

# KIC 003655326

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003655326-01	OBS	6348.01	15.066486	140.655799	108824.9	6.296	3890.0	2312.1	1.63	5751	77.97	178.35
003655326-02	OBS	No	15.066484	134.139003	72200.3	6.362	2696.1	1990.7	1.63	5751	64.31	178.35

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003655326-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—MOD_ODDEVEN_DV—DEEP_V_SHAPED—HAS_SEC_TCE—CENT_KIC_POS
003655326-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE—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 003655326-01

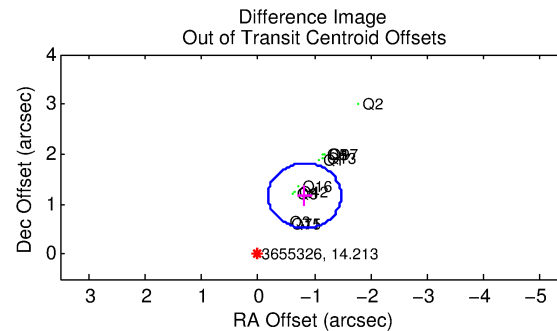
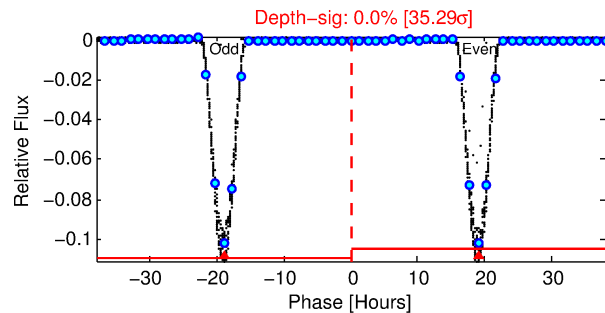
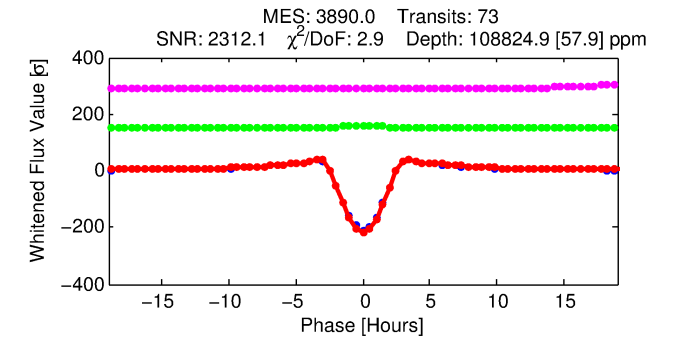
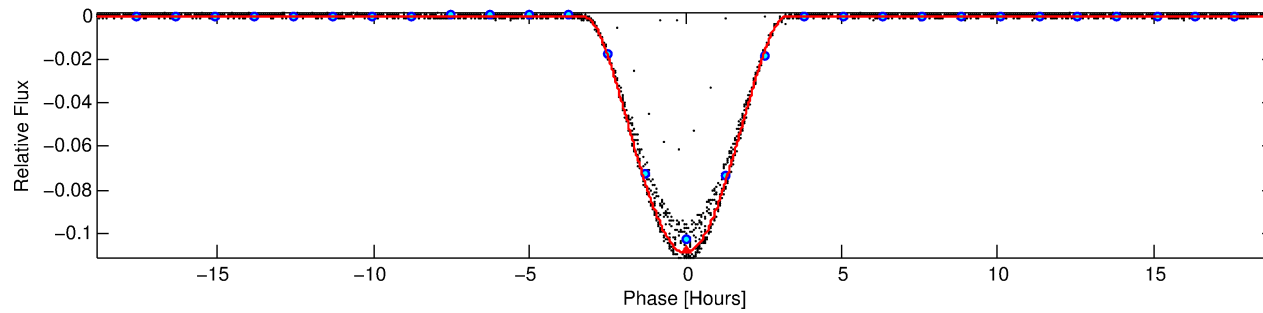
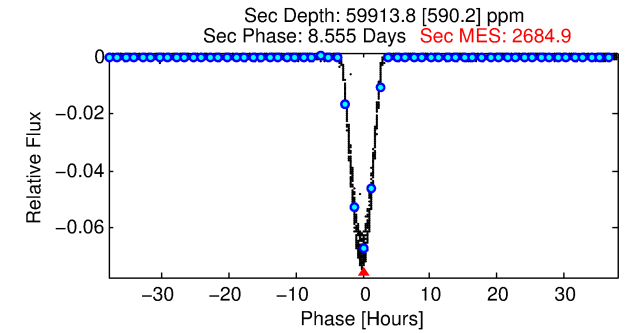
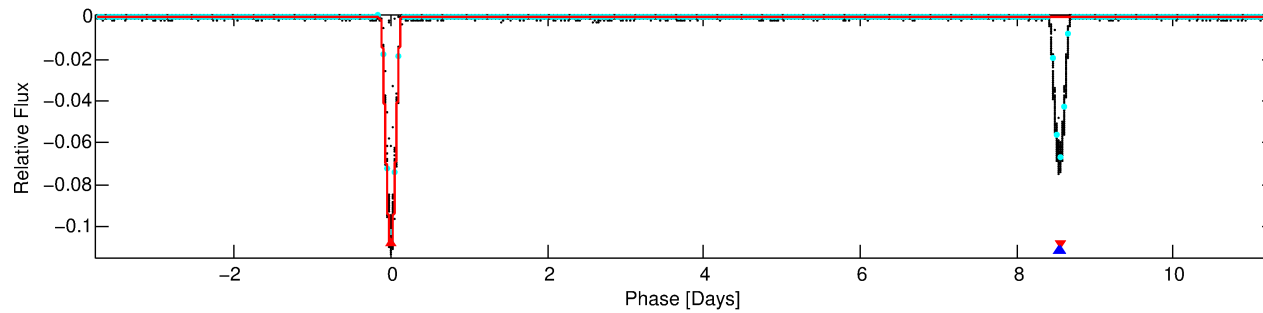
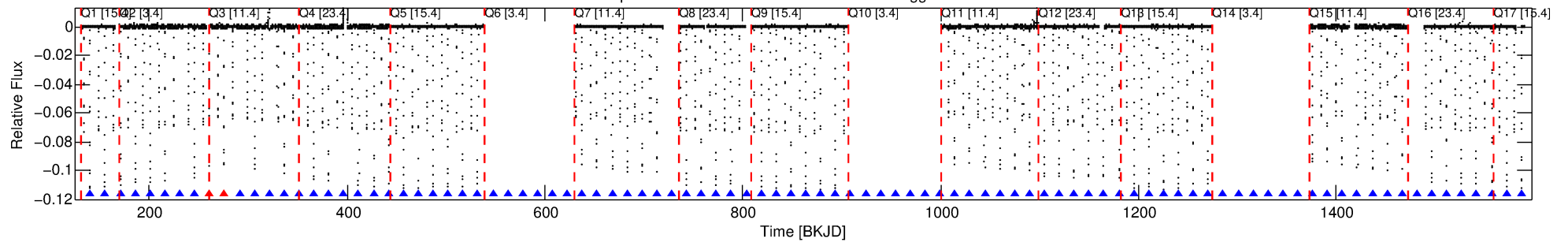
No Significant Match Found

# DV One-Page Summary

KIC: 3655326 Candidate: 1 of 2 Period: 15.066 d

KOI: K06348.01 Corr: 0.998

Kp: 14.21 R\*: 1.63 Rs Teff: 5751.0 K Logg: 4.03 Fe/H: -0.040



## DV Fit Results:

Period = 15.06649 [0.00000] d  
Epoch = 140.6558 [0.0001] BKJD  
Rp/R\* = 0.4394 [0.0180]  
a/R\* = 20.61 [0.03]  
b = 0.90 [0.03]  
Seff = 178.35 [65.27]  
Teff = 932 [85] K  
Rp = 77.97 [19.54] Re  
a = 0.1205 [0.0278] AU  
Ag = 78.77 [29.25] [2.66σ]  
Teffp = 4292 [106] K [24.75σ]

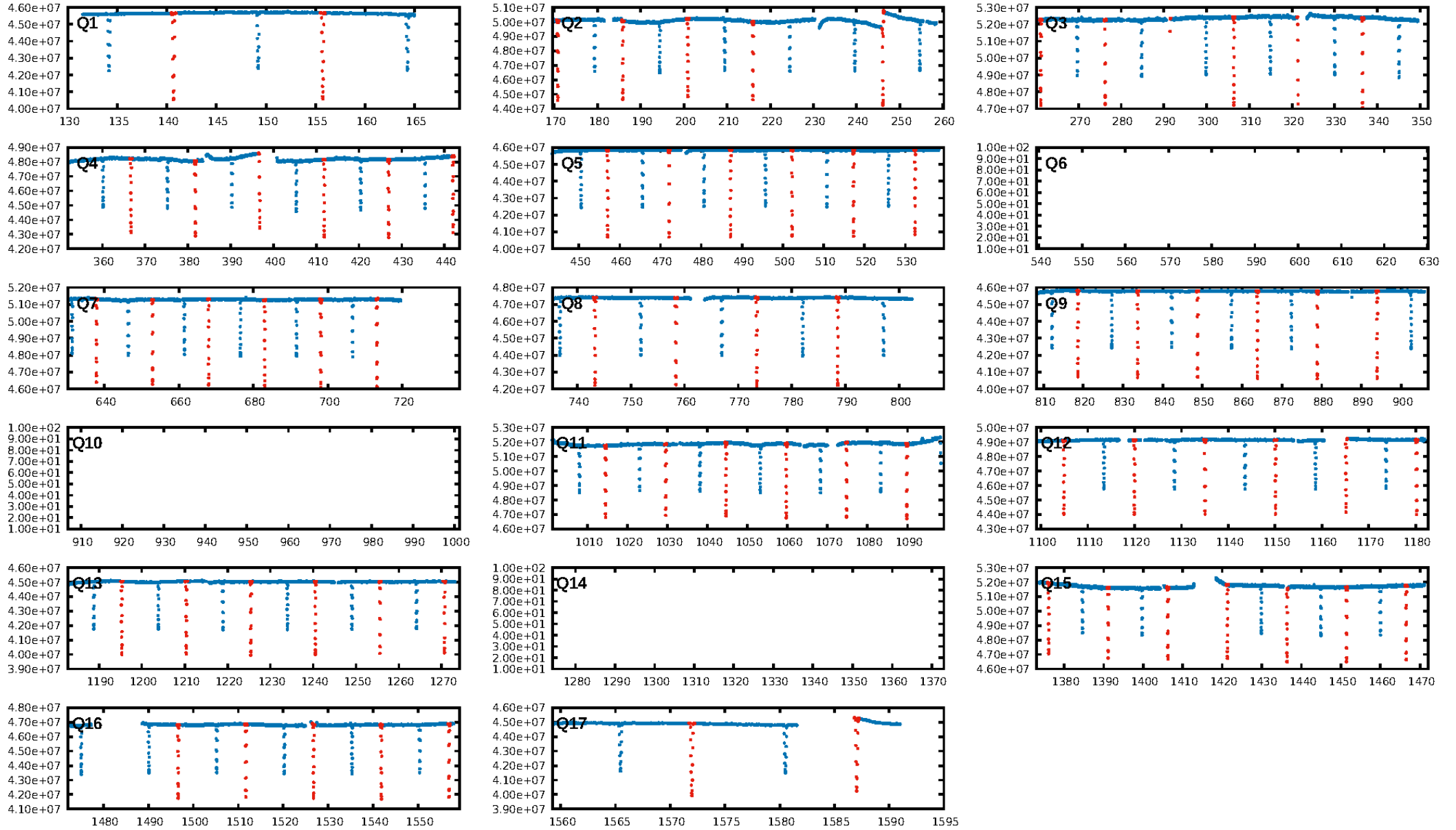
## DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 0.0%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 0.97 [67/69]  
GhostDiagnostic-chr: 3.922  
Centroid-sig: 0.0%  
Centroid-so: 1.078 arcsec [808.40σ]  
OotOffset-rm: 1.432 arcsec [6.63σ]  
KicOffset-rm: 0.215 arcsec [3.17σ]  
OotOffset-st: 1/4/4/5 [14]  
KicOffset-st: 1/4/4/5 [14]  
DiffImageQuality-fgm: 1.00 [14/14]  
DiffImageOverlap-fno: 1.00 [14/14]

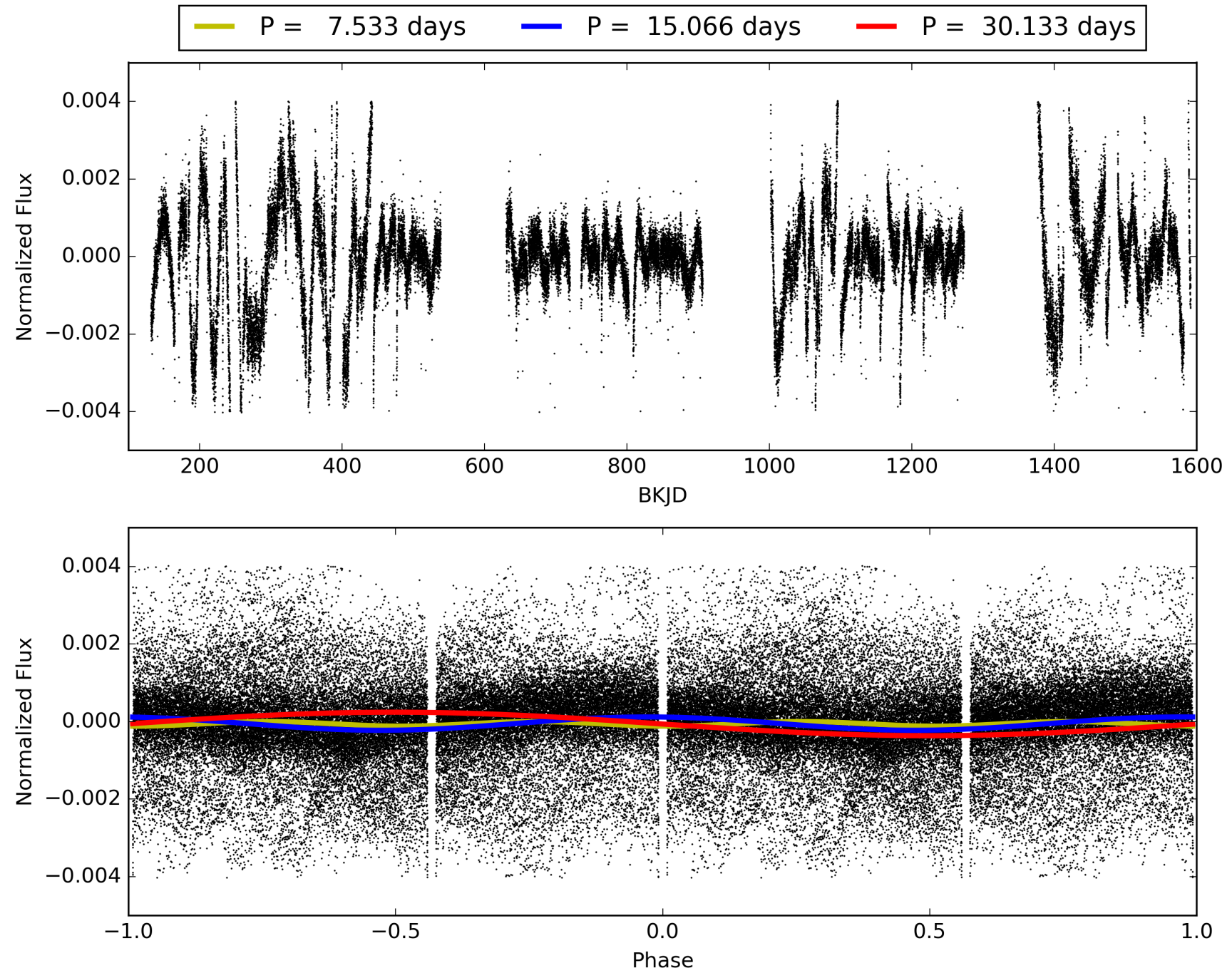
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 05:45:46 Z

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

# TCE 003655326-01, PDC Light Curves

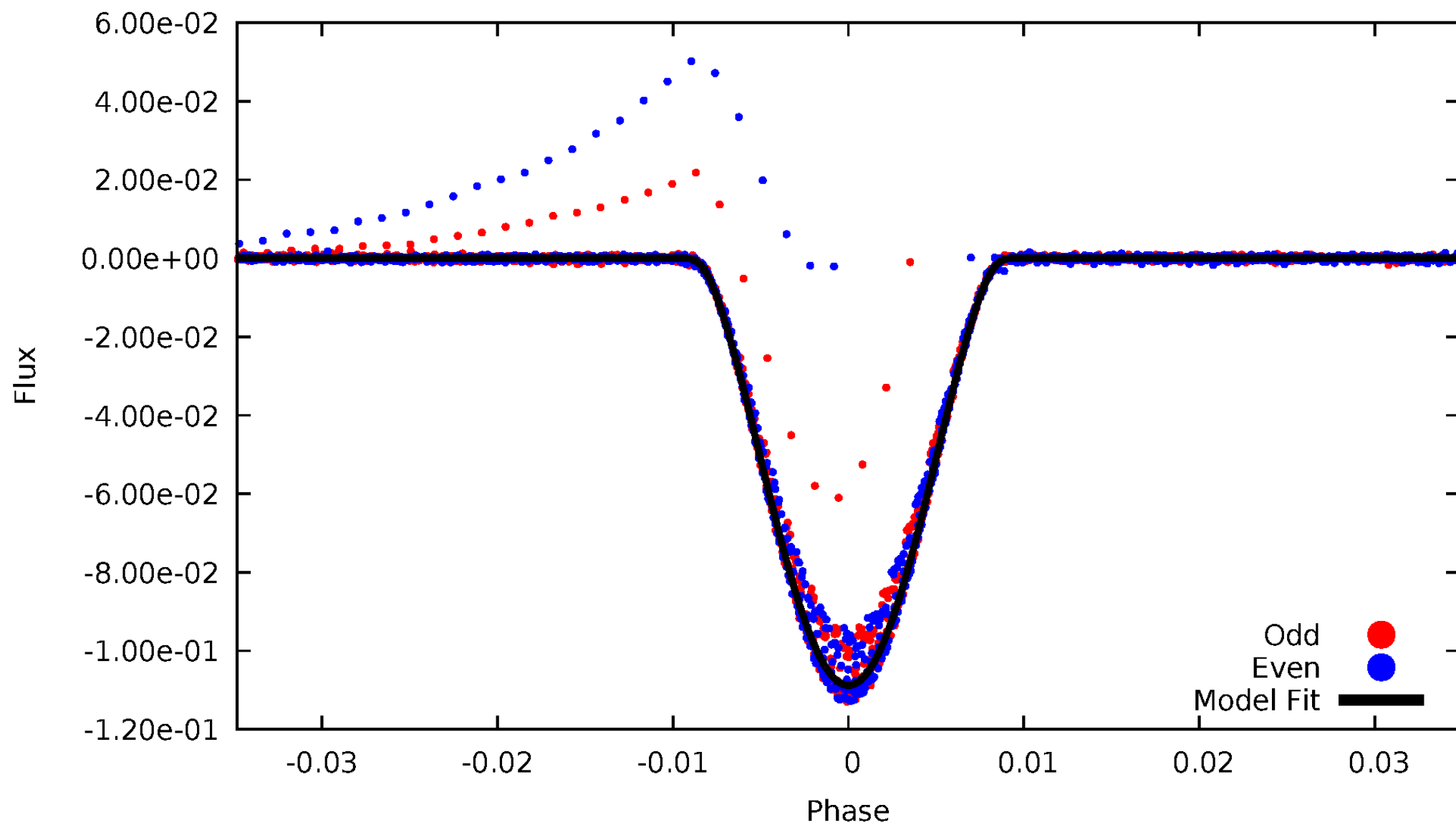


TCE 003655326-01



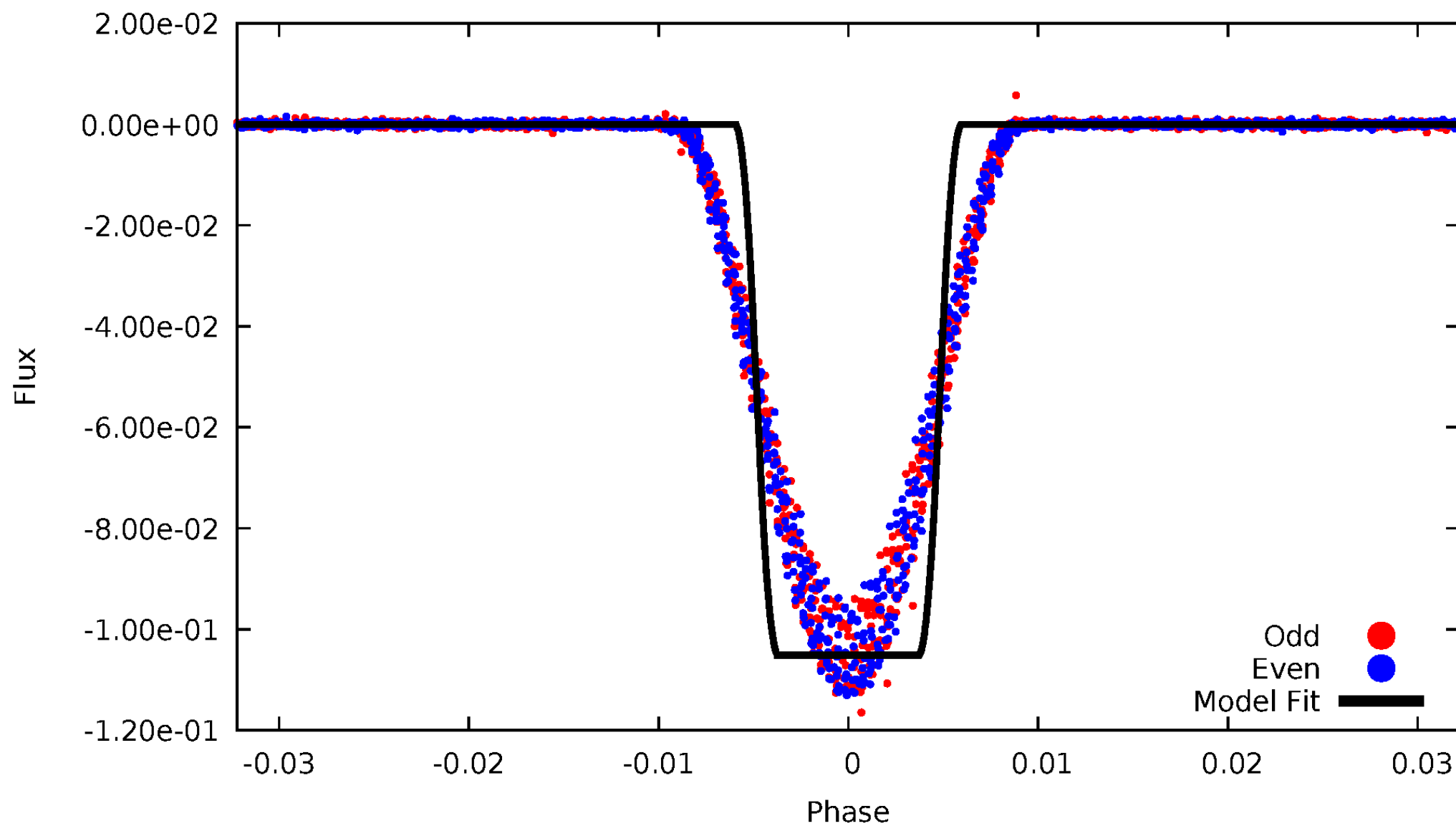
# DV Odd/Even

TCE 003655326-01



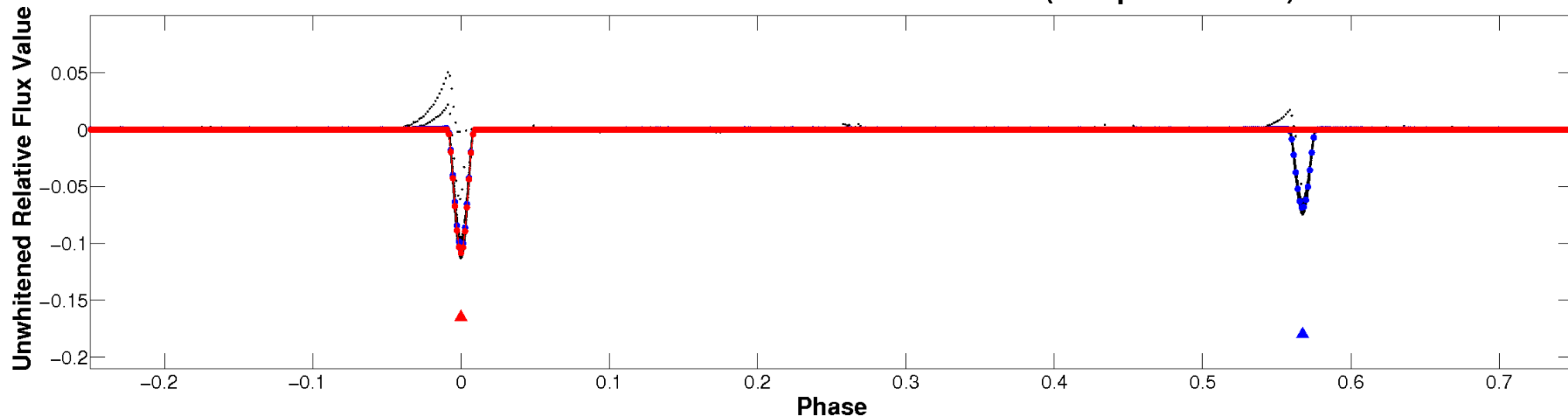
# ALT Odd/Even

TCE 003655326-01

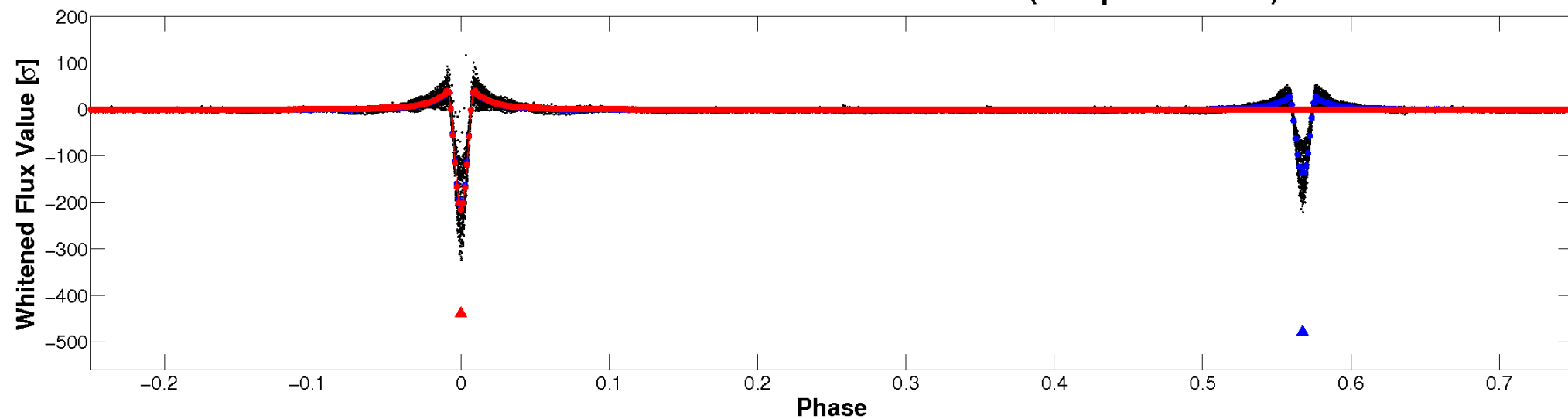


# Non-Whitened Vs. Whitened Light Curve

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

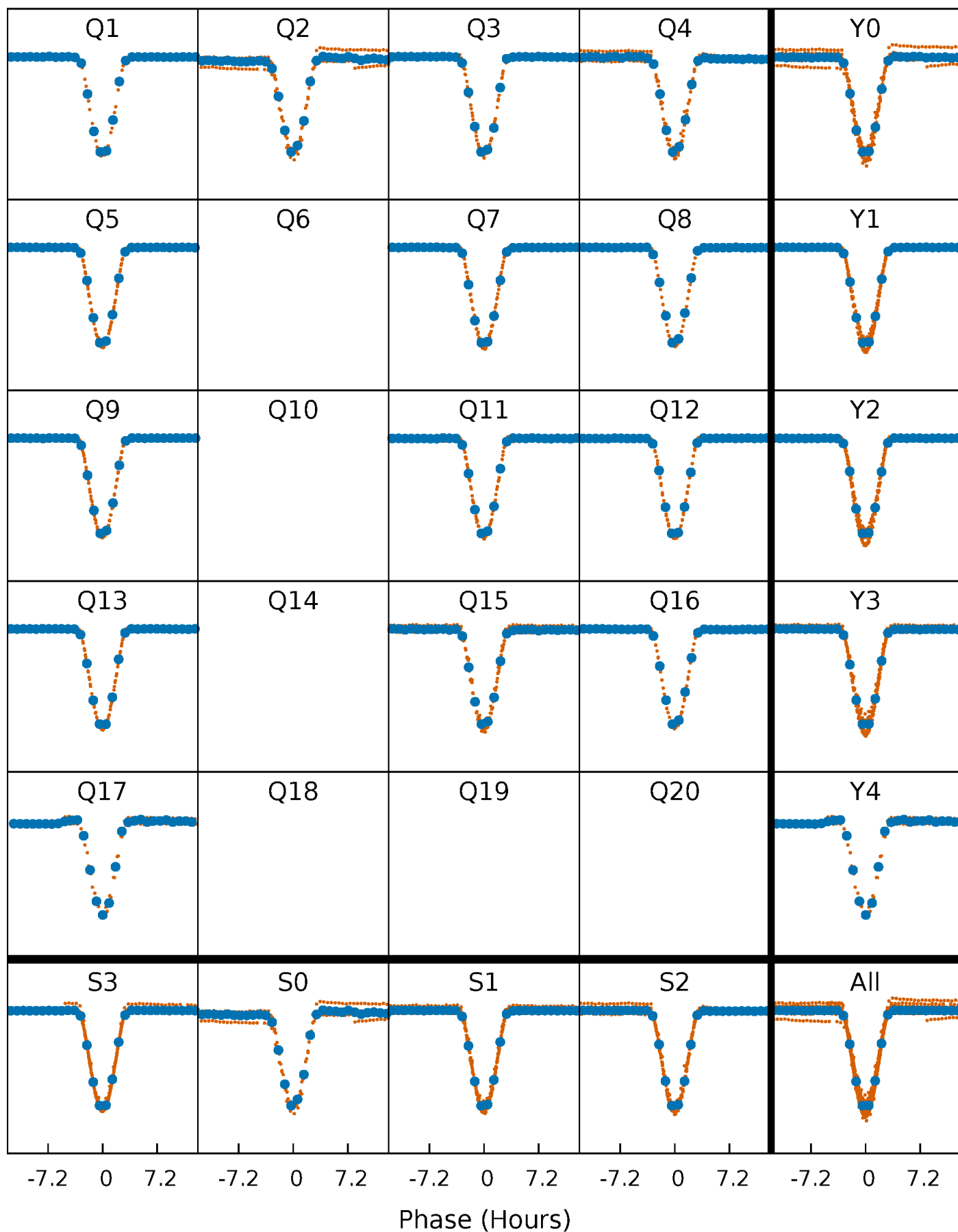


## Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

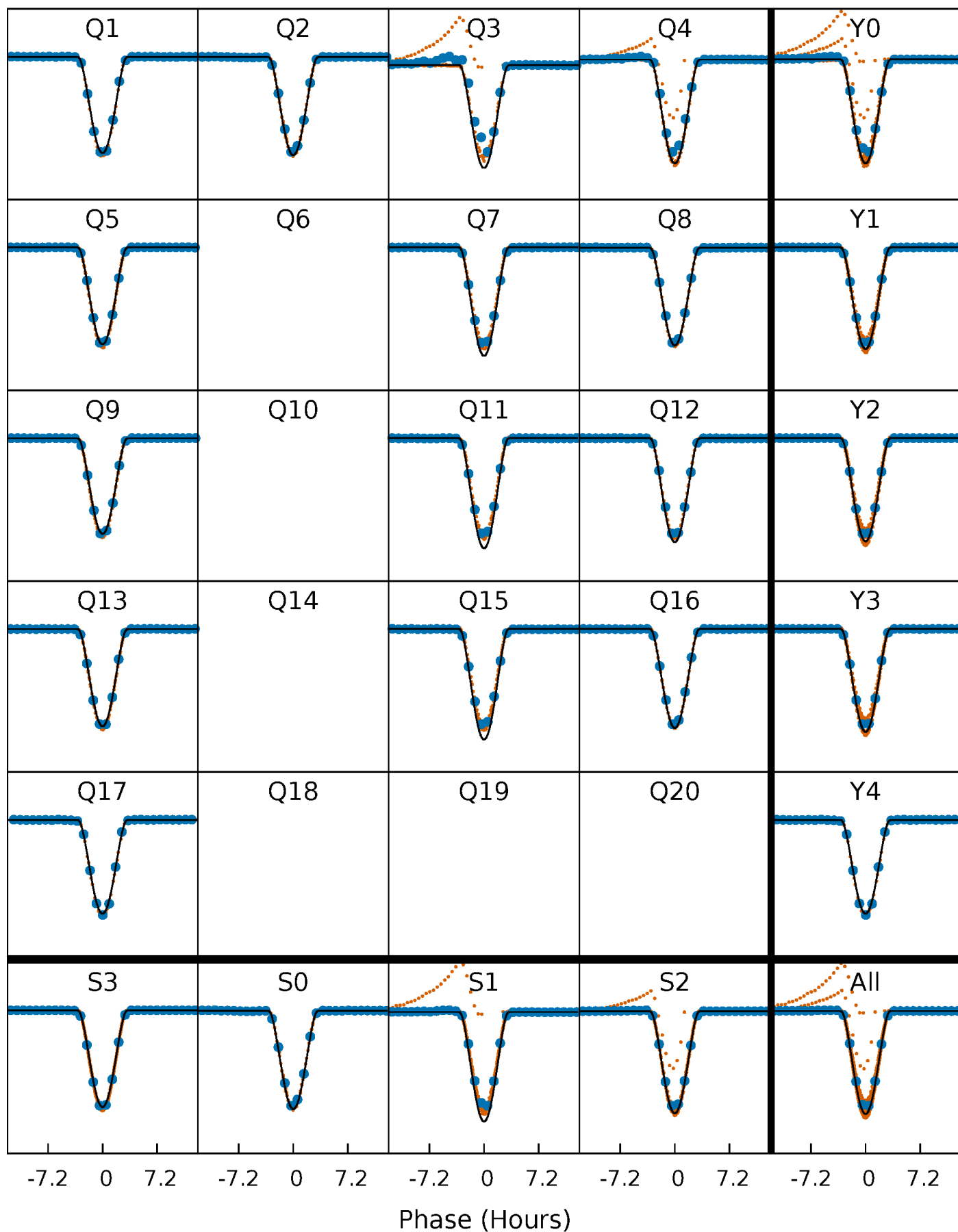
TCE 003655326-01 P= 15.066486 Days  $T_0=140.655799$  (BKJD)





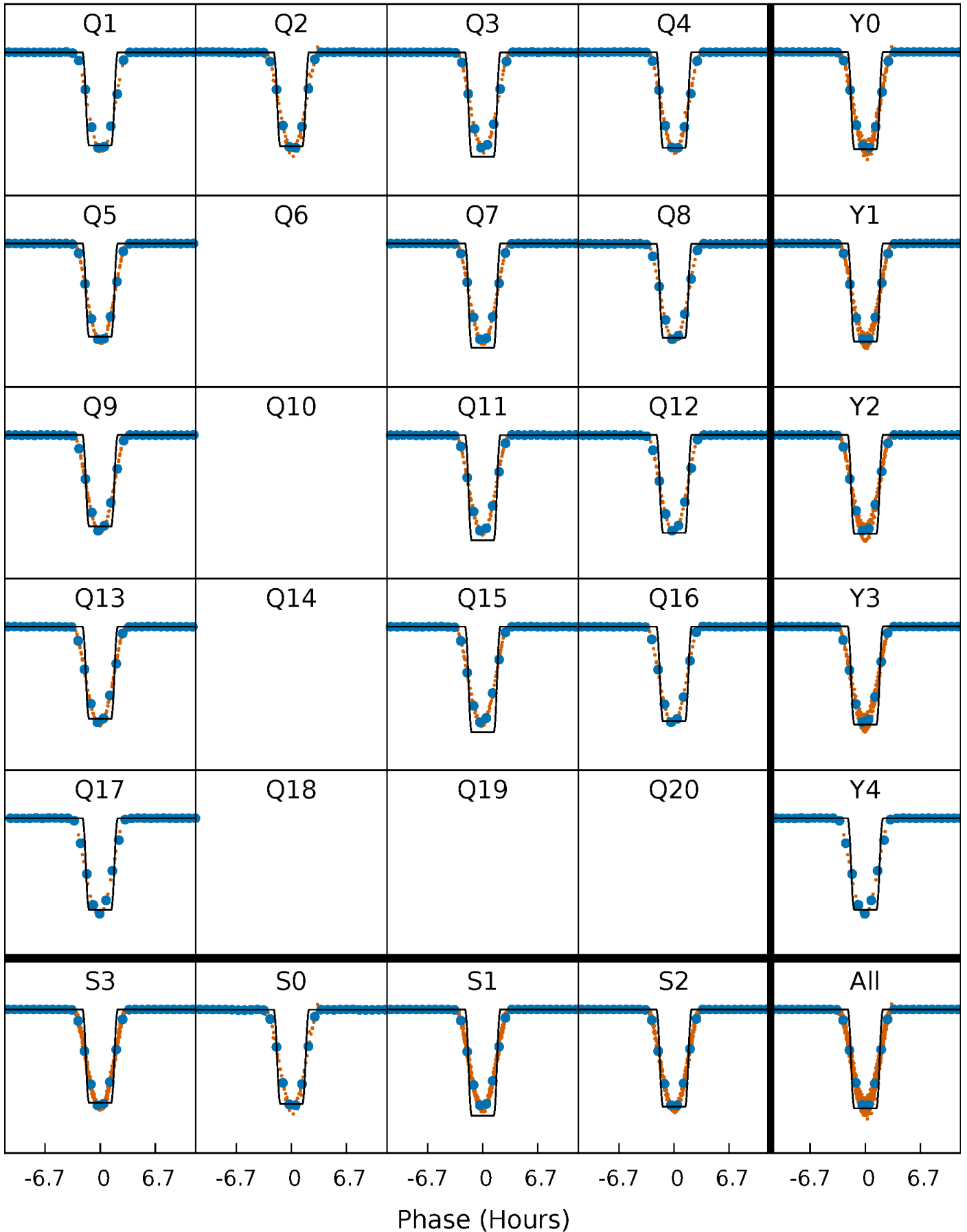
# DV Quarter-Phased Transit Curves

TCE 003655326-01 P= 15.066486 Days  $T_0=140.655799$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

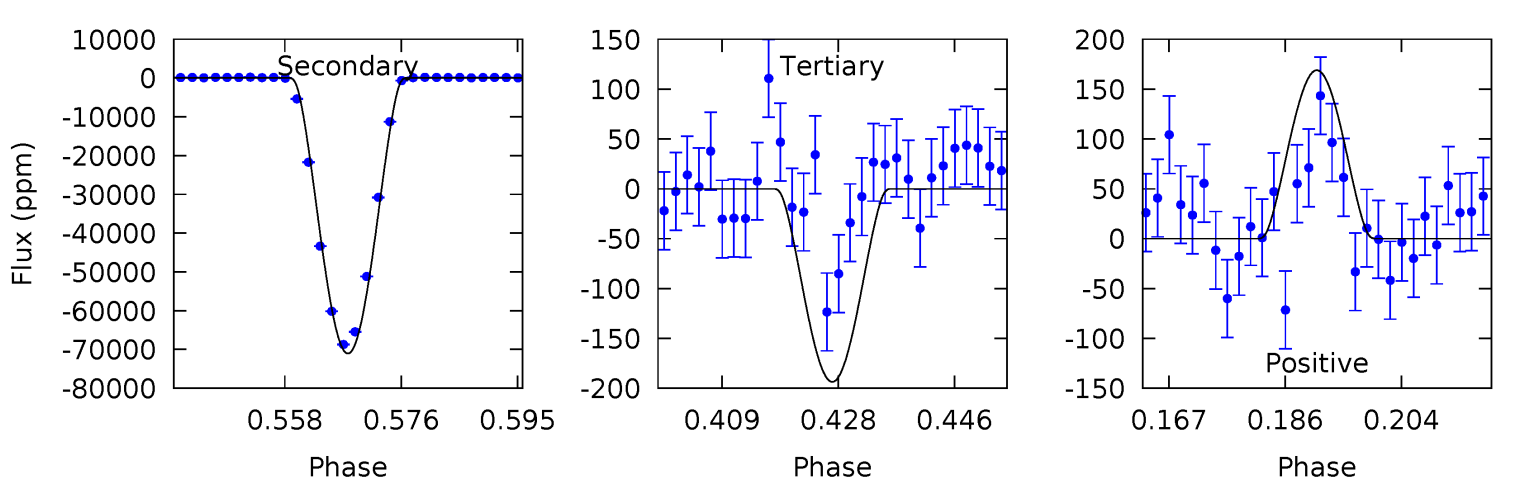
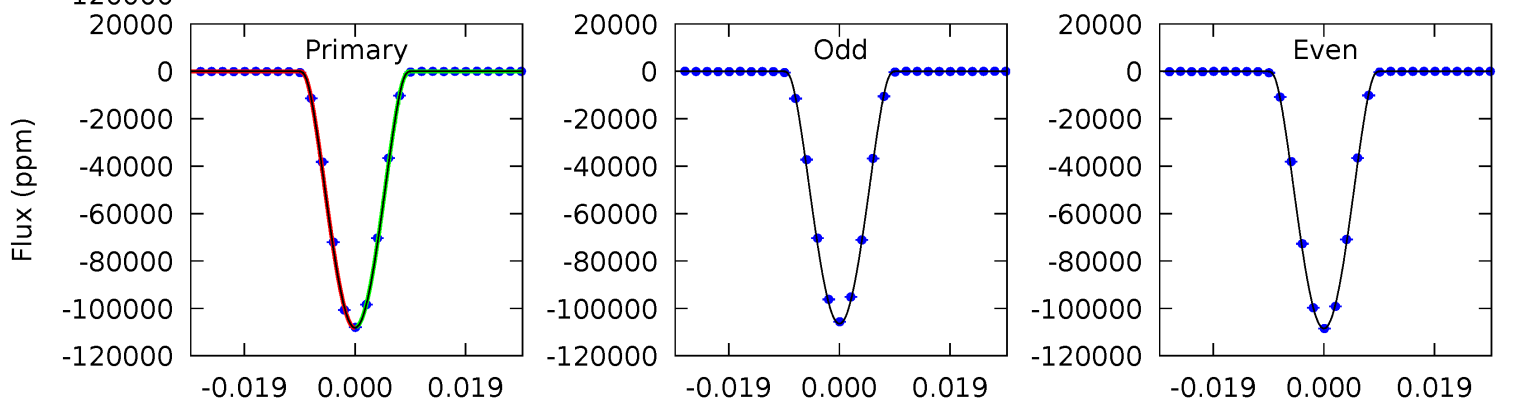
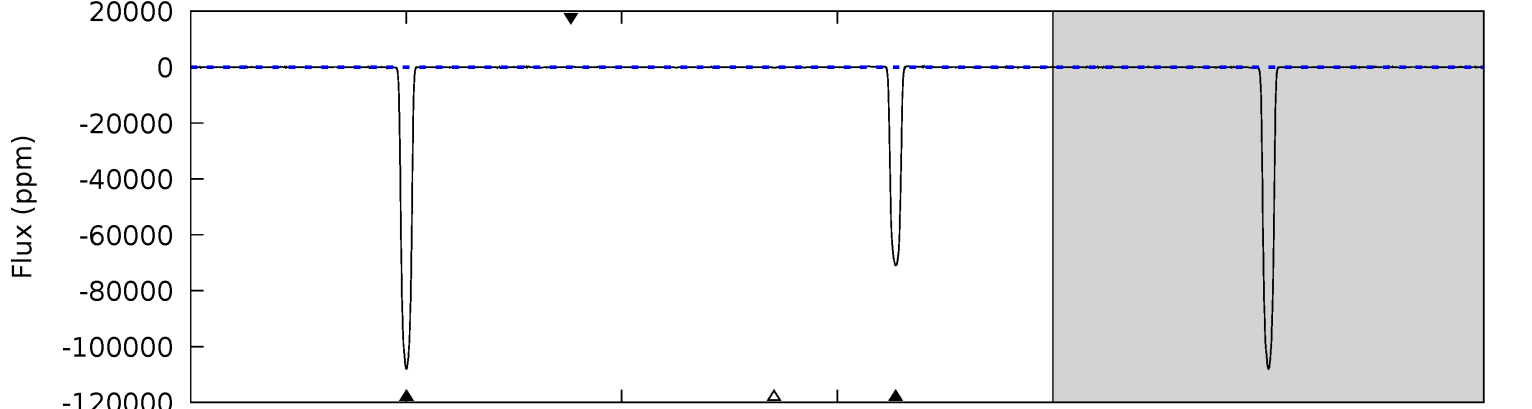
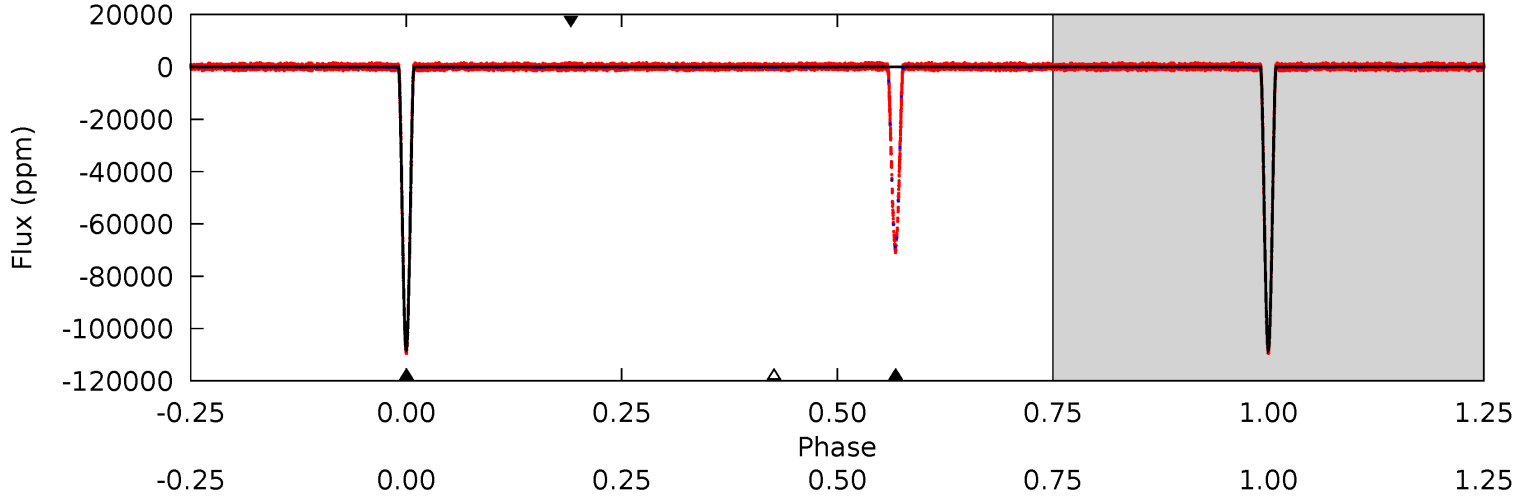
TCE 003655326-01 P= 15.066611 Days  $T_0=140.649775$  (BKJD)



# DV Model-Shift Uniqueness Test

003655326-01, P = 15.066486 Days, E = 125.589313 Days

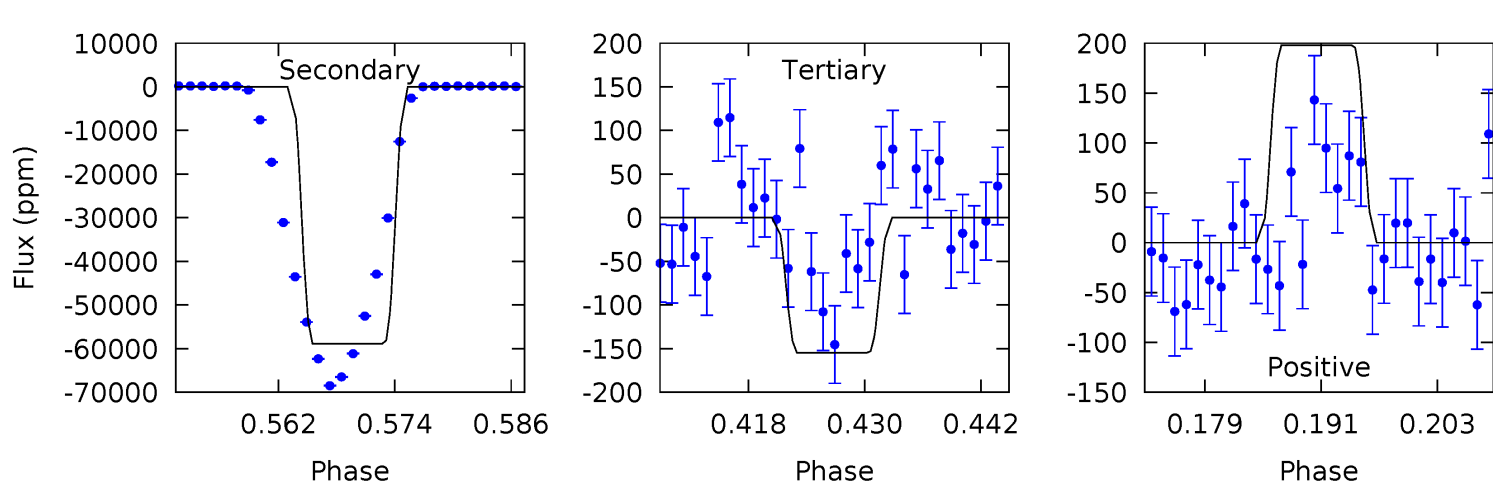
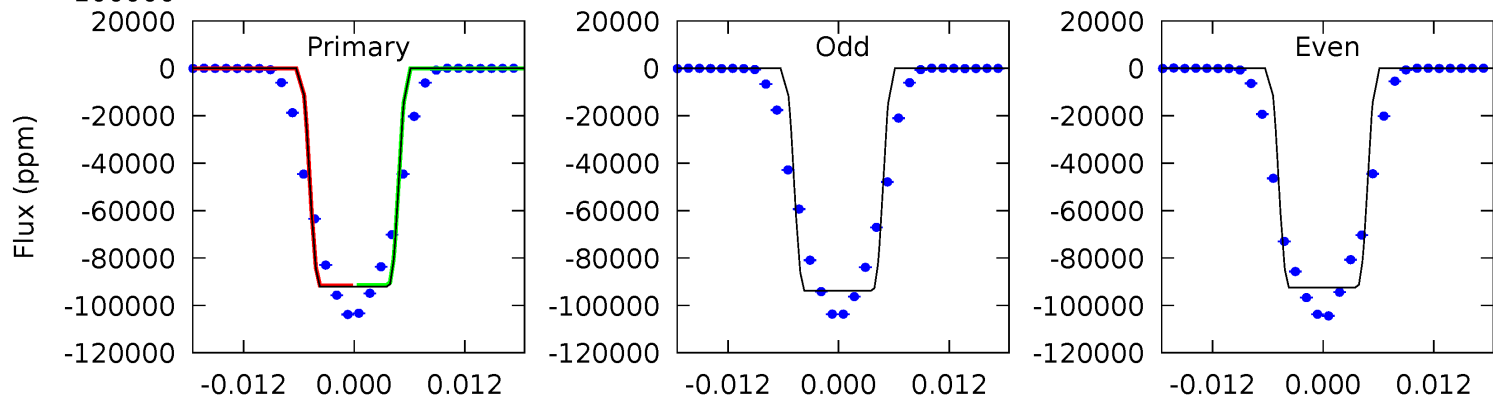
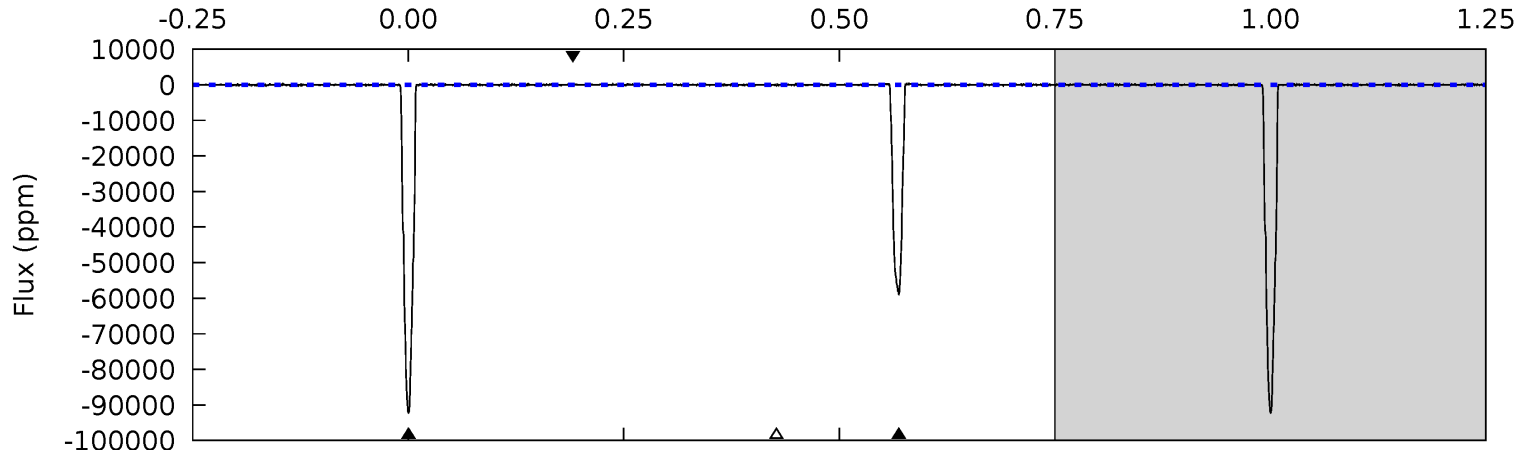
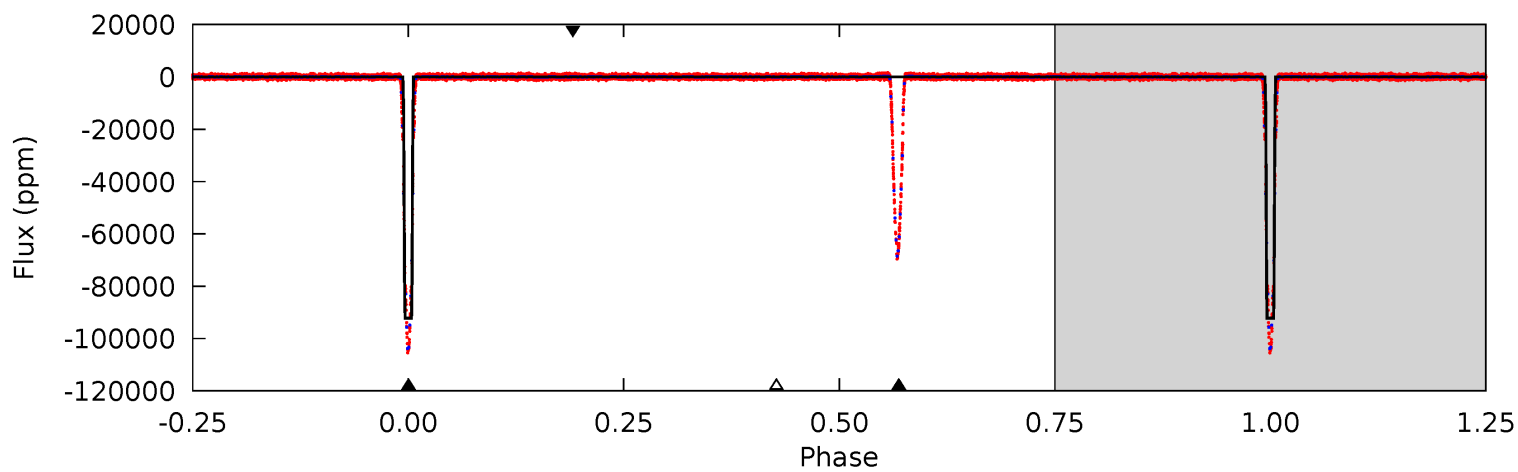
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5974	3924	10.7	9.33	4.91	2.35	3.60	5964	5965	3914	3915	56.6	0.95	0.00	0



# Alt Model-Shift Uniqueness Test

003655326-01, P = 15.066611 Days, E = 125.583164 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
2362	1508	3.97	5.08	4.99	2.51	1.33	2358	2357	1504	1503	18.2	0.98	0.00	0



### Stellar Parameters For KIC 003655326

	$T_{\text{eff}} (K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5751^{+77}_{-77}$	$4.028^{+0.210}_{-0.090}$	$-0.040^{+0.150}_{-0.150}$	$1.626^{+0.268}_{-0.402}$	$1.028^{+0.100}_{-0.100}$	$0.337^{+0.374}_{-0.113}$
	+1%/-1%	+5%/-2%	+375%/-375%	+16%/-25%	+10%/-10%	+111%/-33%
Source	SPE68	SPE68	SPE68	DSEP		

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

### Secondary Eclipse Parameters for KIC 003655326-01 / KOI 6348.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-70965 \pm 18$	$76.59^{+8.51}_{-10.75}$	$1290^{+57}_{-84}$	$4699^{+99}_{-99}$	$105^{+34}_{-19}$
Alt.	$-58844 \pm 39$	$56.08^{+6.66}_{-7.65}$	$1287^{+60}_{-83}$	$5112^{+145}_{-134}$	$160^{+51}_{-30}$

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

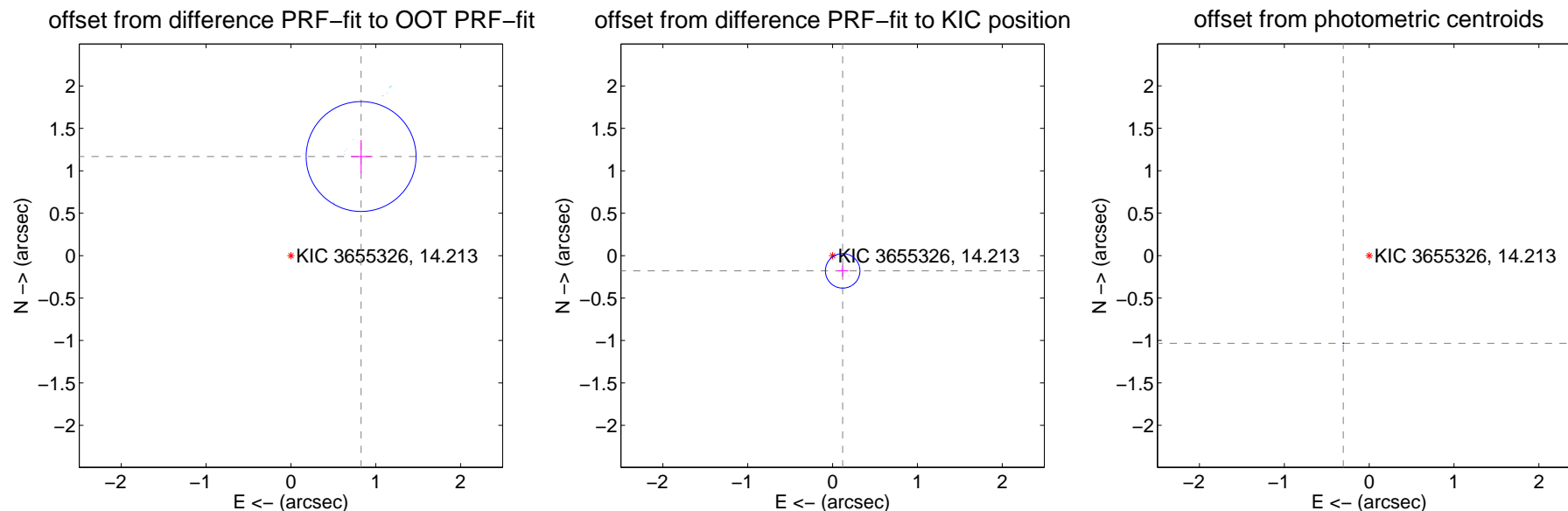
## DV Centroid Data

Supplemental centroid analysis for 003655326-01. Kepler magnitude: 14.21. Transit SNR 2312.07

There are 14 quarters with good PRF difference image offsets

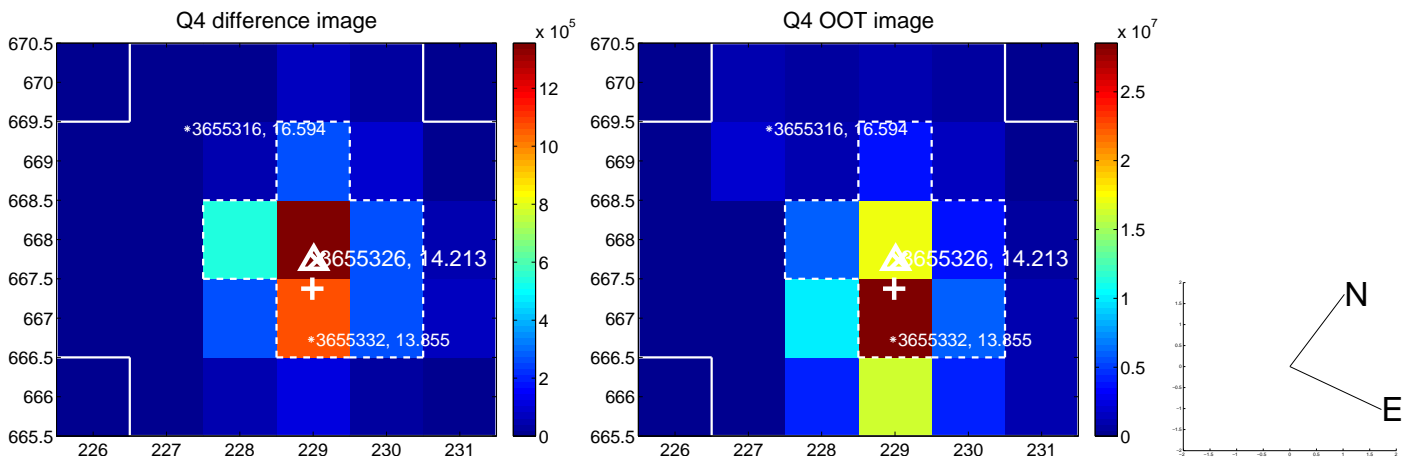
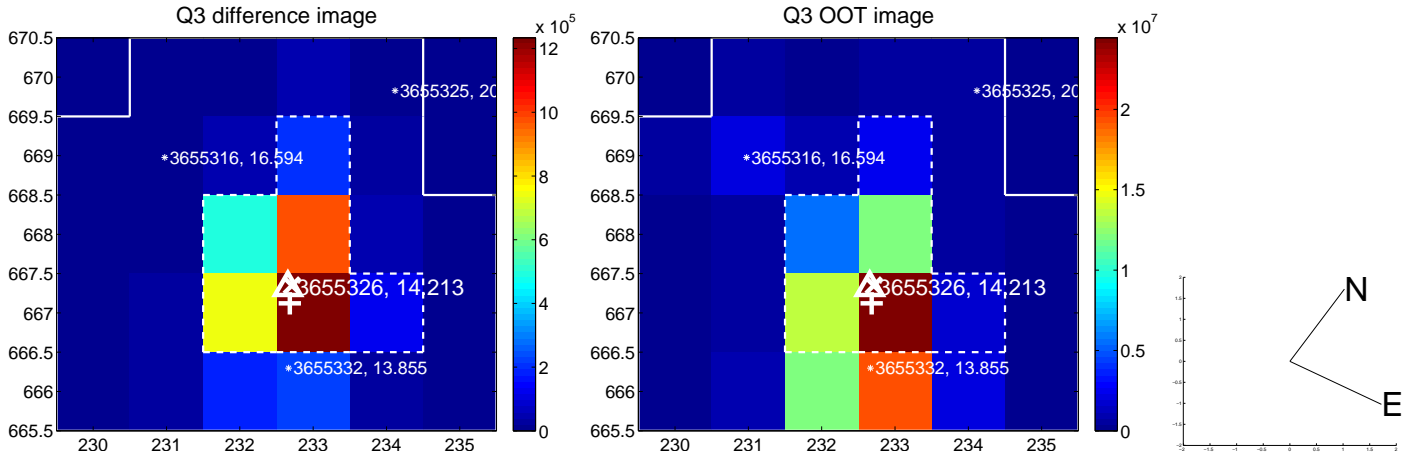
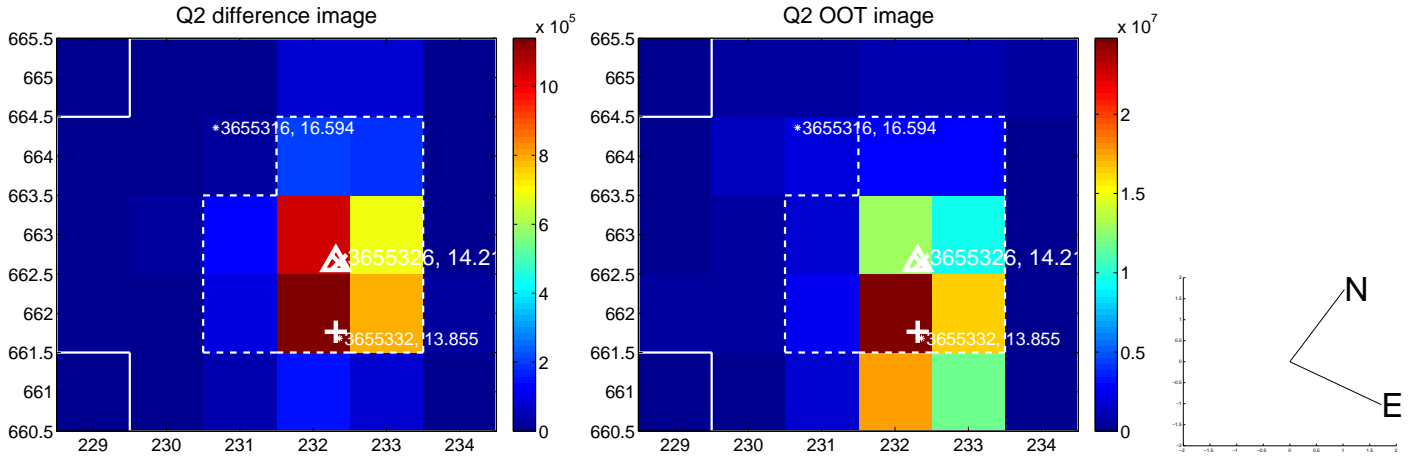
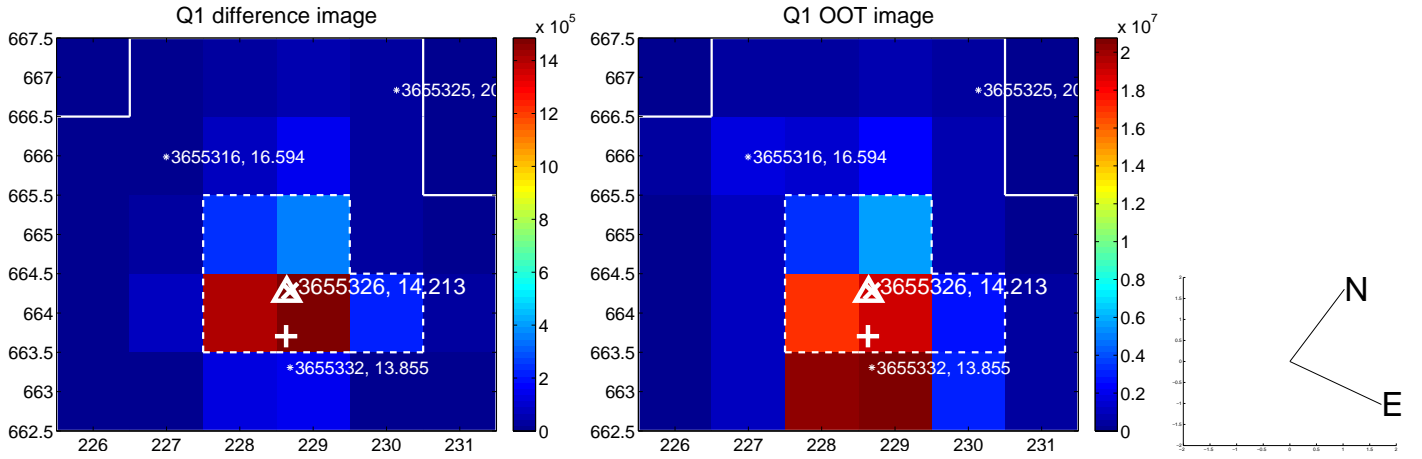
The OOT PRF centroid is offset from the target star catalog position by about 2.41 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.432 \pm 0.216$	6.63	$-0.827 \pm 0.118$	$1.169 \pm 0.195$
PRF-fit source offset from KIC position	$0.215 \pm 0.068$	3.17	$-0.119 \pm 0.067$	$-0.179 \pm 0.068$
photometric centroid source offset	$1.08 \pm 0.00$	808.40	$0.30 \pm 0.00$	$-1.03 \pm 0.00$

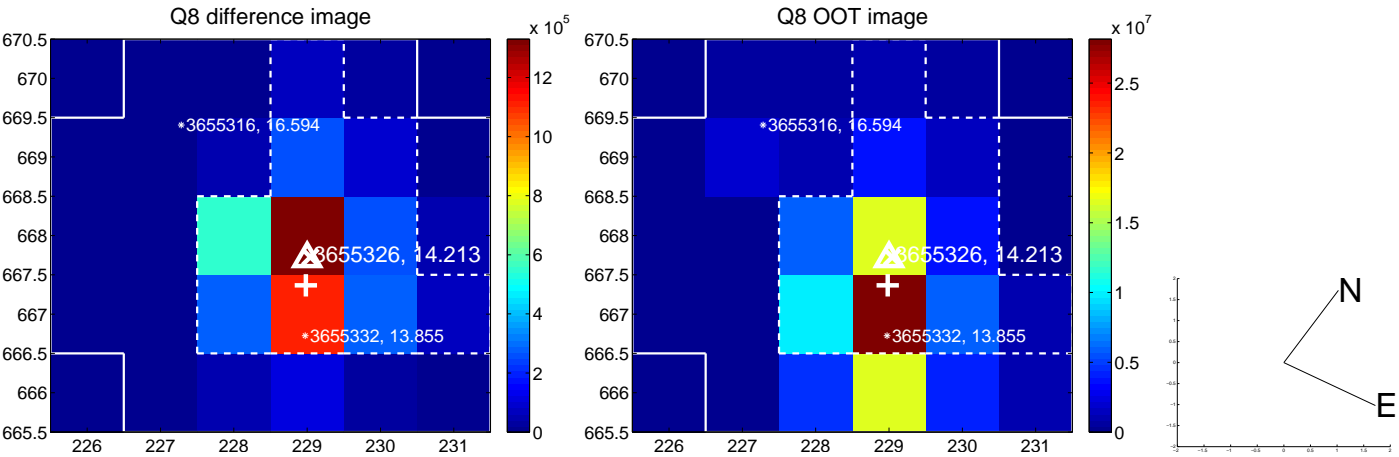
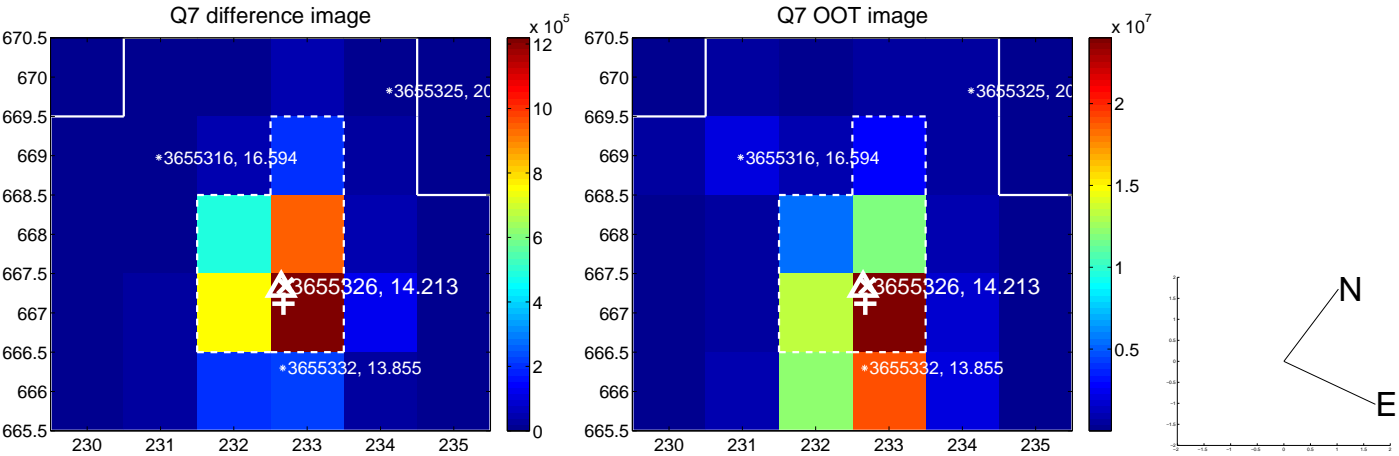
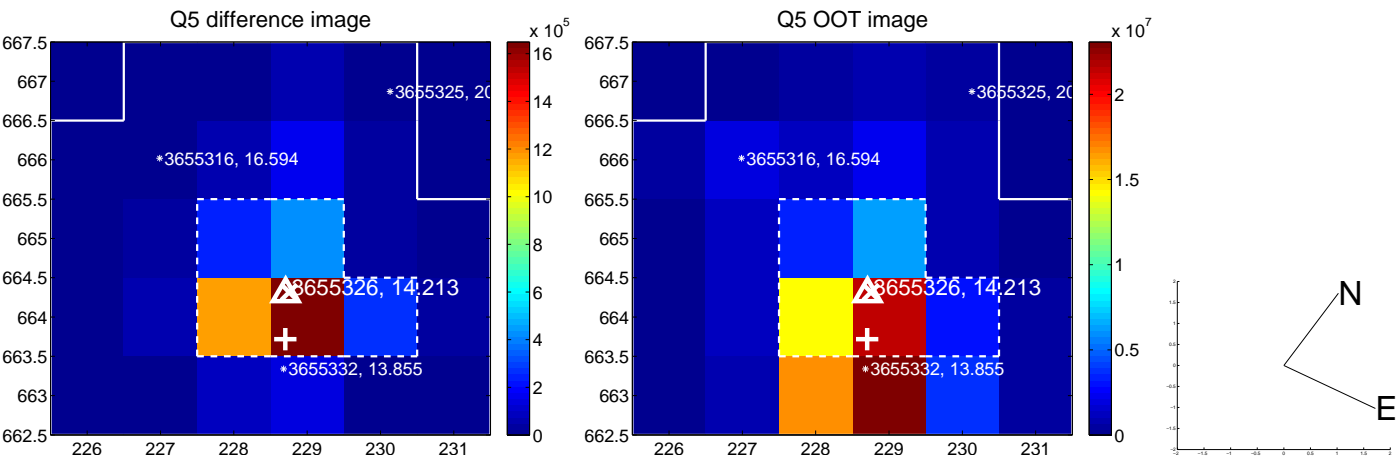


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

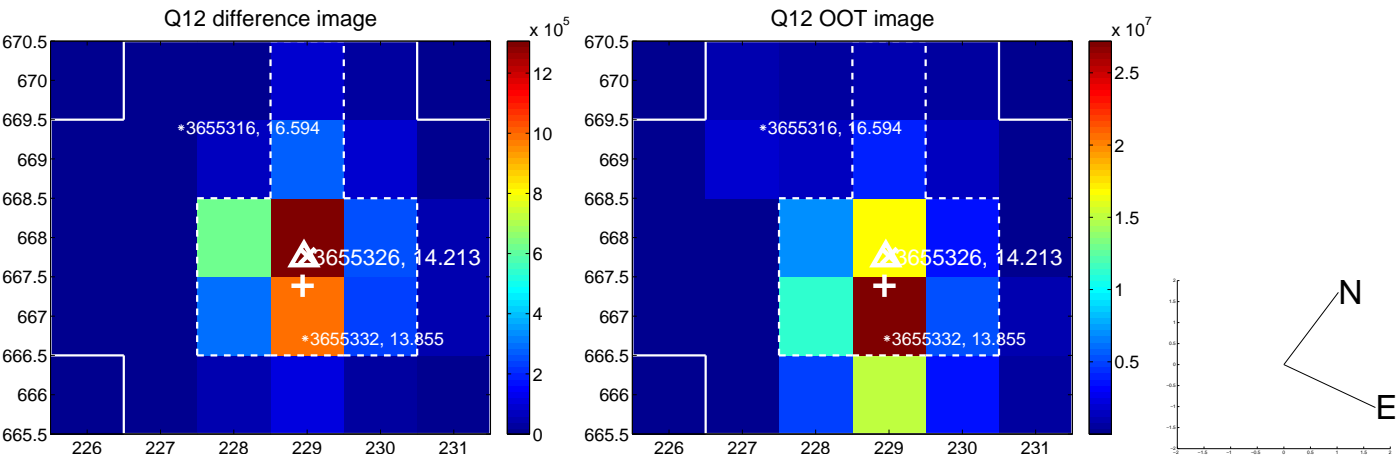
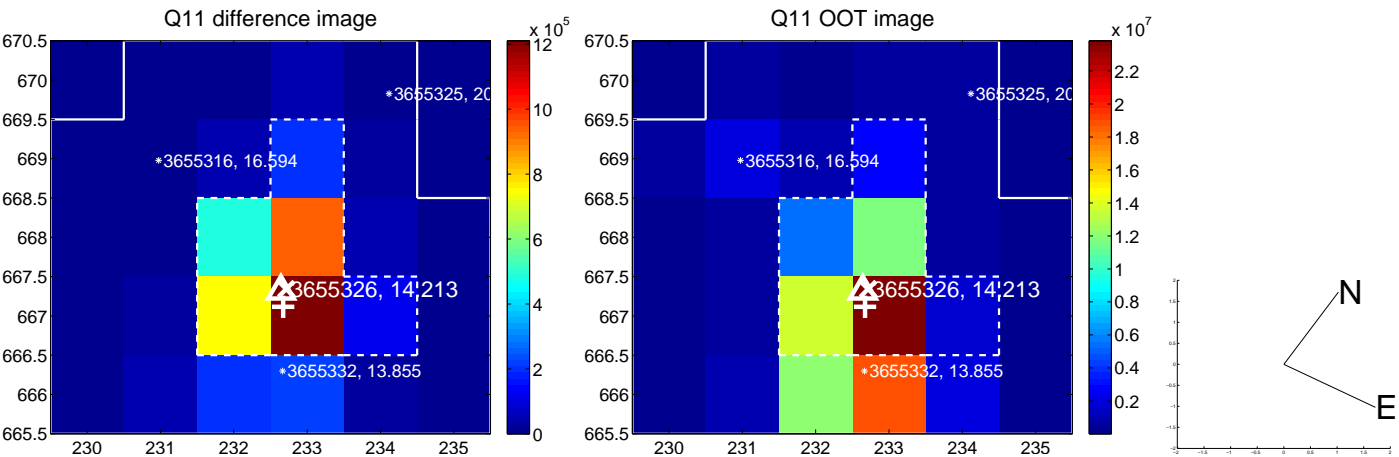
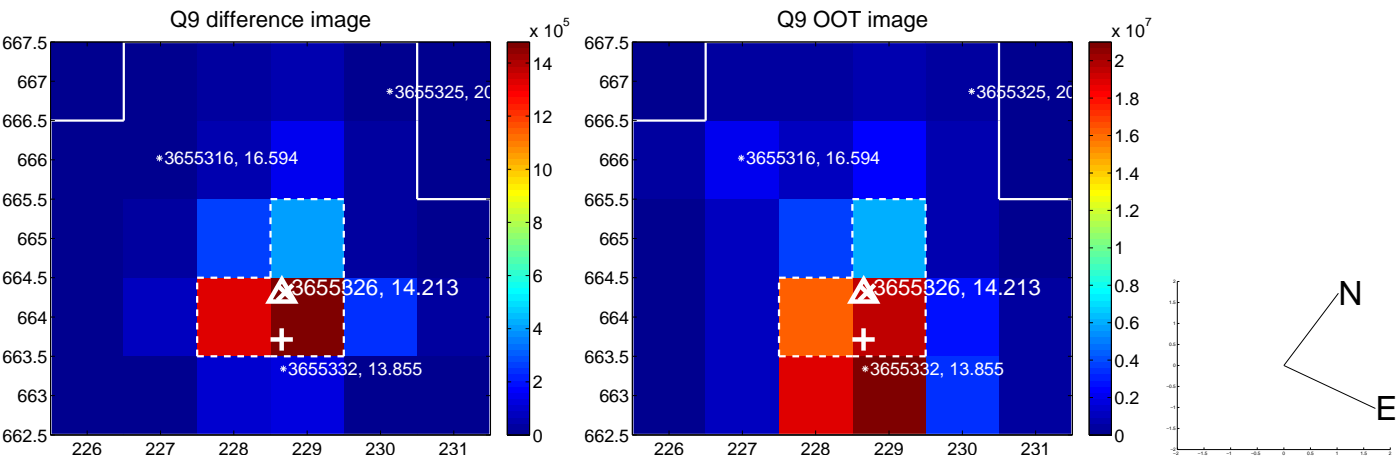


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

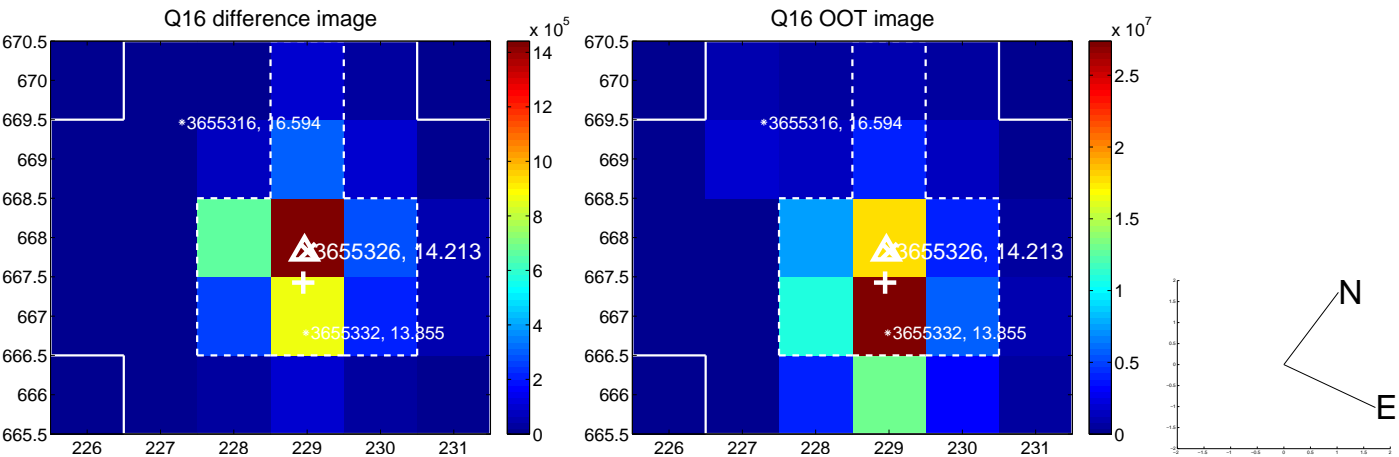
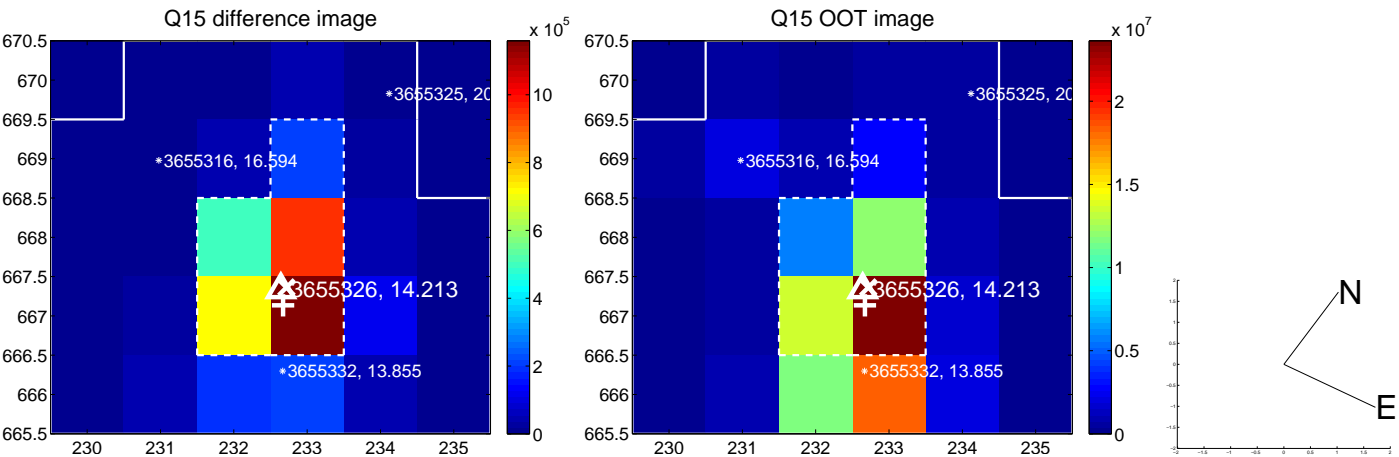
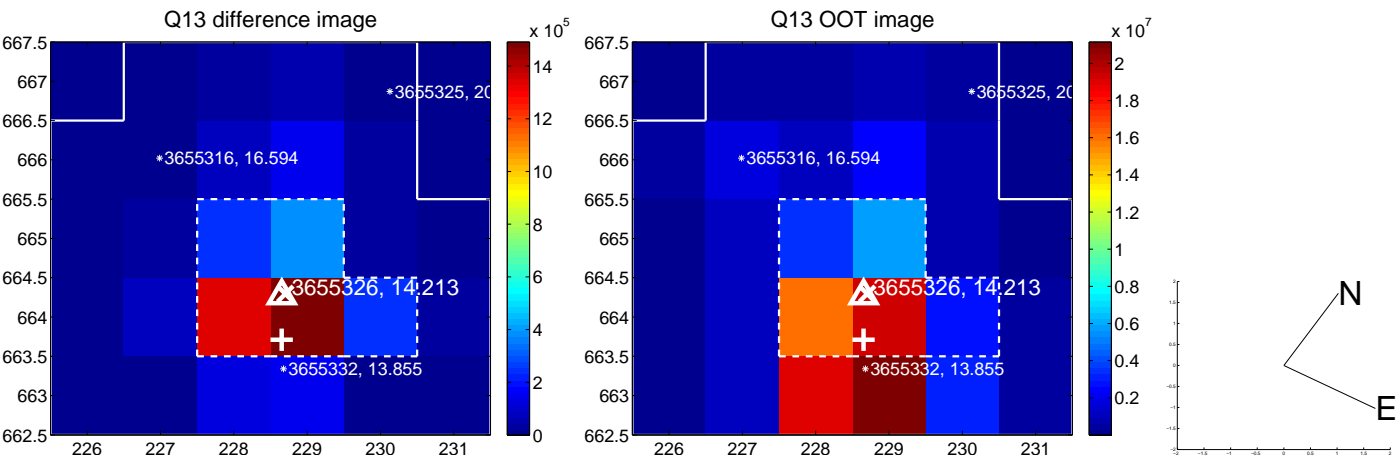




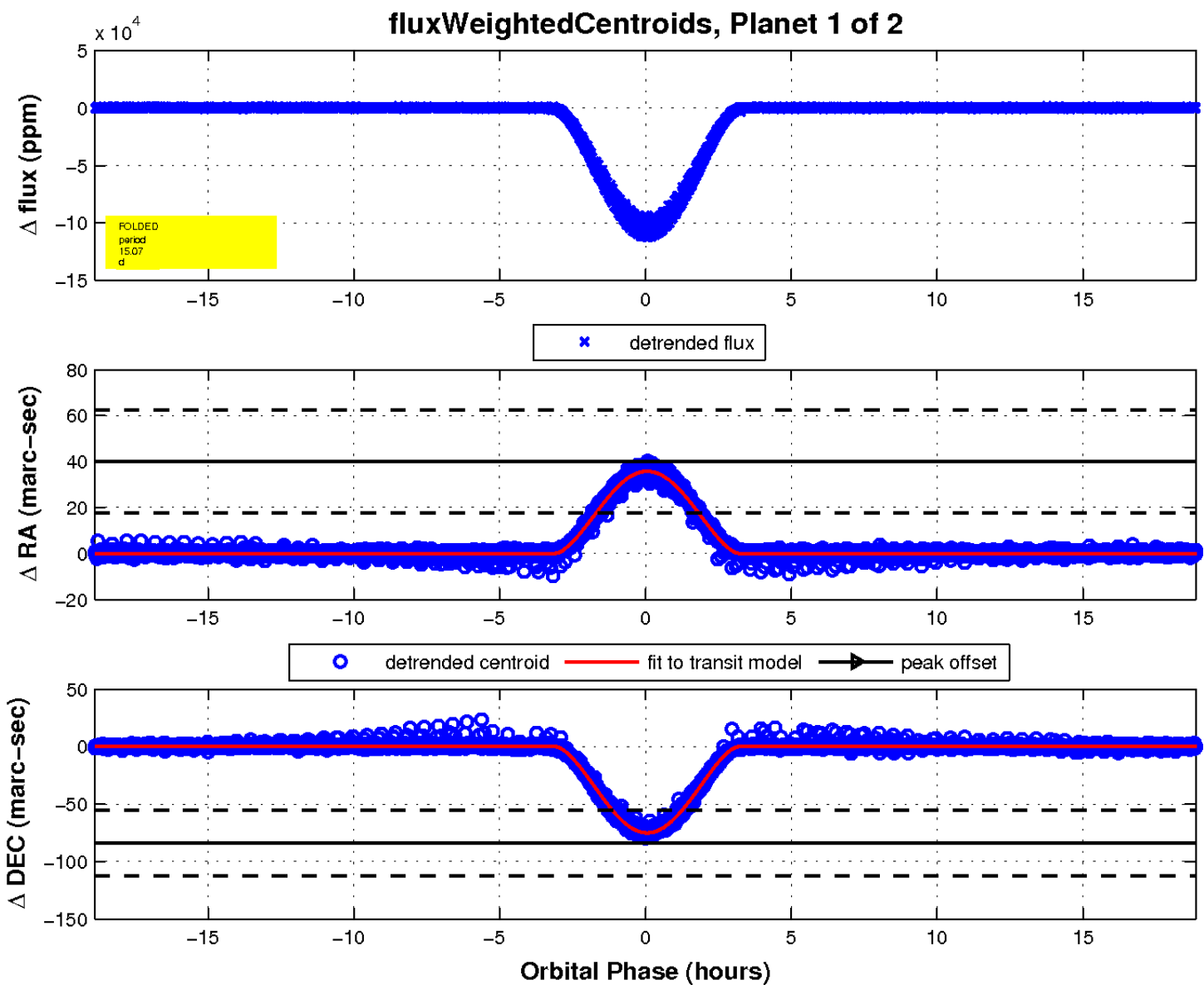
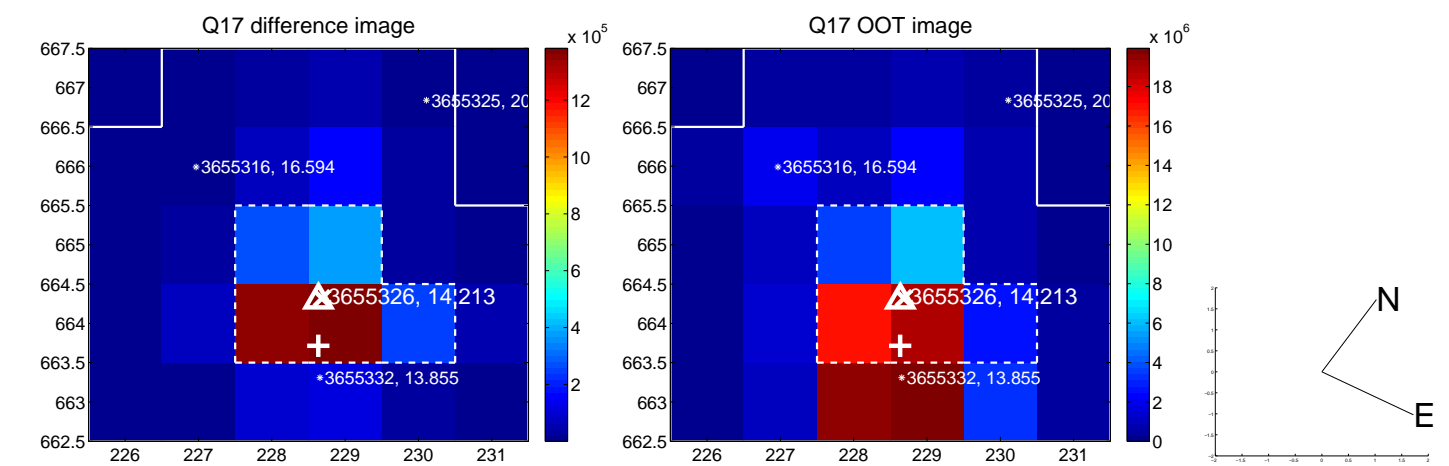
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

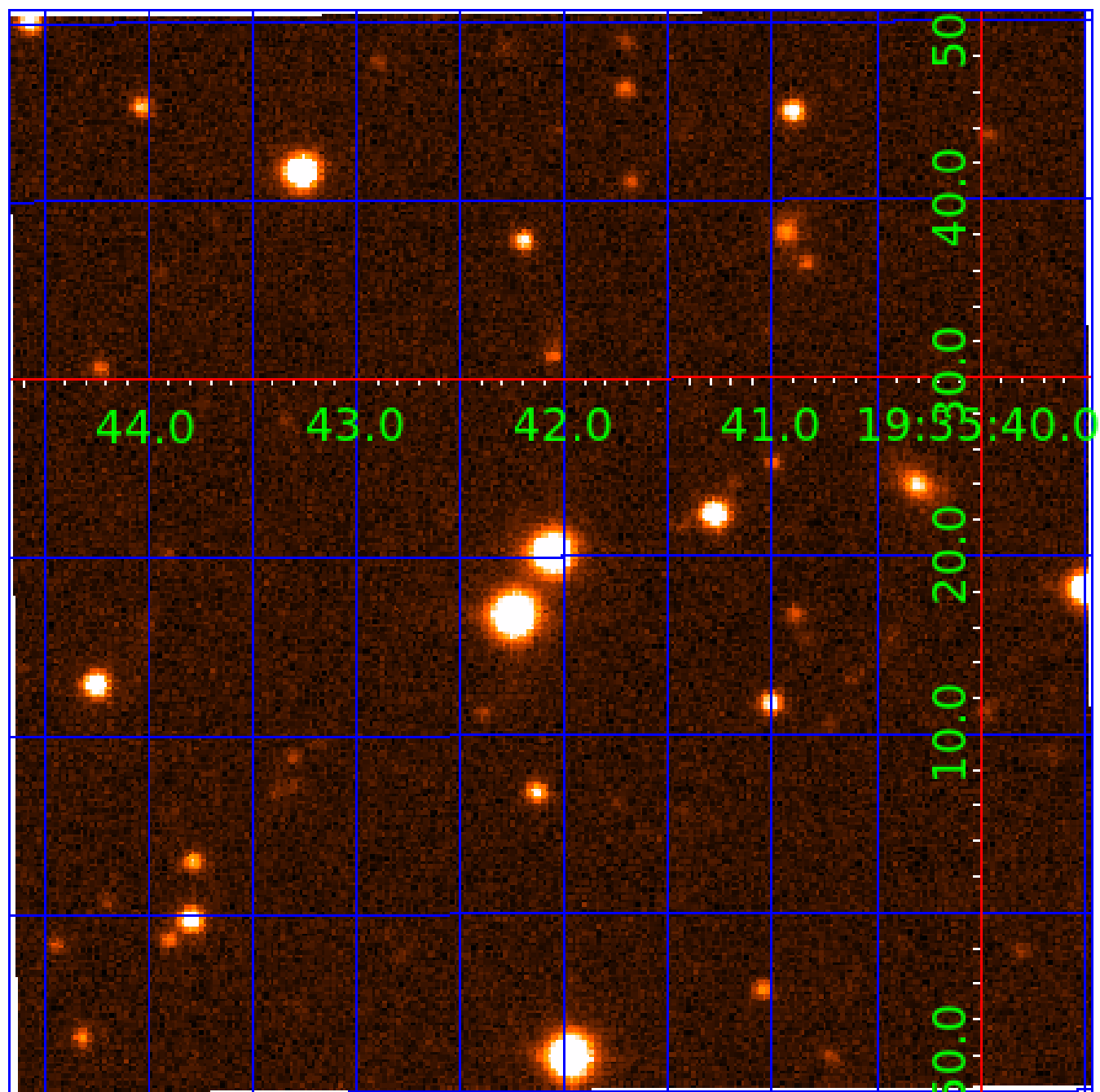


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\Delta$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 003655326

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003655326-01	OBS	6348.01	15.066486	140.655799	108824.9	6.296	3890.0	2312.1	1.63	5751	77.97	178.35
003655326-02	OBS	No	15.066484	134.139003	72200.3	6.362	2696.1	1990.7	1.63	5751	64.31	178.35

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003655326-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—MOD_ODDEVEN_DV—DEEP_V_SHAPED—HAS_SEC_TCE—CENT_KIC_POS
003655326-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE—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.

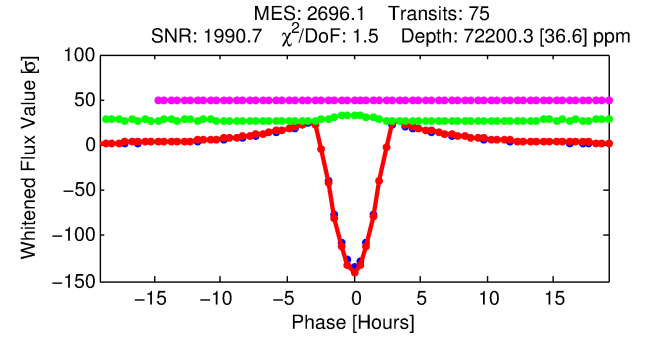
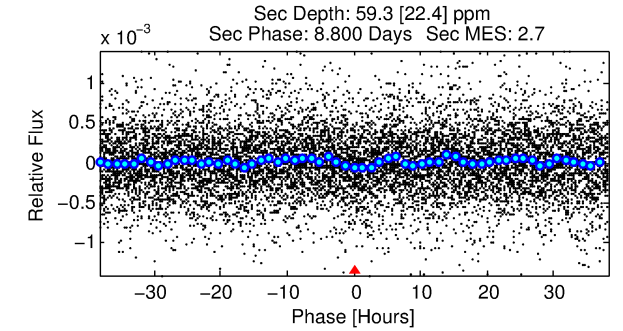
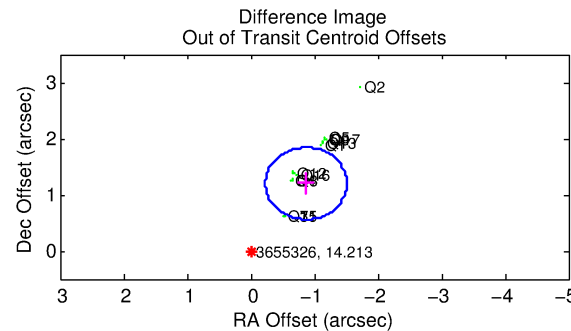
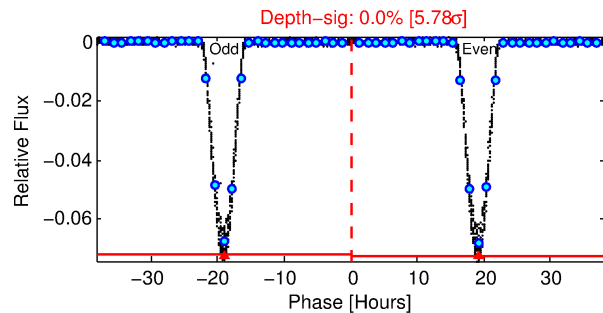
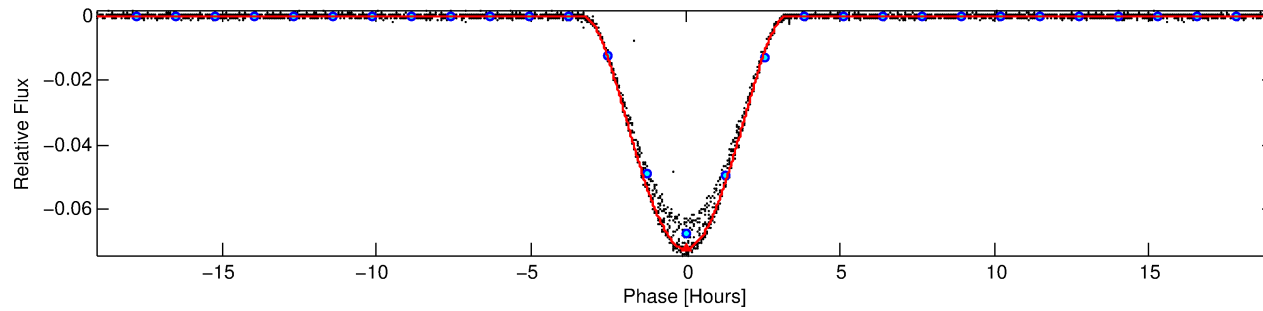
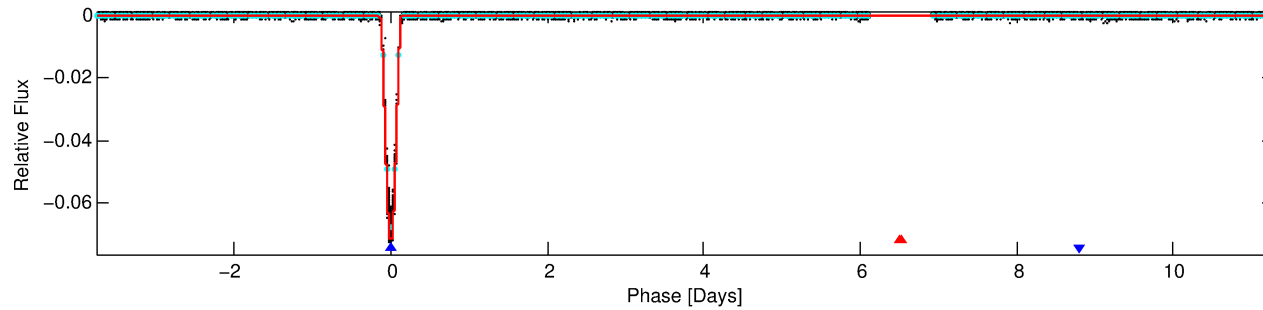
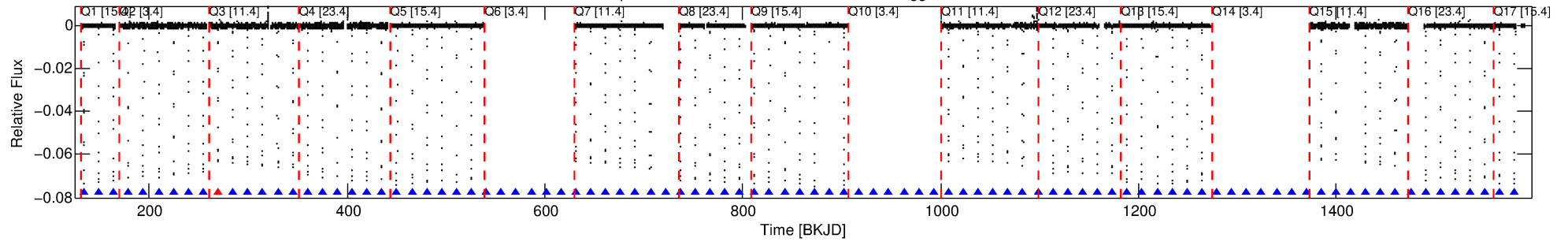
## Ephemeris Match Information For 003655326-02

No Significant Match Found

# DV One-Page Summary

KIC: 3655326 Candidate: 2 of 2 Period: 15.066 d  
KOI: K06348 Corr: No Ephemeris Match

Kp: 14.21 R\*: 1.63 Rs Teff: 5751.0 K Logg: 4.03 Fe/H: -0.040



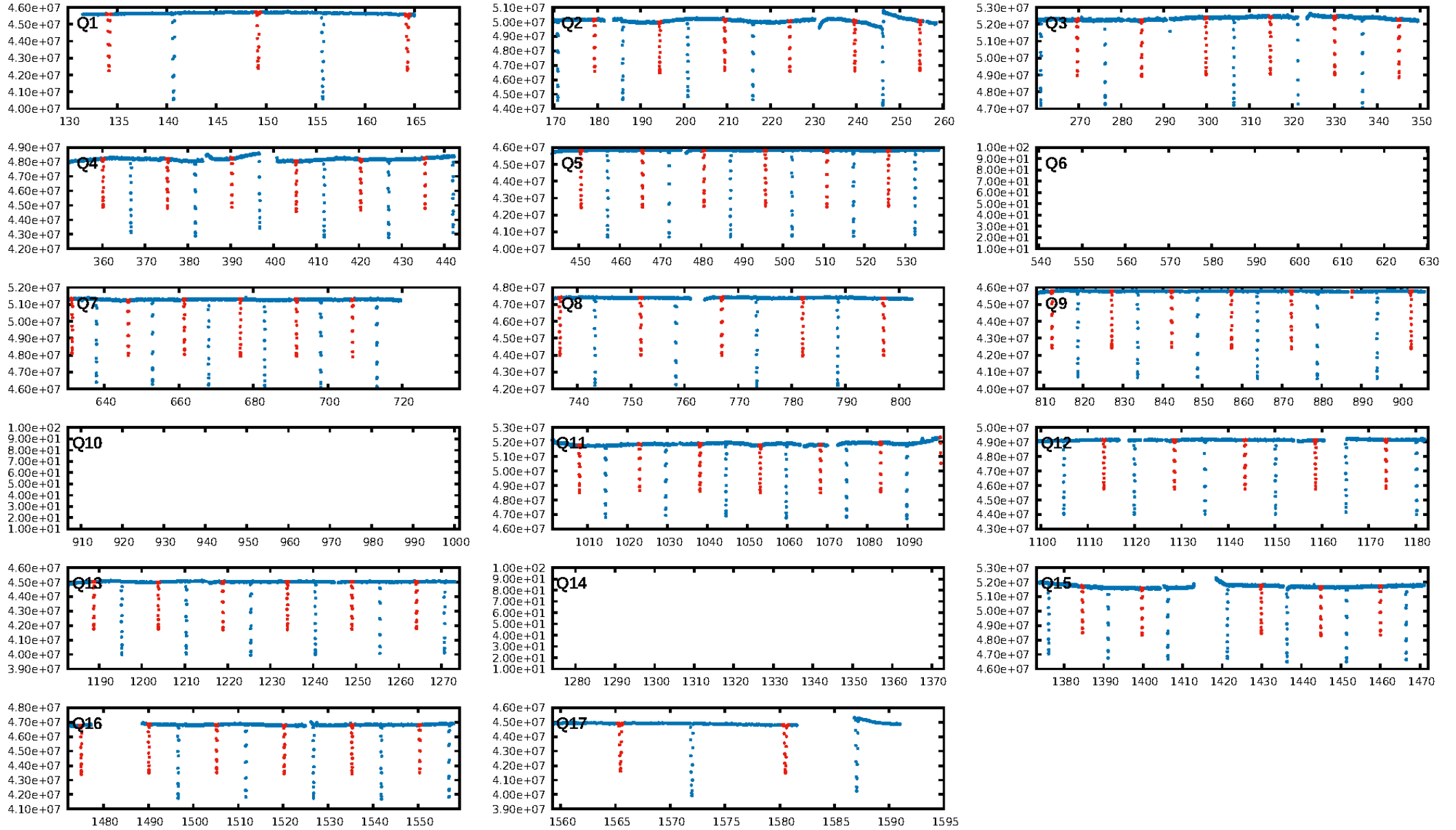
## DV Fit Results:

Period = 15.06648 [0.00000] d  
Epoch = 134.1390 [0.0001] BKJD  
Rp/R\* = 0.3624 [0.0081]  
a/R\* = 18.26 [0.01]  
b = 0.92 [0.01]  
Seff = 178.35 [65.27]  
Teq = 932 [85] K  
Rp = 64.31 [15.96] Re  
a = 0.1205 [0.0278] AU  
Ag = 0.11 [0.06] [-14.71σ]  
Teffp = 838 [81] K [-0.80σ]

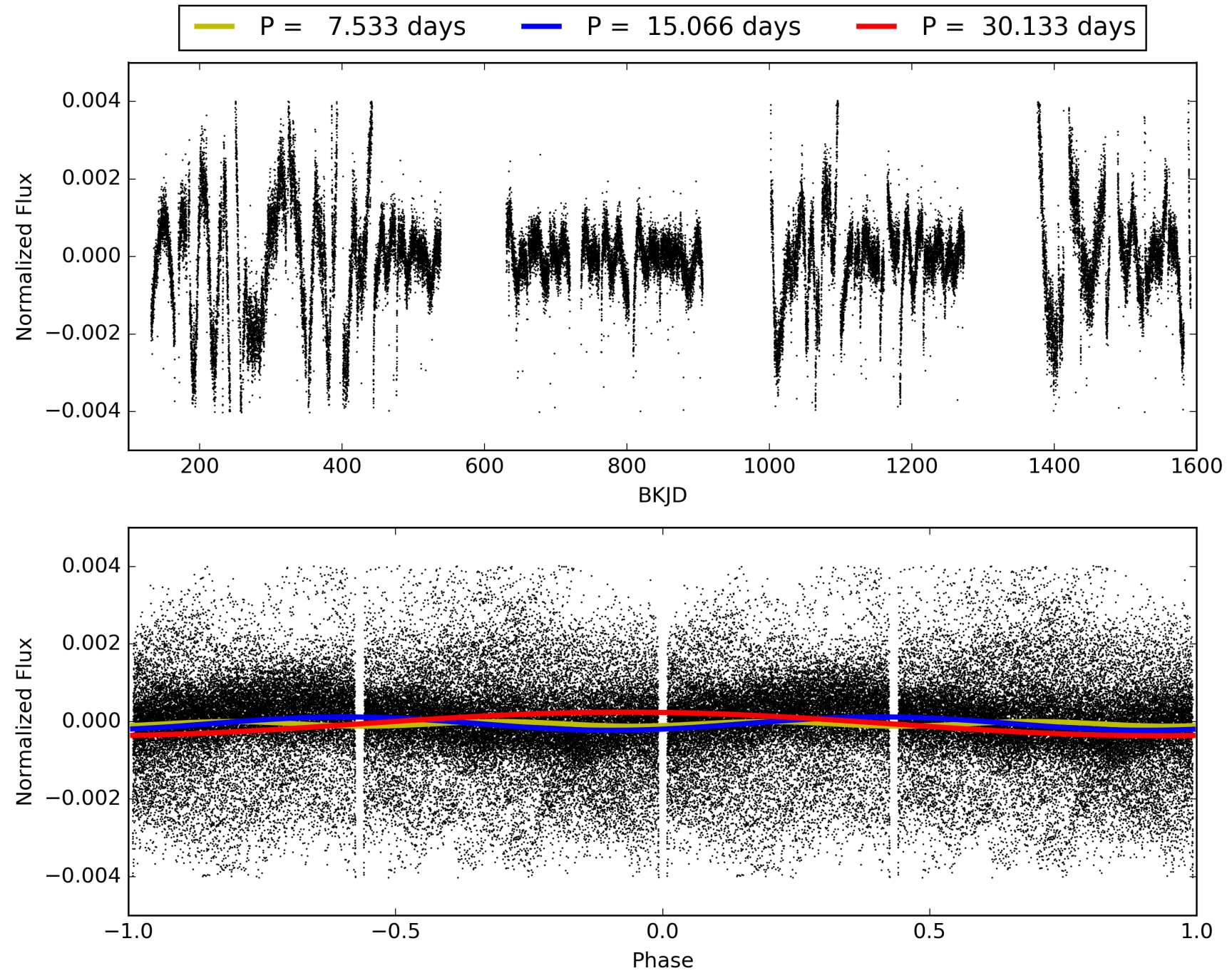
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 23.3%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 0.99 [69/70]  
GhostDiagnostic-chr: 3.077  
Centroid-sig: 0.0%  
Centroid-so: 1.101 arcsec [566.59σ]  
OotOffset-rm: 1.482 arcsec [6.94σ]  
KicOffset-rm: 0.214 arcsec [3.14σ]  
OotOffset-st: 1/4/4/5 [14]  
KicOffset-st: 1/4/4/5 [14]  
DiffImageQuality-fgm: 1.00 [14/14]  
DiffImageOverlap-fno: 1.00 [14/14]

# TCE 003655326-02, PDC Light Curves



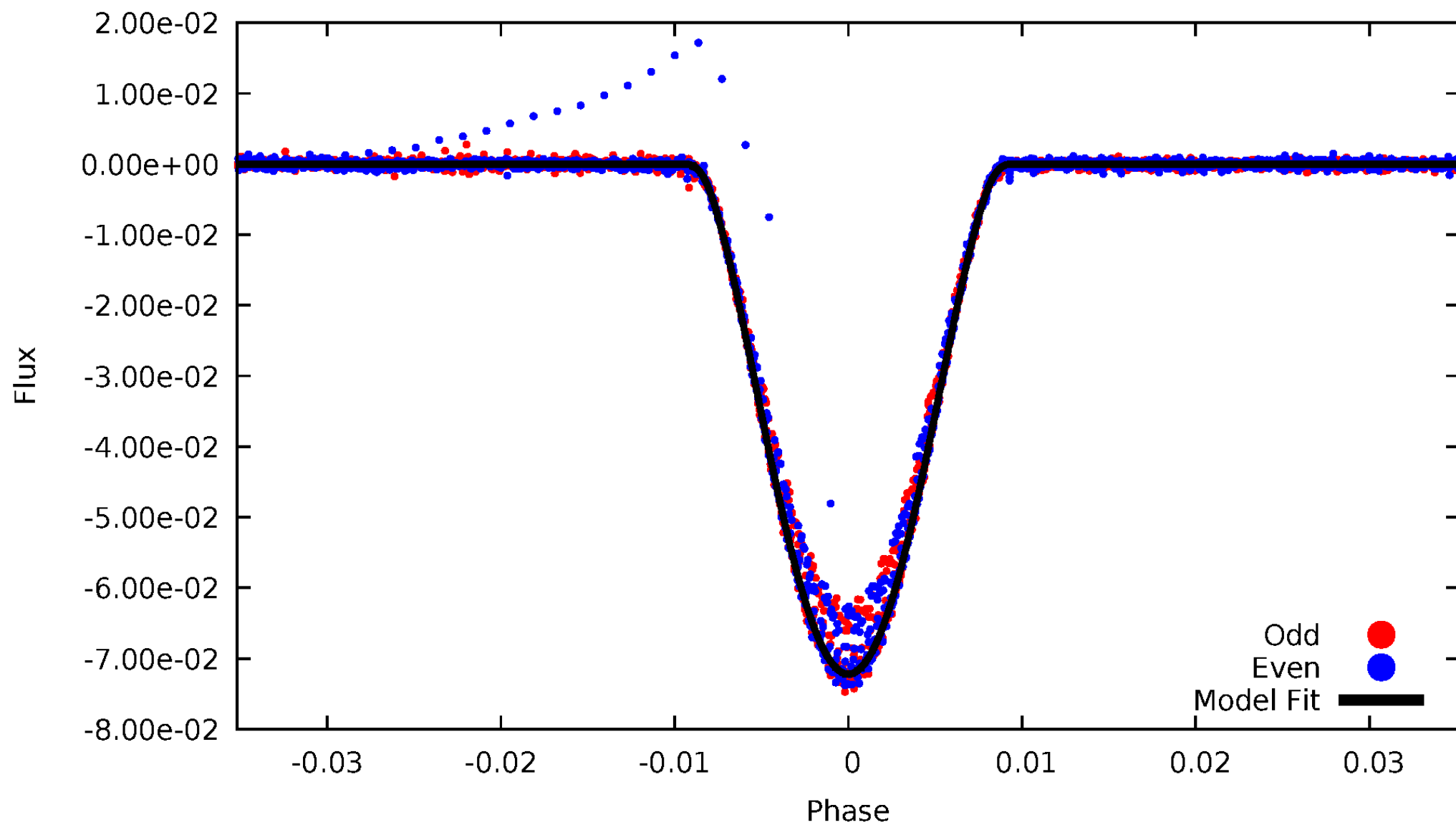
TCE 003655326-02





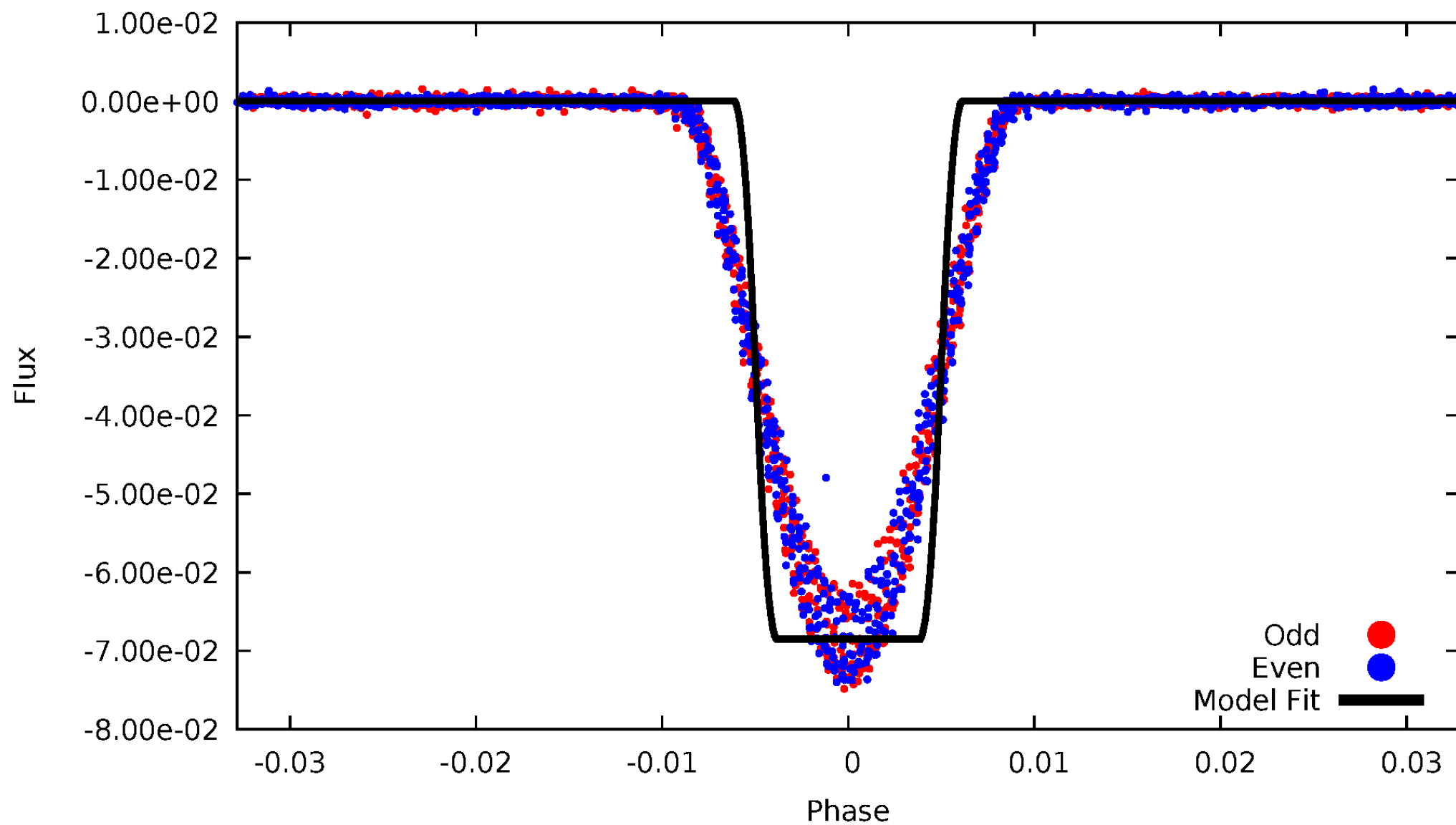
DV Odd/Even

TCE 003655326-02



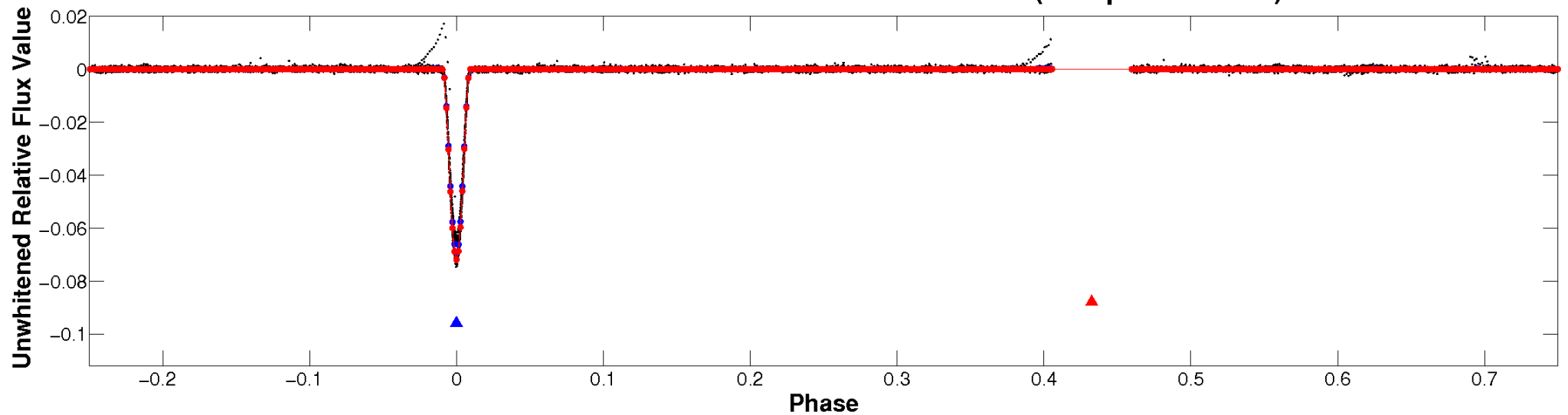
# ALT Odd/Even

TCE 003655326-02

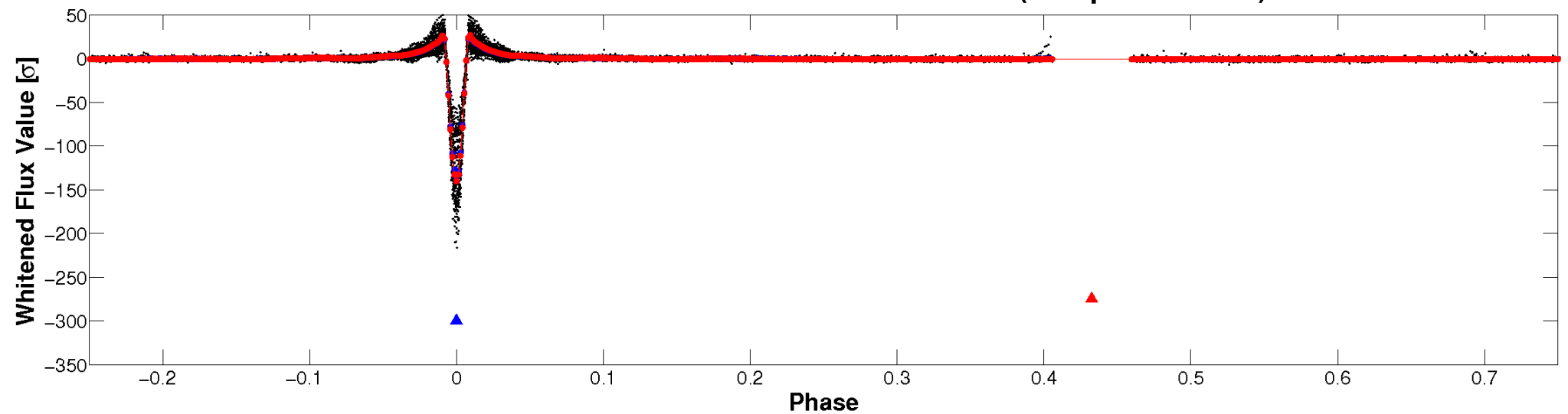


# Non-Whitened Vs. Whitened Light Curve

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

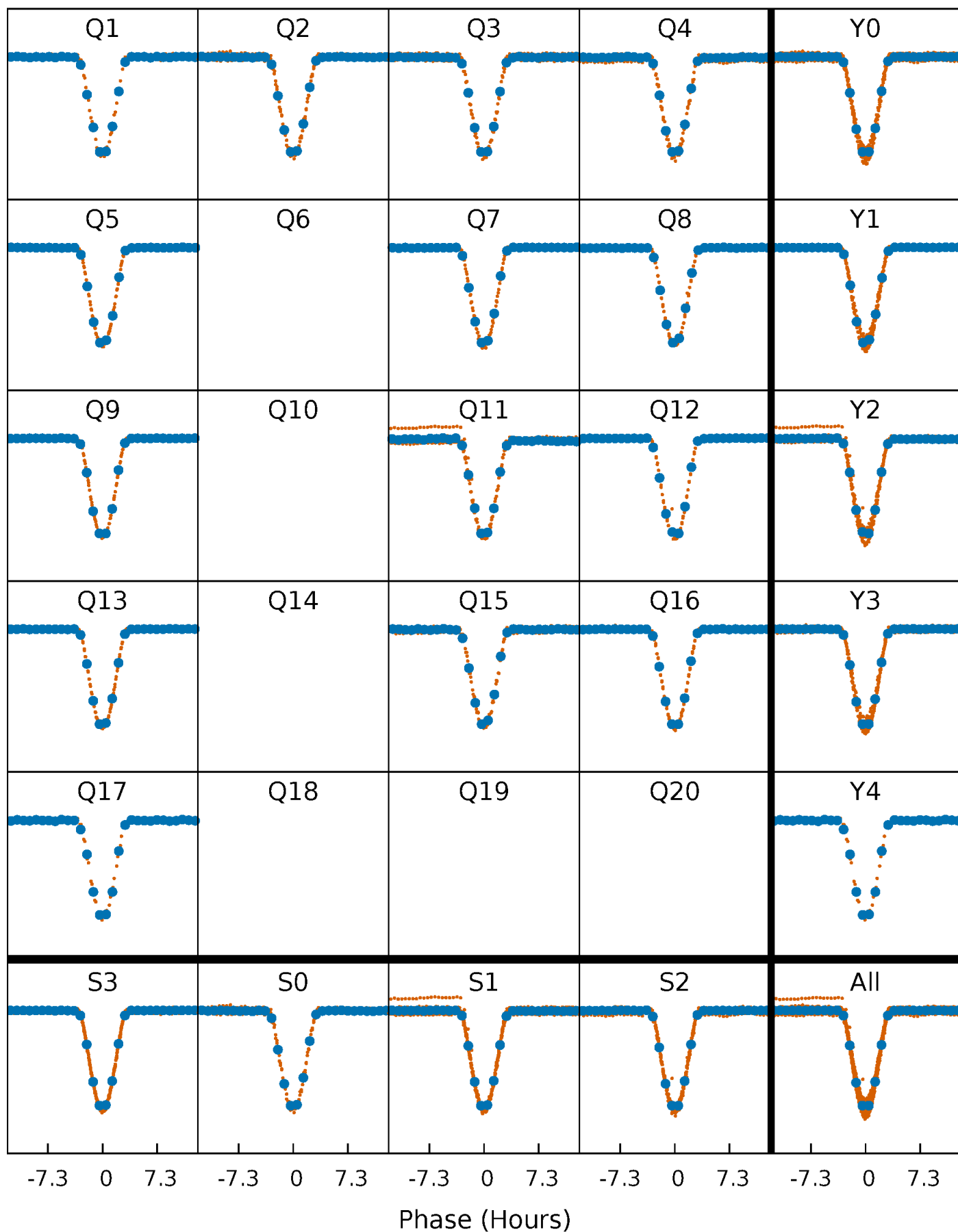


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



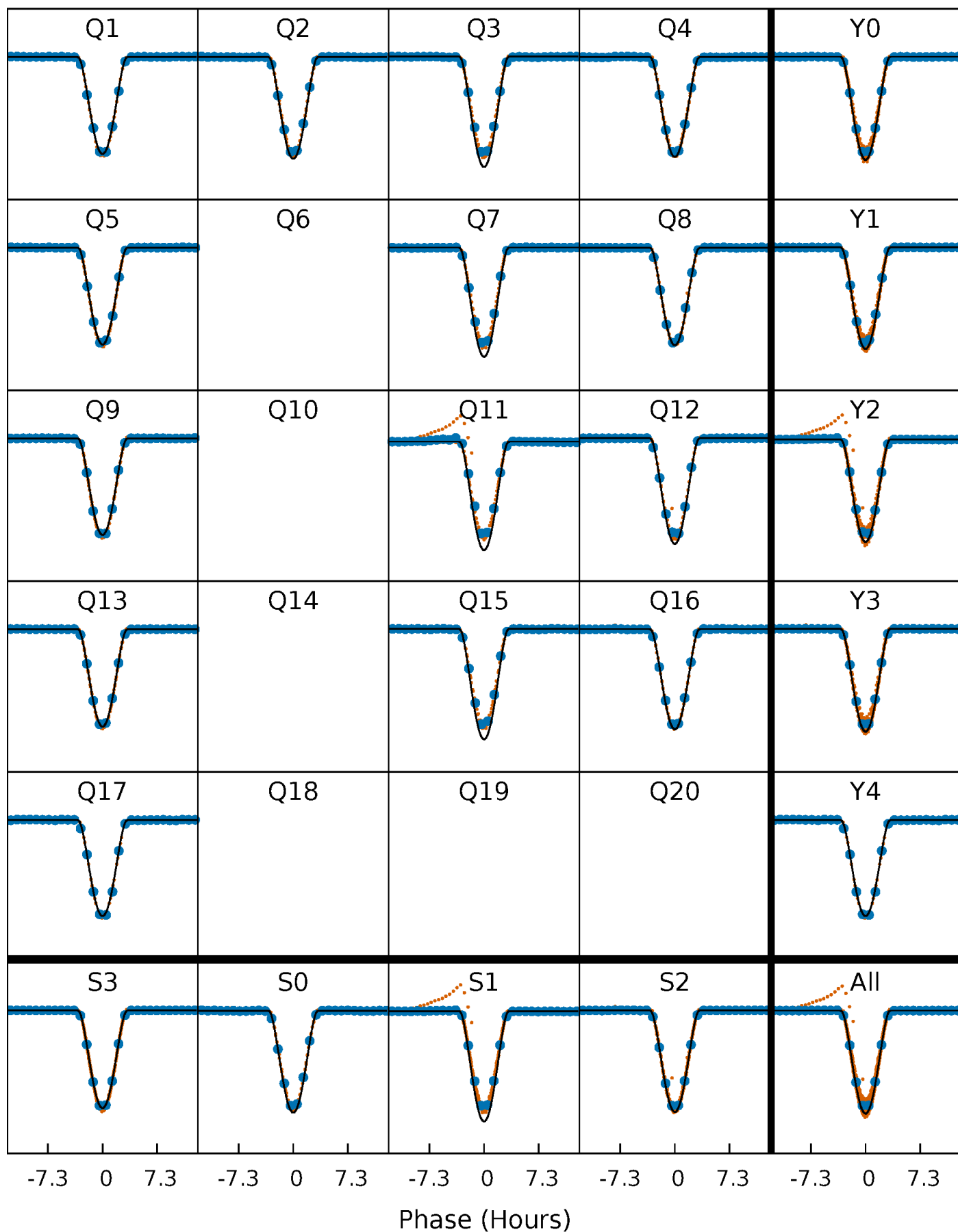
# PDC Quarter-Phased Transit Curves

TCE 003655326-02 P= 15.066484 Days  $T_0=134.139003$  (BKJD)



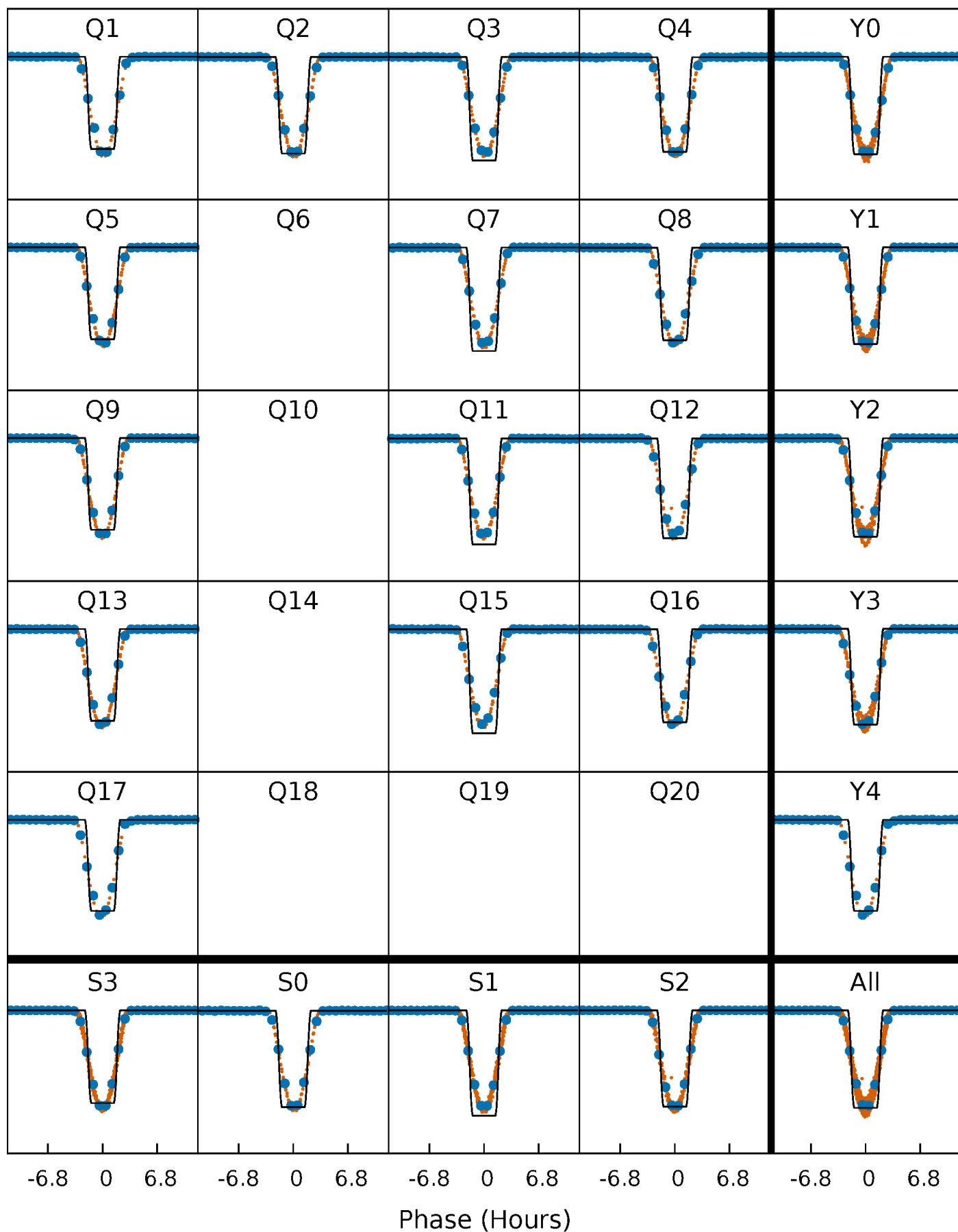
# DV Quarter-Phased Transit Curves

TCE 003655326-02 P= 15.066484 Days  $T_0=134.139003$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

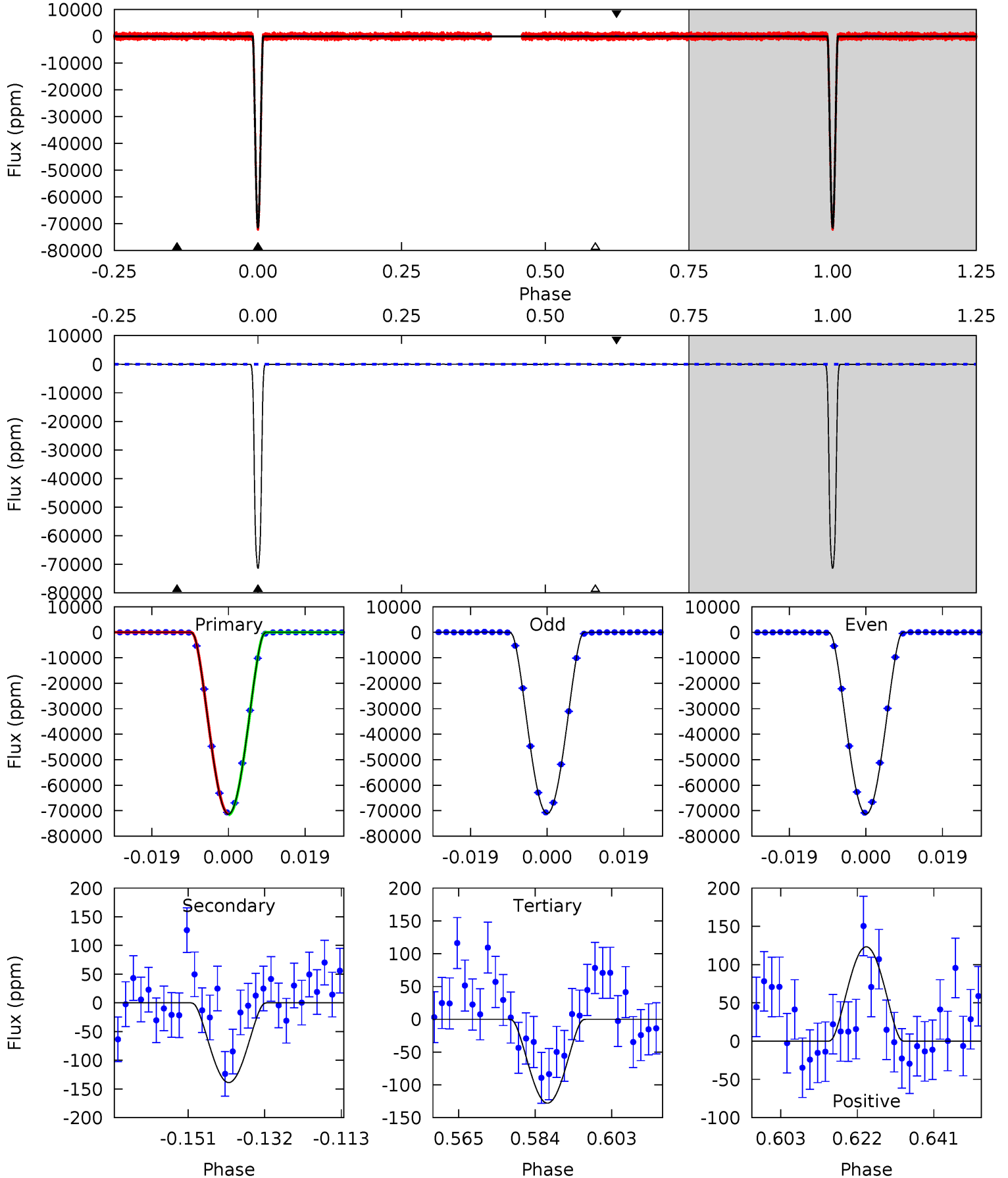
TCE 003655326-02 P= 15.066611 Days  $T_0=134.133223$  (BKJD)



# DV Model-Shift Uniqueness Test

003655326-02, P = 15.066484 Days, E = 119.072519 Days

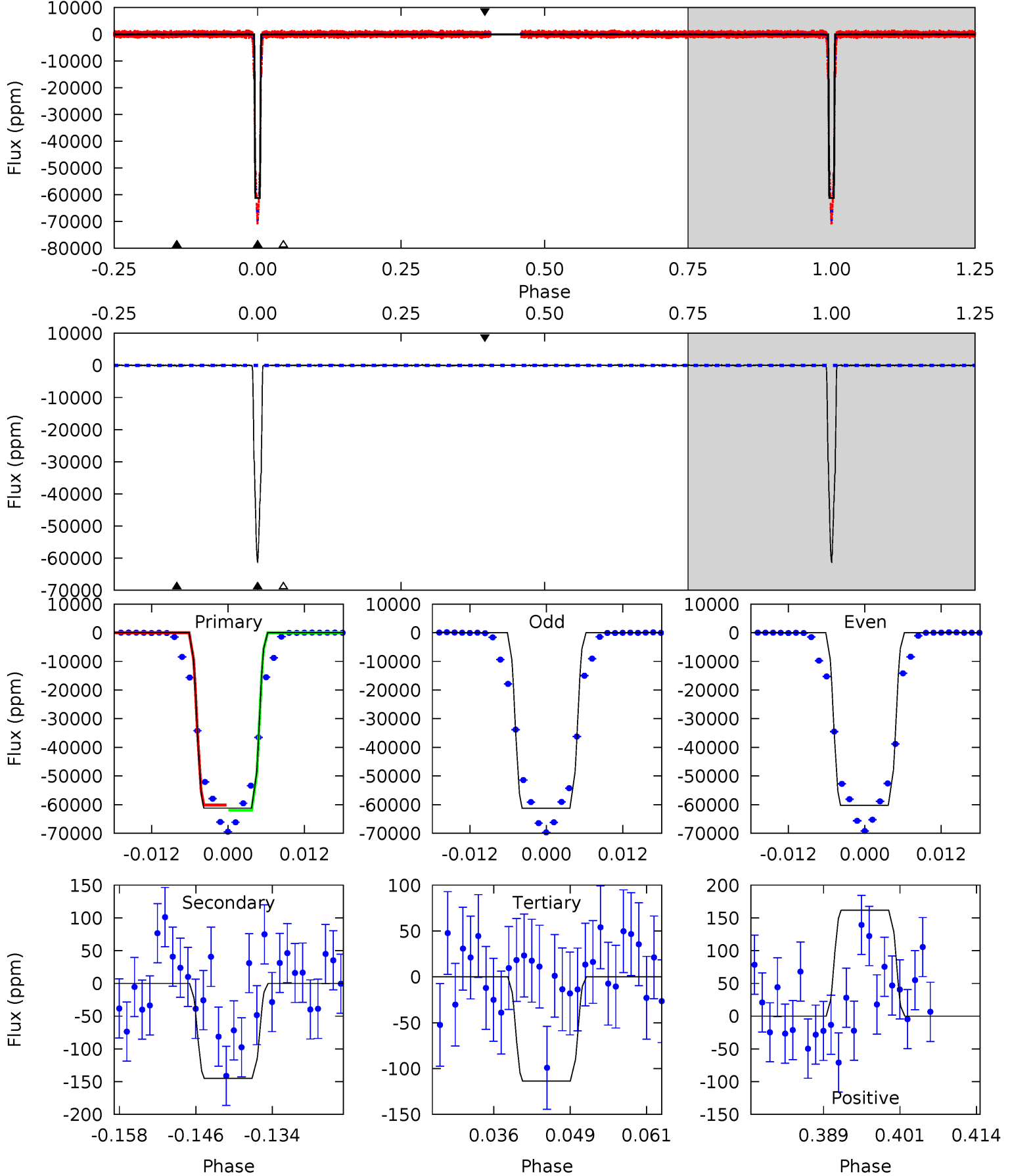
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
4645	9.04	8.33	8.02	4.90	2.35	2.68	4636	4637	0.71	1.01	8.79	0.96	0.00	0



# Alt Model-Shift Uniqueness Test

003655326-02, P = 15.066611 Days, E = 119.066612 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
1797	4.26	3.34	4.74	4.99	2.51	1.15	1794	1792	0.93	-0.48	15.2	0.98	0.00	0





### Stellar Parameters For KIC 003655326

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5751^{+77}_{-77}$	$4.028^{+0.210}_{-0.090}$	$-0.040^{+0.150}_{-0.150}$	$1.626^{+0.268}_{-0.402}$	$1.028^{+0.100}_{-0.100}$	$0.337^{+0.374}_{-0.113}$
	+1%/-1%	+5%/-2%	+375%/-375%	+16%/-25%	+10%/-10%	+111%/-33%
Source	SPE68	SPE68	SPE68	DSEP		

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

### Secondary Eclipse Parameters for KIC 003655326-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-139 \pm 15$	$63.43^{+6.06}_{-8.06}$	$1290^{+59}_{-78}$	$-1581^{+3310}_{-233}$	$0.280^{+0.085}_{-0.056}$
Alt.	$-145 \pm 34$	$45.83^{+5.01}_{-5.95}$	$1290^{+59}_{-80}$	$2016^{+104}_{-163}$	$0.561^{+0.223}_{-0.161}$

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

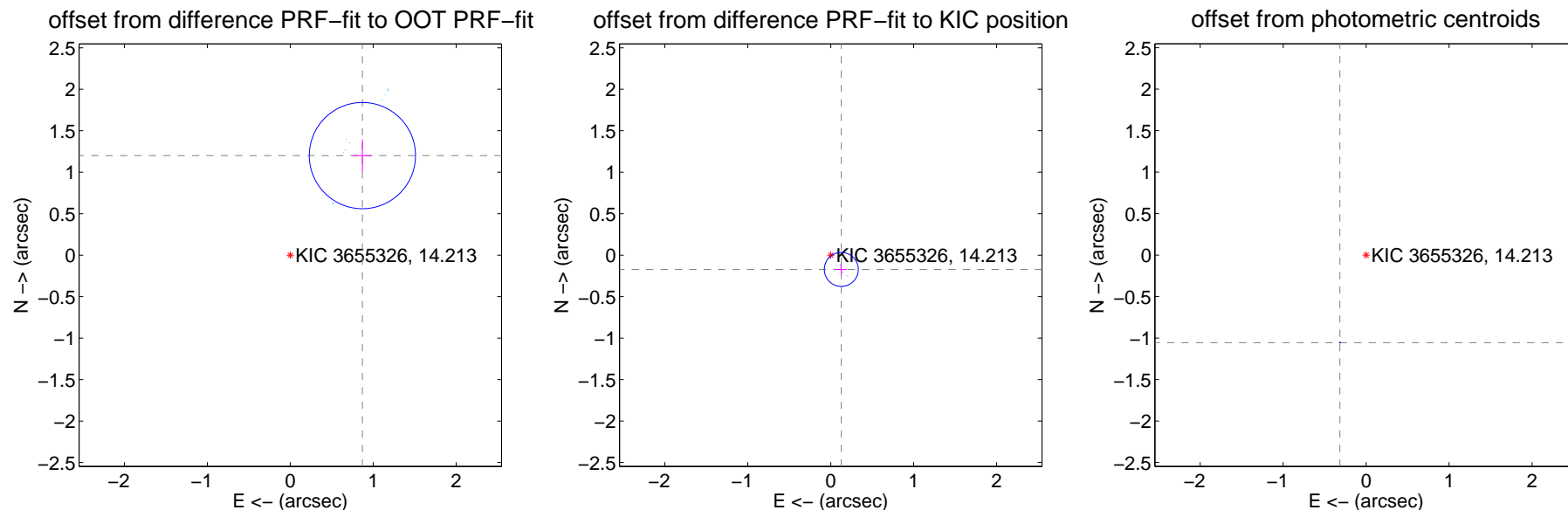
## DV Centroid Data

Supplemental centroid analysis for 003655326-02. Kepler magnitude: 14.21. Transit SNR 1990.70

There are 14 quarters with good PRF difference image offsets

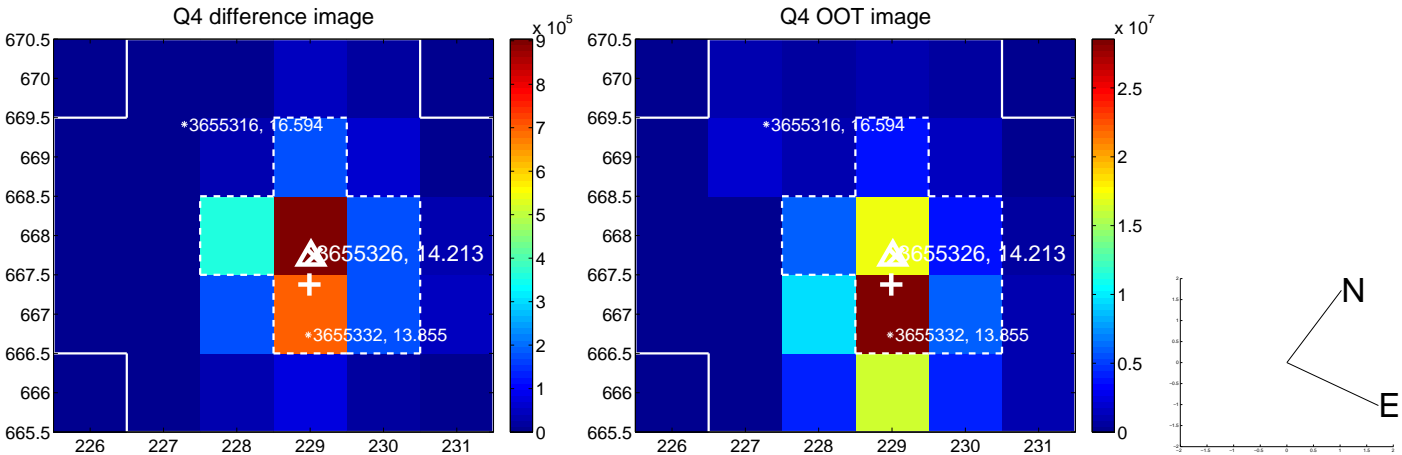
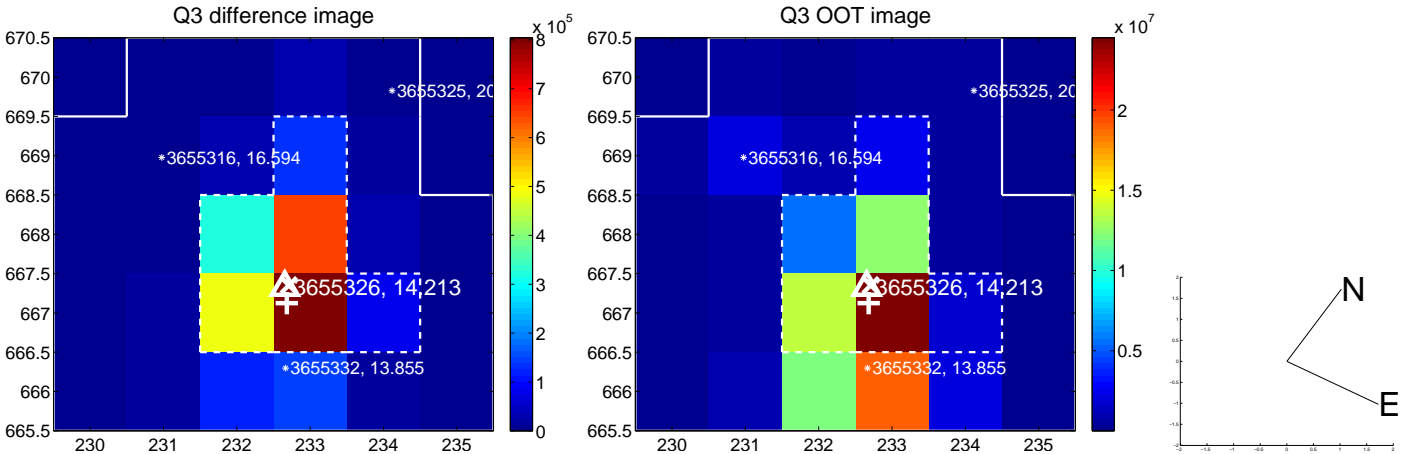
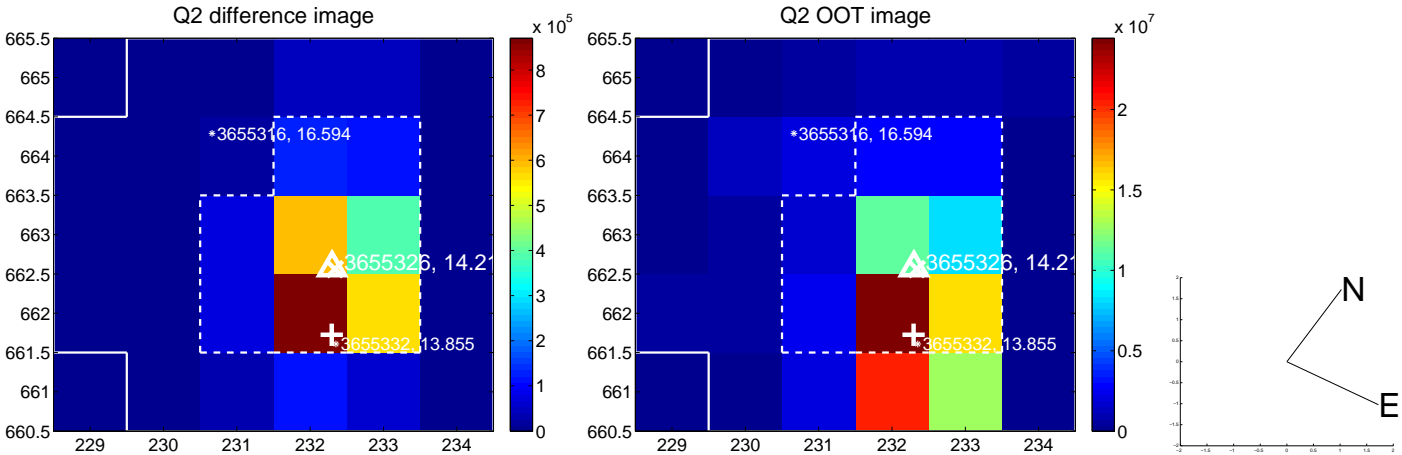
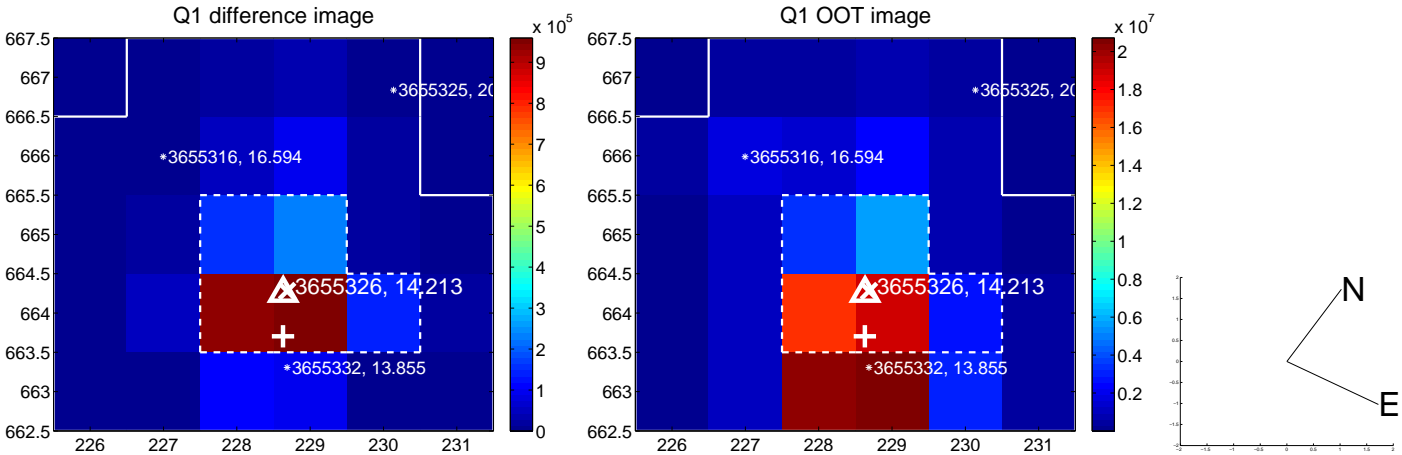
The OOT PRF centroid is offset from the target star catalog position by about 2.41 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.482 \pm 0.213$	6.94	$-0.870 \pm 0.116$	$1.200 \pm 0.195$
PRF-fit source offset from KIC position	$0.214 \pm 0.068$	3.14	$-0.128 \pm 0.067$	$-0.172 \pm 0.068$
photometric centroid source offset	$1.10 \pm 0.00$	566.59	$0.32 \pm 0.00$	$-1.06 \pm 0.00$

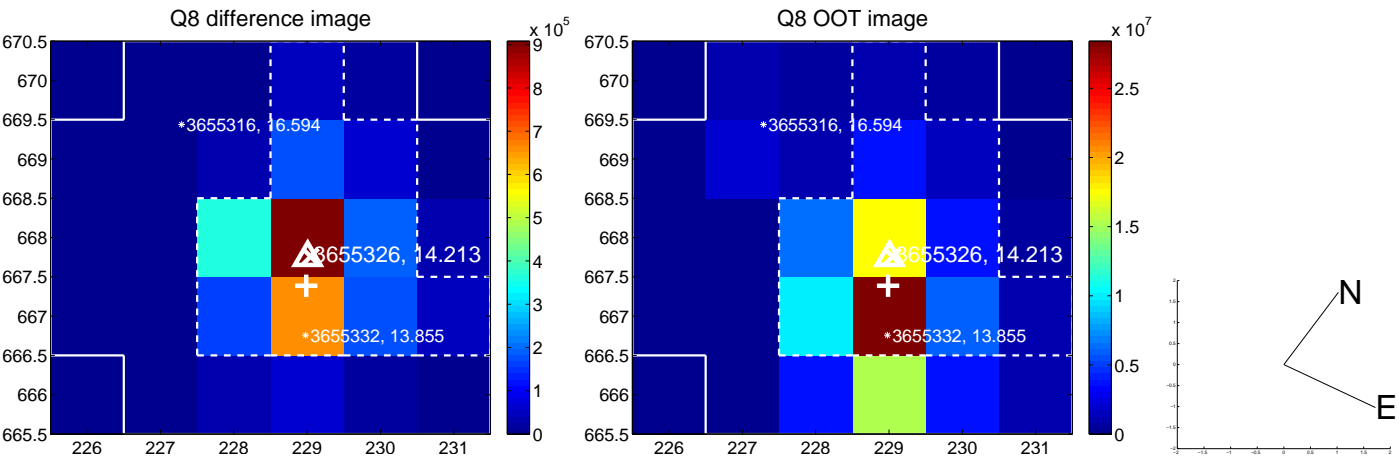
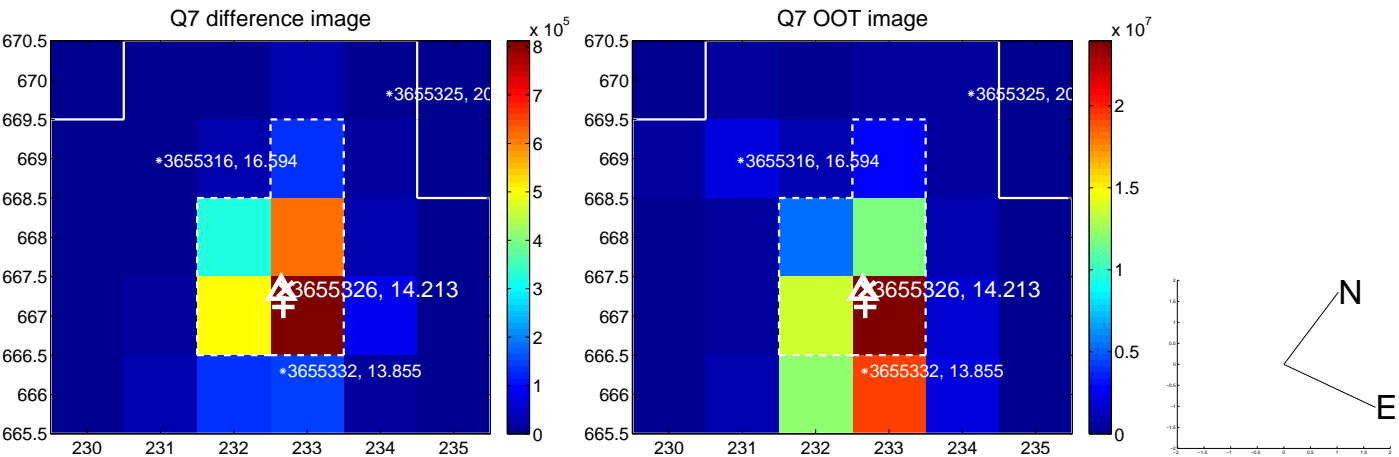
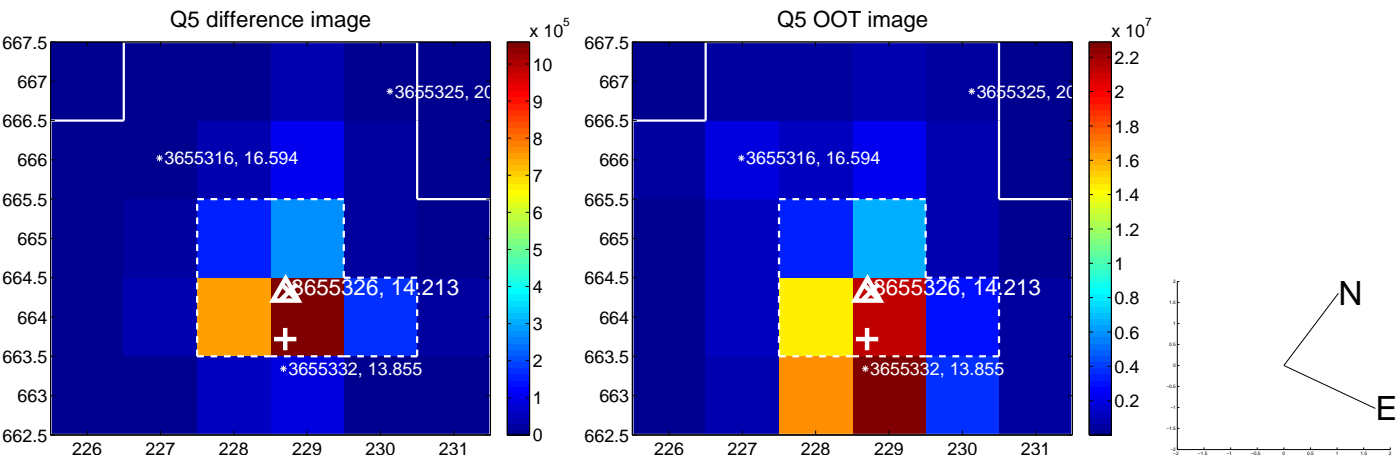


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

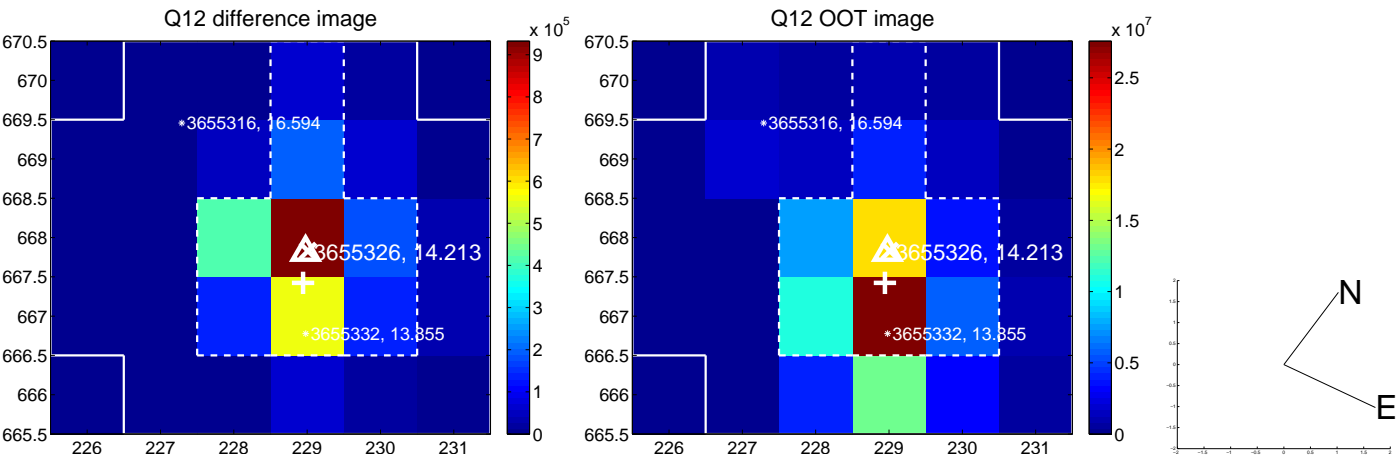
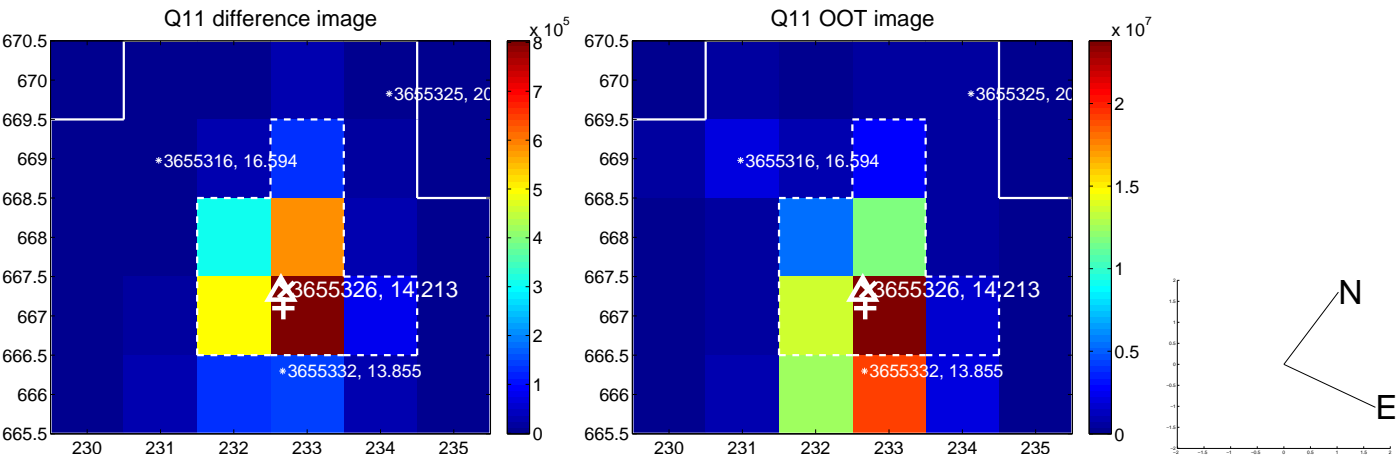
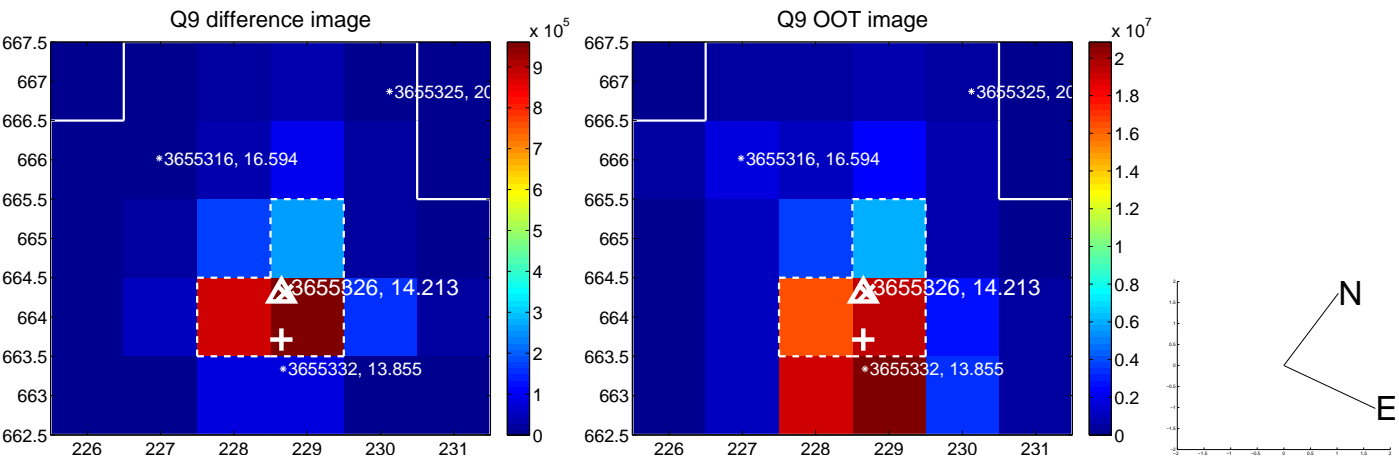
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



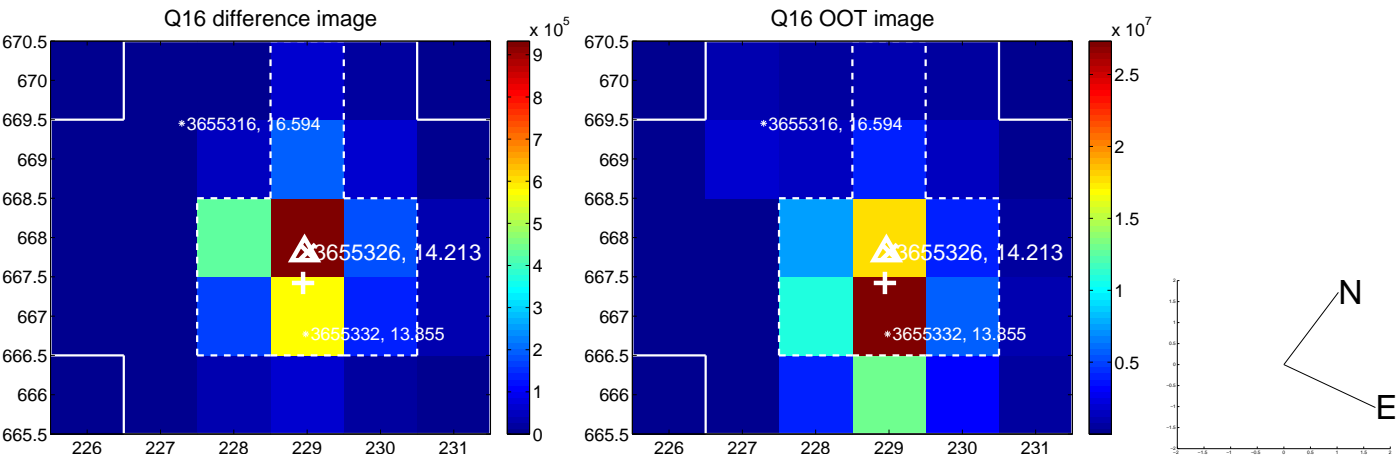
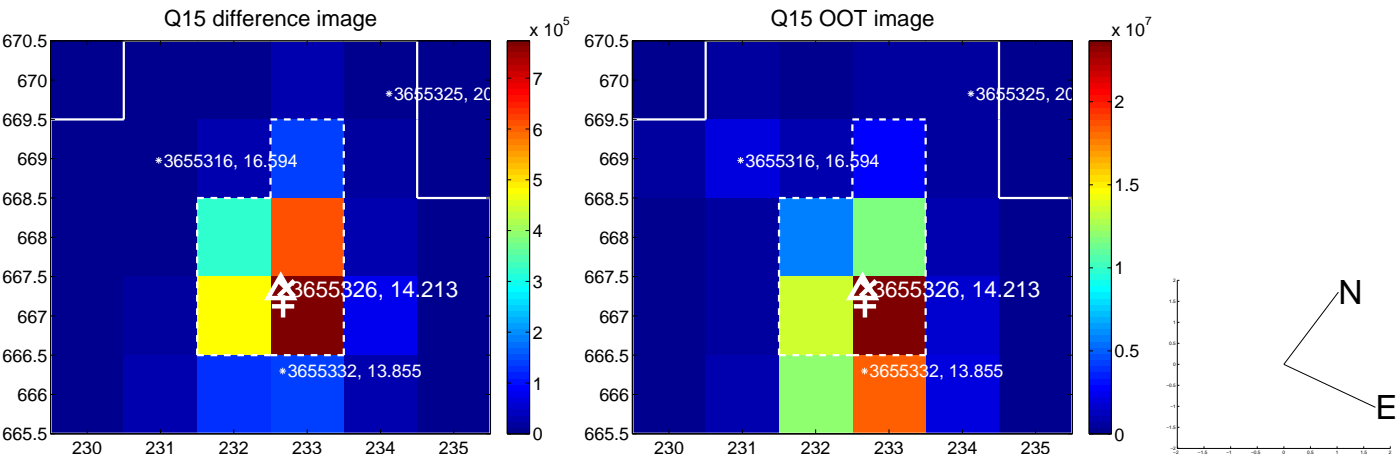
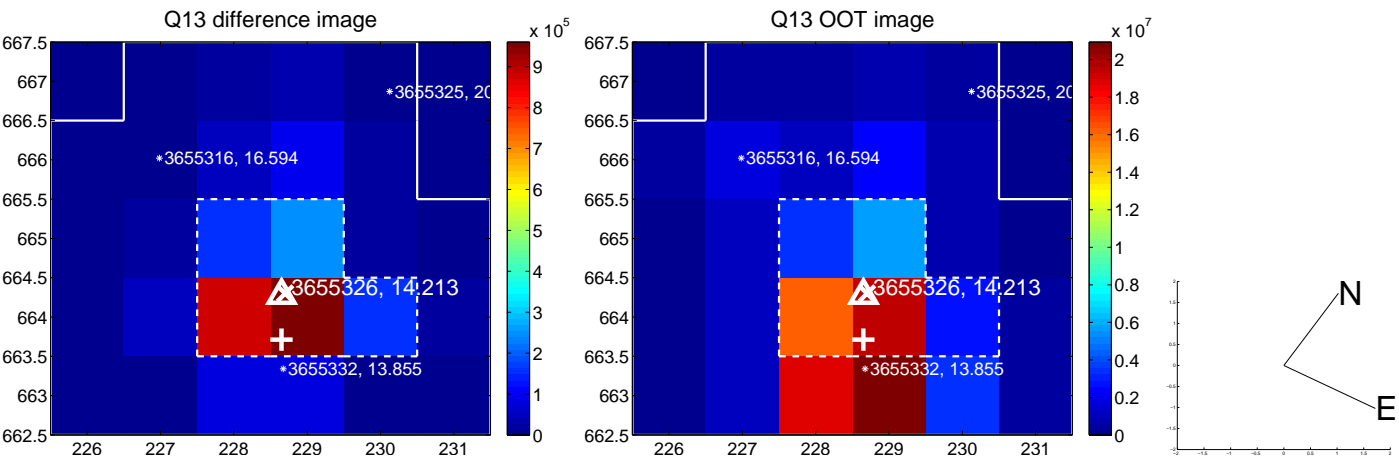
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



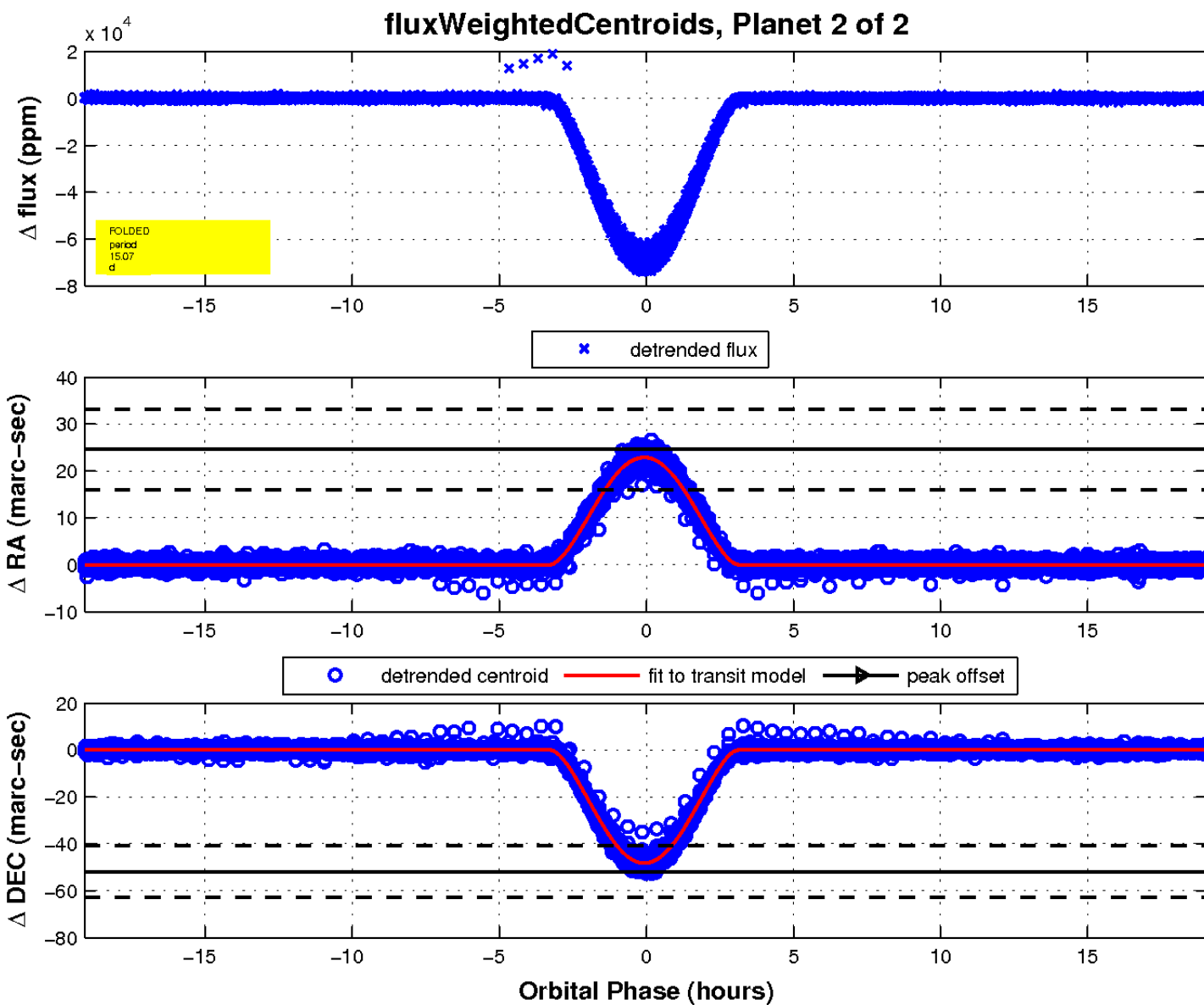
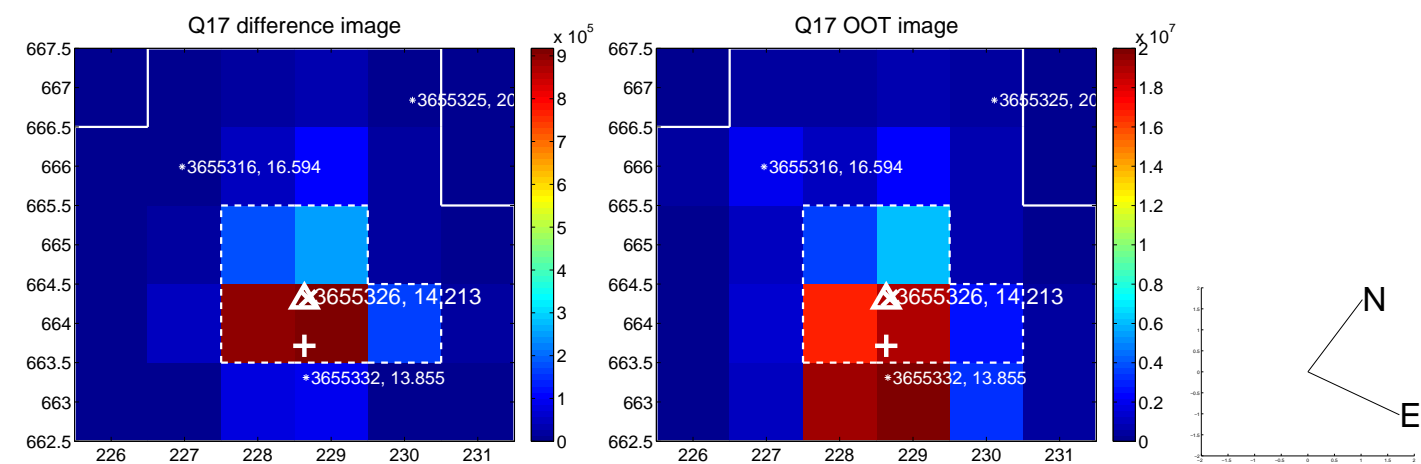
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



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



UKIRT Image

Declination

