

# KIC 009713632

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009713632-01	OBS	No	1.240437	131.619527	175.4	3.000	11.3	-1.0	1.68	7241	2.26	10790.32
009713632-02	OBS	No	1.240938	131.922264	15.1	3.339	8.7	7.0	1.68	7241	0.69	10784.50

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009713632-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—CENT_NOFITS
009713632-02	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV—LPP_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.

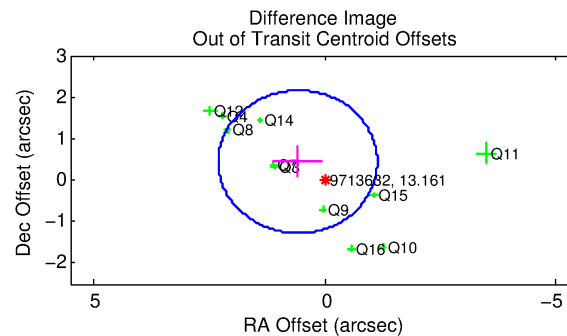
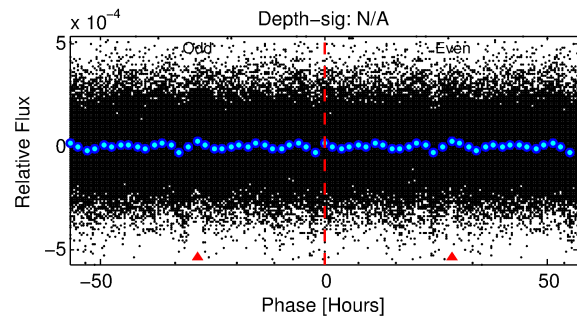
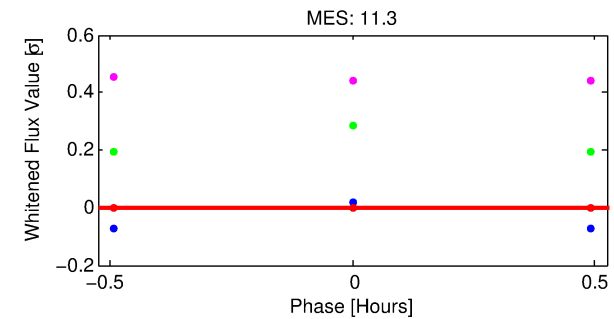
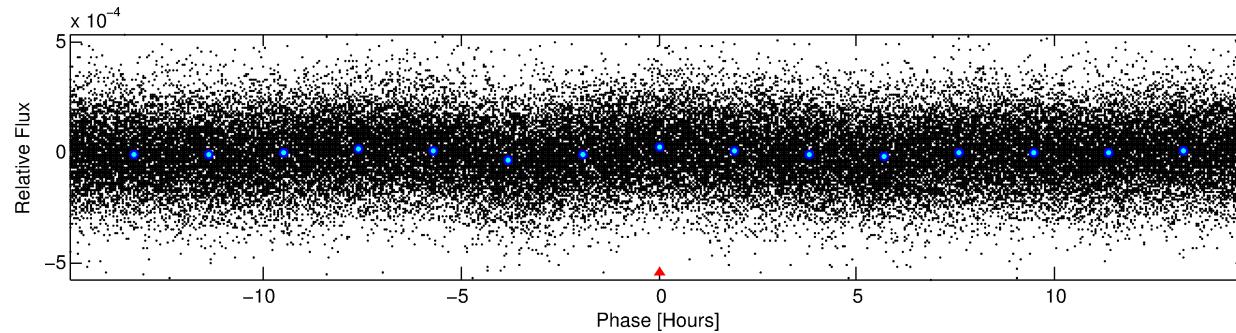
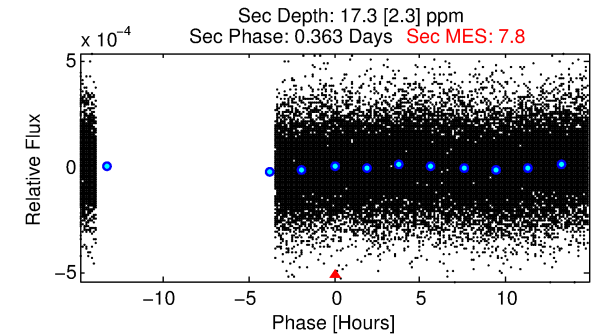
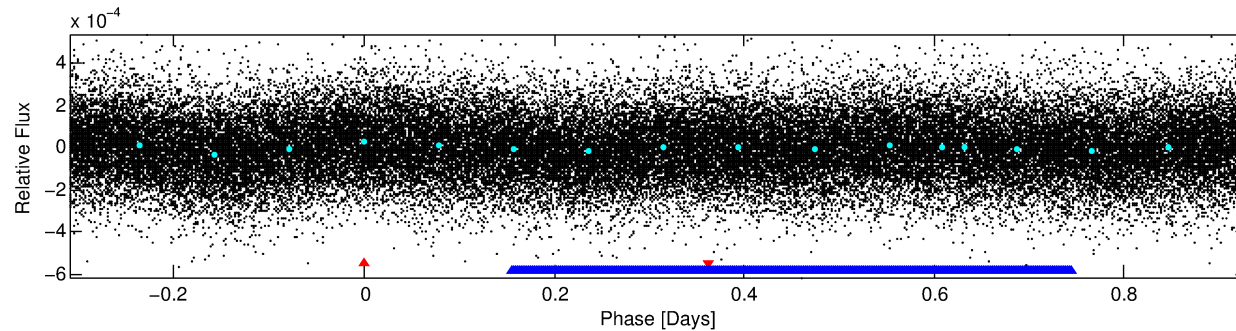
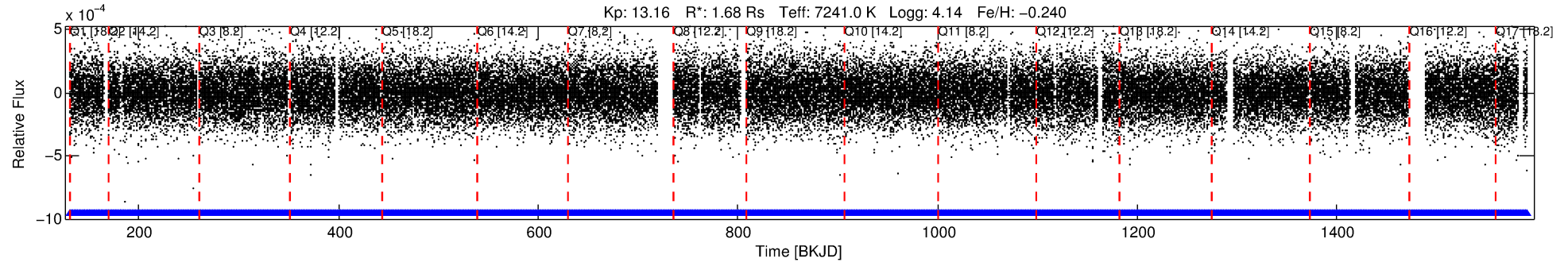
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009713632-01

No Significant Match Found

# DV One-Page Summary

KIC: 9713632 Candidate: 1 of 2 Period: 1.240 d



## TPS TCE Results:

Period = 1.24044 d  
Epoch = 131.6195 BKJD

**DV fit results are unavailable**

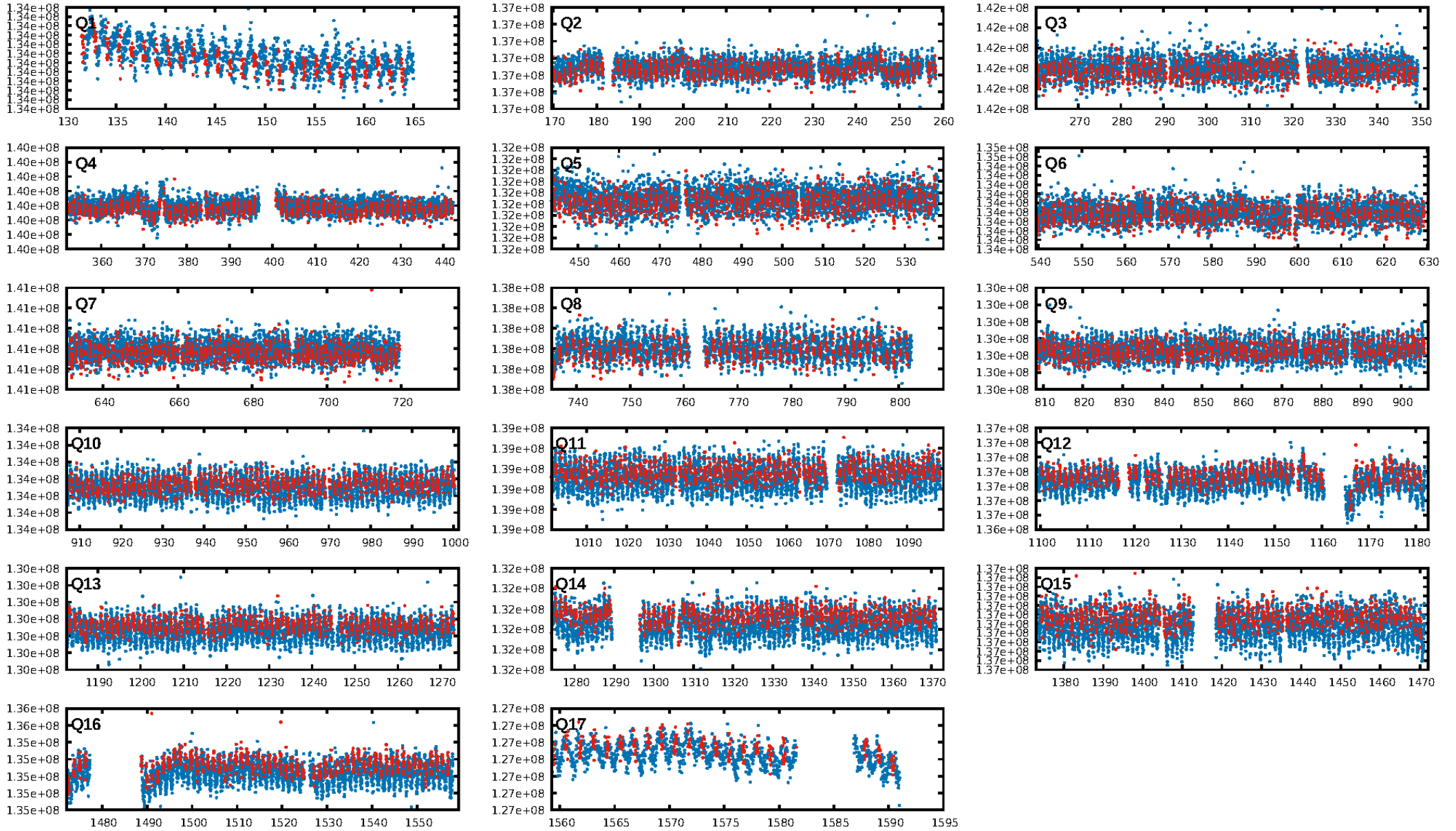
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
**LongPeriod-sig: 0.2% [0.00σ]**  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.08e-23  
RollingBand-fgt: 1.00 [1051/1051]  
GhostDiagnostic-chr: 1.489  
**Centroid-sig: 0.0%**  
Centroid-so: 0.580 arcsec [1.53σ]  
OotOffset-rm: 0.730 arcsec [1.27σ]  
KicOffset-rm: 0.485 arcsec [1.16σ]  
OotOffset-st: 2/4/4/1 [11]  
KicOffset-st: 2/4/4/2 [12]  
DiffImageQuality-fgm: 0.42 [5/12]  
DiffImageOverlap-fno: 0.00 [0/17]

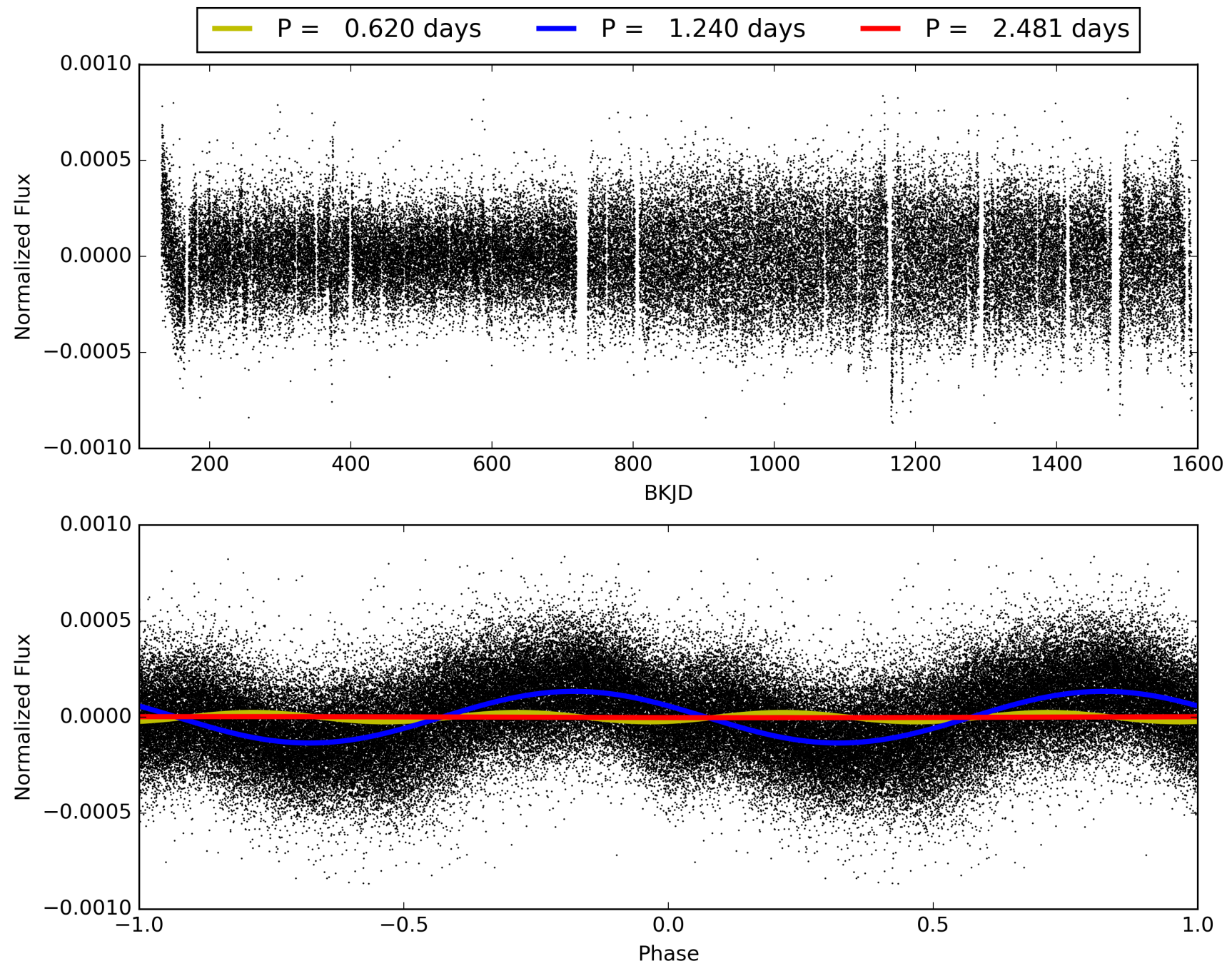
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 02:22:17 Z

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

# TCE 009713632-01, PDC Light Curves



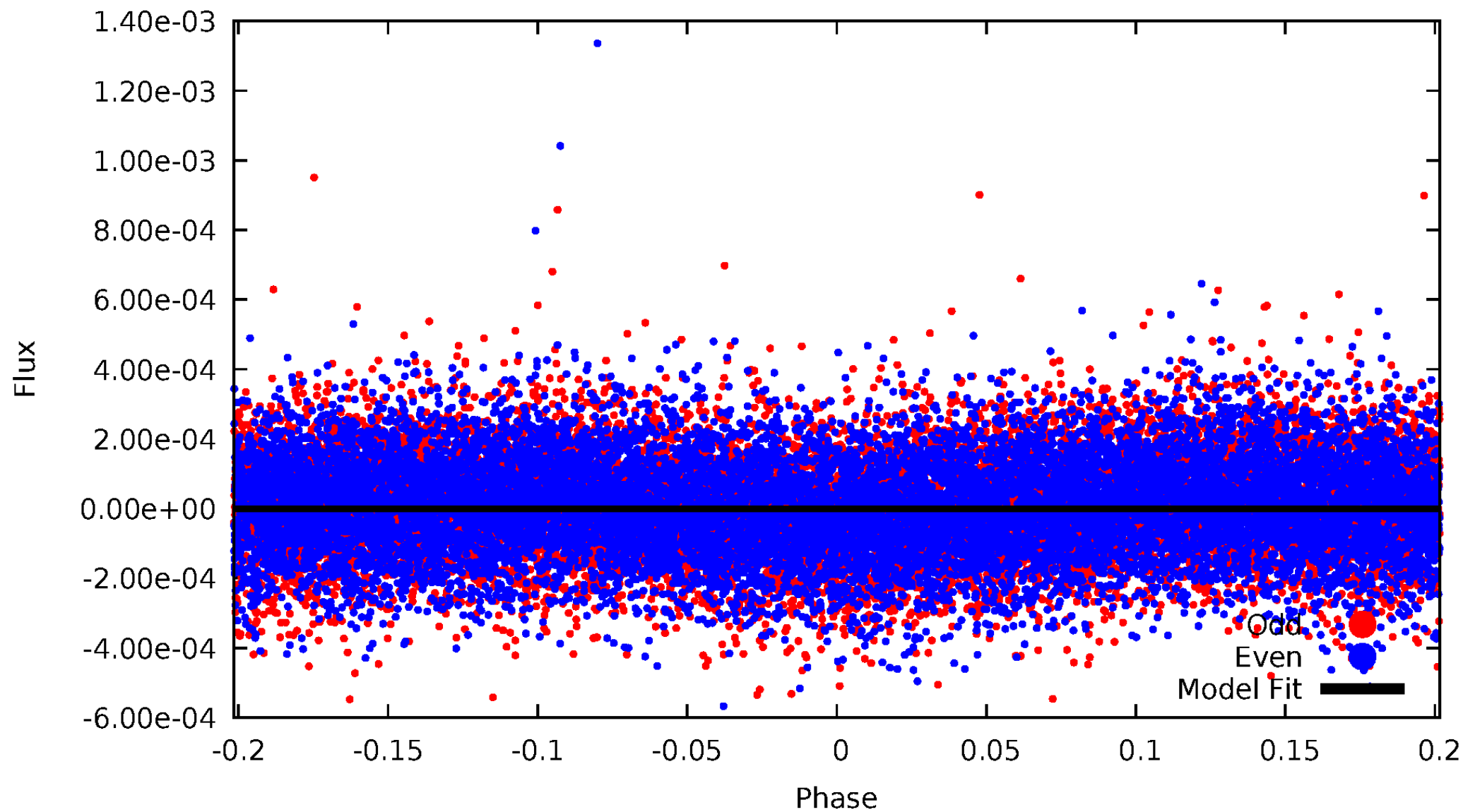
TCE 009713632-01





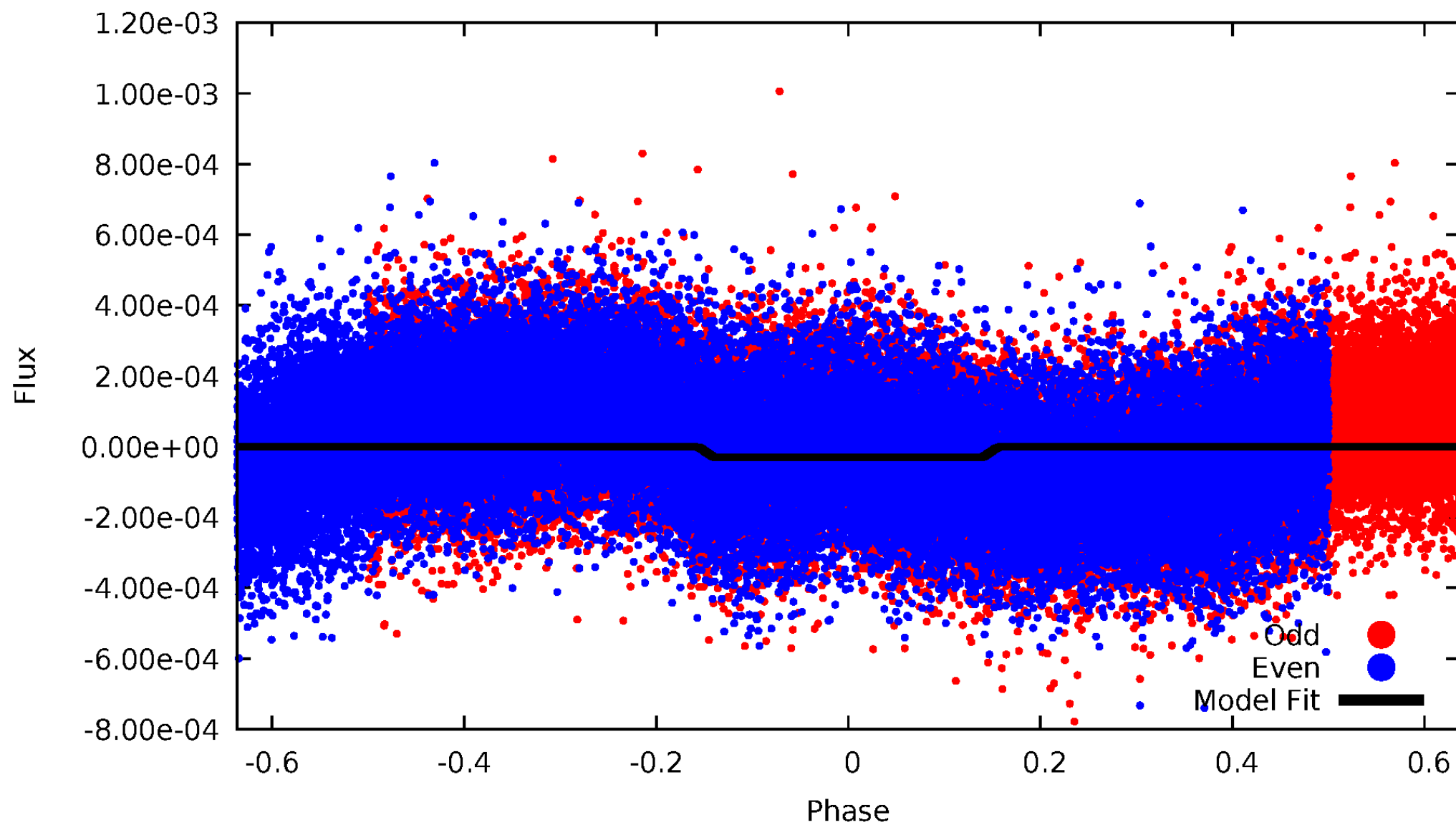
# DV Odd/Even

TCE 009713632-01

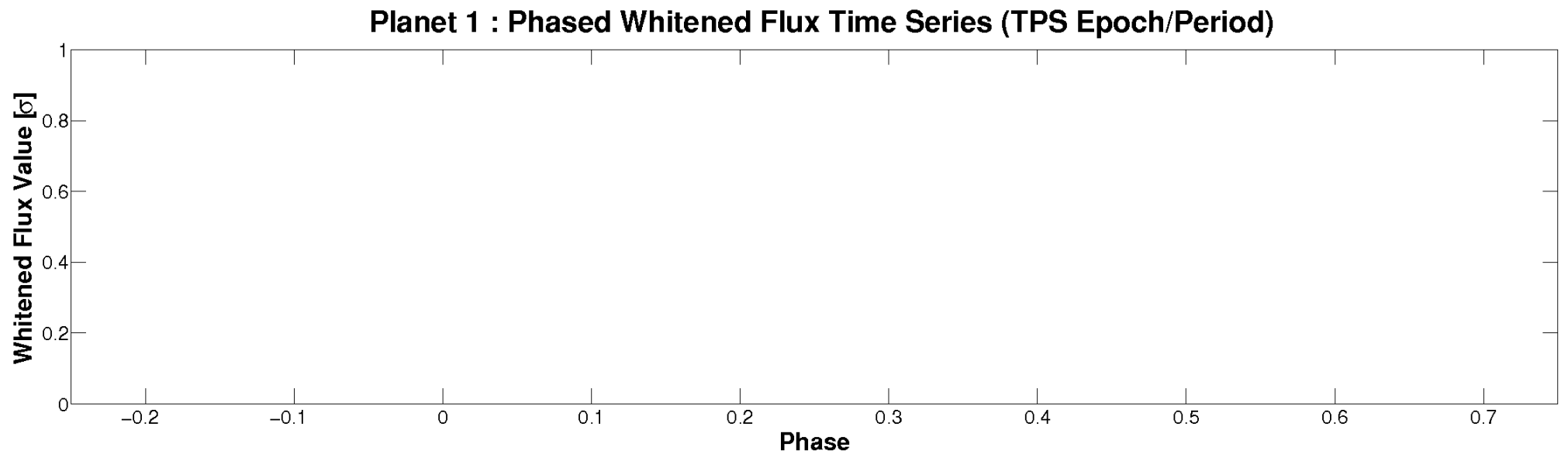
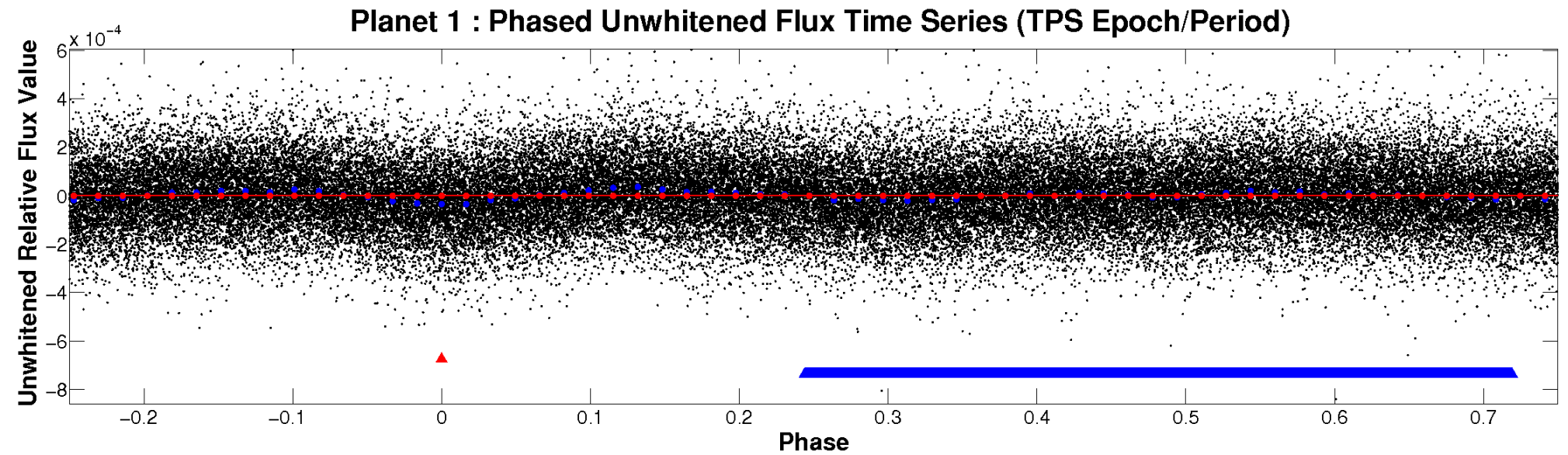


# ALT Odd/Even

TCE 009713632-01

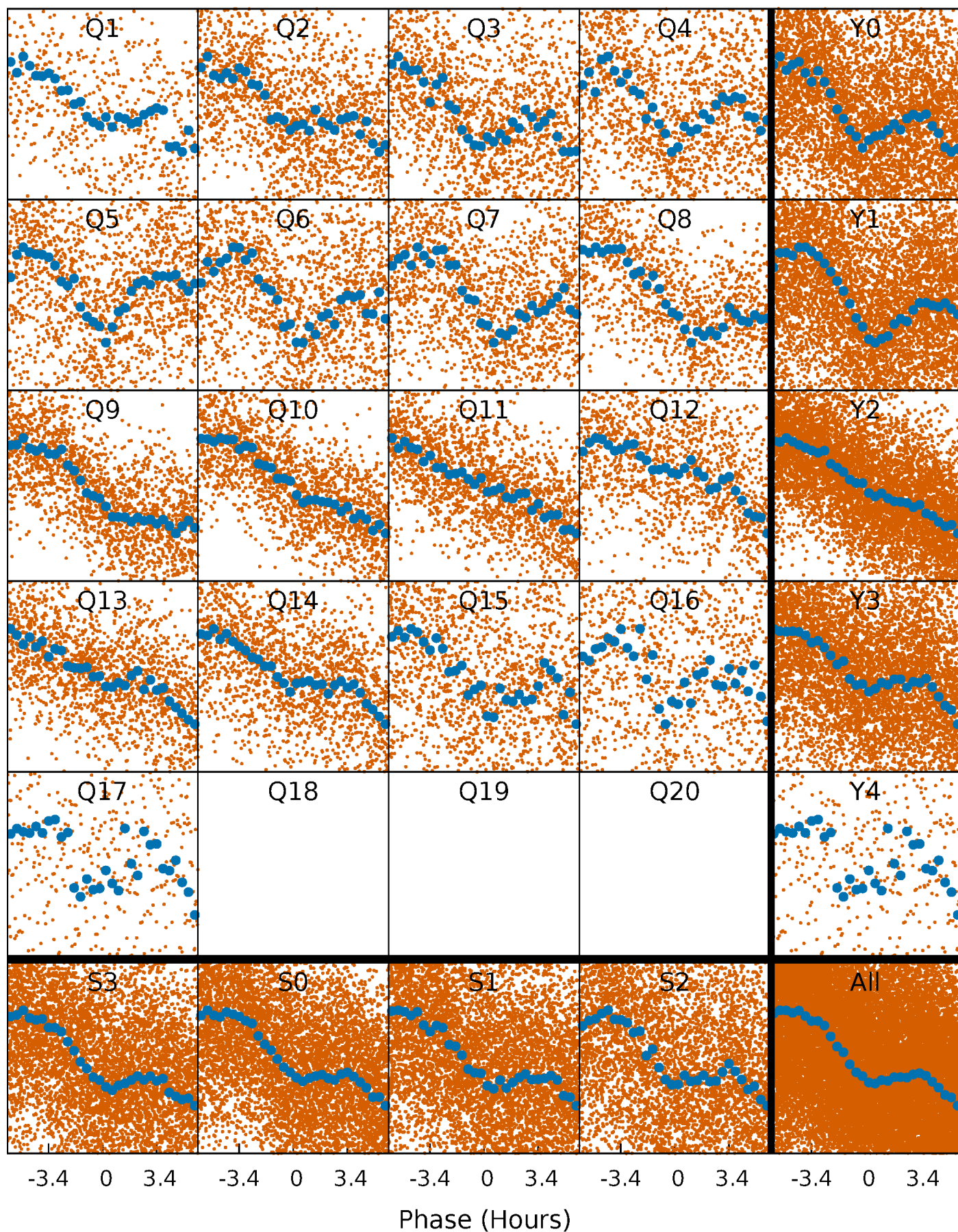


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

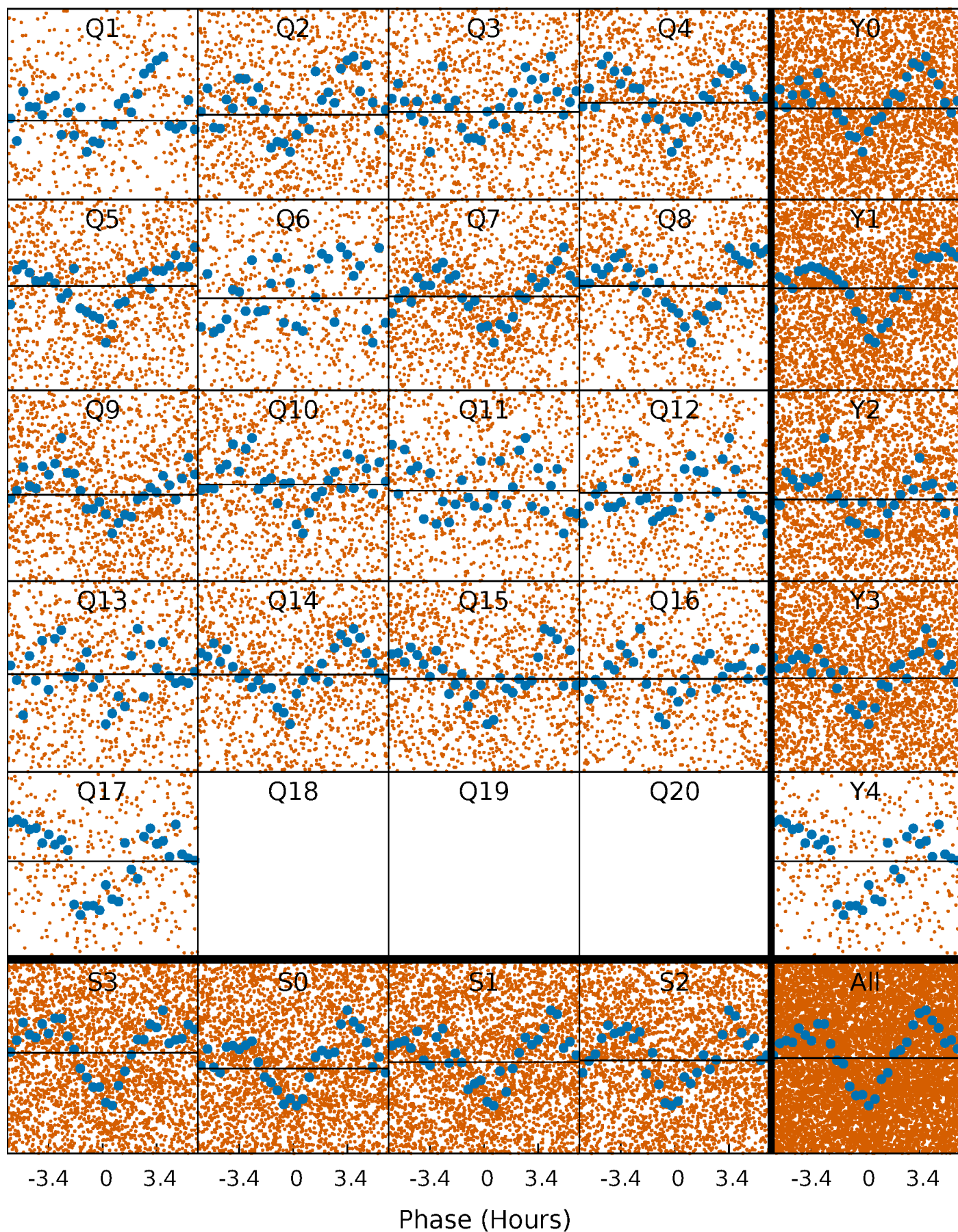
TCE 009713632-01 P= 1.240437 Days  $T_0=131.619527$  (BKJD)





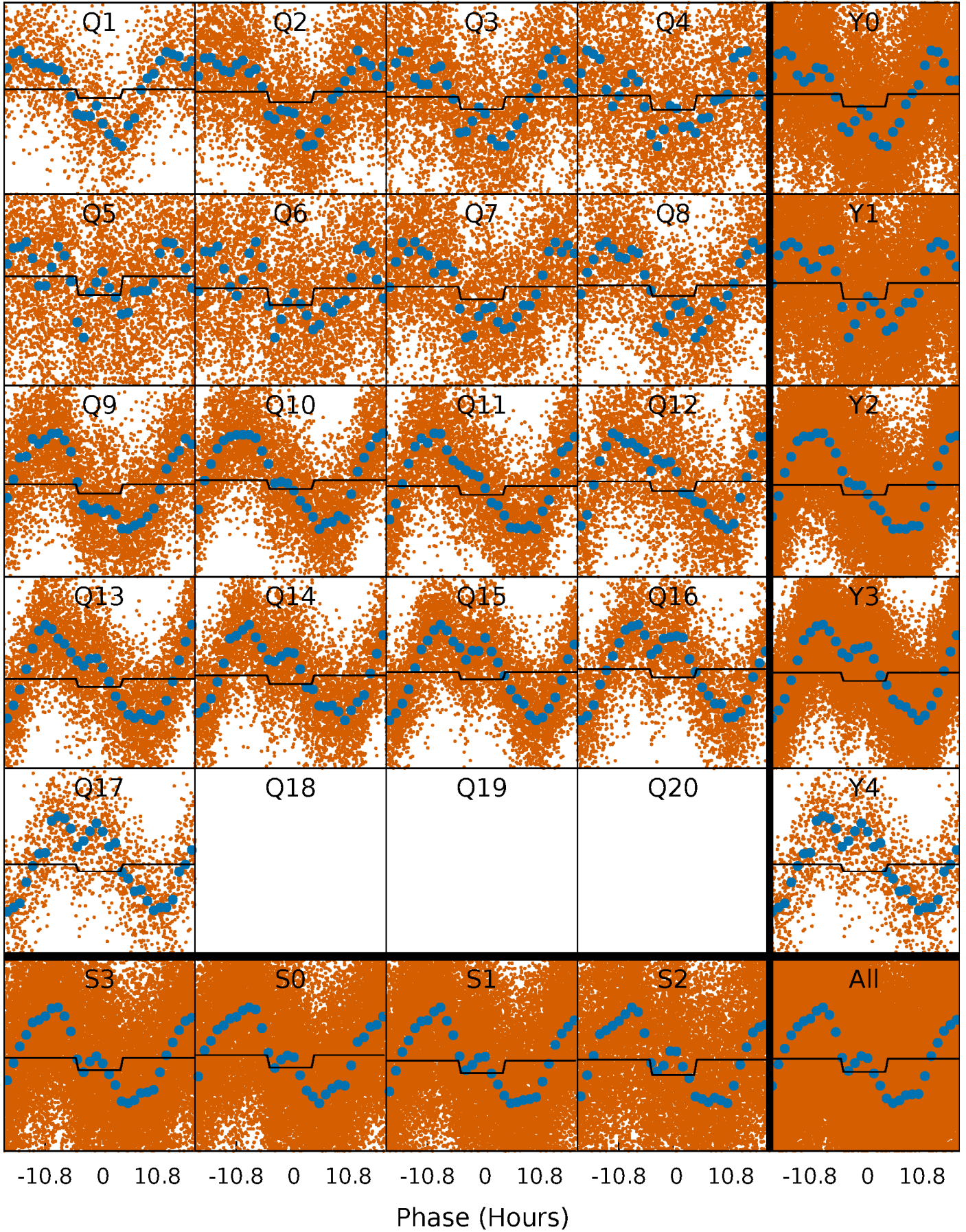
# DV Quarter-Phased Transit Curves

TCE 009713632-01 P= 1.240437 Days  $T_0=131.619527$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

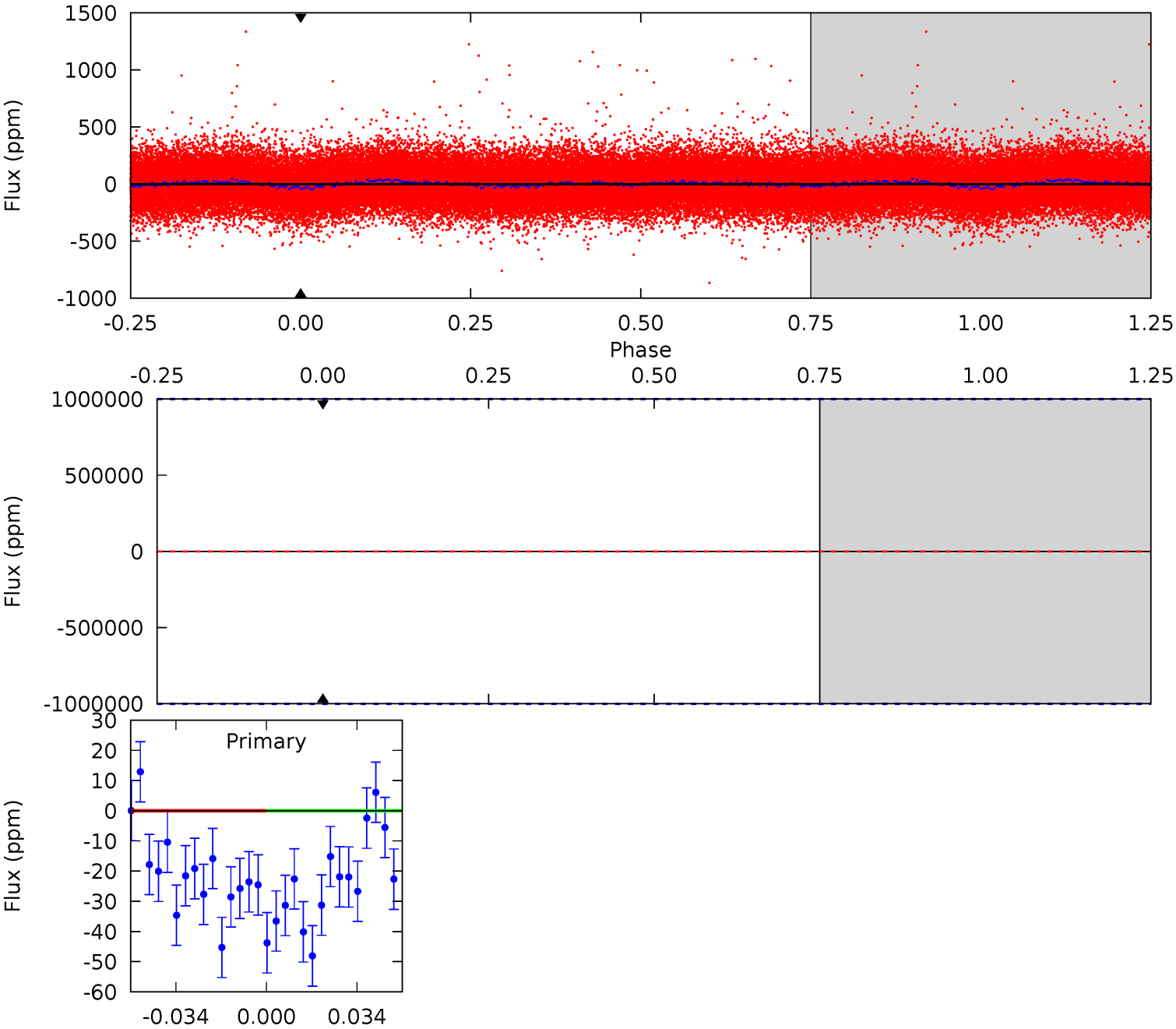
TCE 009713632-01 P= 1.240437 Days  $T_0=131.767570$  (BKJD)



DV Model-Shift Uniqueness Test

009713632-01, P = 1.240437 Days, E = 130.379090 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
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0

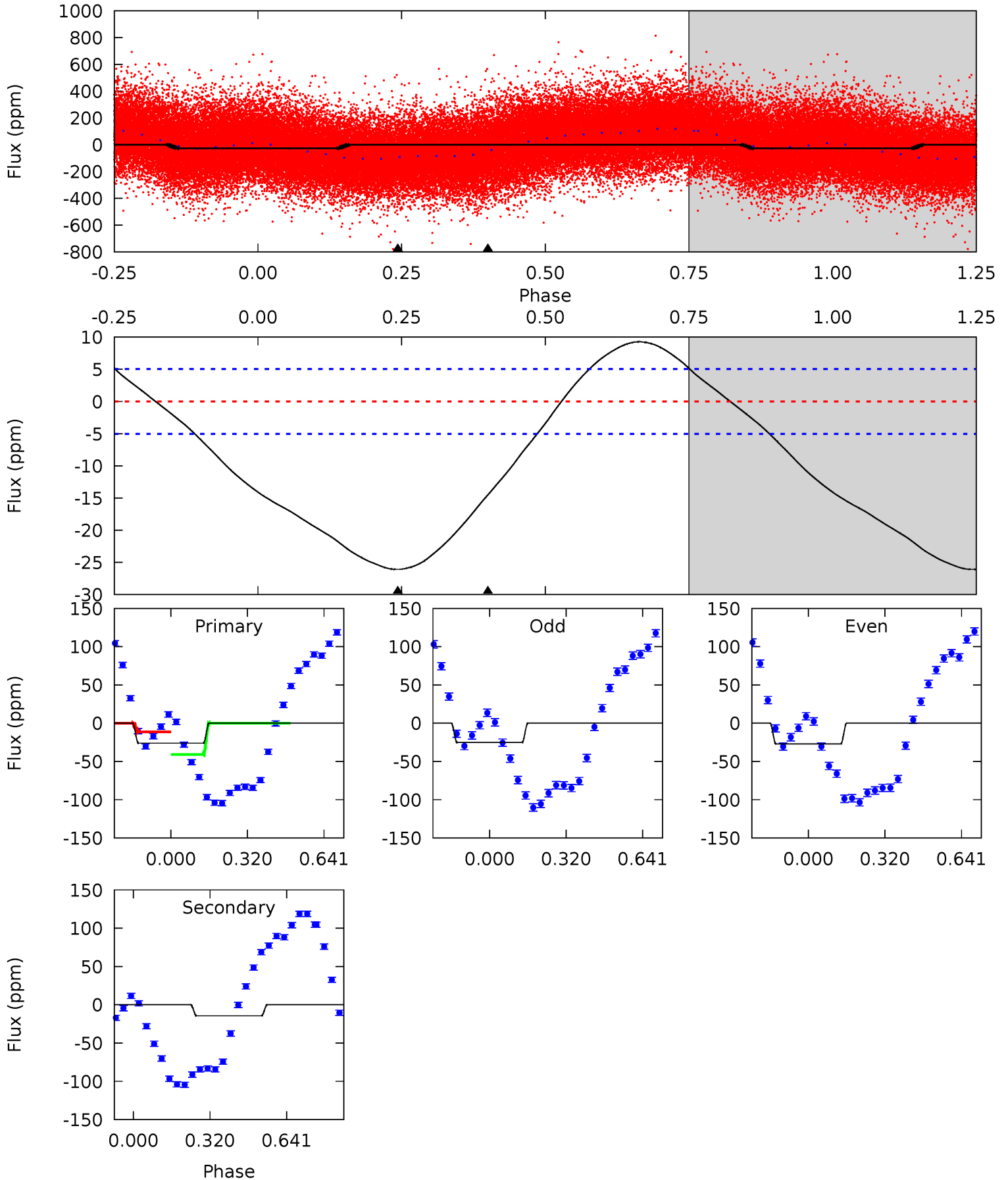




# Alt Model-Shift Uniqueness Test

009713632-01, P = 1.240437 Days, E = 130.527133 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
22.3	12.4	0	0	4.31	0.99	3.68	22.3	22.3	12.4	12.4	0.73	0.78	0.26	12.0





### Stellar Parameters For KIC 009713632

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7241^{+203}_{-304}$	$4.139^{+0.165}_{-0.182}$	$-0.240^{+0.250}_{-0.350}$	$1.681^{+0.489}_{-0.355}$	$1.420^{+0.219}_{-0.219}$	$0.421^{+0.336}_{-0.217}$
	+3%/-4%	+4%/-4%	+104%/-146%	+29%/-21%	+15%/-15%	+80%/-52%
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 009713632-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$0 \pm 1000000$	$13.00^{+14.27}_{-9.03}$	$3638^{+271}_{-256}$	$-4287^{+39683}_{-34610}$	$-0.828^{+344.237}_{-400.813}$
Alt.	$-15 \pm 1$	$13.14^{+14.42}_{-9.19}$	$3616^{+286}_{-237}$	$-3324^{+5824}_{-213}$	$0.029^{+0.310}_{-0.022}$

$T_{\text{max}}$  = 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

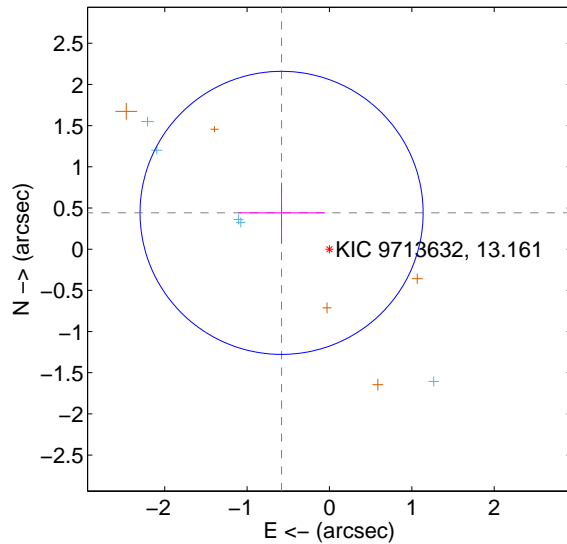
Supplemental centroid analysis for 009713632-01. Kepler magnitude: 13.16. Transit SNR -1.00

There are 5 quarters with good PRF difference image offsets

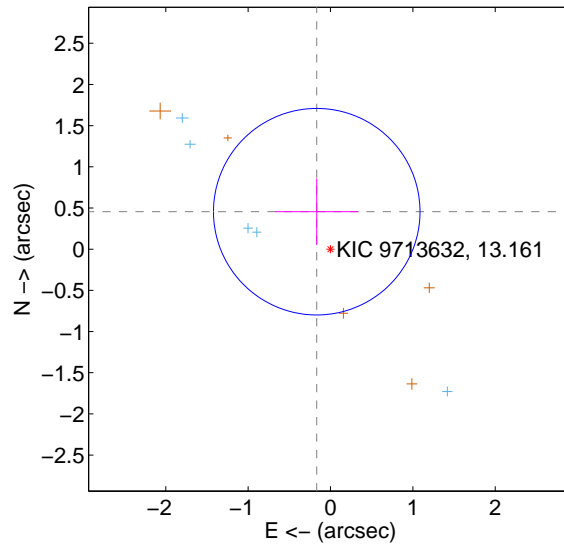
The direct PRF centroid is offset from the target star catalog position by about 0.40 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.730 \pm 0.573$	1.27	$0.581 \pm 0.524$	$0.441 \pm 0.365$
PRF-fit source offset from KIC position	$0.485 \pm 0.418$	1.16	$0.167 \pm 0.508$	$0.455 \pm 0.404$
photometric centroid source offset	$0.58 \pm 0.38$	1.53	$0.19 \pm 0.61$	$-0.55 \pm 0.34$

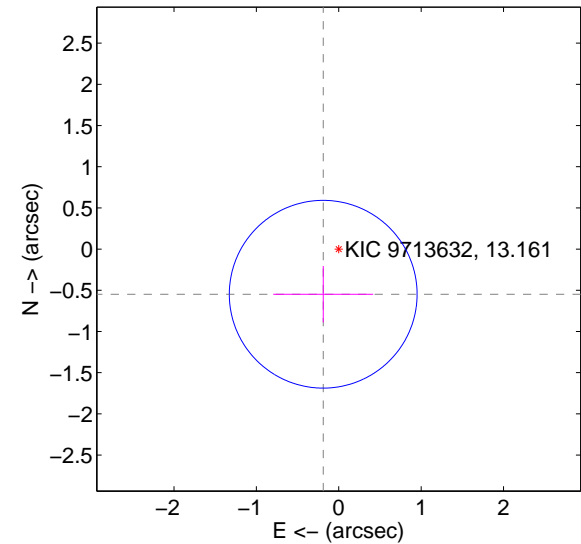
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

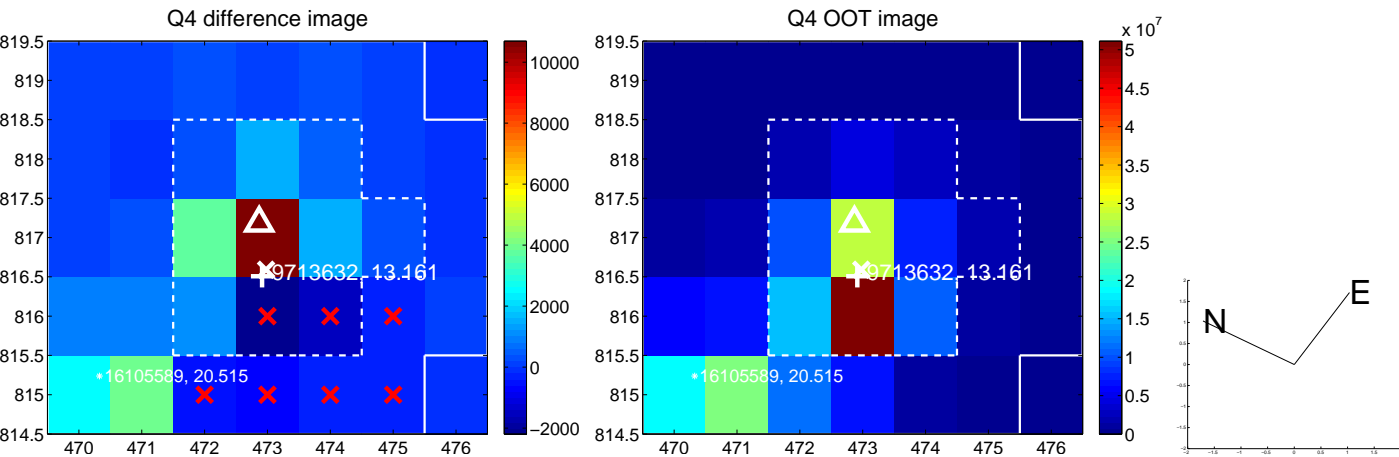
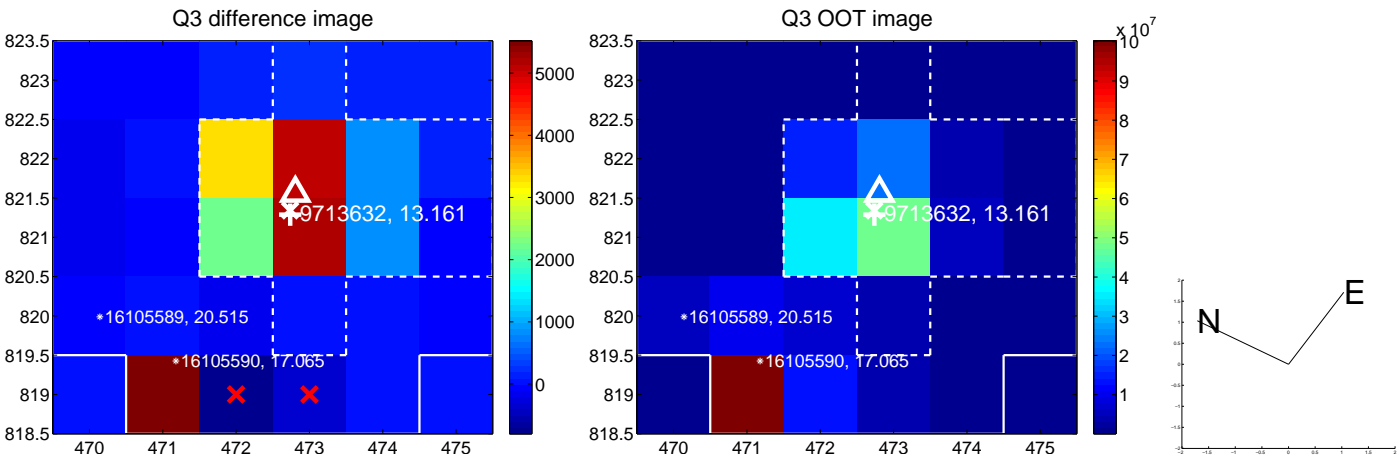
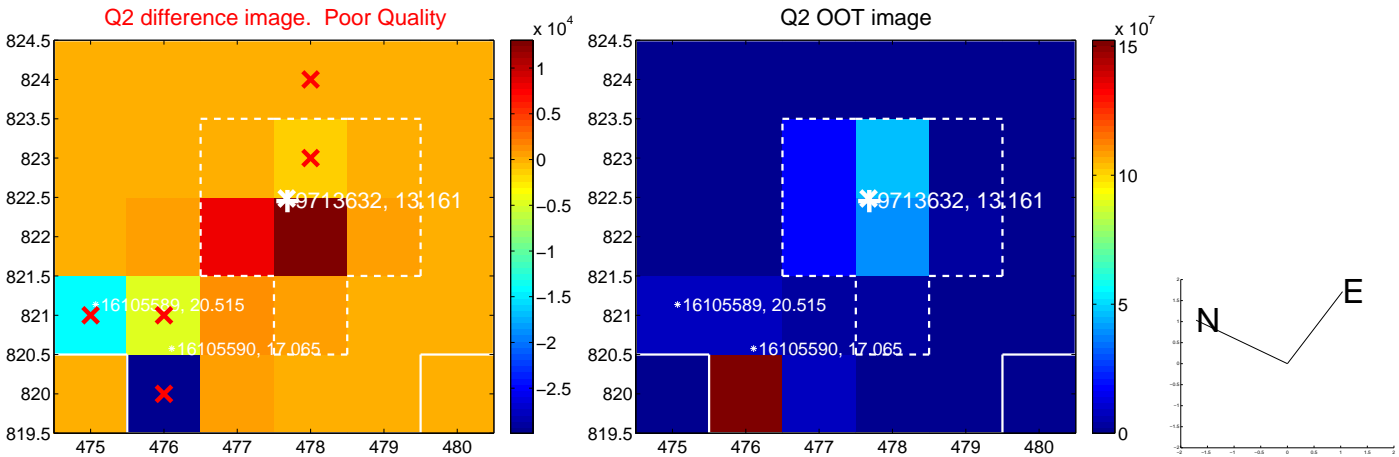
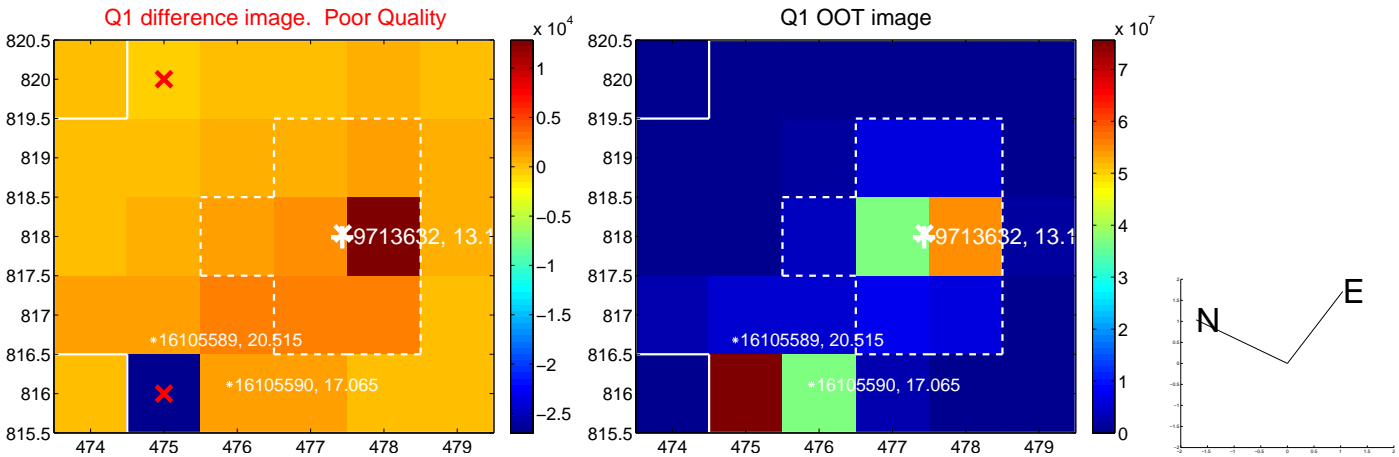


offset from photometric centroids

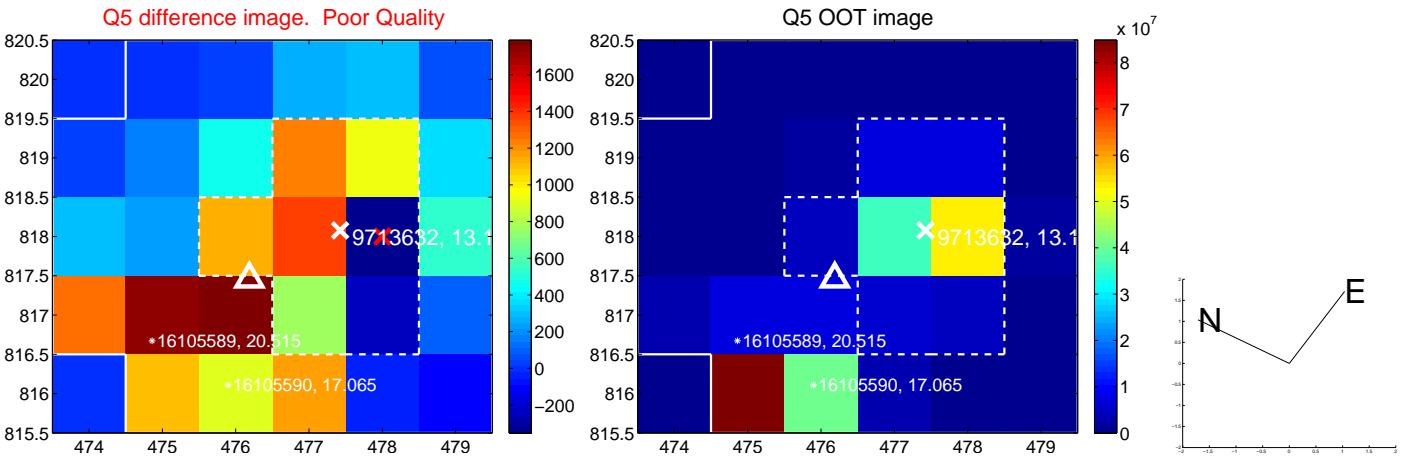


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

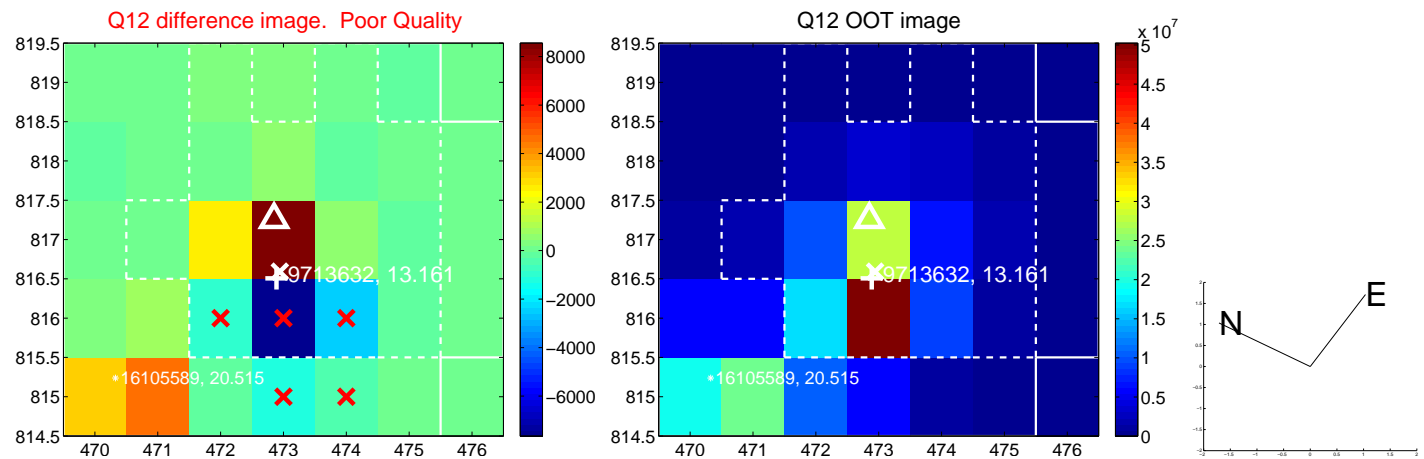
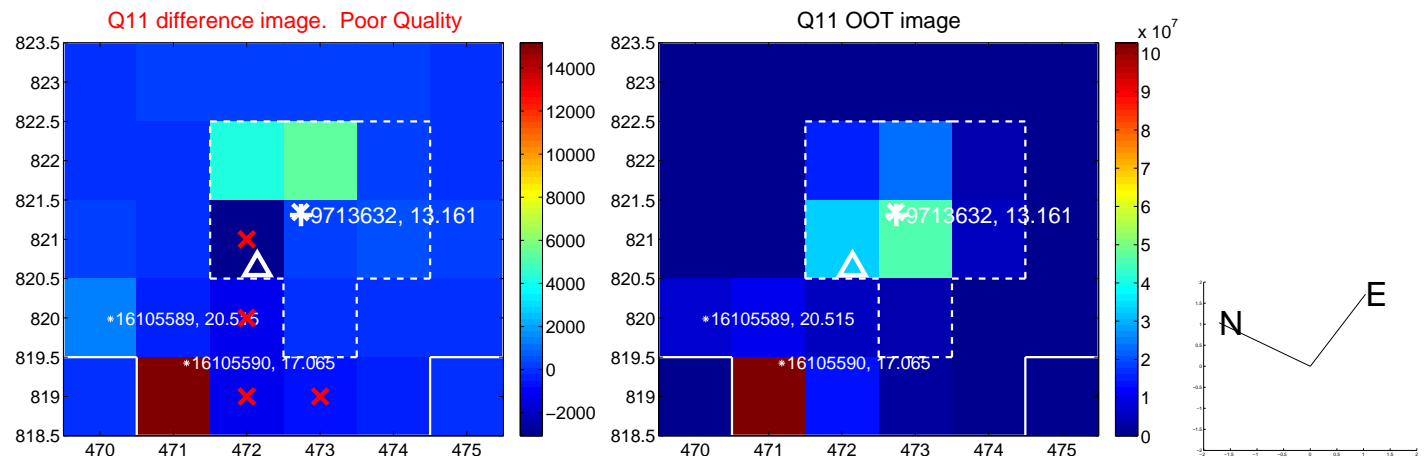
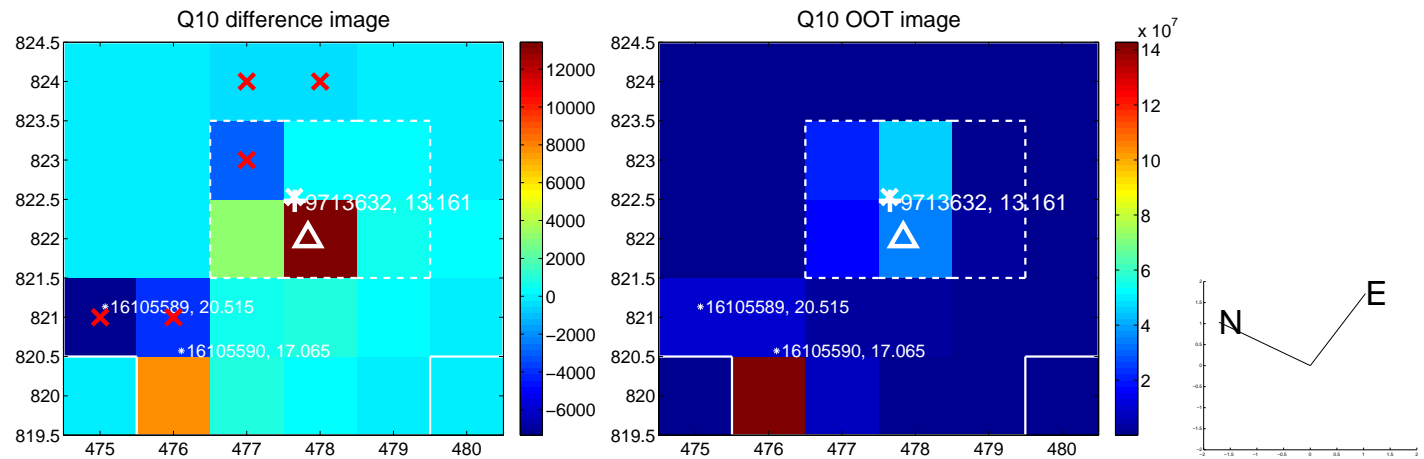
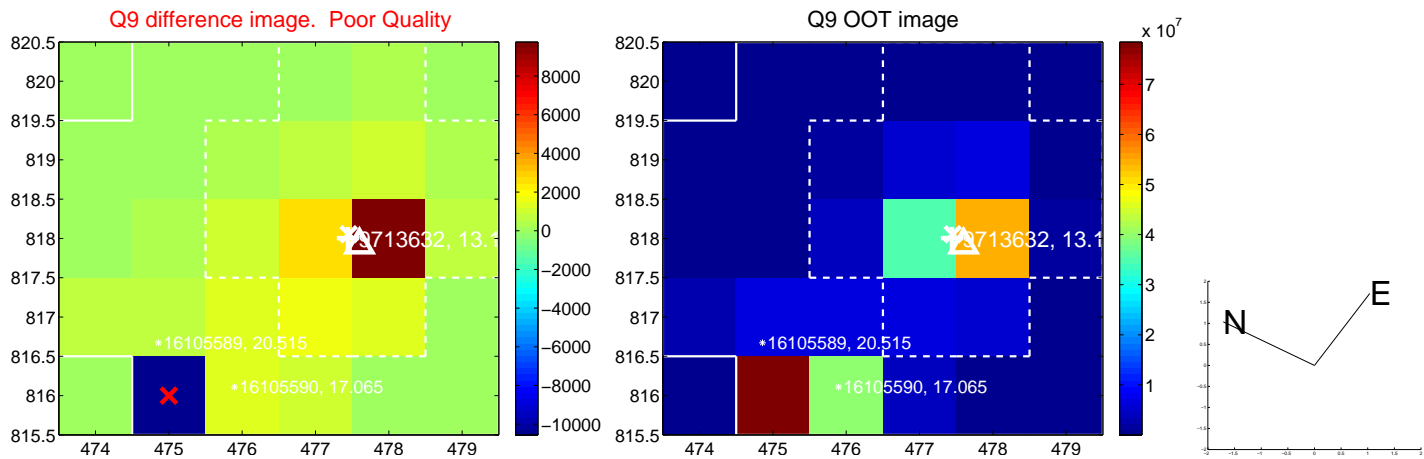


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

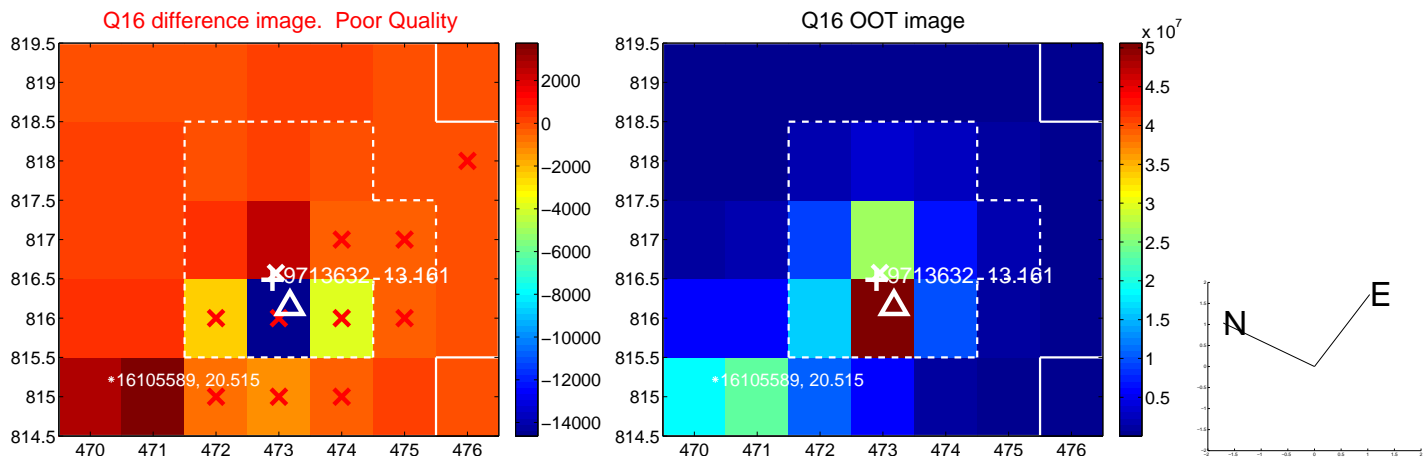
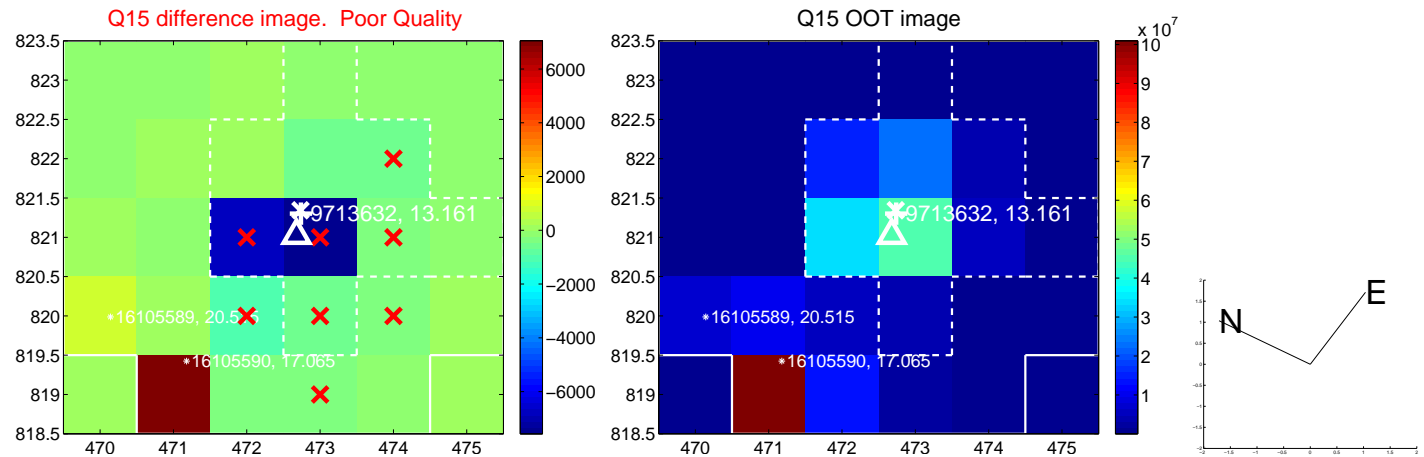
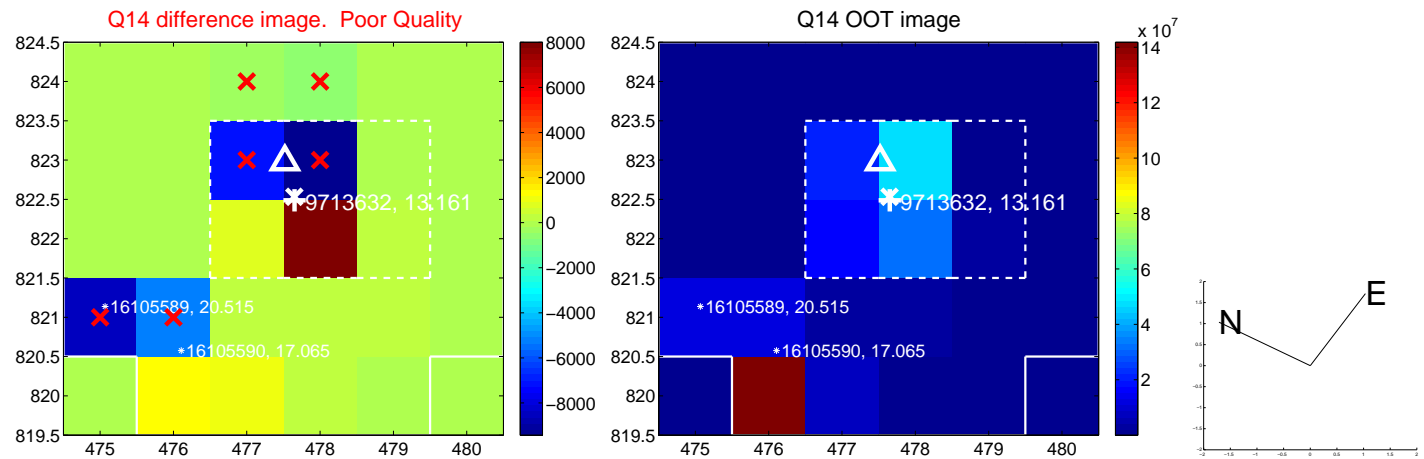
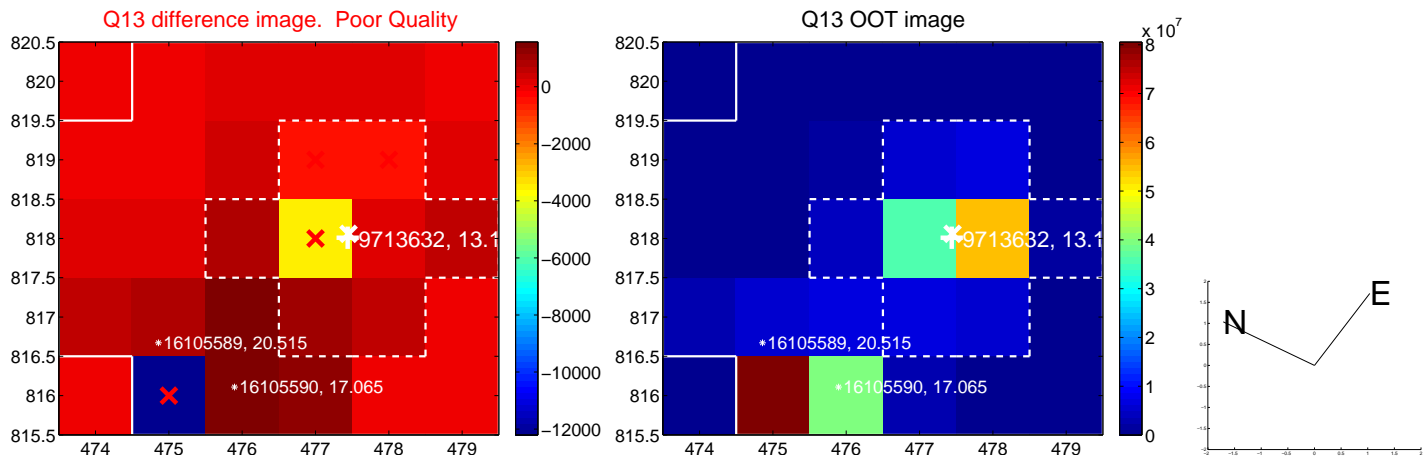




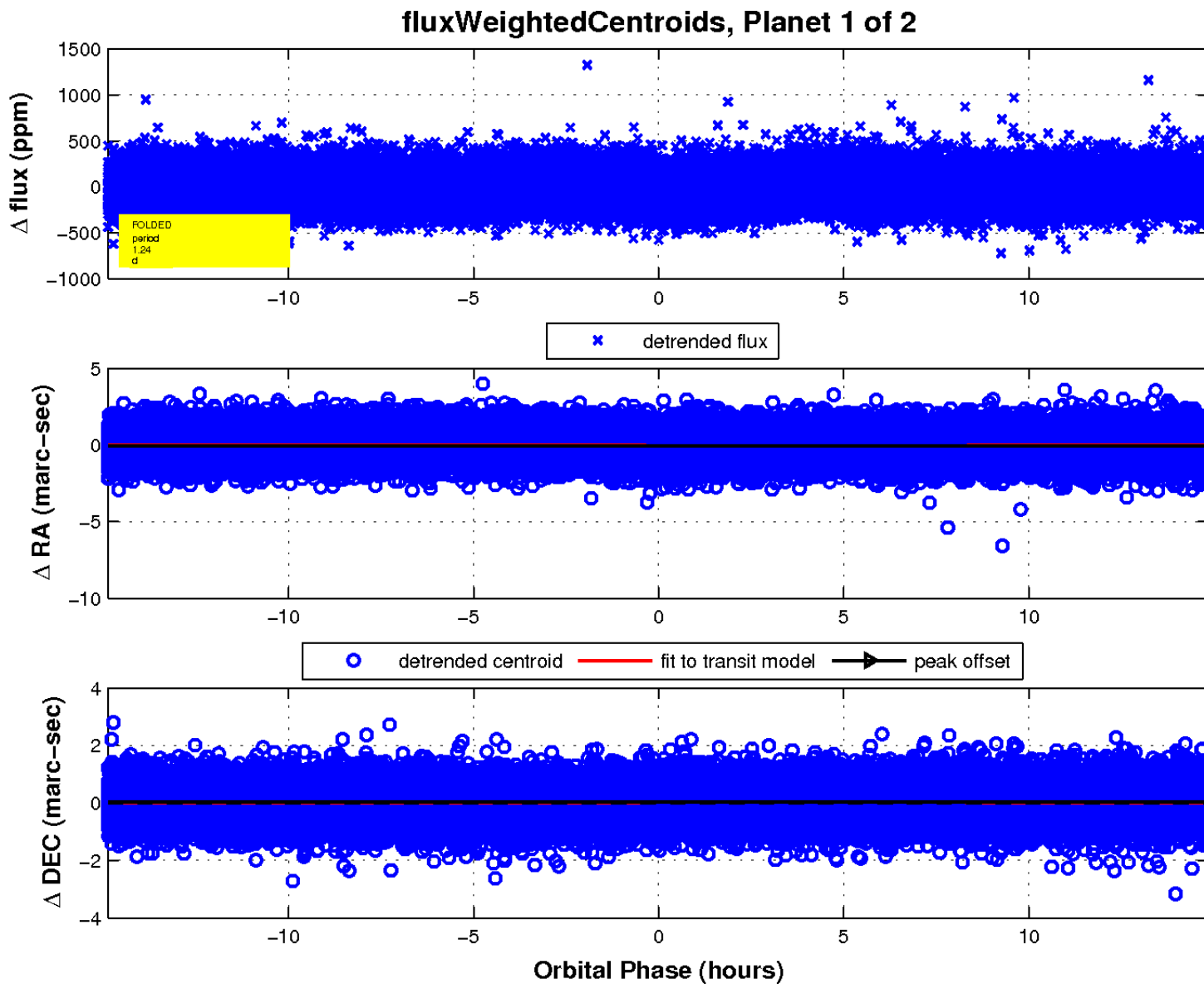
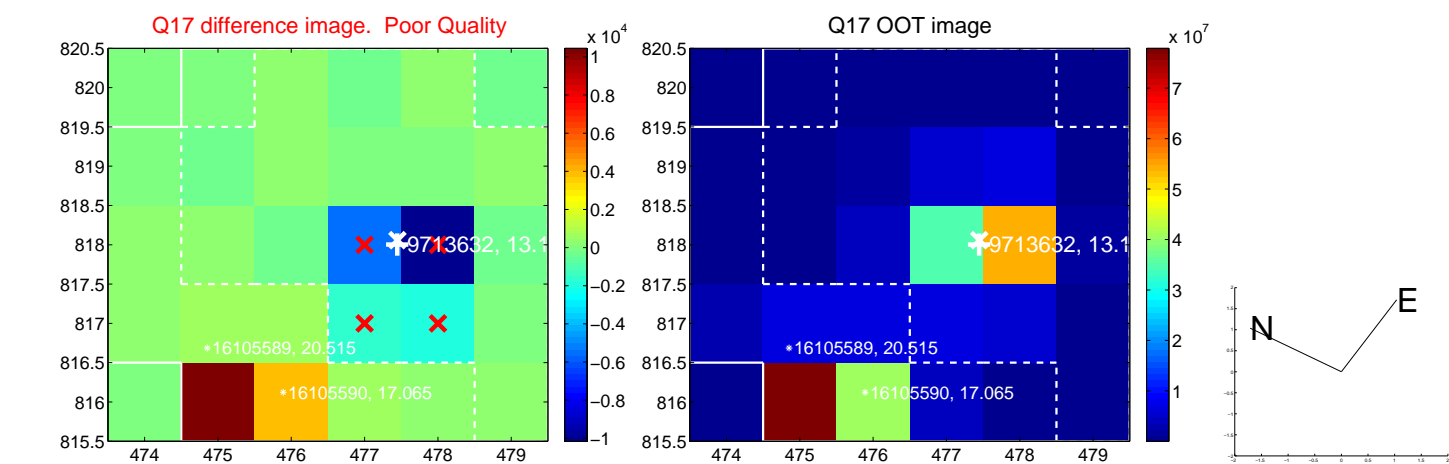
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



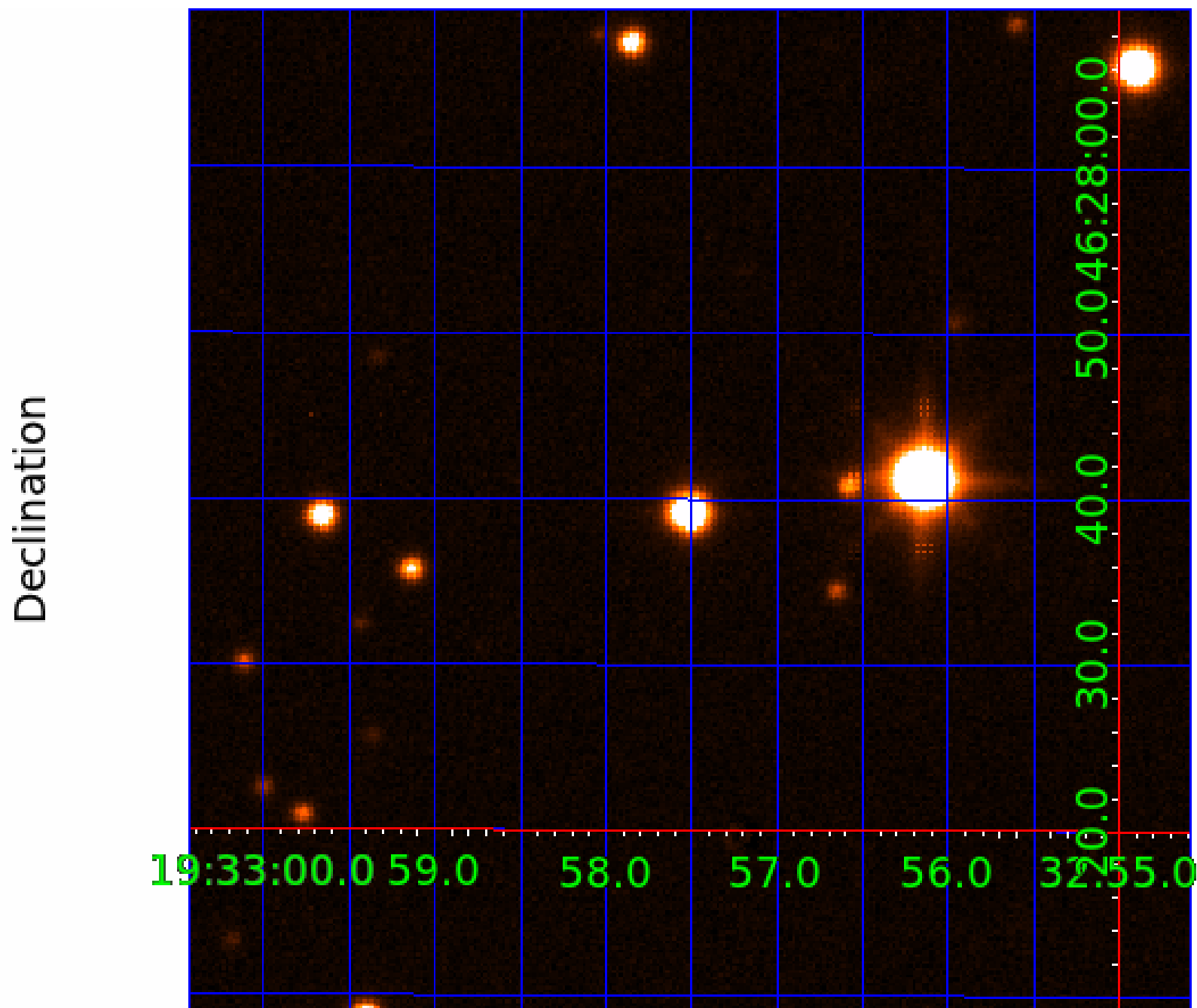
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image





# KIC 009713632

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009713632-01	OBS	No	1.240437	131.619527	175.4	3.000	11.3	-1.0	1.68	7241	2.26	10790.32
009713632-02	OBS	No	1.240938	131.922264	15.1	3.339	8.7	7.0	1.68	7241	0.69	10784.50

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009713632-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—CENT_NOFITS
009713632-02	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV—LPP_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.

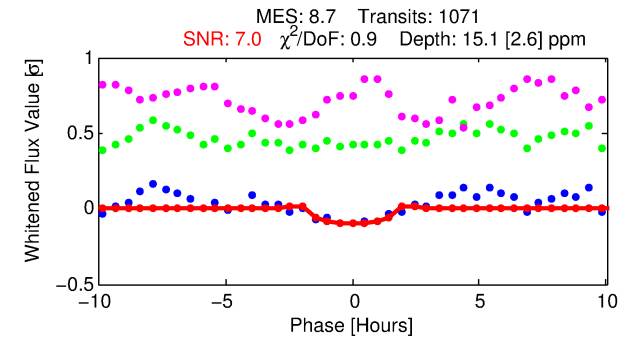
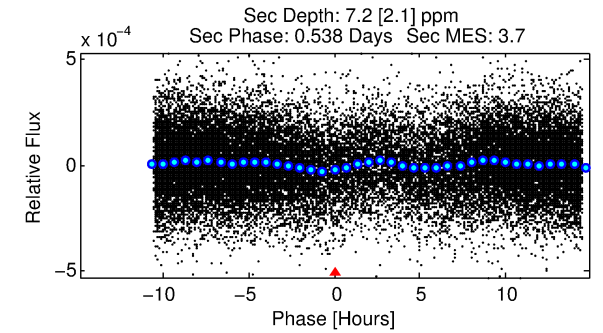
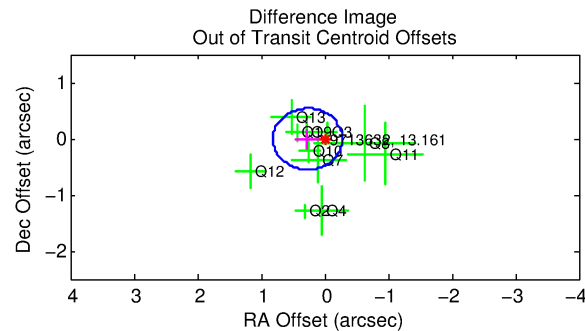
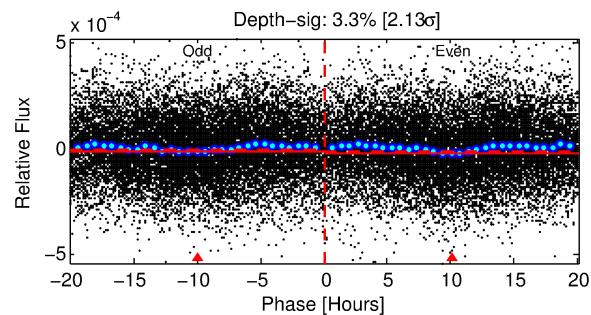
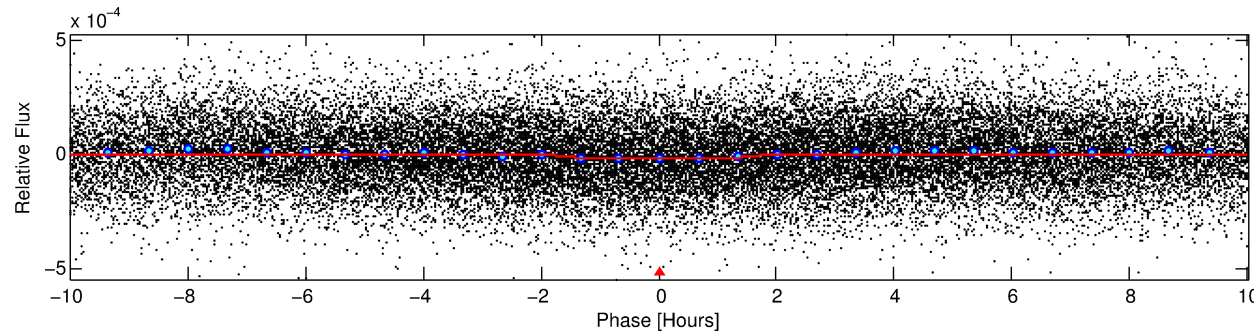
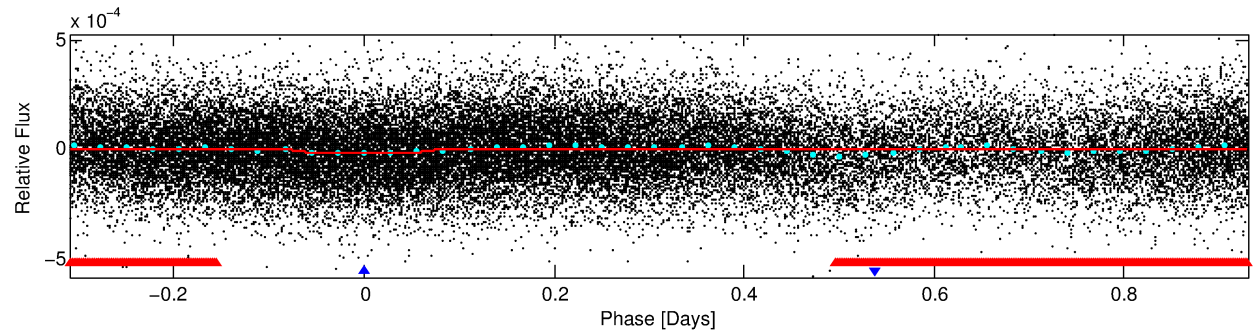
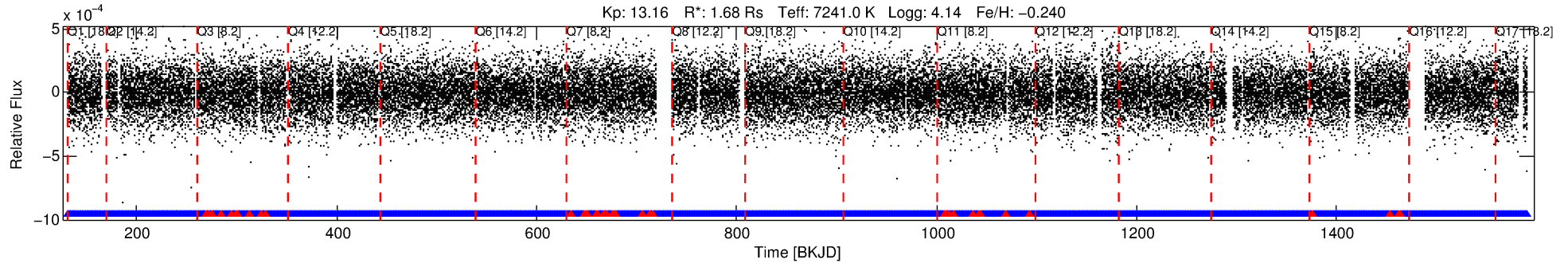
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009713632-02

No Significant Match Found

# DV One-Page Summary

KIC: 9713632 Candidate: 2 of 2 Period: 1.241 d



## DV Fit Results:

Period = 1.24094 [0.00002] d  
Epoch = 131.9223 [0.0055] BKJD  
Rp/R\* = 0.0038 [0.0008]  
a/R\* = 2.30 [2.26]  
b = 0.66 [1.06]  
Seff = 10784.50 [4090.50]  
Teff = 2599 [246] K  
Rp = 0.69 [0.25] Re  
a = 0.0254 [0.0061] AU  
Ag = 5.30 [3.28] [1.31σ]  
Teffp = 6096 [830] K [4.04σ]

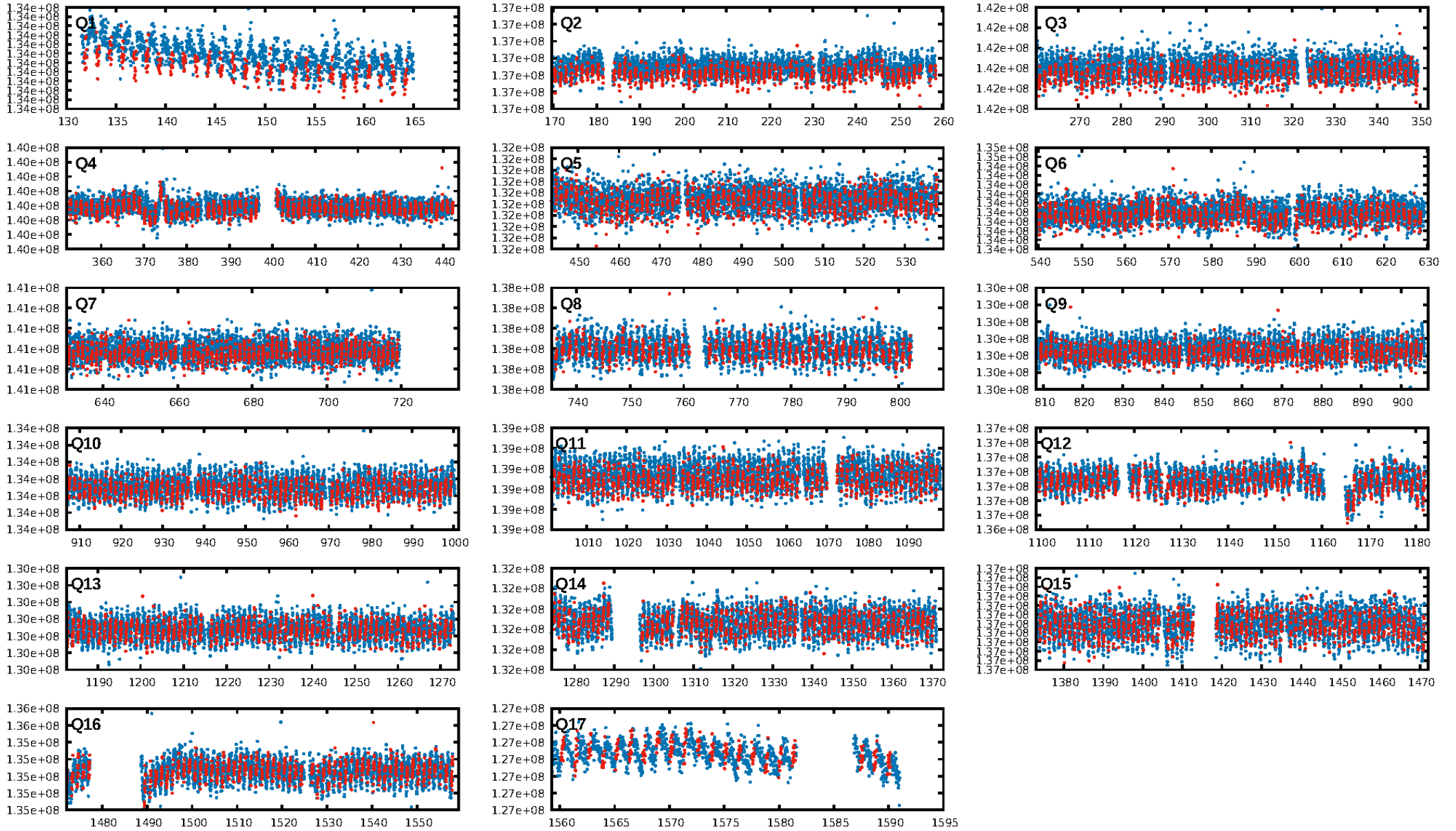
## DV Diagnostic Results:

ShortPeriod-sig: 0.2% [0.00σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 4.70e-14  
RollingBand-fgt: 0.96 [986/1023]  
GhostDiagnostic-chr: 6.433  
Centroid-sig: 0.0%  
Centroid-so: 4.569 arcsec [2.25σ]  
OotOffset-rm: 0.269 arcsec [1.48σ]  
KicOffset-rm: 0.166 arcsec [0.92σ]  
OotOffset-st: 2/3/3/3 [11]  
KicOffset-st: 2/3/3/3 [11]  
DiffImageQuality-fgm: 0.73 [8/11]  
DiffImageOverlap-fno: 0.35 [6/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 02:22:30 Z

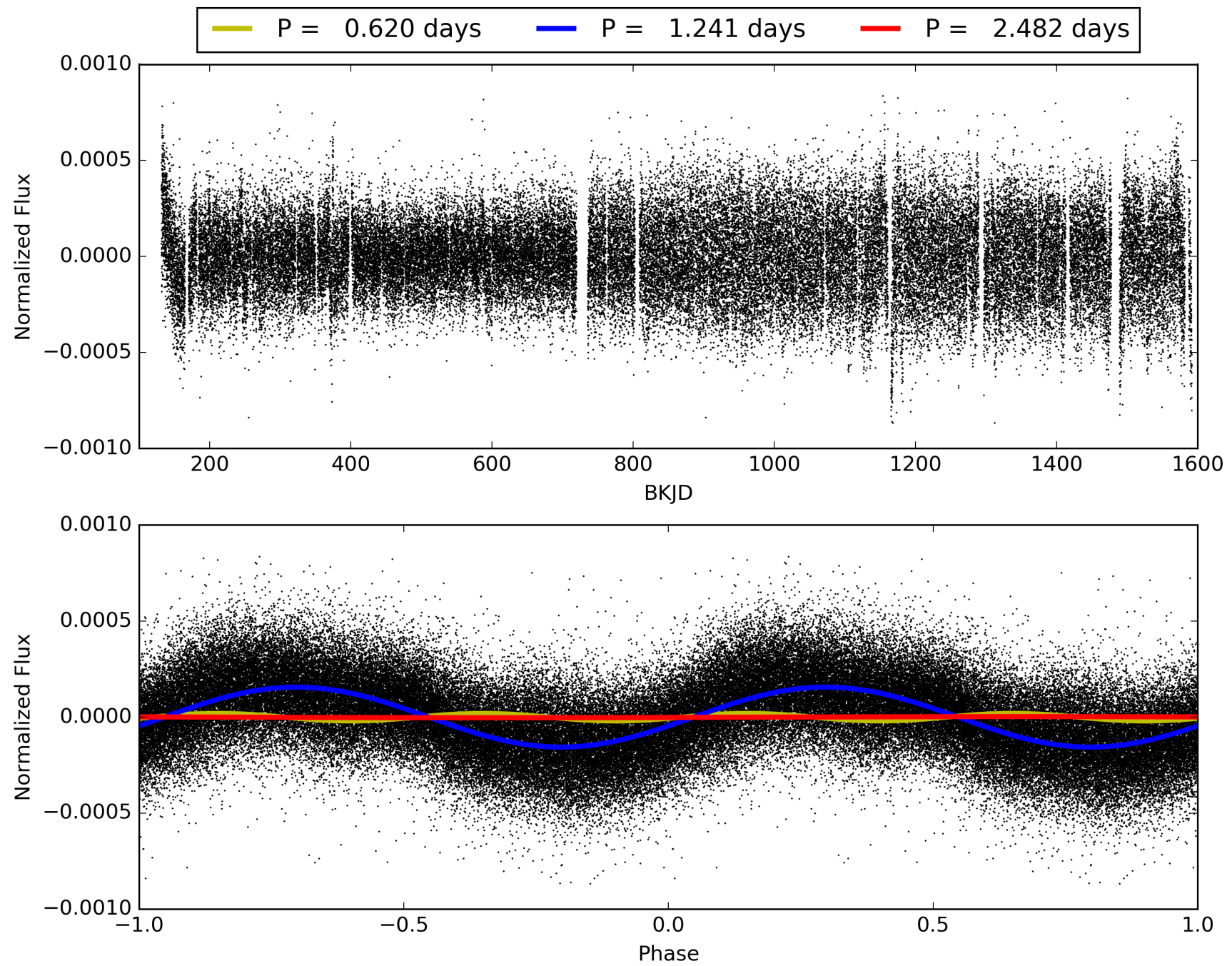
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 009713632-02, PDC Light Curves





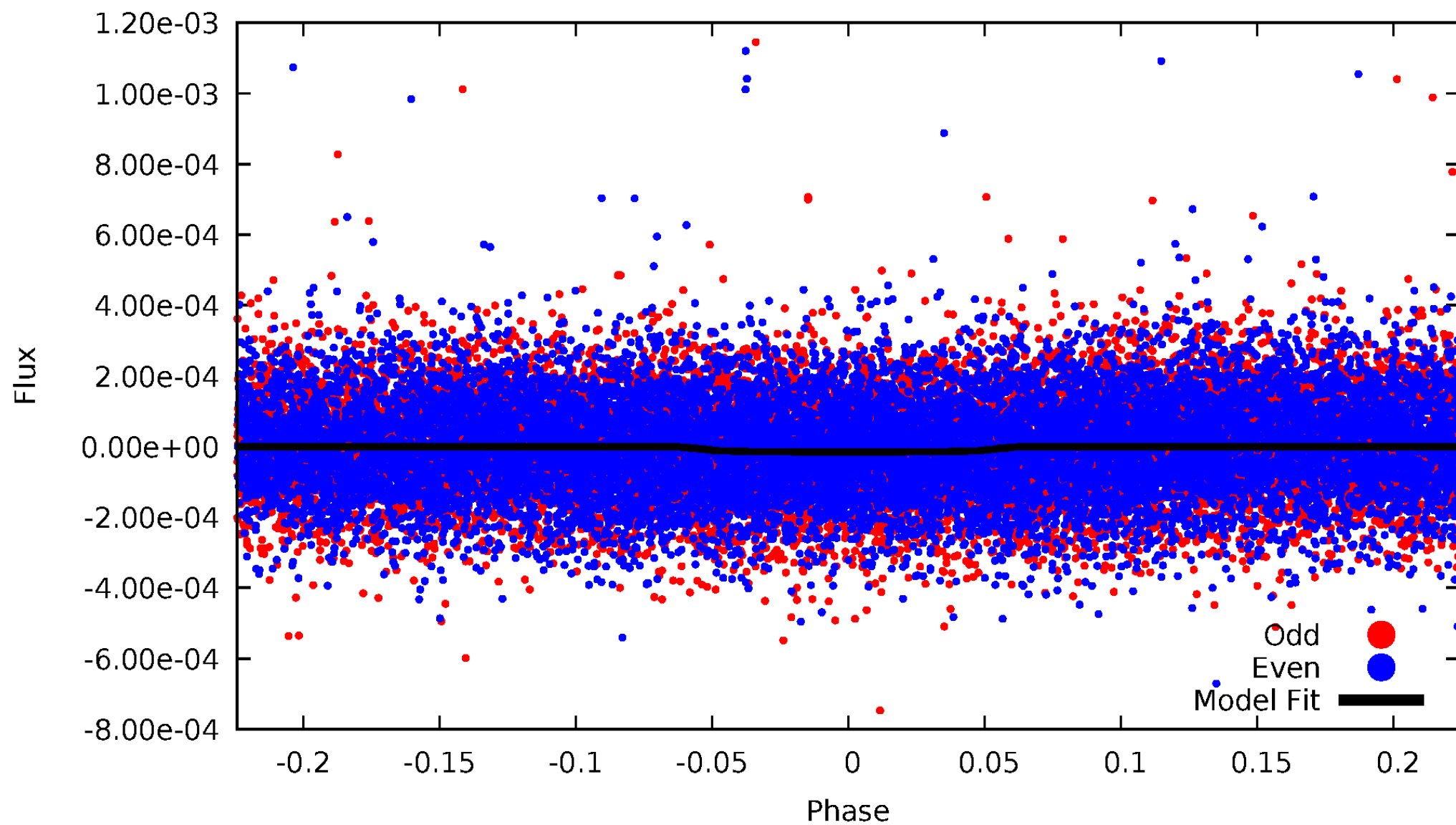
TCE 009713632-02





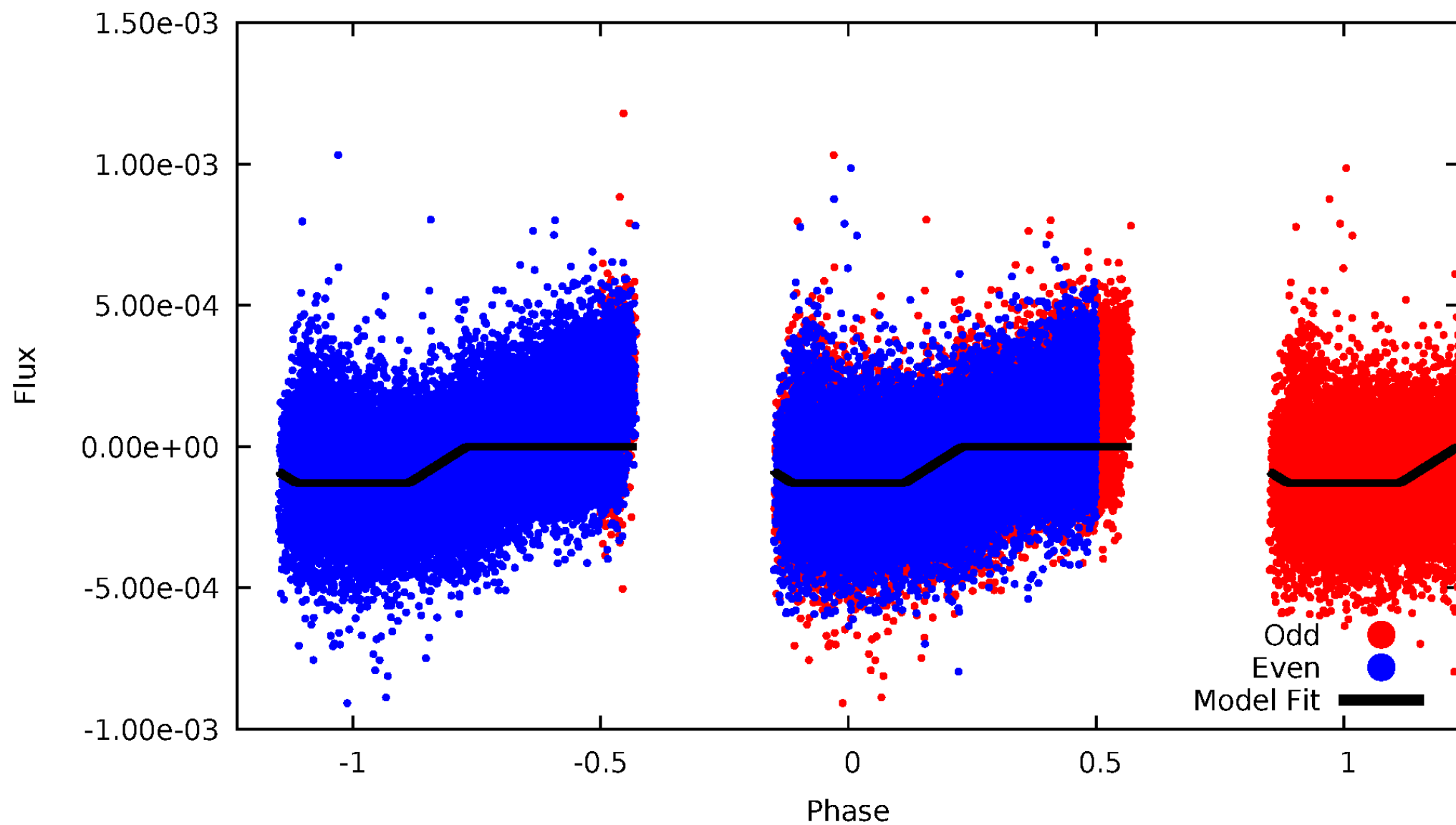
# DV Odd/Even

TCE 009713632-02



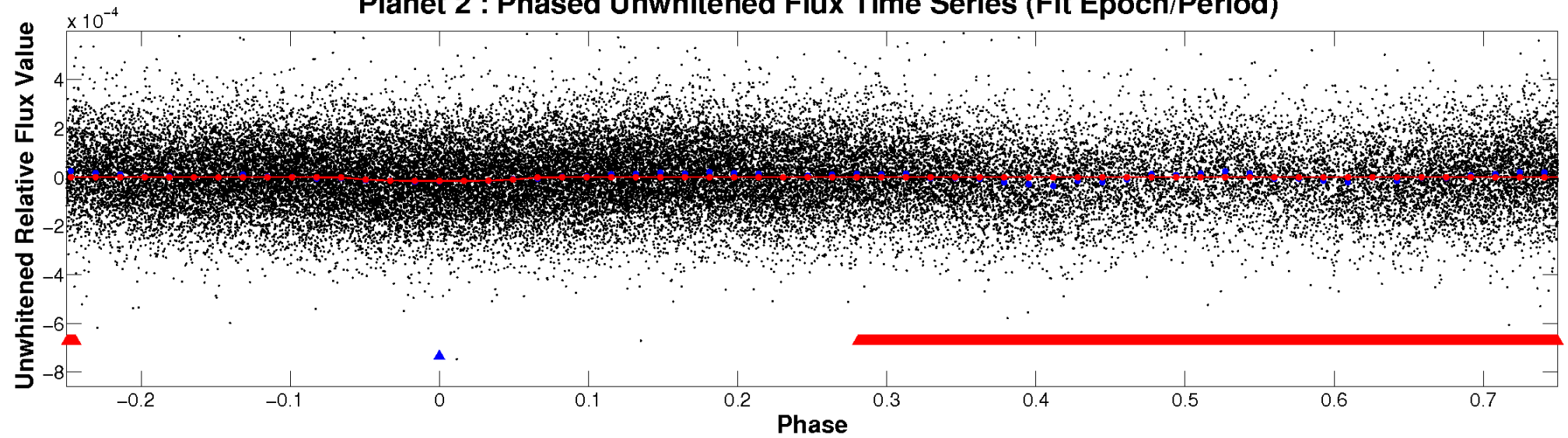
# ALT Odd/Even

TCE 009713632-02

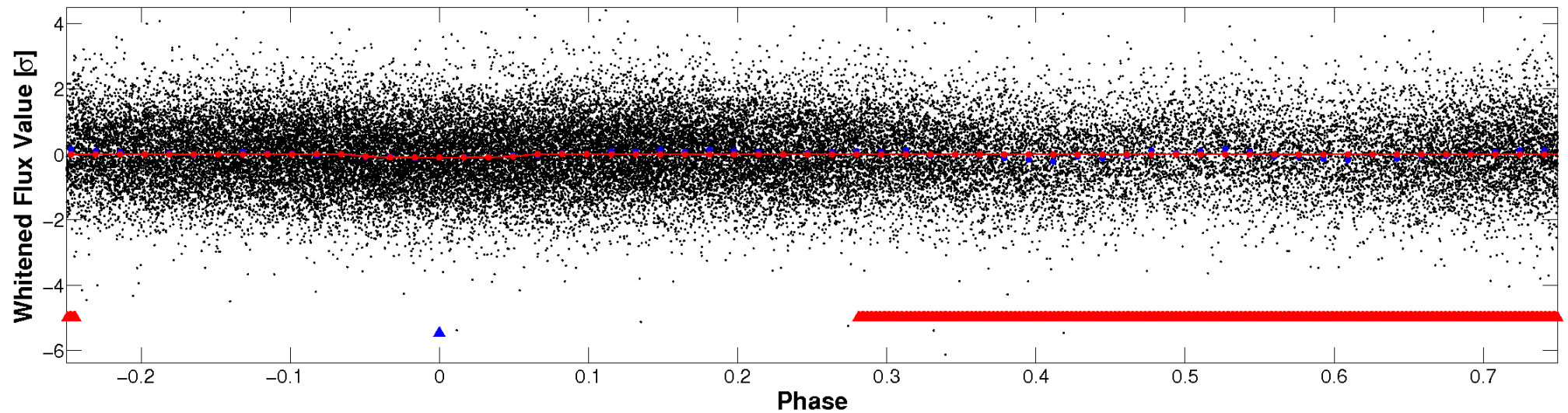


# Non-Whitened Vs. Whitened Light Curve

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

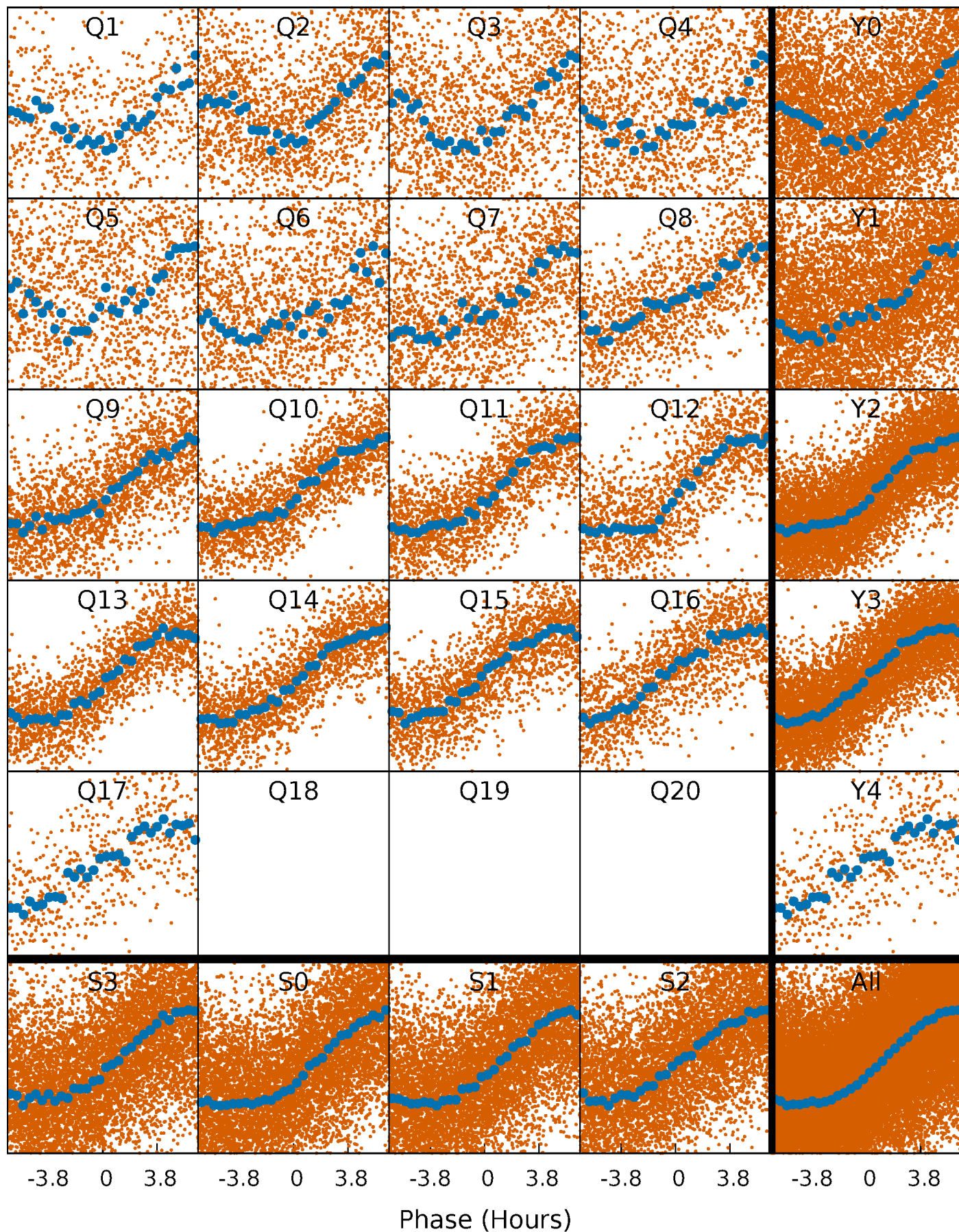


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

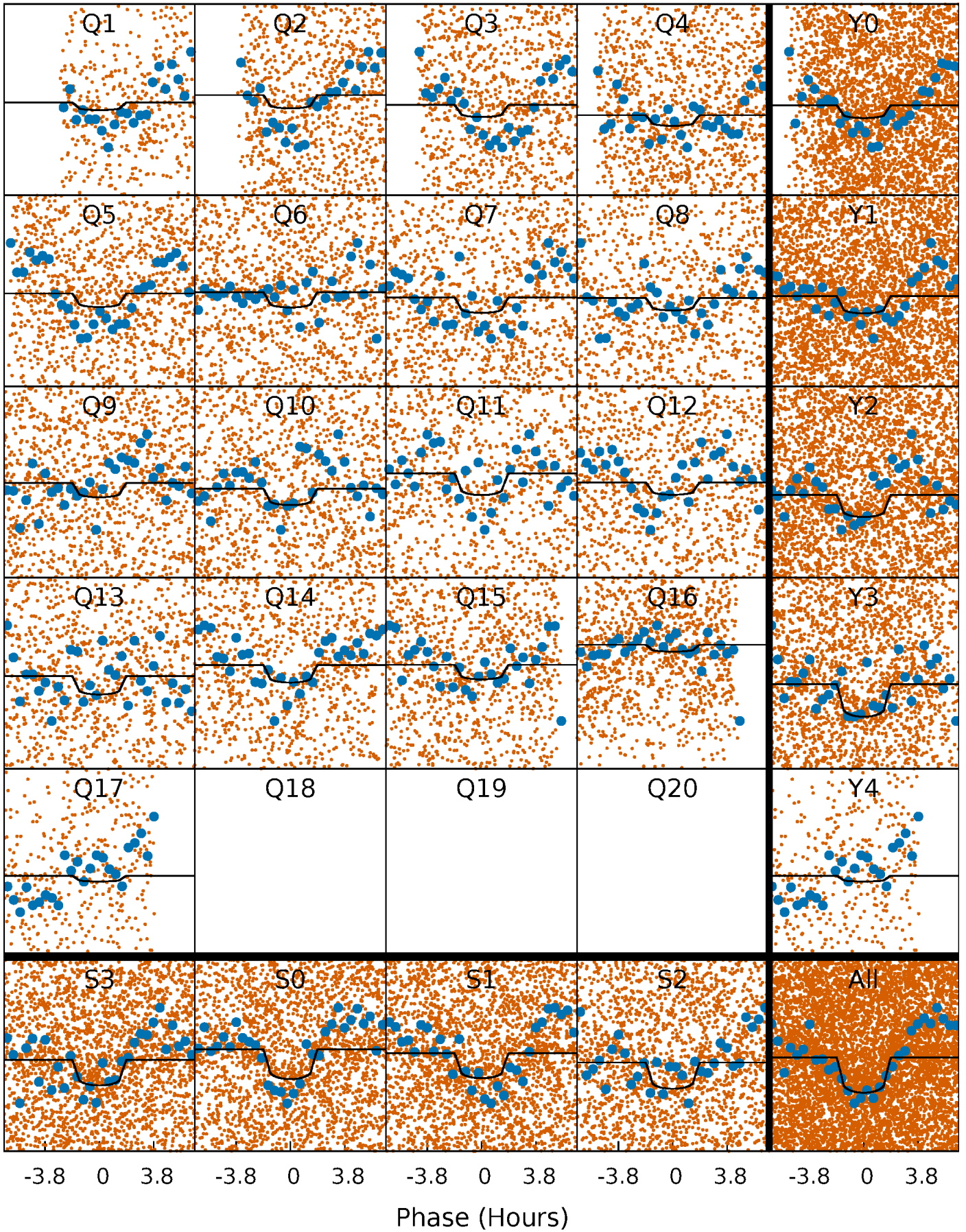
TCE 009713632-02   P= 1.240938 Days    $T_0=131.922264$  (BKJD)





# DV Quarter-Phased Transit Curves

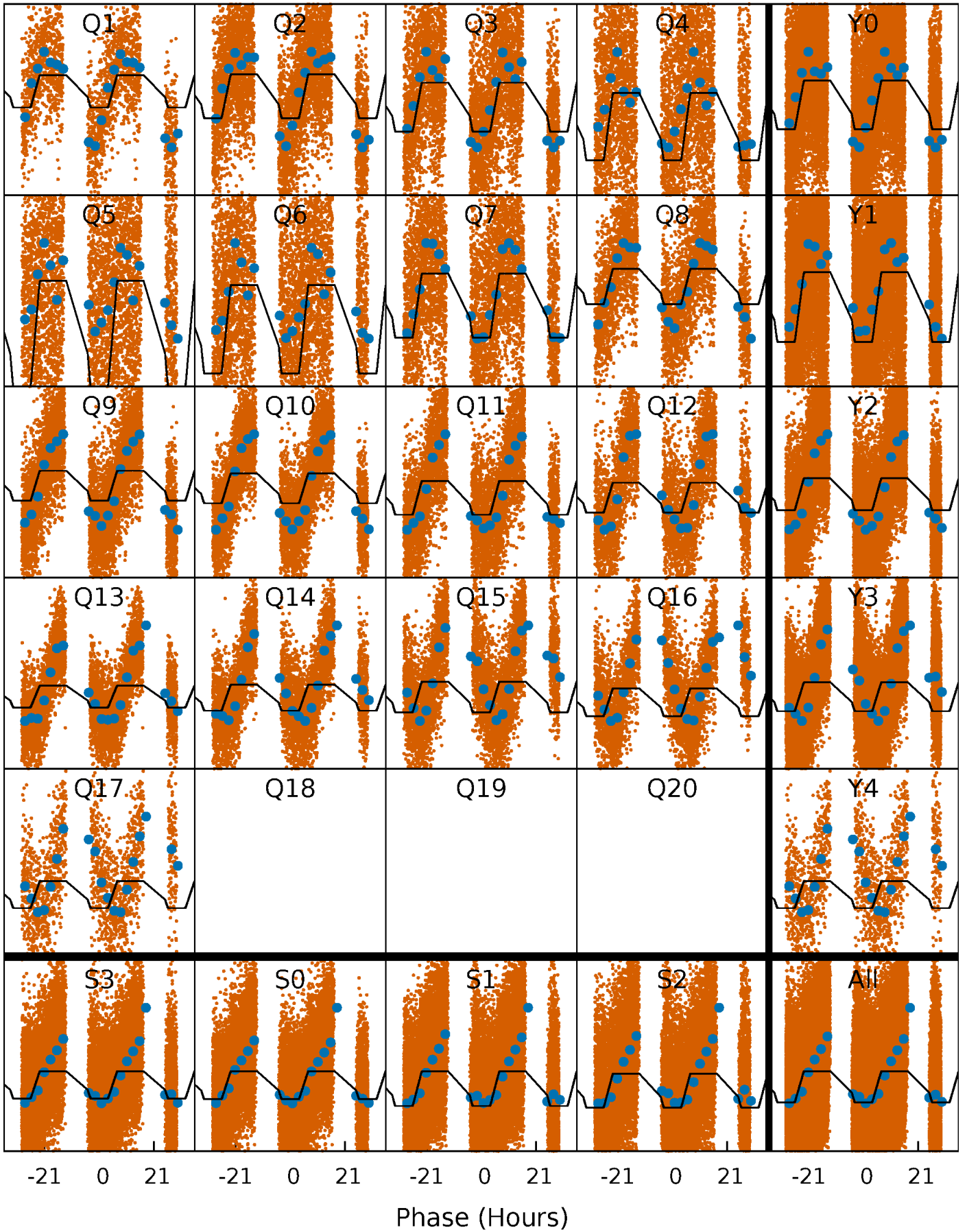
TCE 009713632-02   P= 1.240938 Days    $T_0=131.922264$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

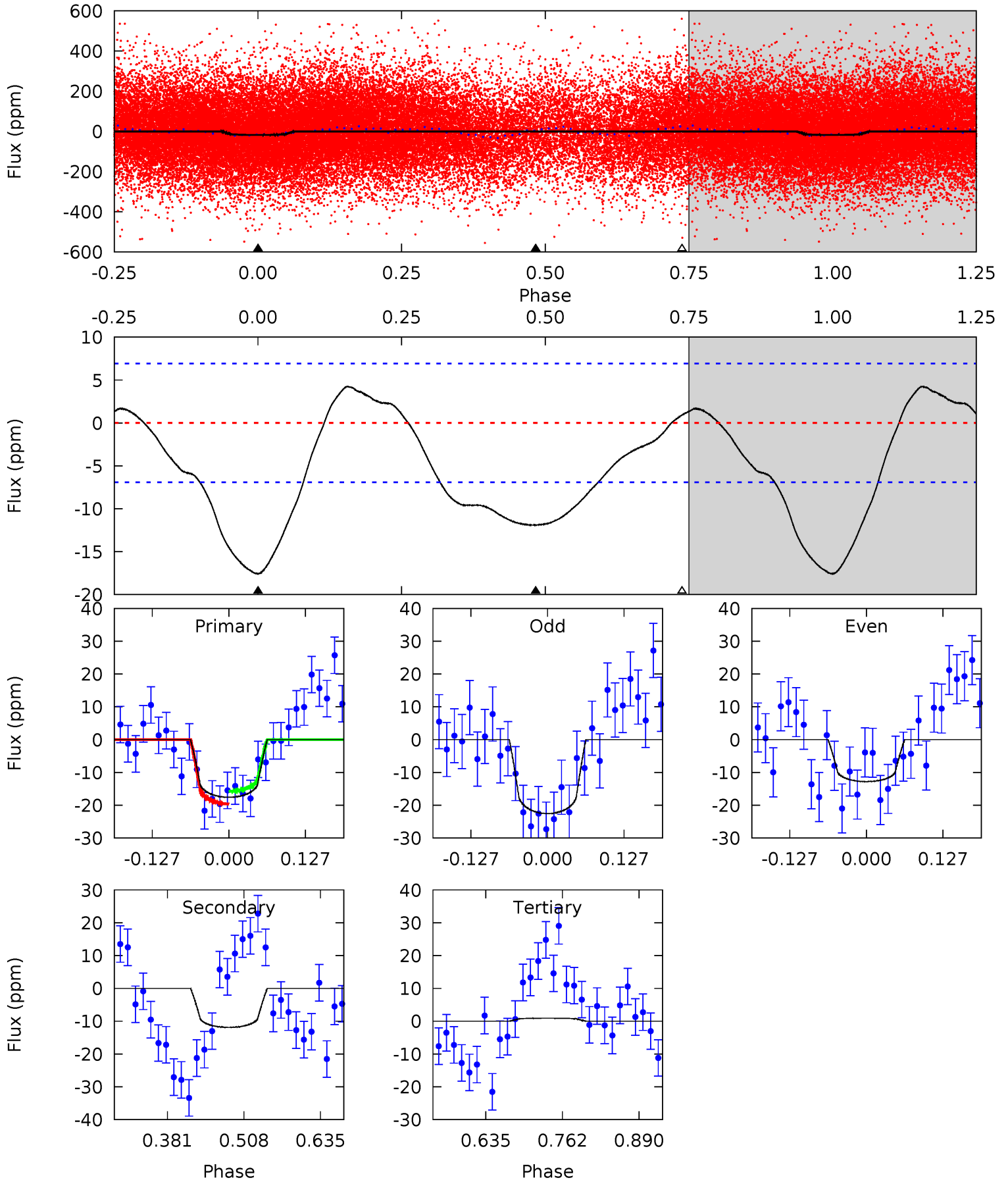
TCE 009713632-02 P= 1.240391 Days  $T_0=132.004896$  (BKJD)



# DV Model-Shift Uniqueness Test

009713632-02, P = 1.240938 Days, E = 130.681326 Days

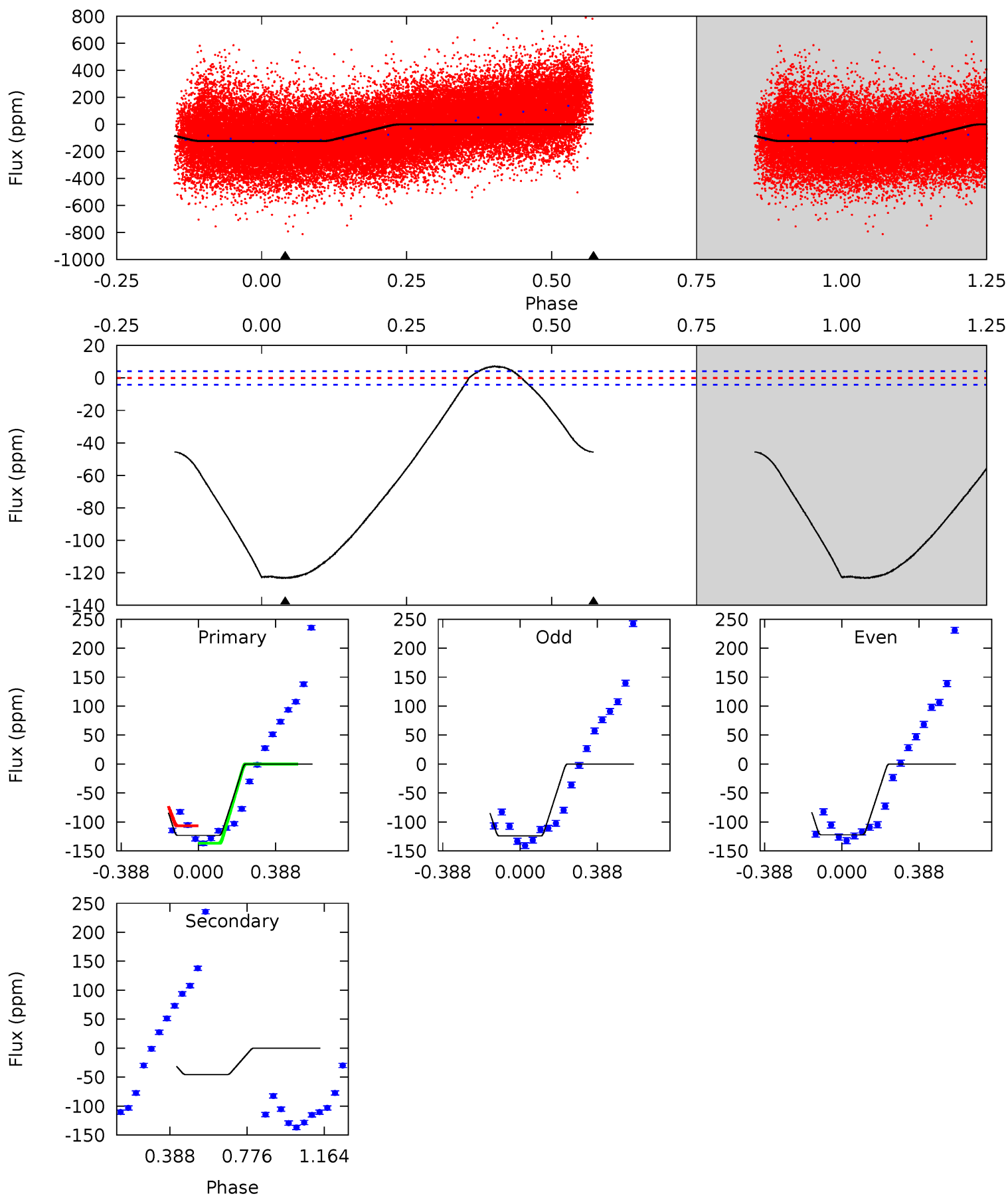
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.5	7.76	-0.59	0	4.51	1.53	2.32	12.1	11.5	8.36	7.76	3.18	1.04	0.19	1.27



# Alt Model-Shift Uniqueness Test

009713632-02, P = 1.240391 Days, E = 130.764505 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
125.8	46.6	0	0	4.27	0.86	10.2	125.8	125.8	46.6	46.6	1.05	0.97	0.05	14.0



### Stellar Parameters For KIC 009713632

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7241^{+203}_{-304}$	$4.139^{+0.165}_{-0.182}$	$-0.240^{+0.250}_{-0.350}$	$1.681^{+0.489}_{-0.355}$	$1.420^{+0.219}_{-0.219}$	$0.421^{+0.336}_{-0.217}$
	+3%/-4%	+4%/-4%	+104%/-146%	+29%/-21%	+15%/-15%	+80%/-52%
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 009713632-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-12 \pm 2$	$0.70^{+0.18}_{-0.18}$	$3636^{+287}_{-261}$	$6762^{+1180}_{-720}$	$8.558^{+6.883}_{-3.318}$
Alt.	$-46 \pm 1$	$2.09^{+0.37}_{-0.29}$	$3640^{+257}_{-268}$	$5428^{+239}_{-267}$	$3.688^{+1.198}_{-0.999}$

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

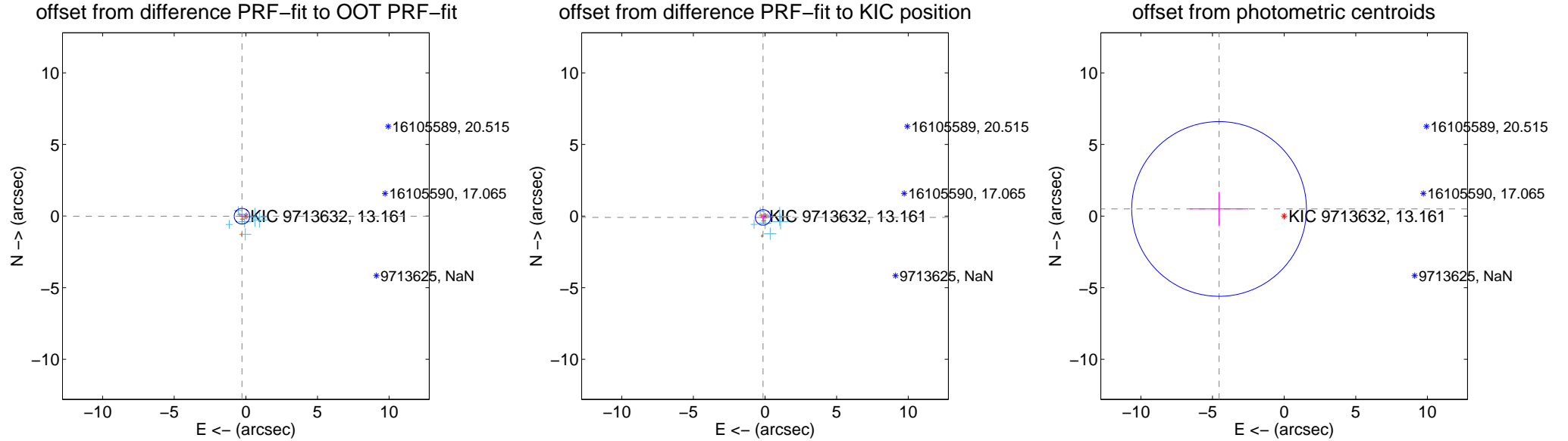
## DV Centroid Data

Supplemental centroid analysis for 009713632-02. Kepler magnitude: 13.16. Transit SNR 7.05

There are 8 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.21 arcsec

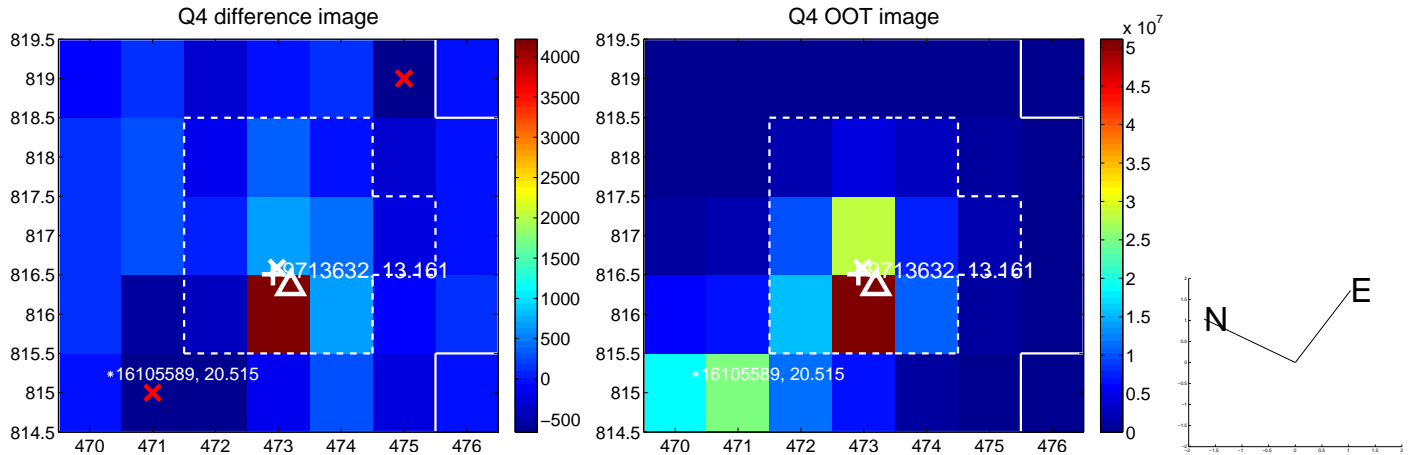
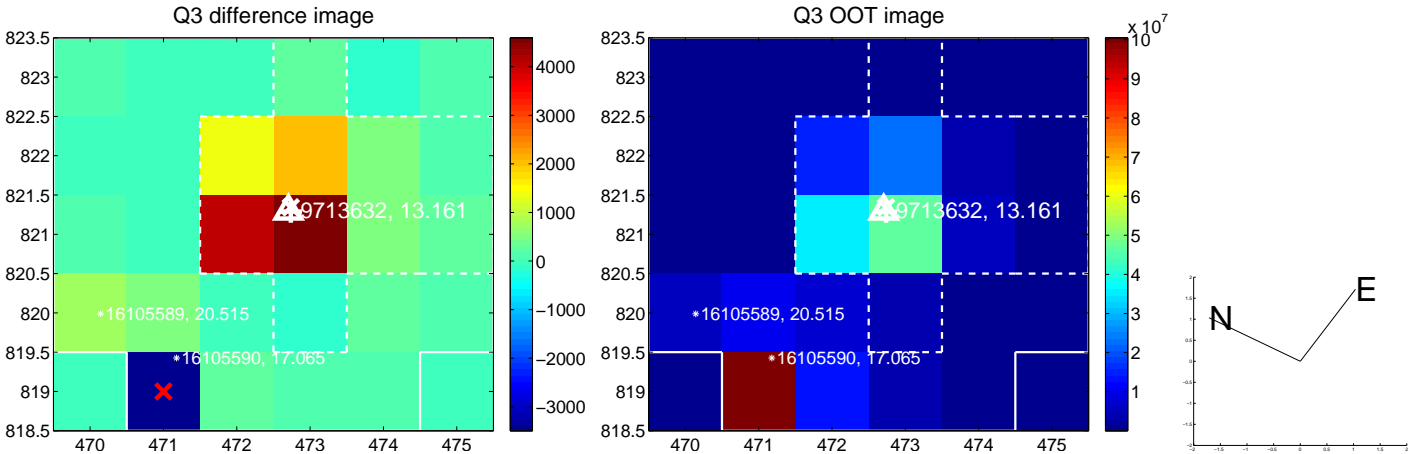
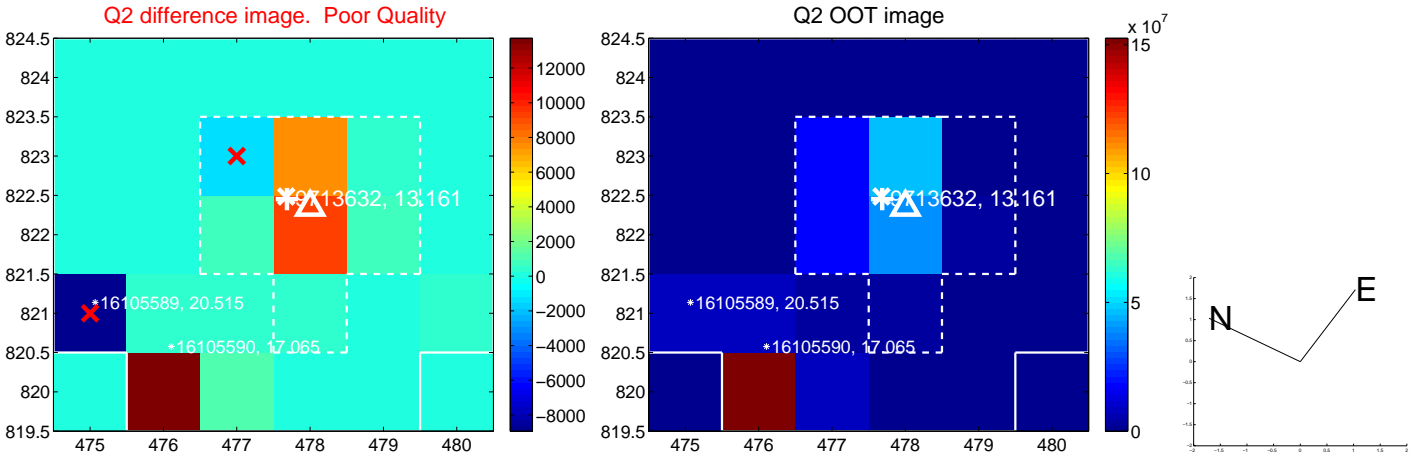
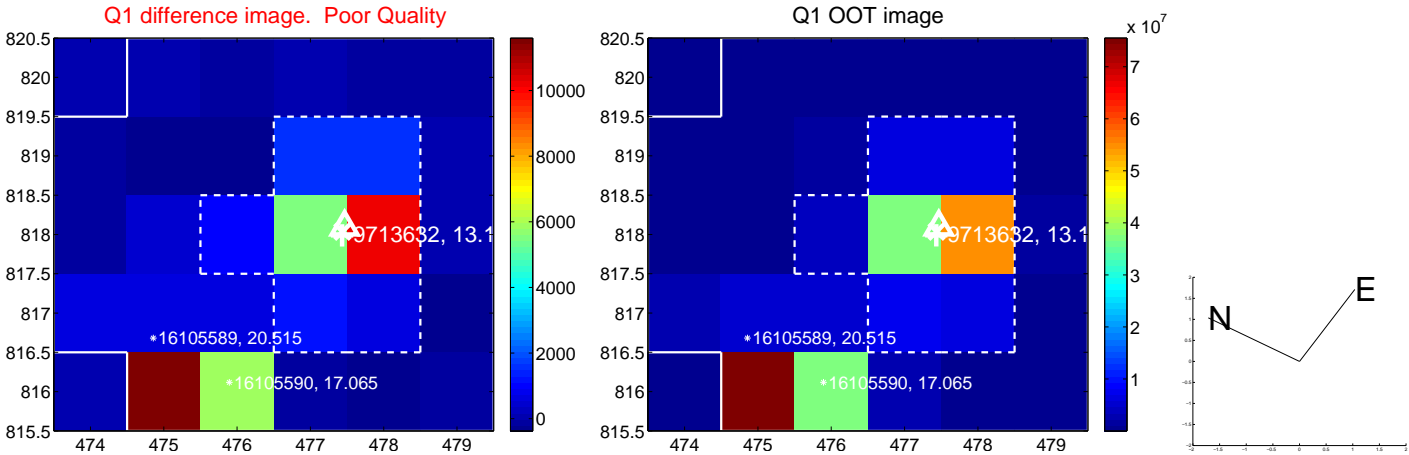
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.269 \pm 0.182$	1.48	$0.269 \pm 0.182$	$-0.008 \pm 0.174$
PRF-fit source offset from KIC position	$0.166 \pm 0.180$	0.92	$0.136 \pm 0.171$	$-0.095 \pm 0.186$
photometric centroid source offset	$4.57 \pm 2.03$	2.25	$4.54 \pm 2.04$	$0.50 \pm 1.20$



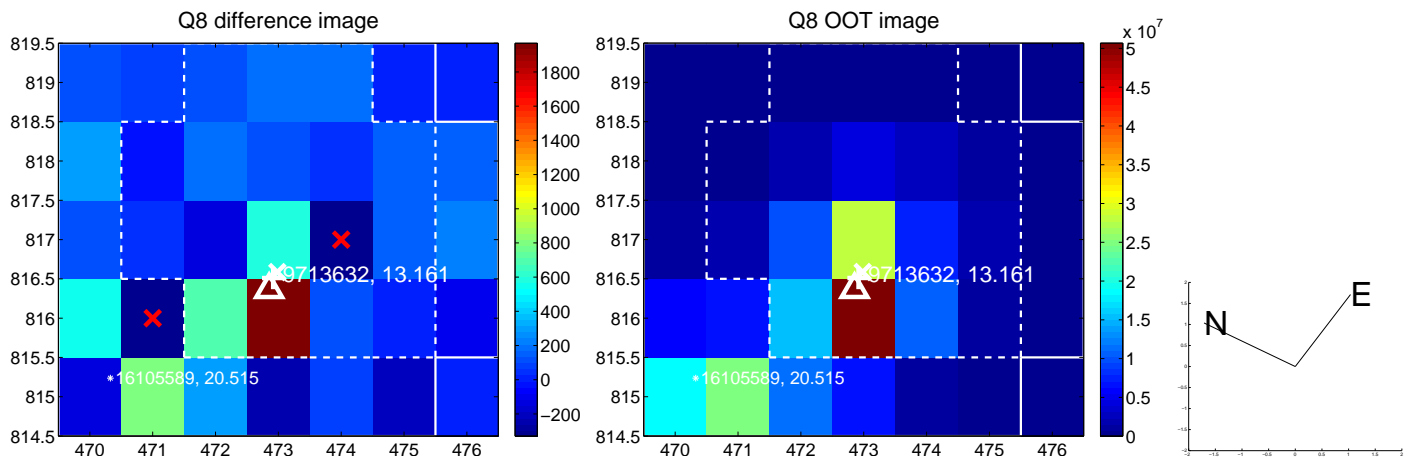
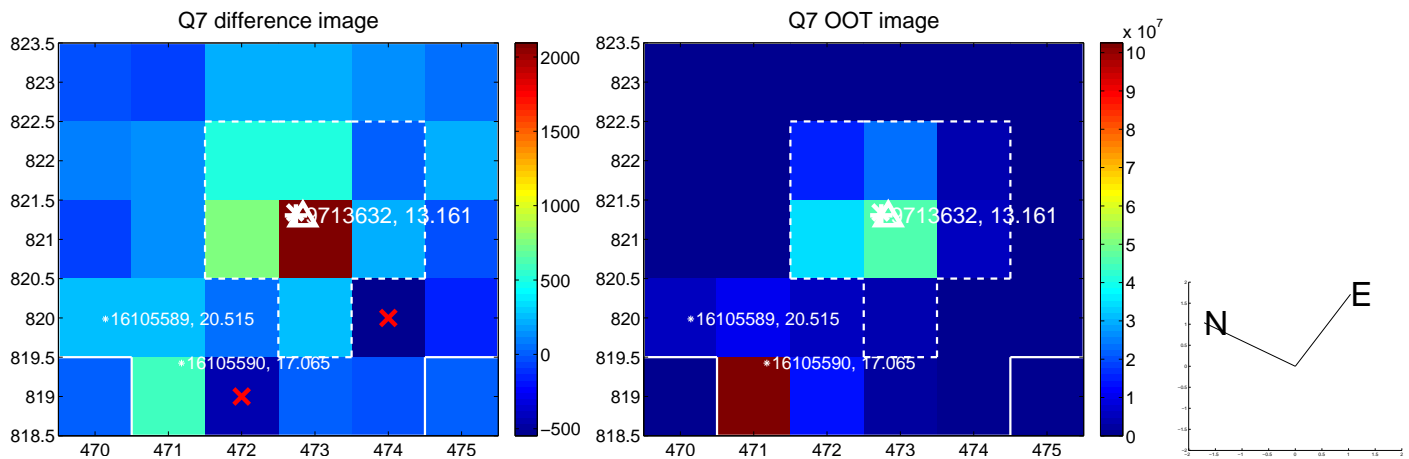
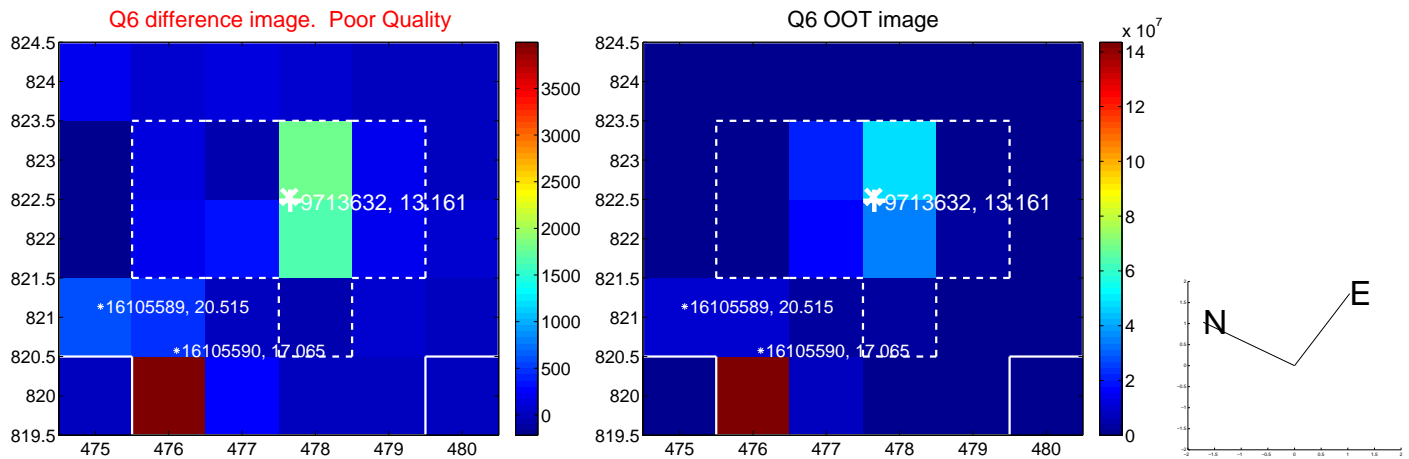
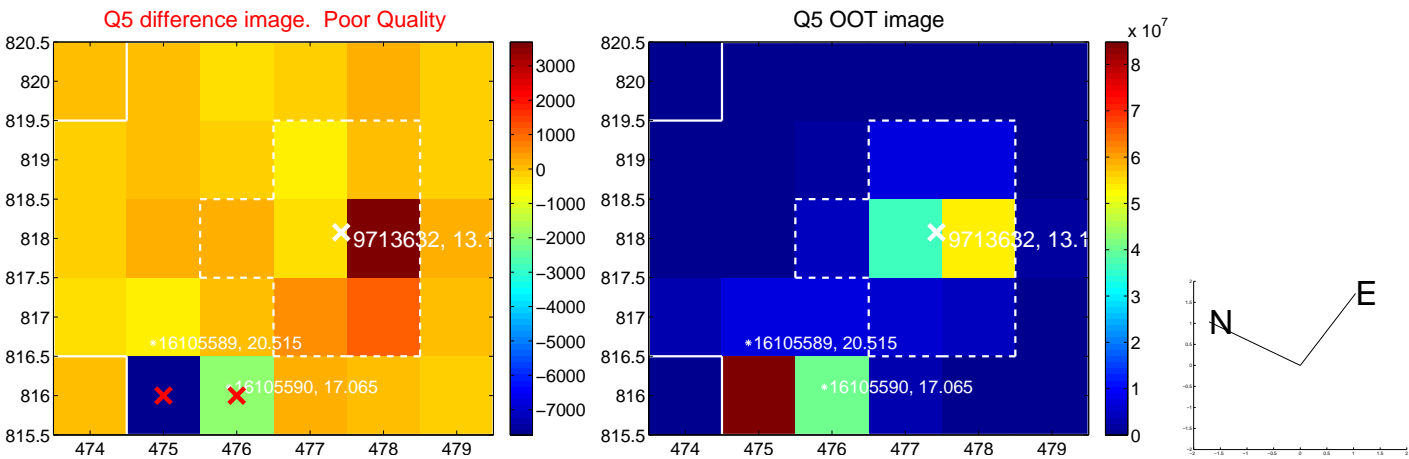
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



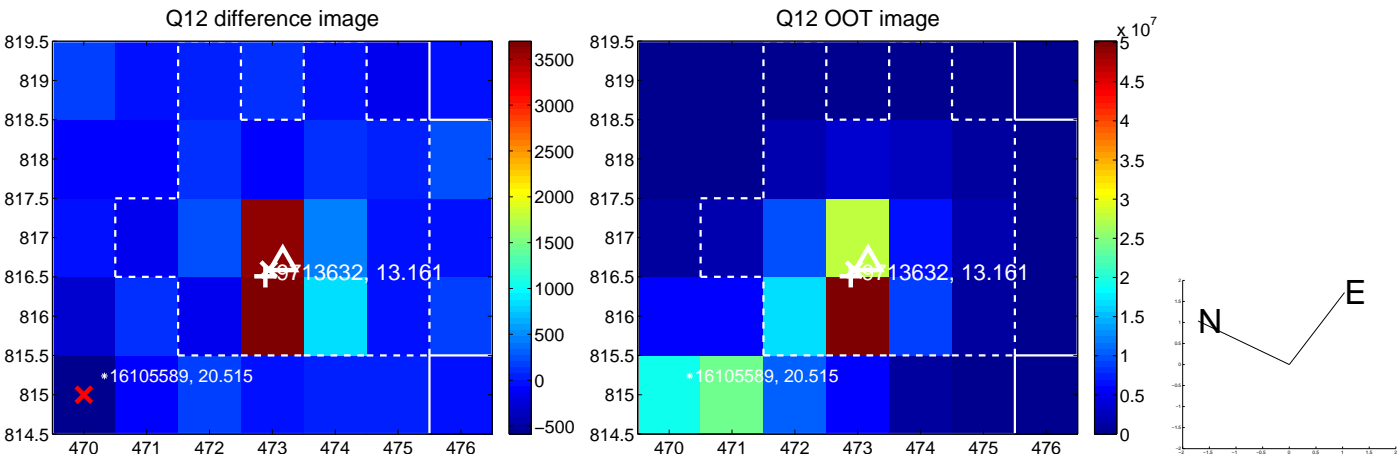
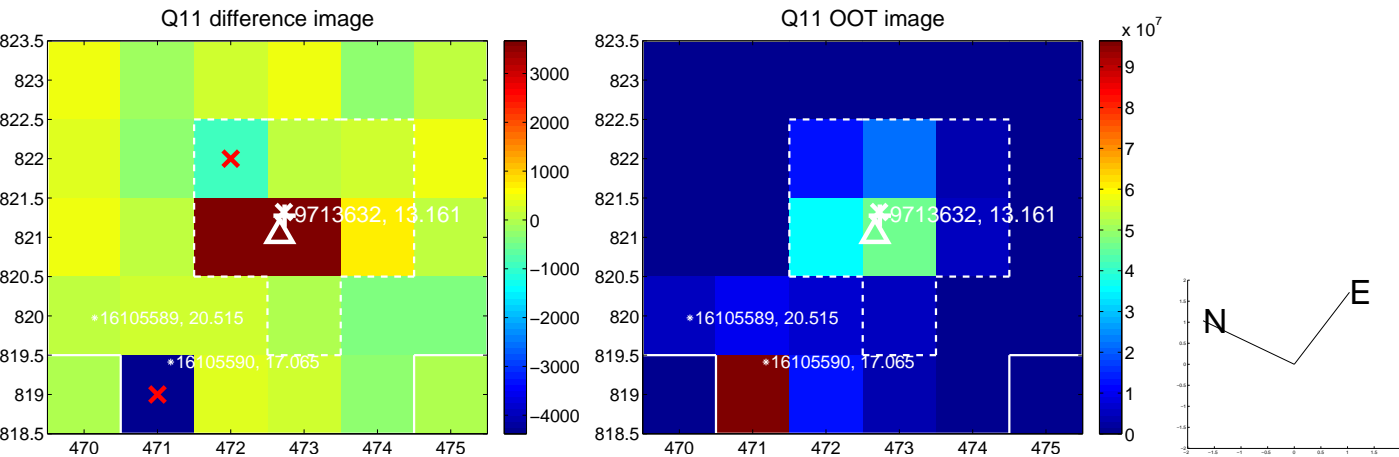
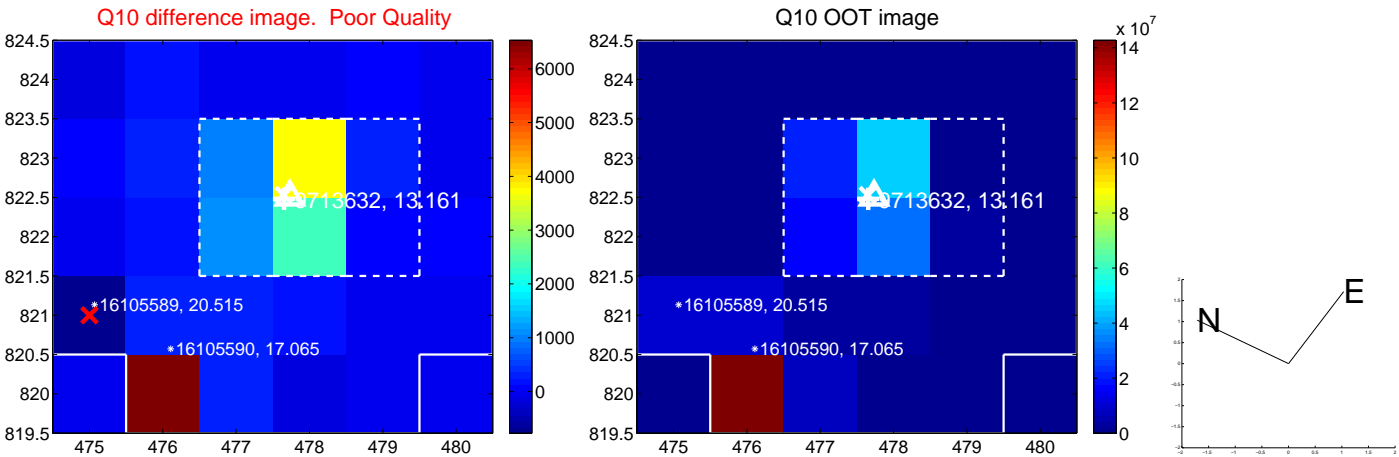
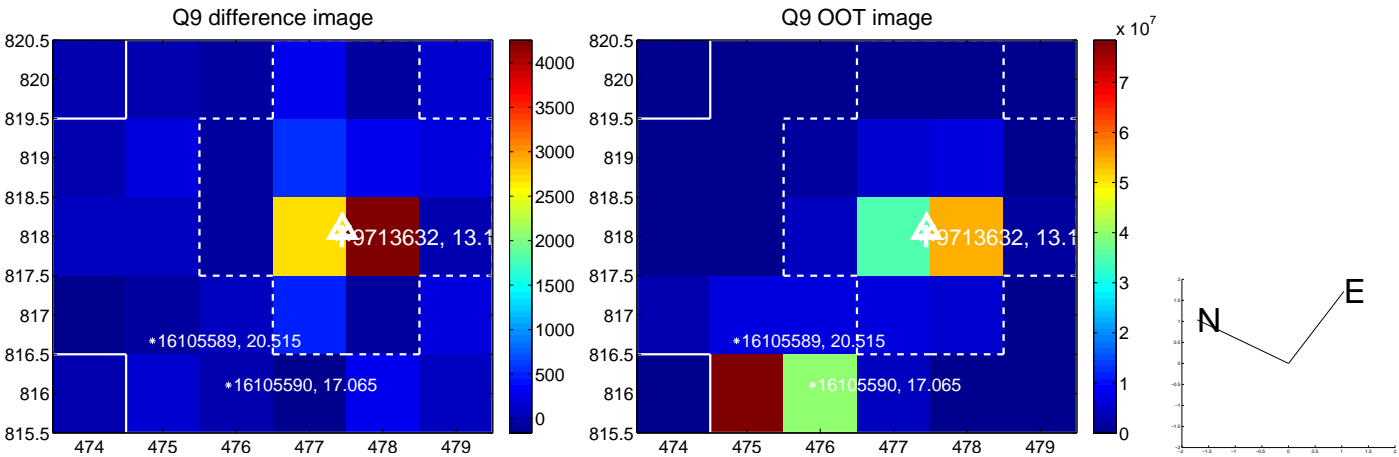
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



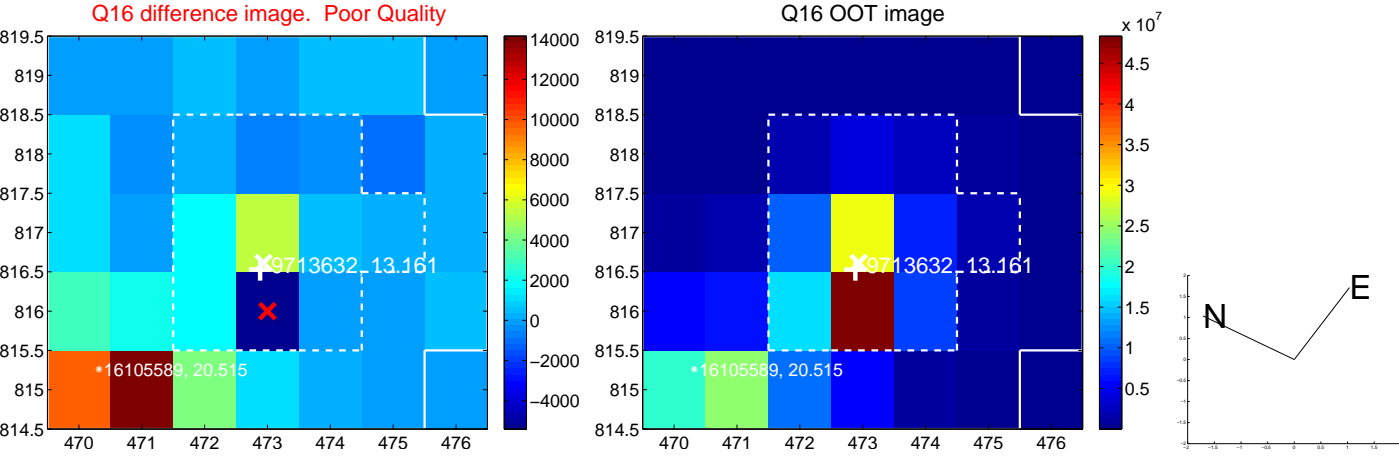
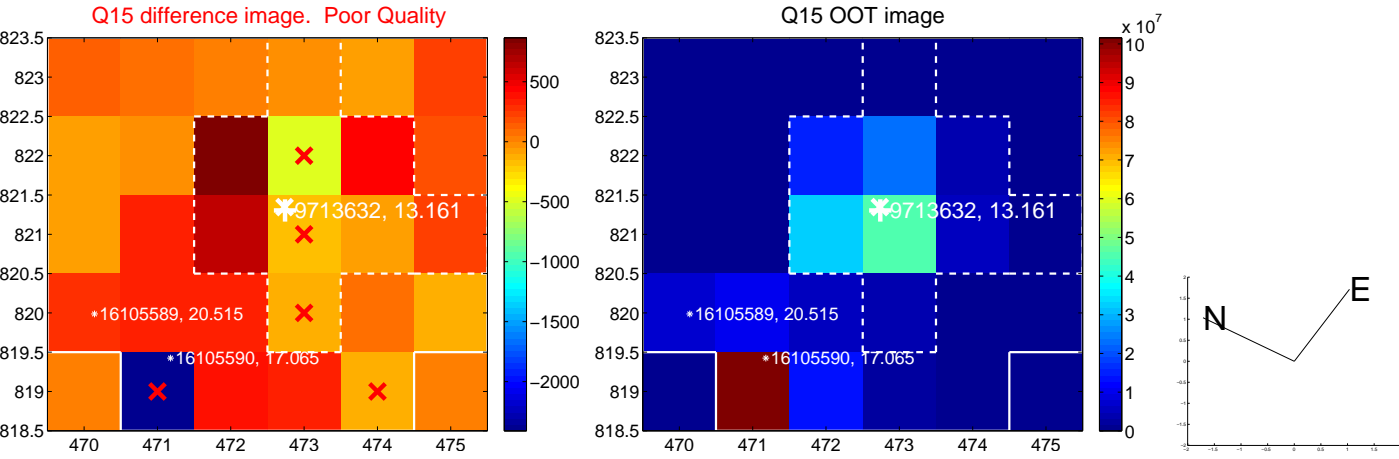
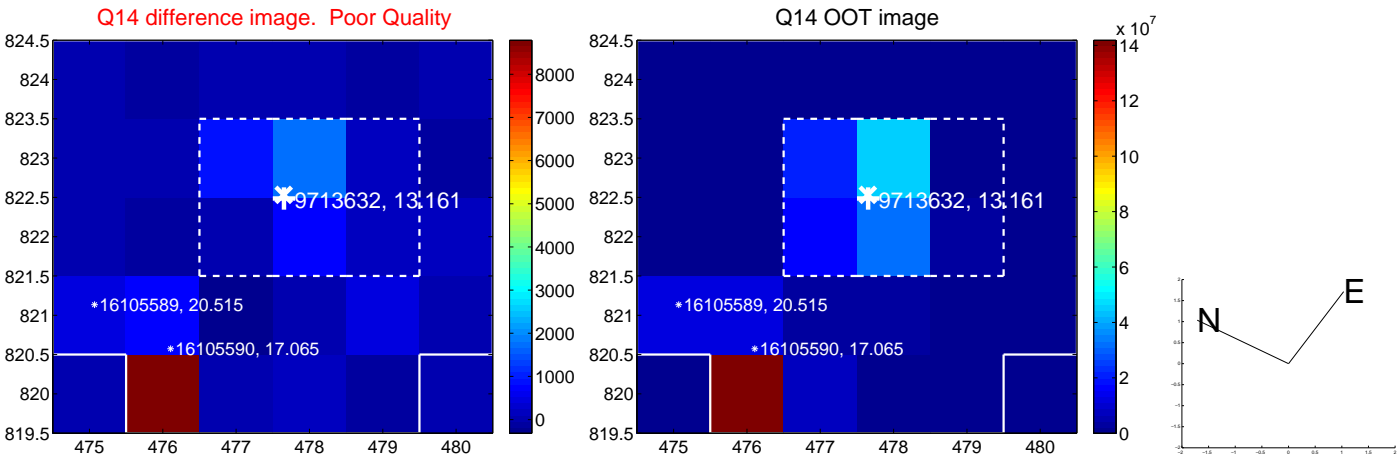
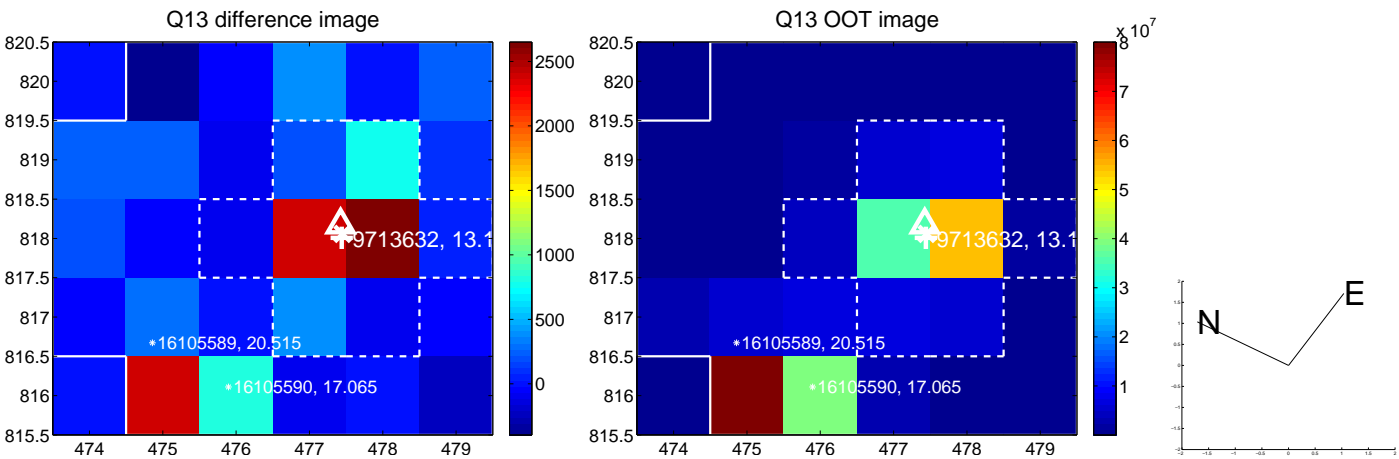
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



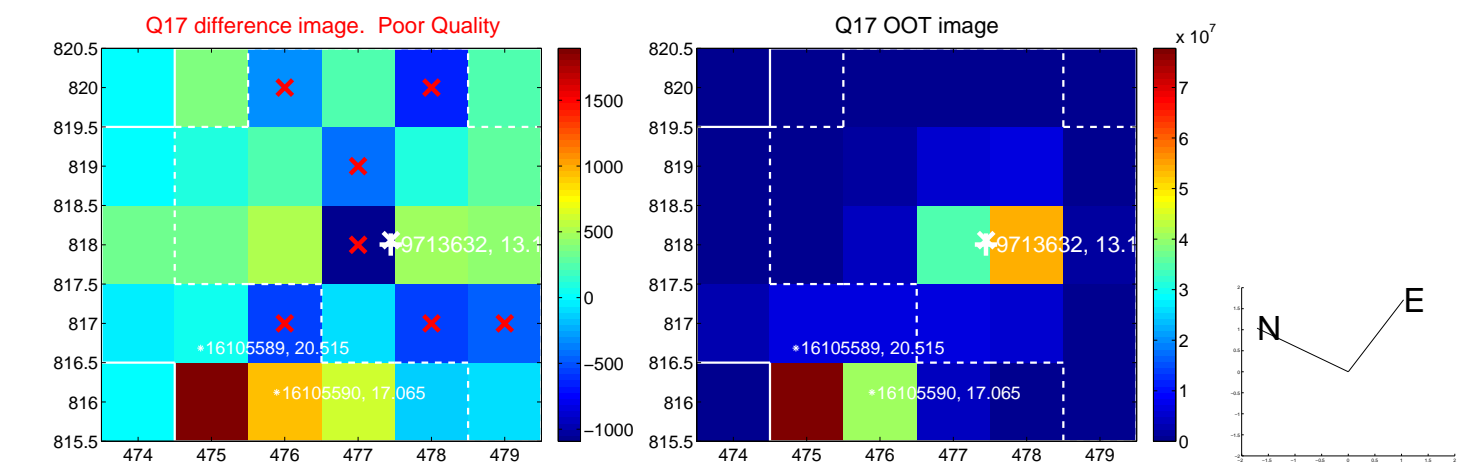
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



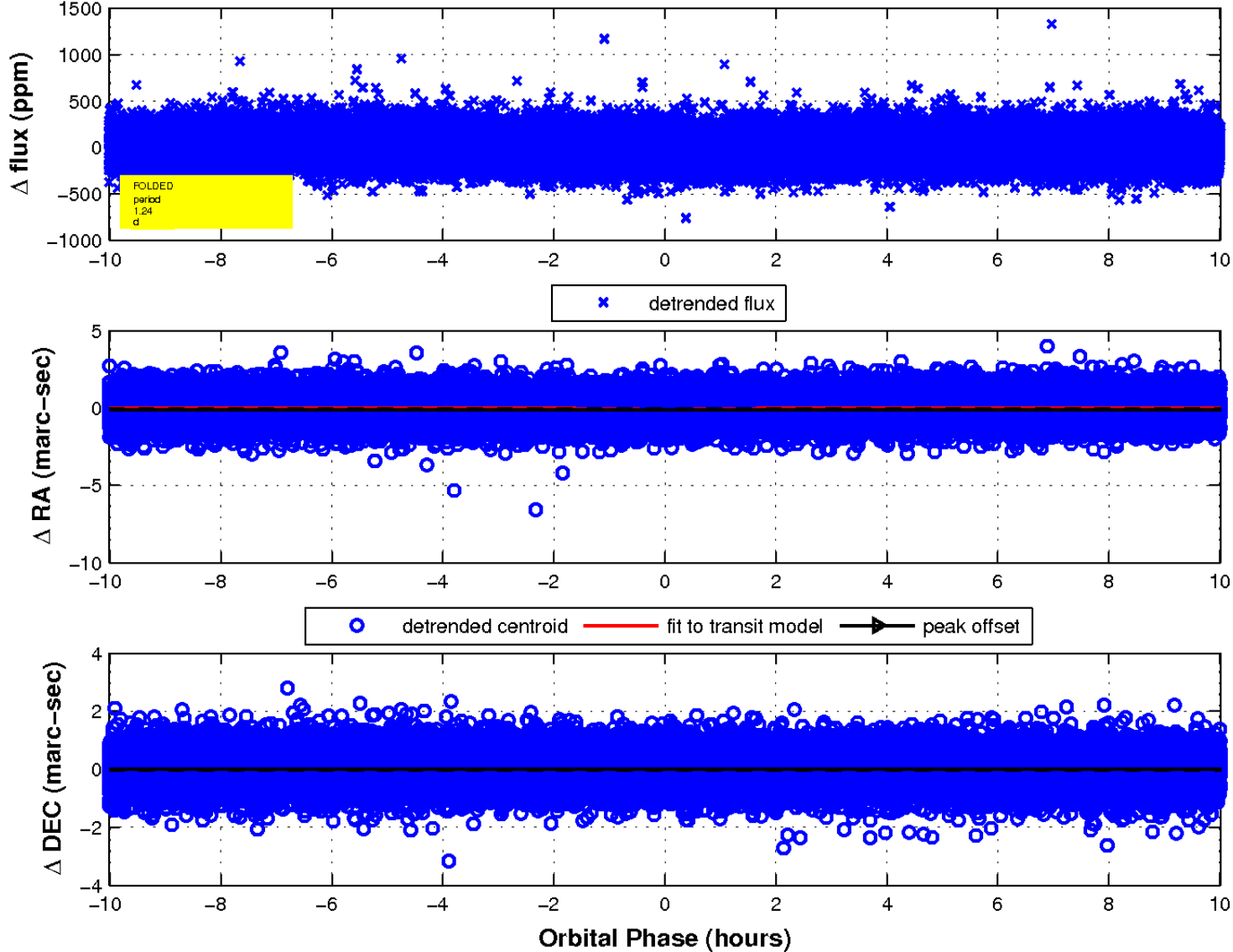
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2





UKIRT Image

