

# KIC 007207061

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
007207061-01	OBS	2113.01	15.942546	146.328761	1062.2	3.625	29.6	31.5	0.81	5376	2.90	34.11
007207061-02	OBS	2113.02	12.330834	140.021011	866.5	3.267	26.1	27.0	0.81	5376	2.72	48.04

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007207061-01	OBS	PC	1.00	0	0	0	0	CENT_KIC_POS
007207061-02	OBS	PC	1.00	0	0	0	0	CENT_KIC_POS

**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.

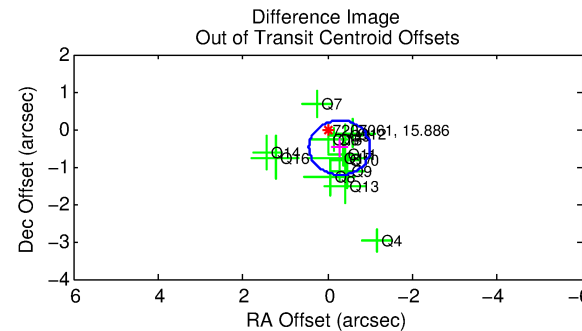
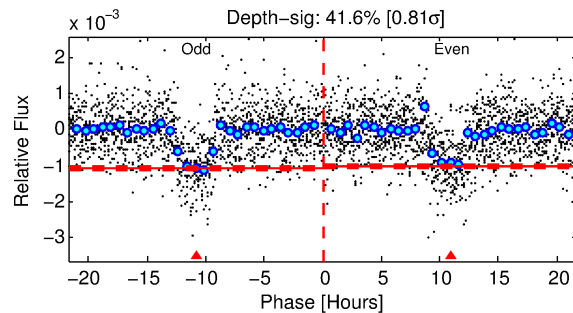
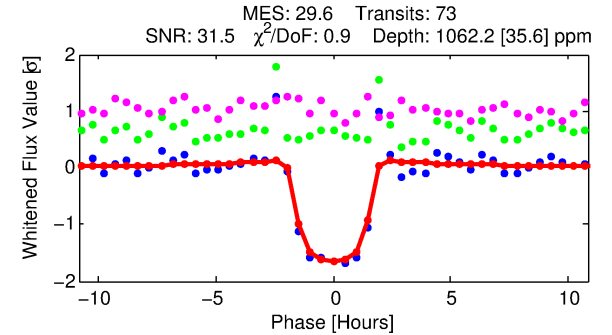
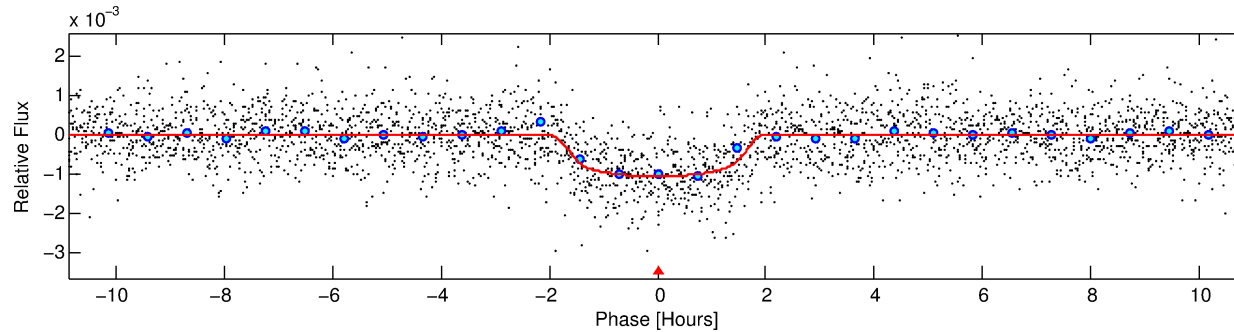
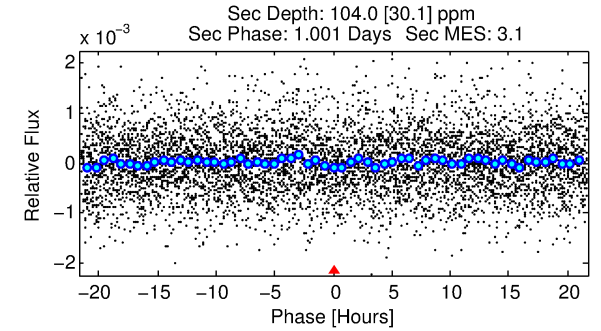
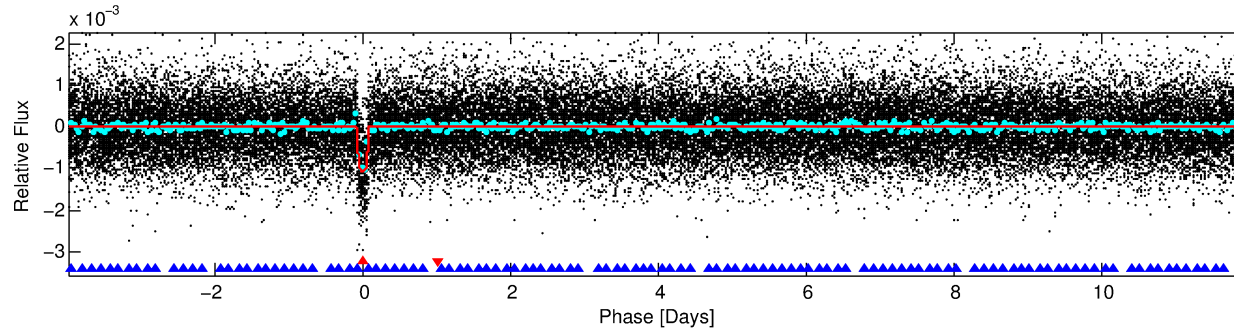
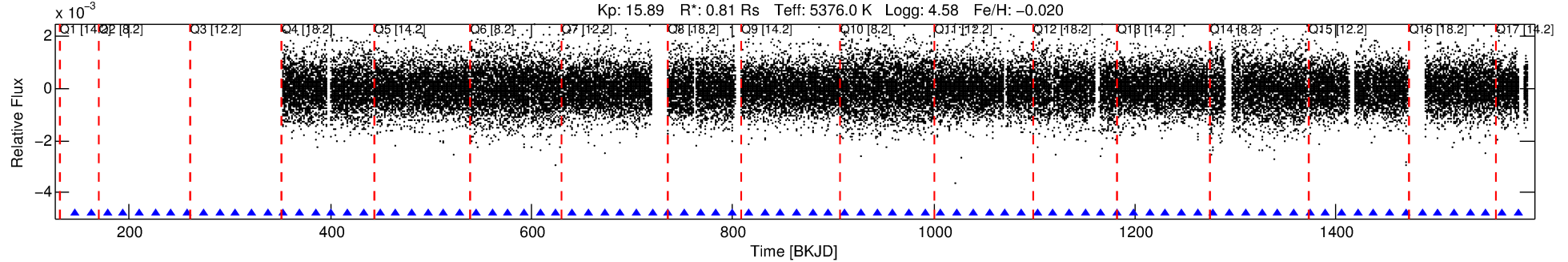
## Ephemeris Match Information For 007207061-01

No Significant Match Found

# DV One-Page Summary

KIC: 7207061 Candidate: 1 of 2 Period: 15.943 d  
KOI: K02113.01 Name: Kepler-417c Corr: 0.982

Kp: 15.89 R\*: 0.81 Rs Teff: 5376.0 K Logg: 4.58 Fe/H: -0.020



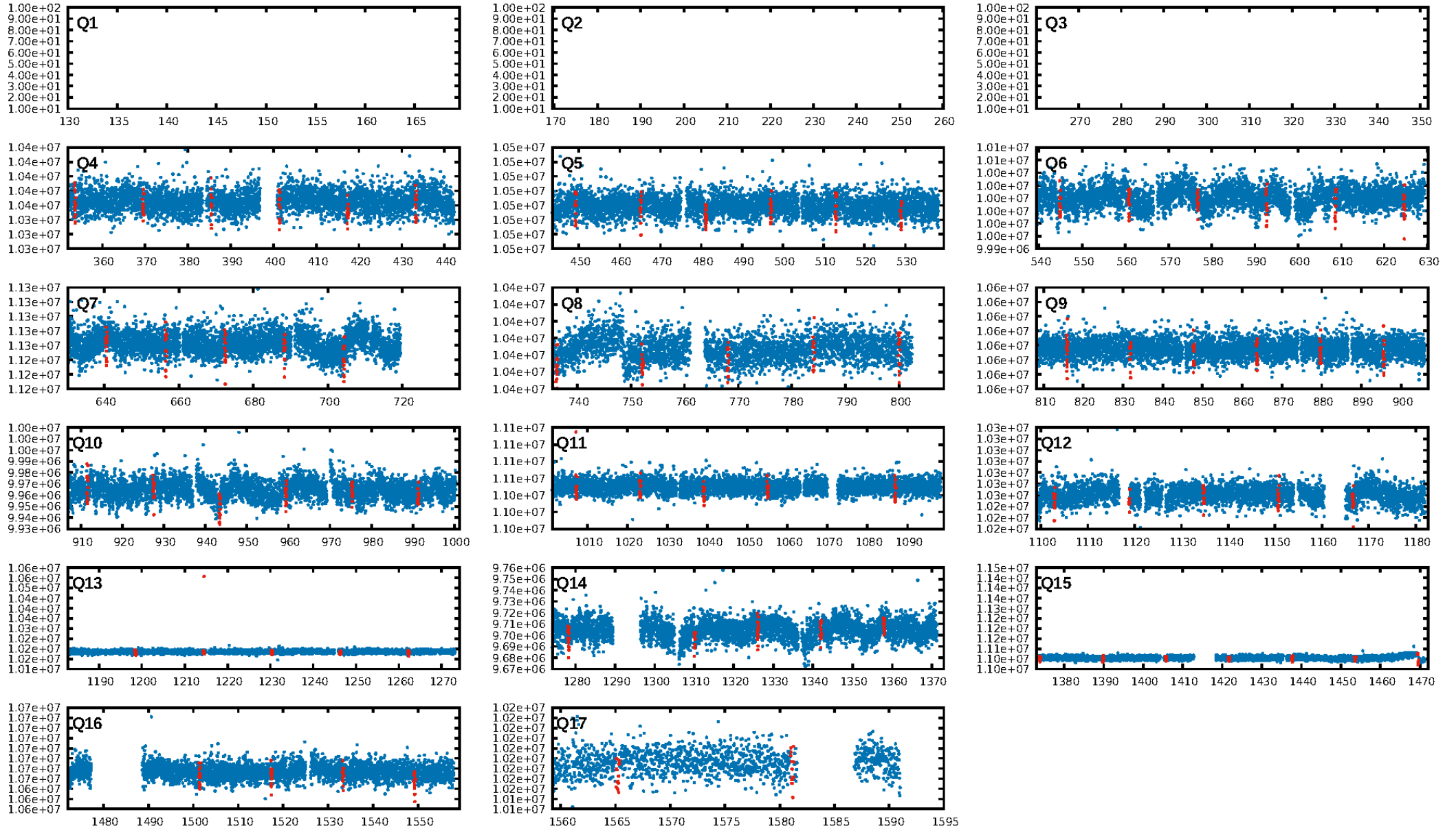
## DV Fit Results:

Period = 15.94255 [0.00006] d  
Epoch = 146.3288 [0.0032] BKJD  
Rp/R\* = 0.0329 [0.0075]  
a/R\* = 22.89 [20.34]  
b = 0.78 [0.46]  
Seff = 34.11 [9.77]  
Teq = 616 [44] K  
Rp = 2.89 [0.89] Re  
a = 0.1194 [0.0207] AU  
Ag = 97.33 [57.97] [1.66σ]  
Teffp = 2993 [417] K [5.66σ]

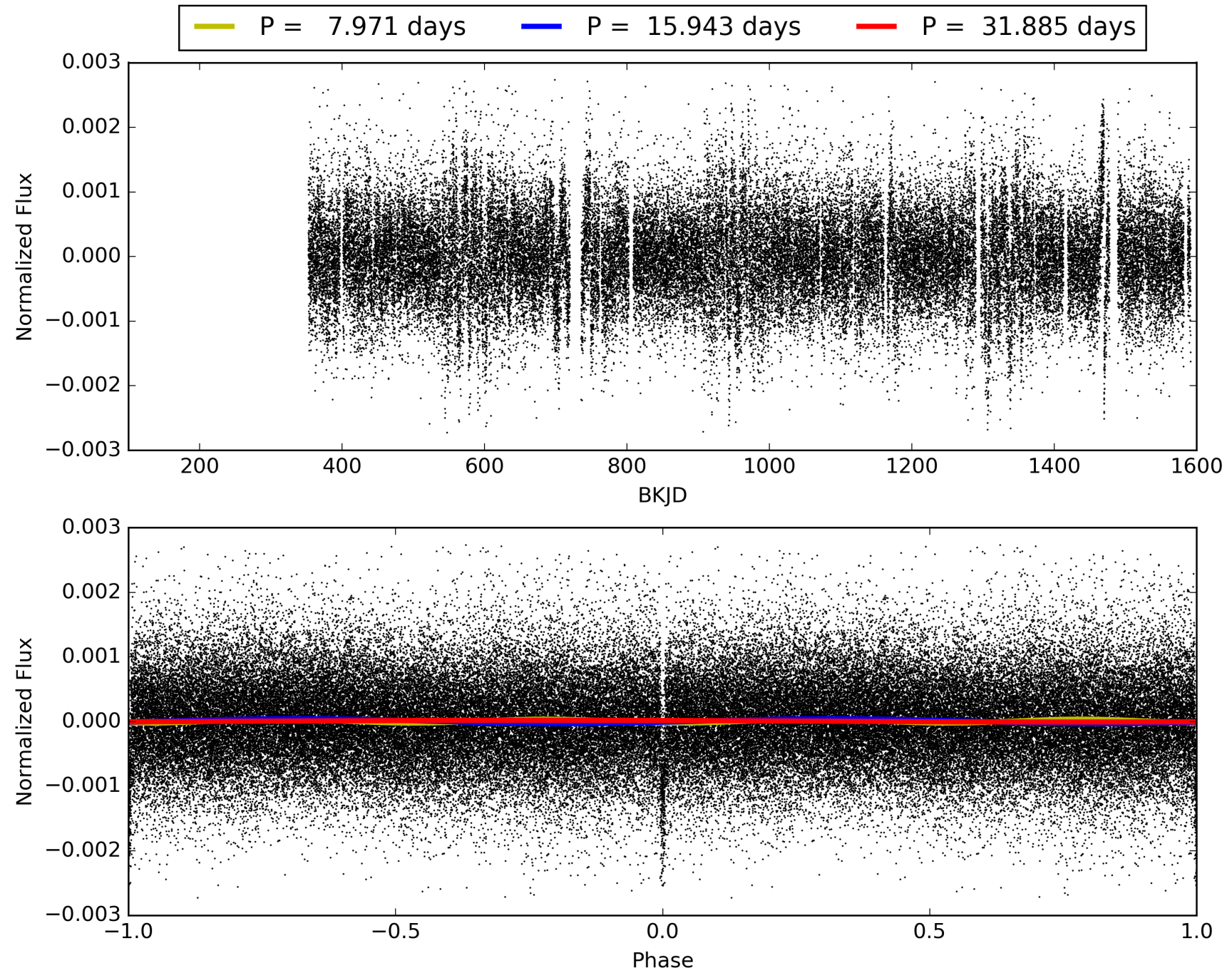
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [17.76σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 84.8%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 4.46e-189  
RollingBand-fgt: 1.00 [71/71]  
GhostDiagnostic-chr: 3.406  
Centroid-sig: 1.0%  
Centroid-so: 0.510 arcsec [1.60σ]  
OotOffset-rm: 0.571 arcsec [2.36σ]  
KicOffset-rm: 0.349 arcsec [1.62σ]  
OotOffset-st: 3/3/4/4 [14]  
KicOffset-st: 3/3/4/4 [14]  
DiffImageQuality-fgm: 1.00 [14/14]  
DiffImageOverlap-fno: 1.00 [14/14]

# TCE 007207061-01, PDC Light Curves

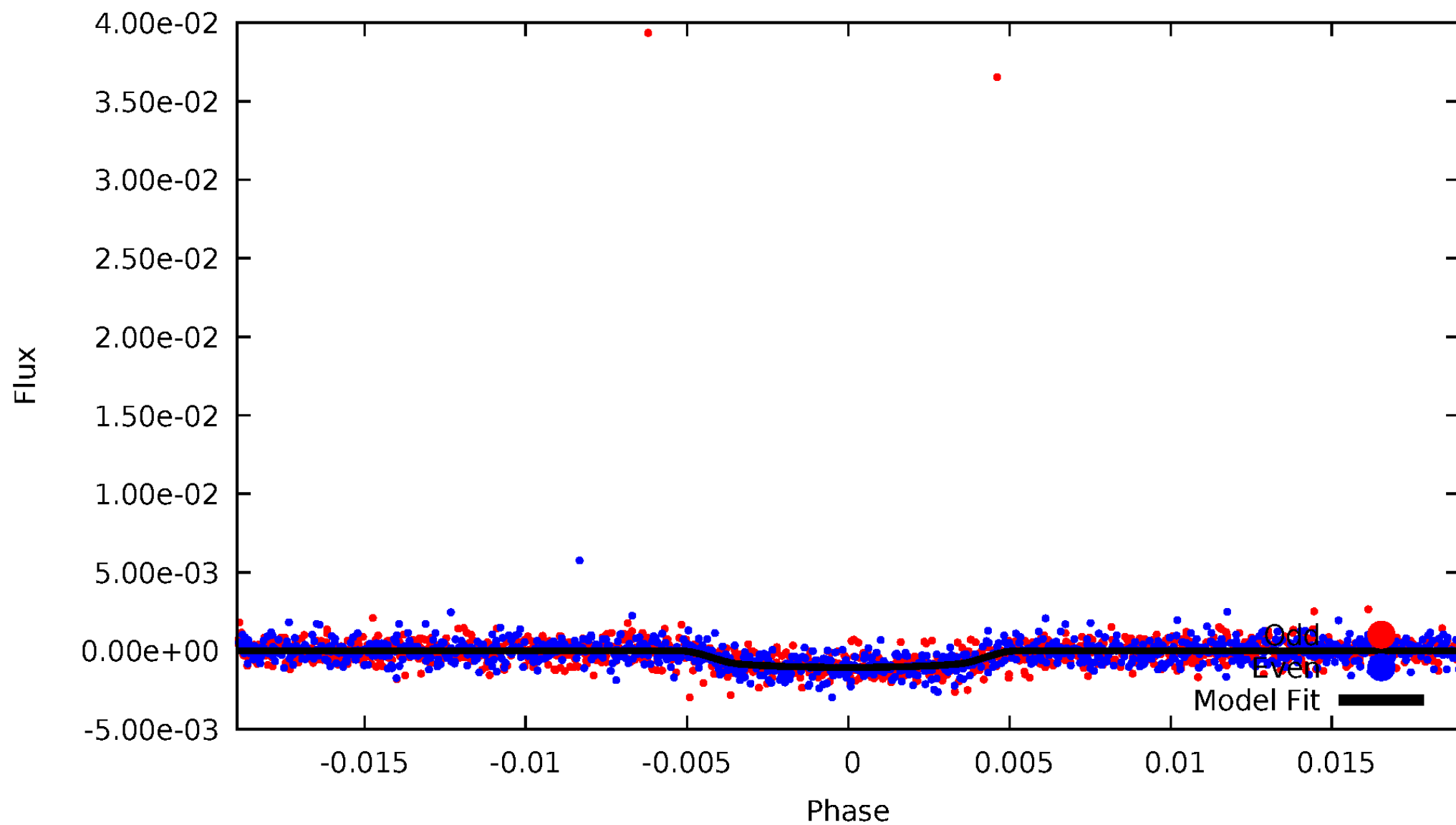


TCE 007207061-01



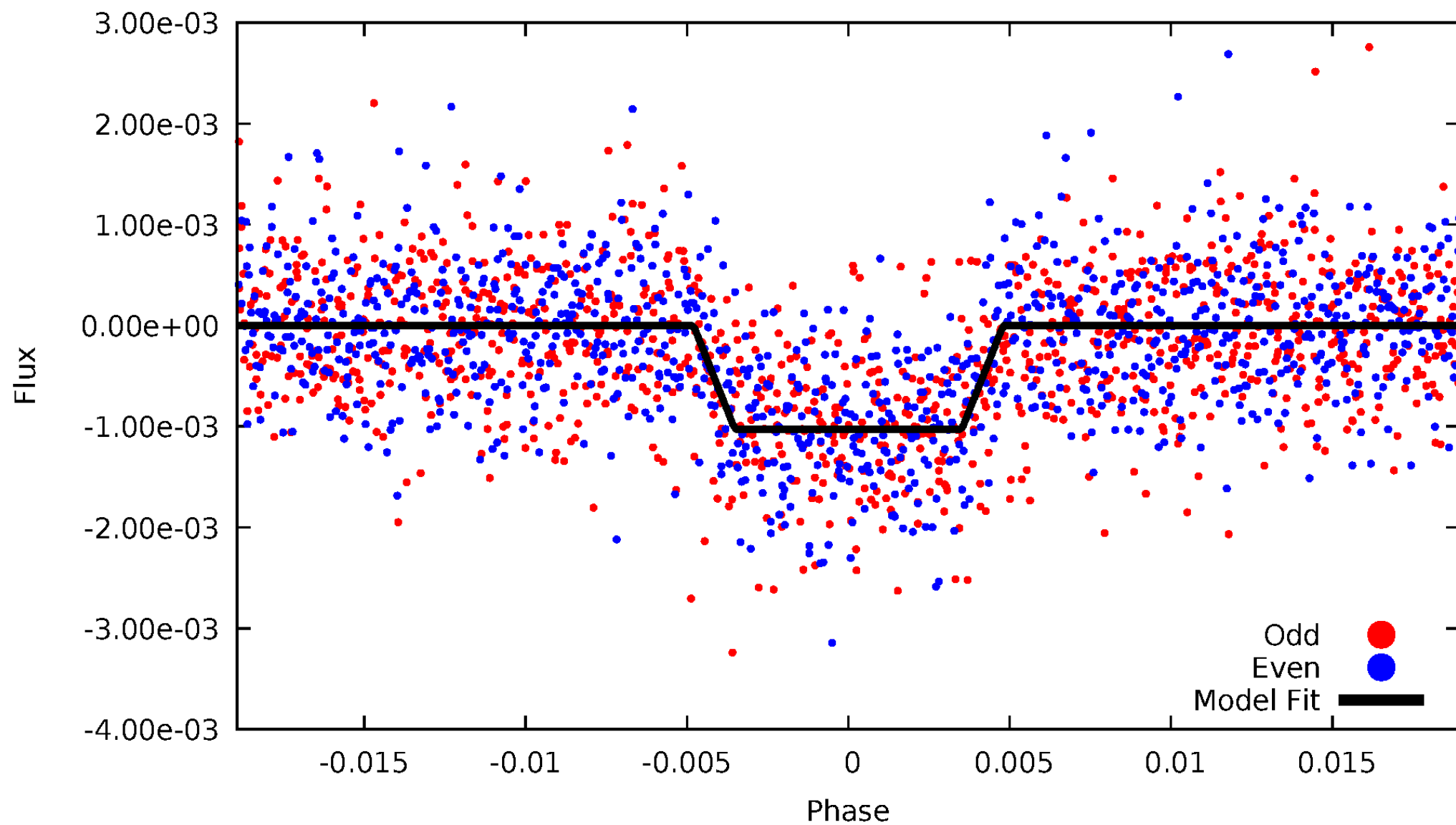
# DV Odd/Even

TCE 007207061-01



# ALT Odd/Even

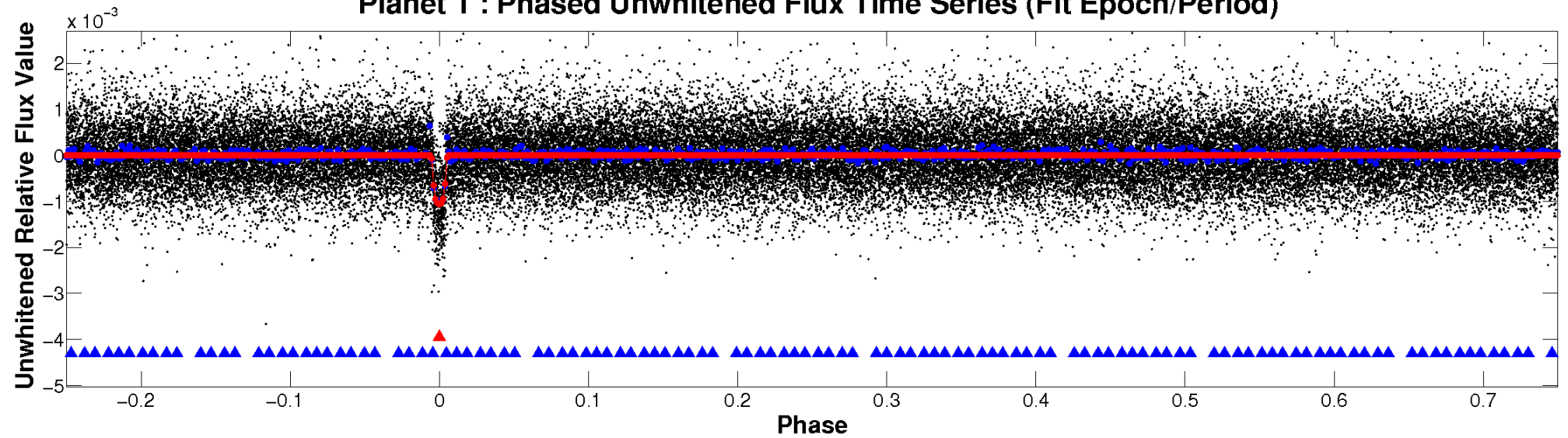
TCE 007207061-01



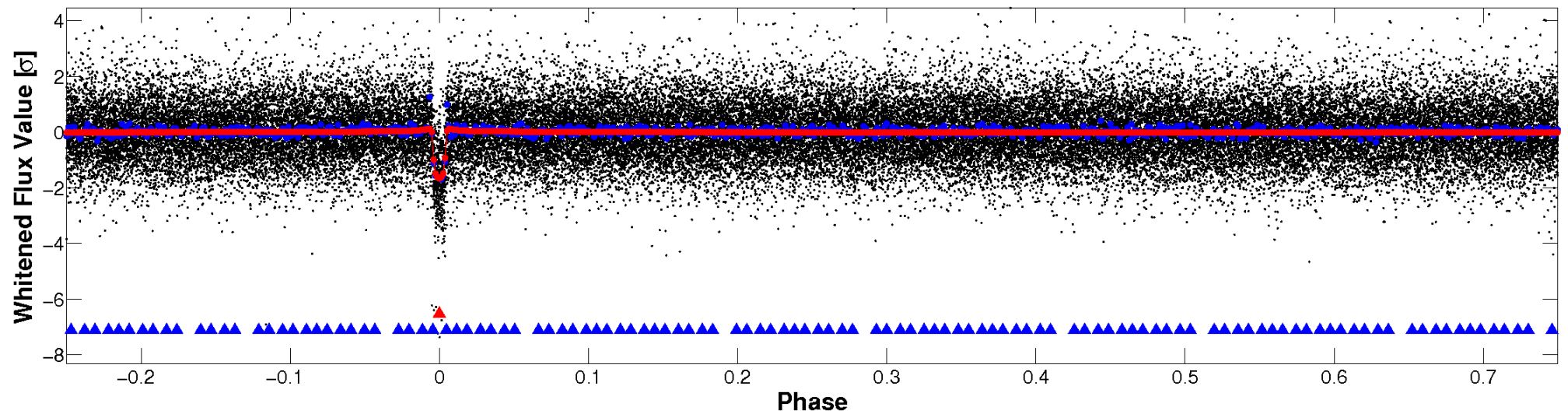


# Non-Whitened Vs. Whitened Light Curve

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

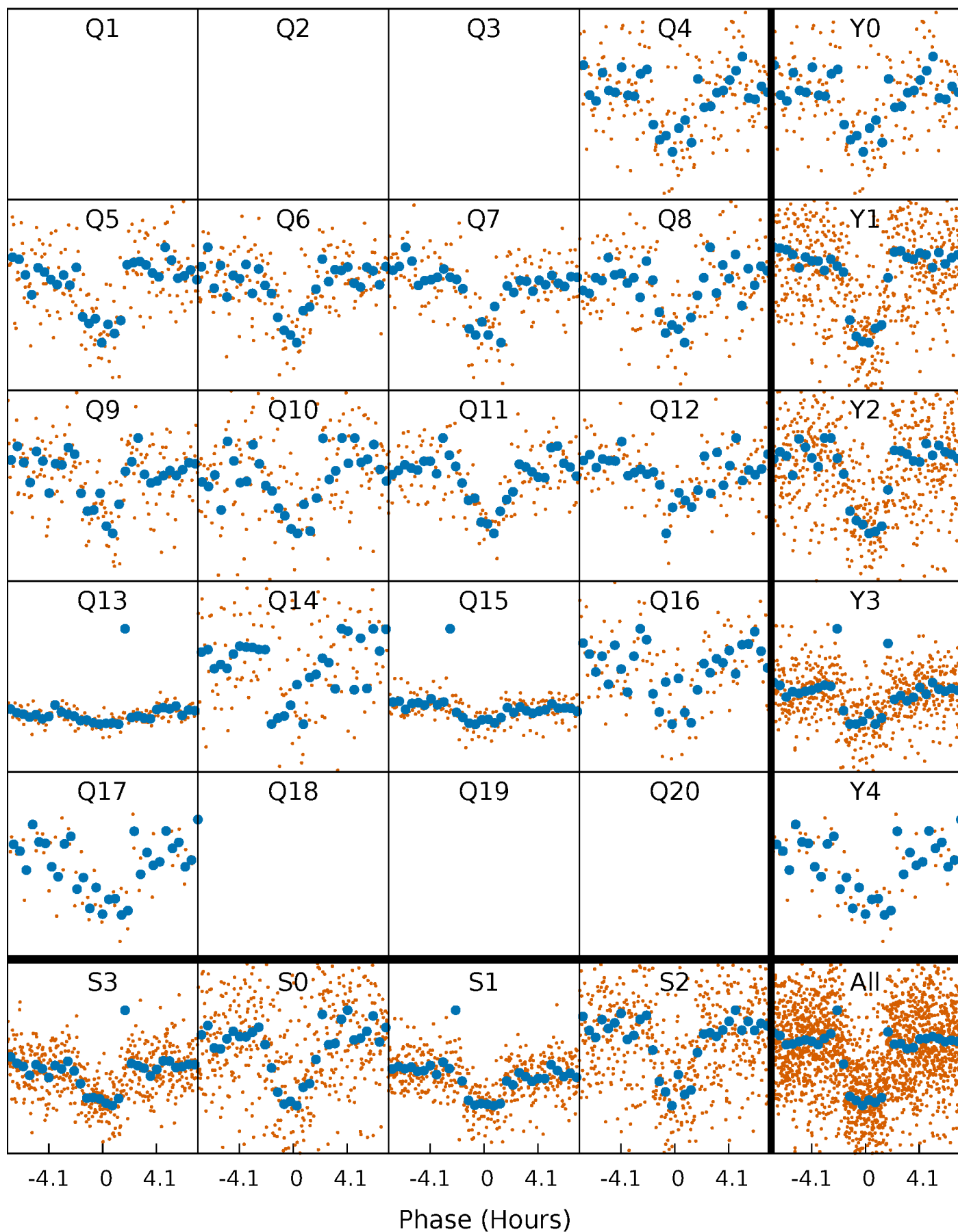


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

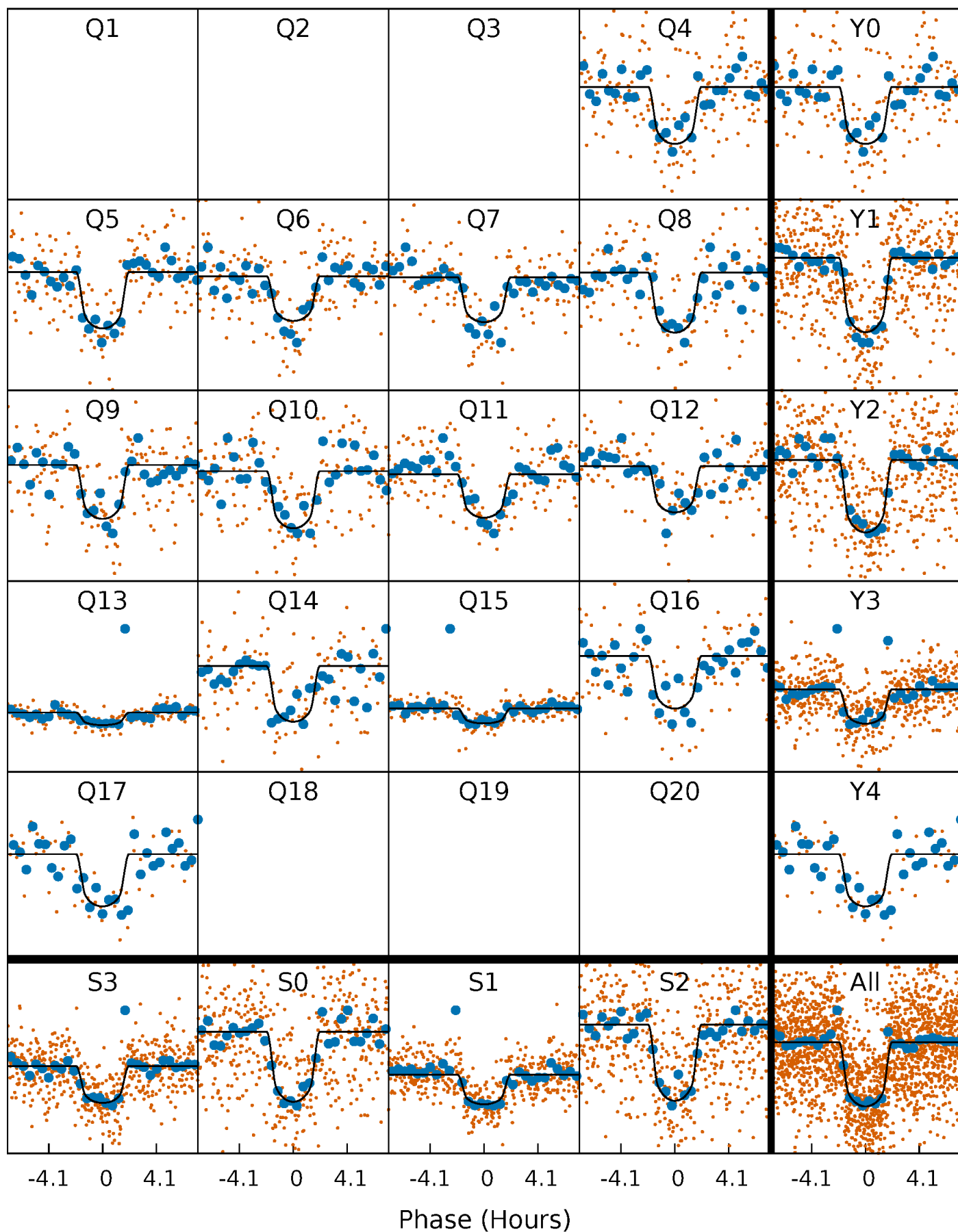
TCE 007207061-01 P= 15.942546 Days  $T_0=146.328761$  (BKJD)





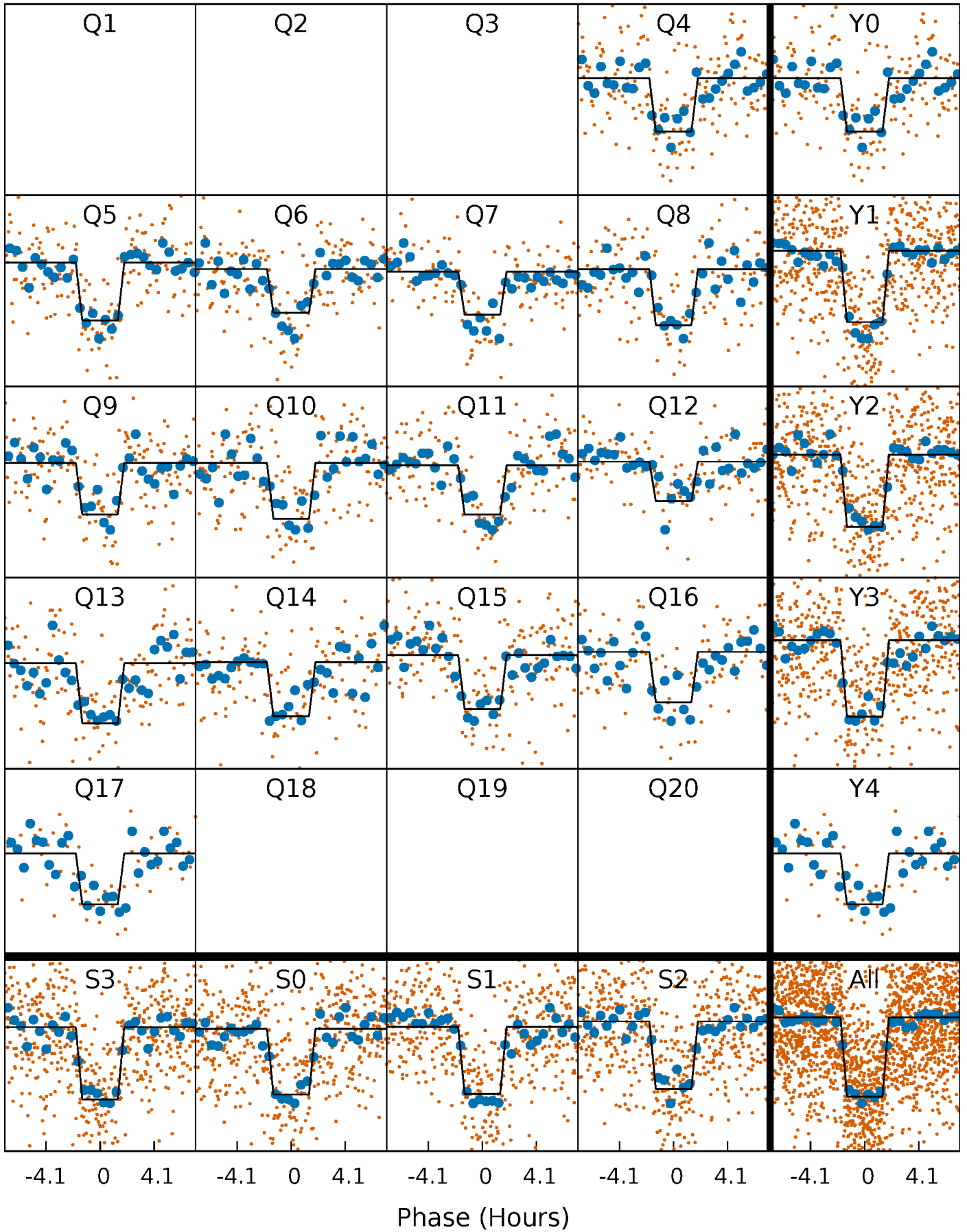
# DV Quarter-Phased Transit Curves

TCE 007207061-01 P= 15.942546 Days  $T_0=146.328761$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

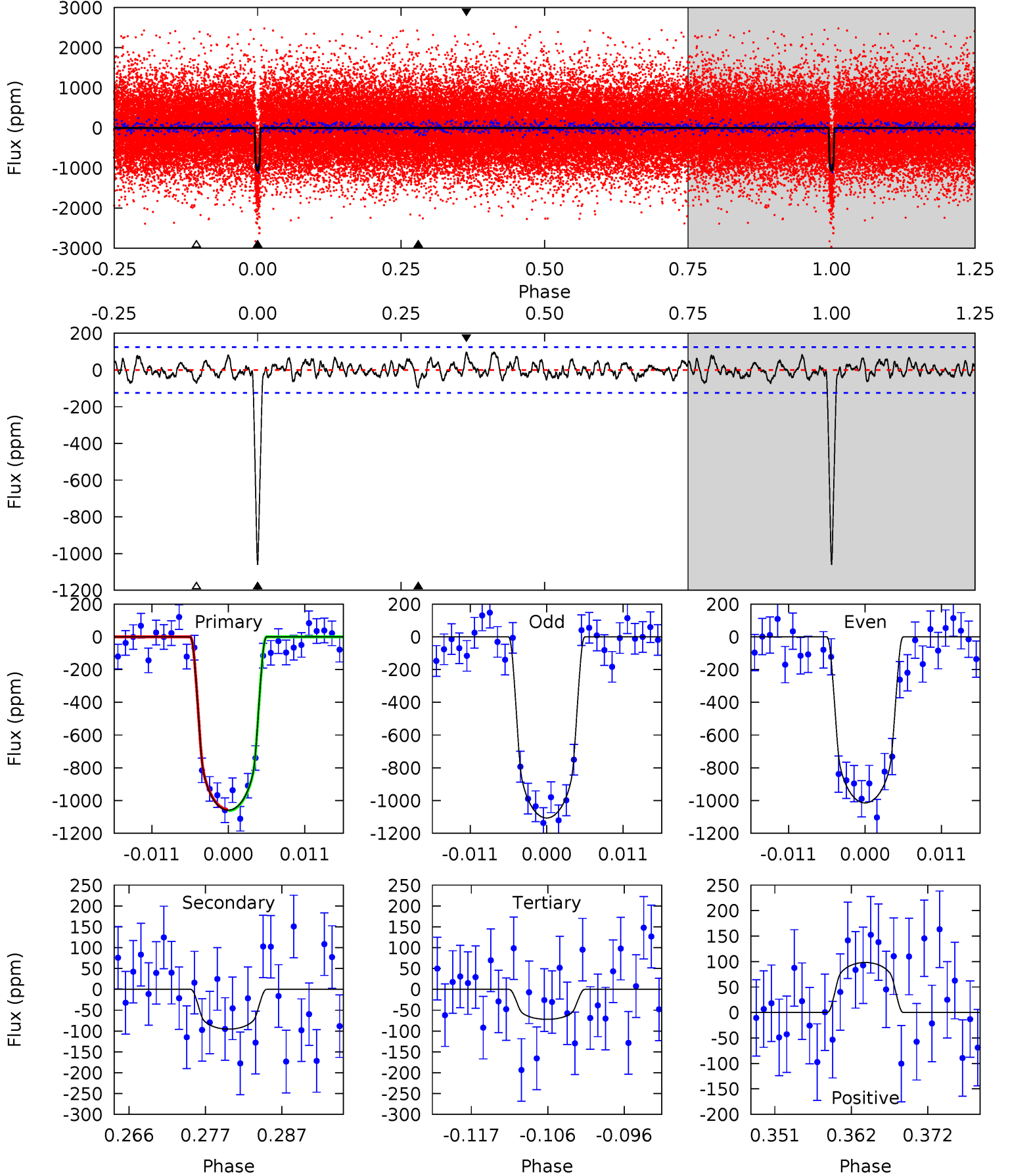
TCE 007207061-01 P= 15.942530 Days  $T_0=146.329249$  (BKJD)



# DV Model-Shift Uniqueness Test

007207061-01,  $P = 15.942546$  Days,  $E = 146.328761$  Days

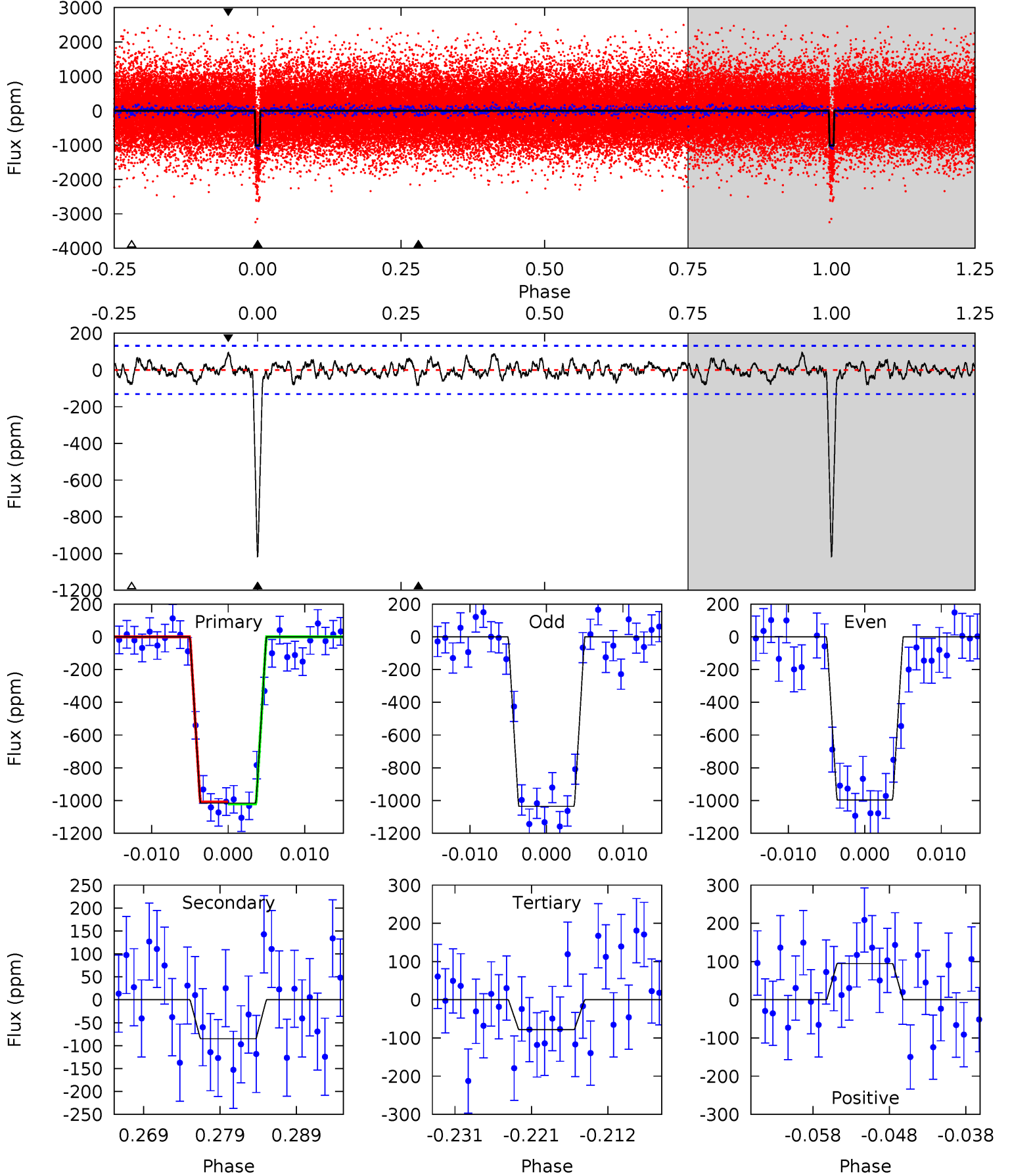
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
42.6	3.84	2.90	3.95	5.01	2.55	1.28	39.7	38.7	0.95	-0.11	1.86	1.00	0.08	0.14



# Alt Model-Shift Uniqueness Test

007207061-01,  $P = 15.942530$  Days,  $E = 146.329249$  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
38.9	3.25	2.98	3.63	5.03	2.59	1.16	35.9	35.2	0.27	-0.38	0.75	1.01	0.09	0.25



### Stellar Parameters For KIC 007207061

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5376^{+186}_{-186}$	$4.576^{+0.034}_{-0.136}$	$-0.020^{+0.250}_{-0.300}$	$0.806^{+0.168}_{-0.067}$	$0.897^{+0.071}_{-0.106}$	$2.413^{+0.441}_{-0.956}$
	+3%/-3%	+1%/-3%	+1250%/-1500%	+21%/-8%	+8%/-12%	+18%/-40%
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 007207061-01 / KOI 2113.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-96 \pm 25$	$2.98^{+0.75}_{-0.72}$	$882^{+44}_{-40}$	$3415^{+372}_{-269}$	$82^{+70}_{-36}$
Alt.	$-85 \pm 26$	$2.91^{+0.78}_{-0.75}$	$878^{+46}_{-39}$	$3395^{+350}_{-292}$	$76^{+71}_{-34}$

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



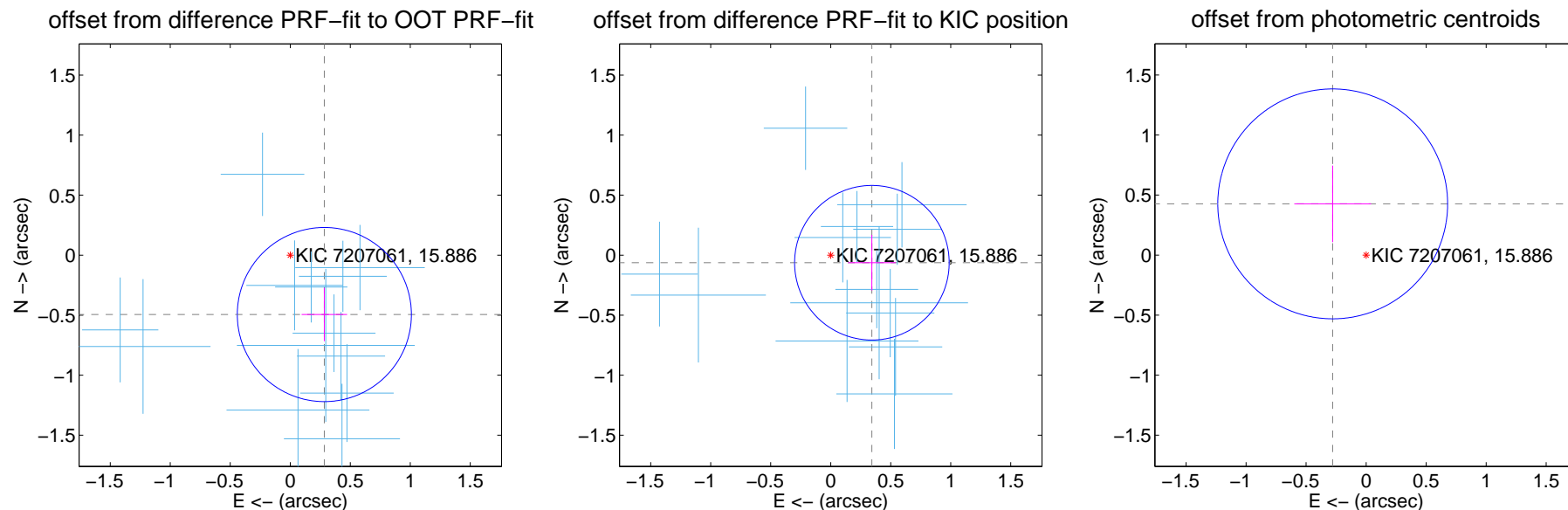
## DV Centroid Data

Supplemental centroid analysis for 007207061-01. Kepler magnitude: 15.89. Transit SNR 31.50

There are 14 quarters with good PRF difference image offsets

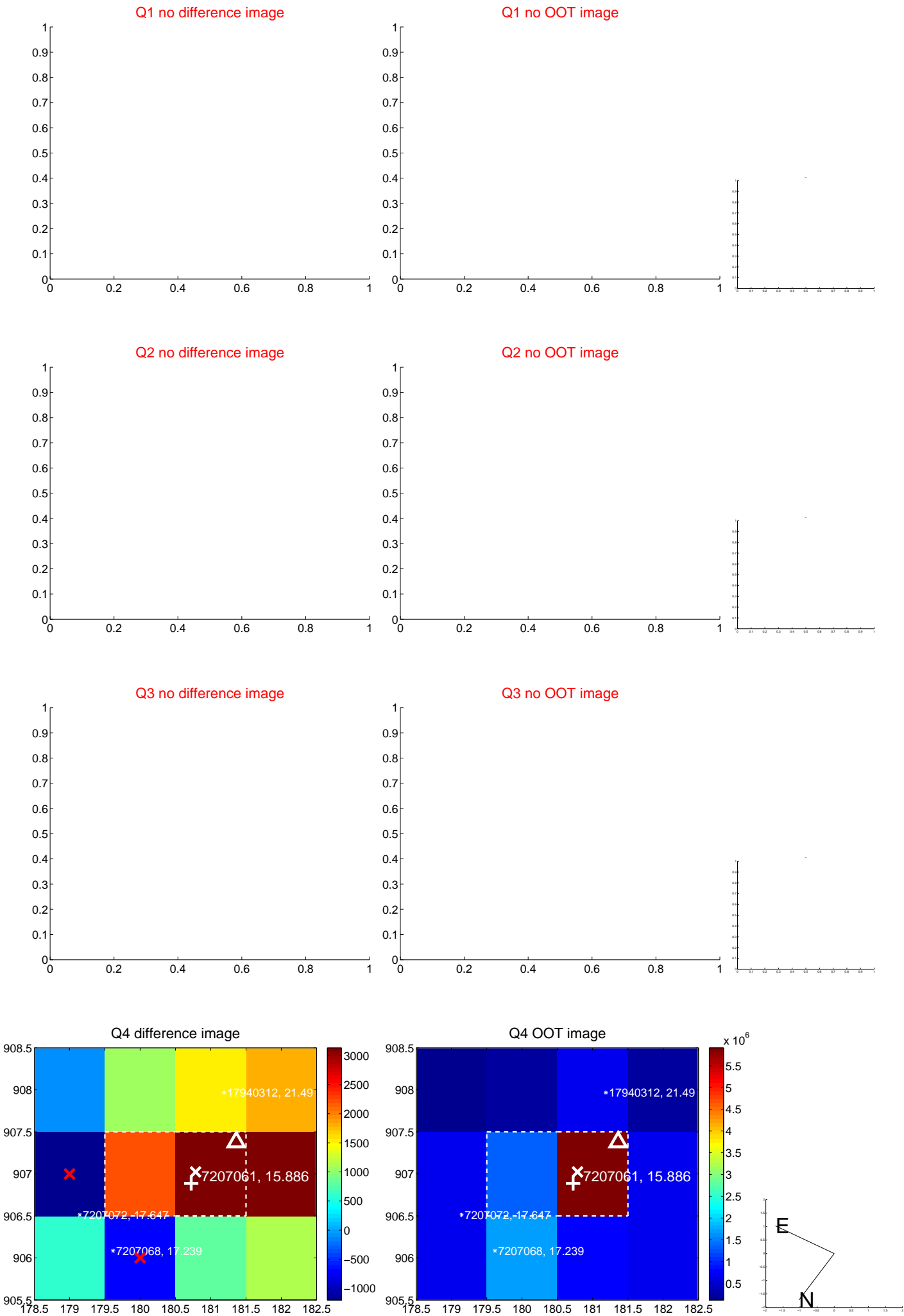
The direct PRF centroid is offset from the target star catalog position by about 0.37 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.571 \pm 0.242$	2.36	$-0.284 \pm 0.190$	$-0.495 \pm 0.222$
PRF-fit source offset from KIC position	$0.349 \pm 0.215$	1.62	$-0.343 \pm 0.199$	$-0.063 \pm 0.232$
photometric centroid source offset	$0.51 \pm 0.32$	1.60	$0.28 \pm 0.32$	$0.43 \pm 0.32$

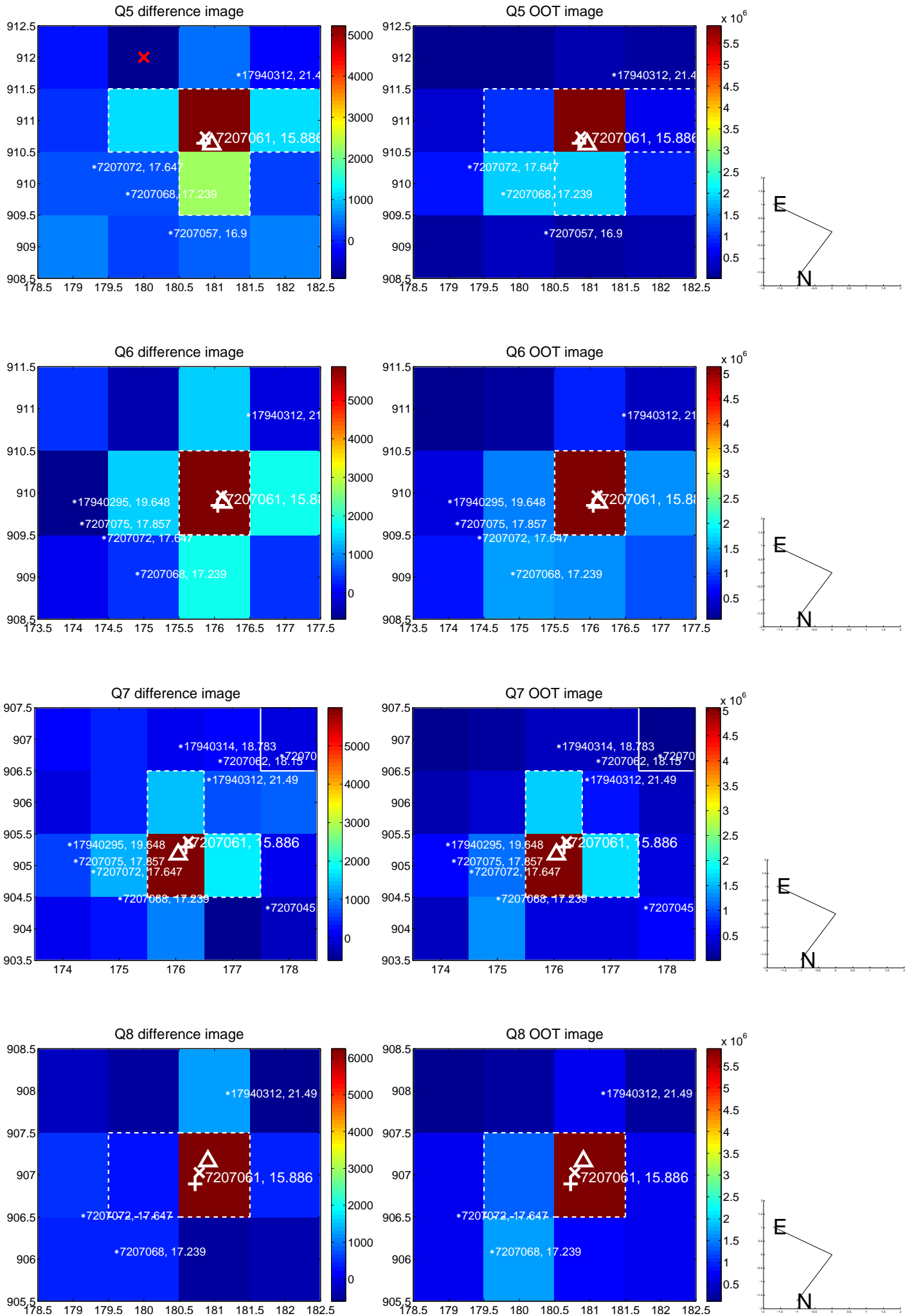


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

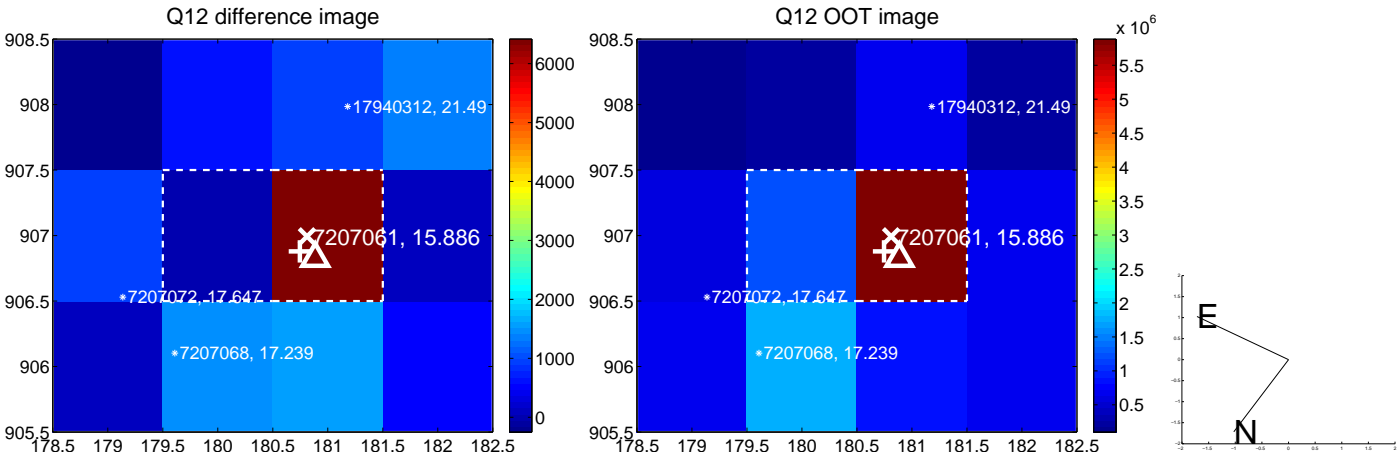
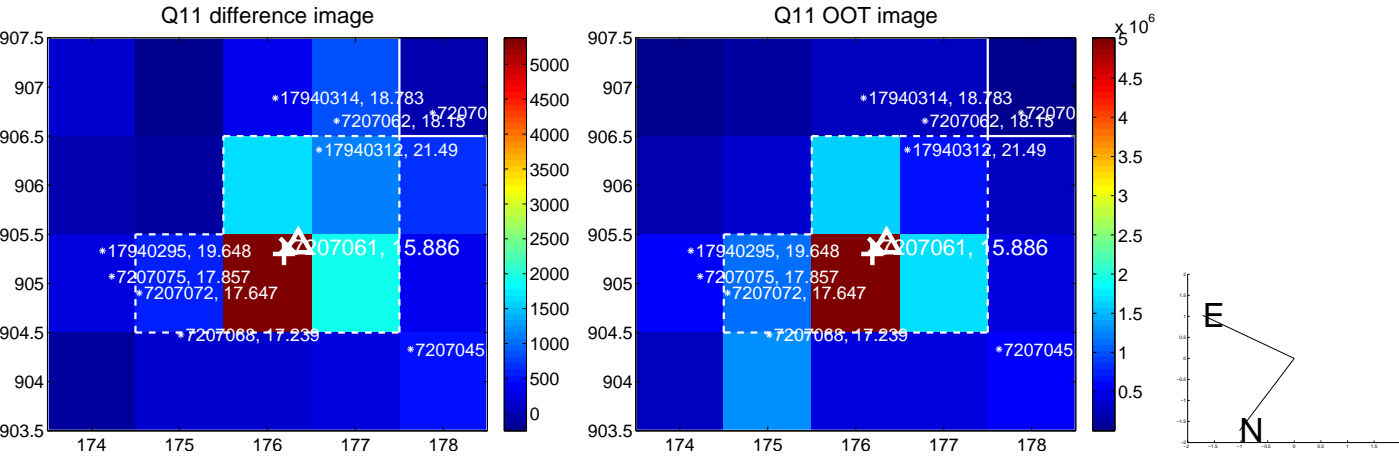
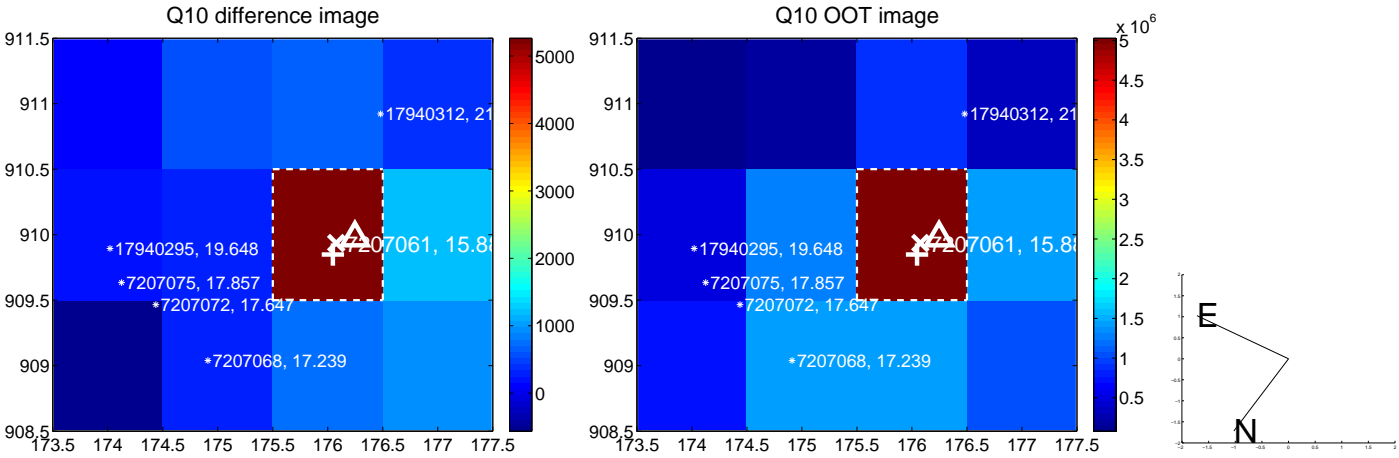
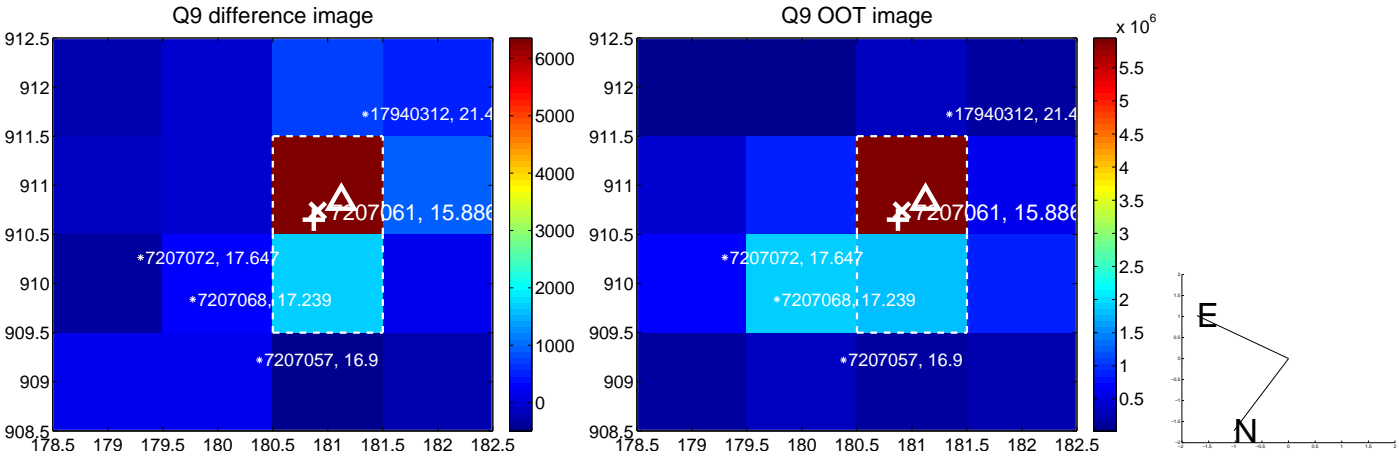
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



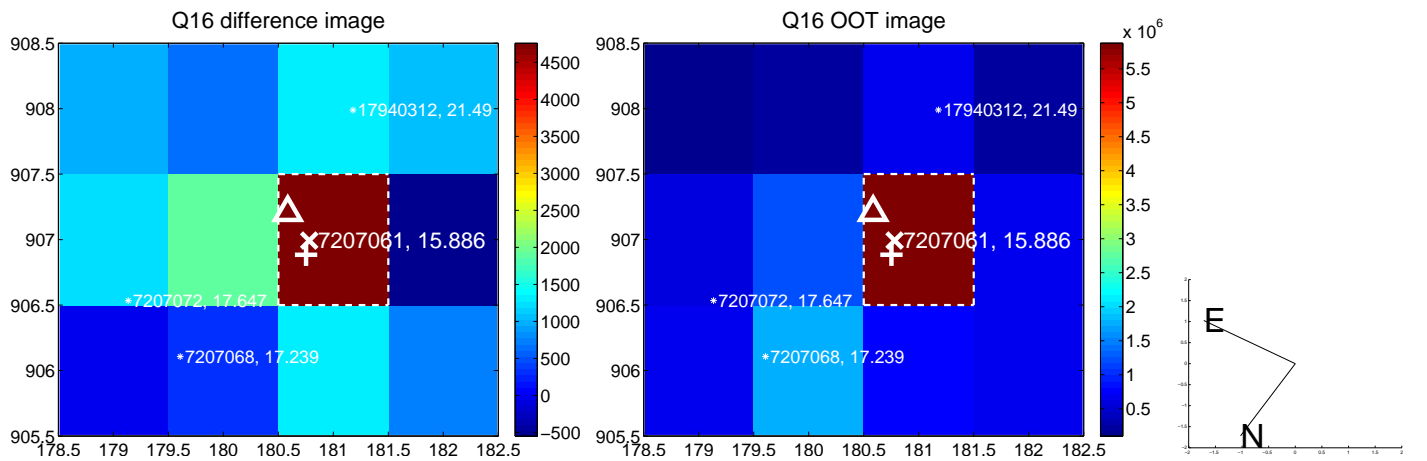
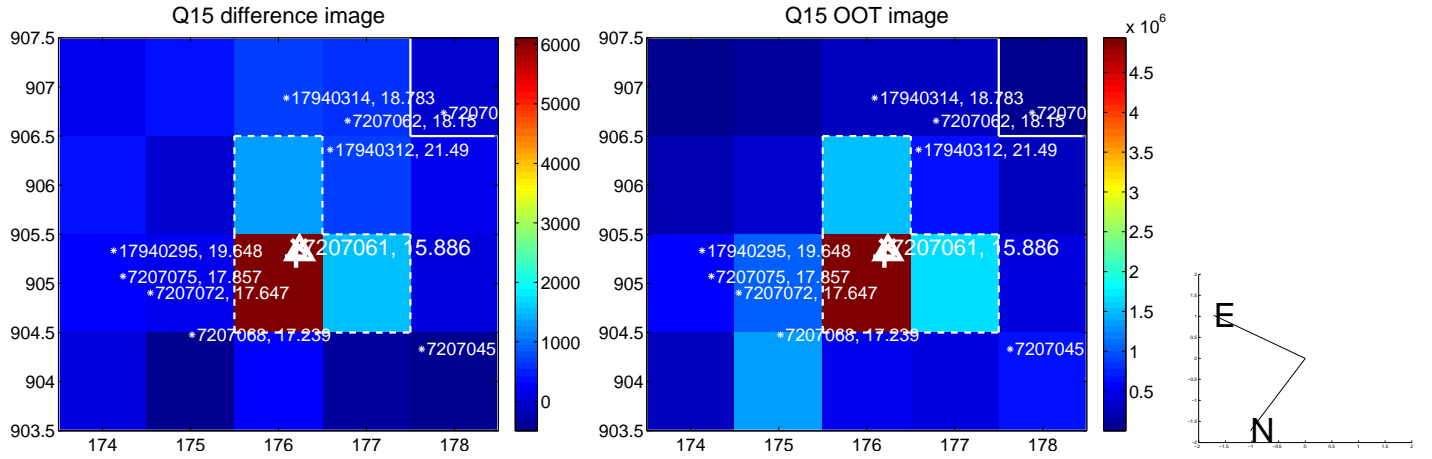
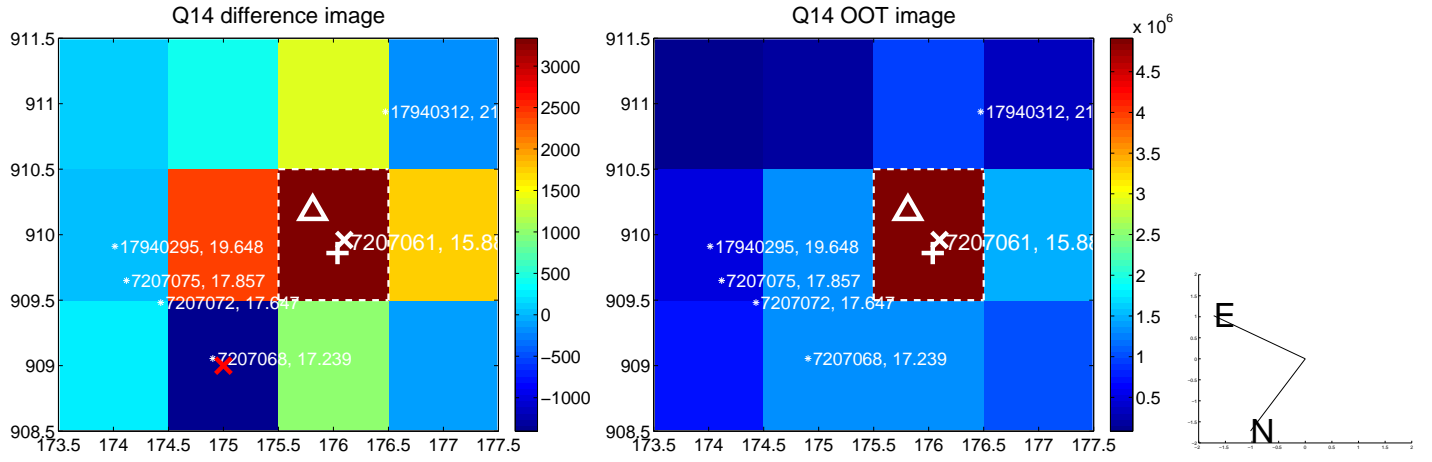
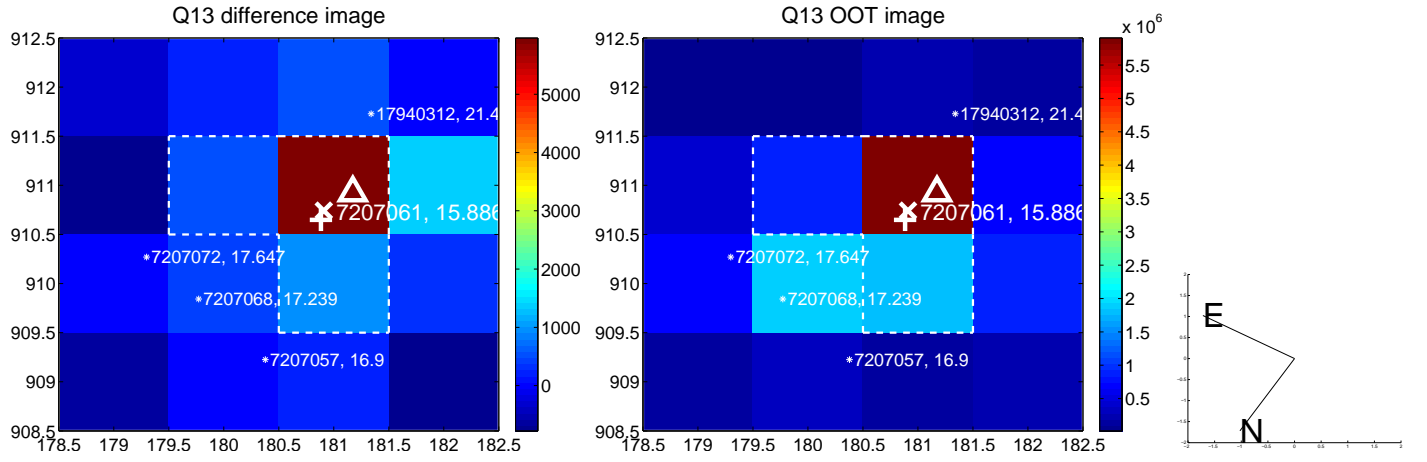
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

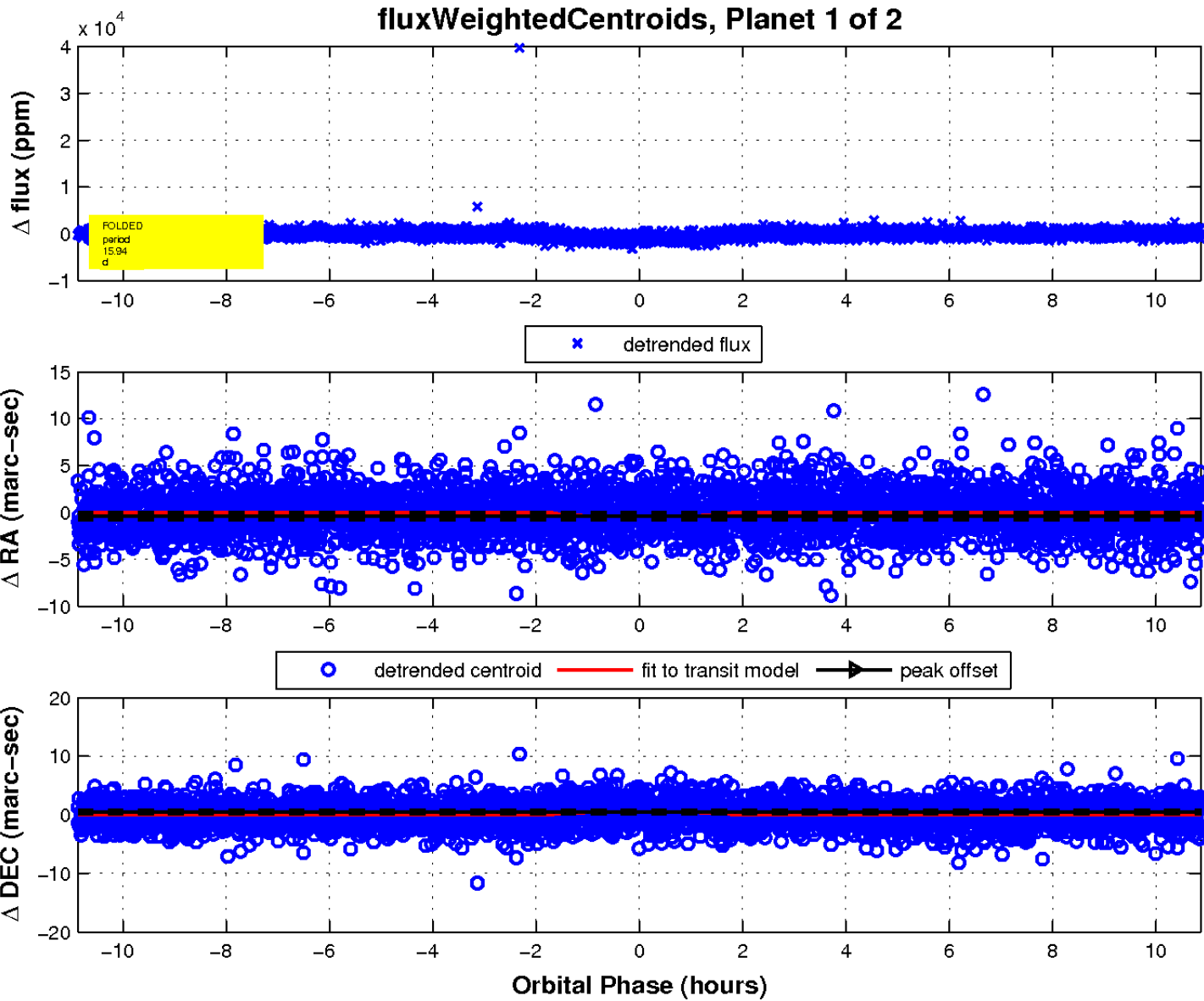
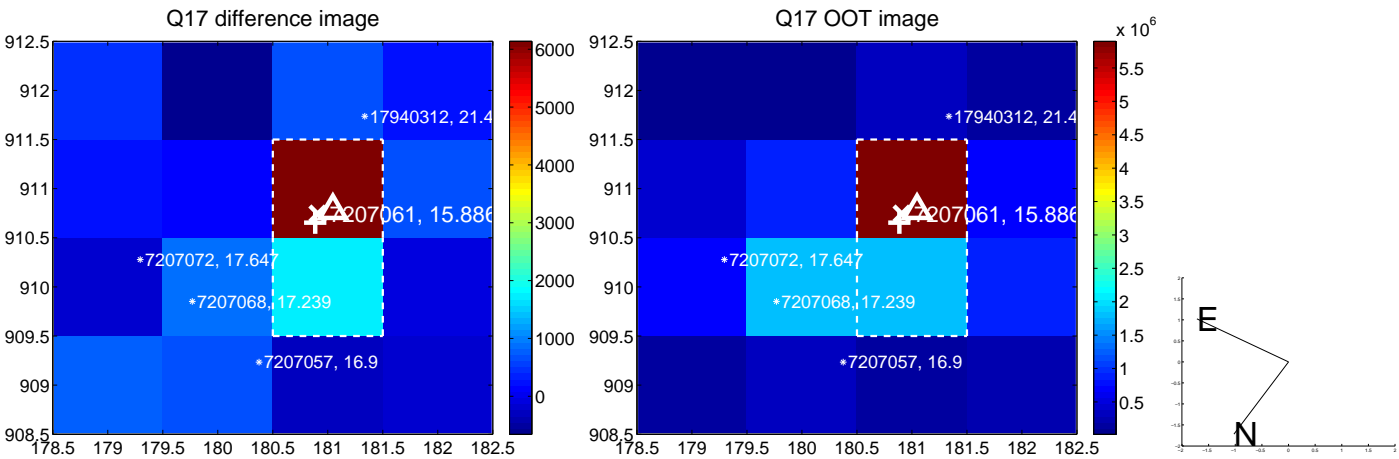


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



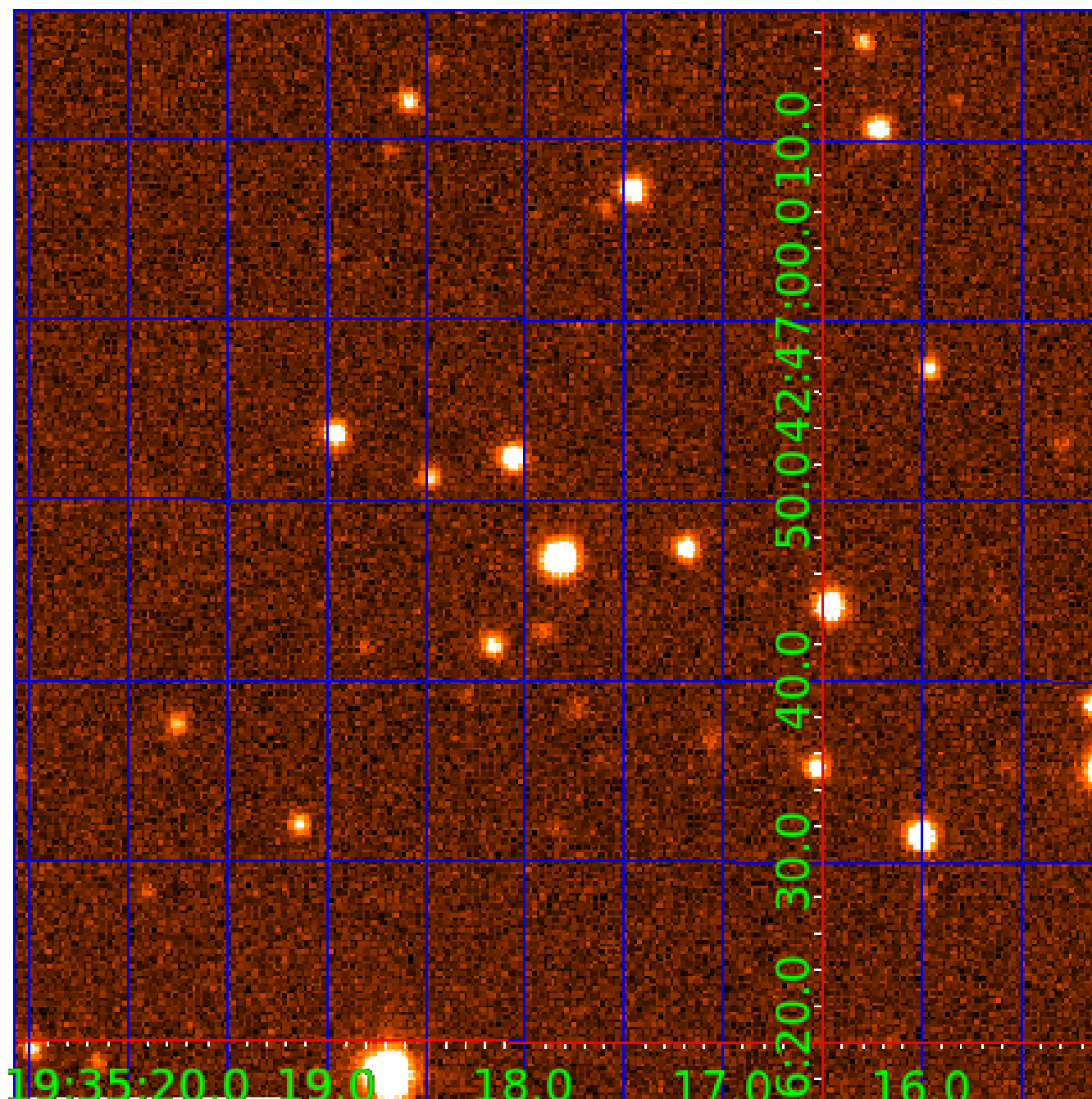


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 007207061

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
007207061-01	OBS	2113.01	15.942546	146.328761	1062.2	3.625	29.6	31.5	0.81	5376	2.90	34.11
007207061-02	OBS	2113.02	12.330834	140.021011	866.5	3.267	26.1	27.0	0.81	5376	2.72	48.04

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007207061-01	OBS	PC	1.00	0	0	0	0	CENT_KIC_POS
007207061-02	OBS	PC	1.00	0	0	0	0	CENT_KIC_POS

**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.

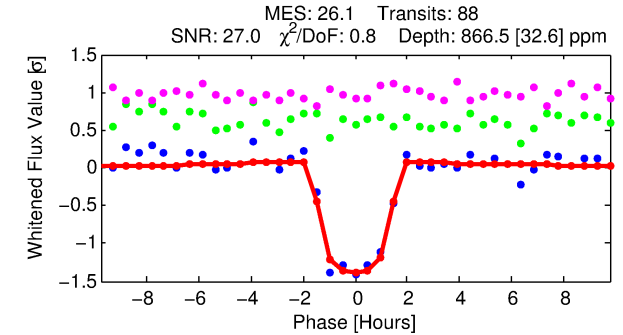
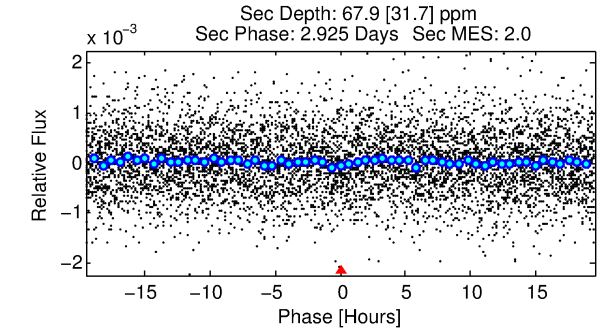
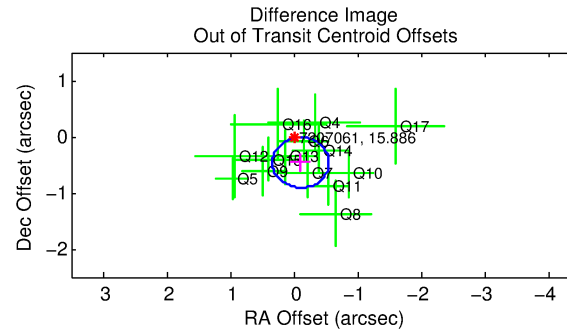
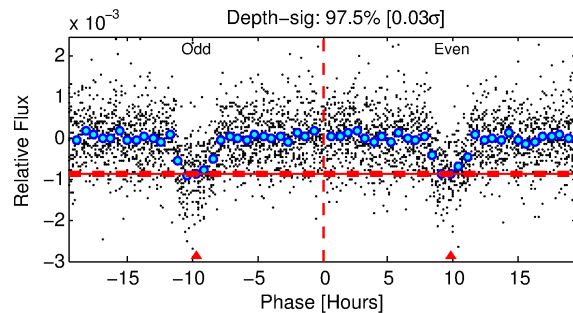
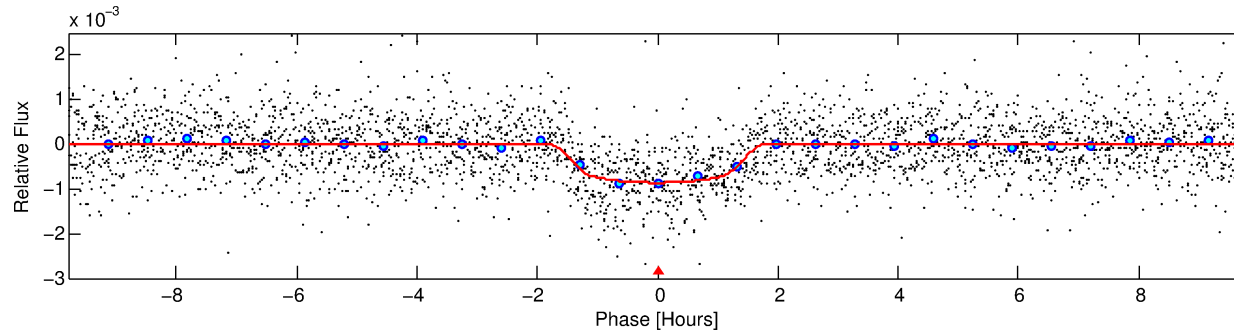
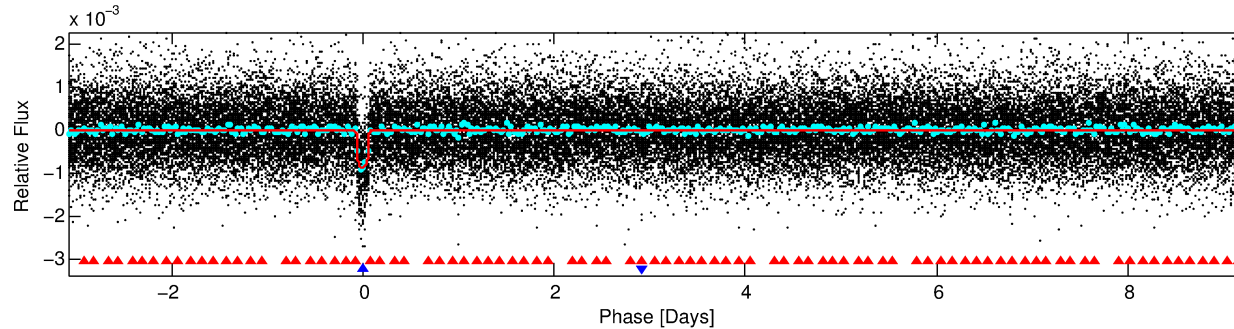
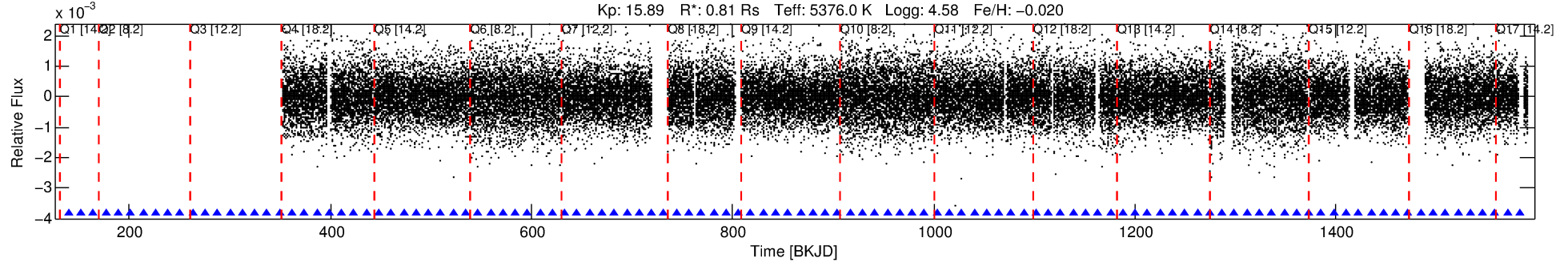
## Ephemeris Match Information For 007207061-02

No Significant Match Found

# DV One-Page Summary

KIC: 7207061 Candidate: 2 of 2 Period: 12.331 d  
KOI: K02113.02 Name: Kepler-417b Corr: 0.967

Kp: 15.89 R\*: 0.81 Rs Teff: 5376.0 K Logg: 4.58 Fe/H: -0.020



## DV Fit Results:

Period = 12.33083 [0.00005] d  
Epoch = 140.0210 [0.0033] BKJD  
Rp/R\* = 0.0310 [0.0055]  
a/R\* = 17.03 [12.02]  
b = 0.85 [0.24]  
Seff = 48.04 [13.76]  
Teq = 671 [48] K  
Rp = 2.72 [0.75] Re  
a = 0.1006 [0.0175] AU  
Ag = 50.97 [32.47] [1.54σ]  
Teffp = 2773 [417] K [5.01σ]

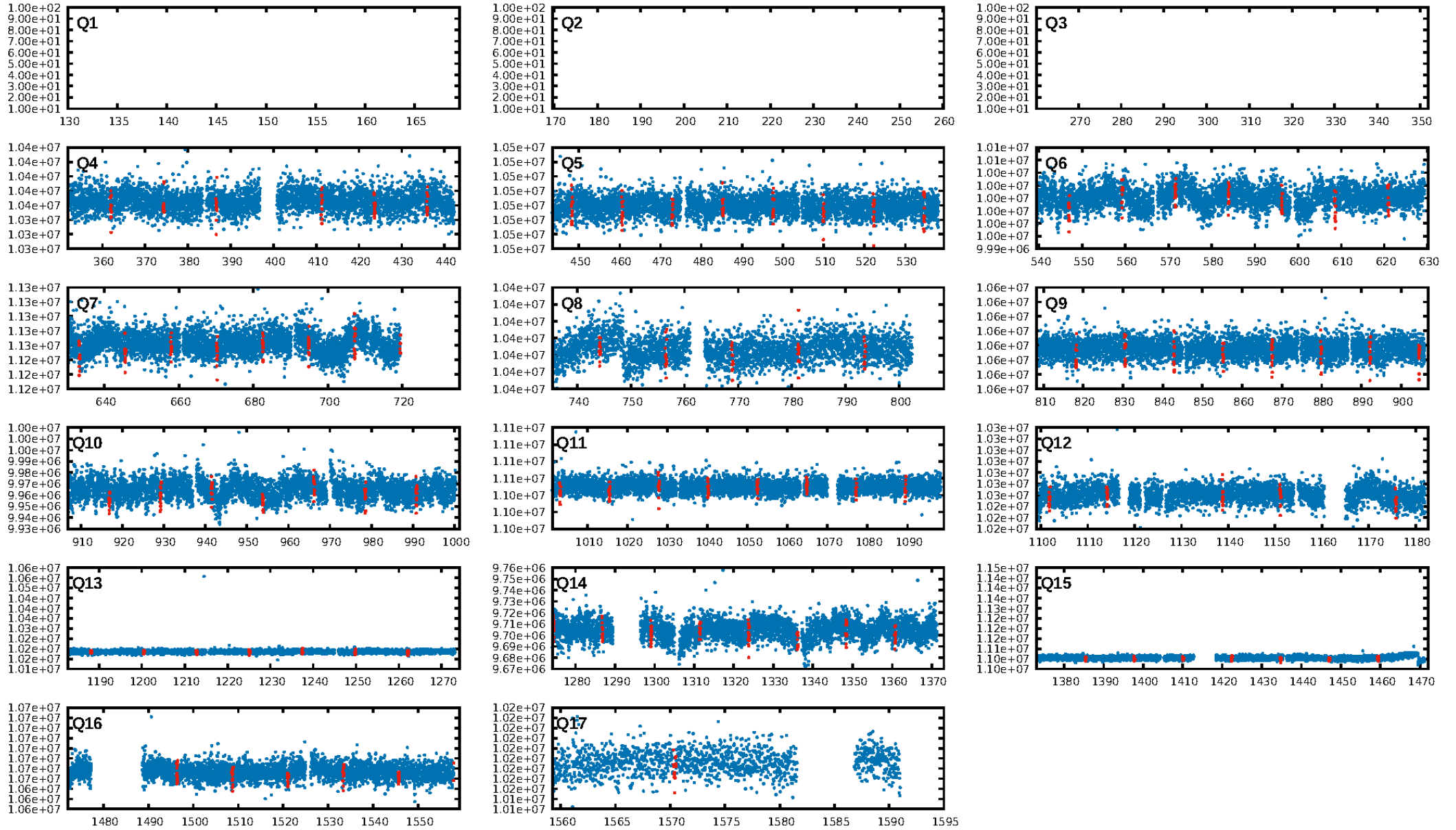
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [17.76σ]  
ModelChiSquare2-sig: 100.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 1.21e-146  
RollingBand-fgt: 1.00 [87/87]  
GhostDiagnostic-chr: 2.728  
Centroid-sig: 1.1%  
Centroid-so: 0.297 arcsec [0.80σ]  
OotOffset-rm: 0.477 arcsec [3.21σ]  
KicOffset-rm: 0.142 arcsec [0.71σ]  
OotOffset-st: 3/3/4/4 [14]  
KicOffset-st: 3/3/4/4 [14]  
DiffImageQuality-fgm: 1.00 [14/14]  
DiffImageOverlap-fno: 1.00 [14/14]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 08:13:49 Z

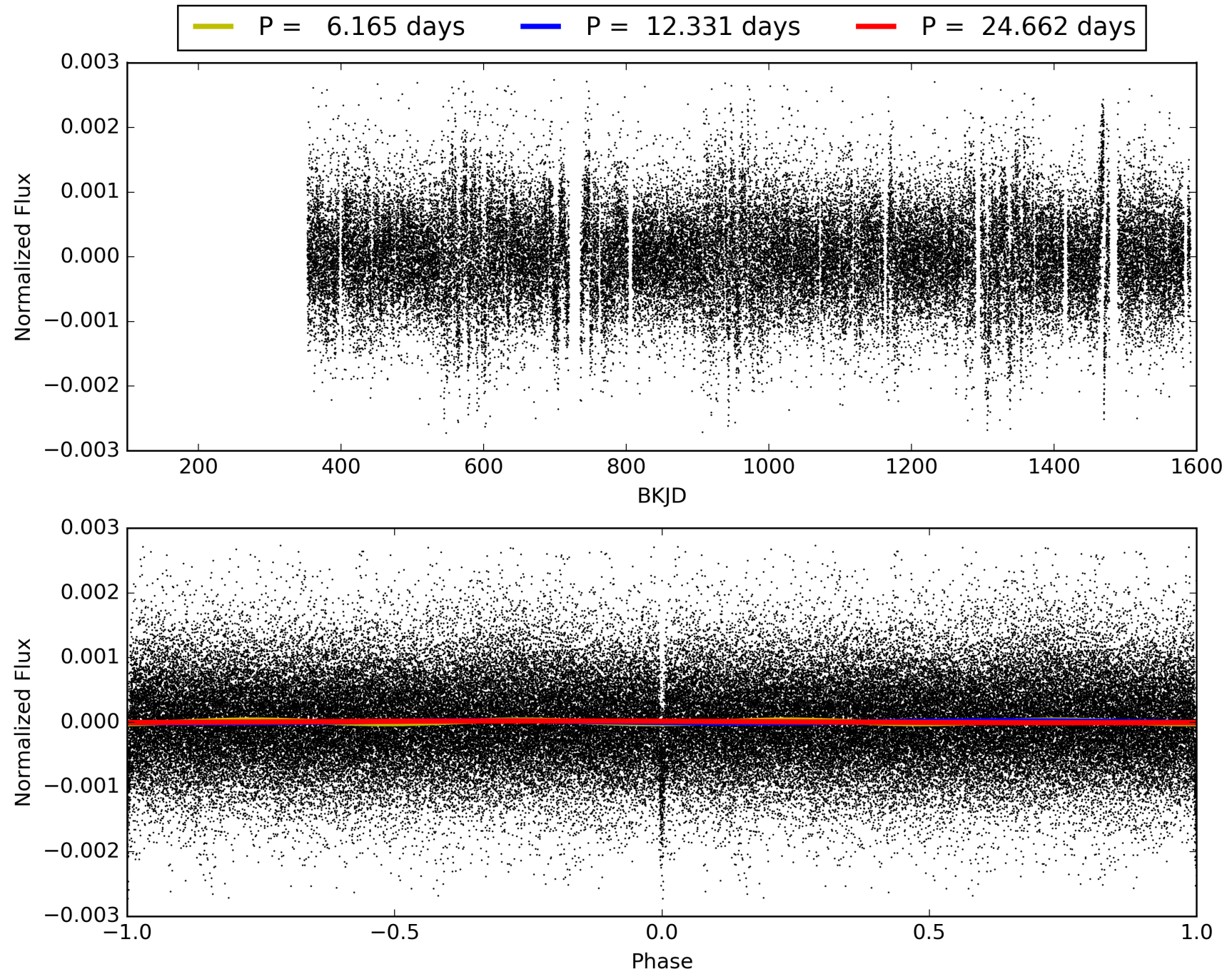
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 007207061-02, PDC Light Curves



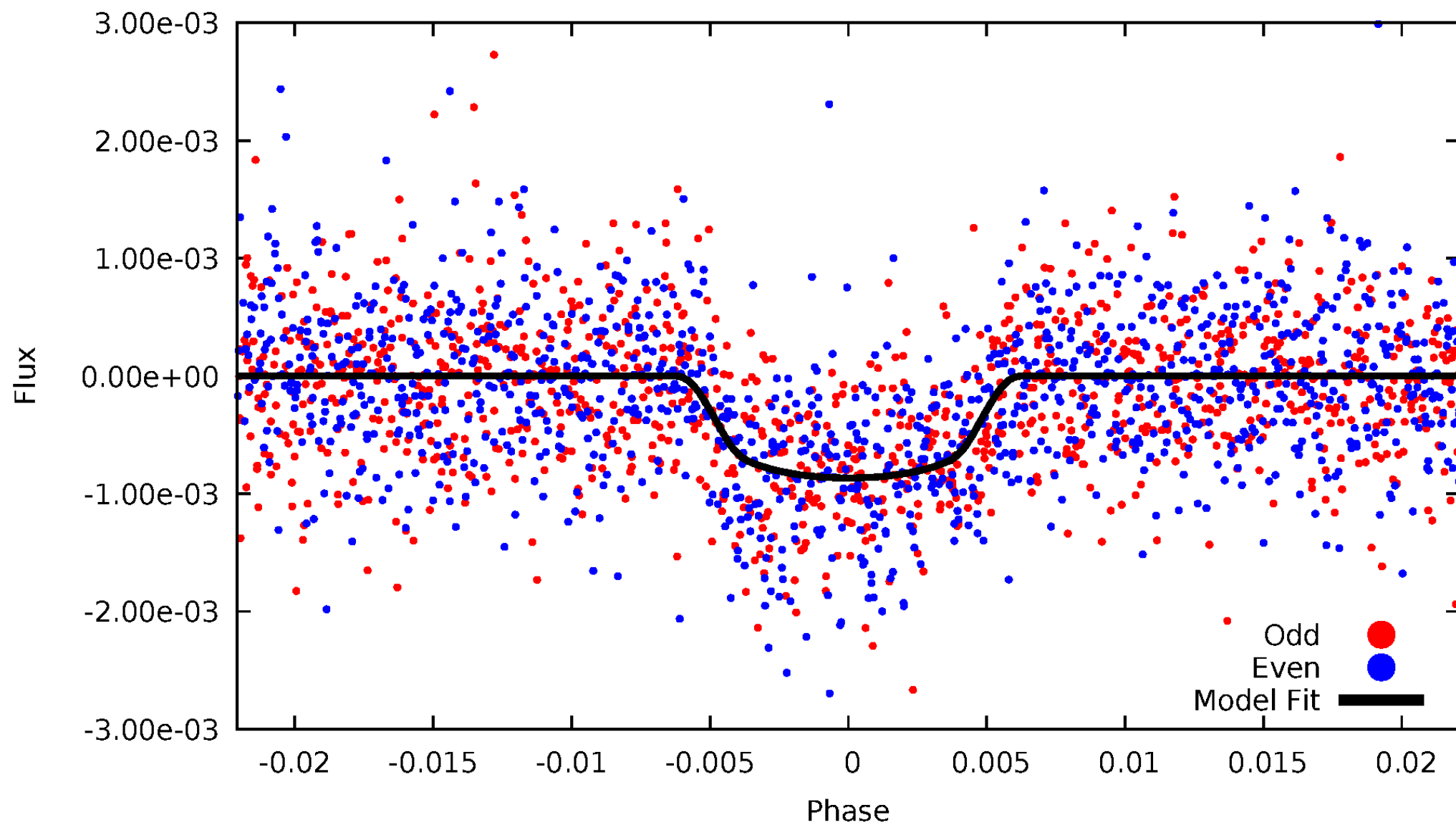


TCE 007207061-02



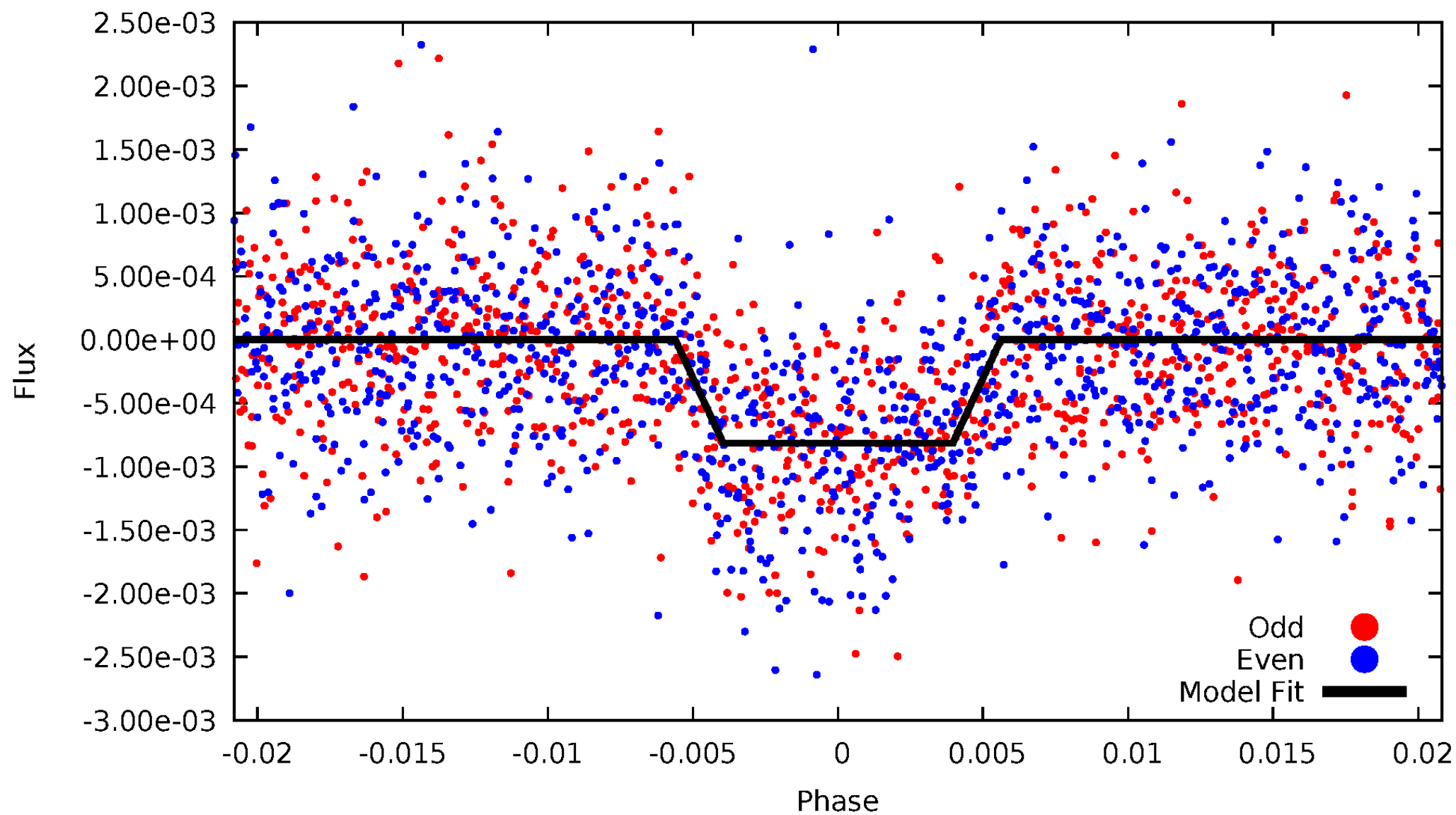
# DV Odd/Even

TCE 007207061-02



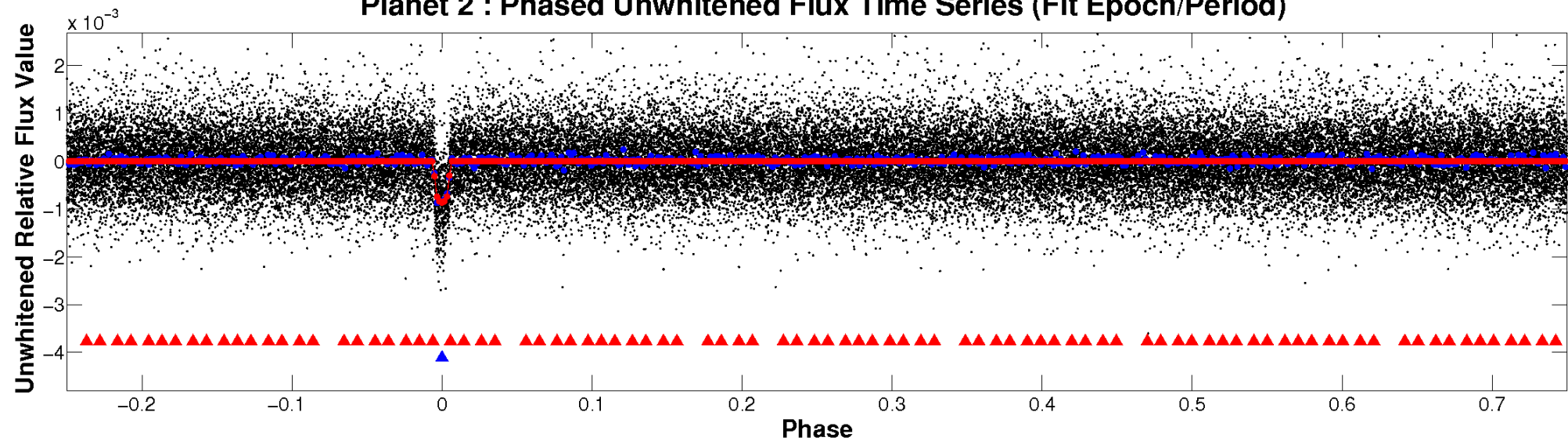
# ALT Odd/Even

TCE 007207061-02

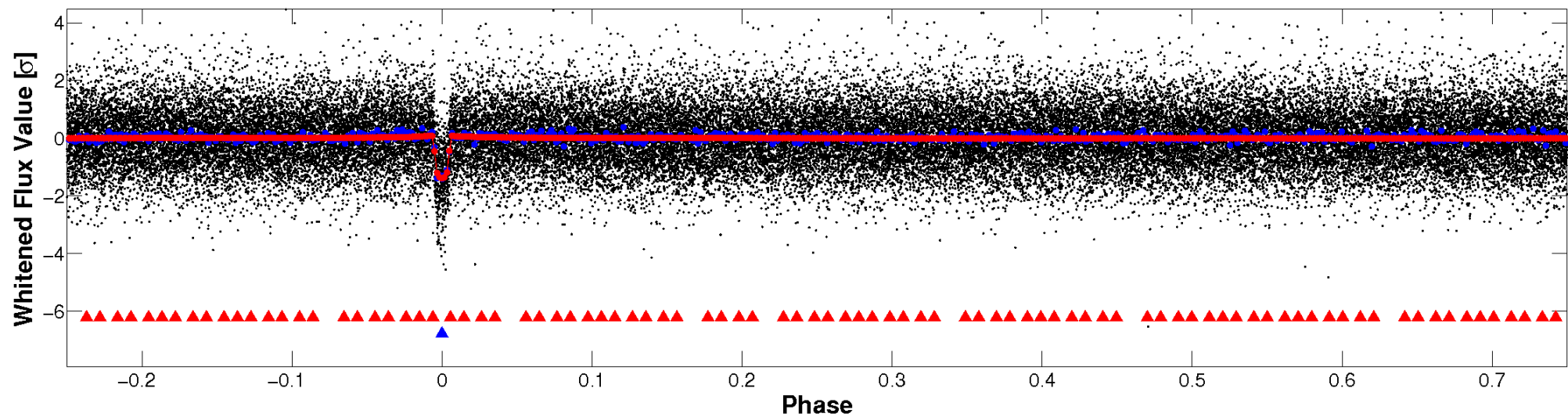


# Non-Whitened Vs. Whitened Light Curve

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

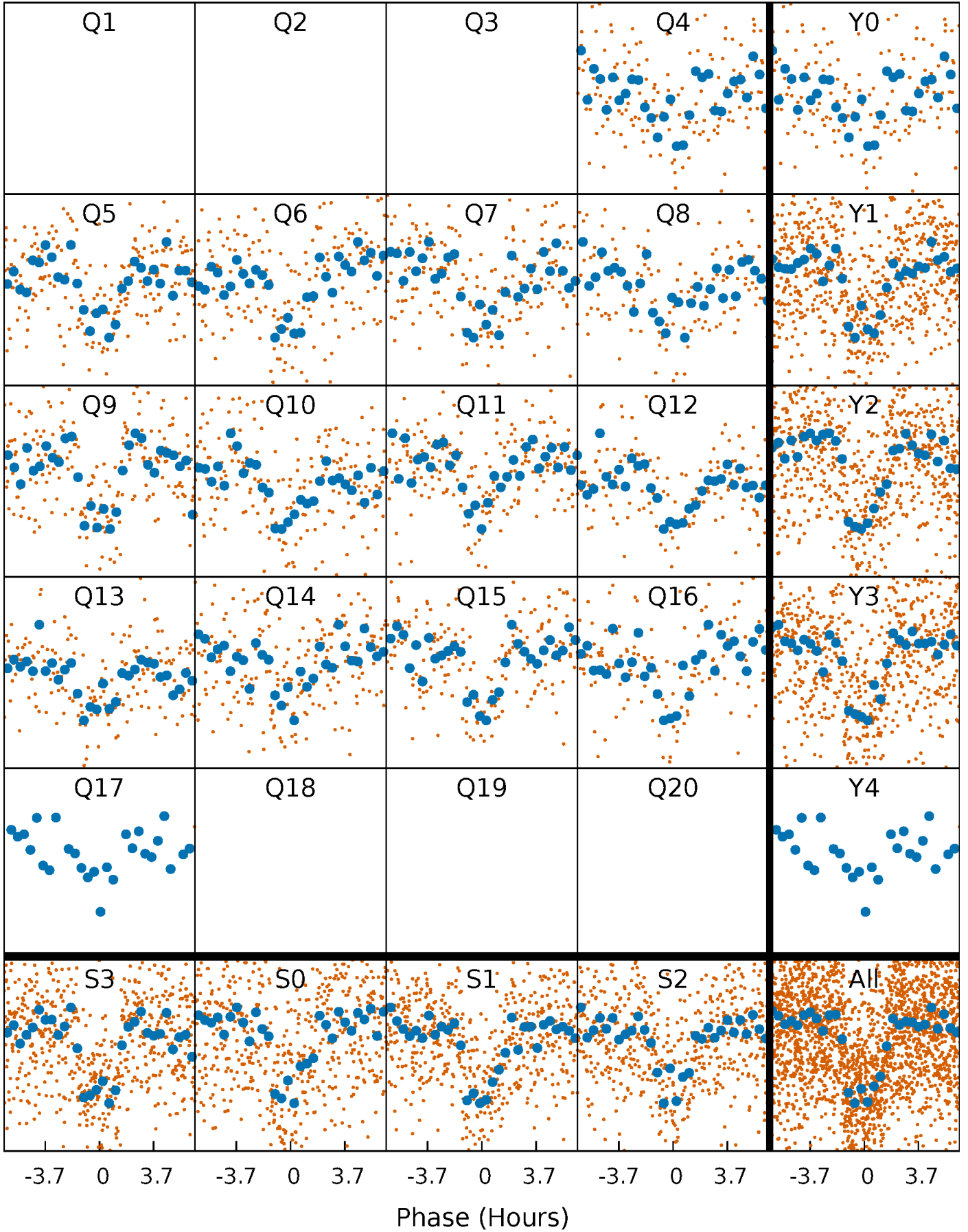


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

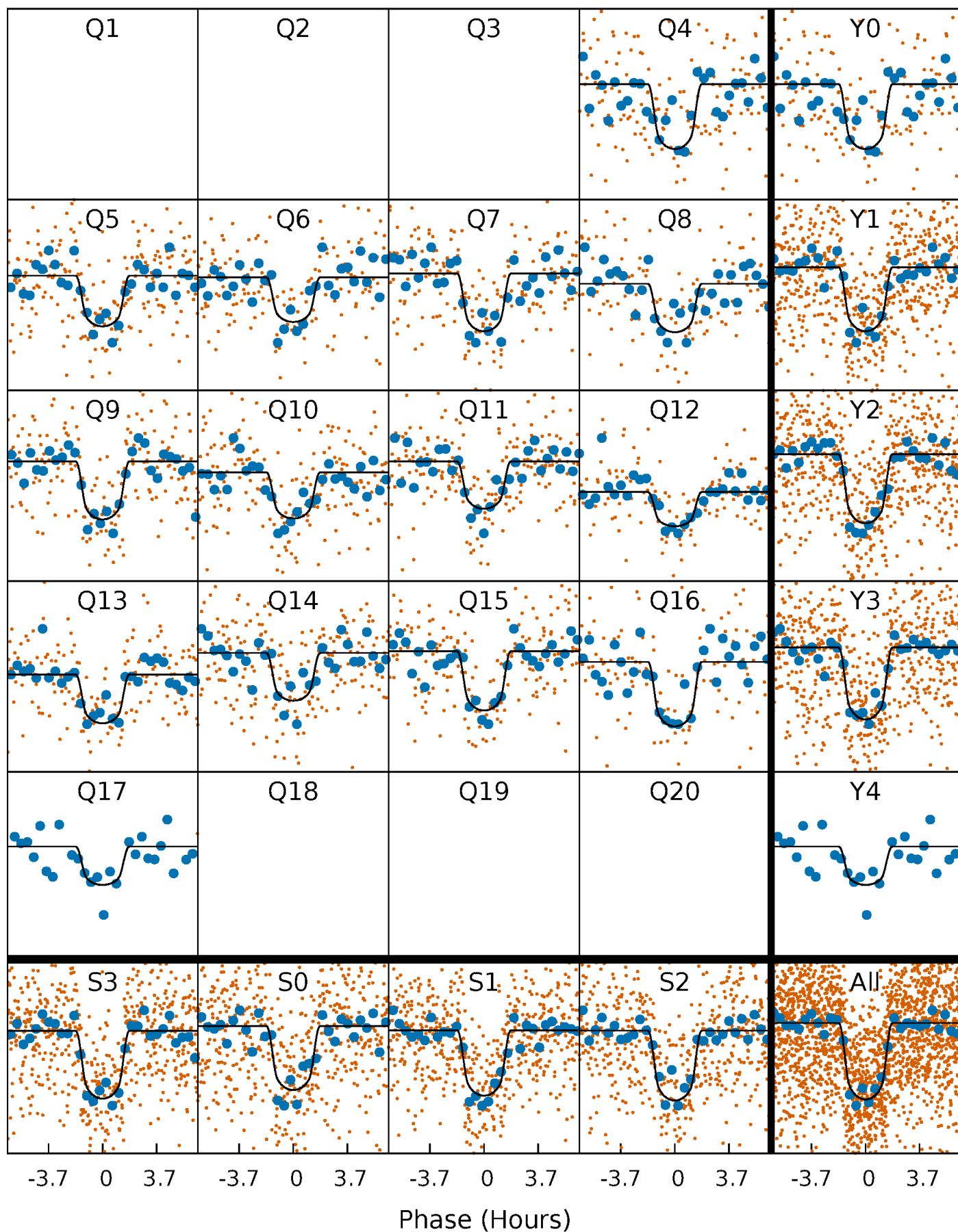
TCE 007207061-02 P= 12.330834 Days  $T_0=140.021011$  (BKJD)





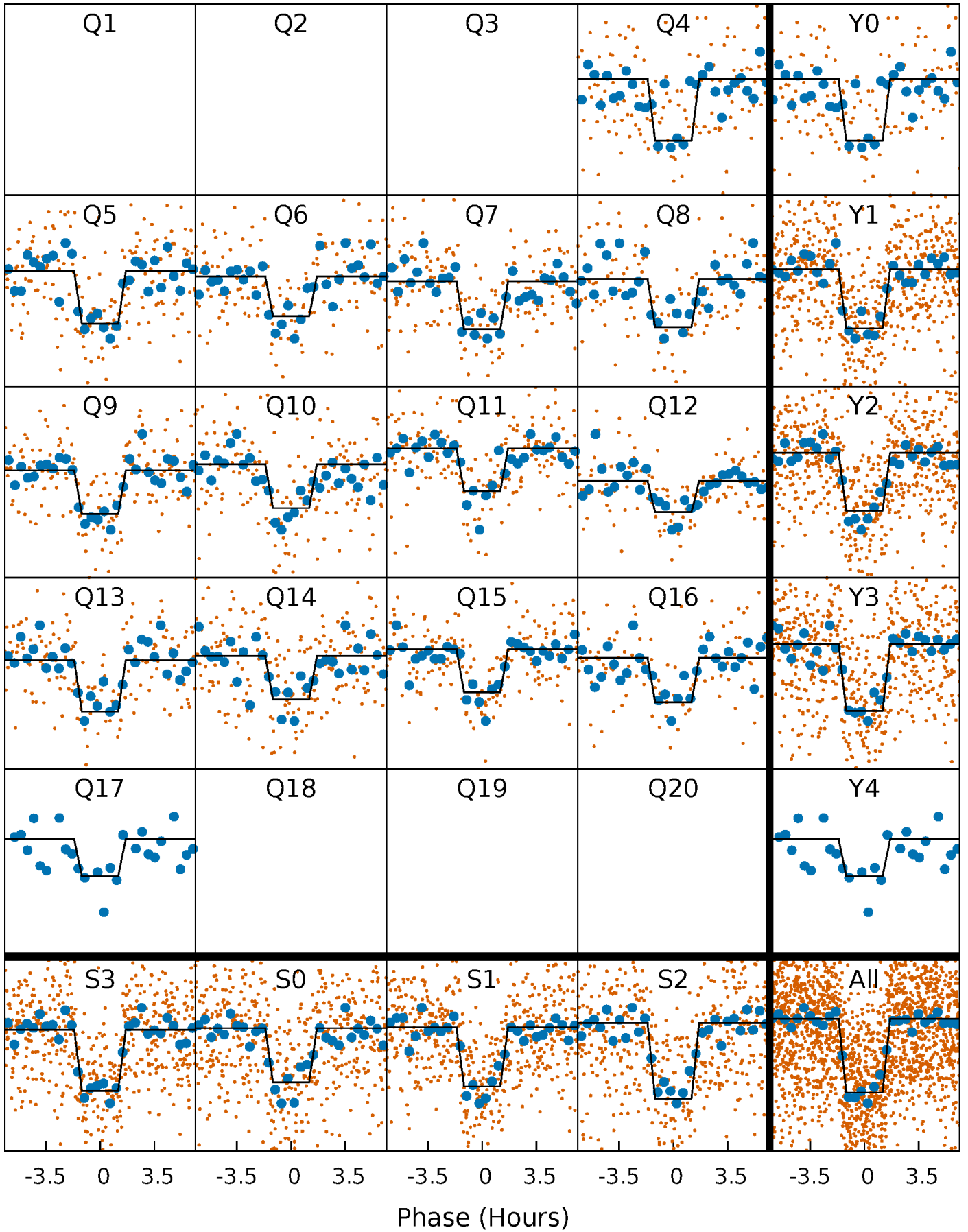
# DV Quarter-Phased Transit Curves

TCE 007207061-02 P= 12.330834 Days  $T_0=140.021011$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

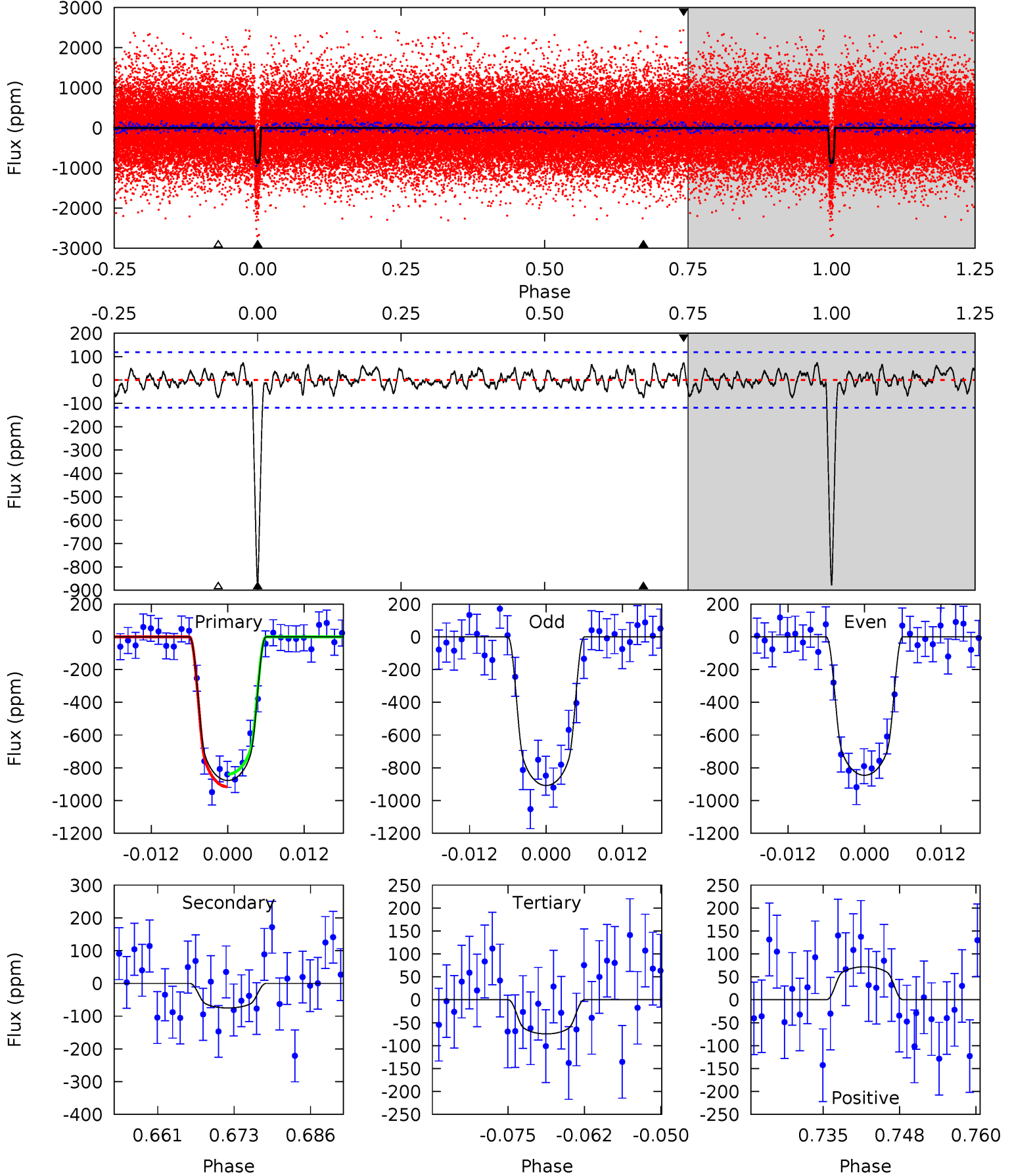
TCE 007207061-02 P= 12.330768 Days  $T_0=140.026508$  (BKJD)



# DV Model-Shift Uniqueness Test

007207061-02, P = 12.330834 Days, E = 140.021011 Days

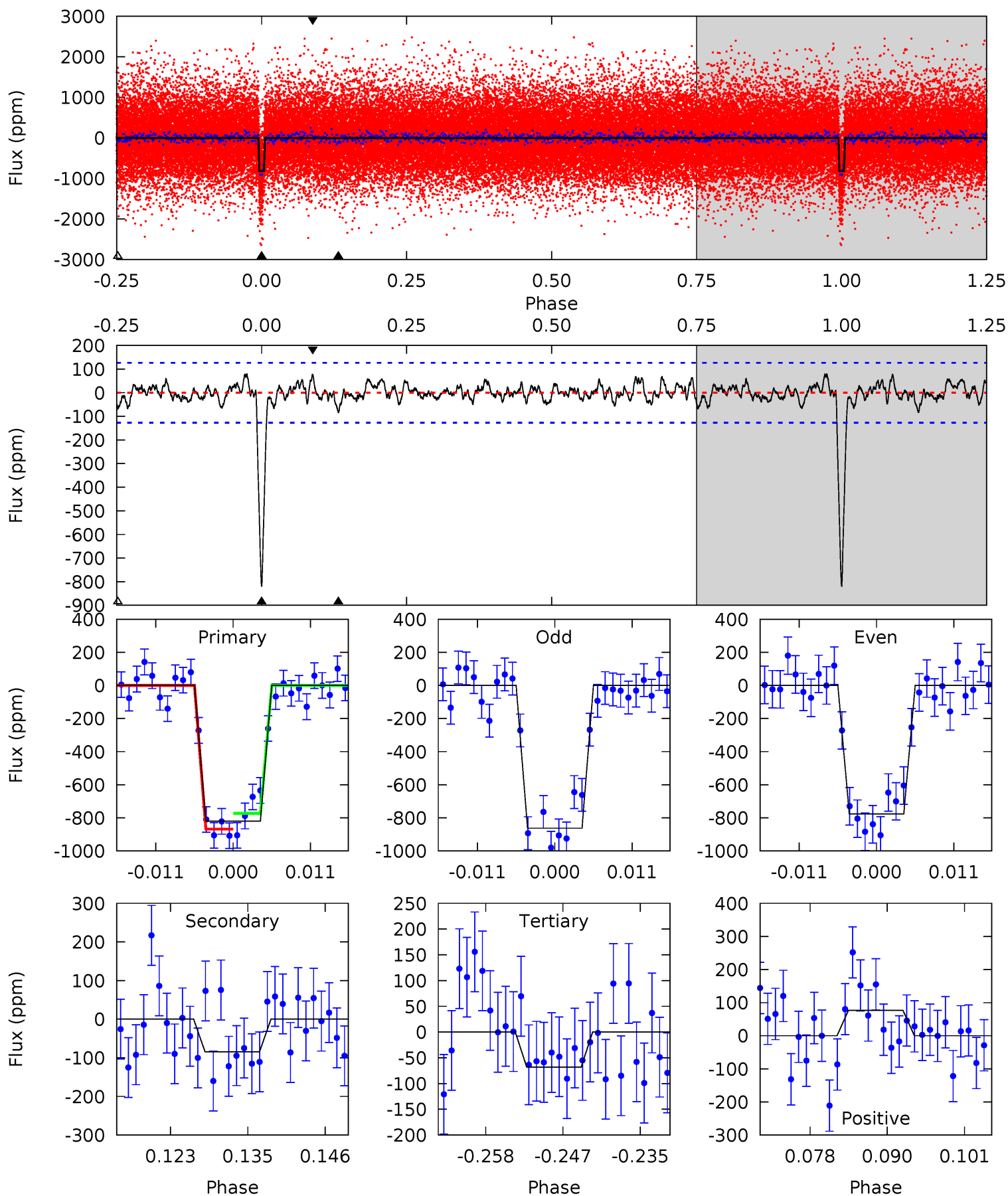
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
36.9	3.15	3.13	3.02	4.98	2.50	1.16	33.7	33.8	0.02	0.13	1.32	0.98	0.08	1.62



# Alt Model-Shift Uniqueness Test

007207061-02, P = 12.330768 Days, E = 140.026508 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
32.4	3.33	2.68	3.04	5.00	2.54	1.06	29.7	29.3	0.65	0.29	1.71	0.98	0.09	1.89



### Stellar Parameters For KIC 007207061

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5376^{+186}_{-186}$	$4.576^{+0.034}_{-0.136}$	$-0.020^{+0.250}_{-0.300}$	$0.806^{+0.168}_{-0.067}$	$0.897^{+0.071}_{-0.106}$	$2.413^{+0.441}_{-0.956}$
	+3%/-3%	+1%/-3%	+1250%/-1500%	+21%/-8%	+8%/-12%	+18%/-40%
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 007207061-02 / KOI 2113.02

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-75 \pm 24$	$2.79^{+0.59}_{-0.52}$	$954^{+55}_{-42}$	$3347^{+286}_{-257}$	$52^{+34}_{-21}$
Alt.	$-84 \pm 25$	$2.61^{+0.55}_{-0.53}$	$954^{+51}_{-39}$	$3482^{+305}_{-261}$	$67^{+41}_{-27}$

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

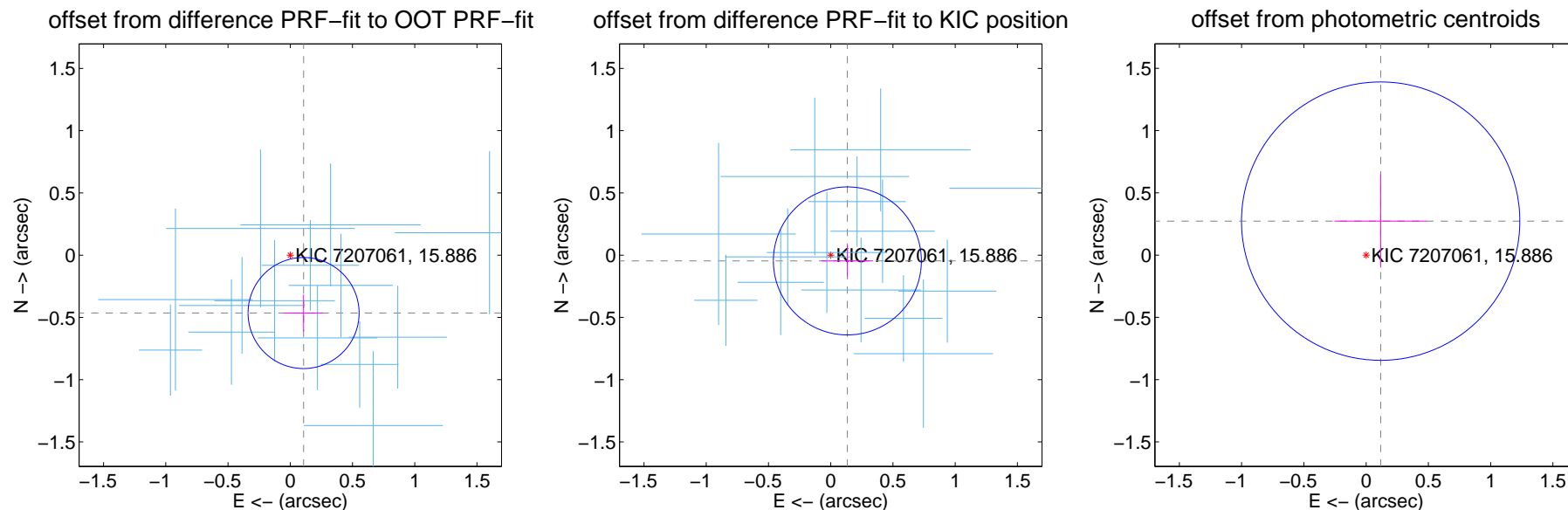
## DV Centroid Data

Supplemental centroid analysis for 007207061-02. Kepler magnitude: 15.89. Transit SNR 27.03

There are 14 quarters with good PRF difference image offsets

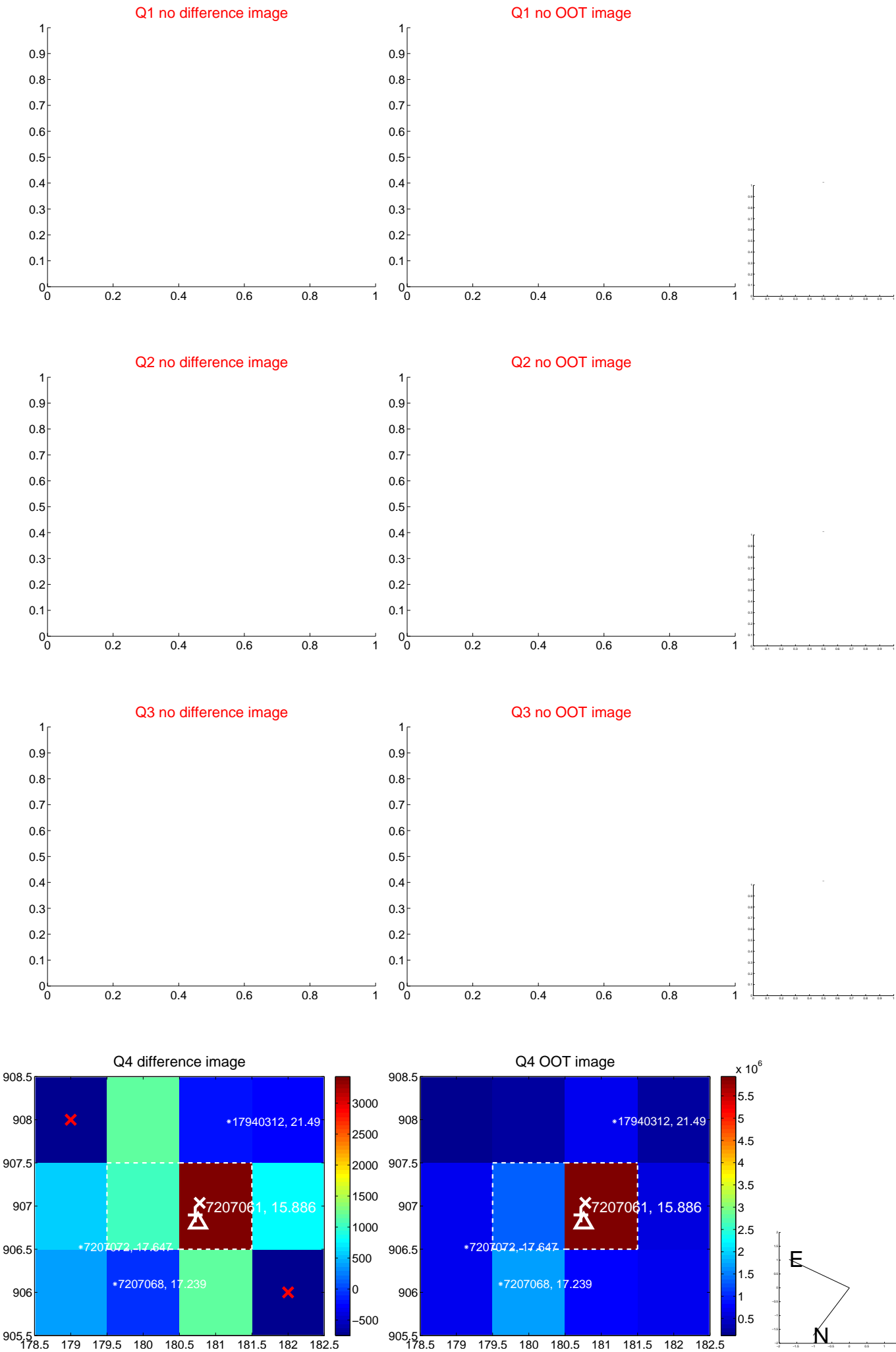
The direct PRF centroid is offset from the target star catalog position by about 0.37 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b><math>0.477 \pm 0.149</math></b>	<b>3.21</b>	$-0.107 \pm 0.155$	$-0.465 \pm 0.148$
PRF-fit source offset from KIC position	$0.142 \pm 0.198$	0.71	$-0.134 \pm 0.206$	$-0.046 \pm 0.129$
photometric centroid source offset	$0.30 \pm 0.37$	0.80	$-0.12 \pm 0.37$	$0.27 \pm 0.37$



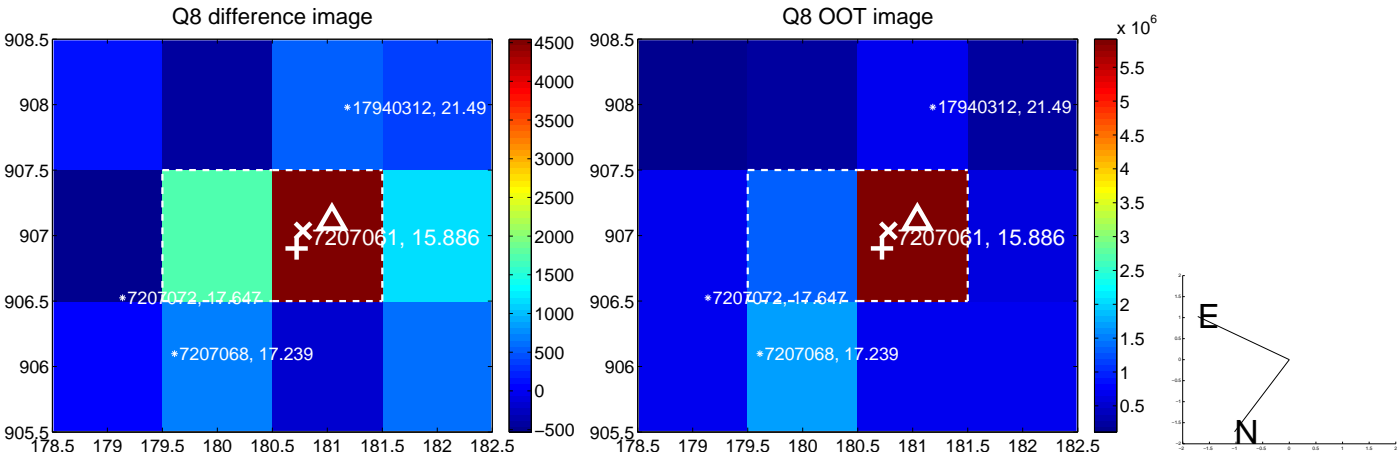
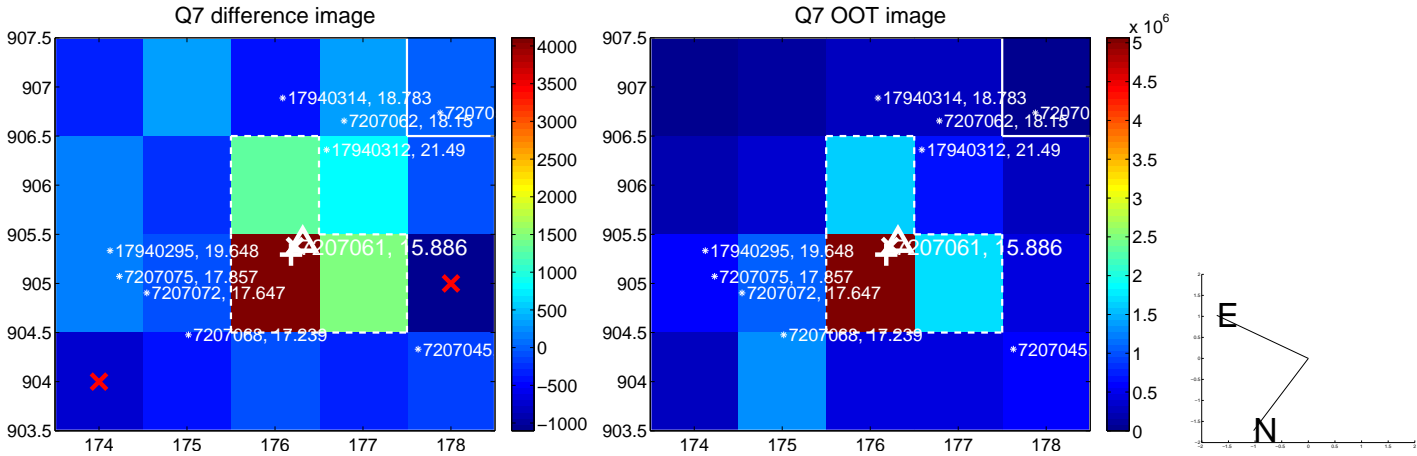
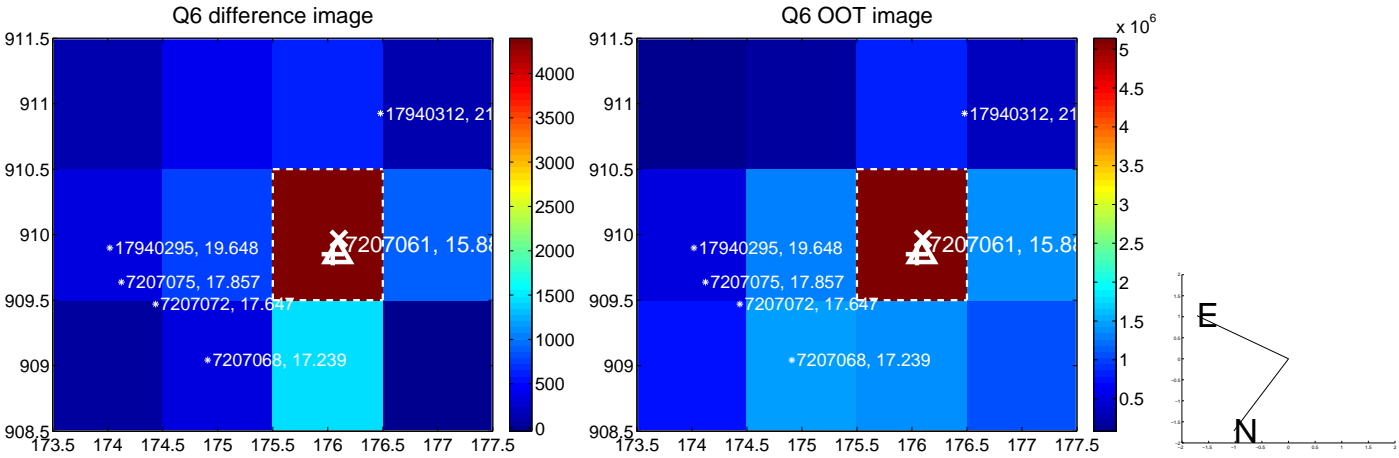
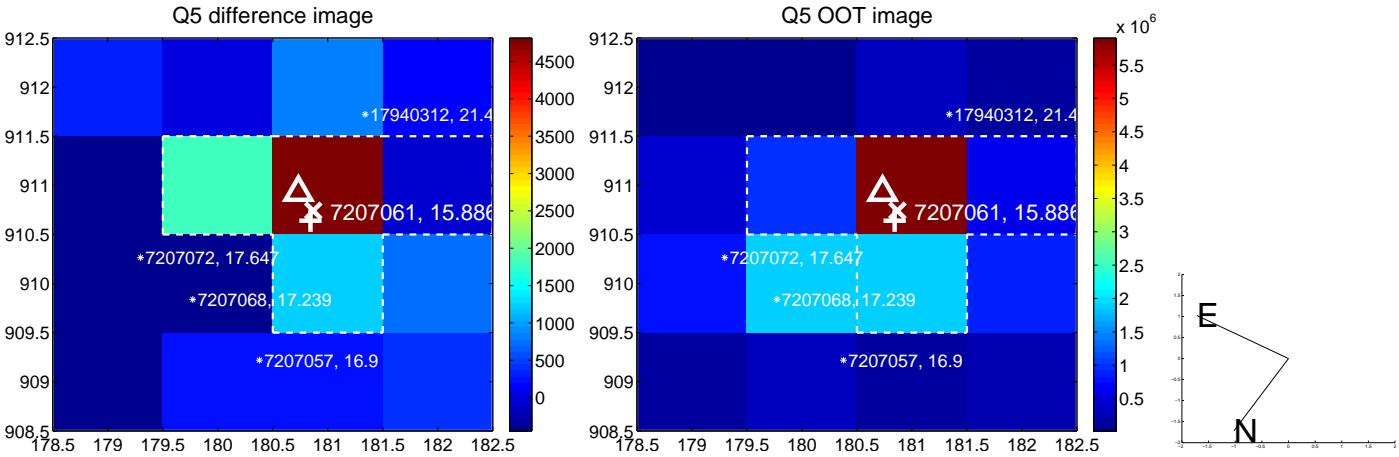
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

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

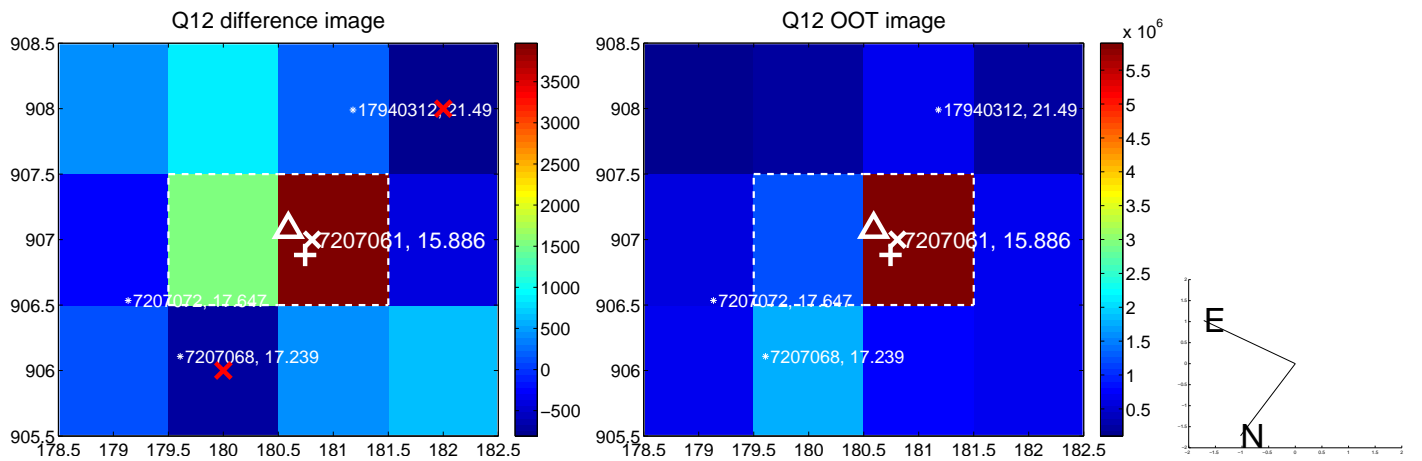
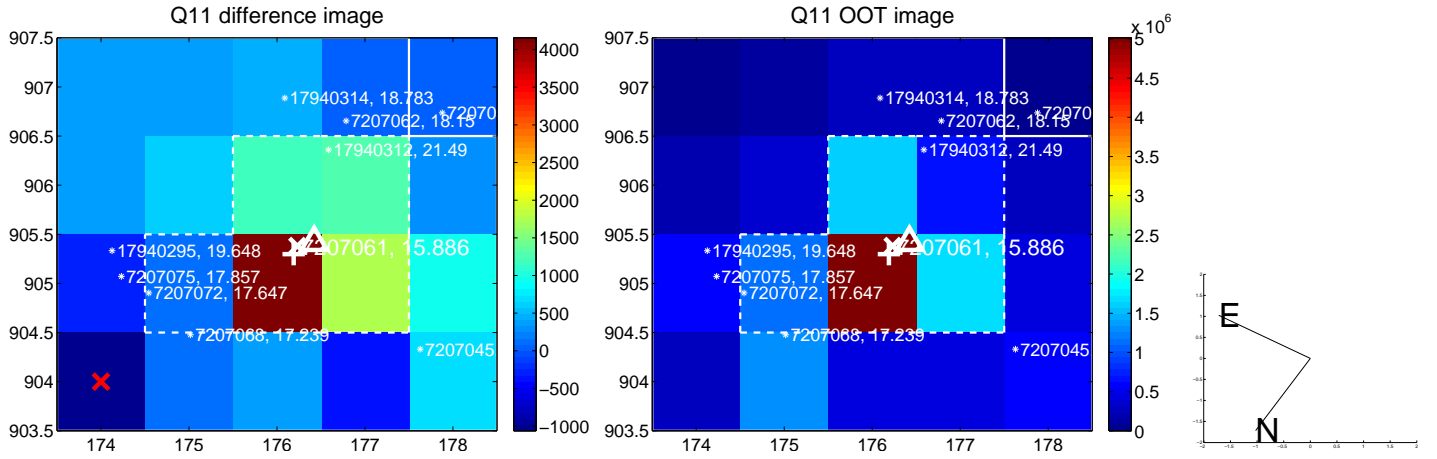
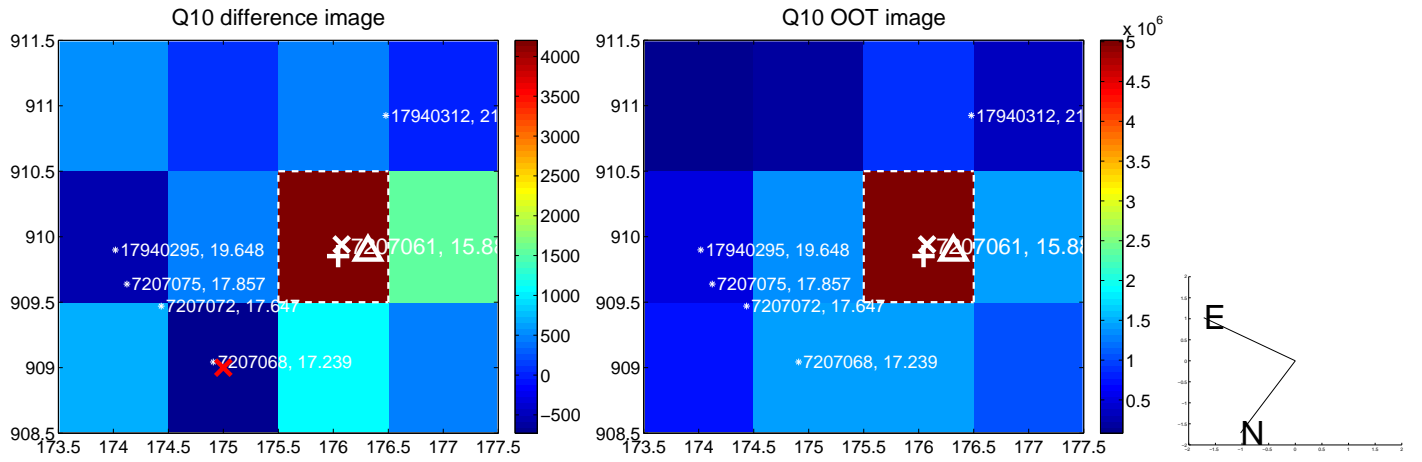
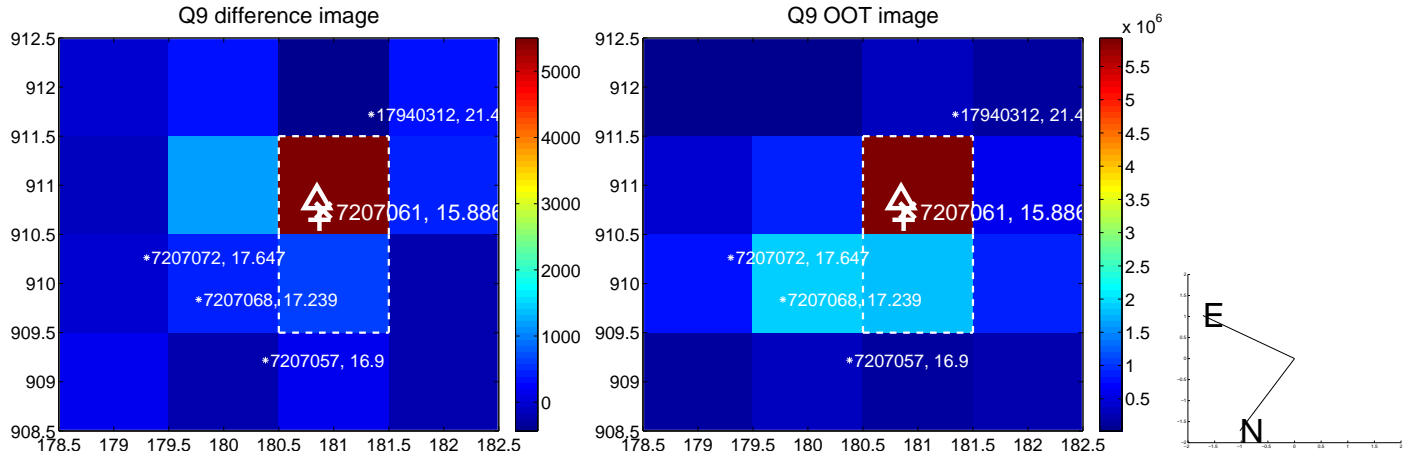




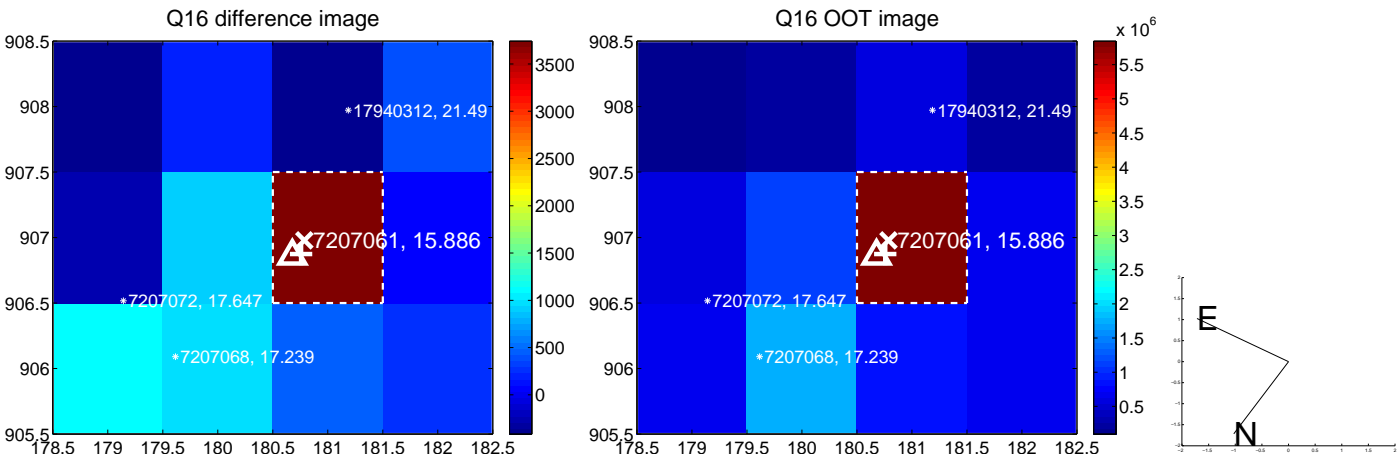
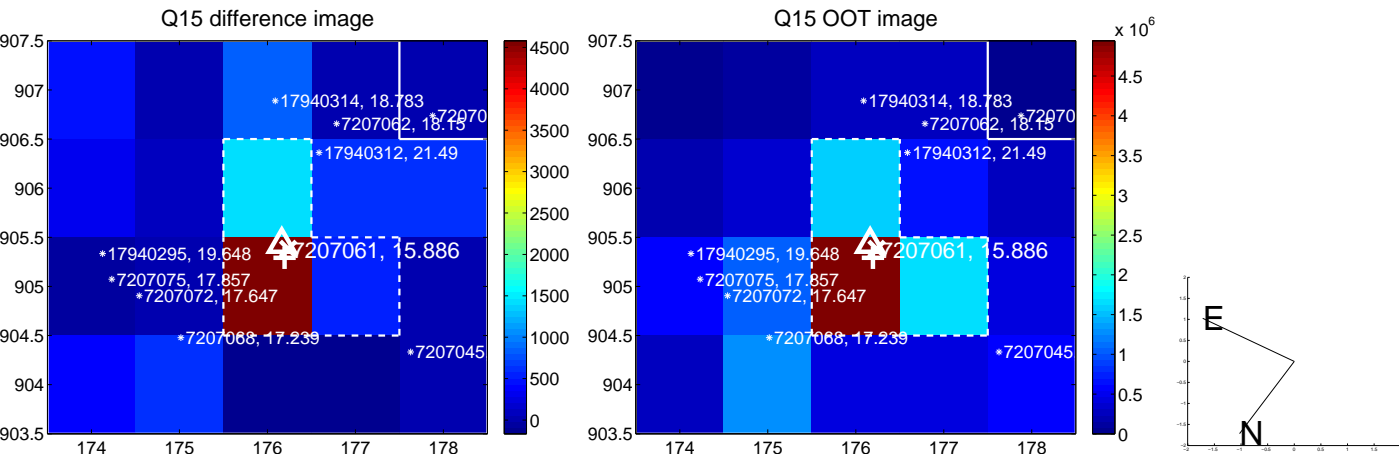
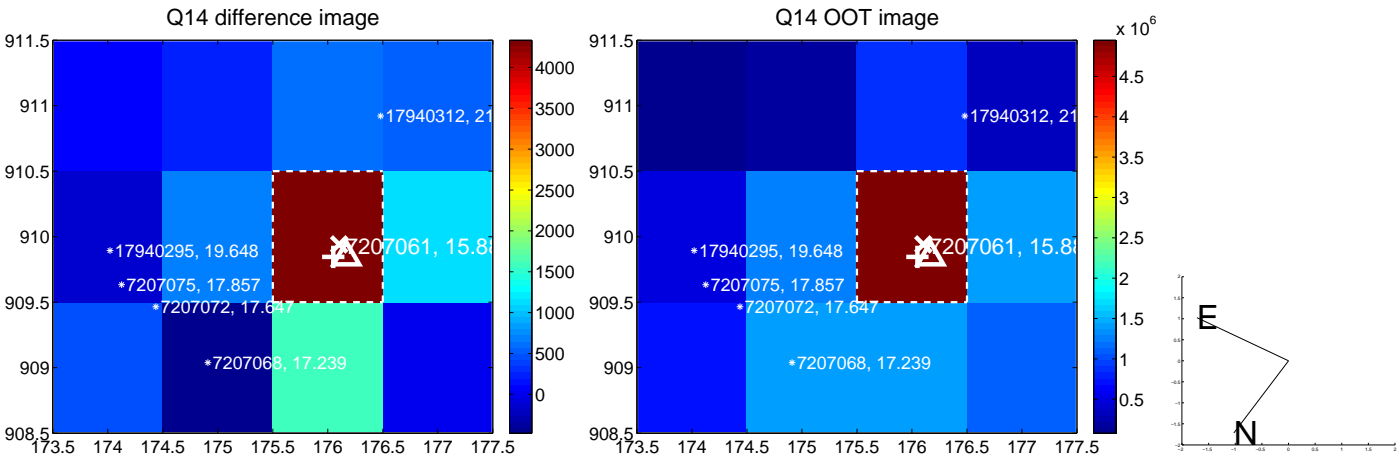
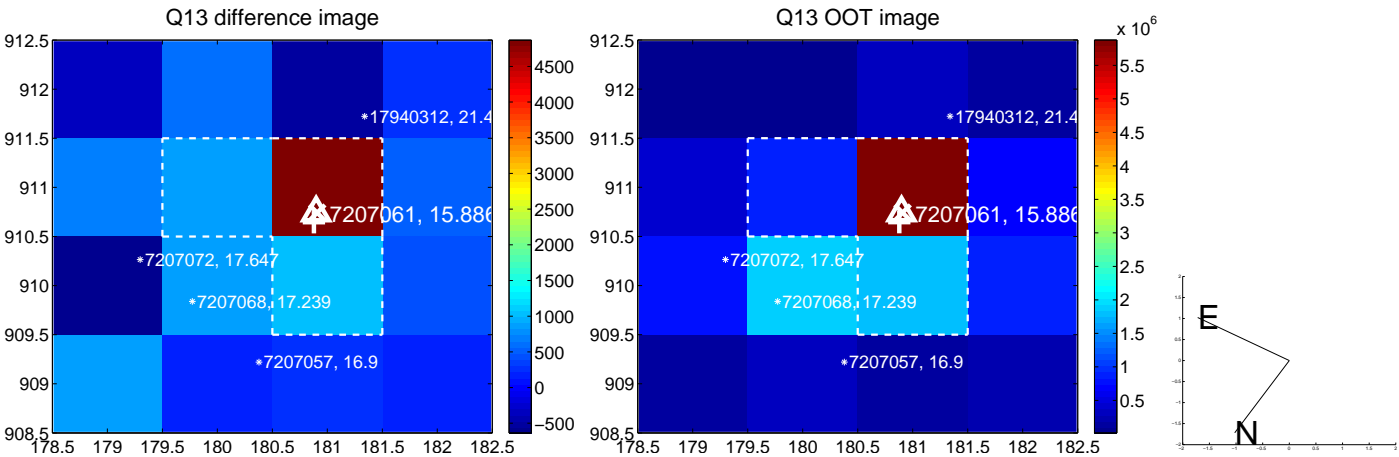
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



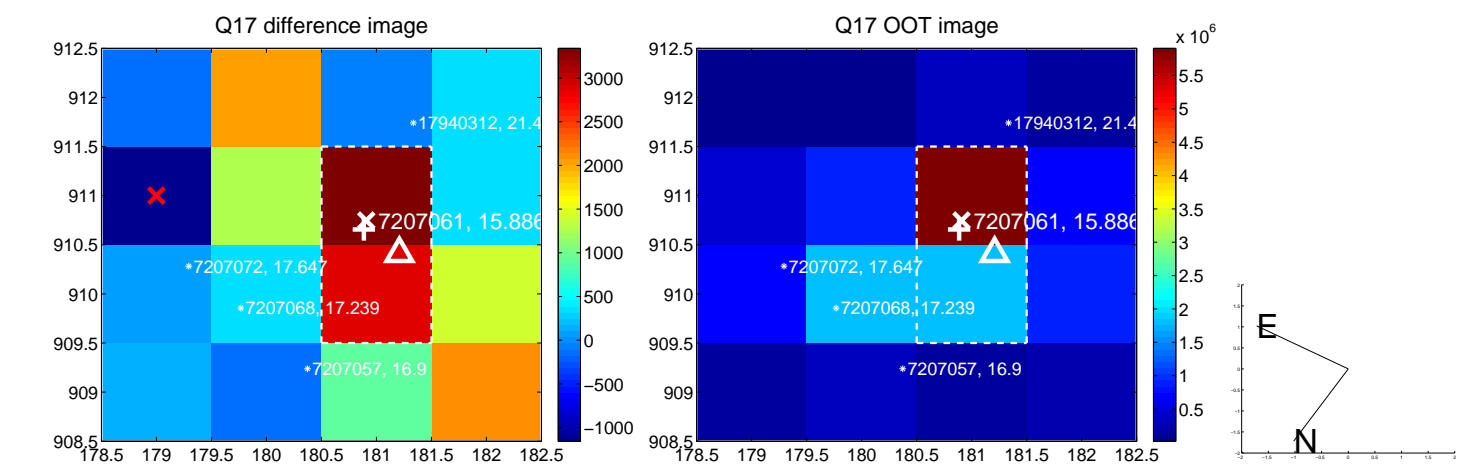
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



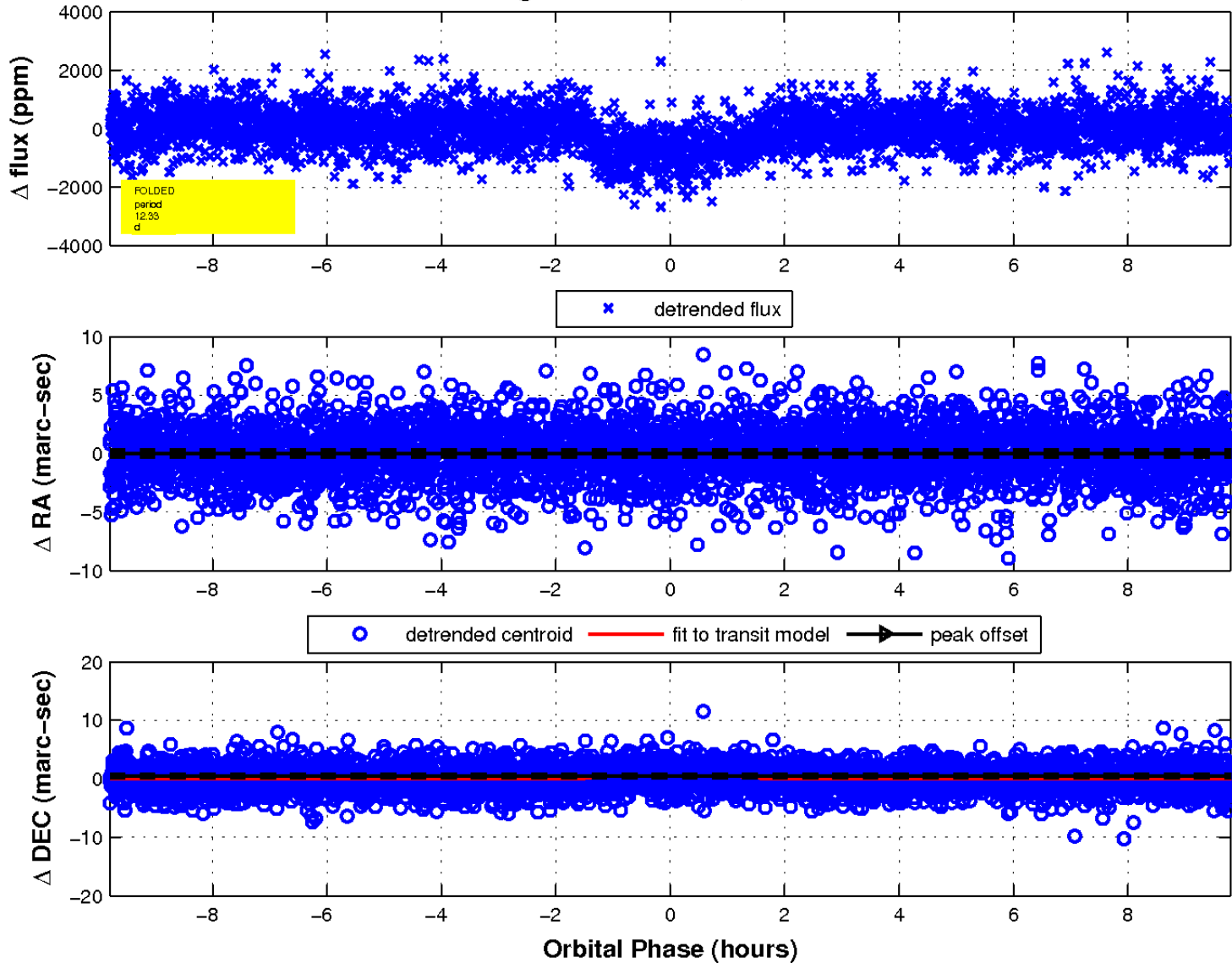
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



### fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

