

# KIC 005724811

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005724811-01	OBS	No	0.682610	132.082461	18.0	4.519	10.0	4.6	1.51	6026	0.69	11418.87
005724811-02	OBS	No	112.879182	148.154610	4002.2	4.021	10.5	14.1	1.51	6026	10.54	12.58

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005724811-01	OBS	FP	0.00	1	0	0	1	LPP_DV—LPP_ALT—CENT_KIC_POS—EPHEM_MATCH
005724811-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_KIC_POS—HALO_GHOST

**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.

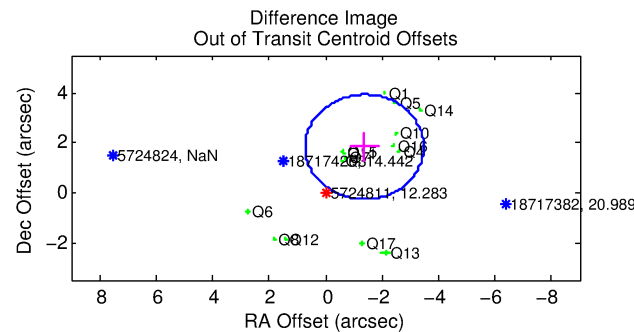
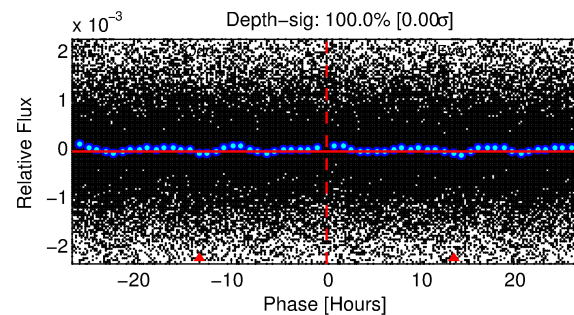
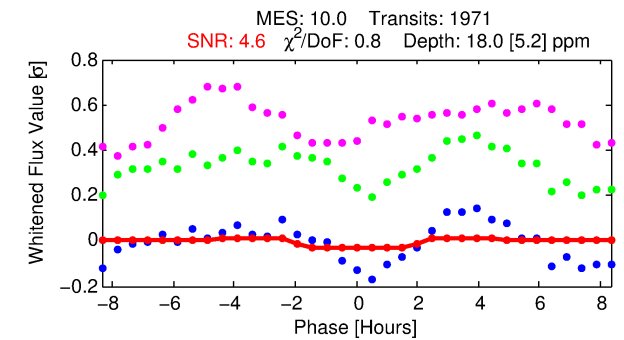
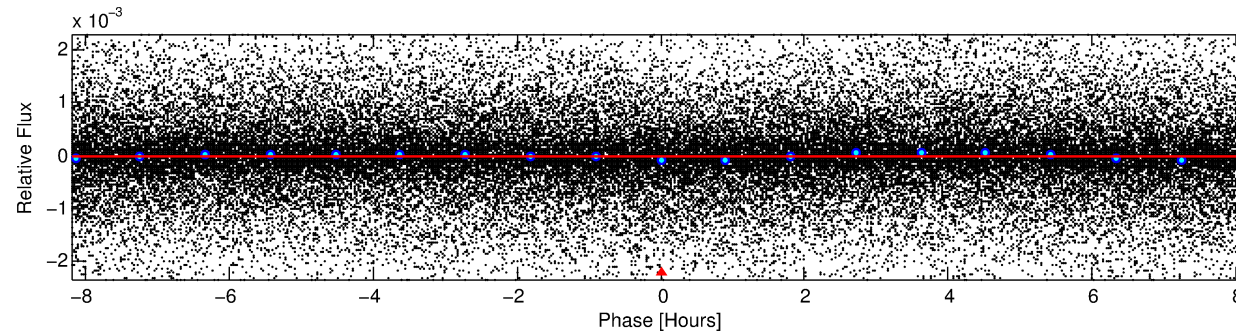
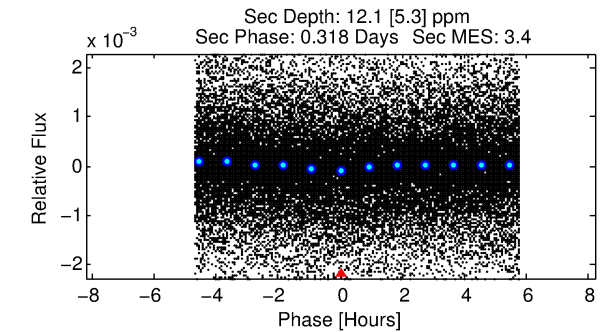
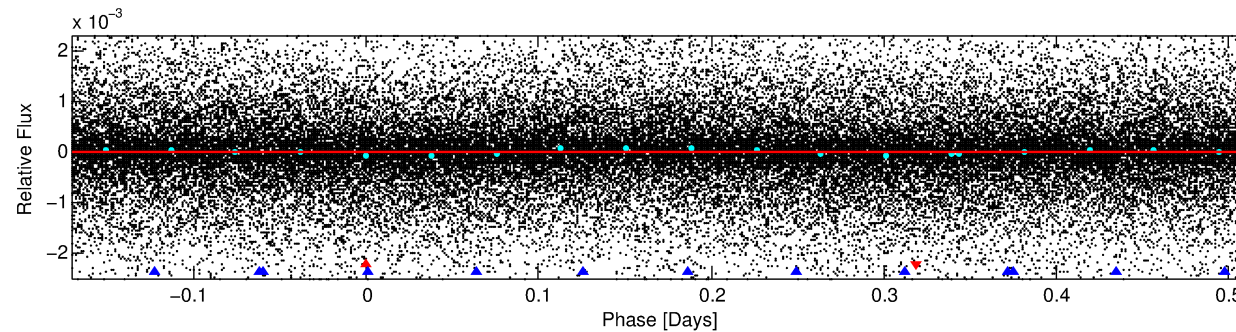
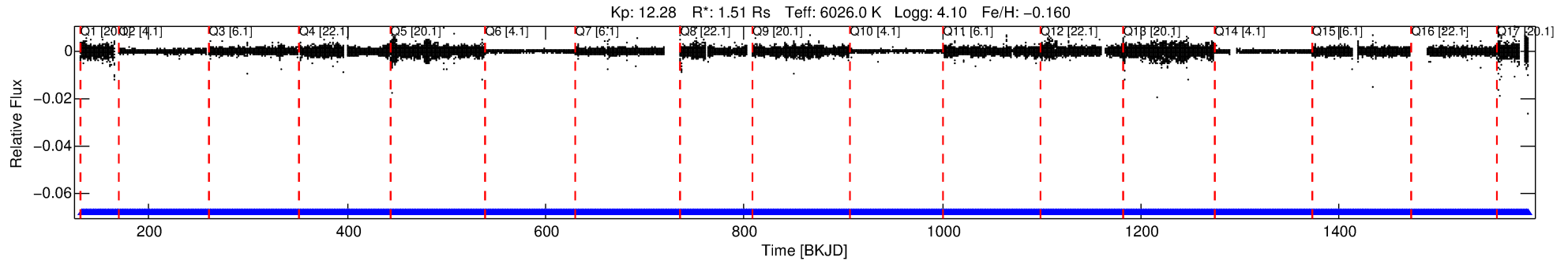
## Ephemeris Match Information For 005724811-01

TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ( $''$ )	$\Delta$ Row	$\Delta$ Col	$m_2$	$m_1$	$D_2/D_1$	Mechanism	Flag	$\sigma_P$	$\sigma_T$
005724811-01	5724811	005724810-01	5724810	1:1	5.2	-1	1	10.90	12.28	3.83	Direct-PRF	0	4.52	2.92

**Notes:**  $P_1:P_2$  is the period ratio. Dist is the distance in arcseconds.  $\Delta$ Row and  $\Delta$ Col are the number of pixels apart in row and column.  $m_2$  and  $m_1$  are the magnitudes of the parent and child.  $D_2/D_1$  is the parent's transit depth divided by the child's.  $\sigma_P$  and  $\sigma_T$  are the significance of the match in period and epoch. For a match to be considered significant  $\sigma_P < 5.0$  and  $\sigma_T < 5.0$ . Matches which have  $\sigma_P$  and  $\sigma_T$  very close to this cutoff should receive extra scrutiny, especially if the period ratio is very large.

# DV One-Page Summary

KIC: 5724811 Candidate: 1 of 2 Period: 0.683 d



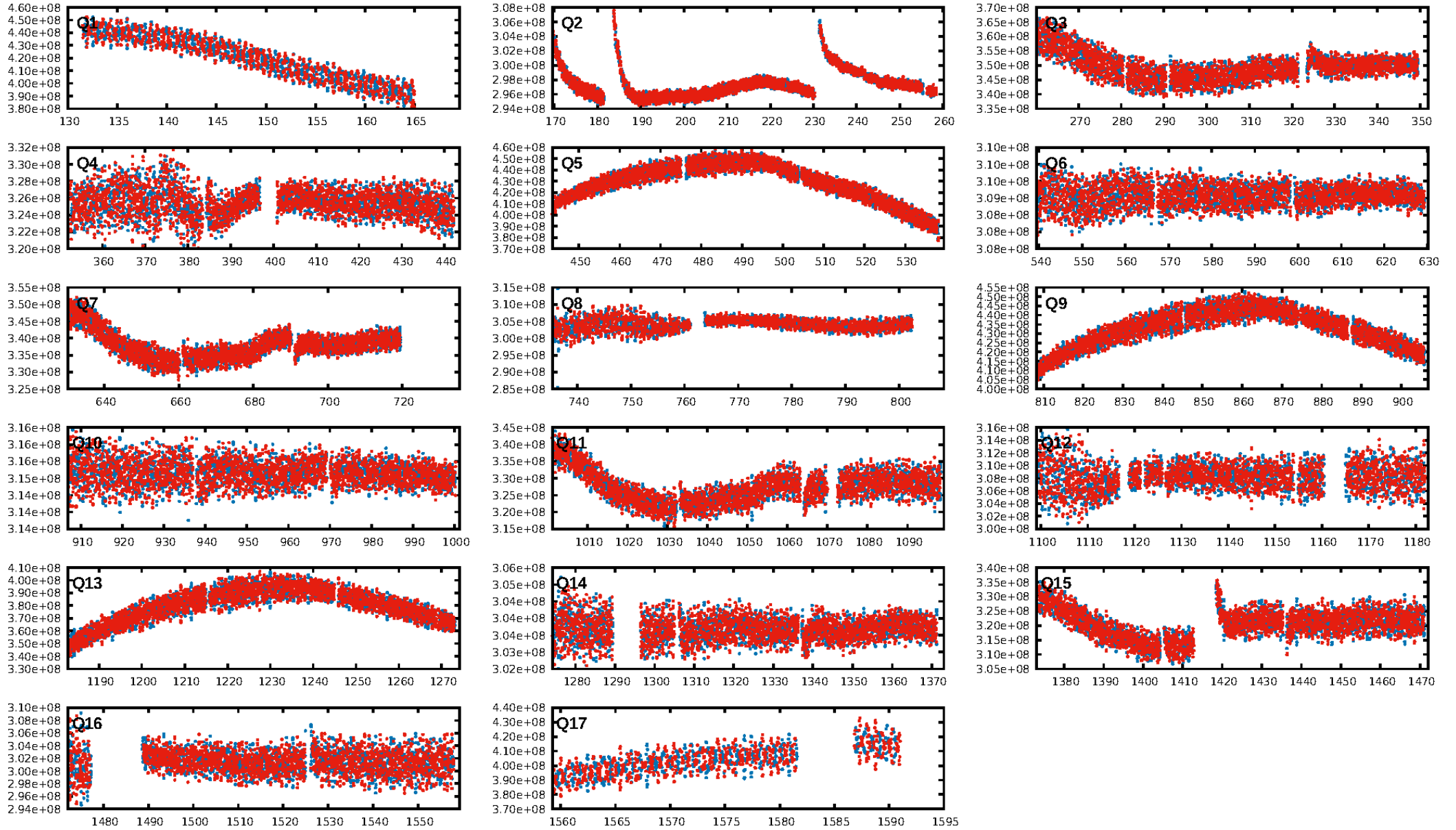
## DV Fit Results:

Period = 0.68261 [0.00002] d  
Epoch = 132.0825 [0.0085] BKJD  
Rp/R\* = 0.0042 [0.0052]  
a/R\* = 1.18 [1.98]  
b = 0.70 [4.53]  
Seff = 11418.87 [6459.16]  
Teff = 2636 [373] K  
Rp = 0.68 [0.88] Re  
a = 0.0154 [0.0052] AU  
Ag = 3.35 [8.64] [0.27σ]  
Teffp = 5514 [3476] K [0.82σ]

## DV Diagnostic Results:

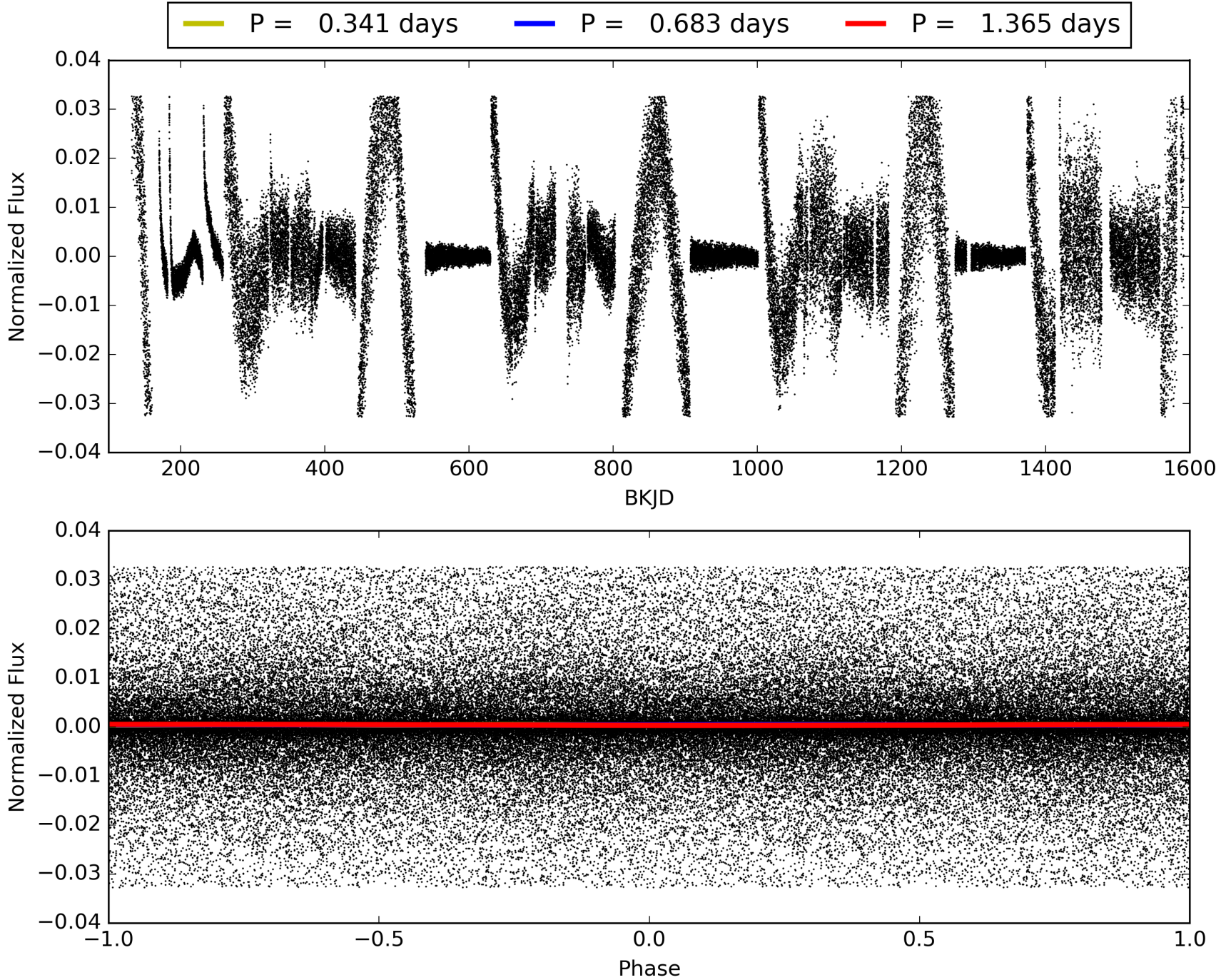
ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [445.16σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 4.72e-15  
RollingBand-fgt: 1.00 [1883/1883]  
GhostDiagnostic-chr: -0.7355  
Centroid-sig: 0.0%  
Centroid-so: 3.914 arcsec [7.12σ]  
OotOffset-rm: 2.287 arcsec [3.27σ]  
KicOffset-rm: 2.735 arcsec [7.51σ]  
OotOffset-st: 3/4/4/4 [15]  
KicOffset-st: 3/4/4/4 [15]  
DiffImageQuality-fgm: 0.53 [8/15]  
DiffImageOverlap-fno: 1.00 [17/17]

# TCE 005724811-01, PDC Light Curves



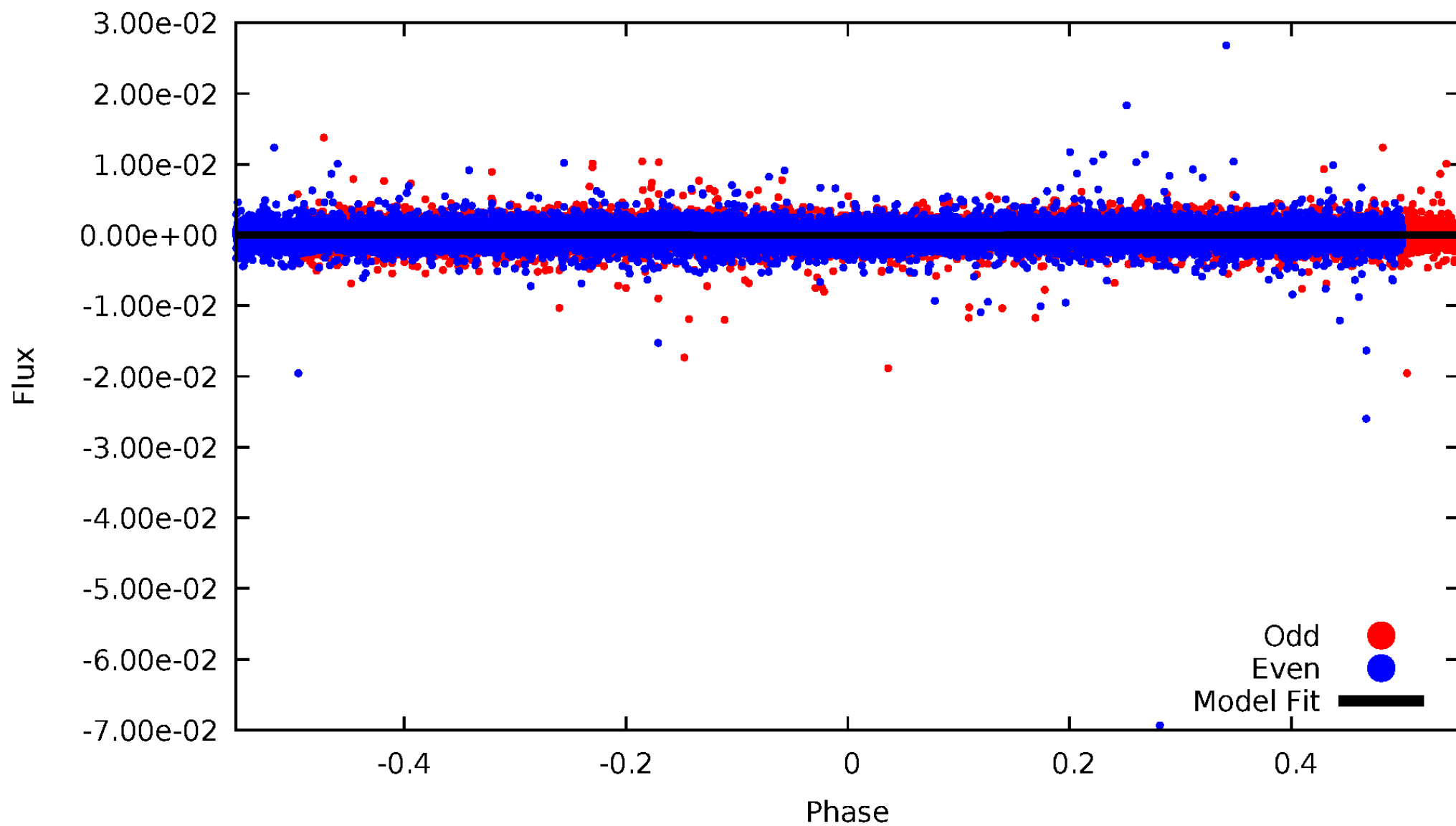


TCE 005724811-01



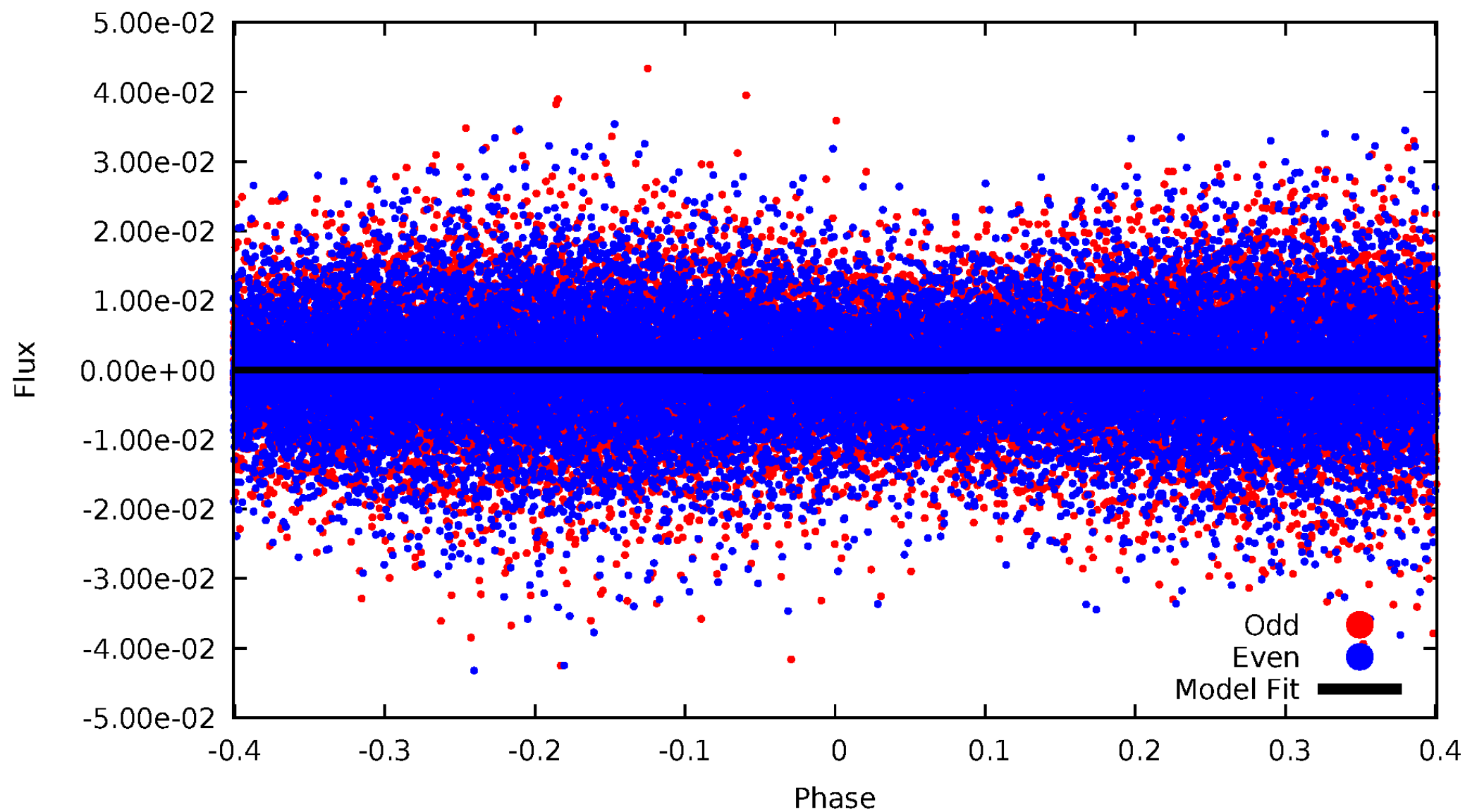
# DV Odd/Even

TCE 005724811-01

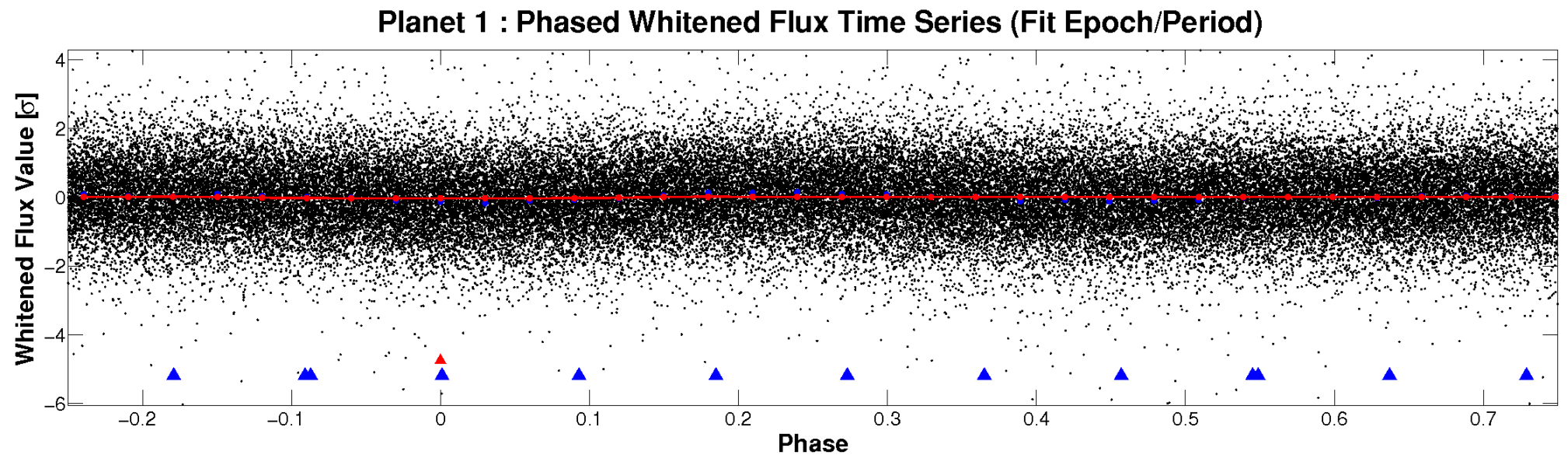
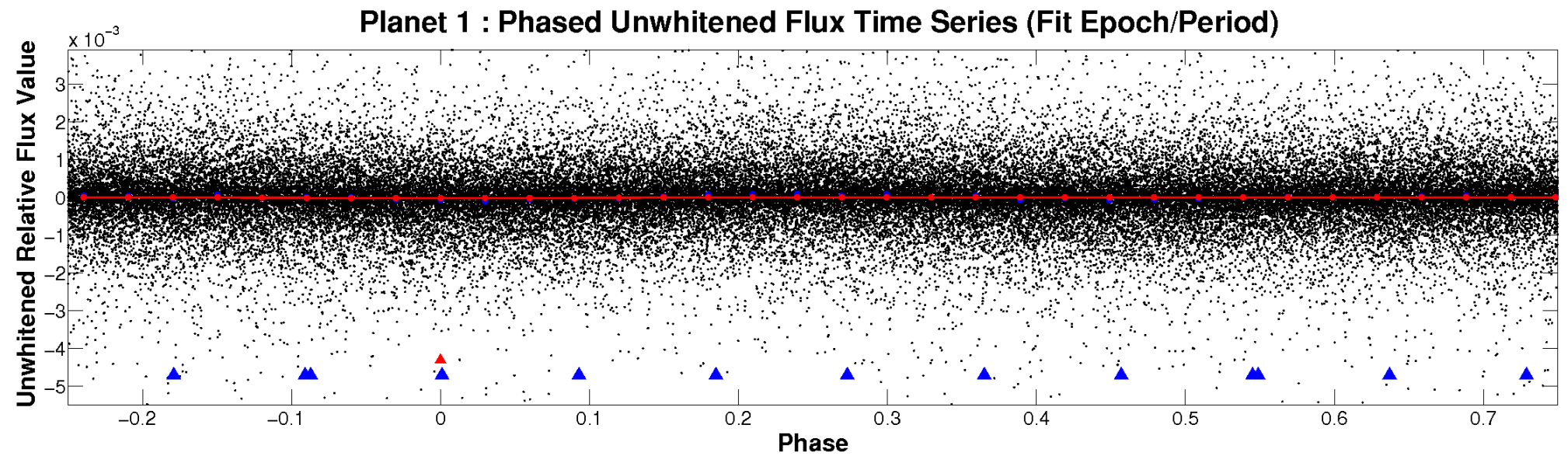


# ALT Odd/Even

TCE 005724811-01



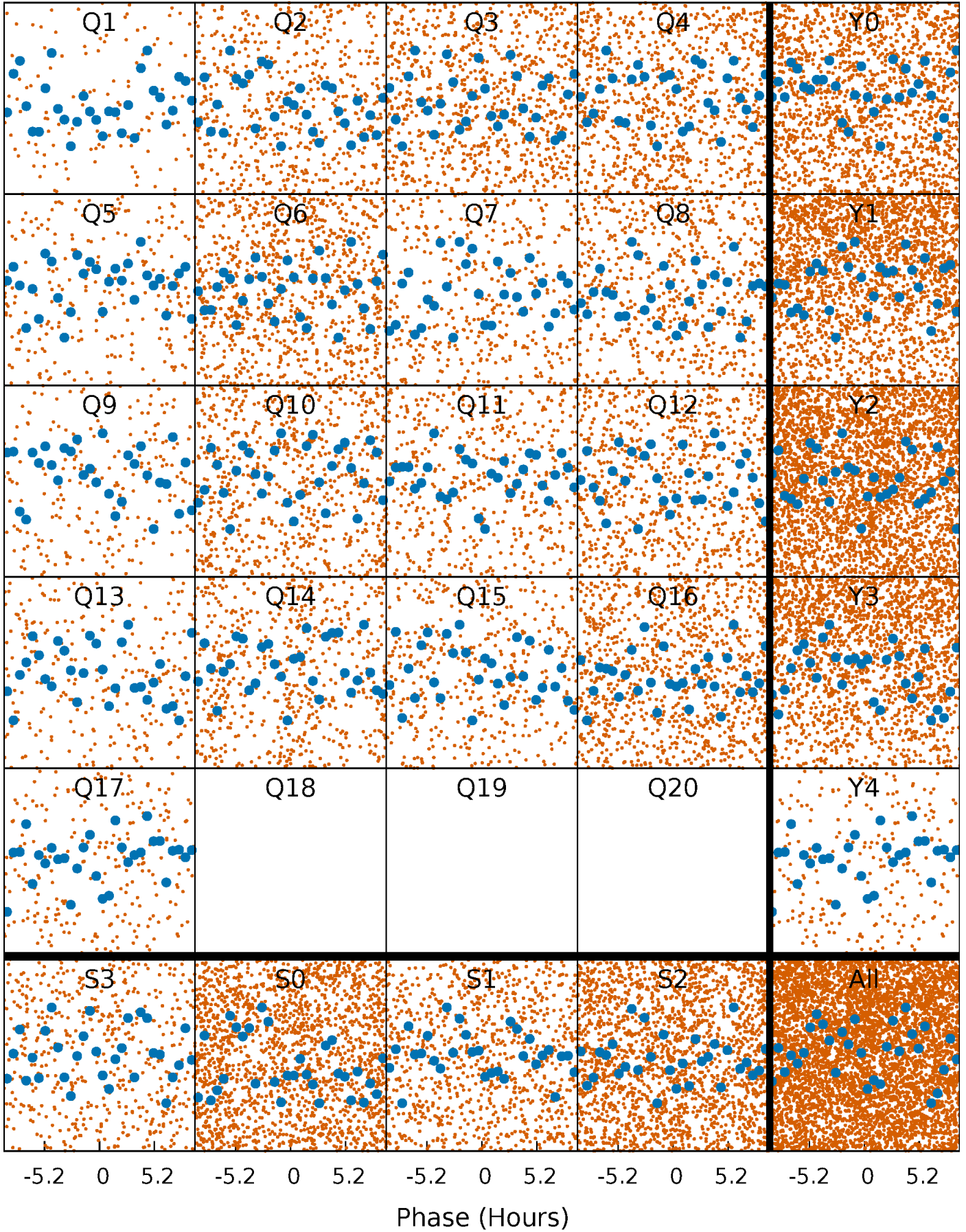
# Non-Whitened Vs. Whitened Light Curve





# PDC Quarter-Phased Transit Curves

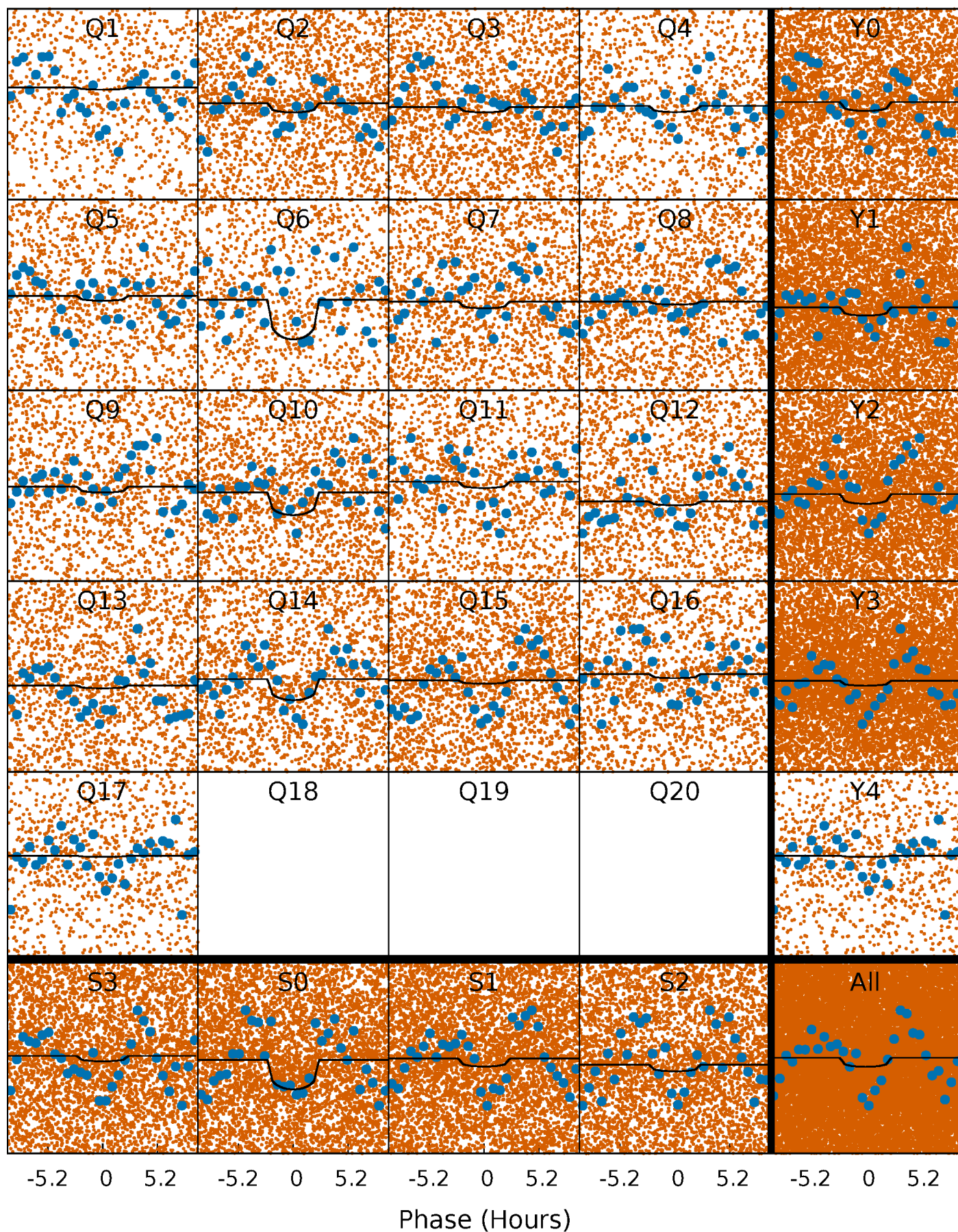
TCE 005724811-01 P= 0.682610 Days  $T_0=132.082461$  (BKJD)





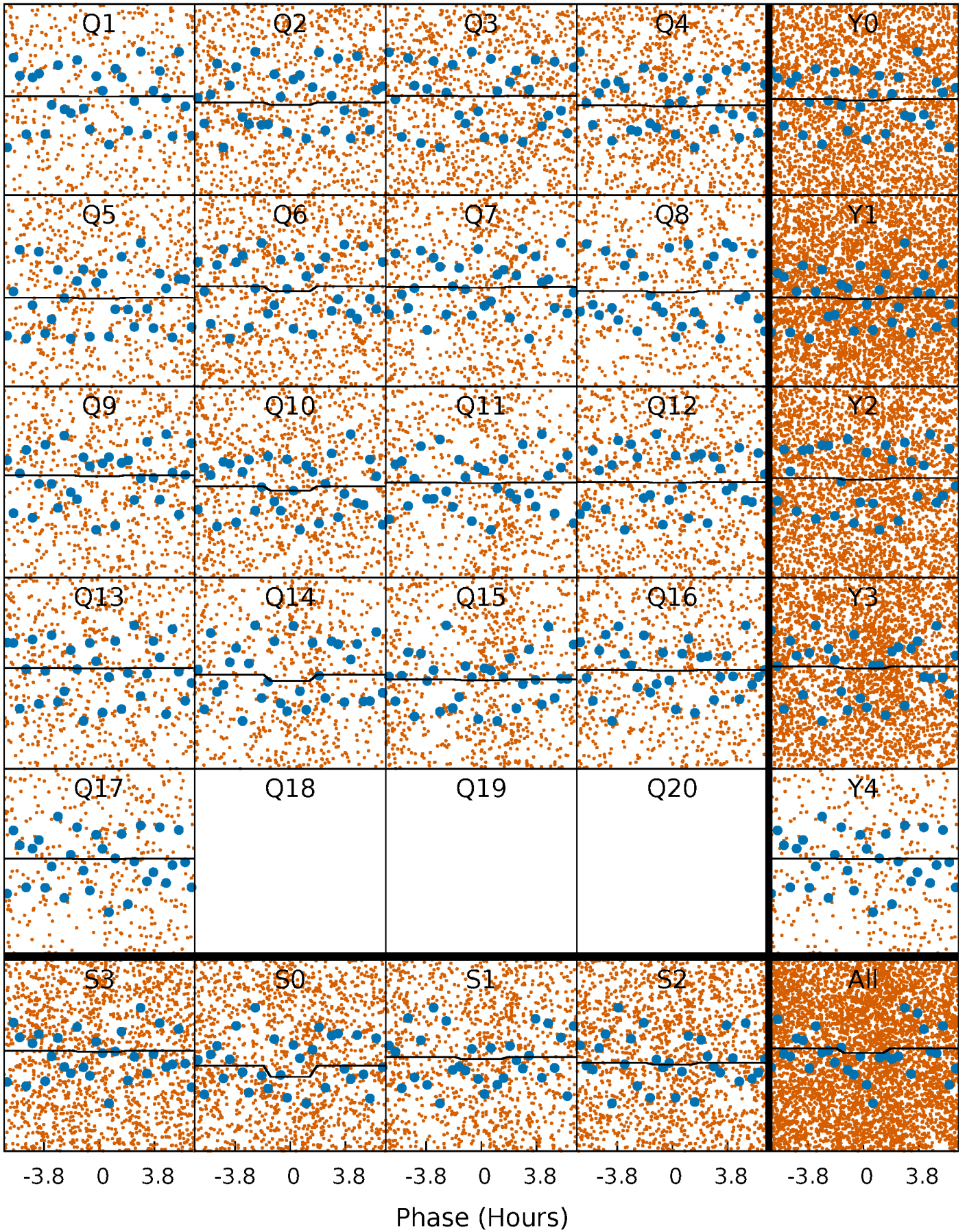
# DV Quarter-Phased Transit Curves

TCE 005724811-01   P= 0.682610 Days    $T_0=132.082461$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 005724811-01 P= 0.682610 Days  $T_0=132.082461$  (BKJD)

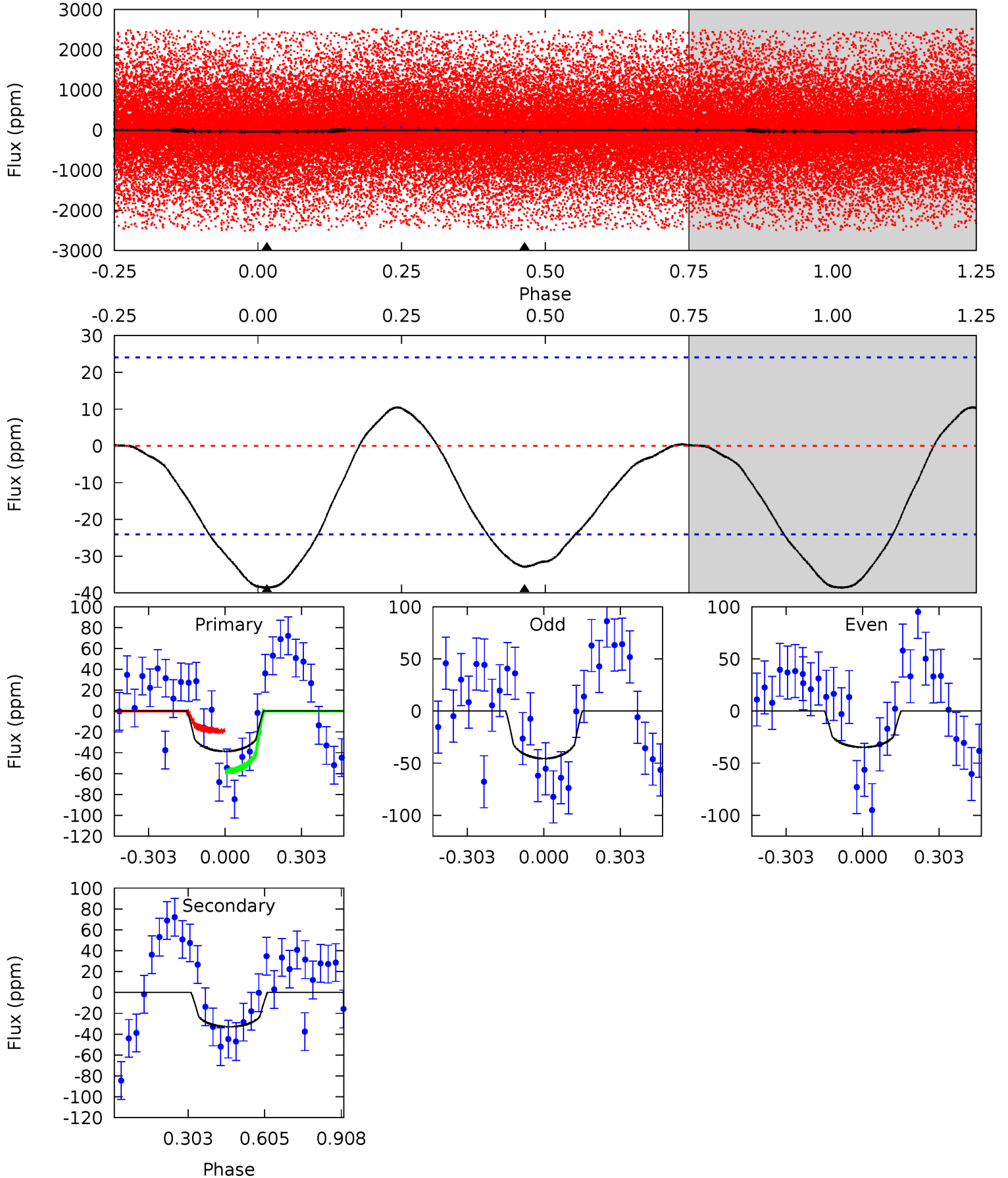




# DV Model-Shift Uniqueness Test

005724811-01, P = 0.682610 Days, E = 131.399851 Days

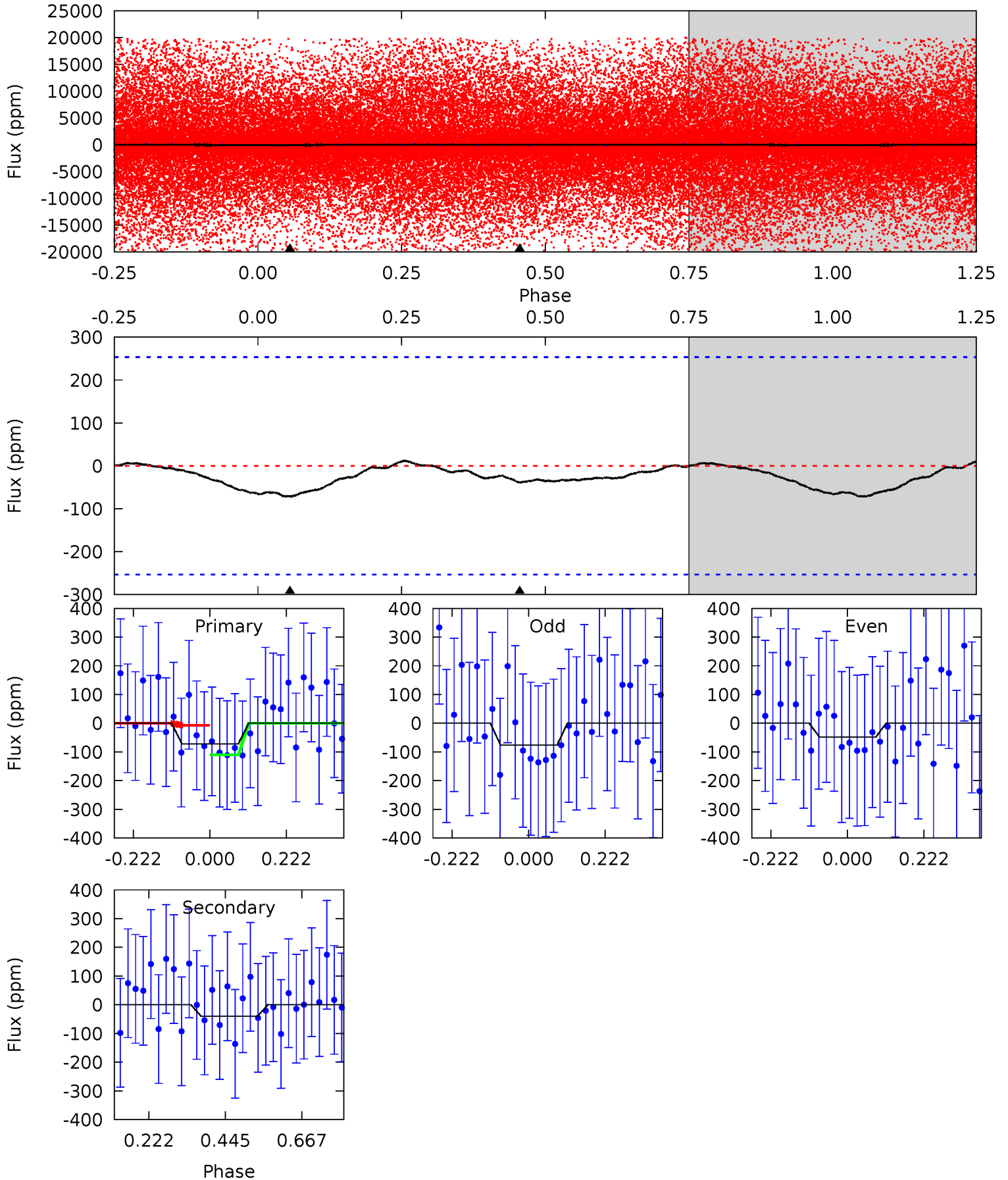
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.94	5.92	0	0	4.33	1.03	0.15	6.94	6.94	5.92	5.92	0.99	2.00	0.21	3.51



# Alt Model-Shift Uniqueness Test

005724811-01, P = 0.682610 Days, E = 131.399851 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
1.25	0.69	0	0	4.39	1.22	0.10	1.25	1.25	0.69	0.69	0.25	1.53	0.15	0.91





### Stellar Parameters For KIC 005724811

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6026^{+180}_{-180}$	$4.096^{+0.329}_{-0.165}$	$-0.160^{+0.300}_{-0.300}$	$1.511^{+0.417}_{-0.510}$	$1.038^{+0.151}_{-0.136}$	$0.424^{+0.957}_{-0.185}$
	+3%/-3%	+8%/-4%	+188%/-188%	+28%/-34%	+15%/-13%	+226%/-44%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 005724811-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-33 \pm 6$	$0.90^{+0.70}_{-0.59}$	$3655^{+298}_{-352}$	$6018^{+5153}_{-1516}$	$5.121^{+34.891}_{-3.404}$
Alt.	$-40 \pm 58$	$0.88^{+0.76}_{-0.56}$	$3626^{+297}_{-325}$	$5857^{+6391}_{-10852}$	$4.704^{+47.956}_{-6.598}$

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

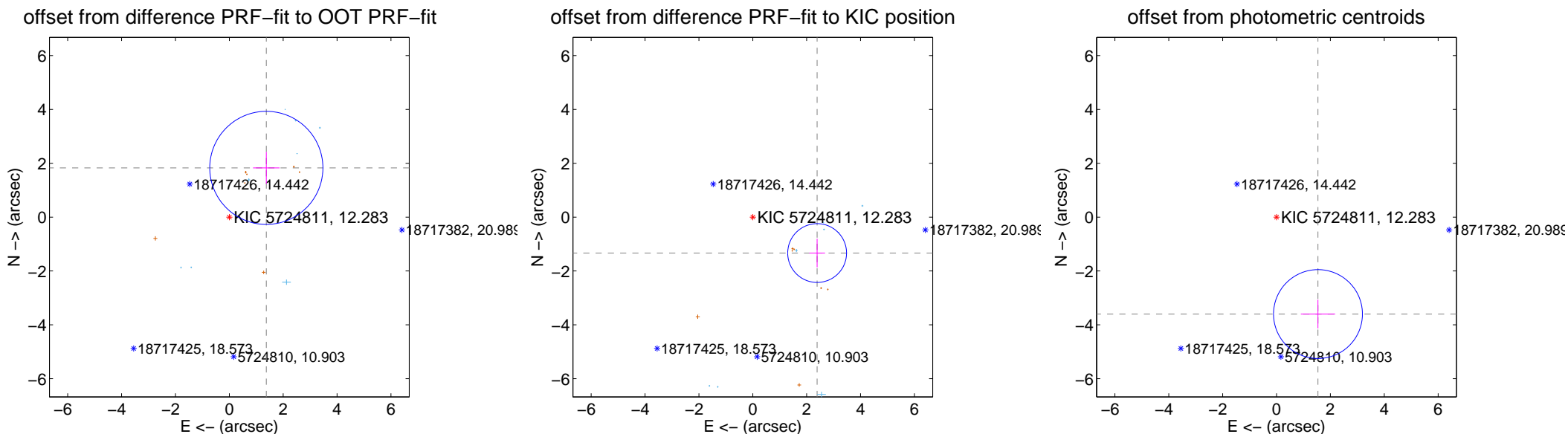
## DV Centroid Data

Supplemental centroid analysis for 005724811-01. Kepler magnitude: 12.28. Transit SNR 4.56

There are 8 quarters with good PRF difference image offsets

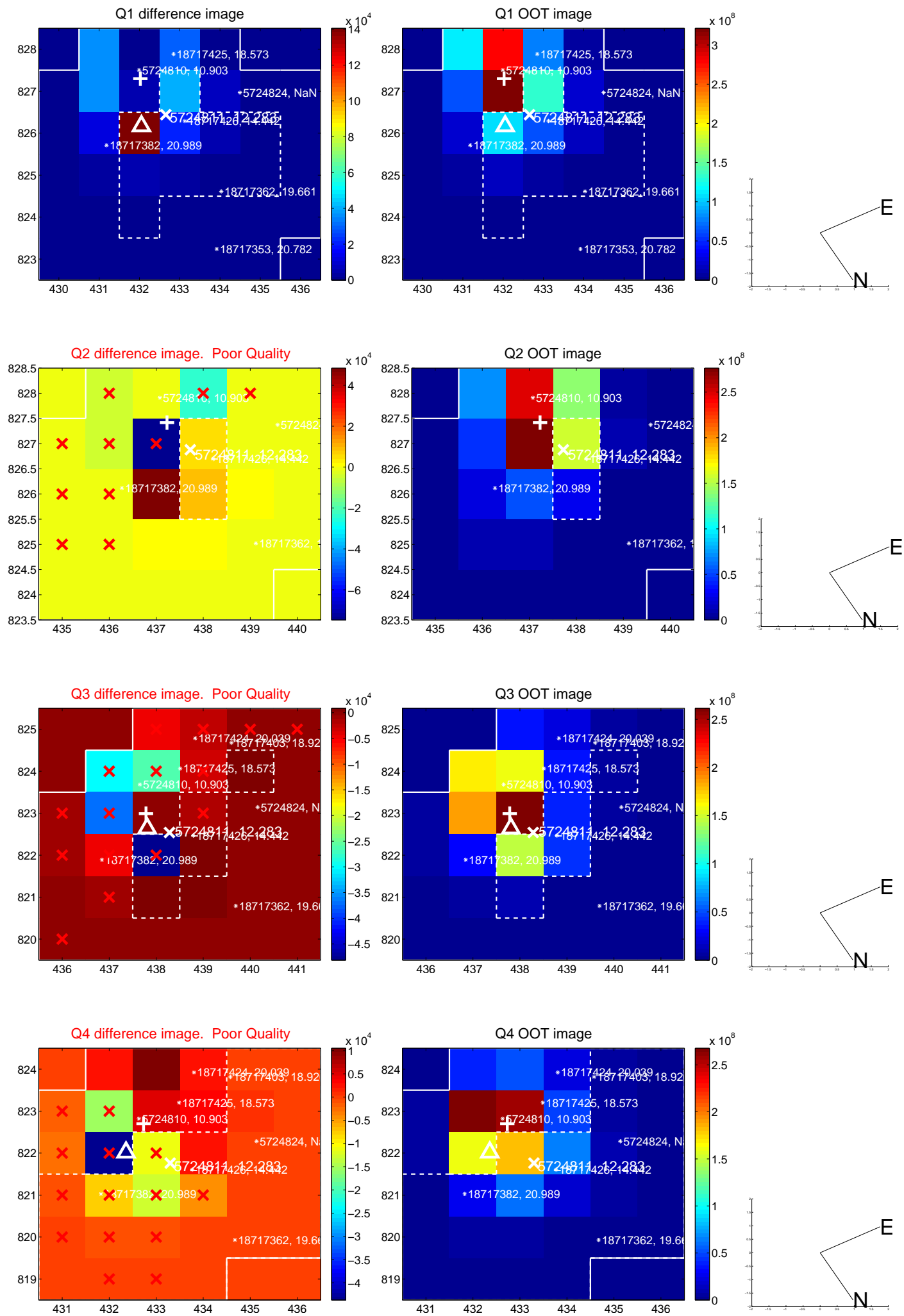
The OOT PRF centroid is offset from the target star catalog position by about 4.21 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.287 \pm 0.700$	3.27	$-1.373 \pm 0.494$	$1.829 \pm 0.592$
PRF-fit source offset from KIC position	$2.735 \pm 0.364$	7.51	$-2.388 \pm 0.292$	$-1.334 \pm 0.533$
photometric centroid source offset	$3.91 \pm 0.55$	7.12	$-1.54 \pm 0.64$	$-3.60 \pm 0.53$



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.

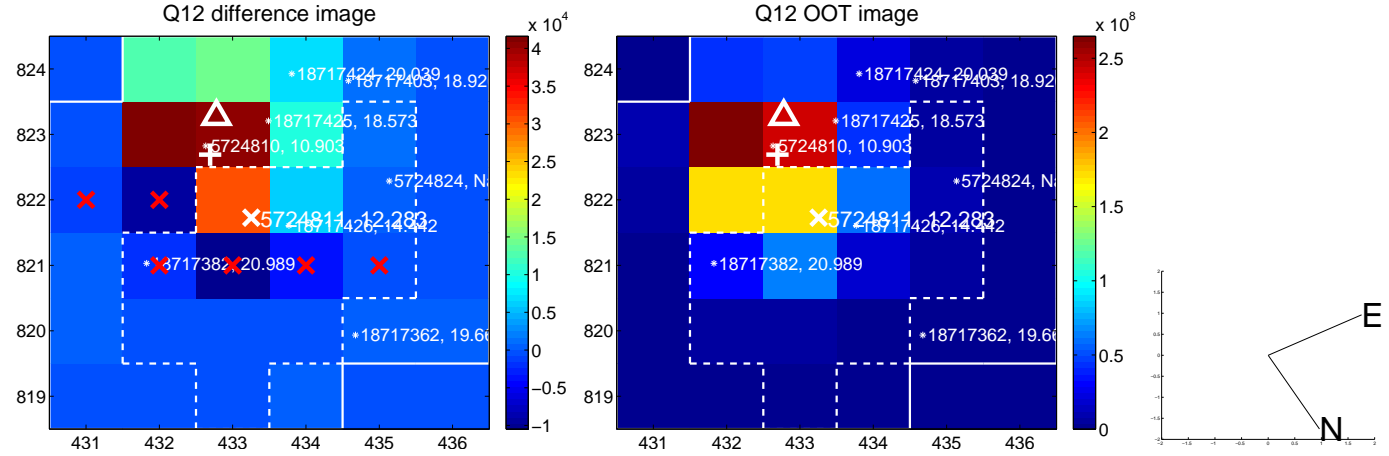
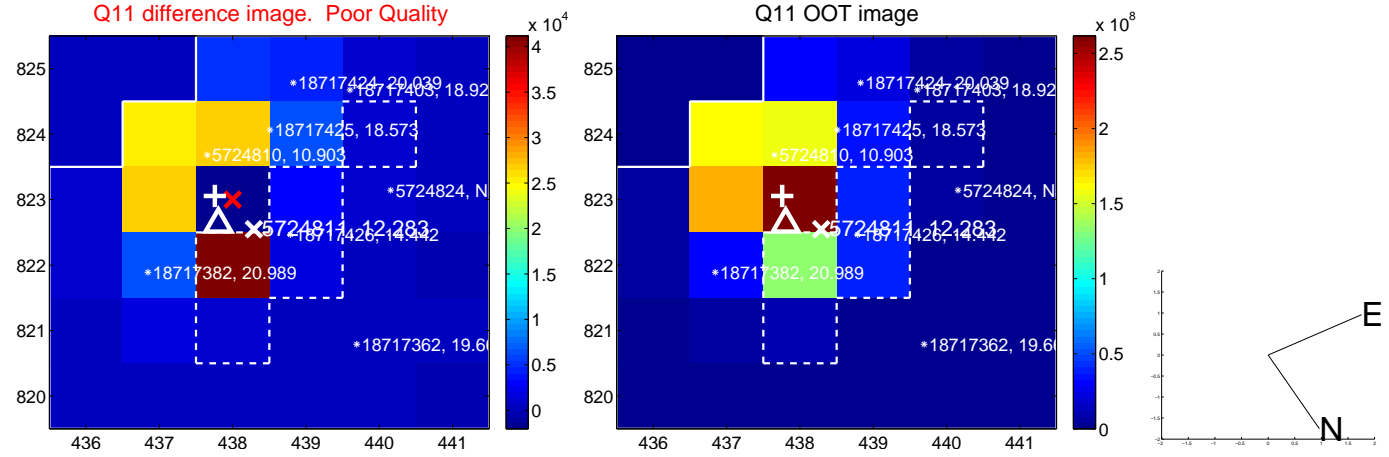
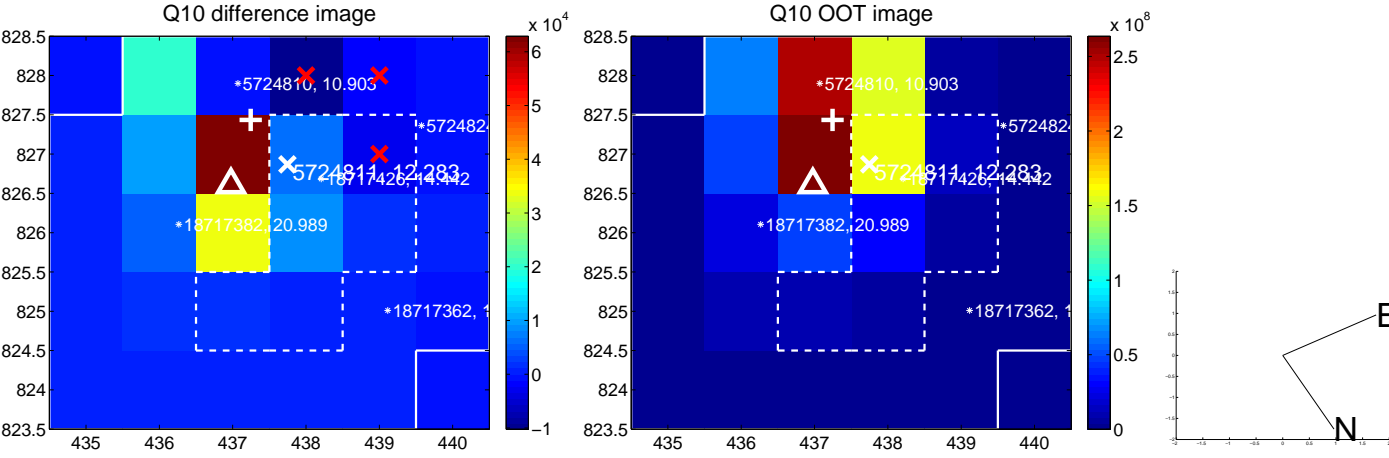
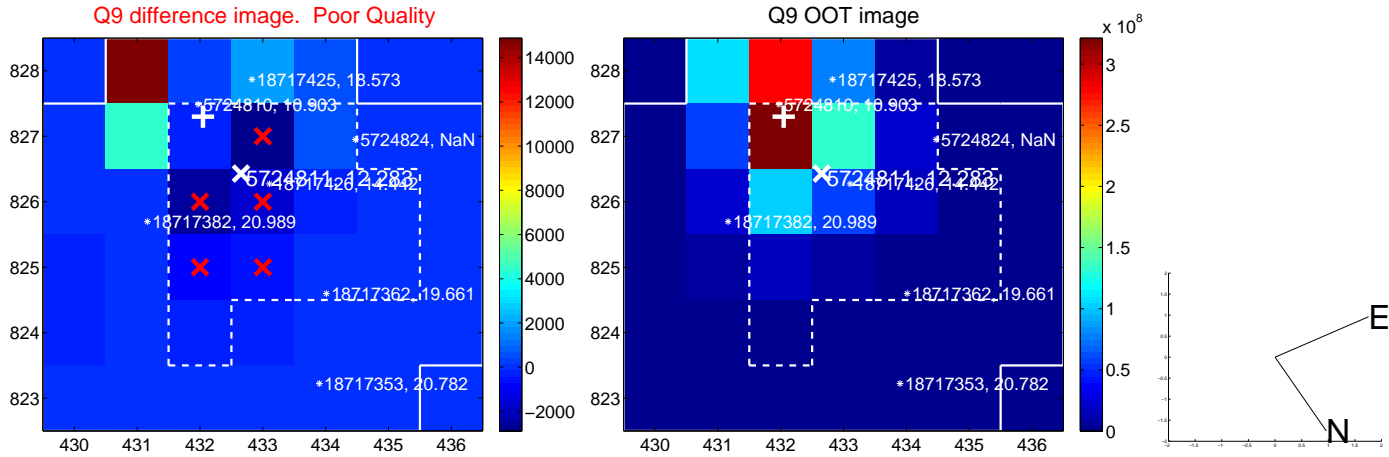
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



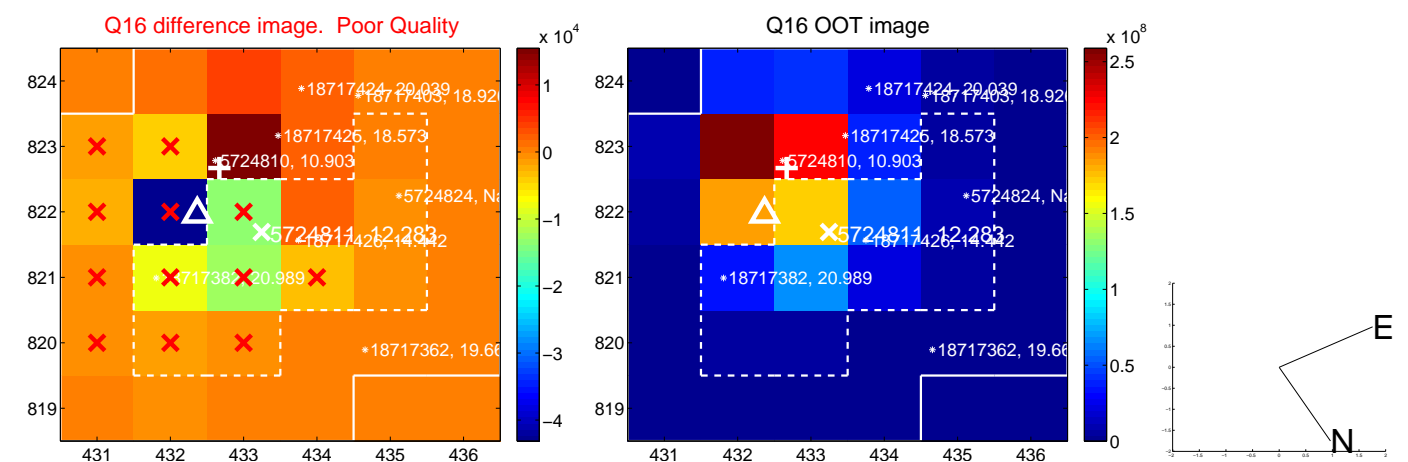
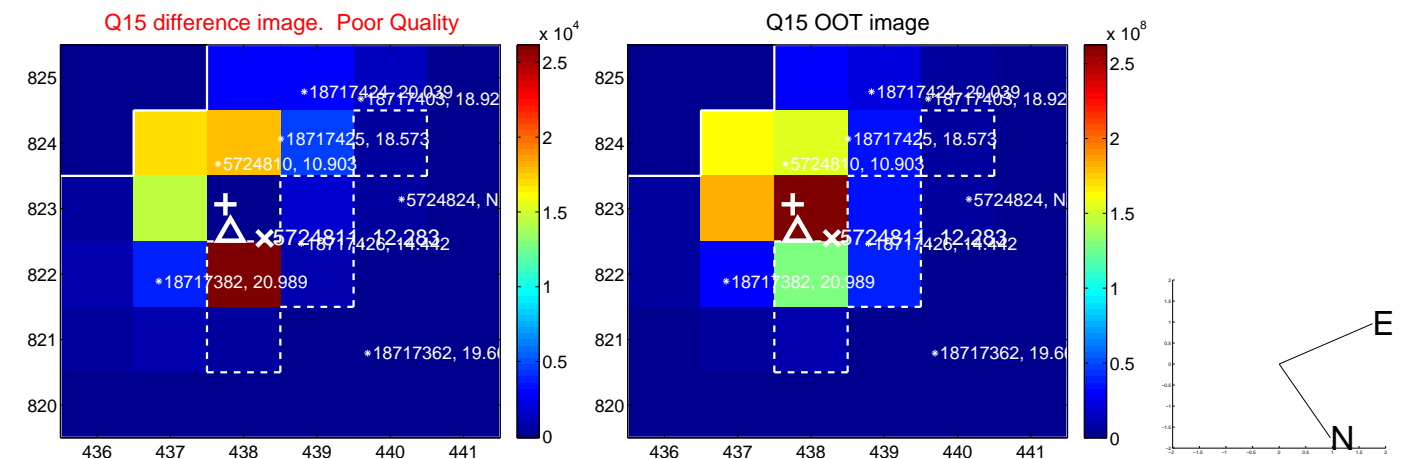
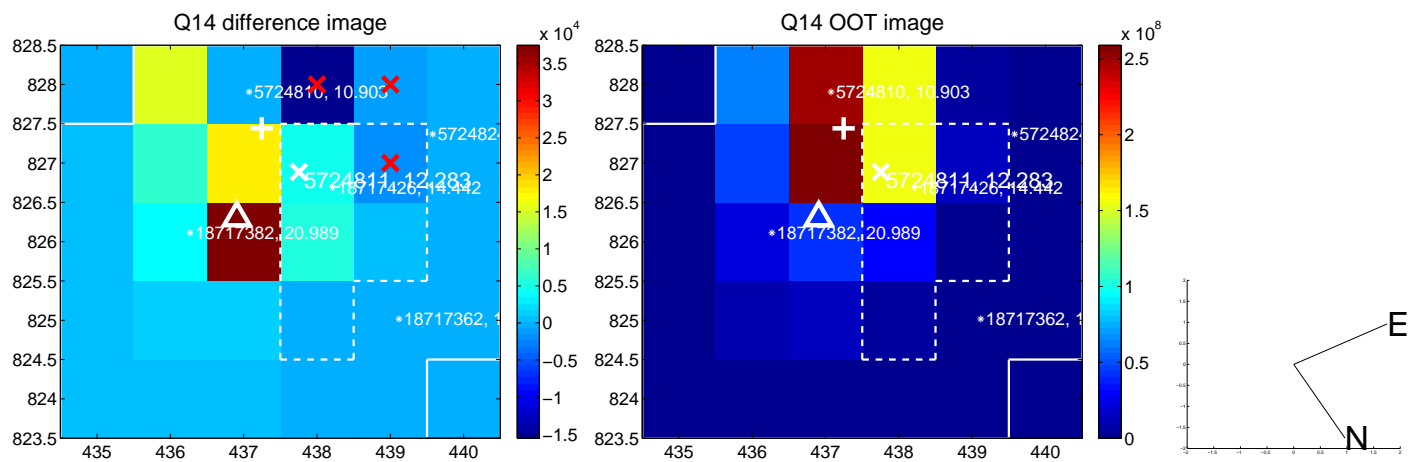
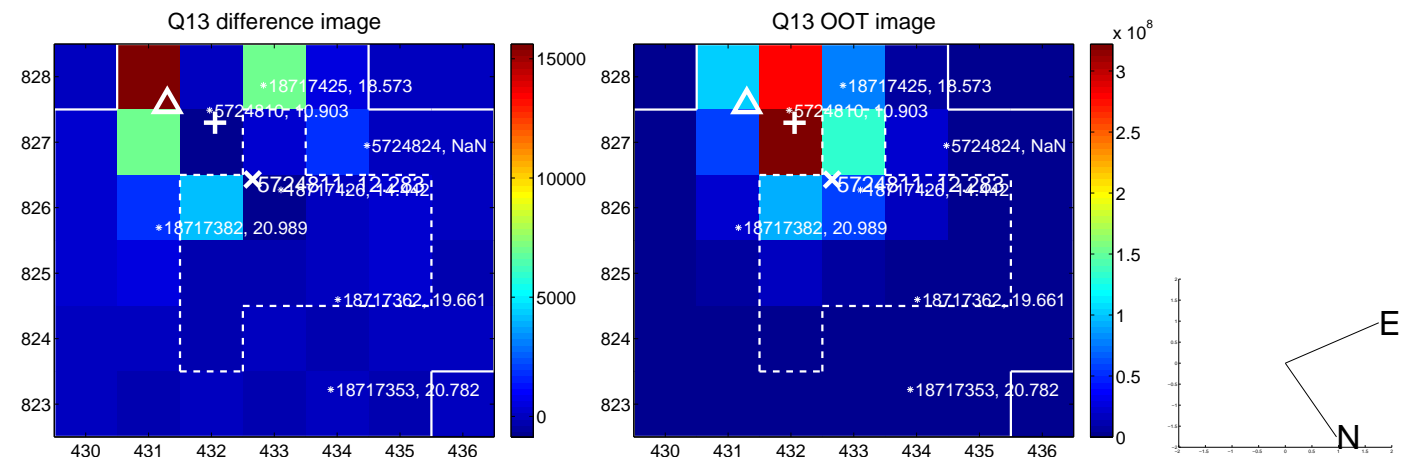




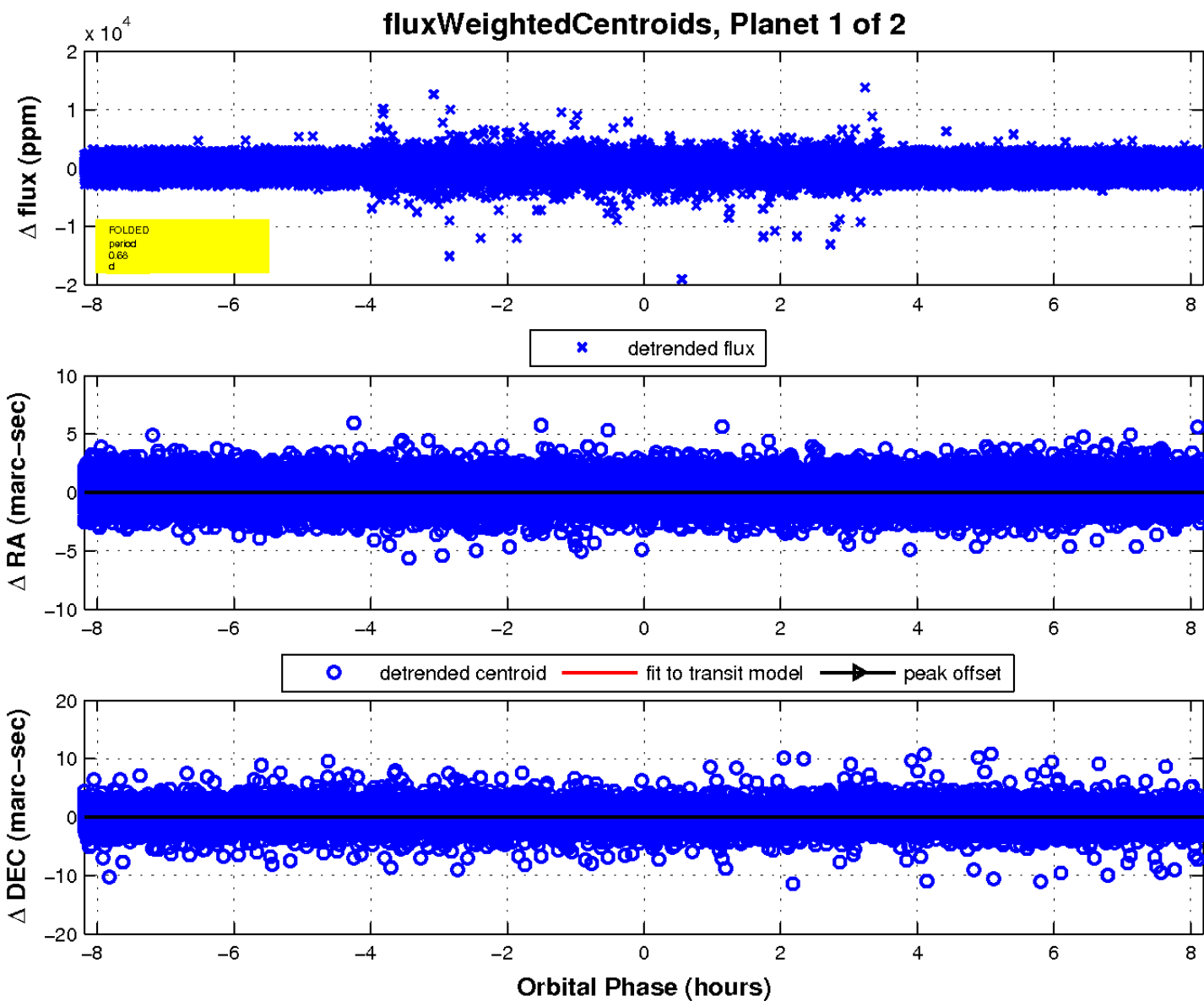
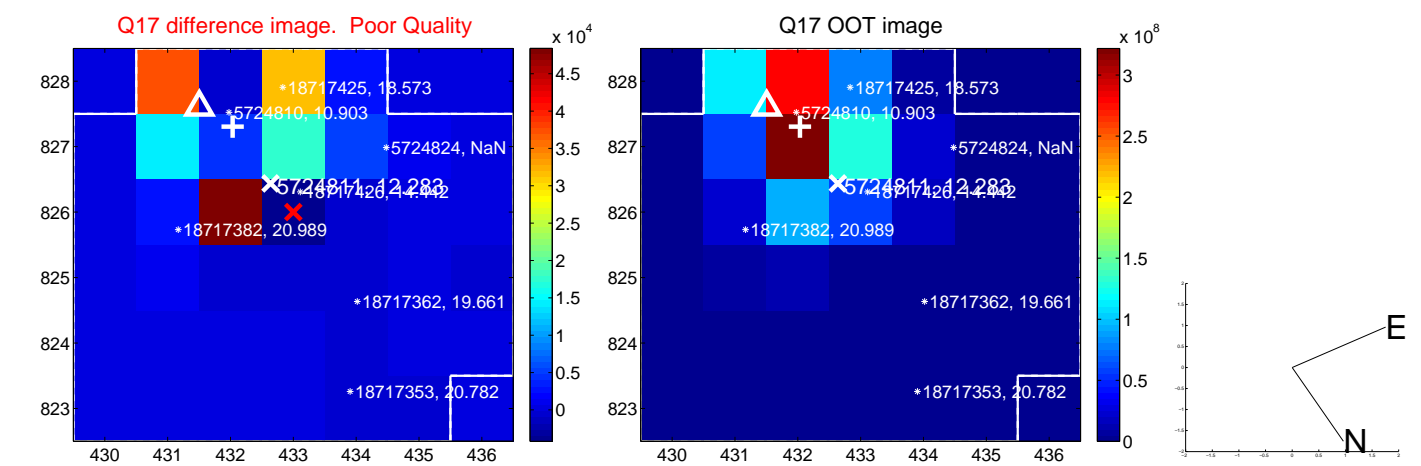
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

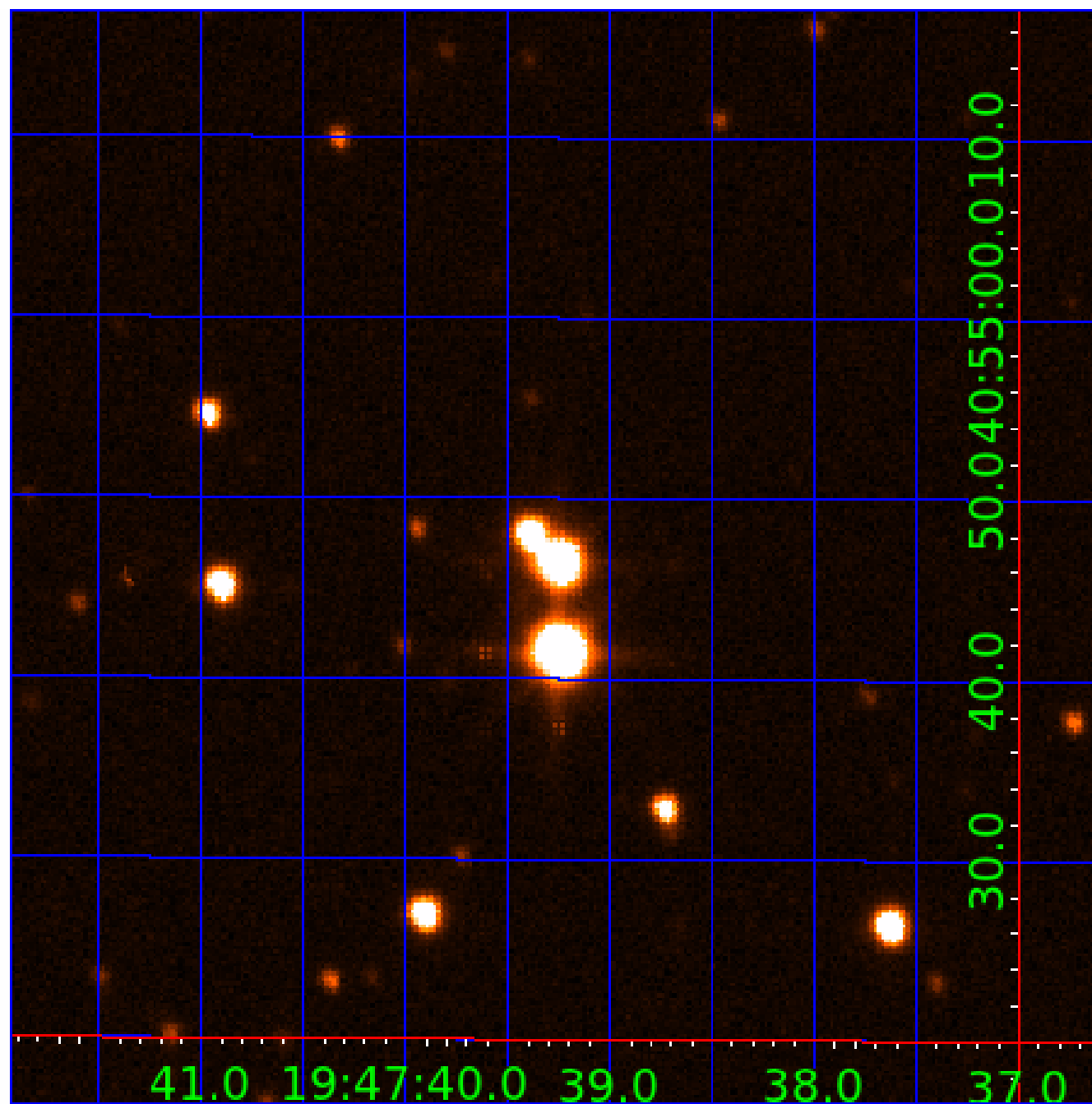


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 005724811

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005724811-01	OBS	No	0.682610	132.082461	18.0	4.519	10.0	4.6	1.51	6026	0.69	11418.87
005724811-02	OBS	No	112.879182	148.154610	4002.2	4.021	10.5	14.1	1.51	6026	10.54	12.58

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005724811-01	OBS	FP	0.00	1	0	0	1	LPP_DV—LPP_ALT—CENT_KIC_POS—EPHEM_MATCH
005724811-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_KIC_POS—HALO_GHOST

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

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

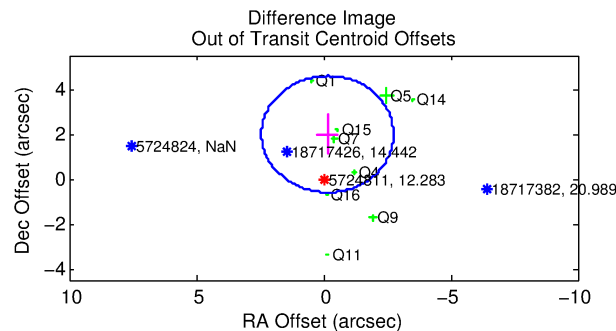
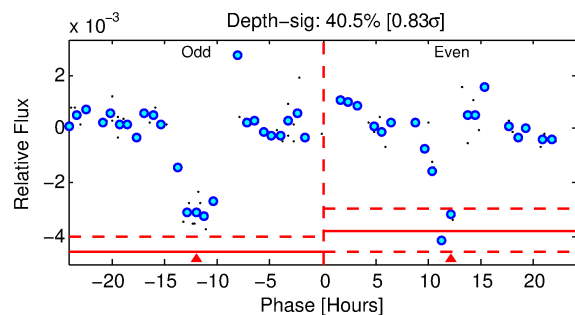
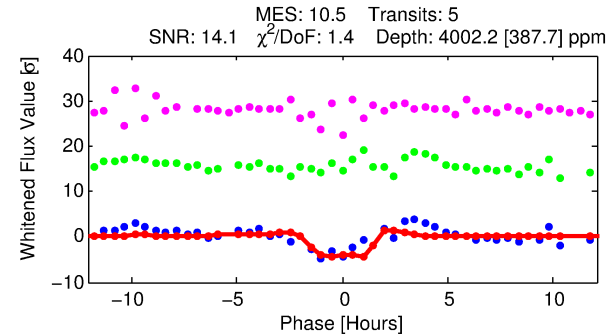
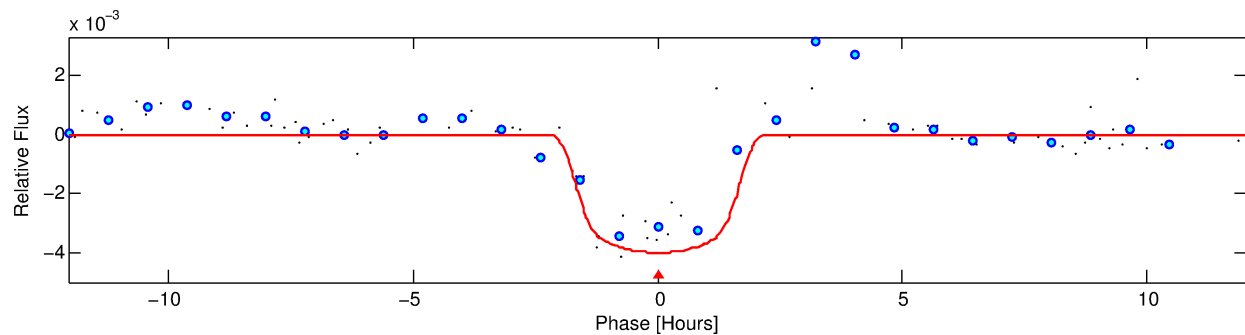
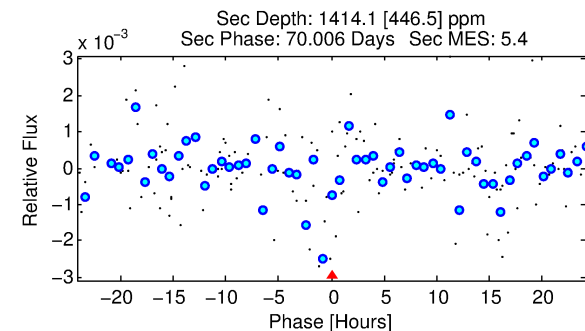
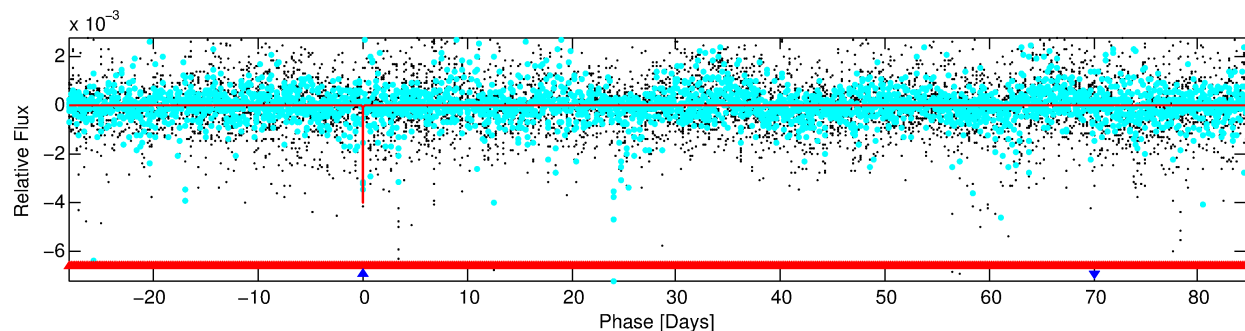
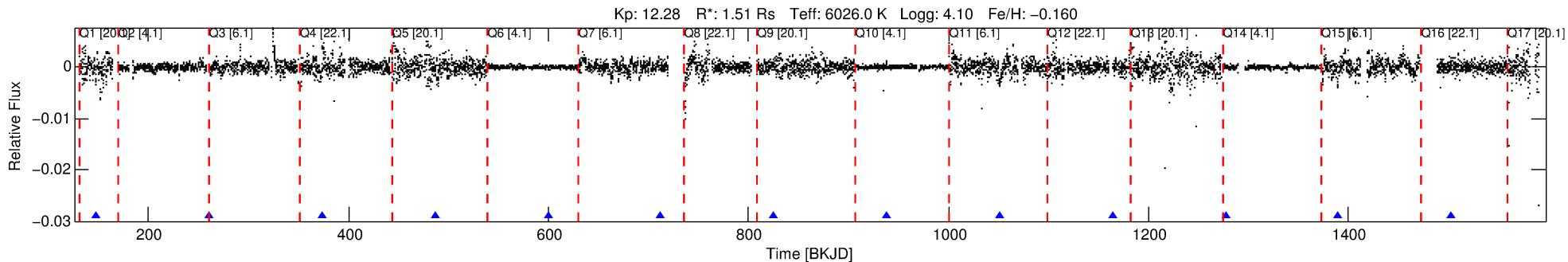
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 005724811-02

No Significant Match Found

# DV One-Page Summary

KIC: 5724811 Candidate: 2 of 2 Period: 112.879 d



## DV Fit Results:

Period = 112.87918 [0.00072] d  
Epoch = 148.1546 [0.0048] BKJD  
Rp/R\* = 0.0639 [0.0109]  
a/R\* = 153.58 [112.80]  
b = 0.79 [0.36]  
Seff = 12.58 [7.12]  
Teq = 480 [68] K  
Rp = 10.54 [3.98] Re  
a = 0.4630 [0.1566] AU  
Ag = 1501.83 [1083.86] [1.38σ]  
Teffp = 4622 [553] K [7.43σ]

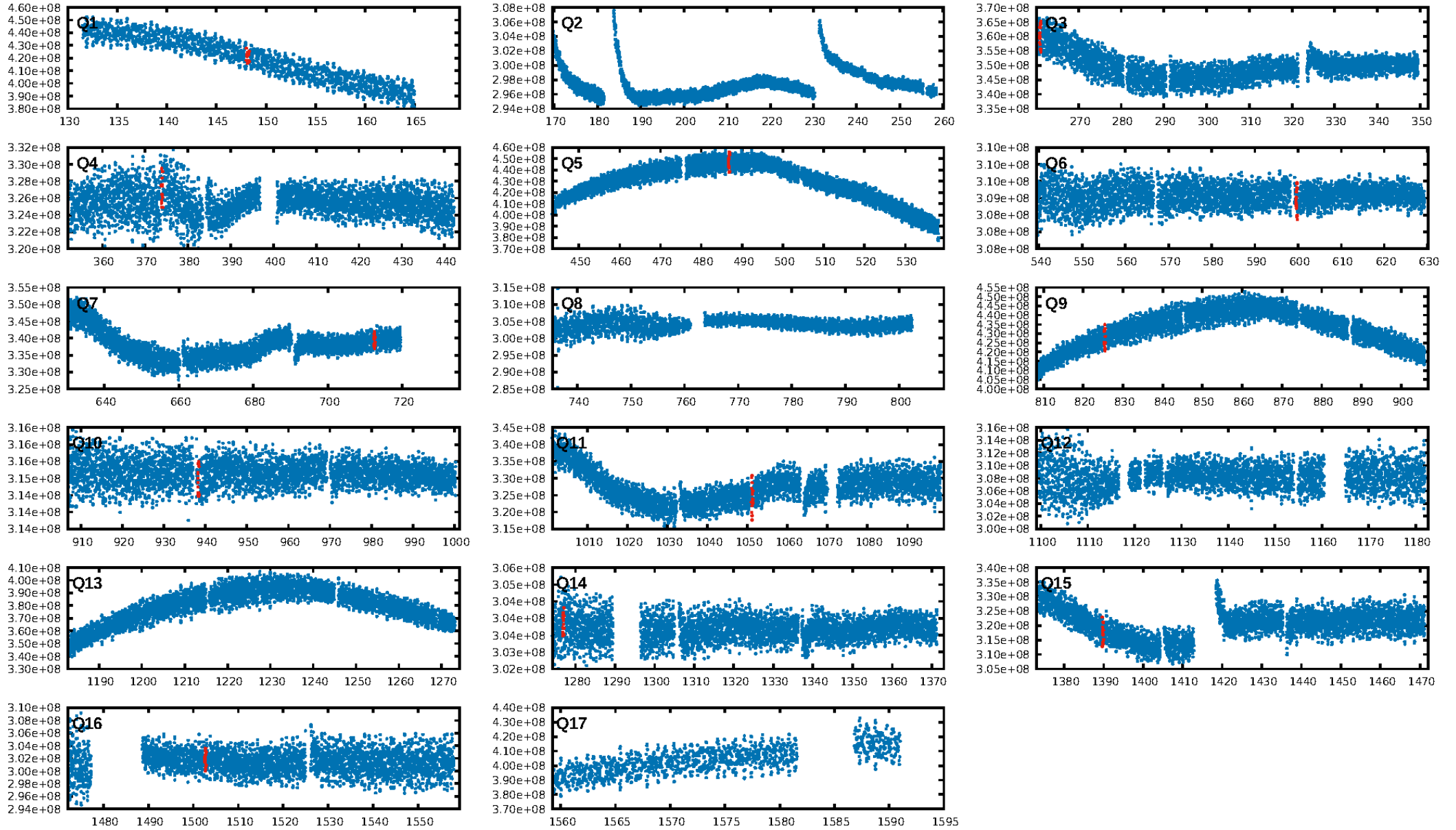
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [445.16σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 82.9%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 4.27e-11**  
RollingBand-fgt: 1.00 [4/4]  
**GhostDiagnostic-chr: 0.2244**  
Centroid-sig: 0.6%  
**Centroid-so: 2.698 arcsec [87.12σ]**  
OotOffset-rm: 1.997 arcsec [2.31σ]  
**KicOffset-rm: 3.403 arcsec [3.36σ]**  
OotOffset-st: 1/3/2/3 [9]  
KicOffset-st: 1/3/2/3 [9]  
DiffImageQuality-fgm: 0.56 [5/9]  
DiffImageOverlap-fno: 0.00 [0/9]

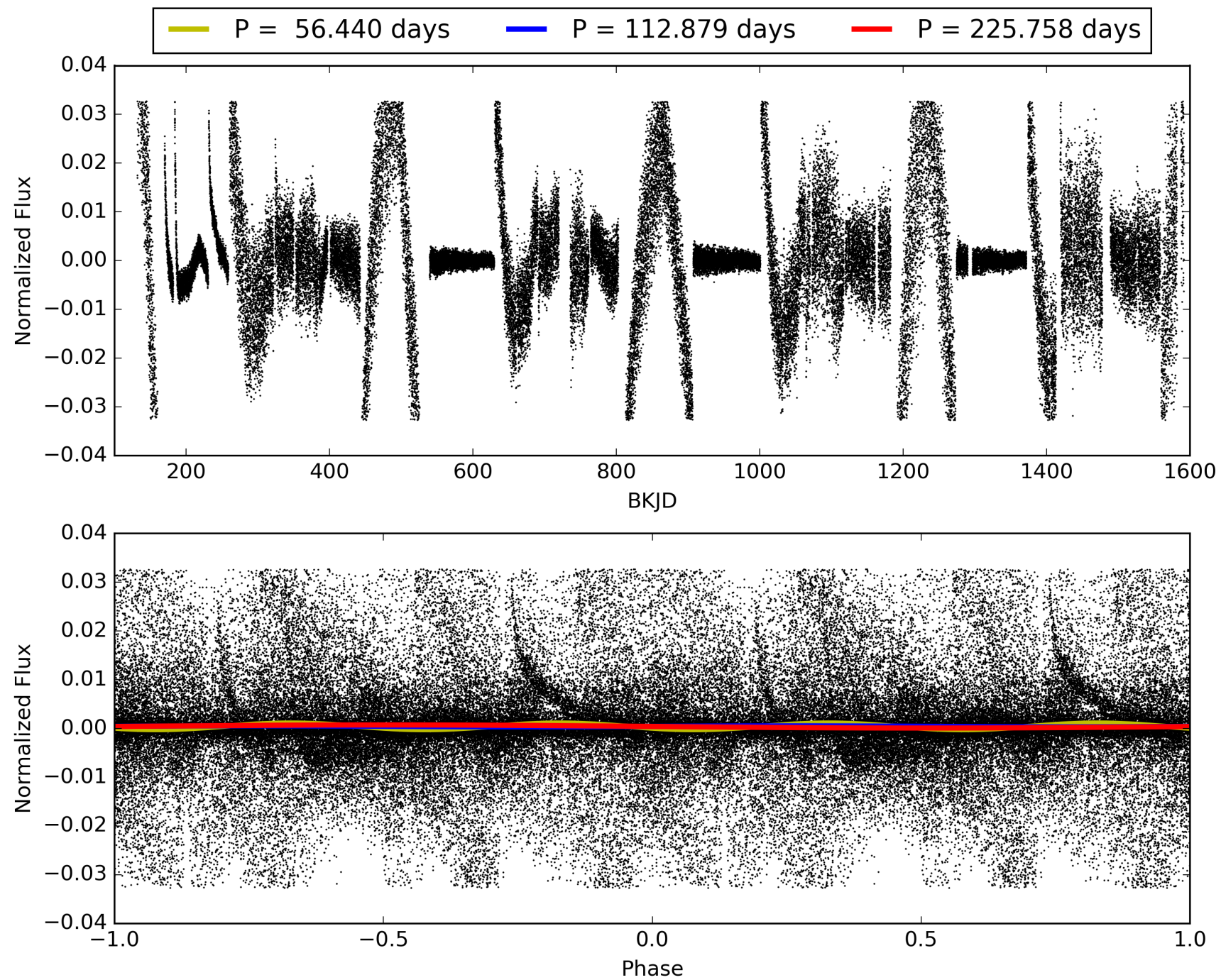
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 01:34:15 Z

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

# TCE 005724811-02, PDC Light Curves

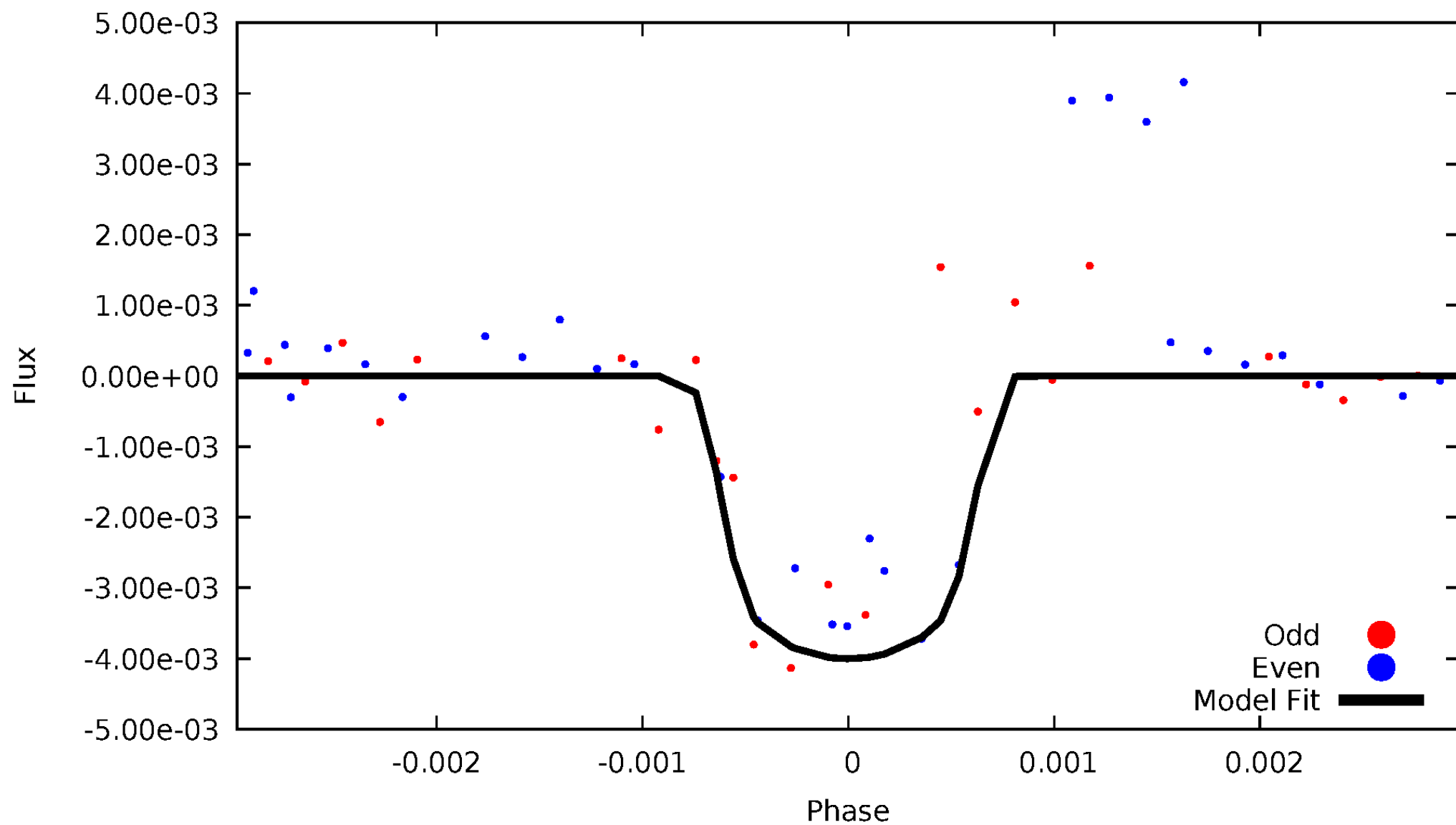


# TCE 005724811-02



# DV Odd/Even

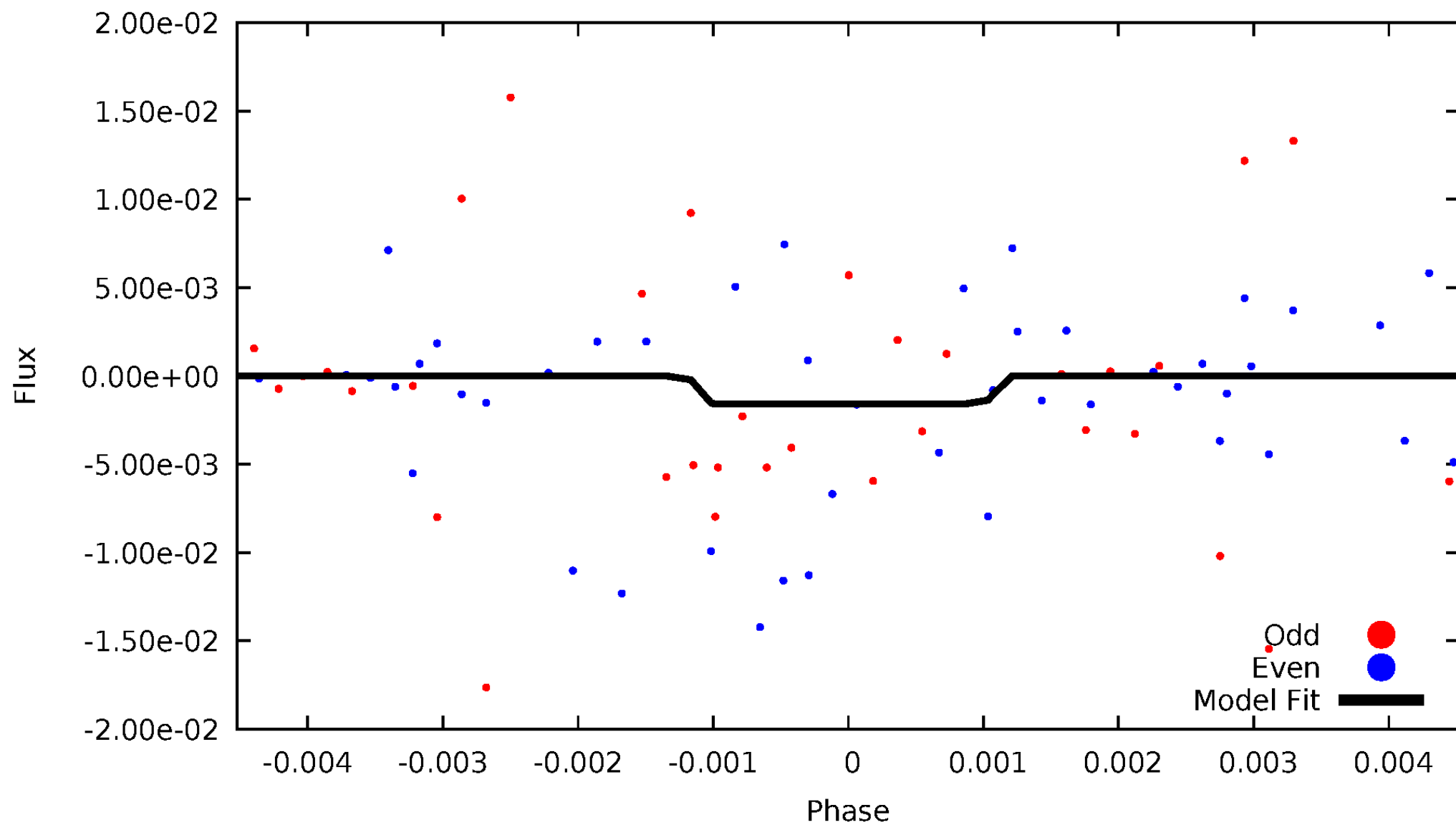
TCE 005724811-02





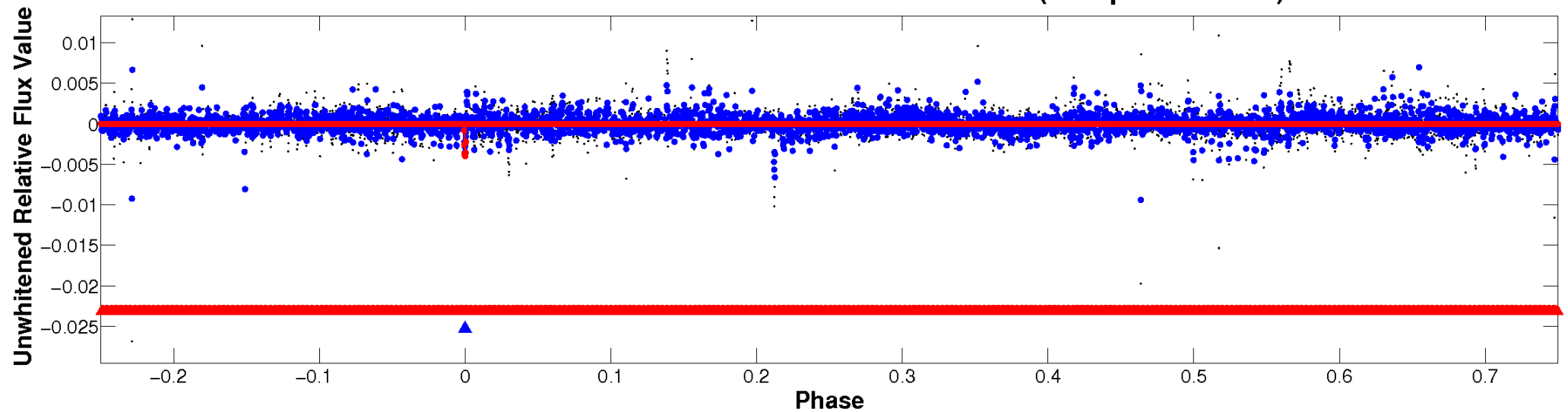
# ALT Odd/Even

TCE 005724811-02

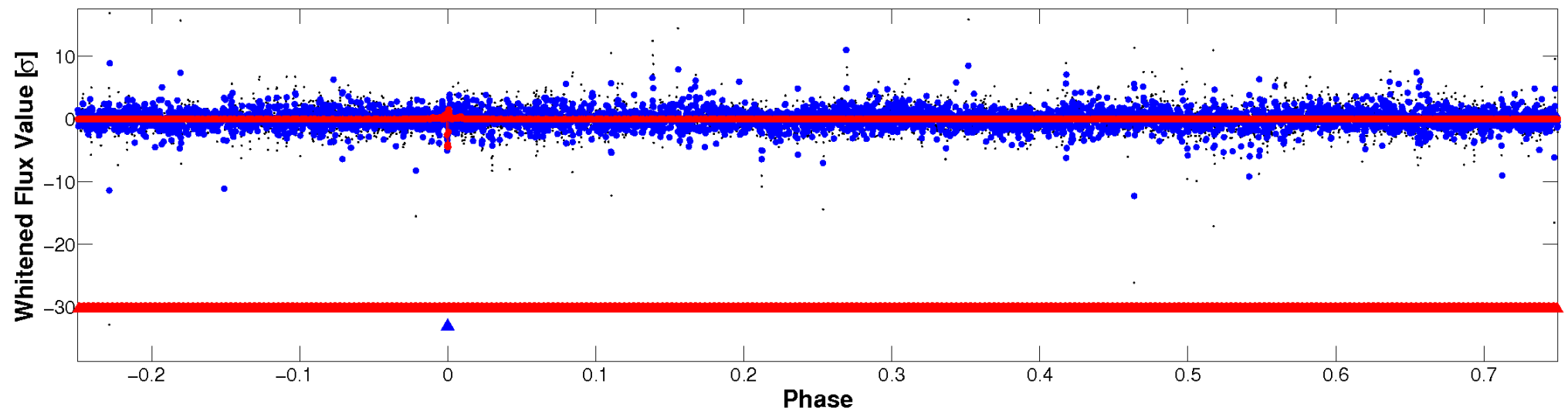


# Non-Whitened Vs. Whitened Light Curve

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

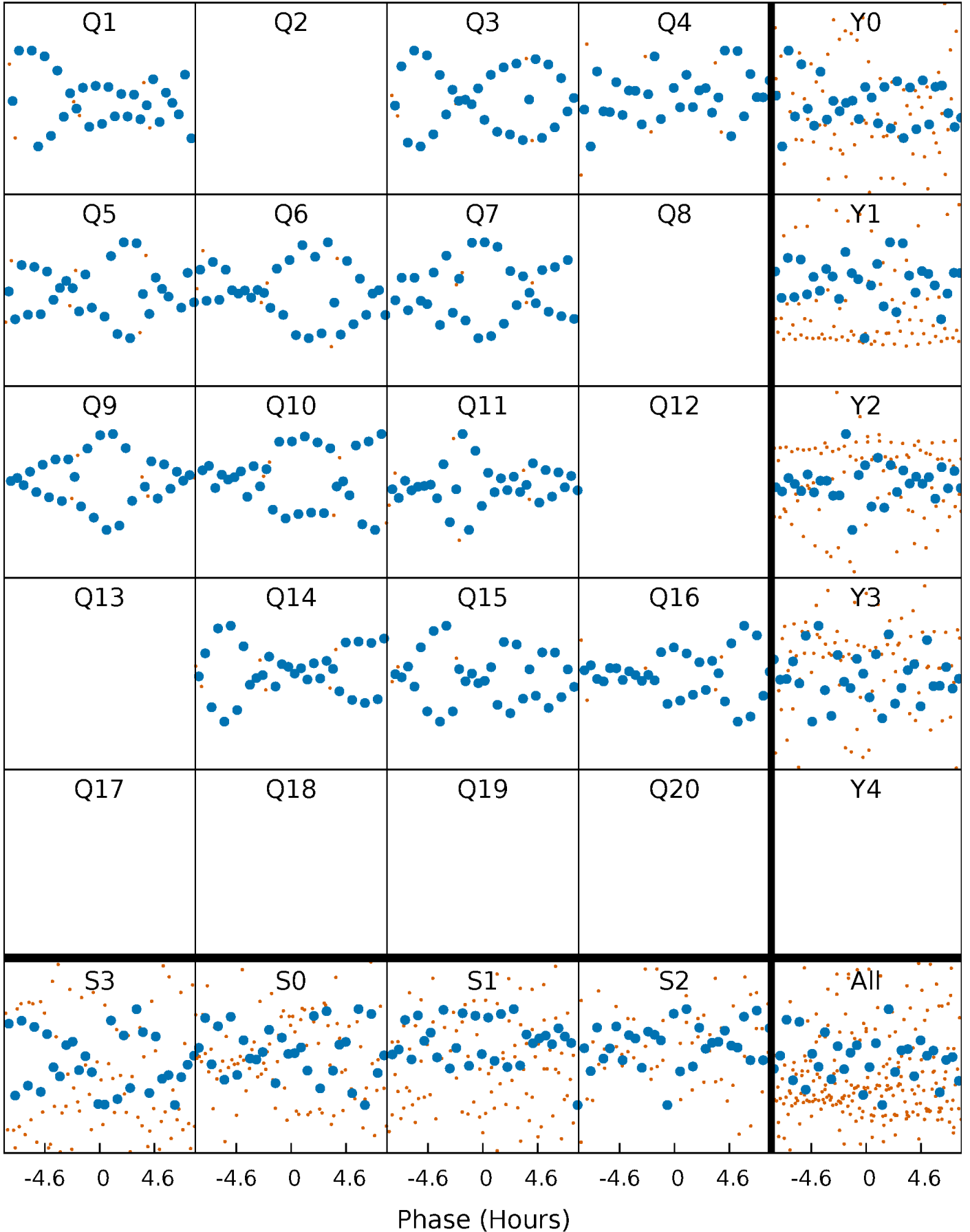


**Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



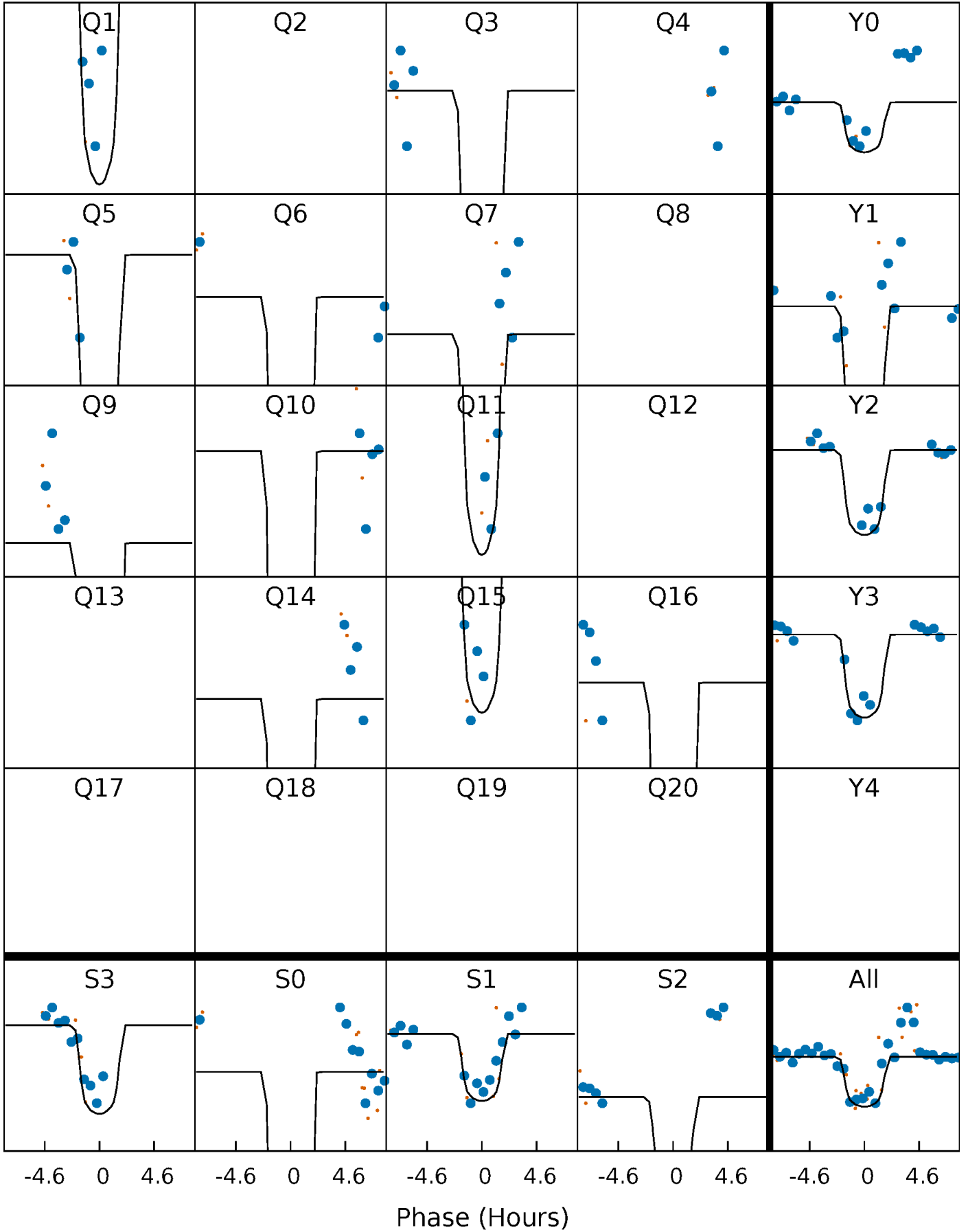
# PDC Quarter-Phased Transit Curves

TCE 005724811-02 P=112.879182 Days  $T_0=148.154610$  (BKJD)



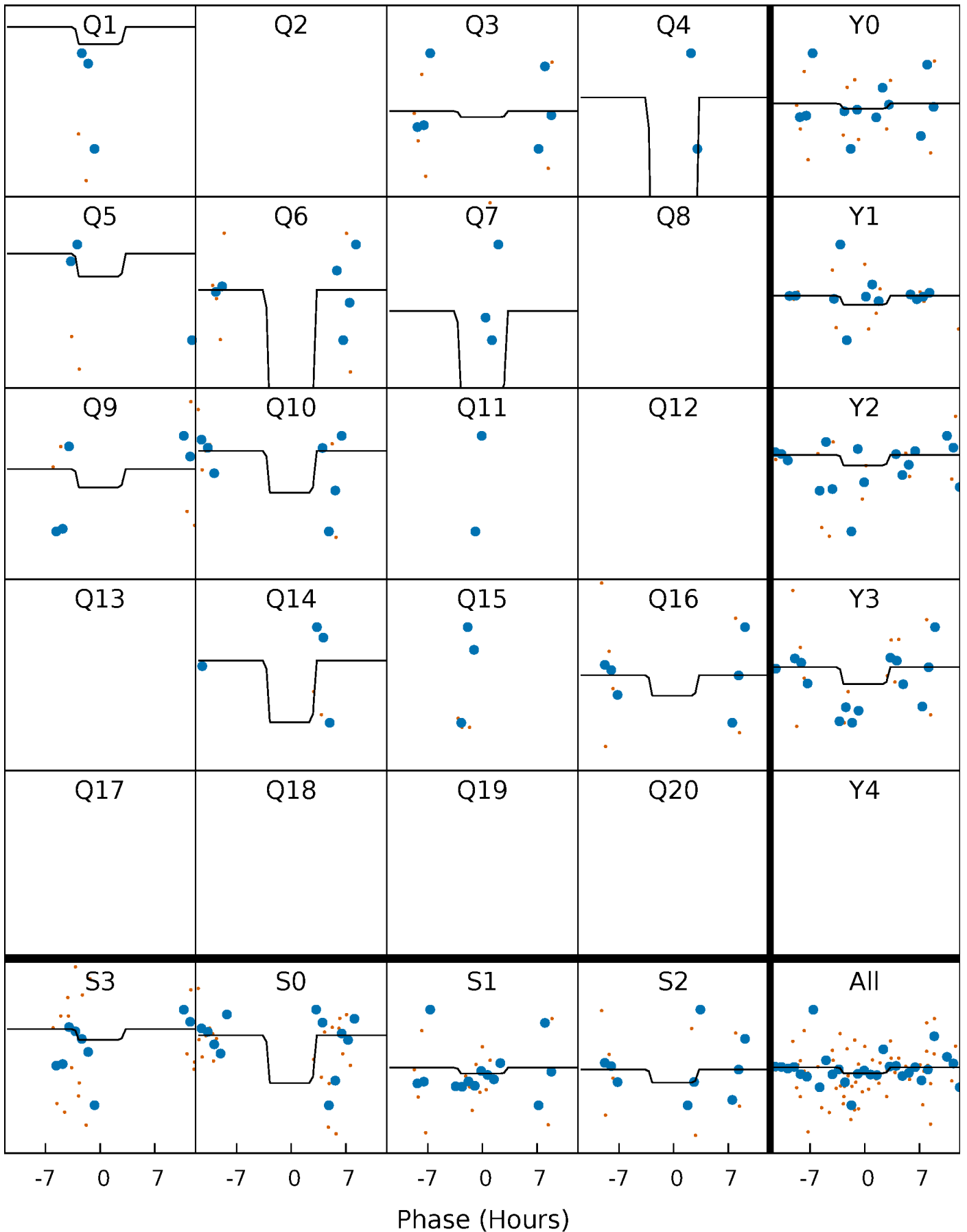
# DV Quarter-Phased Transit Curves

TCE 005724811-02 P=112.879182 Days  $T_0=148.154610$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 005724811-02 P=112.880319 Days  $T_0=148.199190$  (BKJD)

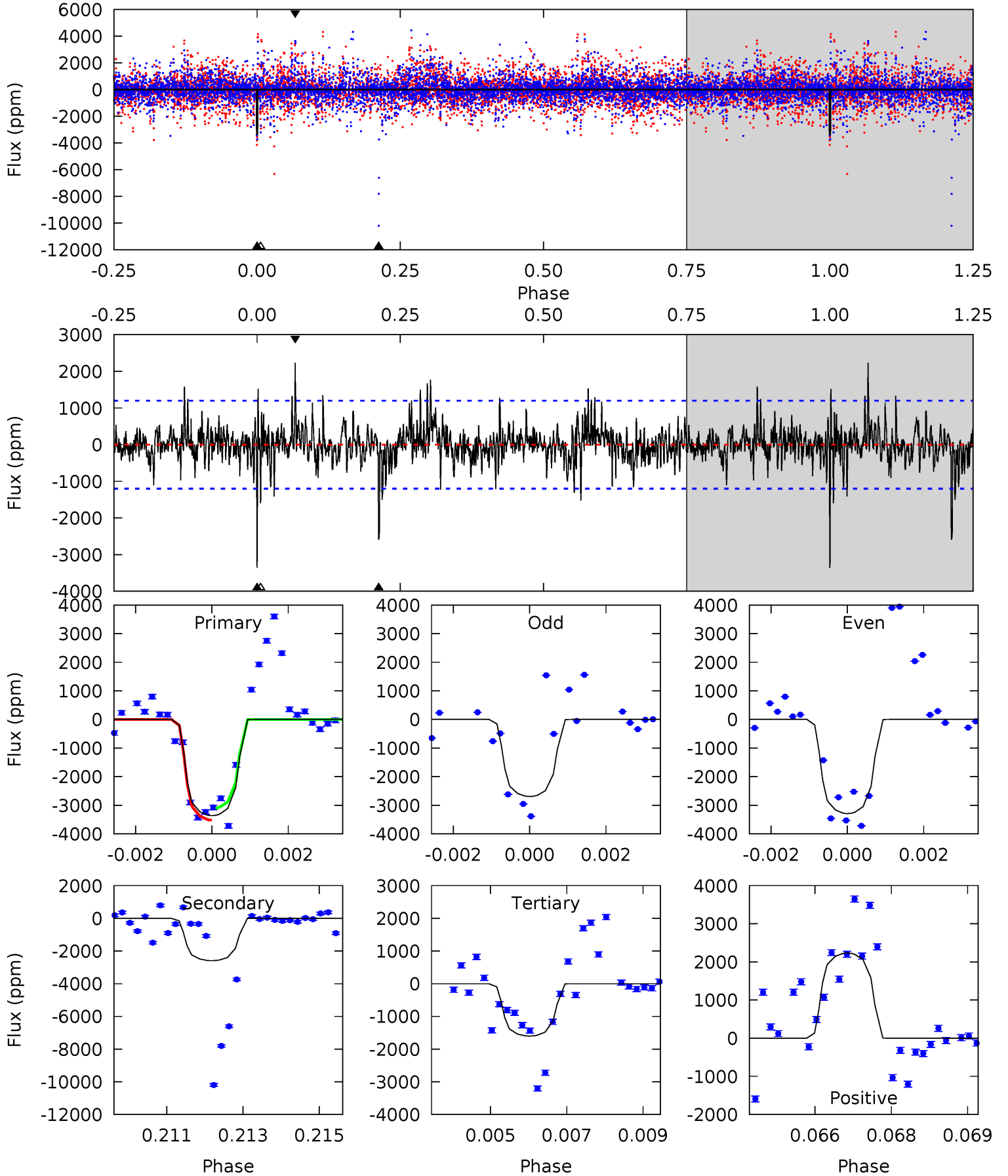




# DV Model-Shift Uniqueness Test

005724811-02, P = 112.879182 Days, E = 35.275428 Days

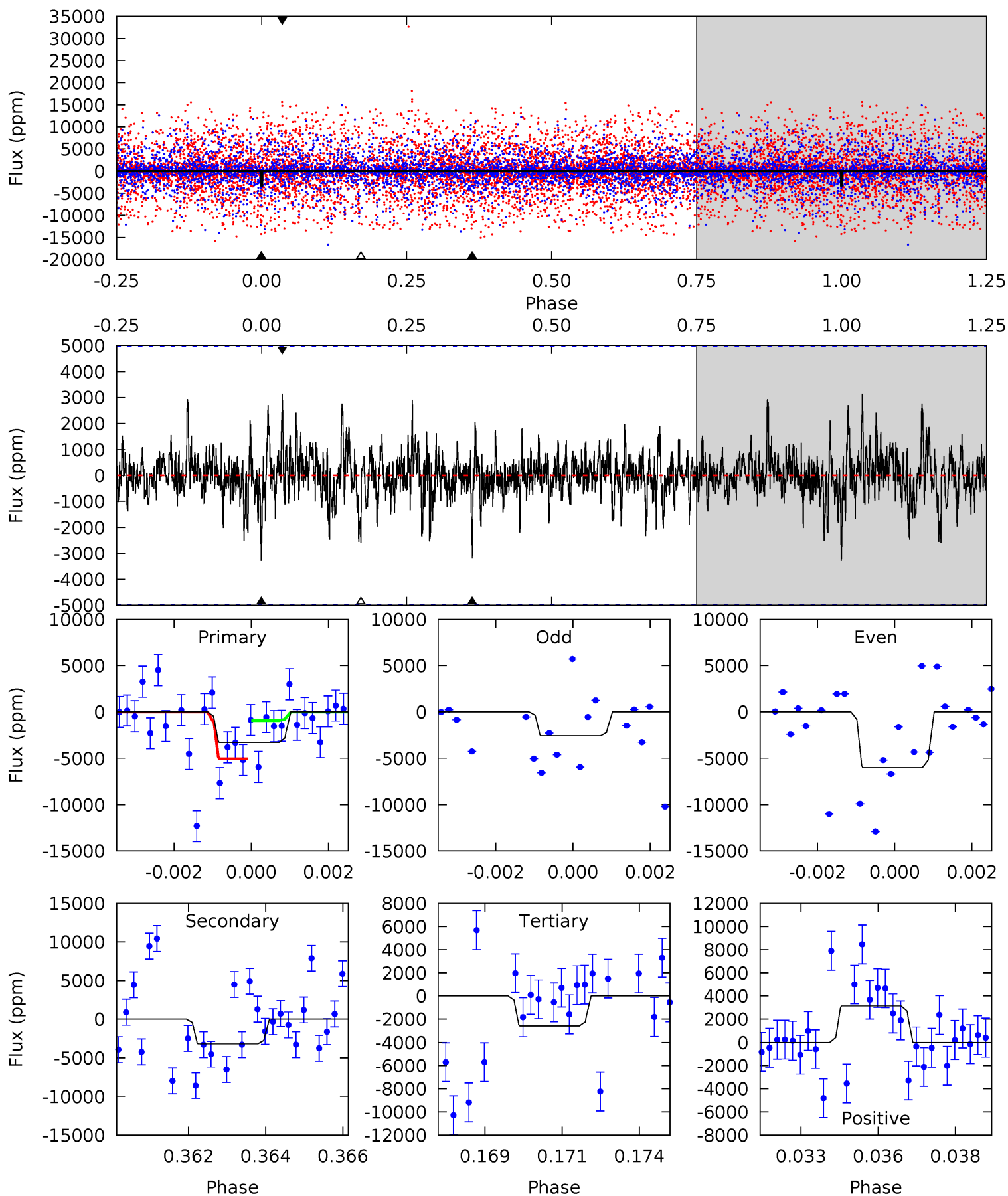
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.0	11.6	7.15	9.97	5.35	3.13	1.74	7.87	5.05	4.42	1.60	1.32	0.72	0.40	0.92



# Alt Model-Shift Uniqueness Test

005724811-02, P = 112.880319 Days, E = 35.318871 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
3.51	3.40	2.75	3.34	5.30	3.04	0.75	0.75	0.17	0.65	0.06	1.82	0.84	0.49	2.19



### Stellar Parameters For KIC 005724811

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6026^{+180}_{-180}$	$4.096^{+0.329}_{-0.165}$	$-0.160^{+0.300}_{-0.300}$	$1.511^{+0.417}_{-0.510}$	$1.038^{+0.151}_{-0.136}$	$0.424^{+0.957}_{-0.185}$
	+3%/-3%	+8%/-4%	+188%/-188%	+28%/-34%	+15%/-13%	+226%/-44%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 005724811-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-2592 \pm 224$	$10.11^{+2.76}_{-2.45}$	$665^{+58}_{-64}$	$5448^{+569}_{-389}$	$3077^{+2184}_{-1206}$
Alt.	$-3194 \pm 939$	$6.14^{+2.26}_{-1.82}$	$663^{+56}_{-61}$	$7266^{+1767}_{-1079}$	$9659^{+10750}_{-4954}$

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

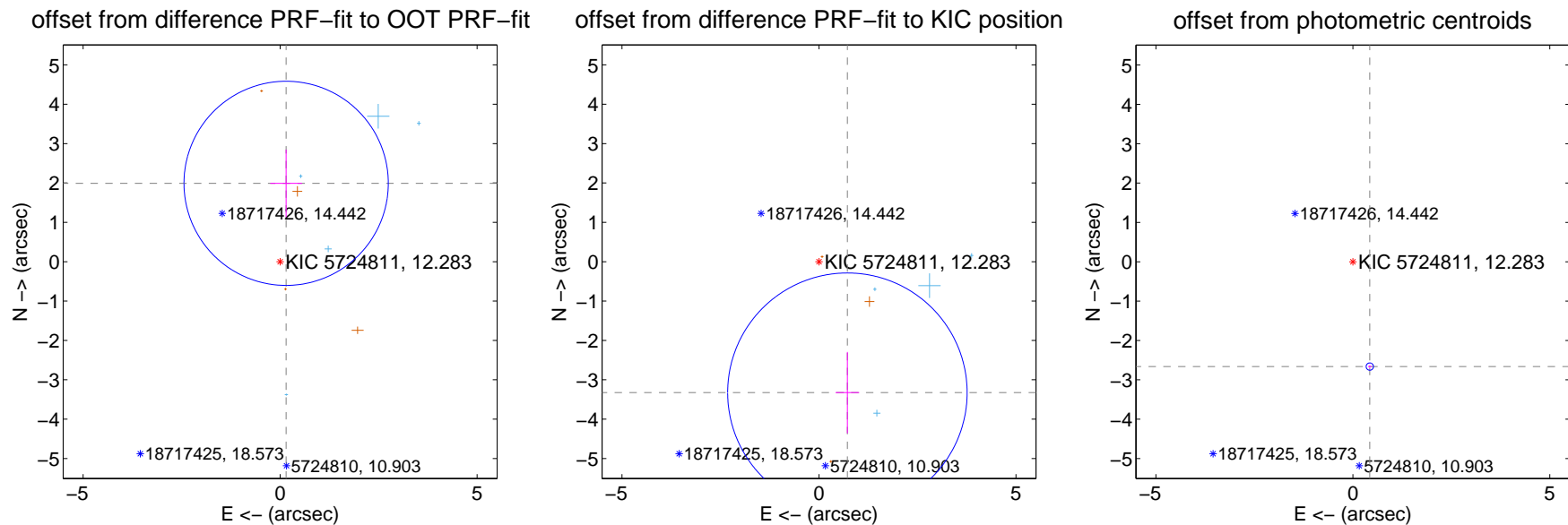
## DV Centroid Data

Supplemental centroid analysis for 005724811-02. Kepler magnitude: 12.28. Transit SNR 14.06

There are 5 quarters with good PRF difference image offsets

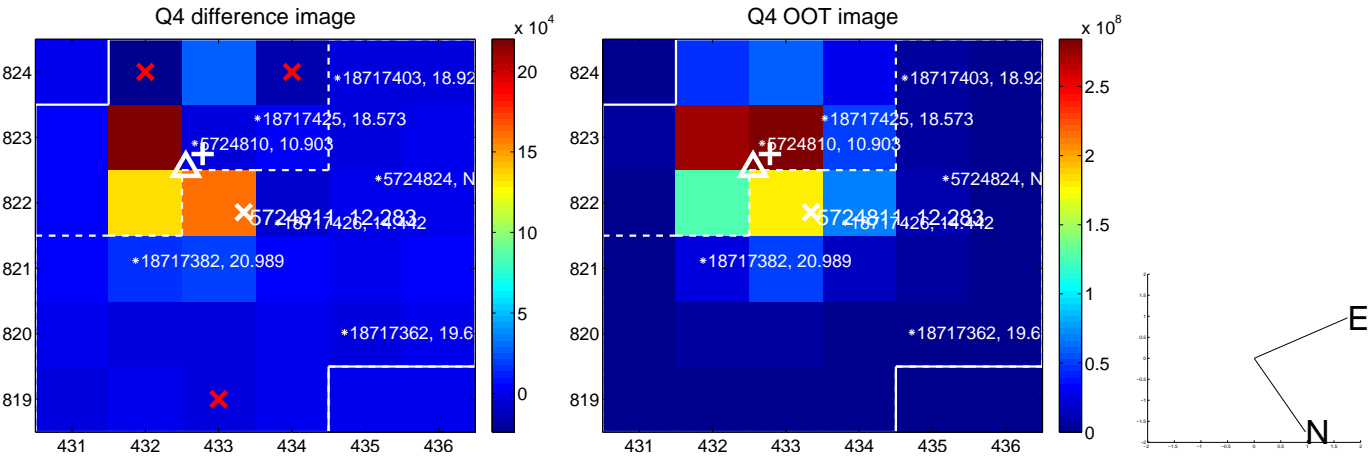
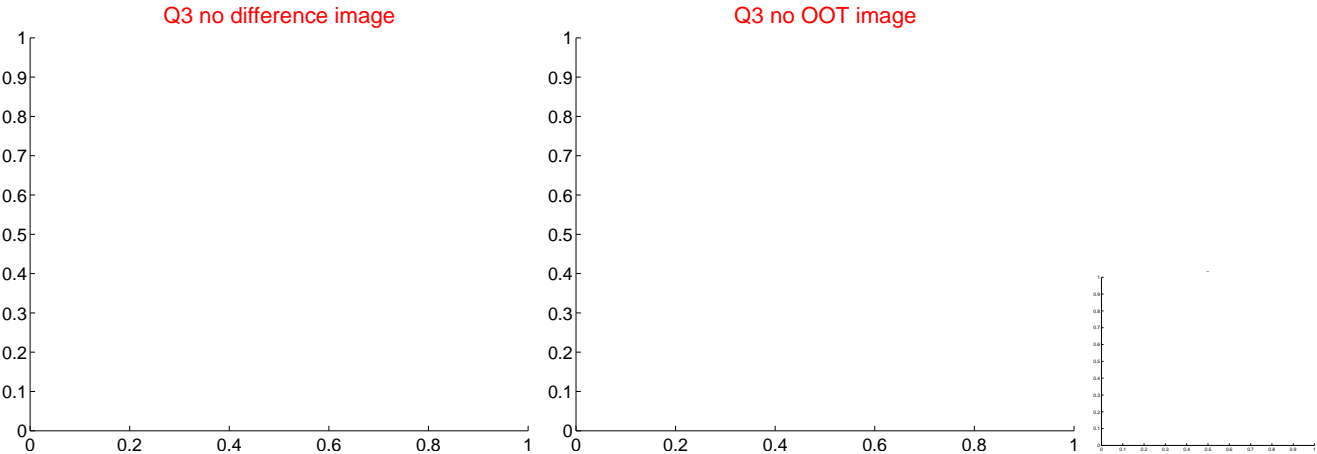
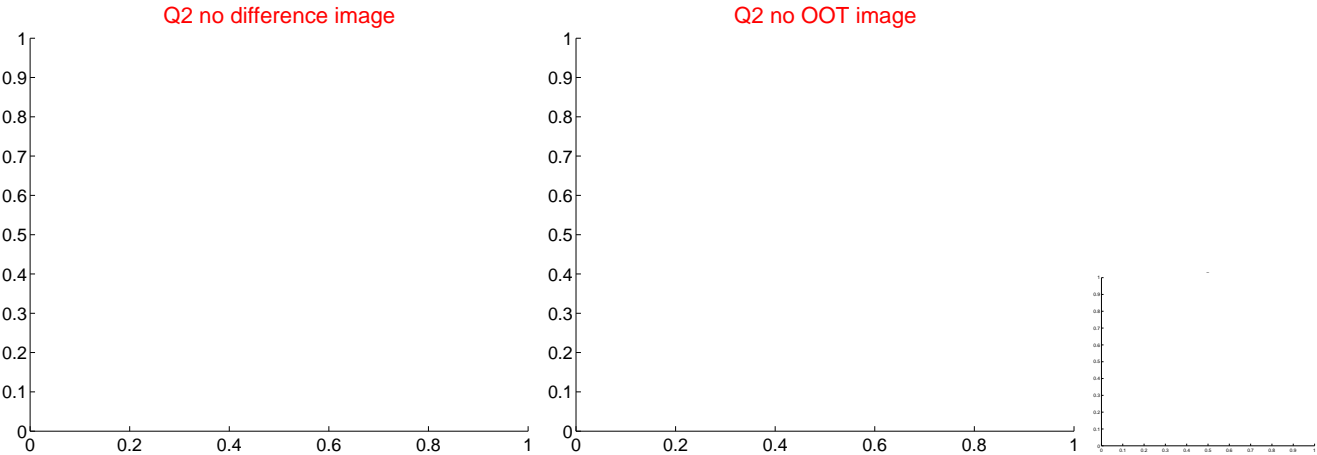
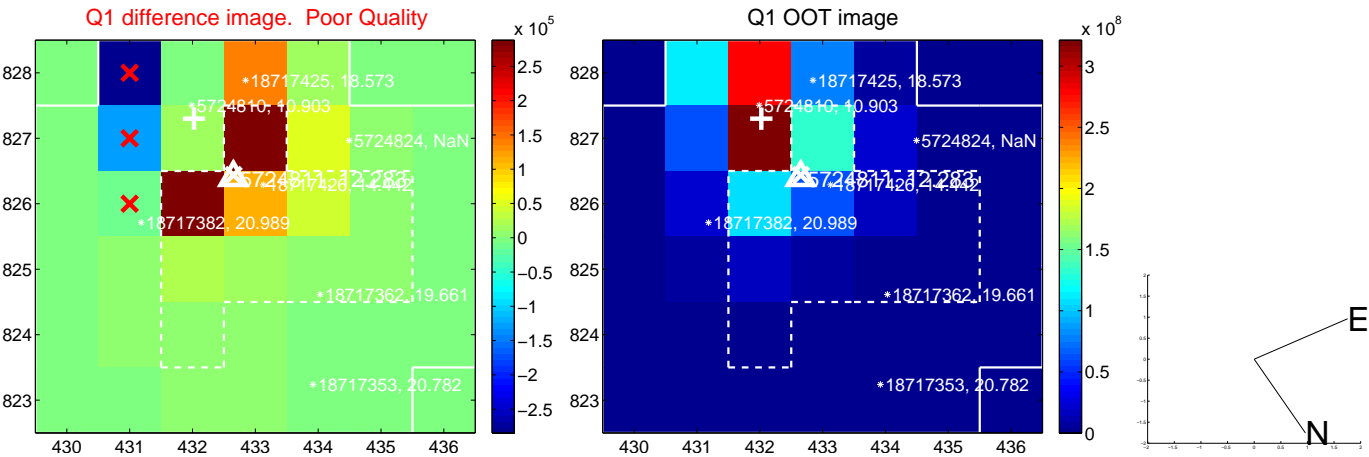
The OOT PRF centroid is offset from the target star catalog position by about 4.38 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.997 \pm 0.864$	2.31	$-0.153 \pm 0.403$	$1.991 \pm 0.857$
PRF-fit source offset from KIC position	$3.403 \pm 1.013$	3.36	$-0.721 \pm 0.300$	$-3.326 \pm 1.035$
photometric centroid source offset	$2.70 \pm 0.03$	87.12	$-0.43 \pm 0.04$	$-2.66 \pm 0.03$



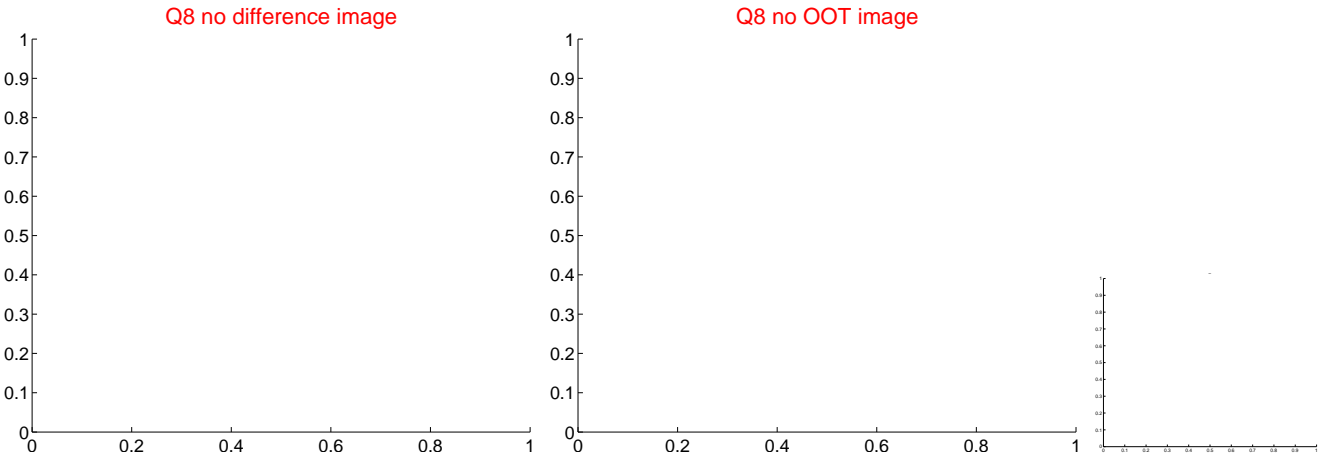
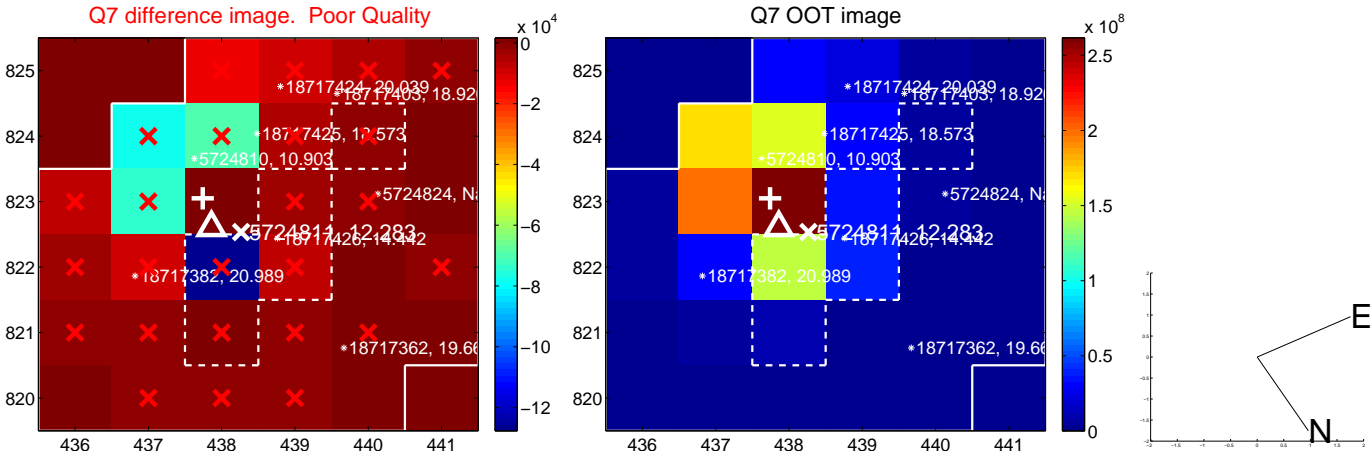
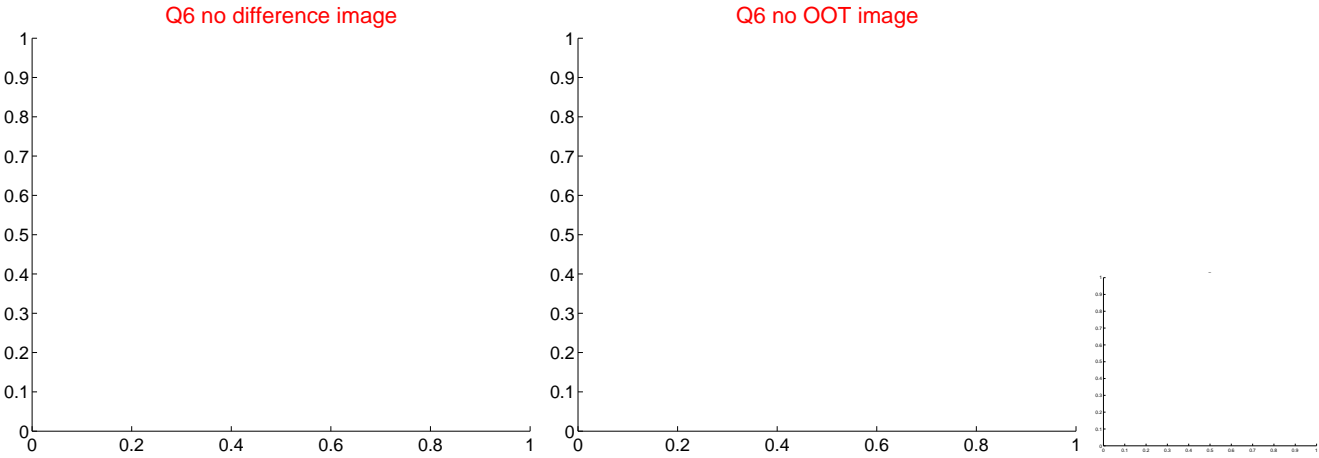
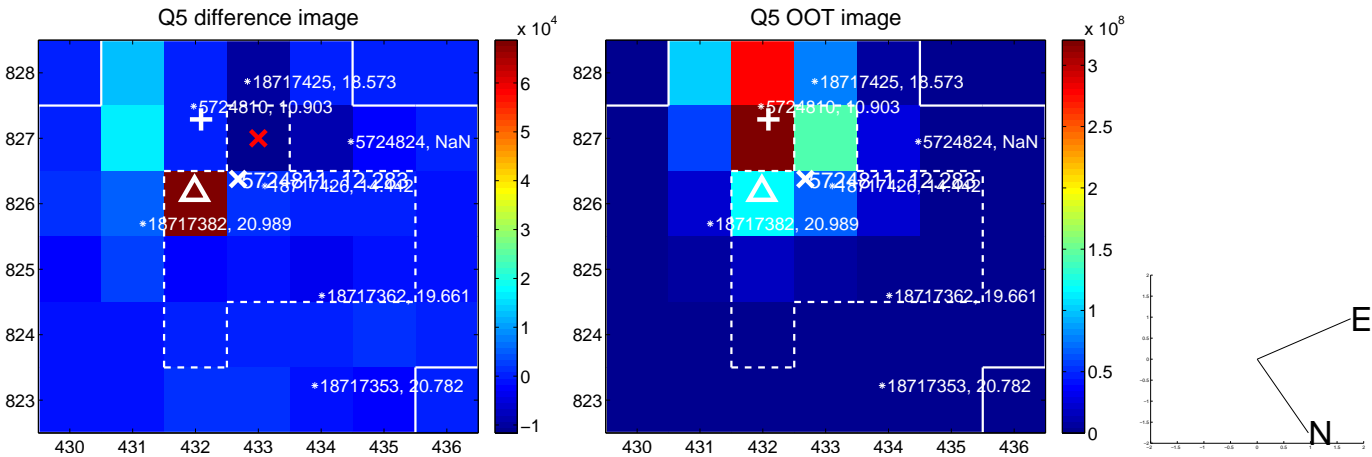
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

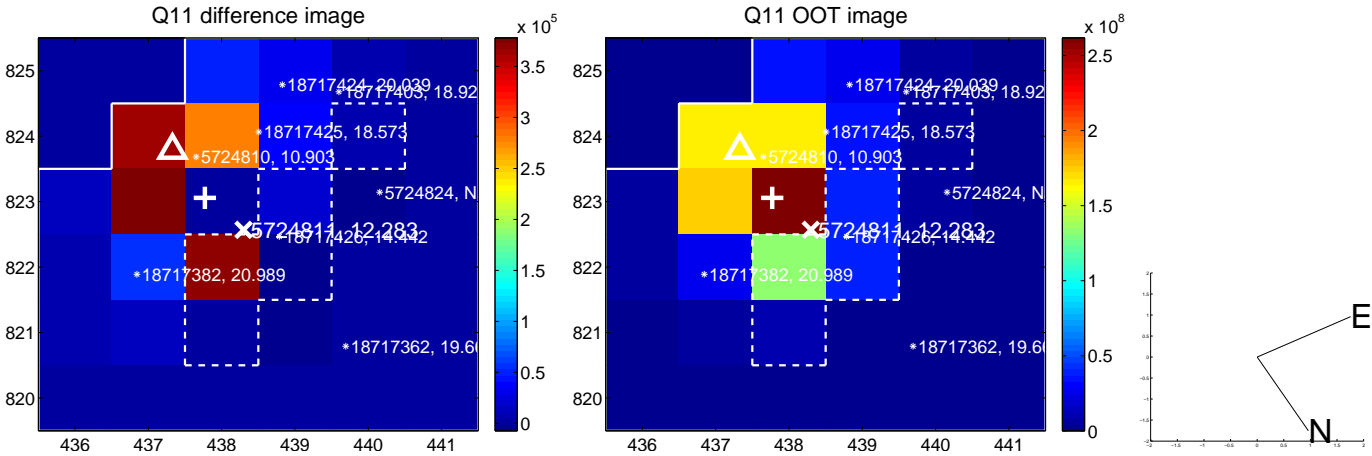
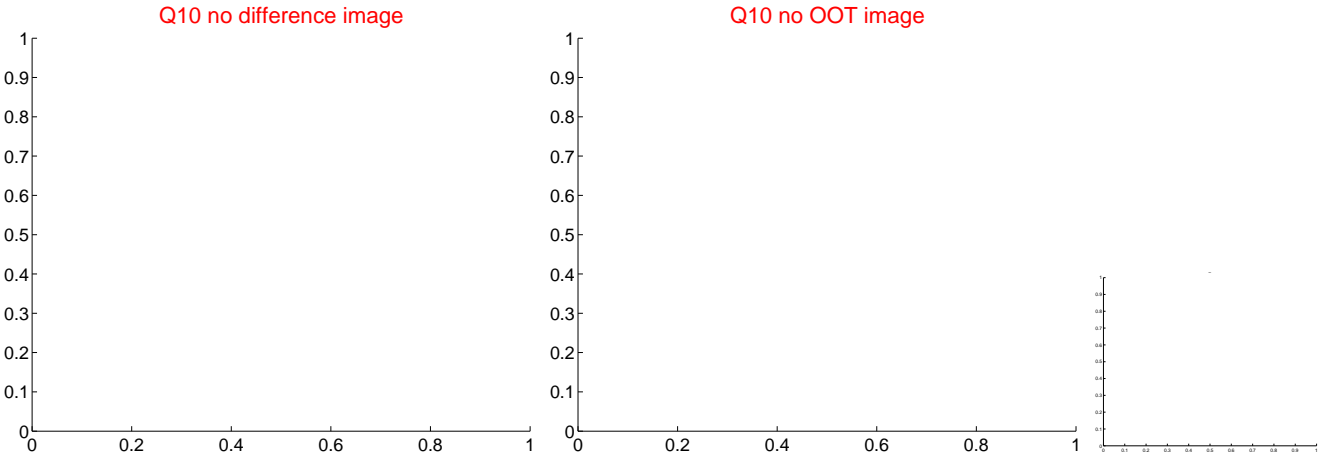
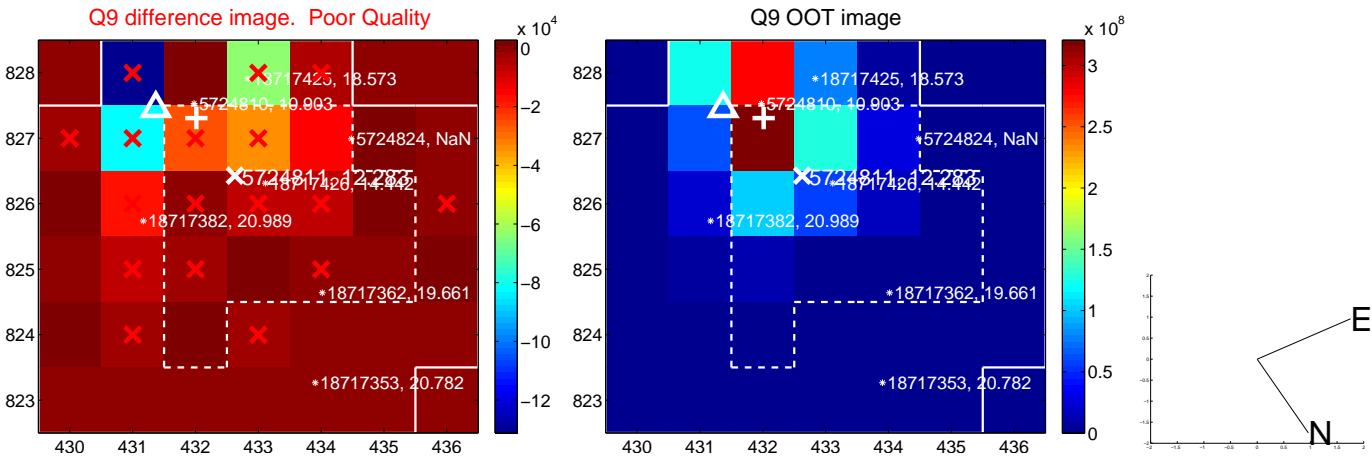




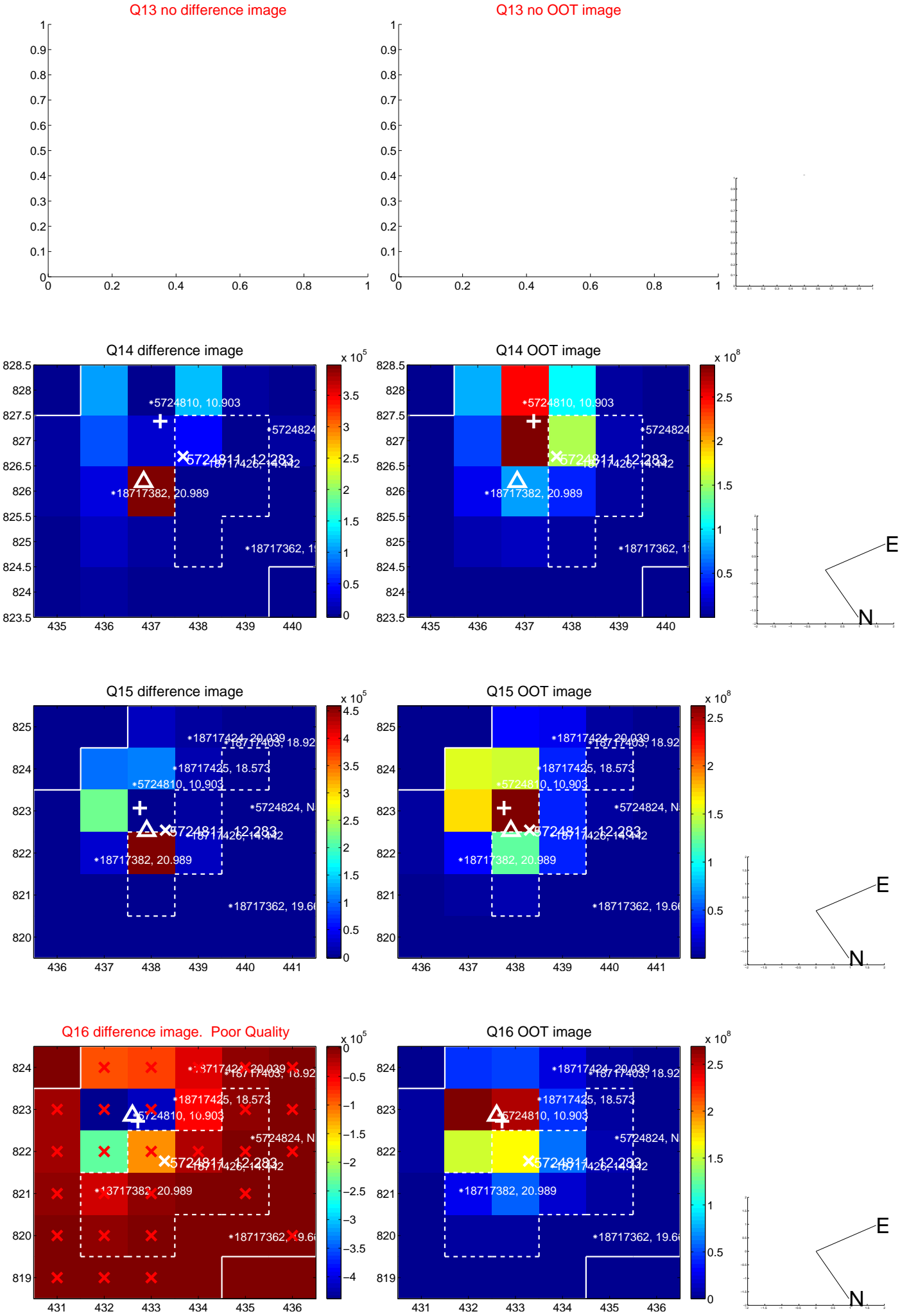
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



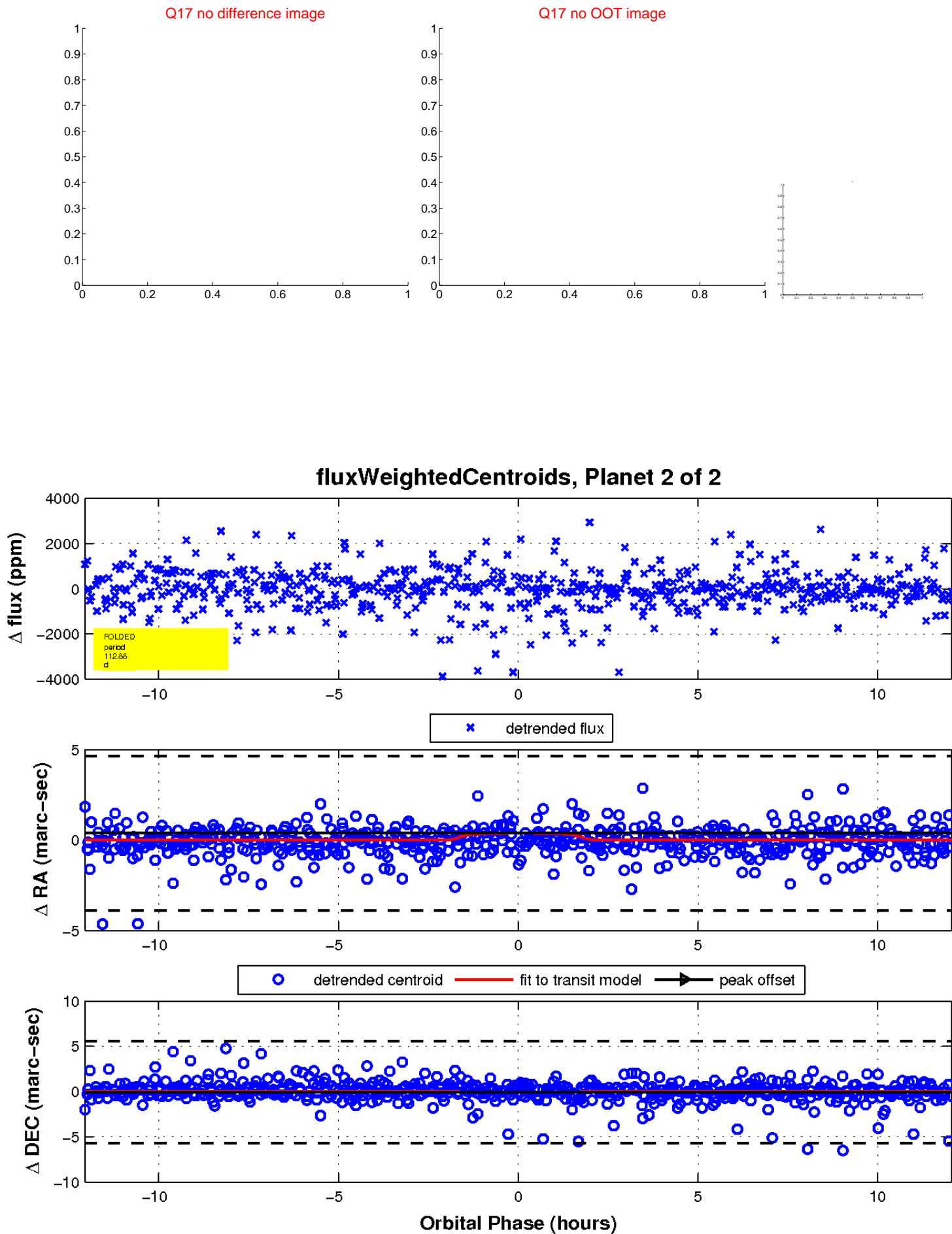
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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UKIRT Image

Declination

