

# KIC 010427700

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010427700-01	OBS	4394.01	0.616390	131.639945	57.2	0.829	13.3	16.8	3.27	5665	2.75	37719.36
010427700-02	OBS	No	0.616387	131.949403	53.4	0.702	9.8	14.8	3.27	5665	2.89	37719.57

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010427700-01	OBS	FP	0.00	1	0	0	0	MOD_NONUNIQ_ALT
010427700-02	OBS	FP	0.00	1	0	0	0	MOD_NONUNIQ_ALT—SAME_NTL_PERIOD

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

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

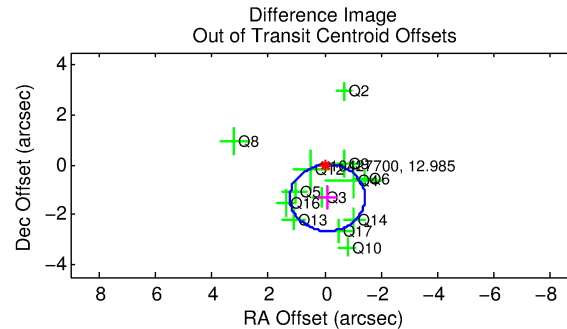
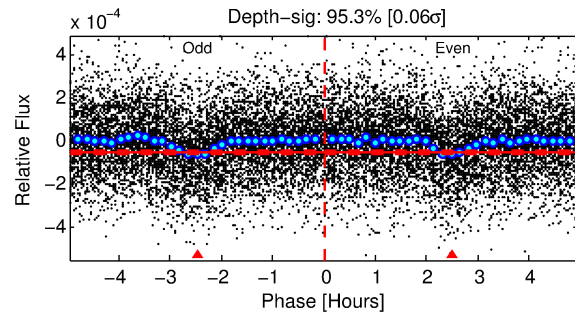
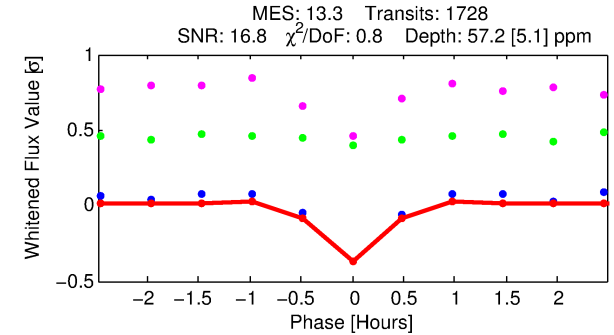
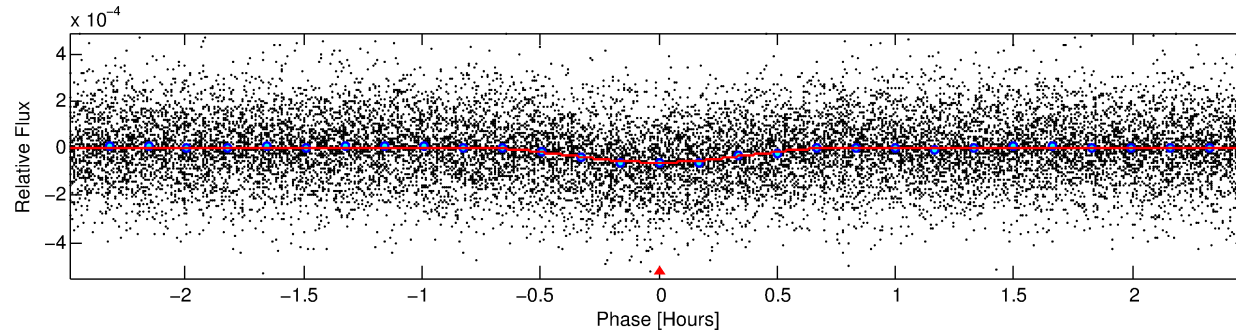
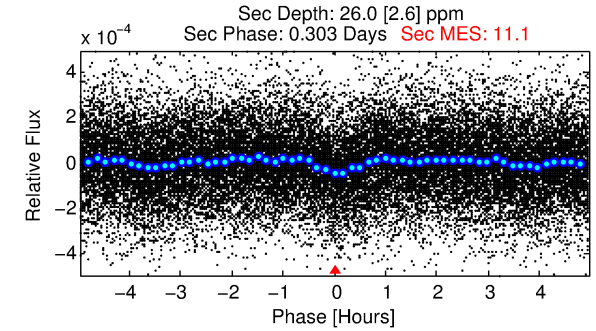
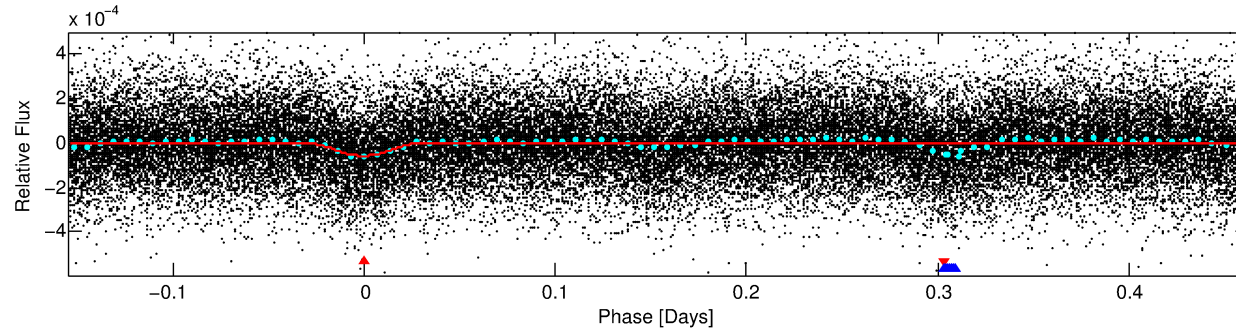
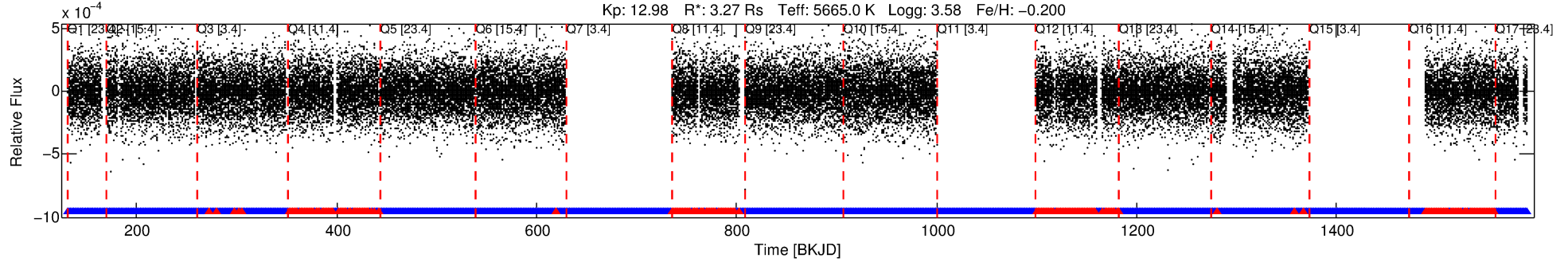
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 010427700-01

No Significant Match Found

# DV One-Page Summary

KIC: 10427700 Candidate: 1 of 2 Period: 0.616 d  
KOI: K04394.01 Corr: 0.970



## DV Fit Results:

Period = 0.61639 [0.00001] d  
Epoch = 131.6399 [0.0009] BKJD  
Rp/R\* = 0.0077 [0.0016]  
a/R\* = 3.79 [3.35]  
b = 0.77 [0.51]  
Seff = 37719.36 [22687.63]  
Teff = 3554 [534] K  
Rp = 2.74 [1.25] Re  
a = 0.0162 [0.0060] AU  
Ag = 0.50 [0.36] [-1.39σ]  
Teffp = 4611 [529] K [1.41σ]

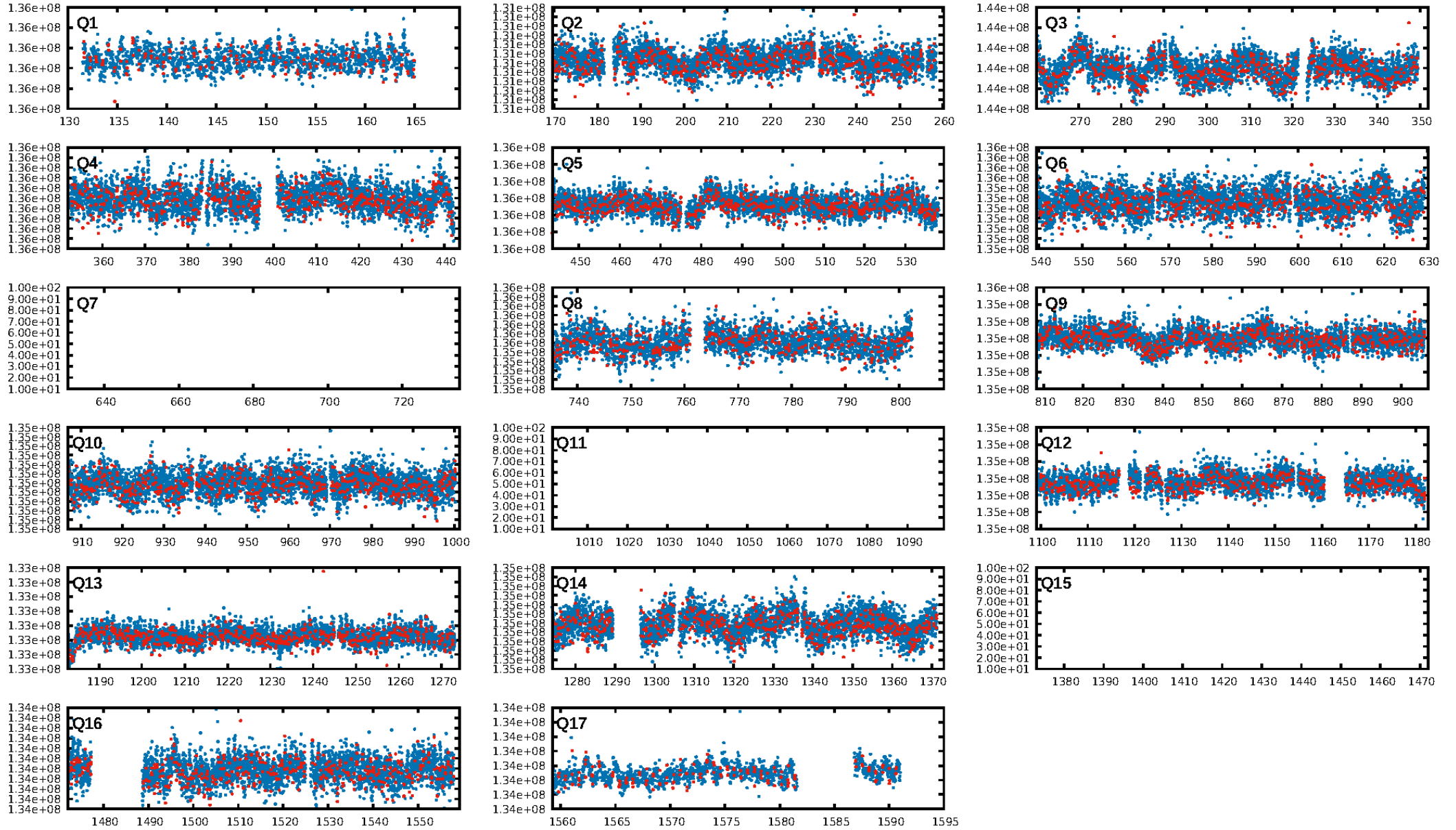
## DV Diagnostic Results:

**ShortPeriod-sig: 0.0% [0.00σ]**  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.39e-33  
RollingBand-fgt: 0.82 [1338/1630]  
**GhostDiagnostic-chr: 0.7356**  
Centroid-sig: N/A  
Centroid-so: 1.521 arcsec [2.49σ]  
**OotOffset-rm: 1.332 arcsec [3.00σ]**  
OotOffset-st: 4/1/4/4 [13]  
KicOffset-rm: 1.386 arcsec [2.81σ]  
KicOffset-st: 4/1/4/4 [13]  
DiffImageQuality-fgm: 0.92 [12/13]  
DiffImageOverlap-fno: 1.00 [14/14]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 21:34:04 Z

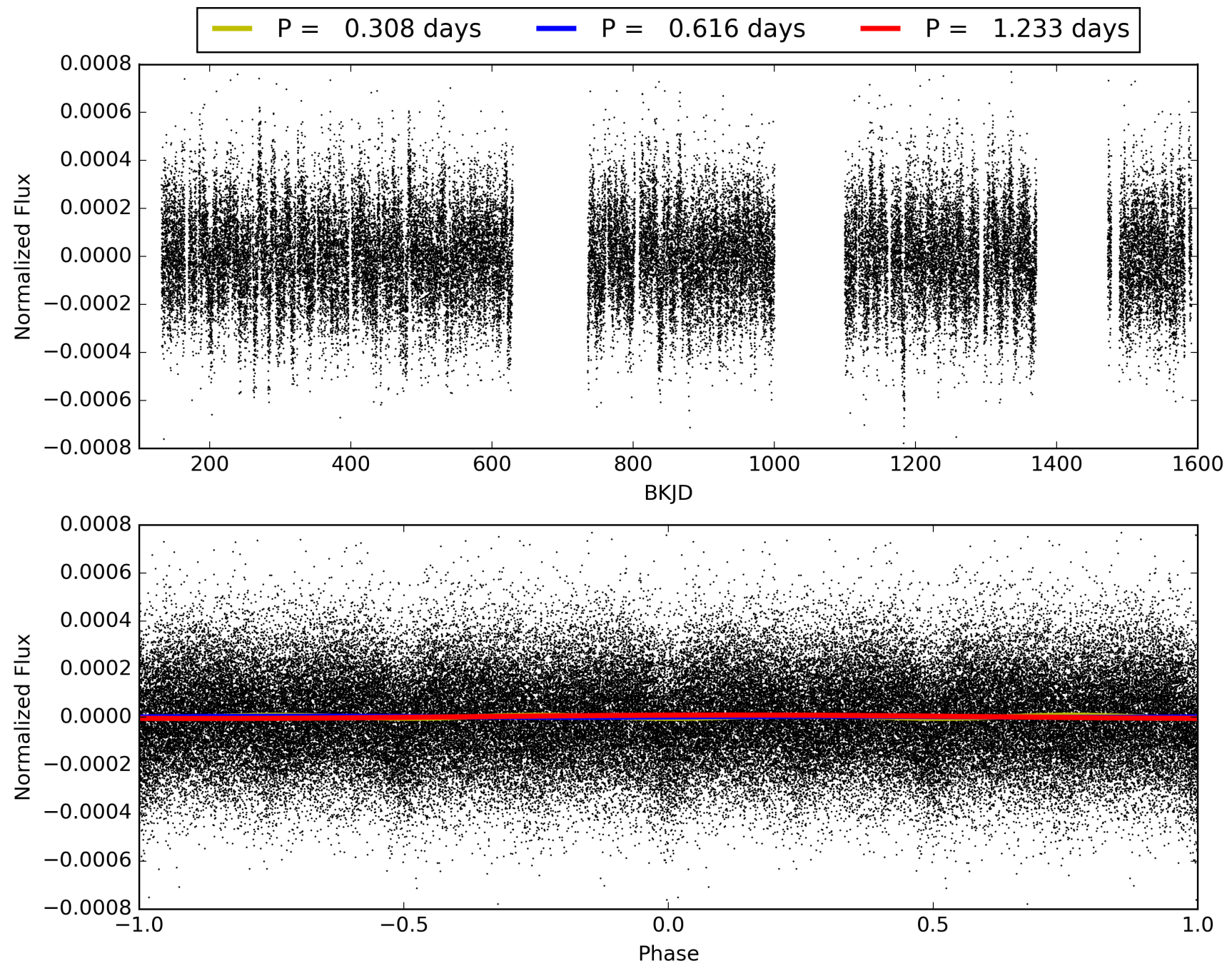
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 010427700-01, PDC Light Curves



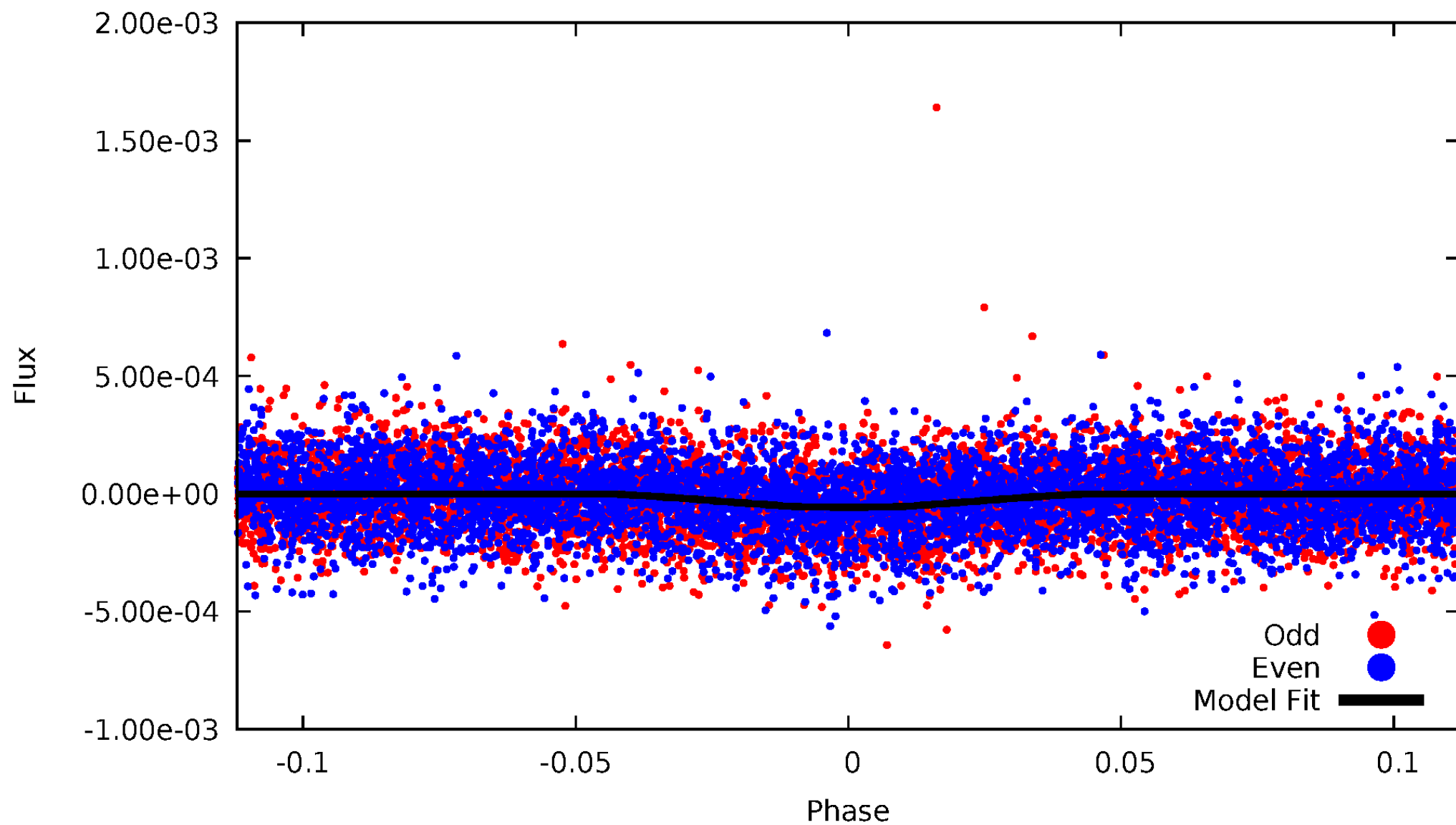


TCE 010427700-01



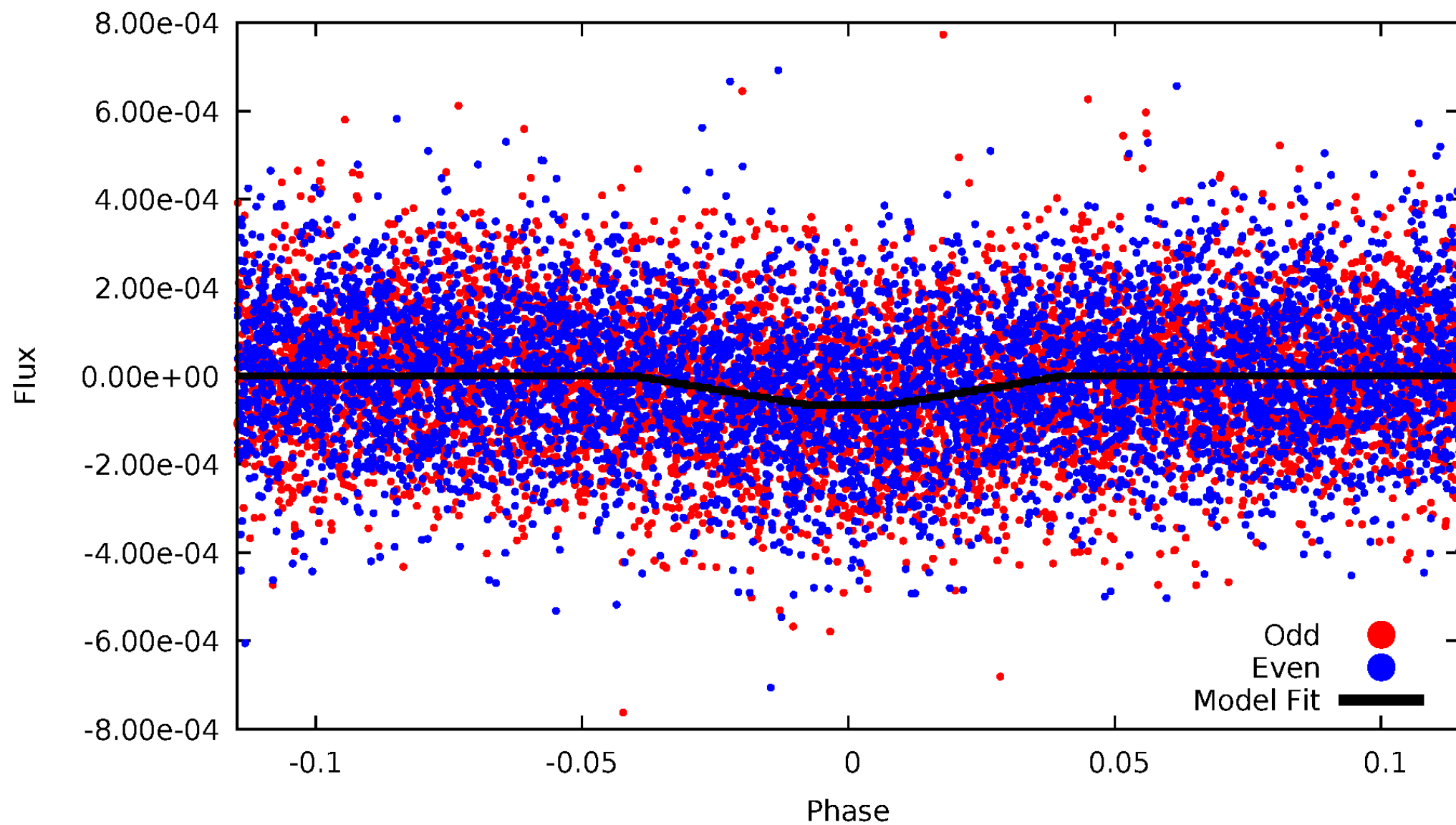
# DV Odd/Even

TCE 010427700-01



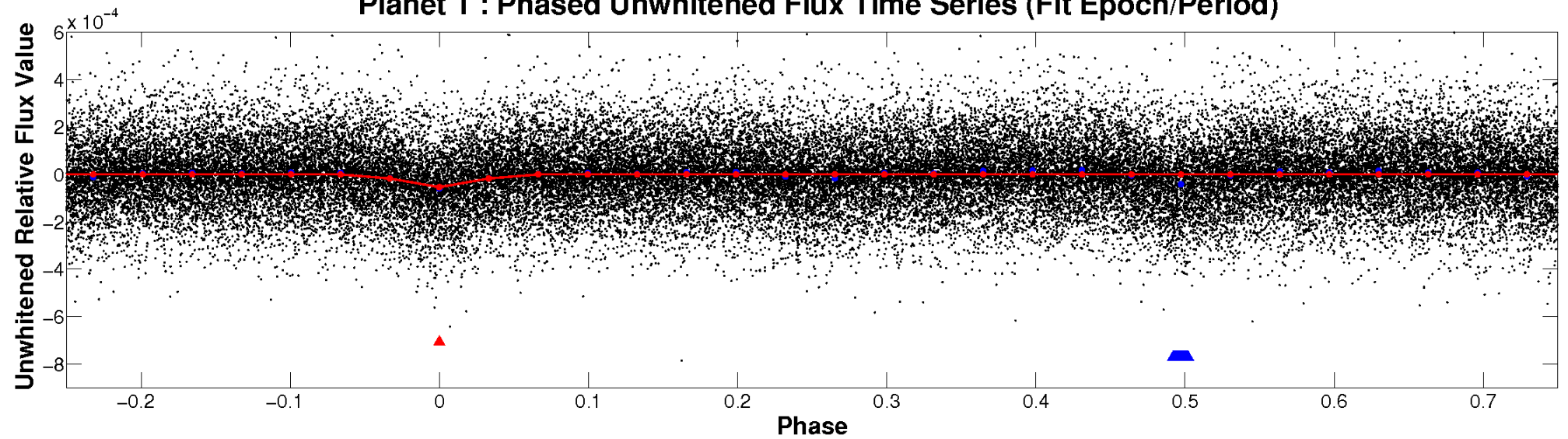
# ALT Odd/Even

TCE 010427700-01

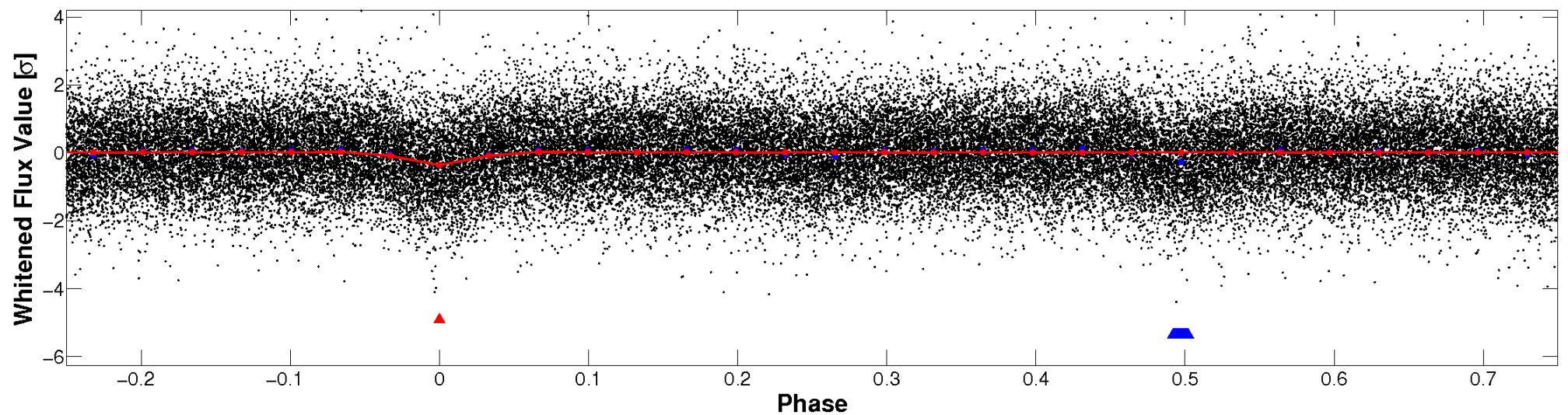


# Non-Whitened Vs. Whitened Light Curve

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



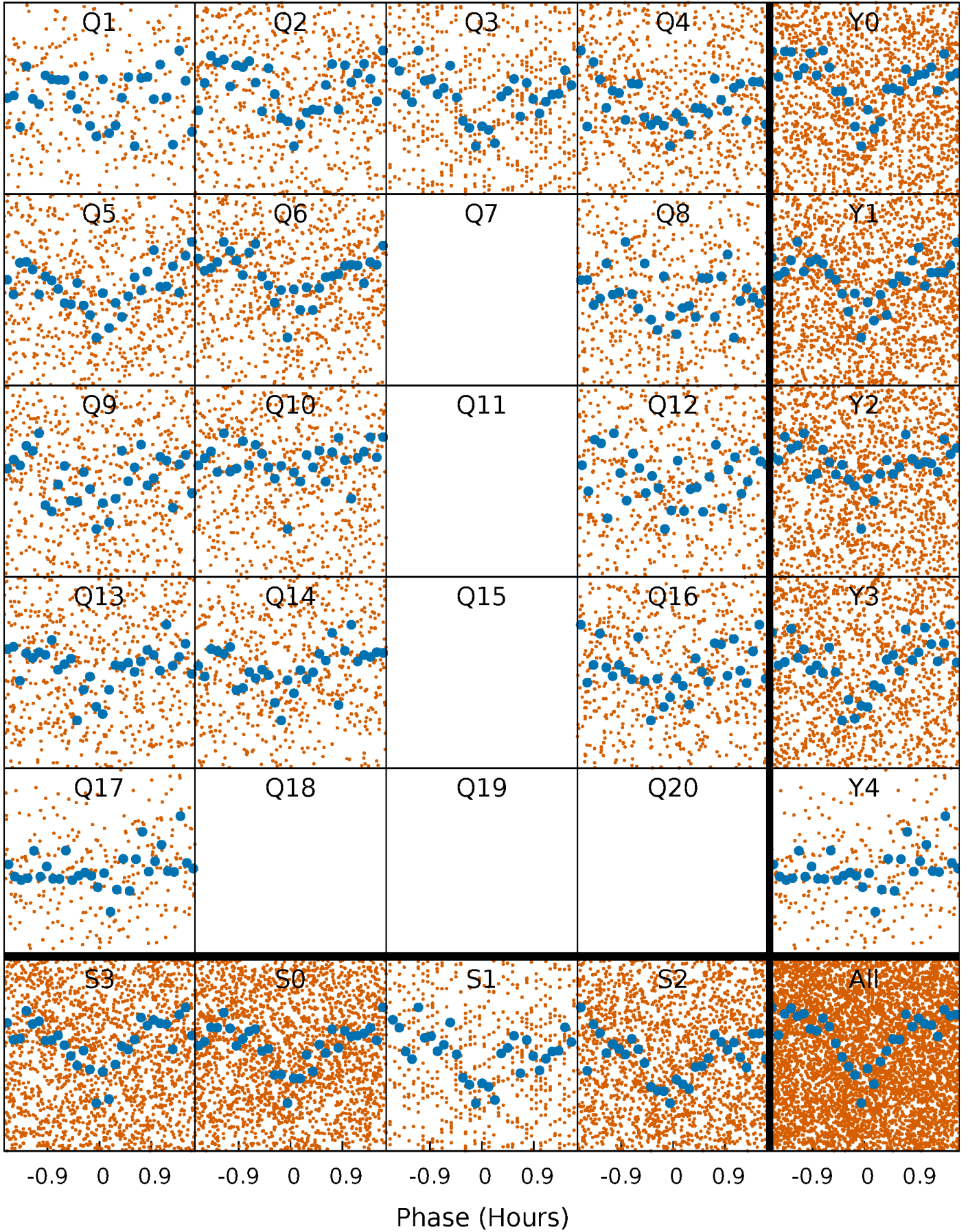
**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**





# PDC Quarter-Phased Transit Curves

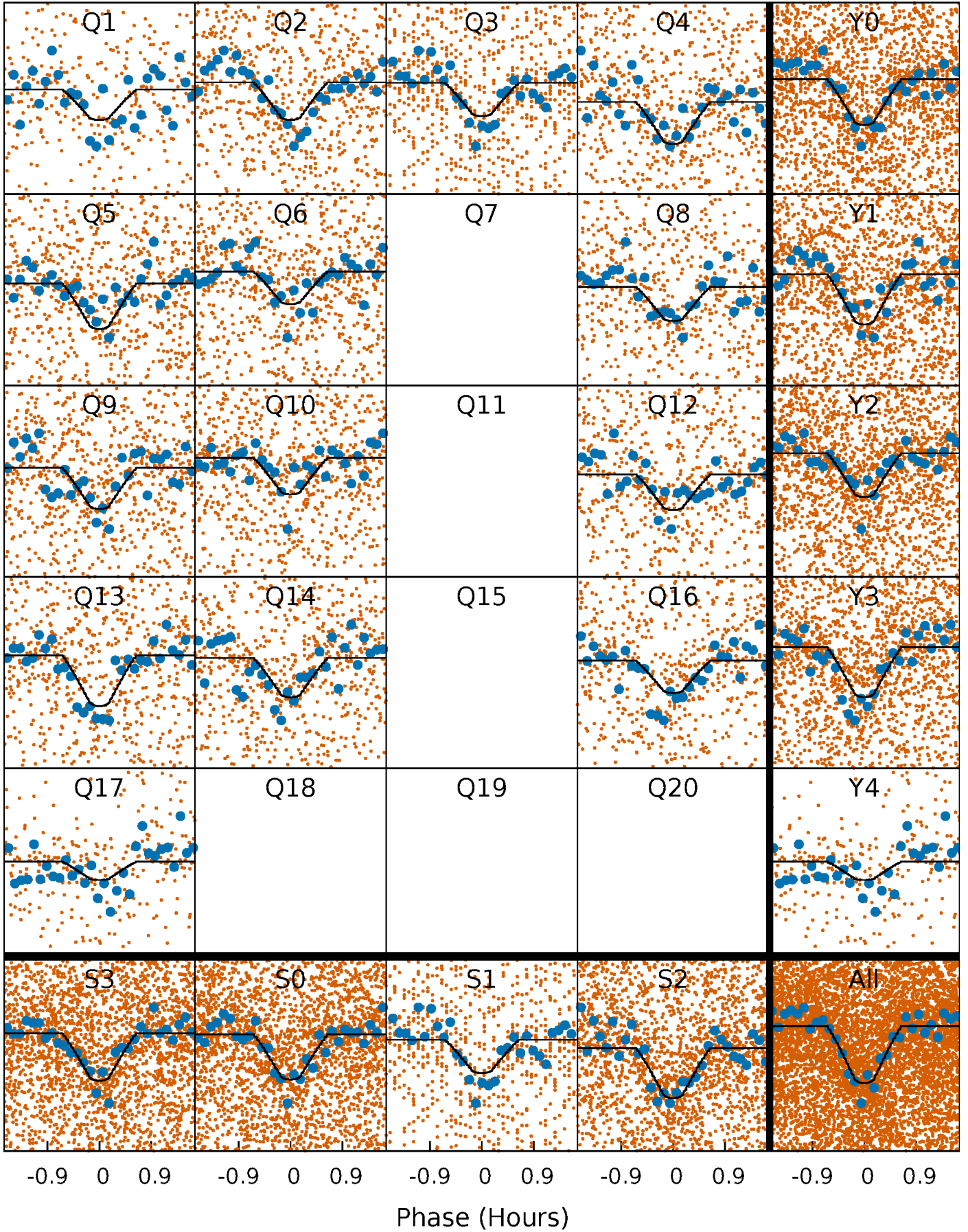
TCE 010427700-01 P= 0.616390 Days  $T_0=131.639945$  (BKJD)





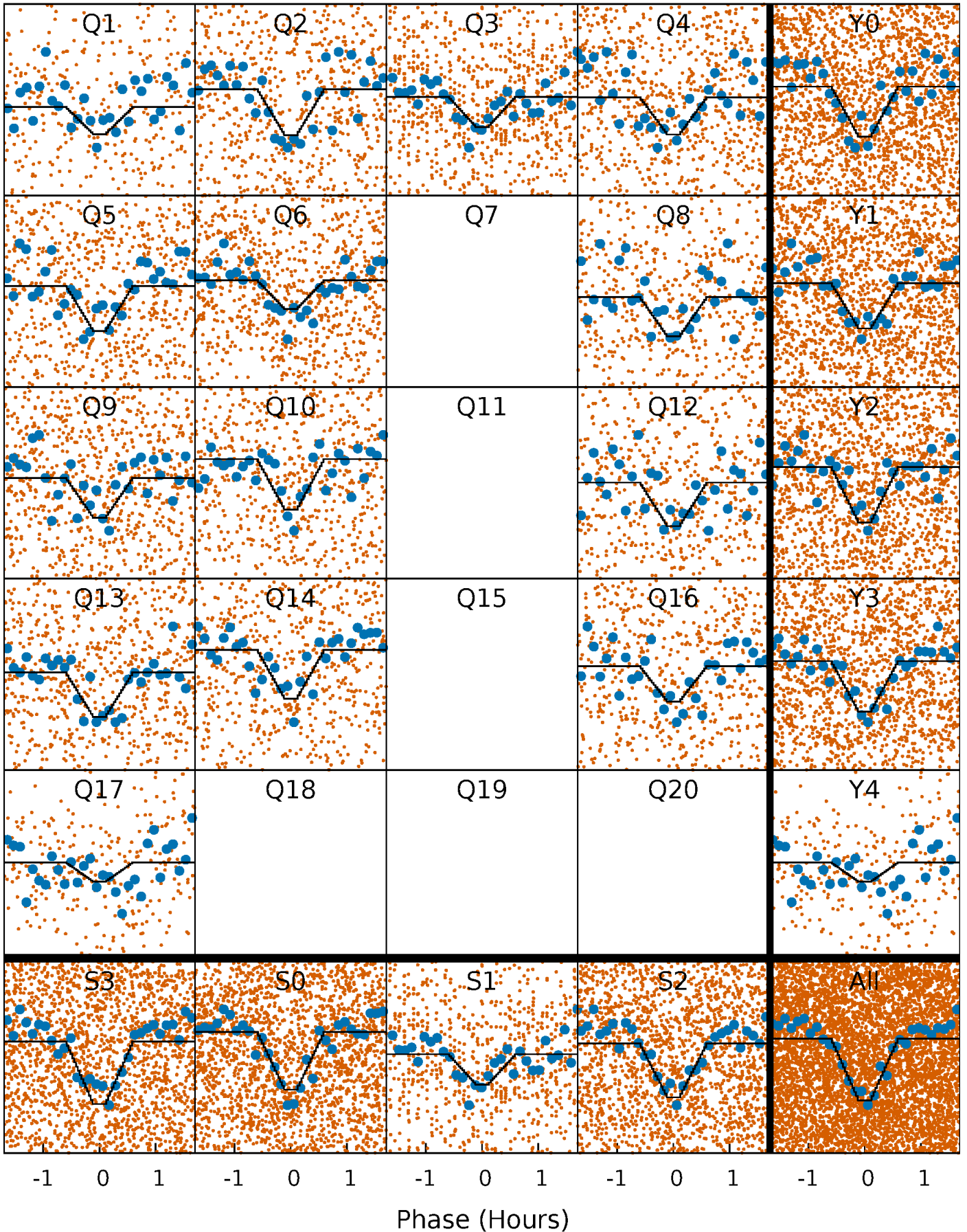
# DV Quarter-Phased Transit Curves

TCE 010427700-01 P= 0.616390 Days  $T_0=131.639945$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

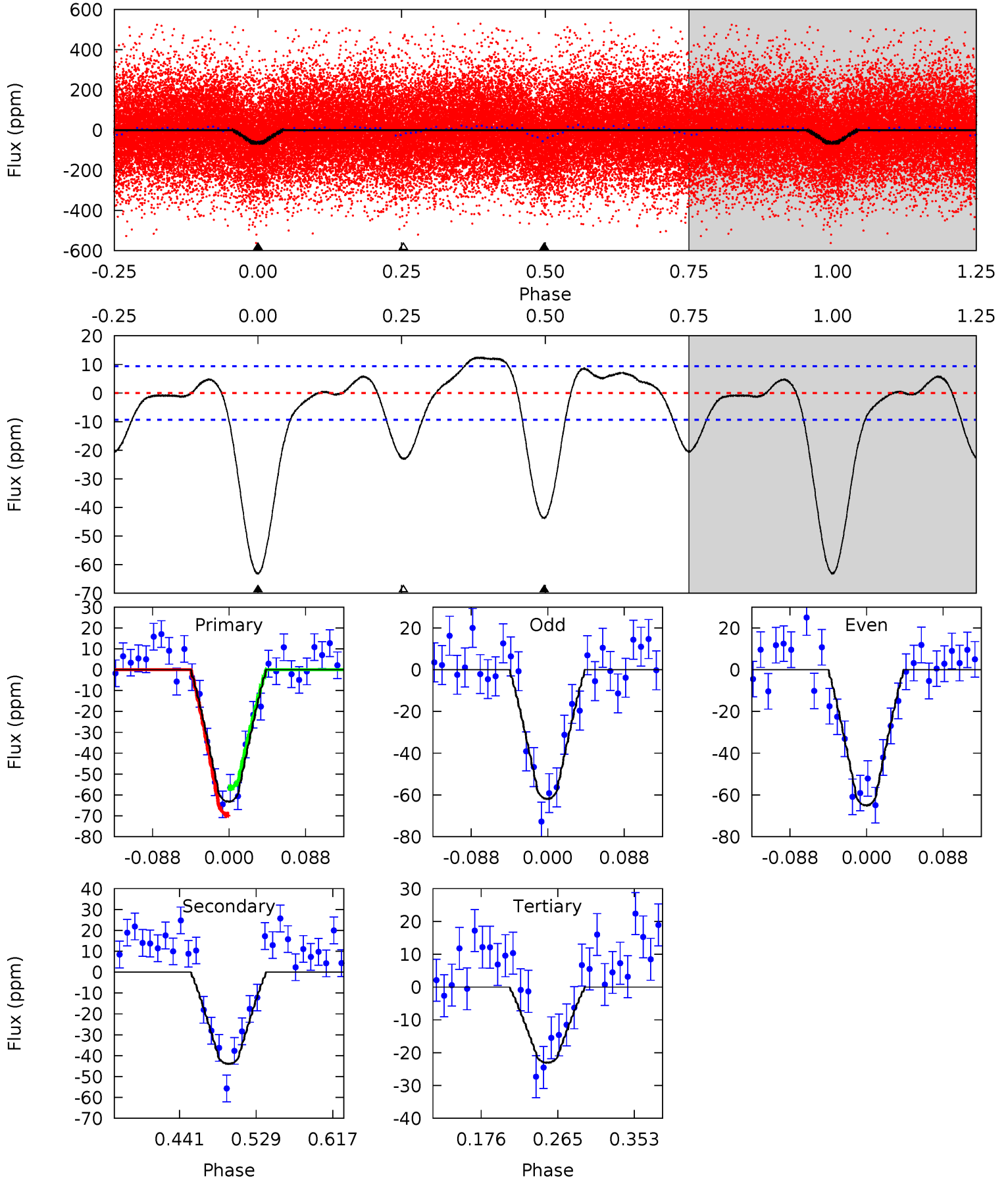
TCE 010427700-01     $P = 0.616382$  Days     $T_0 = 131.646912$  (BKJD)



# DV Model-Shift Uniqueness Test

010427700-01, P = 0.616390 Days, E = 131.023555 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
30.9	21.5	11.3	0	4.59	1.70	4.34	19.7	30.9	10.2	21.5	0.77	1.07	0.16	3.19

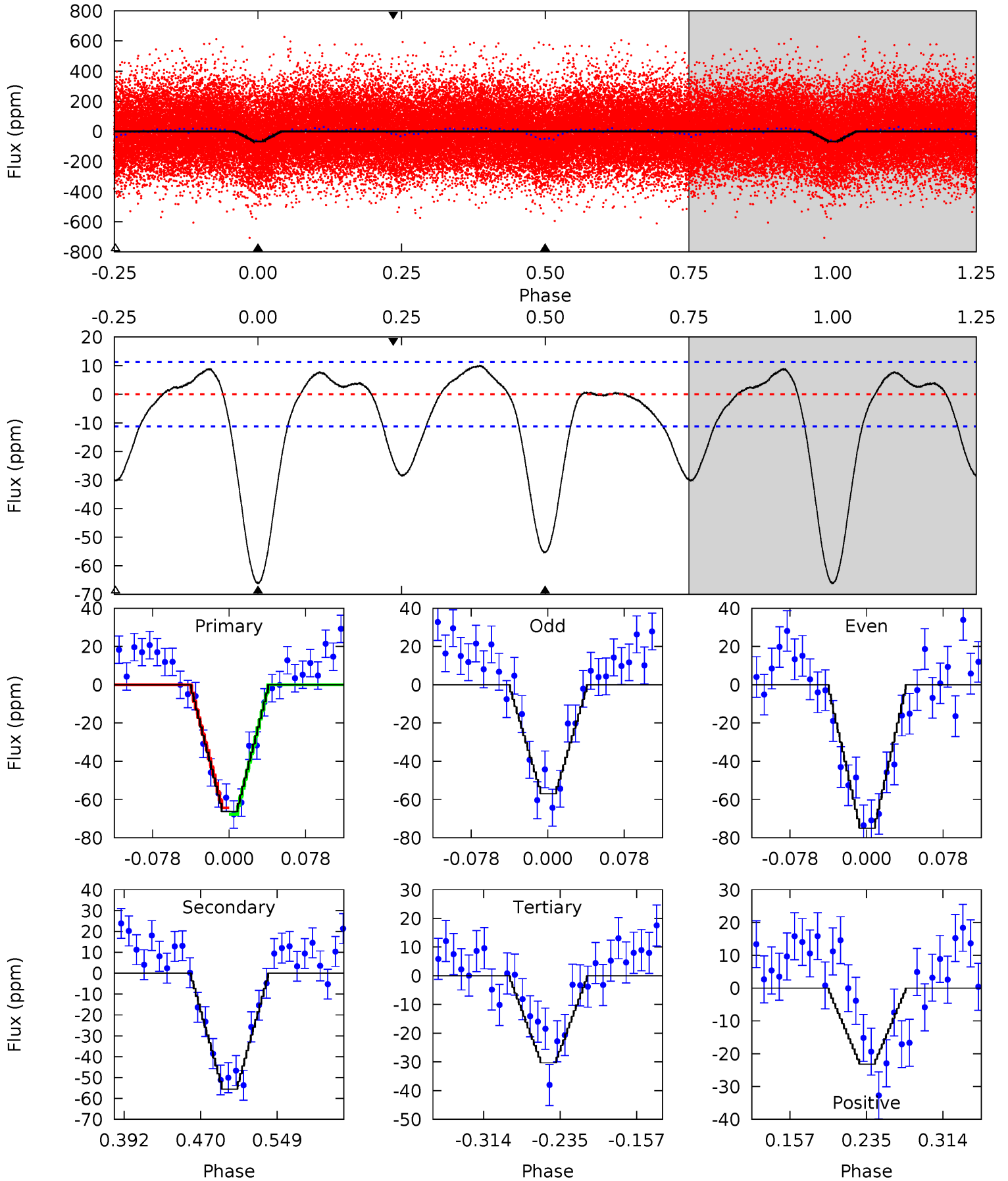




# Alt Model-Shift Uniqueness Test

010427700-01, P = 0.616382 Days, E = 131.030530 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	22.8	12.5	-9.53	4.62	1.76	4.65	14.8	36.8	10.4	32.4	3.70	0.96	0.13	0.69





### Stellar Parameters For KIC 010427700

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5665^{+170}_{-204}$	$3.580^{+0.338}_{-0.135}$	$-0.200^{+0.300}_{-0.350}$	$3.266^{+0.707}_{-1.313}$	$1.478^{+0.184}_{-0.461}$	$0.060^{+0.160}_{-0.021}$
	+3%/-4%	+9%/-4%	+150%/-175%	+22%/-40%	+12%/-31%	+267%/-35%
Source	PHO1	FLK73	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 010427700-01 / KOI 4394.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-44 \pm 2$	$2.58^{+0.82}_{-0.66}$	$4891^{+366}_{-455}$	$4845^{+696}_{-664}$	$0.943^{+0.698}_{-0.384}$
Alt.	$-56 \pm 2$	$2.72^{+0.80}_{-0.79}$	$4858^{+383}_{-491}$	$5032^{+753}_{-609}$	$1.066^{+0.917}_{-0.417}$

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

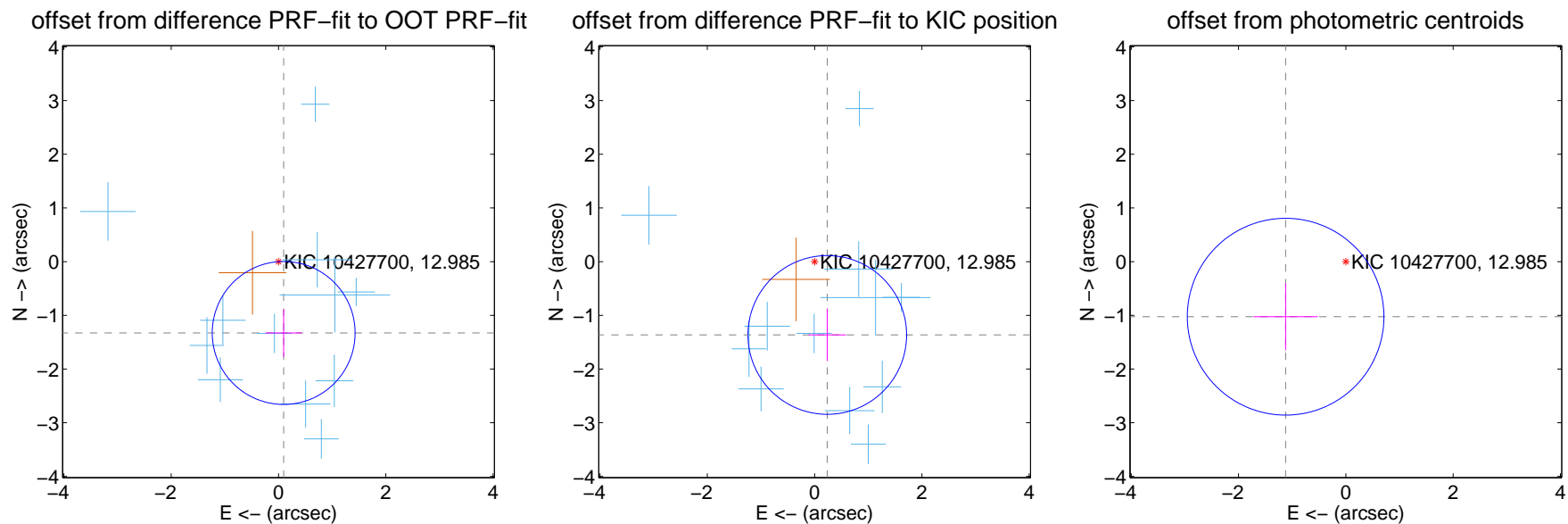
## DV Centroid Data

Supplemental centroid analysis for 010427700-01. Kepler magnitude: 12.98. Transit SNR 16.77

There are 12 quarters with good PRF difference image offsets

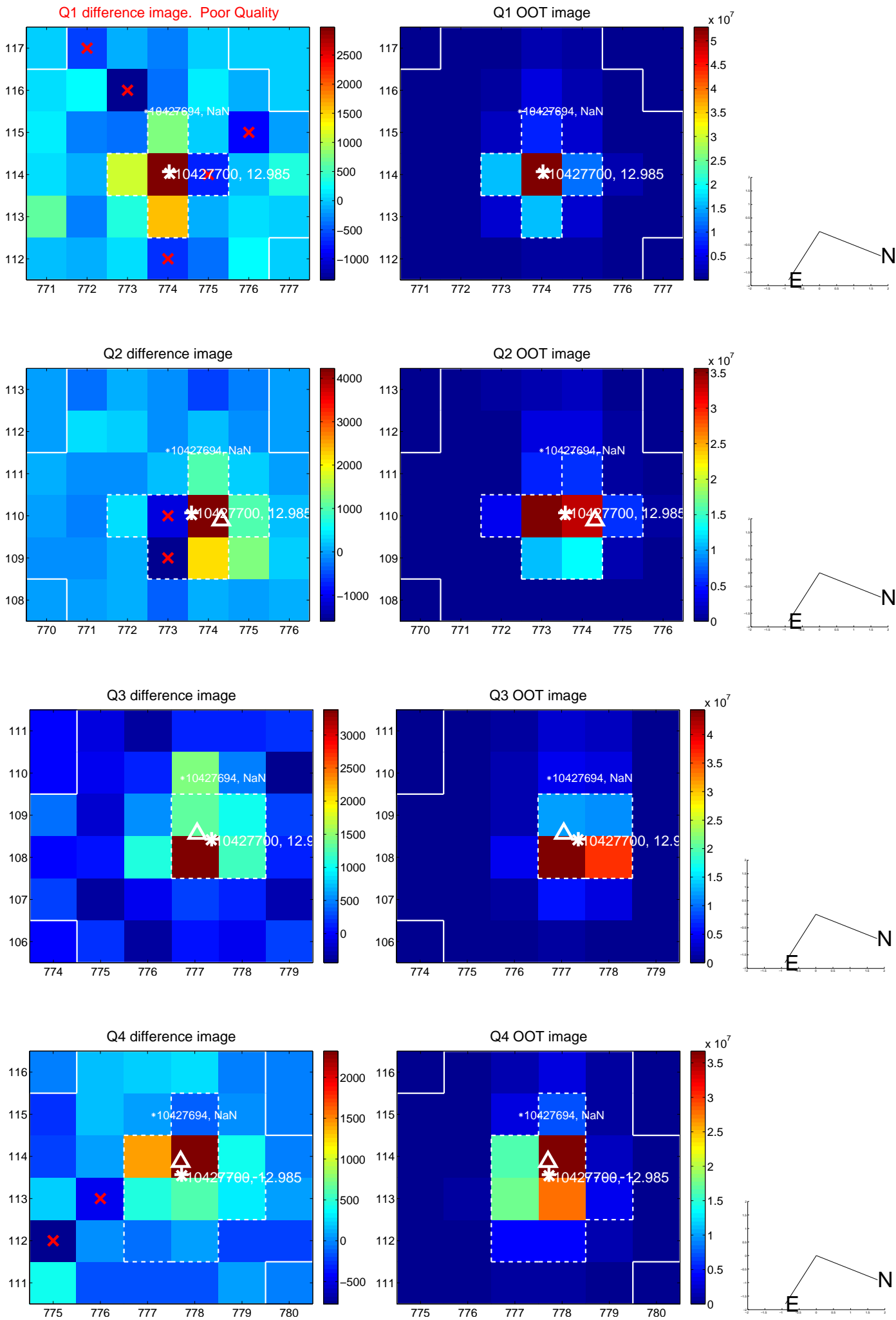
The direct PRF centroid is offset from the target star catalog position by about 0.19 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.332 \pm 0.444$	<b>3.00</b>	$-0.097 \pm 0.340$	$-1.328 \pm 0.442$
PRF-fit source offset from KIC position	$1.386 \pm 0.493$	2.81	$-0.236 \pm 0.348$	$-1.365 \pm 0.487$
photometric centroid source offset	$1.52 \pm 0.61$	2.49	$1.12 \pm 0.60$	$-1.03 \pm 0.62$

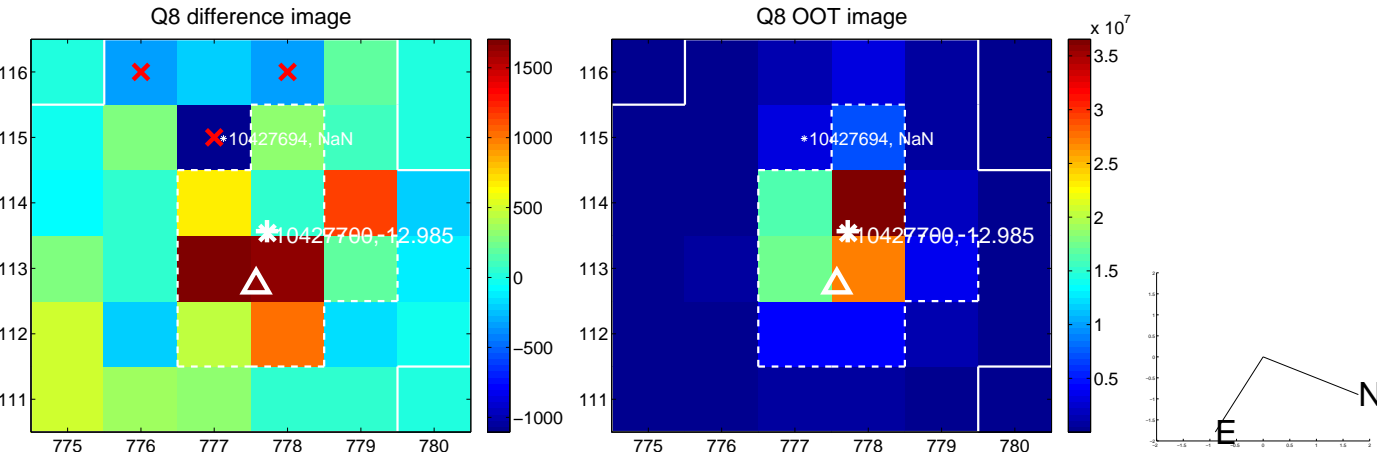
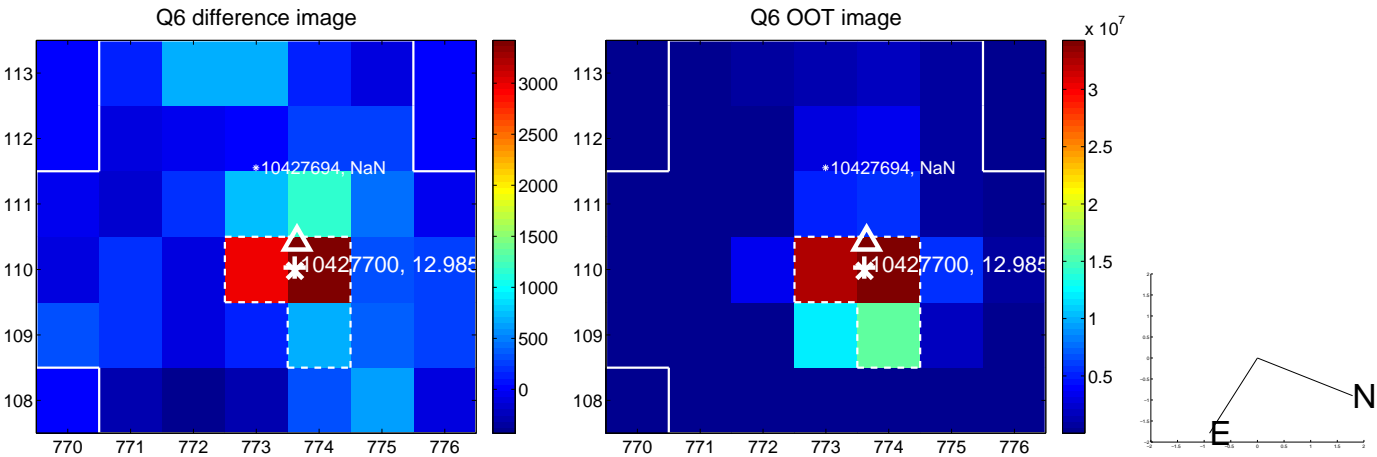
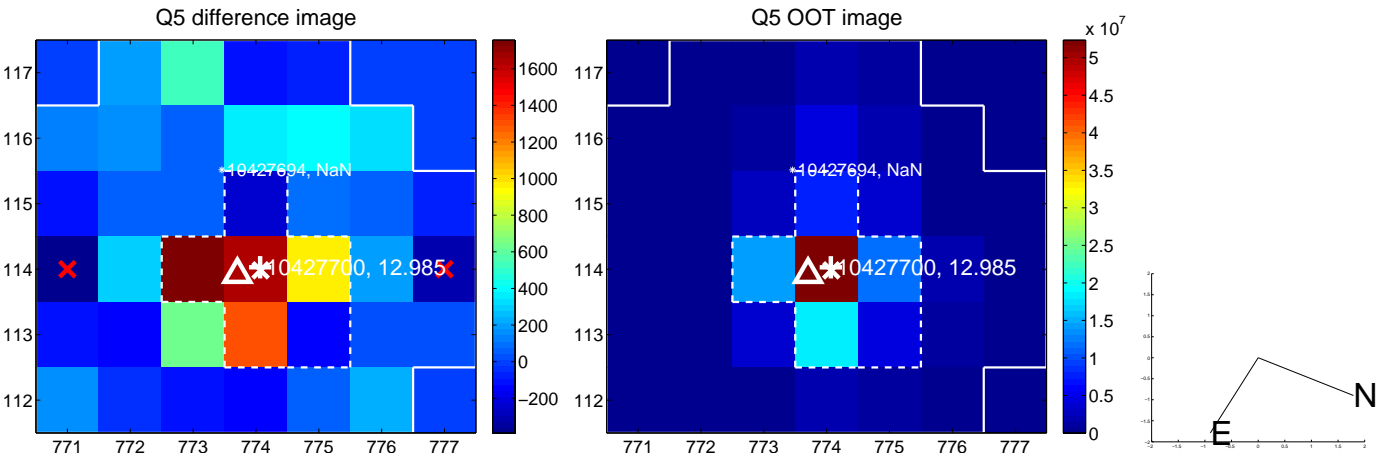


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: 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 ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.

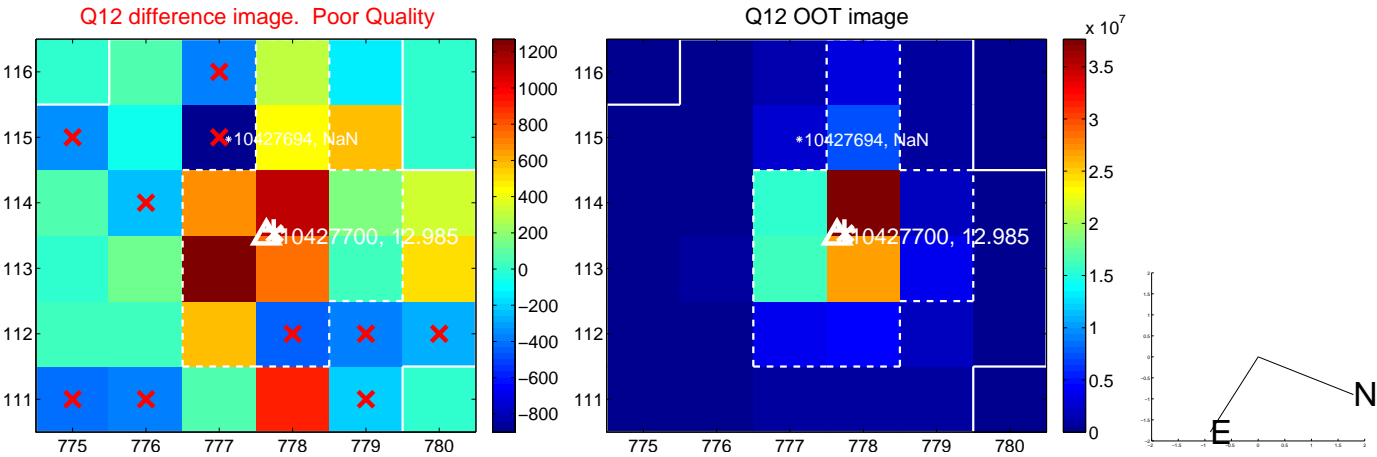
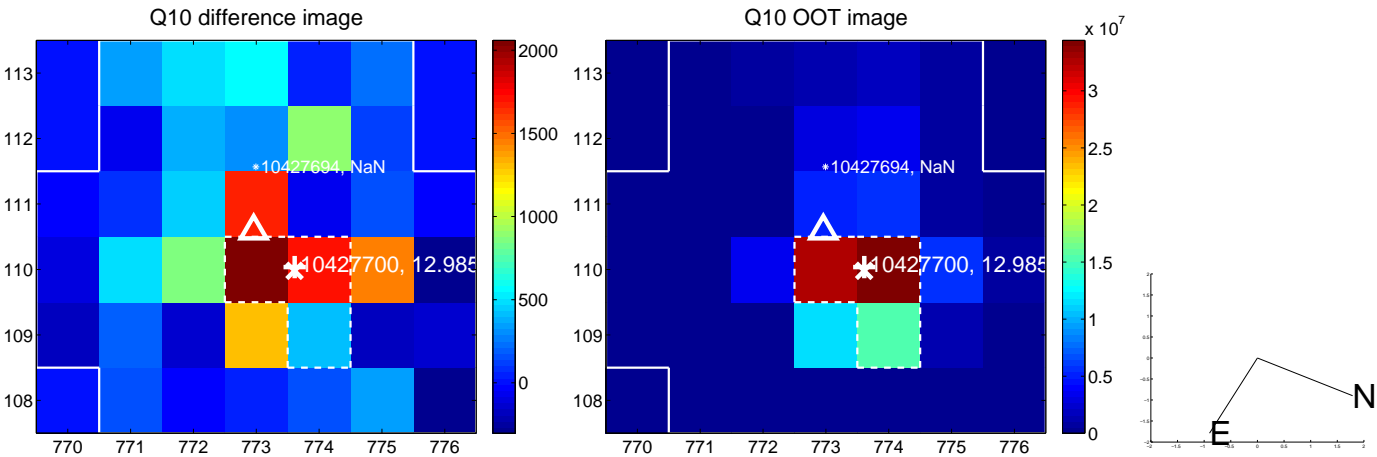
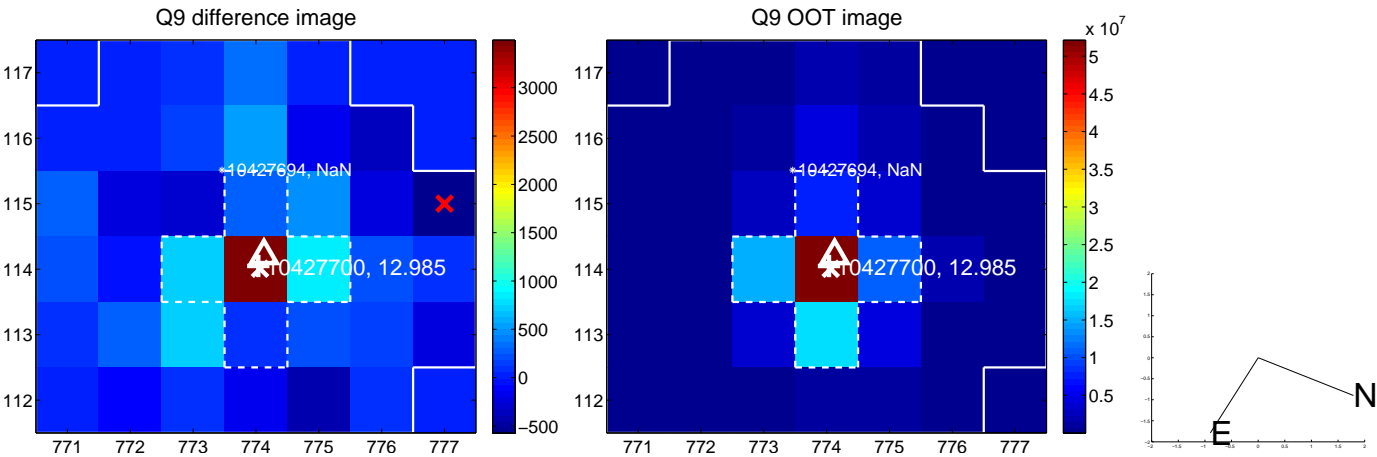


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

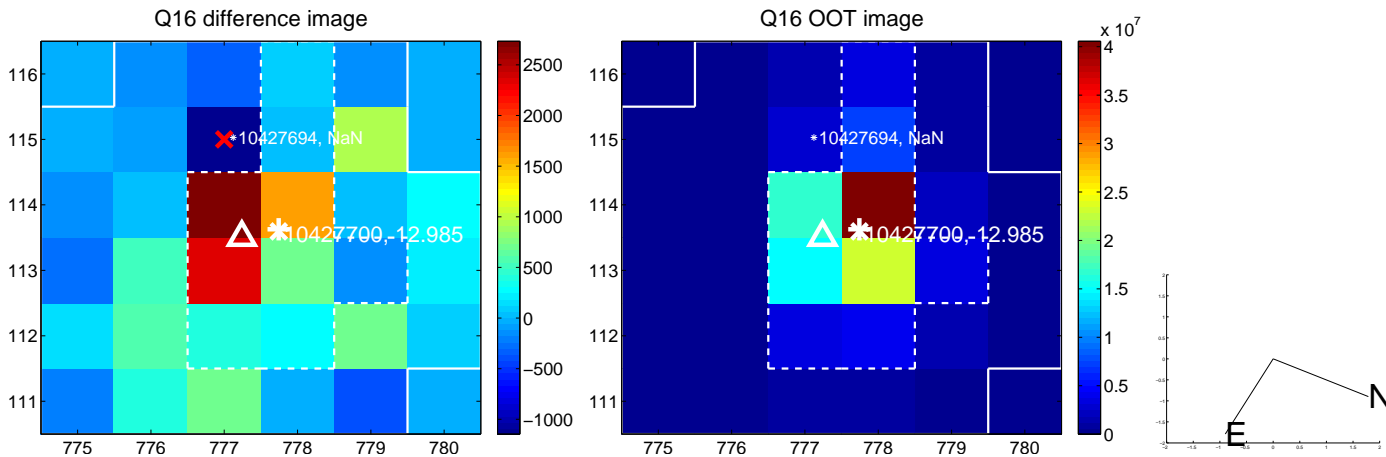
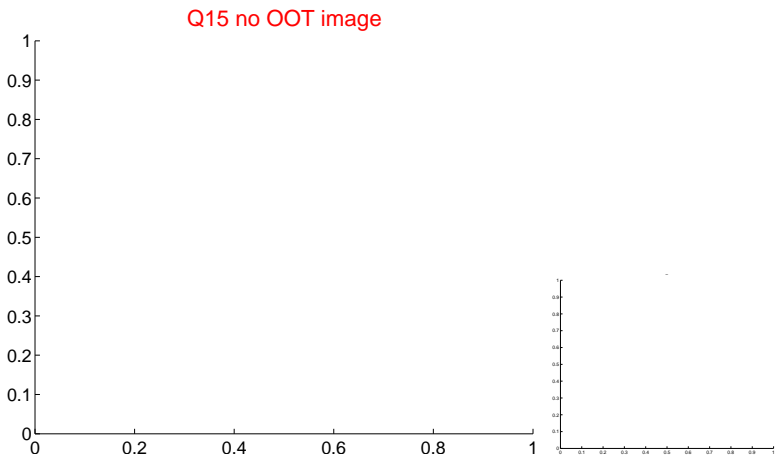
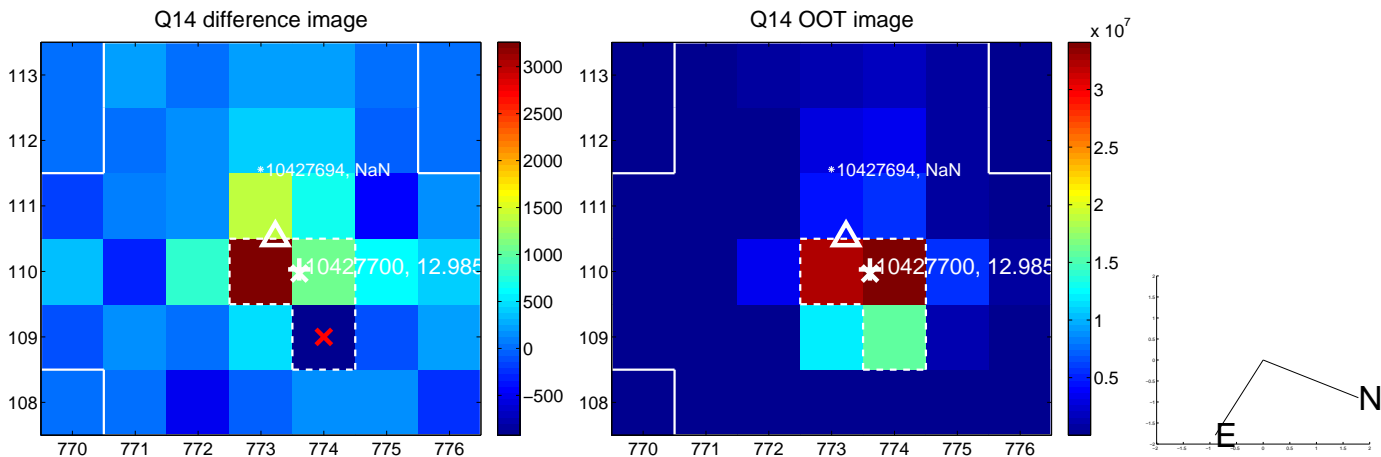
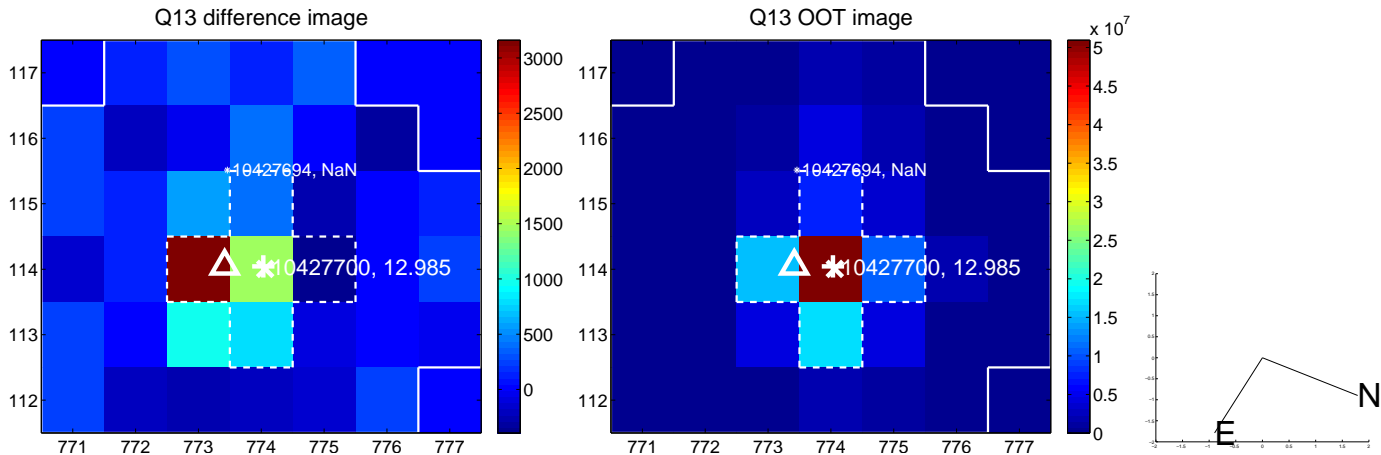




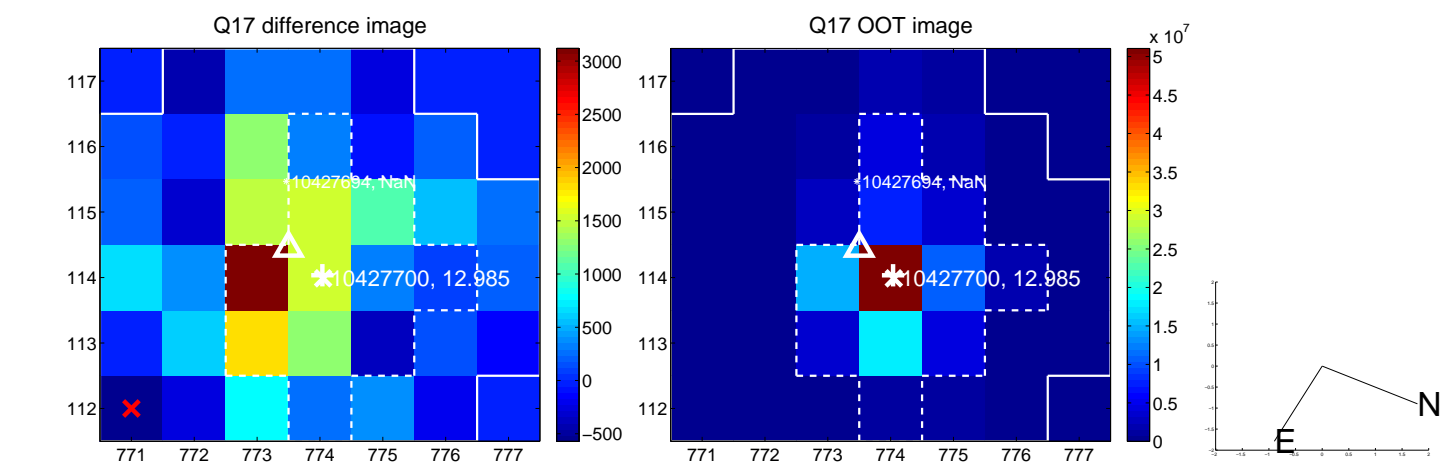
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



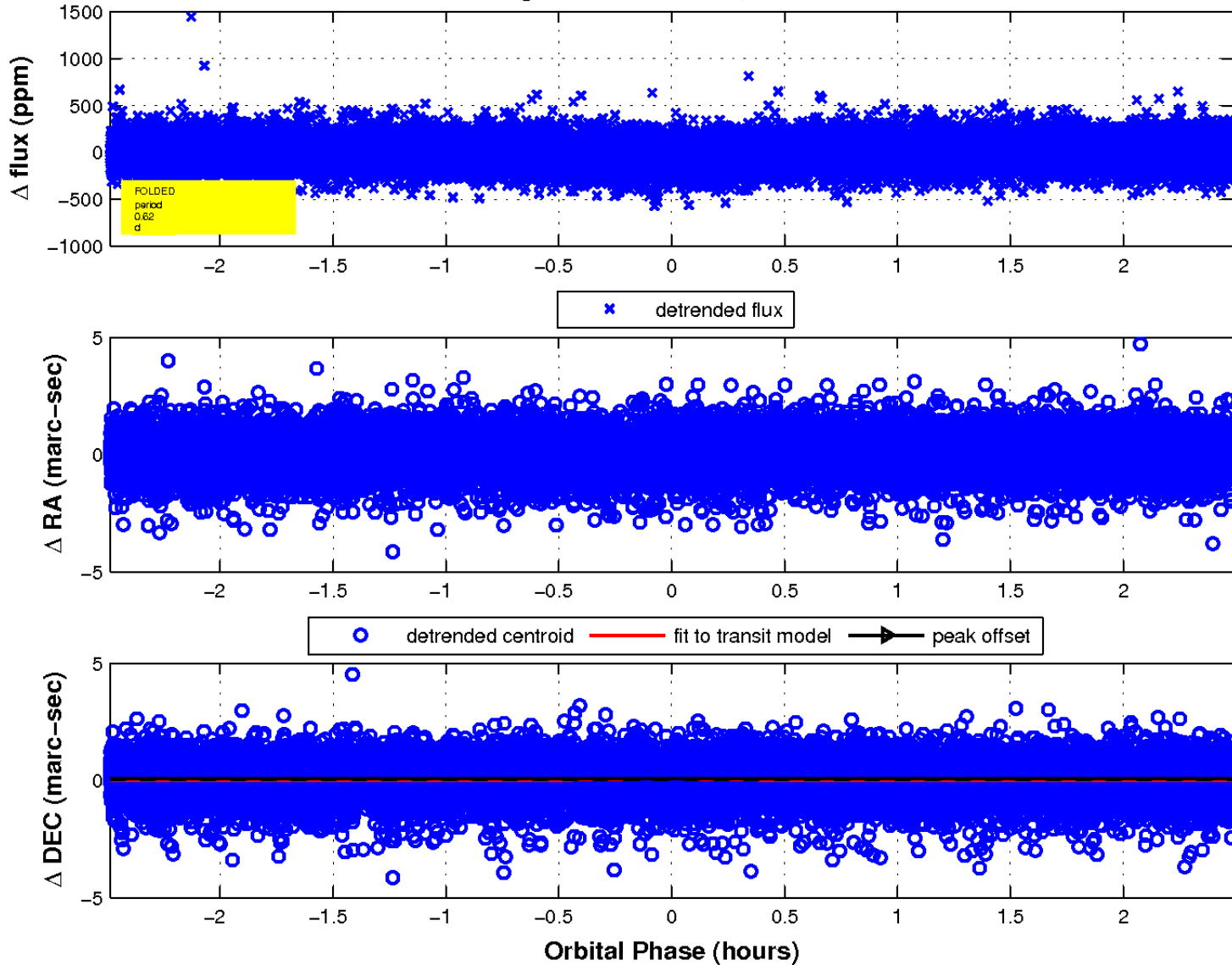
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

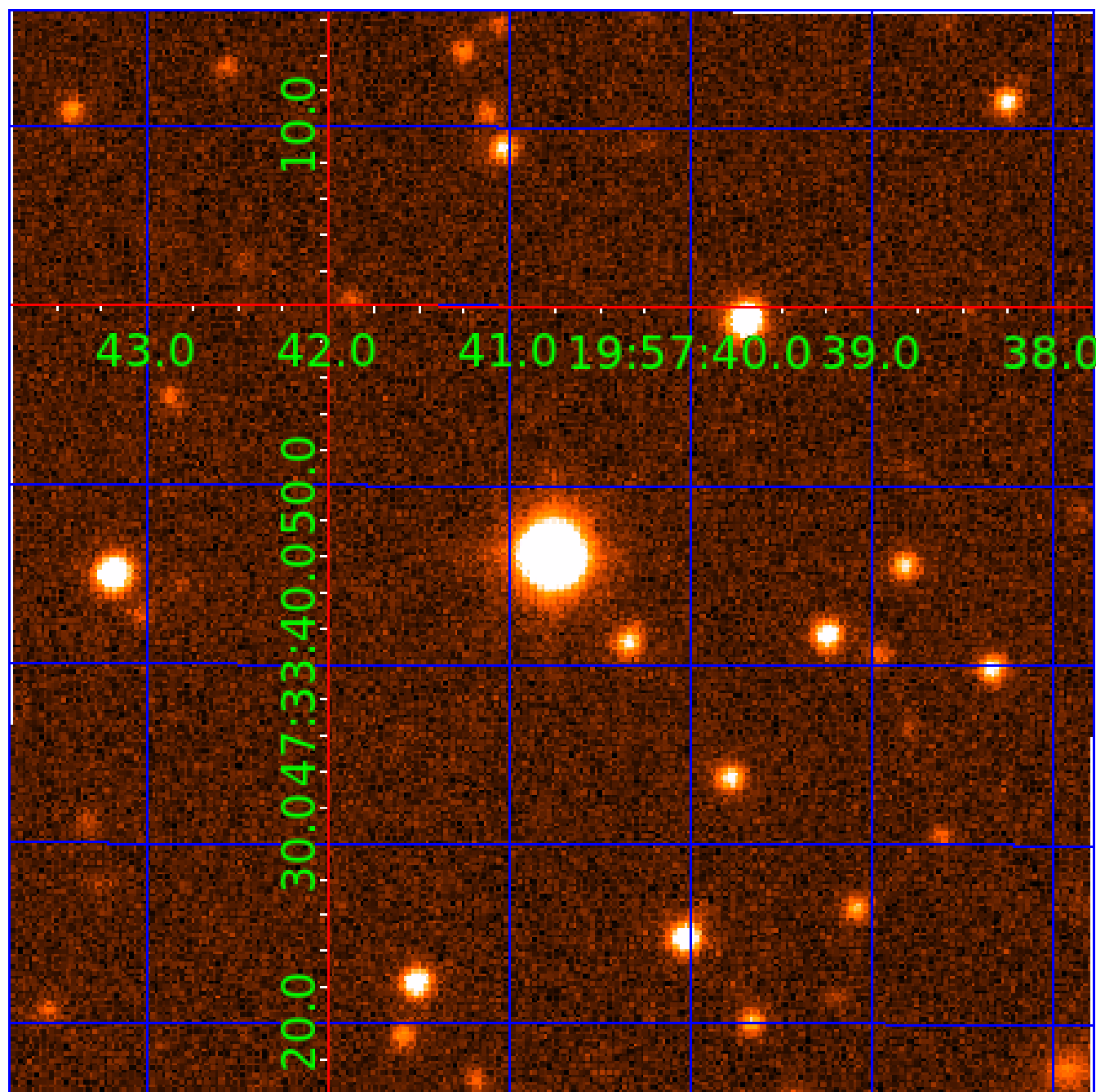


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination





# KIC 010427700

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010427700-01	OBS	4394.01	0.616390	131.639945	57.2	0.829	13.3	16.8	3.27	5665	2.75	37719.36
010427700-02	OBS	No	0.616387	131.949403	53.4	0.702	9.8	14.8	3.27	5665	2.89	37719.57

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010427700-01	OBS	FP	0.00	1	0	0	0	MOD_NONUNIQ_ALT
010427700-02	OBS	FP	0.00	1	0	0	0	MOD_NONUNIQ_ALT—SAME_NTL_PERIOD

**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 010427700-02

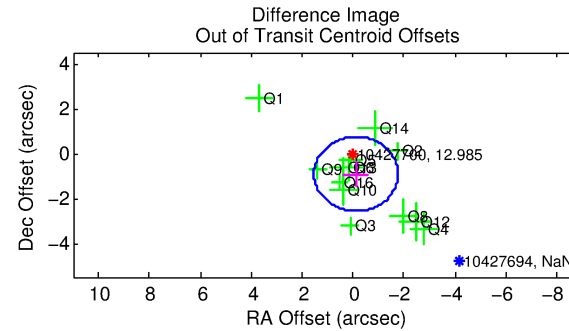
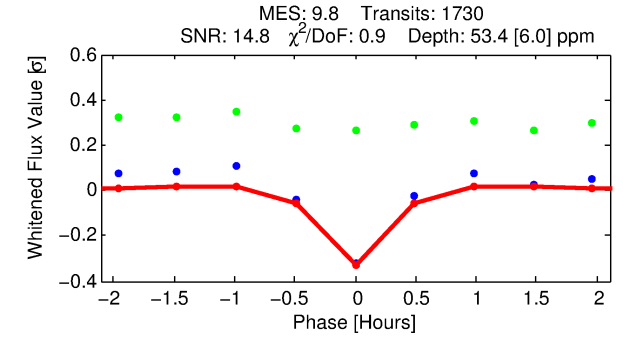
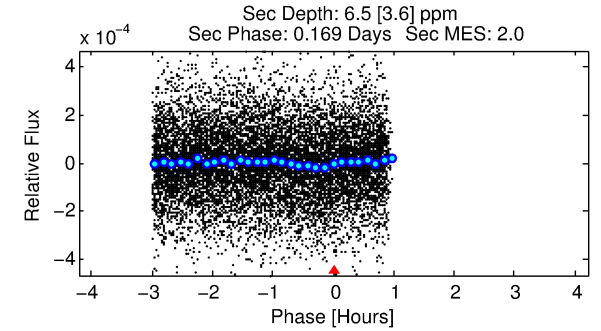
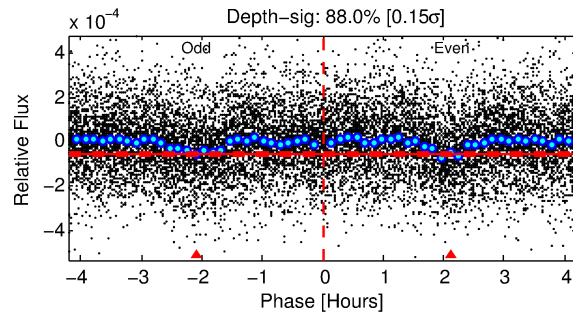
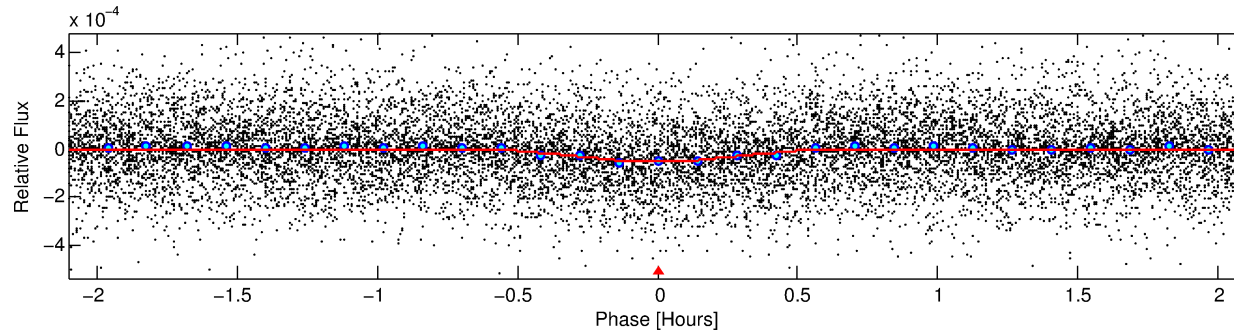
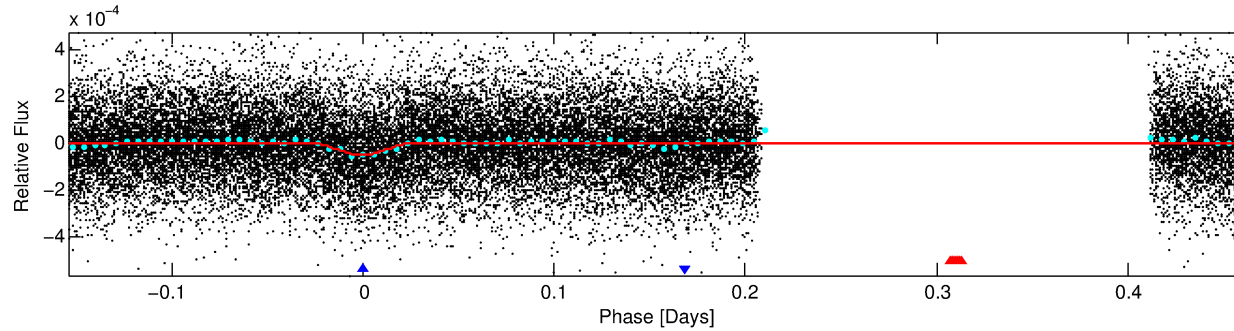
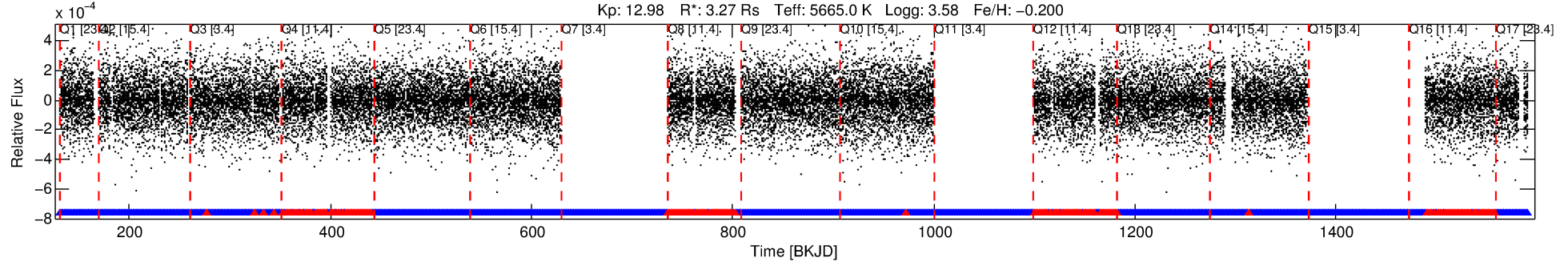
No Significant Match Found

# DV One-Page Summary

KIC: 10427700 Candidate: 2 of 2 Period: 0.616 d

KOI: K04394 Corr: No Ephemeris Match

Kp: 12.98 R\*: 3.27 Rs Teff: 5665.0 K Logg: 3.58 Fe/H: -0.200



## DV Fit Results:

Period = 0.61639 [0.00001] d  
Epoch = 131.9494 [0.0009] BKJD  
Rp/R\* = 0.0081 [0.0019]  
a/R\* = 3.21 [3.17]  
b = 0.90 [0.24]  
Seff = 37719.57 [22687.75]  
Teff = 3554 [534] K  
Rp = 2.89 [1.34] Re  
a = 0.0162 [0.0060] AU  
Ag = 0.11 [0.10] [-8.57σ]  
Teffp = 3175 [585] K [-0.48σ]

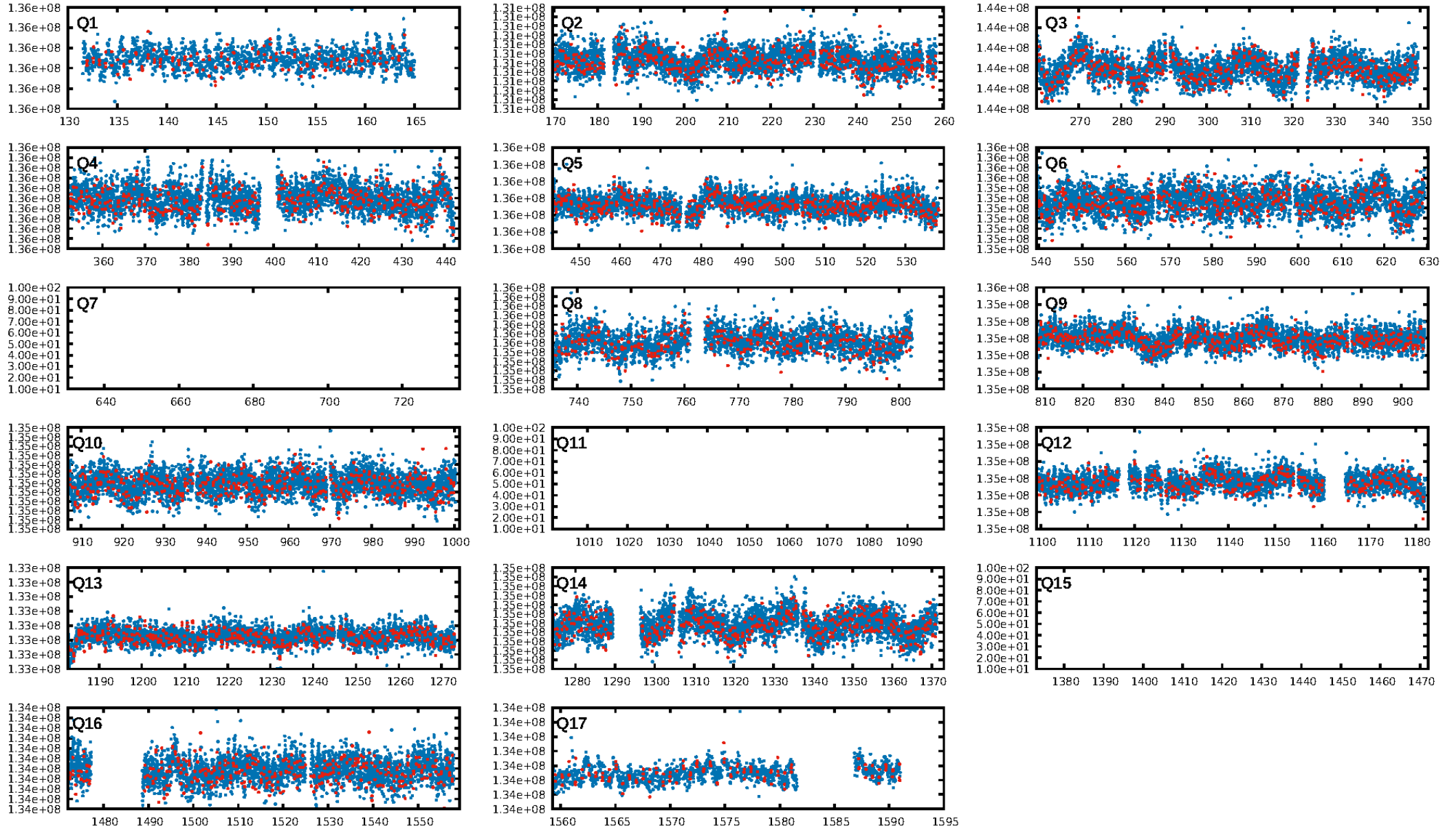
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 2.94e-19  
RollingBand-fgt: 0.81 [1327/1633]  
GhostDiagnostic-chr: 1.891  
Centroid-sig: N/A  
Centroid-so: 3.234 arcsec [4.45σ]  
OotOffset-rm: 0.927 arcsec [1.68σ]  
KicOffset-rm: 1.053 arcsec [1.98σ]  
OotOffset-st: 4/1/4/4 [13]  
KicOffset-st: 4/1/4/4 [13]  
DiffImageQuality-fgm: 0.77 [10/13]  
DiffImageOverlap-fno: 1.00 [14/14]

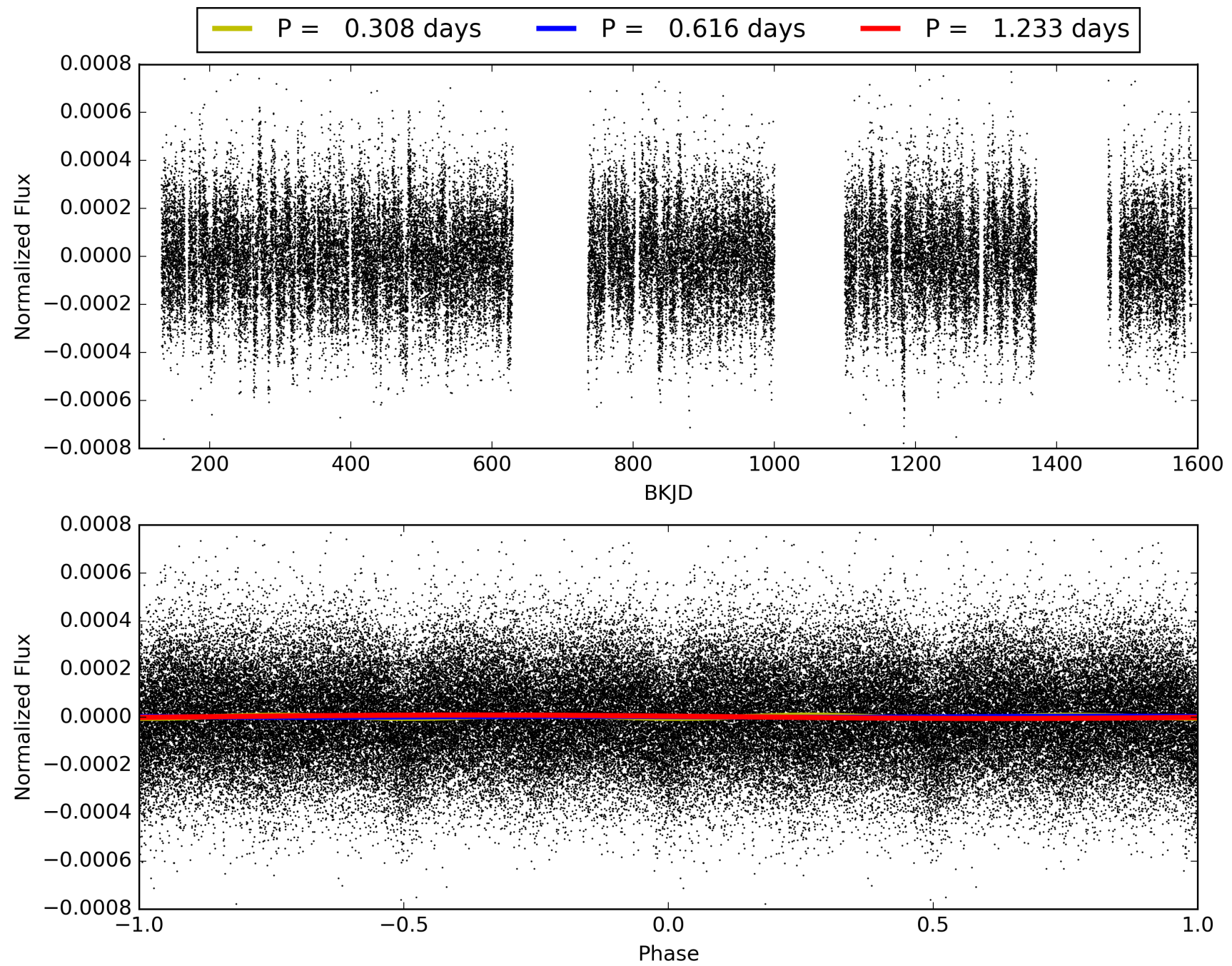
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 21:34:12 Z

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

# TCE 010427700-02, PDC Light Curves



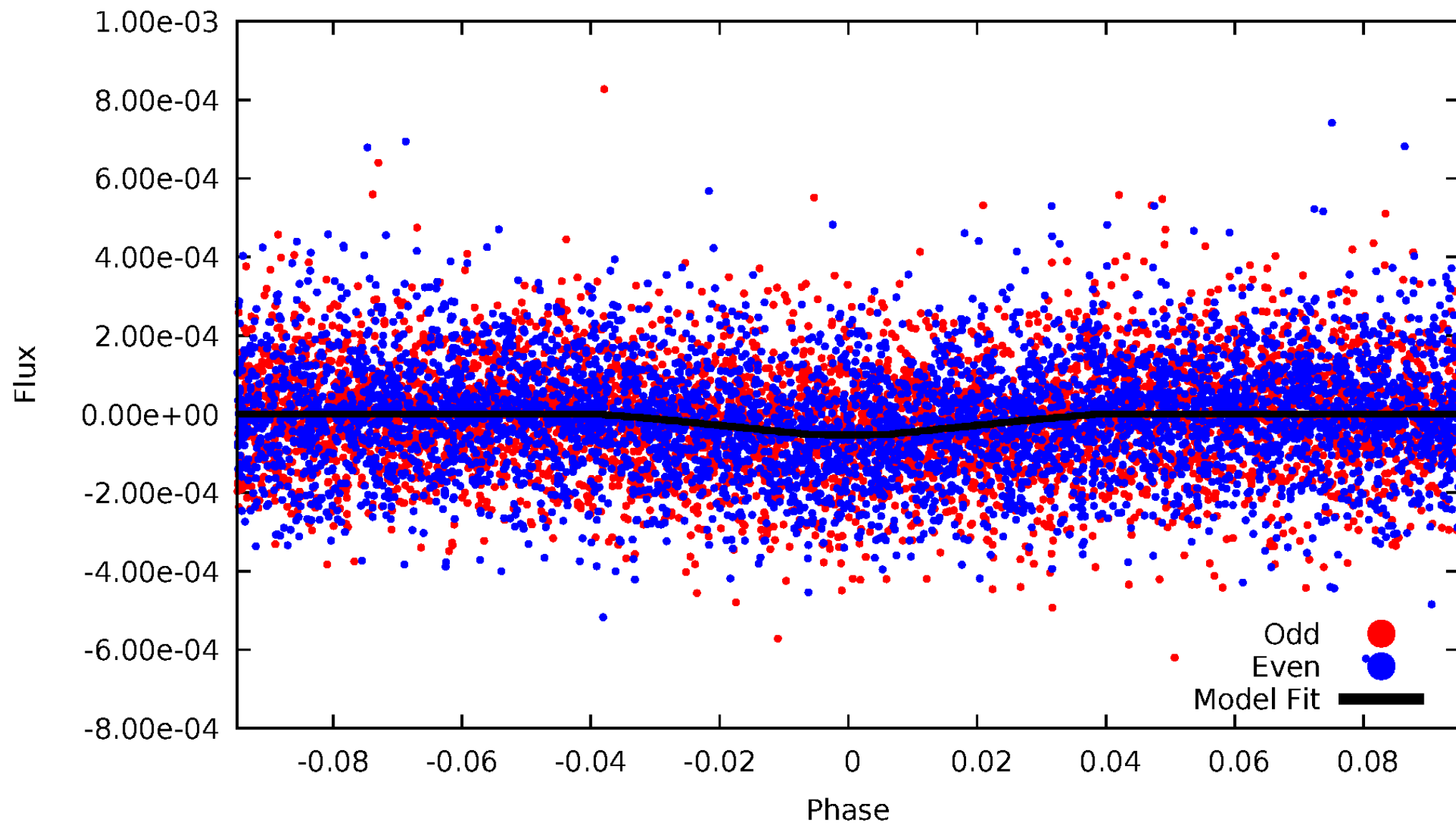
TCE 010427700-02





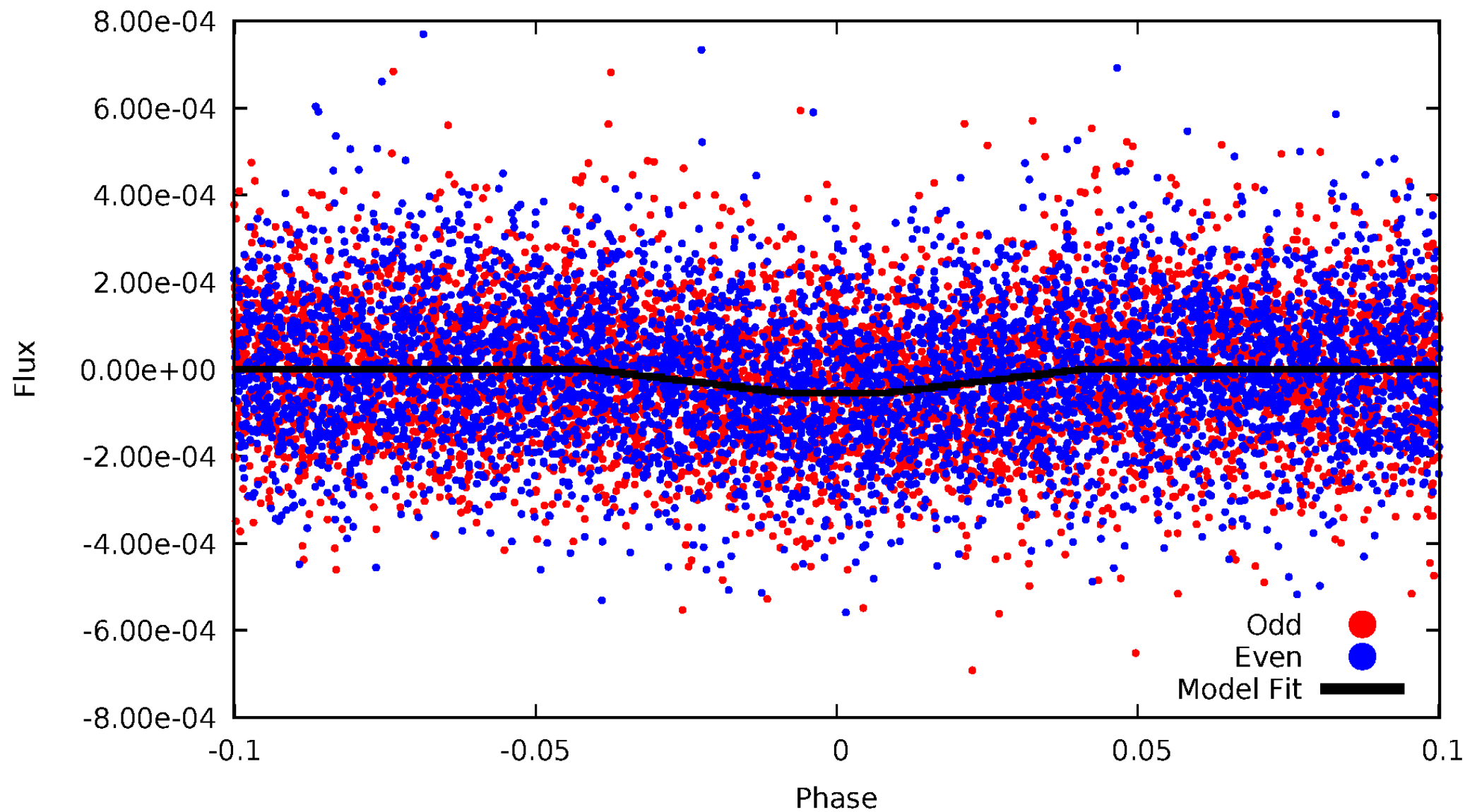
# DV Odd/Even

TCE 010427700-02



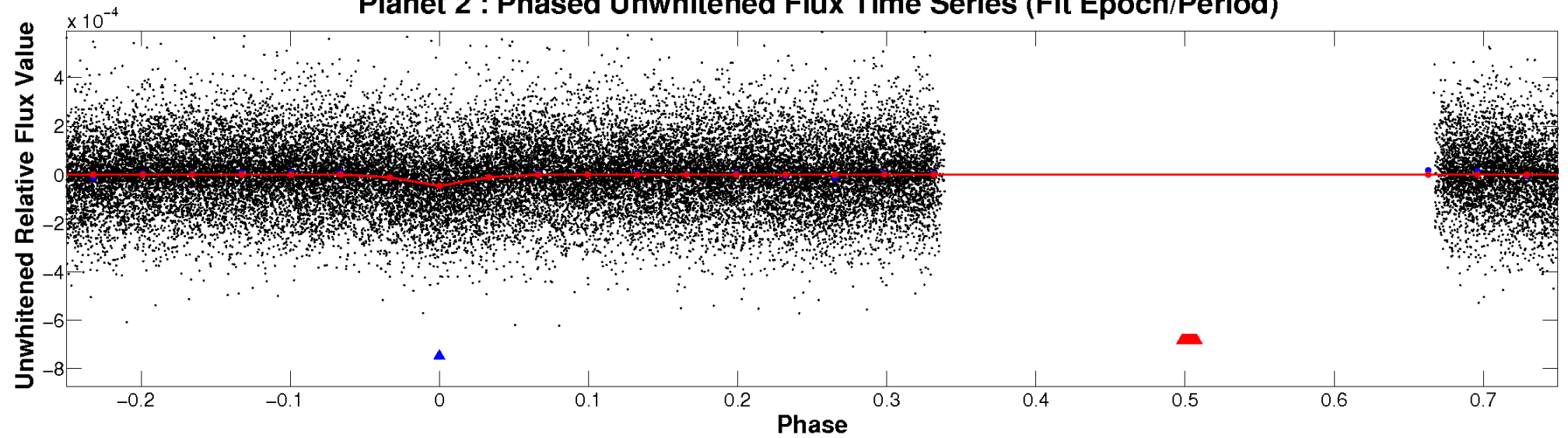
# ALT Odd/Even

TCE 010427700-02

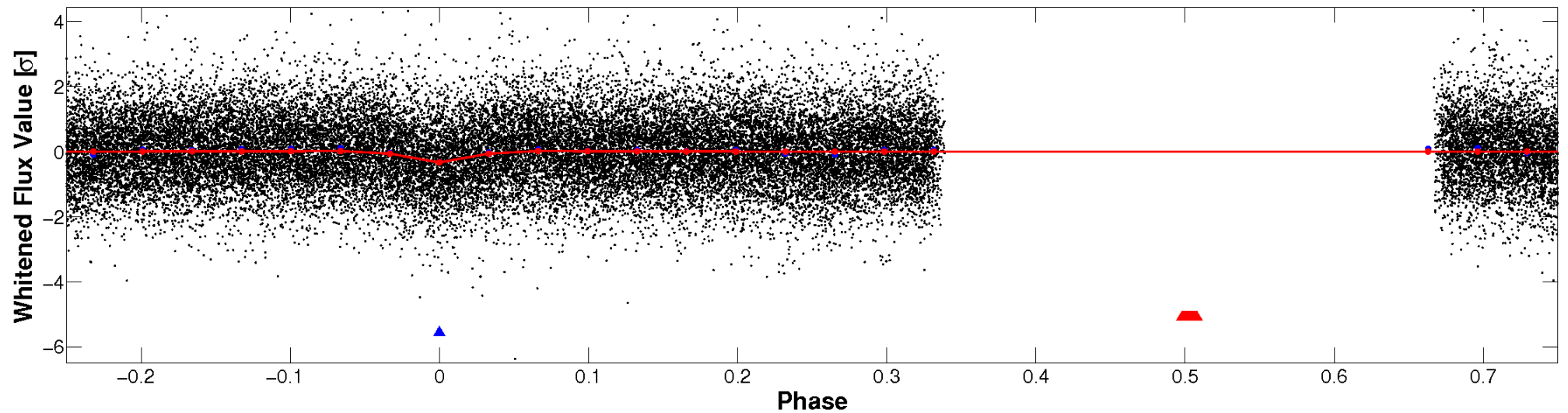


# Non-Whitened Vs. Whitened Light Curve

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

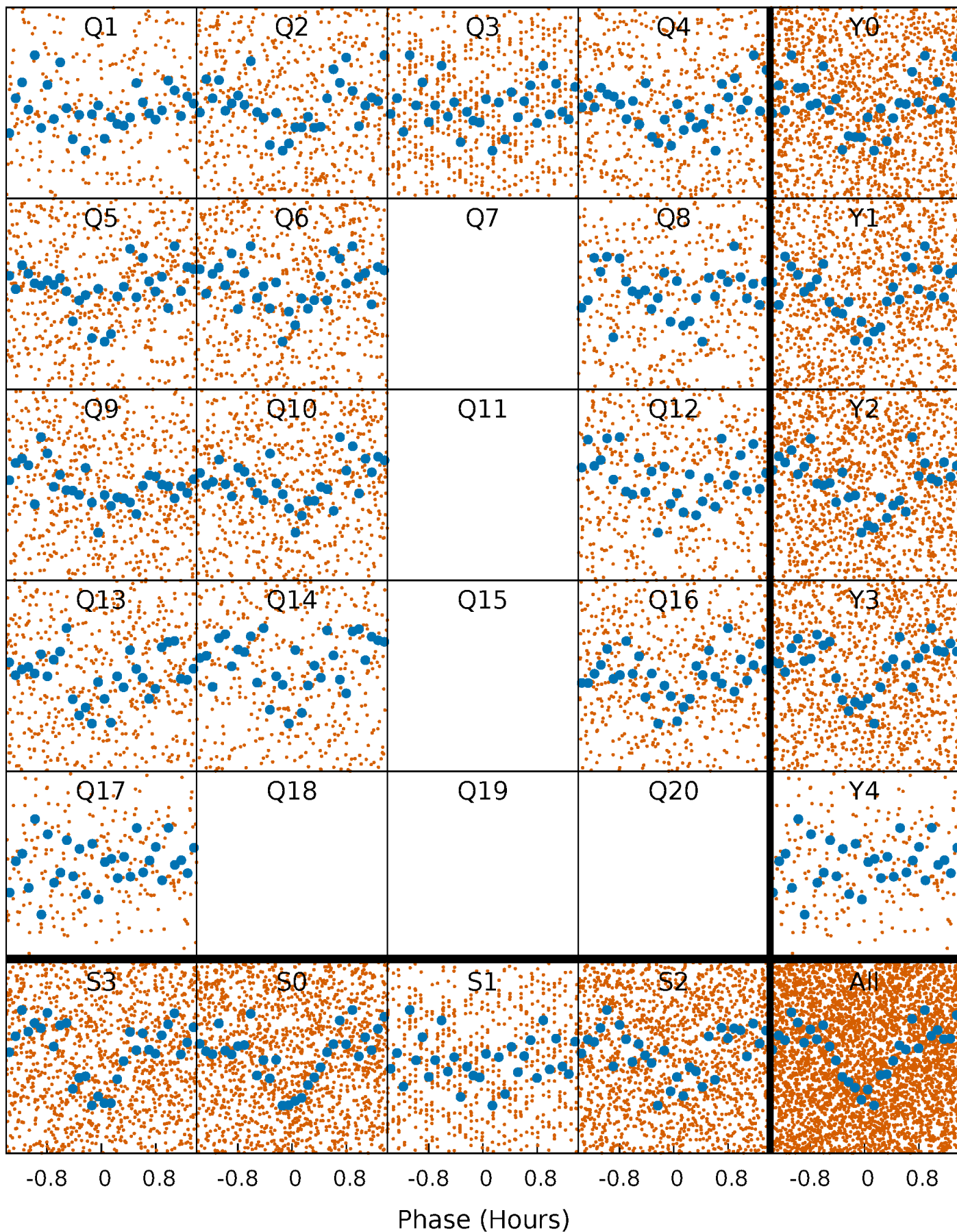


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

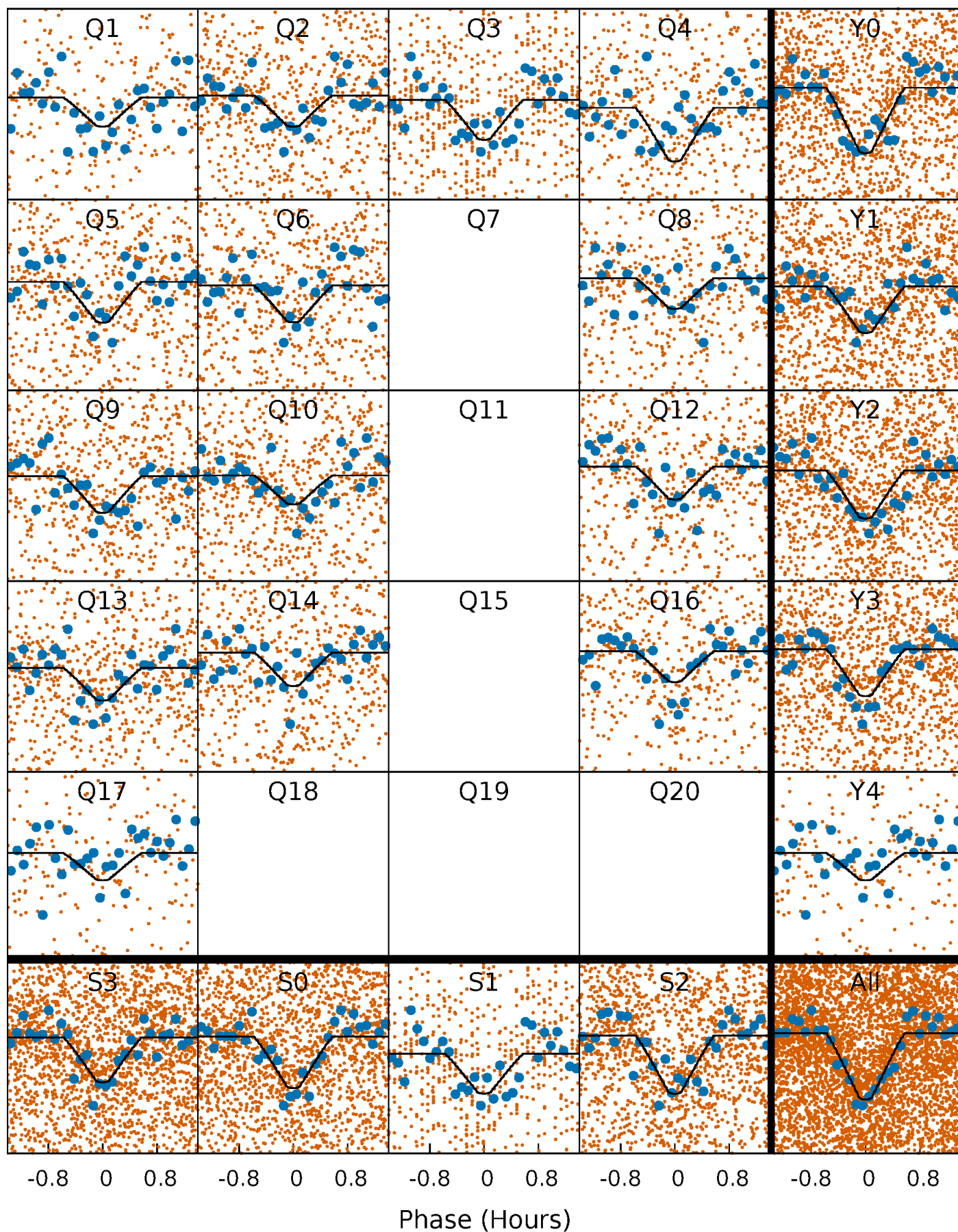
TCE 010427700-02   P= 0.616387 Days    $T_0=131.949403$  (BKJD)





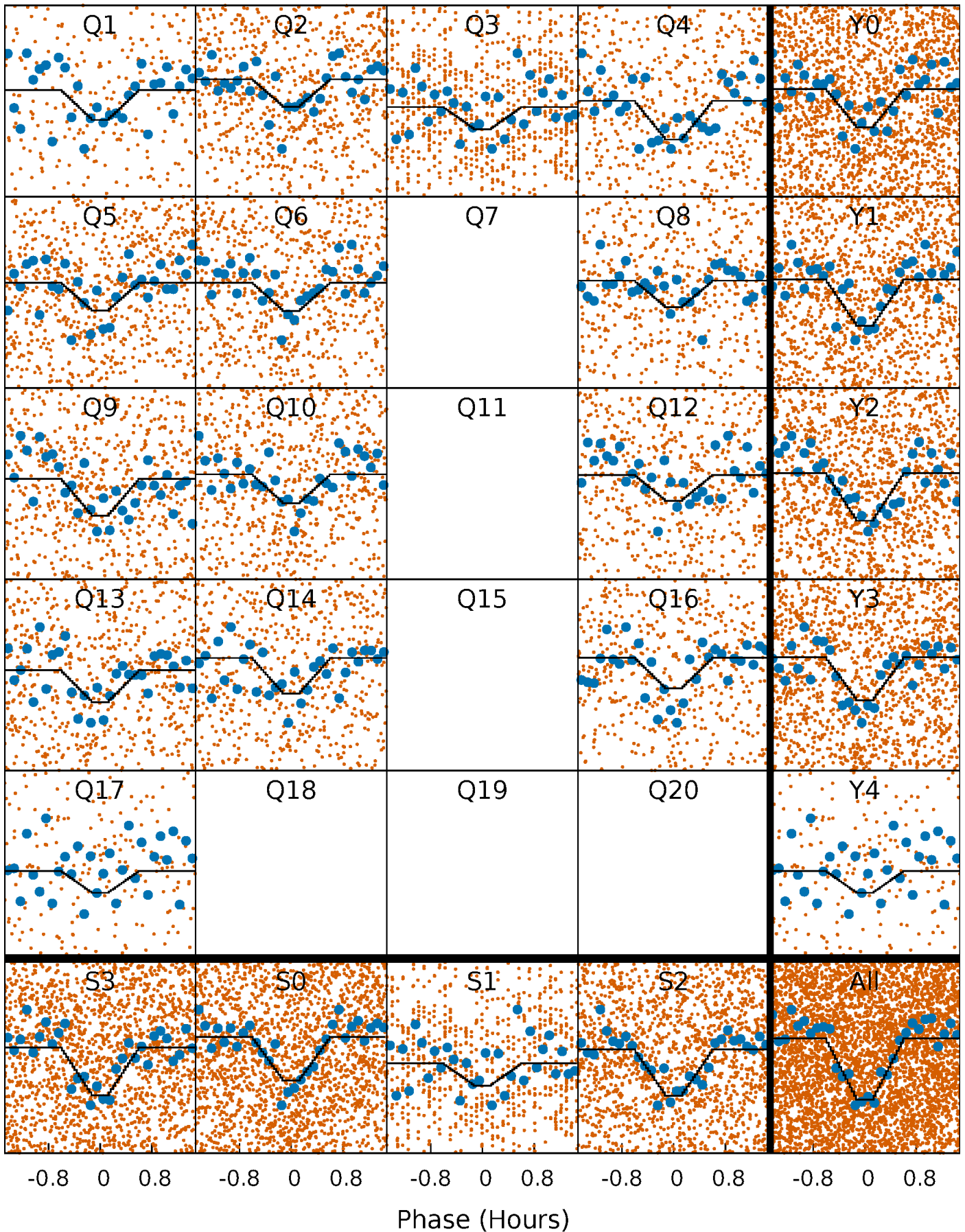
# DV Quarter-Phased Transit Curves

TCE 010427700-02     $P = 0.616387$  Days     $T_0 = 131.949403$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 010427700-02 P= 0.616388 Days  $T_0=131.949090$  (BKJD)

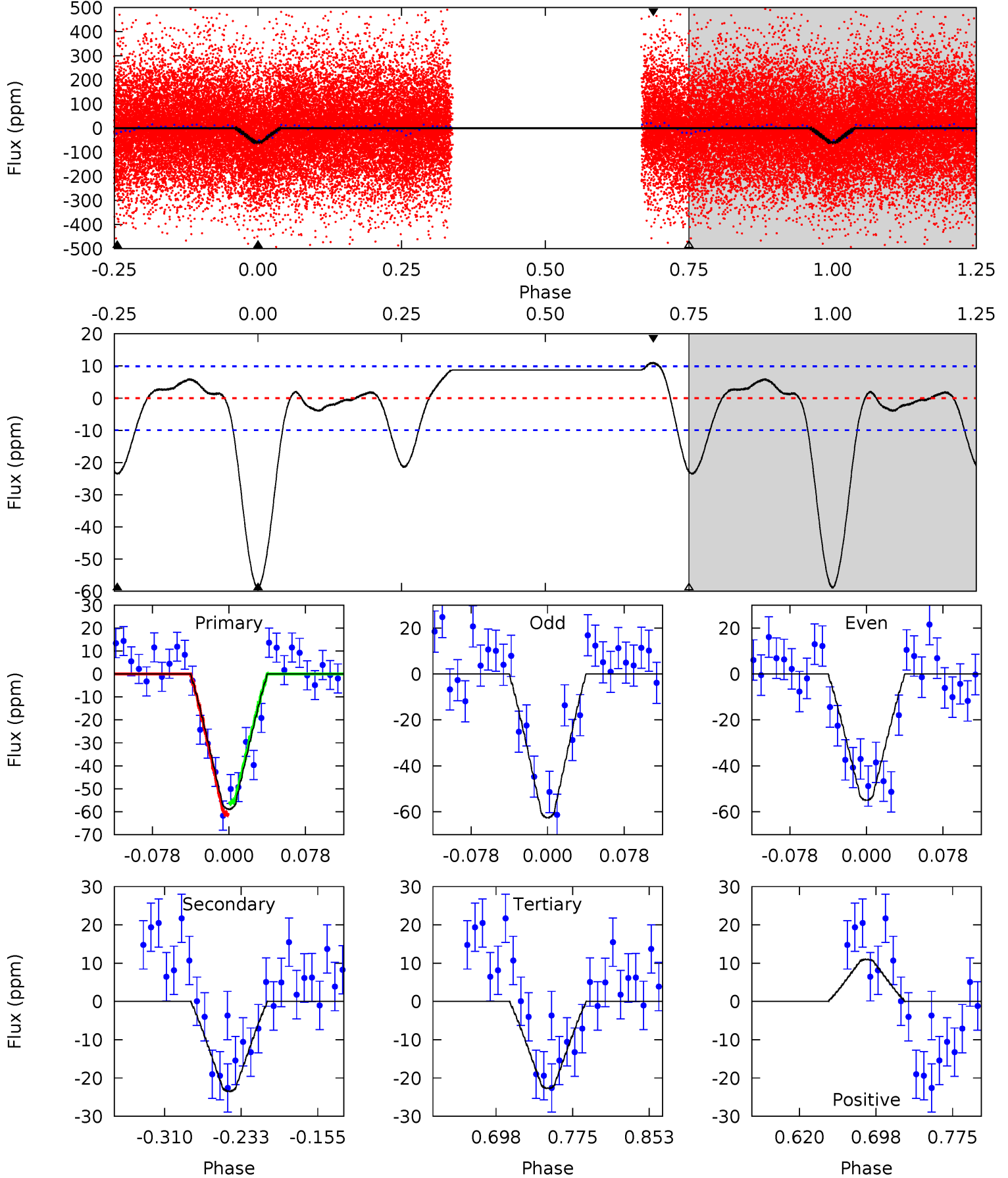




# DV Model-Shift Uniqueness Test

010427700-02, P = 0.616387 Days, E = 131.333016 Days

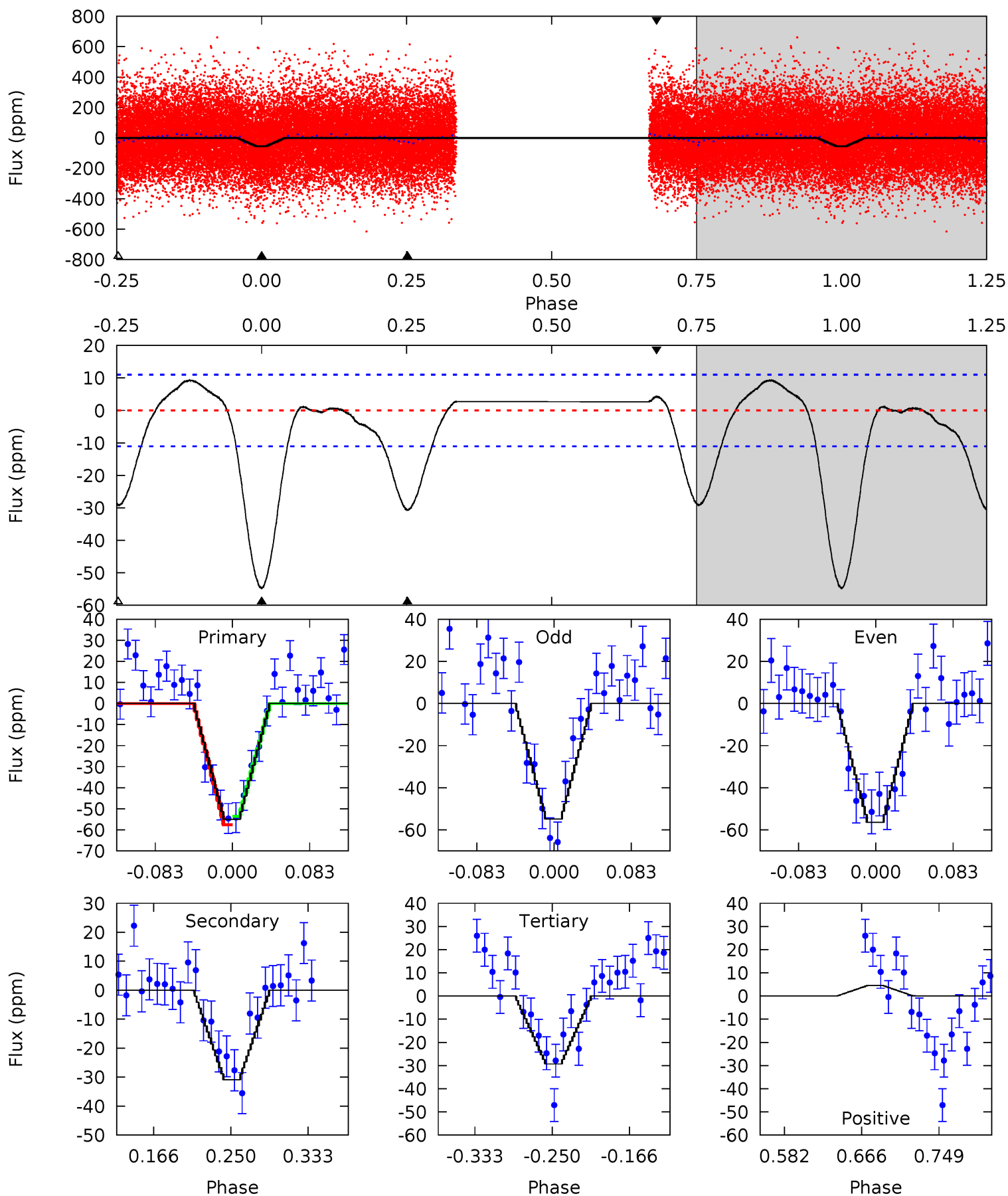
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
27.4	10.9	10.5	5.10	4.62	1.77	3.82	16.8	22.3	0.36	5.81	1.78	1.00	0.16	1.17



# Alt Model-Shift Uniqueness Test

010427700-02, P = 0.616388 Days, E = 131.332702 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
22.9	12.9	12.2	1.89	4.60	1.73	4.61	10.7	21.0	0.66	11.0	0.34	0.89	0.15	0.83



### Stellar Parameters For KIC 010427700

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5665^{+170}_{-204}$	$3.580^{+0.338}_{-0.135}$	$-0.200^{+0.300}_{-0.350}$	$3.266^{+0.707}_{-1.313}$	$1.478^{+0.184}_{-0.461}$	$0.060^{+0.160}_{-0.021}$
	+3%/-4%	+9%/-4%	+150%/-175%	+22%/-40%	+12%/-31%	+267%/-35%
Source	PHO1	FLK73	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 010427700-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-23 \pm 2$	$2.66^{+0.87}_{-0.83}$	$4870^{+358}_{-551}$	$3751^{+887}_{-6717}$	$0.462^{+0.465}_{-0.194}$
Alt.	$-31 \pm 2$	$2.47^{+0.82}_{-0.83}$	$4865^{+370}_{-445}$	$4444^{+1006}_{-853}$	$0.717^{+0.840}_{-0.308}$

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

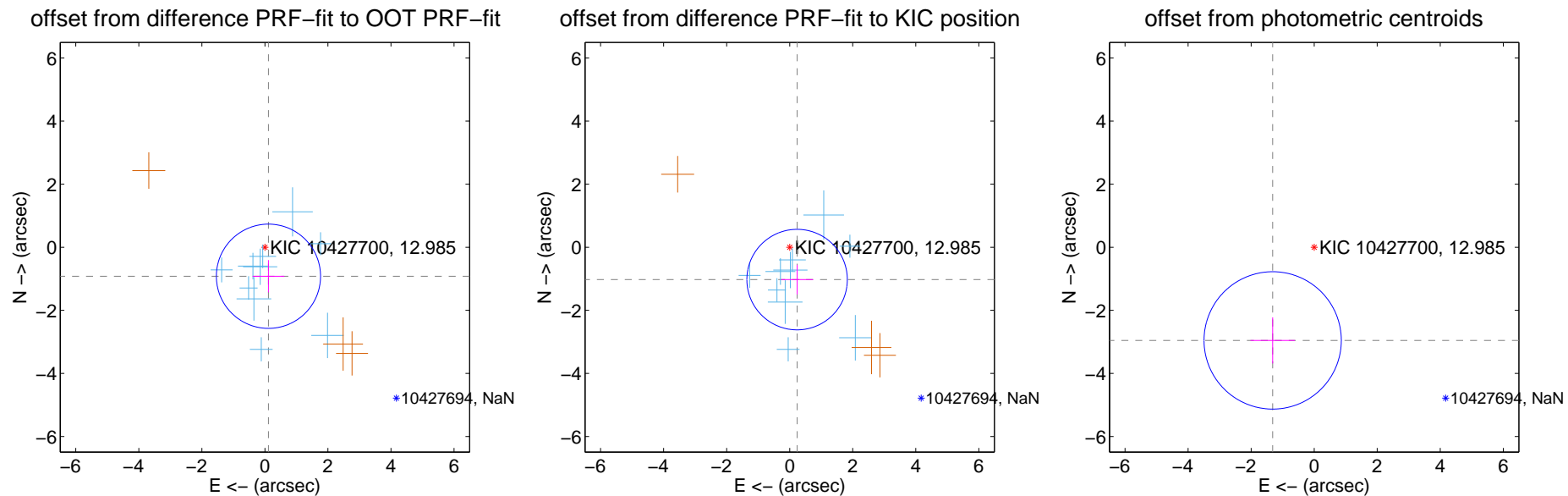
## DV Centroid Data

Supplemental centroid analysis for 010427700-02. Kepler magnitude: 12.98. Transit SNR 14.84

There are 10 quarters with good PRF difference image offsets

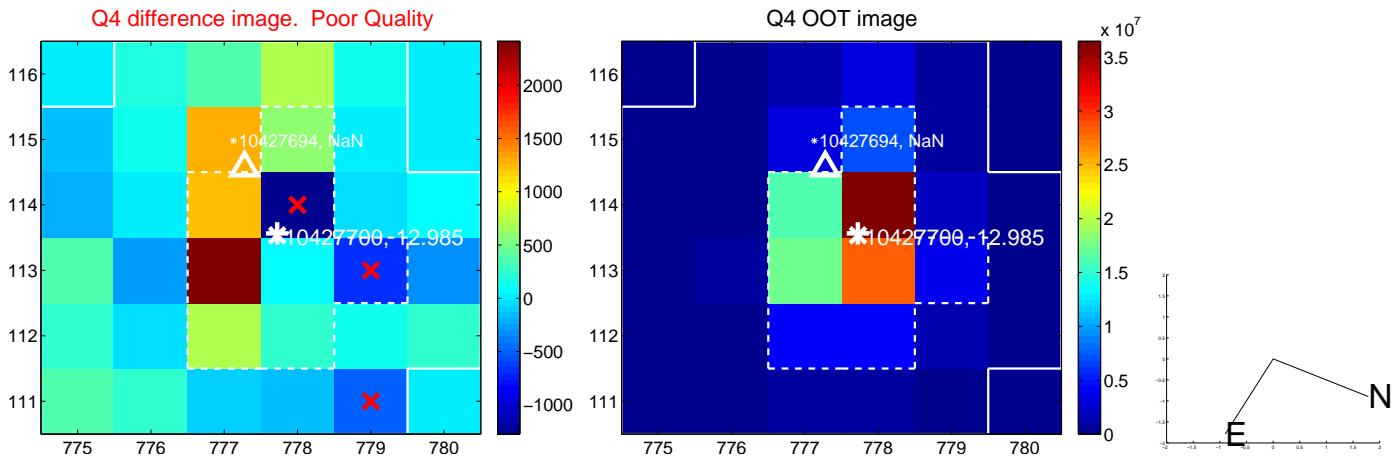
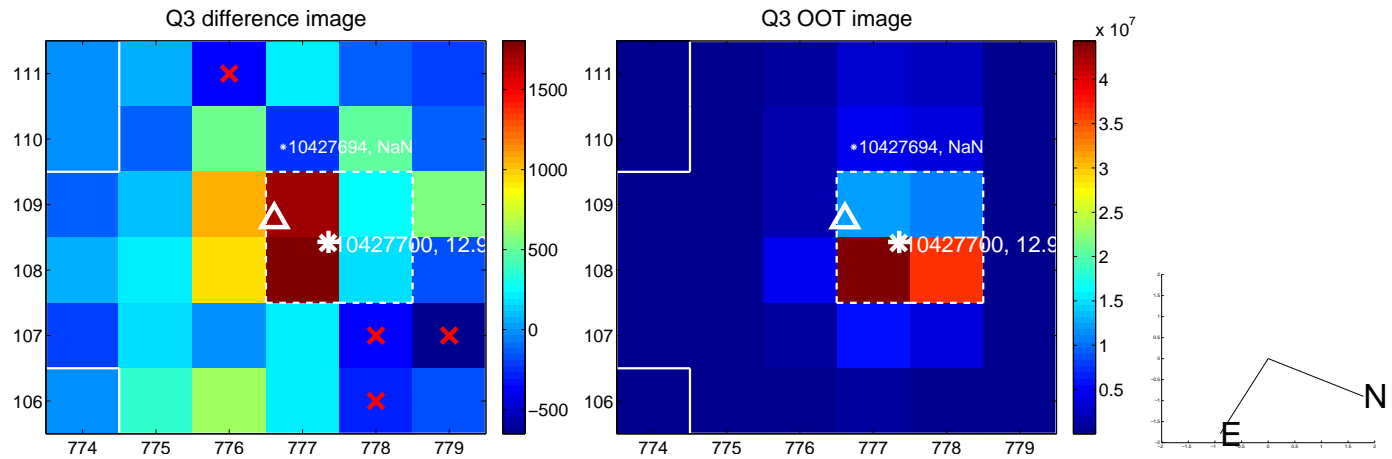
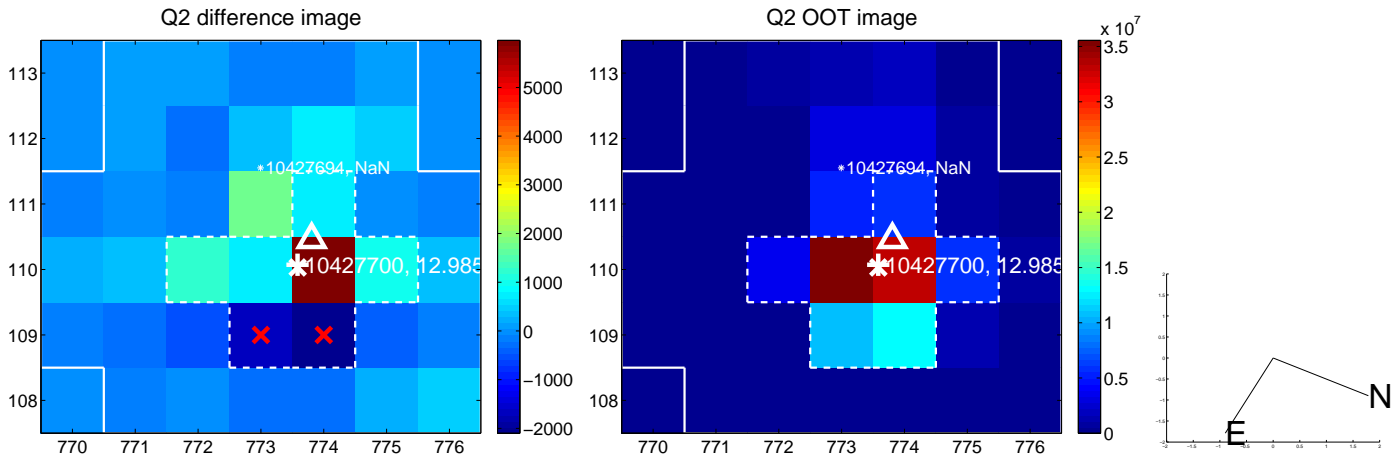
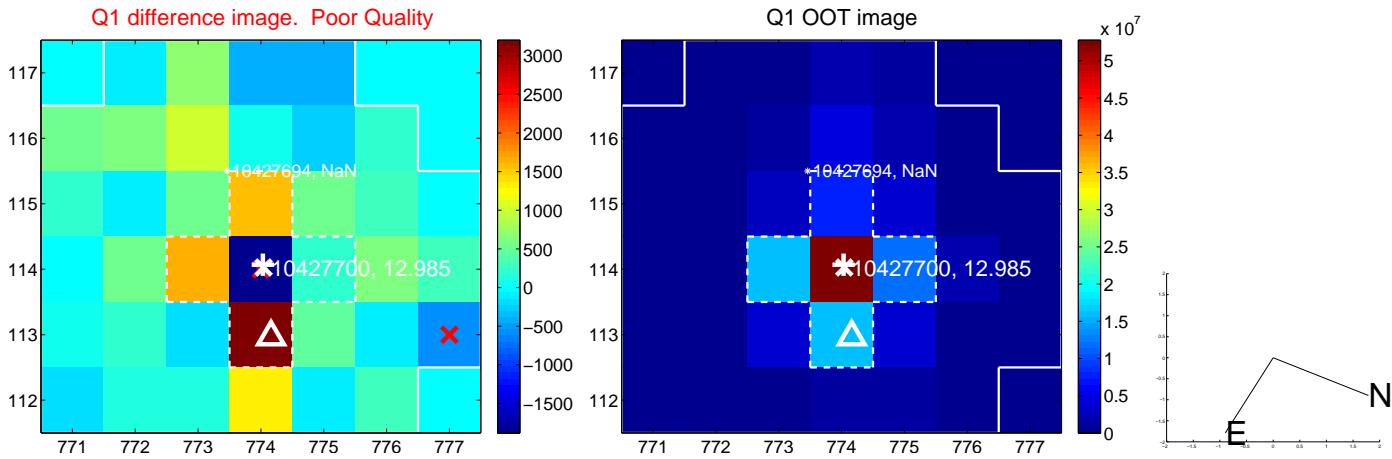
The direct PRF centroid is offset from the target star catalog position by about 0.13 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.927 \pm 0.551$	1.68	$-0.113 \pm 0.505$	$-0.920 \pm 0.511$
PRF-fit source offset from KIC position	$1.053 \pm 0.531$	1.98	$-0.235 \pm 0.508$	$-1.026 \pm 0.468$
photometric centroid source offset	$3.23 \pm 0.73$	4.45	$1.32 \pm 0.70$	$-2.95 \pm 0.73$

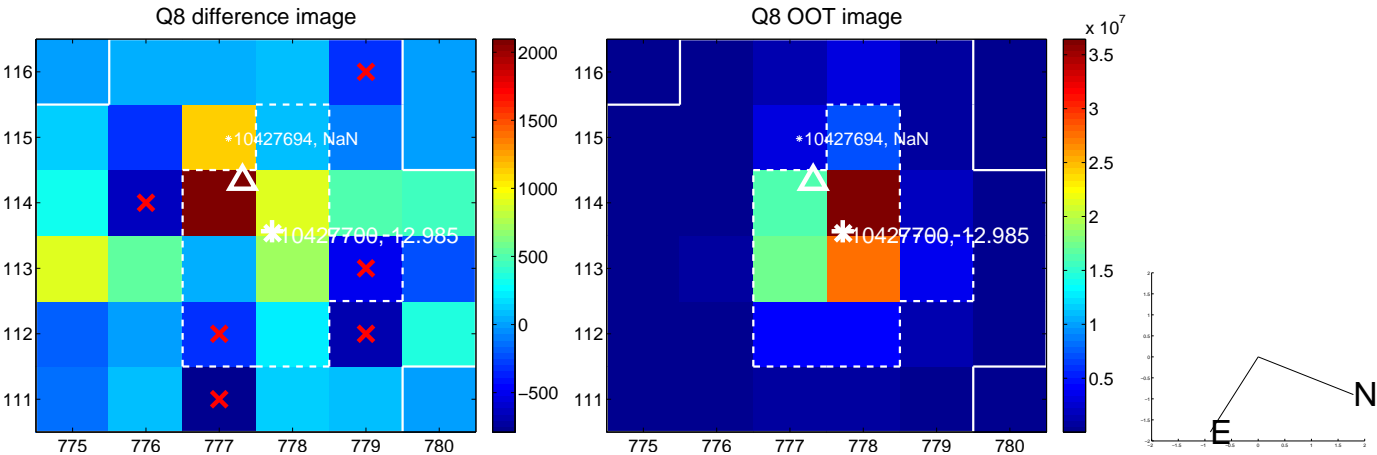
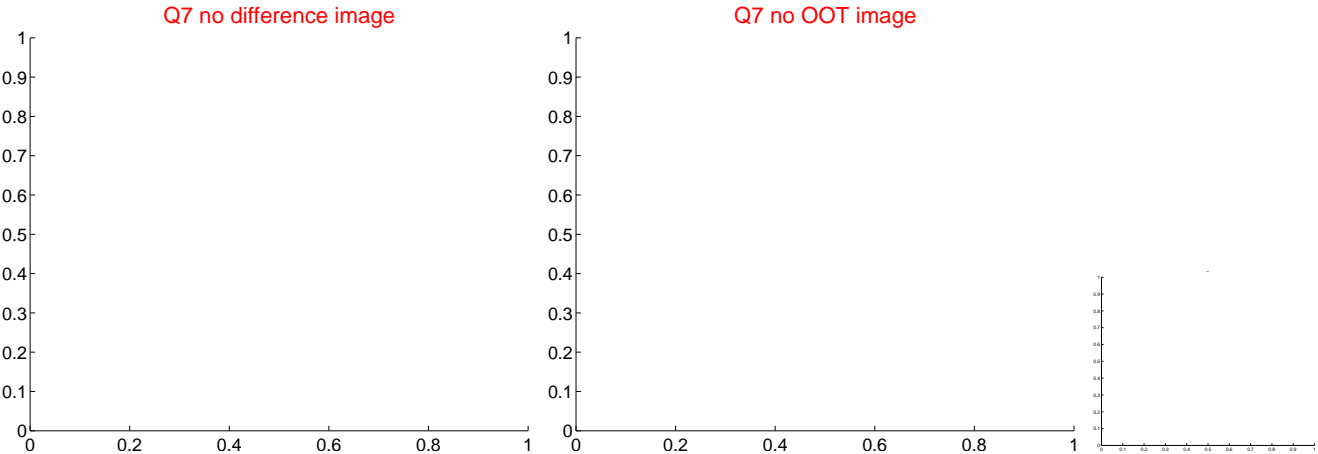
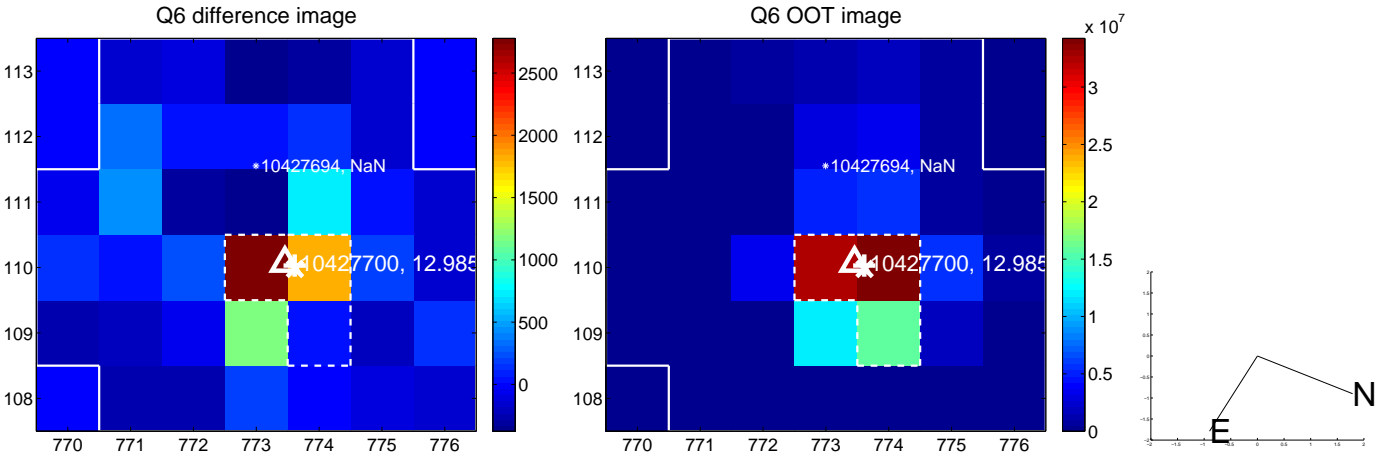
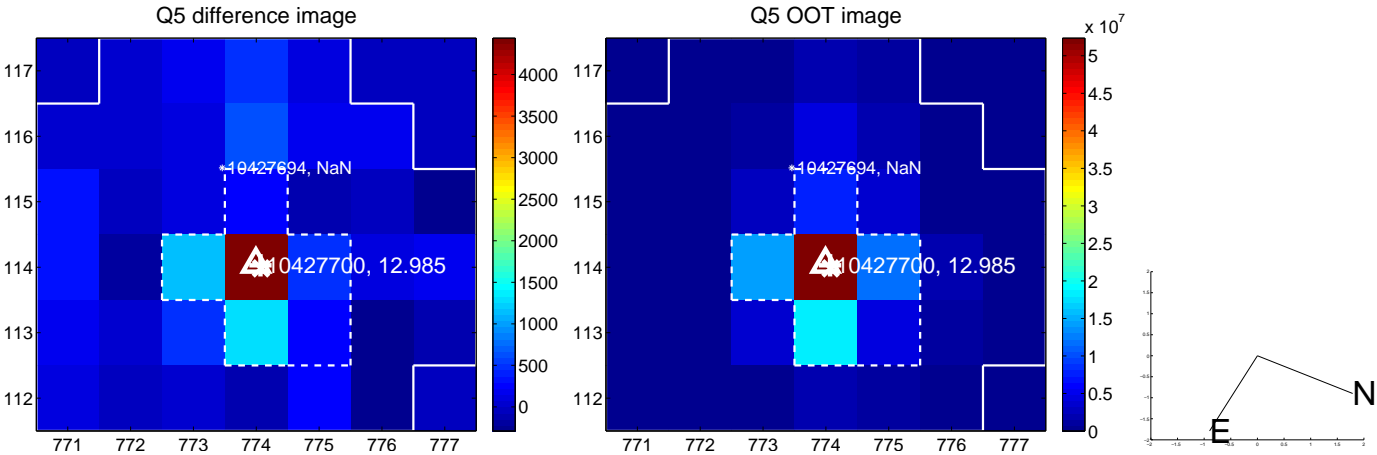


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

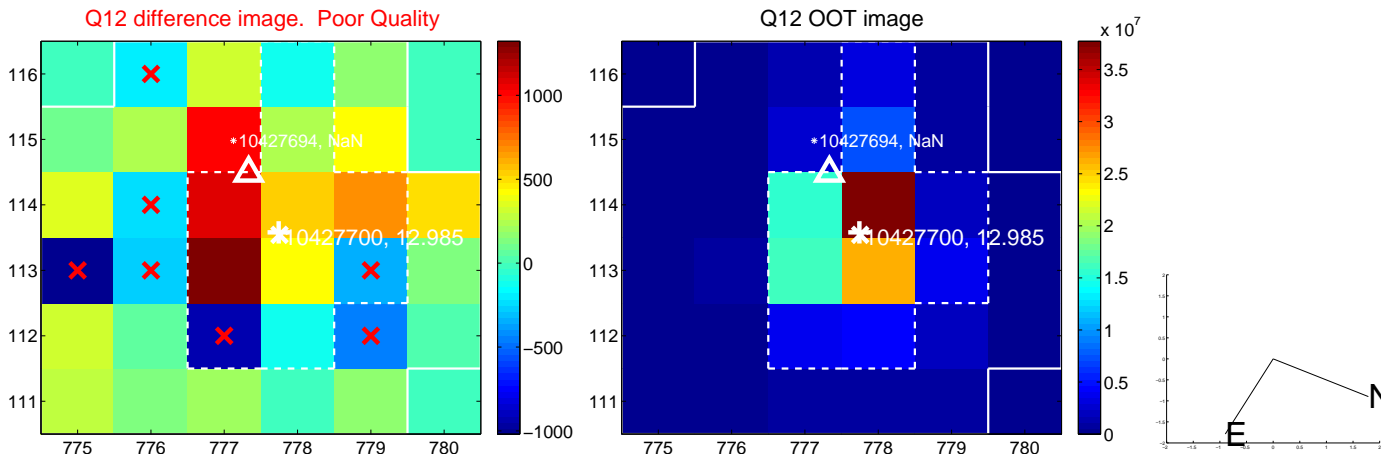
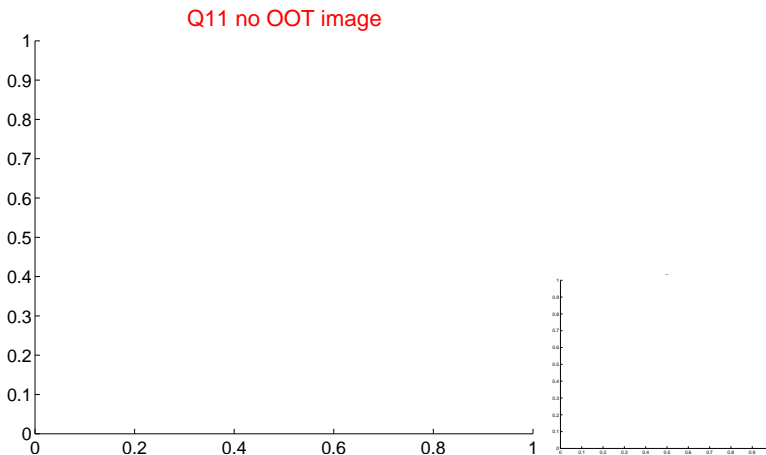
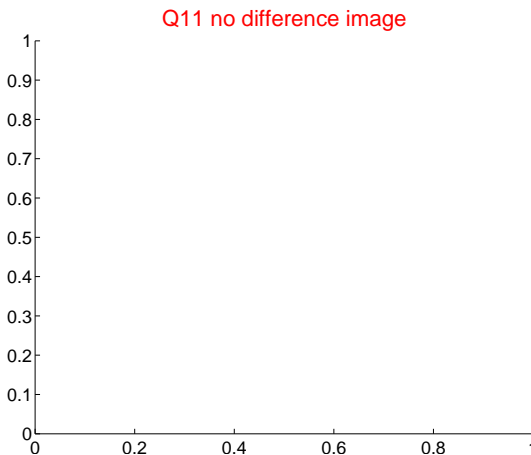
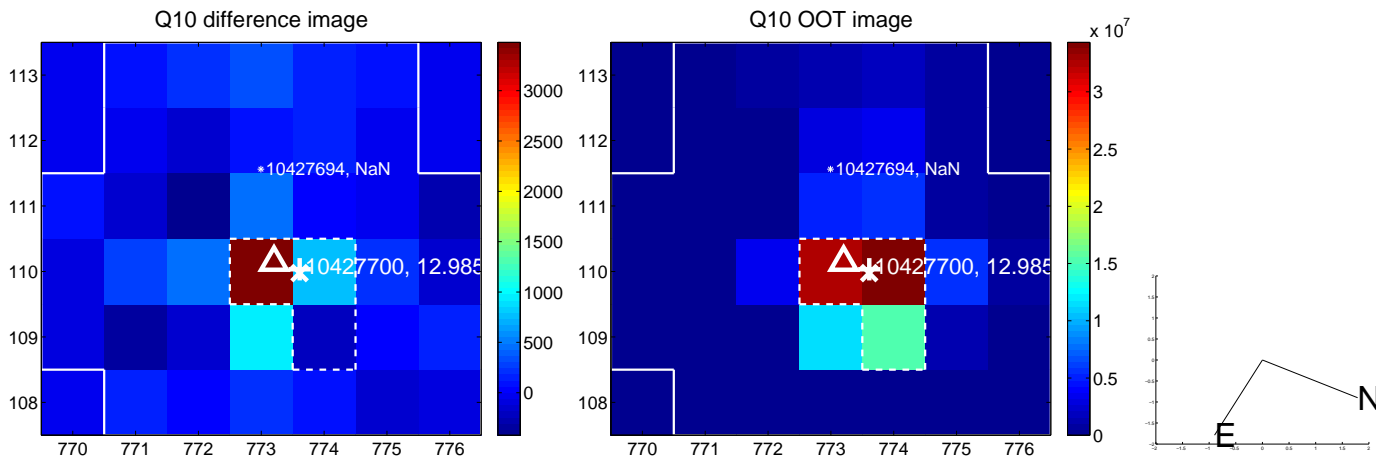
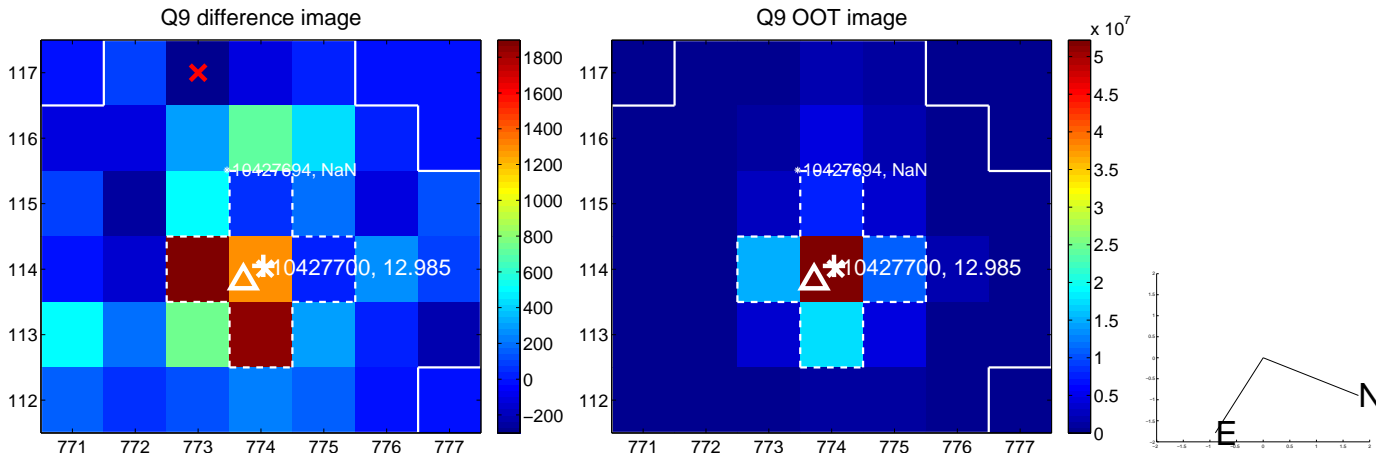


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

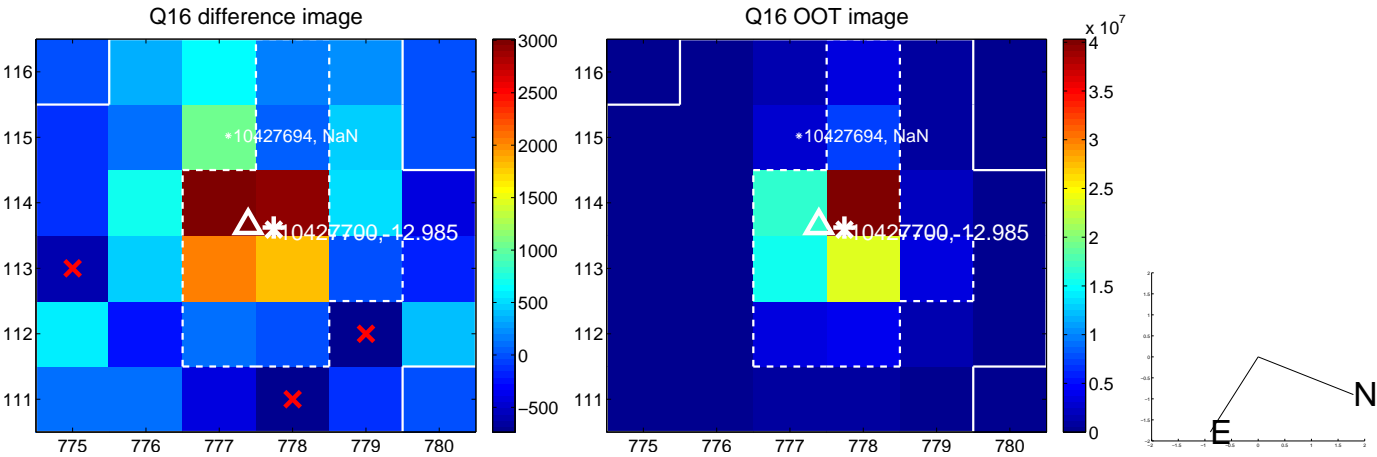
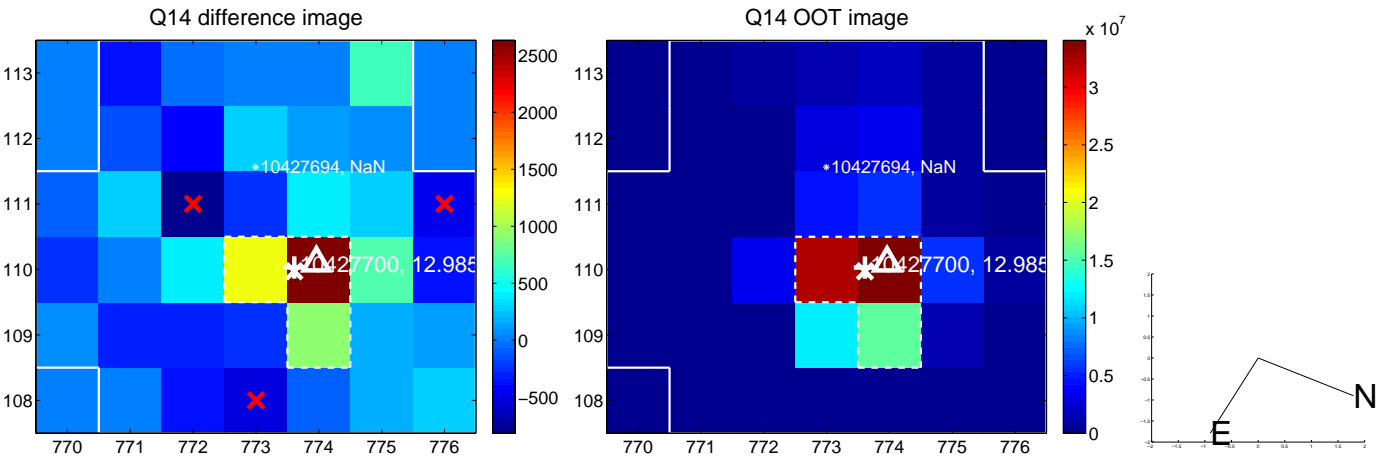
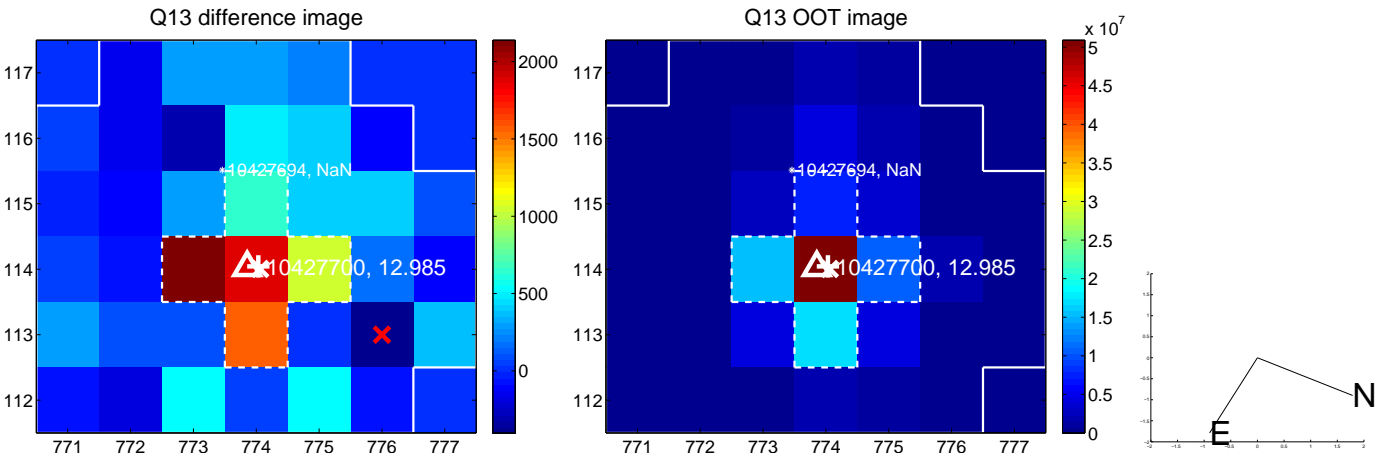




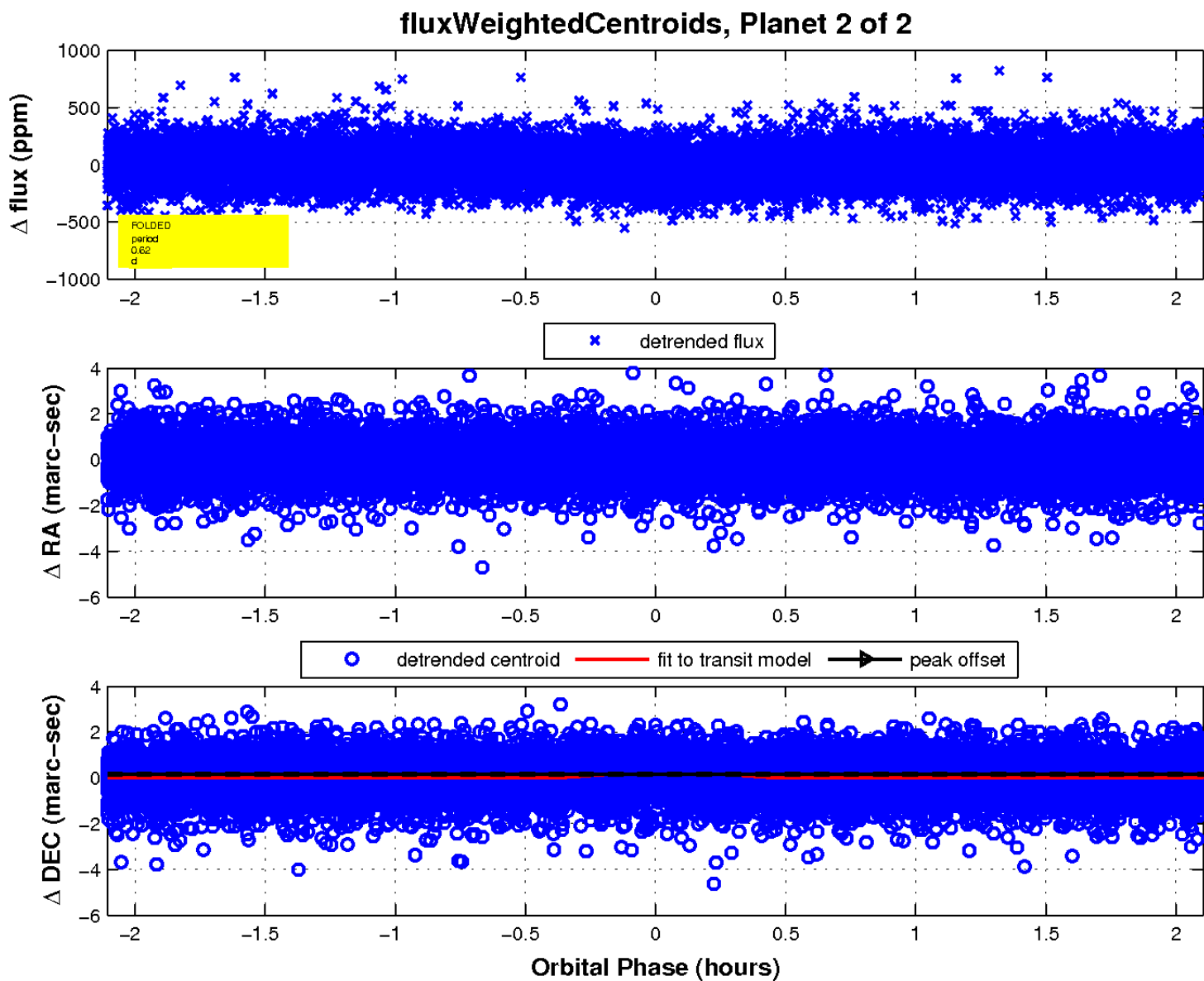
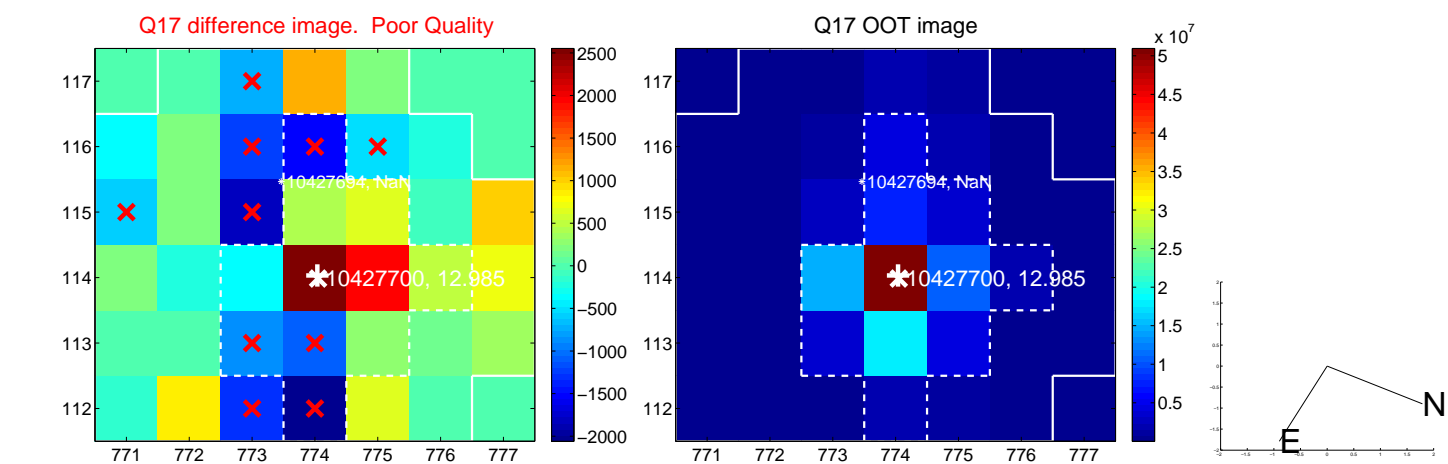
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value



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

