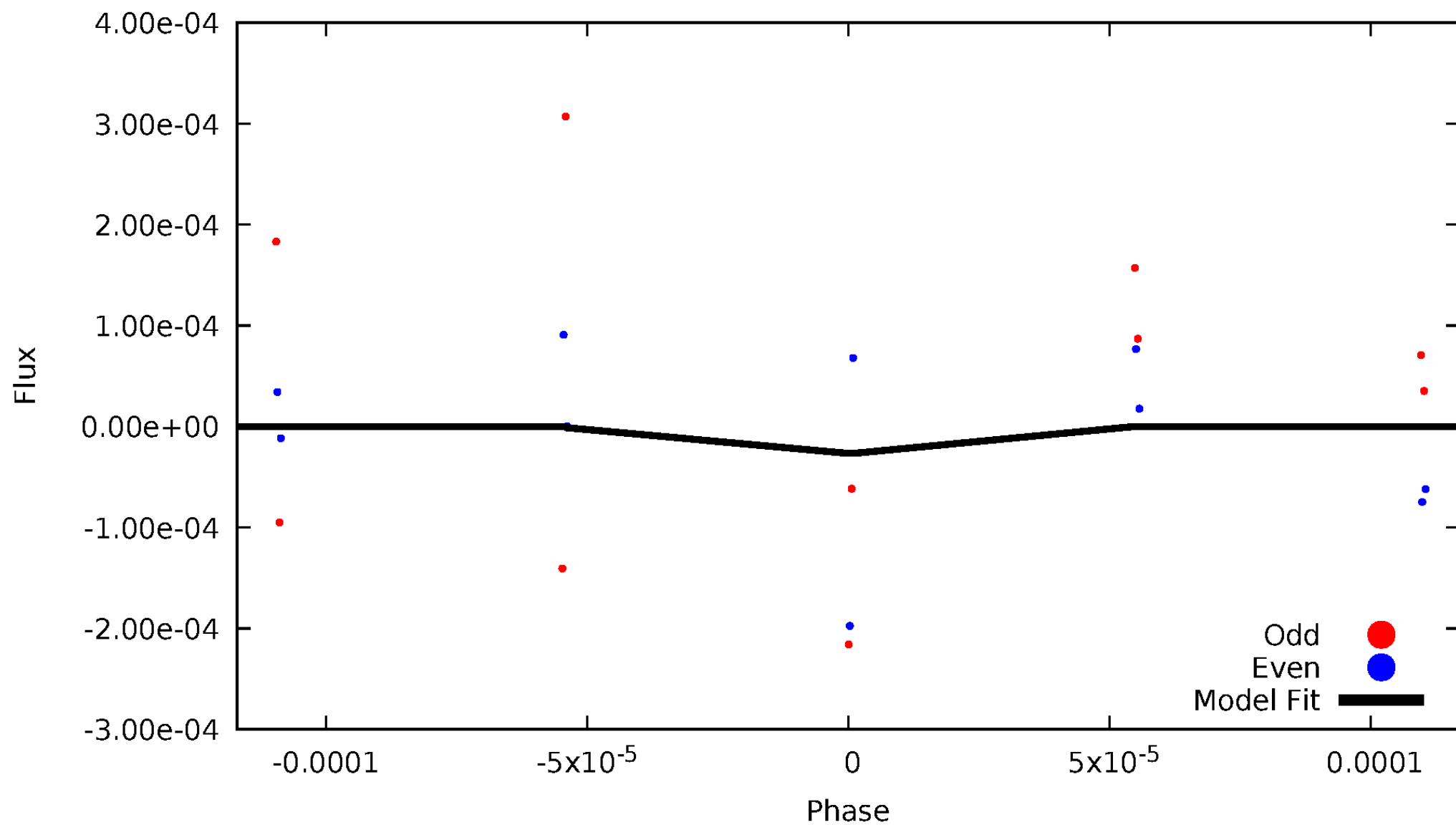


TCE 008630081-01



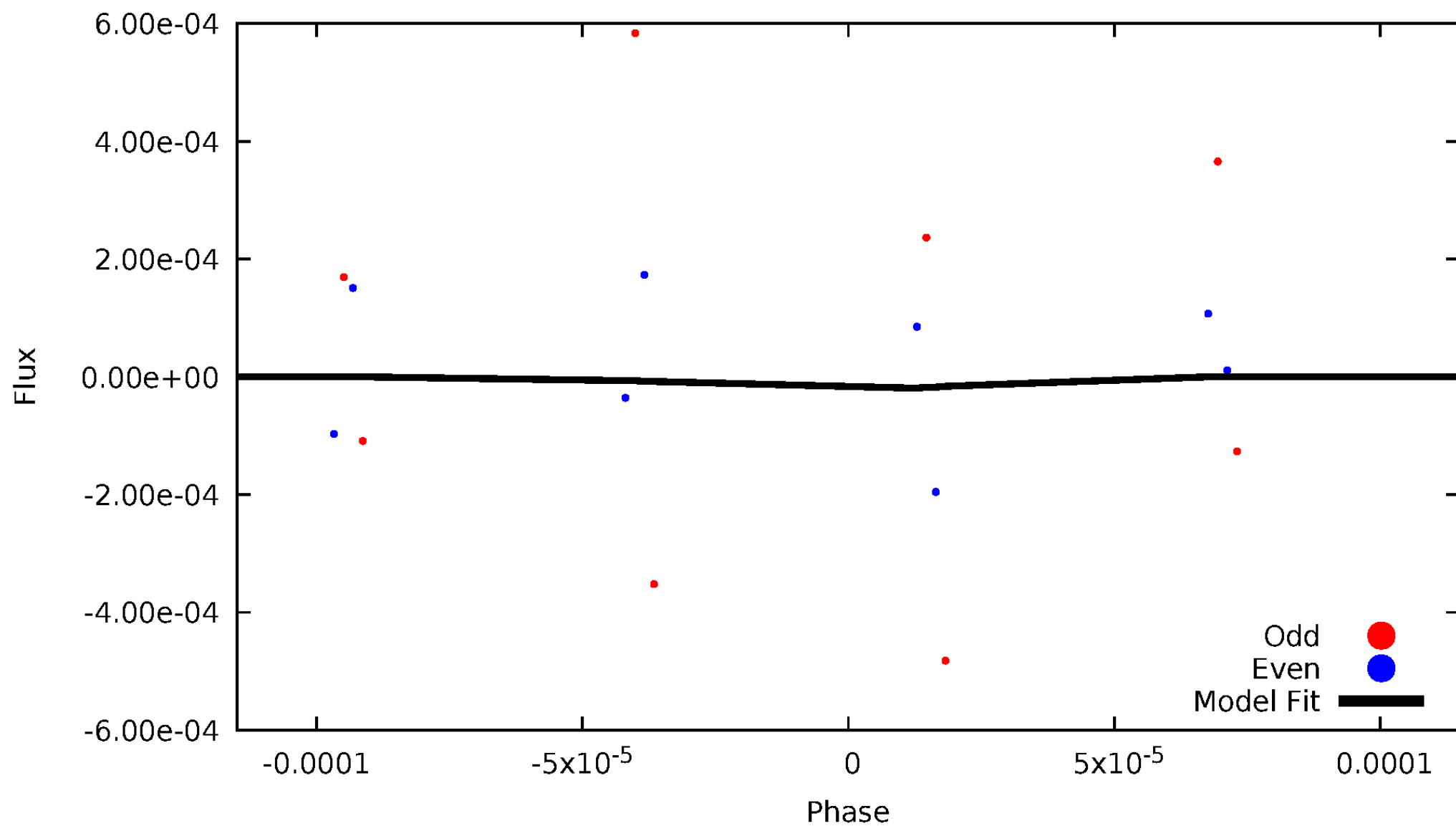
# DV Odd/Even

TCE 008630081-01

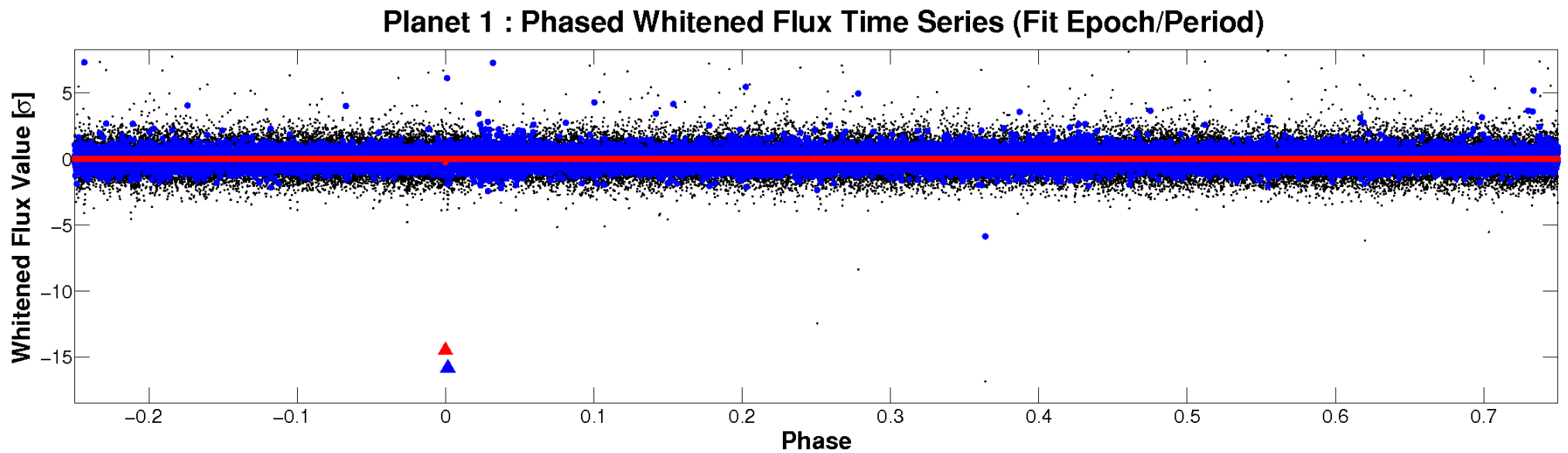
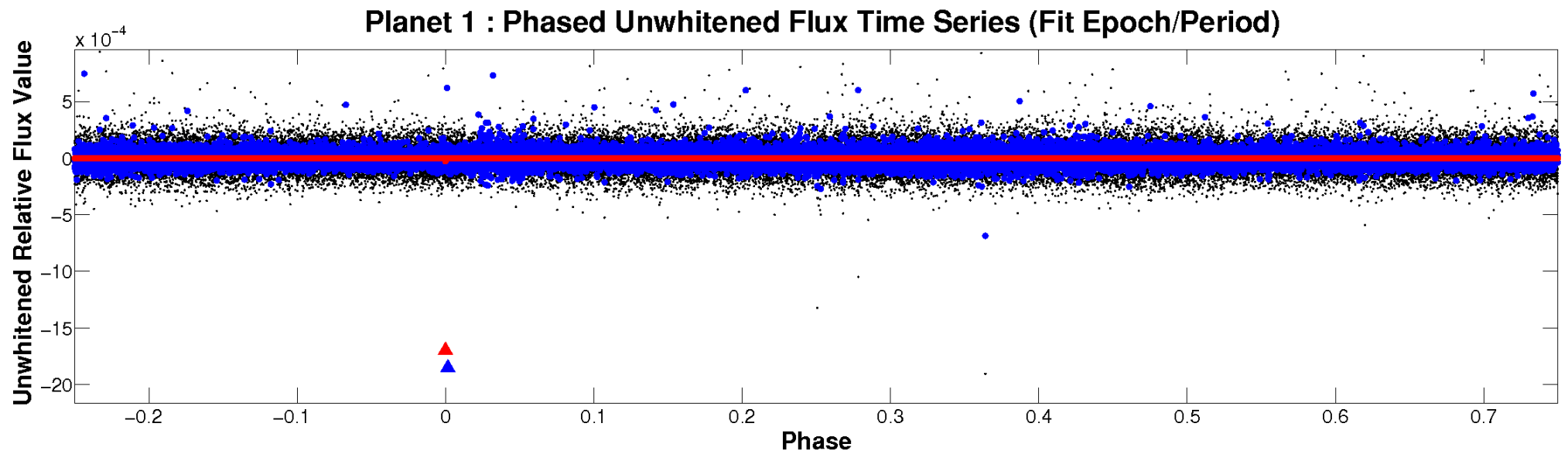


# ALT Odd/Even

TCE 008630081-01

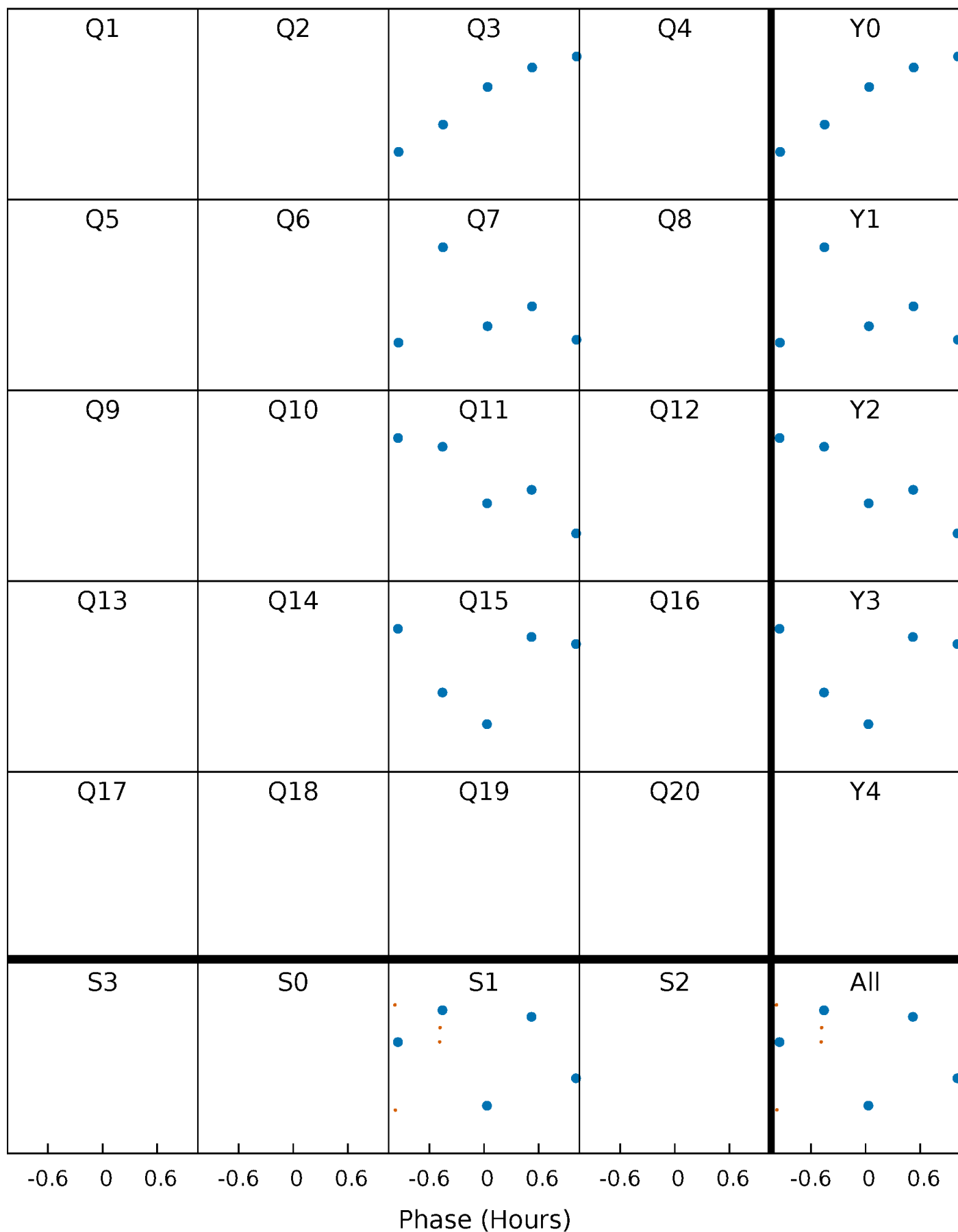


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

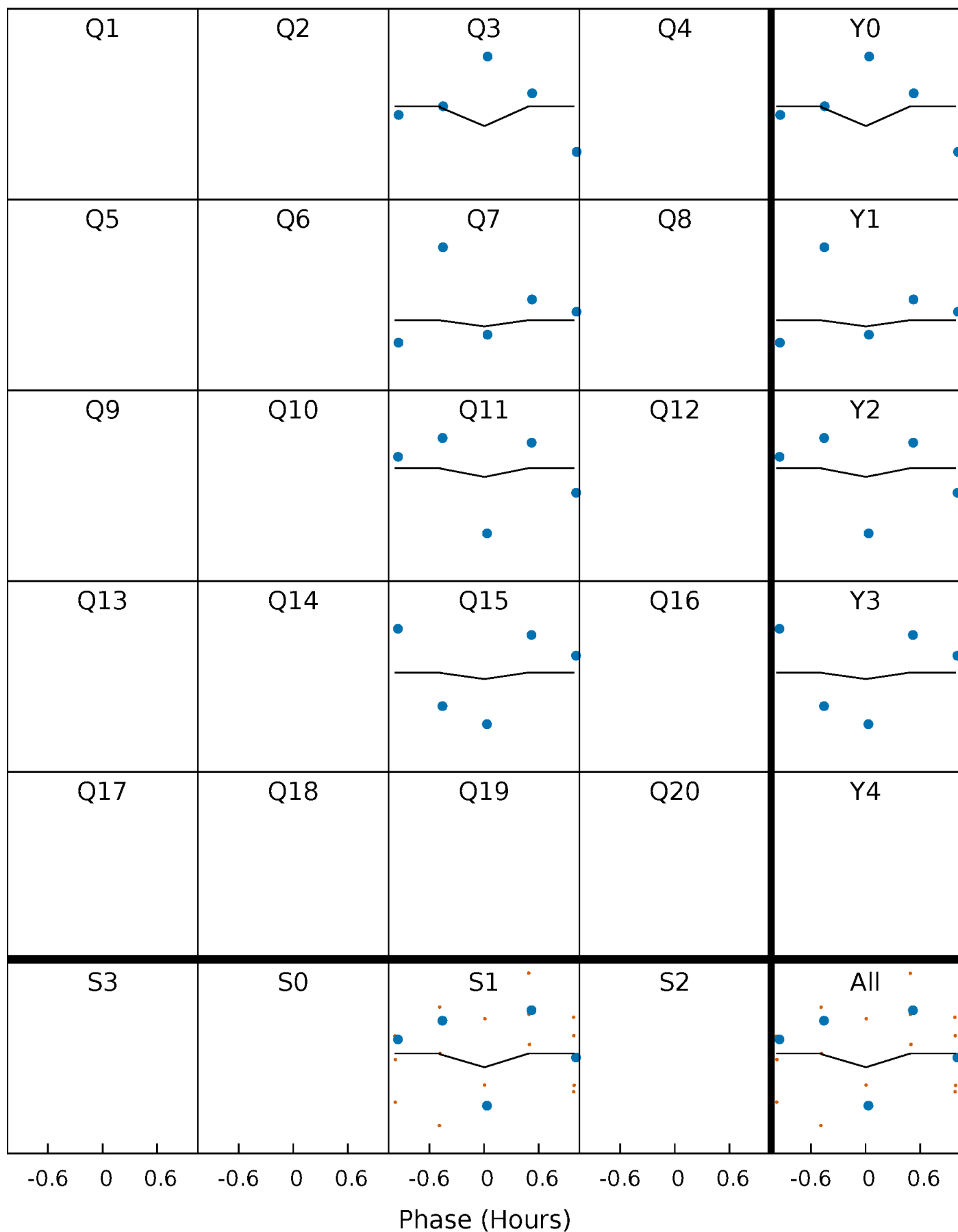
TCE 008630081-01 P=372.974551 Days  $T_0=342.221398$  (BKJD)





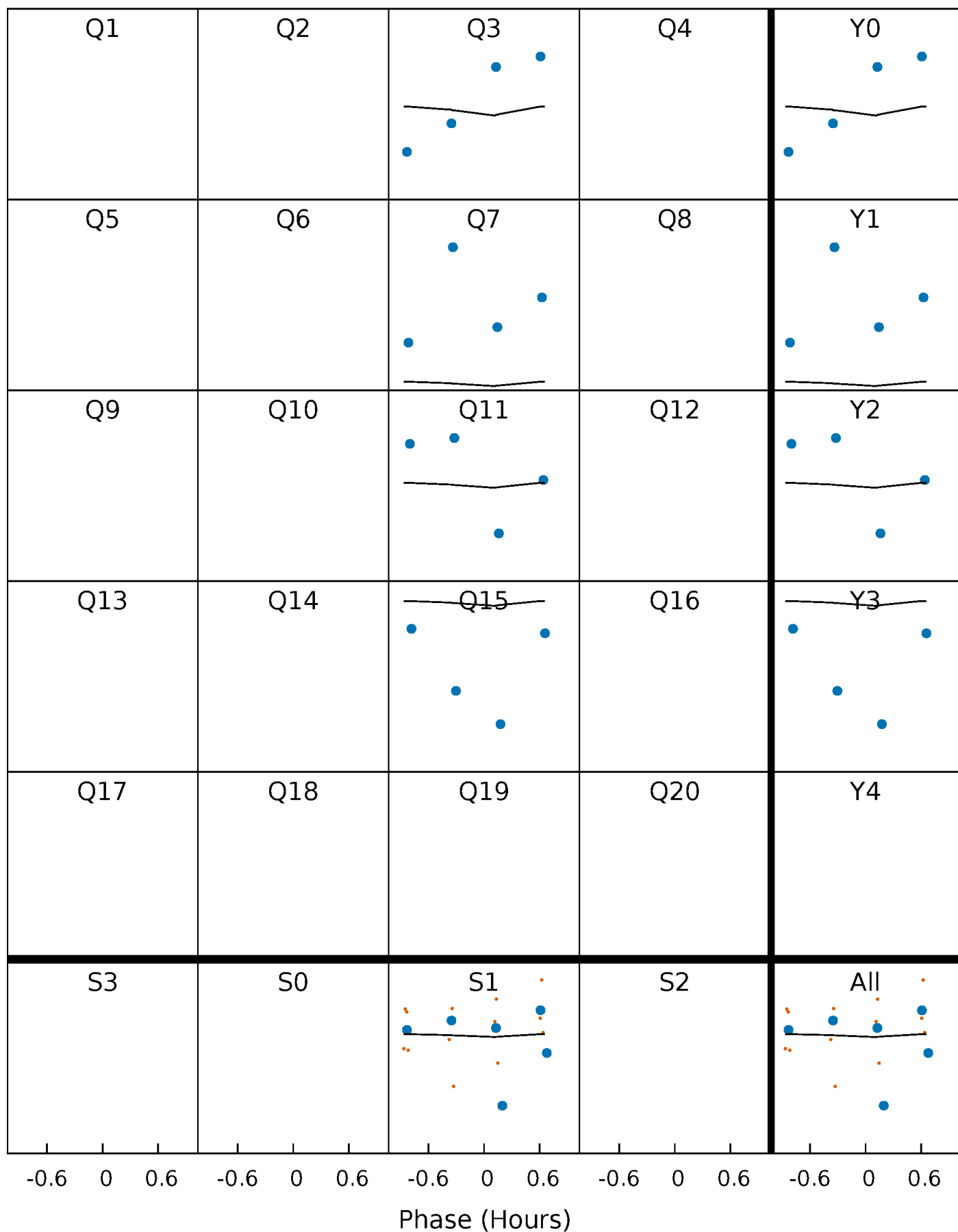
# DV Quarter-Phased Transit Curves

TCE 008630081-01 P=372.974551 Days  $T_0=342.221398$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

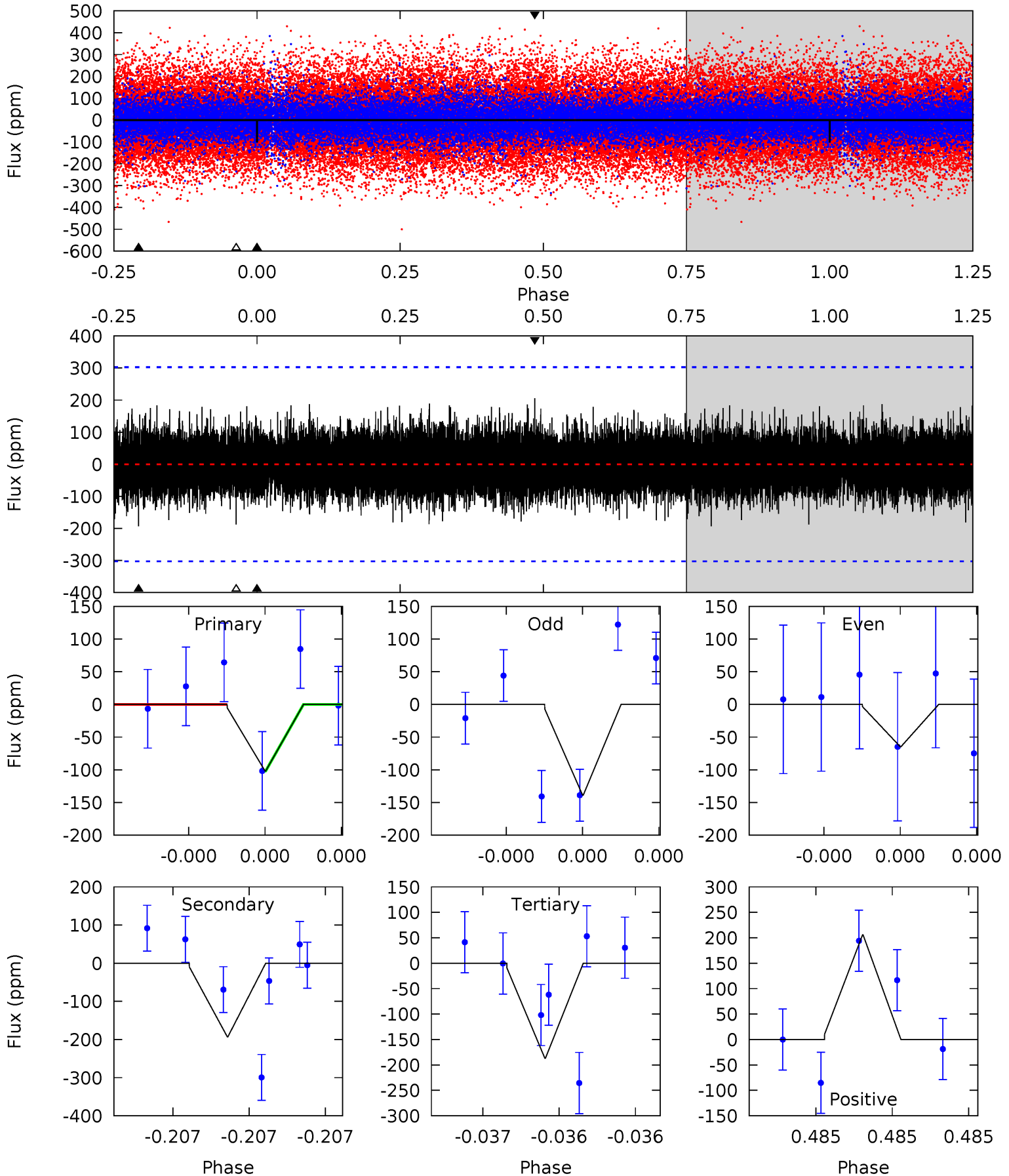
TCE 008630081-01 P=372.973771 Days  $T_0=342.216939$  (BKJD)



# DV Model-Shift Uniqueness Test

008630081-01, P = 372.974551 Days, E = 342.221398 Days

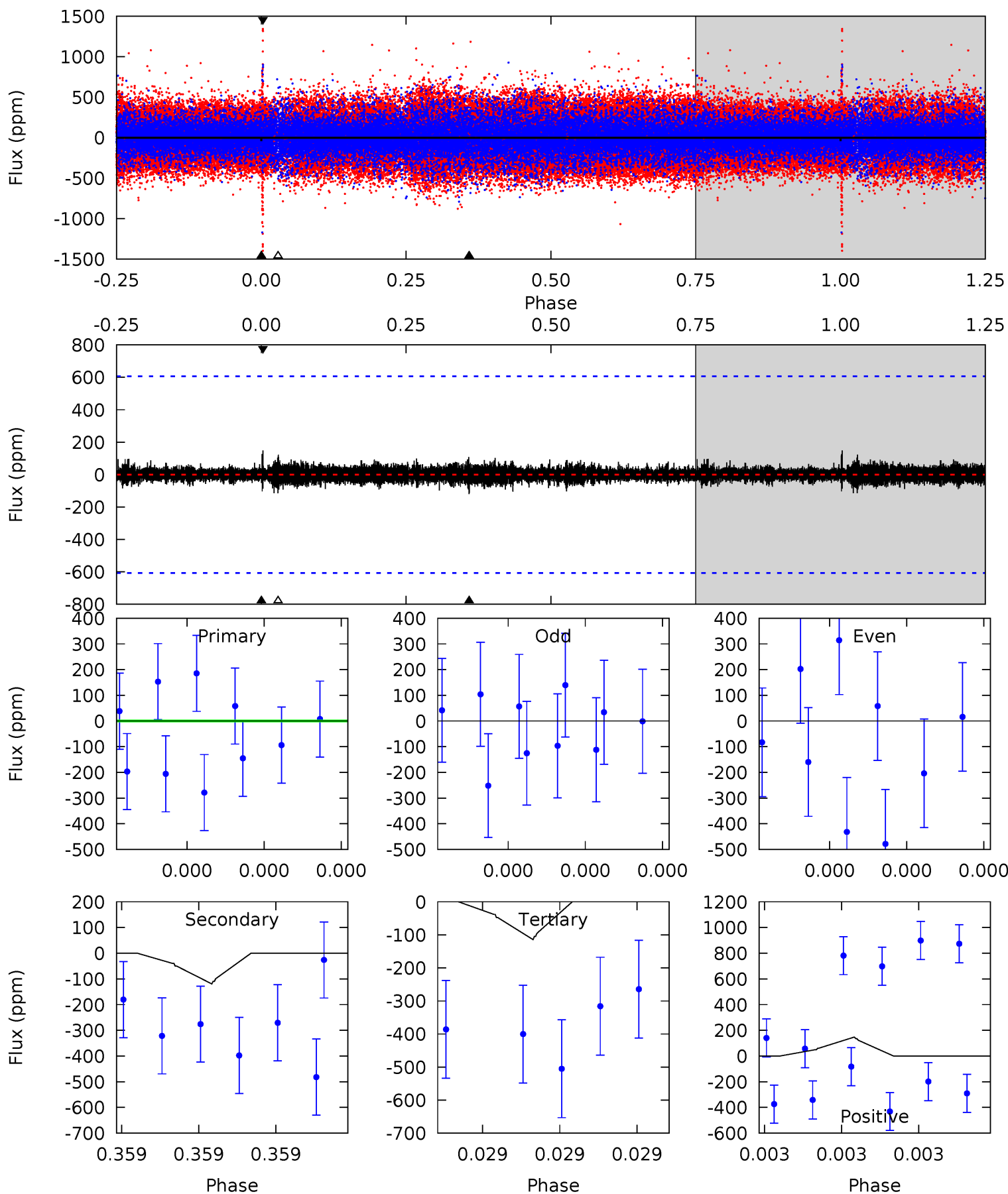
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1.96	3.72	3.60	3.97	5.83	3.87	0.88	-1.64	-2.00	0.12	-0.25	0.79	1.00	0.52	0.00



# Alt Model-Shift Uniqueness Test

008630081-01, P = 372.973771 Days, E = 342.216939 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0.42	1.15	1.10	1.42	5.83	3.87	0.23	-0.68	-1.01	0.05	-0.27	0.25	2.99	0.55	0.02



### Stellar Parameters For KIC 008630081

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$9354^{+301}_{-414}$	$4.061^{+0.185}_{-0.185}$	$0.070^{+0.150}_{-0.700}$	$2.339^{+0.848}_{-0.694}$	$2.296^{+0.345}_{-0.641}$	$0.253^{+0.274}_{-0.130}$
	+3%/-4%	+5%/-5%	+214%/-1000%	+36%/-30%	+15%/-28%	+108%/-51%
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 008630081-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-193 \pm 52$	$3016.30^{+3034.59}_{-2082.55}$	$758^{+62}_{-60}$	$-1609^{+148}_{-60}$	$0.021^{+0.195}_{-0.016}$
Alt.	$-119 \pm 104$	$2976.74^{+3479.13}_{-2169.31}$	$763^{+64}_{-62}$	$-1626^{+85}_{-53}$	$0.009^{+0.111}_{-0.008}$

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

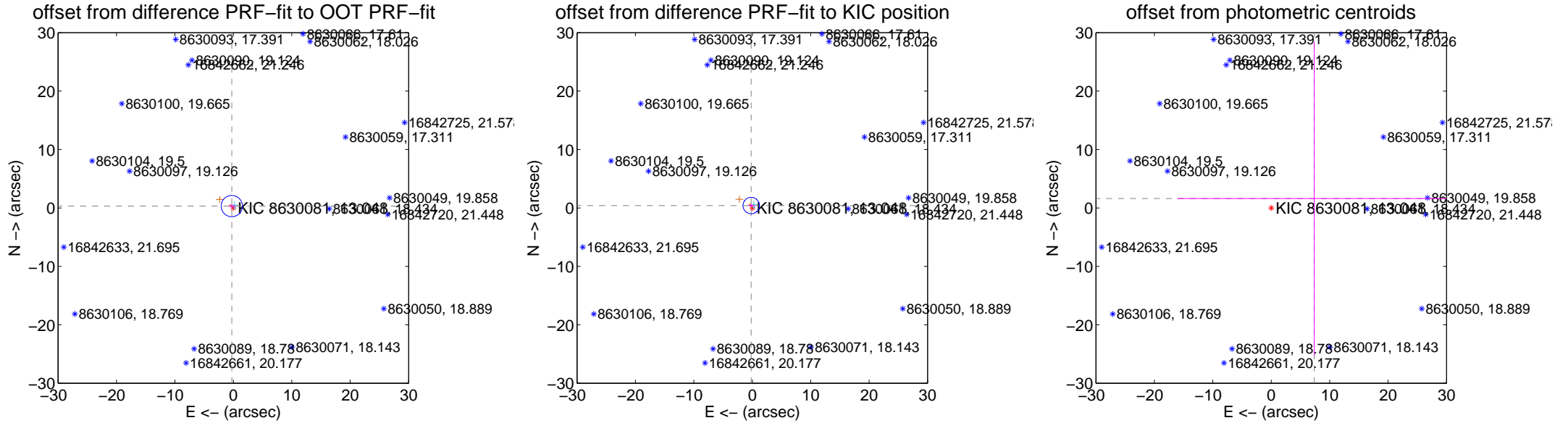
## DV Centroid Data

Supplemental centroid analysis for 008630081-01. Kepler magnitude: 13.05. Transit SNR 0.43

There are 2 quarters with good PRF difference image offsets

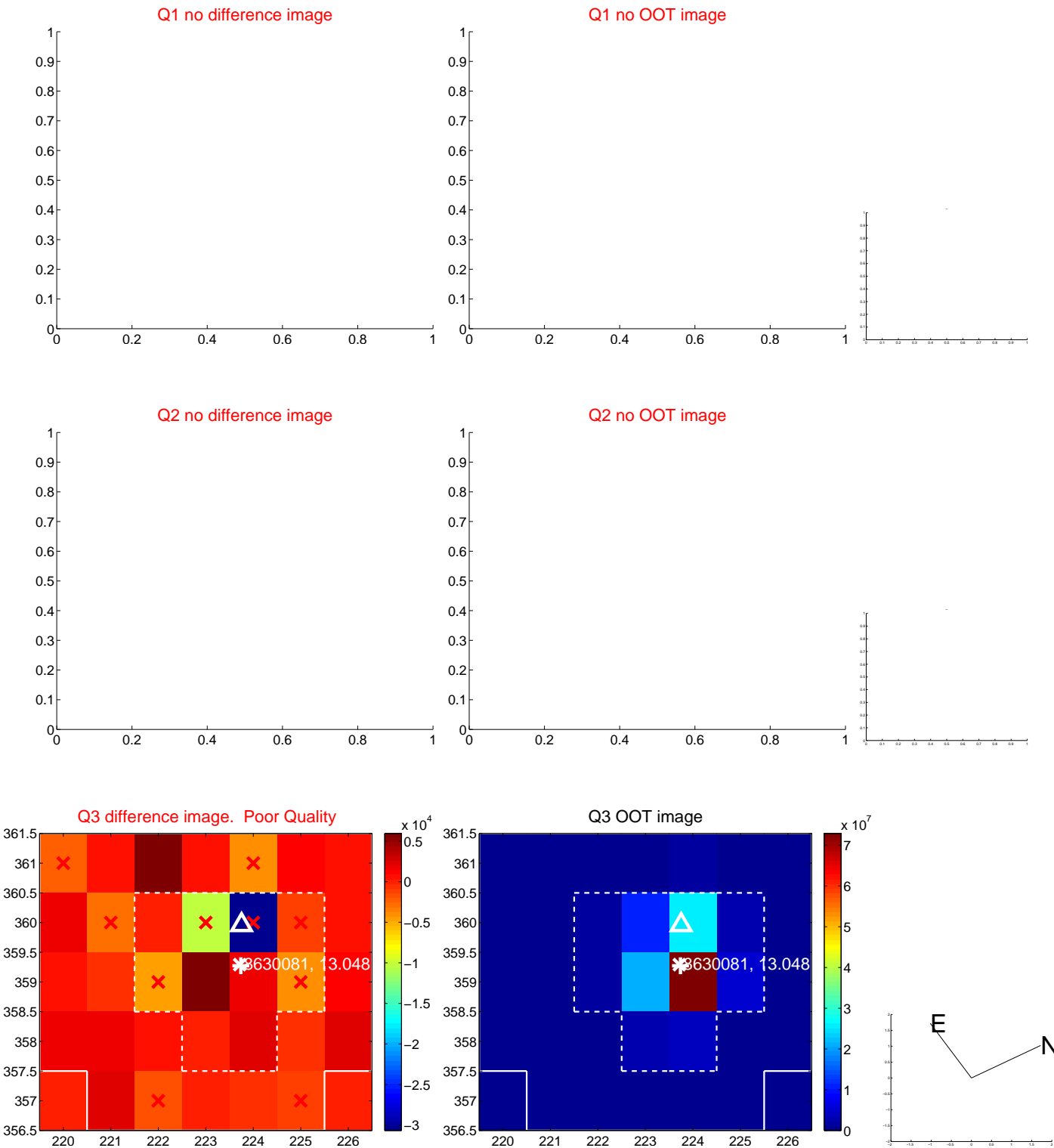
The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.418 \pm 0.607$	0.69	$0.267 \pm 0.592$	$0.322 \pm 0.310$
PRF-fit source offset from KIC position	$0.453 \pm 0.467$	0.97	$0.190 \pm 0.545$	$0.411 \pm 0.275$
photometric centroid source offset	$7.54 \pm 23.60$	0.32	$-7.37 \pm 23.43$	$1.61 \pm 26.85$

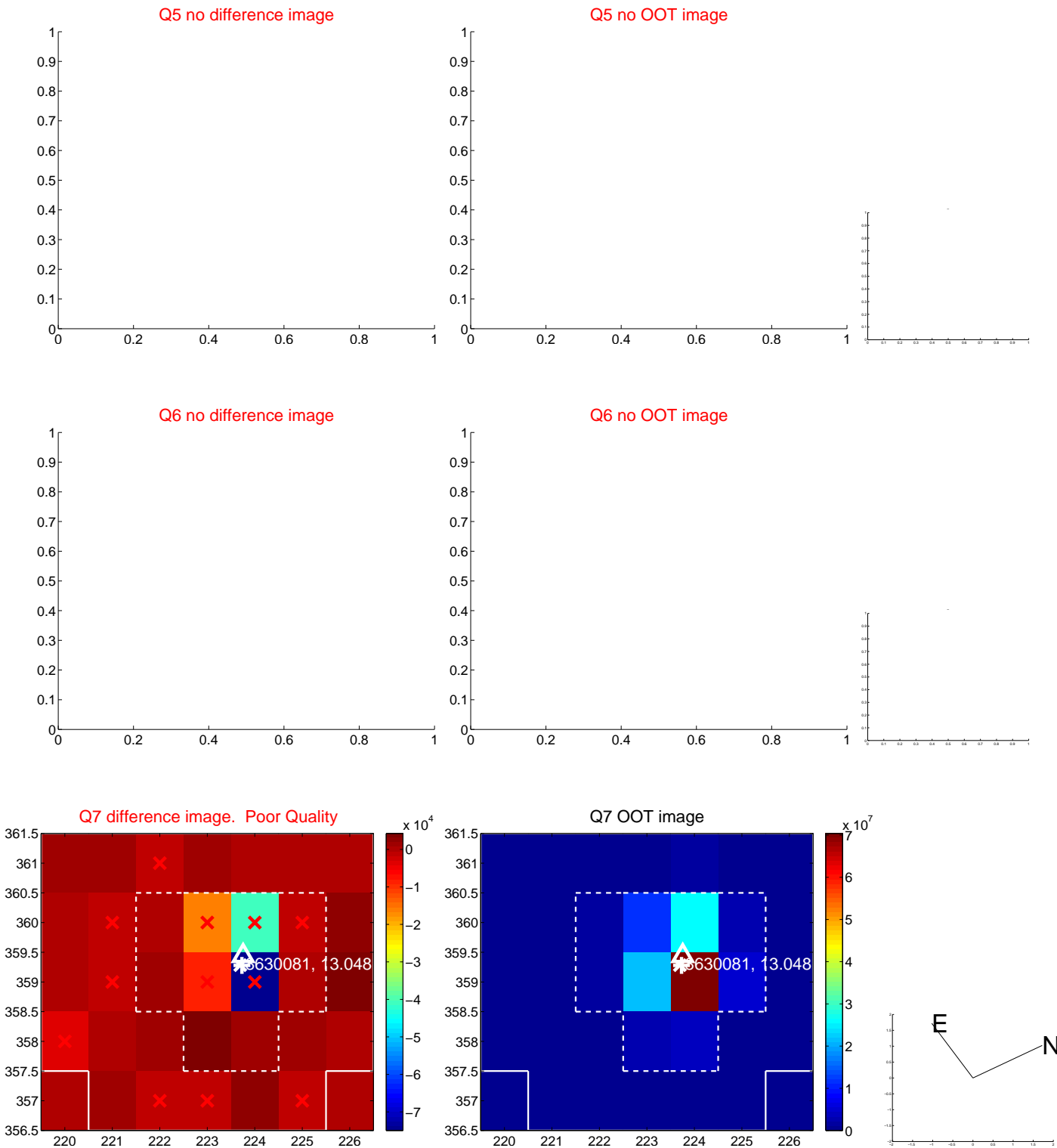


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

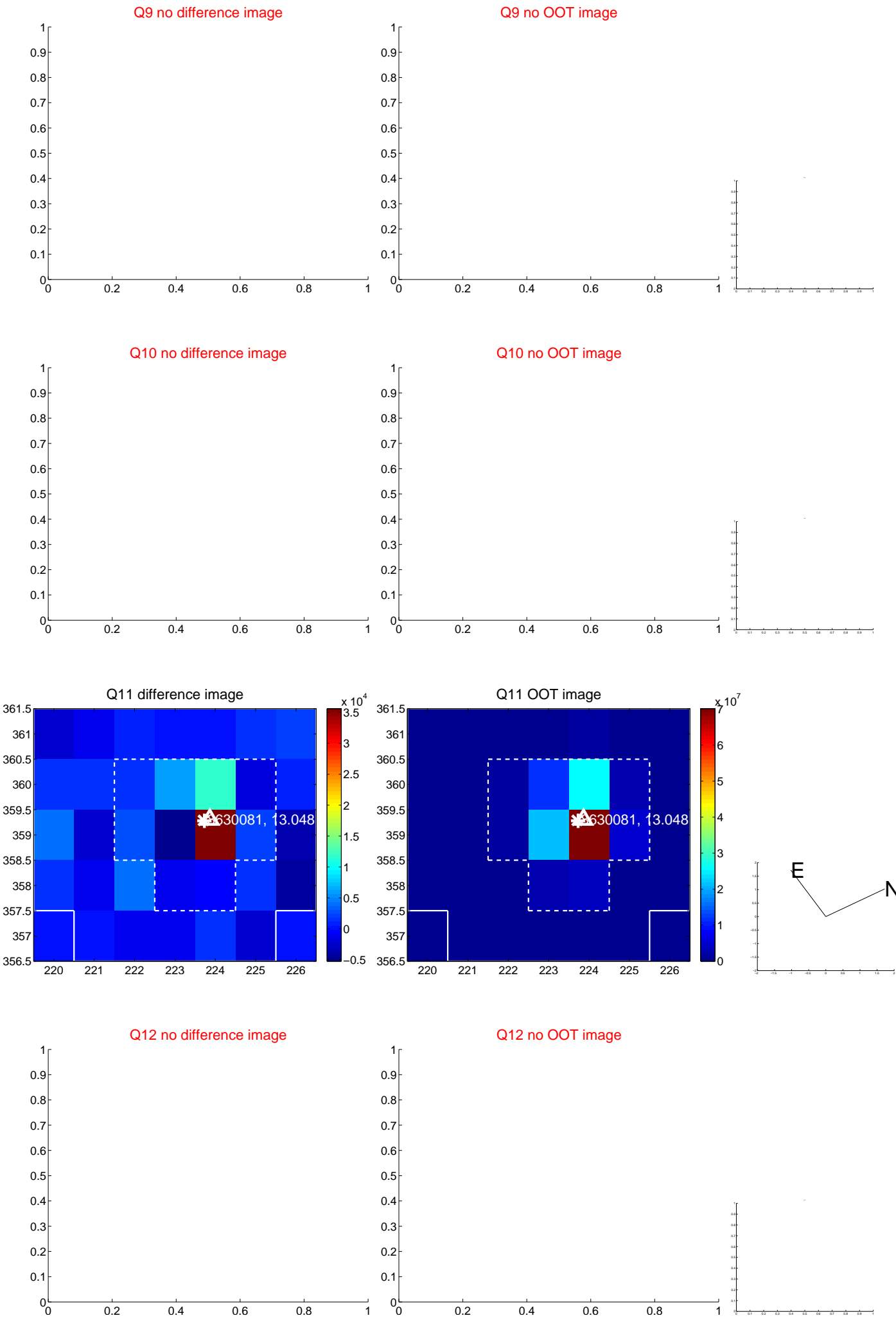


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

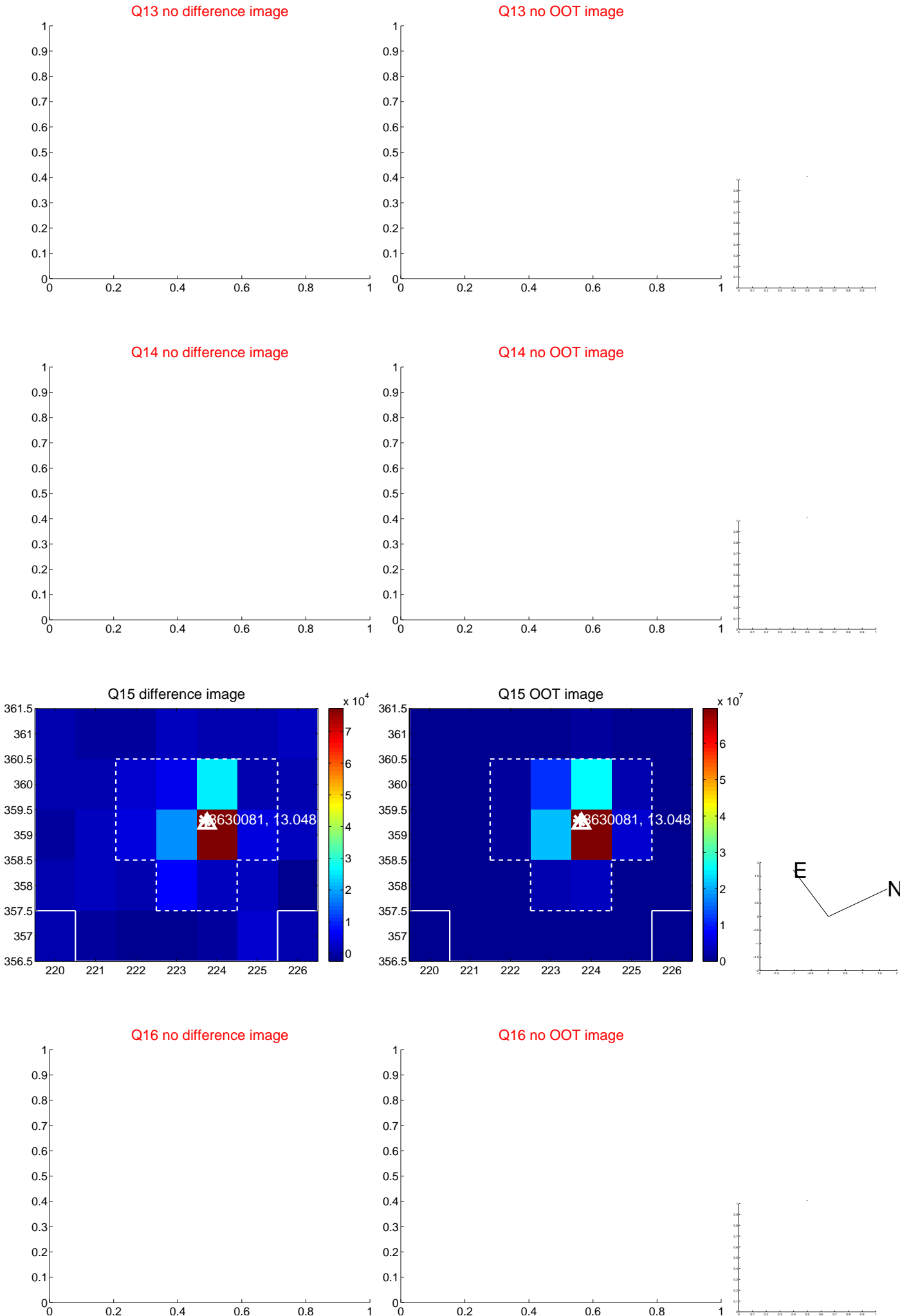




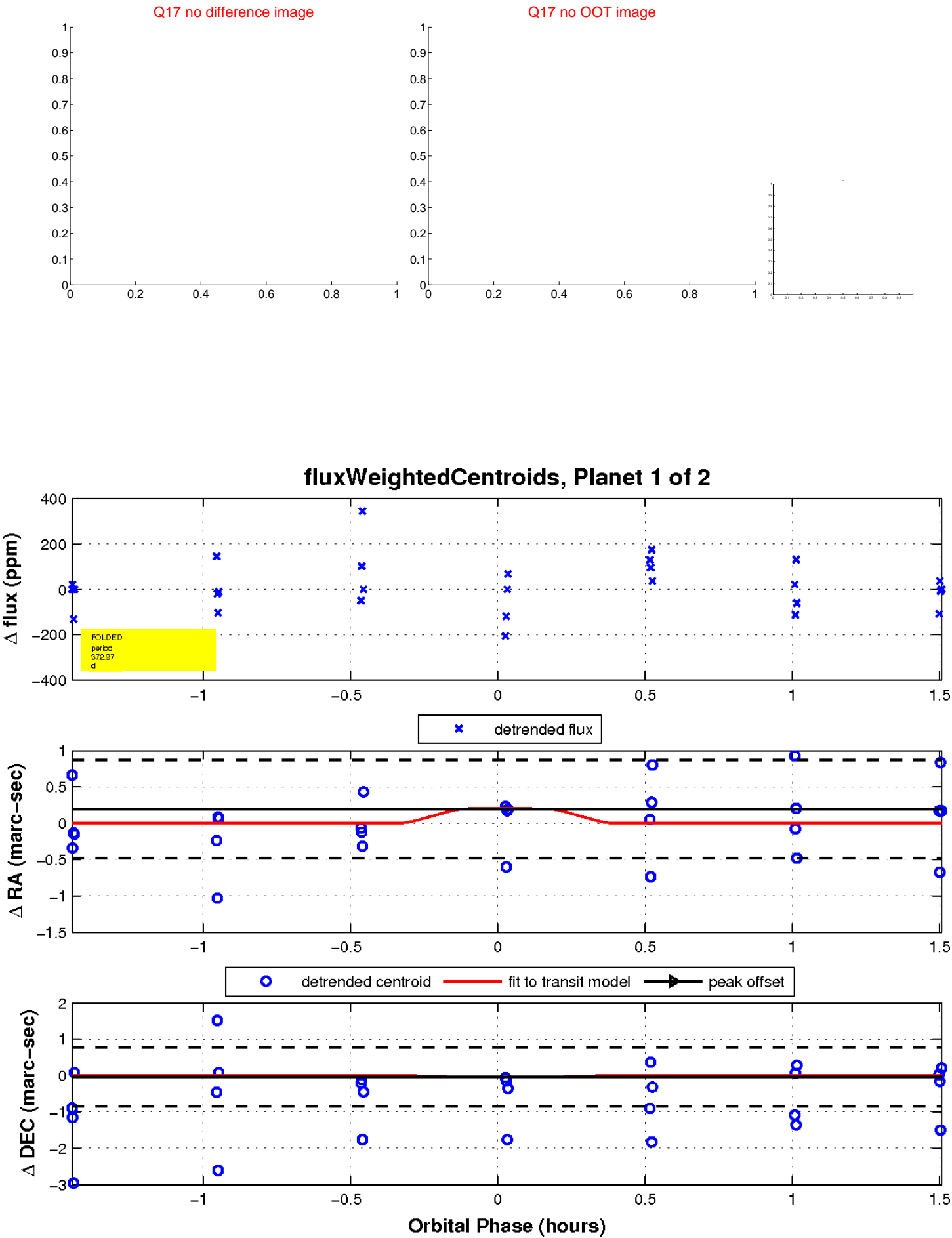
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.

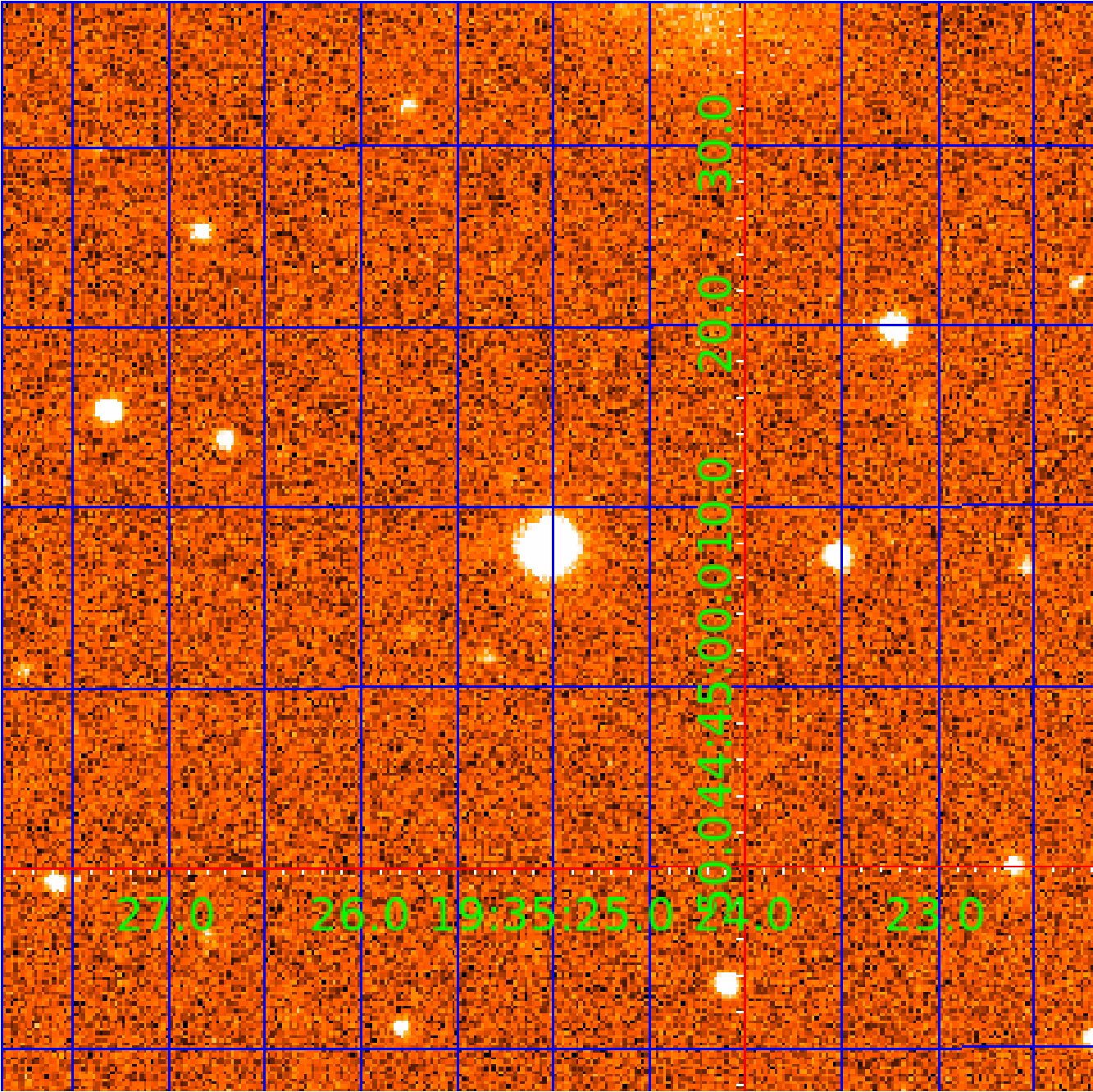


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 008630081

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008630081-01	OBS	No	372.974551	342.221398	26.7	0.524	7.7	0.4	2.34	9354	1.28	20.96
008630081-02	OBS	No	372.972678	342.834487	137.9	4.199	7.4	4.7	2.34	9354	3.13	20.96

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008630081-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_TRACKER—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
008630081-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_TRACKER—LPP_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—SAME_NTL_PERIOD—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.

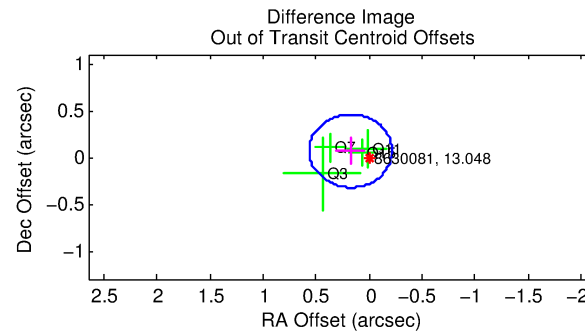
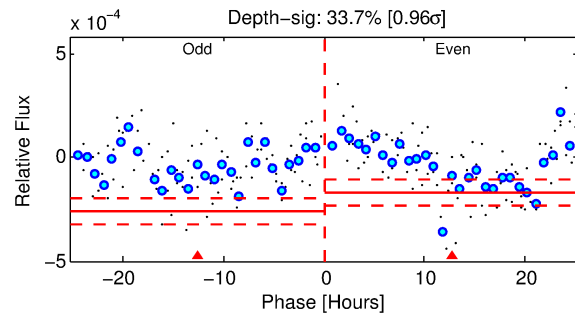
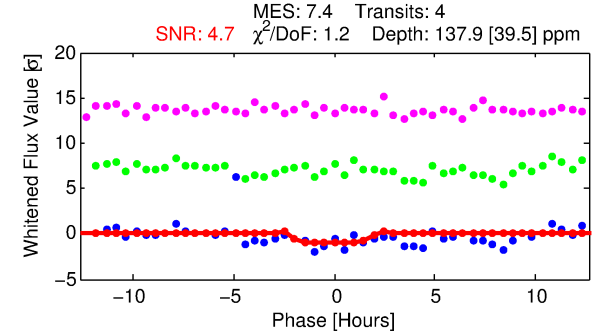
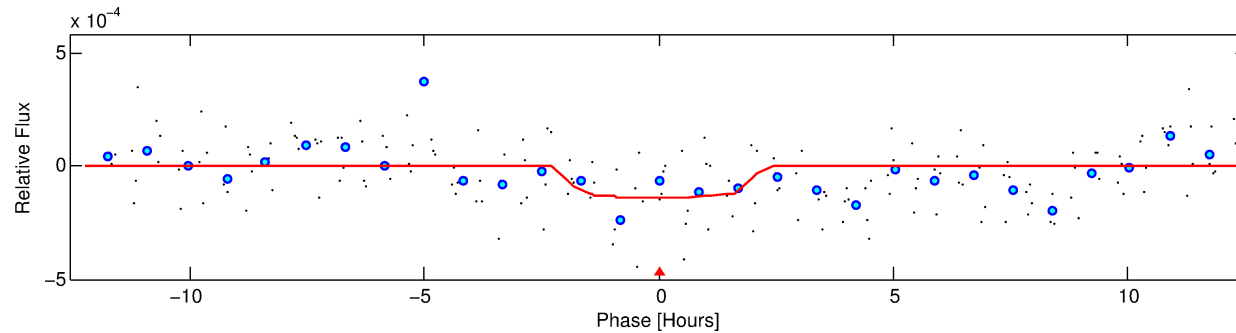
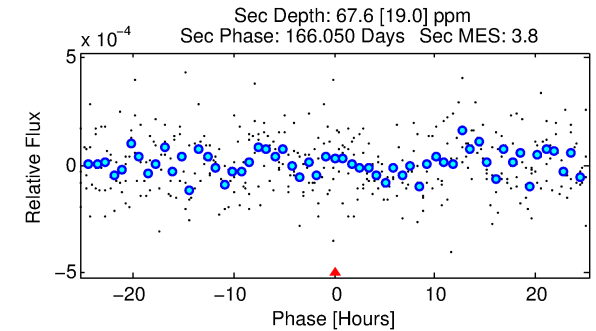
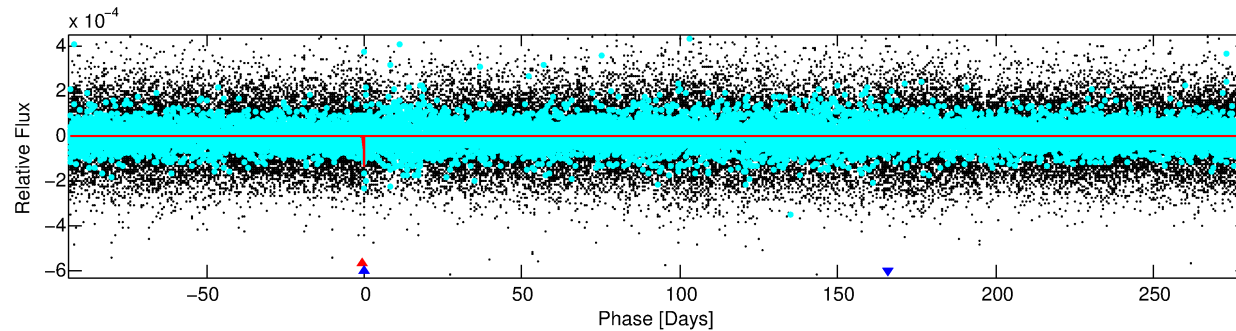
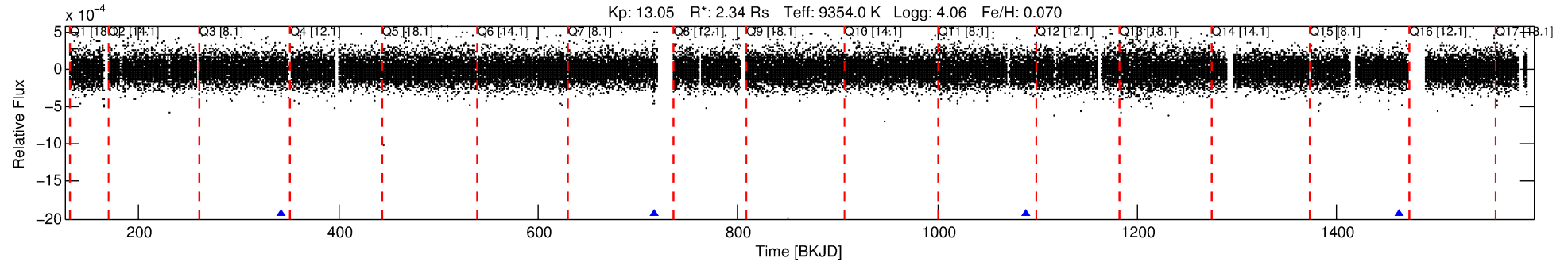
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 008630081-02

No Significant Match Found

# DV One-Page Summary

KIC: 8630081 Candidate: 2 of 2 Period: 372.973 d



## DV Fit Results:

Period = 372.97268 [0.00994] d  
Epoch = 342.8345 [0.0172] BKJD  
Rp/R\* = 0.0123 [0.0161]  
a/R\* = 331.42 [3282.82]  
b = 0.89 [2.40]  
Seff = 20.96 [8.65]  
Teq = 546 [56] K  
Rp = 3.14 [4.26] Re  
a = 1.3381 [0.3751] AU  
Ag = 6776.74 [18013.50] [0.38σ]  
Teffp = 7653 [5047] K [1.41σ]

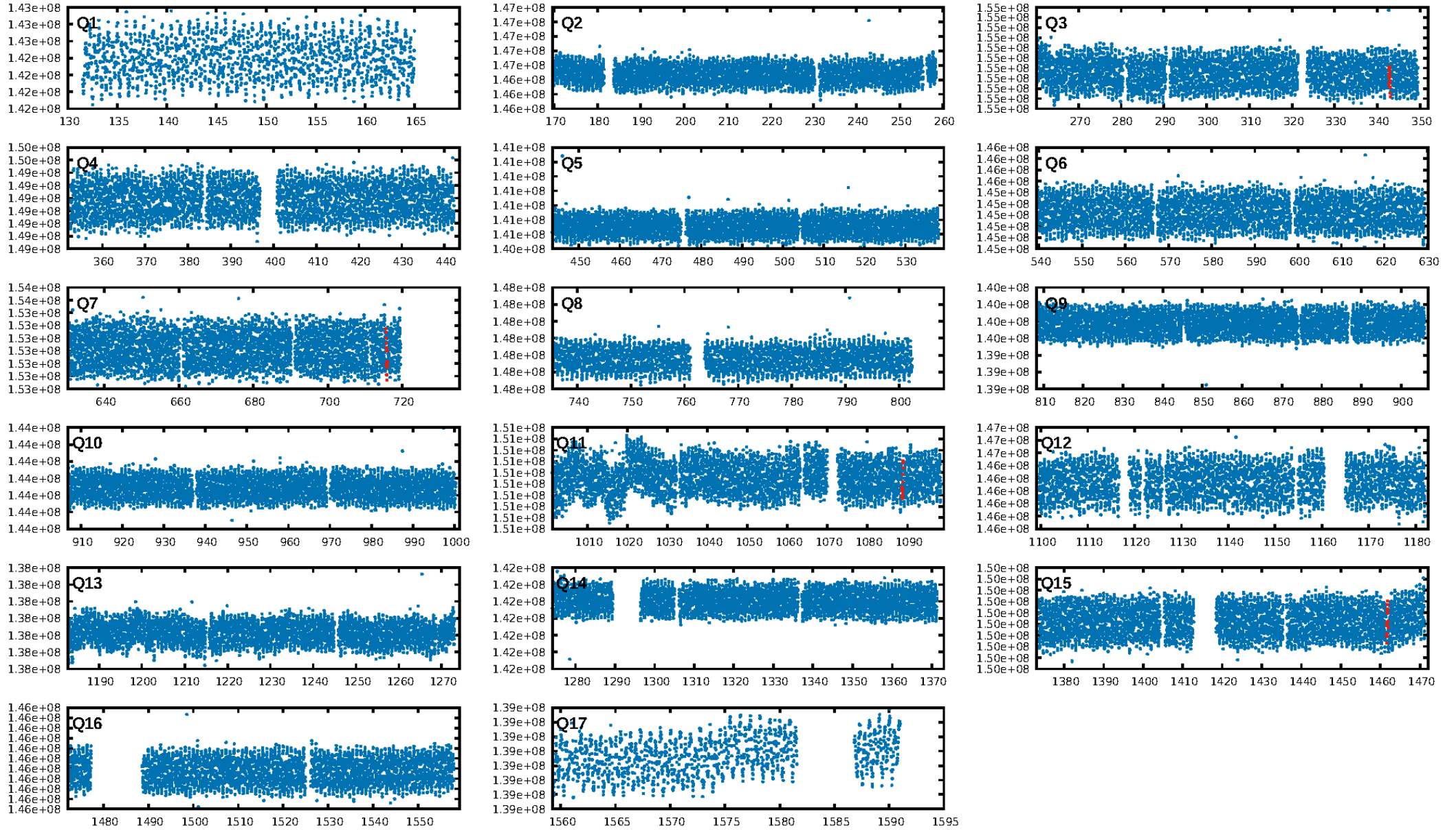
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.8% [0.01σ]  
ModelChiSquare2-sig: 99.6%  
ModelChiSquareGof-sig: 60.7%  
**Bootstrap-pfa: 8.46e-10**  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: -1.709  
Centroid-sig: 3.8%  
Centroid-so: 3.147 arcsec [1.53σ]  
OotOffset-rm: 0.188 arcsec [1.45σ]  
OotOffset-st: 0/4/0/0 [4]  
KicOffset-rm: 0.181 arcsec [1.34σ]  
KicOffset-st: 0/4/0/0 [4]  
DiffImageQuality-fgm: 0.50 [2/4]  
DiffImageOverlap-fno: 1.00 [4/4]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 16:07:33 Z

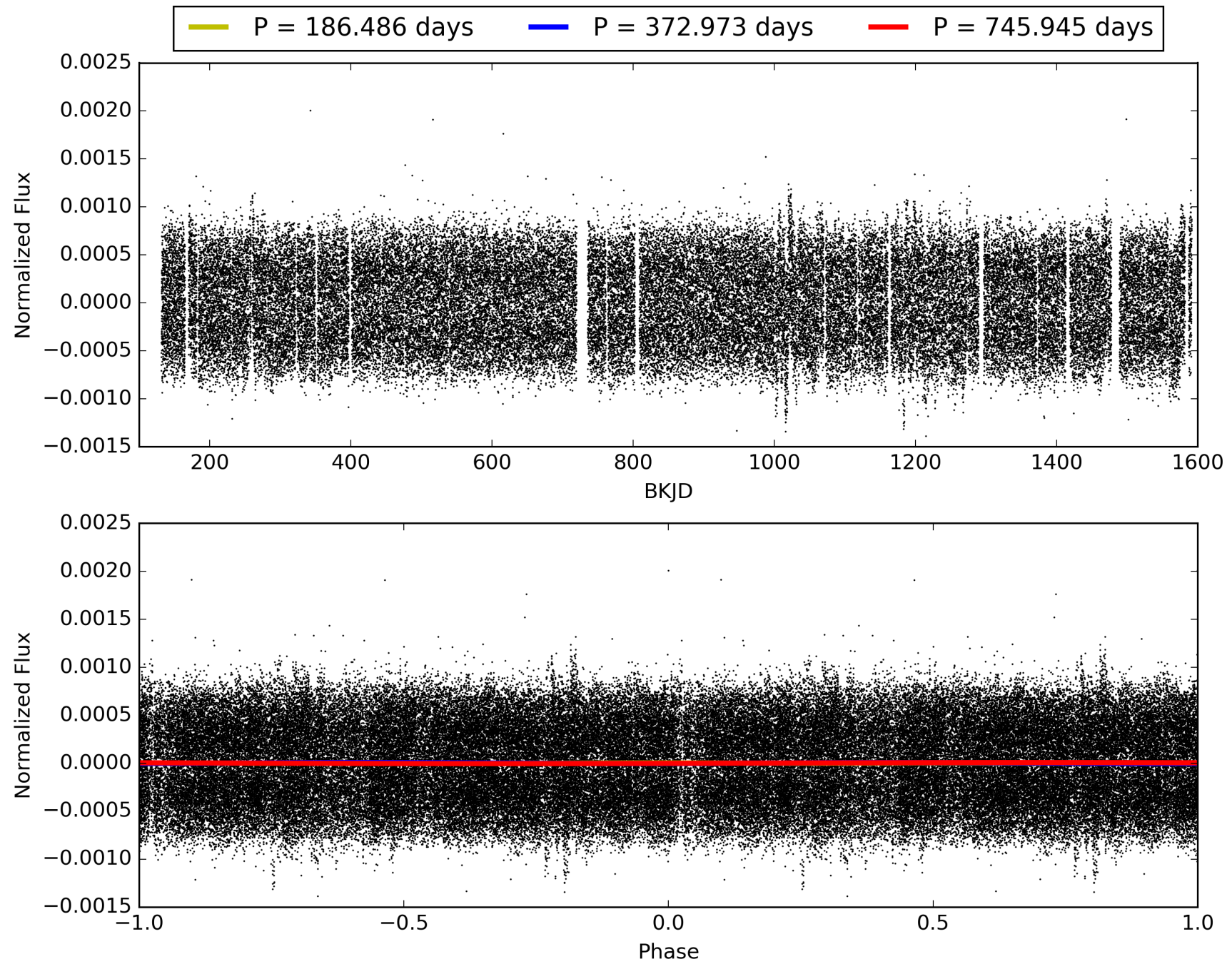
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 008630081-02, PDC Light Curves





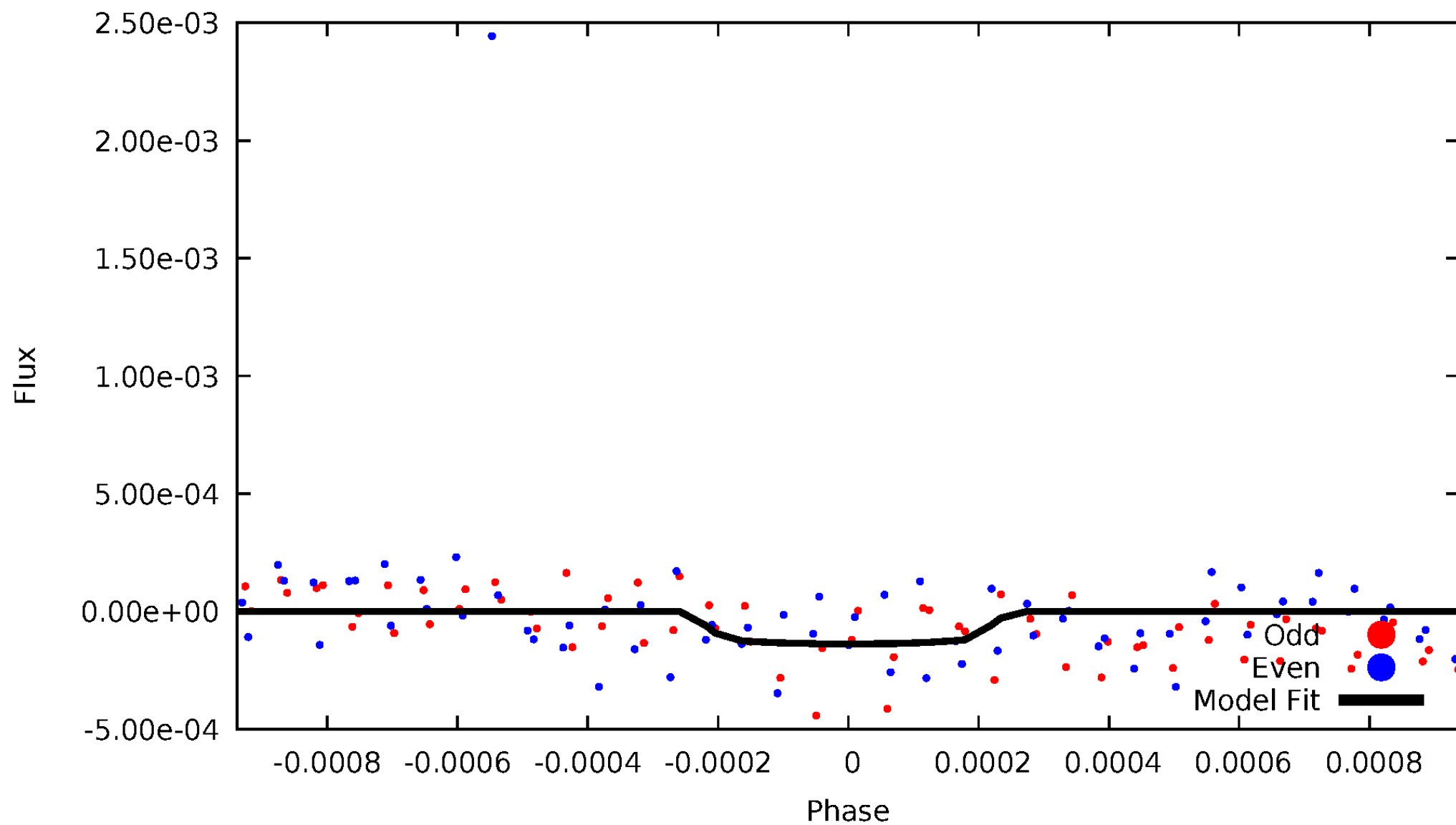
TCE 008630081-02





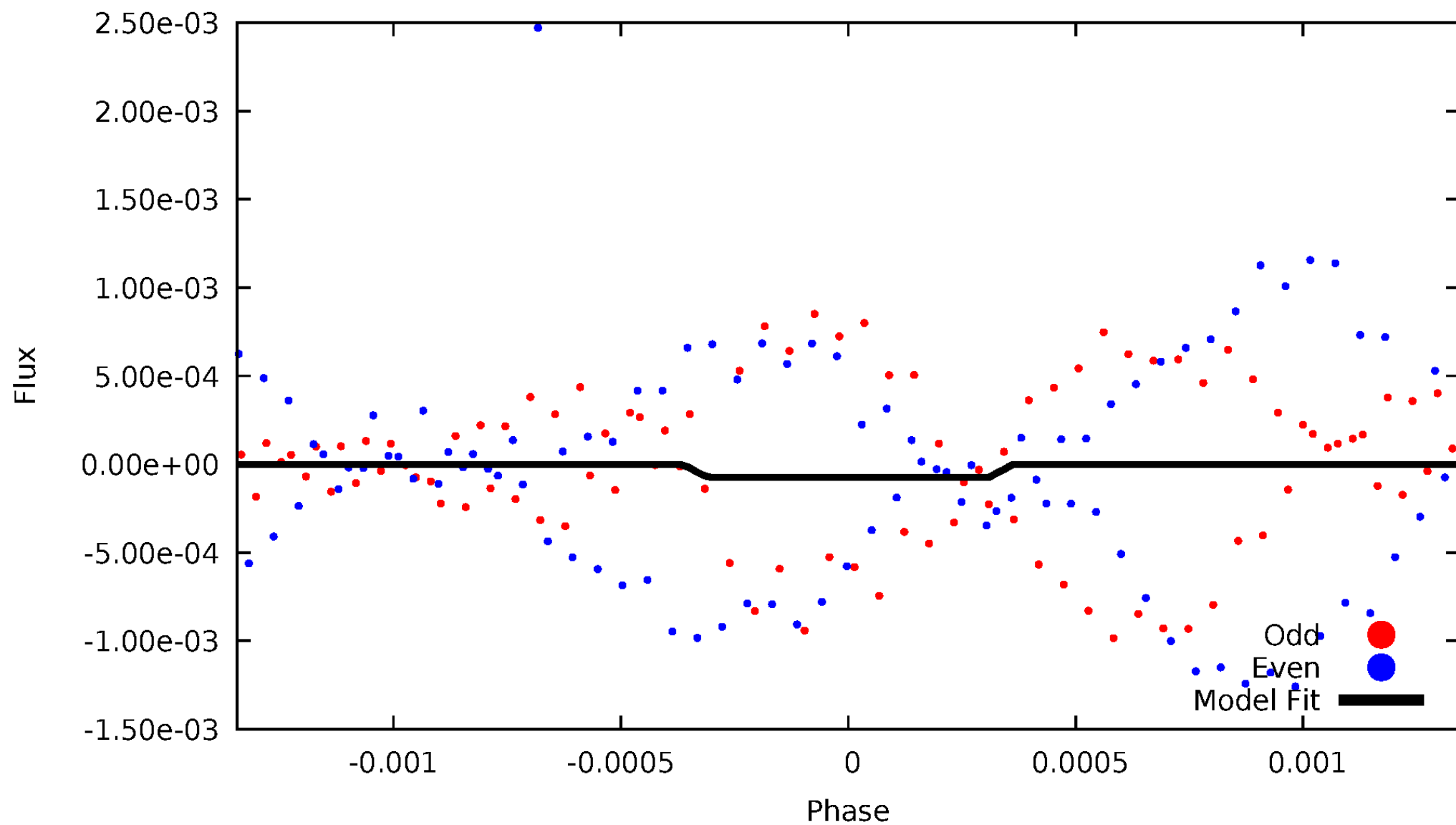
# DV Odd/Even

TCE 008630081-02



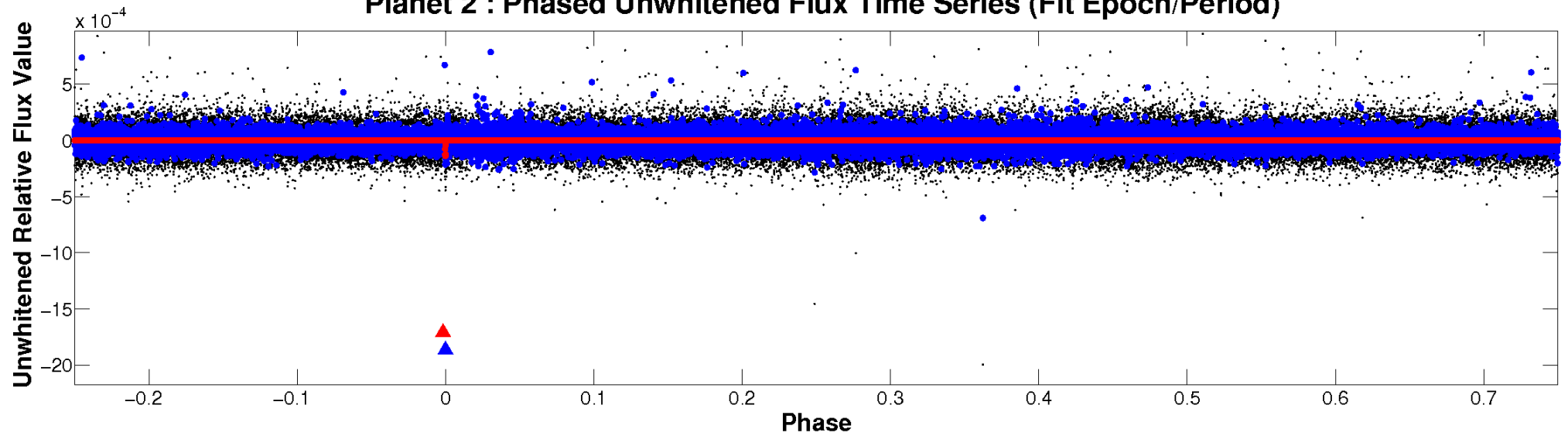
# ALT Odd/Even

TCE 008630081-02

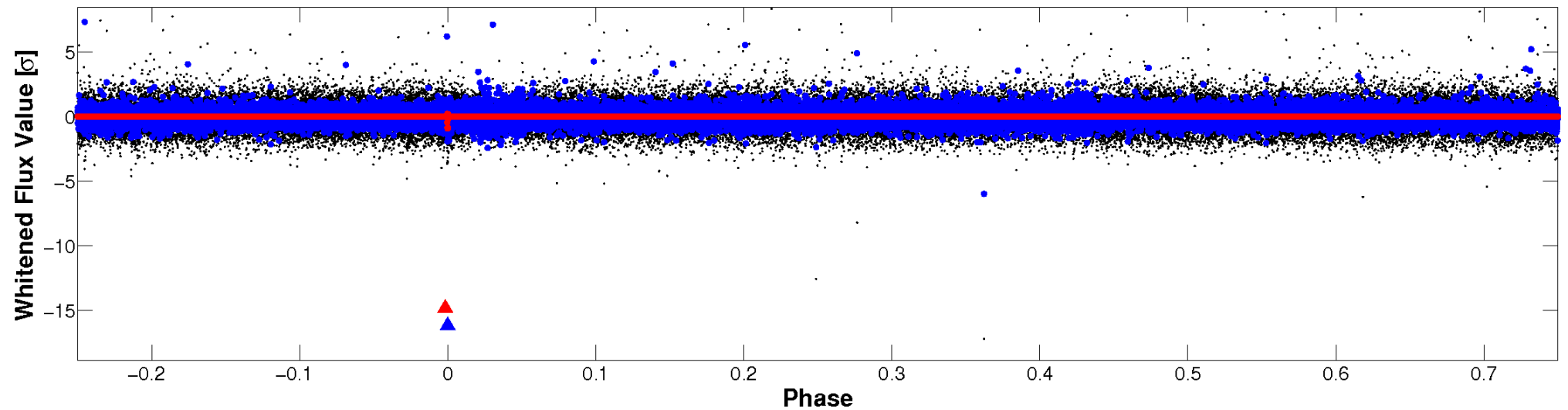


# Non-Whitened Vs. Whitened Light Curve

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

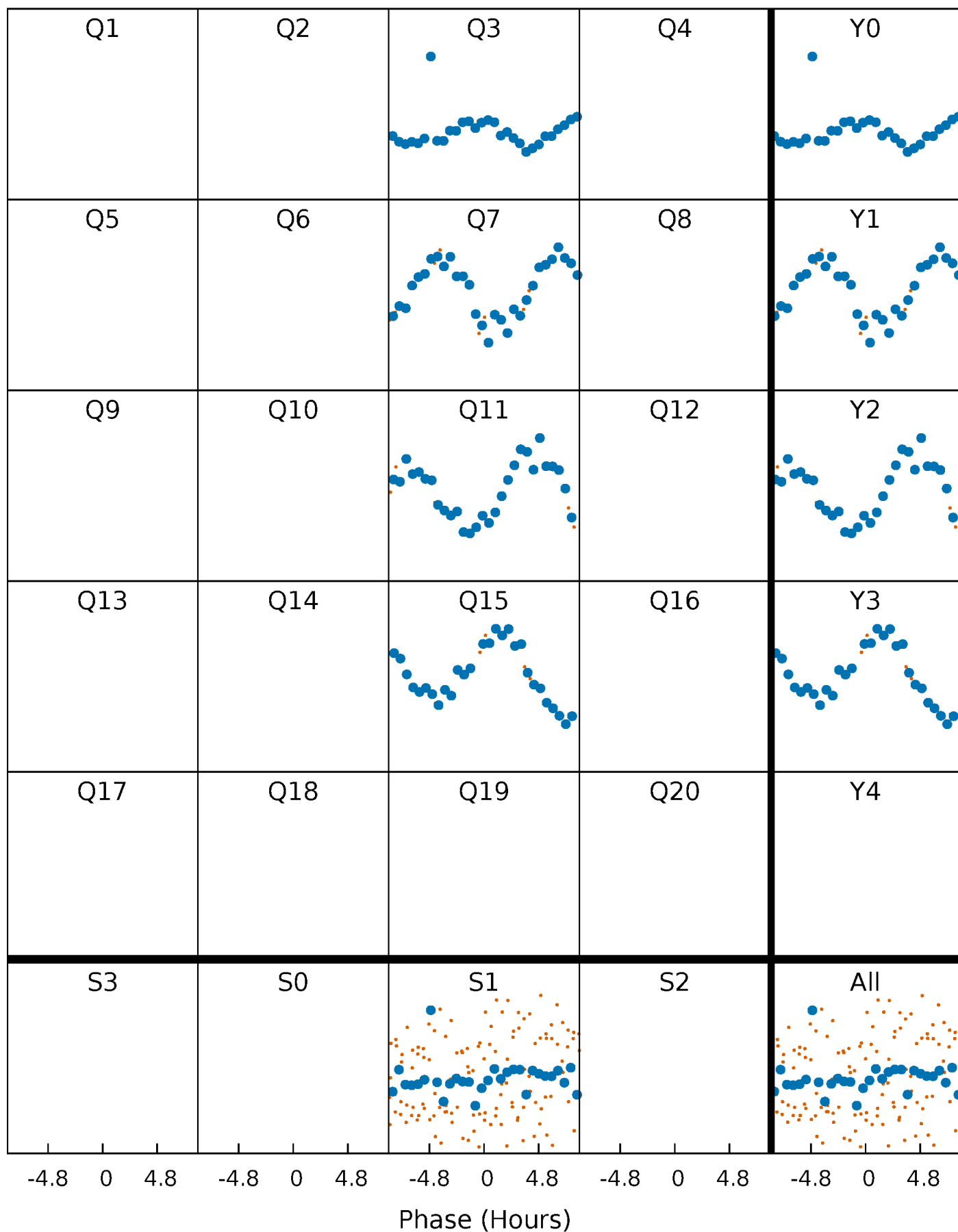


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



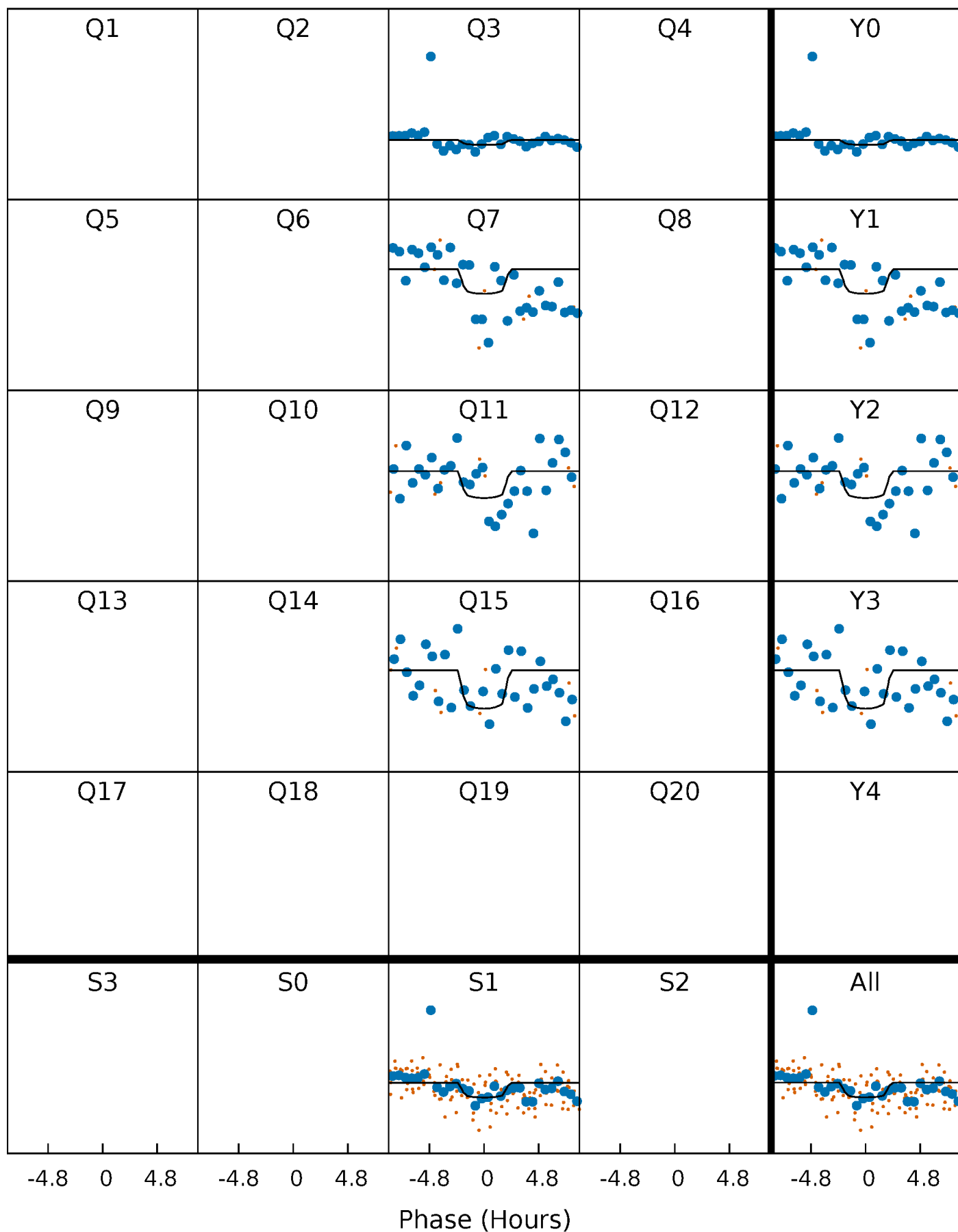
# PDC Quarter-Phased Transit Curves

TCE 008630081-02     $P=372.972678$  Days     $T_0=342.834487$  (BKJD)



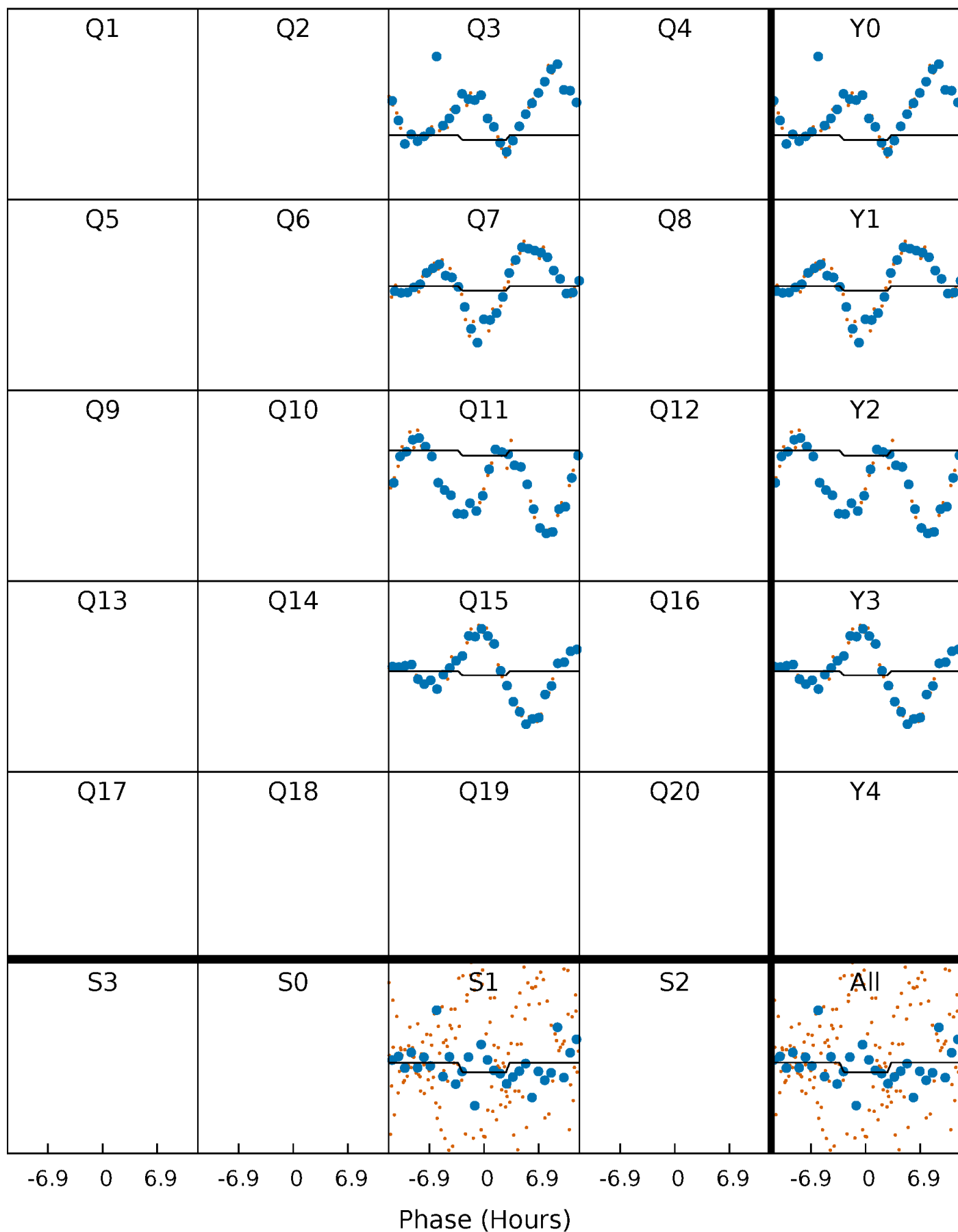
# DV Quarter-Phased Transit Curves

TCE 008630081-02     $P=372.972678$  Days     $T_0=342.834487$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

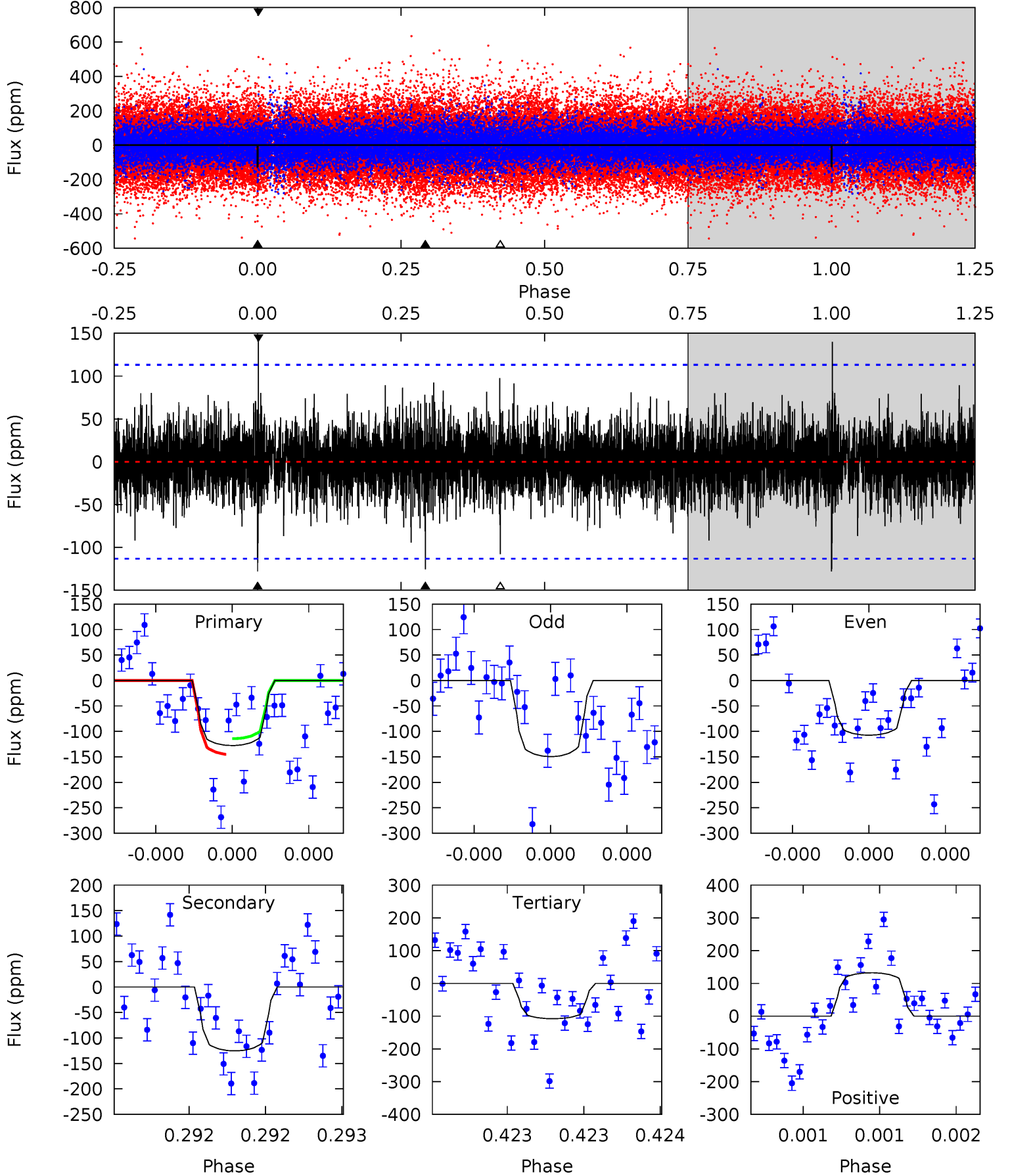
TCE 008630081-02     $P=372.980582$  Days     $T_0=342.884954$  (BKJD)



# DV Model-Shift Uniqueness Test

008630081-02, P = 372.972678 Days, E = 342.834487 Days

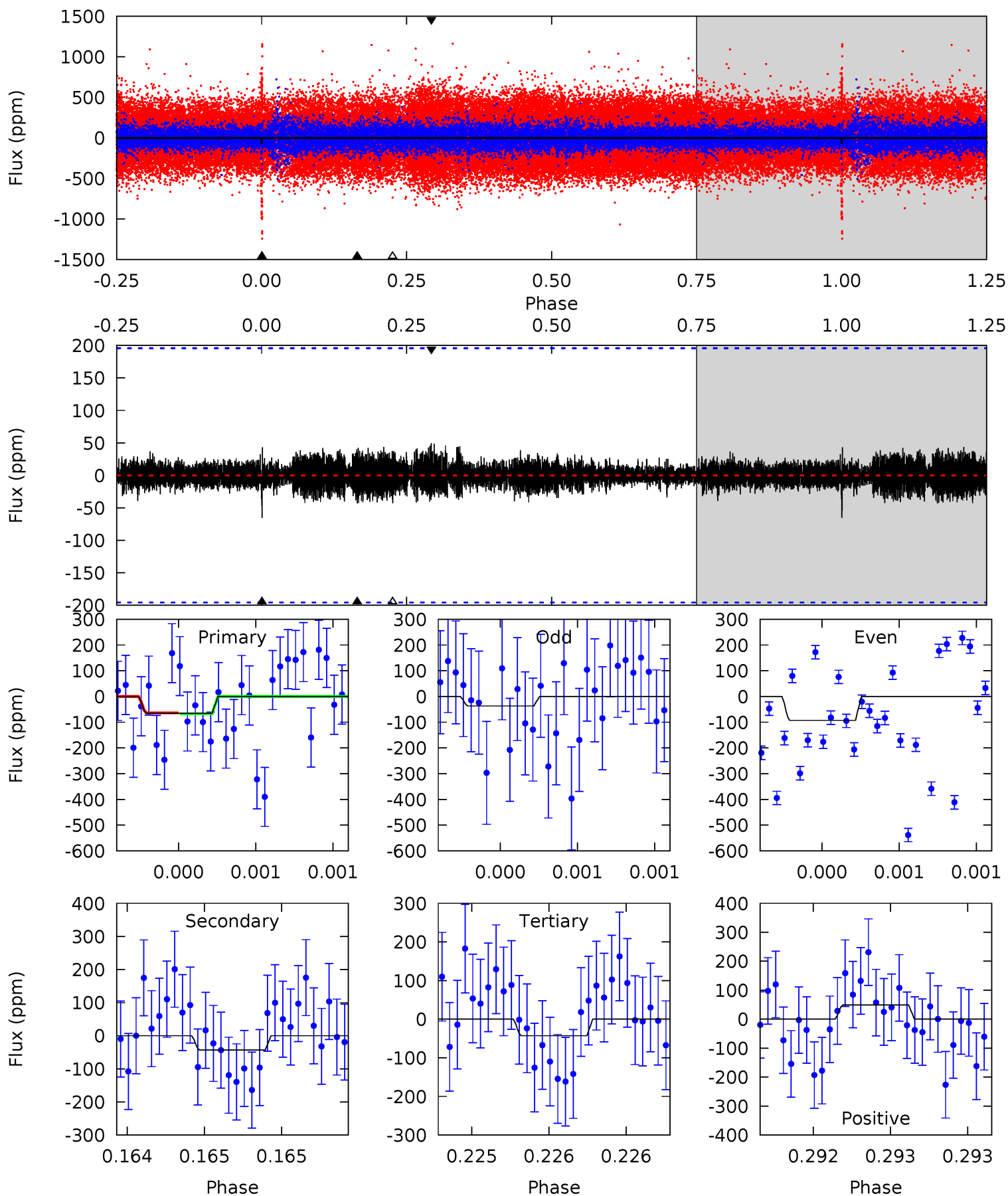
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.30	6.18	5.32	6.53	5.58	3.48	1.25	0.98	-0.23	0.86	-0.35	1.04	1.17	0.52	0.76



# Alt Model-Shift Uniqueness Test

008630081-02, P = 372.980582 Days, E = 342.884954 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
1.84	1.21	1.20	1.39	5.51	3.38	0.39	0.64	0.46	0.01	-0.18	0.79	0.63	0.43	0.05





### Stellar Parameters For KIC 008630081

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$9354^{+301}_{-414}$	$4.061^{+0.185}_{-0.185}$	$0.070^{+0.150}_{-0.700}$	$2.339^{+0.848}_{-0.694}$	$2.296^{+0.345}_{-0.641}$	$0.253^{+0.274}_{-0.130}$
	+3%/-4%	+5%/-5%	+214%/-1000%	+36%/-30%	+15%/-28%	+108%/-51%
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 008630081-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-125 \pm 20$	$4.34^{+3.68}_{-2.76}$	$755^{+62}_{-59}$	$6990^{+8106}_{-1764}$	$6283^{+46057}_{-4382}$
Alt.	$-43 \pm 35$	$3.69^{+3.73}_{-2.51}$	$759^{+62}_{-58}$	$5504^{+5921}_{-1844}$	$2327^{+23204}_{-2075}$

$T_{max}$  = 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

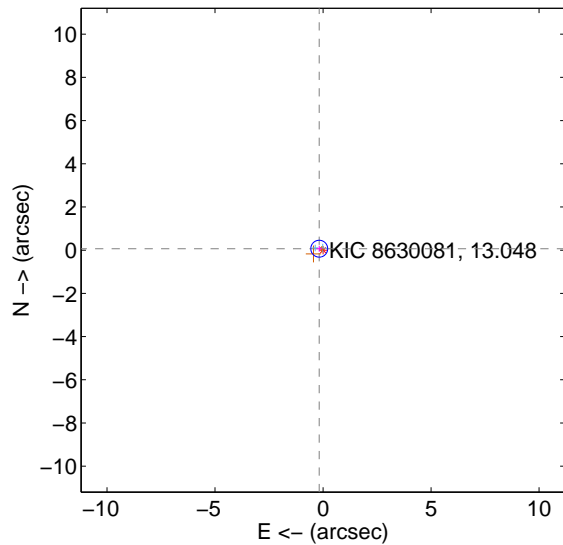
Supplemental centroid analysis for 008630081-02. Kepler magnitude: 13.05. Transit SNR 4.66

There are 2 quarters with good PRF difference image offsets

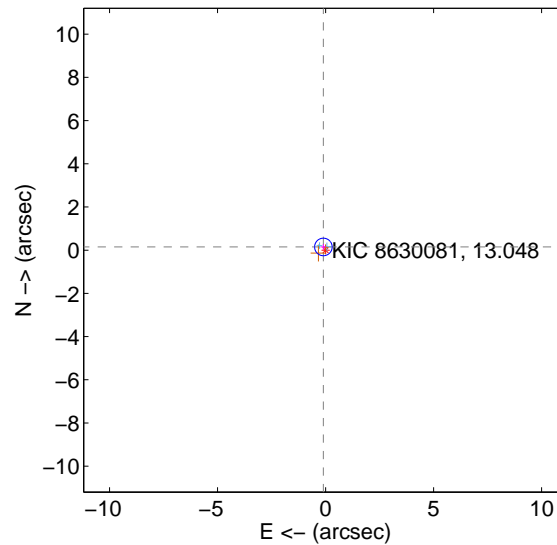
The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.188 \pm 0.130$	1.45	$0.176 \pm 0.129$	$0.068 \pm 0.138$
PRF-fit source offset from KIC position	$0.181 \pm 0.135$	1.34	$0.102 \pm 0.129$	$0.150 \pm 0.138$
photometric centroid source offset	$3.15 \pm 2.06$	1.53	$-1.70 \pm 1.78$	$-2.65 \pm 2.17$

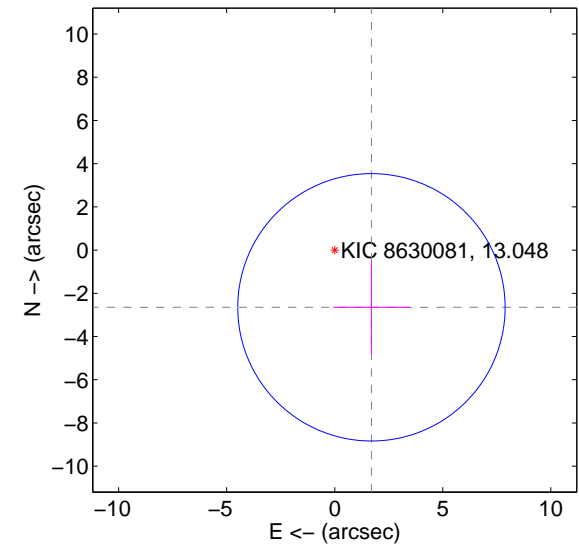
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



offset from photometric centroids



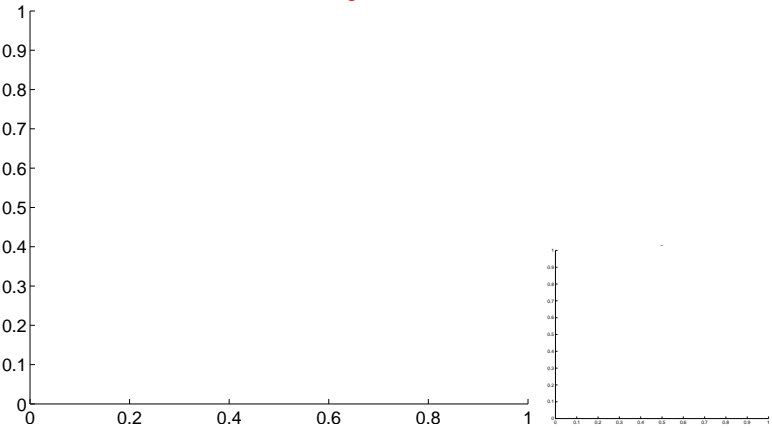
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



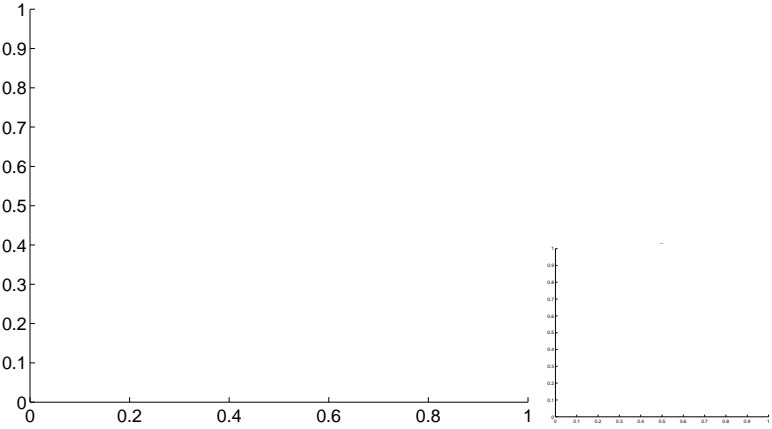
Q1 no OOT image



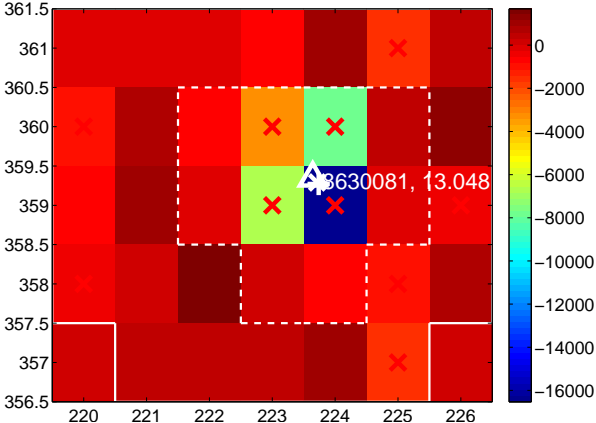
Q2 no difference image



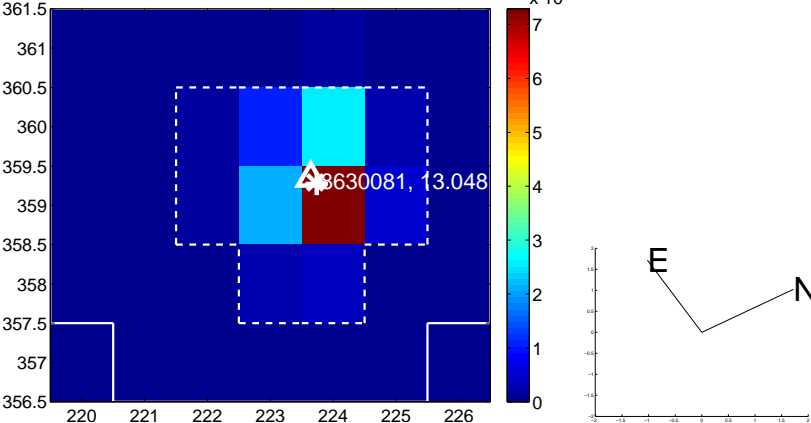
Q2 no OOT image



Q3 difference image. Poor Quality



Q3 OOT image



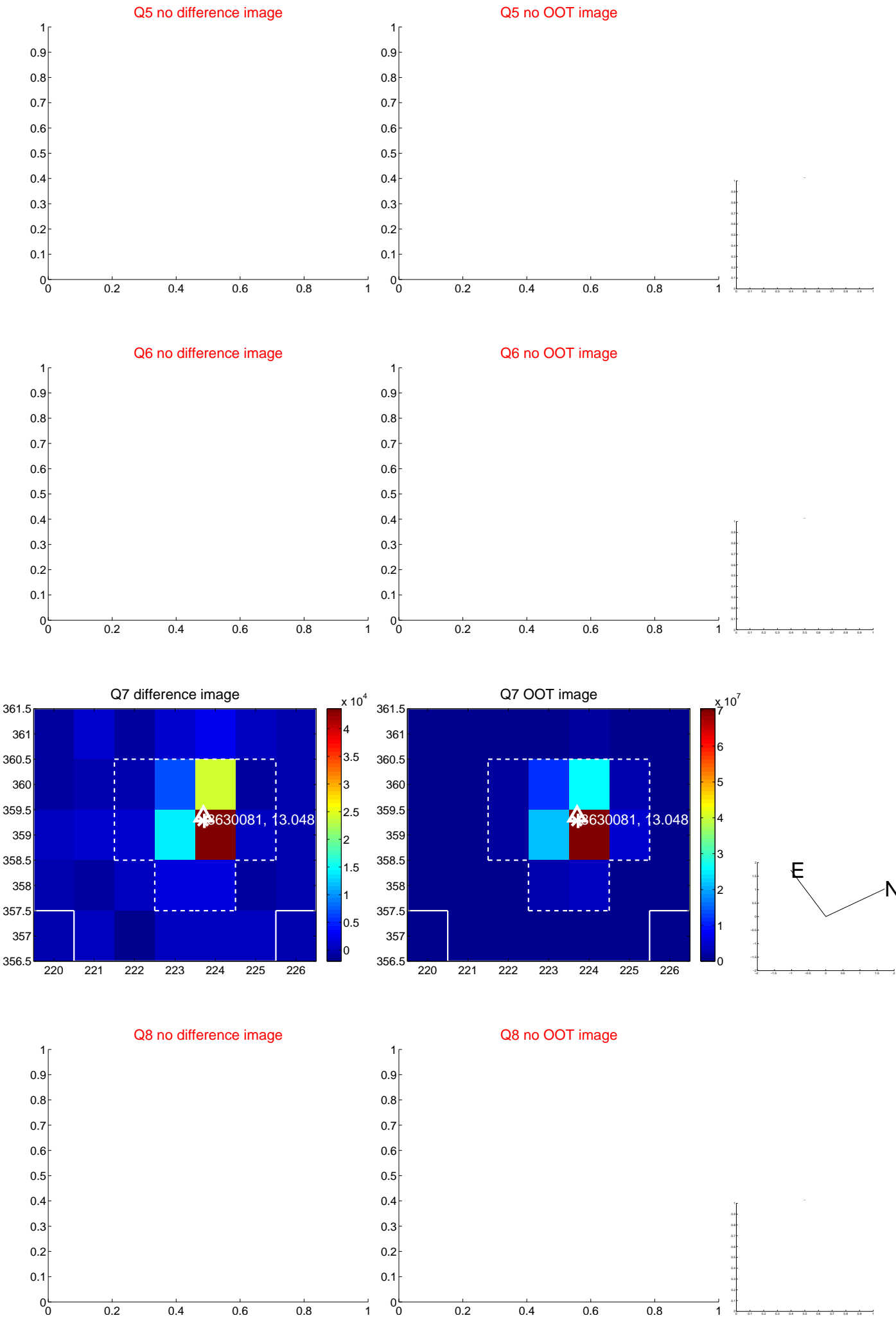
Q4 no difference image



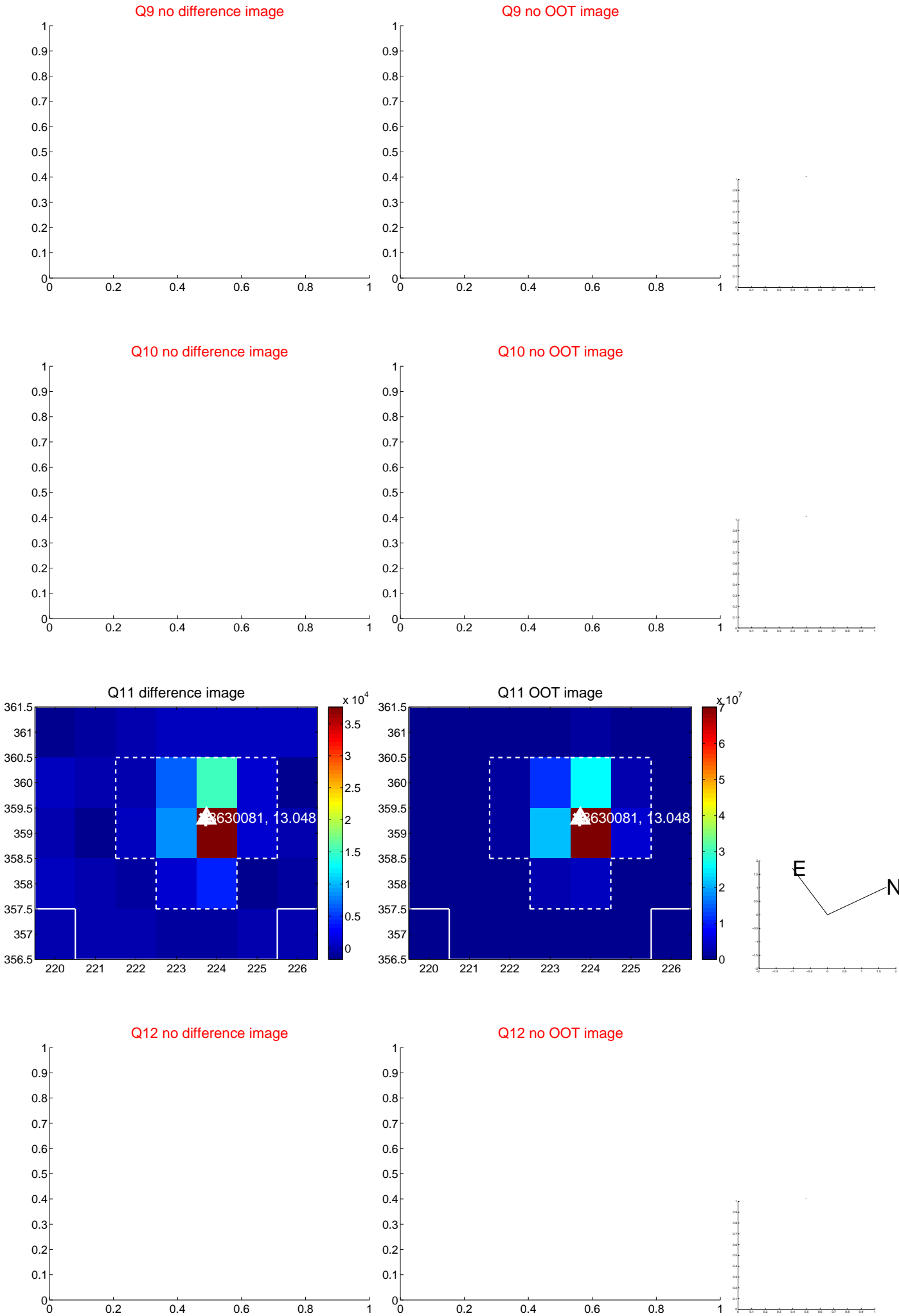
Q4 no OOT image



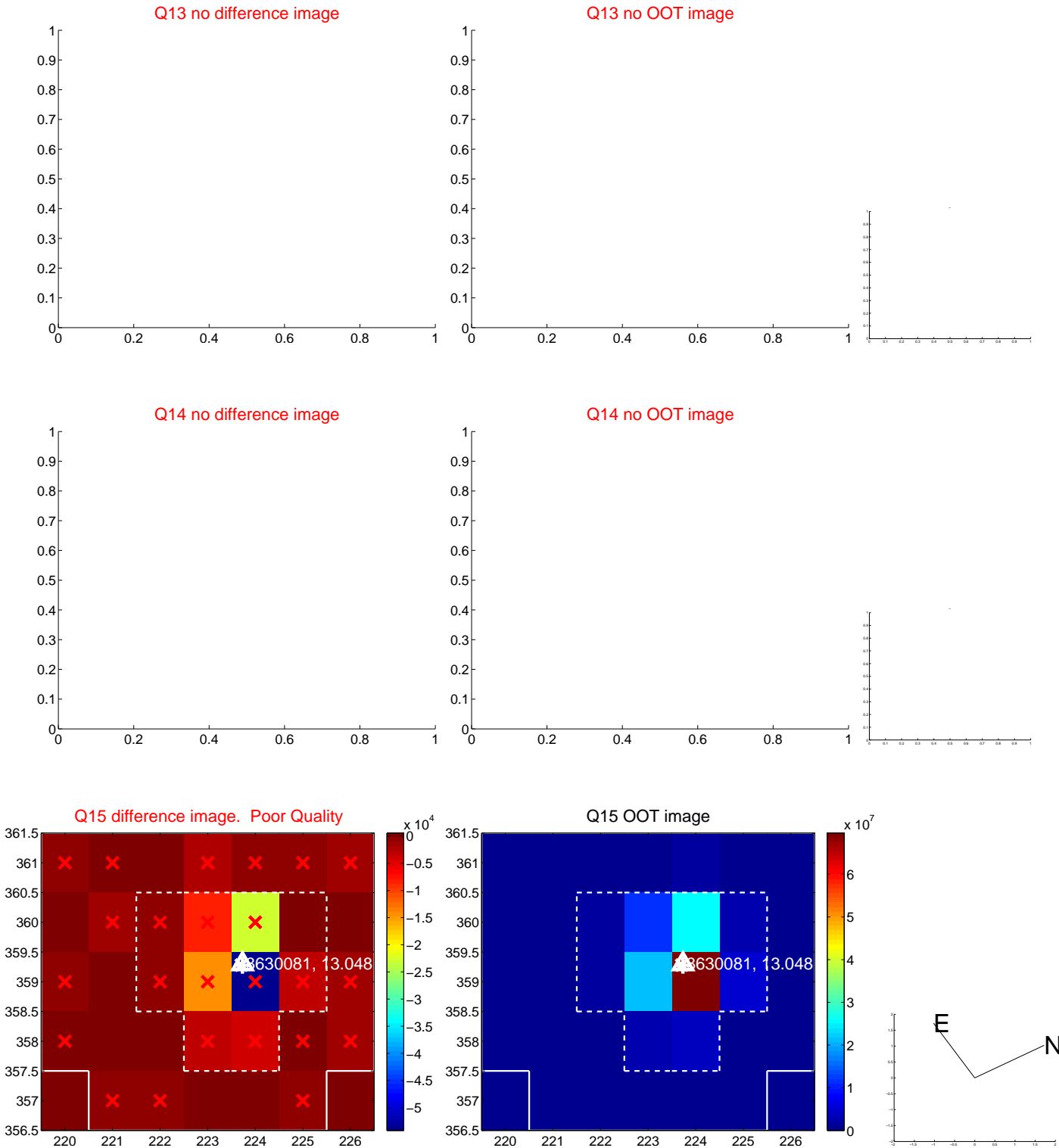
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



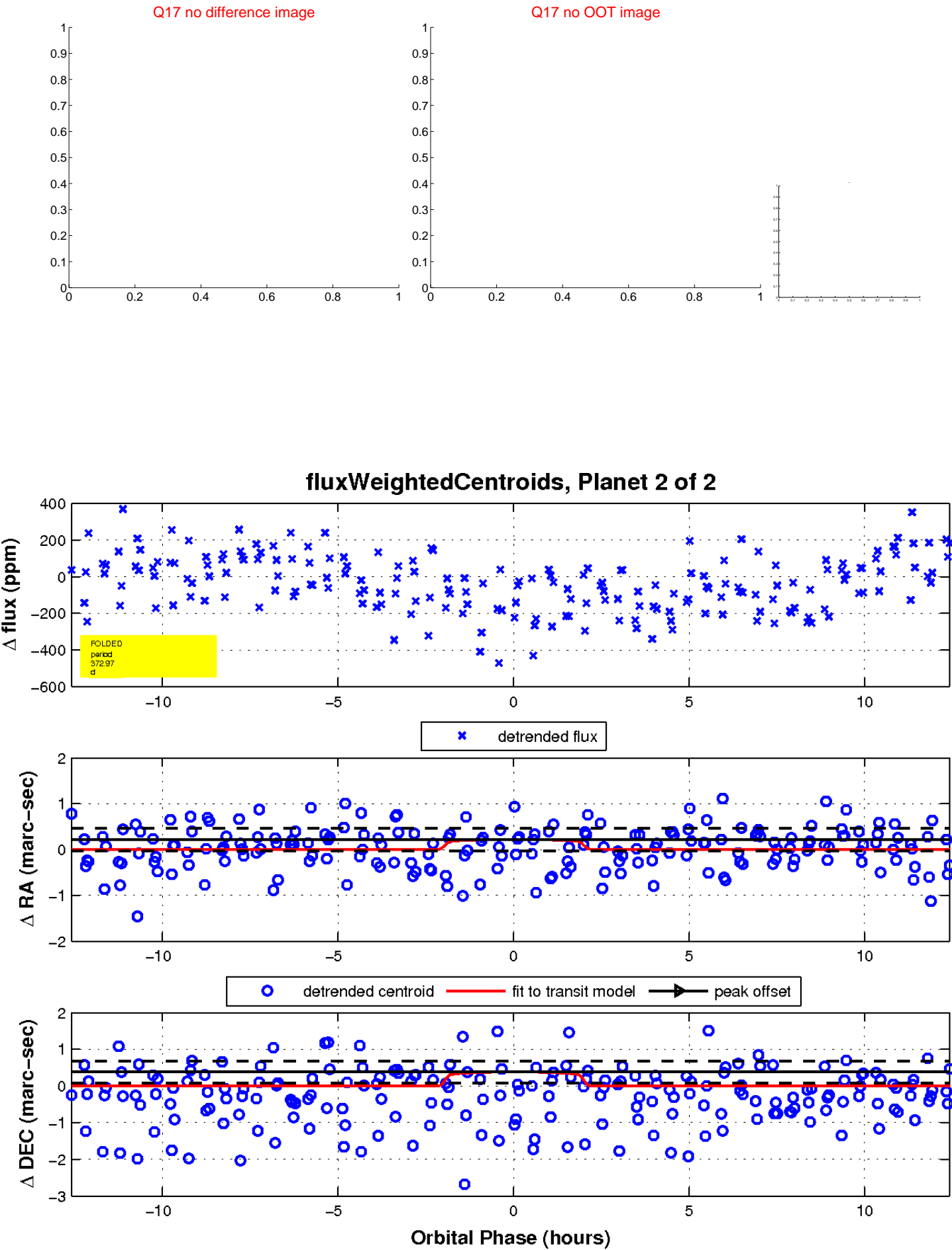
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



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



## UKIRT Image

Declination

