

# KIC 011357670

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011357670-02	OBS	No	0.735076	132.015880	0.0	1.845	9.2	0.0	2.53	7963	0.00	59392.81
011357670-03	OBS	No	238.340900	174.657503	96.2	9.884	10.5	8.9	2.53	7963	2.75	26.66

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011357670-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—CENT_SATURATED
011357670-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—INCONSISTENT_TRANS—CENT_SATURATED

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

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

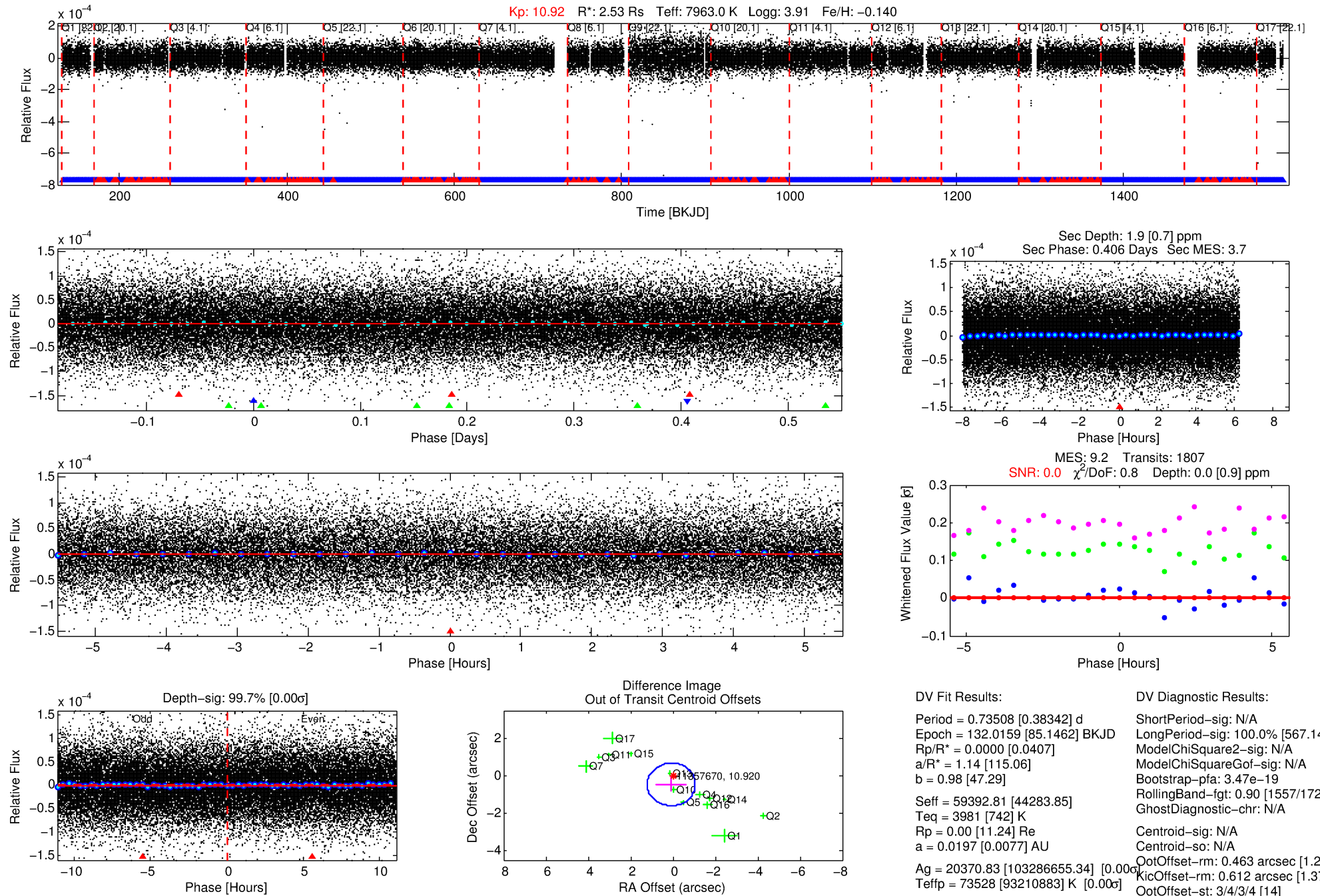
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 011357670-02

No Significant Match Found

# DV One-Page Summary

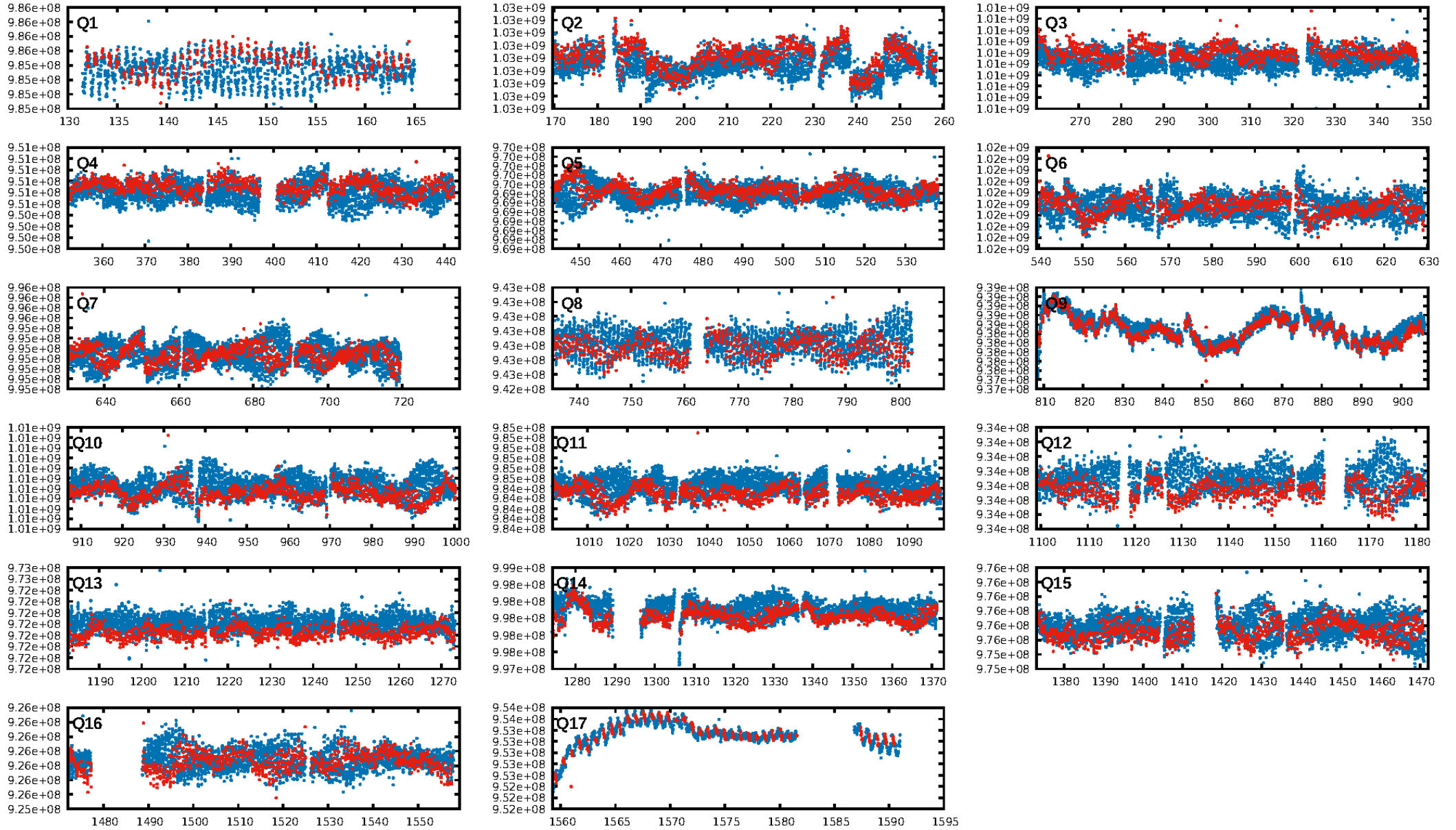
KIC: 11357670 Candidate: 2 of 3 Period: 0.735 d



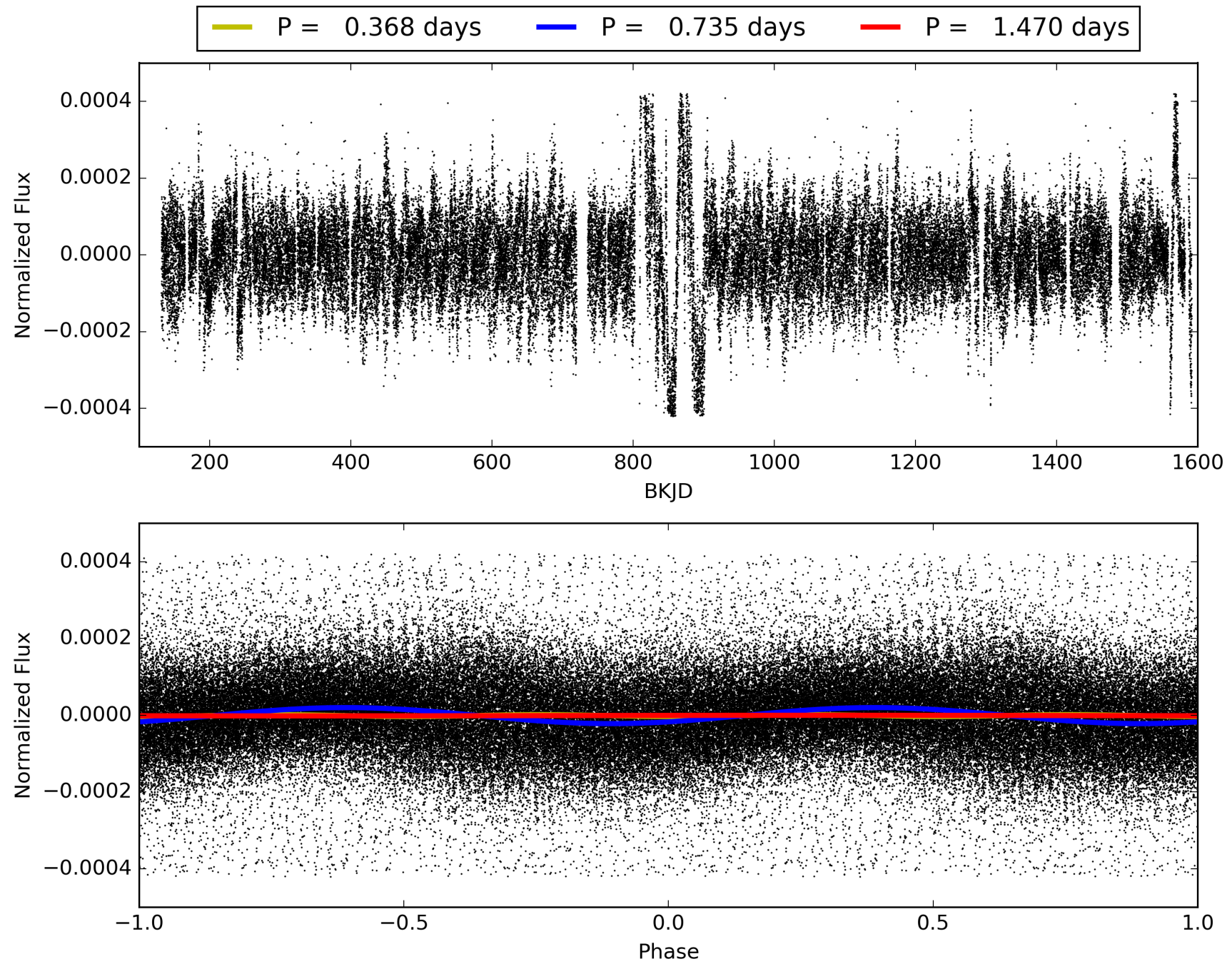
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 09:03:52 Z

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

# TCE 011357670-02, PDC Light Curves

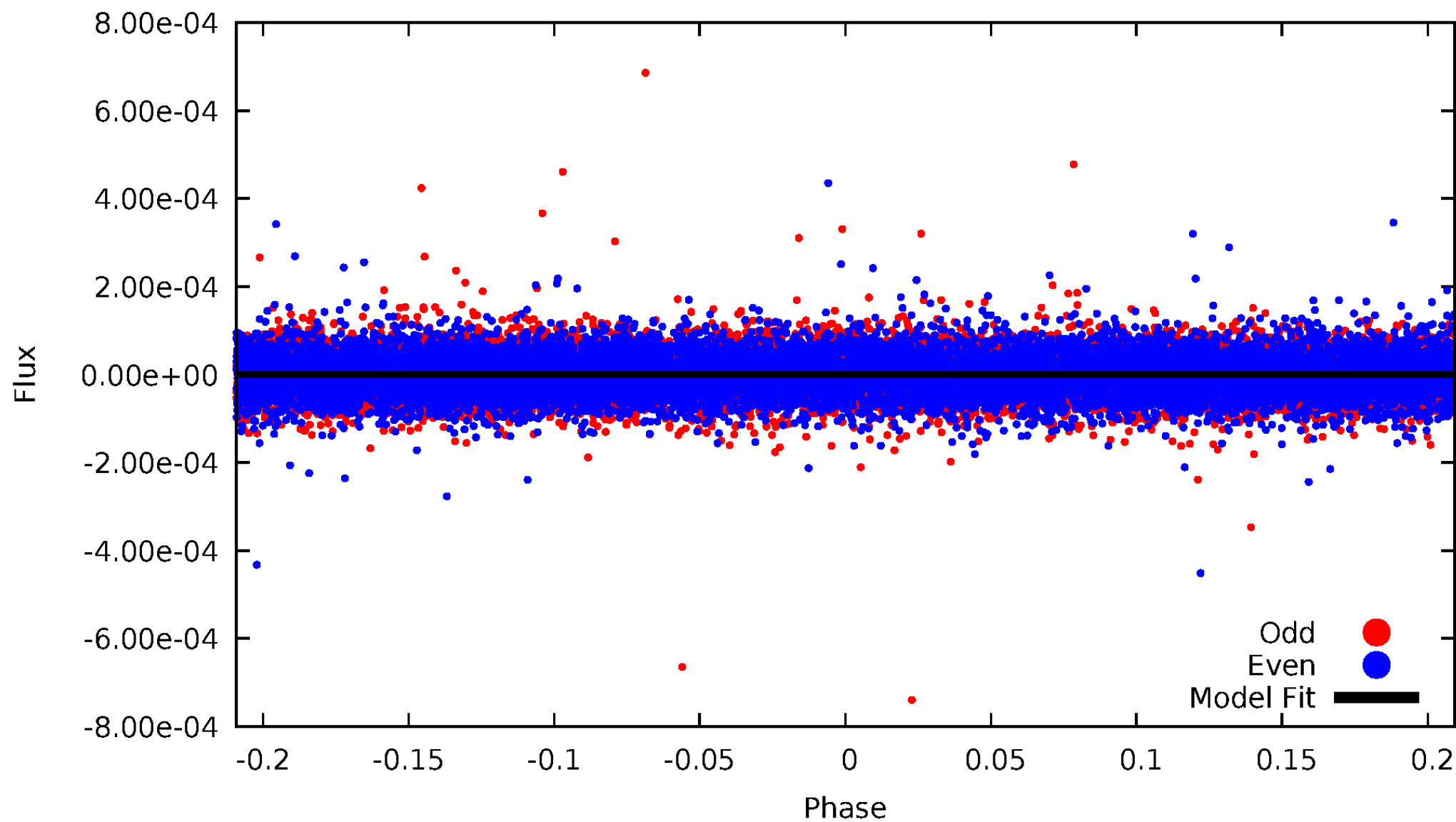


TCE 011357670-02



# DV Odd/Even

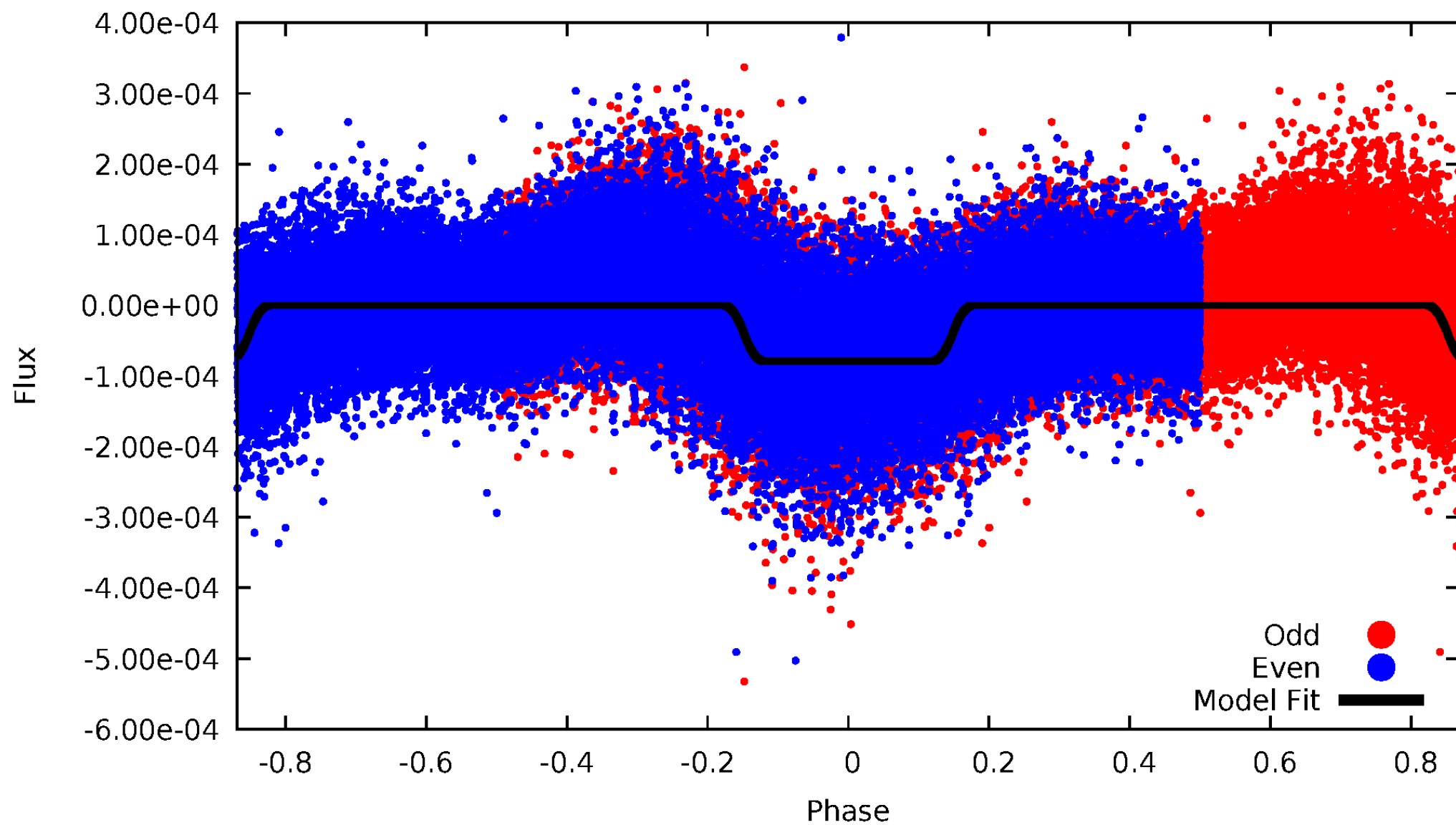
TCE 011357670-02





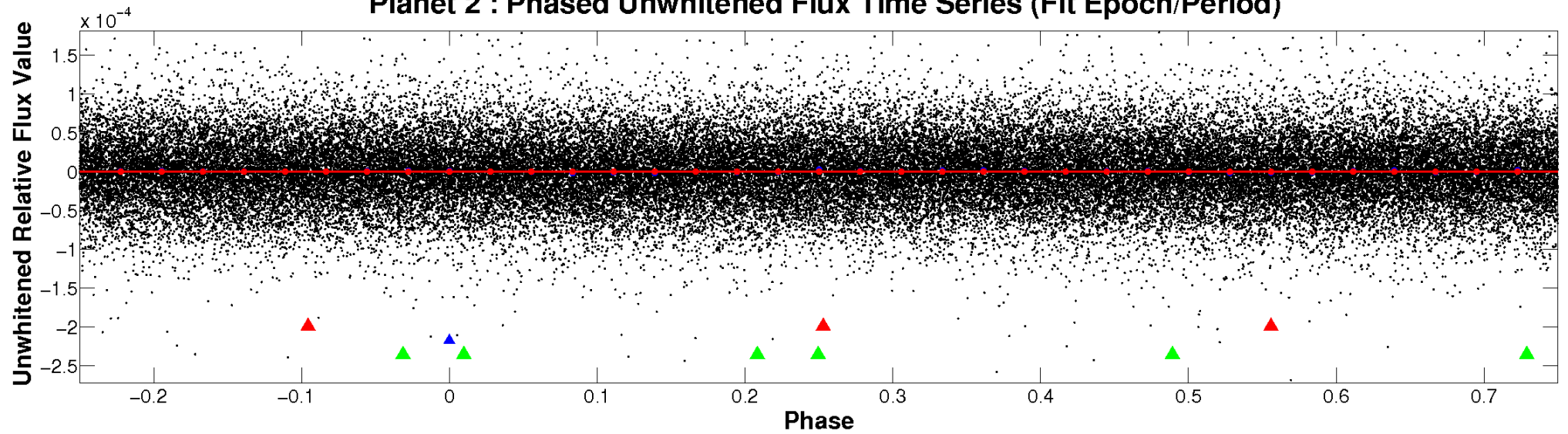
# ALT Odd/Even

TCE 011357670-02

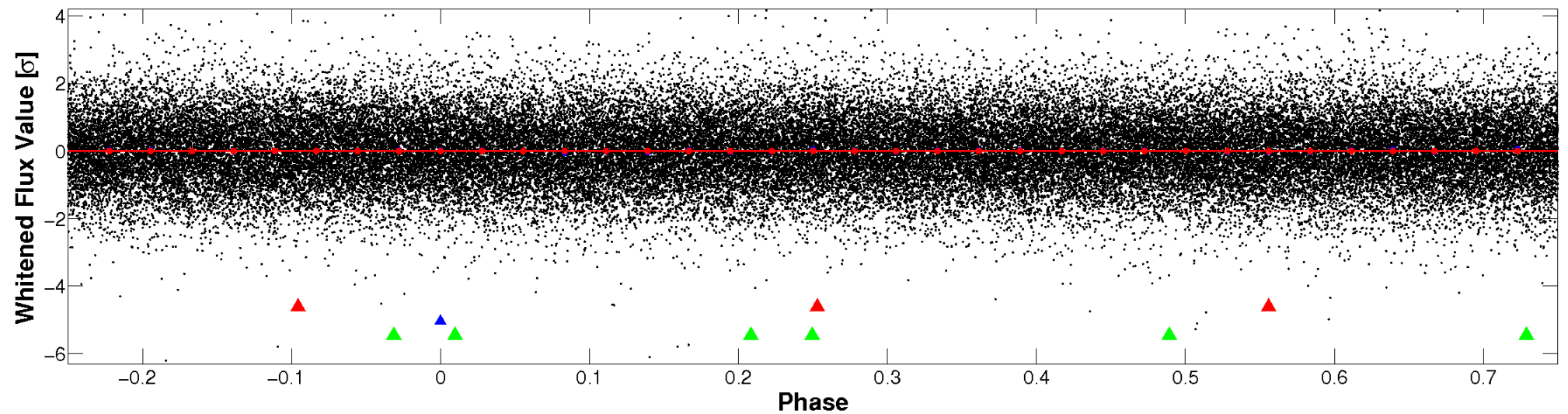


# Non-Whitened Vs. Whitened Light Curve

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

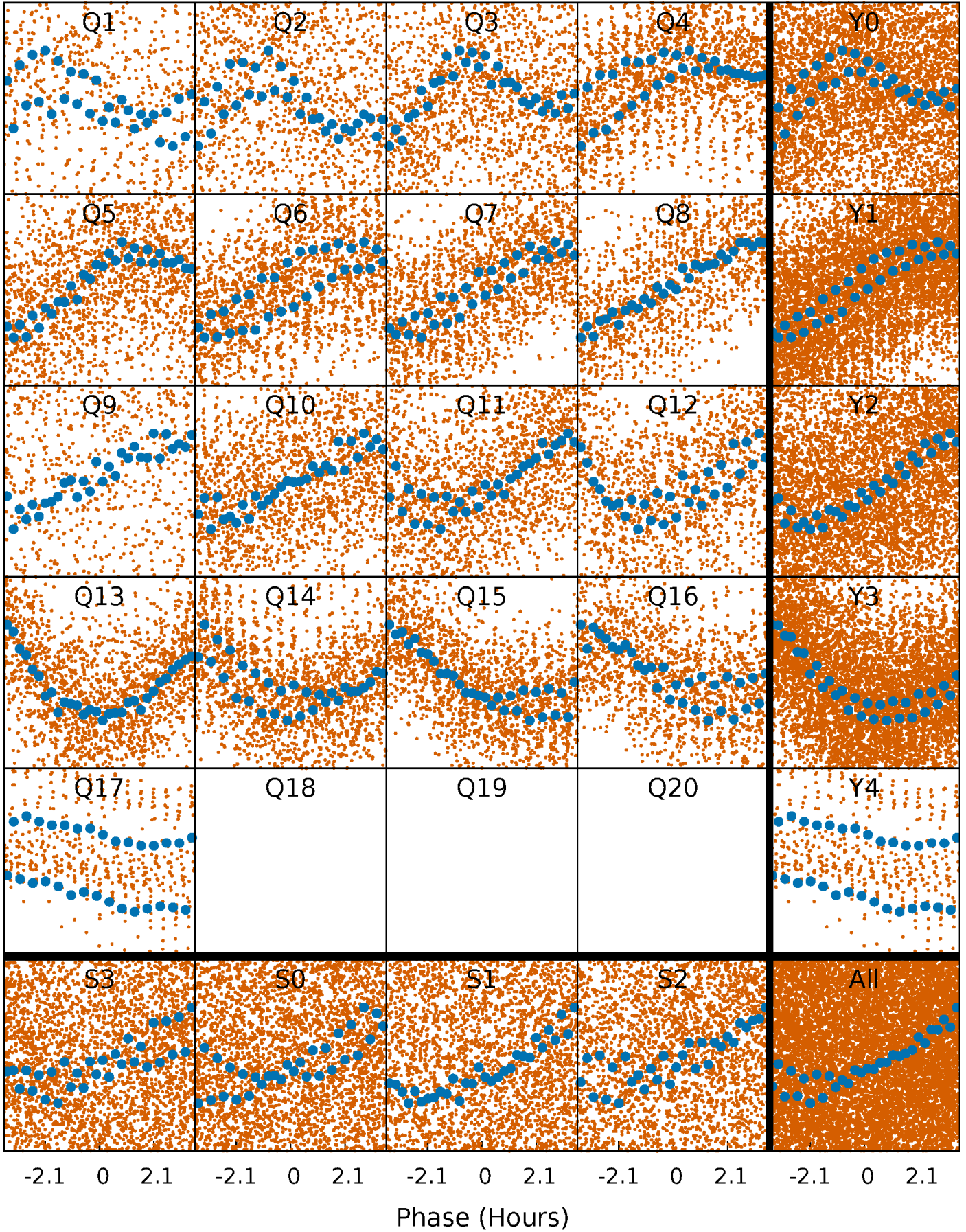


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

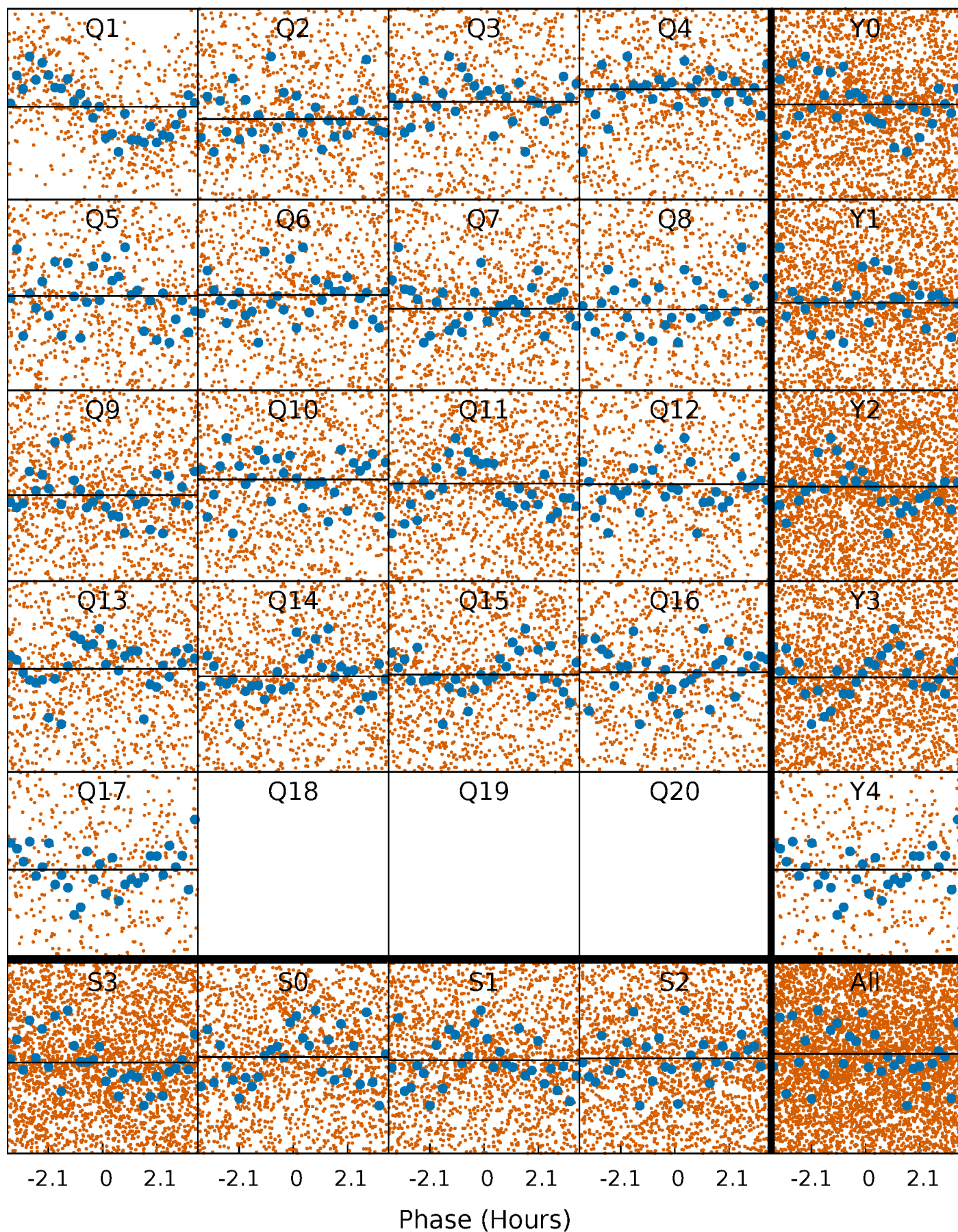
TCE 011357670-02   P= 0.735076 Days    $T_0=132.015880$  (BKJD)





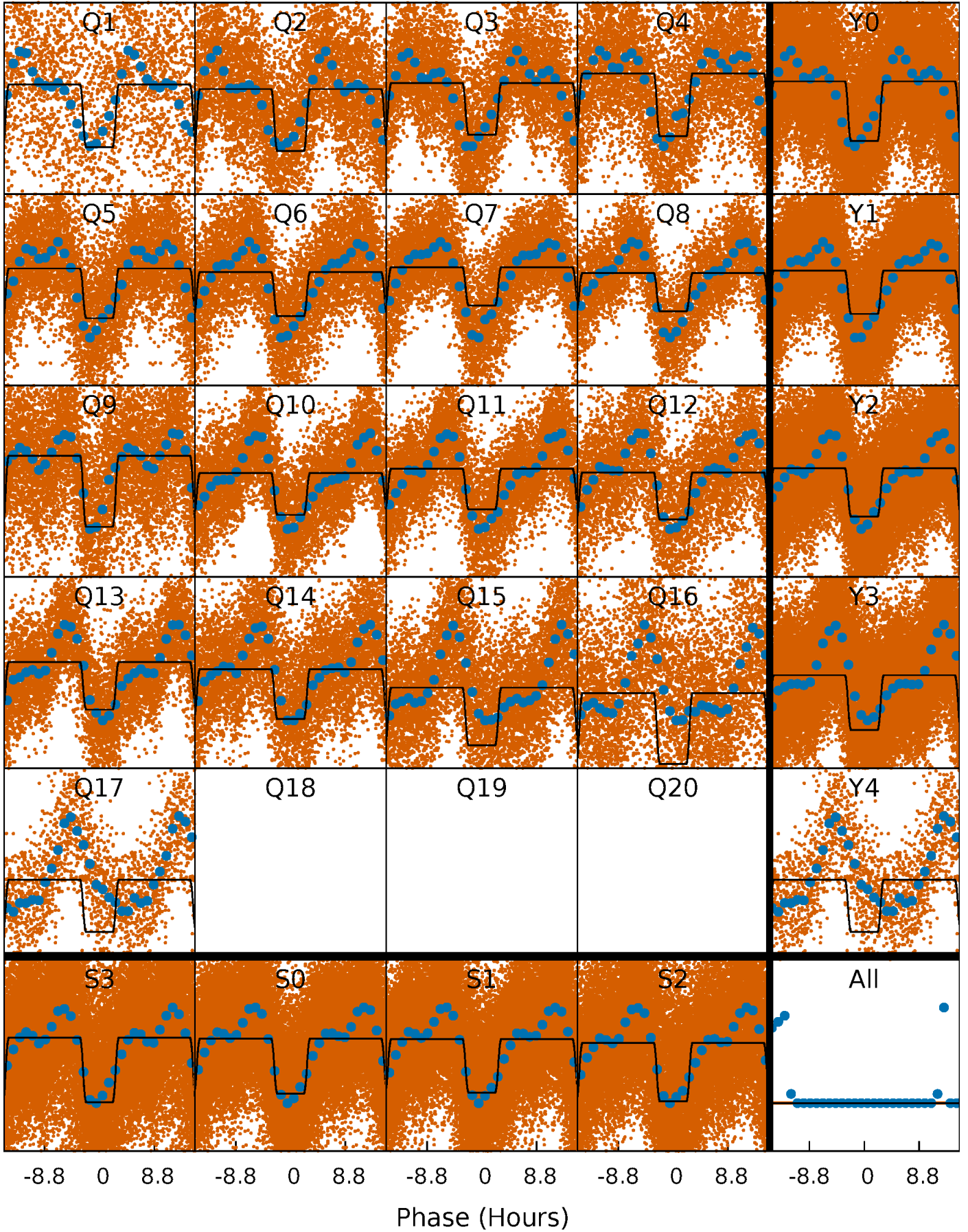
# DV Quarter-Phased Transit Curves

TCE 011357670-02 P= 0.735076 Days  $T_0=132.015880$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

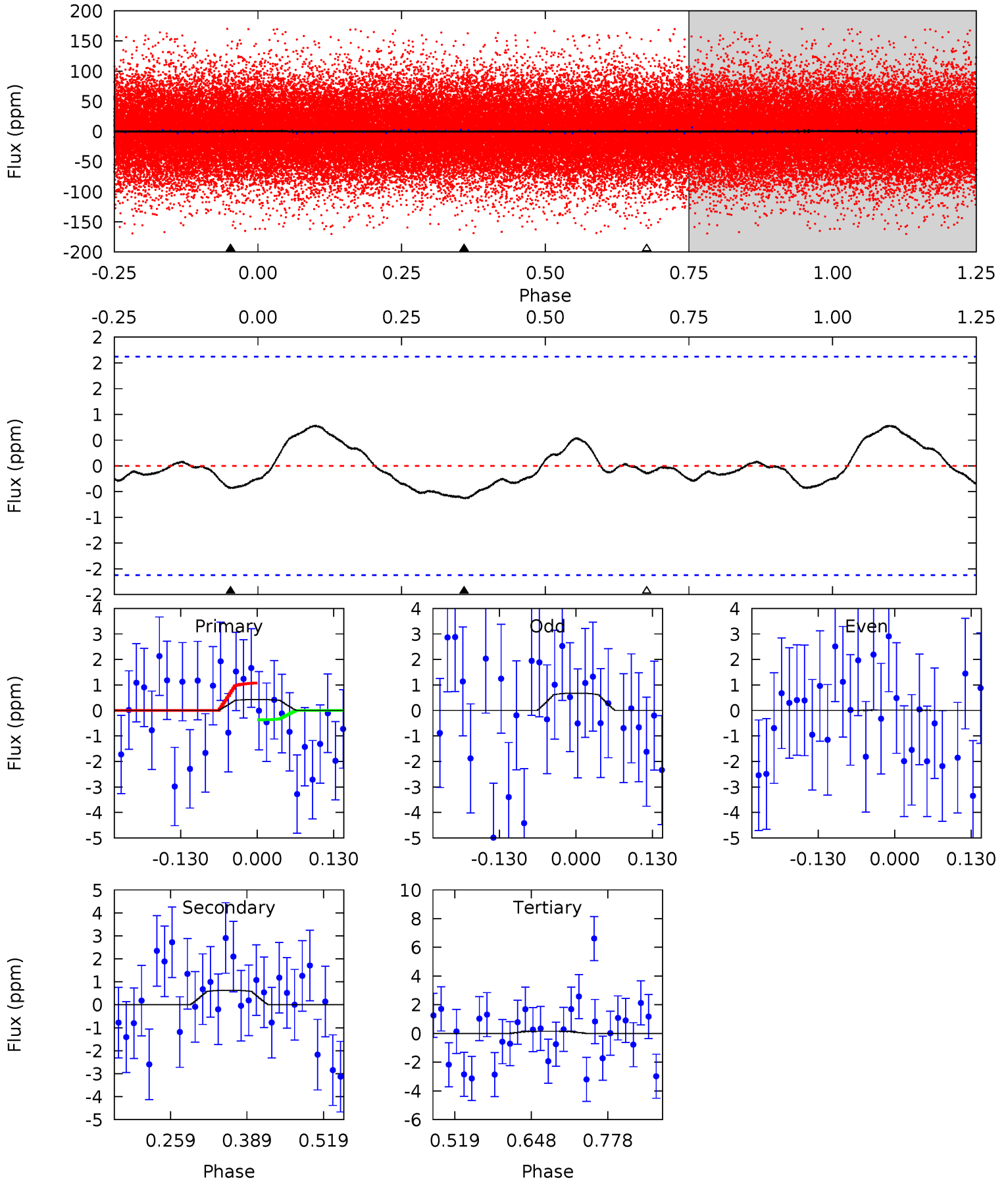
TCE 011357670-02   P= 0.735255 Days    $T_0=131.722197$  (BKJD)



# DV Model-Shift Uniqueness Test

011357670-02, P = 0.735076 Days, E = 131.280804 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
0.92	1.35	0.33	0	4.51	1.52	0.63	0.60	0.92	1.03	1.35	0.71	-1.06	0.55	0.75

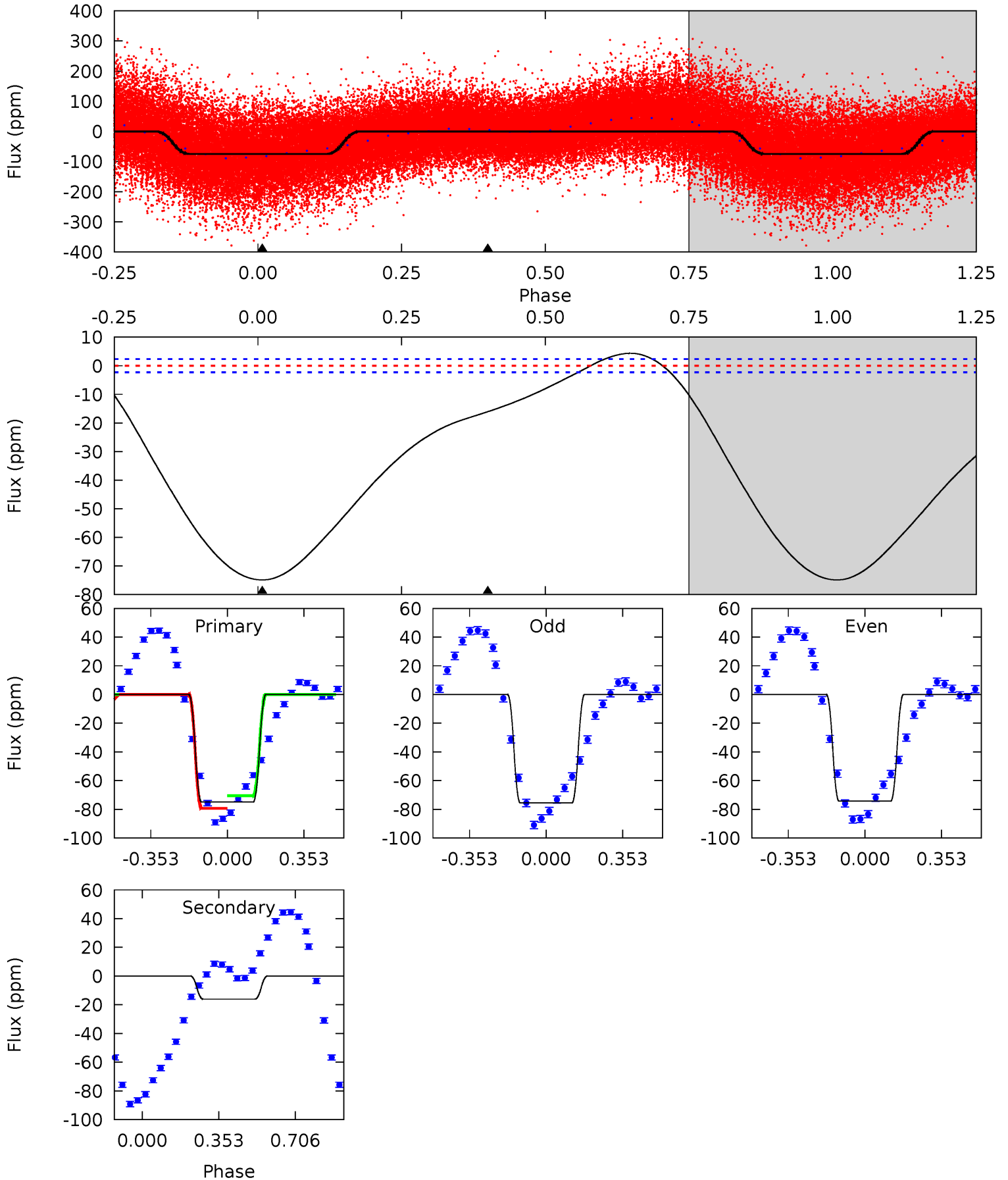




# Alt Model-Shift Uniqueness Test

011357670-02, P = 0.735255 Days, E = 130.986942 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
138.4	29.7	0	0	4.29	0.93	8.90	138.4	138.4	29.7	29.7	1.06	1.02	0.05	9.04





### Stellar Parameters For KIC 011357670

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7963^{+71}_{-87}$	$3.908^{+0.149}_{-0.069}$	$-0.140^{+0.100}_{-0.150}$	$2.532^{+0.255}_{-0.510}$	$1.894^{+0.034}_{-0.203}$	$0.164^{+0.131}_{-0.037}$
	+1%/-1%	+4%/-2%	+71%/-107%	+10%/-20%	+2%/-11%	+80%/-22%
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 011357670-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-1 \pm 0$	$7.94^{+8.48}_{-5.57}$	$5452^{+1458}_{-685}$	$-4486^{+507}_{-1034}$	$0.002^{+0.019}_{-0.001}$
Alt.	$-16 \pm 1$	$7.84^{+9.35}_{-5.71}$	$5442^{+1246}_{-732}$	$-4179^{+8878}_{-977}$	$0.050^{+0.630}_{-0.041}$

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

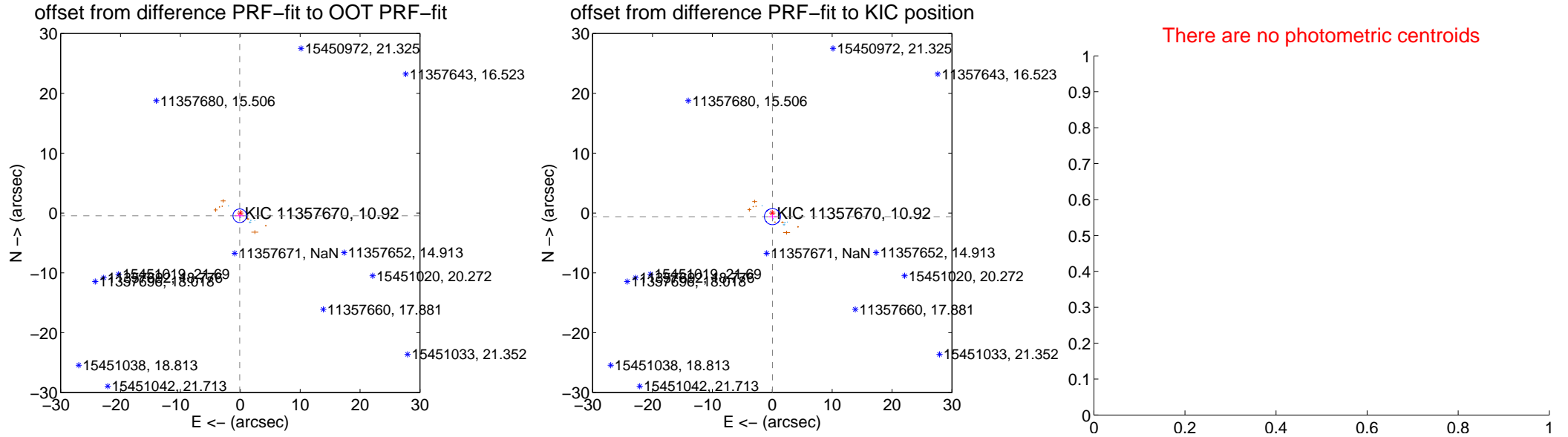
## DV Centroid Data

Supplemental centroid analysis for 011357670-02. **Kepler magnitude: 10.92.** Transit SNR 0.00

There are 6 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.12 arcsec

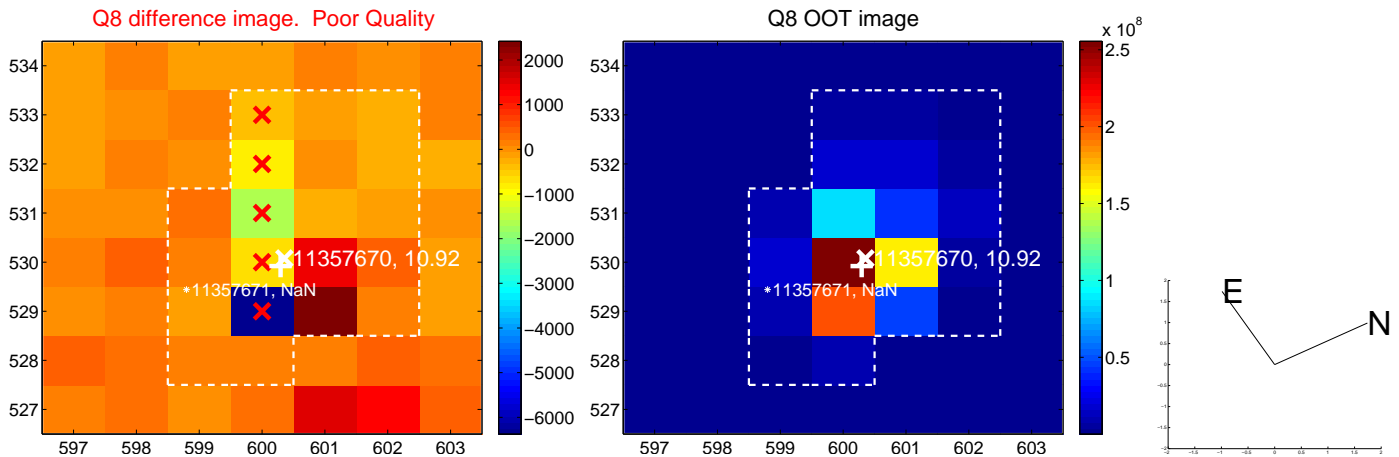
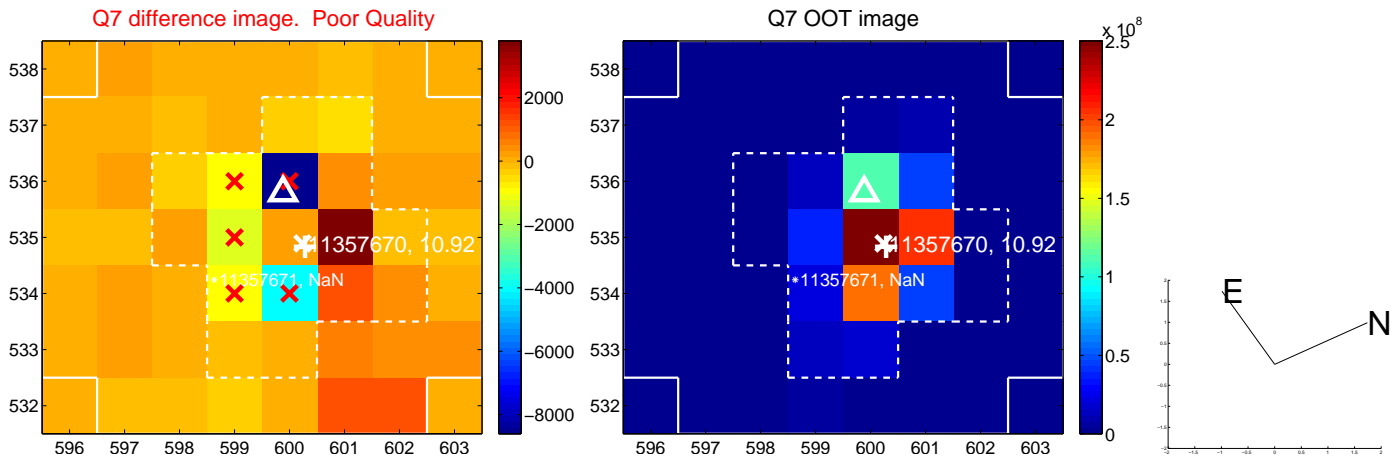
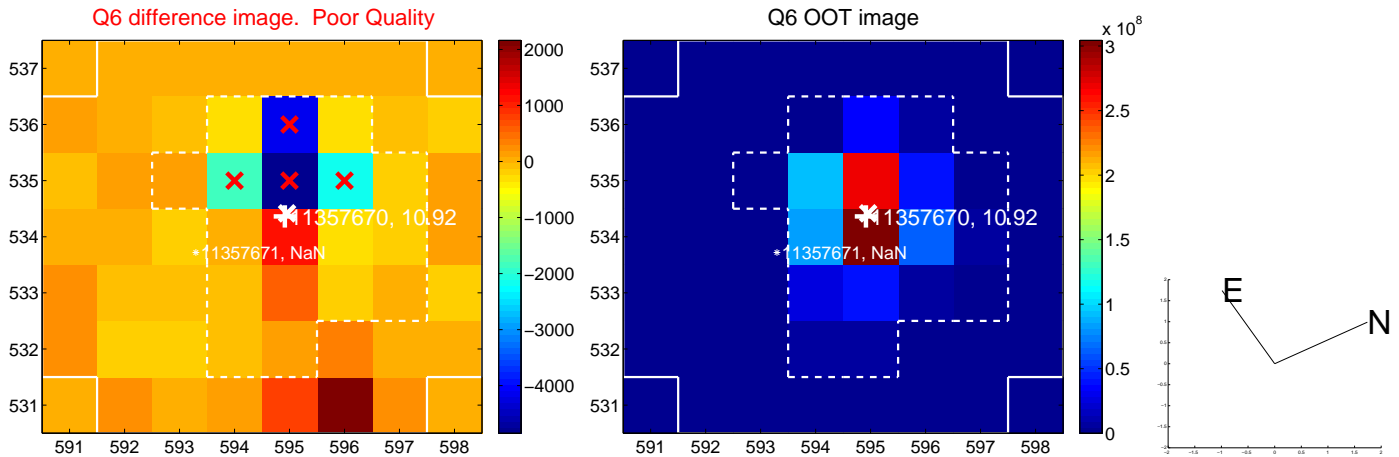
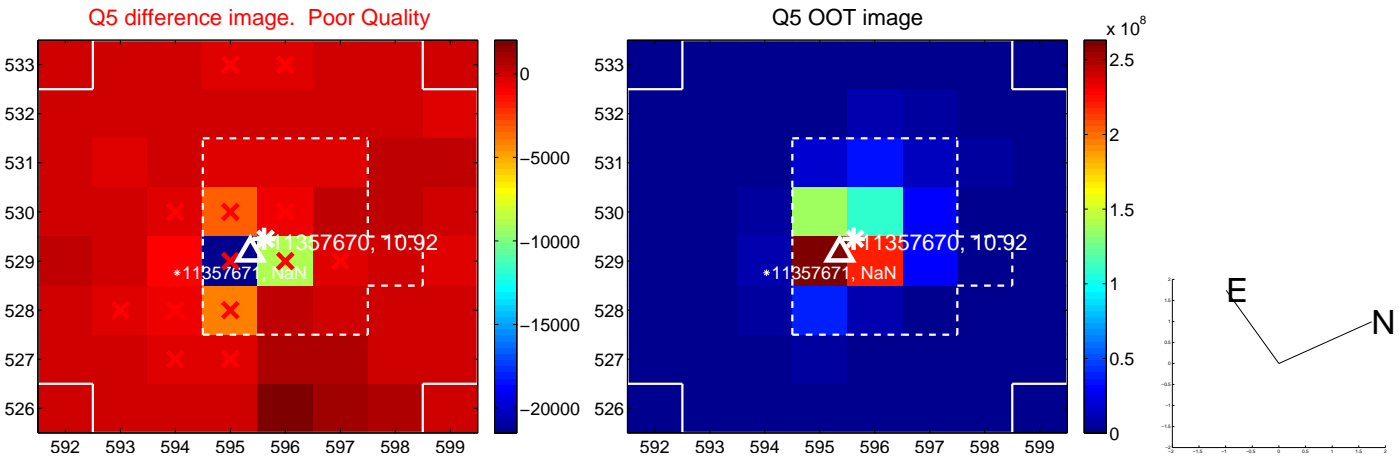
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.463 \pm 0.379$	1.22	$0.085 \pm 0.728$	$-0.456 \pm 0.361$
PRF-fit source offset from KIC position	$0.612 \pm 0.448$	1.37	$-0.034 \pm 0.654$	$-0.611 \pm 0.416$
photometric centroid source offset	—	—	—	—



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.

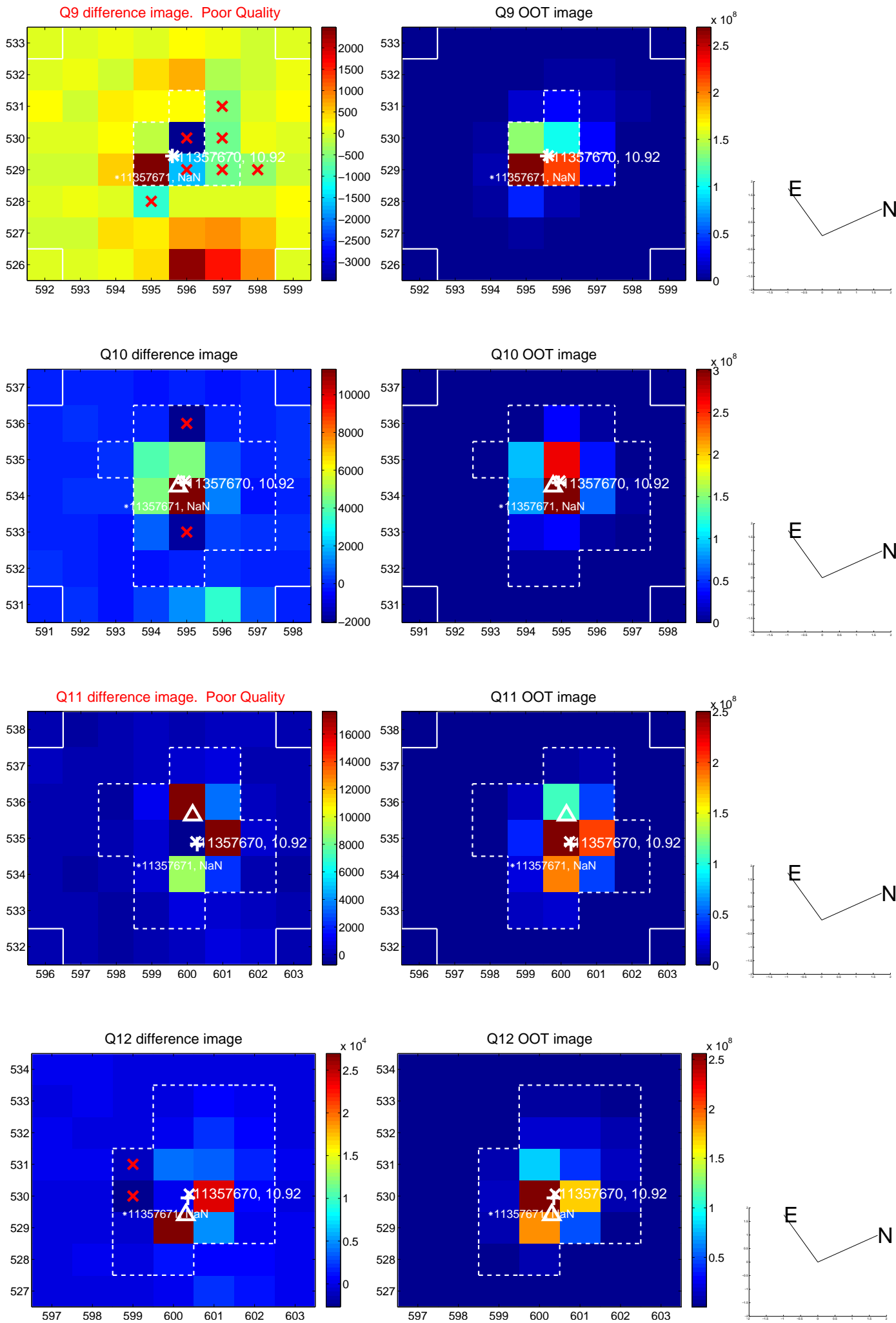


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

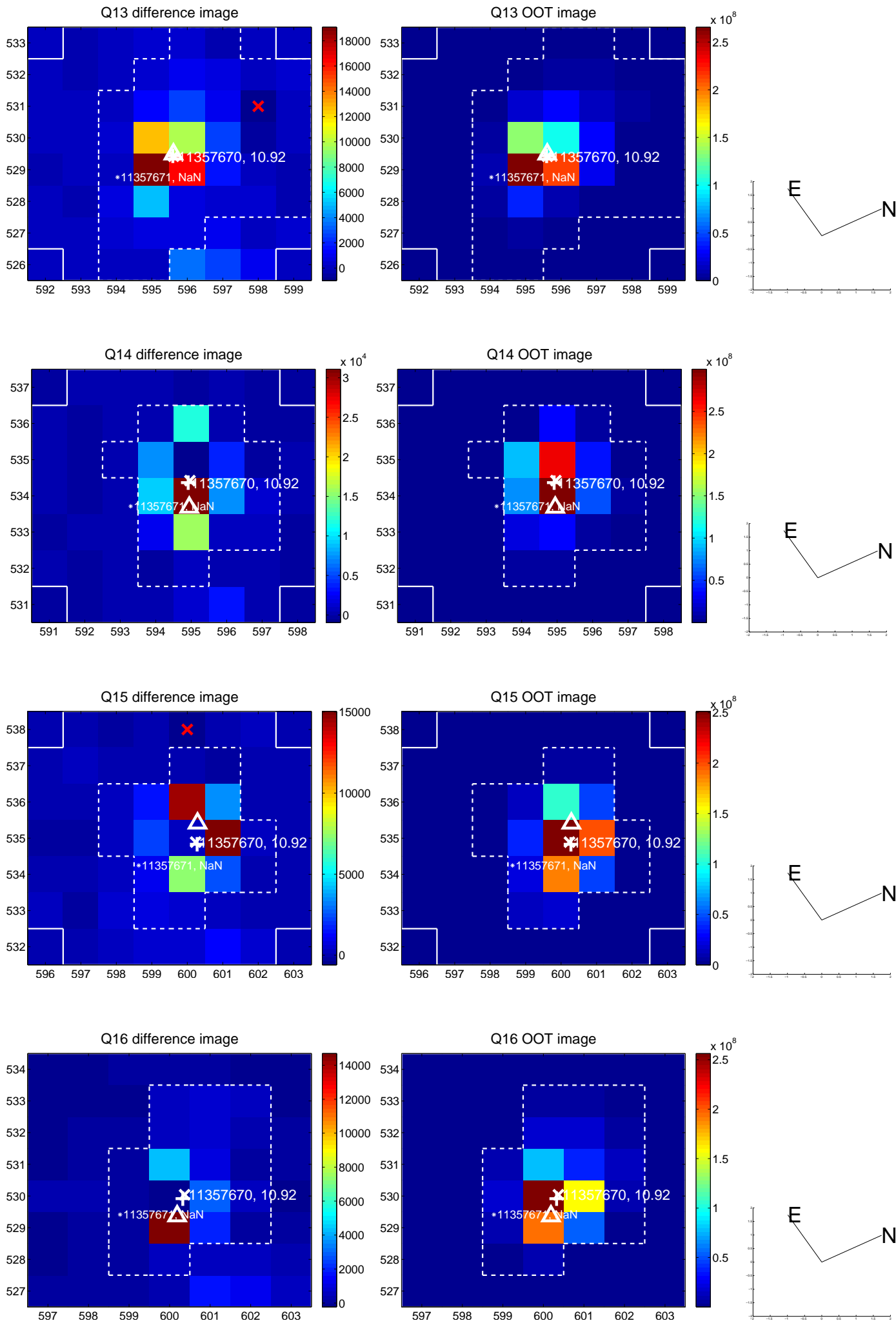




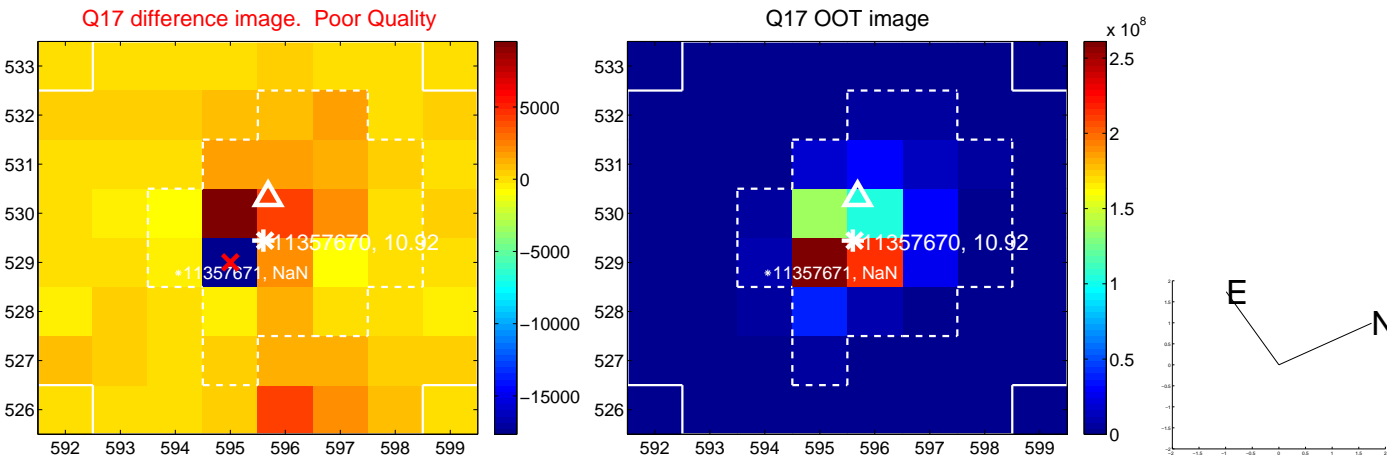
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

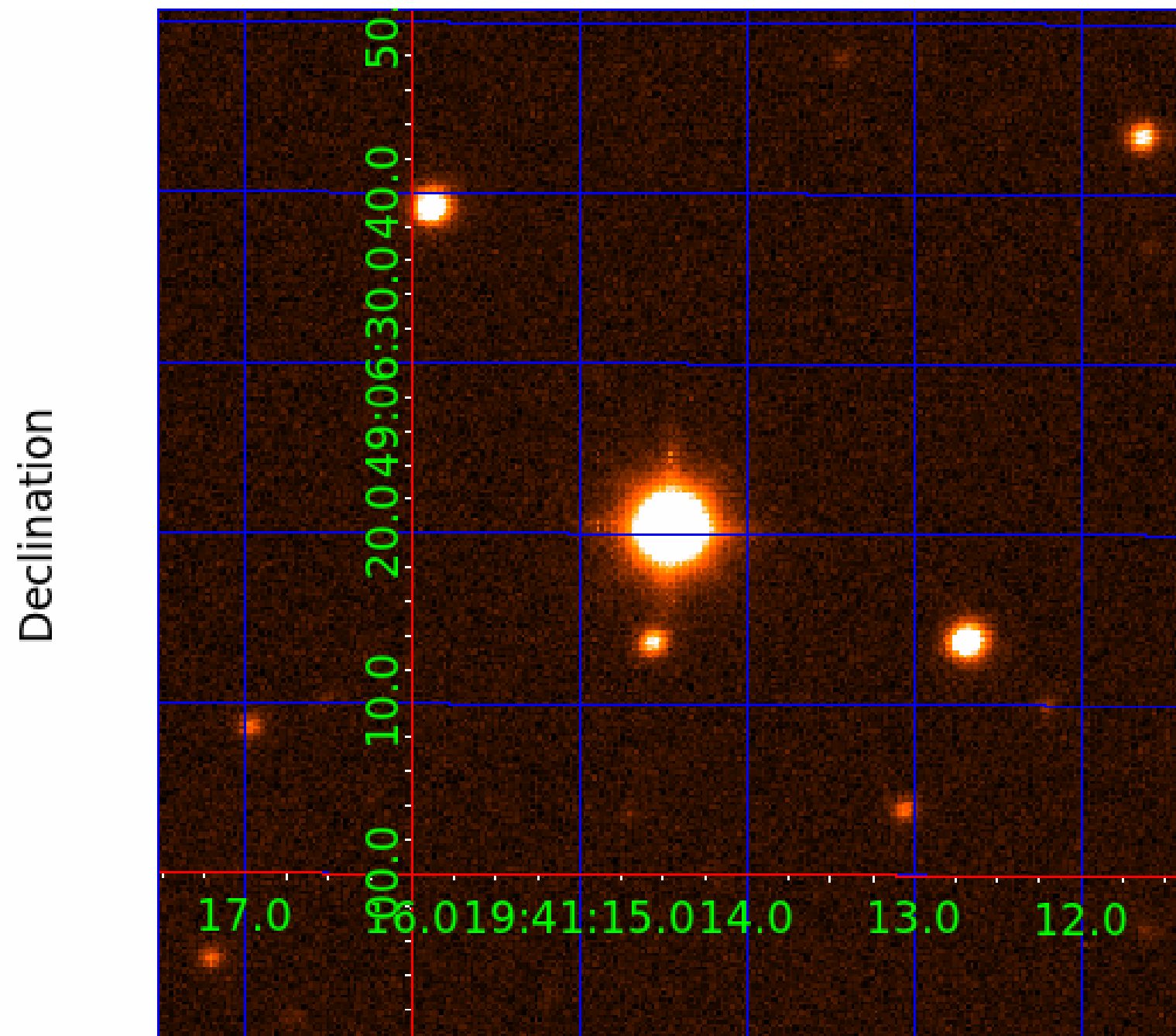


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



folded centroid time series figure for this object.

UKIRT Image





# KIC 011357670

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011357670-02	OBS	No	0.735076	132.015880	0.0	1.845	9.2	0.0	2.53	7963	0.00	59392.81
011357670-03	OBS	No	238.340900	174.657503	96.2	9.884	10.5	8.9	2.53	7963	2.75	26.66

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011357670-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—CENT_SATURATED
011357670-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—INCONSISTENT_TRANS—CENT_SATURATED

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

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

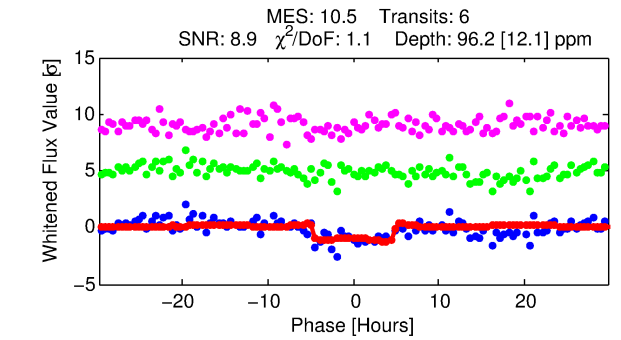
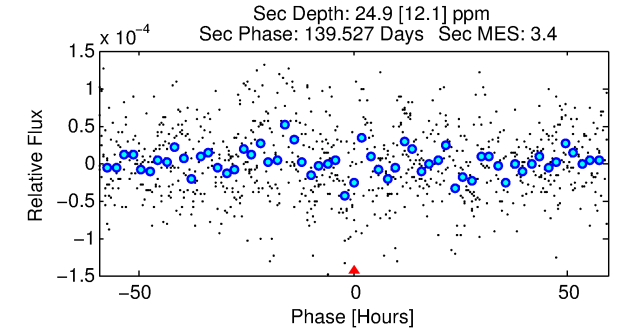
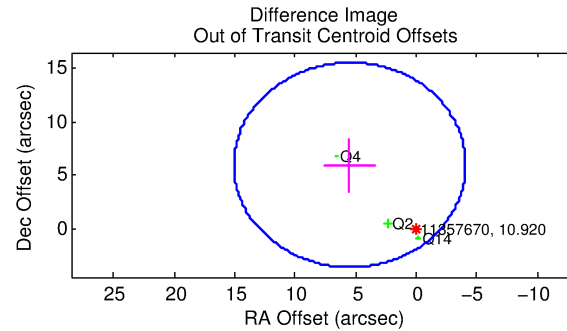
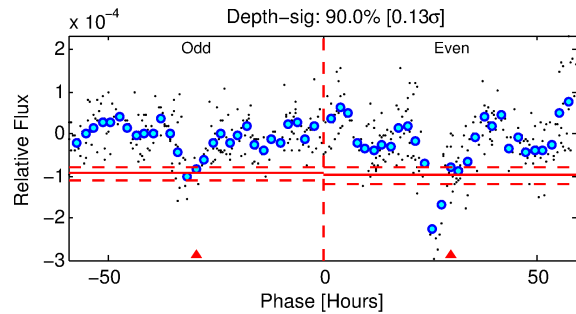
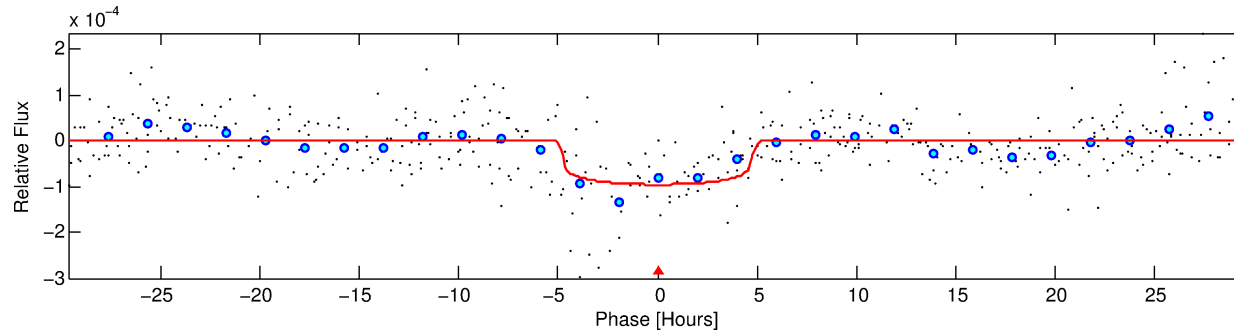
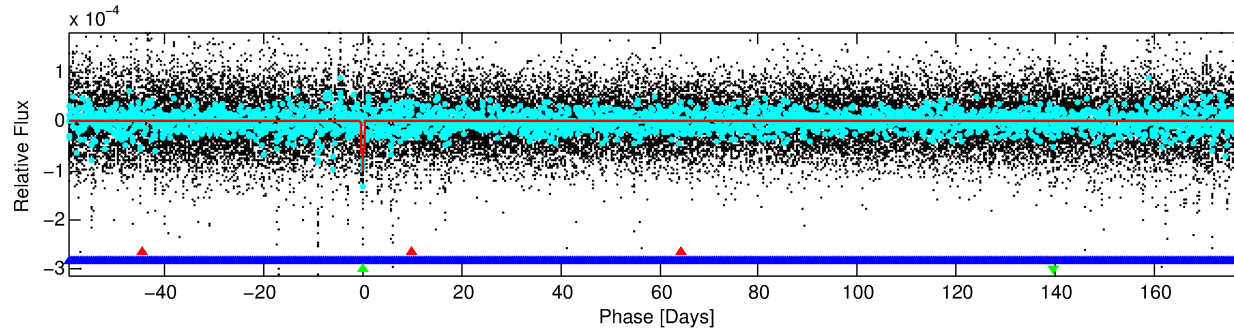
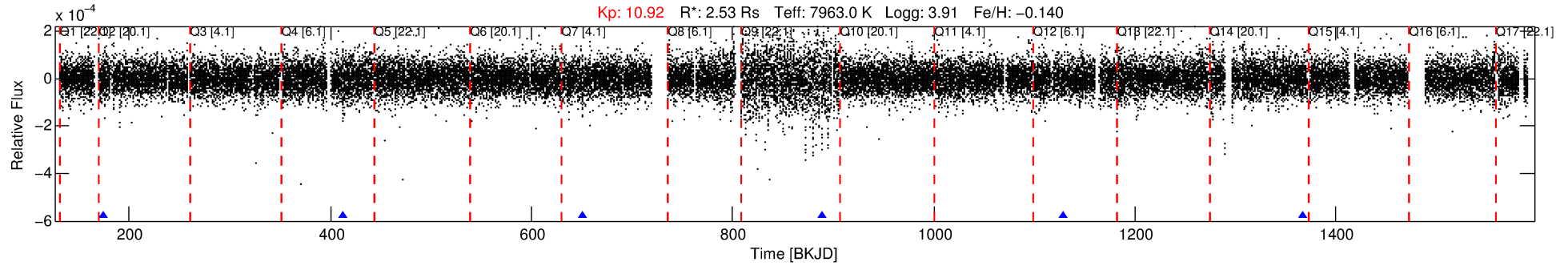
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 011357670-03

No Significant Match Found

# DV One-Page Summary

KIC: 11357670 Candidate: 3 of 3 Period: 238.341 d



## DV Fit Results:

Period = 238.34090 [0.00332] d  
Epoch = 174.6575 [0.0101] BKJD  
Rp/R\* = 0.0099 [0.0024]  
a/R\* = 112.12 [148.50]  
b = 0.81 [0.58]  
Seff = 26.66 [7.17]  
Teq = 579 [39] K  
Rp = 2.75 [0.85] Re  
a = 0.9307 [0.1642] AU  
Ag = 1574.96 [1148.44] [1.37 $\sigma$ ]  
Teffp = 5644 [960] K [5.27 $\sigma$ ]

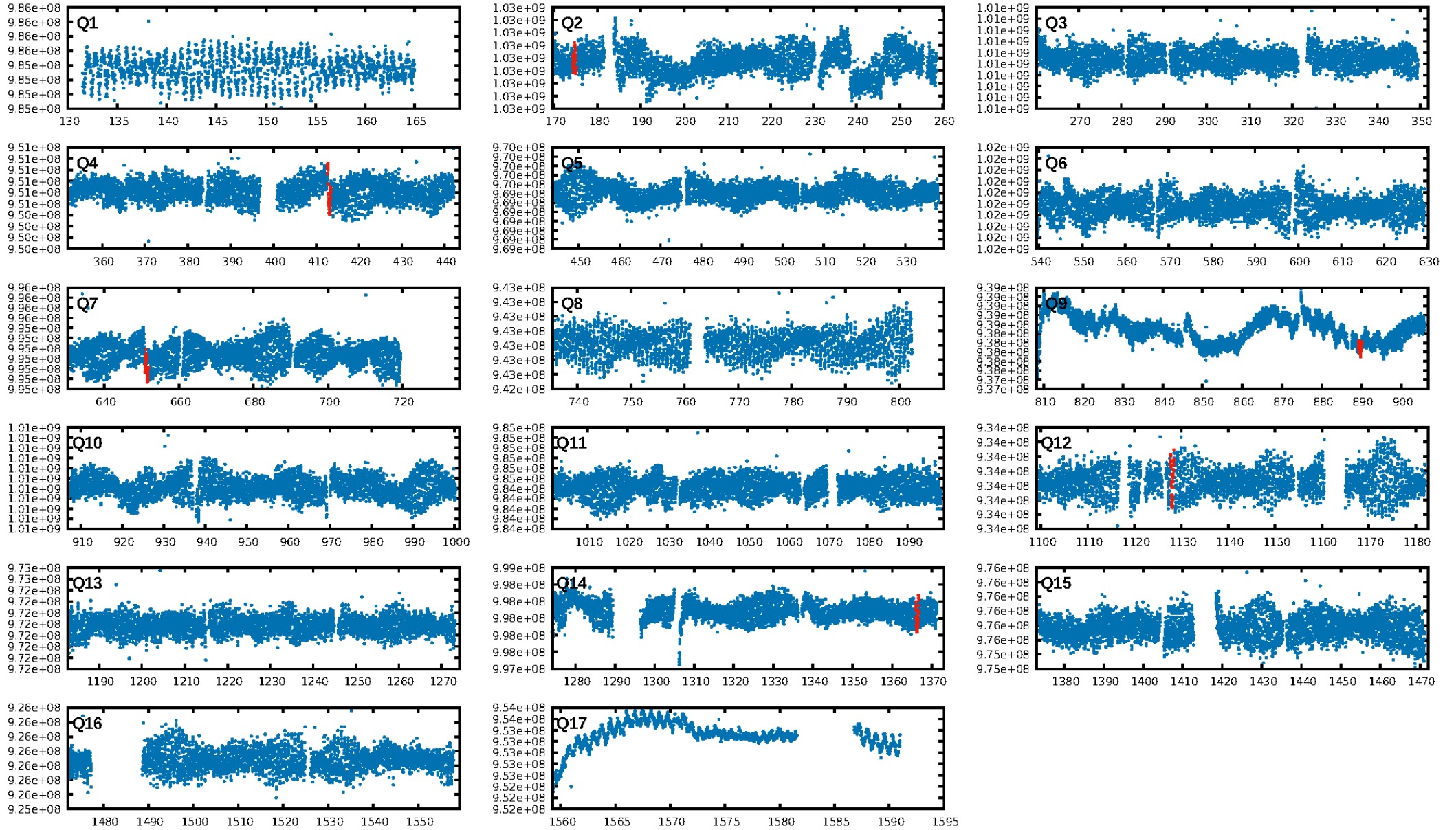
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [567.14 $\sigma$ ]  
LongPeriod-sig: 100.0% [613.48 $\sigma$ ]  
ModelChiSquare2-sig: 0.1%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 6.79e-24  
RollingBand-fgt: 1.00 [6/6]  
GhostDiagnostic-chr: 15.47  
Centroid-sig: 3.8%  
Centroid-so: 2.952 arcsec [1.79 $\sigma$ ]  
OotOffset-rm: 8.114 arcsec [2.54 $\sigma$ ]  
KicOffset-rm: 7.490 arcsec [2.86 $\sigma$ ]  
OotOffset-st: 2/0/1/0 [3]  
KicOffset-st: 2/0/1/0 [3]  
DiffImageQuality-fgm: 0.33 [1/3]  
DiffImageOverlap-fno: 0.00 [0/5]

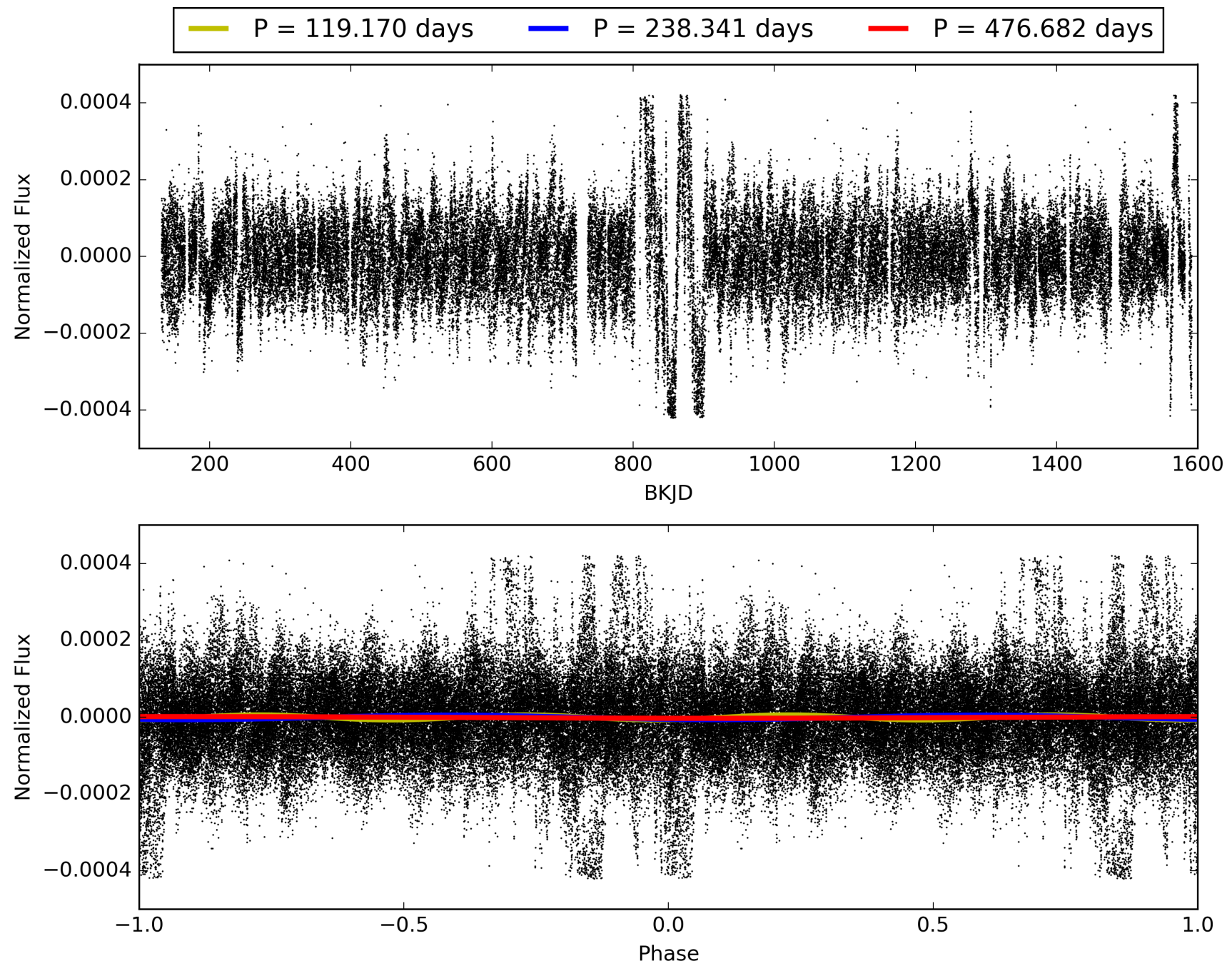
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 09:04:02 Z

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

# TCE 011357670-03, PDC Light Curves



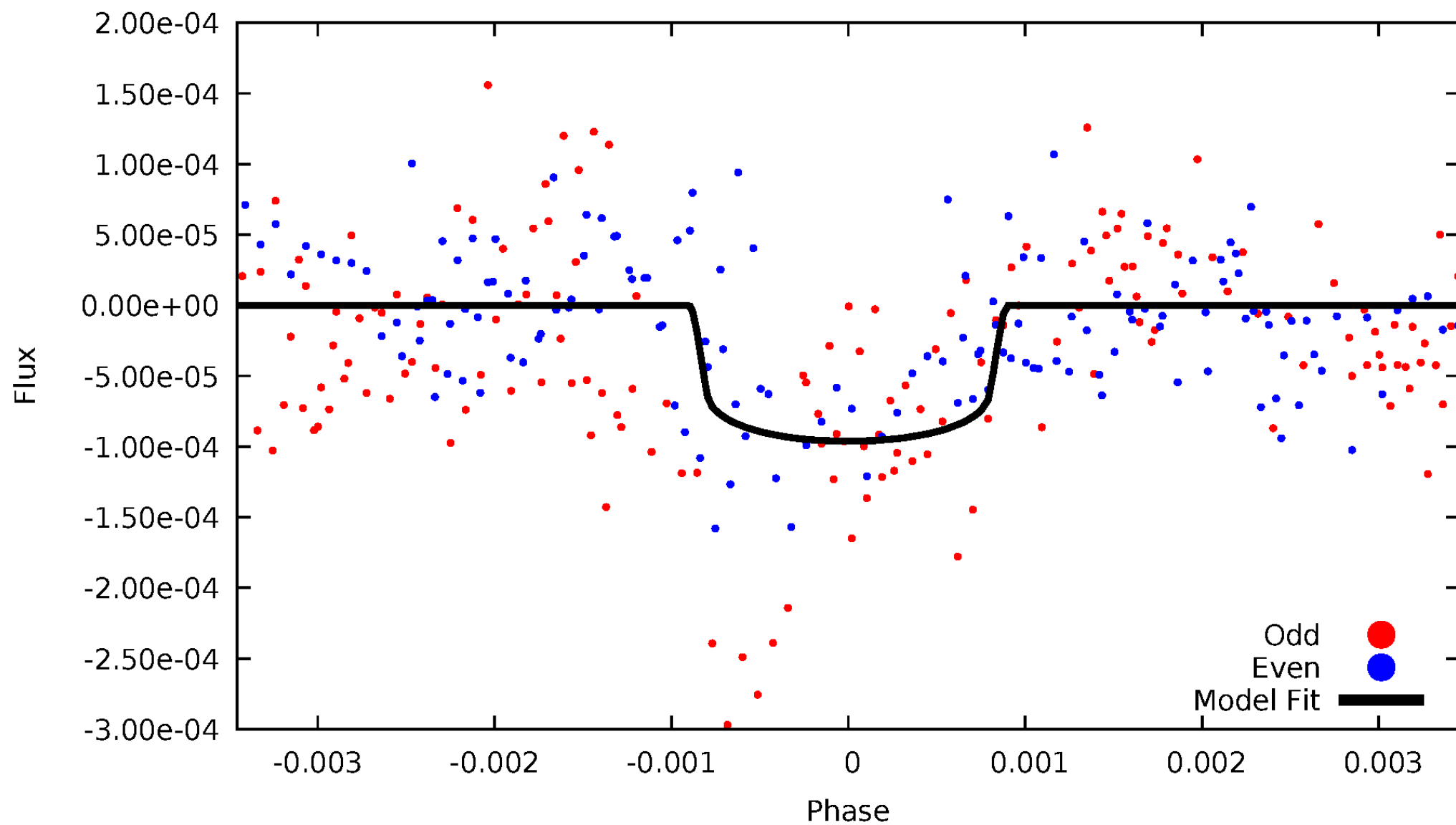
TCE 011357670-03





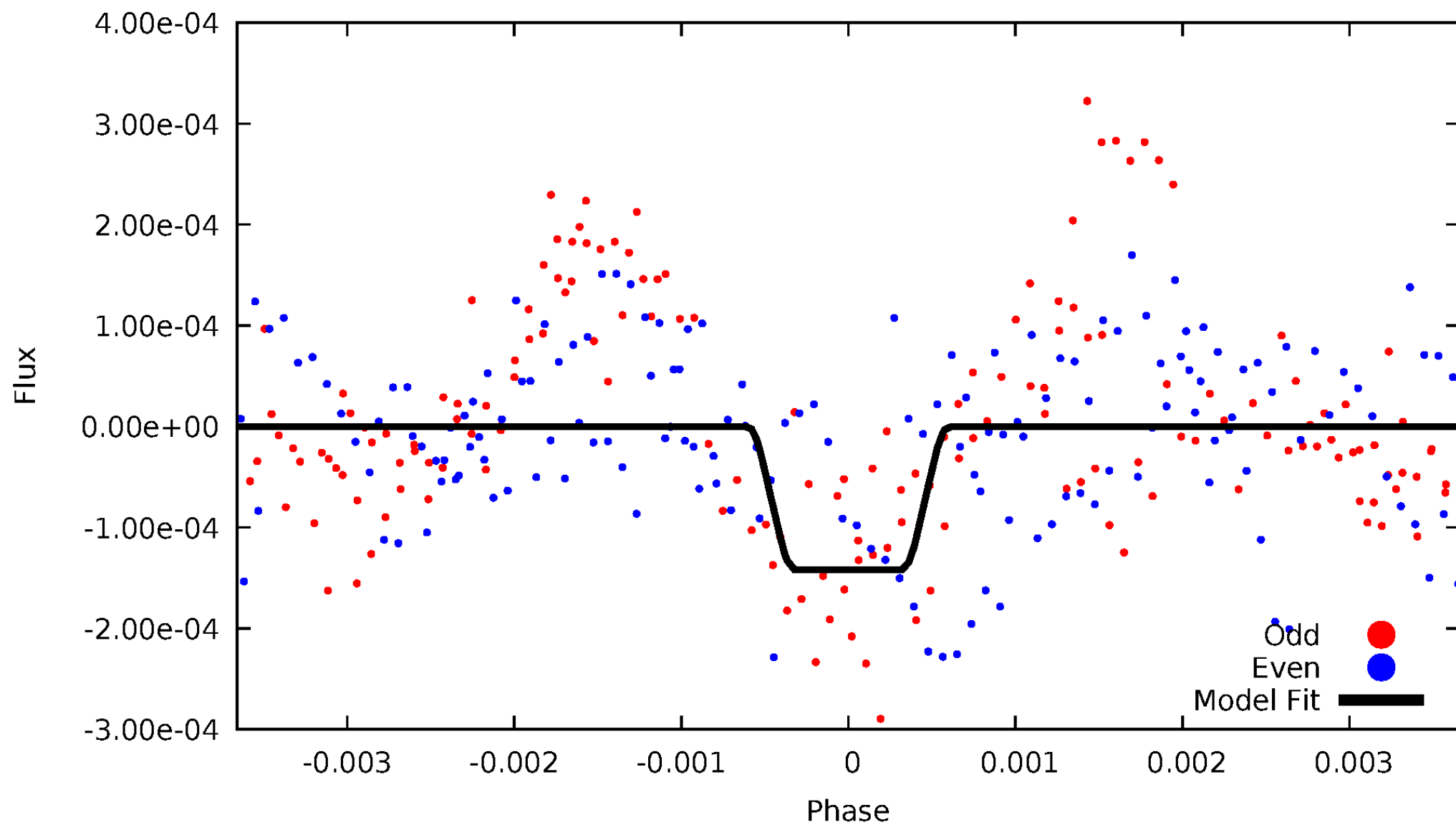
# DV Odd/Even

TCE 011357670-03



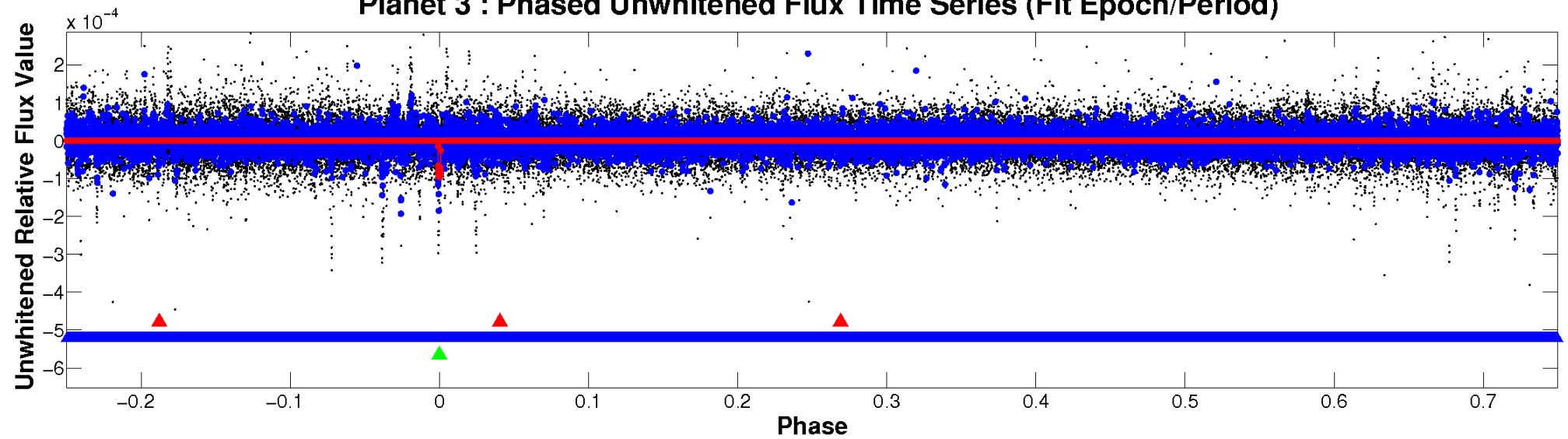
# ALT Odd/Even

TCE 011357670-03

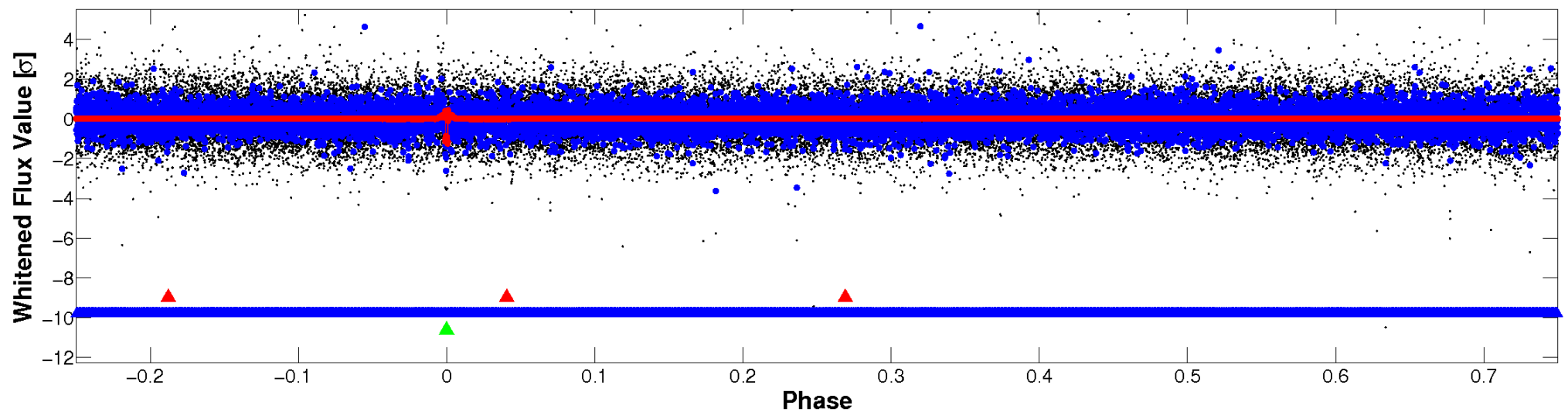


# Non-Whitened Vs. Whitened Light Curve

## Planet 3 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

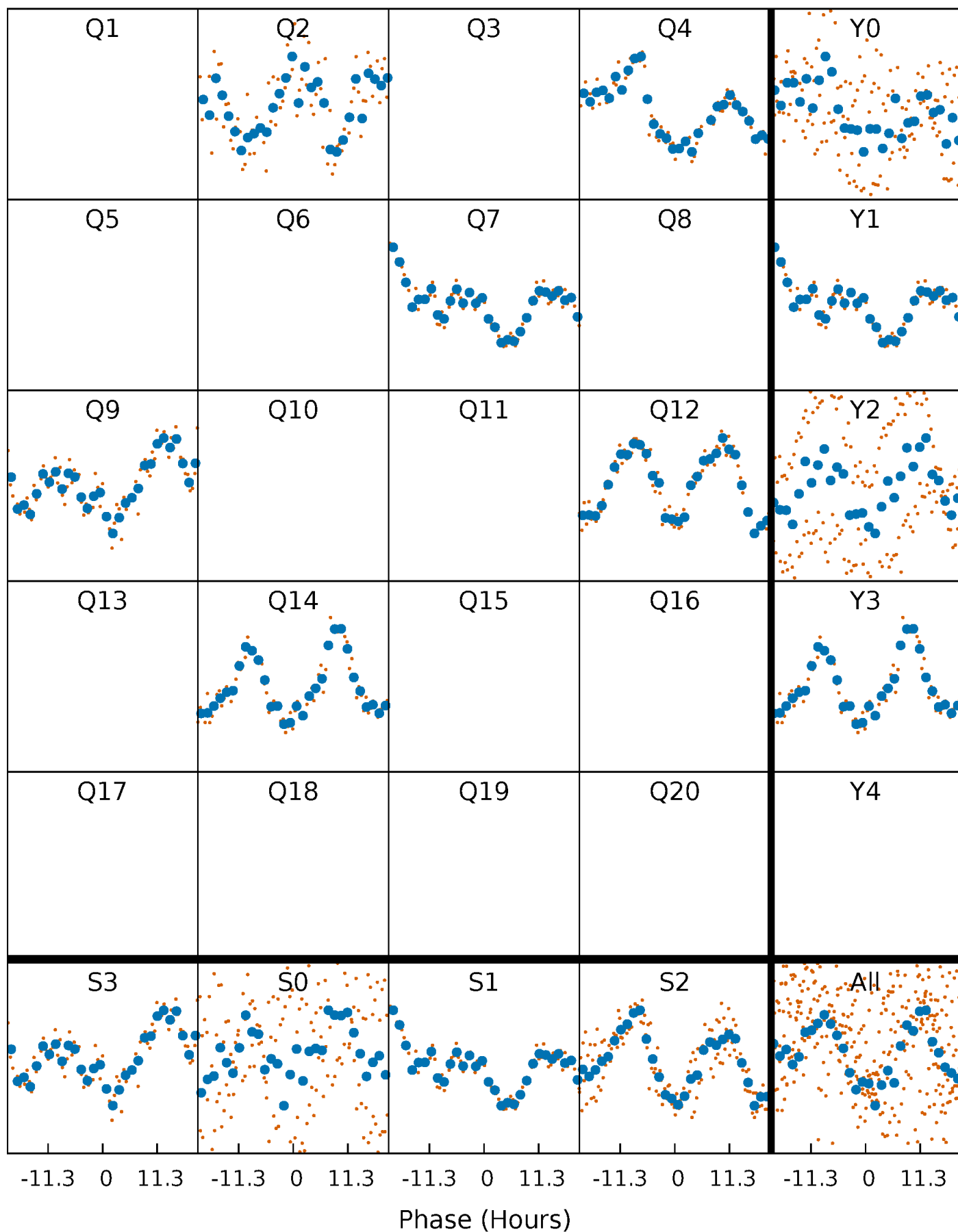


## Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



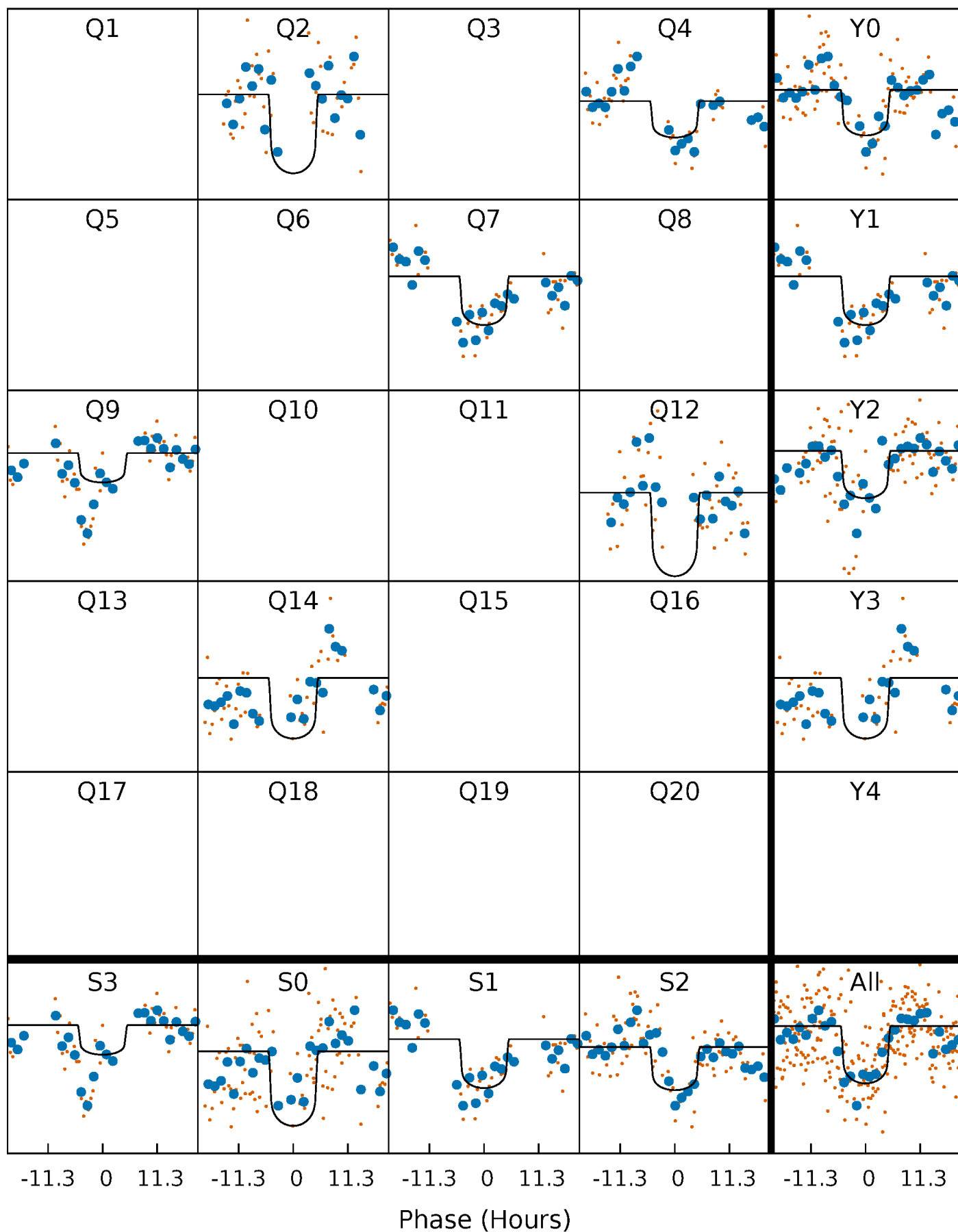
# PDC Quarter-Phased Transit Curves

TCE 011357670-03     $P=238.340900$  Days     $T_0=174.657503$  (BKJD)



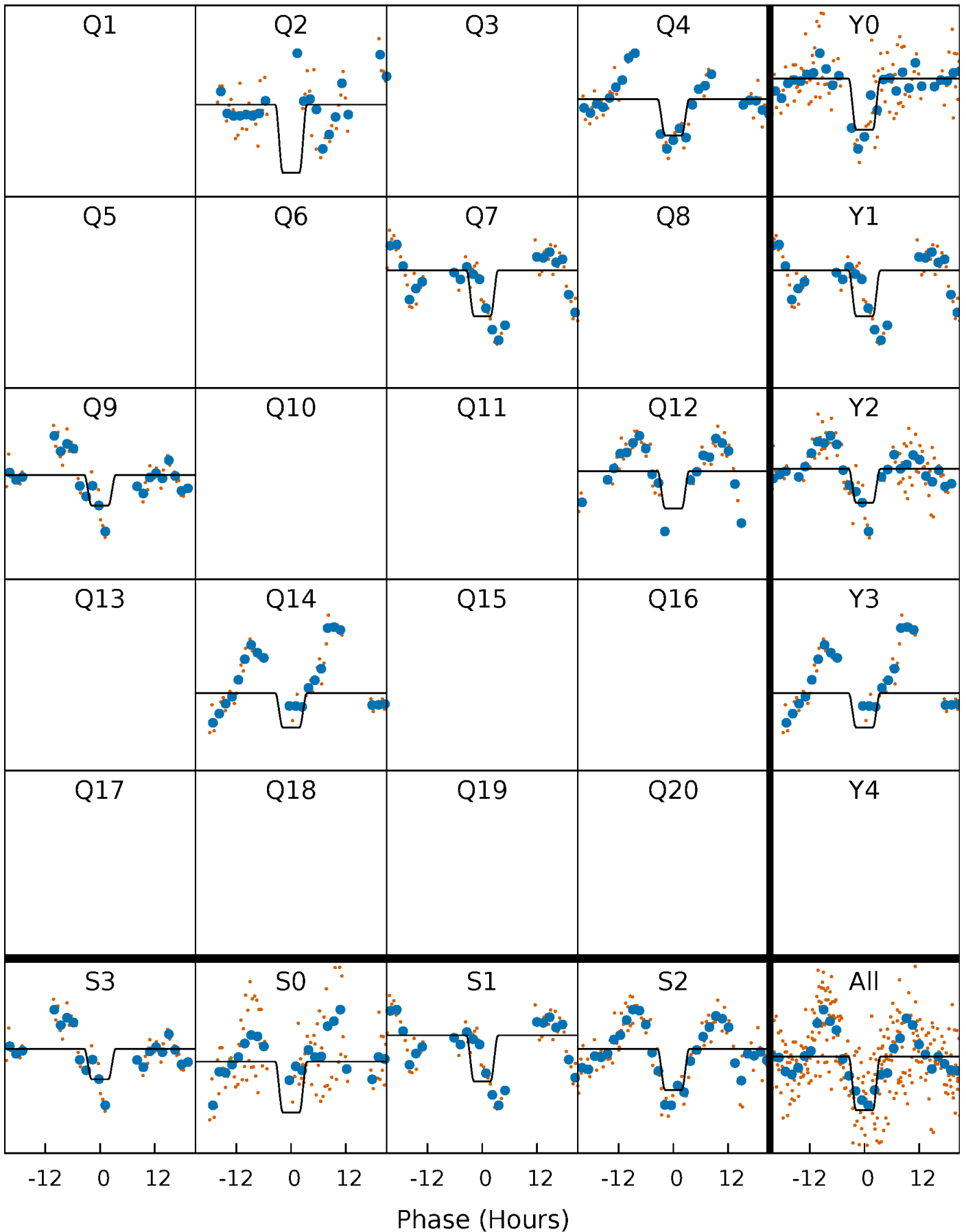
# DV Quarter-Phased Transit Curves

TCE 011357670-03 P=238.340900 Days  $T_0=174.657503$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 011357670-03 P=238.323421 Days  $T_0=174.725894$  (BKJD)

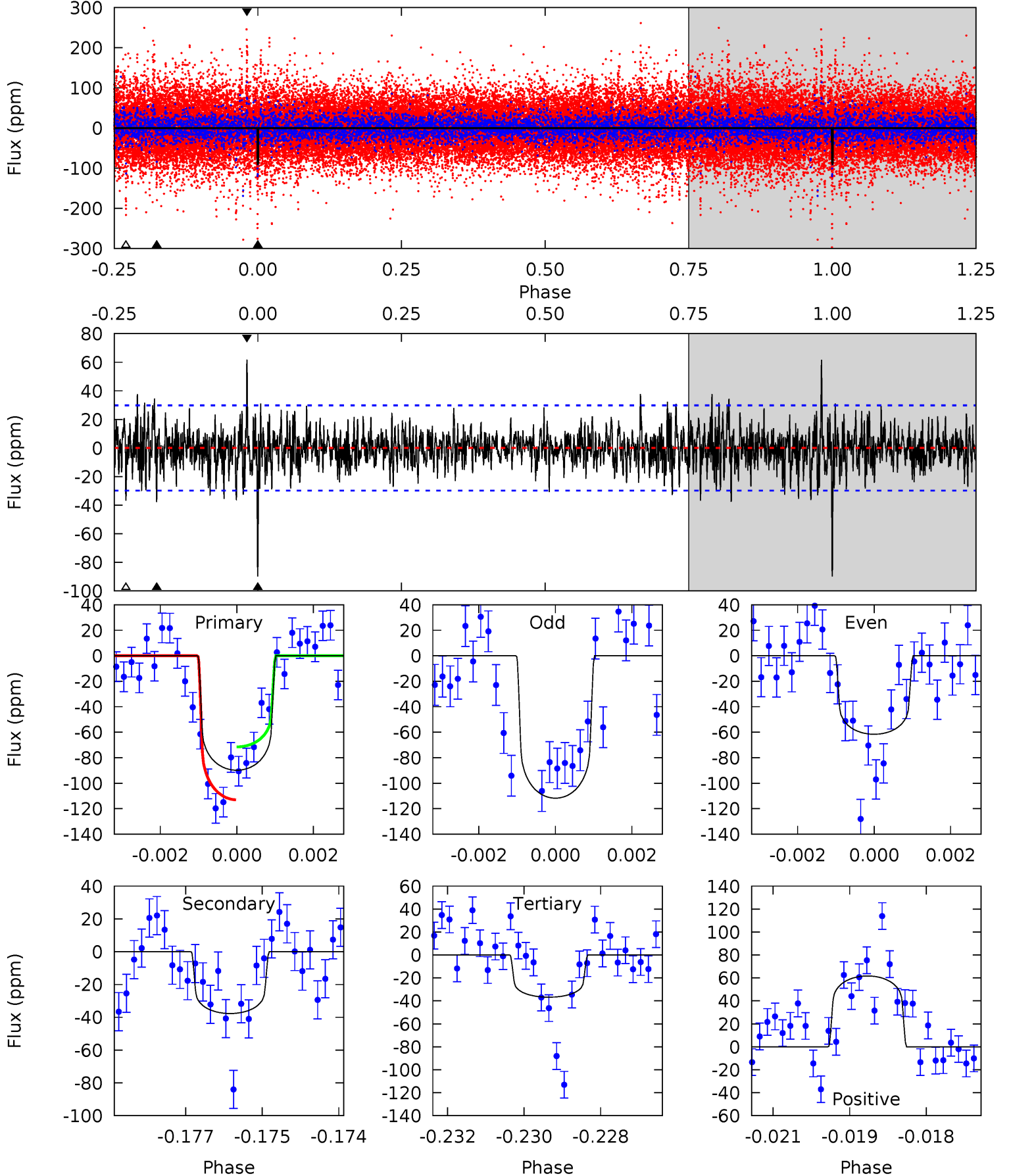




# DV Model-Shift Uniqueness Test

011357670-03, P = 238.340900 Days, E = 174.657503 Days

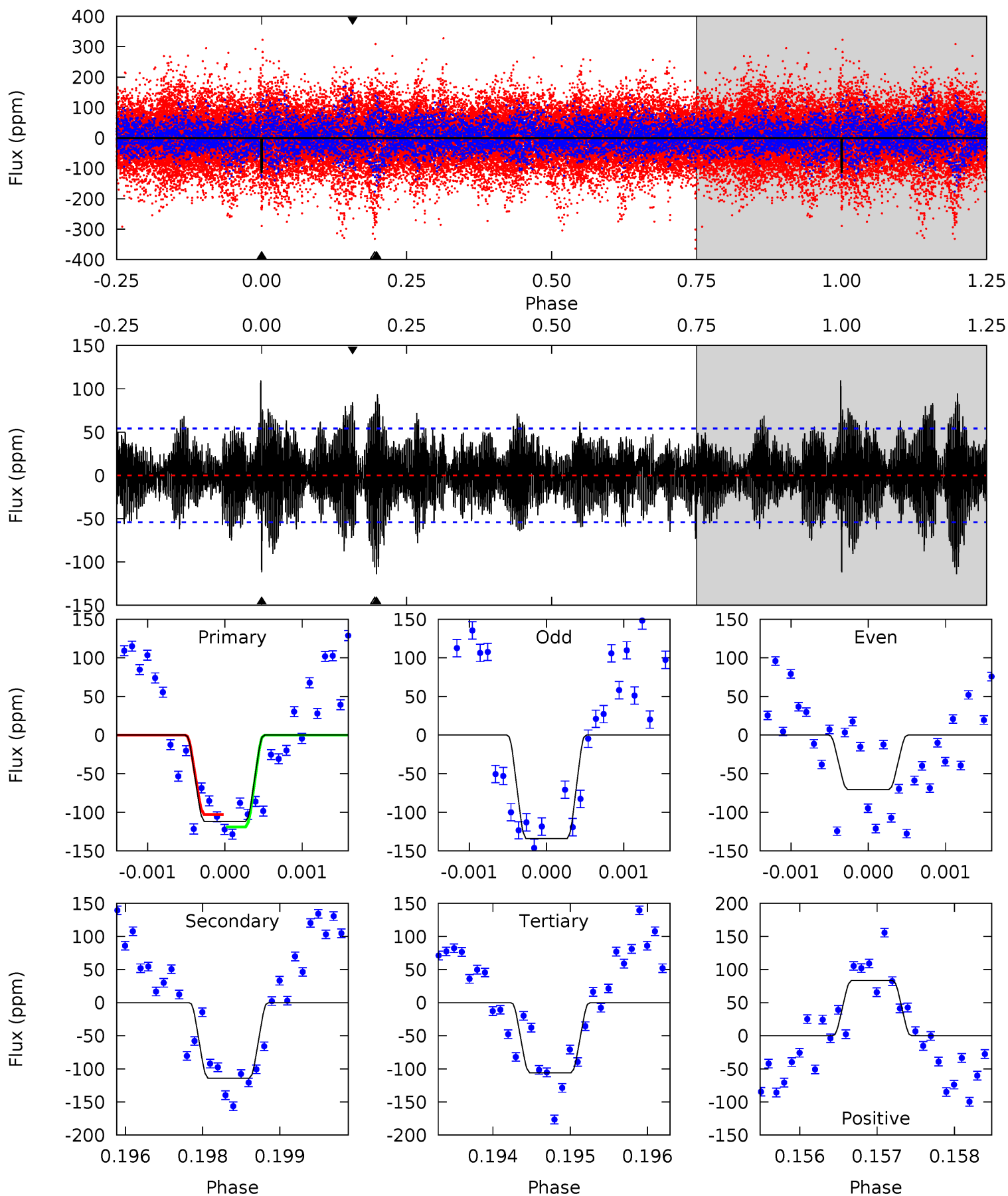
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
16.1	6.77	6.60	11.1	5.35	3.13	1.89	9.51	5.04	0.16	-4.31	4.51	1.06	0.41	3.70



# Alt Model-Shift Uniqueness Test

011357670-03, P = 238.323421 Days, E = 174.725894 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
11.2	11.4	10.6	8.35	5.42	3.24	2.84	0.59	2.83	0.82	3.07	3.13	1.18	0.49	0.81



### Stellar Parameters For KIC 011357670

	$T_{\text{eff}} (K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7963^{+71}_{-87}$	$3.908^{+0.149}_{-0.069}$	$-0.140^{+0.100}_{-0.150}$	$2.532^{+0.255}_{-0.510}$	$1.894^{+0.034}_{-0.203}$	$0.164^{+0.131}_{-0.037}$
	+1%/-1%	+4%/-2%	+71%/-107%	+10%/-20%	+2%/-11%	+80%/-22%
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 011357670-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-38 \pm 6$	$2.62^{+0.69}_{-0.65}$	$805^{+26}_{-40}$	$6141^{+1019}_{-636}$	$2542^{+2107}_{-957}$
Alt.	$-114 \pm 10$	$3.16^{+0.74}_{-0.65}$	$806^{+27}_{-41}$	$7412^{+1154}_{-753}$	$5259^{+3141}_{-1825}$

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

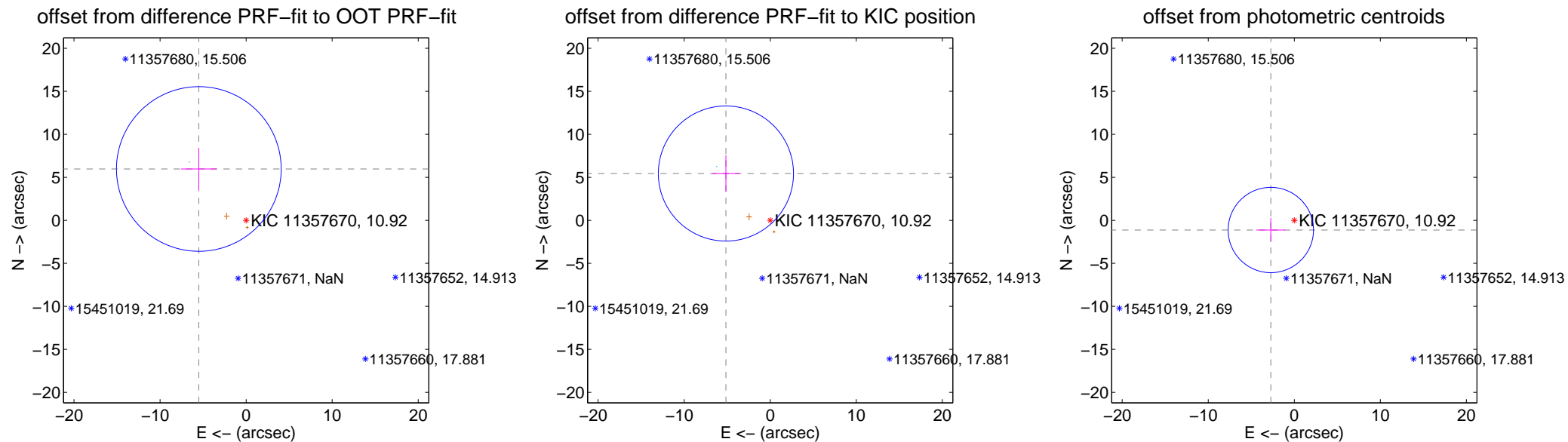
## DV Centroid Data

Supplemental centroid analysis for 011357670-03. **Kepler magnitude: 10.92.** Transit SNR 8.92

**There are 1 quarters with good PRF difference image offsets**

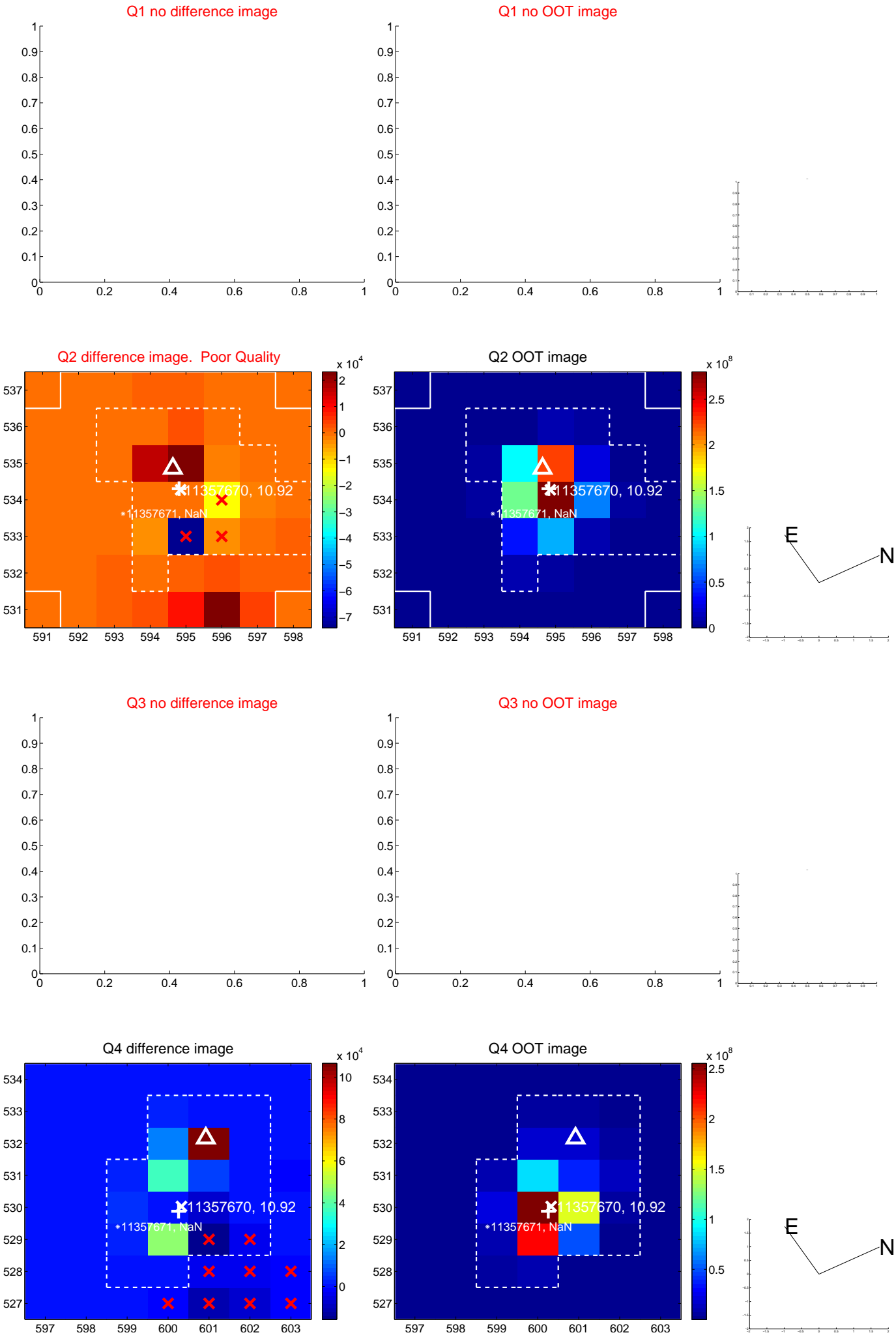
The direct PRF centroid is offset from the target star catalog position by about 0.60 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$8.114 \pm 3.190$	2.54	$5.495 \pm 2.068$	$5.970 \pm 2.438$
PRF-fit source offset from KIC position	$7.490 \pm 2.618$	2.86	$5.146 \pm 1.588$	$5.442 \pm 2.118$
photometric centroid source offset	$2.95 \pm 1.65$	1.79	$2.73 \pm 1.69$	$-1.13 \pm 1.40$

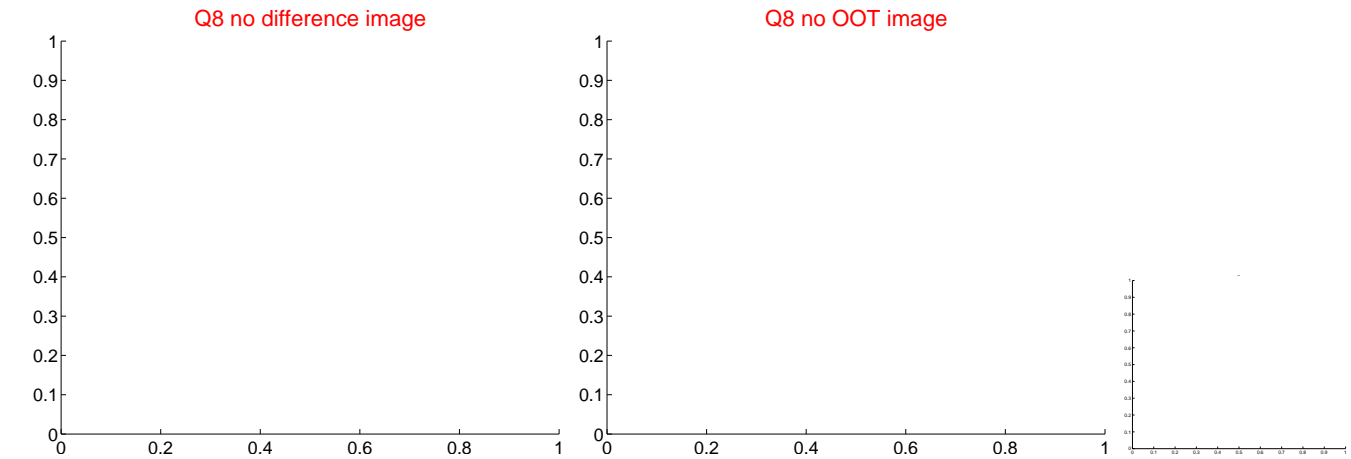
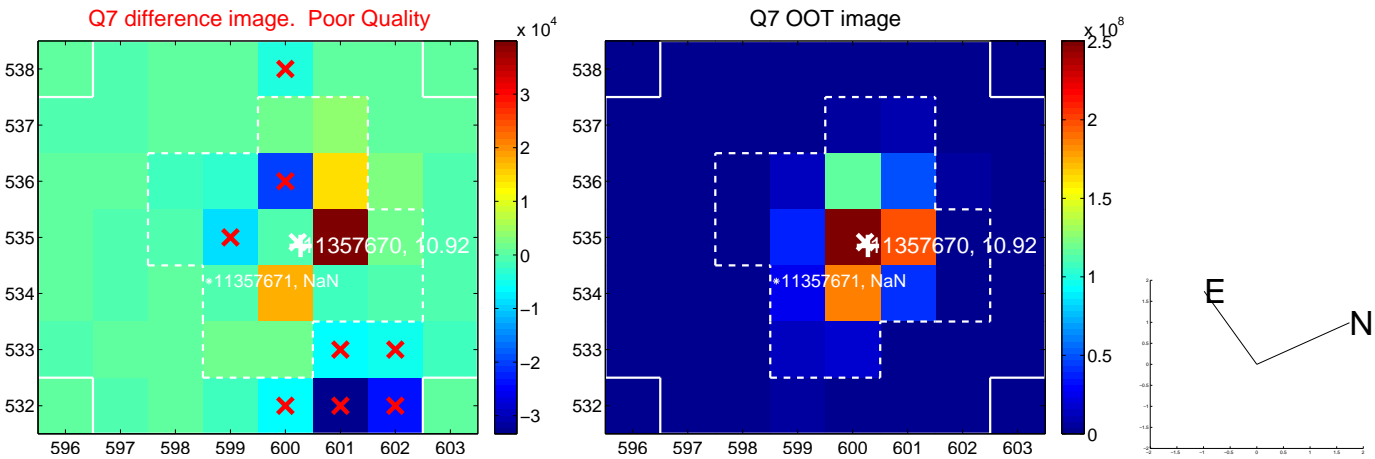
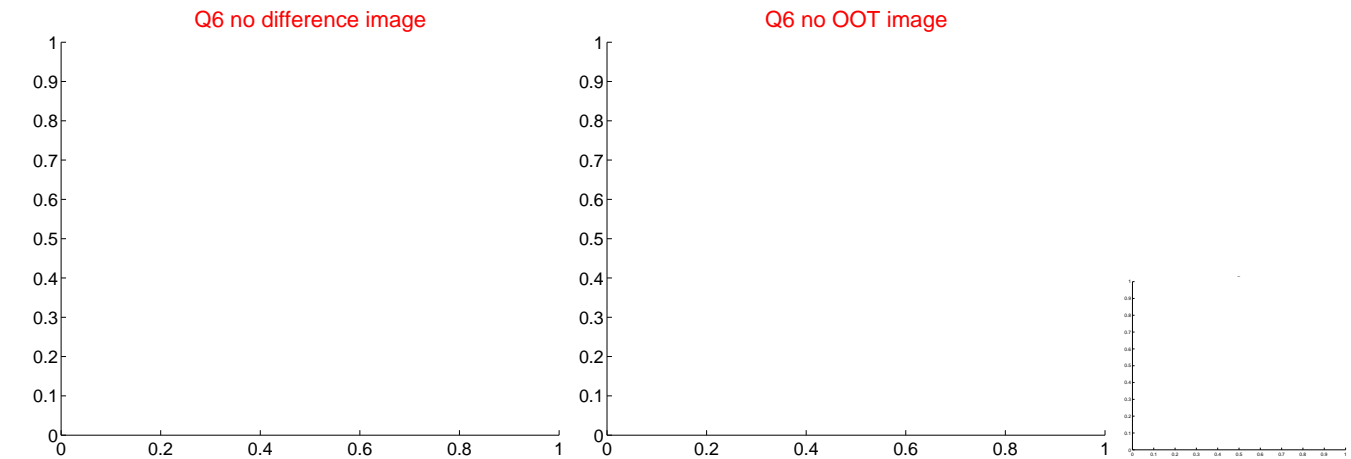
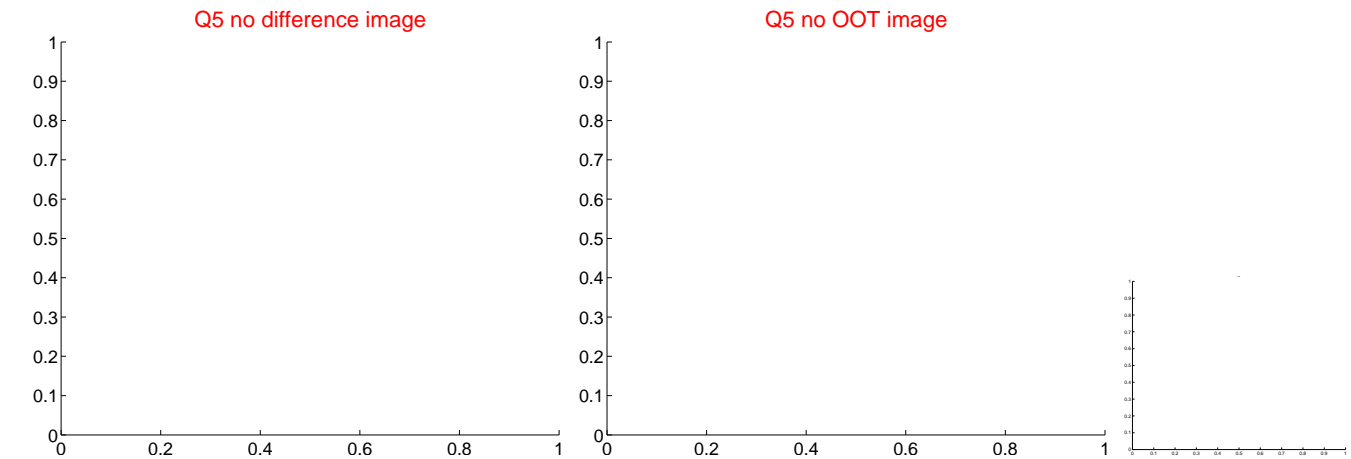


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

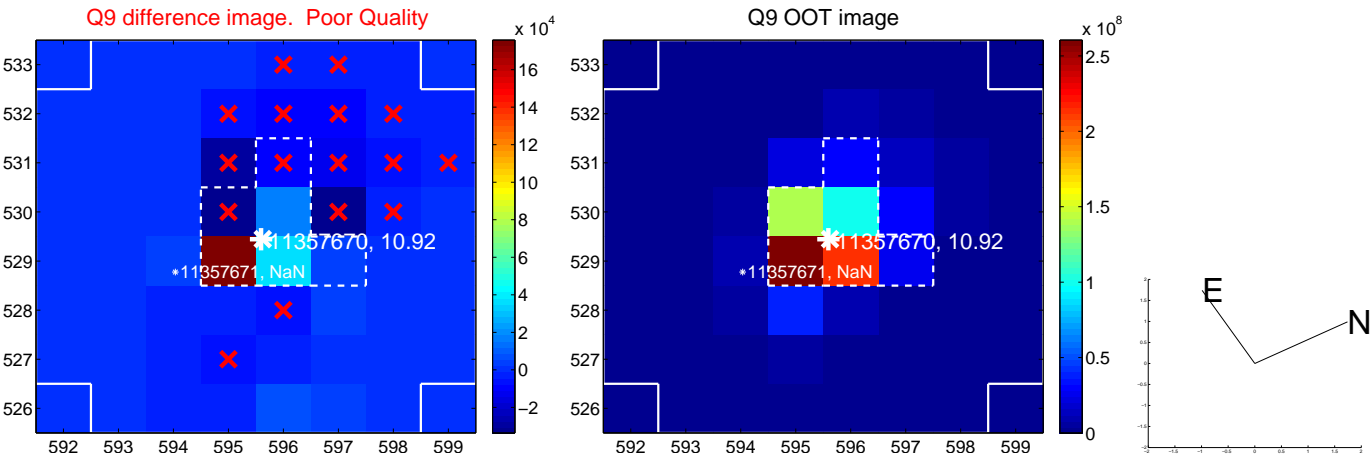


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.

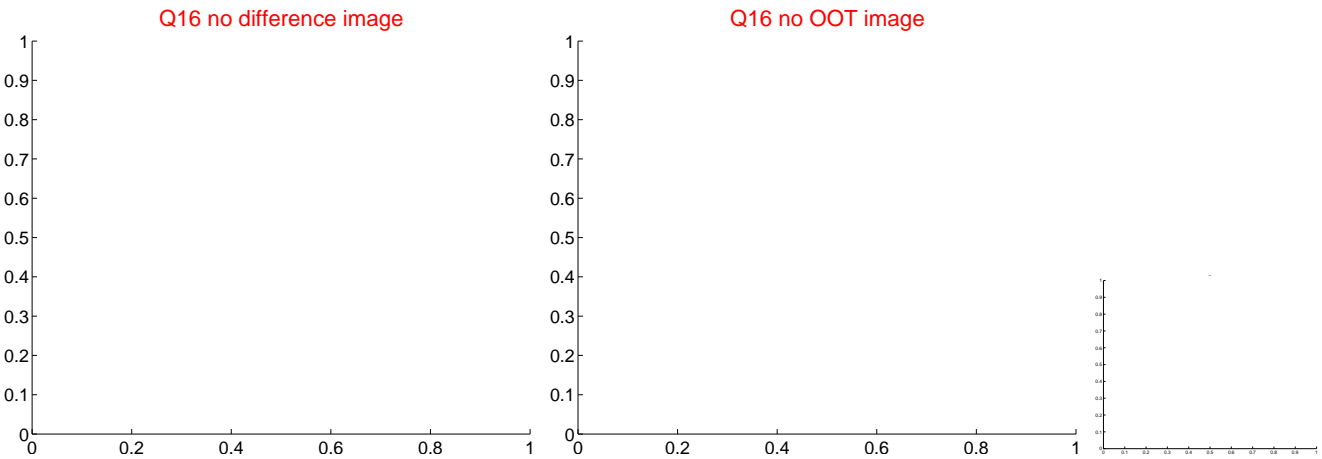
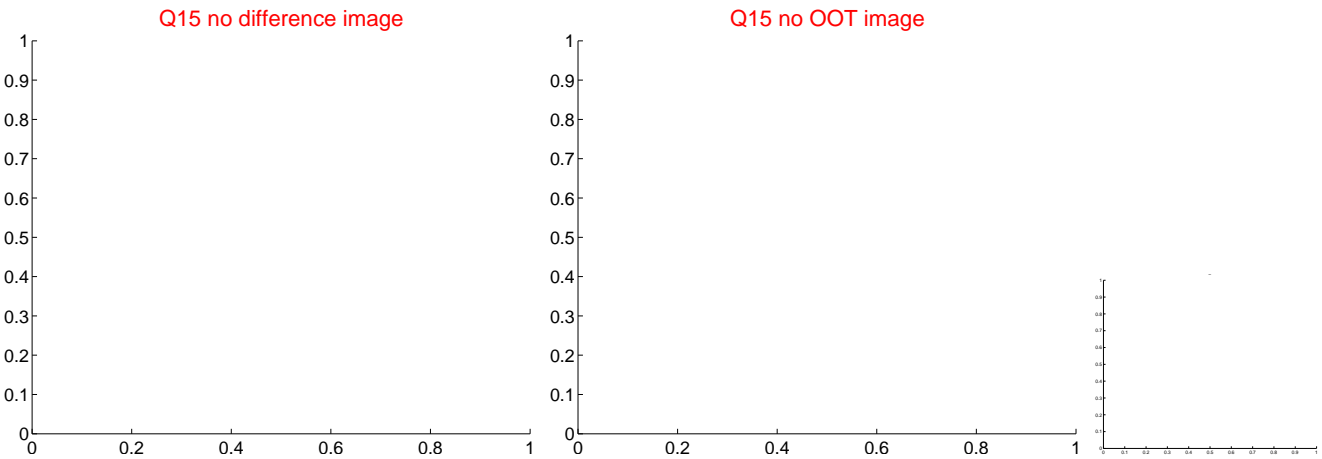
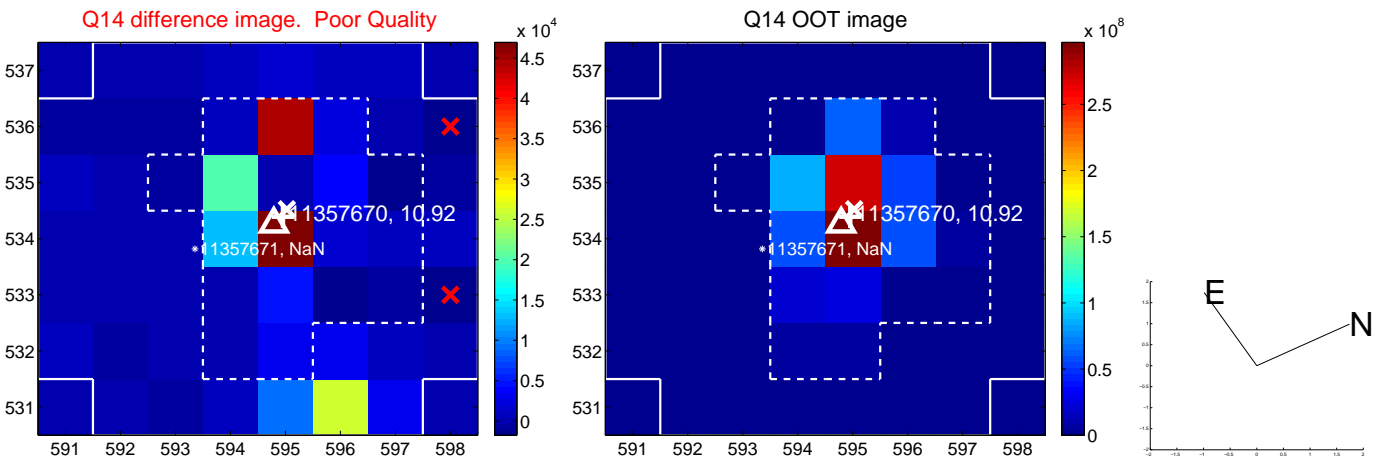
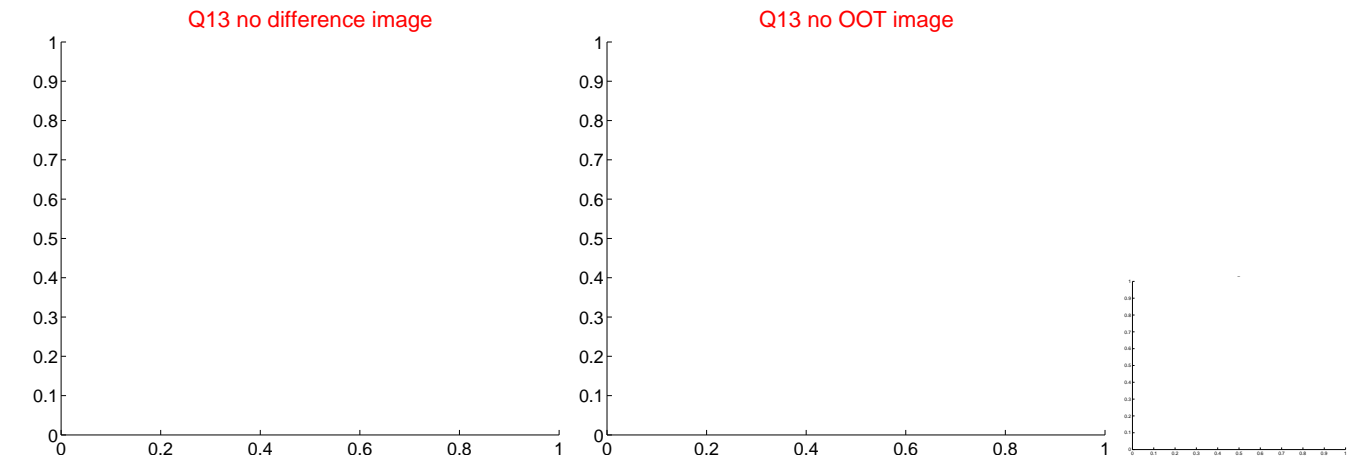




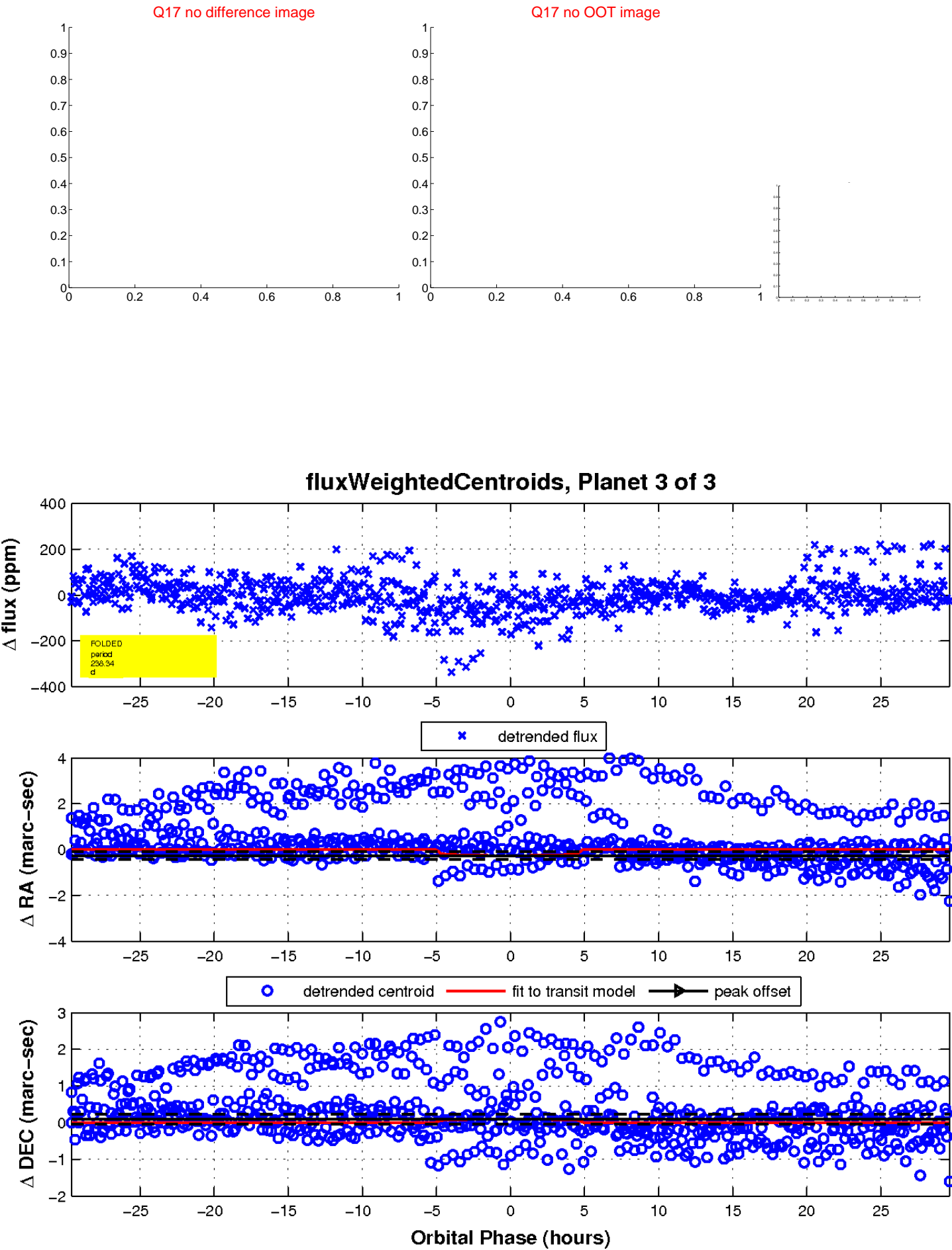
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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.



UKIRT Image

