

# KIC 007047496

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
007047496-01	OBS	No	1.246360	132.280158	7.6	6.236	9.3	8.8	1.68	7051	0.48	10578.07
007047496-02	OBS	No	90.900951	190.316190	62.9	6.802	13.8	5.6	1.68	7051	1.52	34.71

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007047496-01	OBS	FP	0.00	1	0	0	0	LPP_DV
007047496-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

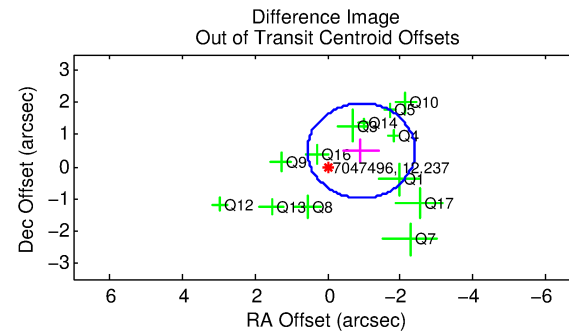
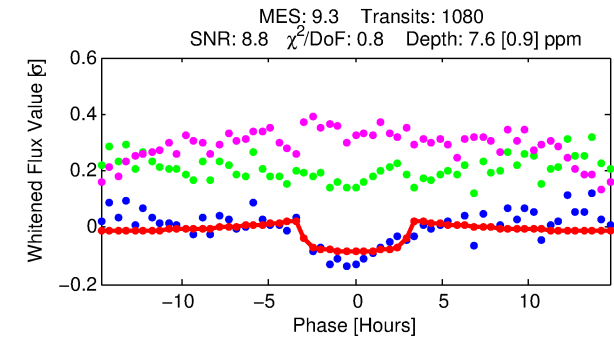
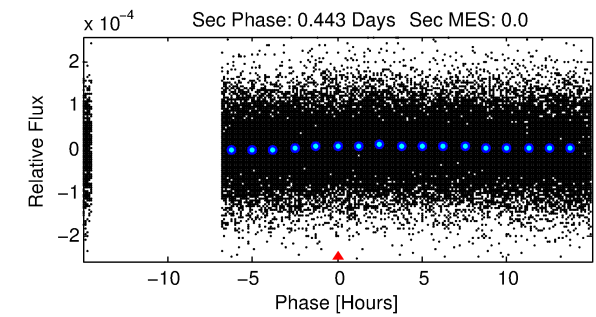
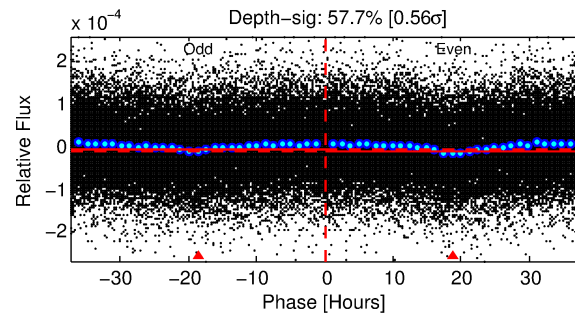
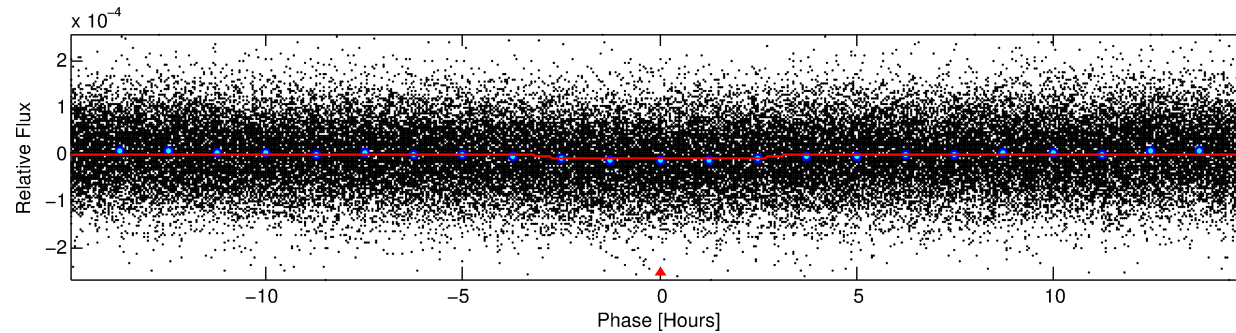
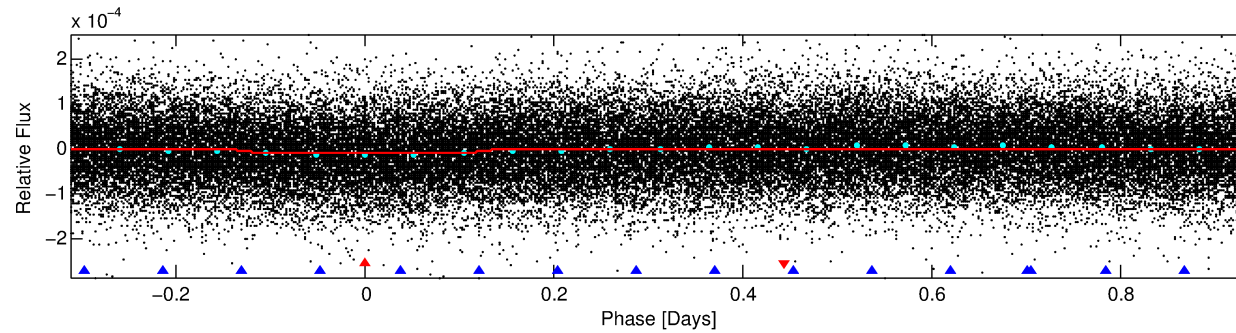
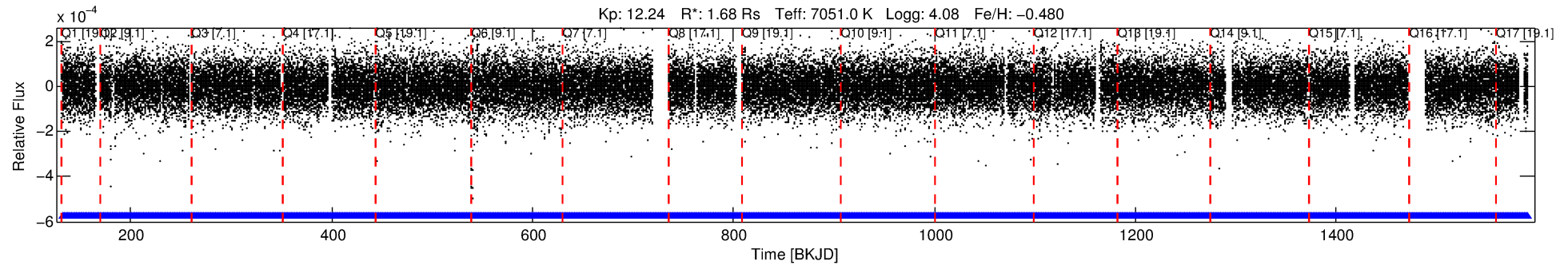
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 007047496-01

No Significant Match Found

# DV One-Page Summary

KIC: 7047496 Candidate: 1 of 2 Period: 1.246 d



## DV Fit Results:

Period = 1.24636 [0.00002] d  
Epoch = 132.2802 [0.0056] BKJD  
Rp/R\* = 0.0026 [0.0006]  
a/R\* = 1.51 [1.02]  
b = 0.51 [1.77]  
Seff = 10578.07 [4846.90]  
Teq = 2586 [296] K  
Rp = 0.48 [0.17] Re  
a = 0.0243 [0.0065] AU  
Ag = N/A  
Teffp = N/A

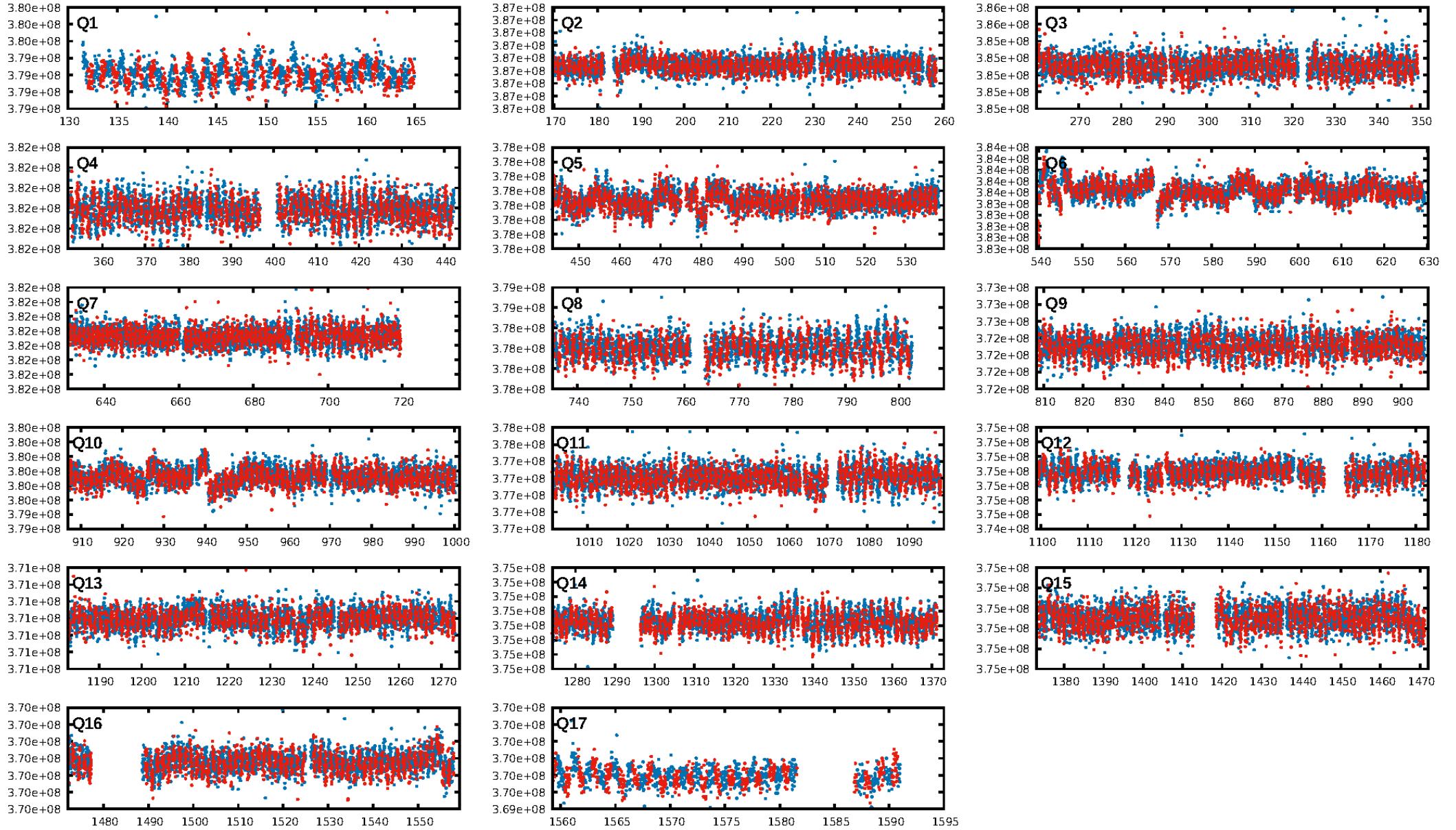
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [233.18 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 5.07e-15  
RollingBand-fgt: 1.00 [1031/1031]  
GhostDiagnostic-chr: 2.37  
Centroid-sig: 52.0%  
Centroid-so: 0.759 arcsec [0.71 $\sigma$ ]  
OotOffset-rm: 1.048 arcsec [2.12 $\sigma$ ]  
KicOffset-rm: 1.119 arcsec [2.56 $\sigma$ ]  
OotOffset-st: 2/2/4/5 [13]  
KicOffset-st: 2/2/4/5 [13]  
DiffImageQuality-fgm: 0.69 [9/13]  
DiffImageOverlap-fno: 1.00 [17/17]

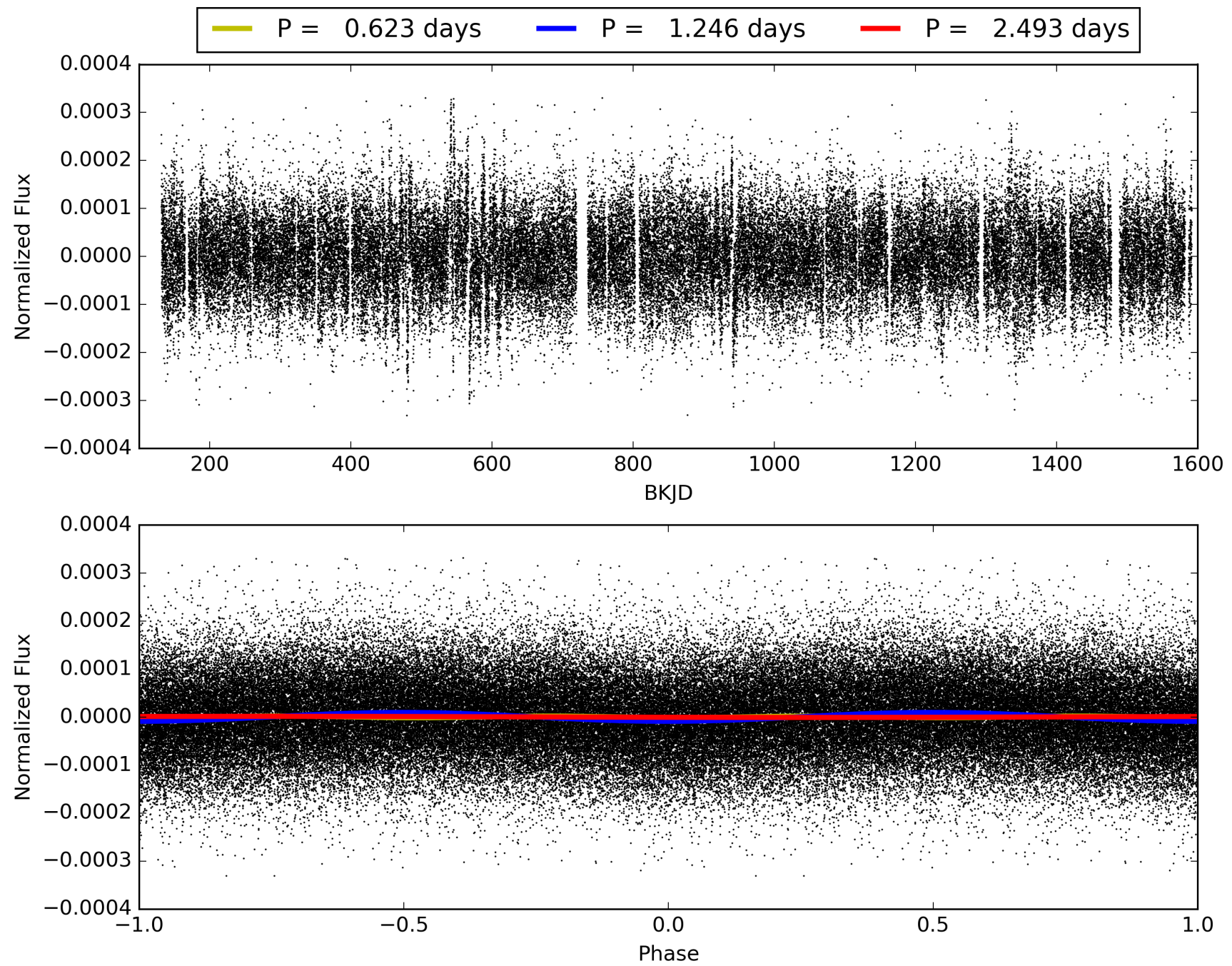
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 20:20:46 Z

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

# TCE 007047496-01, PDC Light Curves



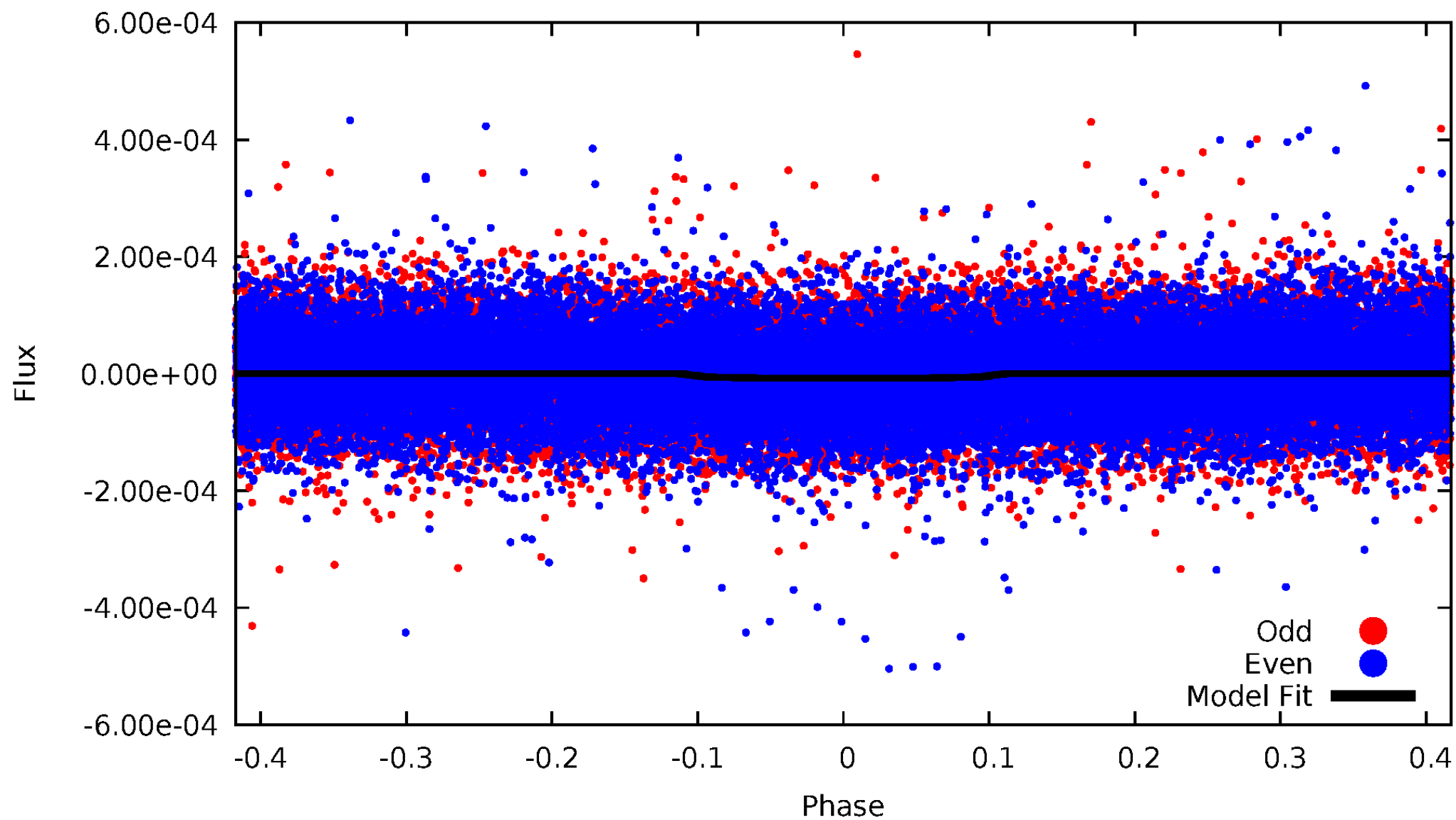
TCE 007047496-01





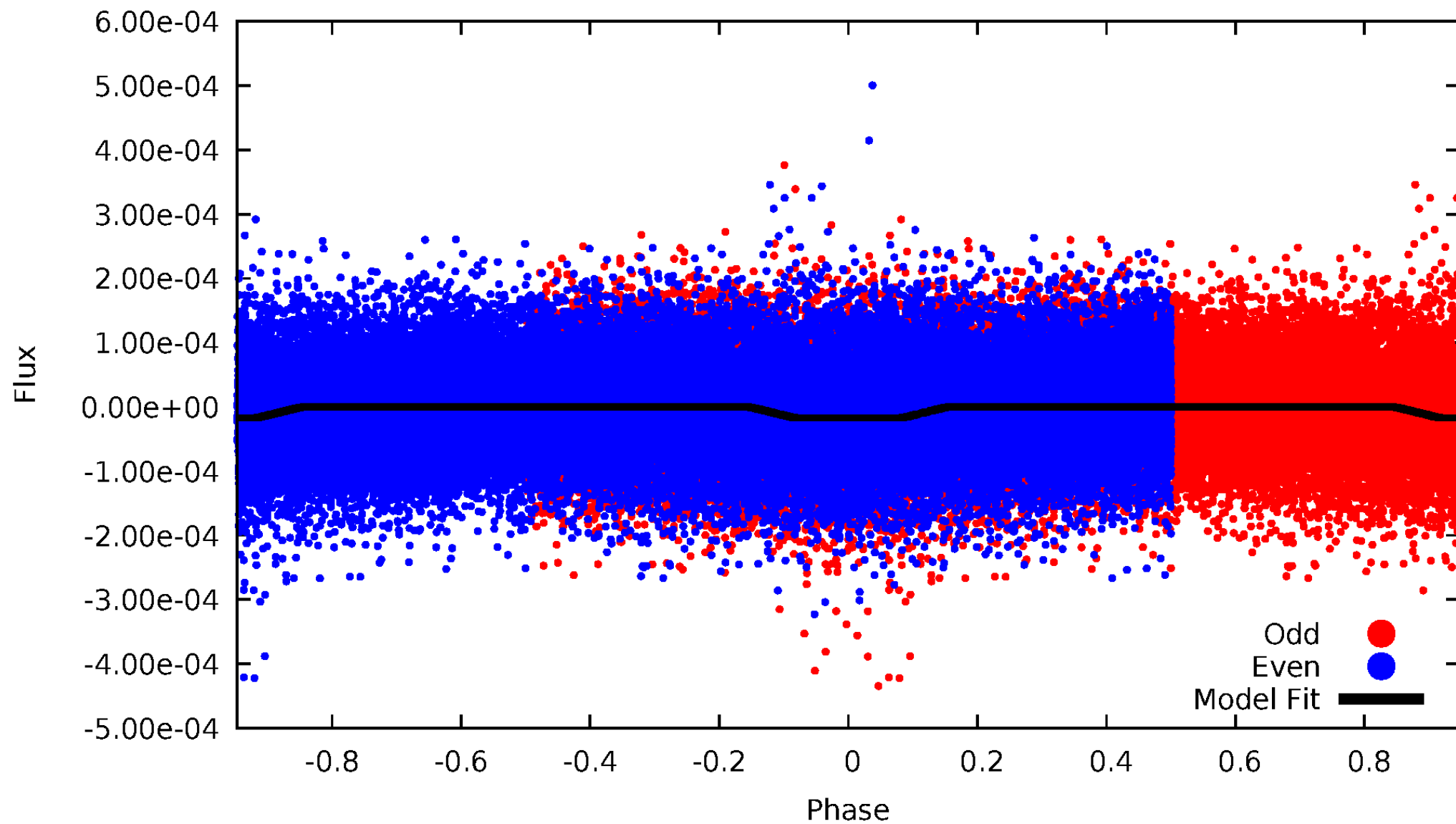
# DV Odd/Even

TCE 007047496-01



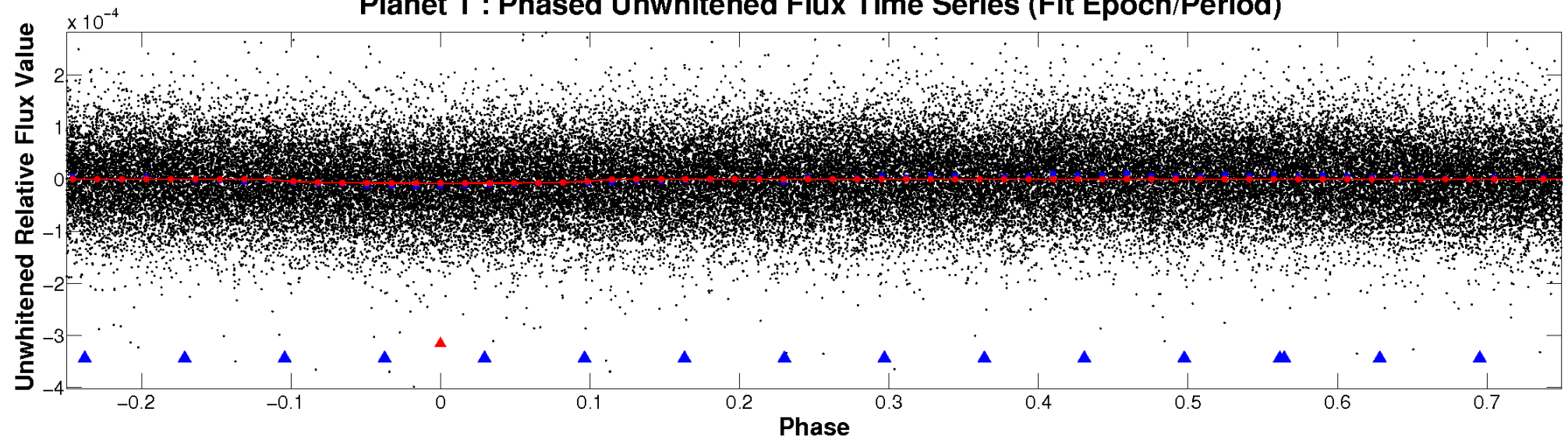
# ALT Odd/Even

TCE 007047496-01

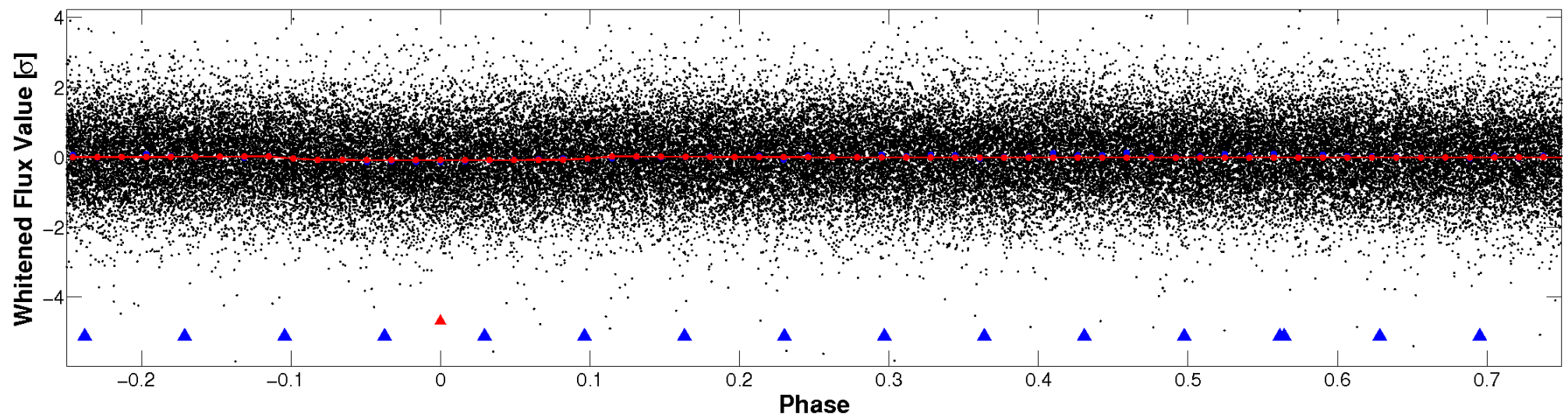


# Non-Whitened Vs. Whitened Light Curve

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

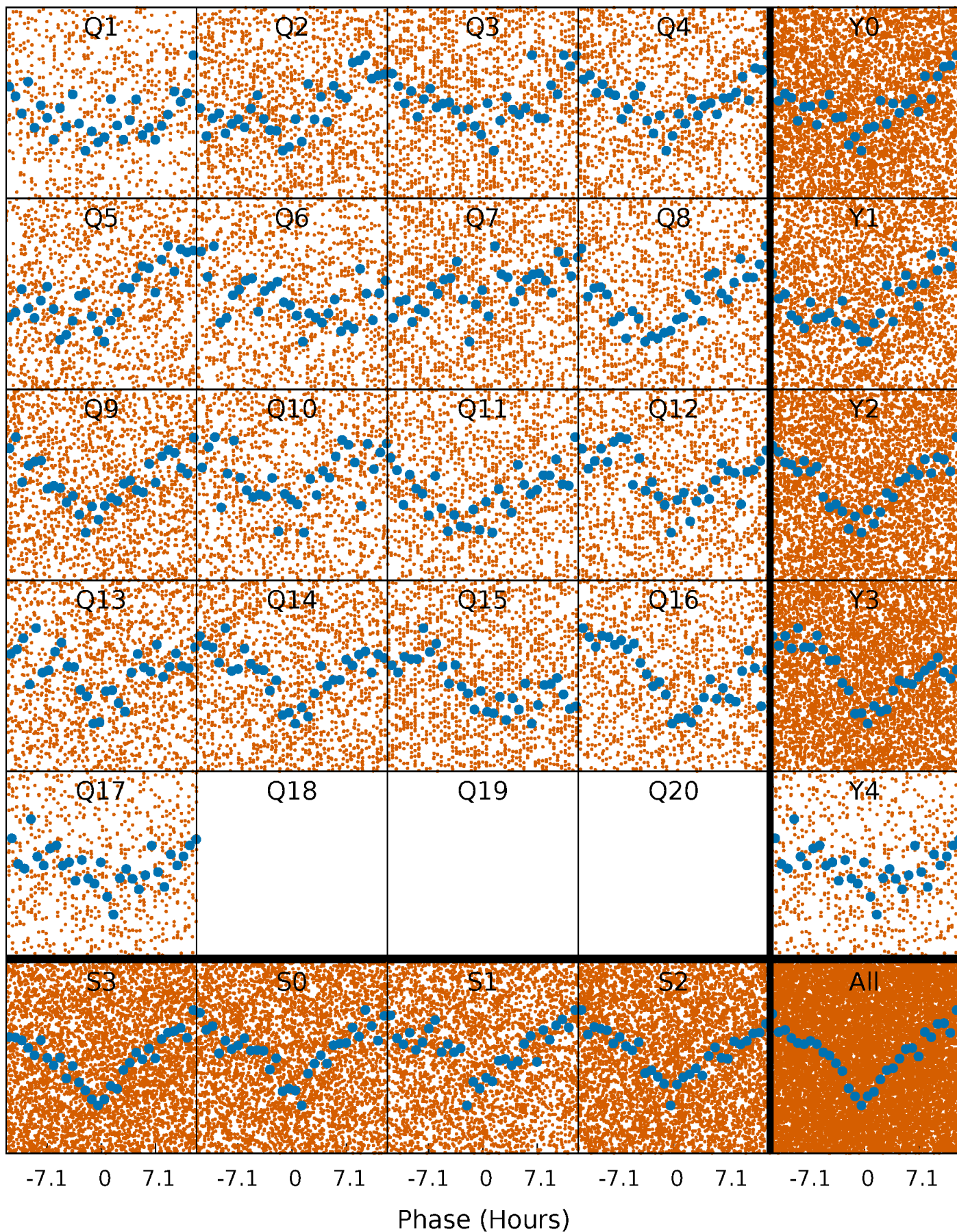


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

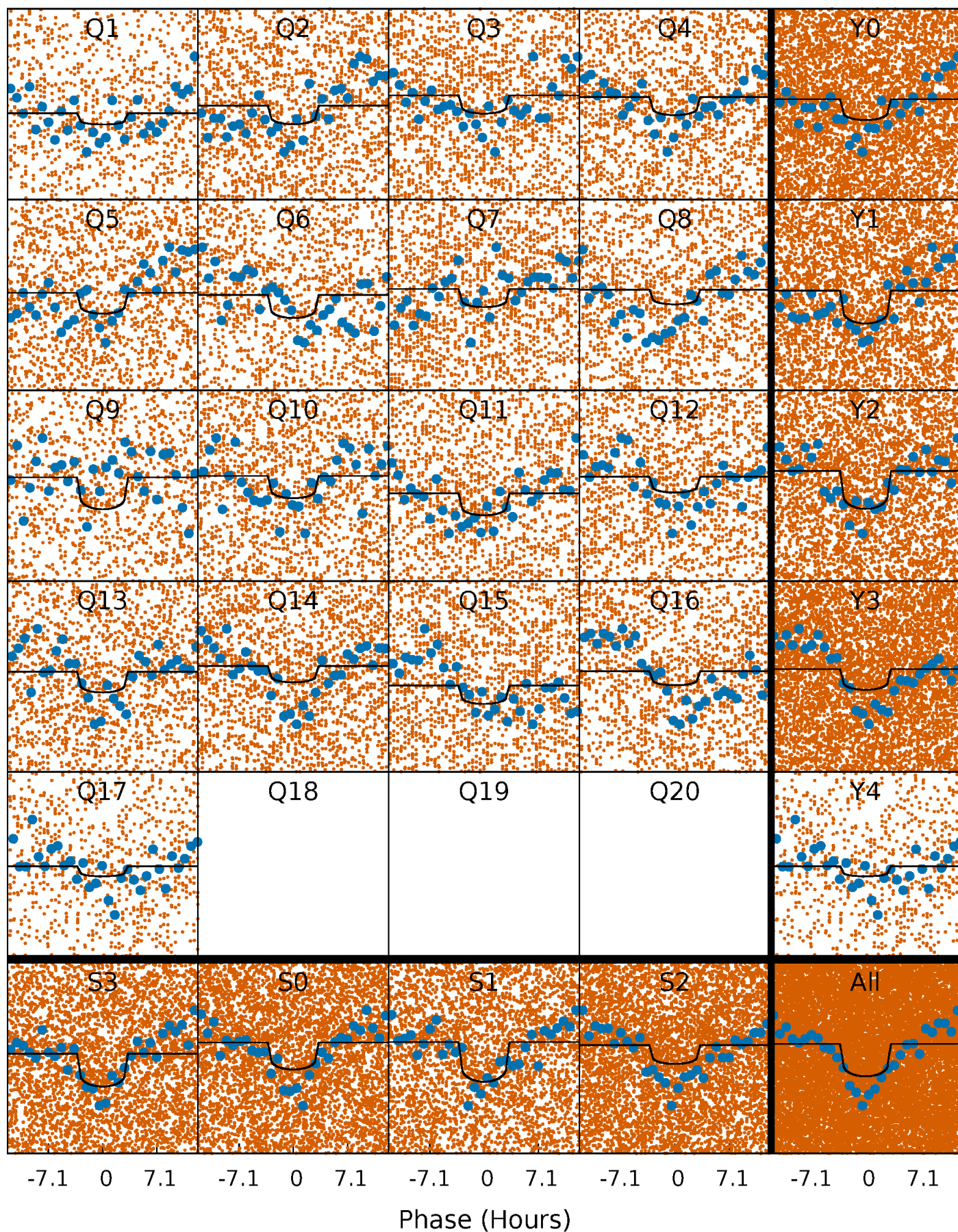
TCE 007047496-01 P= 1.246360 Days  $T_0=132.280158$  (BKJD)





# DV Quarter-Phased Transit Curves

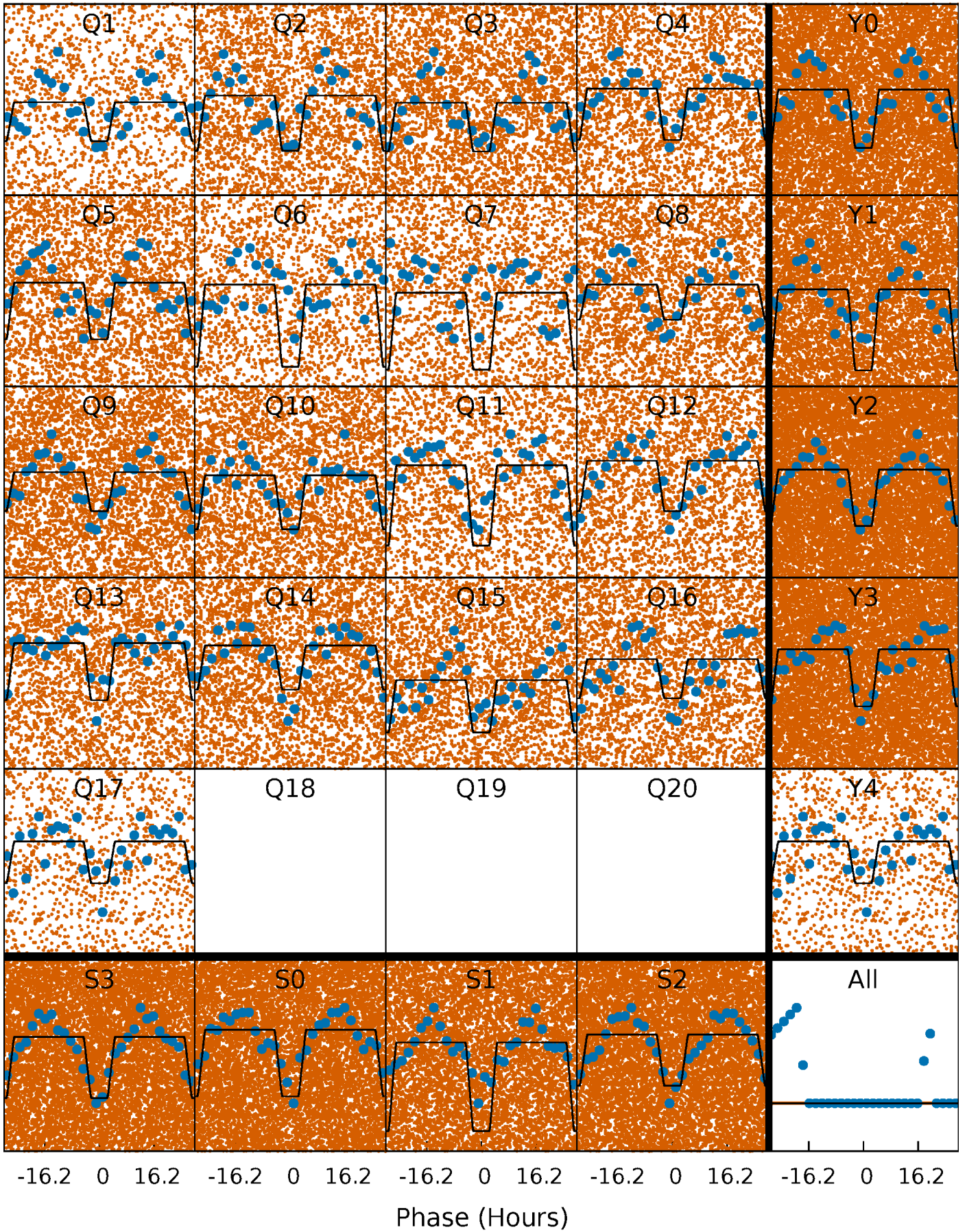
TCE 007047496-01 P= 1.246360 Days  $T_0=132.280158$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

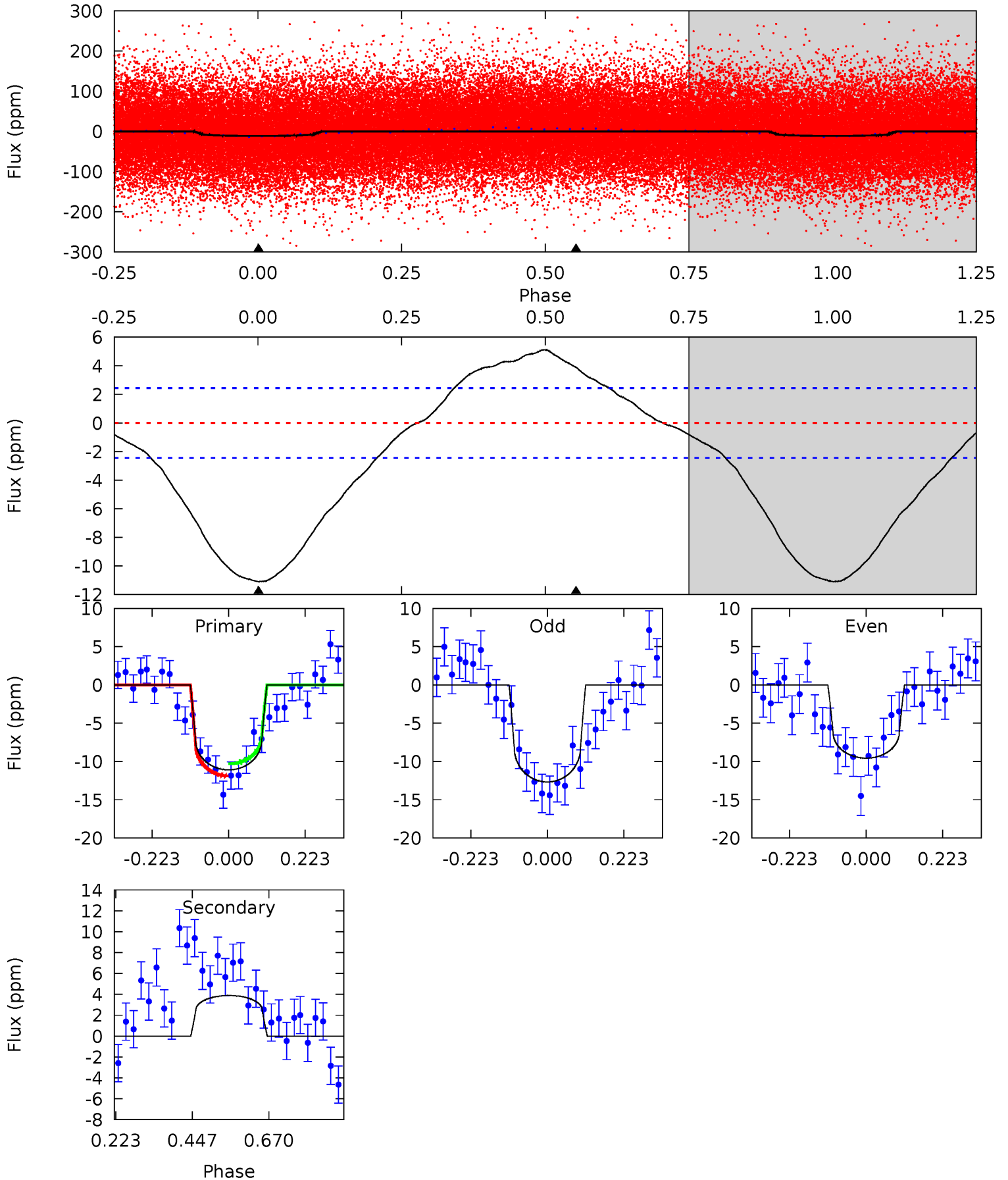
TCE 007047496-01 P= 1.246412 Days  $T_0=132.244204$  (BKJD)



# DV Model-Shift Uniqueness Test

007047496-01, P = 1.246360 Days, E = 131.033798 Days

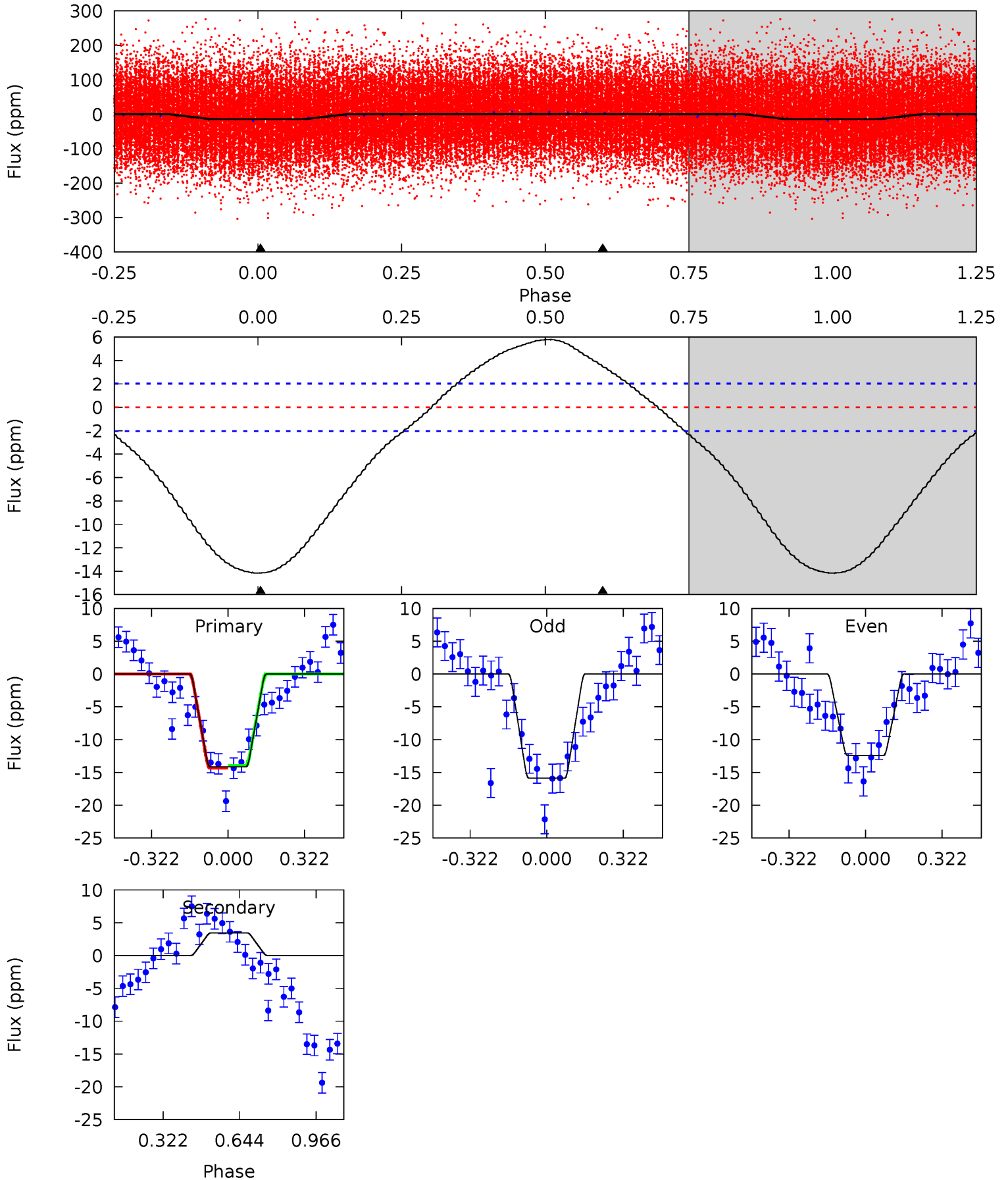
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
20.0	-6.99	0	0	4.39	1.22	1.68	20.0	20.0	-6.99	-6.99	2.80	0.97	0.32	1.45



# Alt Model-Shift Uniqueness Test

007047496-01, P = 1.246412 Days, E = 130.997792 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	-7.34	0	0	4.31	0.99	2.76	30.1	30.1	-7.34	-7.34	3.62	0.93	0.29	0.42





### Stellar Parameters For KIC 007047496

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7051^{+216}_{-312}$	$4.078^{+0.246}_{-0.164}$	$-0.480^{+0.250}_{-0.300}$	$1.679^{+0.430}_{-0.478}$	$1.232^{+0.185}_{-0.166}$	$0.366^{+0.532}_{-0.163}$
	+3%/-4%	+6%/-4%	+52%/-62%	+26%/-28%	+15%/-13%	+145%/-44%
Source	PHO54	PHO54	PHO54	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 007047496-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$4\pm 1$	$0.46^{+0.13}_{-0.11}$	$3573^{+287}_{-307}$	$-6131^{+588}_{-953}$	$-5.752^{+2.277}_{-4.722}$
Alt.	$3\pm 0$	$0.75^{+0.15}_{-0.15}$	$3590^{+266}_{-303}$	$-4954^{+328}_{-321}$	$-1.974^{+0.606}_{-1.108}$

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

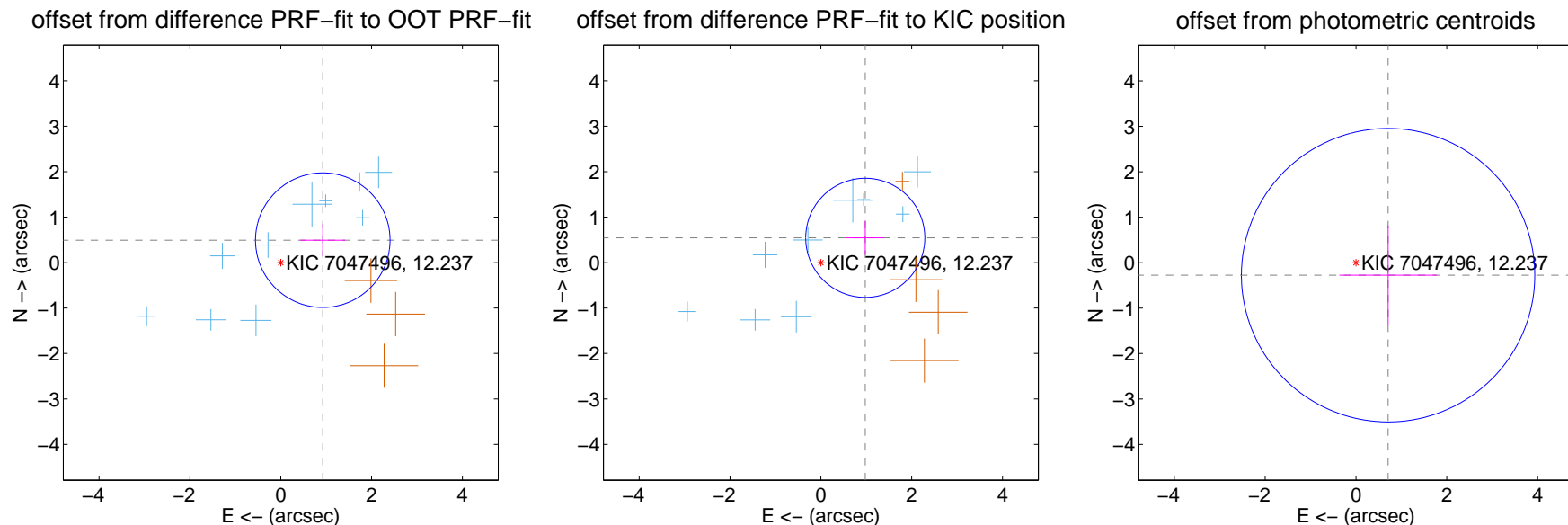
## DV Centroid Data

Supplemental centroid analysis for 007047496-01. Kepler magnitude: 12.24. Transit SNR 8.75

There are 9 quarters with good PRF difference image offsets

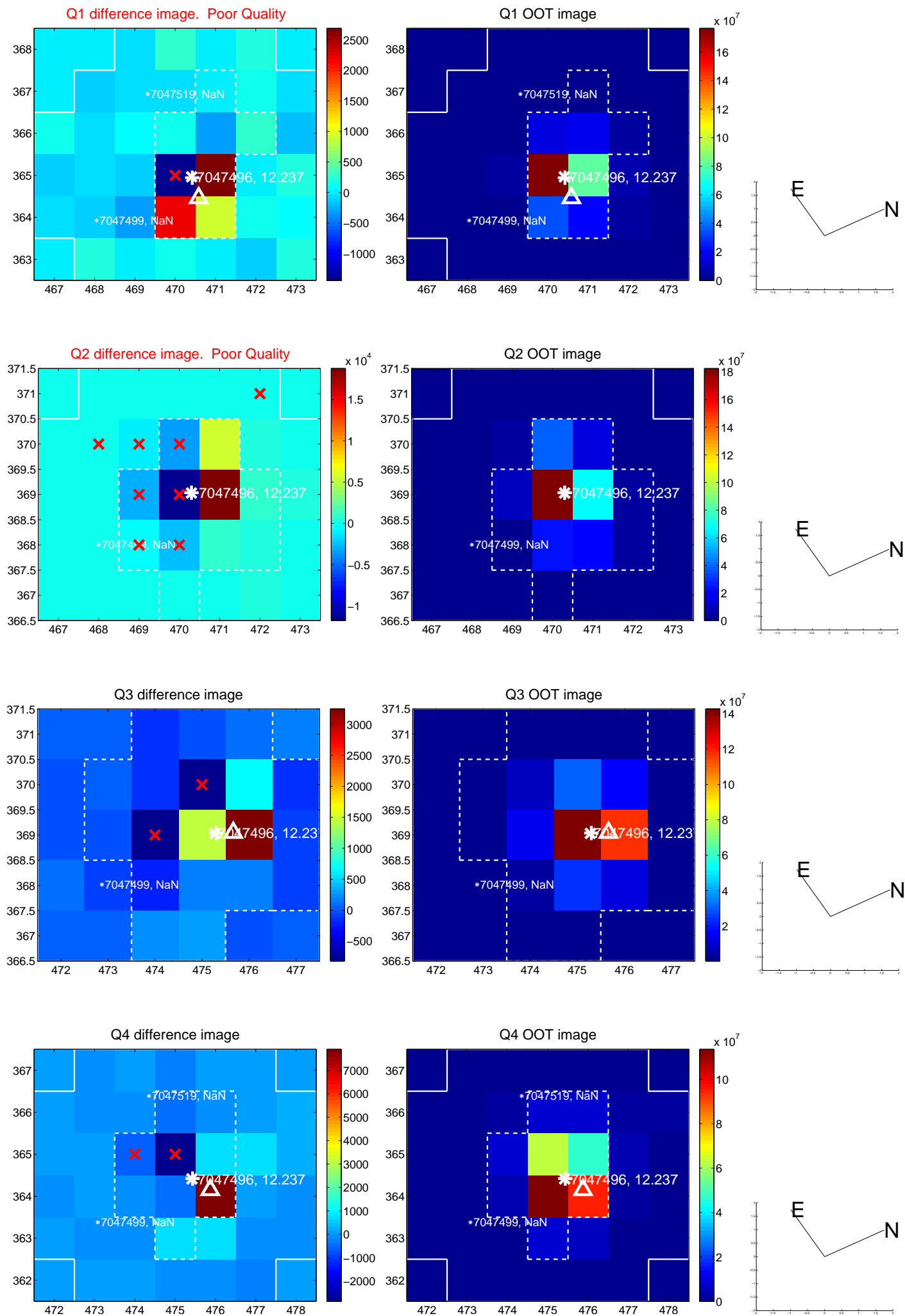
The direct PRF centroid is offset from the target star catalog position by about 0.07 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.048 \pm 0.494$	2.12	$-0.925 \pm 0.494$	$0.493 \pm 0.348$
PRF-fit source offset from KIC position	$1.119 \pm 0.437$	2.56	$-0.977 \pm 0.418$	$0.545 \pm 0.374$
photometric centroid source offset	$0.76 \pm 1.08$	0.71	$-0.71 \pm 1.07$	$-0.28 \pm 1.09$

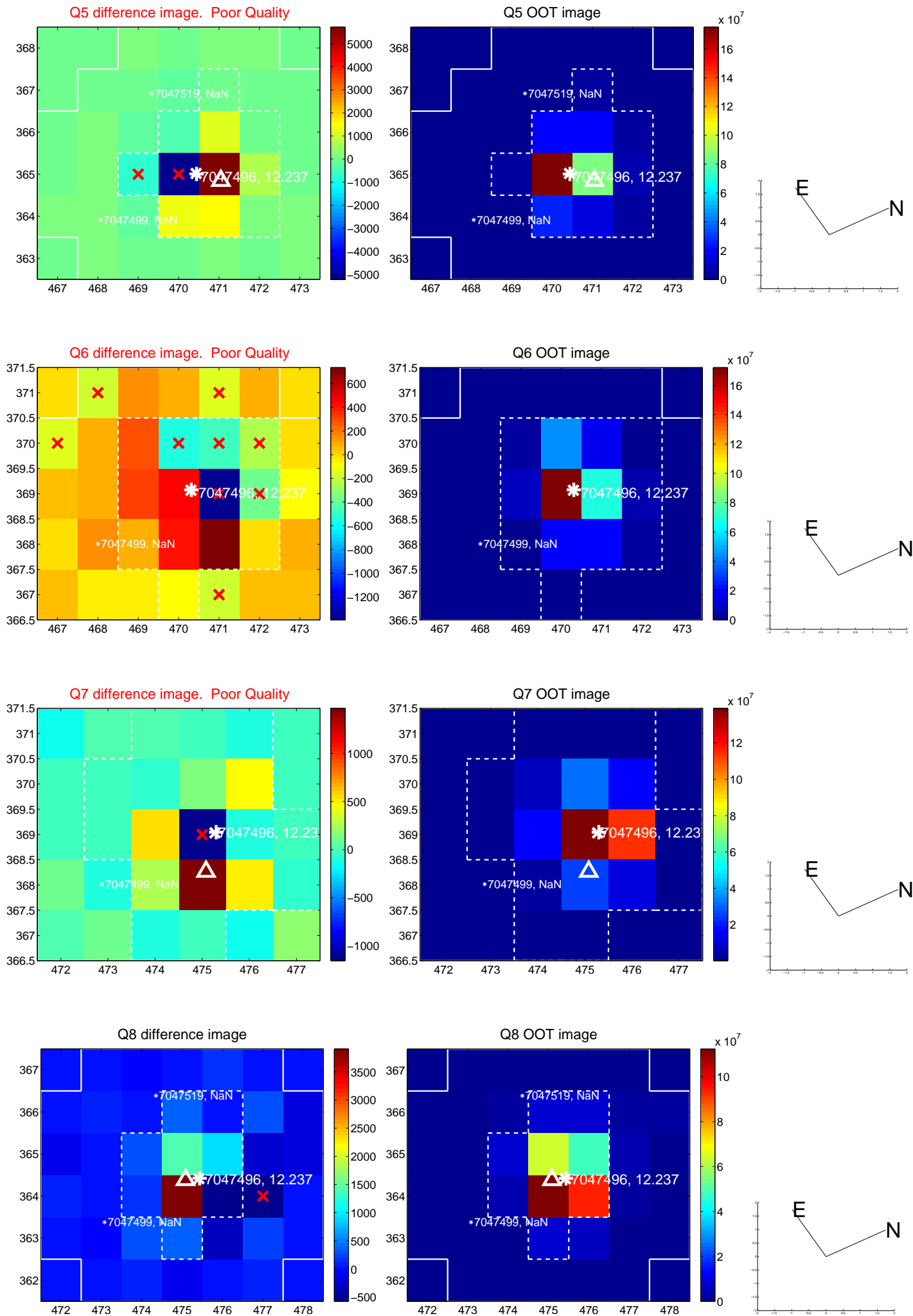


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

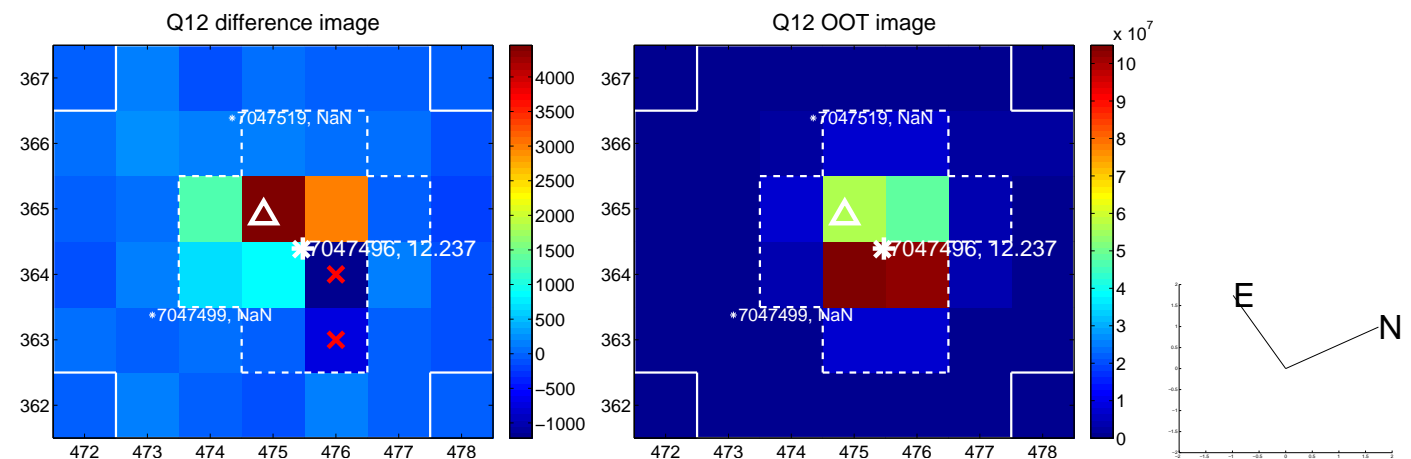
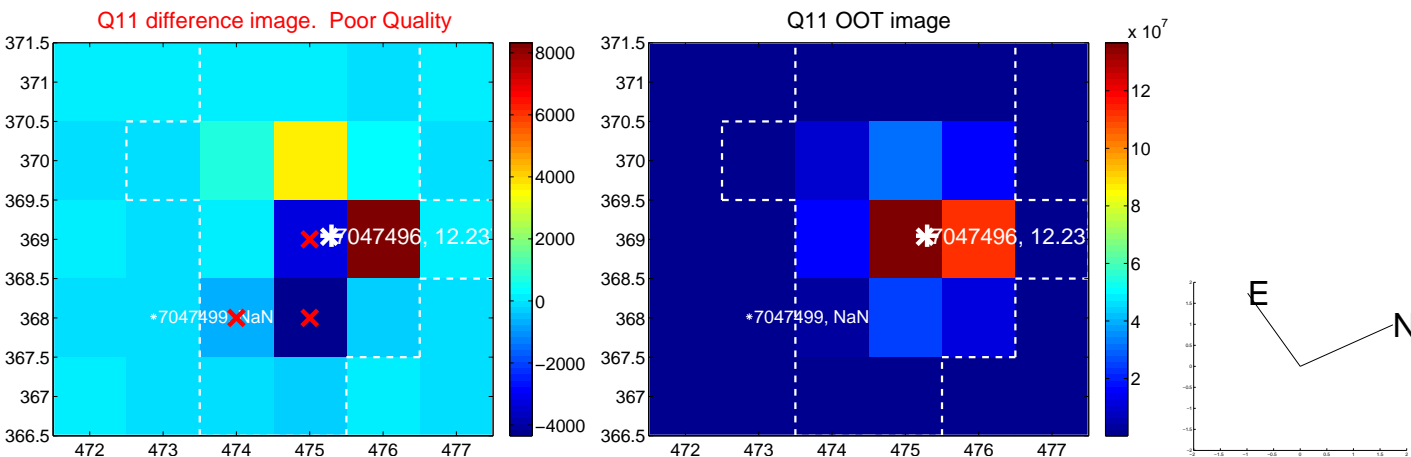
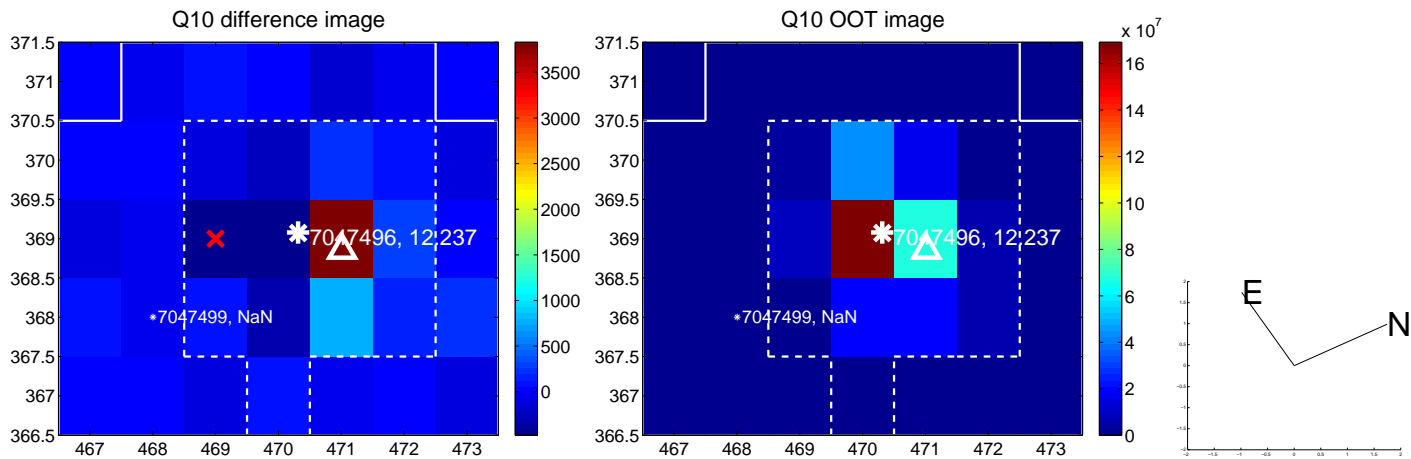
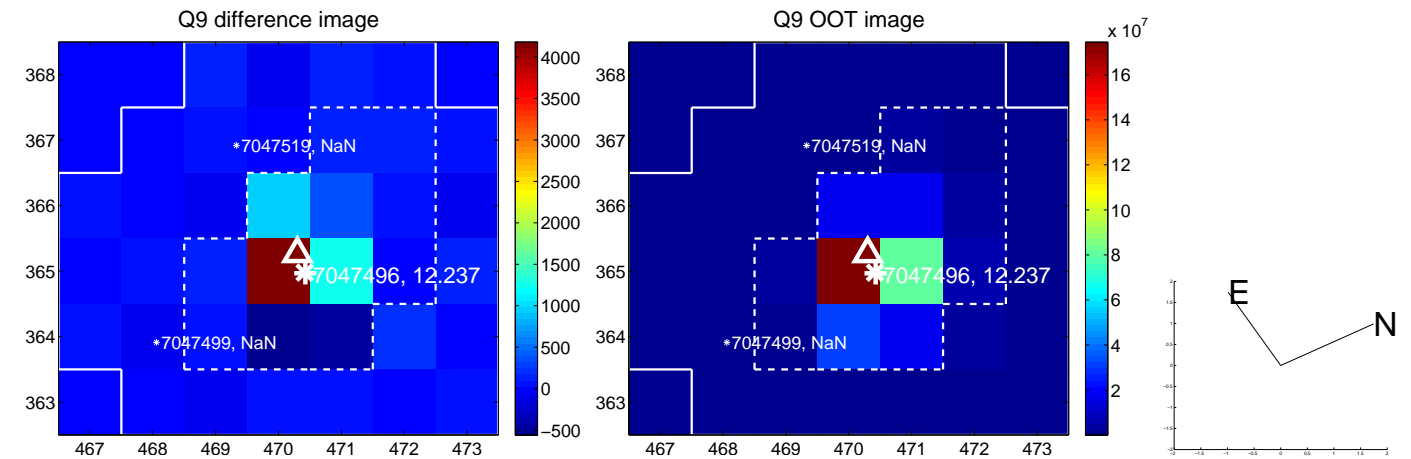


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

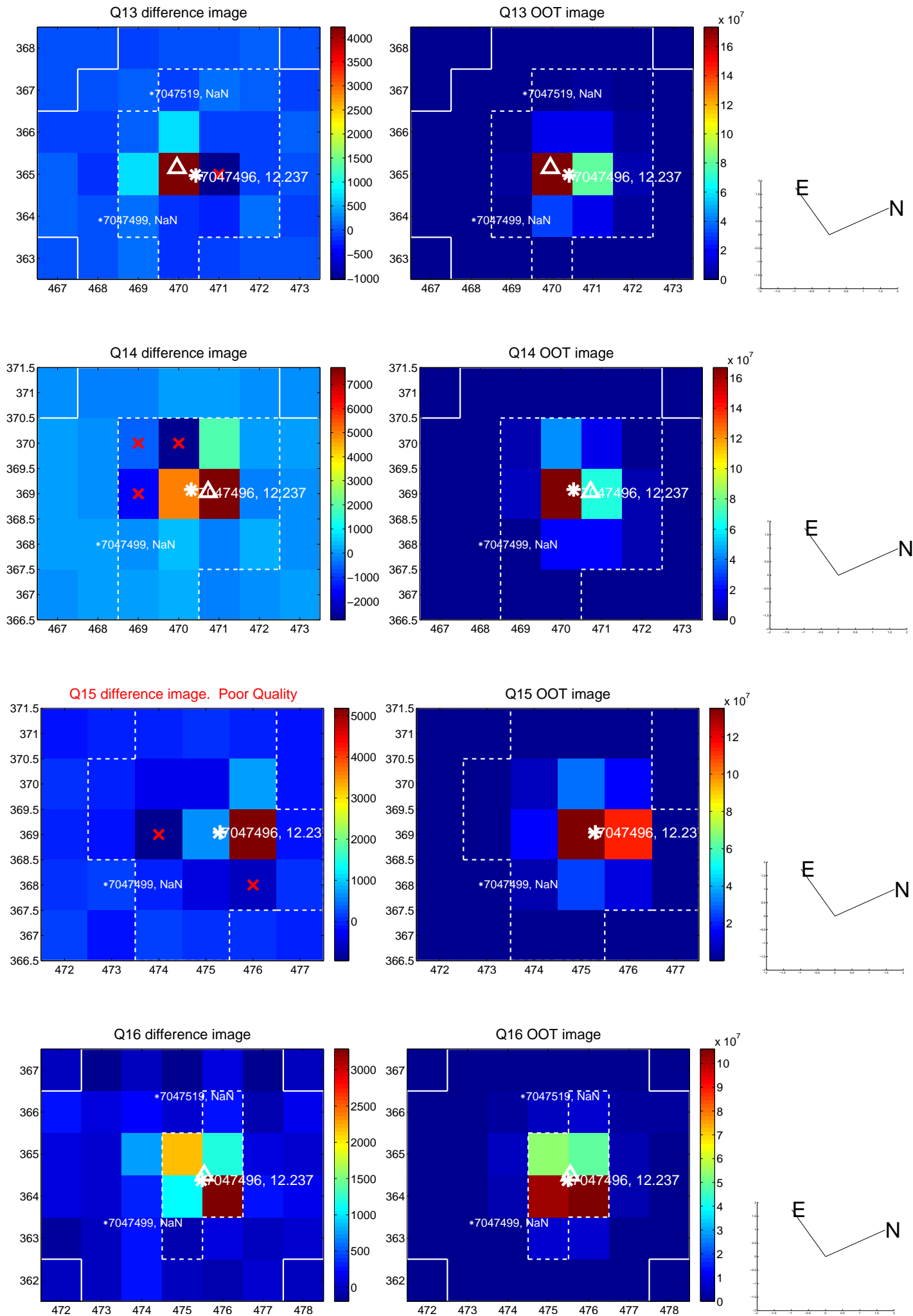




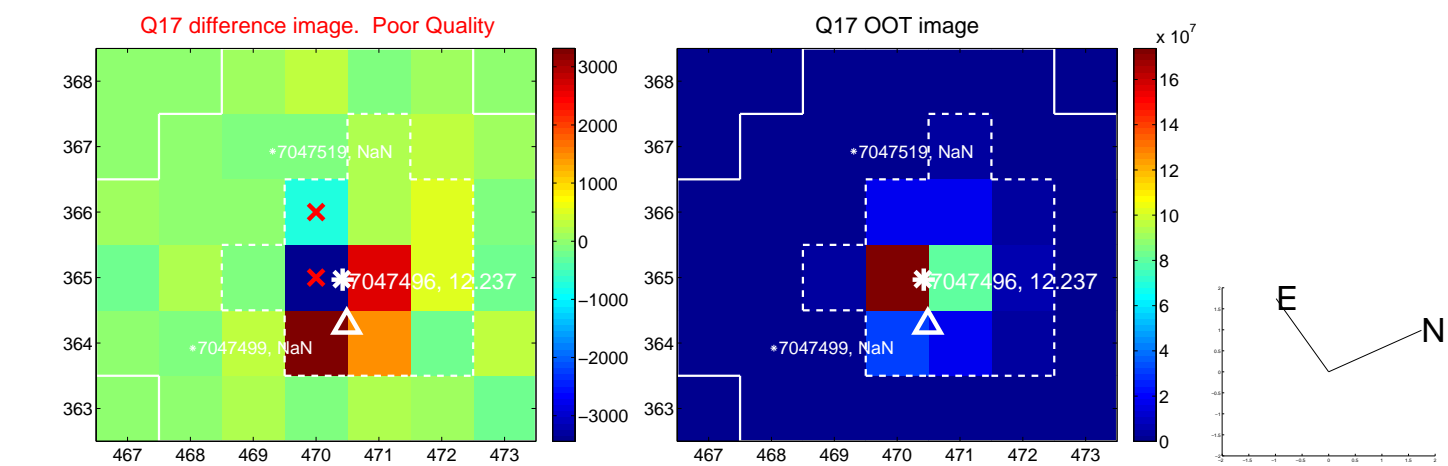
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



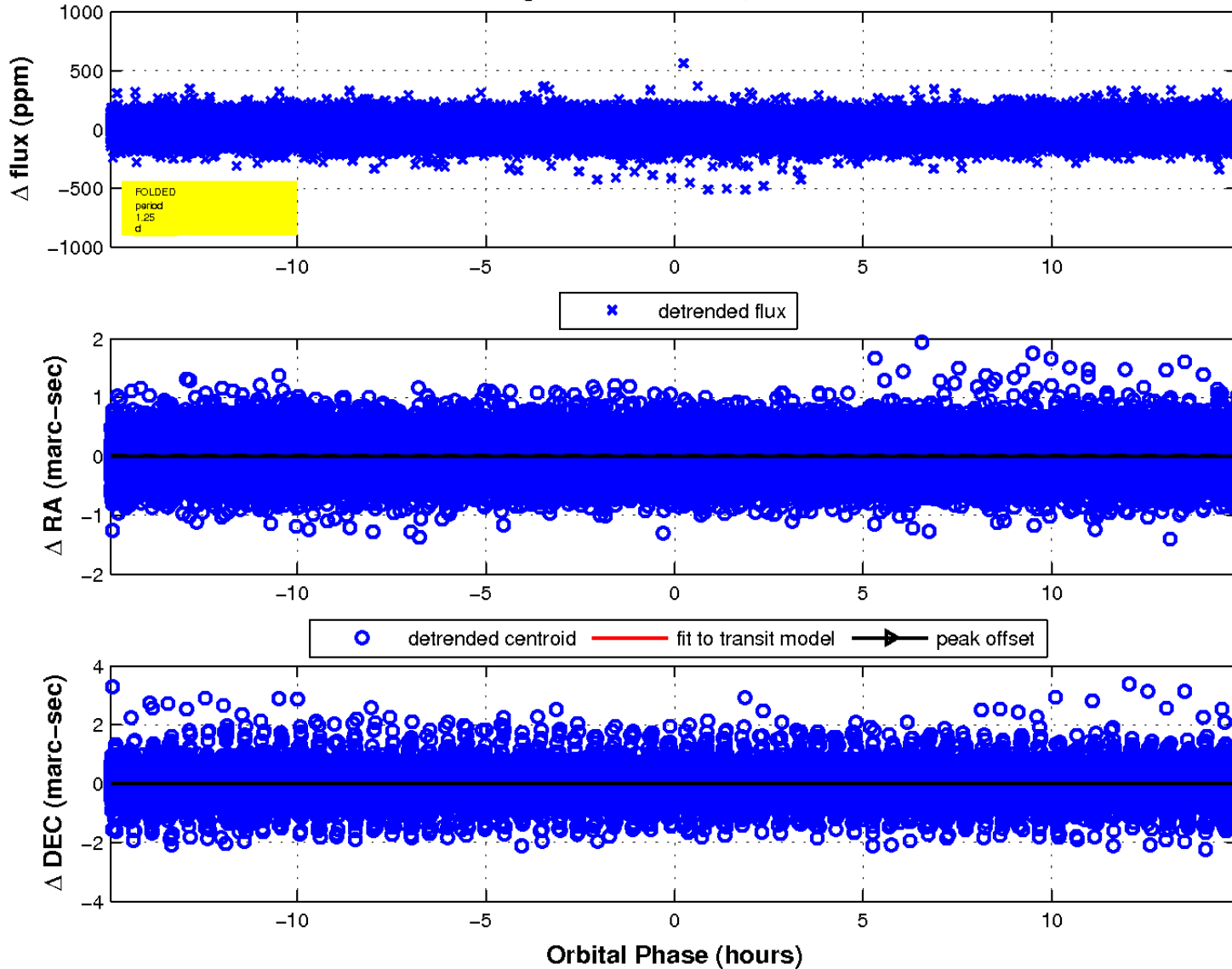
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

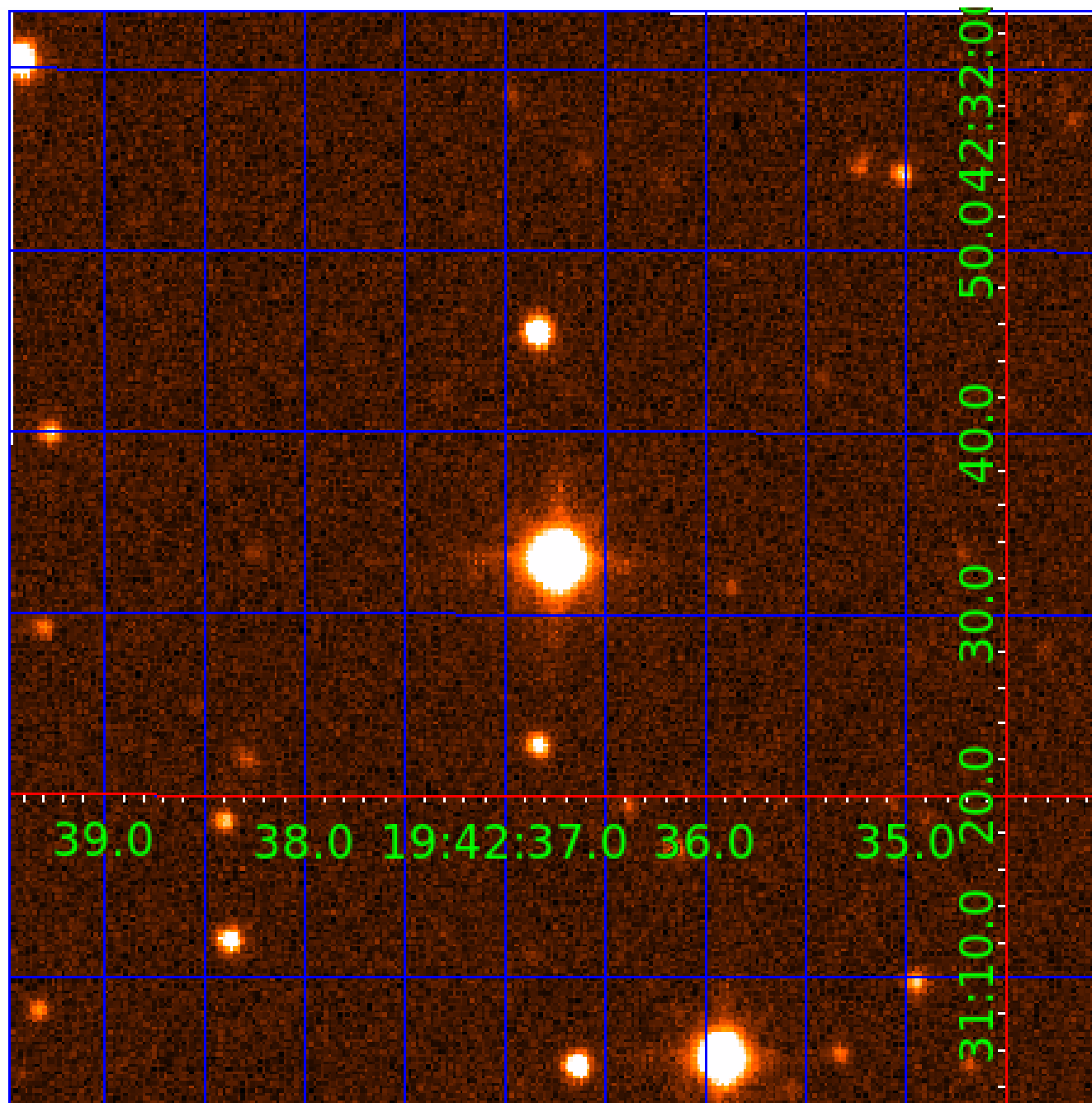


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination





# KIC 007047496

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
007047496-01	OBS	No	1.246360	132.280158	7.6	6.236	9.3	8.8	1.68	7051	0.48	10578.07
007047496-02	OBS	No	90.900951	190.316190	62.9	6.802	13.8	5.6	1.68	7051	1.52	34.71

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007047496-01	OBS	FP	0.00	1	0	0	0	LPP_DV
007047496-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

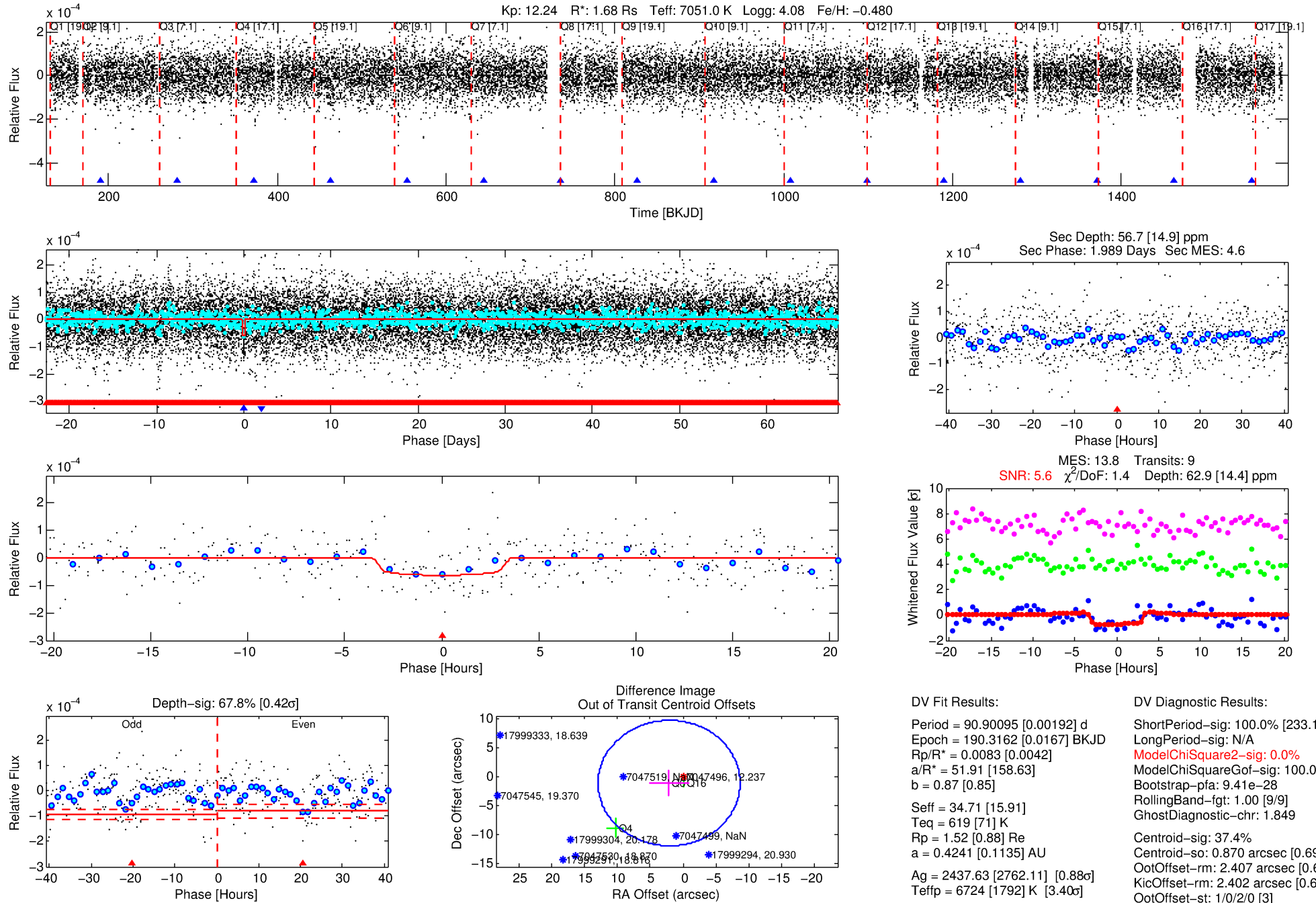
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 007047496-02

No Significant Match Found

# DV One-Page Summary

KIC: 7047496 Candidate: 2 of 2 Period: 90.901 d



## DV Fit Results:

Period = 90.90095 [0.00192] d  
Epoch = 190.3162 [0.0167] BKJD  
Rp/R\* = 0.0083 [0.0042]  
a/R\* = 51.91 [158.63]  
b = 0.87 [0.85]  
Seff = 34.71 [15.91]  
Teq = 619 [71] K  
Rp = 1.52 [0.88] Re  
a = 0.4241 [0.1135] AU  
Ag = 2437.63 [2762.11] [0.88 $\sigma$ ]  
Teffp = 6724 [1792] K [3.40 $\sigma$ ]

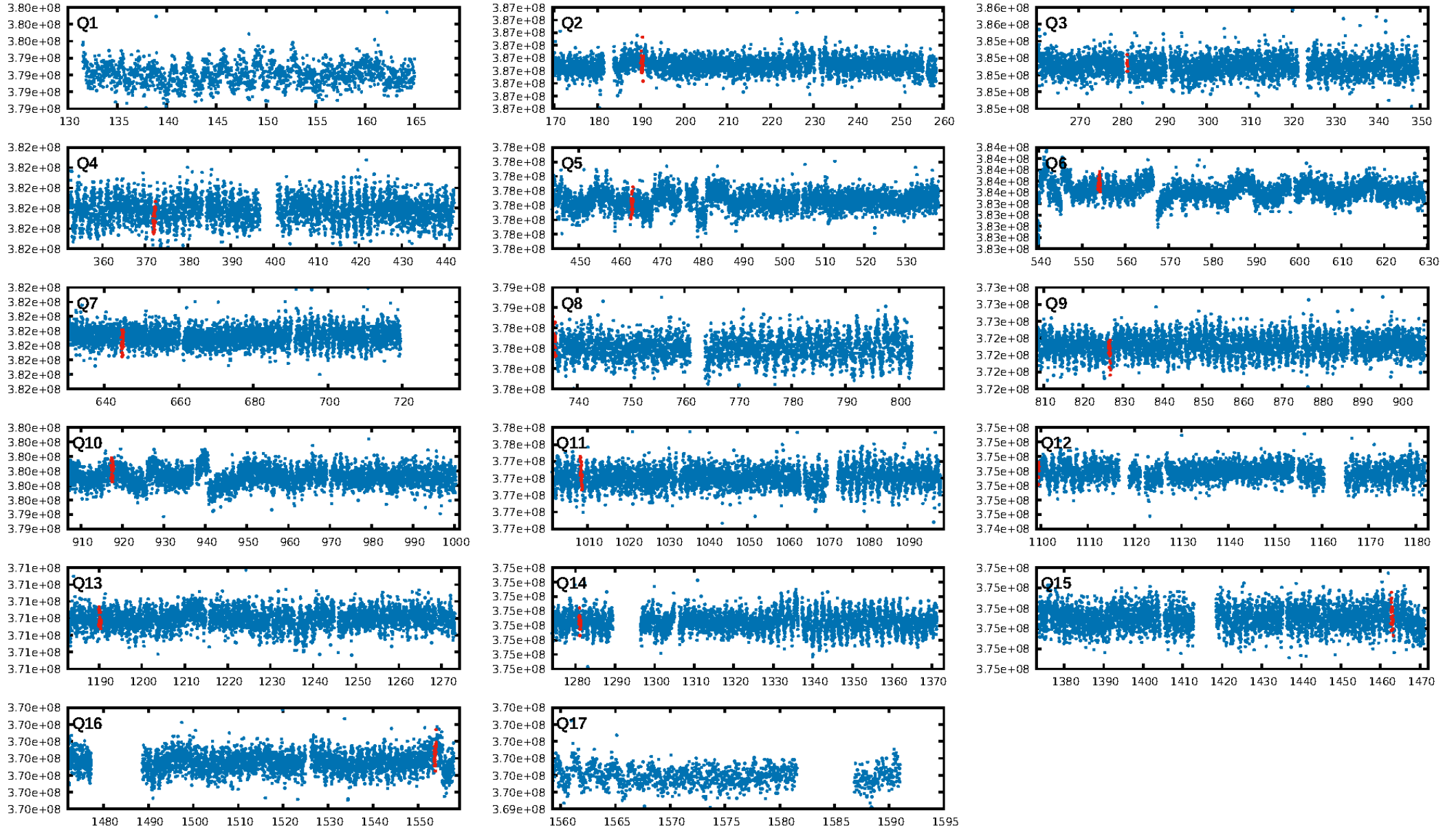
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [233.18 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 9.41e-28  
RollingBand-fgt: 1.00 [9/9]  
GhostDiagnostic-chr: 1.849  
Centroid-sig: 37.4%  
Centroid-so: 0.870 arcsec [0.69 $\sigma$ ]  
OotOffset-rm: 2.407 arcsec [0.67 $\sigma$ ]  
KicOffset-rm: 2.402 arcsec [0.66 $\sigma$ ]  
OotOffset-st: 1/0/2/0 [3]  
KicOffset-st: 1/0/2/0 [3]  
DiffImageQuality-fgm: 0.33 [1/3]  
DiffImageOverlap-fno: 0.00 [0/10]

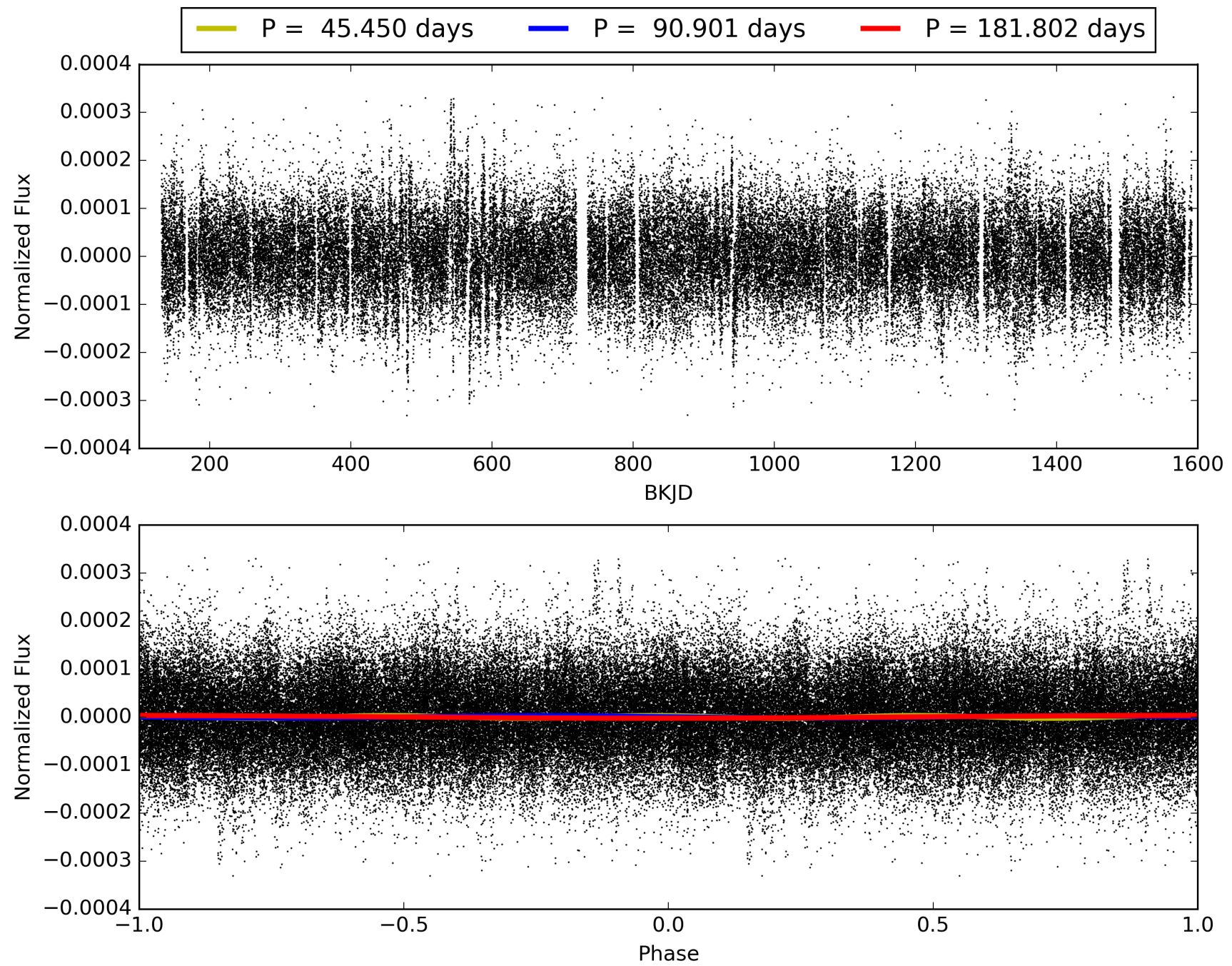
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 20:20:57 Z

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

# TCE 007047496-02, PDC Light Curves



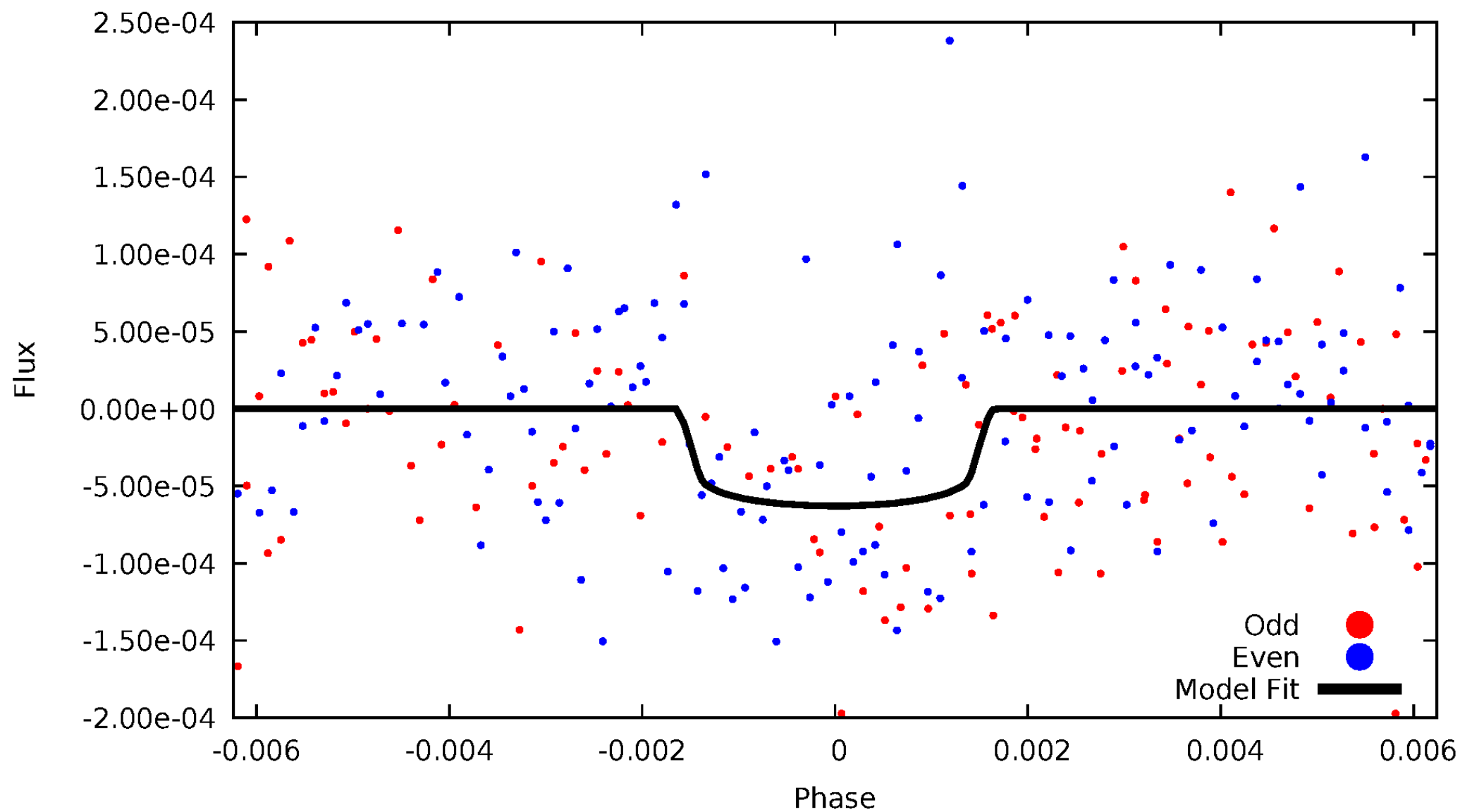
TCE 007047496-02





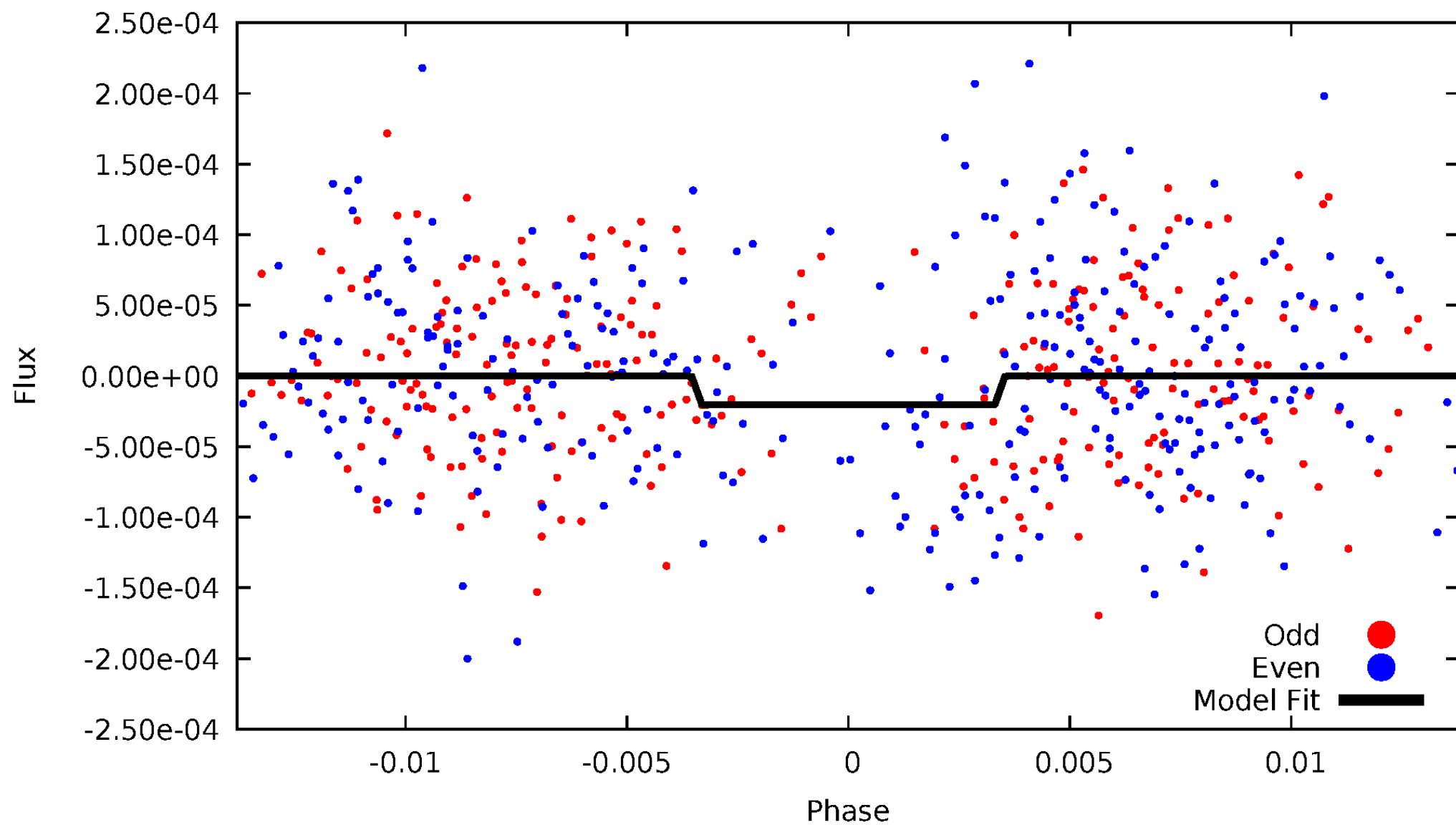
# DV Odd/Even

TCE 007047496-02



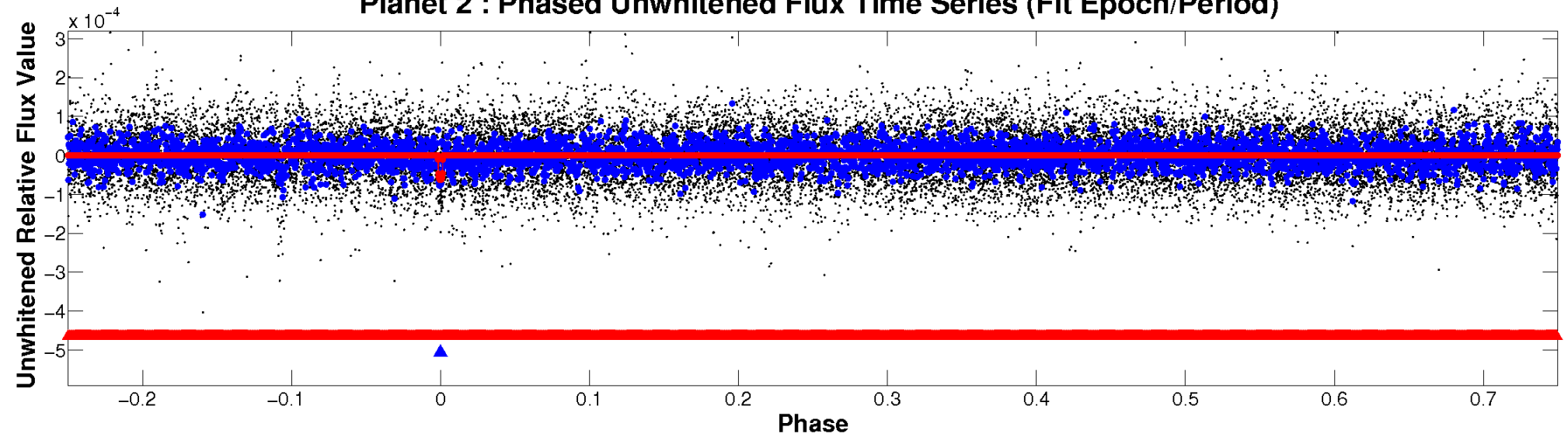
# ALT Odd/Even

TCE 007047496-02

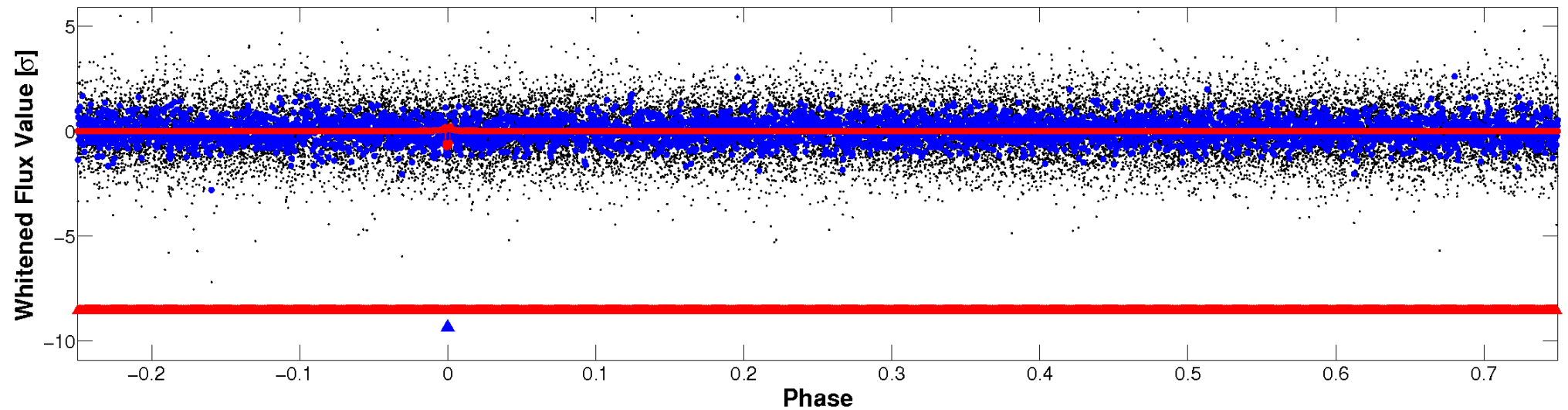


# Non-Whitened Vs. Whitened Light Curve

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

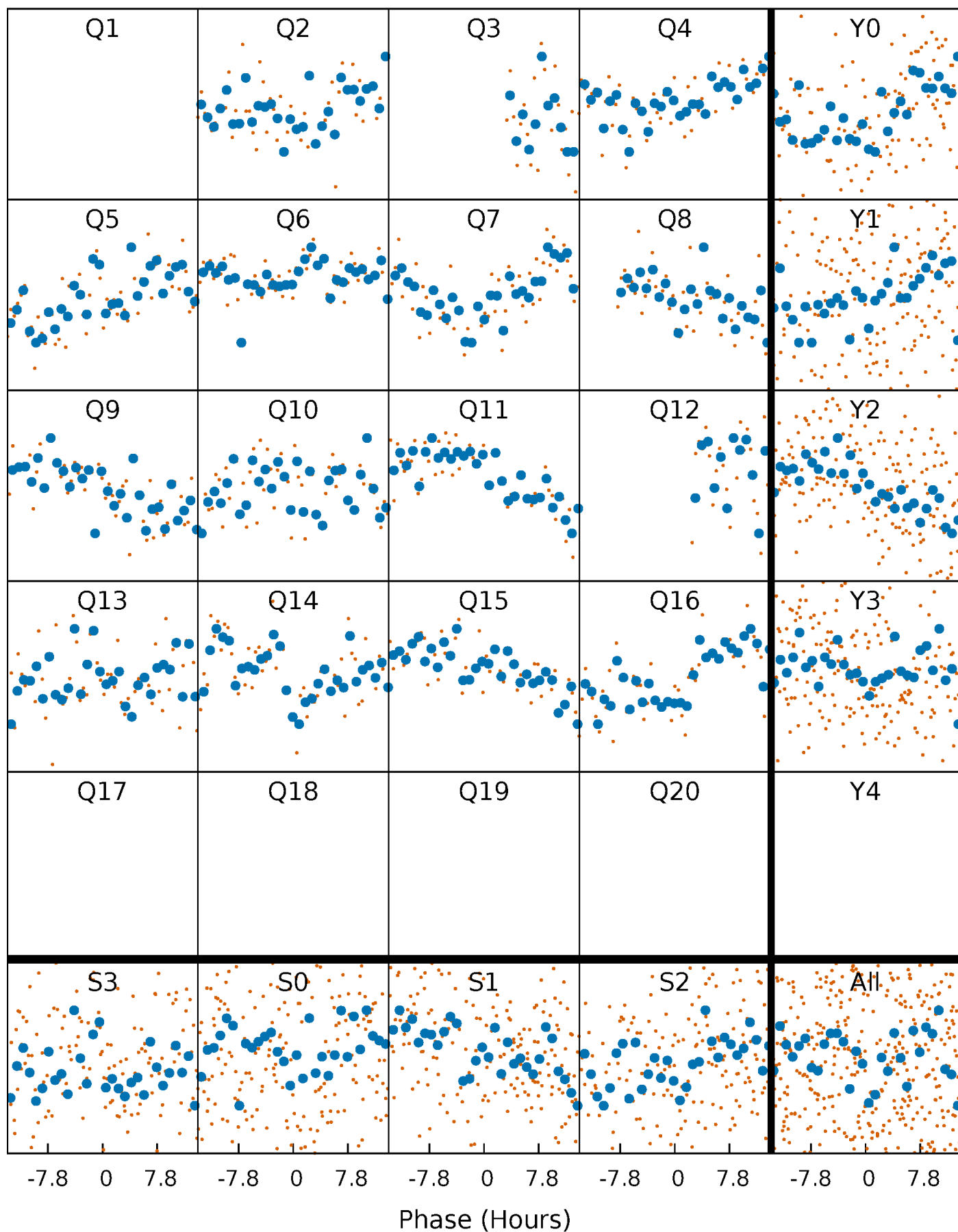


**Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



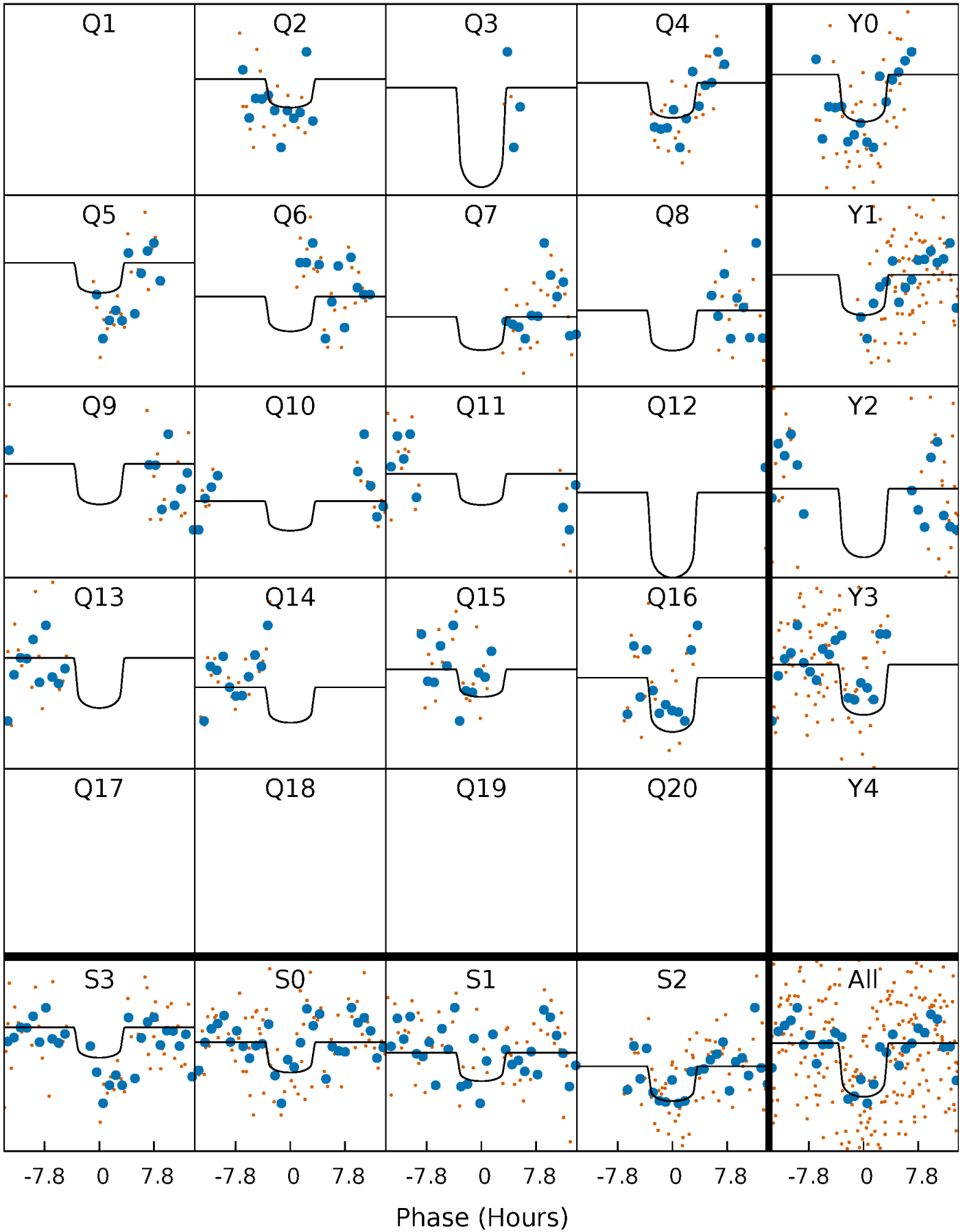
# PDC Quarter-Phased Transit Curves

TCE 007047496-02 P= 90.900951 Days  $T_0=190.316191$  (BKJD)



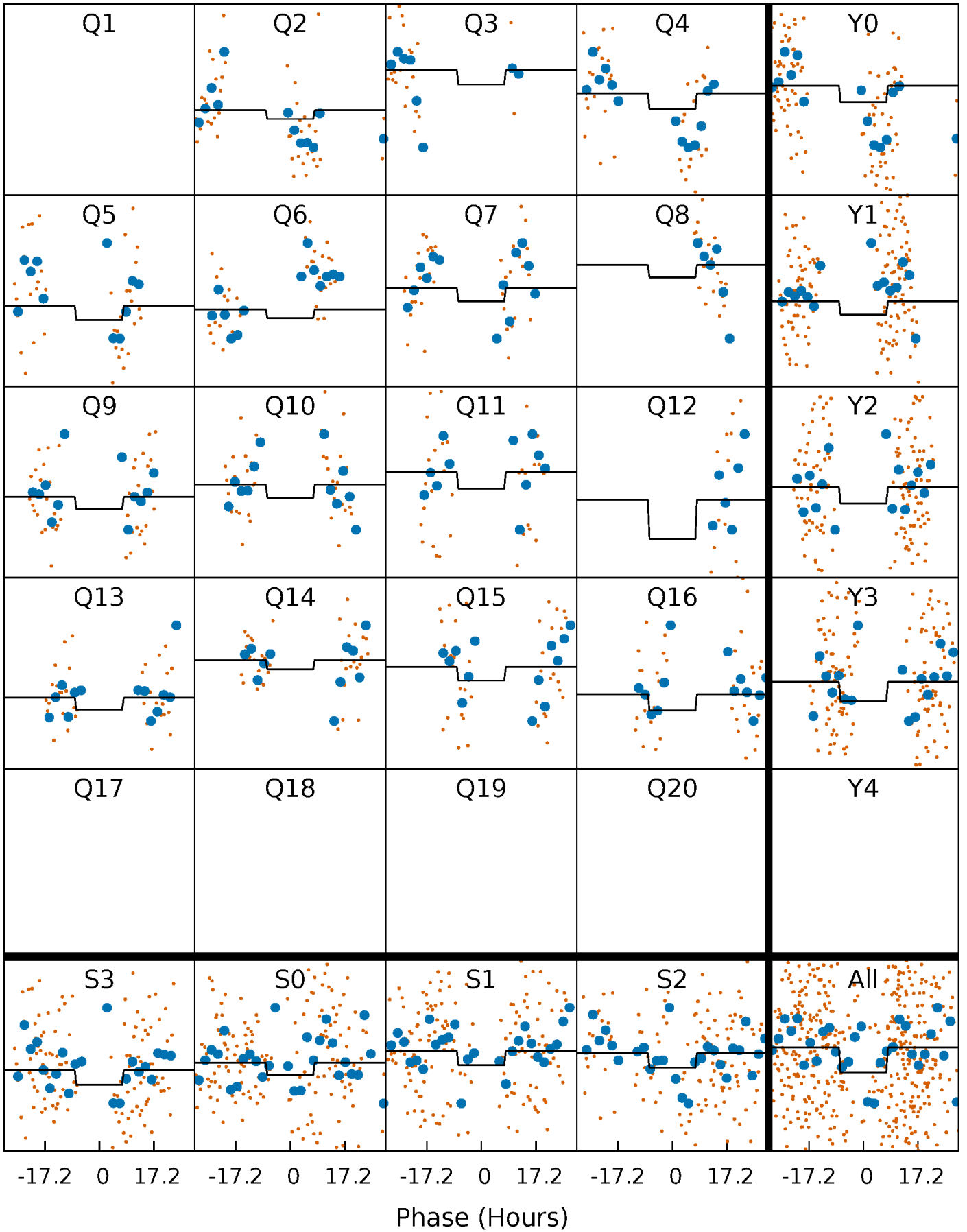
# DV Quarter-Phased Transit Curves

TCE 007047496-02     $P = 90.900951$  Days     $T_0 = 190.316191$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 007047496-02   P= 90.931830 Days    $T_0=190.052538$  (BKJD)

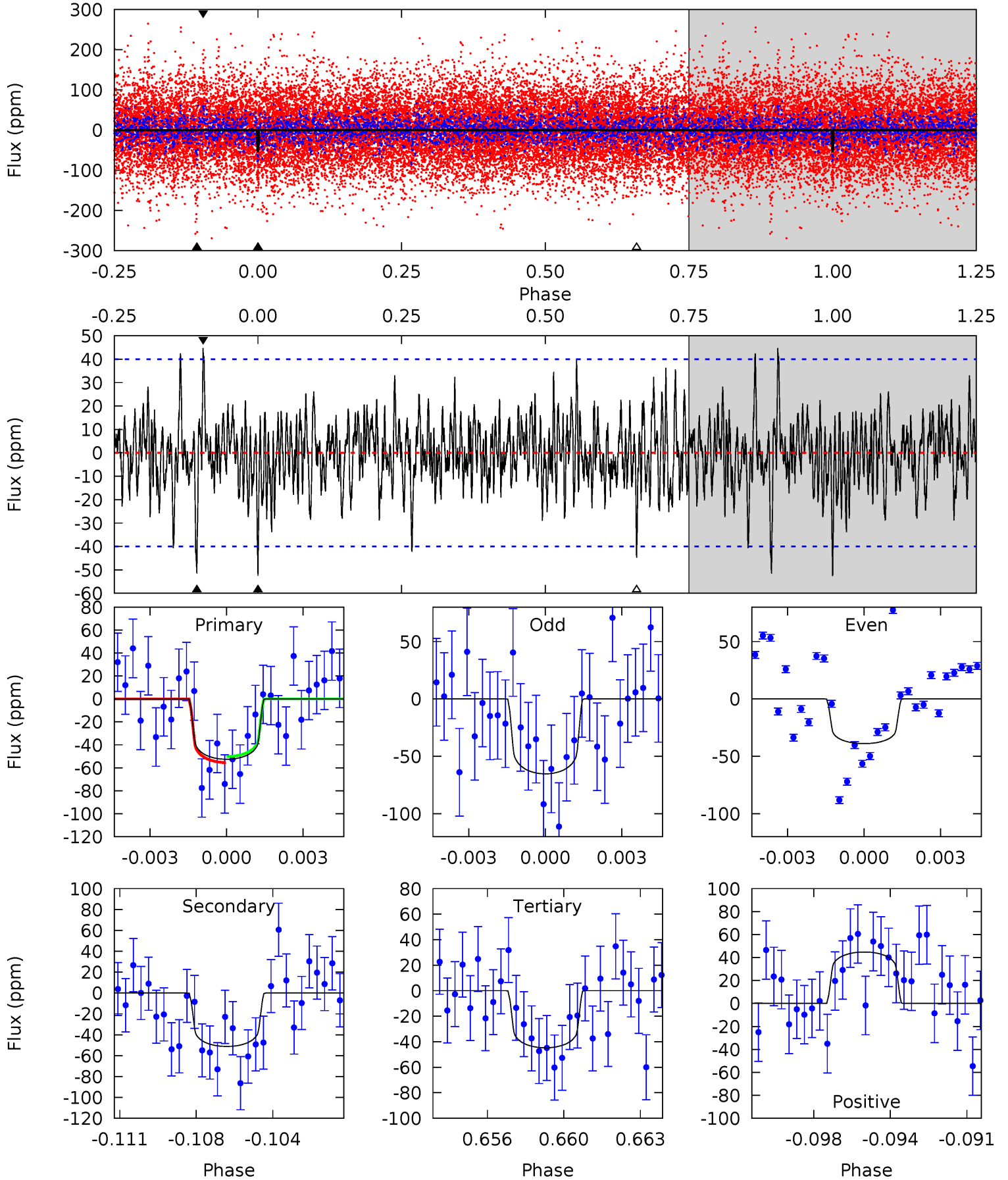




# DV Model-Shift Uniqueness Test

007047496-02, P = 90.900951 Days, E = 99.415240 Days

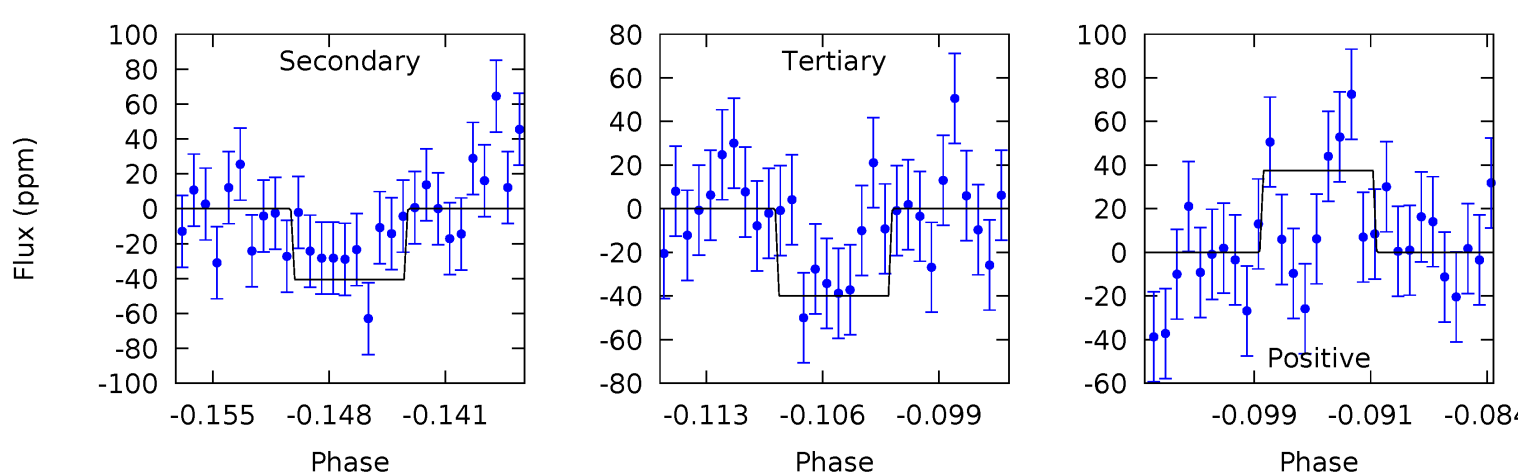
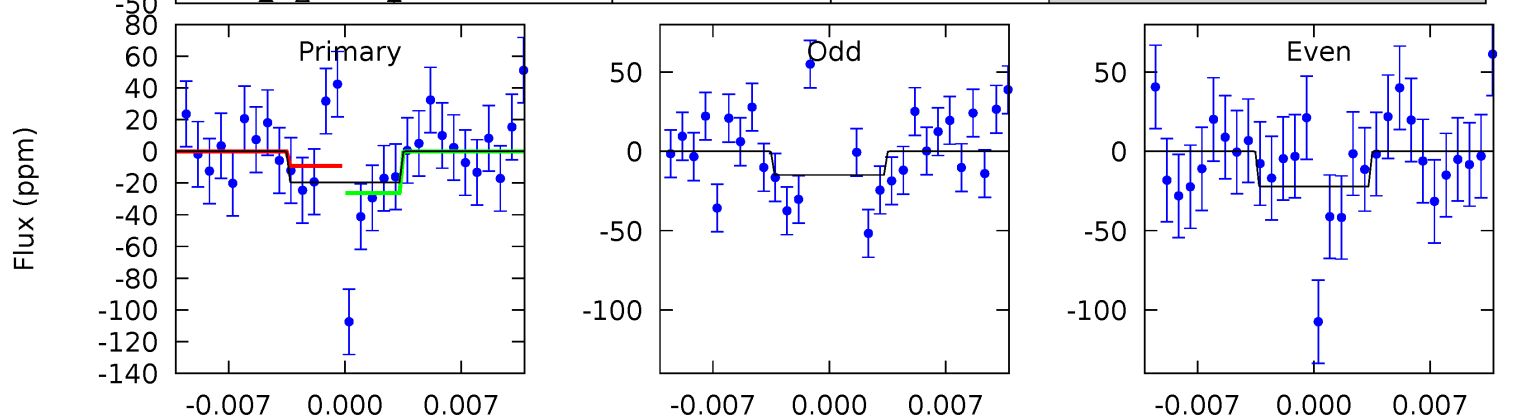
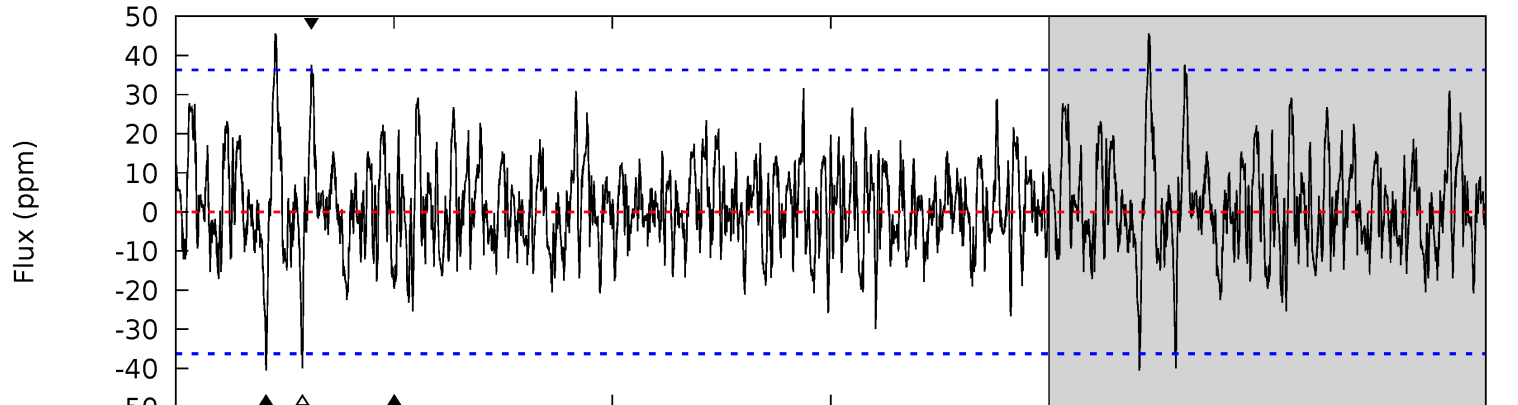
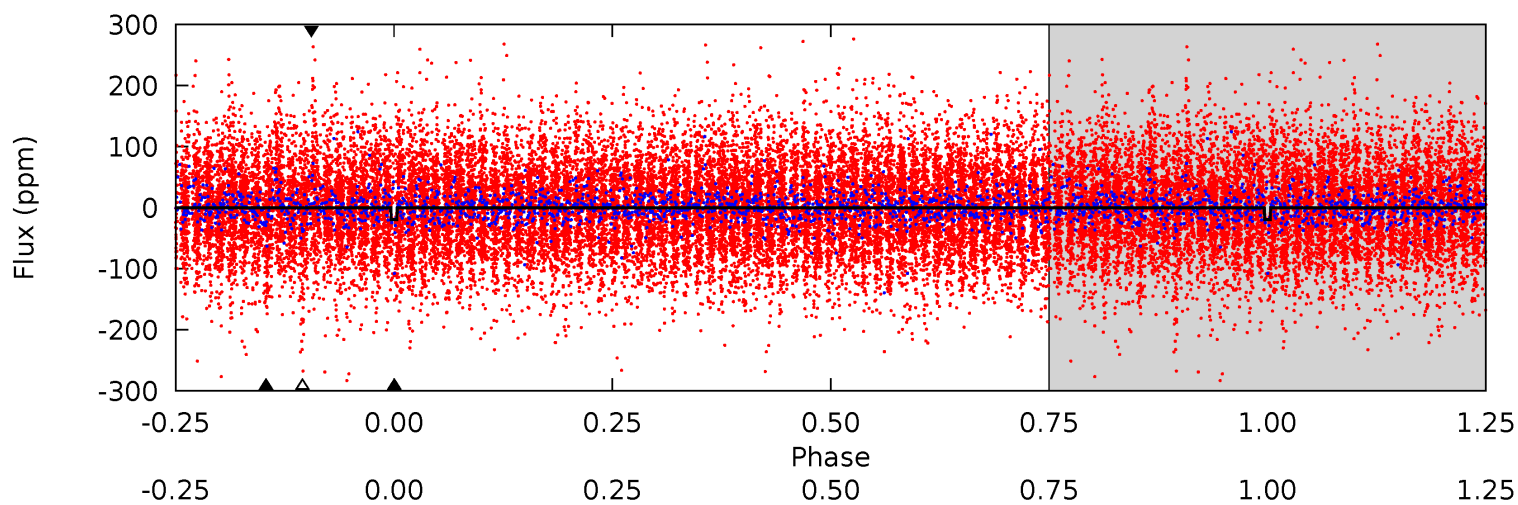
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.87	6.70	5.85	5.86	5.23	2.93	1.60	1.02	1.01	0.85	0.84	1.69	0.34	0.46	0.35



# Alt Model-Shift Uniqueness Test

007047496-02, P = 90.931830 Days, E = 99.120708 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
2.75	5.69	5.61	5.27	5.09	2.70	1.39	-2.86	-2.52	0.08	0.42	0.49	0.10	0.53	1.18



### Stellar Parameters For KIC 007047496

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7051^{+216}_{-312}$	$4.078^{+0.246}_{-0.164}$	$-0.480^{+0.250}_{-0.300}$	$1.679^{+0.430}_{-0.478}$	$1.232^{+0.185}_{-0.166}$	$0.366^{+0.532}_{-0.163}$
	+3%/-4%	+6%/-4%	+52%/-62%	+26%/-28%	+15%/-13%	+145%/-44%
Source	PHO54	PHO54	PHO54	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 007047496-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-51 \pm 8$	$1.54^{+0.86}_{-0.77}$	$853^{+69}_{-69}$	$6360^{+3223}_{-1132}$	$2142^{+6541}_{-1267}$
Alt.	$-41 \pm 7$	$0.93^{+0.75}_{-0.62}$	$855^{+69}_{-77}$	$7905^{+11039}_{-2182}$	$4550^{+34349}_{-3160}$

$T_{max}$  = 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

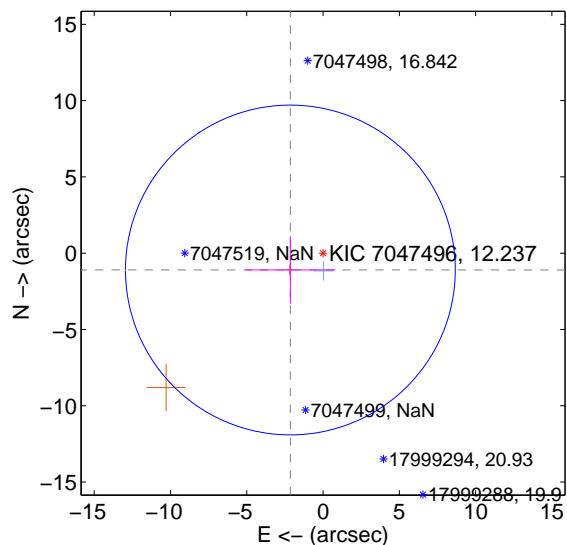
Supplemental centroid analysis for 007047496-02. Kepler magnitude: 12.24. Transit SNR 5.55

There are 1 quarters with good PRF difference image offsets

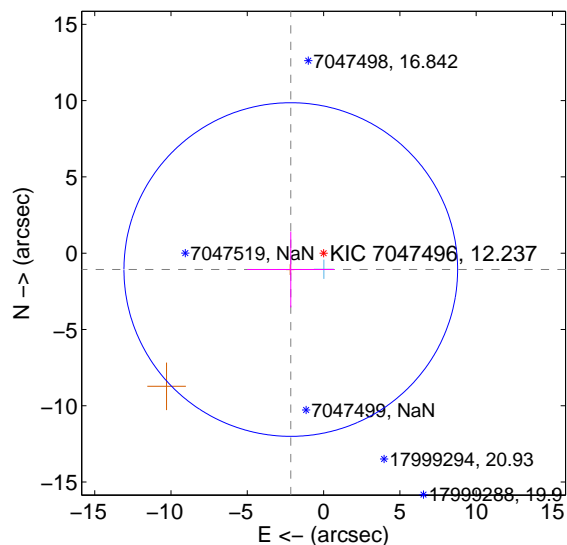
The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.407 \pm 3.603$	0.67	$2.140 \pm 2.930$	$-1.102 \pm 2.214$
PRF-fit source offset from KIC position	$2.402 \pm 3.645$	0.66	$2.149 \pm 2.849$	$-1.073 \pm 2.480$
photometric centroid source offset	$0.87 \pm 1.27$	0.69	$-0.13 \pm 1.22$	$-0.86 \pm 1.27$

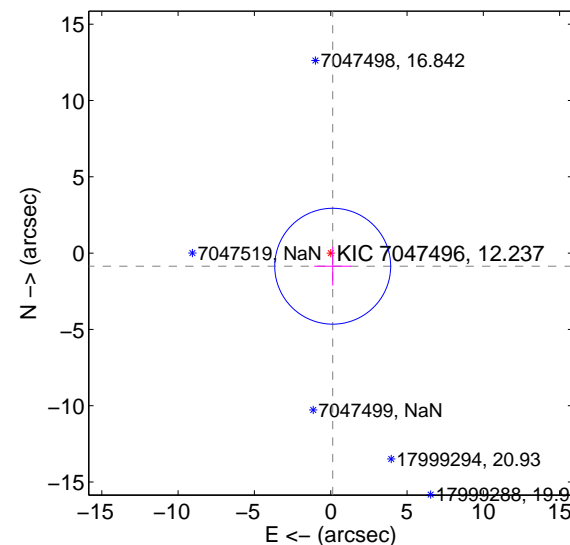
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

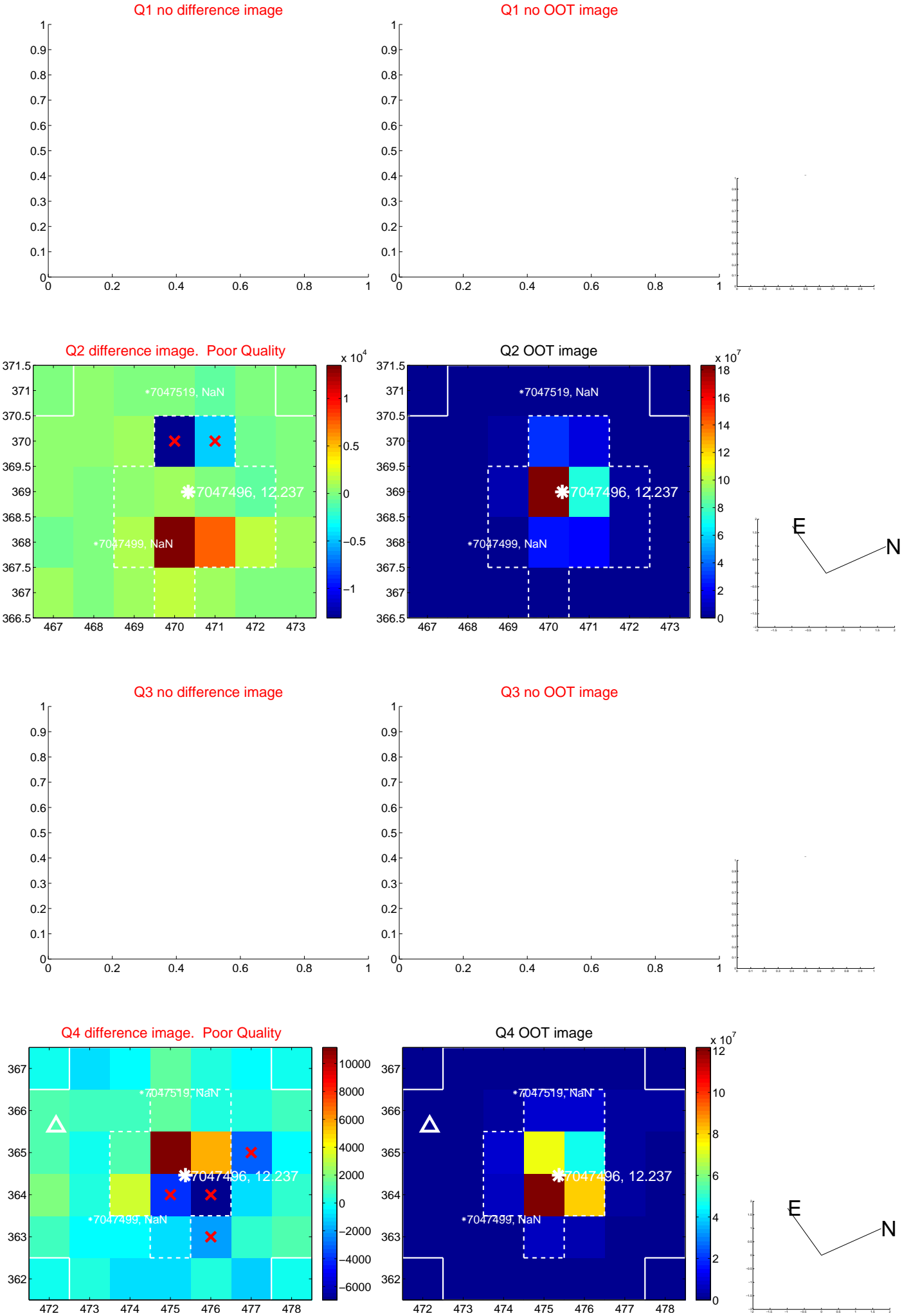


offset from photometric centroids

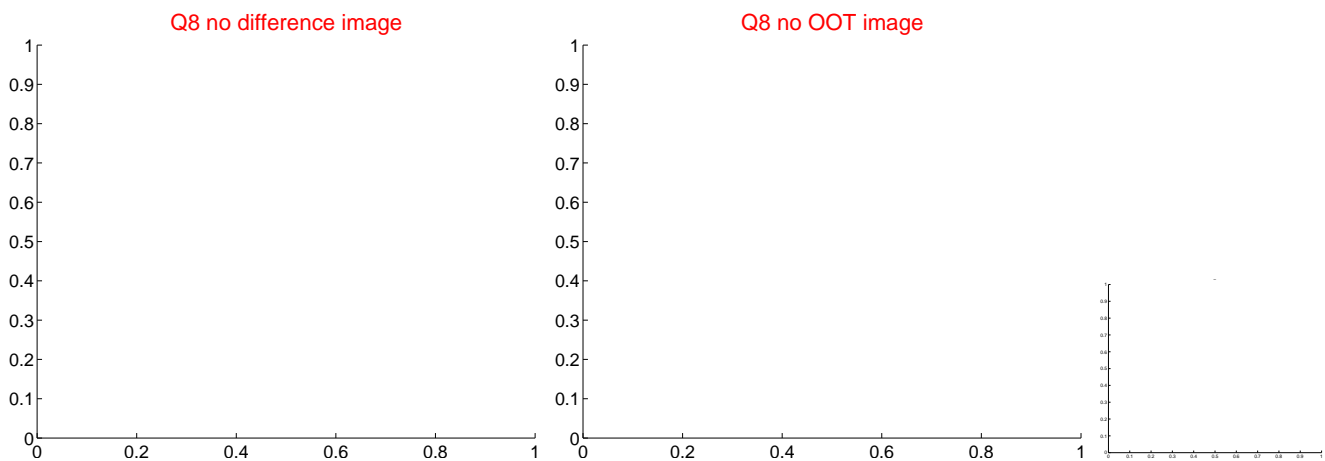
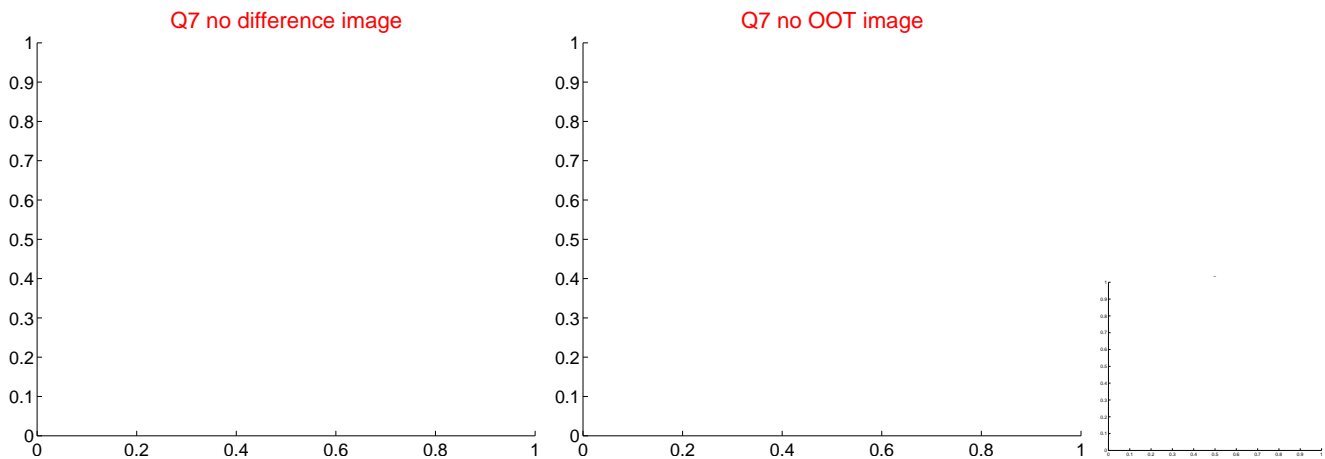
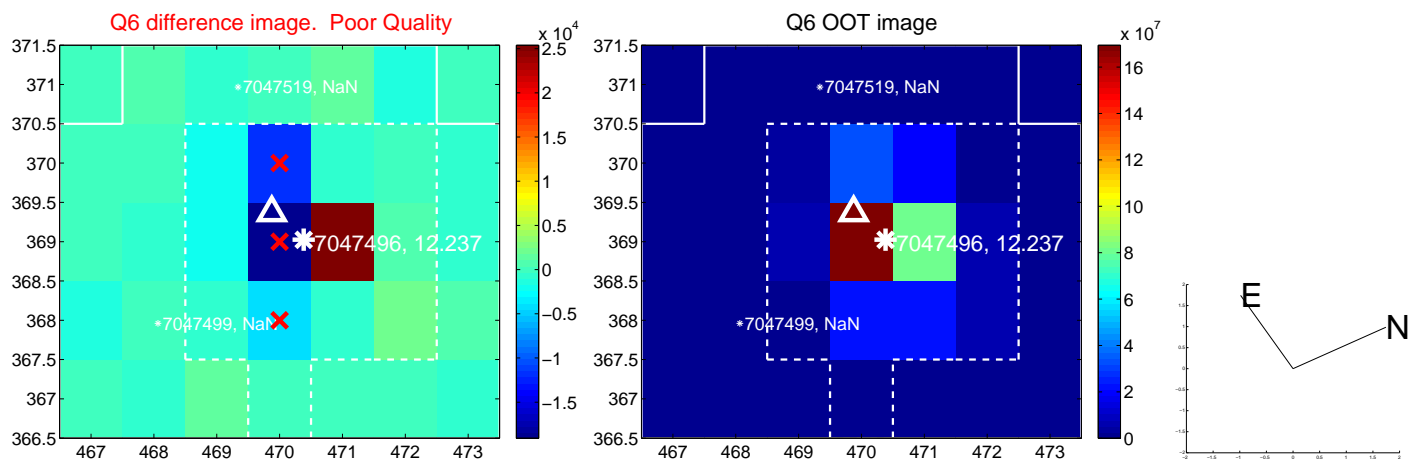
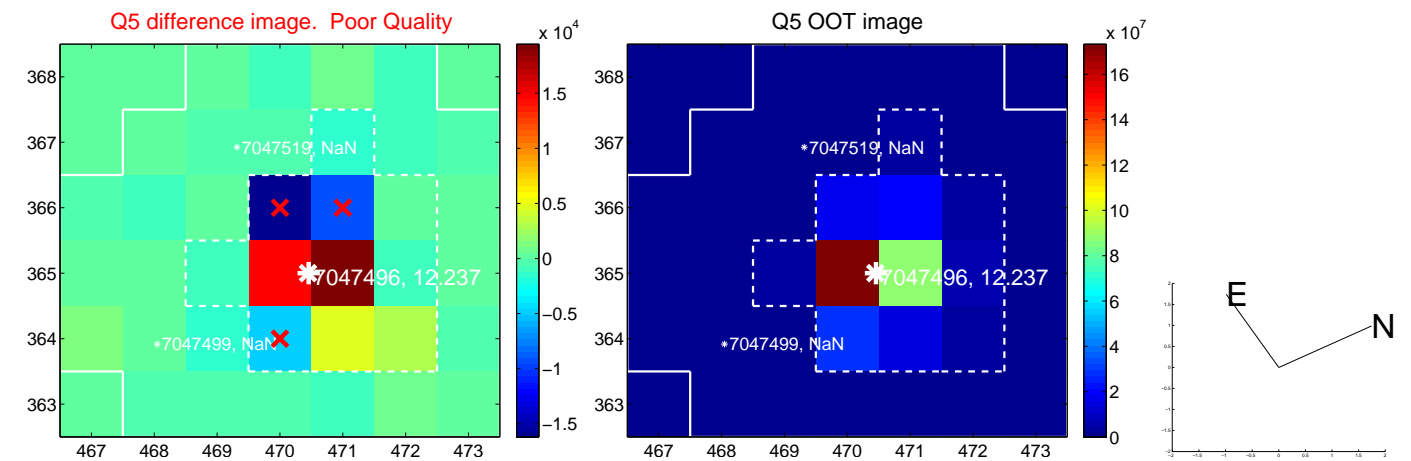


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

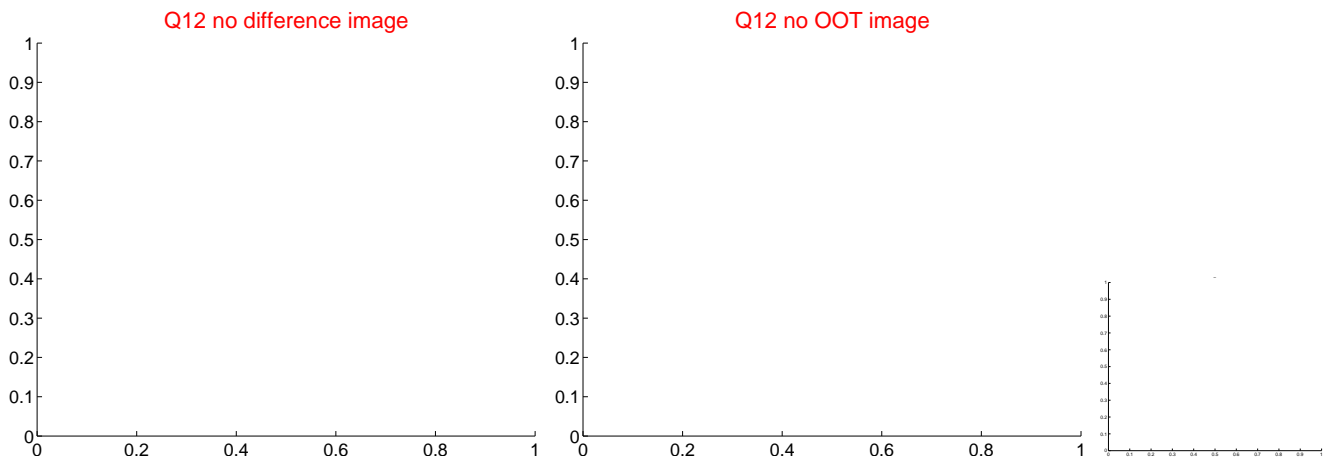
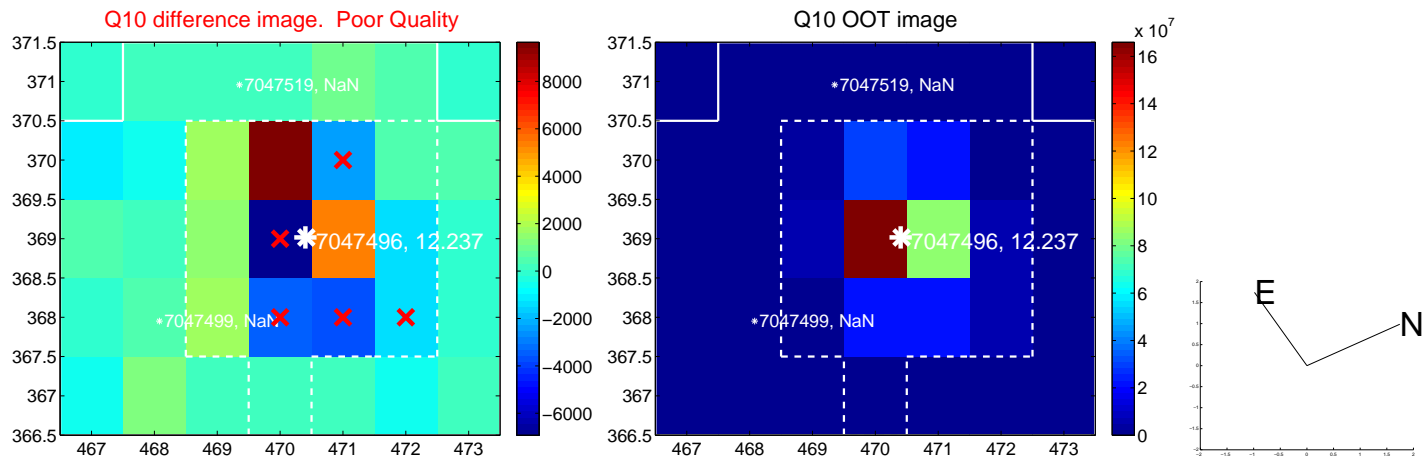
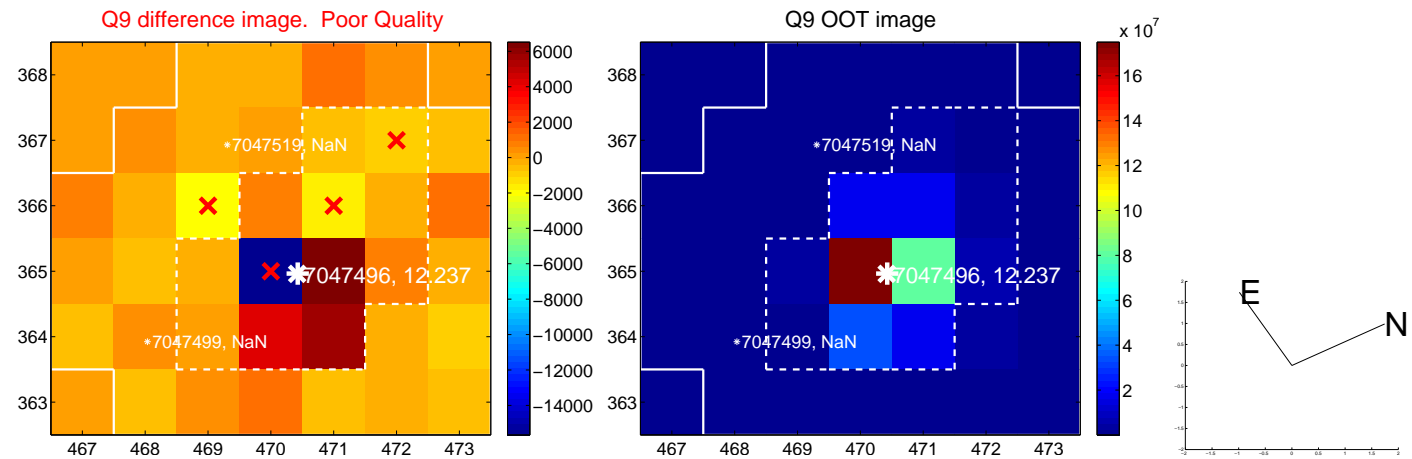


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

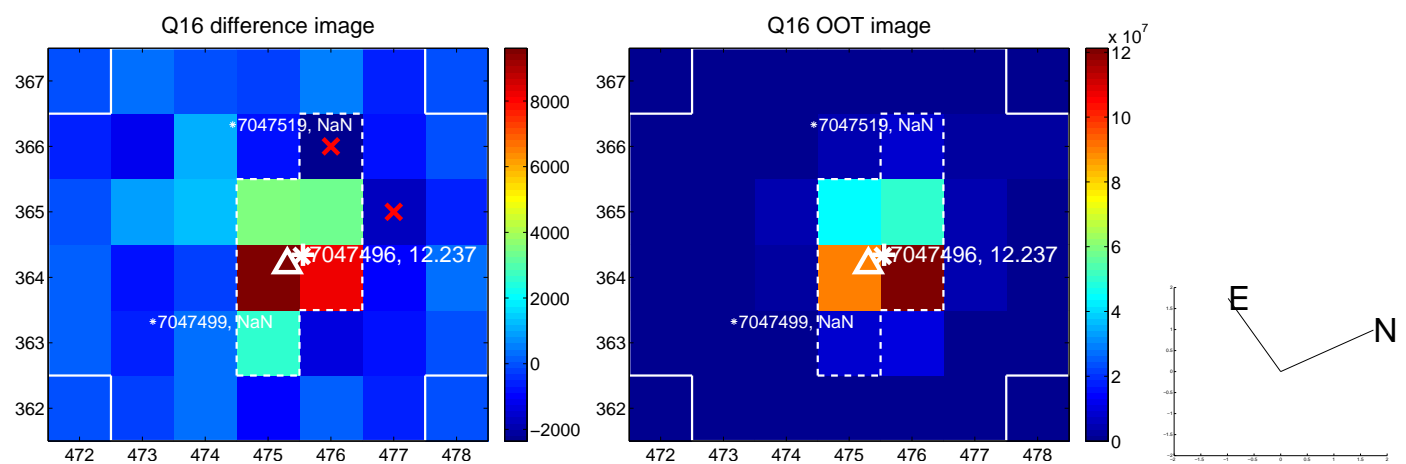
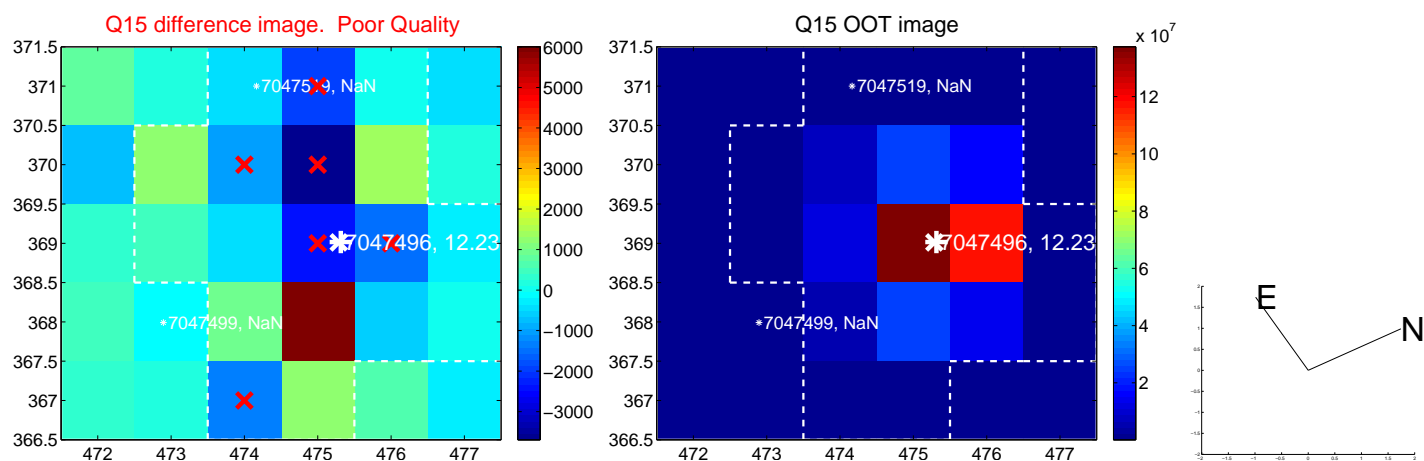
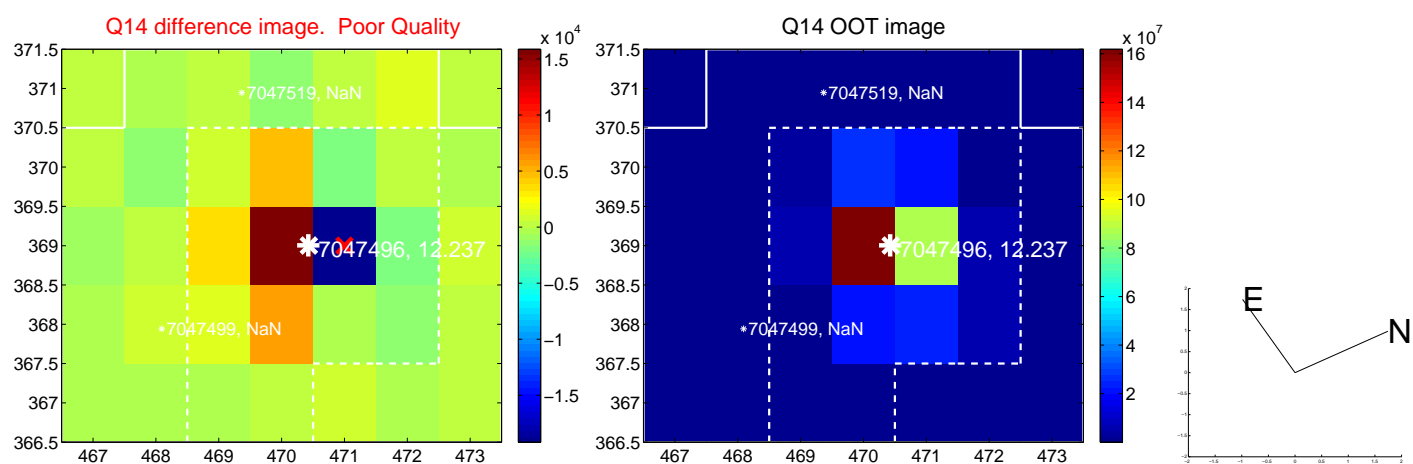
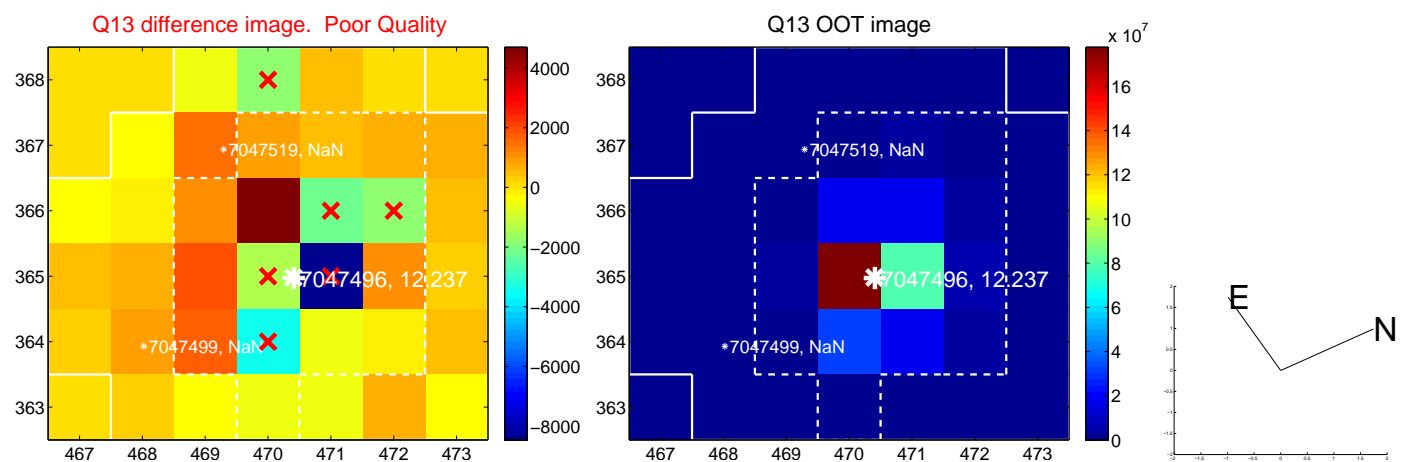




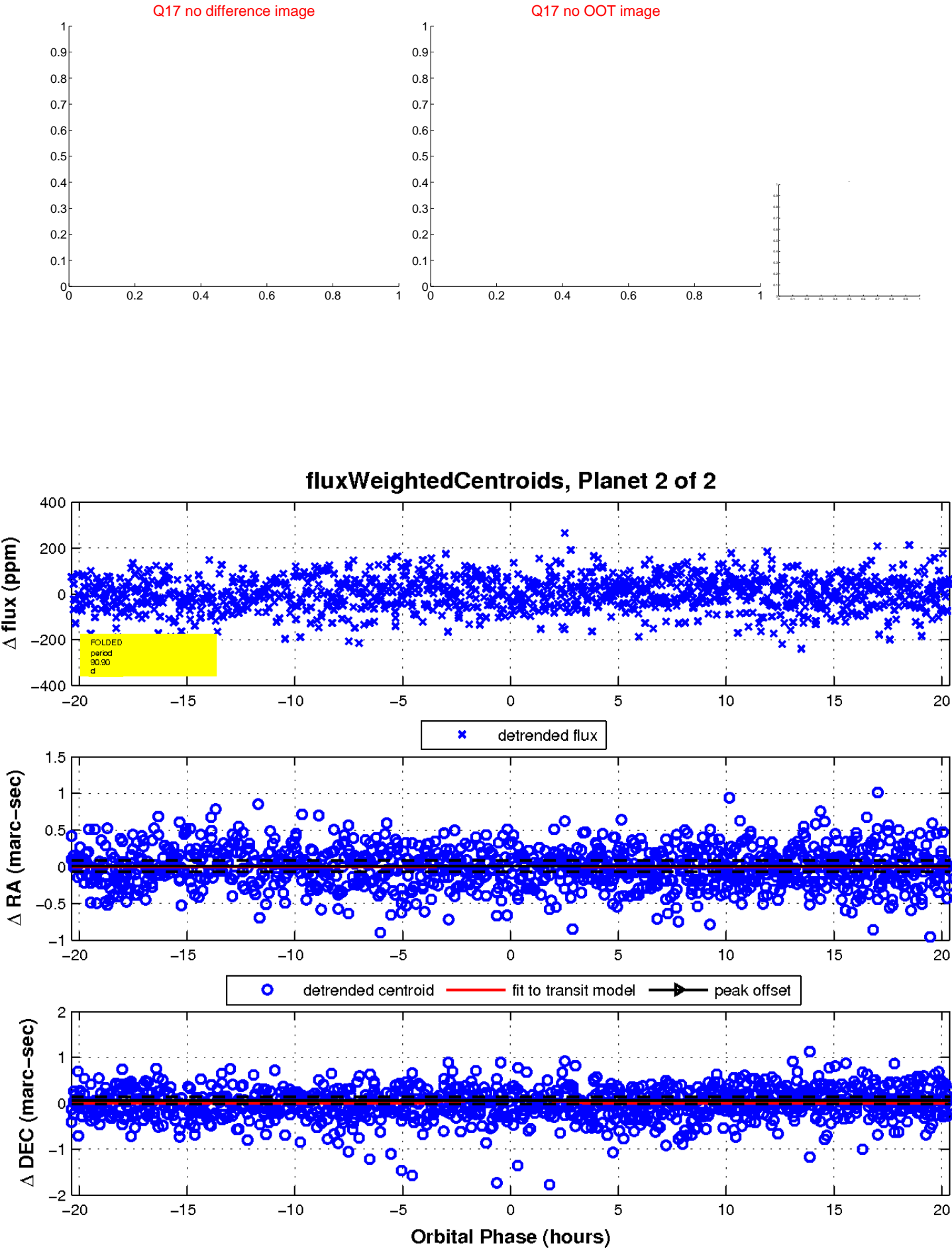
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



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



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



UKIRT Image

Declination

