

# KIC 008180063

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008180063-01	OBS	0905.01	5.795060	132.132648	1689.9	3.296	108.9	114.6	0.83	5865	4.35	193.30
008180063-02	OBS	No	5.794987	135.461040	119.8	2.676	8.7	9.1	0.83	5865	1.03	193.30

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008180063-01	OBS	FP	0.00	0	1	1	0	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—CENT_UNRESOLVED_OFFSET
008180063-02	OBS	FP	0.00	1	1	1	0	IS_SEC_TCE—CENT_UNRESOLVED_OFFSET

**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 008180063-01

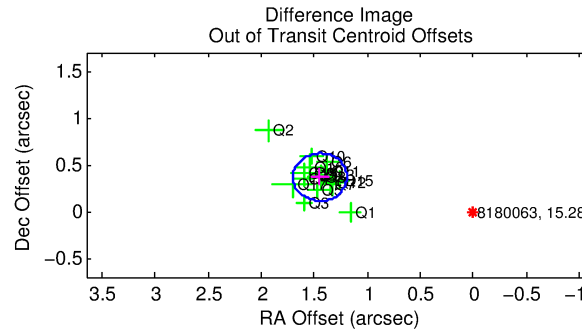
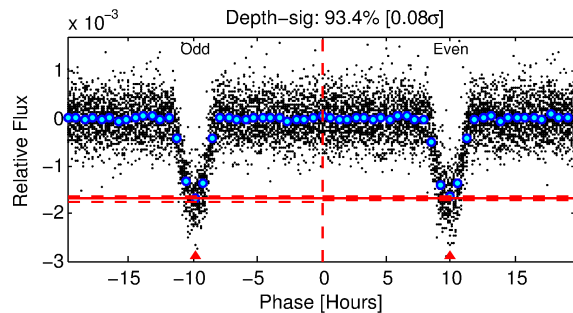
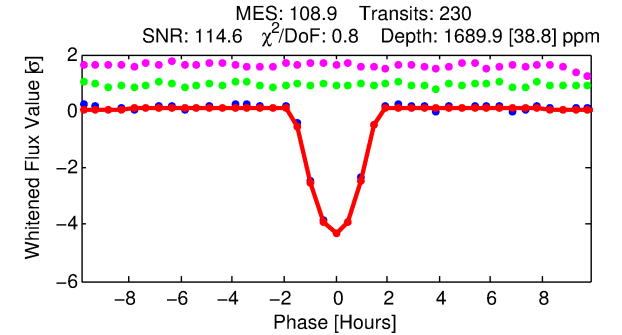
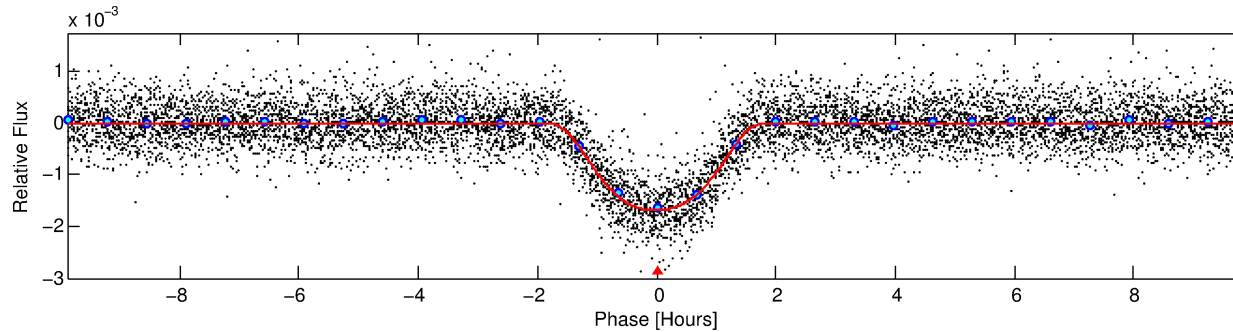
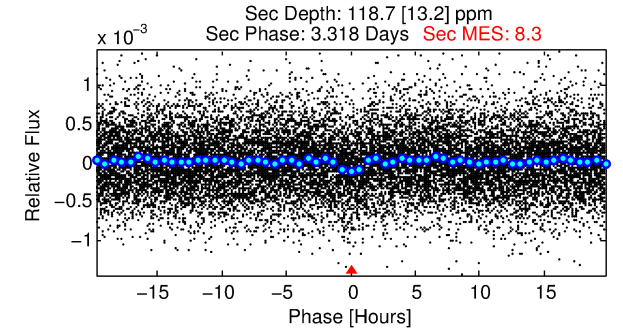
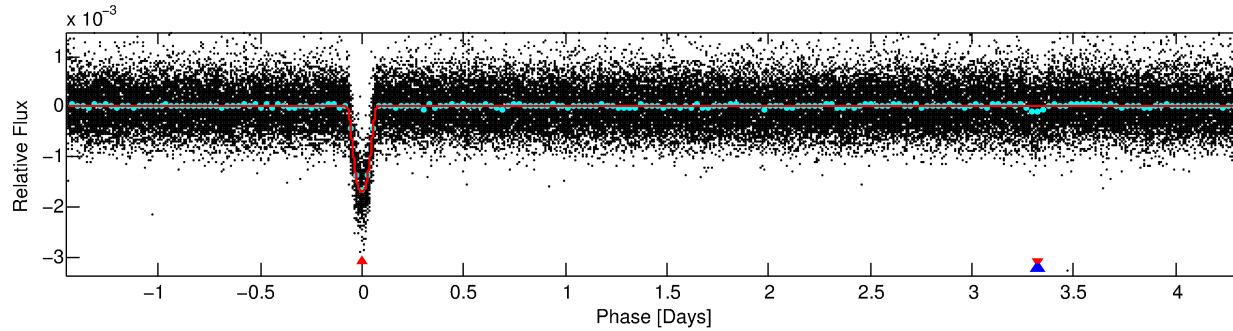
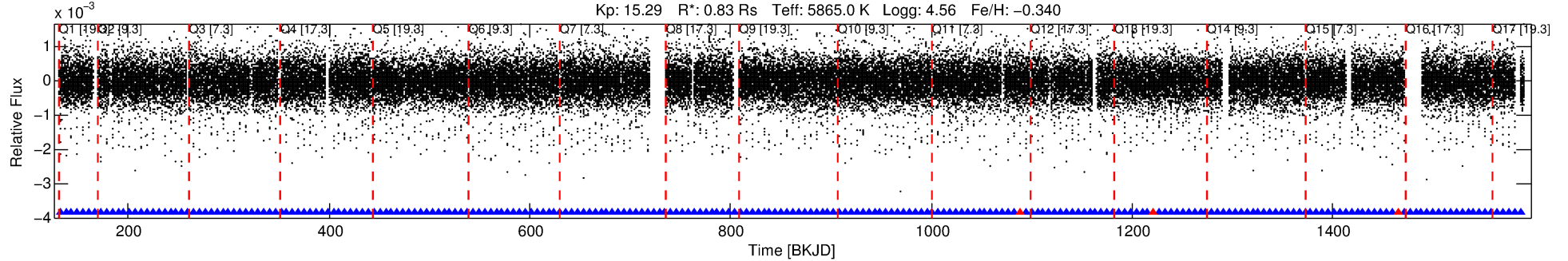
No Significant Match Found

# DV One-Page Summary

KIC: 8180063 Candidate: 1 of 2 Period: 5.795 d

KOI: K00905.01 Corr: 0.988

Kp: 15.29 R\*: 0.83 Rs Teff: 5865.0 K Logg: 4.56 Fe/H: -0.340



## DV Fit Results:

Period = 5.79506 [0.00000] d  
Epoch = 132.1326 [0.0007] BKJD  
Rp/R\* = 0.0482 [0.0011]  
a/R\* = 5.95 [0.15]  
b = 0.95 [0.00]  
Seff = 193.30 [57.52]  
Teq = 951 [71] K  
Rp = 4.35 [0.98] Re  
a = 0.0612 [0.0116] AU  
Ag = 12.94 [3.91] [3.05σ]  
Teff = 2788 [112] K [13.84σ]

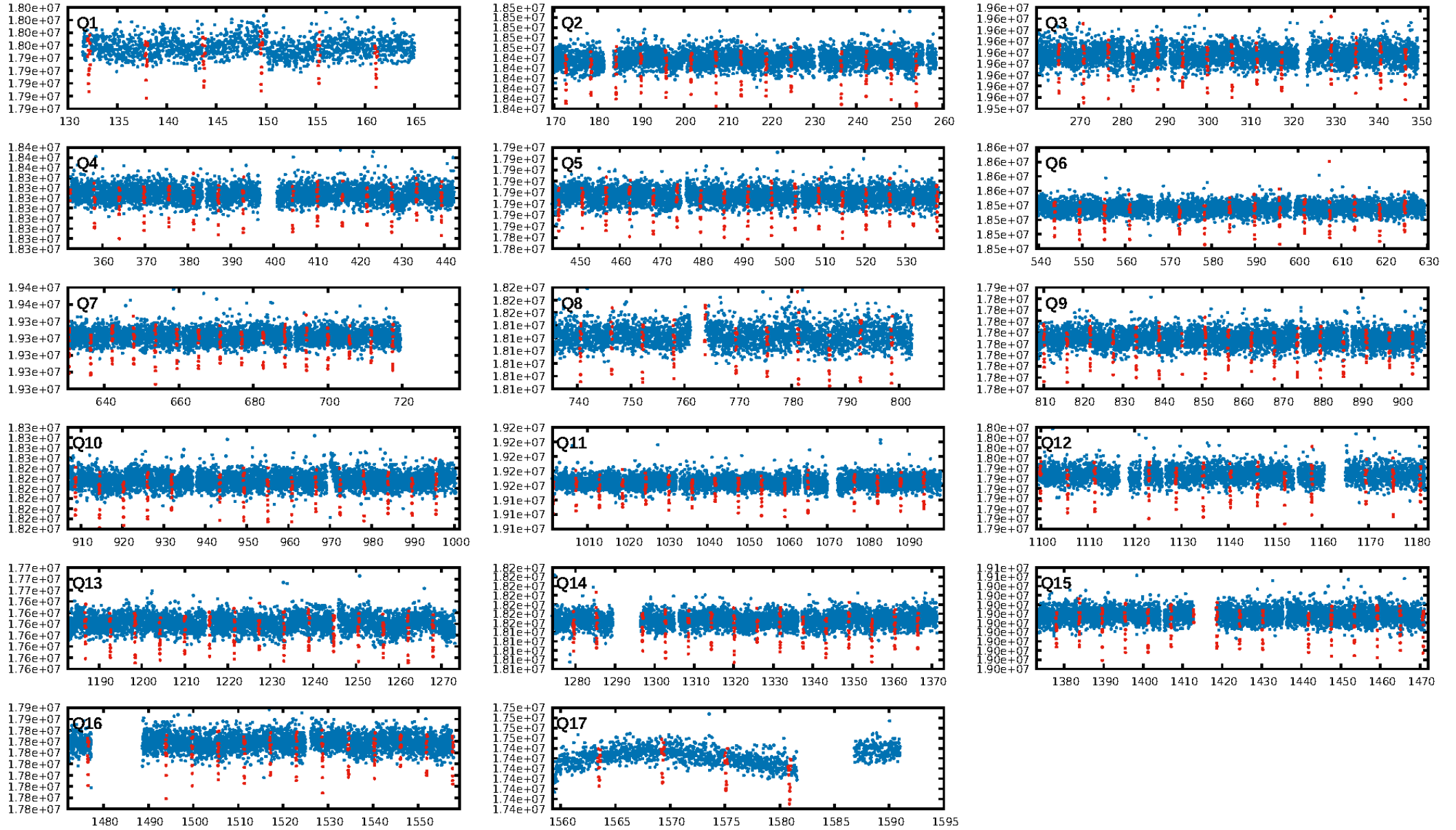
## DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 0.99 [217/220]  
GhostDiagnostic-chr: 4.007  
Centroid-sig: 0.0%  
Centroid-so: 1.411 arcsec [11.89σ]  
OotOffset-rm: 1.494 arcsec [17.63σ]  
KicOffset-rm: 1.472 arcsec [18.27σ]  
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]

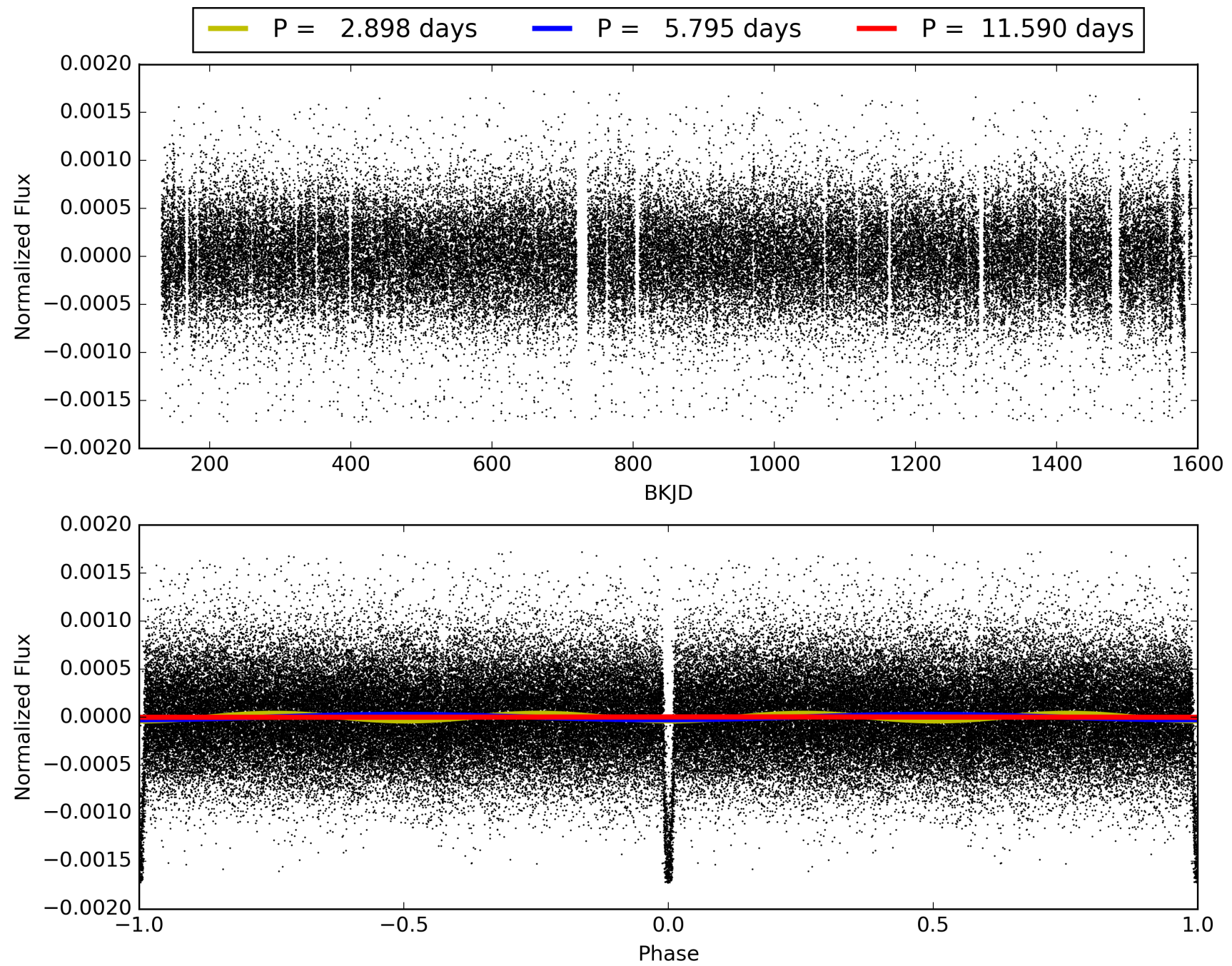
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 21:53:35 Z

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

# TCE 008180063-01, PDC Light Curves

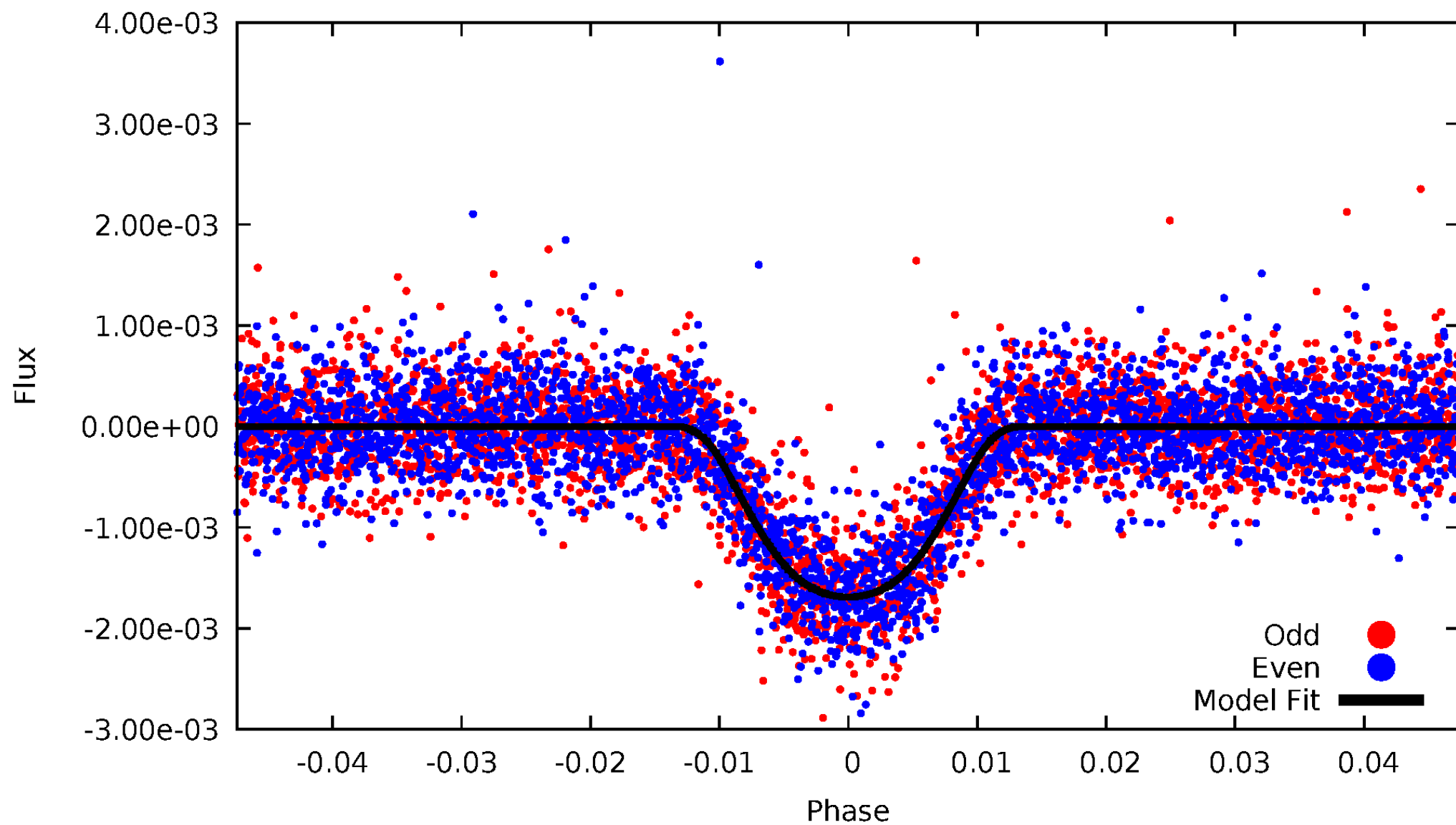


TCE 008180063-01



# DV Odd/Even

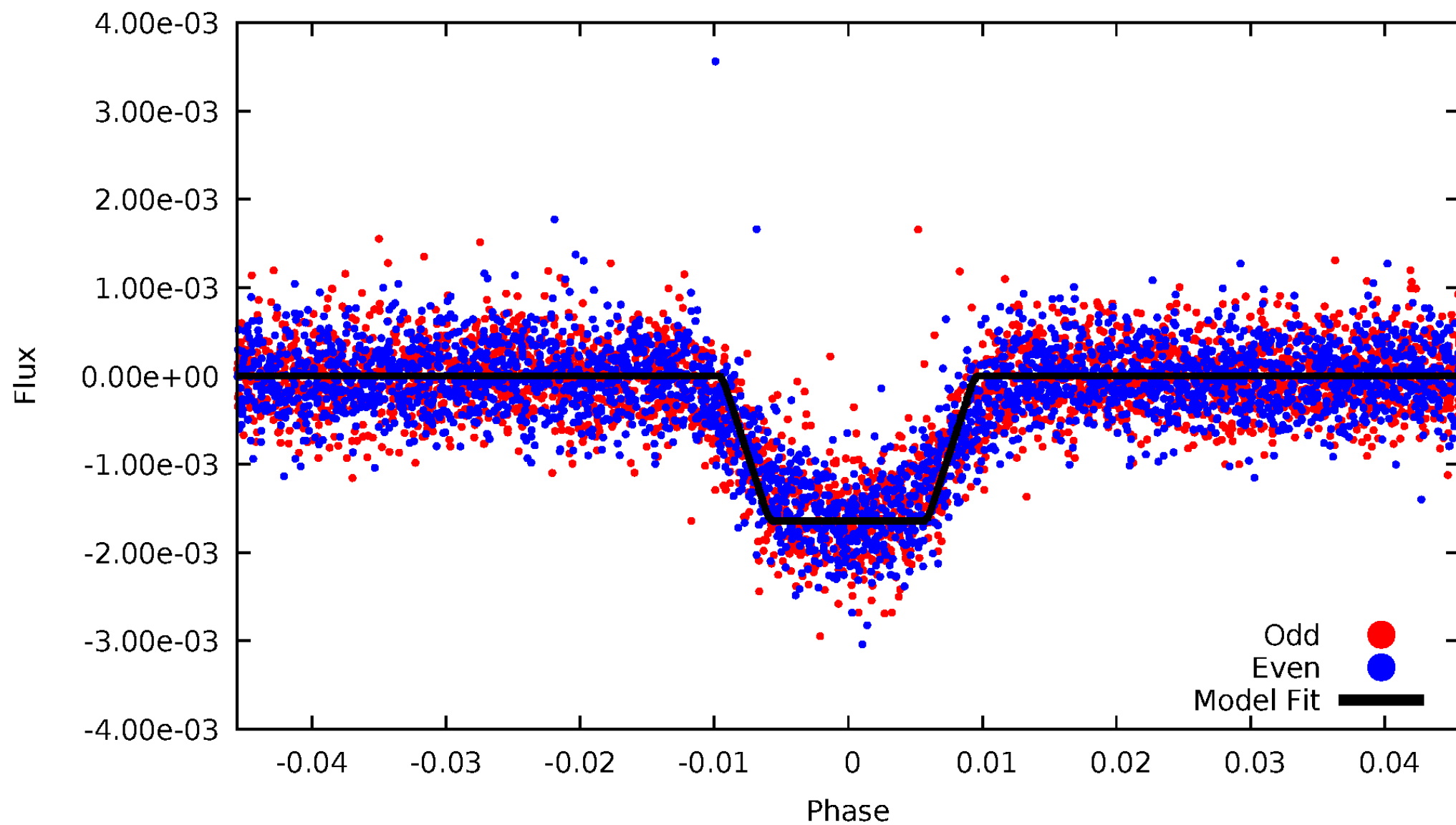
TCE 008180063-01





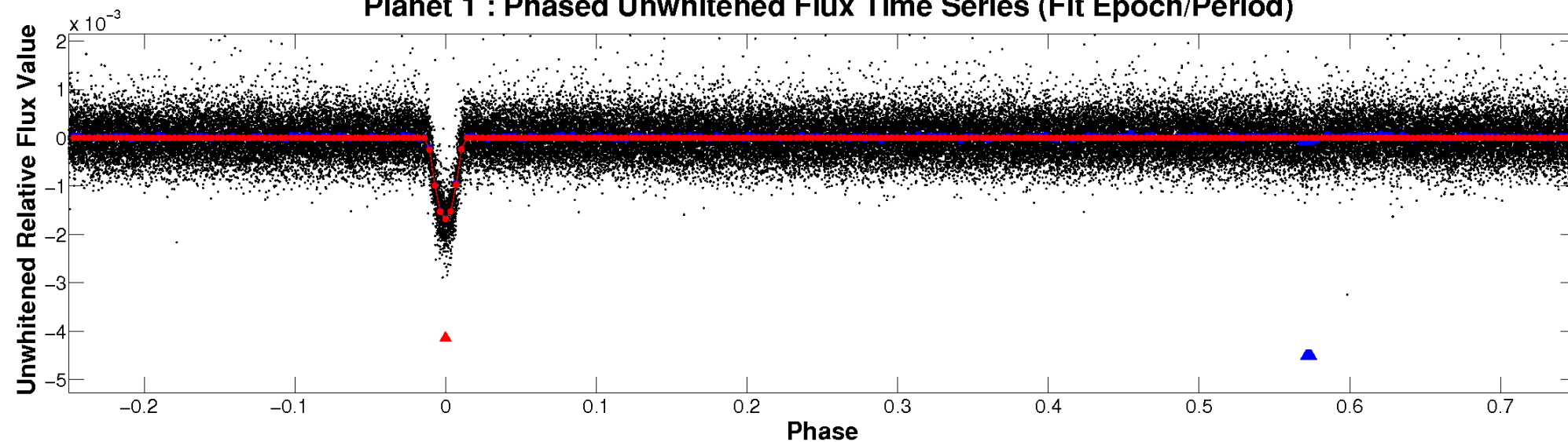
# ALT Odd/Even

TCE 008180063-01

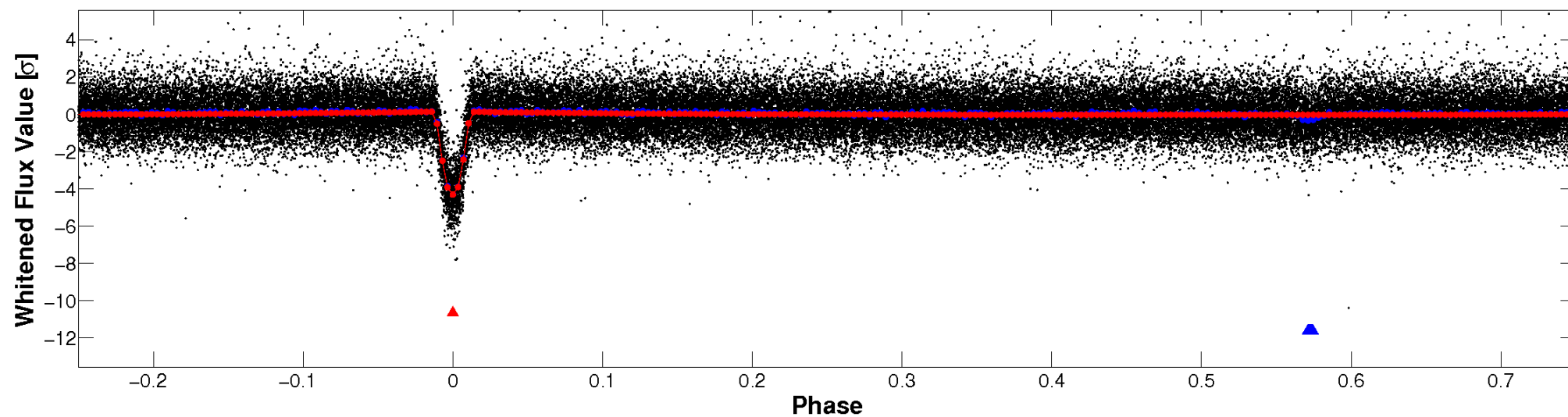


# Non-Whitened Vs. Whitened Light Curve

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

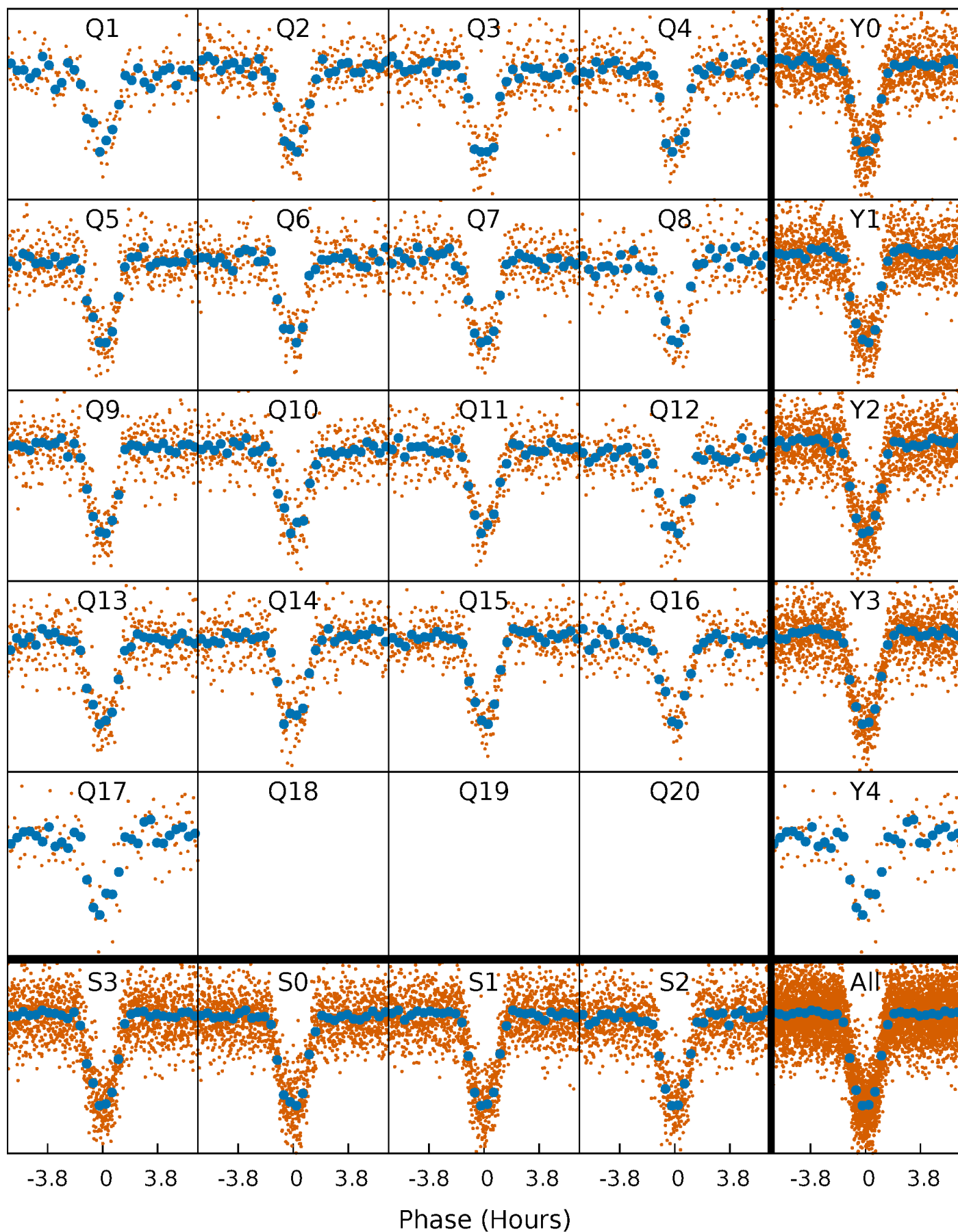


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

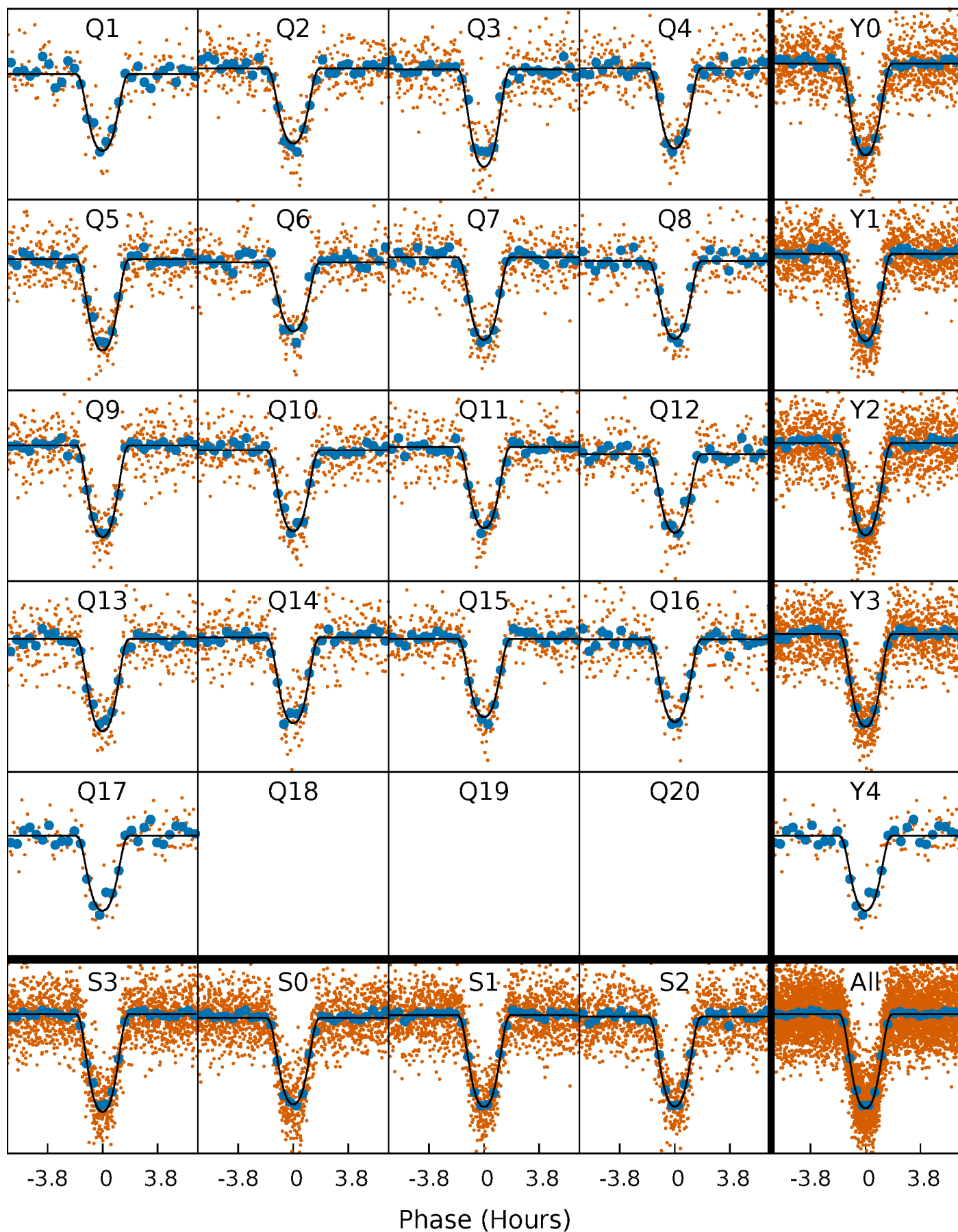
TCE 008180063-01 P= 5.795060 Days  $T_0=132.132648$  (BKJD)





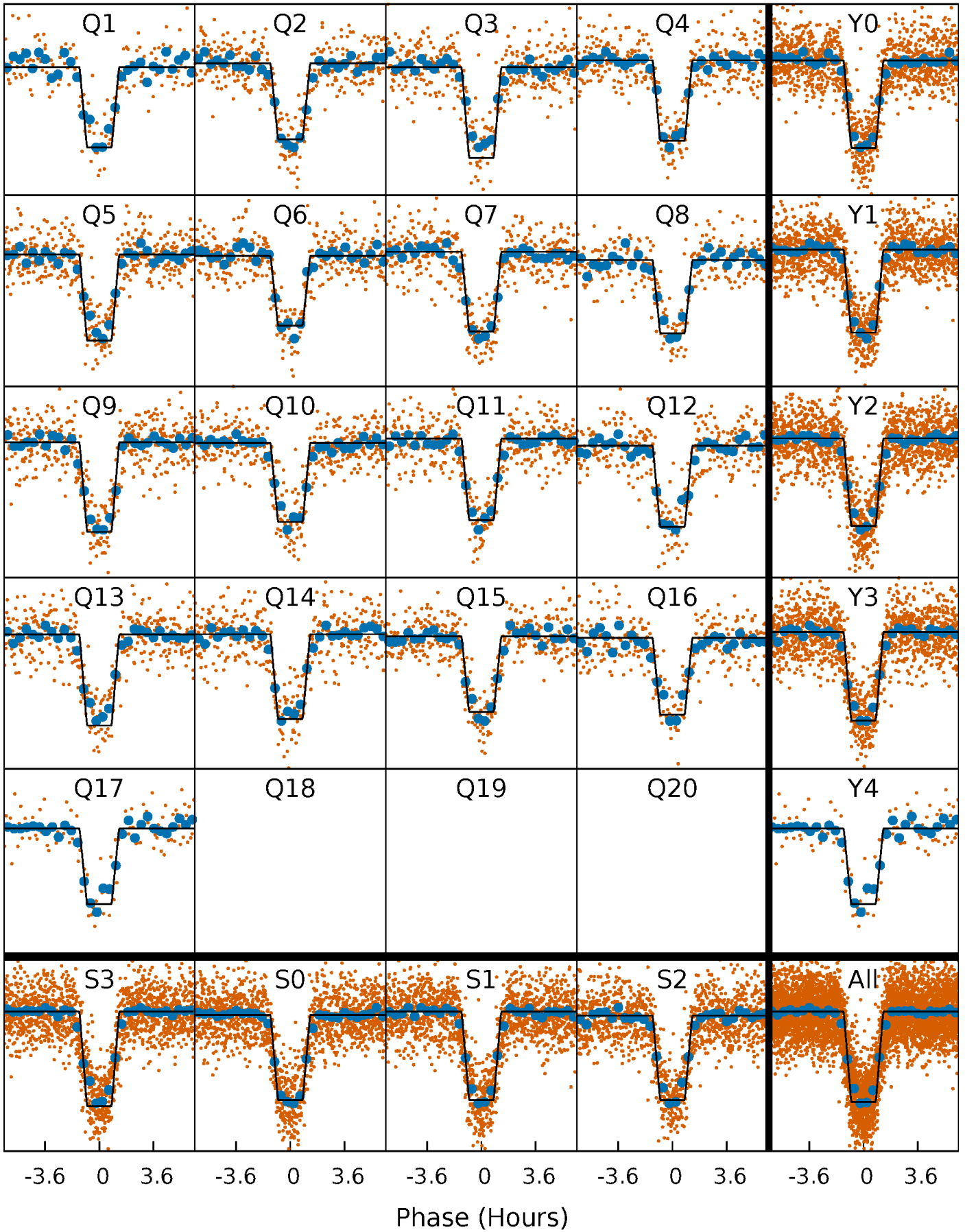
# DV Quarter-Phased Transit Curves

TCE 008180063-01 P= 5.795060 Days  $T_0=132.132648$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

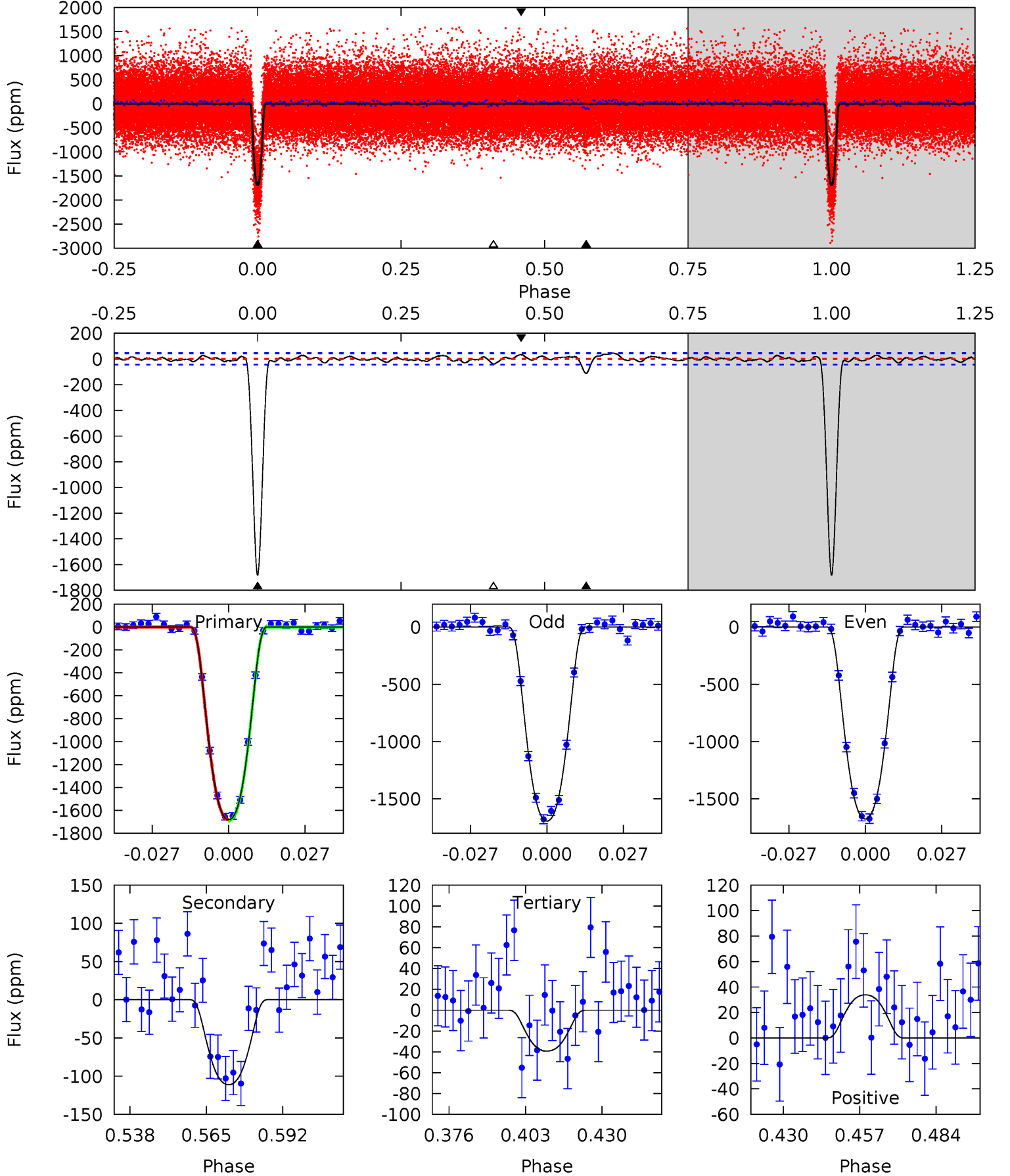
TCE 008180063-01   P= 5.795067 Days    $T_0=132.131767$  (BKJD)



# DV Model-Shift Uniqueness Test

008180063-01, P = 5.795060 Days, E = 126.337588 Days

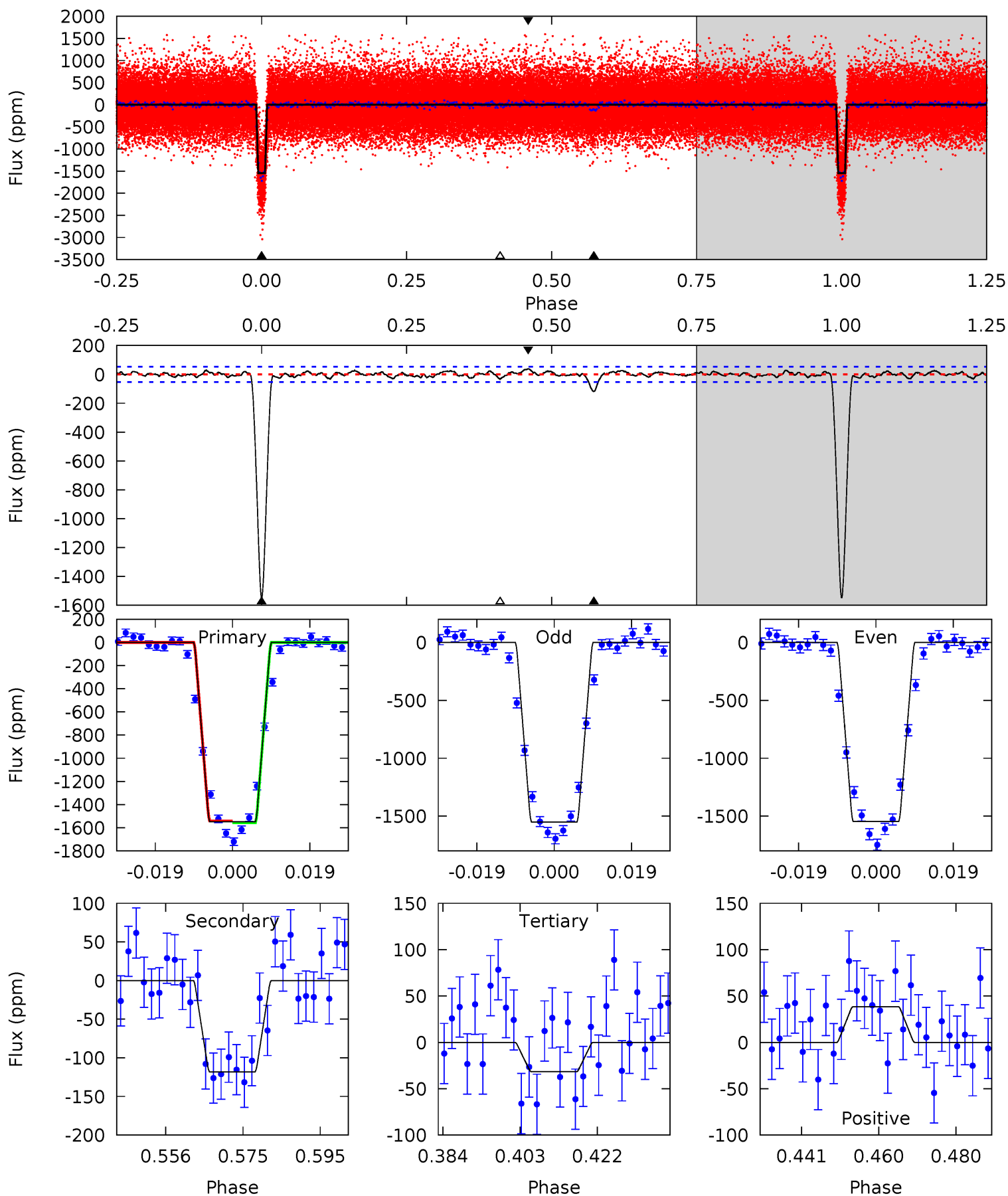
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
182.3	12.0	4.26	3.67	4.83	2.21	1.61	178.1	178.6	7.79	8.37	0.97	0.99	0.03	0.26



# Alt Model-Shift Uniqueness Test

008180063-01, P = 5.795067 Days, E = 126.336700 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
141.9	10.8	2.89	3.53	4.90	2.34	1.18	139.0	138.4	7.94	7.30	0.15	1.00	0.02	0.65



### Stellar Parameters For KIC 008180063

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5865^{+158}_{-158}$	$4.563^{+0.038}_{-0.152}$	$-0.340^{+0.300}_{-0.300}$	$0.827^{+0.186}_{-0.074}$	$0.914^{+0.089}_{-0.109}$	$2.274^{+0.443}_{-0.941}$
	+3%/-3%	+1%/-3%	+88%/-88%	+22%/-9%	+10%/-12%	+19%/-41%
Source	PHO1	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 008180063-01 / KOI 0905.01

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-111 \pm 9$	$4.47^{+0.50}_{-0.32}$	$1356^{+71}_{-56}$	$3286^{+76}_{-72}$	$11^{+2}_{-2}$
Alt.	$-118 \pm 11$	$3.75^{+0.44}_{-0.29}$	$1354^{+72}_{-53}$	$3509^{+83}_{-89}$	$17^{+3}_{-4}$

$T_{\text{max}}$  = Theoretical Maximum Planetary Temperature

$T_{\text{obs}}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )

$A_{\text{obs}}$  = Observed Albedo (Assuming  $T=0$ )

If a secondary eclipse is present, the system is likely an EB if  $T_{\text{obs}} \gg T_{\text{max}}$  AND  $A_{\text{obs}} \gg 1.0$



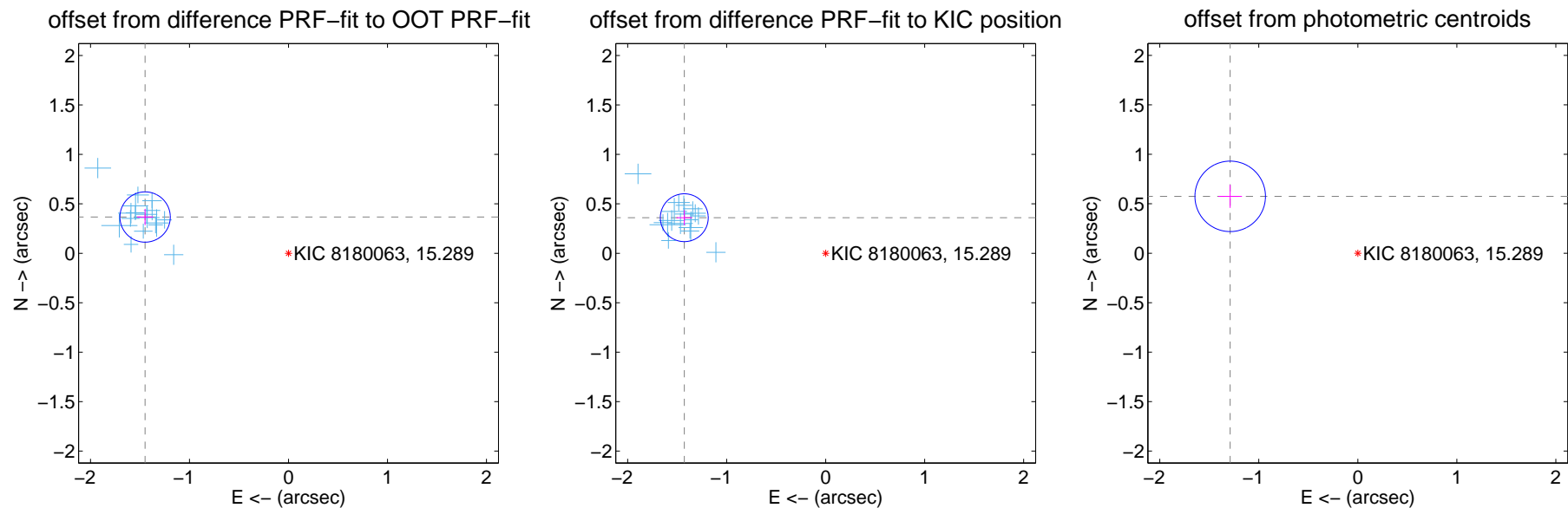
## DV Centroid Data

Supplemental centroid analysis for 008180063-01. Kepler magnitude: 15.29. Transit SNR 114.58

There are 17 quarters with good PRF difference image offsets

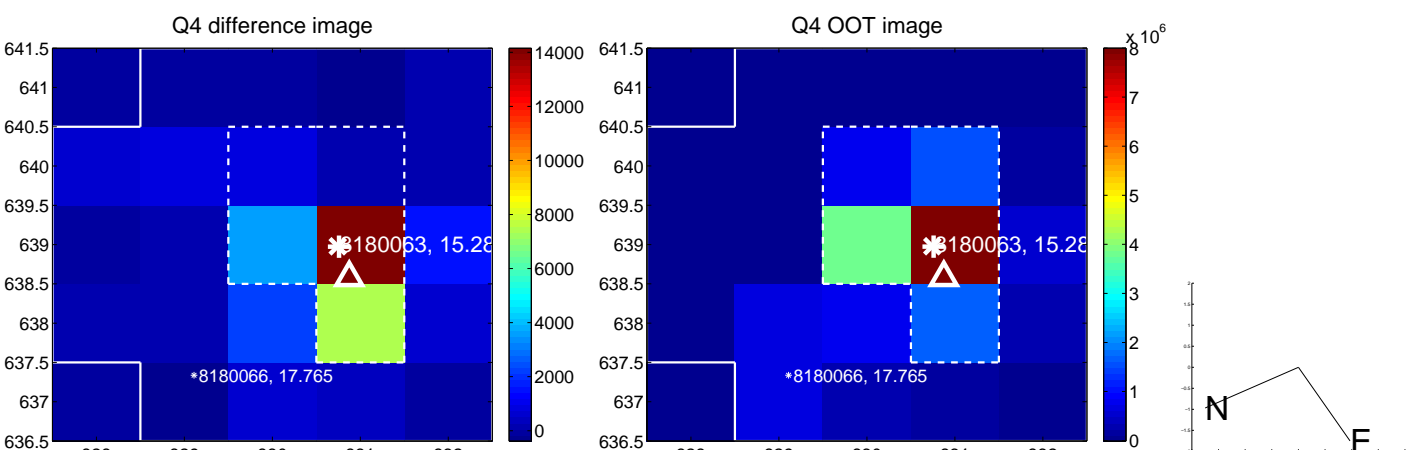
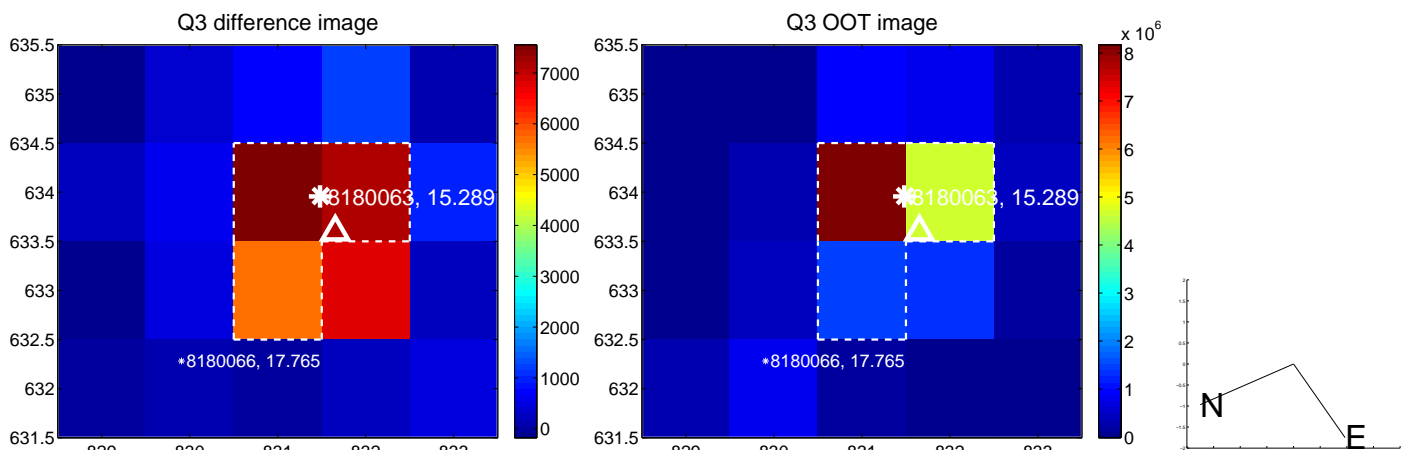
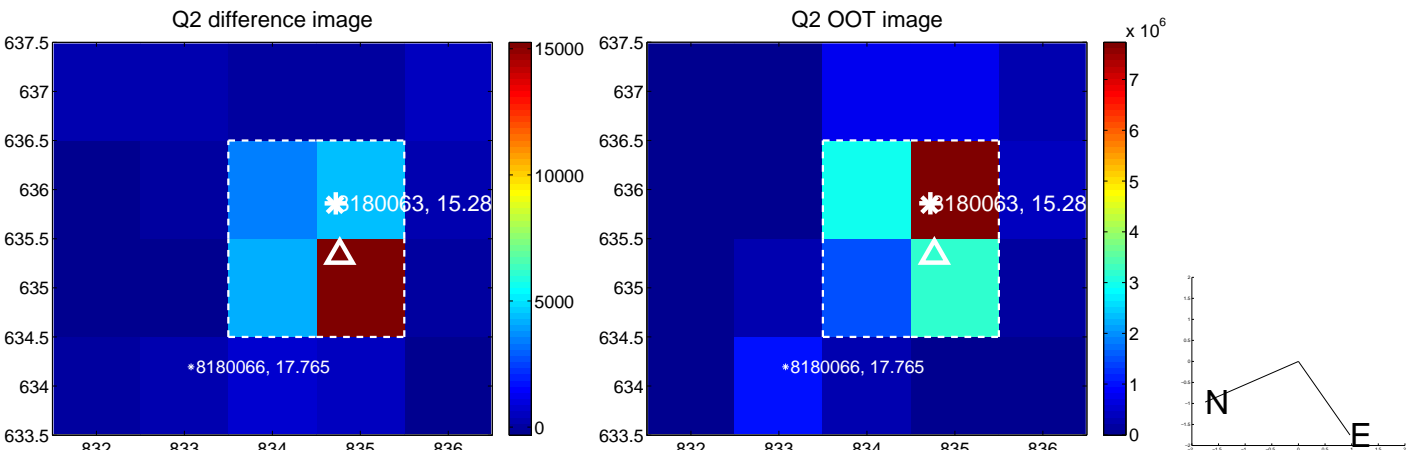
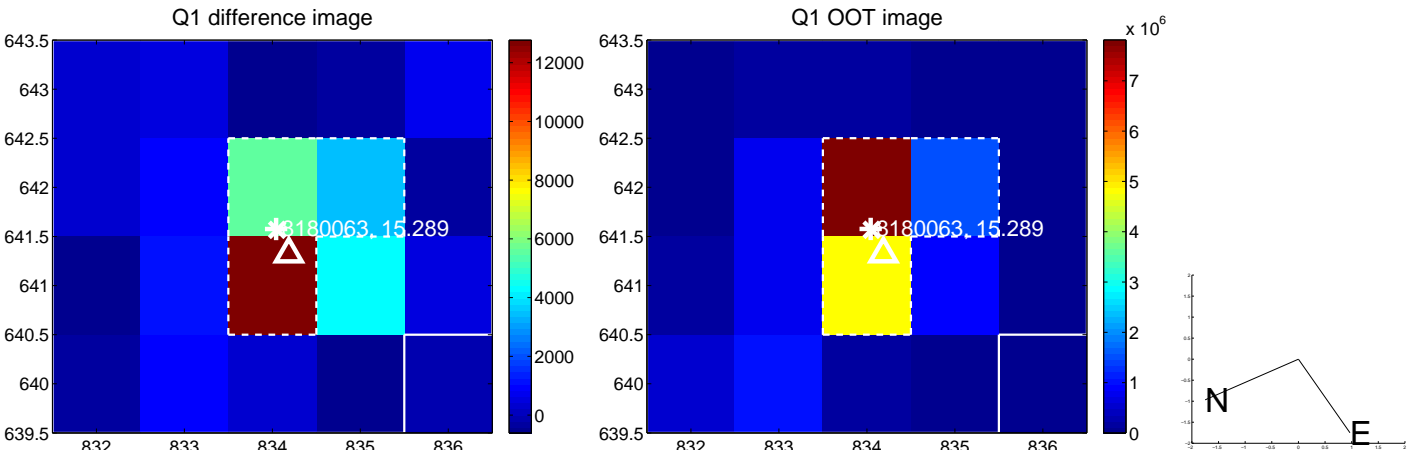
The direct PRF centroid is offset from the target star catalog position by about 0.11 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.494 \pm 0.085$	<b>17.63</b>	$1.448 \pm 0.081$	$0.367 \pm 0.082$
PRF-fit source offset from KIC position	$1.472 \pm 0.081$	<b>18.27</b>	$1.428 \pm 0.078$	$0.360 \pm 0.076$
photometric centroid source offset	$1.41 \pm 0.12$	<b>11.89</b>	$1.29 \pm 0.12$	$0.57 \pm 0.12$

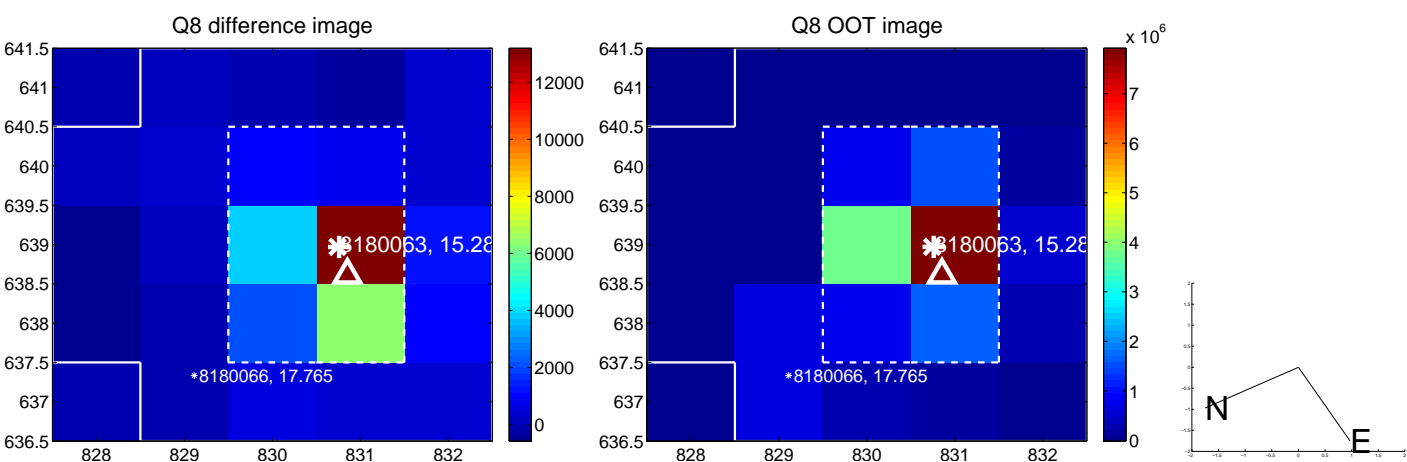
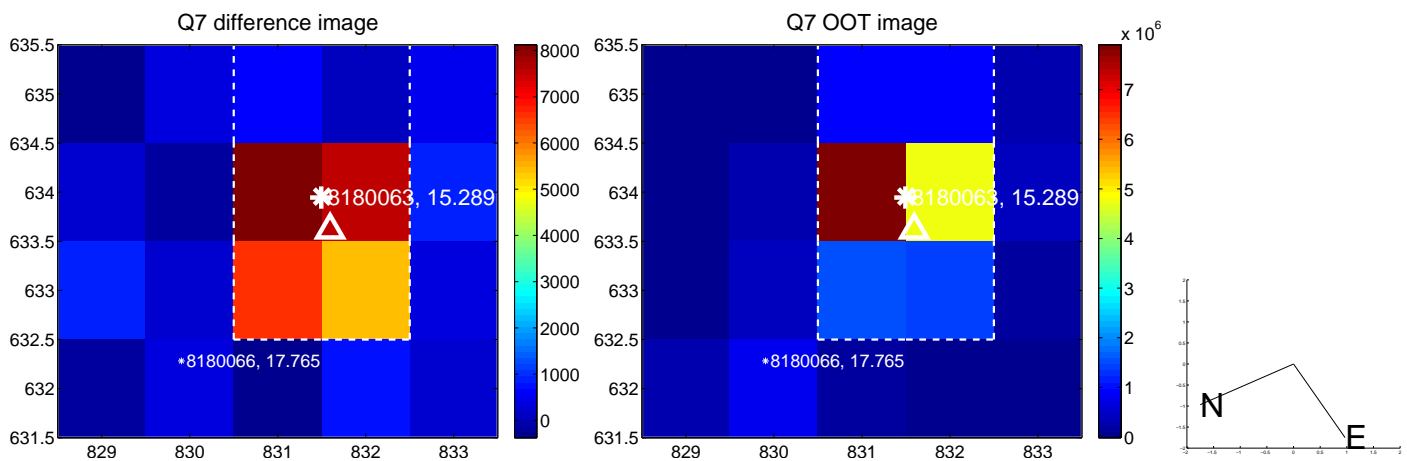
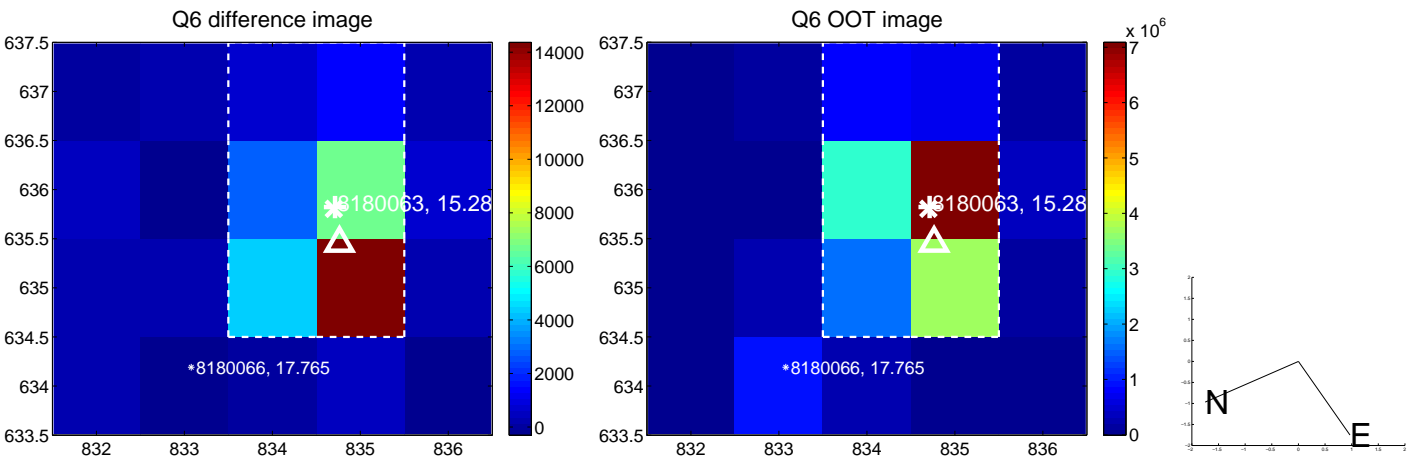
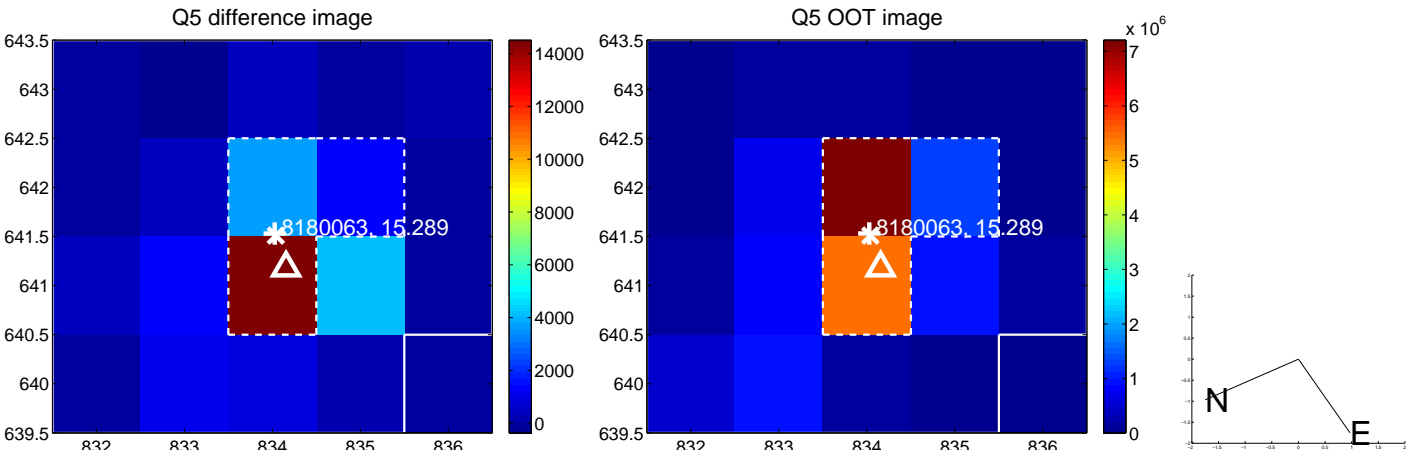


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

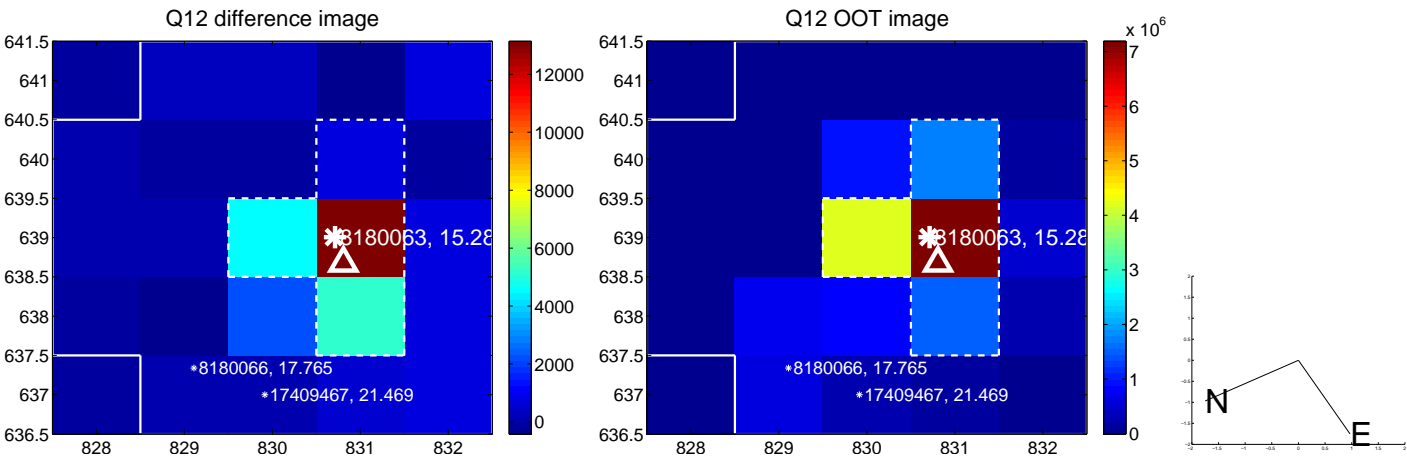
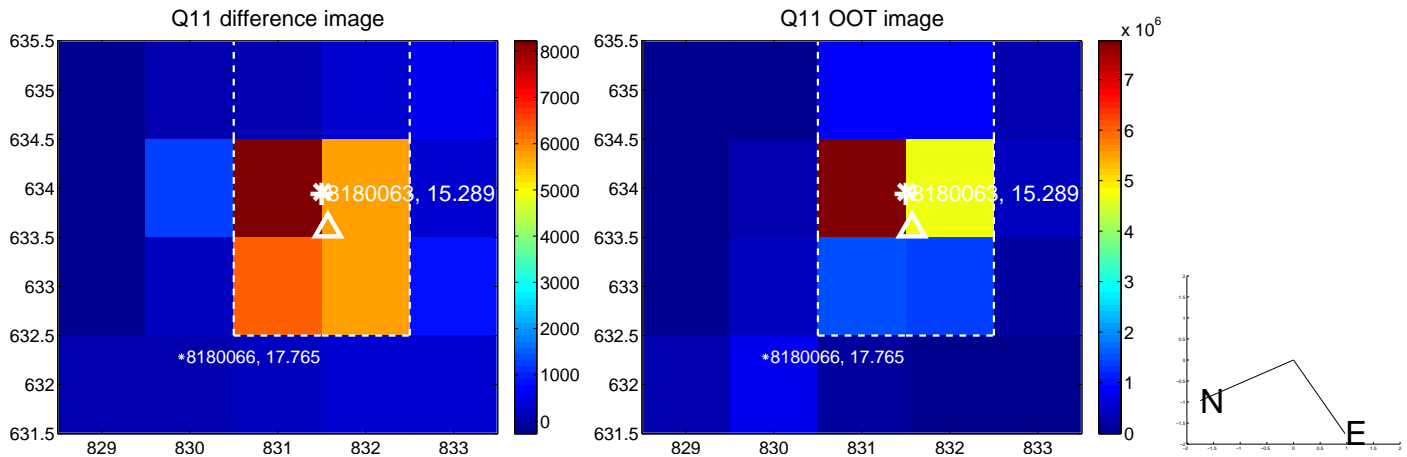
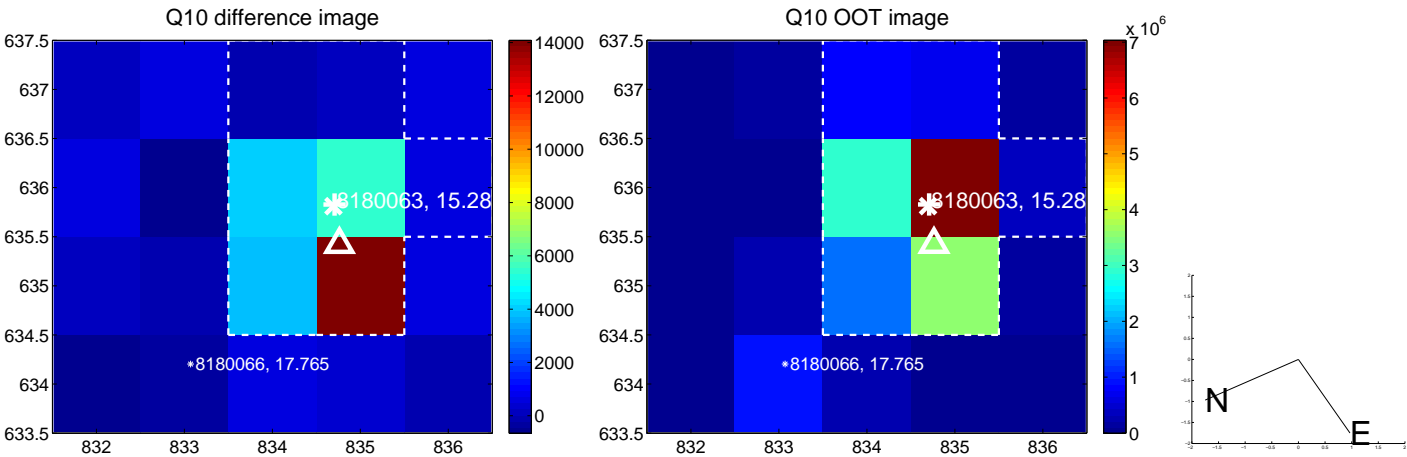
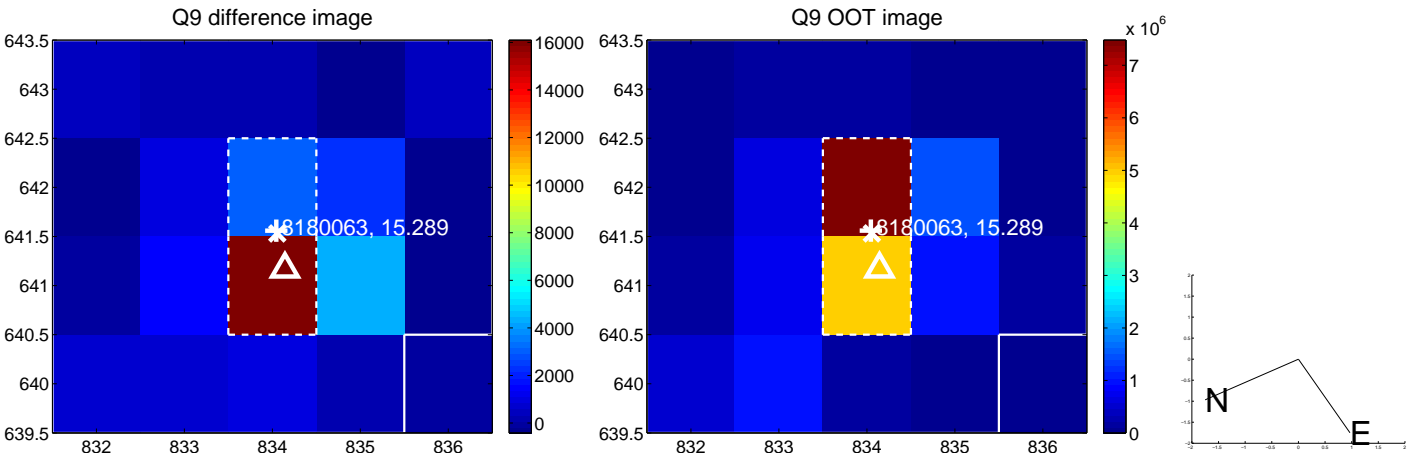
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



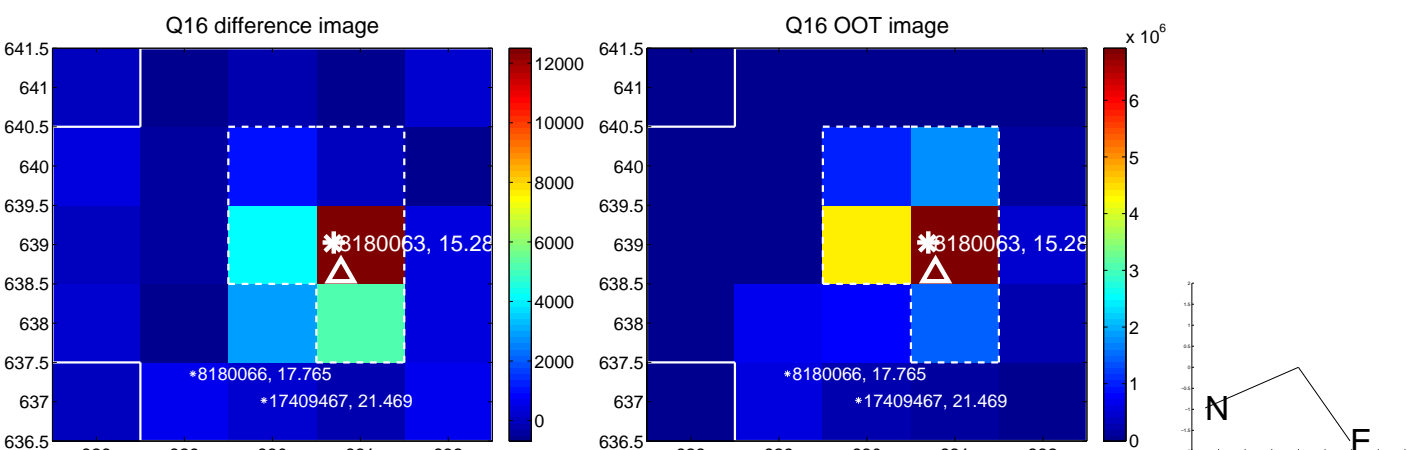
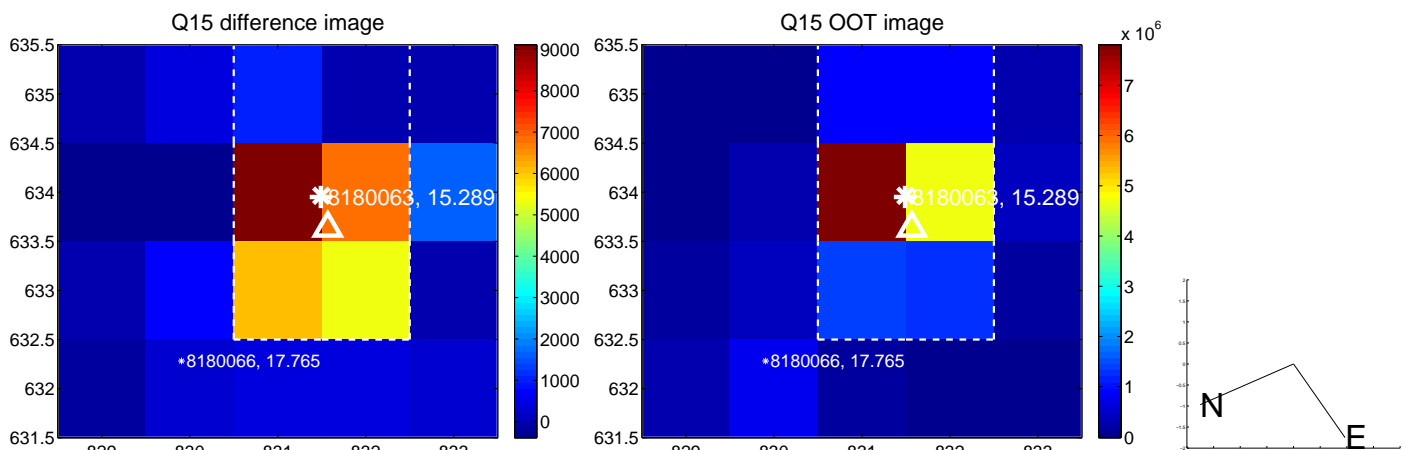
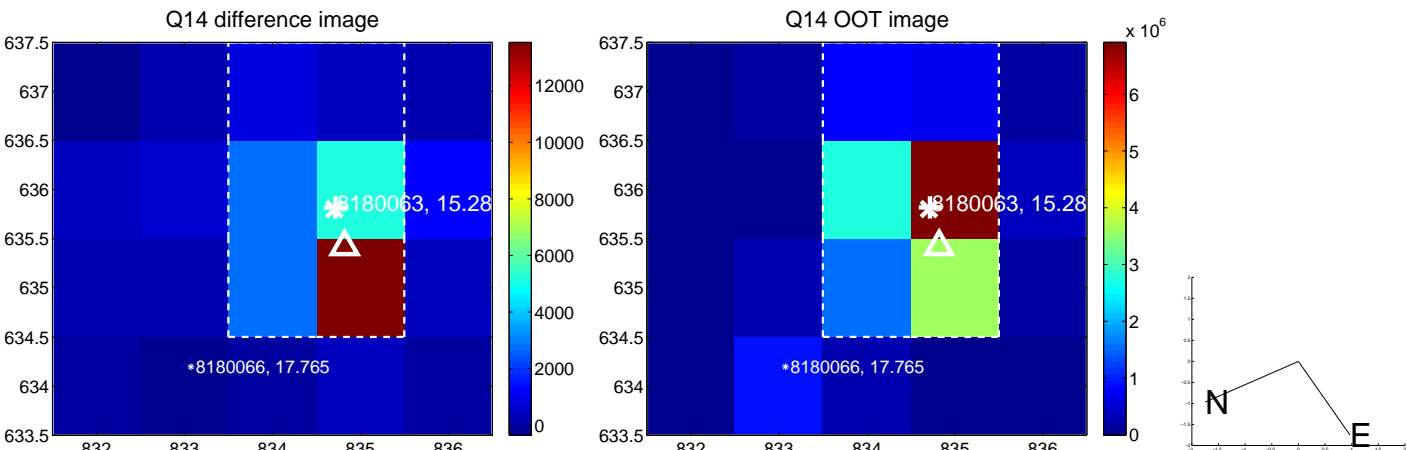
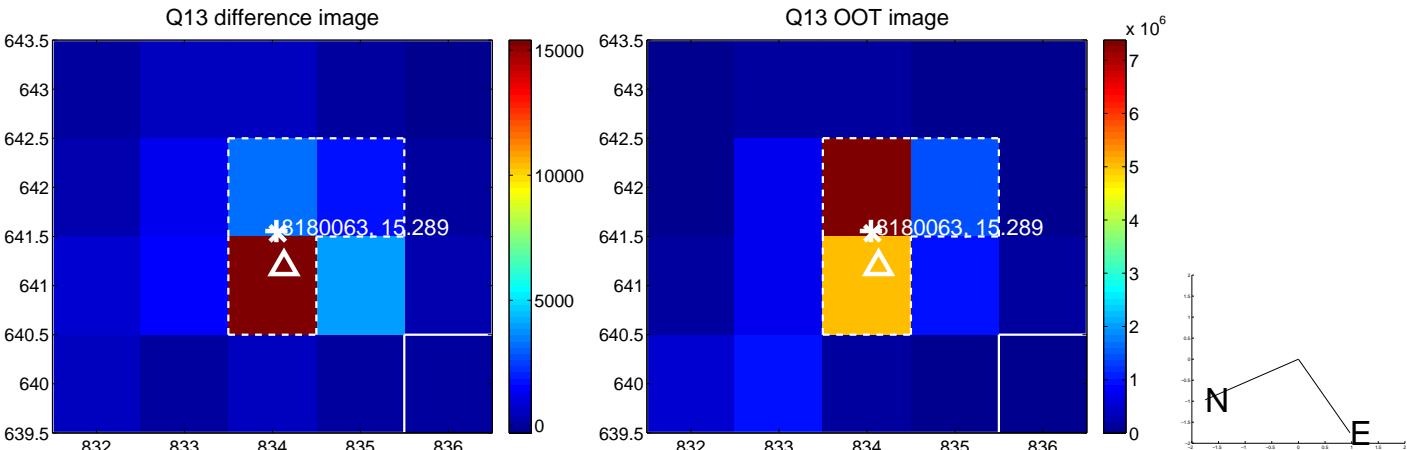
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

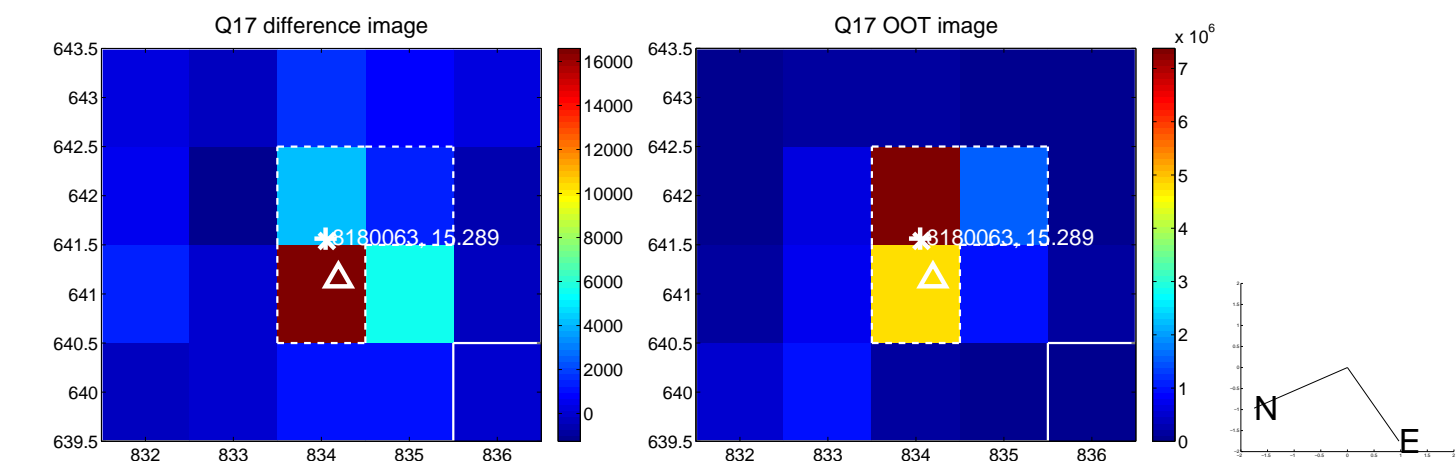


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

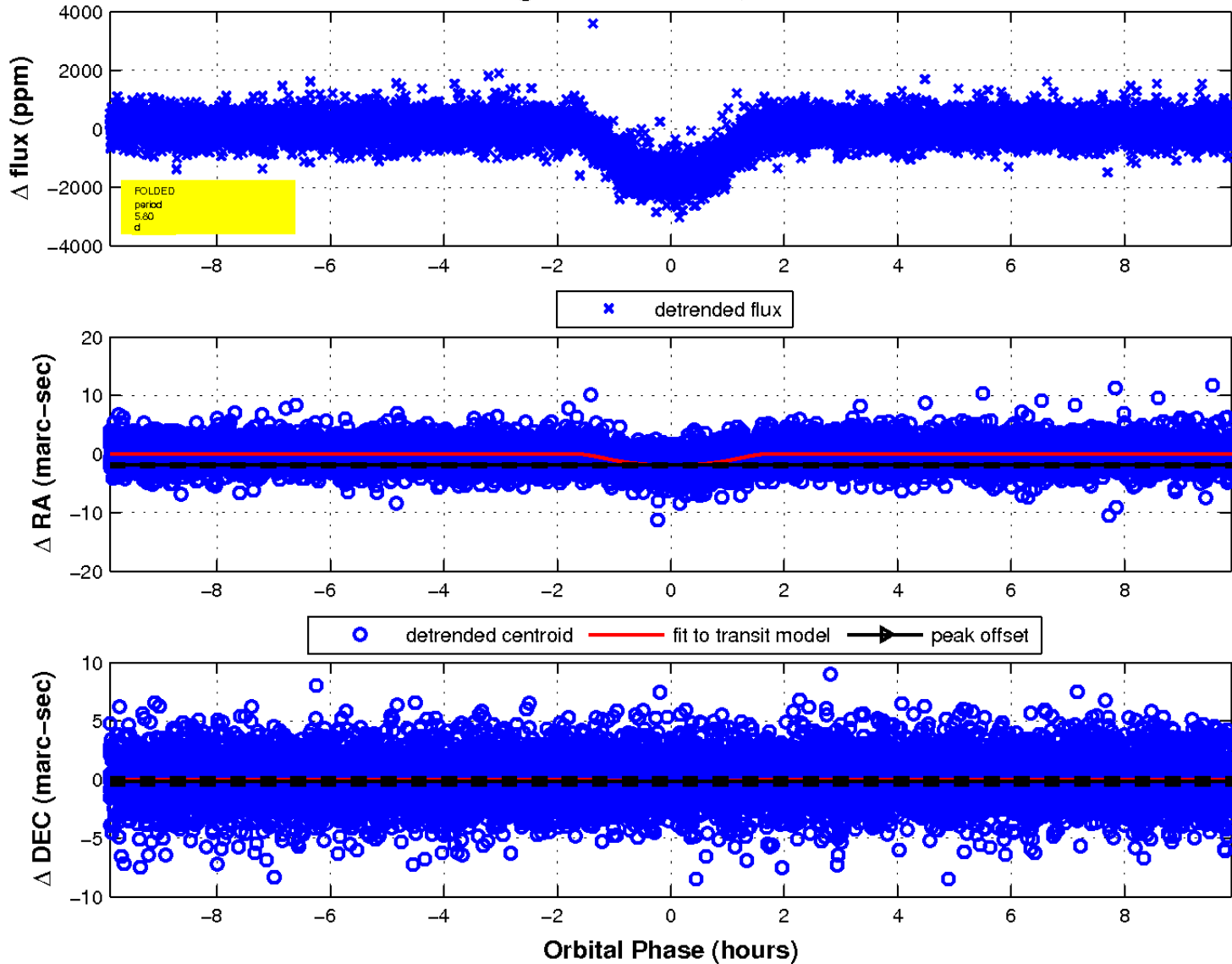




white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.

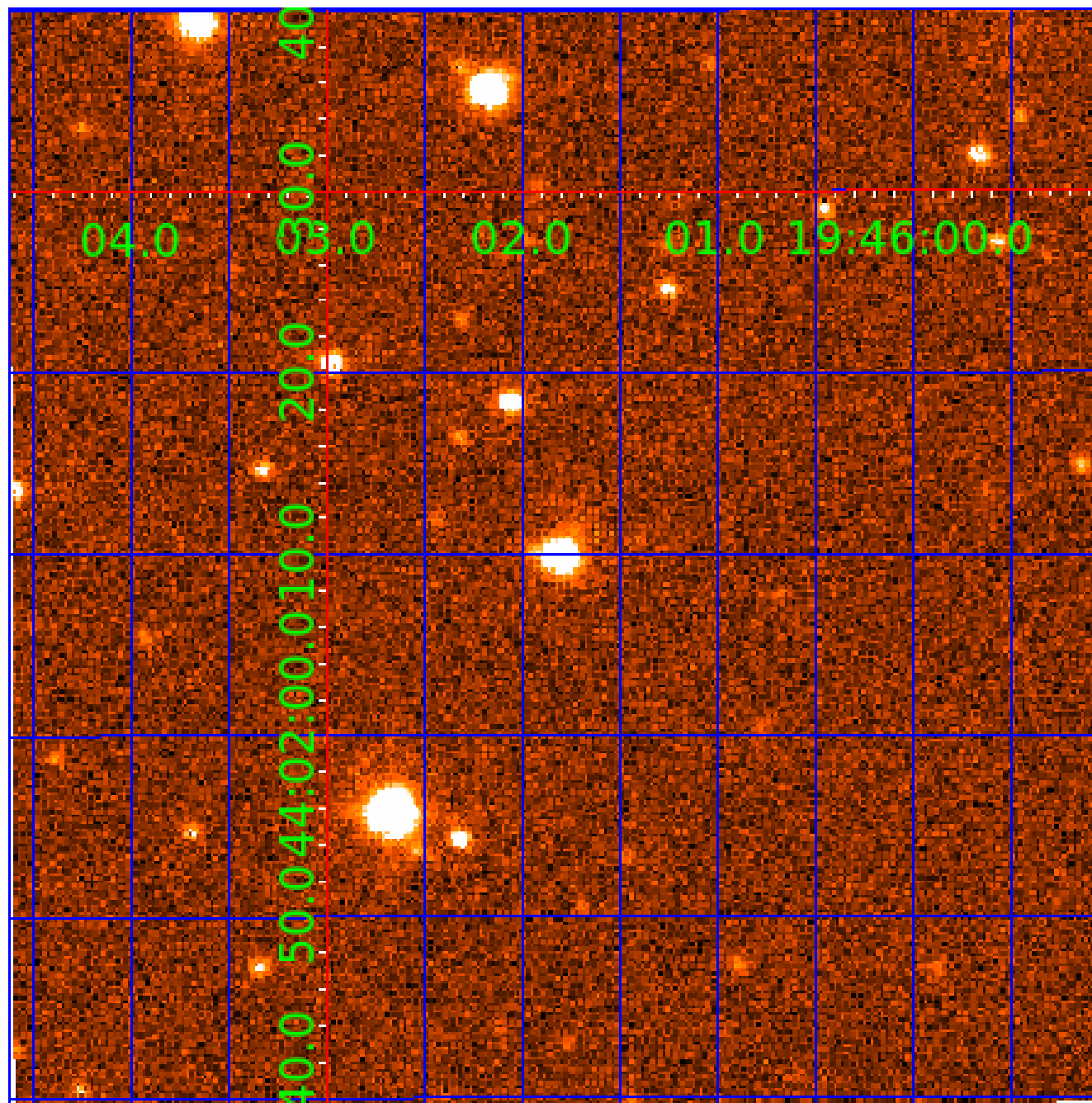


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination



# KIC 008180063

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008180063-01	OBS	0905.01	5.795060	132.132648	1689.9	3.296	108.9	114.6	0.83	5865	4.35	193.30
008180063-02	OBS	No	5.794987	135.461040	119.8	2.676	8.7	9.1	0.83	5865	1.03	193.30

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008180063-01	OBS	FP	0.00	0	1	1	0	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—CENT_UNRESOLVED_OFFSET
008180063-02	OBS	FP	0.00	1	1	1	0	IS_SEC_TCE—CENT_UNRESOLVED_OFFSET

**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 008180063-02

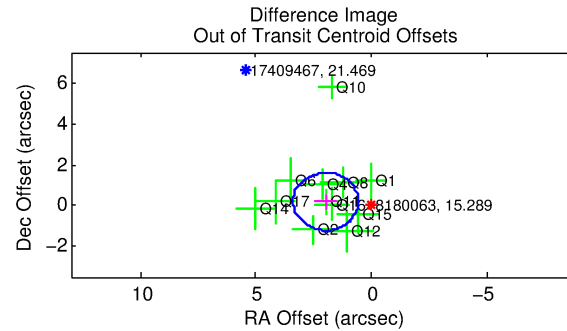
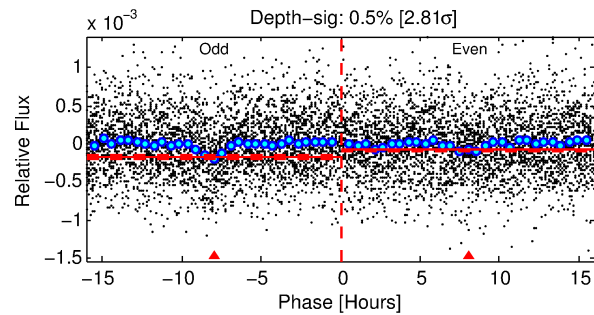
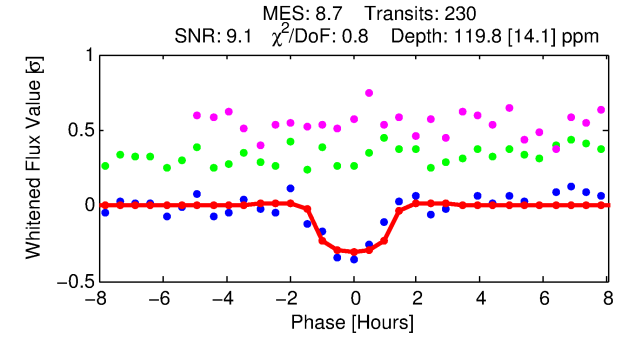
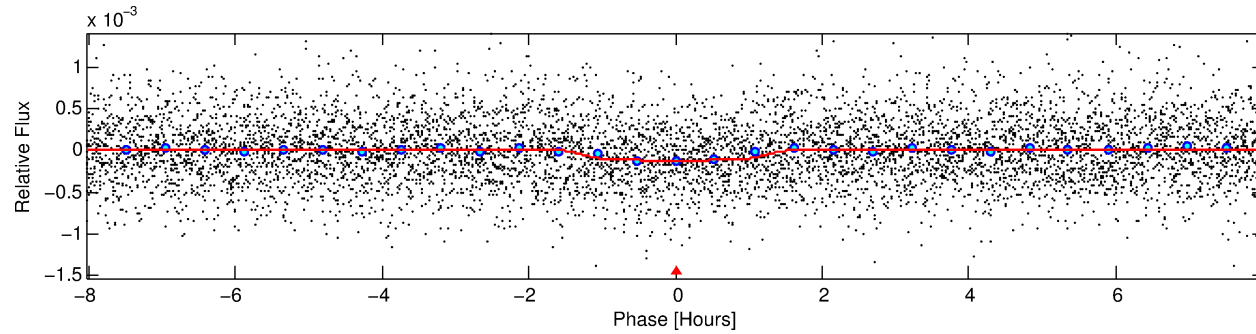
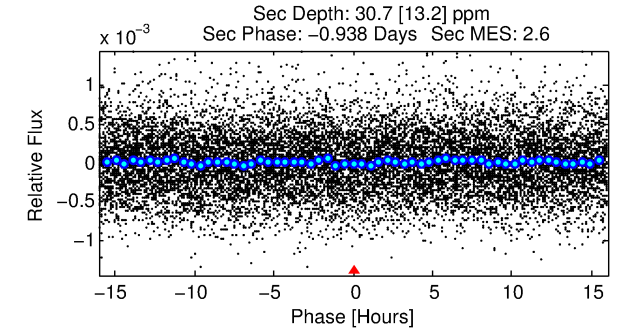
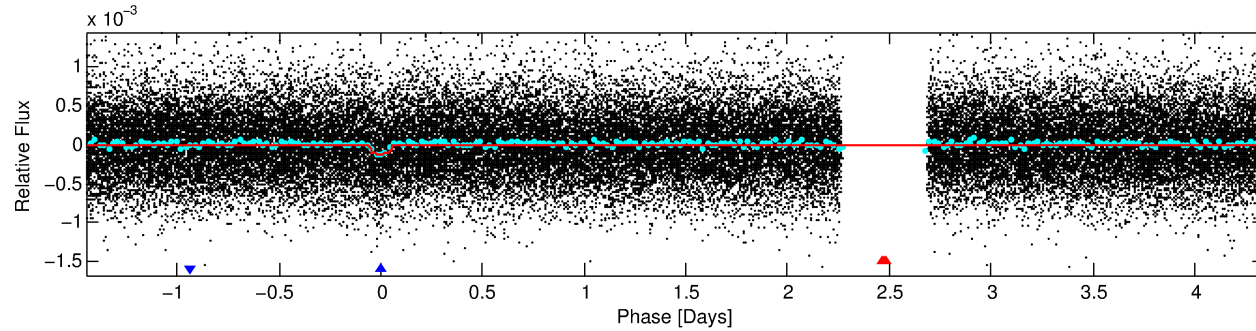
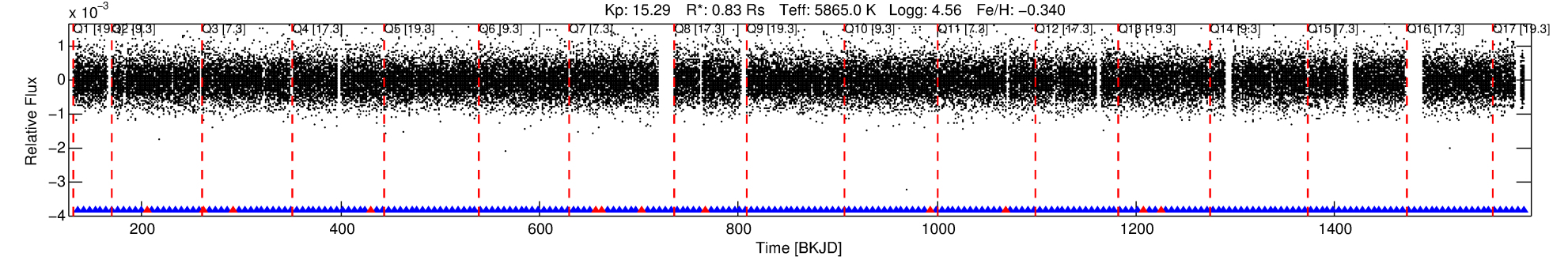
No Significant Match Found

# DV One-Page Summary

KIC: 8180063 Candidate: 2 of 2 Period: 5.795 d

KOI: K00905 Corr: No Ephemeris Match

Kp: 15.29 R\*: 0.83 Rs Teff: 5865.0 K Logg: 4.56 Fe/H: -0.340



## DV Fit Results:

Period = 5.79499 [0.00005] d  
Epoch = 135.4610 [0.0058] BKJD  
Rp/R\* = 0.0115 [0.0103]  
a/R\* = 8.89 [39.55]  
b = 0.86 [1.40]  
Seff = 193.30 [57.52]  
Teq = 951 [71] K  
Rp = 1.04 [0.96] Re  
a = 0.0612 [0.0116] AU  
Ag = 59.09 [110.73] [0.52σ]  
Teffp = 4076 [1891] K [1.65σ]

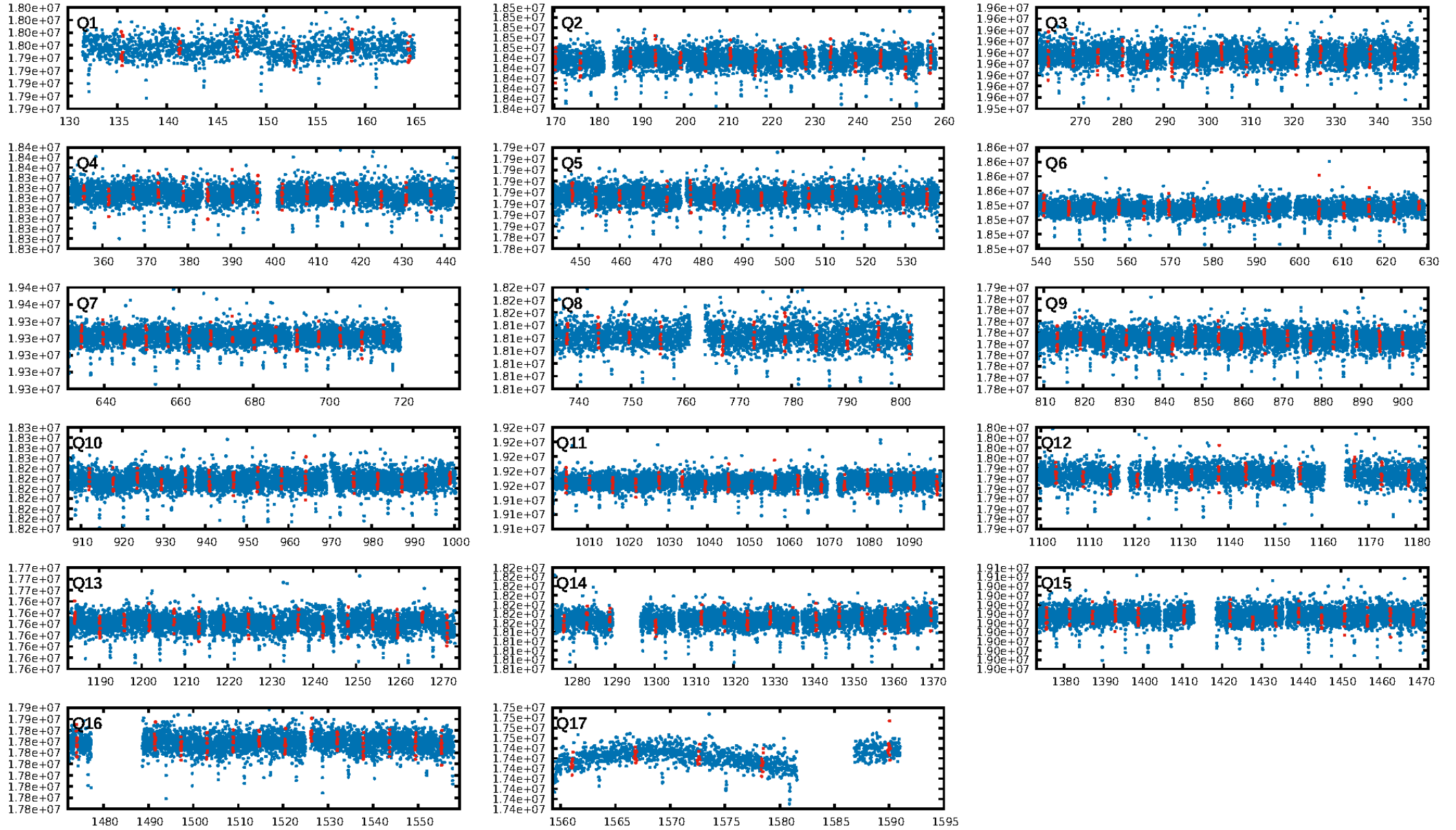
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.62e-18  
RollingBand-fgt: 0.95 [207/219]  
GhostDiagnostic-chr: 1.234  
Centroid-sig: 62.0%  
Centroid-so: 0.863 arcsec [0.57σ]  
OotOffset-rm: 2.002 arcsec [4.26σ]  
KicOffset-rm: 2.005 arcsec [4.31σ]  
OotOffset-st: 4/2/4/2 [12]  
KicOffset-st: 4/2/4/2 [12]  
DiffImageQuality-fgm: 0.67 [8/12]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 21:53:42 Z

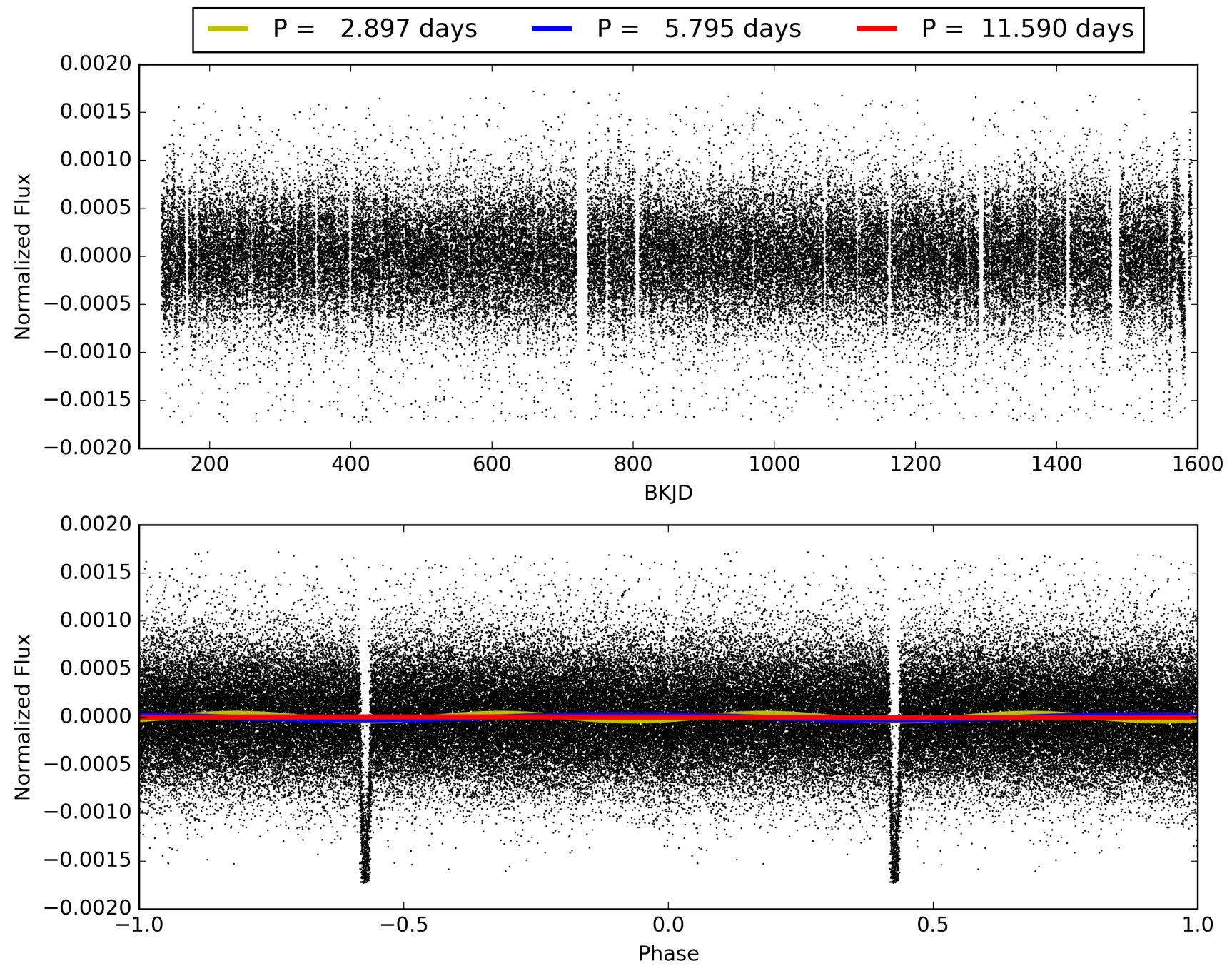
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 008180063-02, PDC Light Curves



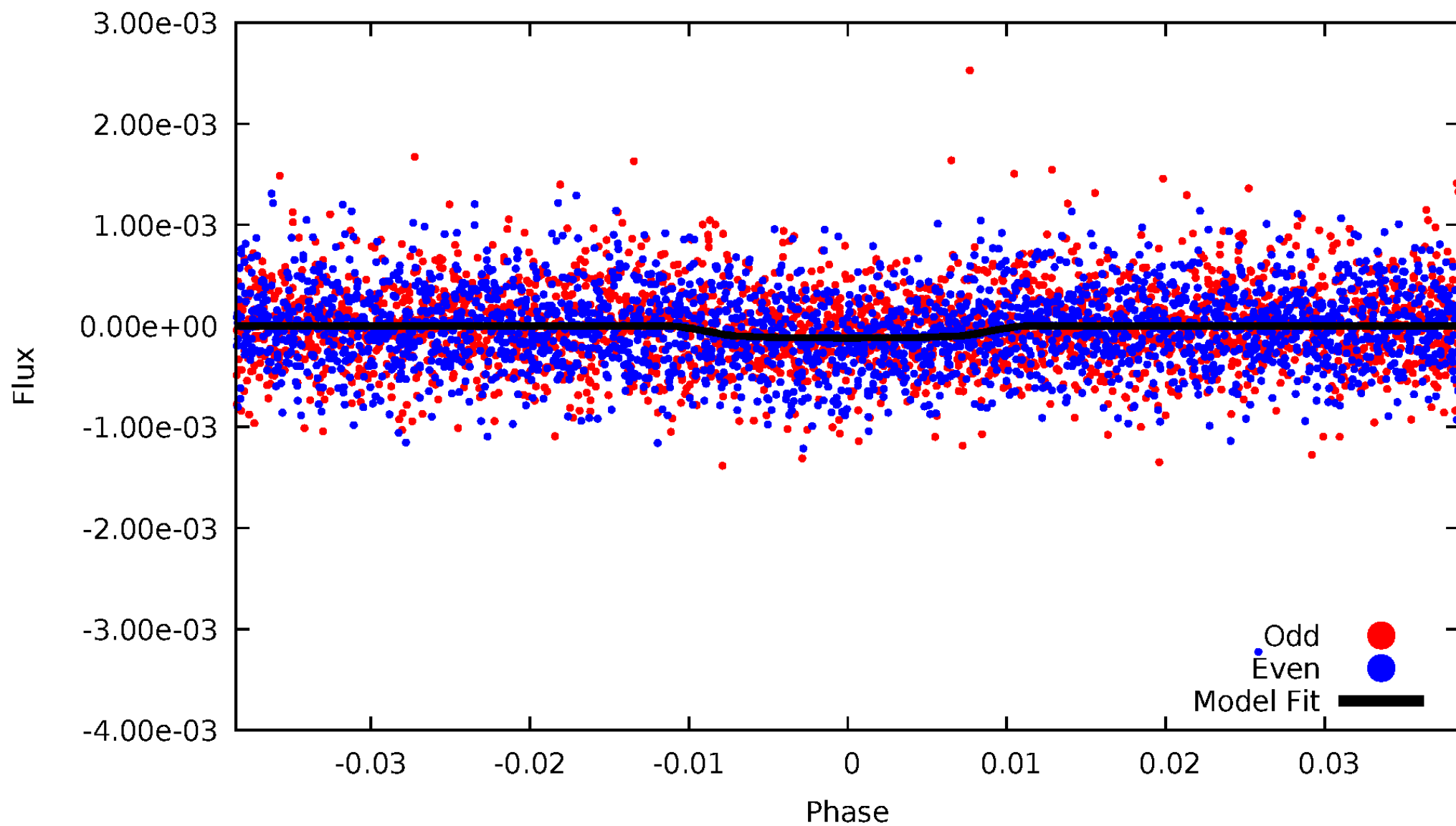


TCE 008180063-02



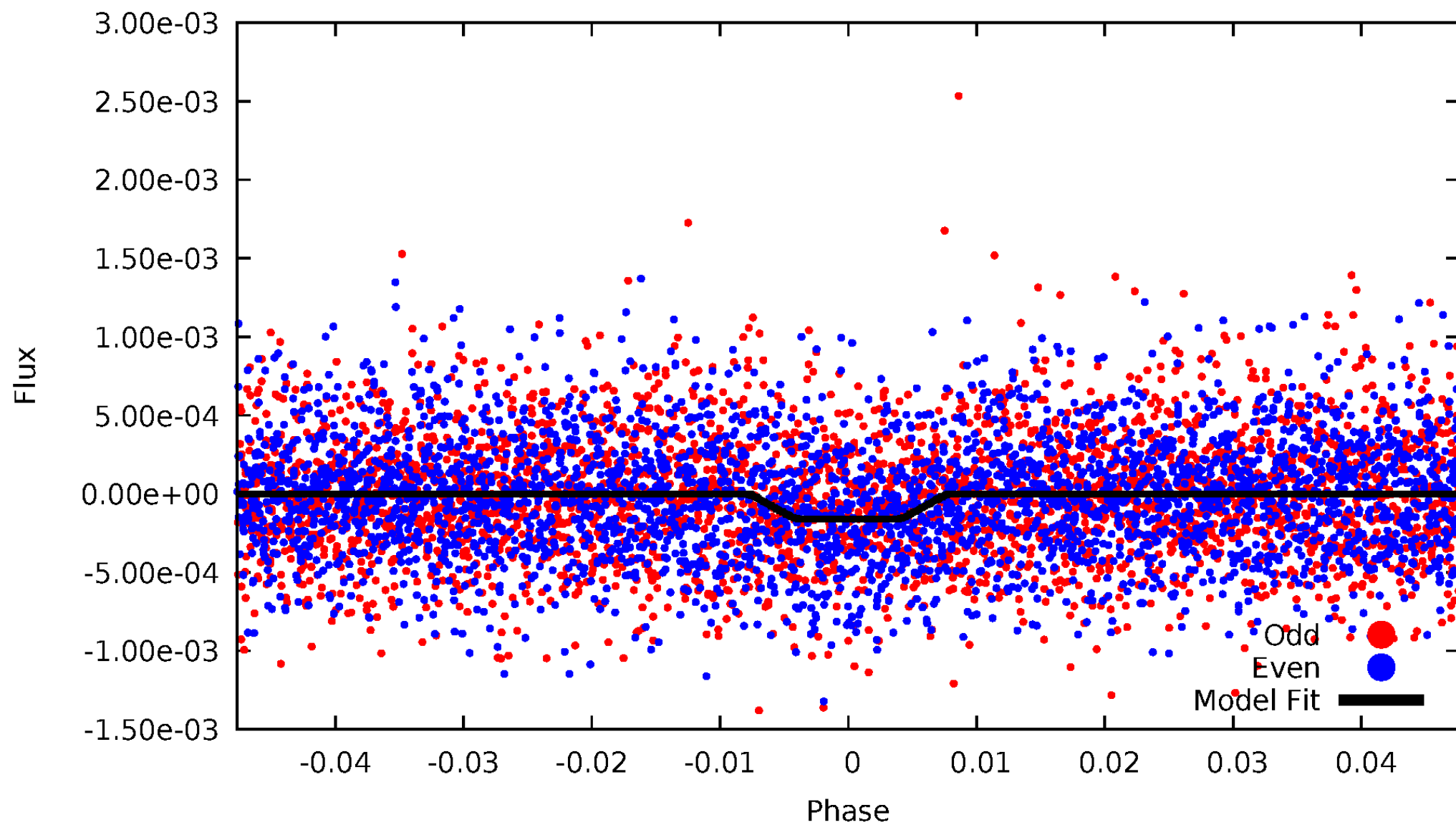
# DV Odd/Even

TCE 008180063-02



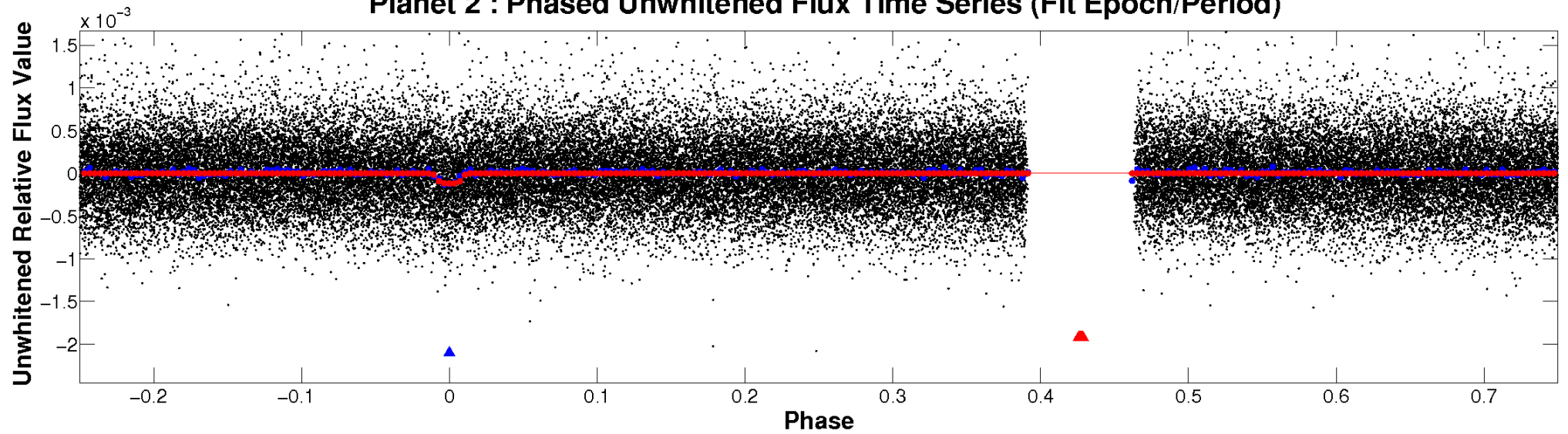
# ALT Odd/Even

TCE 008180063-02

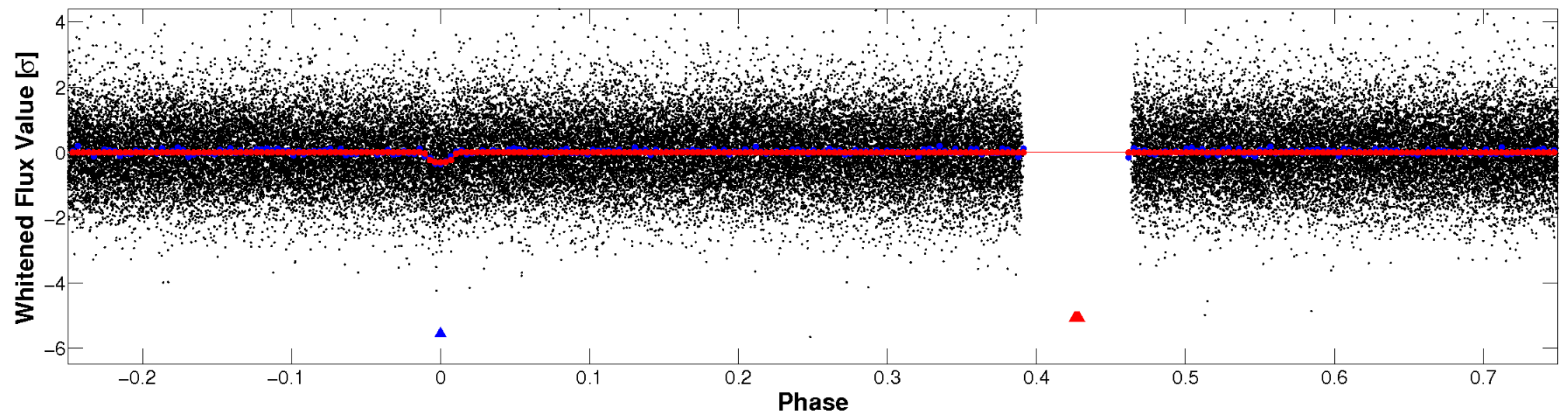


# Non-Whitened Vs. Whitened Light Curve

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



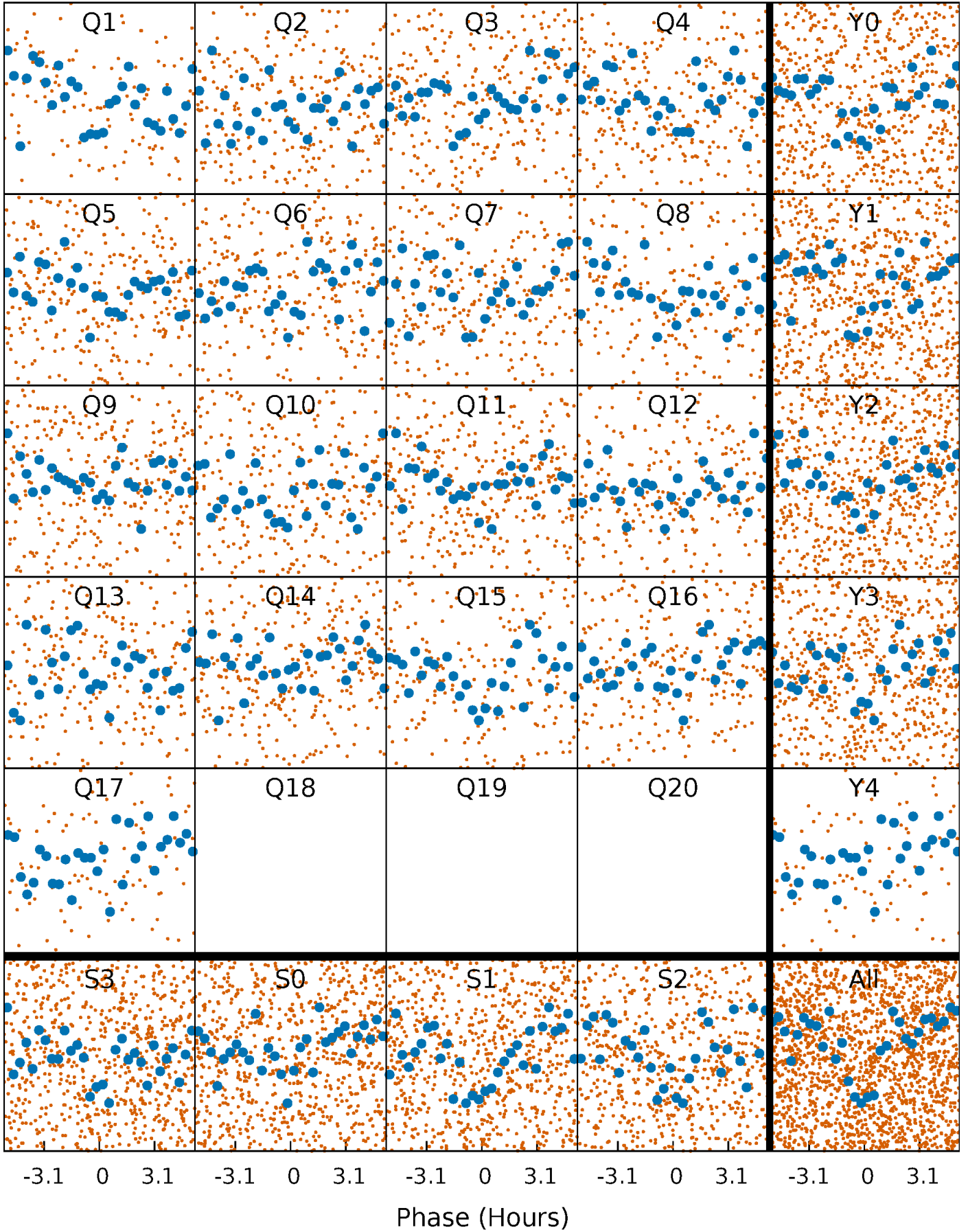
## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)





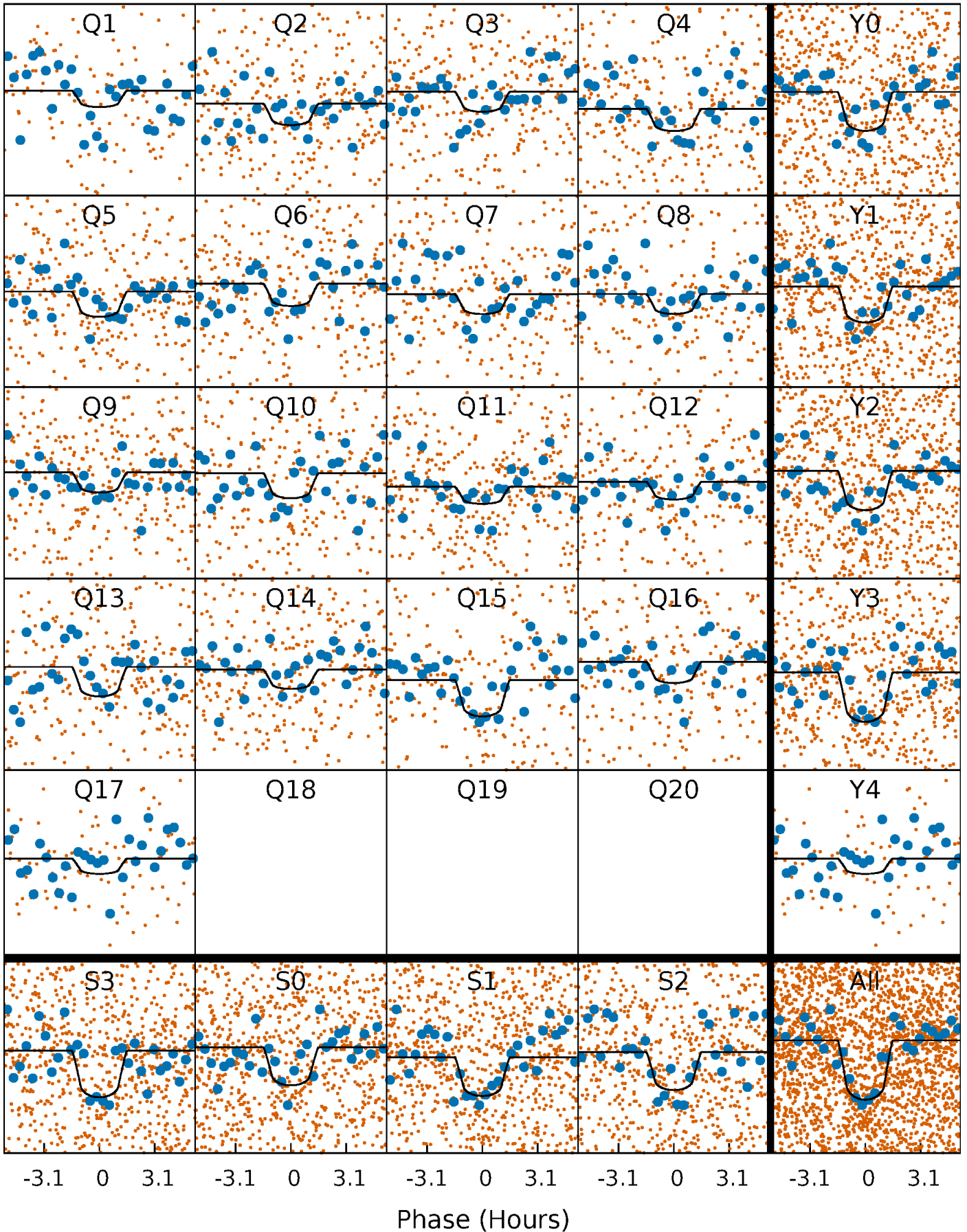
# PDC Quarter-Phased Transit Curves

TCE 008180063-02   P= 5.794987 Days    $T_0=135.461040$  (BKJD)



# DV Quarter-Phased Transit Curves

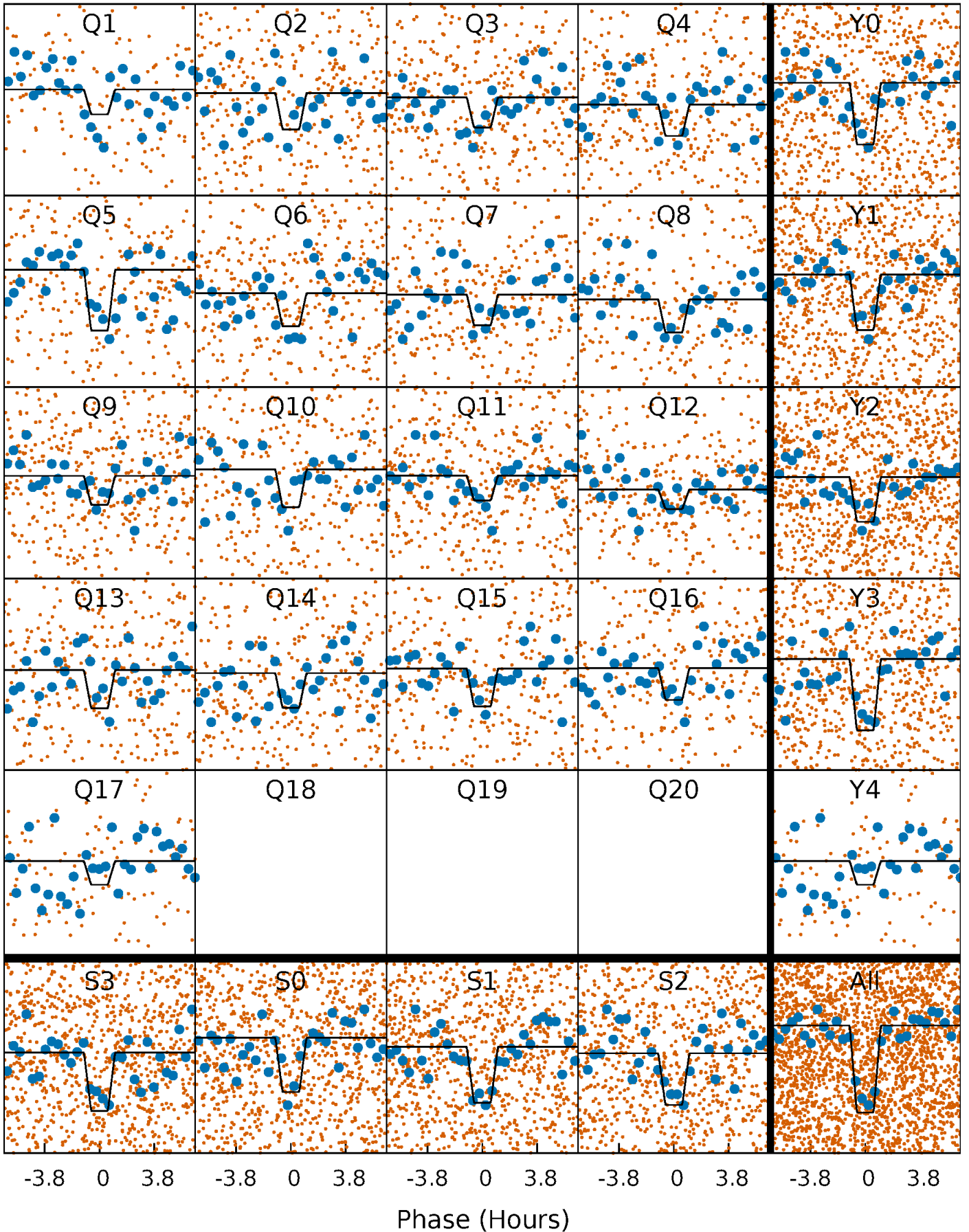
TCE 008180063-02   P= 5.794987 Days    $T_0=135.461040$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

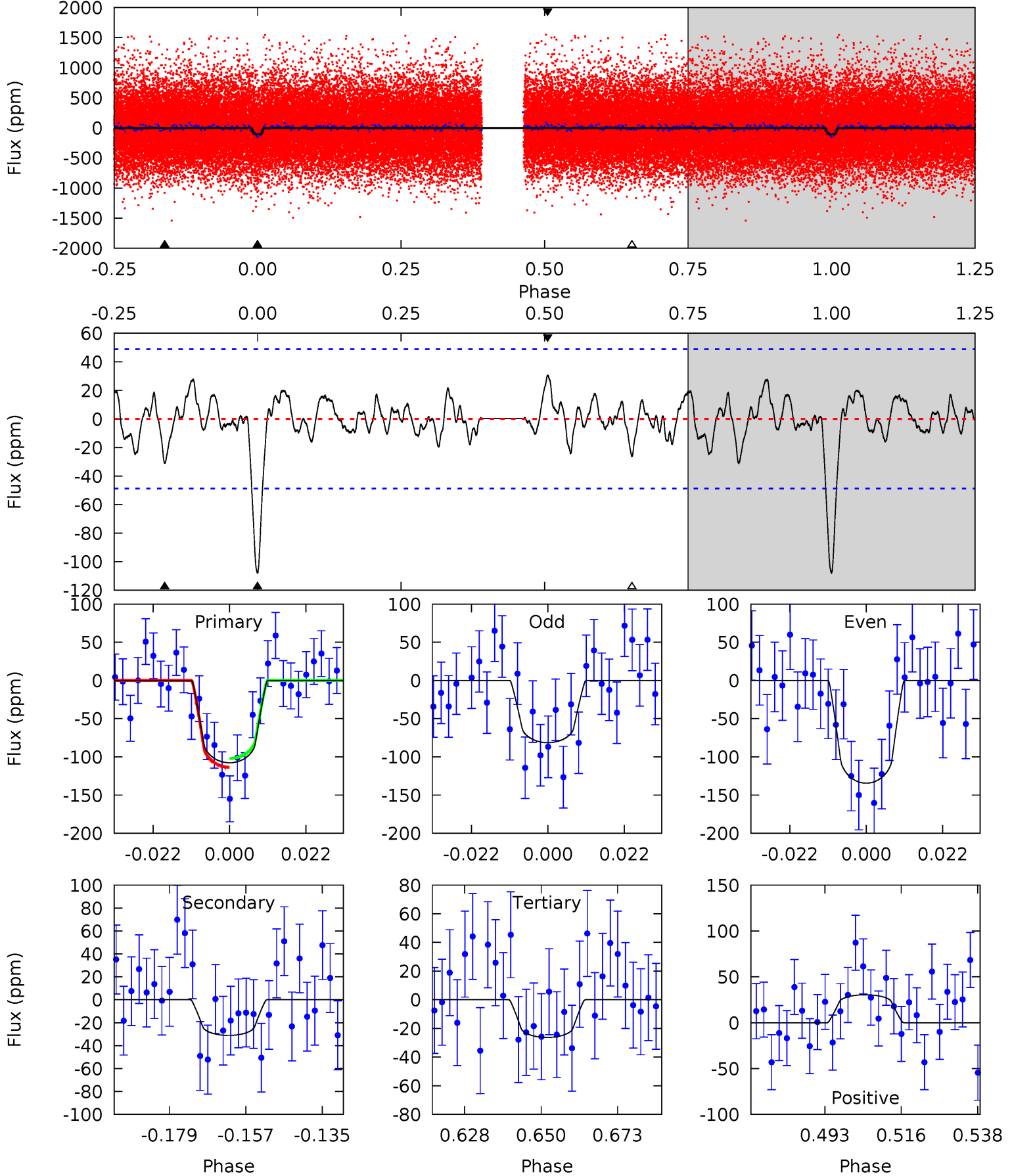
TCE 008180063-02   P= 5.794985 Days    $T_0=135.455907$  (BKJD)



# DV Model-Shift Uniqueness Test

008180063-02, P = 5.794987 Days, E = 129.666053 Days

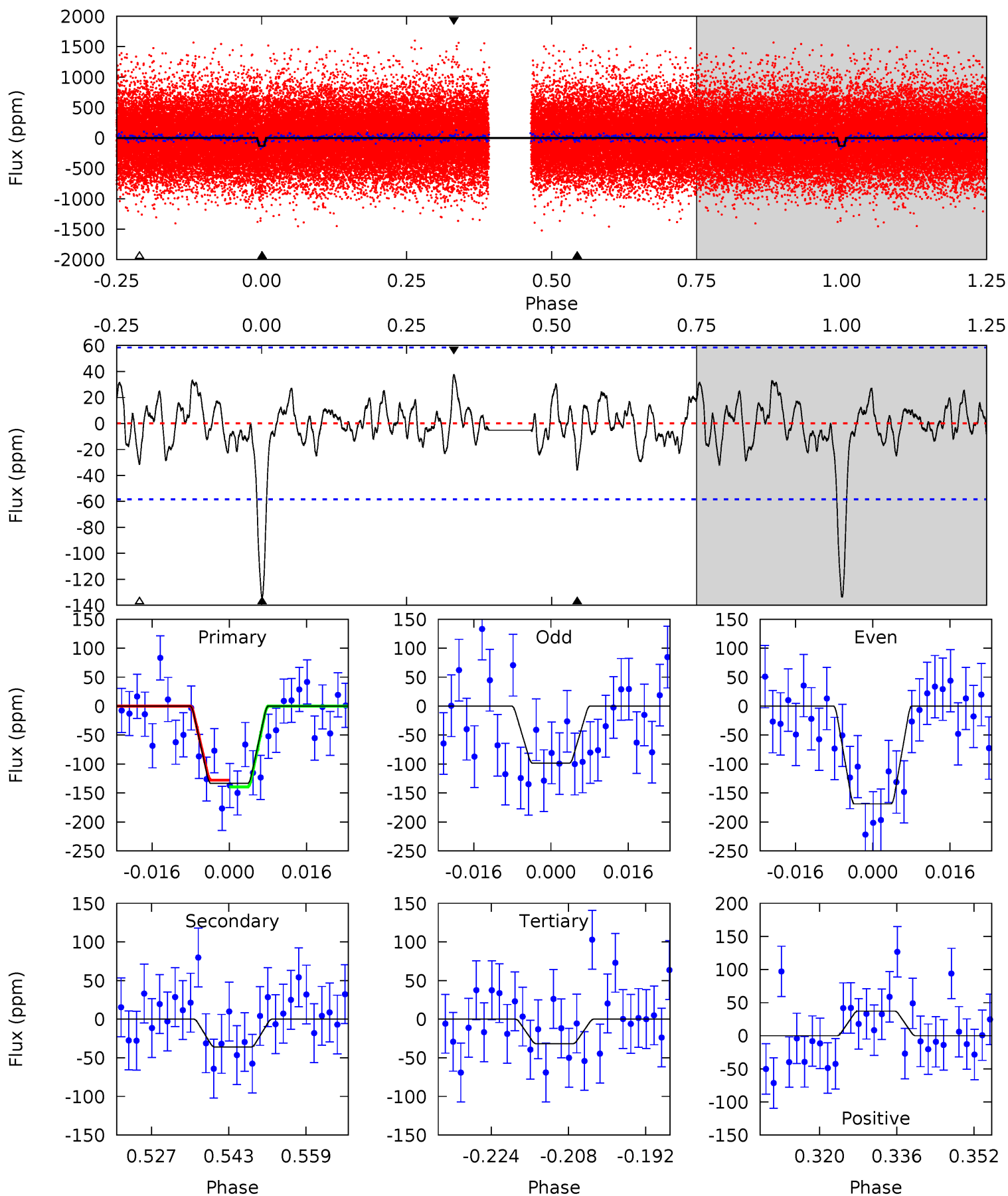
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.8	3.10	2.63	3.04	4.87	2.28	1.06	8.13	7.71	0.48	0.07	2.65	0.97	0.22	0.58



# Alt Model-Shift Uniqueness Test

008180063-02, P = 5.794985 Days, E = 129.660922 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
11.3	3.03	2.67	3.15	4.94	2.41	1.12	8.60	8.13	0.36	-0.11	2.97	1.02	0.22	0.50



### Stellar Parameters For KIC 008180063

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5865^{+158}_{-158}$	$4.563^{+0.038}_{-0.152}$	$-0.340^{+0.300}_{-0.300}$	$0.827^{+0.186}_{-0.074}$	$0.914^{+0.089}_{-0.109}$	$2.274^{+0.443}_{-0.941}$
	+3%/-3%	+1%/-3%	+88%/-88%	+22%/-9%	+10%/-12%	+19%/-41%
Source	PHO1	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 008180063-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-31 \pm 10$	$1.23^{+0.91}_{-0.77}$	$1354^{+68}_{-54}$	$4061^{+2205}_{-720}$	$40^{+231}_{-27}$
Alt.	$-36 \pm 12$	$1.33^{+0.91}_{-0.81}$	$1356^{+69}_{-58}$	$4091^{+1963}_{-732}$	$41^{+222}_{-28}$

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

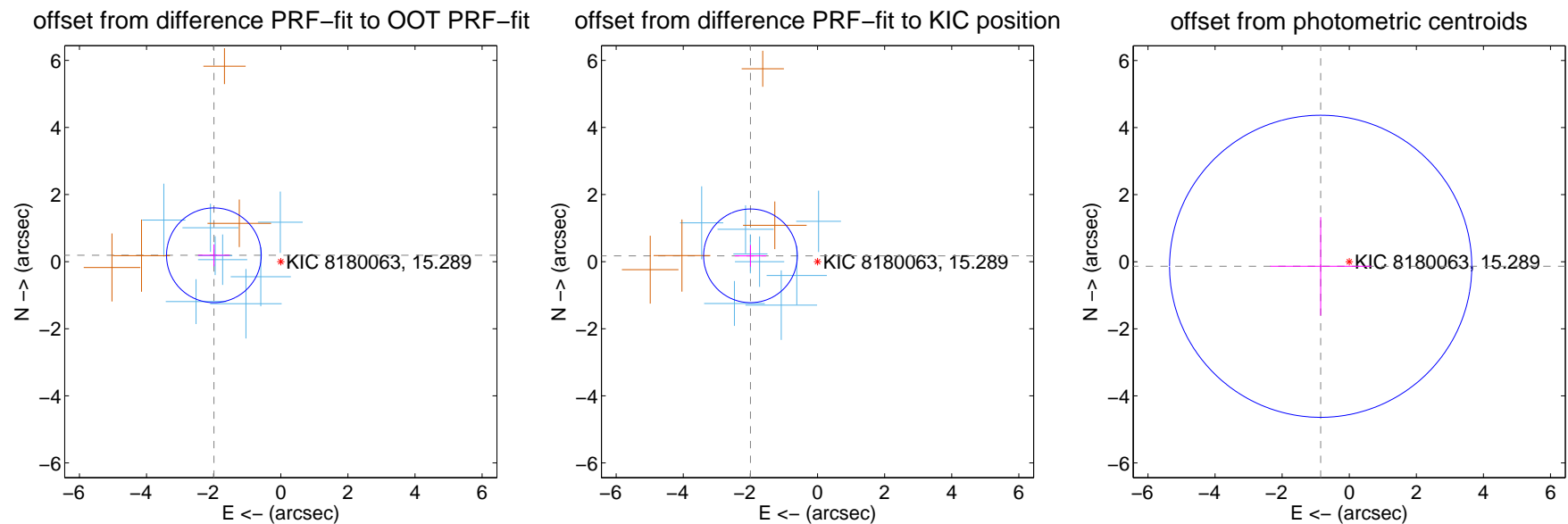
## DV Centroid Data

Supplemental centroid analysis for 008180063-02. Kepler magnitude: 15.29. Transit SNR 9.12

There are 8 quarters with good PRF difference image offsets

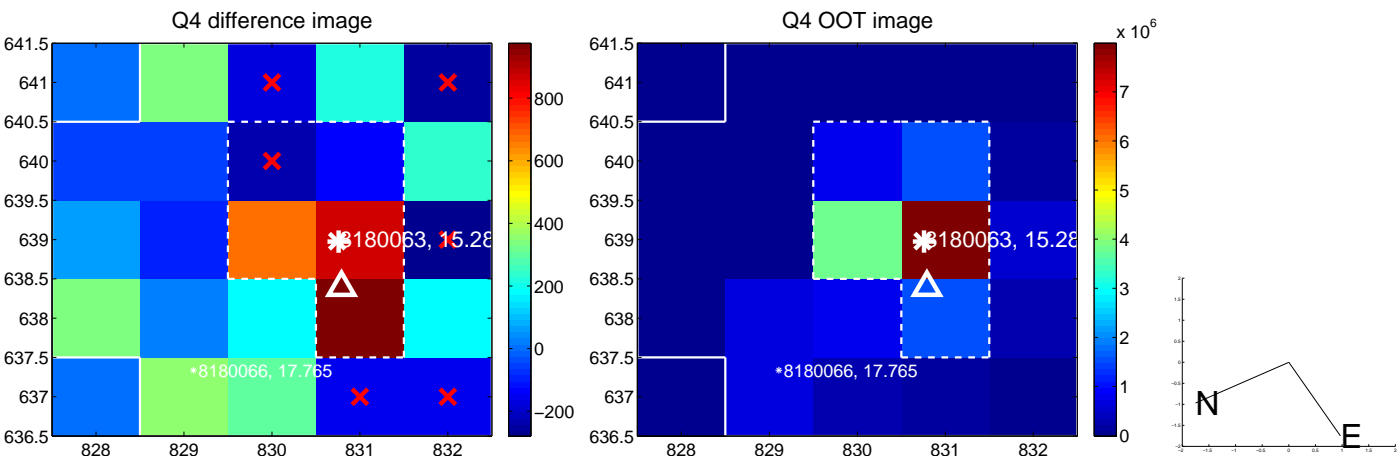
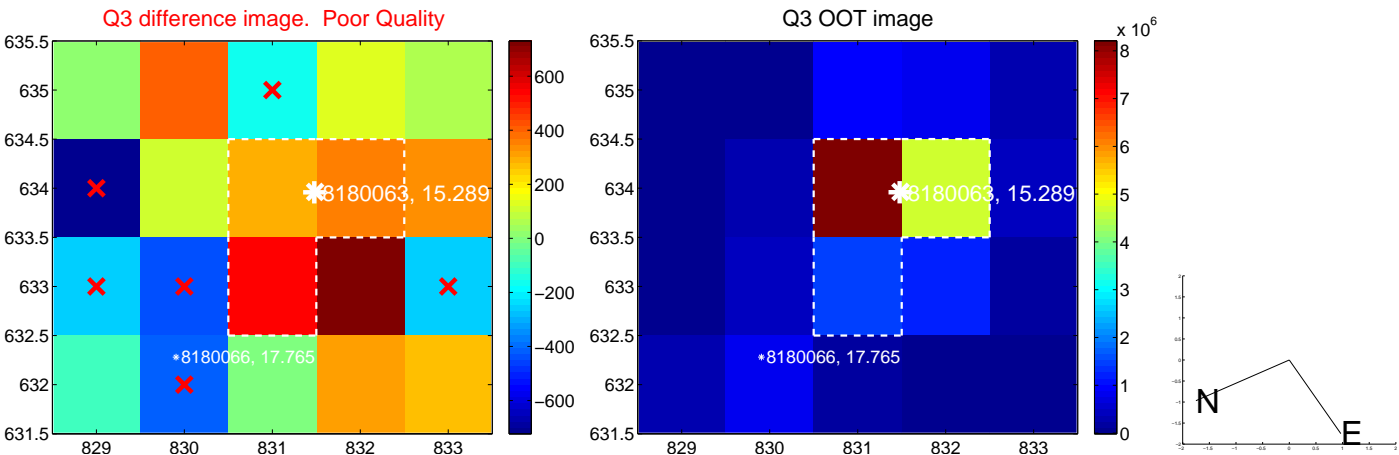
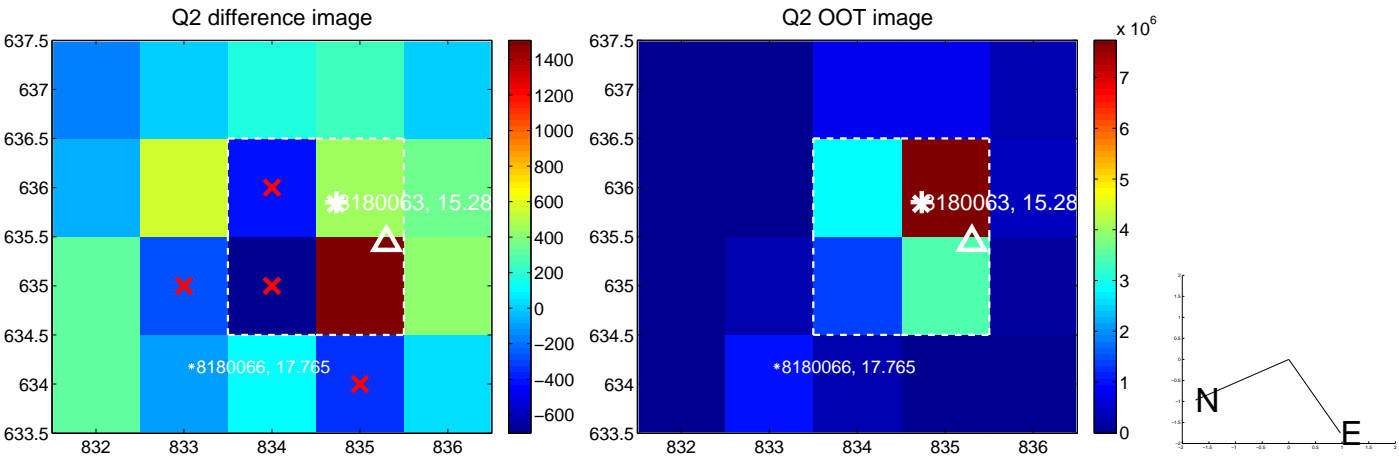
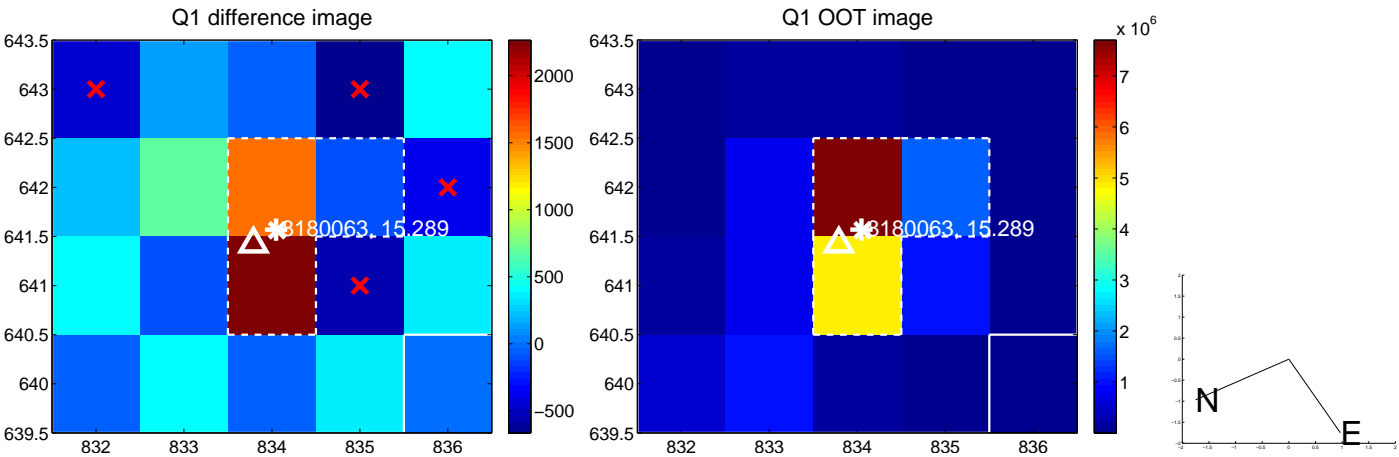
The direct PRF centroid is offset from the target star catalog position by about 0.11 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b>2.002 <math>\pm</math> 0.470</b>	<b>4.26</b>	1.993 $\pm$ 0.472	0.190 $\pm$ 0.326
PRF-fit source offset from KIC position	<b>2.005 <math>\pm</math> 0.466</b>	<b>4.31</b>	1.997 $\pm$ 0.466	0.173 $\pm$ 0.325
photometric centroid source offset	0.86 $\pm$ 1.50	0.57	0.85 $\pm$ 1.50	-0.14 $\pm$ 1.47



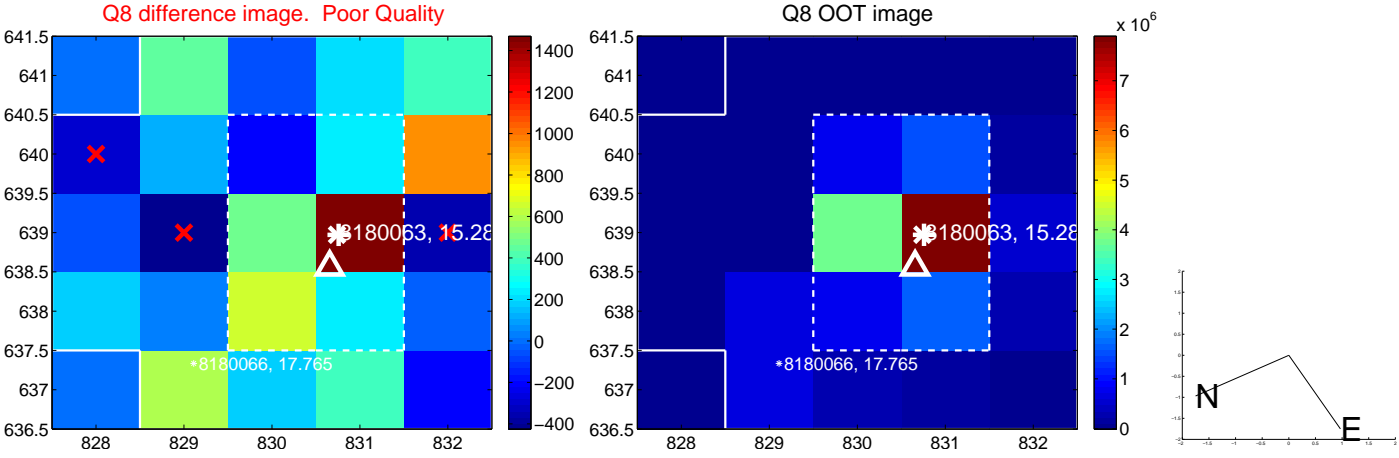
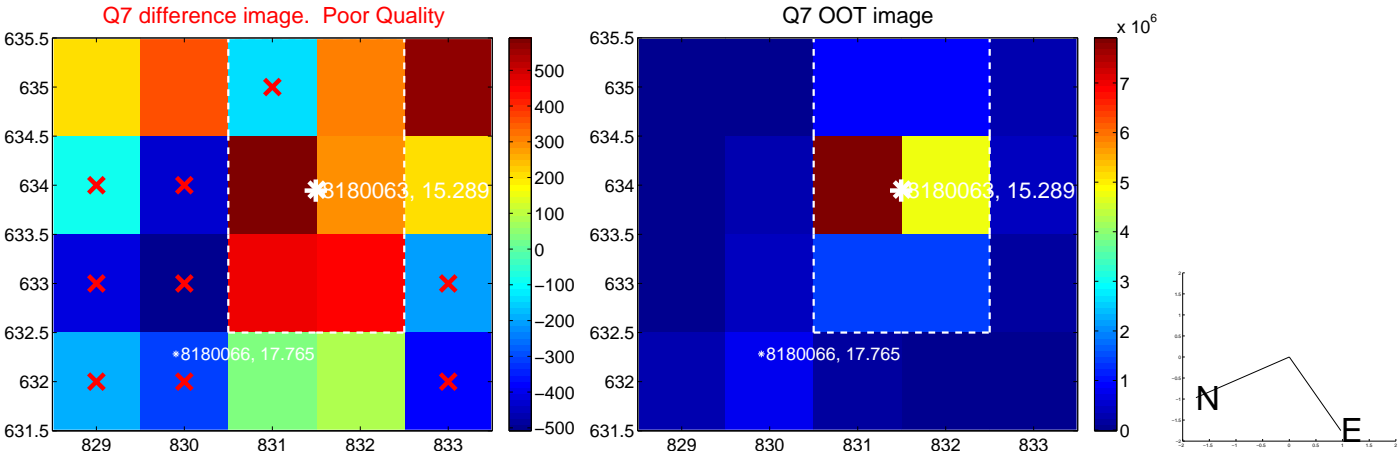
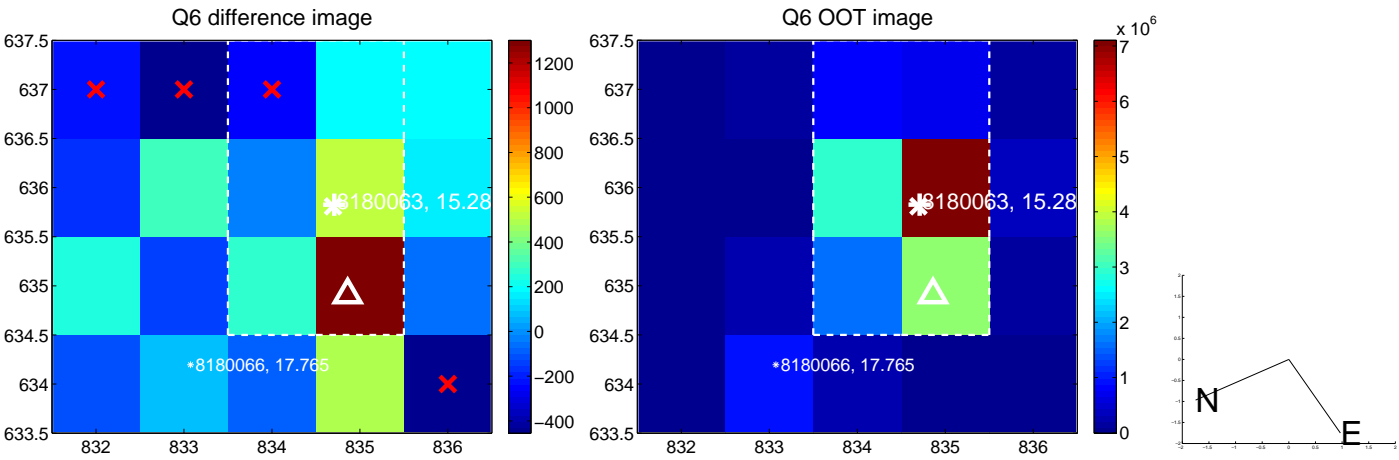
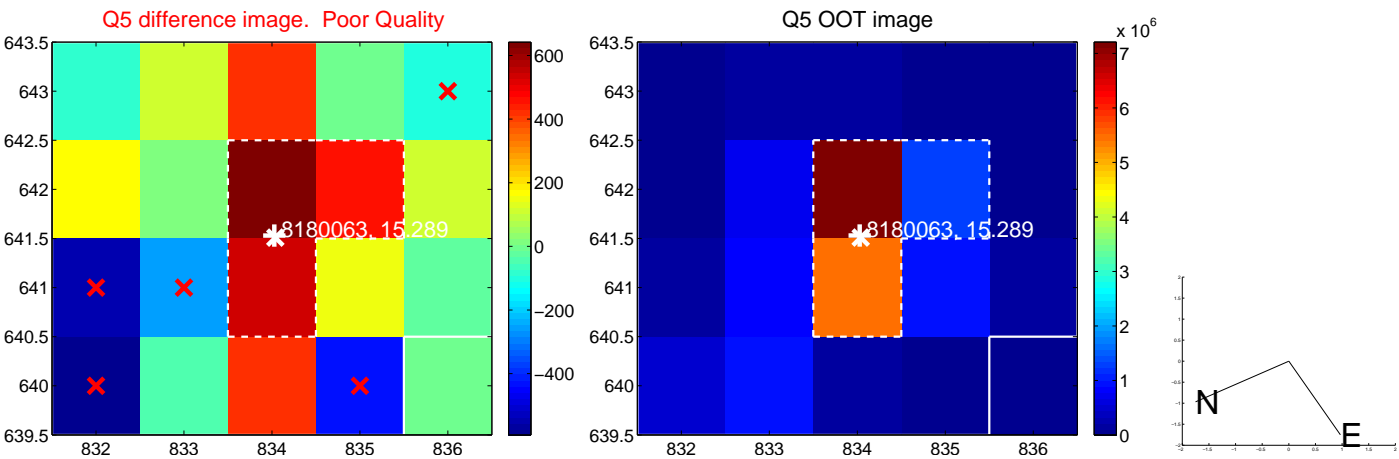
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

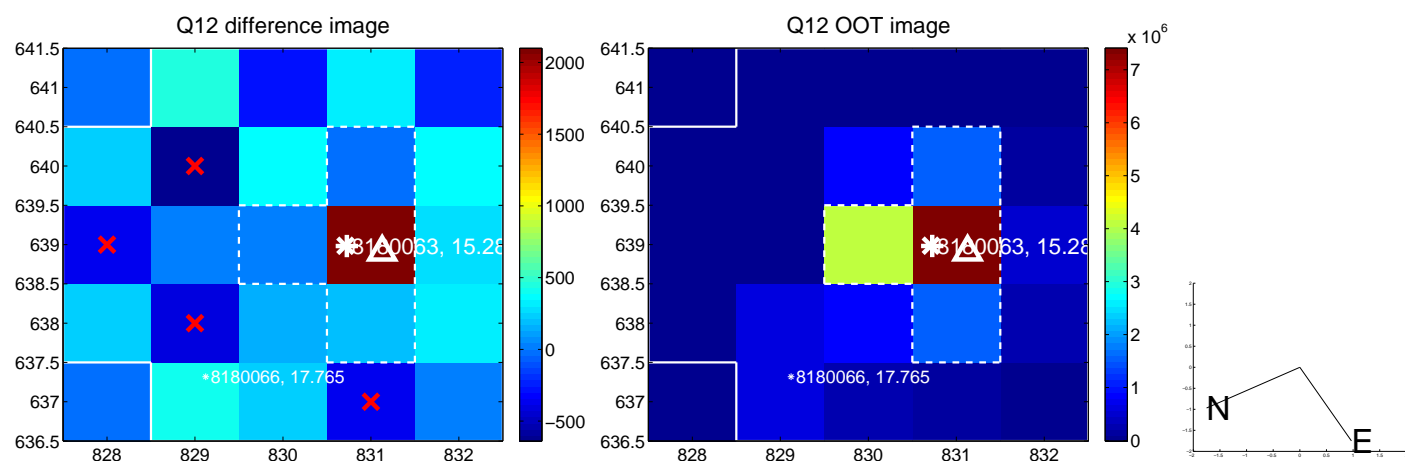
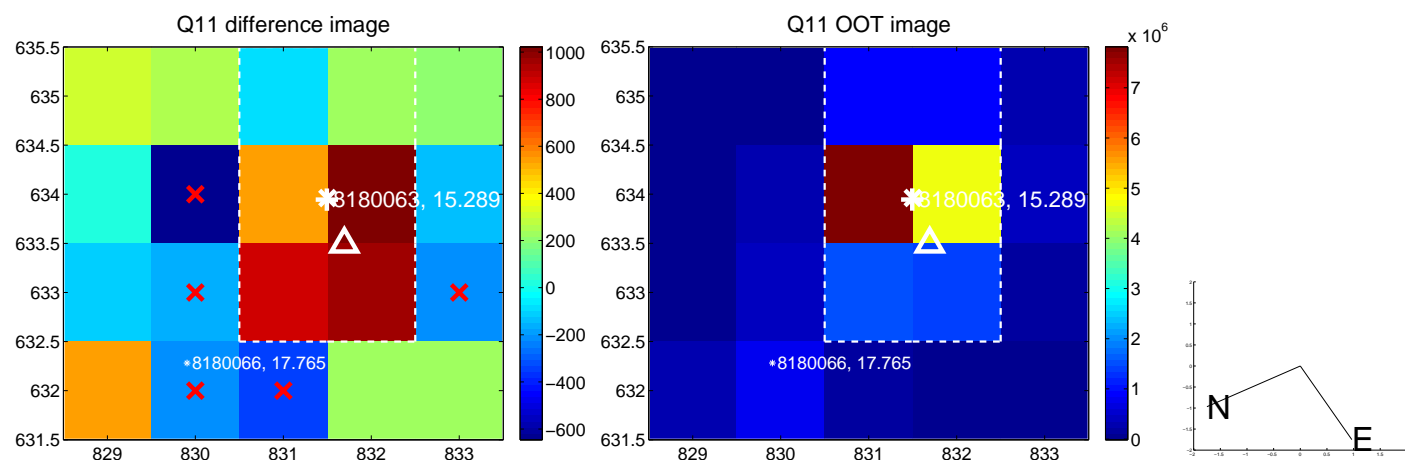
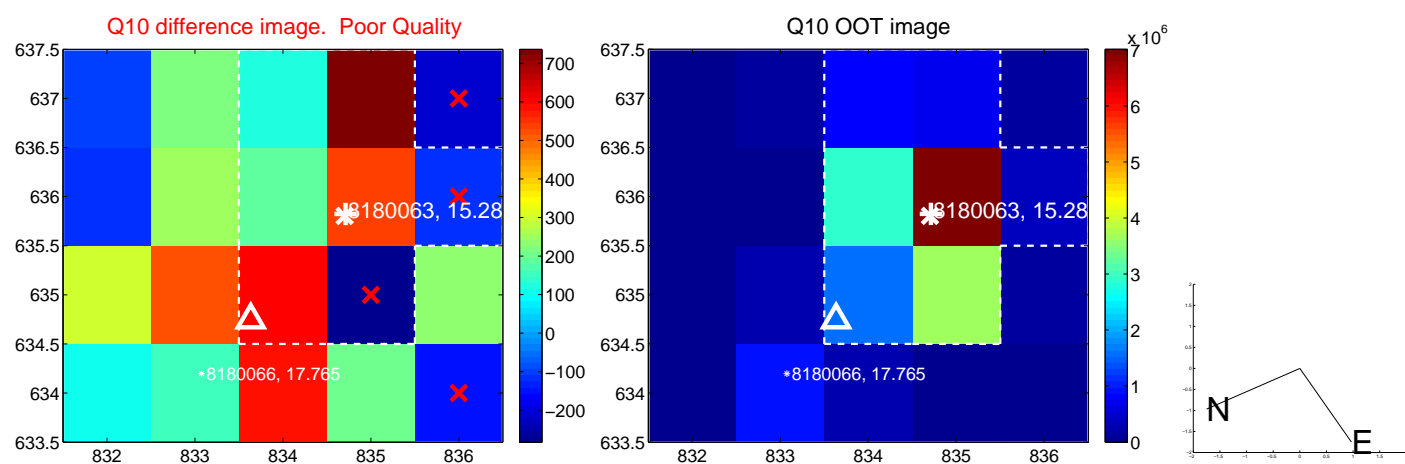
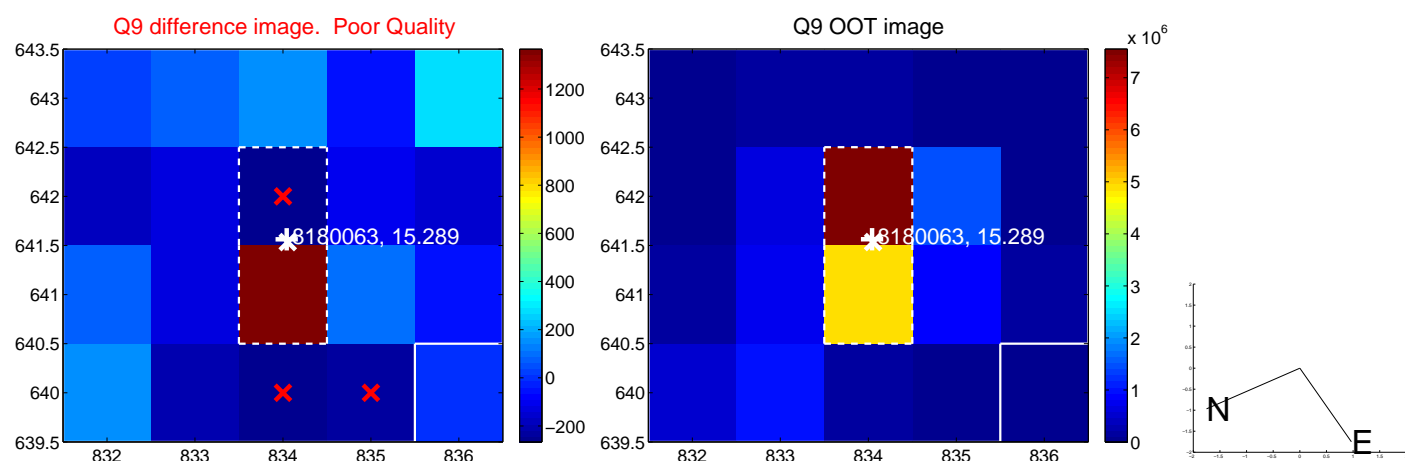




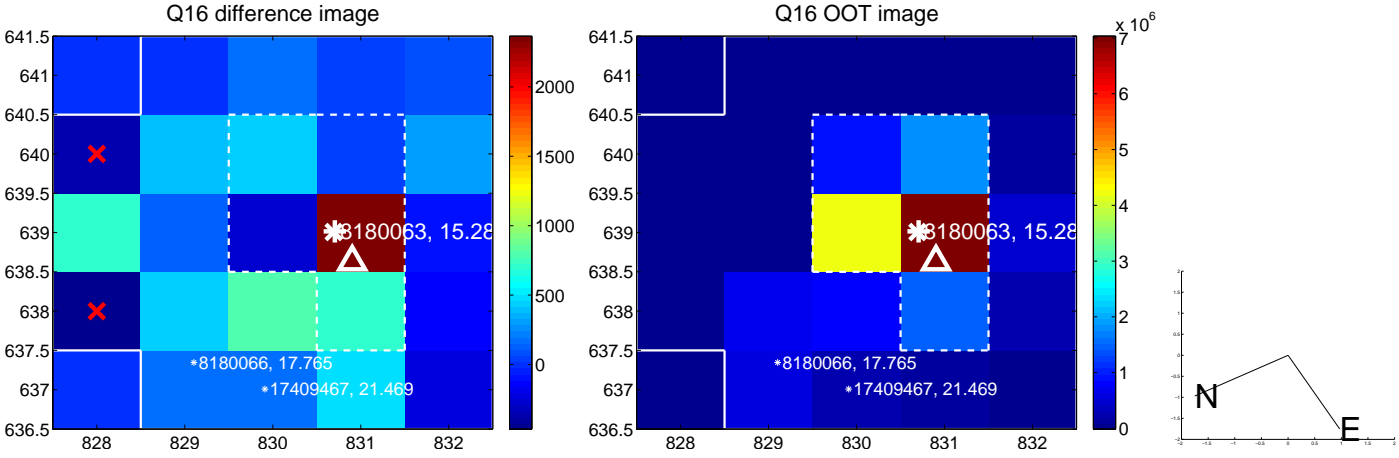
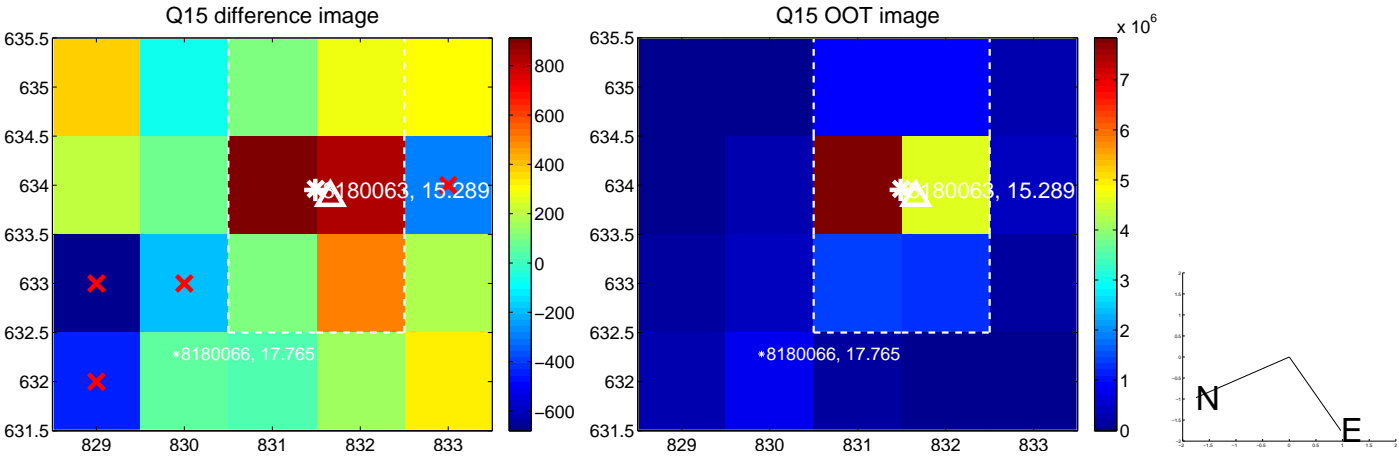
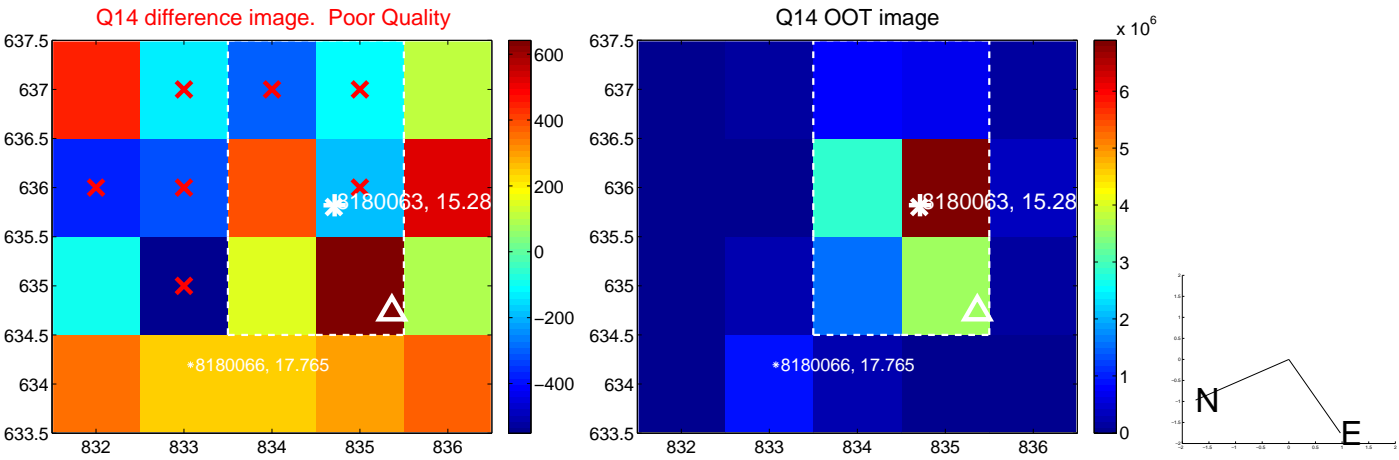
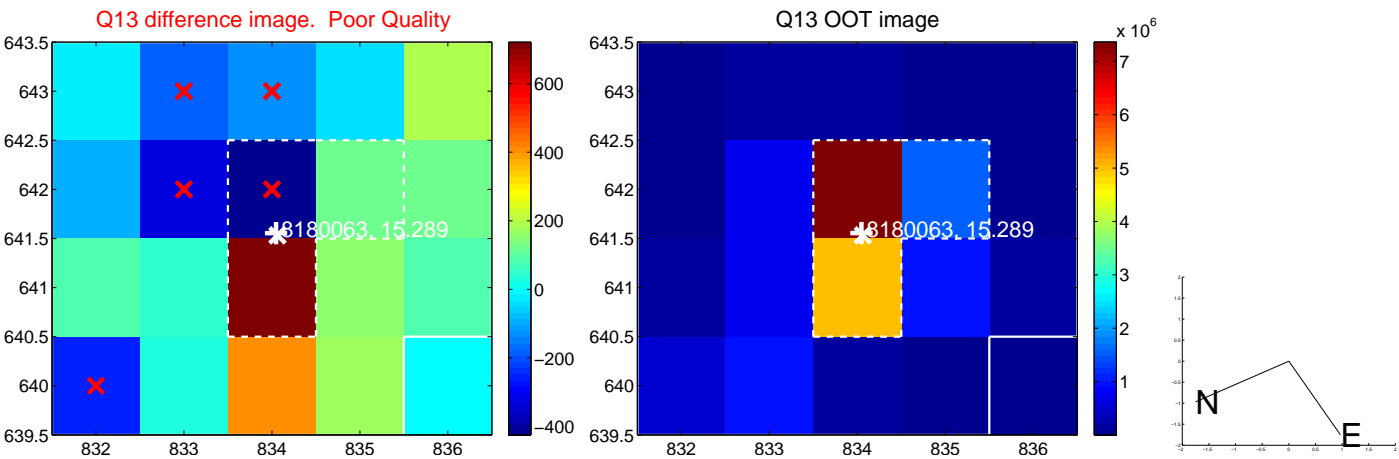
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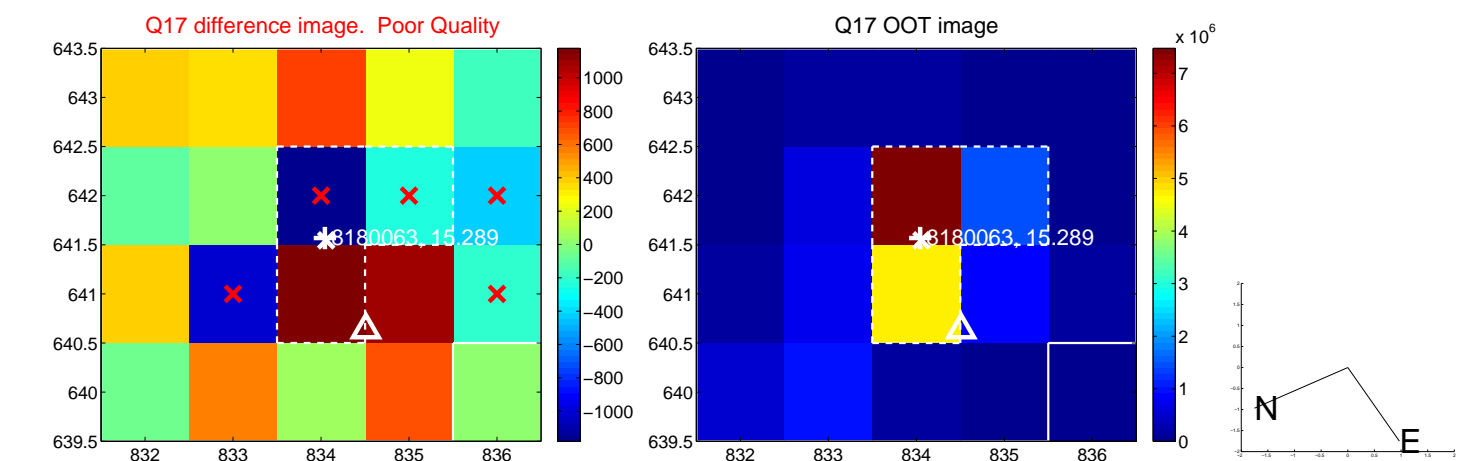
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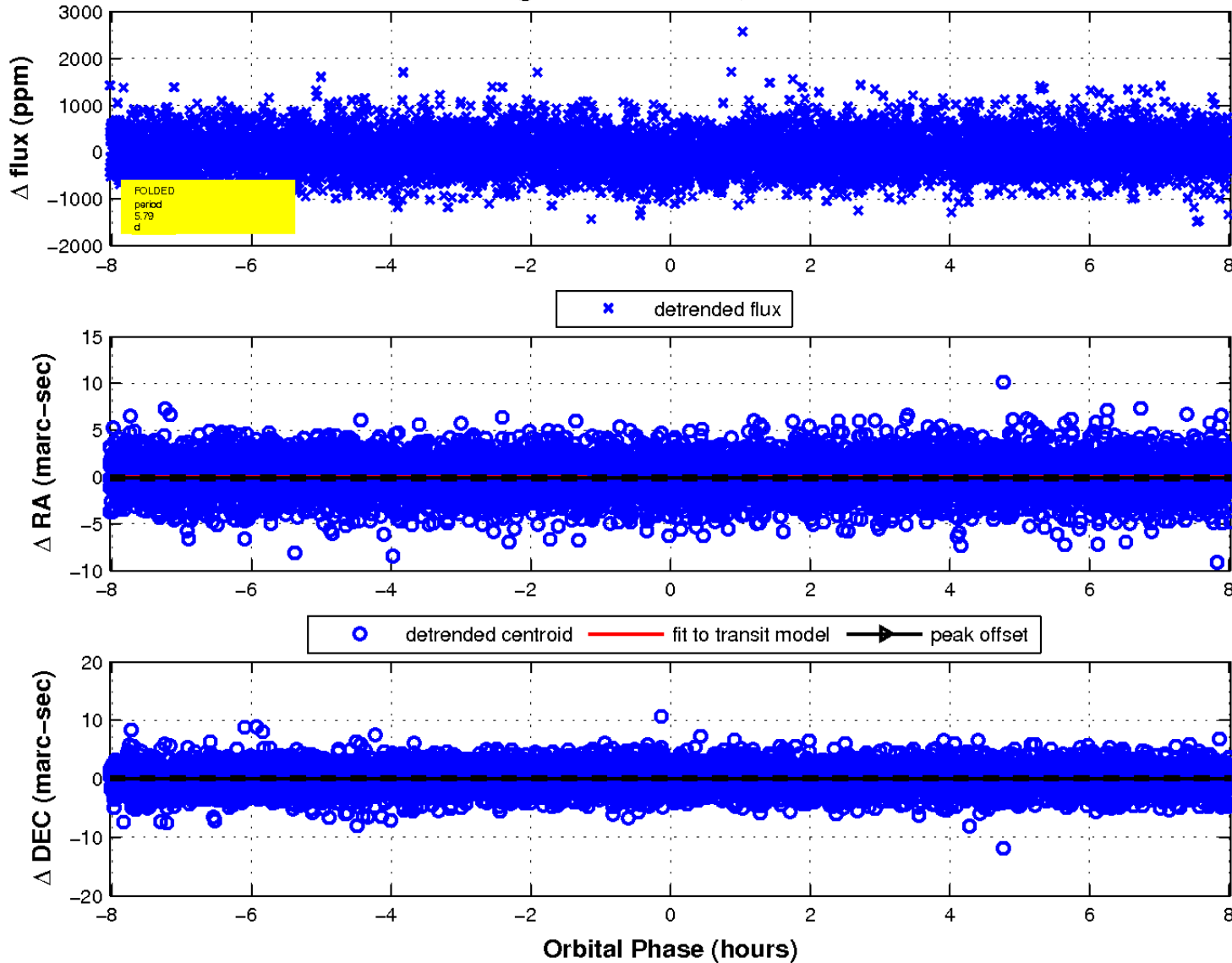
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white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

