

# KIC 010489783

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010489783-01	OBS	No	1.476762	132.702228	95.3	4.691	10.0	10.8	3.49	7861	4.14	38847.20
010489783-02	OBS	No	0.738399	131.581820	58.2	4.340	7.4	8.8	3.49	7861	3.11	97885.64

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010489783-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
010489783-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—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.

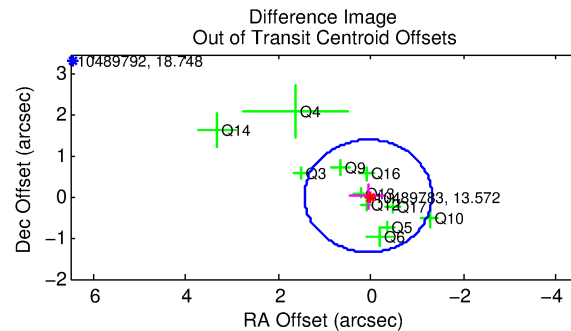
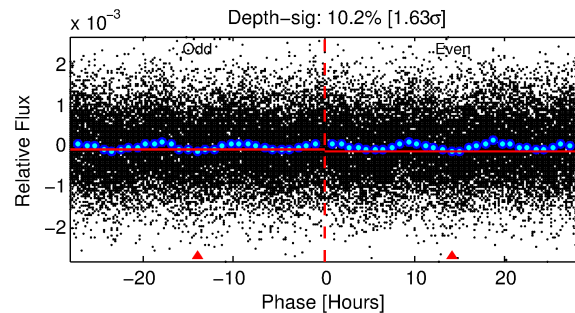
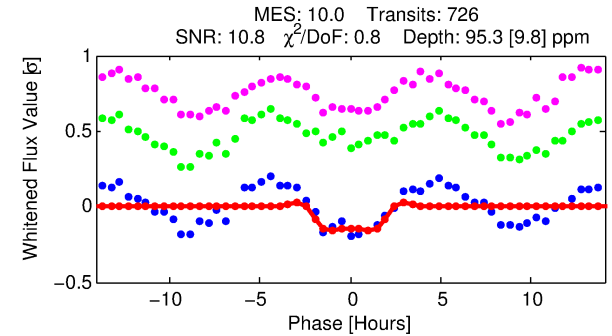
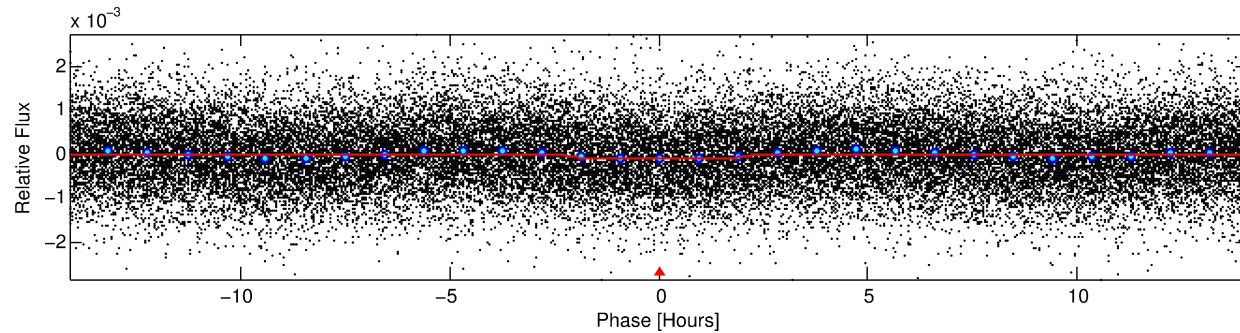
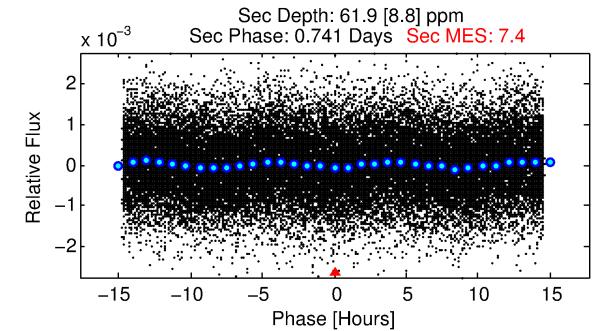
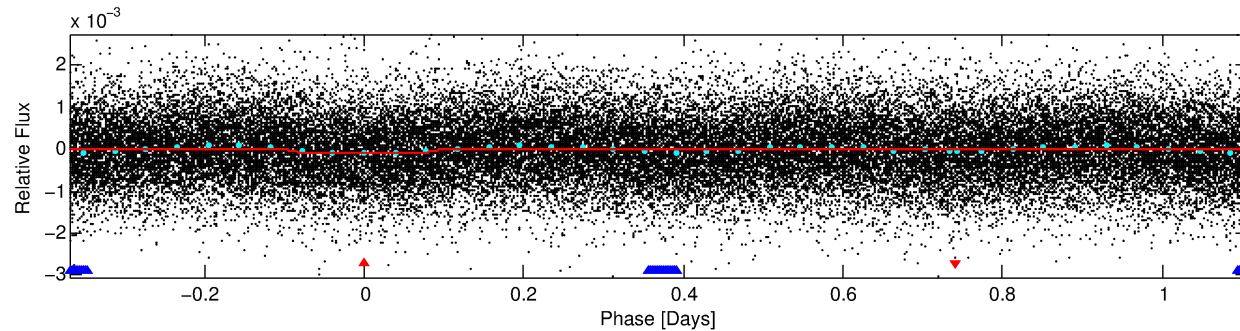
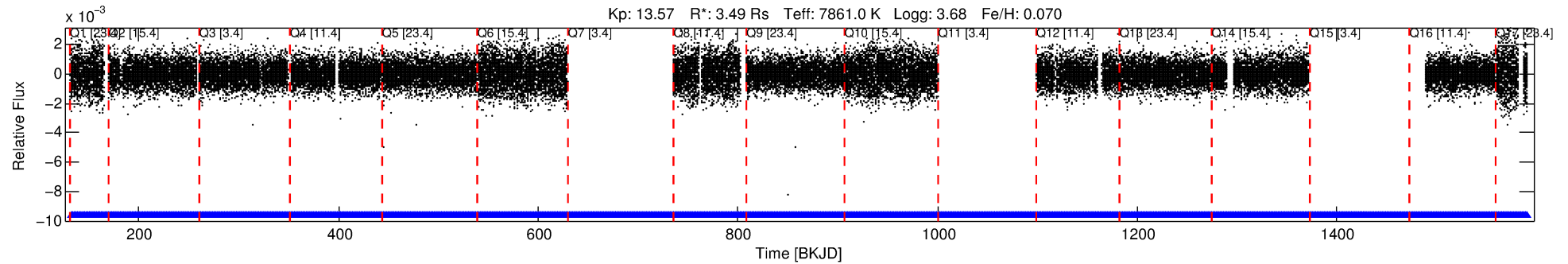
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 010489783-01

No Significant Match Found

# DV One-Page Summary

KIC: 10489783 Candidate: 1 of 2 Period: 1.477 d



## DV Fit Results:

Period = 1.47676 [0.00002] d  
Epoch = 132.7022 [0.0049] BKJD  
Rp/R\* = 0.0109 [0.0022]  
a/R\* = 1.30 [0.67]  
b = 0.94 [0.15]  
Seff = 38847.20 [17583.60]  
Teq = 3580 [405] K  
Rp = 4.14 [1.51] Re  
a = 0.0327 [0.0093] AU  
Ag = 2.13 [1.33] [0.85σ]  
**Teffp = 6686 [729] K [3.72σ]**

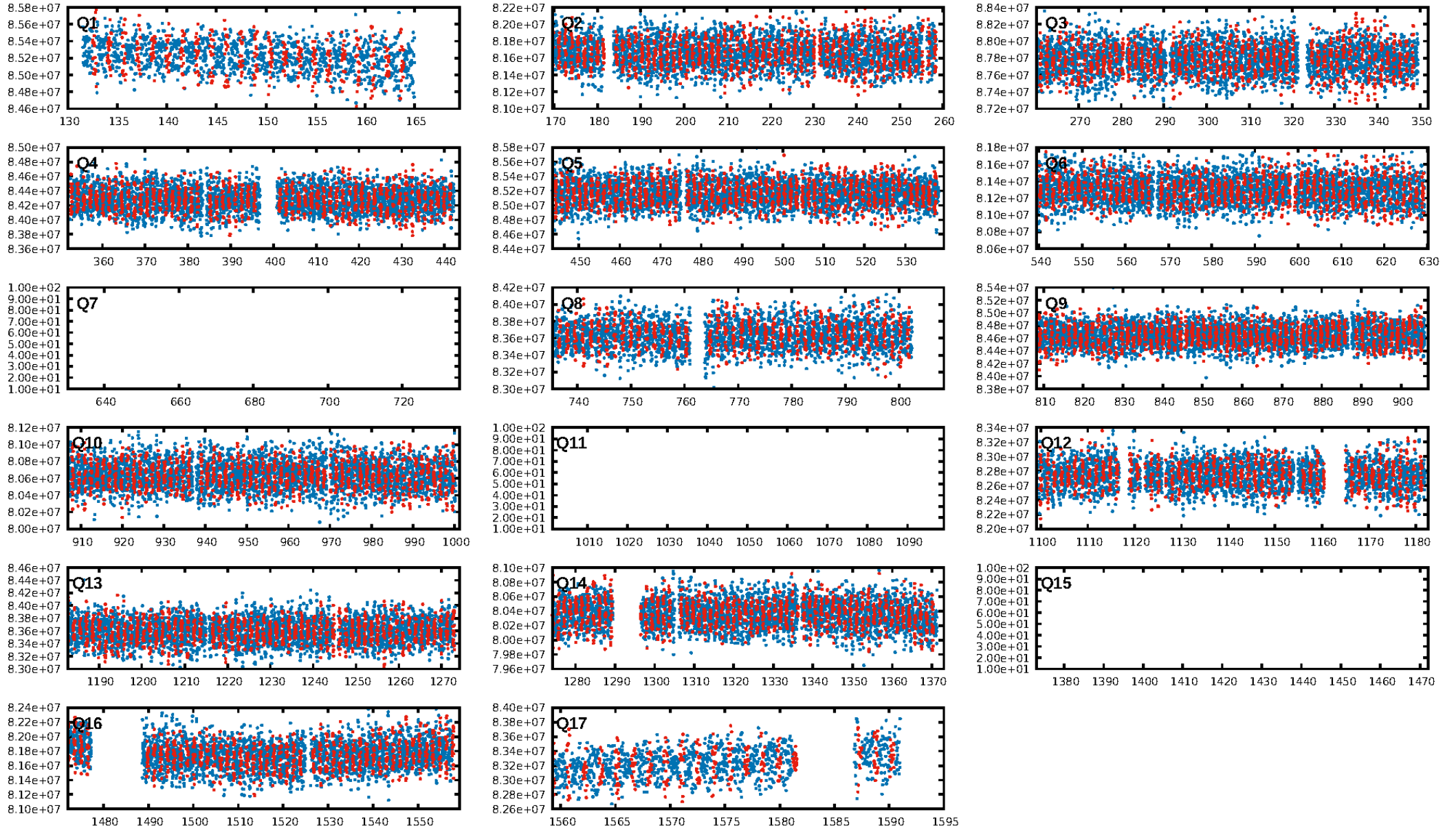
## DV Diagnostic Results:

ShortPeriod-sig: 99.4% [2.77σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 2.97e-23  
RollingBand-fgt: 1.00 [685/685]  
GhostDiagnostic-chr: 1.963  
Centroid-sig: 81.3%  
Centroid-so: 0.149 arcsec [0.35σ]  
OotOffset-rm: 0.067 arcsec [0.15σ]  
OotOffset-st: 3/1/3/4 [11]  
KicOffset-rm: 0.064 arcsec [0.16σ]  
KicOffset-st: 3/1/3/4 [11]  
DiffImageQuality-fgm: 1.00 [11/11]  
DiffImageOverlap-fno: 0.00 [0/14]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 19:17:43 Z

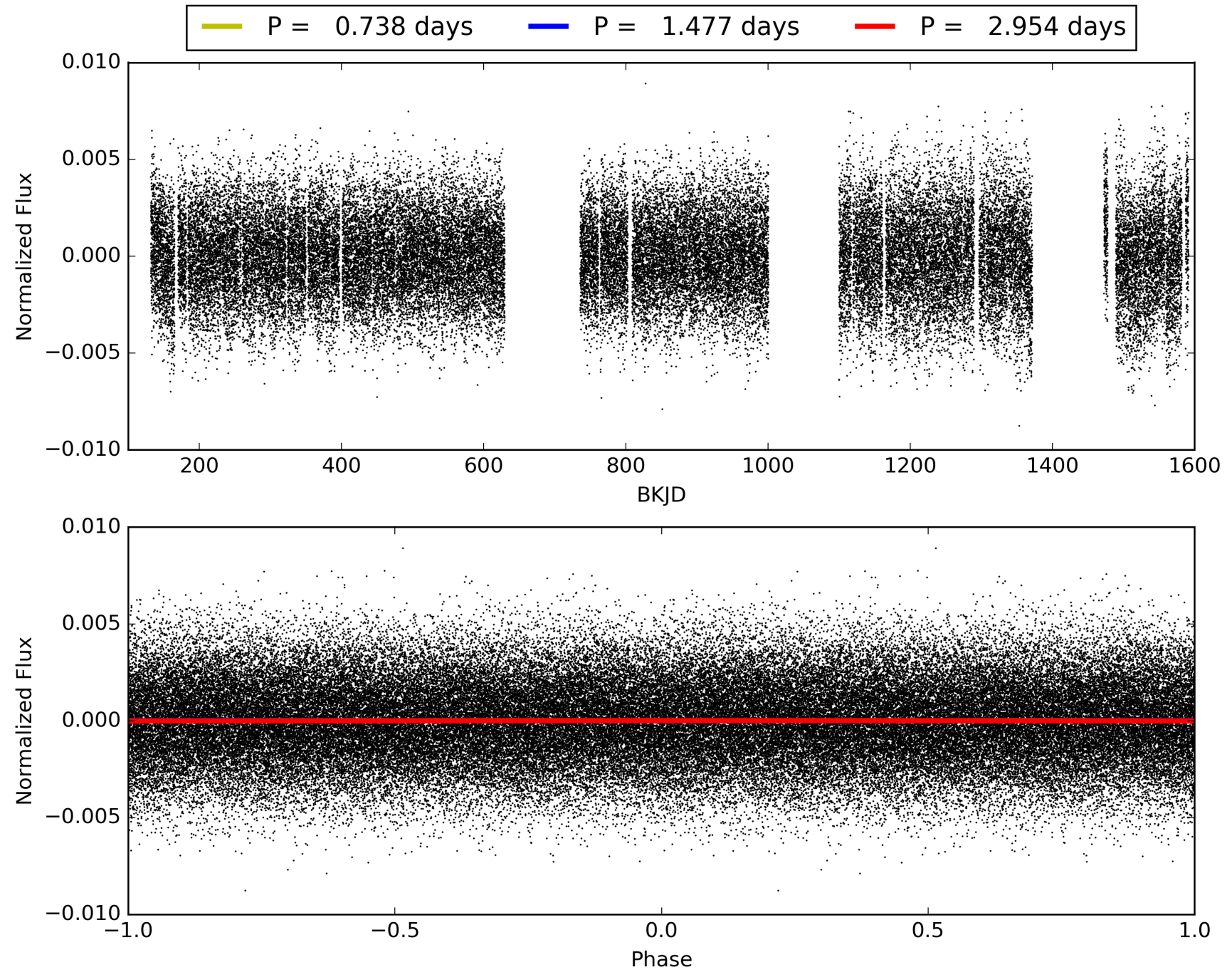
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 010489783-01, PDC Light Curves



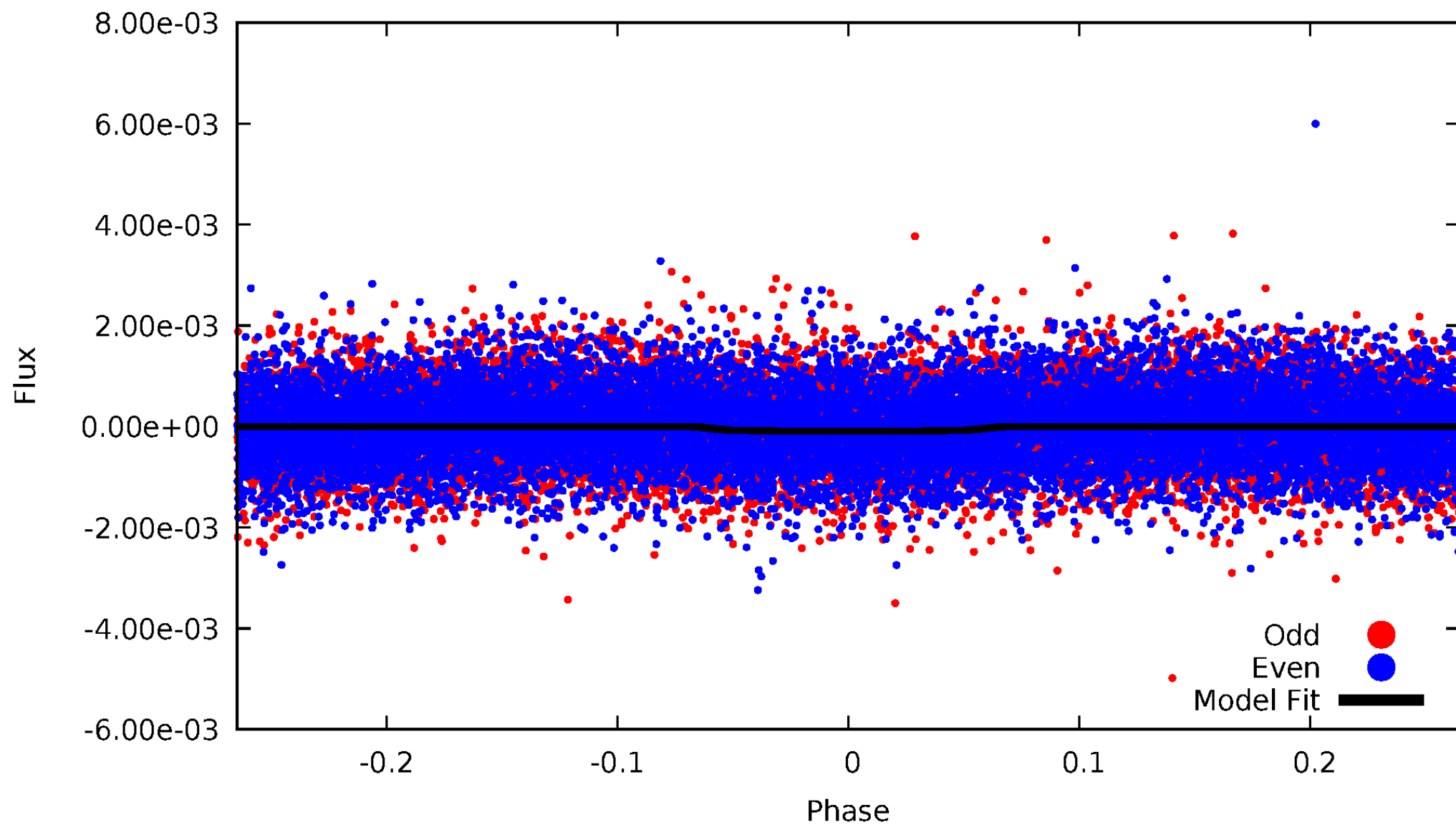


TCE 010489783-01



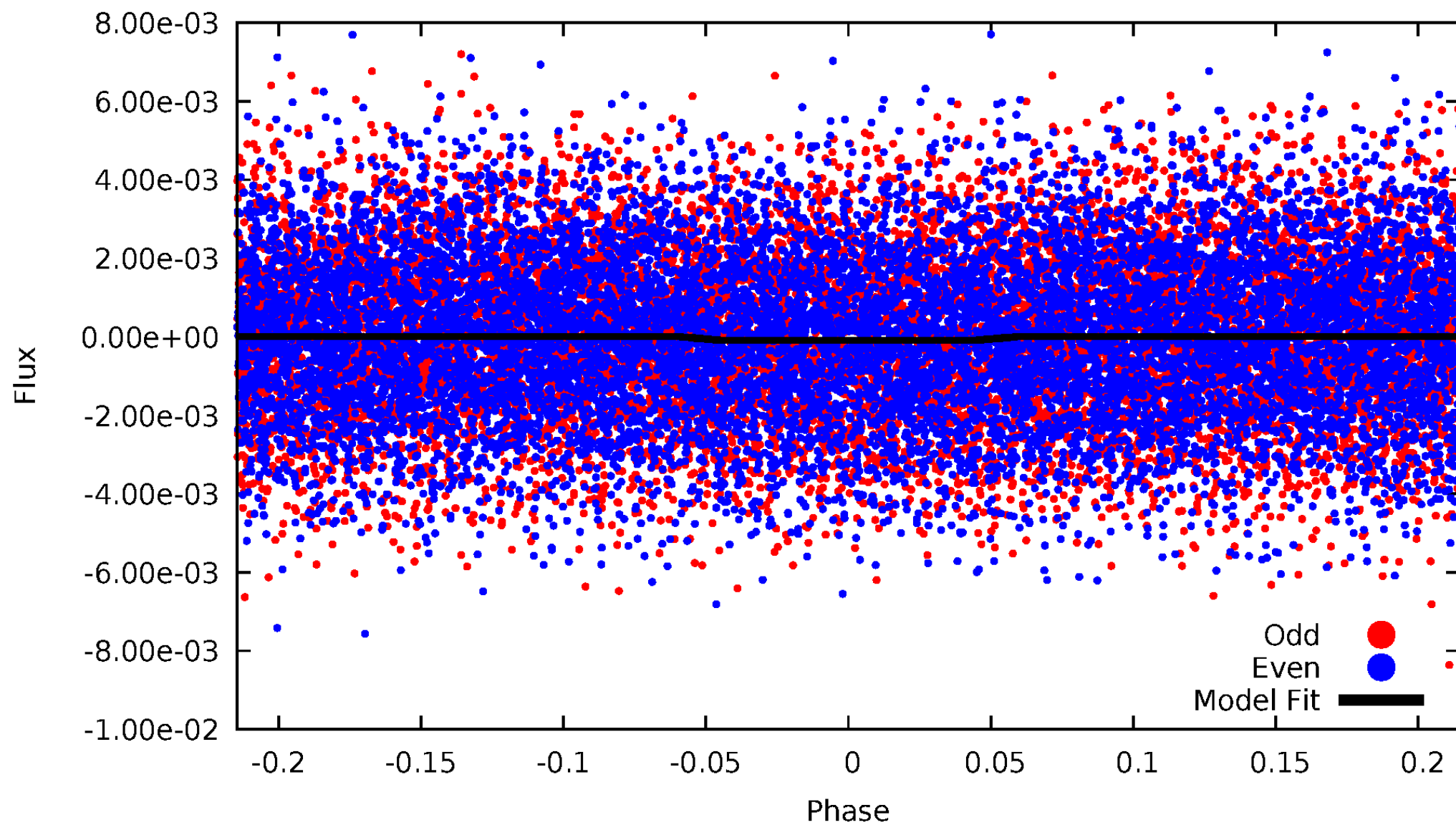
# DV Odd/Even

TCE 010489783-01



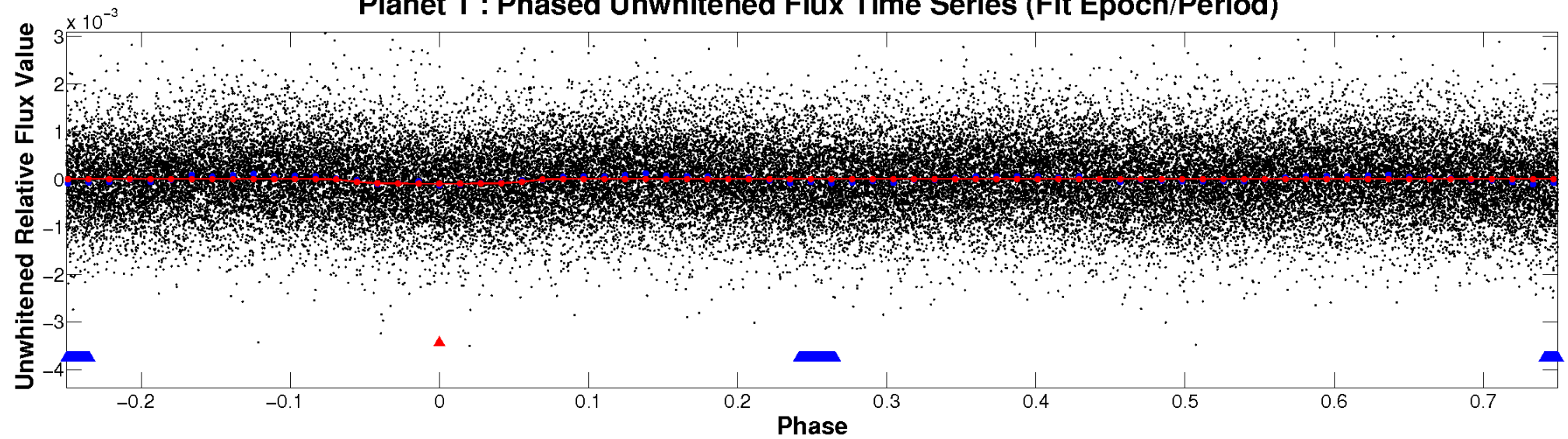
# ALT Odd/Even

TCE 010489783-01

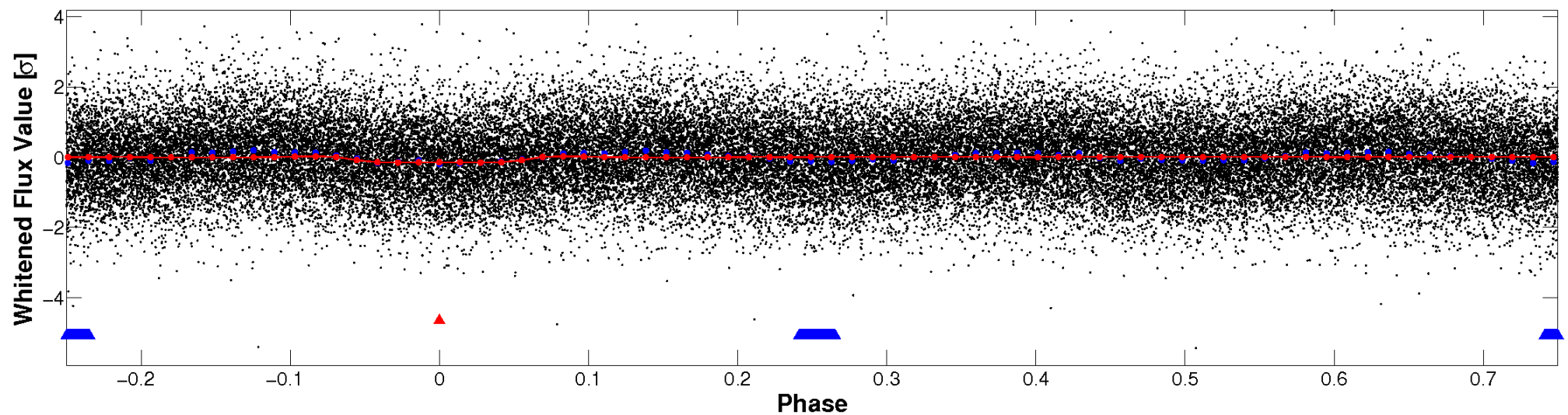


# Non-Whitened Vs. Whitened Light Curve

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



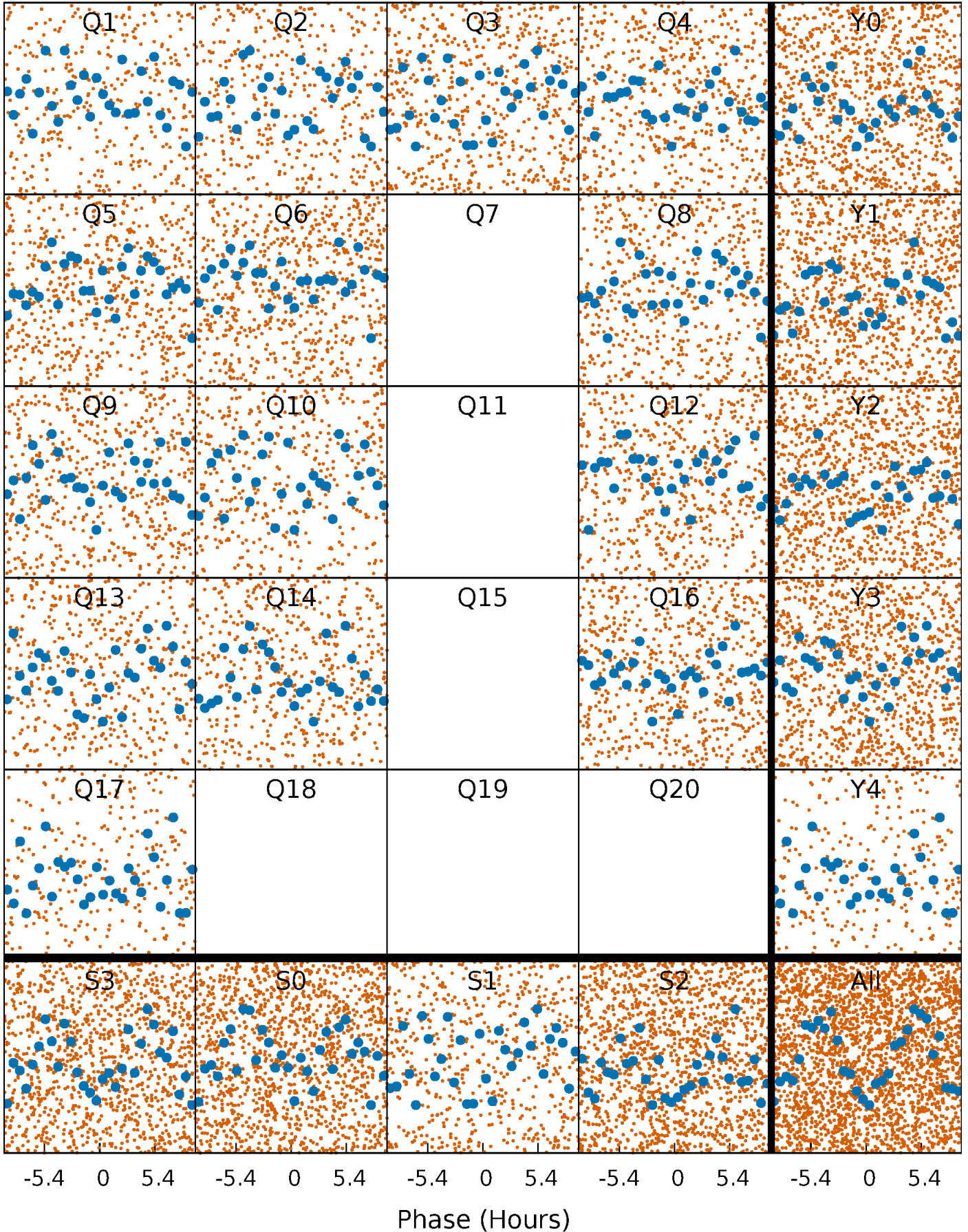
**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**





# PDC Quarter-Phased Transit Curves

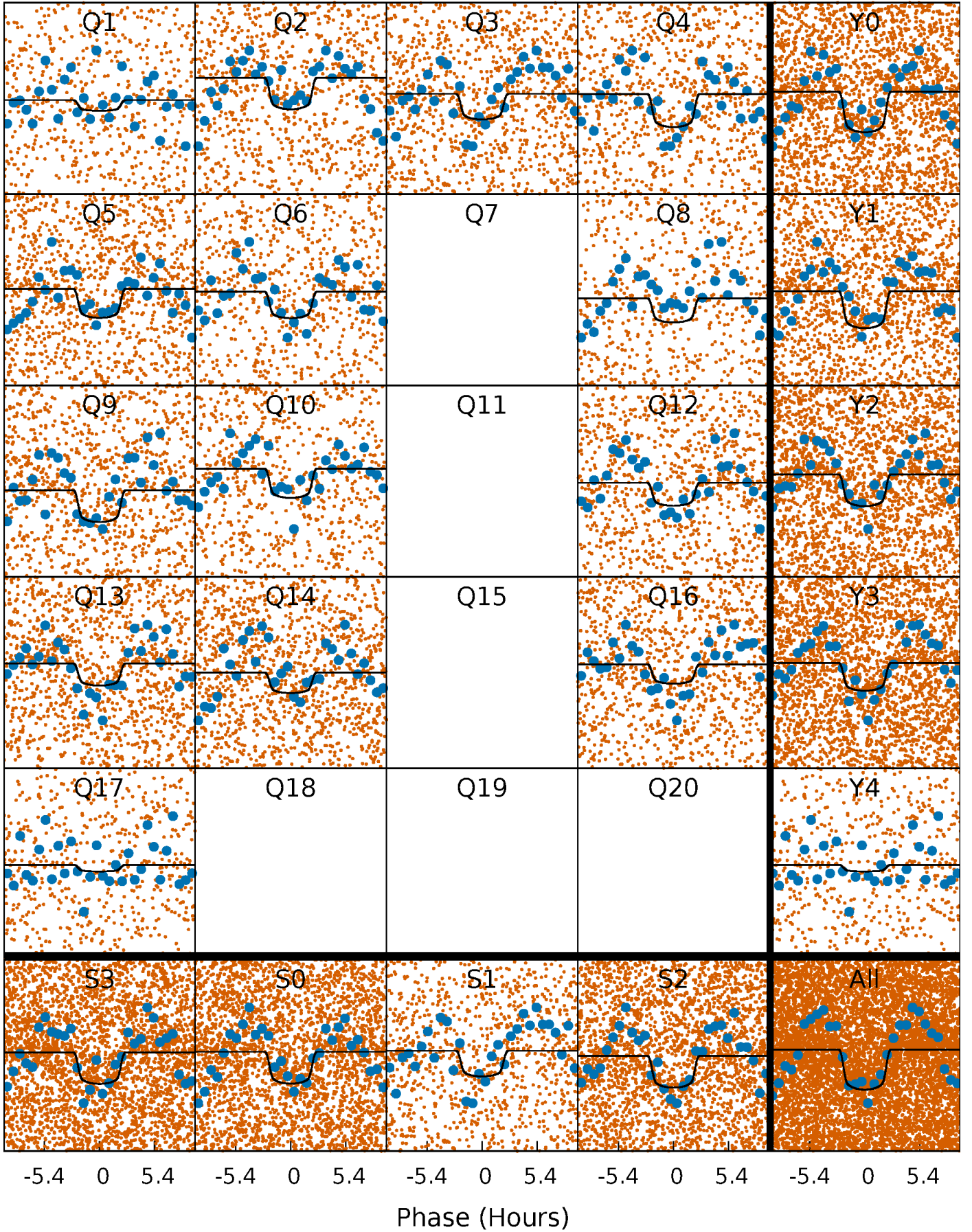
TCE 010489783-01 P= 1.476761 Days  $T_0=132.702228$  (BKJD)





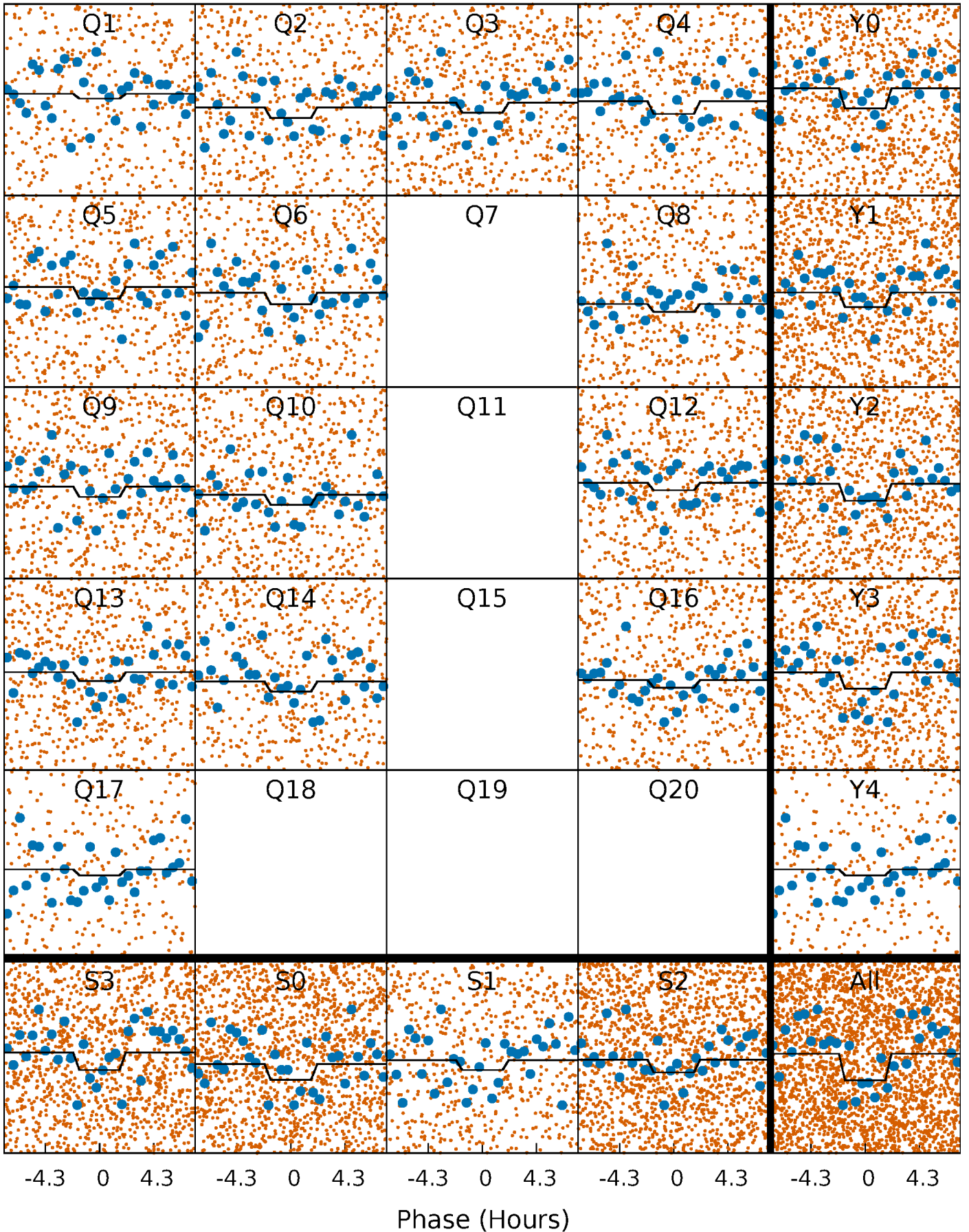
# DV Quarter-Phased Transit Curves

TCE 010489783-01 P= 1.476761 Days  $T_0=132.702228$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

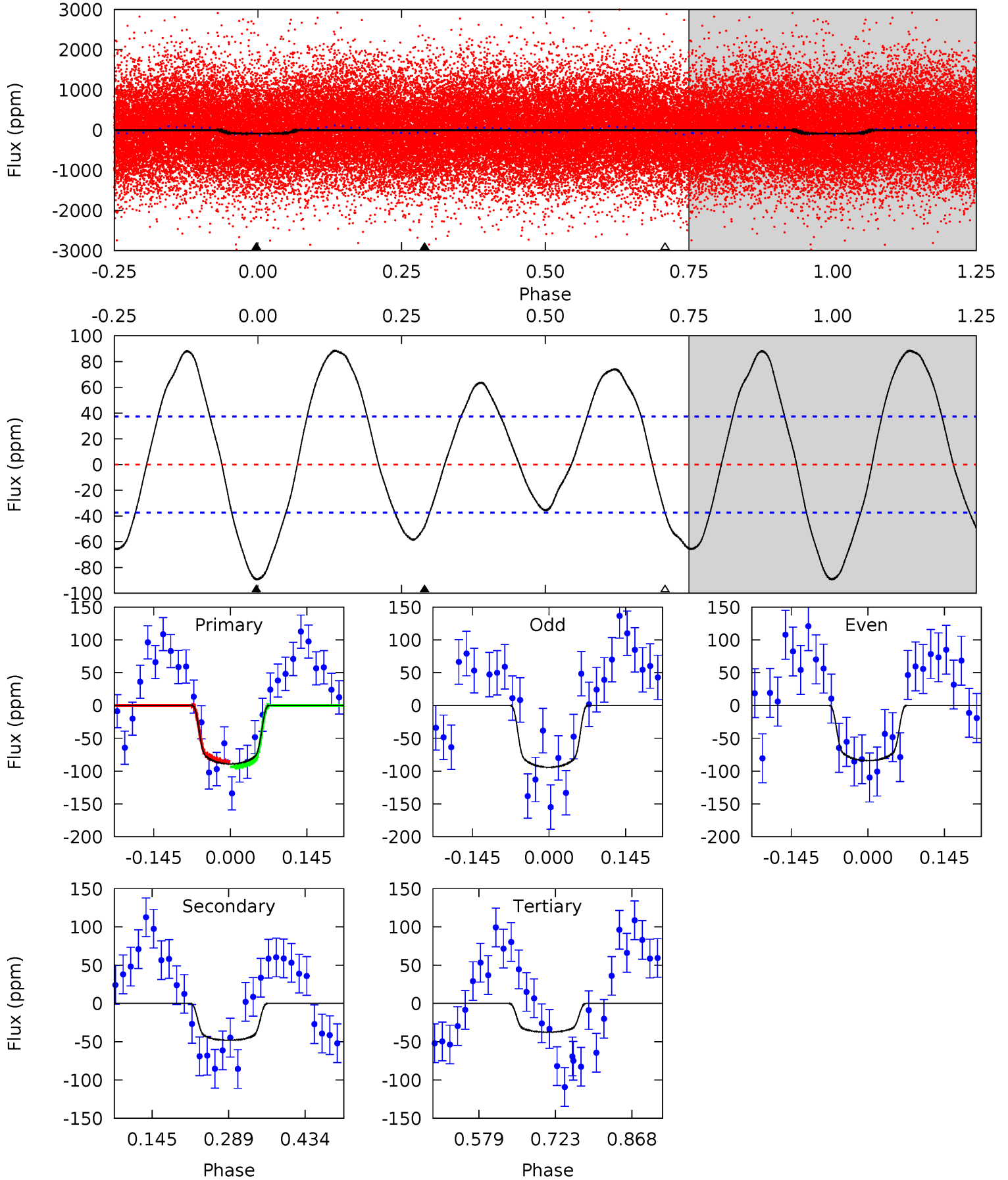
TCE 010489783-01 P= 1.476787 Days  $T_0=132.693065$  (BKJD)



# DV Model-Shift Uniqueness Test

010489783-01, P = 1.476761 Days, E = 131.225467 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
10.7	5.79	4.51	0	4.49	1.46	5.31	6.19	10.7	1.28	5.79	0.61	1.24	0.50	0.48

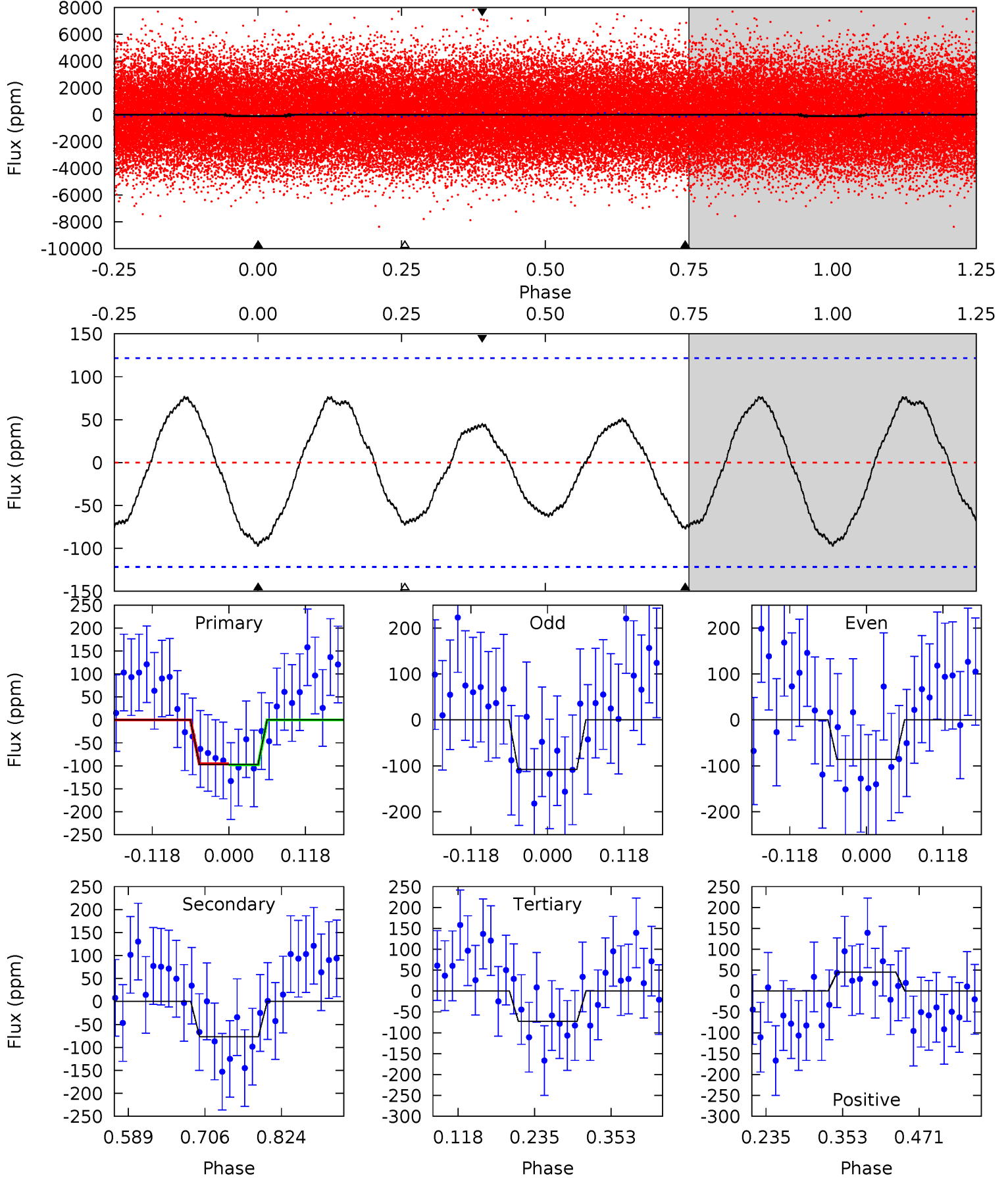




# Alt Model-Shift Uniqueness Test

010489783-01, P = 1.476787 Days, E = 131.216278 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
3.61	2.87	2.70	1.68	4.53	1.56	1.70	0.90	1.93	0.16	1.19	0.41	1.00	0.44	0.04





### Stellar Parameters For KIC 010489783

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7861^{+70}_{-94}$	$3.684^{+0.262}_{-0.105}$	$0.070^{+0.150}_{-0.200}$	$3.487^{+0.617}_{-1.057}$	$2.141^{+0.266}_{-0.266}$	$0.071^{+0.119}_{-0.025}$
	+1%/-1%	+7%/-3%	+214%/-286%	+18%/-30%	+12%/-12%	+167%/-35%
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 010489783-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-48 \pm 8$	$3.93^{+1.10}_{-0.92}$	$4939^{+271}_{-371}$	$5864^{+957}_{-727}$	$1.814^{+1.391}_{-0.736}$
Alt.	$-77 \pm 27$	$3.35^{+1.08}_{-0.92}$	$4962^{+242}_{-410}$	$7401^{+1760}_{-1295}$	$3.927^{+3.983}_{-1.988}$

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

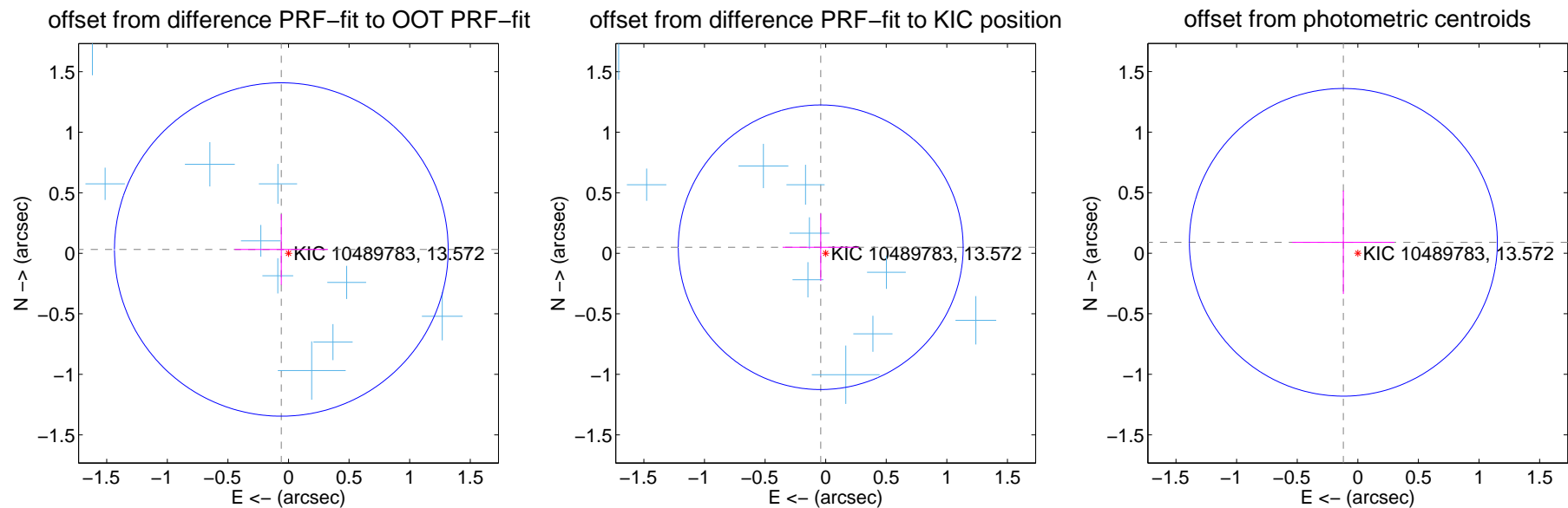
## DV Centroid Data

Supplemental centroid analysis for 010489783-01. Kepler magnitude: 13.57. Transit SNR 10.77

There are 11 quarters with good PRF difference image offsets

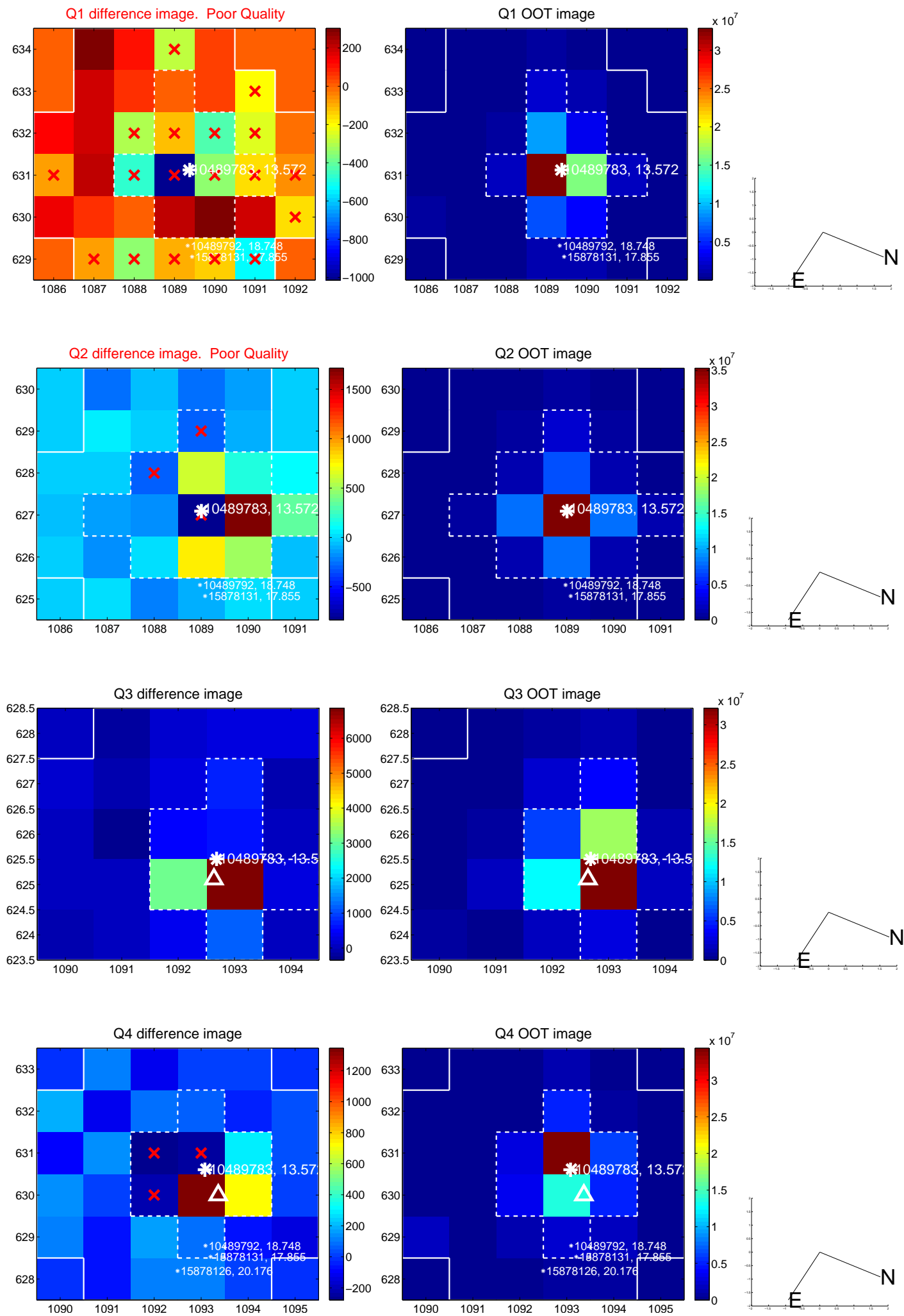
The direct PRF centroid is offset from the target star catalog position by about 0.09 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.067 \pm 0.459$	0.15	$0.059 \pm 0.385$	$0.031 \pm 0.291$
PRF-fit source offset from KIC position	$0.064 \pm 0.392$	0.16	$0.041 \pm 0.314$	$0.050 \pm 0.278$
photometric centroid source offset	$0.15 \pm 0.42$	0.35	$0.12 \pm 0.42$	$0.09 \pm 0.43$

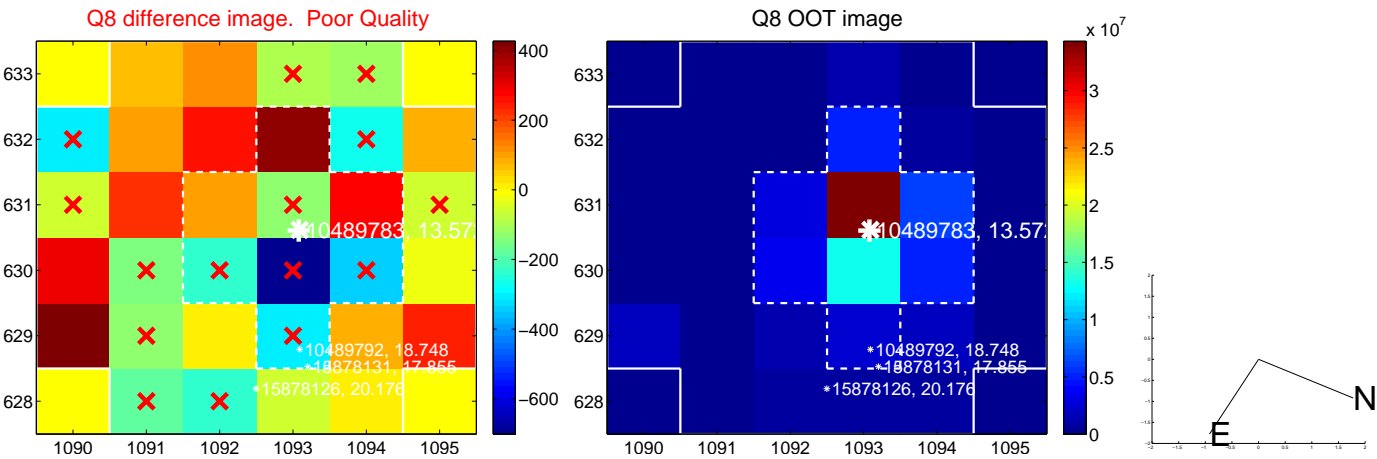
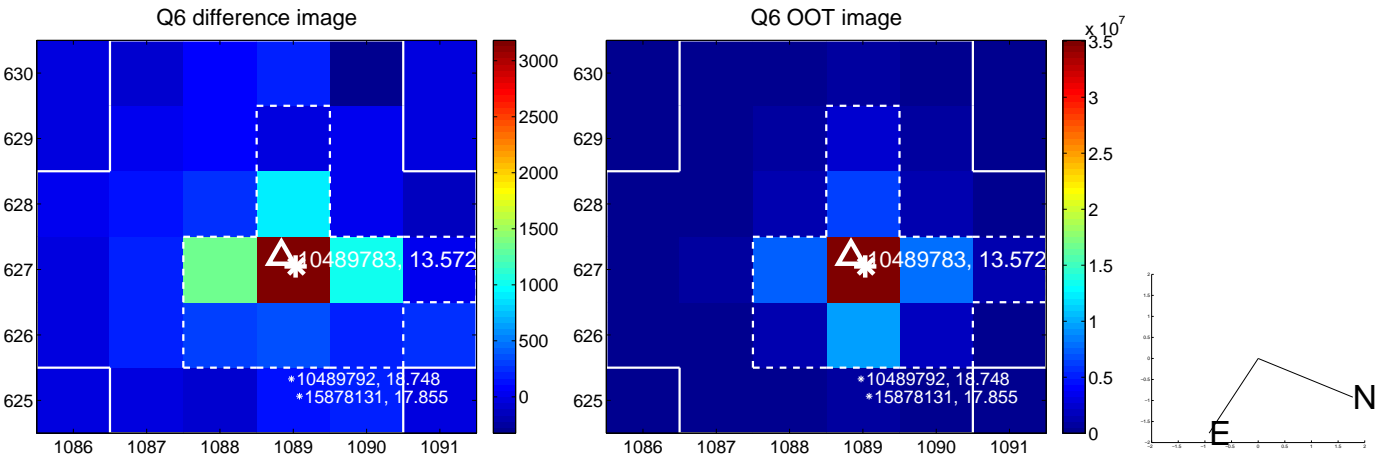
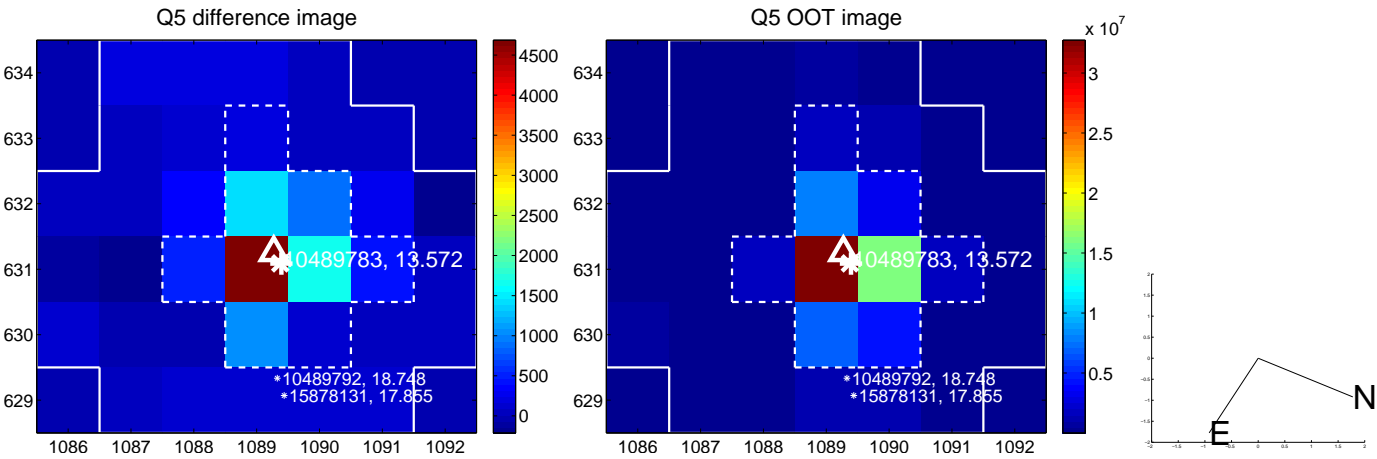


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

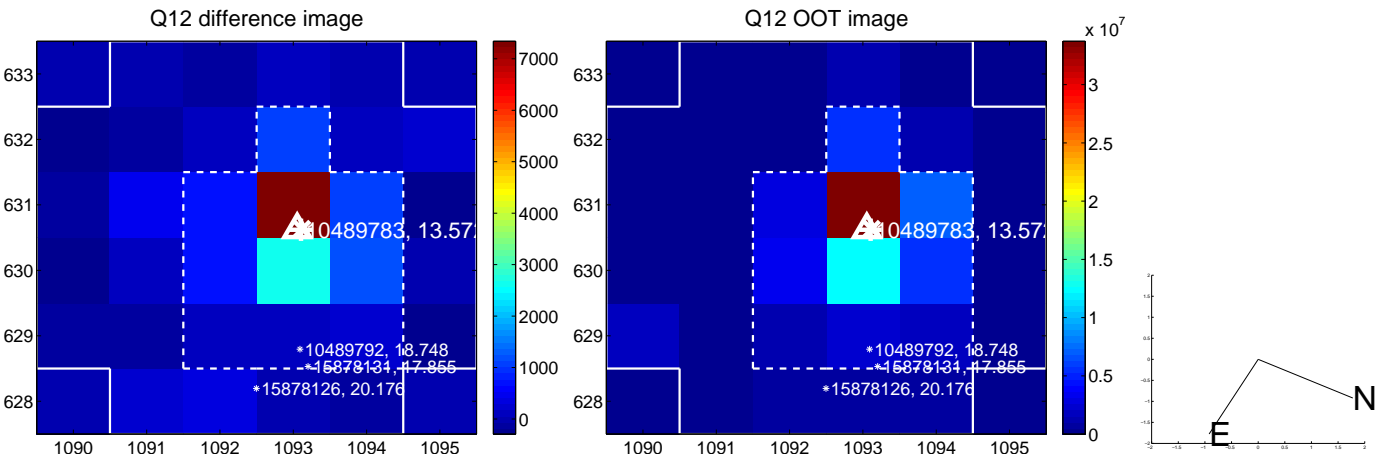
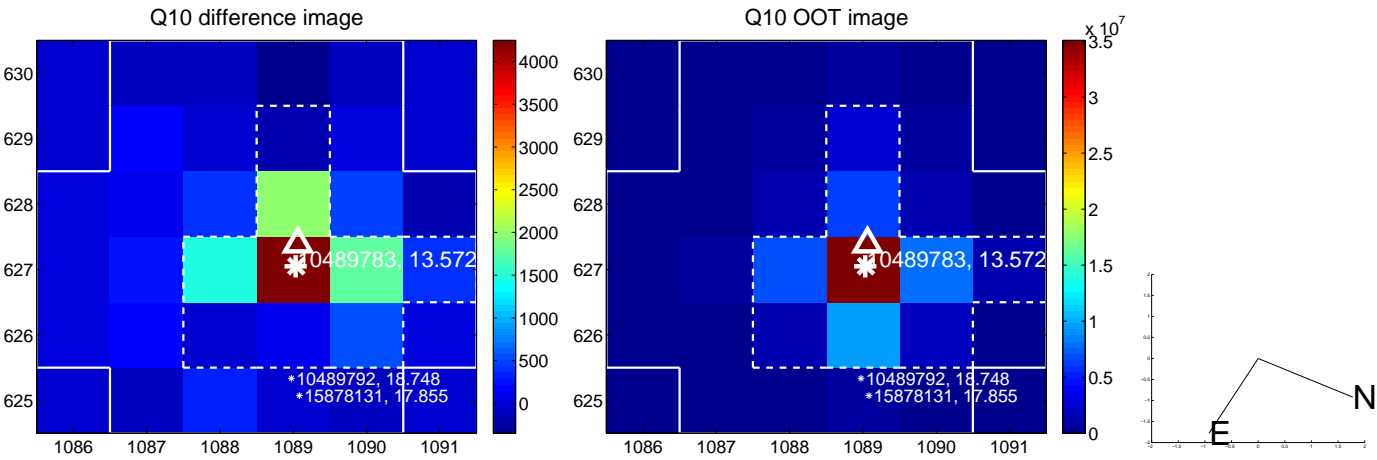
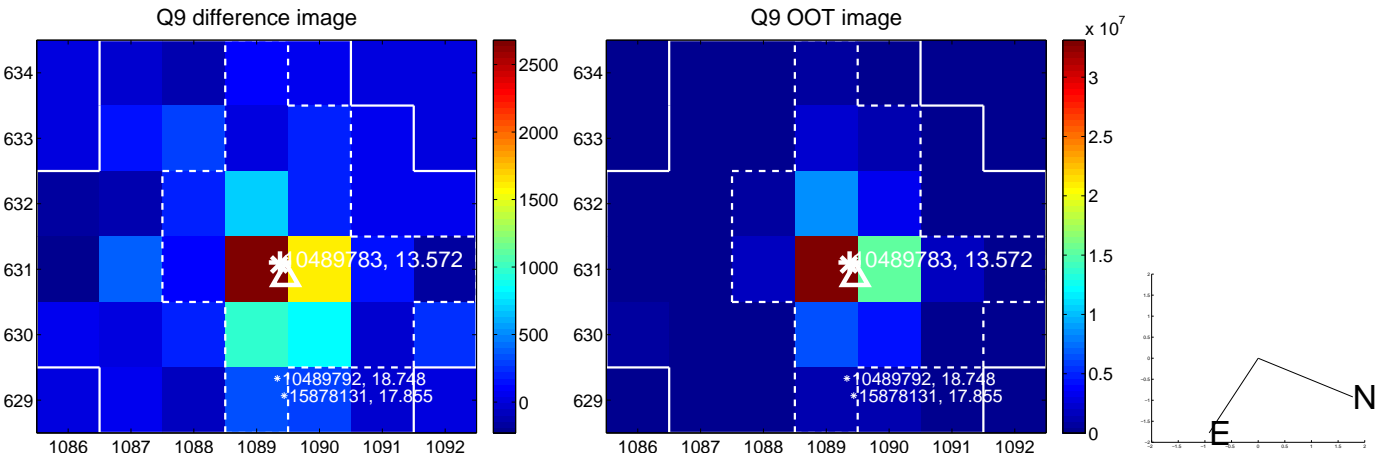


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.

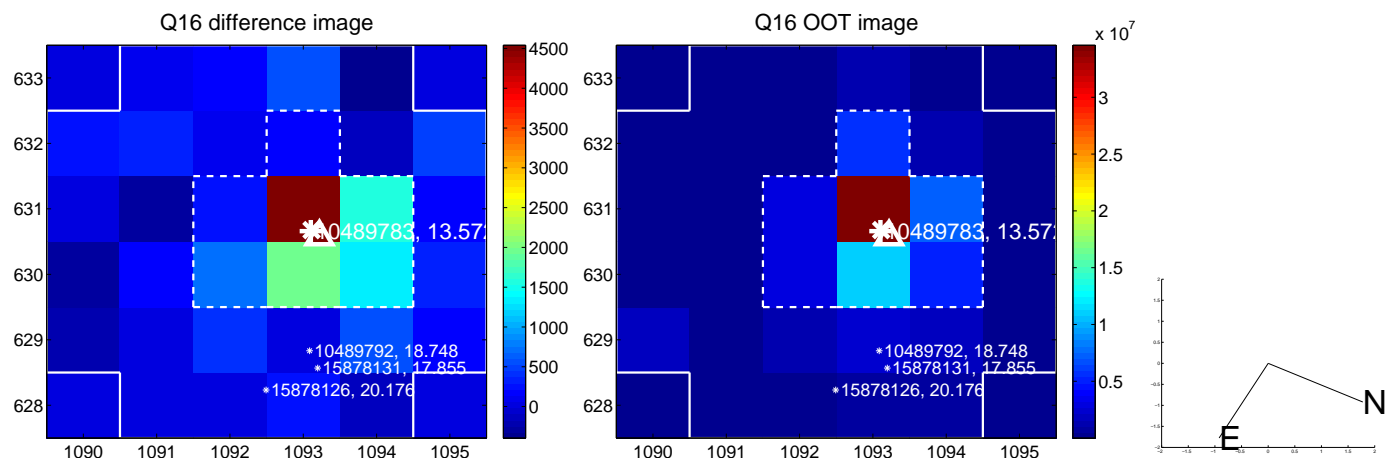
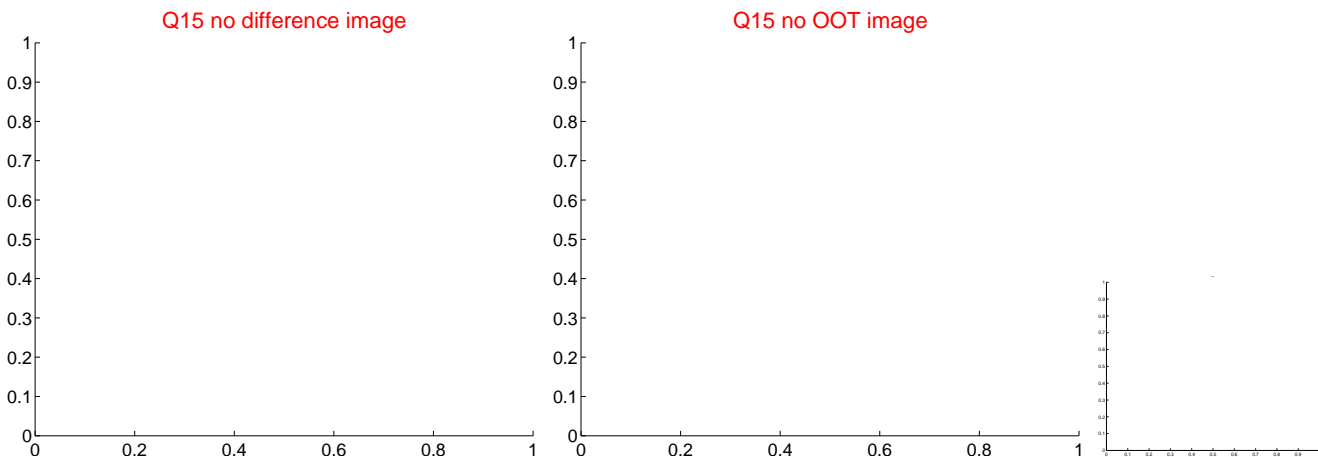
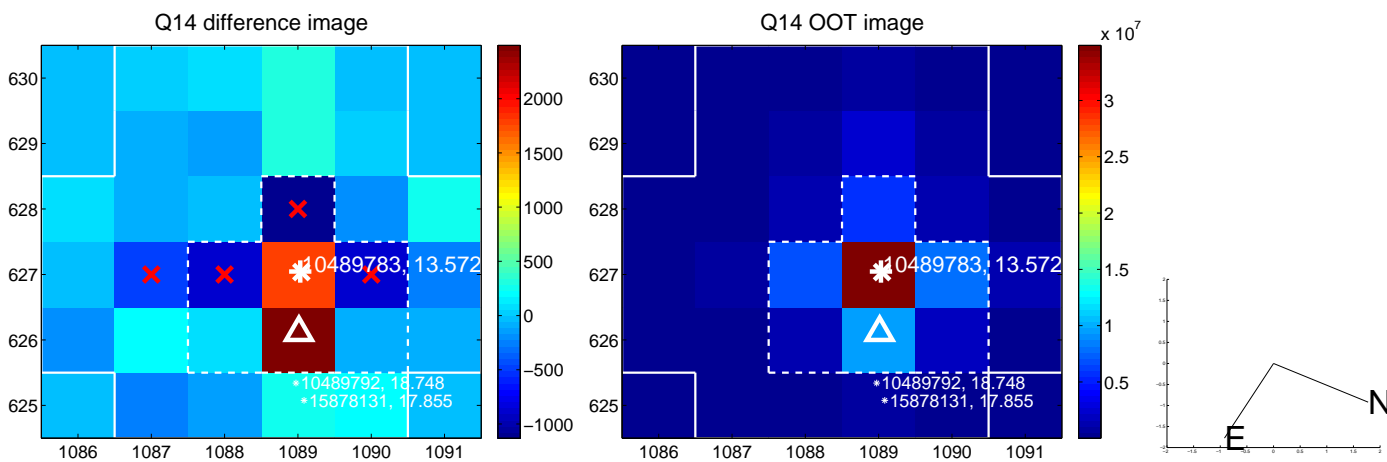
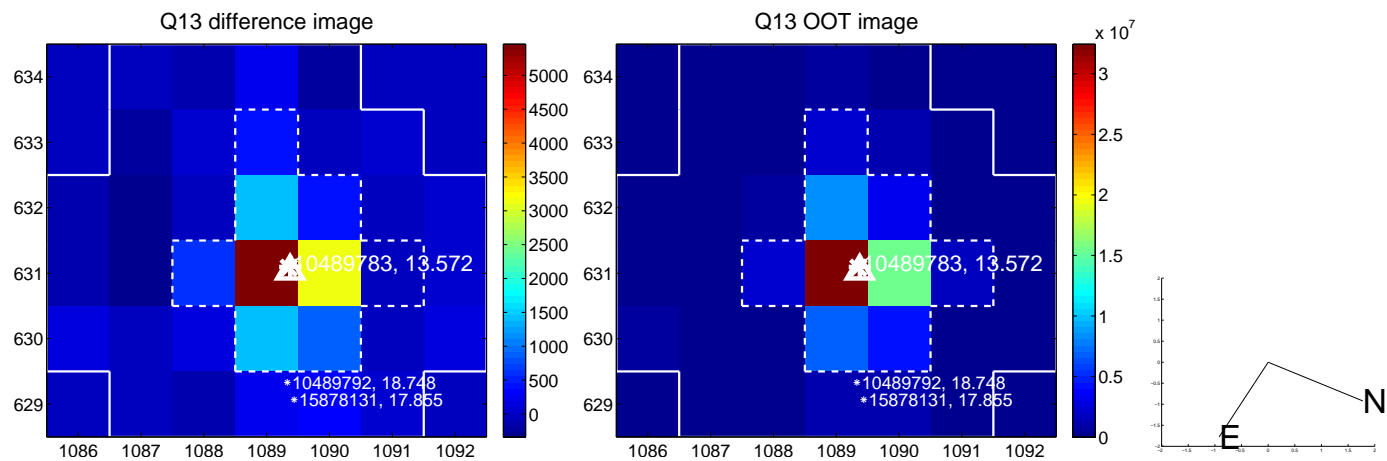




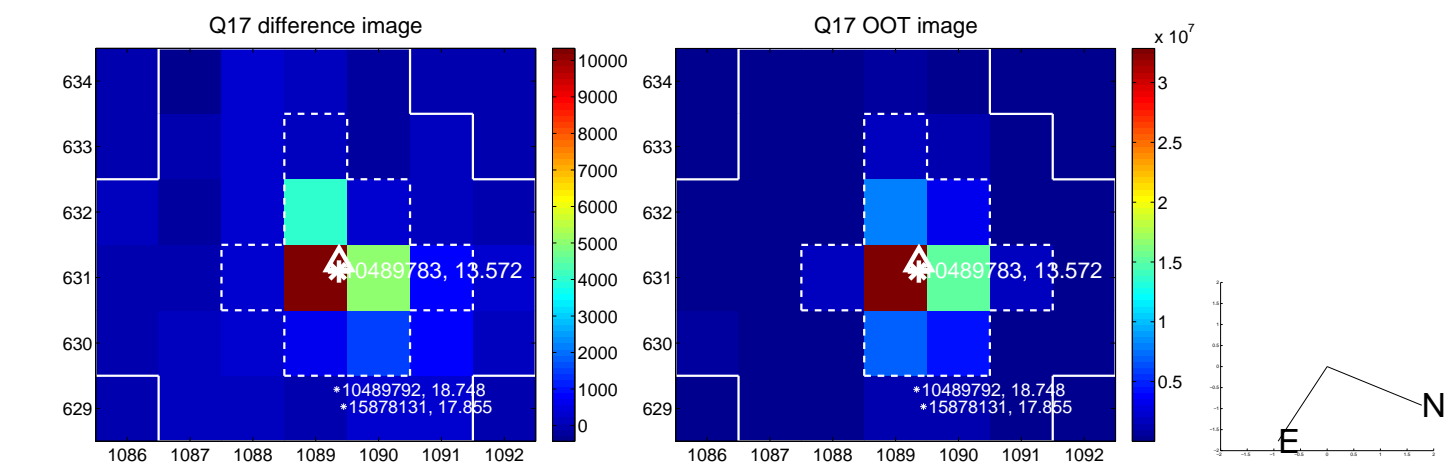
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



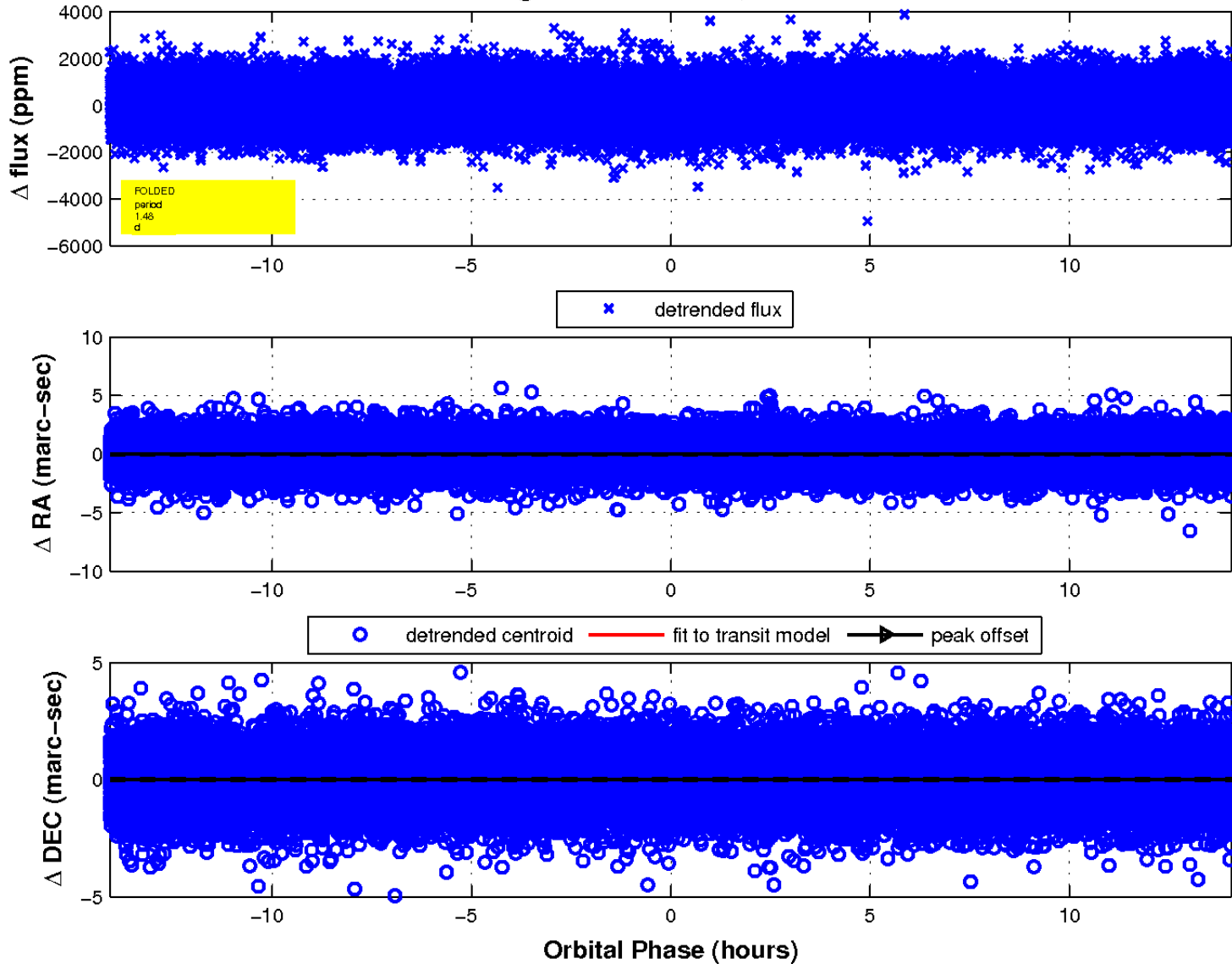
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

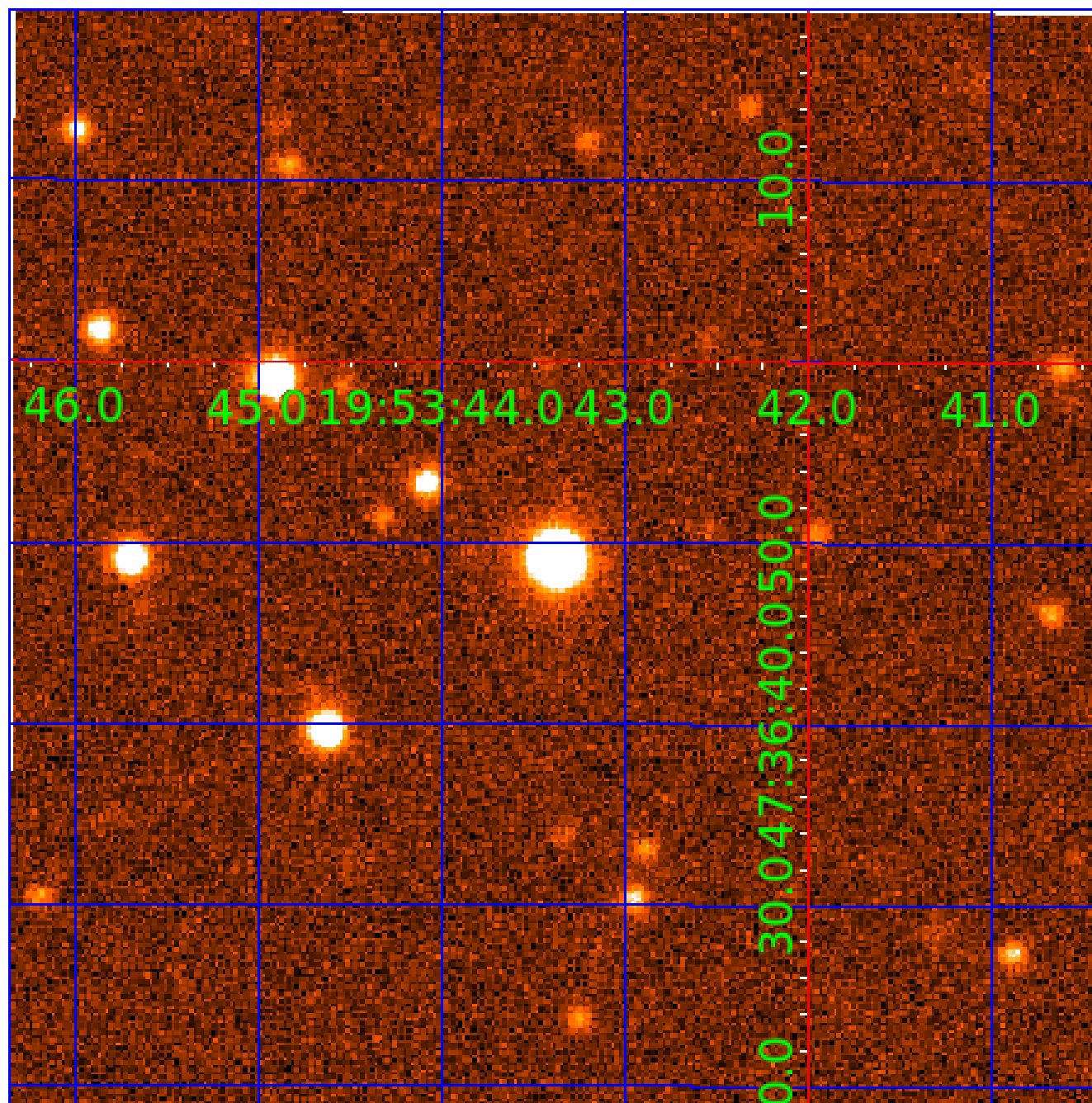


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination





# KIC 010489783

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010489783-01	OBS	No	1.476762	132.702228	95.3	4.691	10.0	10.8	3.49	7861	4.14	38847.20
010489783-02	OBS	No	0.738399	131.581820	58.2	4.340	7.4	8.8	3.49	7861	3.11	97885.64

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010489783-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
010489783-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—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.

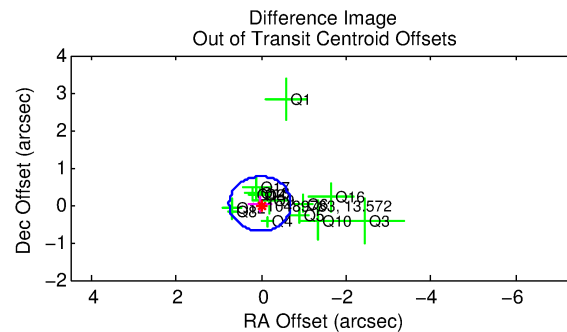
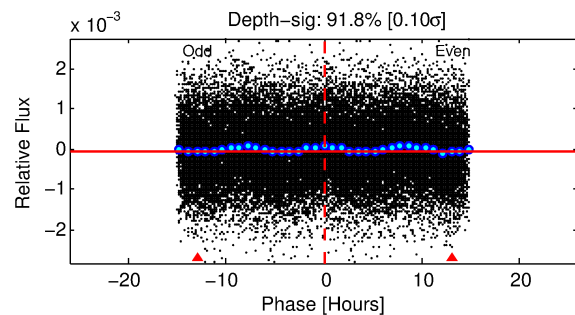
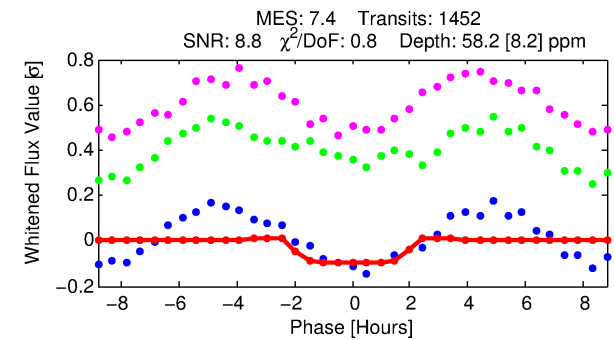
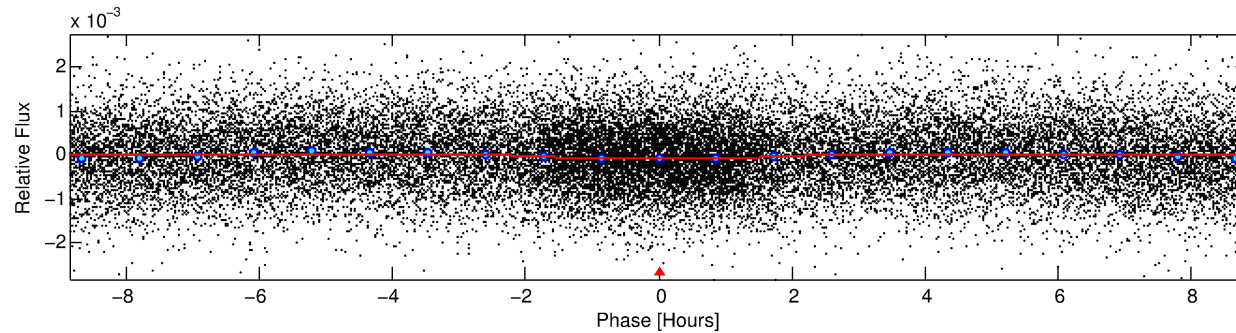
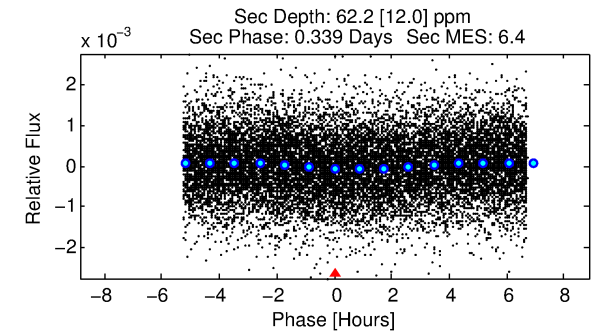
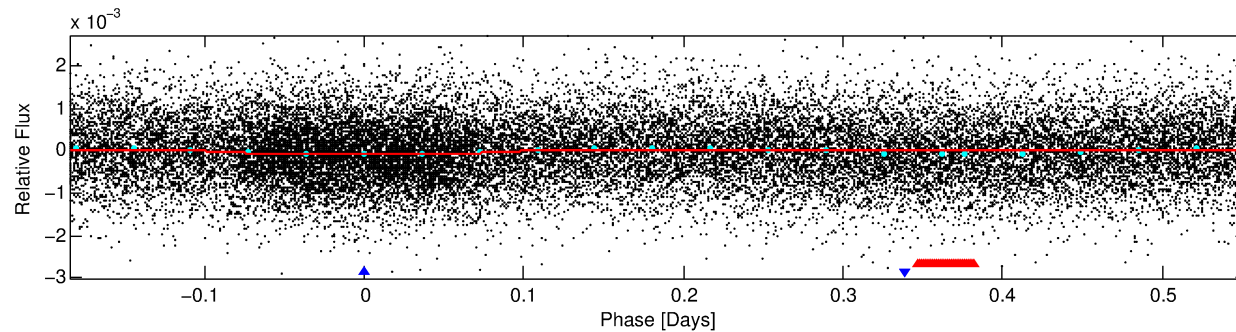
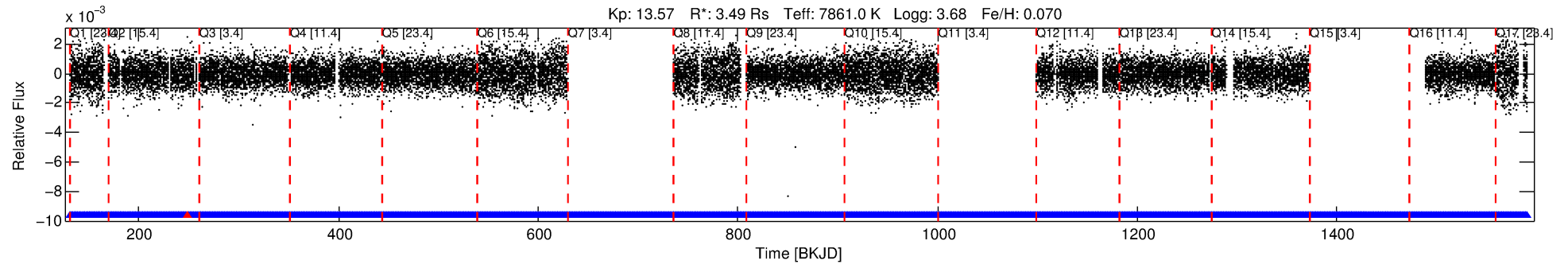
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 010489783-02

No Significant Match Found

# DV One-Page Summary

KIC: 10489783 Candidate: 2 of 2 Period: 0.738 d



## DV Fit Results:

Period = 0.73840 [0.00001] d  
Epoch = 131.5818 [0.0069] BKJD  
Rp/R\* = 0.0082 [0.0066]  
a/R\* = 1.11 [1.00]  
b = 0.91 [1.00]  
Seff = 97885.64 [44306.46]  
Teff = 4510 [510] K  
Rp = 3.11 [2.67] Re  
a = 0.0206 [0.0059] AU  
Ag = 1.50 [2.51] [0.20σ]  
Teffp = 7718 [3116] K [1.02σ]

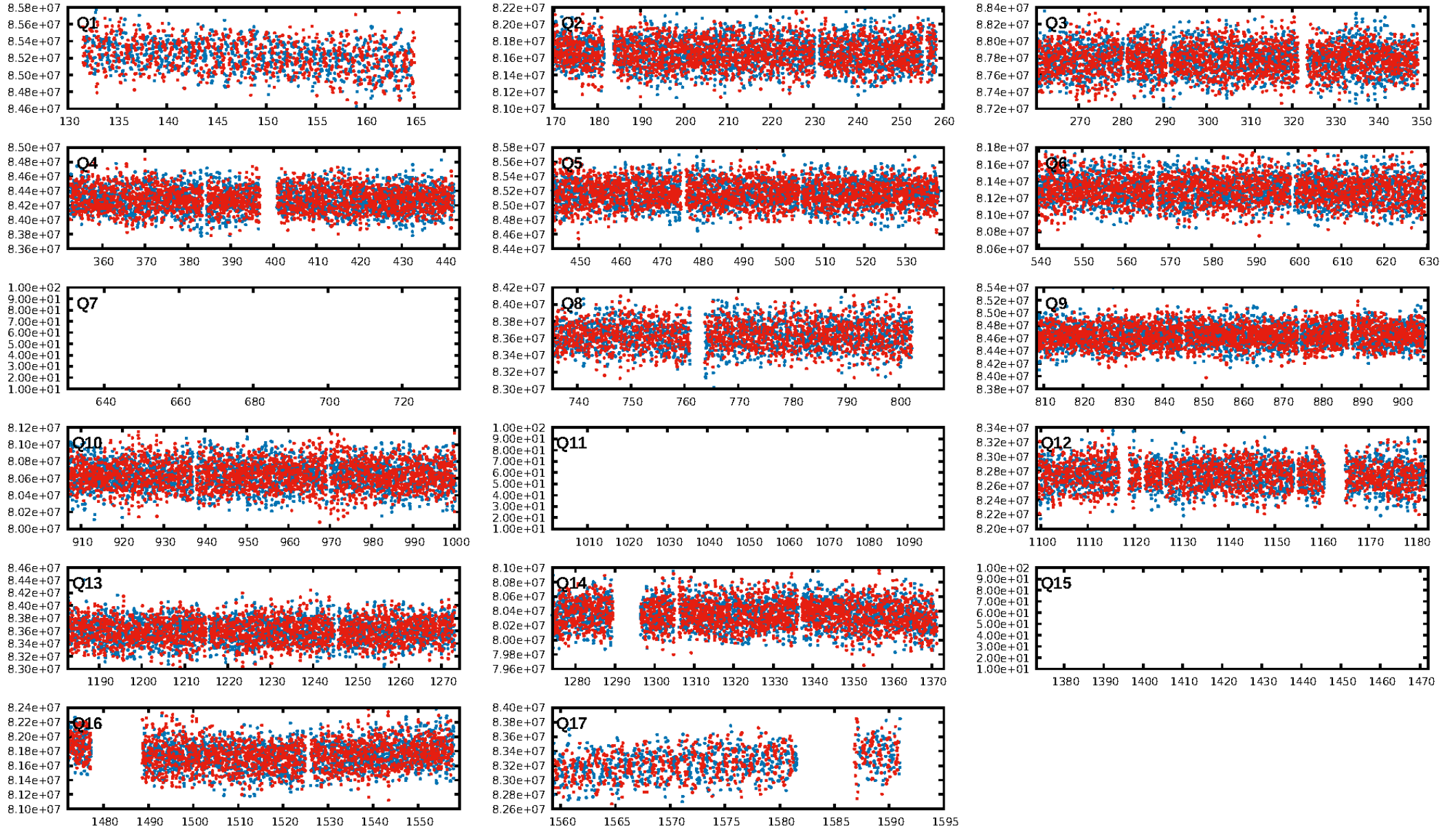
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 99.4% [2.77σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
**Bootstrap-pfa: 3.50e-05**  
RollingBand-fgt: 1.00 [1369/1370]  
GhostDiagnostic-chr: 2.04  
Centroid-sig: 78.8%  
Centroid-so: 0.163 arcsec [0.33σ]  
OotOffset-rm: 0.043 arcsec [0.18σ]  
KicOffset-rm: 0.055 arcsec [0.23σ]  
OotOffset-st: 4/1/4/5 [14]  
KicOffset-st: 4/1/4/5 [14]  
DiffImageQuality-fgm: 1.00 [14/14]  
DiffImageOverlap-fno: 0.00 [0/14]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 19:17:55 Z

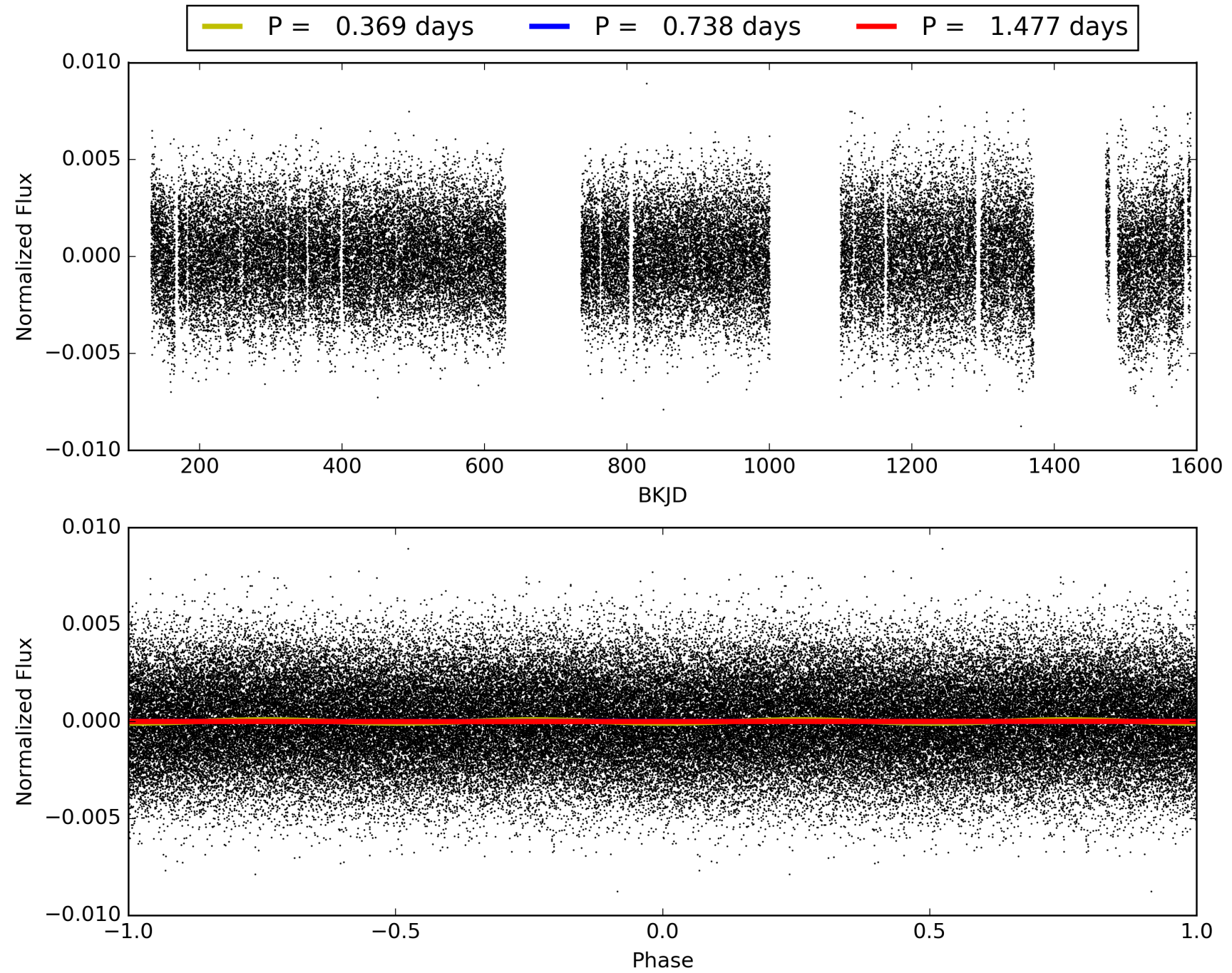
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 010489783-02, PDC Light Curves





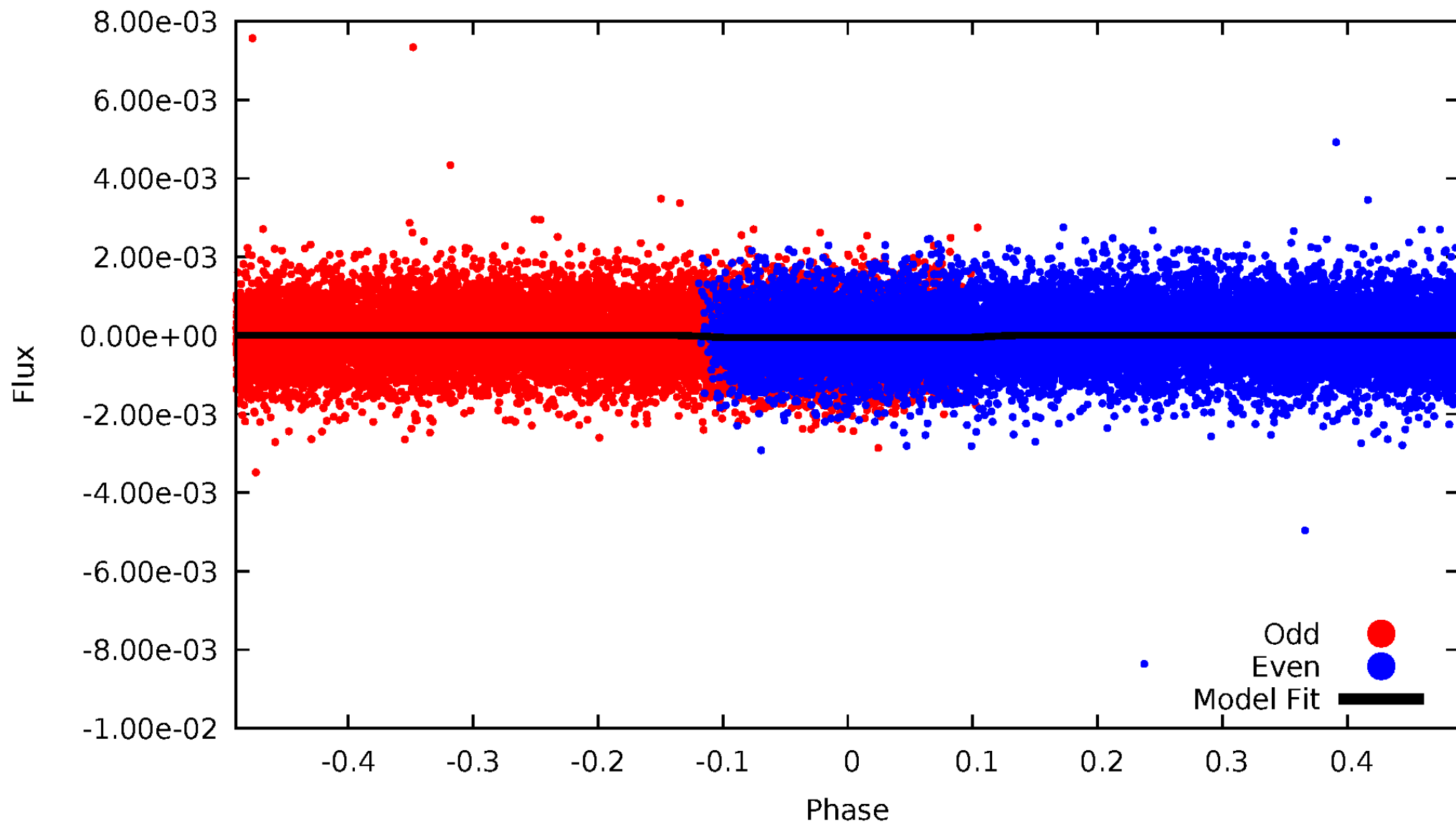
TCE 010489783-02





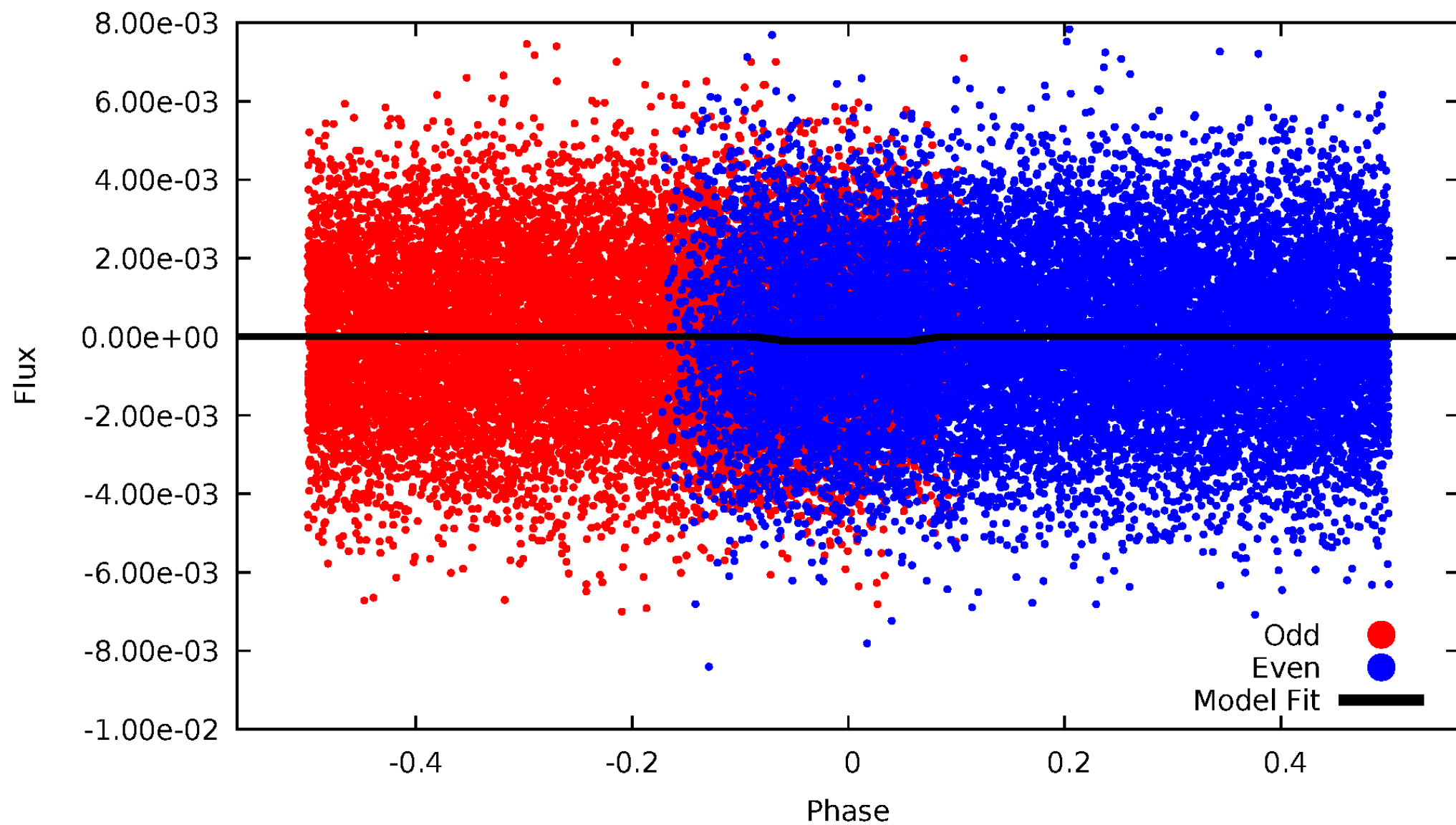
# DV Odd/Even

TCE 010489783-02



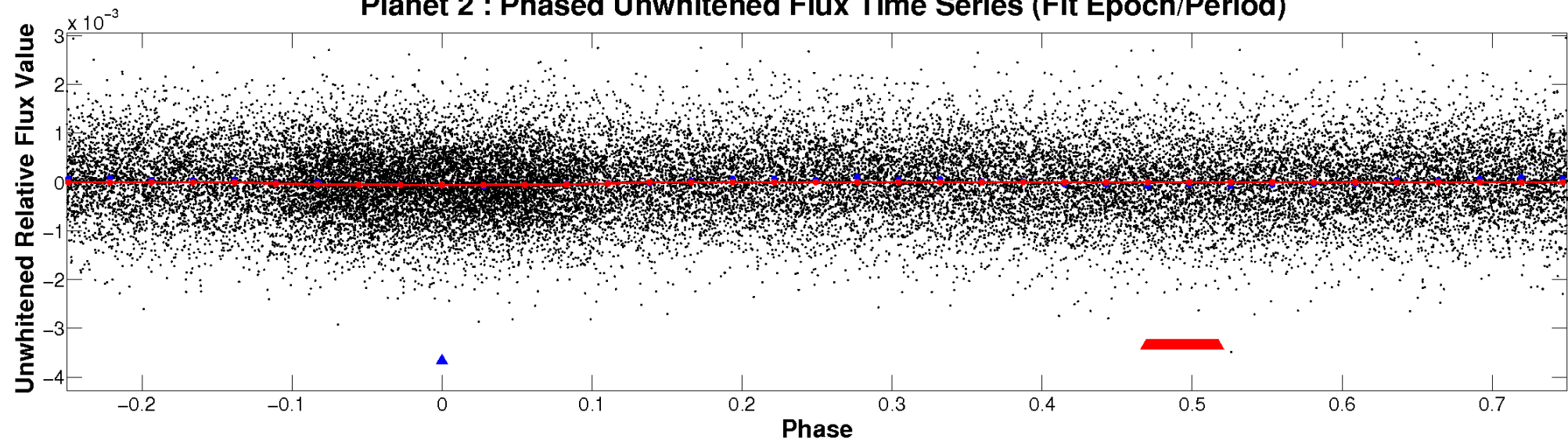
# ALT Odd/Even

TCE 010489783-02

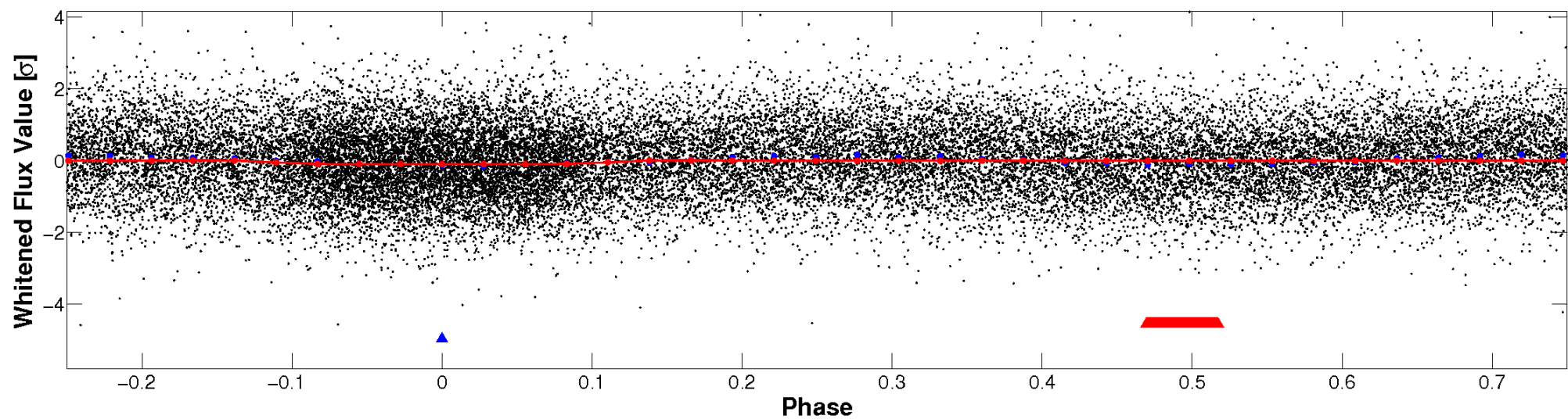


# Non-Whitened Vs. Whitened Light Curve

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

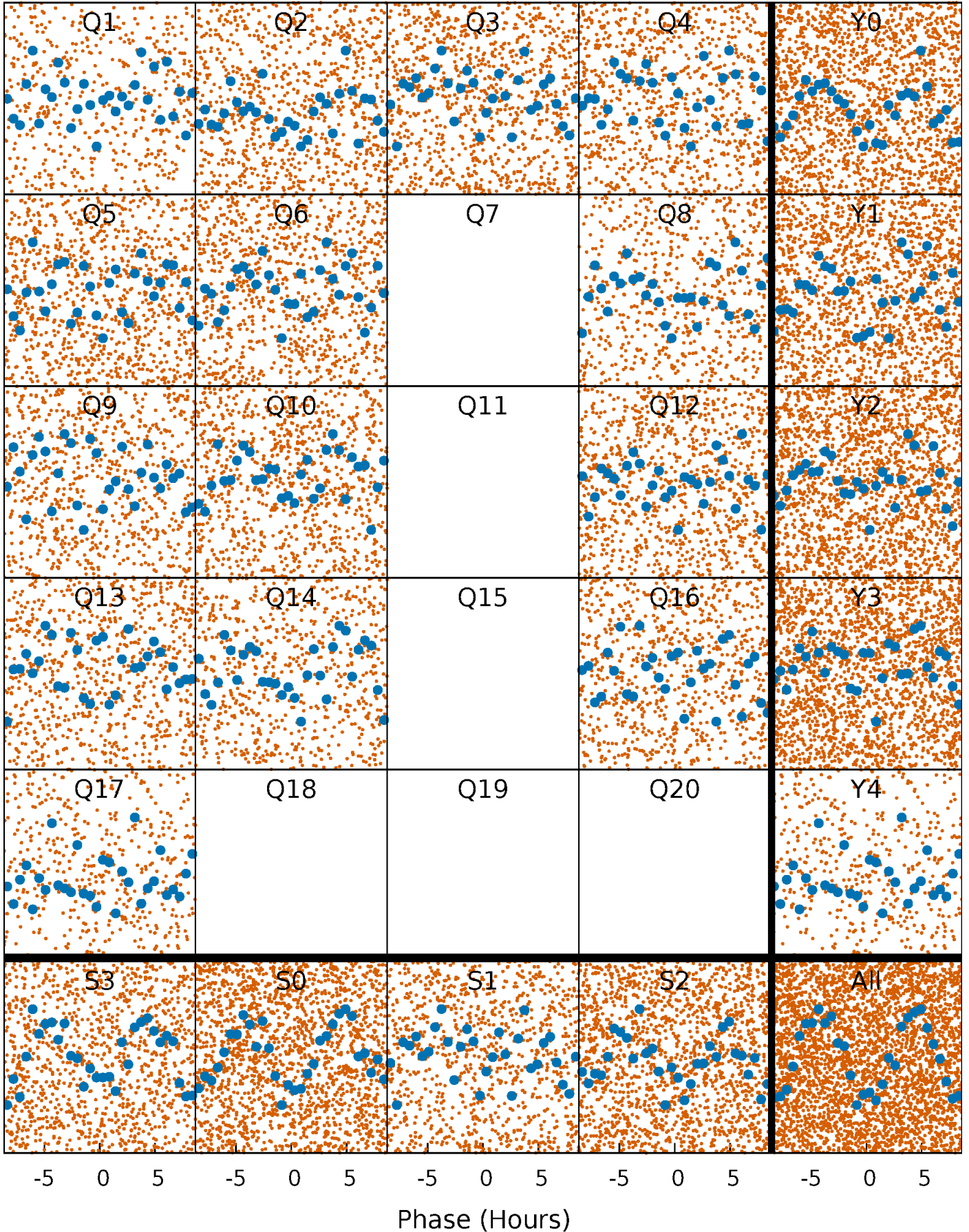


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

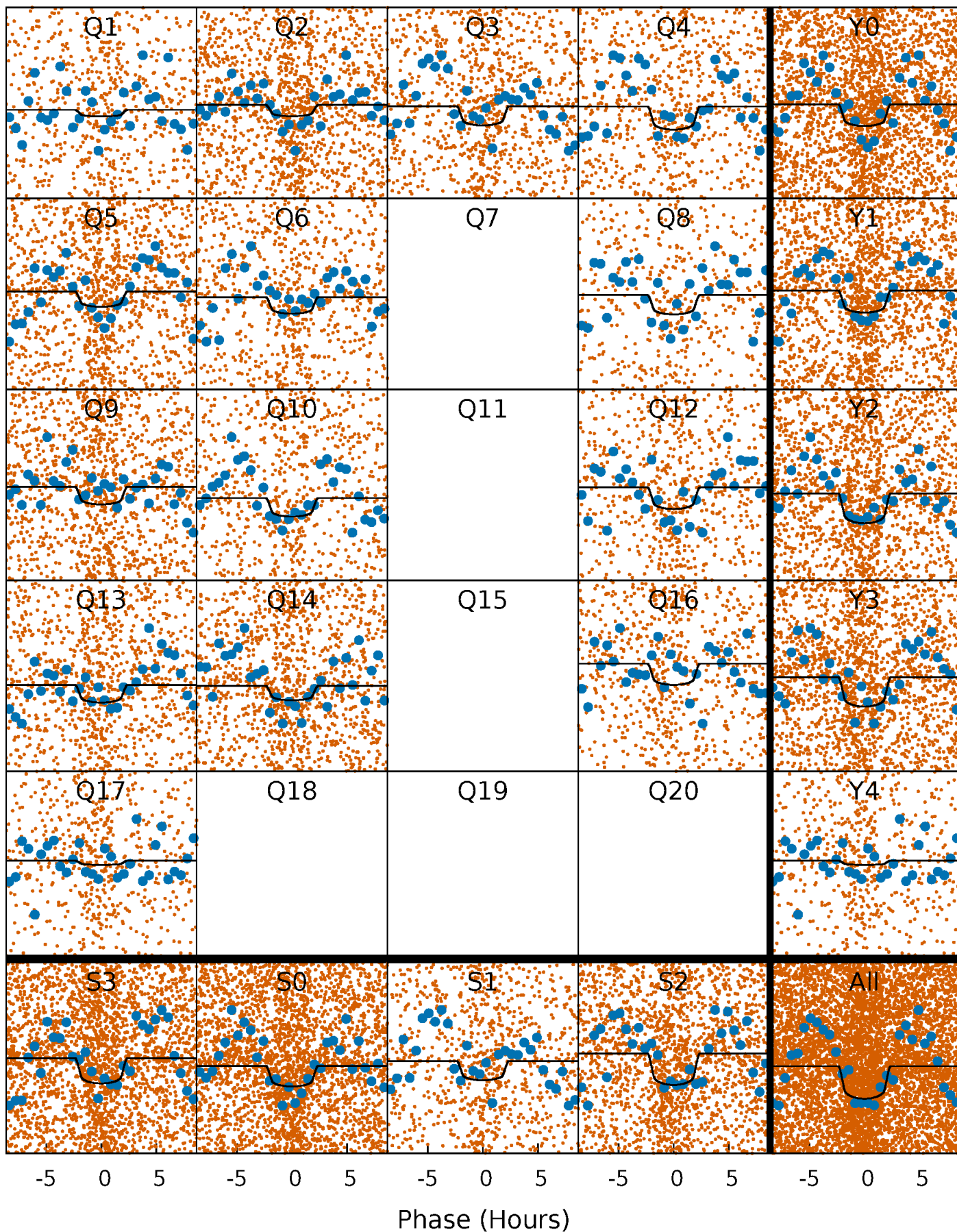
TCE 010489783-02   P= 0.738399 Days    $T_0=131.581820$  (BKJD)





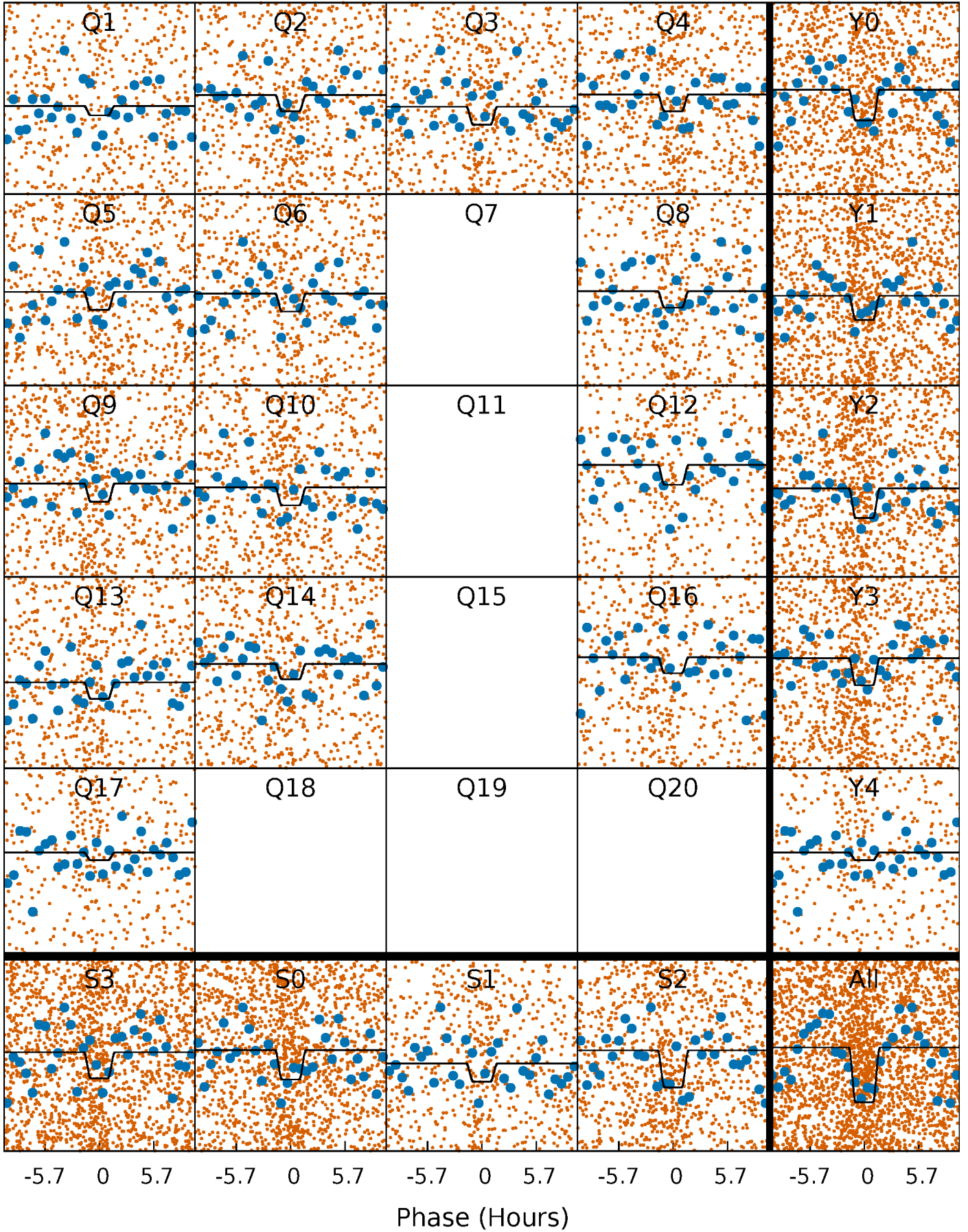
# DV Quarter-Phased Transit Curves

TCE 010489783-02   P= 0.738399 Days    $T_0=131.581820$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 010489783-02 P= 0.738420 Days  $T_0=131.578802$  (BKJD)

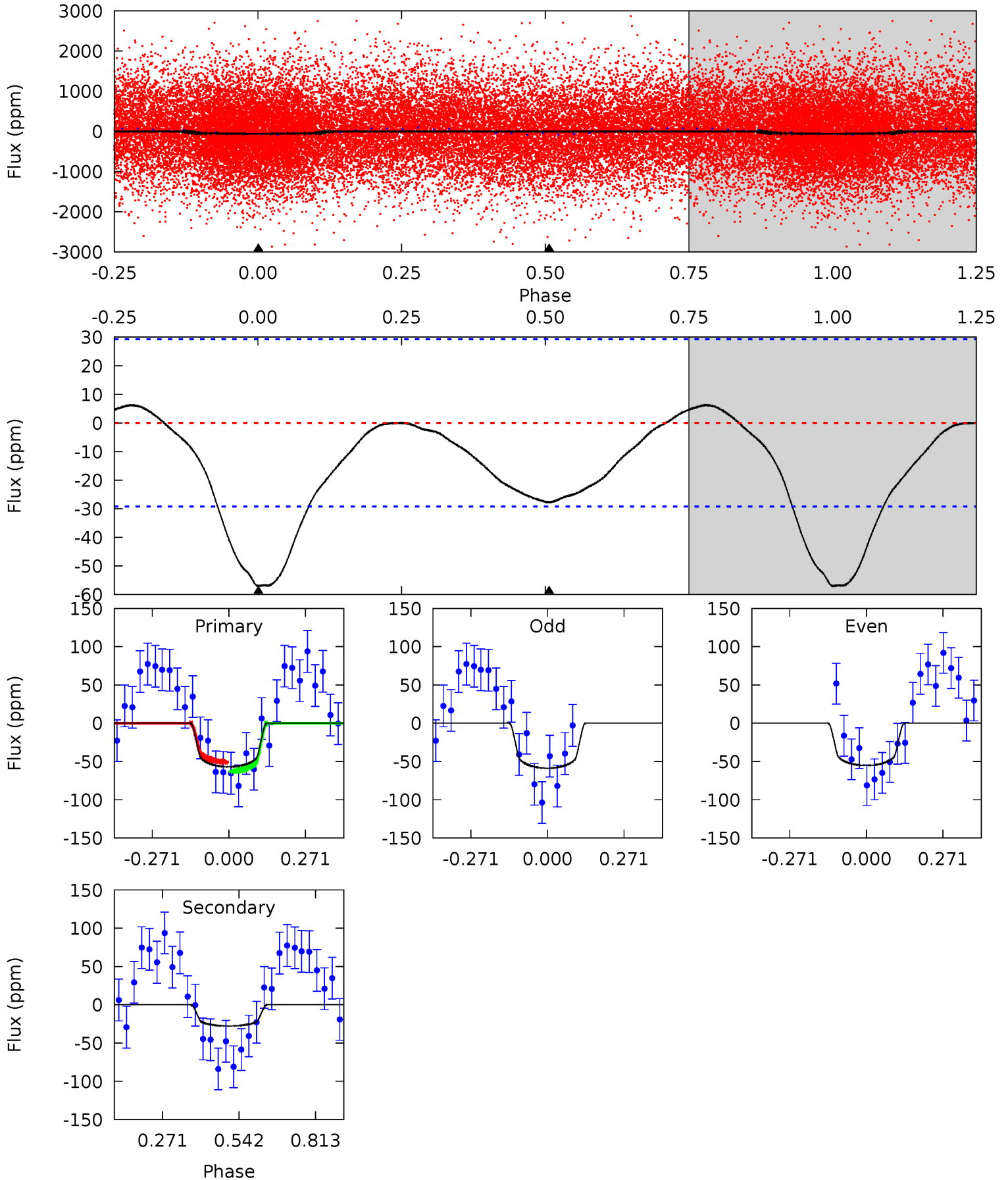




# DV Model-Shift Uniqueness Test

010489783-02, P = 0.738399 Days, E = 130.843421 Days

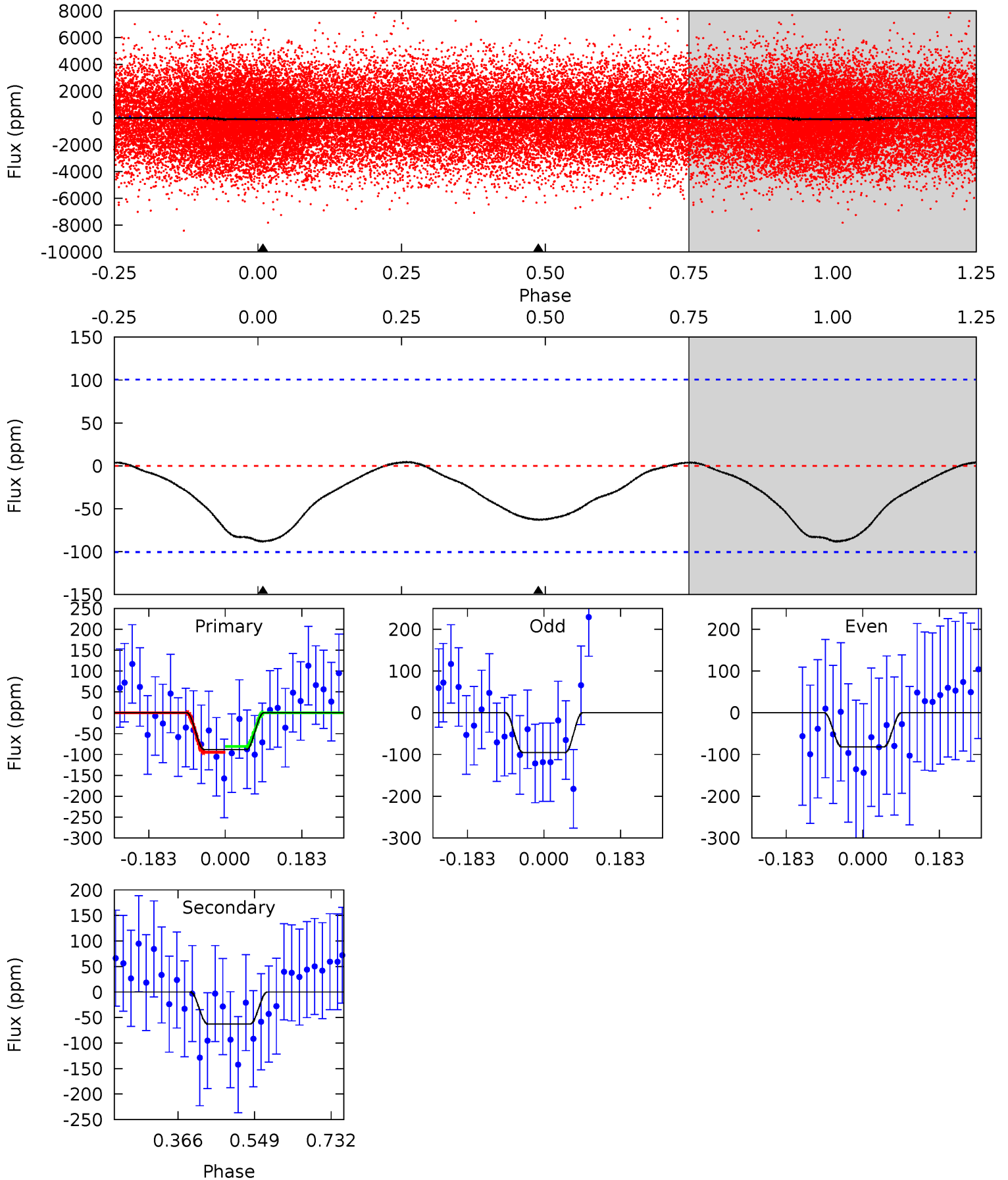
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.49	4.12	0	0	4.35	1.10	0.41	8.49	8.49	4.12	4.12	0.26	0.98	0.10	0.94



# Alt Model-Shift Uniqueness Test

010489783-02, P = 0.738420 Days, E = 130.840382 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
3.89	2.77	0	0	4.44	1.33	0.19	3.89	3.89	2.77	2.77	0.30	1.07	0.05	0.30



### Stellar Parameters For KIC 010489783

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7861^{+70}_{-94}$	$3.684^{+0.262}_{-0.105}$	$0.070^{+0.150}_{-0.200}$	$3.487^{+0.617}_{-1.057}$	$2.141^{+0.266}_{-0.266}$	$0.071^{+0.119}_{-0.025}$
	+1%/-1%	+7%/-3%	+214%/-286%	+18%/-30%	+12%/-12%	+167%/-35%
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 010489783-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-28 \pm 7$	$3.37^{+2.27}_{-2.09}$	$6251^{+316}_{-459}$	$4849^{+4975}_{-8984}$	$0.579^{+3.468}_{-0.384}$
Alt.	$-63 \pm 23$	$4.03^{+2.61}_{-2.02}$	$6222^{+311}_{-476}$	$5784^{+3793}_{-2692}$	$0.902^{+3.051}_{-0.583}$

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

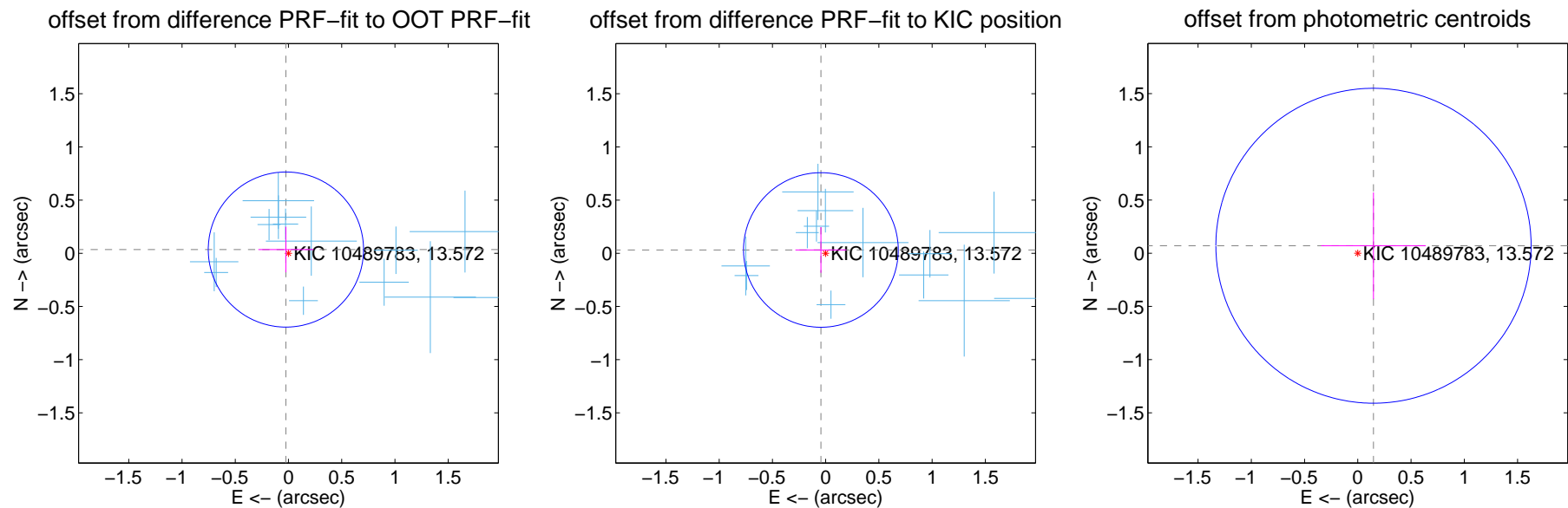
## DV Centroid Data

Supplemental centroid analysis for 010489783-02. Kepler magnitude: 13.57. Transit SNR 8.84

There are 14 quarters with good PRF difference image offsets

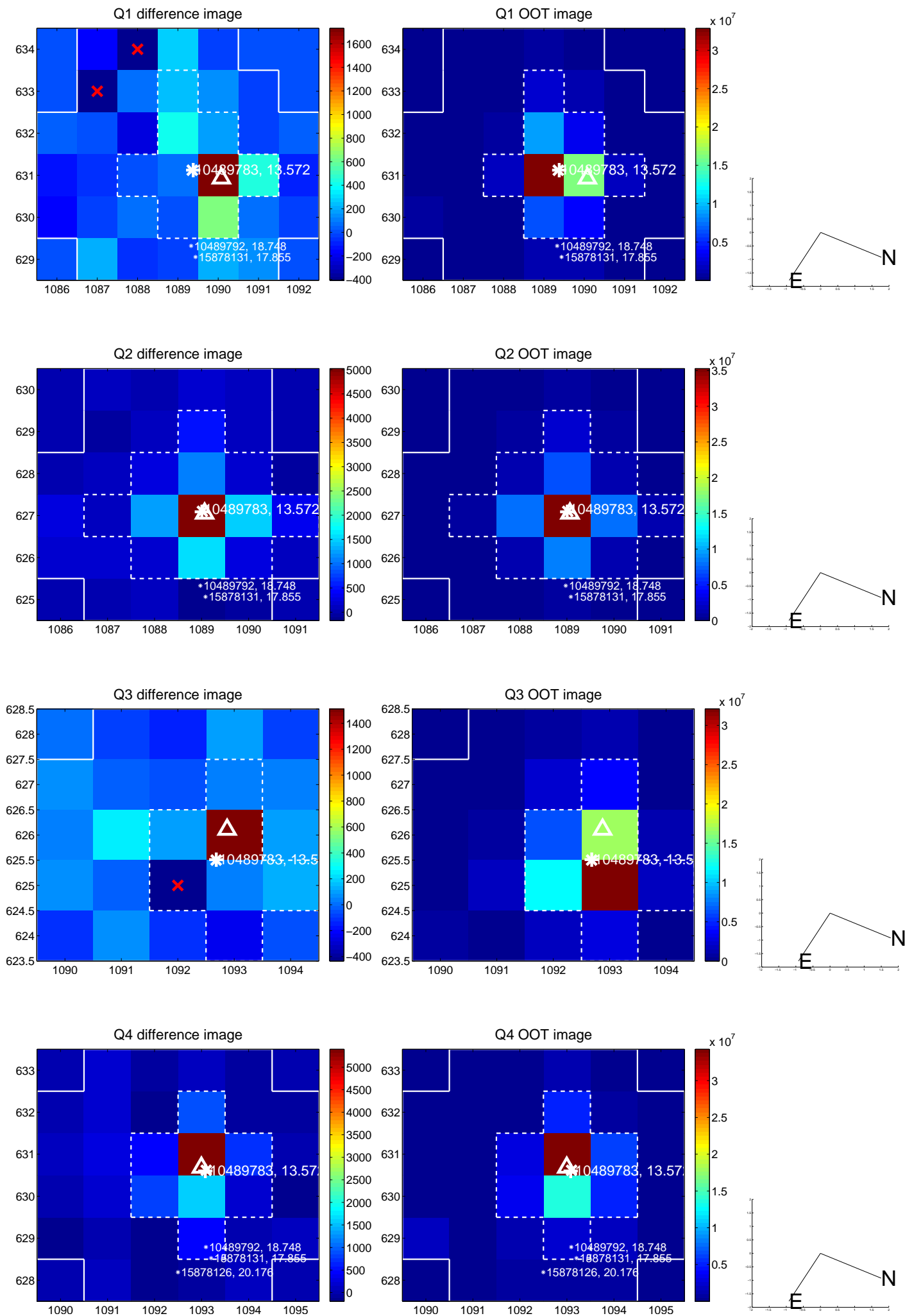
The direct PRF centroid is offset from the target star catalog position by about 0.09 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.043 \pm 0.243$	0.18	$0.024 \pm 0.259$	$0.035 \pm 0.214$
PRF-fit source offset from KIC position	$0.055 \pm 0.242$	0.23	$0.045 \pm 0.239$	$0.031 \pm 0.214$
photometric centroid source offset	$0.16 \pm 0.49$	0.33	$-0.15 \pm 0.49$	$0.07 \pm 0.50$

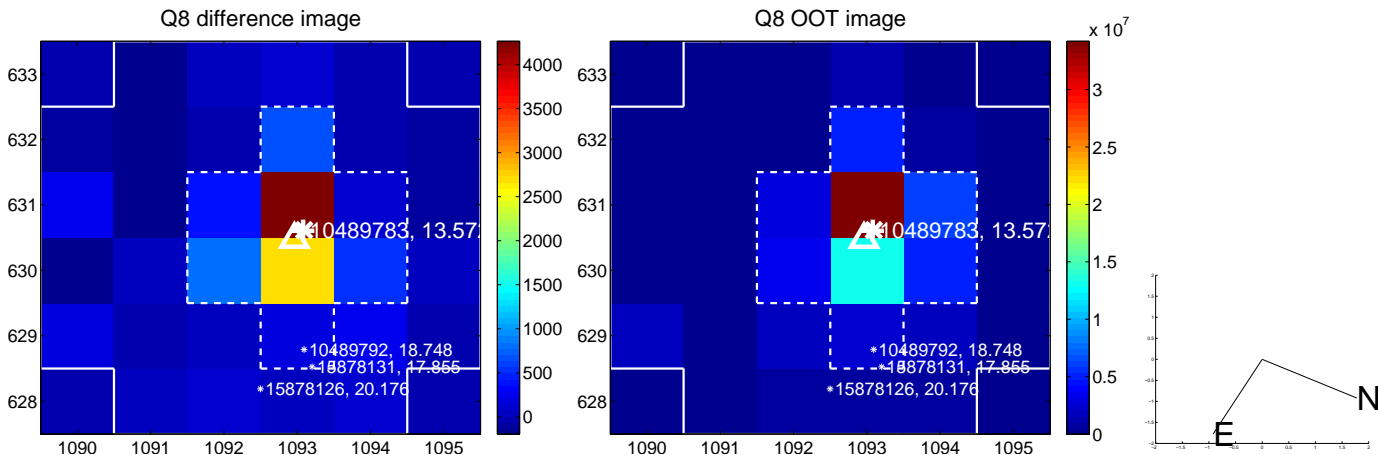
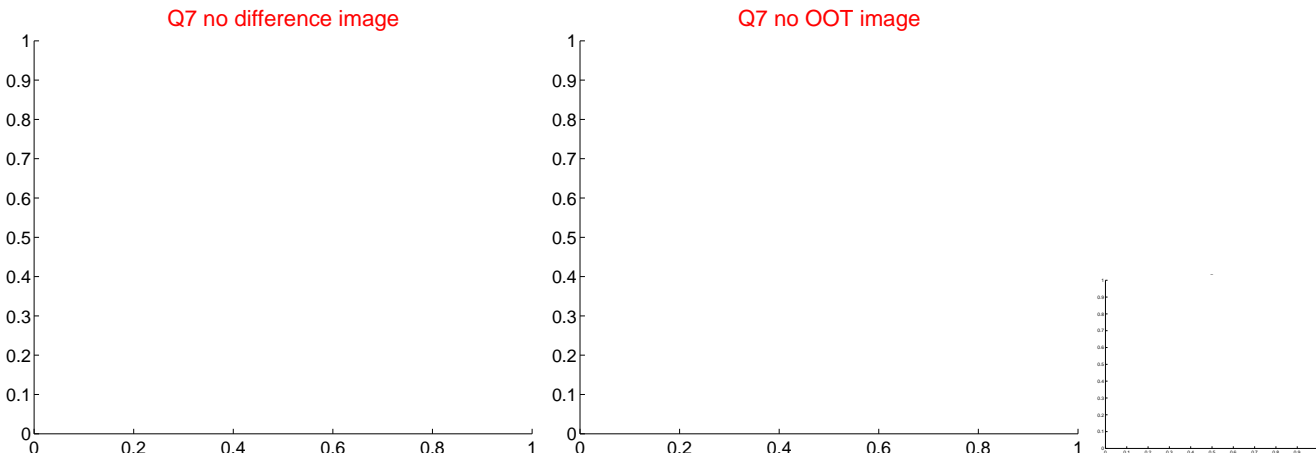
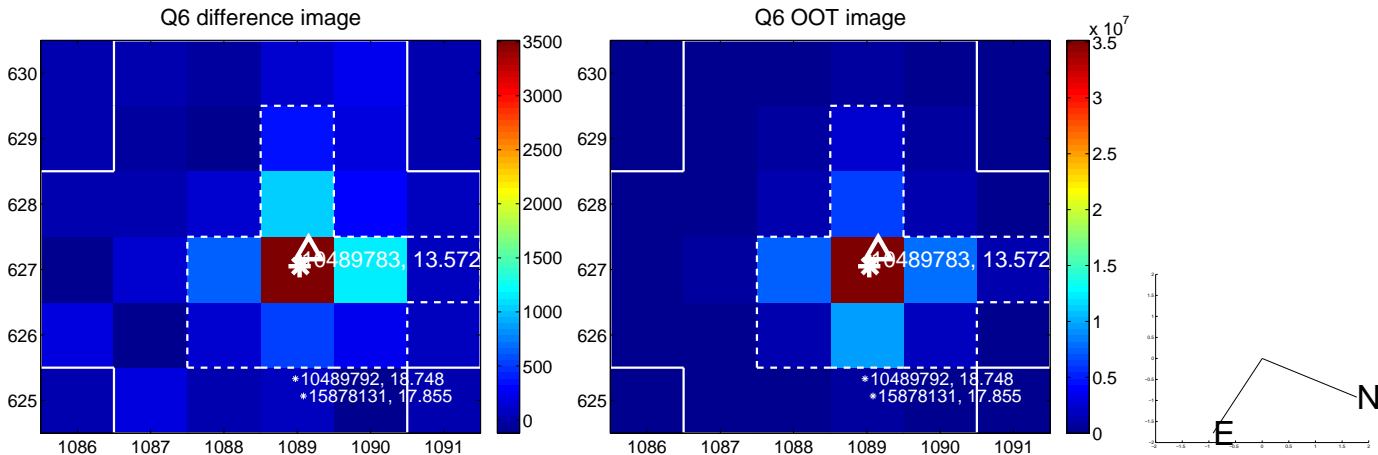
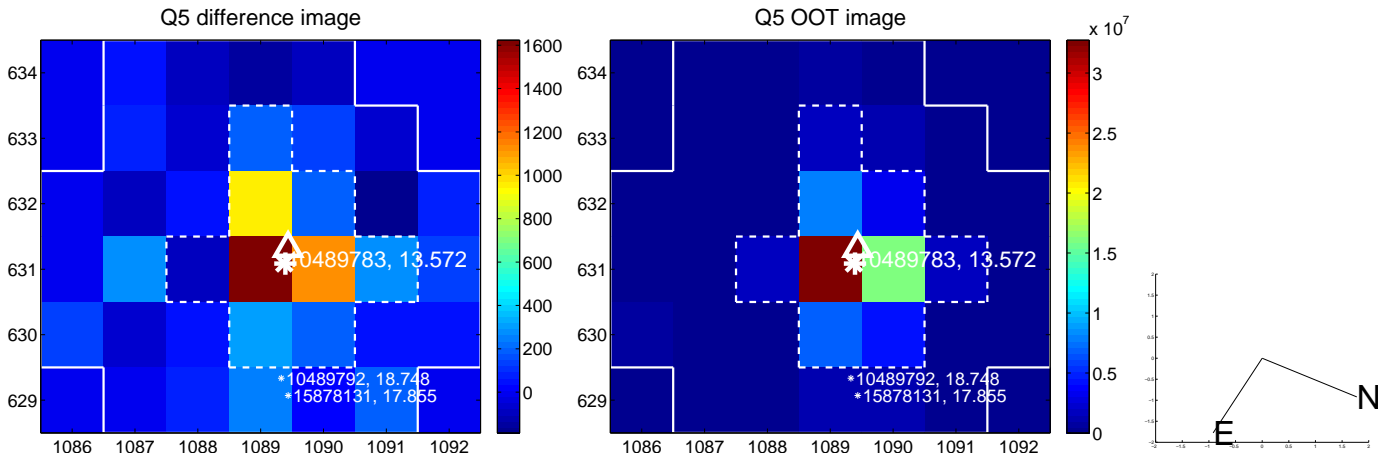


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three- $\sigma$ . Red \*: target star. Blue \*: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

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

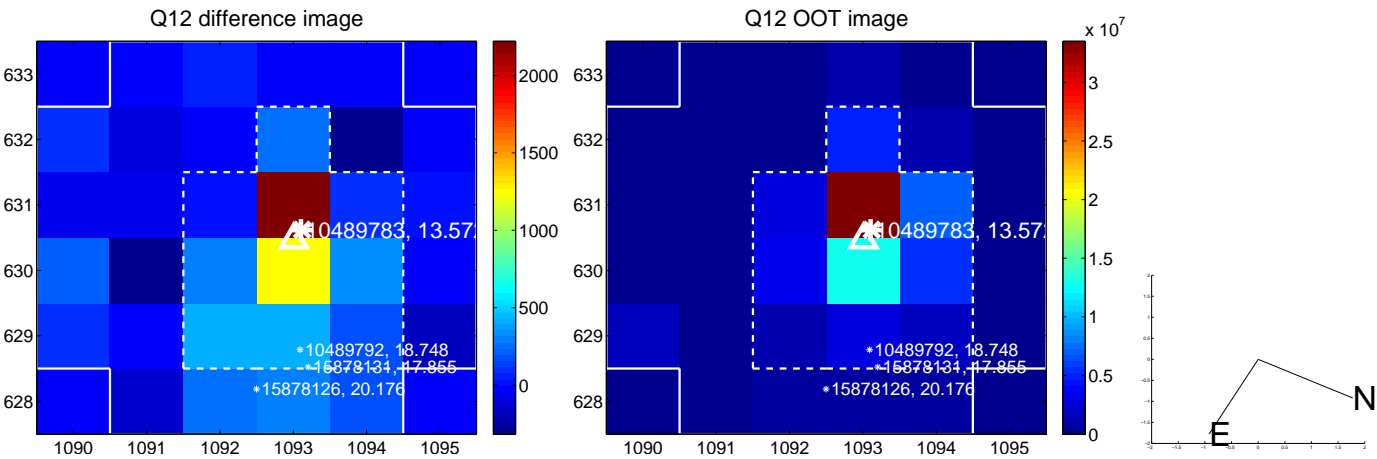
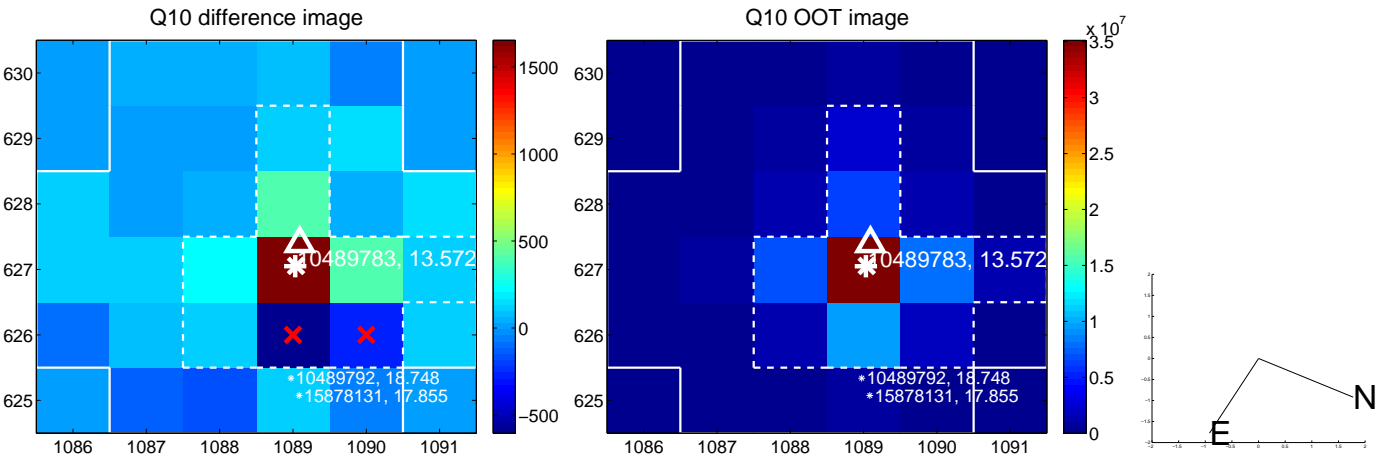
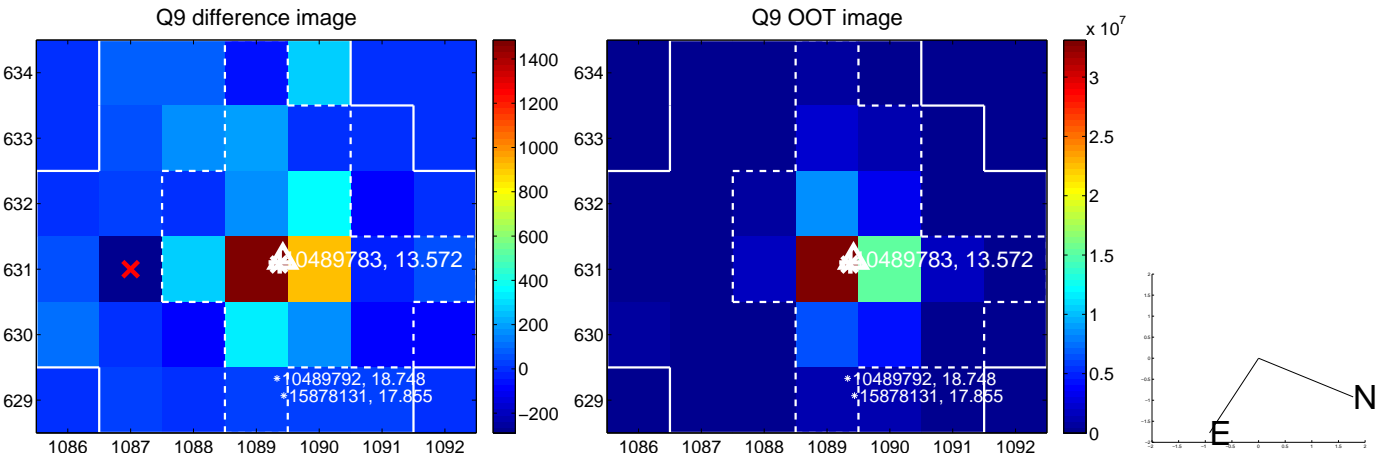


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value

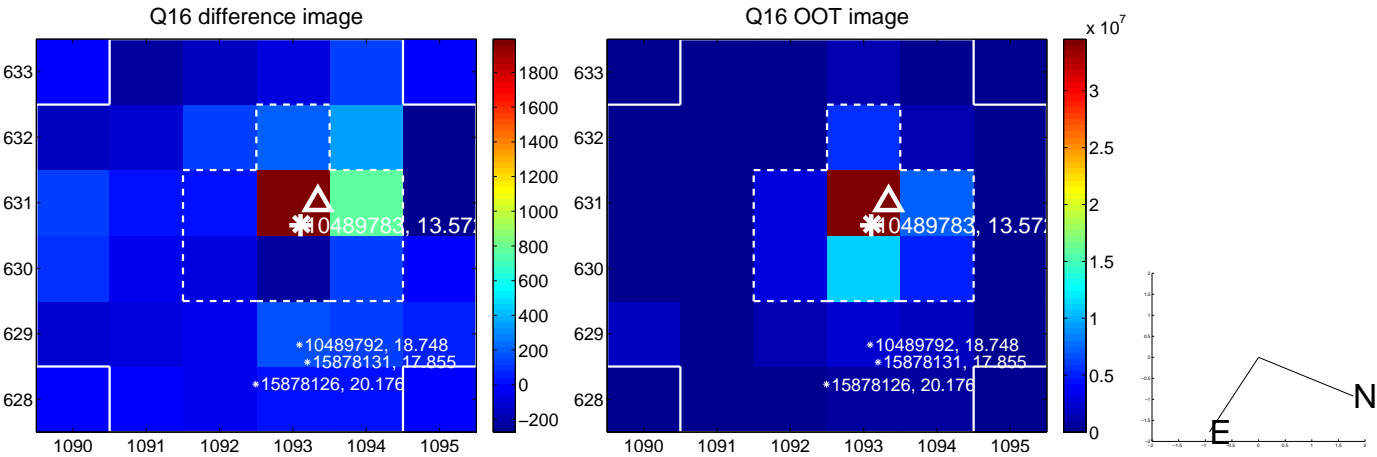
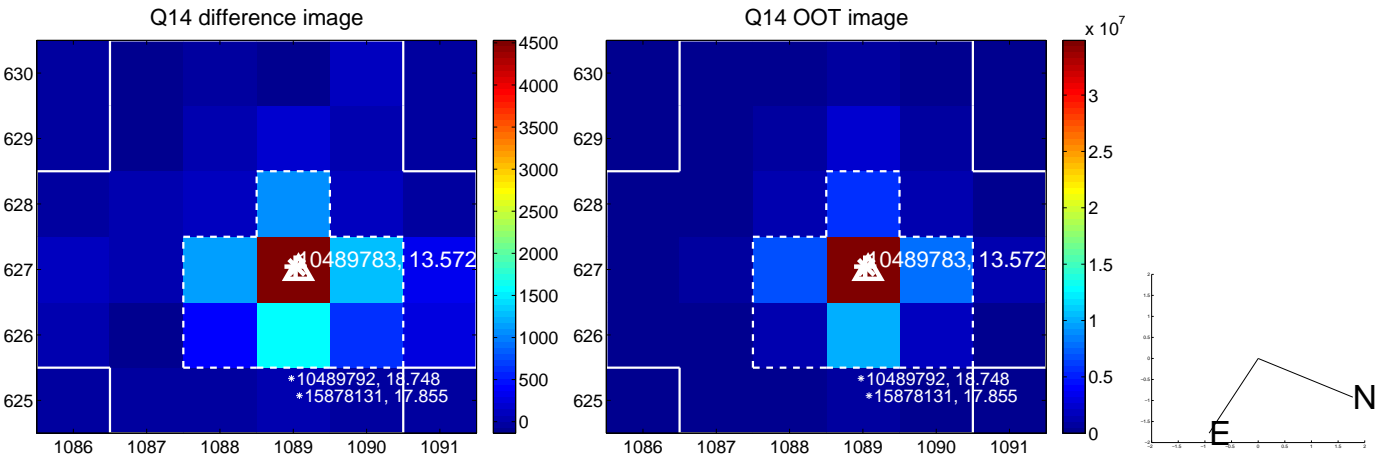
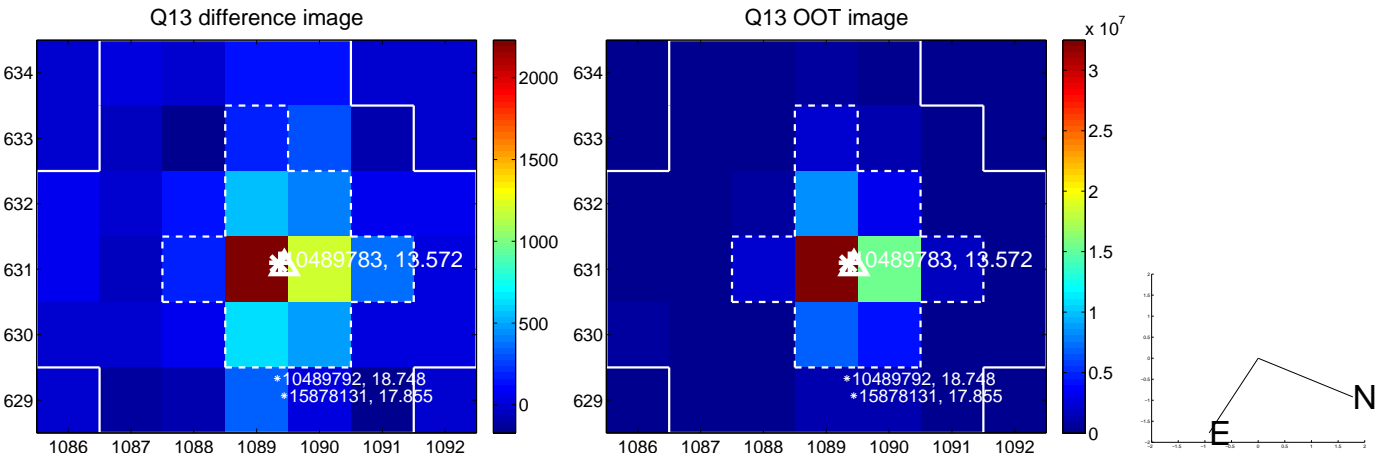




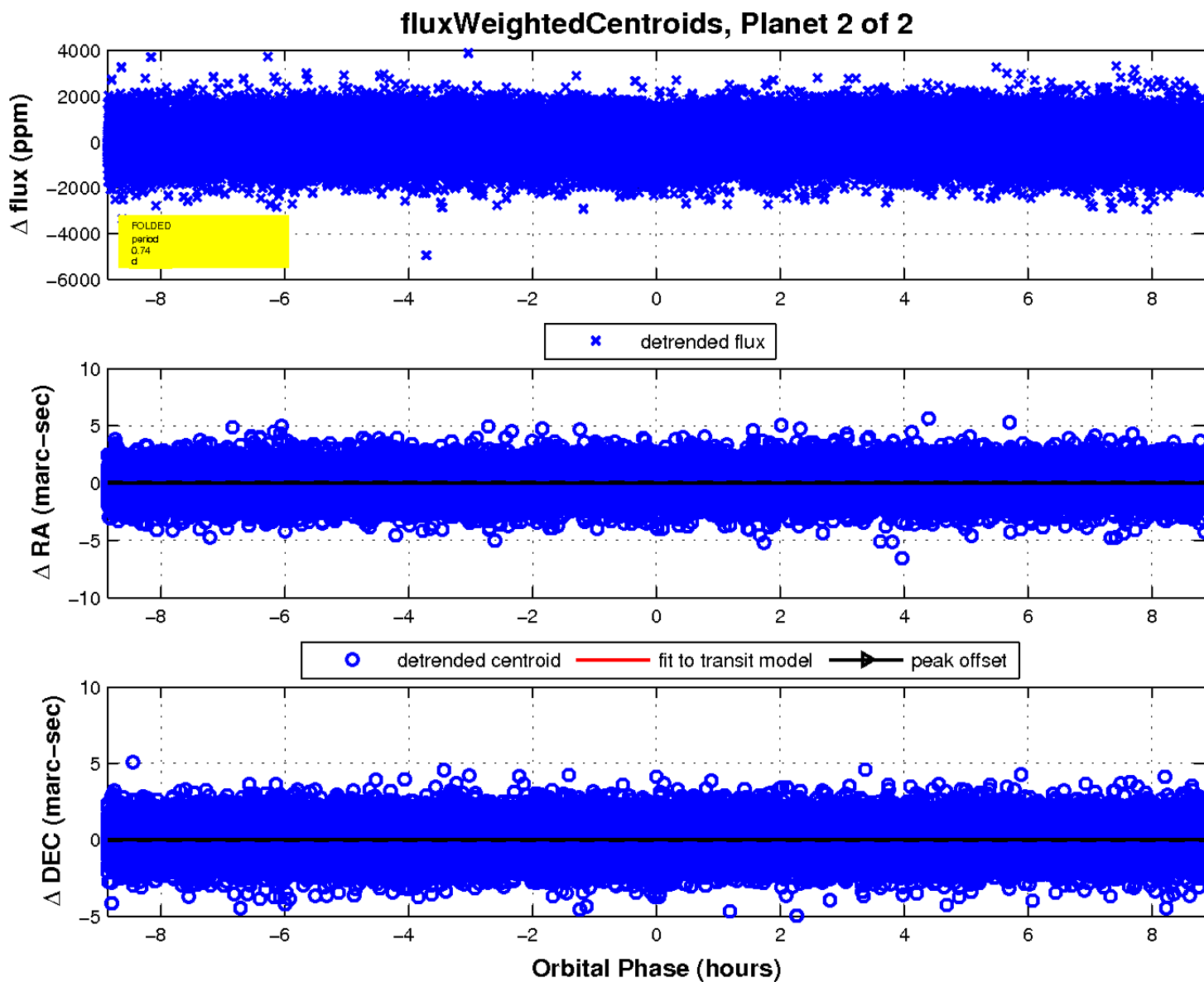
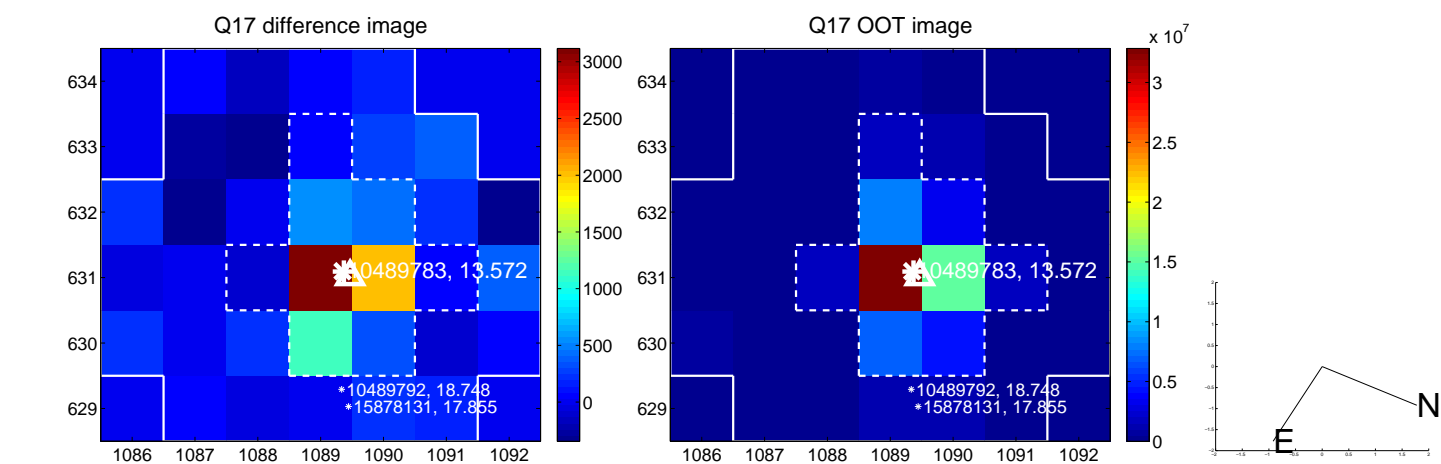
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



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



UKIRT Image

Declination

