

# KIC 003861595

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003861595-01	OBS	0004.01	3.849375	134.429896	1288.0	2.713	235.6	228.8	2.99	6244	13.02	4056.95
003861595-02	OBS	No	3.849300	132.499005	60.9	2.359	10.8	11.7	2.99	6244	2.75	4057.06

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003861595-01	OBS	PC	1.00	0	1	0	0	MOD_SEC_DV—PLANET_OCCULT_DV—MOD_SEC_ALT—PLANET_OCCULT_ALT—HAS_SEC_TCE—CENT_SATURATED
003861595-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE—CENT_SATURATED

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

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

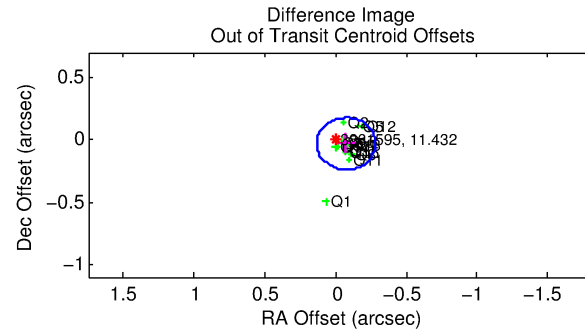
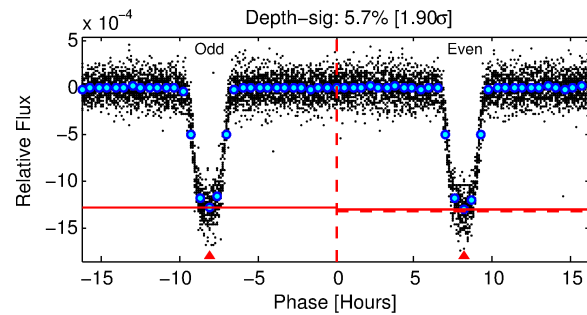
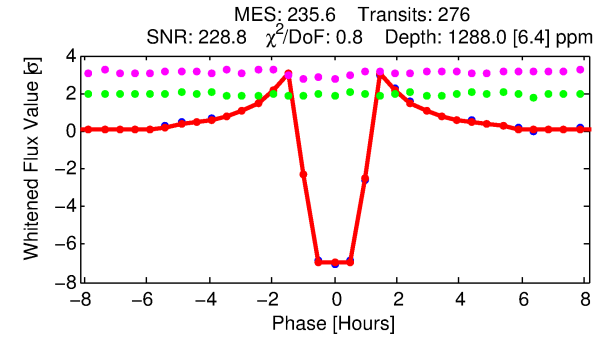
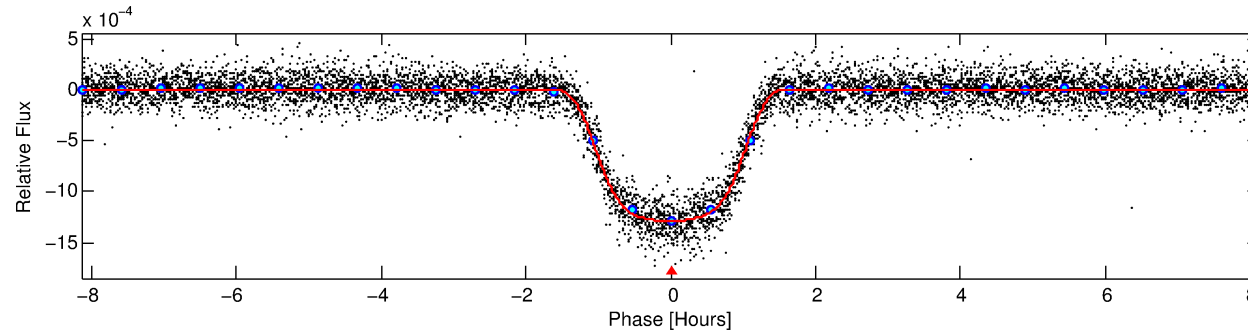
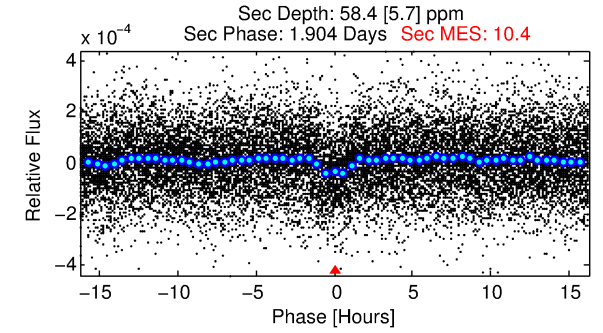
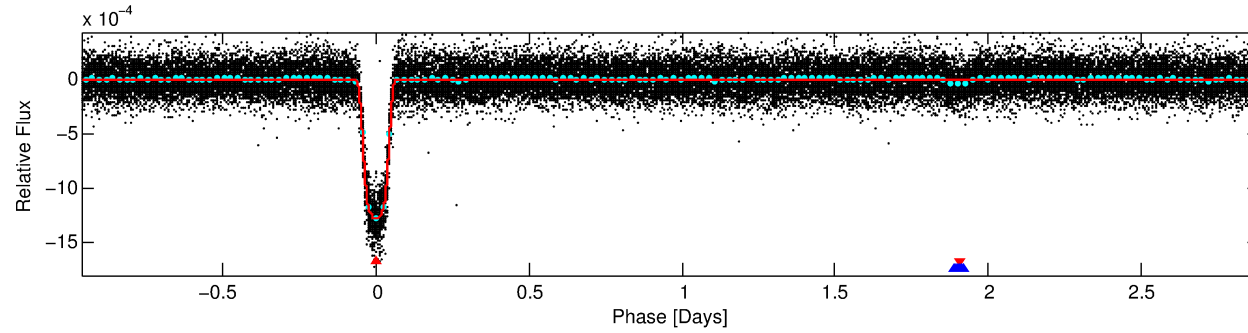
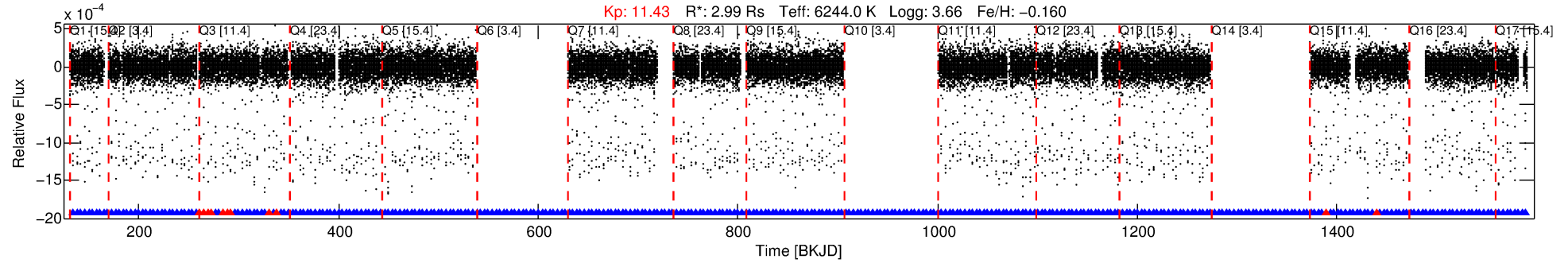
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 003861595-01

No Significant Match Found

# DV One-Page Summary

KIC: 3861595 Candidate: 1 of 2 Period: 3.849 d  
KOI: K00004.01 Corr: 0.990



## DV Fit Results:

Period = 3.84938 [0.00000] d  
Epoch = 134.4299 [0.0001] BKJD  
Rp/R\* = 0.0399 [0.0001]  
a/R\* = 5.14 [0.06]  
b = 0.93 [0.00]  
Seff = 4056.95 [1924.84]  
Teq = 2035 [241] K  
Rp = 13.02 [4.22] Re  
a = 0.0548 [0.0164] AU  
Ag = 0.57 [0.27] [-1.58σ]  
Teffp = 2734 [86] K [2.73σ]

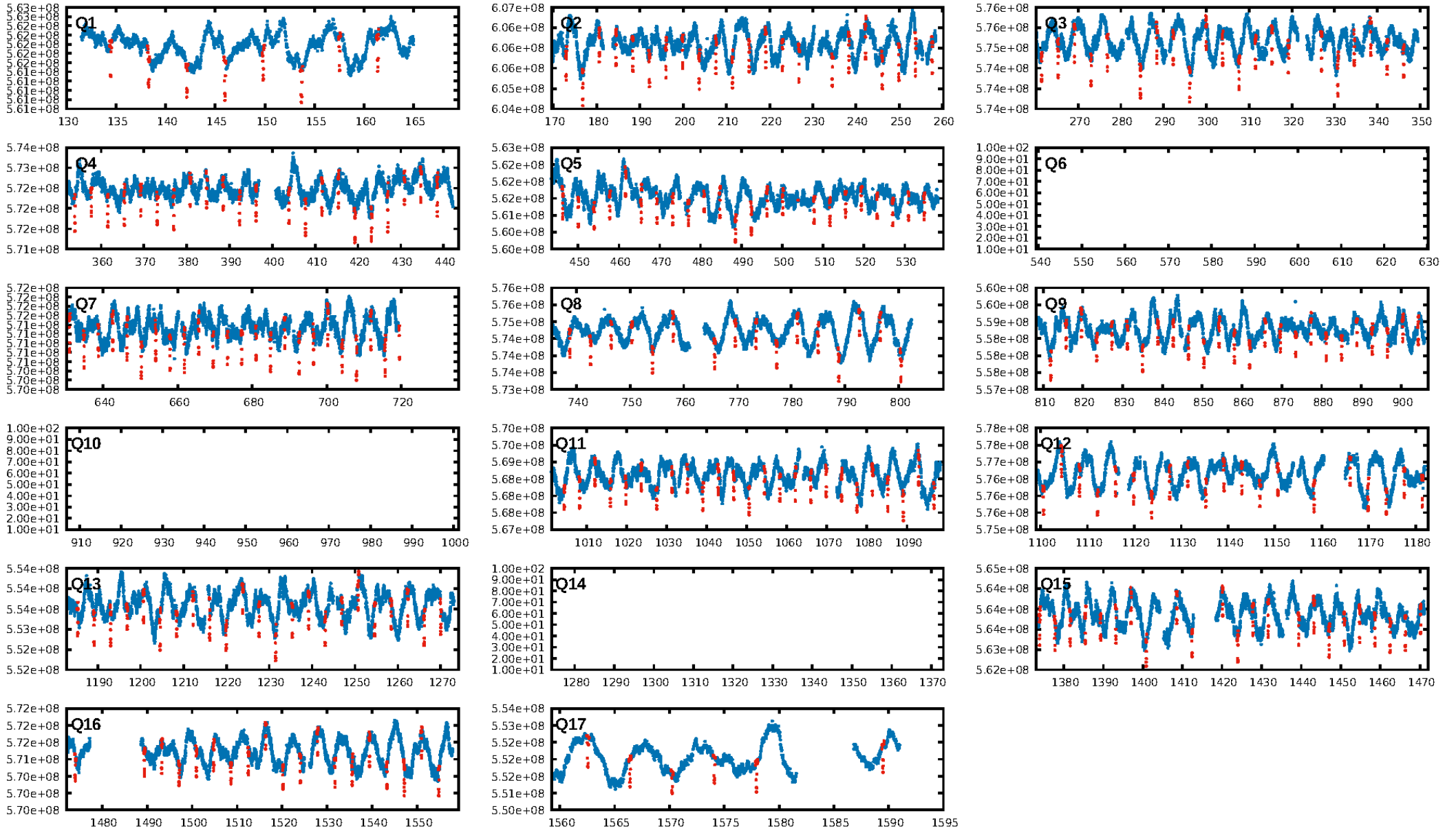
## DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 0.96 [251/262]  
GhostDiagnostic-chr: 3.997  
Centroid-sig: 0.0%  
Centroid-so: 0.153 arcsec [7.95σ]  
OotOffset-rm: 0.080 arcsec [1.15σ]  
KicOffset-rm: 0.091 arcsec [1.21σ]  
OotOffset-st: 1/4/4/5 [14]  
KicOffset-st: 1/4/4/5 [14]  
DiffImageQuality-fgm: 1.00 [14/14]  
DiffImageOverlap-fno: 1.00 [14/14]

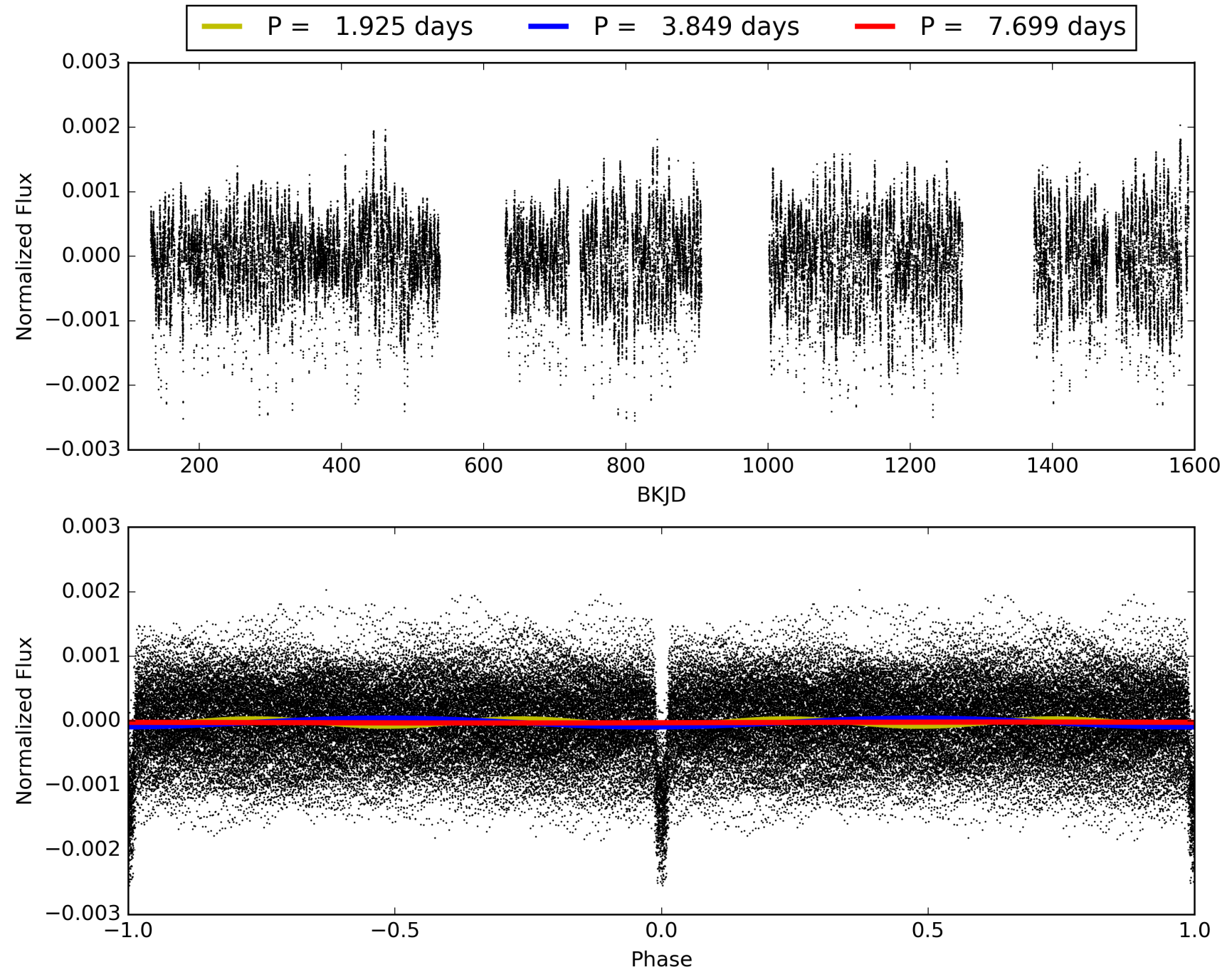
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 003861595-01, PDC Light Curves

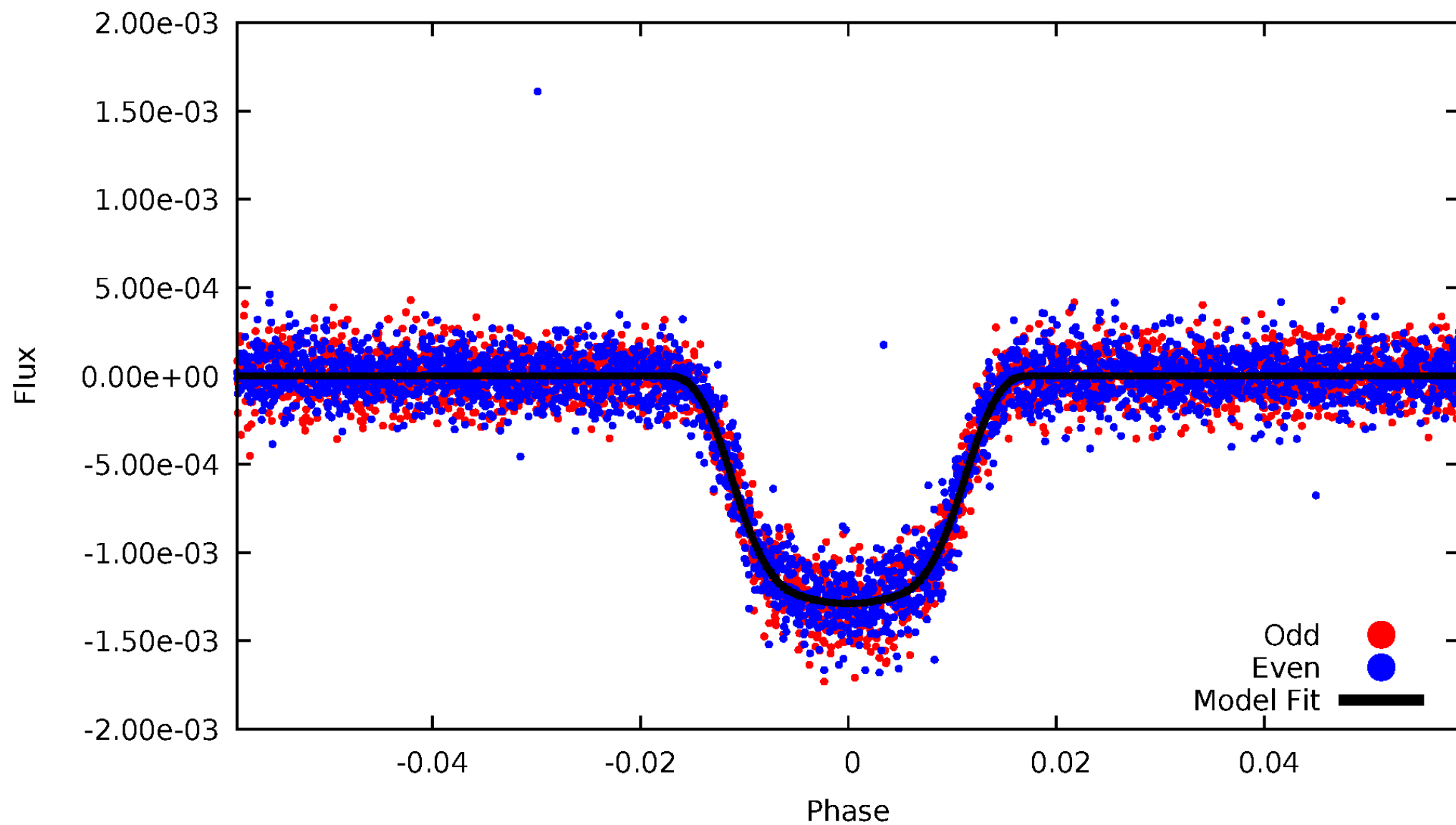


# TCE 003861595-01



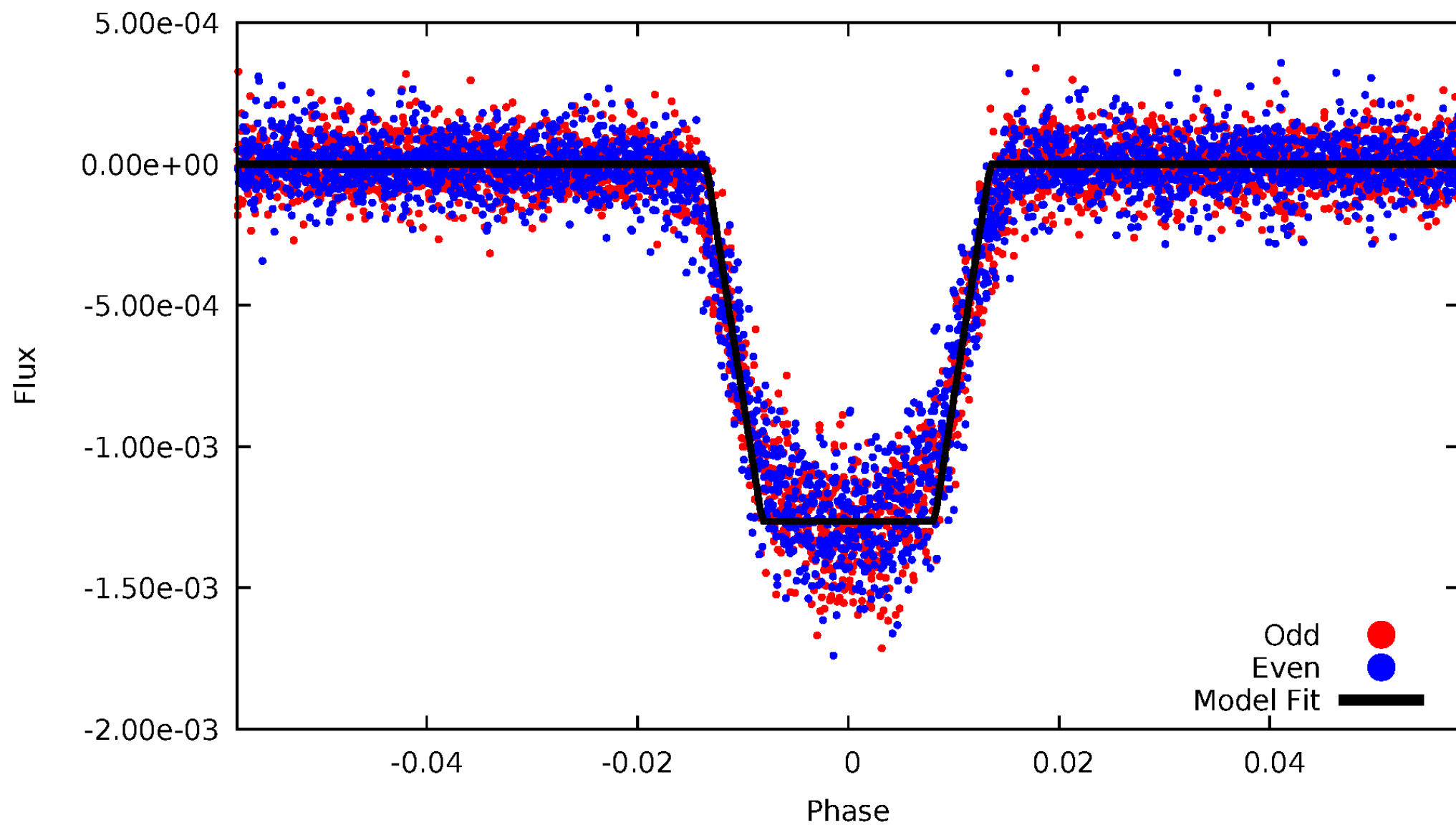
# DV Odd/Even

TCE 003861595-01



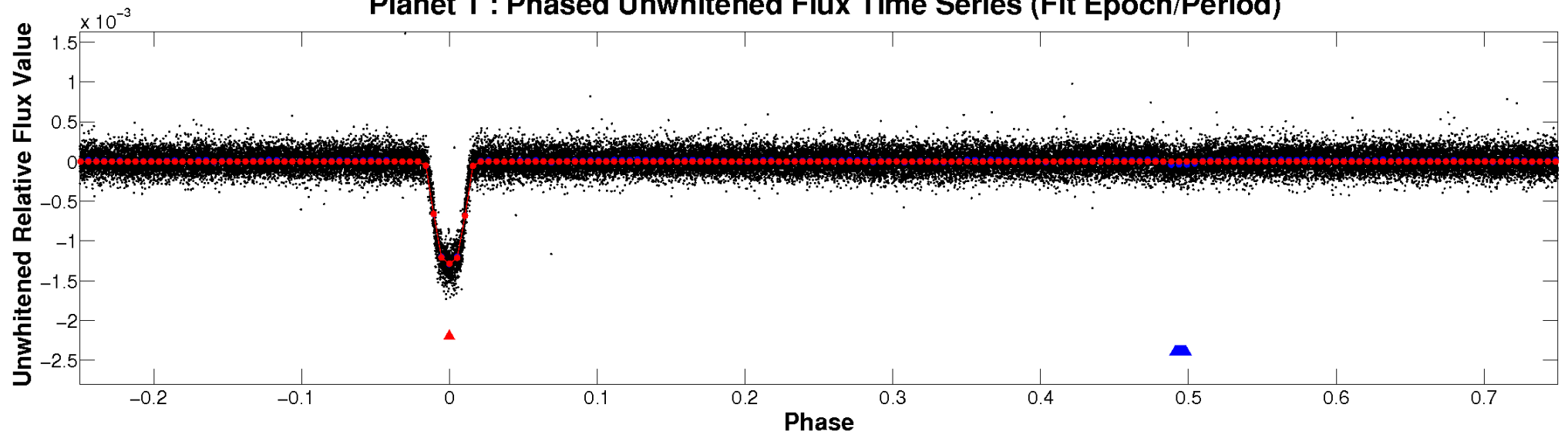
# ALT Odd/Even

TCE 003861595-01

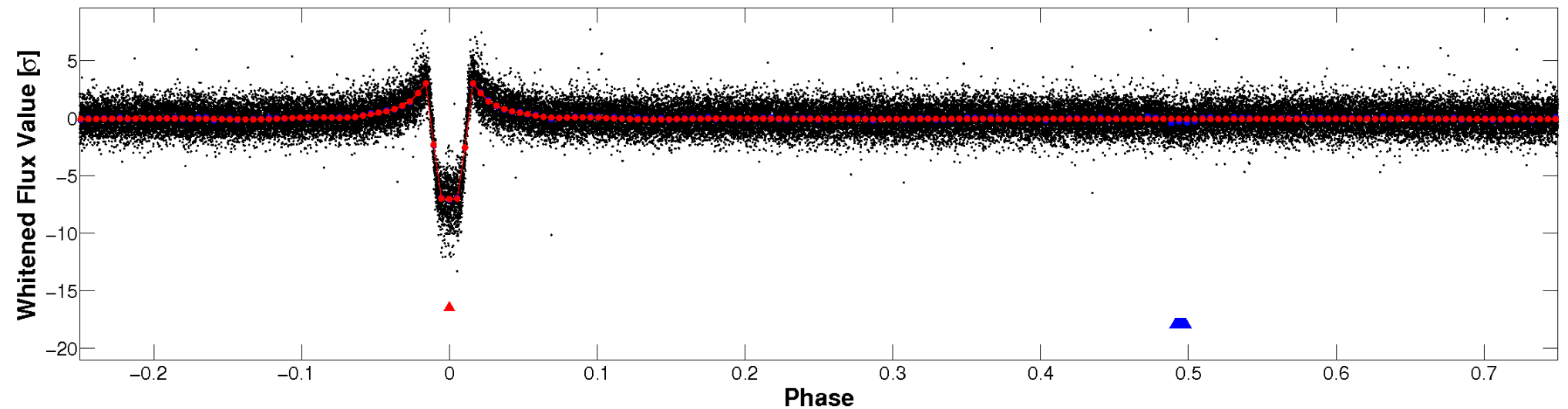


# Non-Whitened Vs. Whitened Light Curve

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



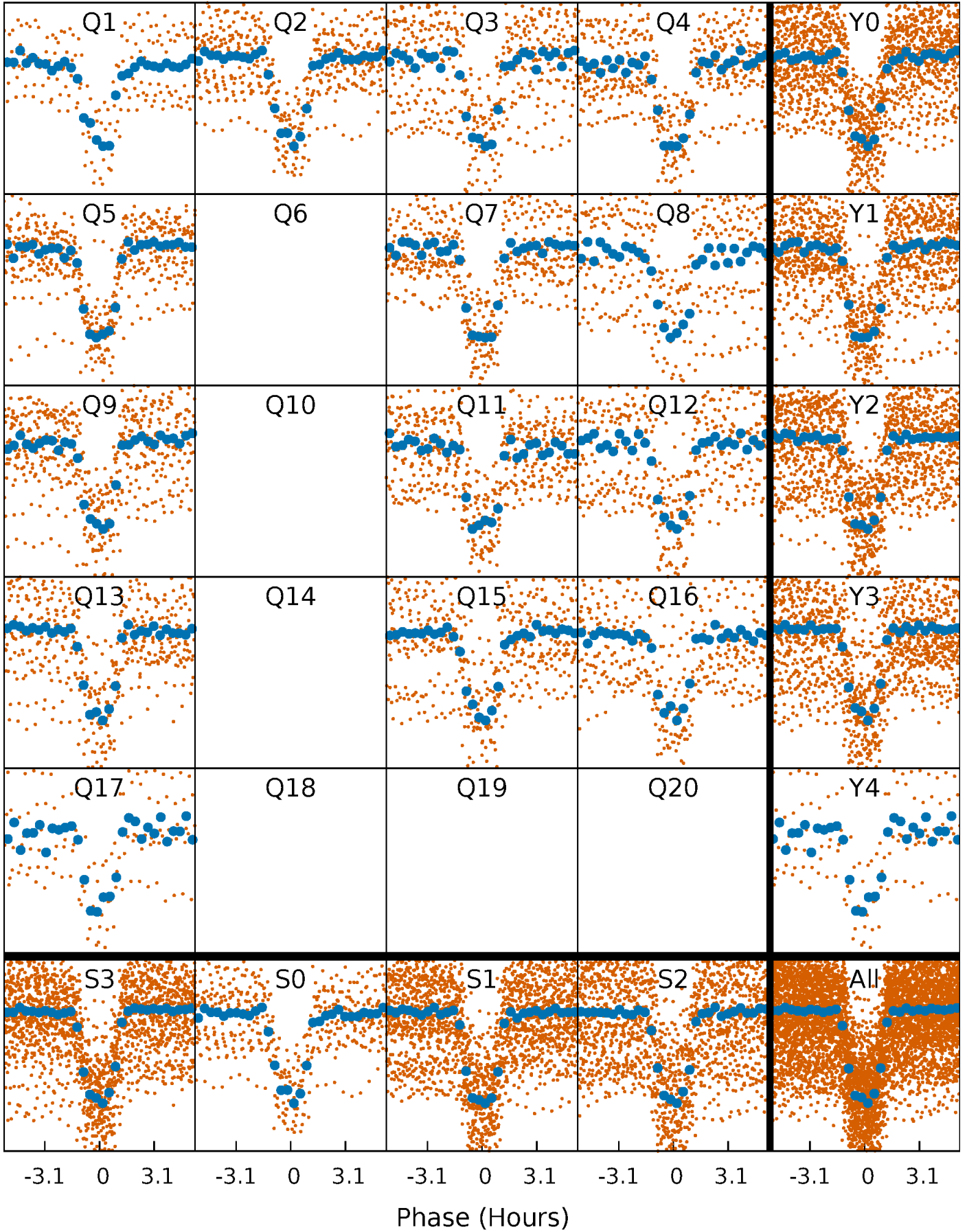
**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**





# PDC Quarter-Phased Transit Curves

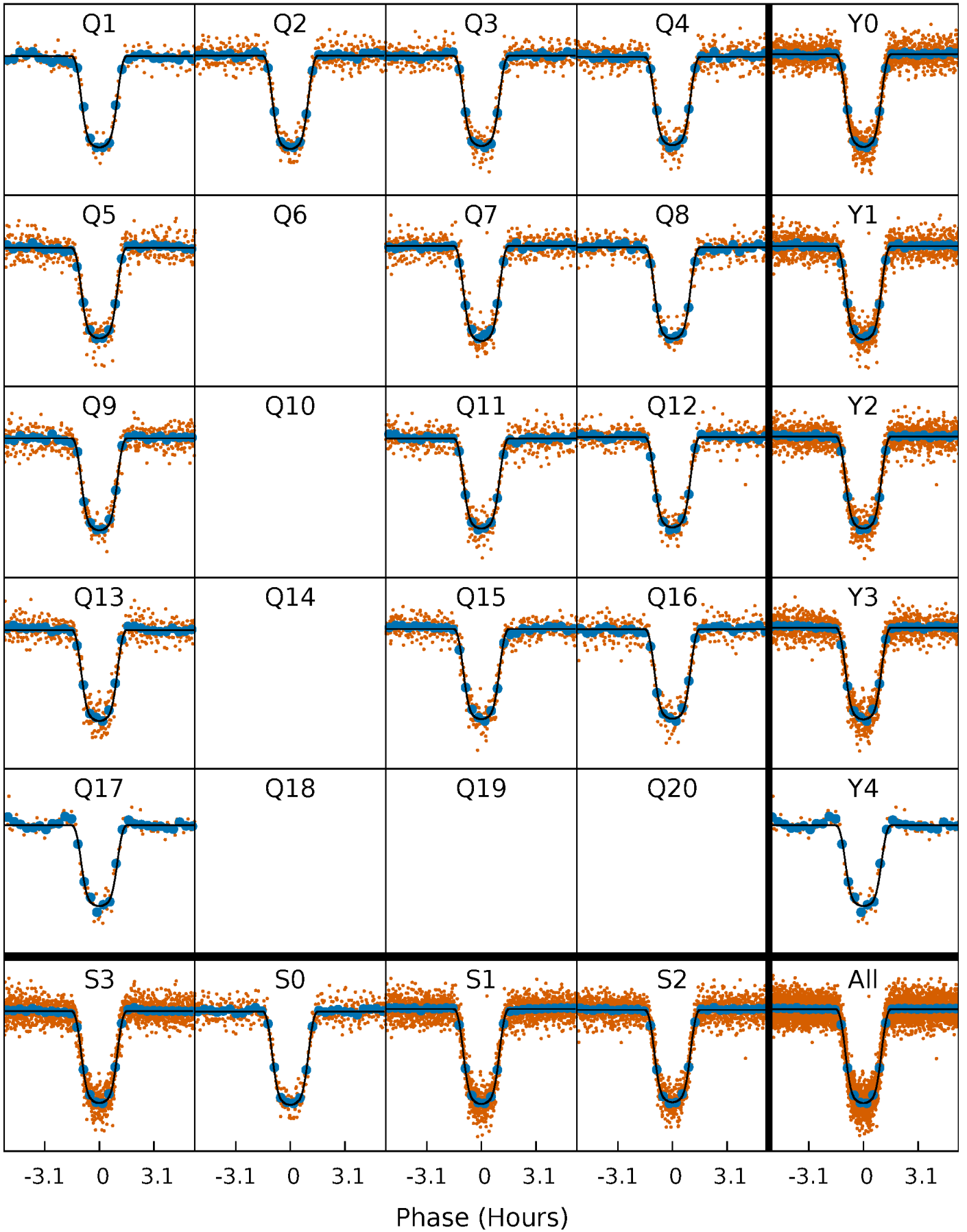
TCE 003861595-01 P= 3.849375 Days  $T_0=134.429896$  (BKJD)





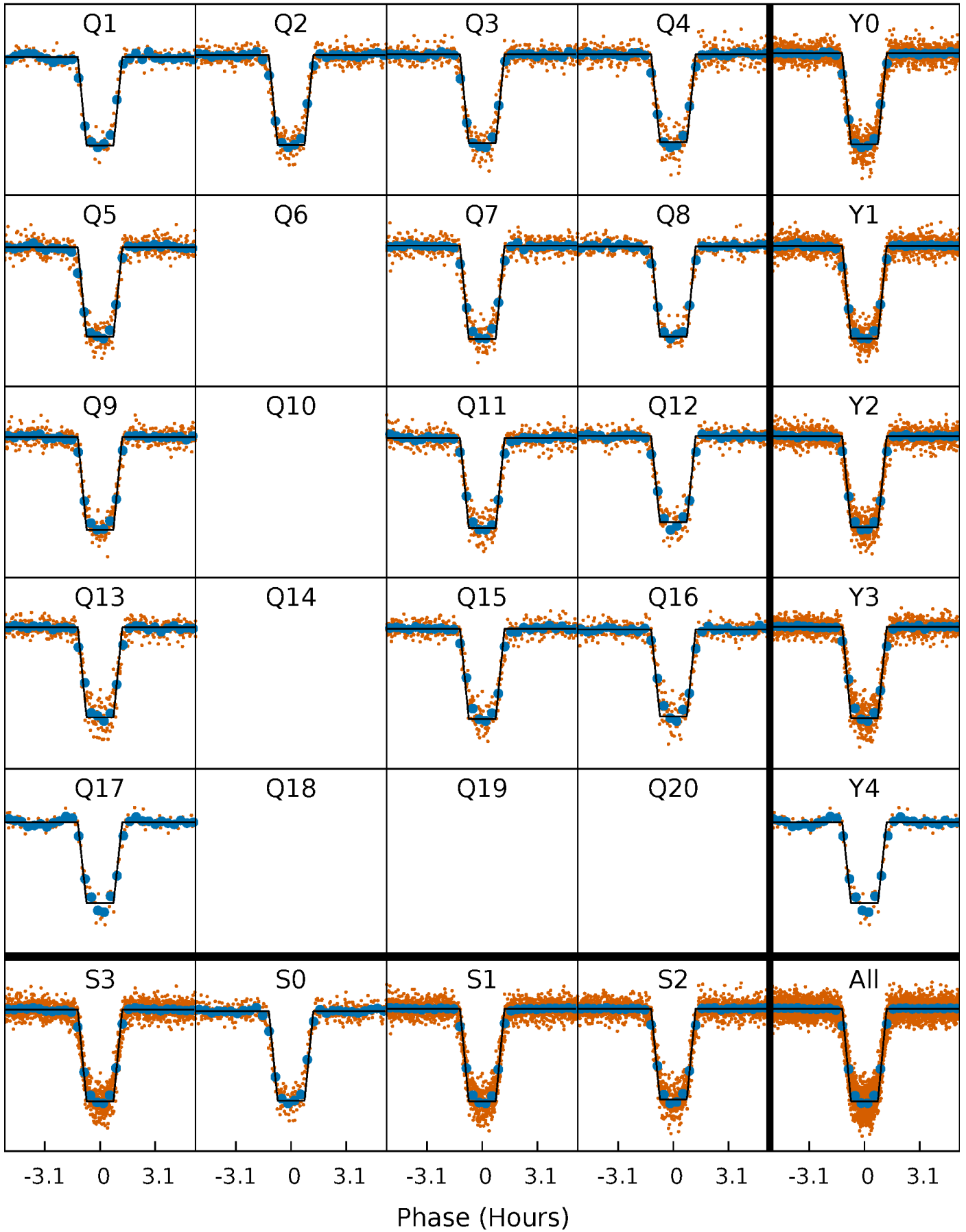
# DV Quarter-Phased Transit Curves

TCE 003861595-01   P= 3.849375 Days    $T_0=134.429896$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

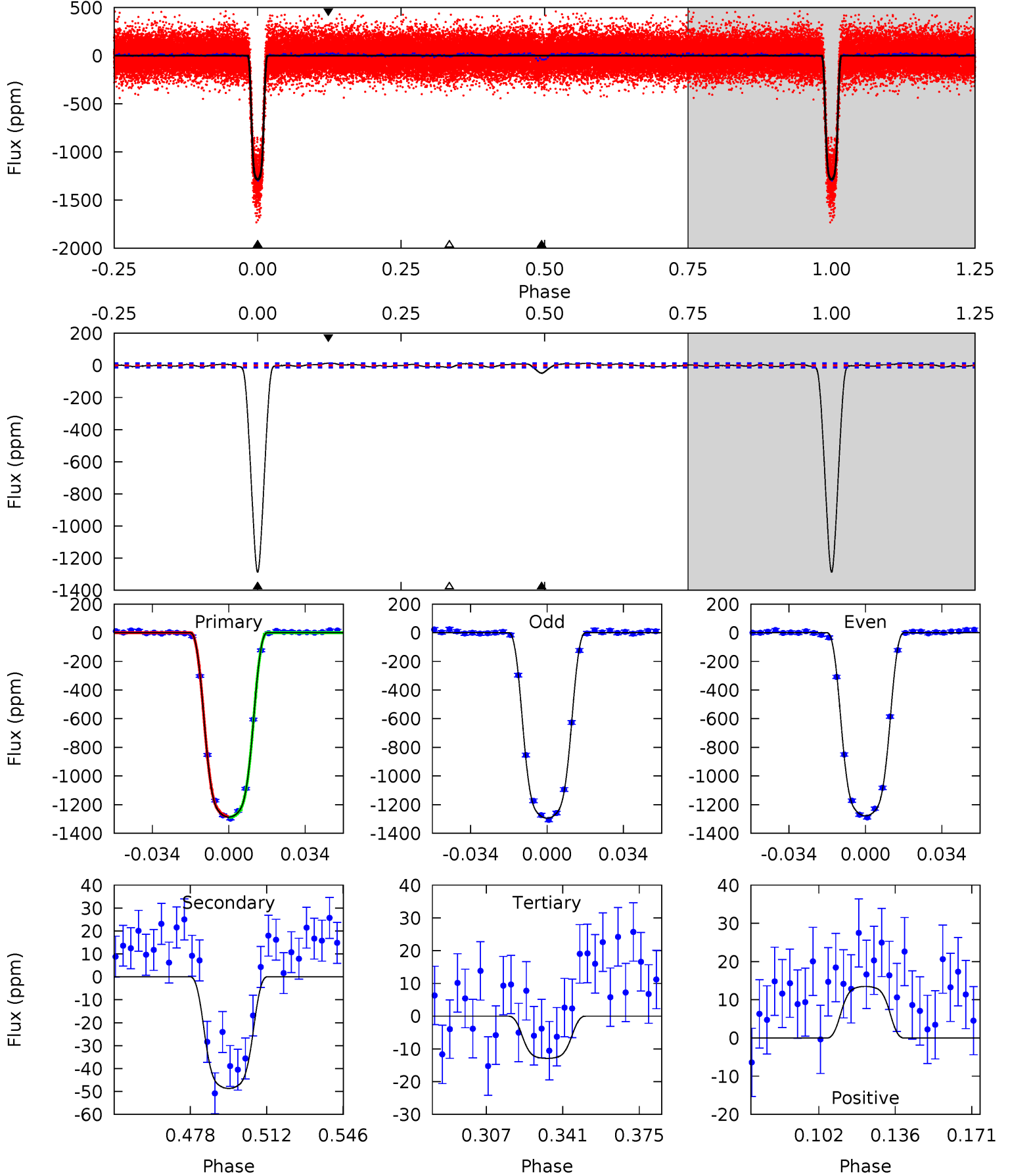
TCE 003861595-01   P= 3.849357 Days    $T_0=134.433392$  (BKJD)



# DV Model-Shift Uniqueness Test

003861595-01, P = 3.849375 Days, E = 130.580521 Days

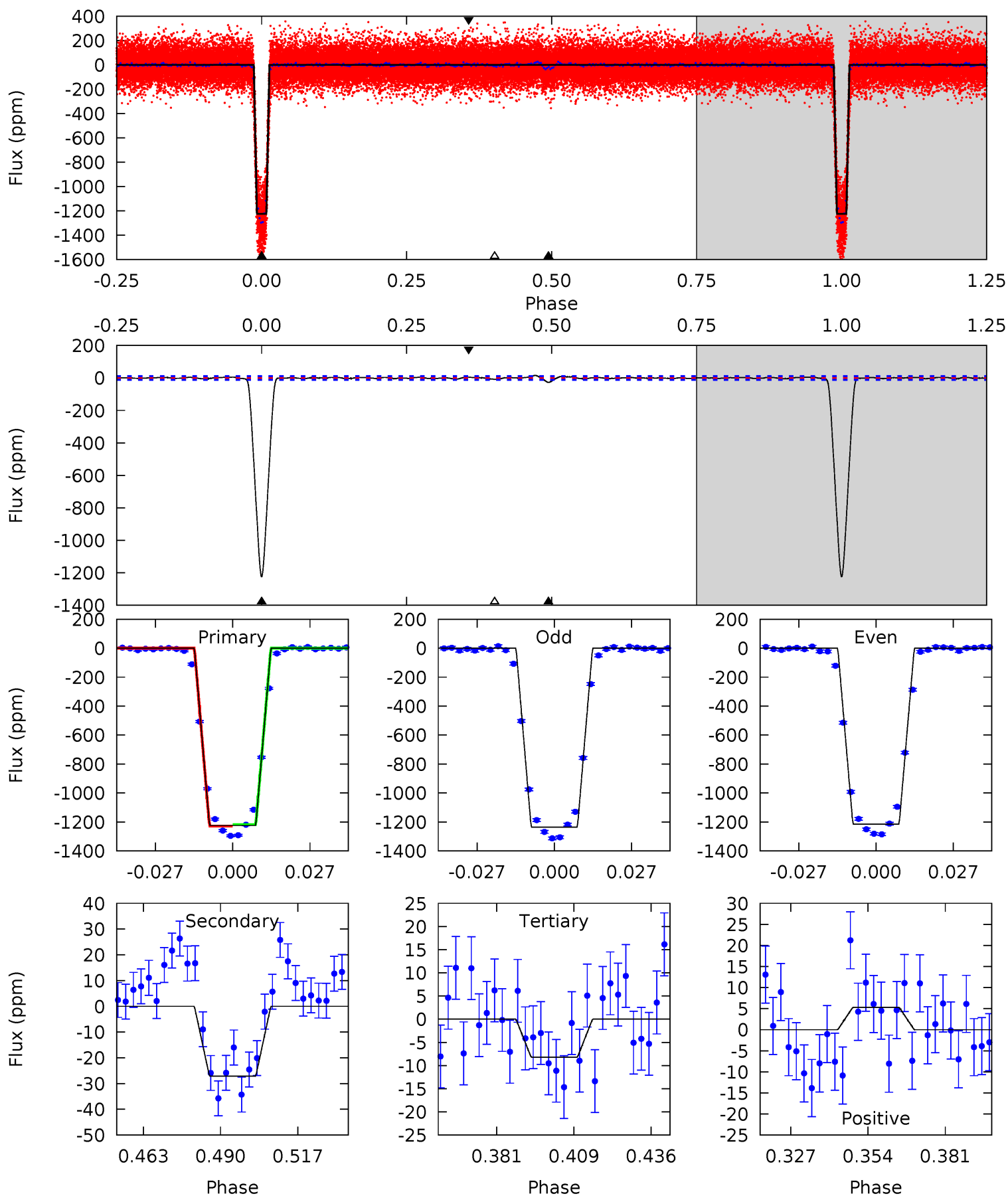
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
474.3	17.9	4.76	4.98	4.79	2.12	2.25	469.6	469.3	13.2	13.0	3.12	1.00	0.01	1.31



# Alt Model-Shift Uniqueness Test

003861595-01, P = 3.849357 Days, E = 130.584035 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
521.8	11.6	3.50	2.27	4.83	2.21	1.23	518.3	519.6	8.06	9.29	4.43	1.00	0.01	2.08



### Stellar Parameters For KIC 003861595

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6244^{+126}_{-114}$	$3.657^{+0.270}_{-0.090}$	$-0.160^{+0.200}_{-0.150}$	$2.992^{+0.416}_{-0.971}$	$1.482^{+0.131}_{-0.261}$	$0.078^{+0.135}_{-0.022}$
	+2%/-2%	+7%/-2%	+125%/-94%	+14%/-32%	+9%/-18%	+173%/-28%
Source	SPE3	SPE3	SPE3	DSEP		

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

### Secondary Eclipse Parameters for KIC 003861595-01 / KOI 0004.01

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-49 \pm 3$	$12.84^{+1.11}_{-2.20}$	$2810^{+140}_{-214}$	$2819^{+145}_{-150}$	$0.494^{+0.186}_{-0.083}$
Alt.	$-27 \pm 2$	$11.44^{+1.04}_{-2.00}$	$2815^{+127}_{-241}$	$2367^{+324}_{-4459}$	$0.348^{+0.145}_{-0.062}$

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

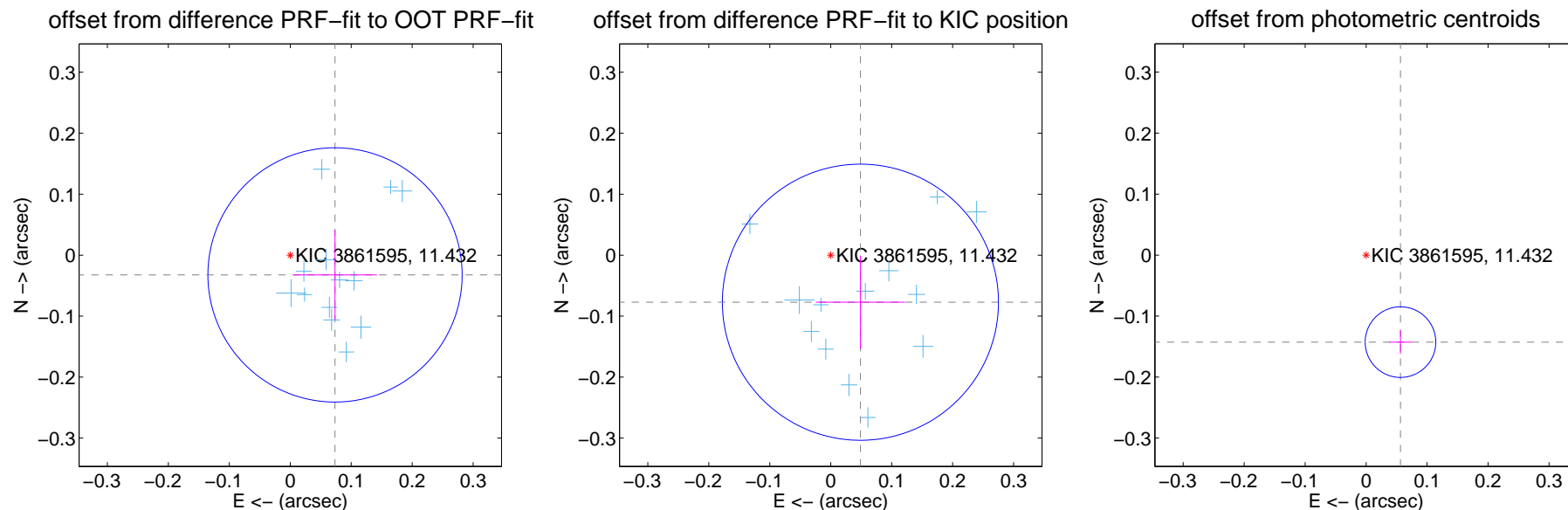
## DV Centroid Data

Supplemental centroid analysis for 003861595-01. **Kepler magnitude: 11.43.** Transit SNR 228.78

There are 14 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.05 arcsec

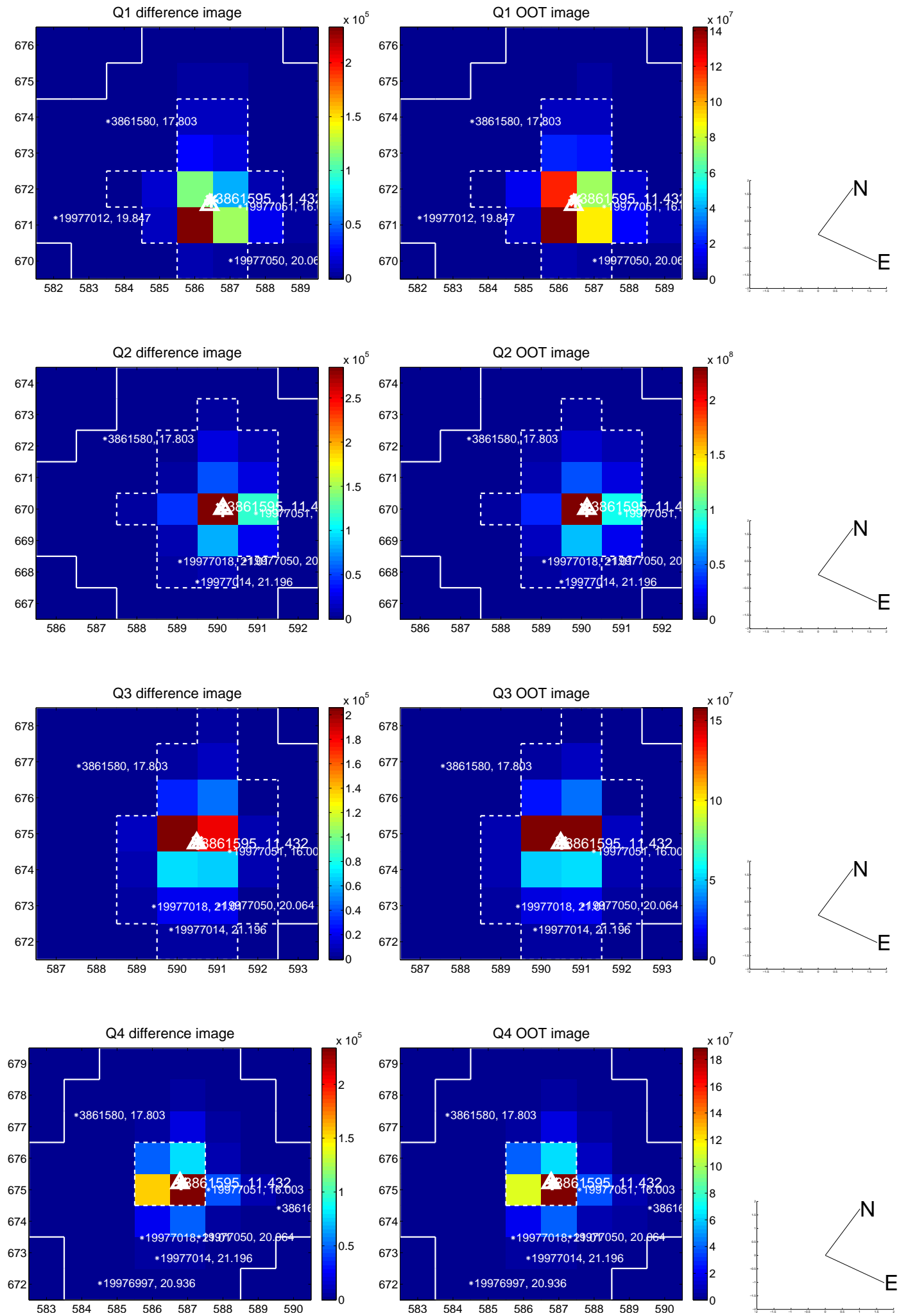
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.080 \pm 0.069$	1.15	$-0.073 \pm 0.069$	$-0.032 \pm 0.074$
PRF-fit source offset from KIC position	$0.091 \pm 0.075$	1.21	$-0.049 \pm 0.073$	$-0.077 \pm 0.076$
photometric centroid source offset	<b><math>0.15 \pm 0.02</math></b>	<b>7.95</b>	$-0.06 \pm 0.02$	$-0.14 \pm 0.02$



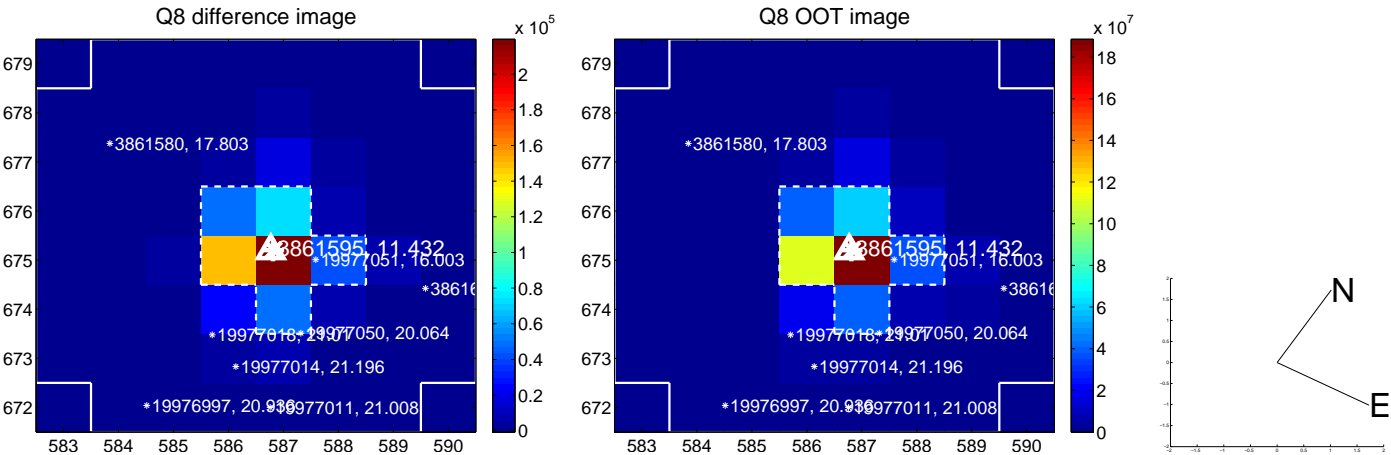
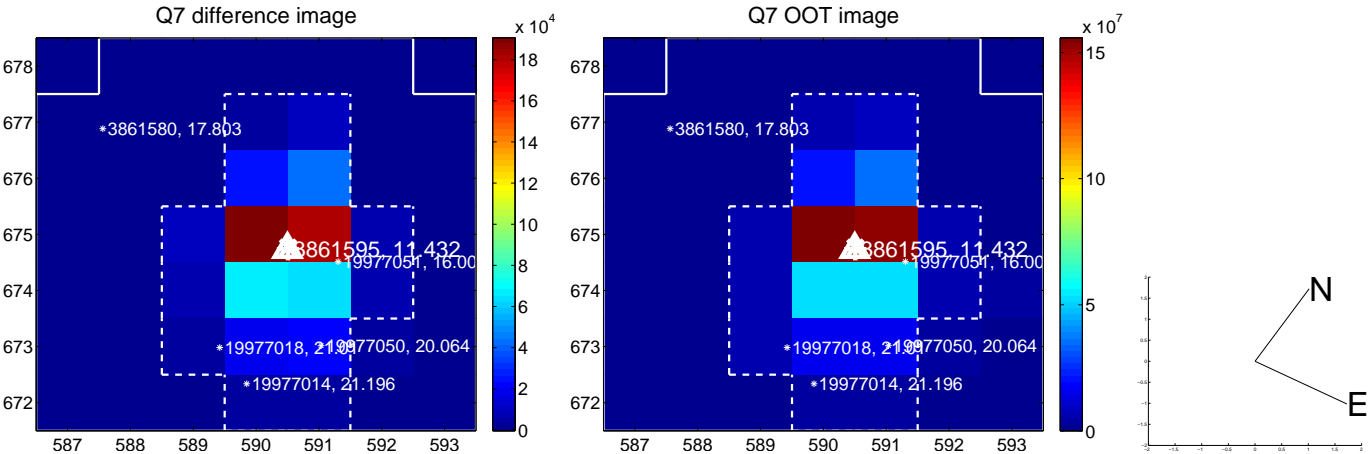
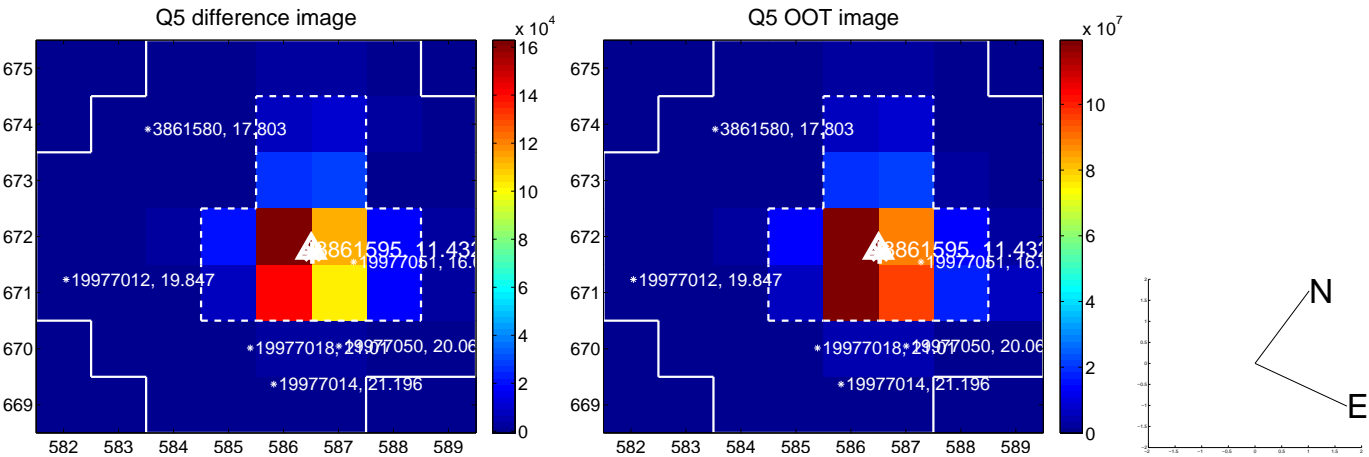
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



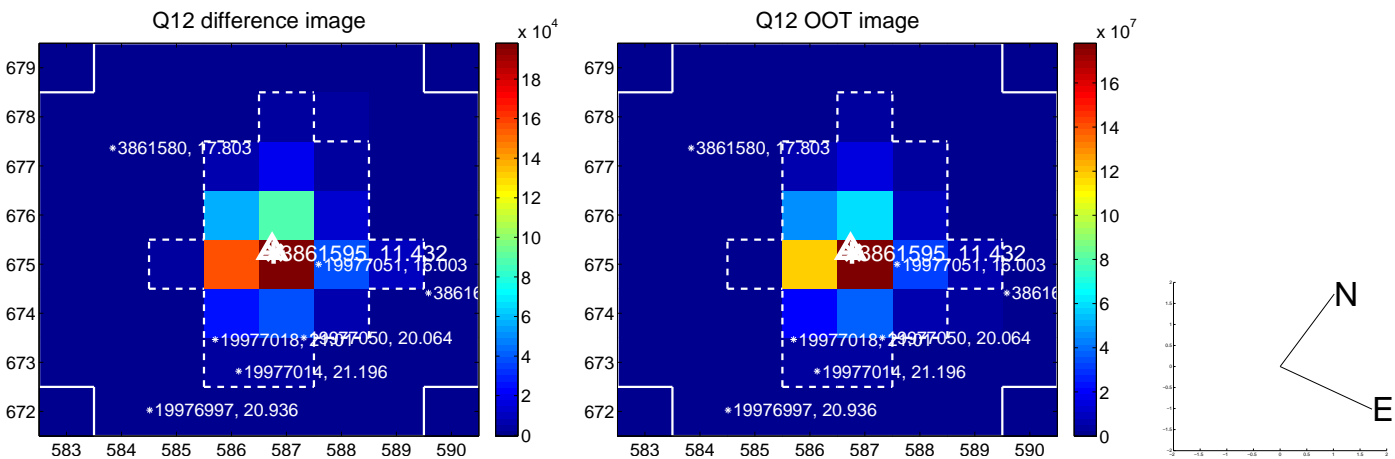
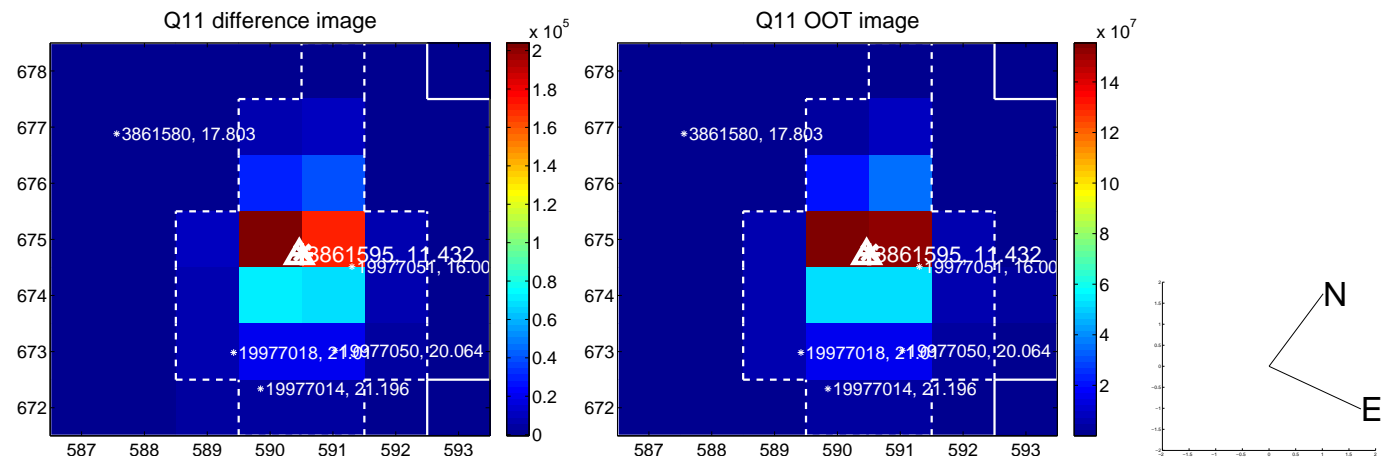
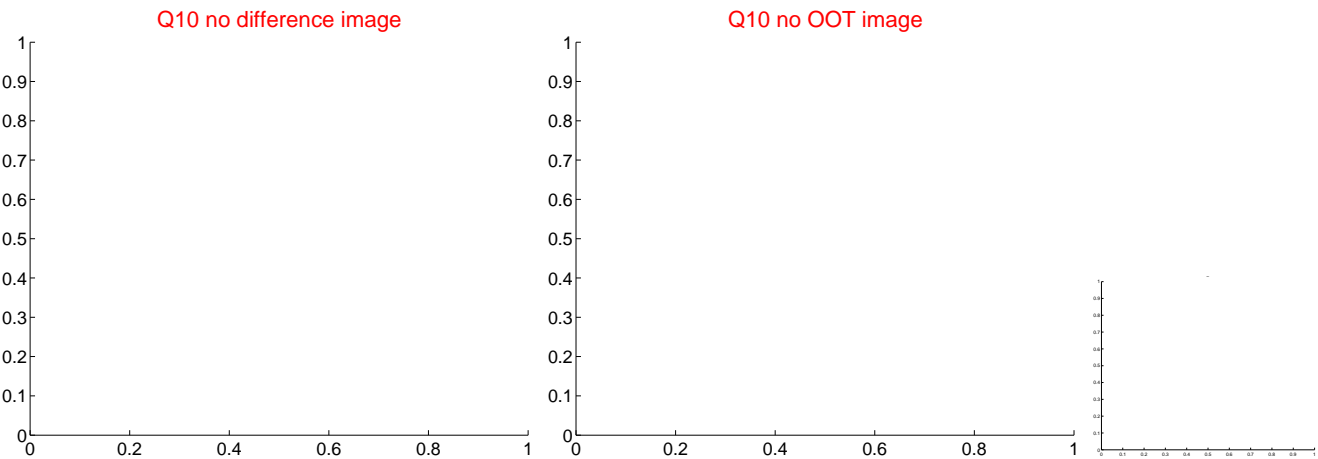
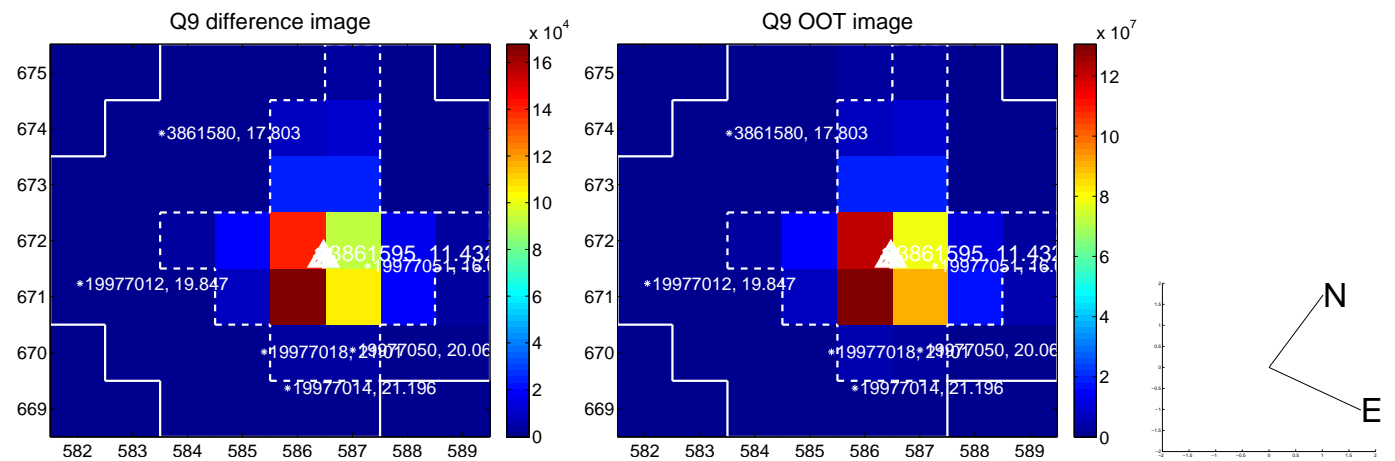
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



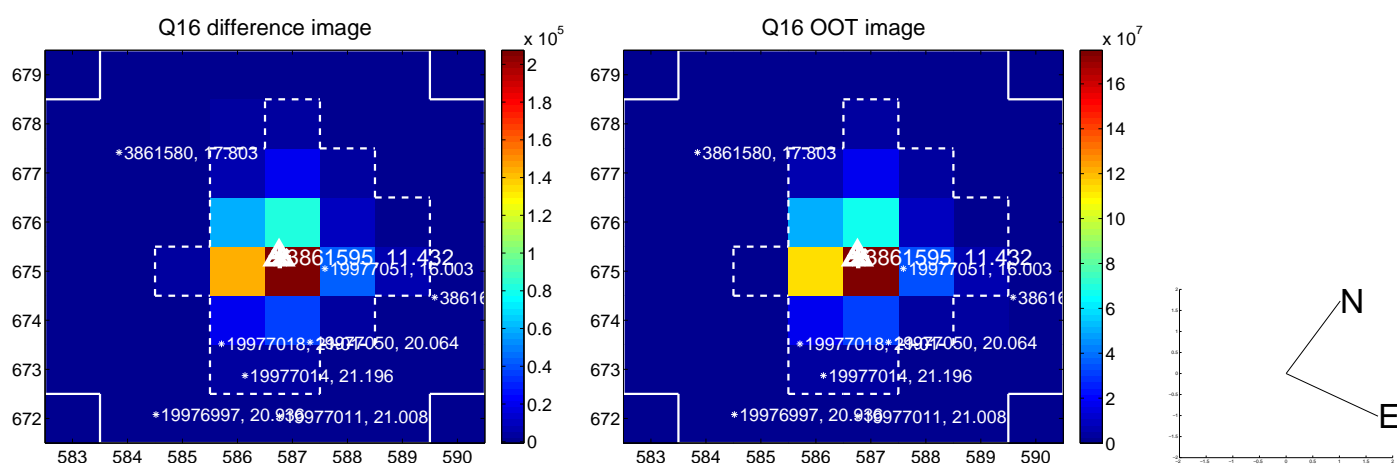
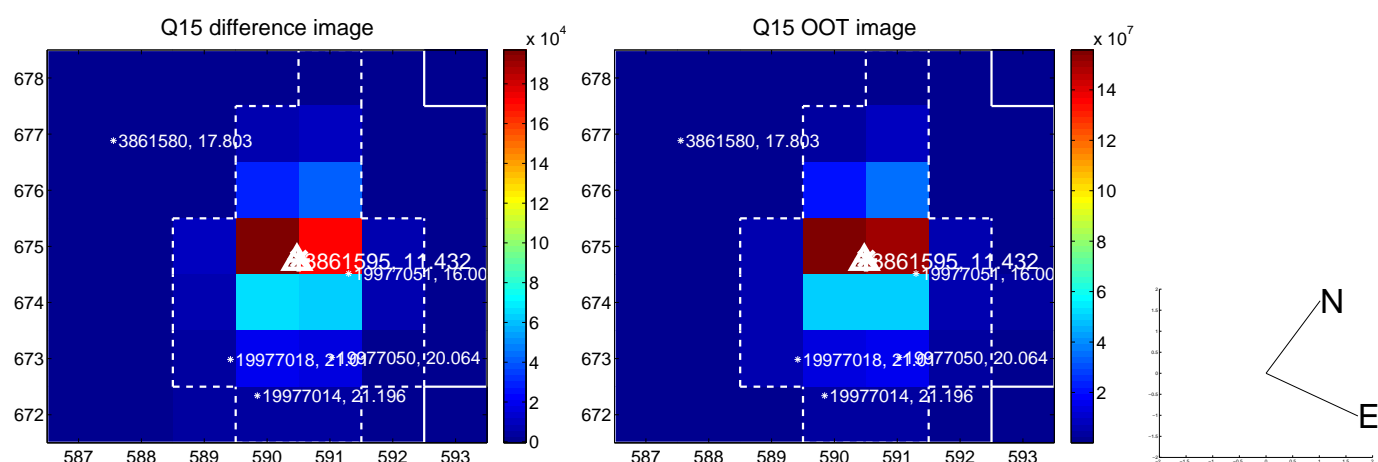
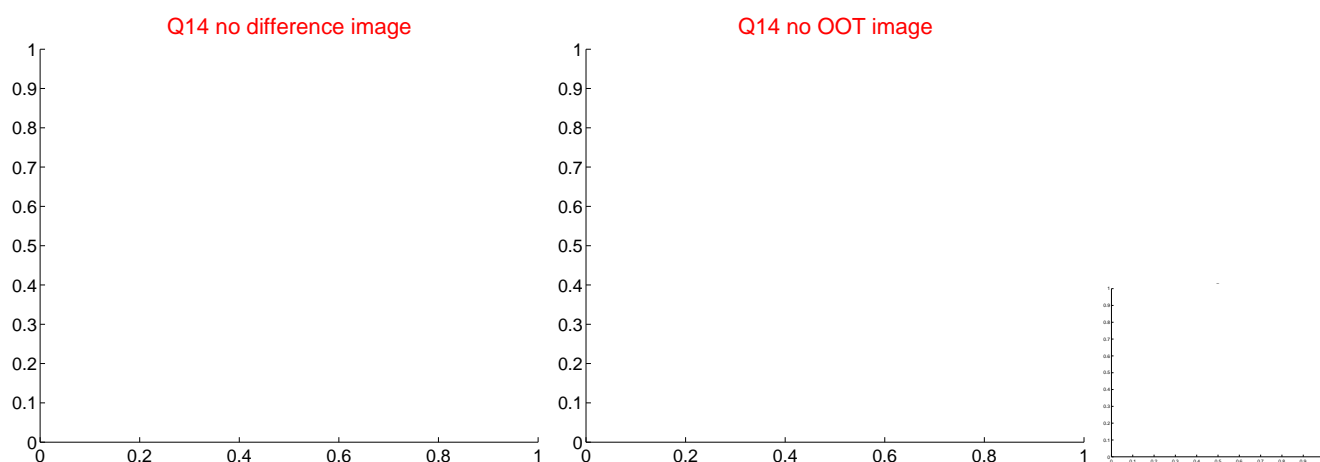
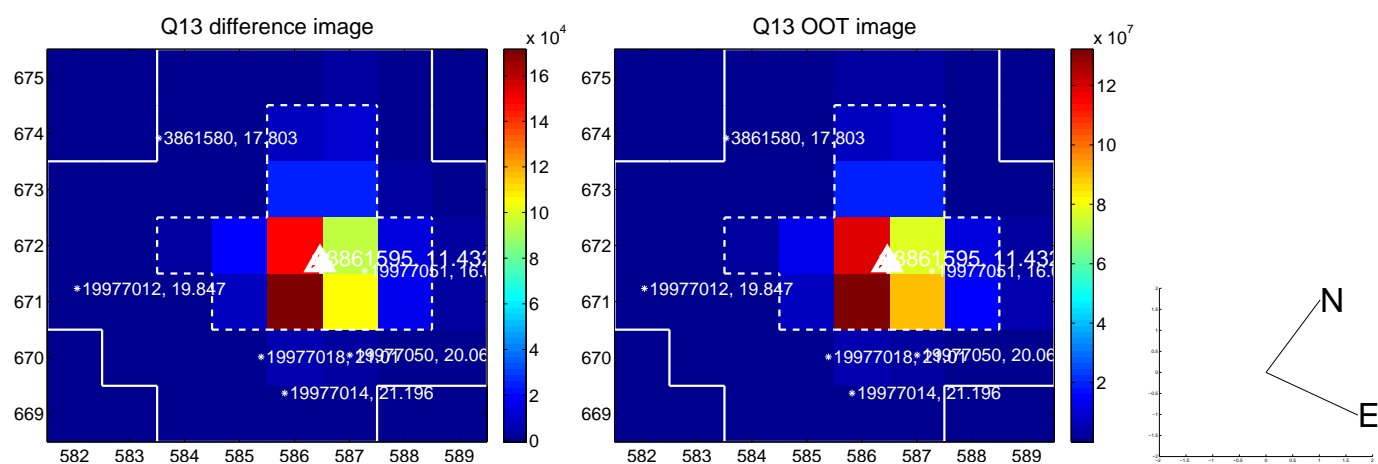
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



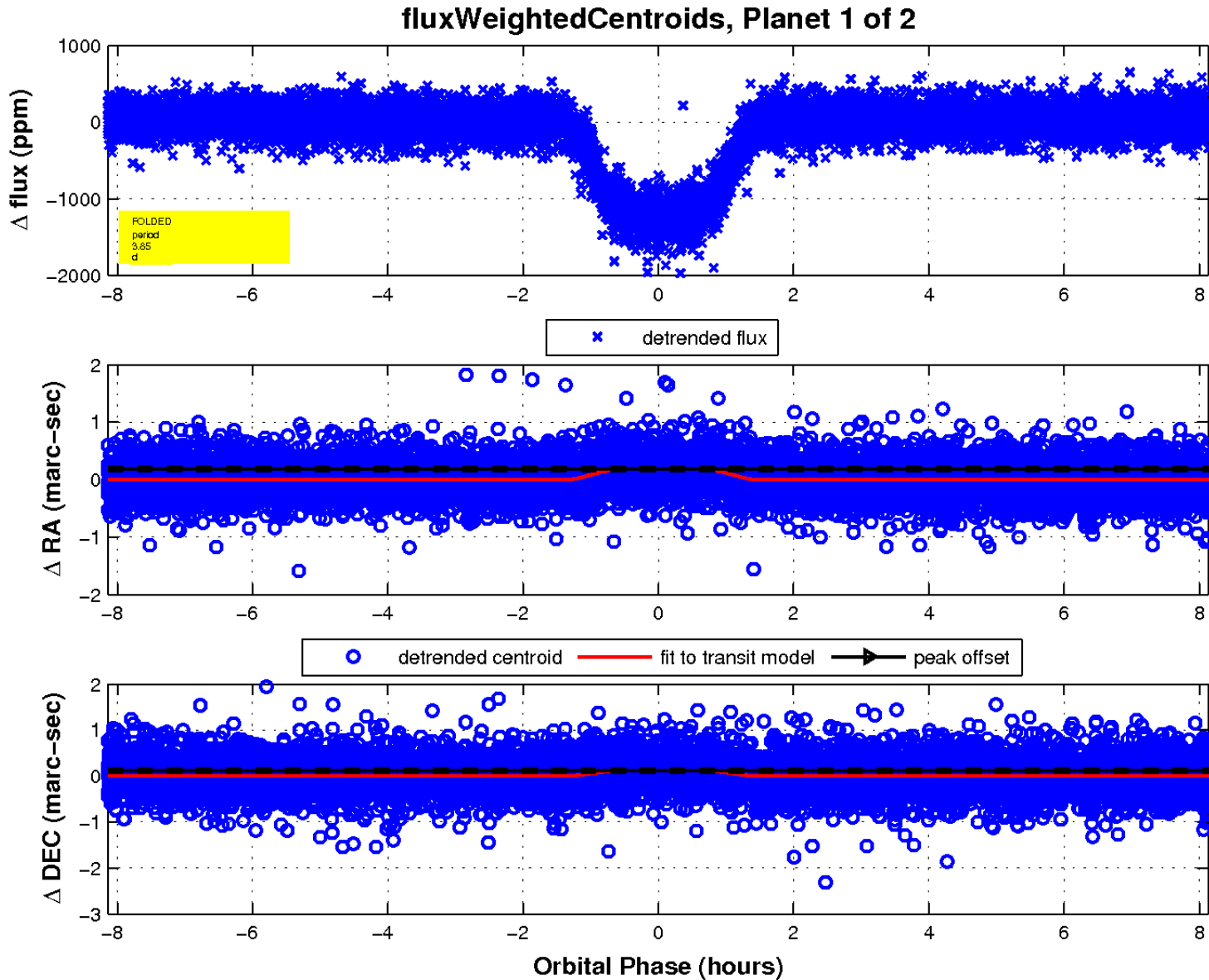
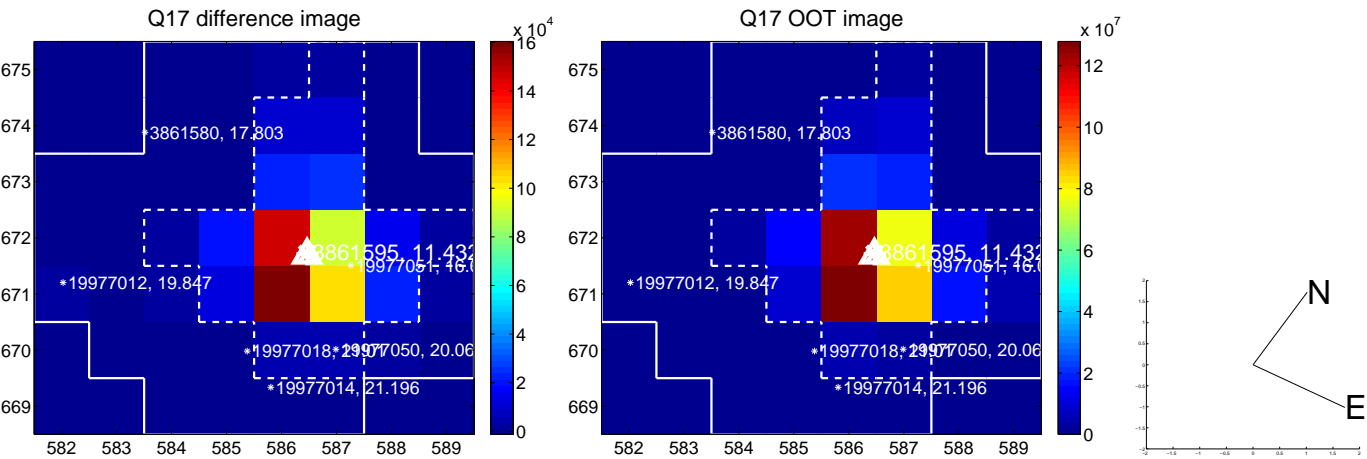
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



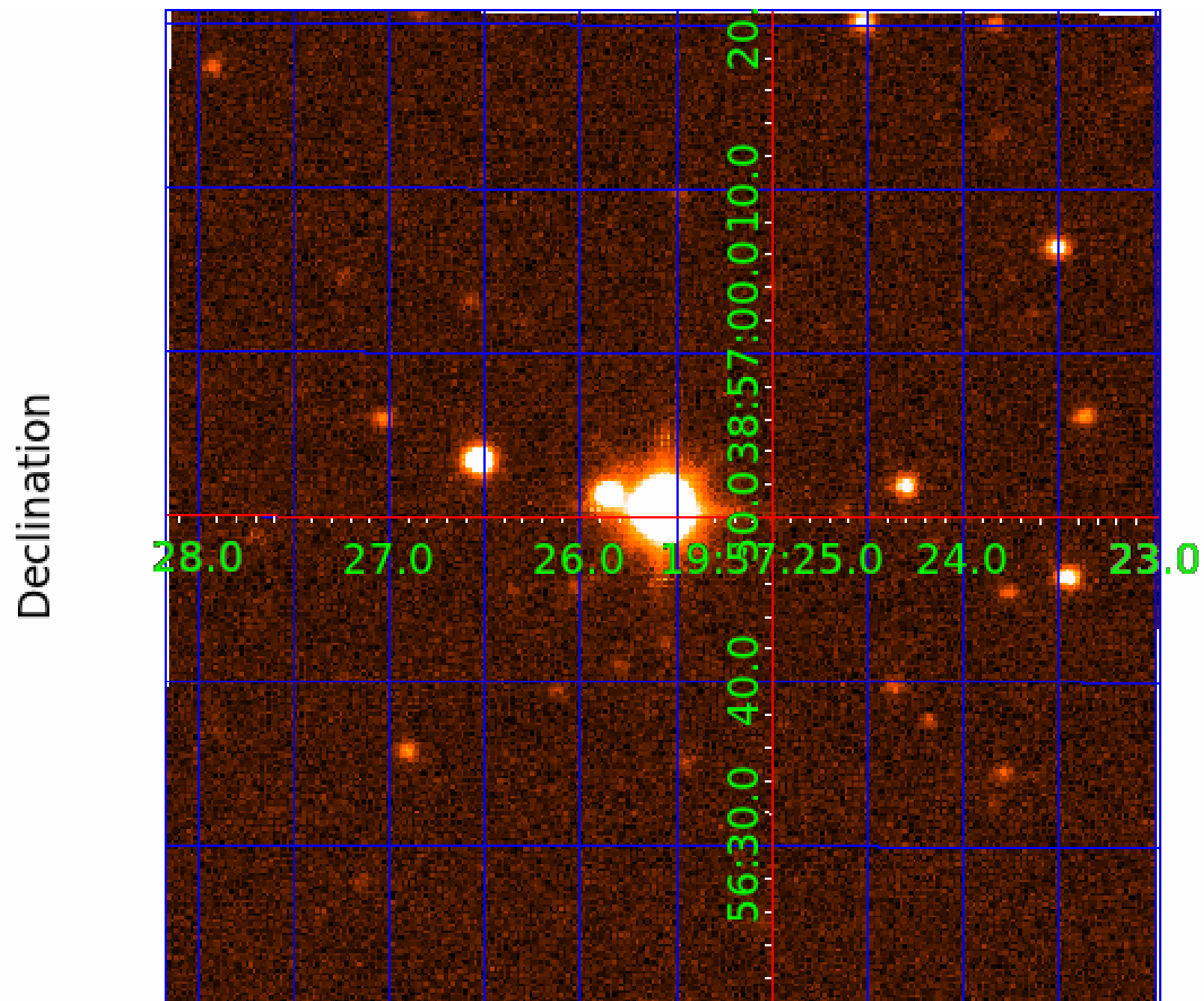
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image





# KIC 003861595

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003861595-01	OBS	0004.01	3.849375	134.429896	1288.0	2.713	235.6	228.8	2.99	6244	13.02	4056.95
003861595-02	OBS	No	3.849300	132.499005	60.9	2.359	10.8	11.7	2.99	6244	2.75	4057.06

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003861595-01	OBS	PC	1.00	0	1	0	0	MOD_SEC_DV—PLANET_OCCULT_DV—MOD_SEC_ALT—PLANET_OCCULT_ALT—HAS_SEC_TCE—CENT_SATURATED
003861595-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE—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.

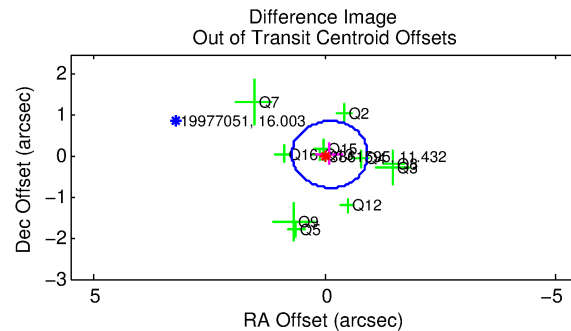
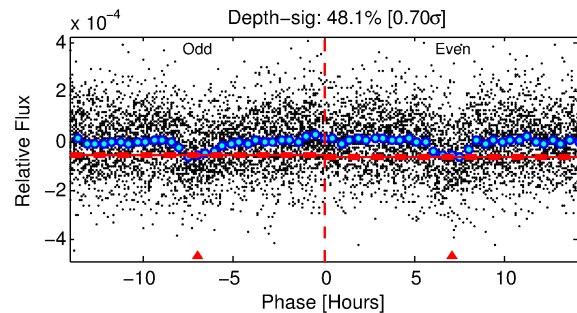
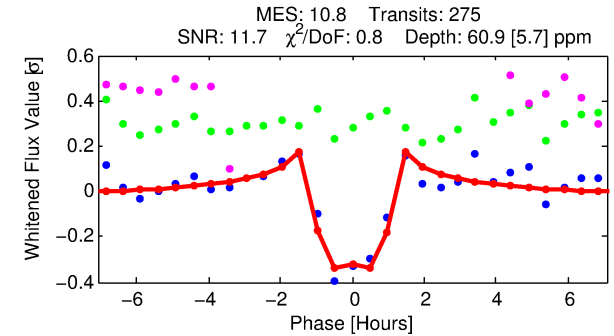
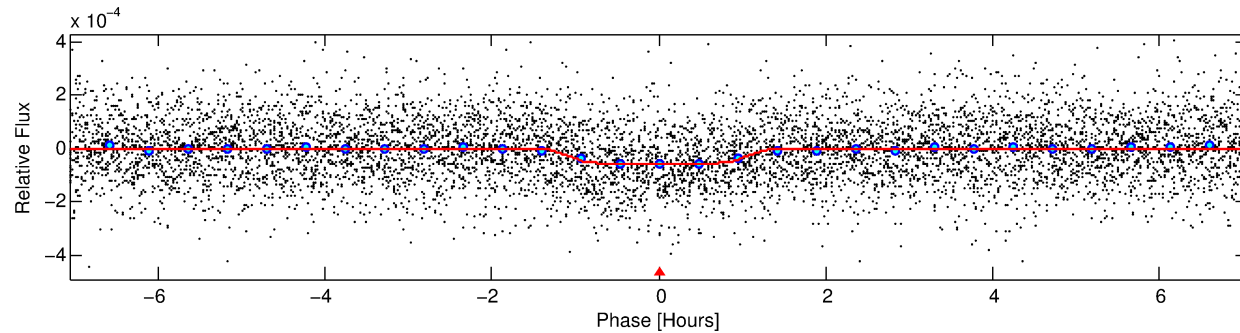
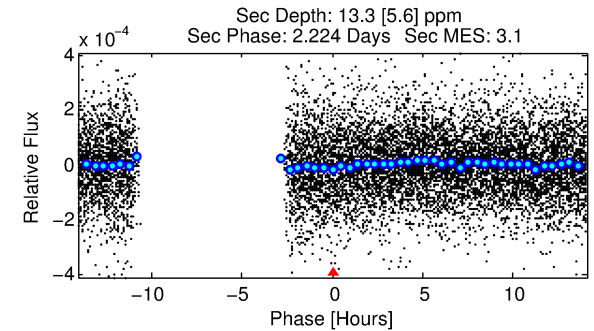
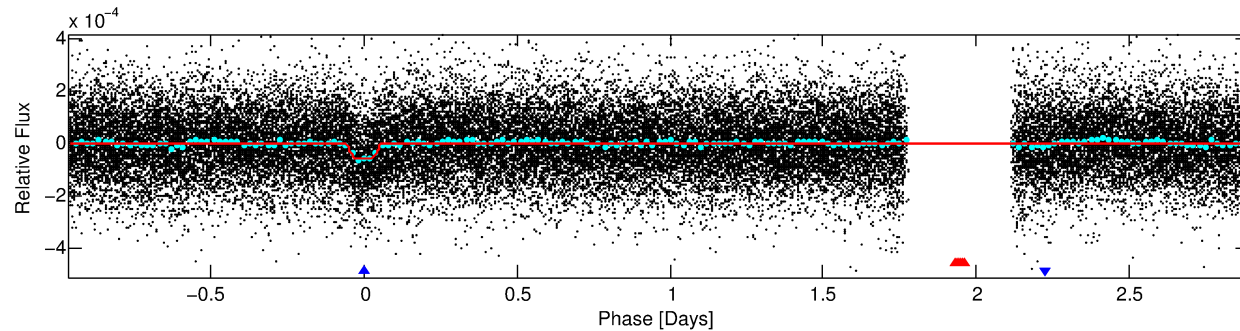
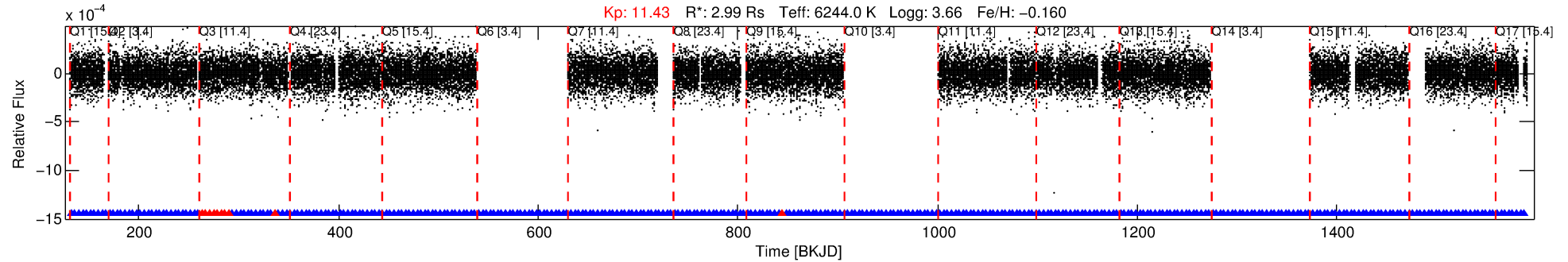
## Ephemeris Match Information For 003861595-02

No Significant Match Found

# DV One-Page Summary

KIC: 3861595 Candidate: 2 of 2 Period: 3.849 d

KOI: K00004 Corr: No Ephemeris Match



## DV Fit Results:

Period = 3.84930 [0.00001] d  
Epoch = 132.4990 [0.0020] BKJD  
 $R_p/R^* = 0.0084$  [0.0025]  
 $a/R^* = 5.69$  [8.93]  
 $b = 0.90$  [0.34]  
 $S_{\text{eff}} = 4057.06$  [1924.89]  
 $T_{\text{eq}} = 2035$  [241] K  
 $R_p = 2.75$  [1.20]  $R_{\text{e}}$   
 $a = 0.0548$  [0.0164] AU  
 $A_g = 2.92$  [2.52] [0.76σ]  
 $T_{\text{eff}} = 4114$  [751] K [2.64σ]

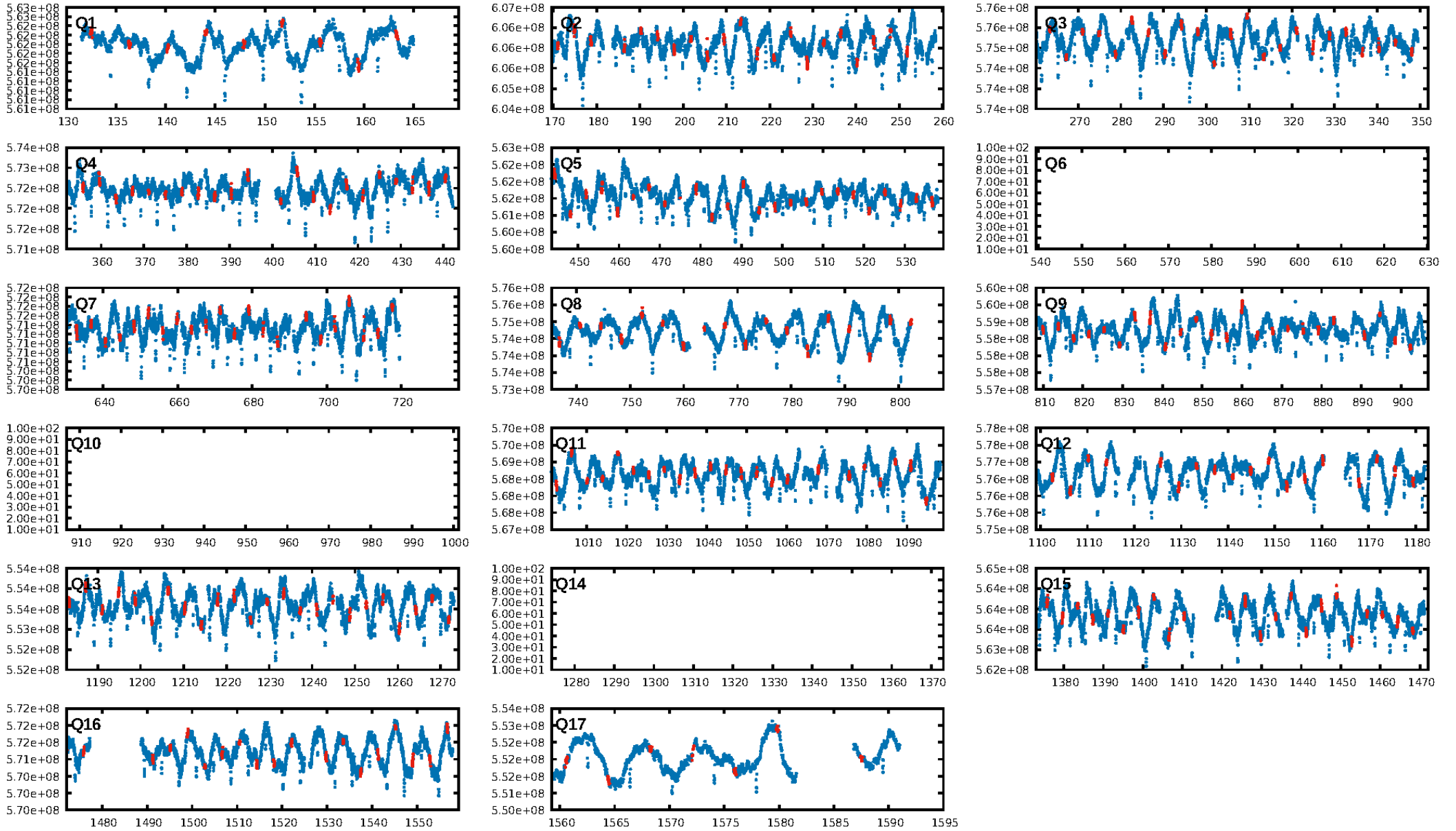
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGoF-sig: N/A  
Bootstrap-pfa: 2.82e-24  
RollingBand-fgt: 0.96 [249/259]  
GhostDiagnostic-chr: 2.753  
Centroid-sig: 0.0%  
Centroid-so: 1.006 arcsec [2.66σ]  
OotOffset-rm: 0.122 arcsec [0.45σ]  
KicOffset-rm: 0.097 arcsec [0.37σ]  
OotOffset-st: 1/3/4/3 [11]  
KicOffset-st: 1/3/4/3 [11]  
DiffImageQuality-fgm: 1.00 [11/11]  
DiffImageOverlap-fno: 1.00 [14/14]

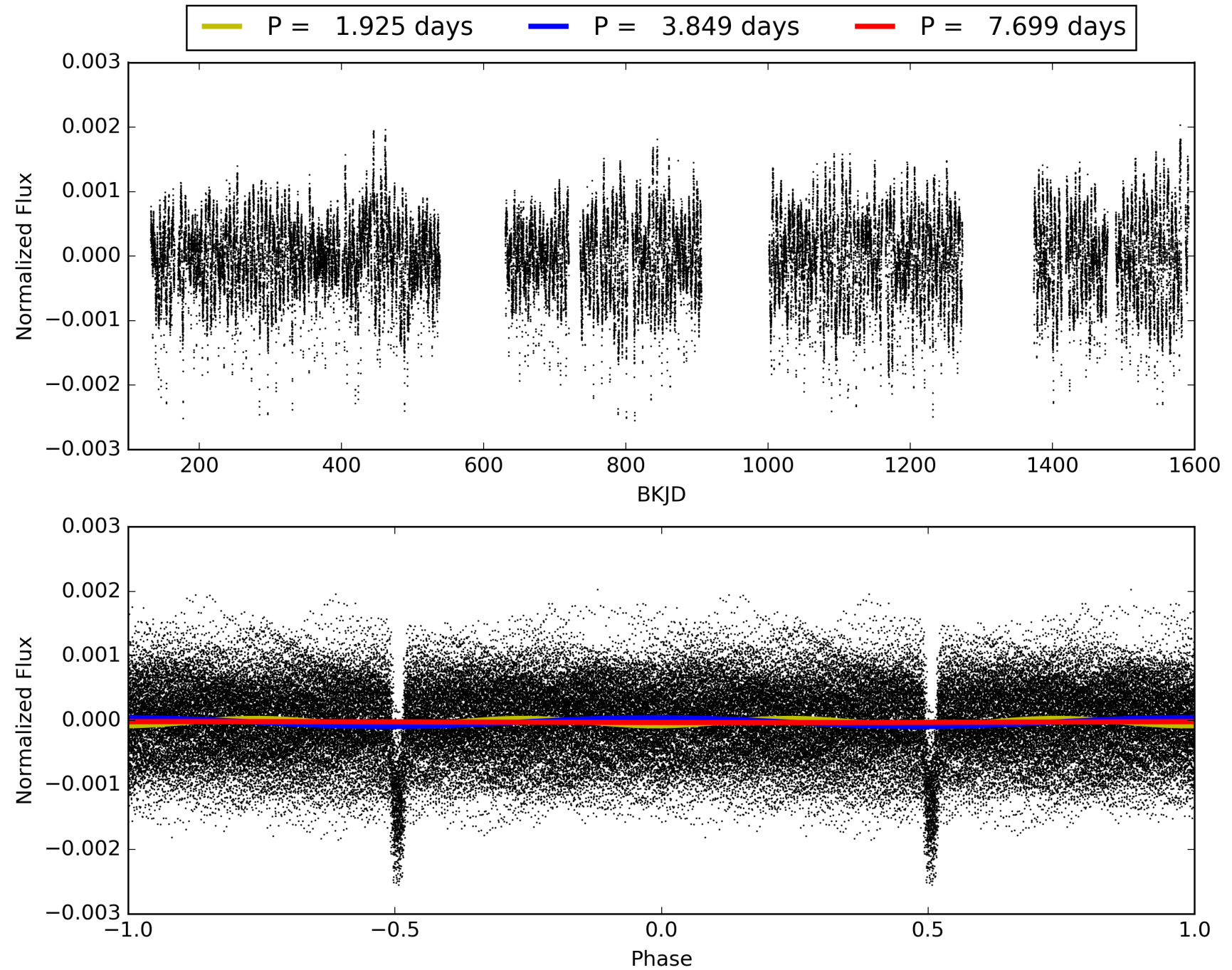
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 22:56:18 Z

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

# TCE 003861595-02, PDC Light Curves

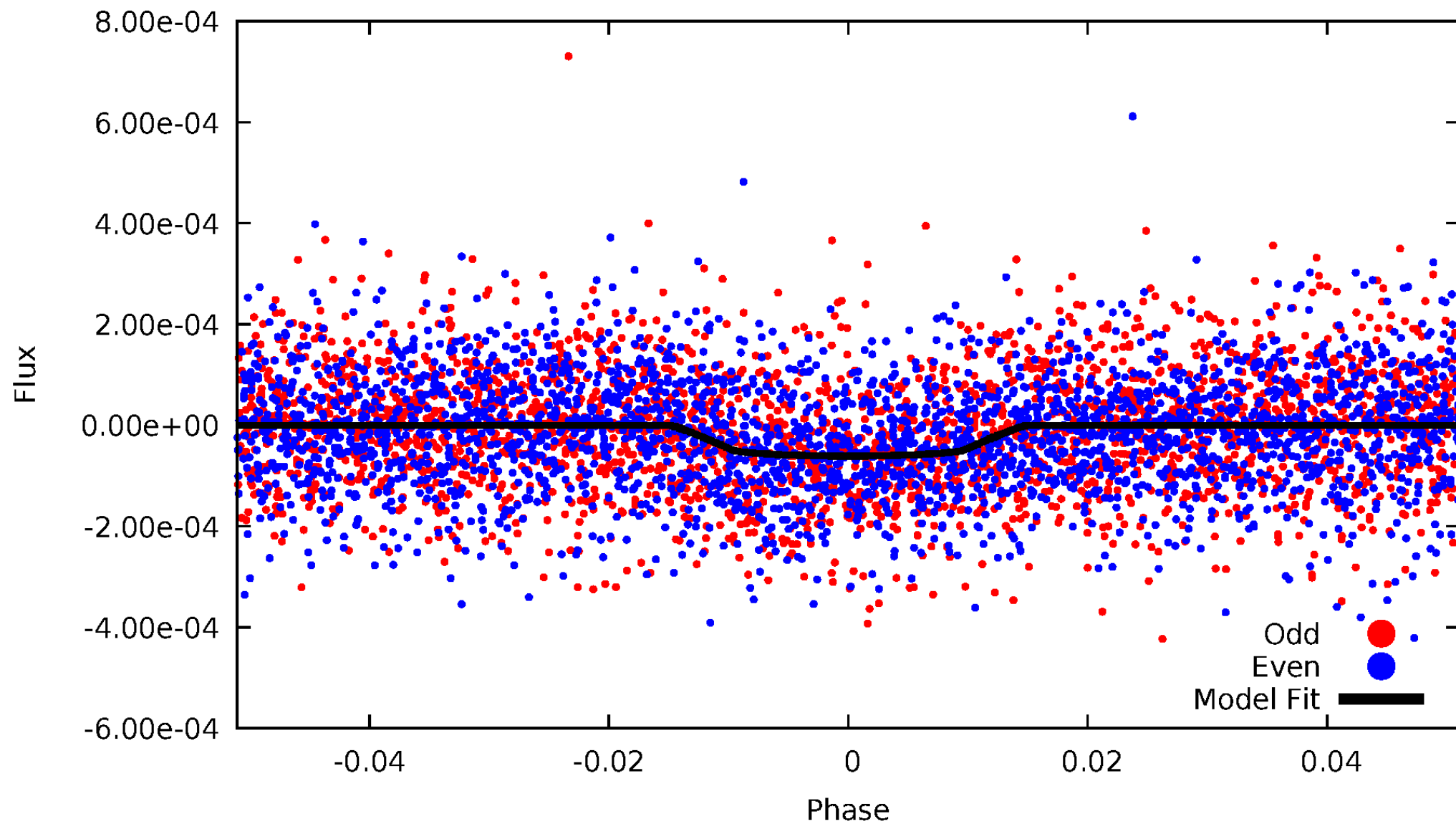


# TCE 003861595-02



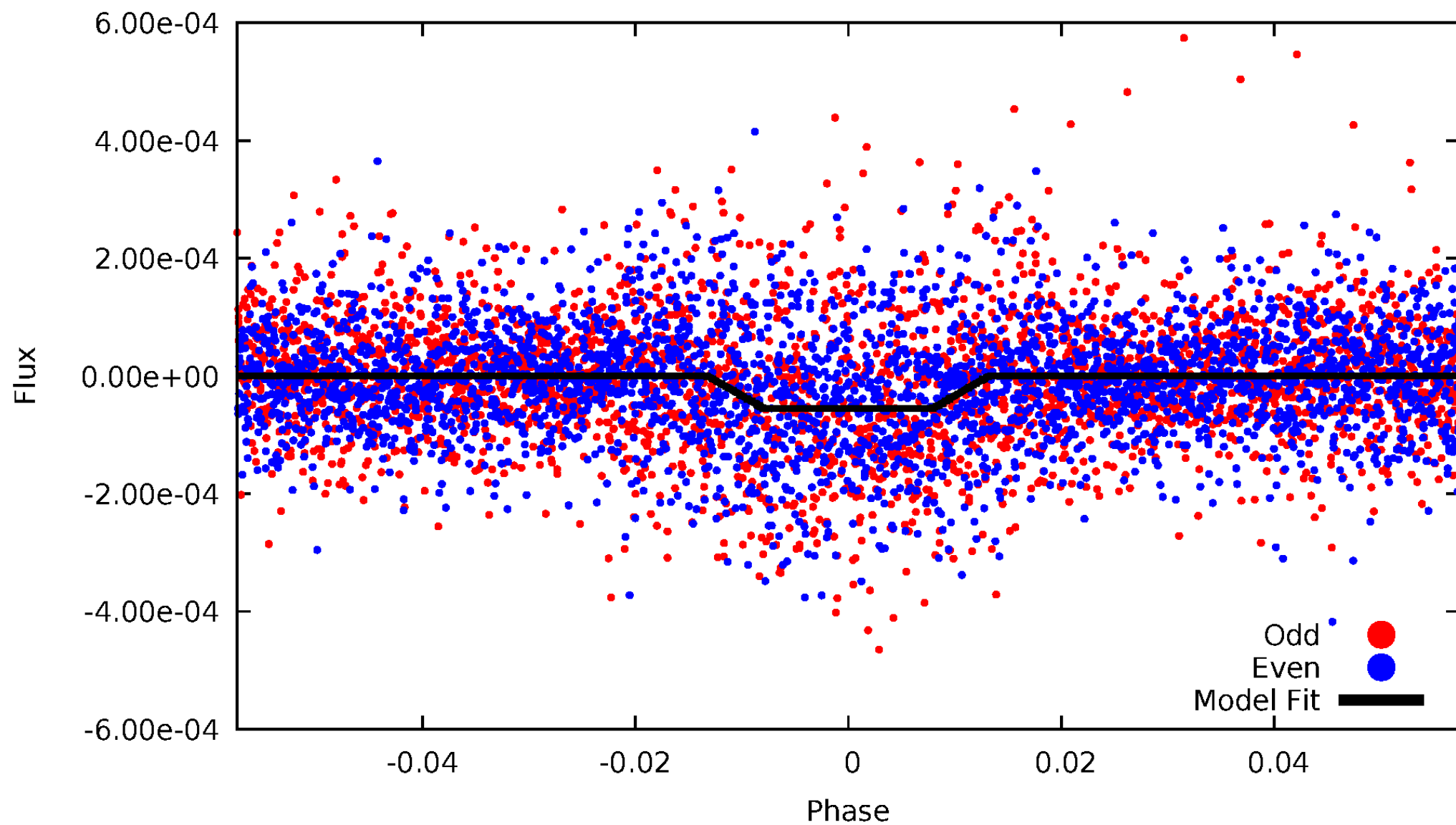
# DV Odd/Even

TCE 003861595-02



# ALT Odd/Even

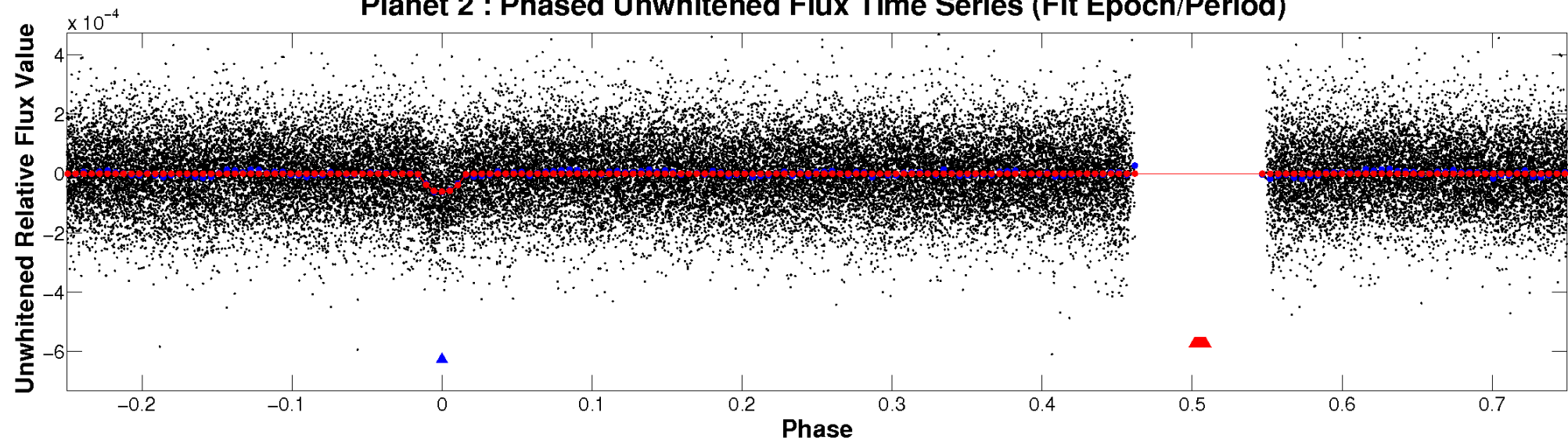
TCE 003861595-02



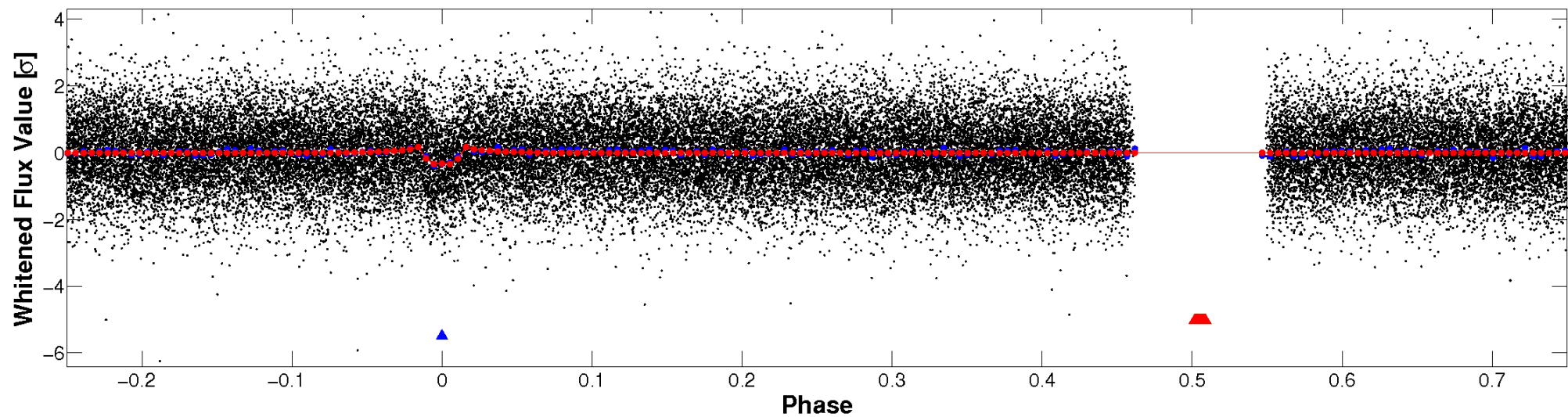


# Non-Whitened Vs. Whitened Light Curve

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

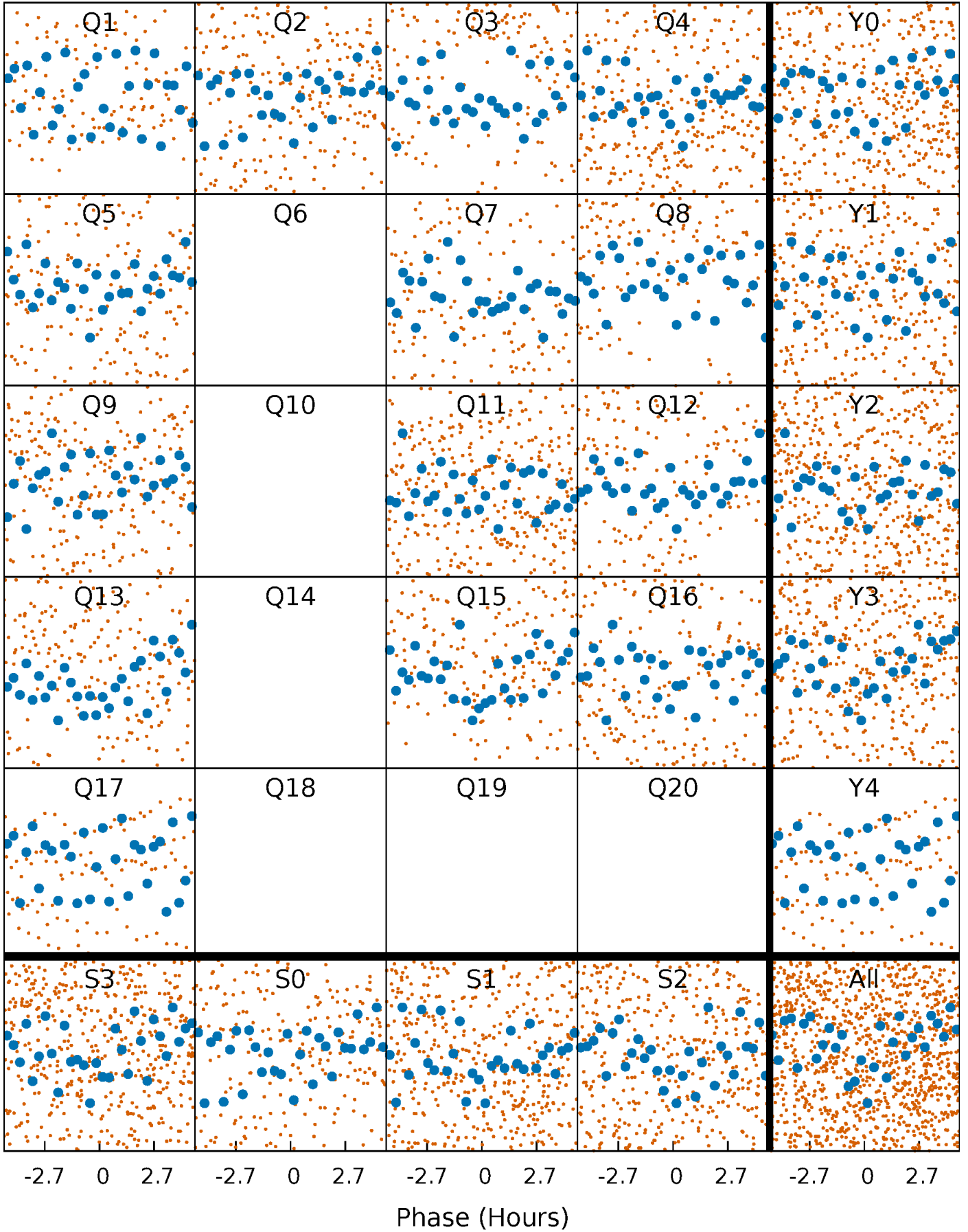


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



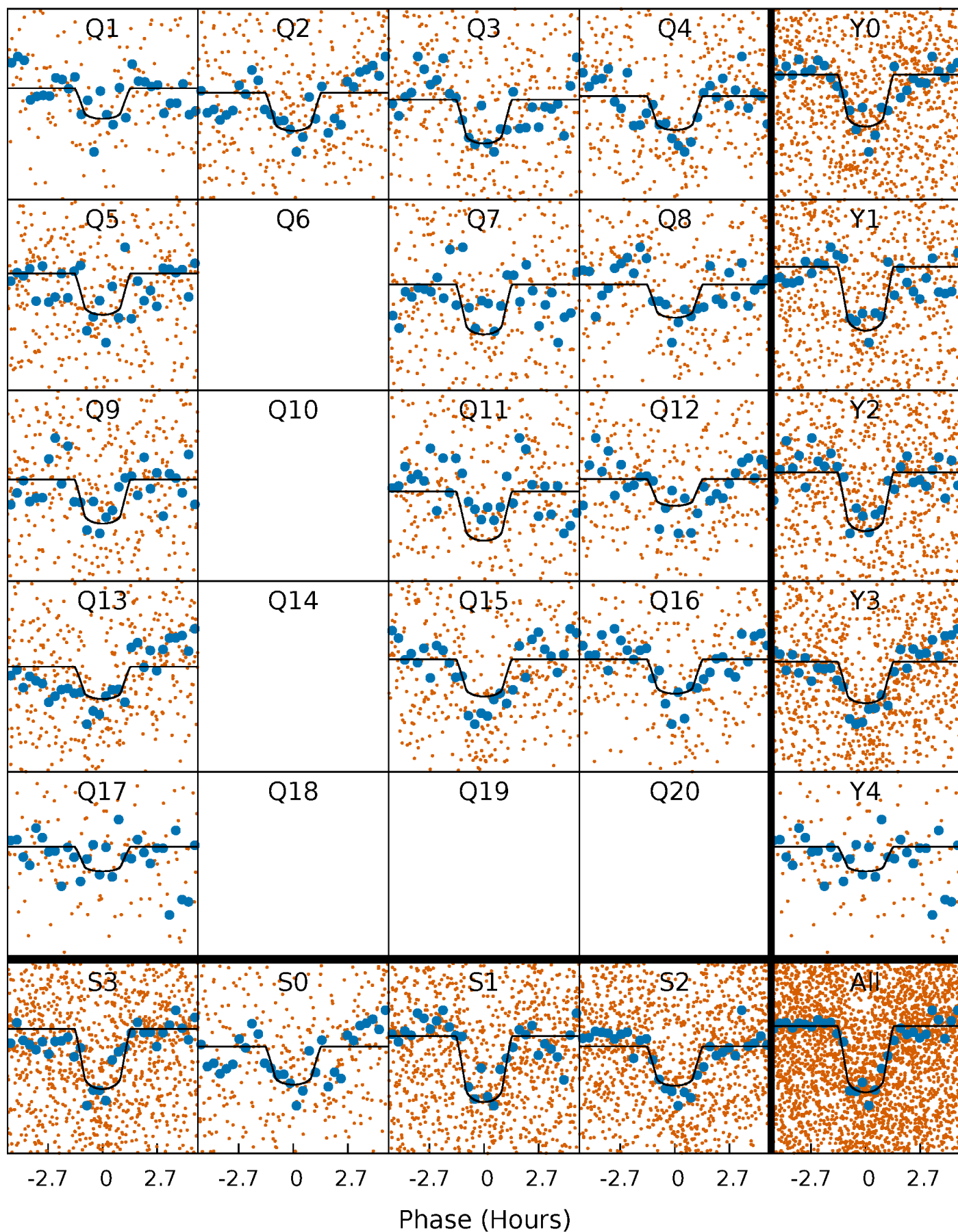
# PDC Quarter-Phased Transit Curves

TCE 003861595-02    P= 3.849300 Days     $T_0=132.499005$  (BKJD)



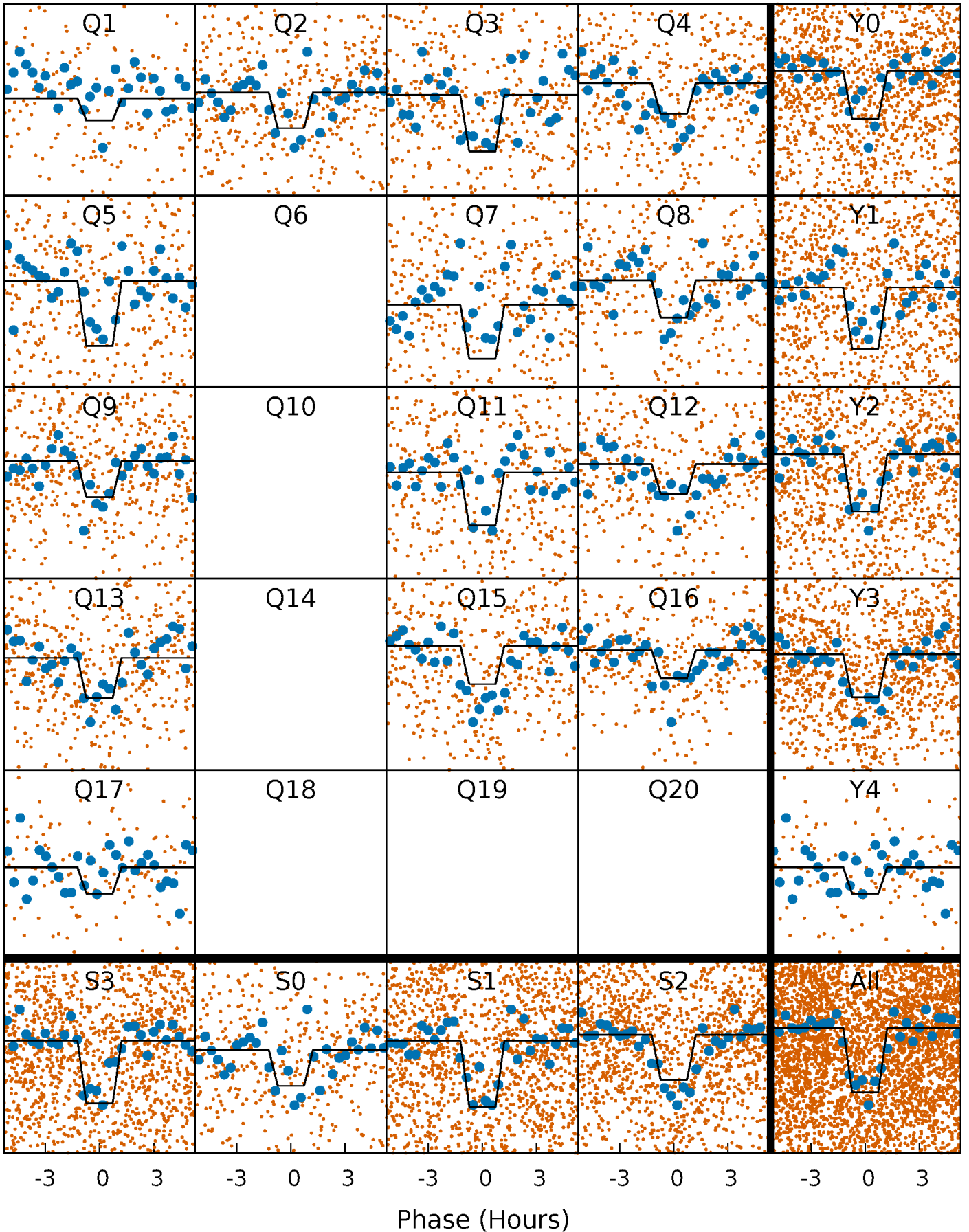
# DV Quarter-Phased Transit Curves

TCE 003861595-02   P= 3.849300 Days    $T_0=132.499005$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 003861595-02   P= 3.849305 Days    $T_0=132.497335$  (BKJD)

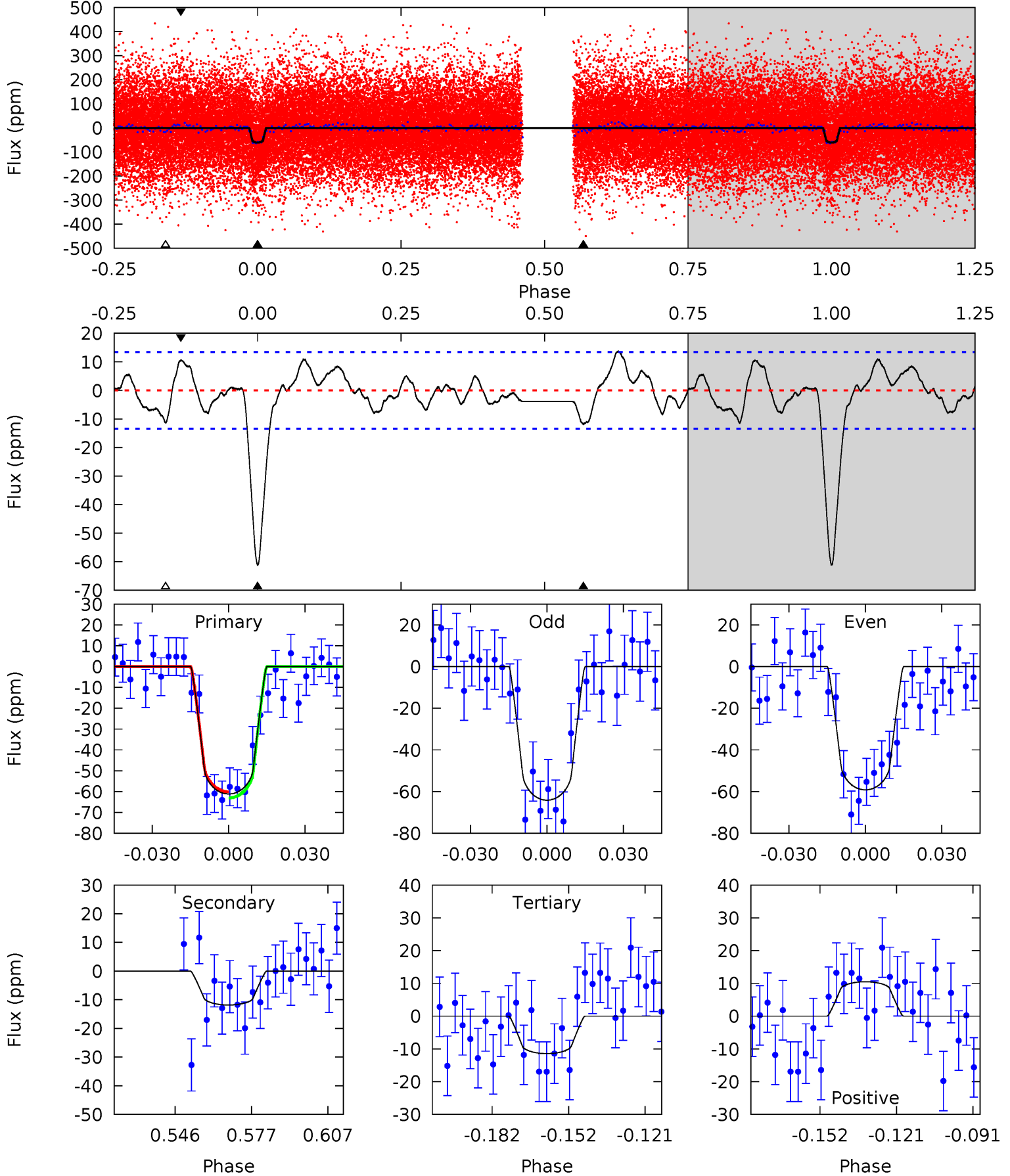




# DV Model-Shift Uniqueness Test

003861595-02, P = 3.849300 Days, E = 128.649705 Days

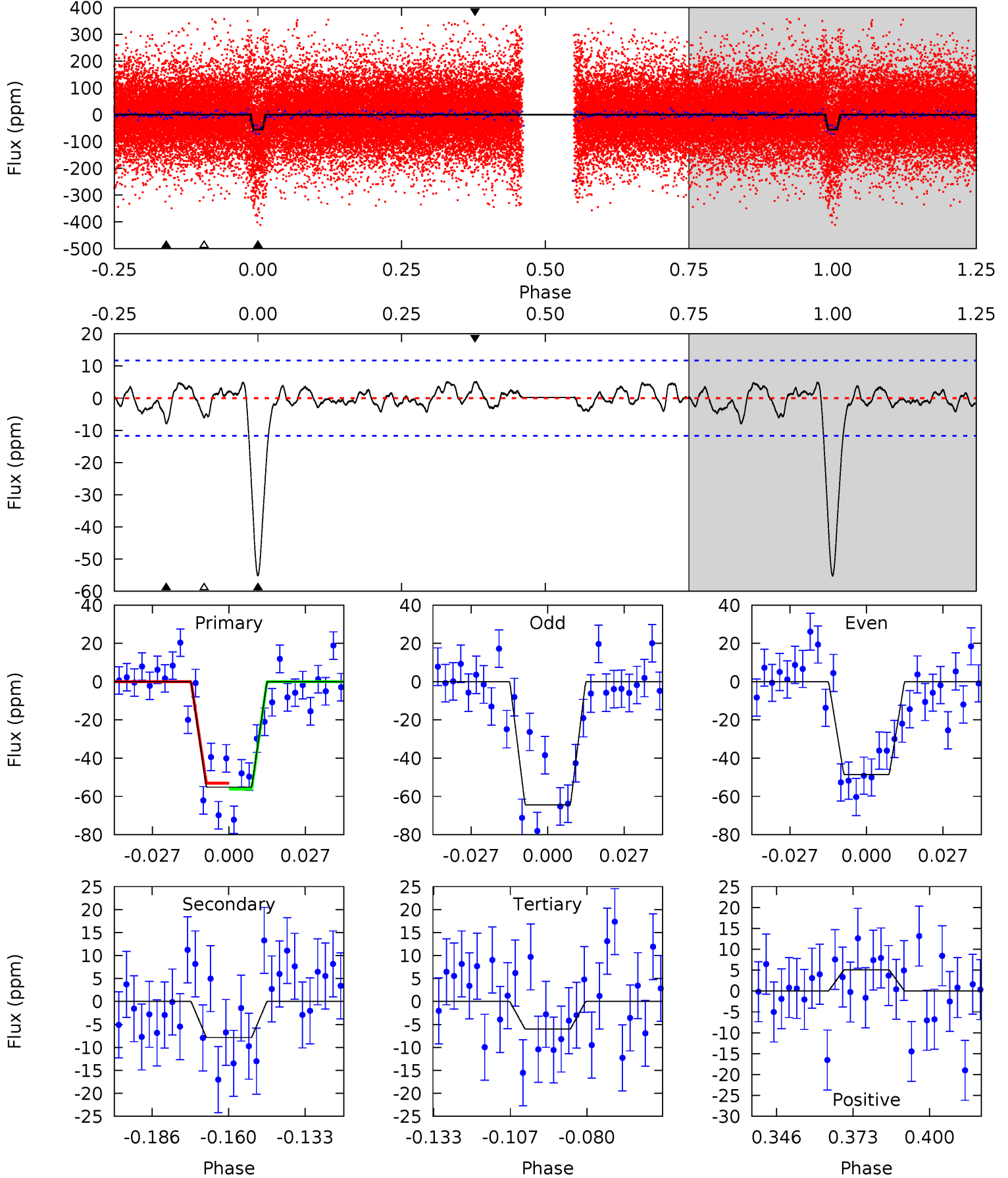
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
21.9	4.23	4.09	3.75	4.81	2.17	1.83	17.8	18.1	0.14	0.48	0.89	0.97	0.18	0.52



# Alt Model-Shift Uniqueness Test

003861595-02, P = 3.849305 Days, E = 128.648030 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
22.8	3.24	2.48	2.09	4.83	2.22	0.99	20.3	20.7	0.76	1.16	3.32	0.99	0.08	0.66





### Stellar Parameters For KIC 003861595

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6244^{+126}_{-114}$	$3.657^{+0.270}_{-0.090}$	$-0.160^{+0.200}_{-0.150}$	$2.992^{+0.416}_{-0.971}$	$1.482^{+0.131}_{-0.261}$	$0.078^{+0.135}_{-0.022}$
	+2%/-2%	+7%/-2%	+125%/-94%	+14%/-32%	+9%/-18%	+173%/-28%
Source	SPE3	SPE3	SPE3	DSEP		

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

### Secondary Eclipse Parameters for KIC 003861595-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-12 \pm 3$	$2.61^{+0.97}_{-0.82}$	$2814^{+137}_{-234}$	$4133^{+730}_{-485}$	$2.768^{+3.652}_{-1.339}$
Alt.	$-8 \pm 2$	$2.27^{+0.96}_{-0.83}$	$2817^{+147}_{-215}$	$4020^{+808}_{-568}$	$2.436^{+3.713}_{-1.325}$

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

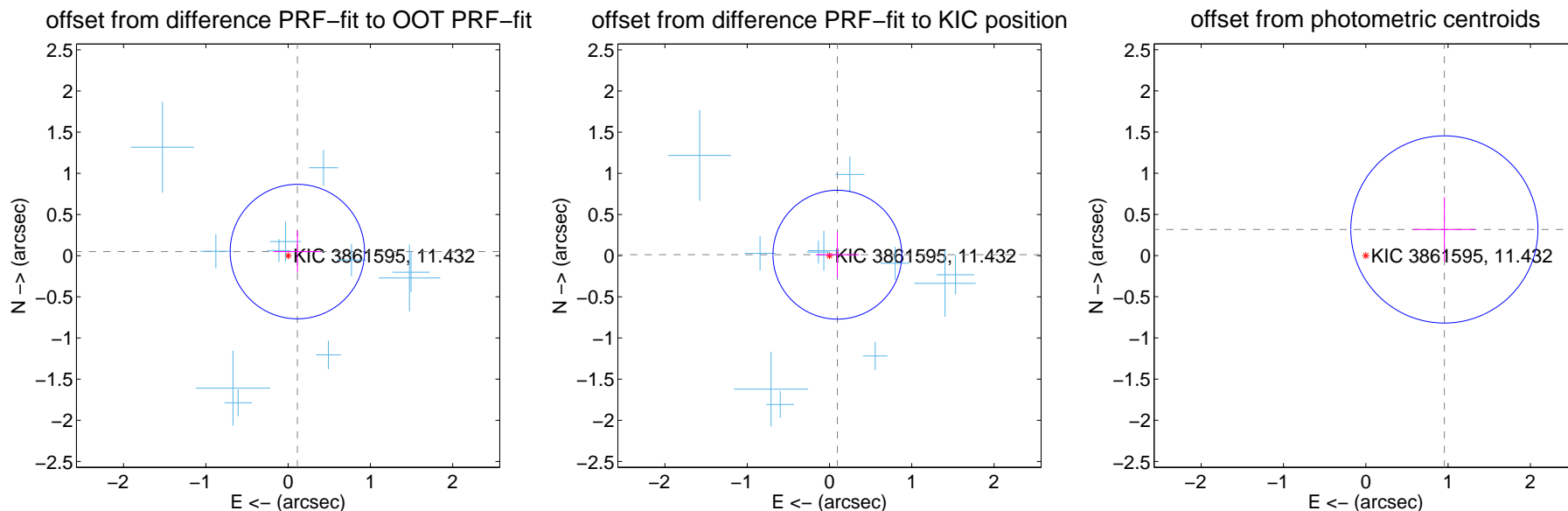
## DV Centroid Data

Supplemental centroid analysis for 003861595-02. **Kepler magnitude: 11.43.** Transit SNR 11.73

There are 11 quarters with good PRF difference image offsets

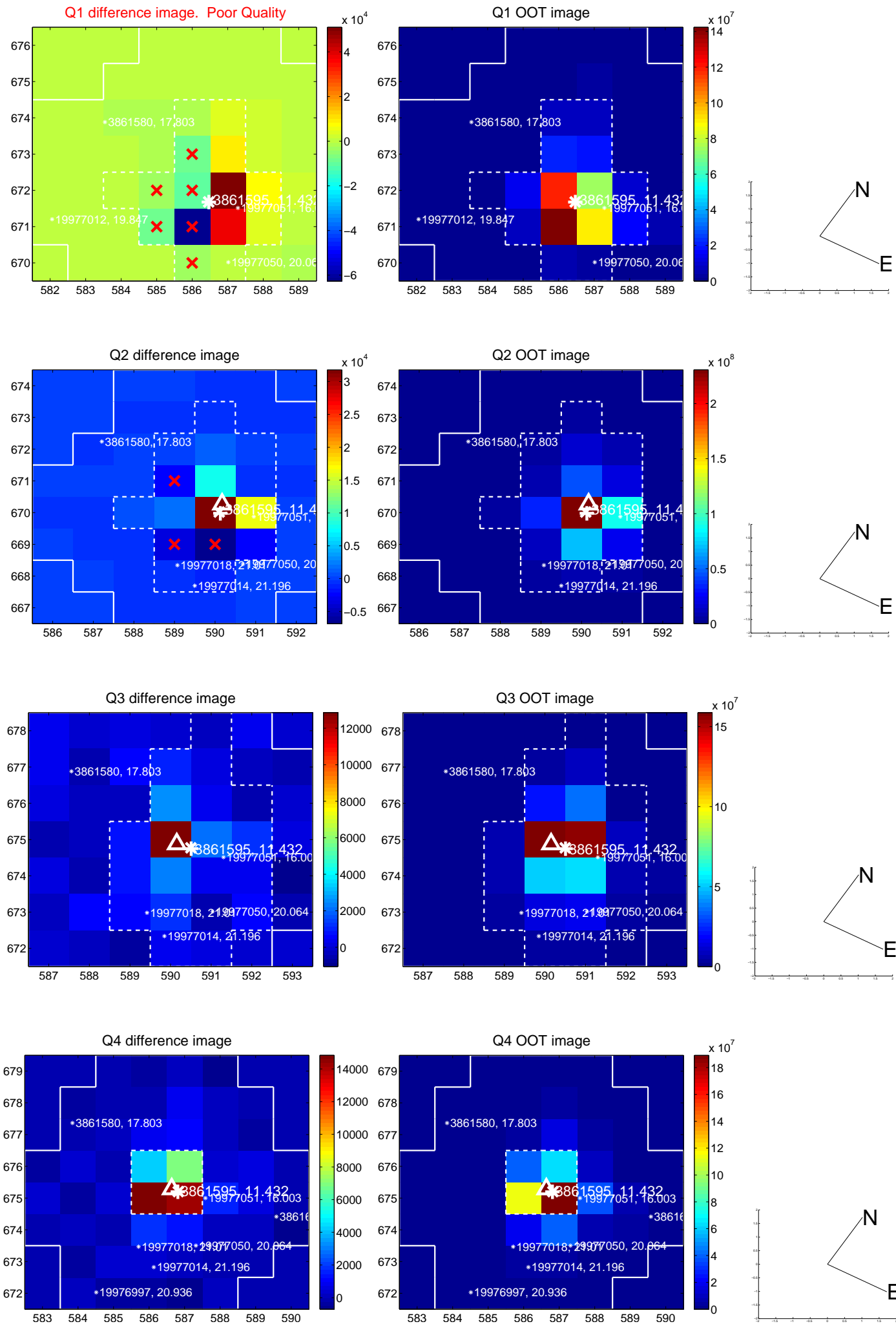
The direct PRF centroid is offset from the target star catalog position by about 0.04 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.122 \pm 0.272$	0.45	$-0.112 \pm 0.290$	$0.049 \pm 0.252$
PRF-fit source offset from KIC position	$0.097 \pm 0.261$	0.37	$-0.096 \pm 0.263$	$0.012 \pm 0.275$
photometric centroid source offset	$1.01 \pm 0.38$	2.66	$-0.95 \pm 0.38$	$0.32 \pm 0.39$

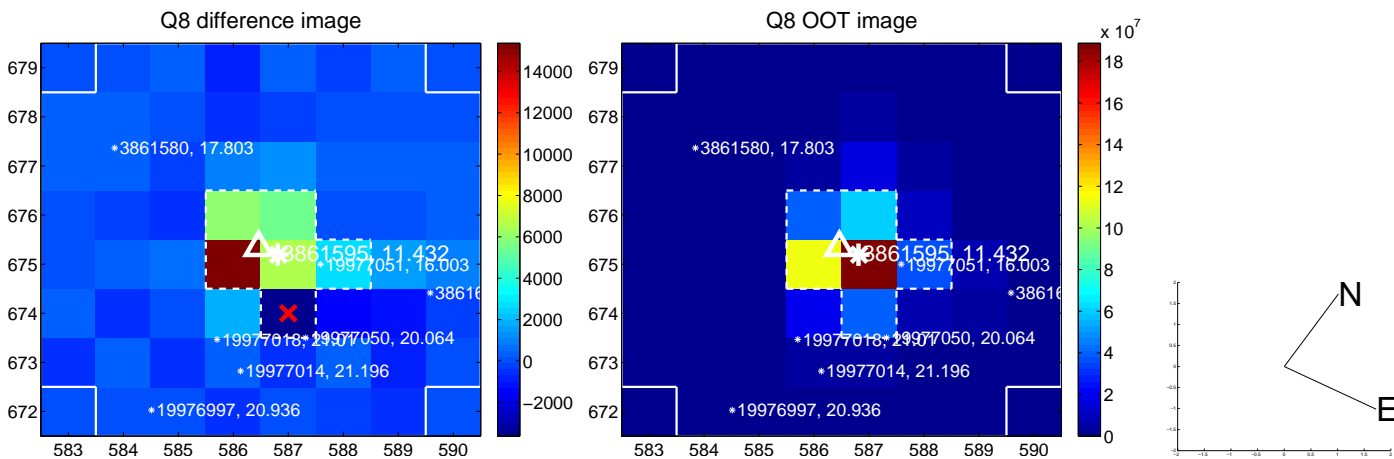
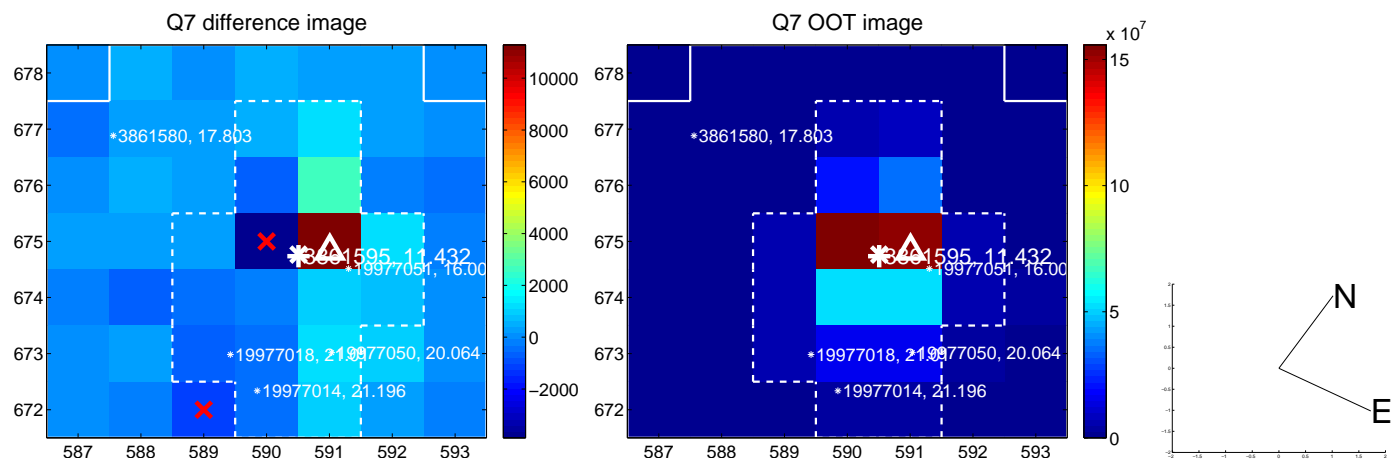
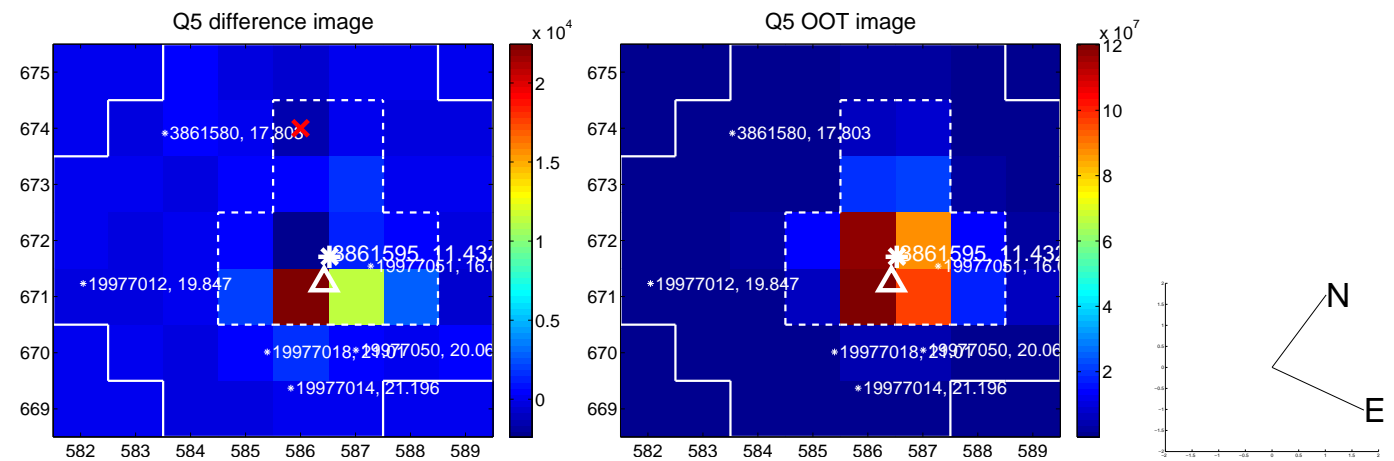


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

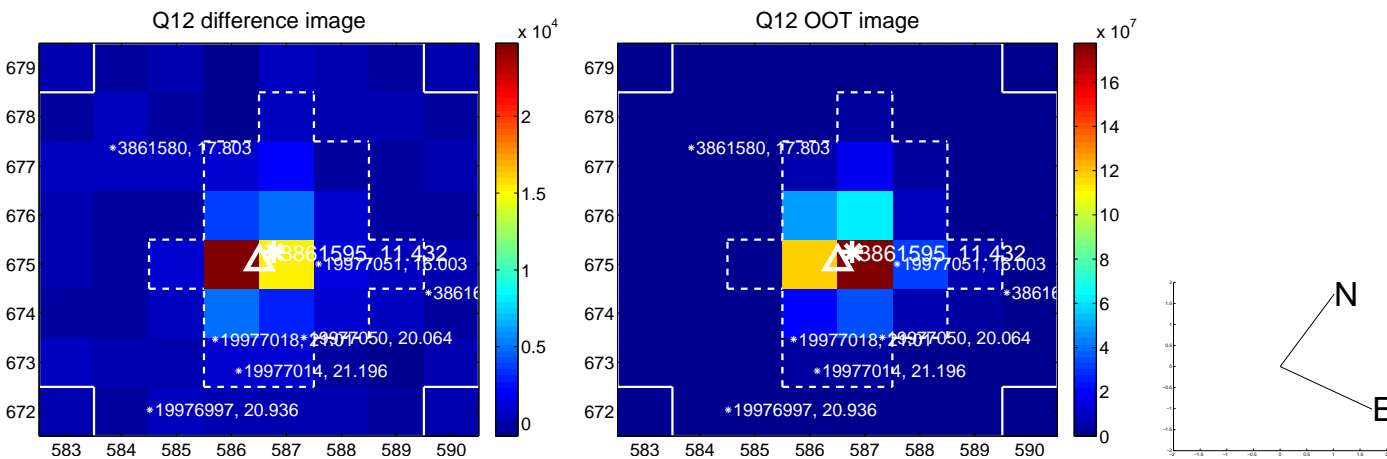
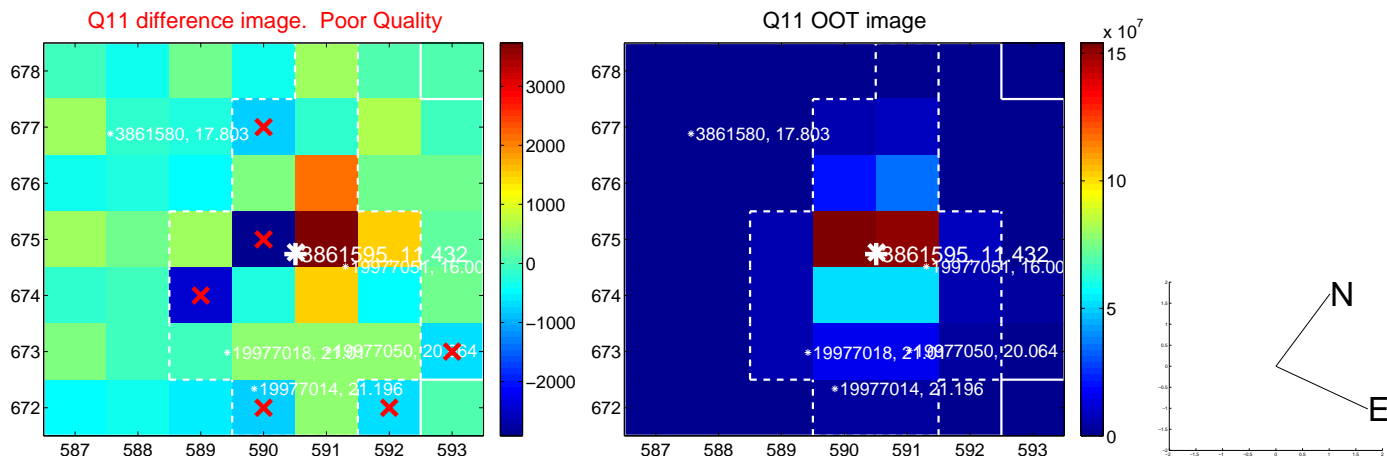
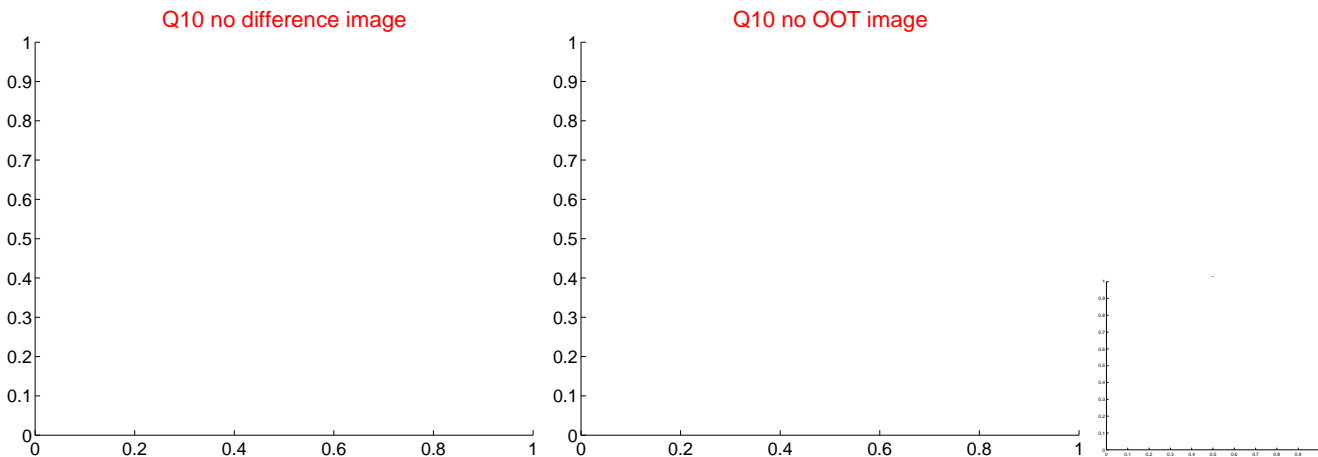
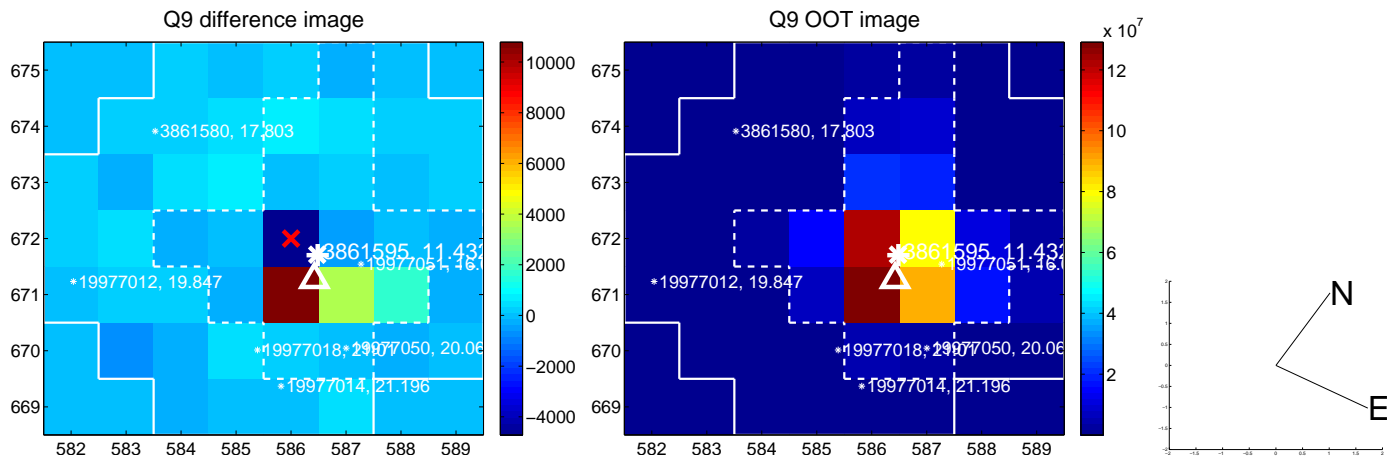
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



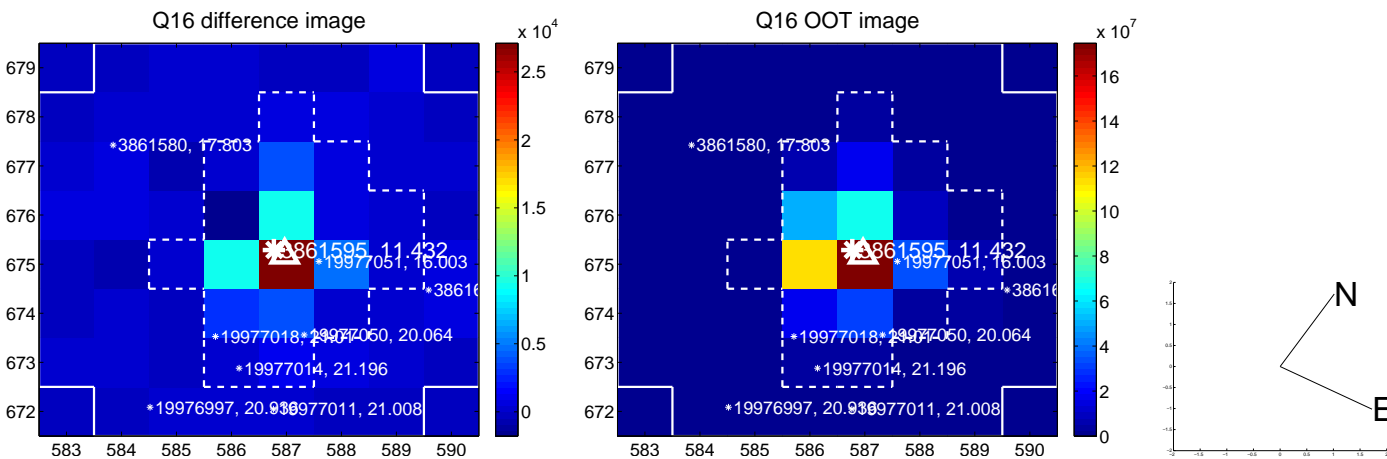
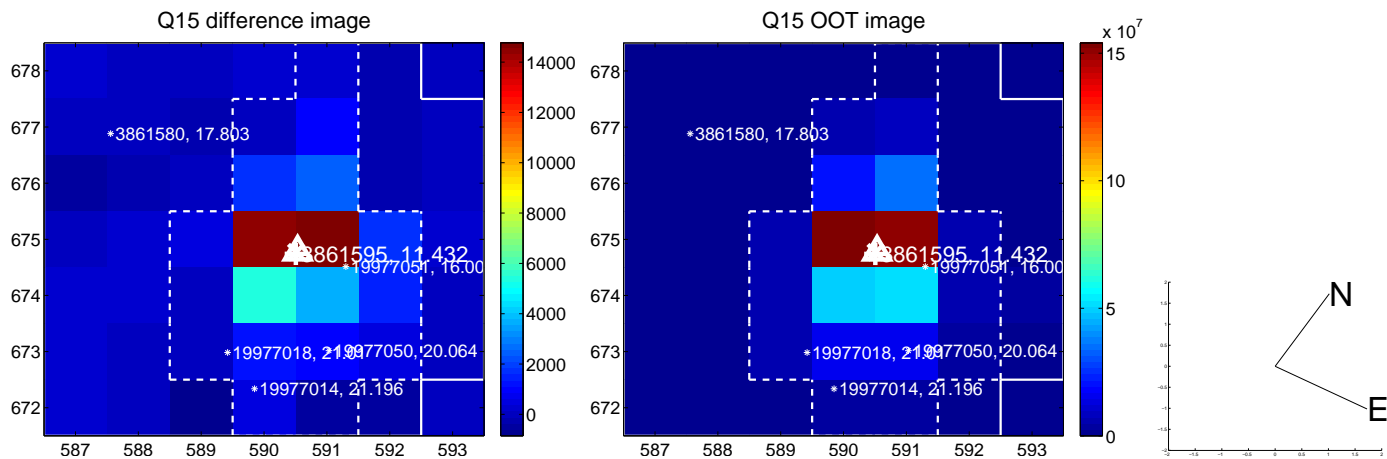
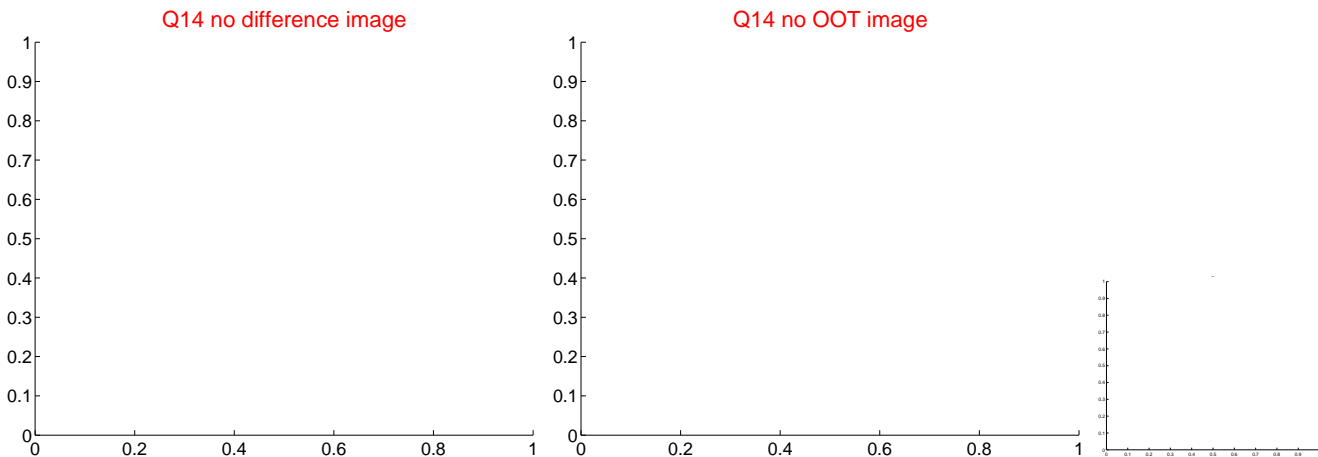
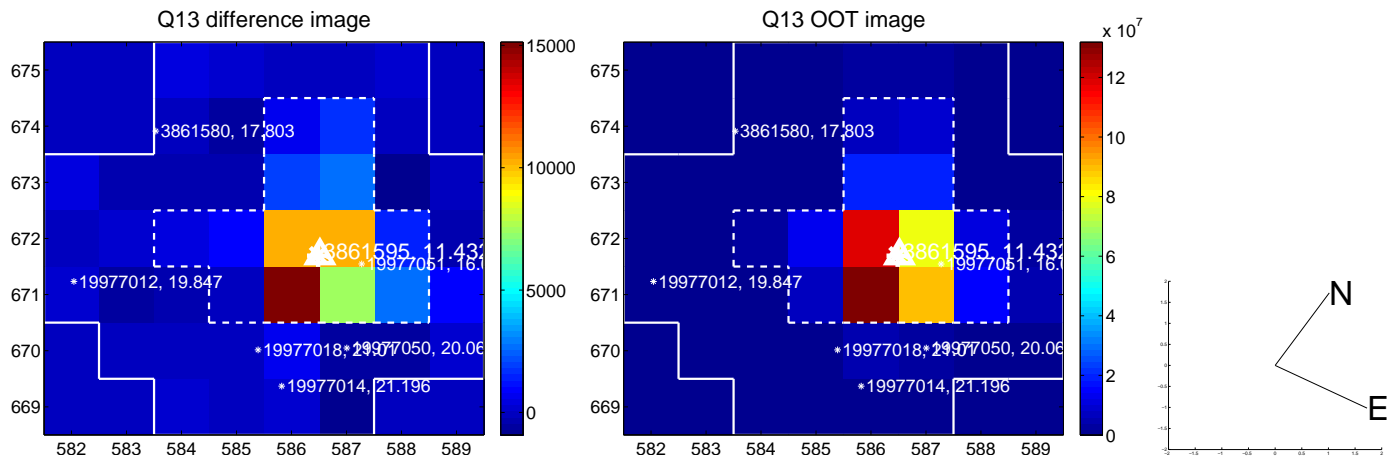
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



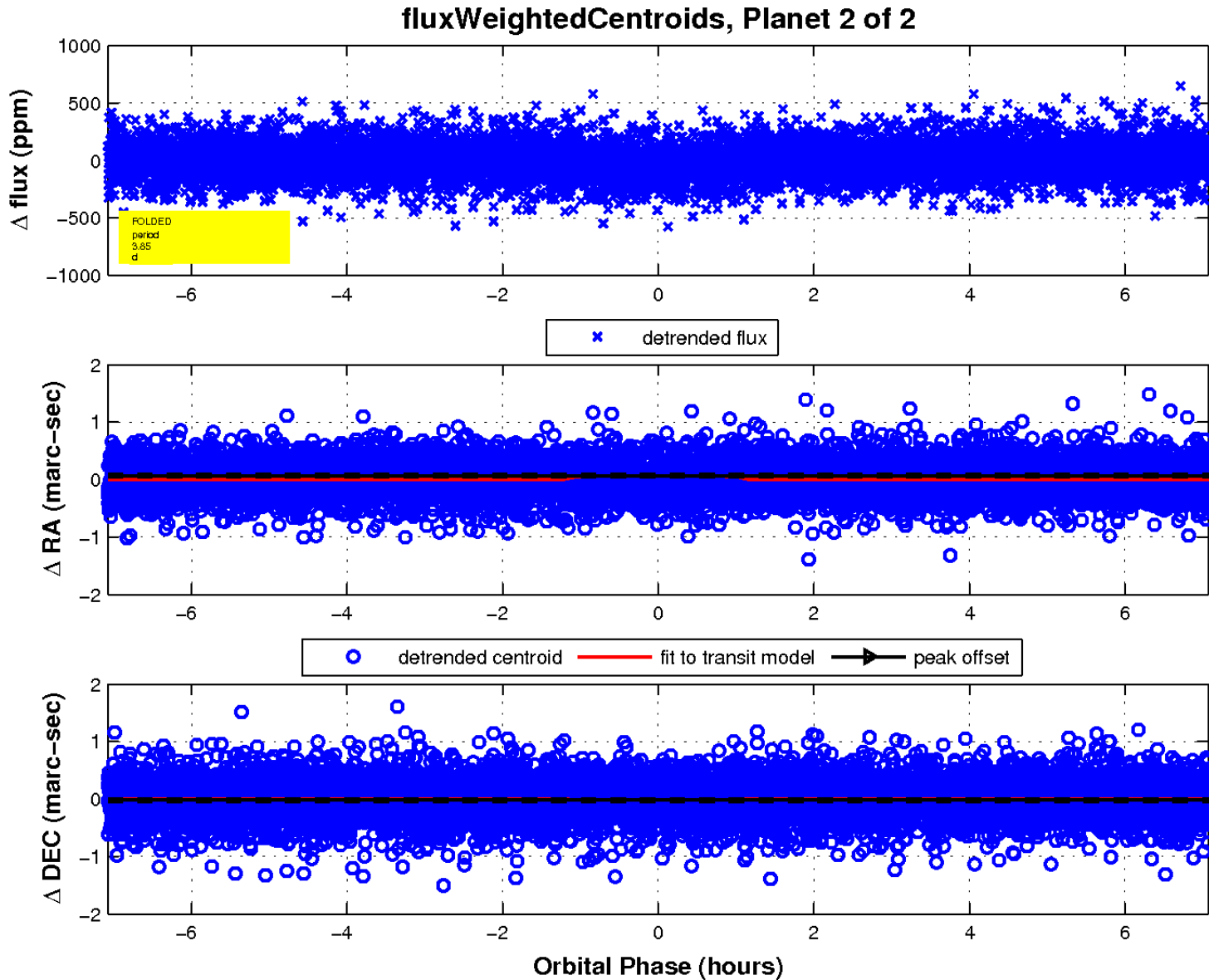
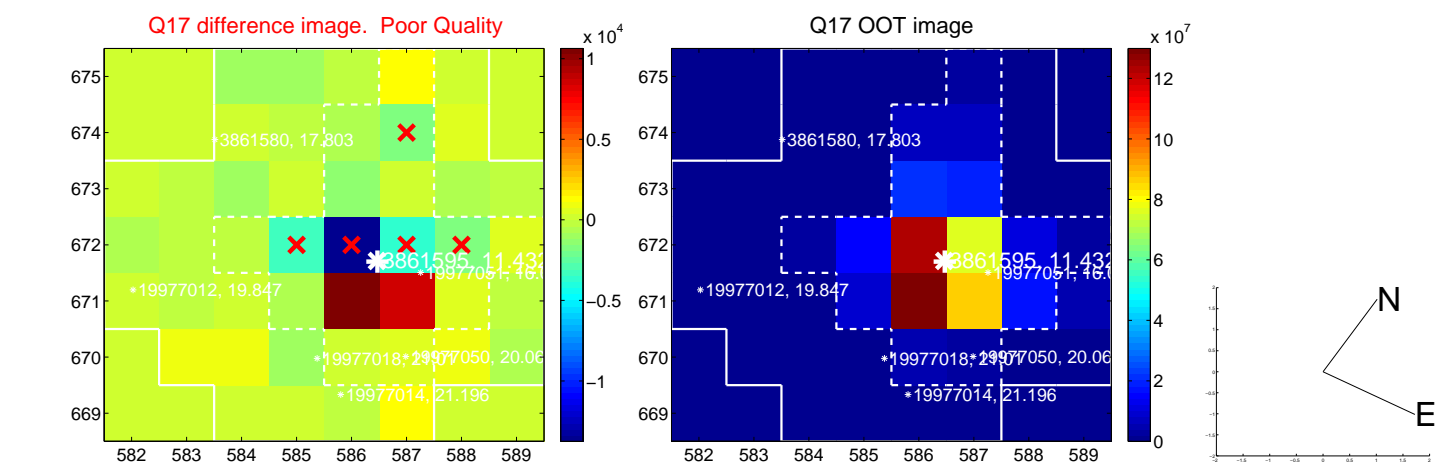
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

