

# KIC 006891637

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006891637-01	OBS	1697.01	1.752508	132.748432	422.8	5.013	24.3	26.9	0.53	4408	1.55	179.18
006891637-02	OBS	No	390.817013	205.170528	737.3	12.123	10.8	5.1	0.53	4408	1.52	0.13

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006891637-01	OBS	FP	0.00	0	0	1	1	CENT_RESOLVED_OFFSET—HALO_GHOST—EPHEM_MATCH
006891637-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS—HALO_GHOST

**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 006891637-01

TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ( $''$ )	$\Delta$ Row	$\Delta$ Col	$m_2$	$m_1$	$D_2/D_1$	Mechanism	Flag	$\sigma_P$	$\sigma_T$
006891637-01	6891637	5335.01	6891512	1:1	63.4	5	-15	11.39	15.83	873.19	Direct-PRF	0	2.37	1.56

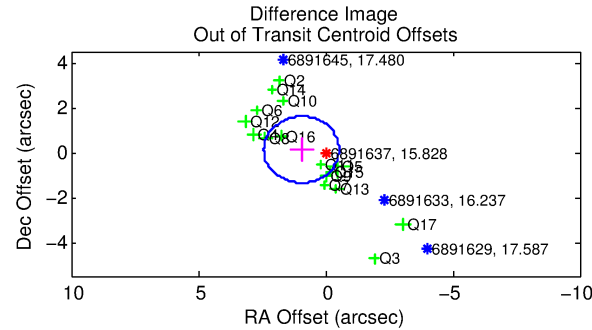
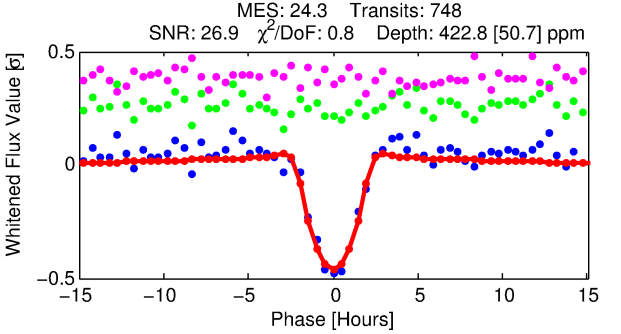
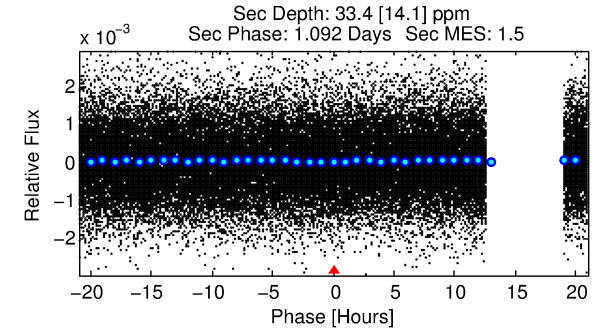
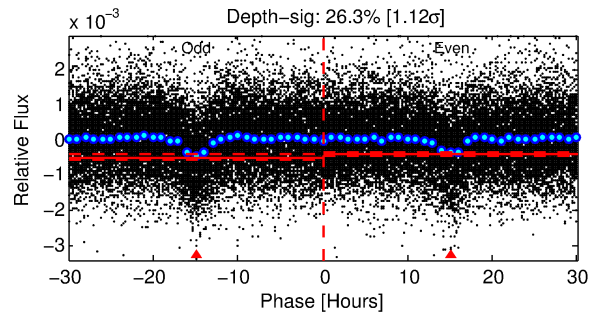
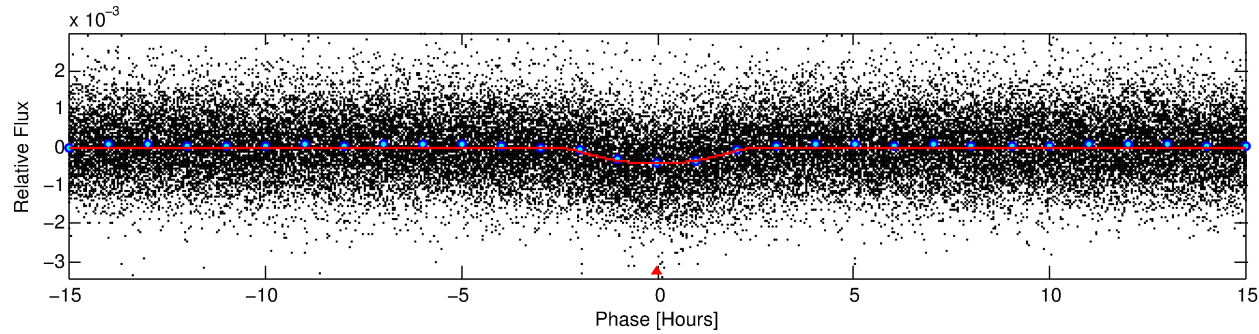
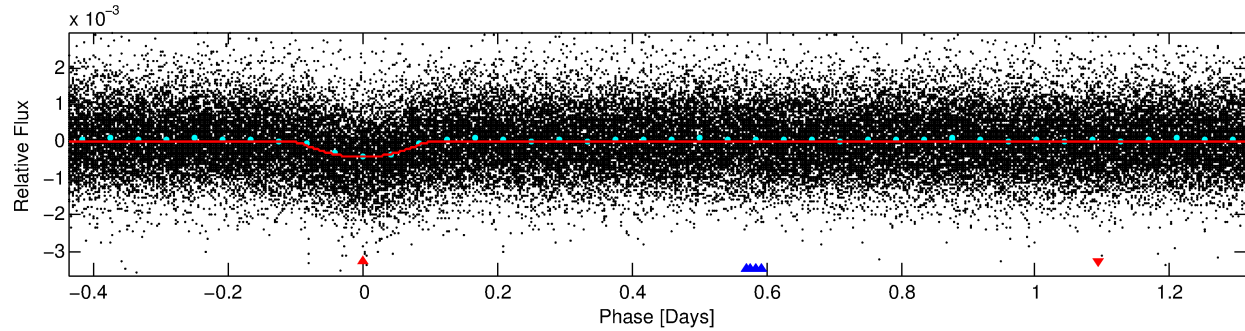
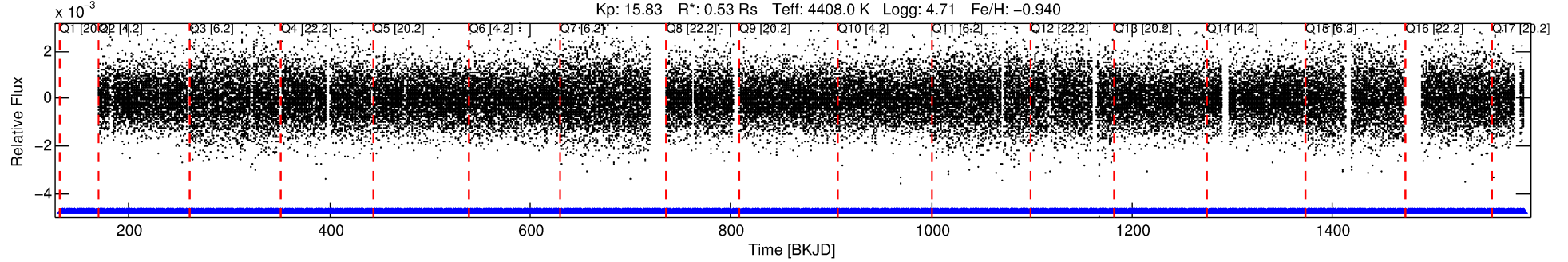
**Notes:**  $P_1:P_2$  is the period ratio. Dist is the distance in arcseconds.  $\Delta$ Row and  $\Delta$ Col are the number of pixels apart in row and column.  $m_2$  and  $m_1$  are the magnitudes of the parent and child.  $D_2/D_1$  is the parent's transit depth divided by the child's.  $\sigma_P$  and  $\sigma_T$  are the significance of the match in period and epoch. For a match to be considered significant  $\sigma_P < 5.0$  and  $\sigma_T < 5.0$ . Matches which have  $\sigma_P$  and  $\sigma_T$  very close to this cutoff should receive extra scrutiny, especially if the period ratio is very large.

# DV One-Page Summary

KIC: 6891637 Candidate: 1 of 2 Period: 1.753 d

KOI: K01697.01 Corr: 0.952

Kp: 15.83 R\*: 0.53 Rs Teff: 4408.0 K Logg: 4.71 Fe/H: -0.940



## DV Fit Results:

Period = 1.75251 [0.00001] d  
Epoch = 132.7484 [0.0031] BKJD  
Rp/R\* = 0.0268 [0.0035]  
a/R\* = 1.31 [0.06]  
b = 0.98 [0.01]  
Seff = 179.18 [28.06]  
Teq = 933 [37] K  
Rp = 1.55 [0.24] Re  
a = 0.0230 [0.0016] AU  
Ag = 4.06 [2.07] [1.48σ]  
Teffp = 2048 [262] K [4.21σ]

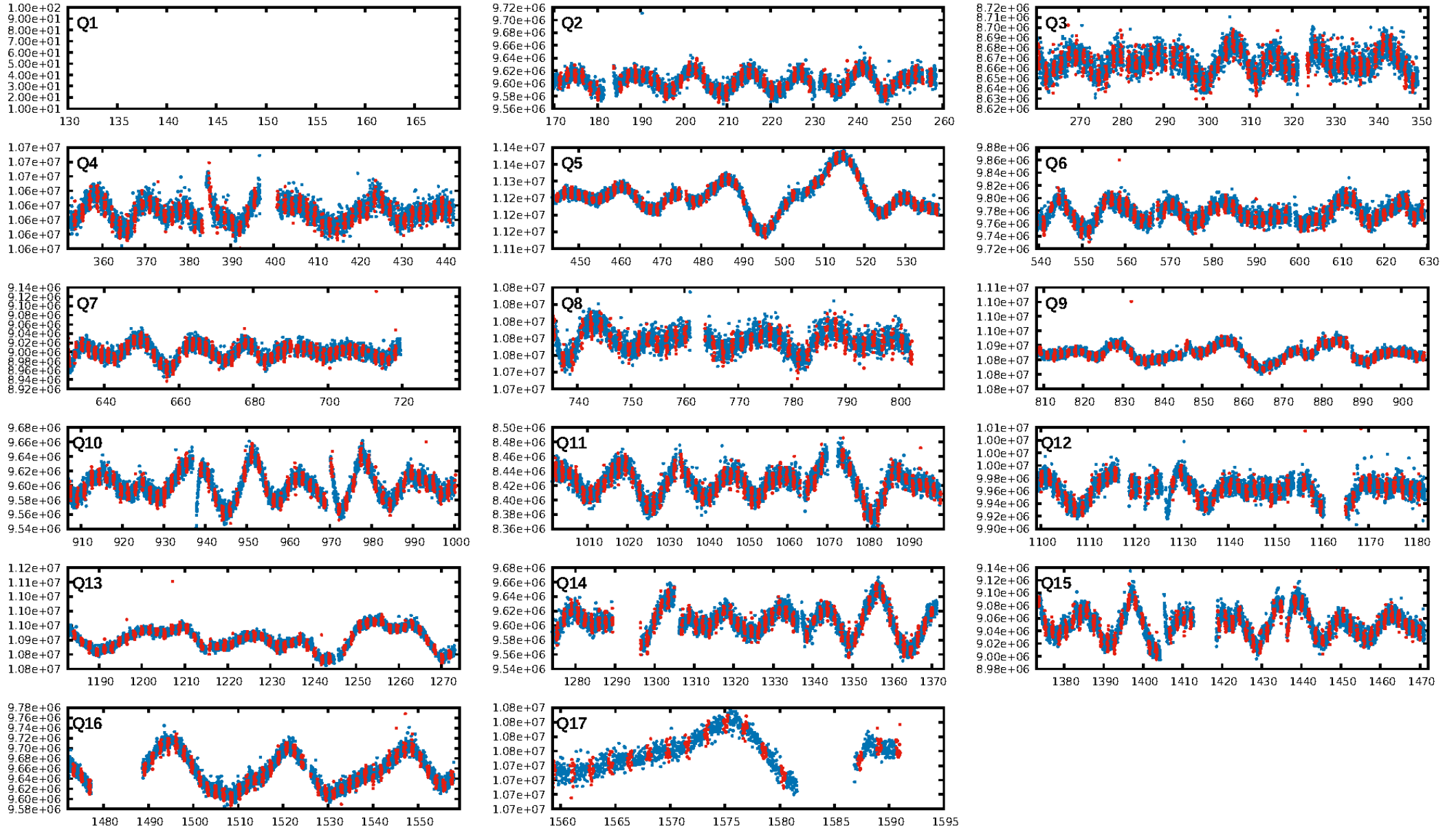
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [711.80σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 3.56e-114  
RollingBand-fgt: 1.00 [732/732]  
**GhostDiagnostic-chr: -0.04812**  
Centroid-sig: 42.8%  
Centroid-so: 0.444 arcsec [1.32σ]  
OotOffset-rm: 0.957 arcsec [1.94σ]  
KicOffset-rm: 0.624 arcsec [1.17σ]  
OotOffset-st: 4/4/4 [16]  
KicOffset-st: 4/4/4 [16]  
DiffImageQuality-fgm: 0.00 [0/16]  
DiffImageOverlap-fno: 1.00 [16/16]

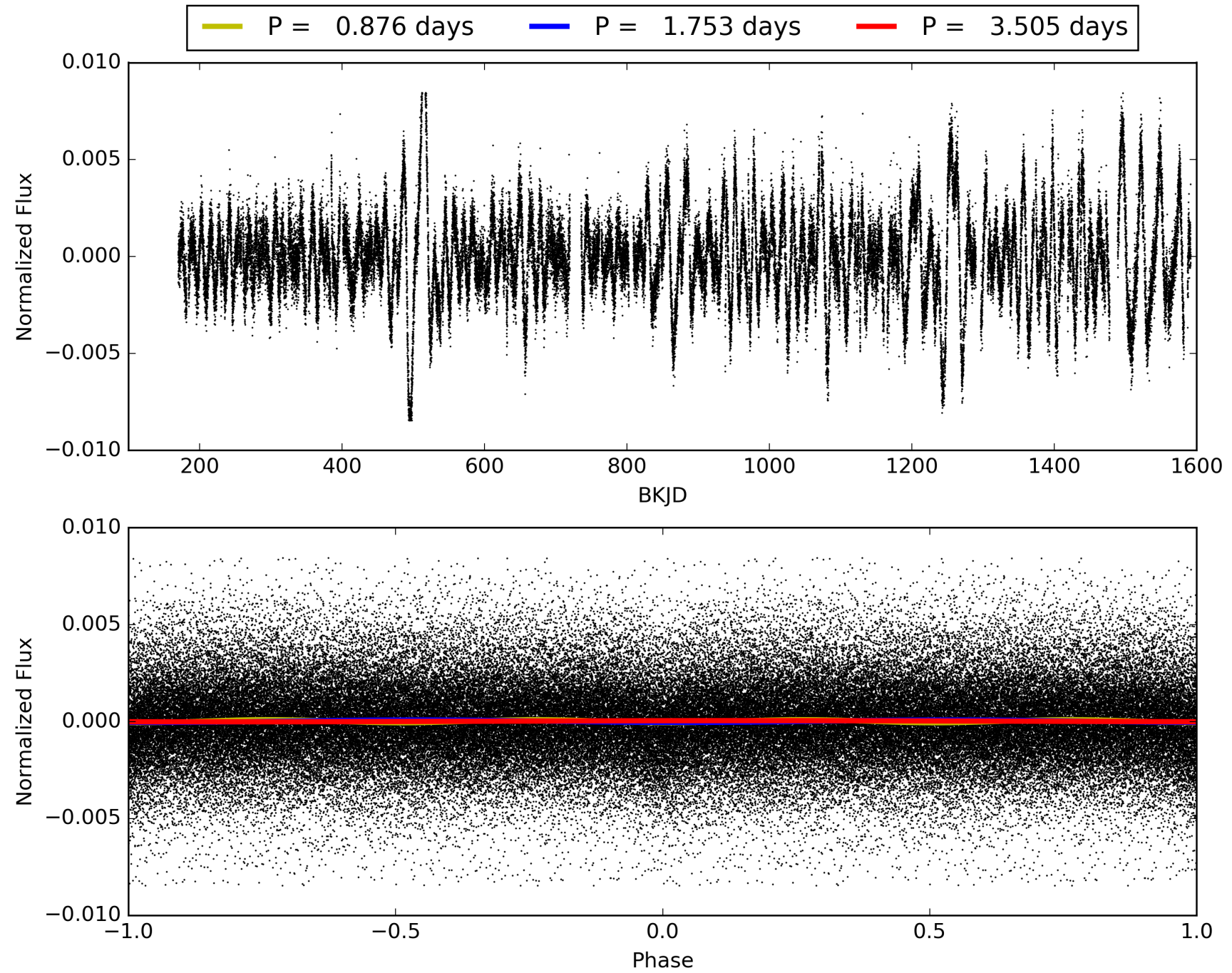
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 006891637-01, PDC Light Curves

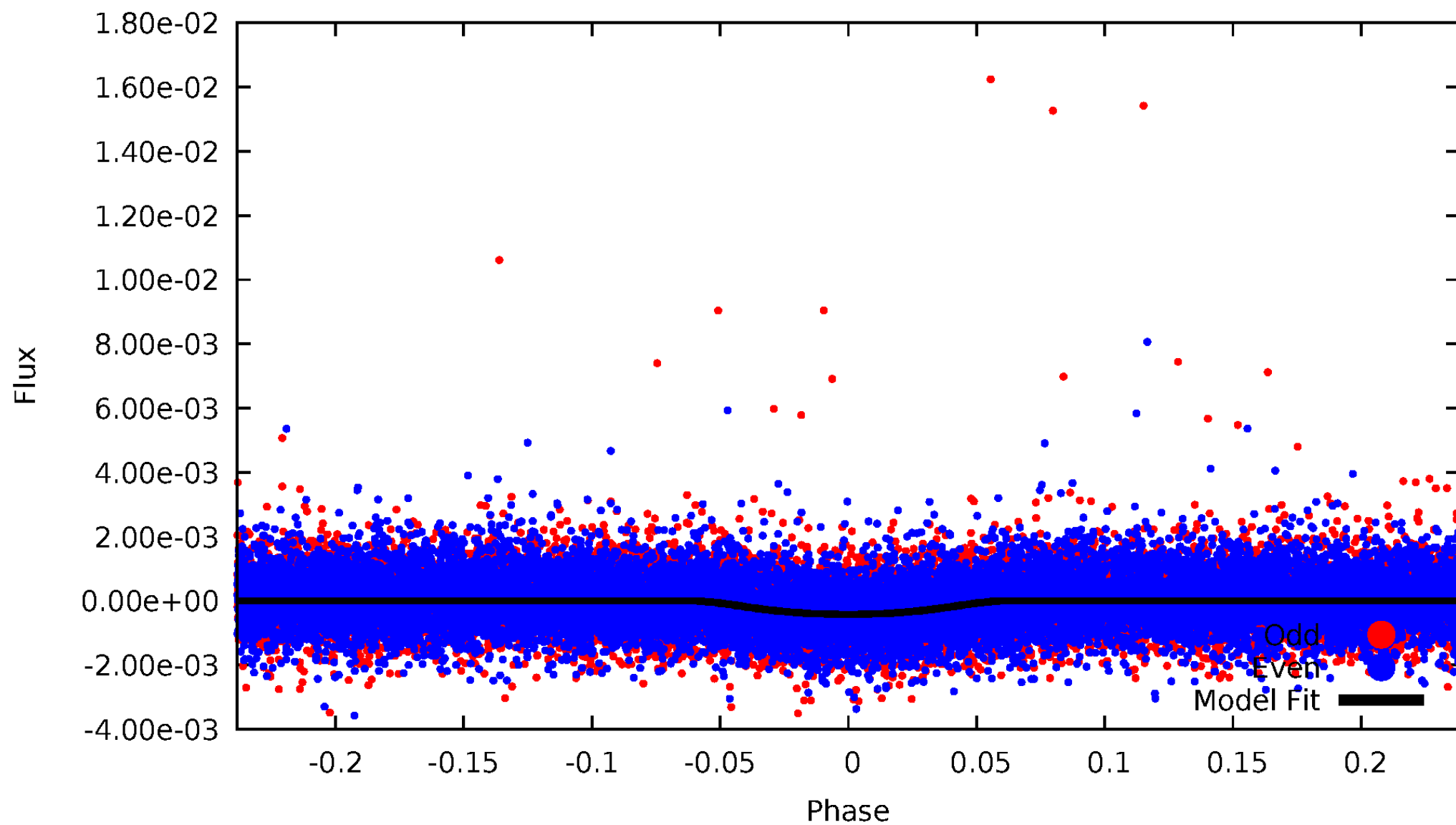


TCE 006891637-01



# DV Odd/Even

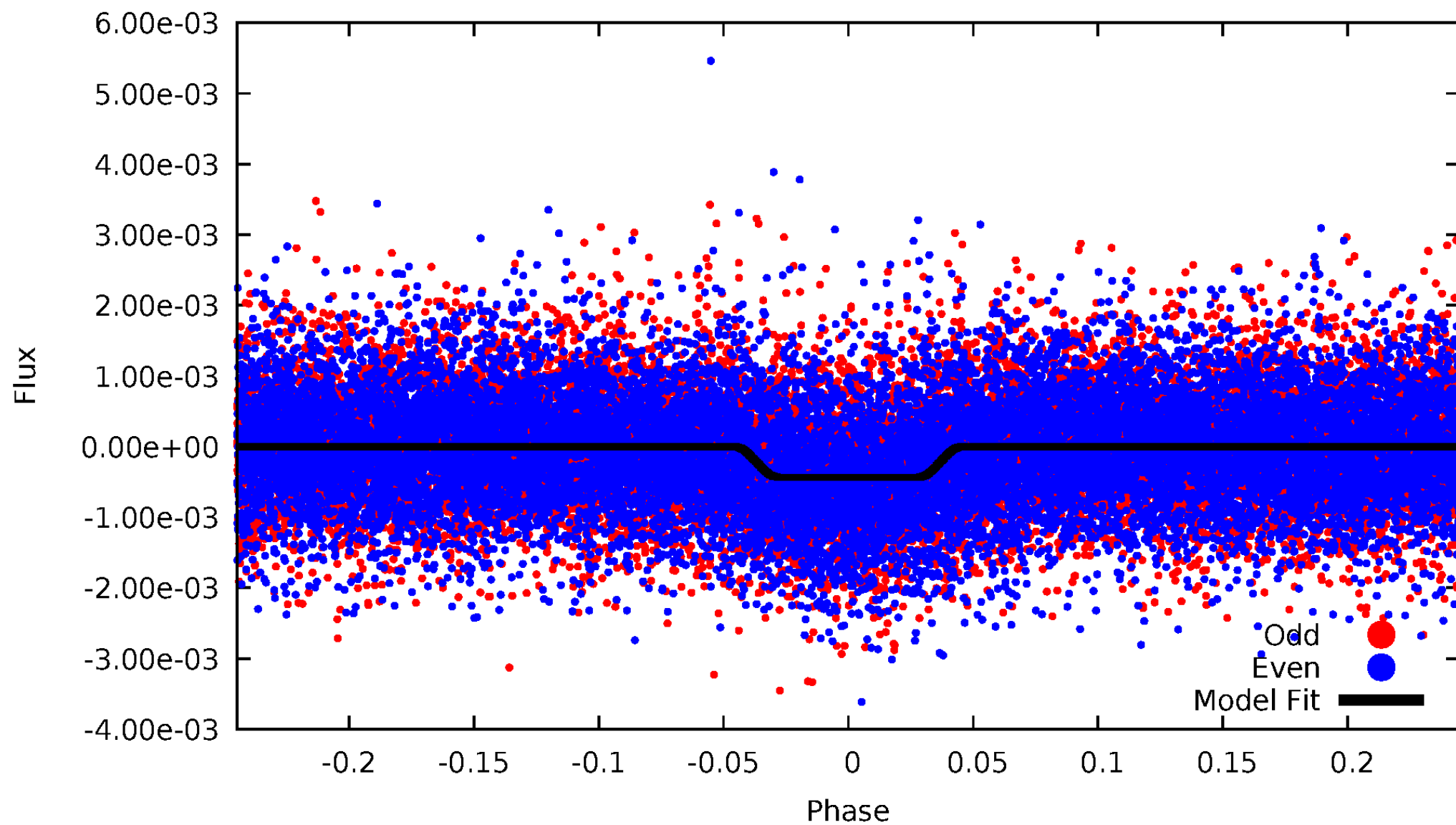
TCE 006891637-01





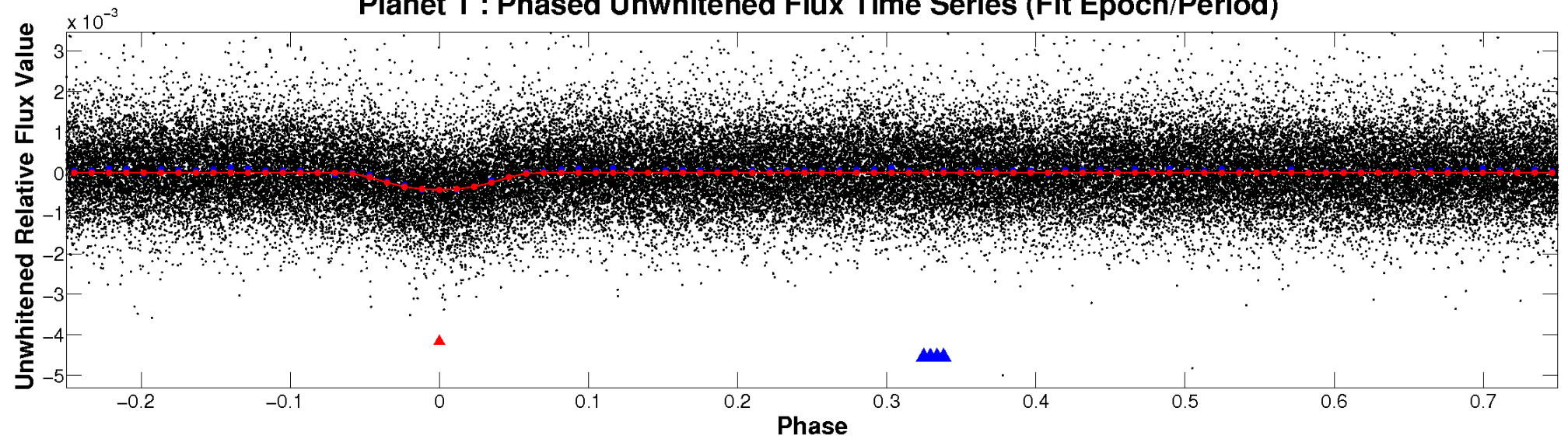
# ALT Odd/Even

TCE 006891637-01

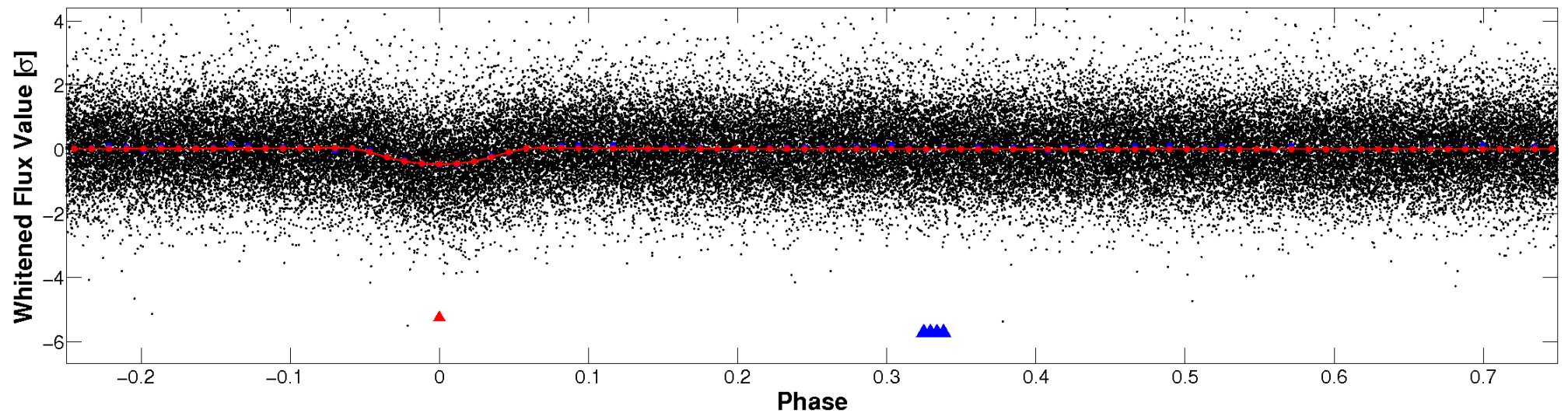


# Non-Whitened Vs. Whitened Light Curve

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

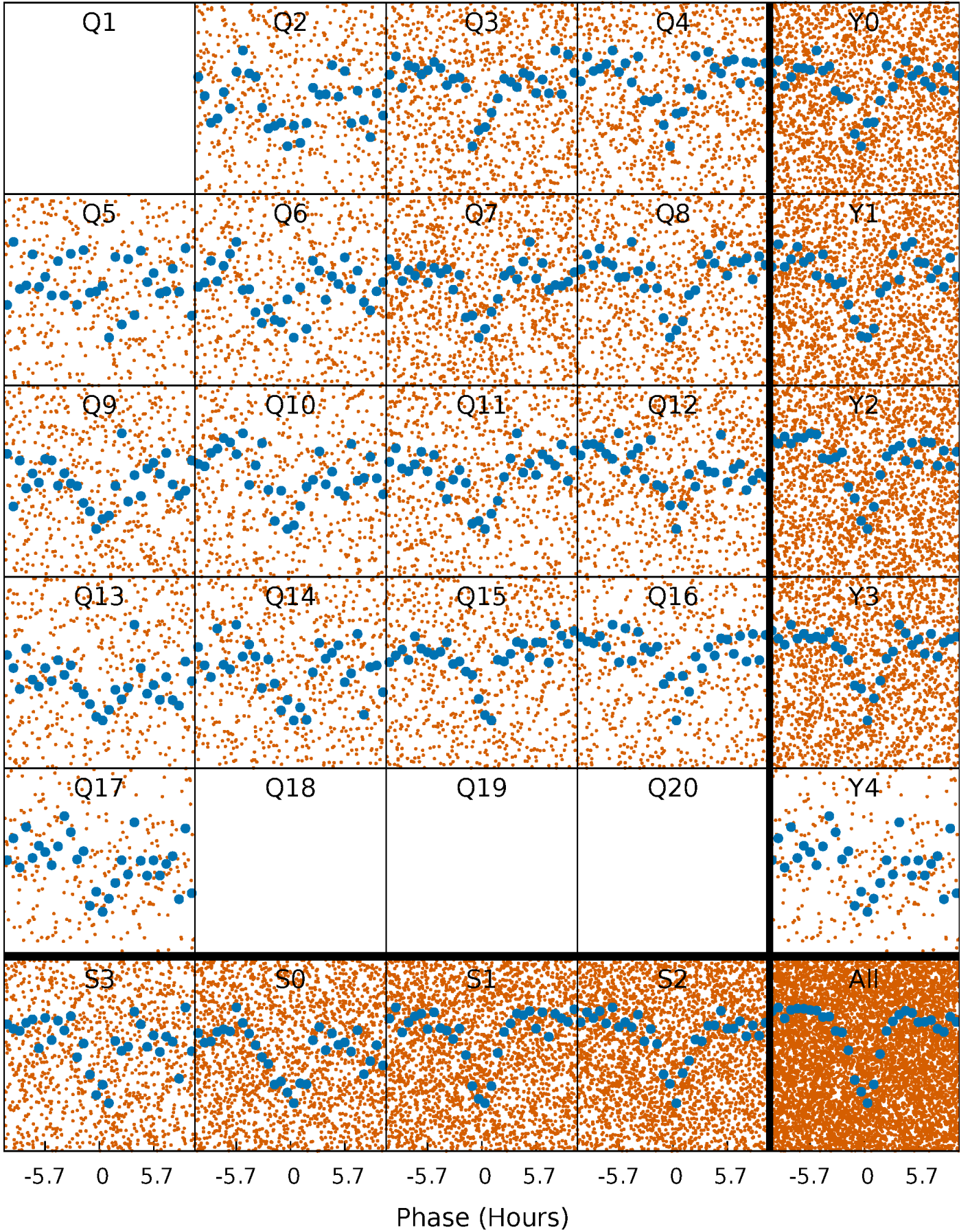


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

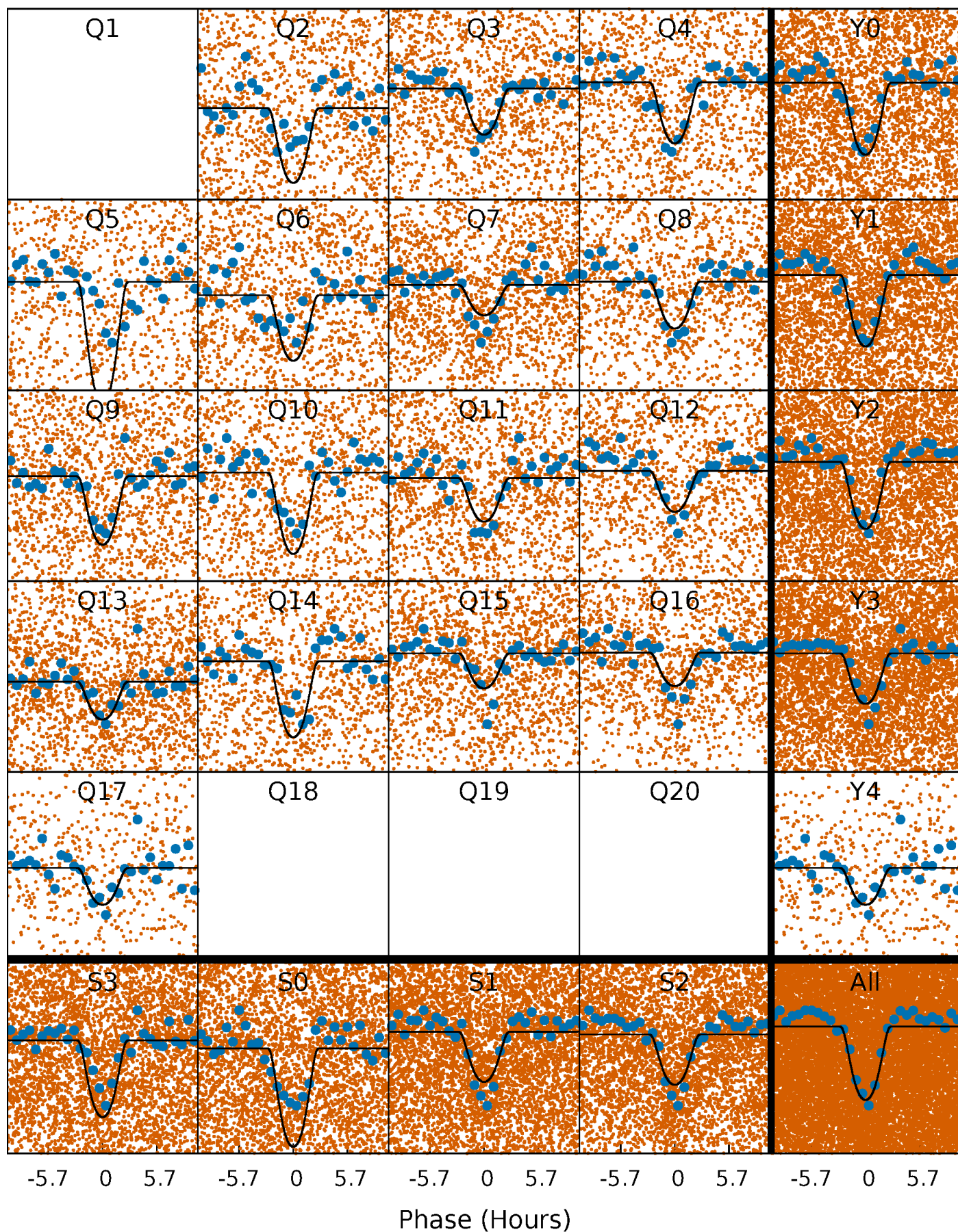
TCE 006891637-01   P= 1.752508 Days    $T_0=132.748432$  (BKJD)





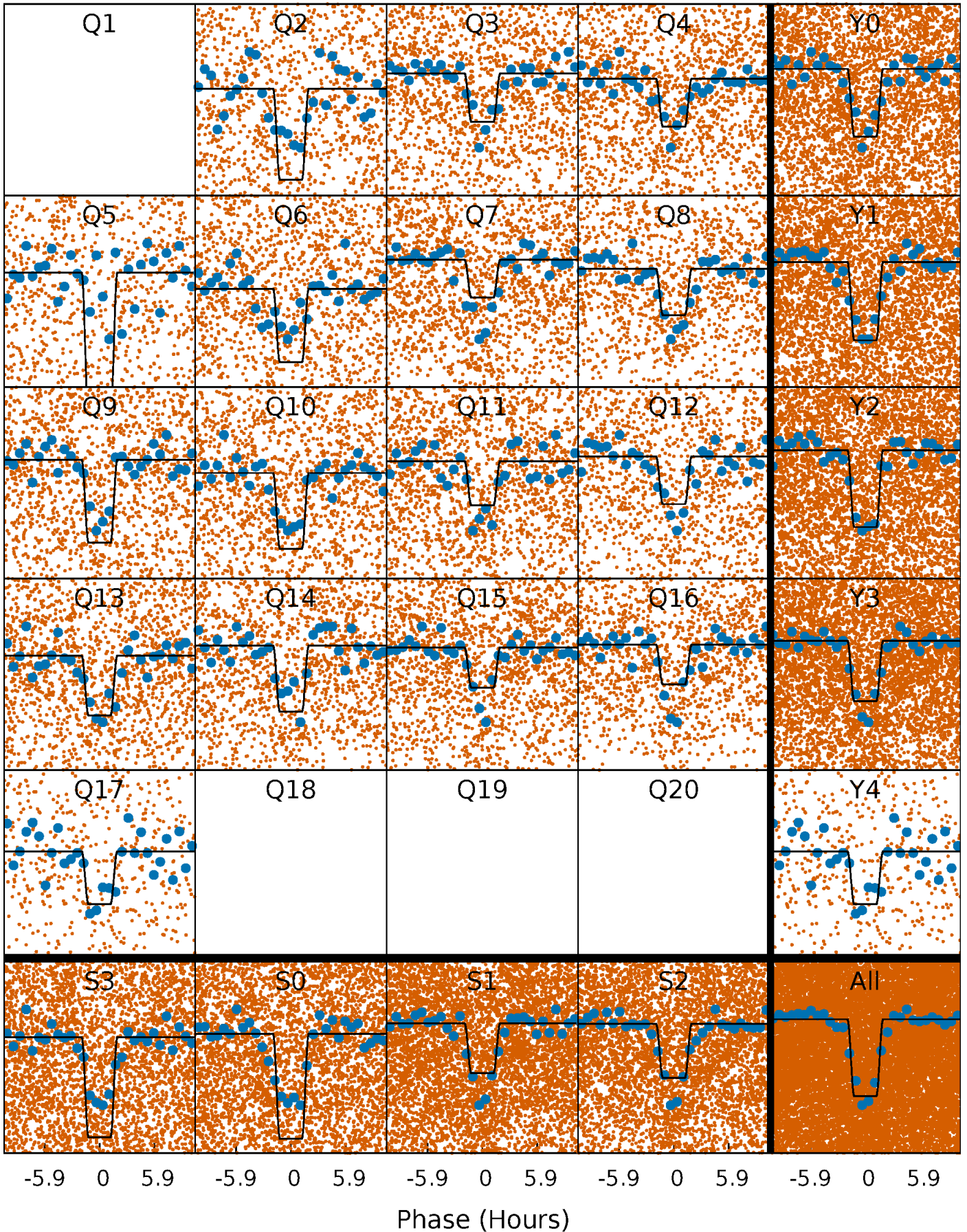
# DV Quarter-Phased Transit Curves

TCE 006891637-01 P= 1.752508 Days  $T_0=132.748432$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 006891637-01 P= 1.752545 Days  $T_0=132.732335$  (BKJD)

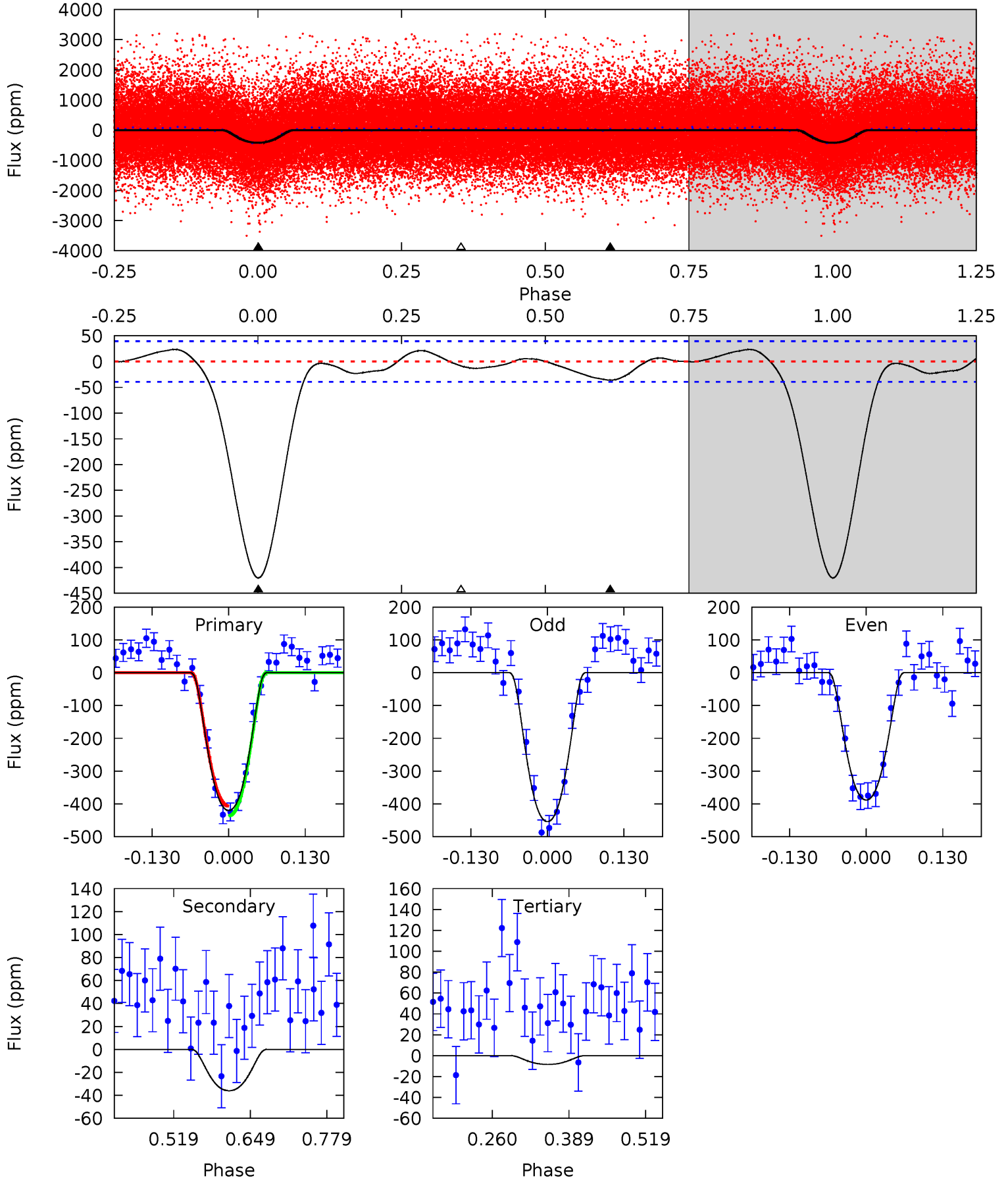




# DV Model-Shift Uniqueness Test

006891637-01, P = 1.752508 Days, E = 132.748432 Days

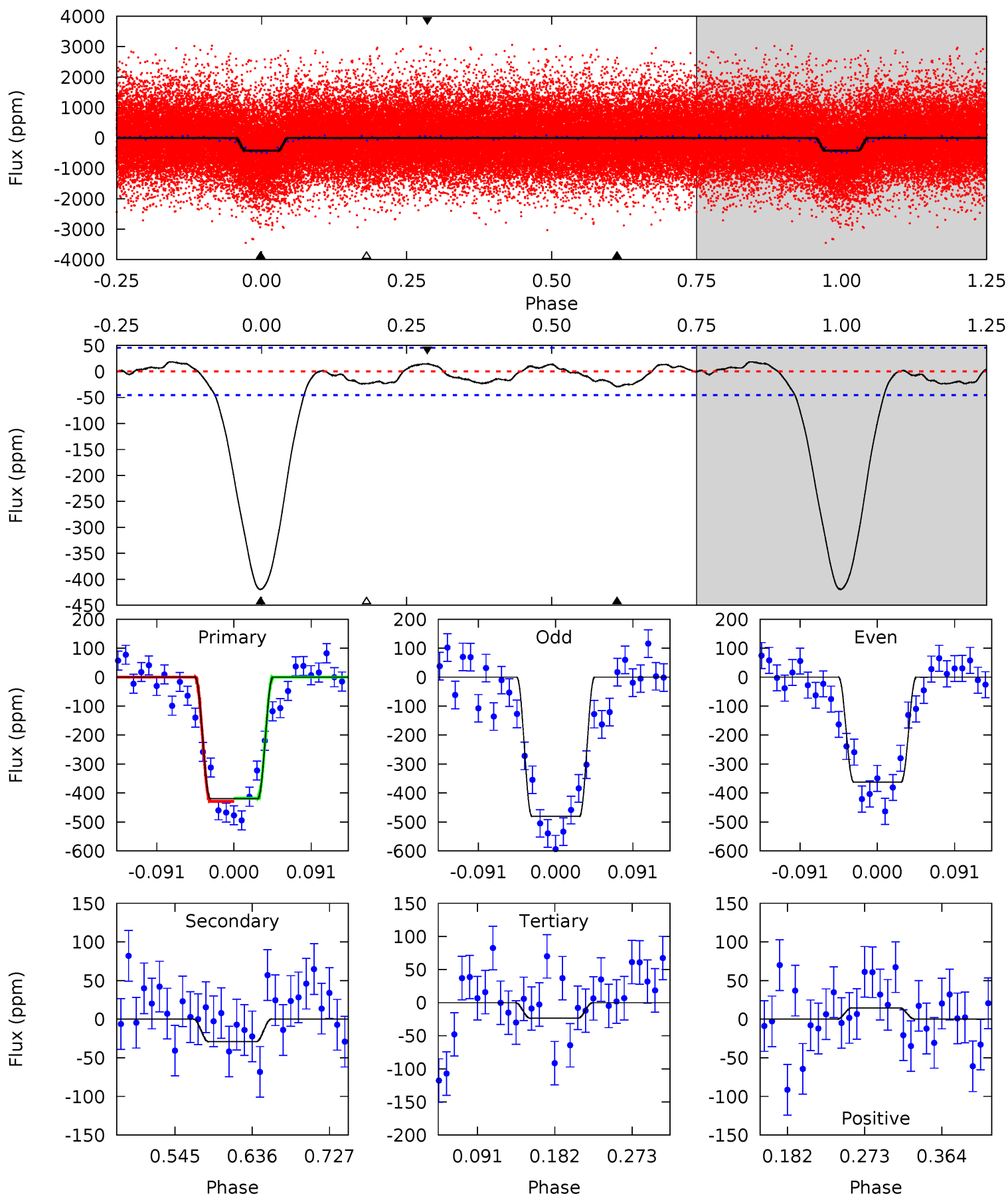
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
48.0	4.11	0.96	0	4.51	1.51	1.58	47.1	48.0	3.15	4.11	3.79	0.96	0.05	1.73



# Alt Model-Shift Uniqueness Test

006891637-01, P = 1.752545 Days, E = 132.732335 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
42.2	2.93	2.36	1.47	4.58	1.69	1.28	39.9	40.8	0.57	1.46	6.01	0.95	0.04	0.52





### Stellar Parameters For KIC 006891637

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4408^{+130}_{-130}$	$4.713^{+0.056}_{-0.032}$	$-0.940^{+0.300}_{-0.300}$	$0.529^{+0.041}_{-0.045}$	$0.528^{+0.041}_{-0.034}$	$5.020^{+1.238}_{-0.685}$
	+3%/-3%	+1%/-1%	+32%/-32%	+8%/-9%	+8%/-6%	+25%/-14%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 006891637-01 / KOI 1697.01

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-36 \pm 9$	$1.54^{+0.23}_{-0.20}$	$1298^{+47}_{-42}$	$2727^{+148}_{-149}$	$4.454^{+1.916}_{-1.475}$
Alt.	$-29 \pm 10$	$1.19^{+0.22}_{-0.21}$	$1297^{+42}_{-45}$	$2835^{+222}_{-219}$	$5.944^{+3.703}_{-2.551}$

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

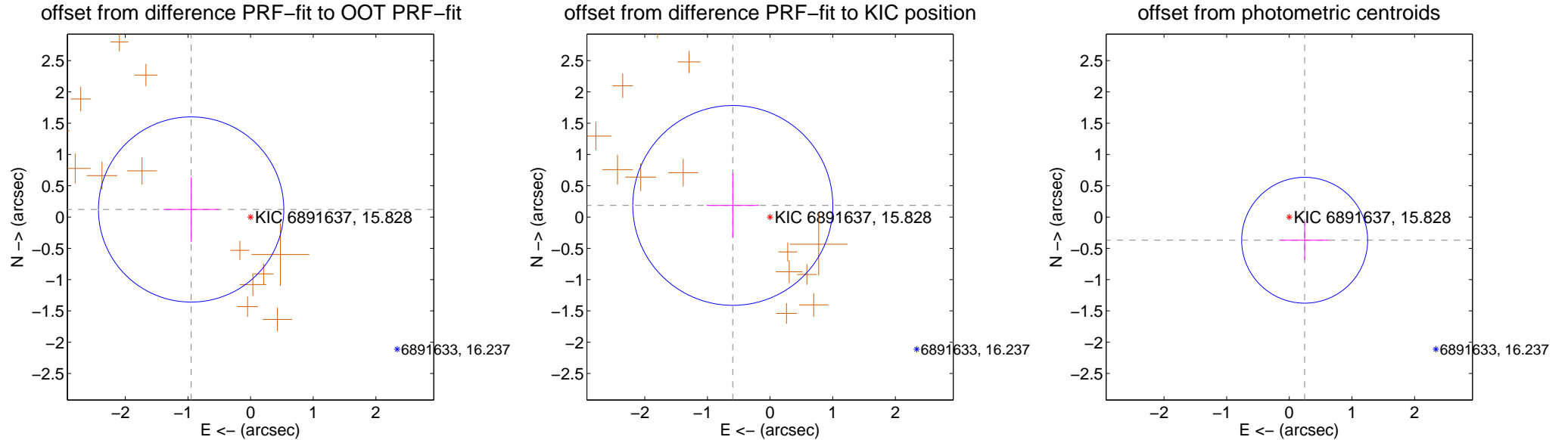
## DV Centroid Data

Supplemental centroid analysis for 006891637-01. Kepler magnitude: 15.83. Transit SNR 26.90

There are 0 quarters with good PRF difference image offsets

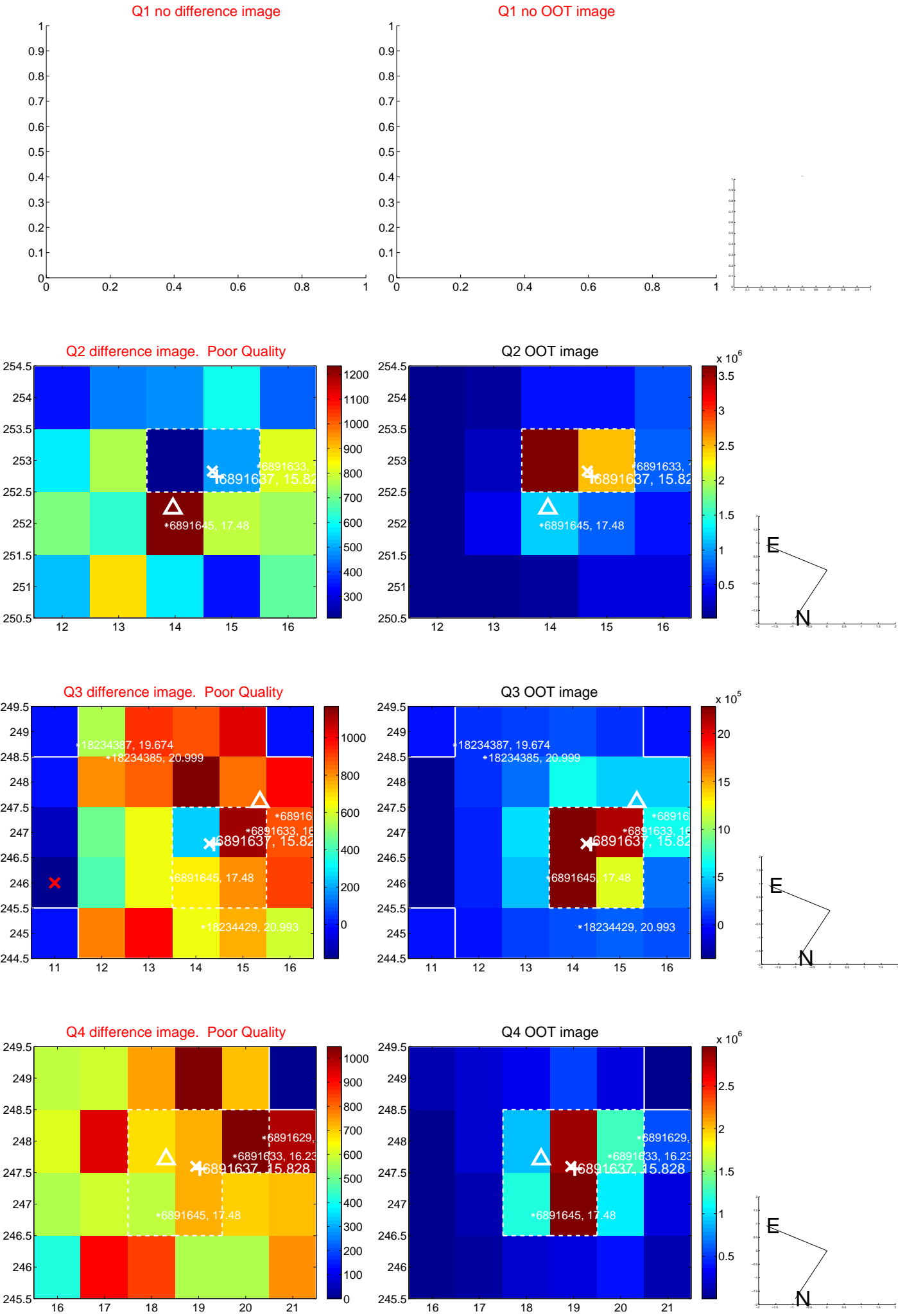
The direct PRF centroid is offset from the target star catalog position by about 0.34 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.957 \pm 0.493$	1.94	$0.949 \pm 0.441$	$0.121 \pm 0.516$
PRF-fit source offset from KIC position	$0.624 \pm 0.532$	1.17	$0.595 \pm 0.420$	$0.186 \pm 0.515$
photometric centroid source offset	$0.44 \pm 0.34$	1.32	$-0.24 \pm 0.39$	$-0.37 \pm 0.31$

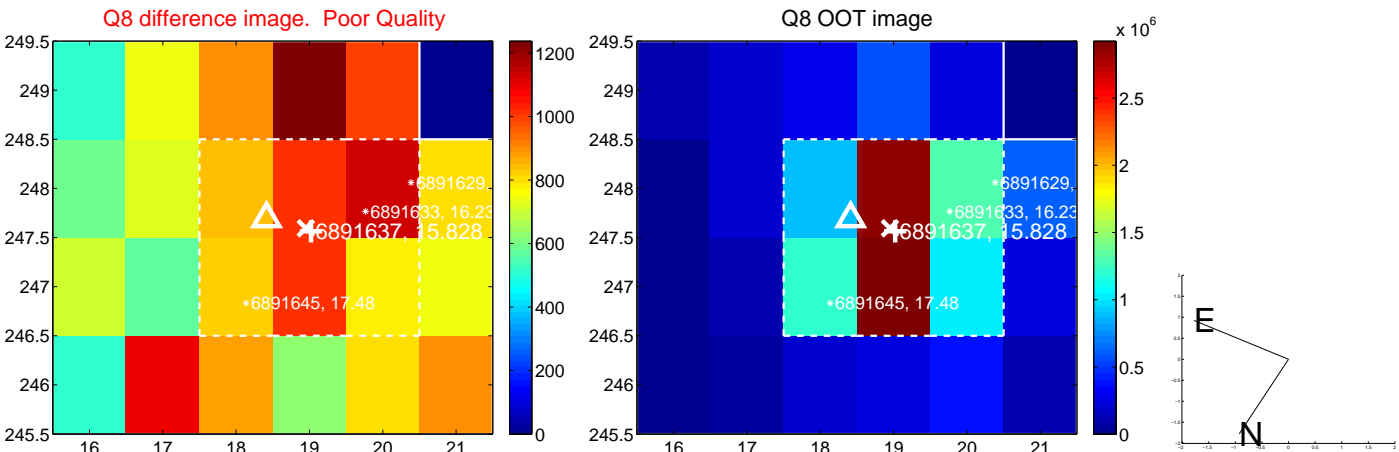
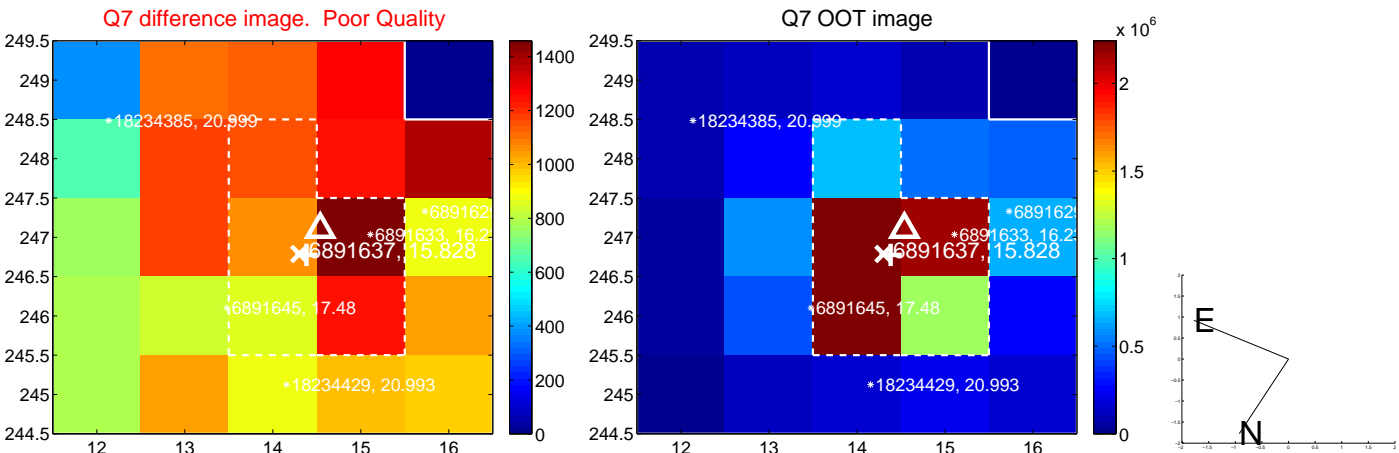
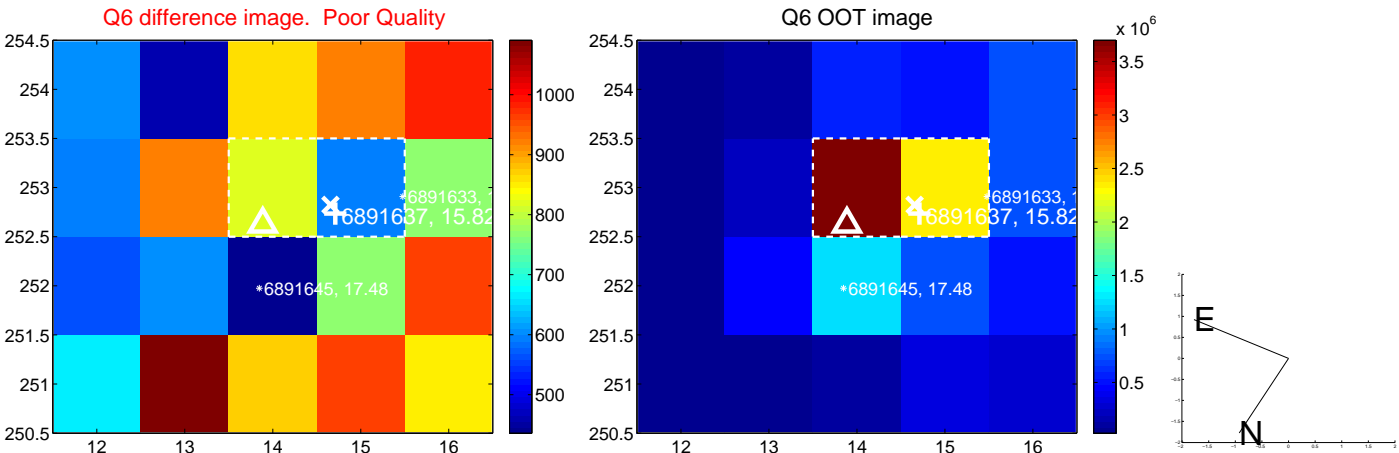
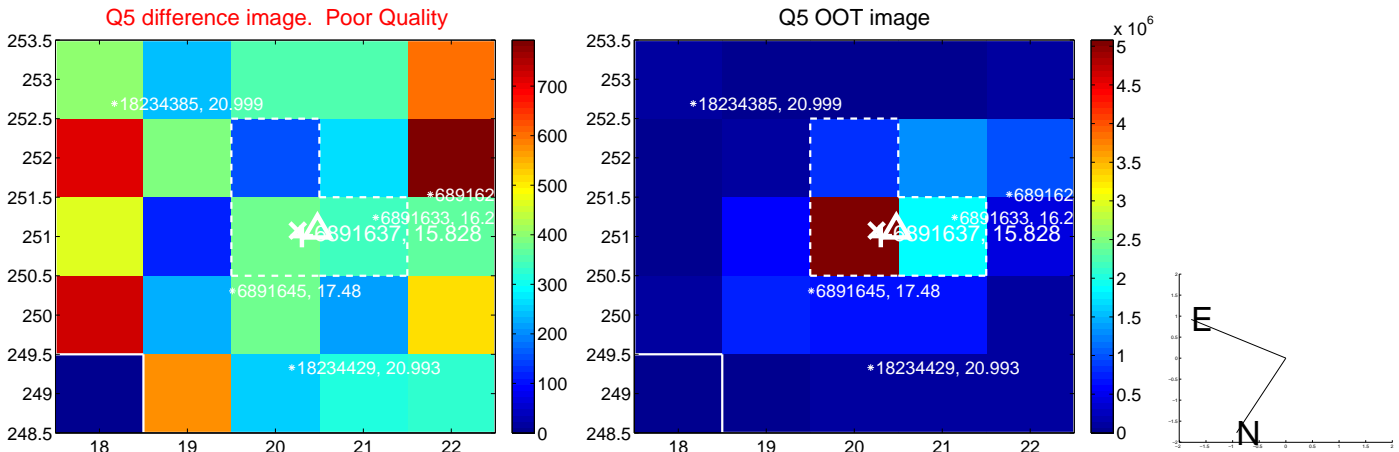


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

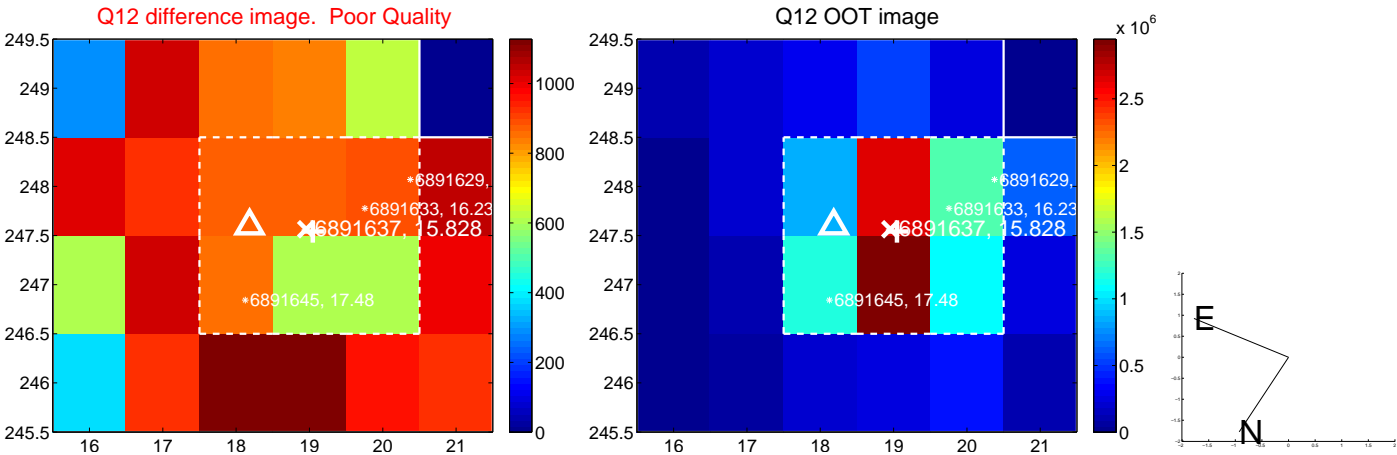
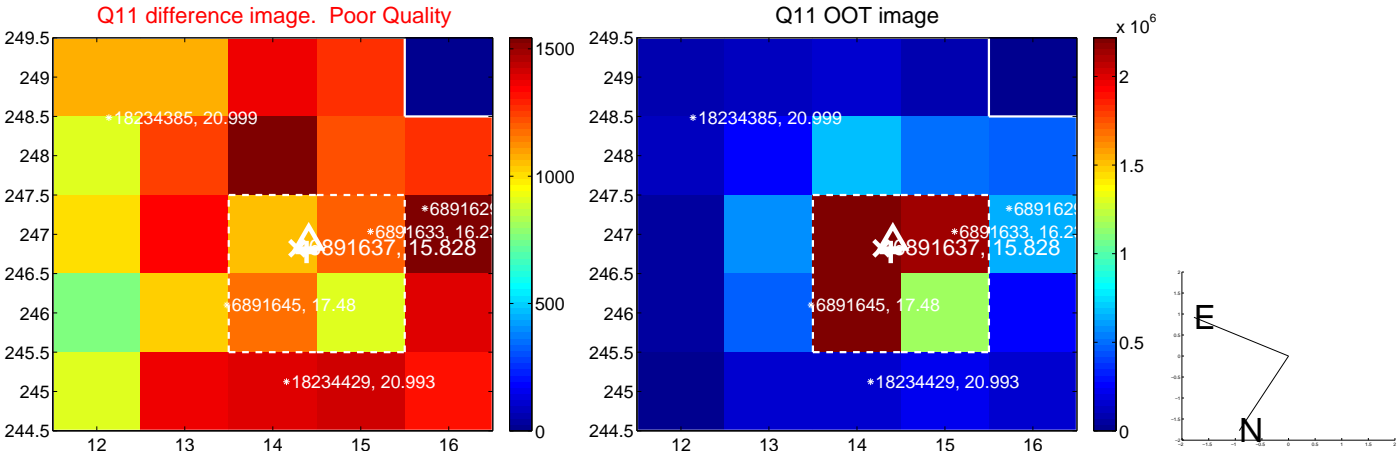
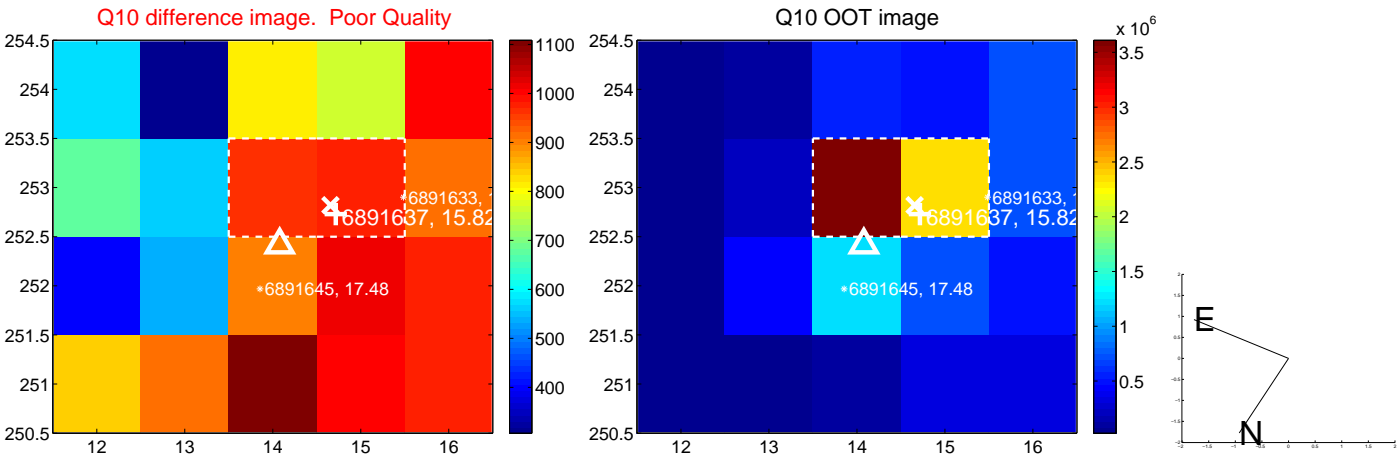
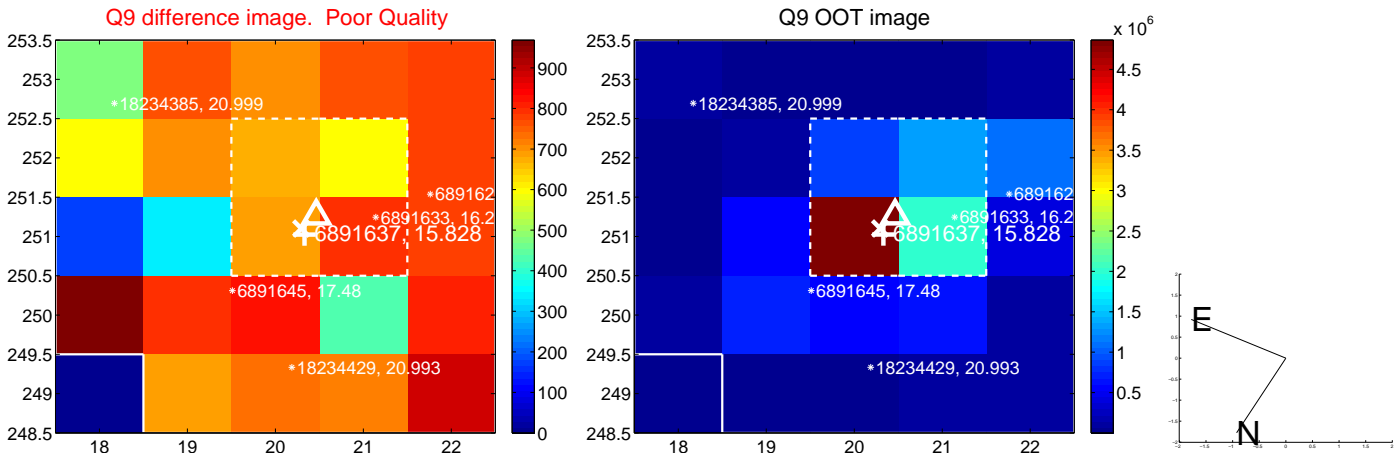


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

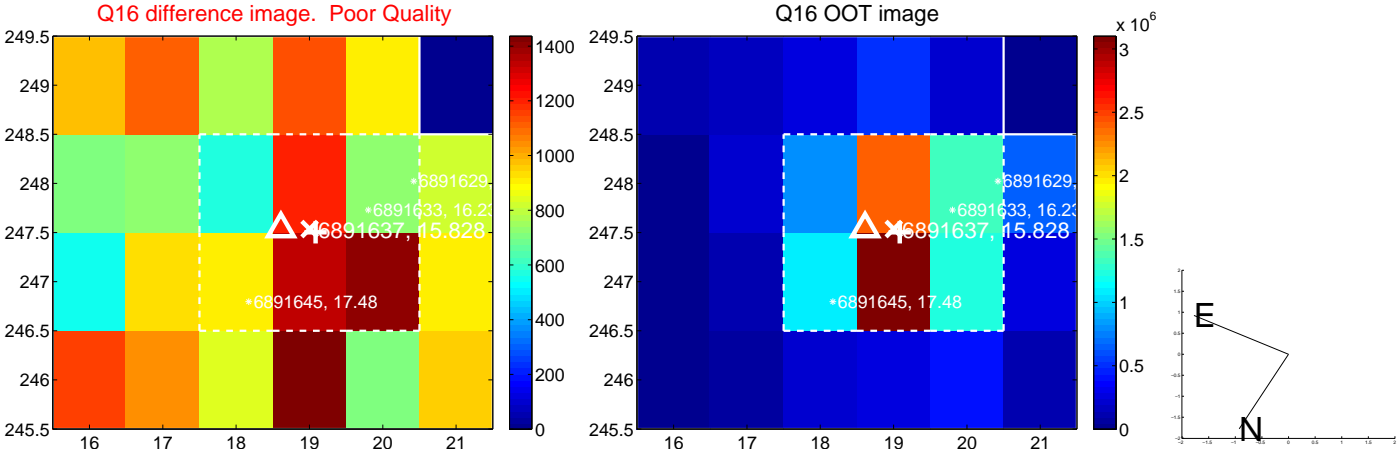
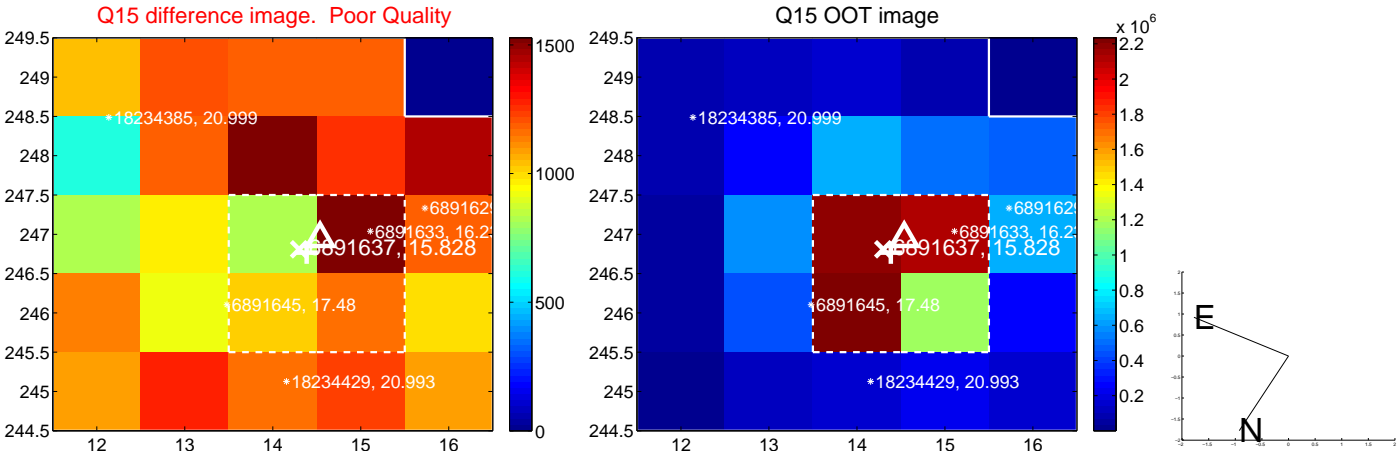
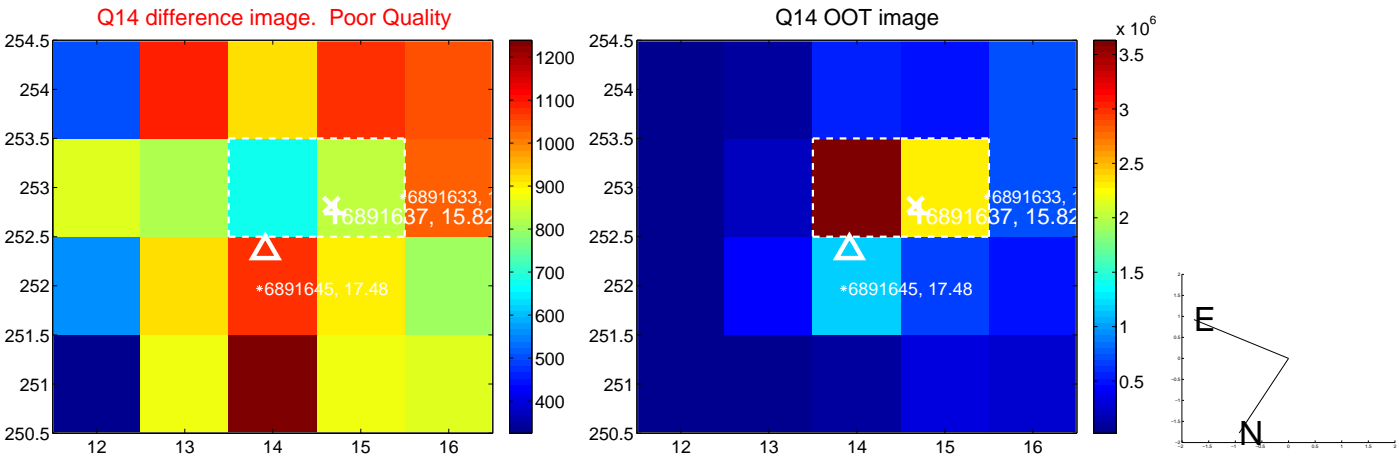
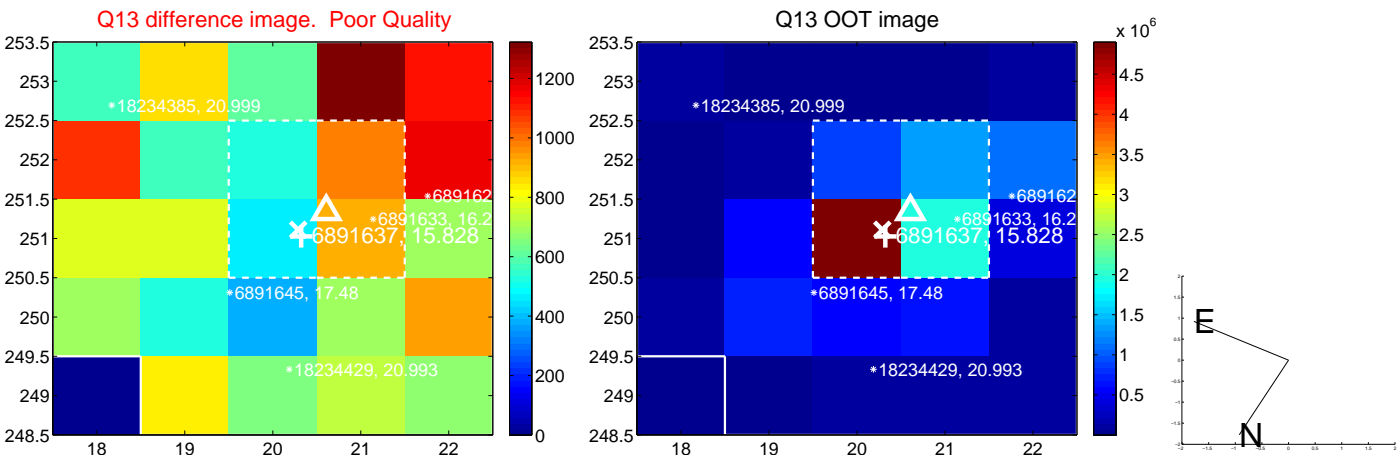




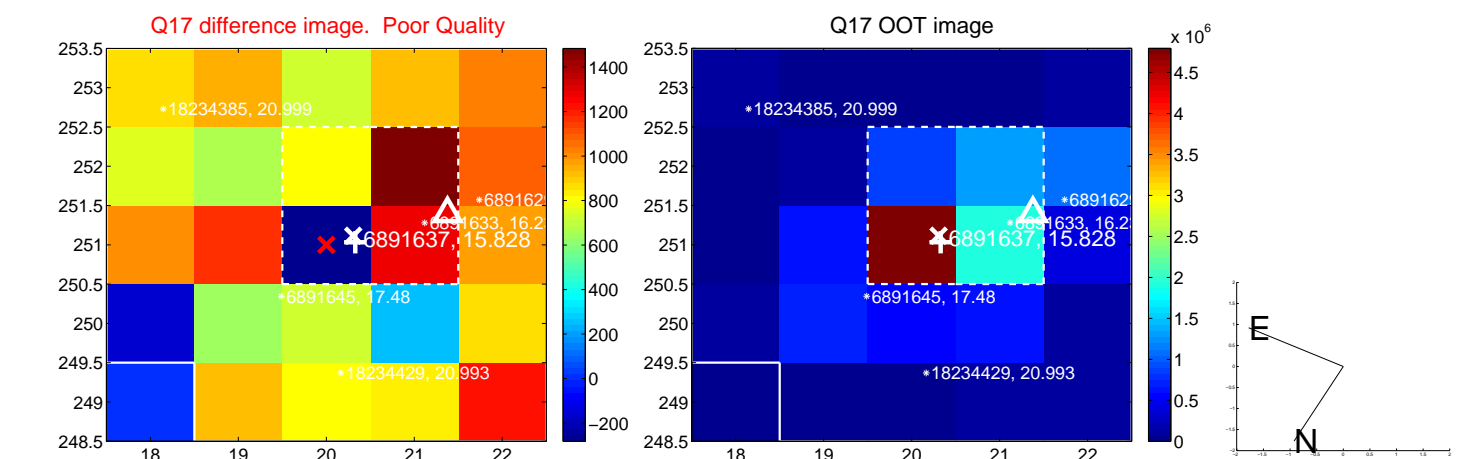
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



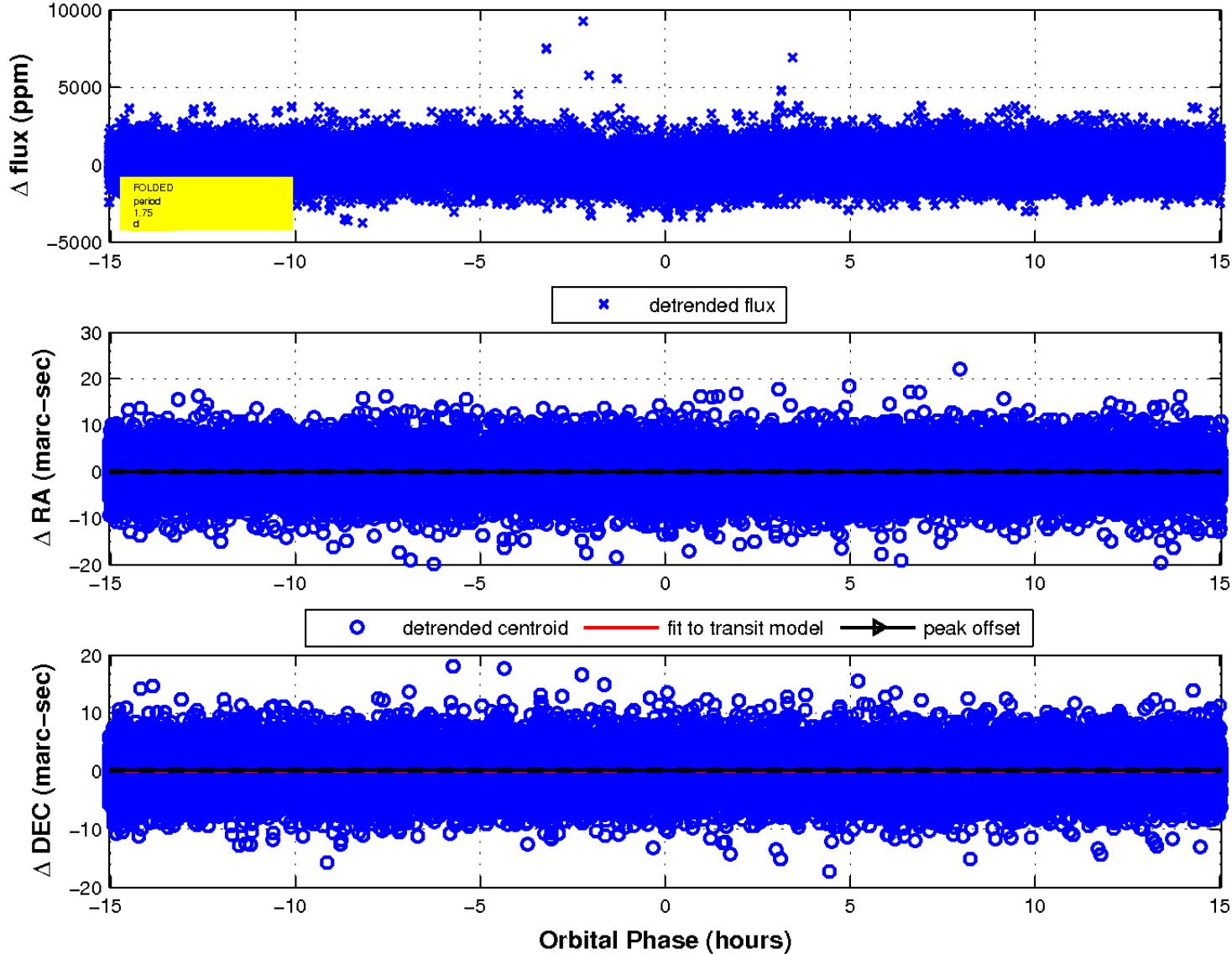
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

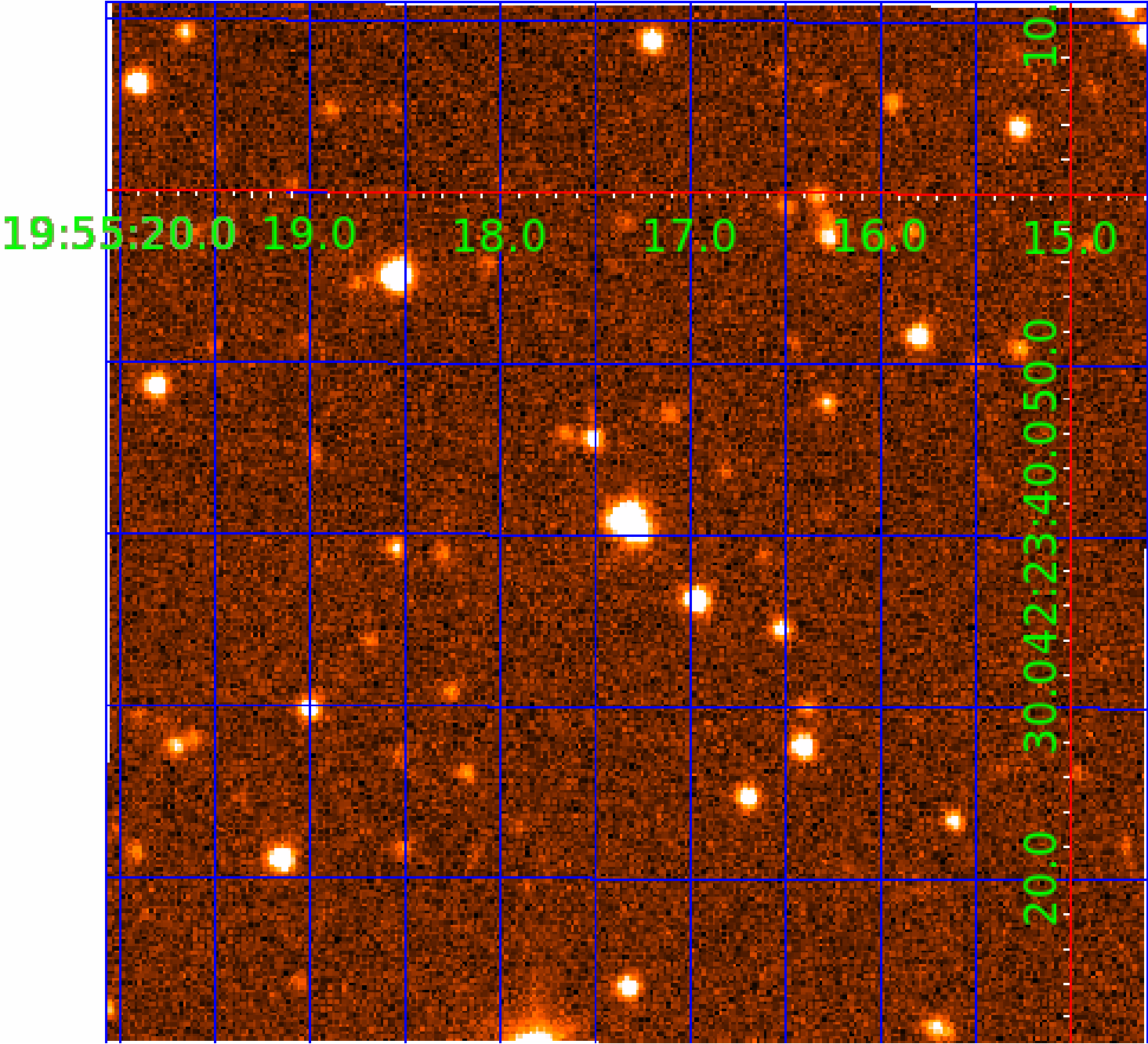


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination





# KIC 006891637

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006891637-01	OBS	1697.01	1.752508	132.748432	422.8	5.013	24.3	26.9	0.53	4408	1.55	179.18
006891637-02	OBS	No	390.817013	205.170528	737.3	12.123	10.8	5.1	0.53	4408	1.52	0.13

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006891637-01	OBS	FP	0.00	0	0	1	1	CENT_RESOLVED_OFFSET—HALO_GHOST—EPHEM_MATCH
006891637-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS—HALO_GHOST

**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.

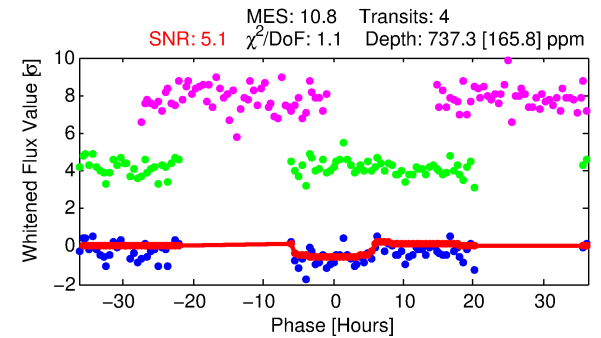
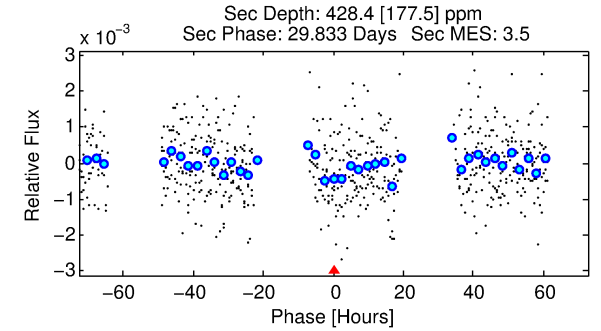
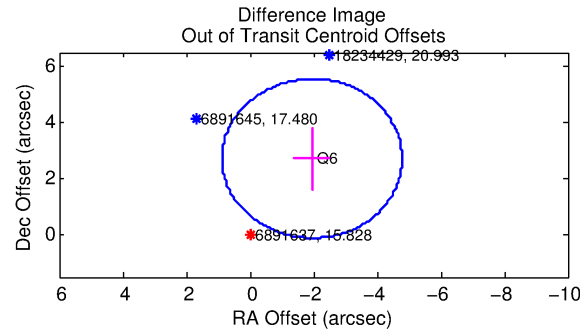
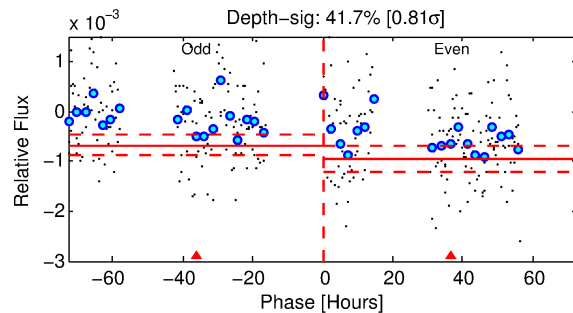
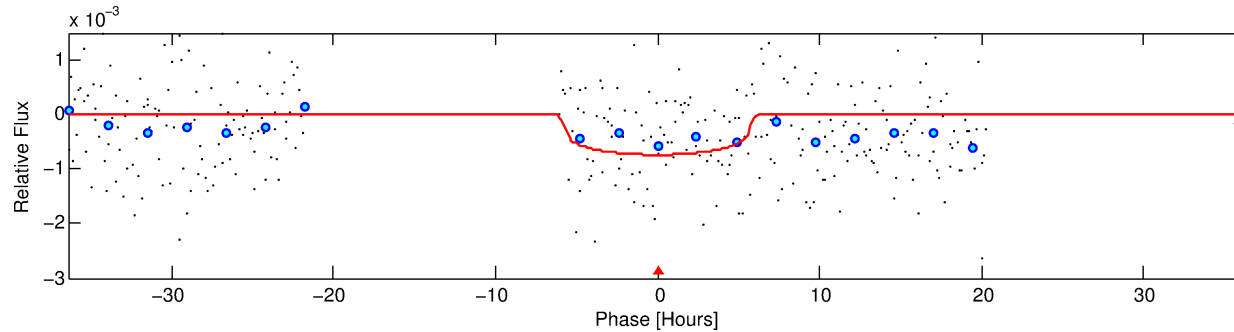
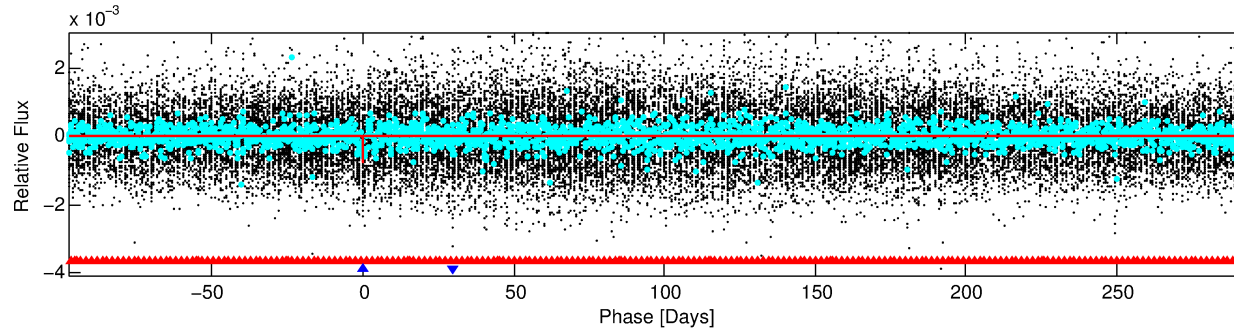
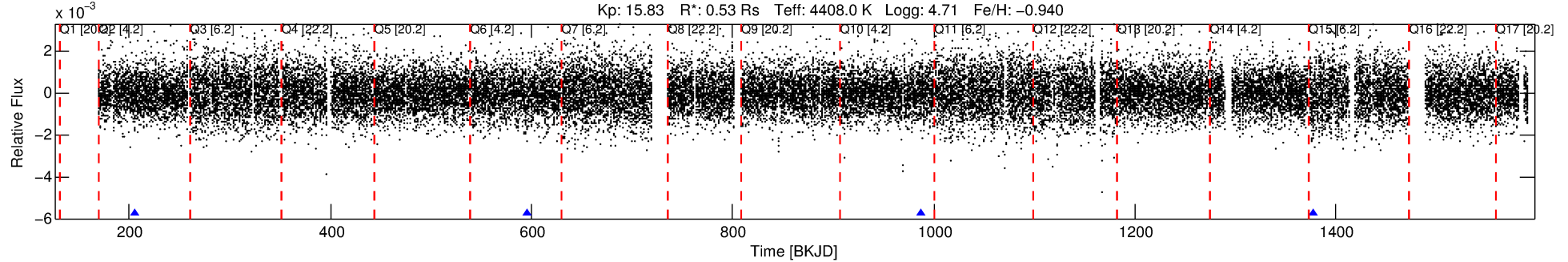
## Ephemeris Match Information For 006891637-02

No Significant Match Found

# DV One-Page Summary

KIC: 6891637 Candidate: 2 of 2 Period: 390.817 d  
KOI: K01697 Corr: No Ephemeris Match

Kp: 15.83 R\*: 0.53 Rs Teff: 4408.0 K Logg: 4.71 Fe/H: -0.940



## DV Fit Results:

Period = 390.81701 [0.01481] d  
Epoch = 205.1705 [0.0255] BKJD  
Rp/R\* = 0.0264 [0.0167]  
a/R\* = 189.90 [453.58]  
b = 0.68 [1.94]  
Seff = 0.13 [0.02]  
Teq = 154 [6] K  
Rp = 1.52 [0.97] Re  
a = 0.8452 [0.0601] AU  
Ag = 72770.38 [97436.41] [0.75σ]  
Teff = 3907 [1309] K [2.87σ]

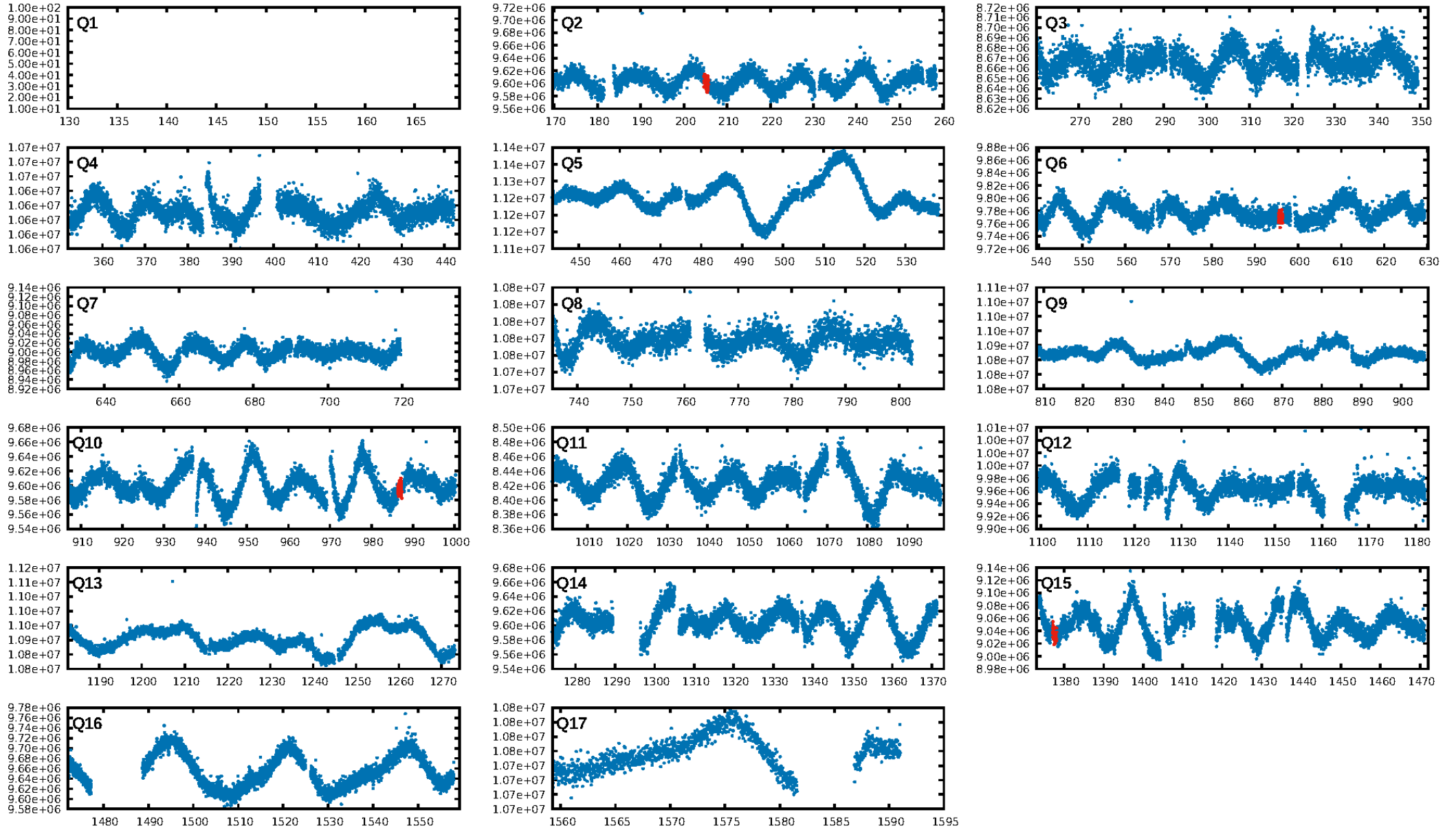
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [711.80σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 0.1%  
ModelChiSquareGof-sig: 94.5%  
Bootstrap-pfa: 2.38e-18  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: 0.2088  
Centroid-sig: 8.4%  
Centroid-so: 1.809 arcsec [1.27σ]  
OotOffset-rm: 3.349 arcsec [3.55σ]  
KicOffset-rm: 3.687 arcsec [3.98σ]  
OotOffset-st: 1/0/0/0 [1]  
KicOffset-st: 1/0/0/0 [1]  
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DiffImageOverlap-fno: 0.00 [0/4]

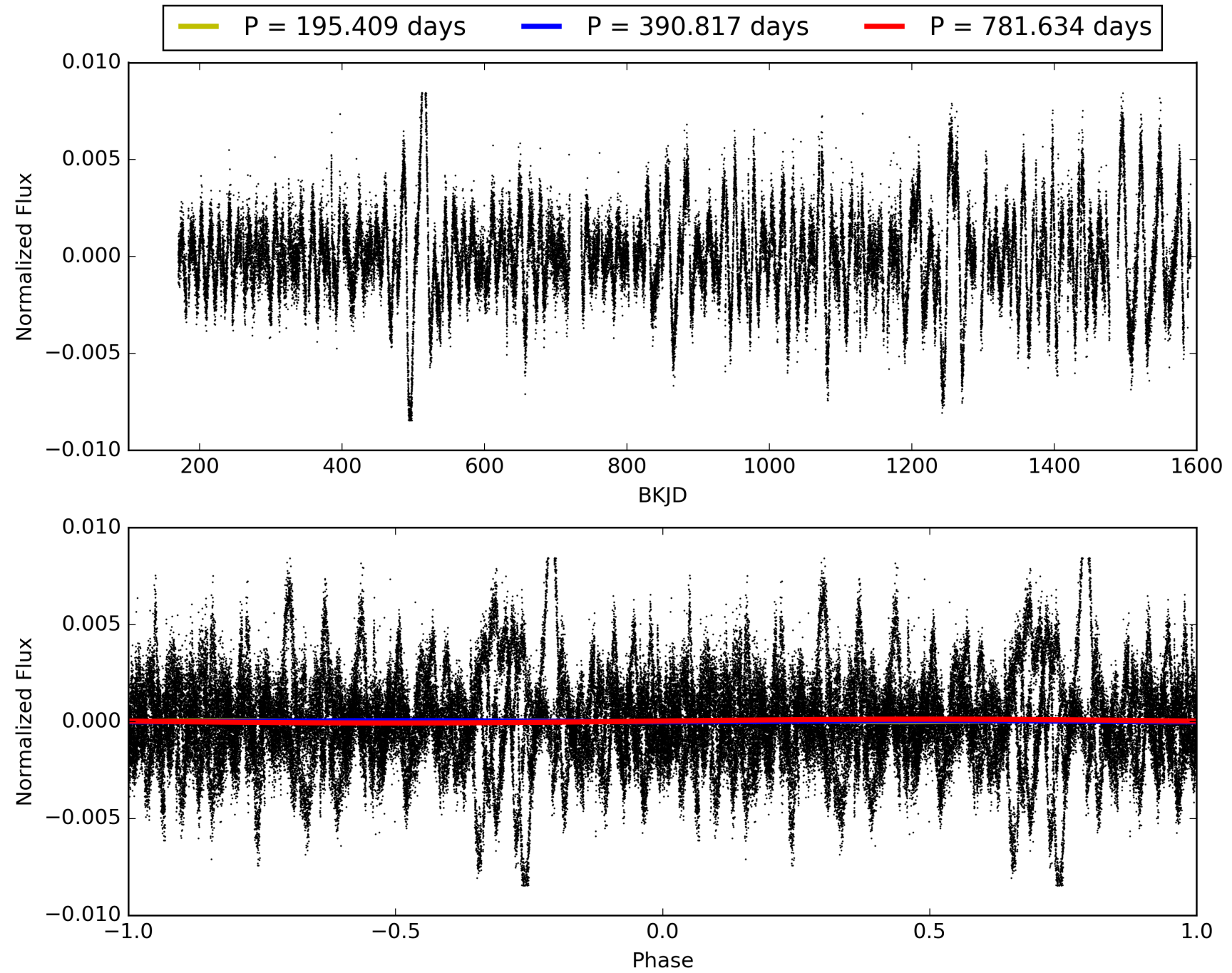
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 006891637-02, PDC Light Curves



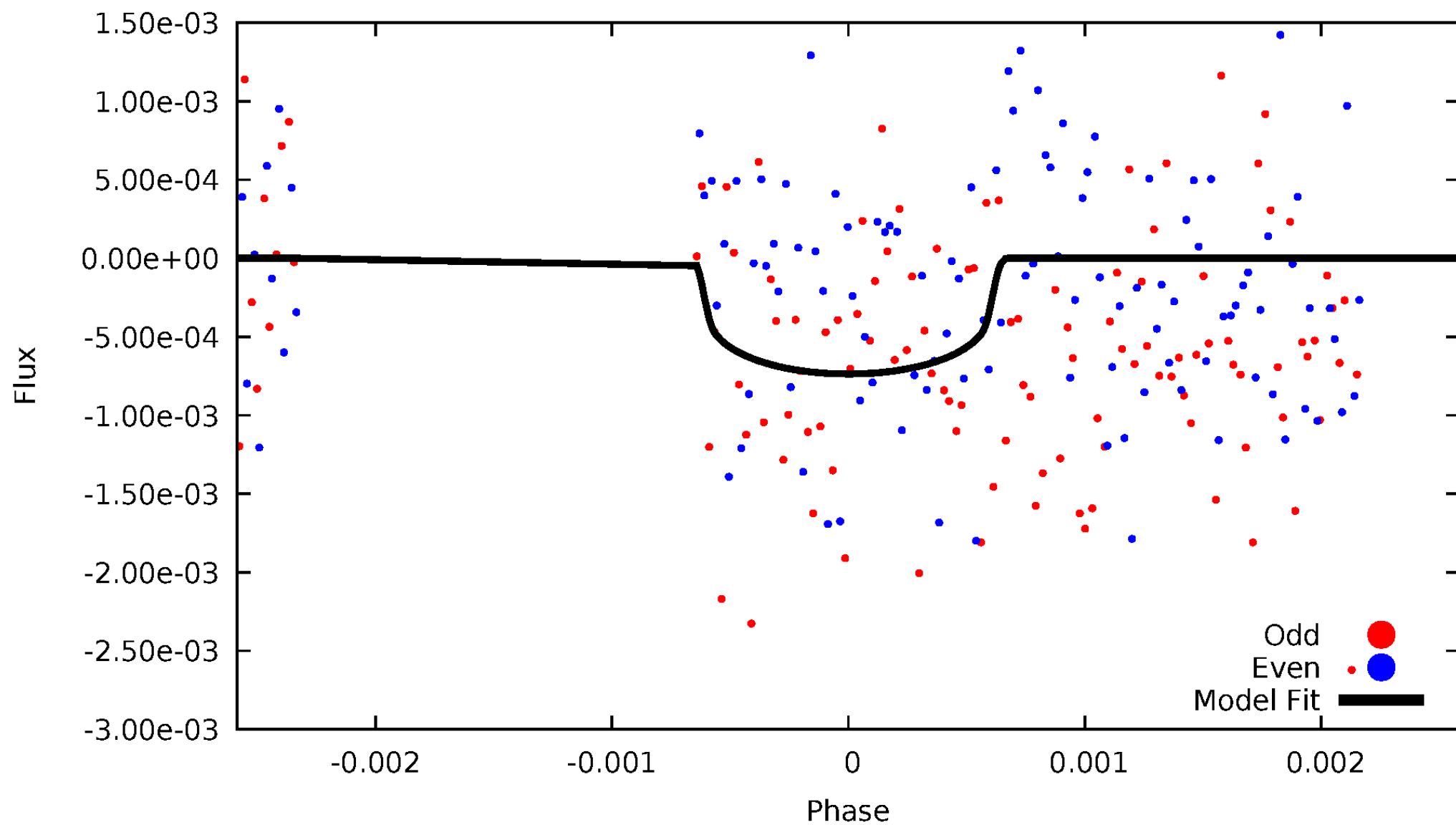
TCE 006891637-02





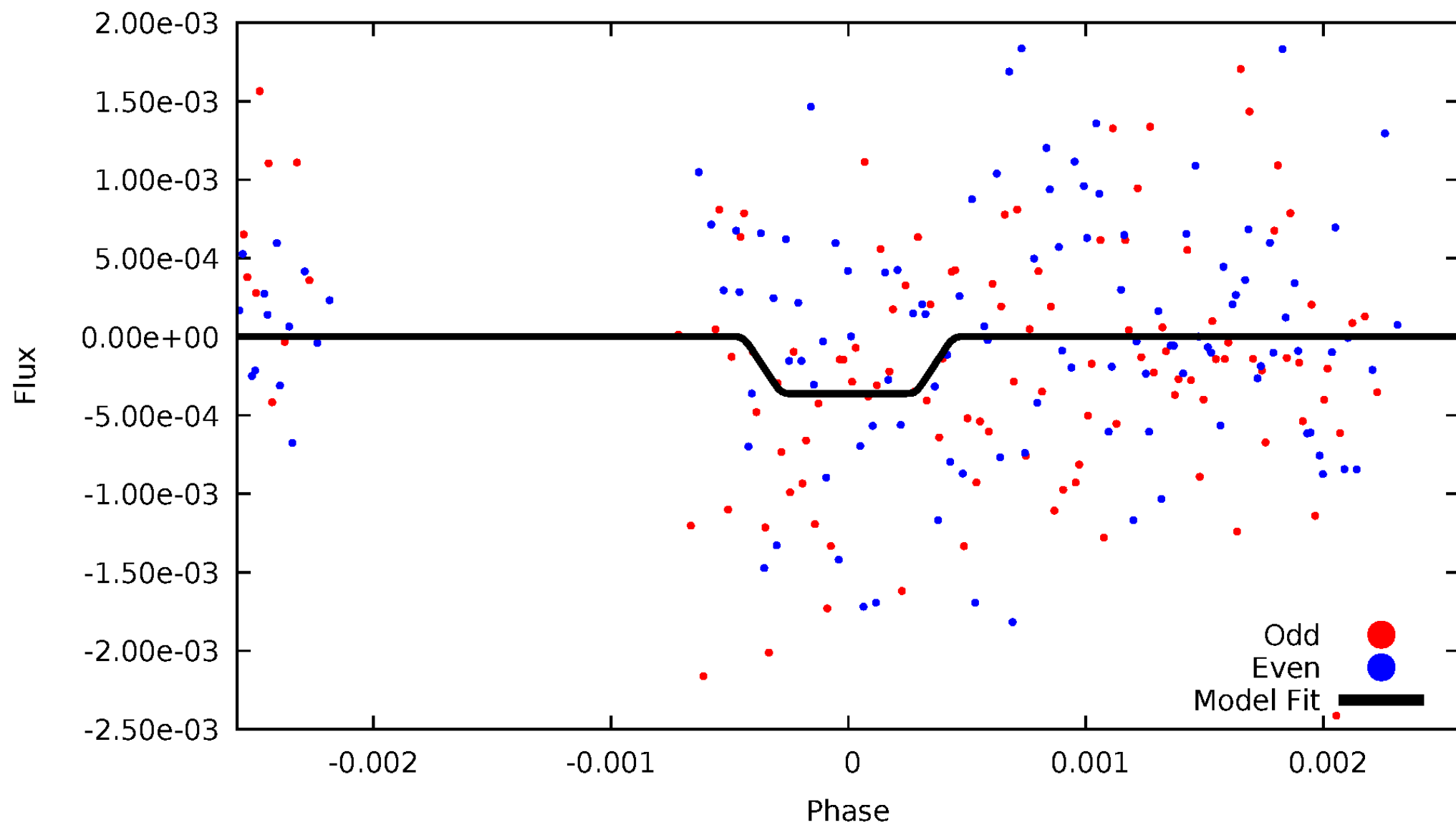
# DV Odd/Even

TCE 006891637-02



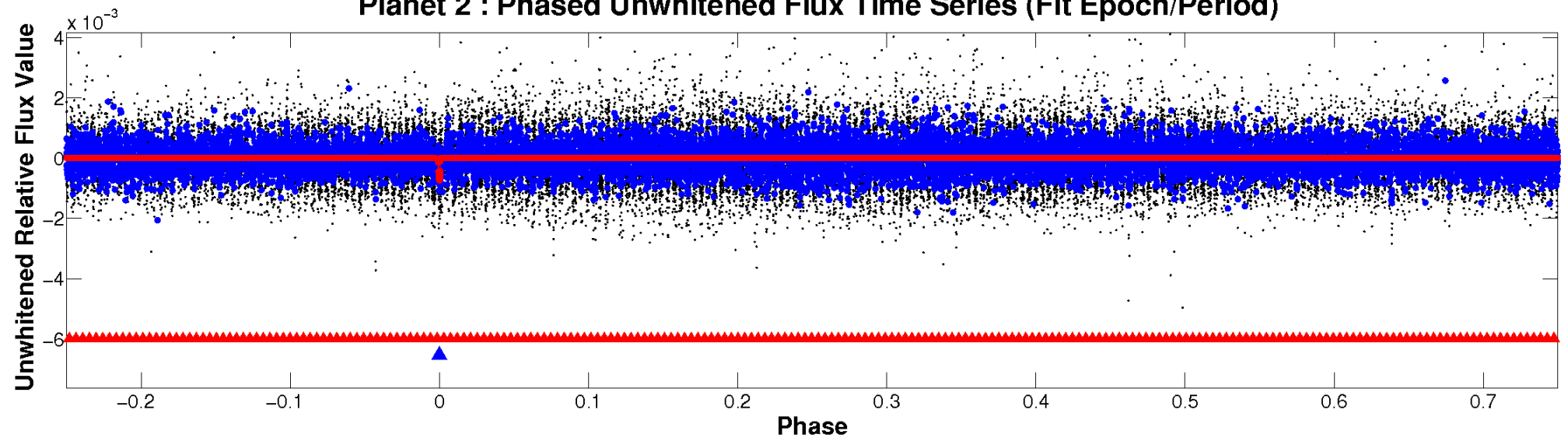
# ALT Odd/Even

TCE 006891637-02

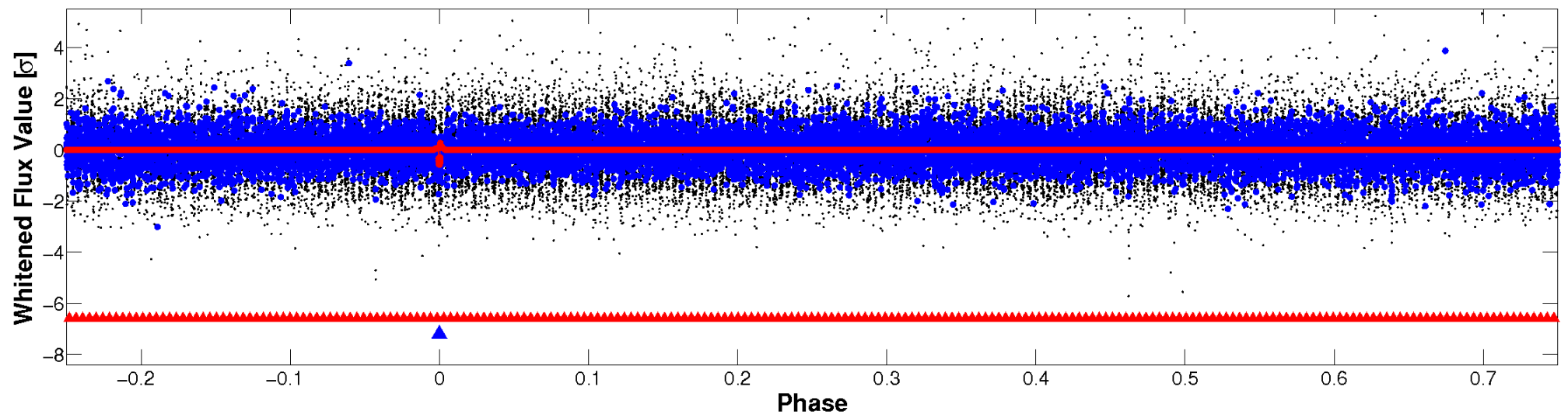


# Non-Whitened Vs. Whitened Light Curve

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



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



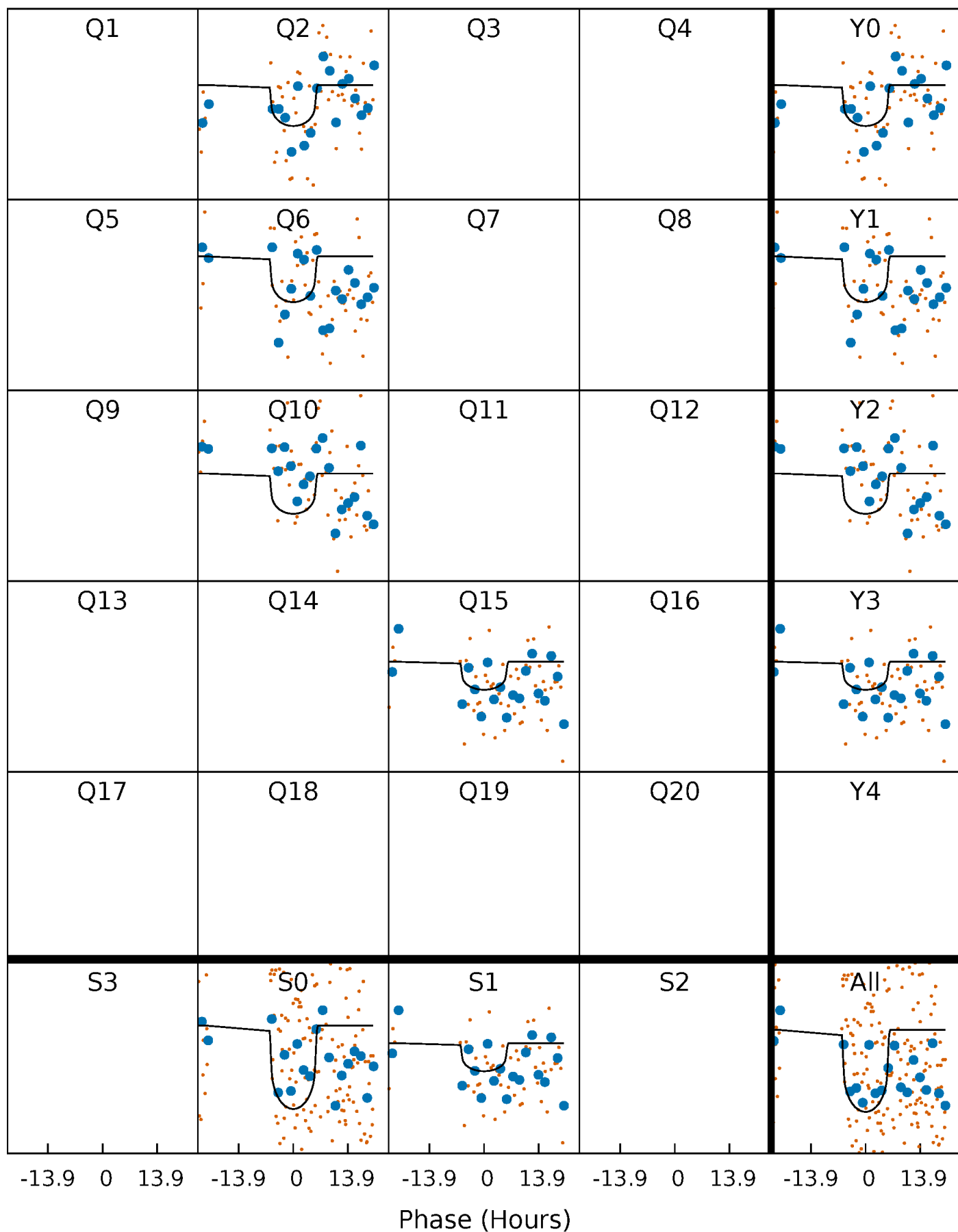
# PDC Quarter-Phased Transit Curves

TCE 006891637-02     $P=390.817012$  Days     $T_0=205.170528$  (BKJD)



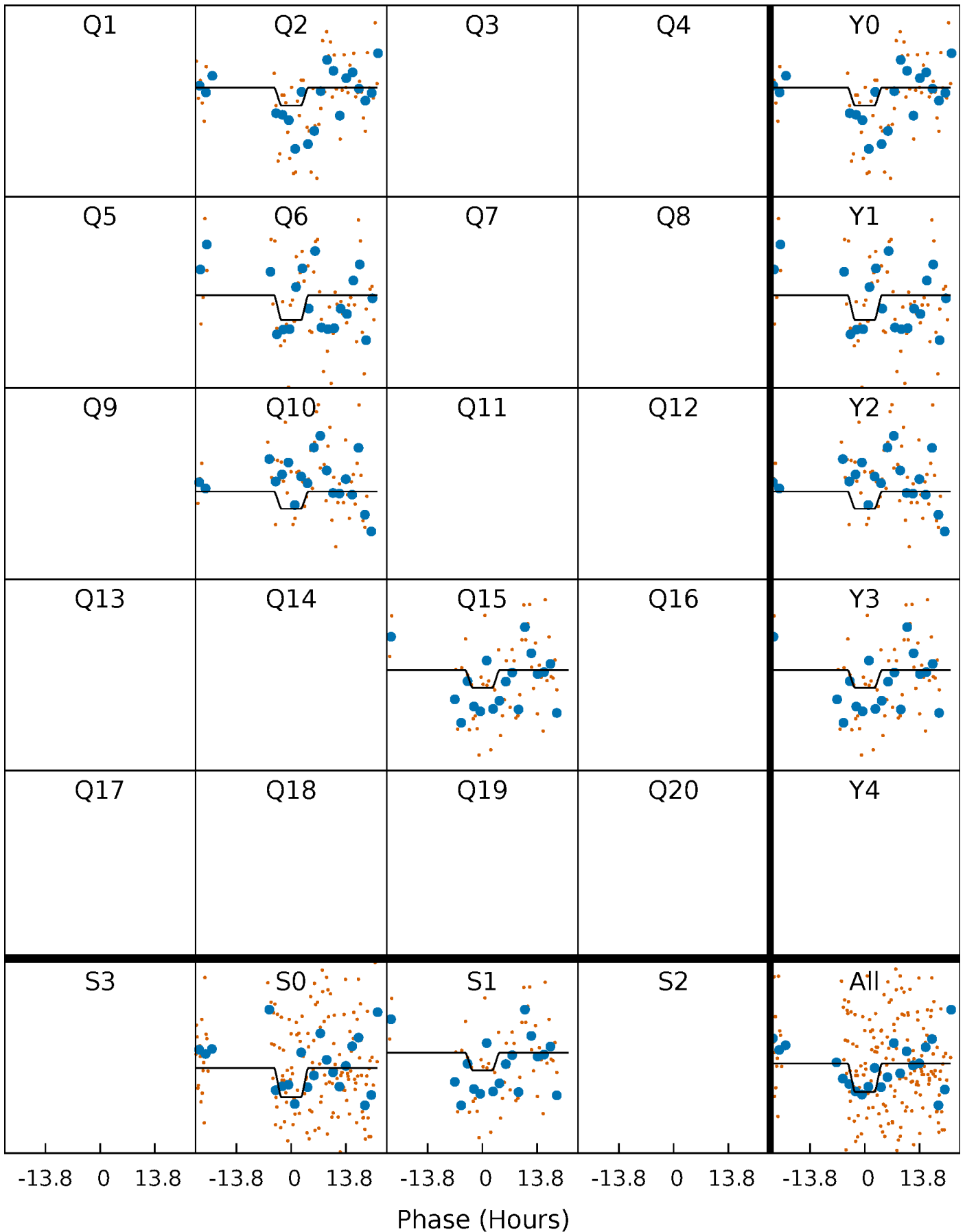
# DV Quarter-Phased Transit Curves

TCE 006891637-02 P=390.817012 Days  $T_0=205.170528$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 006891637-02     $P=390.846324$  Days     $T_0=205.111746$  (BKJD)

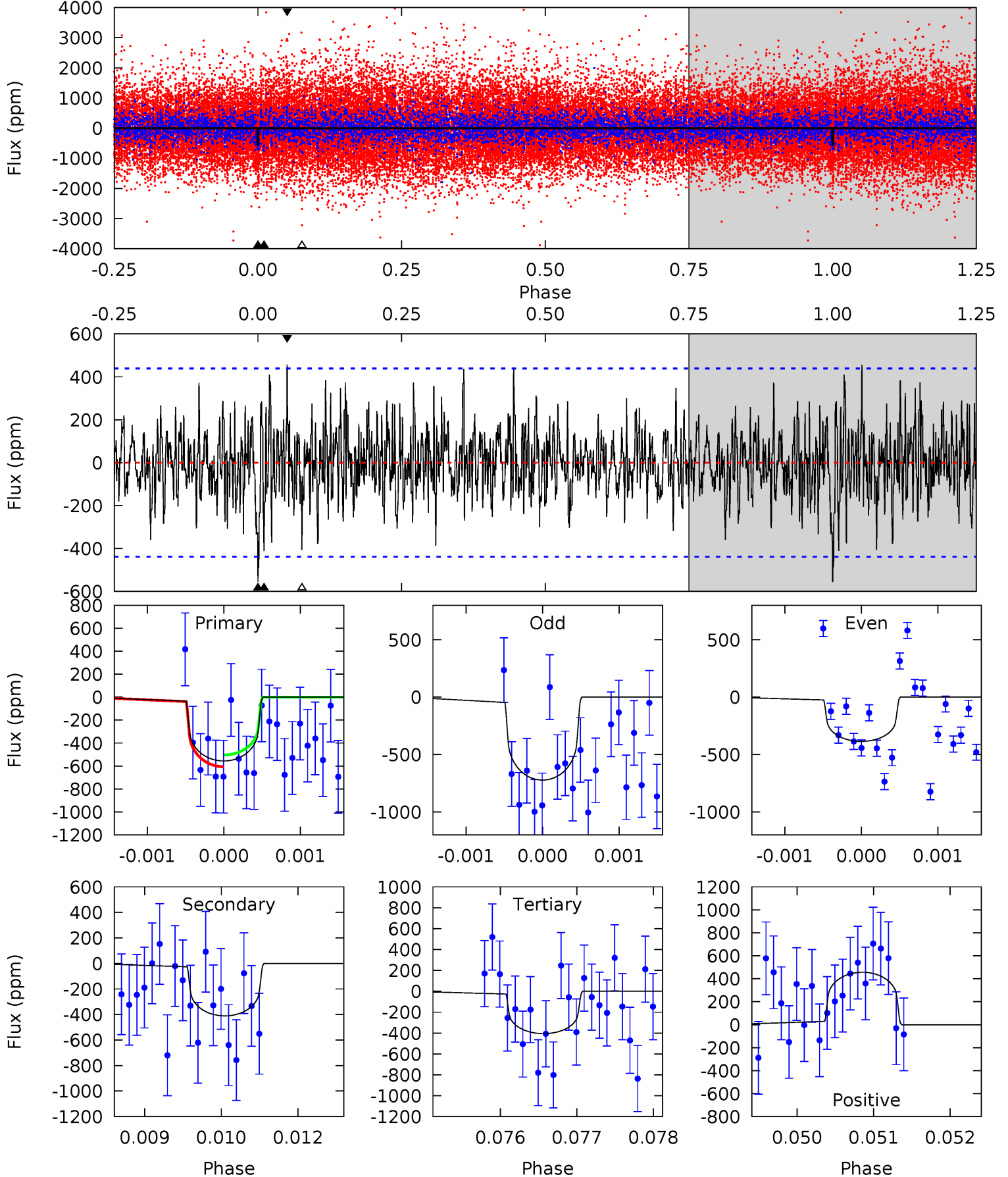




# DV Model-Shift Uniqueness Test

006891637-02, P = 390.817012 Days, E = 205.170528 Days

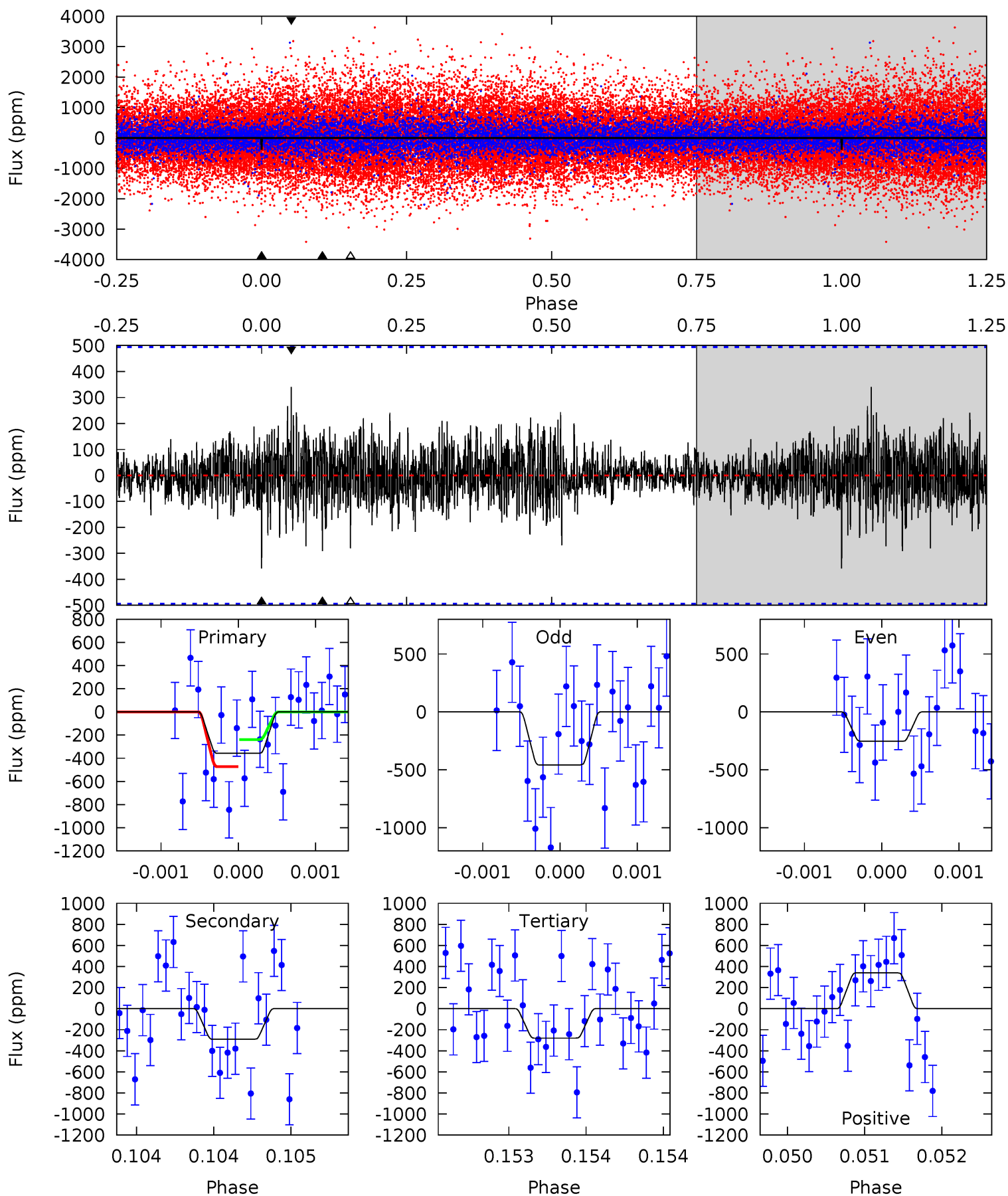
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.85	5.06	5.00	5.63	5.40	3.21	1.58	1.85	1.22	0.06	-0.57	2.07	0.83	0.45	0.64



# Alt Model-Shift Uniqueness Test

006891637-02, P = 390.846324 Days, E = 205.111746 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
3.96	3.22	3.10	3.76	5.47	3.32	0.77	0.86	0.20	0.12	-0.55	1.12	0.76	0.49	1.30



### Stellar Parameters For KIC 006891637

	$T_{\text{eff}} (K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (g \cdot \text{cm}^{-3})$
	$4408^{+130}_{-130}$	$4.713^{+0.056}_{-0.032}$	$-0.940^{+0.300}_{-0.300}$	$0.529^{+0.041}_{-0.045}$	$0.528^{+0.041}_{-0.034}$	$5.020^{+1.238}_{-0.685}$
	+3%/-3%	+1%/-1%	+32%/-32%	+8%/-9%	+8%/-6%	+25%/-14%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 006891637-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-411 \pm 81$	$1.60^{+0.89}_{-0.86}$	$214^{+8}_{-7}$	$3919^{+1425}_{-551}$	$61833^{+246874}_{-36694}$
Alt.	$-291 \pm 90$	$1.31^{+0.84}_{-0.77}$	$214^{+7}_{-8}$	$3962^{+1756}_{-649}$	$67224^{+320353}_{-45249}$

$T_{\text{max}}$  = 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

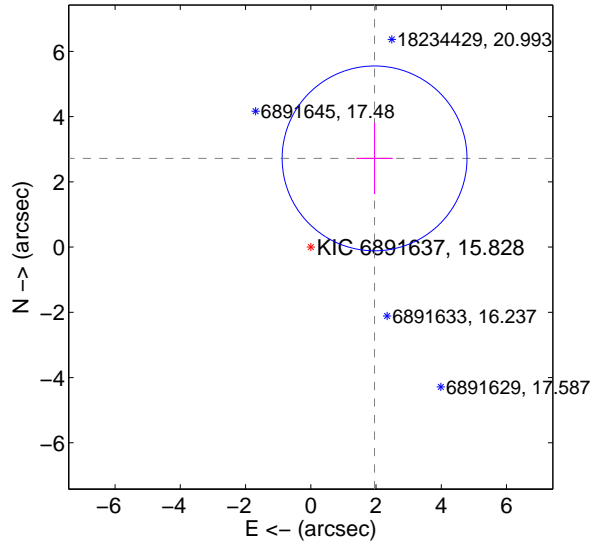
Supplemental centroid analysis for 006891637-02. Kepler magnitude: 15.83. Transit SNR 5.06

There are 0 quarters with good PRF difference image offsets

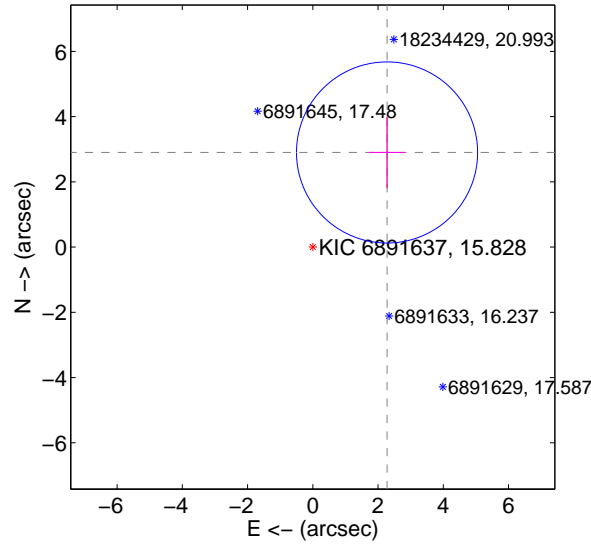
The direct PRF centroid is offset from the target star catalog position by about 0.37 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$3.349 \pm 0.944$	3.55	$-1.955 \pm 0.555$	$2.719 \pm 1.092$
PRF-fit source offset from KIC position	$3.687 \pm 0.925$	3.98	$-2.276 \pm 0.555$	$2.901 \pm 1.092$
photometric centroid source offset	$1.81 \pm 1.43$	1.27	$1.81 \pm 1.43$	$0.08 \pm 1.05$

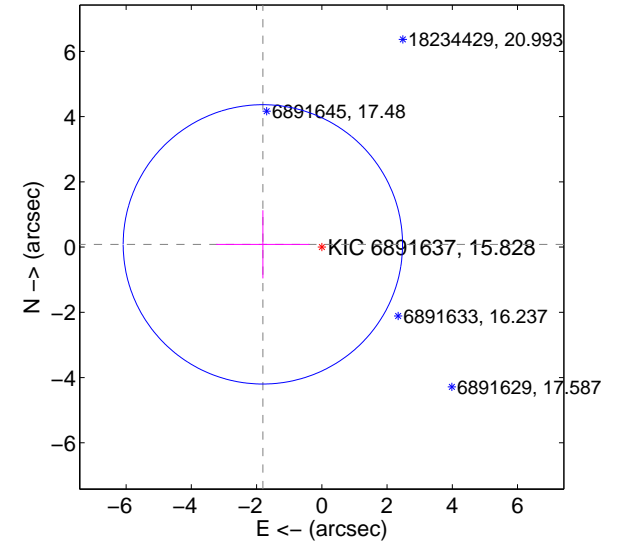
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

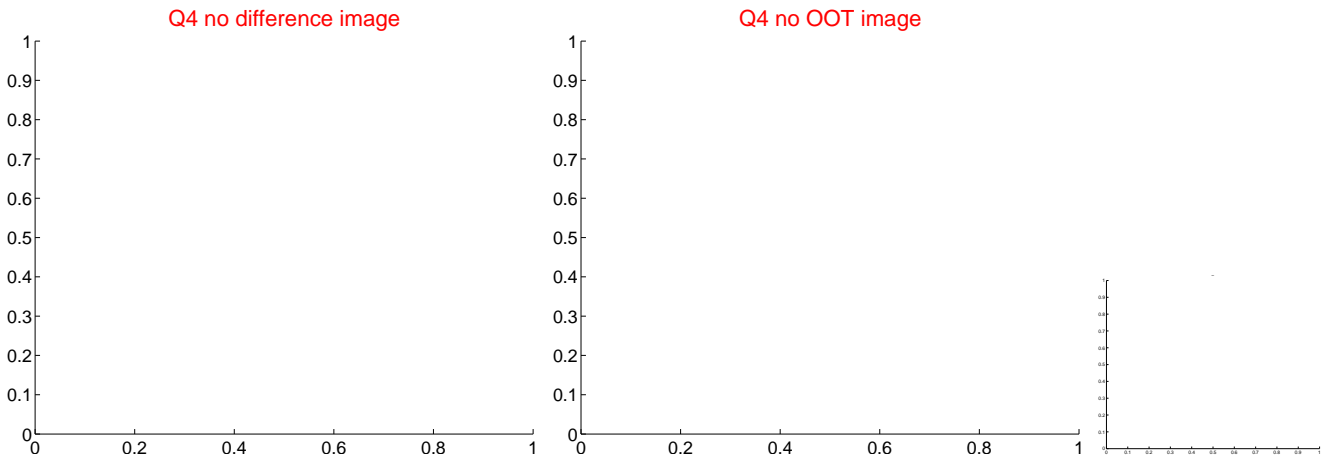
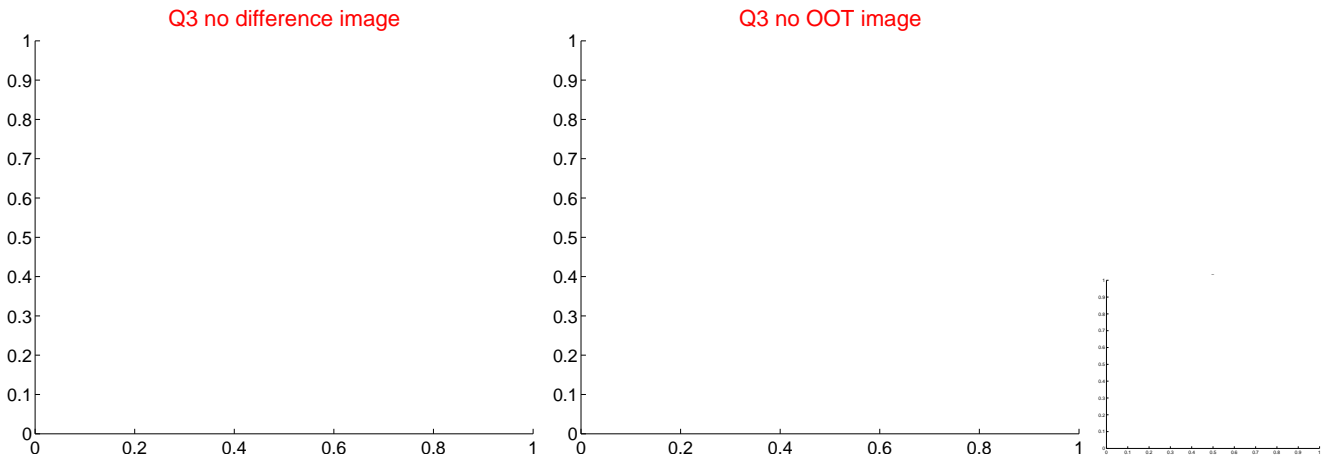
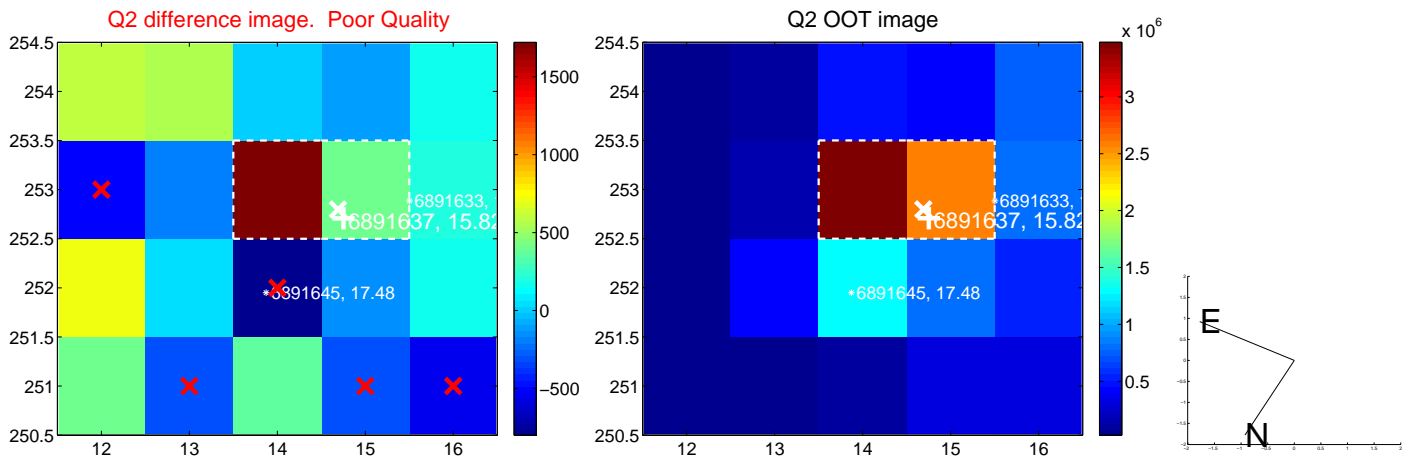
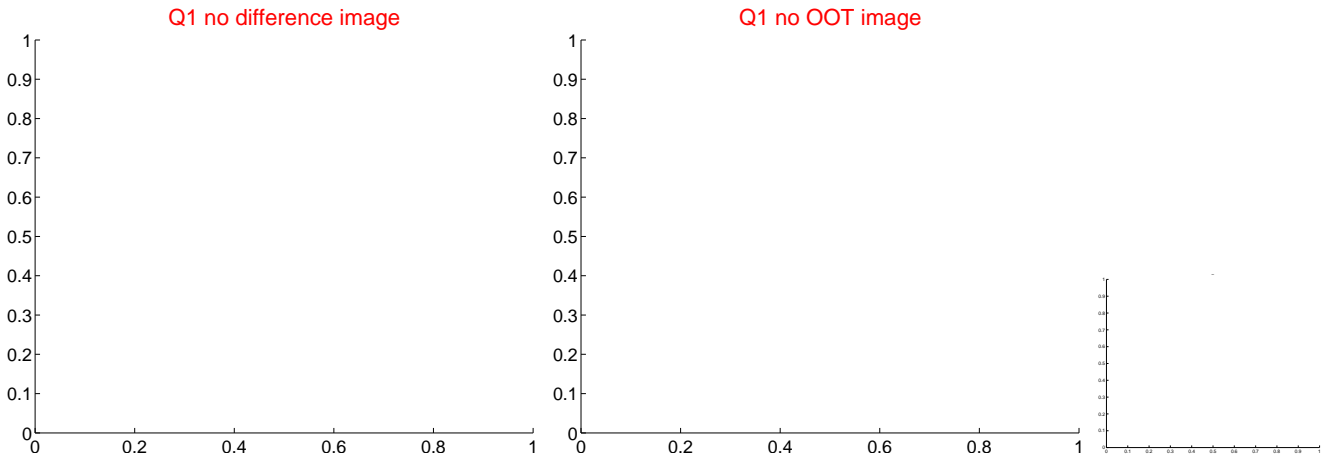


offset from photometric centroids

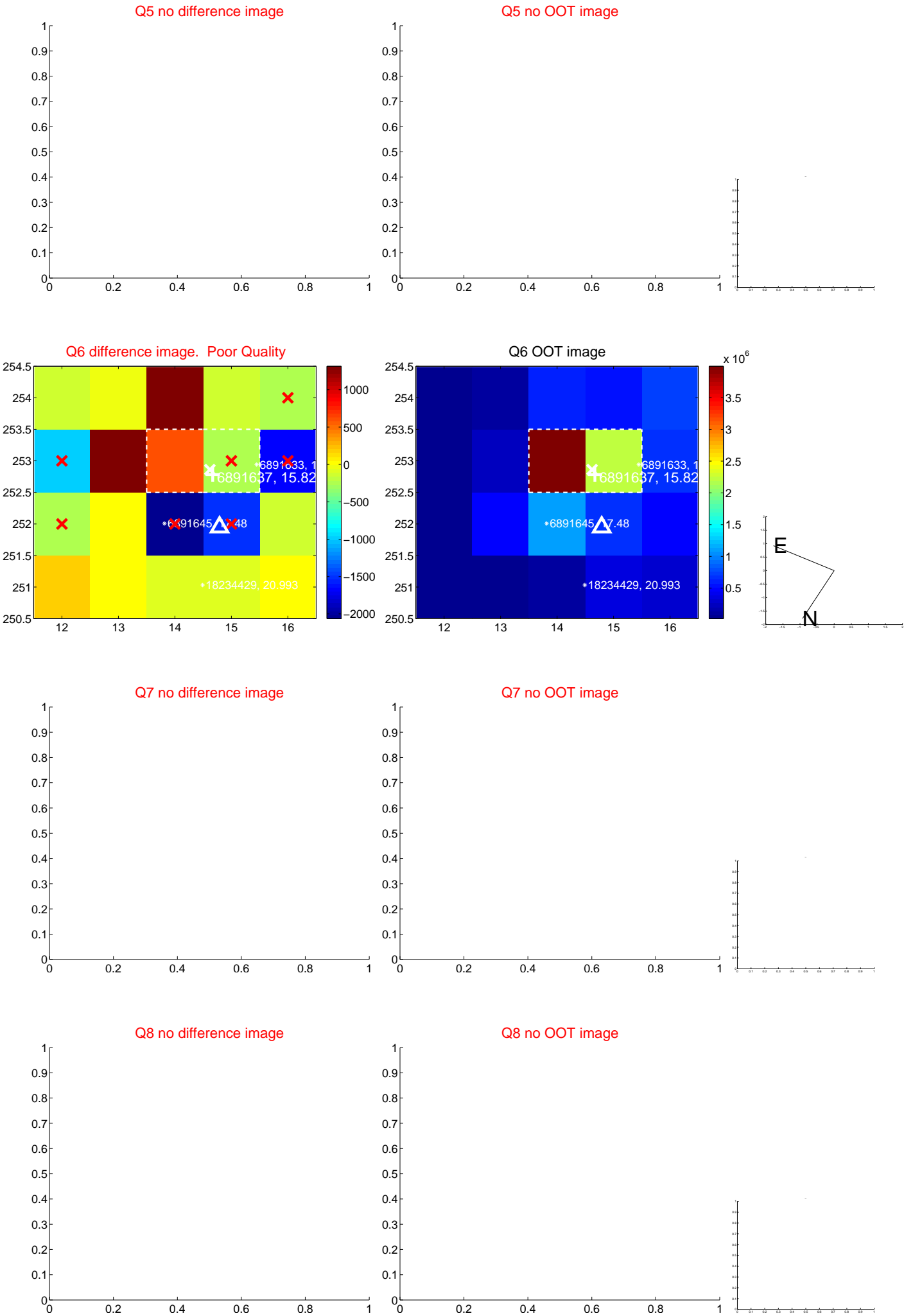


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

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

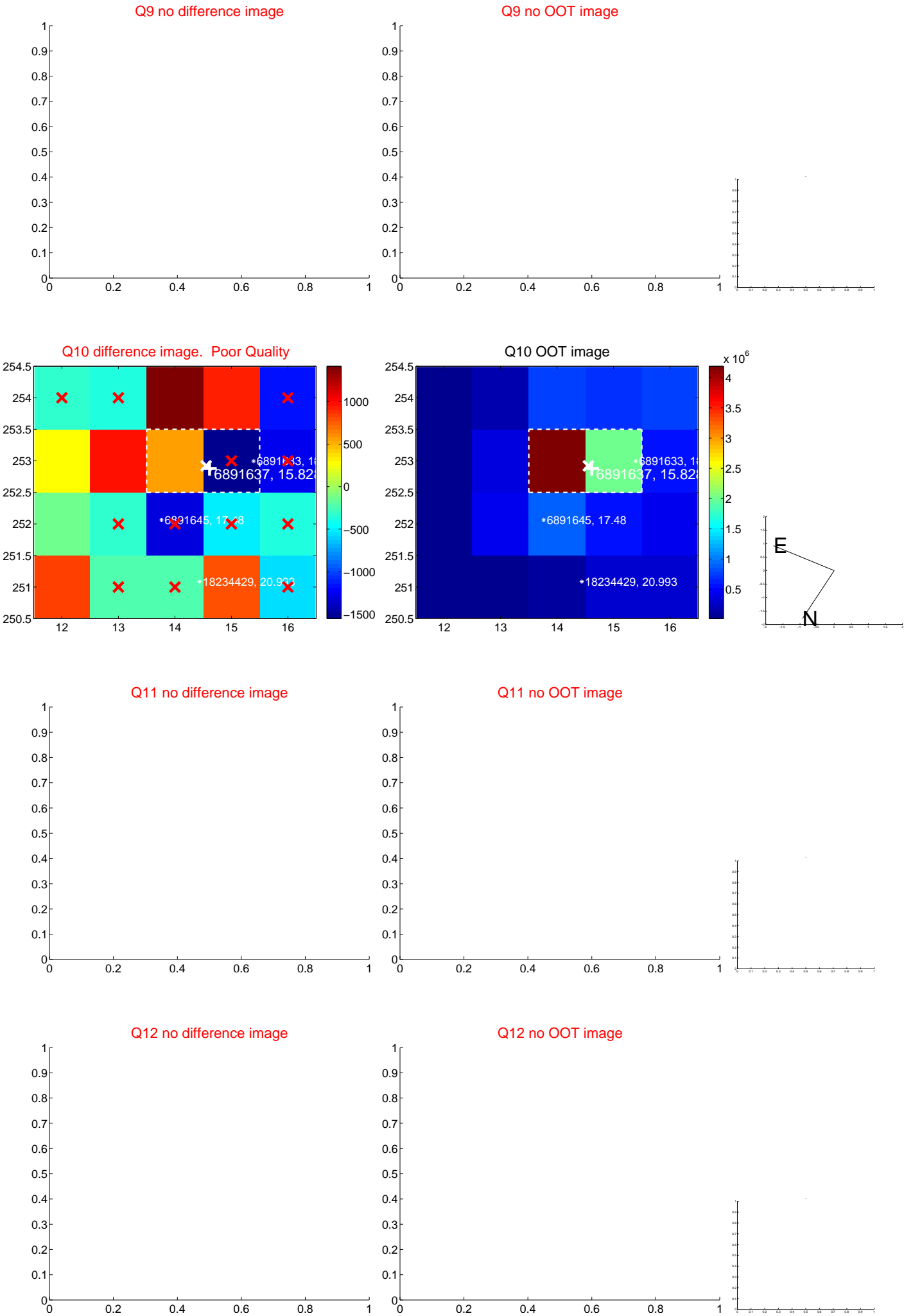


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.

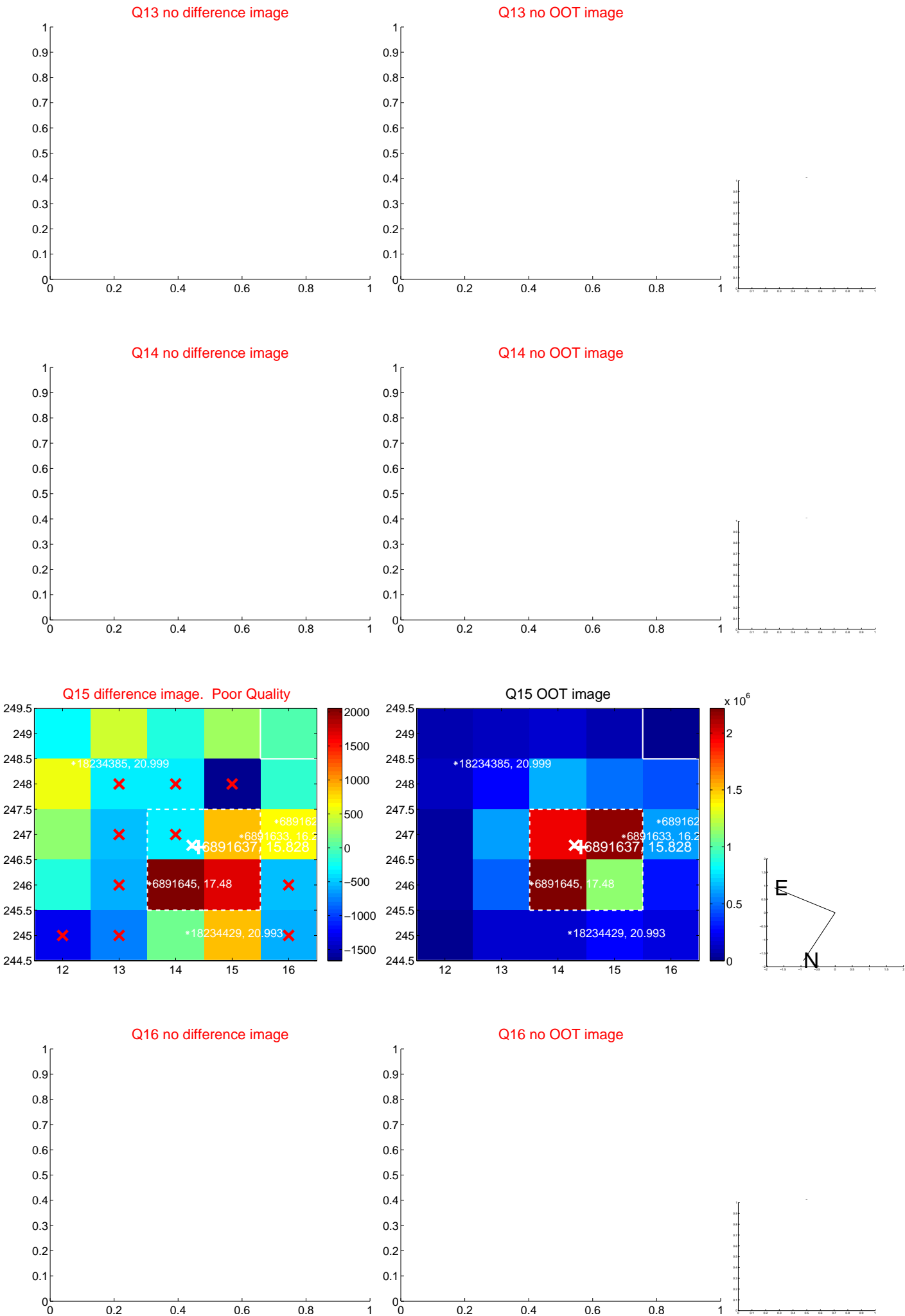




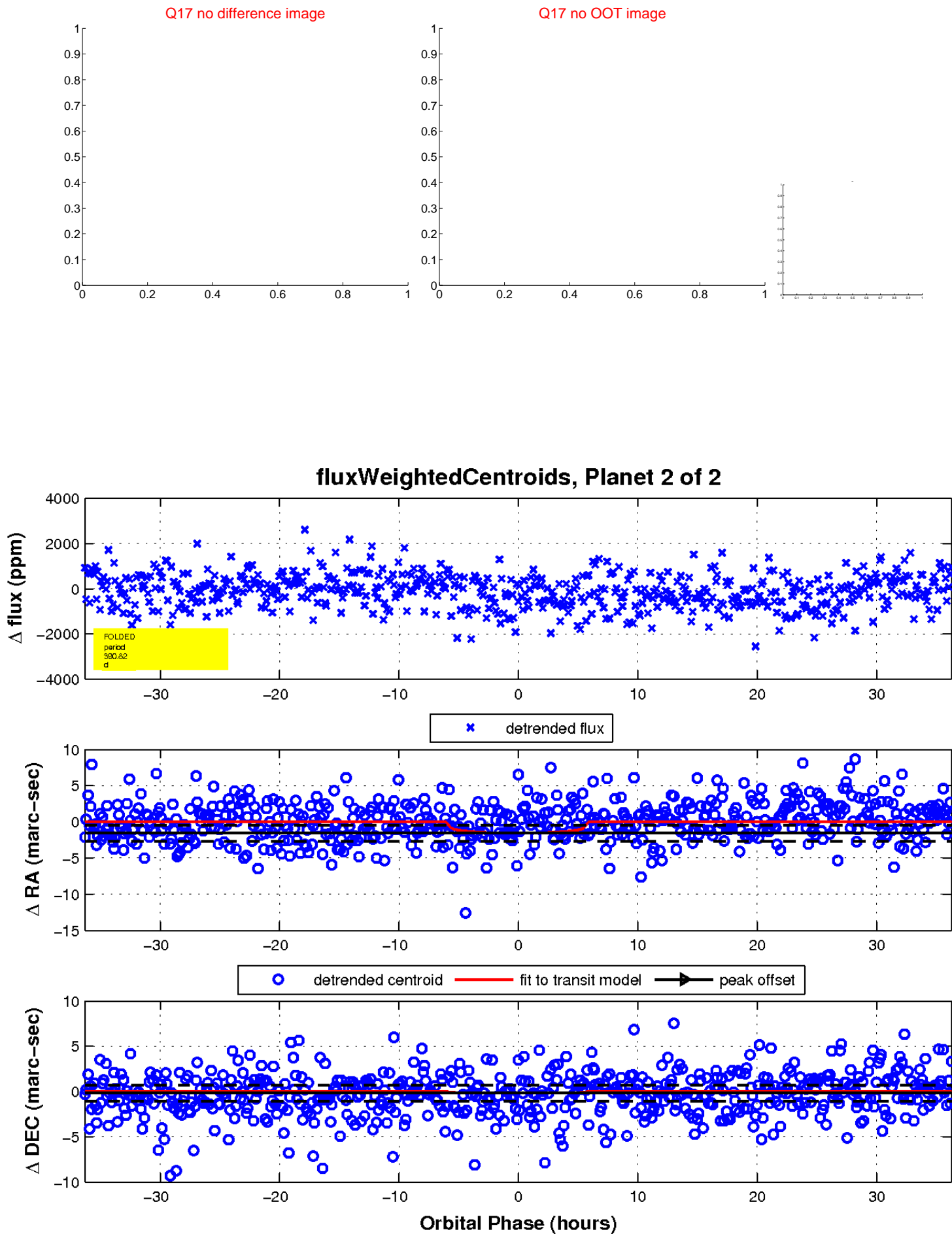
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



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

