

# KIC 004824942

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004824942-01	OBS	No	0.695205	131.879328	14.2	2.291	7.8	7.6	3.15	6915	1.39	62095.74
004824942-02	OBS	No	278.935062	241.495507	240.1	4.580	7.2	7.5	3.15	6915	5.57	20.98

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004824942-01	OBS	FP	0.00	1	0	1	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_UNRESOLVED_OFFSET
004824942-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—MOD_NONUNIQ_ALT—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.

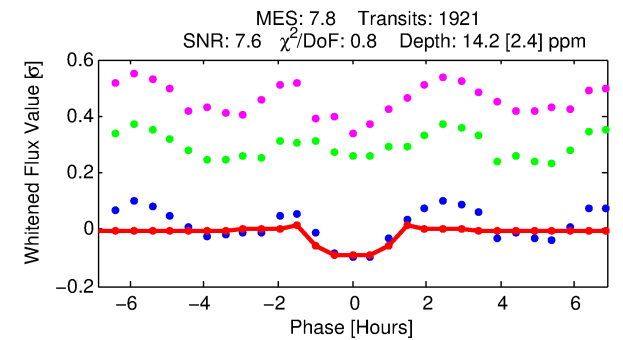
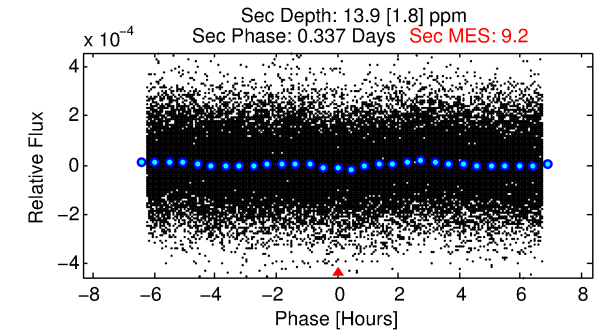
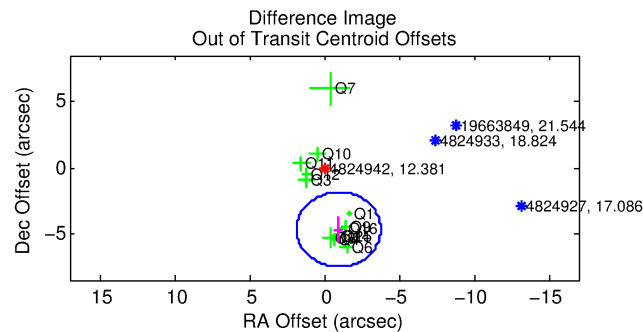
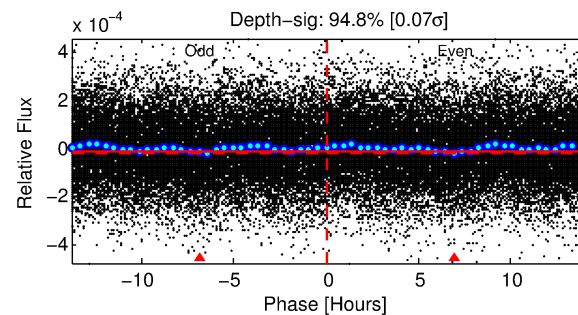
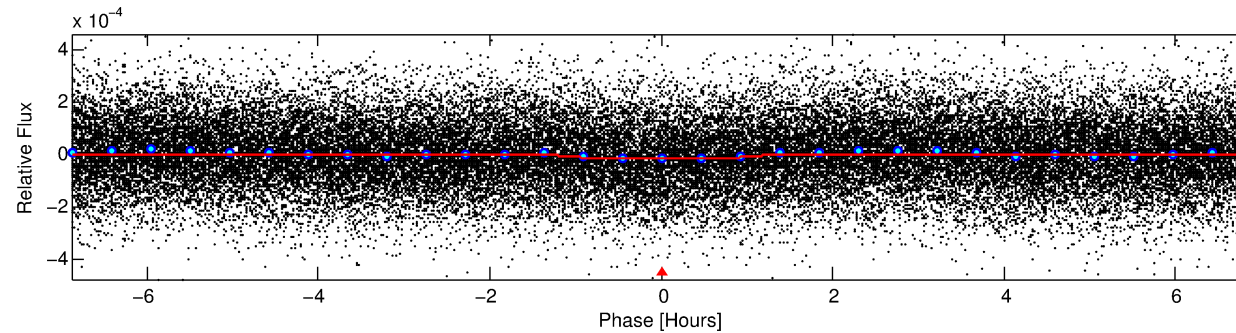
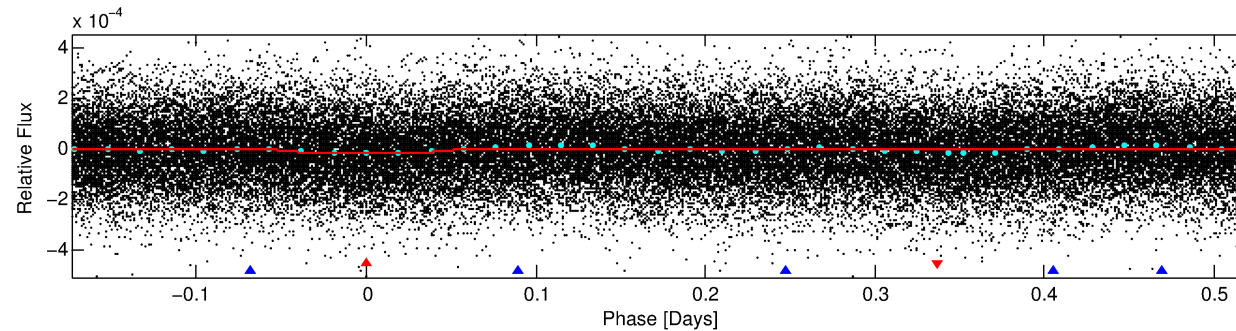
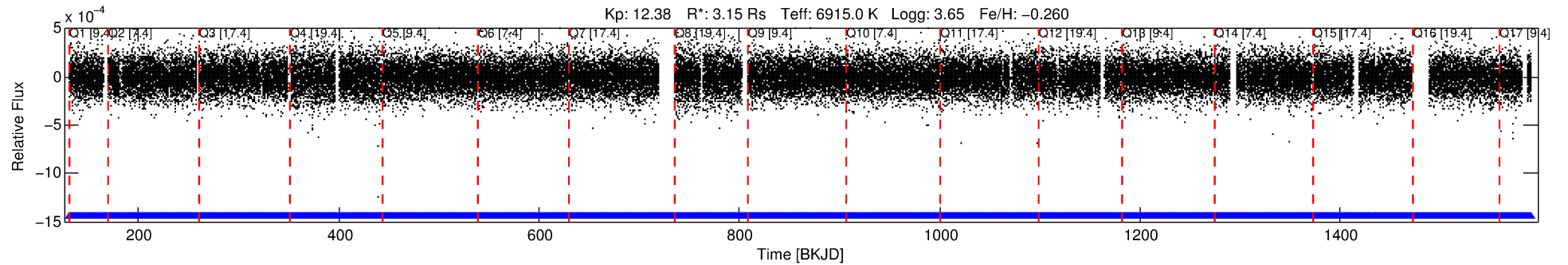
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 004824942-01

No Significant Match Found

# DV One-Page Summary

KIC: 4824942 Candidate: 1 of 2 Period: 0.695 d



## DV Fit Results:

Period = 0.69521 [0.00001] d  
Epoch = 131.8793 [0.0031] BKJD  
Rp/R\* = 0.0040 [0.0014]  
a/R\* = 1.38 [1.35]  
b = 0.90 [0.42]  
Seff = 62095.74 [34076.60]  
Teq = 4025 [552] K  
Rp = 1.39 [0.68] Re  
a = 0.0181 [0.0061] AU  
Ag = 1.30 [1.13] [0.26 $\sigma$ ]  
Teffp = 6645 [1164] K [2.03 $\sigma$ ]

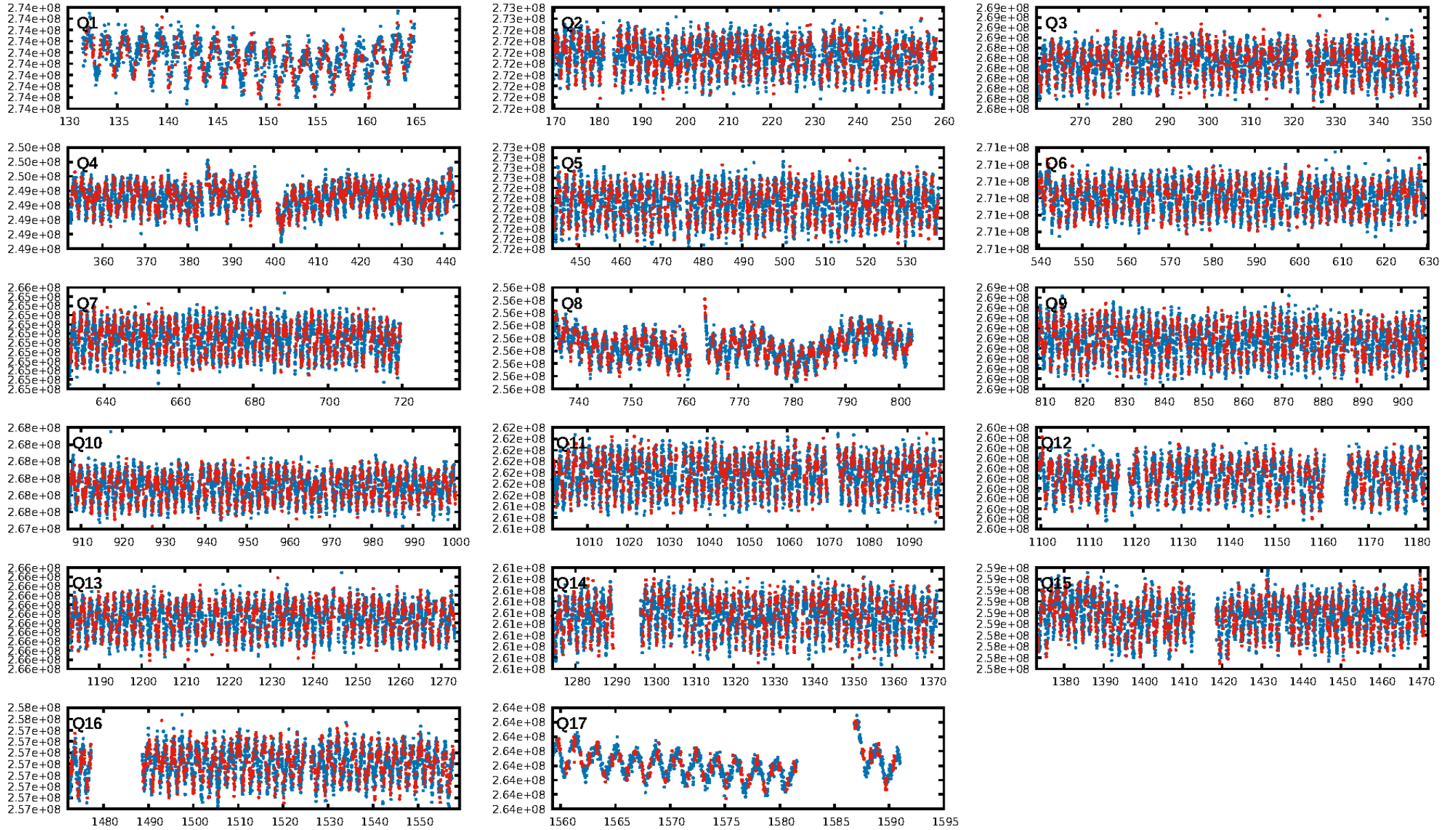
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [1304.07 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
**Bootstrap-pfa: 9.17e-12**  
RollingBand-fgt: 1.00 [1835/1835]  
**GhostDiagnostic-chr: 0.3234**  
Centroid-sig: 0.5%  
Centroid-so: 1.238 arcsec [1.65 $\sigma$ ]  
**OotOffset-rm: 4.775 arcsec [5.08 $\sigma$ ]**  
**KicOffset-rm: 4.649 arcsec [5.31 $\sigma$ ]**  
OotOffset-st: 4/4/4/2 [14]  
KicOffset-st: 4/4/4/2 [14]  
DiffImageQuality-fgm: 0.57 [8/14]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 02:59:01 Z

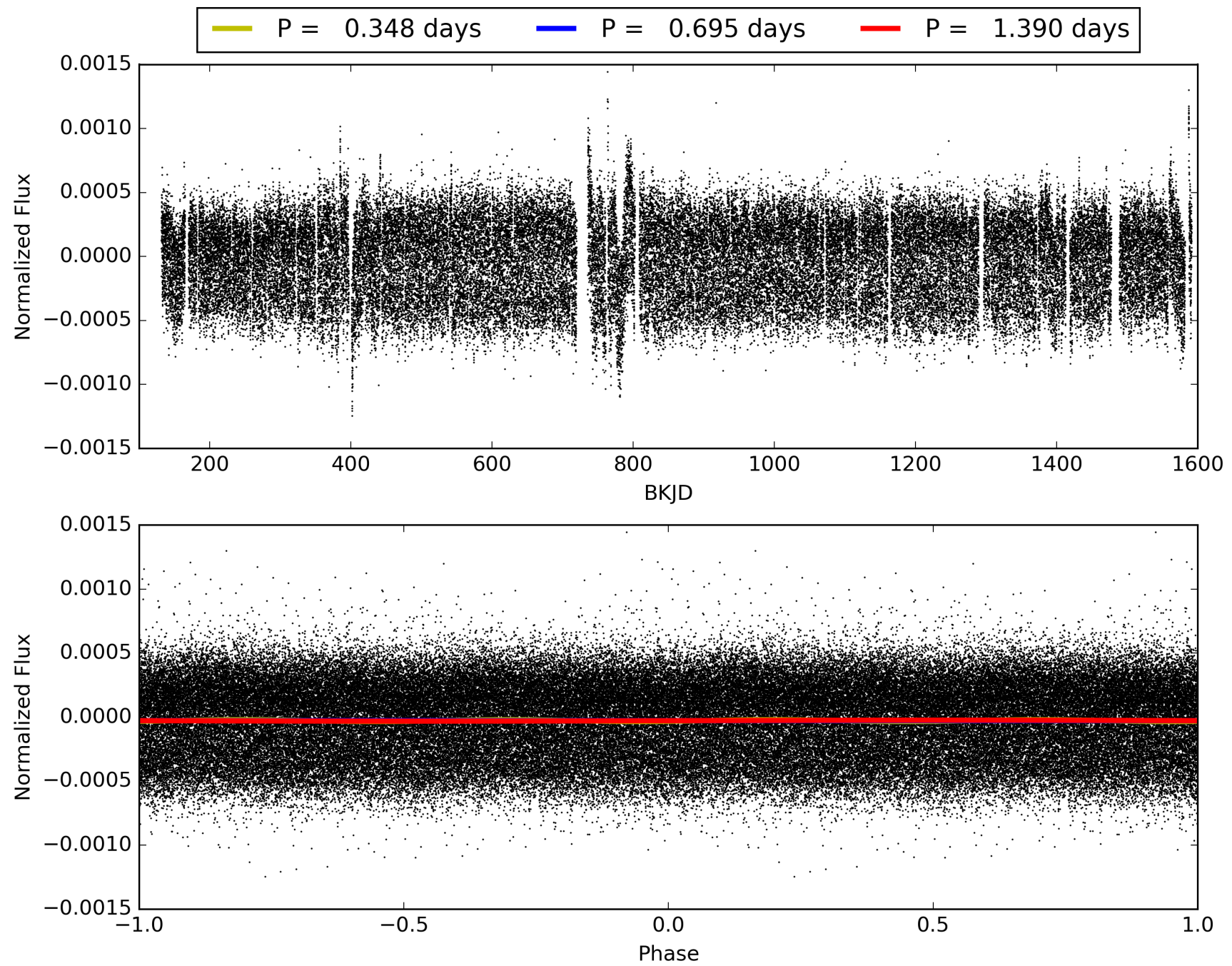
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 004824942-01, PDC Light Curves



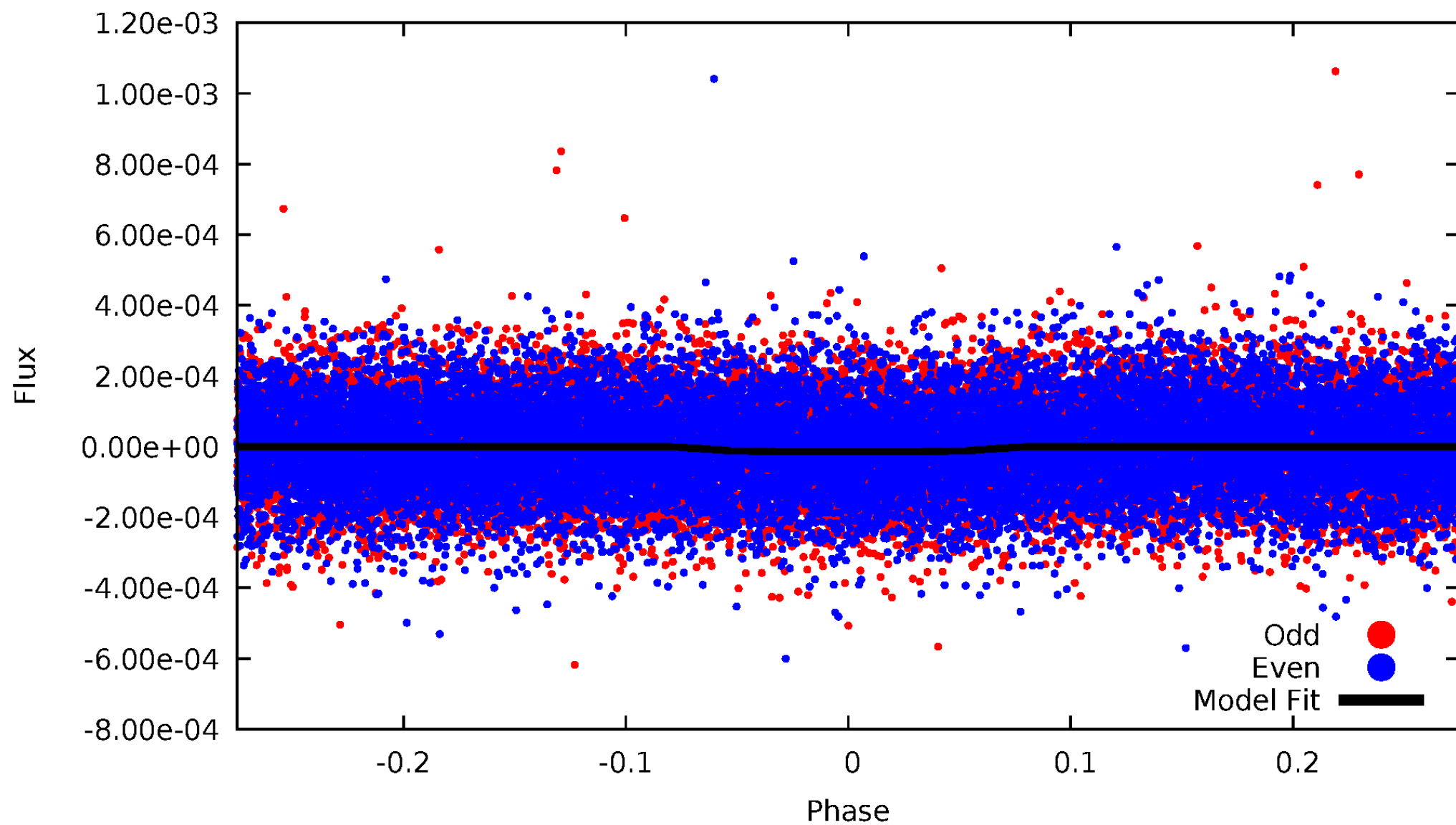


TCE 004824942-01



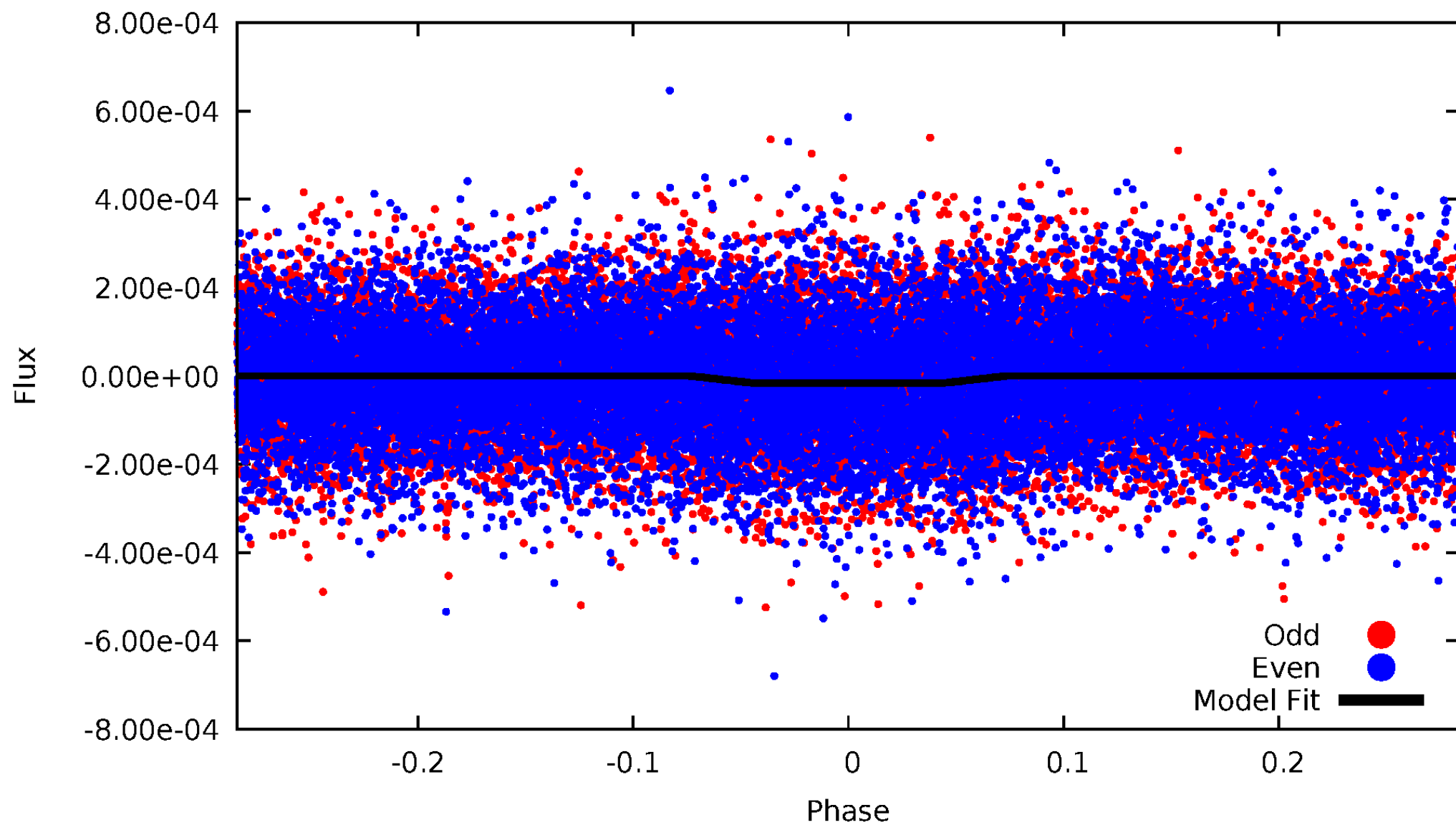
# DV Odd/Even

TCE 004824942-01

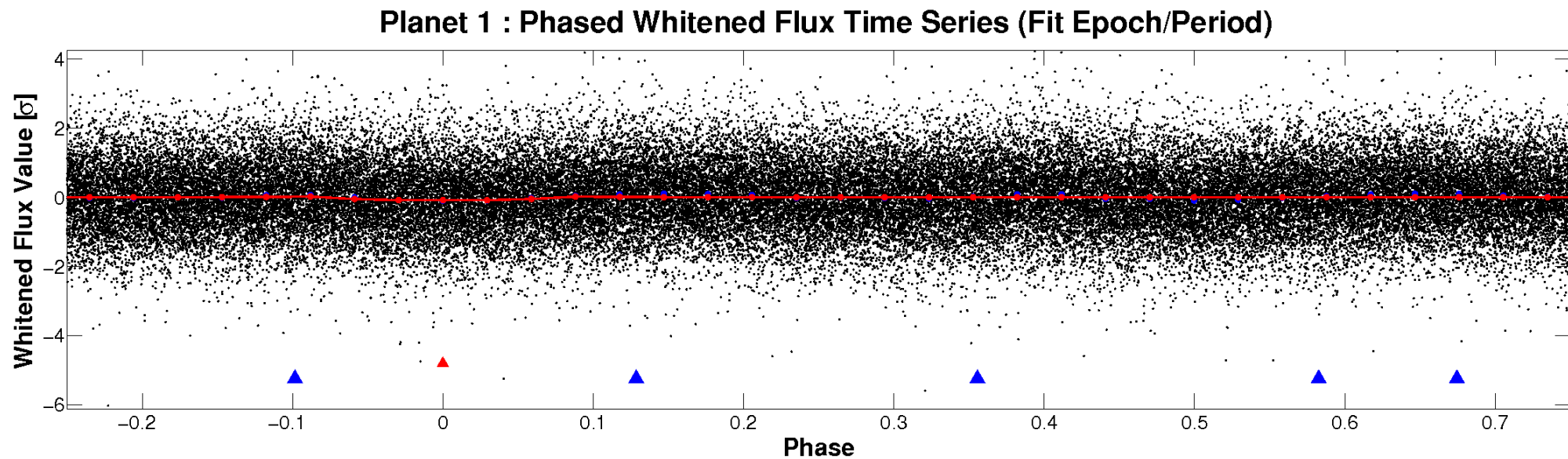
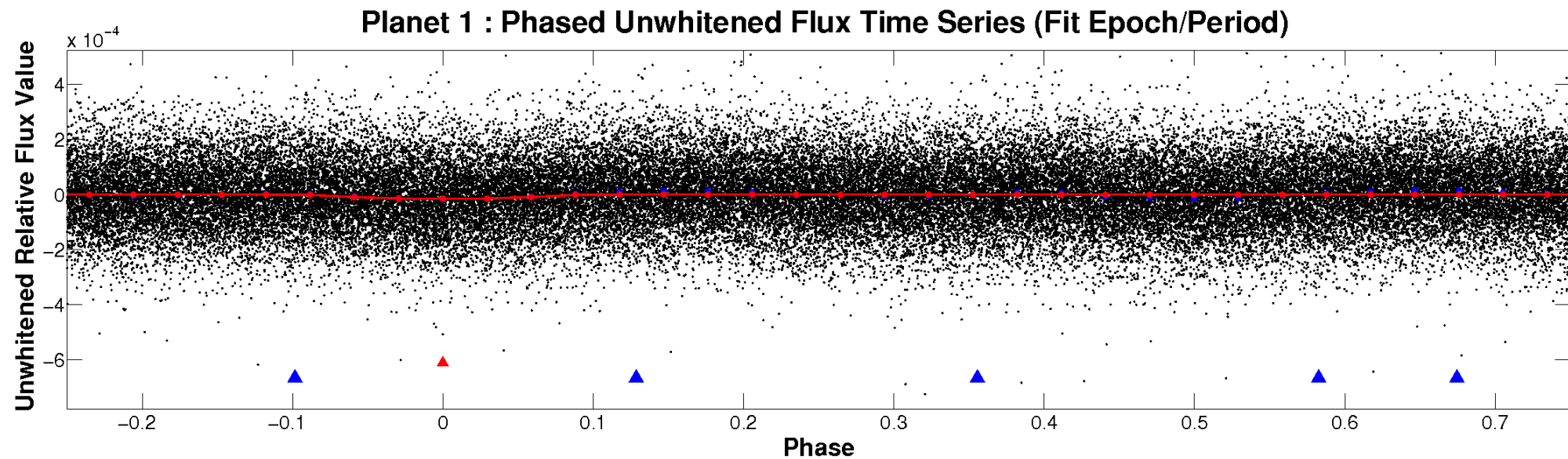


# ALT Odd/Even

TCE 004824942-01



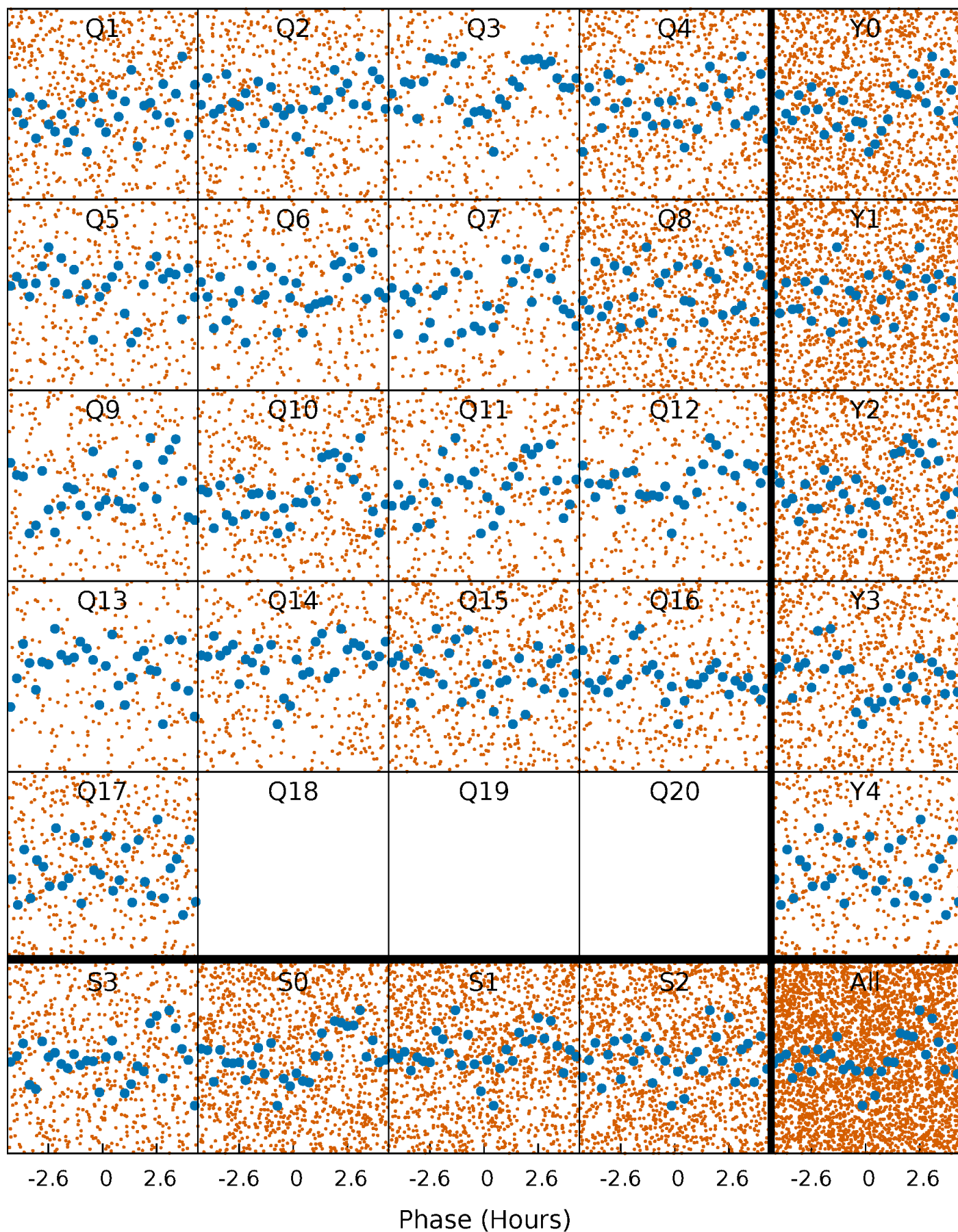
# Non-Whitened Vs. Whitened Light Curve





# PDC Quarter-Phased Transit Curves

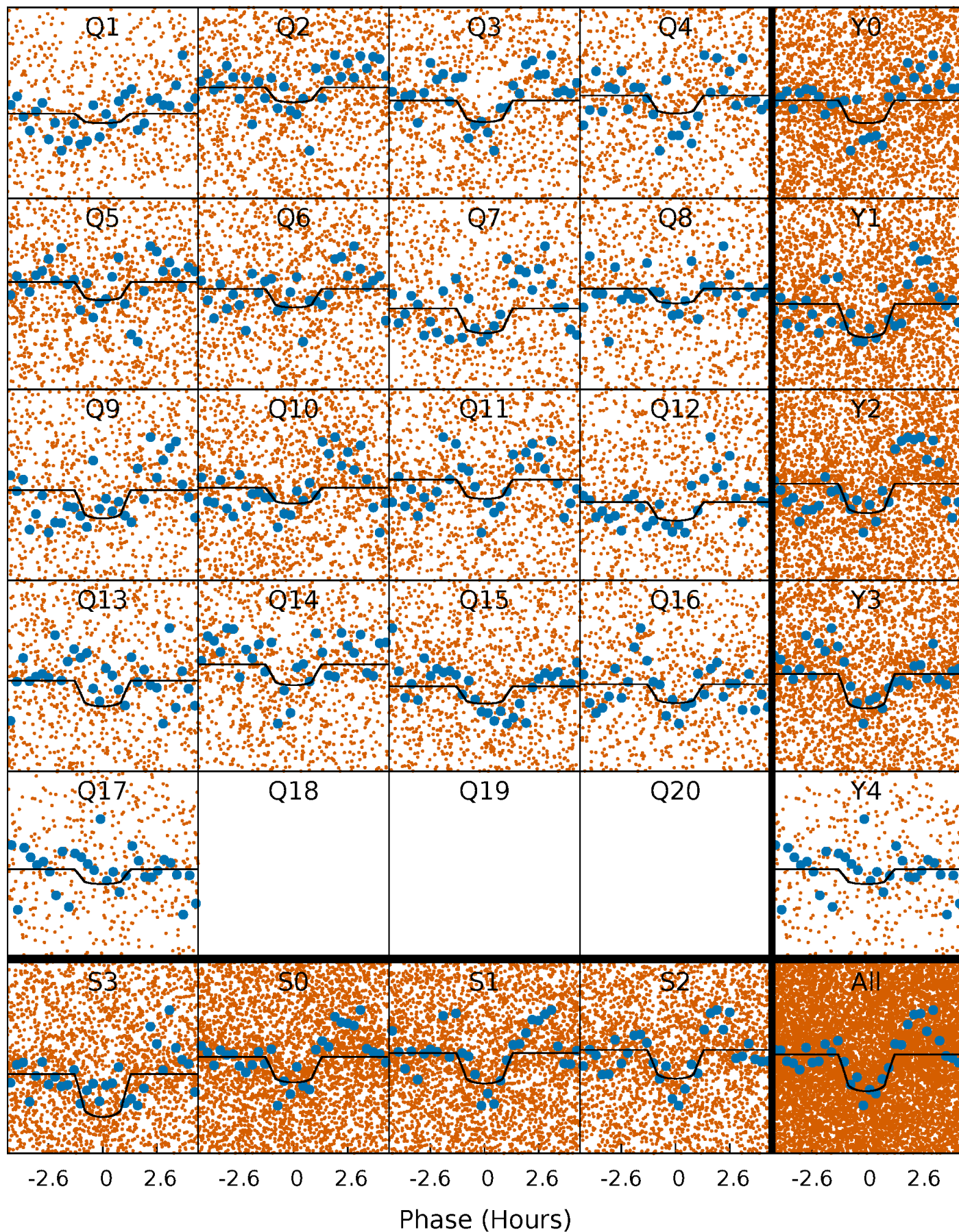
TCE 004824942-01 P= 0.695205 Days  $T_0=131.879328$  (BKJD)





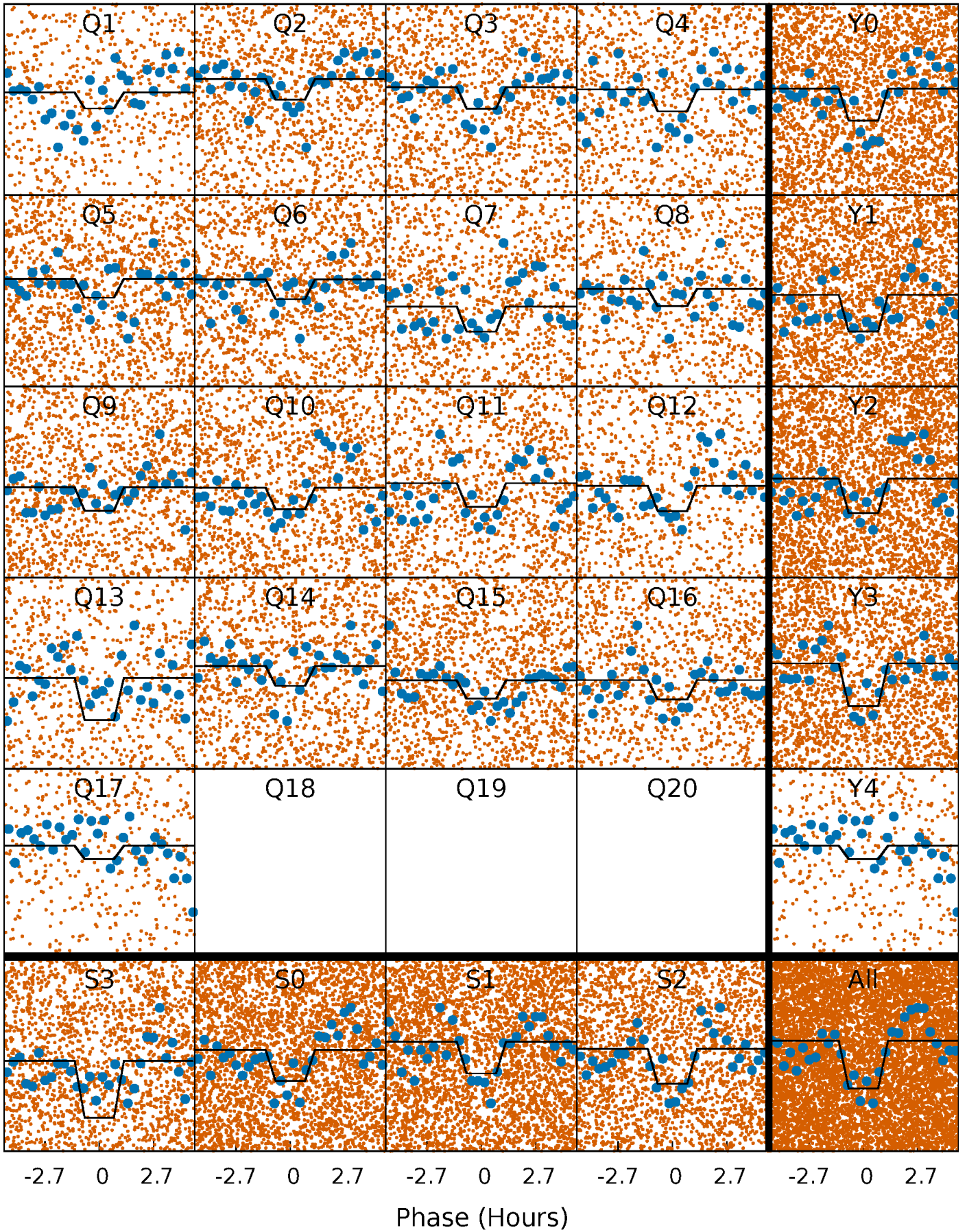
# DV Quarter-Phased Transit Curves

TCE 004824942-01 P= 0.695205 Days  $T_0=131.879328$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 004824942-01 P= 0.695208 Days  $T_0=131.879380$  (BKJD)

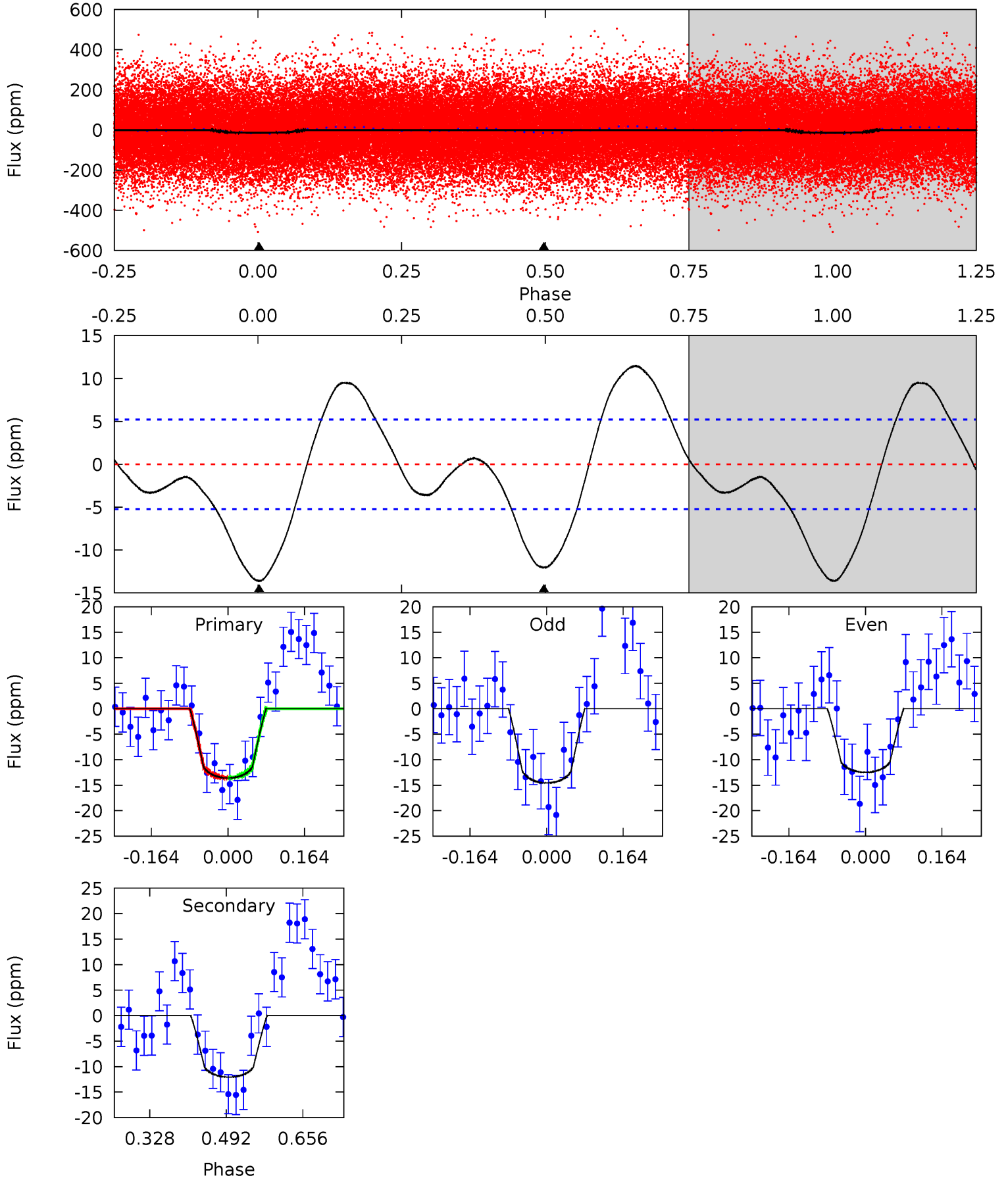




# DV Model-Shift Uniqueness Test

004824942-01, P = 0.695205 Days, E = 131.184123 Days

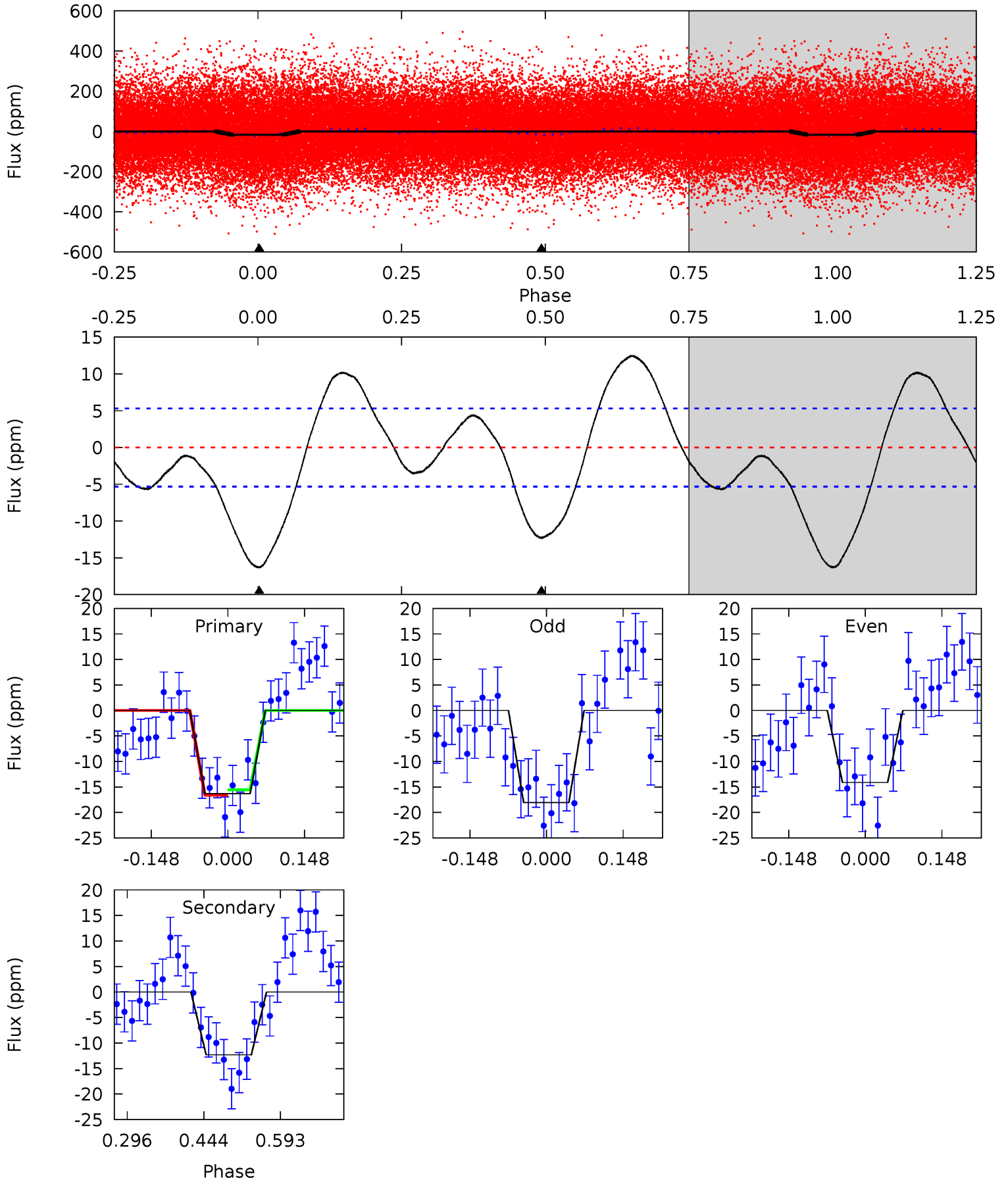
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.6	10.3	0	0	4.46	1.39	4.09	11.6	11.6	10.3	10.3	0.90	1.01	0.46	0.01



# Alt Model-Shift Uniqueness Test

004824942-01, P = 0.695208 Days, E = 131.184172 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
13.7	10.4	0	0	4.48	1.45	4.78	13.7	13.7	10.4	10.4	1.68	0.96	0.43	0.46





### Stellar Parameters For KIC 004824942

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6915^{+183}_{-224}$	$3.655^{+0.312}_{-0.078}$	$-0.260^{+0.300}_{-0.250}$	$3.153^{+0.396}_{-1.109}$	$1.638^{+0.216}_{-0.324}$	$0.074^{+0.174}_{-0.018}$
	+3%/-3%	+9%/-2%	+115%/-96%	+13%/-35%	+13%/-20%	+236%/-24%
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 004824942-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-12 \pm 1$	$1.29^{+0.52}_{-0.45}$	$5500^{+317}_{-453}$	$5941^{+1849}_{-1051}$	$1.296^{+1.830}_{-0.613}$
Alt.	$-12 \pm 1$	$1.31^{+0.51}_{-0.48}$	$5515^{+299}_{-481}$	$5967^{+1954}_{-1081}$	$1.342^{+1.964}_{-0.657}$

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

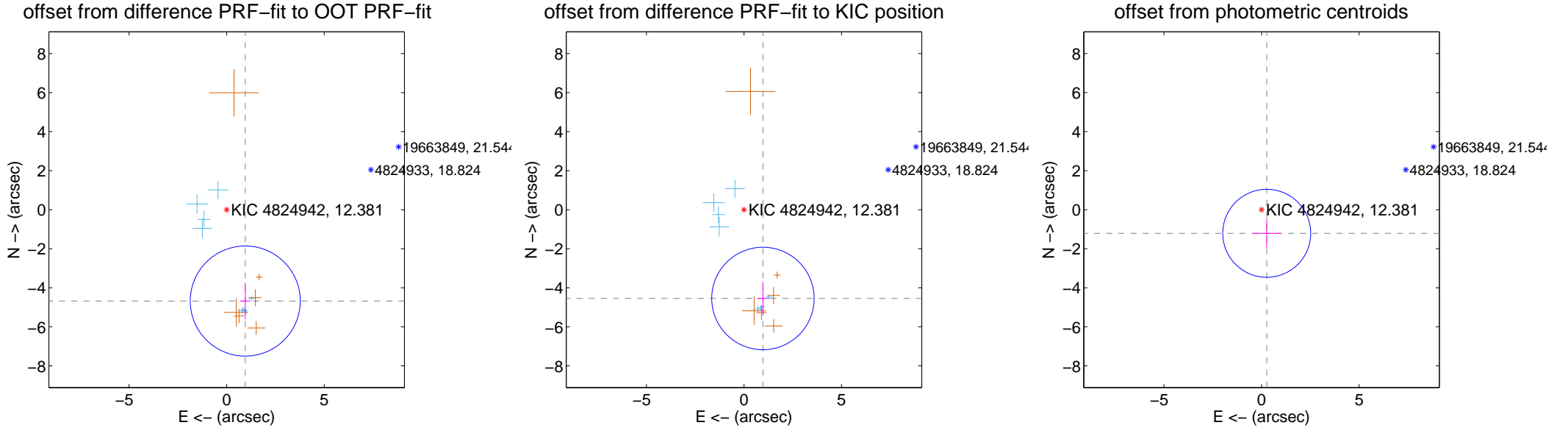
## DV Centroid Data

Supplemental centroid analysis for 004824942-01. Kepler magnitude: 12.38. Transit SNR 7.61

There are 8 quarters with good PRF difference image offsets

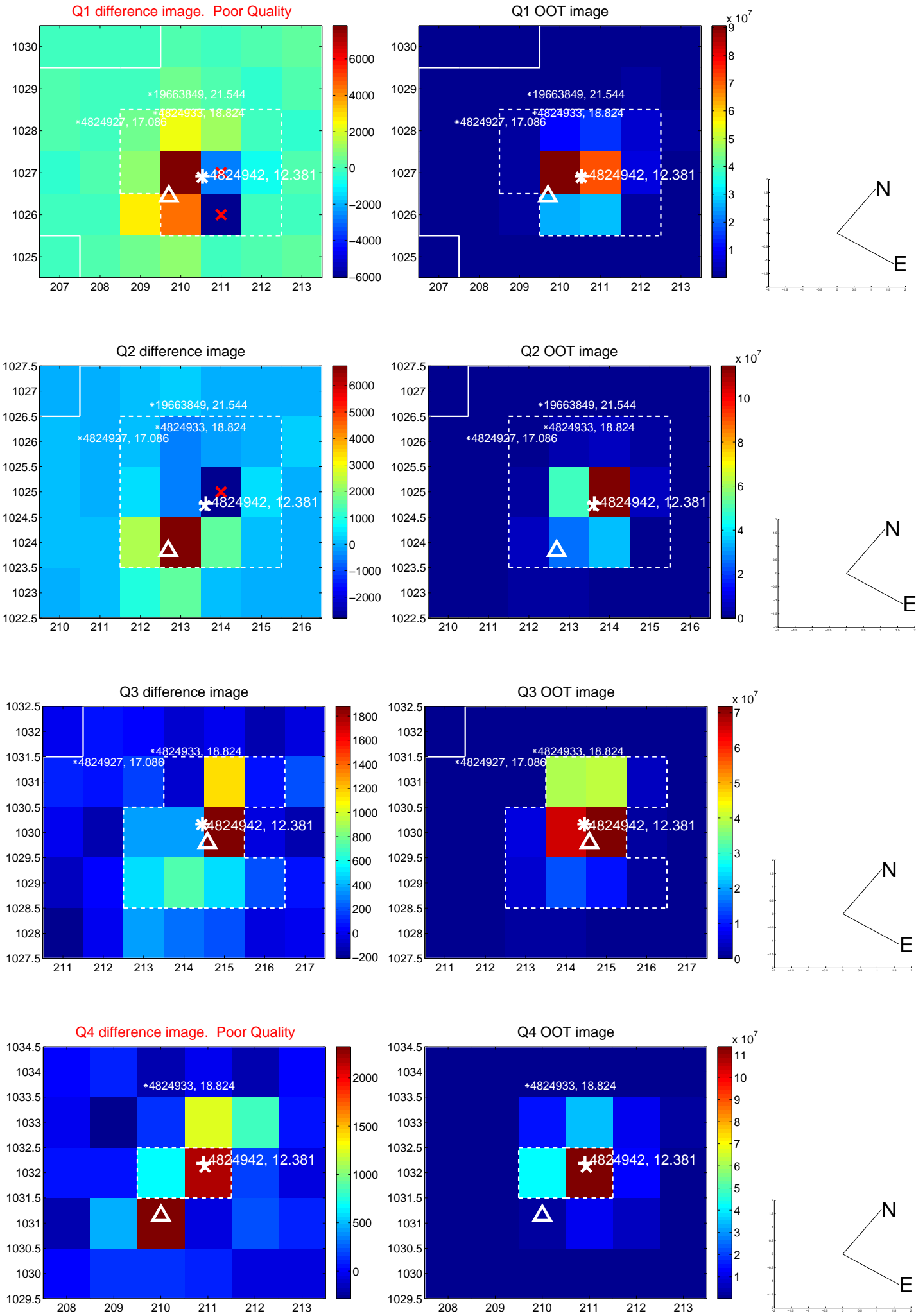
The direct PRF centroid is offset from the target star catalog position by about 0.07 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$4.775 \pm 0.940$	<b>5.08</b>	$-0.954 \pm 0.269$	$-4.679 \pm 0.932$
PRF-fit source offset from KIC position	$4.649 \pm 0.875$	<b>5.31</b>	$-0.973 \pm 0.295$	$-4.546 \pm 0.861$
photometric centroid source offset	$1.24 \pm 0.75$	1.65	$-0.26 \pm 0.74$	$-1.21 \pm 0.75$



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.

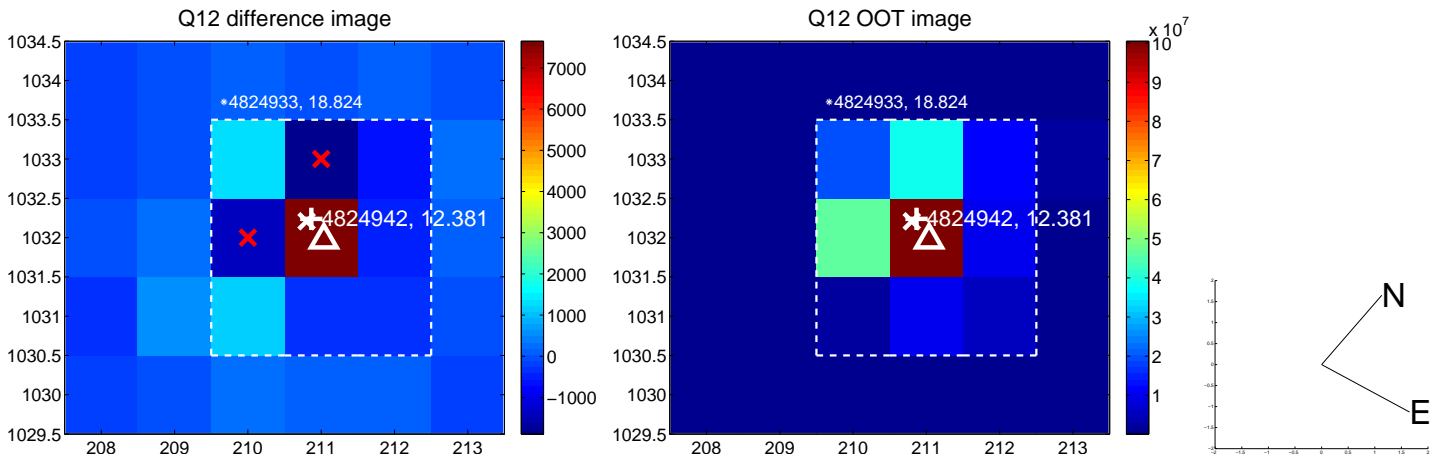
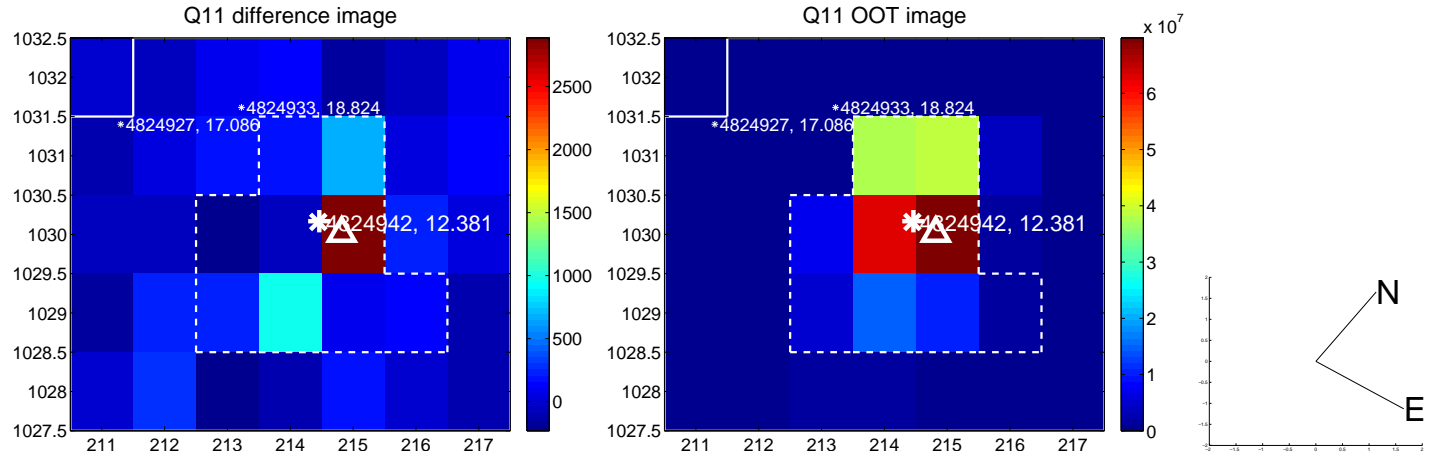
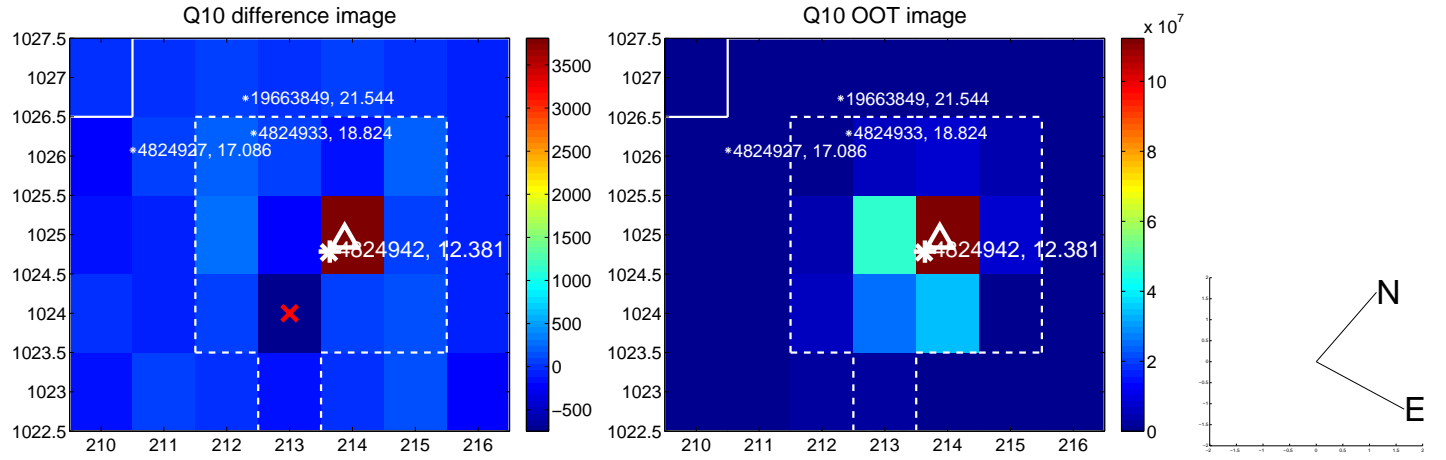
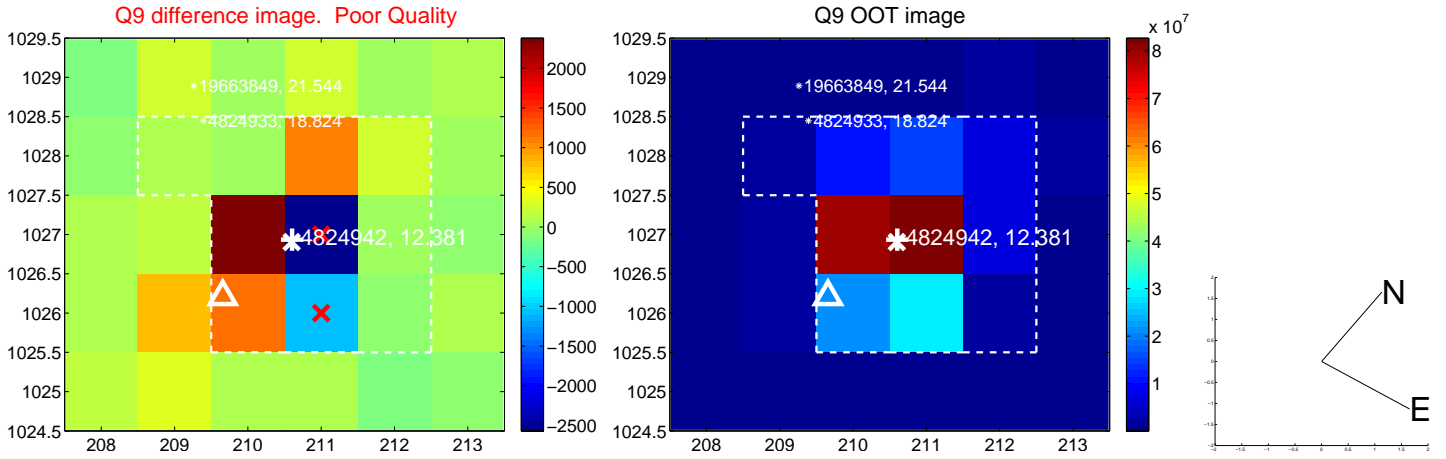
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



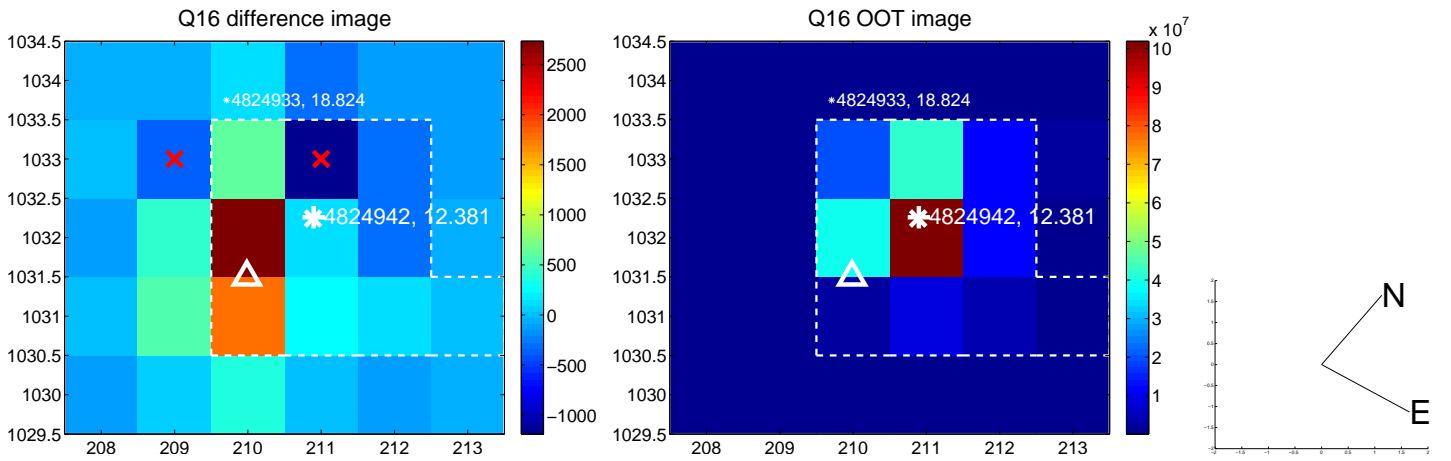
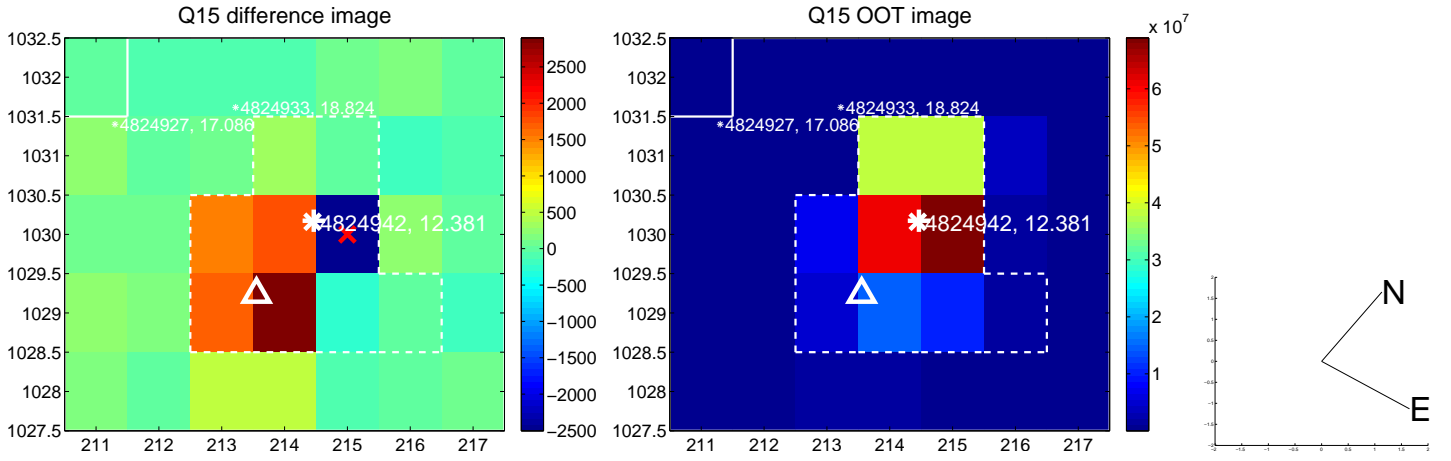
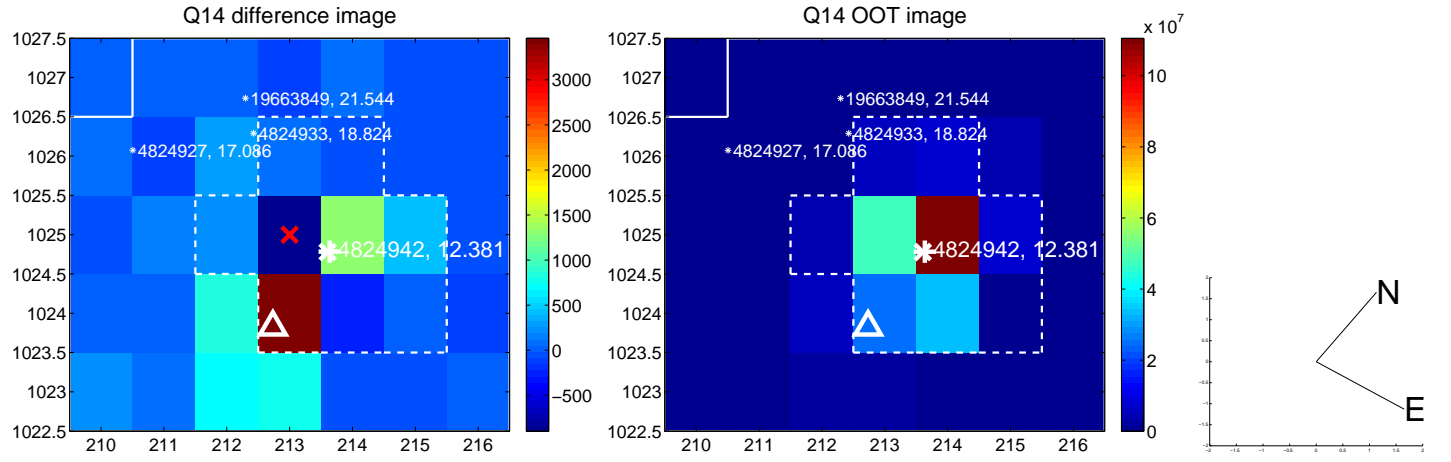
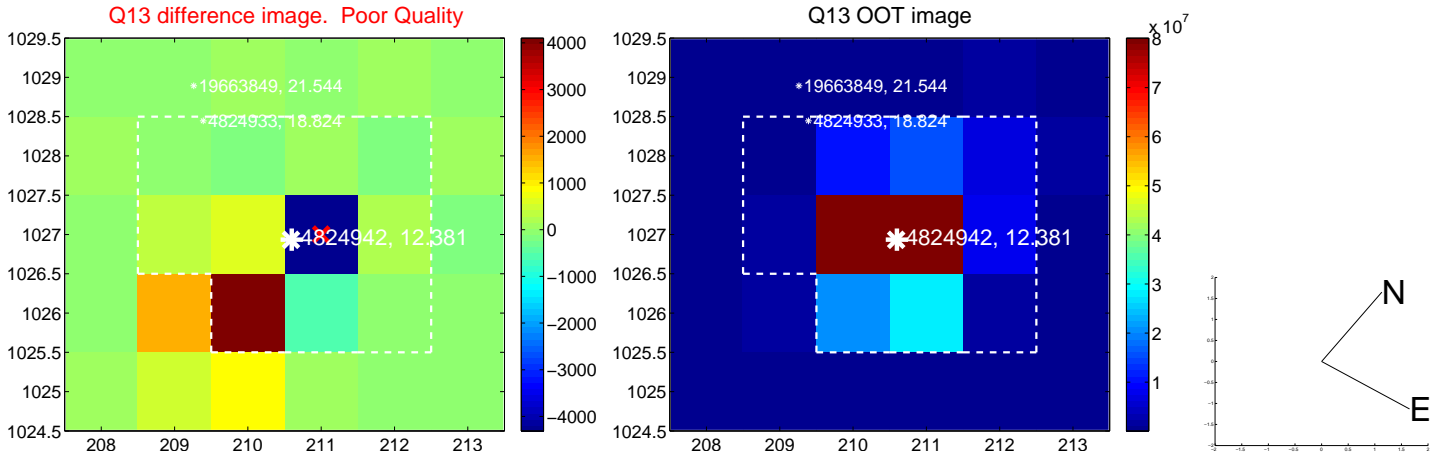




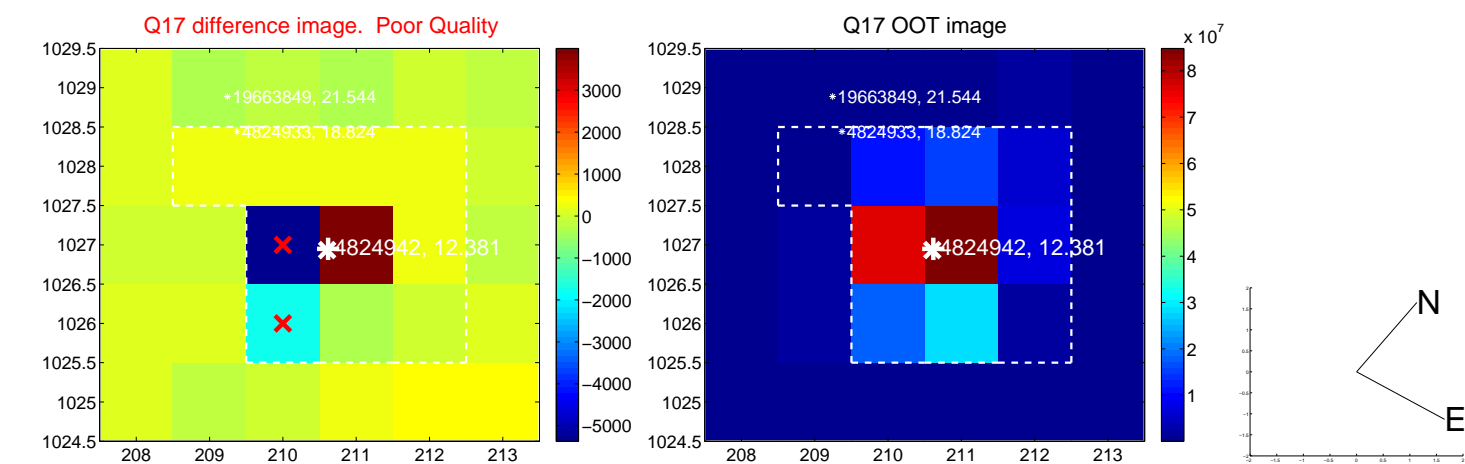
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



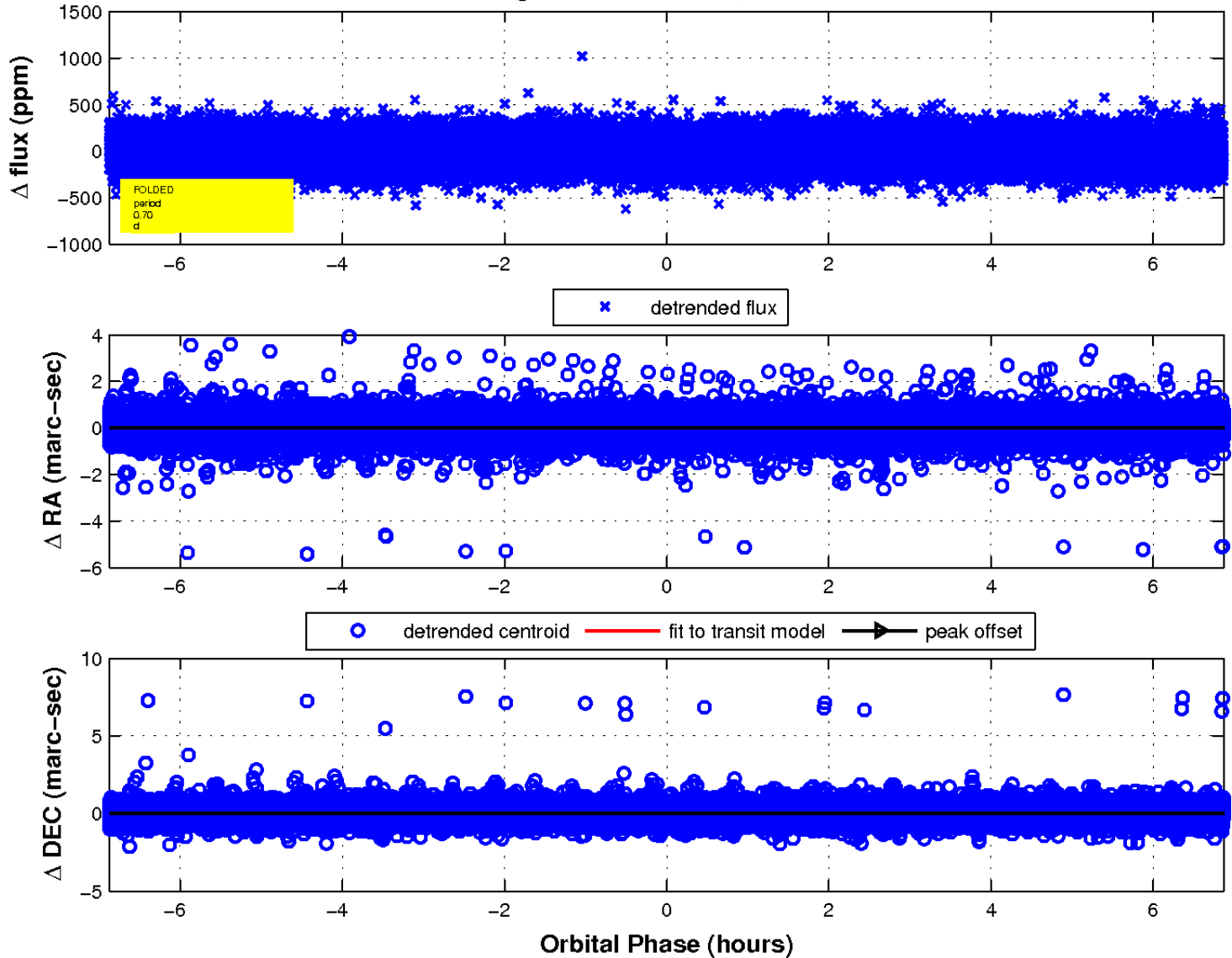
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

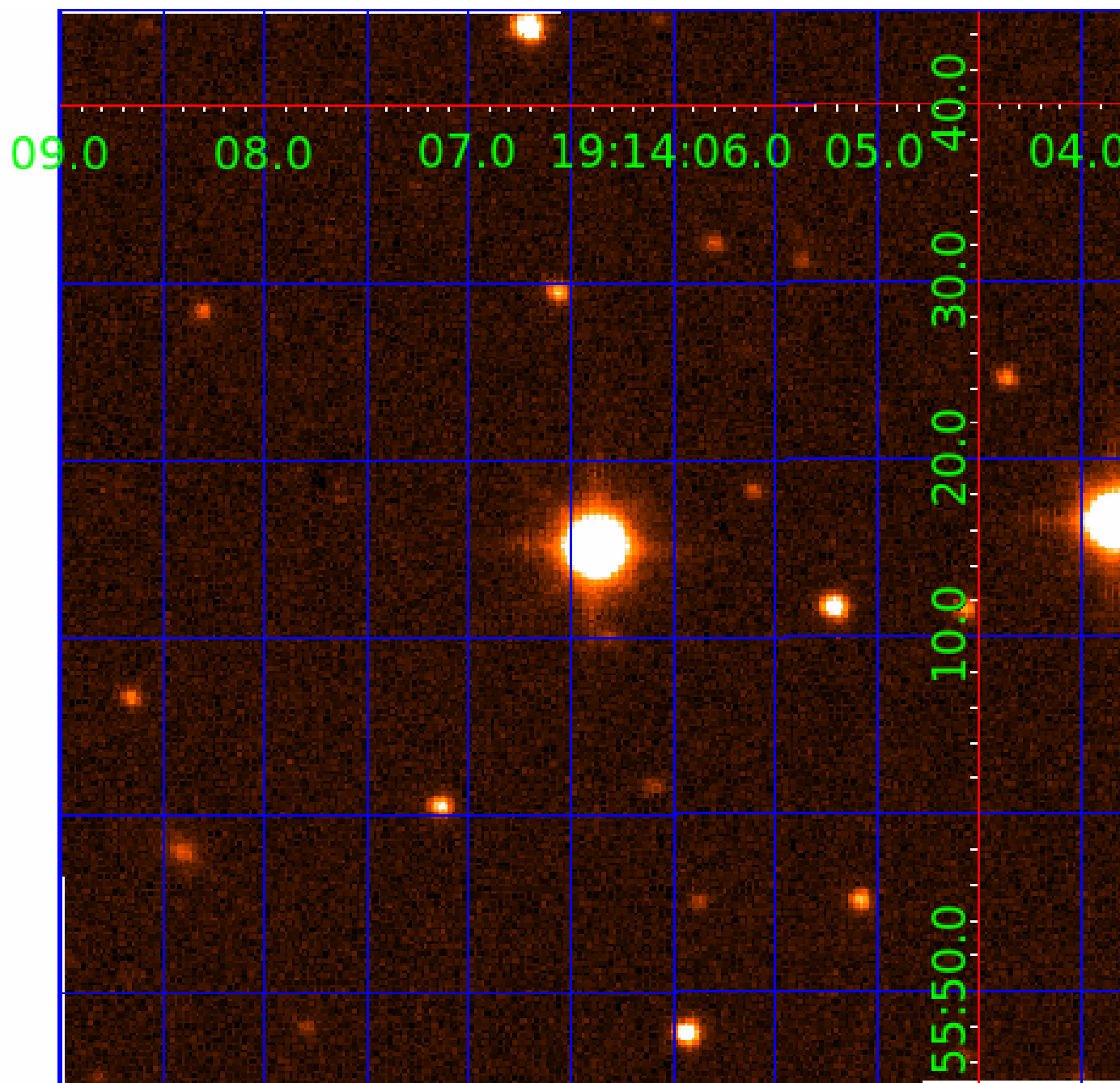


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination





# KIC 004824942

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004824942-01	OBS	No	0.695205	131.879328	14.2	2.291	7.8	7.6	3.15	6915	1.39	62095.74
004824942-02	OBS	No	278.935062	241.495507	240.1	4.580	7.2	7.5	3.15	6915	5.57	20.98

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004824942-01	OBS	FP	0.00	1	0	1	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_UNRESOLVED_OFFSET
004824942-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—MOD_NONUNIQ_ALT—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.

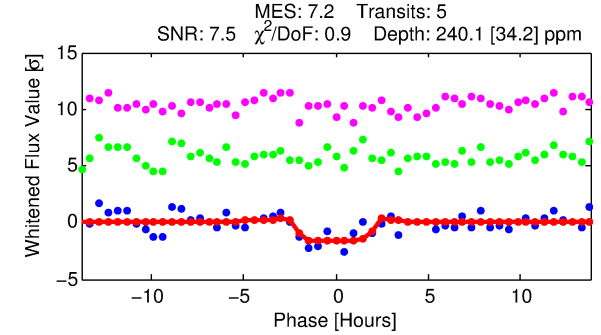
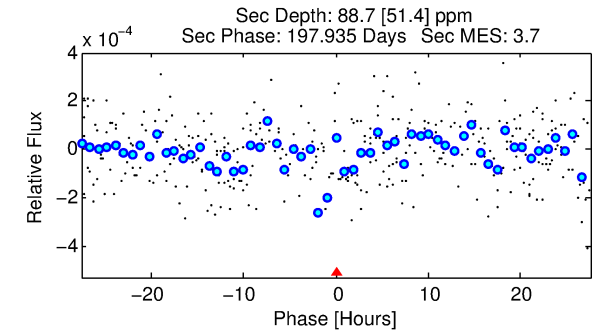
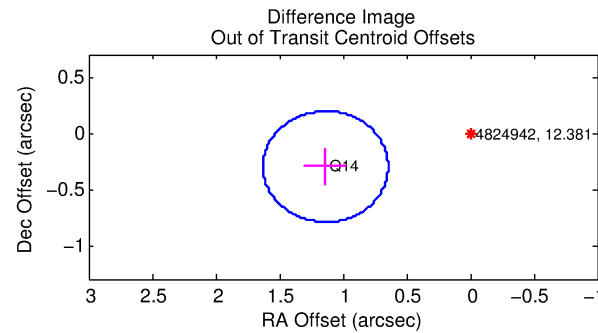
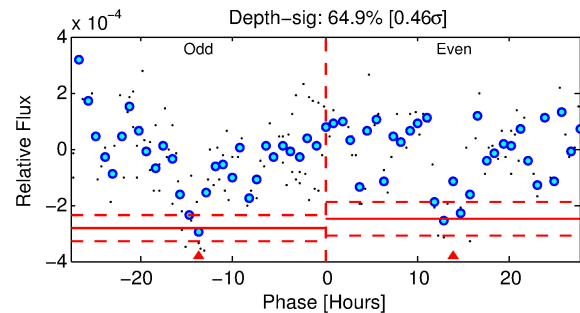
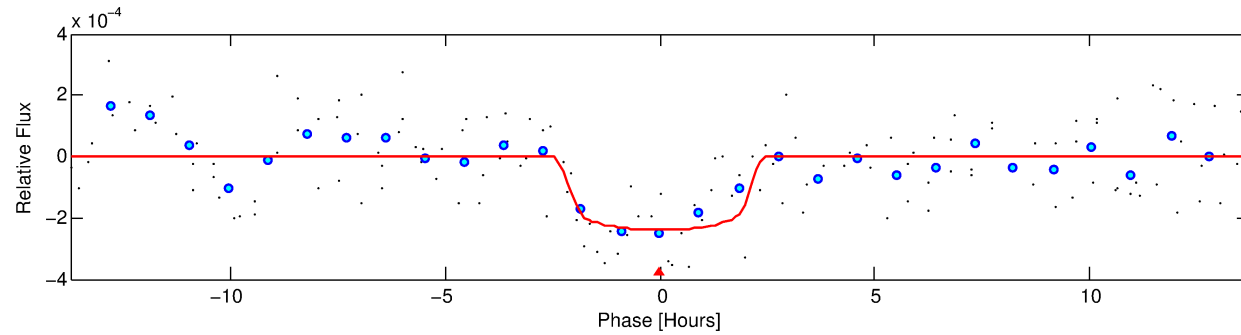
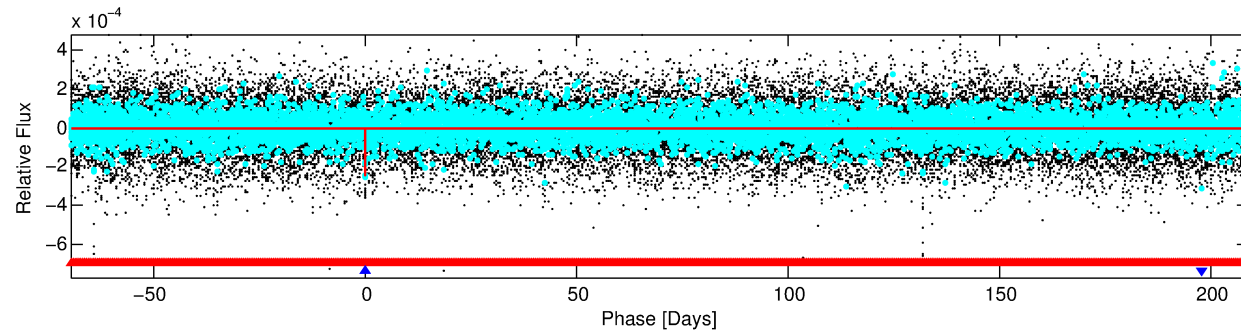
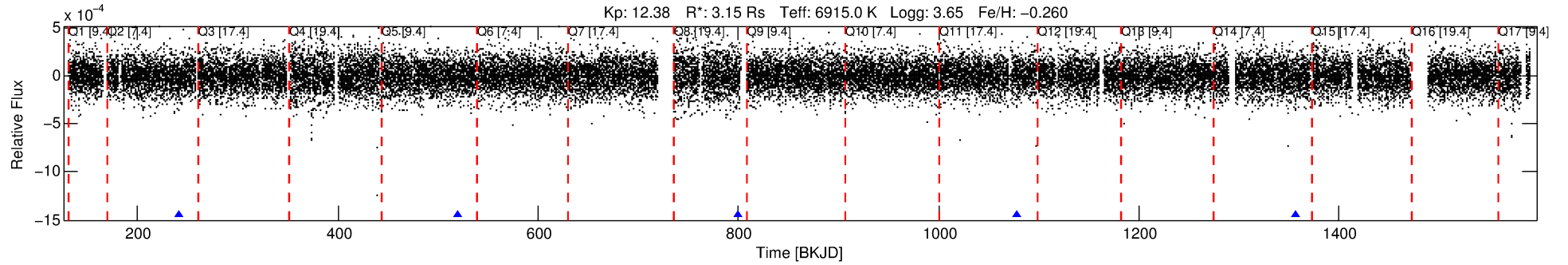
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 004824942-02

No Significant Match Found

# DV One-Page Summary

KIC: 4824942 Candidate: 2 of 2 Period: 278.935 d



## DV Fit Results:

Period = 278.93506 [0.00344] d  
Epoch = 241.4955 [0.0107] BKJD  
Rp/R\* = 0.0162 [0.0078]  
a/R\* = 244.59 [699.61]  
b = 0.87 [0.81]  
Seff = 20.98 [11.52]  
Teq = 546 [75] K  
Rp = 5.56 [3.31] Re  
a = 0.9852 [0.3302] AU  
Ag = 1529.71 [1900.39] [0.80 $\sigma$ ]  
Teffp = 5277 [1490] K [3.17 $\sigma$ ]

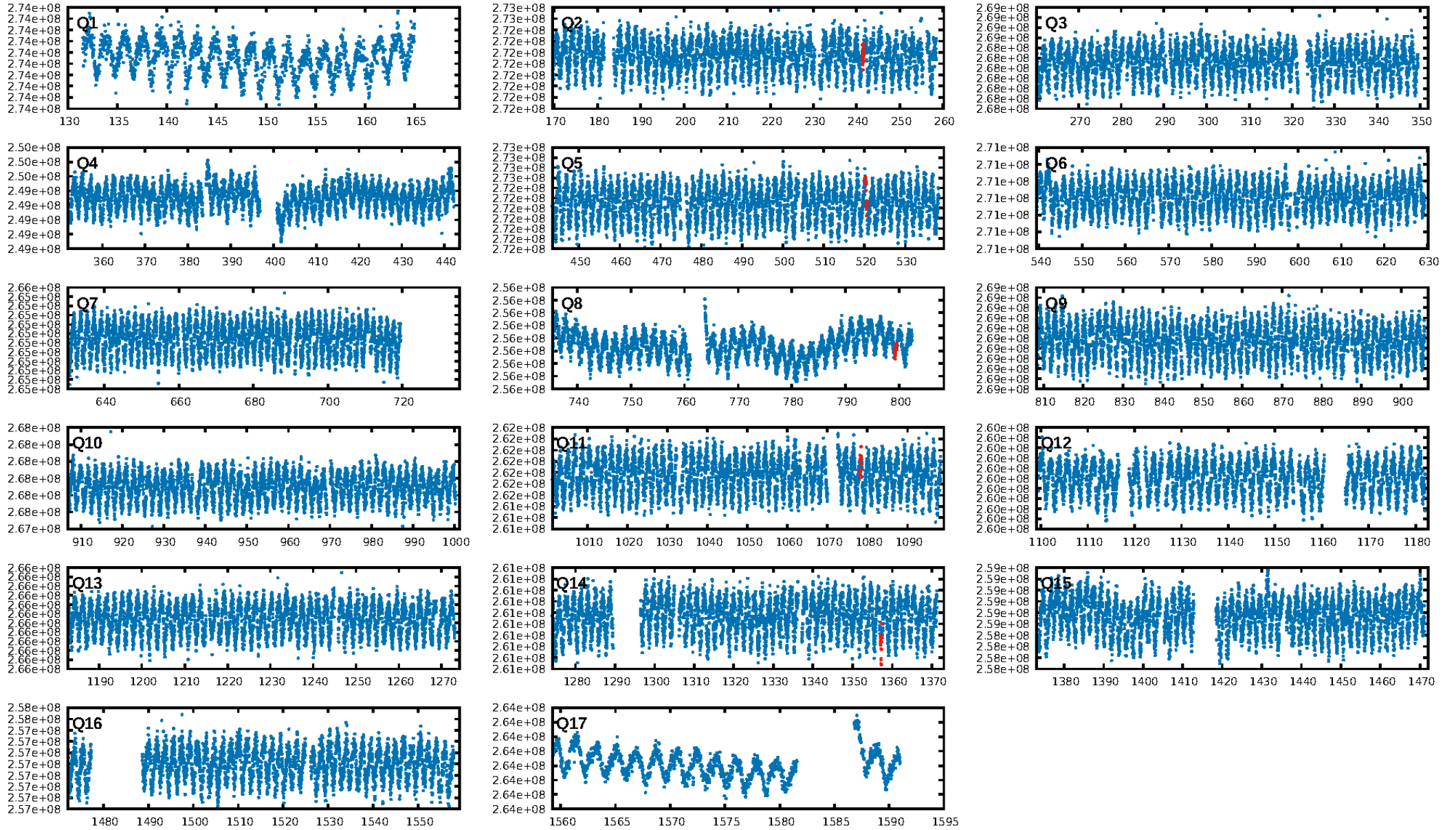
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [1304.07 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 54.8%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 8.98e-09**  
RollingBand-fgt: 1.00 [5/5]  
GhostDiagnostic-chr: -22.82  
Centroid-sig: 7.9%  
Centroid-so: 0.916 arcsec [1.55 $\sigma$ ]  
**OotOffset-rm: 1.177 arcsec [7.16 $\sigma$ ]**  
**KicOffset-rm: 1.242 arcsec [7.54 $\sigma$ ]**  
OotOffset-st: 1/0/0/0 [1]  
KicOffset-st: 1/0/0/0 [1]  
DiffImageQuality-fgm: 1.00 [1/1]  
DiffImageOverlap-fno: 0.00 [0/5]

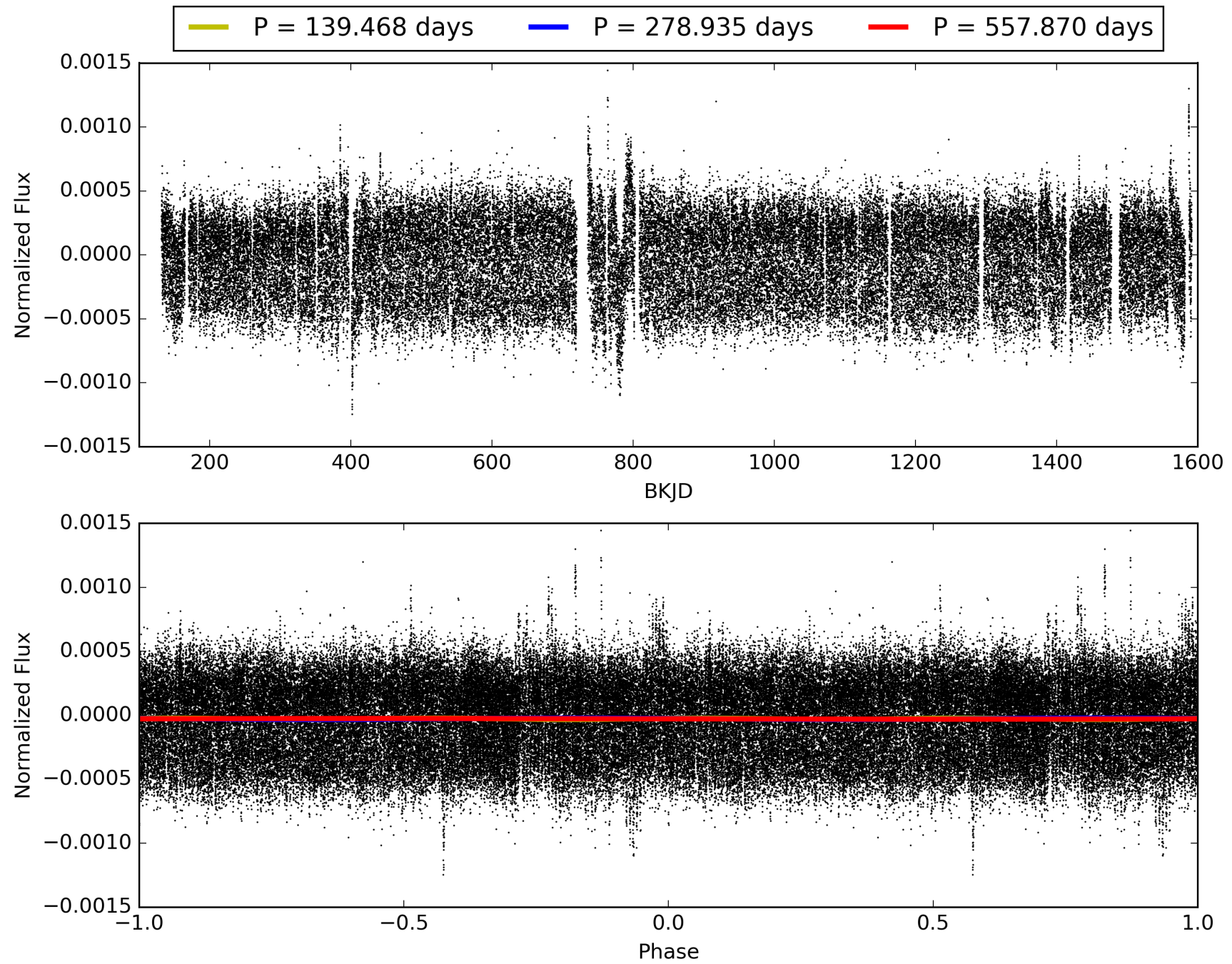
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 02:59:14 Z

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

# TCE 004824942-02, PDC Light Curves



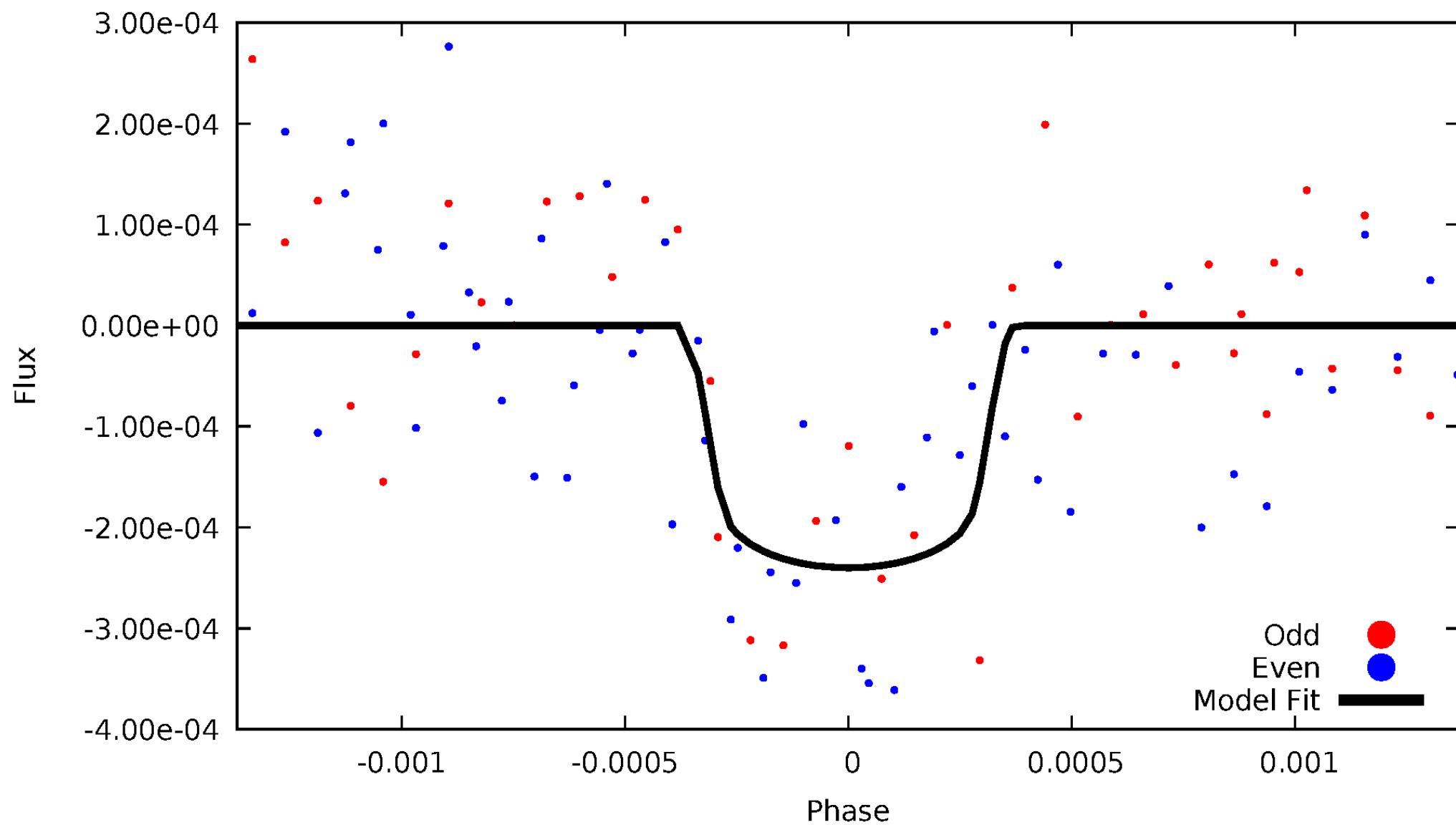
TCE 004824942-02





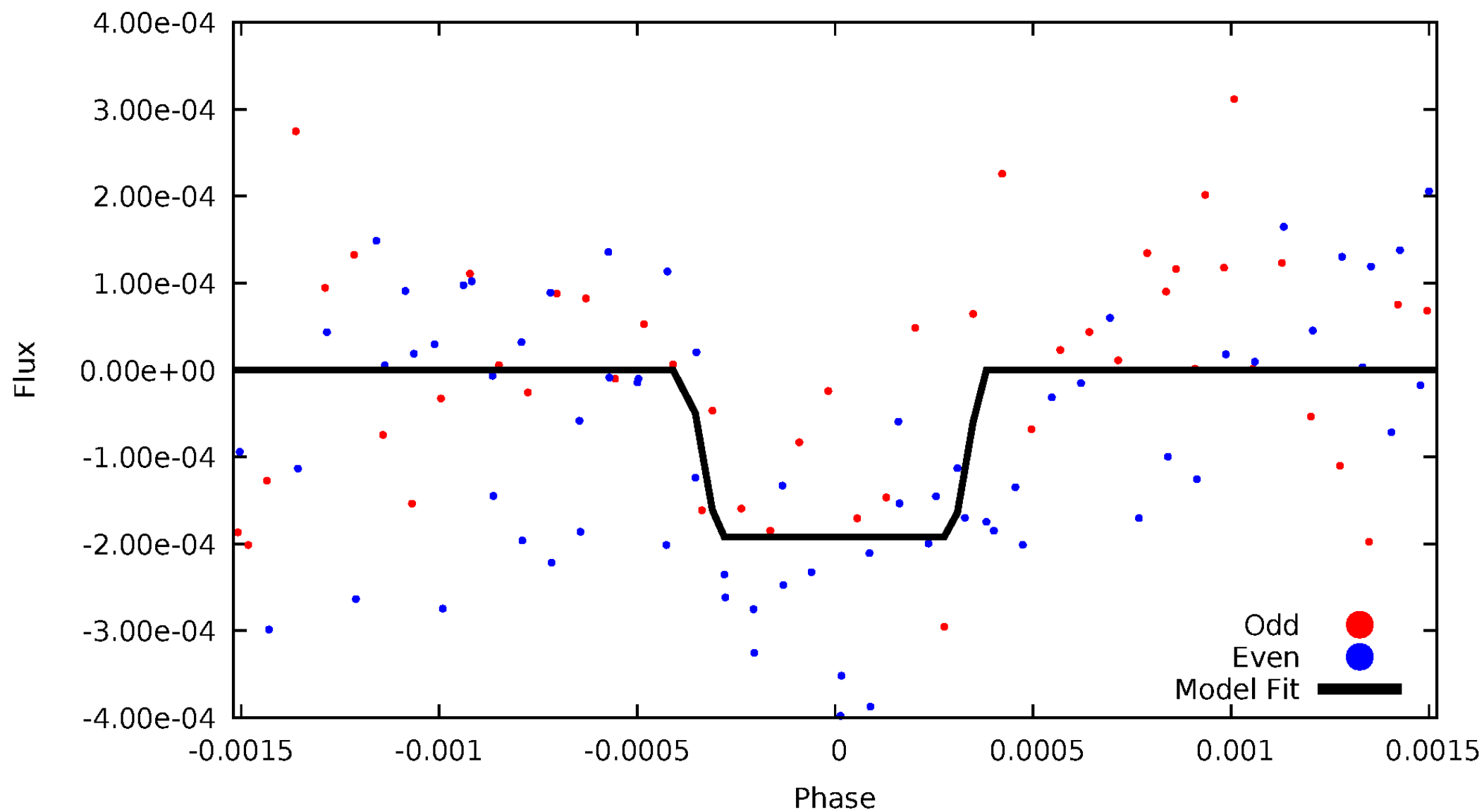
# DV Odd/Even

TCE 004824942-02



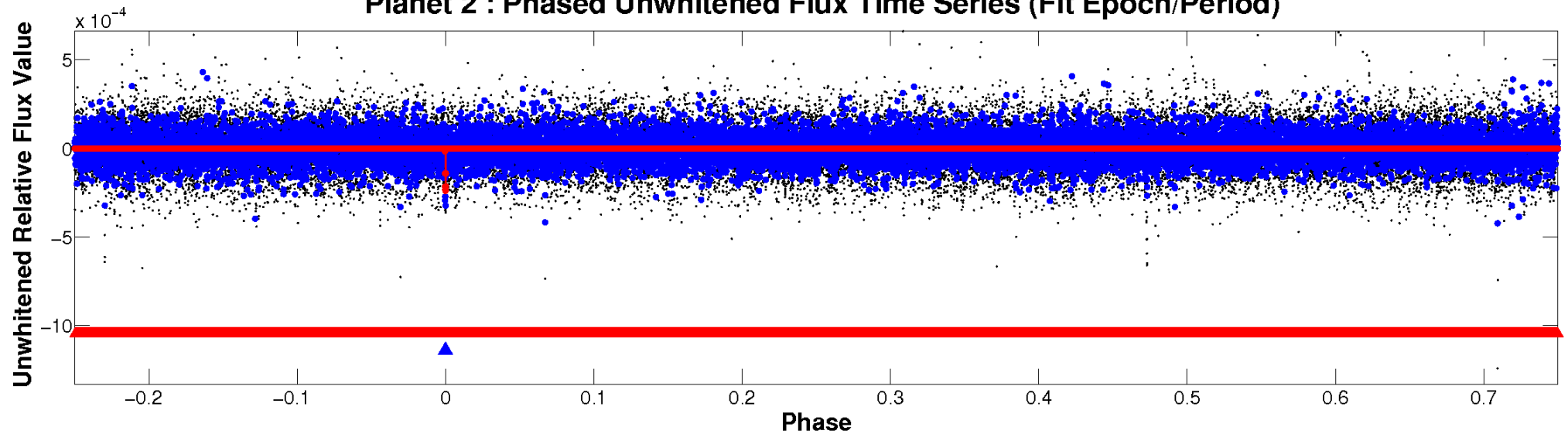
# ALT Odd/Even

TCE 004824942-02

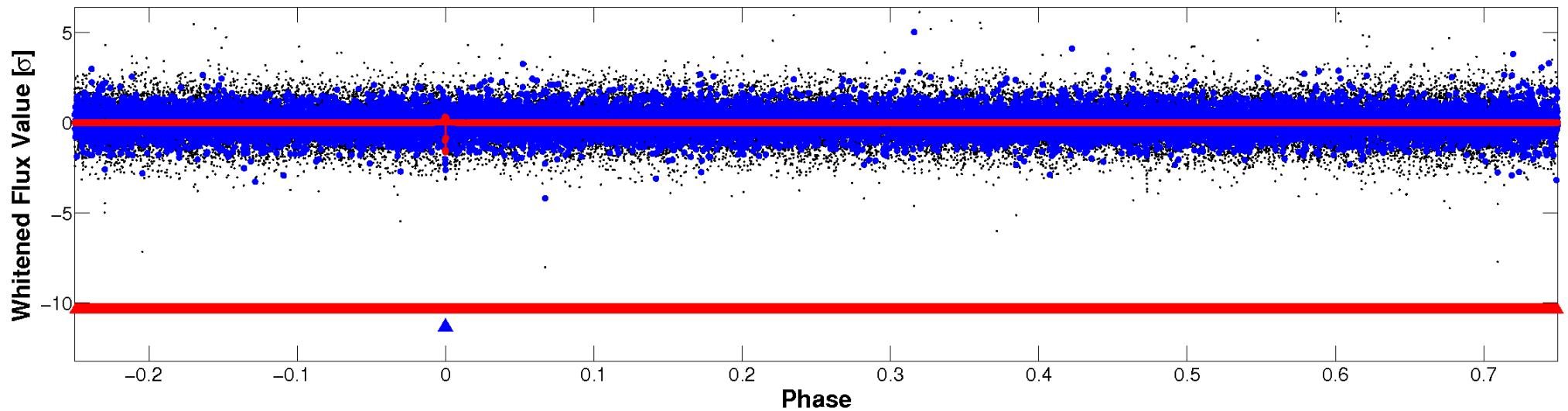


# Non-Whitened Vs. Whitened Light Curve

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

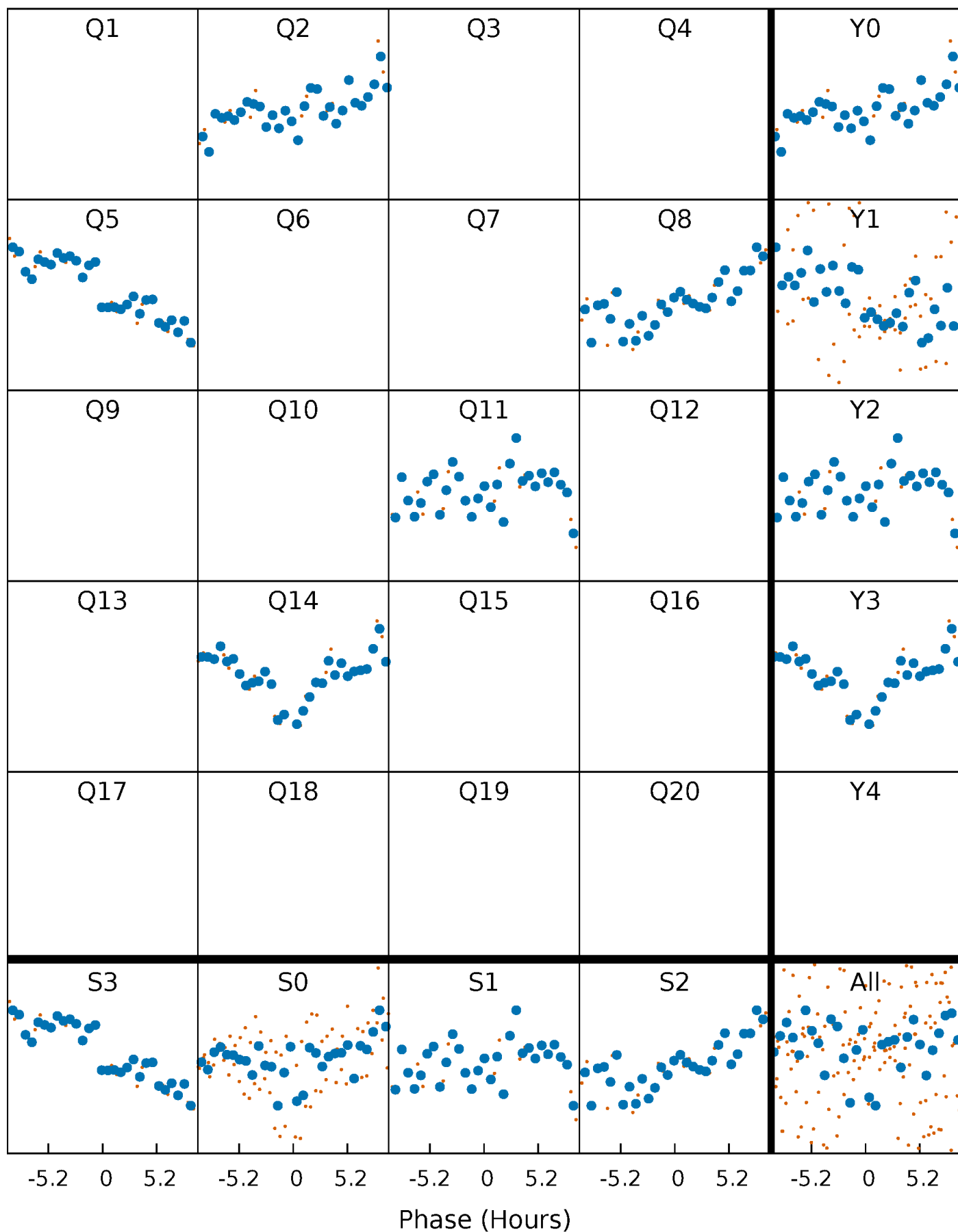


**Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



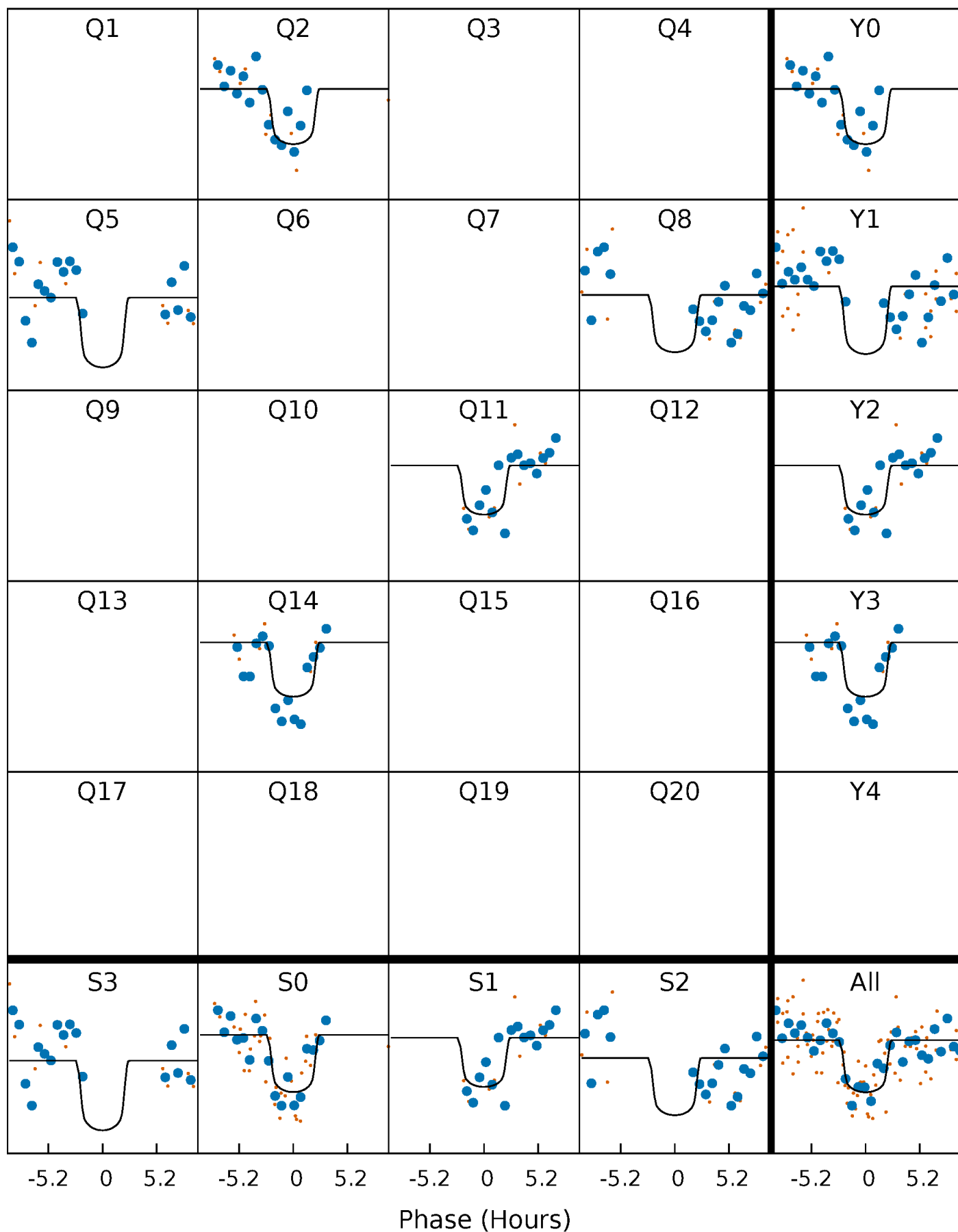
# PDC Quarter-Phased Transit Curves

TCE 004824942-02     $P=278.935062$  Days     $T_0=241.495507$  (BKJD)



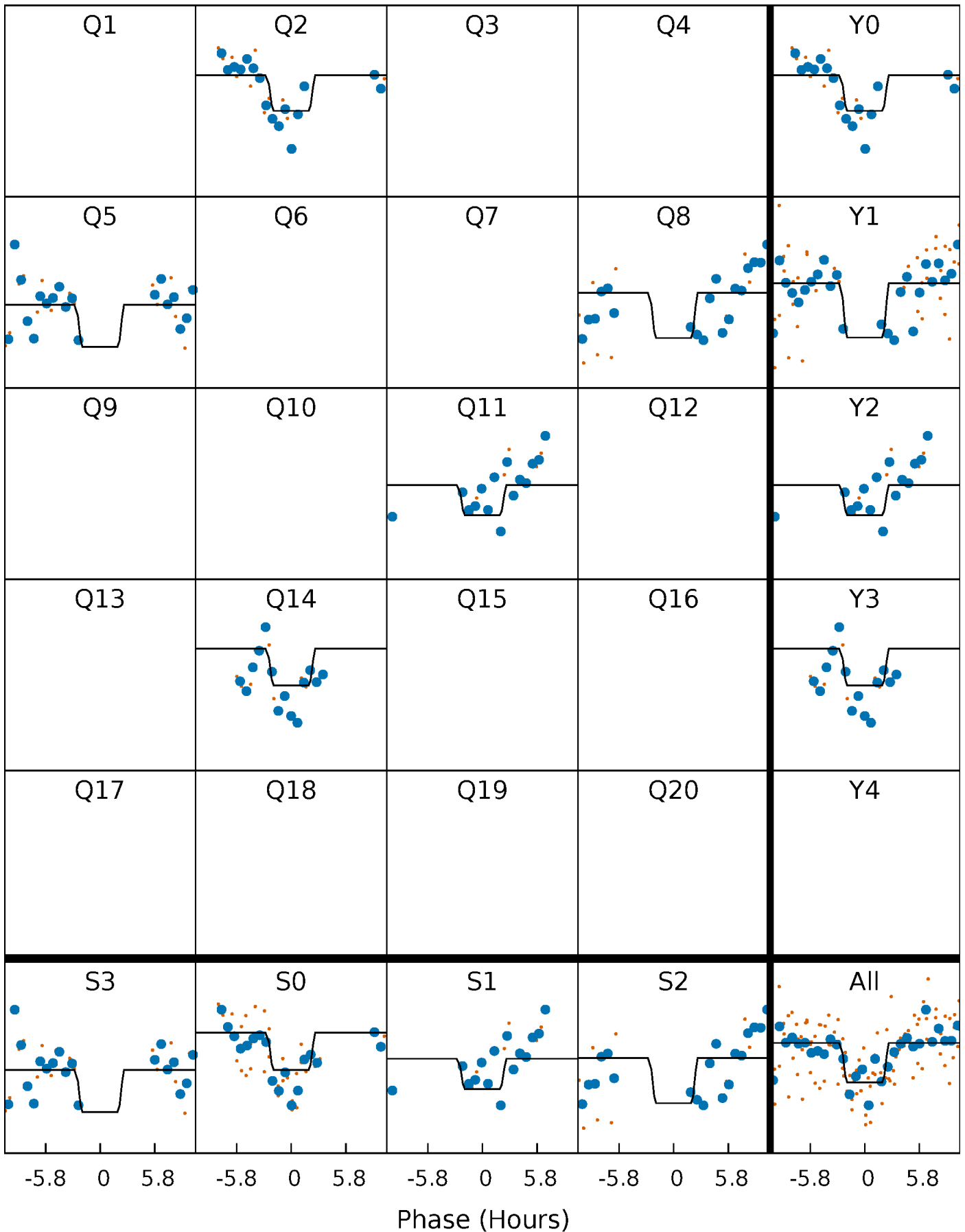
# DV Quarter-Phased Transit Curves

TCE 004824942-02 P=278.935062 Days  $T_0=241.495507$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 004824942-02 P=278.933782 Days  $T_0=241.504445$  (BKJD)

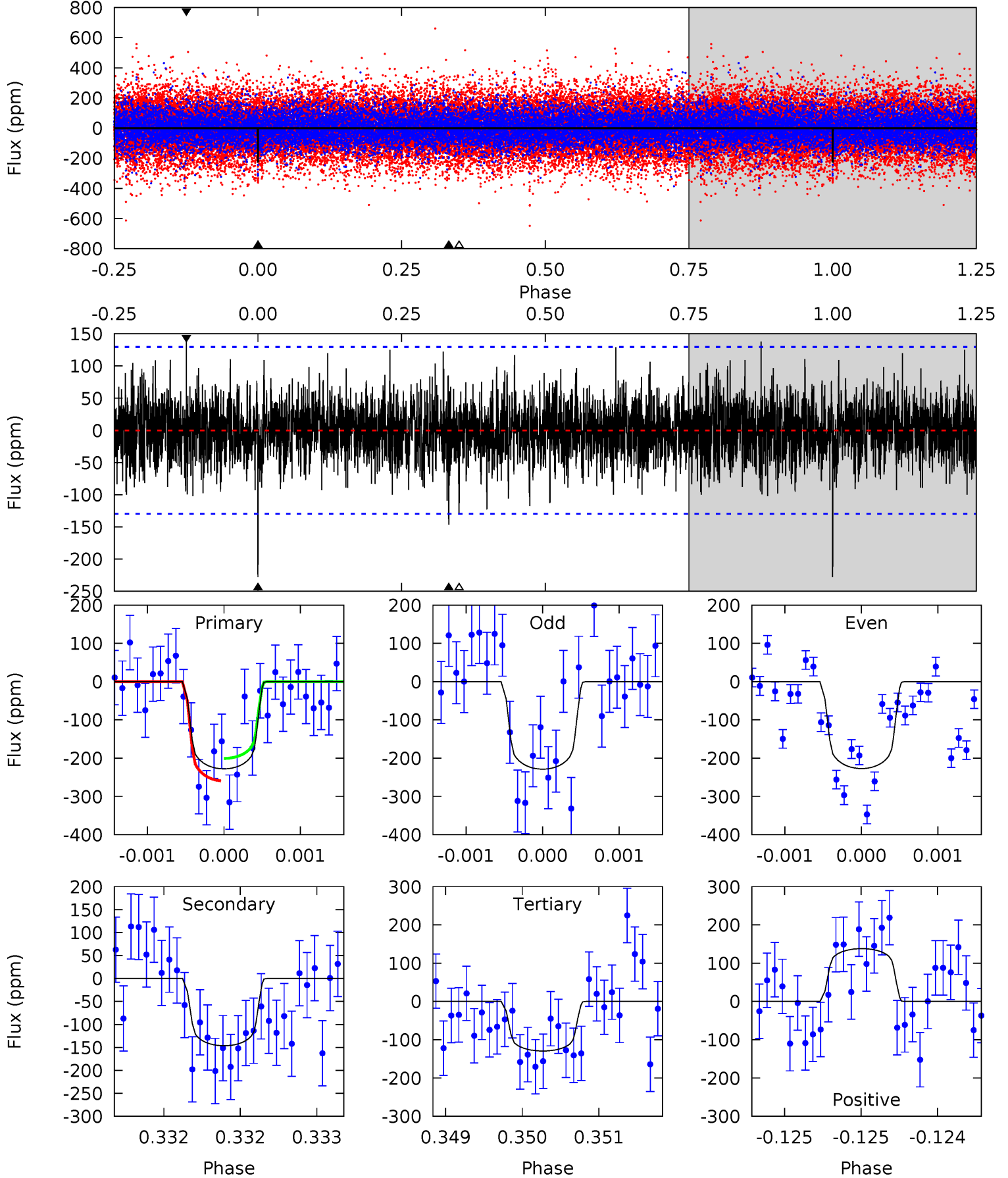




# DV Model-Shift Uniqueness Test

004824942-02, P = 278.935062 Days, E = 241.495507 Days

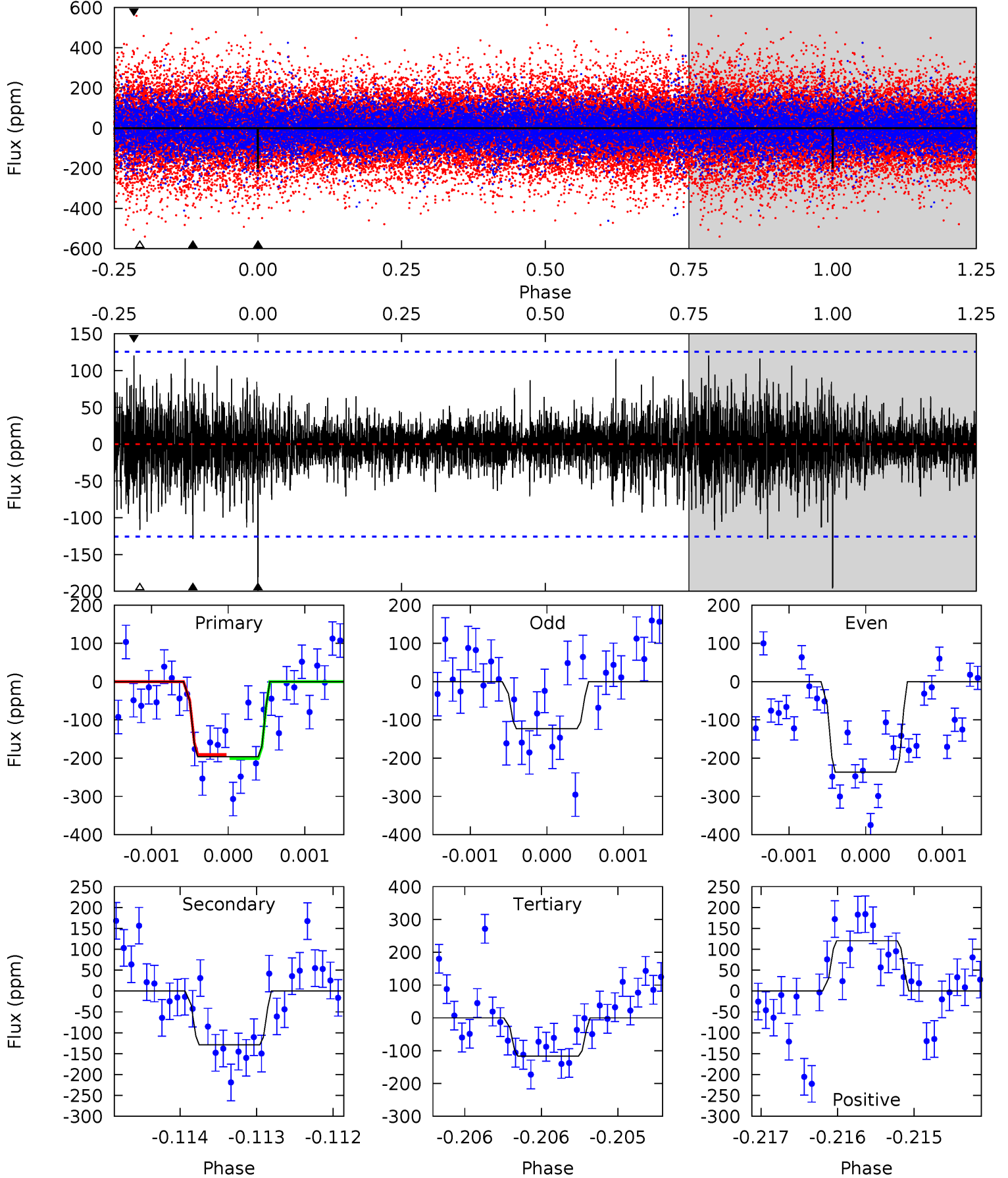
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.70	6.23	5.51	5.87	5.51	3.39	1.50	4.19	3.83	0.73	0.36	0.03	0.93	0.38	1.24



# Alt Model-Shift Uniqueness Test

004824942-02, P = 278.933782 Days, E = 241.504445 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
8.60	5.66	5.12	5.28	5.51	3.39	1.15	3.48	3.32	0.54	0.38	2.38	0.96	0.38	0.22



### Stellar Parameters For KIC 004824942

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6915^{+183}_{-224}$	$3.655^{+0.312}_{-0.078}$	$-0.260^{+0.300}_{-0.250}$	$3.153^{+0.396}_{-1.109}$	$1.638^{+0.216}_{-0.324}$	$0.074^{+0.174}_{-0.018}$
	+3%/-3%	+9%/-2%	+115%/-96%	+13%/-35%	+13%/-20%	+236%/-24%
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 004824942-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-147 \pm 24$	$5.17^{+2.74}_{-2.37}$	$746^{+44}_{-65}$	$5909^{+2230}_{-961}$	$2892^{+7001}_{-1694}$
Alt.	$-129 \pm 23$	$4.44^{+2.69}_{-2.13}$	$745^{+44}_{-64}$	$6167^{+2848}_{-1150}$	$3434^{+10205}_{-2110}$

$T_{\text{max}}$  = 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

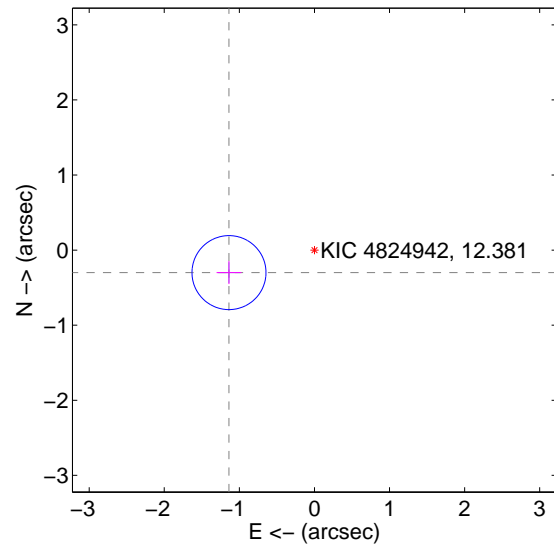
Supplemental centroid analysis for 004824942-02. Kepler magnitude: 12.38. Transit SNR 7.45

There are 1 quarters with good PRF difference image offsets

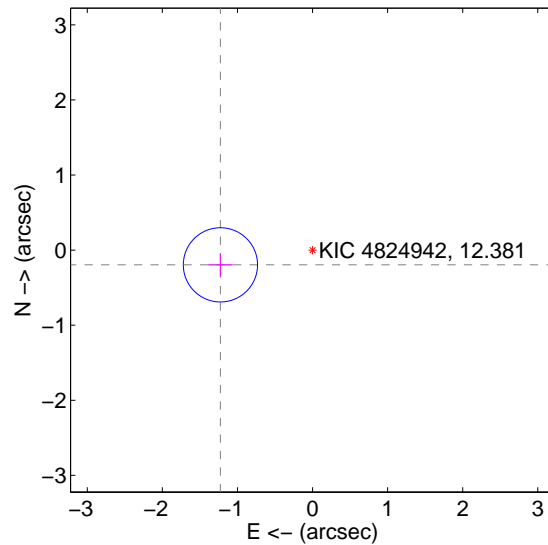
The direct PRF centroid is offset from the target star catalog position by about 0.14 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.177 \pm 0.164$	7.16	$1.138 \pm 0.165$	$-0.300 \pm 0.152$
PRF-fit source offset from KIC position	$1.242 \pm 0.165$	7.54	$1.226 \pm 0.165$	$-0.196 \pm 0.152$
photometric centroid source offset	$0.92 \pm 0.59$	1.55	$0.77 \pm 0.58$	$0.49 \pm 0.62$

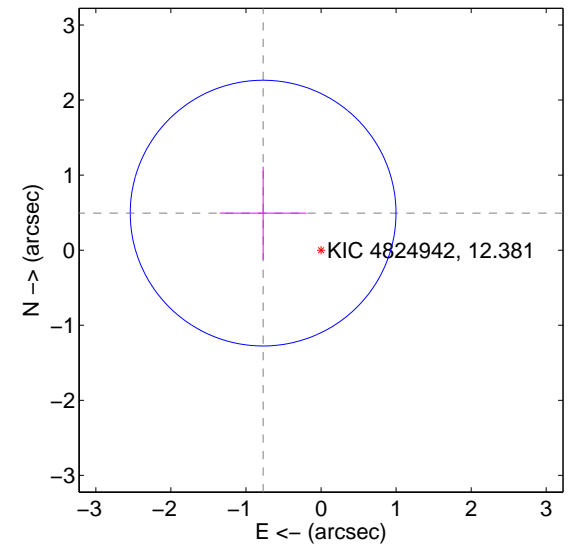
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

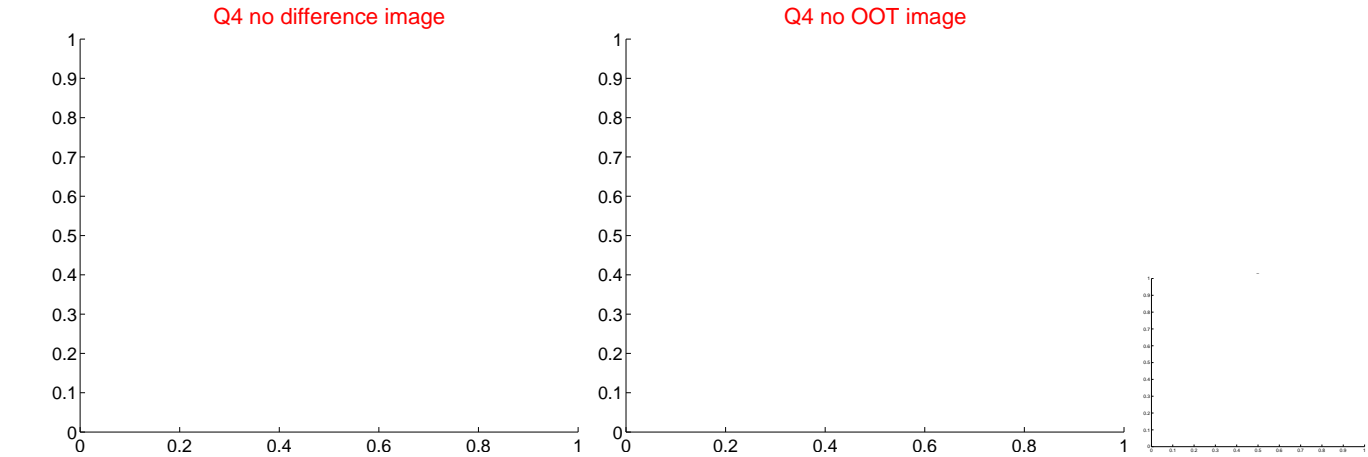
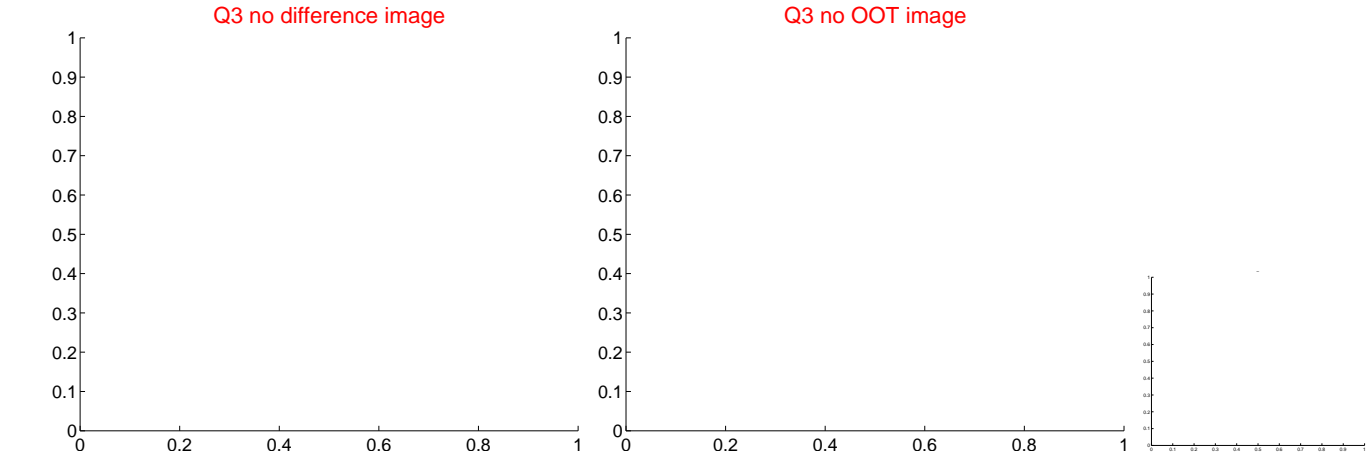
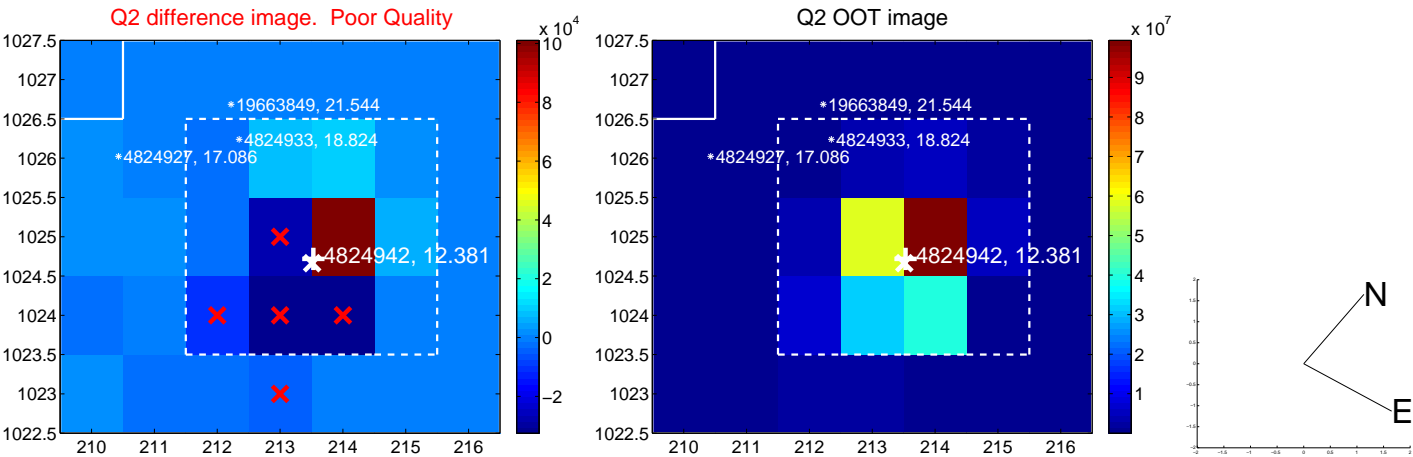
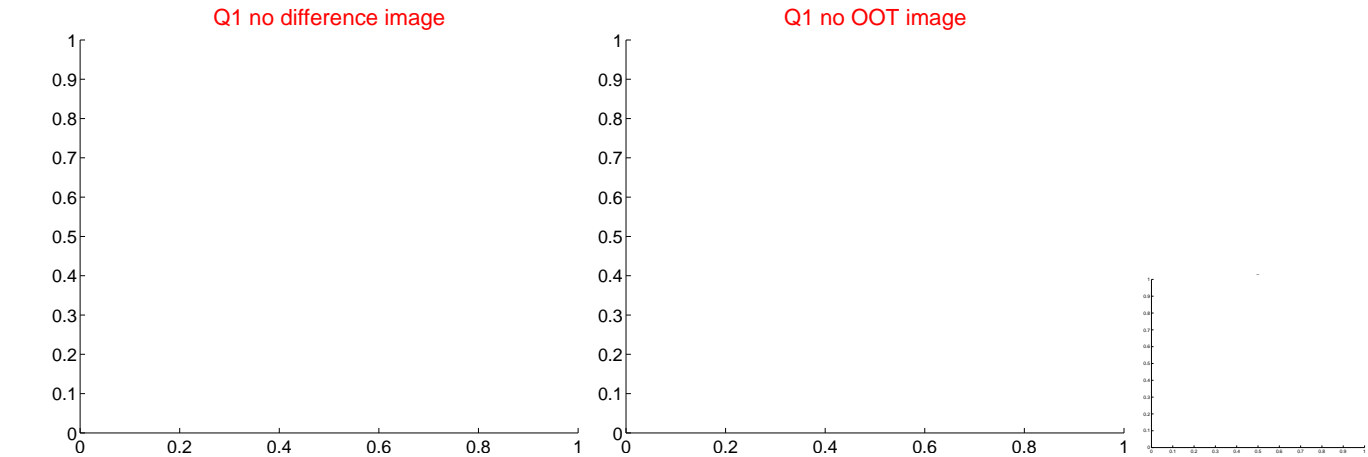


offset from photometric centroids

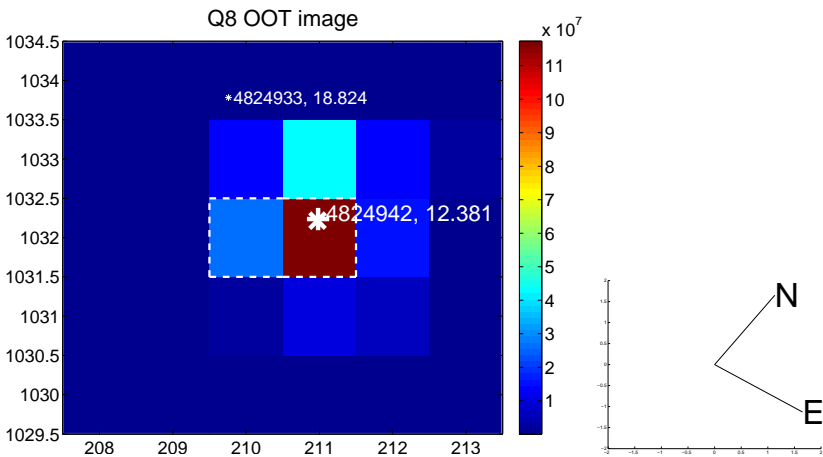
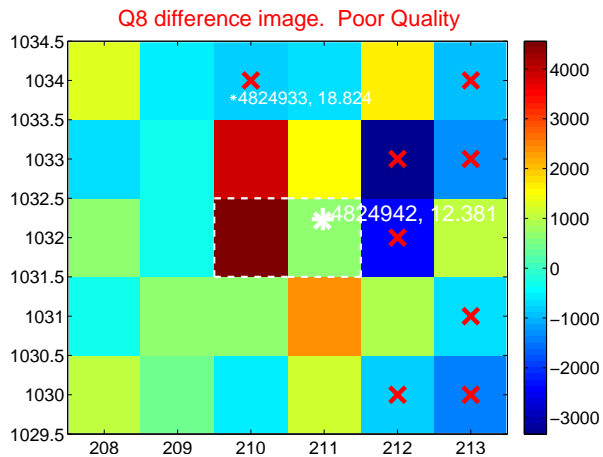
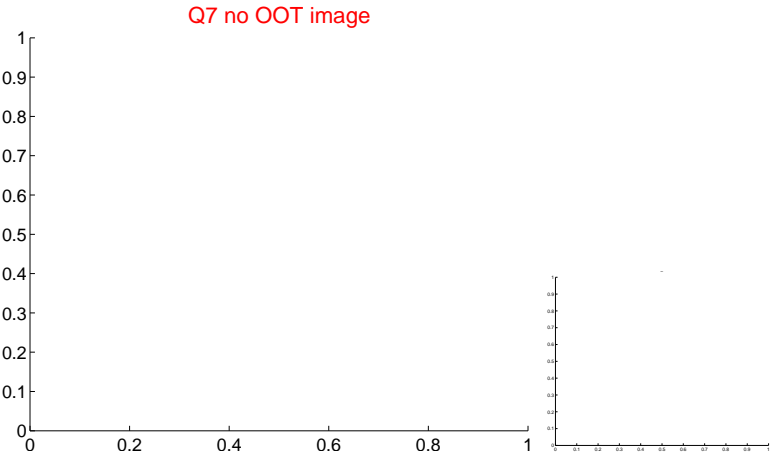
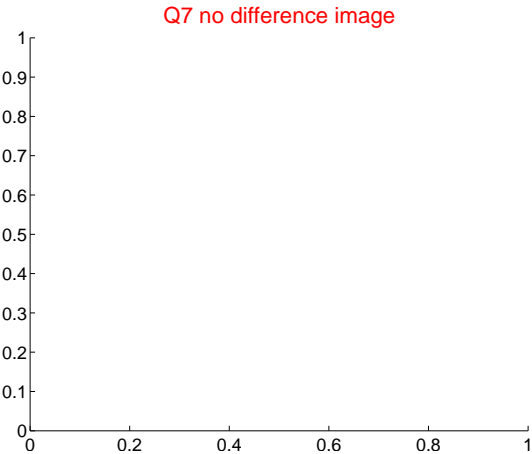
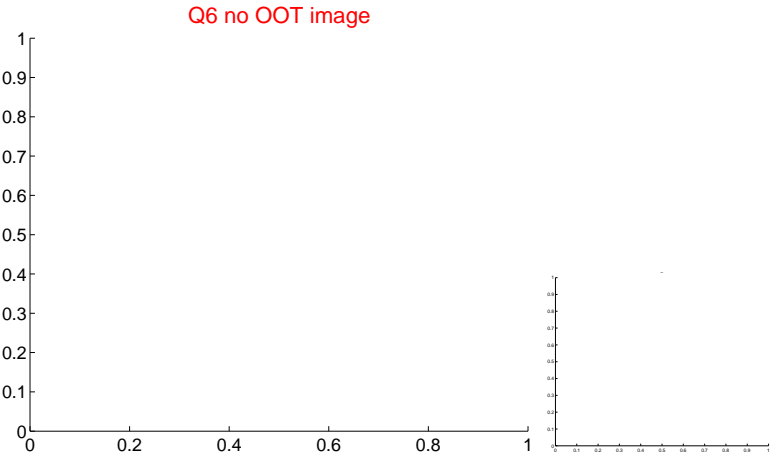
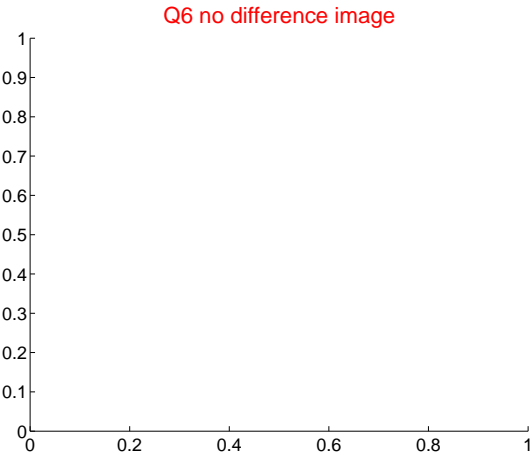
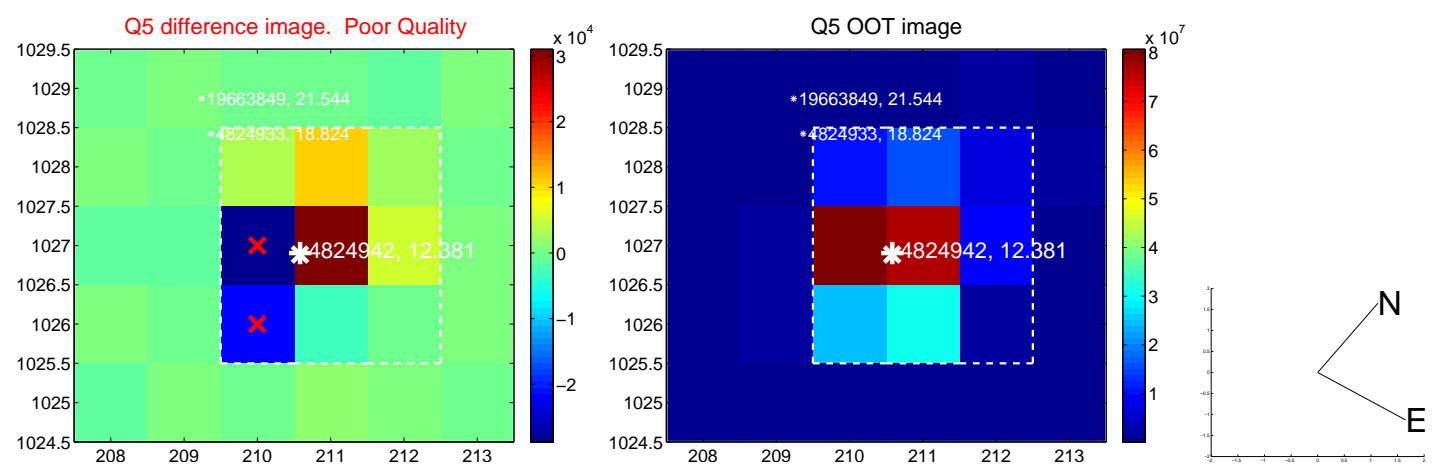


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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





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

Q9 no difference image



Q9 no OOT image



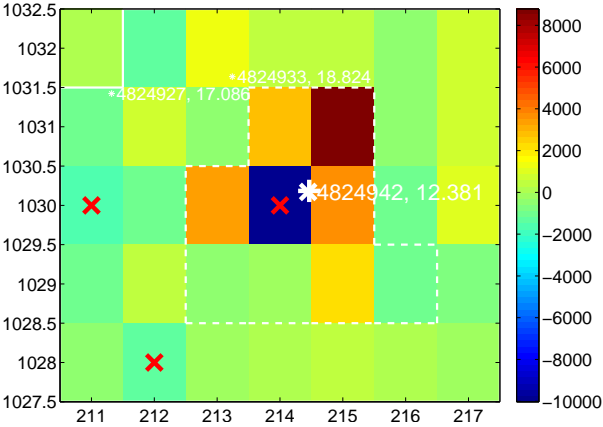
Q10 no difference image



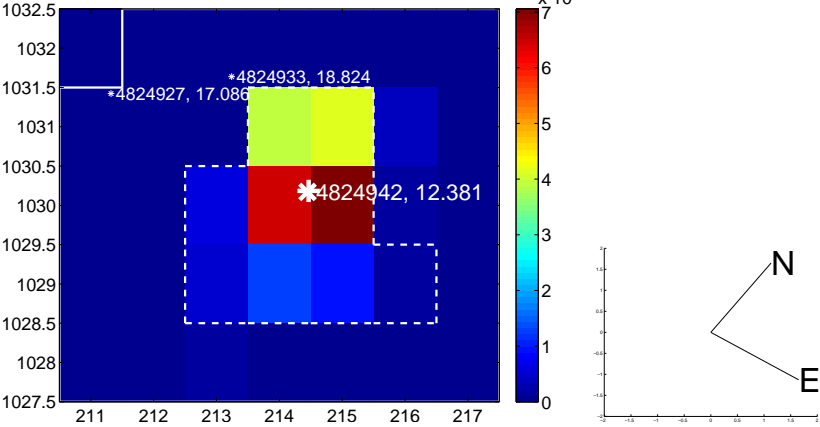
Q10 no OOT image



Q11 difference image. Poor Quality



Q11 OOT image



Q12 no difference image



Q12 no OOT image



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

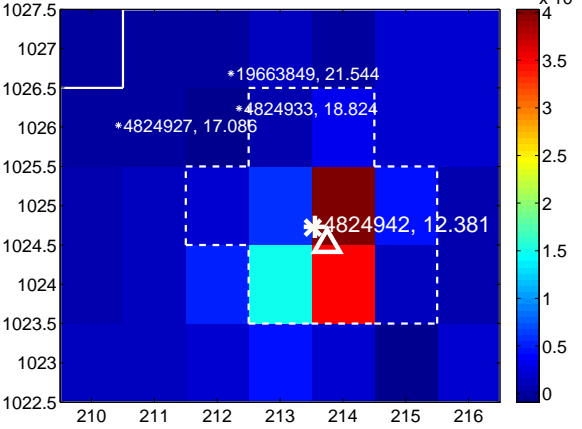
Q13 no difference image



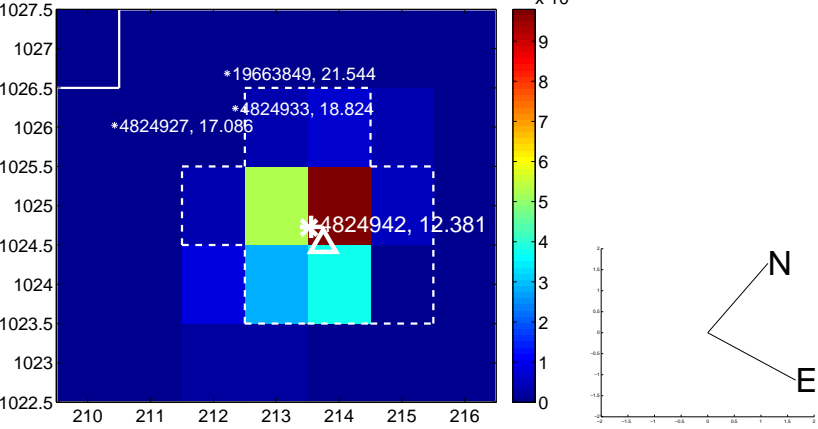
Q13 no OOT image



Q14 difference image



Q14 OOT image



Q15 no difference image



Q15 no OOT image



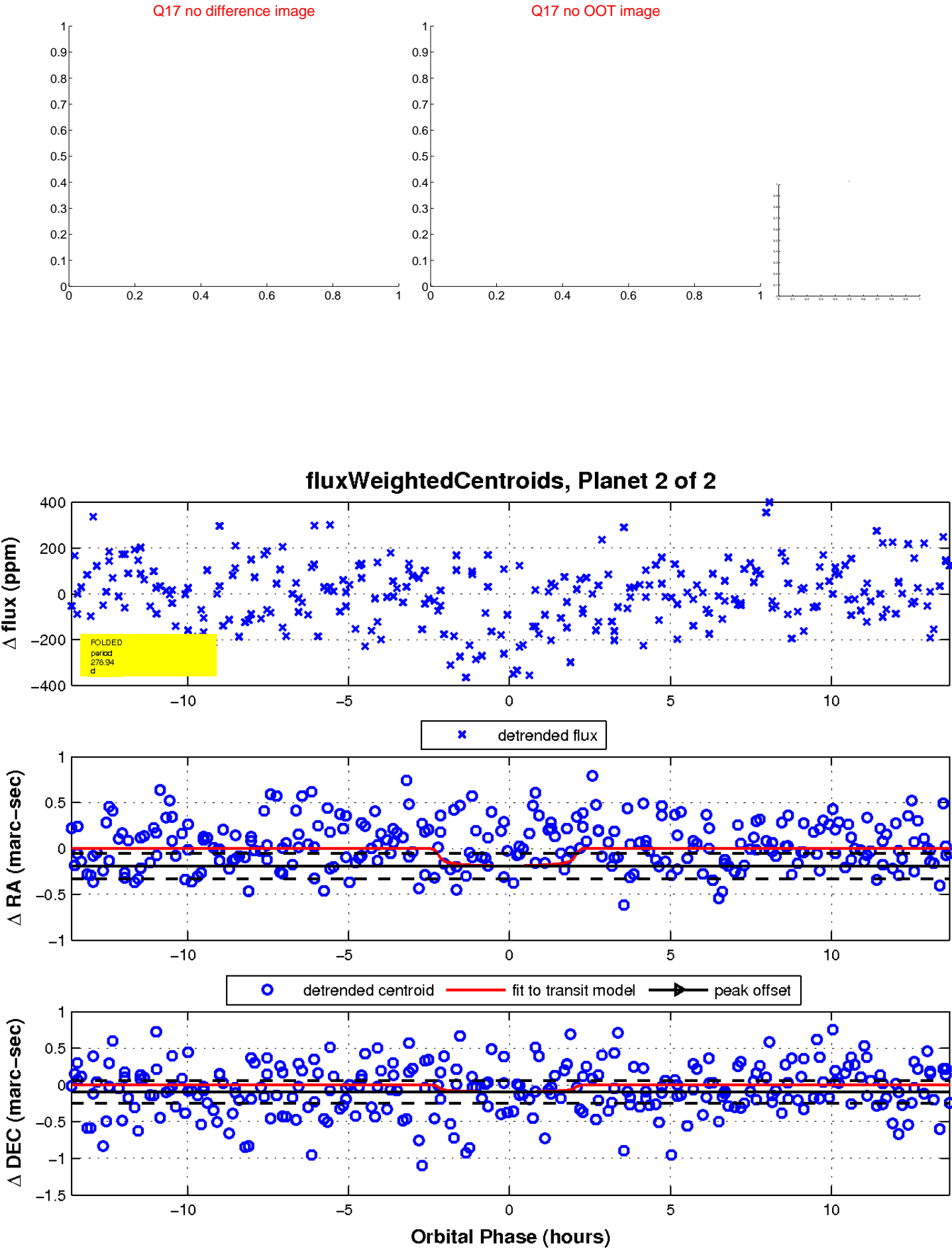
Q16 no difference image



Q16 no OOT image



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



UKIRT Image

Declination

