

# KIC 002694746

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
002694746-01	OBS	No	355.398300	400.117295	3532.9	37.479	16.7	22.6	0.72	5394	4.21	0.48
002694746-02	OBS	No	379.091432	359.108157	2336.3	14.697	8.8	8.5	0.72	5394	3.49	0.44

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002694746-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
002694746-02	OBS	FP	0.00	1	0	0	0	LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_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.

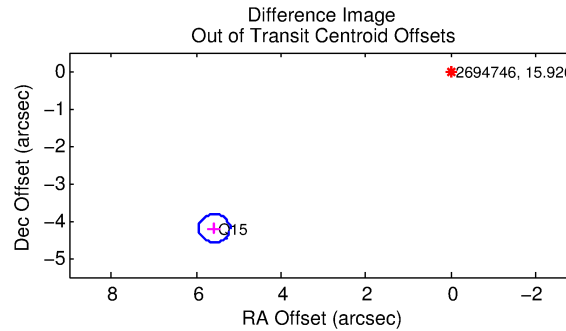
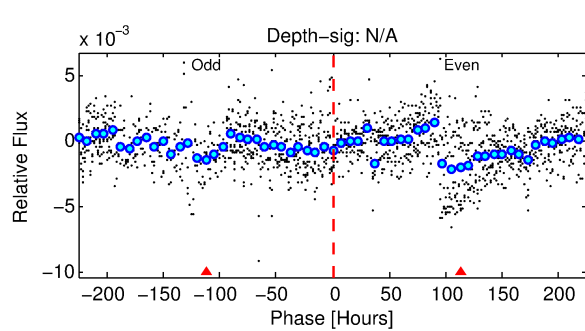
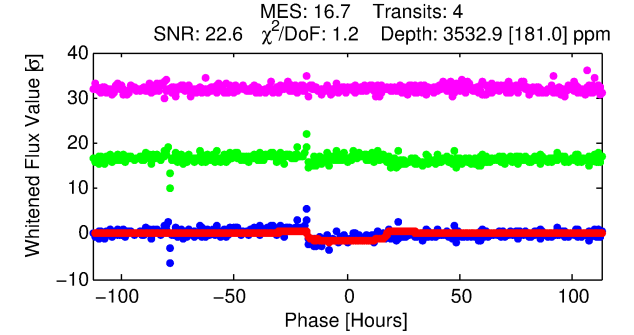
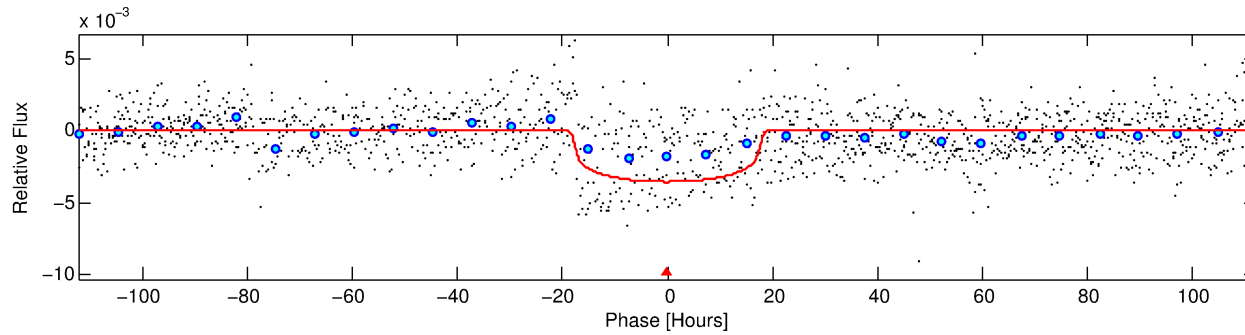
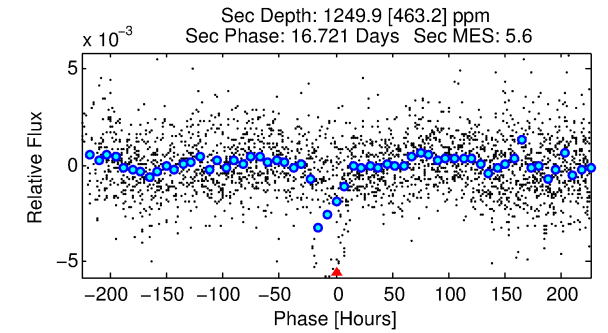
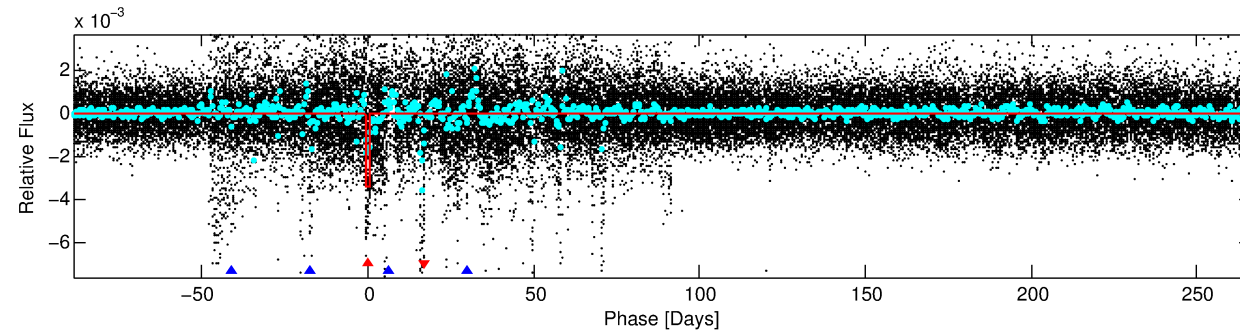
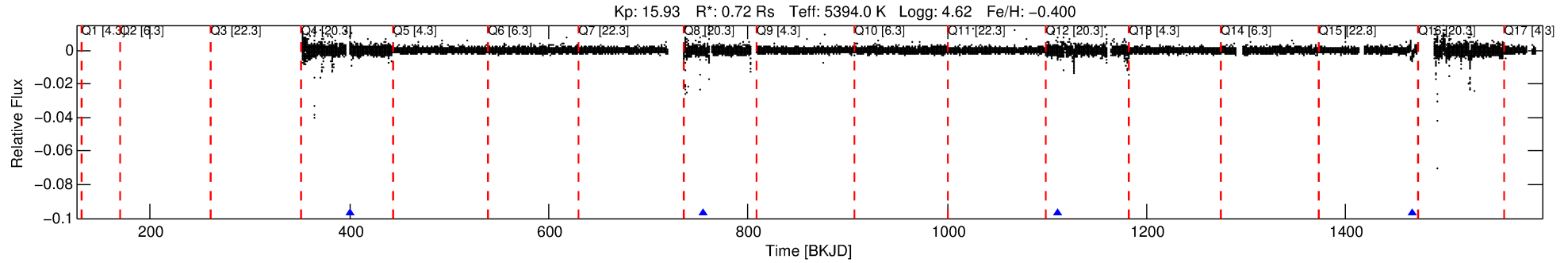
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 002694746-01

No Significant Match Found

# DV One-Page Summary

KIC: 2694746 Candidate: 1 of 2 Period: 355.398 d



## DV Fit Results:

Period = 355.39830 [0.01153] d  
Epoch = 400.1173 [0.0279] BKJD  
Rp/R\* = 0.0536 [0.0048]  
a/R\* = 76.21 [26.74]  
b = 0.06 [5.96]  
Seff = 0.48 [0.11]  
Teq = 212 [13] K  
Rp = 4.21 [0.81] Re  
a = 0.9086 [0.1261] AU  
Ag = 31975.95 [14589.24] [2.19σ]  
Teffp = 4379 [476] K [8.76σ]

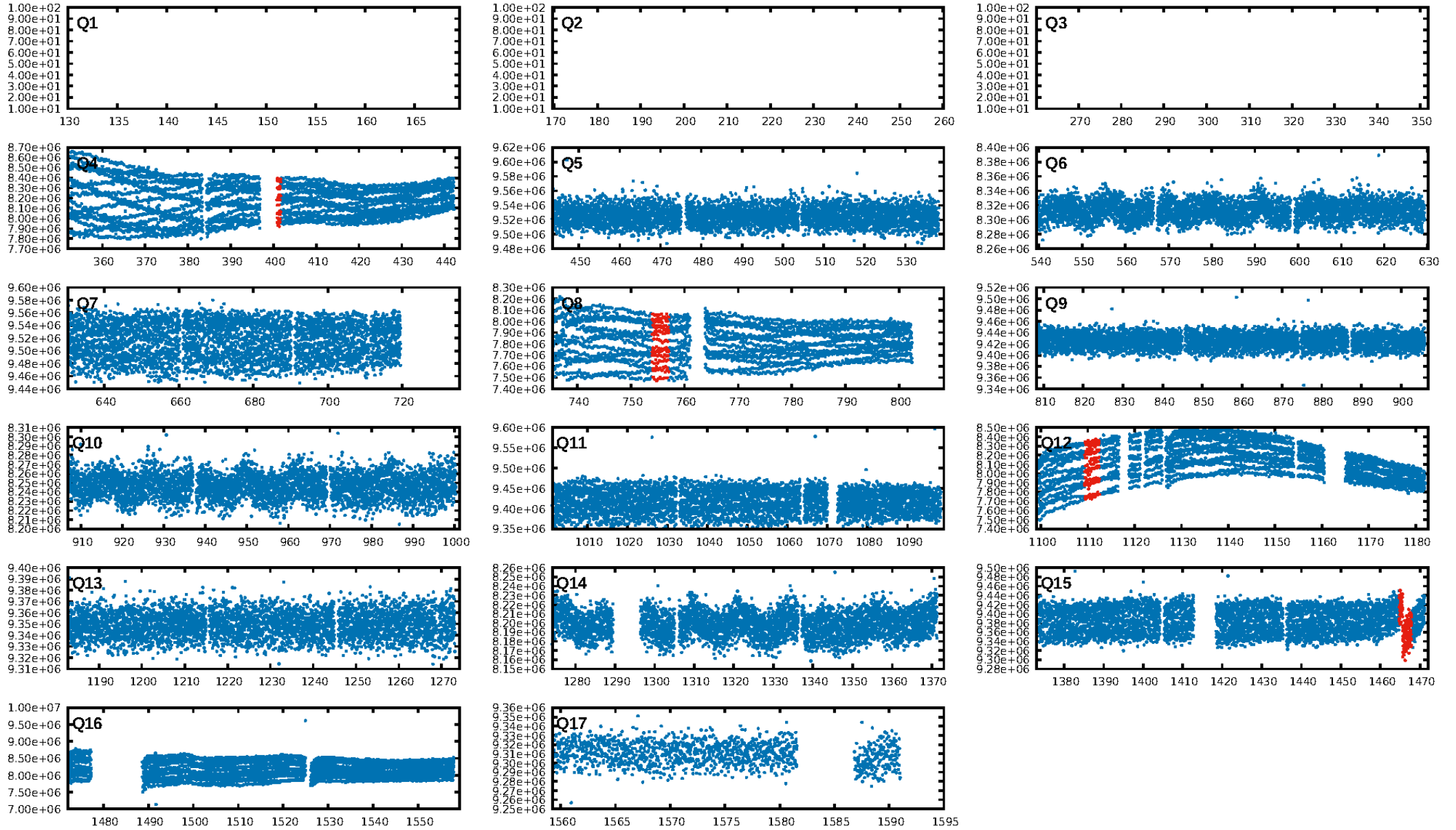
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [14.12σ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 2.82e-12  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: 4.428  
Centroid-sig: 0.1%  
Centroid-so: 2.398 arcsec [6.97σ]  
OotOffset-rm: 6.980 arcsec [55.86σ]  
KicOffset-rm: 1.451 arcsec [12.49σ]  
OotOffset-st: 0/1/0/0 [1]  
KicOffset-st: 0/1/0/0 [1]  
DiffImageQuality-fgm: 1.00 [1/1]  
DiffImageOverlap-fno: 1.00 [2/2]

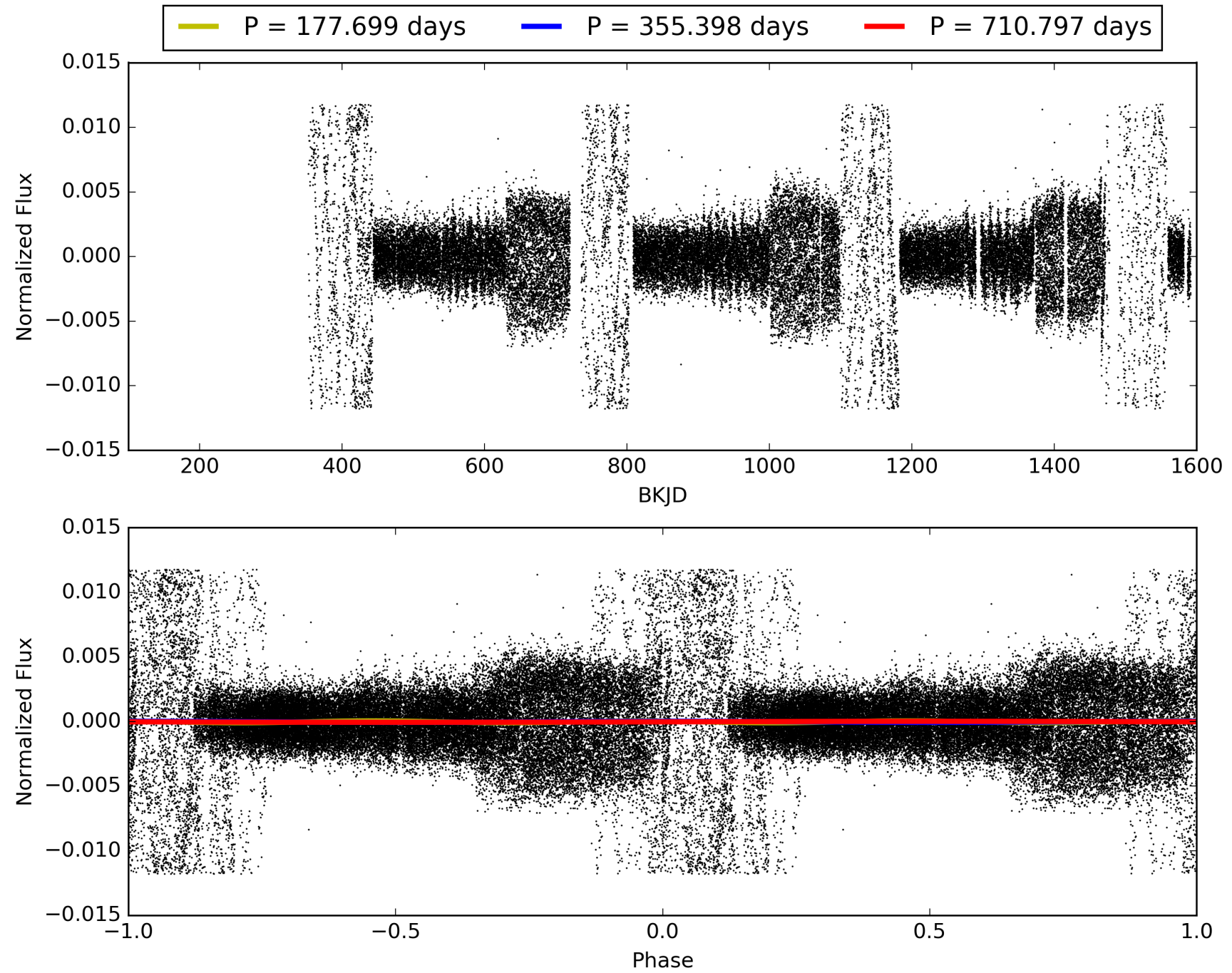
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 23:21:14 Z

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

# TCE 002694746-01, PDC Light Curves

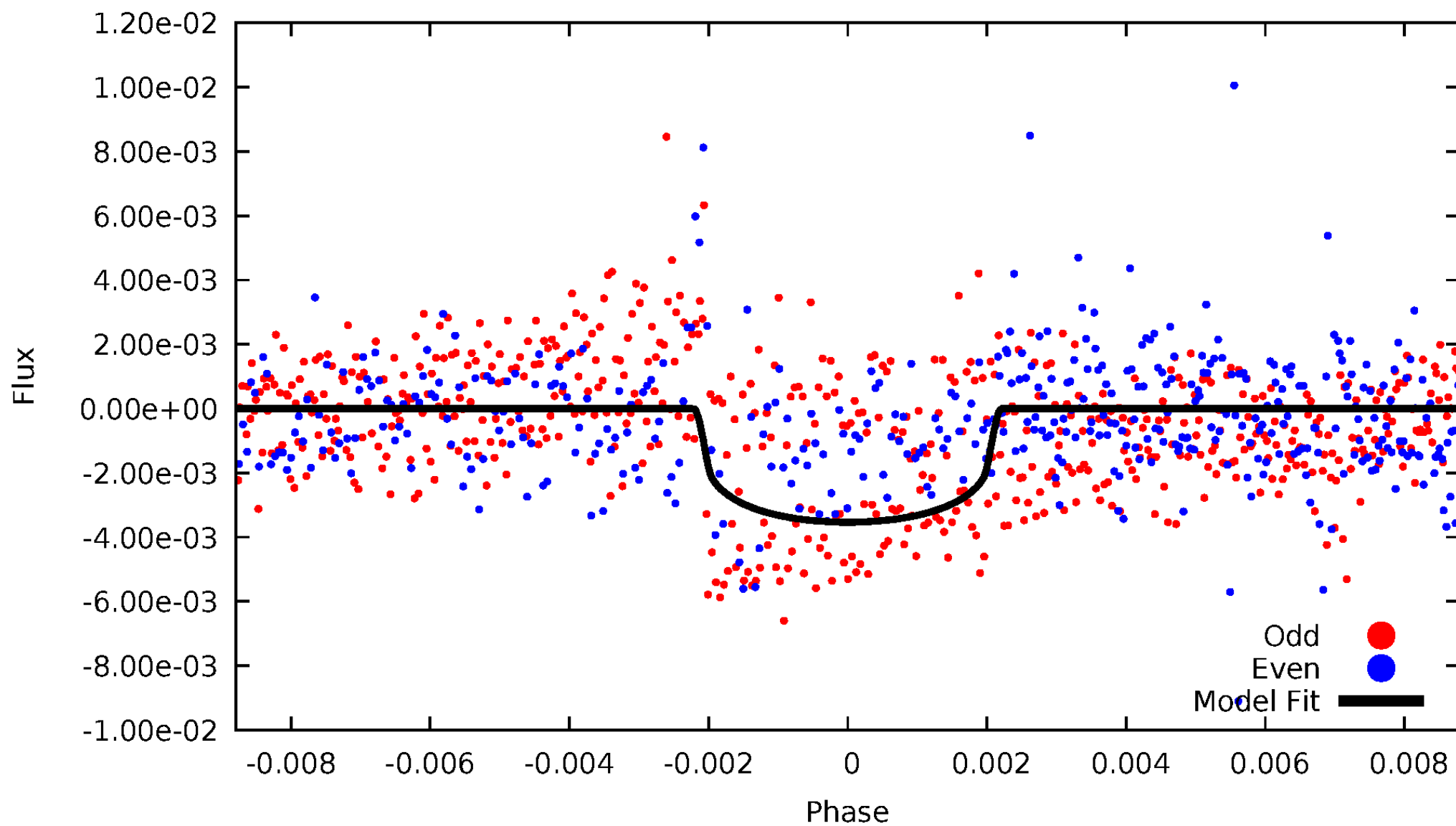


TCE 002694746-01



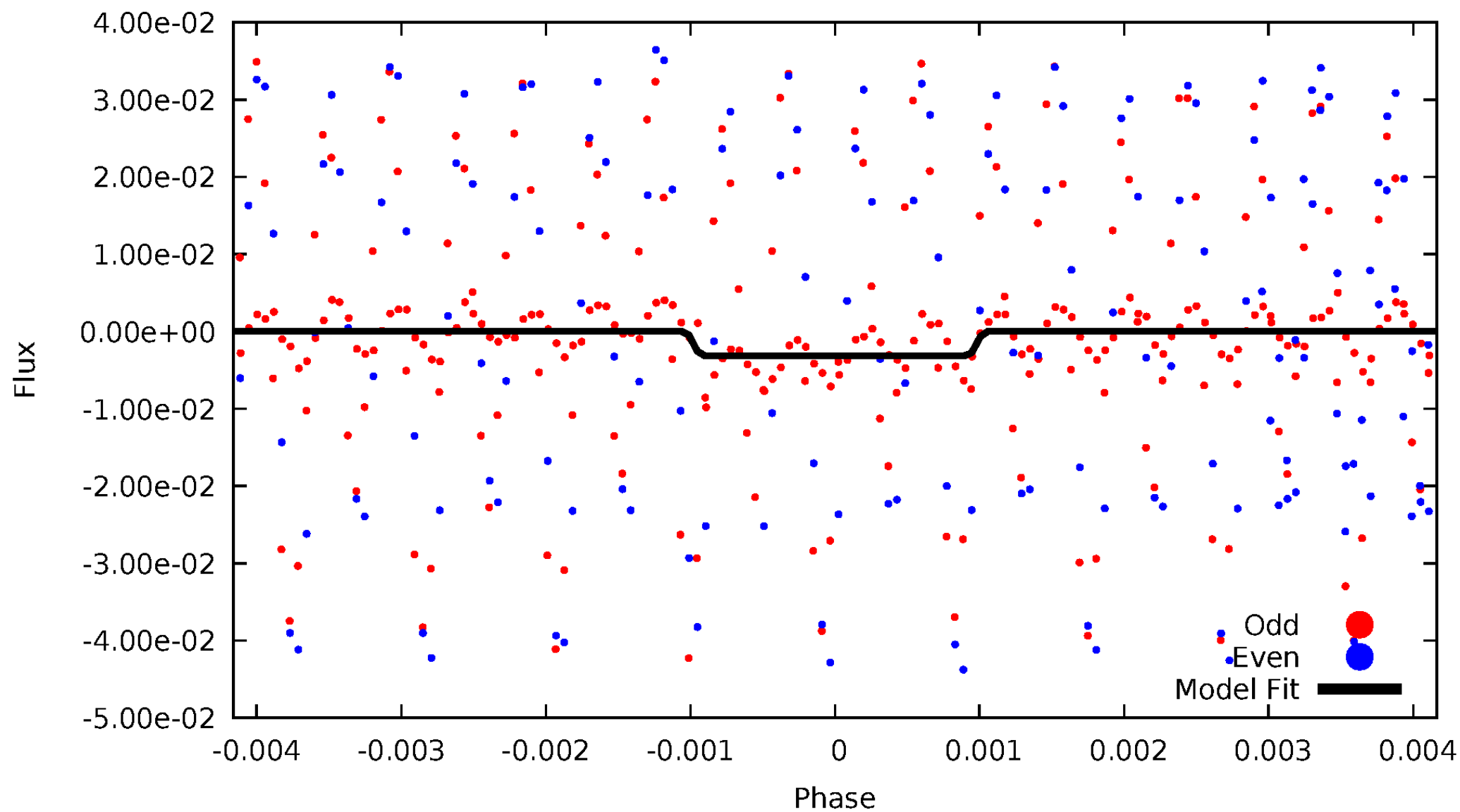
# DV Odd/Even

TCE 002694746-01



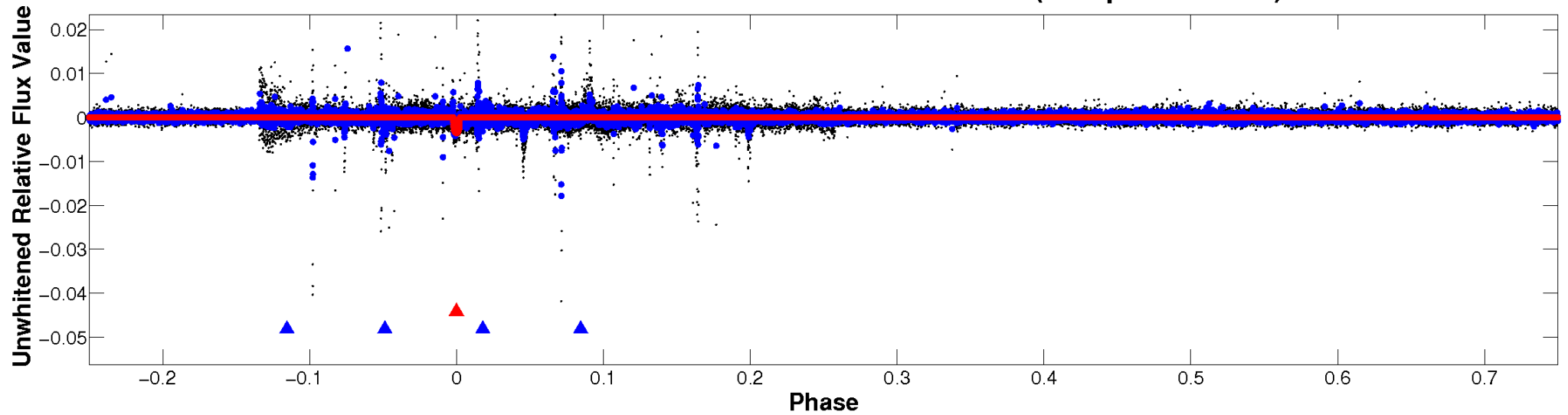
# ALT Odd/Even

TCE 002694746-01

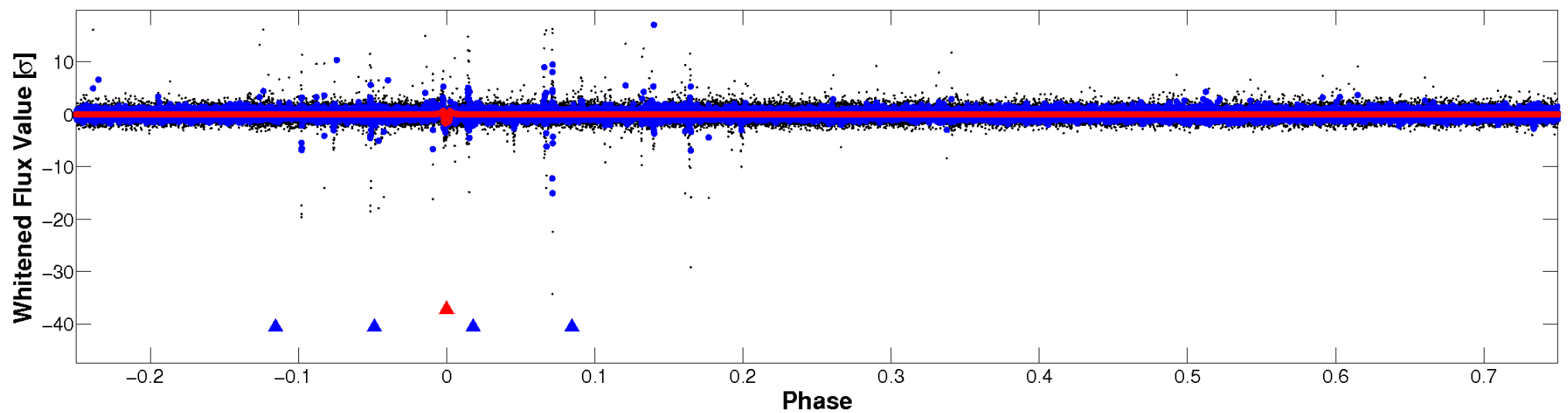


# Non-Whitened Vs. Whitened Light Curve

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



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



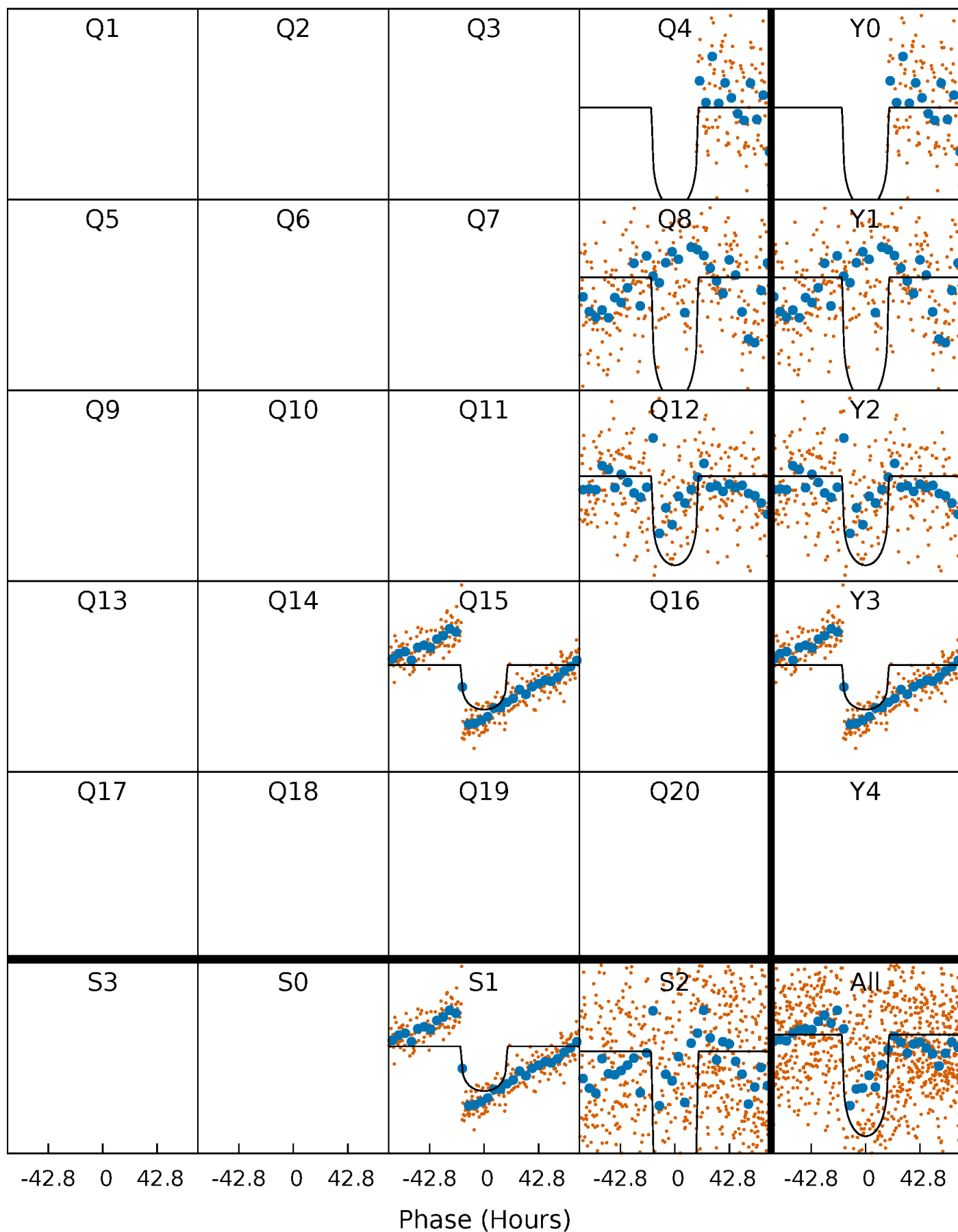
# PDC Quarter-Phased Transit Curves

TCE 002694746-01 P=355.398300 Days  $T_0=400.117295$  (BKJD)



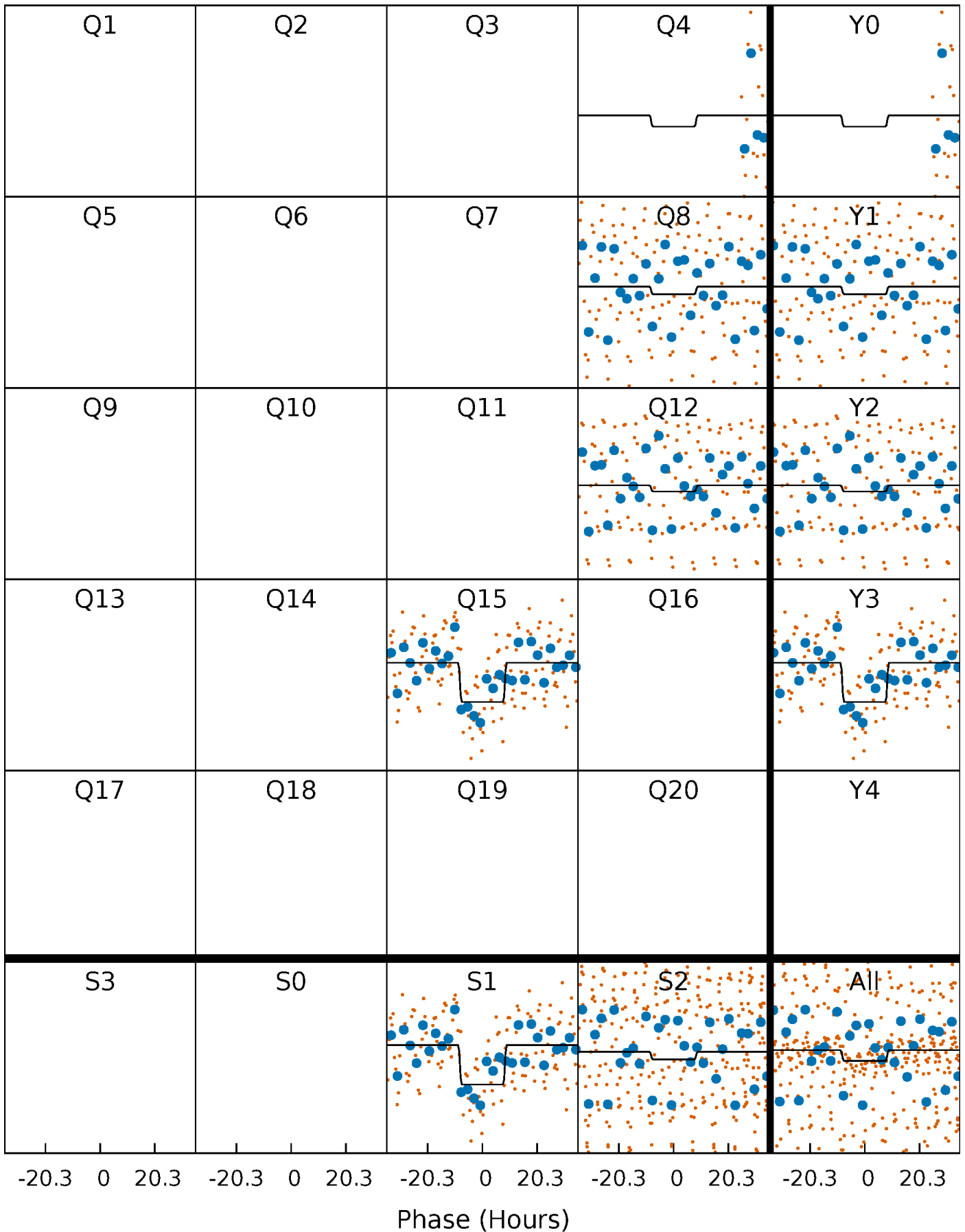
# DV Quarter-Phased Transit Curves

TCE 002694746-01 P=355.398300 Days  $T_0=400.117295$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

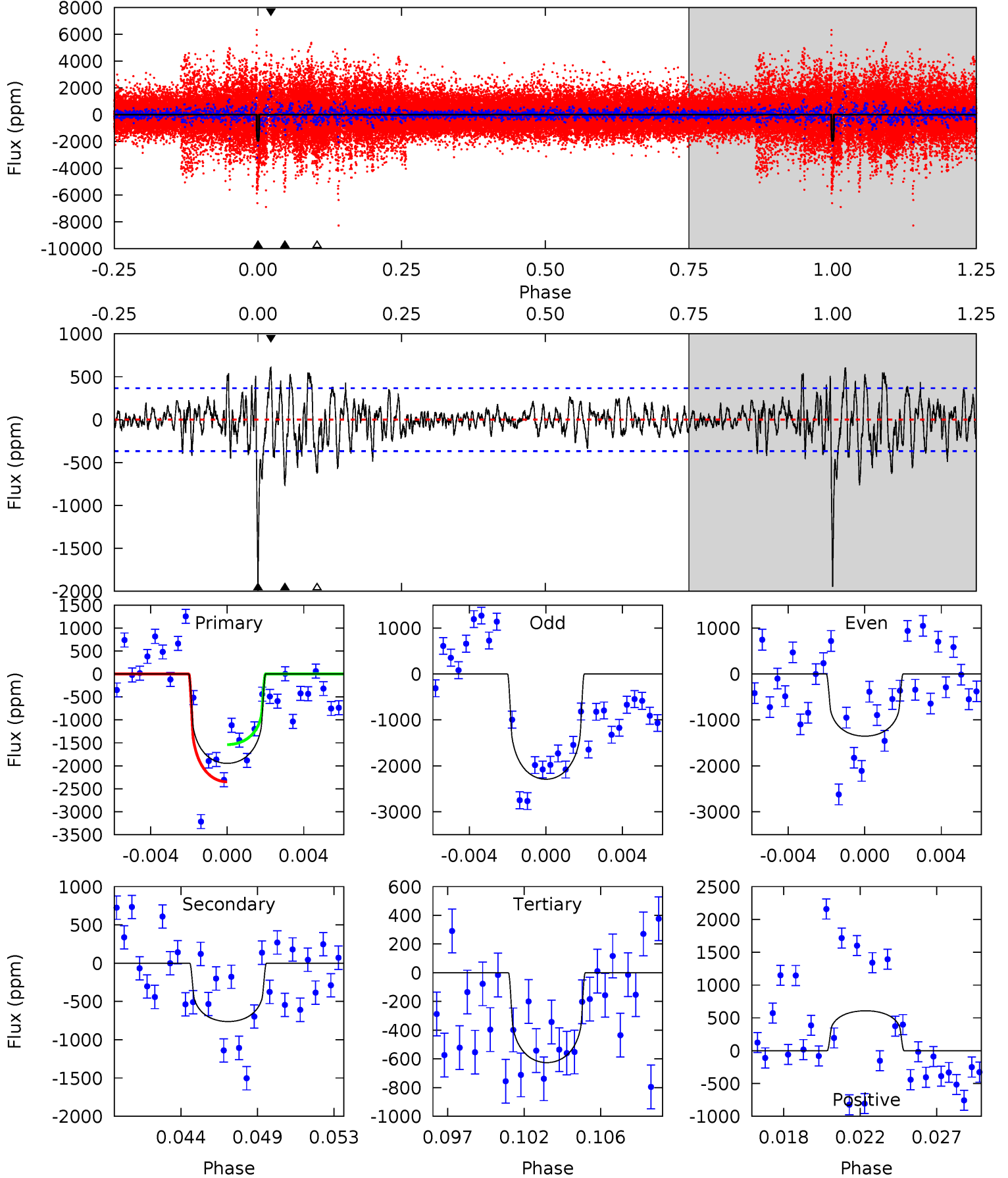
TCE 002694746-01 P=355.380475 Days  $T_0=399.774181$  (BKJD)



# DV Model-Shift Uniqueness Test

002694746-01, P = 355.398300 Days, E = 44.718995 Days

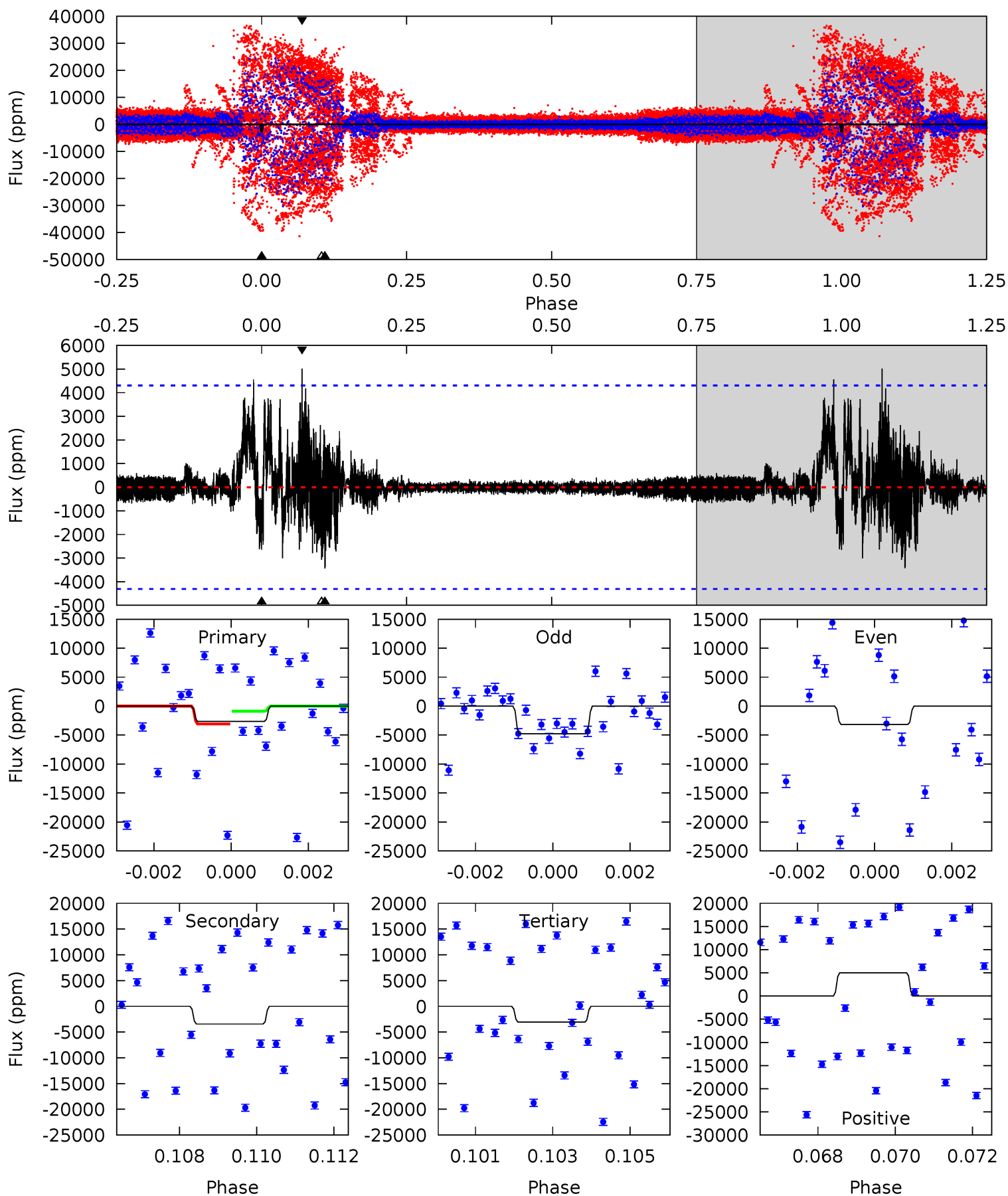
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
27.5	10.8	8.85	8.59	5.18	2.85	2.36	18.7	18.9	1.93	2.18	5.86	1.02	0.24	5.76



# Alt Model-Shift Uniqueness Test

002694746-01, P = 355.380475 Days, E = 44.393706 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
3.27	4.24	3.79	6.20	5.32	3.08	0.67	-0.52	-2.93	0.45	-1.96	1.03	0.69	0.59	1.44



### Stellar Parameters For KIC 002694746

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5394^{+187}_{-187}$	$4.622^{+0.035}_{-0.105}$	$-0.400^{+0.300}_{-0.300}$	$0.720^{+0.122}_{-0.061}$	$0.805^{+0.076}_{-0.093}$	$3.039^{+0.544}_{-0.968}$
	+3%/-3%	+1%/-2%	+75%/-75%	+17%/-8%	+9%/-12%	+18%/-32%
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 002694746-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-763 \pm 71$	$4.29^{+0.53}_{-0.45}$	$300^{+15}_{-11}$	$4140^{+194}_{-180}$	$18493^{+4865}_{-3838}$
Alt.	$-3433 \pm 810$	$4.52^{+0.58}_{-0.48}$	$300^{+14}_{-13}$	$5529^{+371}_{-415}$	$76430^{+26567}_{-22119}$

$T_{max}$  = 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

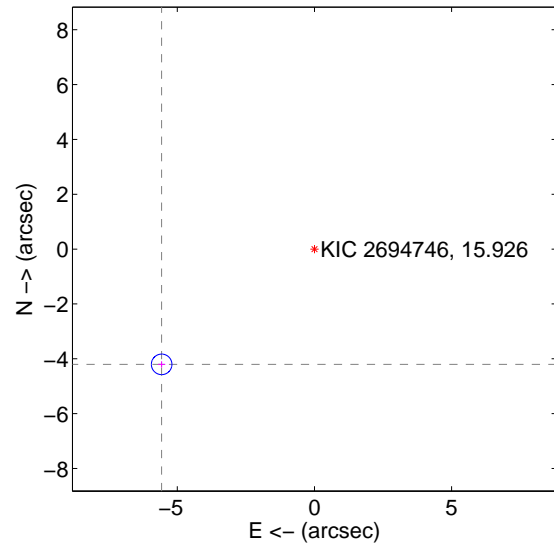
Supplemental centroid analysis for 002694746-01. Kepler magnitude: 15.93. Transit SNR 22.56

There are 1 quarters with good PRF difference image offsets

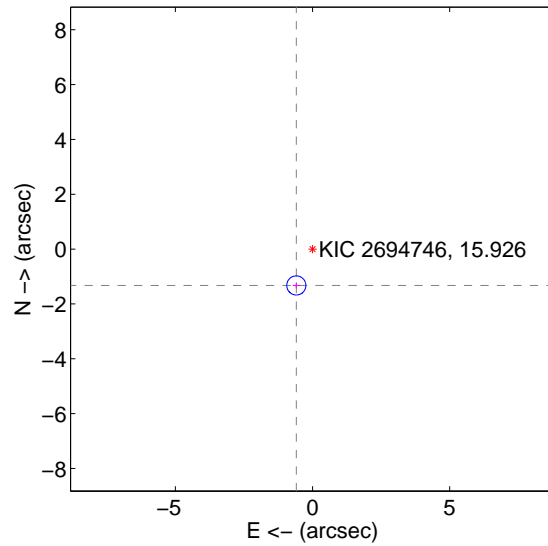
The OOT PRF centroid is offset from the target star catalog position by about 5.75 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$6.980 \pm 0.125$	55.86	$5.572 \pm 0.131$	$-4.204 \pm 0.113$
PRF-fit source offset from KIC position	$1.451 \pm 0.116$	12.49	$0.591 \pm 0.131$	$-1.325 \pm 0.113$
photometric centroid source offset	$2.40 \pm 0.34$	6.97	$-2.35 \pm 0.34$	$0.47 \pm 0.37$

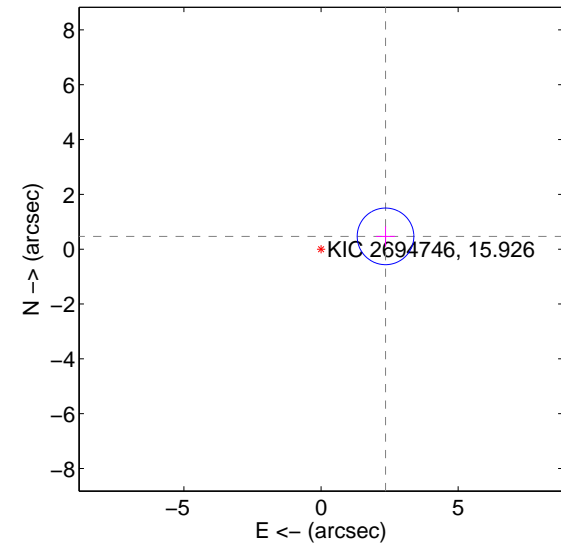
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

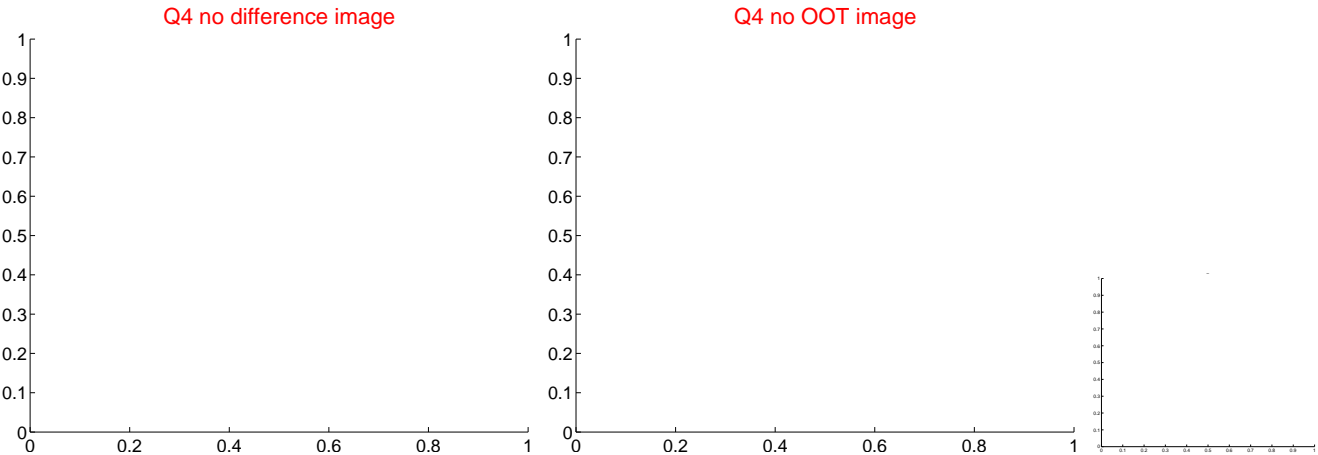
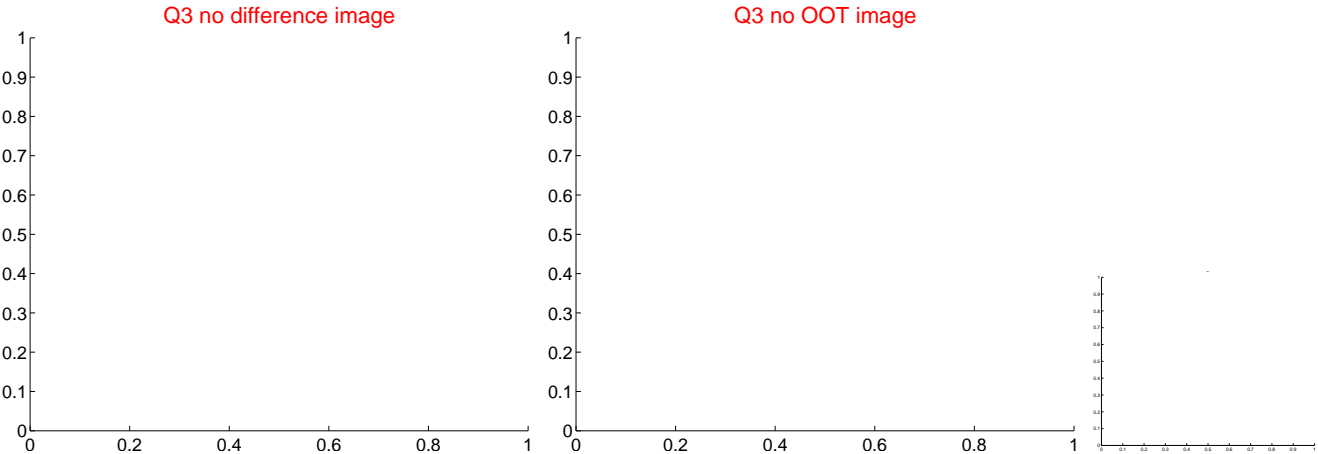
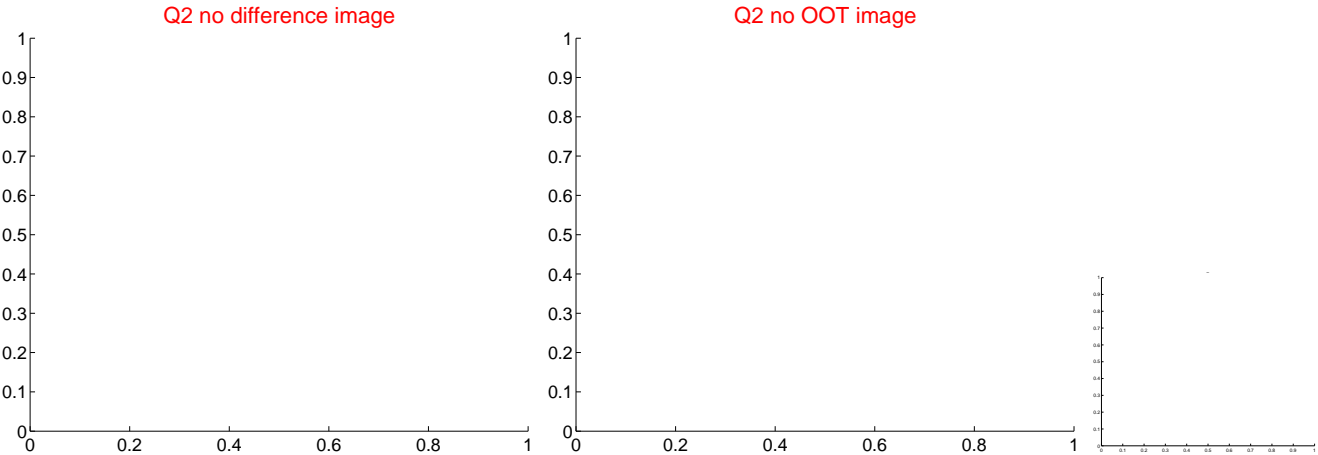
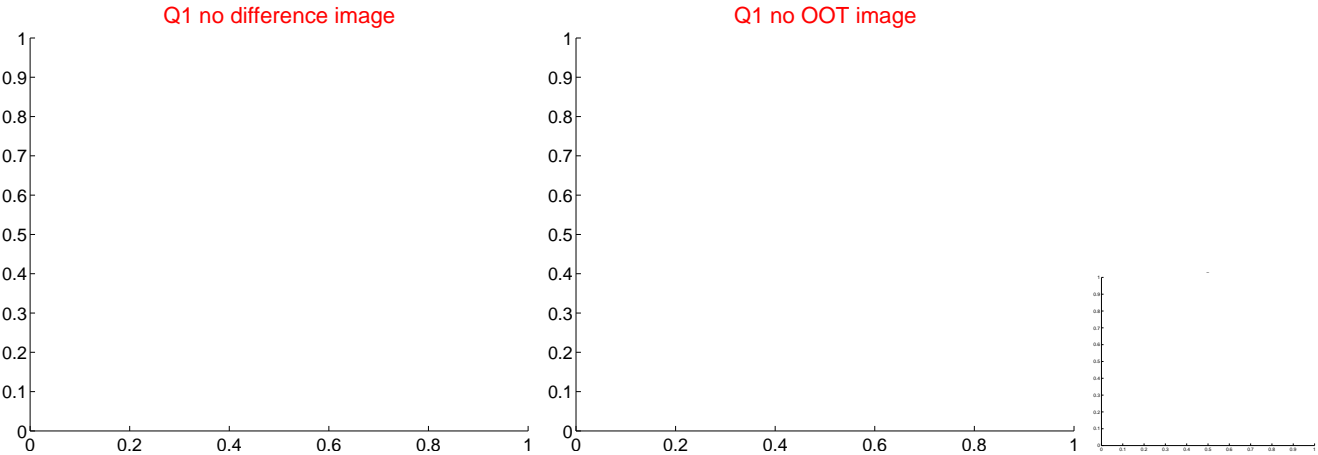


offset from photometric centroids

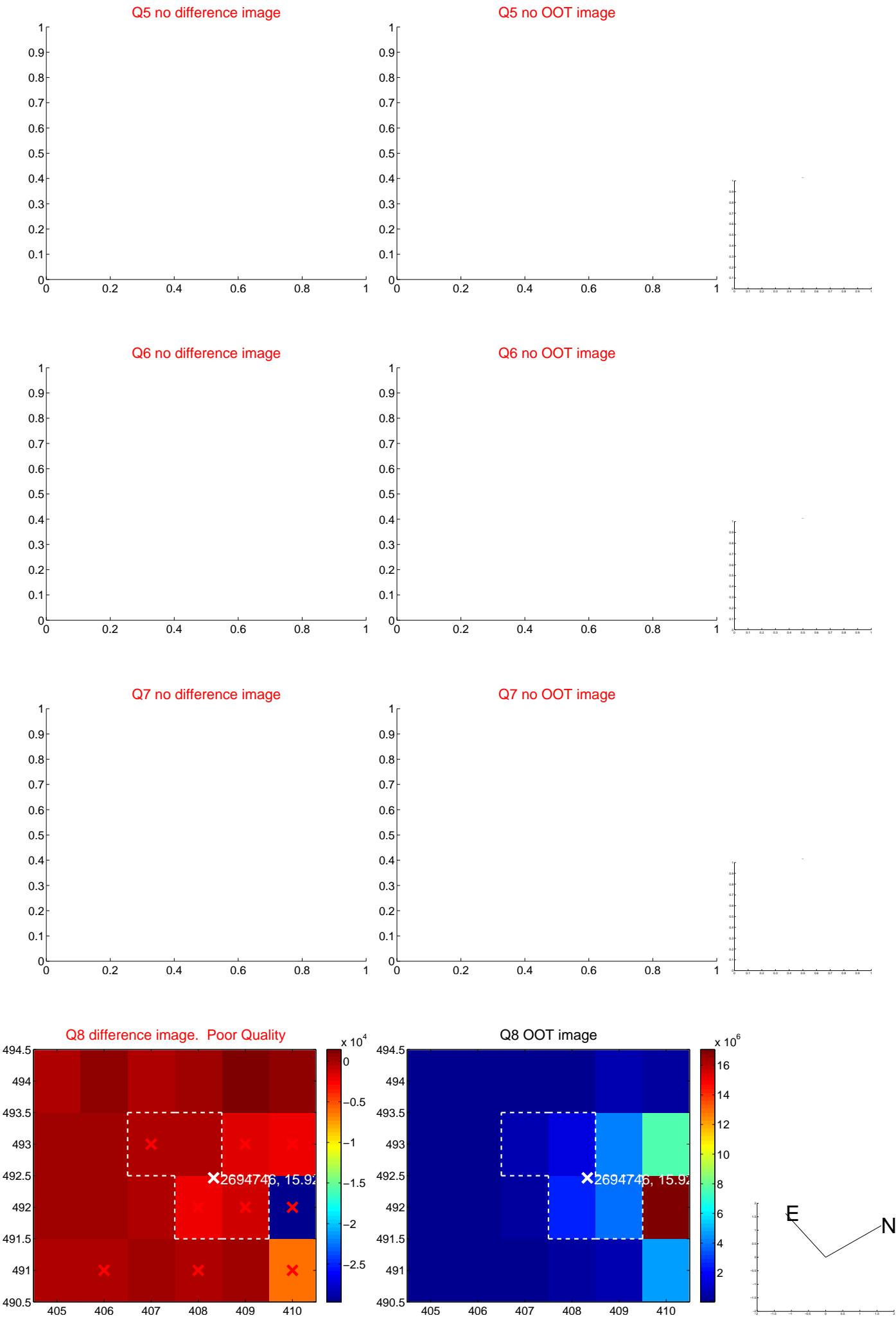


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



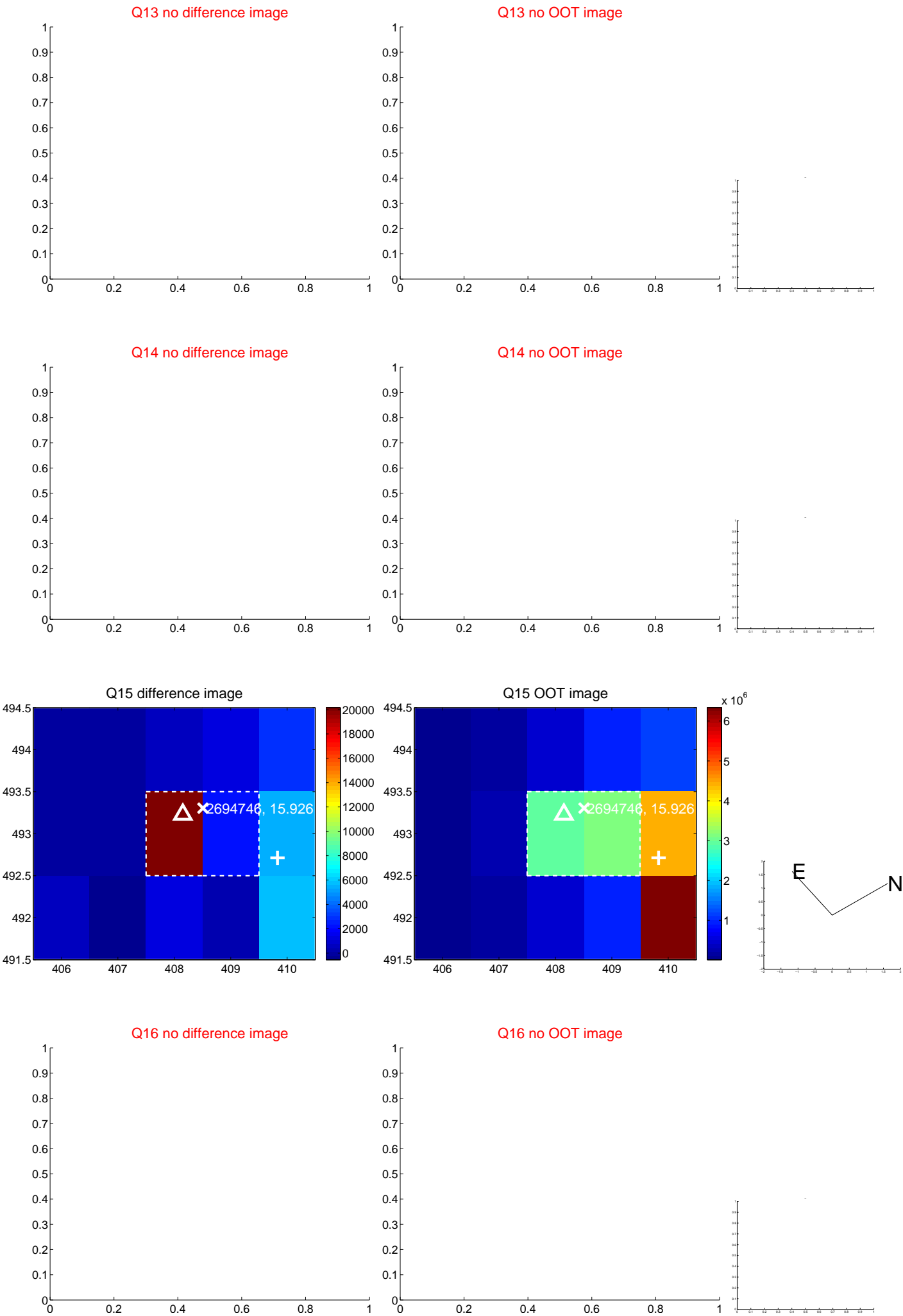
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



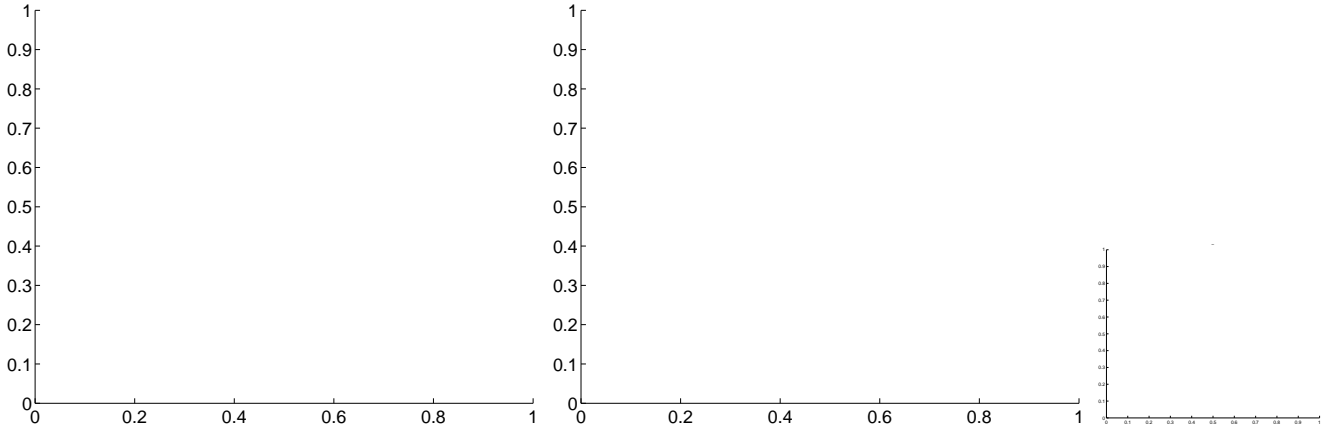
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



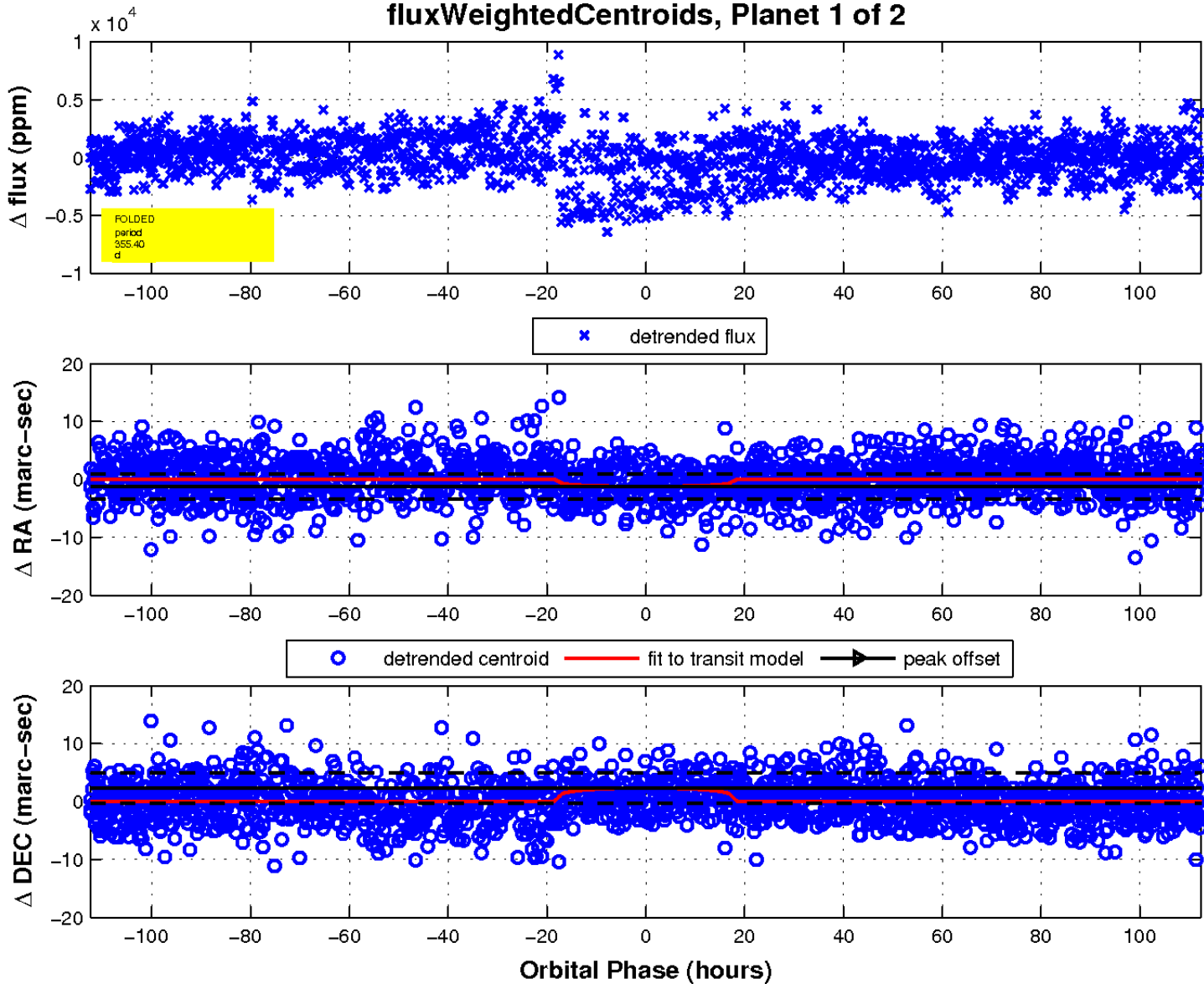
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

Q17 no difference image

Q17 no OOT image

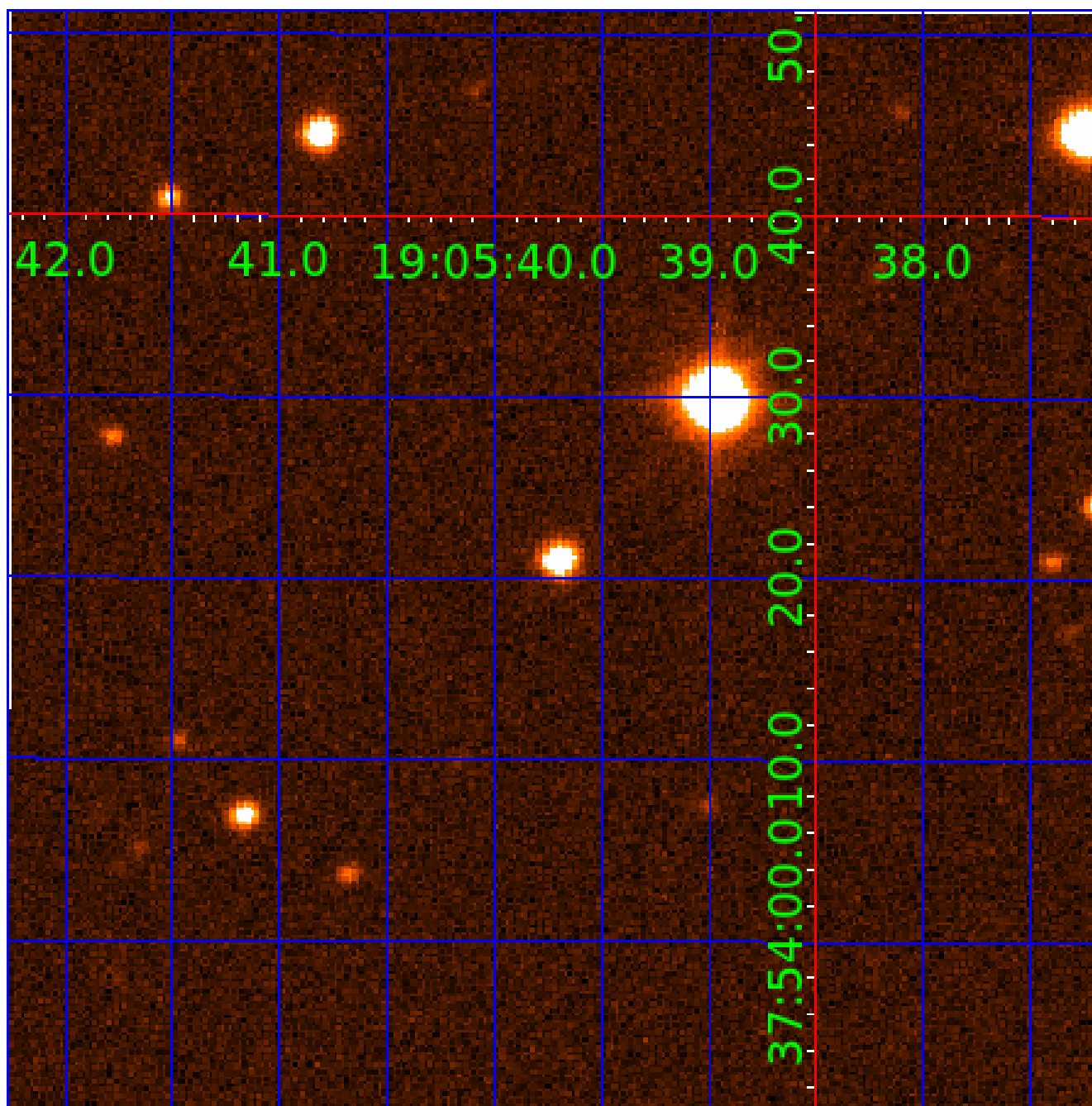


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination



# KIC 002694746

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
002694746-01	OBS	No	355.398300	400.117295	3532.9	37.479	16.7	22.6	0.72	5394	4.21	0.48
002694746-02	OBS	No	379.091432	359.108157	2336.3	14.697	8.8	8.5	0.72	5394	3.49	0.44

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002694746-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
002694746-02	OBS	FP	0.00	1	0	0	0	LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_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.

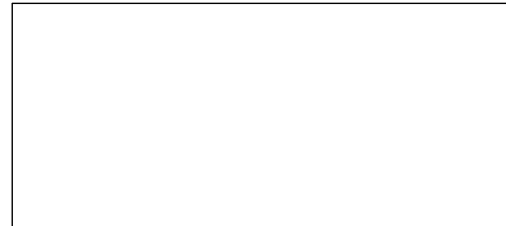
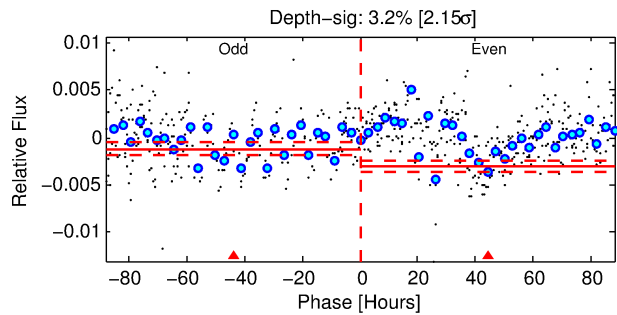
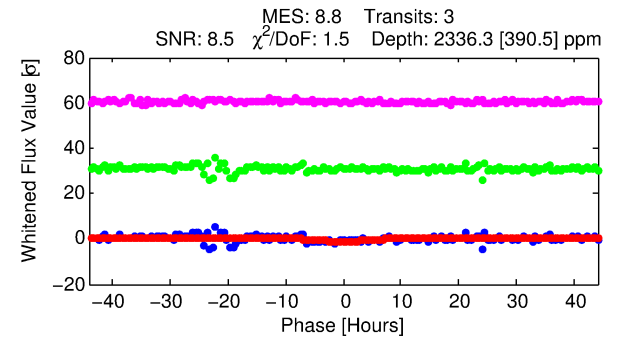
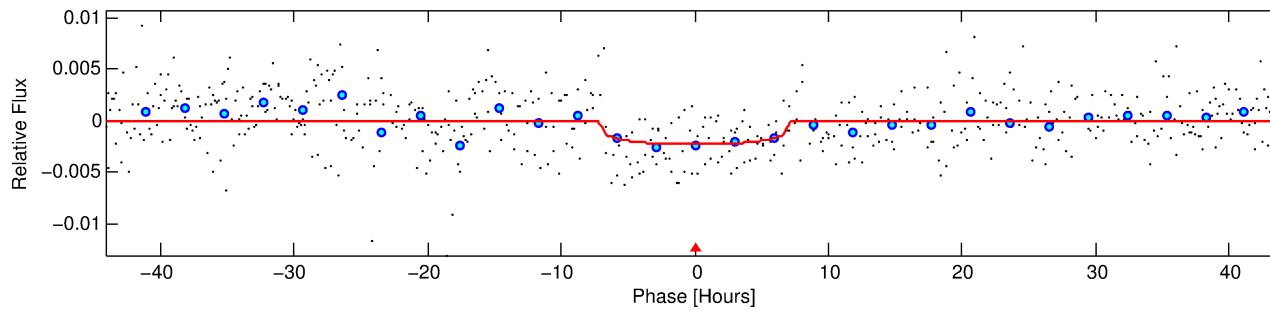
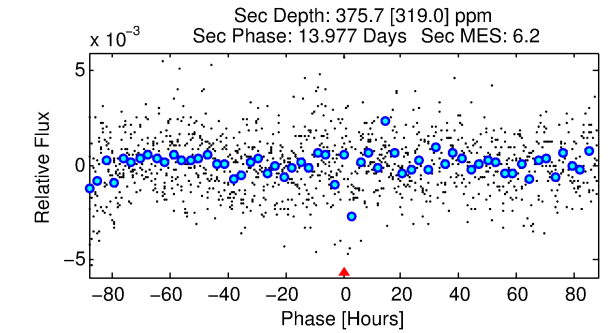
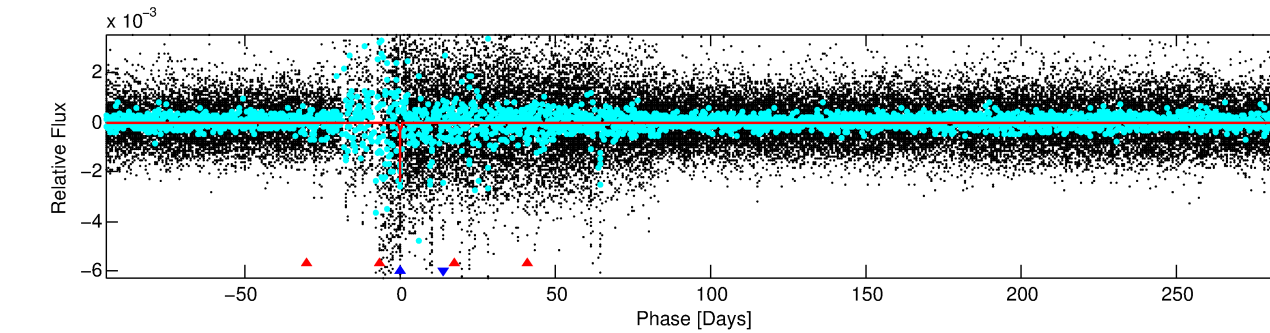
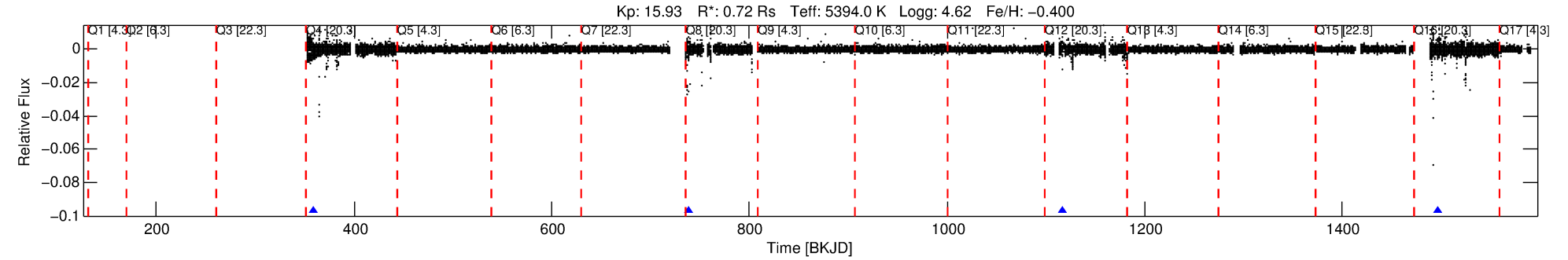
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 002694746-02

No Significant Match Found

# DV One-Page Summary

KIC: 2694746 Candidate: 2 of 2 Period: 379.091 d



## DV Fit Results:

Period = 379.09143 [0.01302] d  
Epoch = 359.1082 [0.0236] BKJD  
Rp/R\* = 0.0444 [0.0156]  
a/R\* = 192.01 [263.92]  
b = 0.38 [3.19]  
Seff = 0.44 [0.11]  
Teq = 207 [12] K  
Rp = 3.49 [1.36] Re  
a = 0.9486 [0.1316] AU  
Ag = 15290.44 [17123.38] [0.89σ]  
Teff = 3564 [990] K [3.39σ]

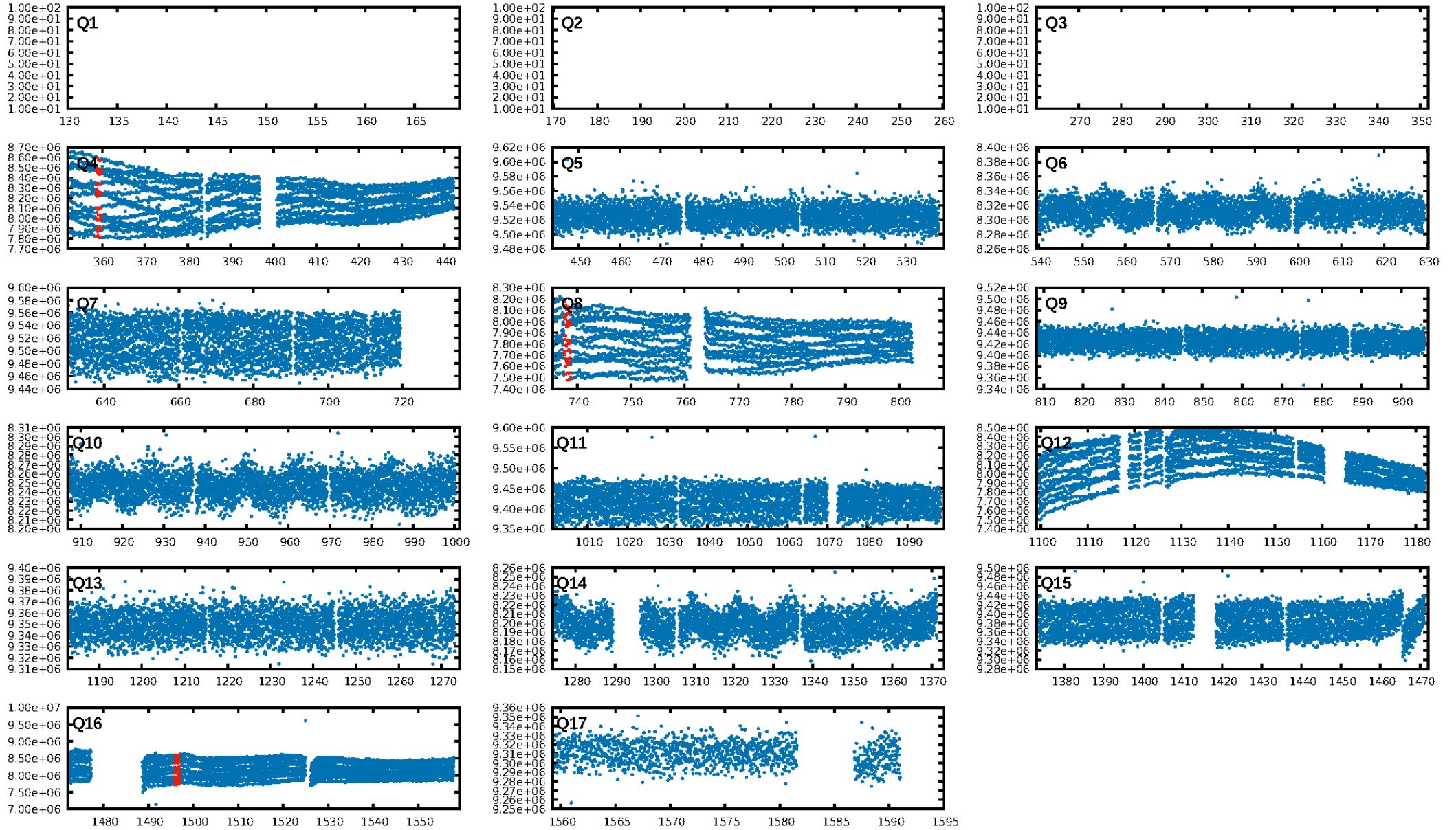
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [14.12σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 1.7%  
ModelChiSquareGof-sig: 71.1%  
Bootstrap-pfa: 1.84e-07  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: -1.355  
Centroid-sig: 4.7%  
Centroid-so: 3.990 arcsec [6.34σ]  
OotOffset-rm: N/A  
KicOffset-rm: N/A  
OotOffset-st: 0/0/0/0 [0]  
KicOffset-st: 0/0/0/0 [0]  
DiffImageQuality-fgm: N/A  
DiffImageOverlap-fno: 1.00 [3/3]

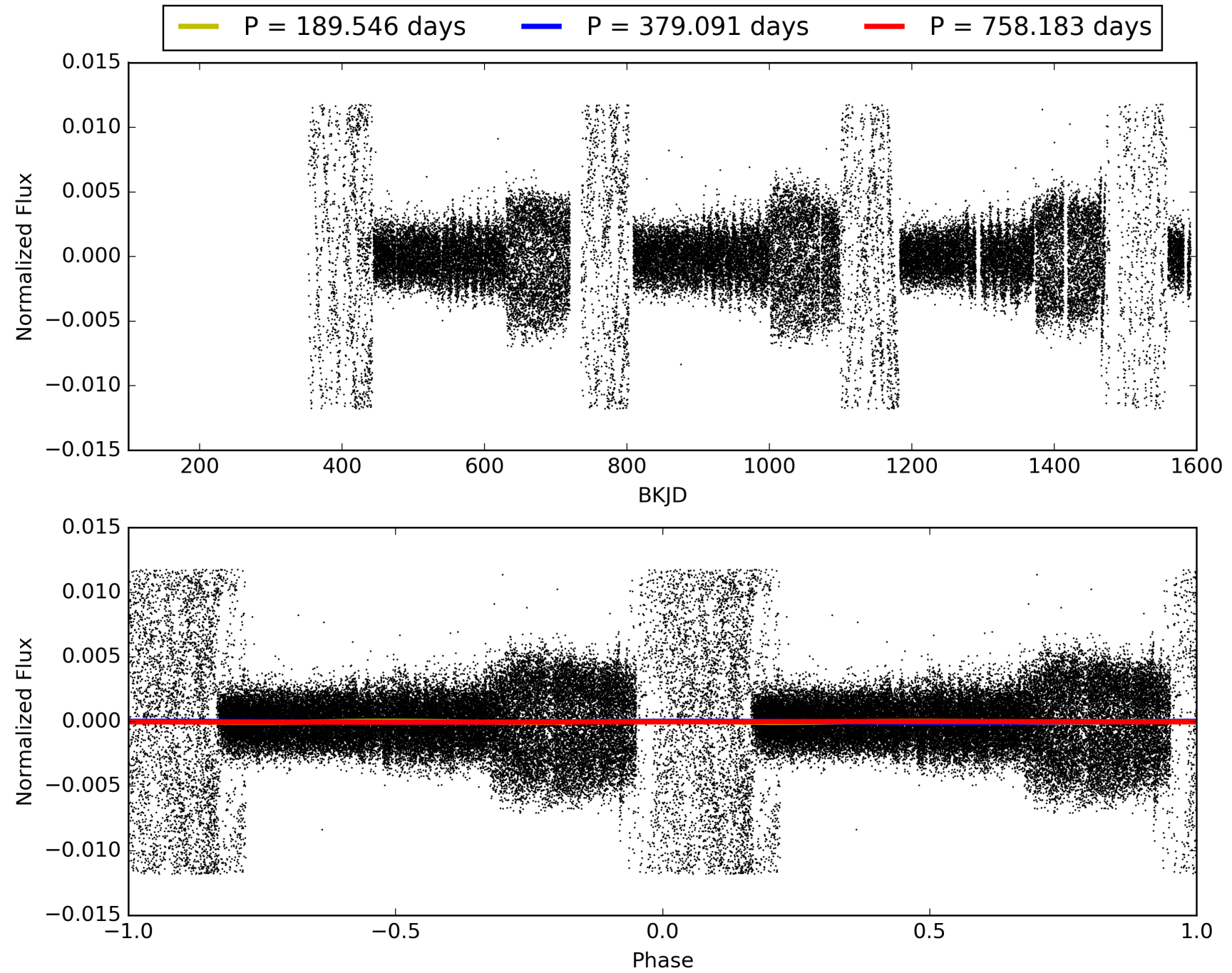
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 23:21:21 Z

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

# TCE 002694746-02, PDC Light Curves

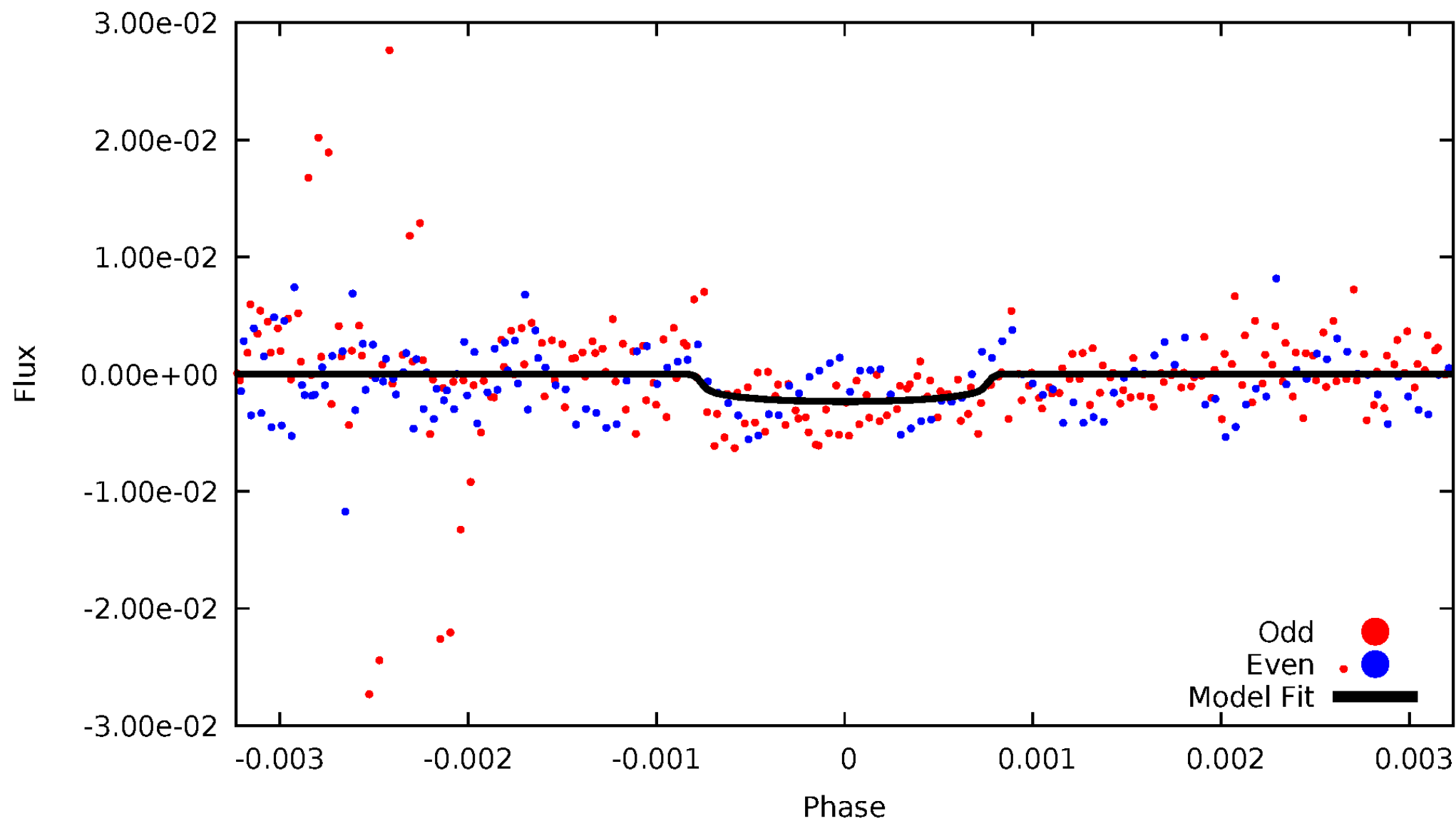


TCE 002694746-02



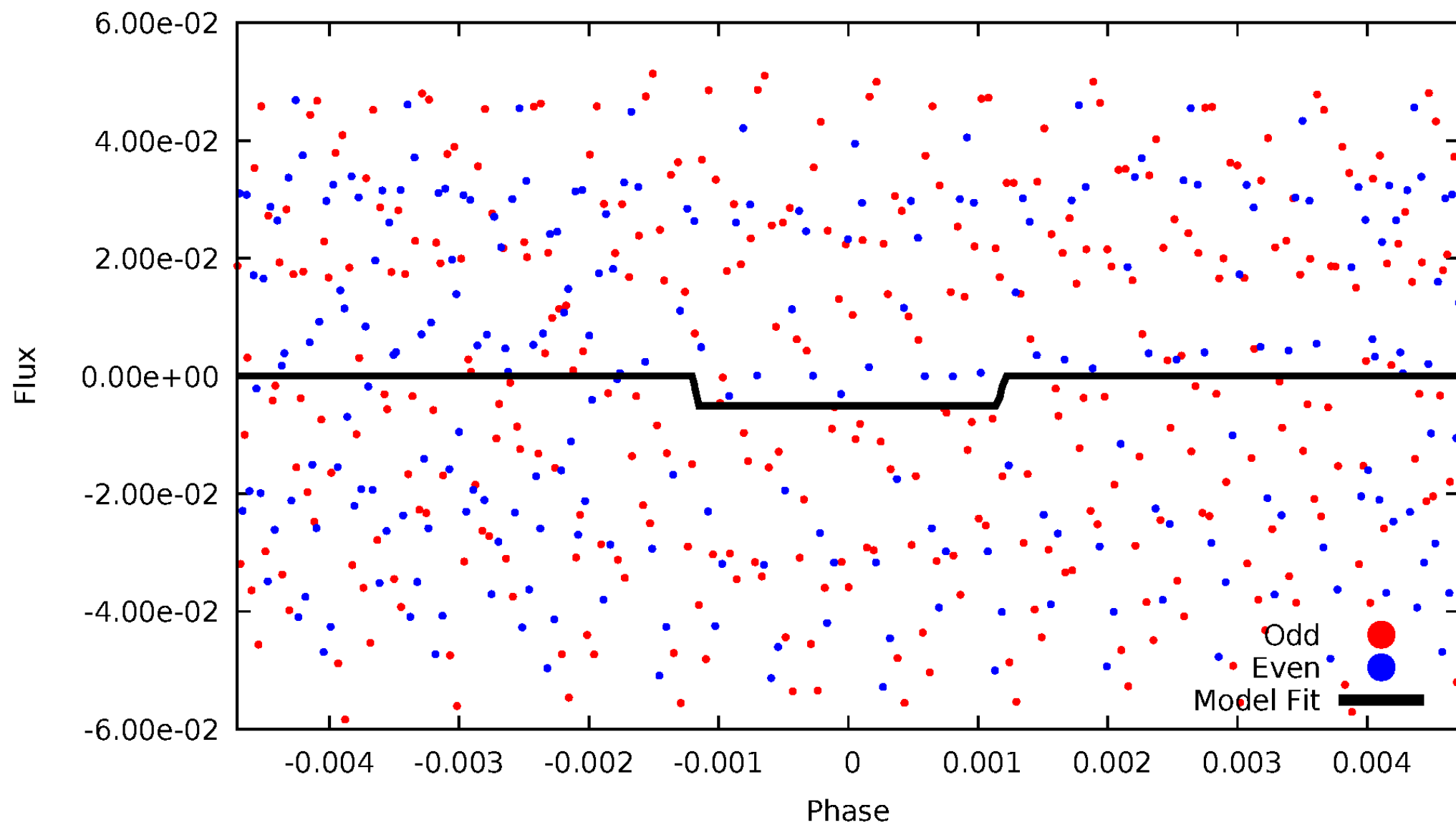
# DV Odd/Even

TCE 002694746-02



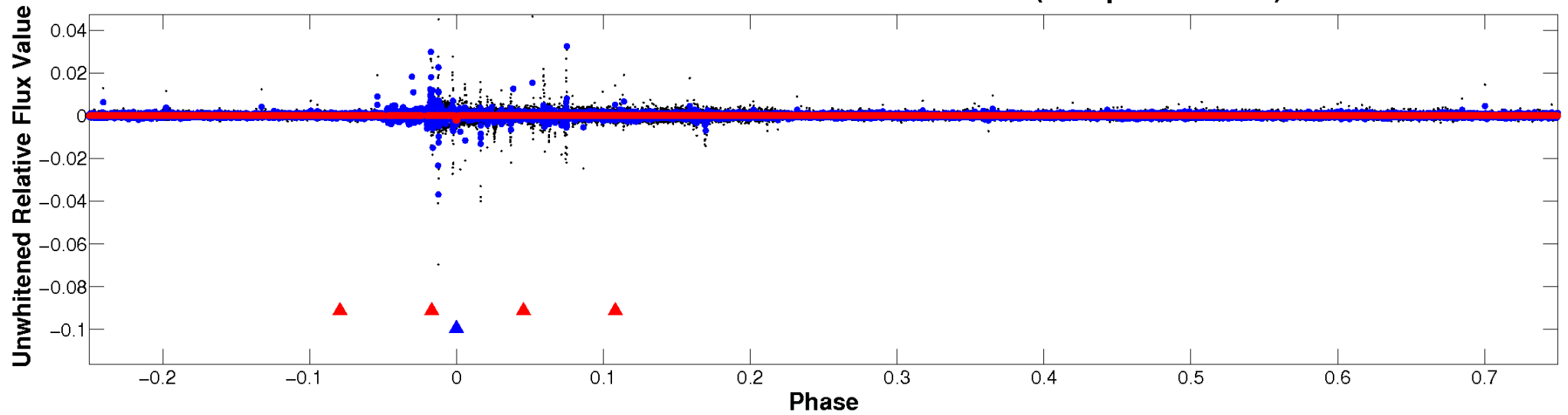
# ALT Odd/Even

TCE 002694746-02

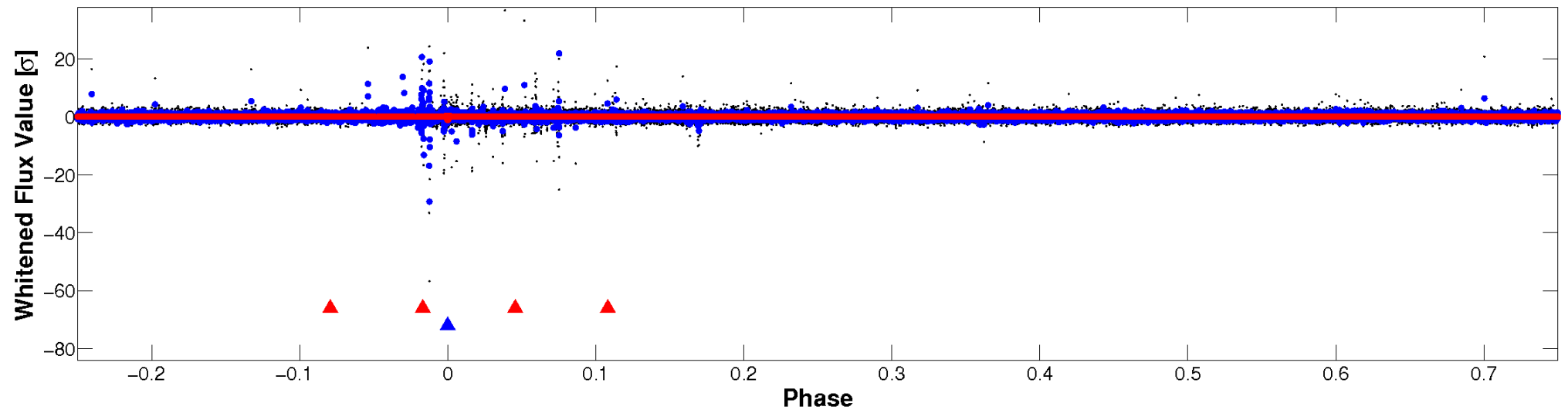


# Non-Whitened Vs. Whitened Light Curve

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

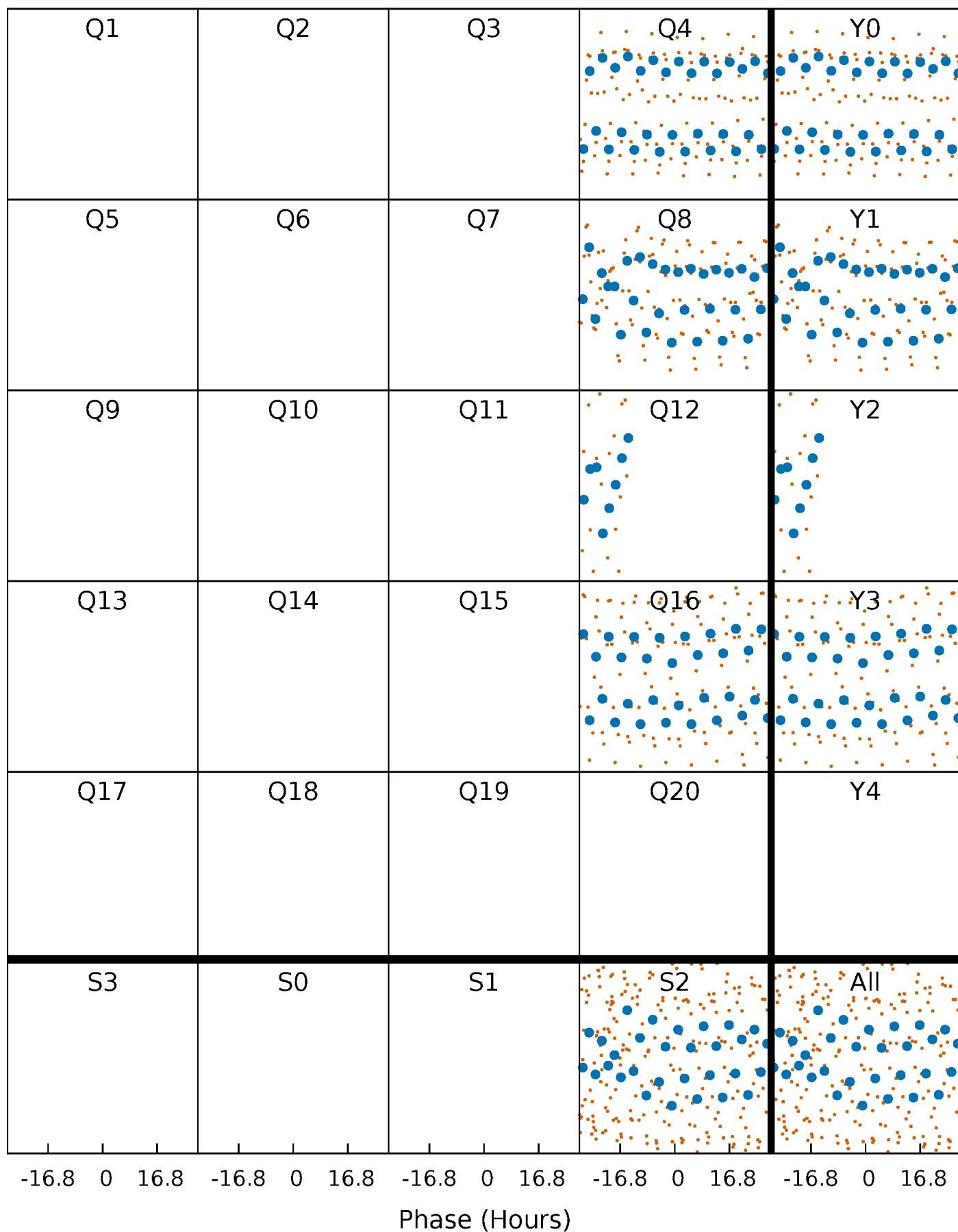


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



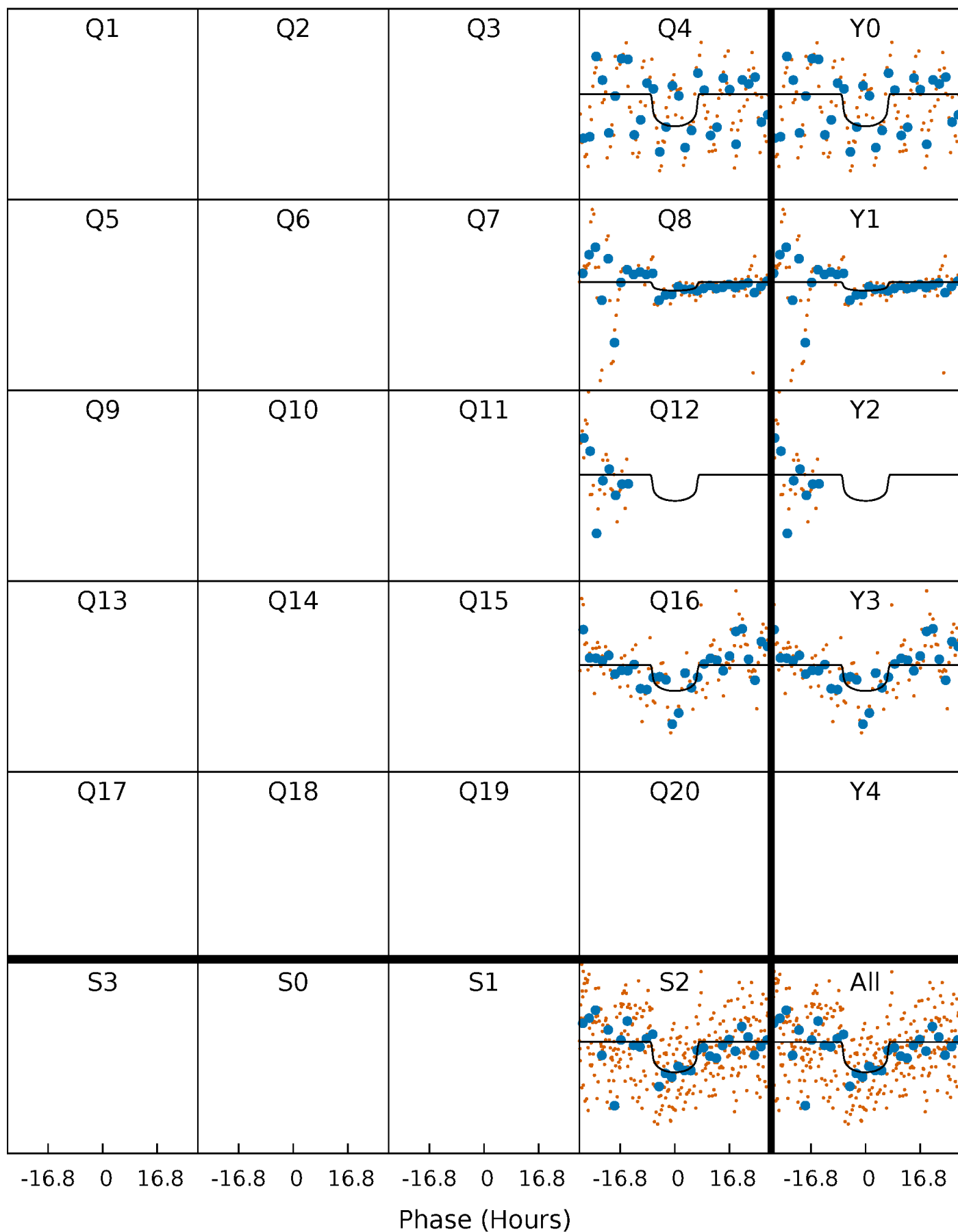
# PDC Quarter-Phased Transit Curves

TCE 002694746-02 P=379.091432 Days  $T_0=359.108158$  (BKJD)



# DV Quarter-Phased Transit Curves

TCE 002694746-02     $P=379.091432$  Days     $T_0=359.108158$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

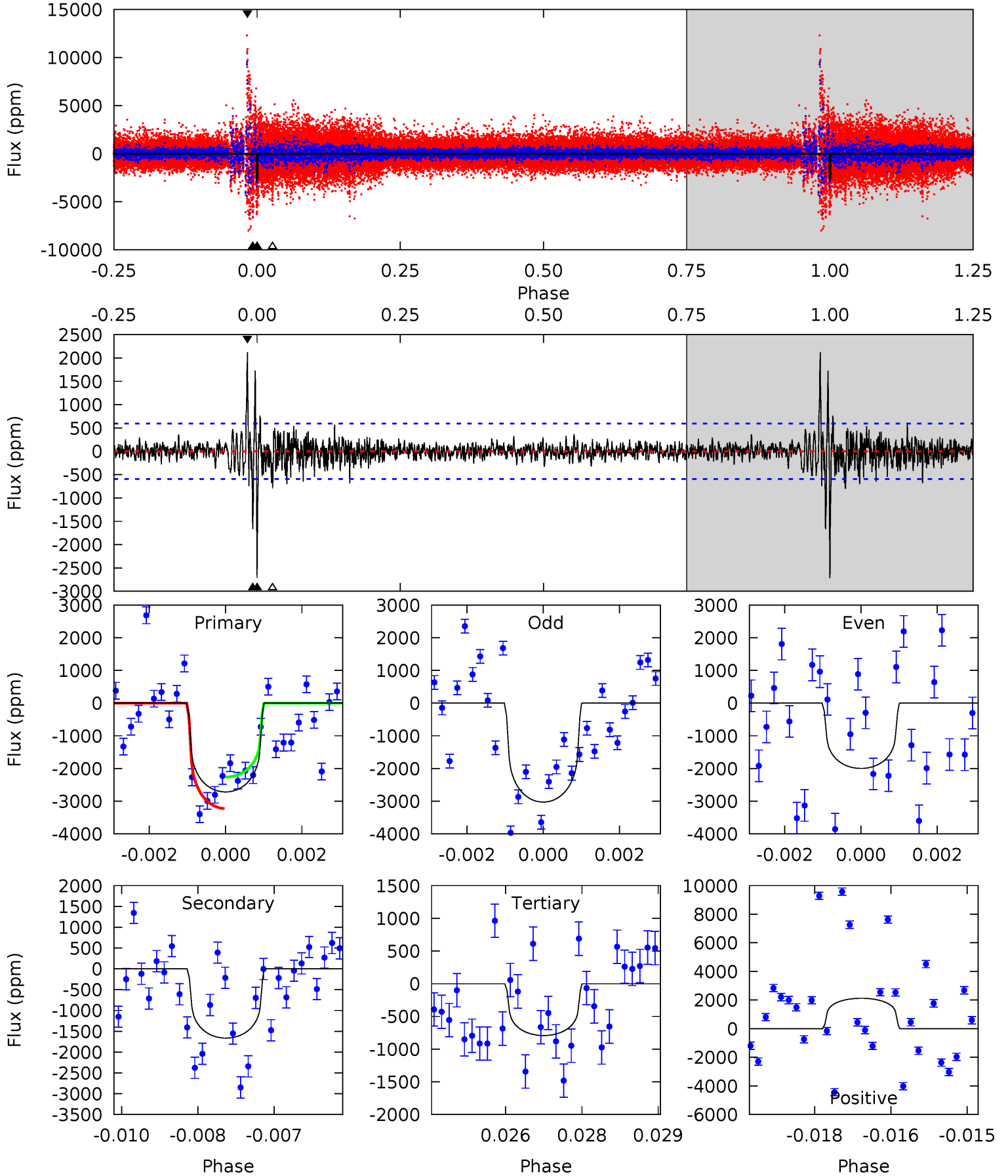
TCE 002694746-02 P=379.110650 Days  $T_0=359.120063$  (BKJD)



# DV Model-Shift Uniqueness Test

002694746-02, P = 379.091432 Days, E = 359.108158 Days

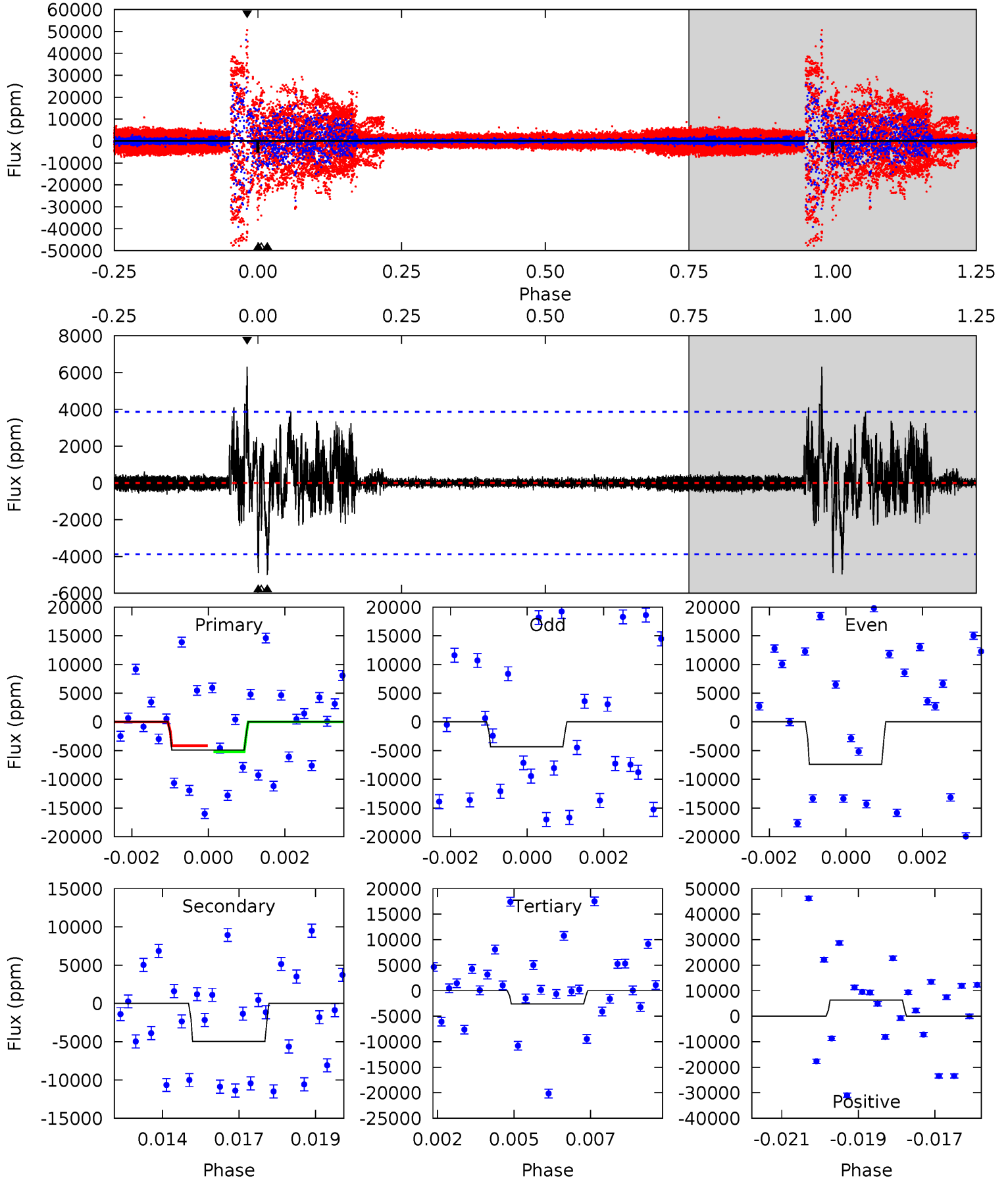
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
24.5	15.0	7.16	19.2	5.36	3.15	1.50	17.4	5.37	7.87	-4.15	4.05	0.94	0.44	4.31



# Alt Model-Shift Uniqueness Test

002694746-02, P = 379.110650 Days, E = 359.120063 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
6.70	6.78	3.57	8.64	5.30	3.04	0.61	3.13	-1.94	3.21	-1.85	1.76	0.46	0.56	0



### Stellar Parameters For KIC 002694746

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5394^{+187}_{-187}$	$4.622^{+0.035}_{-0.105}$	$-0.400^{+0.300}_{-0.300}$	$0.720^{+0.122}_{-0.061}$	$0.805^{+0.076}_{-0.093}$	$3.039^{+0.544}_{-0.968}$
	+3%/-3%	+1%/-2%	+75%/-75%	+17%/-8%	+9%/-12%	+18%/-32%
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 002694746-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-1664 \pm 111$	$3.61^{+1.28}_{-1.28}$	$294^{+14}_{-11}$	$5228^{+1181}_{-667}$	$64579^{+83280}_{-30686}$
Alt.	$-4963 \pm 732$	$5.77^{+1.37}_{-1.30}$	$293^{+15}_{-13}$	$5362^{+629}_{-526}$	$73067^{+47967}_{-25231}$

$T_{max}$  = 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

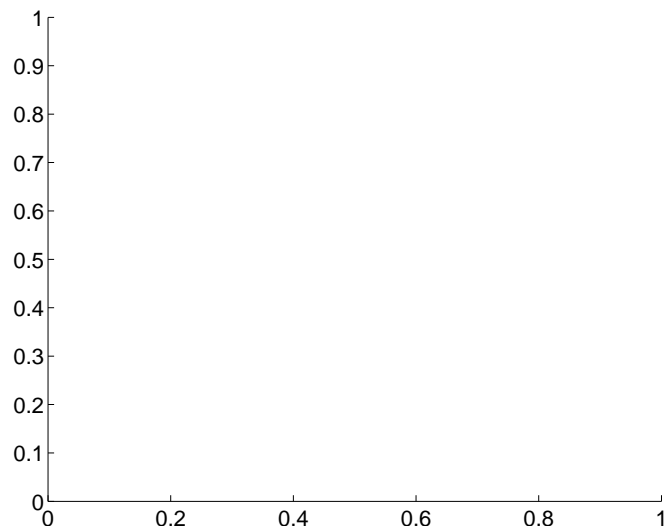
Supplemental centroid analysis for 002694746-02. Kepler magnitude: 15.93. Transit SNR 8.48

There are 0 quarters with good PRF difference image offsets

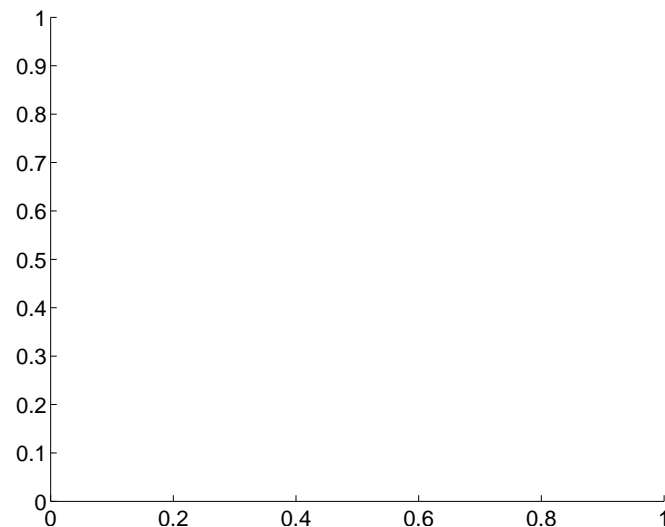
The direct PRF centroid is offset from the target star catalog position by about NaN arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	—	—	—	—
PRF-fit source offset from KIC position	—	—	—	—
photometric centroid source offset	$3.99 \pm 0.63$	$6.34$	$-3.61 \pm 0.60$	$1.69 \pm 0.73$

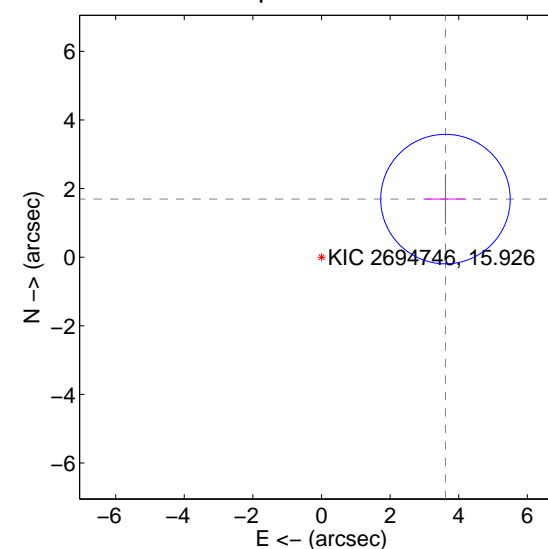
There is no PRF-fit offset from OOT-fit



There is no PRF-fit offset from KIC

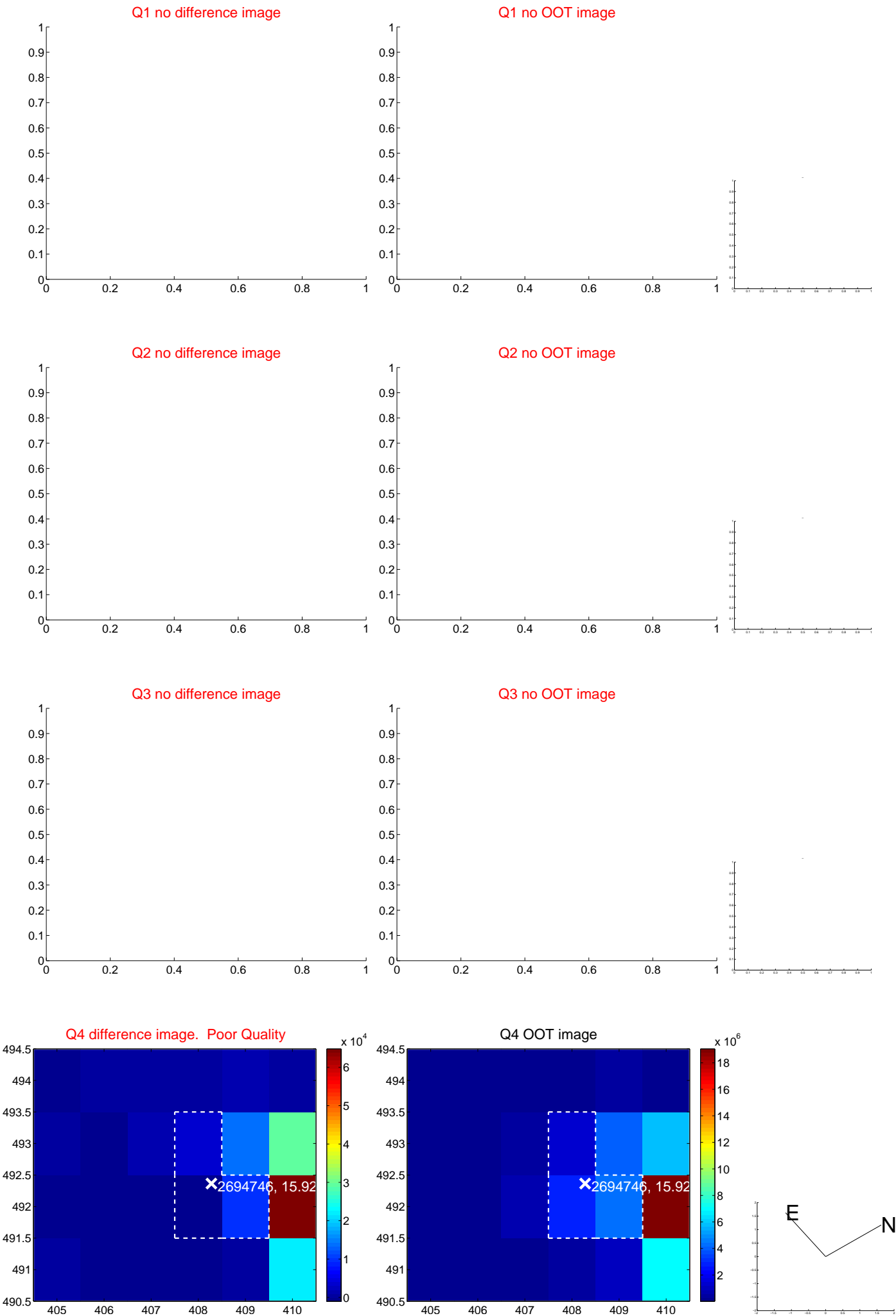


offset from photometric centroids

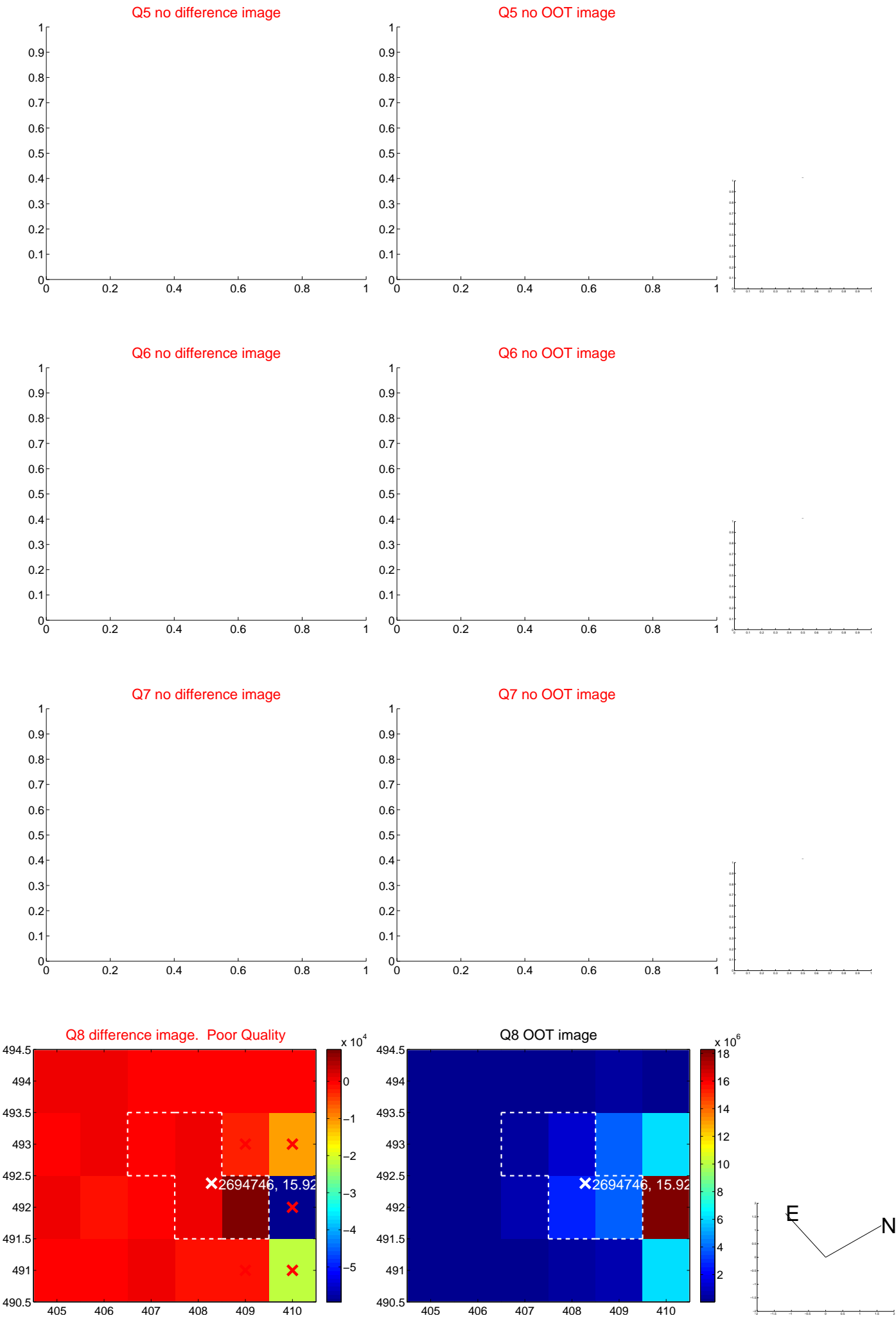


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

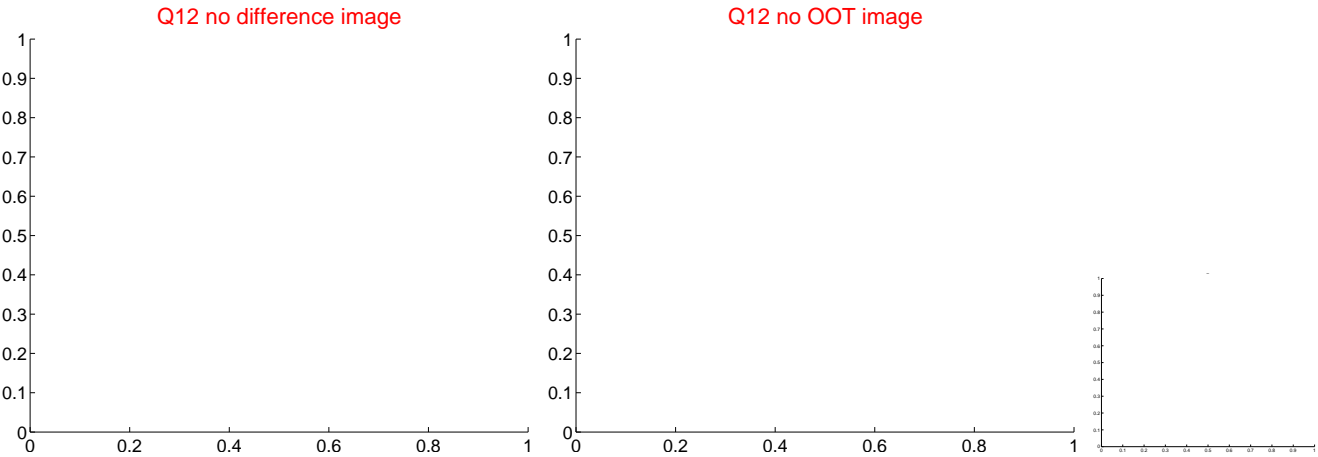
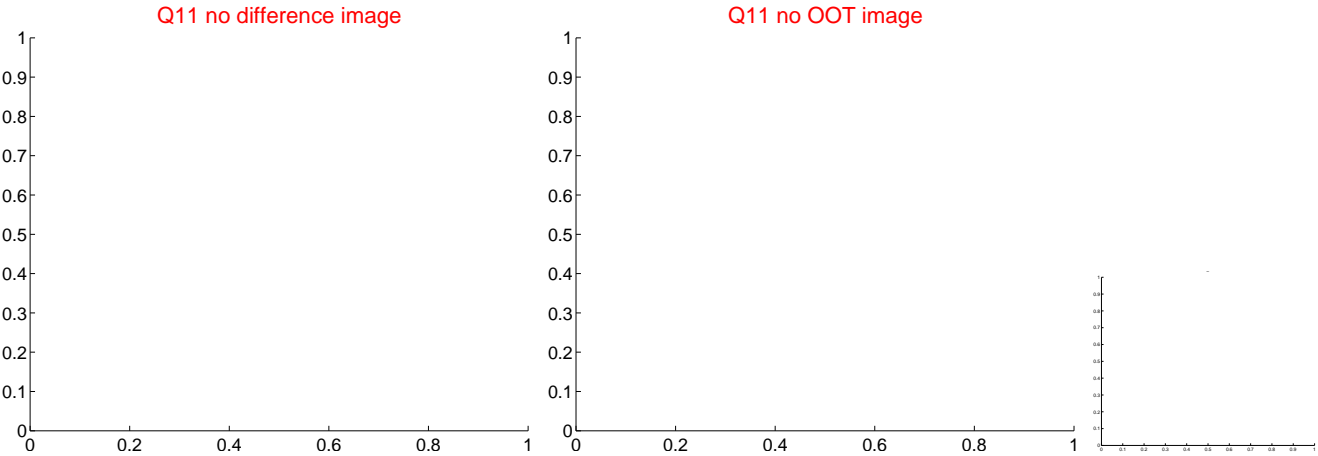
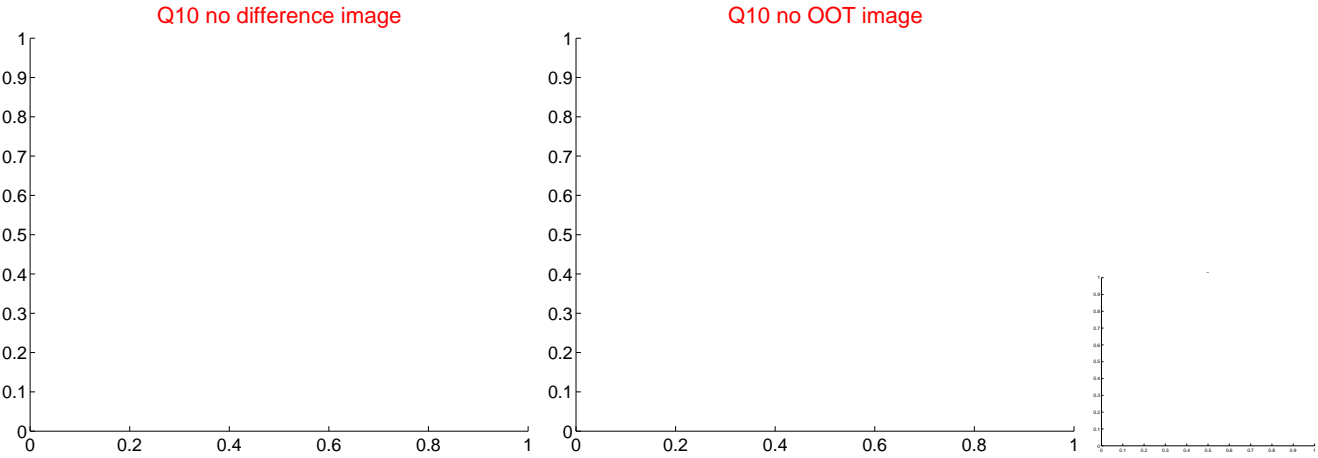
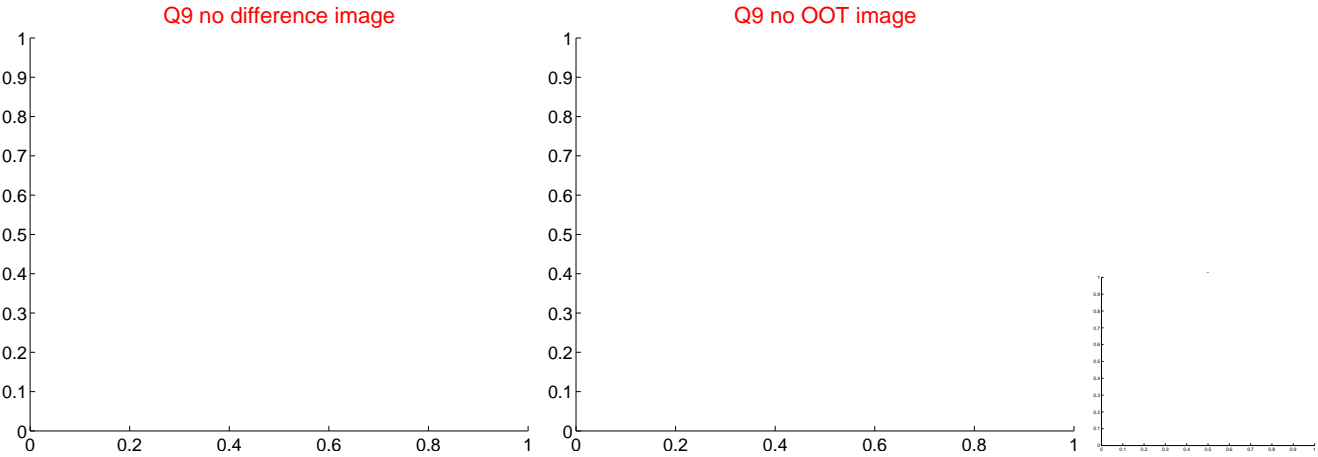
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



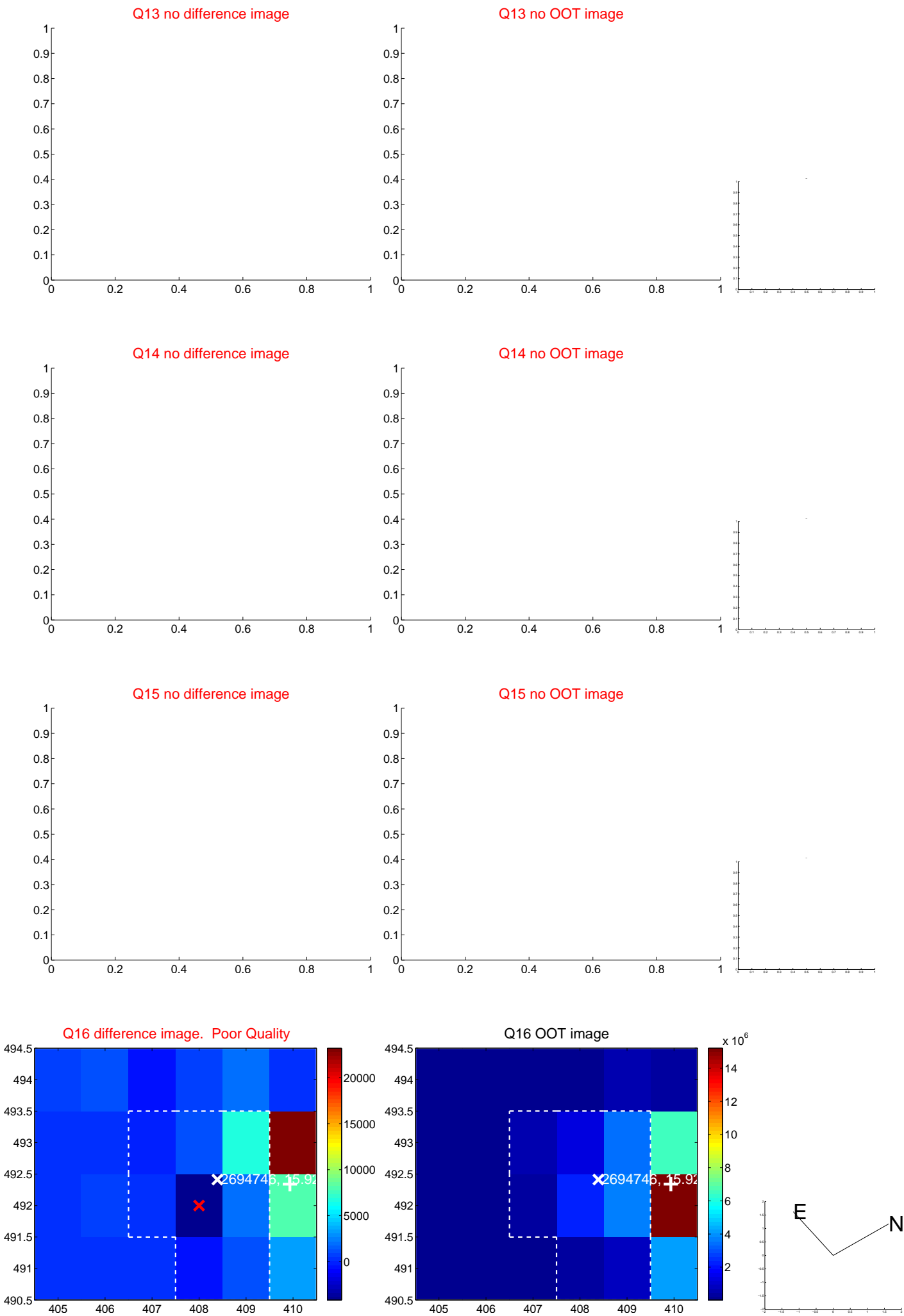
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



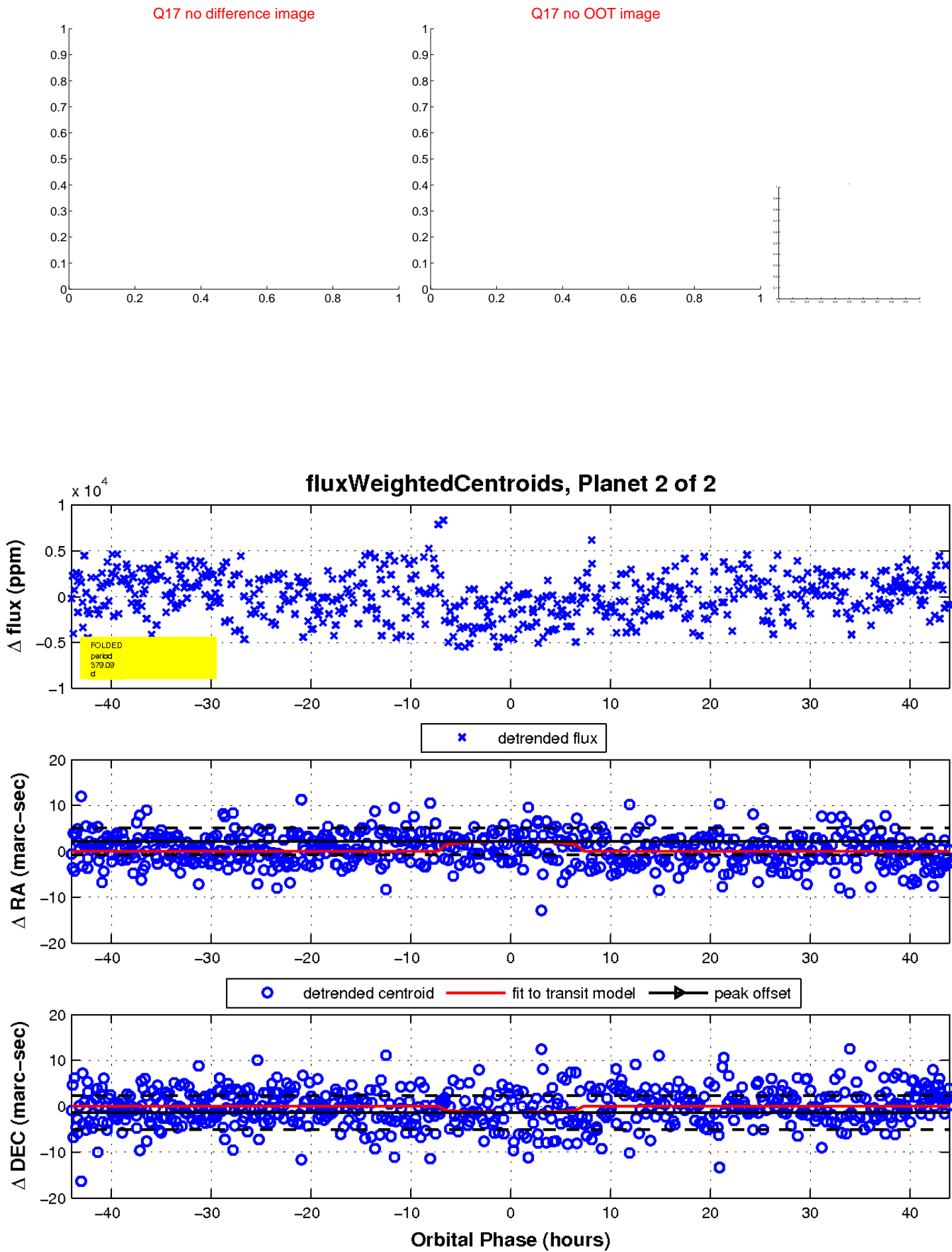
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



white ×: 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

