

# KIC 005688683

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005688683-01	OBS	4097.01	2.790656	133.153776	175.6	0.782	14.7	21.0	0.60	4353	1.01	105.03
005688683-02	OBS	4097.02	4.449023	131.754417	88.3	1.533	8.5	10.4	0.60	4353	0.66	56.40

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005688683-01	OBS	PC	0.98	0	0	0	0	CENT_KIC_POS
005688683-02	OBS	FP	0.00	0	0	1	0	CENT_KIC_POS—HALO_GHOST

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

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

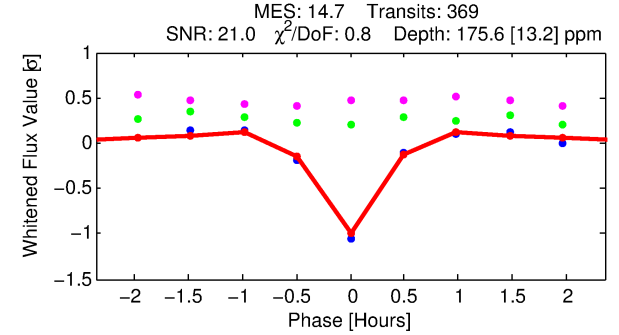
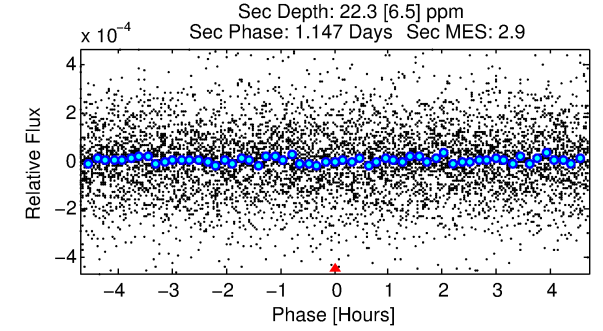
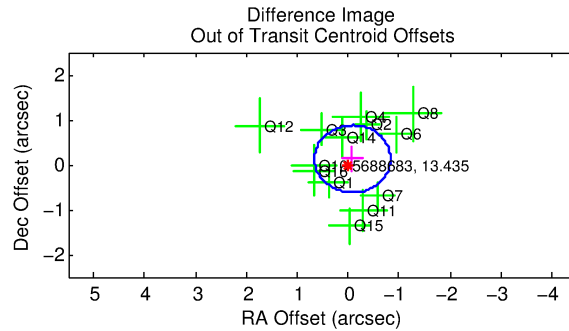
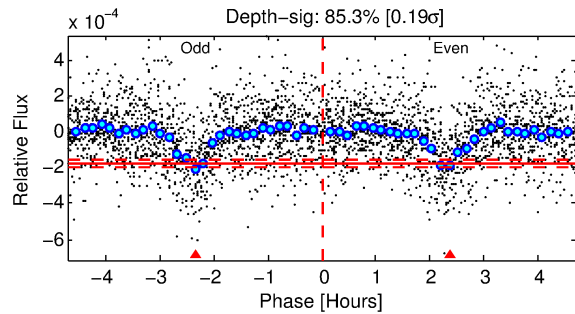
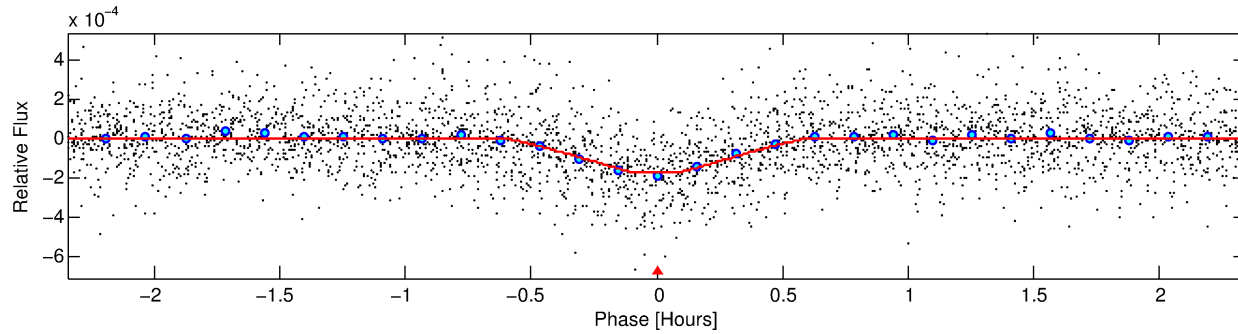
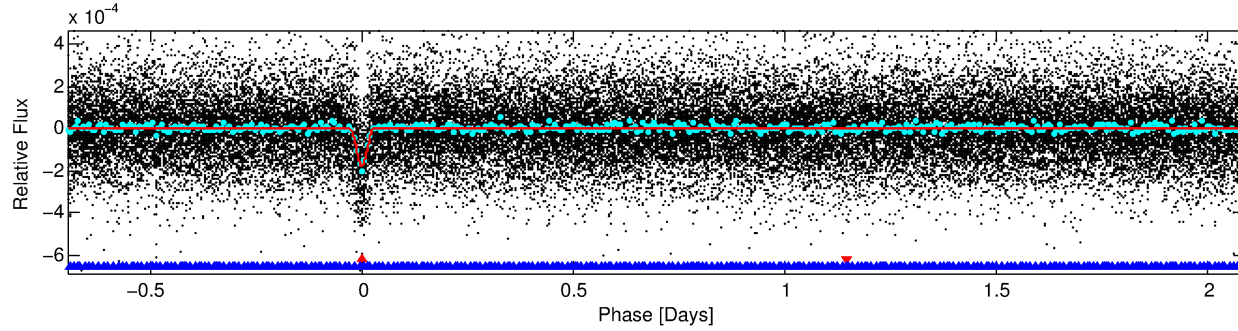
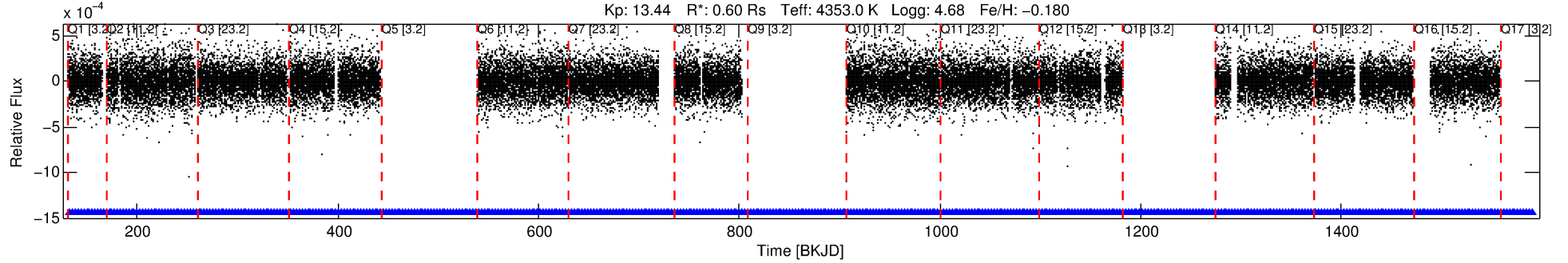
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 005688683-01

No Significant Match Found

# DV One-Page Summary

KIC: 5688683 Candidate: 1 of 2 Period: 2.791 d  
KOI: K04097.01 Corr: 0.911



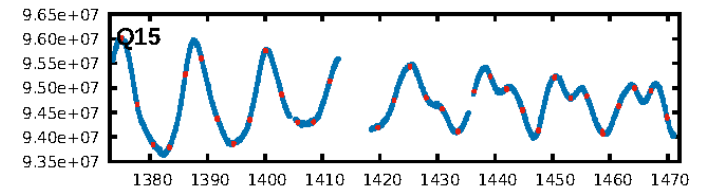
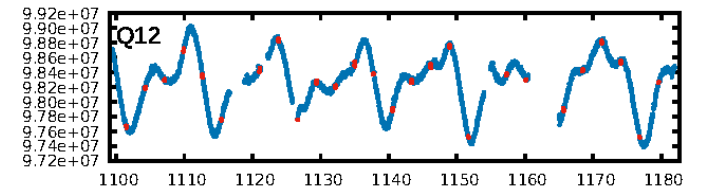
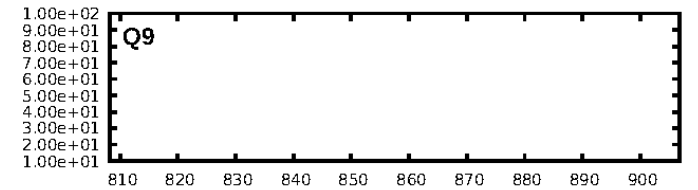
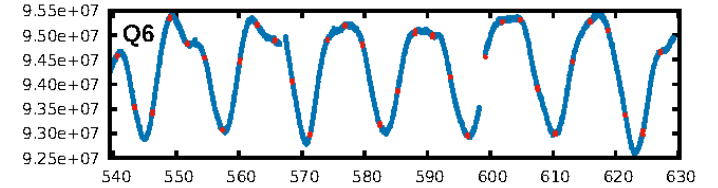
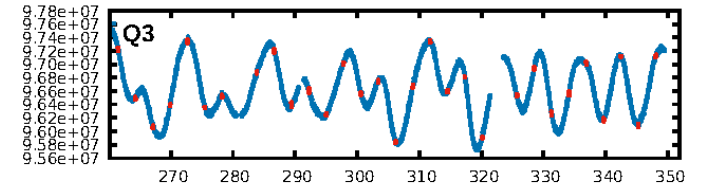
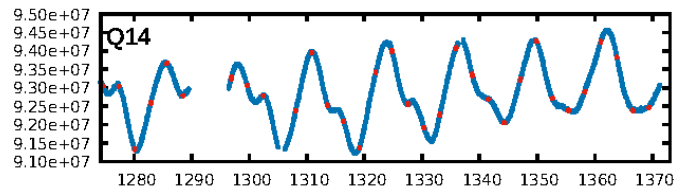
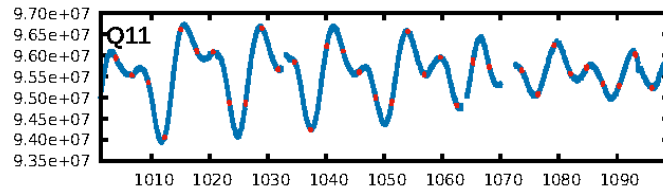
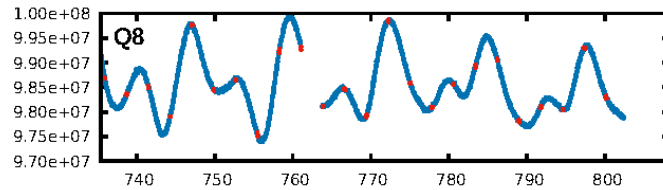
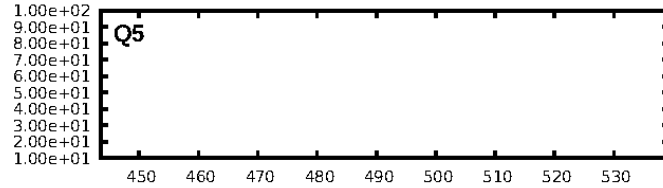
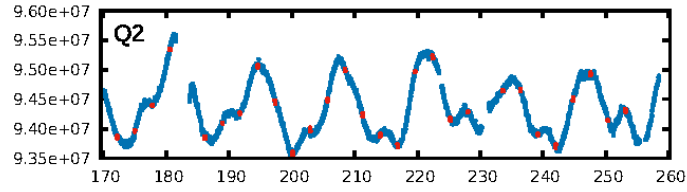
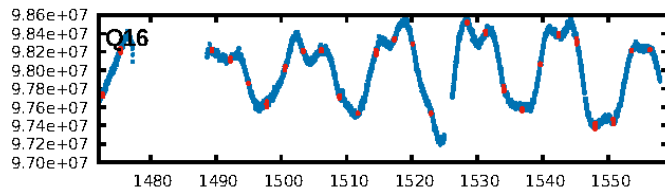
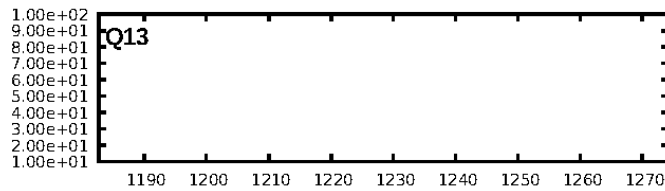
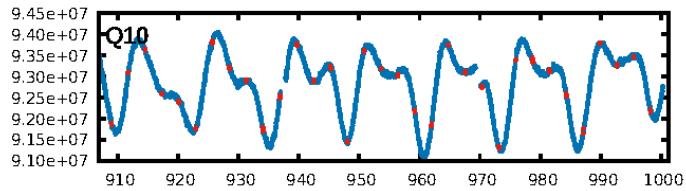
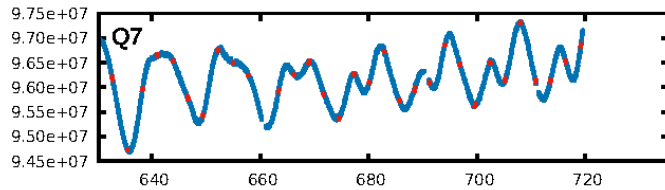
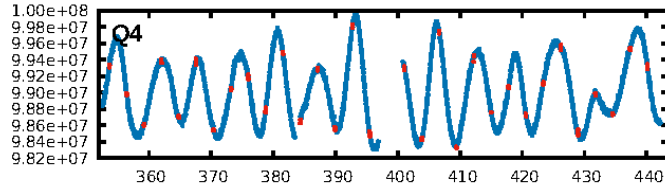
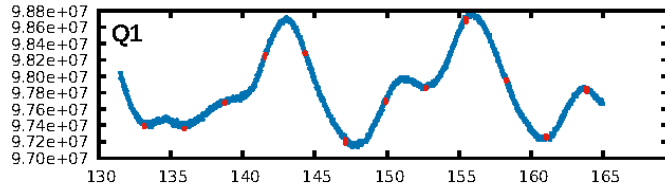
## DV Fit Results:

Period = 2.79066 [0.00000] d  
Epoch = 133.1538 [0.0006] BKJD  
Rp/R\* = 0.0153 [0.0064]  
a/R\* = 12.69 [20.26]  
b = 0.90 [0.34]  
Seff = 105.03 [16.38]  
Teq = 816 [32] K  
Rp = 1.01 [0.43] Re  
a = 0.0334 [0.0025] AU  
Ag = 13.50 [12.08] [1.03 $\sigma$ ]  
Teffp = 2419 [543] K [2.95 $\sigma$ ]

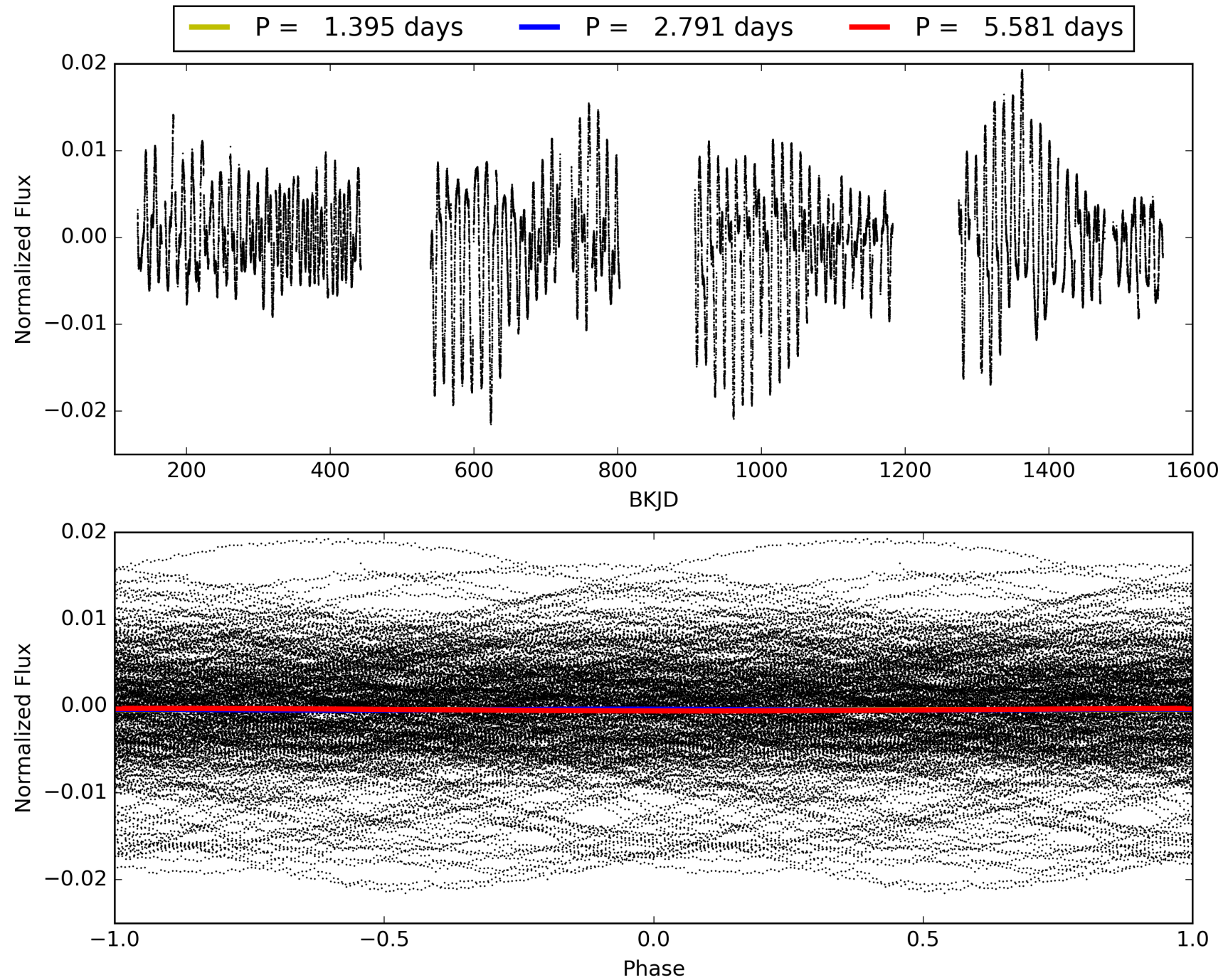
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [23.13 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 3.19e-45  
RollingBand-fgt: 1.00 [357/357]  
GhostDiagnostic-chr: 1.316  
Centroid-sig: 0.2%  
Centroid-so: 1.086 arcsec [2.16 $\sigma$ ]  
OotOffset-rm: 0.153 arcsec [0.61 $\sigma$ ]  
KicOffset-rm: 0.538 arcsec [2.22 $\sigma$ ]  
OotOffset-st: 4/4/4/1 [13]  
KicOffset-st: 4/4/4/1 [13]  
DiffImageQuality-fgm: 1.00 [13/13]  
DiffImageOverlap-fno: 1.00 [13/13]

# TCE 005688683-01, PDC Light Curves

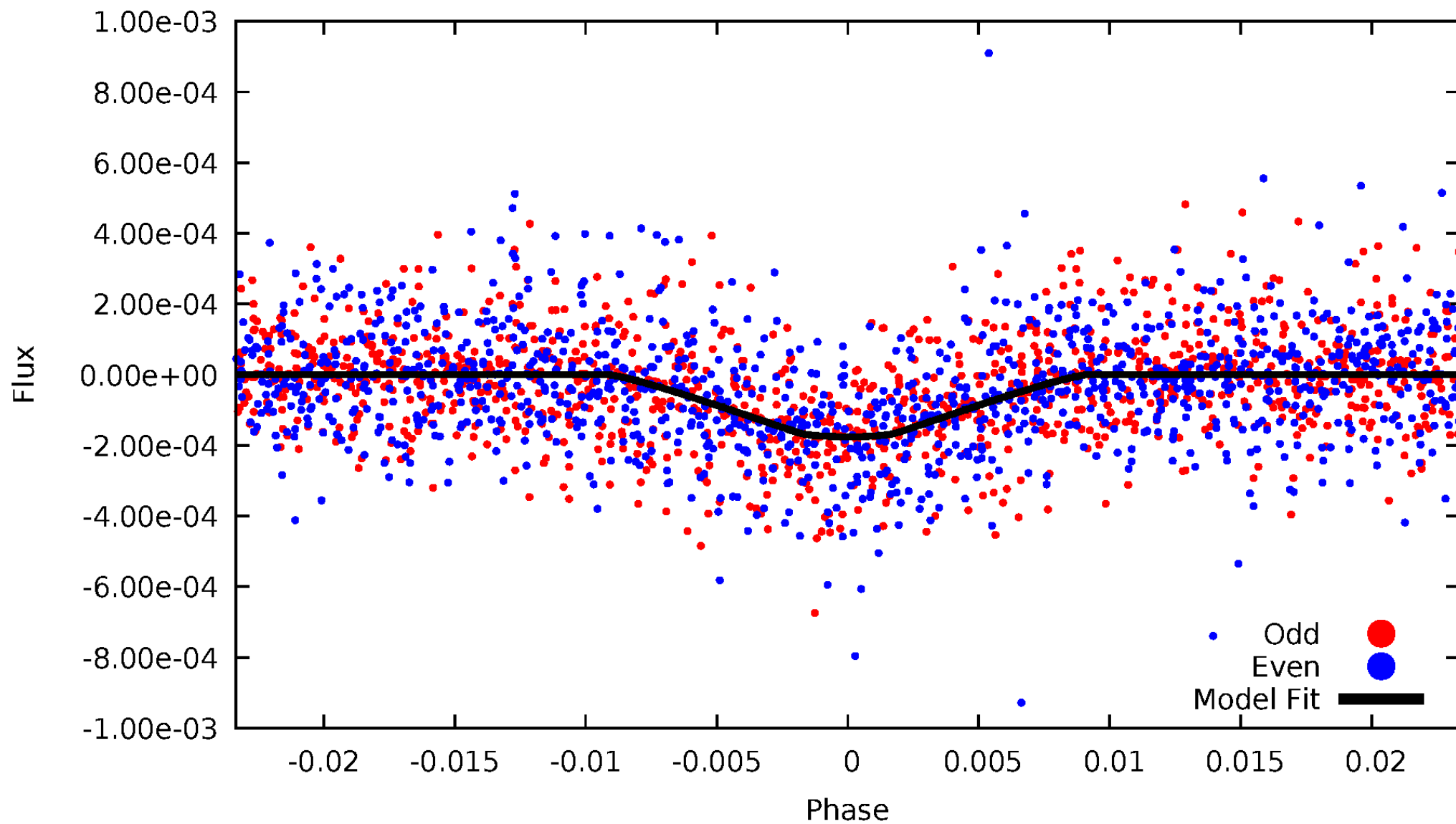


TCE 005688683-01



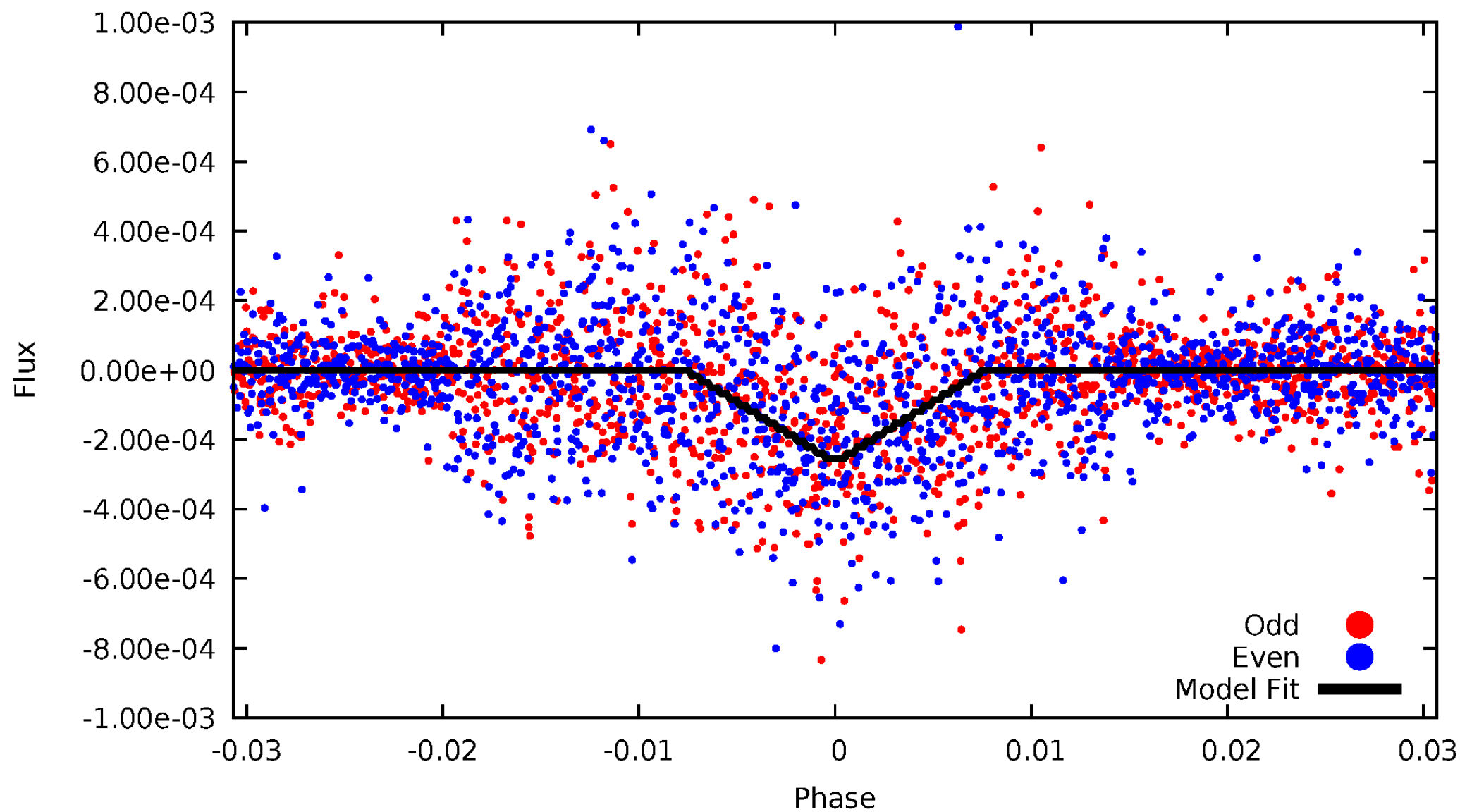
# DV Odd/Even

TCE 005688683-01



# ALT Odd/Even

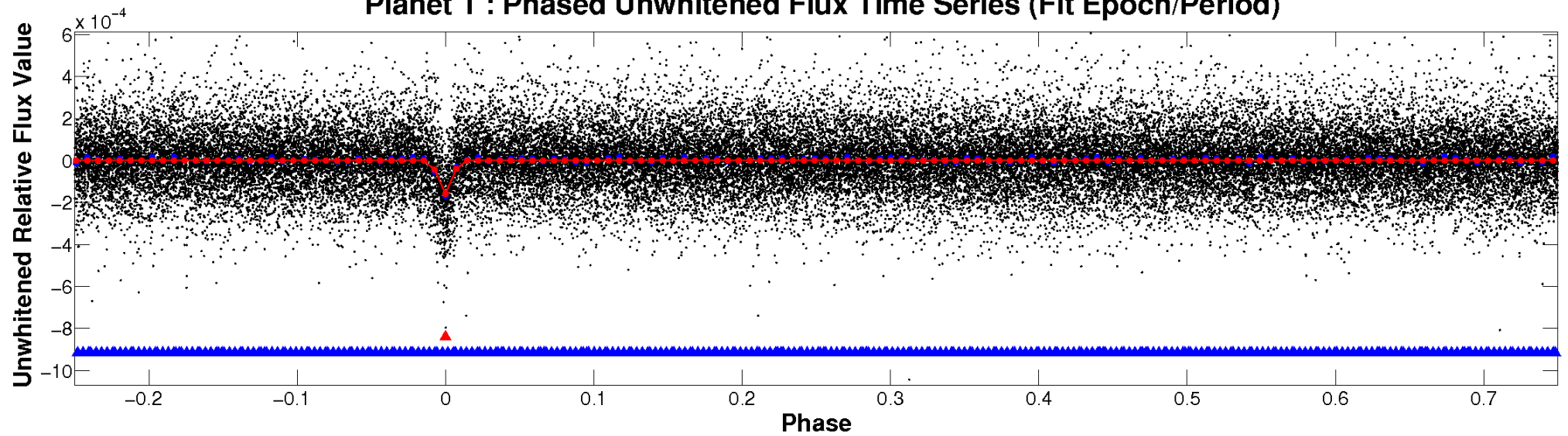
TCE 005688683-01



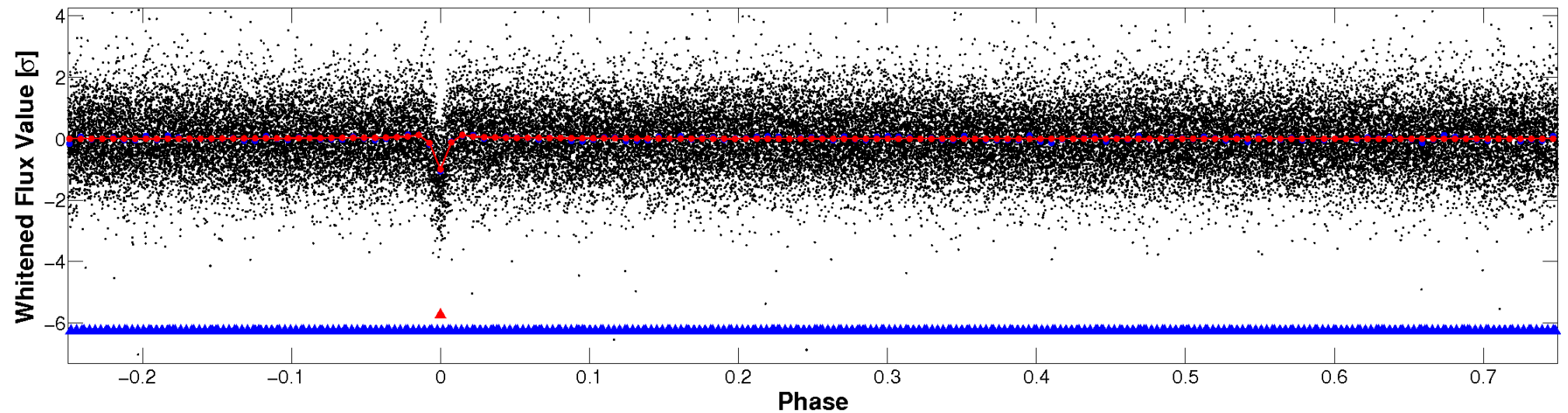


# Non-Whitened Vs. Whitened Light Curve

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

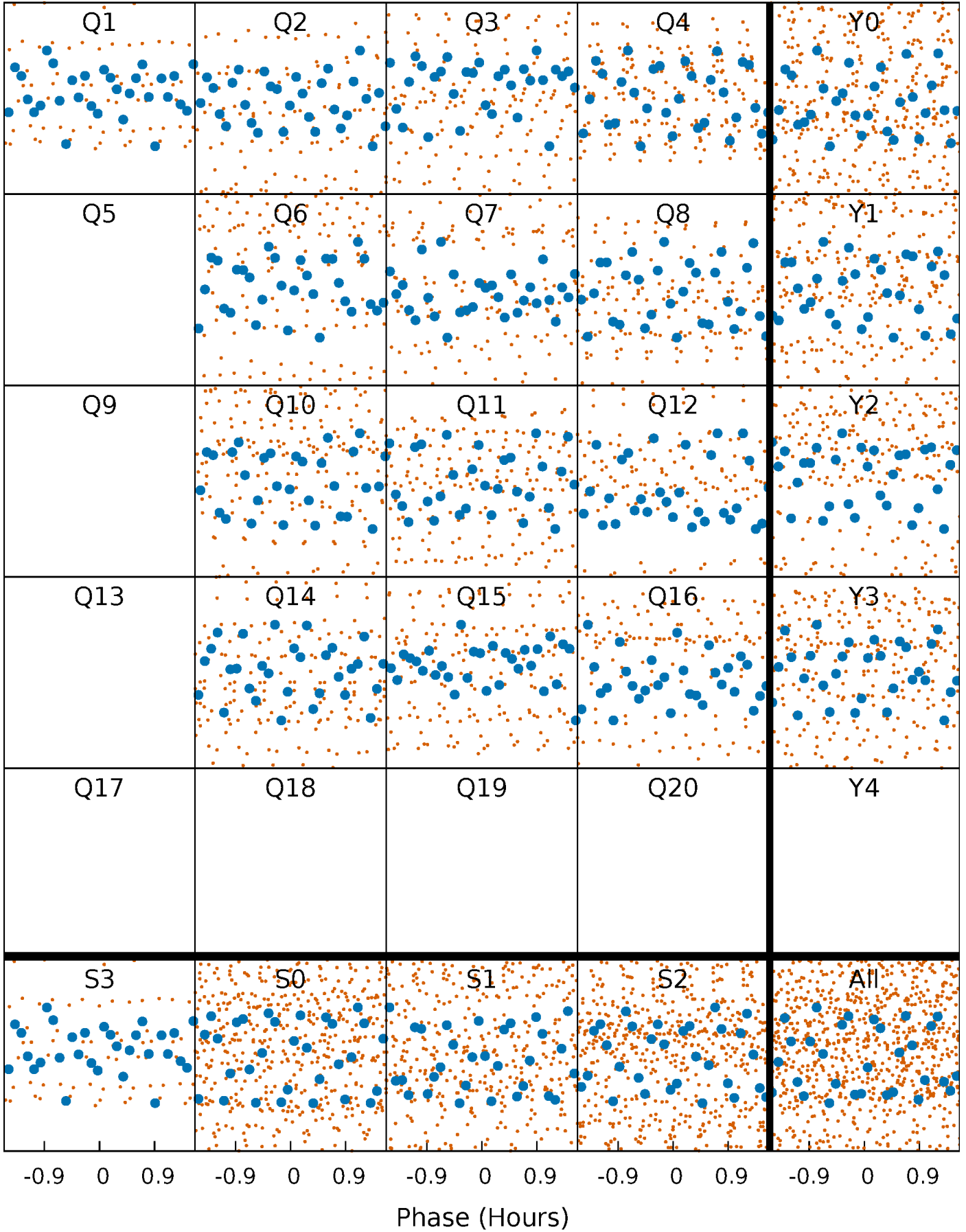


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

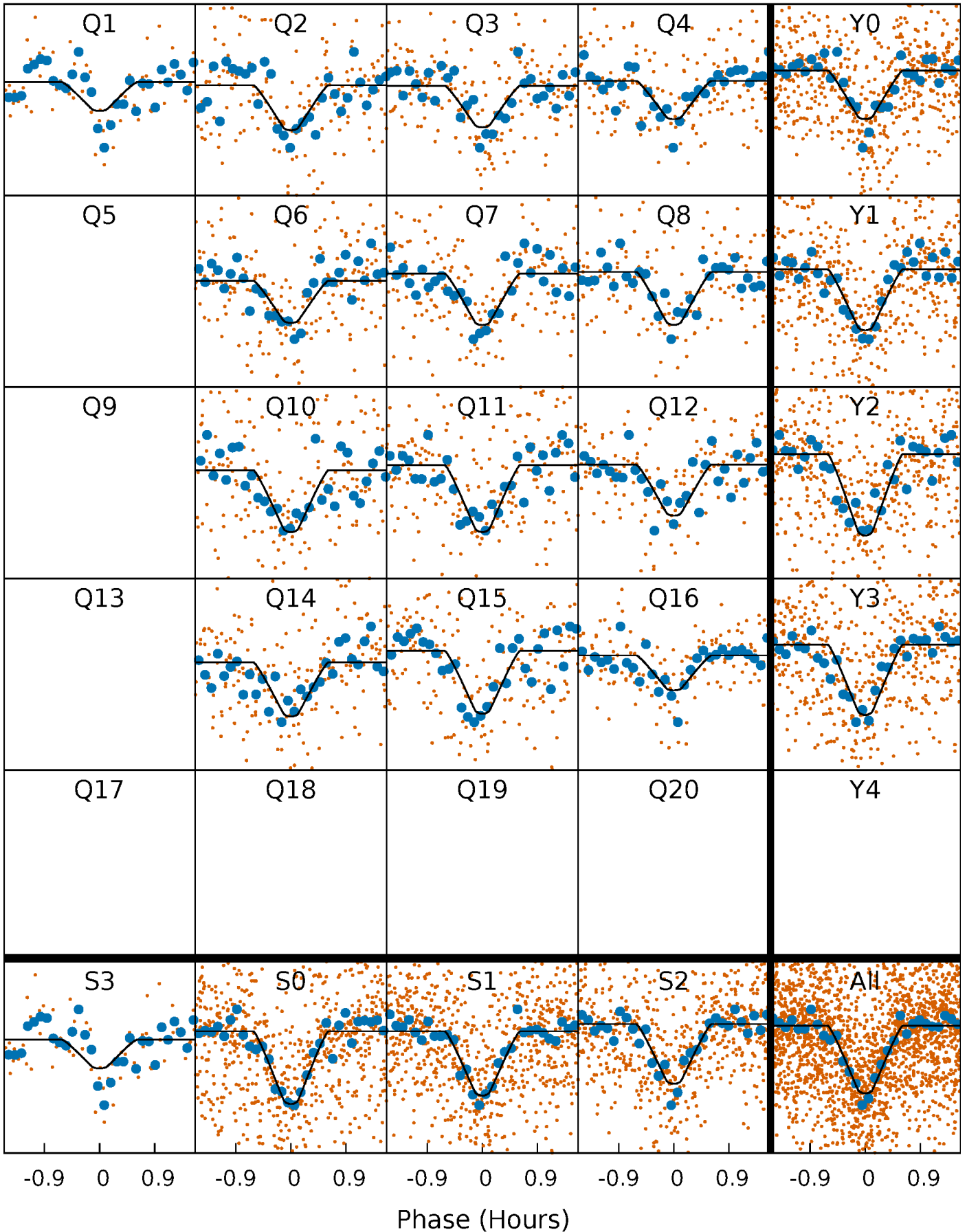
TCE 005688683-01 P= 2.790656 Days  $T_0=133.153776$  (BKJD)





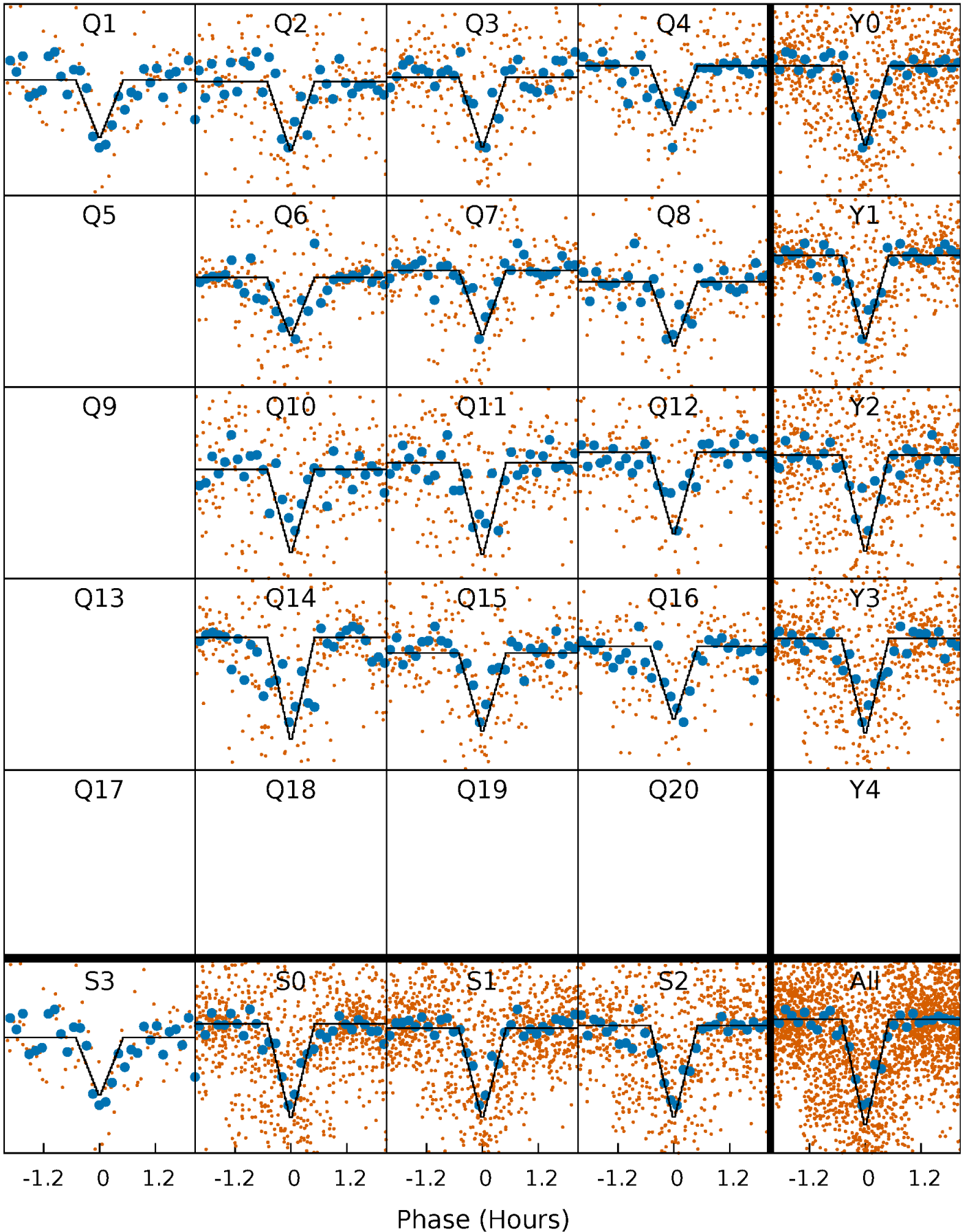
# DV Quarter-Phased Transit Curves

TCE 005688683-01 P= 2.790656 Days  $T_0=133.153776$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

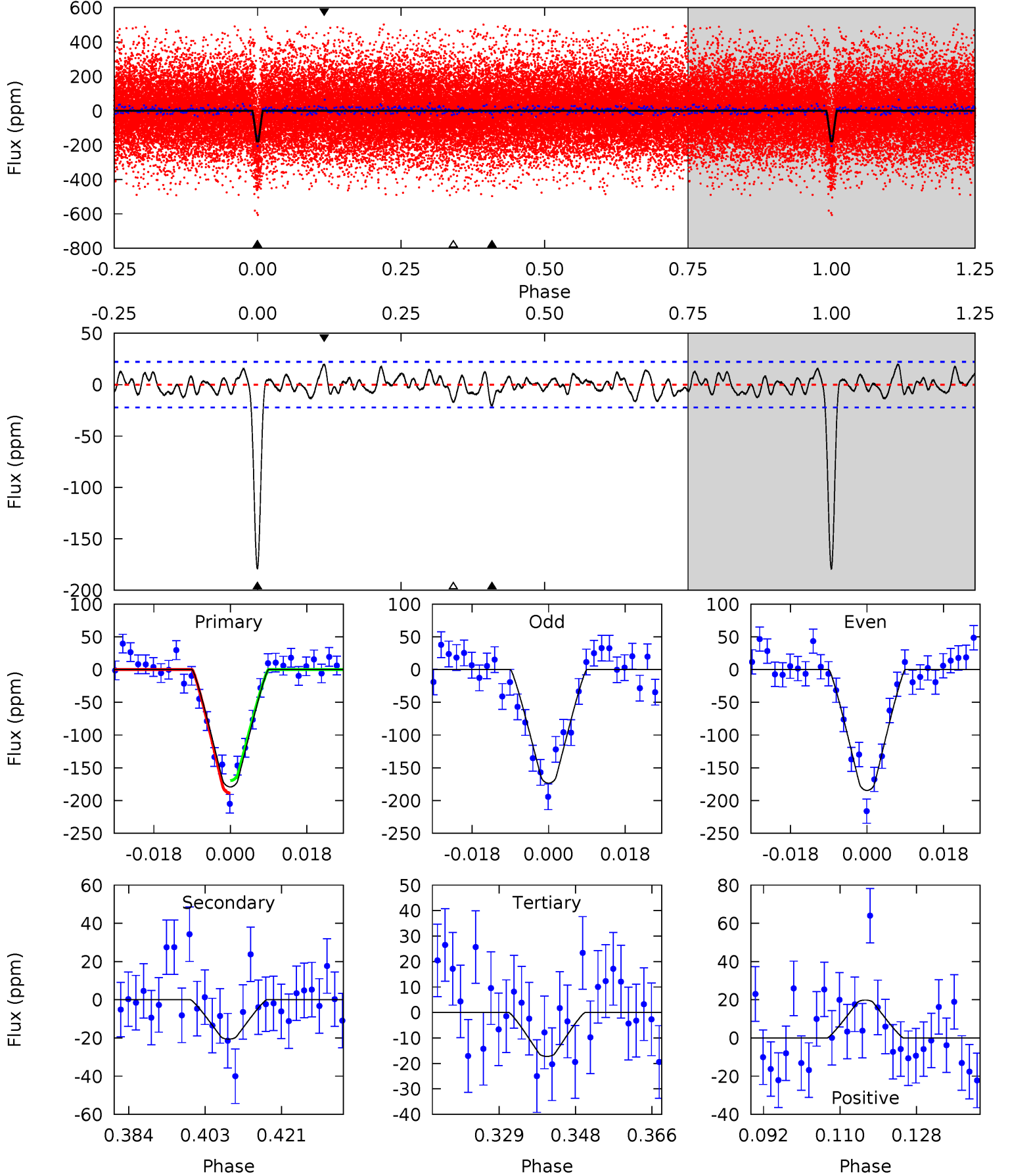
TCE 005688683-01 P= 2.790644 Days  $T_0=133.154893$  (BKJD)



# DV Model-Shift Uniqueness Test

005688683-01, P = 2.790656 Days, E = 130.363120 Days

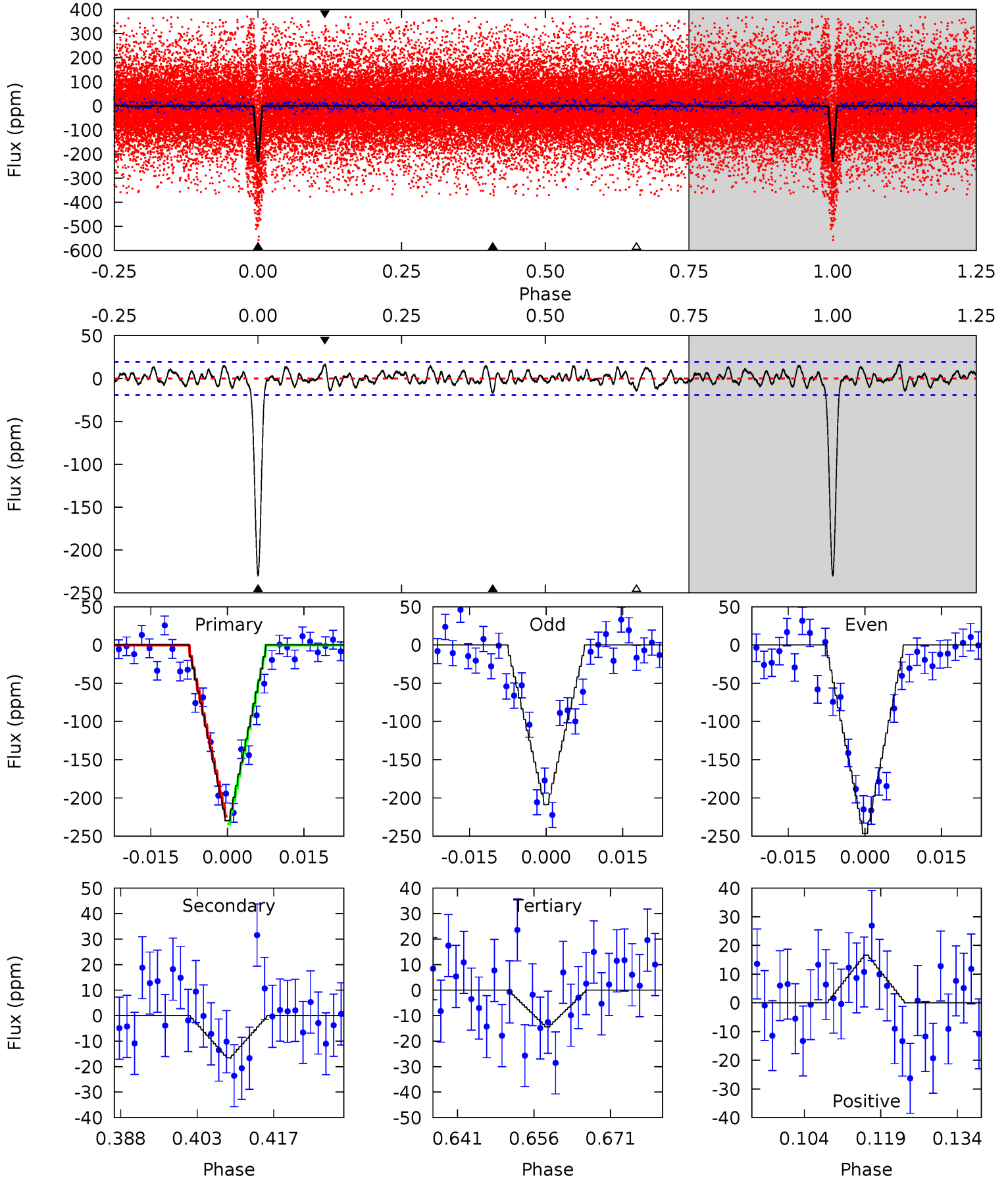
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
39.8	4.57	3.83	4.40	4.91	2.36	1.53	35.9	35.4	0.75	0.17	1.23	1.04	0.10	2.14



# Alt Model-Shift Uniqueness Test

005688683-01, P = 2.790644 Days, E = 130.364249 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
59.3	4.27	3.71	4.28	4.95	2.43	1.46	55.6	55.0	0.56	-0.01	4.88	0.96	0.07	1.29



### Stellar Parameters For KIC 005688683

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4353^{+118}_{-131}$	$4.681^{+0.028}_{-0.048}$	$-0.180^{+0.300}_{-0.300}$	$0.603^{+0.060}_{-0.040}$	$0.648^{+0.056}_{-0.062}$	$4.172^{+0.613}_{-0.832}$
	+3%/-3%	+1%/-1%	+167%/-167%	+10%/-7%	+9%/-10%	+15%/-20%
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 005688683-01 / KOI 4097.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-21 \pm 5$	$1.00^{+0.42}_{-0.39}$	$1147^{+37}_{-35}$	$2932^{+485}_{-280}$	$12^{+23}_{-7}$
Alt.	$-17 \pm 4$	$1.06^{+0.43}_{-0.40}$	$1147^{+36}_{-40}$	$2801^{+420}_{-260}$	$8.835^{+14.042}_{-4.469}$

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



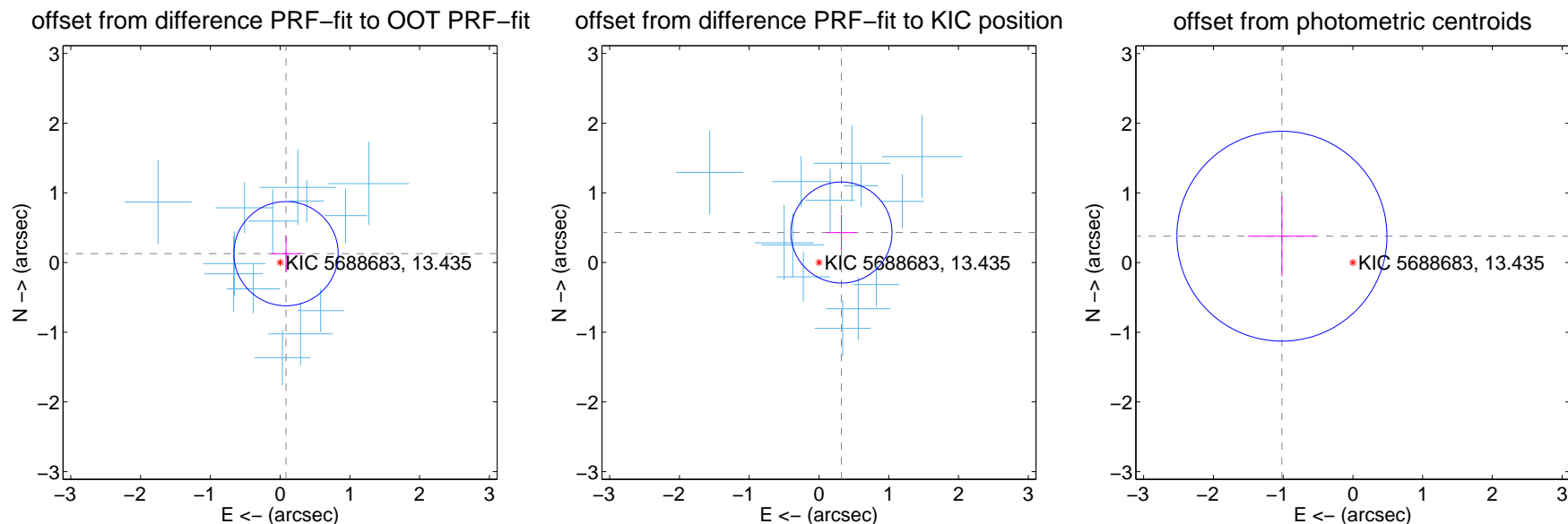
## DV Centroid Data

Supplemental centroid analysis for 005688683-01. Kepler magnitude: 13.44. Transit SNR 20.99

There are 13 quarters with good PRF difference image offsets

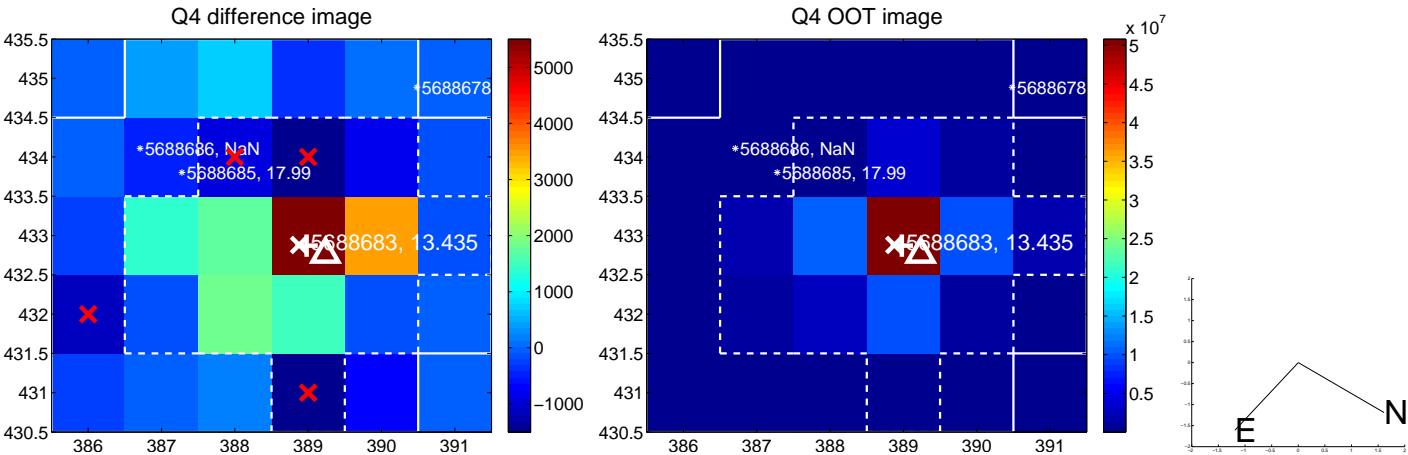
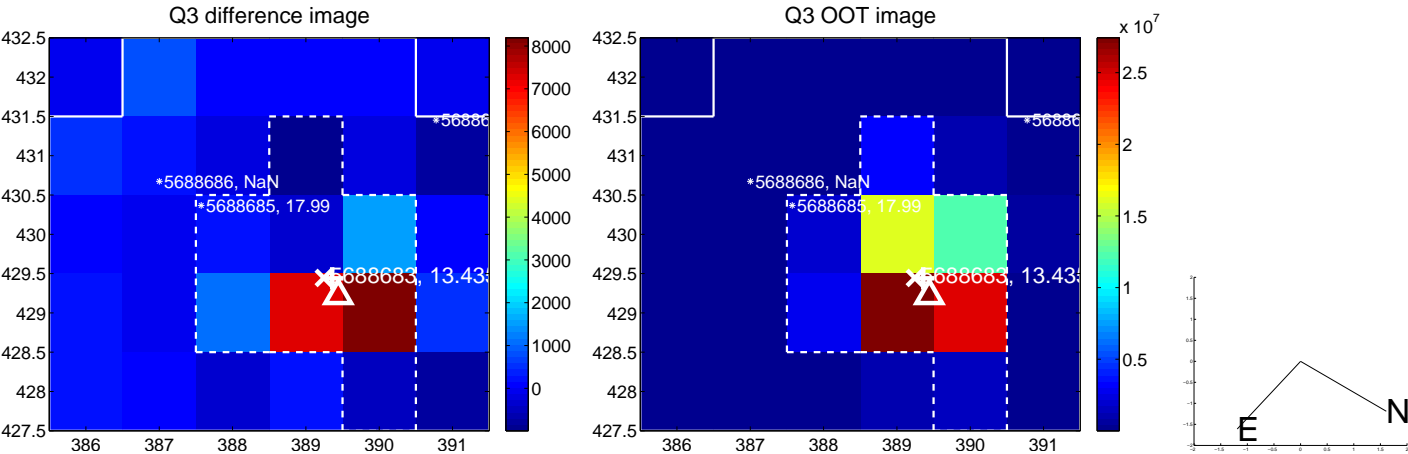
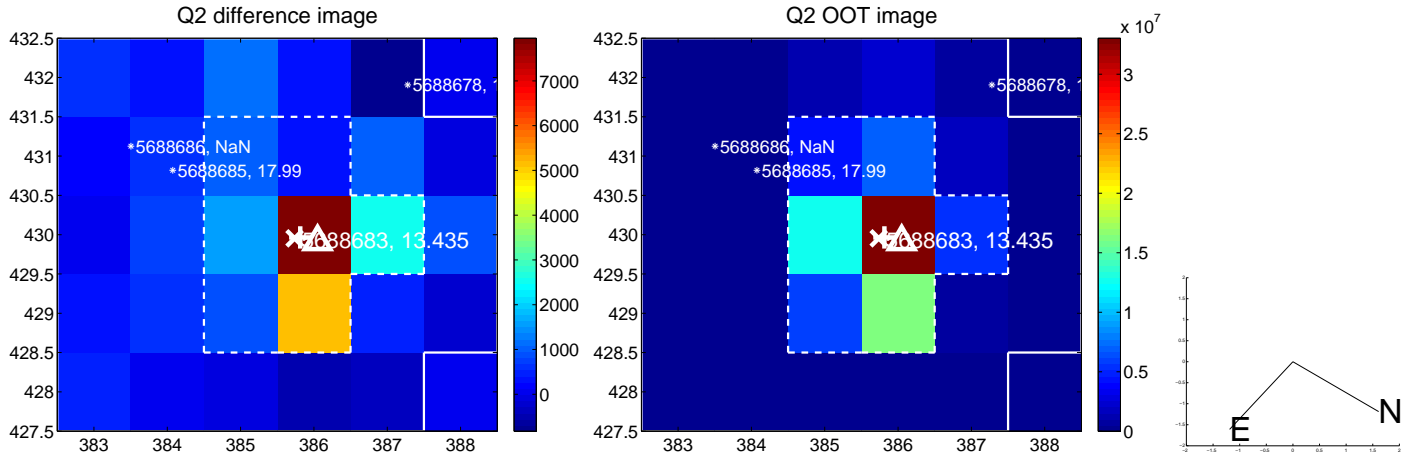
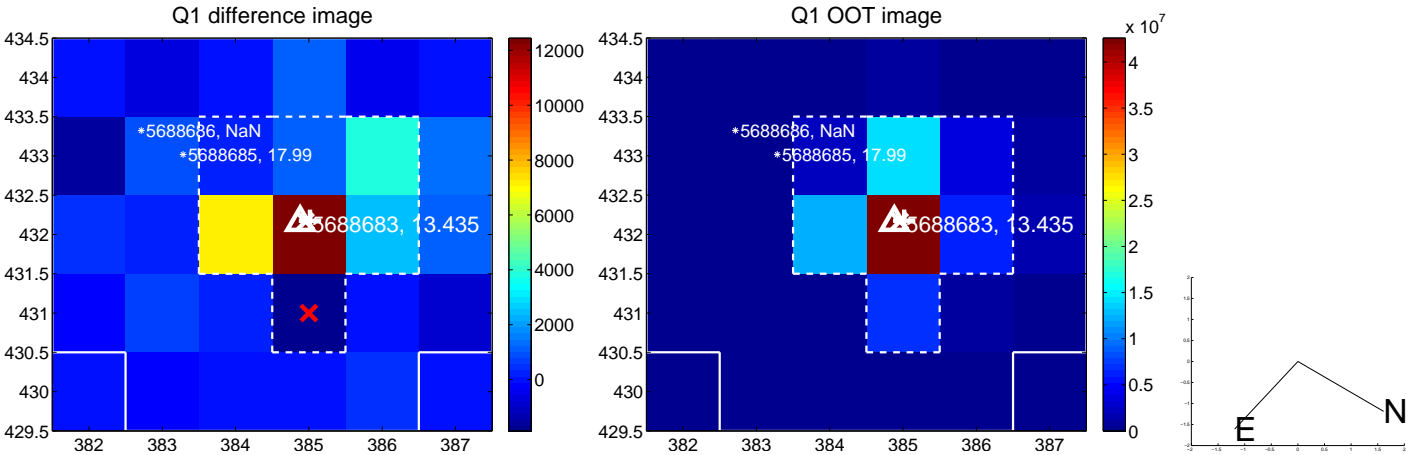
The direct PRF centroid is offset from the target star catalog position by about 0.47 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.153 \pm 0.249$	0.61	$-0.085 \pm 0.216$	$0.127 \pm 0.263$
PRF-fit source offset from KIC position	$0.538 \pm 0.242$	2.22	$-0.322 \pm 0.219$	$0.431 \pm 0.254$
photometric centroid source offset	$1.09 \pm 0.50$	2.16	$1.02 \pm 0.49$	$0.38 \pm 0.58$

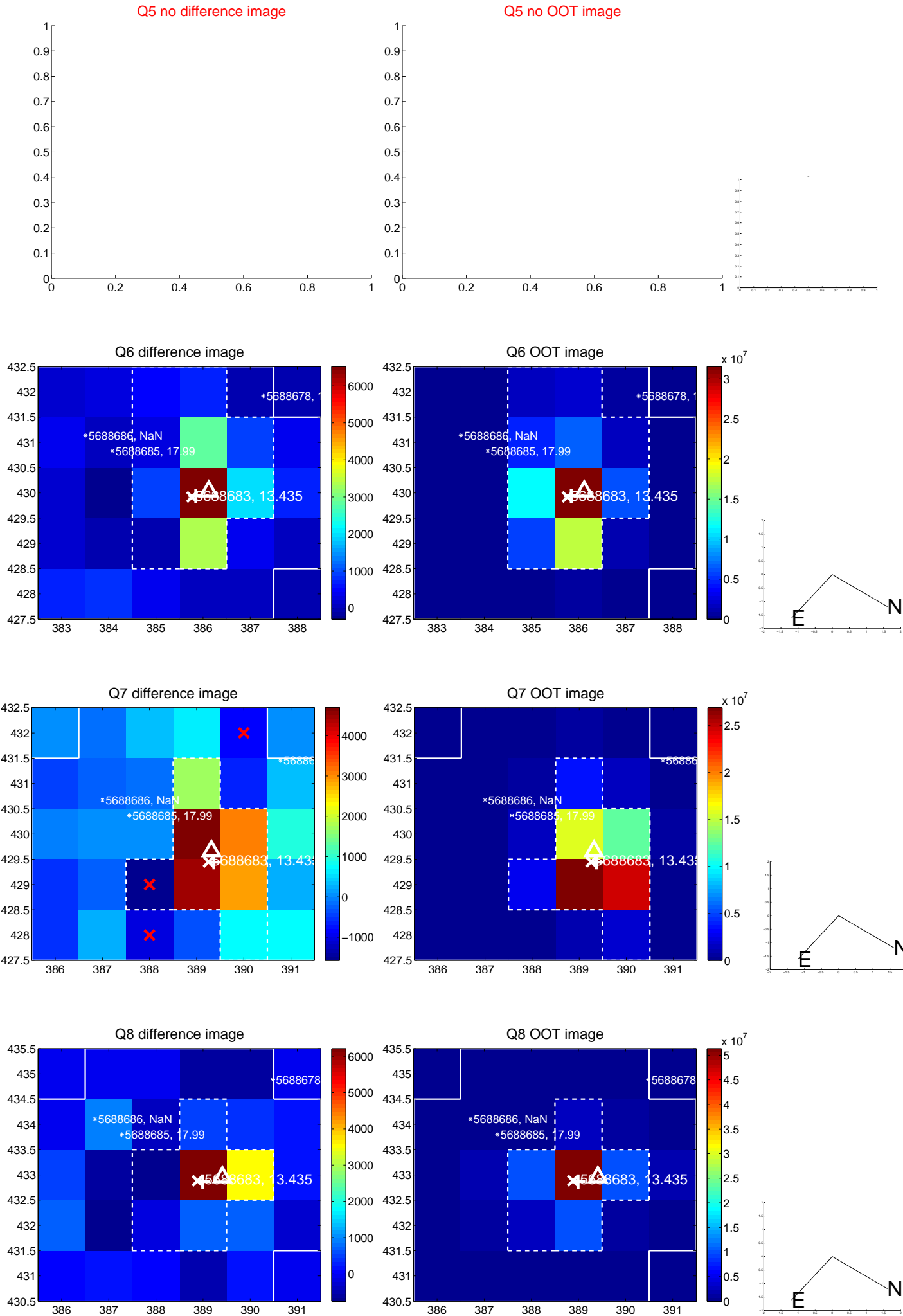


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

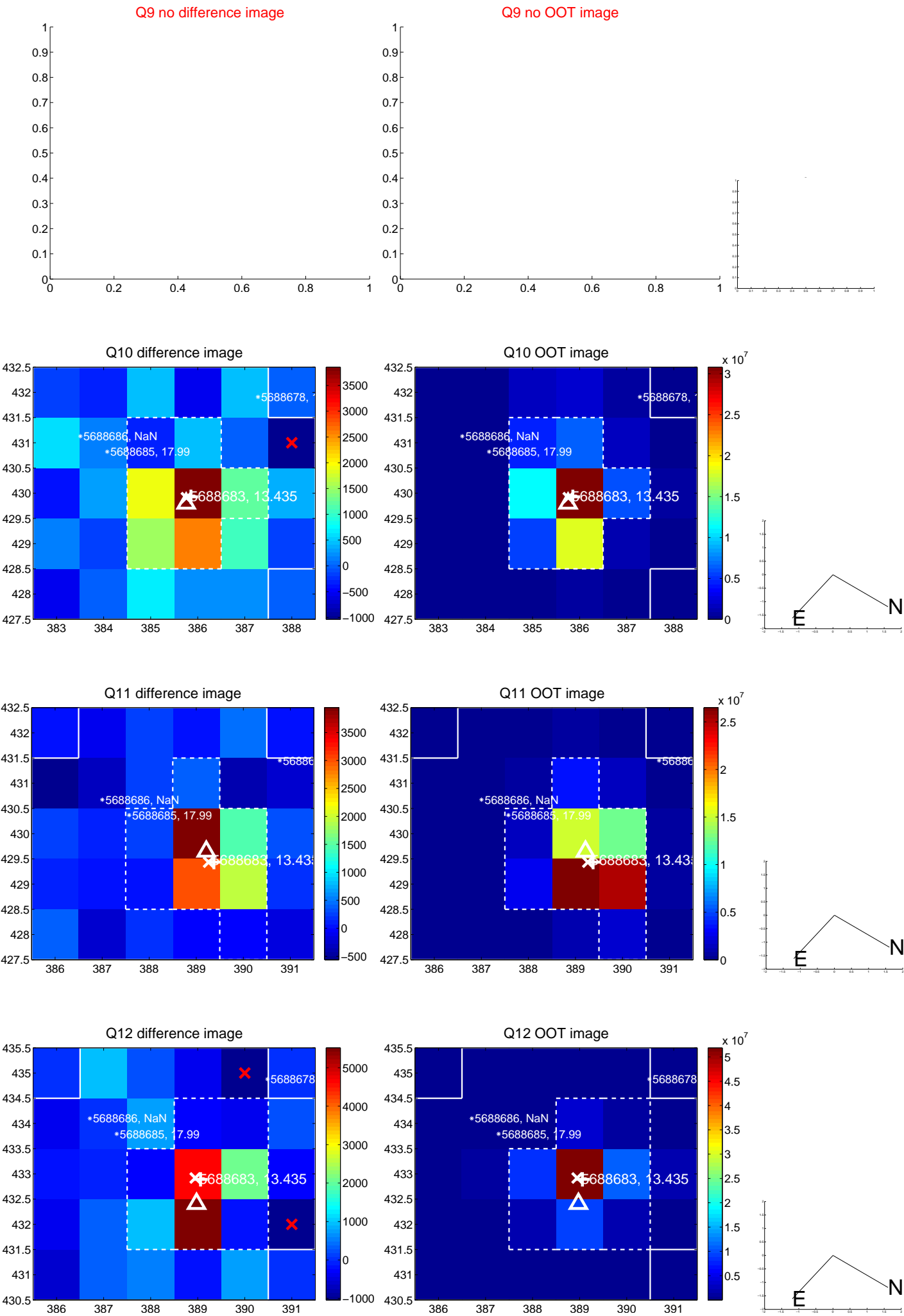
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



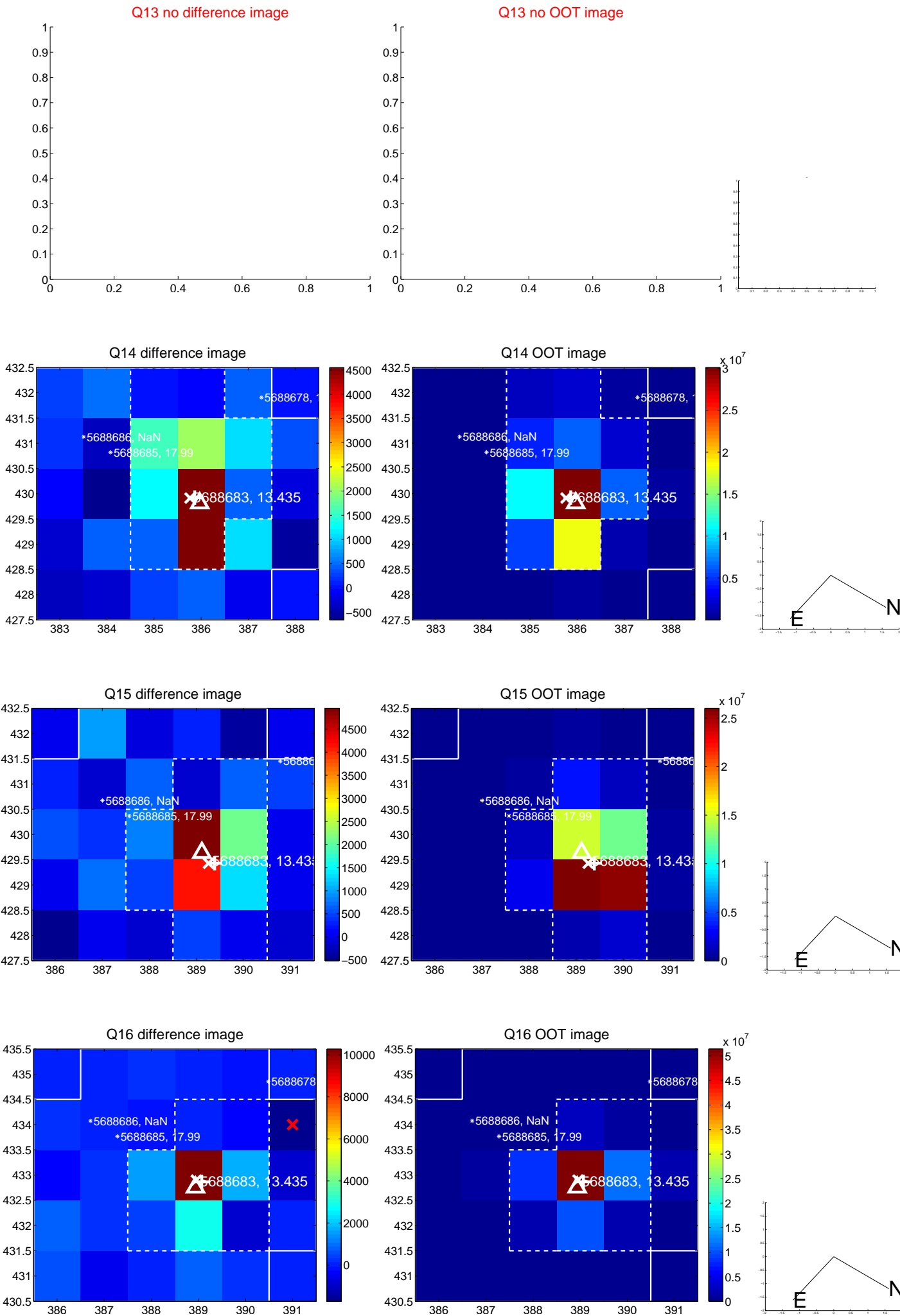
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

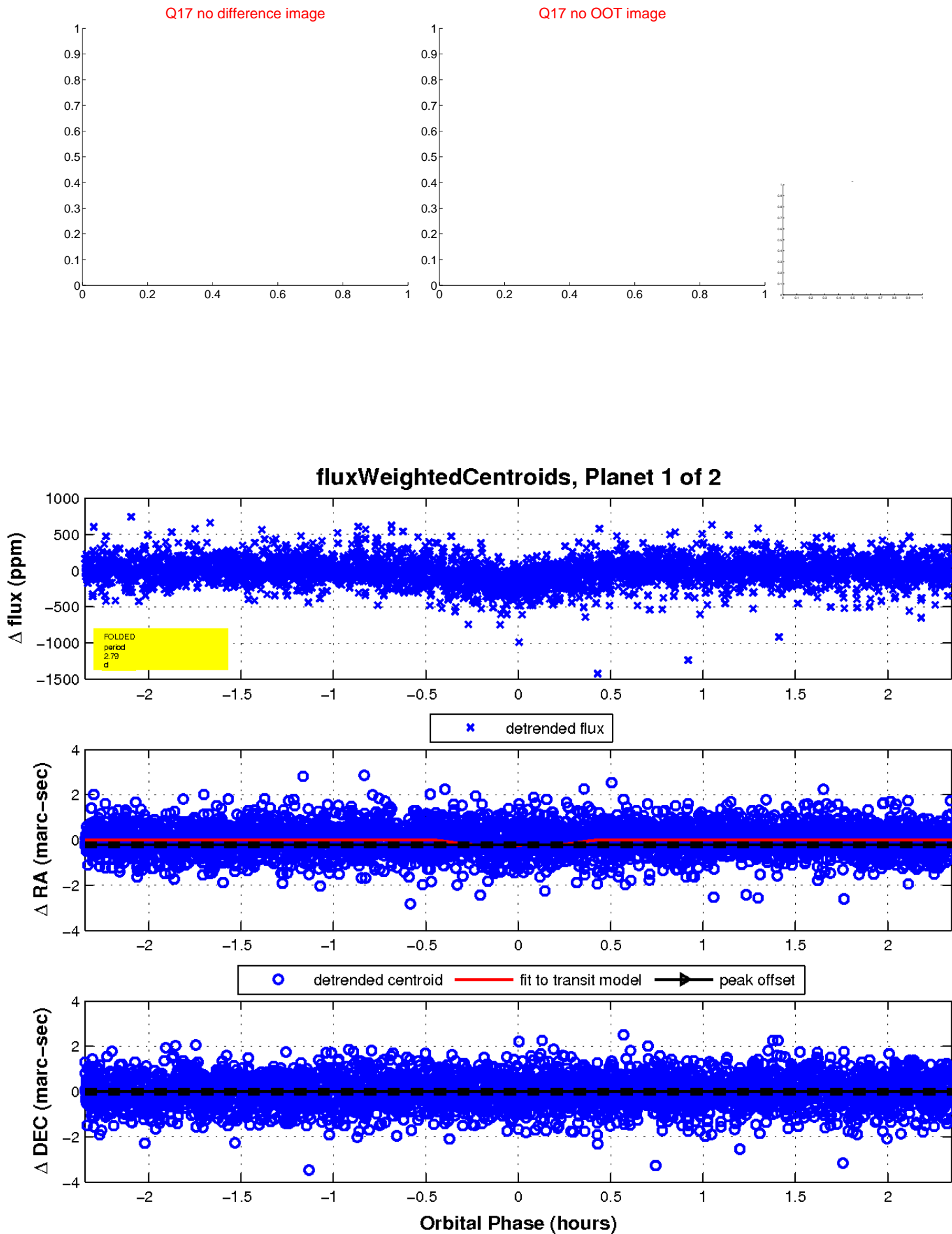


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



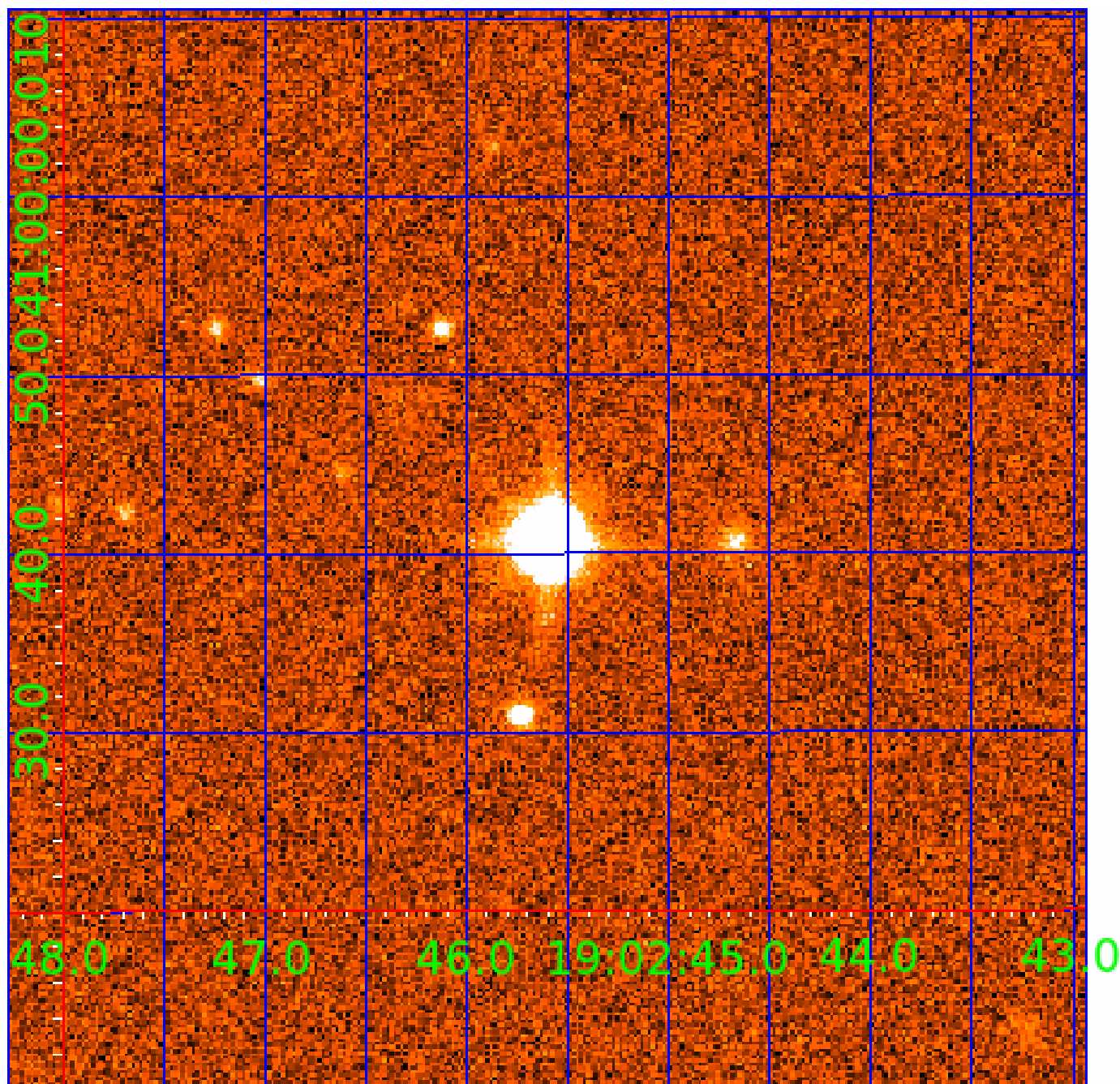


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 005688683

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005688683-01	OBS	4097.01	2.790656	133.153776	175.6	0.782	14.7	21.0	0.60	4353	1.01	105.03
005688683-02	OBS	4097.02	4.449023	131.754417	88.3	1.533	8.5	10.4	0.60	4353	0.66	56.40

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005688683-01	OBS	PC	0.98	0	0	0	0	CENT_KIC_POS
005688683-02	OBS	FP	0.00	0	0	1	0	CENT_KIC_POS—HALO_GHOST

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

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

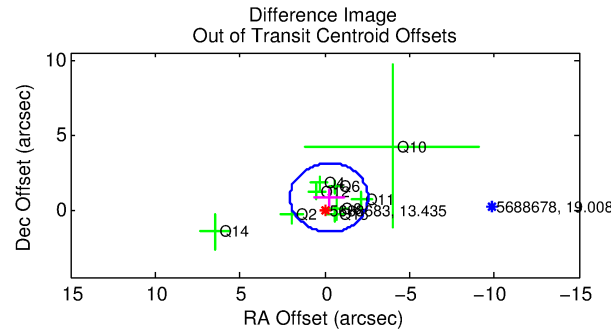
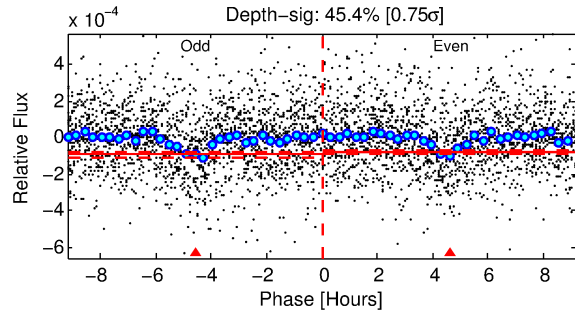
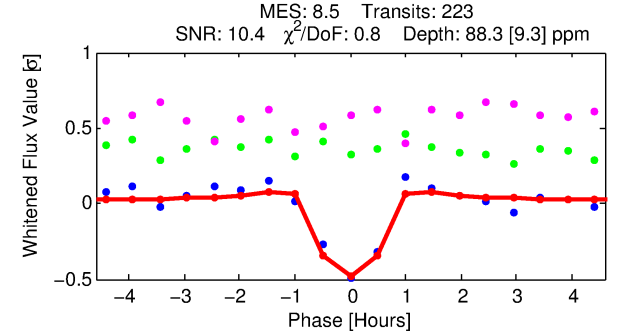
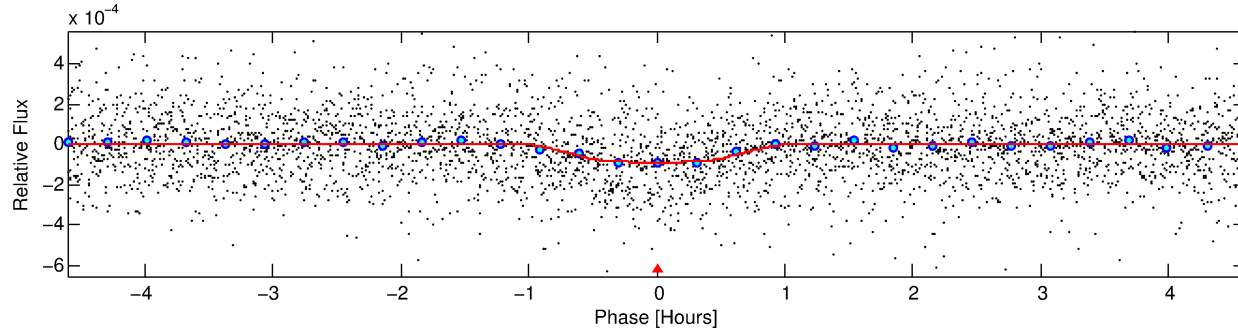
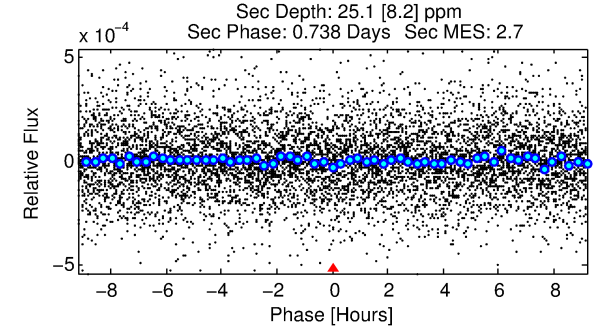
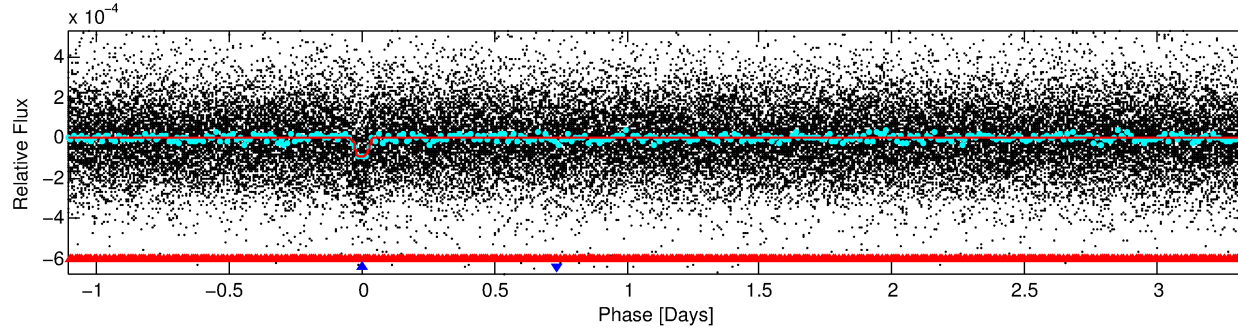
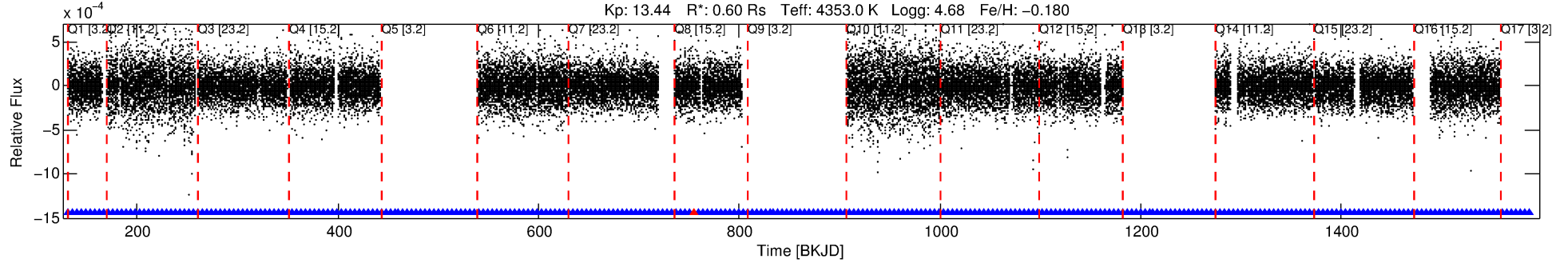
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 005688683-02

No Significant Match Found

# DV One-Page Summary

KIC: 5688683 Candidate: 2 of 2 Period: 4.449 d  
KOI: K04097.02 Corr: 0.937



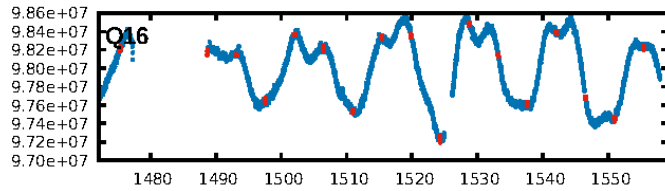
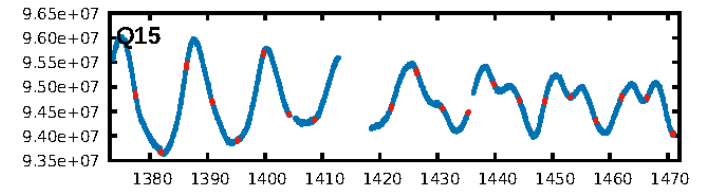
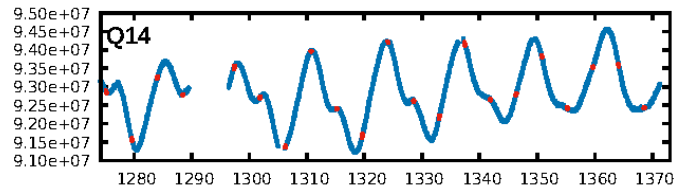
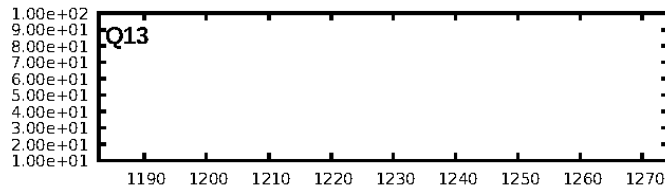
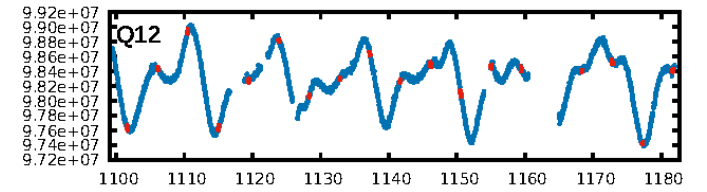
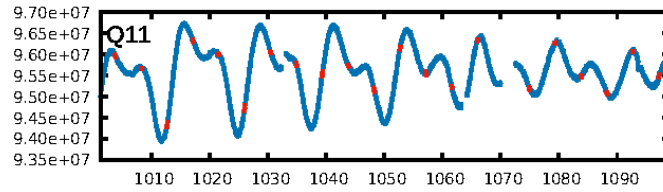
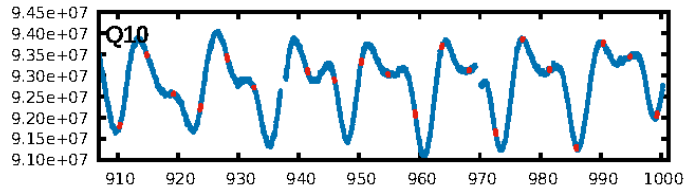
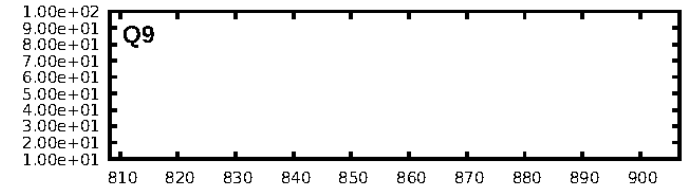
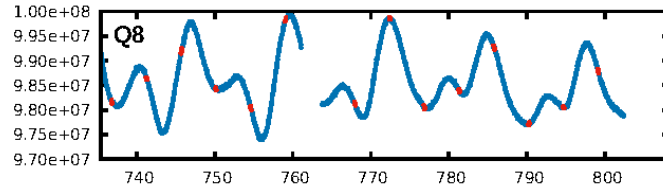
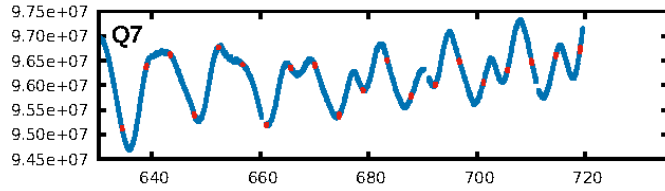
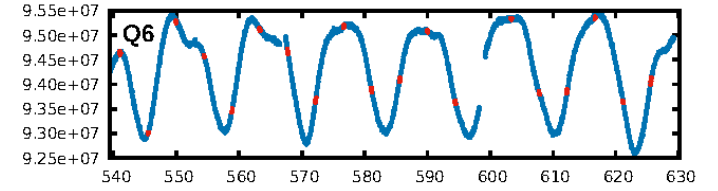
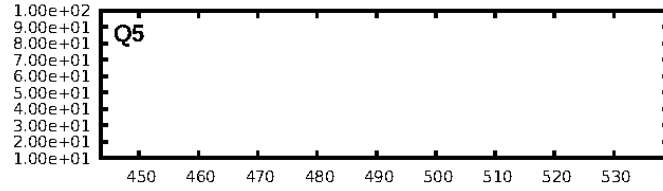
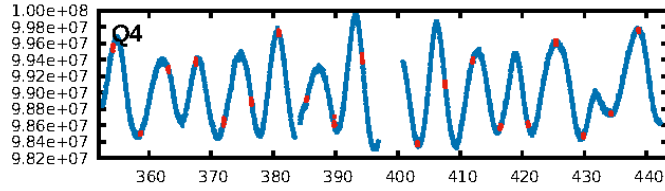
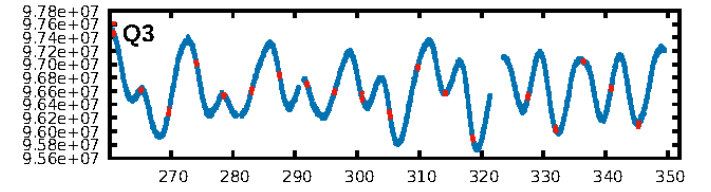
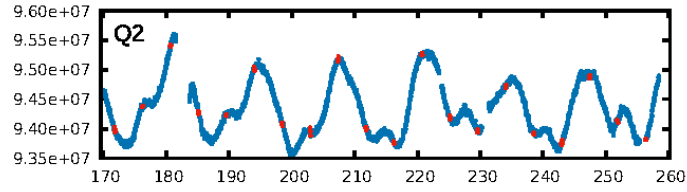
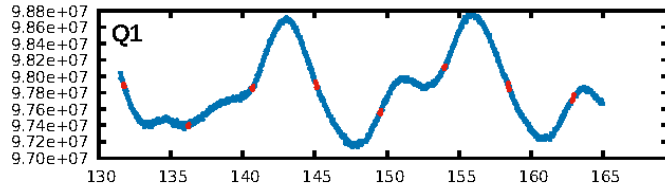
## DV Fit Results:

Period = 4.44902 [0.00002] d  
Epoch = 131.7544 [0.0025] BKJD  
Rp/R\* = 0.0100 [0.0064]  
a/R\* = 12.51 [27.72]  
b = 0.84 [0.82]  
Seff = 56.40 [8.79]  
Teq = 699 [27] K  
Rp = 0.66 [0.42] Re  
a = 0.0455 [0.0035] AU  
Ag = 66.17 [87.08] [0.75σ]  
Teffp = 3081 [1015] K [2.35σ]

## DV Diagnostic Results:

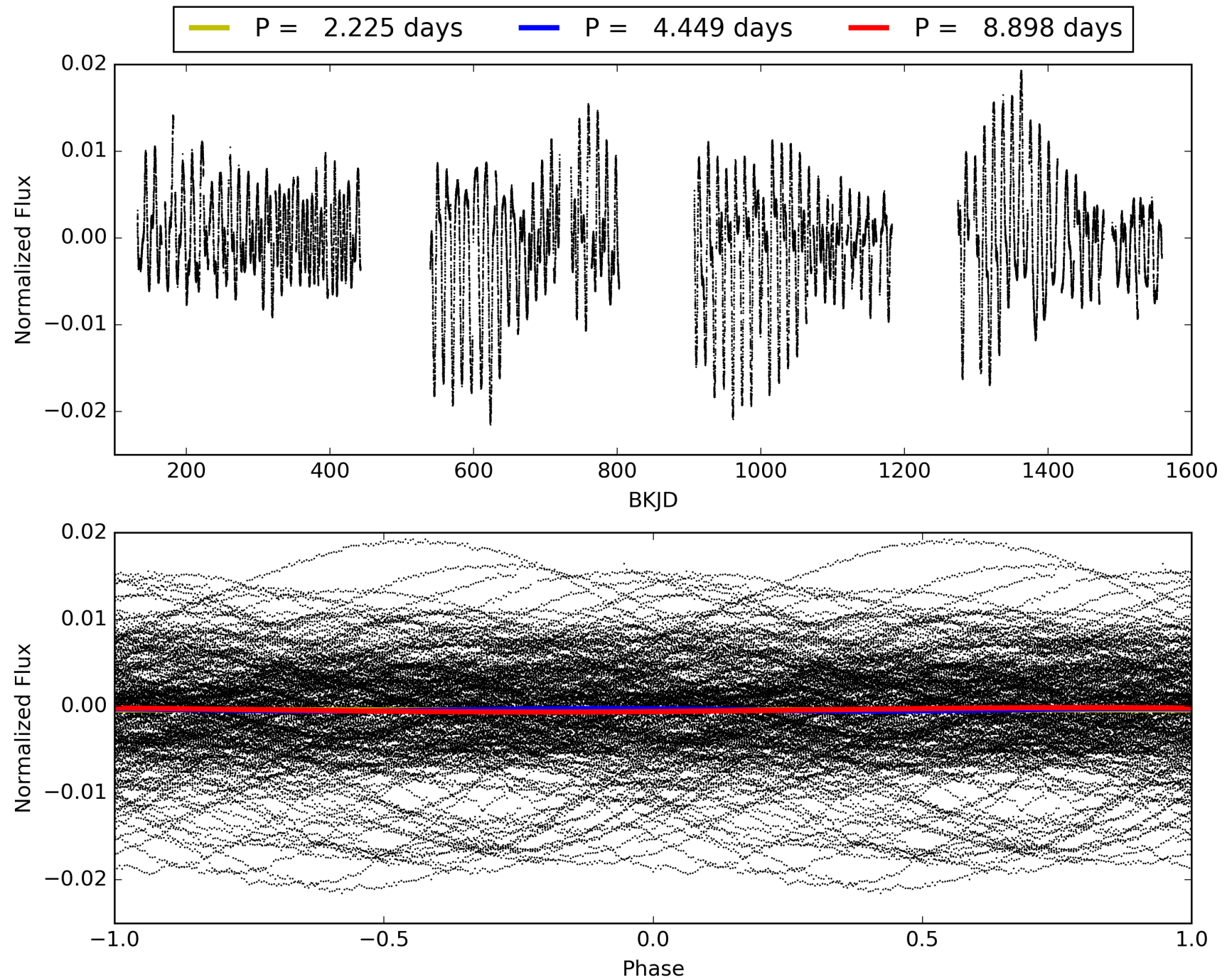
ShortPeriod-sig: 100.0% [23.13σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 2.13e-16  
RollingBand-fgt: 1.00 [214/215]  
GhostDiagnostic-chr: -0.04087  
Centroid-sig: 59.6%  
Centroid-so: 0.687 arcsec [0.71σ]  
OotOffset-rm: 0.836 arcsec [1.09σ]  
OotOffset-st: 4/2/3/0 [9]  
KicOffset-rm: 1.201 arcsec [1.47σ]  
KicOffset-st: 4/2/3/0 [9]  
DiffImageQuality-fgm: 0.78 [7/9]  
DiffImageOverlap-fno: 1.00 [13/13]

# TCE 005688683-02, PDC Light Curves



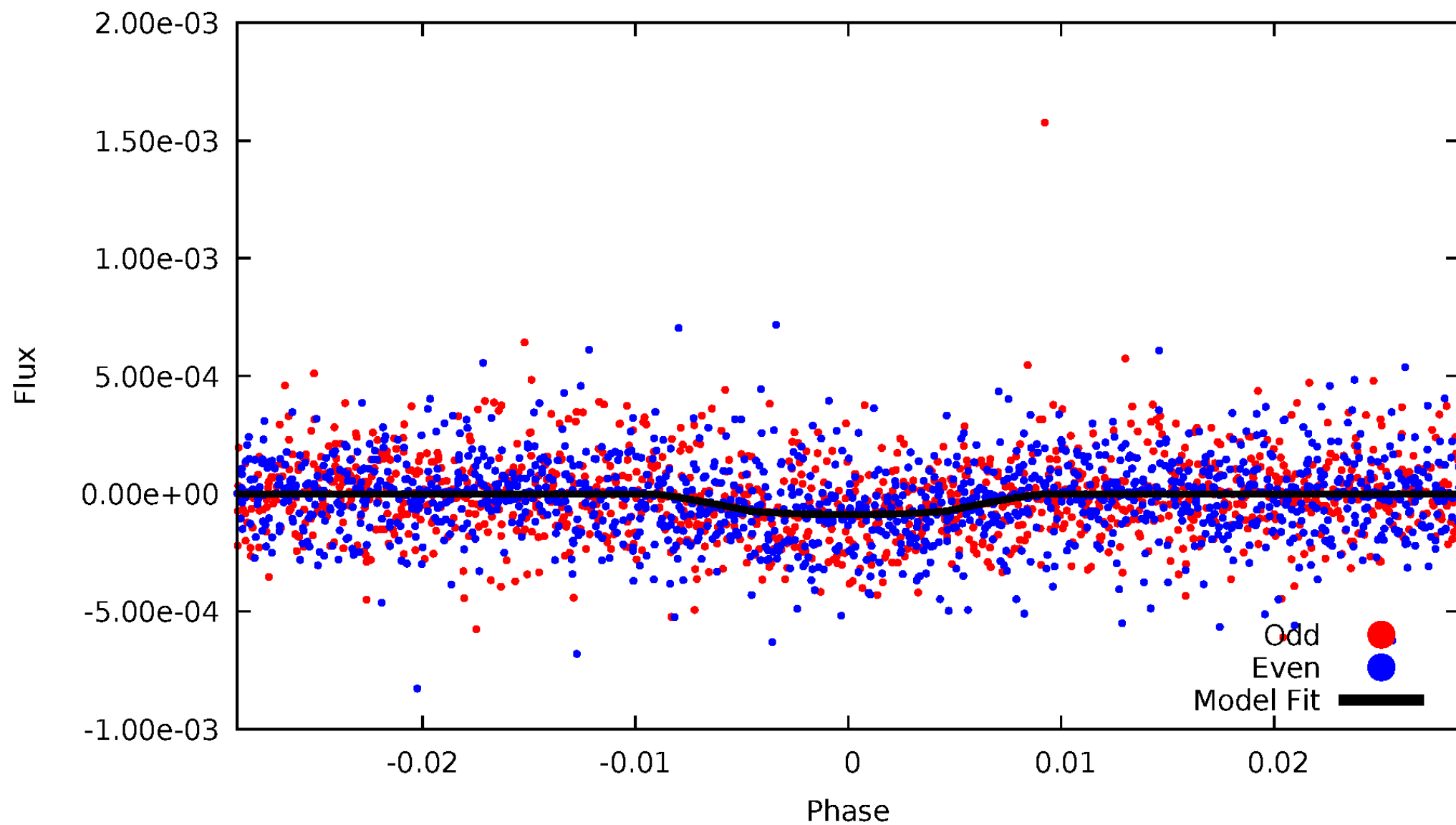


TCE 005688683-02



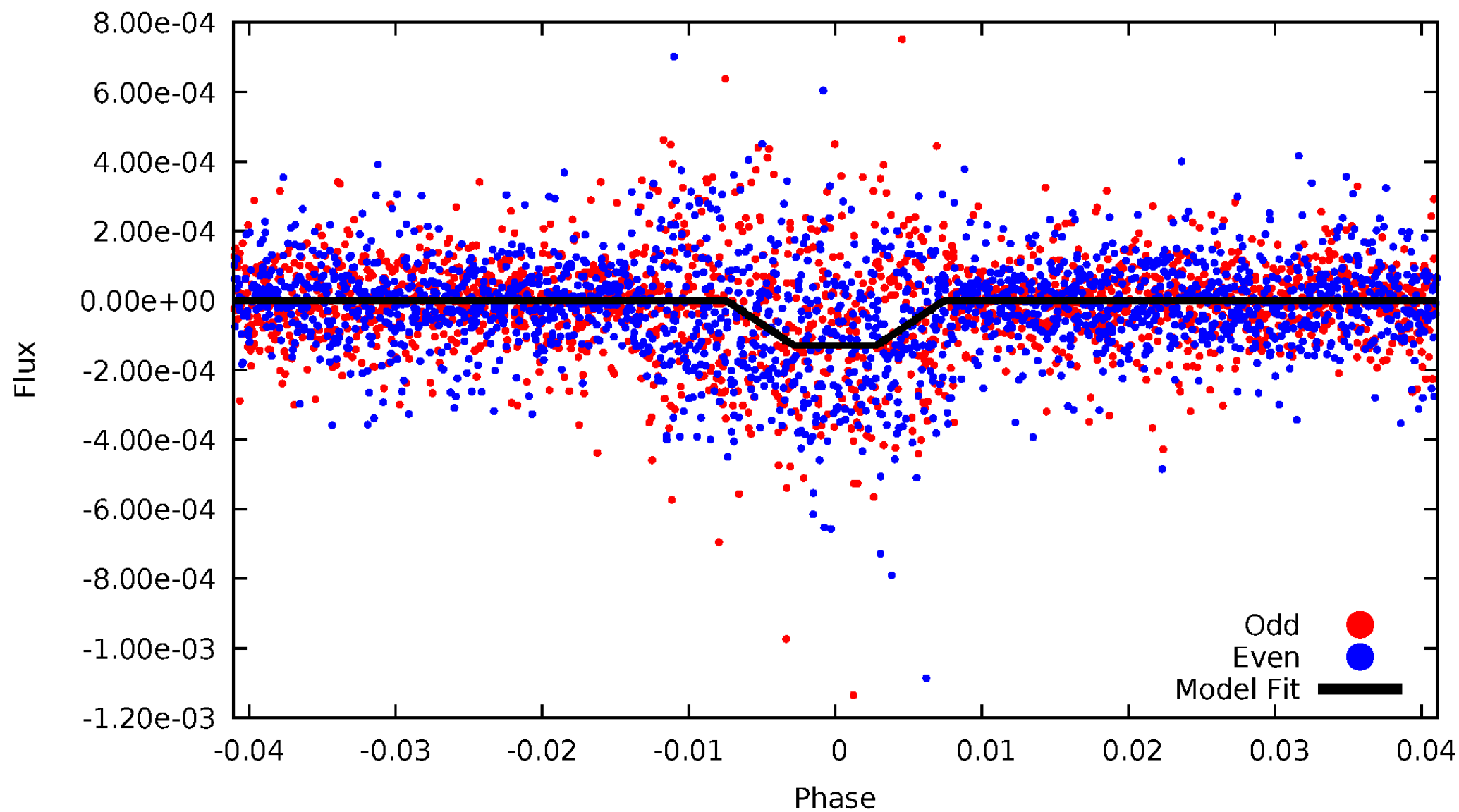
# DV Odd/Even

TCE 005688683-02



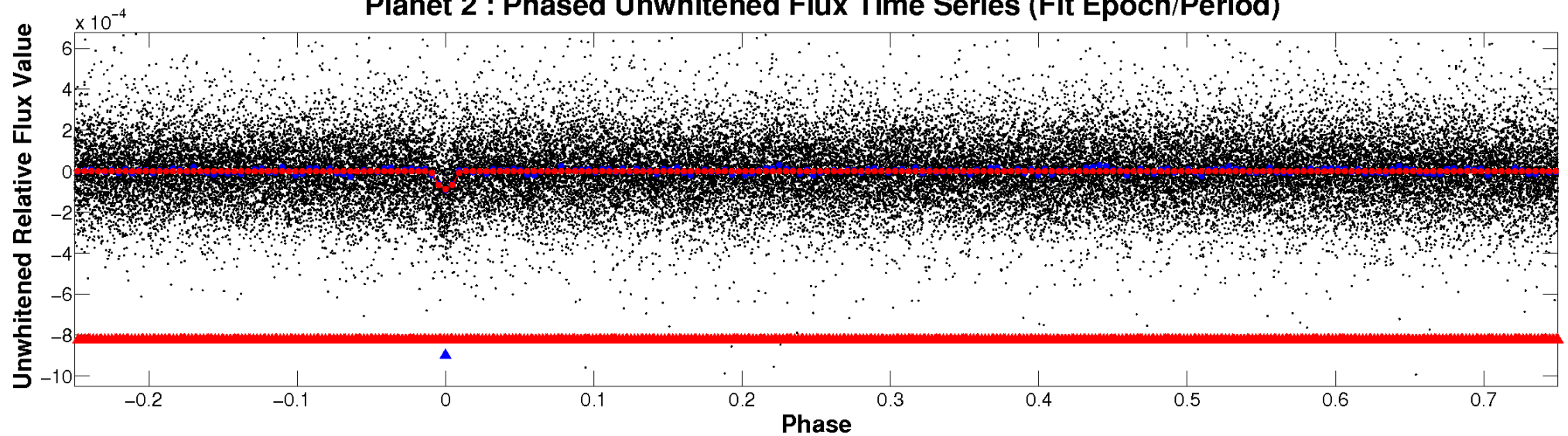
# ALT Odd/Even

TCE 005688683-02

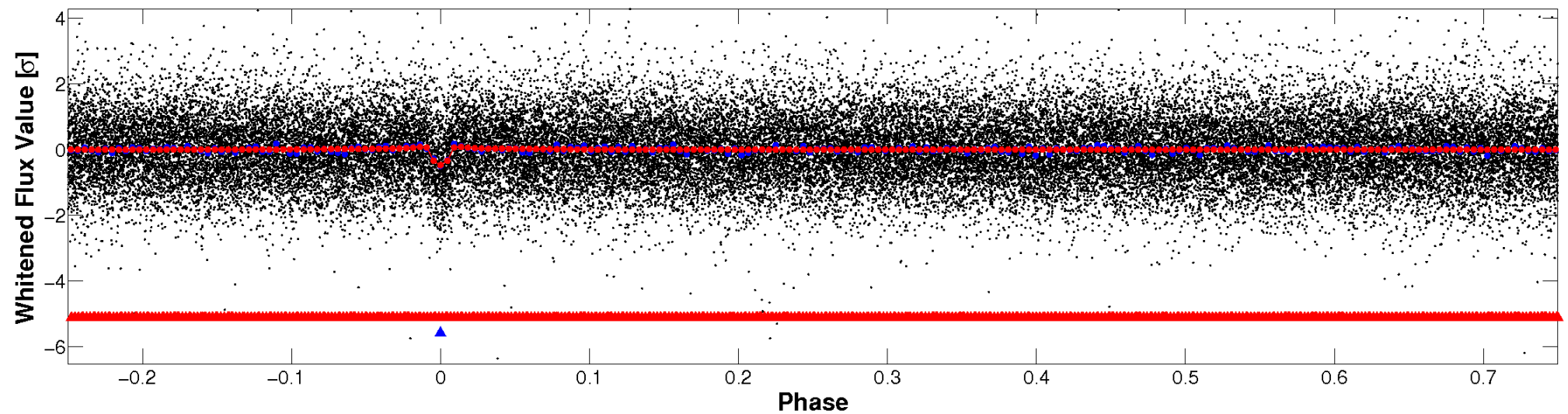


# Non-Whitened Vs. Whitened Light Curve

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

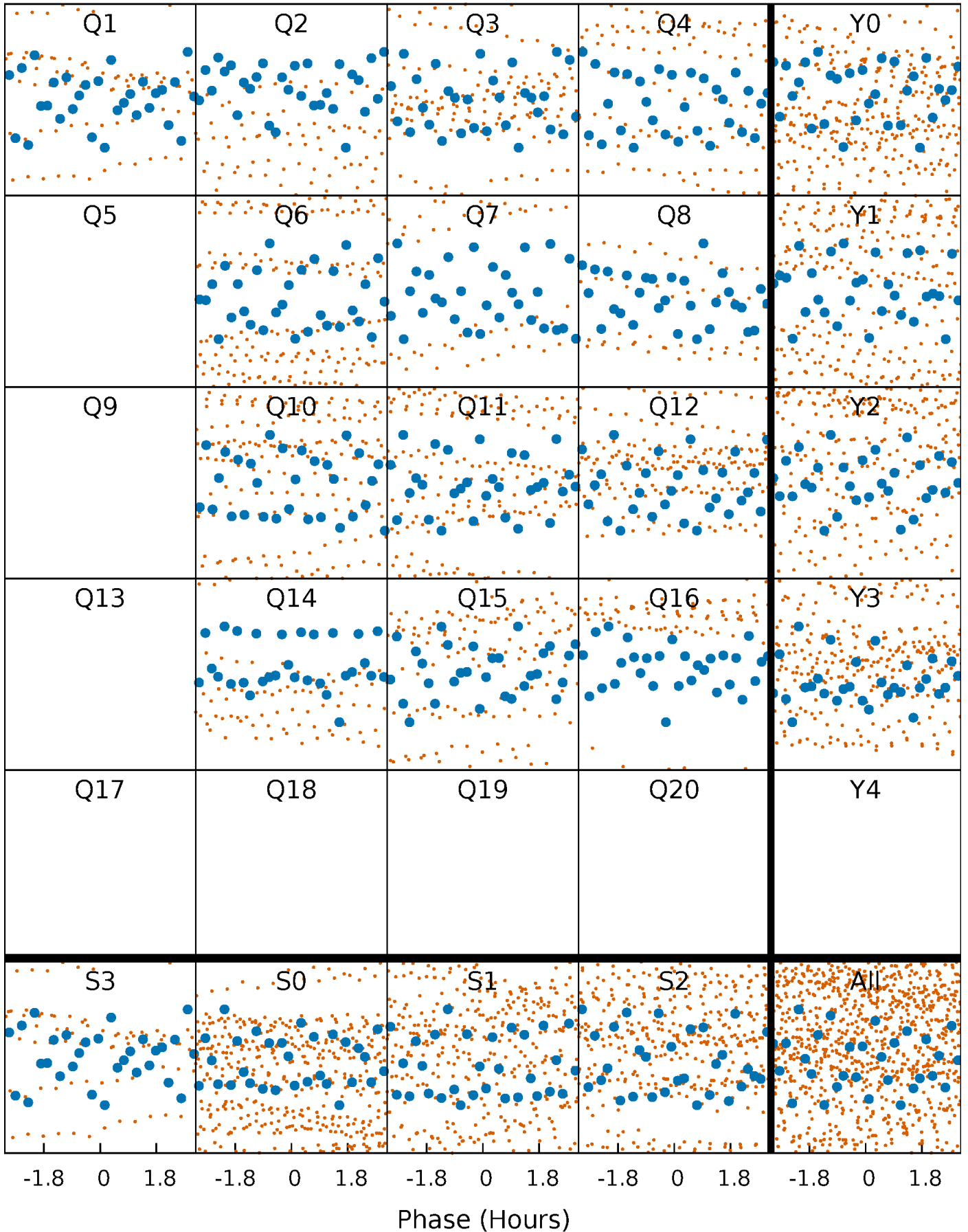


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

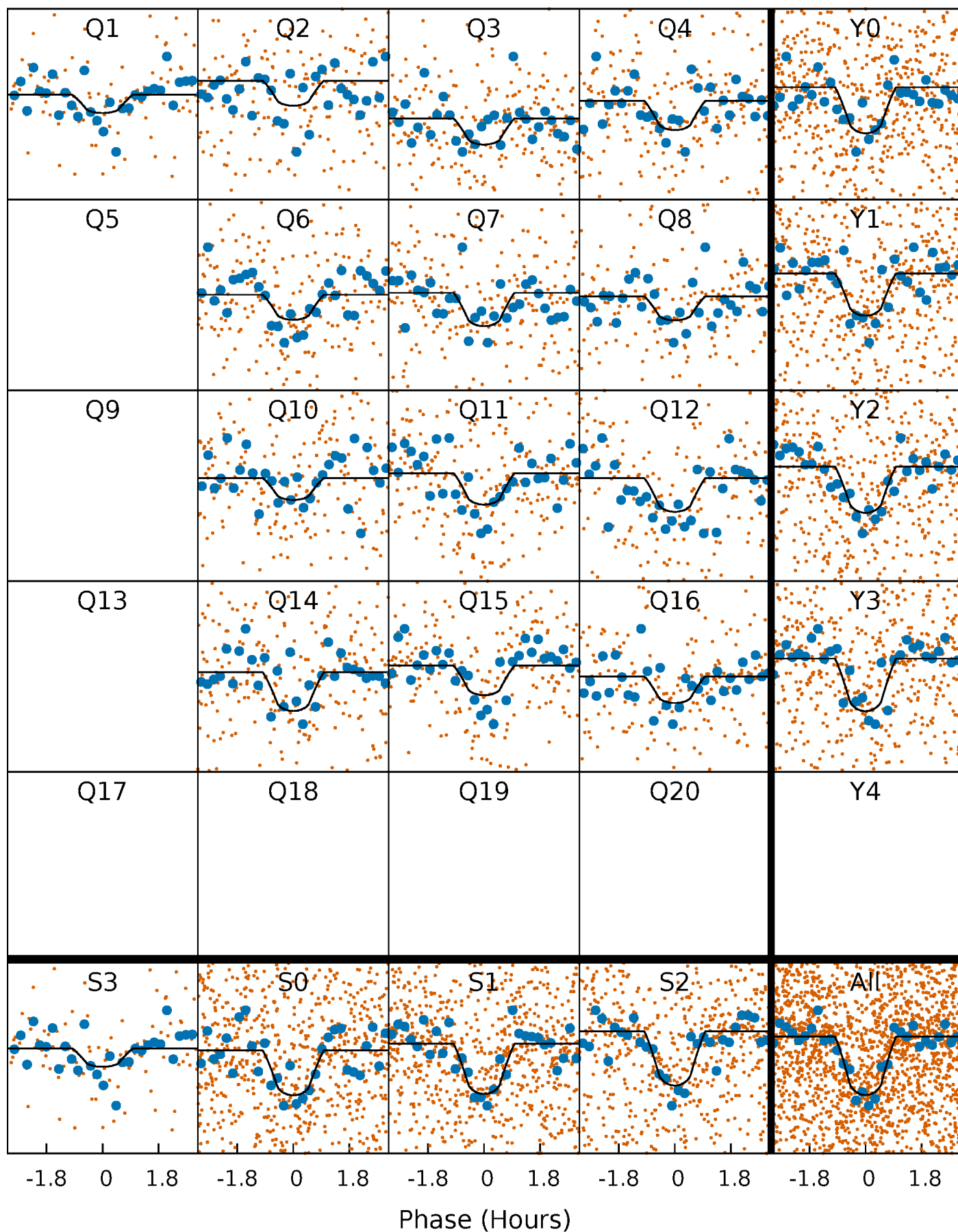
TCE 005688683-02 P= 4.449023 Days  $T_0=131.754417$  (BKJD)





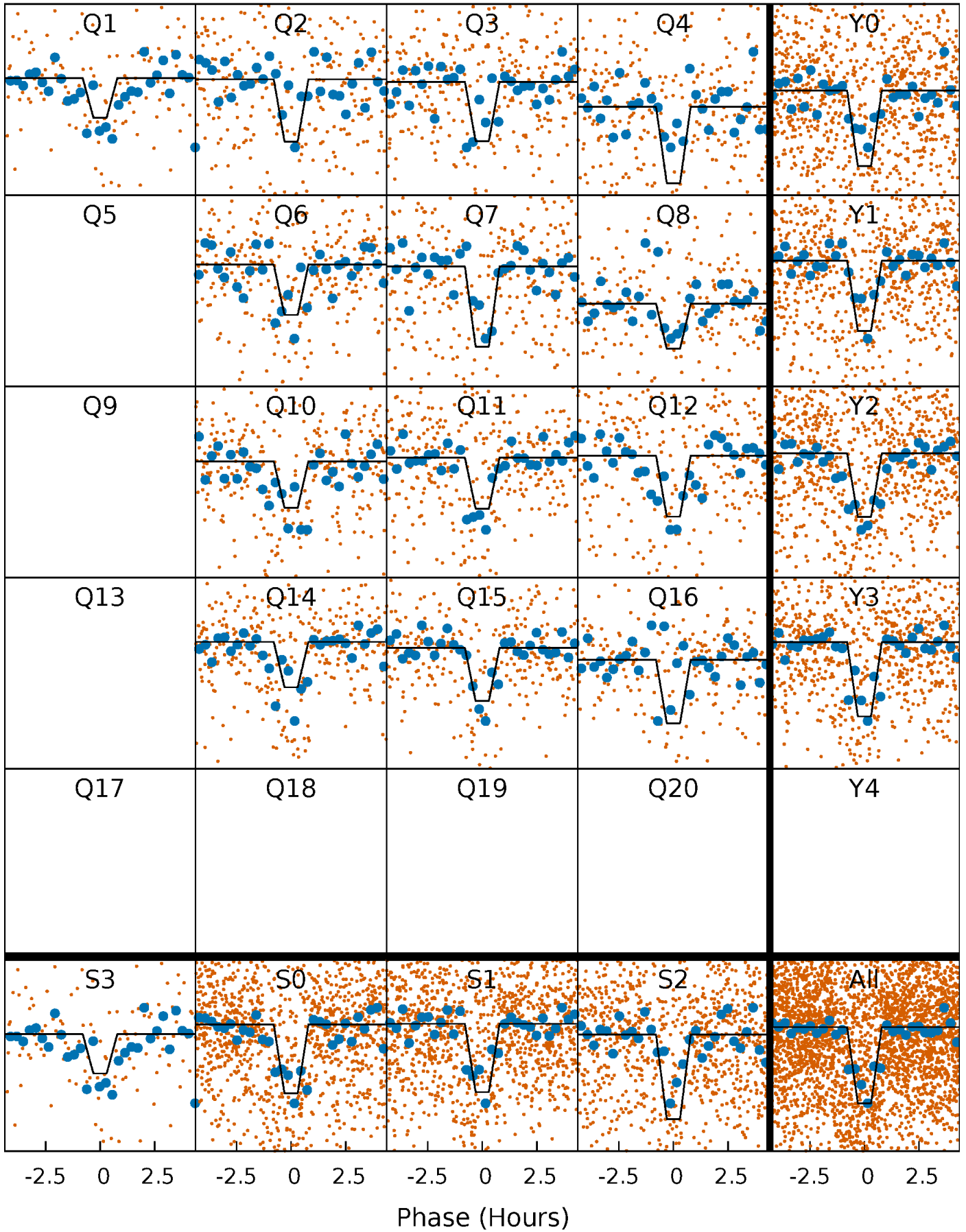
# DV Quarter-Phased Transit Curves

TCE 005688683-02 P= 4.449023 Days  $T_0=131.754417$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

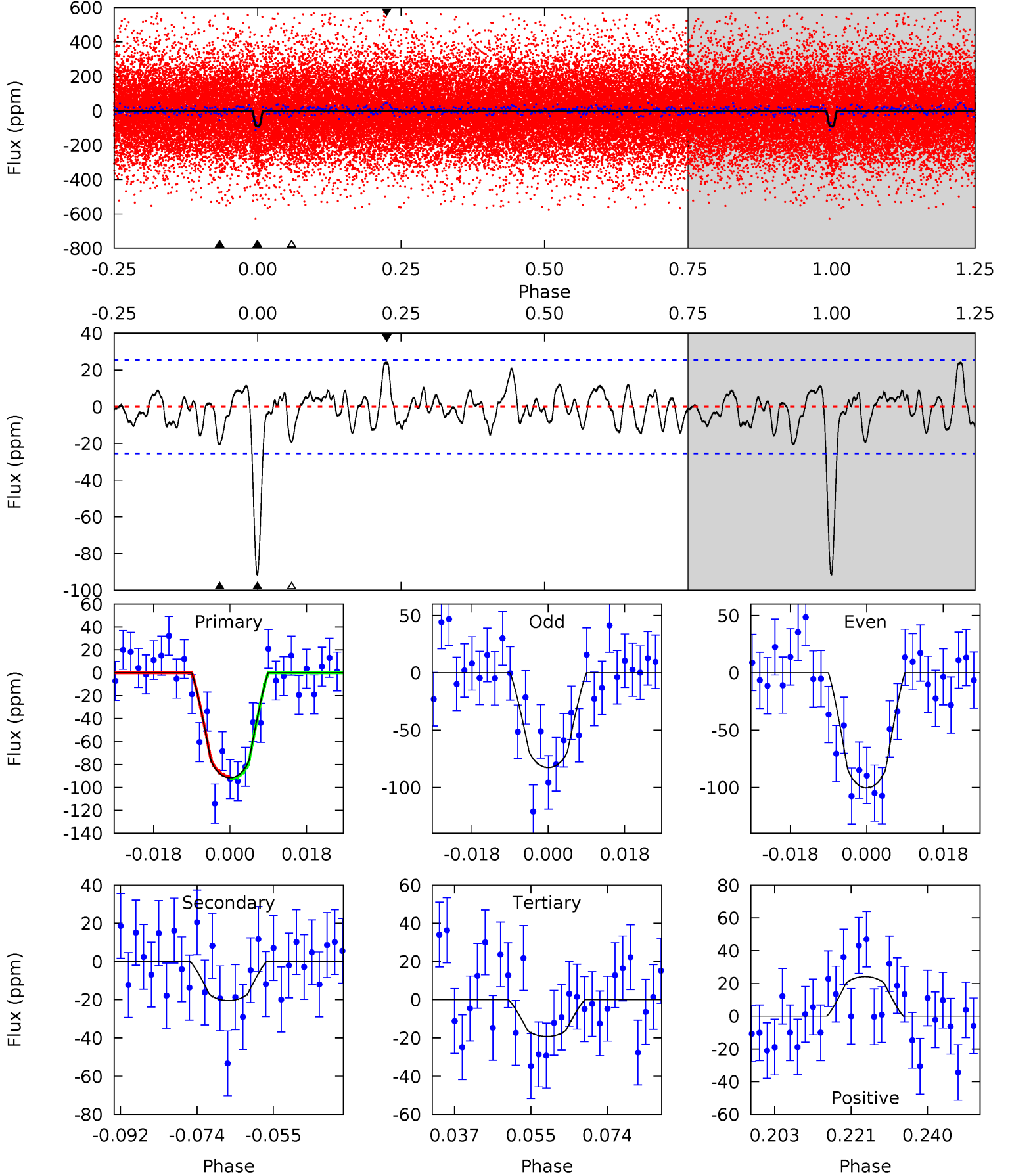
TCE 005688683-02   P= 4.449055 Days    $T_0=131.747982$  (BKJD)



# DV Model-Shift Uniqueness Test

005688683-02, P = 4.449023 Days, E = 127.305394 Days

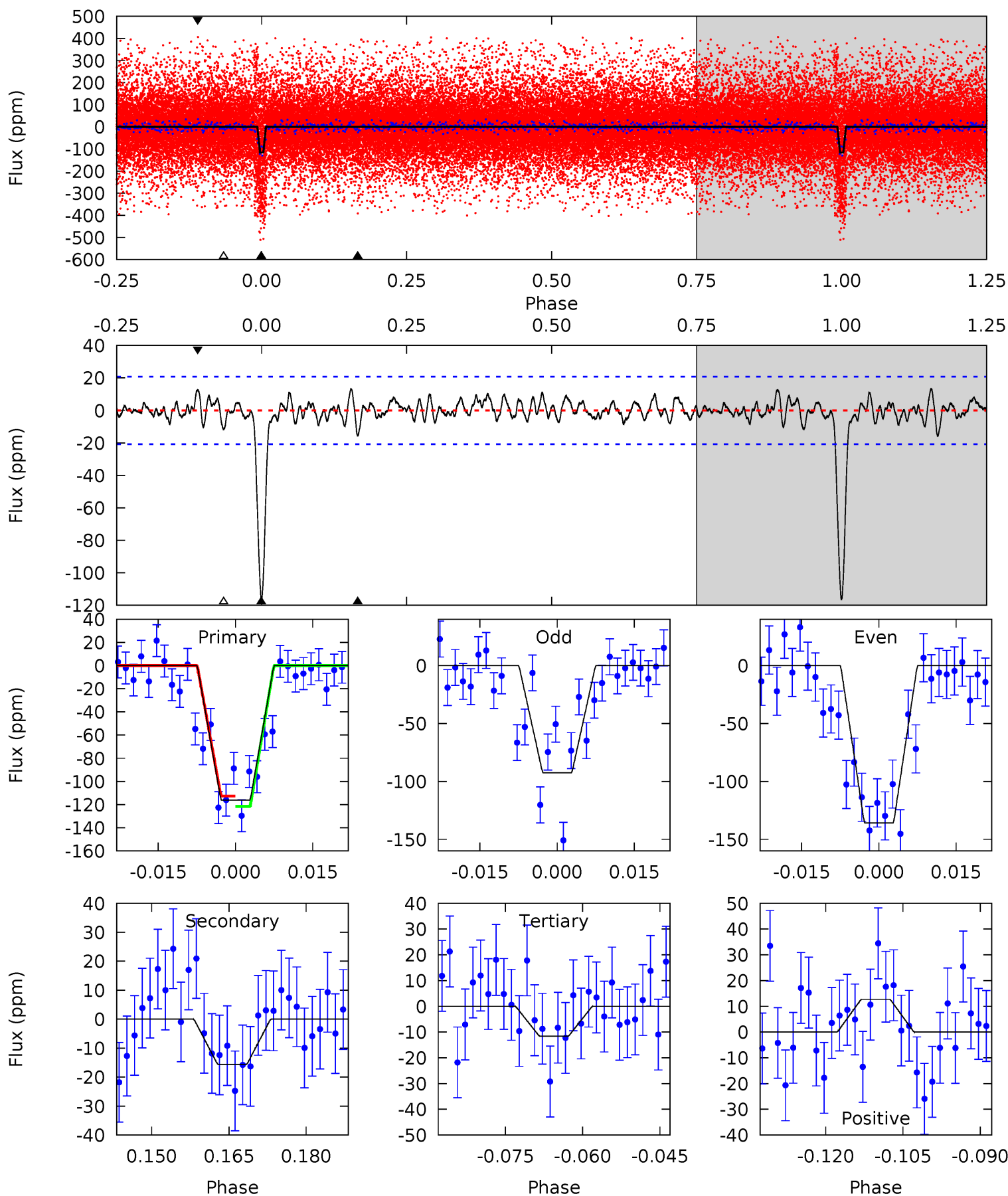
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
17.7	3.94	3.71	4.64	4.91	2.36	1.45	13.9	13.0	0.23	-0.71	1.71	0.91	0.21	0.20



# Alt Model-Shift Uniqueness Test

005688683-02, P = 4.449055 Days, E = 127.298927 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
27.6	3.72	2.76	3.01	4.95	2.43	1.05	24.9	24.6	0.96	0.70	5.15	1.04	0.10	0



### Stellar Parameters For KIC 005688683

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4353^{+118}_{-131}$	$4.681^{+0.028}_{-0.048}$	$-0.180^{+0.300}_{-0.300}$	$0.603^{+0.060}_{-0.040}$	$0.648^{+0.056}_{-0.062}$	$4.172^{+0.613}_{-0.832}$
	+3%/-3%	+1%/-1%	+167%/-167%	+10%/-7%	+9%/-10%	+15%/-20%
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 005688683-02 / KOI 4097.02

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-20 \pm 5$	$0.71^{+0.42}_{-0.43}$	$980^{+32}_{-34}$	$3256^{+1170}_{-452}$	$46^{+250}_{-29}$
Alt.	$-16 \pm 4$	$0.77^{+0.40}_{-0.39}$	$982^{+30}_{-34}$	$3054^{+789}_{-362}$	$30^{+99}_{-19}$

$T_{\text{max}}$  = 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

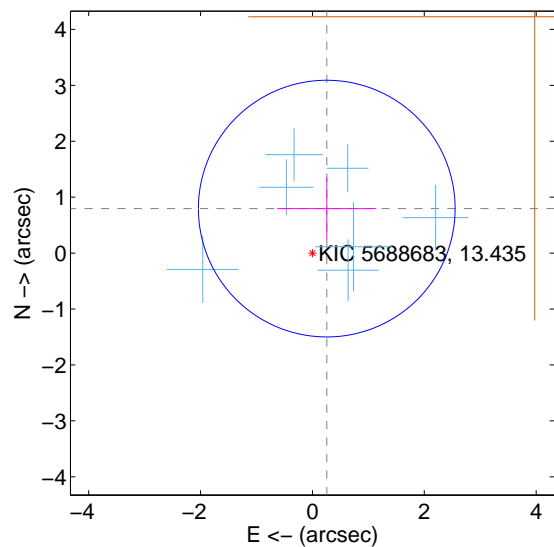
Supplemental centroid analysis for 005688683-02. Kepler magnitude: 13.44. Transit SNR 10.44

There are 7 quarters with good PRF difference image offsets

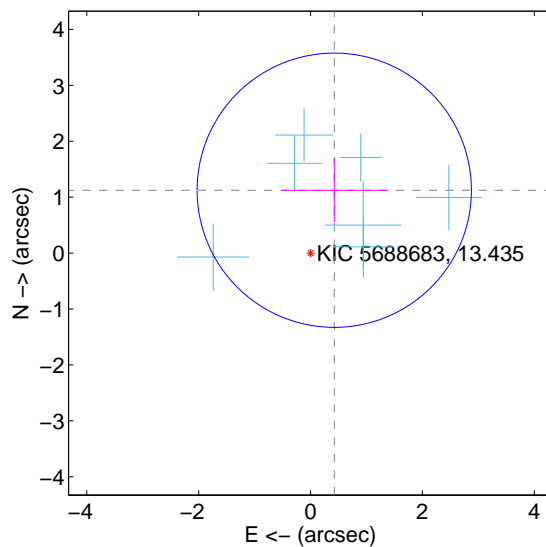
The direct PRF centroid is offset from the target star catalog position by about 0.52 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.836 \pm 0.765$	1.09	$-0.256 \pm 0.885$	$0.796 \pm 0.560$
PRF-fit source offset from KIC position	$1.201 \pm 0.817$	1.47	$-0.424 \pm 0.950$	$1.124 \pm 0.568$
photometric centroid source offset	$0.69 \pm 0.97$	0.71	$0.19 \pm 0.85$	$0.66 \pm 0.98$

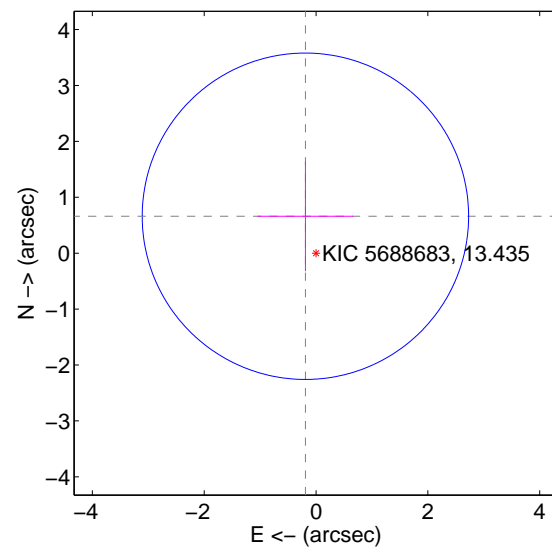
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

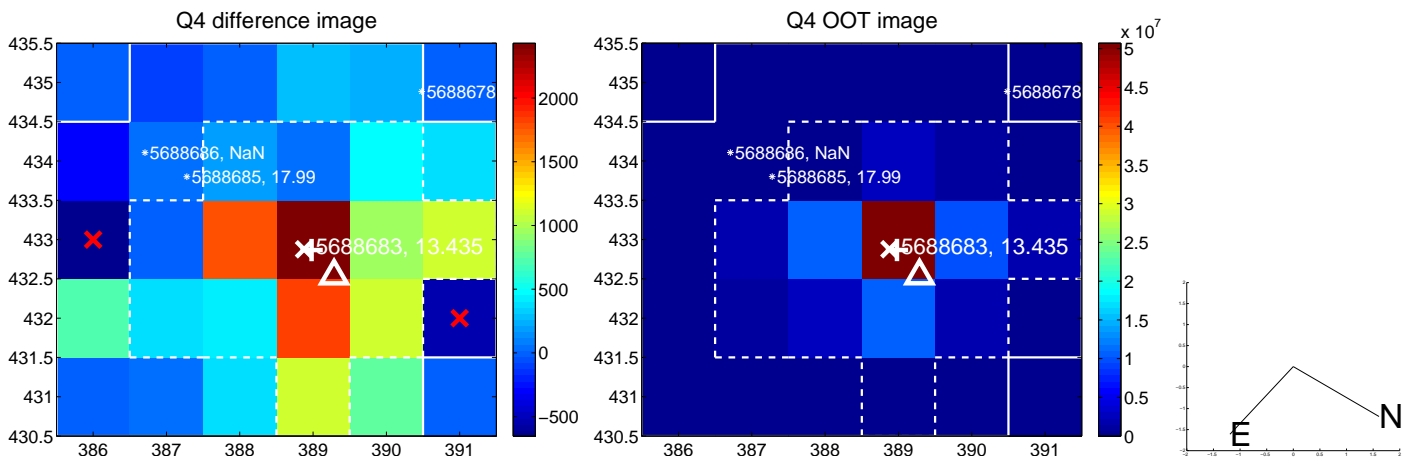
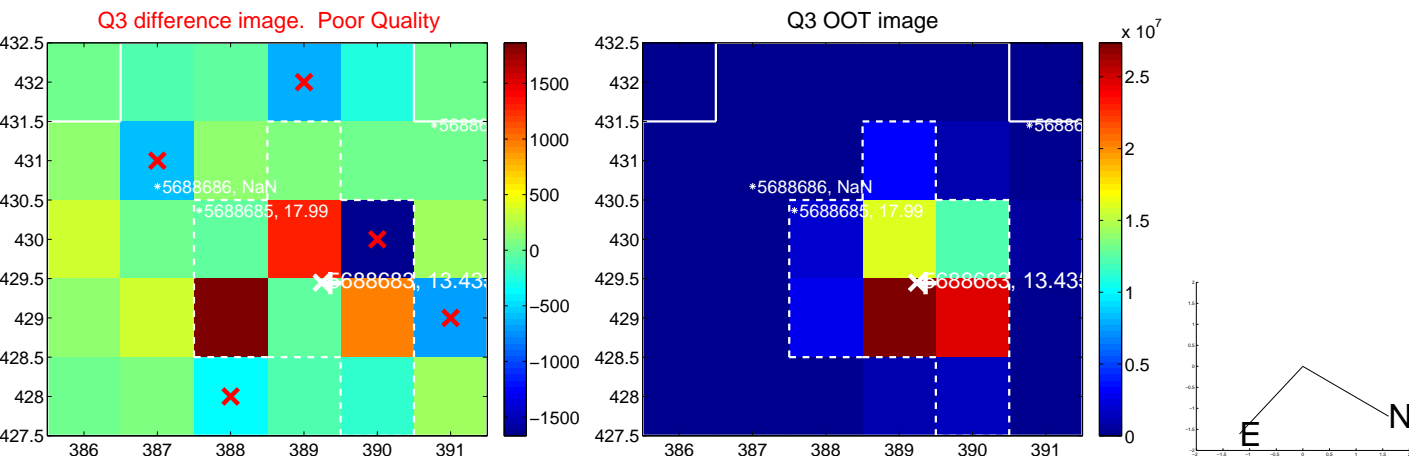
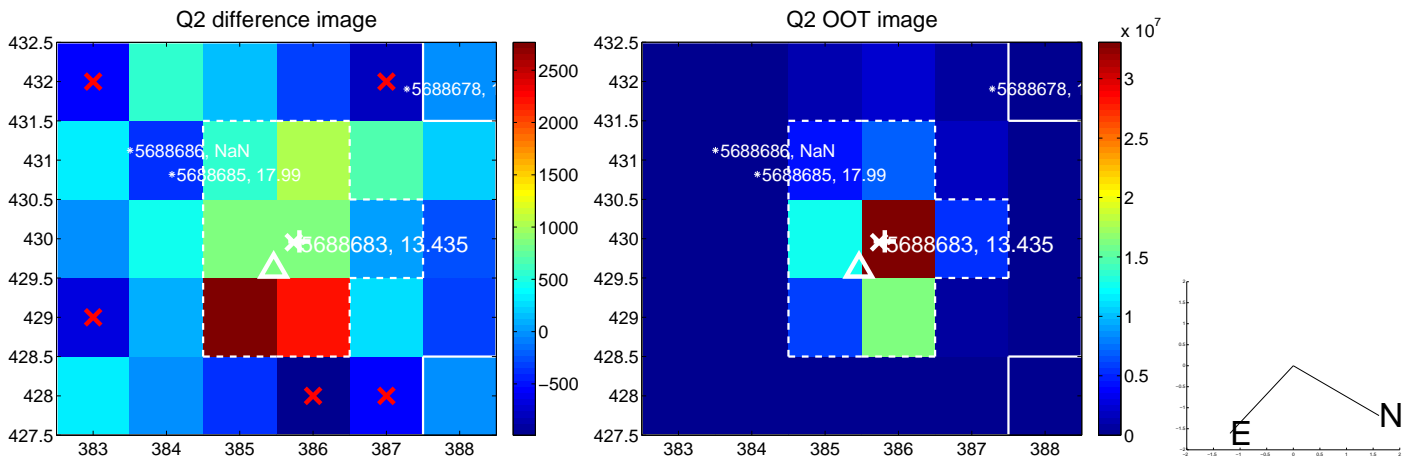
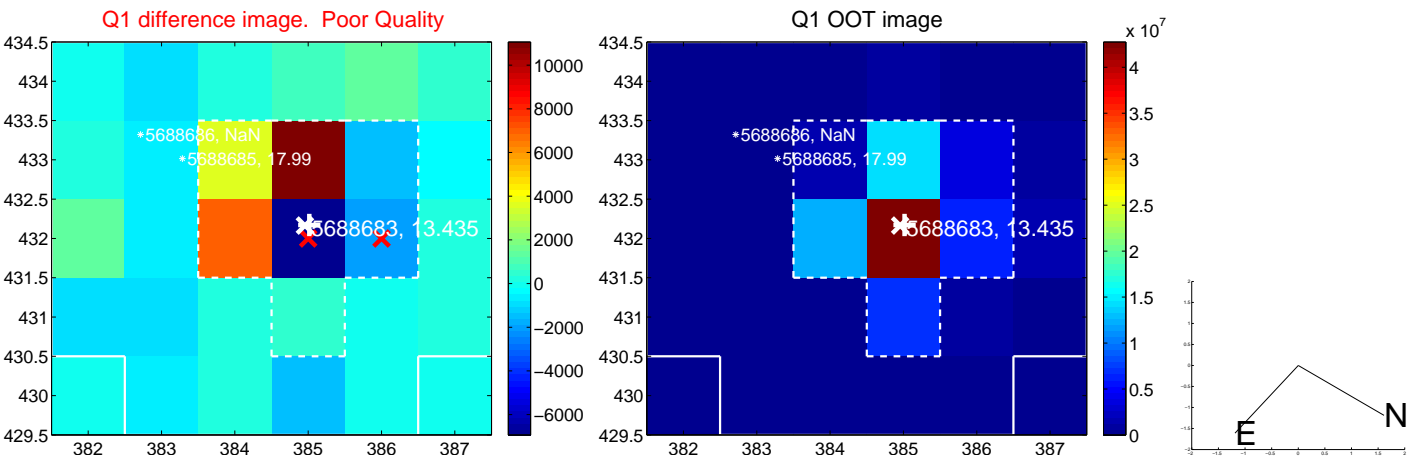


offset from photometric centroids



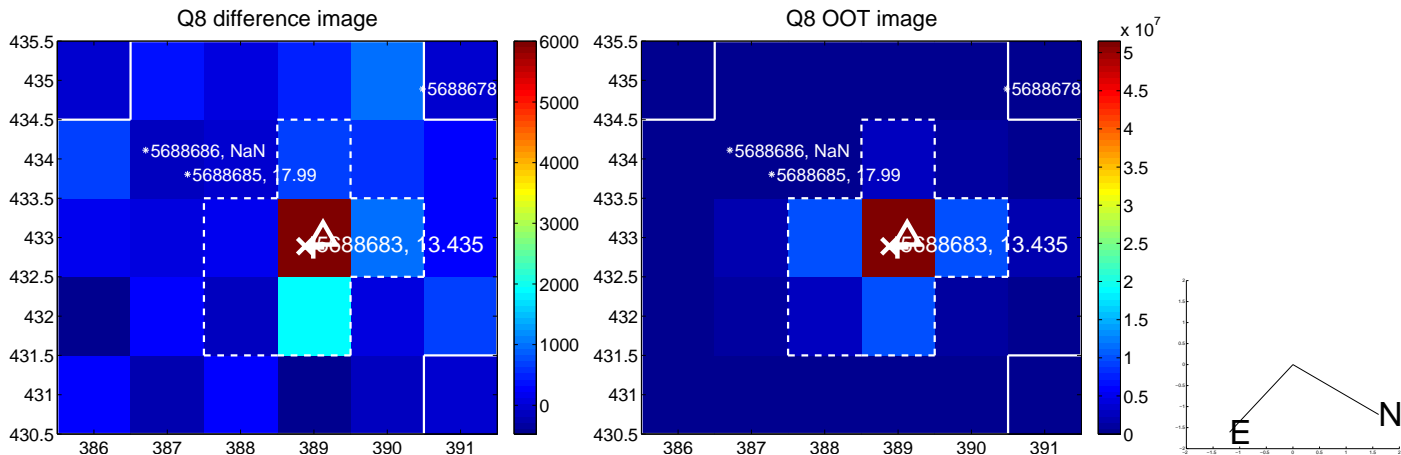
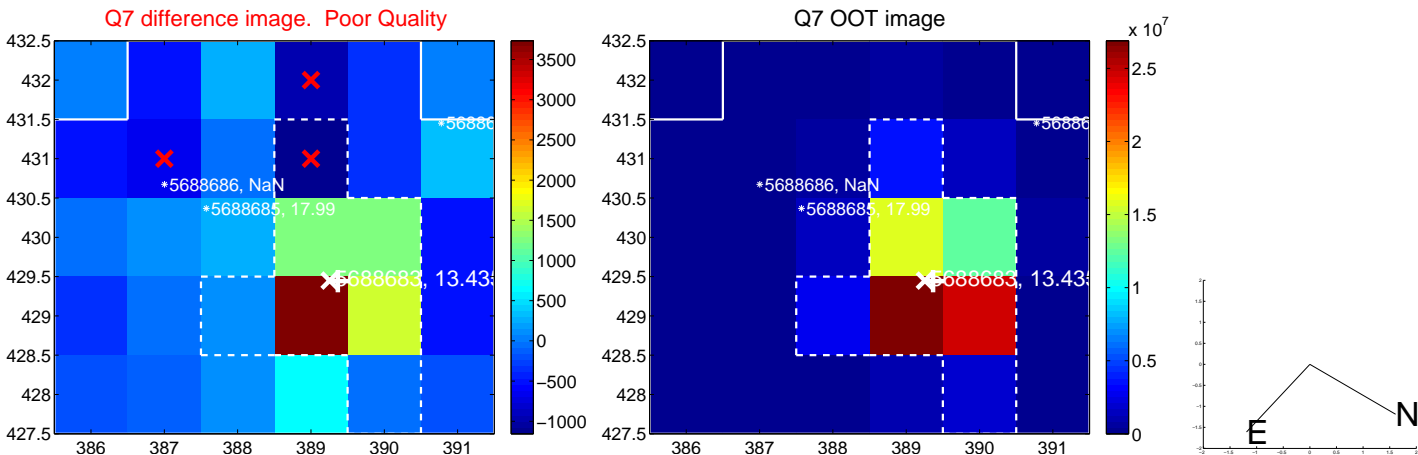
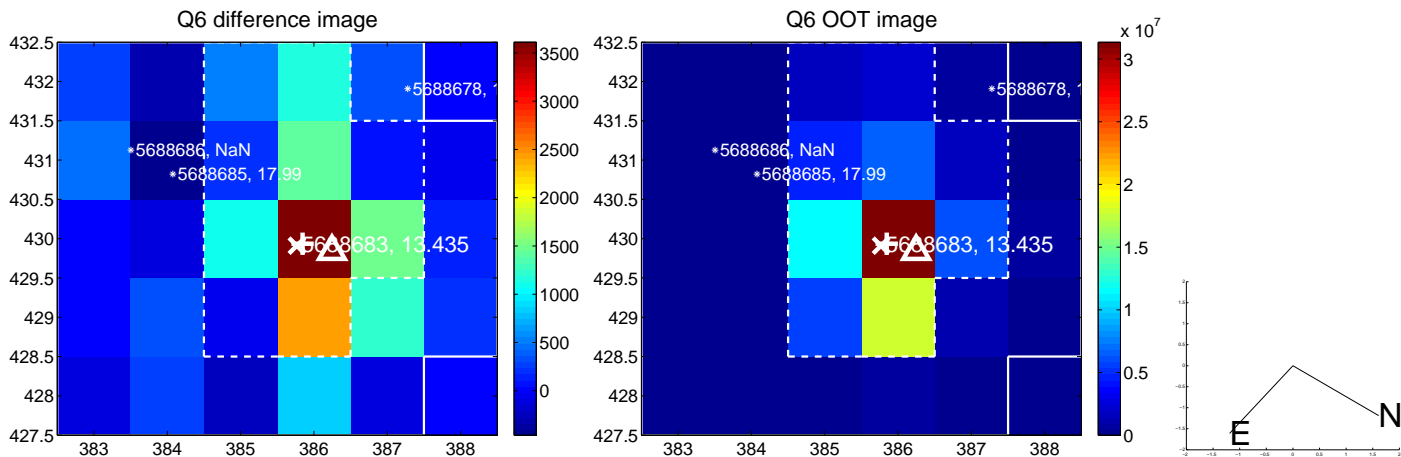
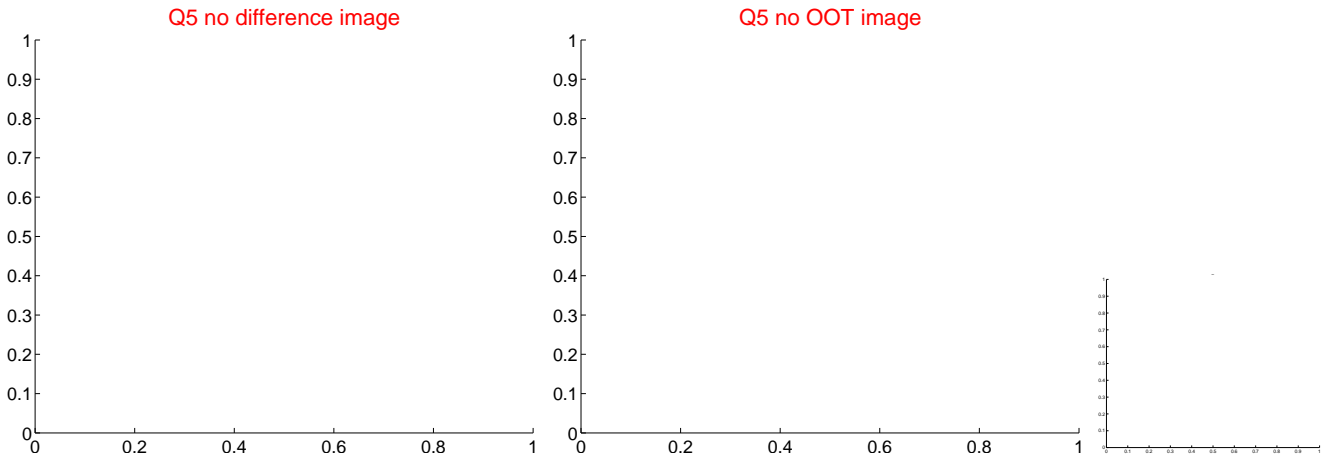
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

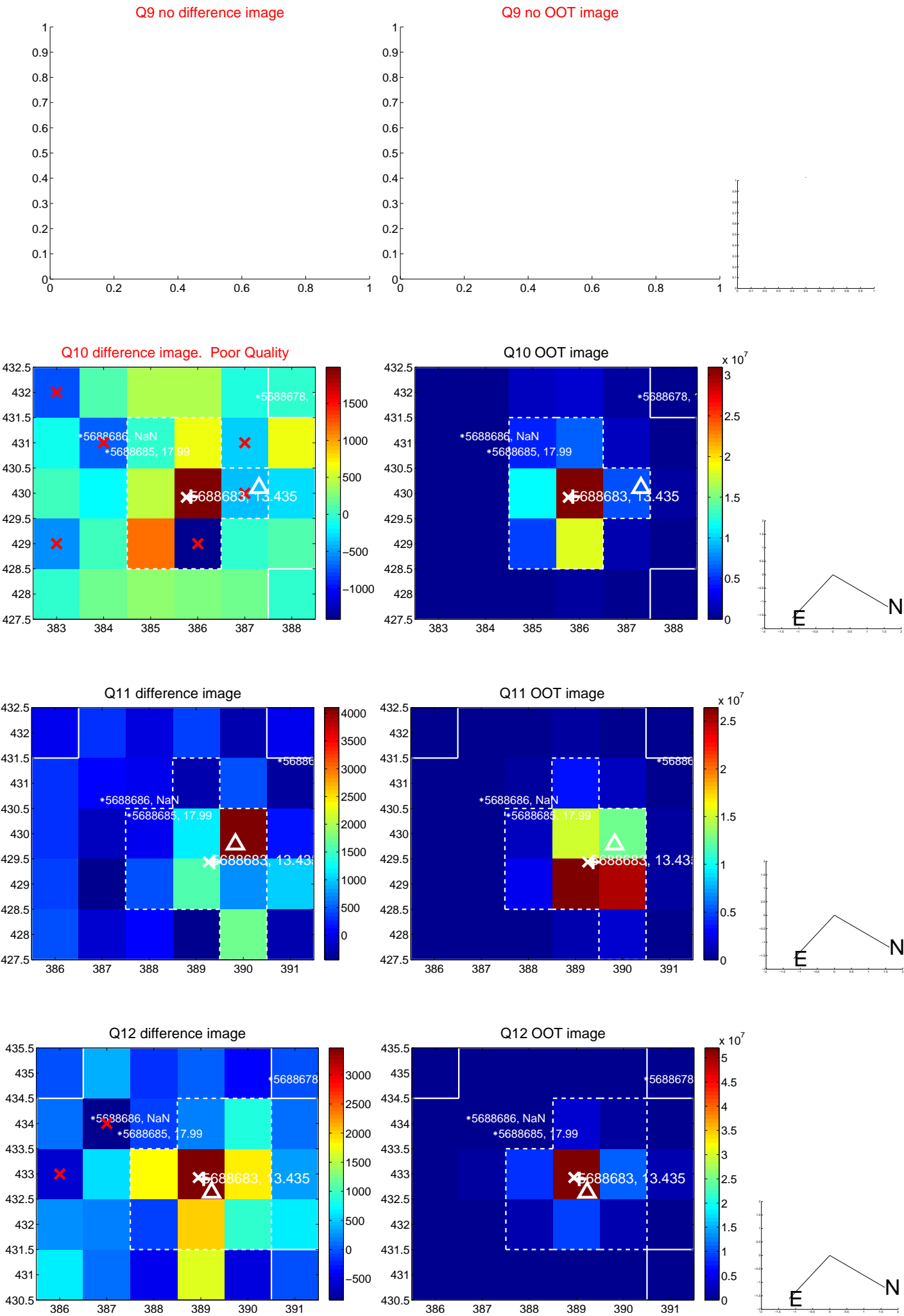




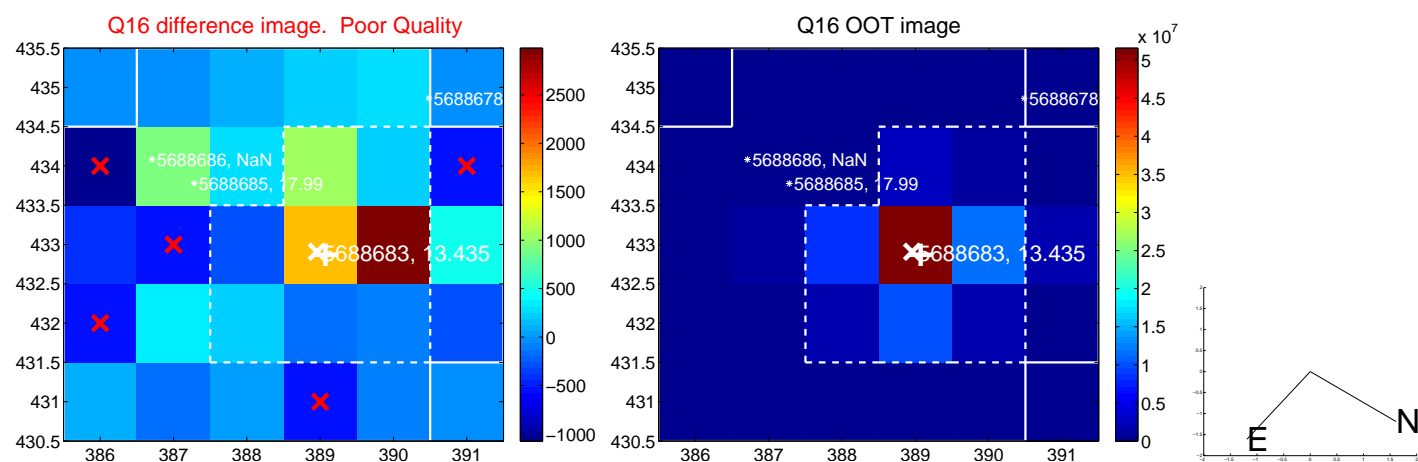
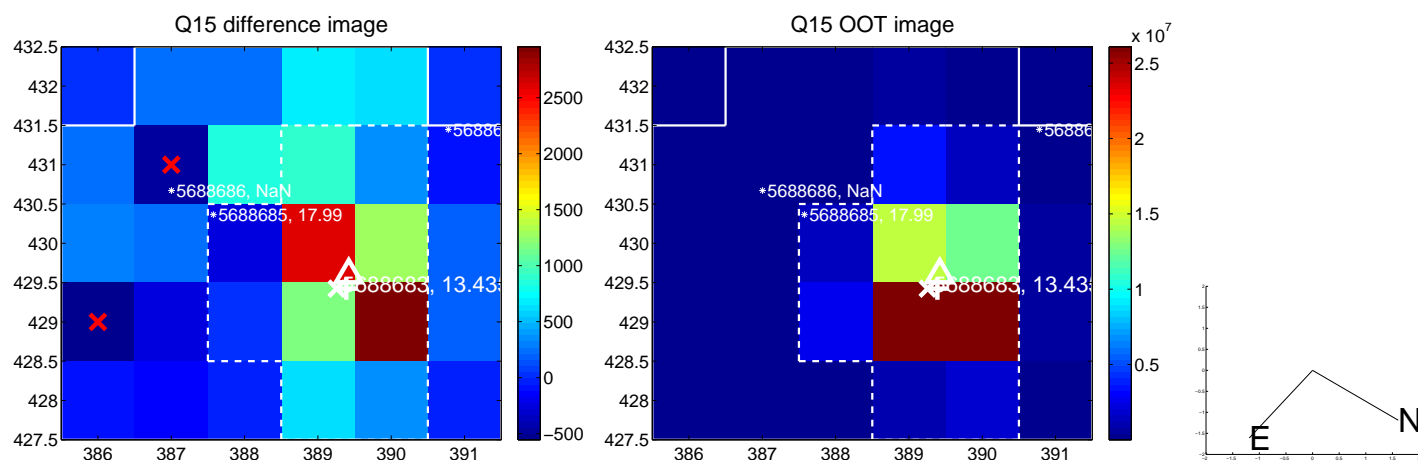
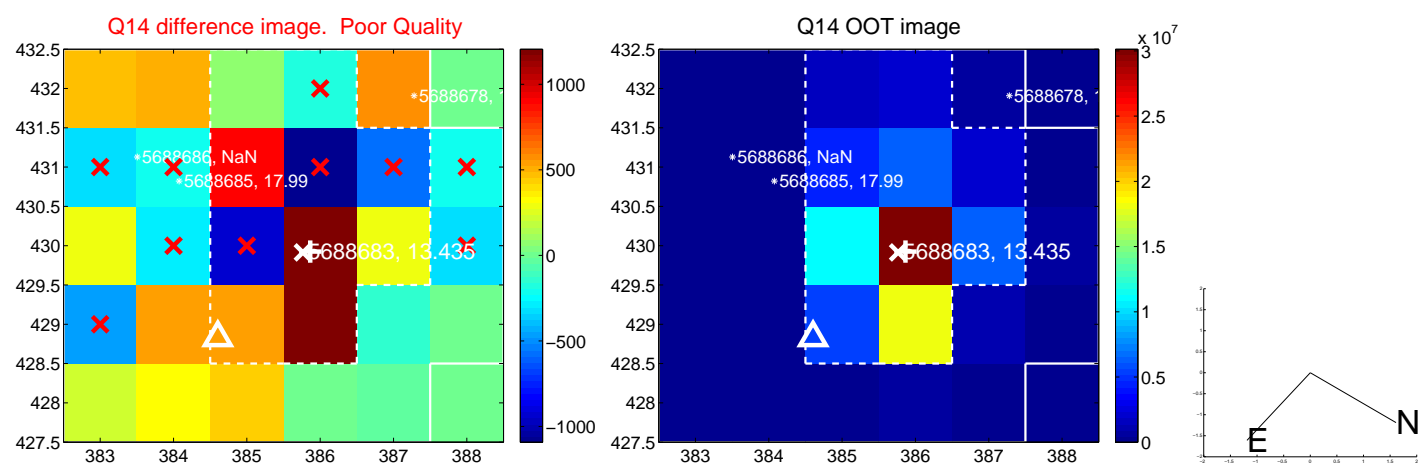
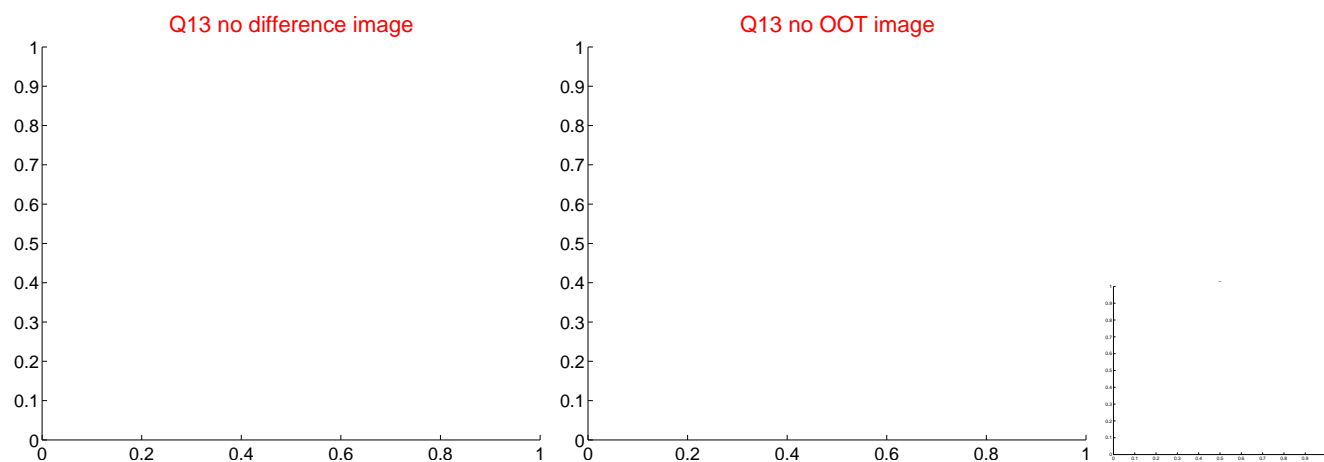
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value



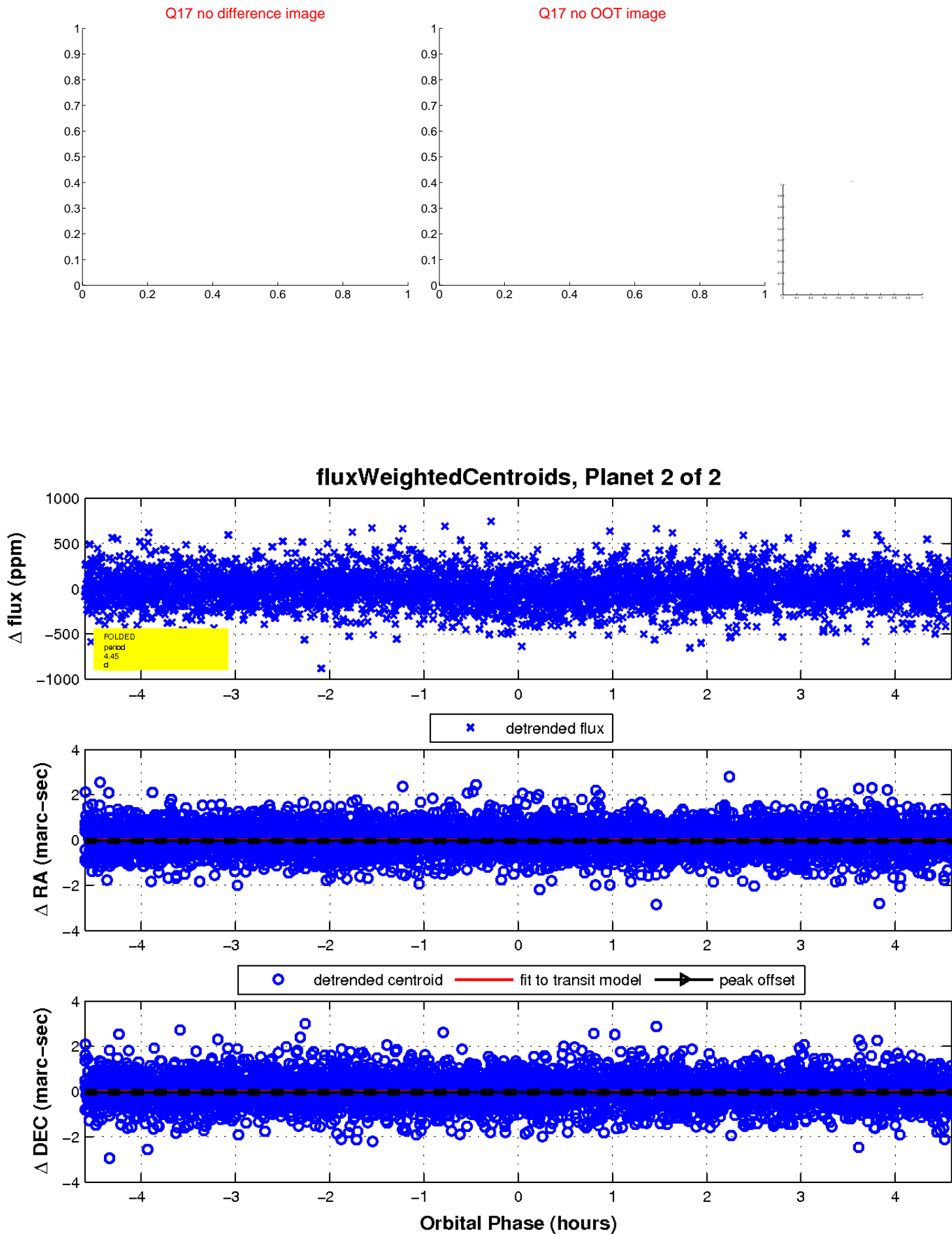
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

