

# KIC 008653563

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008653563-01	OBS	No	1.103682	131.776312	153.9	5.335	16.4	16.2	2.16	7830	2.76	24198.32
008653563-02	OBS	No	1.103761	132.226438	126.0	5.515	14.2	17.0	2.16	7830	2.47	24196.02

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008653563-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT
008653563-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—SAME_NTL_PERIOD

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

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

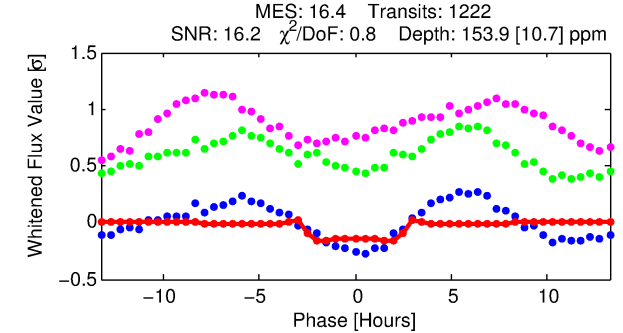
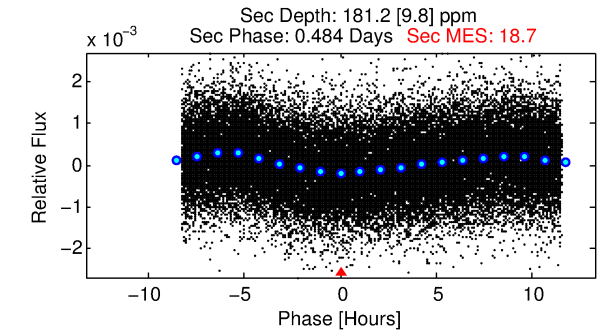
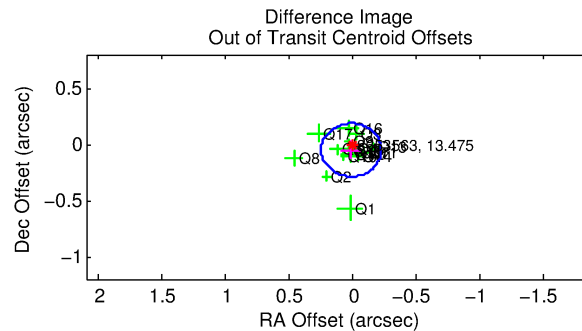
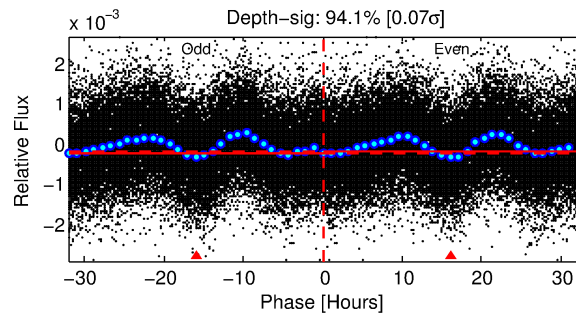
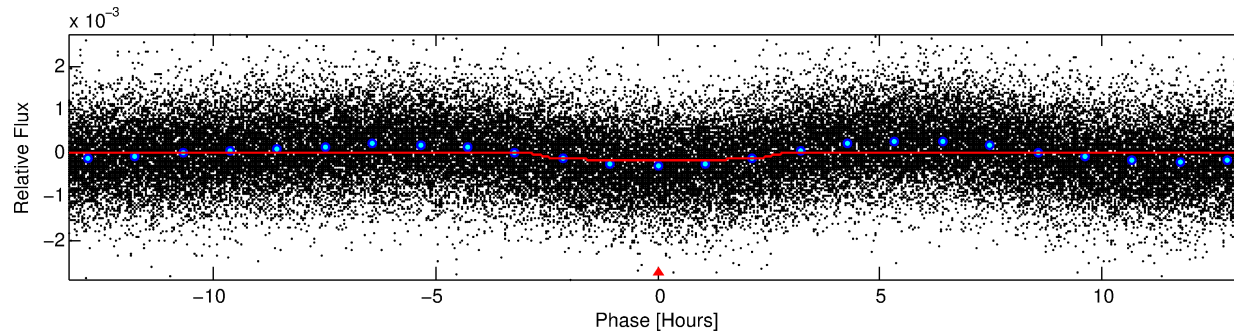
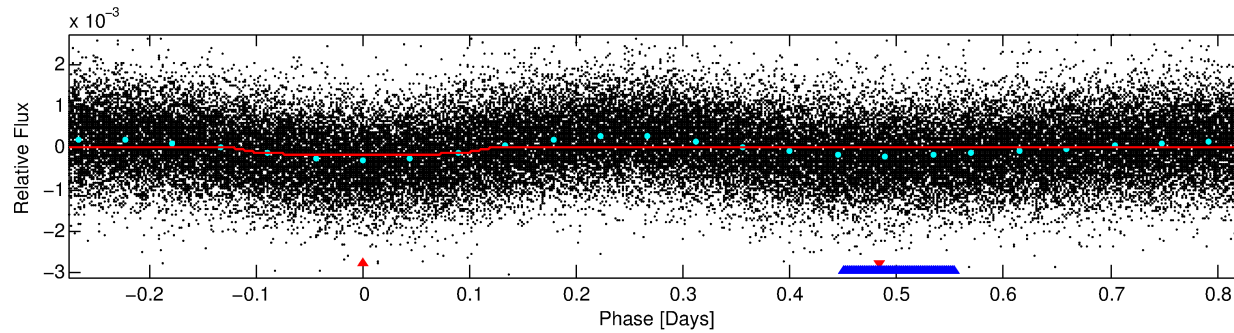
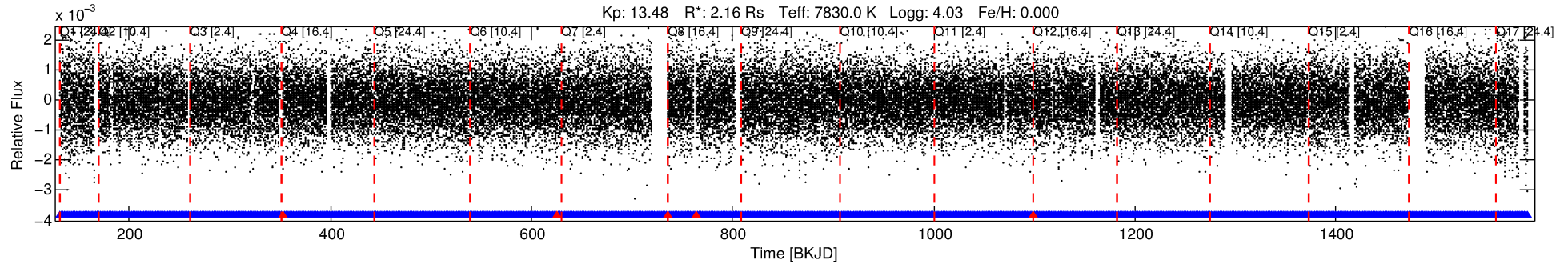
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 008653563-01

No Significant Match Found

# DV One-Page Summary

KIC: 8653563 Candidate: 1 of 2 Period: 1.104 d



## DV Fit Results:

Period = 1.10368 [0.00001] d  
Epoch = 131.7763 [0.0026] BKJD  
Rp/R\* = 0.0117 [0.0064]  
a/R\* = 1.62 [3.27]  
b = 0.41 [6.66]  
Seff = 24198.32 [8628.53]  
Teq = 3180 [284] K  
Rp = 2.76 [1.64] Re  
a = 0.0255 [0.0054] AU  
Ag = 8.50 [9.62] [0.78 $\sigma$ ]  
Teffp = 8397 [2308] K [2.24 $\sigma$ ]

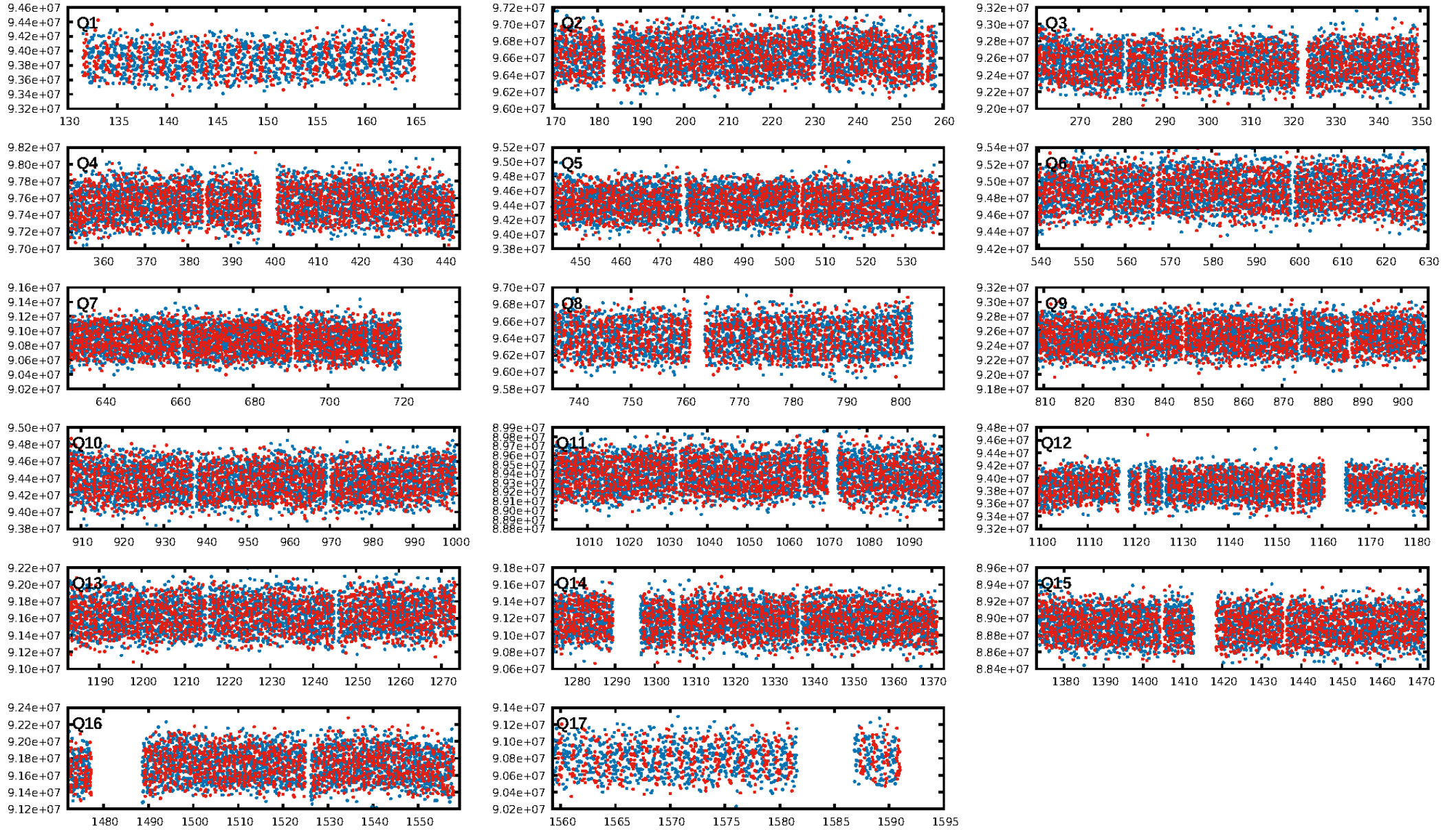
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
**LongPeriod-sig: 0.0% [0.00 $\sigma$ ]**  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [1162/1167]  
GhostDiagnostic-chr: 2.624  
Centroid-sig: 1.3%  
**Centroid-so: 0.717 arcsec [3.28 $\sigma$ ]**  
OotOffset-rm: 0.055 arcsec [0.69 $\sigma$ ]  
KicOffset-rm: 0.049 arcsec [0.65 $\sigma$ ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 0.00 [0/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 22:24:45 Z

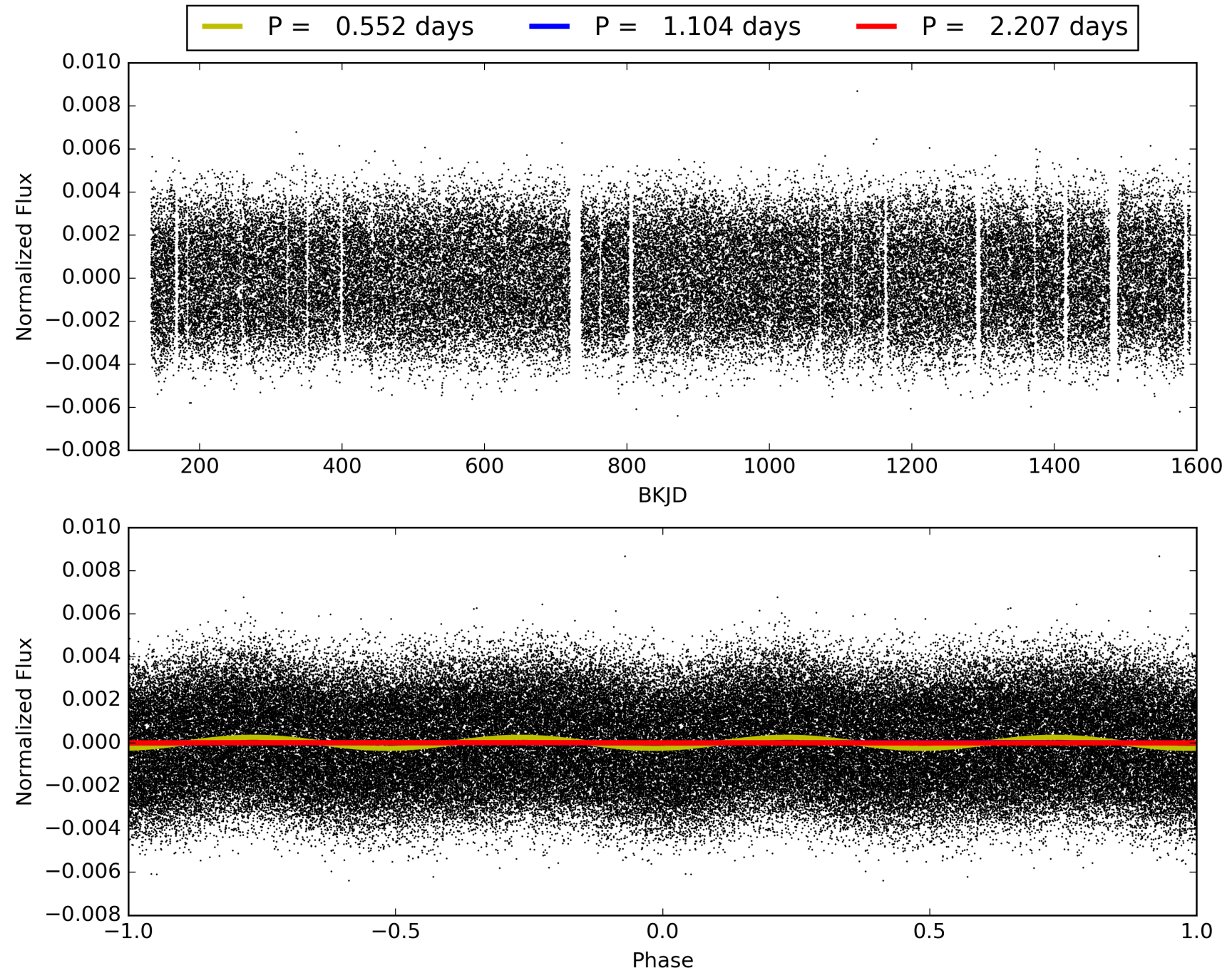
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 008653563-01, PDC Light Curves



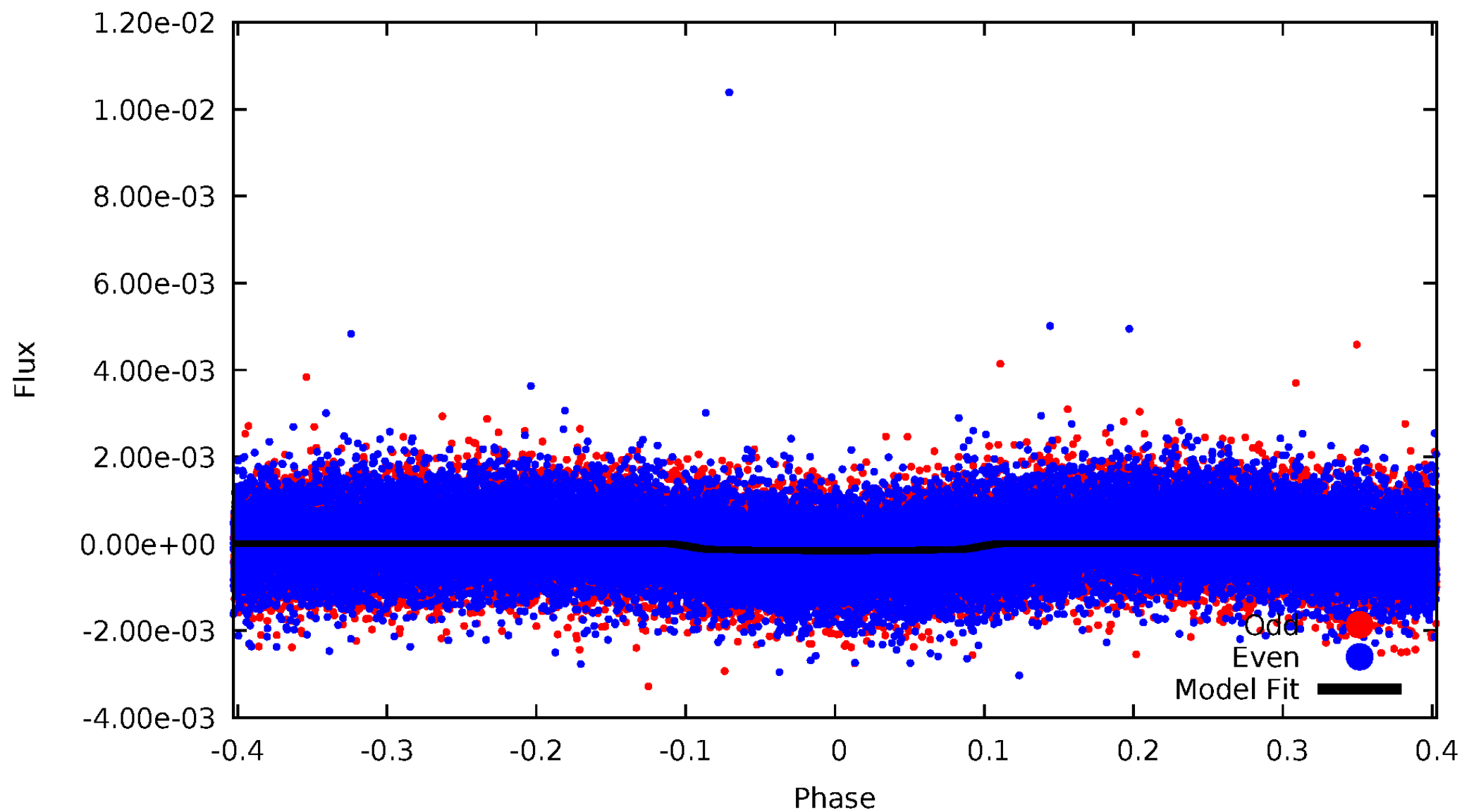


TCE 008653563-01



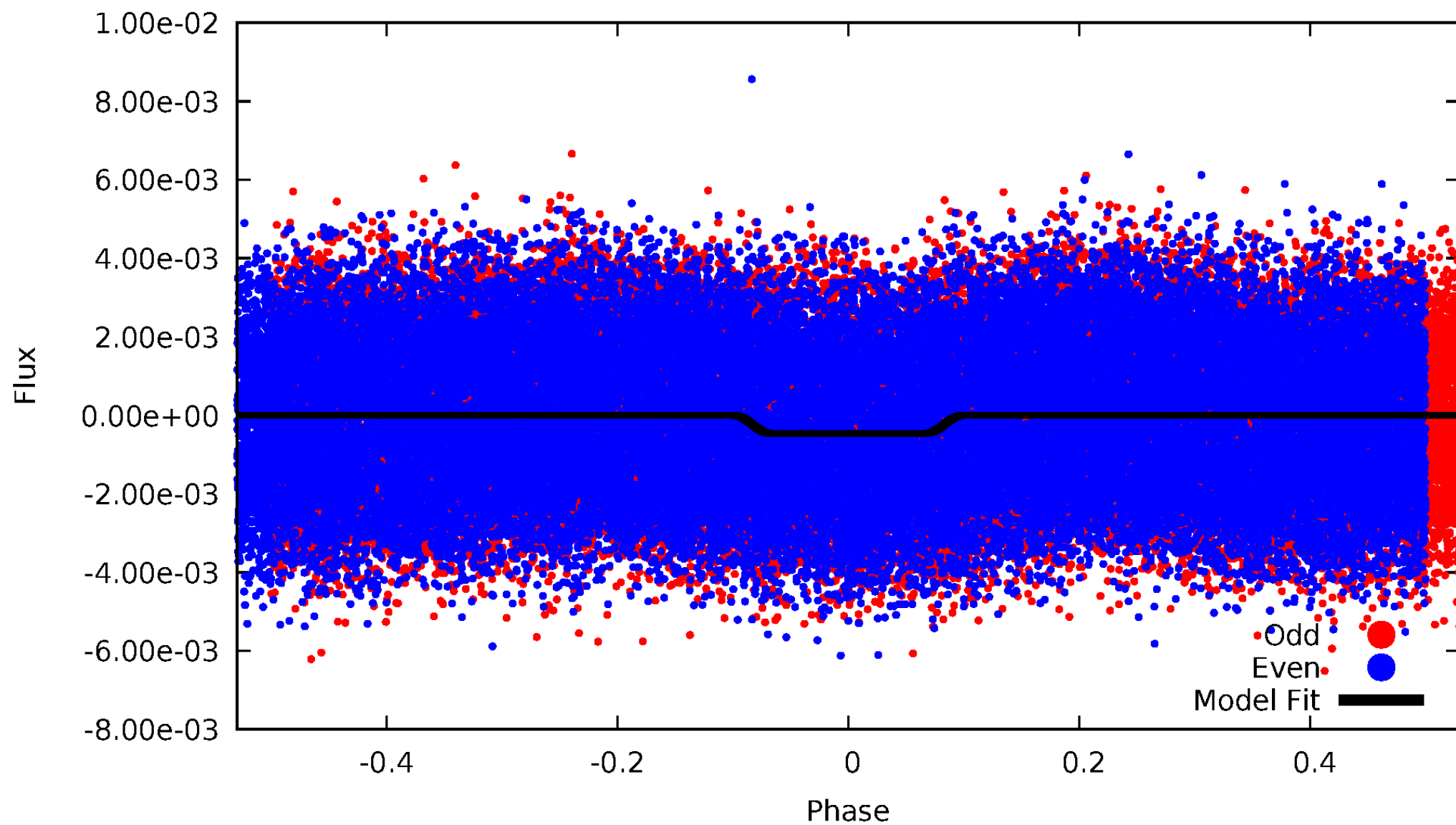
# DV Odd/Even

TCE 008653563-01



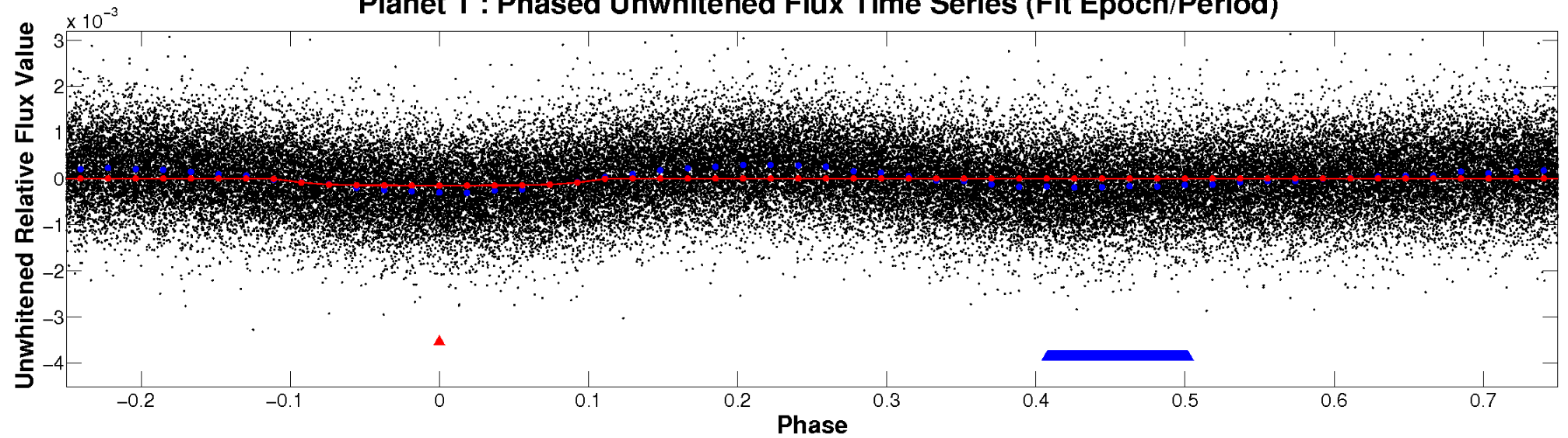
# ALT Odd/Even

TCE 008653563-01

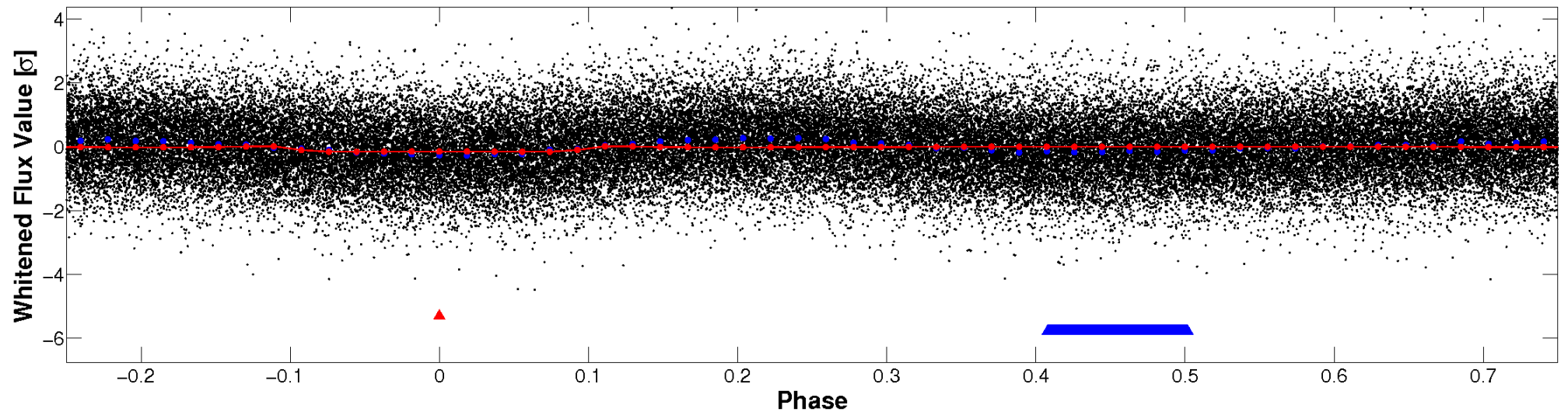


# Non-Whitened Vs. Whitened Light Curve

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



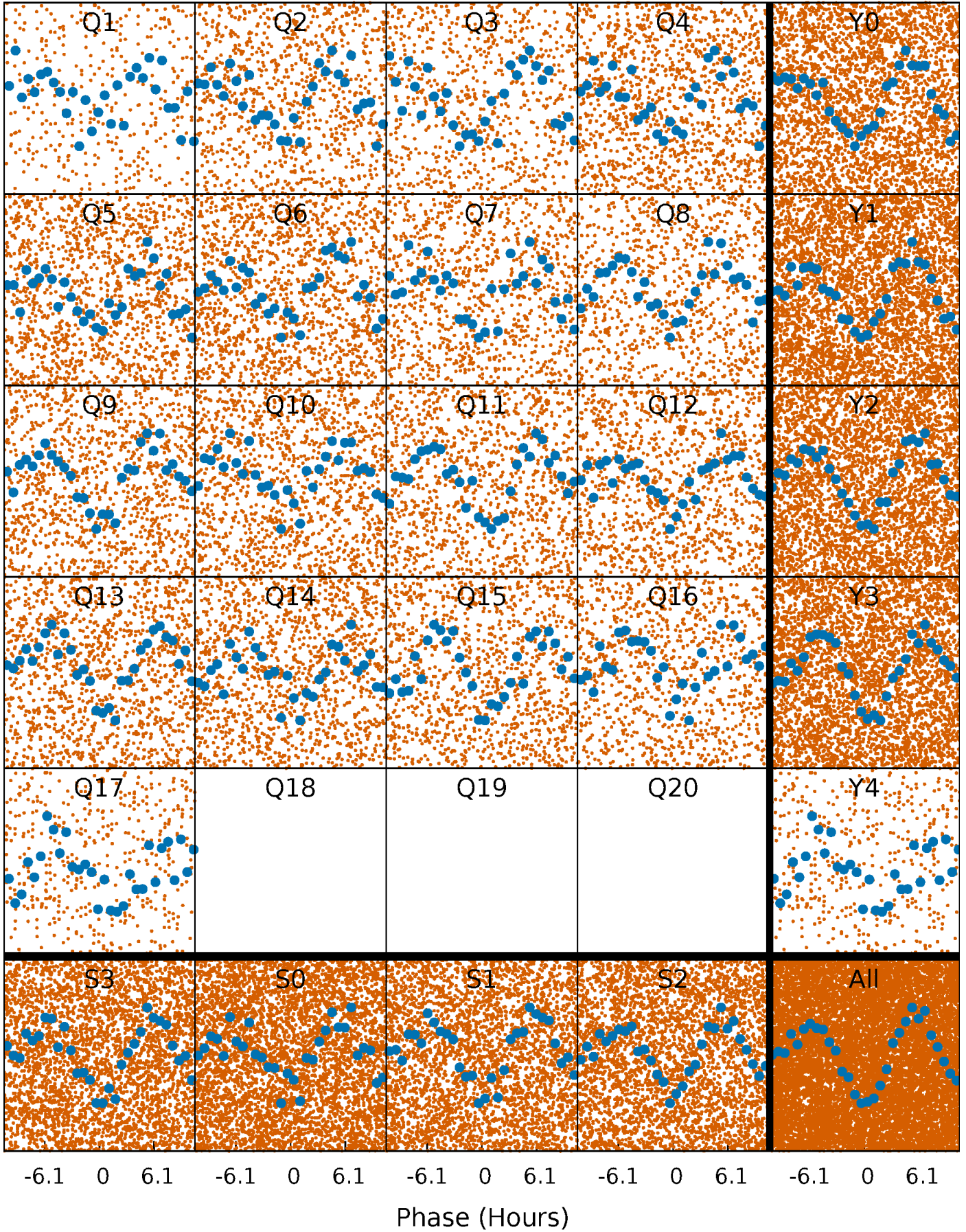
**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**





# PDC Quarter-Phased Transit Curves

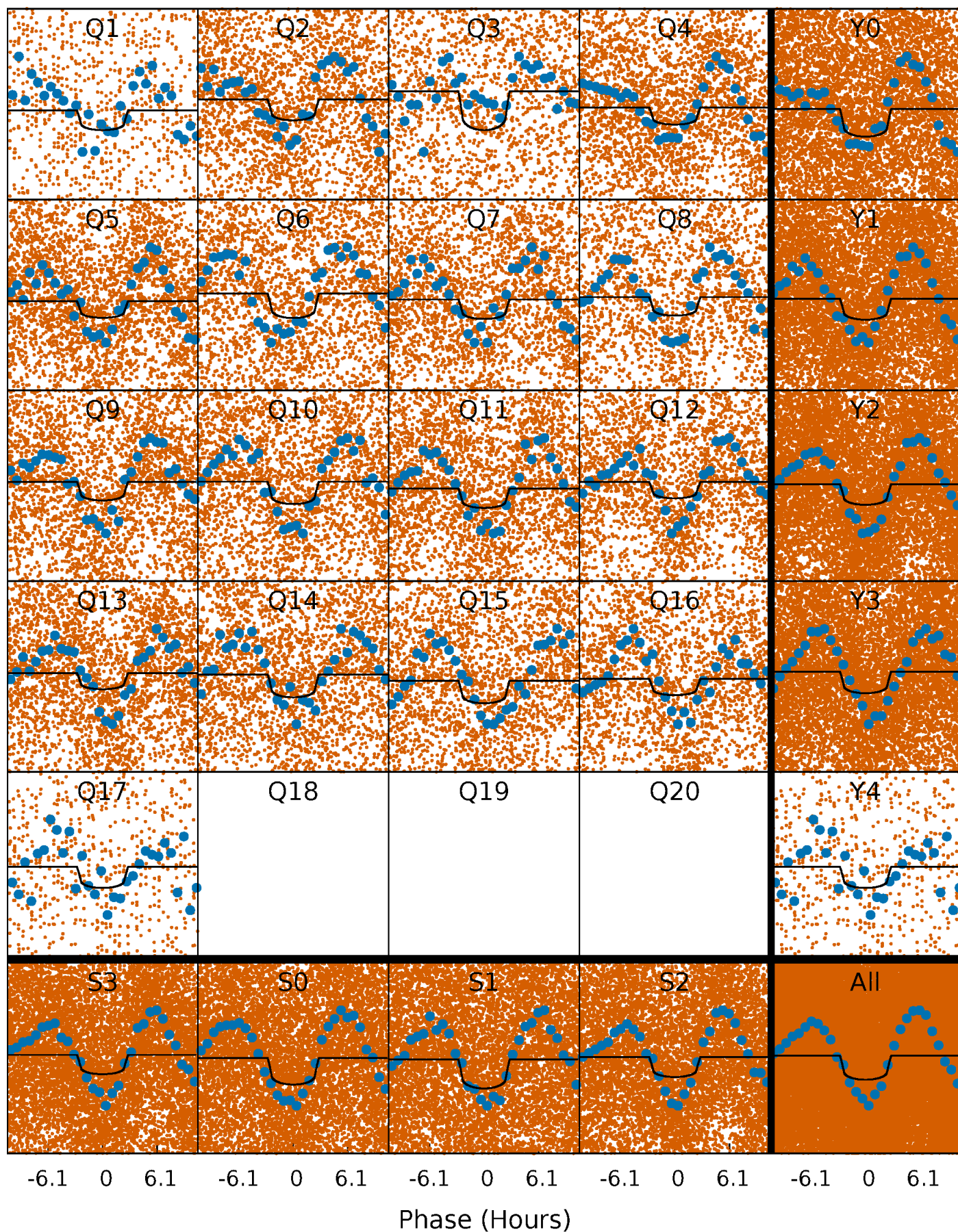
TCE 008653563-01 P= 1.103682 Days  $T_0=131.776312$  (BKJD)





# DV Quarter-Phased Transit Curves

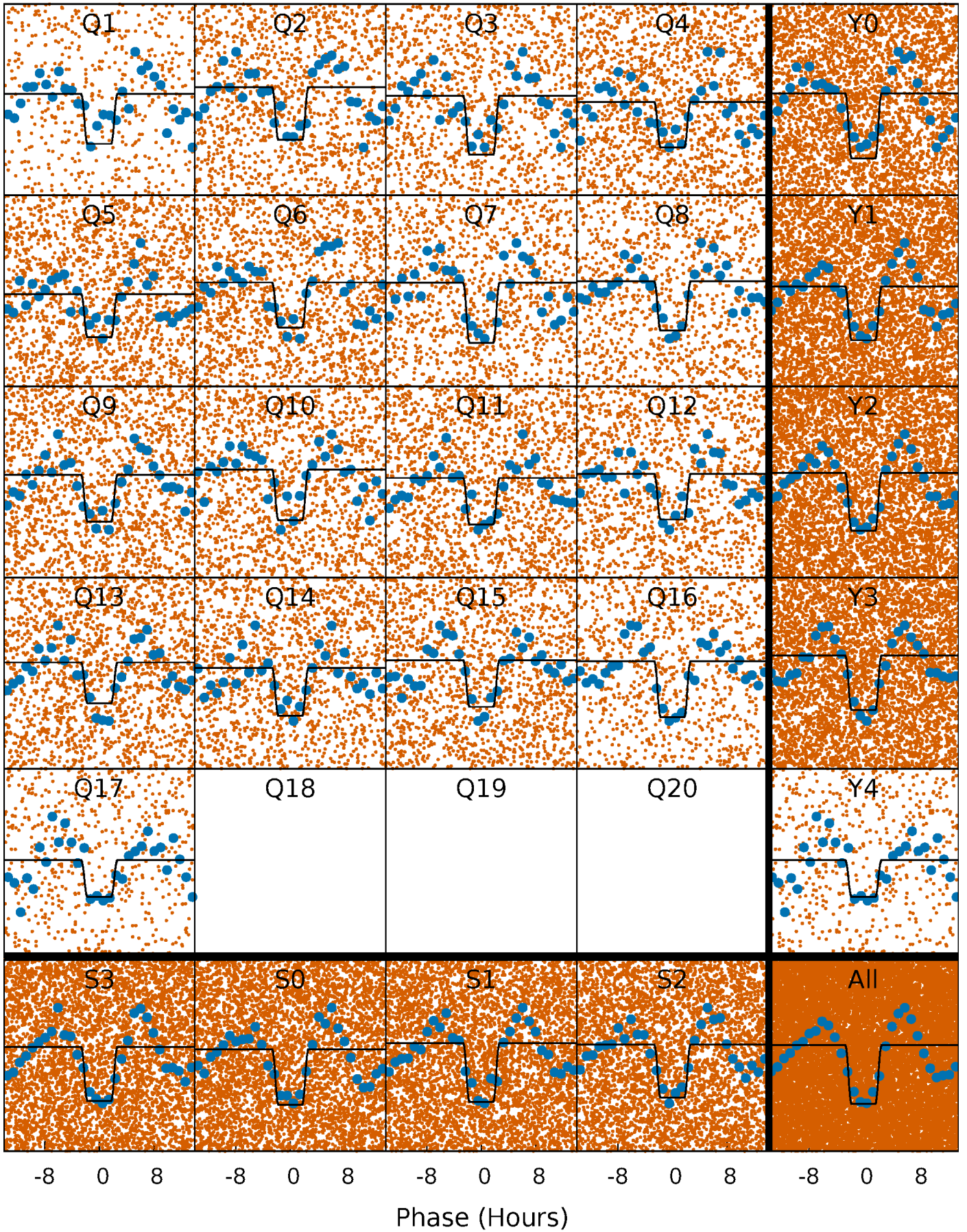
TCE 008653563-01 P= 1.103682 Days  $T_0=131.776312$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

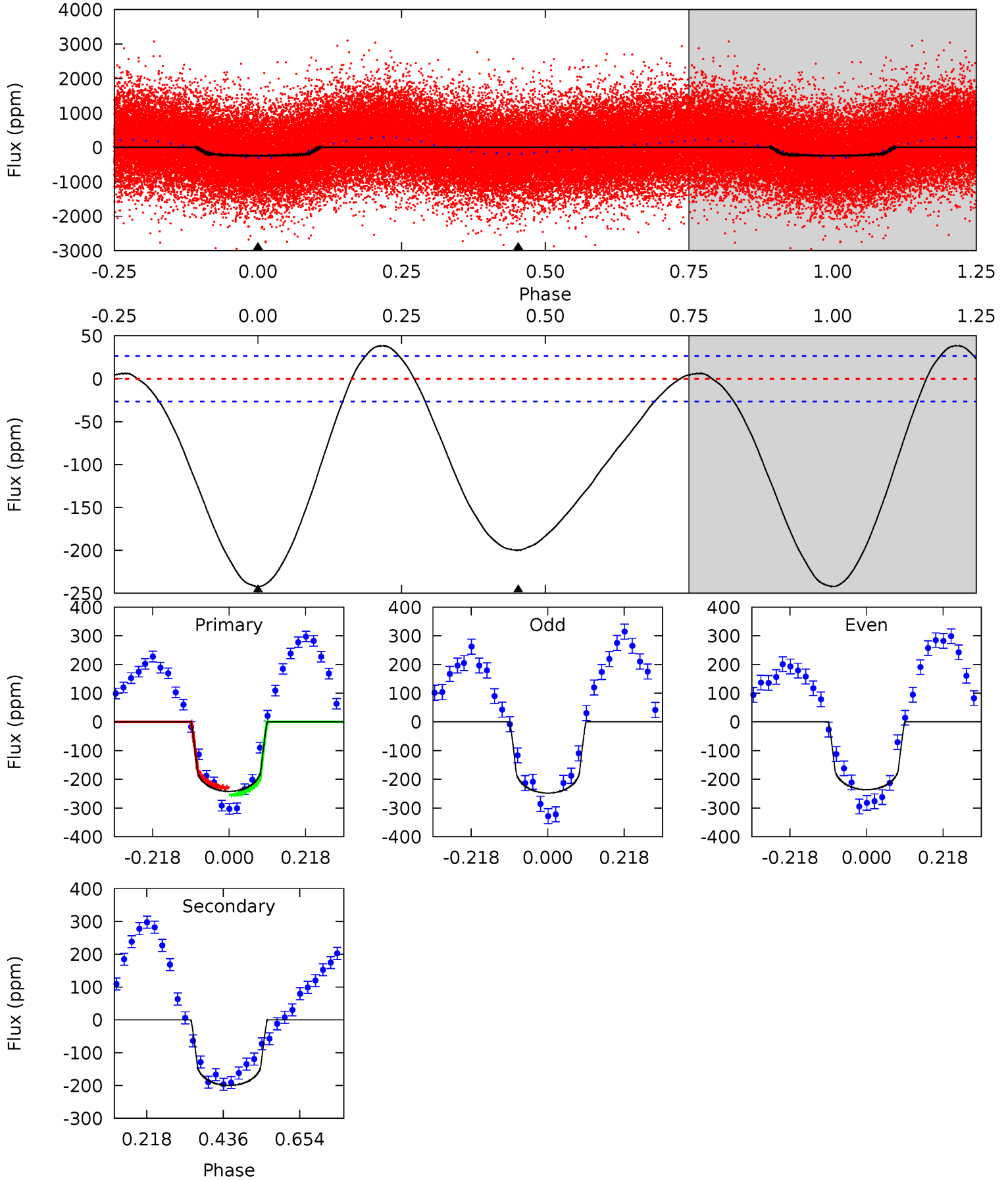
TCE 008653563-01 P= 1.103745 Days  $T_0=131.734221$  (BKJD)



# DV Model-Shift Uniqueness Test

008653563-01, P = 1.103682 Days, E = 130.672630 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
40.2	33.2	0	0	4.40	1.23	3.43	40.2	40.2	33.2	33.2	0.99	0.99	0.14	2.01

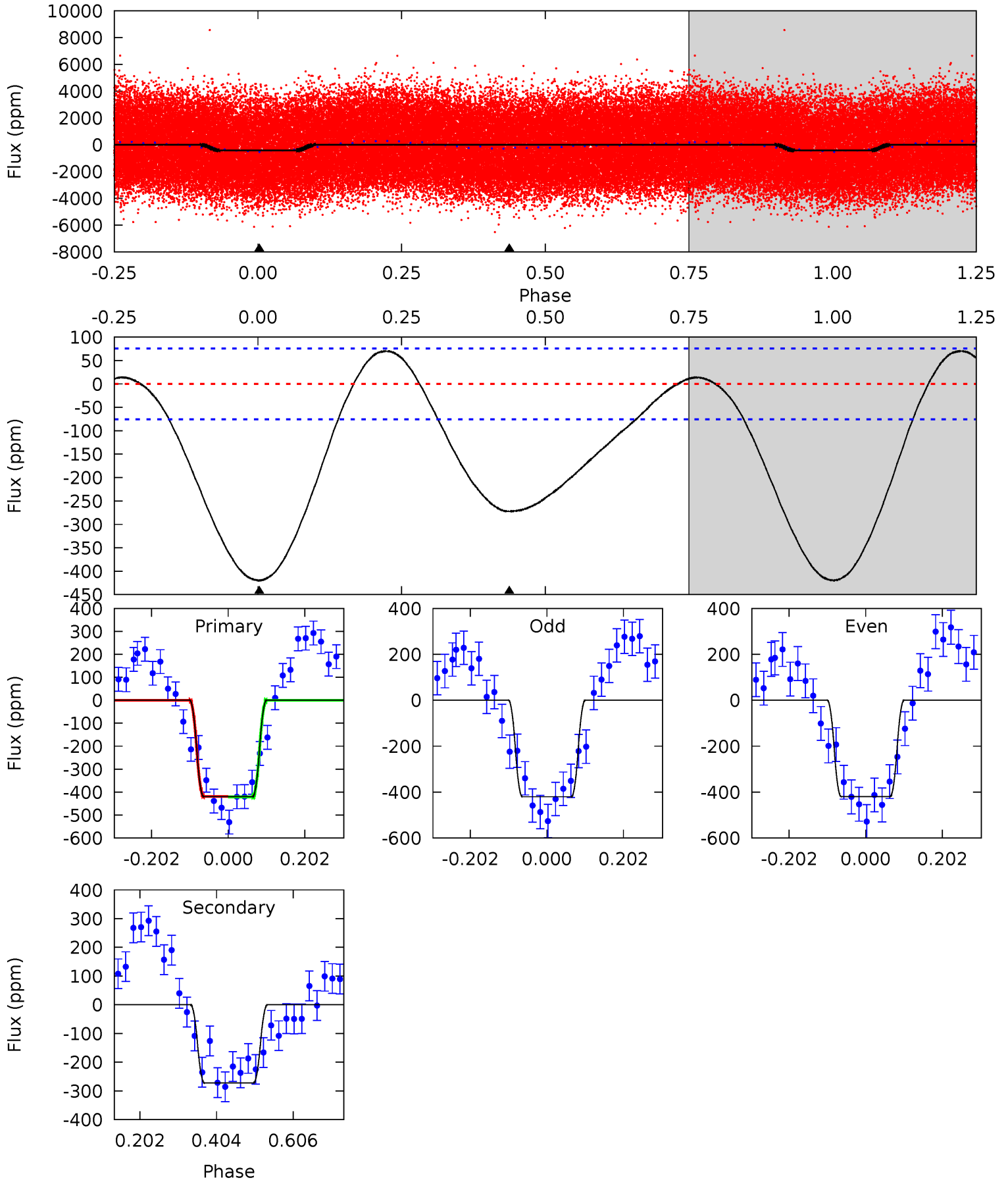




# Alt Model-Shift Uniqueness Test

008653563-01, P = 1.103745 Days, E = 130.630476 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
24.5	15.9	0	0	4.41	1.28	2.66	24.5	24.5	15.9	15.9	0.04	1.01	0.14	0.06



### Stellar Parameters For KIC 008653563

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7830^{+216}_{-324}$	$4.027^{+0.176}_{-0.144}$	$0.000^{+0.200}_{-0.350}$	$2.160^{+0.477}_{-0.530}$	$1.809^{+0.147}_{-0.319}$	$0.253^{+0.245}_{-0.108}$
	+3%/-4%	+4%/-4%	+inf%/-inf%	+22%/-25%	+8%/-18%	+97%/-43%
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 008653563-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-200 \pm 6$	$2.76^{+1.59}_{-1.39}$	$4404^{+307}_{-324}$	$8372^{+6470}_{-1829}$	$9.046^{+27.045}_{-5.350}$
Alt.	$-272 \pm 17$	$5.00^{+1.72}_{-1.64}$	$4415^{+309}_{-307}$	$6483^{+1672}_{-879}$	$3.808^{+4.599}_{-1.669}$

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

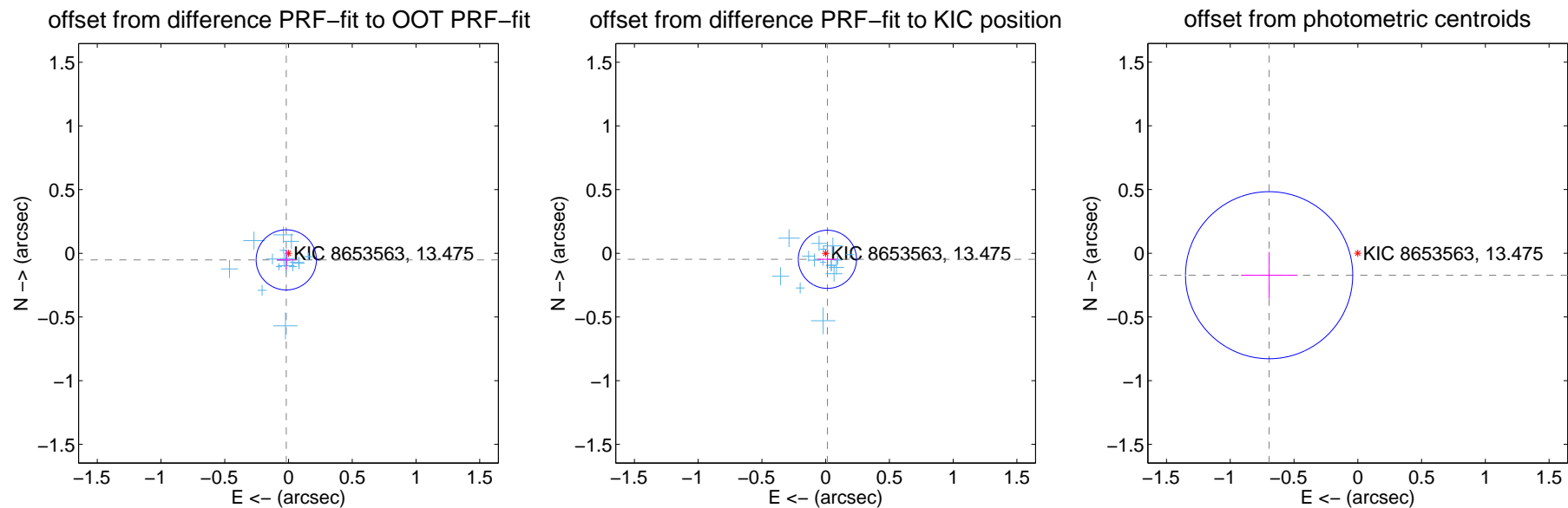
## DV Centroid Data

Supplemental centroid analysis for 008653563-01. Kepler magnitude: 13.47. Transit SNR 16.19

There are 17 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.03 arcsec

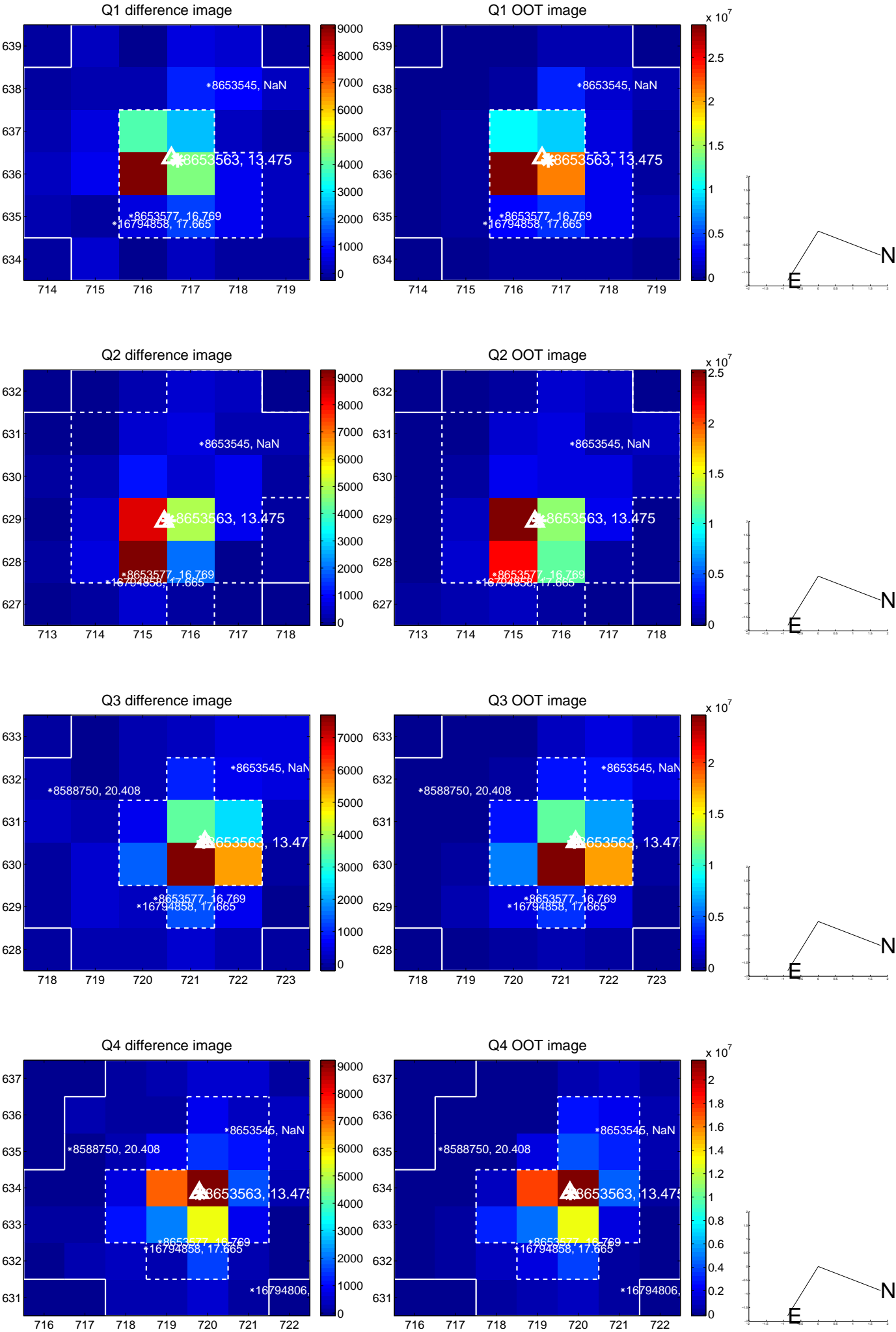
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.055 \pm 0.079$	0.69	$0.018 \pm 0.075$	$-0.052 \pm 0.078$
PRF-fit source offset from KIC position	$0.049 \pm 0.076$	0.65	$-0.014 \pm 0.075$	$-0.047 \pm 0.076$
photometric centroid source offset	$0.72 \pm 0.22$	3.28	$0.70 \pm 0.22$	$-0.17 \pm 0.18$



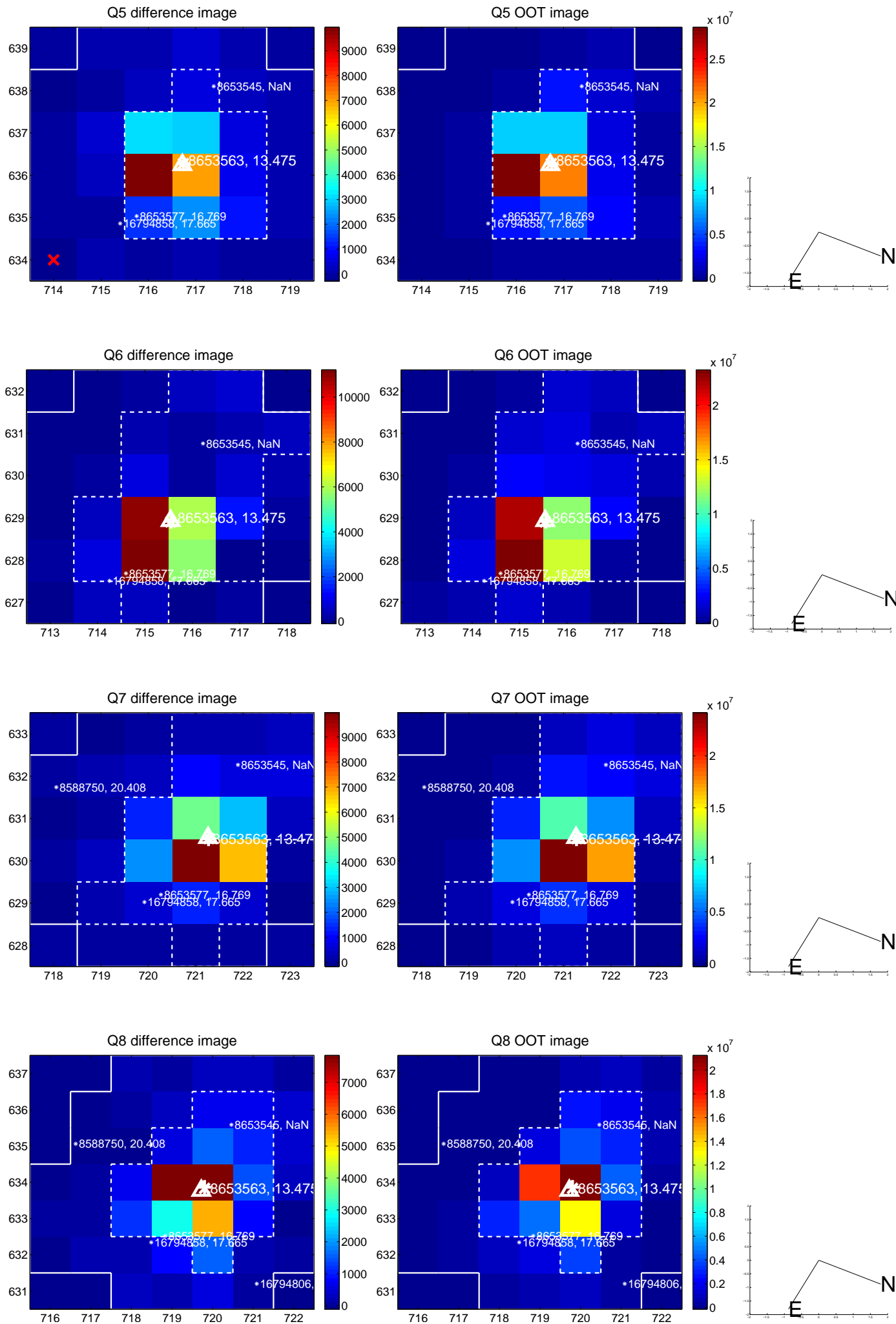
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



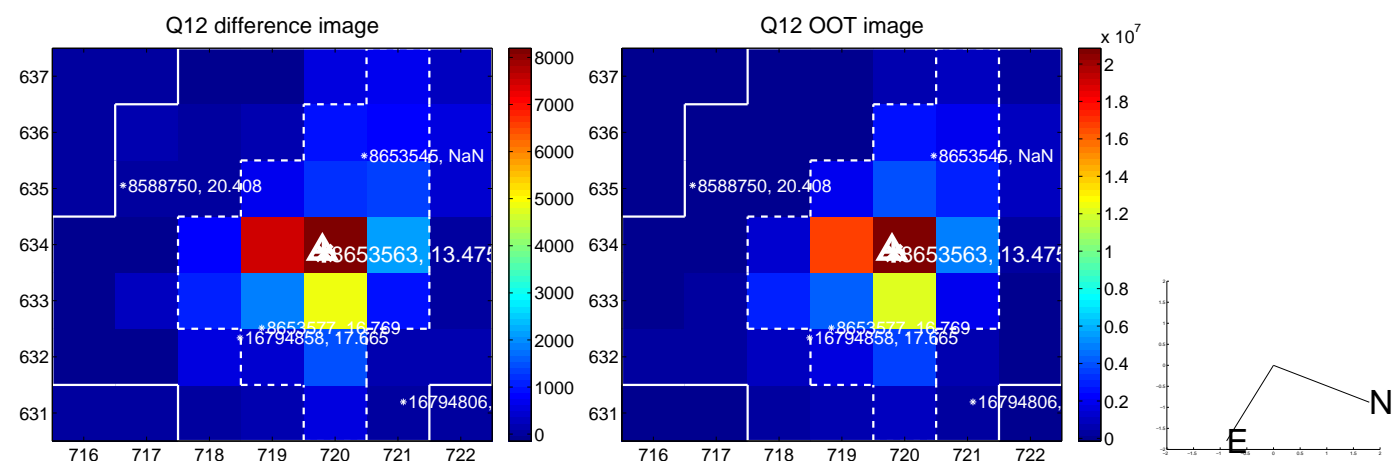
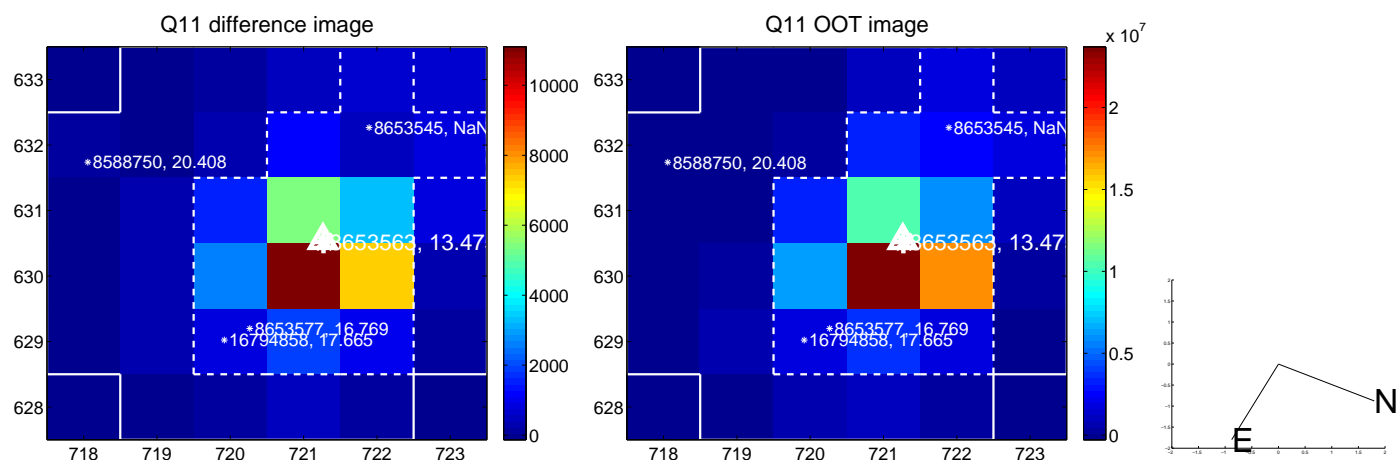
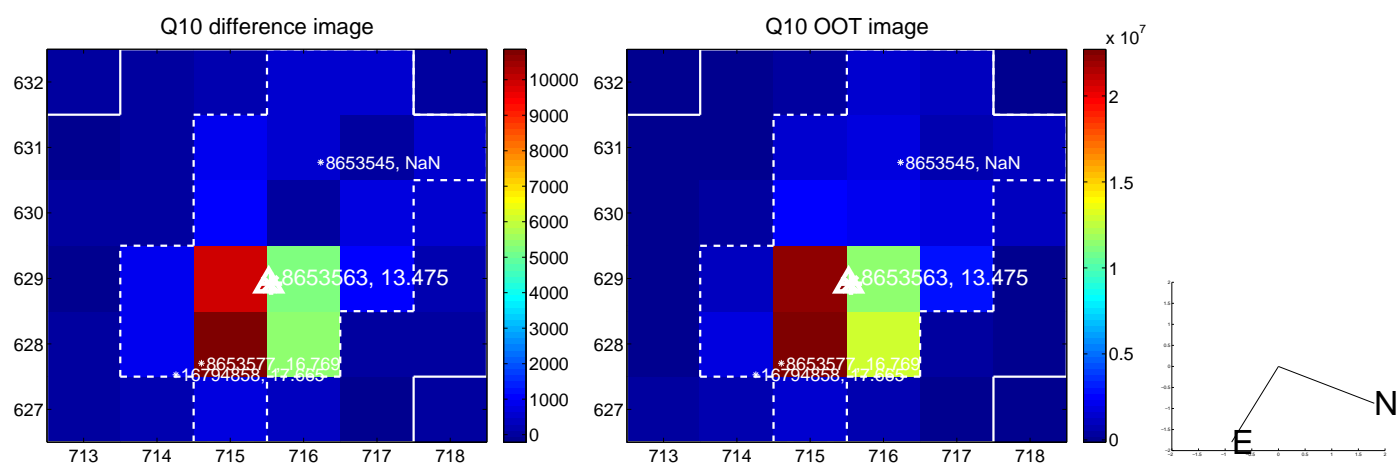
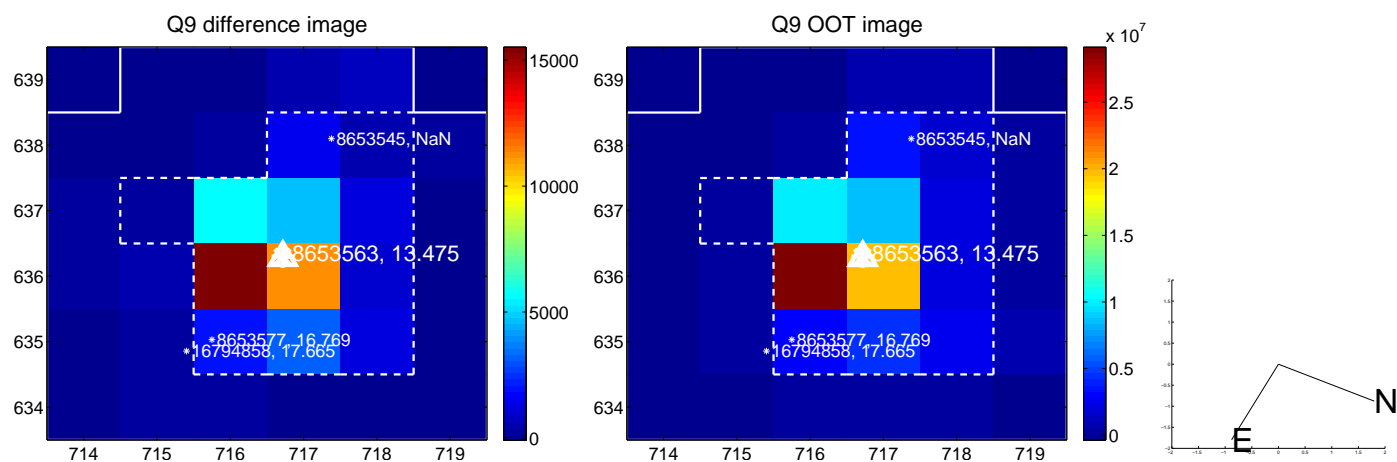
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

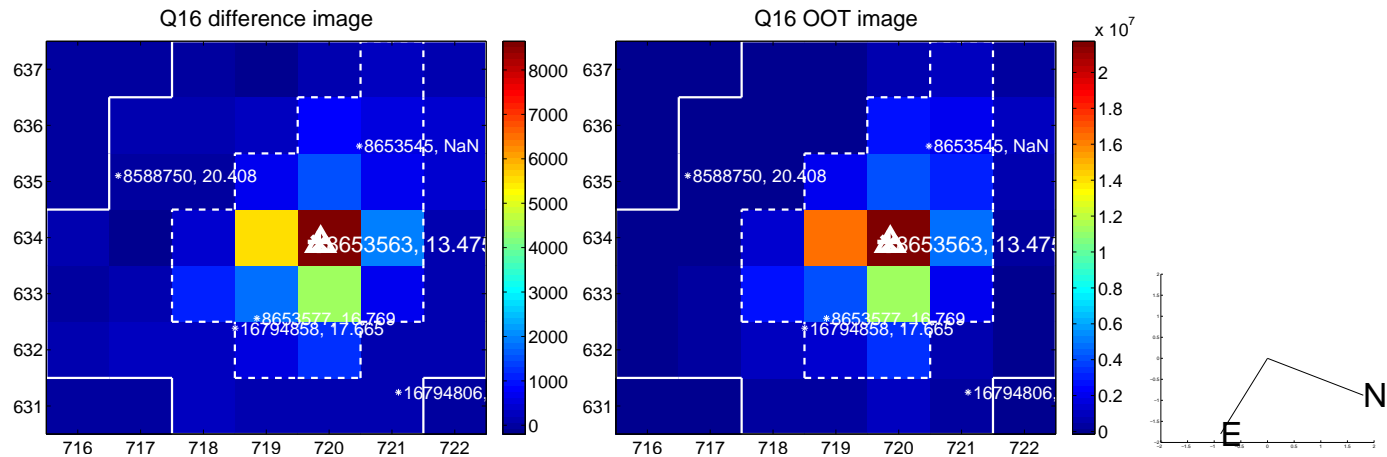
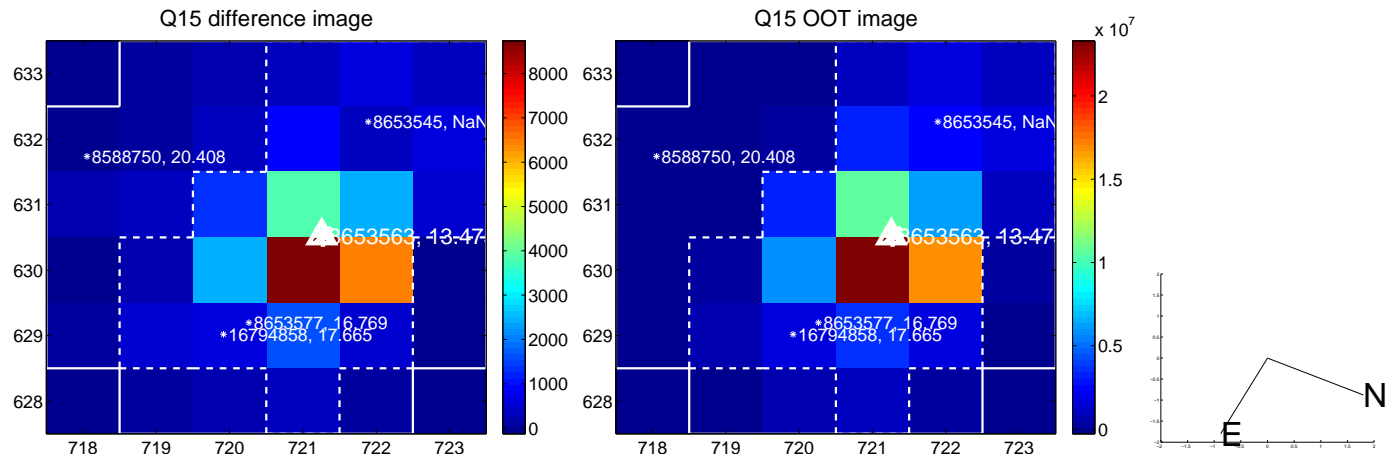
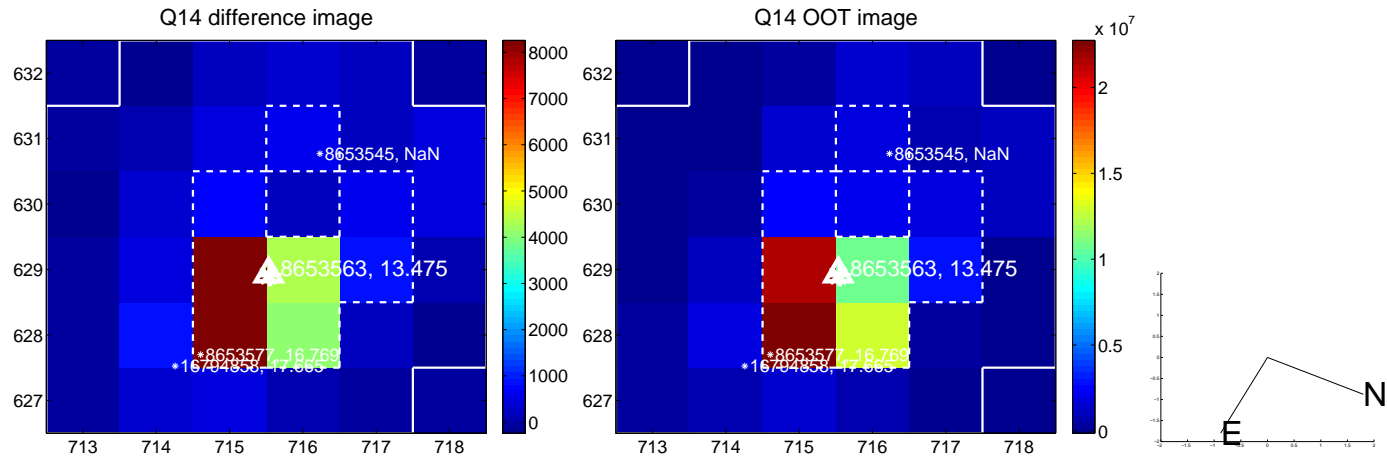
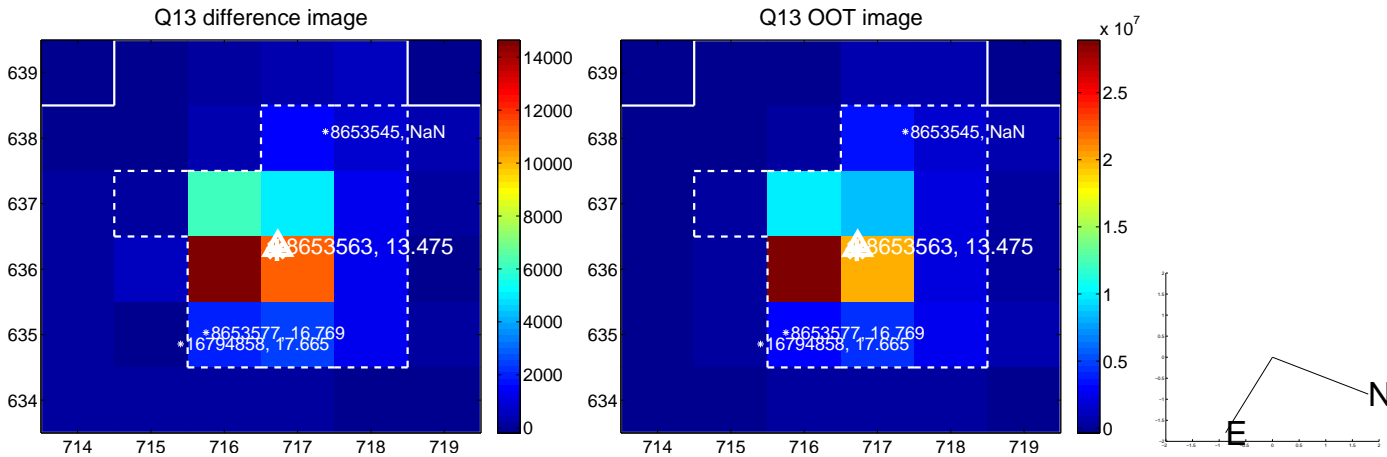


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

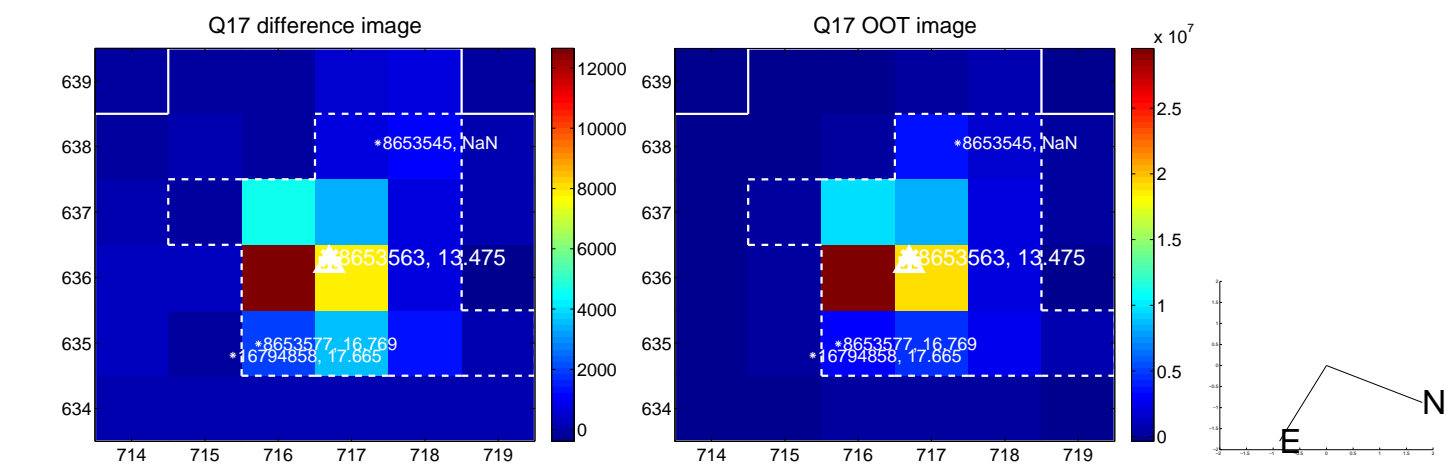




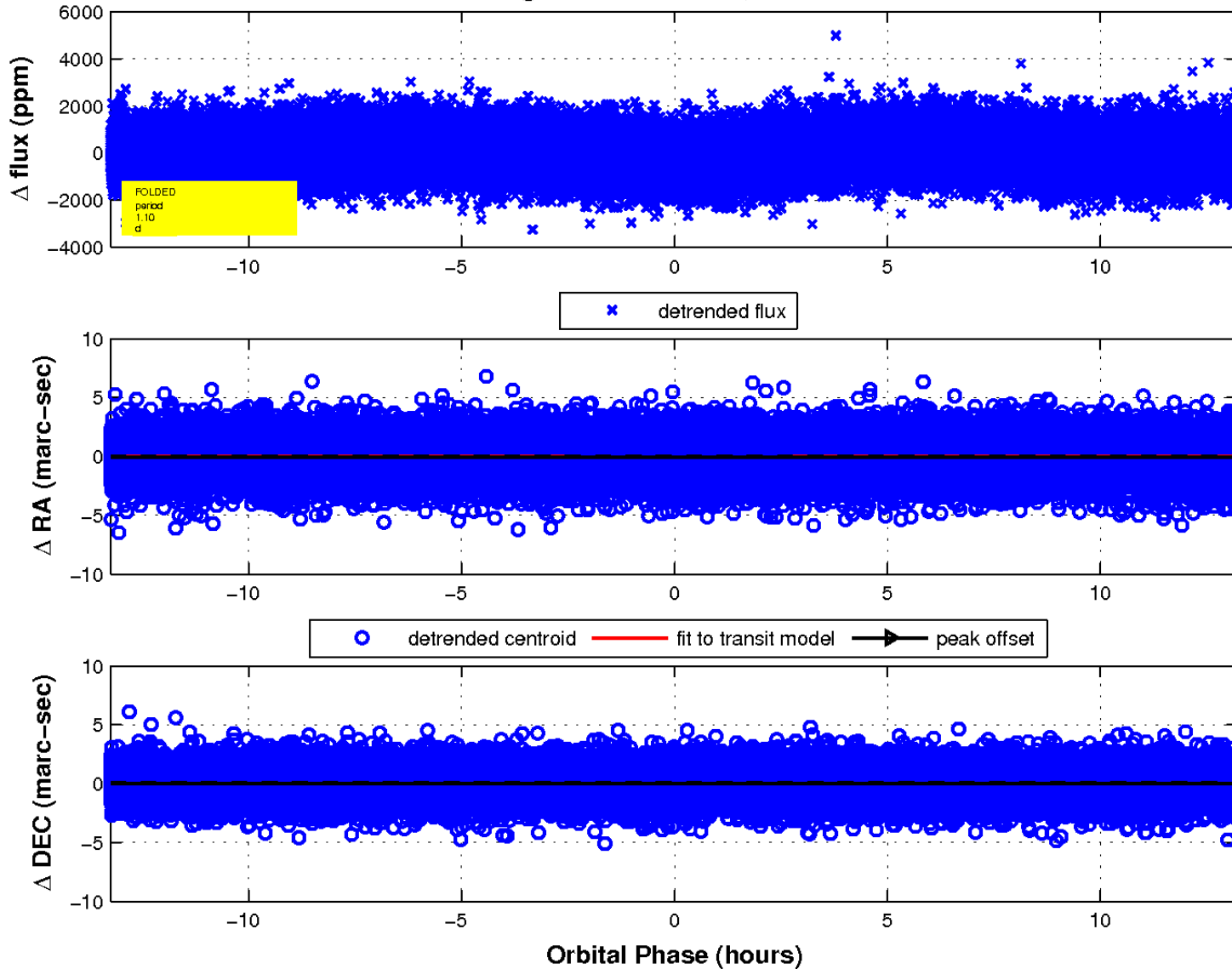
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

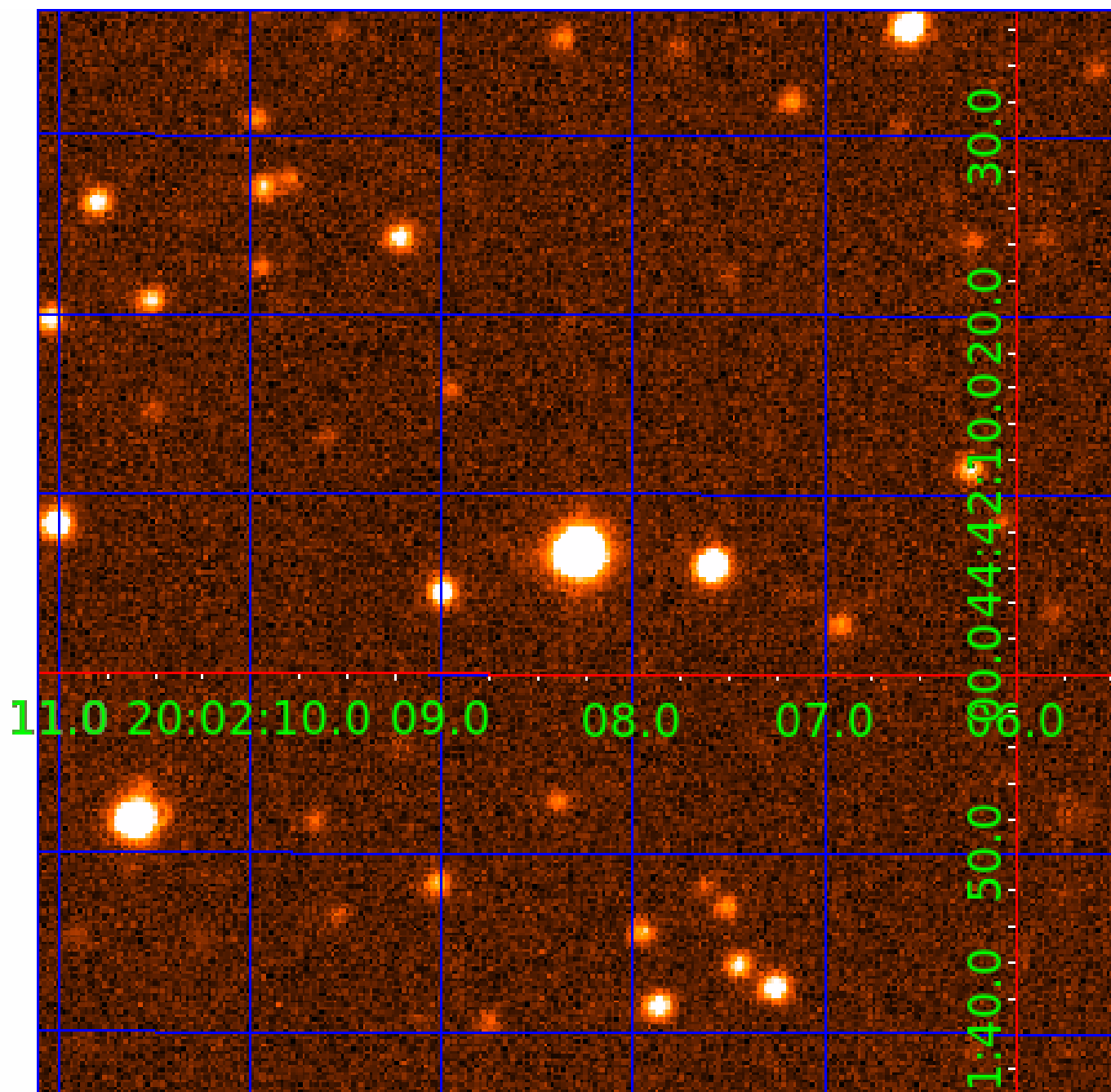


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination





# KIC 008653563

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008653563-01	OBS	No	1.103682	131.776312	153.9	5.335	16.4	16.2	2.16	7830	2.76	24198.32
008653563-02	OBS	No	1.103761	132.226438	126.0	5.515	14.2	17.0	2.16	7830	2.47	24196.02

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008653563-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT
008653563-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—SAME_NTL_PERIOD

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

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

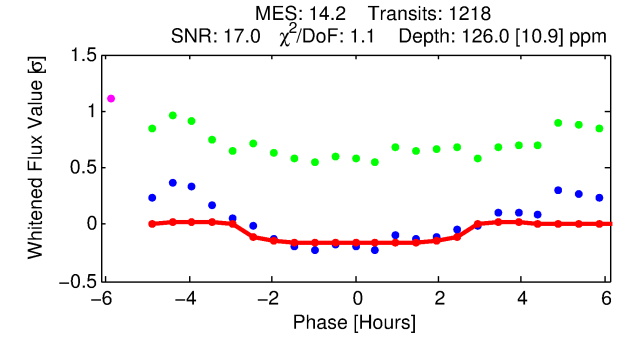
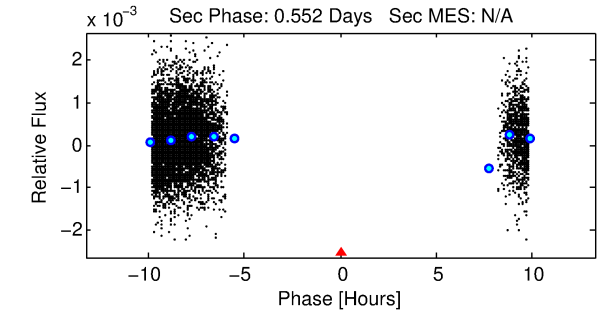
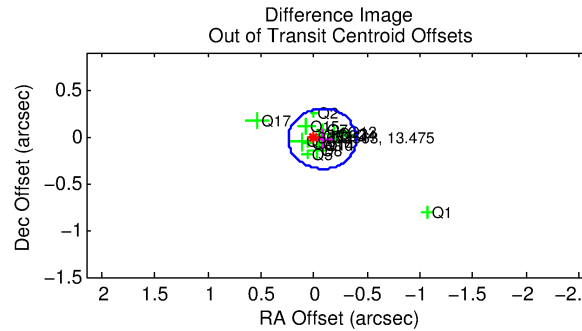
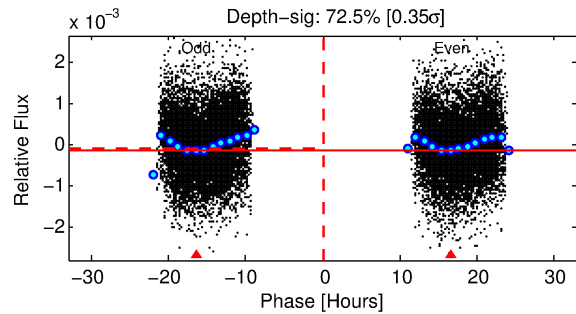
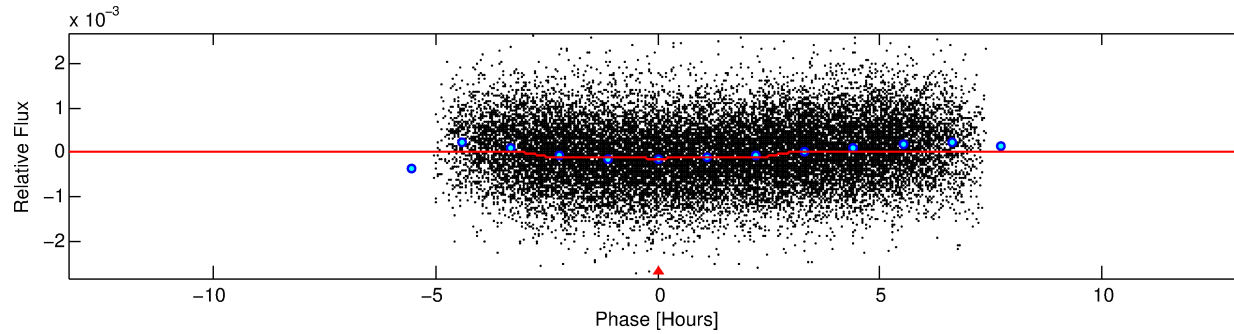
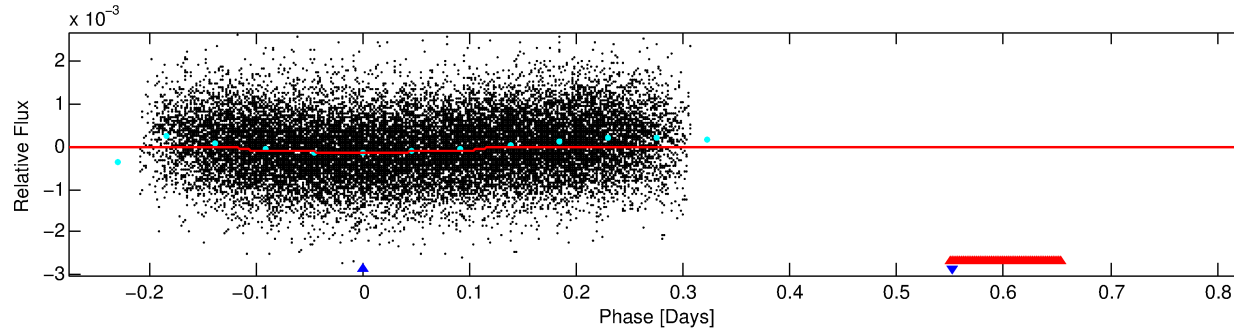
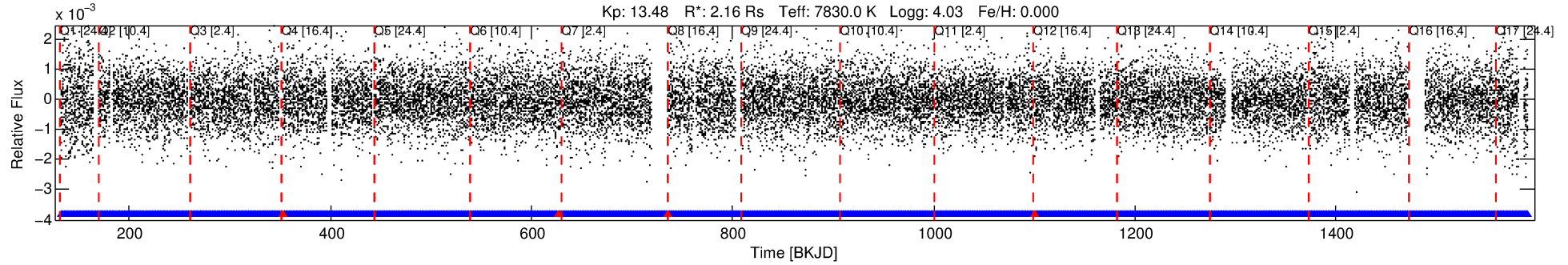
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 008653563-02

No Significant Match Found

# DV One-Page Summary

KIC: 8653563 Candidate: 2 of 2 Period: 1.104 d



## DV Fit Results:

Period = 1.10376 [0.00001] d  
Epoch = 132.2264 [0.0033] BKJD  
Rp/R\* = 0.0105 [0.0092]  
a/R\* = 1.64 [5.45]  
b = 0.20 [26.14]  
Seff = 24196.02 [8627.72]  
Teq = 3180 [284] K  
Rp = 2.47 [2.26] Re  
a = 0.0255 [0.0054] AU

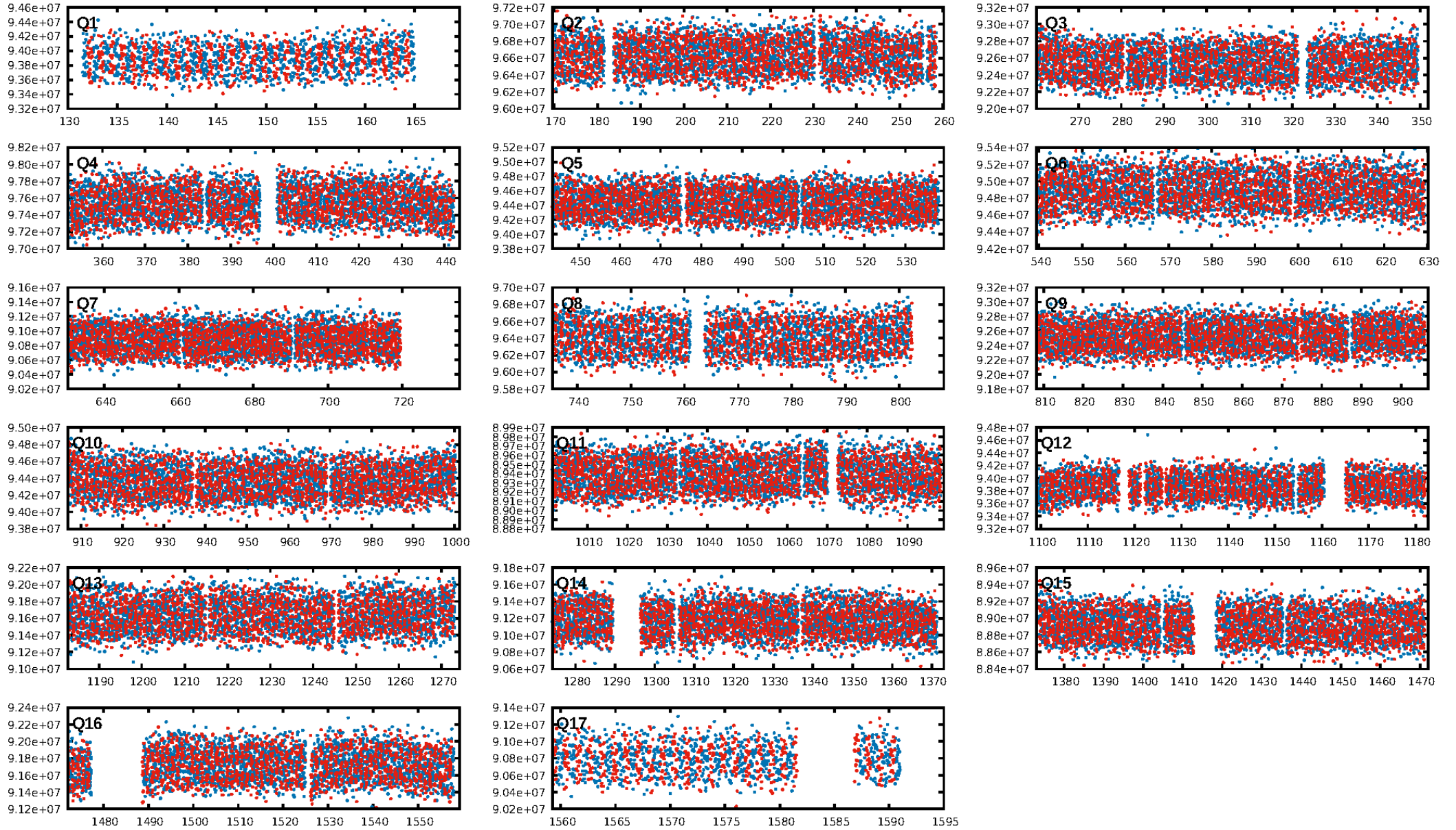
## DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [1159/1163]  
GhostDiagnostic-chr: 4.123  
Centroid-sig: 0.0%  
Centroid-so: 0.514 arcsec [2.24 $\sigma$ ]  
OotOffset-rm: 0.081 arcsec [0.76 $\sigma$ ]  
KicOffset-rm: 0.115 arcsec [1.16 $\sigma$ ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 0.00 [0/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 22:25:03 Z

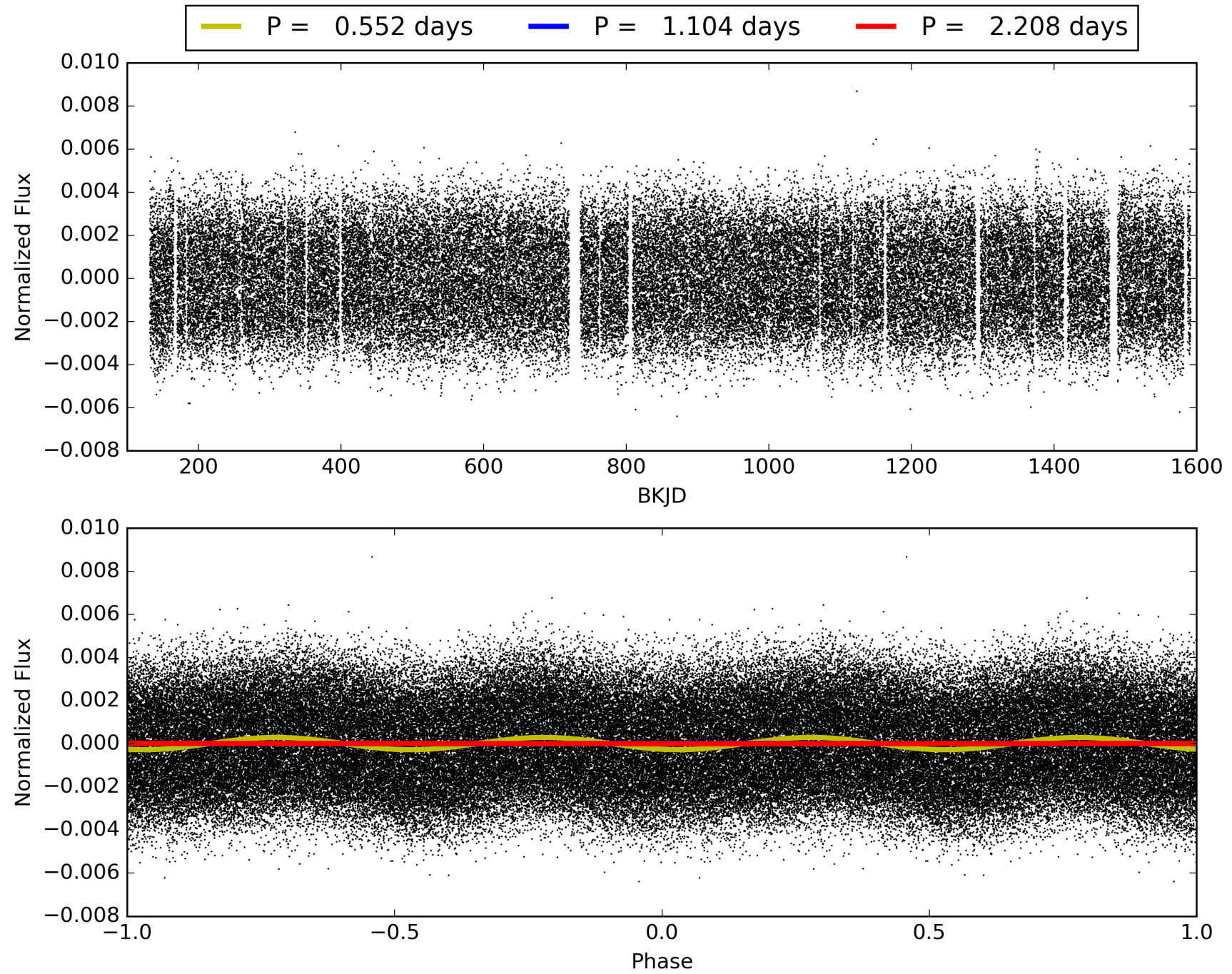
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 008653563-02, PDC Light Curves



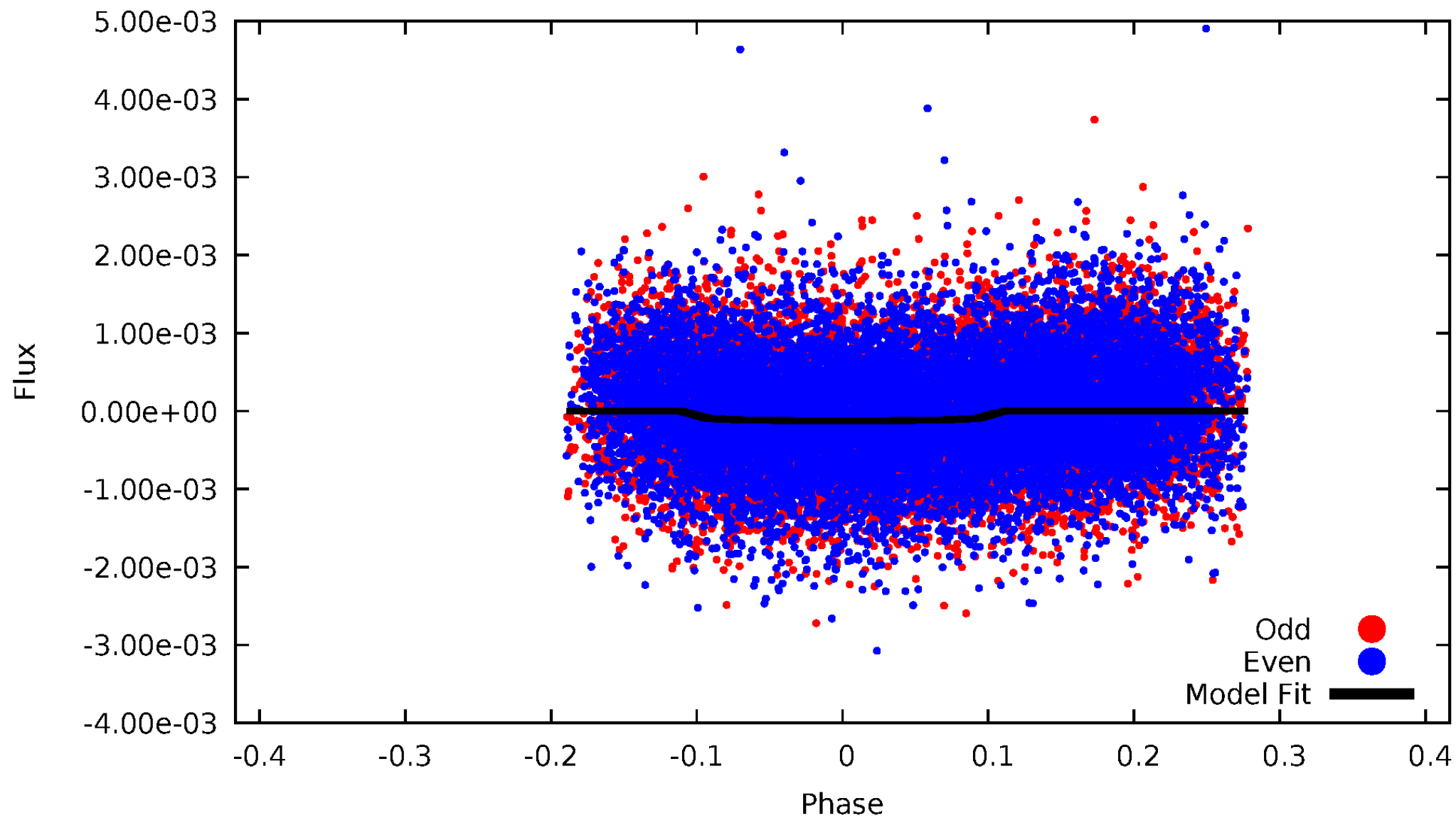


# TCE 008653563-02



DV Odd/Even

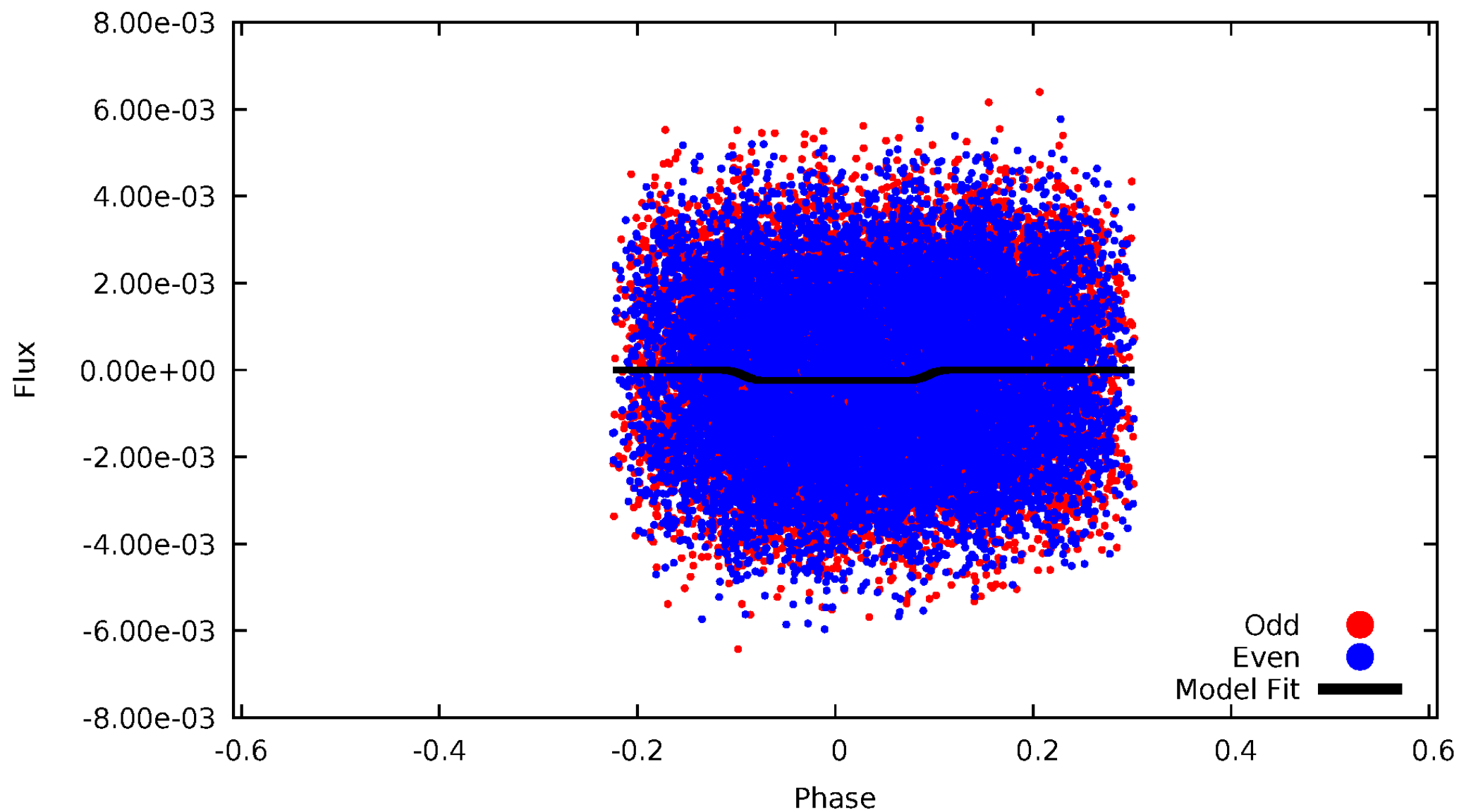
TCE 008653563-02





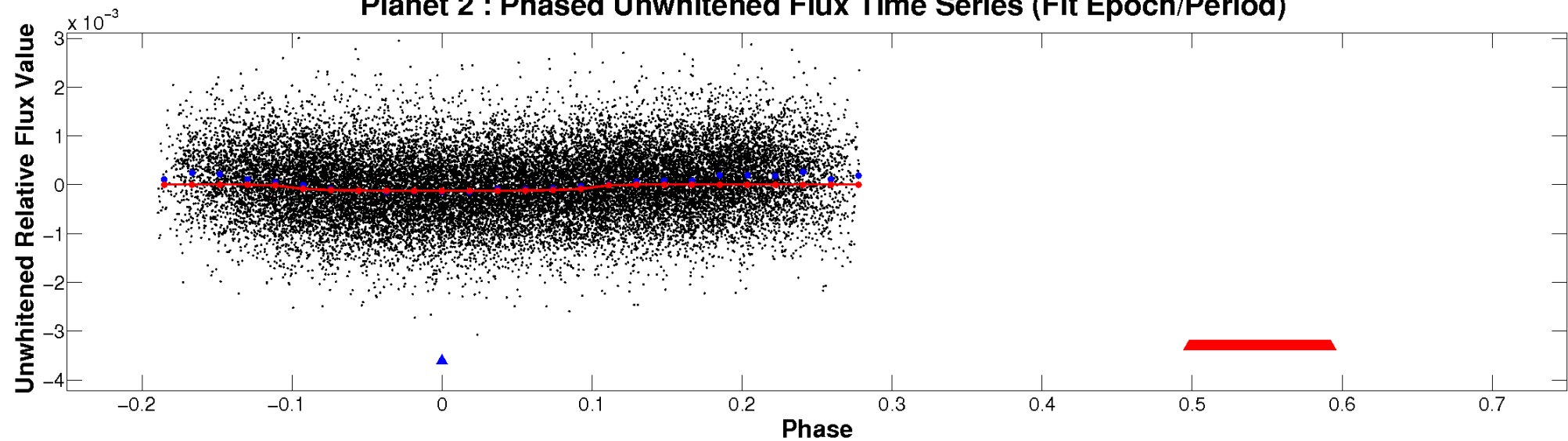
# ALT Odd/Even

TCE 008653563-02

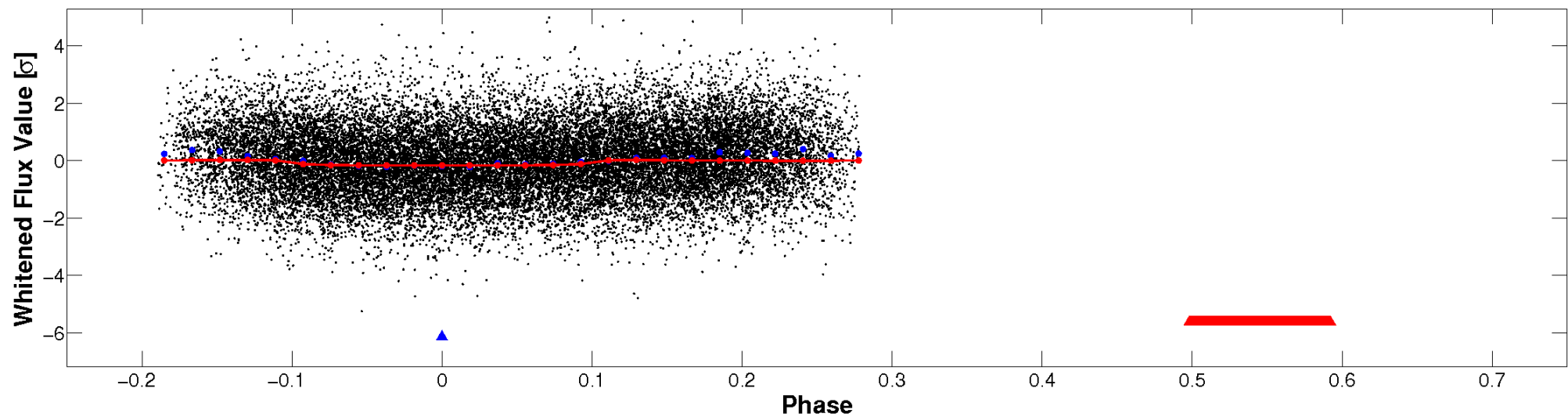


# Non-Whitened Vs. Whitened Light Curve

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

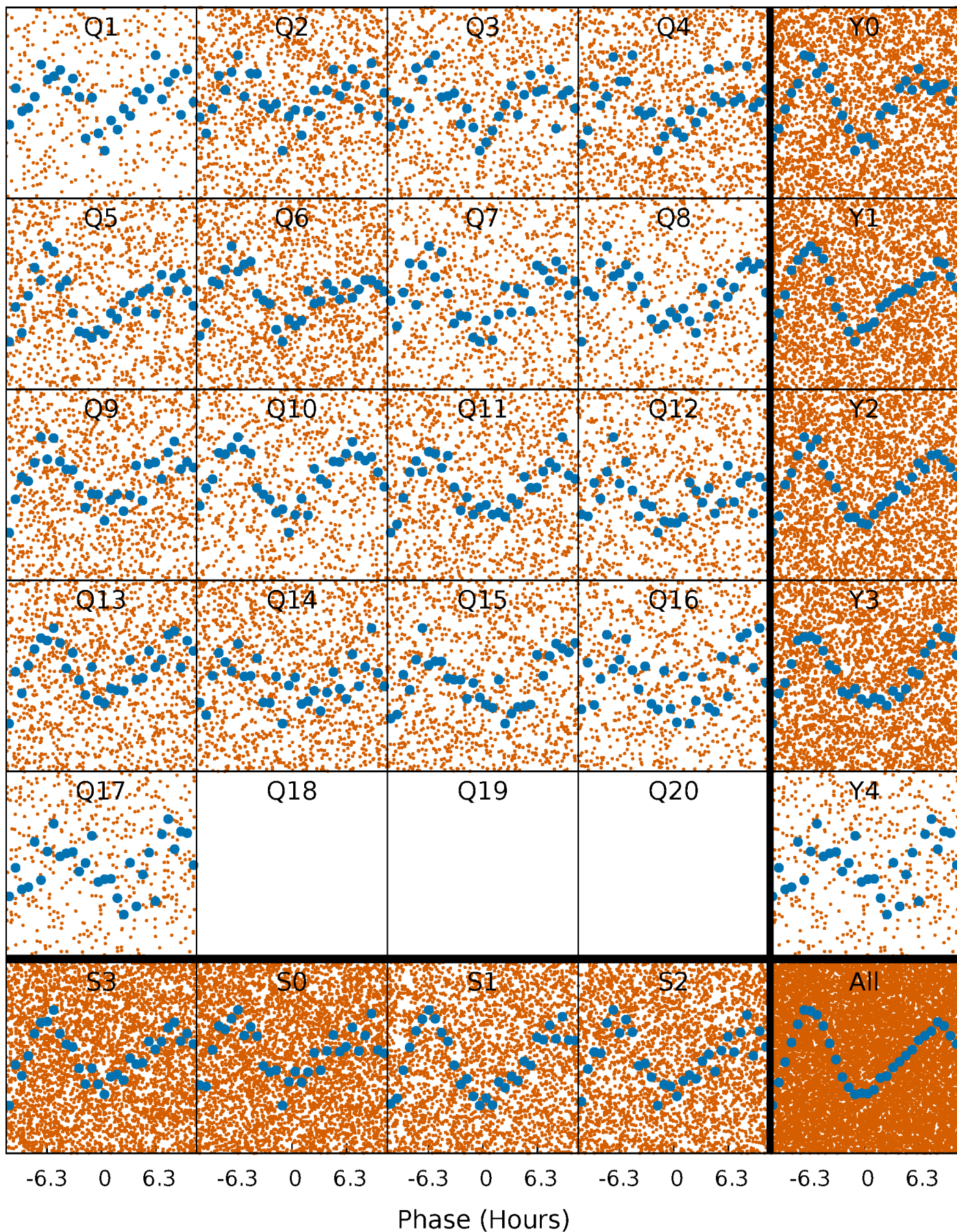


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



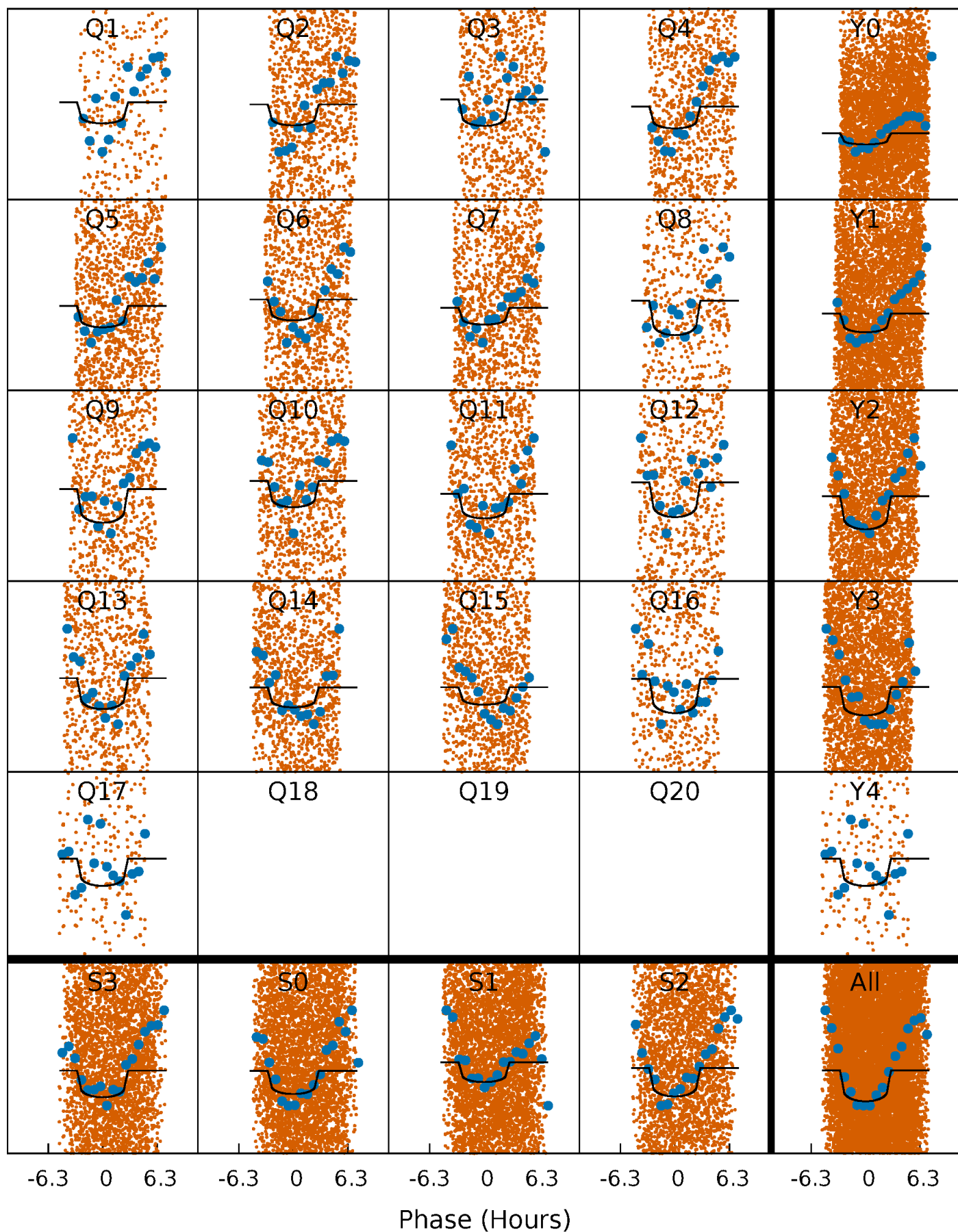
# PDC Quarter-Phased Transit Curves

TCE 008653563-02   P= 1.103761 Days    $T_0=132.226438$  (BKJD)



# DV Quarter-Phased Transit Curves

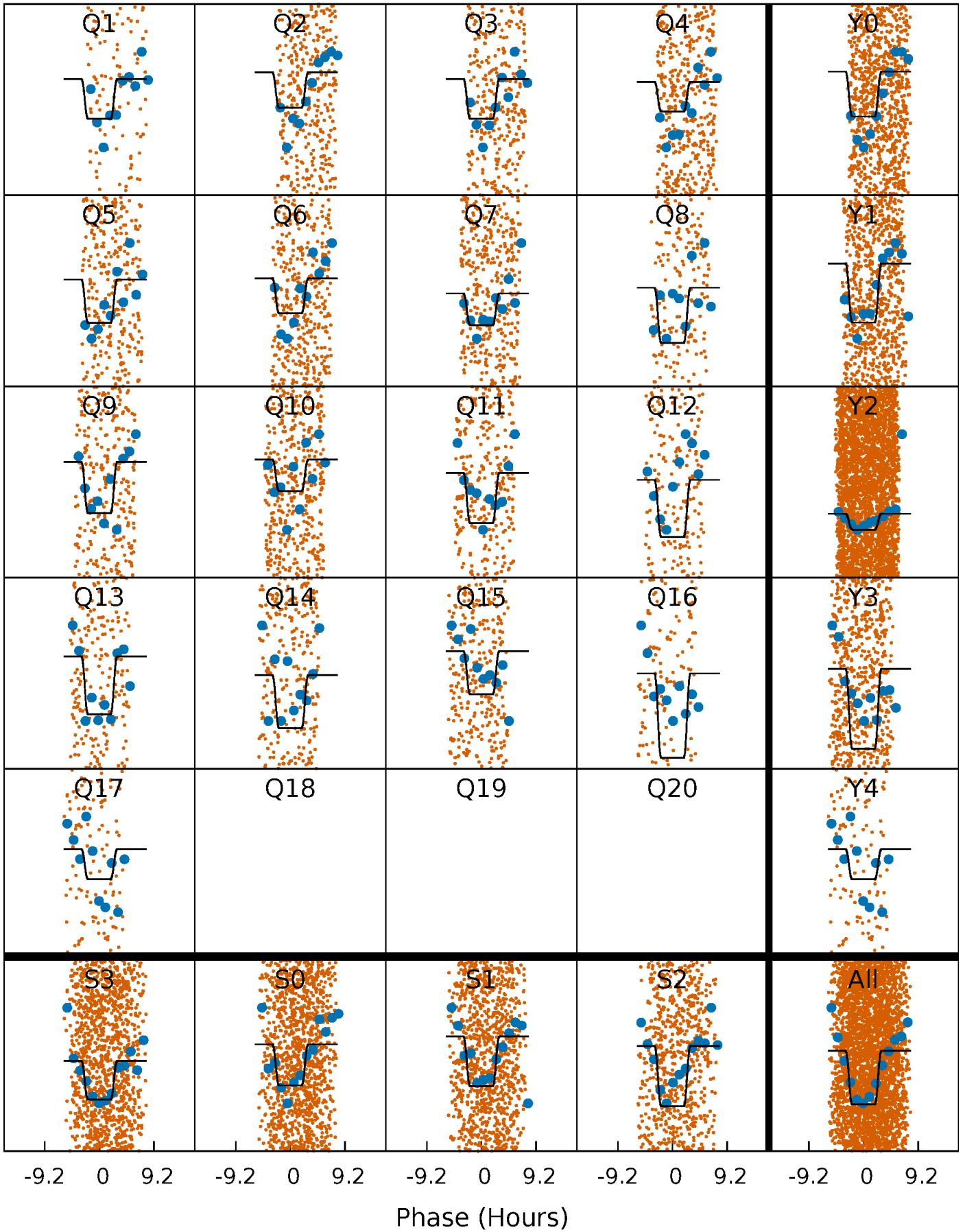
TCE 008653563-02   P= 1.103761 Days    $T_0=132.226438$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

TCE 008653563-02   P= 1.103811 Days    $T_0=132.200045$  (BKJD)

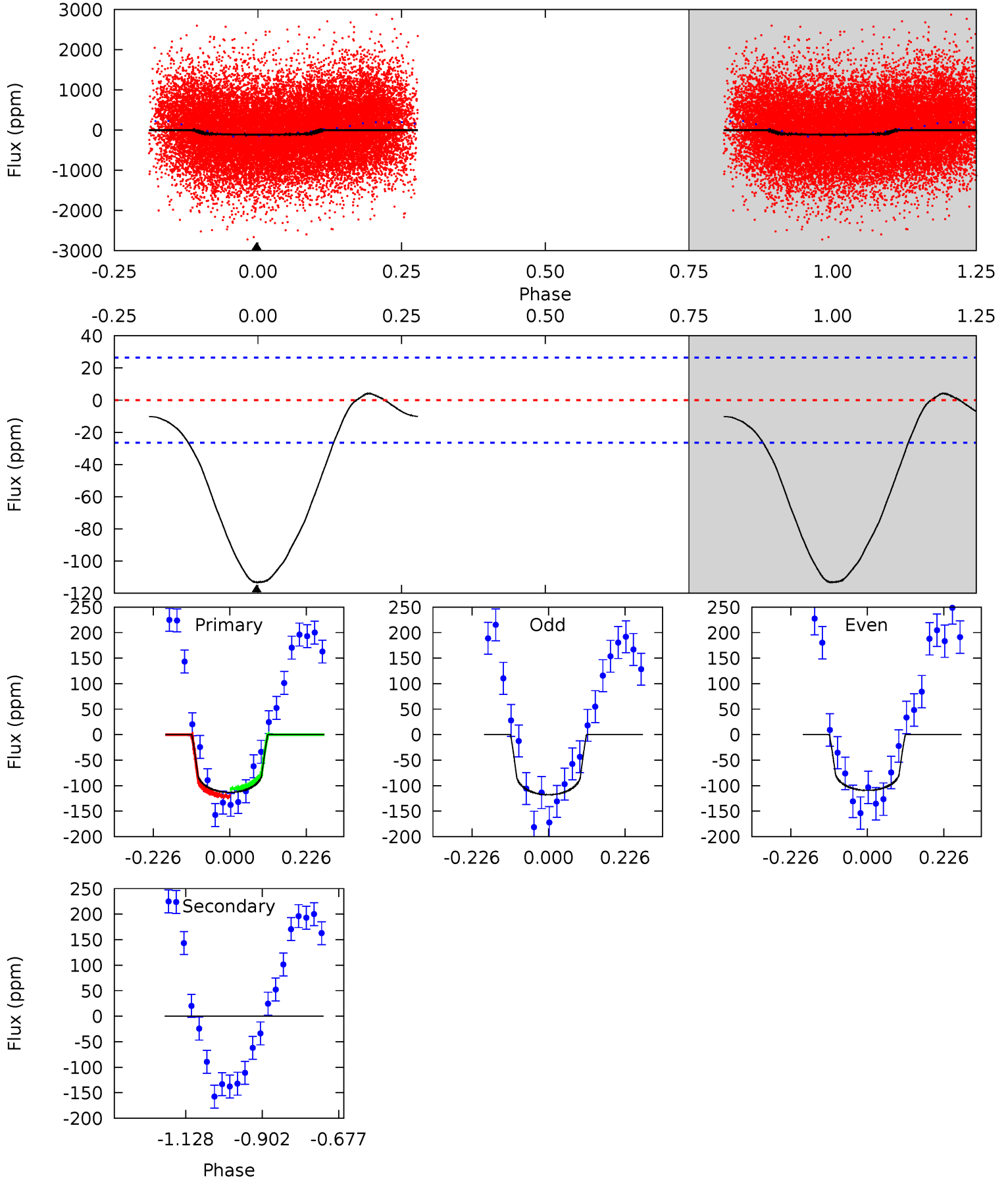




# DV Model-Shift Uniqueness Test

008653563-02, P = 1.103761 Days, E = 131.122677 Days

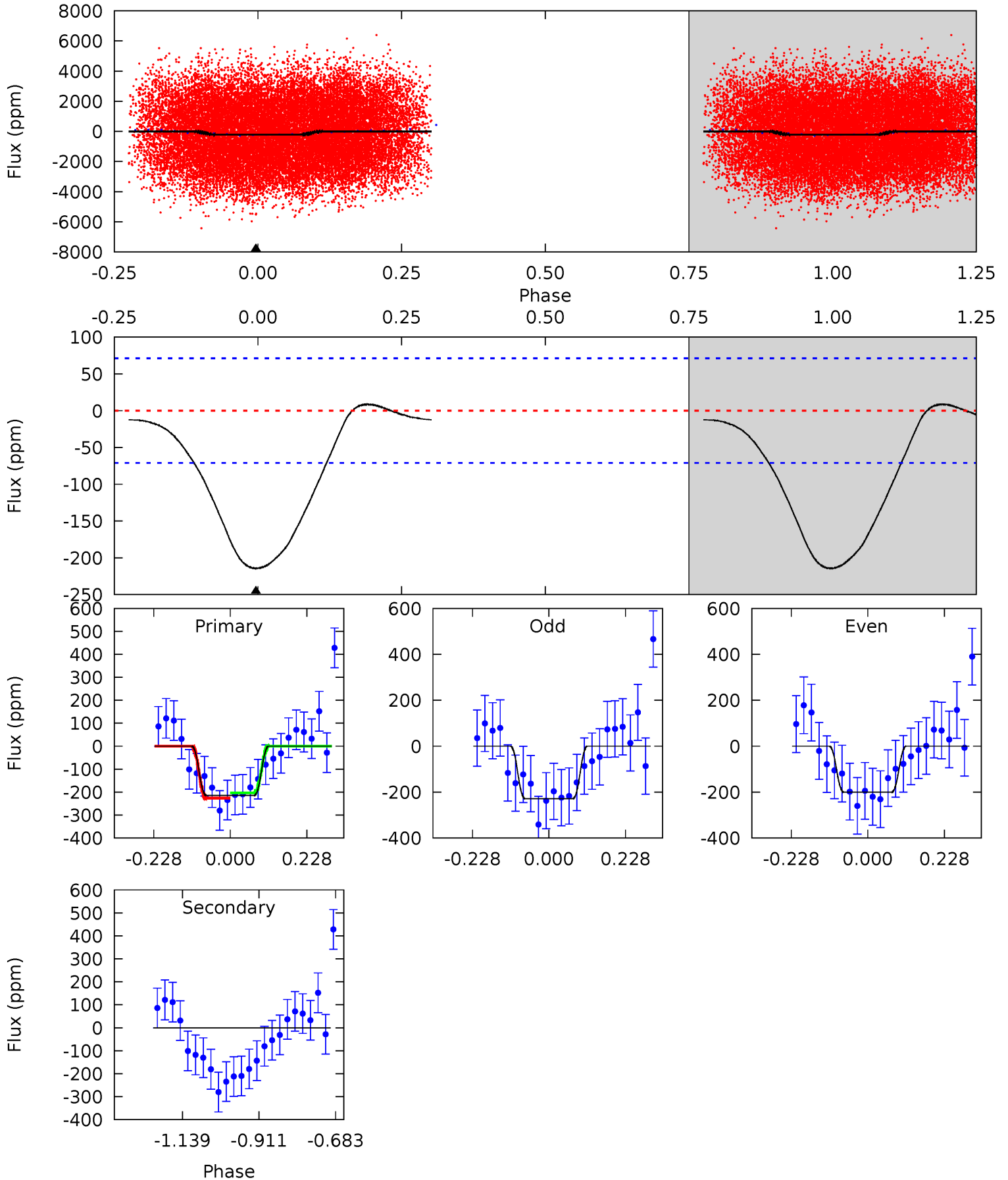
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
18.8	0	0	0	4.39	1.21	0.69	18.8	18.8	0	0	0.71	1.02	0.04	1.23



# Alt Model-Shift Uniqueness Test

008653563-02, P = 1.103811 Days, E = 131.096234 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
13.2	0	0	0	4.39	1.21	0.39	13.2	13.2	0	0	0.86	1.08	0.04	0.69



### Stellar Parameters For KIC 008653563

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7830^{+216}_{-324}$	$4.027^{+0.176}_{-0.144}$	$0.000^{+0.200}_{-0.350}$	$2.160^{+0.477}_{-0.530}$	$1.809^{+0.147}_{-0.319}$	$0.253^{+0.245}_{-0.108}$
	+3%/-4%	+4%/-4%	+inf%/-inf%	+22%/-25%	+8%/-18%	+97%/-43%
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 008653563-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$0 \pm 6$	$2.75^{+2.13}_{-1.65}$	$4445^{+273}_{-313}$	$-3931^{+7113}_{-685}$	$-0.002^{+0.399}_{-0.419}$
Alt.	$0 \pm 16$	$3.72^{+2.26}_{-2.02}$	$4441^{+281}_{-308}$	$-3896^{+7464}_{-864}$	$0.009^{+0.498}_{-0.627}$

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

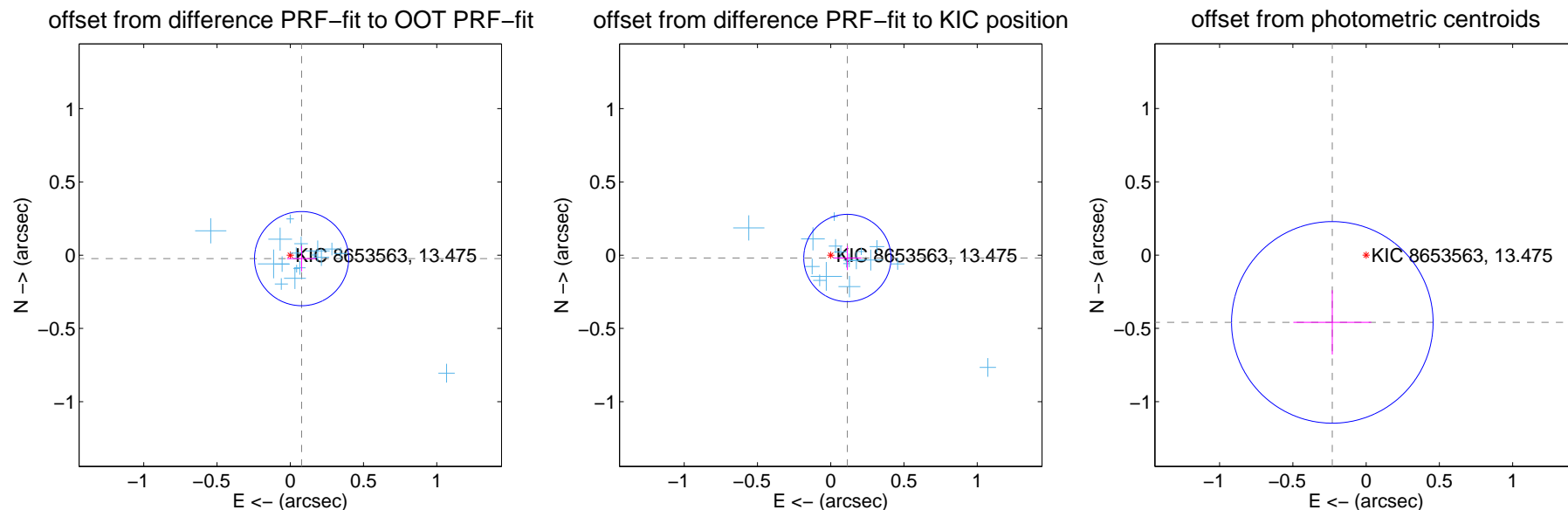
## DV Centroid Data

Supplemental centroid analysis for 008653563-02. Kepler magnitude: 13.47. Transit SNR 16.97

There are 17 quarters with good PRF difference image offsets

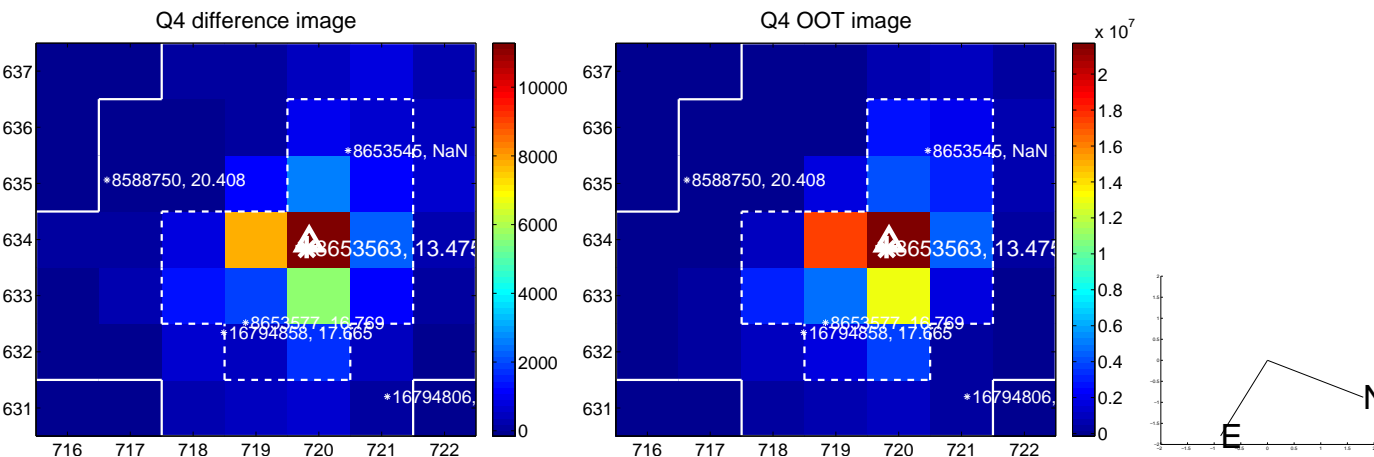
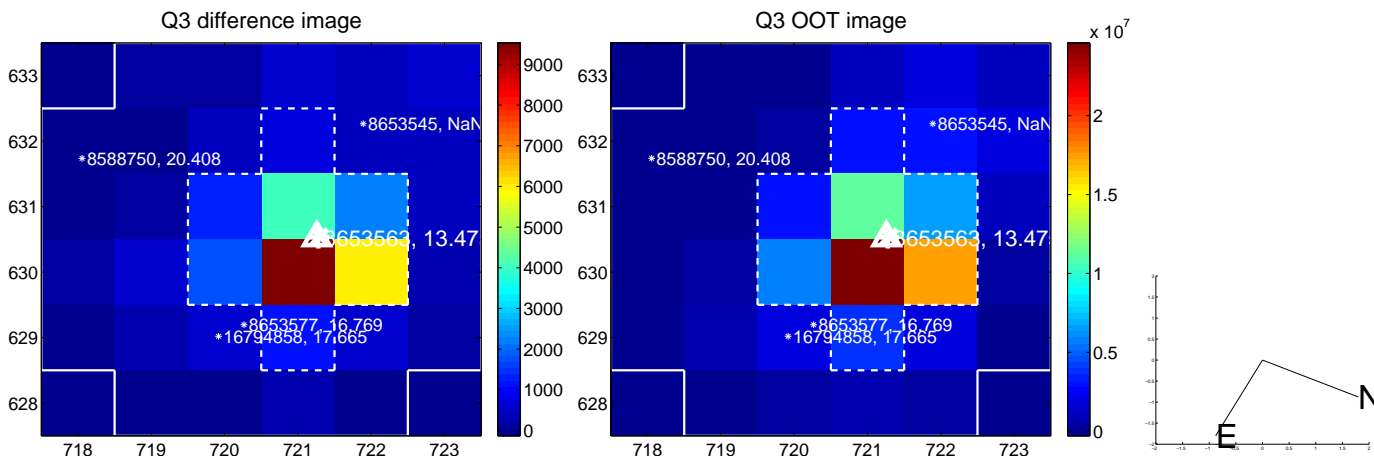
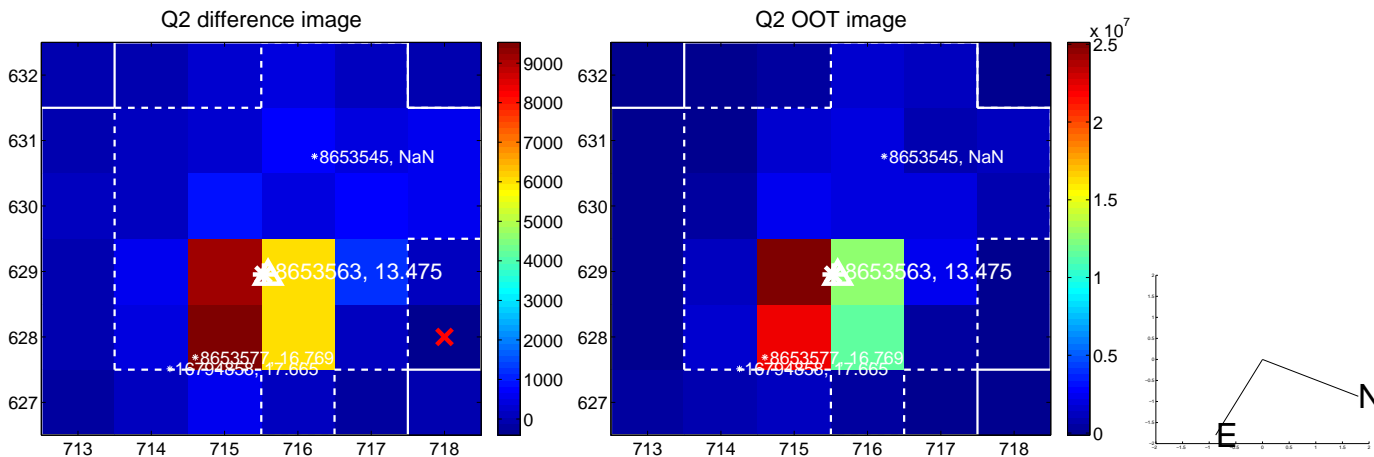
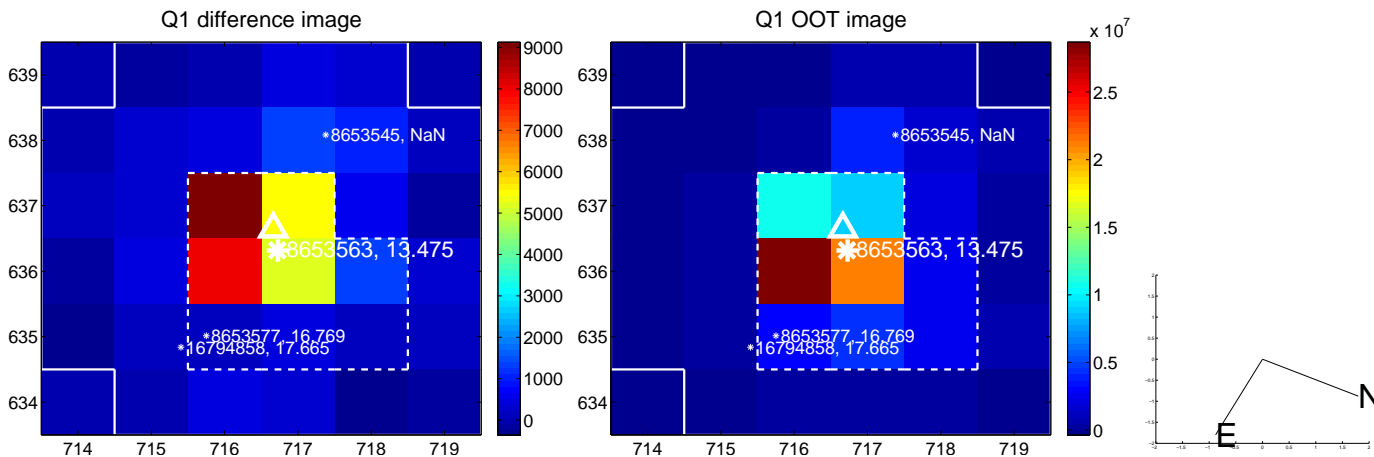
The direct PRF centroid is offset from the target star catalog position by about 0.03 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.081 \pm 0.107$	0.76	$-0.077 \pm 0.100$	$-0.024 \pm 0.086$
PRF-fit source offset from KIC position	$0.115 \pm 0.099$	1.16	$-0.114 \pm 0.096$	$-0.019 \pm 0.083$
photometric centroid source offset	$0.51 \pm 0.23$	2.24	$0.23 \pm 0.27$	$-0.46 \pm 0.22$



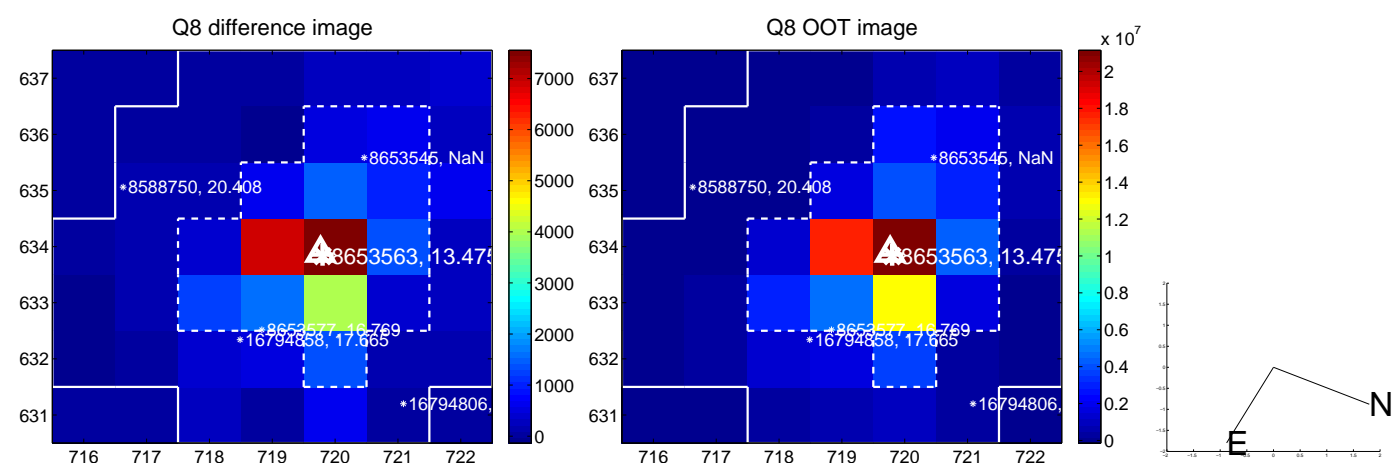
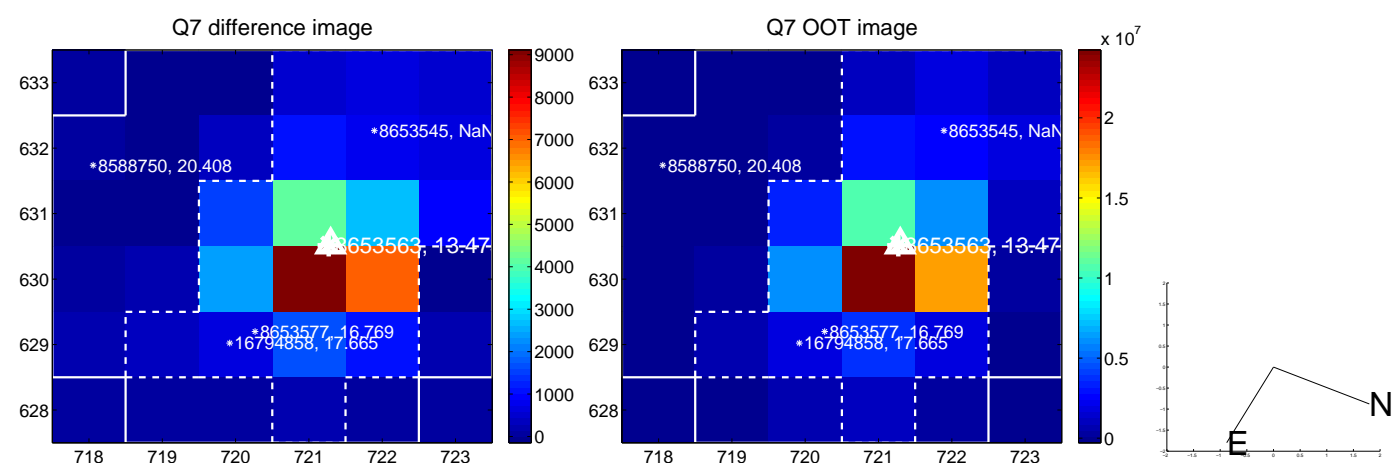
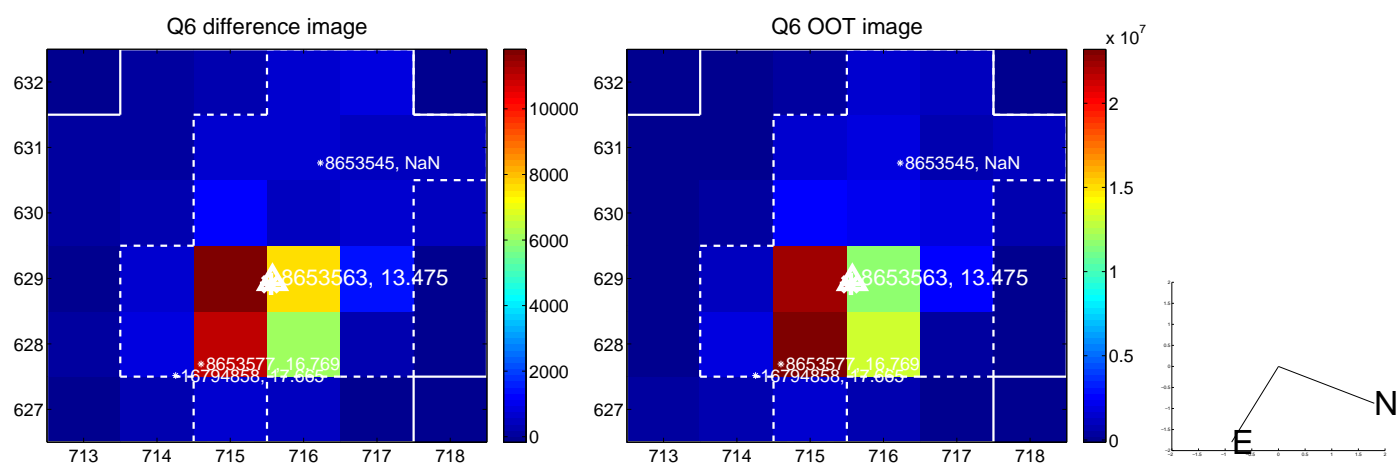
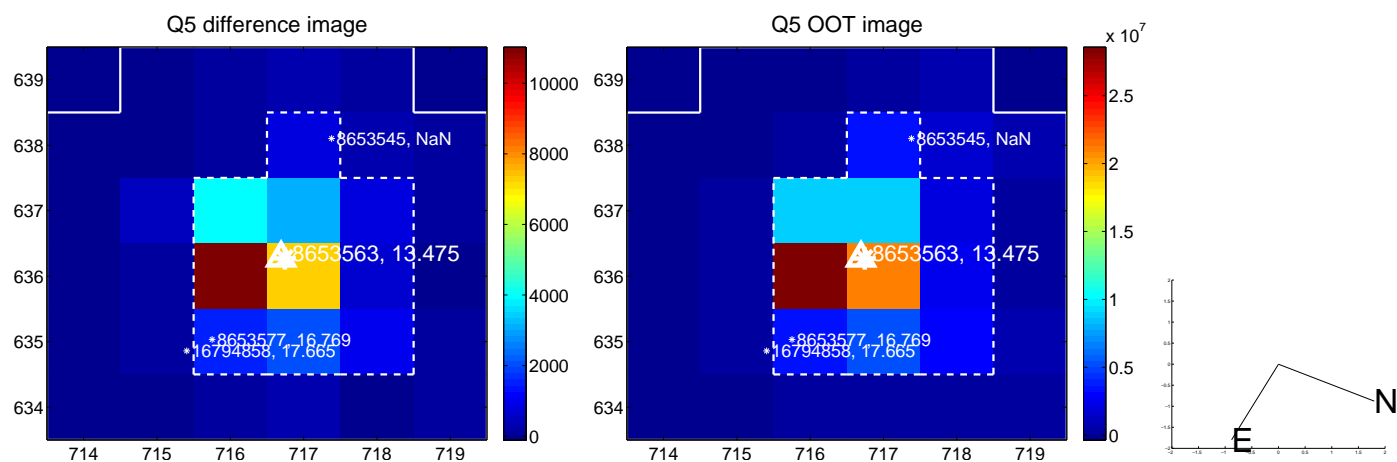
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

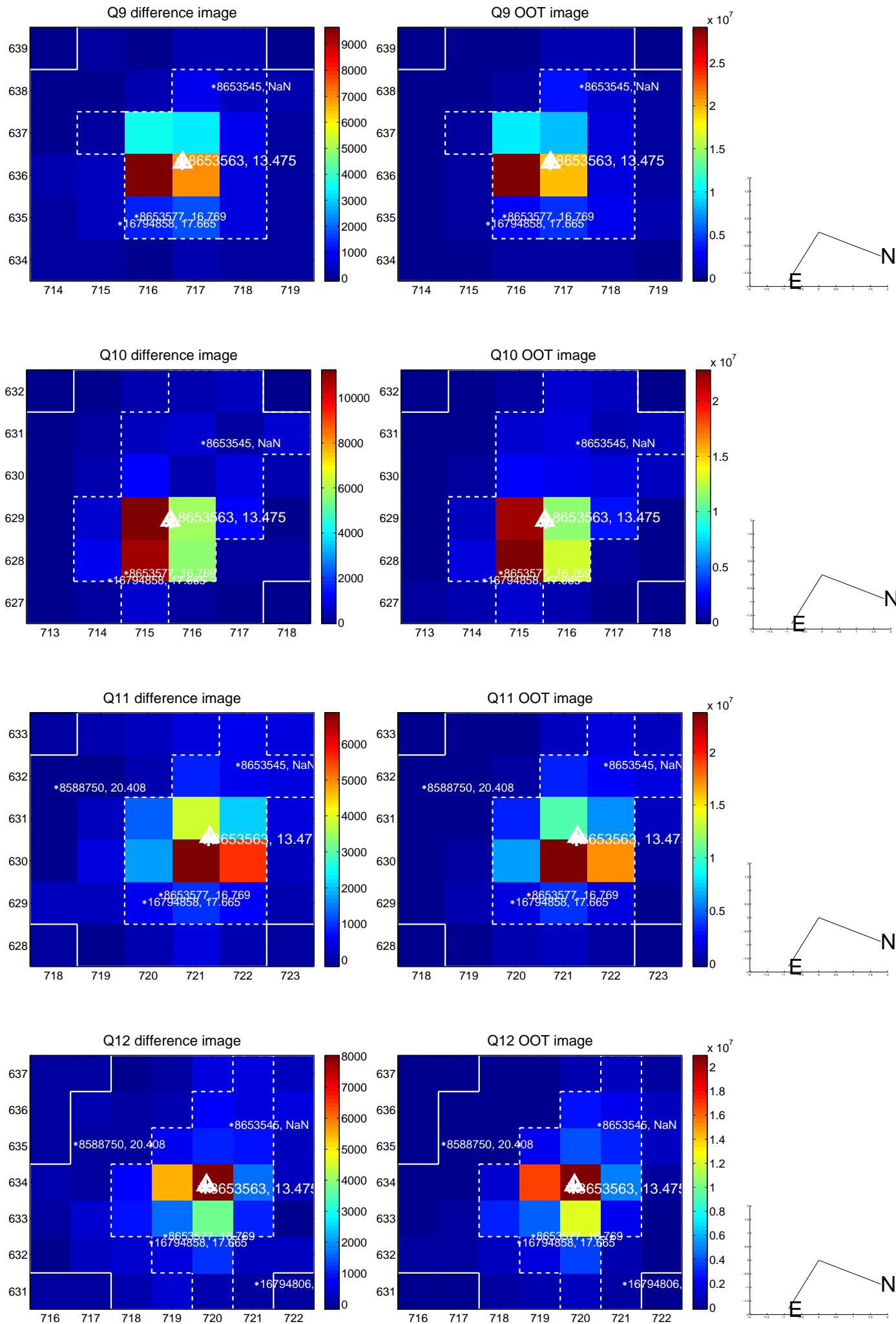




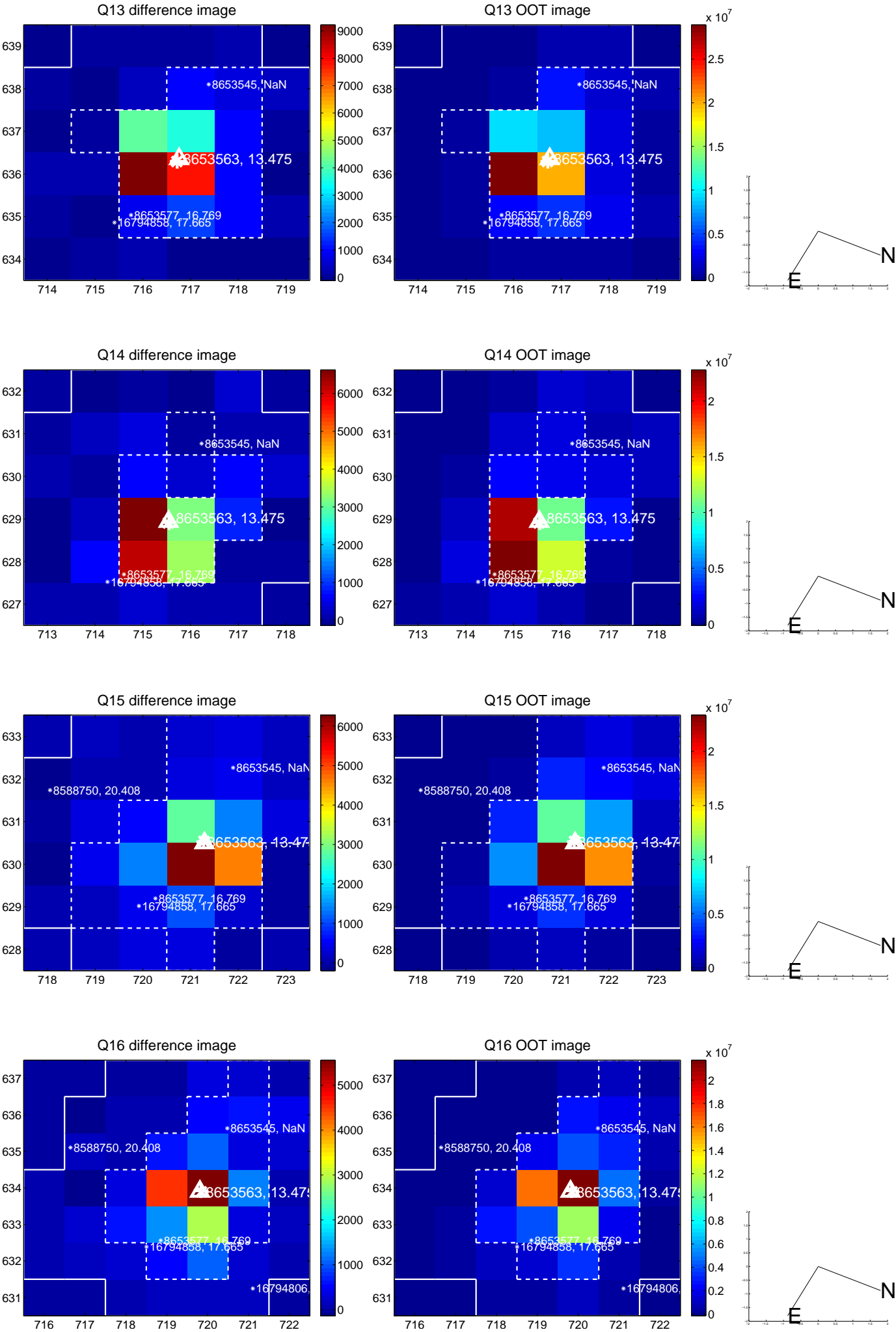
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



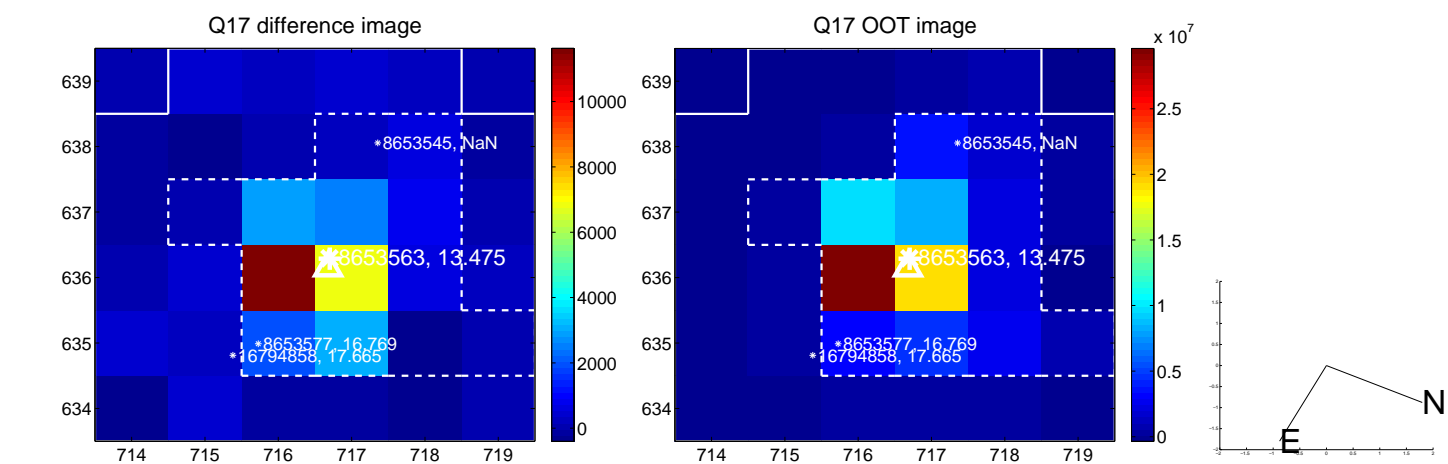
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



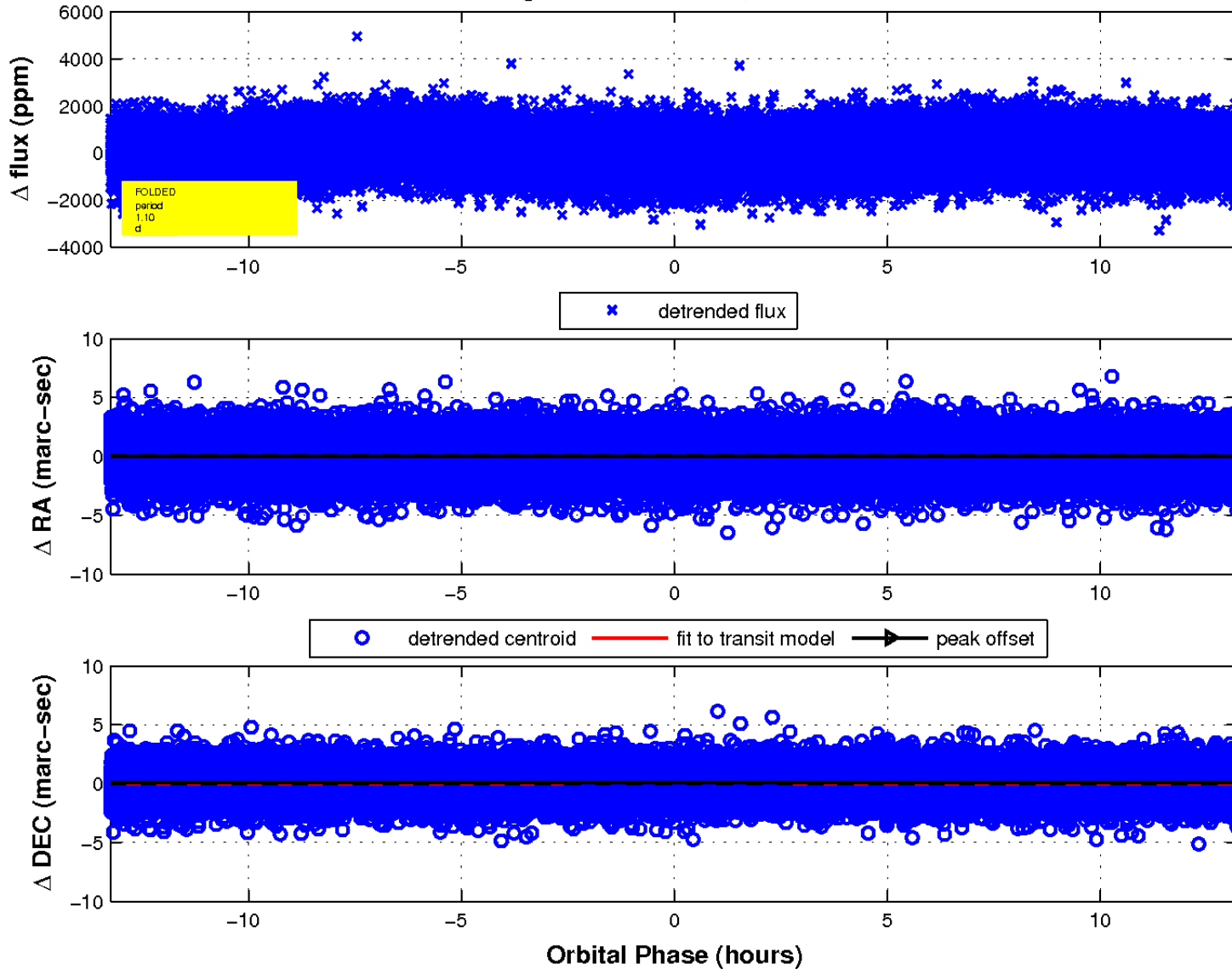
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

