

# KIC 006200709

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006200709-01	OBS	3694.01	3.723551	134.946652	39764.2	3.559	587.5	570.9	0.89	6063	18.79	453.55
006200709-02	OBS	No	3.723535	133.089398	1207.4	3.631	18.2	18.8	0.89	6063	3.77	453.56

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006200709-01	OBS	FP	0.02	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—CENT_KIC_POS
006200709-02	OBS	FP	0.00	1	1	1	0	IS_SEC_TCE—CENT_KIC_POS—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.

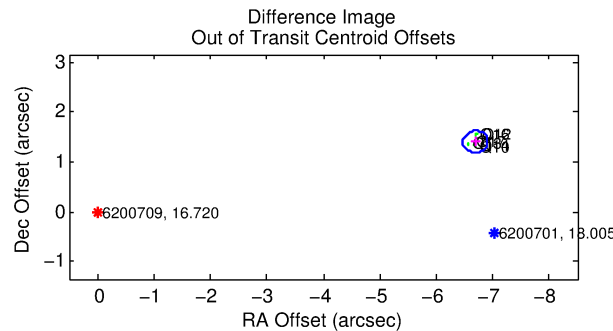
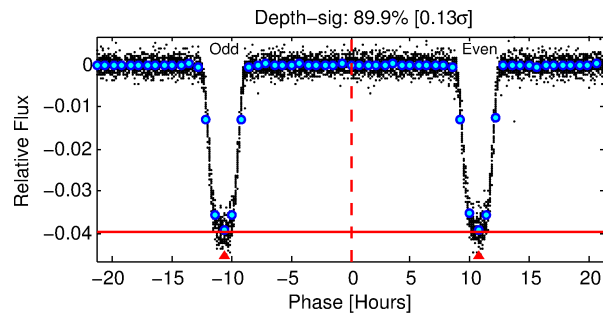
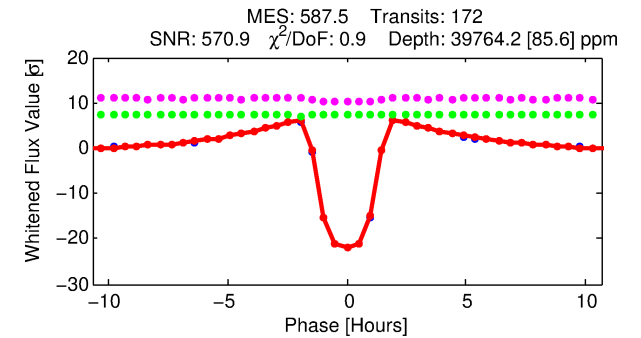
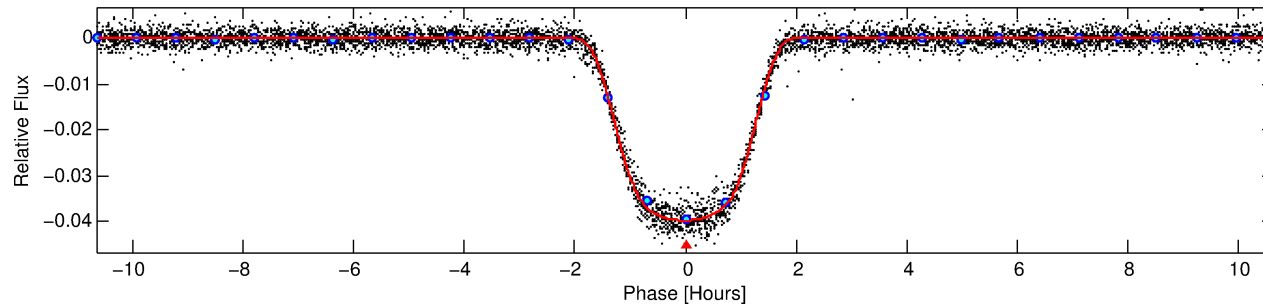
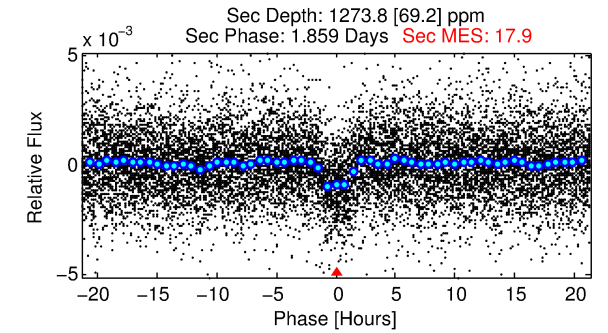
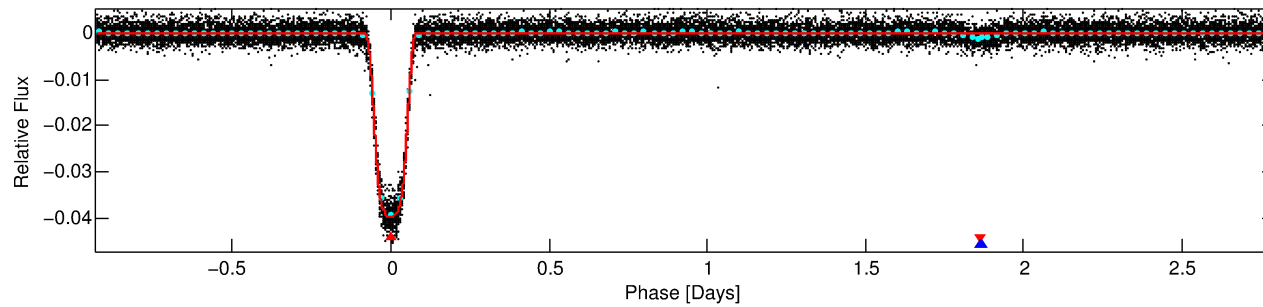
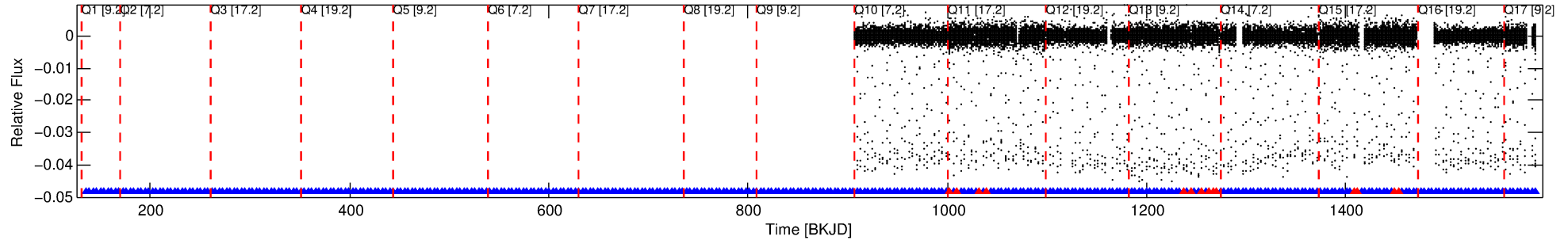
## Ephemeris Match Information For 006200709-01

No Significant Match Found

# DV One-Page Summary

KIC: 6200709 Candidate: 1 of 2 Period: 3.724 d  
KOI: K03694.01 Corr: 0.994

Kp: 16.72 R\*: 0.89 Rs Teff: 6063.0 K Logg: 4.51 Fe/H: -0.420



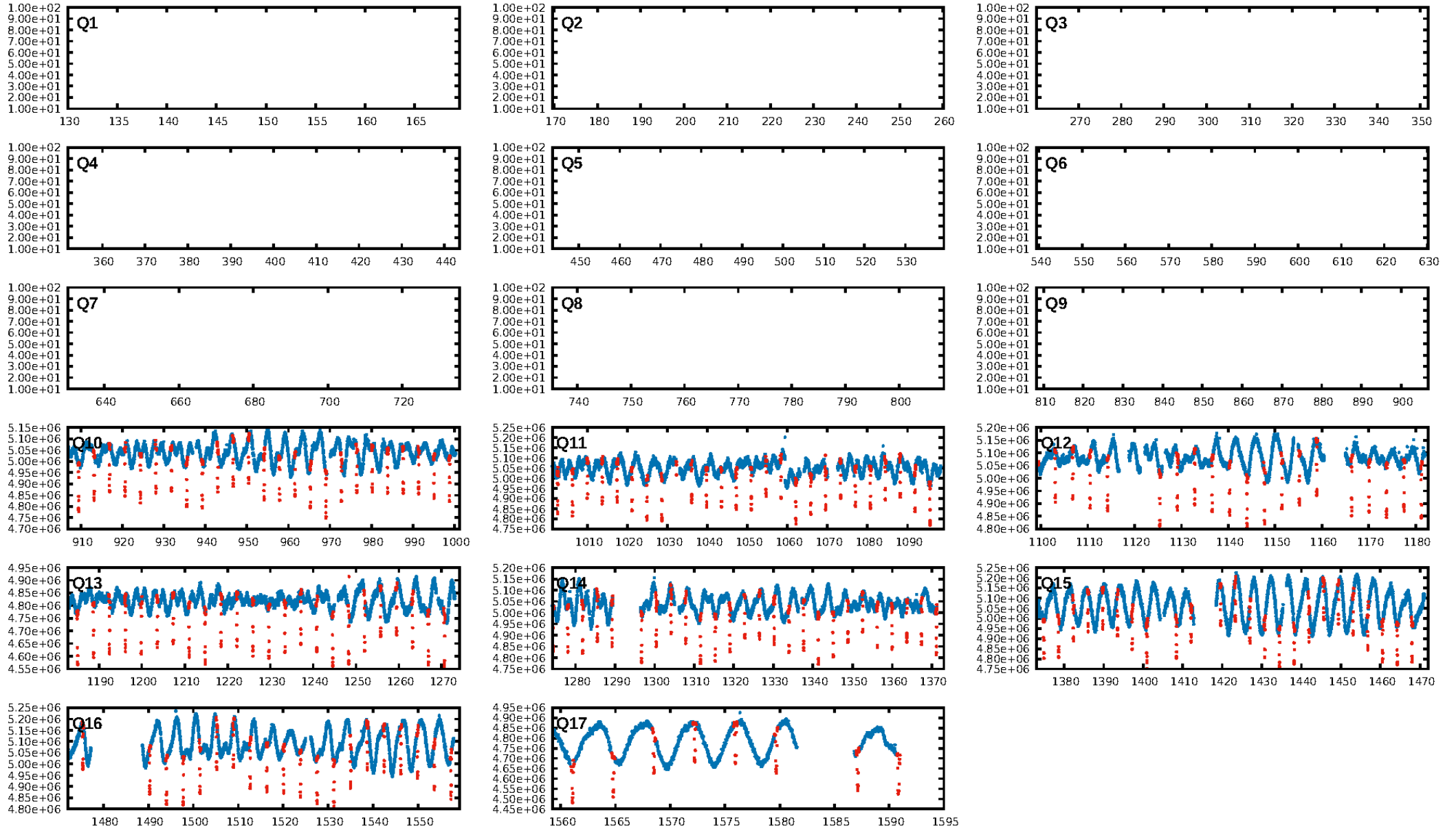
## DV Fit Results:

Period = 3.72355 [0.00000] d  
Epoch = 134.9467 [0.0001] BKJD  
Rp/R\* = 0.1935 [0.0003]  
a/R\* = 8.13 [0.05]  
b = 0.63 [0.01]  
Seff = 453.55 [181.04]  
Teff = 1177 [117] K  
Rp = 18.79 [5.47] Re  
a = 0.0460 [0.0116] AU  
Ag = 4.19 [1.58] [2.02σ]  
Teffp = 2604 [98] K [9.33σ]

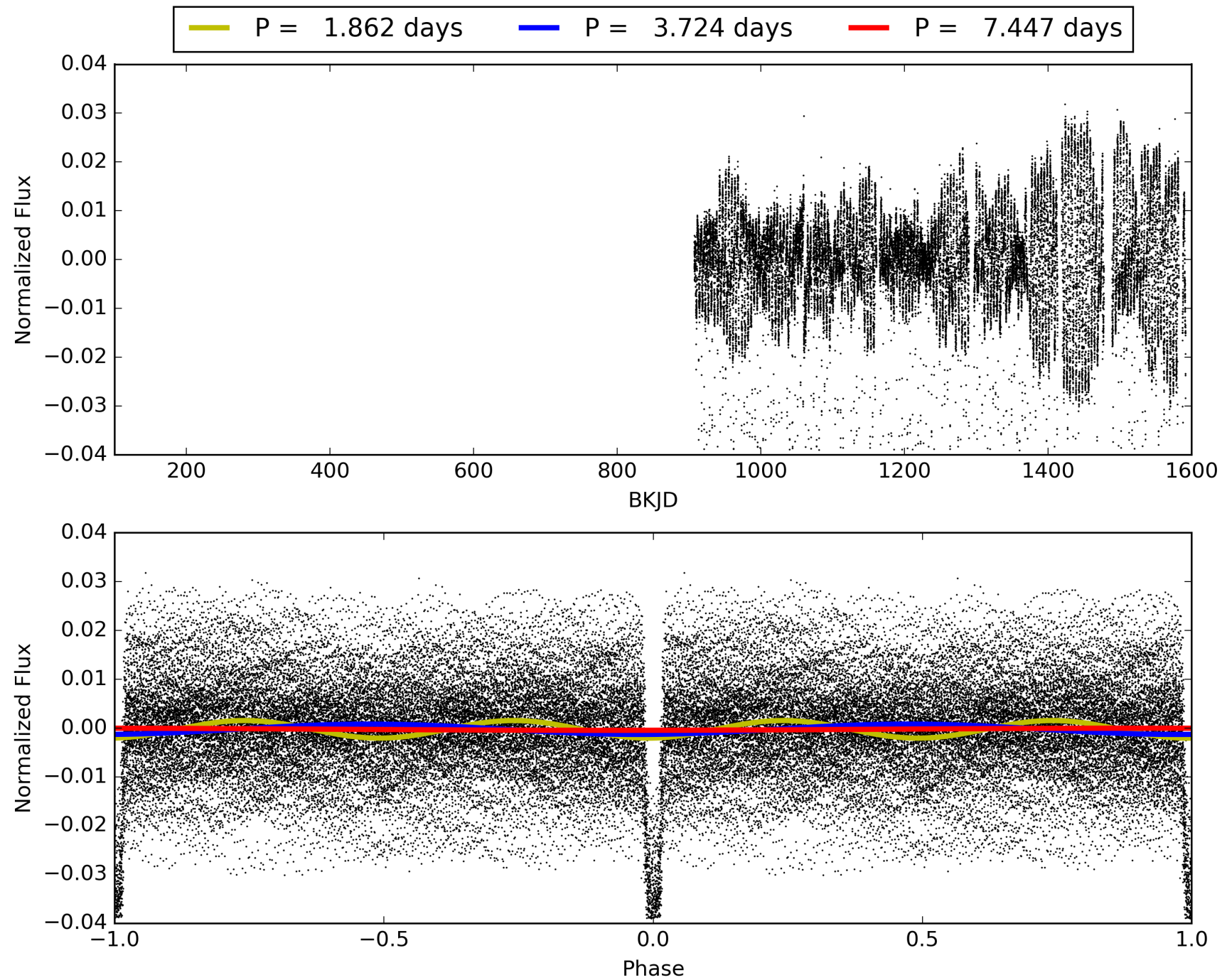
## DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 0.91 [150/164]  
GhostDiagnostic-chr: 2.312  
Centroid-sig: 0.0%  
Centroid-so: 3.445 arcsec [425.94σ]  
OotOffset-rm: 6.837 arcsec [94.24σ]  
KicOffset-rm: 0.131 arcsec [1.93σ]  
OotOffset-st: 2/0/2/2 [6]  
KicOffset-st: 2/2/2/2 [8]  
DiffImageQuality-fgm: 1.00 [8/8]  
DiffImageOverlap-fno: 1.00 [8/8]

# TCE 006200709-01, PDC Light Curves

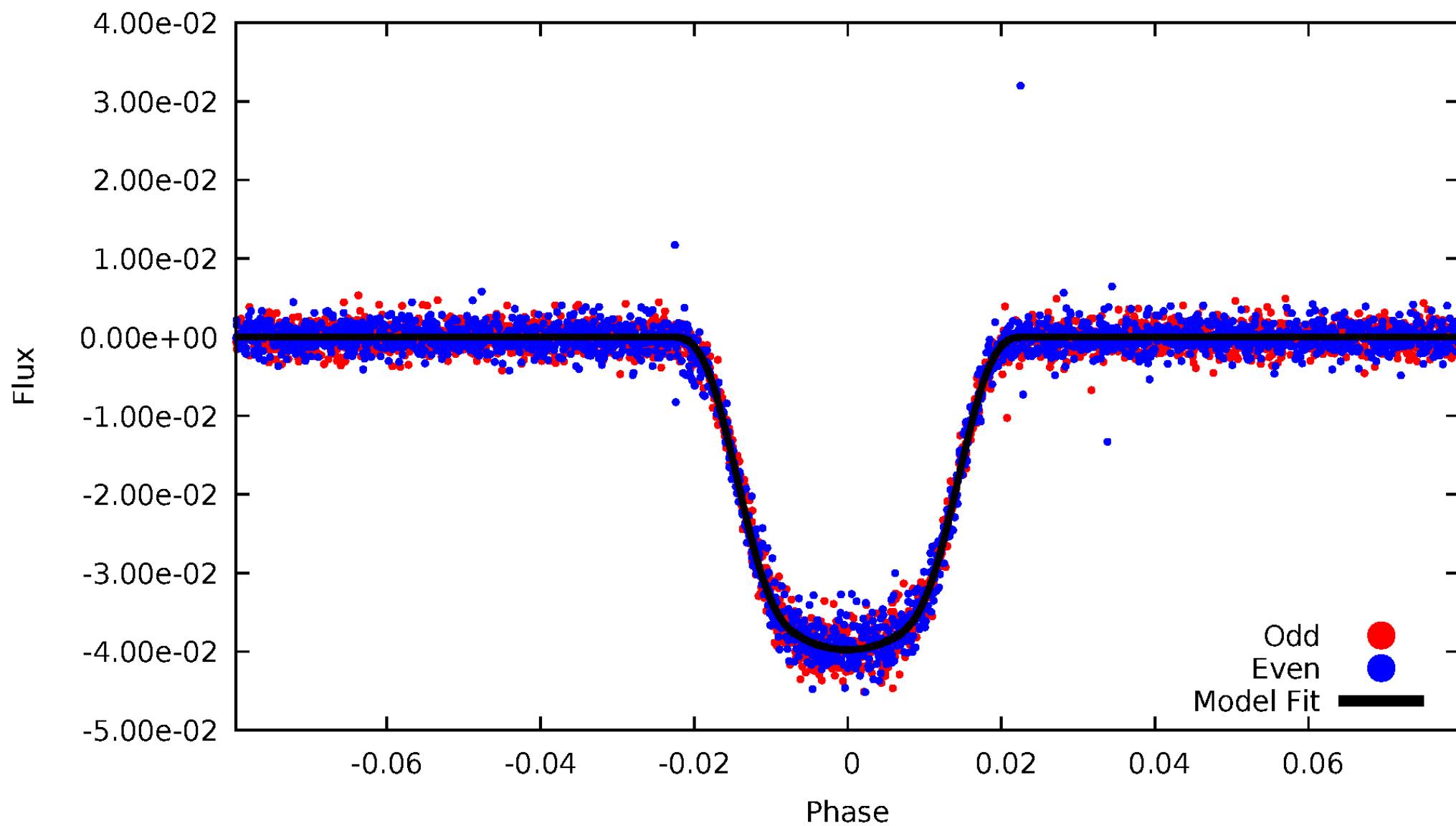


TCE 006200709-01



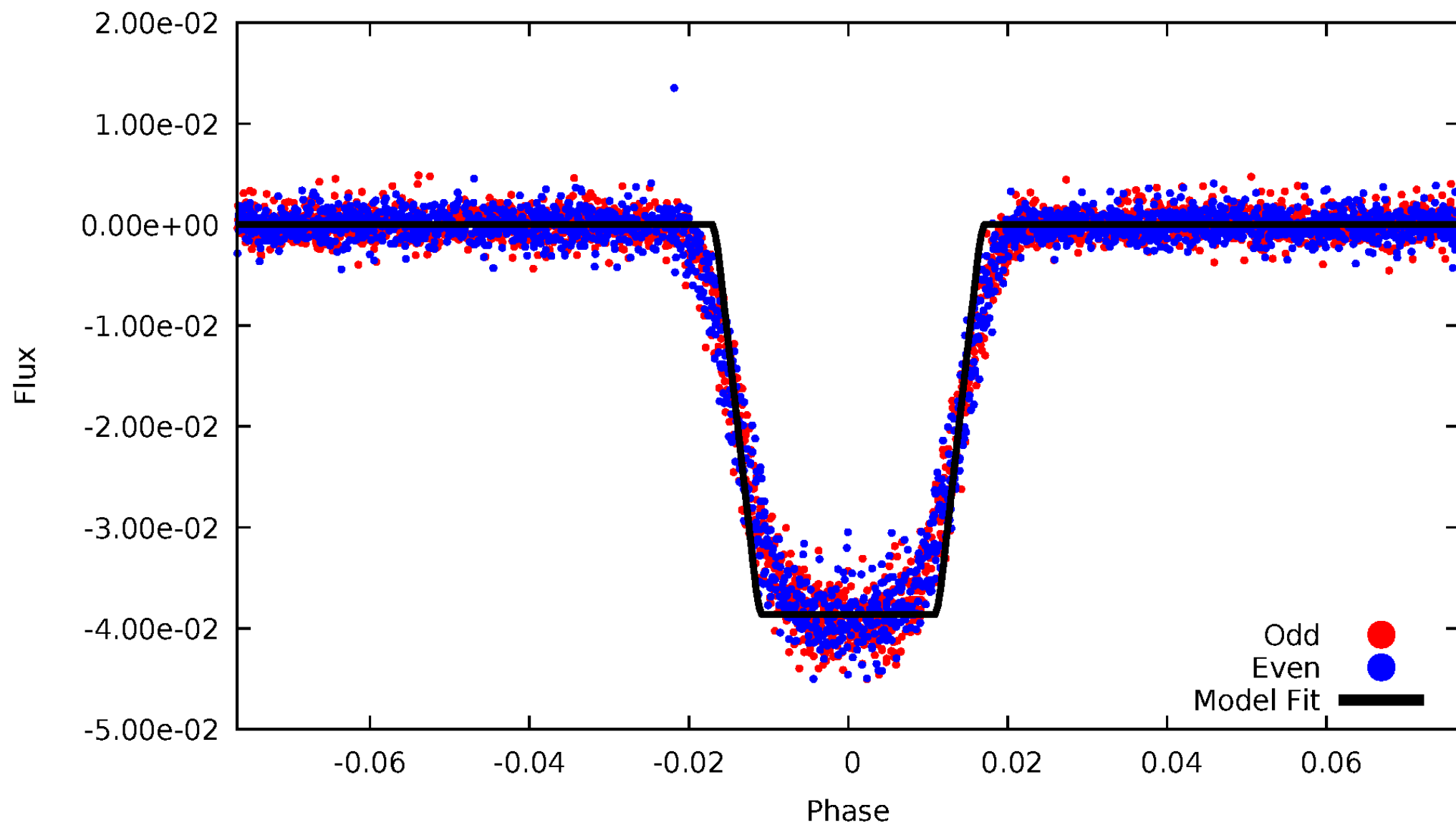
# DV Odd/Even

TCE 006200709-01



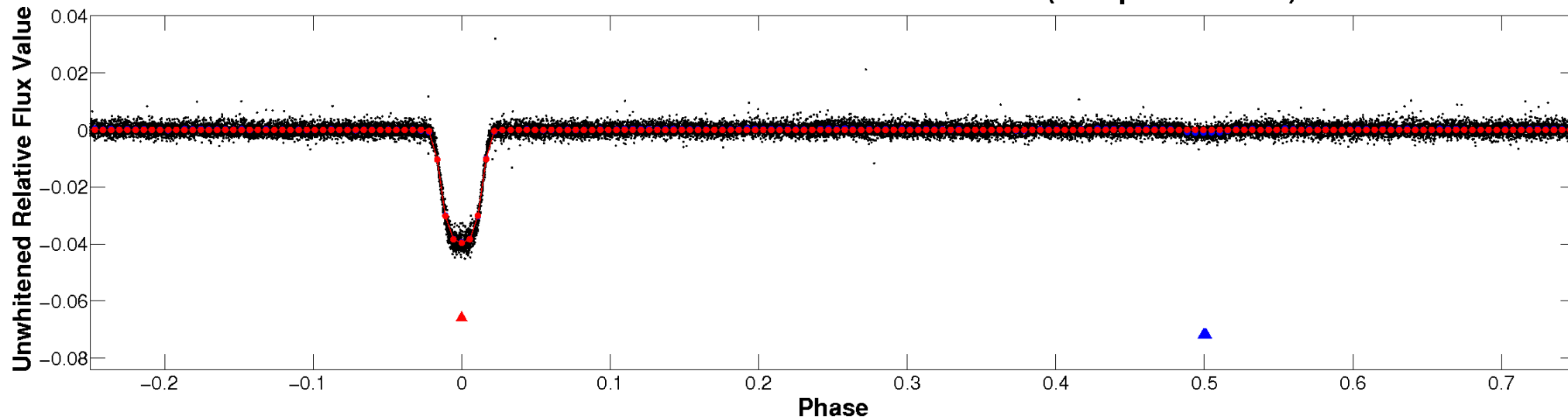
# ALT Odd/Even

TCE 006200709-01

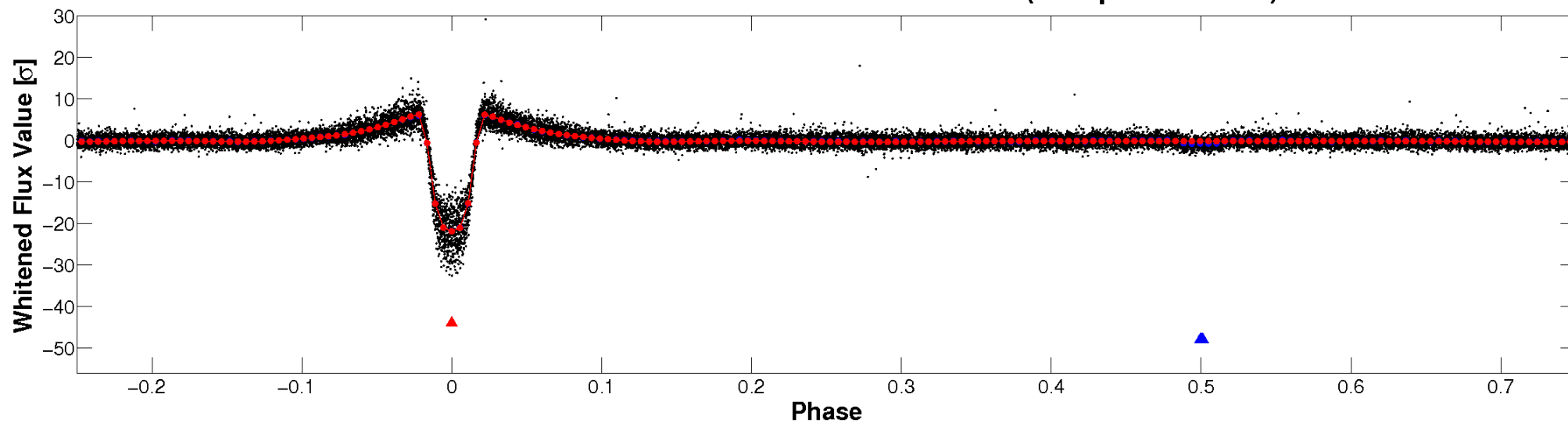


# Non-Whitened Vs. Whitened Light Curve

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

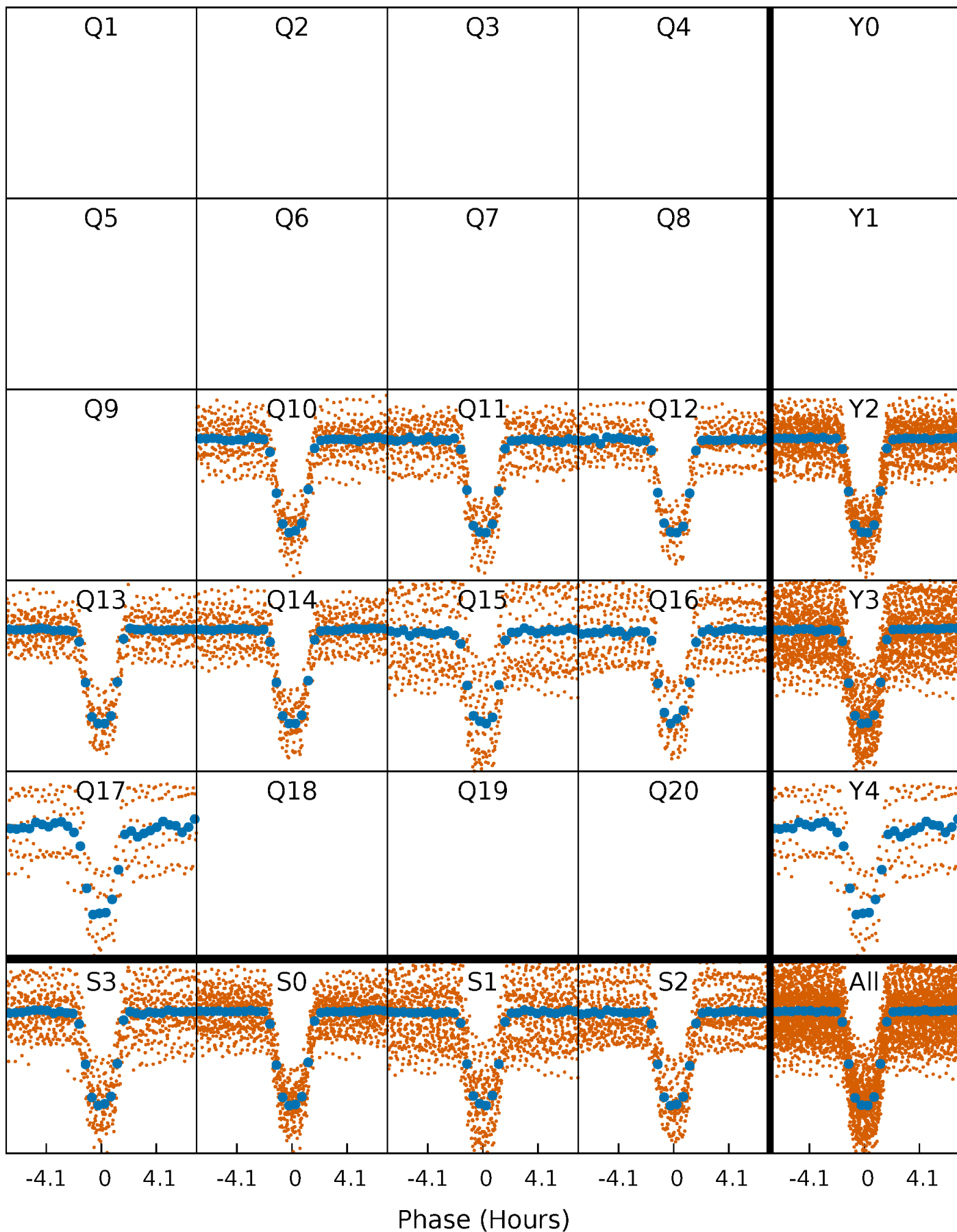


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



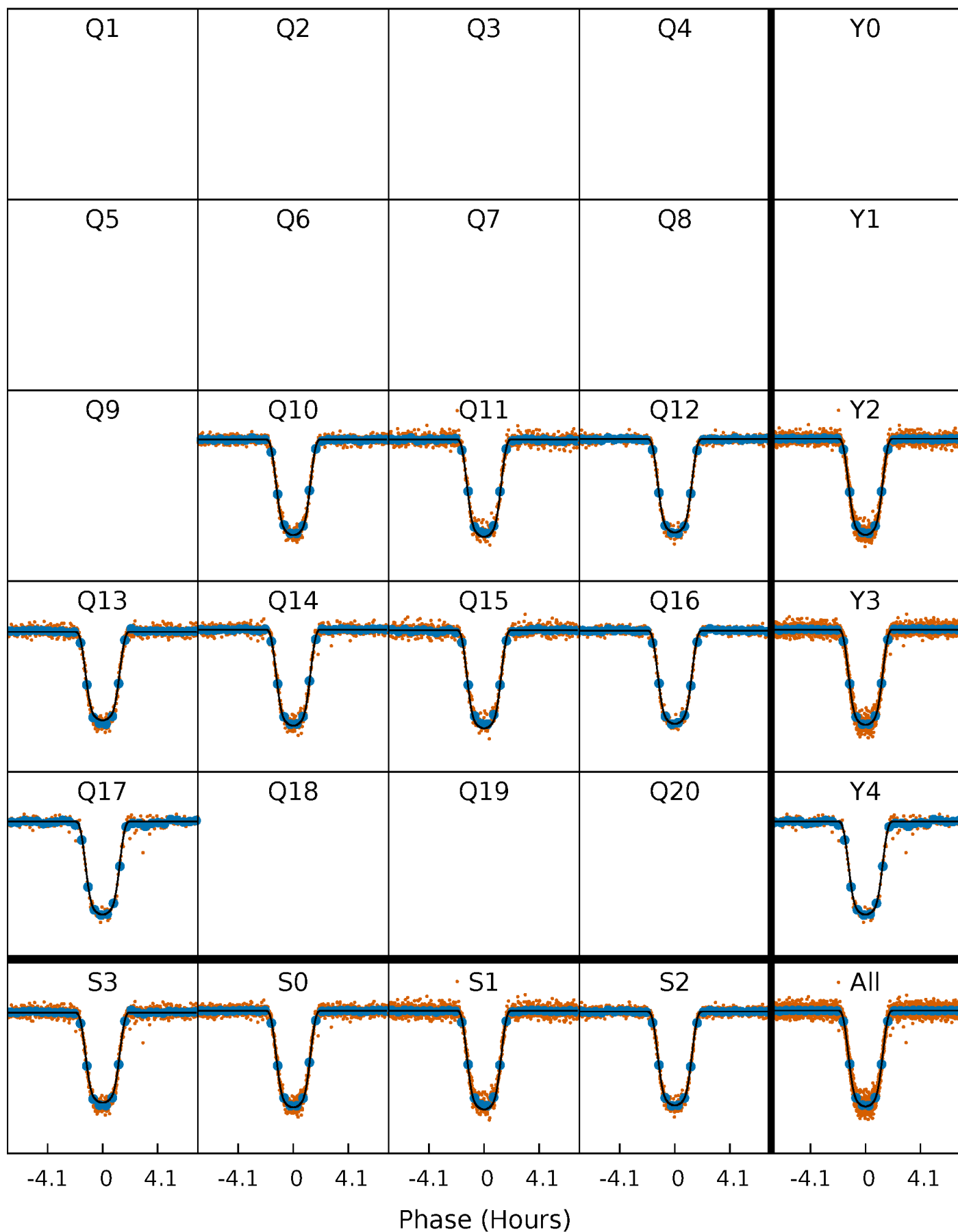
# PDC Quarter-Phased Transit Curves

TCE 006200709-01 P= 3.723551 Days  $T_0=134.946652$  (BKJD)



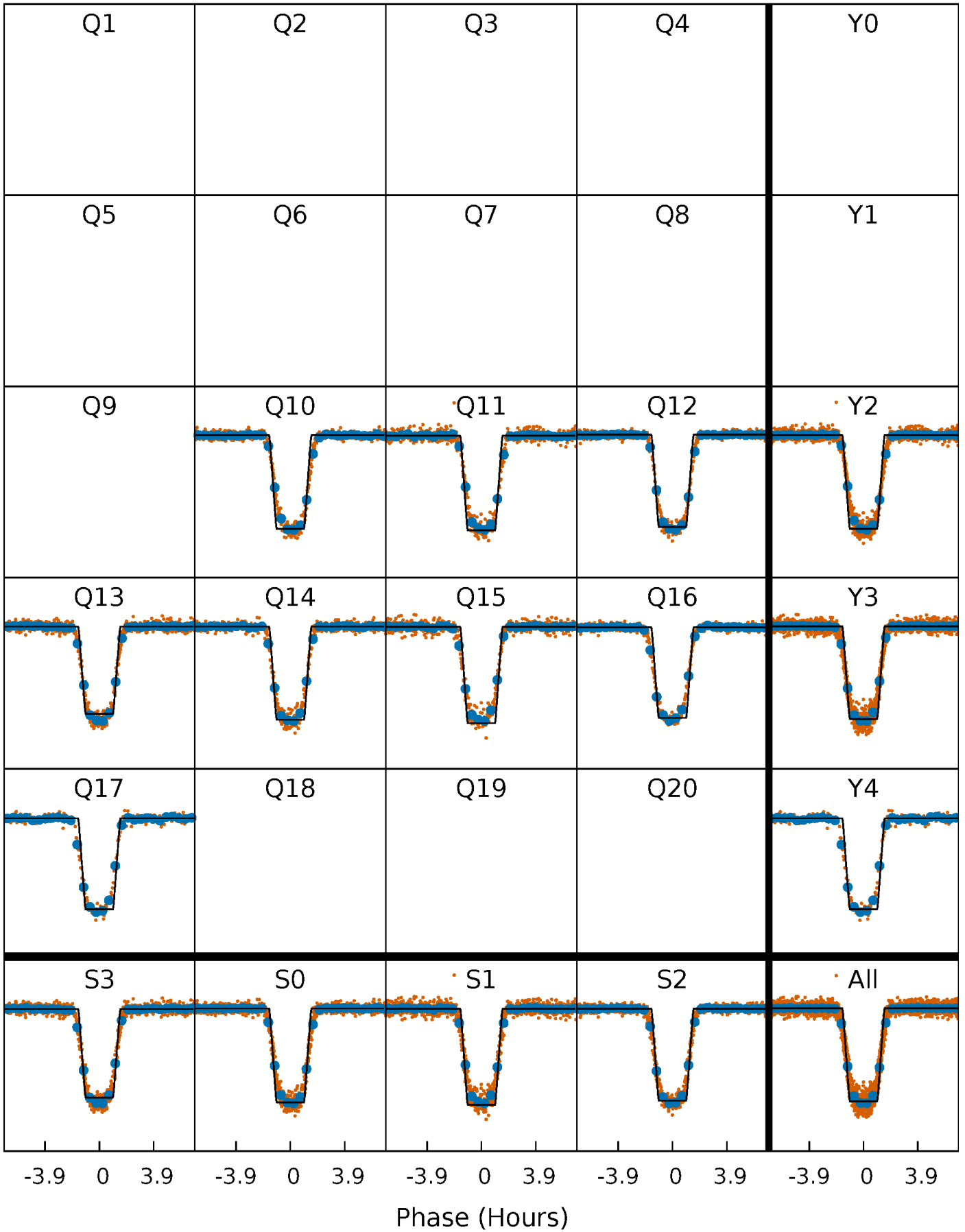
# DV Quarter-Phased Transit Curves

TCE 006200709-01 P= 3.723551 Days  $T_0=134.946652$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

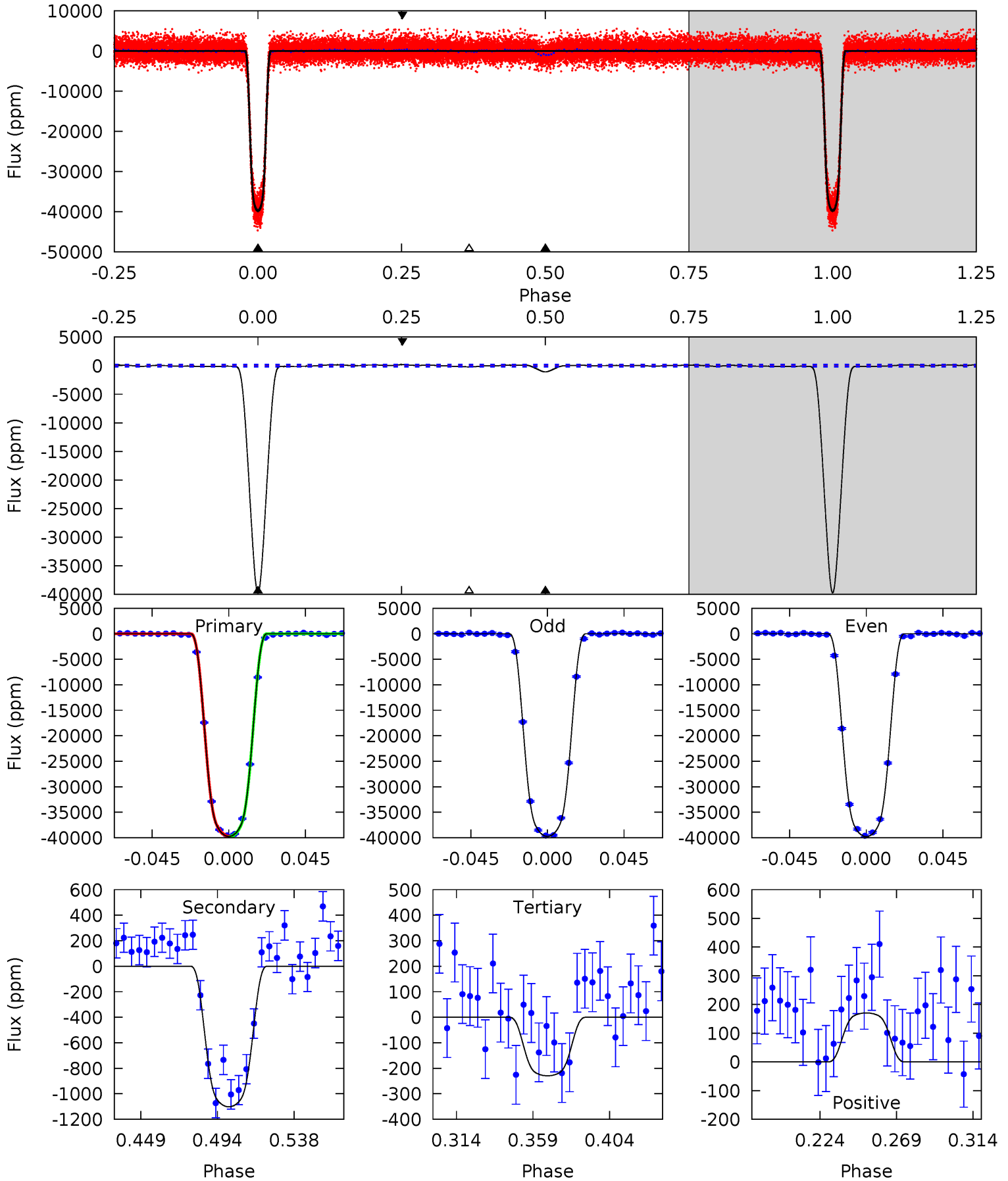
TCE 006200709-01 P= 3.723600 Days  $T_0=134.931960$  (BKJD)



# DV Model-Shift Uniqueness Test

006200709-01, P = 3.723551 Days, E = 134.946652 Days

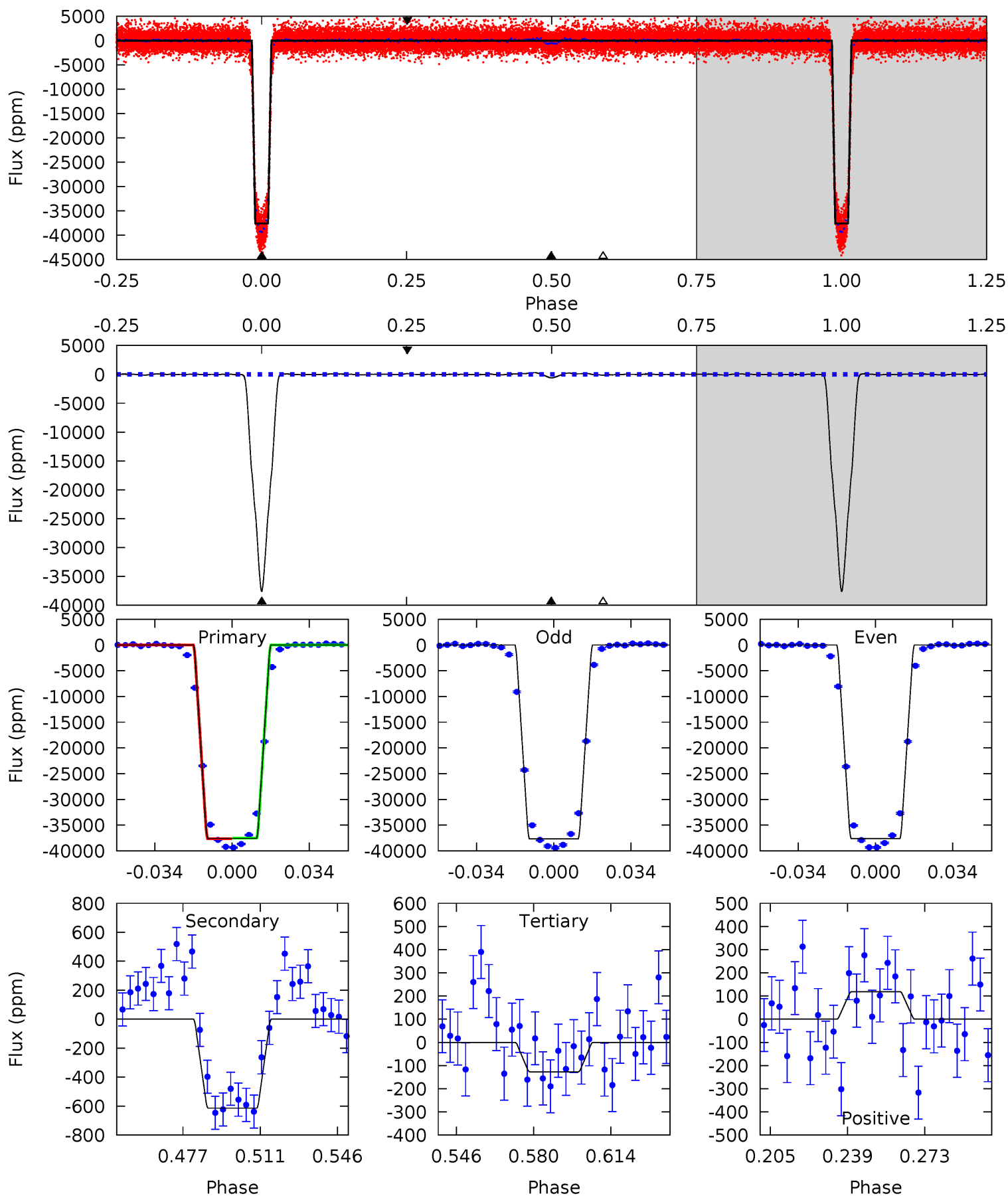
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1035	28.7	5.97	4.44	4.73	2.01	2.22	1029	1030	22.7	24.2	0.56	1.00	0.00	1.59



# Alt Model-Shift Uniqueness Test

006200709-01, P = 3.723600 Days, E = 134.931960 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
887.1	14.5	3.00	2.80	4.79	2.12	1.26	884.1	884.3	11.5	11.7	0.90	1.00	0.01	0



### Stellar Parameters For KIC 006200709

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6063^{+192}_{-213}$	$4.510^{+0.052}_{-0.208}$	$-0.420^{+0.300}_{-0.300}$	$0.890^{+0.259}_{-0.104}$	$0.934^{+0.118}_{-0.118}$	$1.866^{+0.520}_{-0.981}$
	+3%/-4%	+1%/-5%	+71%/-71%	+29%/-12%	+13%/-13%	+28%/-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 006200709-01 / KOI 3694.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-1102 \pm 38$	$19.23^{+2.85}_{-1.48}$	$1681^{+121}_{-89}$	$3086^{+69}_{-71}$	$3.378^{+0.530}_{-0.789}$
Alt.	$-614 \pm 42$	$19.70^{+3.07}_{-1.57}$	$1680^{+118}_{-87}$	$2798^{+56}_{-63}$	$1.795^{+0.324}_{-0.398}$

$T_{\text{max}}$  = 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

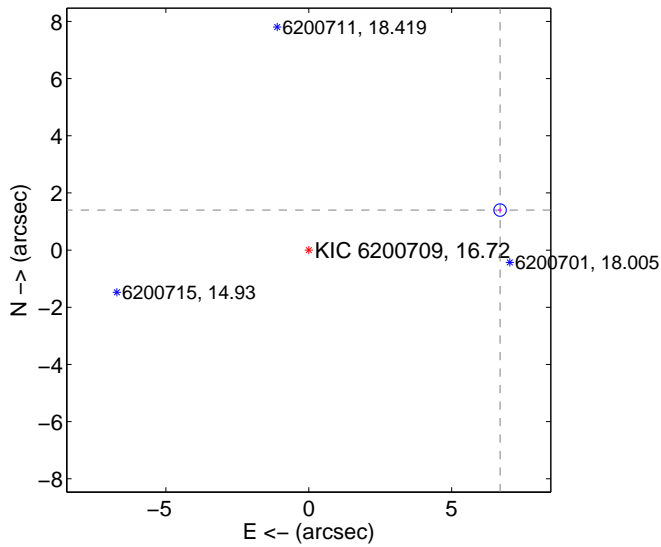
Supplemental centroid analysis for 006200709-01. Kepler magnitude: 16.72. Transit SNR 570.93

There are 8 quarters with good PRF difference image offsets

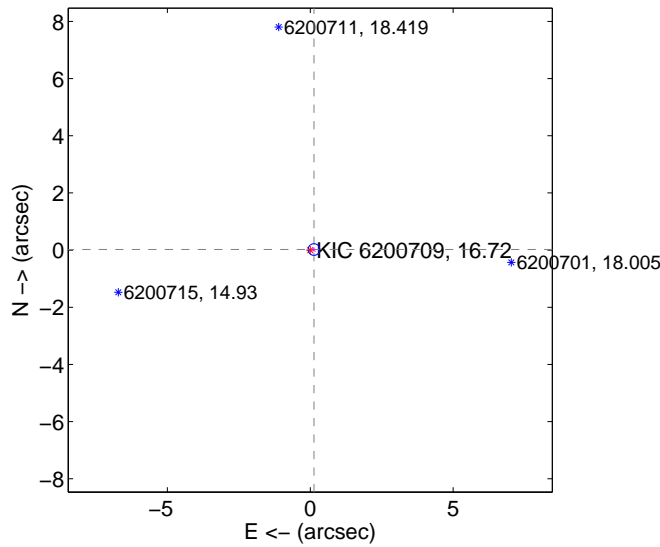
The OOT PRF centroid is offset from the target star catalog position by about 6.66 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$6.837 \pm 0.073$	94.24	$-6.692 \pm 0.070$	$1.400 \pm 0.086$
PRF-fit source offset from KIC position	$0.131 \pm 0.068$	1.93	$-0.129 \pm 0.068$	$0.020 \pm 0.069$
photometric centroid source offset	$3.45 \pm 0.01$	425.94	$3.40 \pm 0.01$	$-0.57 \pm 0.01$

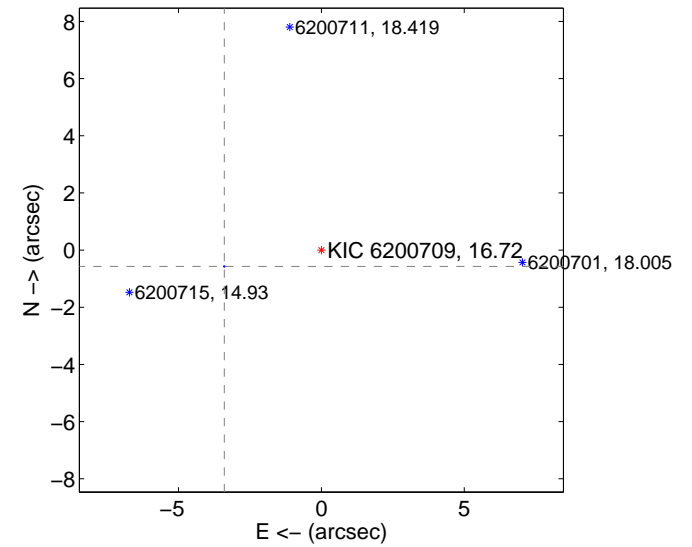
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



offset from photometric centroids

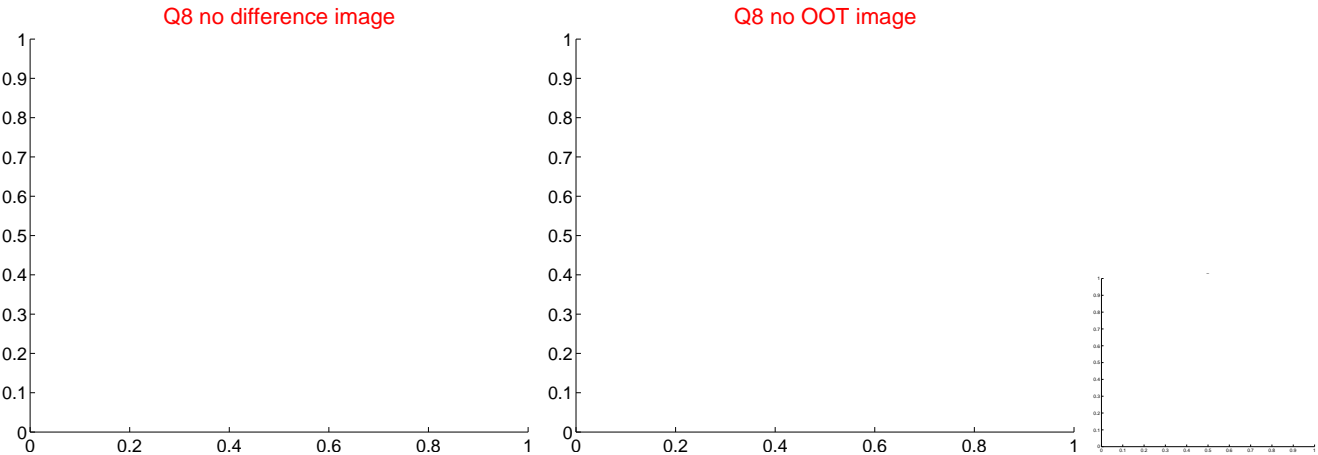
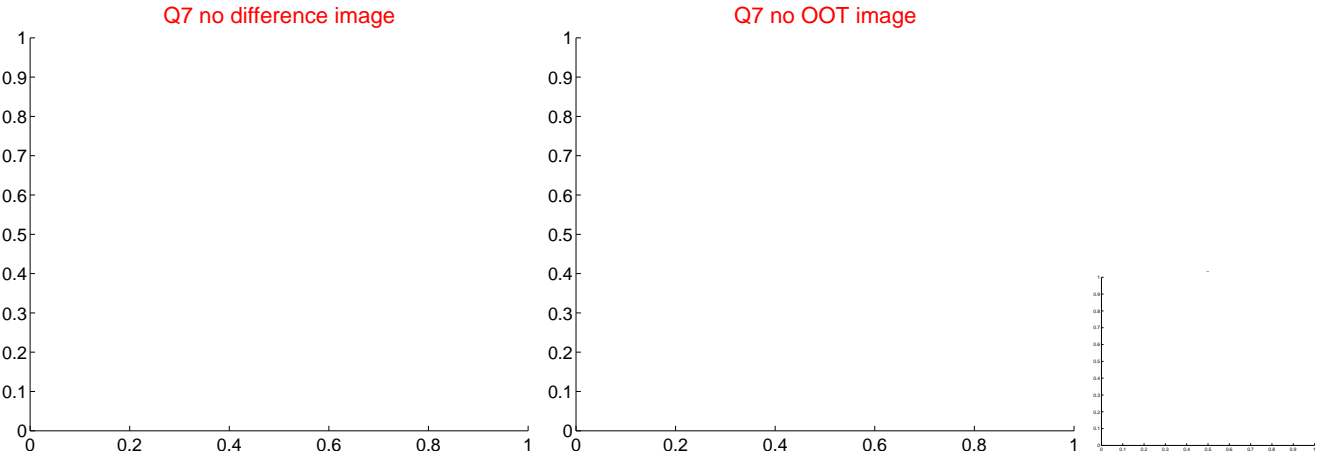
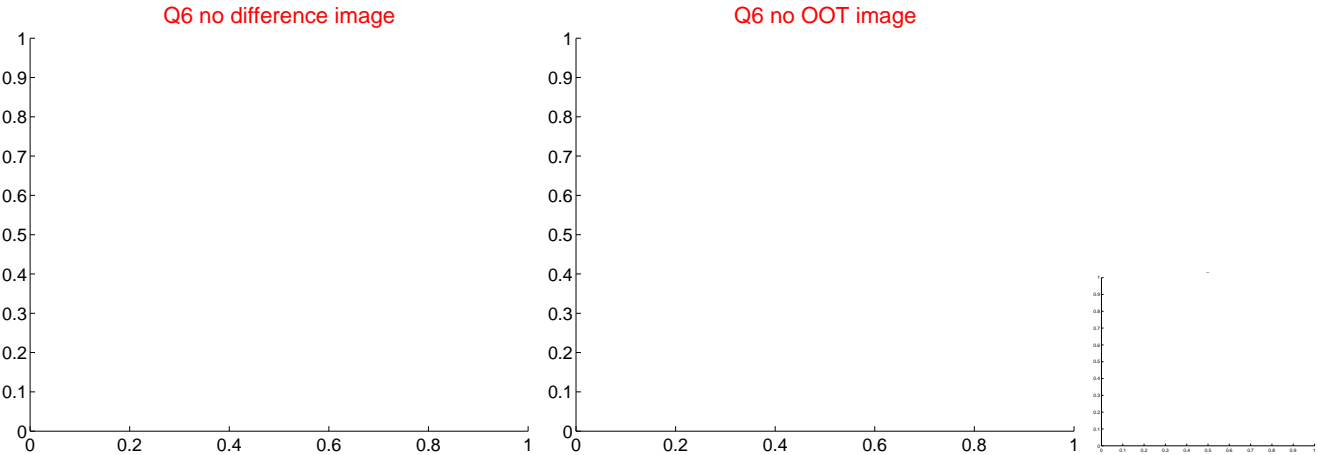
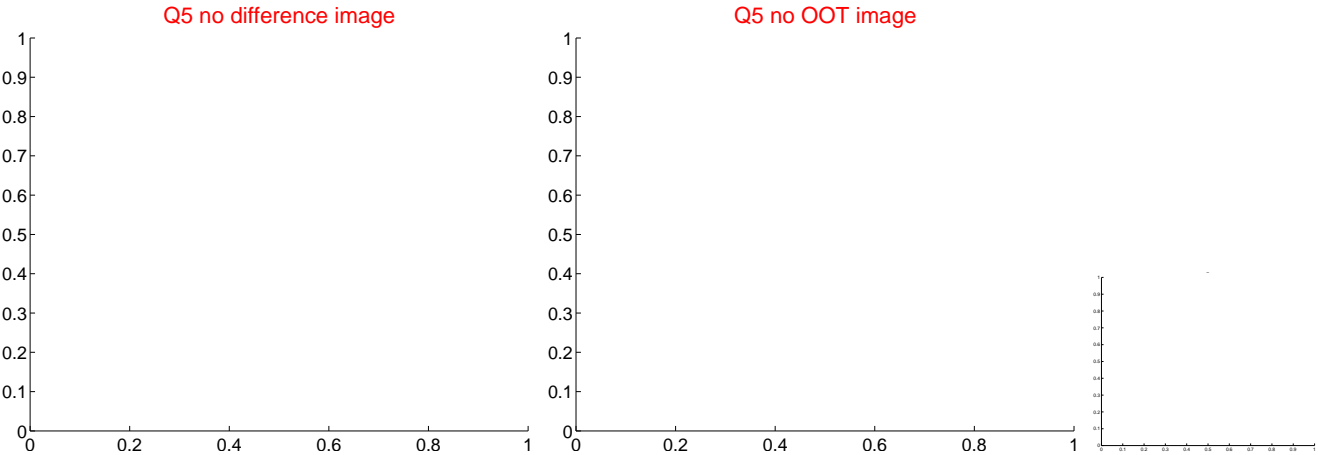


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

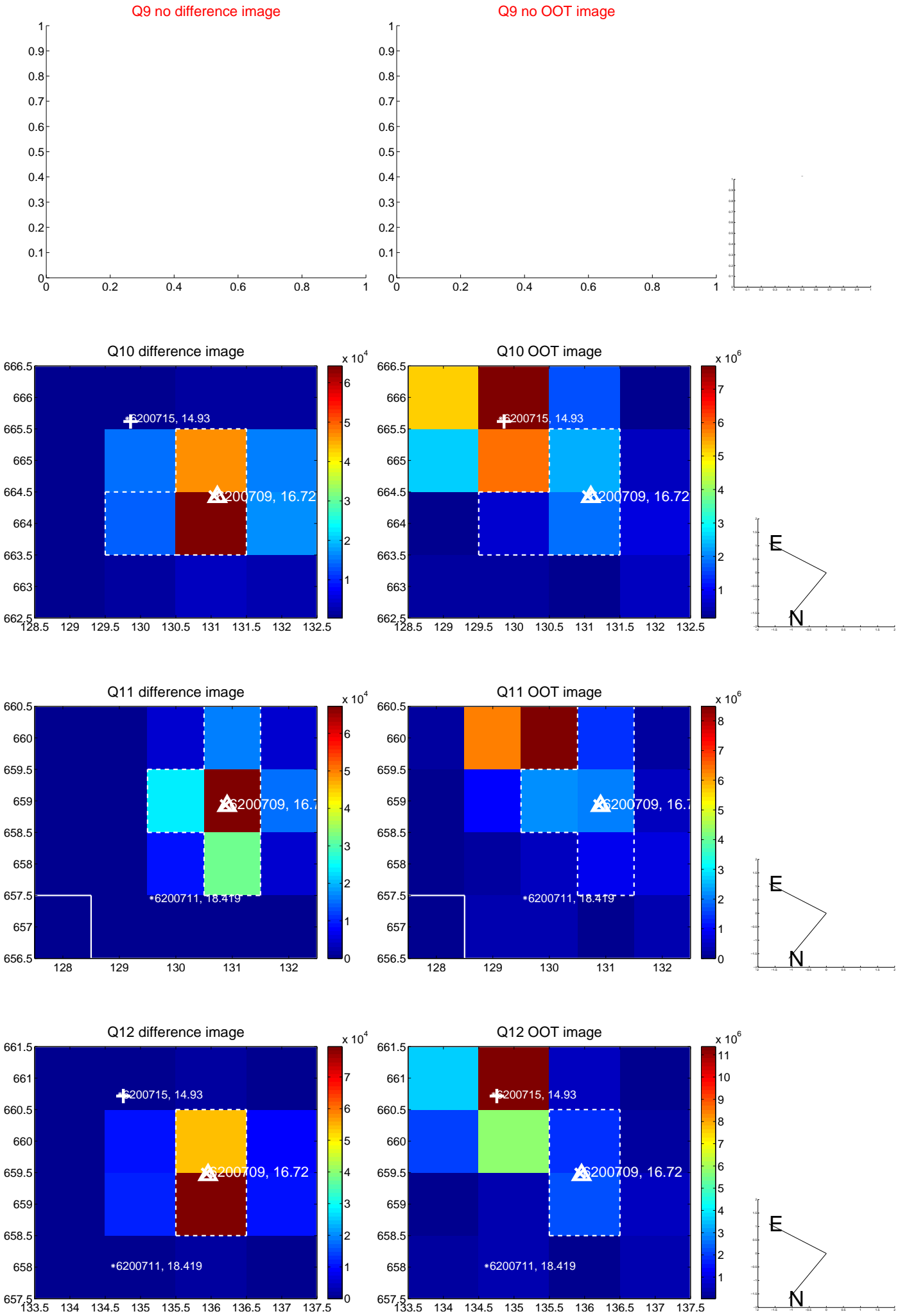
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



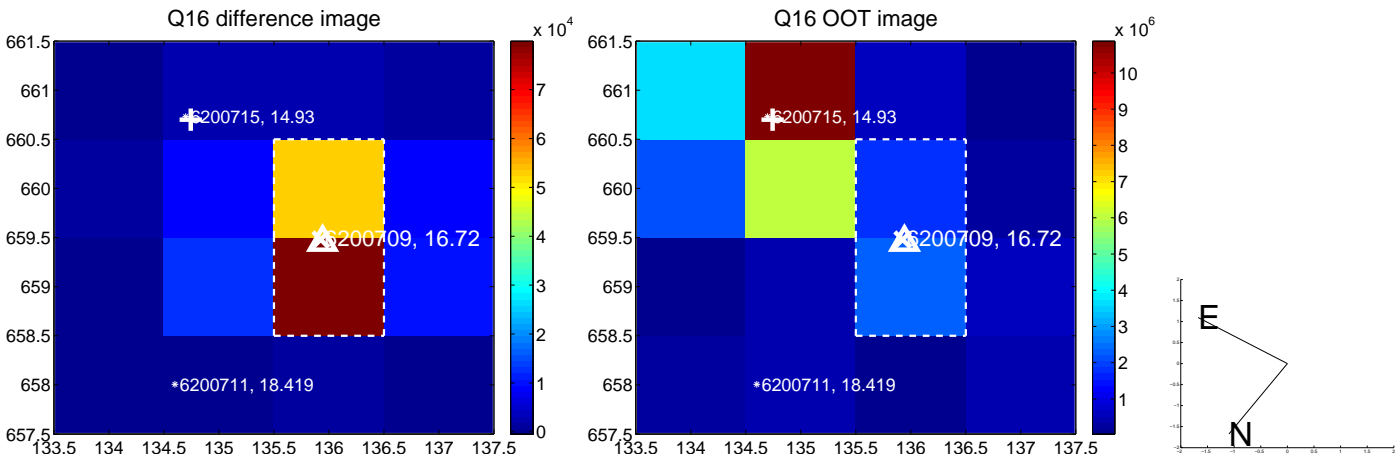
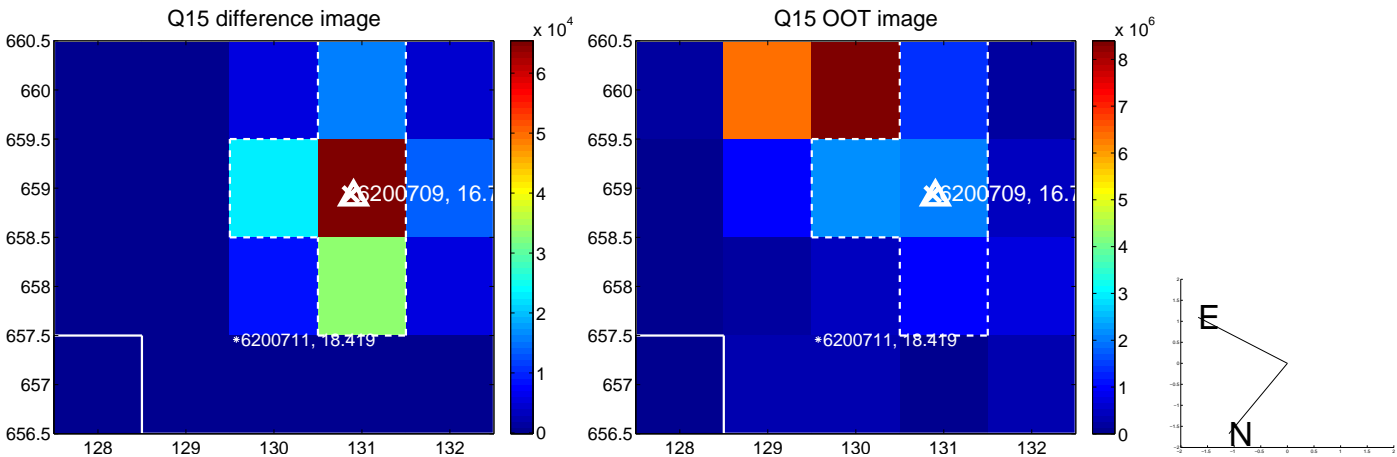
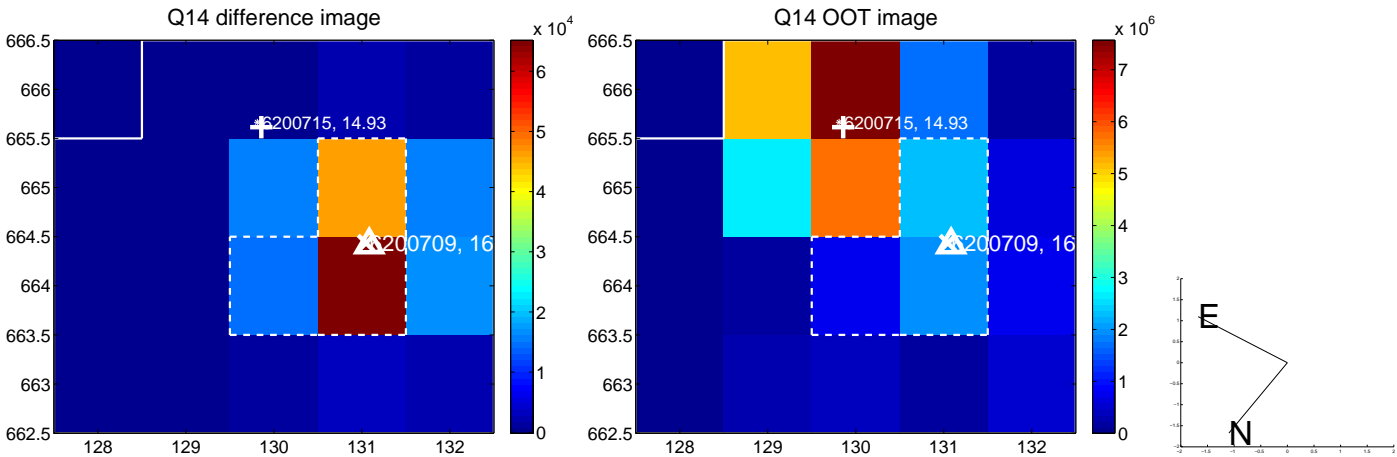
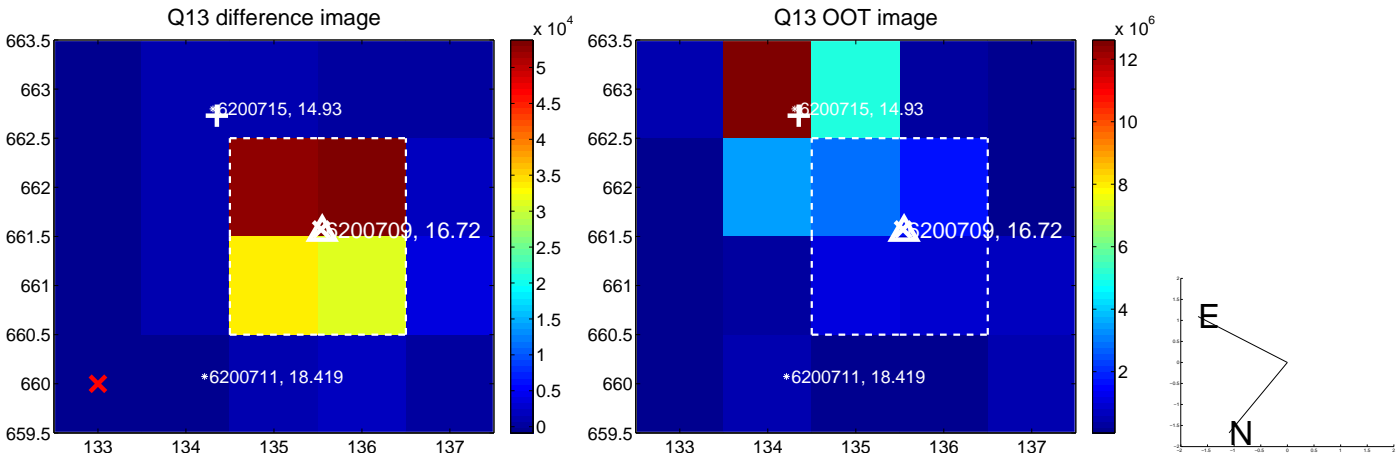
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



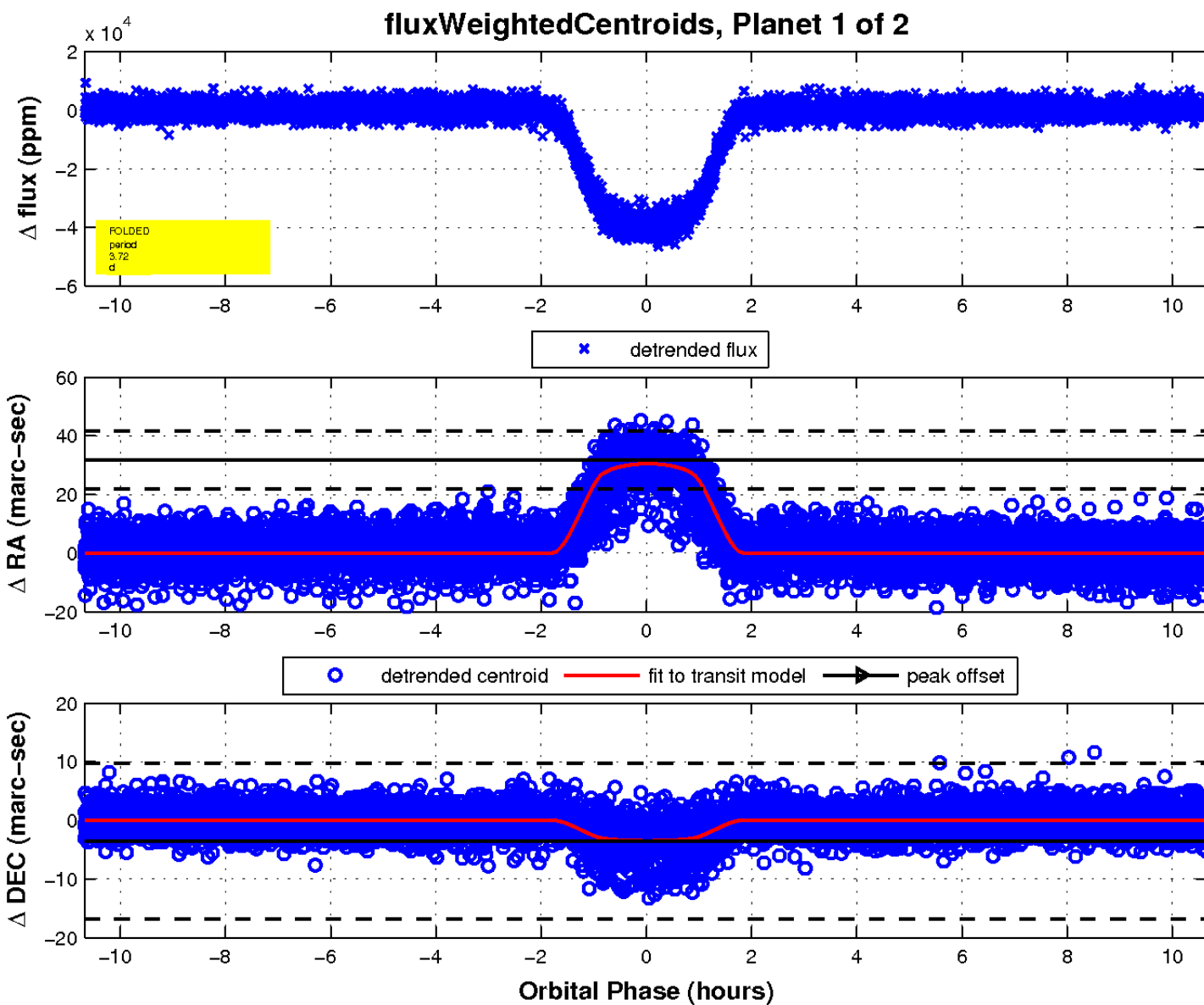
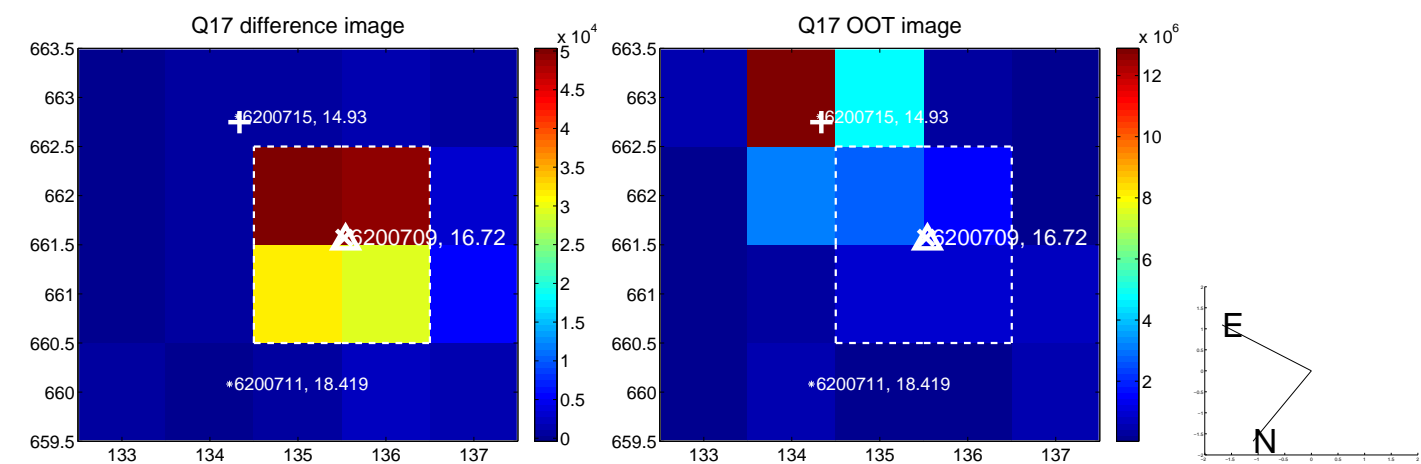
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

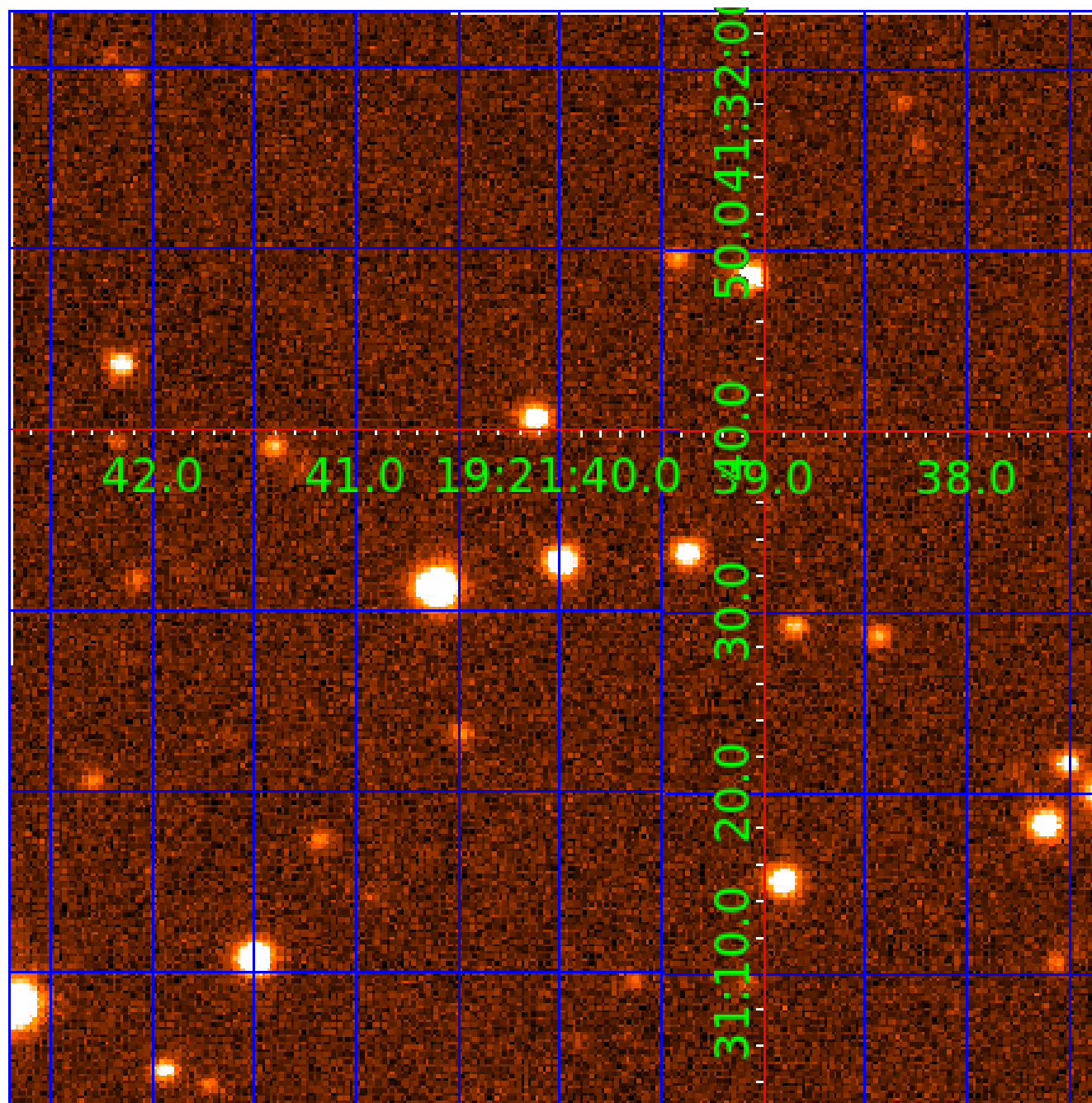


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 006200709

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006200709-01	OBS	3694.01	3.723551	134.946652	39764.2	3.559	587.5	570.9	0.89	6063	18.79	453.55
006200709-02	OBS	No	3.723535	133.089398	1207.4	3.631	18.2	18.8	0.89	6063	3.77	453.56

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006200709-01	OBS	FP	0.02	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—CENT_KIC_POS
006200709-02	OBS	FP	0.00	1	1	1	0	IS_SEC_TCE—CENT_KIC_POS—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.

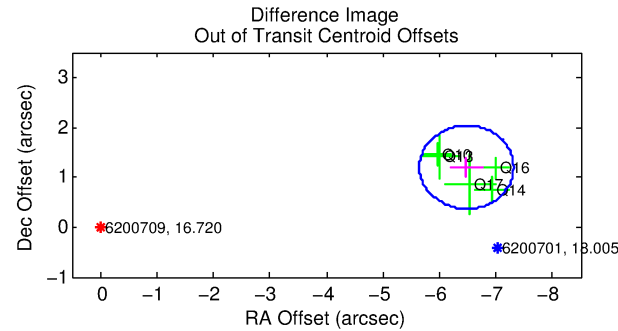
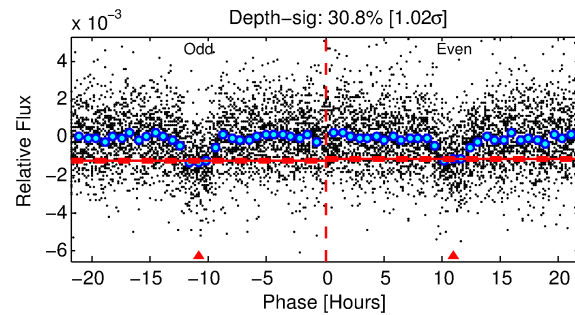
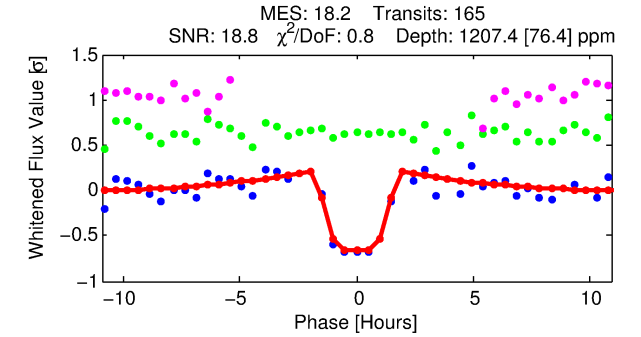
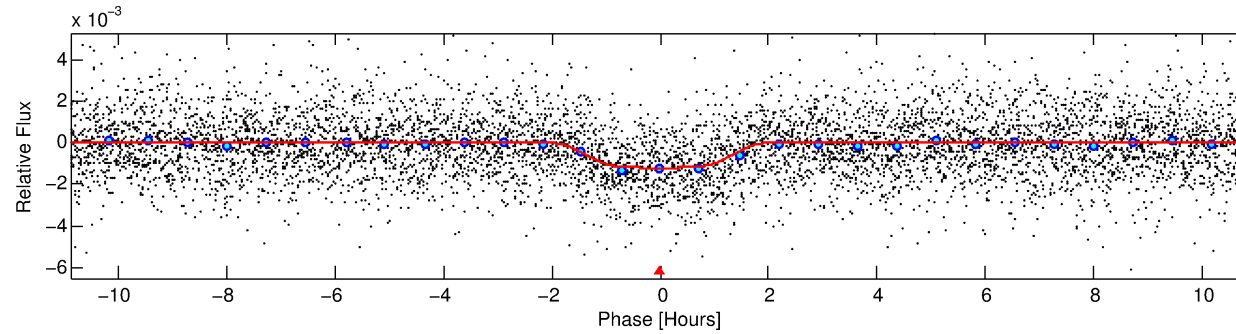
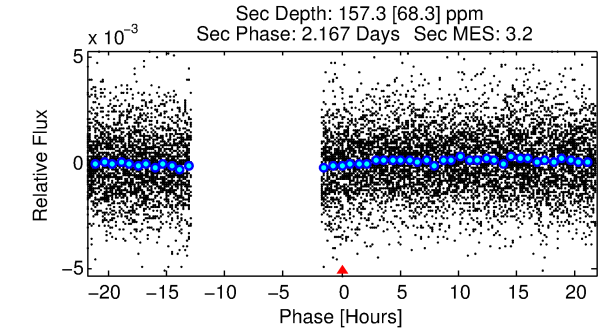
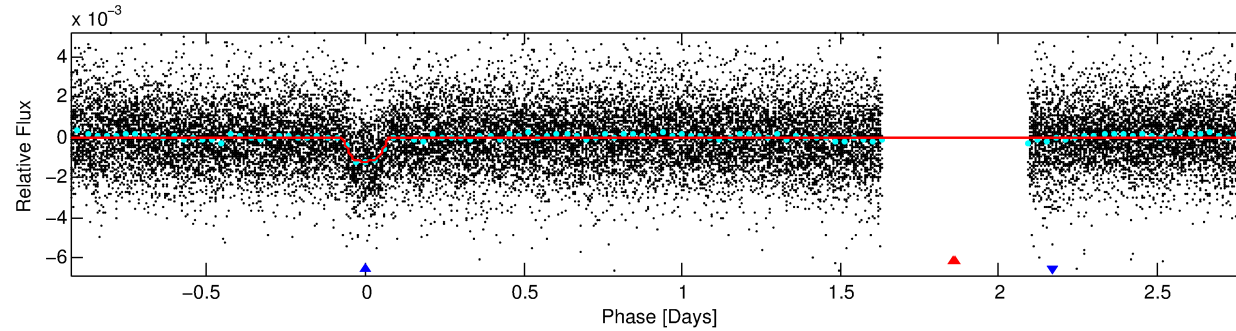
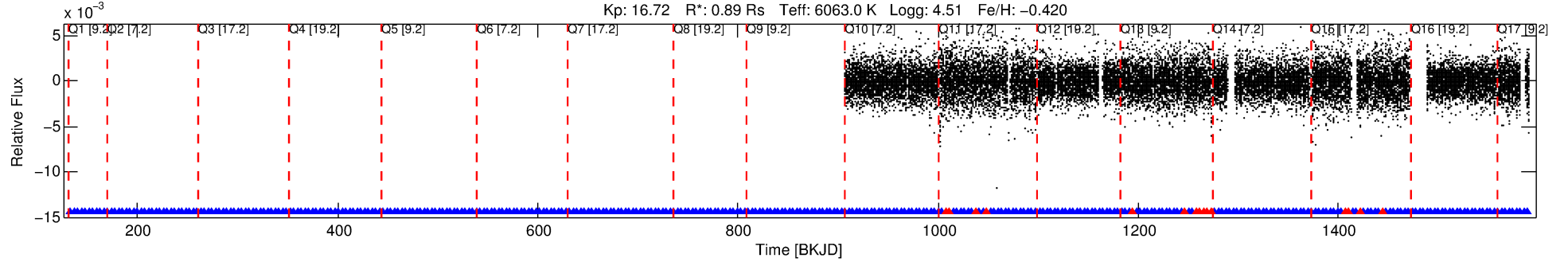
## Ephemeris Match Information For 006200709-02

No Significant Match Found

# DV One-Page Summary

KIC: 6200709 Candidate: 2 of 2 Period: 3.724 d  
KOI: K03694 Corr: No Ephemeris Match

Kp: 16.72 R\*: 0.89 Rs Teff: 6063.0 K Logg: 4.51 Fe/H: -0.420



## DV Fit Results:

Period = 3.72353 [0.00001] d  
Epoch = 133.0894 [0.0035] BKJD  
Rp/R\* = 0.0388 [0.0019]  
a/R\* = 3.71 [0.63]  
b = 0.93 [0.03]  
Seff = 453.56 [181.04]  
Teq = 1177 [117] K  
Rp = 3.77 [1.11] Re  
a = 0.0460 [0.0116] AU  
Ag = 12.89 [7.49] [1.59σ]  
Teffp = 3447 [403] K [5.41σ]

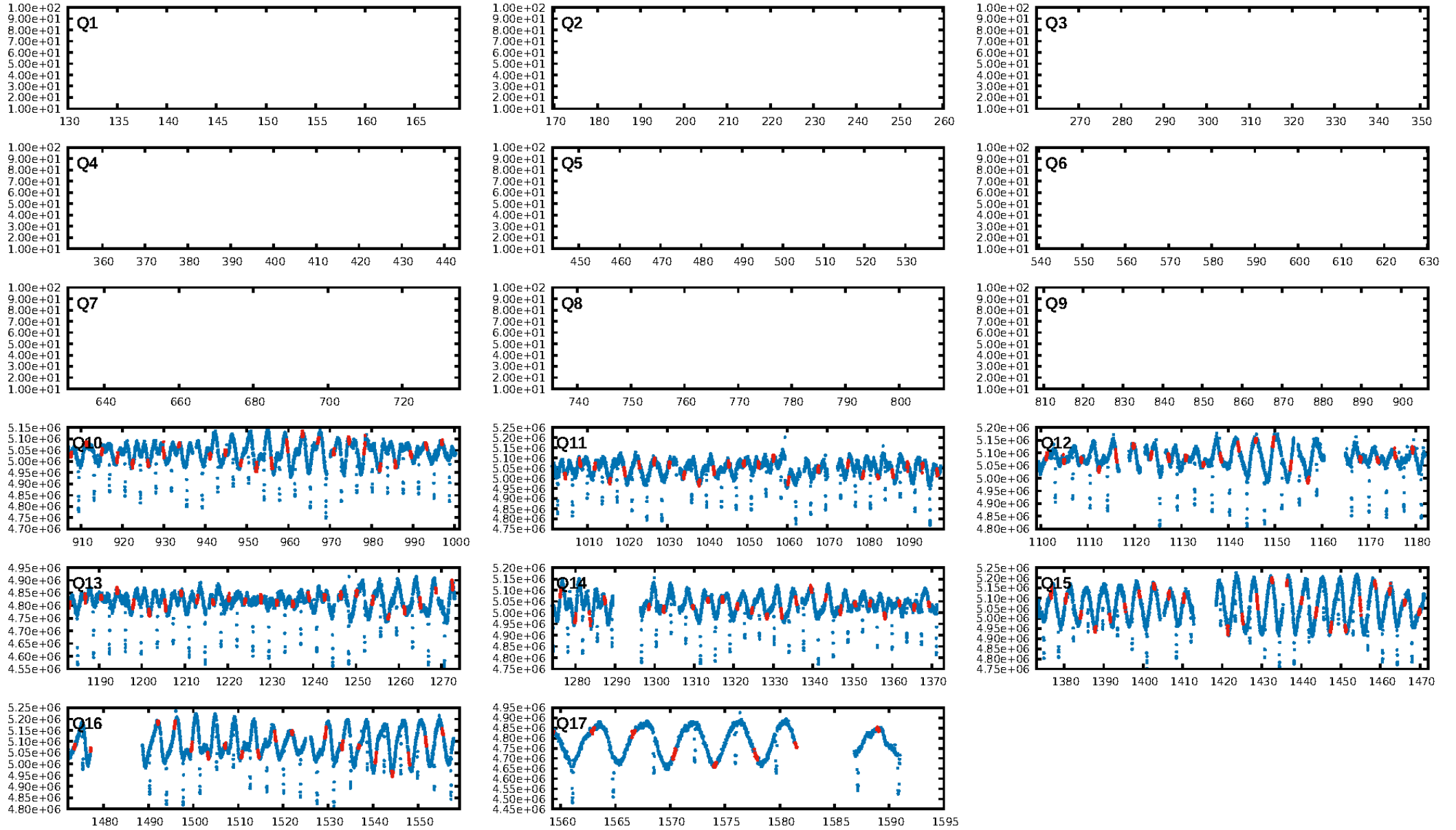
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: 99.9%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 3.81e-68  
RollingBand-fgt: 0.90 [142/157]  
GhostDiagnostic-chr: 0.224  
Centroid-sig: 10.9%  
Centroid-so: 3.916 arcsec [14.83σ]  
OotOffset-rm: 6.587 arcsec [23.70σ]  
KicOffset-rm: 0.228 arcsec [0.72σ]  
OotOffset-st: 2/0/1/2 [5]  
KicOffset-st: 2/2/1/2 [7]  
DiffImageQuality-fgm: 0.86 [6/7]  
DiffImageOverlap-fno: 1.00 [8/8]

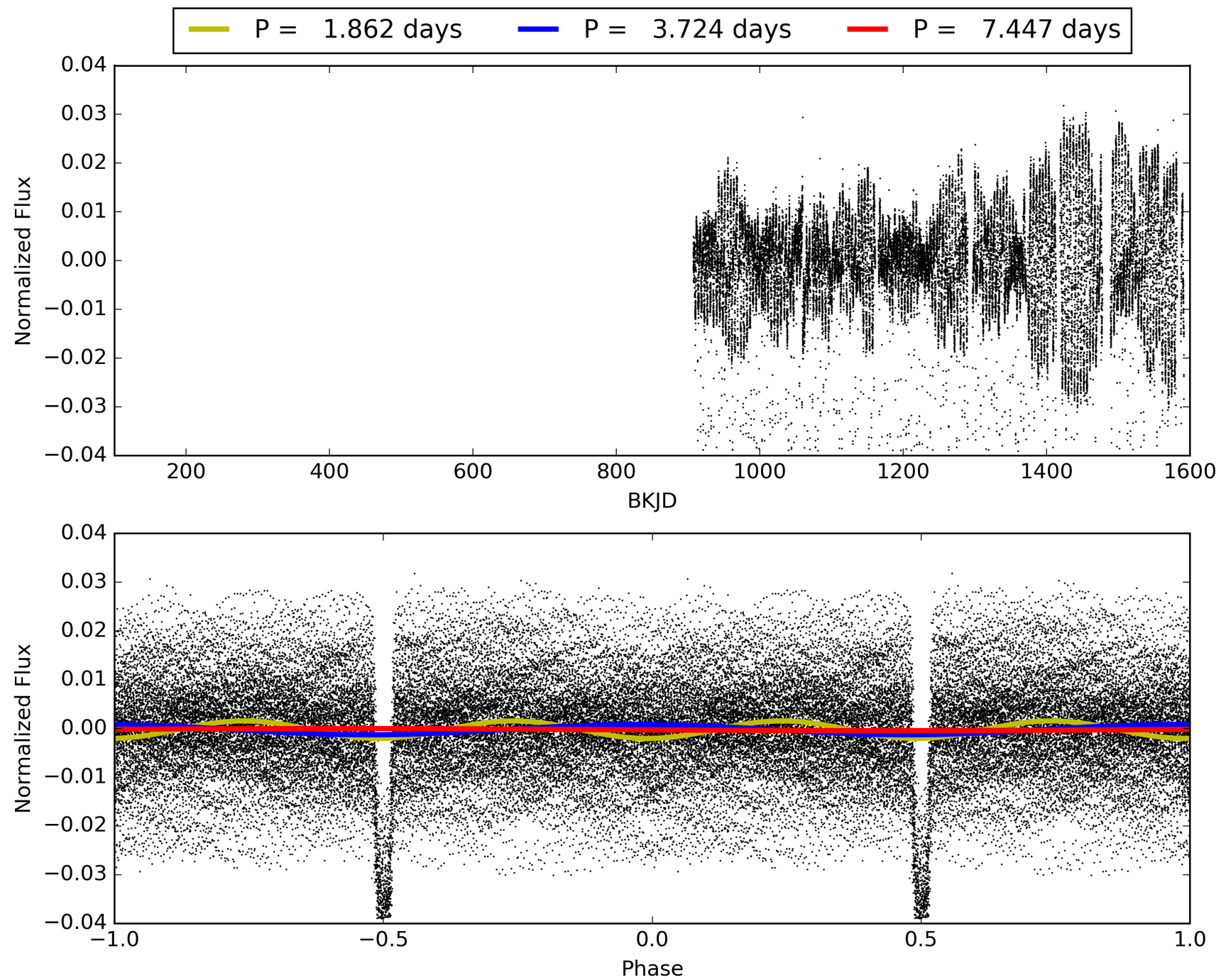
Software Revision: svn-ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 12:56:36 Z

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

# TCE 006200709-02, PDC Light Curves

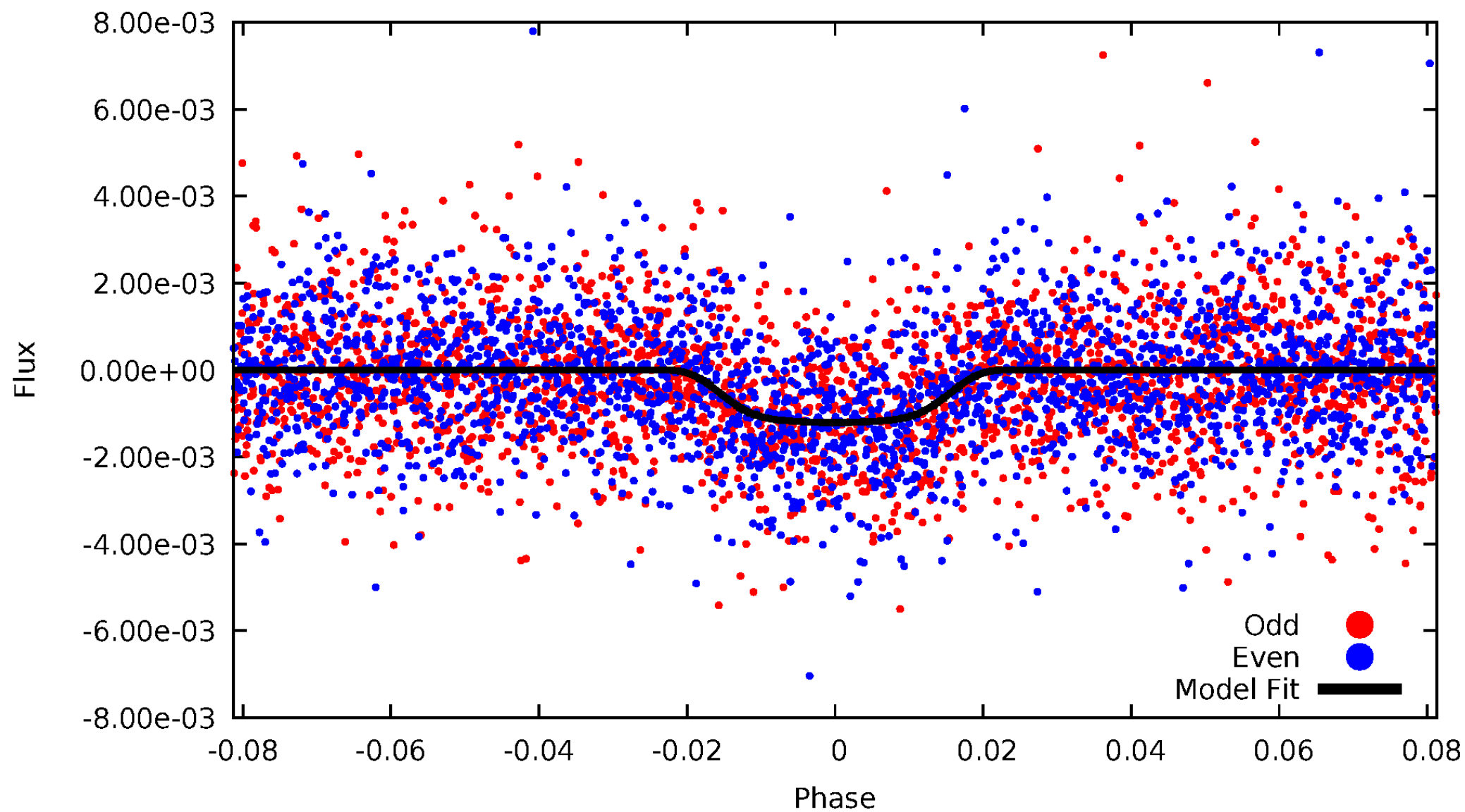


TCE 006200709-02



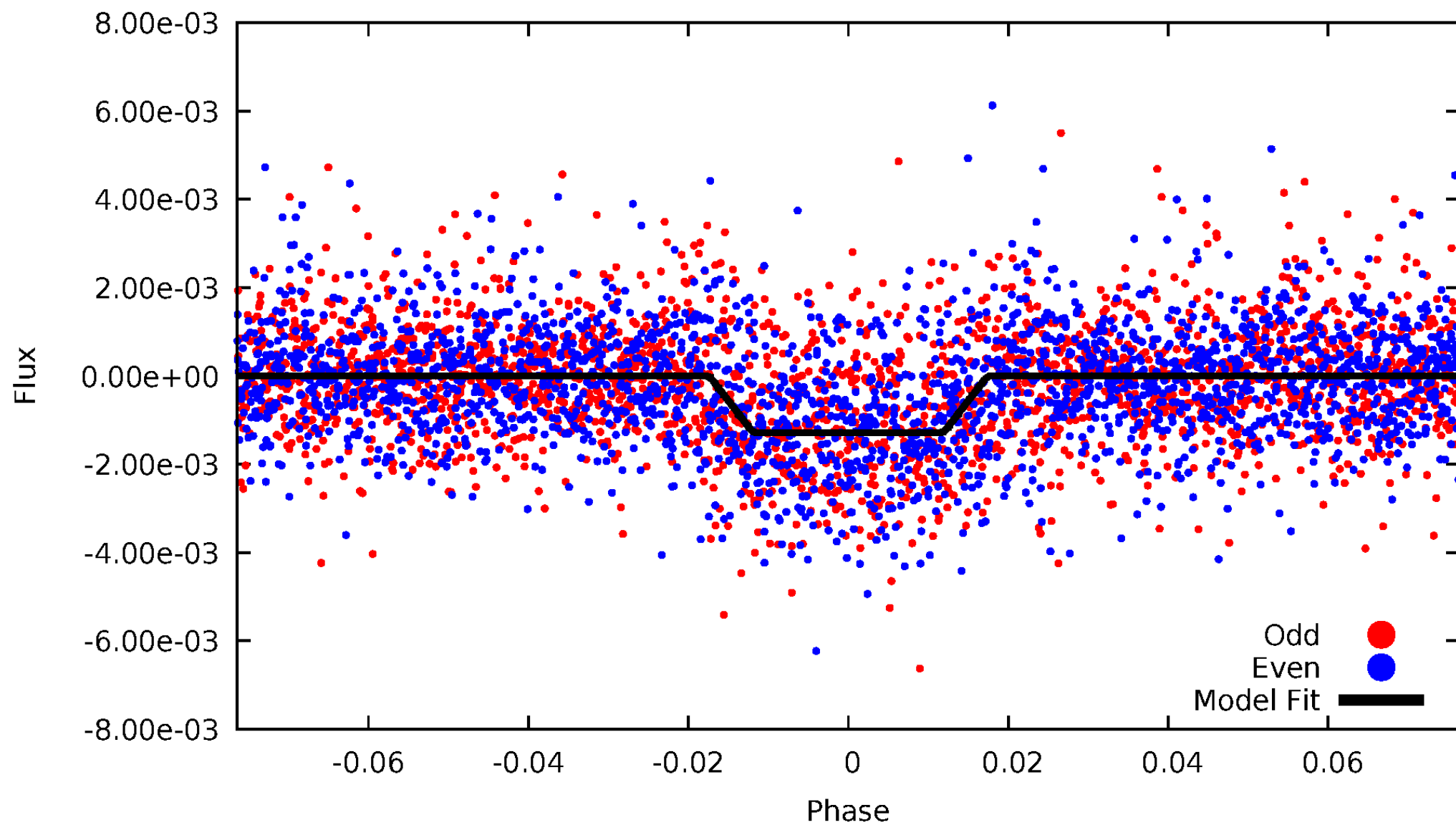
# DV Odd/Even

TCE 006200709-02



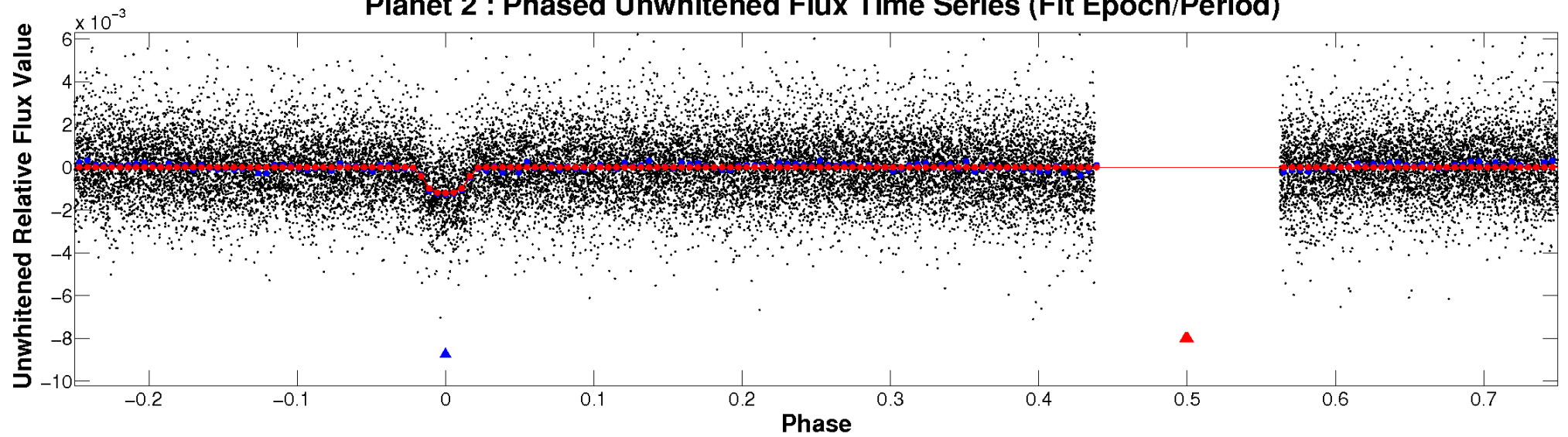
# ALT Odd/Even

TCE 006200709-02

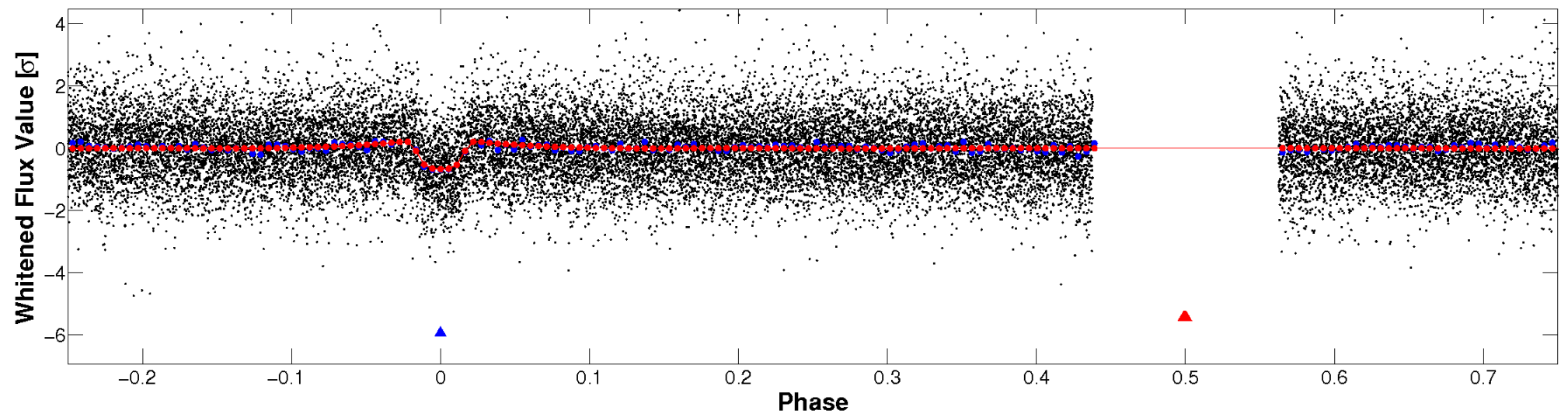


# Non-Whitened Vs. Whitened Light Curve

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

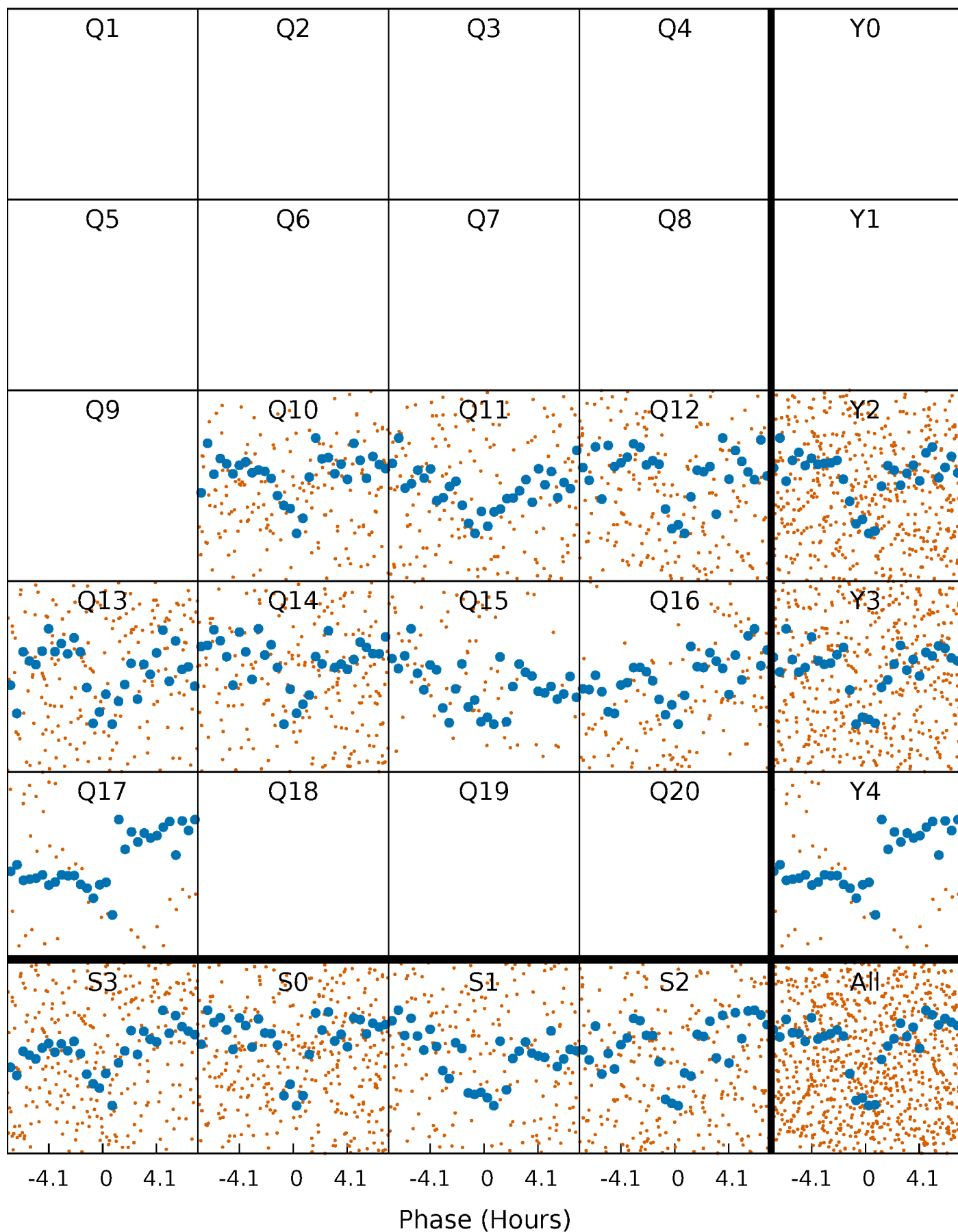


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



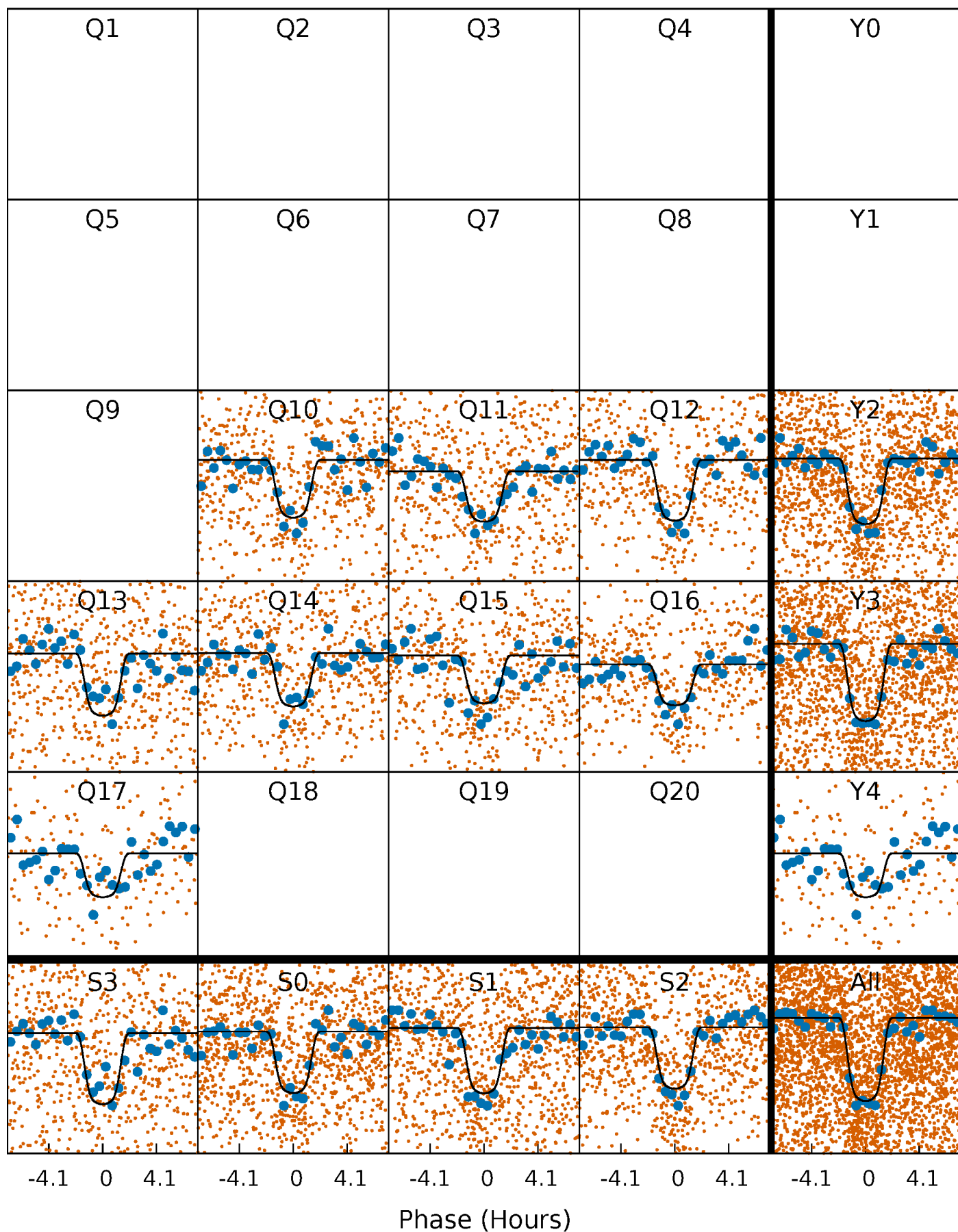
# PDC Quarter-Phased Transit Curves

TCE 006200709-02    P= 3.723535 Days     $T_0=133.089398$  (BKJD)



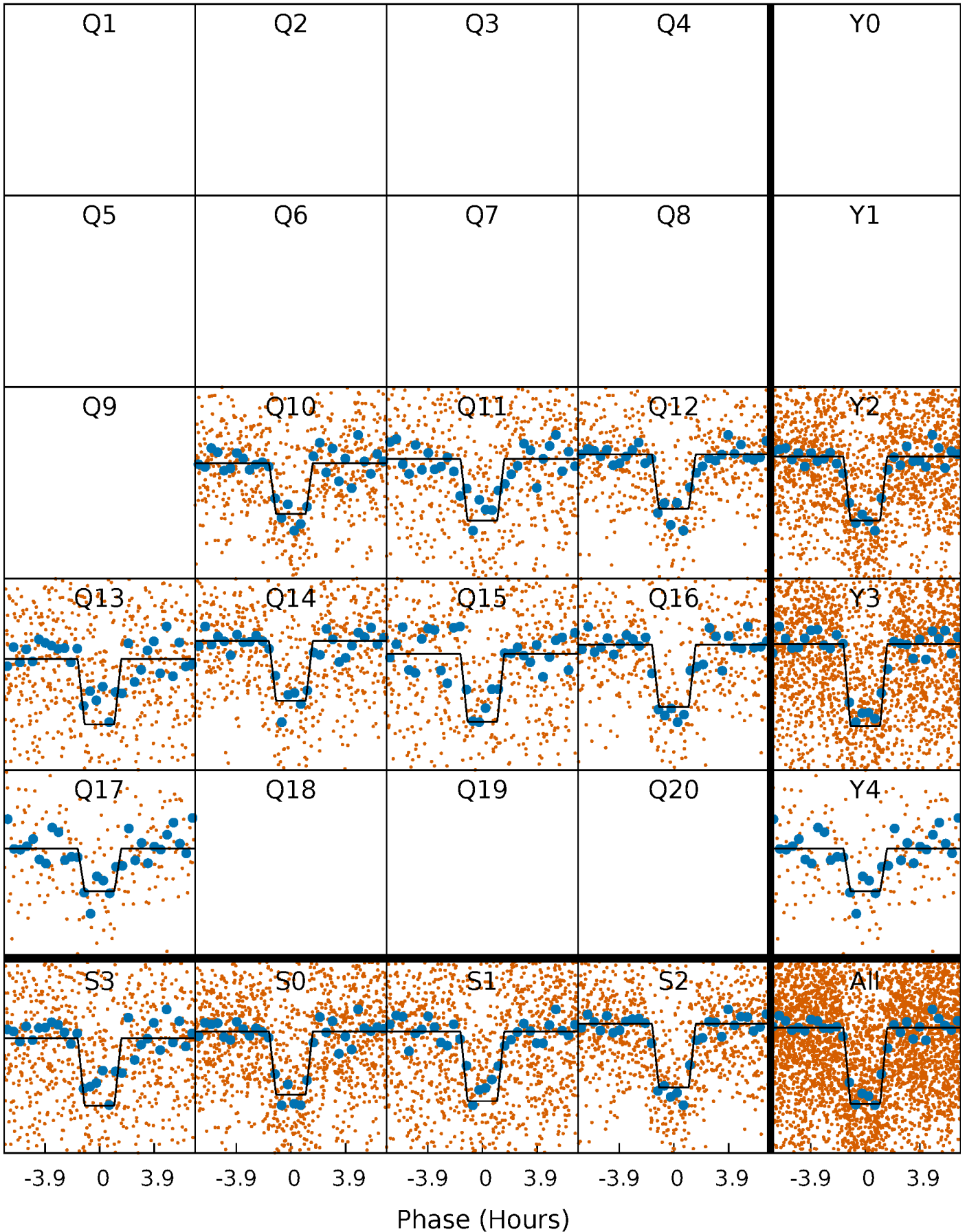
# DV Quarter-Phased Transit Curves

TCE 006200709-02 P= 3.723535 Days  $T_0=133.089398$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

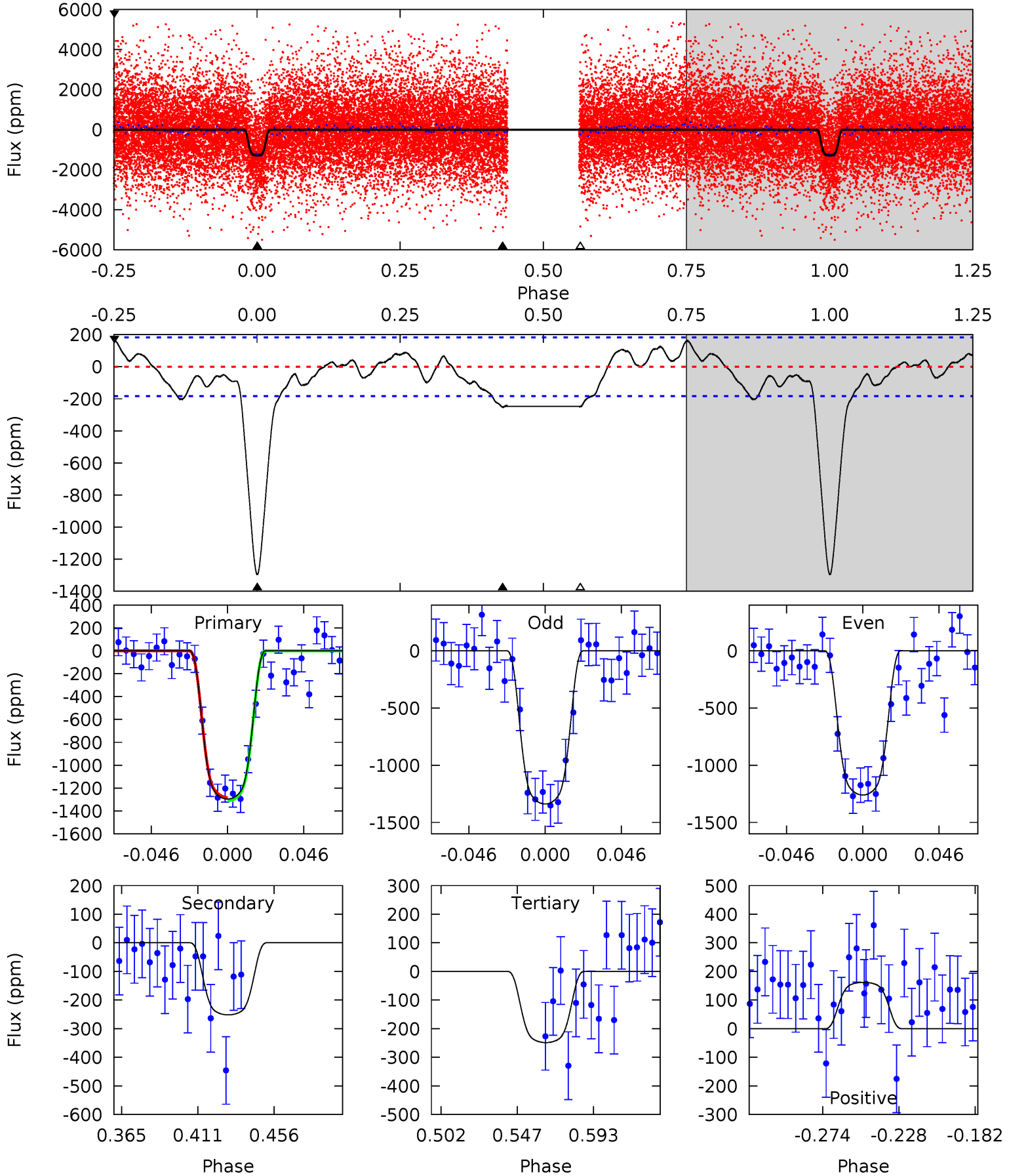
TCE 006200709-02     $P = 3.723570$  Days     $T_0 = 133.079681$  (BKJD)



# DV Model-Shift Uniqueness Test

006200709-02, P = 3.723535 Days, E = 133.089398 Days

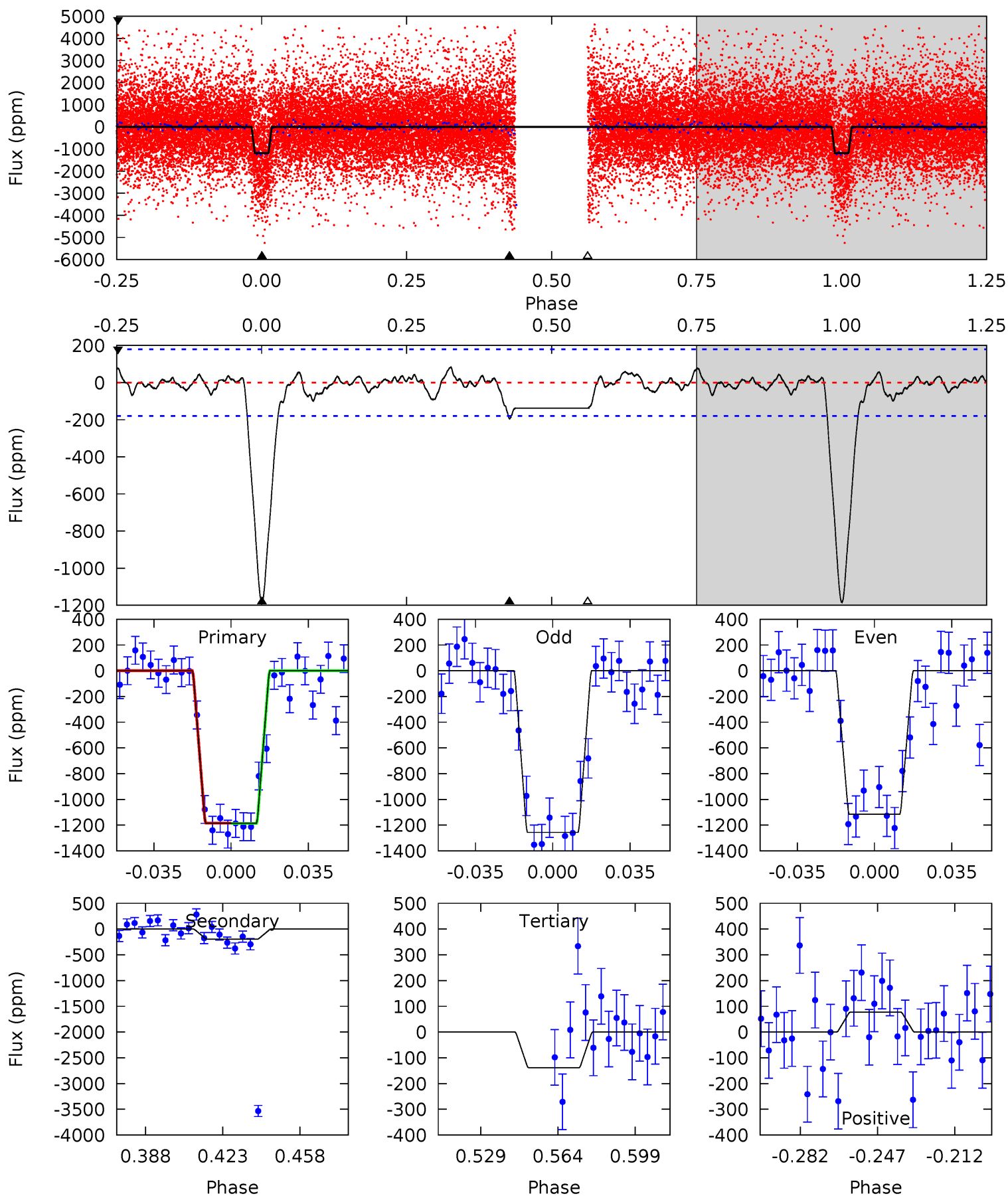
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
33.5	6.52	6.44	4.19	4.73	2.00	2.25	27.1	29.4	0.08	2.33	1.02	1.01	0.11	0.33



# Alt Model-Shift Uniqueness Test

006200709-02, P = 3.723570 Days, E = 133.079681 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
31.5	5.20	3.68	2.06	4.78	2.11	0.95	27.8	29.5	1.53	3.15	1.86	0.90	0.07	0.03



### Stellar Parameters For KIC 006200709

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6063^{+192}_{-213}$	$4.510^{+0.052}_{-0.208}$	$-0.420^{+0.300}_{-0.300}$	$0.890^{+0.259}_{-0.104}$	$0.934^{+0.118}_{-0.118}$	$1.866^{+0.520}_{-0.981}$
	+3%/-4%	+1%/-5%	+71%/-71%	+29%/-12%	+13%/-13%	+28%/-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 006200709-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-252 \pm 39$	$3.90^{+0.59}_{-0.39}$	$1684^{+116}_{-91}$	$4142^{+189}_{-175}$	$19^{+5}_{-5}$
Alt.	$-196 \pm 38$	$3.64^{+0.57}_{-0.39}$	$1680^{+124}_{-83}$	$4058^{+191}_{-199}$	$17^{+5}_{-4}$

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

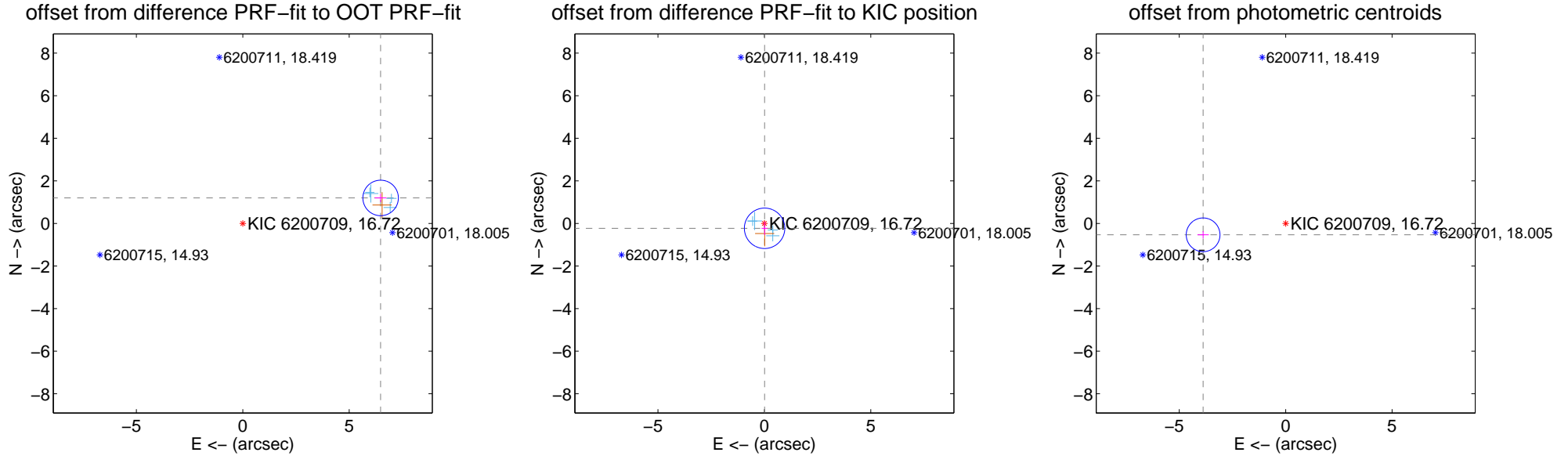
## DV Centroid Data

Supplemental centroid analysis for 006200709-02. Kepler magnitude: 16.72. Transit SNR 18.83

There are 6 quarters with good PRF difference image offsets

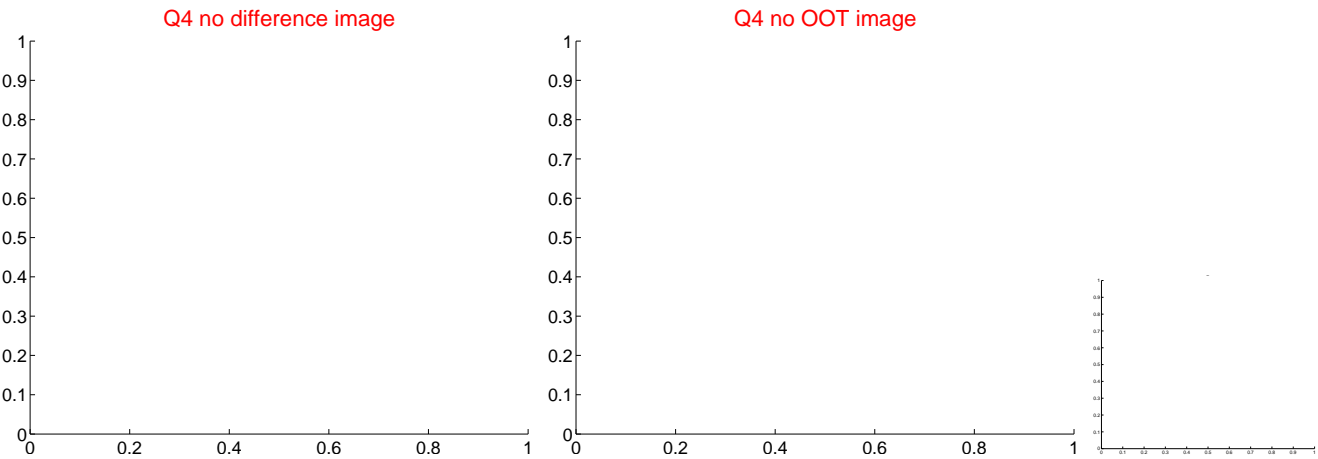
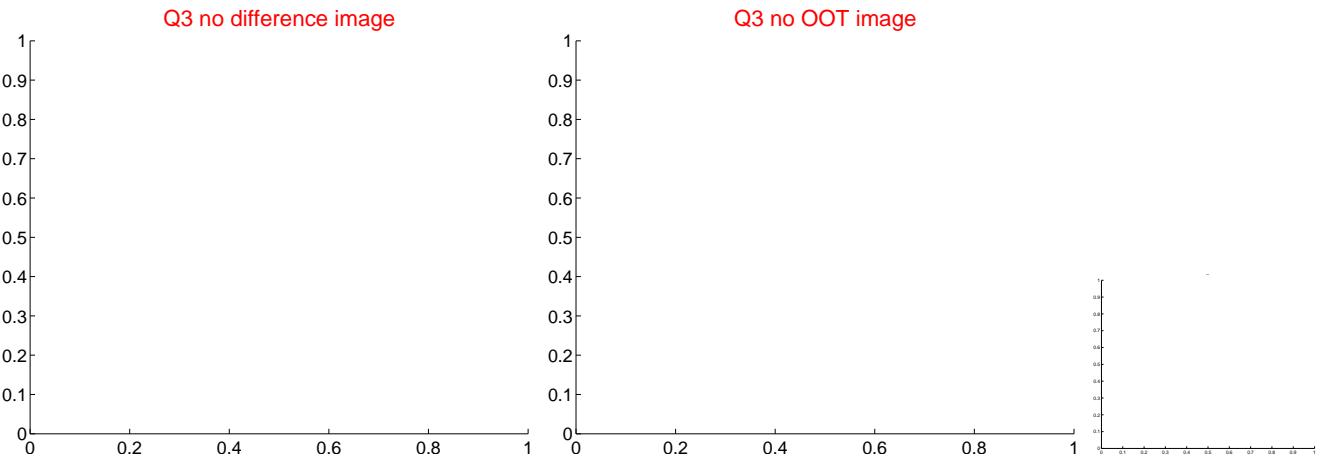
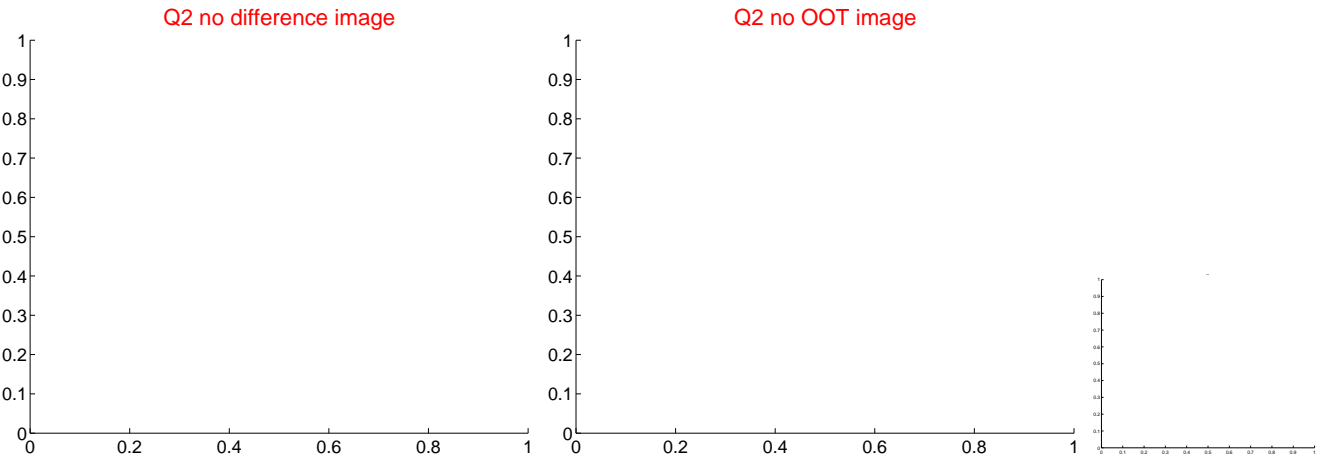
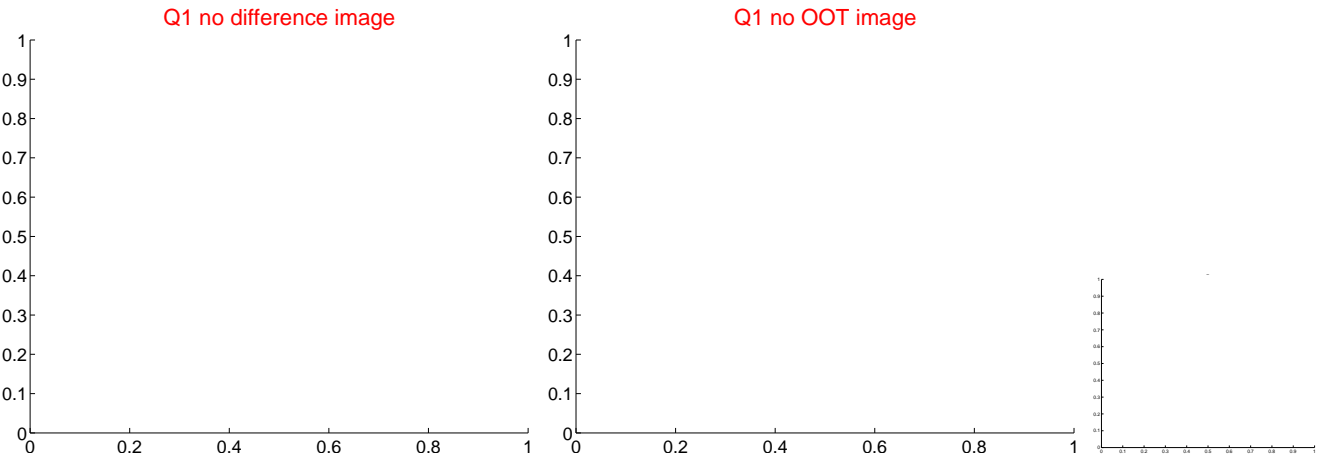
The OOT PRF centroid is offset from the target star catalog position by about 6.67 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$6.587 \pm 0.278$	23.70	$-6.477 \pm 0.280$	$1.198 \pm 0.194$
PRF-fit source offset from KIC position	$0.228 \pm 0.317$	0.72	$-0.010 \pm 0.143$	$-0.228 \pm 0.316$
photometric centroid source offset	$3.92 \pm 0.26$	14.83	$3.88 \pm 0.27$	$-0.53 \pm 0.17$

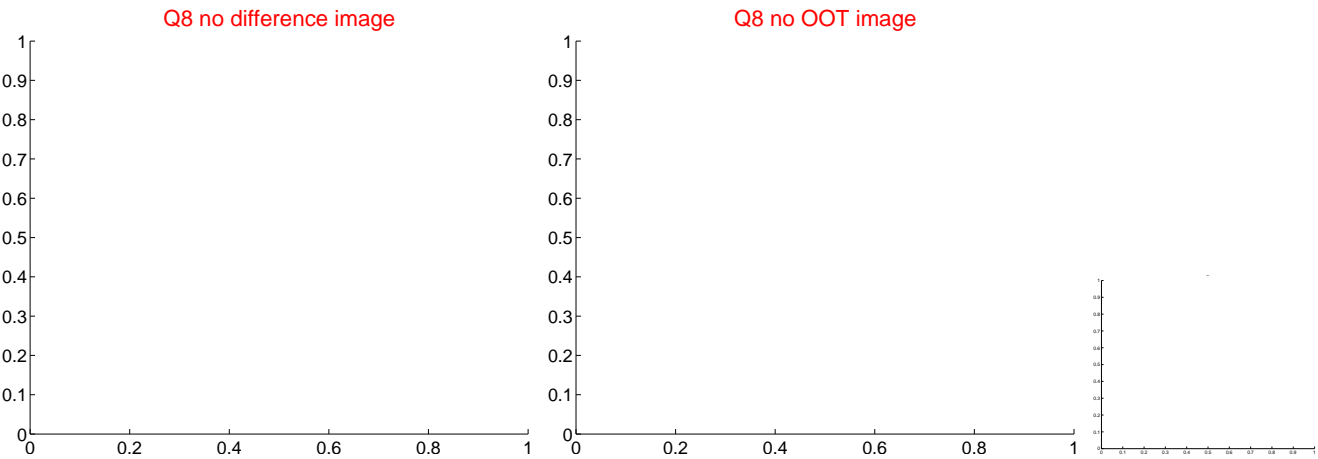
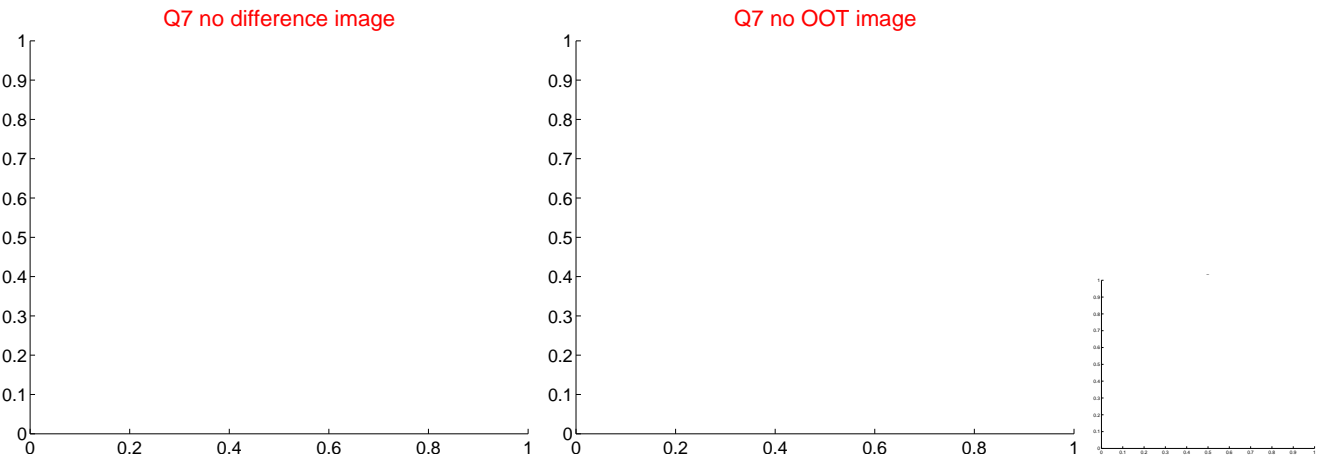
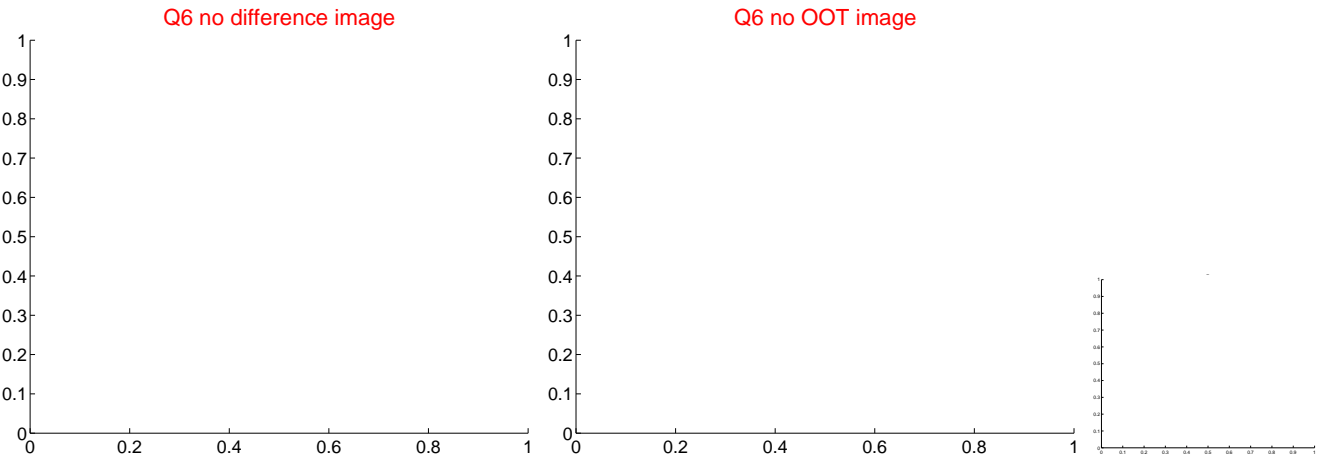
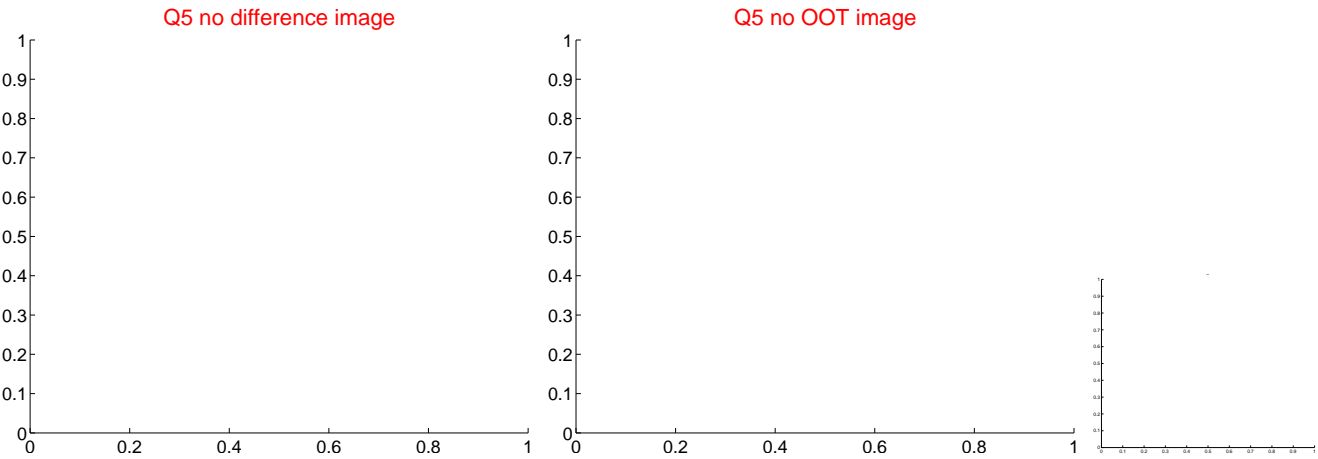


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

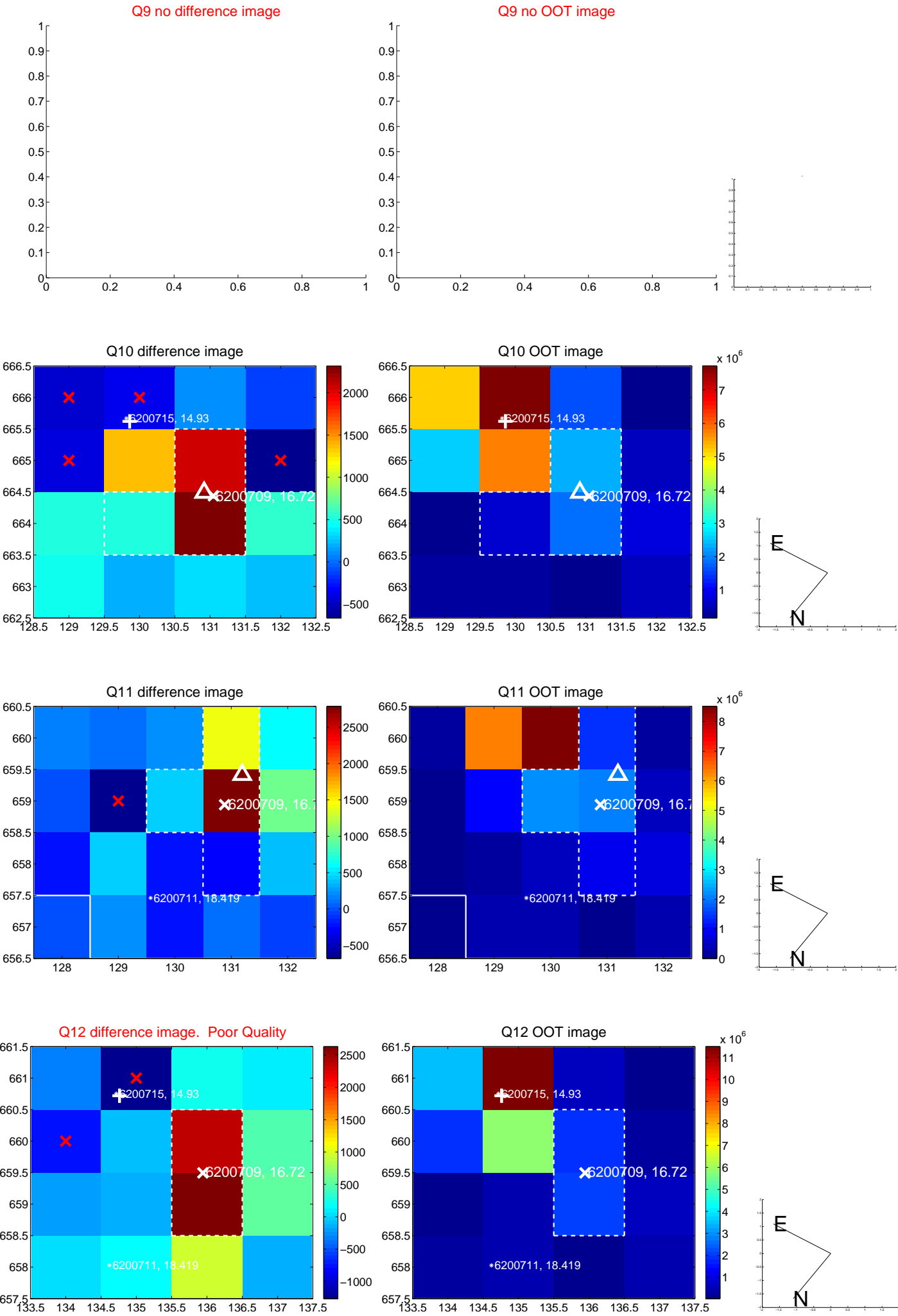
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



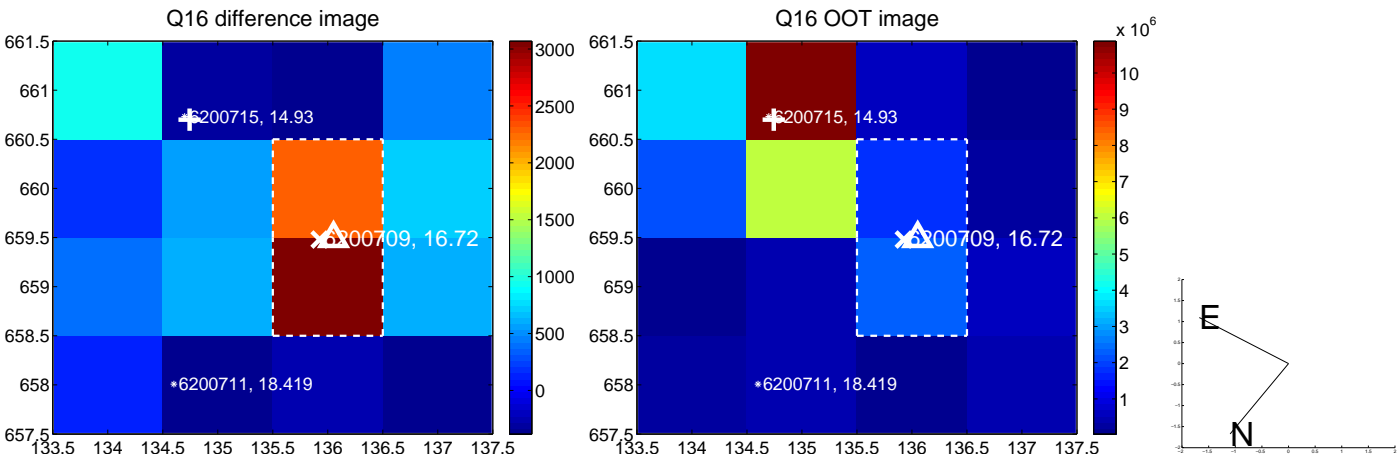
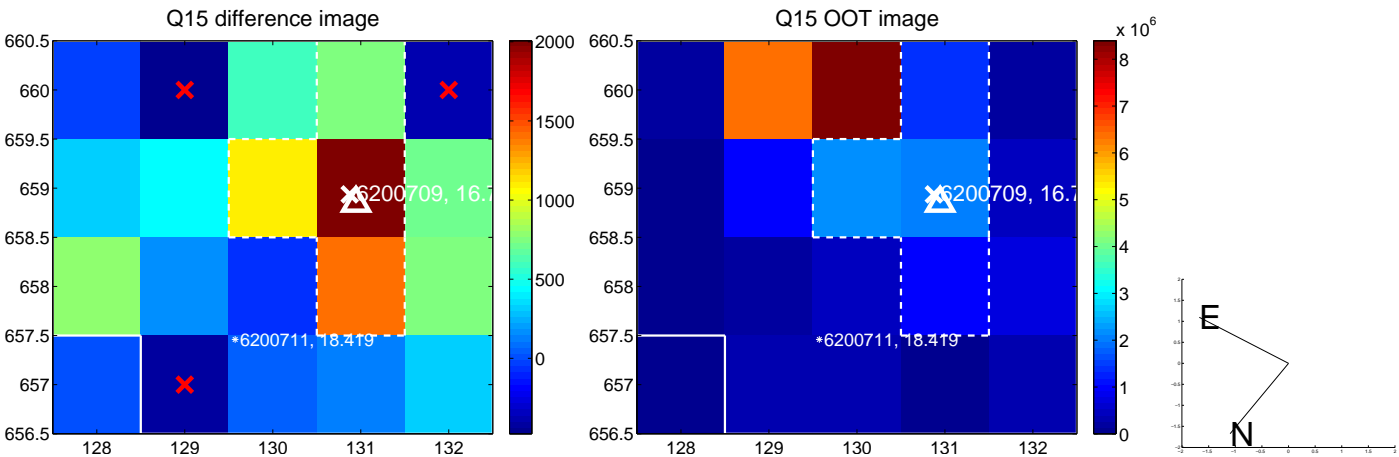
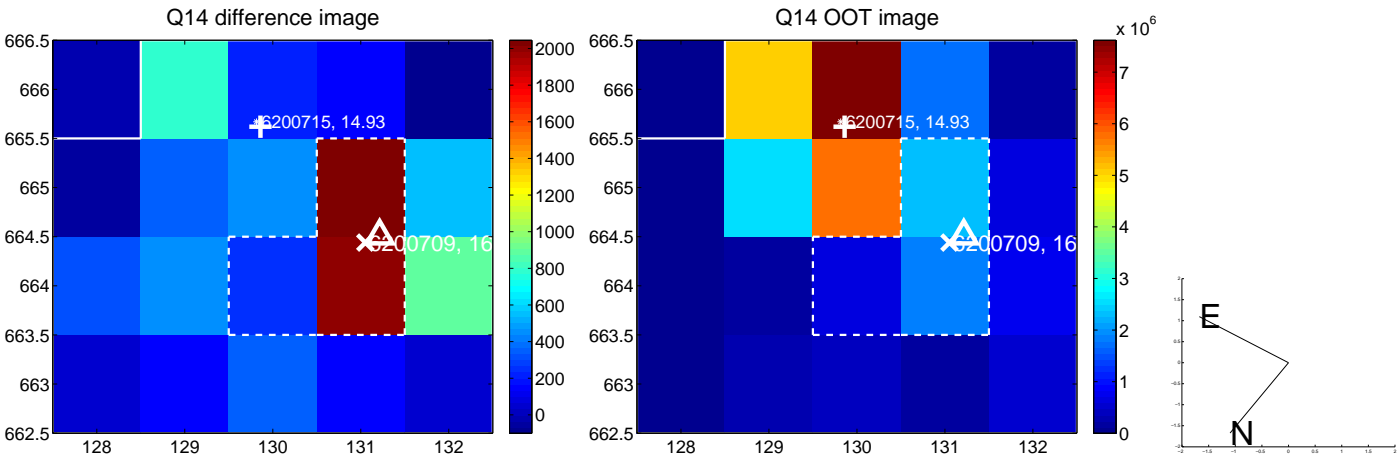
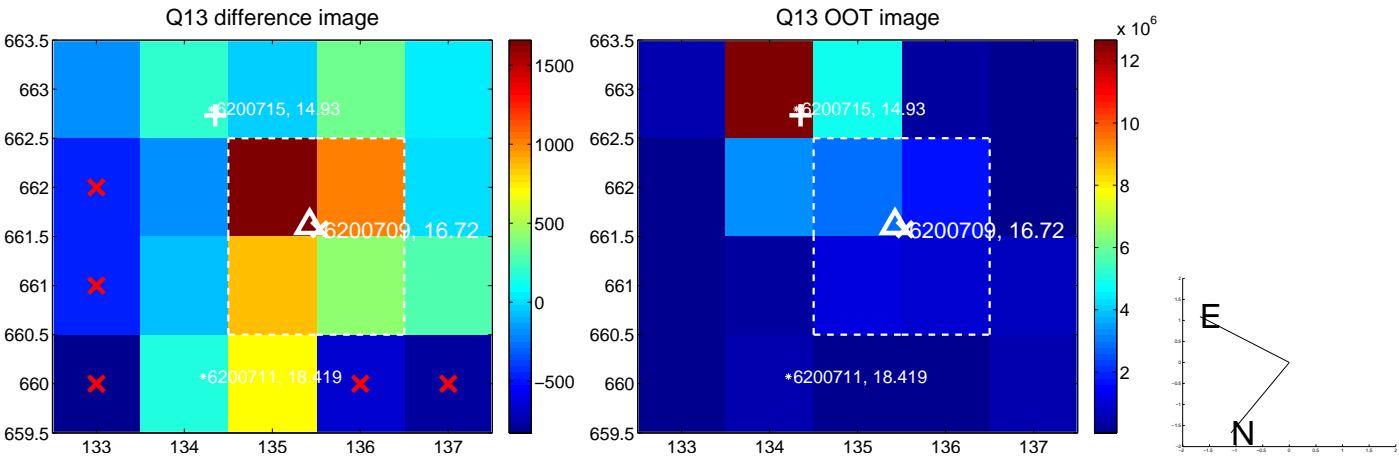
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



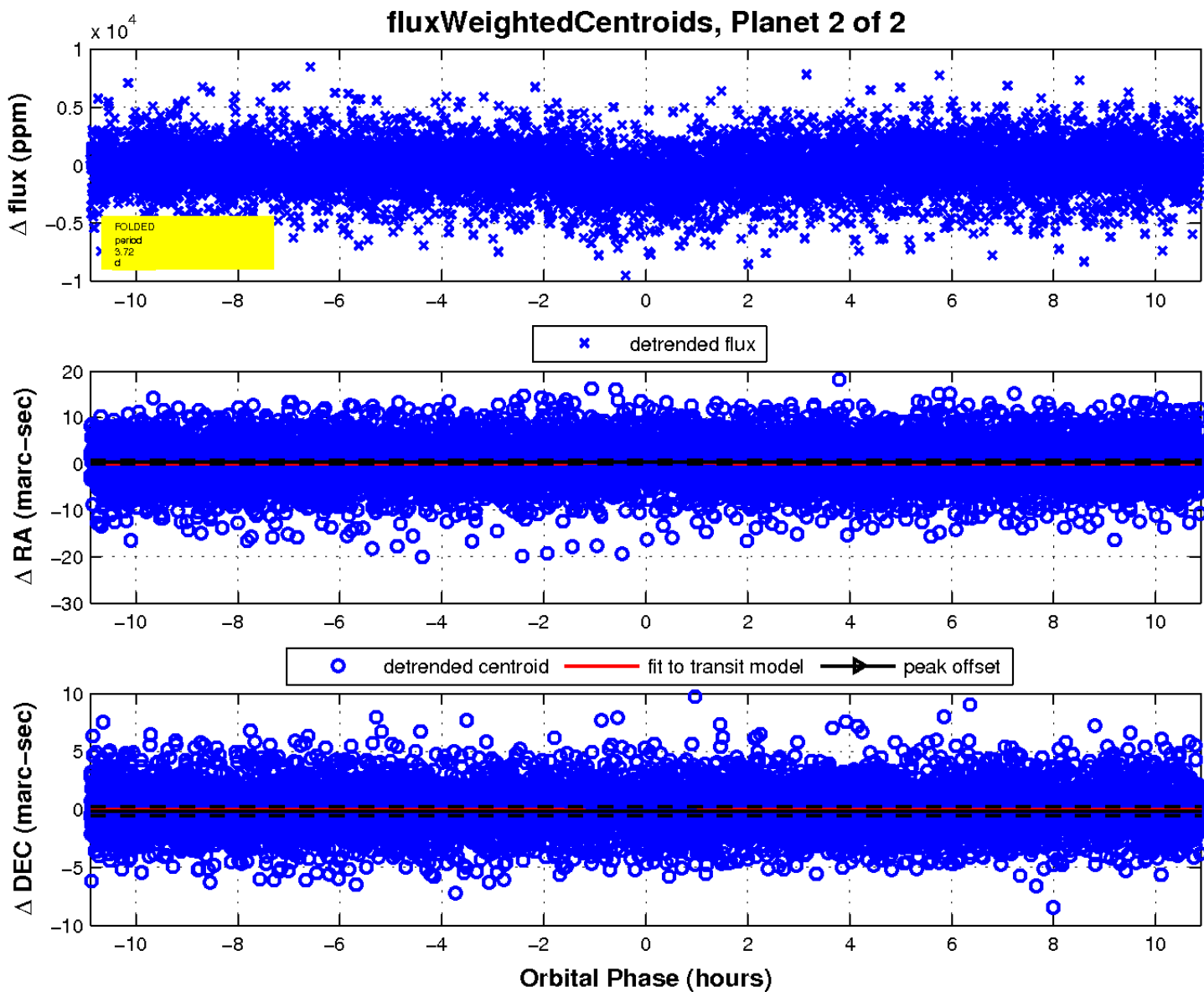
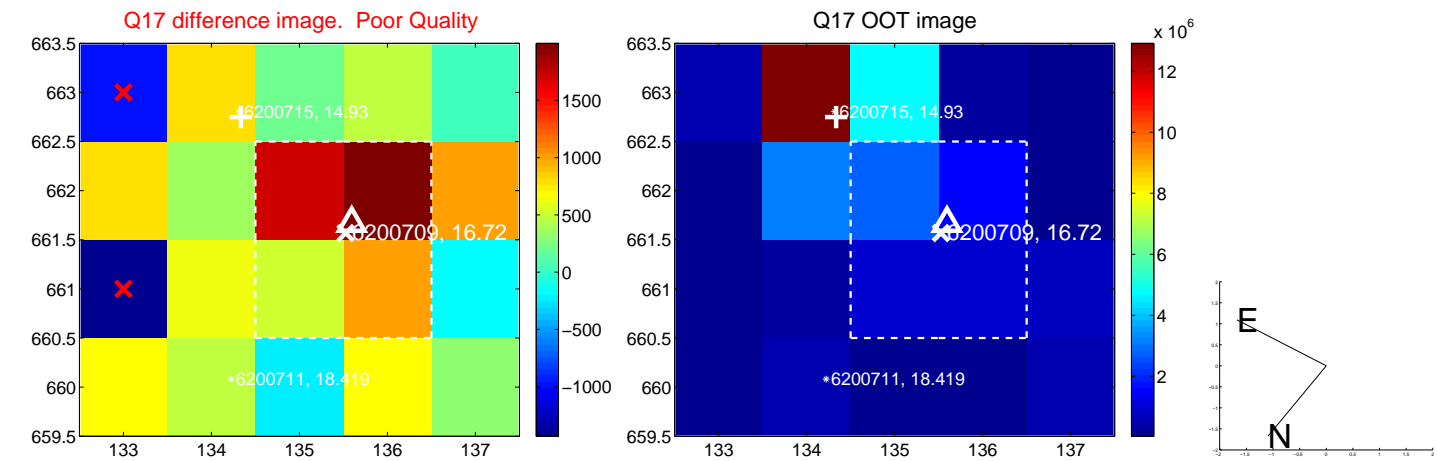
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

