

# KIC 011099351

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011099351-01	OBS	6234.01	2.377956	132.557263	4300.2	2.434	1792.0	1355.0	2.29	9565	26.43	18312.46
011099351-02	OBS	No	2.377955	133.744852	873.7	2.421	340.4	343.9	2.29	9565	12.30	18312.47

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011099351-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—DEEP_V_SHAPED—HAS_SEC_TCE
011099351-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE

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

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

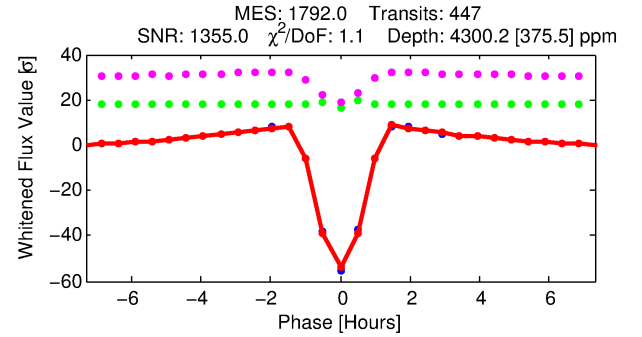
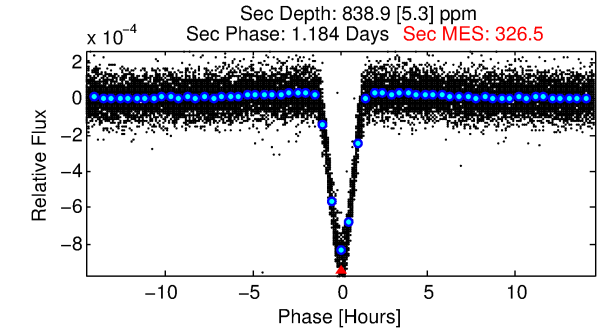
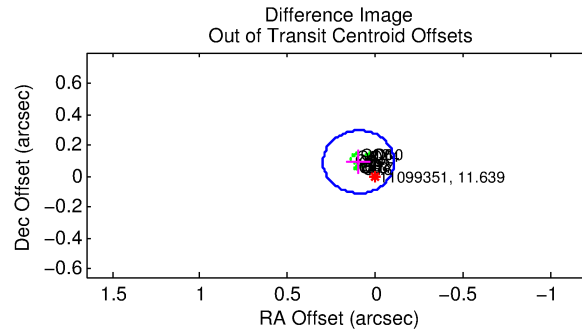
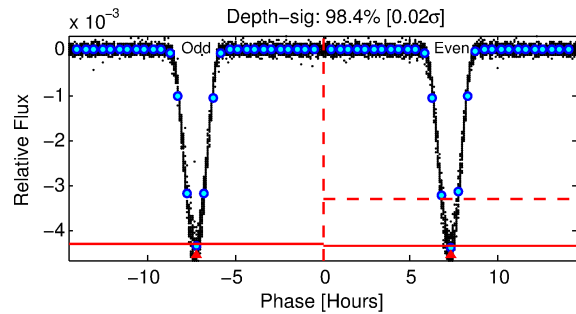
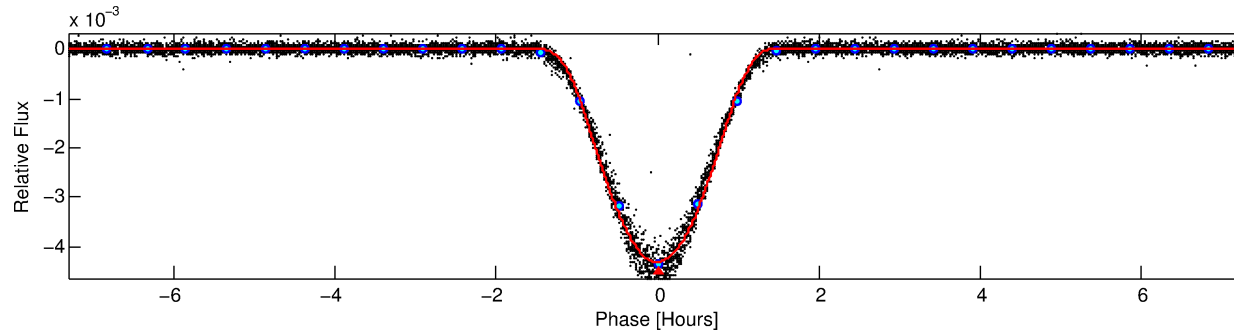
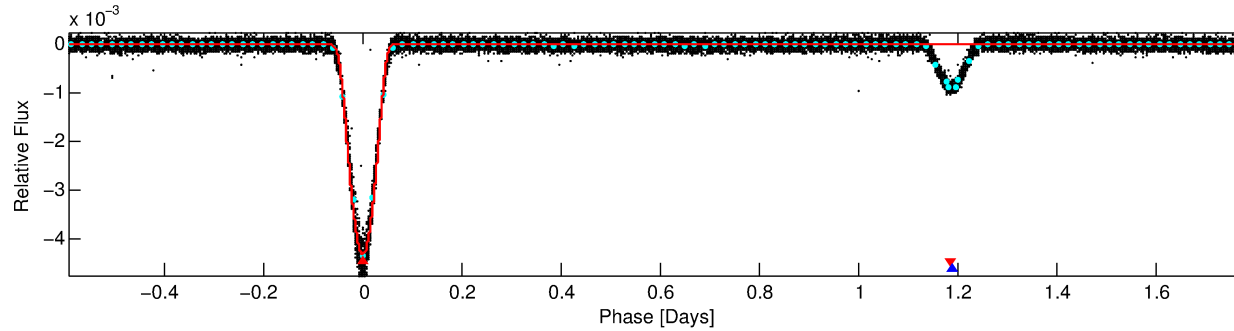
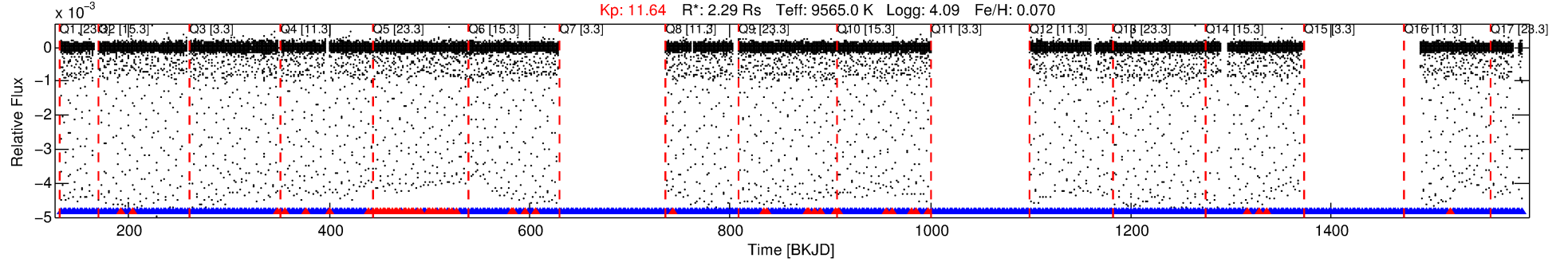
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 011099351-01

No Significant Match Found

# DV One-Page Summary

KIC: 11099351 Candidate: 1 of 2 Period: 2.378 d  
KOI: K06234.01 Corr: 0.998



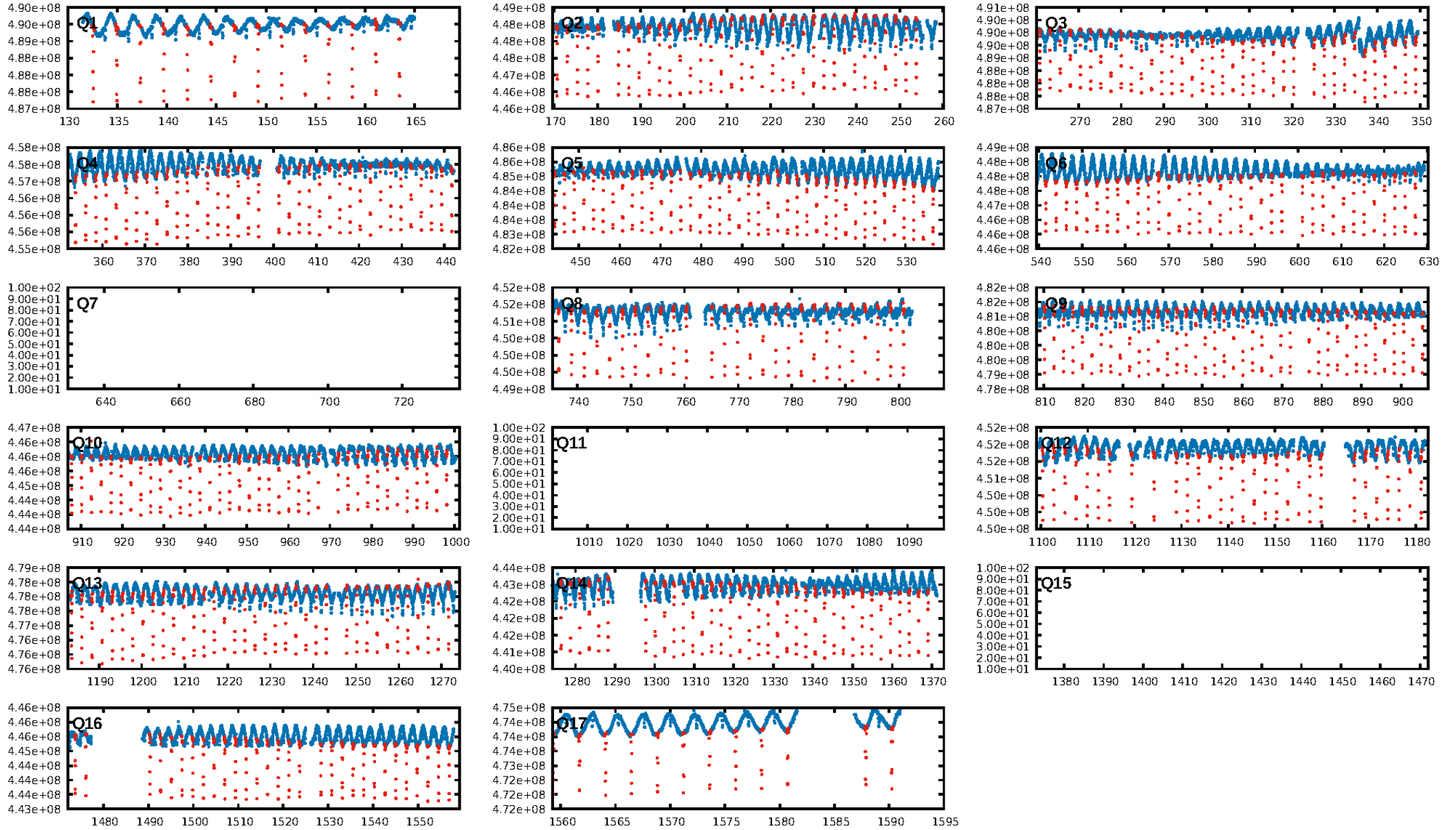
## DV Fit Results:

Period = 2.37796 [0.00000] d  
Epoch = 132.5573 [0.0000] BKJD  
Rp/R\* = 0.1060 [0.0037]  
a/R\* = 3.67 [0.02]  
b = 1.00 [0.00]  
Seff = 18312.46 [8052.23]  
Teq = 2966 [326] K  
Rp = 26.43 [9.77] Re  
a = 0.0463 [0.0136] AU  
Ag = 1.41 [0.58] [0.71 $\sigma$ ]  
Teffp = 5001 [235] K [5.06 $\sigma$ ]

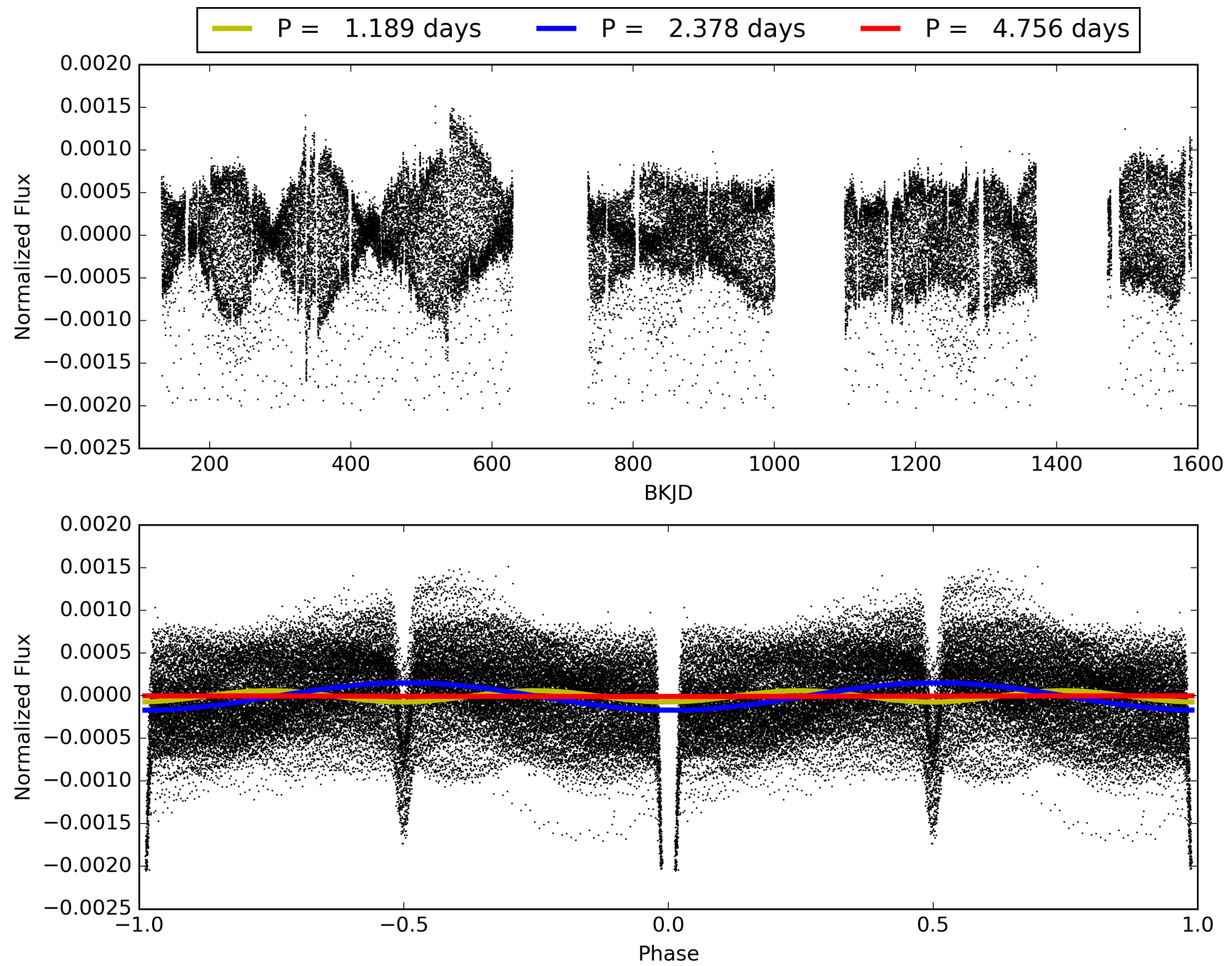
## DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 0.86 [363/421]  
GhostDiagnostic-chr: 10.57  
Centroid-sig: 0.0%  
Centroid-so: 0.082 arcsec [9.88 $\sigma$ ]  
OotOffset-rm: 0.135 arcsec [2.00 $\sigma$ ]  
OotOffset-st: 4/1/4/5 [14]  
KicOffset-rm: 0.034 arcsec [0.49 $\sigma$ ]  
KicOffset-st: 4/1/4/5 [14]  
DiffImageQuality-fgm: 1.00 [14/14]  
DiffImageOverlap-fno: 1.00 [14/14]

# TCE 011099351-01, PDC Light Curves

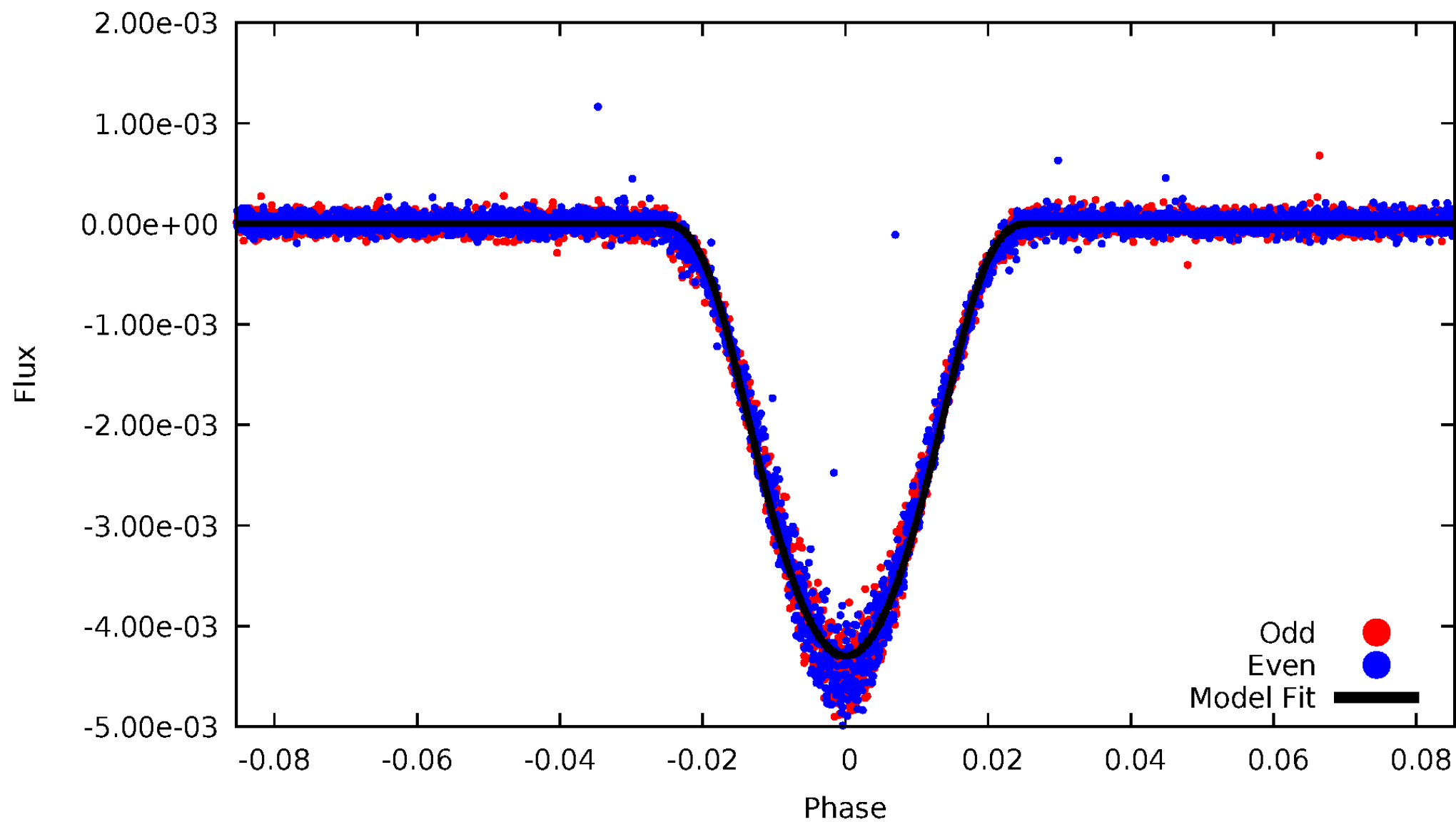


TCE 011099351-01



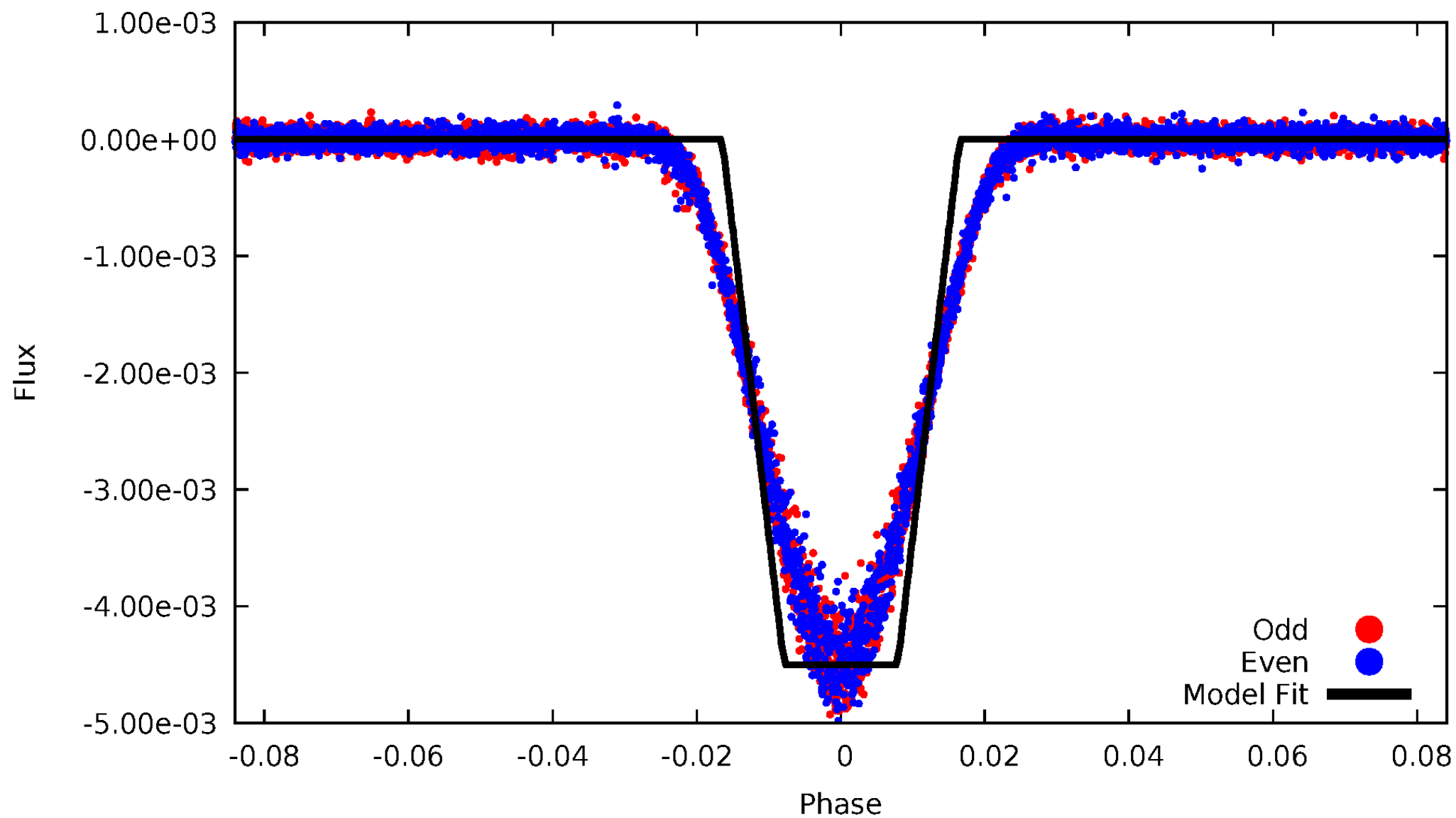
# DV Odd/Even

TCE 011099351-01



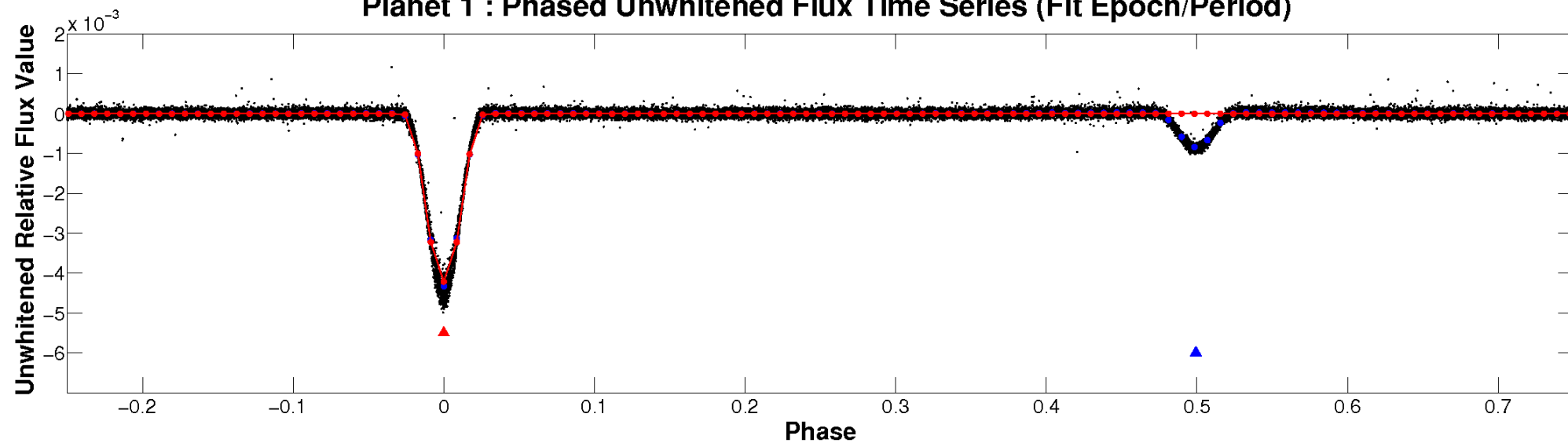
# ALT Odd/Even

TCE 011099351-01

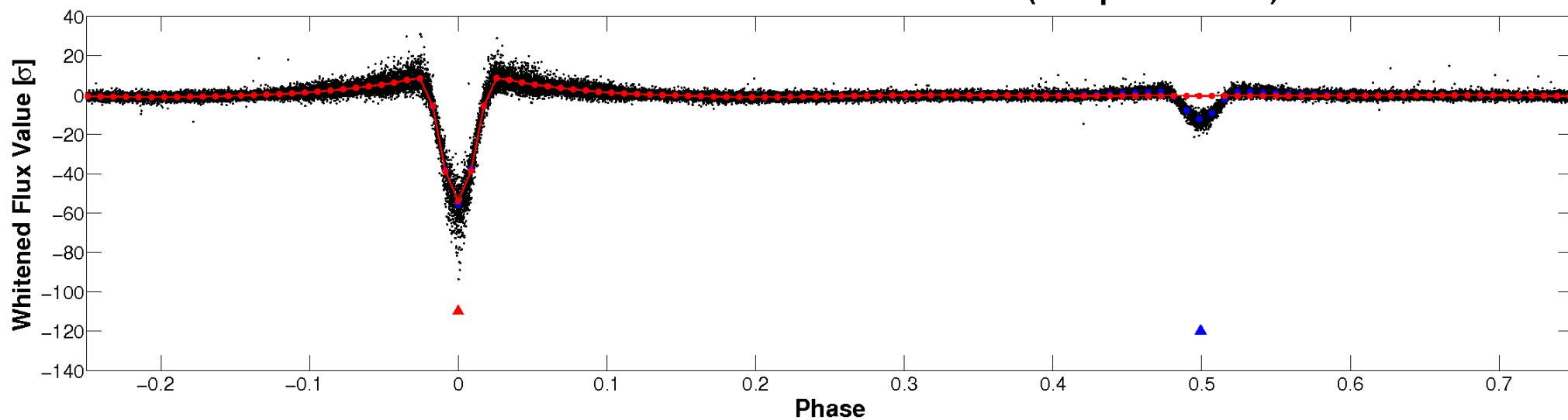


# Non-Whitened Vs. Whitened Light Curve

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

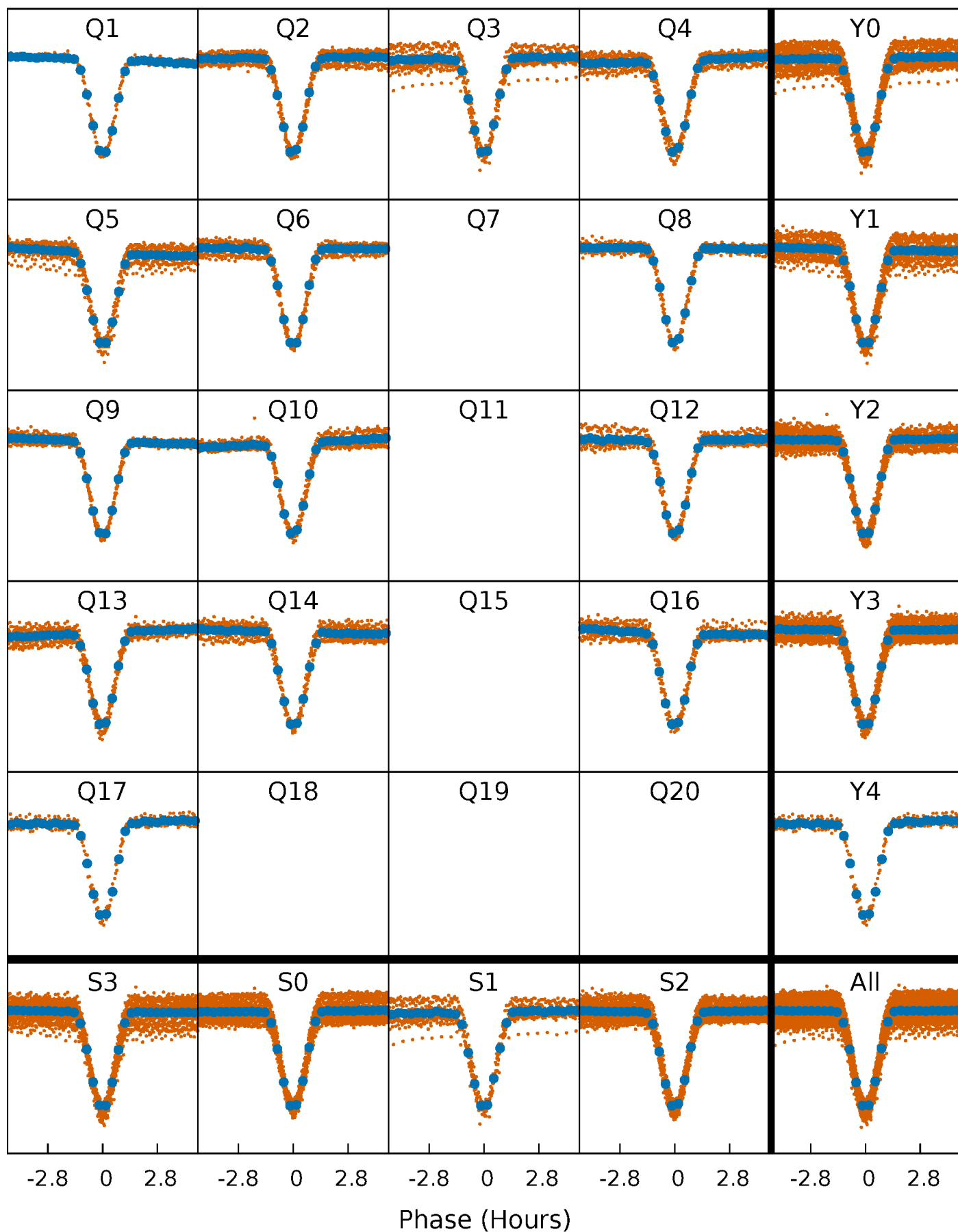


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

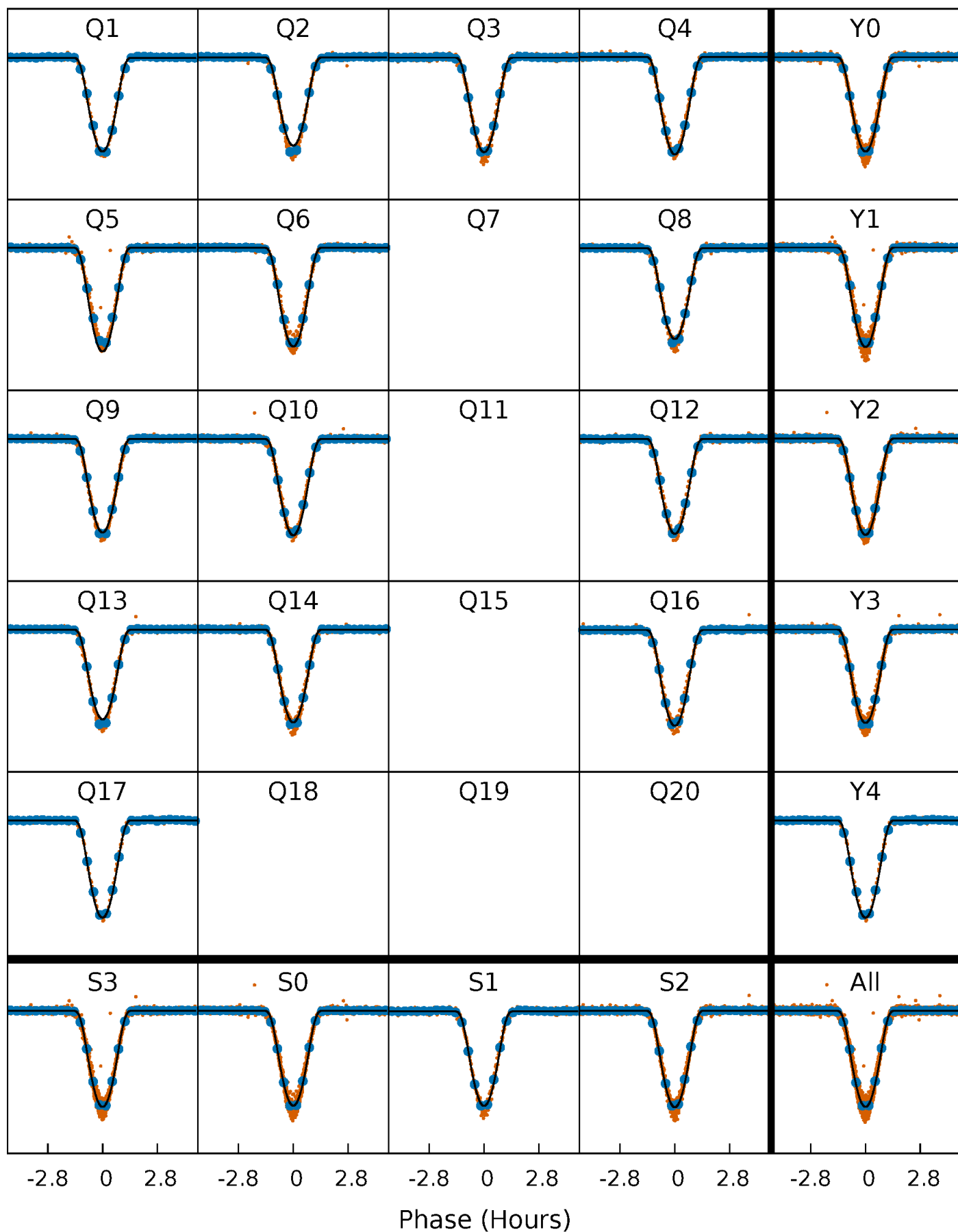
TCE 011099351-01 P= 2.377956 Days  $T_0=132.557263$  (BKJD)





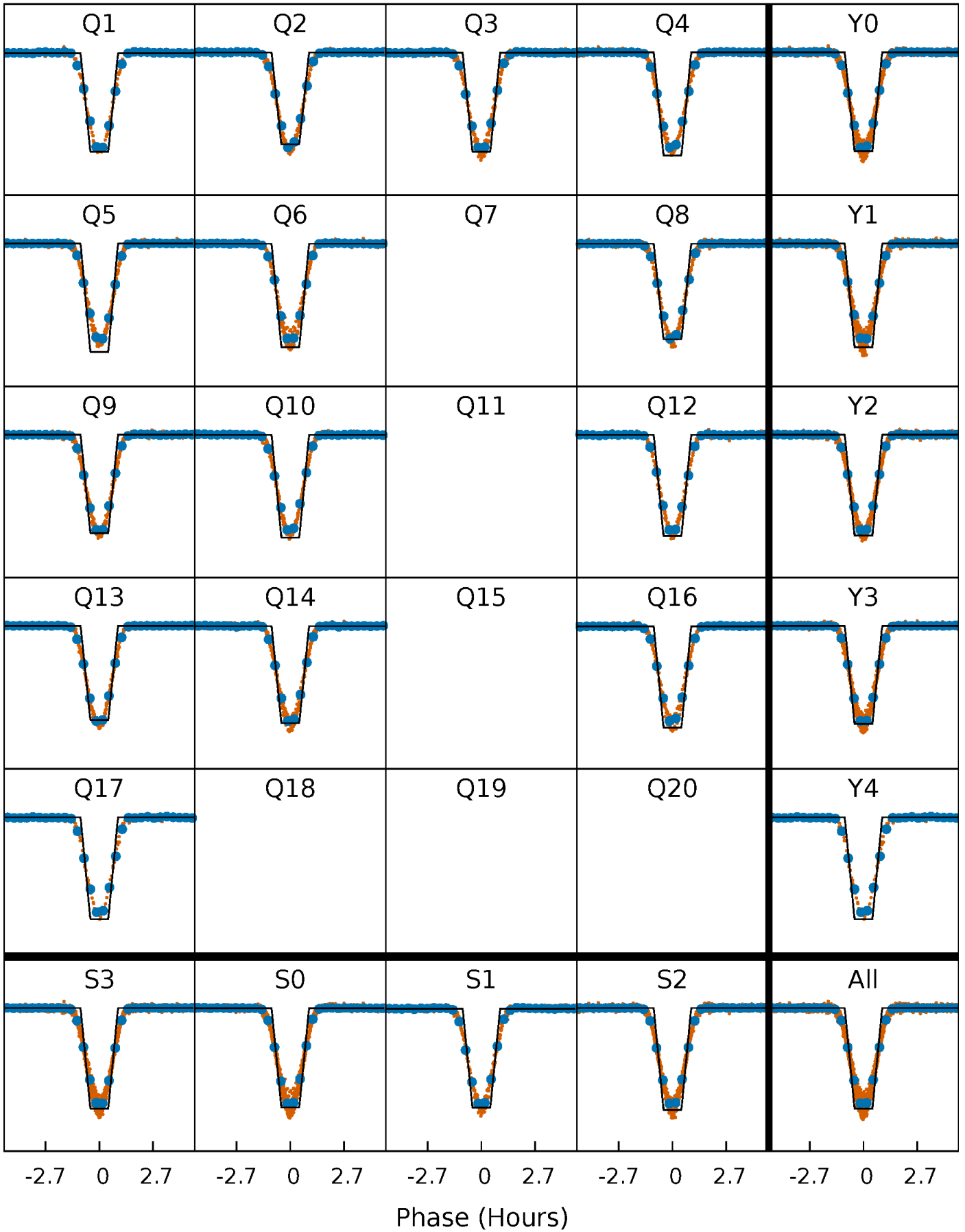
# DV Quarter-Phased Transit Curves

TCE 011099351-01 P= 2.377956 Days  $T_0=132.557263$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

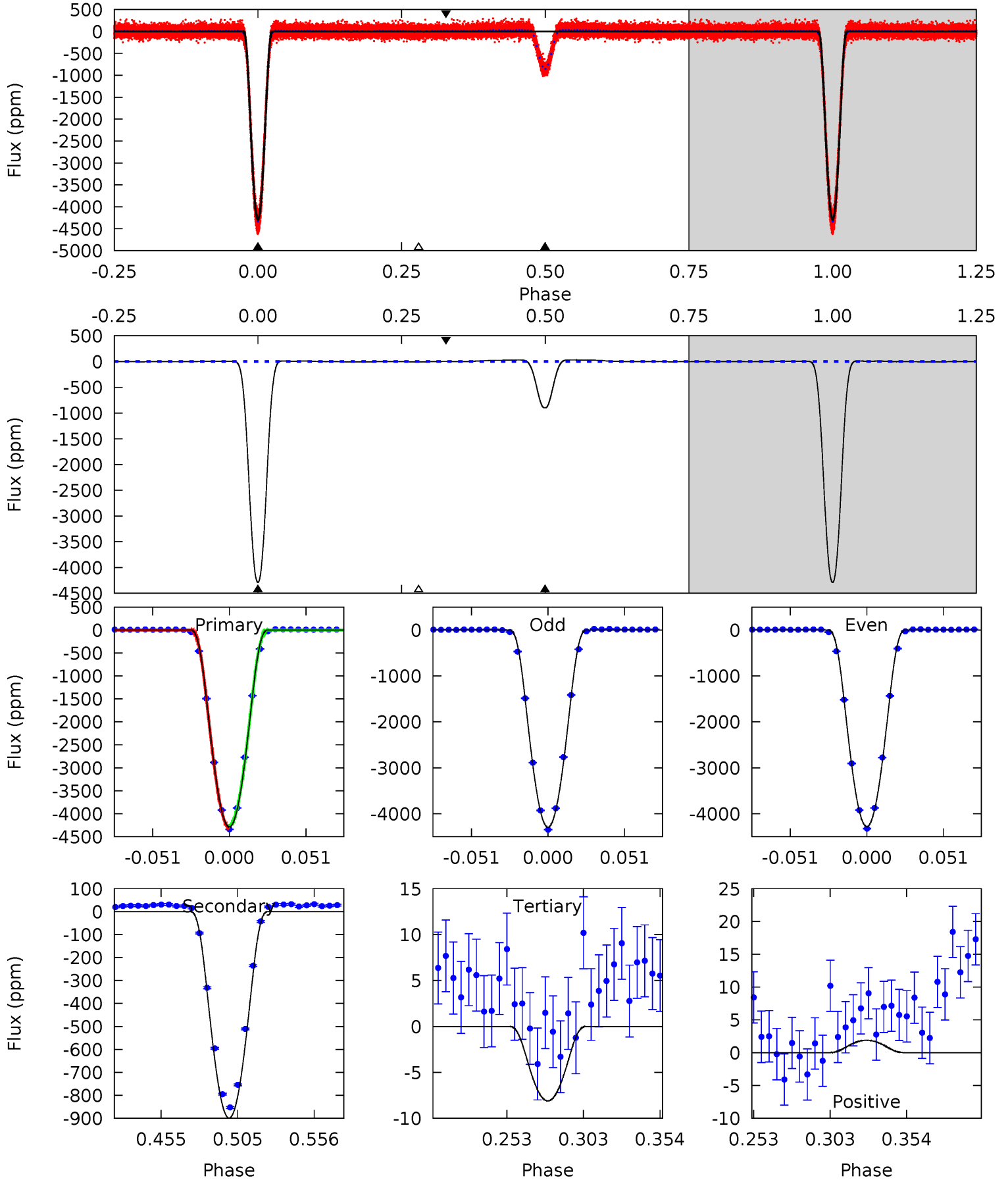
TCE 011099351-01 P= 2.377955 Days  $T_0=132.557253$  (BKJD)



# DV Model-Shift Uniqueness Test

011099351-01, P = 2.377956 Days, E = 130.179307 Days

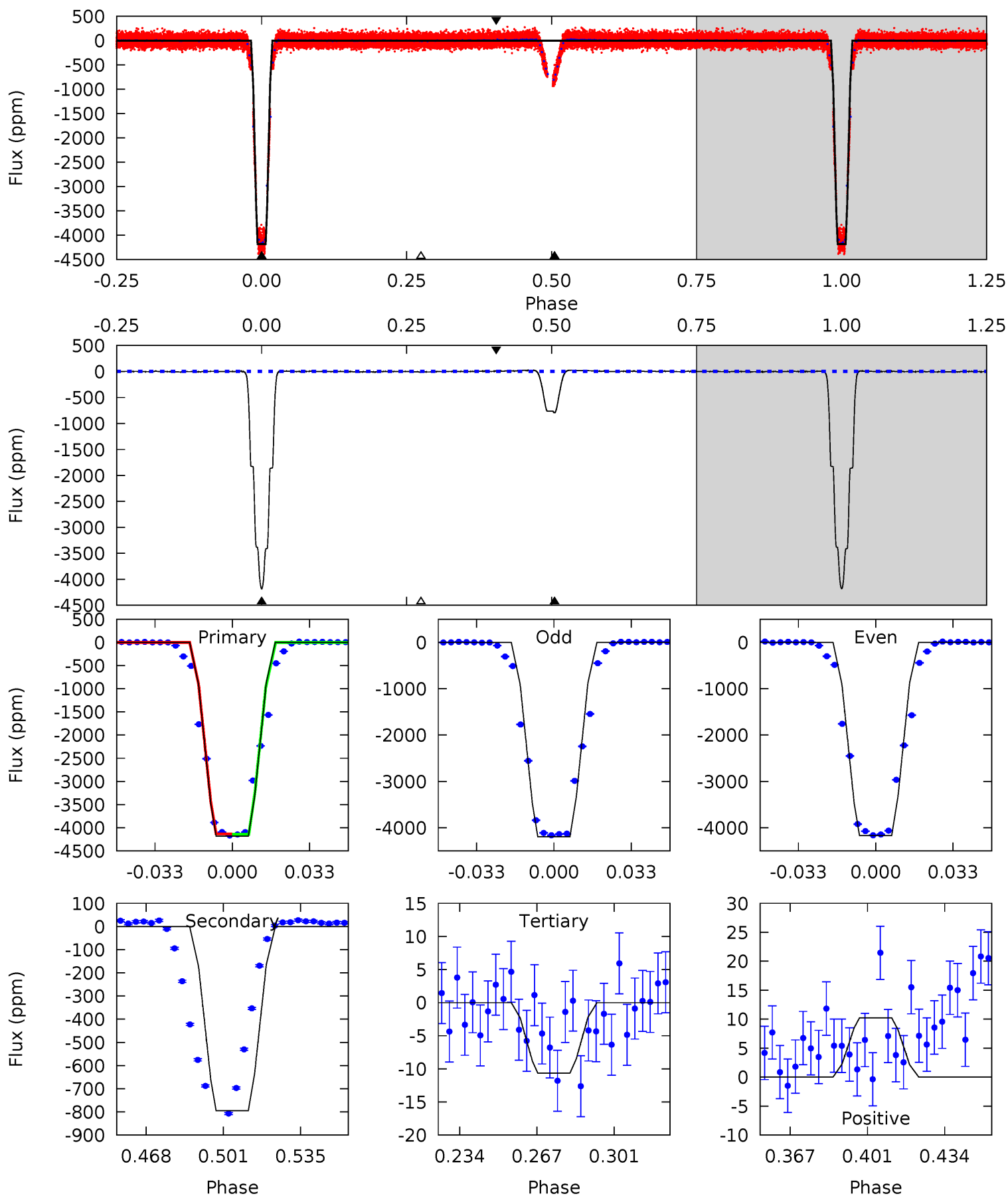
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3216	674.2	6.08	1.42	4.71	1.96	7.38	3210	3215	668.1	672.8	4.62	1.00	0.01	17.2



# Alt Model-Shift Uniqueness Test

011099351-01, P = 2.377955 Days, E = 130.179298 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
1766	335.6	4.49	4.32	4.79	2.13	2.69	1762	1762	331.1	331.3	4.80	1.00	0.01	0



### Stellar Parameters For KIC 011099351

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$9565^{+302}_{-416}$	$4.088^{+0.171}_{-0.209}$	$0.070^{+0.150}_{-0.600}$	$2.286^{+0.841}_{-0.688}$	$2.335^{+0.366}_{-0.679}$	$0.275^{+0.316}_{-0.146}$
	+3%/-4%	+4%/-5%	+214%/-857%	+37%/-30%	+16%/-29%	+115%/-53%
Source	KIC0	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 011099351-01 / KOI 6234.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-899 \pm 1$	$26.31^{+5.34}_{-4.04}$	$4169^{+374}_{-339}$	$4631^{+146}_{-163}$	$1.476^{+0.514}_{-0.406}$
Alt.	$-795 \pm 2$	$16.92^{+3.57}_{-2.88}$	$4151^{+406}_{-303}$	$5641^{+218}_{-212}$	$3.196^{+1.172}_{-0.894}$

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

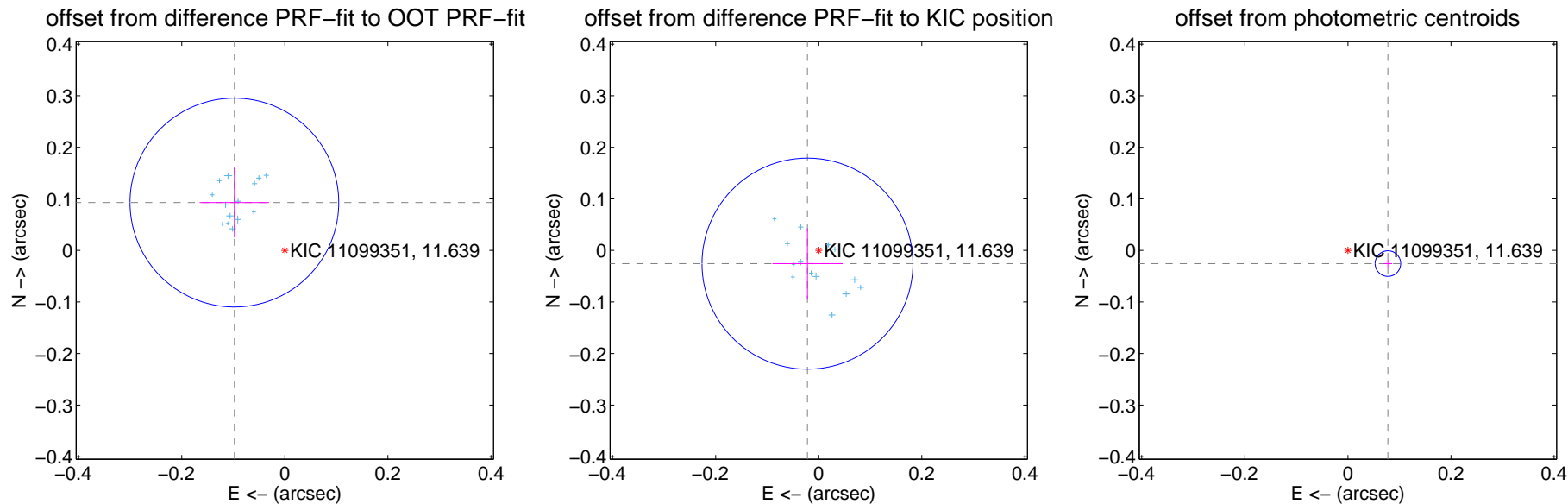
## DV Centroid Data

Supplemental centroid analysis for 011099351-01. **Kepler magnitude: 11.64.** Transit SNR 1355.04

There are 14 quarters with good PRF difference image offsets

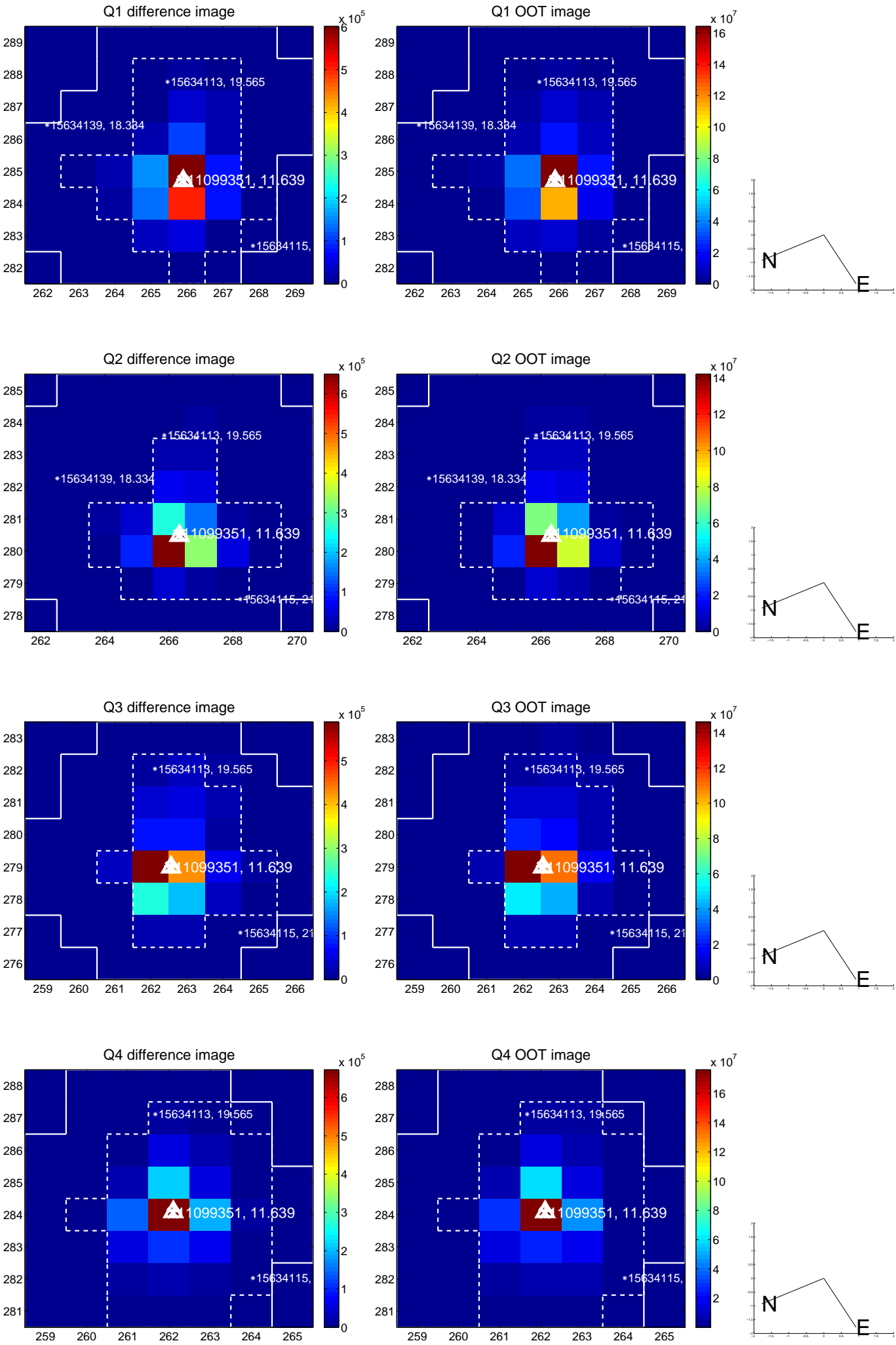
The direct PRF centroid is offset from the target star catalog position by about 0.14 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.135 \pm 0.068$	2.00	$0.098 \pm 0.067$	$0.093 \pm 0.068$
PRF-fit source offset from KIC position	$0.034 \pm 0.068$	0.49	$0.022 \pm 0.068$	$-0.026 \pm 0.068$
photometric centroid source offset	<b><math>0.08 \pm 0.01</math></b>	<b>9.88</b>	$-0.08 \pm 0.01$	$-0.03 \pm 0.01$

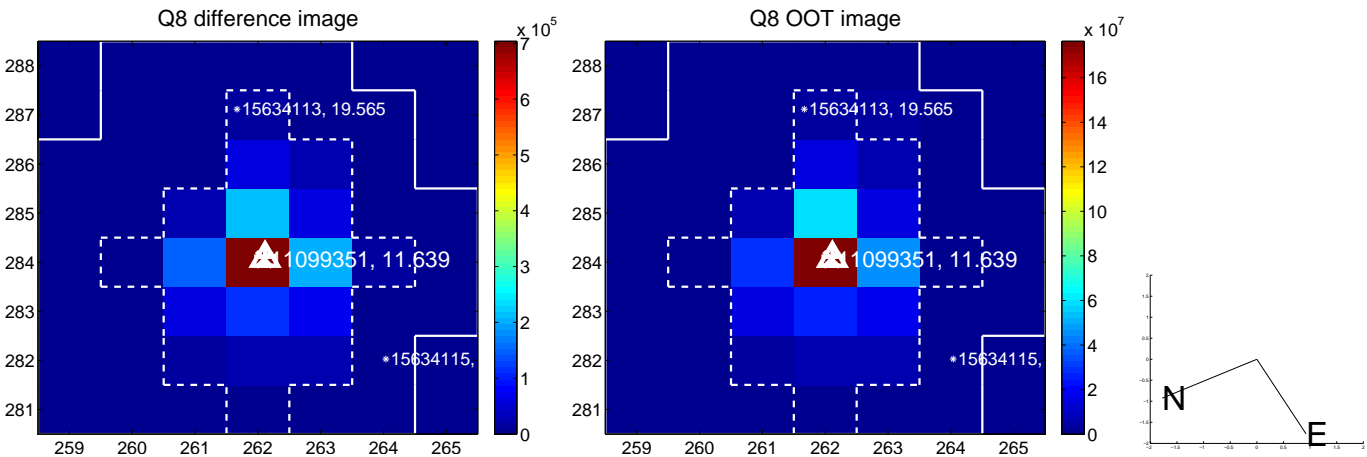
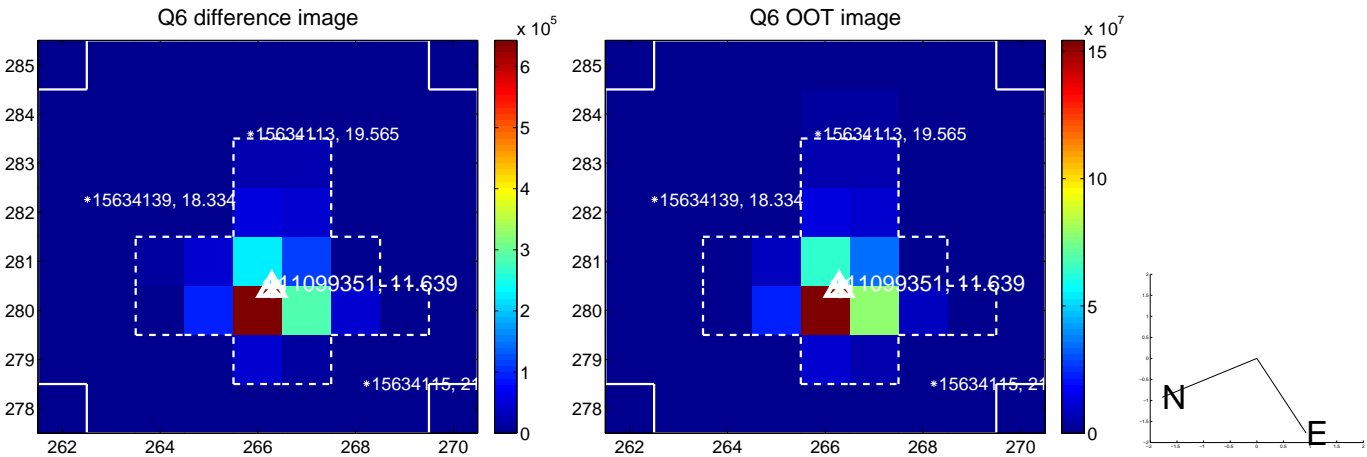
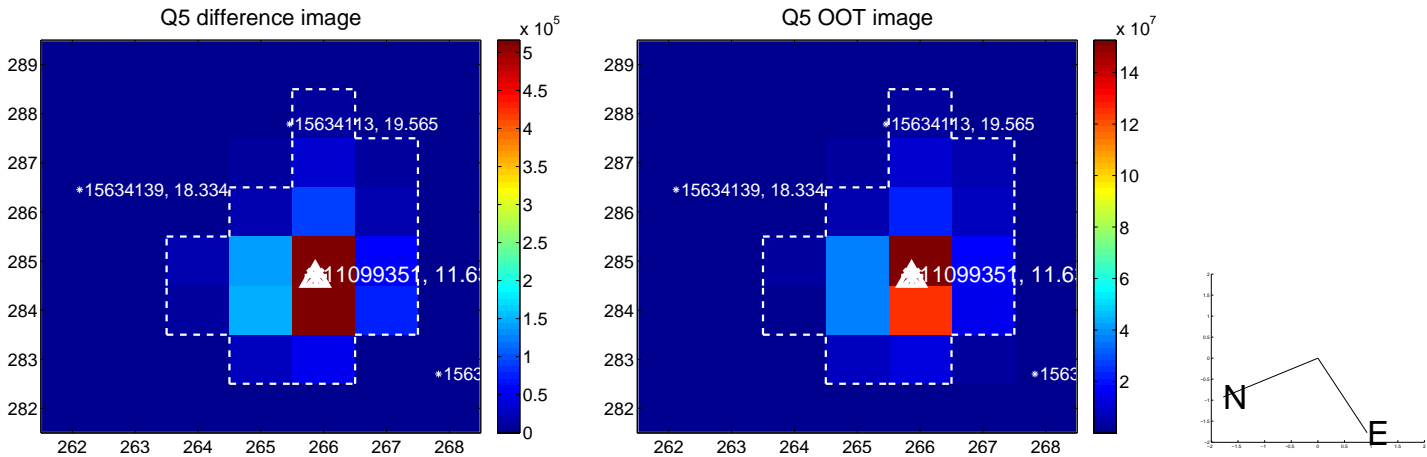


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

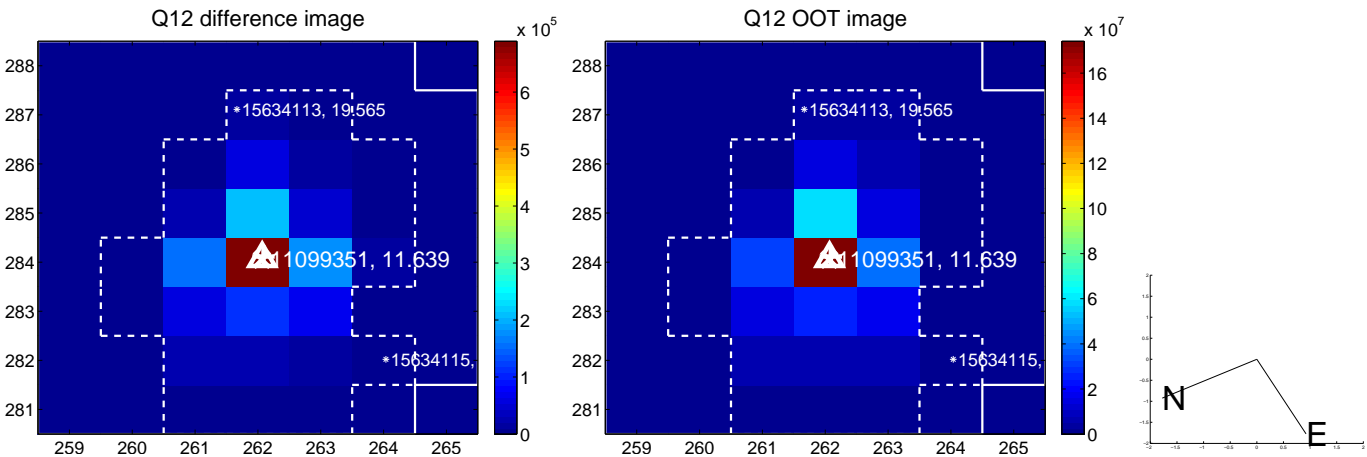
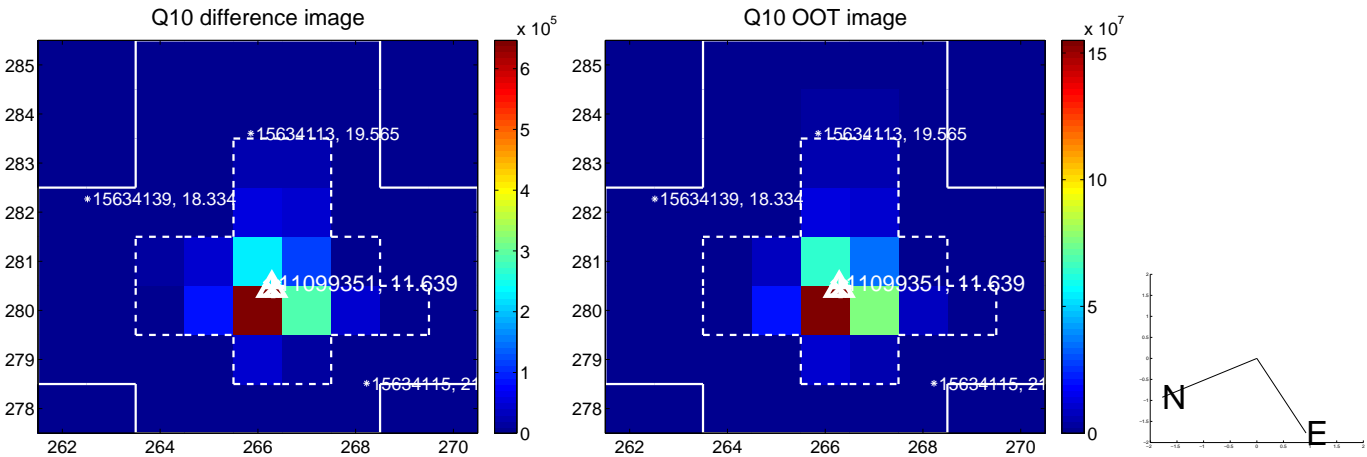
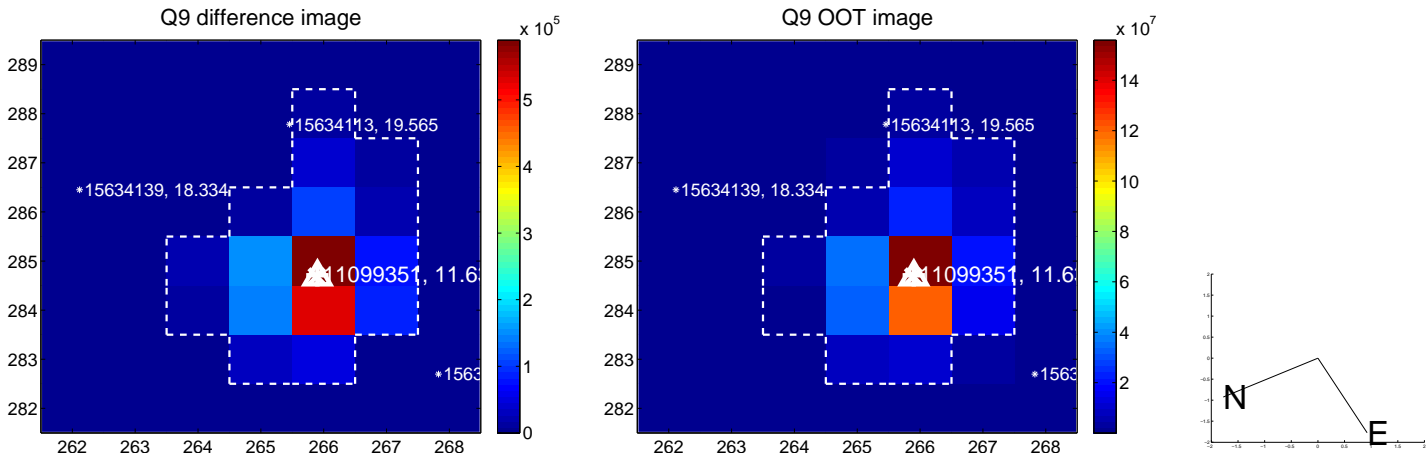


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

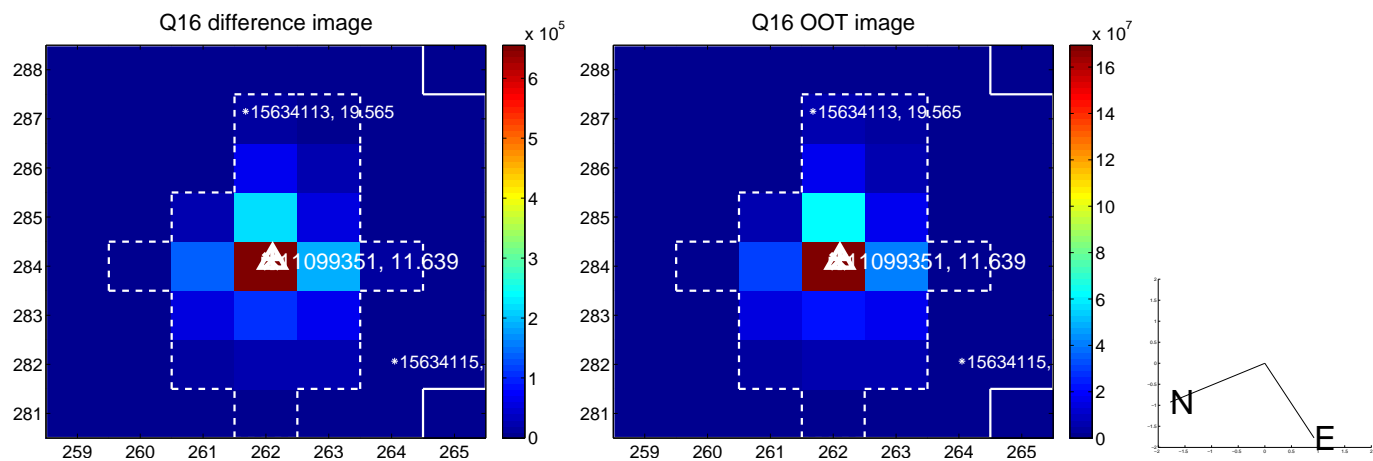
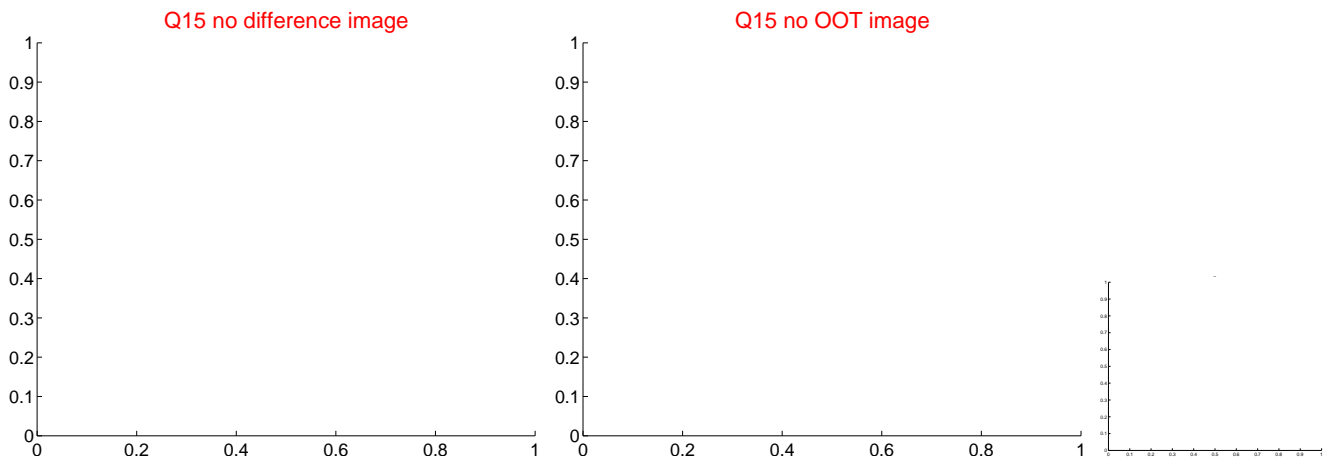
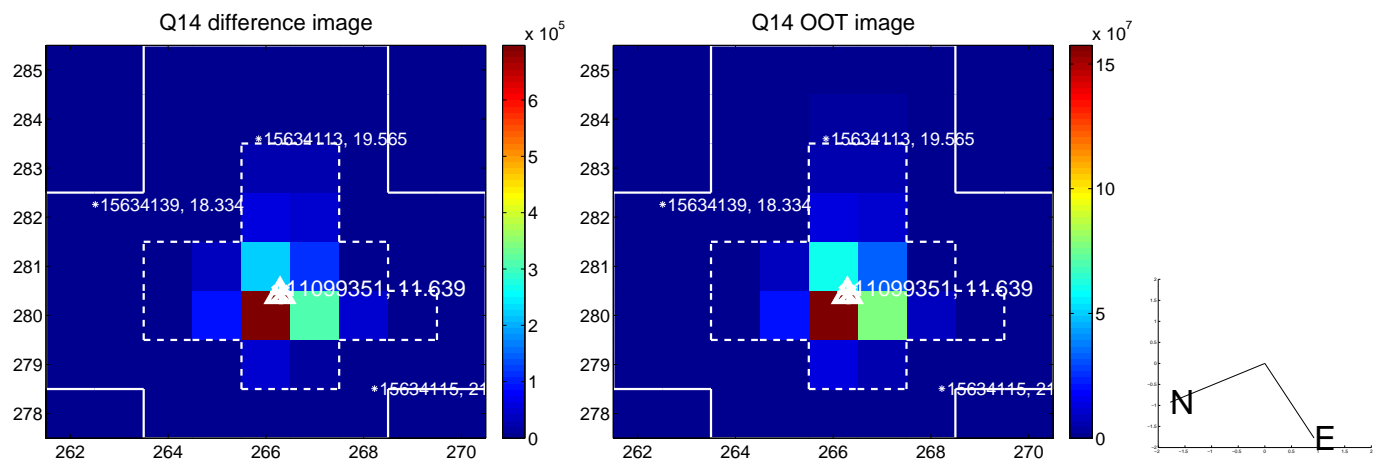
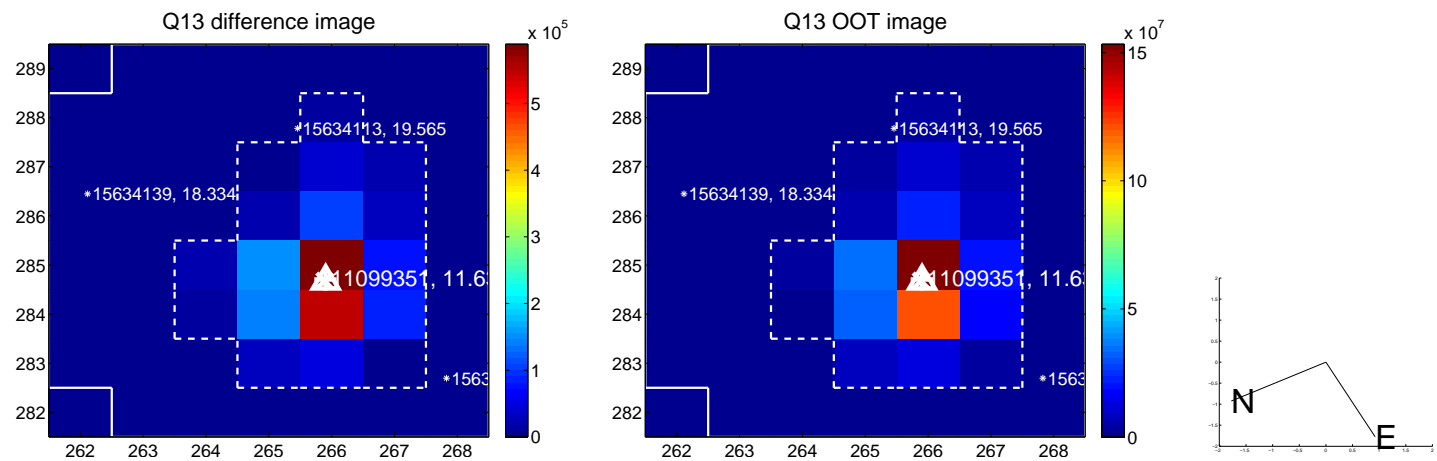




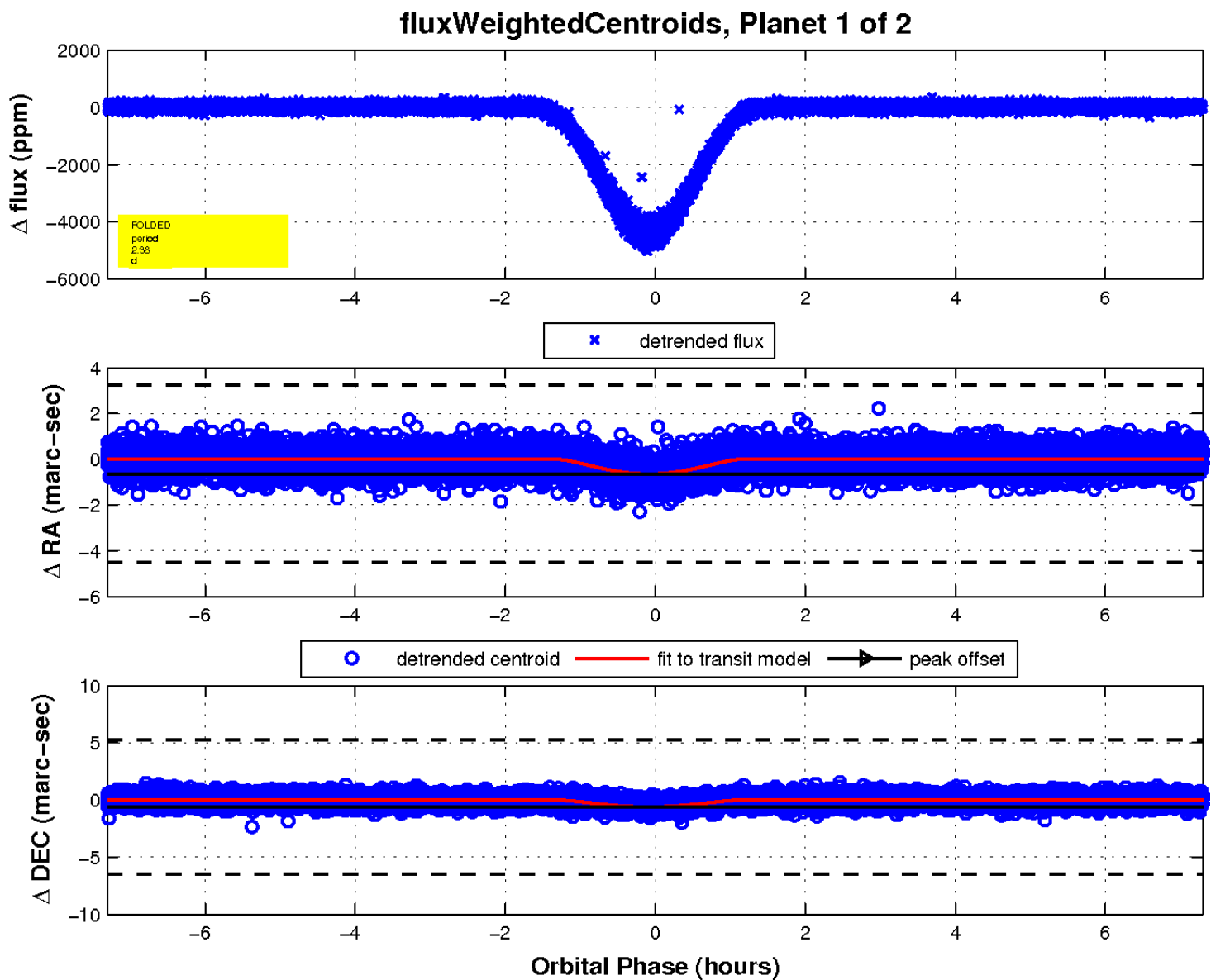
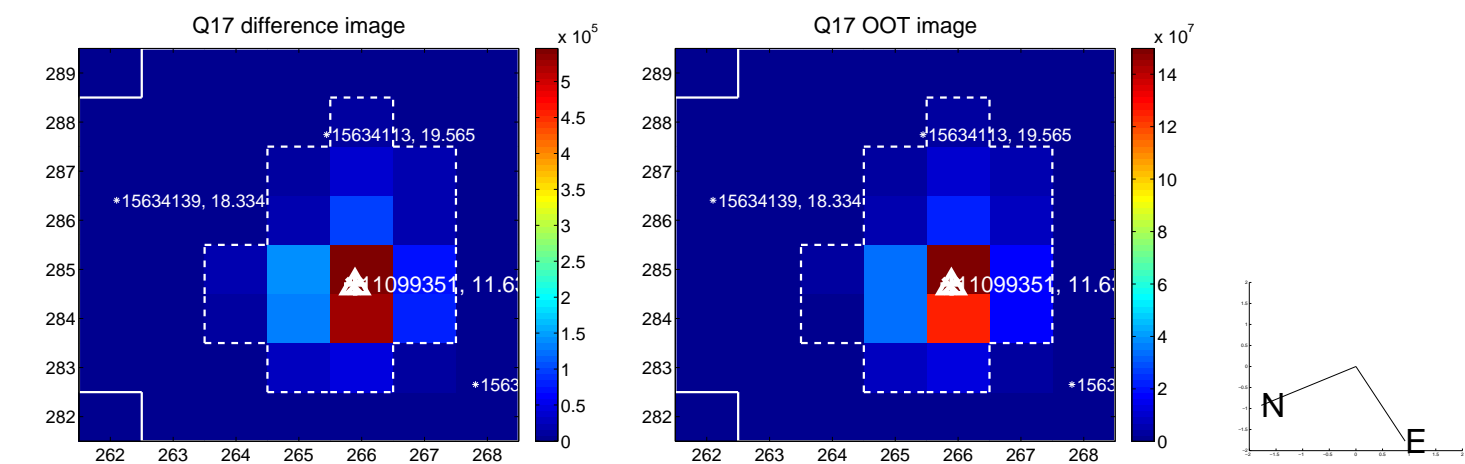
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

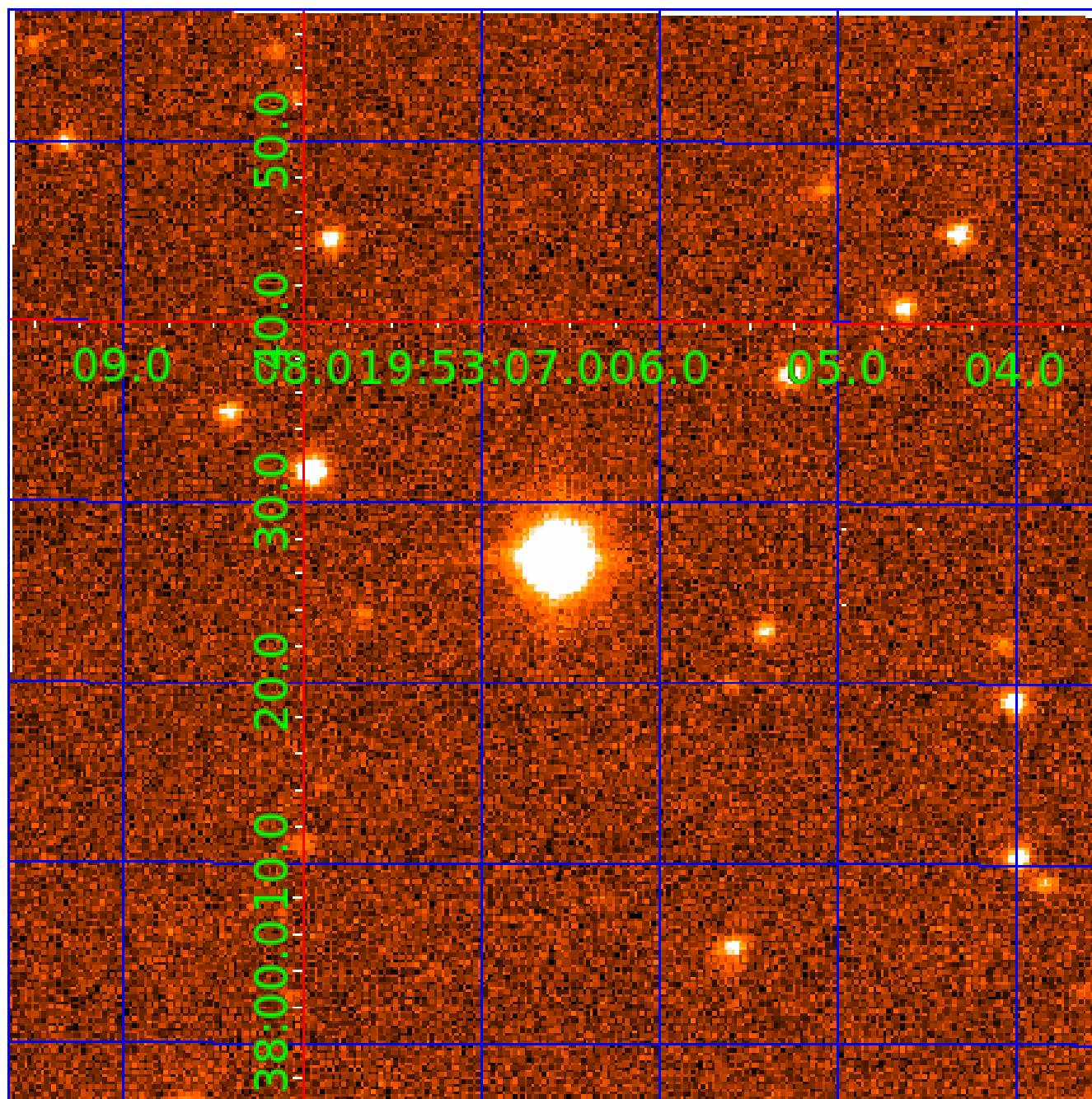


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 011099351

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011099351-01	OBS	6234.01	2.377956	132.557263	4300.2	2.434	1792.0	1355.0	2.29	9565	26.43	18312.46
011099351-02	OBS	No	2.377955	133.744852	873.7	2.421	340.4	343.9	2.29	9565	12.30	18312.47

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011099351-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—DEEP_V_SHAPED—HAS_SEC_TCE
011099351-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE

**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.

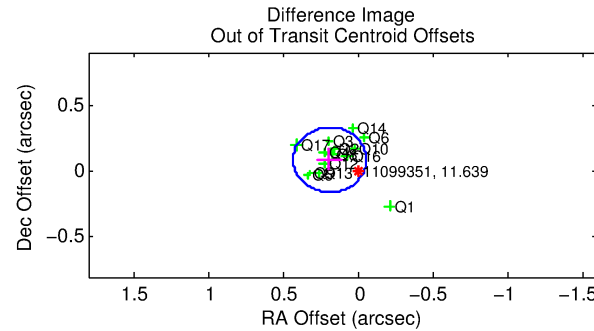
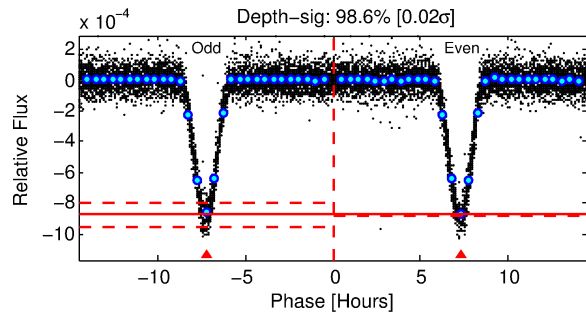
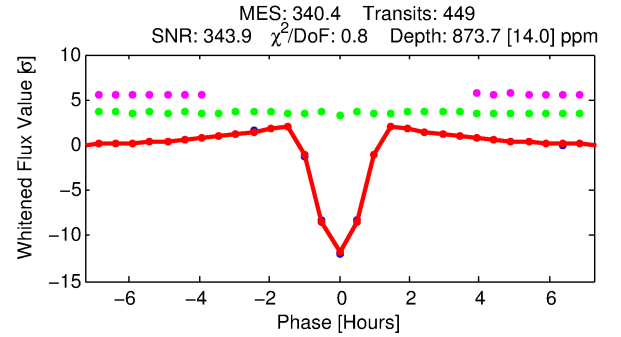
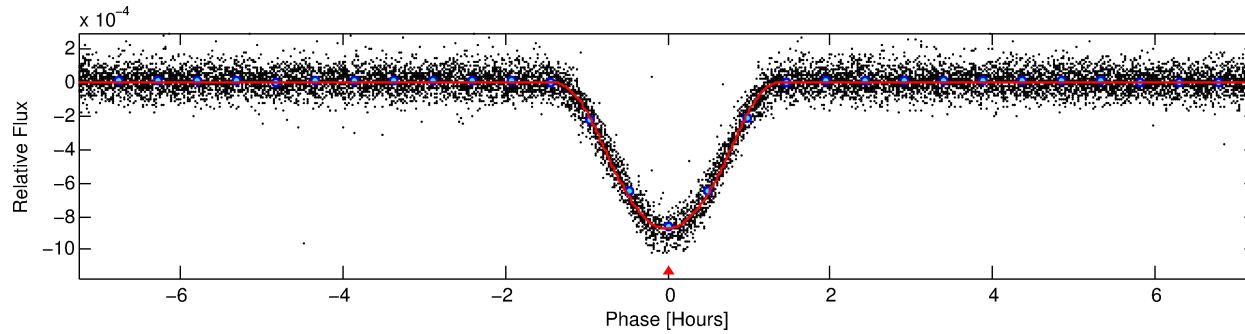
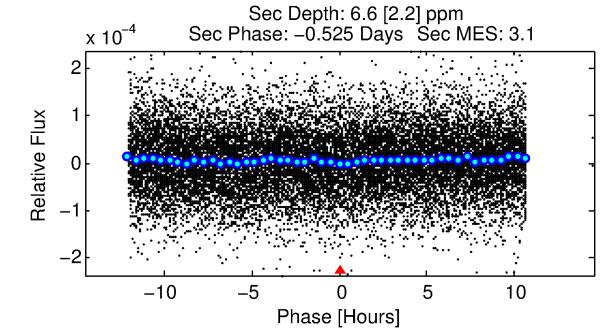
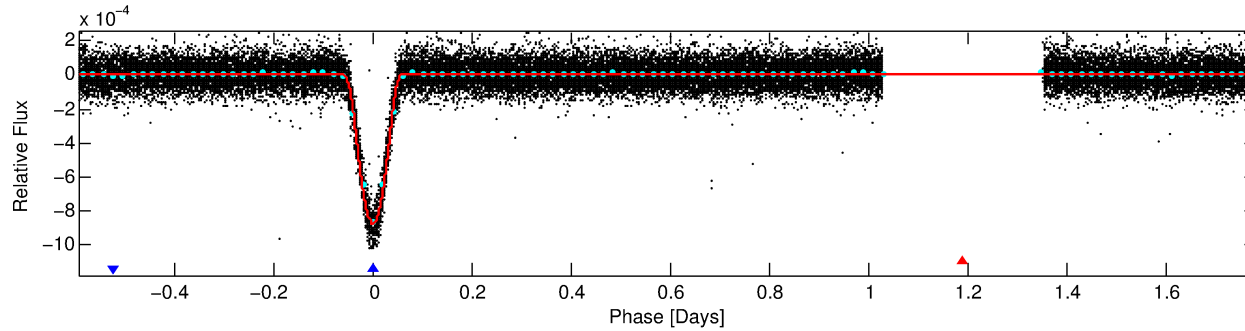
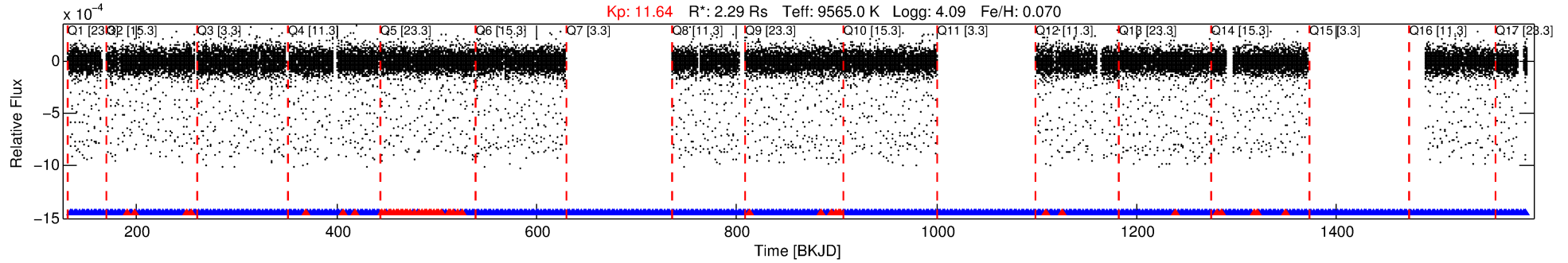
## Ephemeris Match Information For 011099351-02

No Significant Match Found

# DV One-Page Summary

KIC: 11099351 Candidate: 2 of 2 Period: 2.378 d

KOI: K06234 Corr: No Ephemeris Match



## DV Fit Results:

Period = 2.37796 [0.00000] d  
Epoch = 133.7449 [0.0001] BKJD  
Rp/R\* = 0.0493 [0.0058]  
a/R\* = 2.60 [0.06]  
b = 1.00 [0.01]  
Seff = 18312.47 [8052.23]  
Teq = 2966 [326] K  
Rp = 12.30 [4.75] Re  
a = 0.0463 [0.0136] AU  
Ag = 0.05 [0.03] [-31.85 $\sigma$ ]  
Teffp = 2185 [245] K [-1.92 $\sigma$ ]

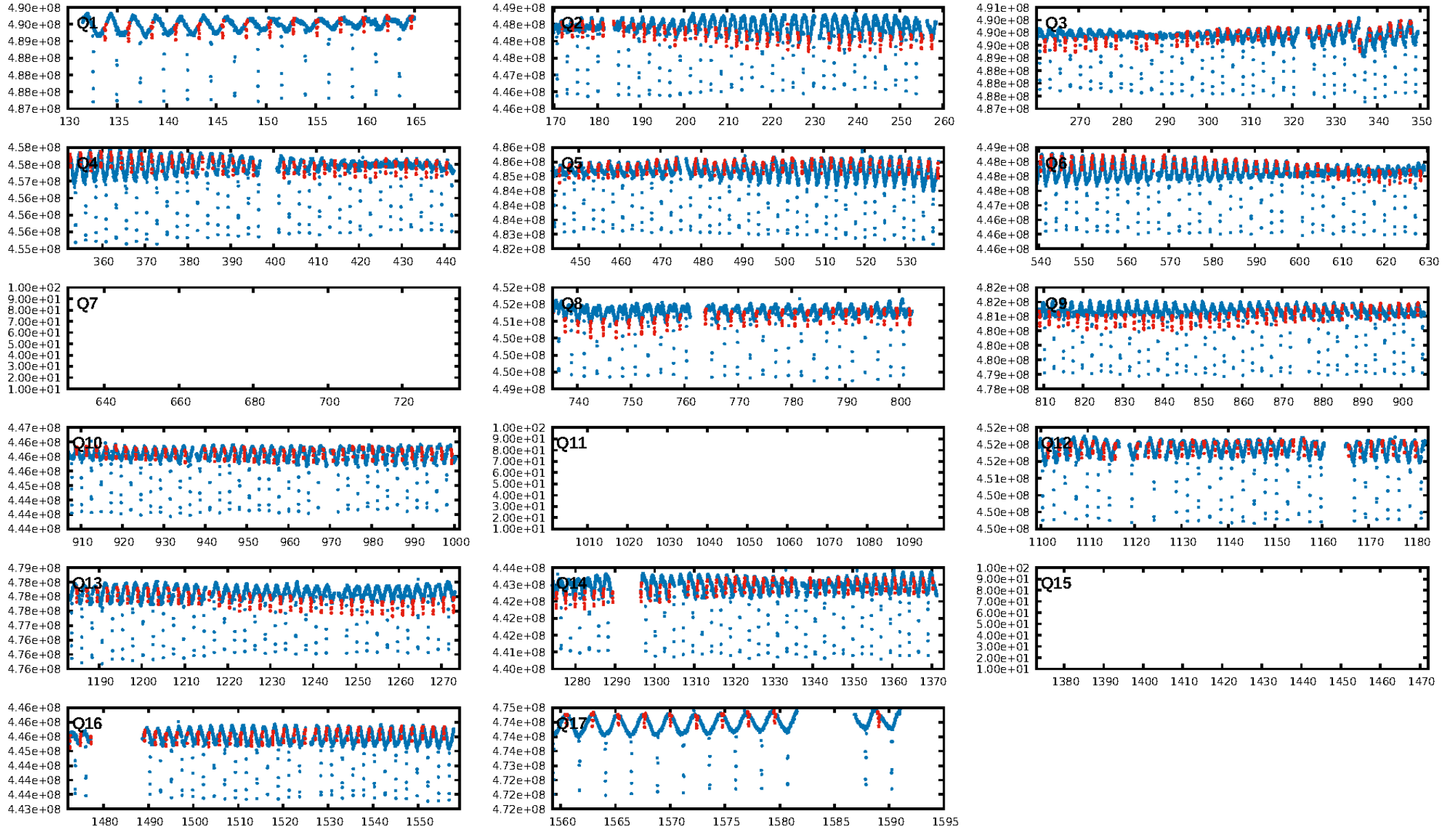
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 0.88 [376/425]  
GhostDiagnostic-chr: 88.43  
Centroid-sig: 0.0%  
Centroid-so: 0.034 arcsec [0.97 $\sigma$ ]  
OotOffset-rm: 0.207 arcsec [2.54 $\sigma$ ]  
KicOffset-rm: 0.116 arcsec [1.44 $\sigma$ ]  
OotOffset-st: 4/1/4/5 [14]  
KicOffset-st: 4/1/4/5 [14]  
DiffImageQuality-fgm: 1.00 [14/14]  
DiffImageOverlap-fno: 1.00 [14/14]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 06:04:55 Z

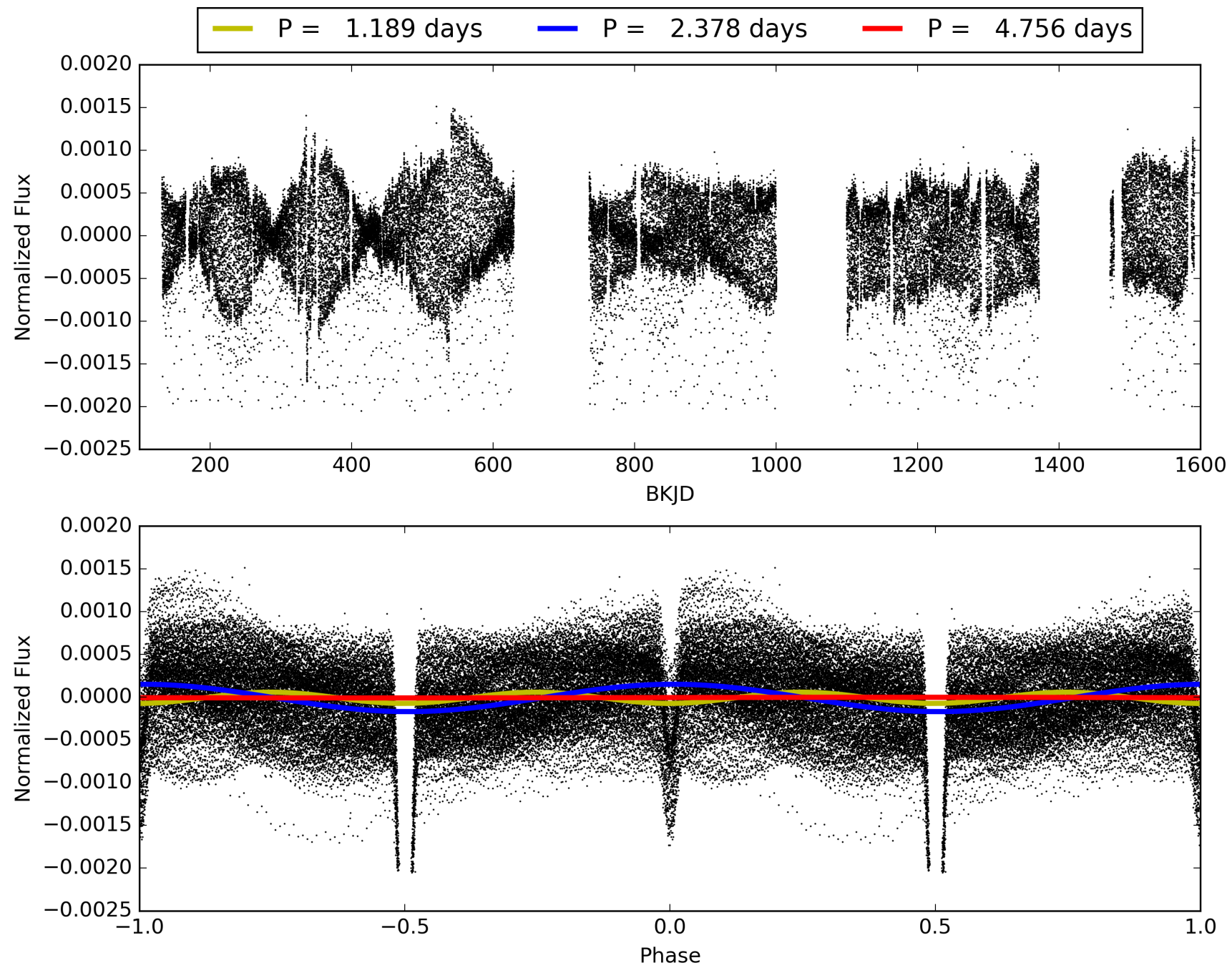
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 011099351-02, PDC Light Curves





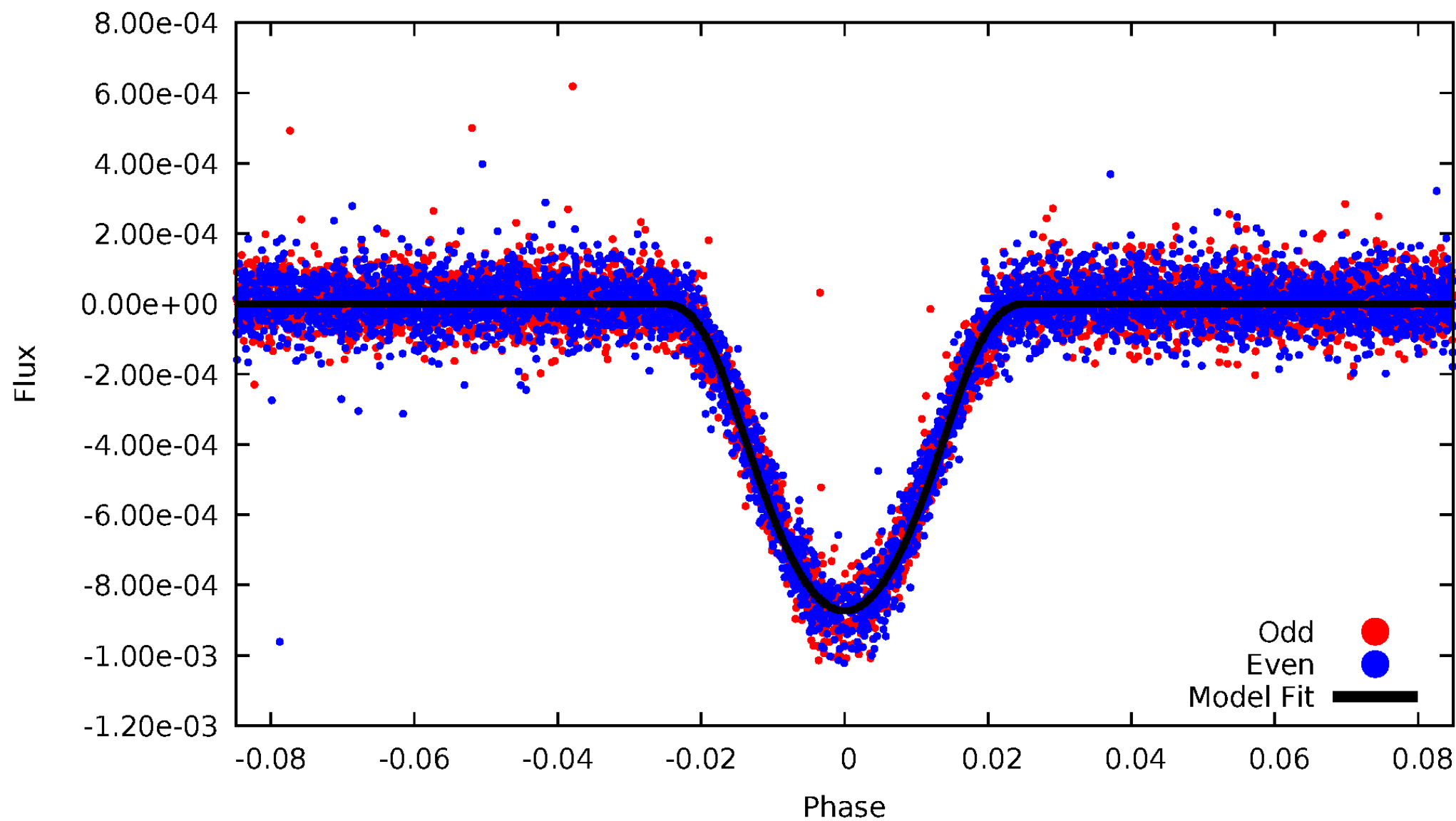
TCE 011099351-02





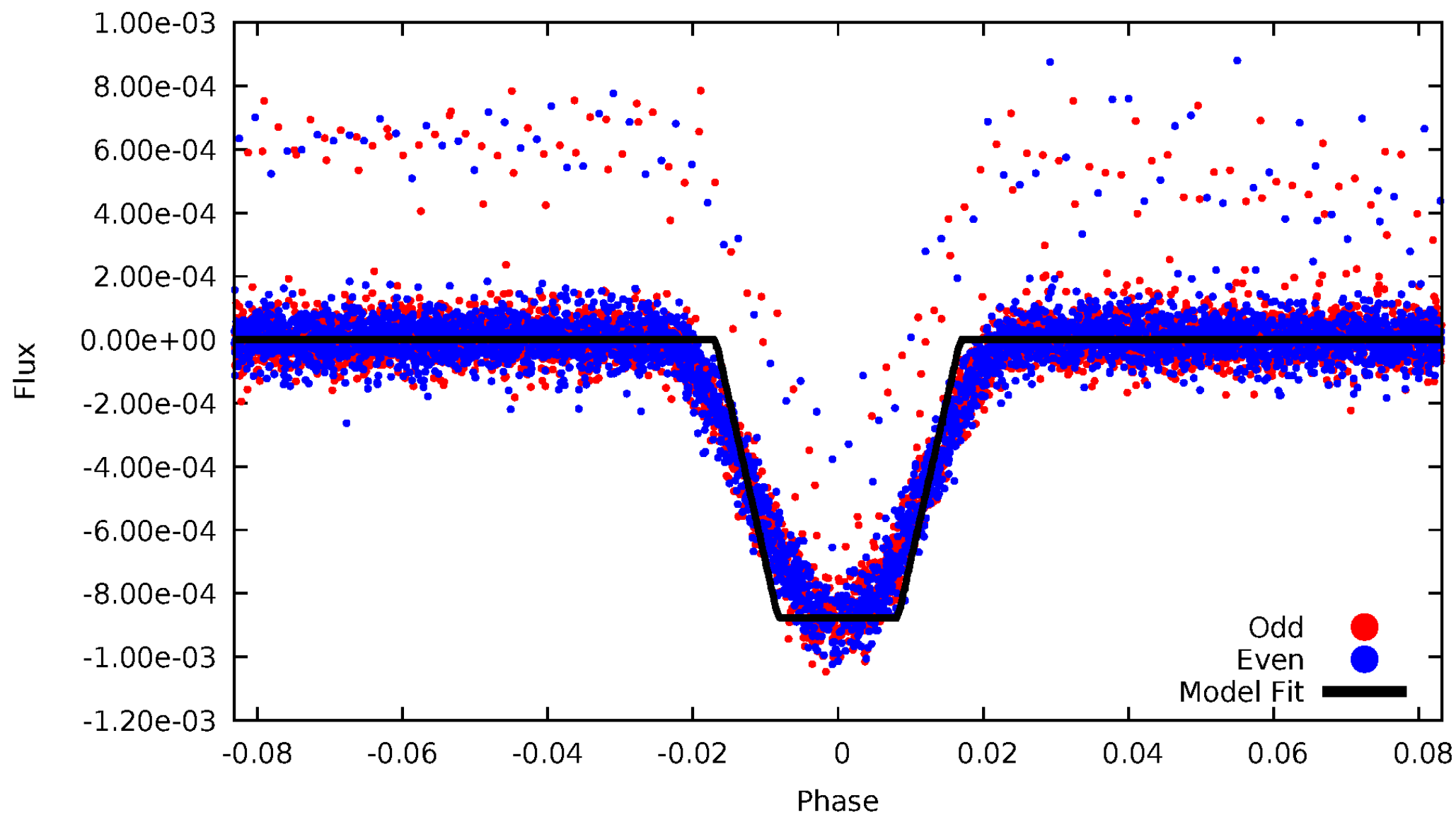
# DV Odd/Even

TCE 011099351-02



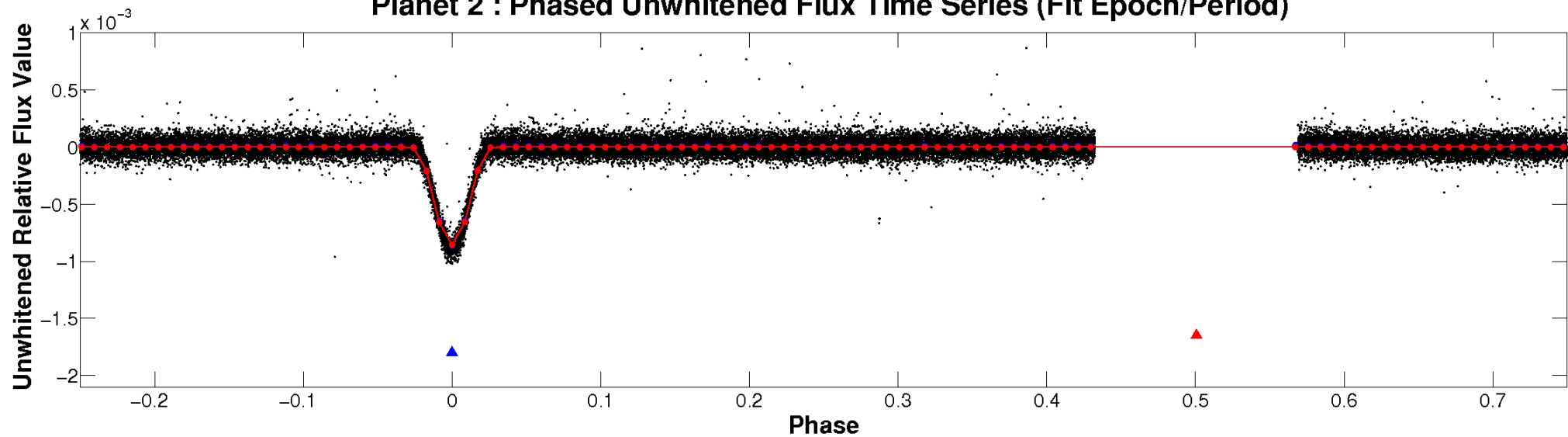
# ALT Odd/Even

TCE 011099351-02

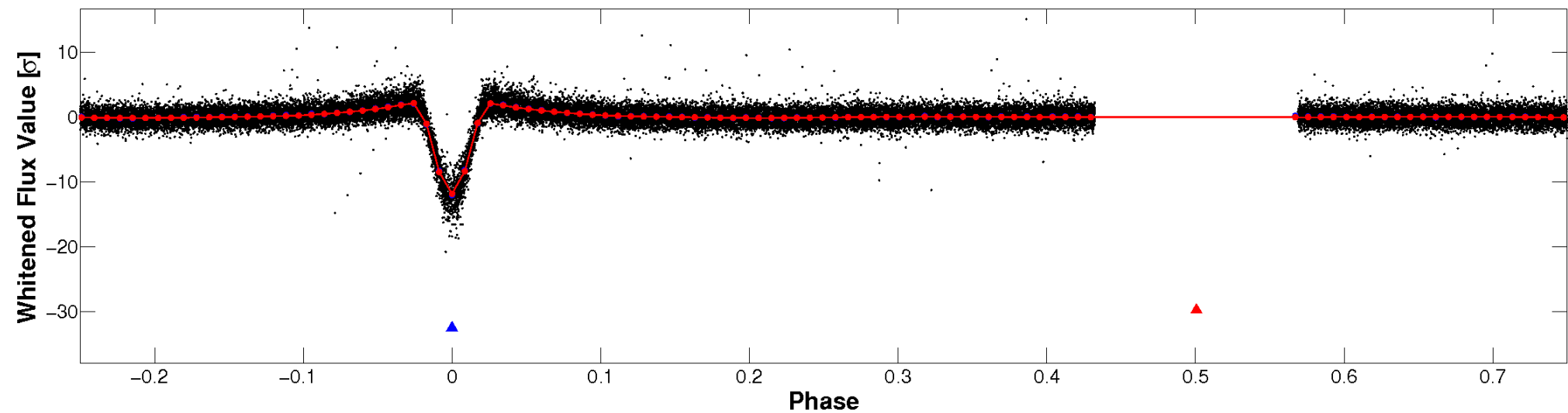


# Non-Whitened Vs. Whitened Light Curve

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

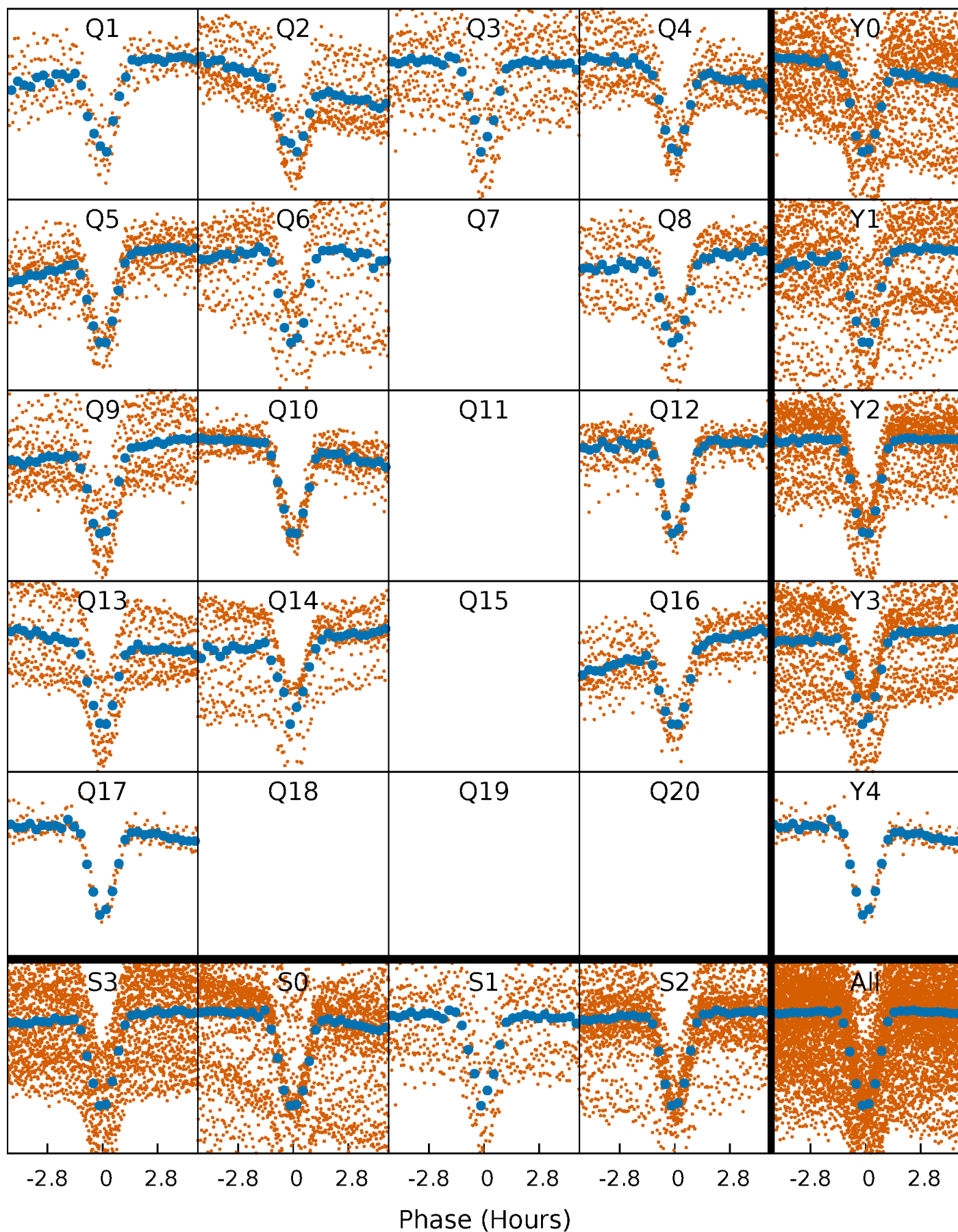


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



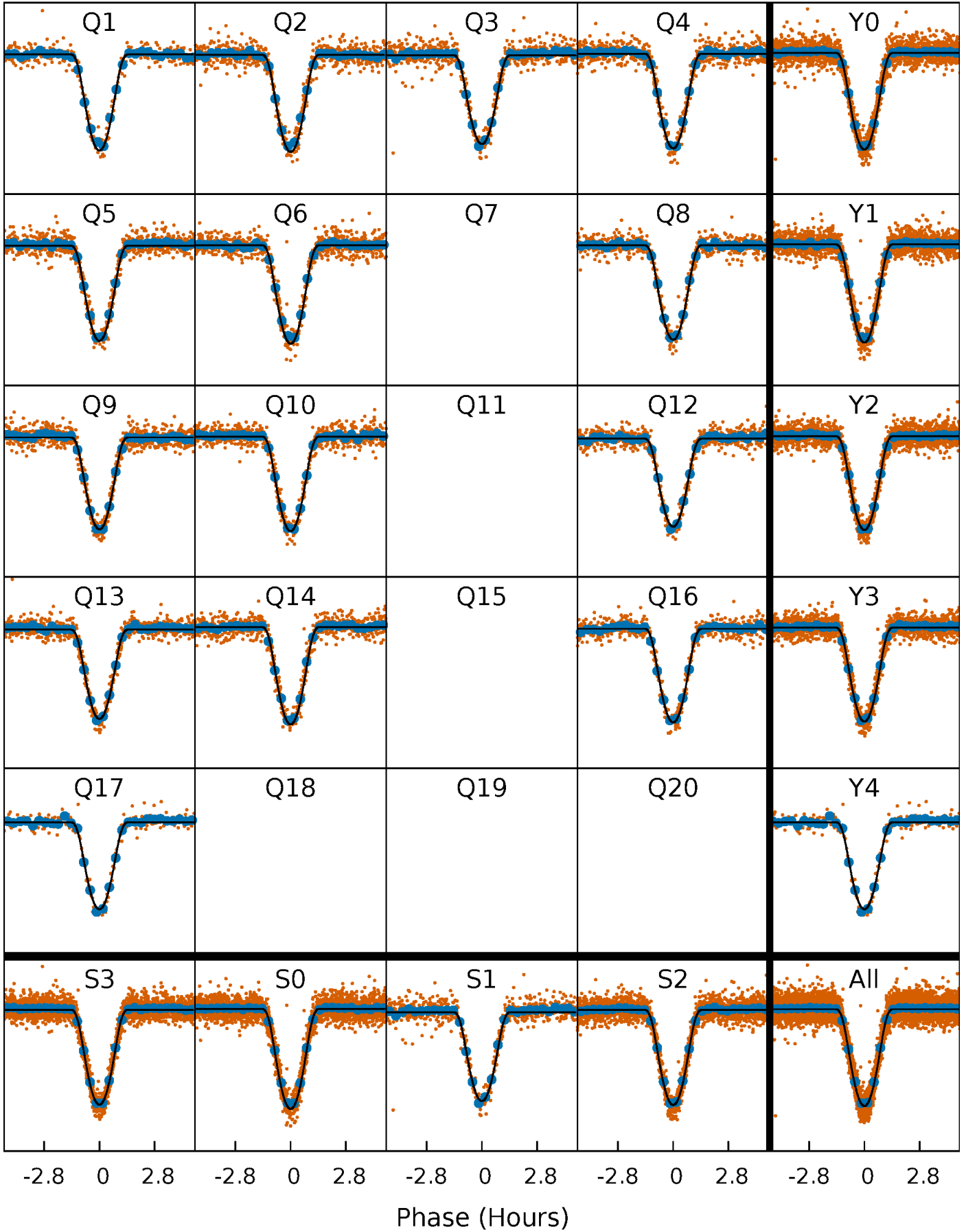
# PDC Quarter-Phased Transit Curves

TCE 011099351-02   P= 2.377955 Days    $T_0=133.744853$  (BKJD)



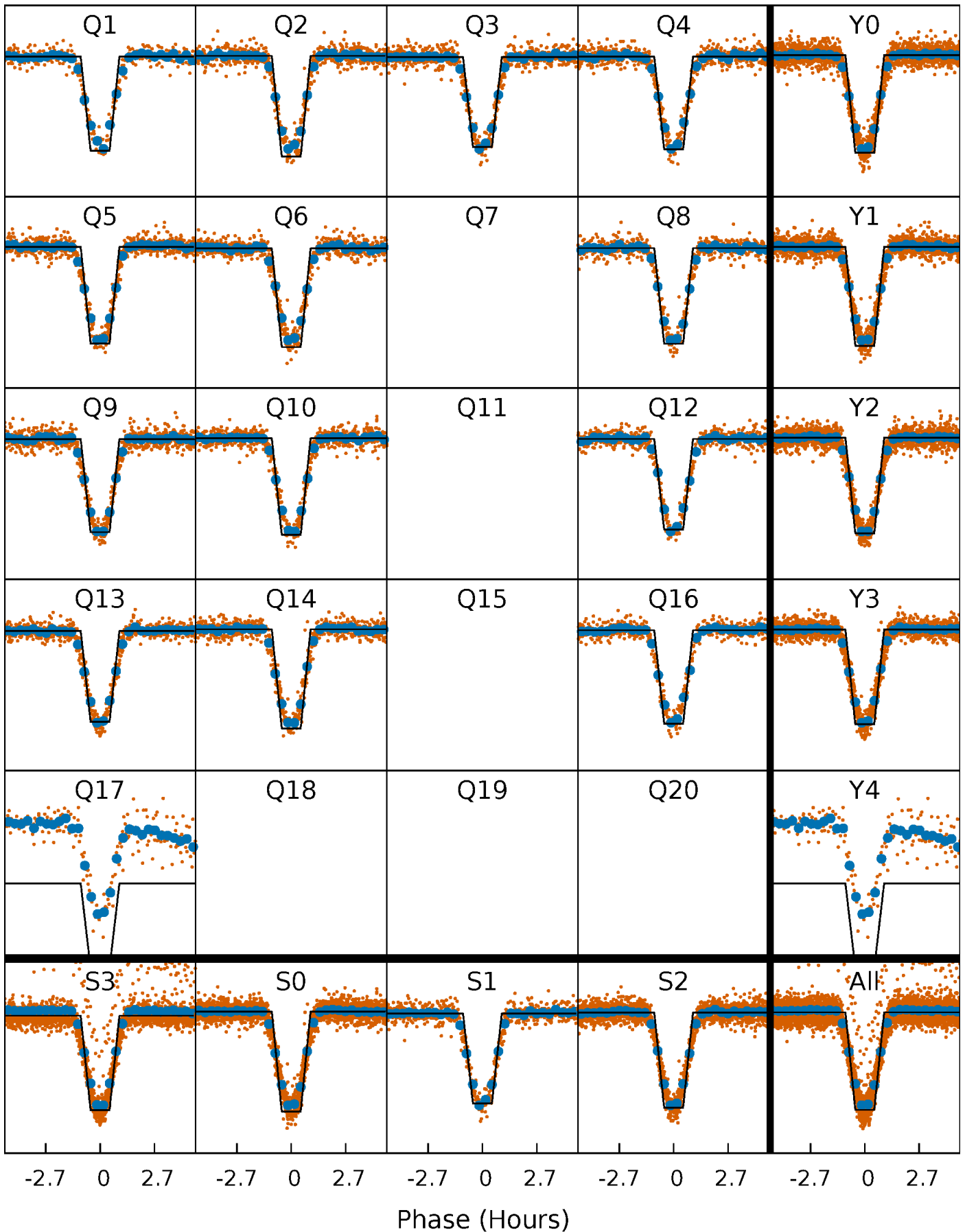
# DV Quarter-Phased Transit Curves

TCE 011099351-02   P= 2.377955 Days    $T_0=133.744853$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

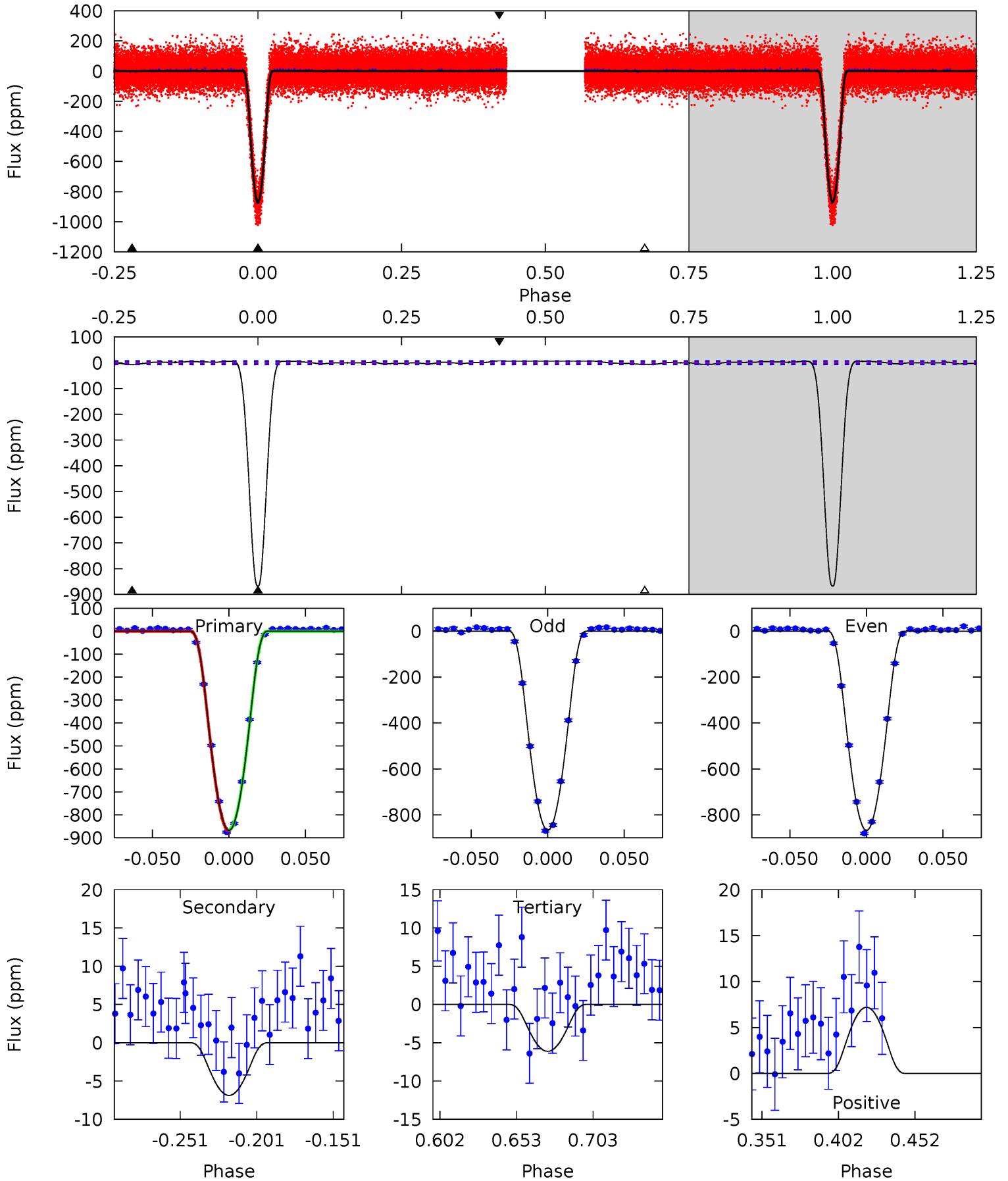
TCE 011099351-02     $P = 2.377955$  Days     $T_0 = 133.744629$  (BKJD)



# DV Model-Shift Uniqueness Test

011099351-02, P = 2.377955 Days, E = 131.366898 Days

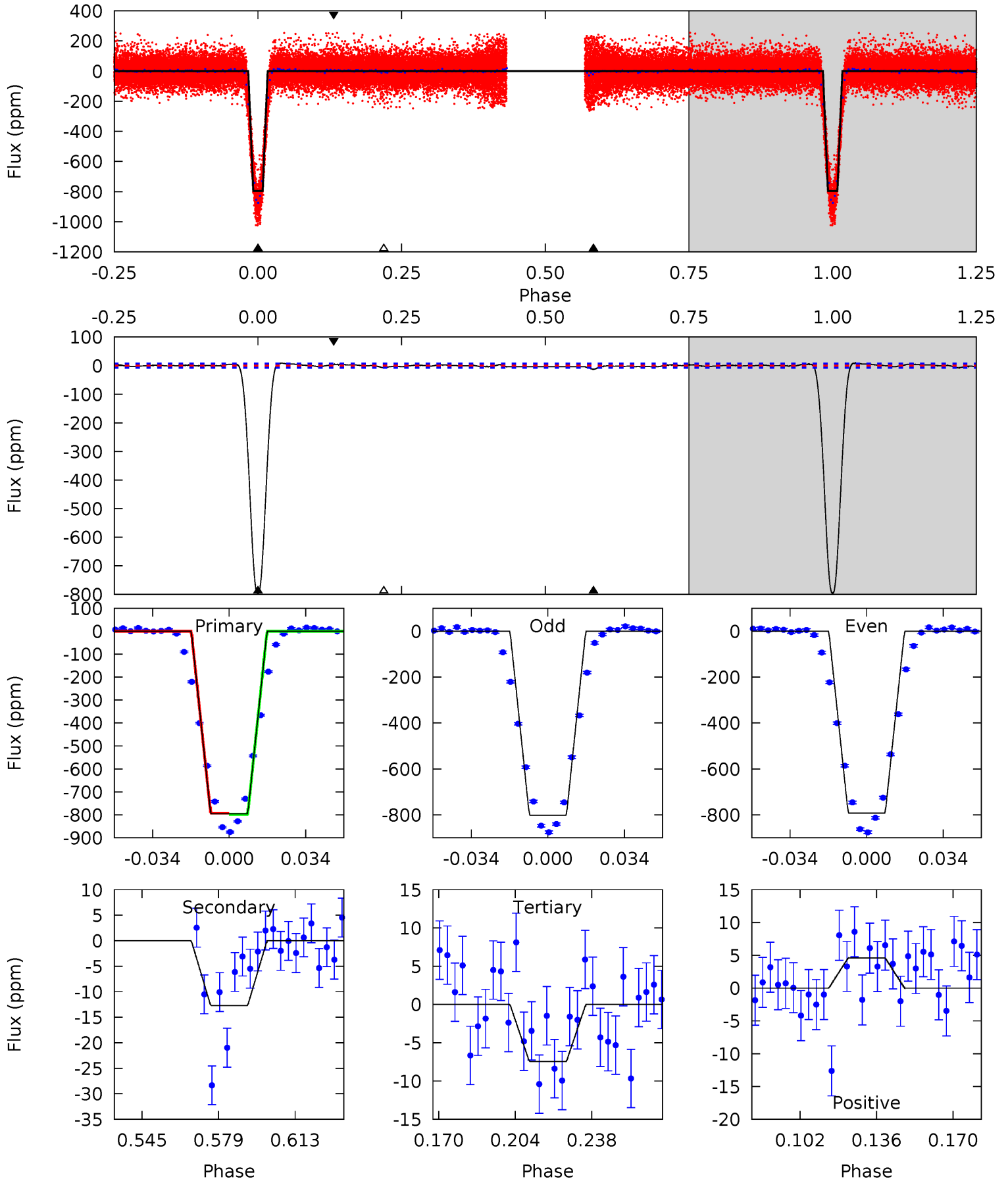
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
679.3	5.38	4.79	5.64	4.71	1.96	2.50	674.5	673.6	0.59	-0.25	0.26	0.99	0.01	1.87



# Alt Model-Shift Uniqueness Test

011099351-02, P = 2.377955 Days, E = 131.366674 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
523.7	8.36	4.90	3.03	4.79	2.12	1.75	518.8	520.7	3.45	5.33	3.23	0.97	0.01	2.00





### Stellar Parameters For KIC 011099351

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$9565^{+302}_{-416}$	$4.088^{+0.171}_{-0.209}$	$0.070^{+0.150}_{-0.600}$	$2.286^{+0.841}_{-0.688}$	$2.335^{+0.366}_{-0.679}$	$0.275^{+0.316}_{-0.146}$
	+3%/-4%	+4%/-5%	+214%/-857%	+37%/-30%	+16%/-29%	+115%/-53%
Source	KIC0	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 011099351-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-7 \pm 1$	$12.39^{+2.74}_{-2.57}$	$4157^{+382}_{-308}$	$-3511^{+206}_{-238}$	$0.051^{+0.029}_{-0.017}$
Alt.	$-13 \pm 2$	$7.25^{+1.99}_{-1.93}$	$4130^{+376}_{-318}$	$-2543^{+5768}_{-713}$	$0.273^{+0.208}_{-0.101}$

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

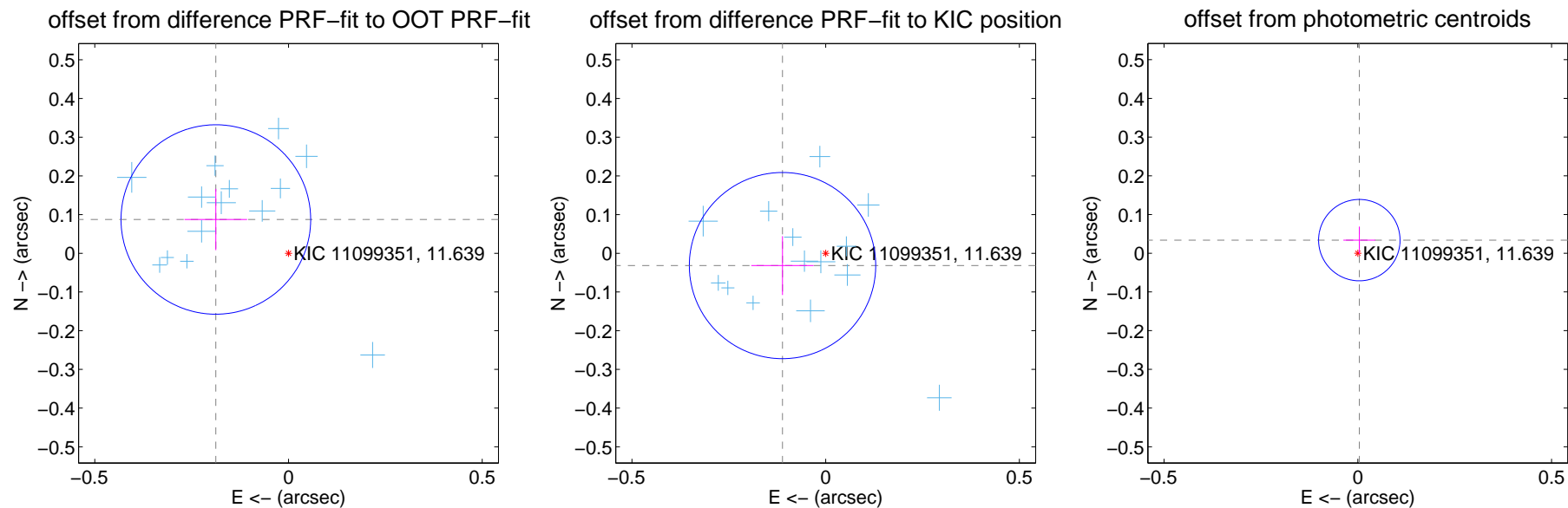
## DV Centroid Data

Supplemental centroid analysis for 011099351-02. **Kepler magnitude: 11.64.** Transit SNR 343.93

There are 14 quarters with good PRF difference image offsets

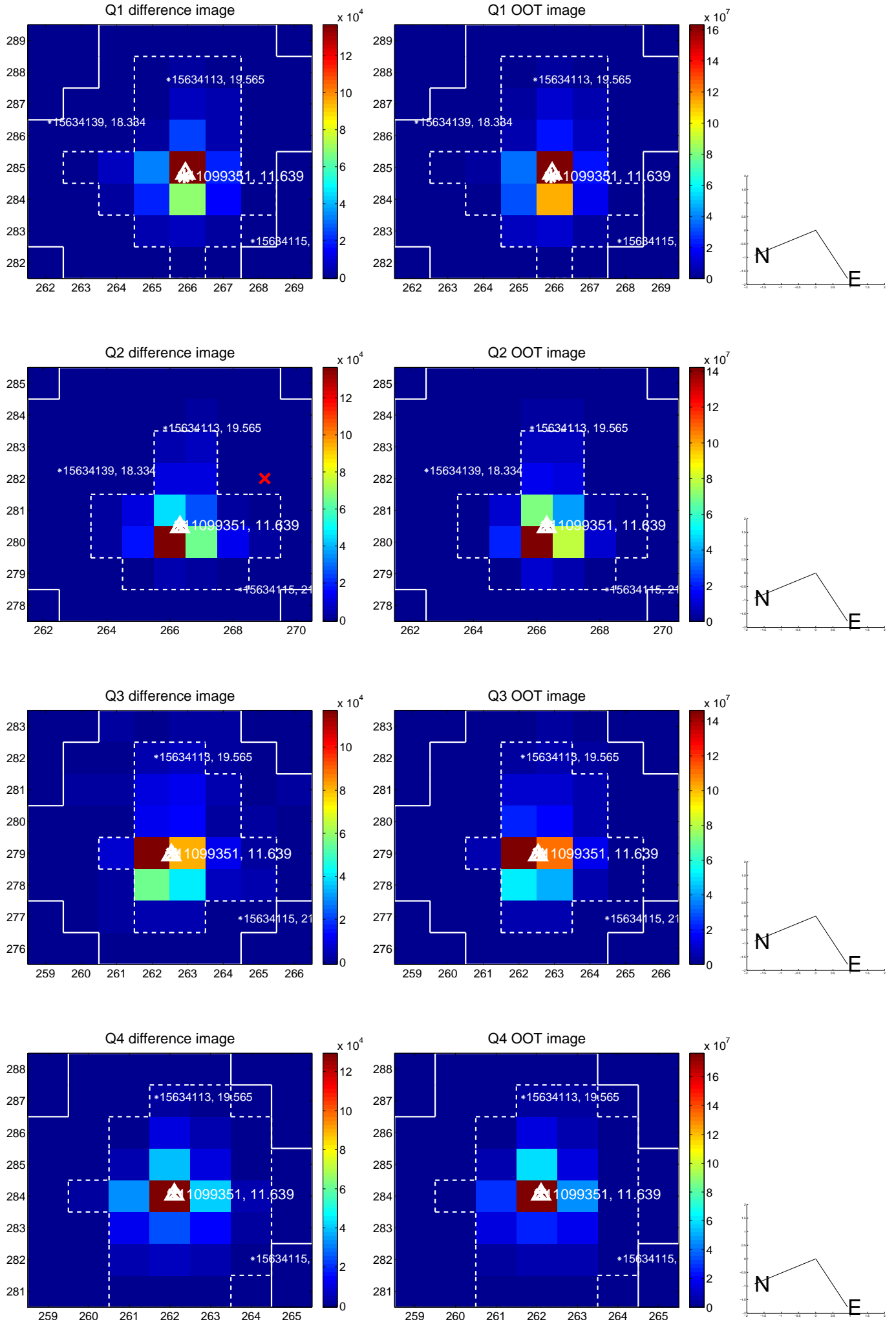
The direct PRF centroid is offset from the target star catalog position by about 0.14 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.207 \pm 0.082$	2.54	$0.188 \pm 0.081$	$0.087 \pm 0.079$
PRF-fit source offset from KIC position	$0.116 \pm 0.080$	1.44	$0.111 \pm 0.081$	$-0.032 \pm 0.076$
photometric centroid source offset	$0.03 \pm 0.04$	0.97	$-0.00 \pm 0.04$	$0.03 \pm 0.03$

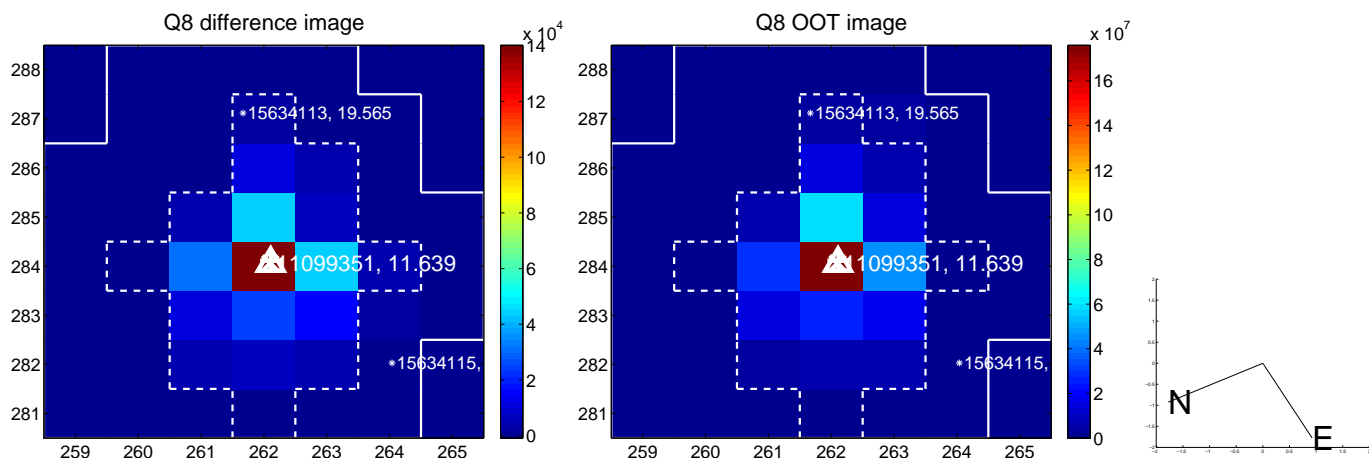
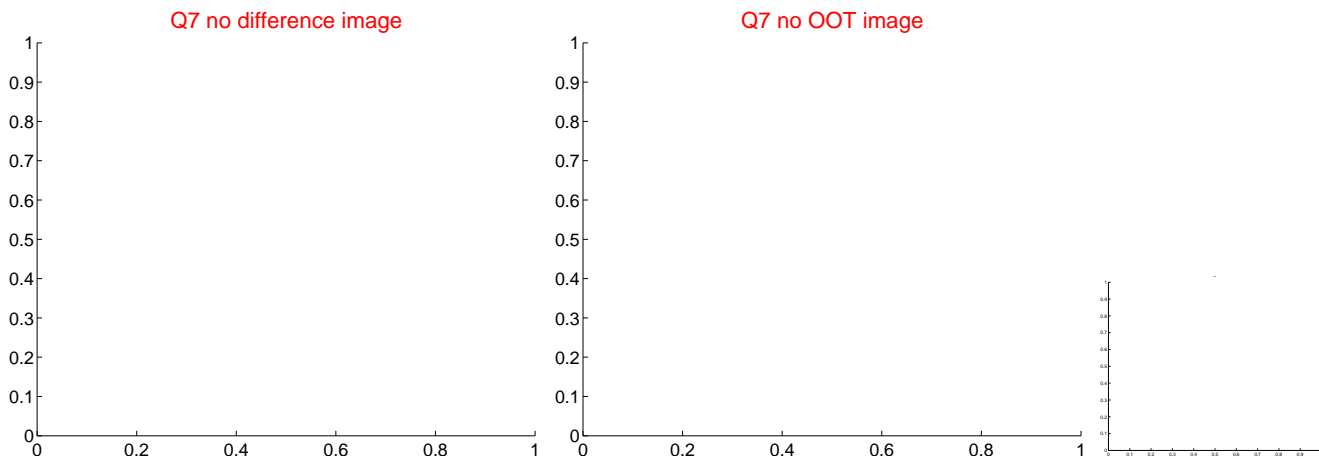
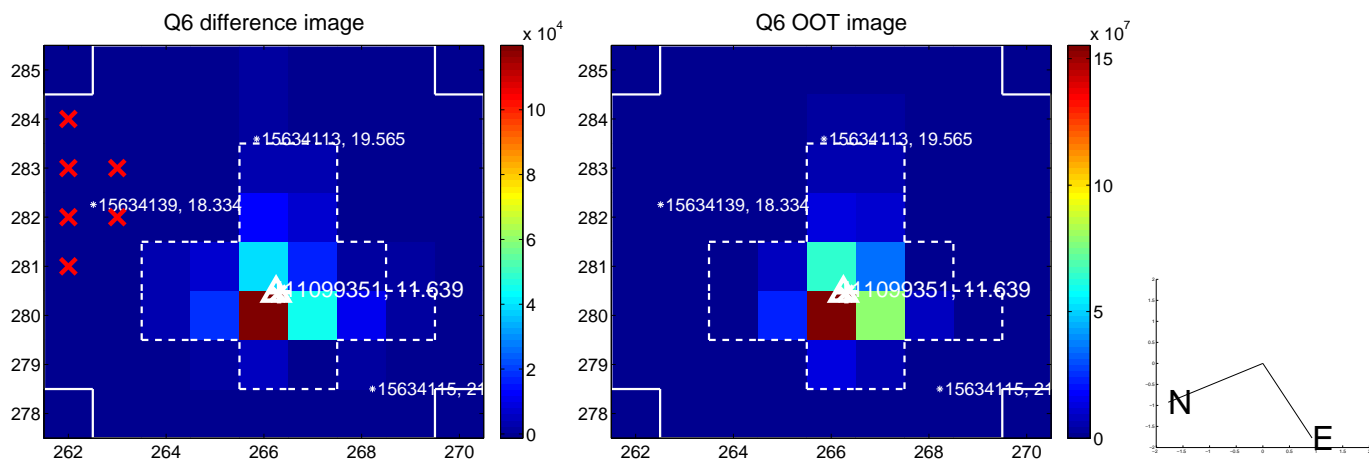
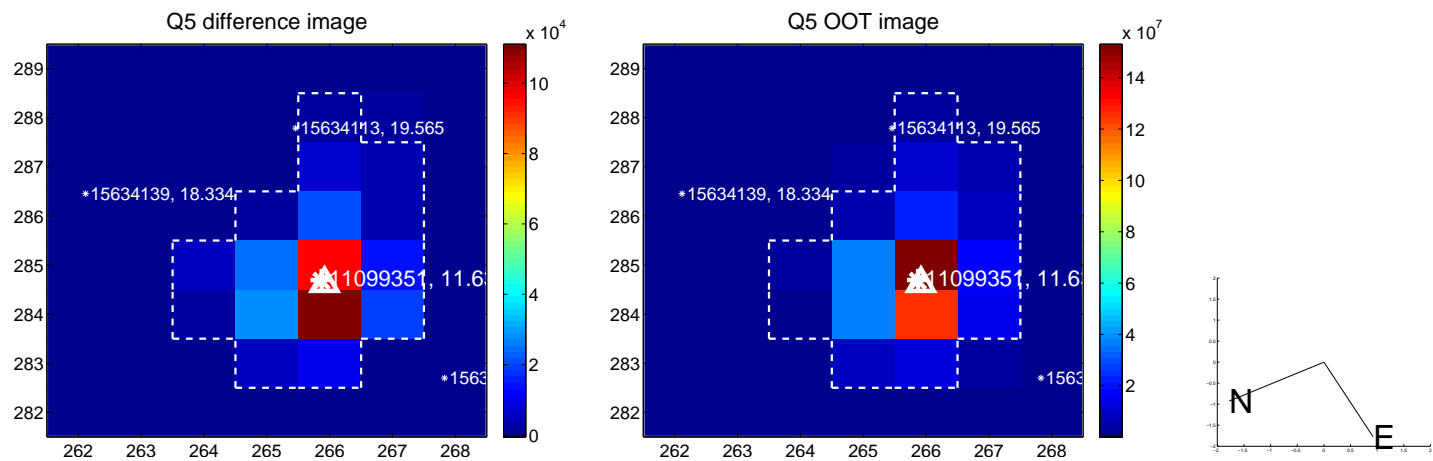


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

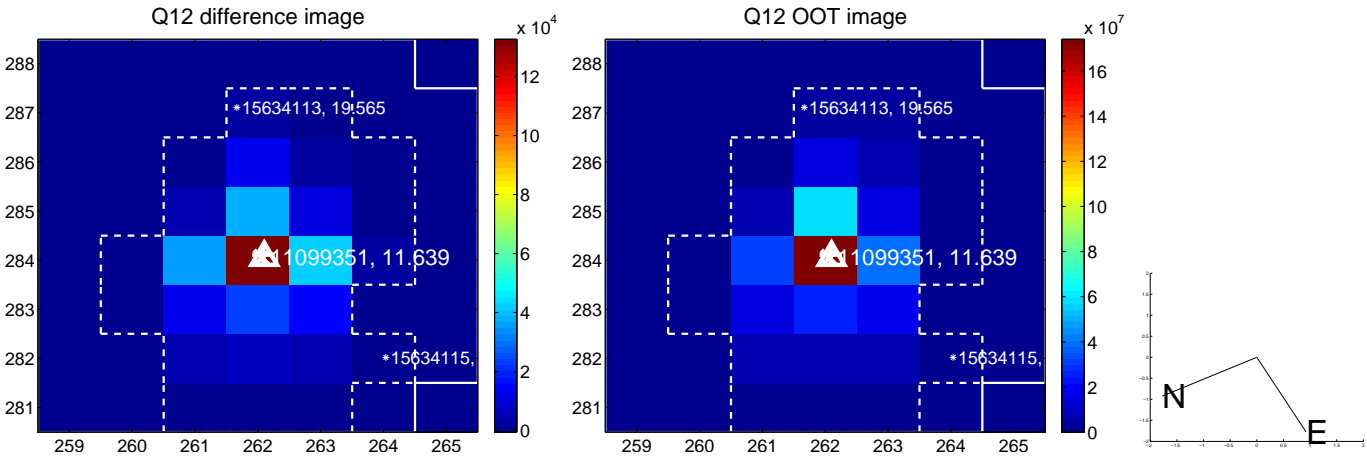
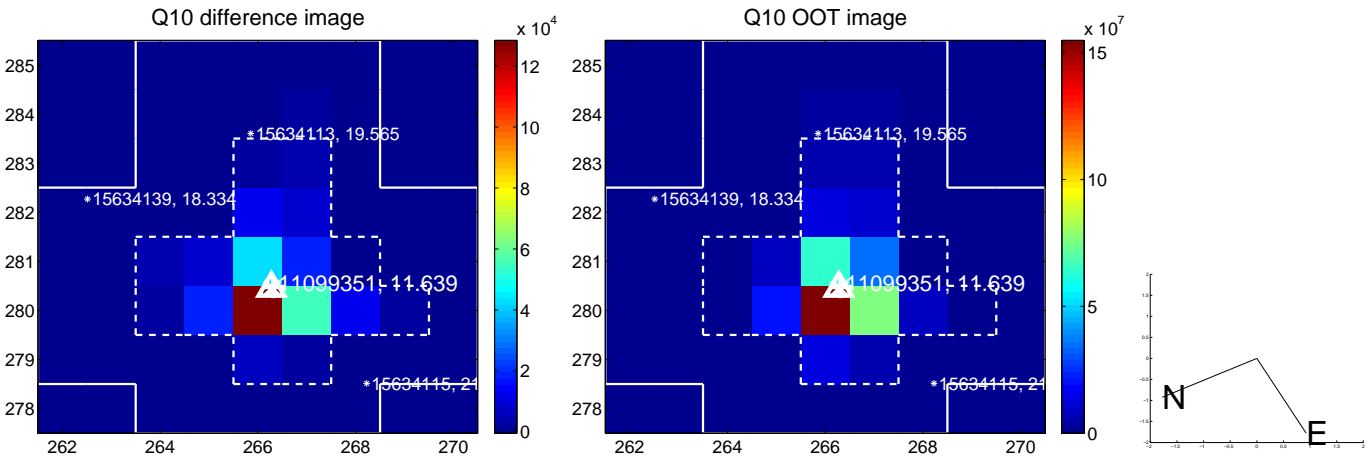
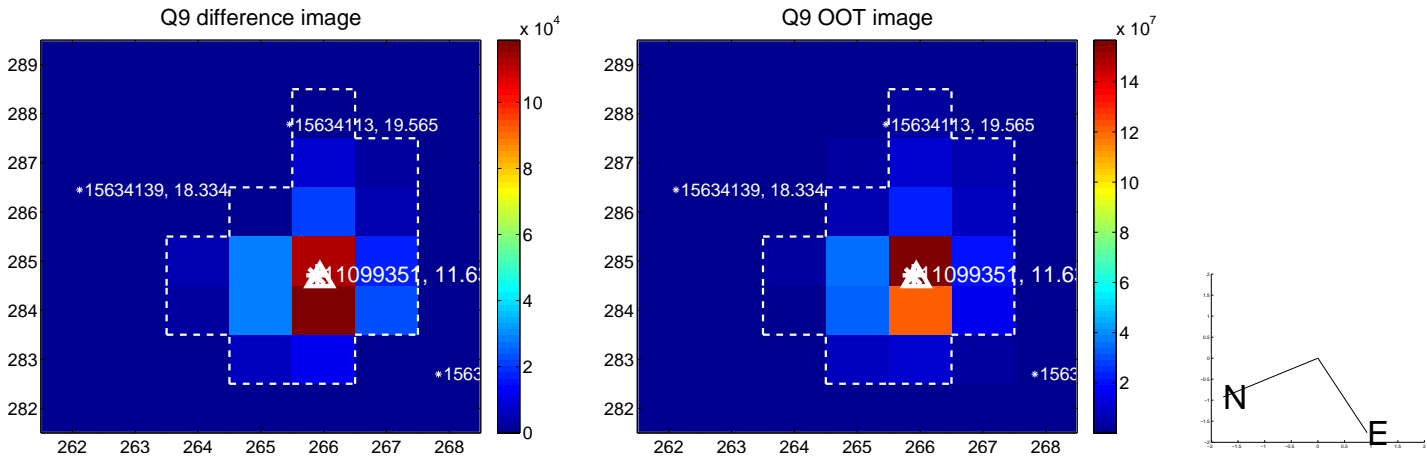
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



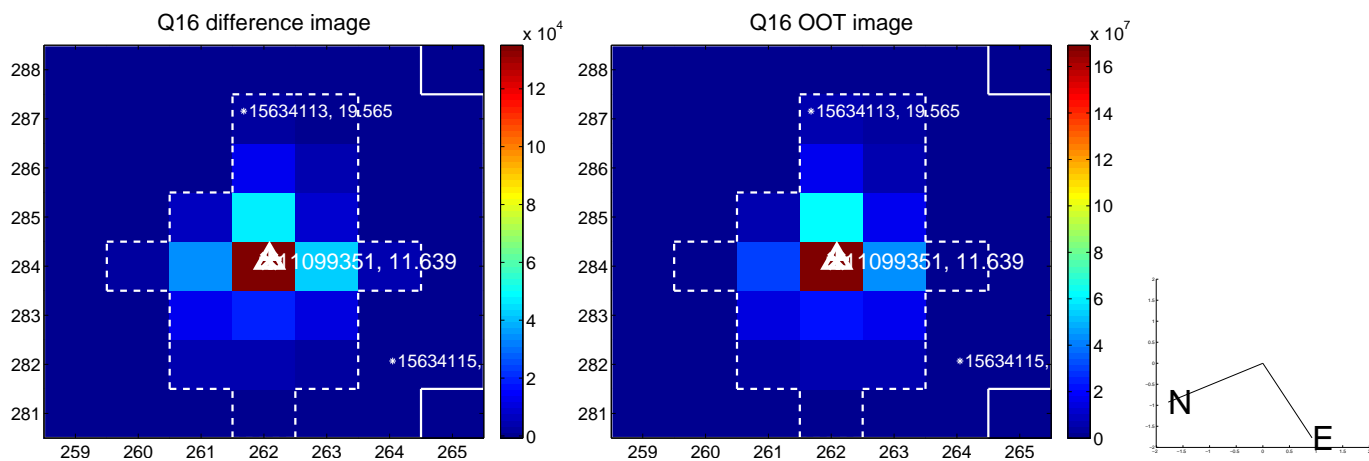
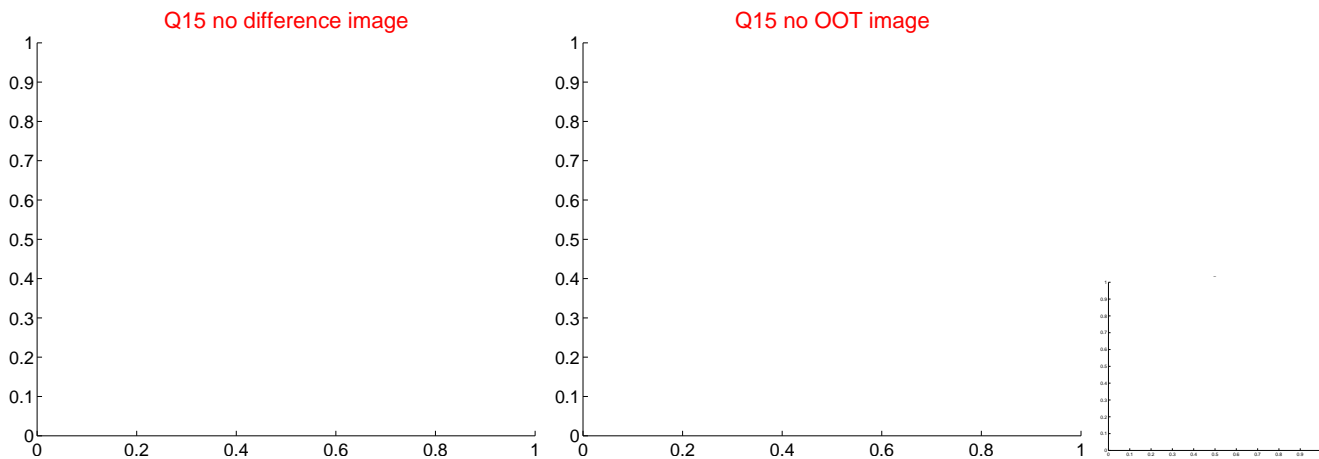
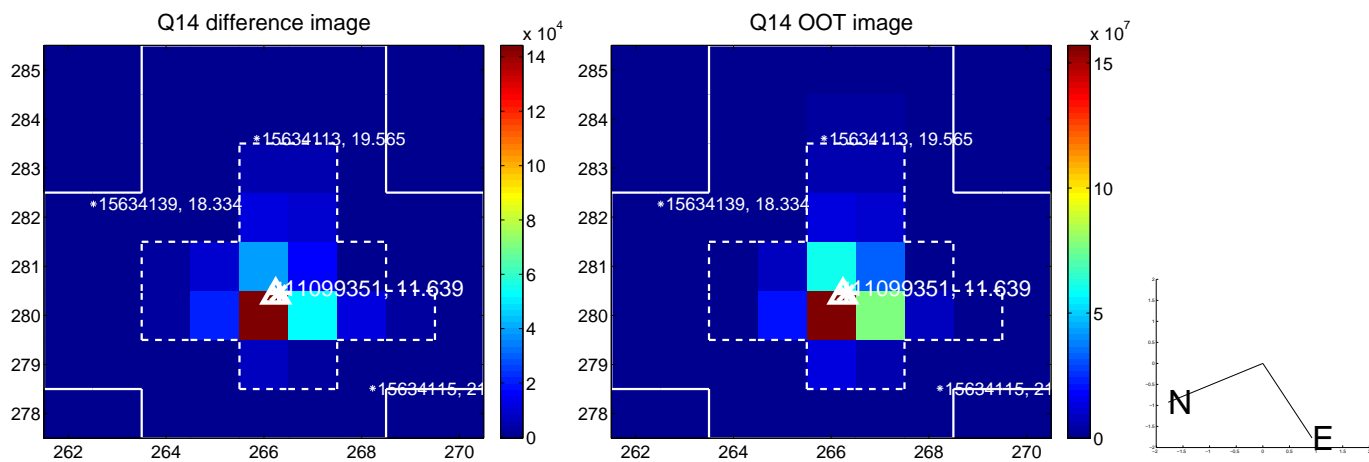
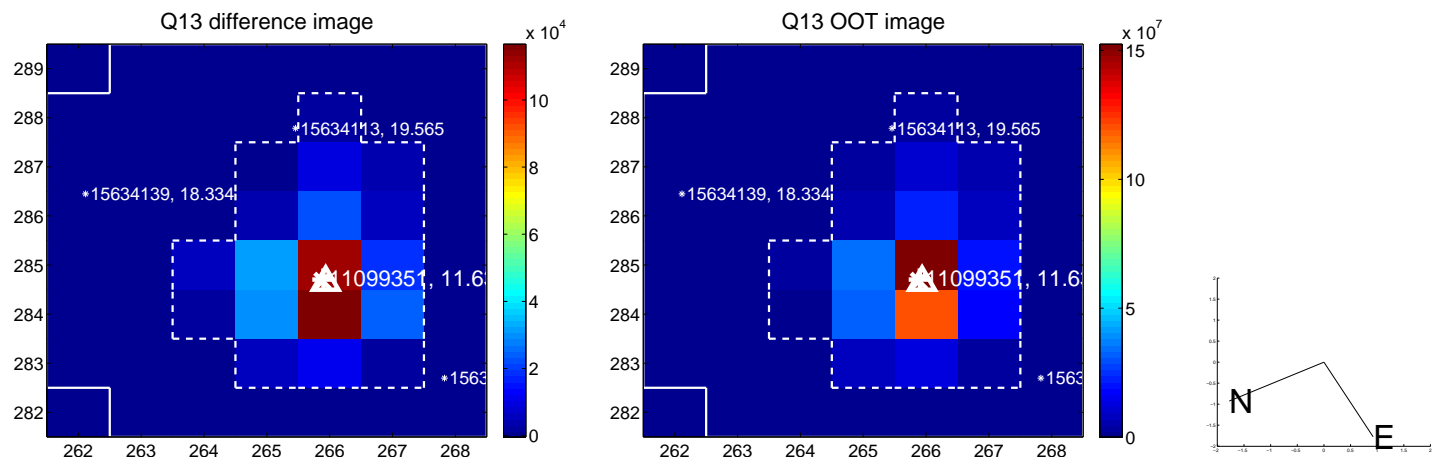
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



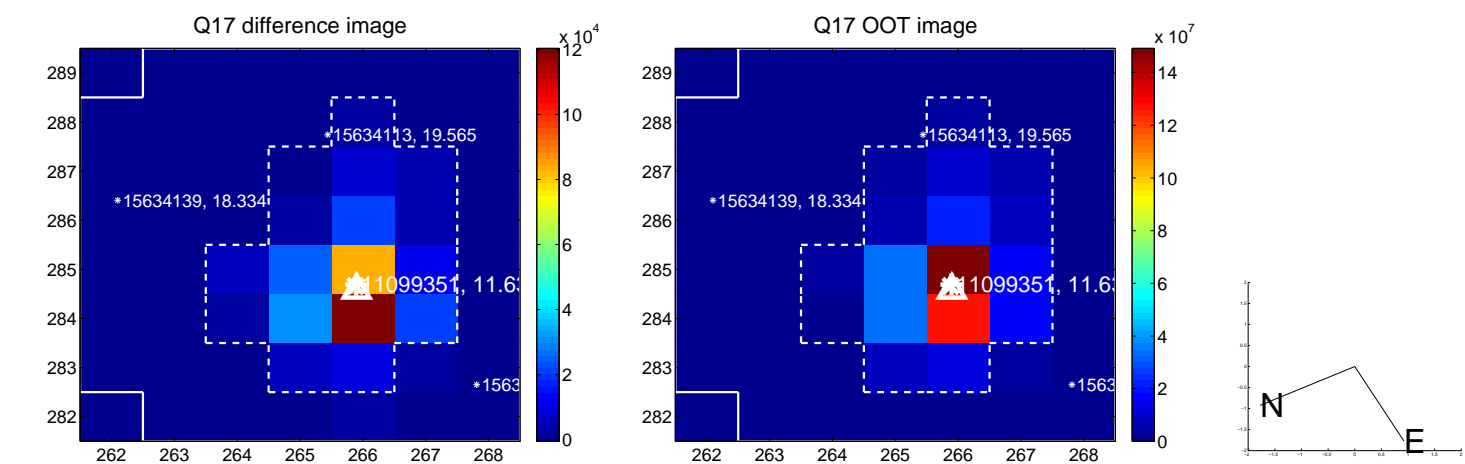
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



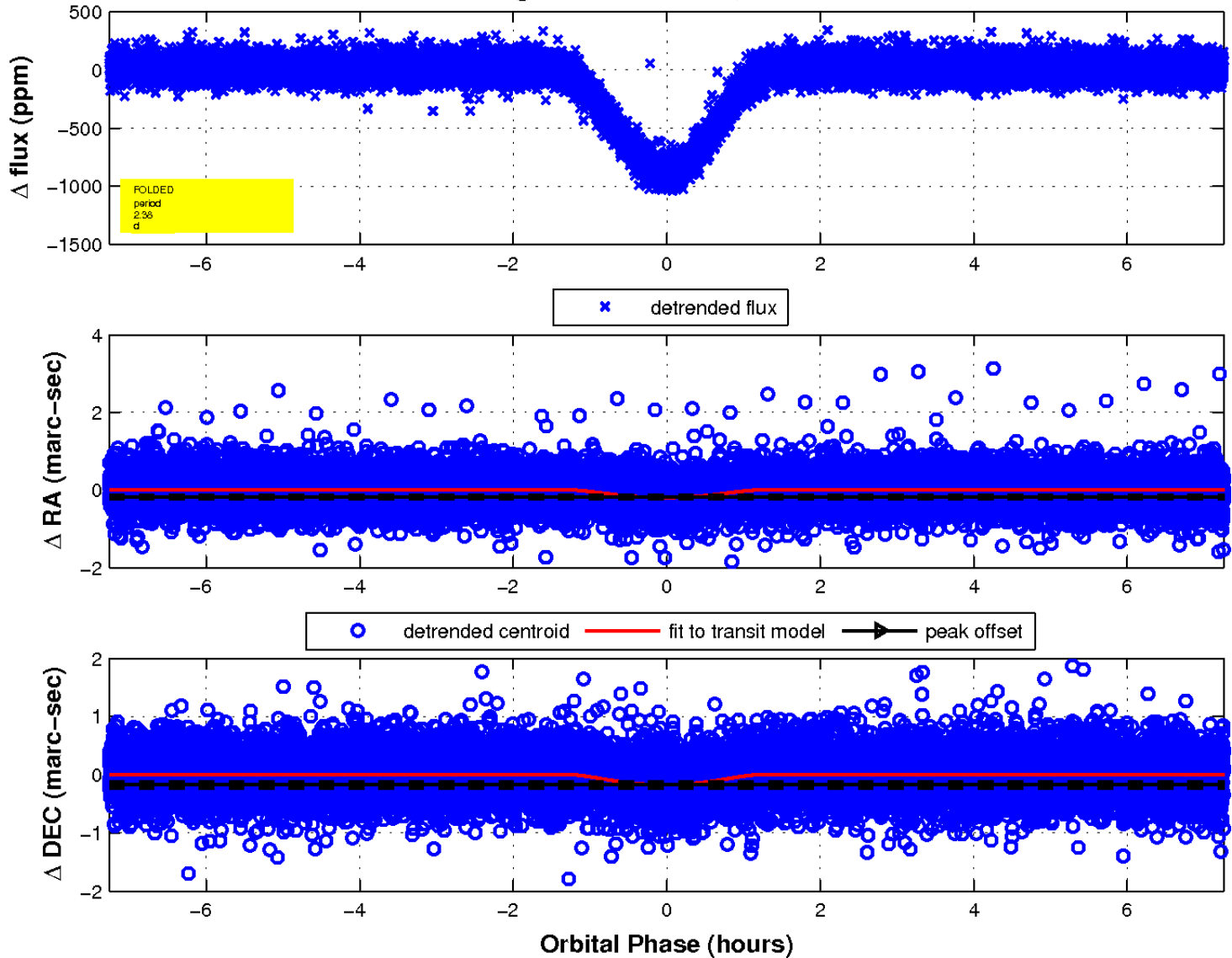
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

