

# KIC 009757613

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009757613-01	OBS	0250.01	12.283014	133.548260	2788.4	3.002	104.5	105.0	0.54	3879	3.15	8.15
009757613-02	OBS	0250.02	17.251197	132.635403	2013.9	2.339	53.4	54.1	0.54	3879	2.92	5.18
009757613-03	OBS	0250.04	46.827645	136.745305	1487.3	1.955	24.2	25.9	0.54	3879	2.26	1.37
009757613-04	OBS	0250.03	3.543922	132.714442	385.6	2.159	22.3	25.2	0.54	3879	1.25	42.77

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009757613-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
009757613-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT
009757613-03	OBS	PC	0.96	0	0	0	0	NO_COMMENT
009757613-04	OBS	PC	1.00	0	0	0	0	NO_COMMENT

**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.

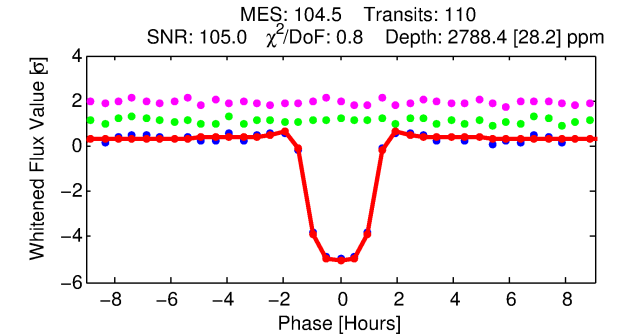
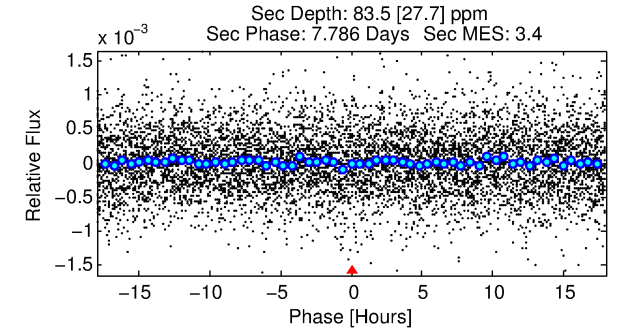
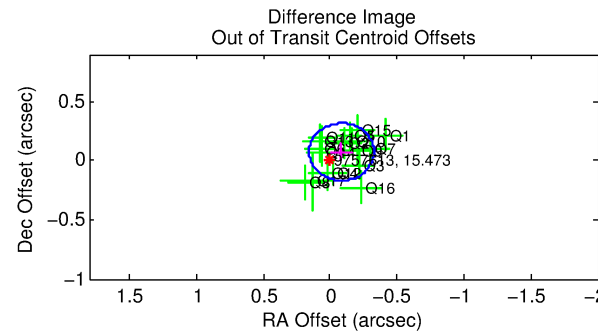
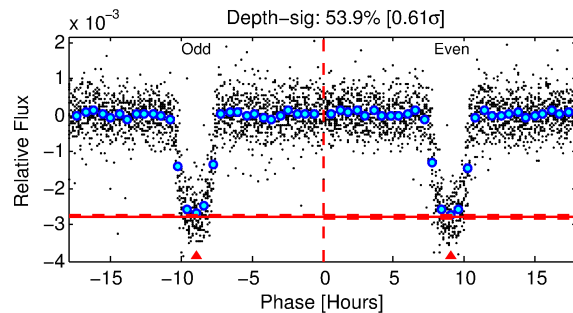
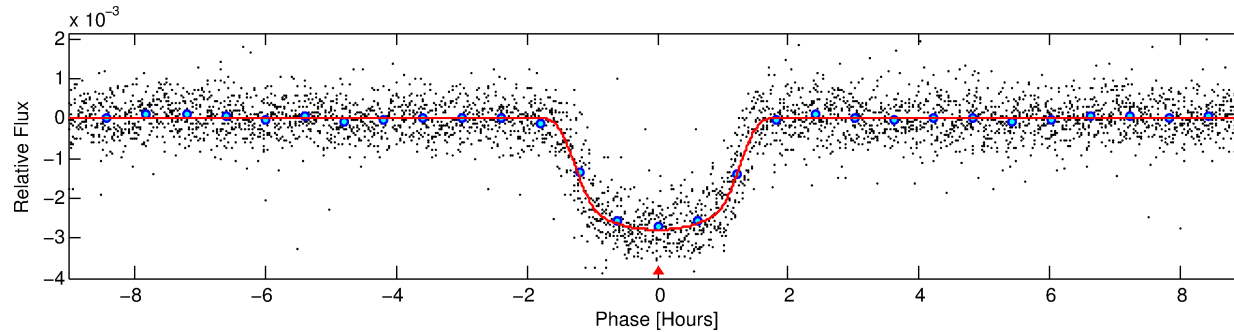
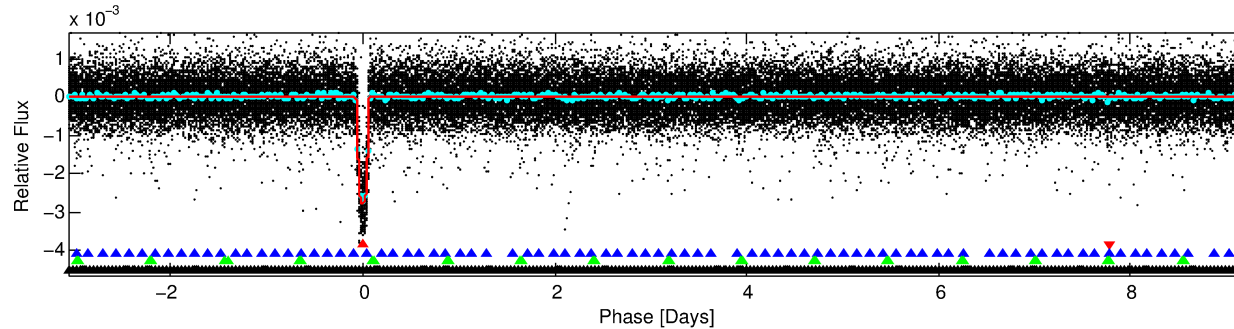
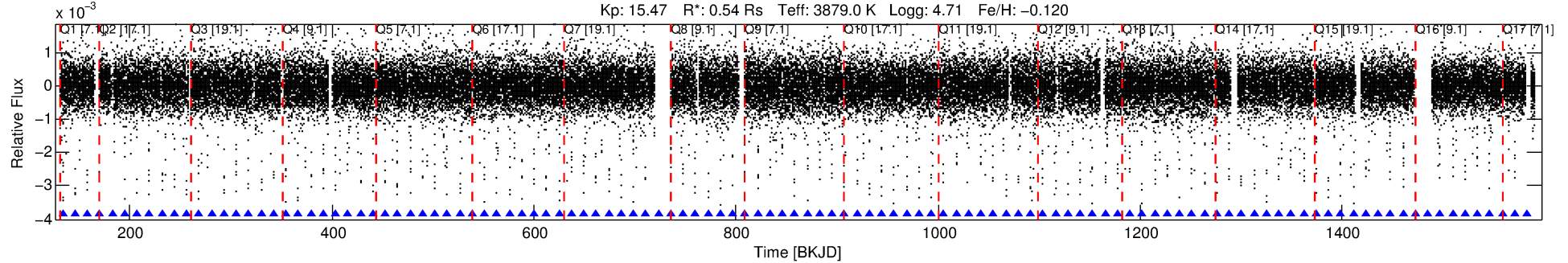
Ephemeris Match Information For 009757613-01

No Significant Match Found

# DV One-Page Summary

KIC: 9757613 Candidate: 1 of 4 Period: 12.283 d  
KOI: K00250.01 Name: Kepler-26b Corr: 0.966

Kp: 15.47 R\*: 0.54 Rs Teff: 3879.0 K Logg: 4.71 Fe/H: -0.120



## DV Fit Results:

Period = 12.28301 [0.00001] d  
Epoch = 133.5483 [0.0006] BKJD  
Rp/R\* = 0.0538 [0.0013]  
a/R\* = 21.38 [2.09]  
b = 0.80 [0.04]  
Seff = 8.15 [1.00]  
Teq = 431 [13] K  
Rp = 3.15 [0.25] Re  
a = 0.0847 [0.0052] AU  
Ag = 33.12 [11.48] [2.80σ]  
Teffp = 1598 [139] K [8.38σ]

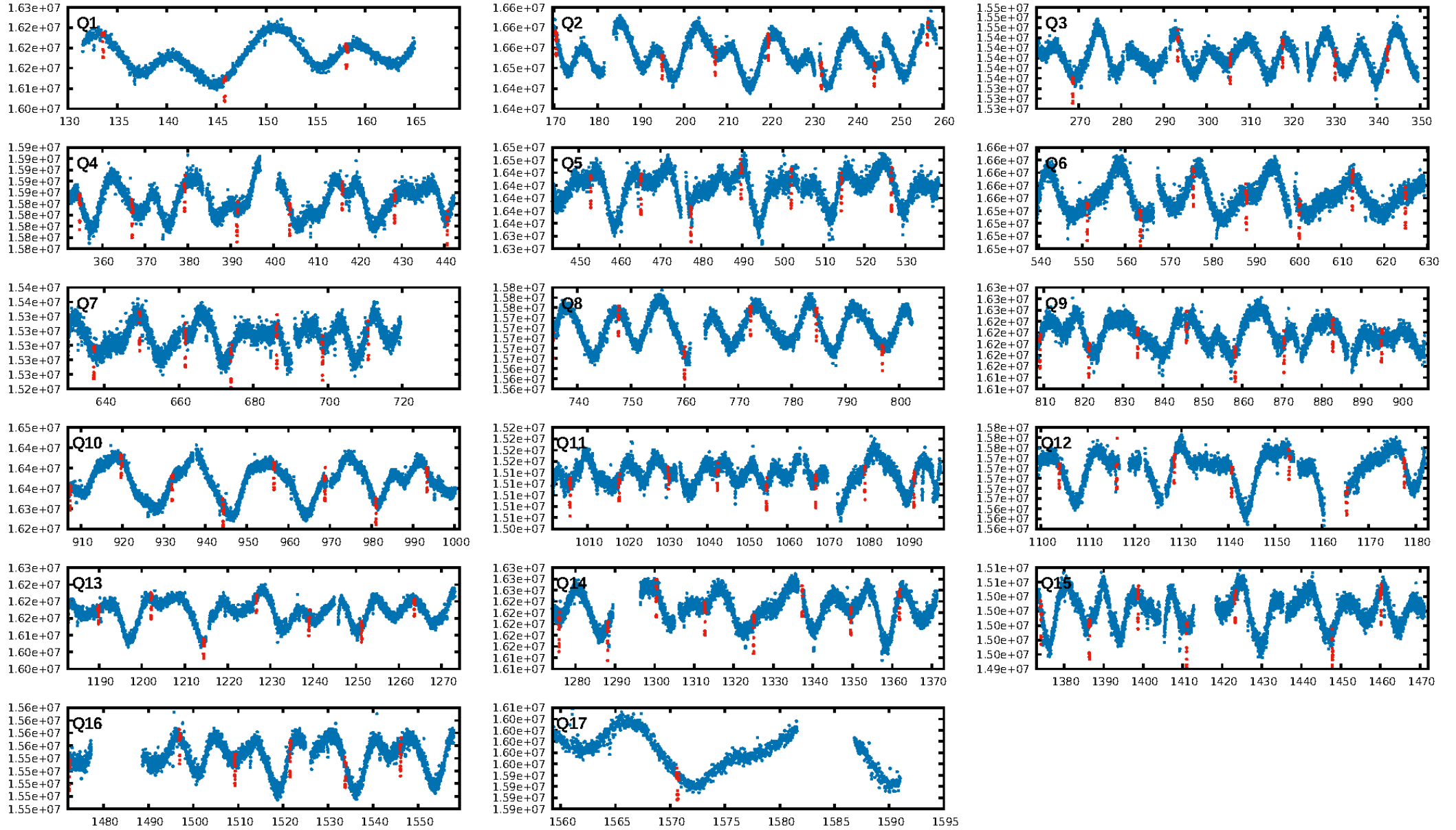
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [56.71σ]  
LongPeriod-sig: 100.0% [31.33σ]  
ModelChiSquare2-sig: 99.5%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [106/106]  
GhostDiagnostic-chr: 5.359  
**Centroid-sig: 0.0%**  
Centroid-so: 0.226 arcsec [2.30σ]  
OotOffset-rm: 0.113 arcsec [1.40σ]  
KicOffset-rm: 0.133 arcsec [1.54σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 1.00 [17/17]

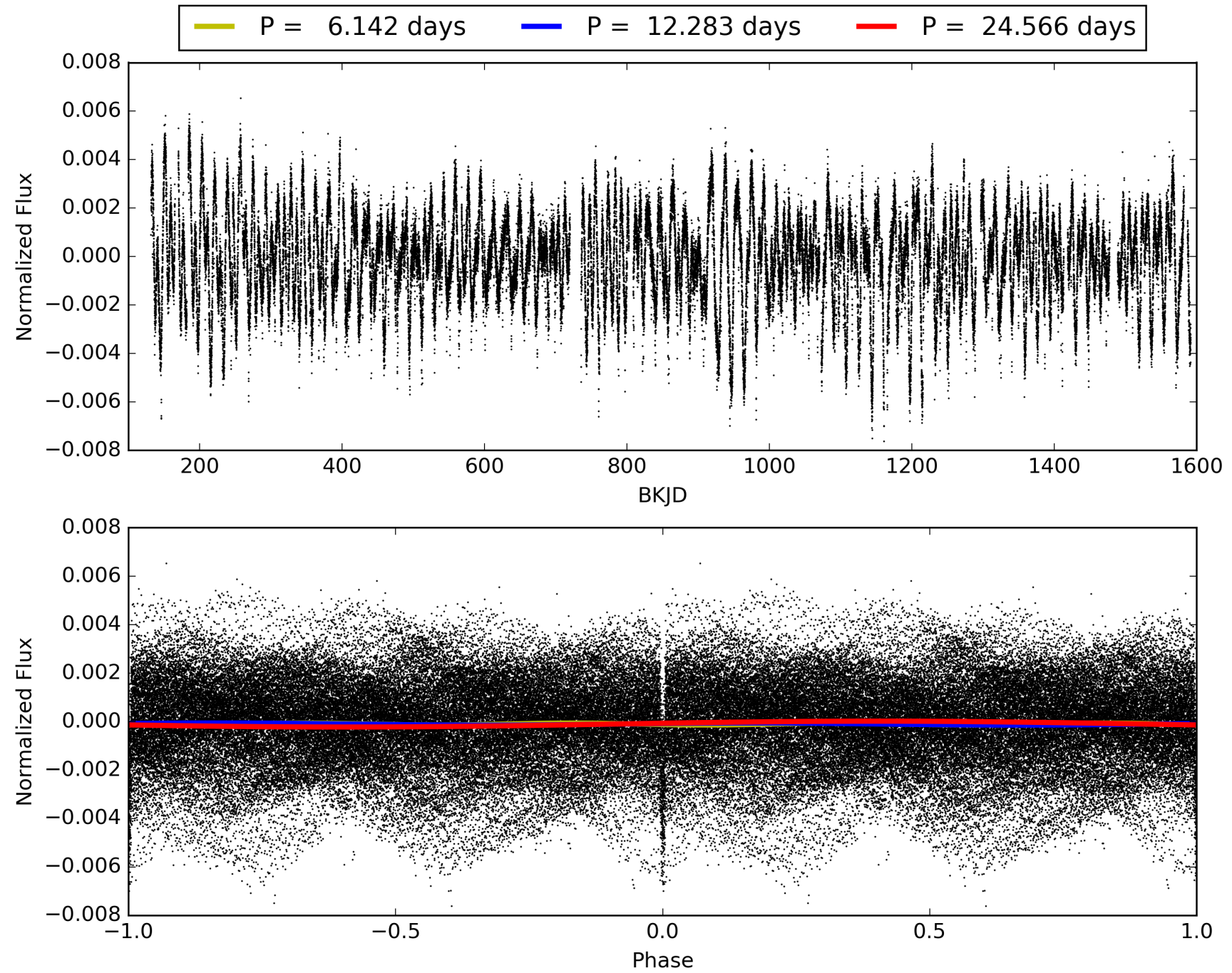
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 17:32:42 Z

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

# TCE 009757613-01, PDC Light Curves



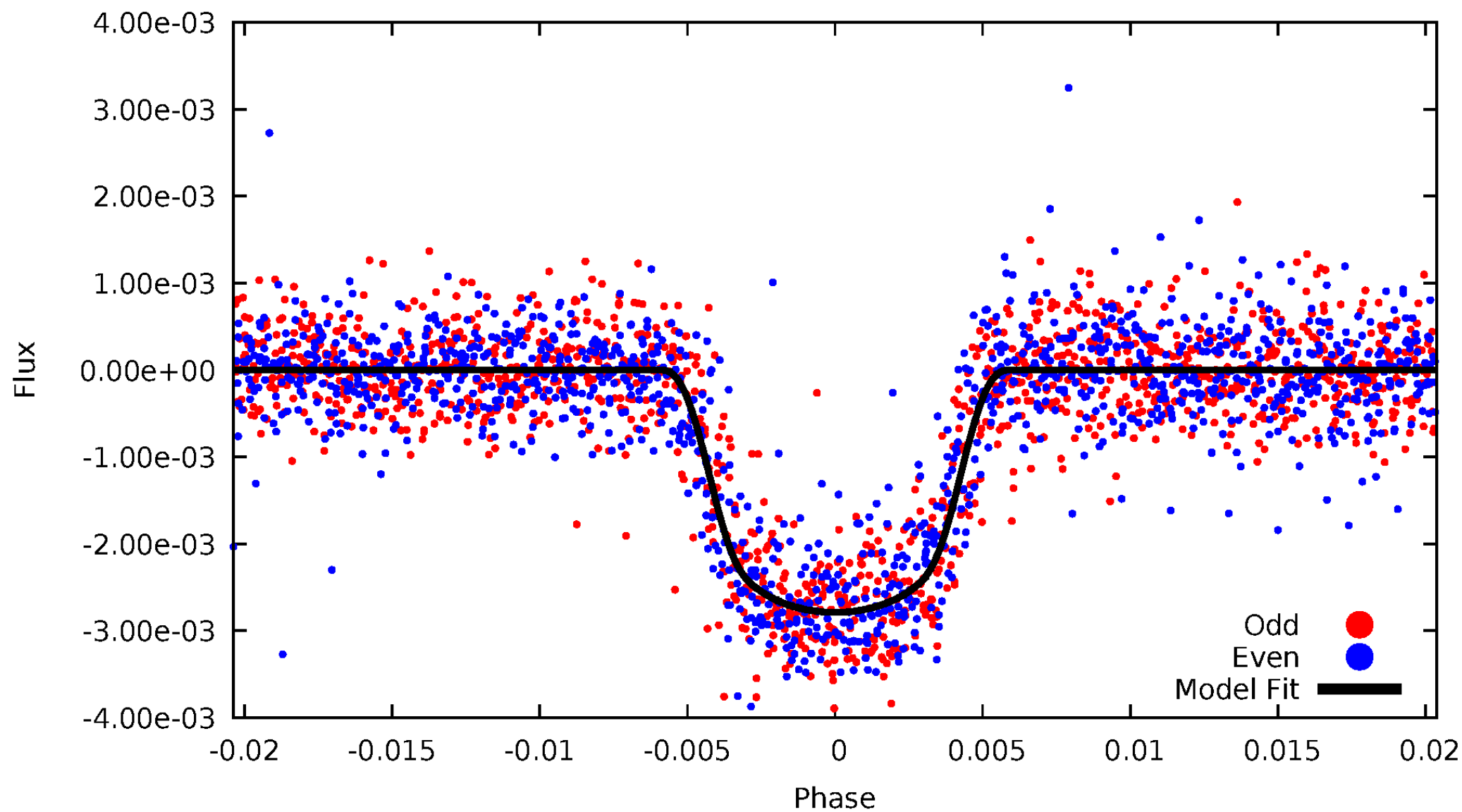
TCE 009757613-01





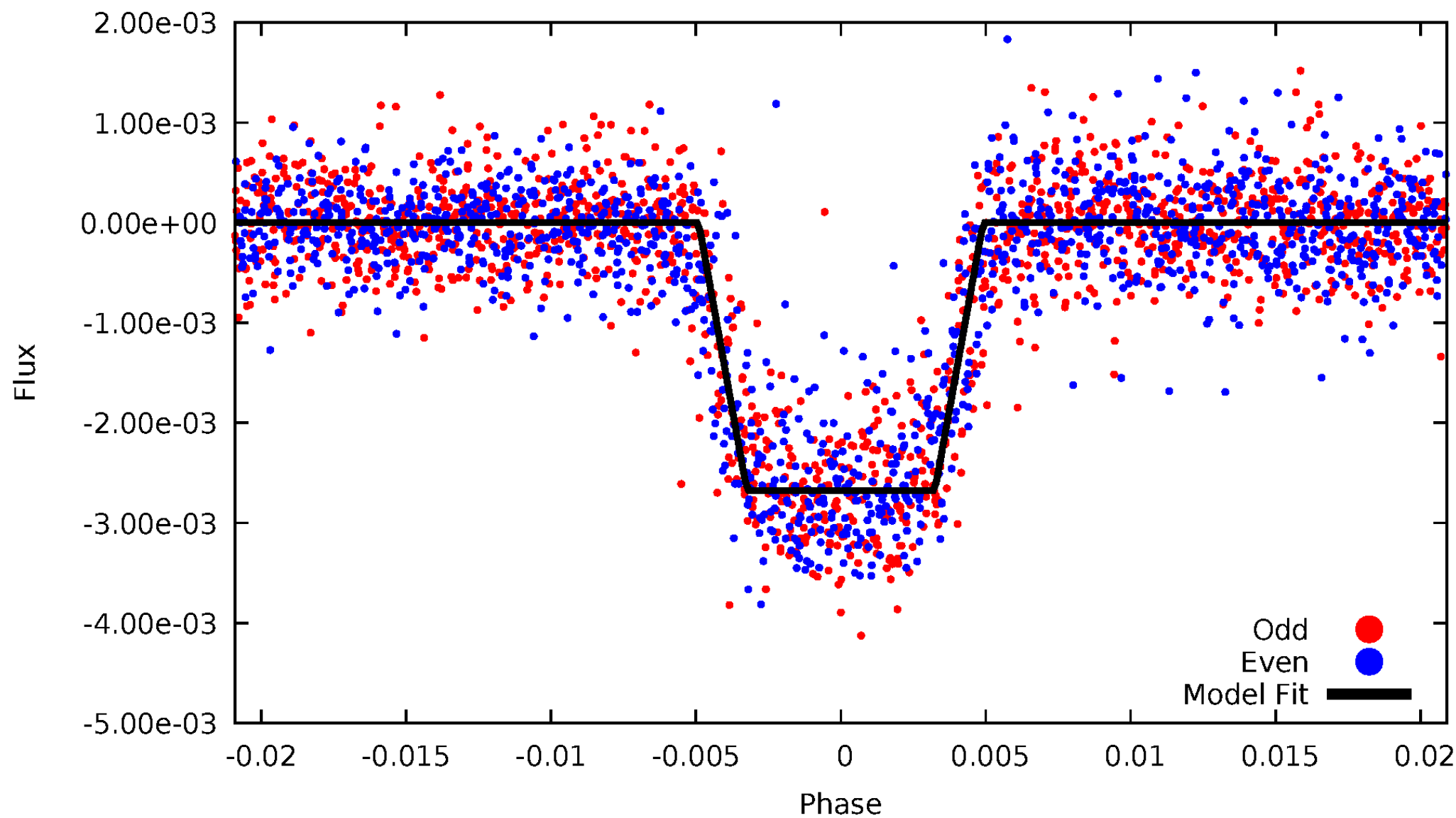
# DV Odd/Even

TCE 009757613-01



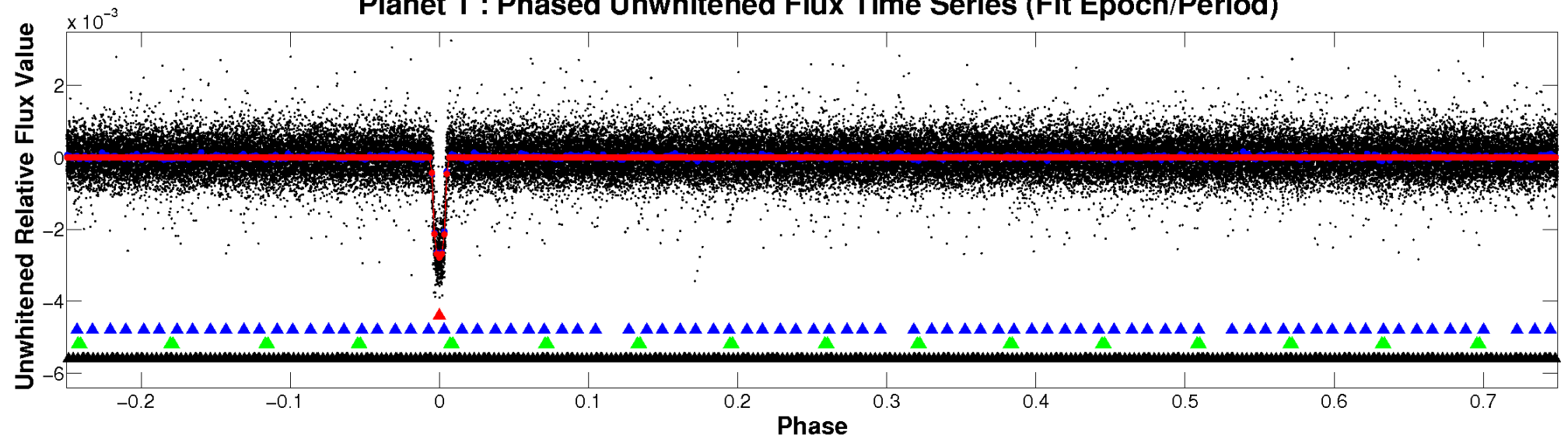
# ALT Odd/Even

TCE 009757613-01

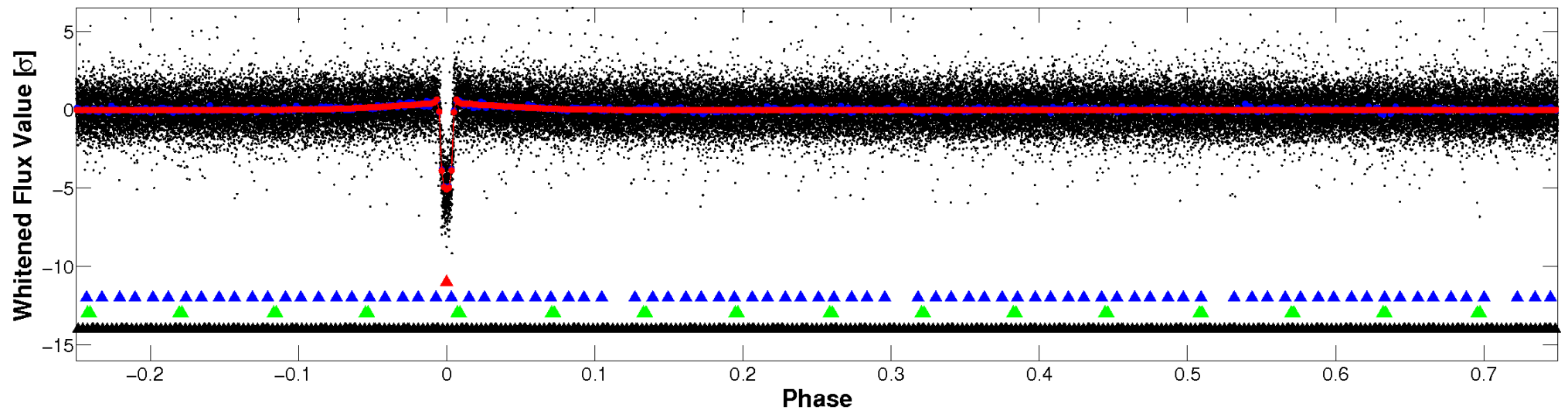


# Non-Whitened Vs. Whitened Light Curve

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

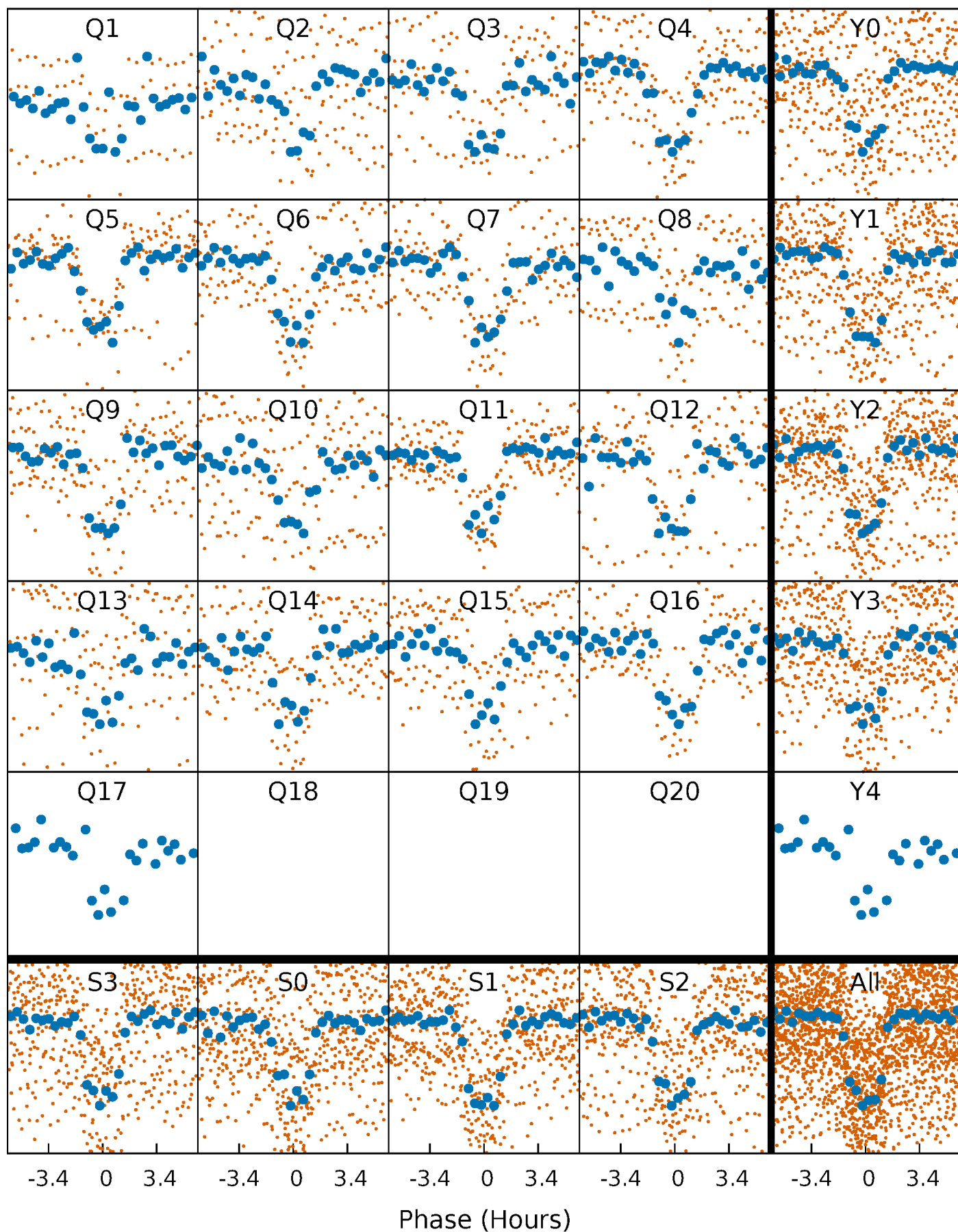


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

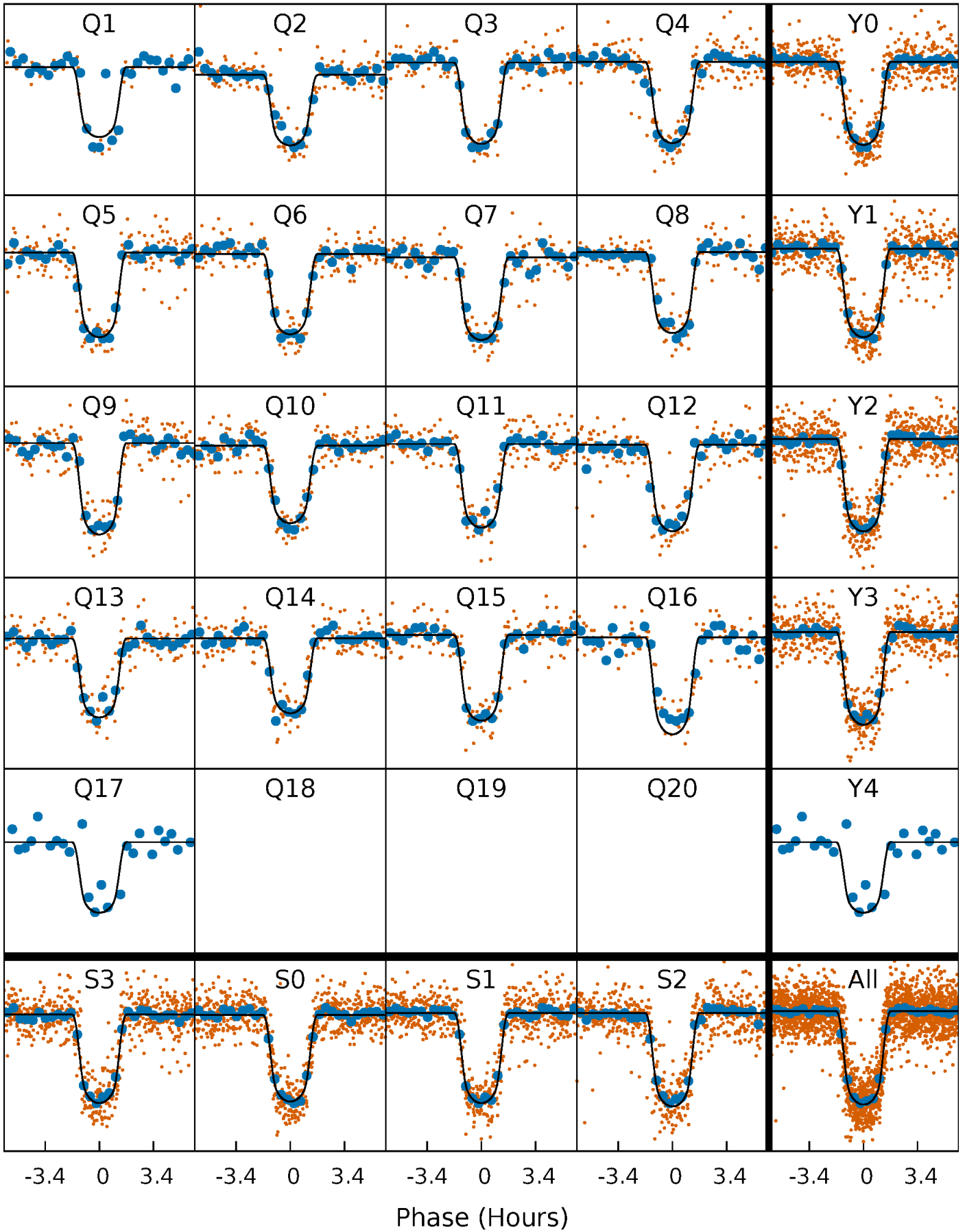
TCE 009757613-01 P= 12.283014 Days  $T_0=133.548260$  (BKJD)





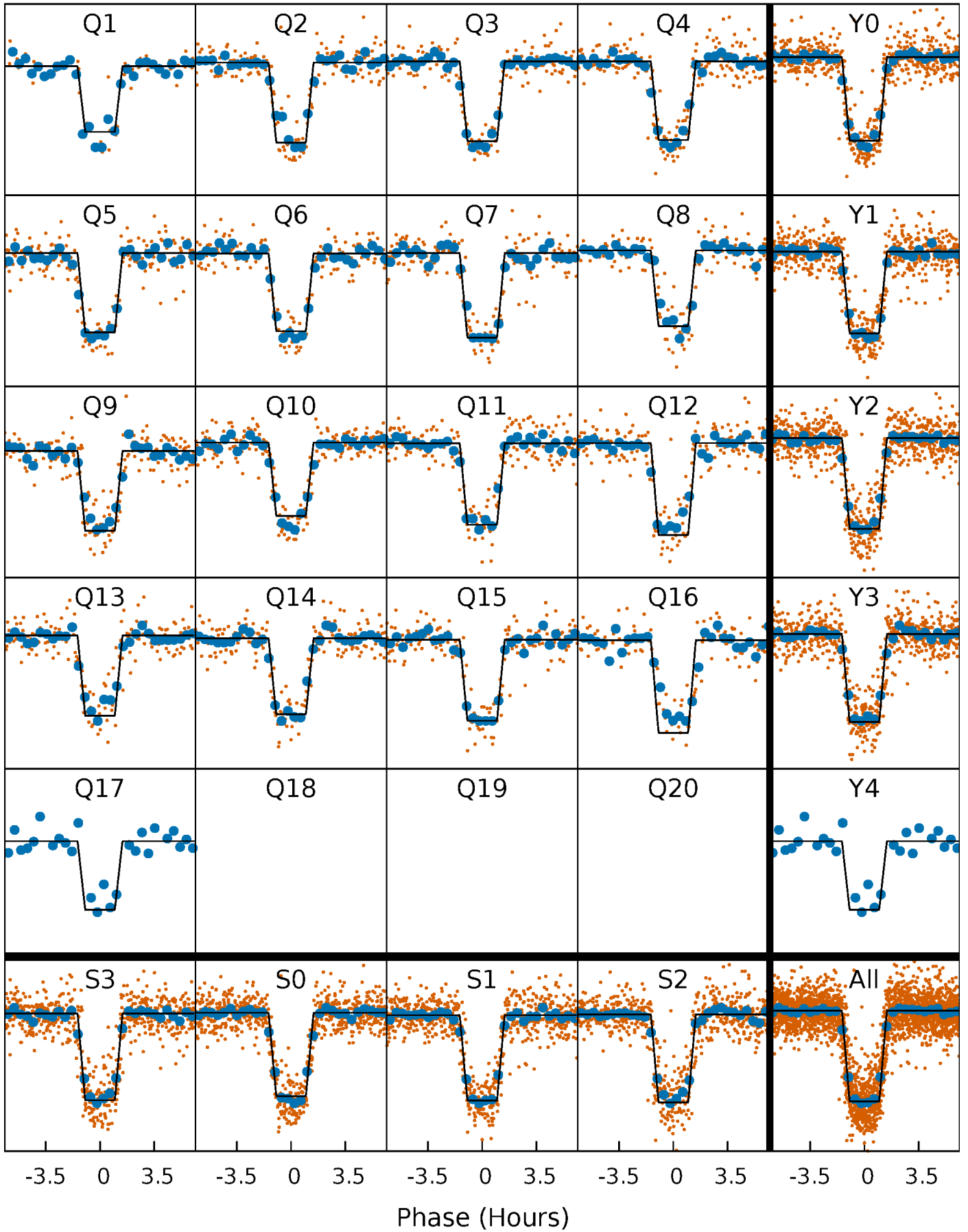
# DV Quarter-Phased Transit Curves

TCE 009757613-01 P= 12.283014 Days  $T_0=133.548260$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

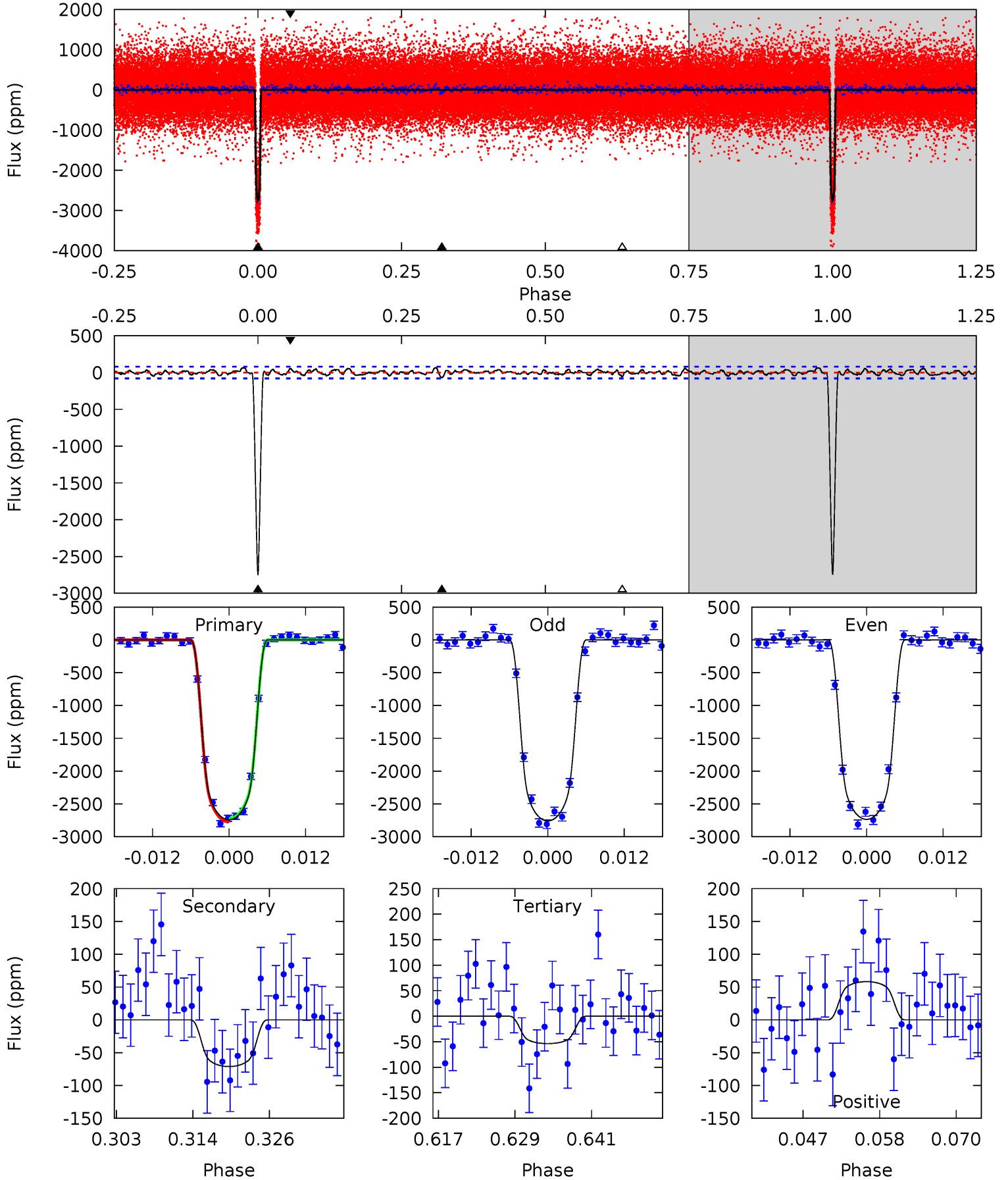
TCE 009757613-01 P= 12.282984 Days  $T_0=133.550017$  (BKJD)



# DV Model-Shift Uniqueness Test

009757613-01,  $P = 12.283014$  Days,  $E = 121.265246$  Days

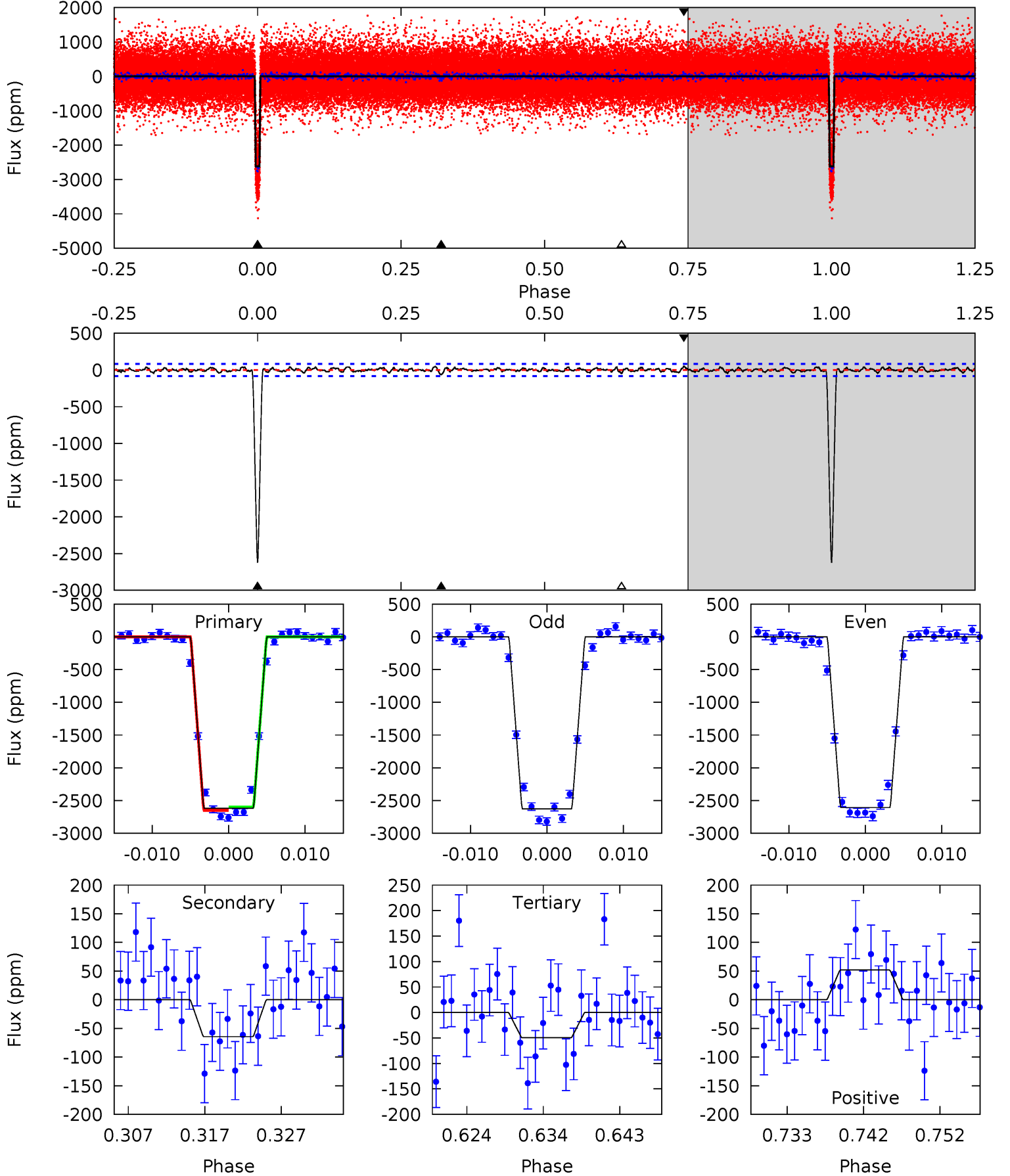
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
170.8	4.43	3.34	3.63	5.00	2.52	1.37	167.4	167.1	1.09	0.80	0.73	0.98	0.02	1.65



# Alt Model-Shift Uniqueness Test

009757613-01, P = 12.282984 Days, E = 121.267033 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
158.7	3.91	2.99	3.14	5.03	2.58	1.05	155.7	155.6	0.91	0.76	0.64	0.98	0.02	1.53





### Stellar Parameters For KIC 009757613

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$3879^{+77}_{-85}$	$4.708^{+0.045}_{-0.021}$	$-0.120^{+0.150}_{-0.150}$	$0.537^{+0.030}_{-0.041}$	$0.537^{+0.037}_{-0.033}$	$4.884^{+0.959}_{-0.449}$
	+2%/-2%	+1%/-0%	+125%/-125%	+6%/-8%	+7%/-6%	+20%/-9%
Source	SPE70	SPE60	SPE70	DSEP		

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

### Secondary Eclipse Parameters for KIC 009757613-01 / KOI 0250.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-71 \pm 16$	$3.13^{+0.14}_{-0.15}$	$599^{+14}_{-17}$	$2309^{+70}_{-78}$	$29^{+7}_{-7}$
Alt.	$-64 \pm 16$	$3.01^{+0.13}_{-0.13}$	$599^{+15}_{-17}$	$2301^{+78}_{-85}$	$28^{+9}_{-7}$

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

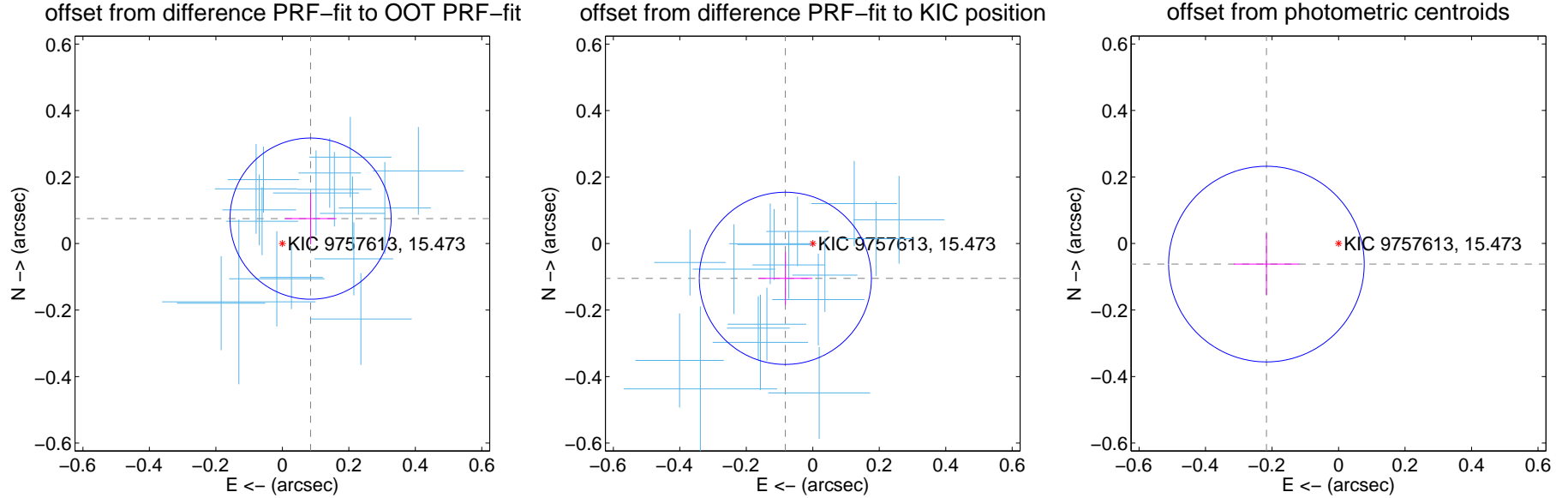
## DV Centroid Data

Supplemental centroid analysis for 009757613-01. Kepler magnitude: 15.47. Transit SNR 105.03

There are 17 quarters with good PRF difference image offsets

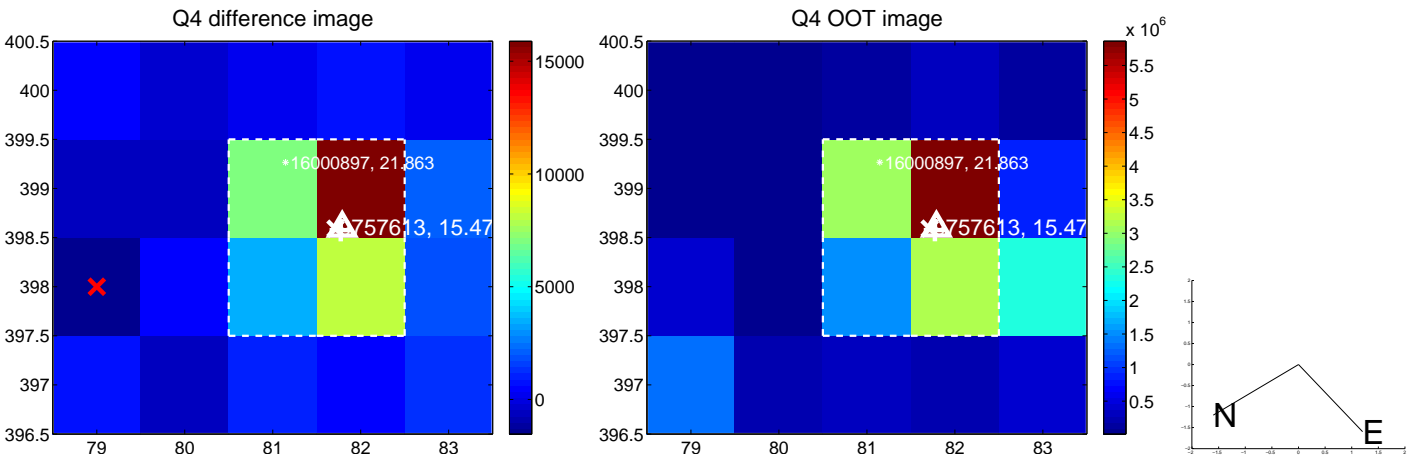
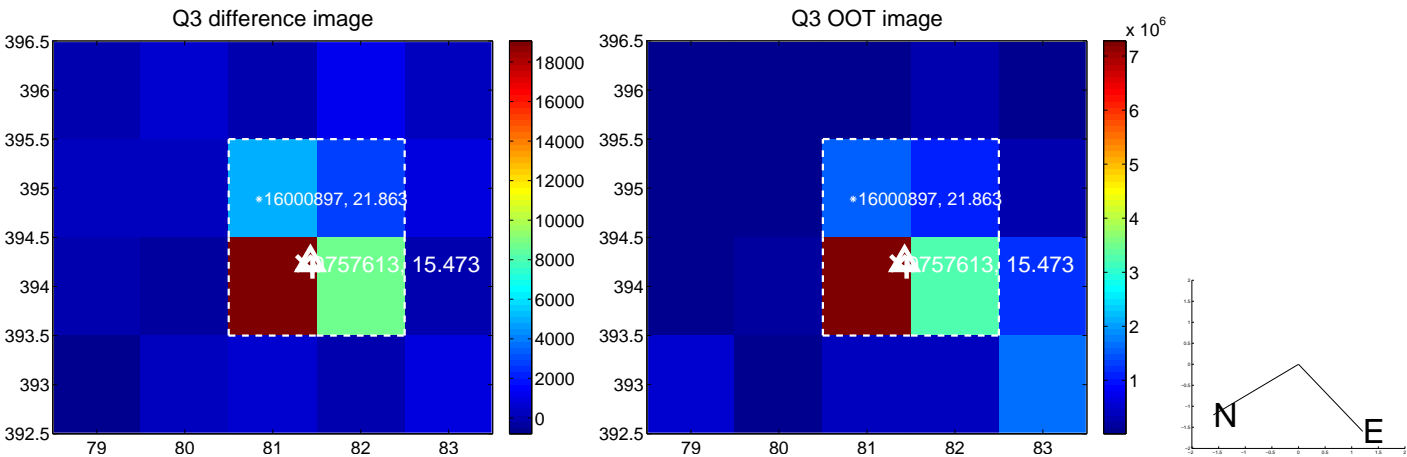
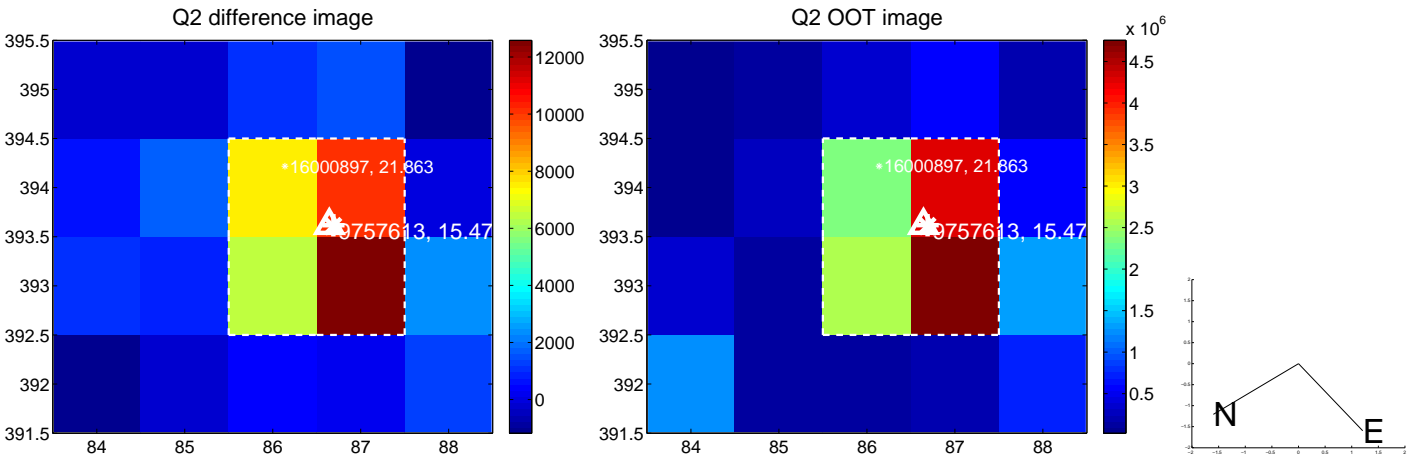
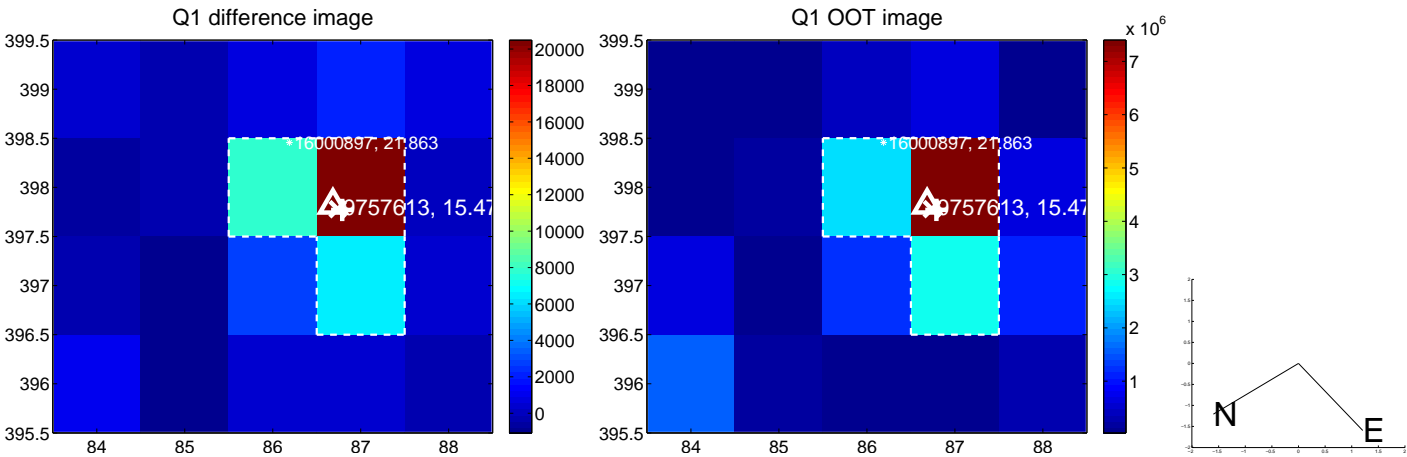
The direct PRF centroid is offset from the target star catalog position by about 0.33 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.113 \pm 0.081$	1.40	$-0.085 \pm 0.078$	$0.075 \pm 0.077$
PRF-fit source offset from KIC position	$0.133 \pm 0.086$	1.54	$0.083 \pm 0.082$	$-0.104 \pm 0.079$
photometric centroid source offset	$0.23 \pm 0.10$	2.30	$0.22 \pm 0.10$	$-0.06 \pm 0.09$

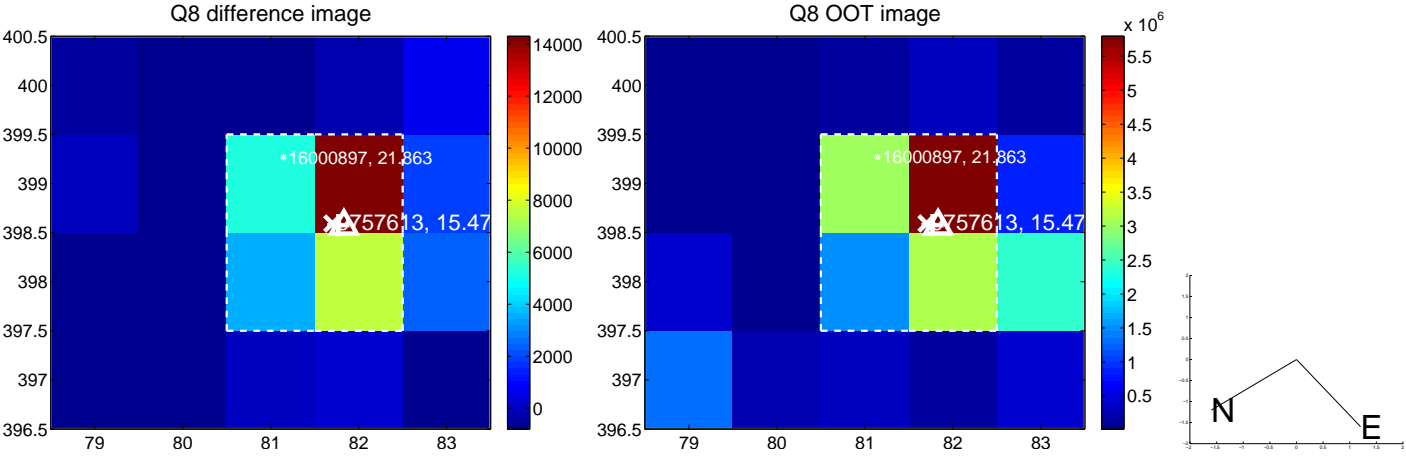
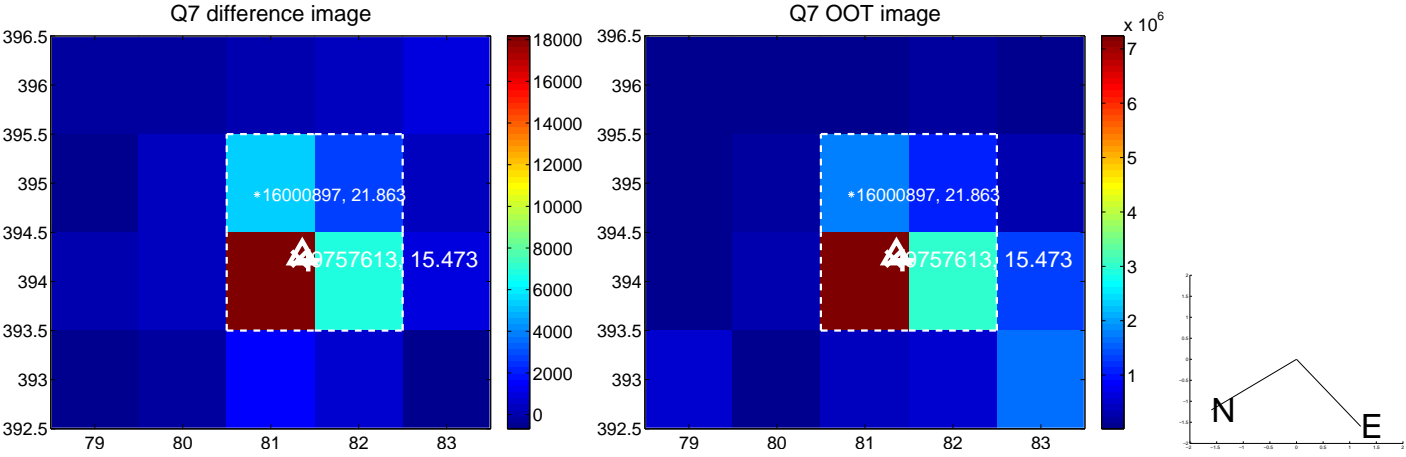
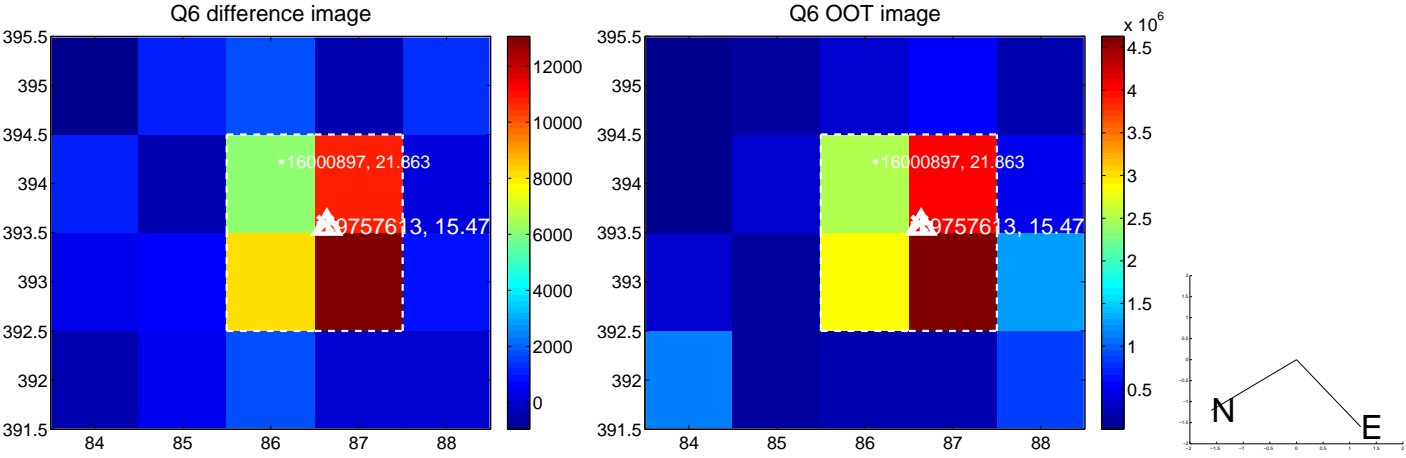
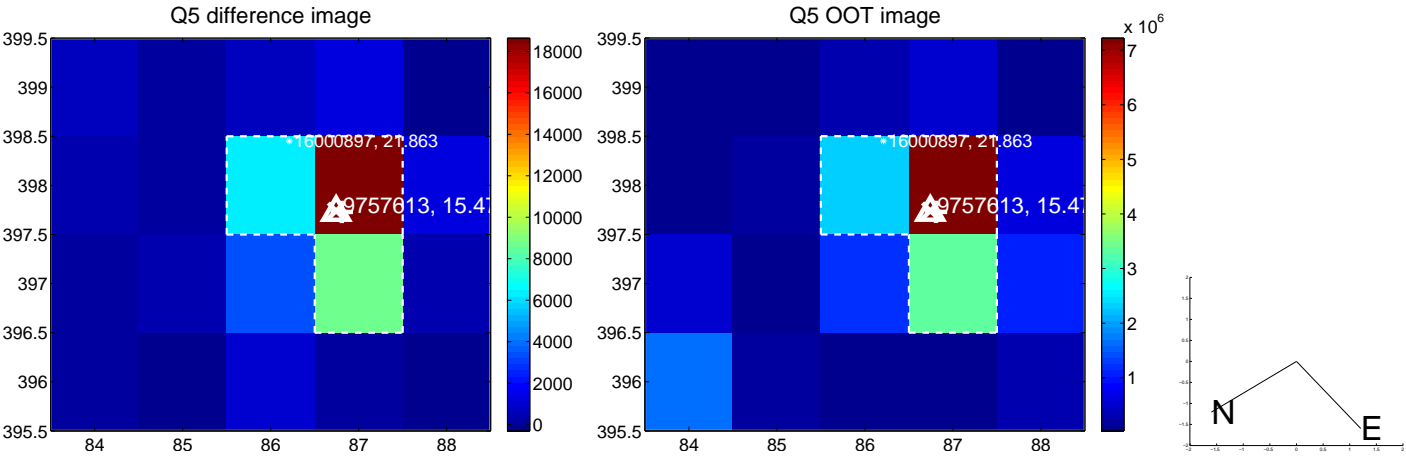


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

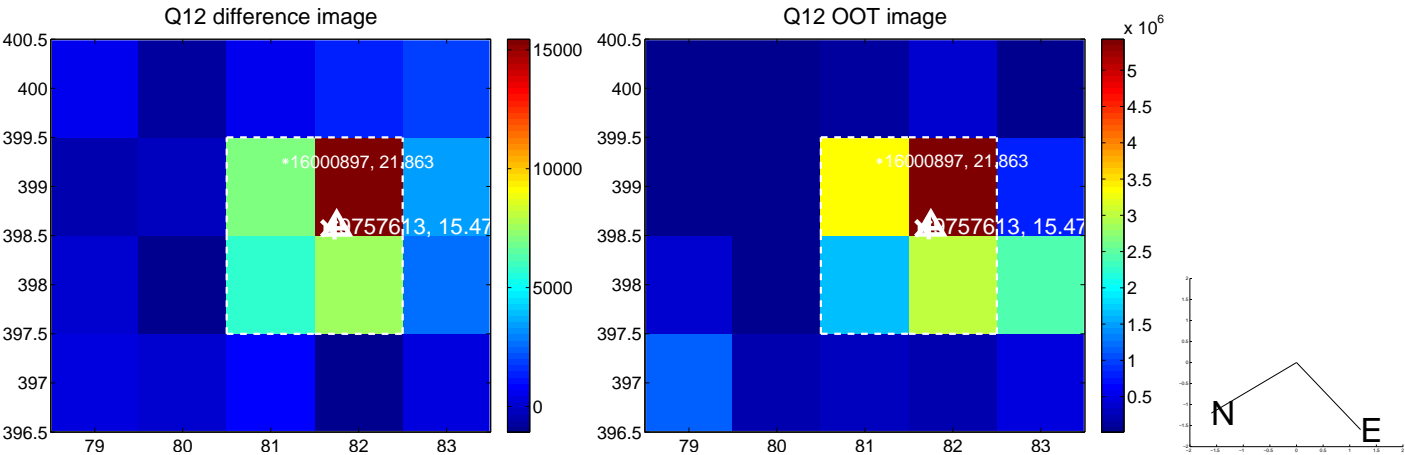
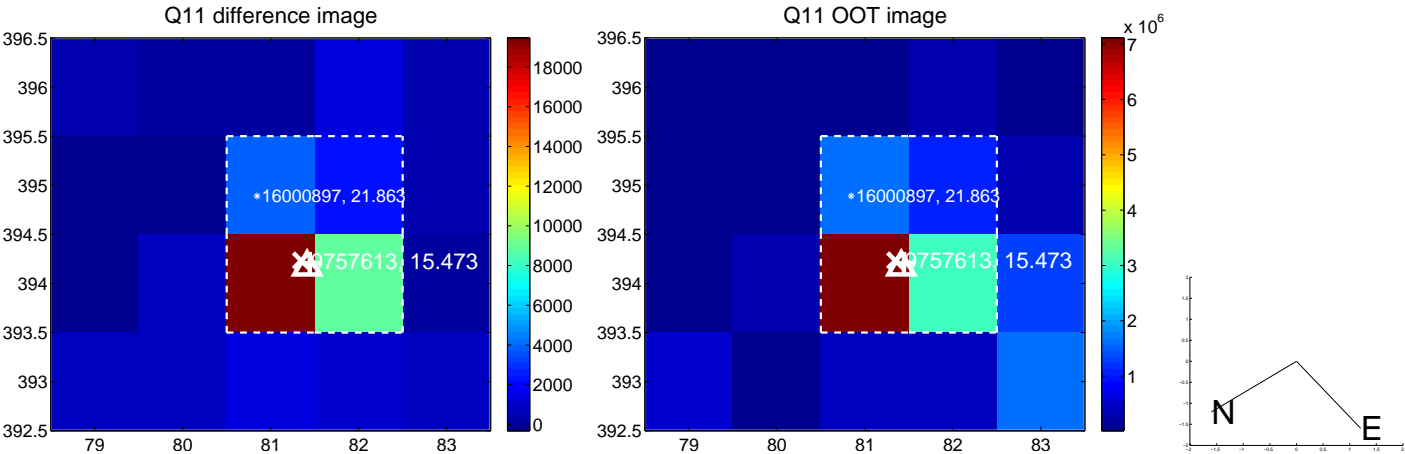
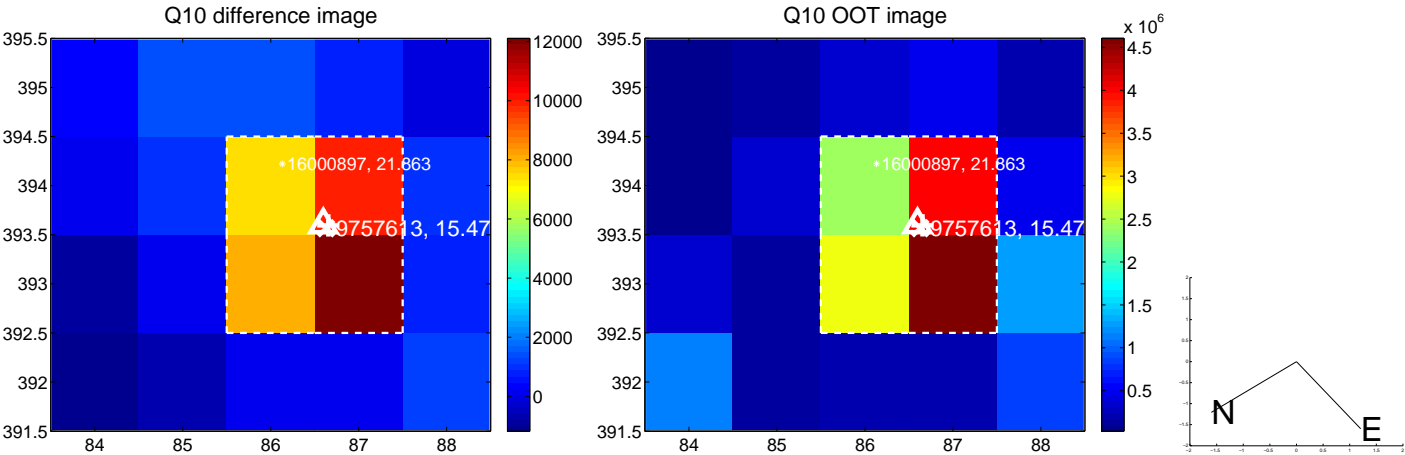
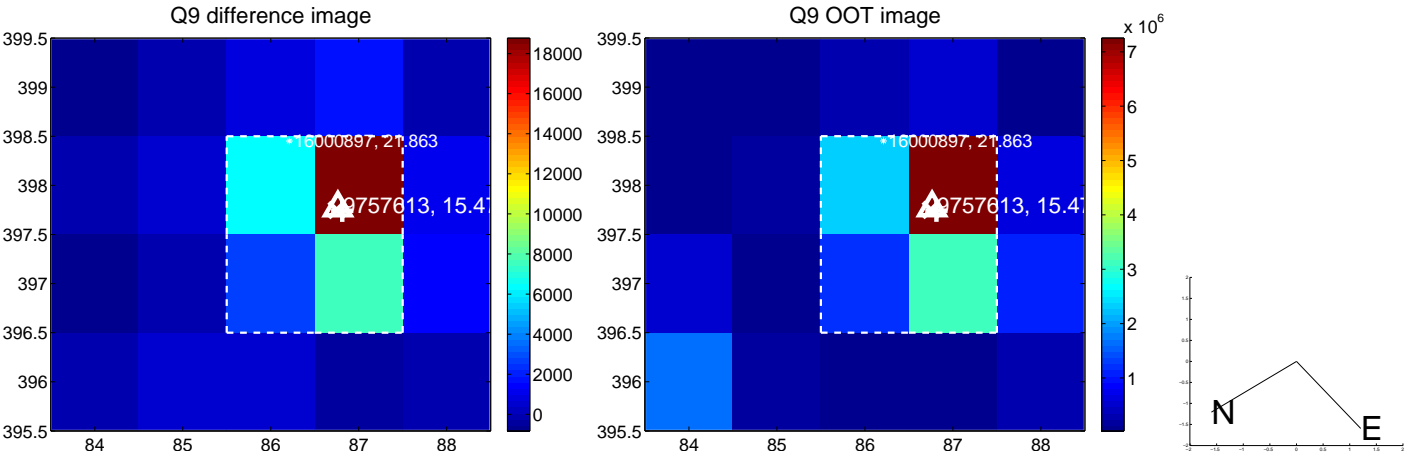


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

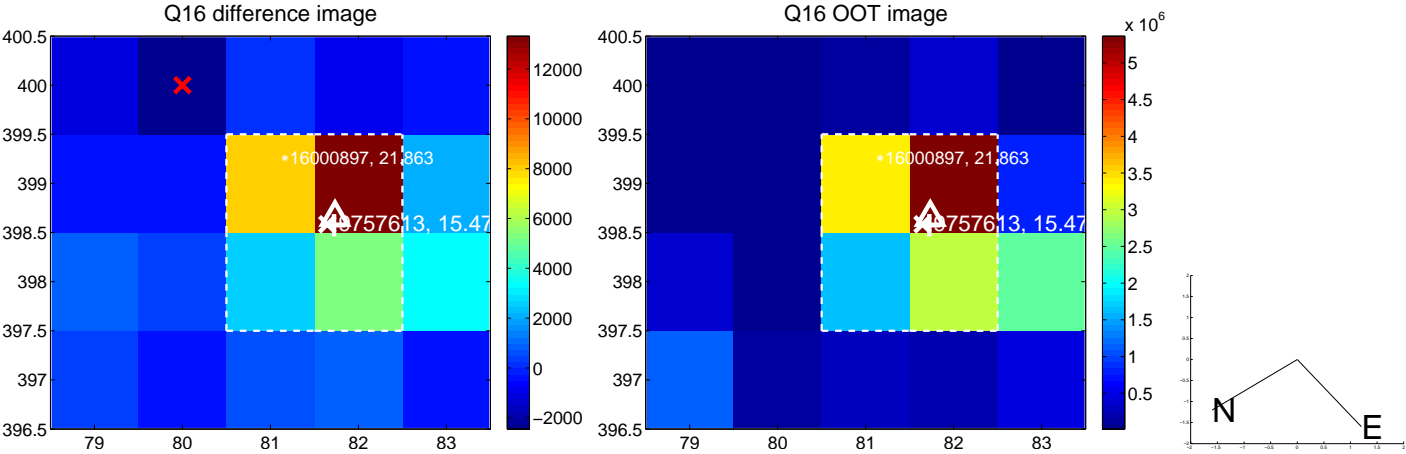
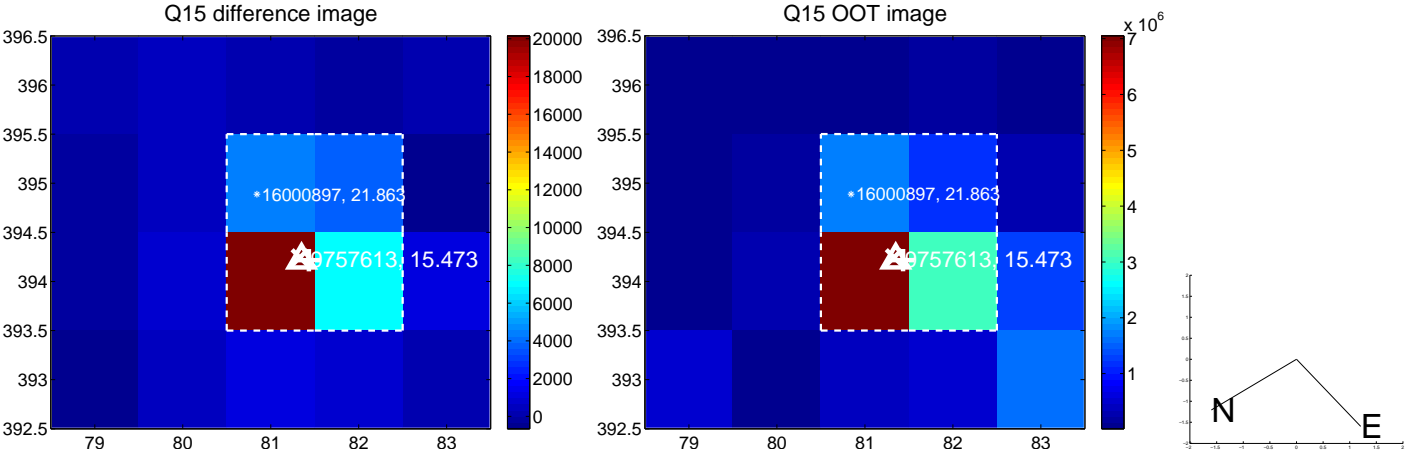
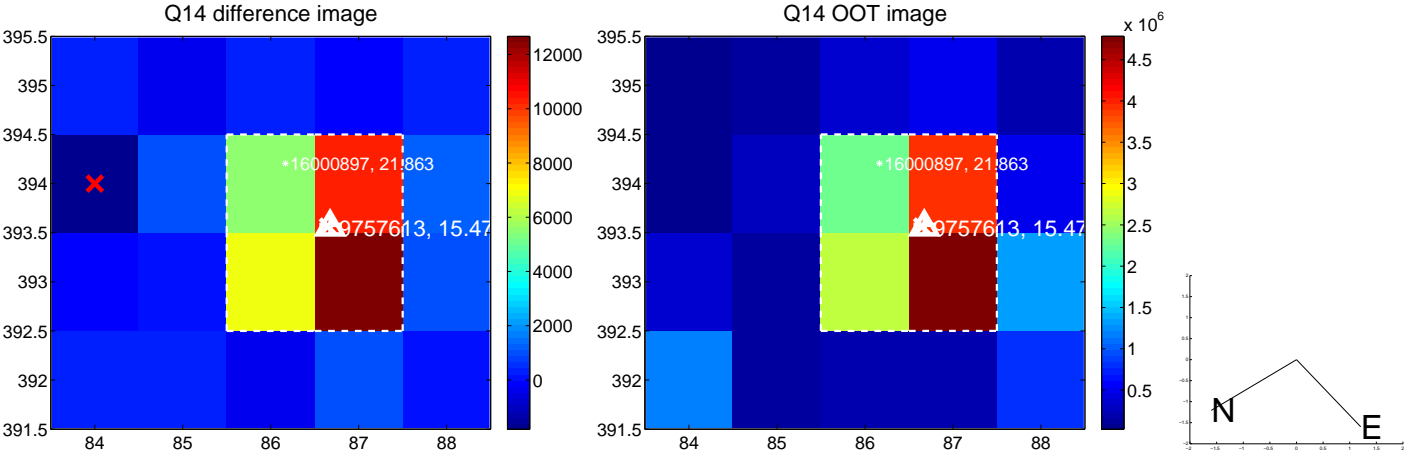
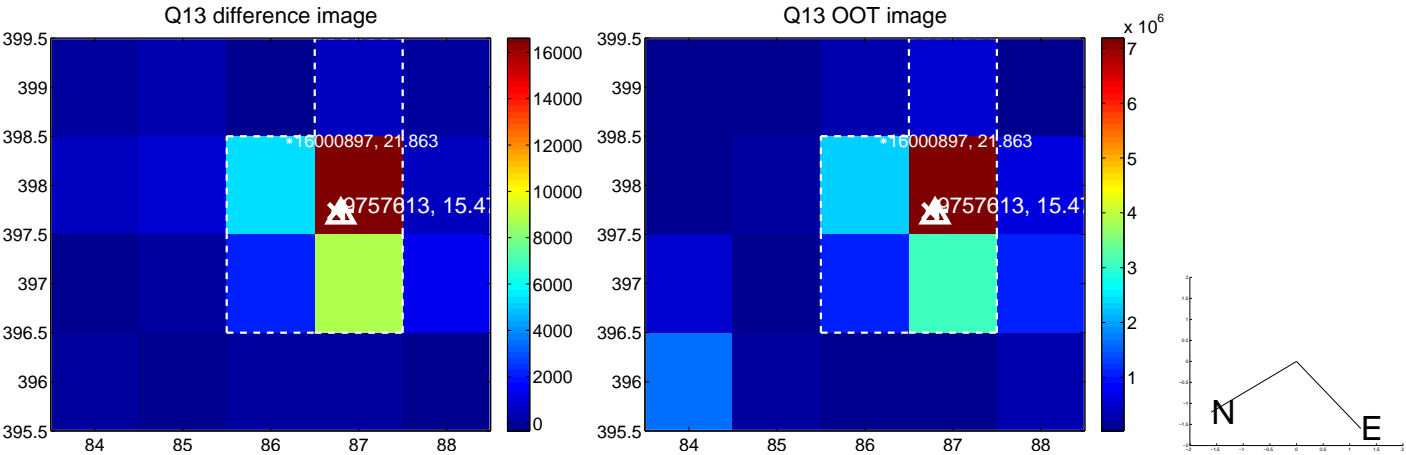




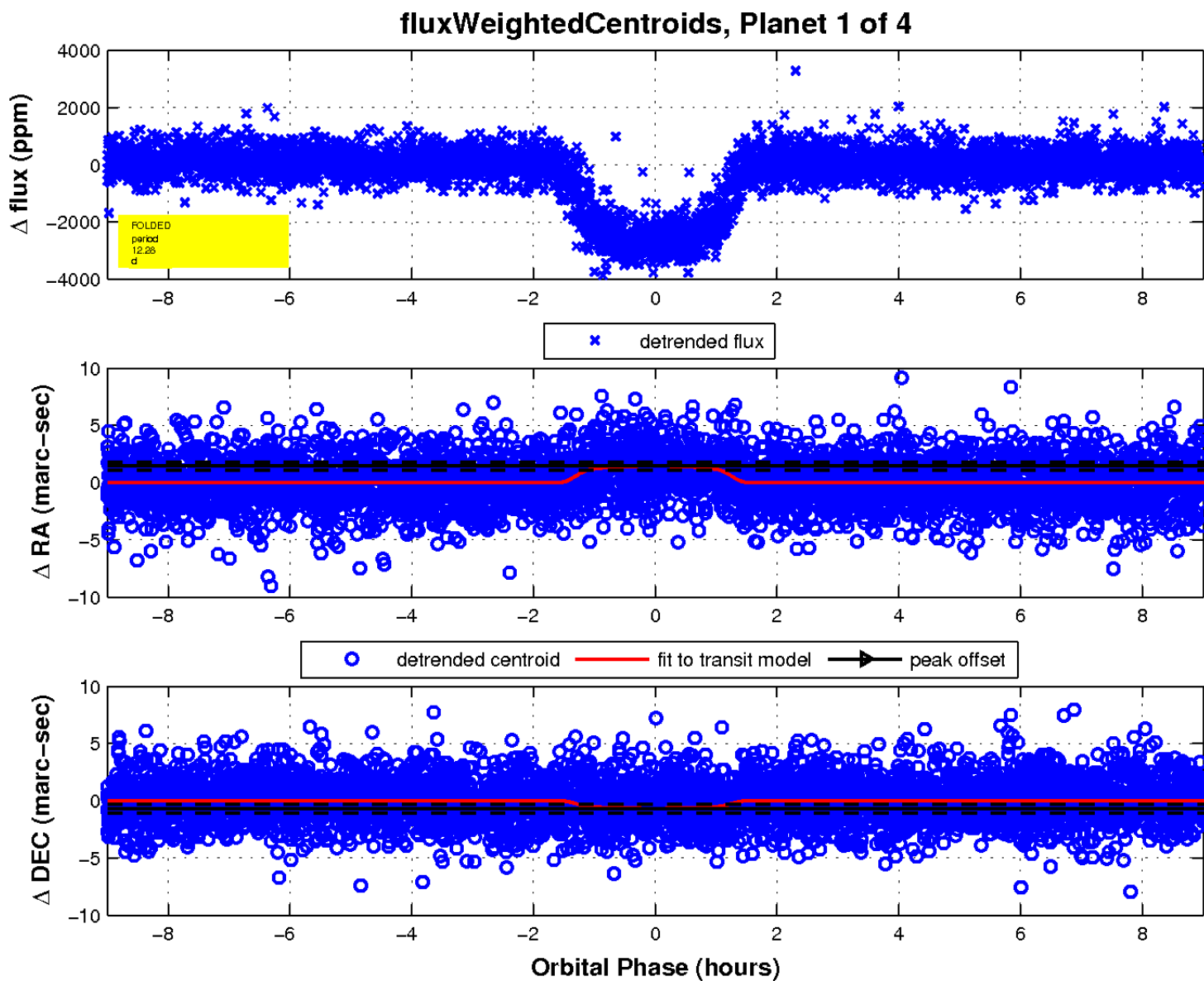
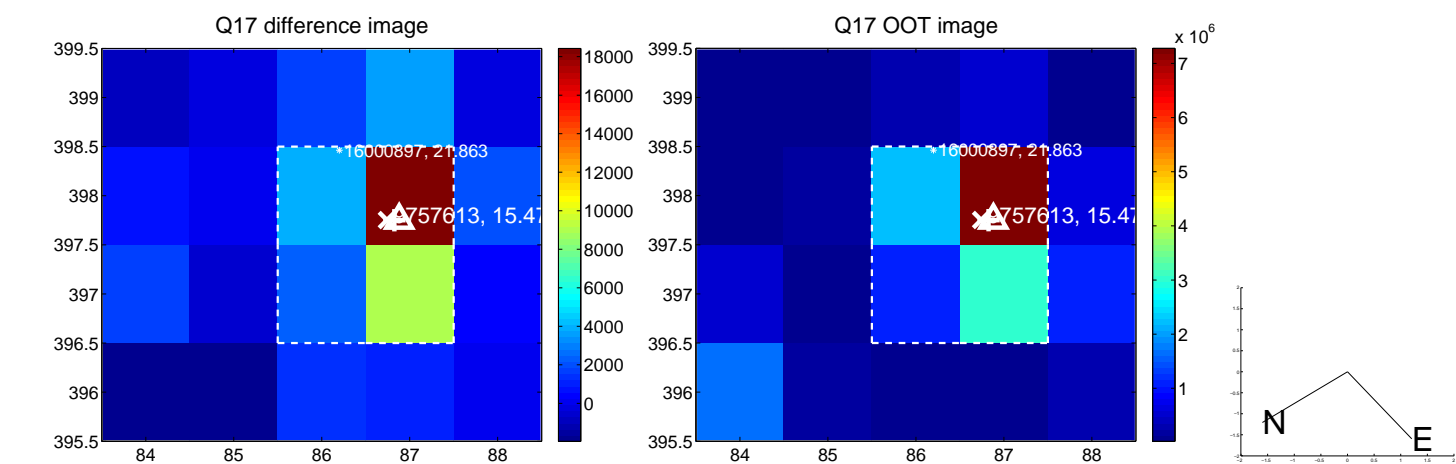
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

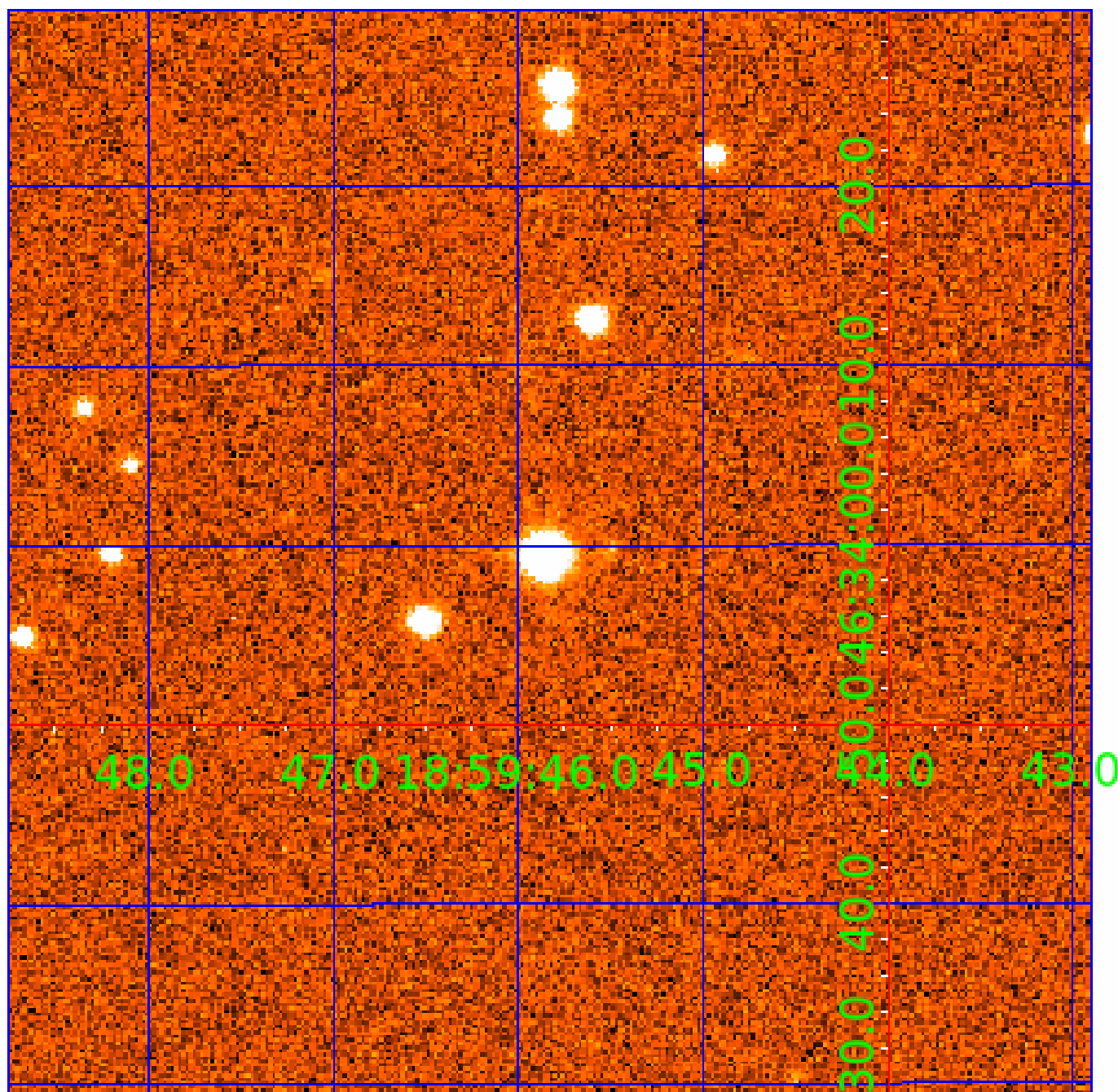


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 009757613

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009757613-01	OBS	0250.01	12.283014	133.548260	2788.4	3.002	104.5	105.0	0.54	3879	3.15	8.15
009757613-02	OBS	0250.02	17.251197	132.635403	2013.9	2.339	53.4	54.1	0.54	3879	2.92	5.18
009757613-03	OBS	0250.04	46.827645	136.745305	1487.3	1.955	24.2	25.9	0.54	3879	2.26	1.37
009757613-04	OBS	0250.03	3.543922	132.714442	385.6	2.159	22.3	25.2	0.54	3879	1.25	42.77

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009757613-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
009757613-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT
009757613-03	OBS	PC	0.96	0	0	0	0	NO_COMMENT
009757613-04	OBS	PC	1.00	0	0	0	0	NO_COMMENT

**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.

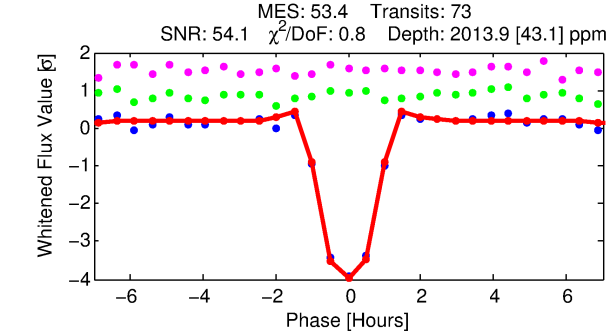
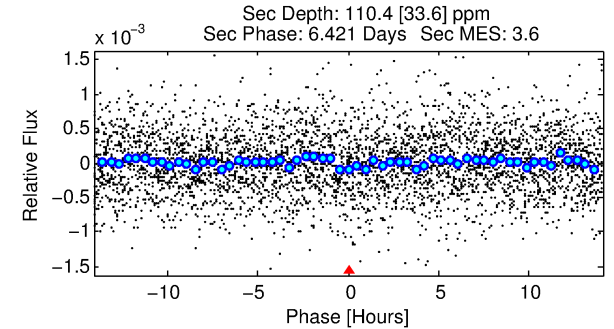
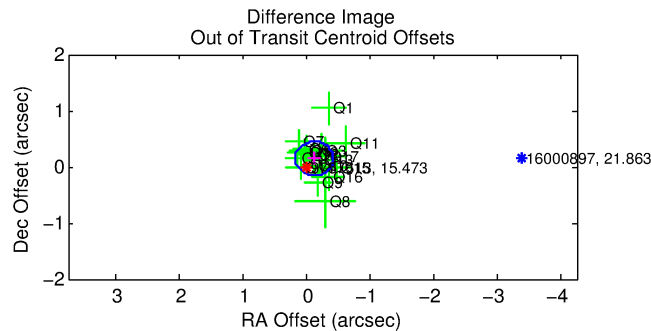
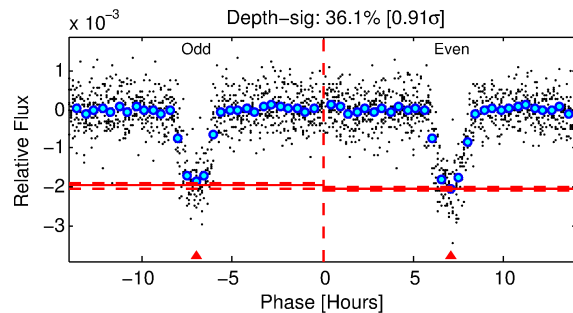
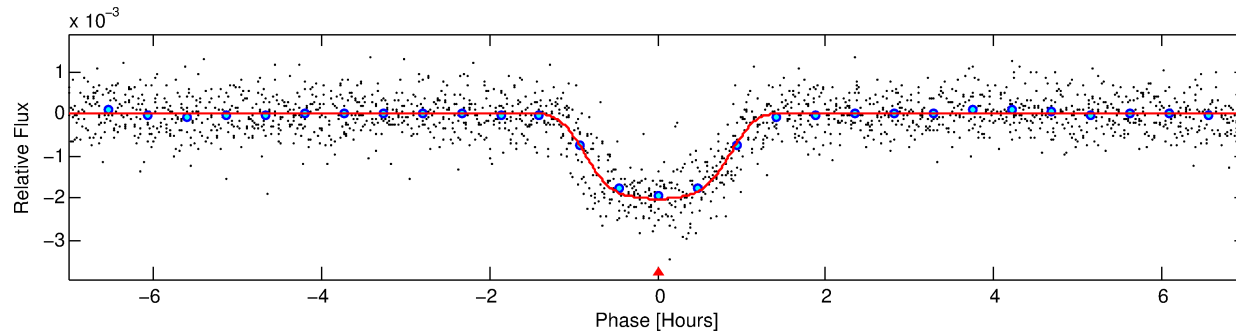
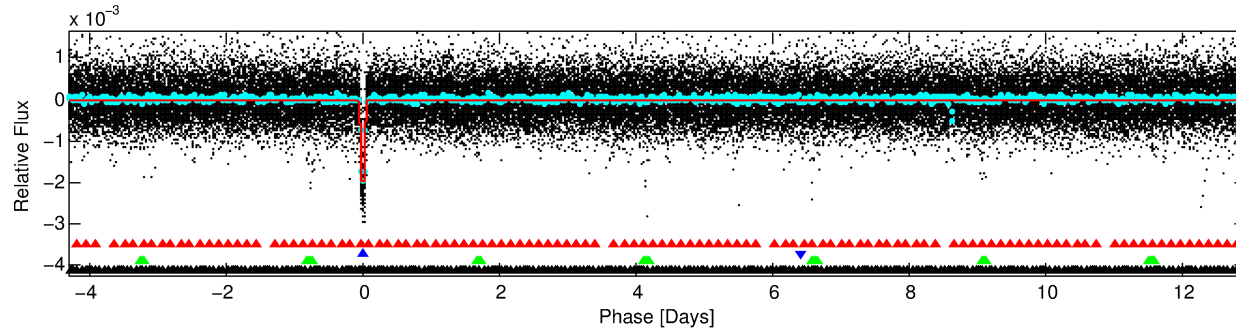
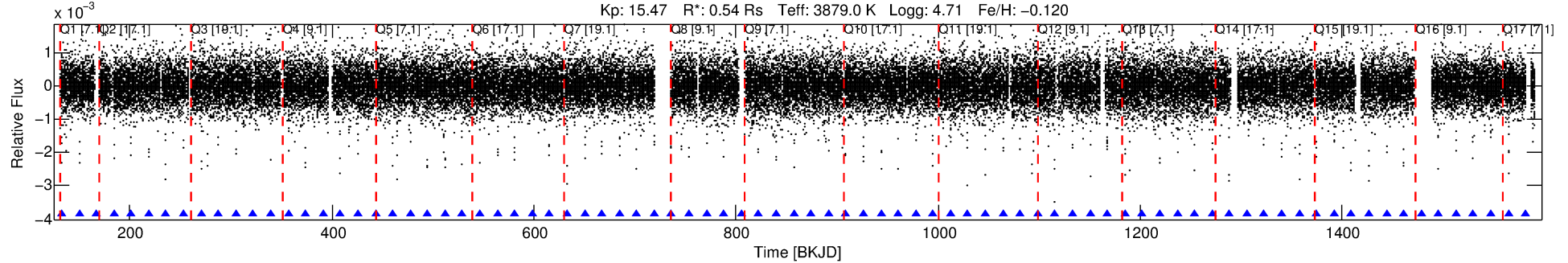
Ephemeris Match Information For 009757613-02

No Significant Match Found

# DV One-Page Summary

KIC: 9757613 Candidate: 2 of 4 Period: 17.251 d  
KOI: K00250.02 Name: Kepler-26c Corr: 0.947

Kp: 15.47 R\*: 0.54 Rs Teff: 3879.0 K Logg: 4.71 Fe/H: -0.120



## DV Fit Results:

Period = 17.25120 [0.00002] d  
Epoch = 132.6354 [0.0010] BKJD  
Rp/R\* = 0.0497 [0.0014]  
a/R\* = 29.46 [2.61]  
b = 0.91 [0.02]  
Seff = 5.18 [0.64]  
Teff = 385 [12] K  
Rp = 2.91 [0.24] Re  
a = 0.1062 [0.0065] AU  
Ag = 80.69 [25.91] [3.08σ]  
Teffp = 1783 [143] K [9.72σ]

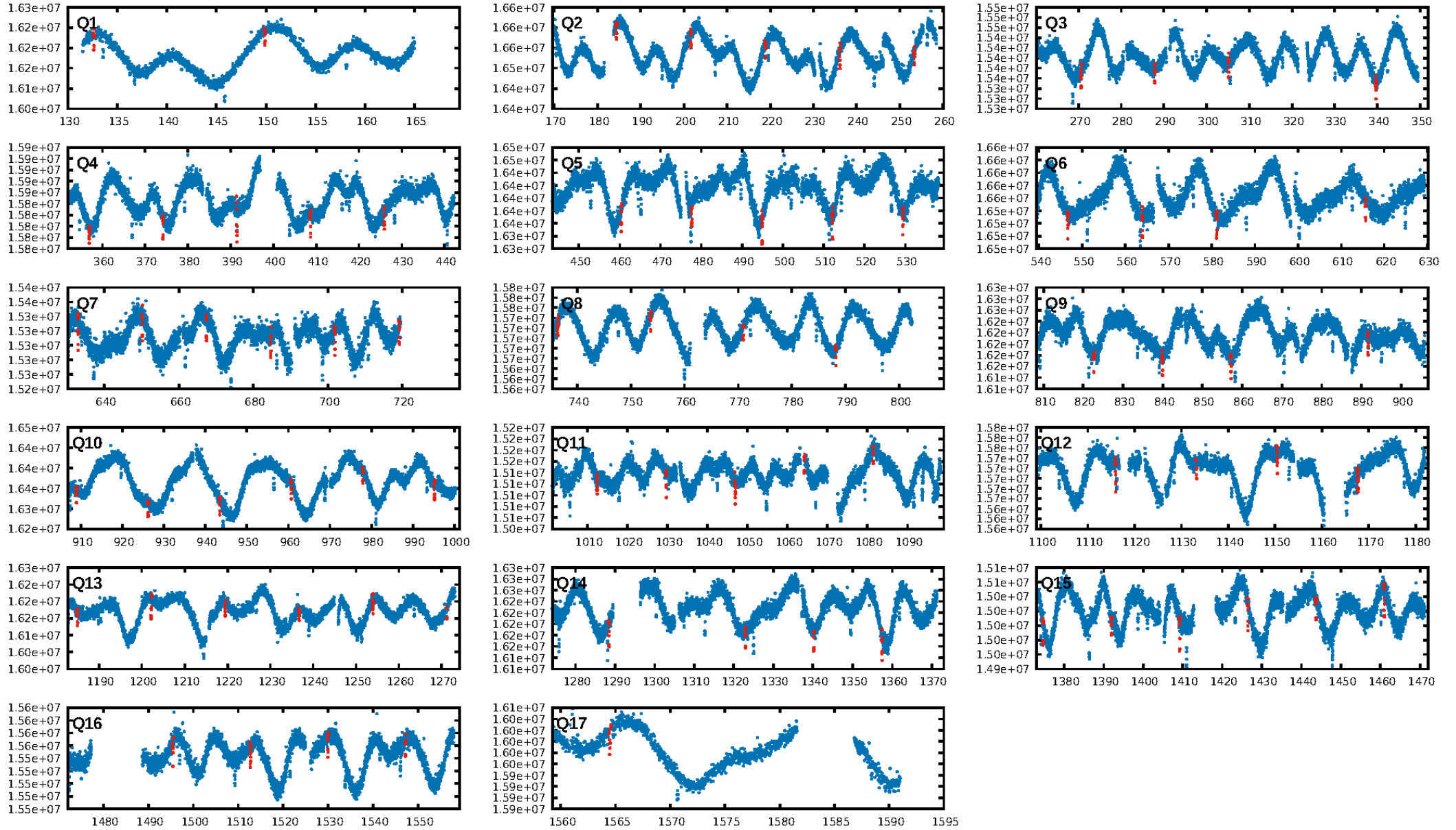
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [31.33σ]  
LongPeriod-sig: 100.0% [232.83σ]  
ModelChiSquare2-sig: 100.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [70/70]  
GhostDiagnostic-chr: 5.599  
Centroid-sig: 0.0%  
Centroid-so: 0.632 arcsec [3.32σ]  
OotOffset-rm: 0.187 arcsec [1.86σ]  
KicOffset-rm: 0.031 arcsec [0.30σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 0.94 [16/17]

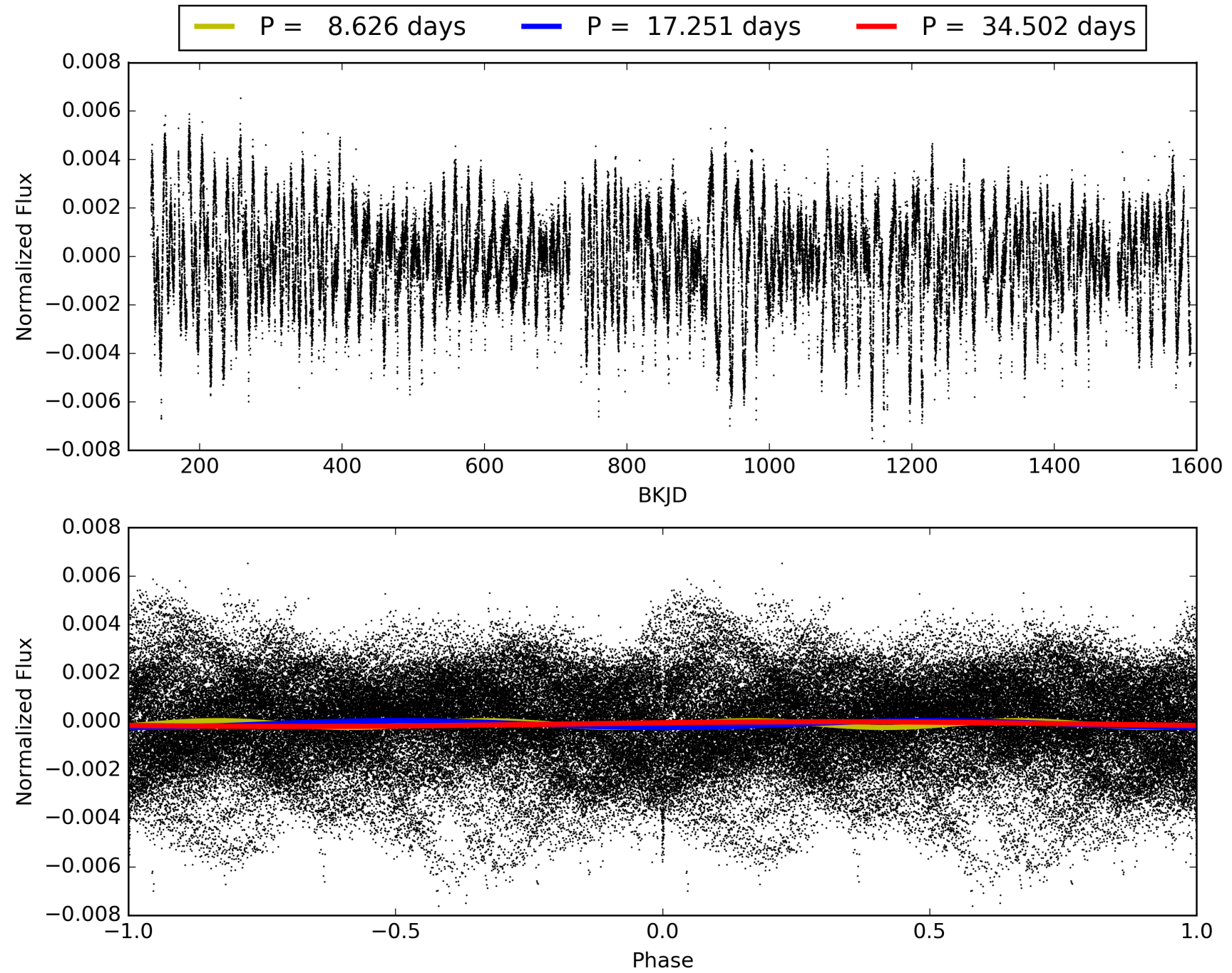
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 17:32:49 Z

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

# TCE 009757613-02, PDC Light Curves

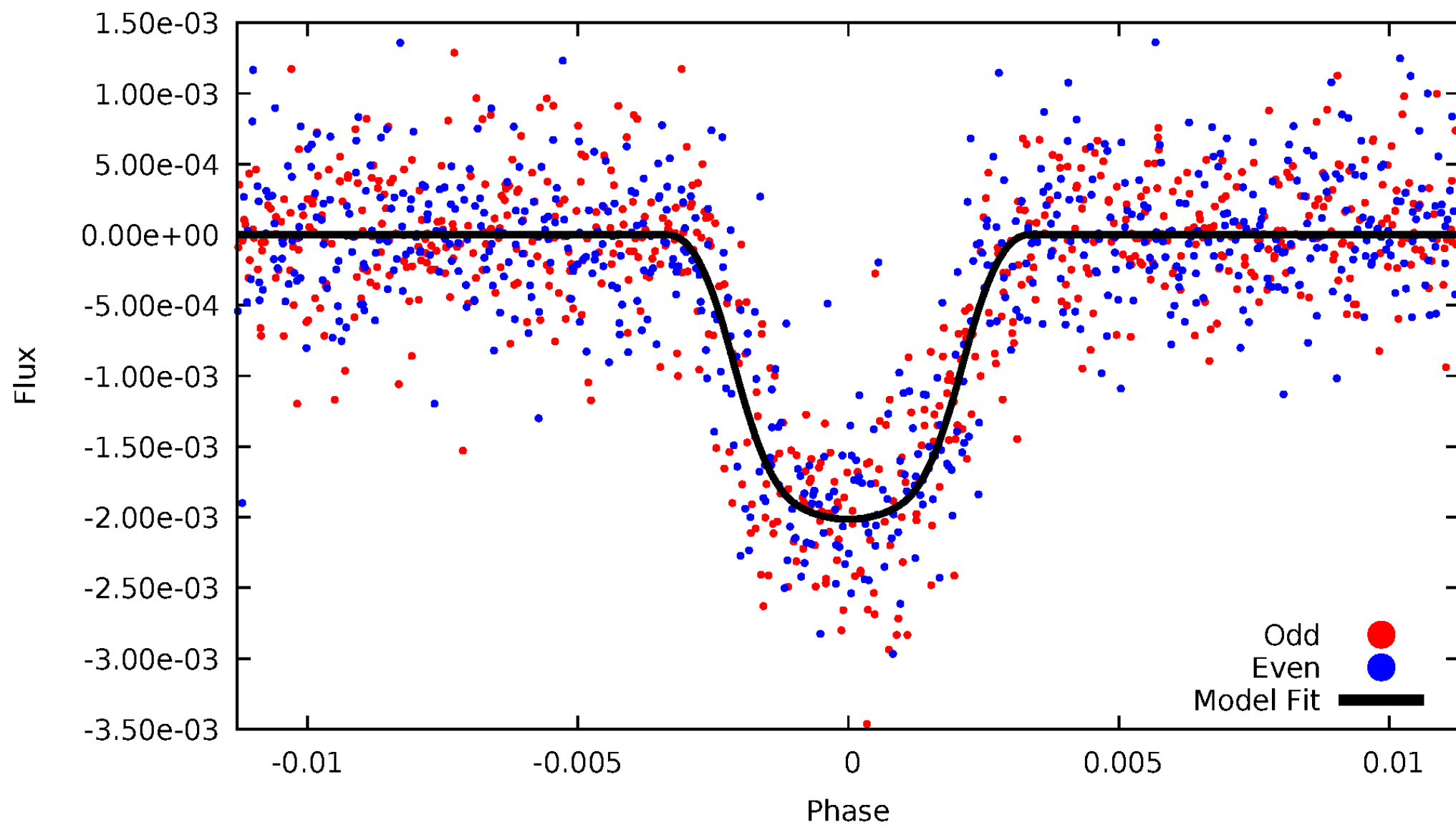


# TCE 009757613-02



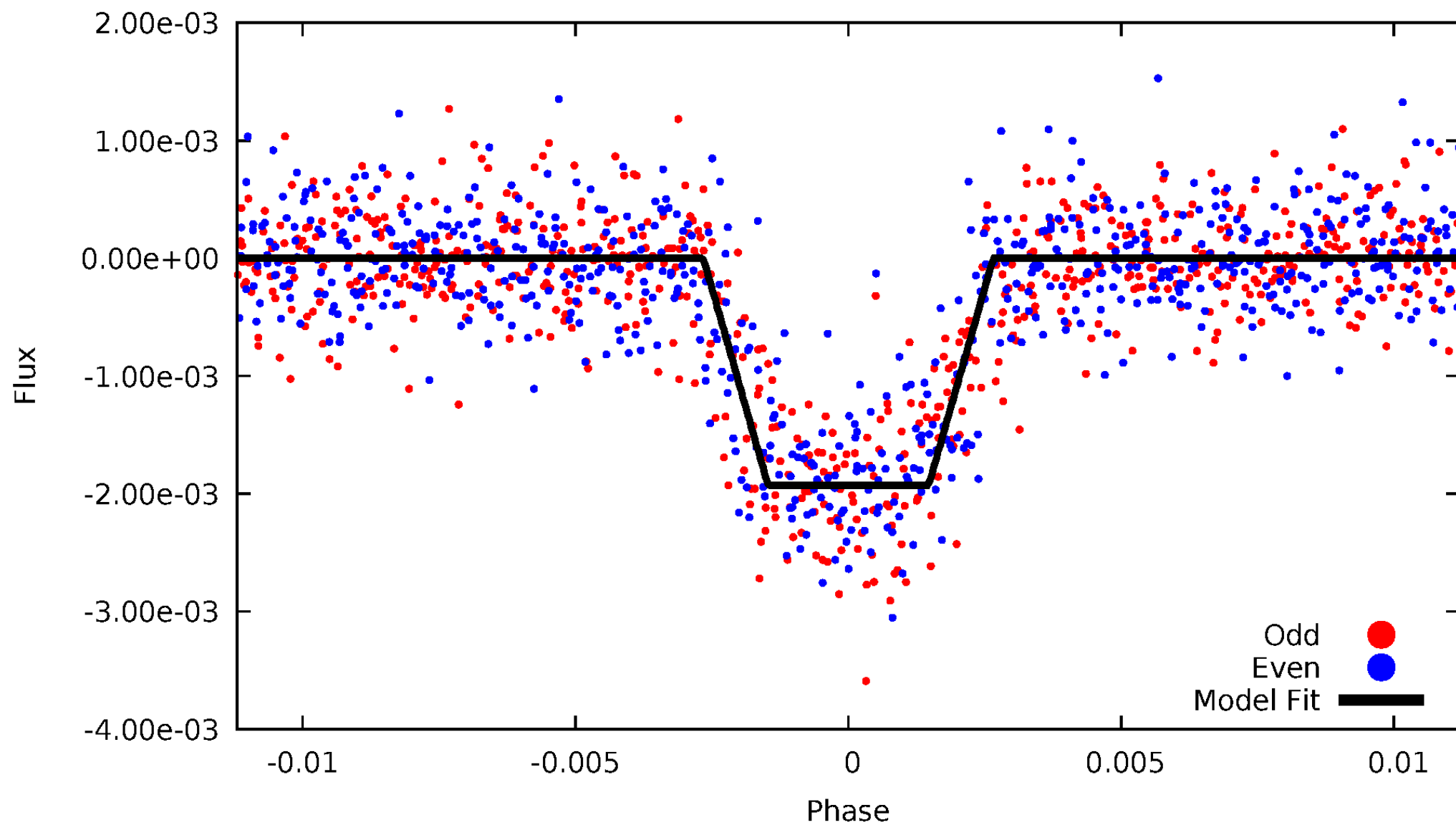
# DV Odd/Even

TCE 009757613-02



# ALT Odd/Even

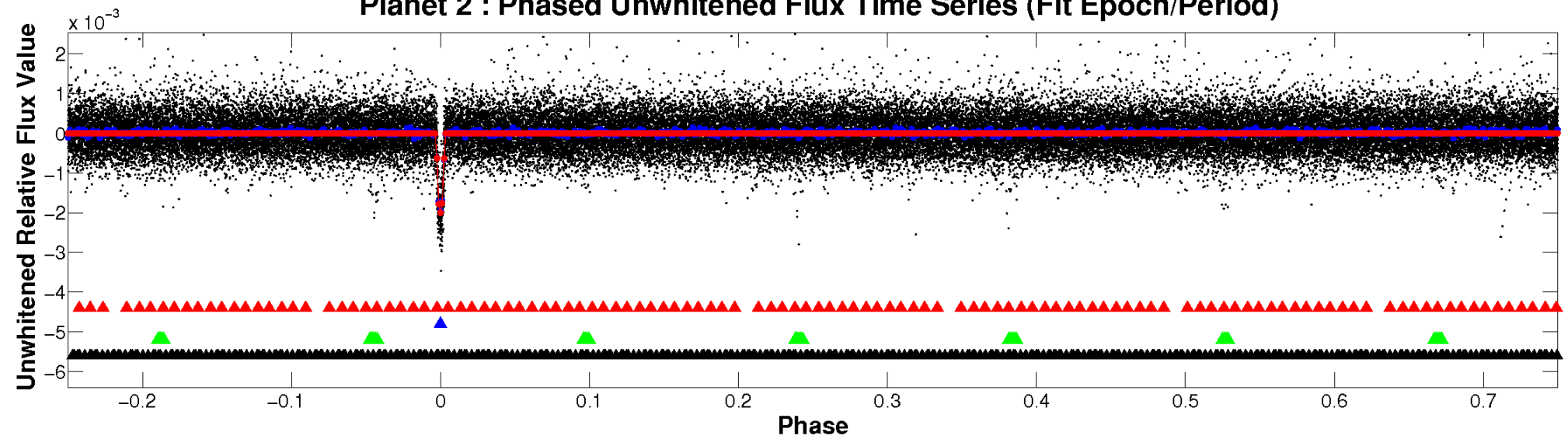
TCE 009757613-02



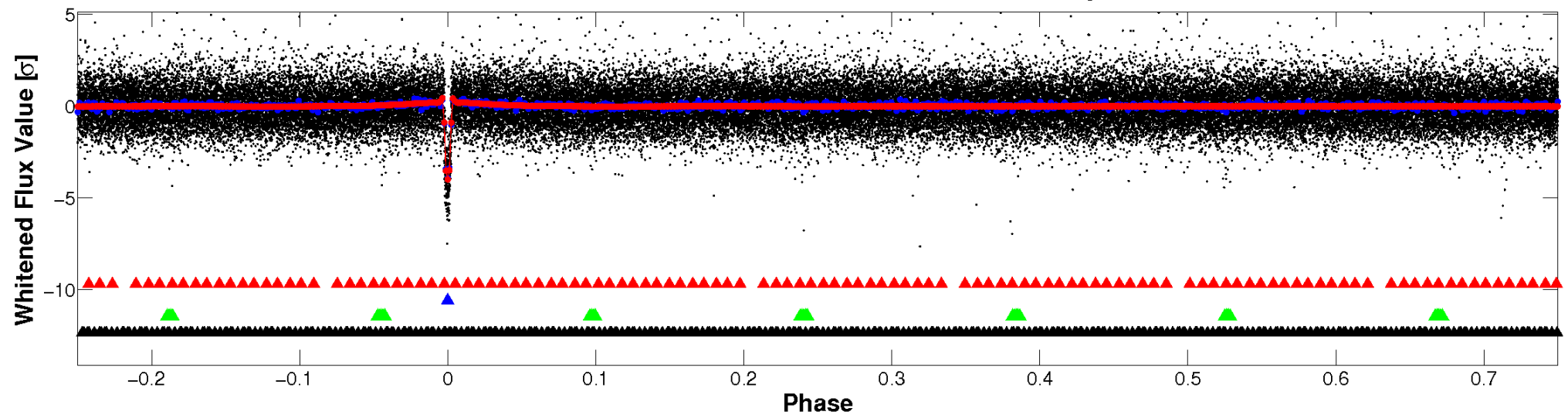


# Non-Whitened Vs. Whitened Light Curve

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



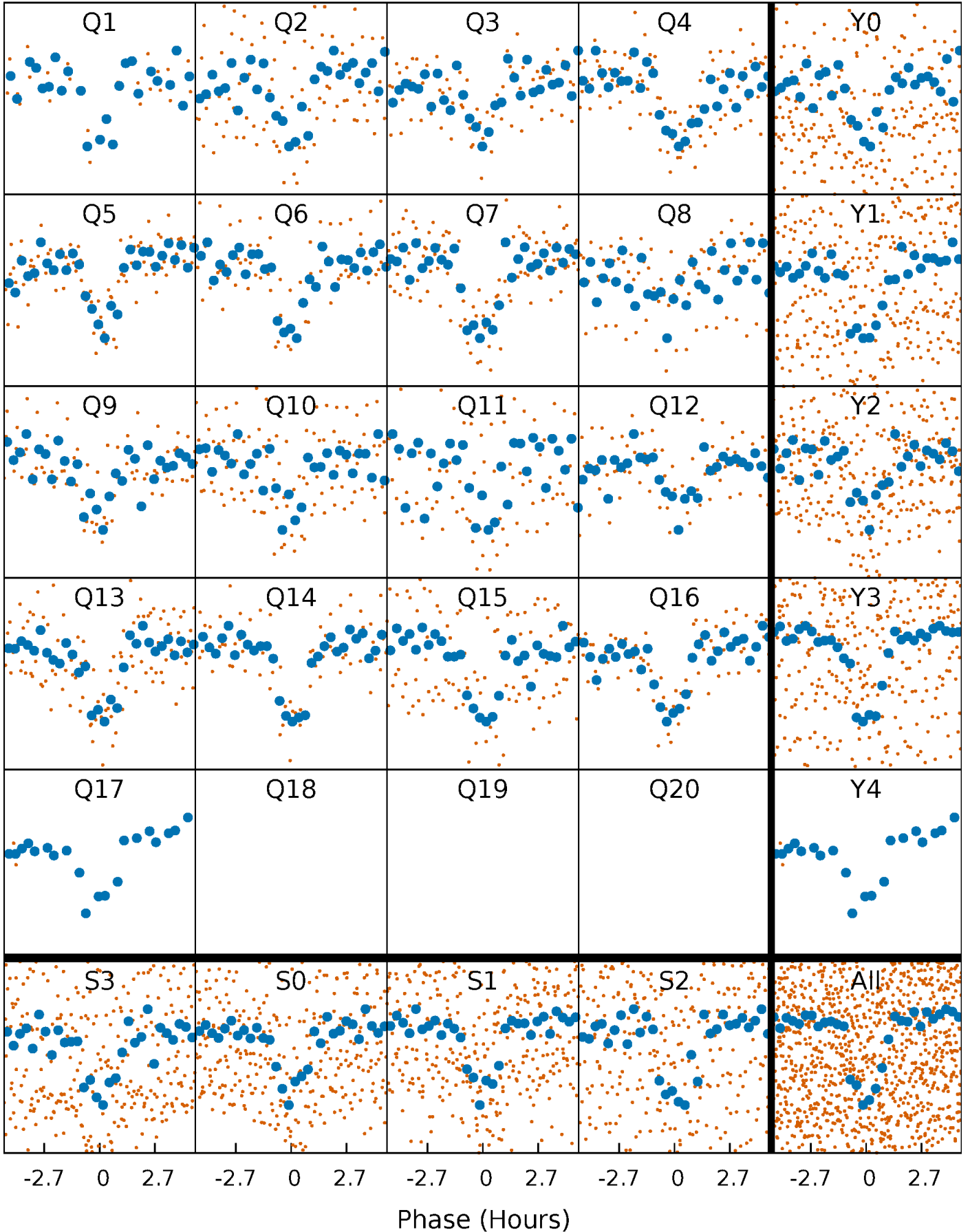
## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)





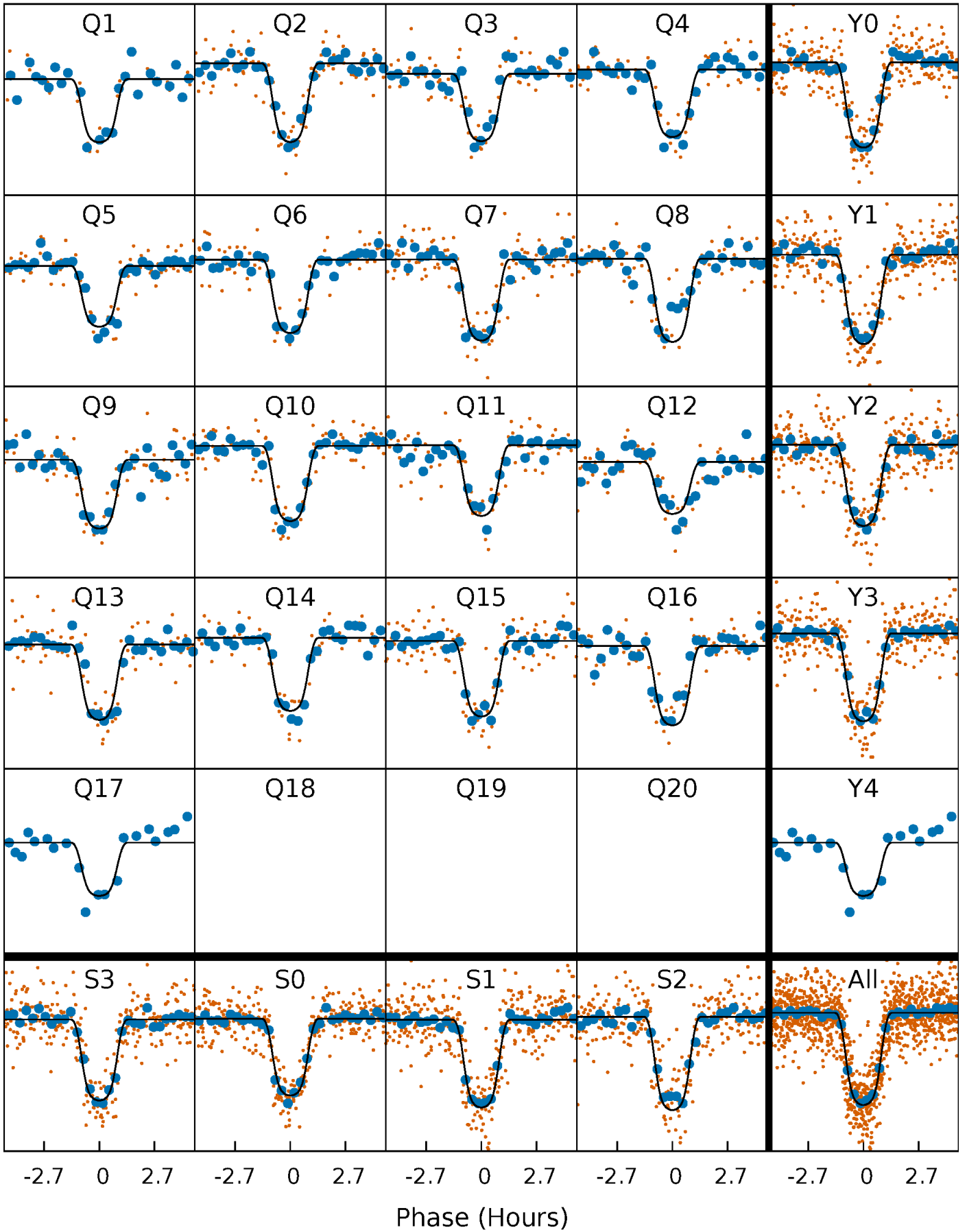
# PDC Quarter-Phased Transit Curves

TCE 009757613-02 P= 17.251197 Days  $T_0=132.635403$  (BKJD)



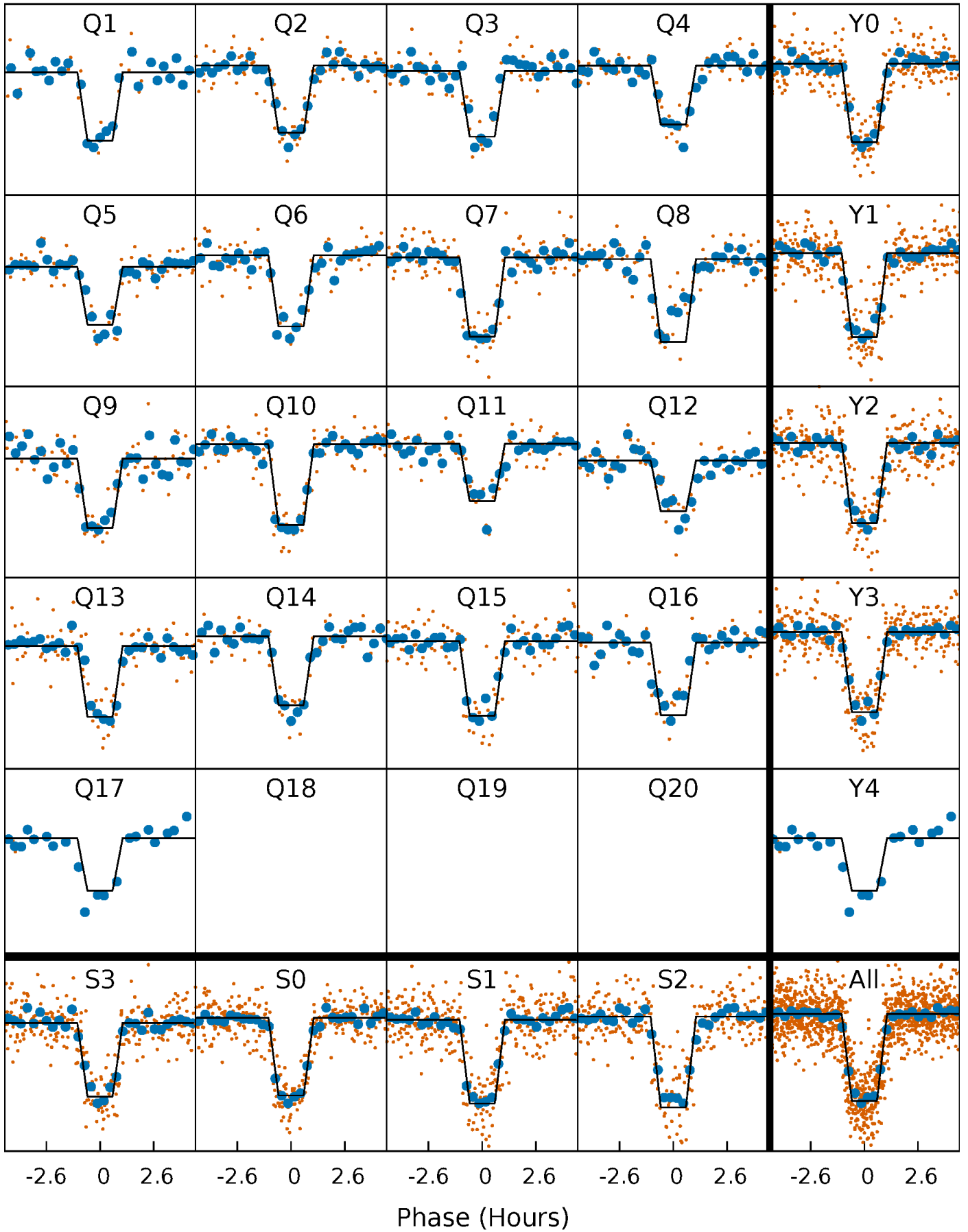
# DV Quarter-Phased Transit Curves

TCE 009757613-02 P= 17.251197 Days  $T_0=132.635403$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

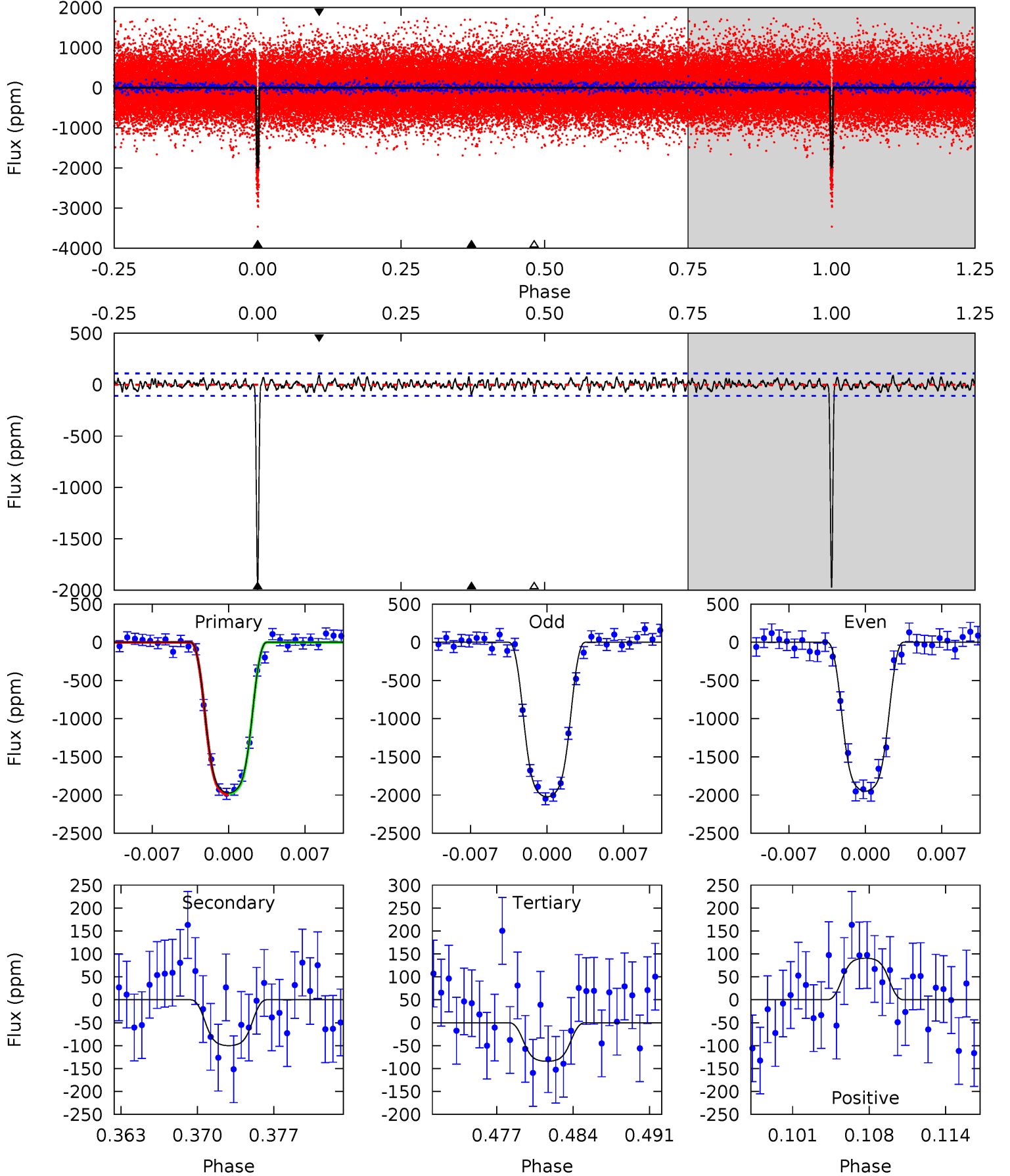
TCE 009757613-02 P= 17.251221 Days  $T_0=132.634431$  (BKJD)



# DV Model-Shift Uniqueness Test

009757613-02, P = 17.251197 Days, E = 115.384206 Days

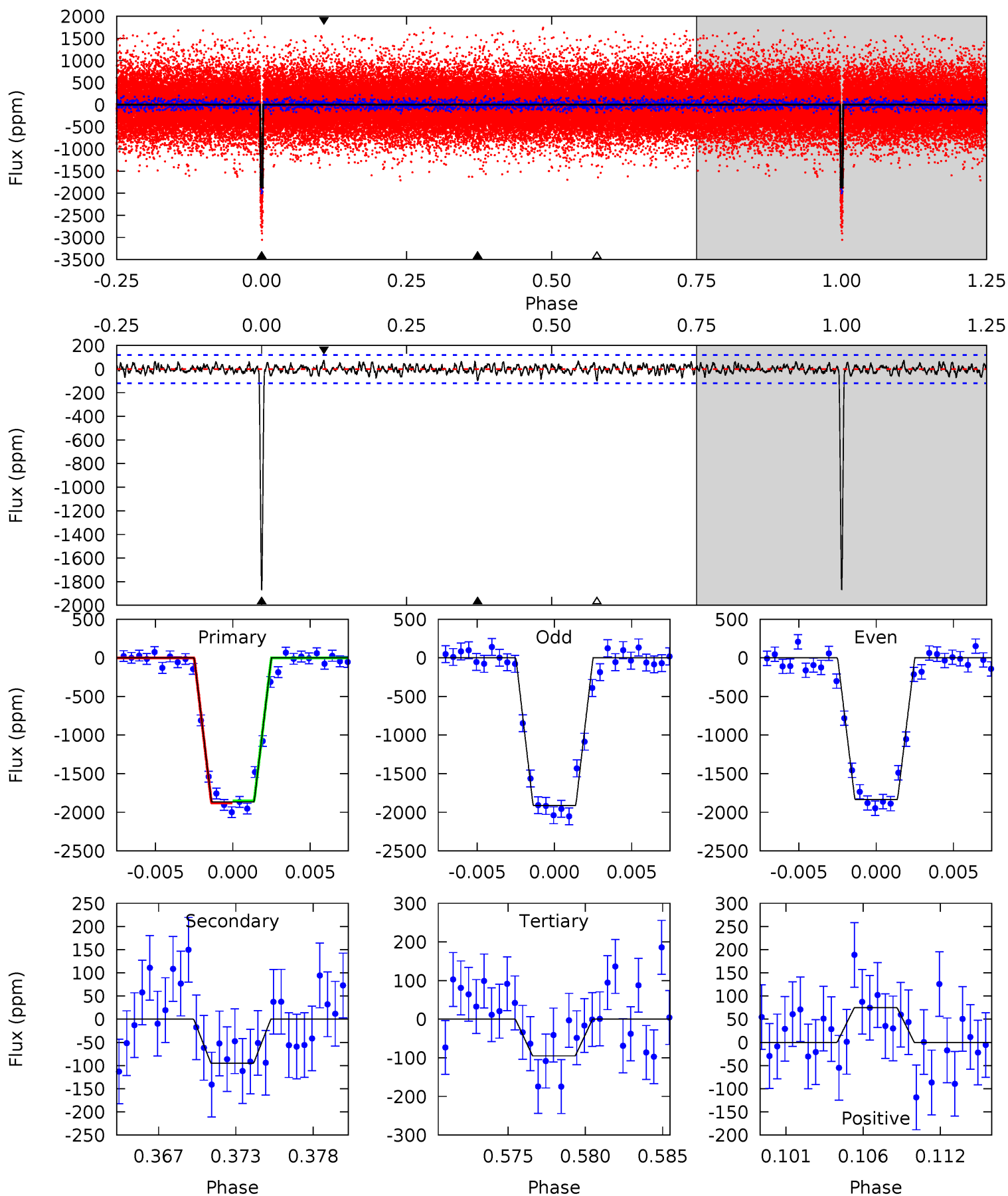
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
91.9	4.67	3.93	4.23	5.10	2.71	1.39	88.0	87.7	0.74	0.44	1.69	1.00	0.04	0.32



# Alt Model-Shift Uniqueness Test

009757613-02, P = 17.251221 Days, E = 115.383210 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
80.2	4.09	4.08	3.22	5.15	2.79	1.11	76.1	77.0	0.00	0.86	1.72	0.99	0.04	0.54



### Stellar Parameters For KIC 009757613

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$3879^{+77}_{-85}$	$4.708^{+0.045}_{-0.021}$	$-0.120^{+0.150}_{-0.150}$	$0.537^{+0.030}_{-0.041}$	$0.537^{+0.037}_{-0.033}$	$4.884^{+0.959}_{-0.449}$
	+2%/-2%	+1%/-0%	+125%/-125%	+6%/-8%	+7%/-6%	+20%/-9%
Source	SPE70	SPE60	SPE70	DSEP		

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

### Secondary Eclipse Parameters for KIC 009757613-02 / KOI 0250.02

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-100 \pm 21$	$2.90^{+0.14}_{-0.14}$	$534^{+13}_{-13}$	$2447^{+73}_{-81}$	$75^{+16}_{-17}$
Alt.	$-95 \pm 23$	$2.56^{+0.12}_{-0.13}$	$535^{+12}_{-14}$	$2506^{+85}_{-92}$	$90^{+25}_{-22}$

$T_{max}$  = 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

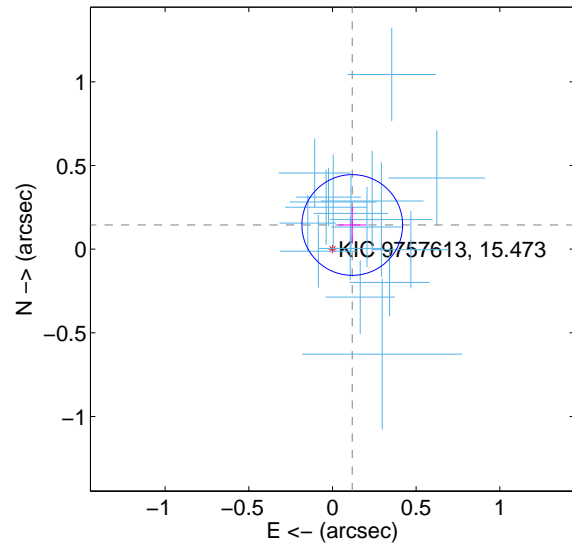
Supplemental centroid analysis for 009757613-02. Kepler magnitude: 15.47. Transit SNR 54.07

There are 17 quarters with good PRF difference image offsets

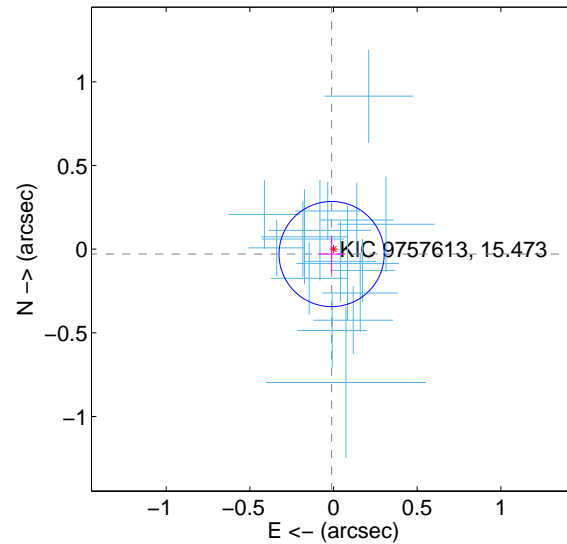
The direct PRF centroid is offset from the target star catalog position by about 0.33 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.187 \pm 0.100$	1.86	$-0.118 \pm 0.083$	$0.144 \pm 0.109$
PRF-fit source offset from KIC position	$0.031 \pm 0.105$	0.30	$0.011 \pm 0.082$	$-0.029 \pm 0.109$
photometric centroid source offset	$0.63 \pm 0.19$	3.32	$0.21 \pm 0.20$	$-0.59 \pm 0.19$

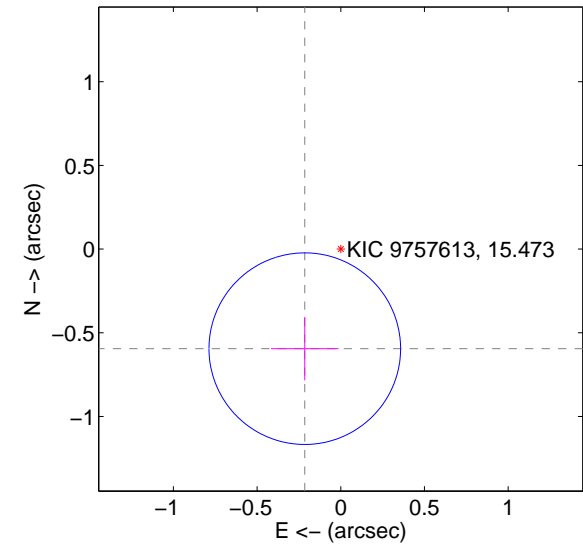
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

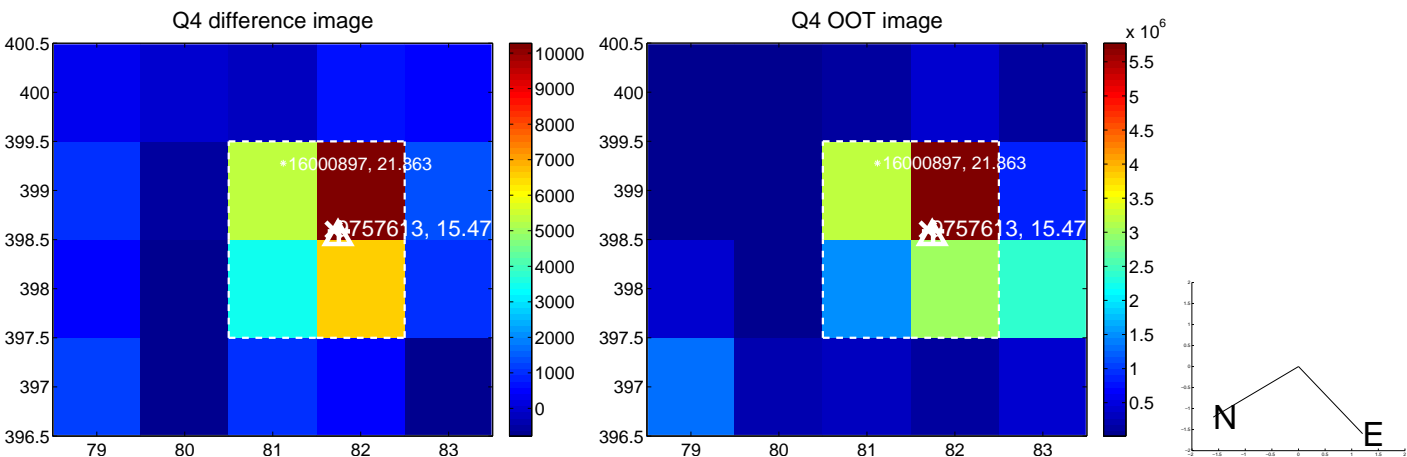
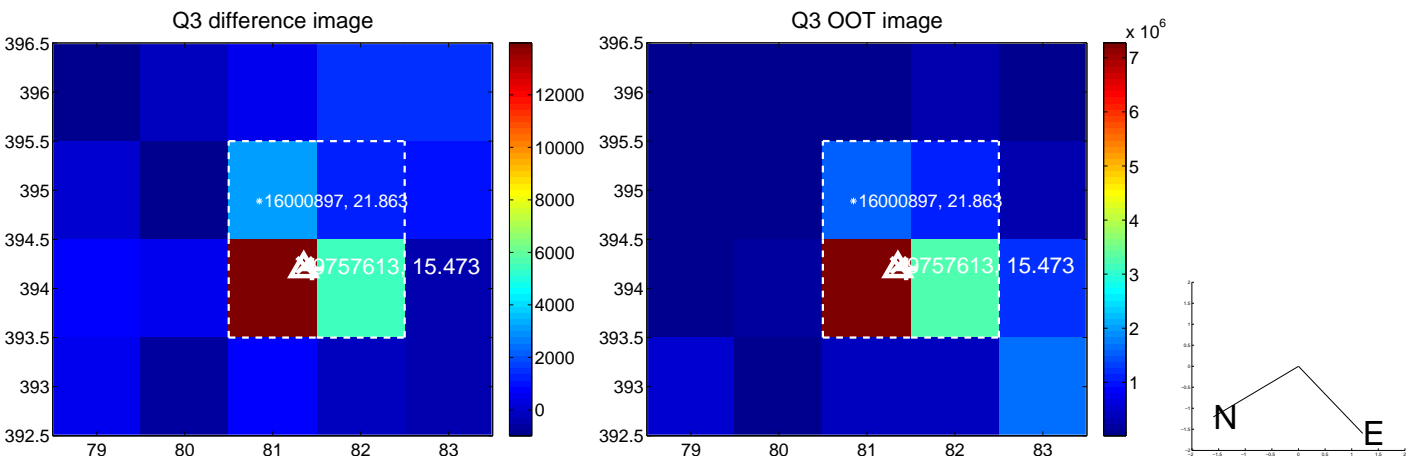
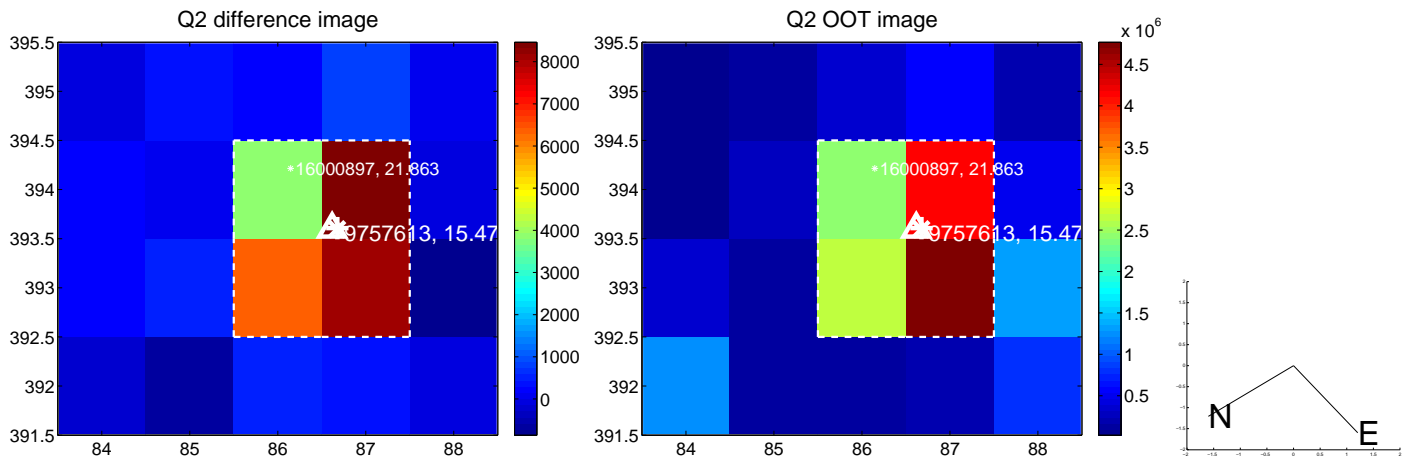
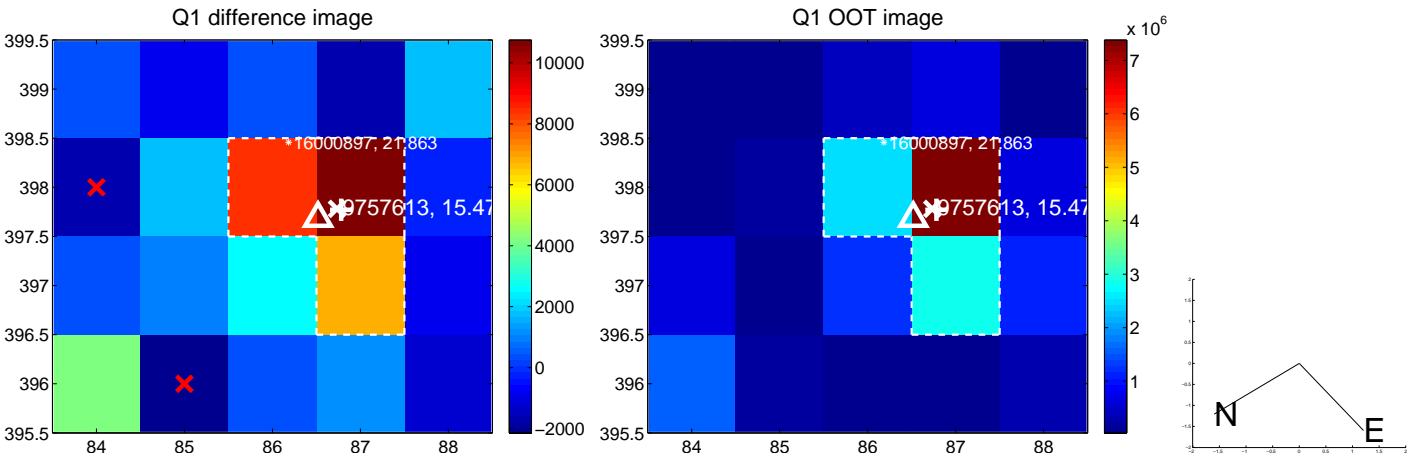


offset from photometric centroids



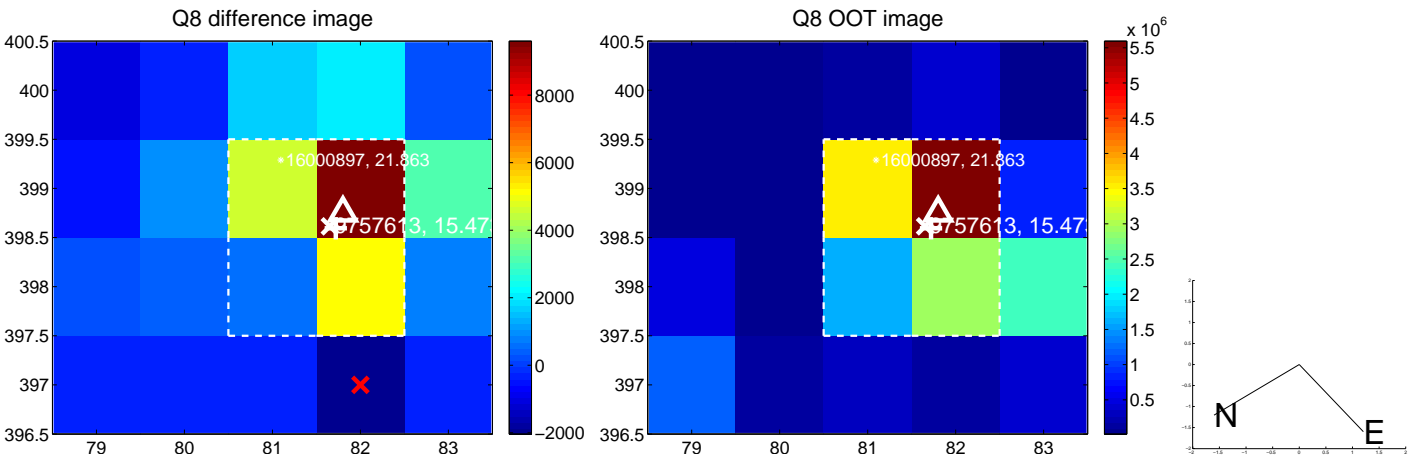
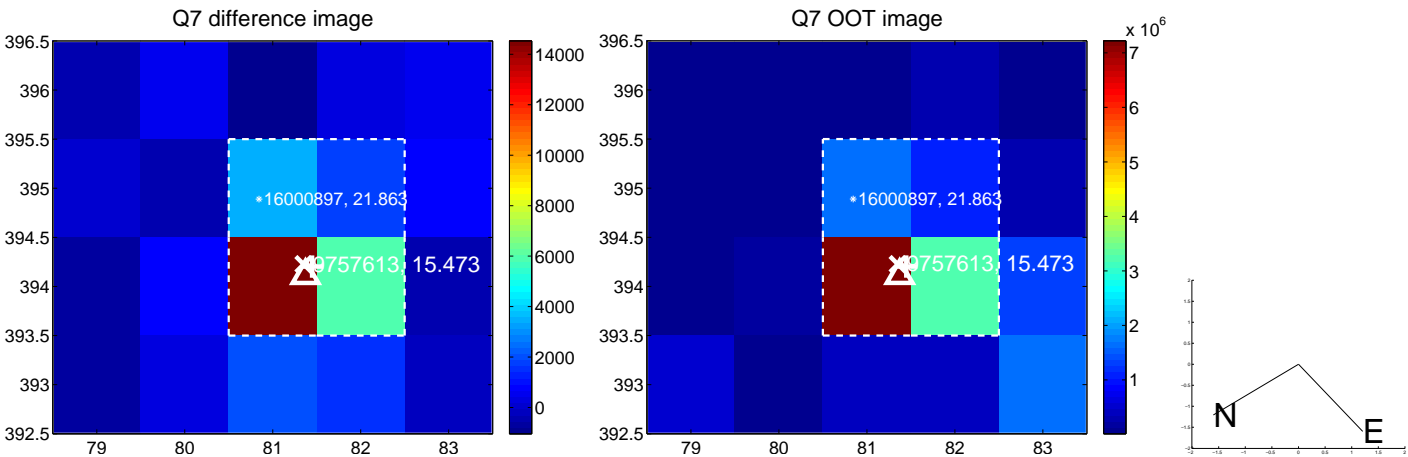
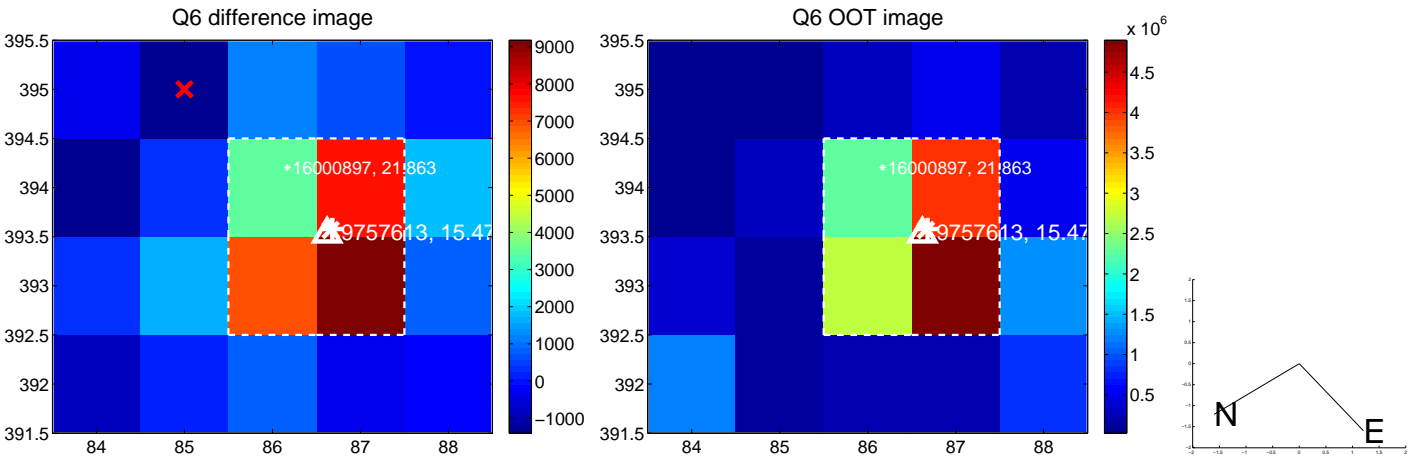
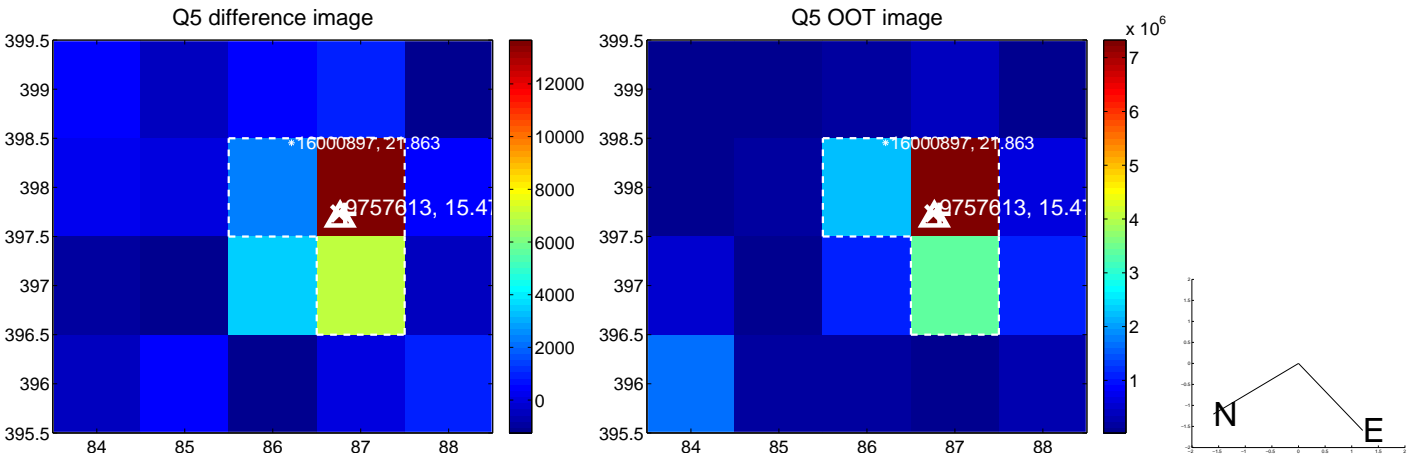
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

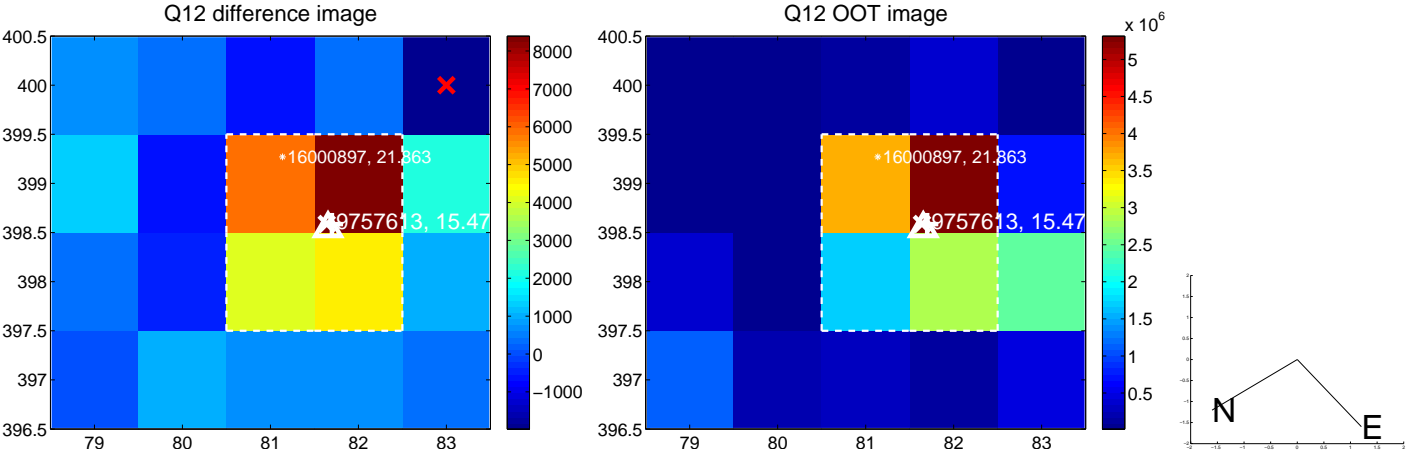
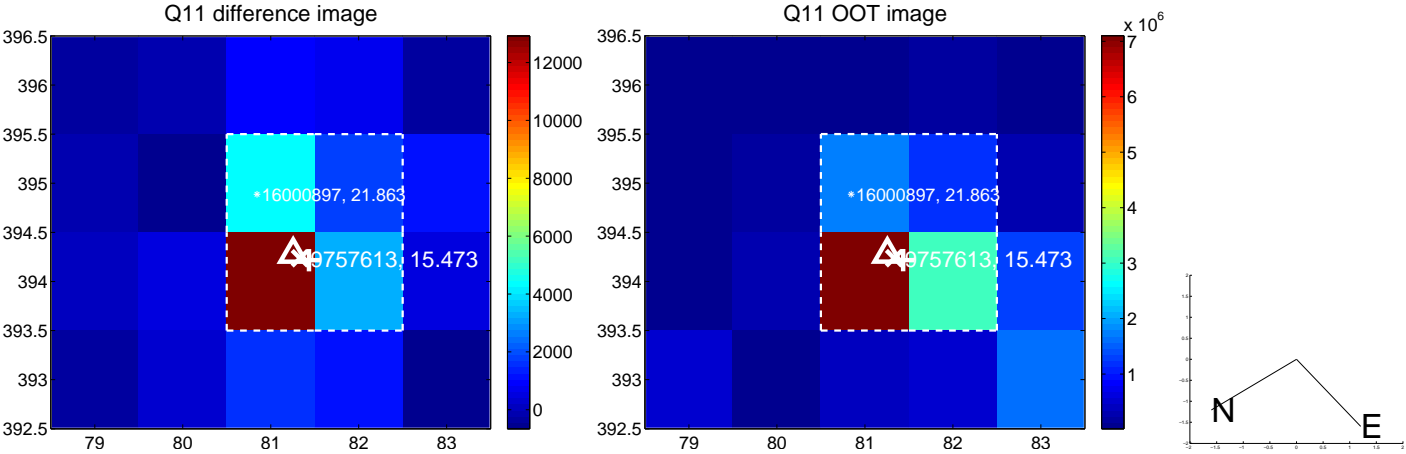
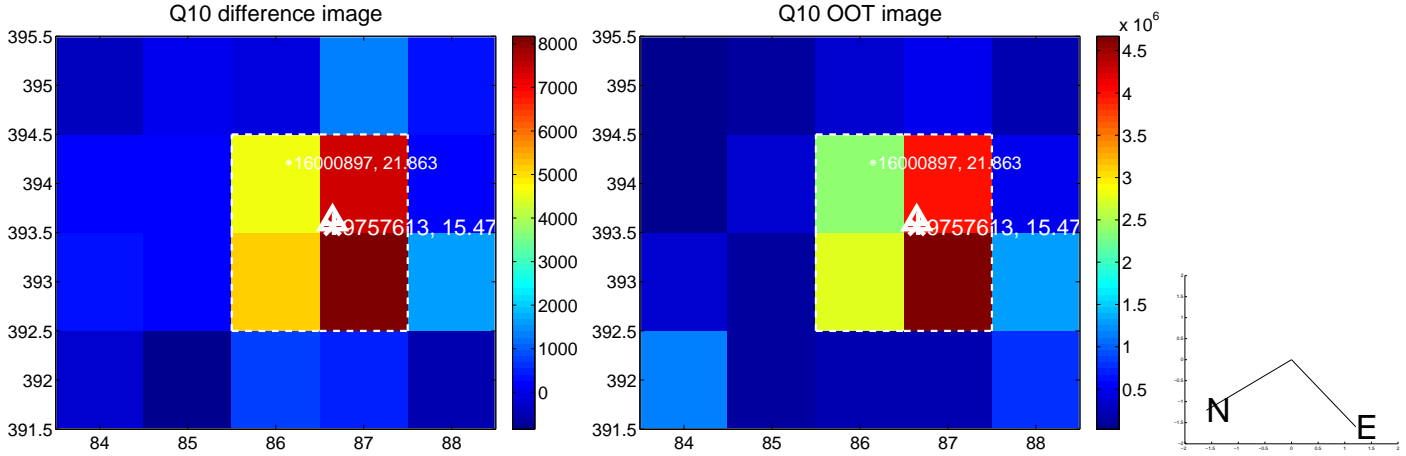
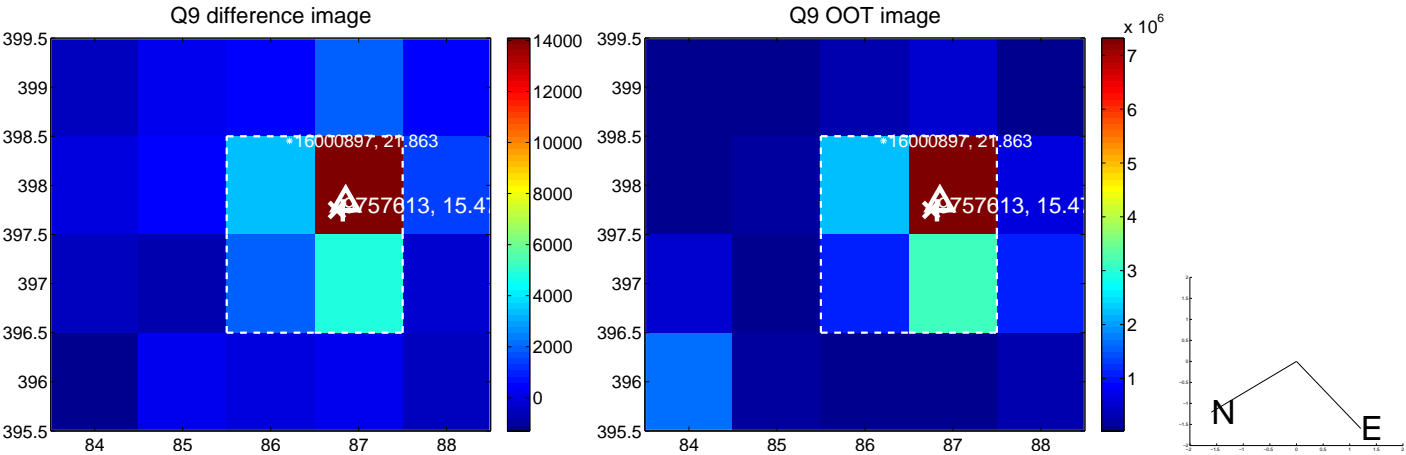




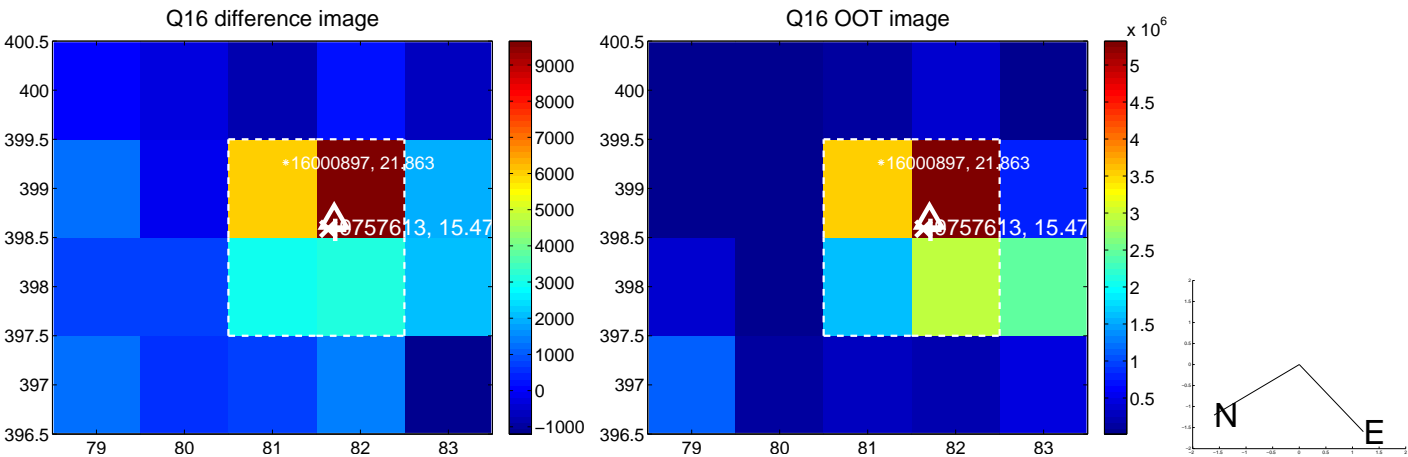
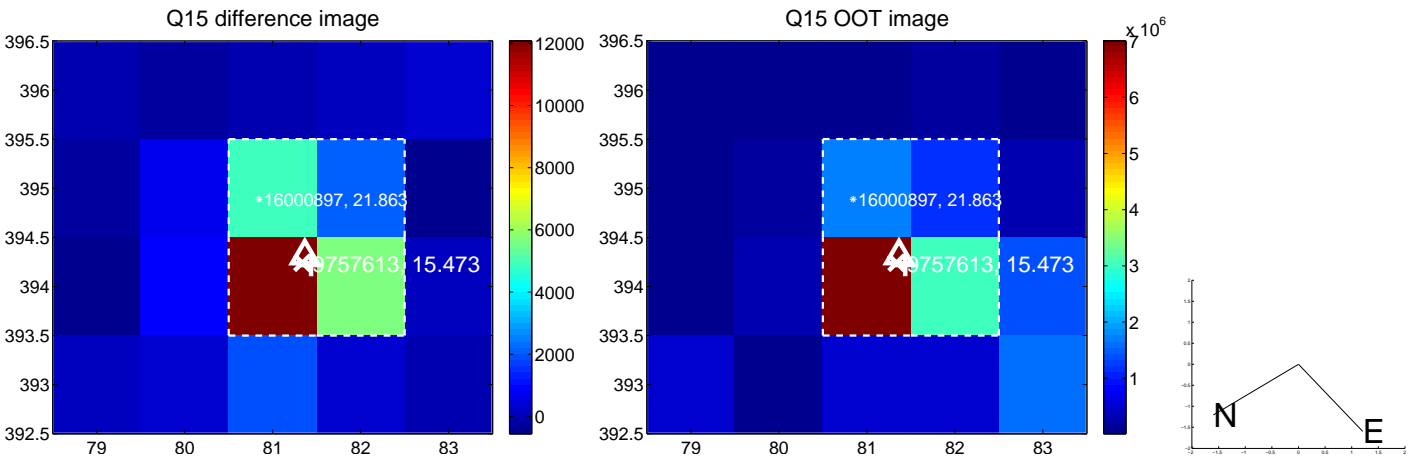
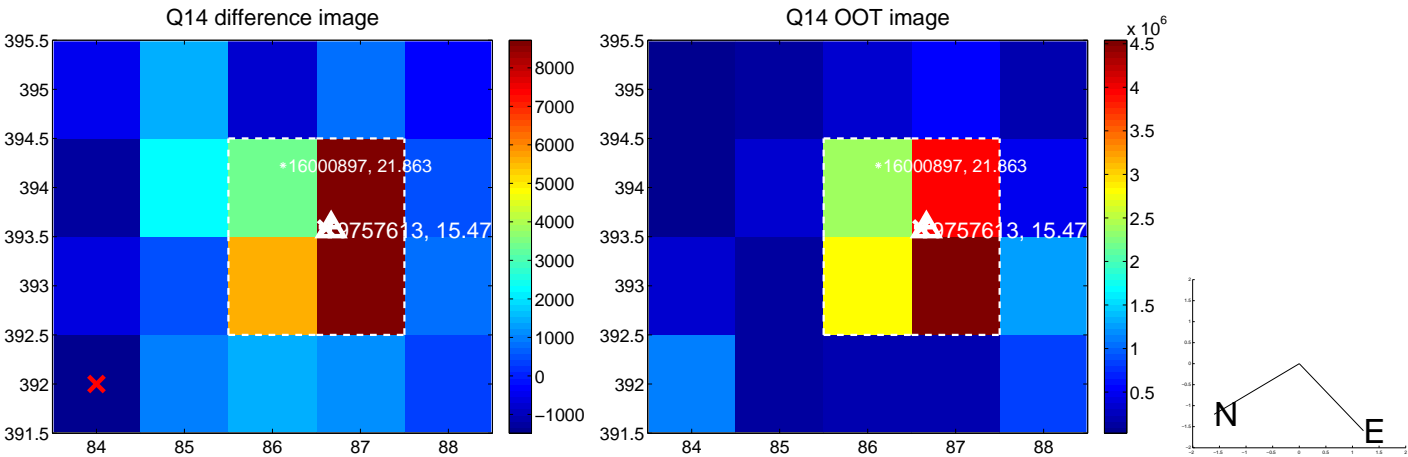
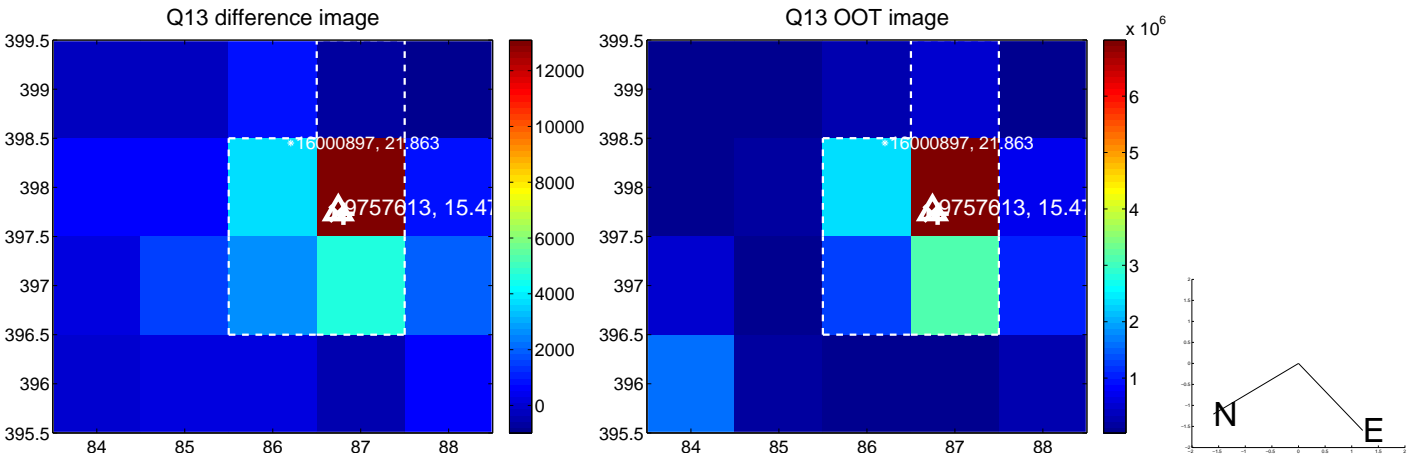
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



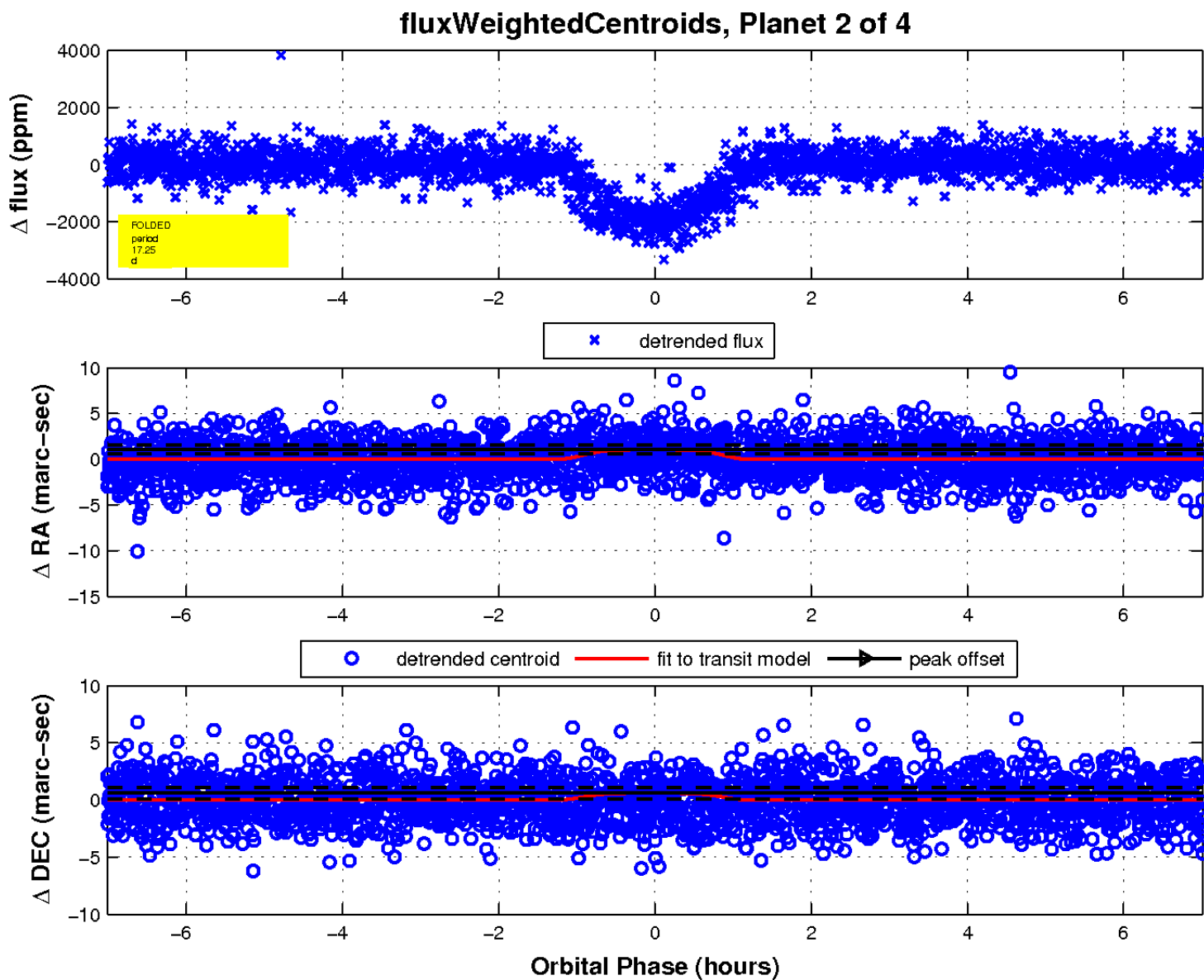
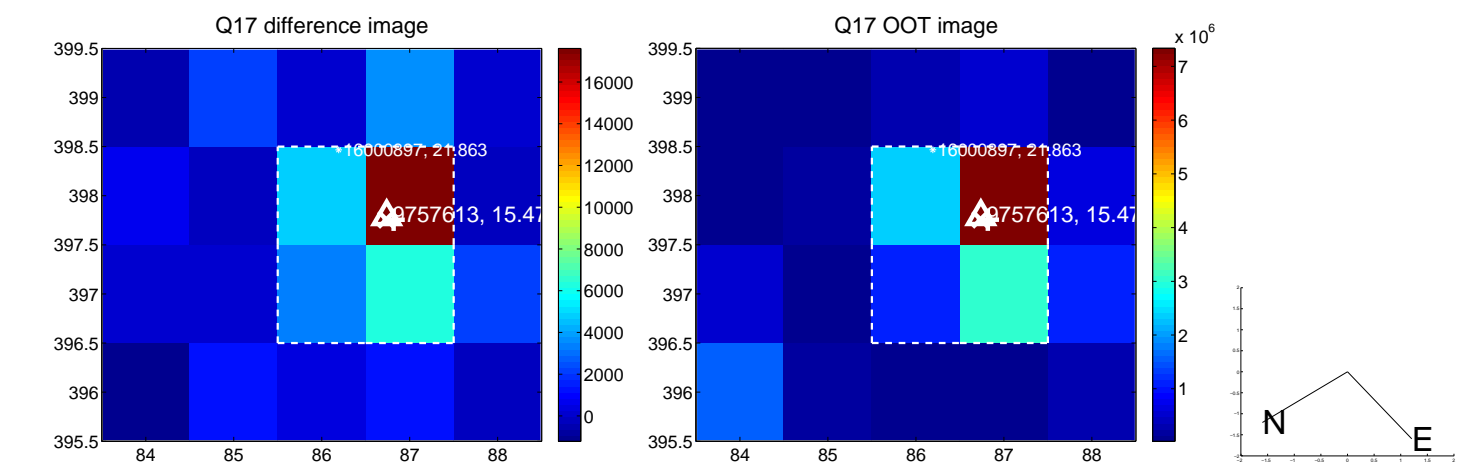
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

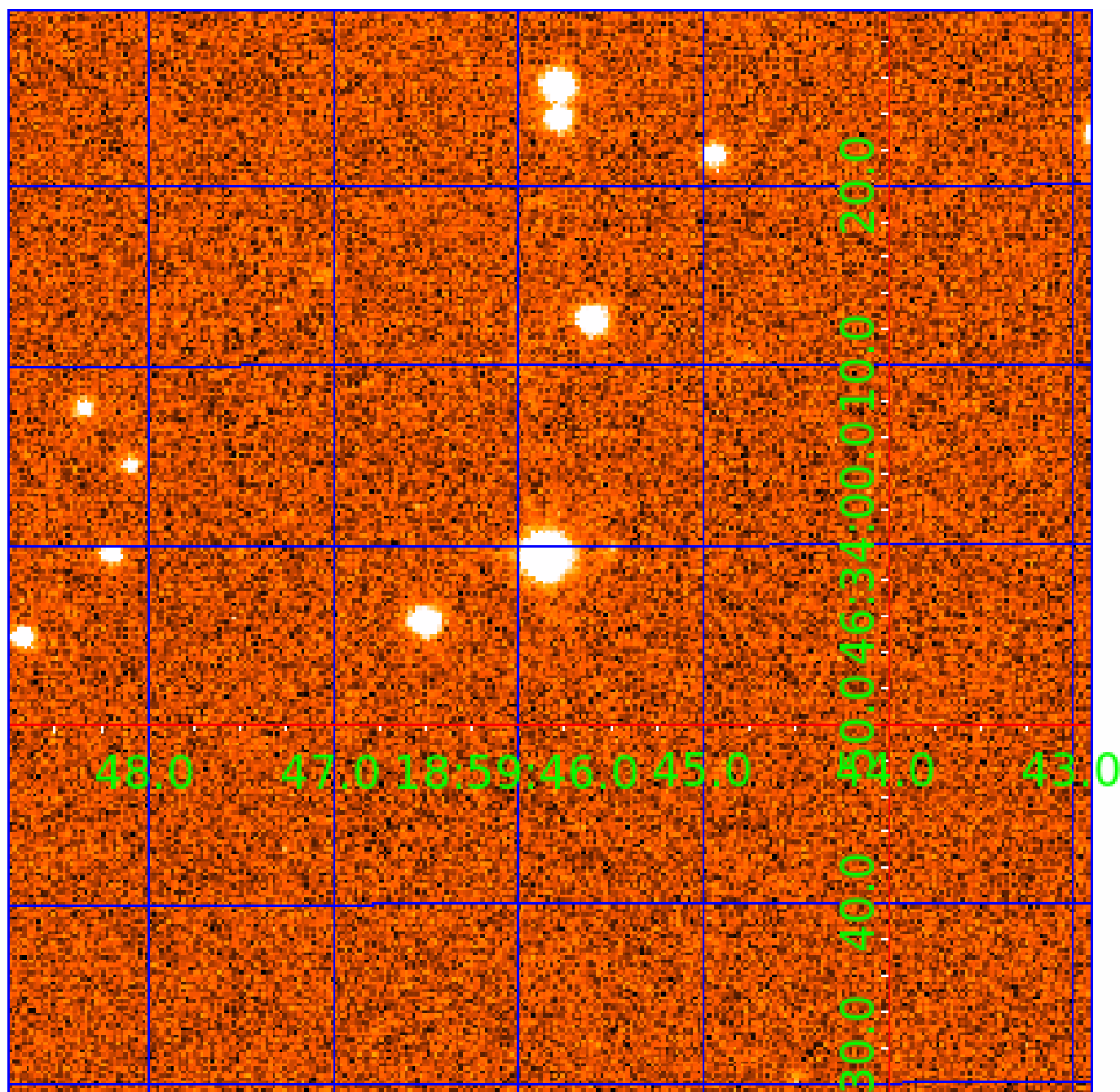


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 009757613

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009757613-01	OBS	0250.01	12.283014	133.548260	2788.4	3.002	104.5	105.0	0.54	3879	3.15	8.15
009757613-02	OBS	0250.02	17.251197	132.635403	2013.9	2.339	53.4	54.1	0.54	3879	2.92	5.18
009757613-03	OBS	0250.04	46.827645	136.745305	1487.3	1.955	24.2	25.9	0.54	3879	2.26	1.37
009757613-04	OBS	0250.03	3.543922	132.714442	385.6	2.159	22.3	25.2	0.54	3879	1.25	42.77

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009757613-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
009757613-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT
009757613-03	OBS	PC	0.96	0	0	0	0	NO_COMMENT
009757613-04	OBS	PC	1.00	0	0	0	0	NO_COMMENT

**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.

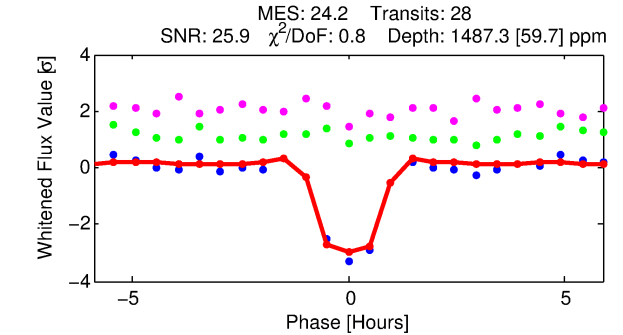
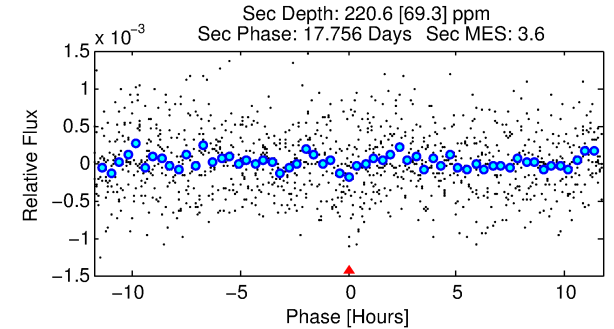
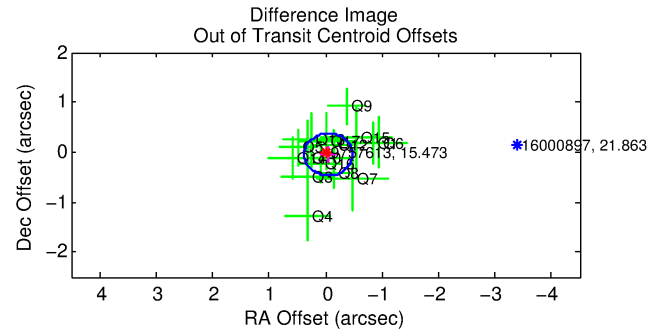
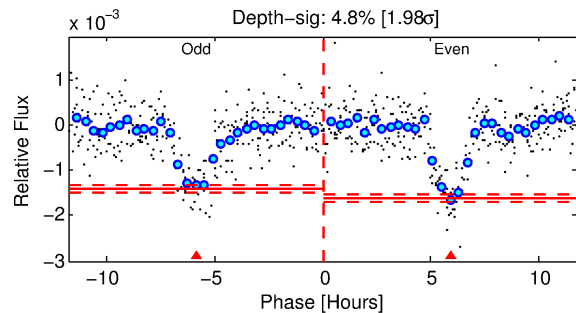
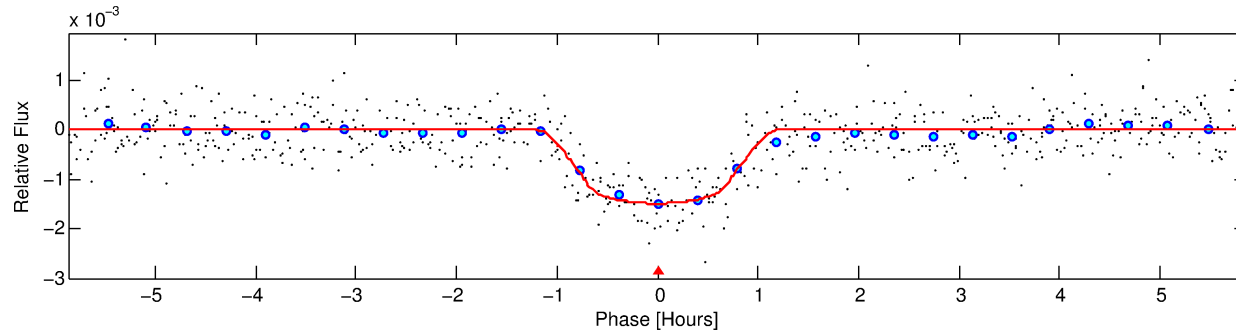
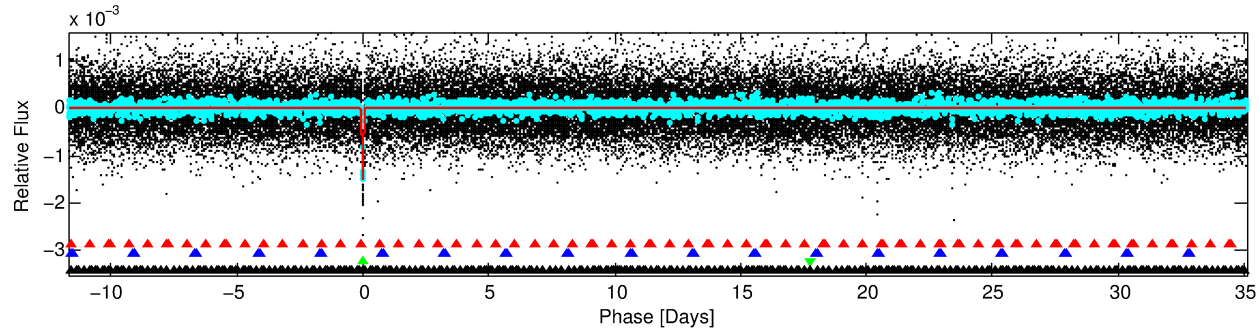
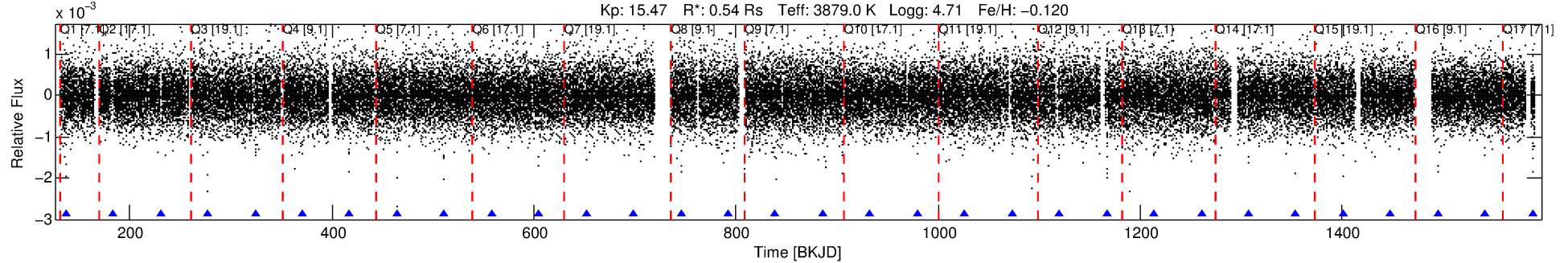
Ephemeris Match Information For 009757613-03

No Significant Match Found

# DV One-Page Summary

KIC: 9757613 Candidate: 3 of 4 Period: 46.828 d  
KOI: K00250.04 Name: Kepler-26e Corr: 0.984

Kp: 15.47 R\*: 0.54 Rs Teff: 3879.0 K Logg: 4.71 Fe/H: -0.120



## DV Fit Results:

Period = 46.82765 [0.00010] d  
Epoch = 136.7453 [0.0019] BKJD  
Rp/R\* = 0.0386 [0.0121]  
a/R\* = 130.00 [176.60]  
b = 0.76 [0.77]  
Seff = 1.37 [0.17]  
Teq = 276 [8] K  
Rp = 2.26 [0.73] Re  
a = 0.2067 [0.0127] AU  
Ag = 1015.11 [718.52] [1.41σ]  
Teffp = 2407 [426] K [5.00σ]

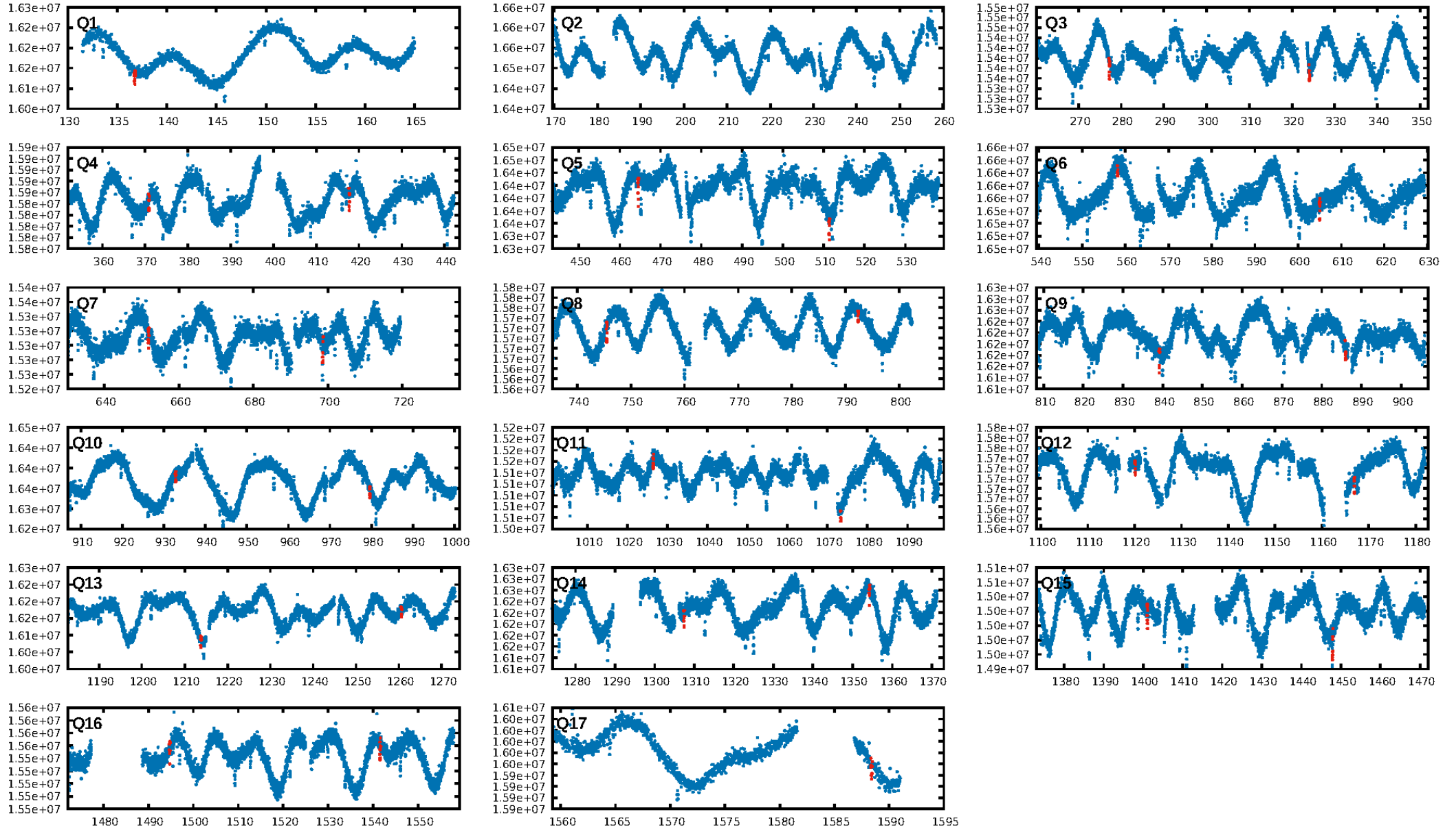
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [232.83σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 68.7%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 1.79e-118  
RollingBand-fgt: 1.00 [26/26]  
GhostDiagnostic-chr: 4.344  
Centroid-sig: 0.4%  
Centroid-so: 0.653 arcsec [1.56σ]  
OotOffset-rm: 0.065 arcsec [0.46σ]  
KicOffset-rm: 0.287 arcsec [1.82σ]  
OotOffset-st: 3/3/4/5 [15]  
KicOffset-st: 3/3/4/5 [15]  
DiffImageQuality-fgm: 0.93 [14/15]  
DiffImageOverlap-fno: 1.00 [16/16]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 17:32:57 Z

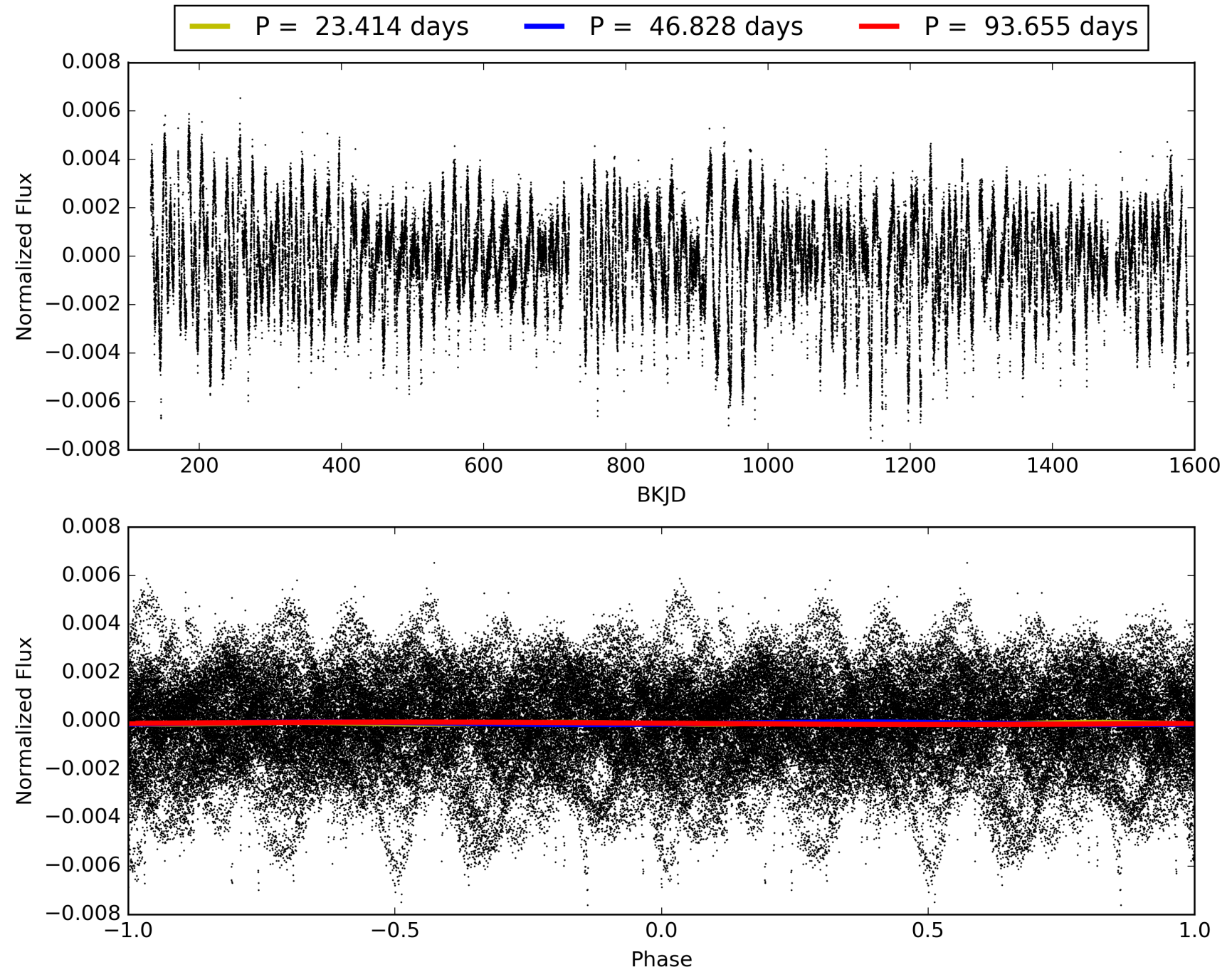
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 009757613-03, PDC Light Curves



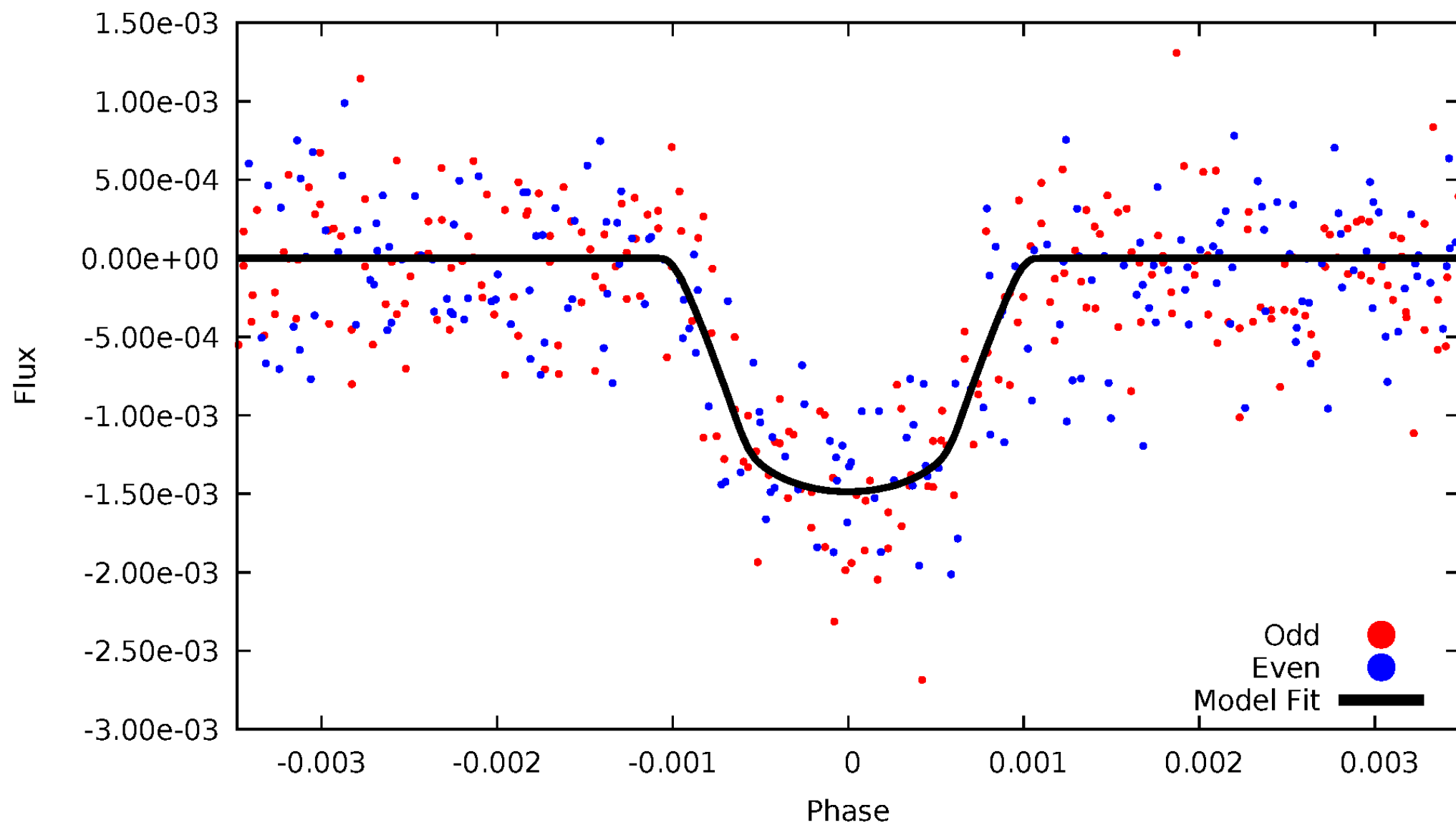


# TCE 009757613-03



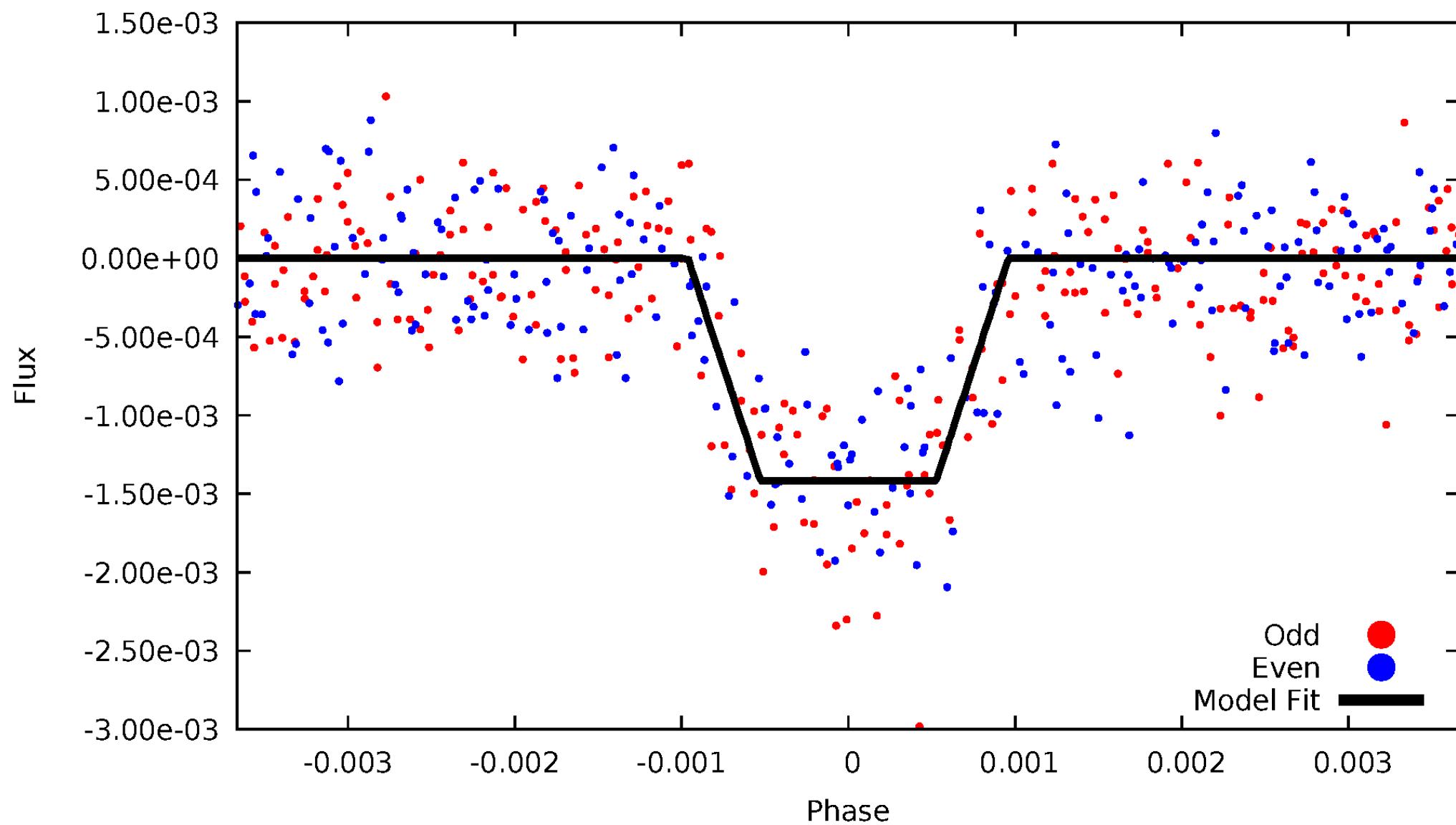
# DV Odd/Even

TCE 009757613-03



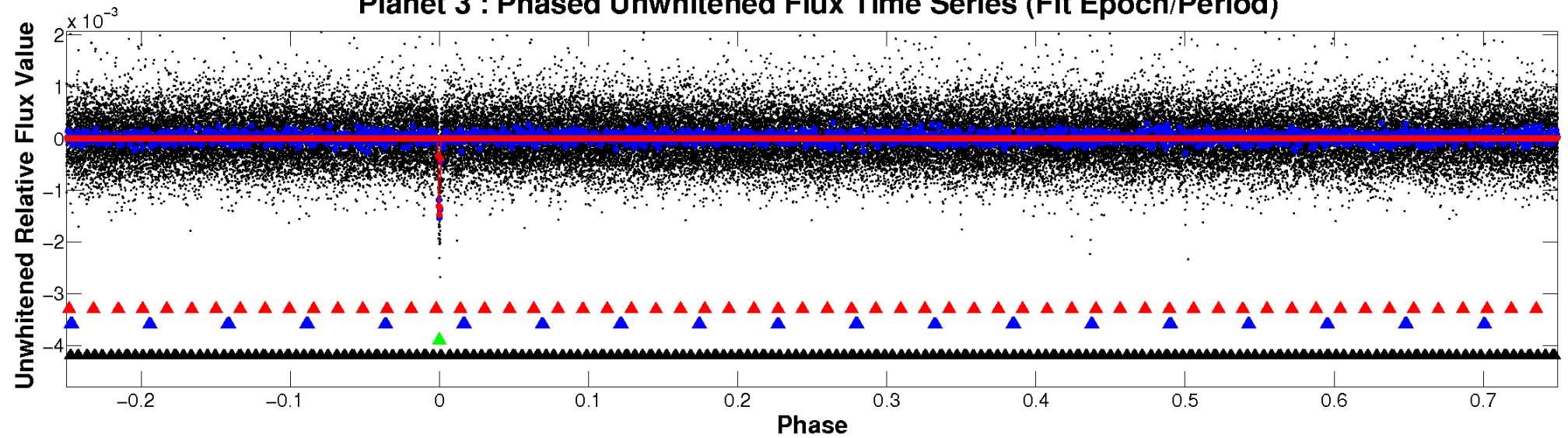
# ALT Odd/Even

TCE 009757613-03

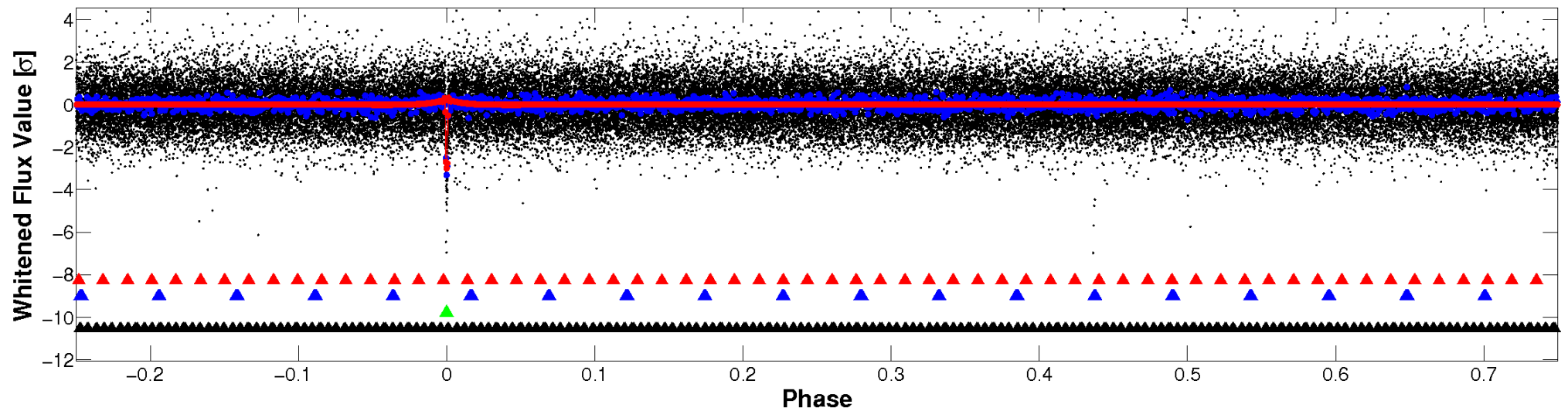


# Non-Whitened Vs. Whitened Light Curve

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

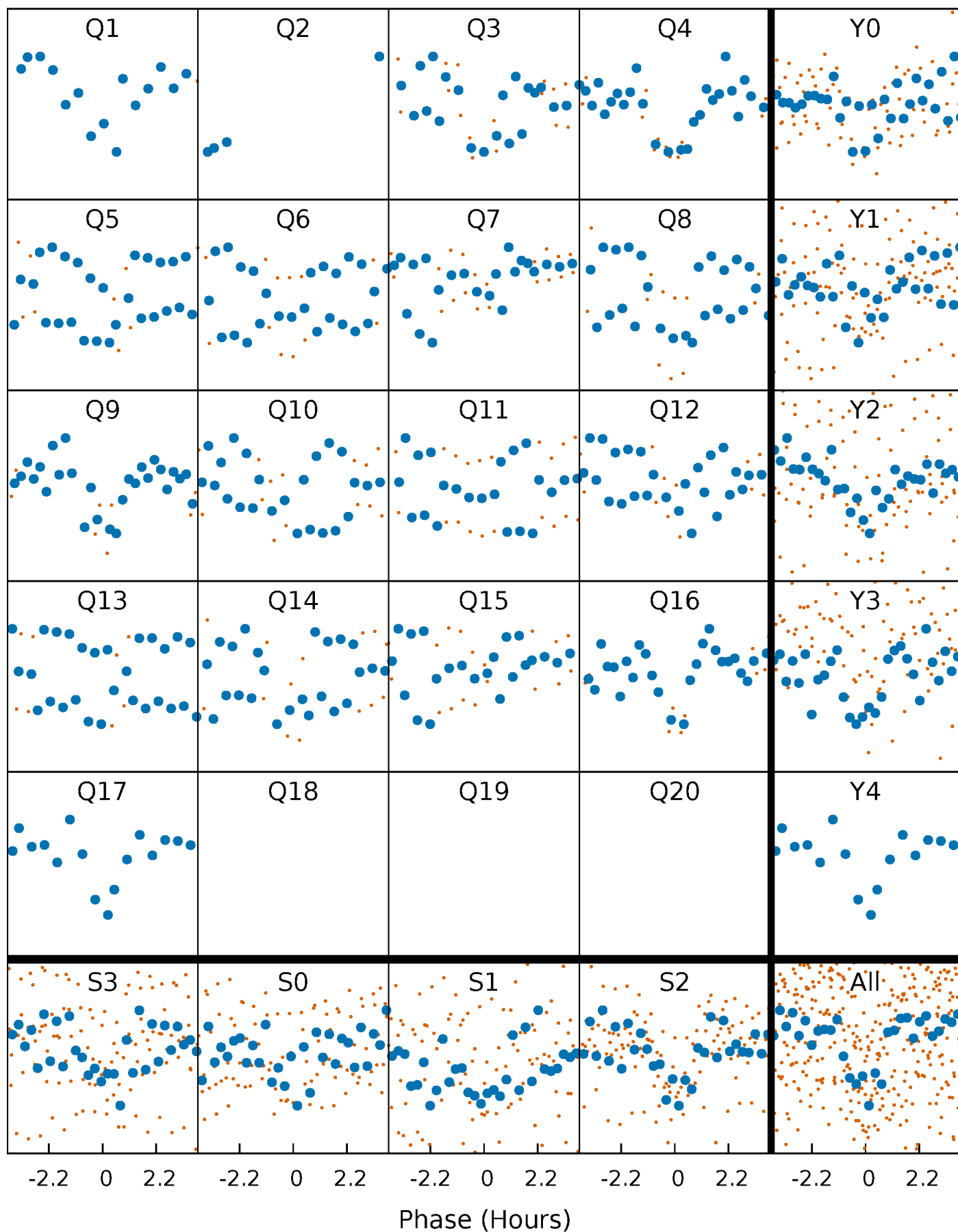


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



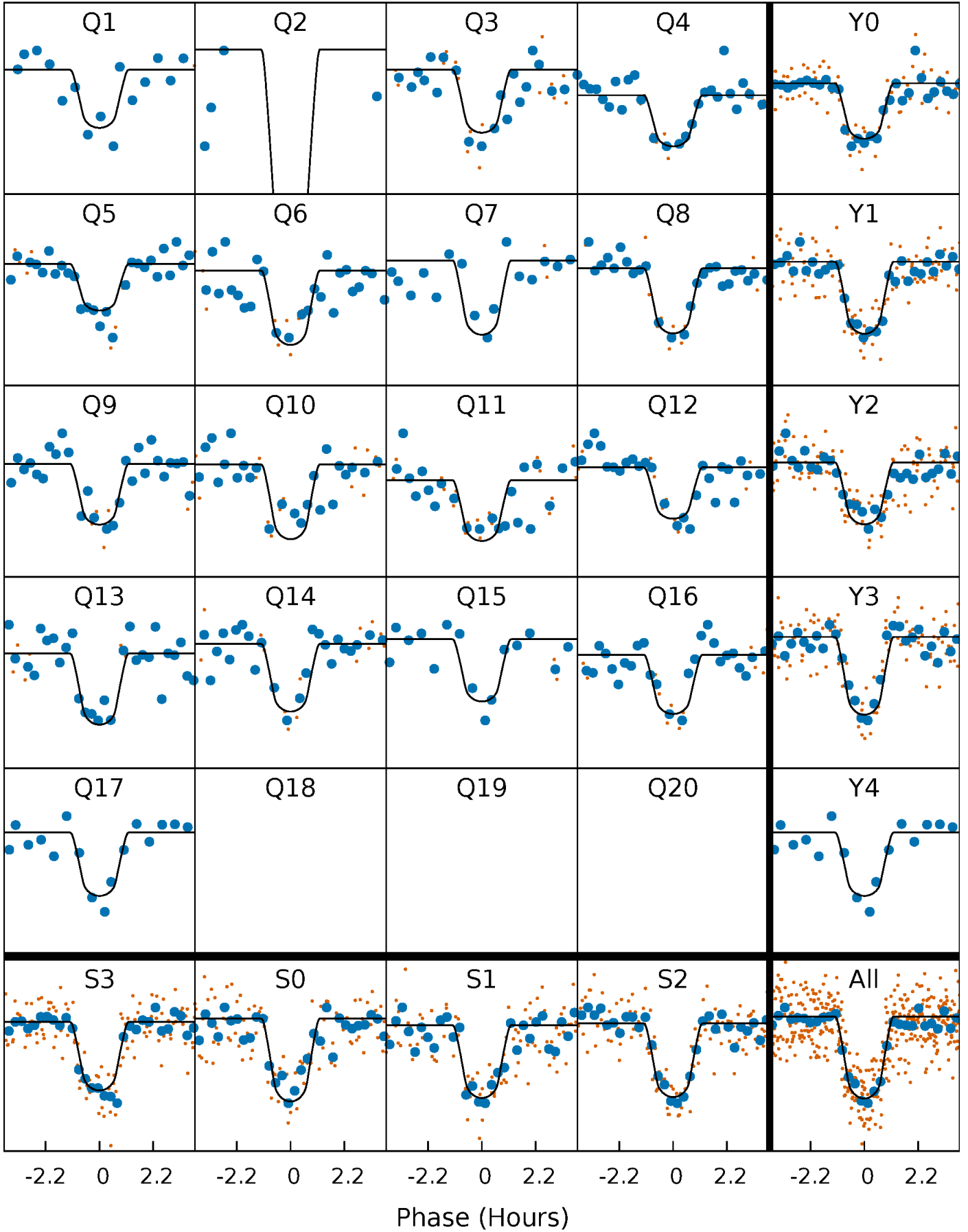
# PDC Quarter-Phased Transit Curves

TCE 009757613-03 P= 46.827645 Days  $T_0=136.745305$  (BKJD)



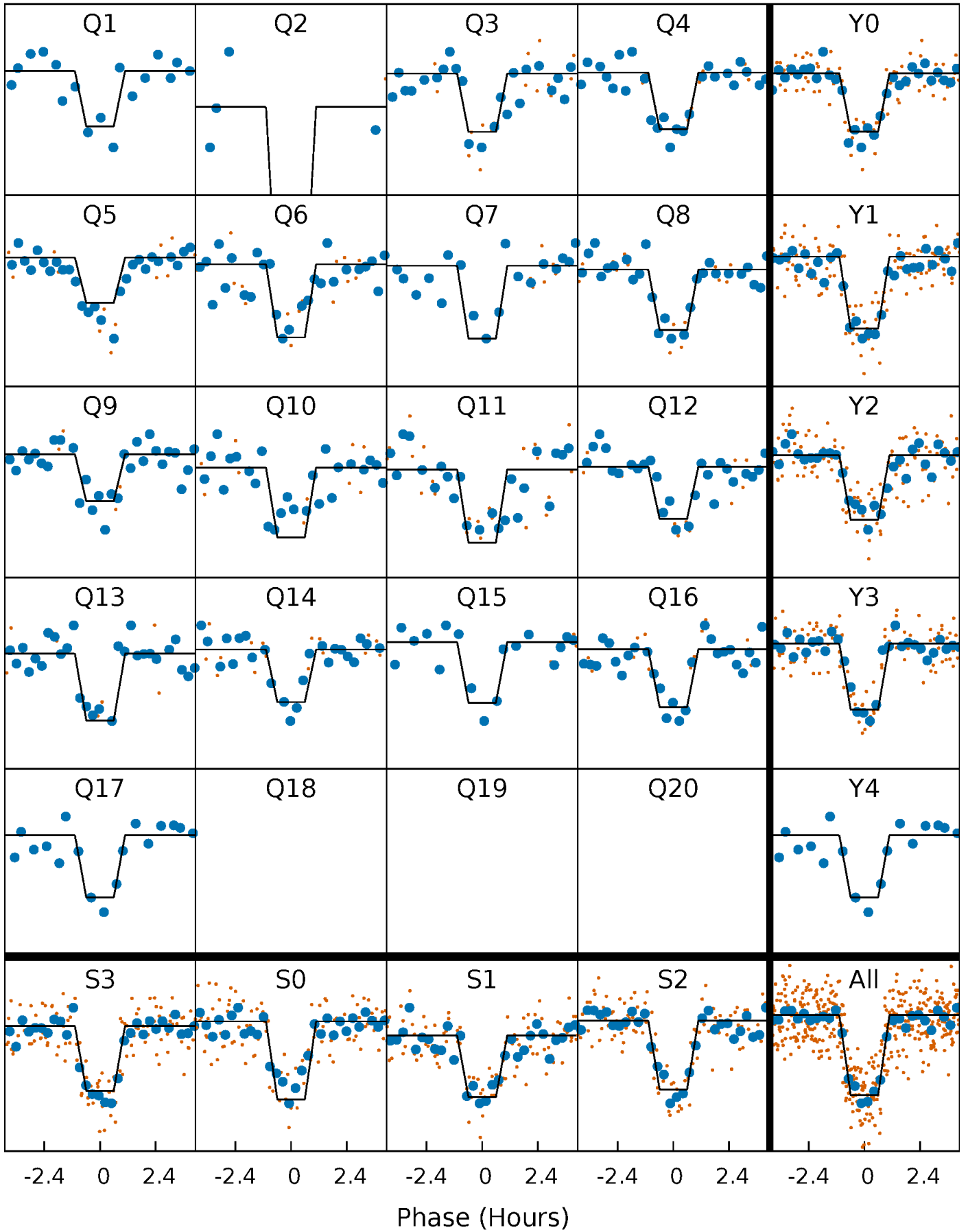
# DV Quarter-Phased Transit Curves

TCE 009757613-03 P= 46.827645 Days  $T_0=136.745305$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 009757613-03 P= 46.827651 Days  $T_0=136.744979$  (BKJD)

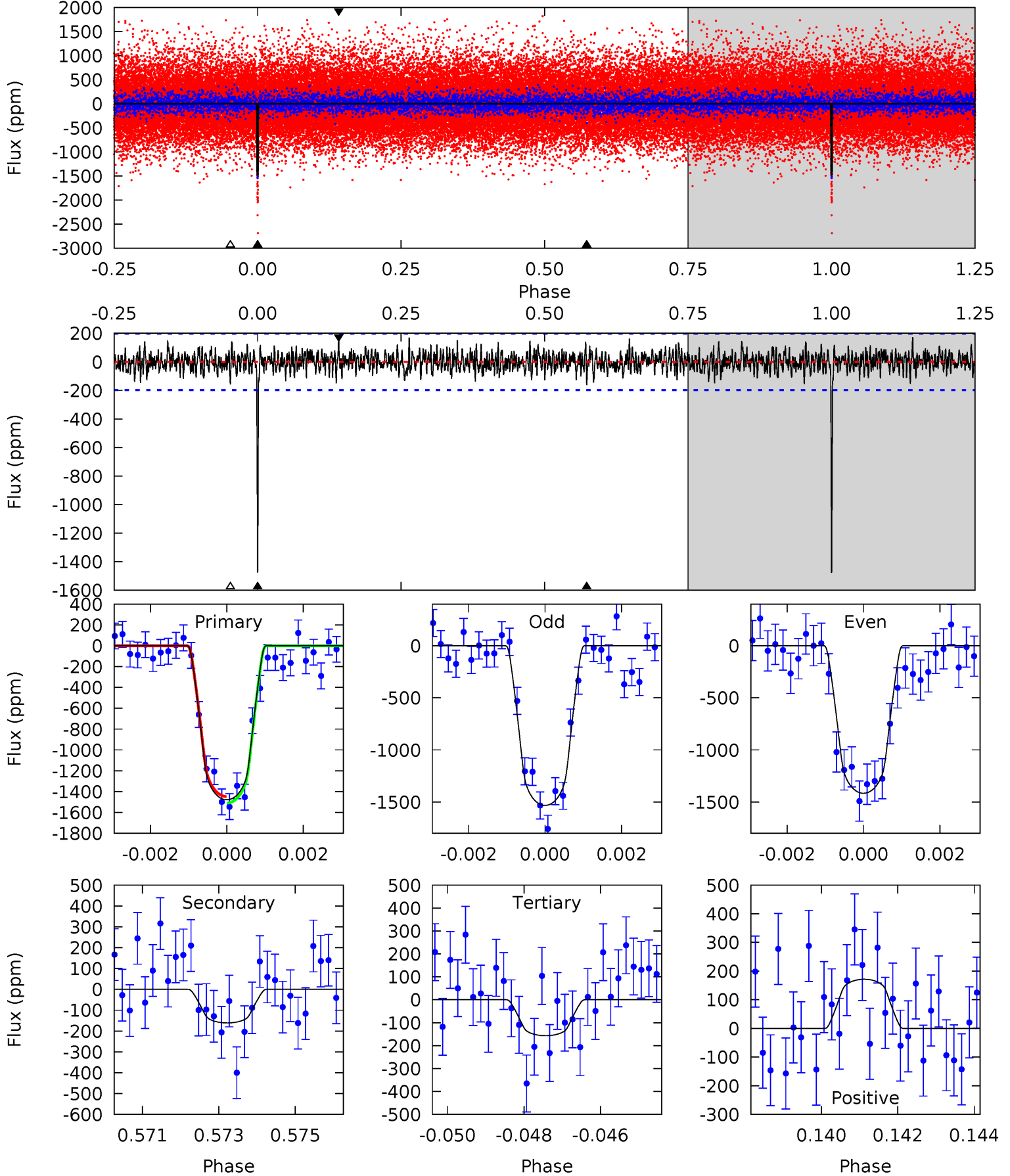




# DV Model-Shift Uniqueness Test

009757613-03, P = 46.827645 Days, E = 89.917660 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
39.7	4.33	4.21	4.61	5.32	3.08	1.38	35.5	35.1	0.12	-0.28	1.57	1.04	0.10	0.84

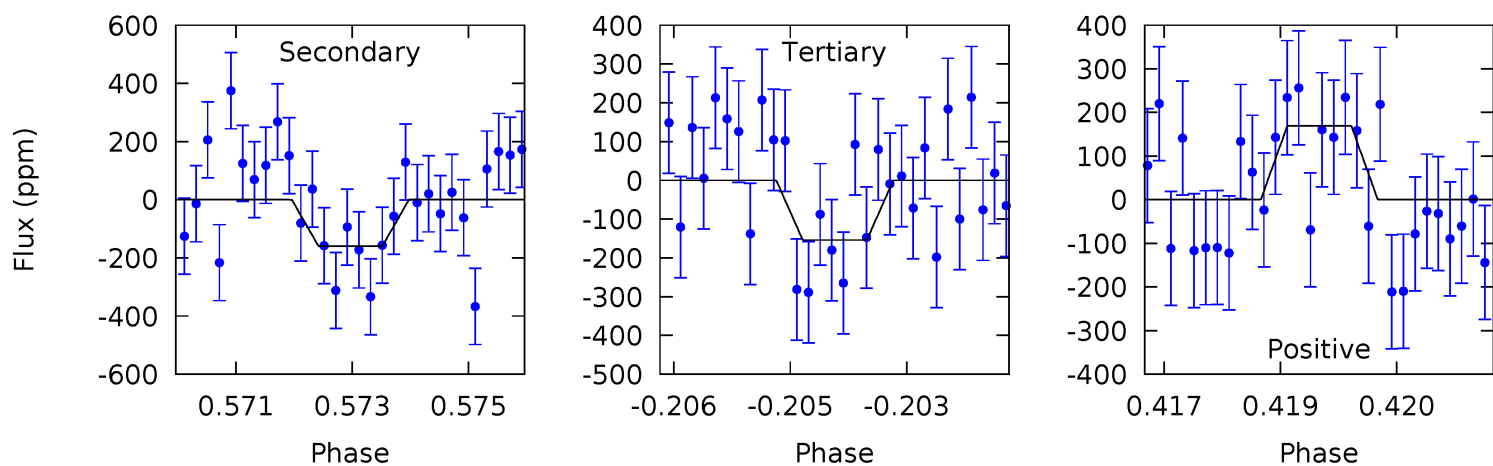
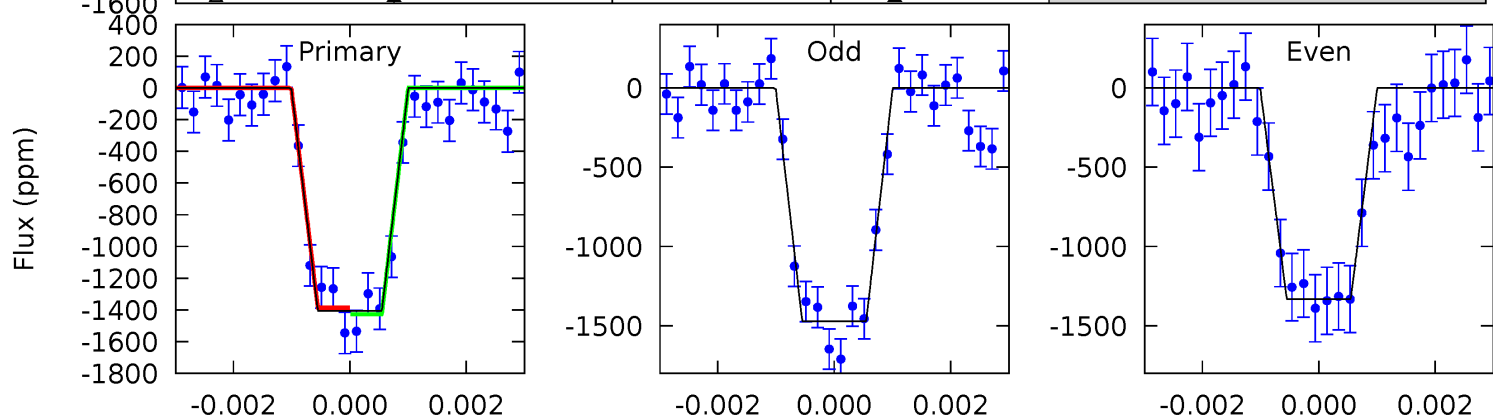
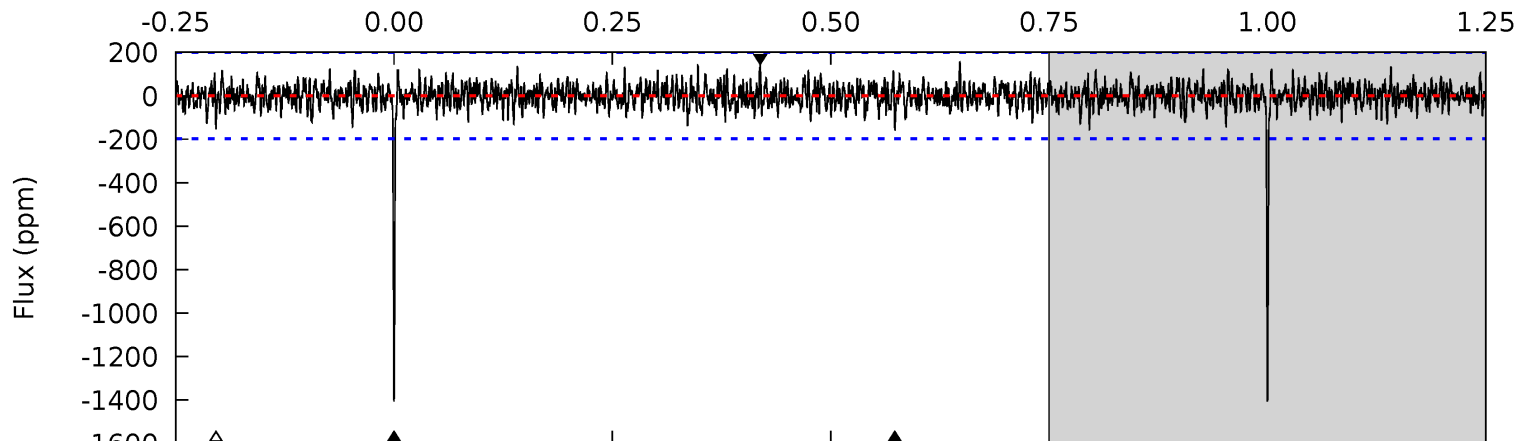
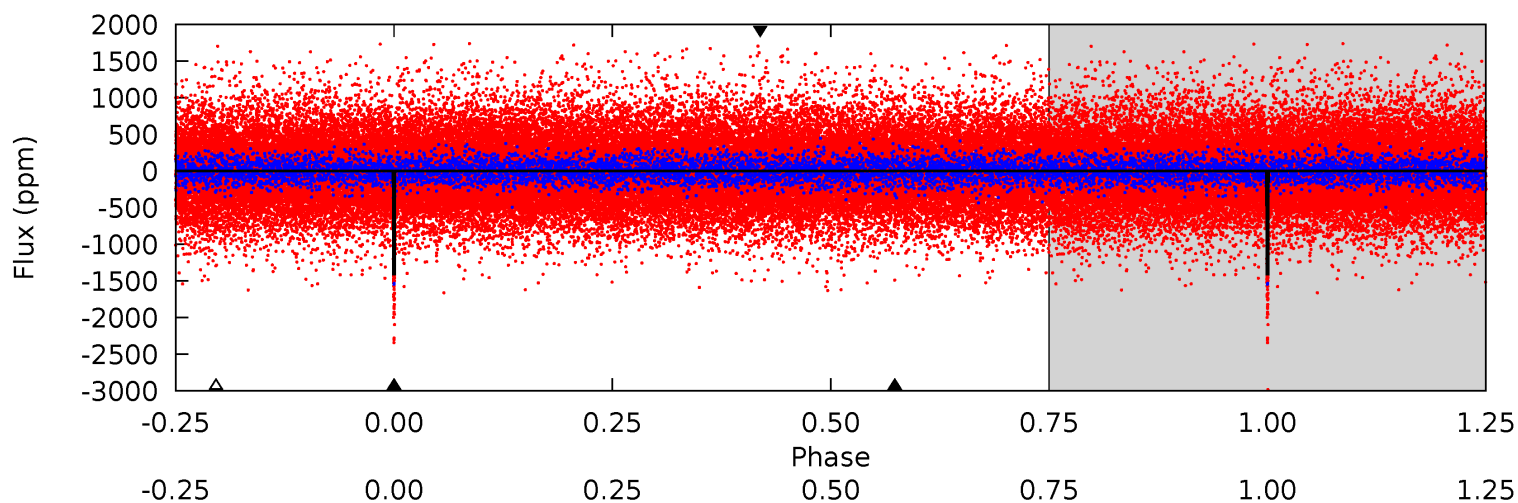




# Alt Model-Shift Uniqueness Test

009757613-03, P = 46.827651 Days, E = 89.917328 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
37.8	4.28	4.14	4.56	5.33	3.10	1.20	33.7	33.3	0.14	-0.28	1.88	1.06	0.11	0.55



### Stellar Parameters For KIC 009757613

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$3879^{+77}_{-85}$	$4.708^{+0.045}_{-0.021}$	$-0.120^{+0.150}_{-0.150}$	$0.537^{+0.030}_{-0.041}$	$0.537^{+0.037}_{-0.033}$	$4.884^{+0.959}_{-0.449}$
	+2%/-2%	+1%/-0%	+125%/-125%	+6%/-8%	+7%/-6%	+20%/-9%
Source	SPE70	SPE60	SPE70	DSEP		

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

### Secondary Eclipse Parameters for KIC 009757613-03 / KOI 0250.04

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-161 \pm 37$	$2.17^{+0.79}_{-0.72}$	$383^{+9}_{-10}$	$2790^{+327}_{-227}$	$781^{+1023}_{-368}$
Alt.	$-159 \pm 37$	$2.20^{+0.73}_{-0.70}$	$384^{+9}_{-10}$	$2773^{+325}_{-208}$	$749^{+893}_{-335}$

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

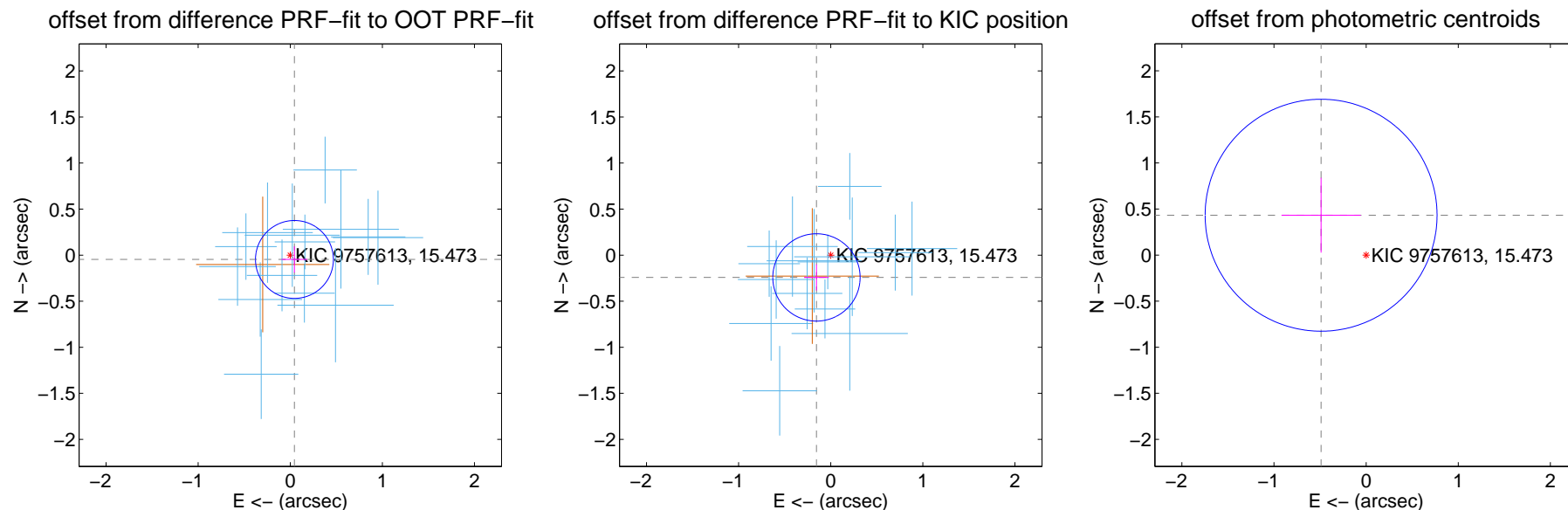
## DV Centroid Data

Supplemental centroid analysis for 009757613-03. Kepler magnitude: 15.47. Transit SNR 25.86

There are 14 quarters with good PRF difference image offsets

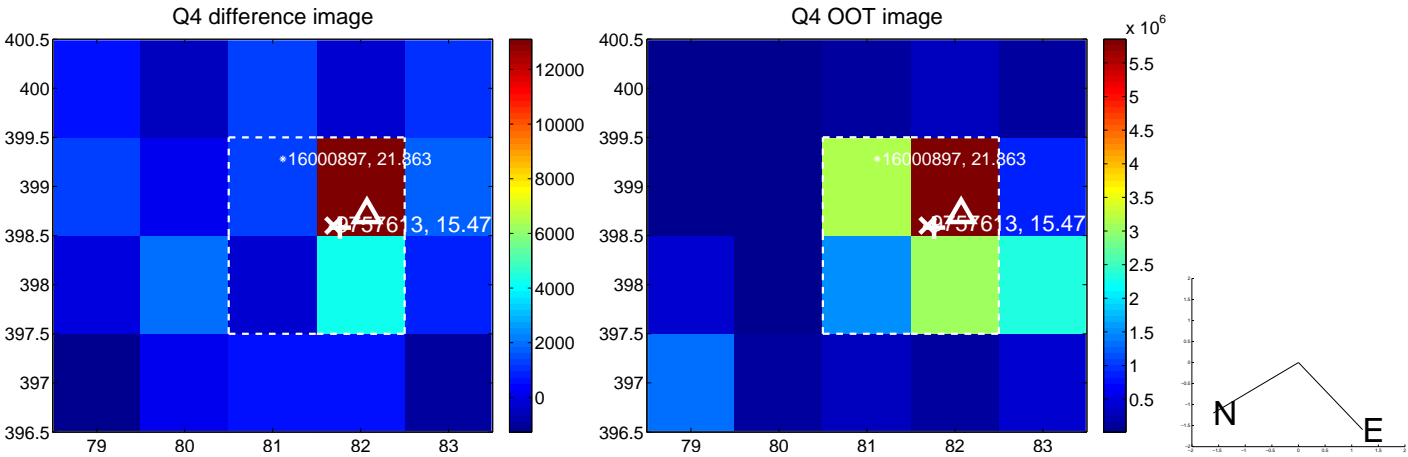
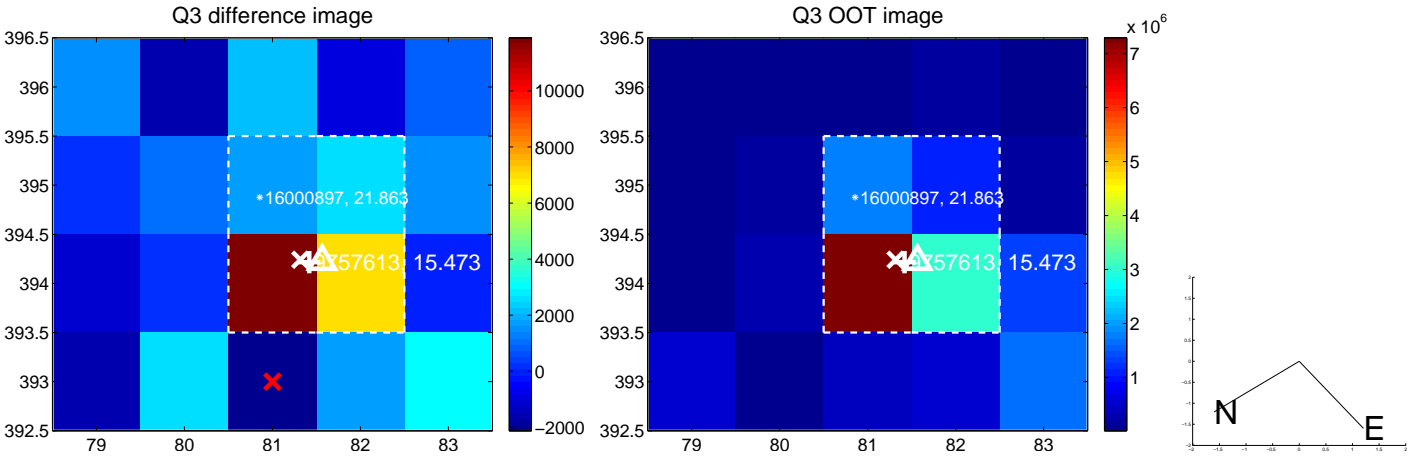
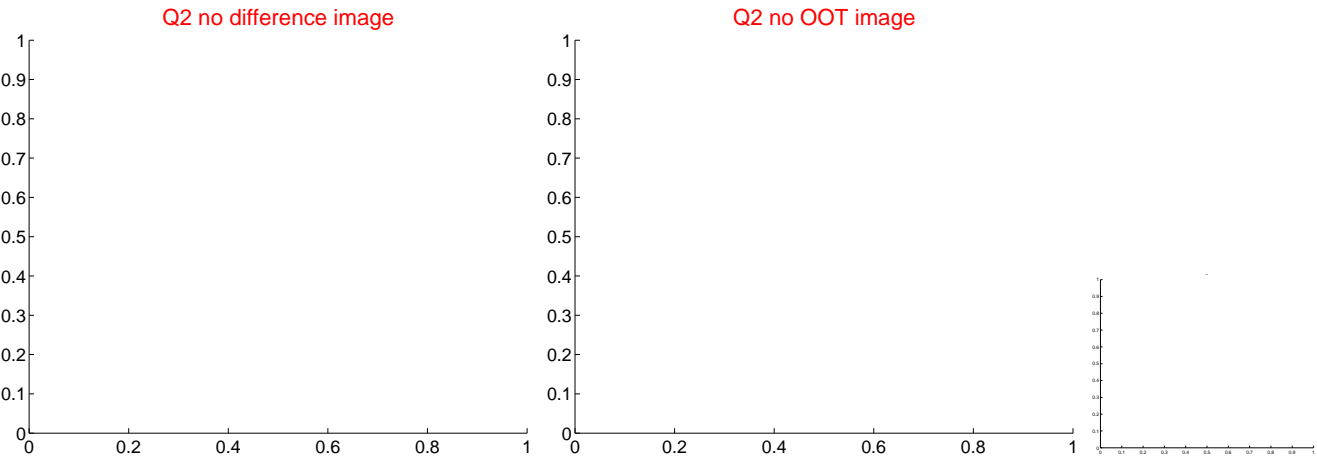
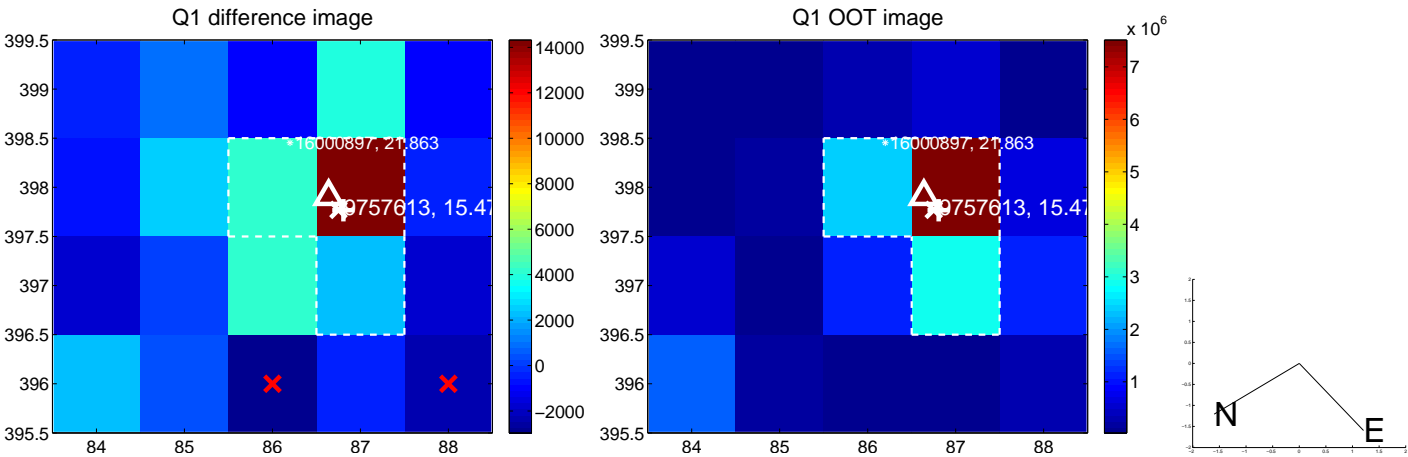
The direct PRF centroid is offset from the target star catalog position by about 0.34 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.065 \pm 0.141$	0.46	$-0.045 \pm 0.139$	$-0.047 \pm 0.142$
PRF-fit source offset from KIC position	$0.287 \pm 0.158$	1.82	$0.155 \pm 0.135$	$-0.242 \pm 0.141$
photometric centroid source offset	$0.65 \pm 0.42$	1.56	$0.49 \pm 0.43$	$0.43 \pm 0.41$

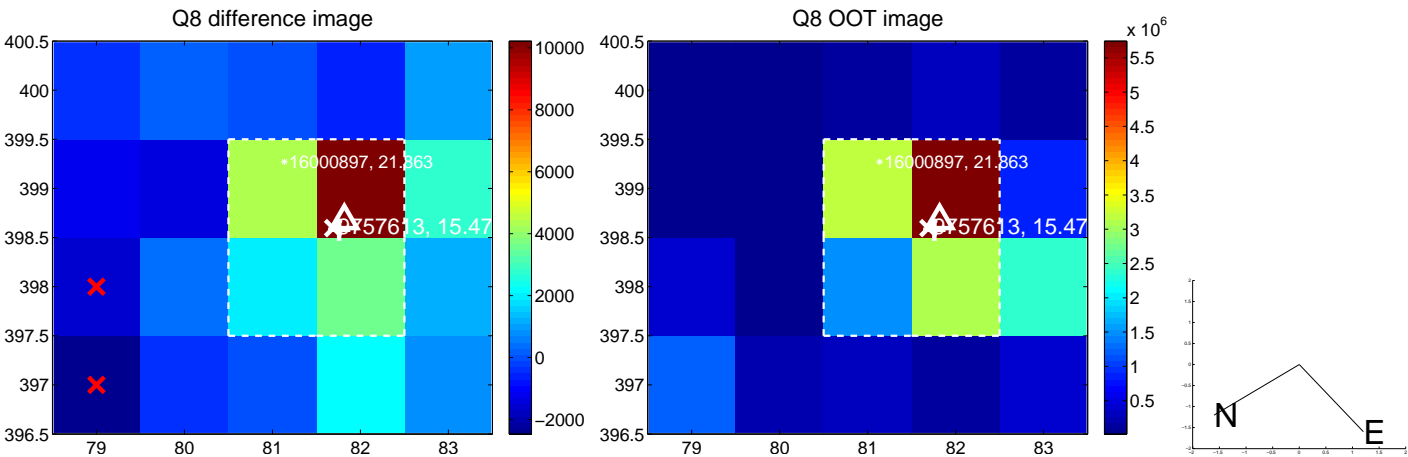
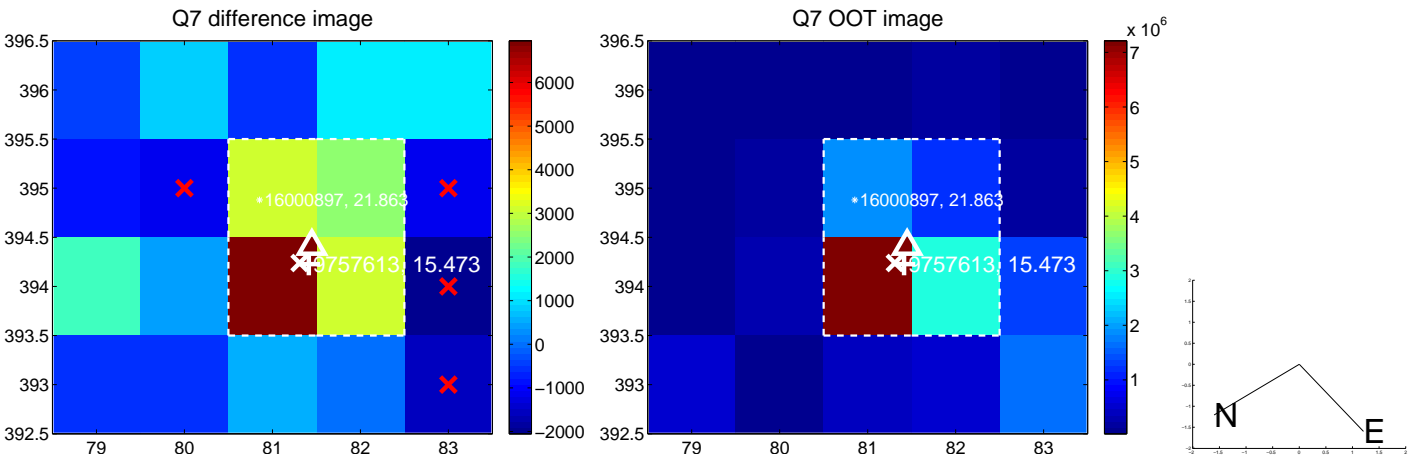
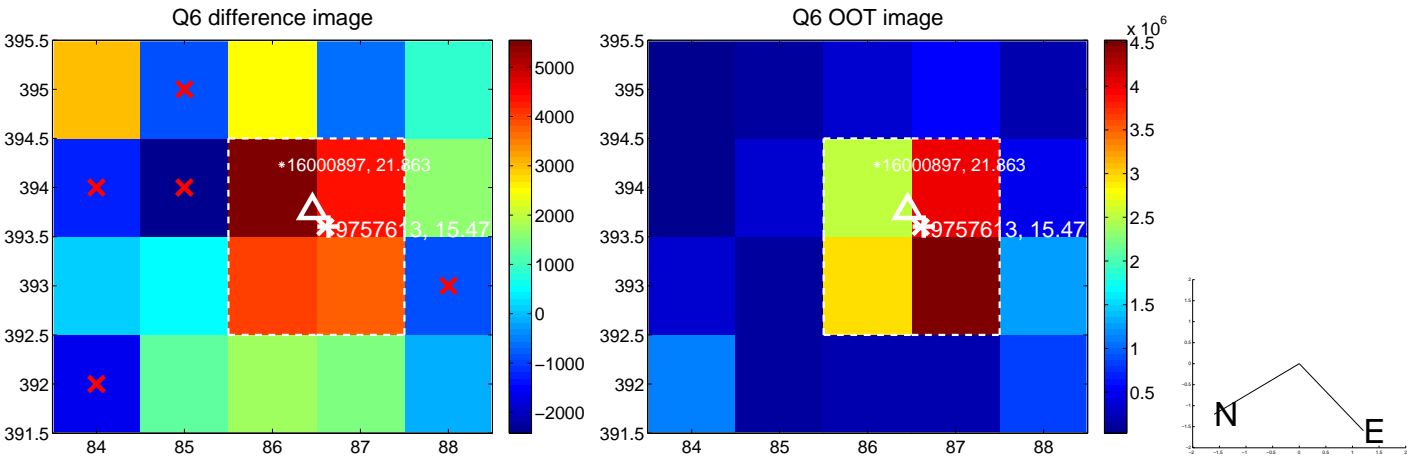
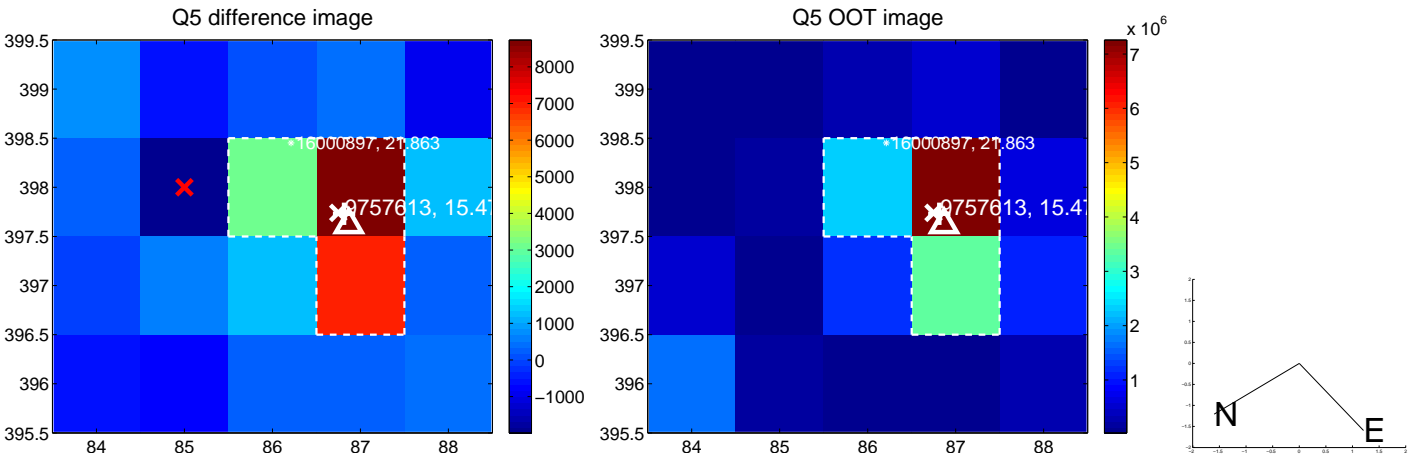


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

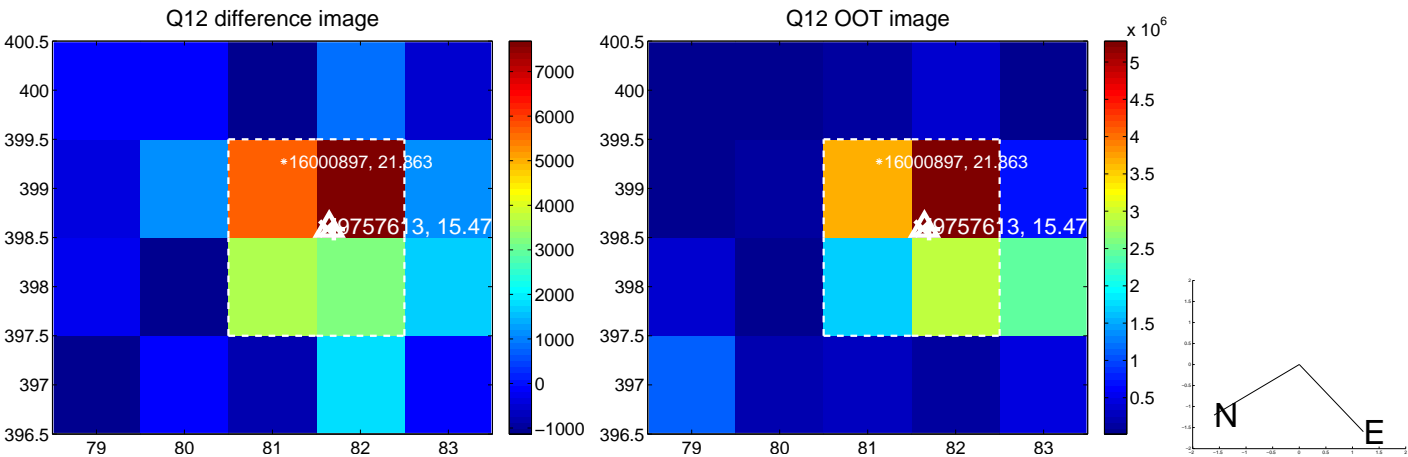
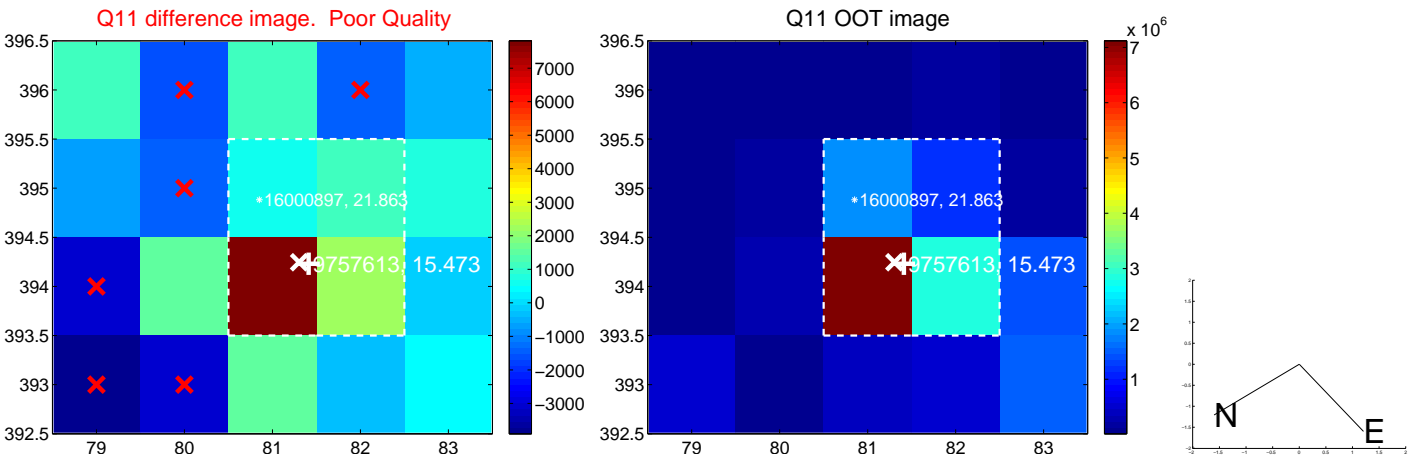
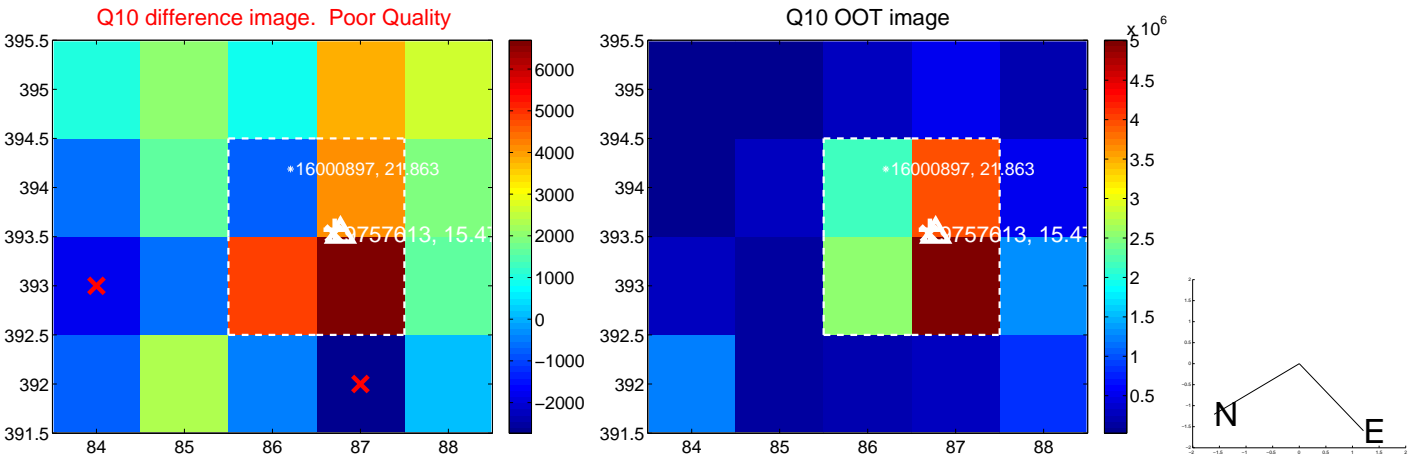
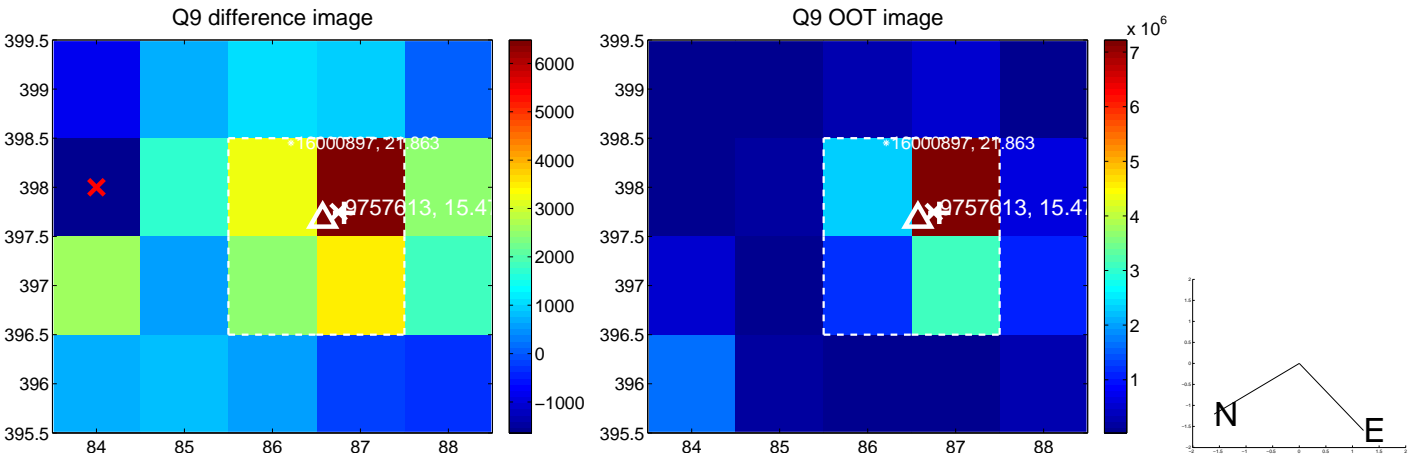
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



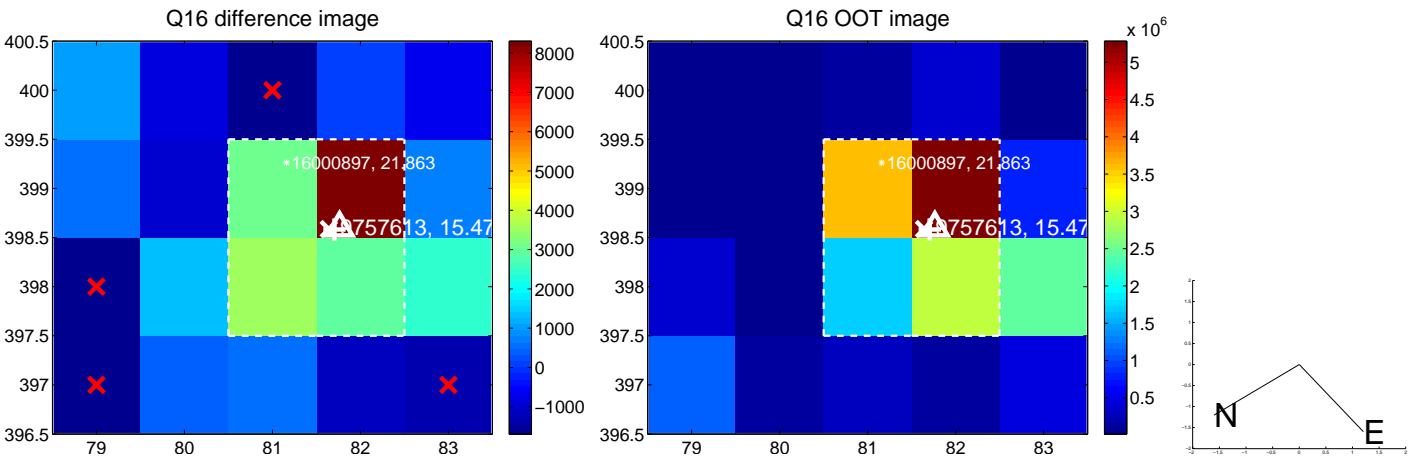
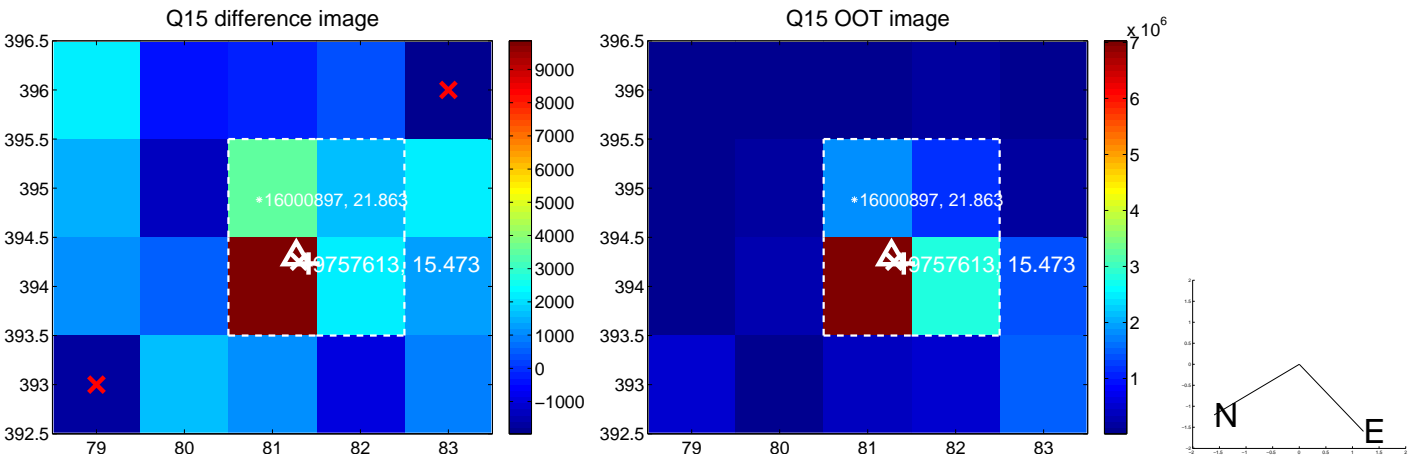
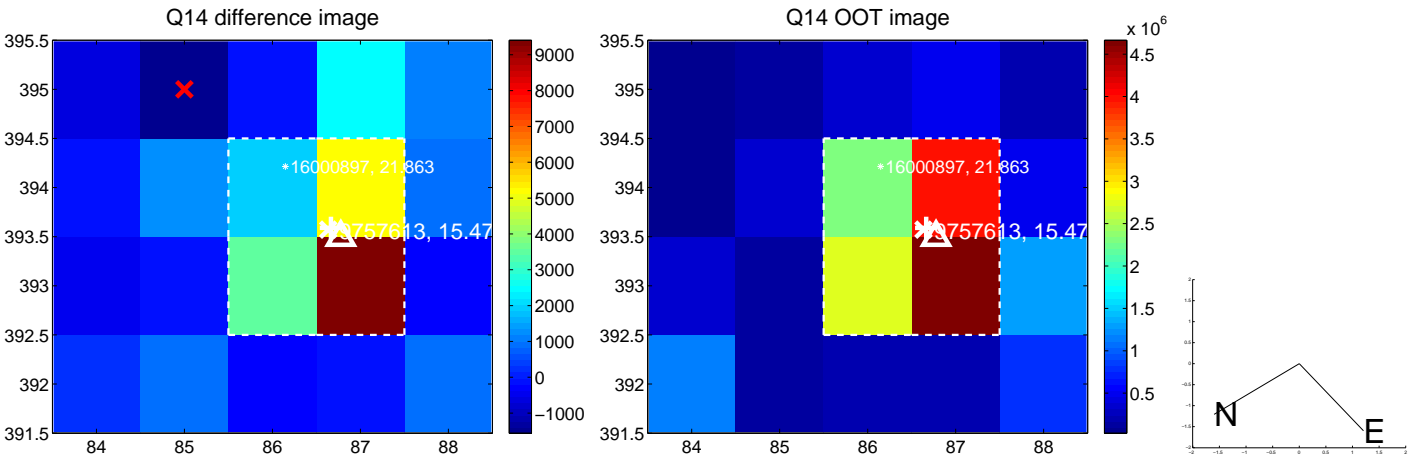
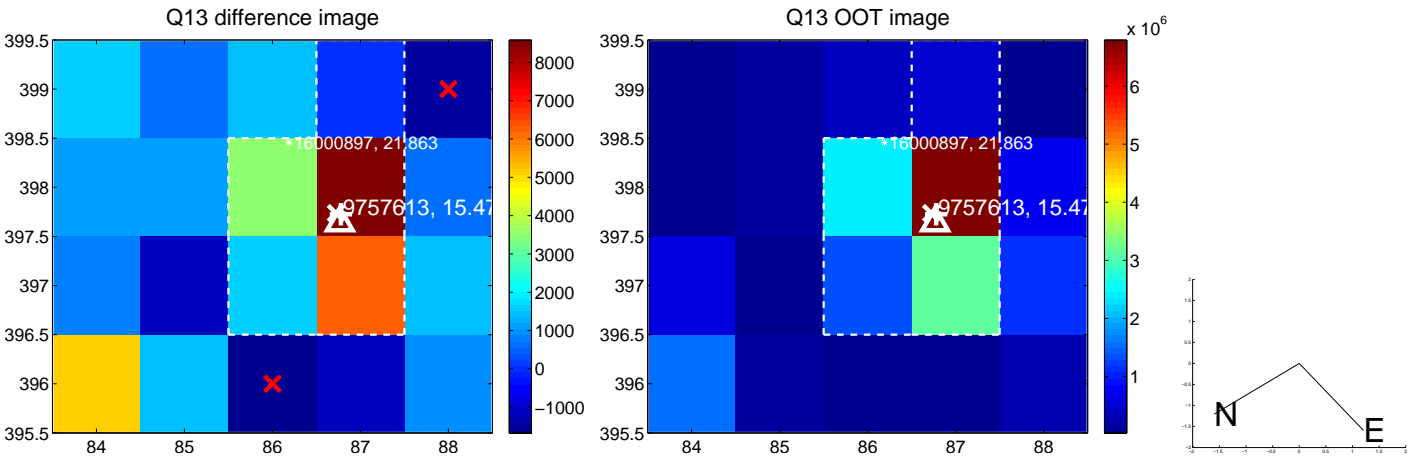
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



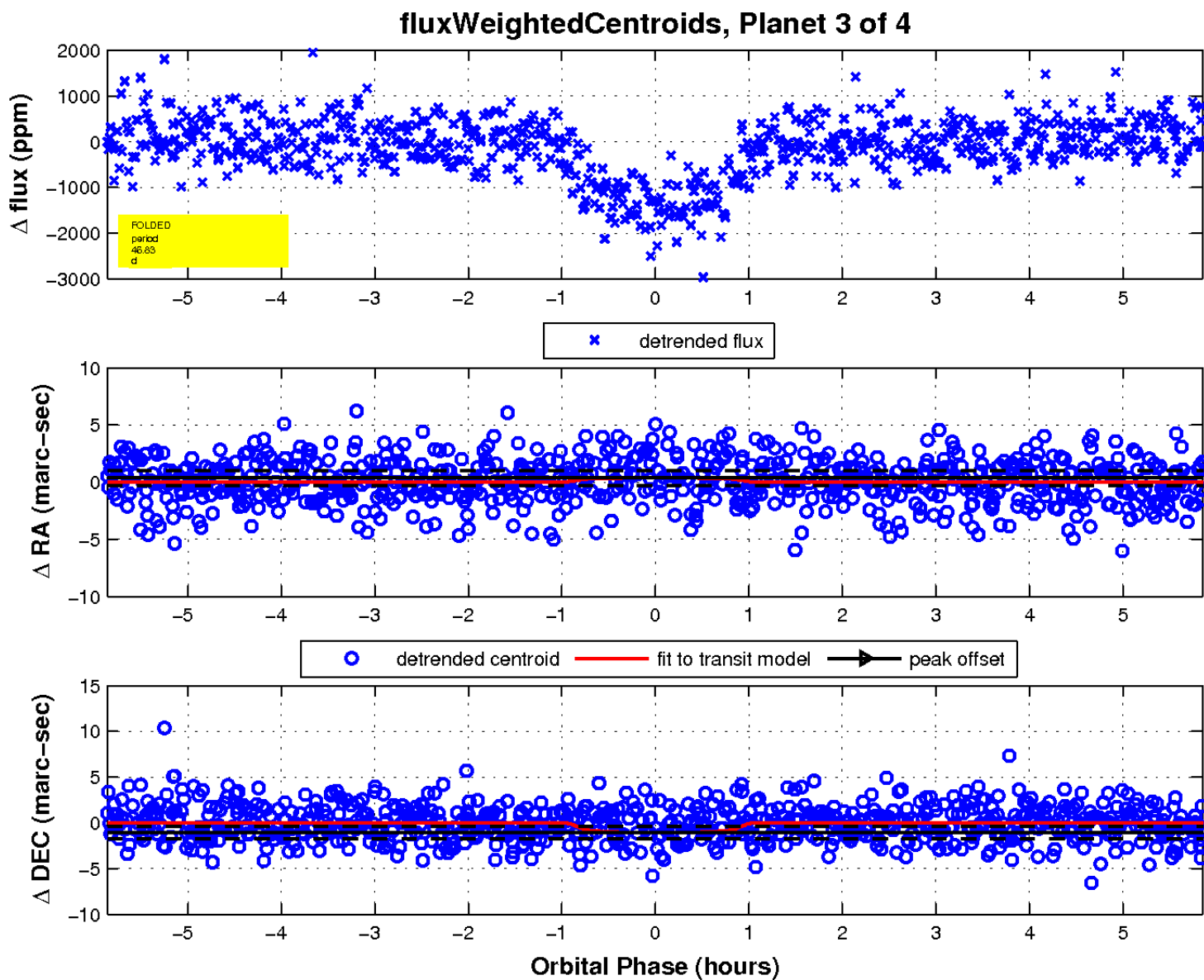
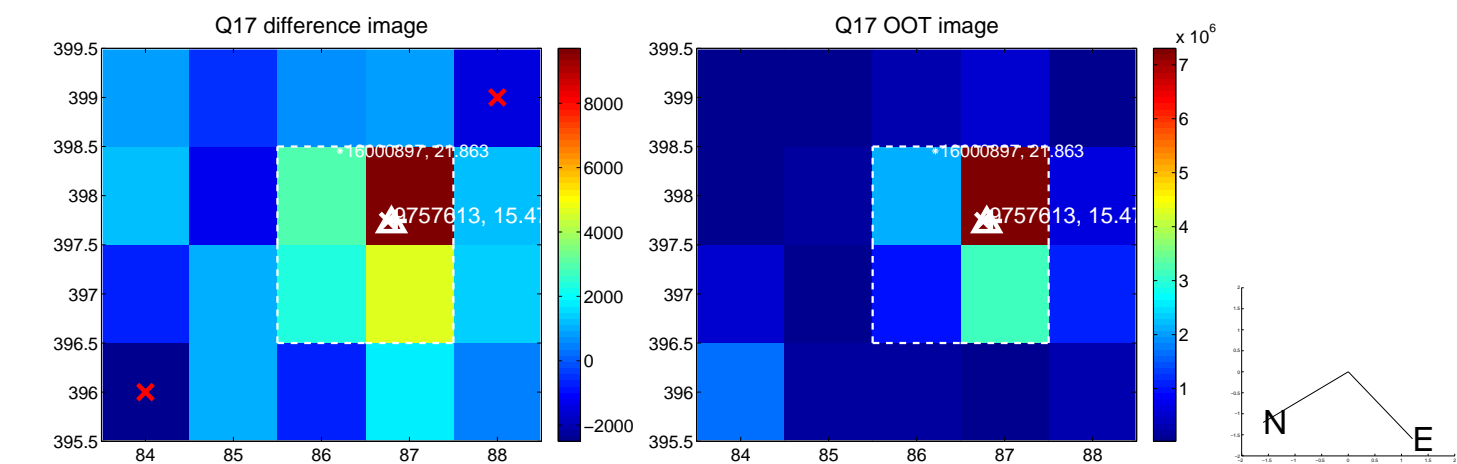
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



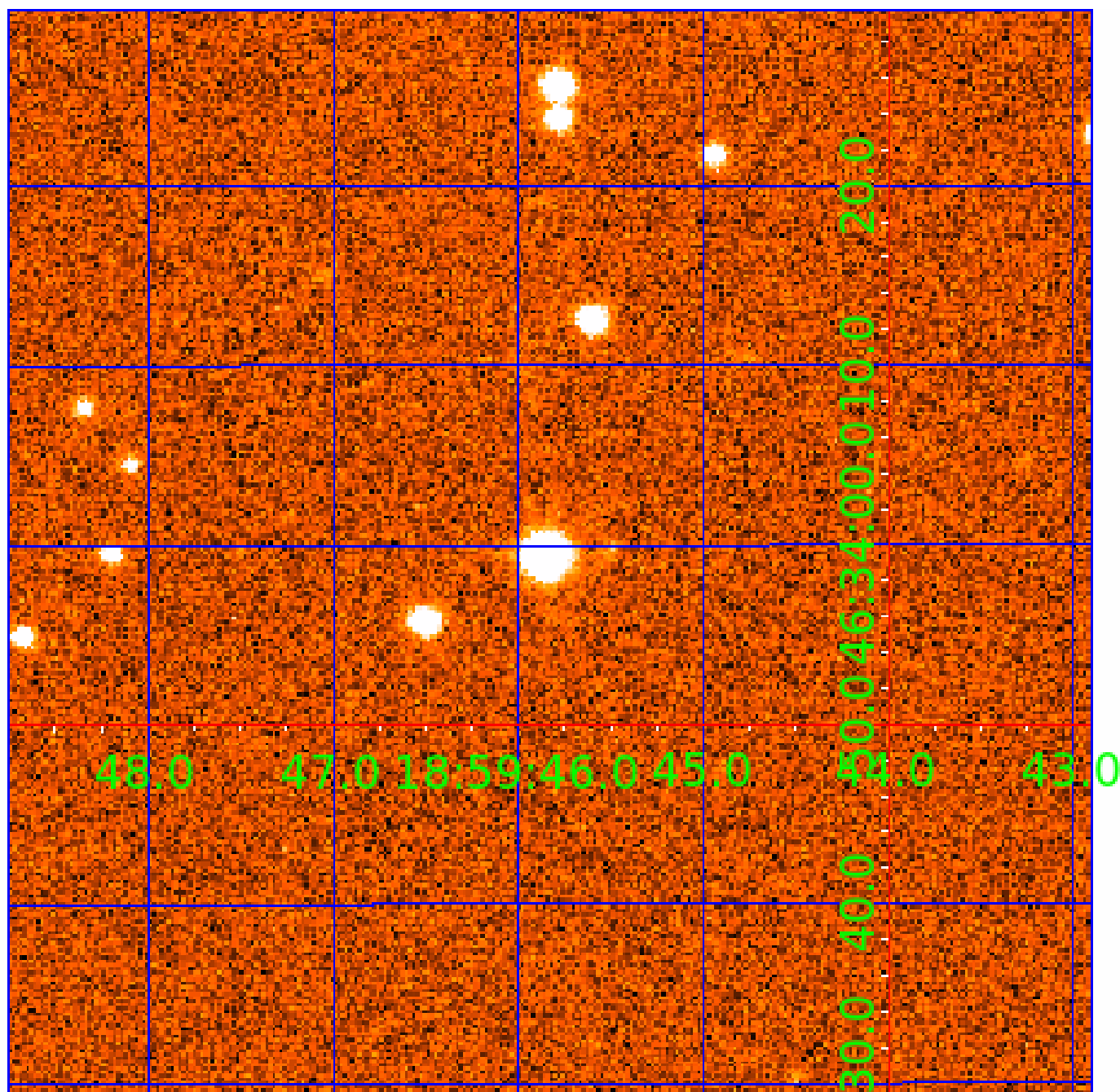
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image

Declination



# KIC 009757613

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009757613-01	OBS	0250.01	12.283014	133.548260	2788.4	3.002	104.5	105.0	0.54	3879	3.15	8.15
009757613-02	OBS	0250.02	17.251197	132.635403	2013.9	2.339	53.4	54.1	0.54	3879	2.92	5.18
009757613-03	OBS	0250.04	46.827645	136.745305	1487.3	1.955	24.2	25.9	0.54	3879	2.26	1.37
009757613-04	OBS	0250.03	3.543922	132.714442	385.6	2.159	22.3	25.2	0.54	3879	1.25	42.77

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009757613-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
009757613-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT
009757613-03	OBS	PC	0.96	0	0	0	0	NO_COMMENT
009757613-04	OBS	PC	1.00	0	0	0	0	NO_COMMENT

**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.

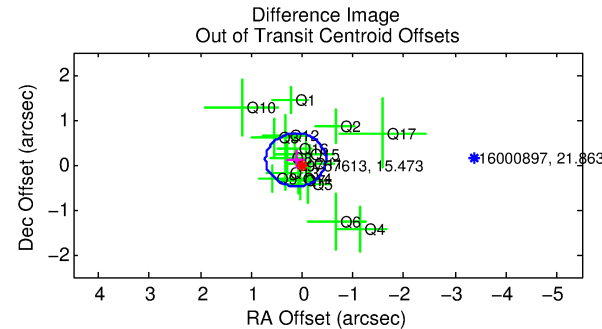
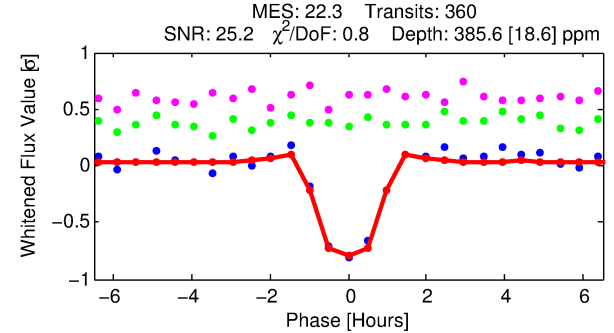
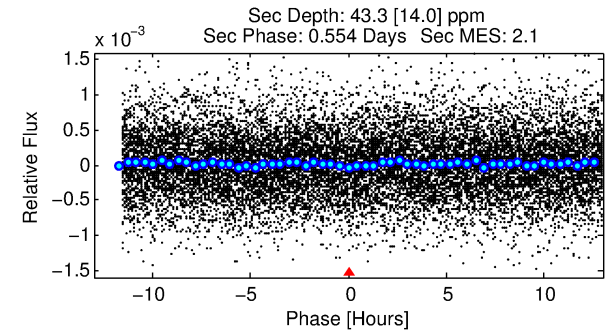
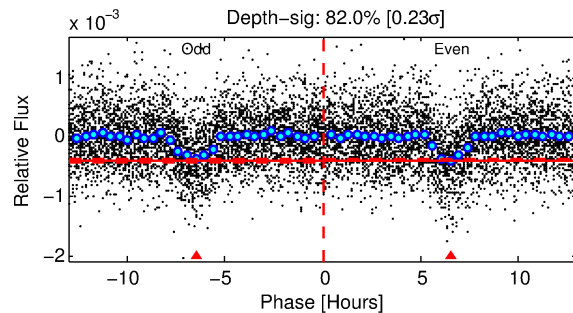
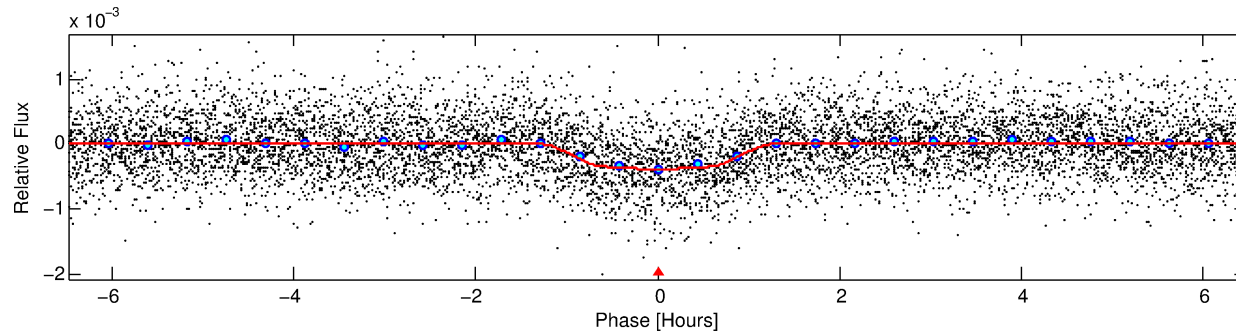
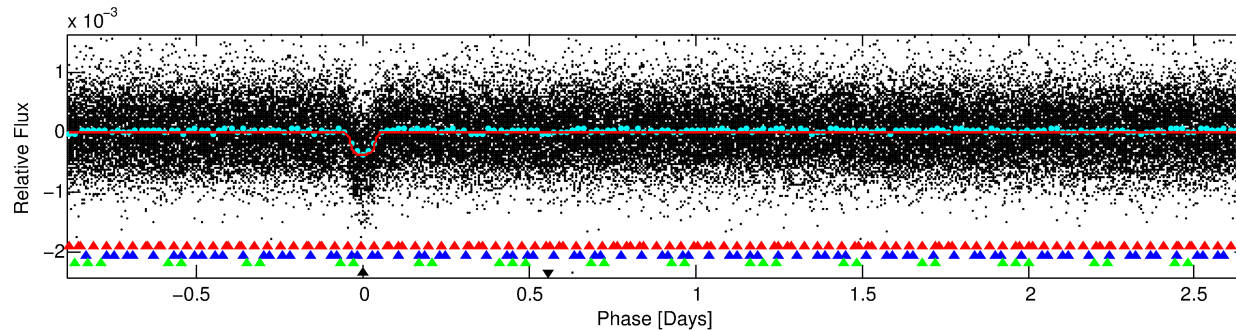
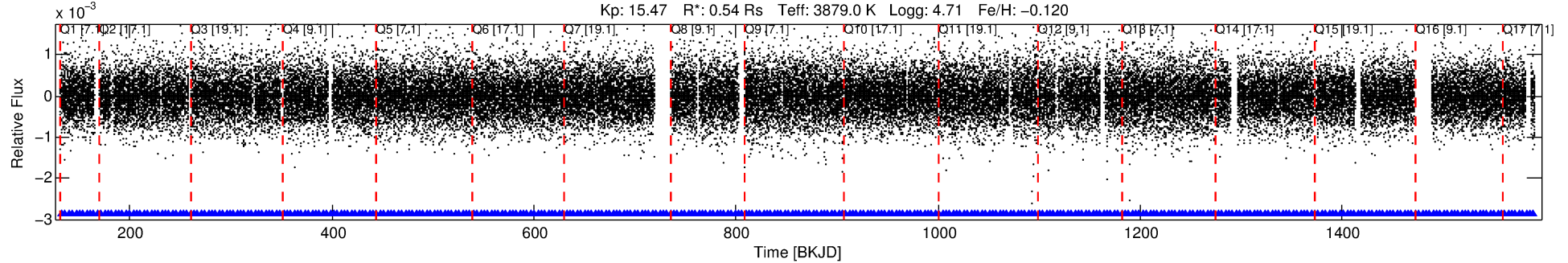
Ephemeris Match Information For 009757613-04

No Significant Match Found

# DV One-Page Summary

KIC: 9757613 Candidate: 4 of 4 Period: 3.544 d  
KOI: K00250.03 Name: Kepler-26d Corr: 0.941

Kp: 15.47 R\*: 0.54 Rs Teff: 3879.0 K Logg: 4.71 Fe/H: -0.120



## DV Fit Results:

Period = 3.54392 [0.00001] d  
Epoch = 132.7144 [0.0013] BKJD  
Rp/R\* = 0.0214 [0.0040]  
a/R\* = 6.16 [5.02]  
b = 0.90 [0.18]  
Seff = 42.77 [5.25]  
Teq = 652 [20] K  
Rp = 1.25 [0.26] Re  
a = 0.0370 [0.0023] AU  
Ag = 20.68 [10.44] [1.89σ]  
Teffp = 2150 [271] K [5.50σ]

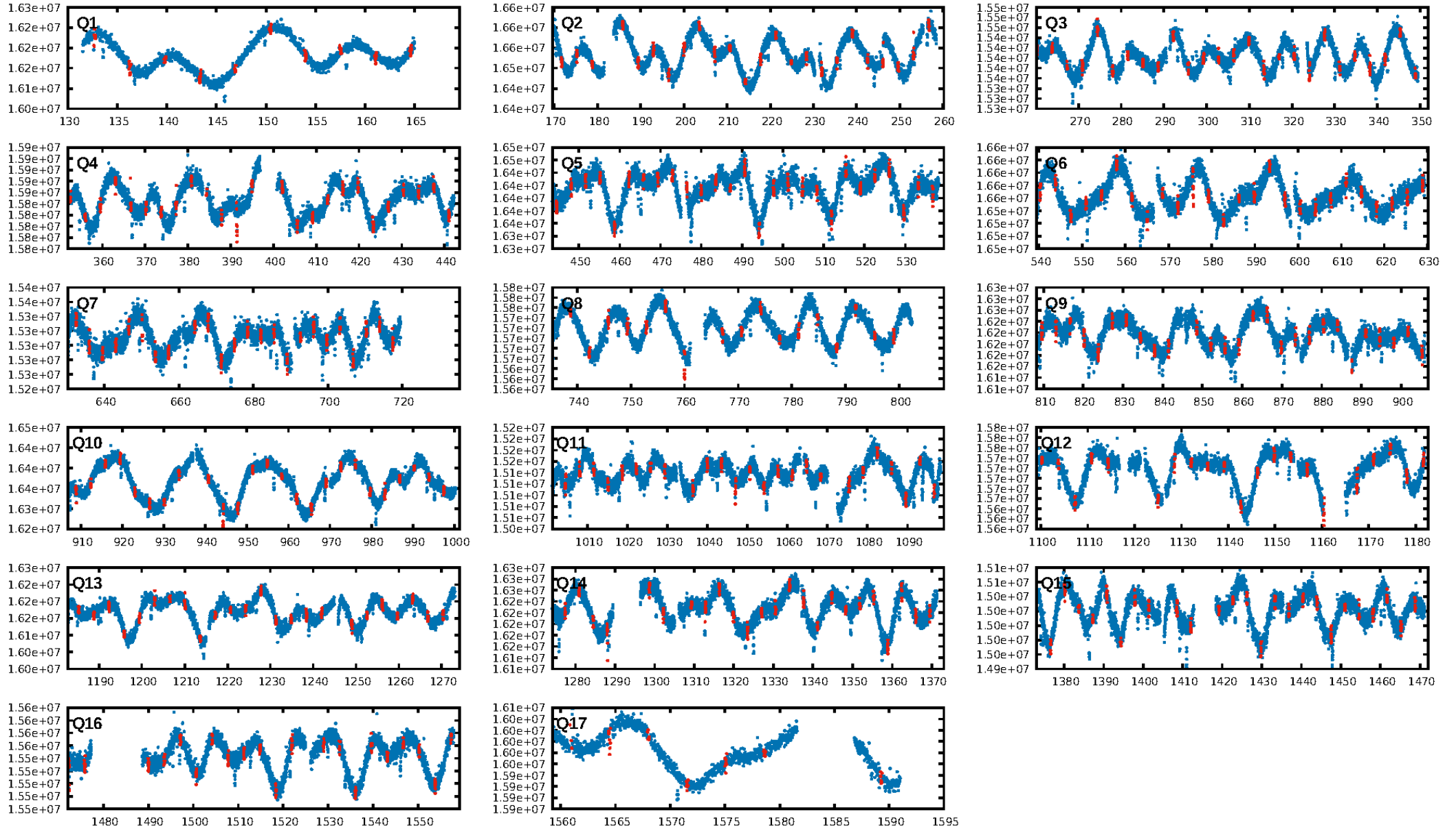
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [56.71σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 3.85e-105  
RollingBand-fgt: 1.00 [345/345]  
GhostDiagnostic-chr: 2.232  
Centroid-sig: 18.5%  
Centroid-so: 0.349 arcsec [0.83σ]  
OotOffset-rm: 0.166 arcsec [0.84σ]  
KicOffset-rm: 0.342 arcsec [2.00σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 1.00 [17/17]

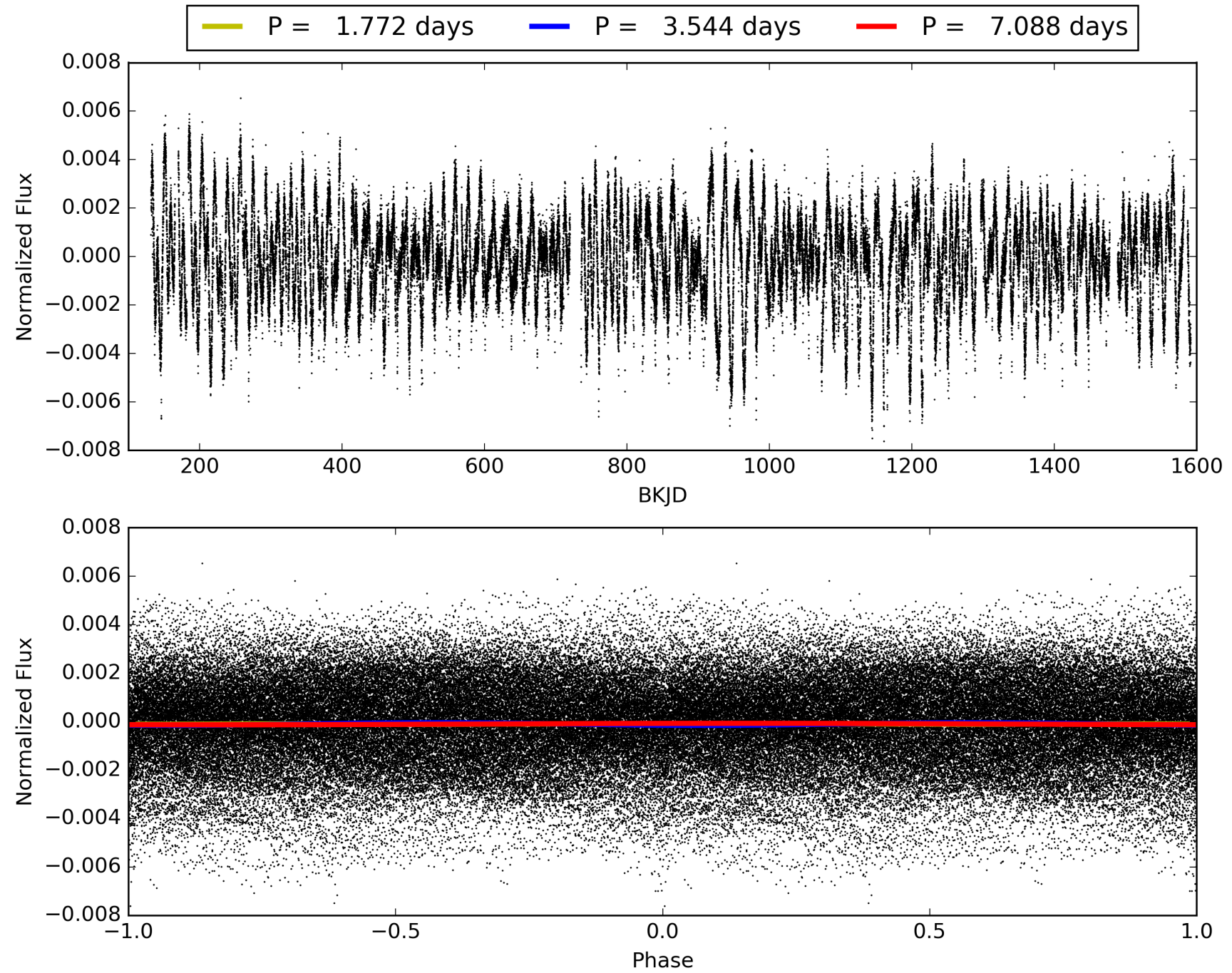
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 17:33:03 Z

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

# TCE 009757613-04, PDC Light Curves



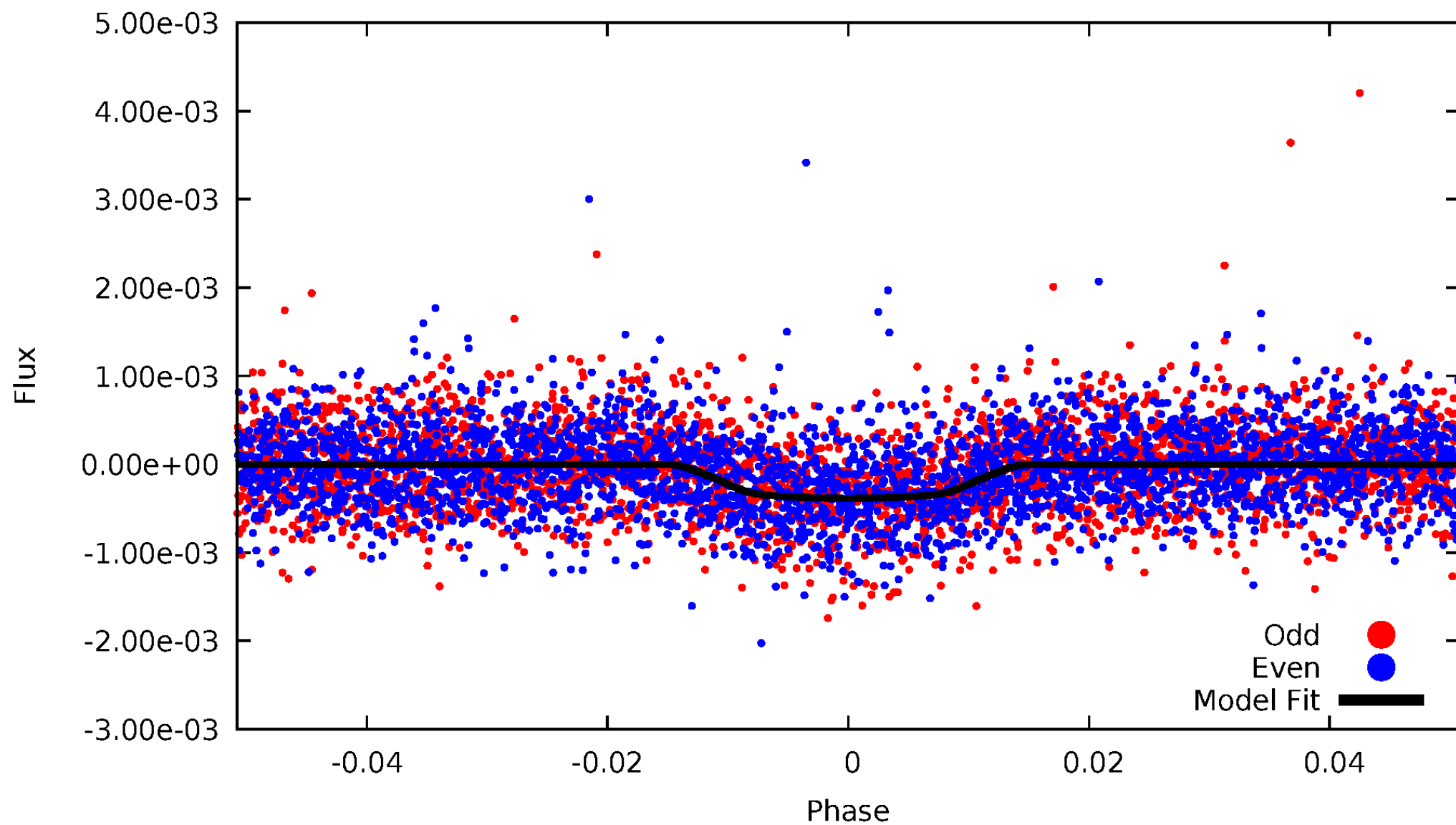
TCE 009757613-04





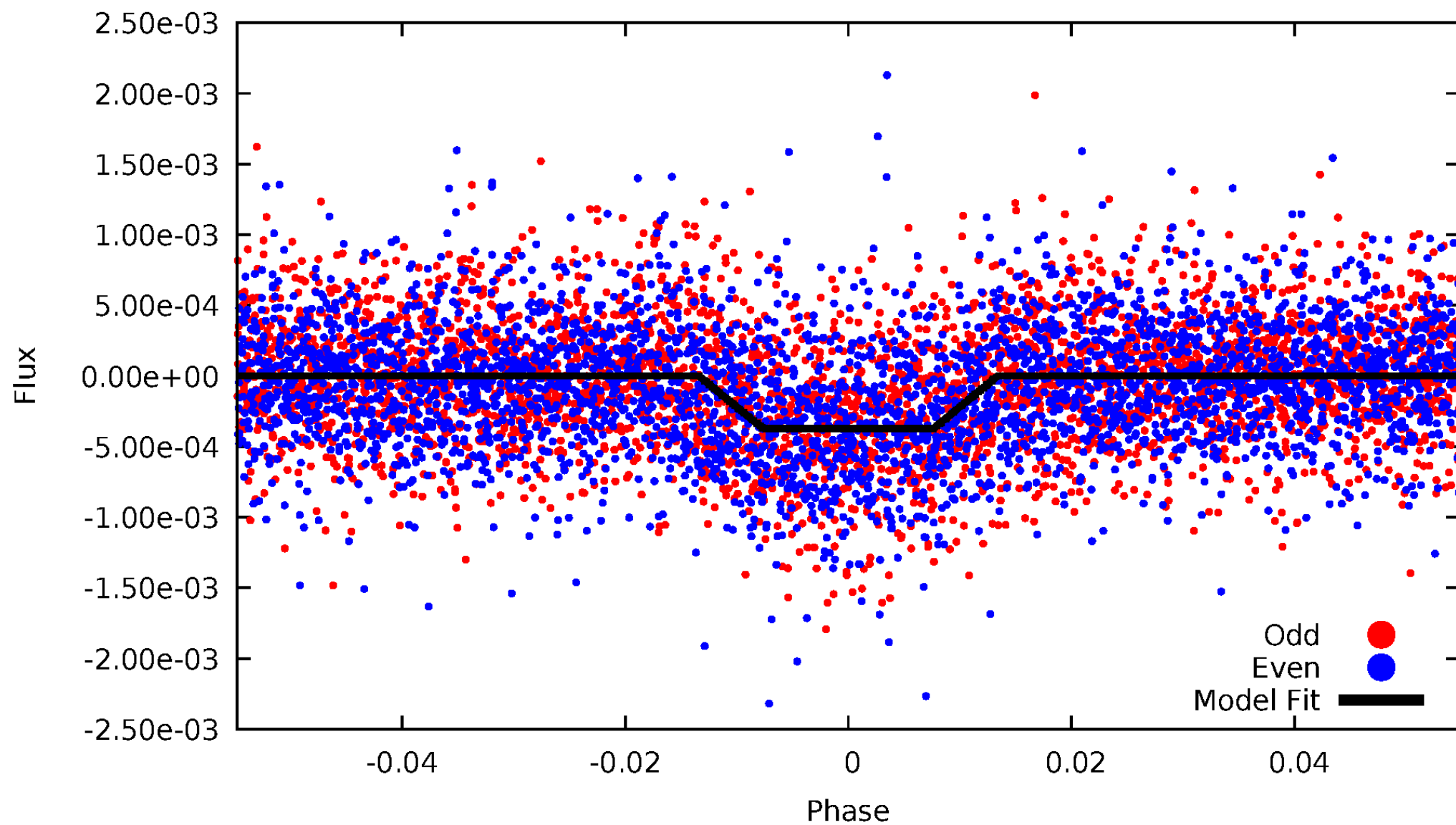
# DV Odd/Even

TCE 009757613-04



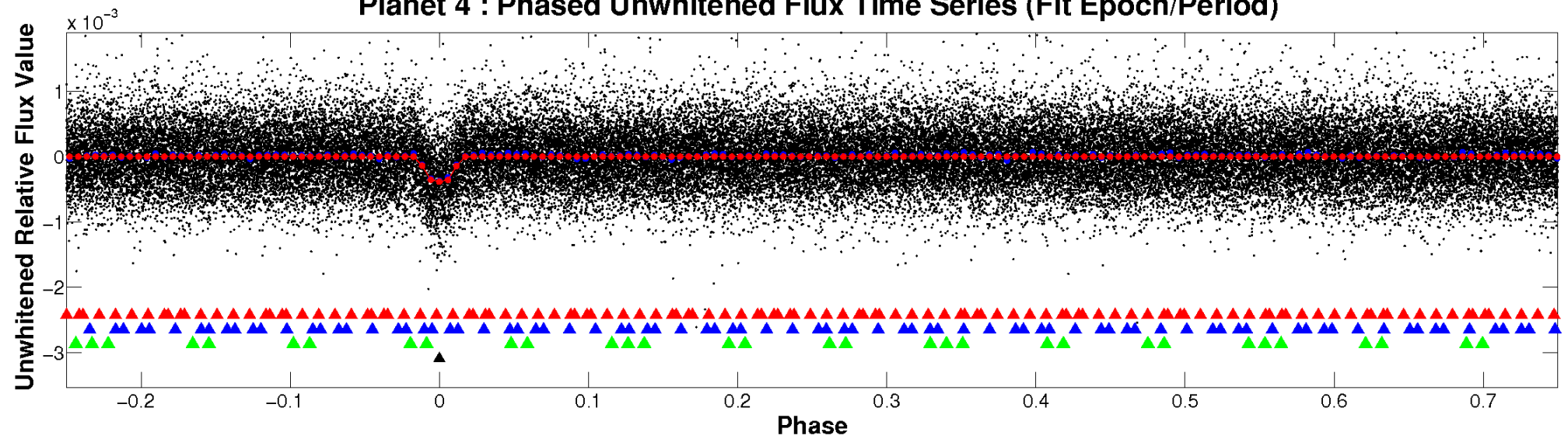
# ALT Odd/Even

TCE 009757613-04

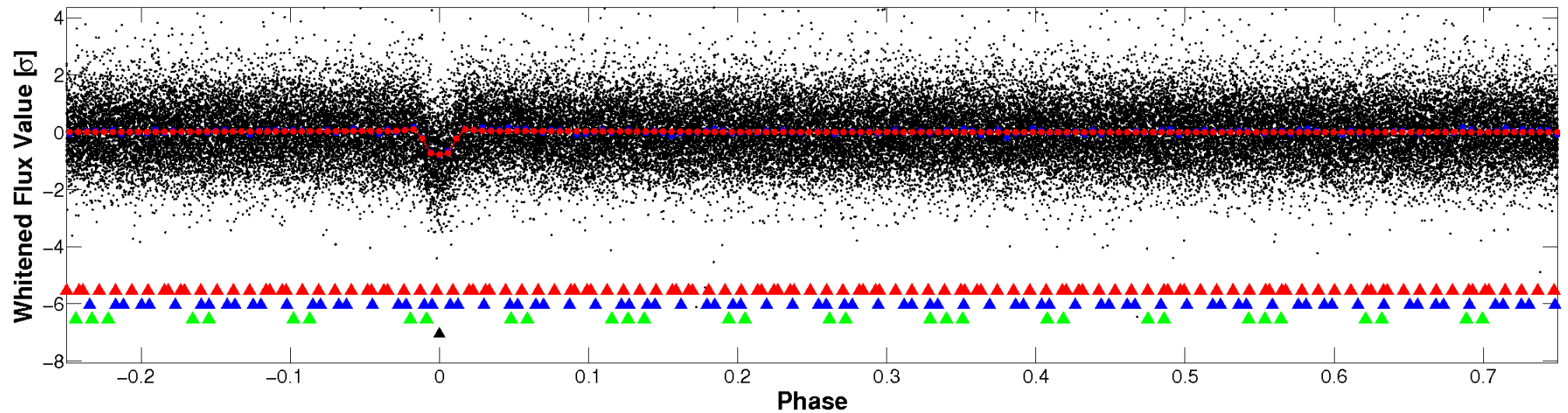


# Non-Whitened Vs. Whitened Light Curve

## Planet 4 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)



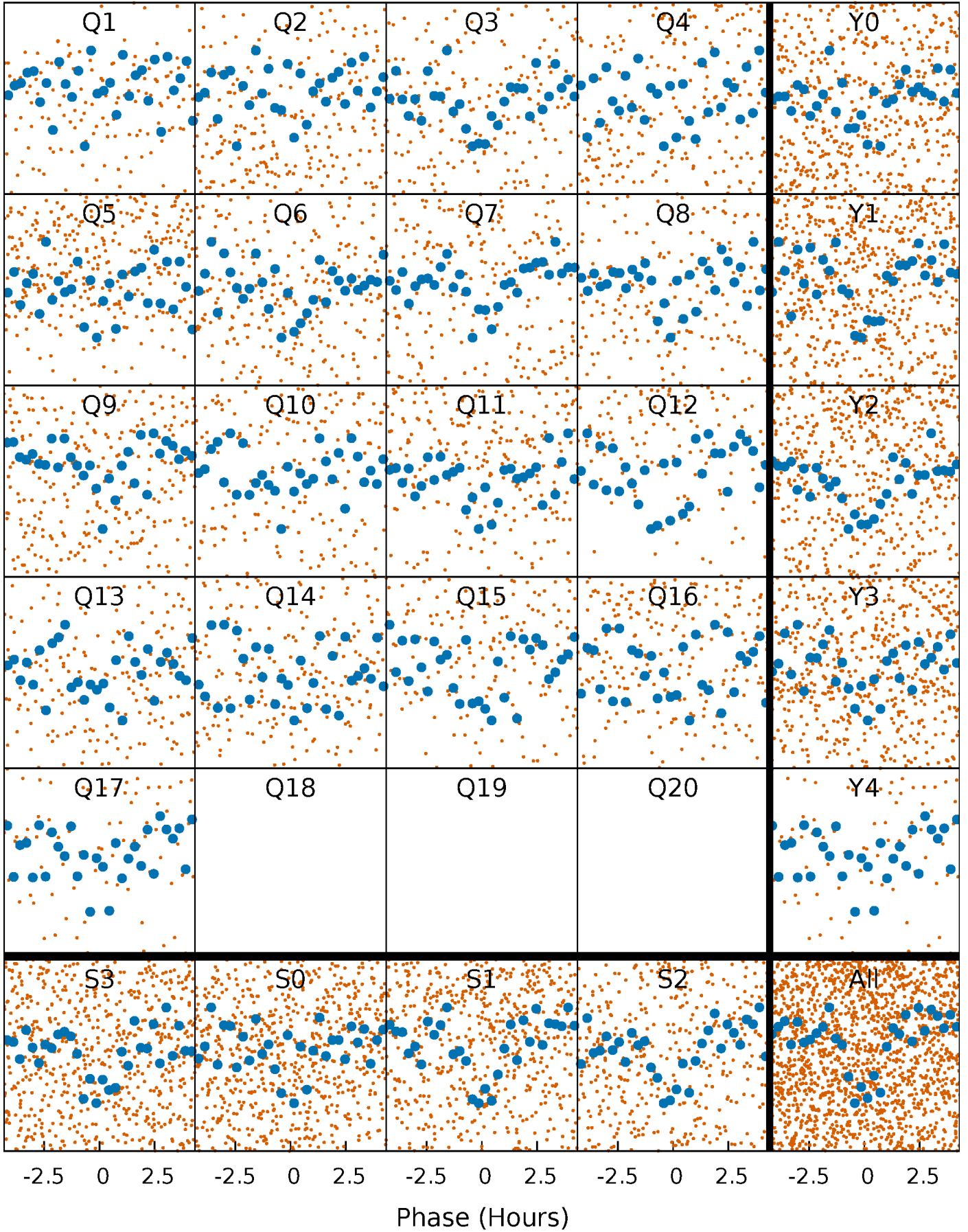
## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)





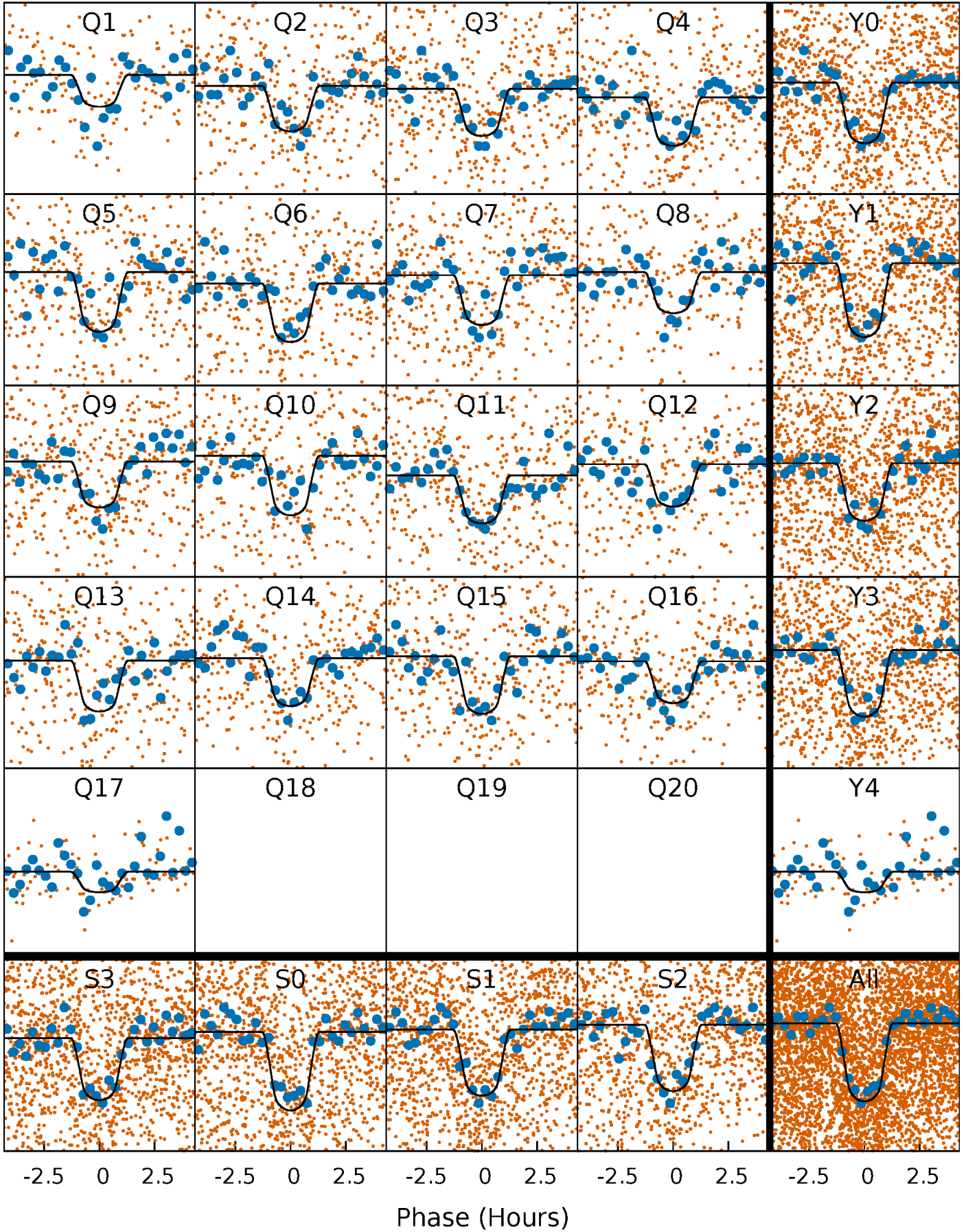
# PDC Quarter-Phased Transit Curves

TCE 009757613-04   P= 3.543922 Days    $T_0=132.714442$  (BKJD)



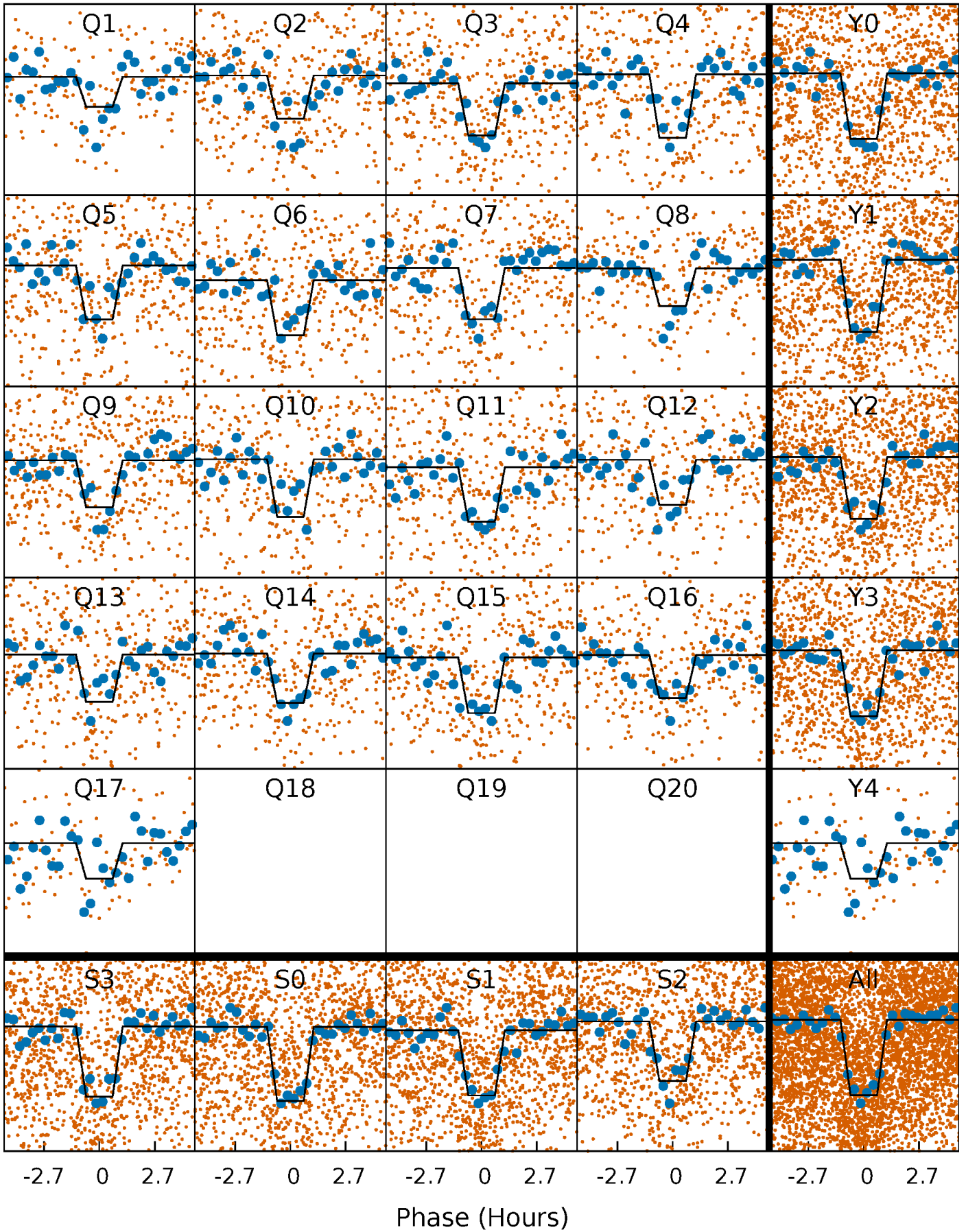
# DV Quarter-Phased Transit Curves

TCE 009757613-04   P= 3.543922 Days    $T_0=132.714442$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

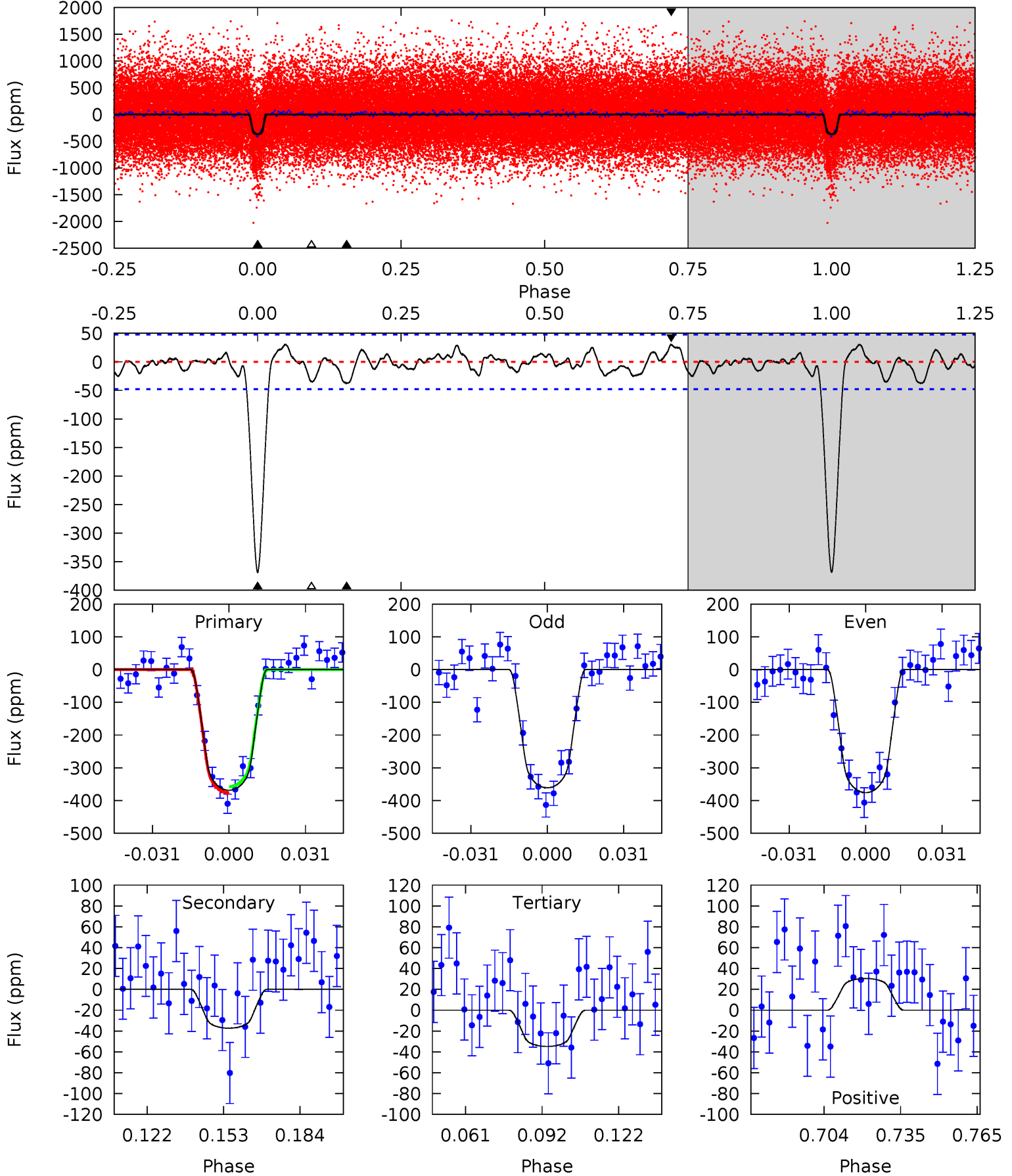
TCE 009757613-04 P= 3.543915 Days  $T_0=132.715984$  (BKJD)



# DV Model-Shift Uniqueness Test

009757613-04, P = 3.543922 Days, E = 129.170520 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
37.0	3.75	3.50	3.06	4.81	2.16	1.29	33.5	34.0	0.25	0.69	0.75	0.96	0.08	0.94

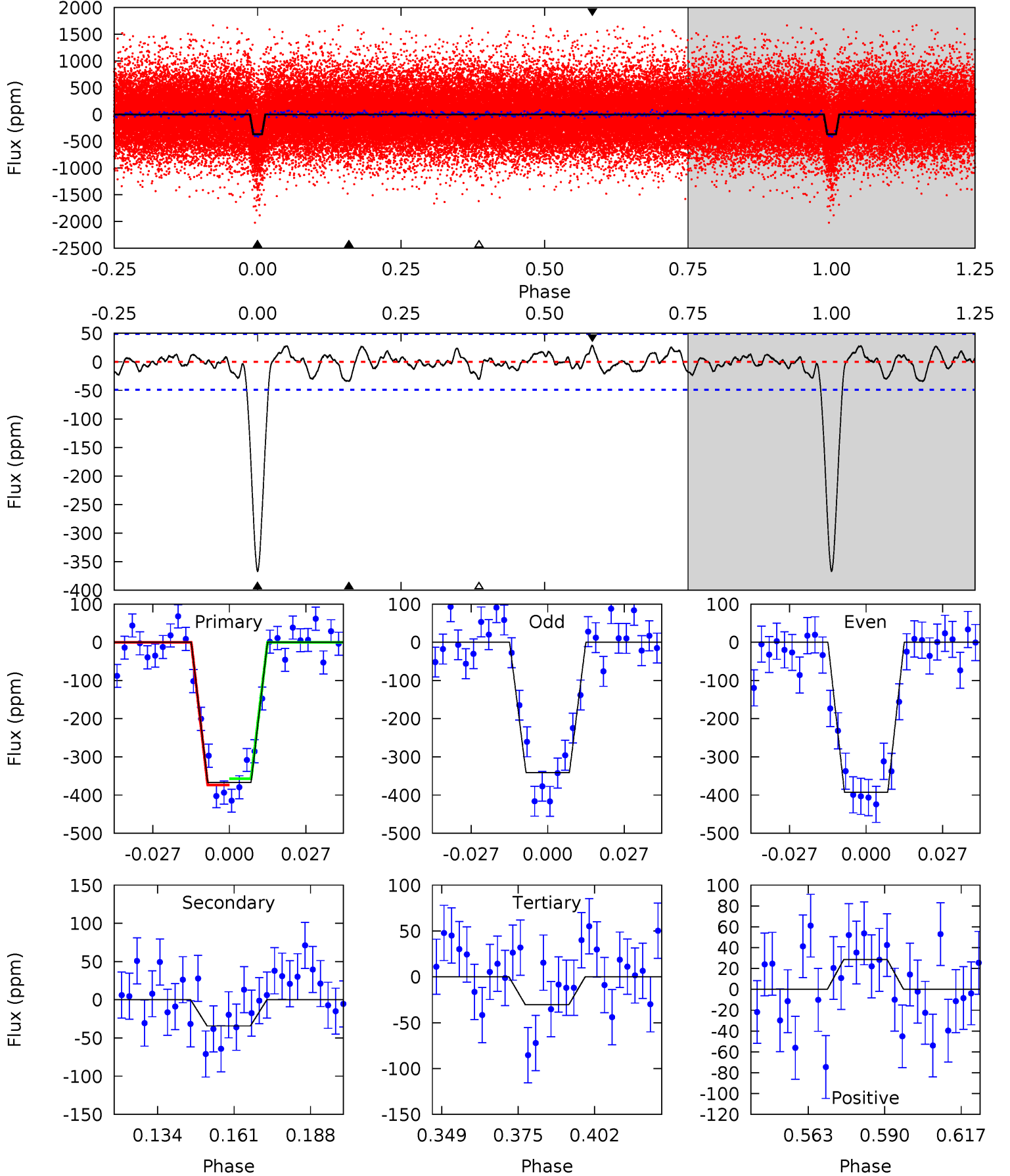




# Alt Model-Shift Uniqueness Test

009757613-04, P = 3.543915 Days, E = 129.172069 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
36.2	3.38	3.01	2.83	4.83	2.21	1.14	33.2	33.4	0.37	0.56	2.53	0.99	0.07	0.79



### Stellar Parameters For KIC 009757613

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$3879^{+77}_{-85}$	$4.708^{+0.045}_{-0.021}$	$-0.120^{+0.150}_{-0.150}$	$0.537^{+0.030}_{-0.041}$	$0.537^{+0.037}_{-0.033}$	$4.884^{+0.959}_{-0.449}$
	+2%/-2%	+1%/-0%	+125%/-125%	+6%/-8%	+7%/-6%	+20%/-9%
Source	SPE70	SPE60	SPE70	DSEP		

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

### Secondary Eclipse Parameters for KIC 009757613-04 / KOI 0250.03

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-37 \pm 10$	$1.25^{+0.24}_{-0.25}$	$905^{+22}_{-22}$	$2670^{+189}_{-168}$	$18^{+12}_{-7}$
Alt.	$-34 \pm 10$	$1.13^{+0.24}_{-0.23}$	$907^{+22}_{-25}$	$2703^{+201}_{-185}$	$20^{+14}_{-8}$

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

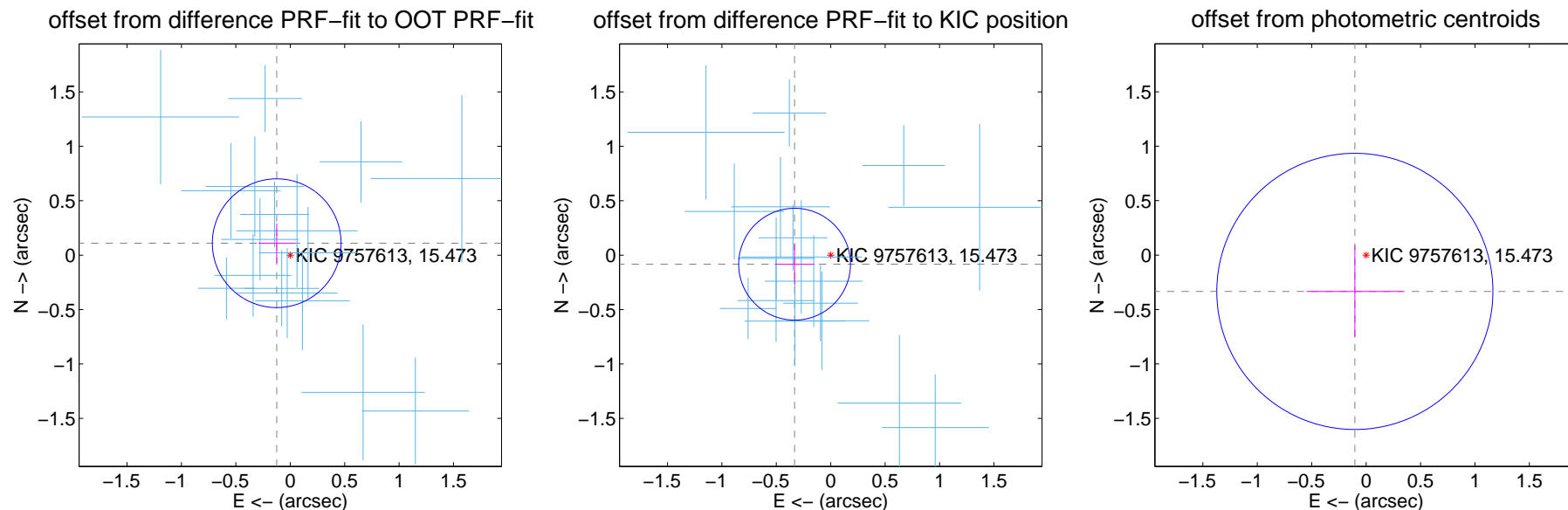
## DV Centroid Data

Supplemental centroid analysis for 009757613-04. Kepler magnitude: 15.47. Transit SNR 25.24

There are 17 quarters with good PRF difference image offsets

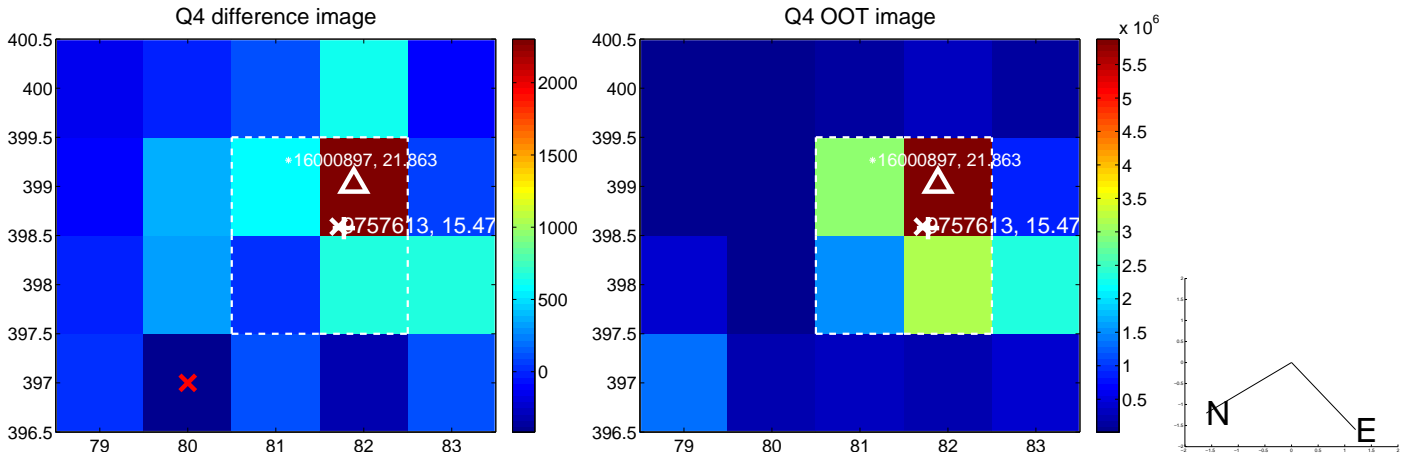
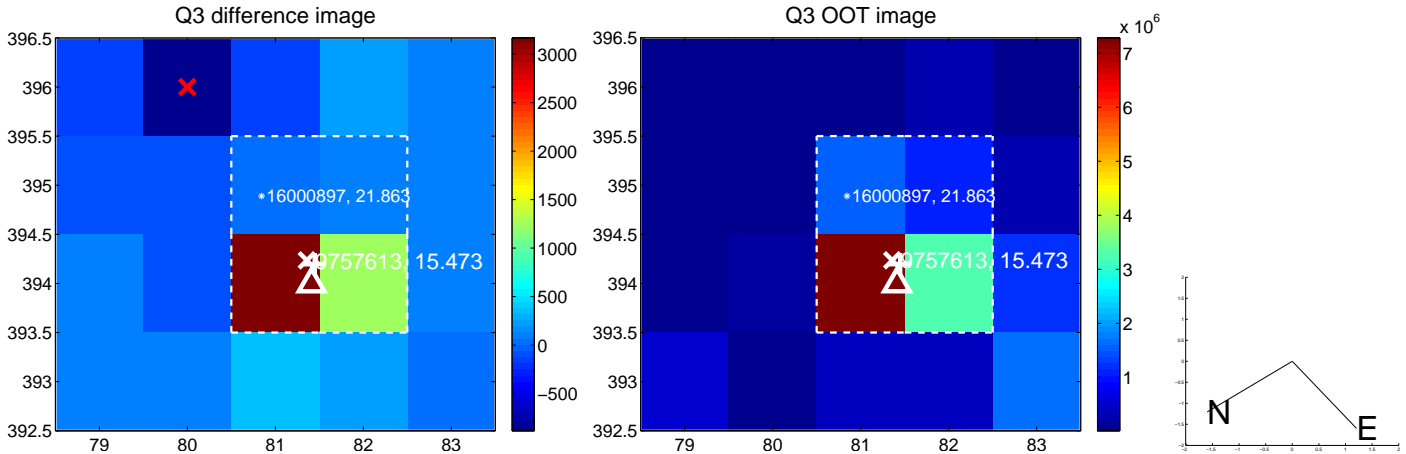
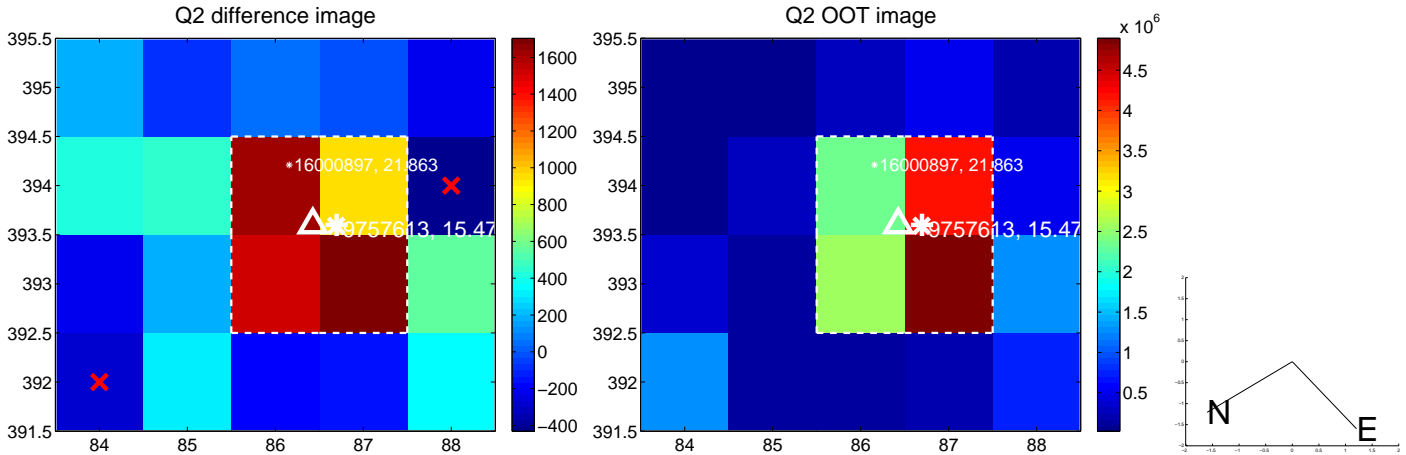
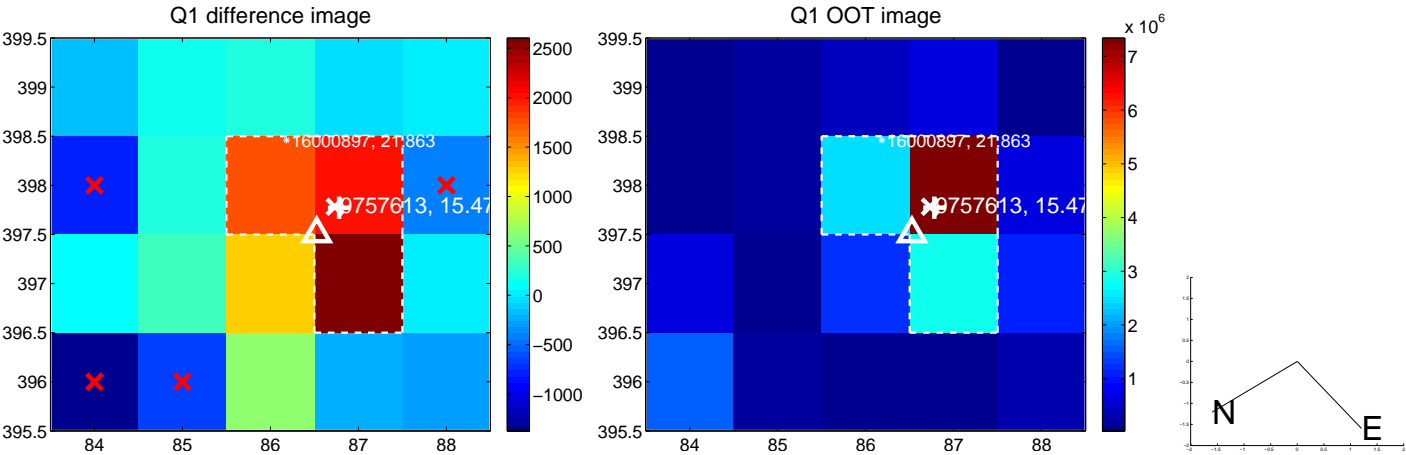
The direct PRF centroid is offset from the target star catalog position by about 0.34 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.166 \pm 0.197$	0.84	$0.125 \pm 0.167$	$0.110 \pm 0.183$
PRF-fit source offset from KIC position	$0.342 \pm 0.171$	2.00	$0.332 \pm 0.183$	$-0.083 \pm 0.186$
photometric centroid source offset	$0.35 \pm 0.42$	0.83	$0.10 \pm 0.44$	$-0.33 \pm 0.42$



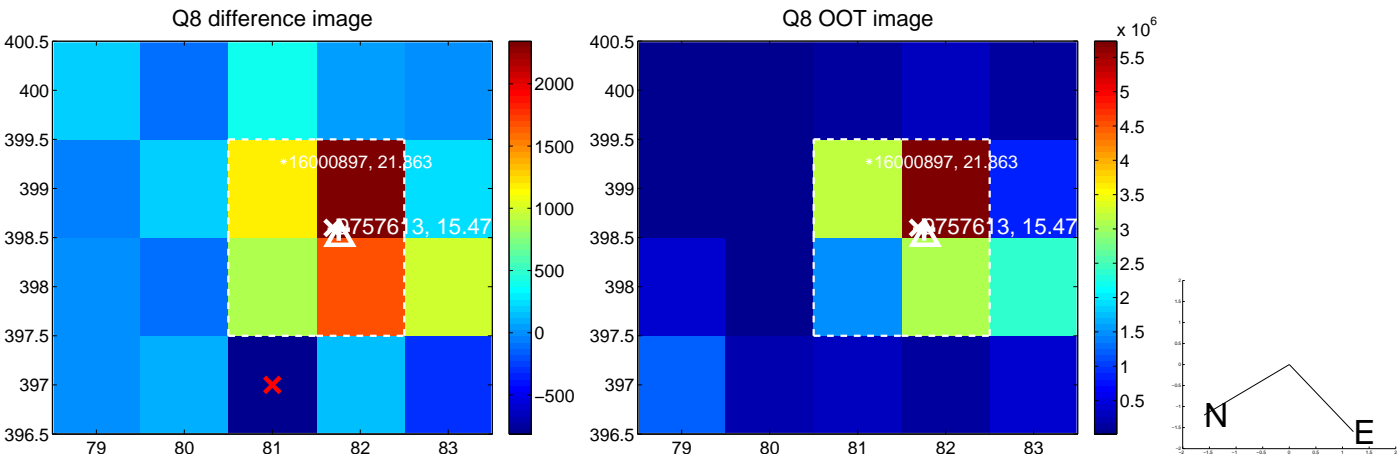
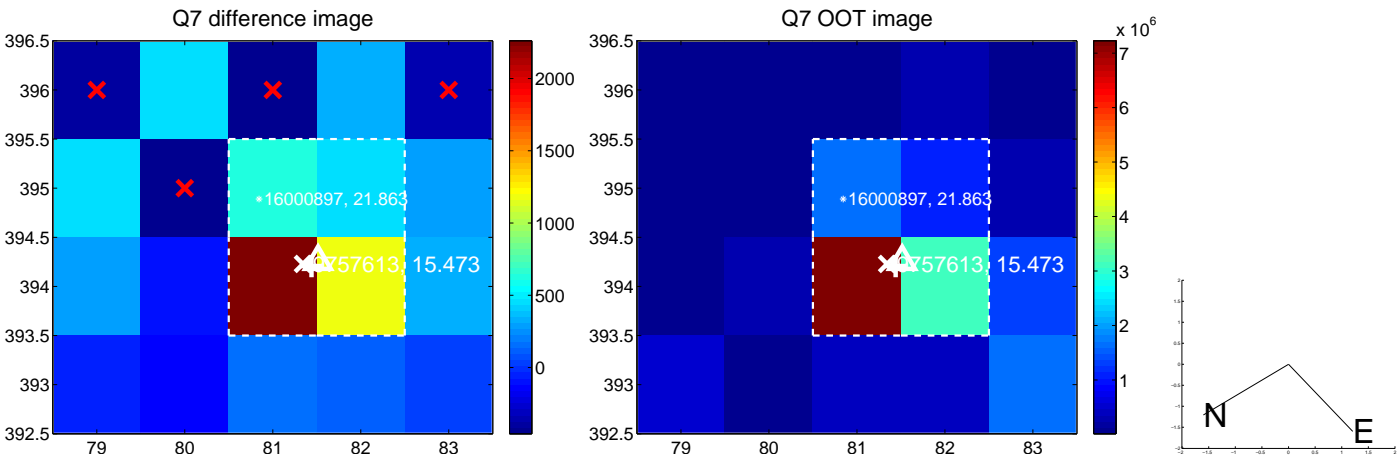
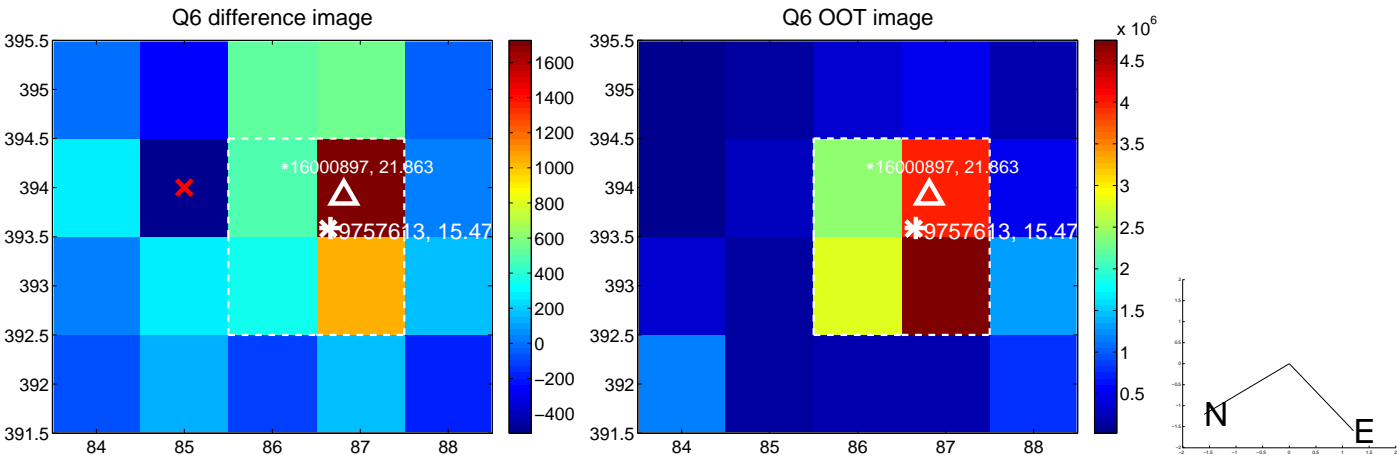
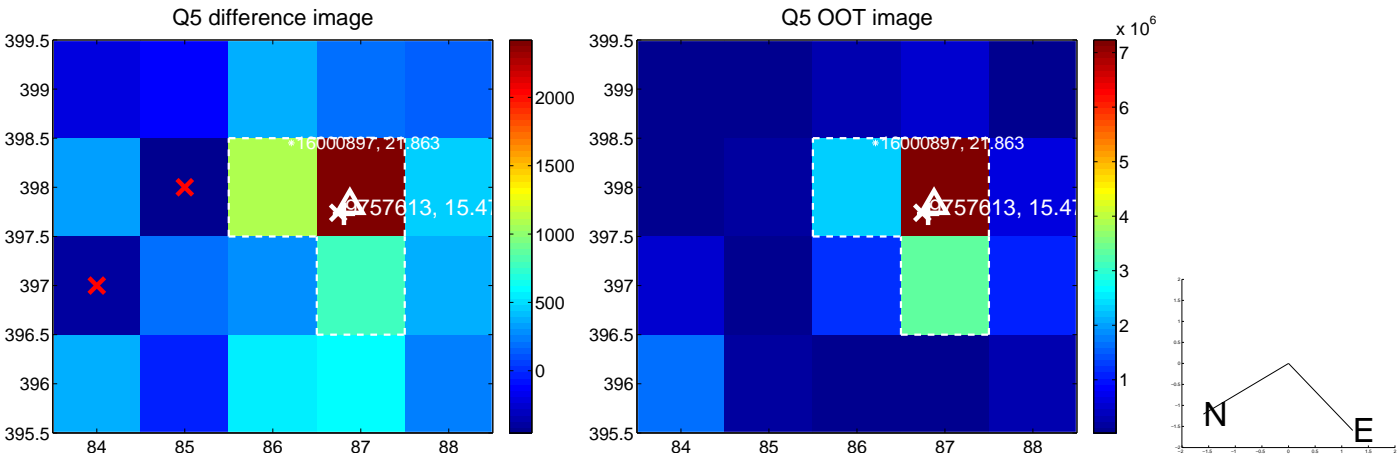
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

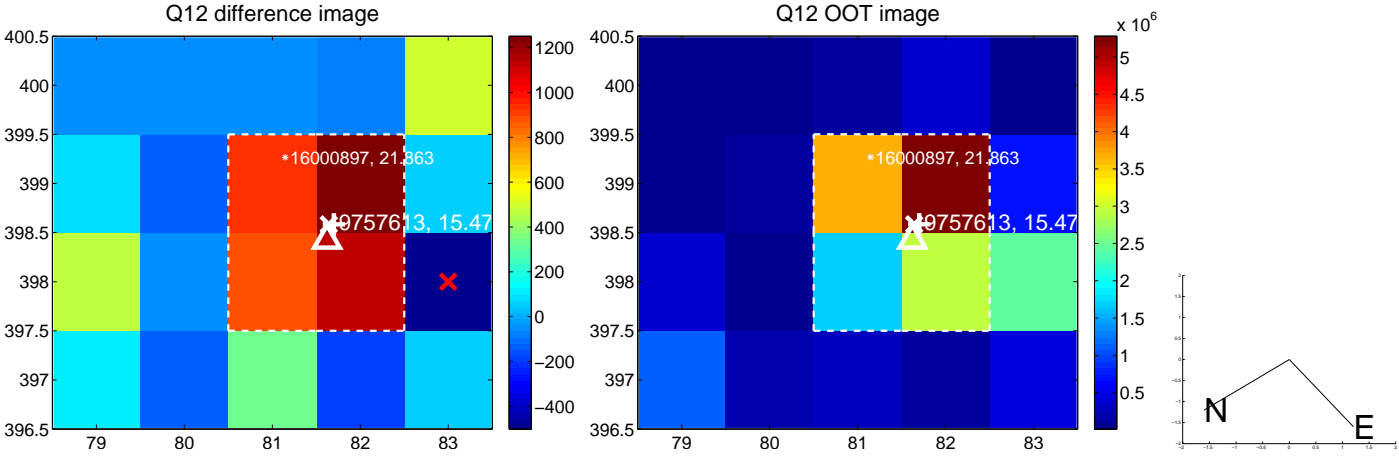
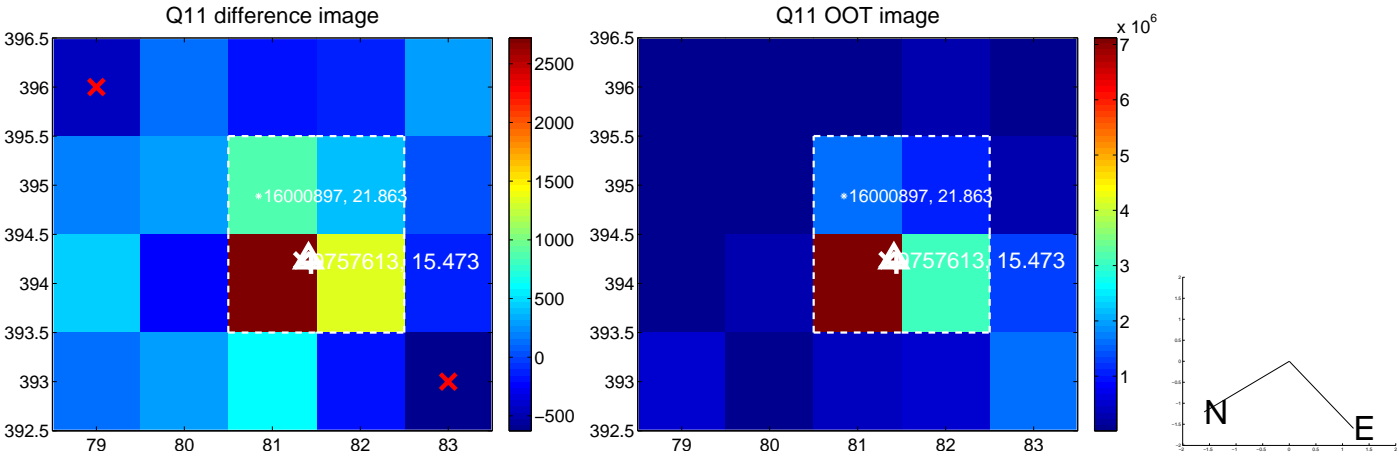
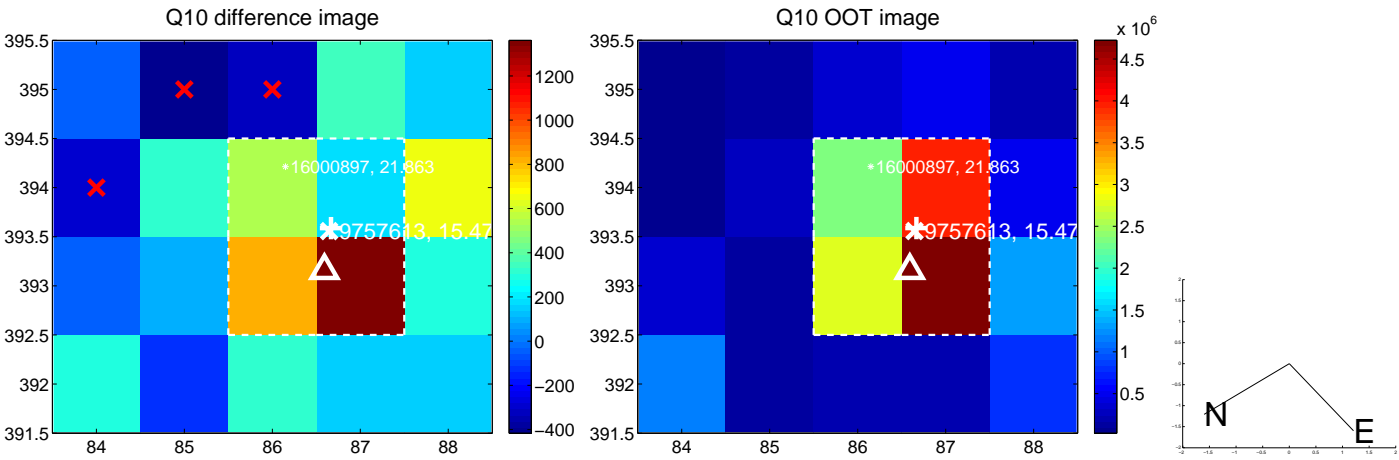
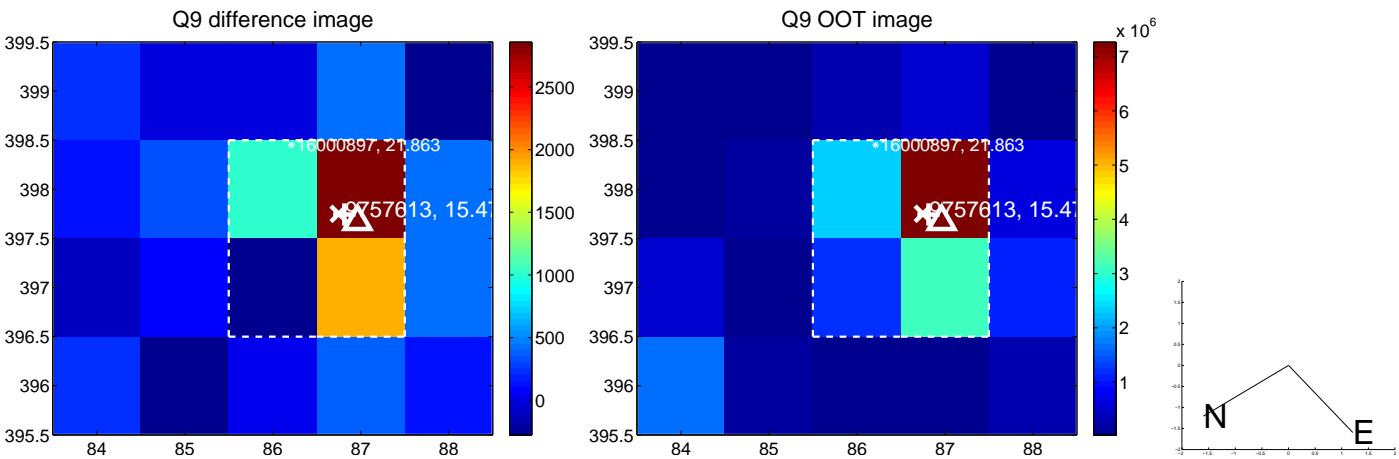




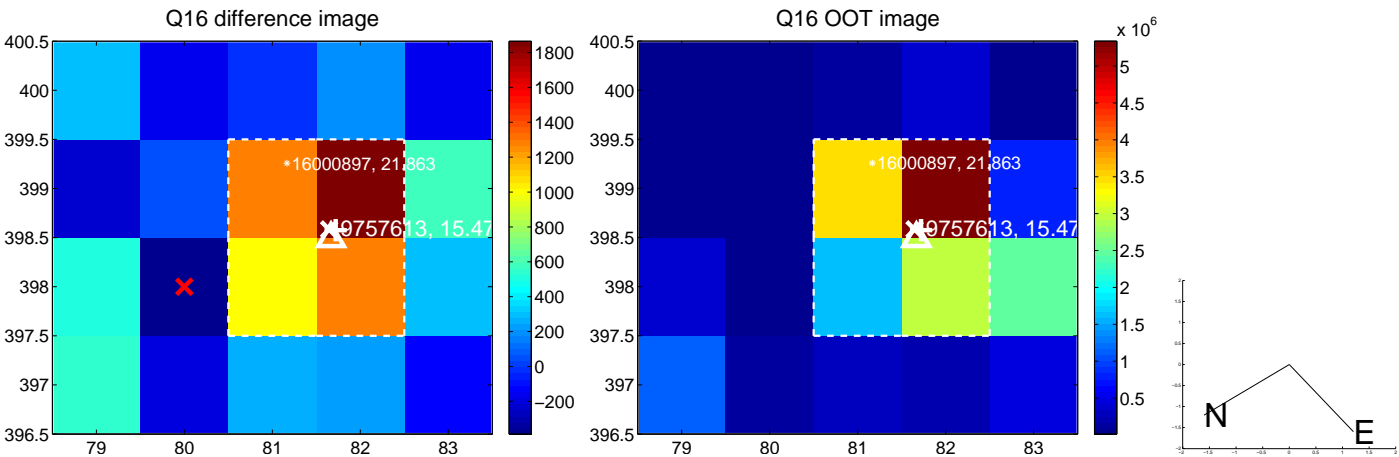
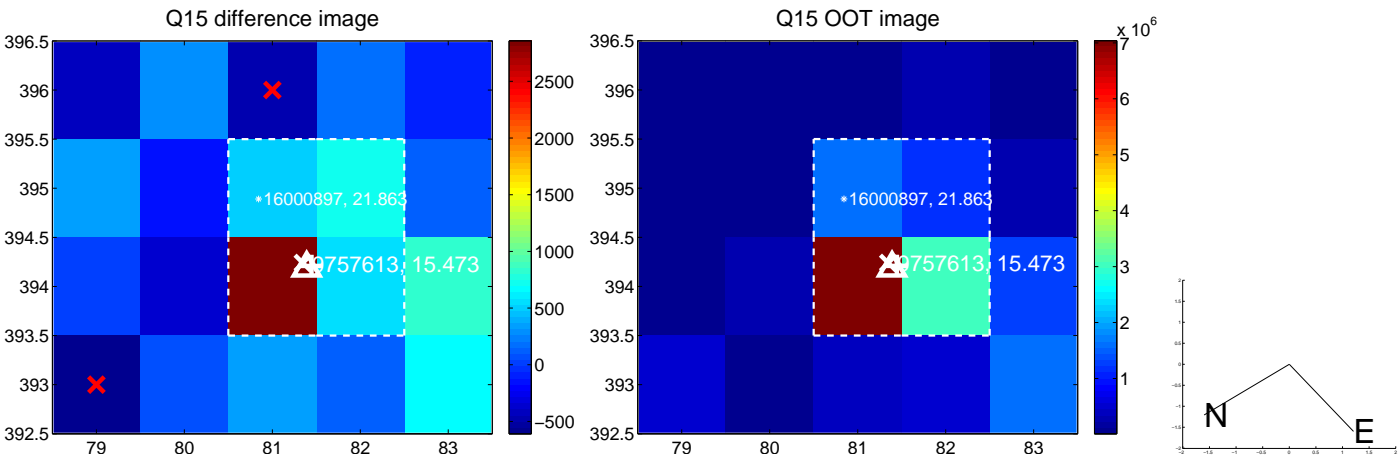
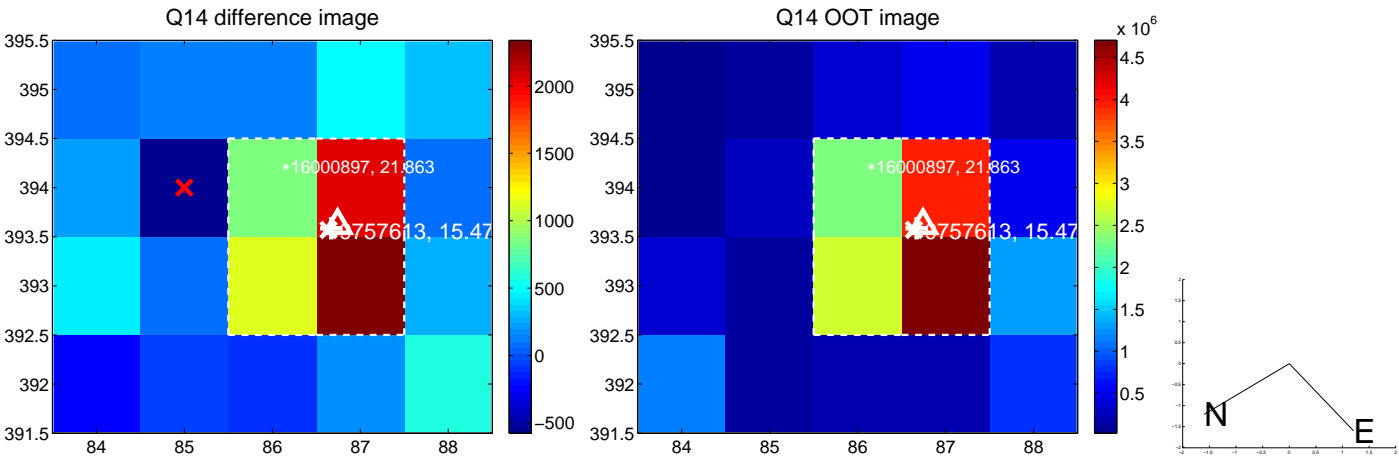
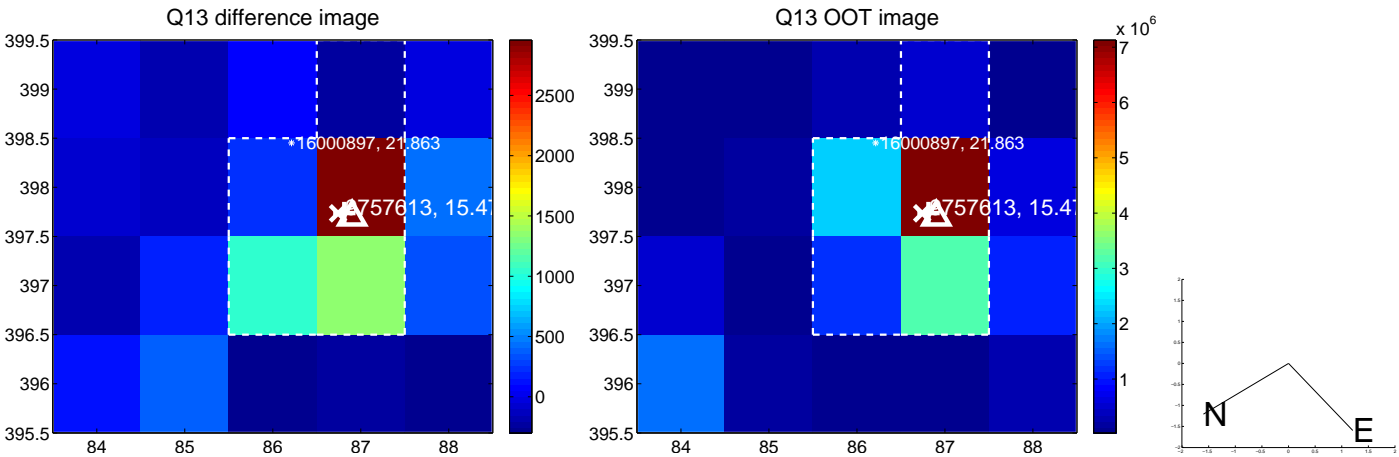
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



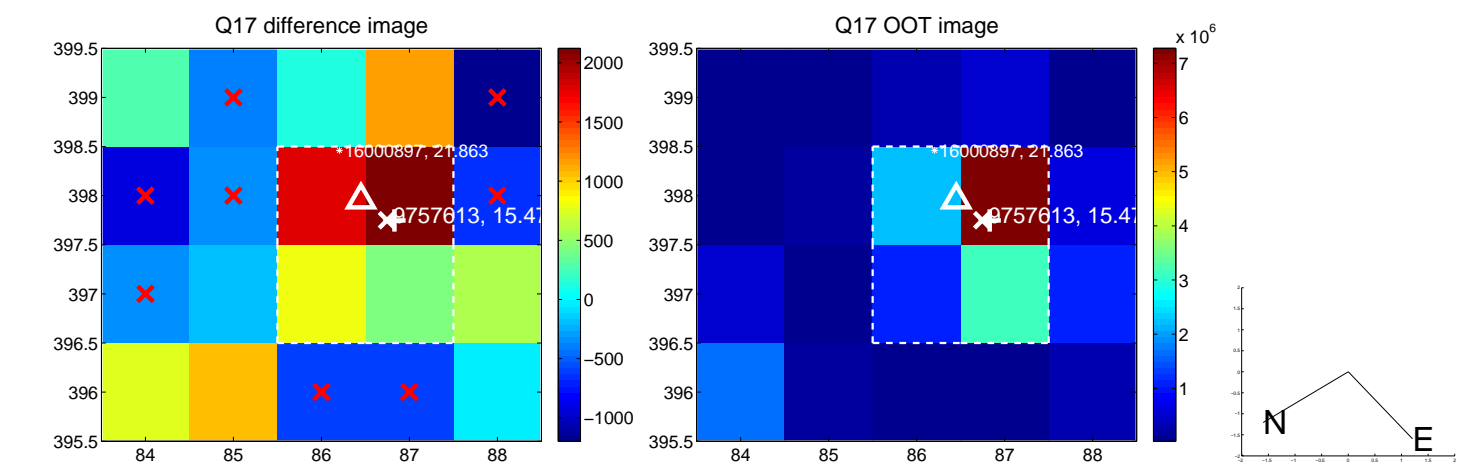
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



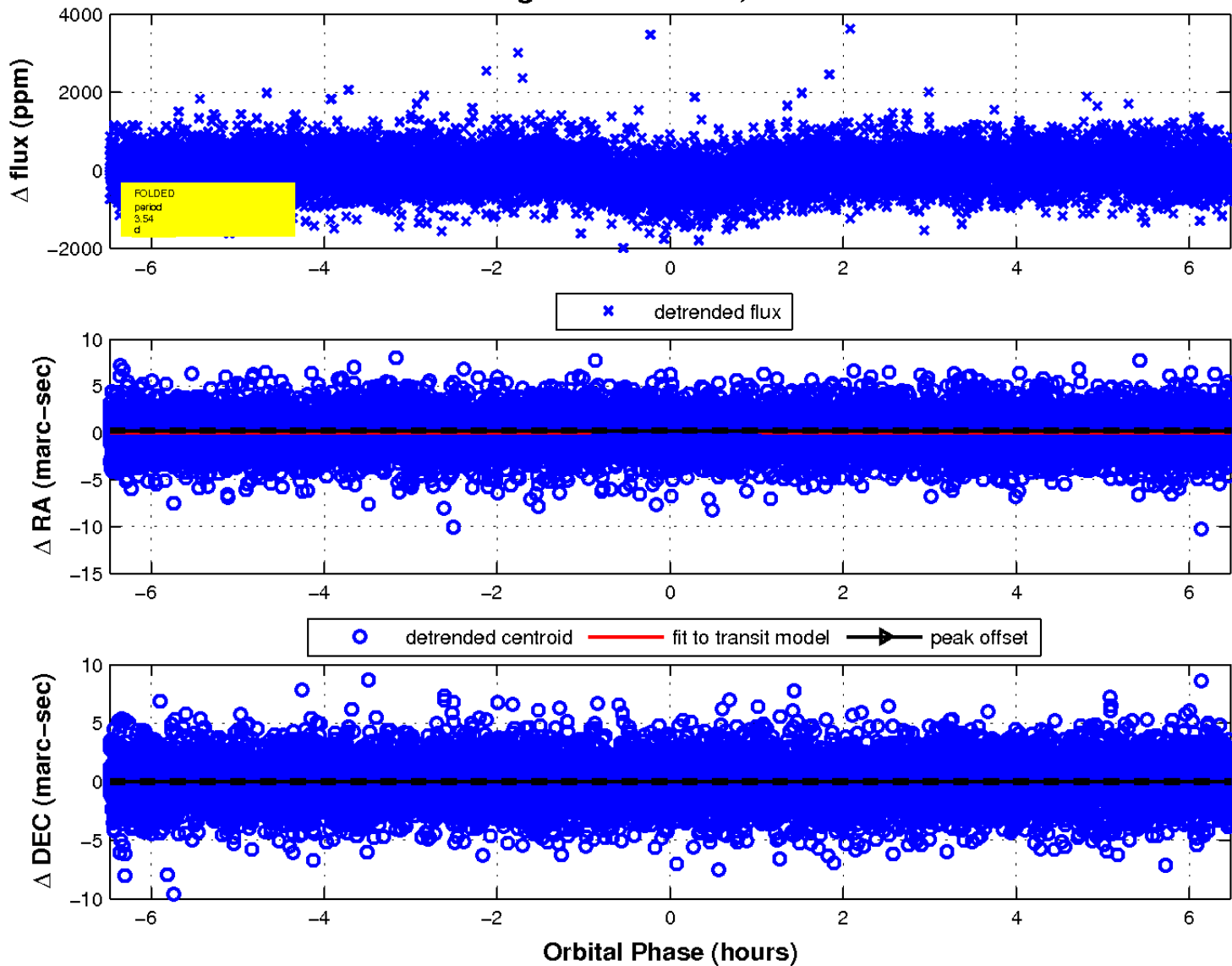
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 4 of 4



UKIRT Image

Declination

