

# KIC 005960899

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005960899-01	OBS	No	1.401395	132.537514	13.3	1.556	8.9	8.6	2.85	8647	1.09	43833.86
005960899-02	OBS	No	1.401363	131.692738	10.3	2.444	8.6	7.7	2.85	8647	1.05	43835.21

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005960899-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
005960899-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—CENT_SATURATED

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

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

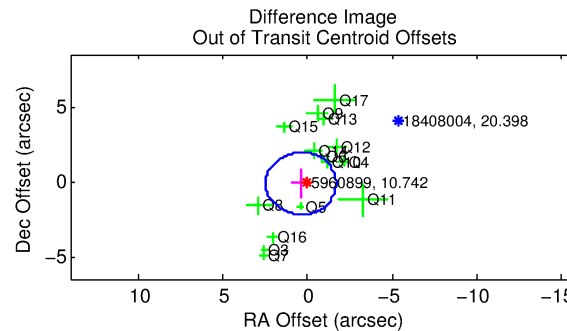
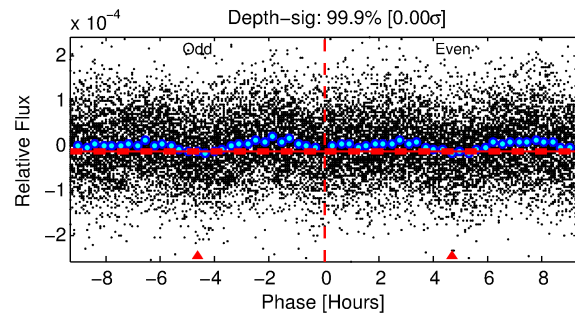
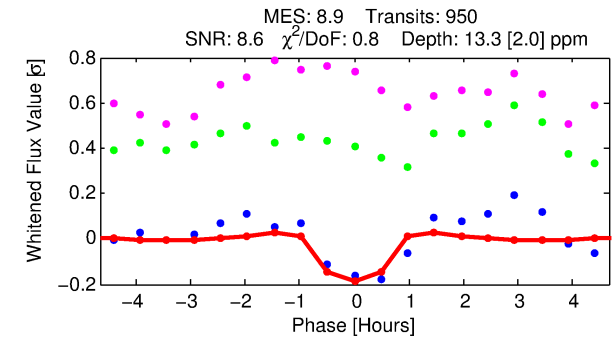
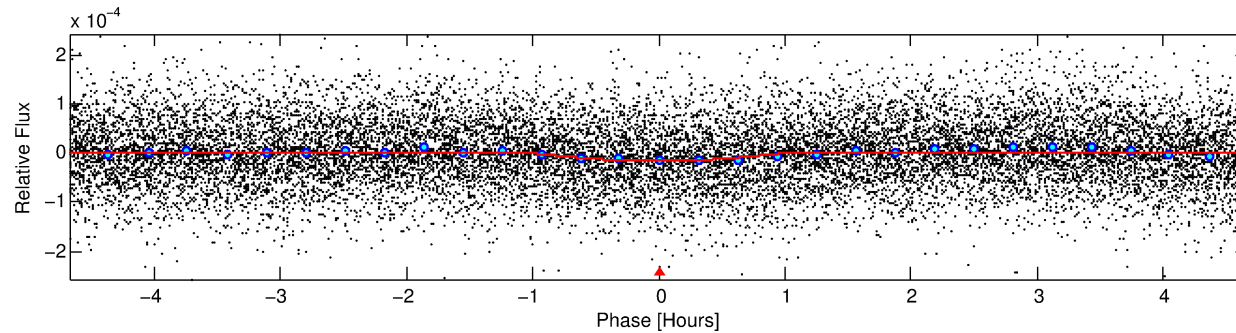
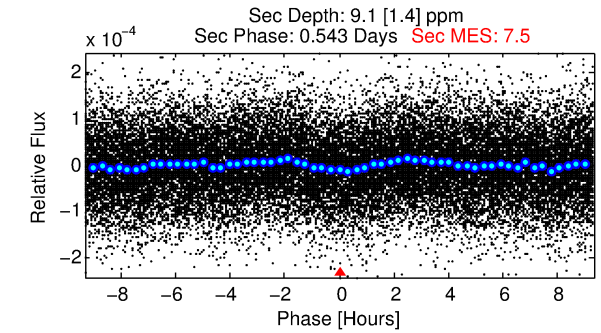
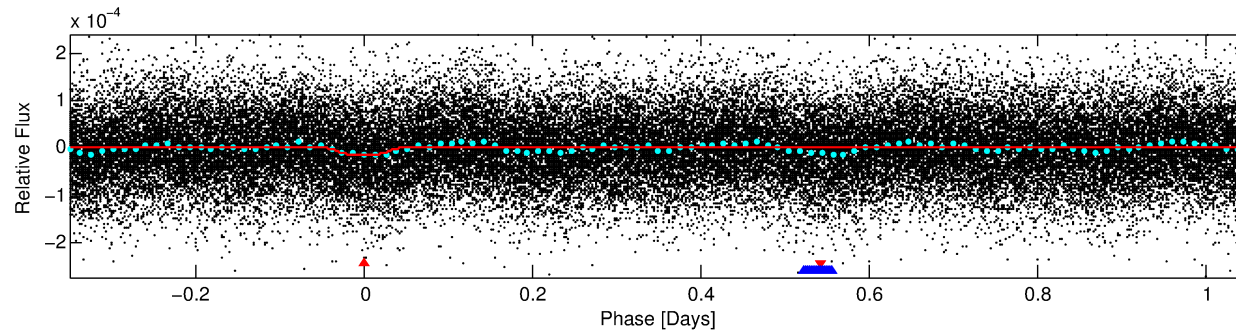
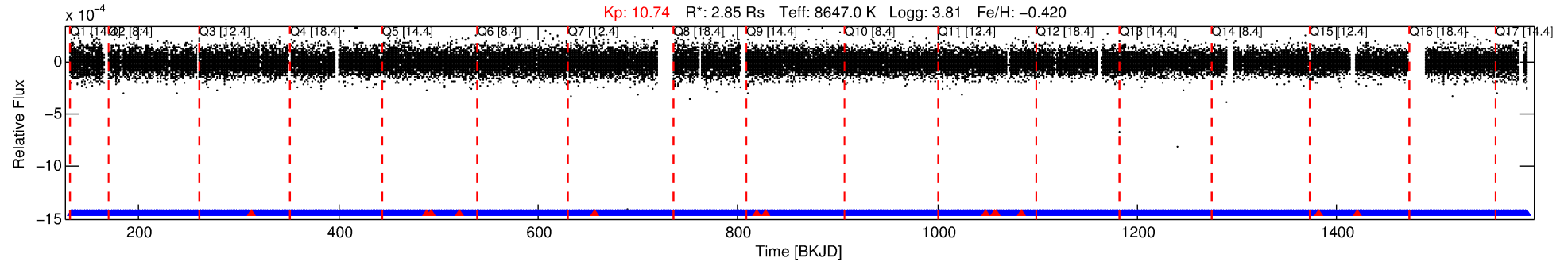
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 005960899-01

No Significant Match Found

# DV One-Page Summary

KIC: 5960899 Candidate: 1 of 2 Period: 1.401 d



## DV Fit Results:

Period = 1.40140 [0.00001] d  
Epoch = 132.5375 [0.0024] BKJD  
 $R_p/R^*$  = 0.0035 [0.0006]  
 $a/R^*$  = 6.03 [5.37]  
 $b$  = 0.50 [1.38]  
 $S_{\text{eff}}$  = 43833.86 [18611.24]  
 $T_{\text{eq}}$  = 3690 [392] K  
 $R_p$  = 1.09 [0.36]  $R_e$   
 $a$  = 0.0305 [0.0082] AU  
 $A_g$  = 3.97 [2.22] [1.34σ]  
 **$T_{\text{eff}}$  = 8051 [744] K [5.19σ]**

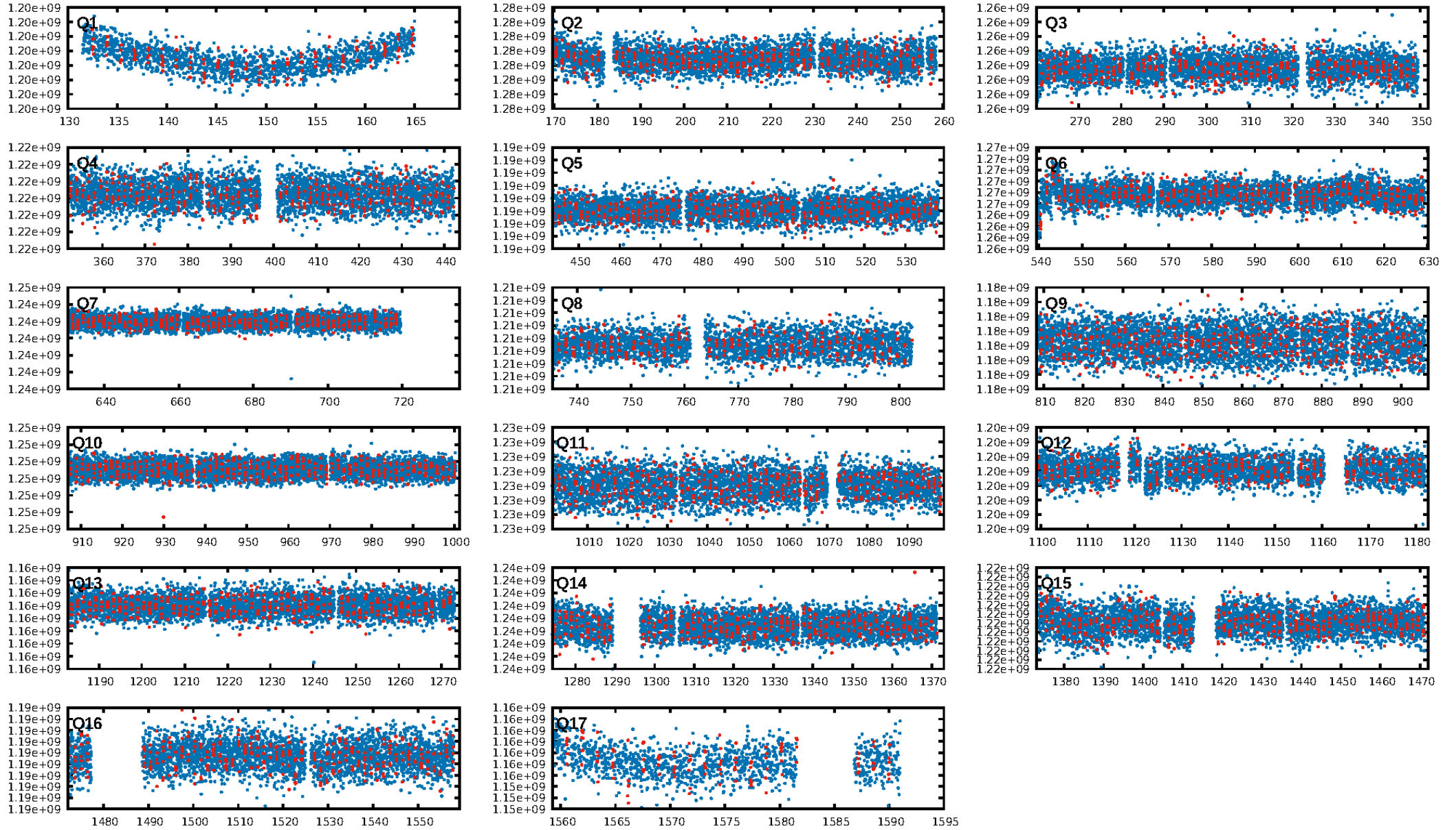
## DV Diagnostic Results:

**ShortPeriod-sig: 0.0% [0.00σ]**  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.43e-17  
RollingBand-fgt: 0.98 [893/907]  
GhostDiagnostic-chr: -3.248  
Centroid-sig: 96.0%  
Centroid-so: 0.279 arcsec [0.33σ]  
OotOffset-rm: 0.419 arcsec [0.60σ]  
OotOffset-st: 3/4/4/4 [15]  
KicOffset-rm: 0.762 arcsec [1.15σ]  
KicOffset-st: 3/4/4/4 [15]  
DiffImageQuality-fgm: 0.67 [10/15]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 02:03:44 Z

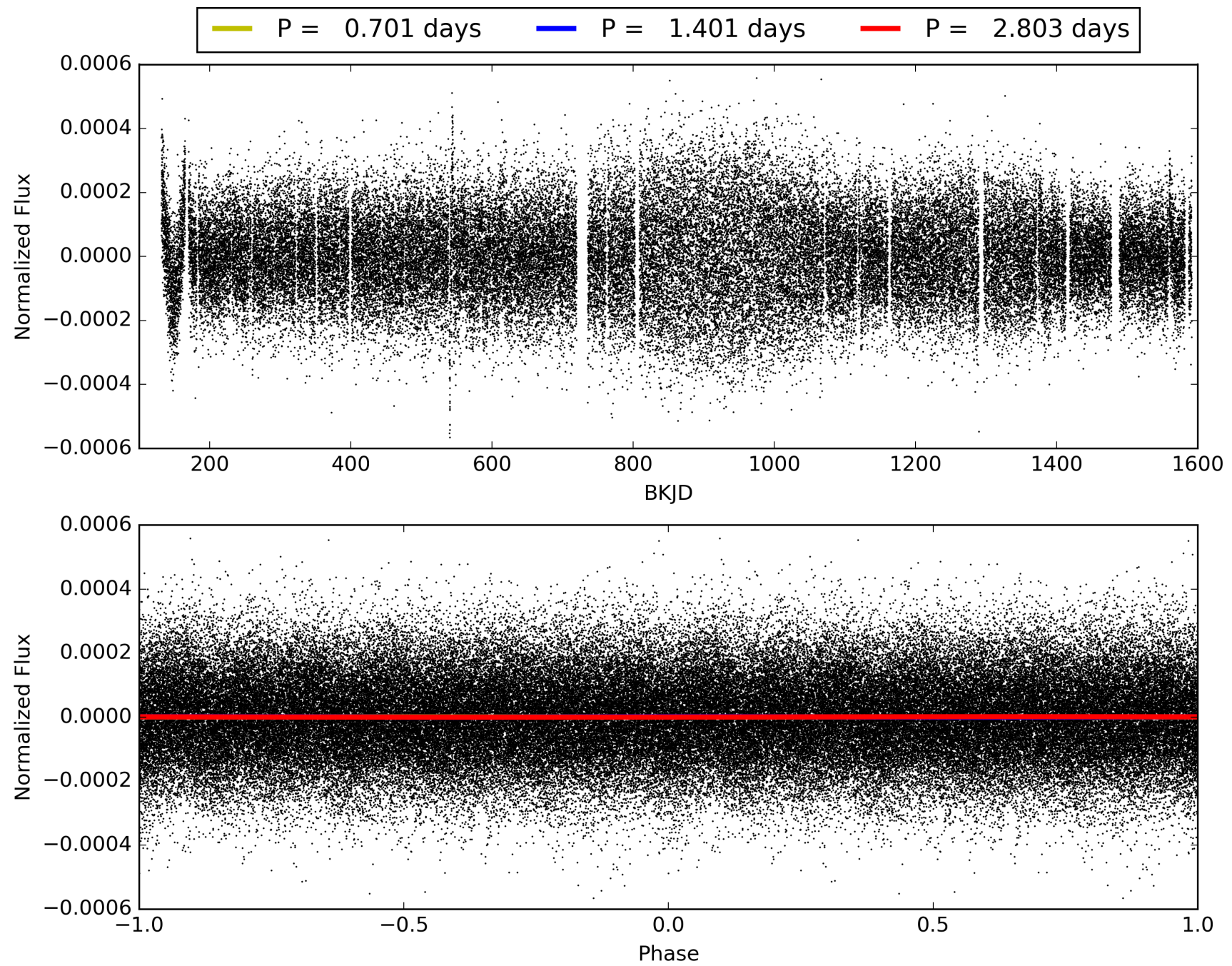
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 005960899-01, PDC Light Curves



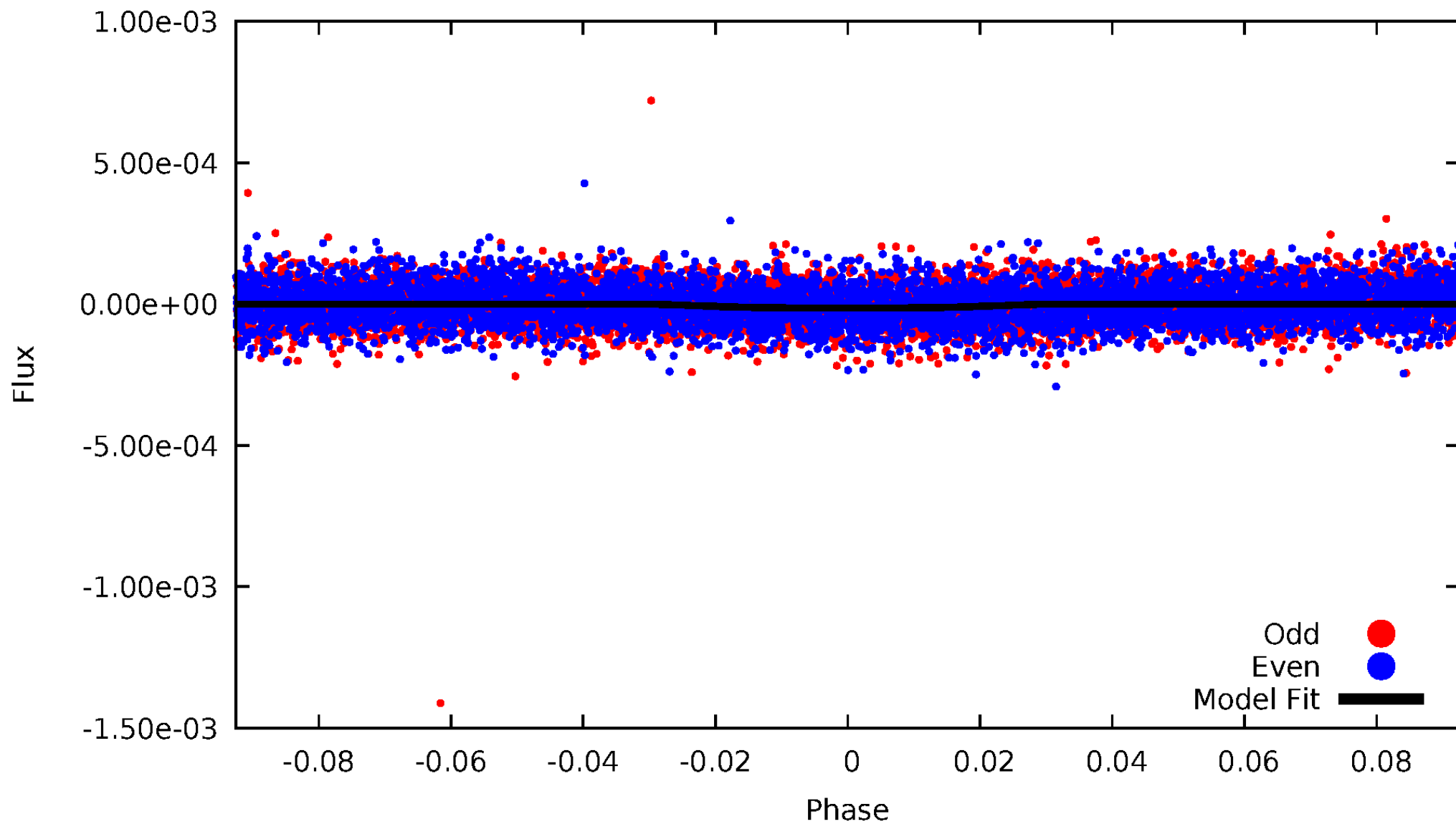


TCE 005960899-01



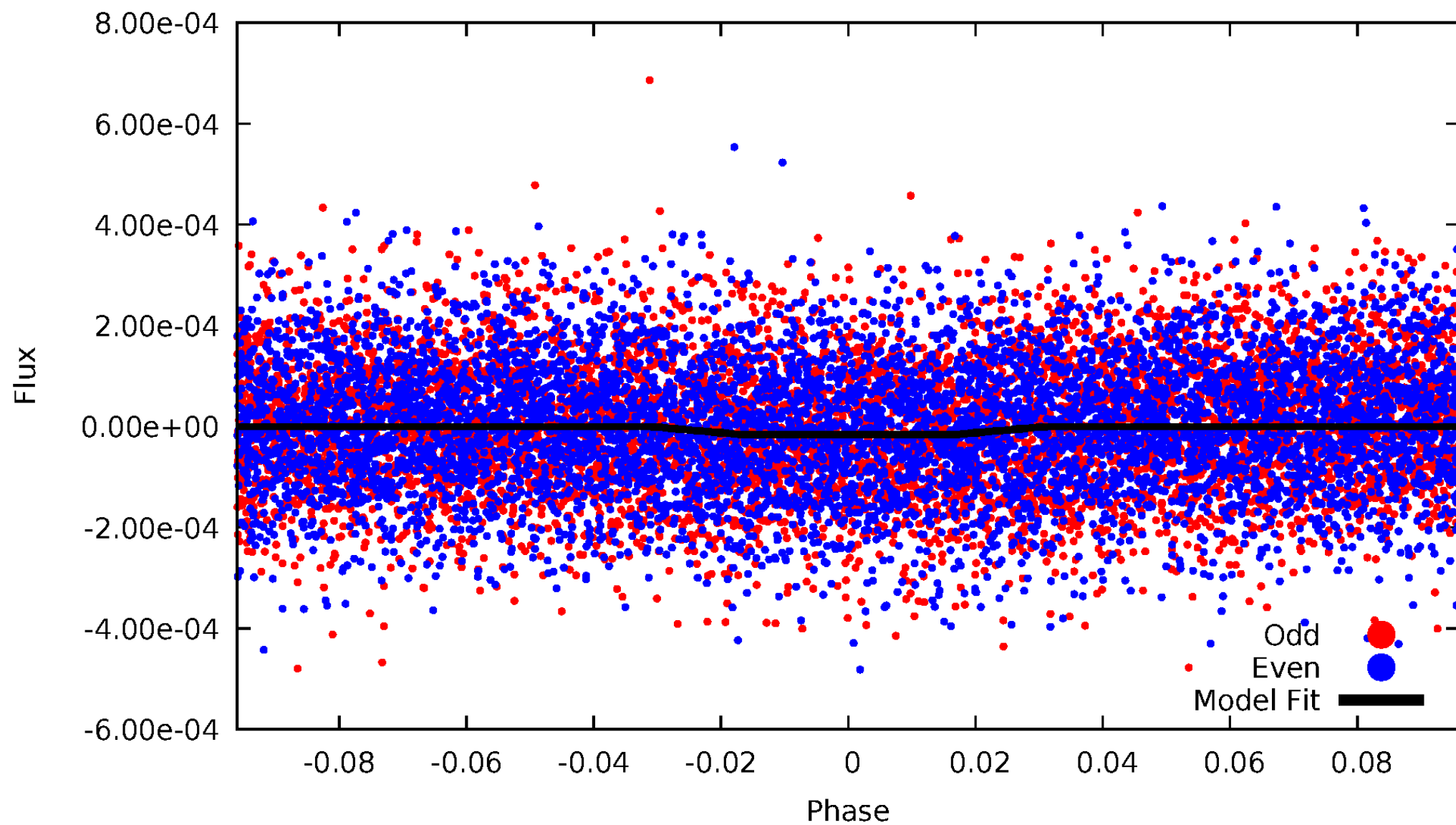
# DV Odd/Even

TCE 005960899-01

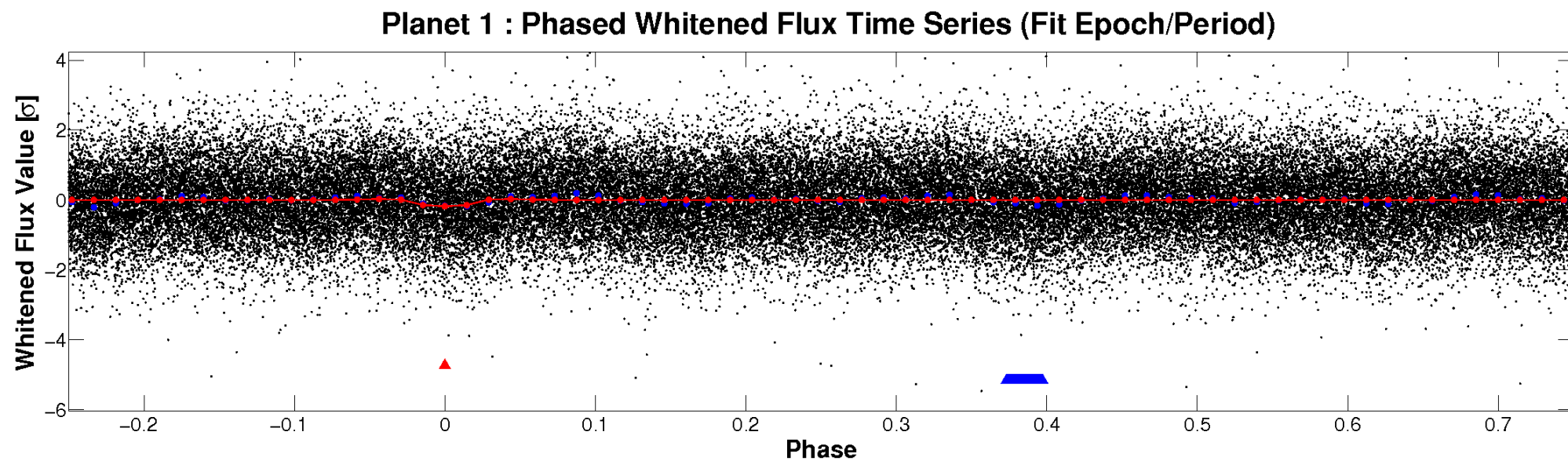
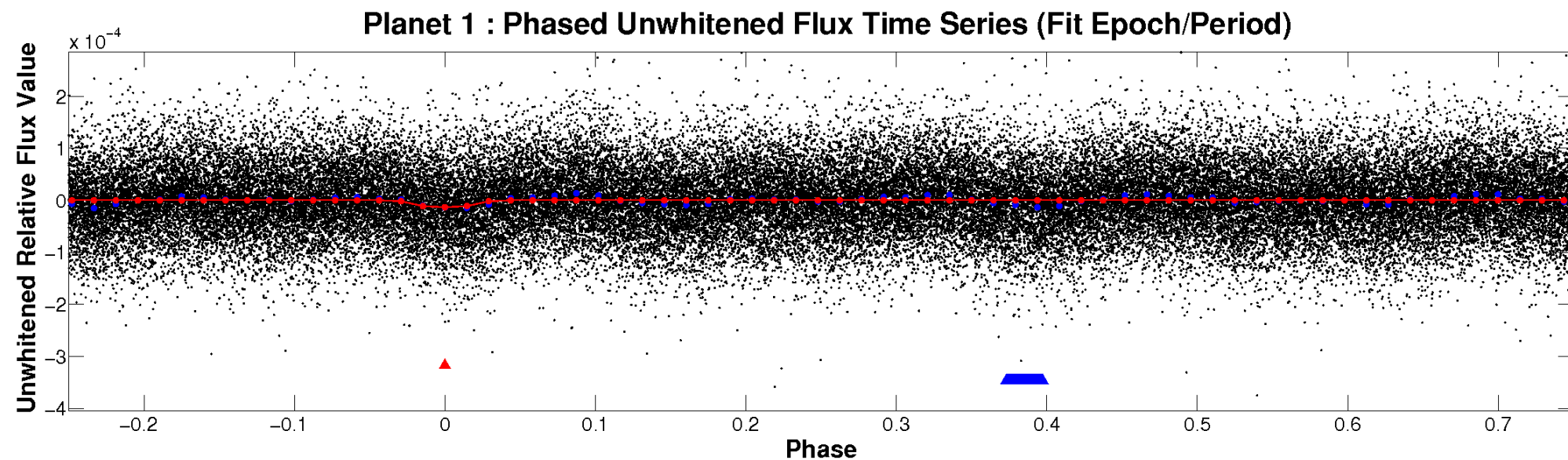


# ALT Odd/Even

TCE 005960899-01



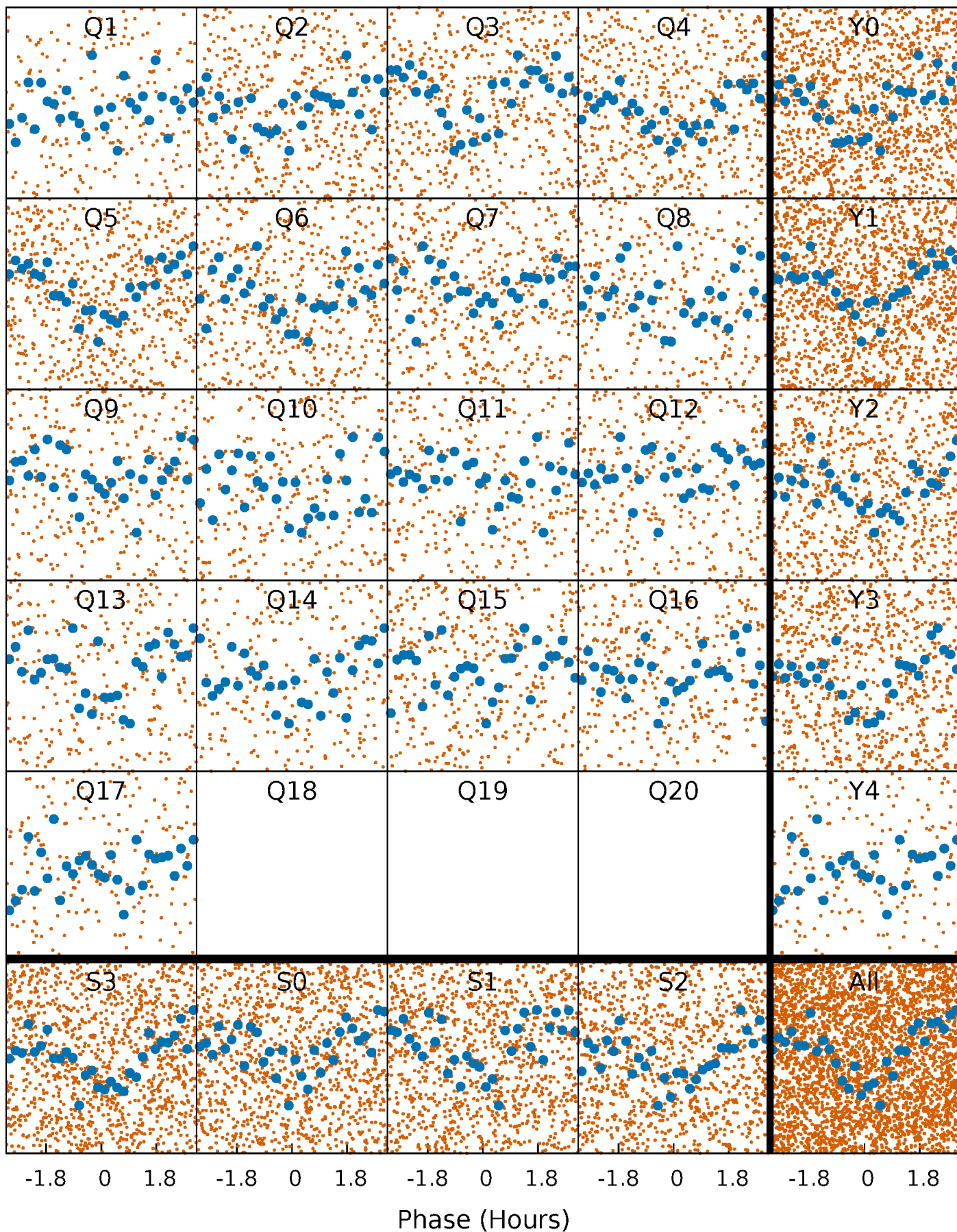
# Non-Whitened Vs. Whitened Light Curve





# PDC Quarter-Phased Transit Curves

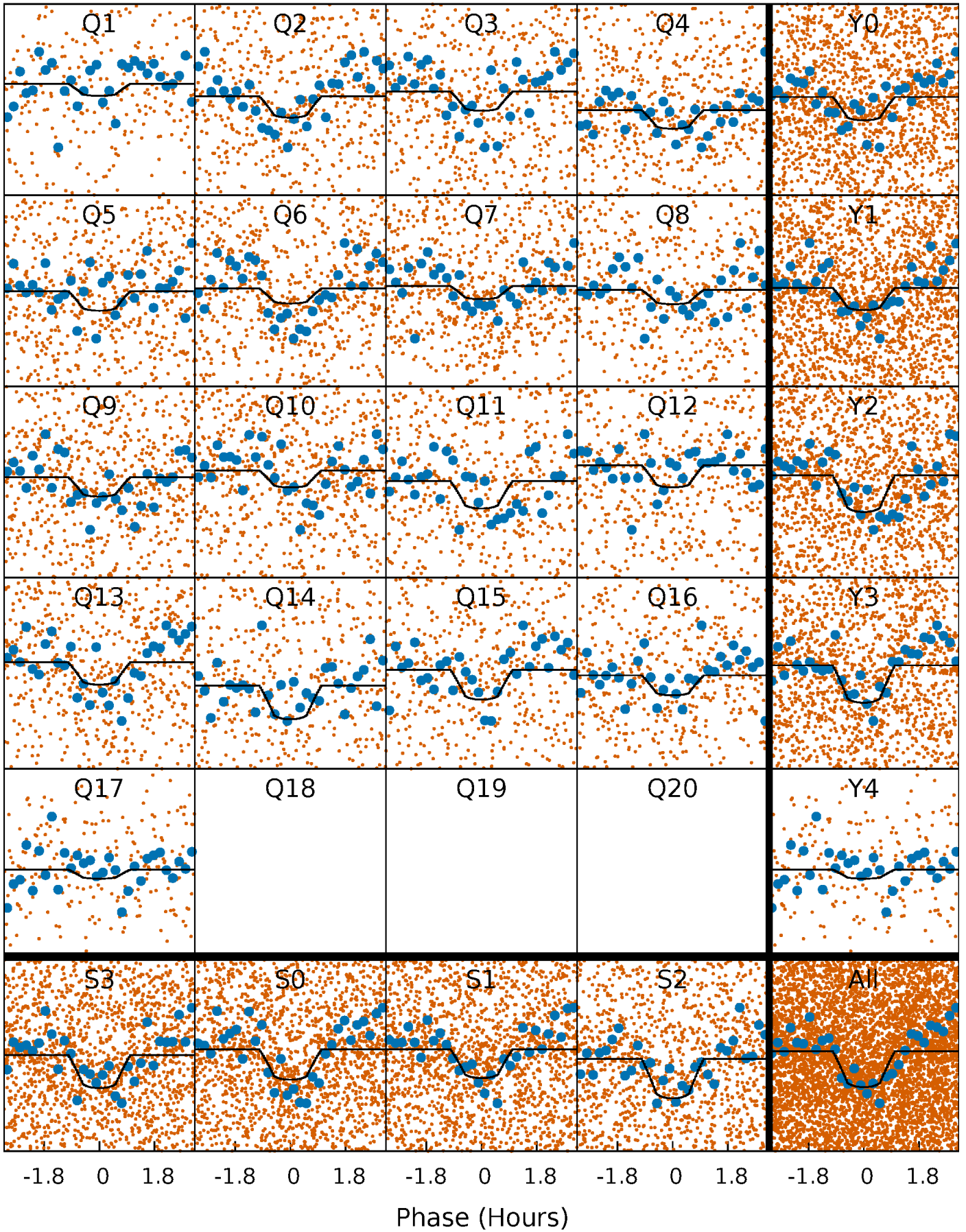
TCE 005960899-01 P= 1.401395 Days  $T_0=132.537514$  (BKJD)





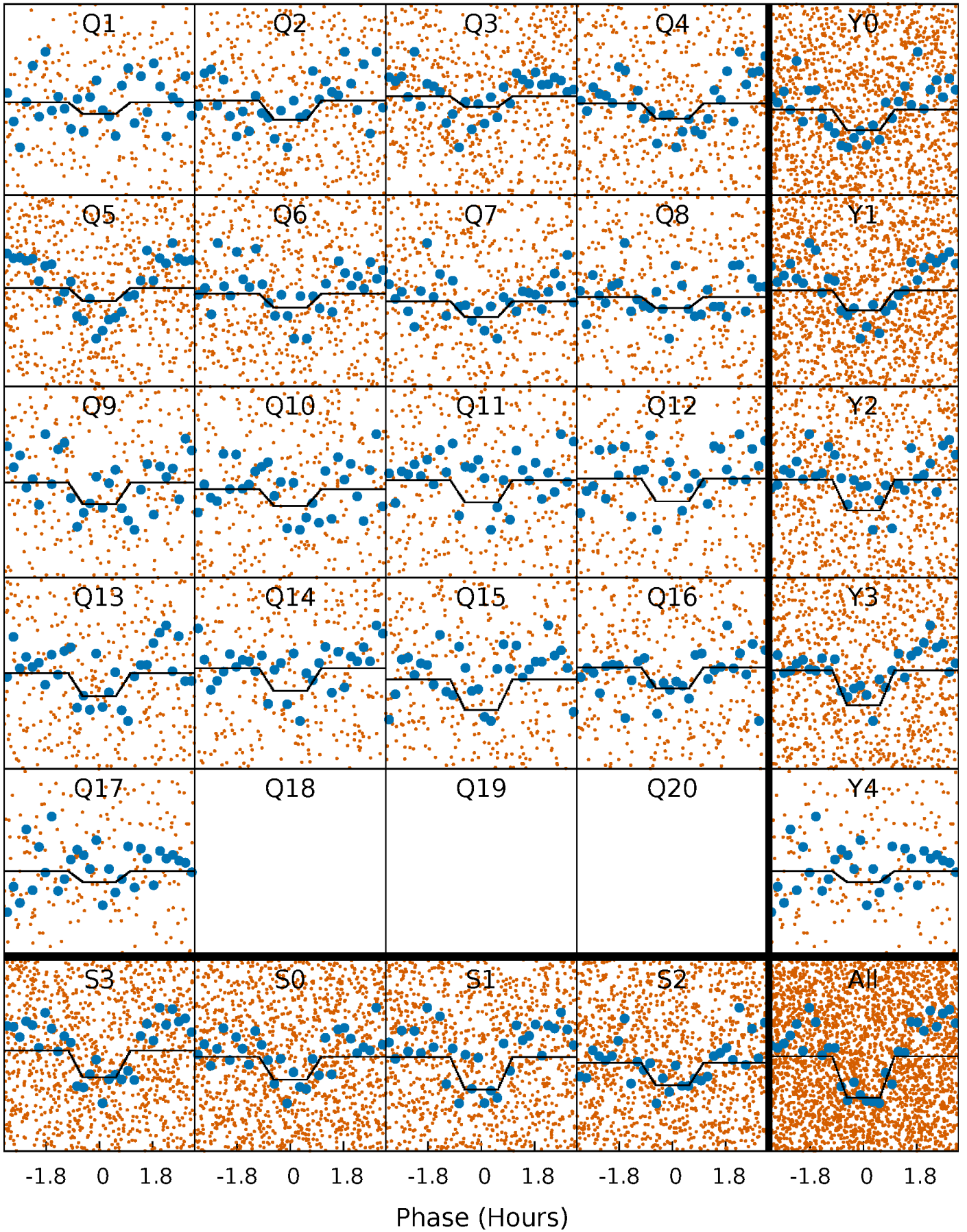
# DV Quarter-Phased Transit Curves

TCE 005960899-01 P= 1.401395 Days  $T_0=132.537514$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

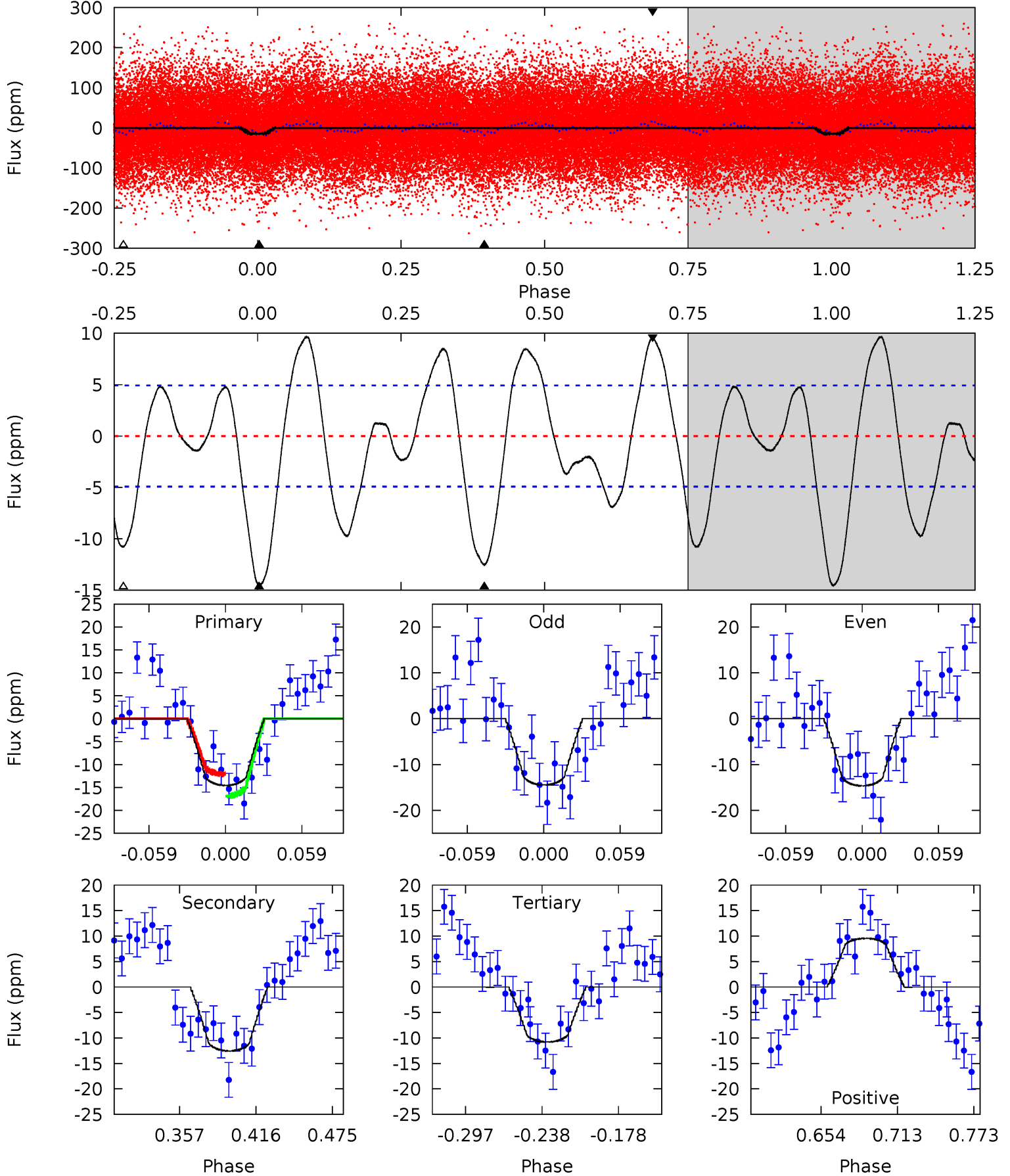
TCE 005960899-01 P= 1.401402 Days  $T_0=132.533849$  (BKJD)



# DV Model-Shift Uniqueness Test

005960899-01, P = 1.401395 Days, E = 131.136119 Days

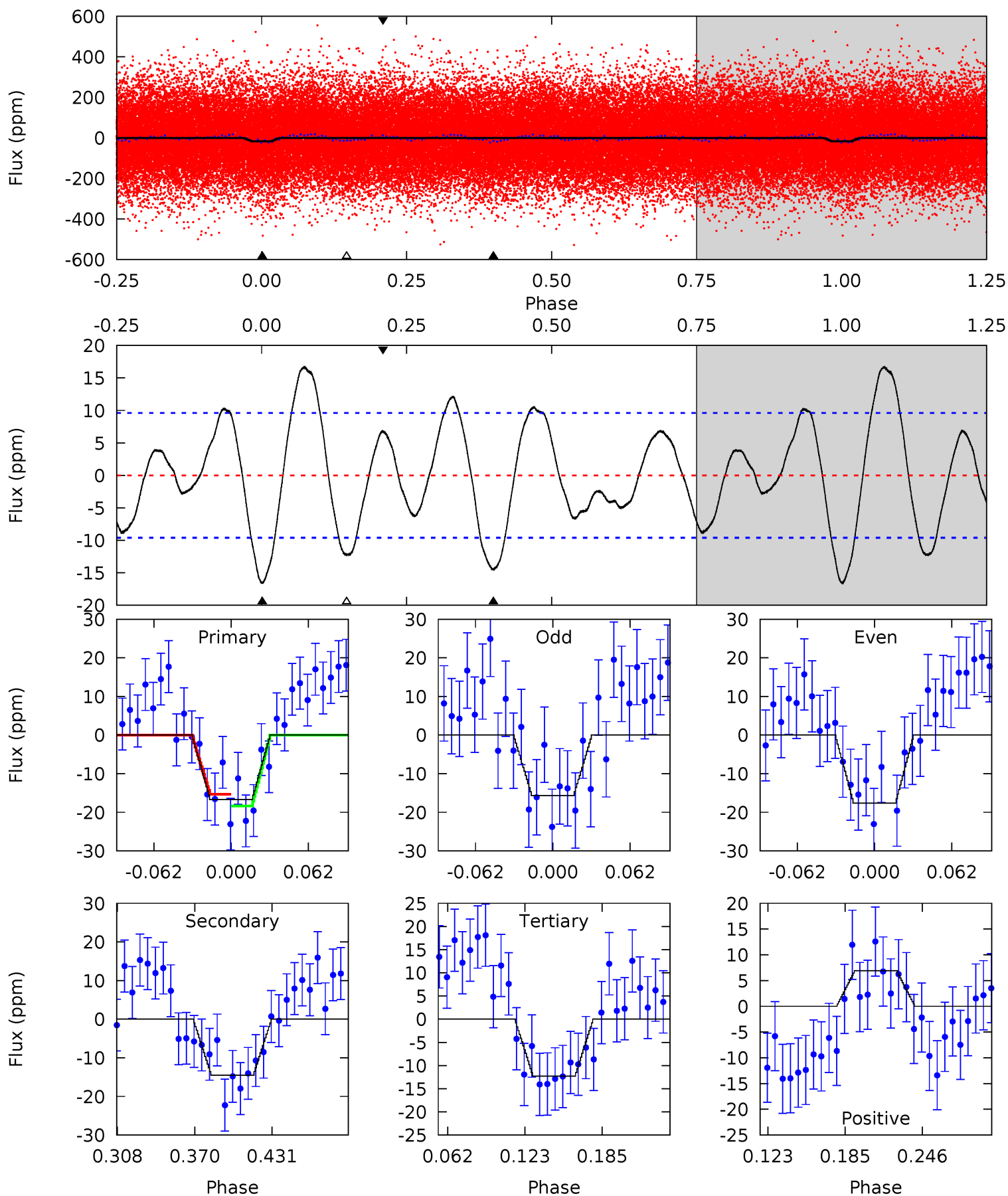
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.8	11.9	10.2	9.06	4.67	1.88	5.12	3.58	4.75	1.68	2.86	0.09	0.95	0.40	2.27



# Alt Model-Shift Uniqueness Test

005960899-01, P = 1.401402 Days, E = 131.132447 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
8.09	7.05	5.97	3.35	4.67	1.87	3.20	2.12	4.74	1.08	3.70	0.47	1.00	0.50	0.72





### Stellar Parameters For KIC 005960899

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$8647^{+69}_{-86}$	$3.812^{+0.246}_{-0.043}$	$-0.420^{+0.050}_{-0.200}$	$2.853^{+0.254}_{-0.813}$	$1.926^{+0.112}_{-0.192}$	$0.117^{+0.177}_{-0.017}$
	+1%/-1%	+6%/-1%	+12%/-48%	+9%/-28%	+6%/-10%	+152%/-15%
Source	SPE68	SPE68	SPE68	DSEP		

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

### Secondary Eclipse Parameters for KIC 005960899-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-13 \pm 1$	$1.02^{+0.21}_{-0.22}$	$5055^{+174}_{-362}$	$8579^{+1235}_{-828}$	$6.148^{+3.522}_{-1.927}$
Alt.	$-15 \pm 2$	$1.19^{+0.22}_{-0.23}$	$5071^{+164}_{-348}$	$8202^{+960}_{-778}$	$5.304^{+2.830}_{-1.594}$

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

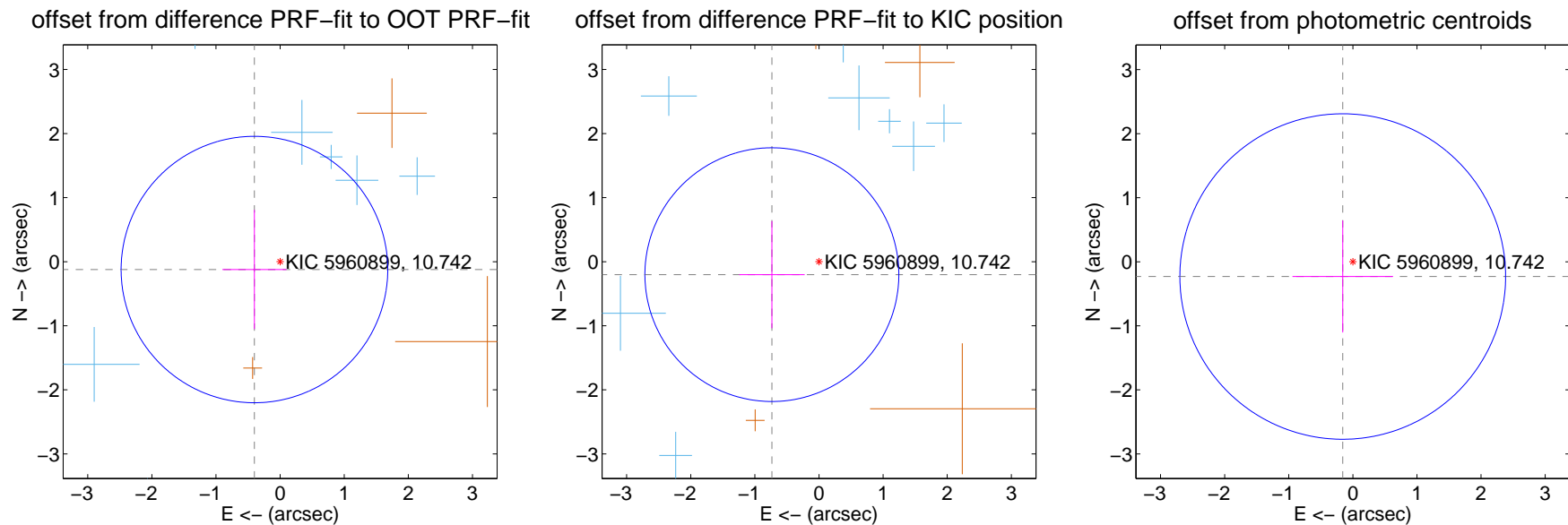
## DV Centroid Data

Supplemental centroid analysis for 005960899-01. **Kepler magnitude: 10.74.** Transit SNR 8.61

There are 10 quarters with good PRF difference image offsets

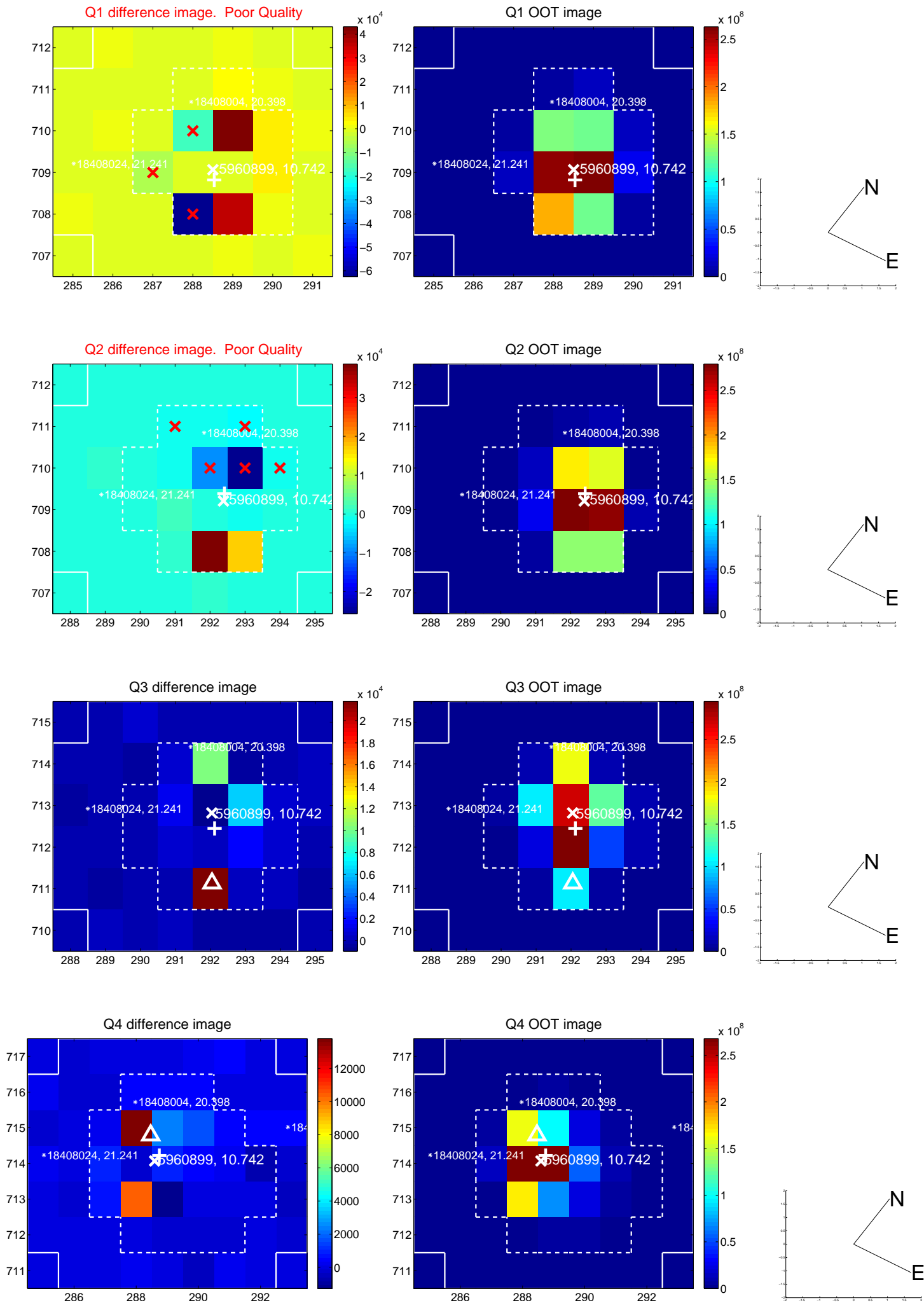
The direct PRF centroid is offset from the target star catalog position by about 0.98 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.419 \pm 0.693$	0.60	$0.400 \pm 0.501$	$-0.122 \pm 0.930$
PRF-fit source offset from KIC position	$0.762 \pm 0.660$	1.15	$0.735 \pm 0.511$	$-0.202 \pm 0.836$
photometric centroid source offset	$0.28 \pm 0.85$	0.33	$0.16 \pm 0.78$	$-0.23 \pm 0.87$

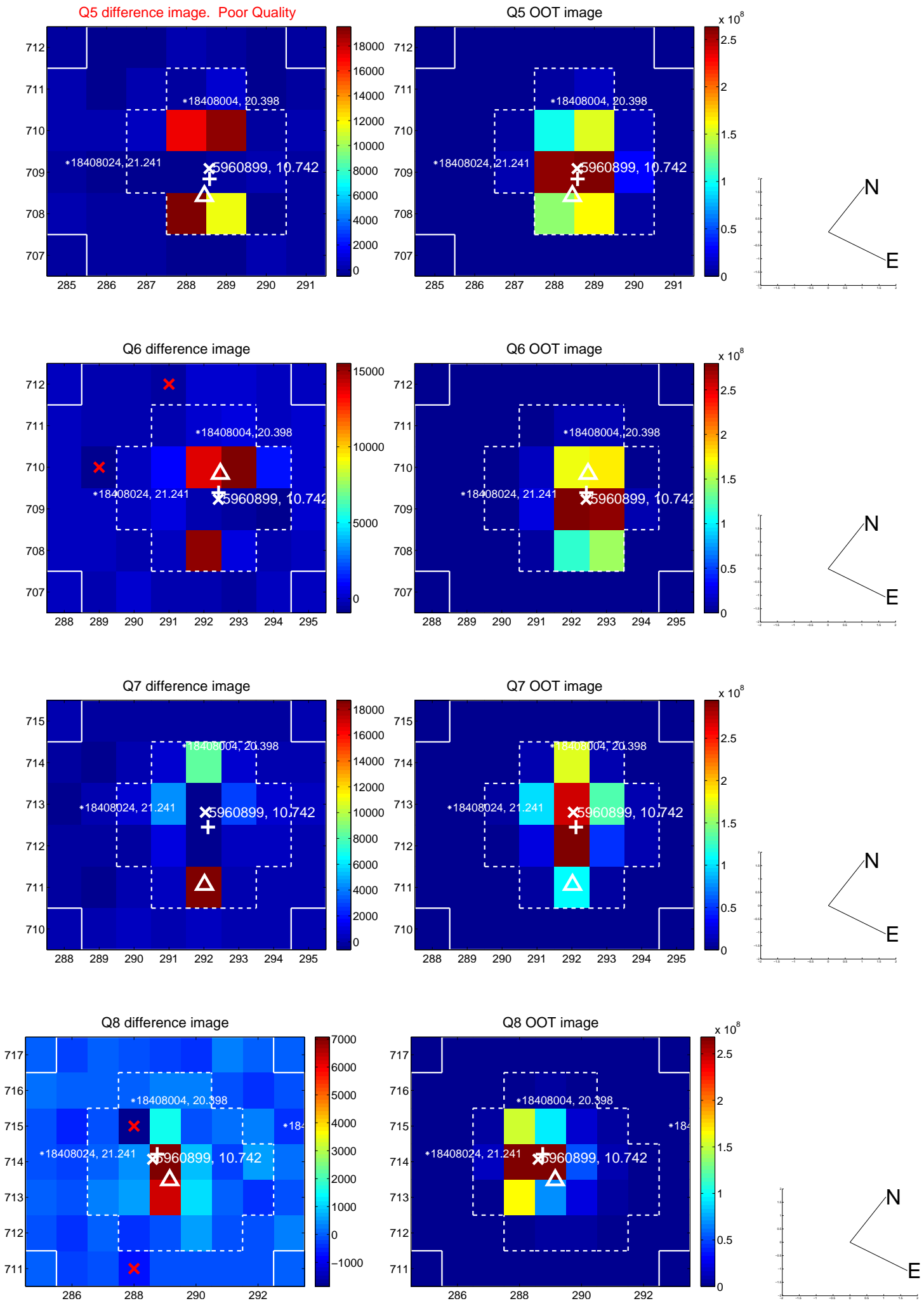


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

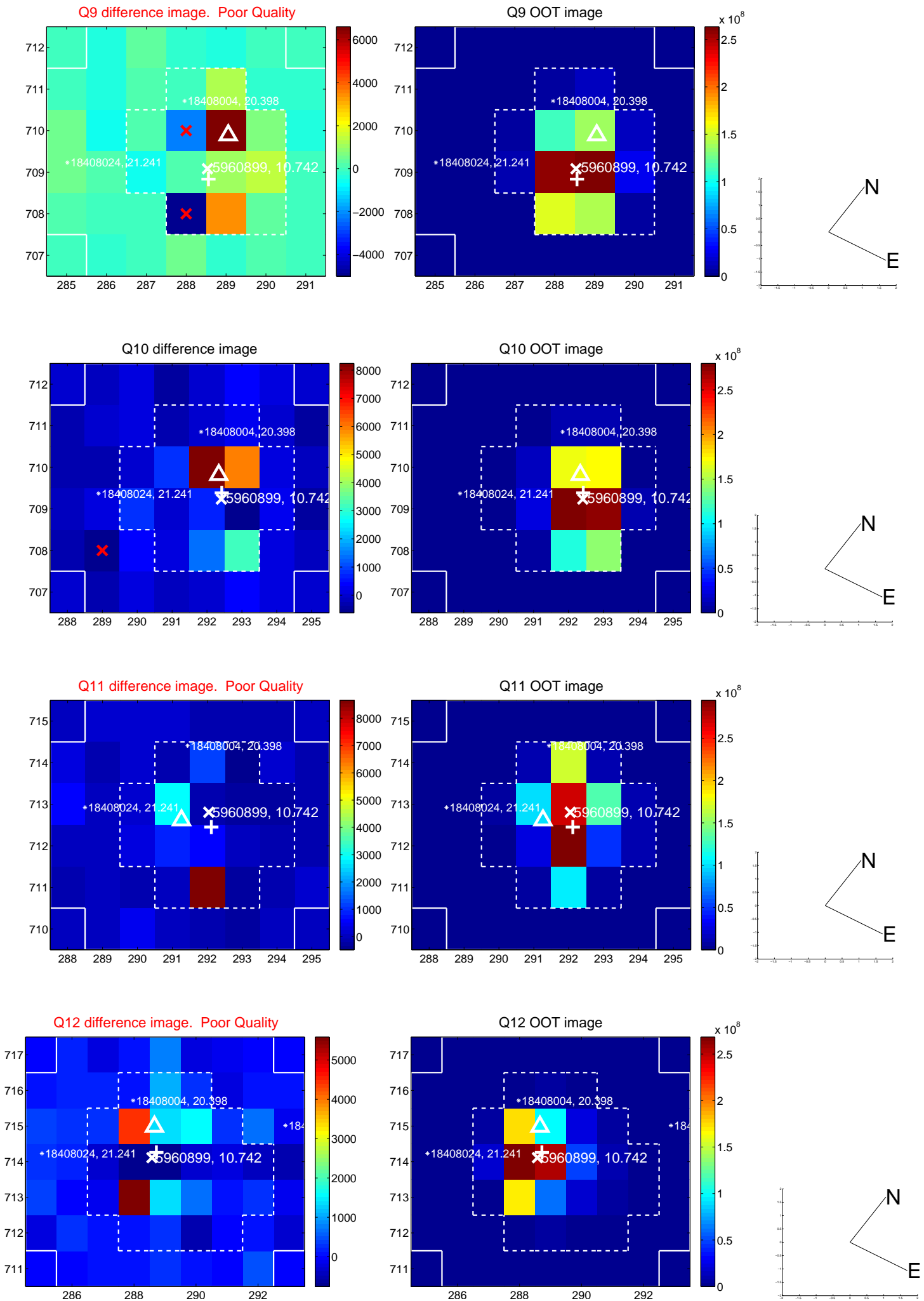


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

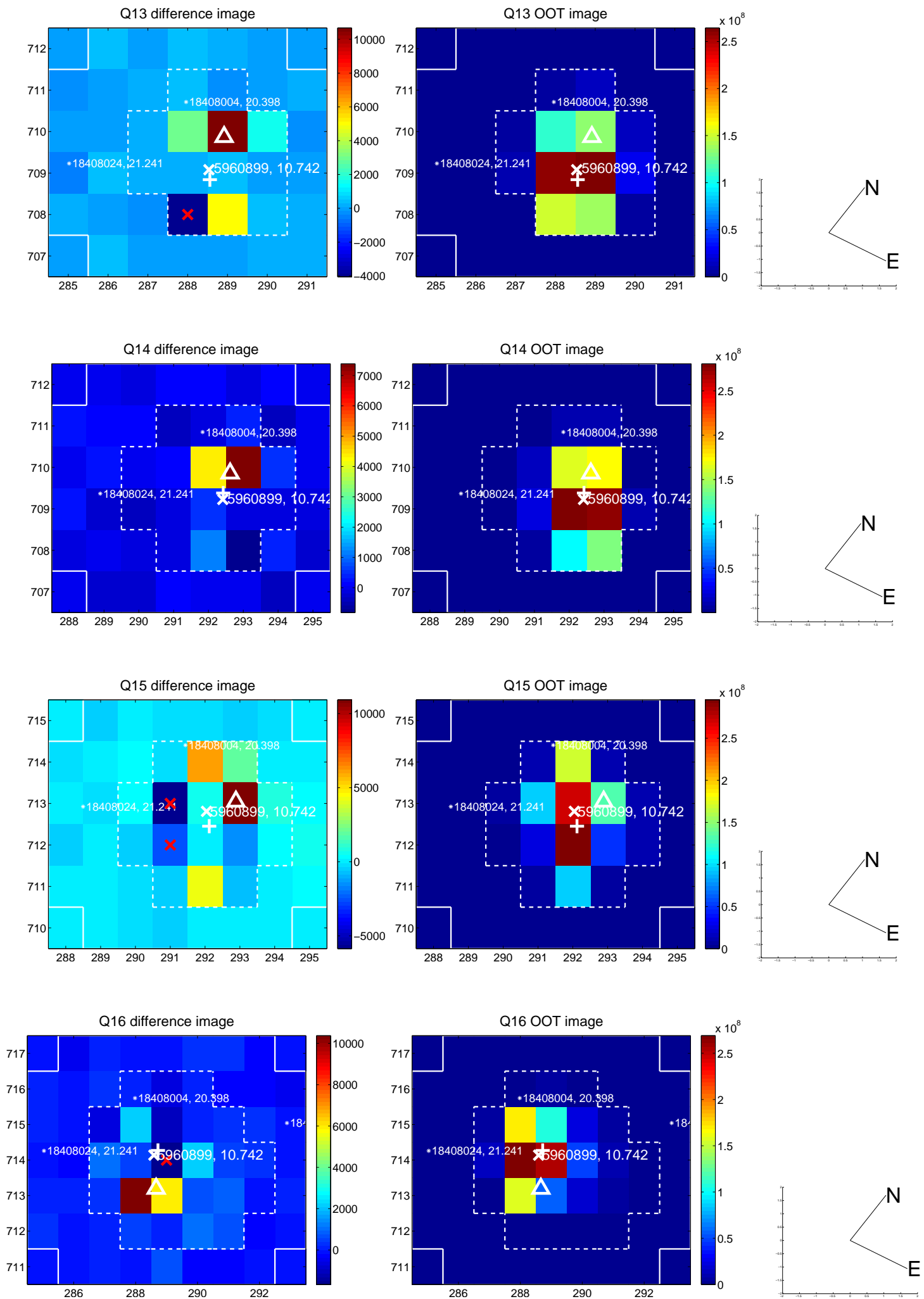




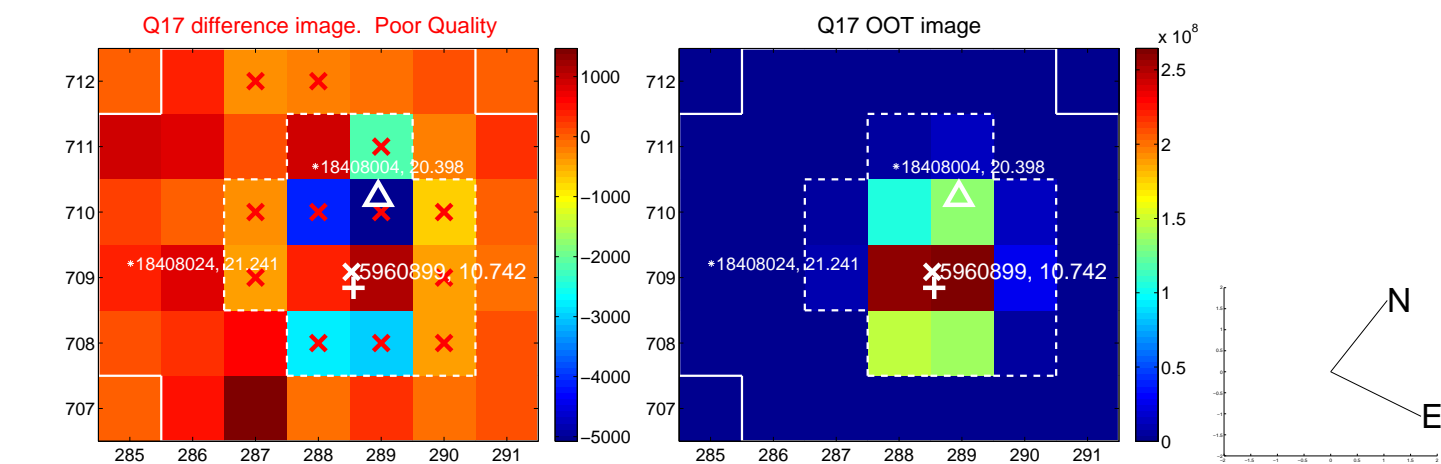
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



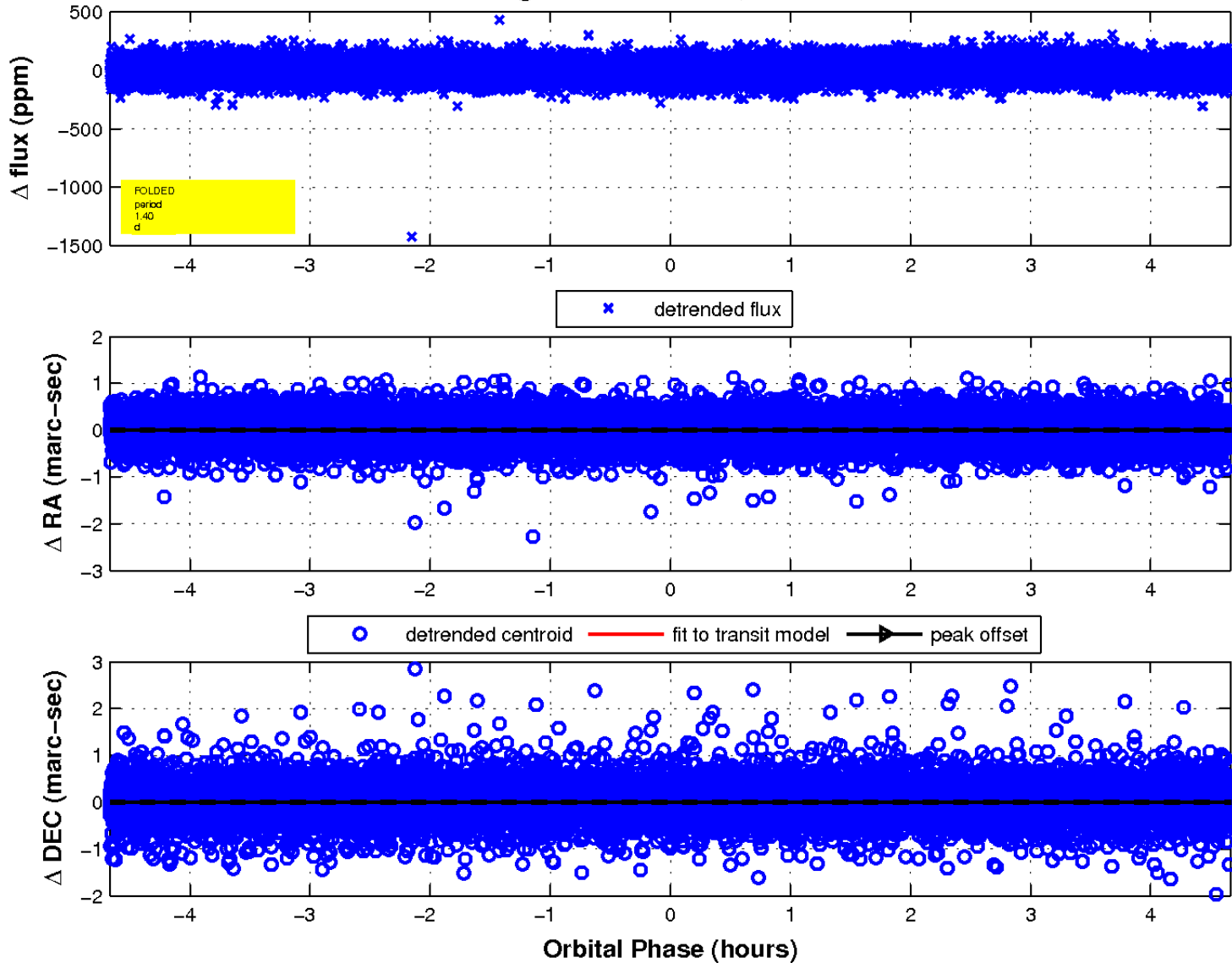
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

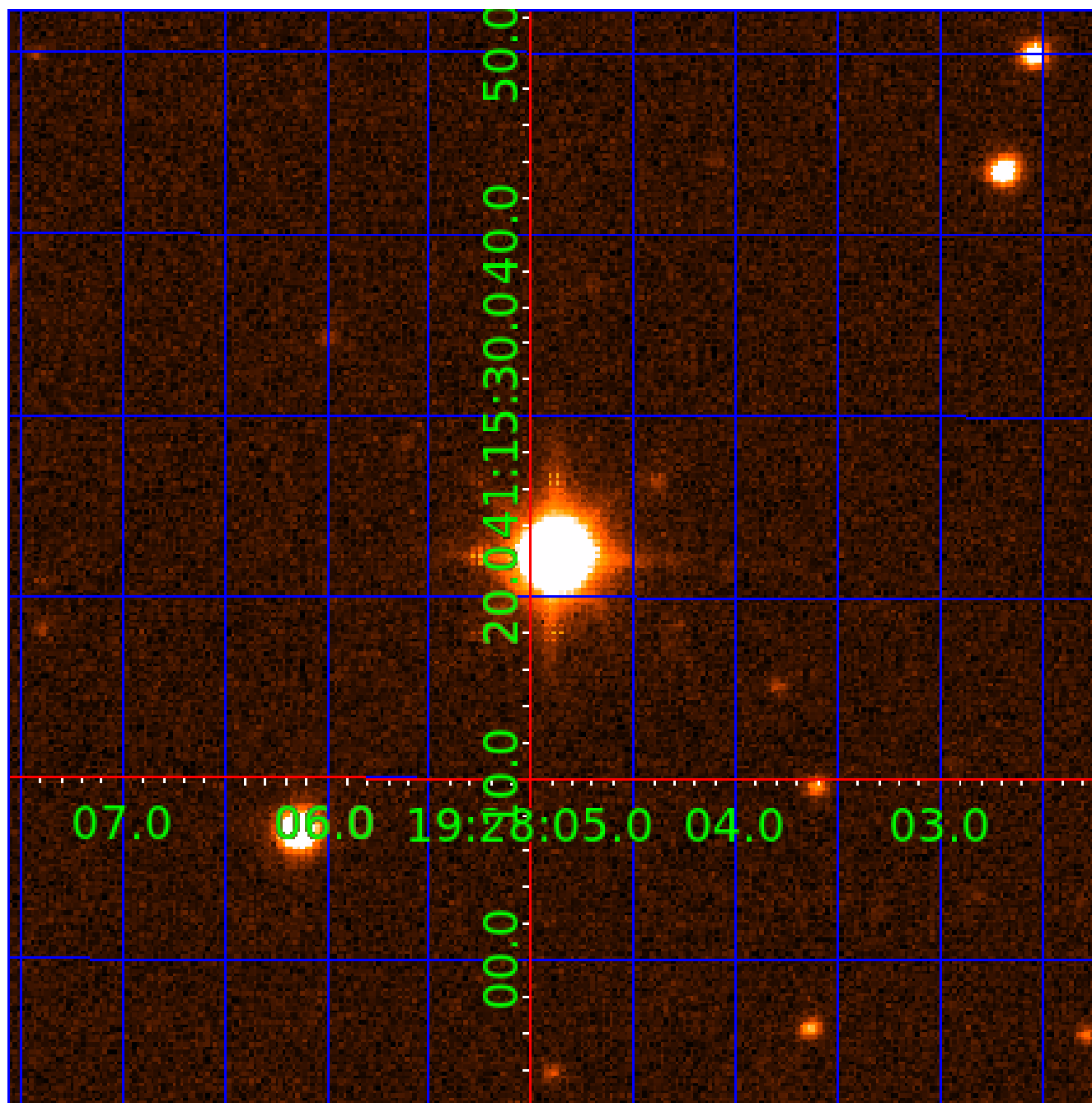


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination





# KIC 005960899

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005960899-01	OBS	No	1.401395	132.537514	13.3	1.556	8.9	8.6	2.85	8647	1.09	43833.86
005960899-02	OBS	No	1.401363	131.692738	10.3	2.444	8.6	7.7	2.85	8647	1.05	43835.21

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005960899-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
005960899-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—CENT_SATURATED

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

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

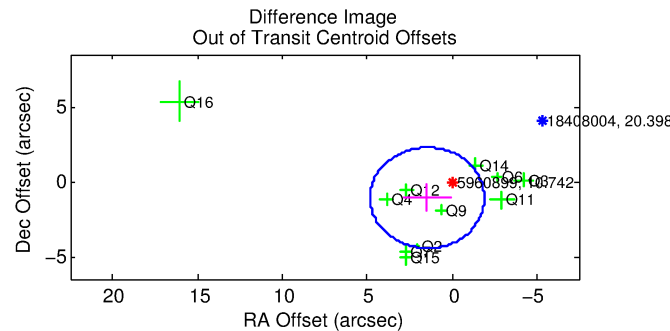
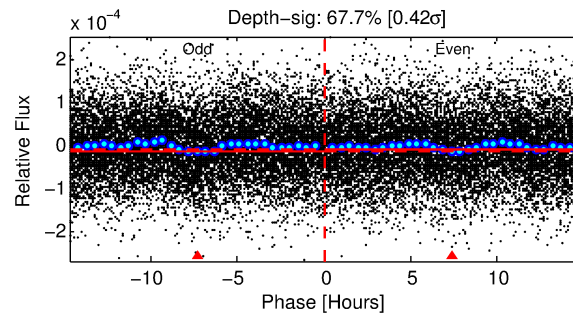
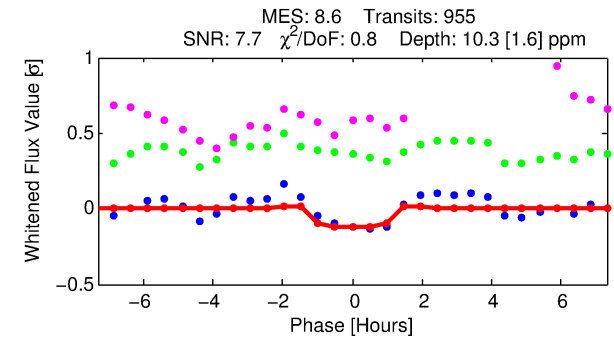
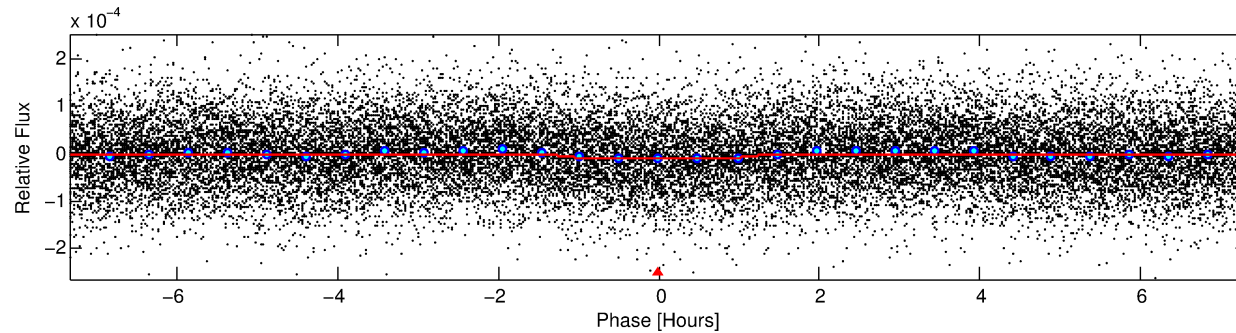
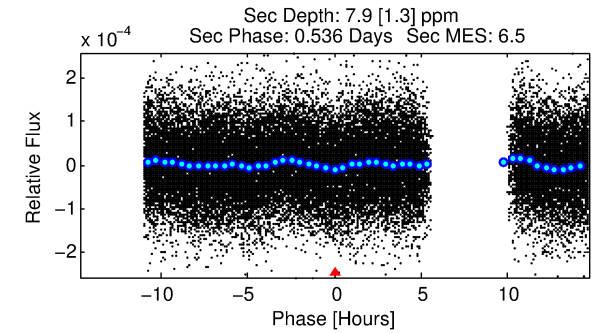
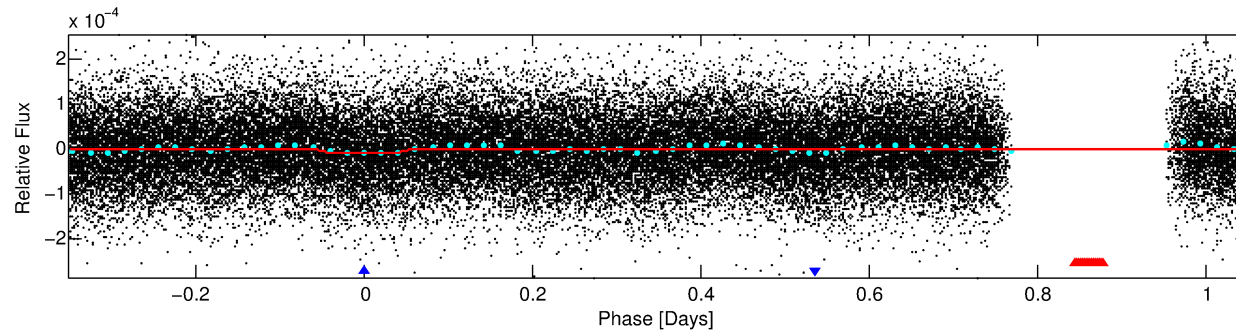
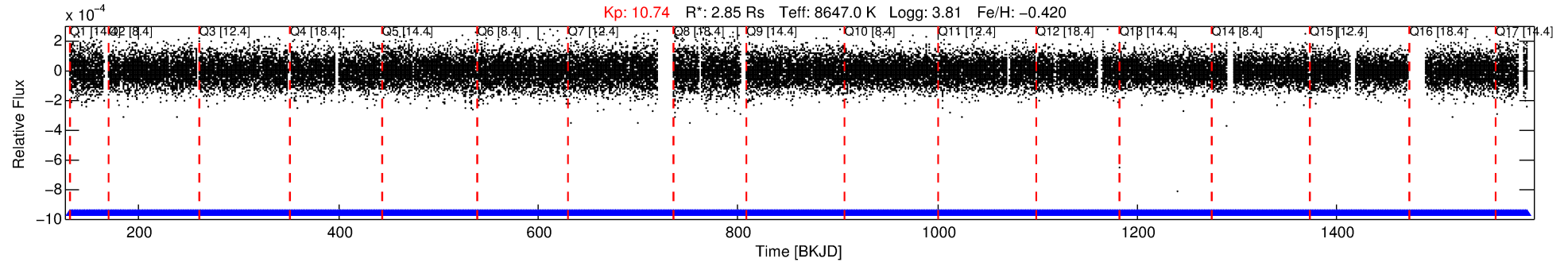
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 005960899-02

No Significant Match Found

# DV One-Page Summary

KIC: 5960899 Candidate: 2 of 2 Period: 1.401 d



## DV Fit Results:

Period = 1.40136 [0.00001] d  
Epoch = 131.6927 [0.0036] BKJD  
 $R_p/R^* = 0.0034$  [0.0005]  
 $a/R^* = 2.27$  [1.40]  
 $b = 0.89$  [0.19]  
 $\text{Seff} = 43835.21$  [18611.81]  
 $T_{\text{eq}} = 3690$  [392] K  
 $R_p = 1.05$  [0.33]  $R_e$   
 $a = 0.0305$  [0.0082] AU  
 $A_g = 3.65$  [1.93] [1.37σ]  
 $T_{\text{eff}} = 7883$  [636] K [5.62σ]

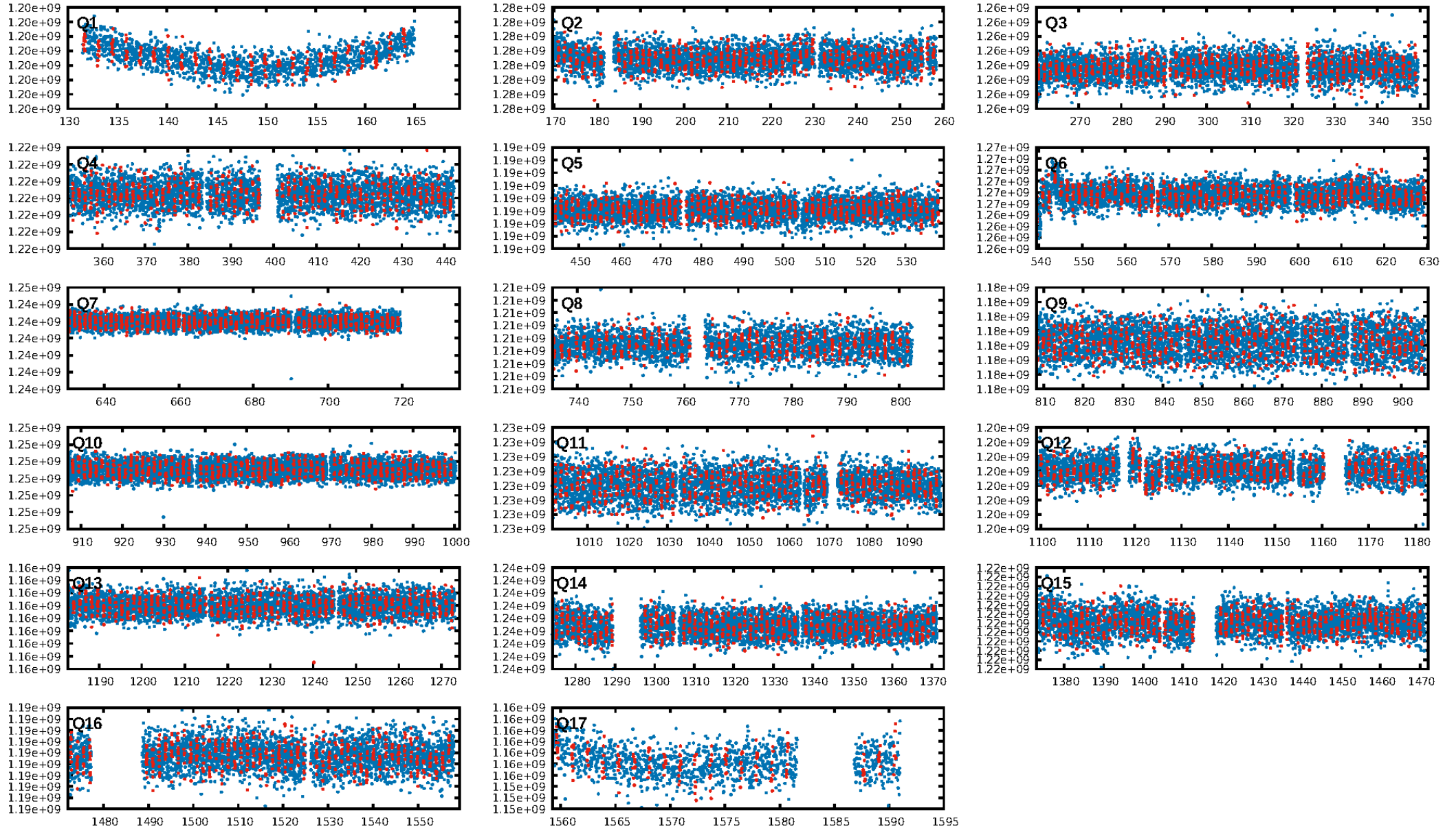
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGoF-sig: N/A  
Bootstrap-pfa: 4.93e-15  
RollingBand-fgt: 1.00 [912/912]  
GhostDiagnostic-chr: 1.325  
Centroid-sig: 2.6%  
Centroid-so: 1.620 arcsec [1.71σ]  
OotOffset-rm: 1.815 arcsec [1.62σ]  
KicOffset-rm: 2.809 arcsec [2.82σ]  
OotOffset-st: 3/4/3/1 [11]  
KicOffset-st: 3/4/3/1 [11]  
DiffImageQuality-fgm: 0.64 [7/11]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 02:03:53 Z

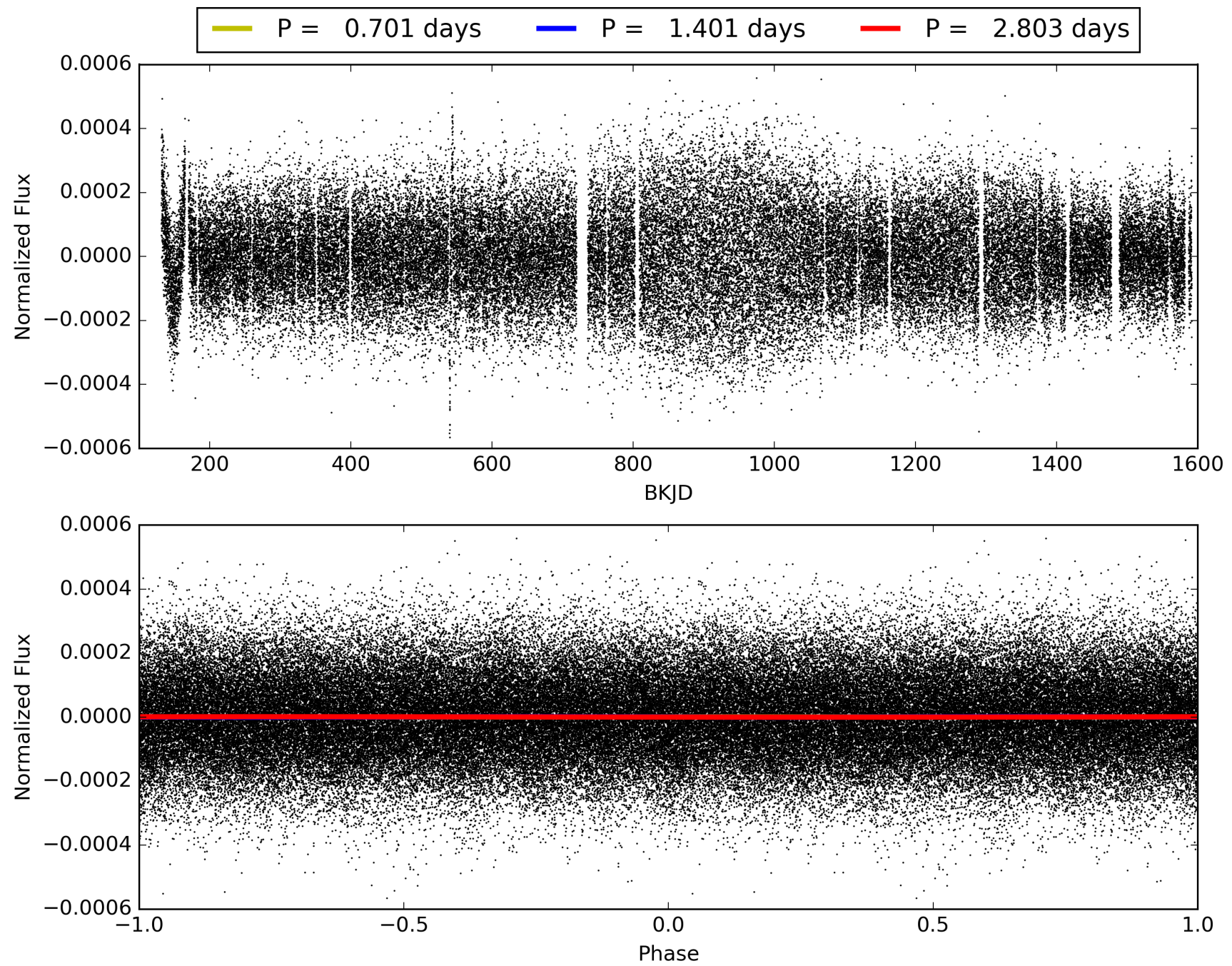
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 005960899-02, PDC Light Curves





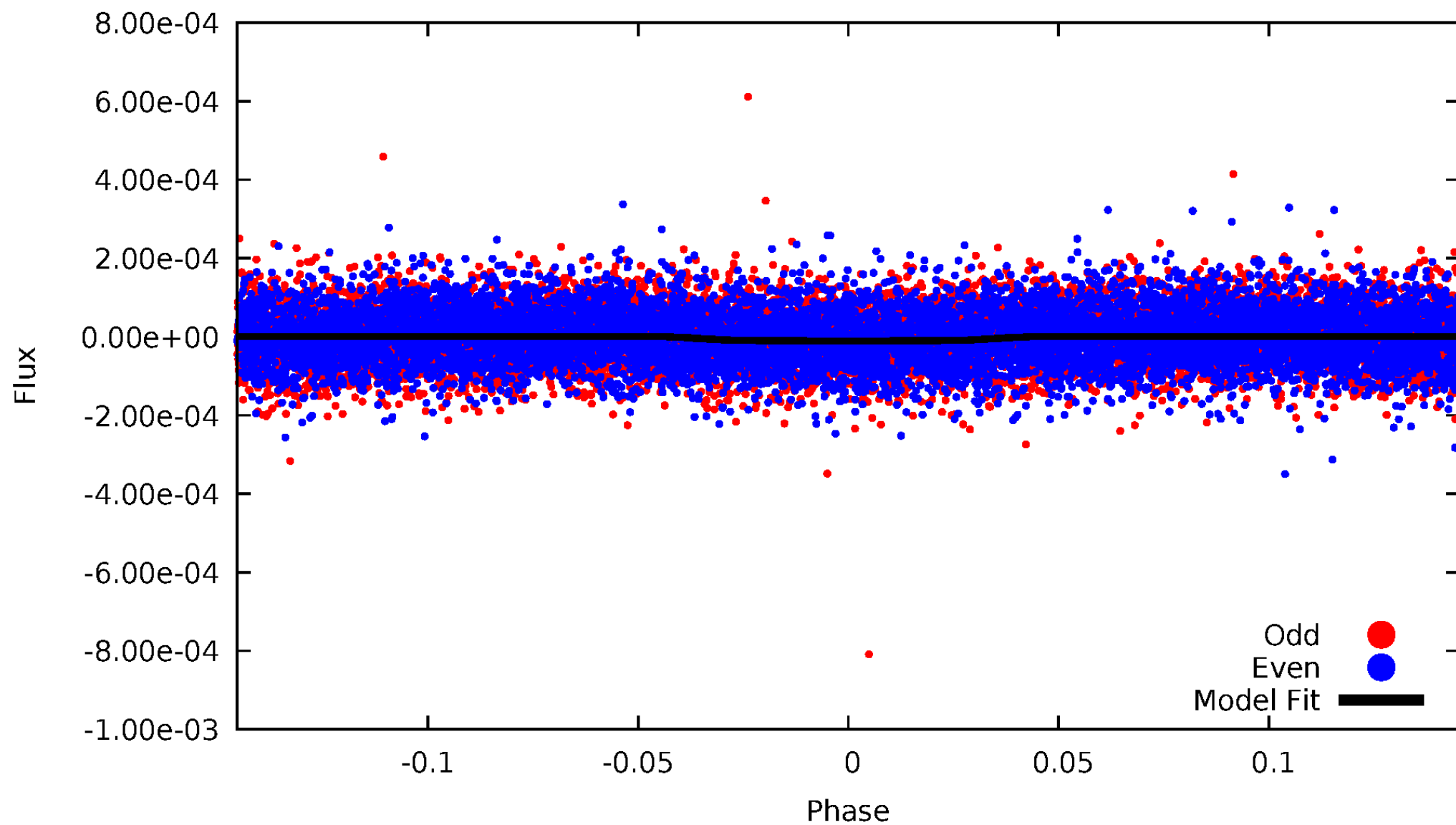
TCE 005960899-02





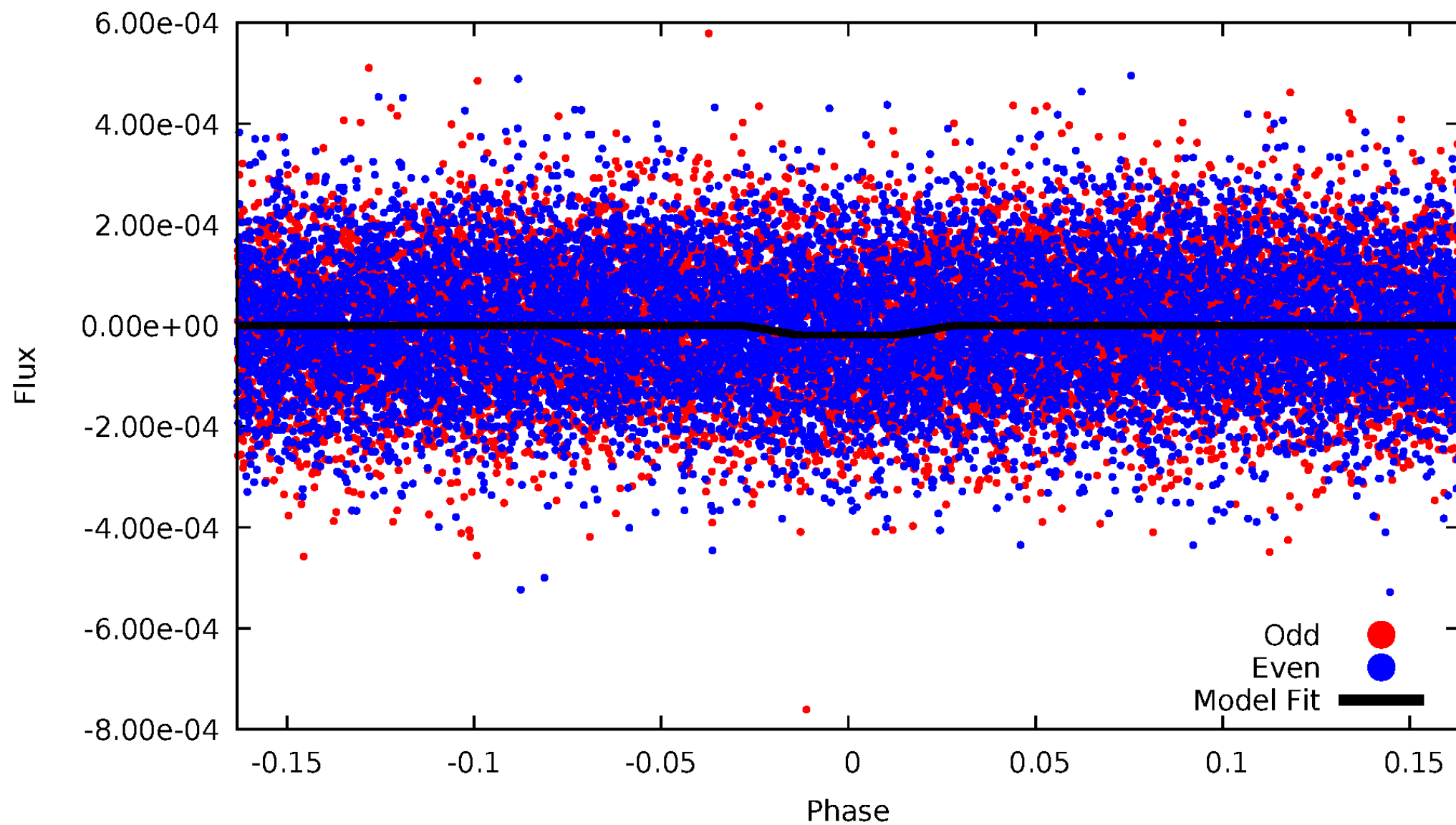
DV Odd/Even

TCE 005960899-02



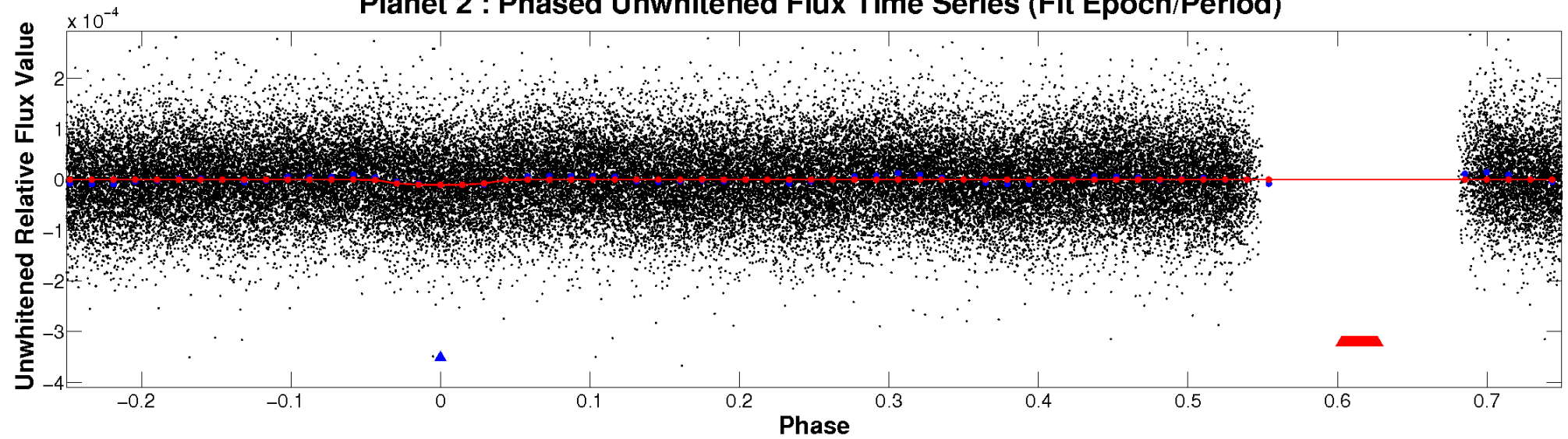
# ALT Odd/Even

TCE 005960899-02

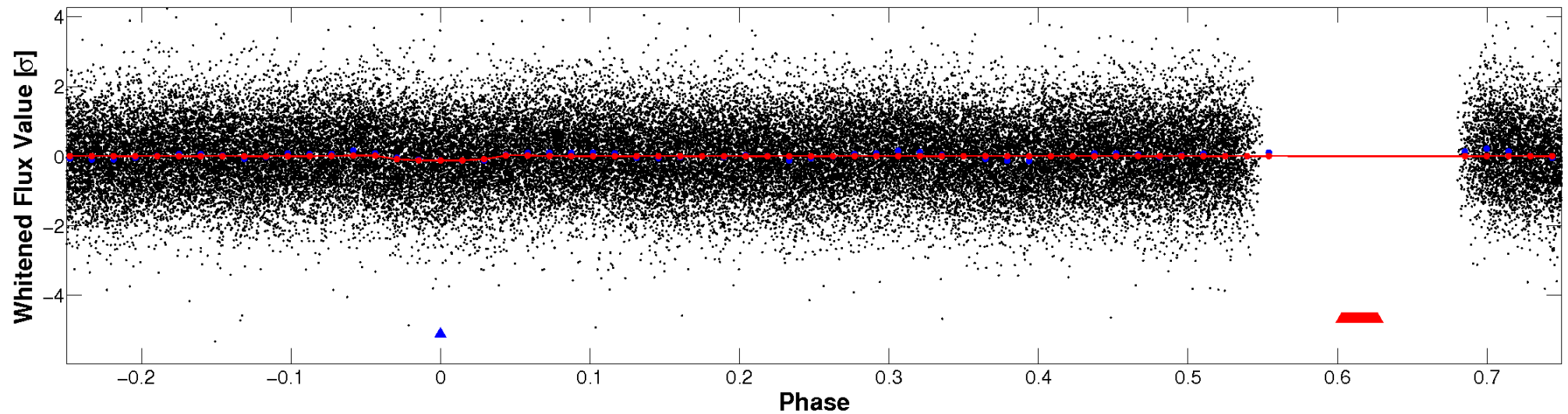


# Non-Whitened Vs. Whitened Light Curve

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

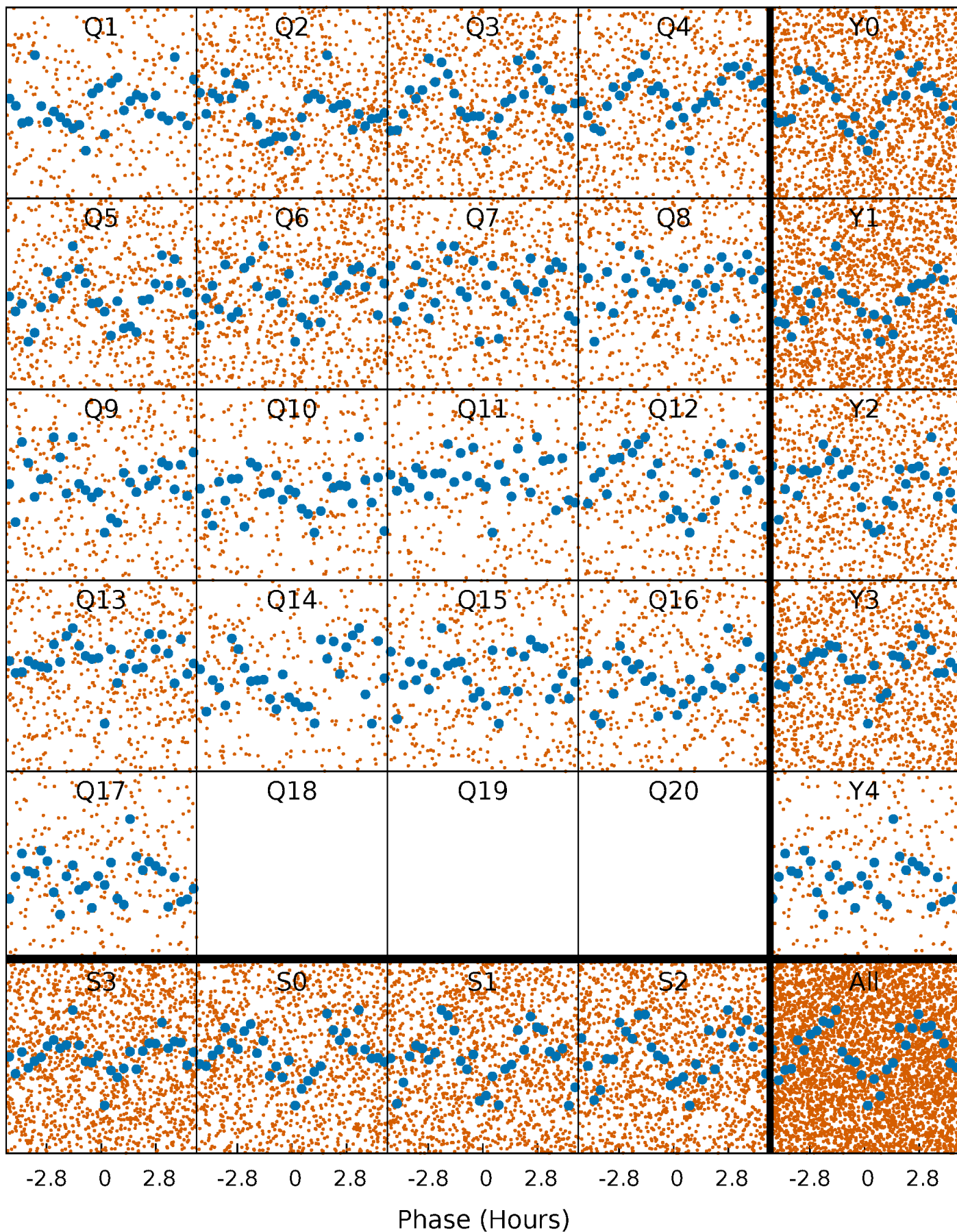


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

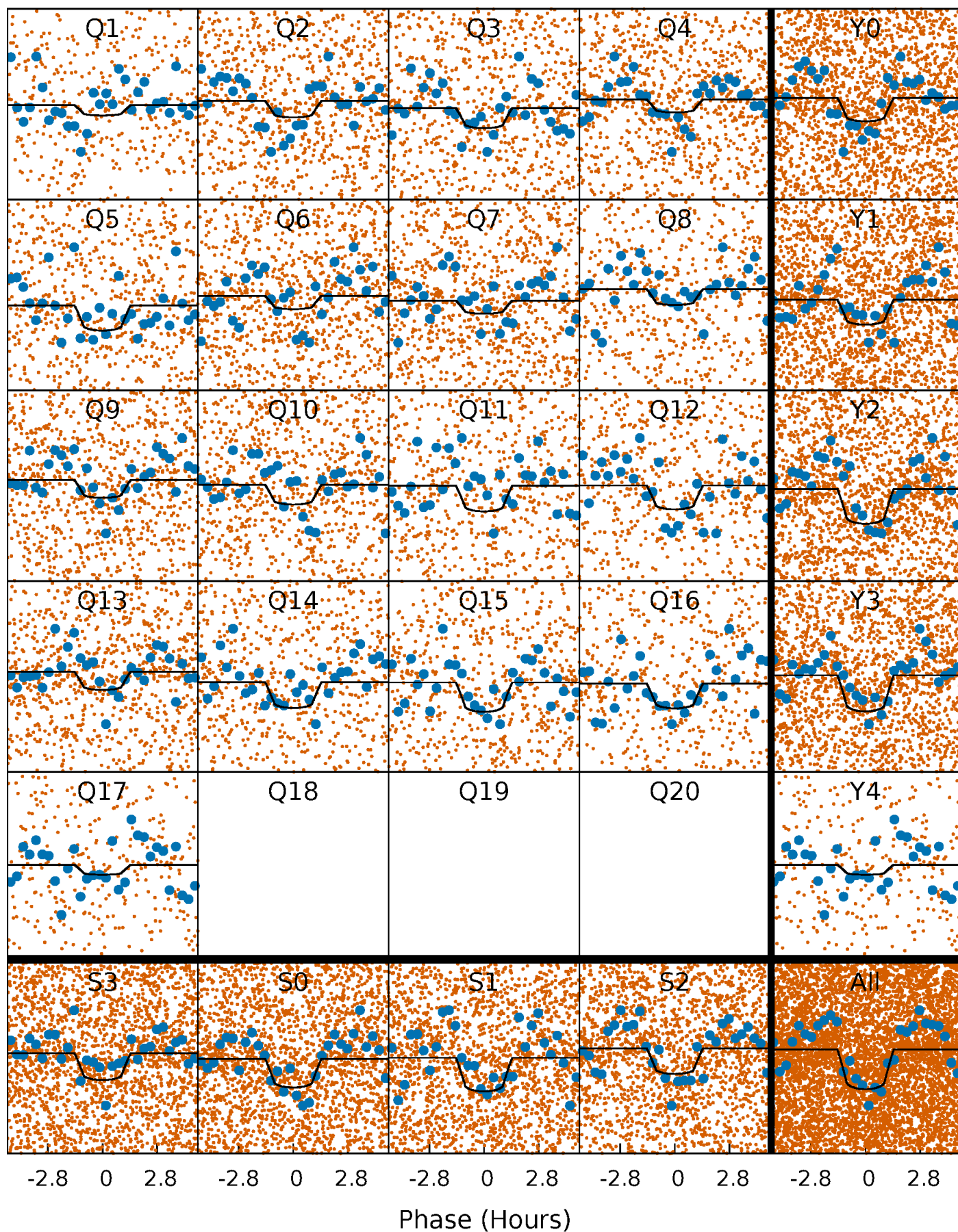
TCE 005960899-02   P= 1.401363 Days    $T_0=131.692738$  (BKJD)





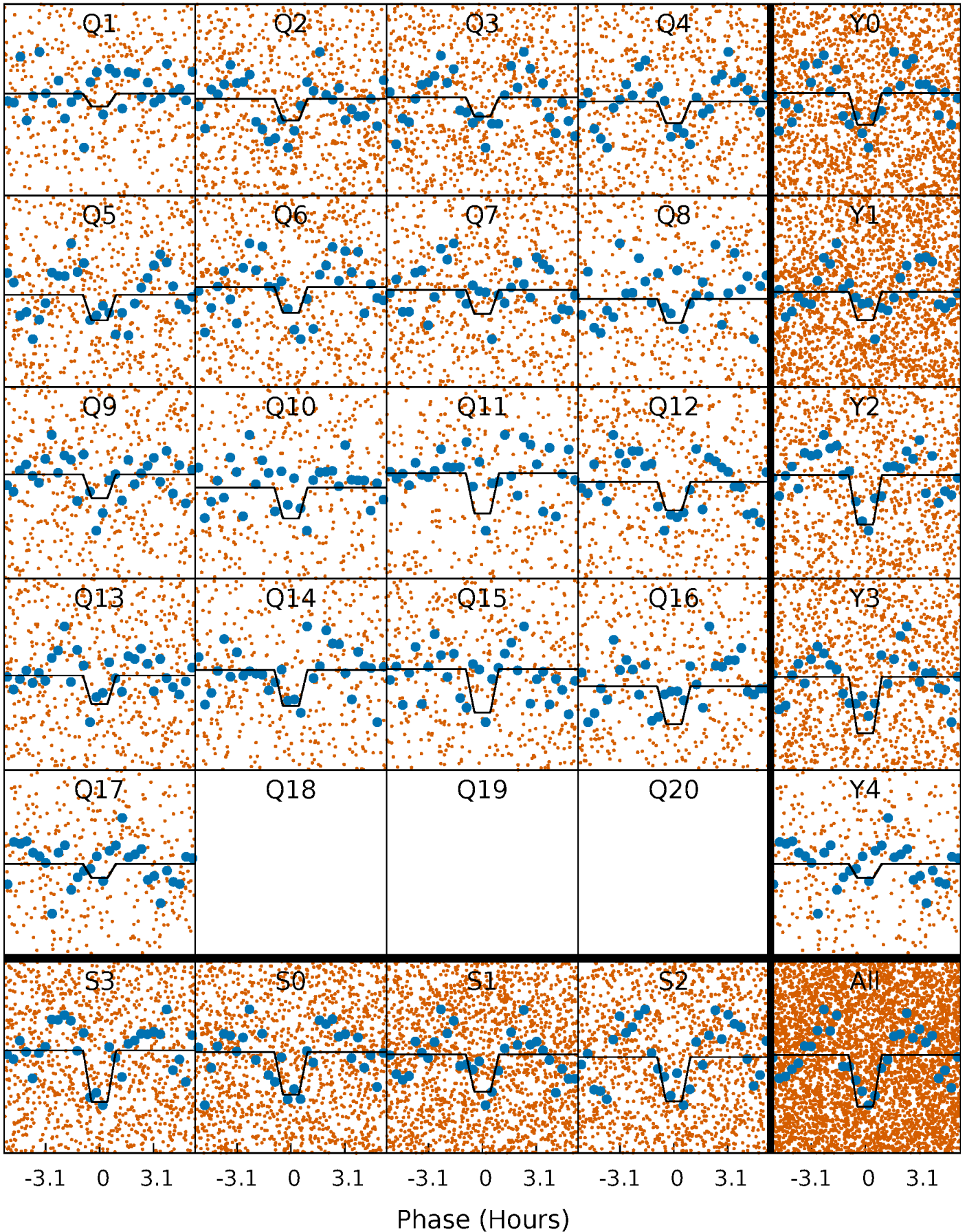
# DV Quarter-Phased Transit Curves

TCE 005960899-02 P= 1.401363 Days  $T_0=131.692738$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 005960899-02     $P = 1.401393$  Days     $T_0 = 131.691388$  (BKJD)

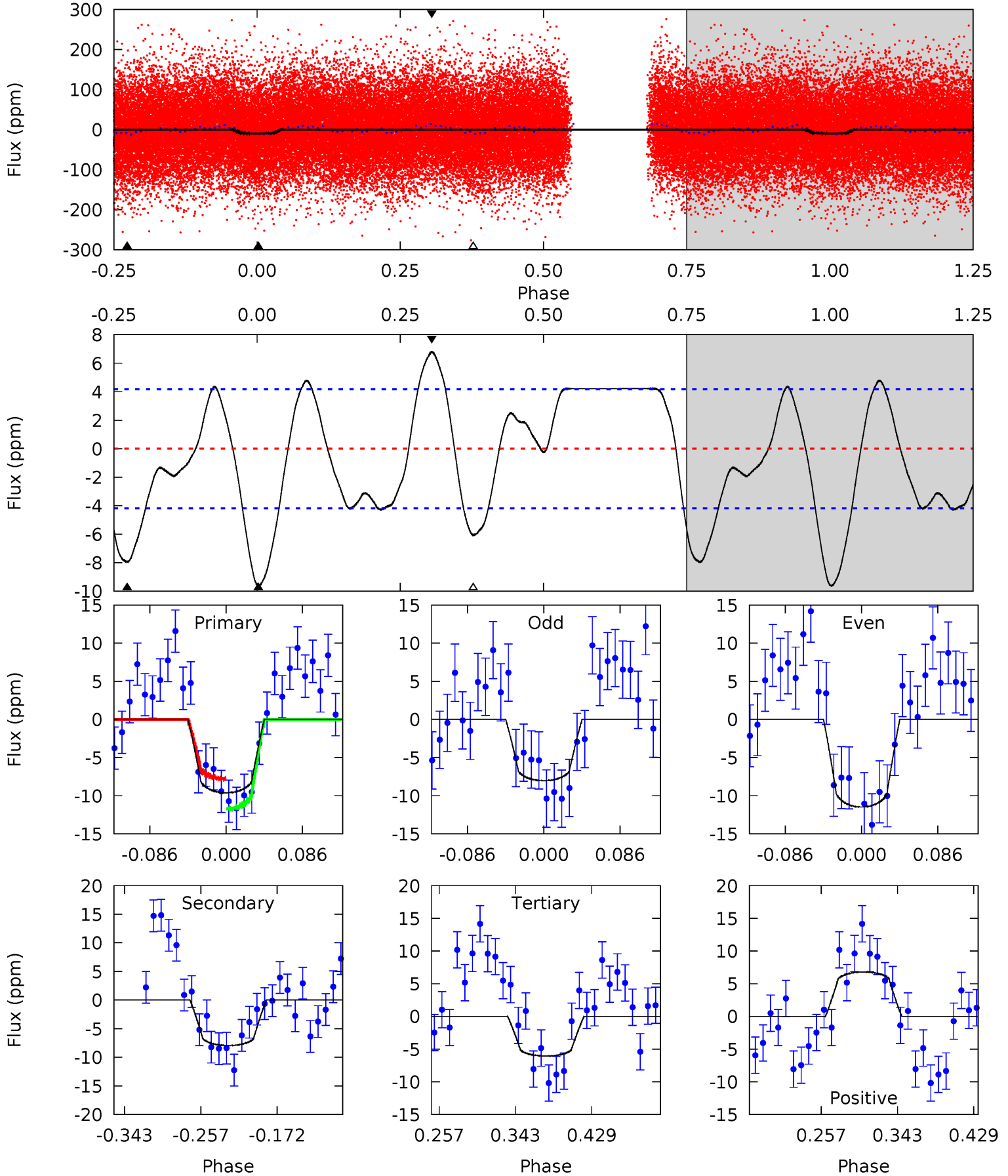




# DV Model-Shift Uniqueness Test

005960899-02, P = 1.401363 Days, E = 130.291375 Days

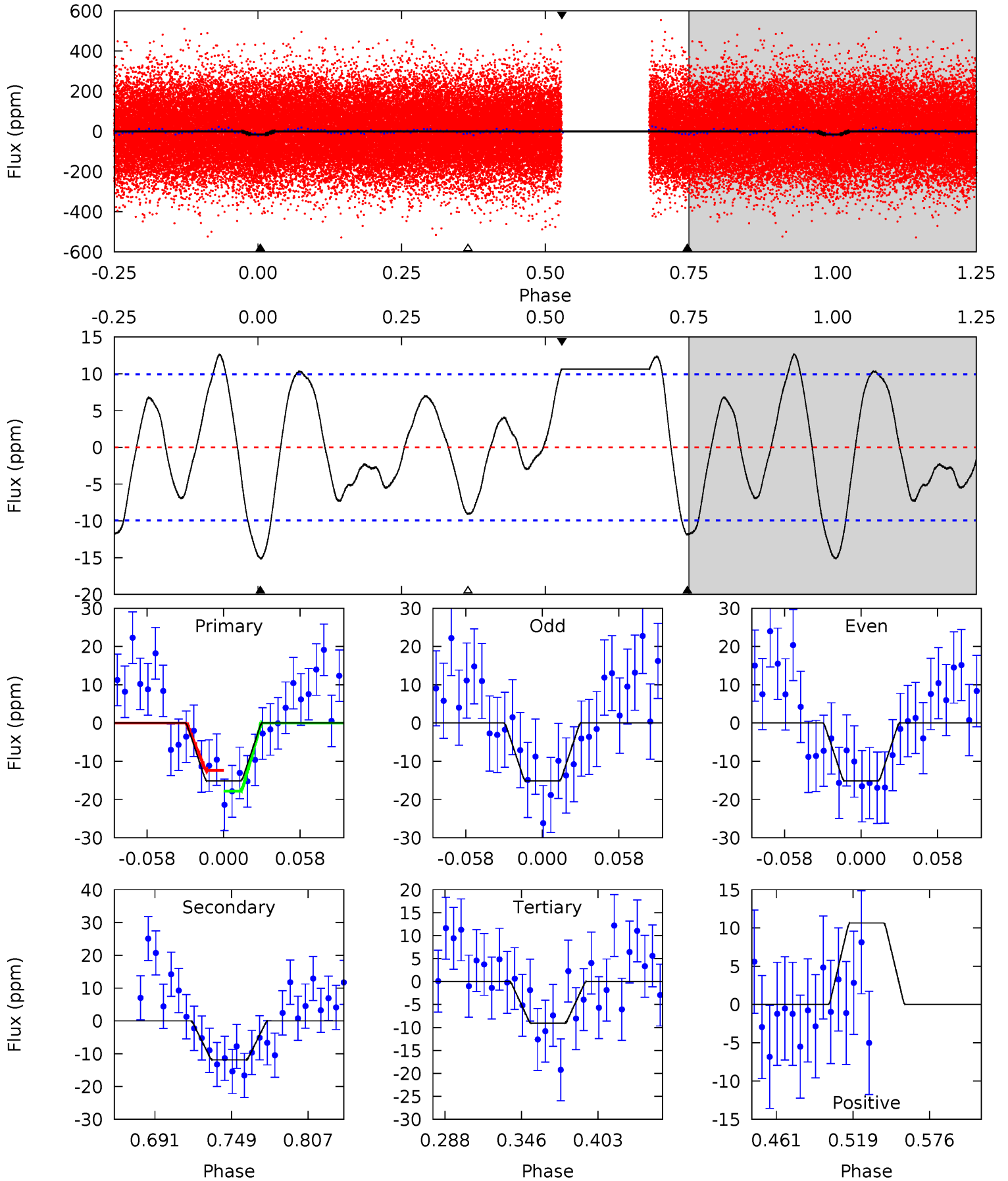
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.6	8.75	6.67	7.48	4.60	1.72	3.73	3.92	3.12	2.08	1.28	1.91	0.87	0.41	2.18



# Alt Model-Shift Uniqueness Test

005960899-02, P = 1.401393 Days, E = 130.289995 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
7.12	5.59	4.26	5.01	4.68	1.90	2.65	2.86	2.11	1.33	0.58	0.00	1.07	0.46	1.27



### Stellar Parameters For KIC 005960899

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (g \cdot \text{cm}^{-3})$
	$8647^{+69}_{-86}$	$3.812^{+0.246}_{-0.043}$	$-0.420^{+0.050}_{-0.200}$	$2.853^{+0.254}_{-0.813}$	$1.926^{+0.112}_{-0.192}$	$0.117^{+0.177}_{-0.017}$
	+1%/-1%	+6%/-1%	+12%/-48%	+9%/-28%	+6%/-10%	+152%/-15%
Source	SPE68	SPE68	SPE68	DSEP		

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

### Secondary Eclipse Parameters for KIC 005960899-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-8 \pm 1$	$0.99^{+0.19}_{-0.18}$	$5064^{+162}_{-363}$	$7587^{+864}_{-700}$	$4.205^{+2.282}_{-1.267}$
Alt.	$-12 \pm 2$	$1.27^{+0.19}_{-0.22}$	$5069^{+155}_{-390}$	$7352^{+729}_{-610}$	$3.845^{+1.867}_{-1.111}$

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

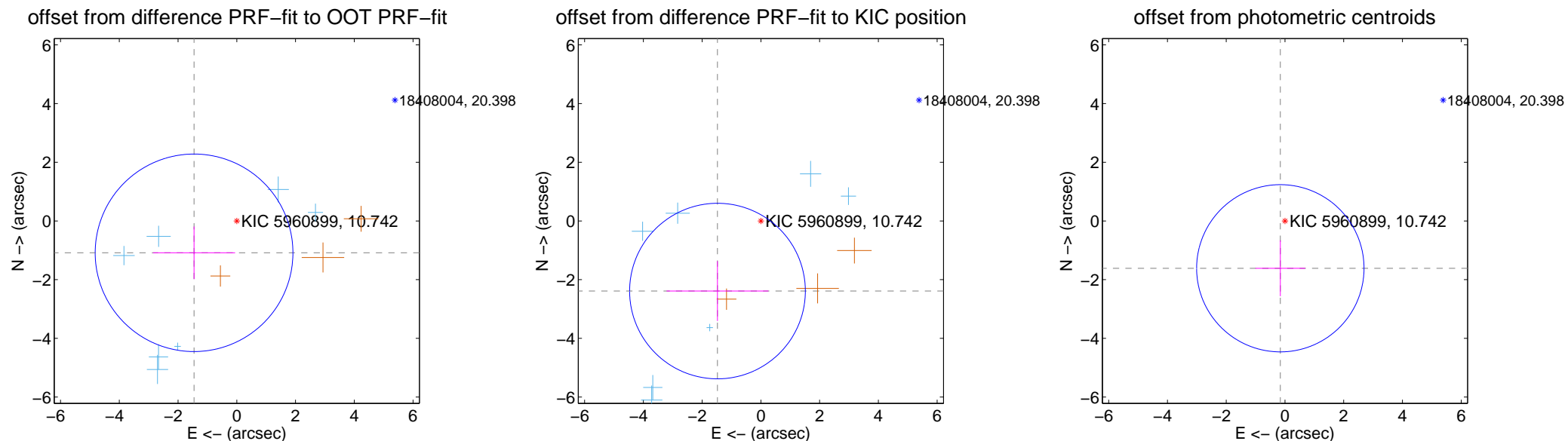
## DV Centroid Data

Supplemental centroid analysis for 005960899-02. **Kepler magnitude: 10.74**. Transit SNR 7.68

There are 7 quarters with good PRF difference image offsets

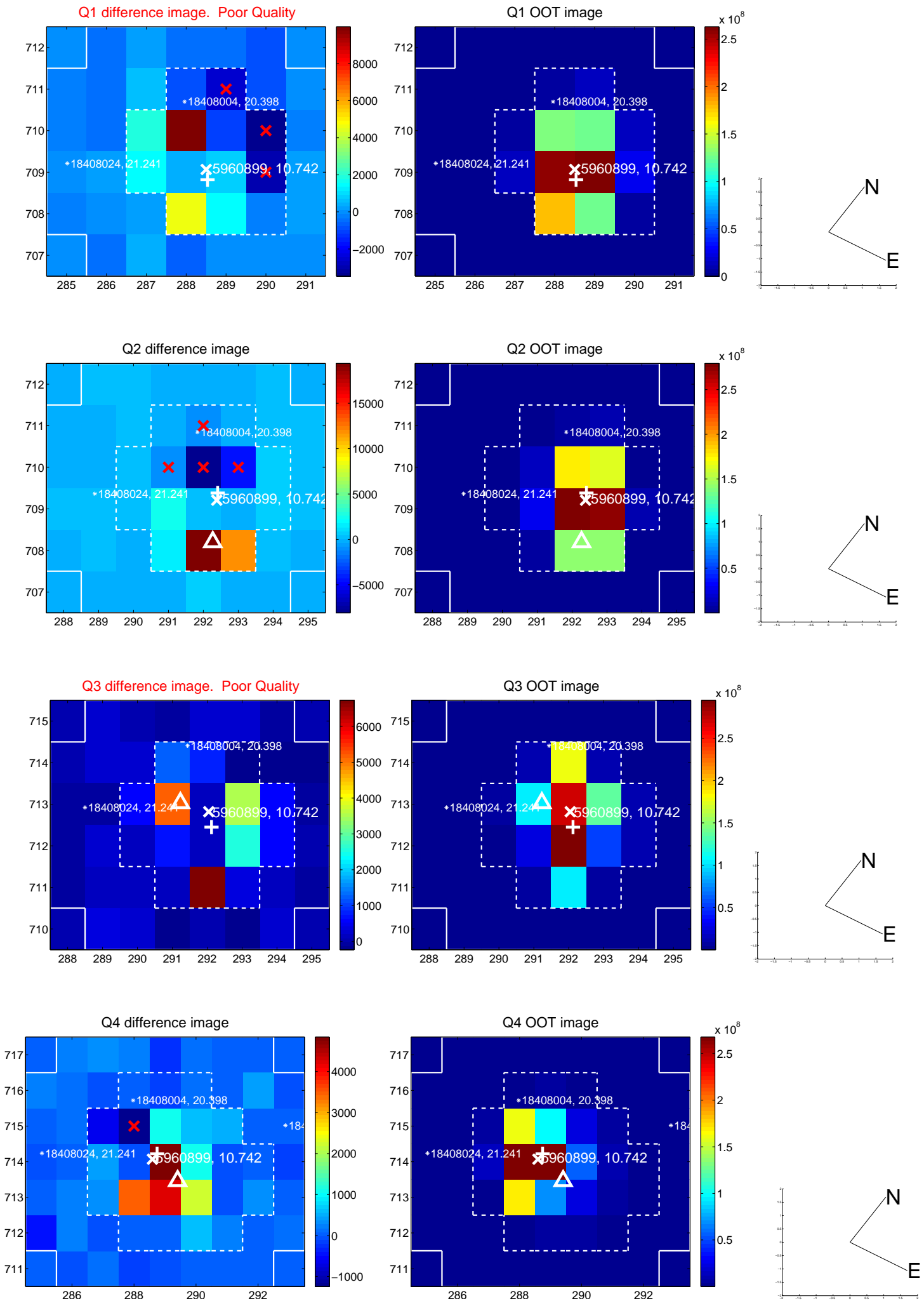
The direct PRF centroid is offset from the target star catalog position by about 0.74 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.815 \pm 1.122$	1.62	$1.455 \pm 1.399$	$-1.086 \pm 0.895$
PRF-fit source offset from KIC position	$2.809 \pm 0.997$	2.82	$1.477 \pm 1.735$	$-2.389 \pm 1.021$
photometric centroid source offset	$1.62 \pm 0.95$	1.71	$0.16 \pm 0.85$	$-1.61 \pm 0.95$

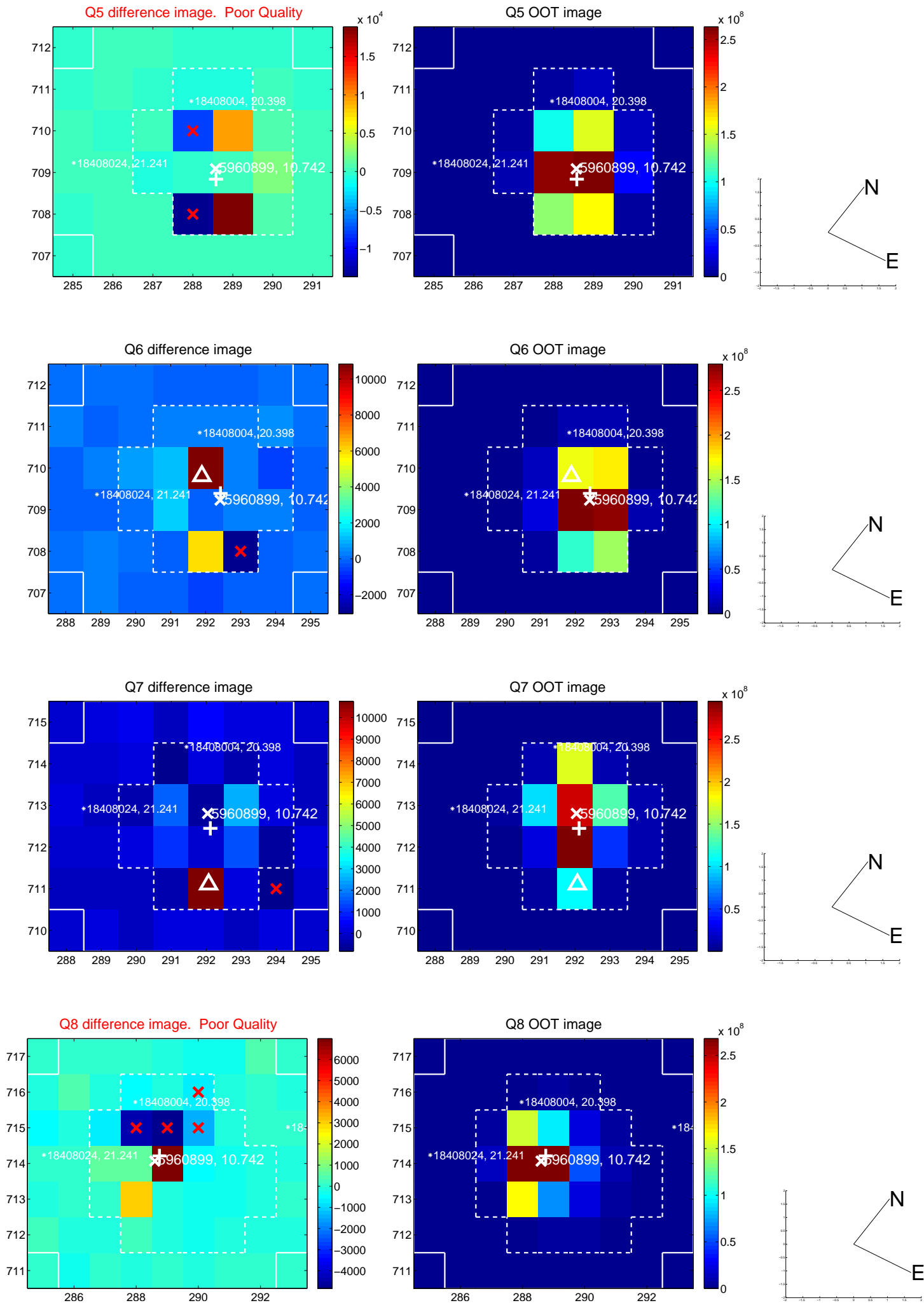


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

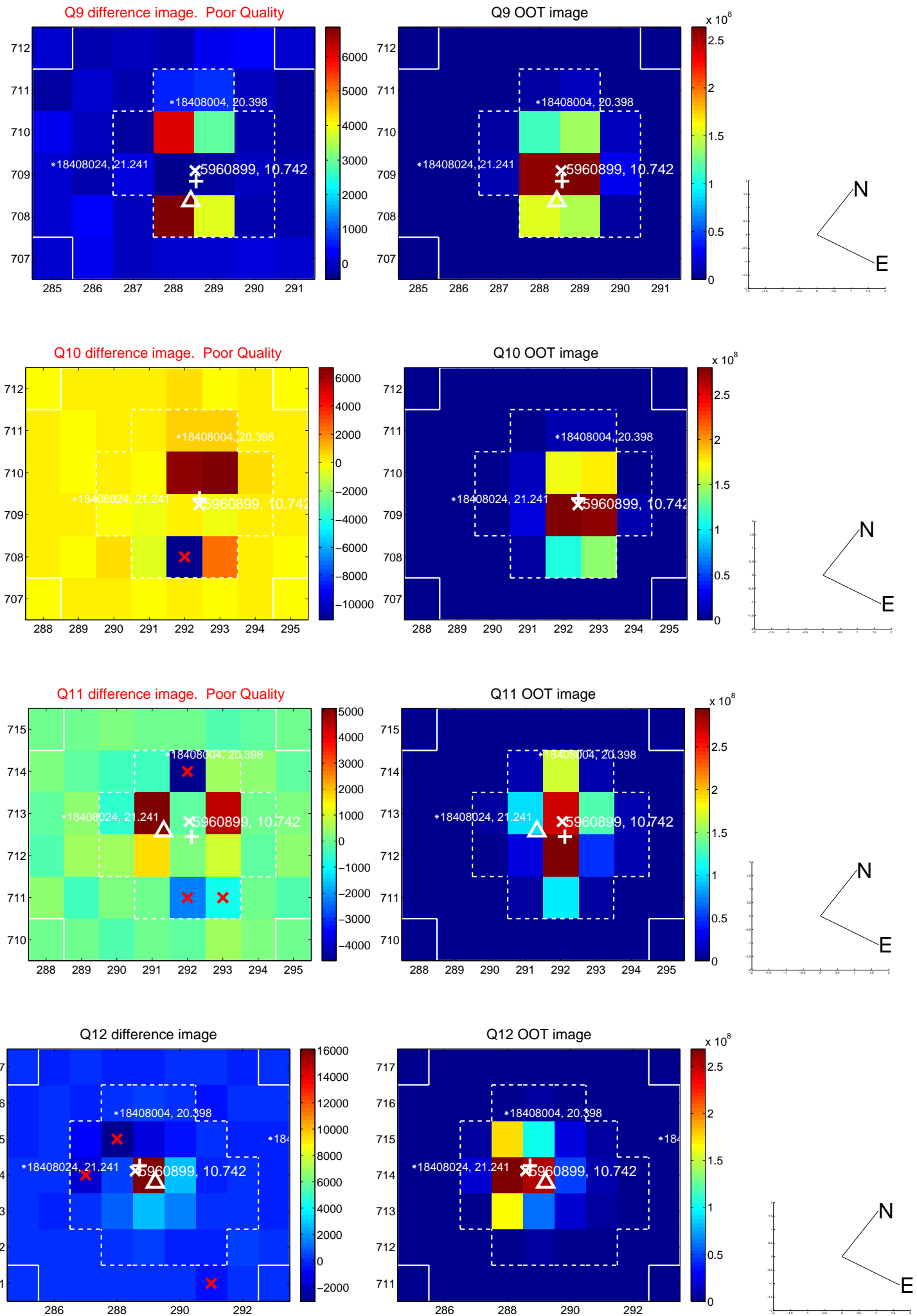


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

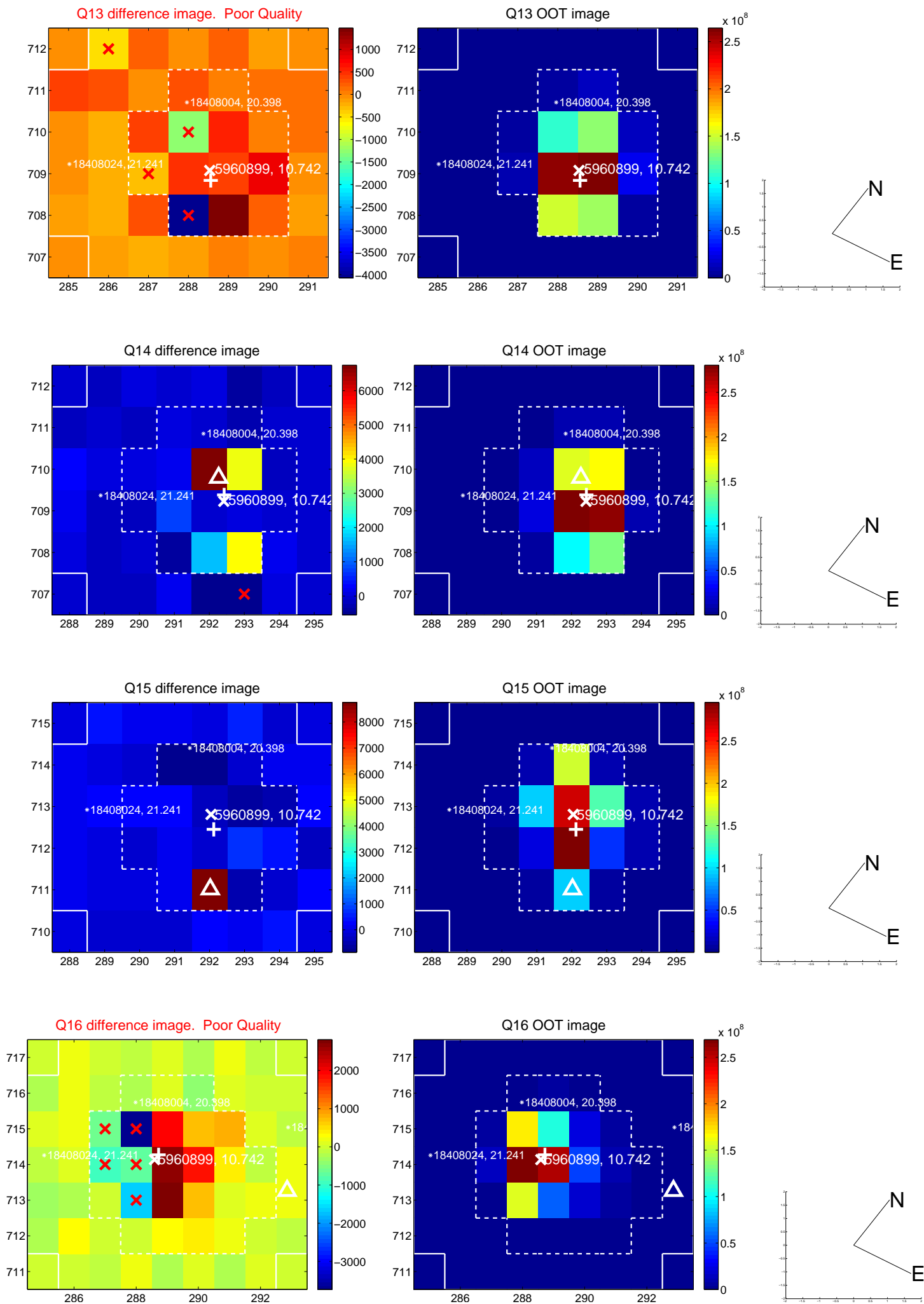




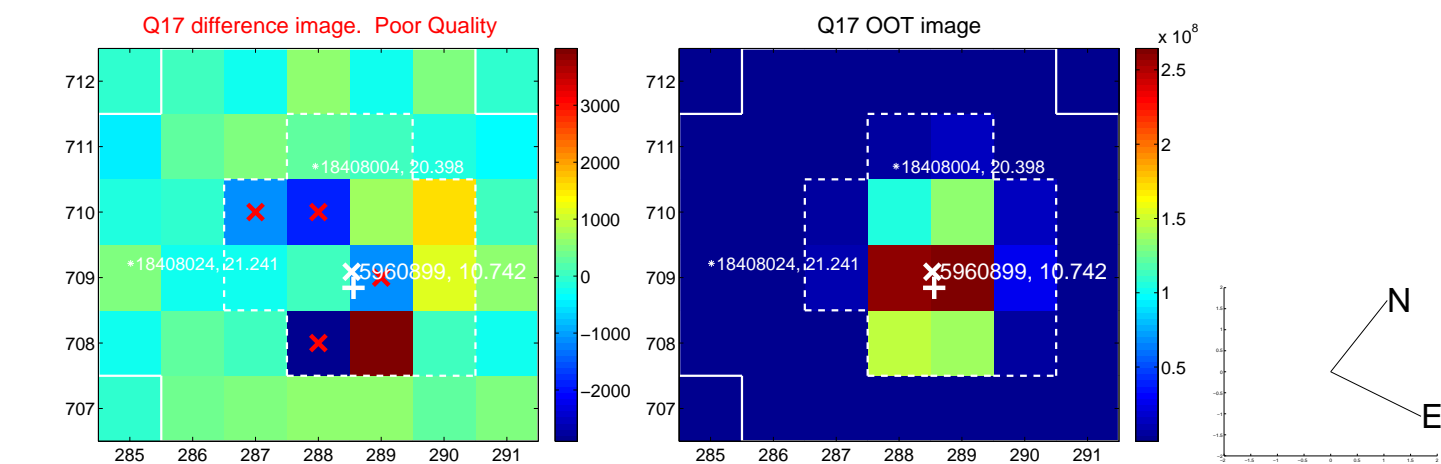
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



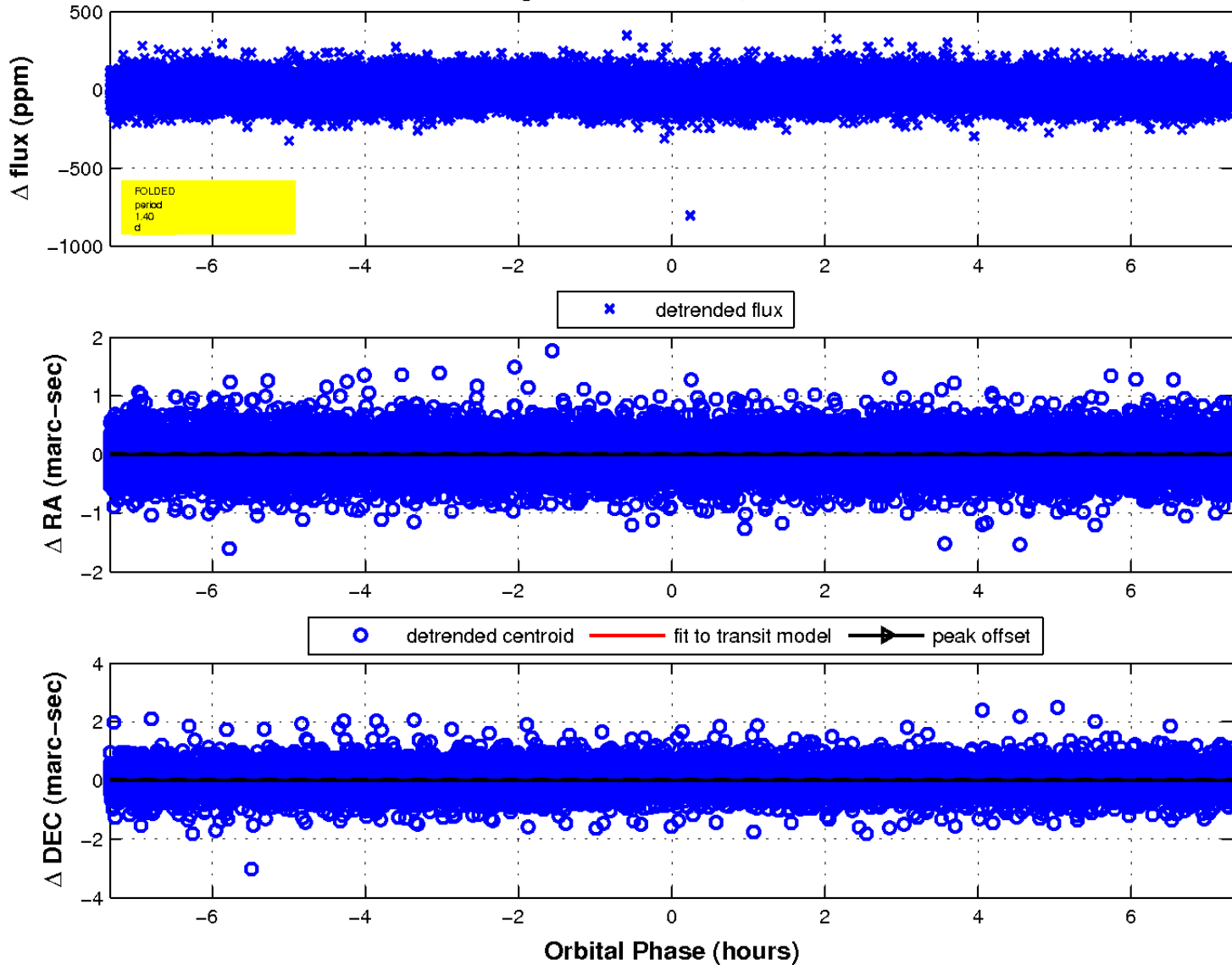
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

