

# KIC 011568987

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011568987-01	OBS	0354.01	15.959963	139.600880	532.1	4.498	55.8	61.5	0.96	5936	2.52	64.05
011568987-02	OBS	0354.02	7.378695	135.821796	115.0	3.445	17.3	18.6	0.96	5936	1.23	179.16

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011568987-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
011568987-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT

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

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

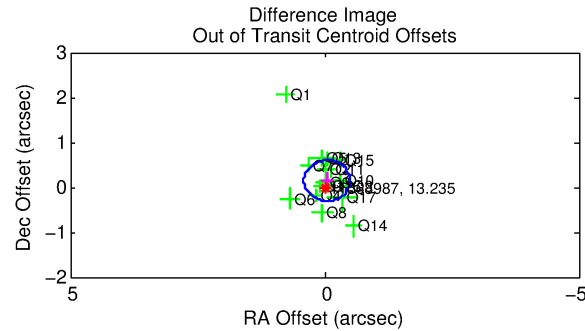
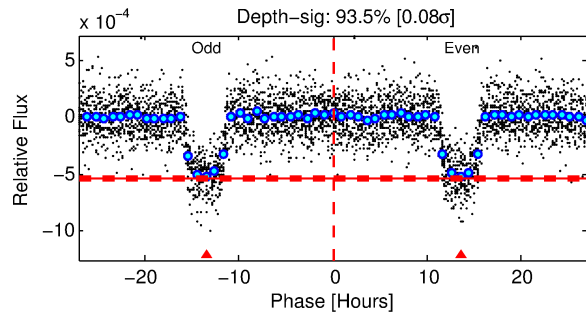
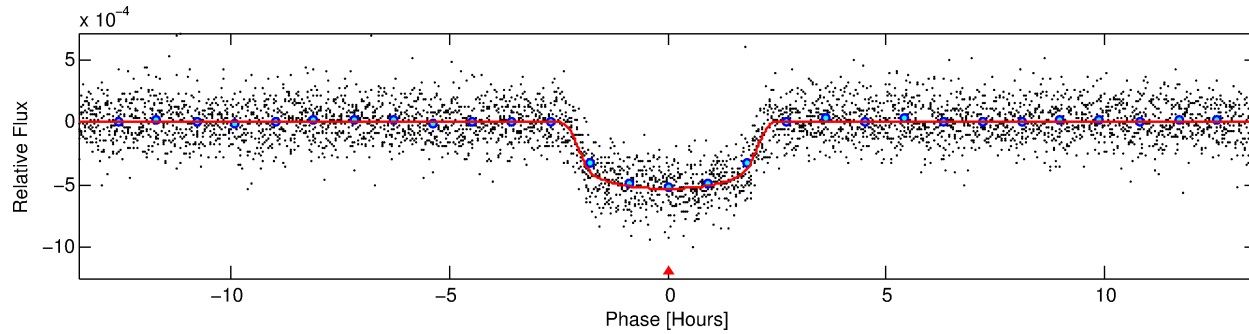
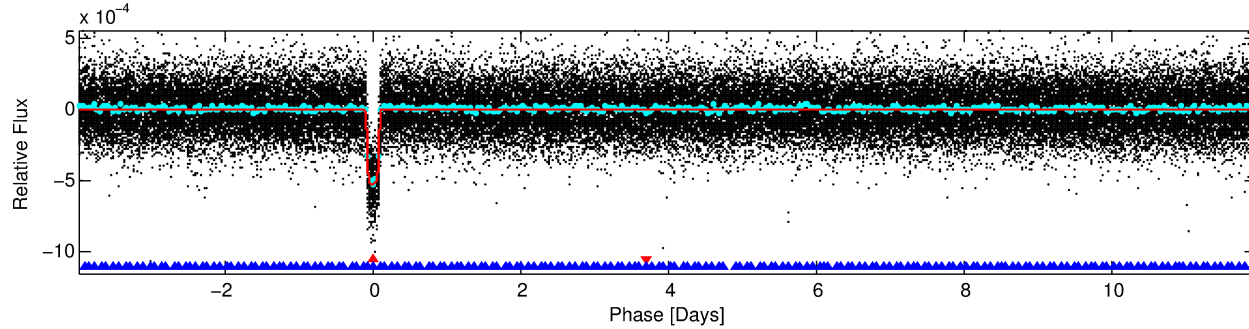
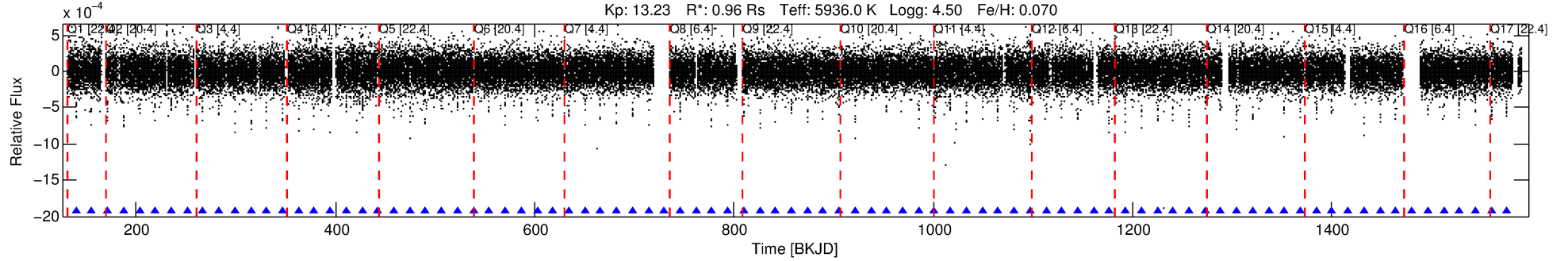
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 011568987-01

No Significant Match Found

# DV One-Page Summary

KIC: 11568987 Candidate: 1 of 2 Period: 15.960 d  
KOI: K00354.01 Corr: 0.985



## DV Fit Results:

Period = 15.95996 [0.00002] d  
Epoch = 139.6009 [0.0012] BKJD  
Rp/R\* = 0.0240 [0.0013]  
a/R\* = 15.90 [3.91]  
b = 0.84 [0.09]  
Seff = 64.05 [13.65]  
Teq = 721 [38] K  
Rp = 2.52 [0.39] Re  
a = 0.1272 [0.0163] AU  
Ag = 28.26 [13.94] [1.96σ]  
Teffp = 2572 [297] K [6.18σ]

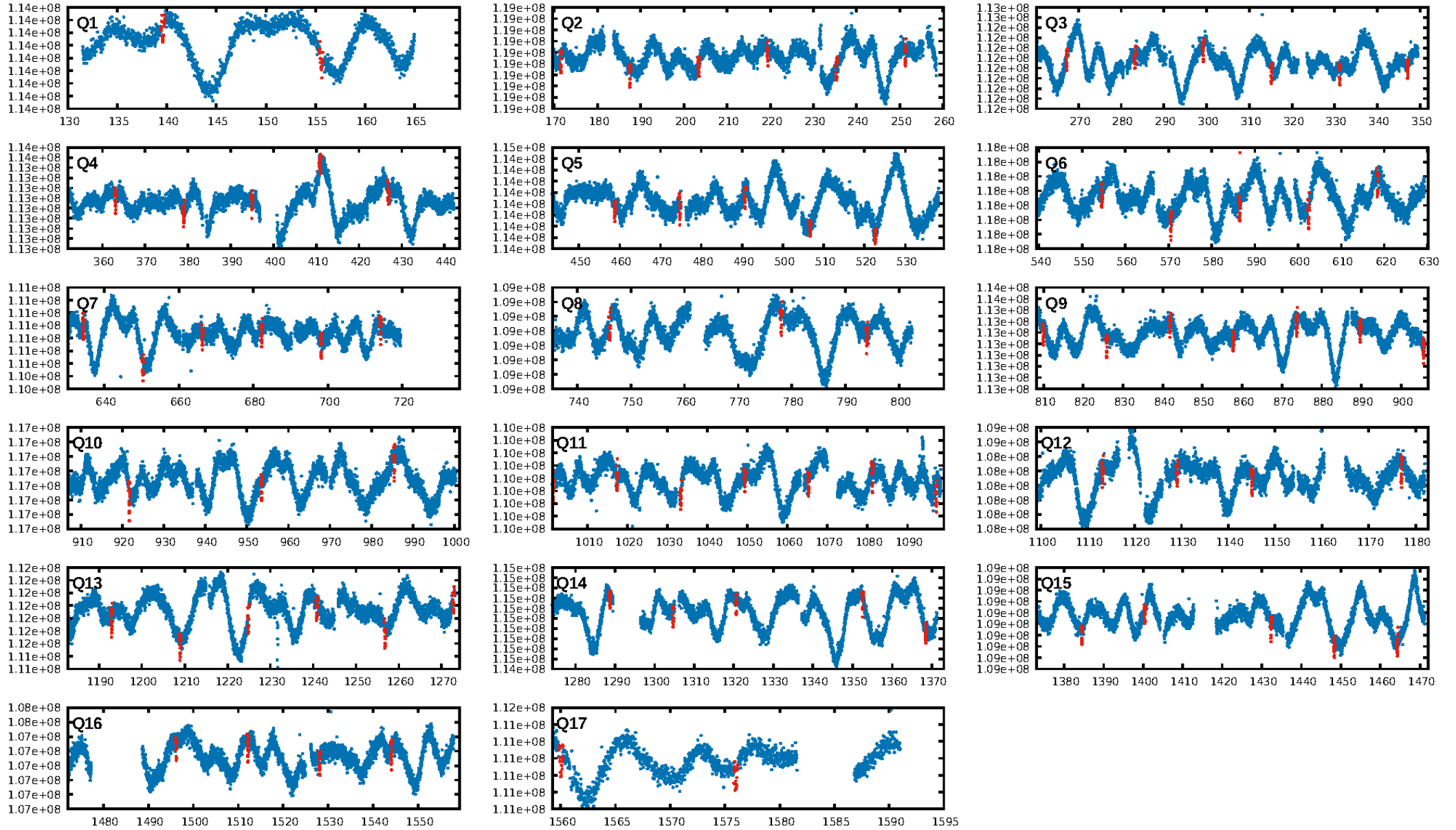
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [36.35σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 99.6%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [77/77]  
GhostDiagnostic-chr: 3.981  
Centroid-sig: 0.0%  
Centroid-so: 0.393 arcsec [2.47σ]  
OotOffset-rm: 0.151 arcsec [1.00σ]  
KicOffset-rm: 0.258 arcsec [1.68σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 1.00 [17/17]

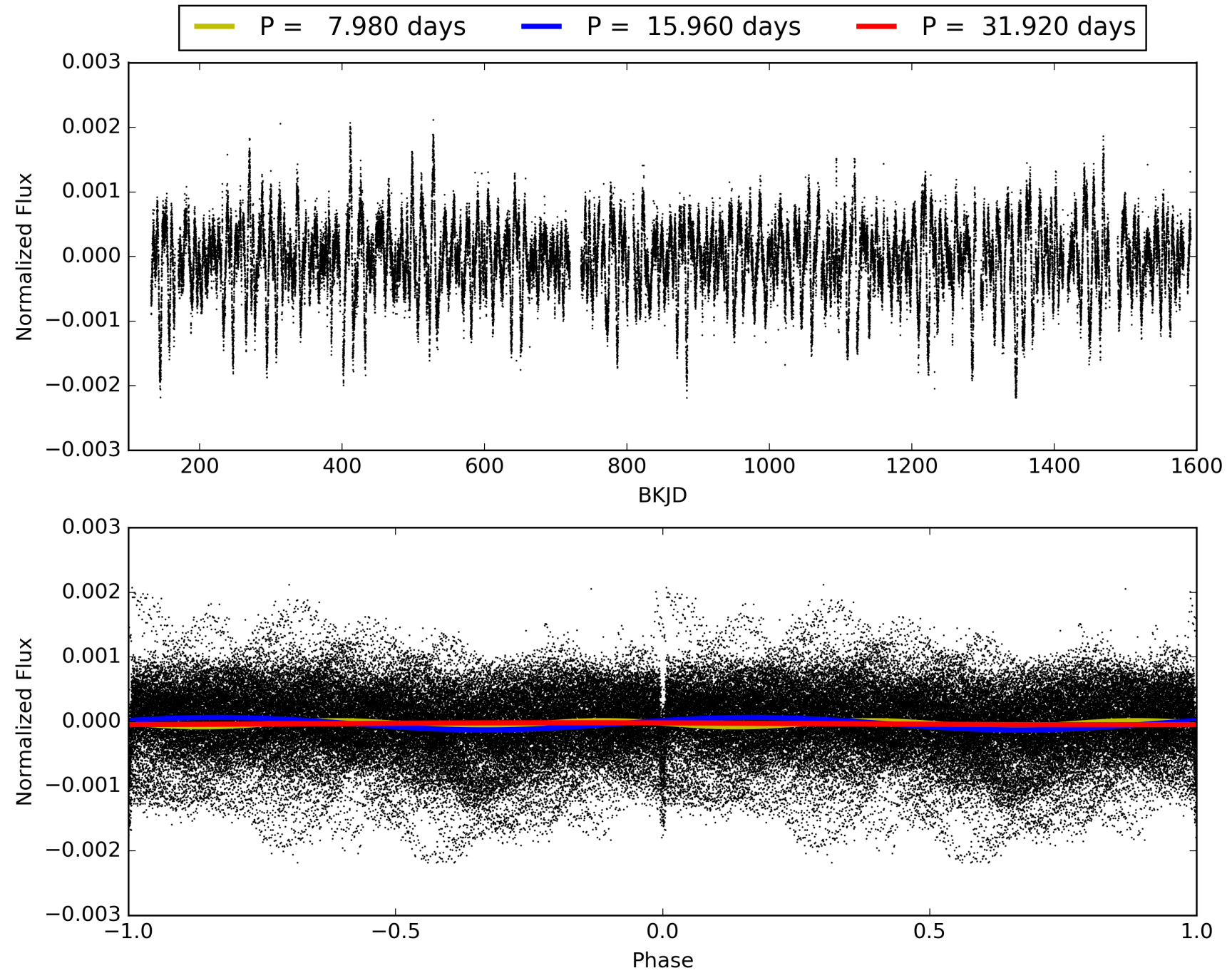
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 02:34:40 Z

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

# TCE 011568987-01, PDC Light Curves

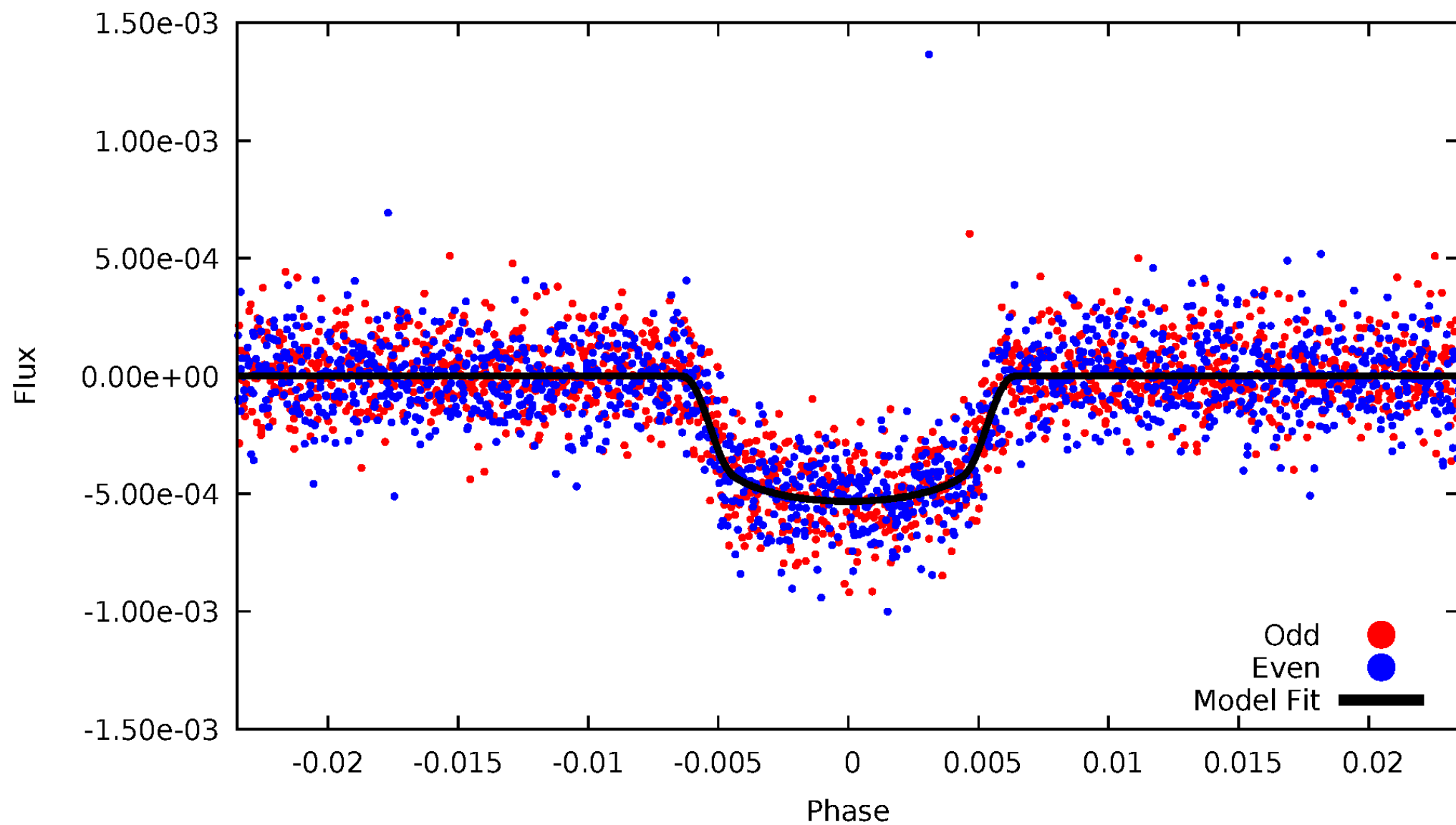


TCE 011568987-01



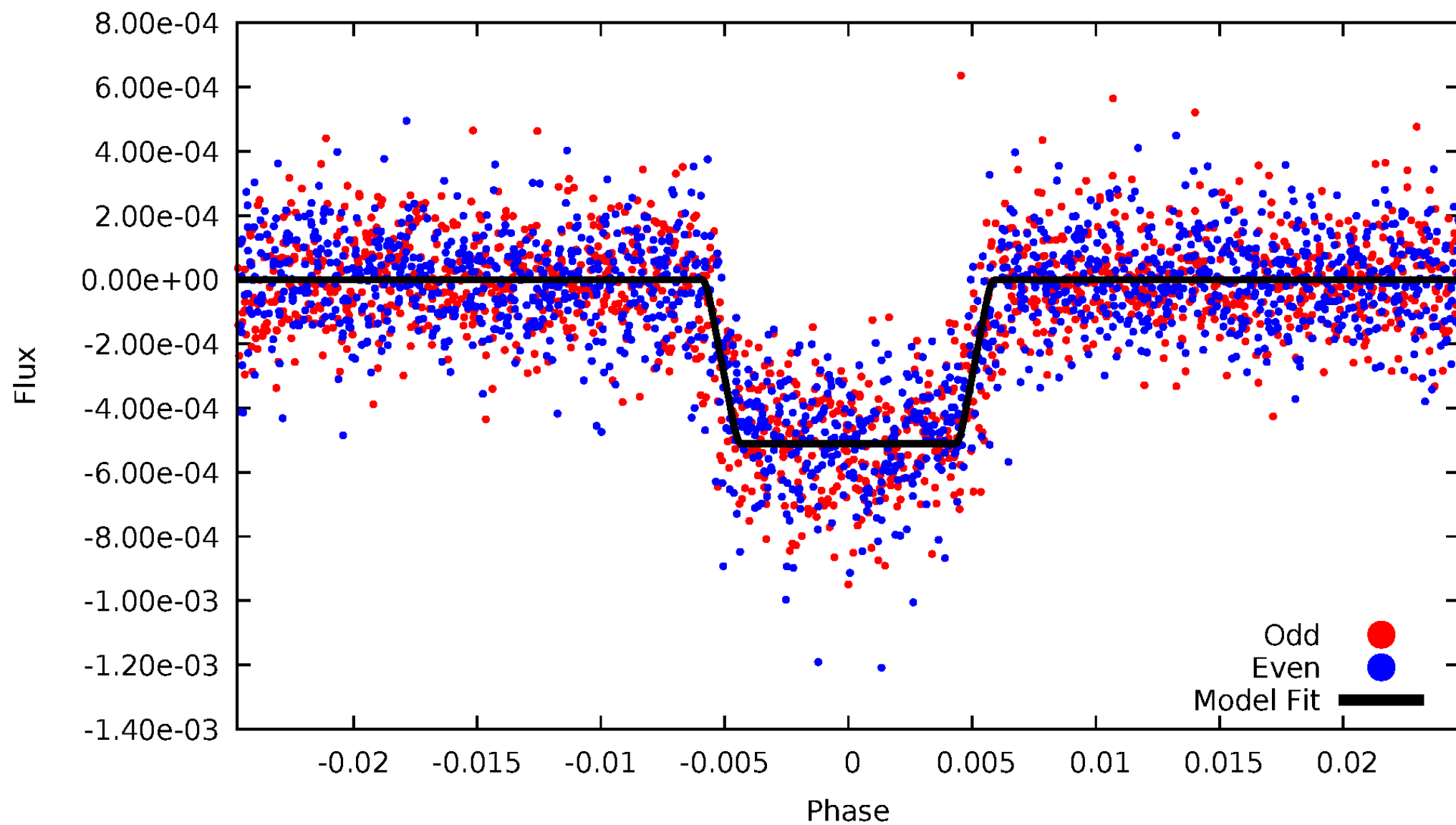
# DV Odd/Even

TCE 011568987-01



# ALT Odd/Even

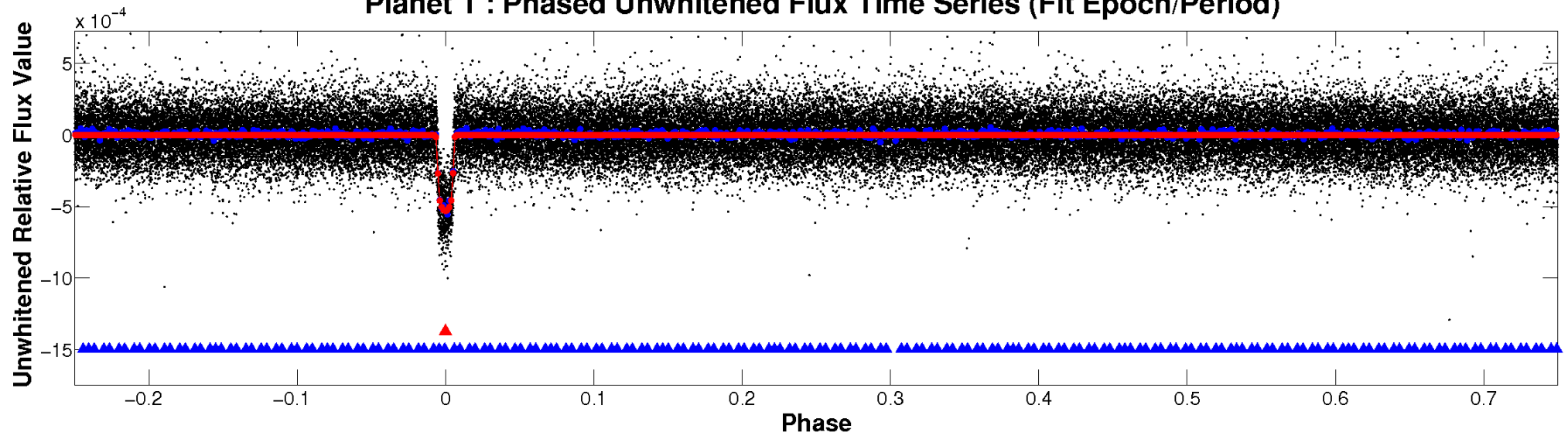
TCE 011568987-01



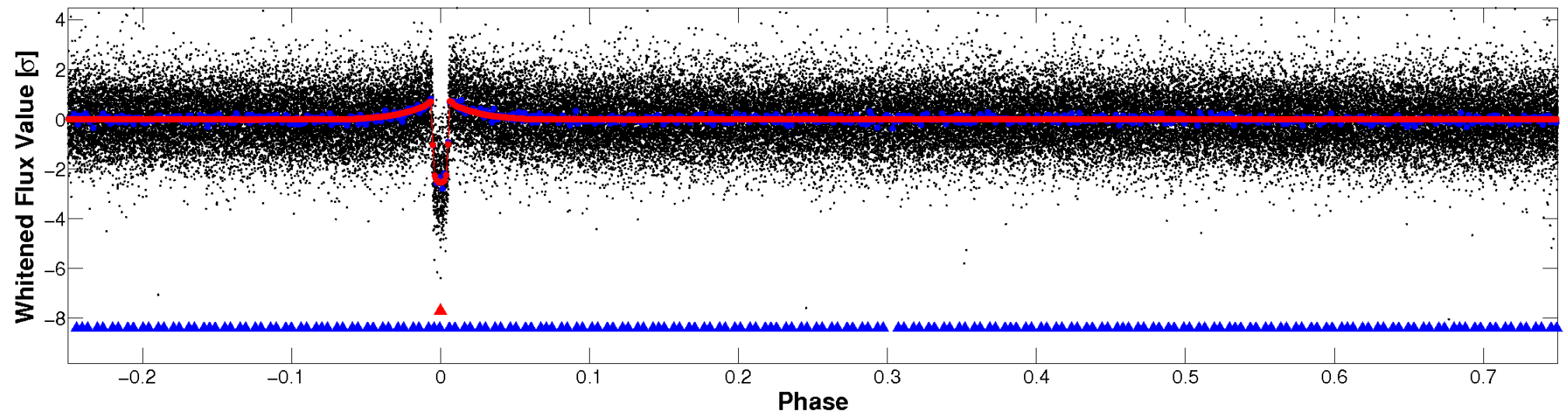


# Non-Whitened Vs. Whitened Light Curve

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

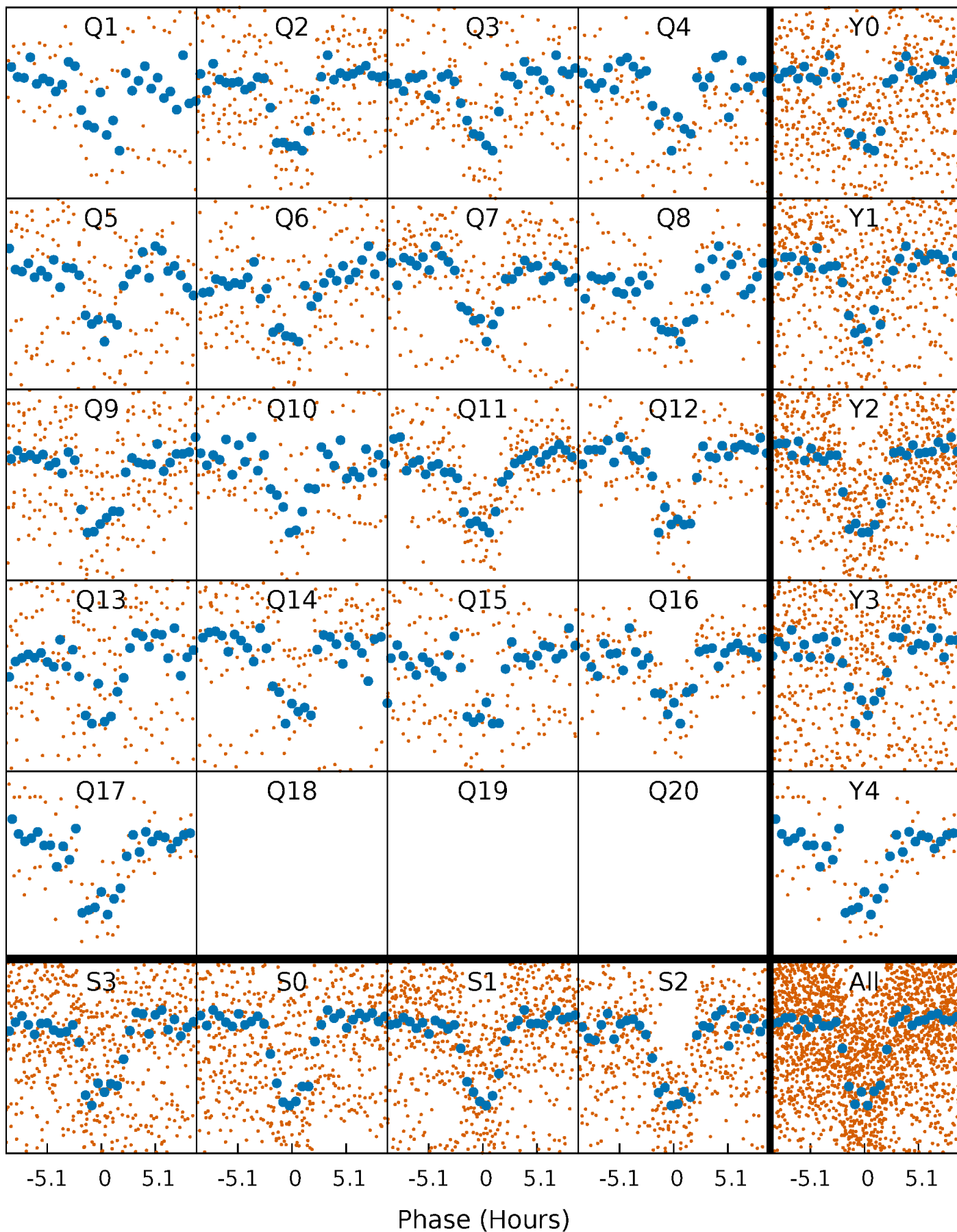


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

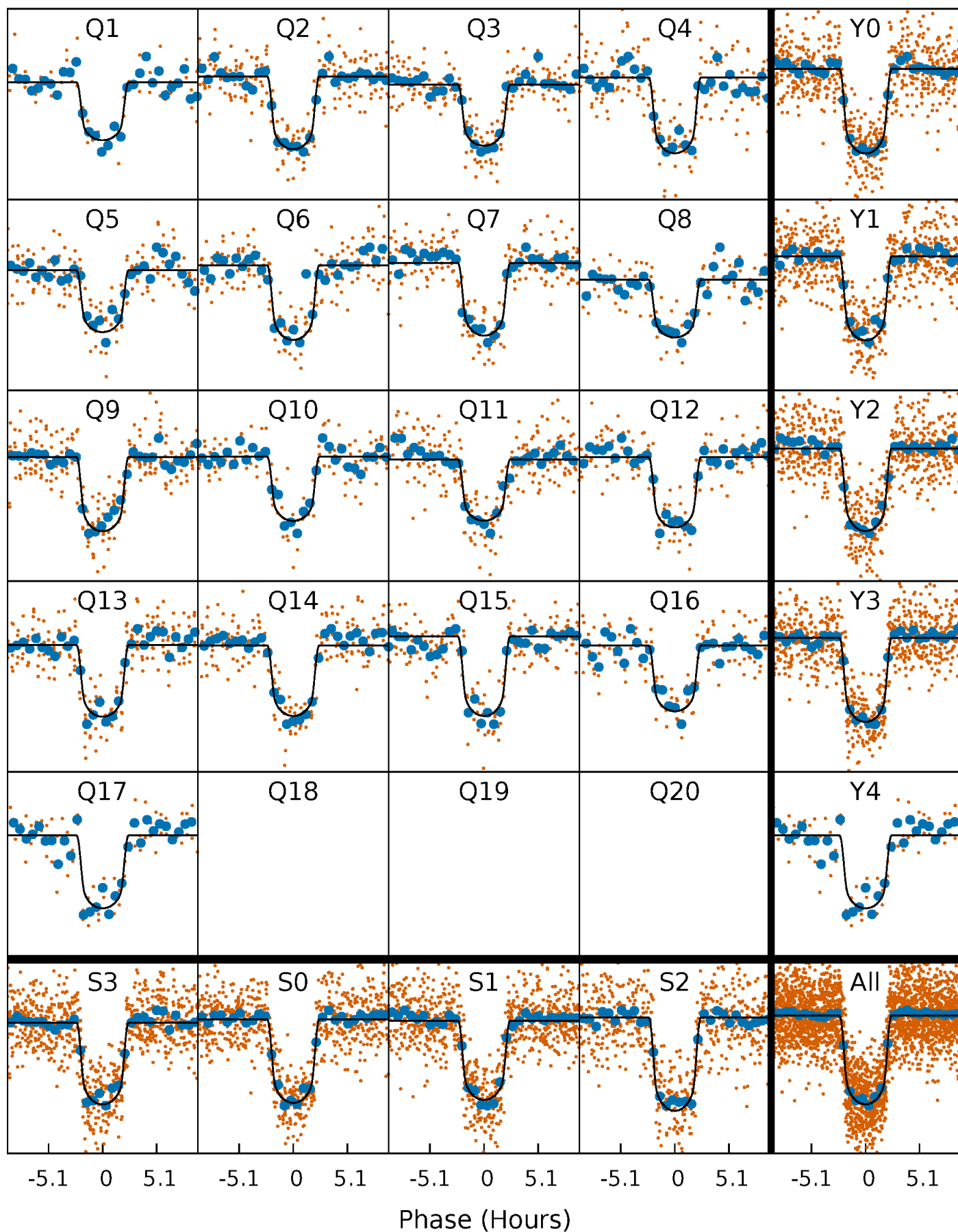
TCE 011568987-01 P= 15.959963 Days  $T_0=139.600880$  (BKJD)





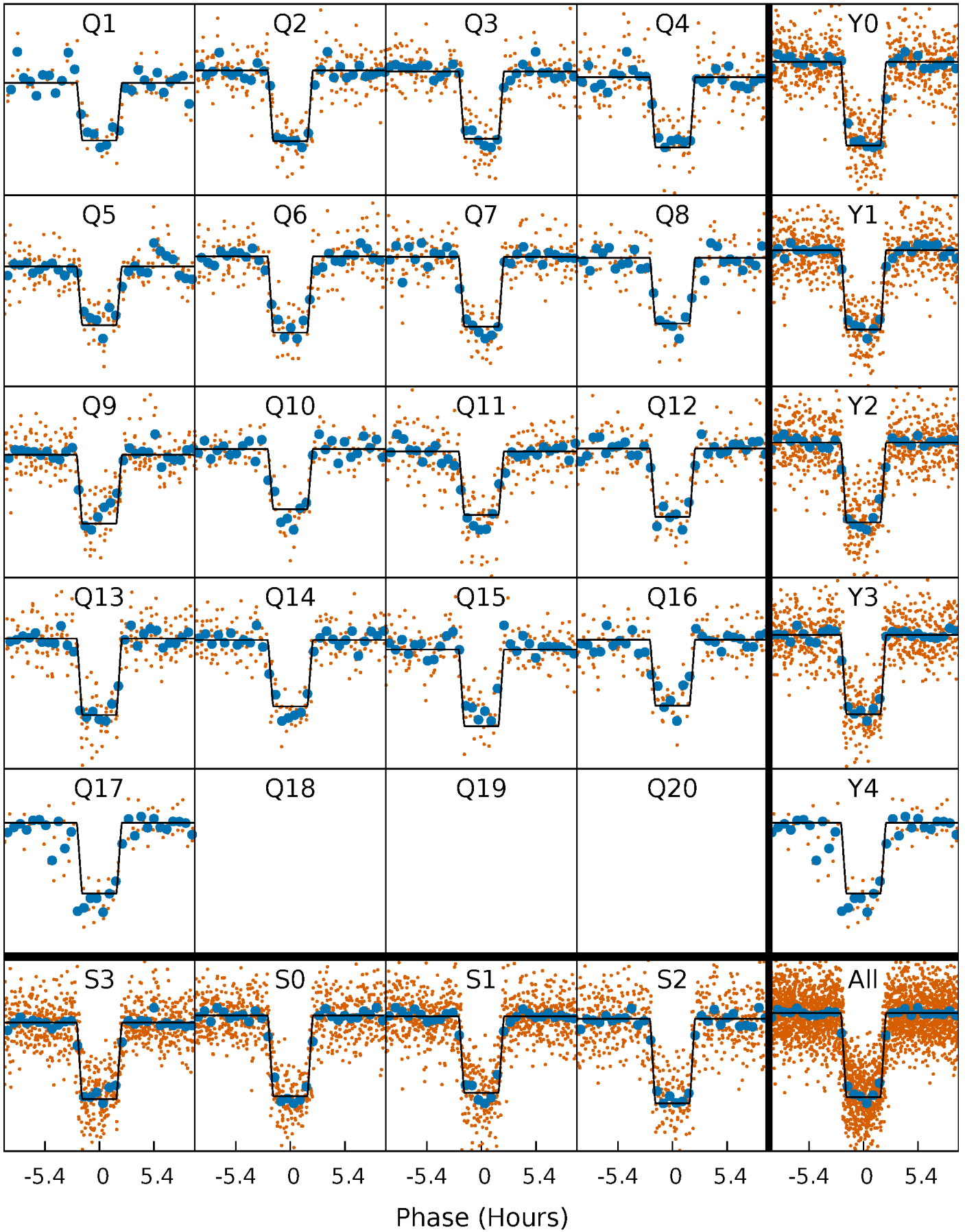
# DV Quarter-Phased Transit Curves

TCE 011568987-01 P= 15.959963 Days  $T_0=139.600880$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

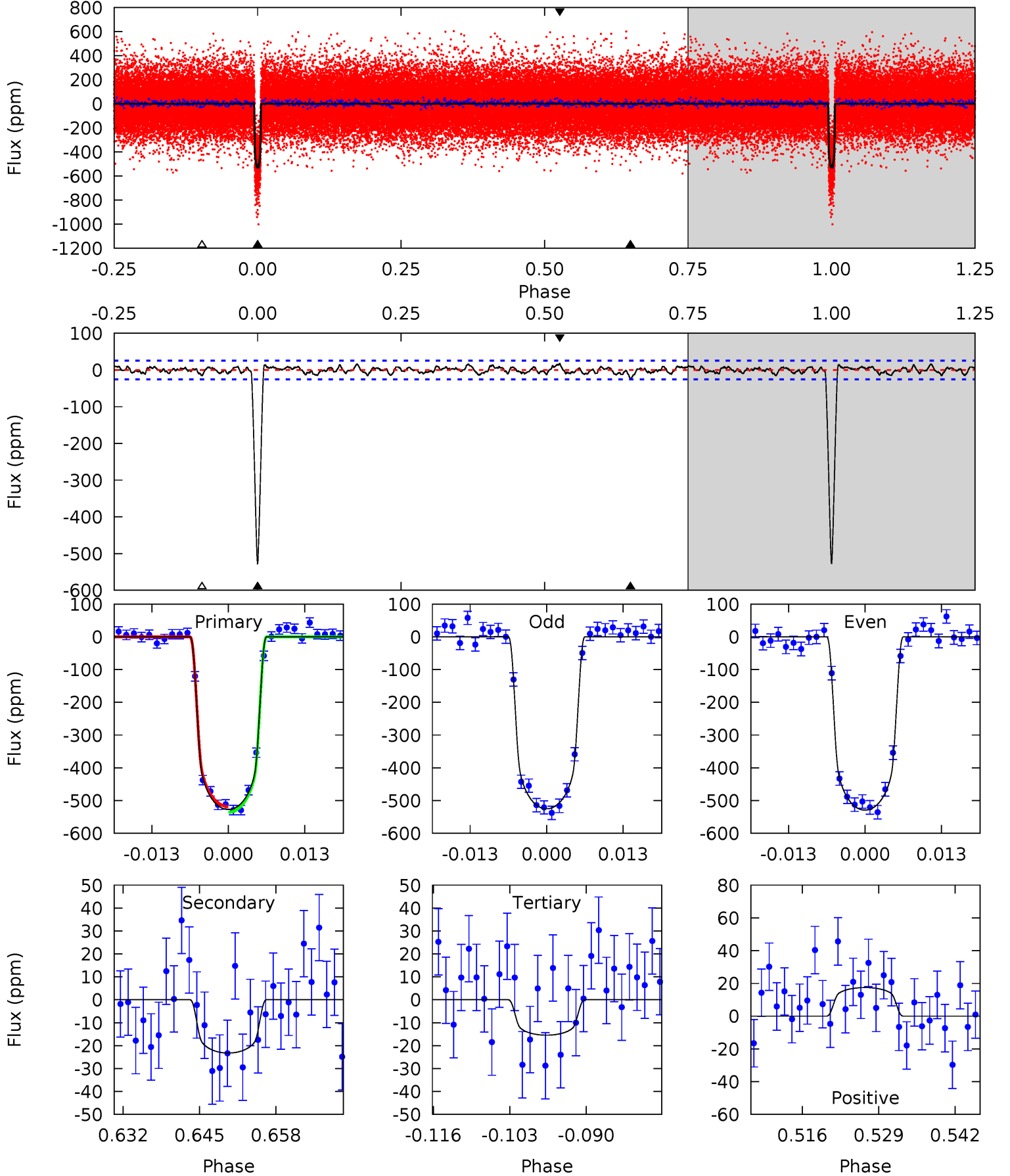
TCE 011568987-01   P= 15.960152 Days    $T_0=139.592270$  (BKJD)



# DV Model-Shift Uniqueness Test

011568987-01,  $P = 15.959963$  Days,  $E = 123.640917$  Days

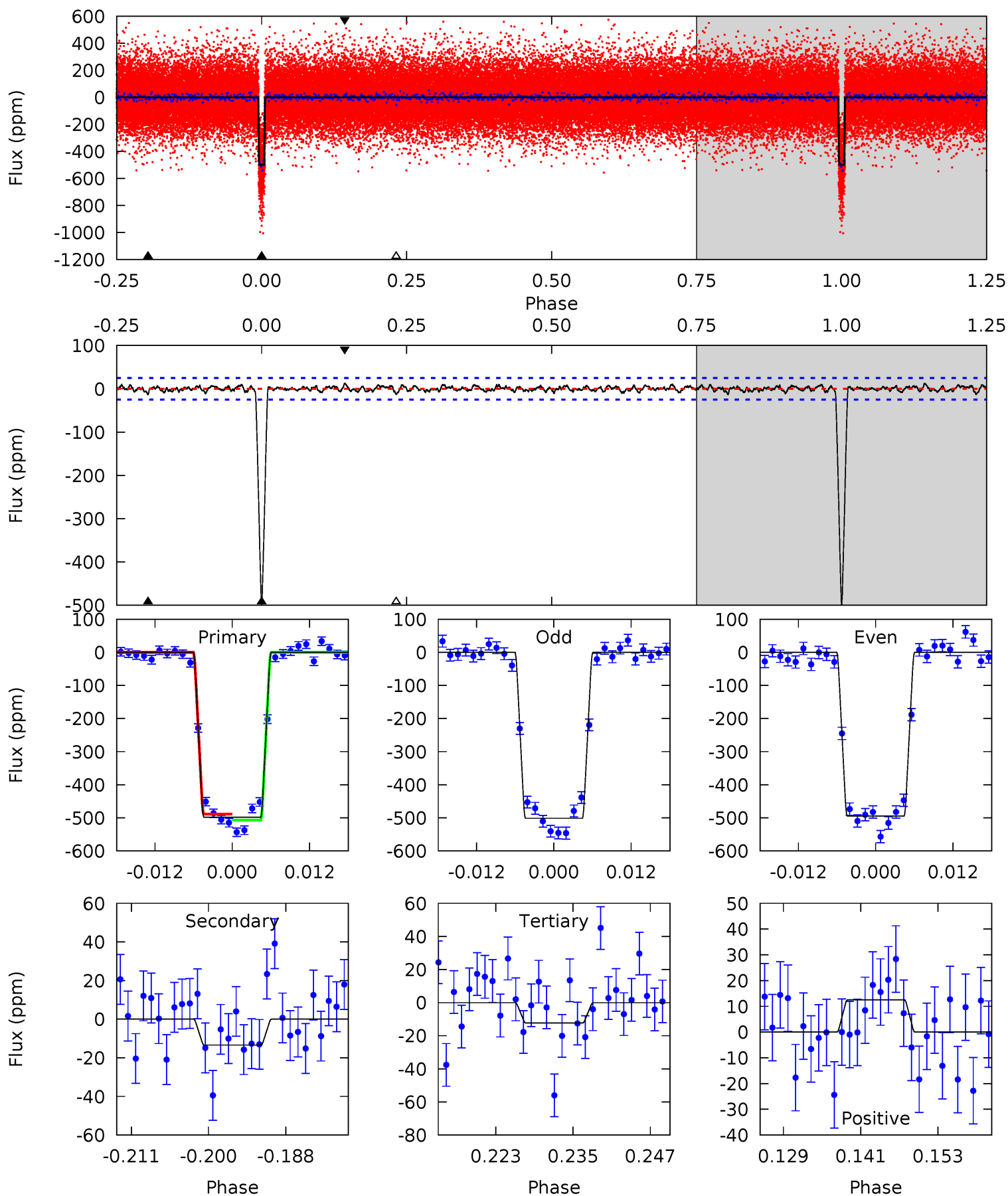
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
103.6	4.57	3.03	3.43	4.98	2.49	1.29	100.5	100.2	1.53	1.14	0.41	0.99	0.03	1.70



# Alt Model-Shift Uniqueness Test

011568987-01,  $P = 15.960152$  Days,  $E = 123.632118$  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
100.0	2.69	2.47	2.51	5.00	2.52	0.87	97.5	97.5	0.22	0.18	0.73	1.01	0.02	1.81



### Stellar Parameters For KIC 011568987

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (g \cdot \text{cm}^{-3})$
	$5936^{+94}_{-130}$	$4.501^{+0.019}_{-0.110}$	$0.070^{+0.150}_{-0.150}$	$0.965^{+0.139}_{-0.050}$	$1.075^{+0.053}_{-0.090}$	$1.685^{+0.172}_{-0.545}$
	+2%/-2%	+0%/-2%	+214%/-214%	+14%/-5%	+5%/-8%	+10%/-32%
Source	SPE18	SPE18	SPE18	DSEP		

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

### Secondary Eclipse Parameters for KIC 011568987-01 / KOI 0354.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-23 \pm 5$	$2.58^{+0.24}_{-0.19}$	$1019^{+37}_{-27}$	$3223^{+128}_{-129}$	$30^{+9}_{-7}$
Alt.	$-13 \pm 5$	$2.43^{+0.23}_{-0.17}$	$1019^{+42}_{-29}$	$3024^{+159}_{-204}$	$19^{+8}_{-8}$

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

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

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

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

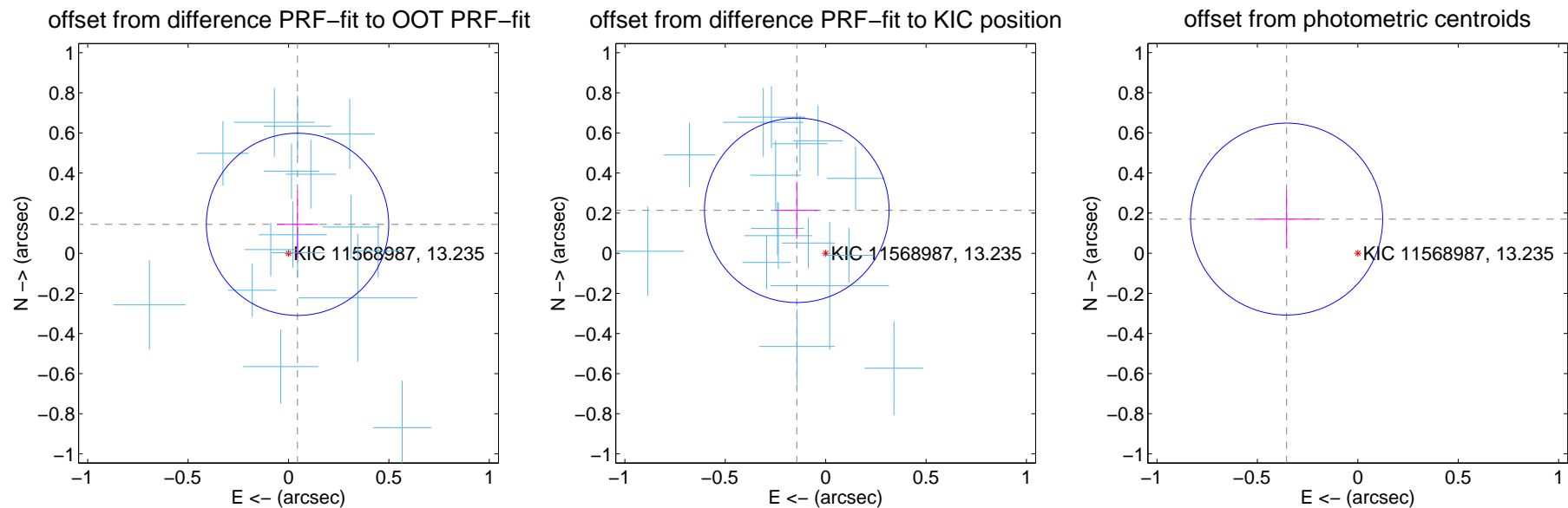
## DV Centroid Data

Supplemental centroid analysis for 011568987-01. Kepler magnitude: 13.23. Transit SNR 61.53

There are 17 quarters with good PRF difference image offsets

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

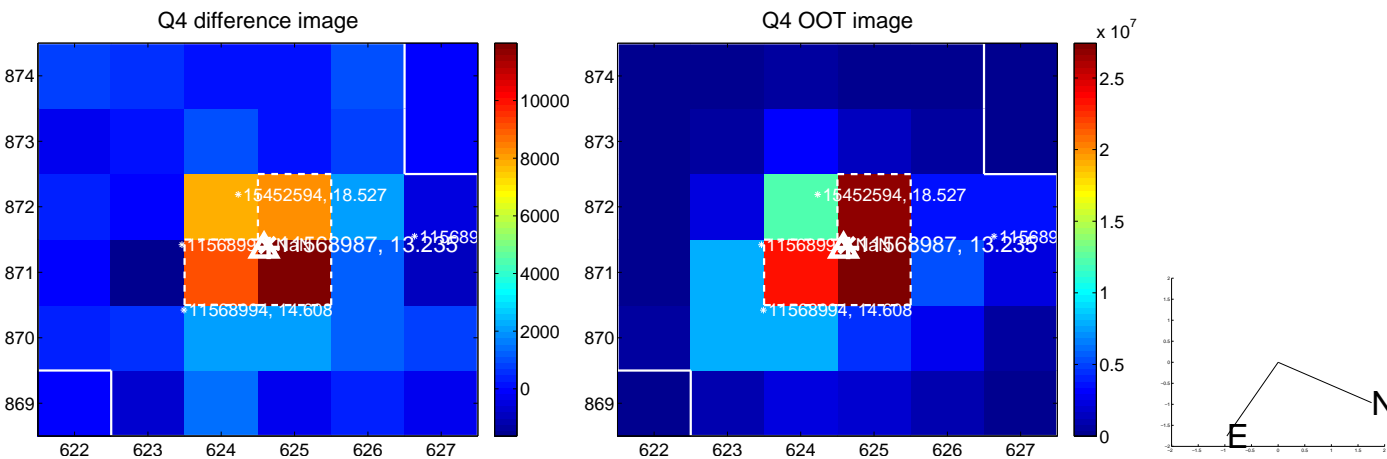
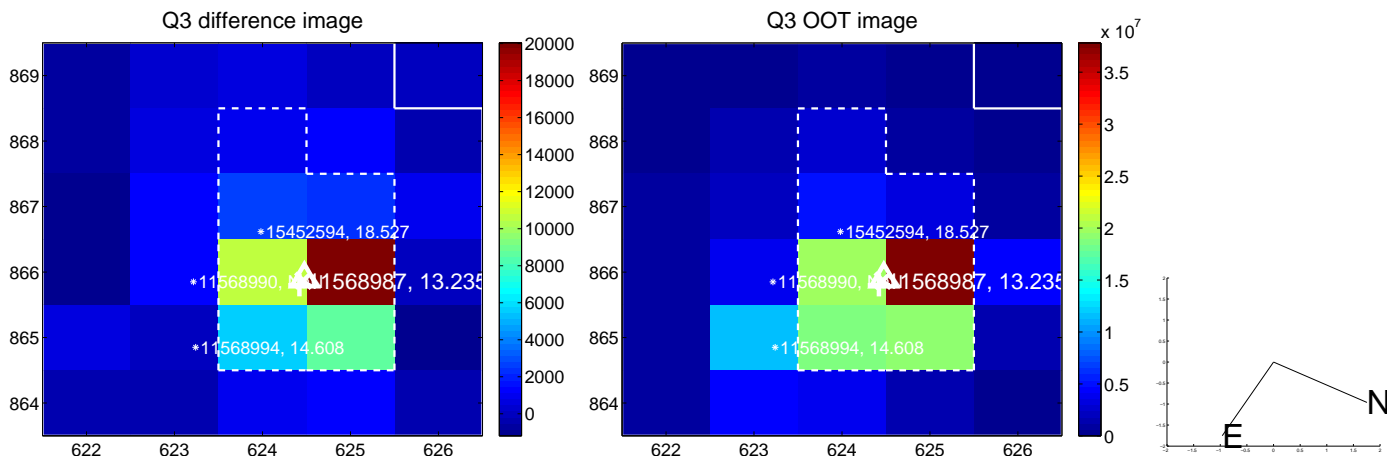
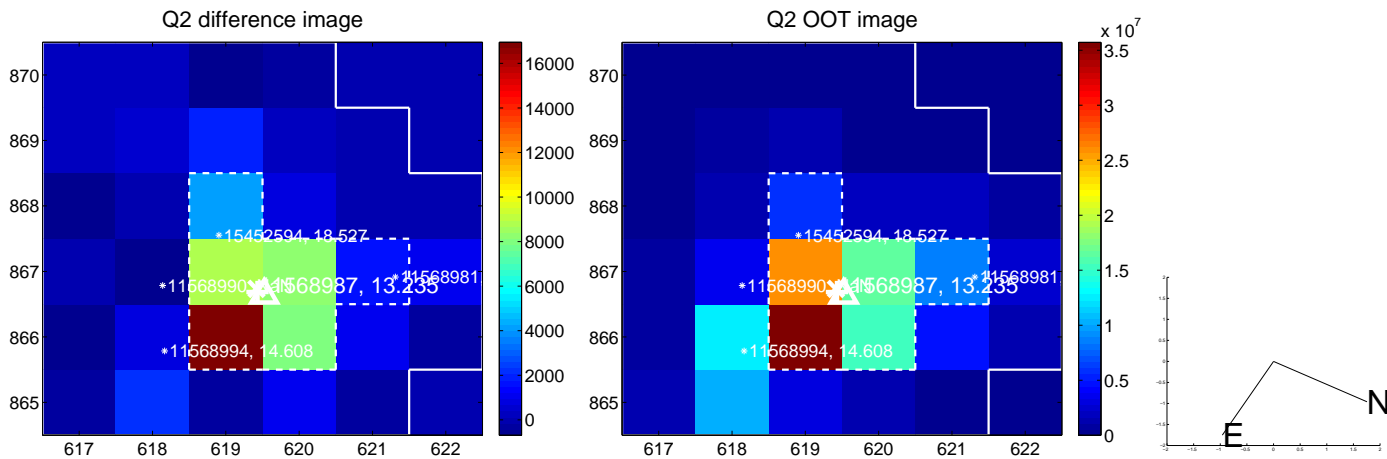
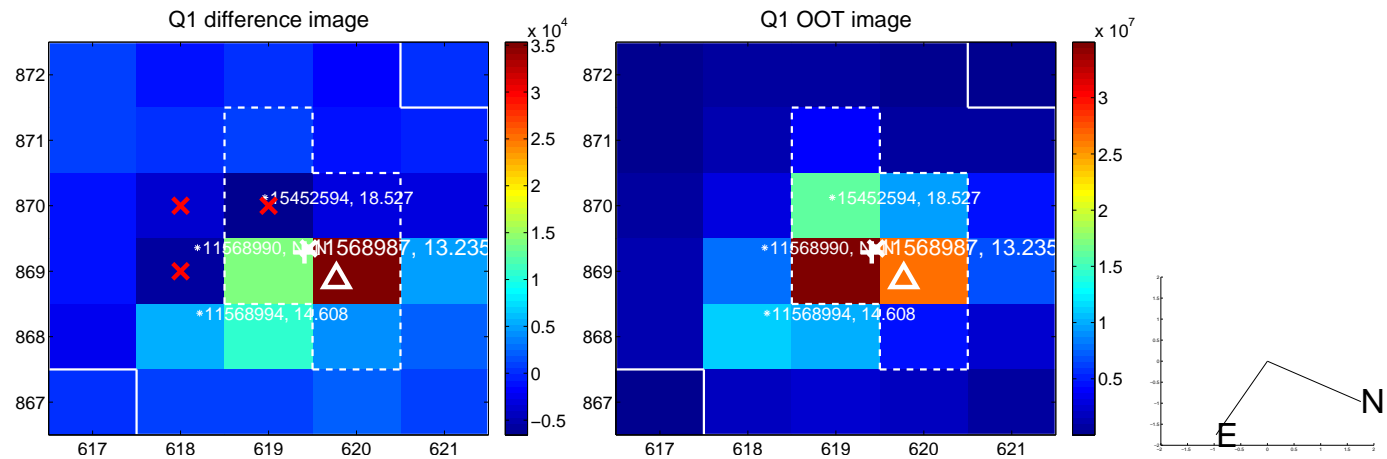
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.151 \pm 0.151$	1.00	$-0.045 \pm 0.102$	$0.144 \pm 0.168$
PRF-fit source offset from KIC position	$0.258 \pm 0.153$	1.68	$0.144 \pm 0.107$	$0.214 \pm 0.142$
photometric centroid source offset	$0.39 \pm 0.16$	2.47	$0.35 \pm 0.16$	$0.17 \pm 0.14$



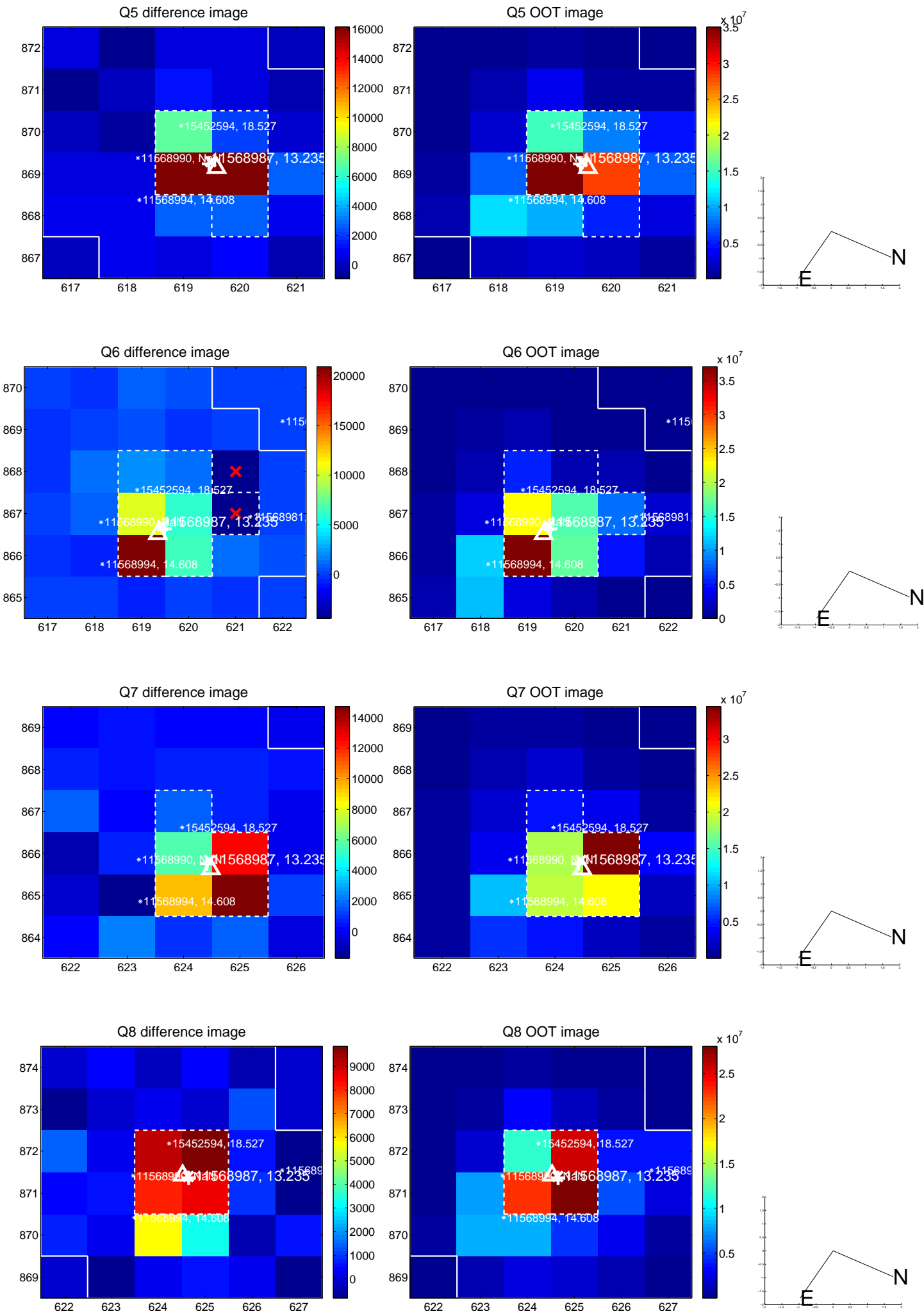
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



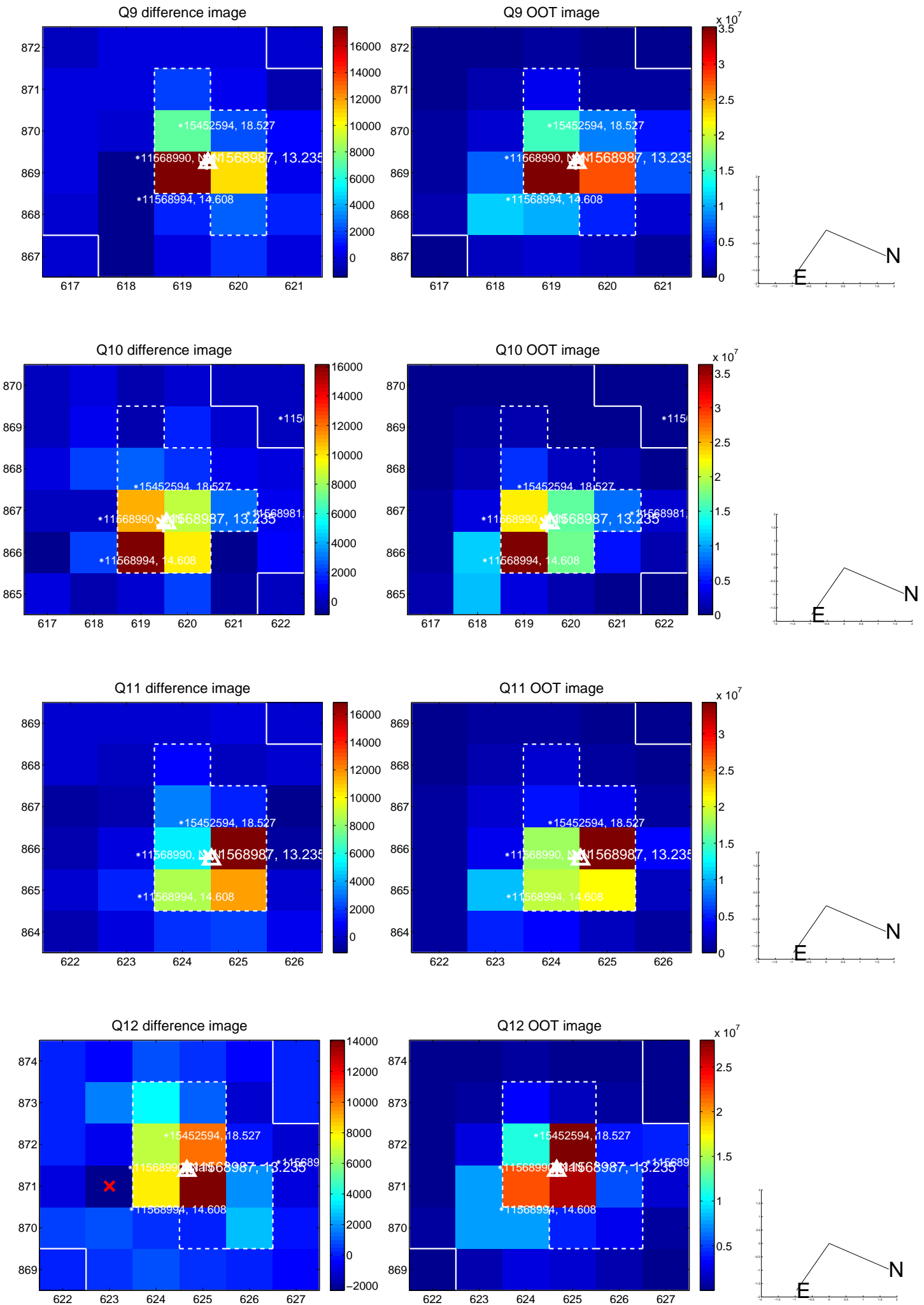
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



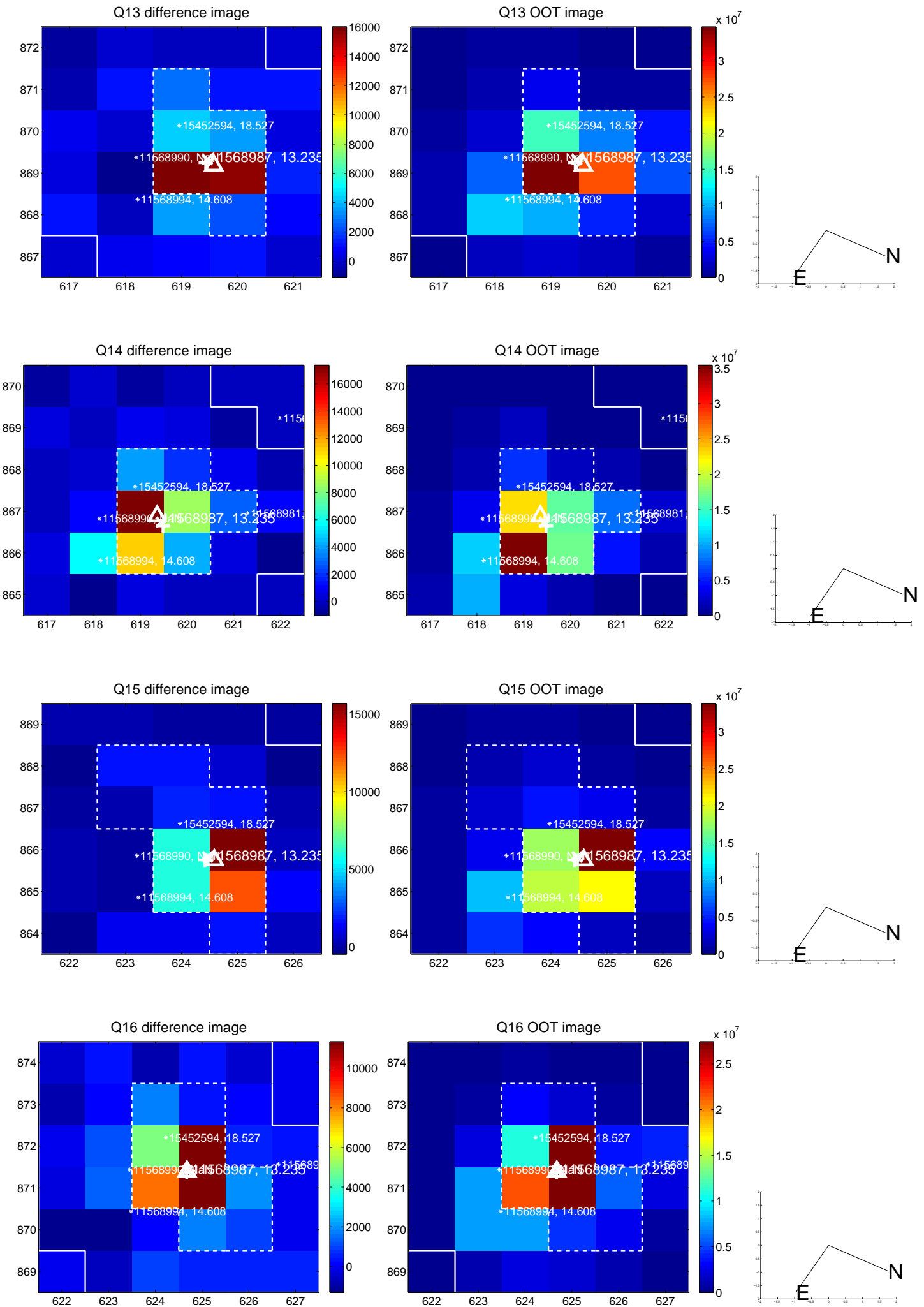
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



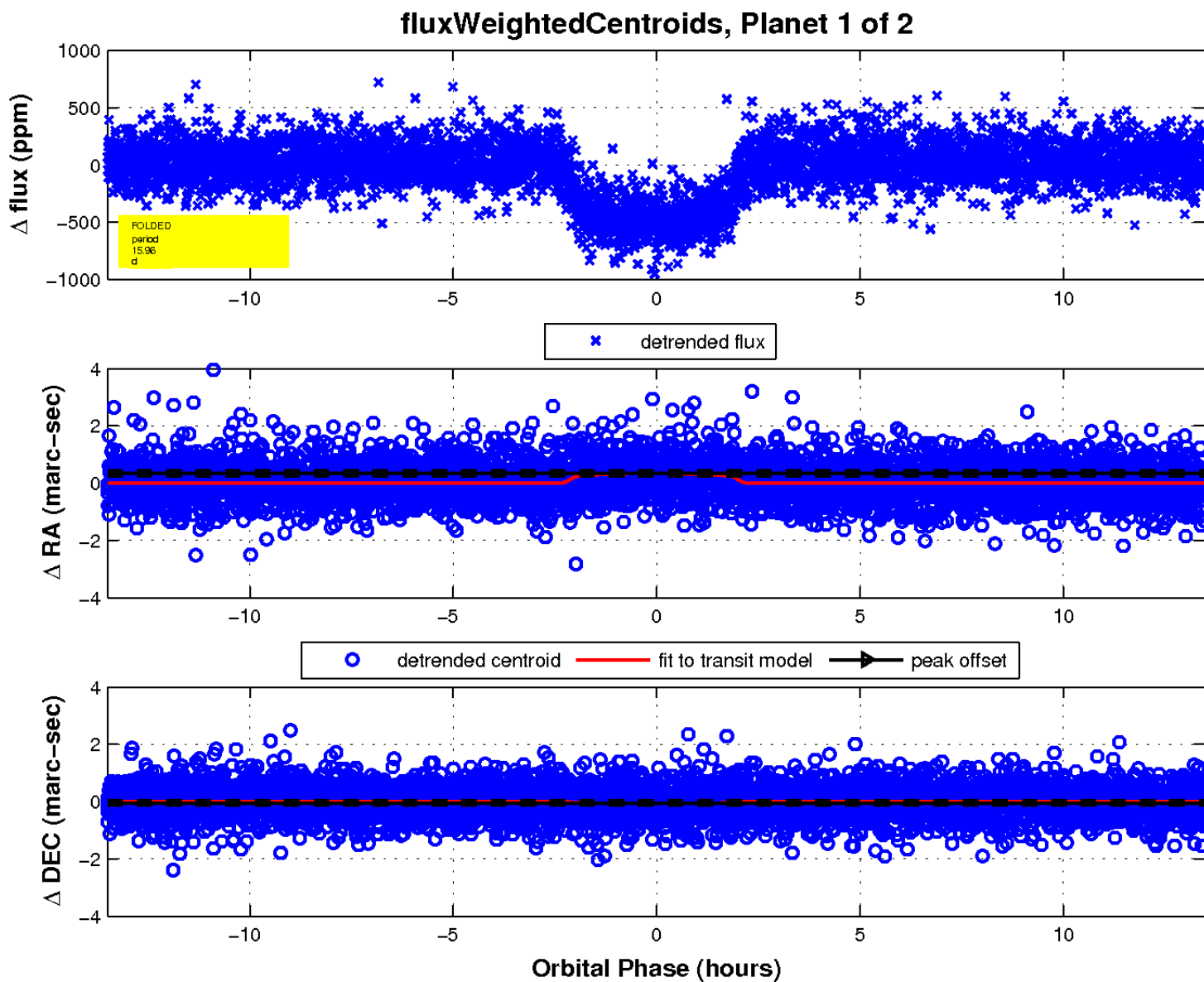
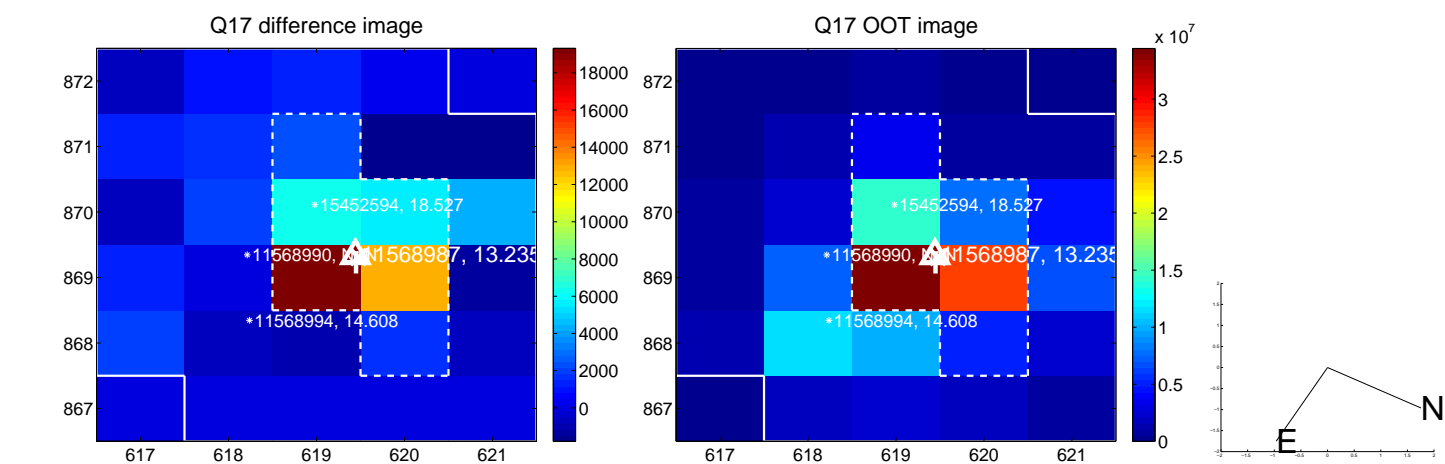
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

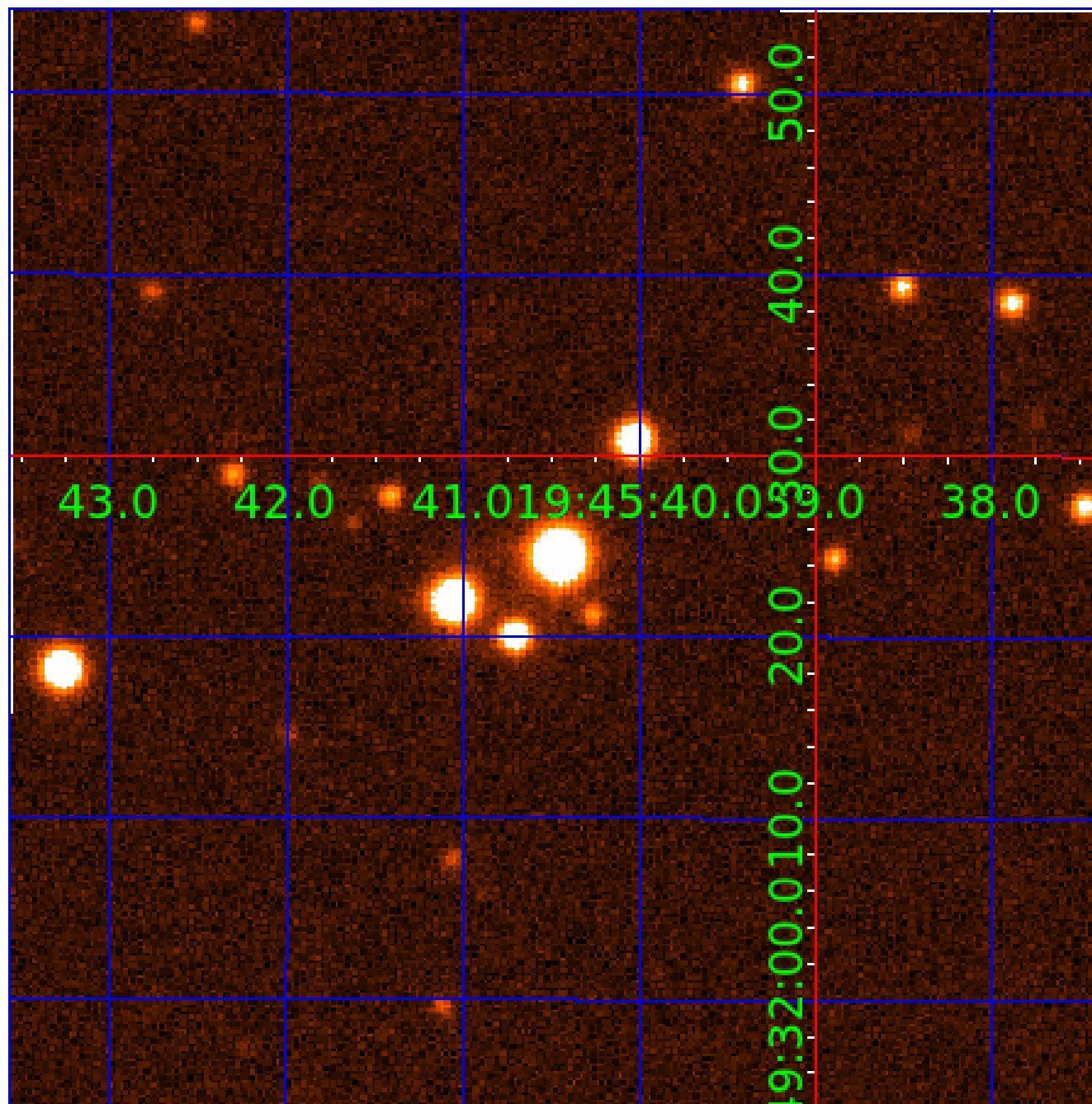


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 011568987

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011568987-01	OBS	0354.01	15.959963	139.600880	532.1	4.498	55.8	61.5	0.96	5936	2.52	64.05
011568987-02	OBS	0354.02	7.378695	135.821796	115.0	3.445	17.3	18.6	0.96	5936	1.23	179.16

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011568987-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
011568987-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT

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

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

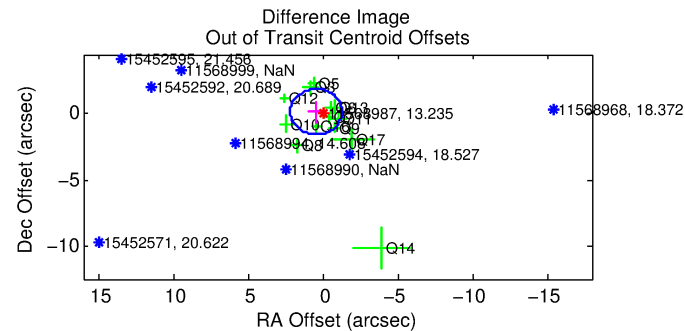
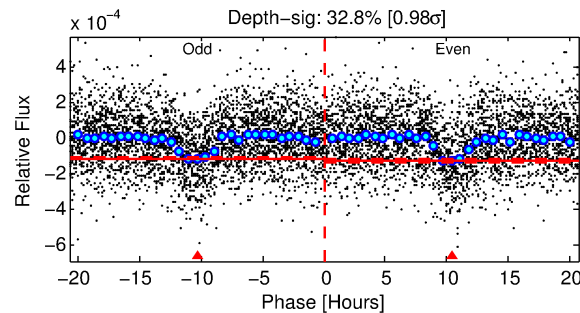
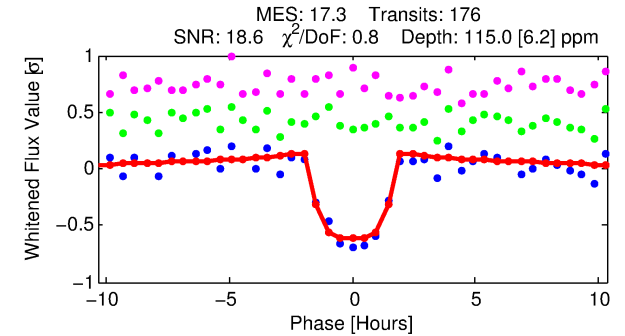
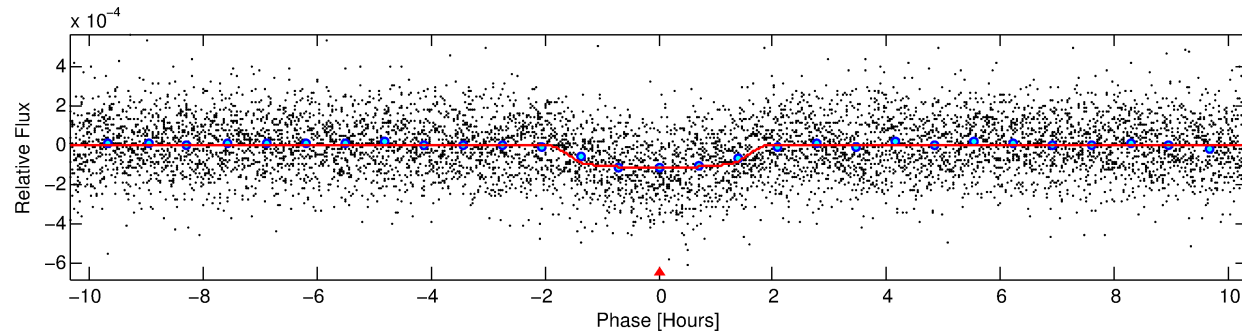
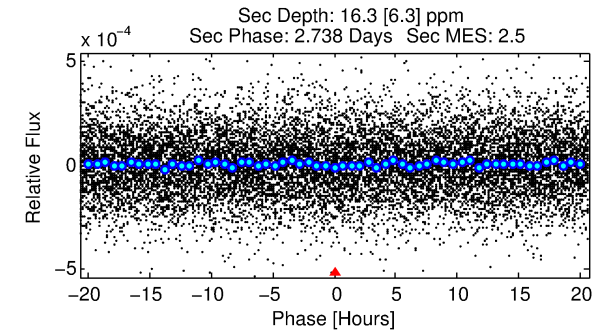
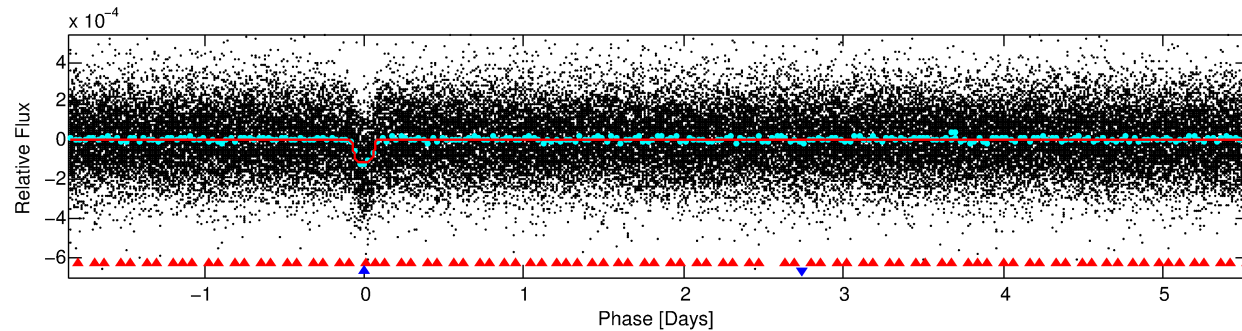
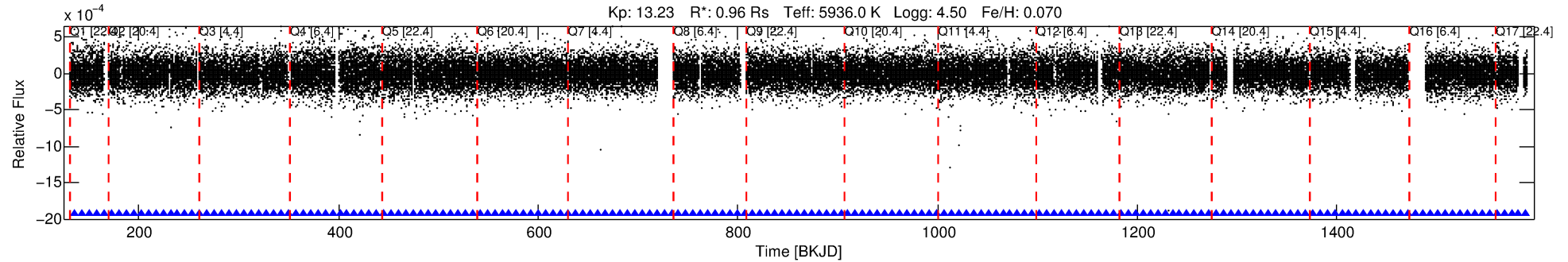
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 011568987-02

No Significant Match Found

# DV One-Page Summary

KIC: 11568987 Candidate: 2 of 2 Period: 7.379 d  
KOI: K00354.02 Corr: 0.962



## DV Fit Results:

Period = 7.37869 [0.00003] d  
Epoch = 135.8218 [0.0030] BKJD  
Rp/R\* = 0.0116 [0.0031]  
a/R\* = 7.61 [9.75]  
b = 0.90 [0.28]  
Seff = 179.16 [38.18]  
Teq = 933 [50] K  
Rp = 1.23 [0.37] Re  
a = 0.0760 [0.0097] AU  
Ag = 34.50 [23.46] [1.43σ]  
Teffp = 3496 [575] K [4.44σ]

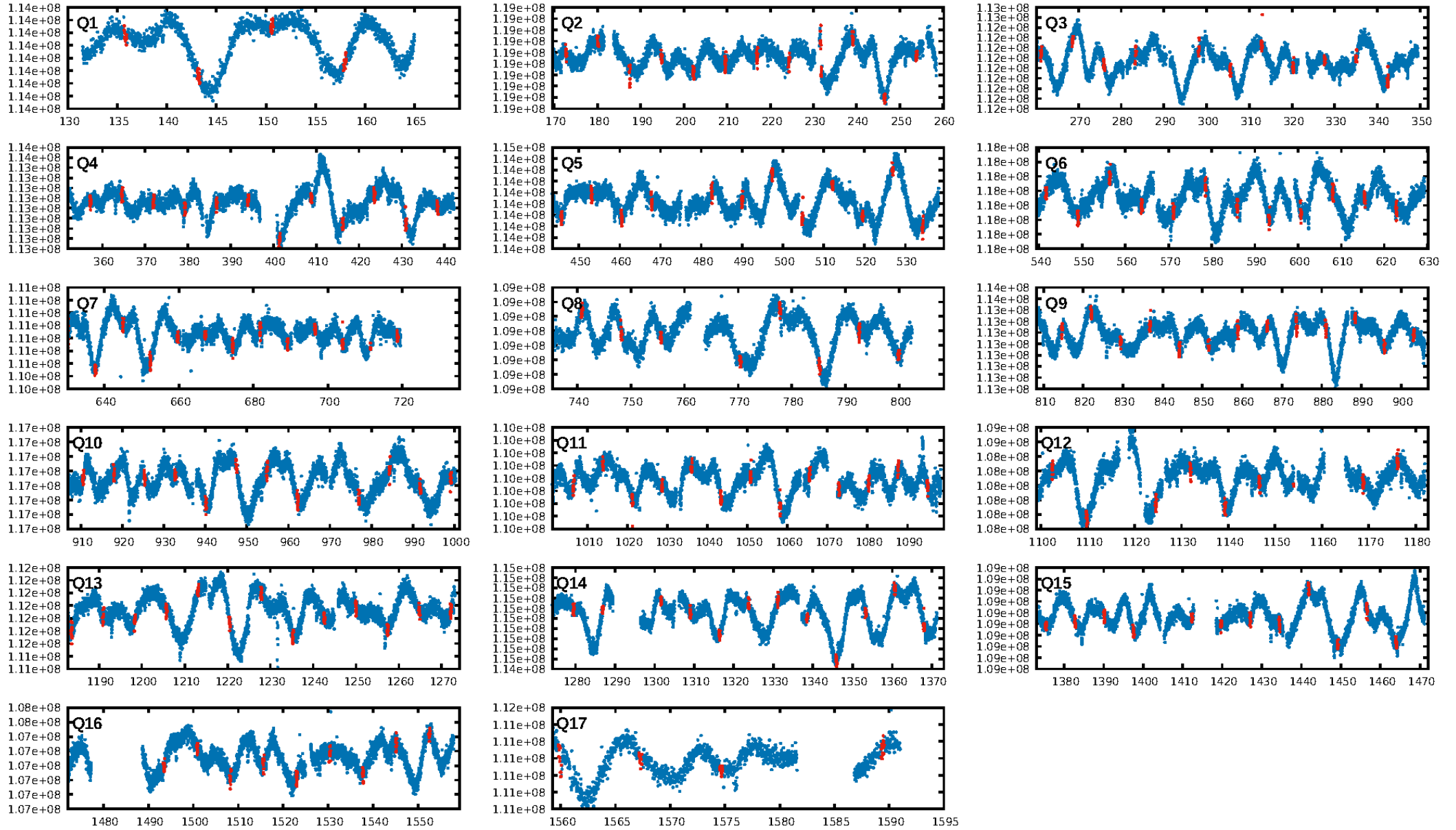
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [36.35σ]  
ModelChiSquare2-sig: 98.7%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 8.46e-63  
RollingBand-fgt: 1.00 [169/169]  
GhostDiagnostic-chr: 2.99  
Centroid-sig: 4.3%  
Centroid-so: 0.289 arcsec [0.57σ]  
OotOffset-rm: 0.463 arcsec [0.80σ]  
KicOffset-rm: 0.680 arcsec [1.20σ]  
OotOffset-st: 3/3/3/4 [13]  
KicOffset-st: 3/3/3/4 [13]  
DiffImageQuality-fgm: 0.85 [11/13]  
DiffImageOverlap-fno: 1.00 [17/17]

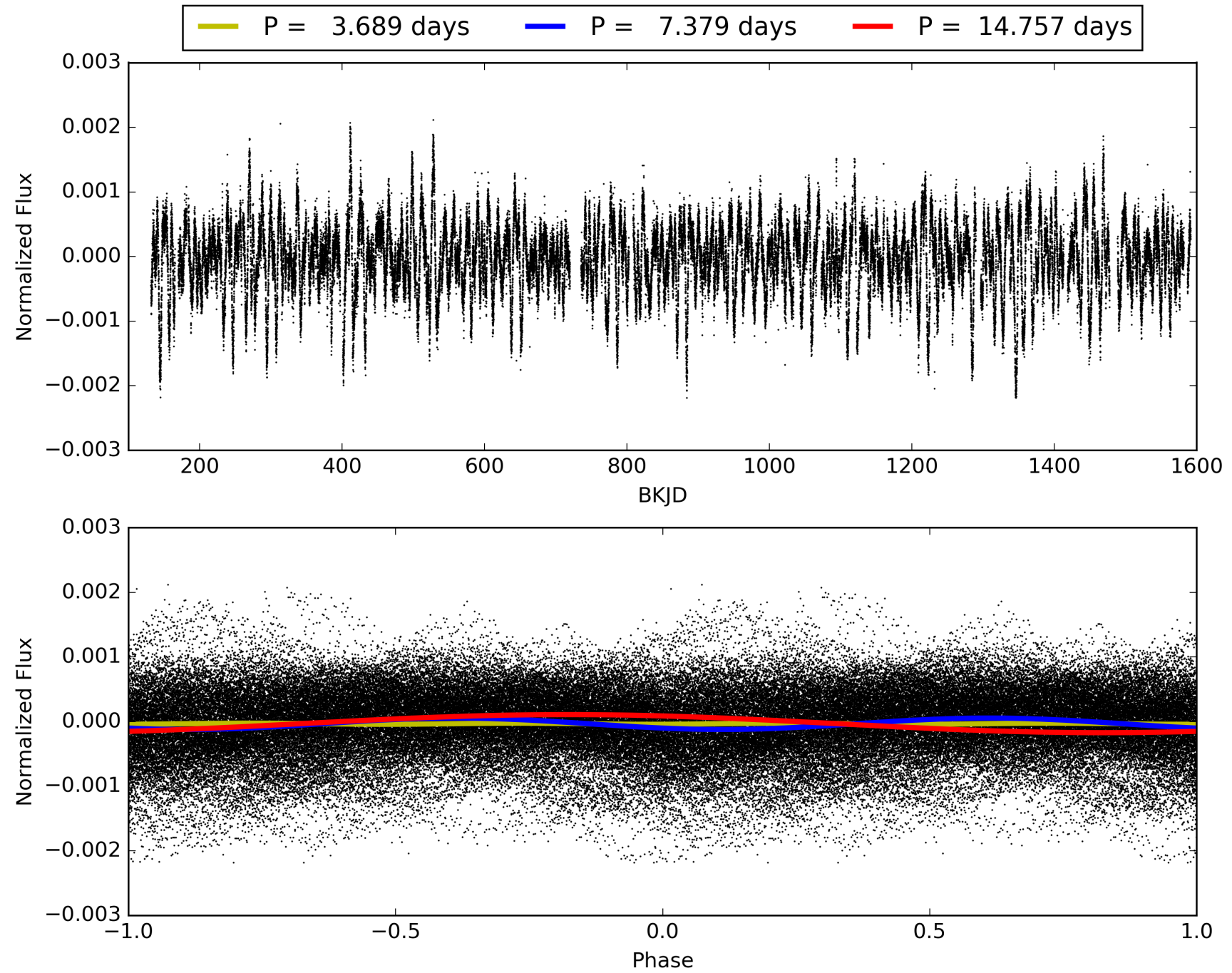
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 02:34:47 Z

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

# TCE 011568987-02, PDC Light Curves

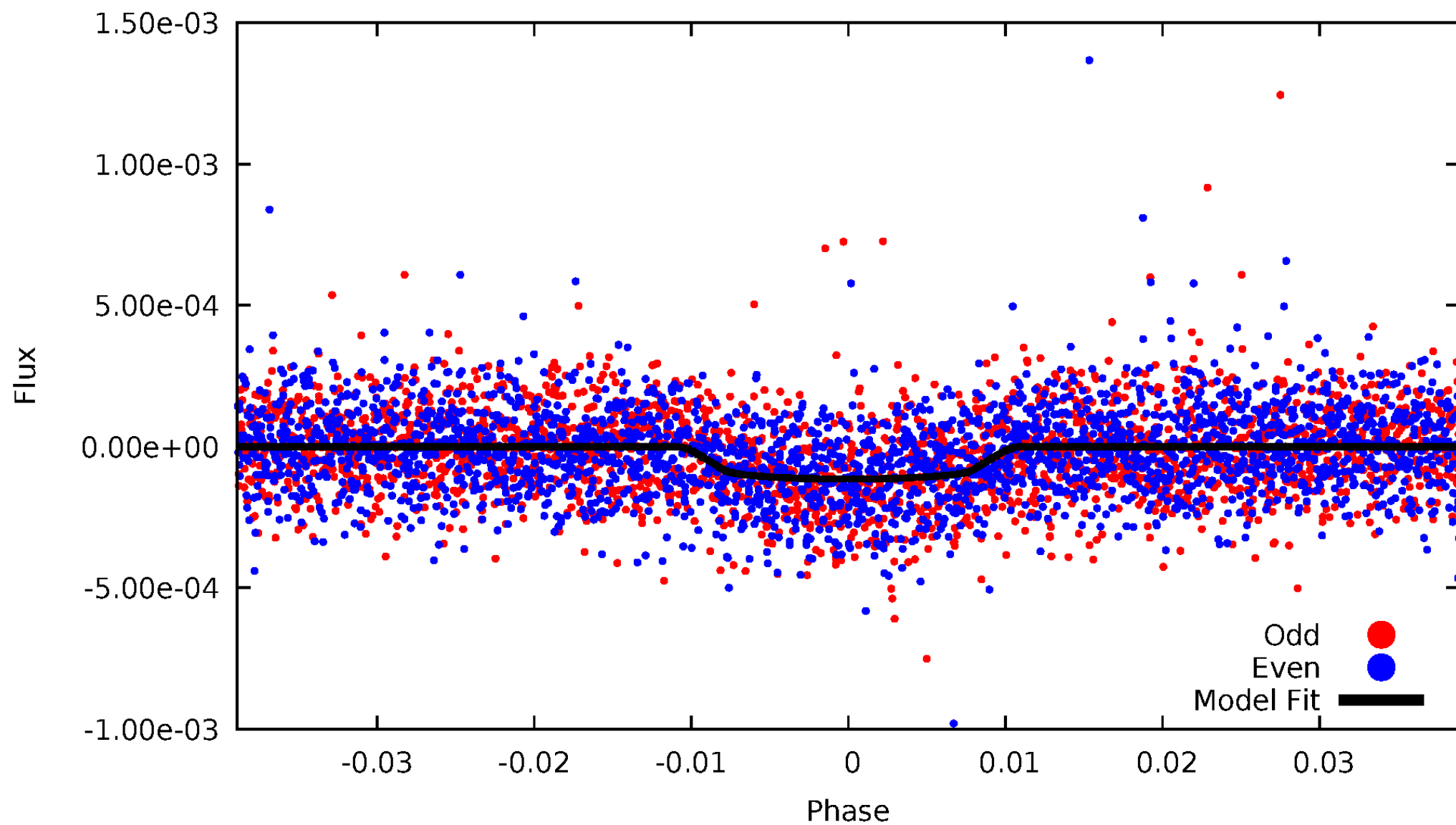


# TCE 011568987-02



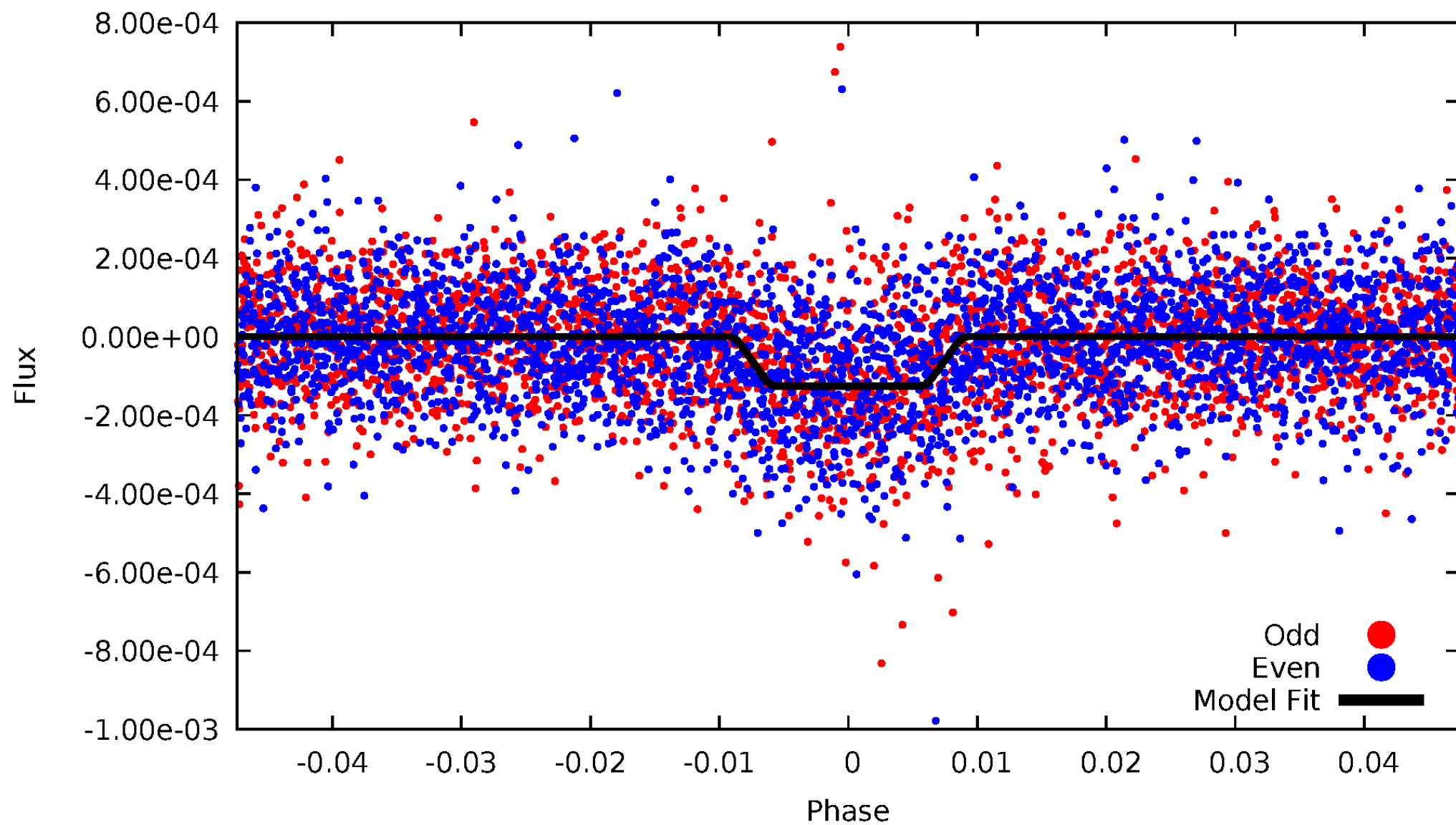
# DV Odd/Even

TCE 011568987-02



# ALT Odd/Even

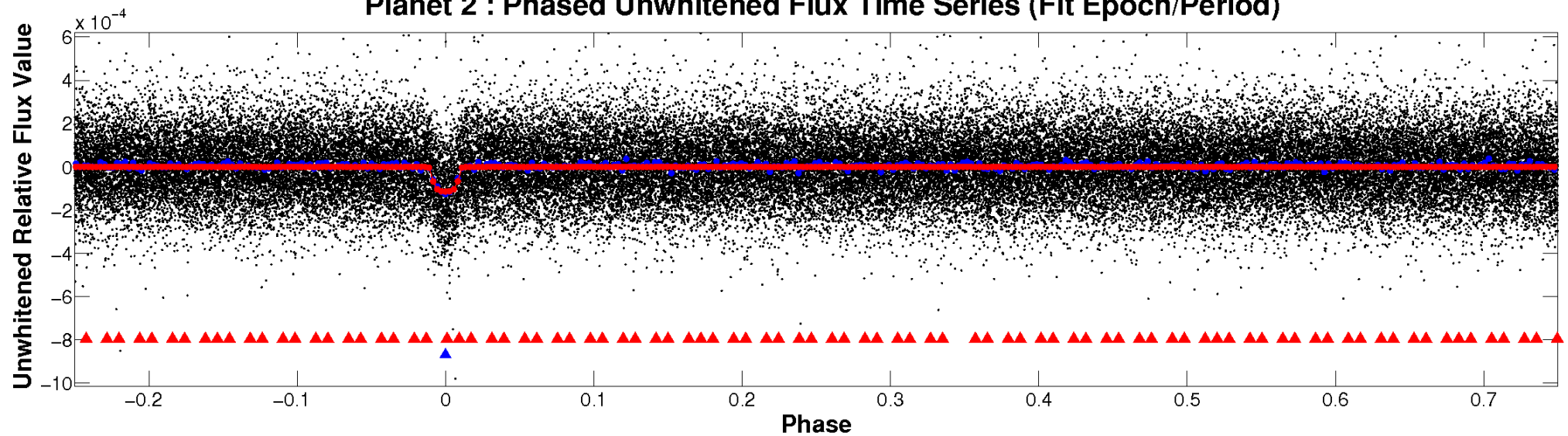
TCE 011568987-02



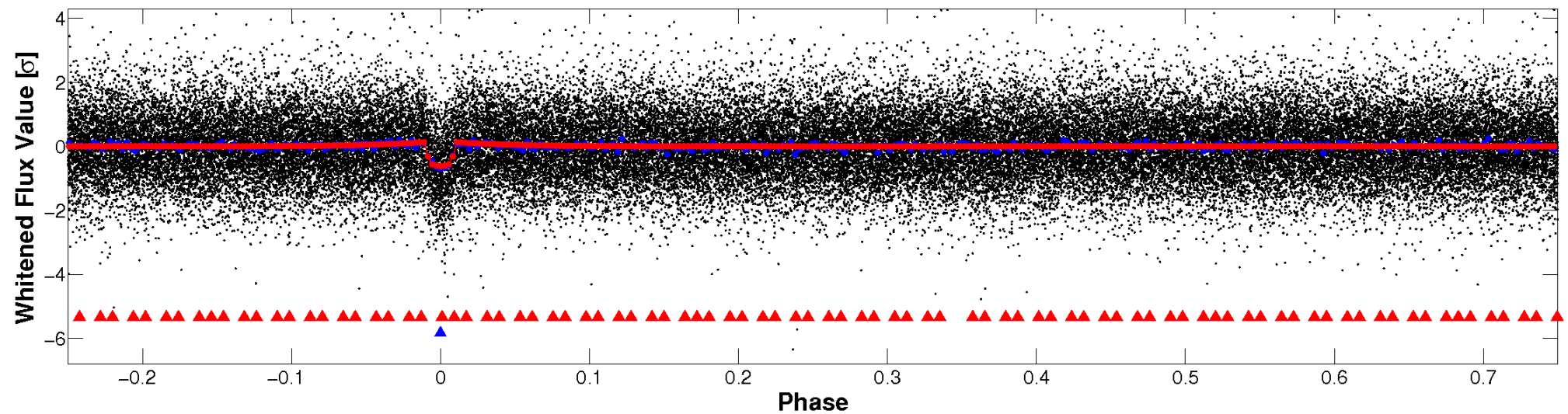


# Non-Whitened Vs. Whitened Light Curve

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

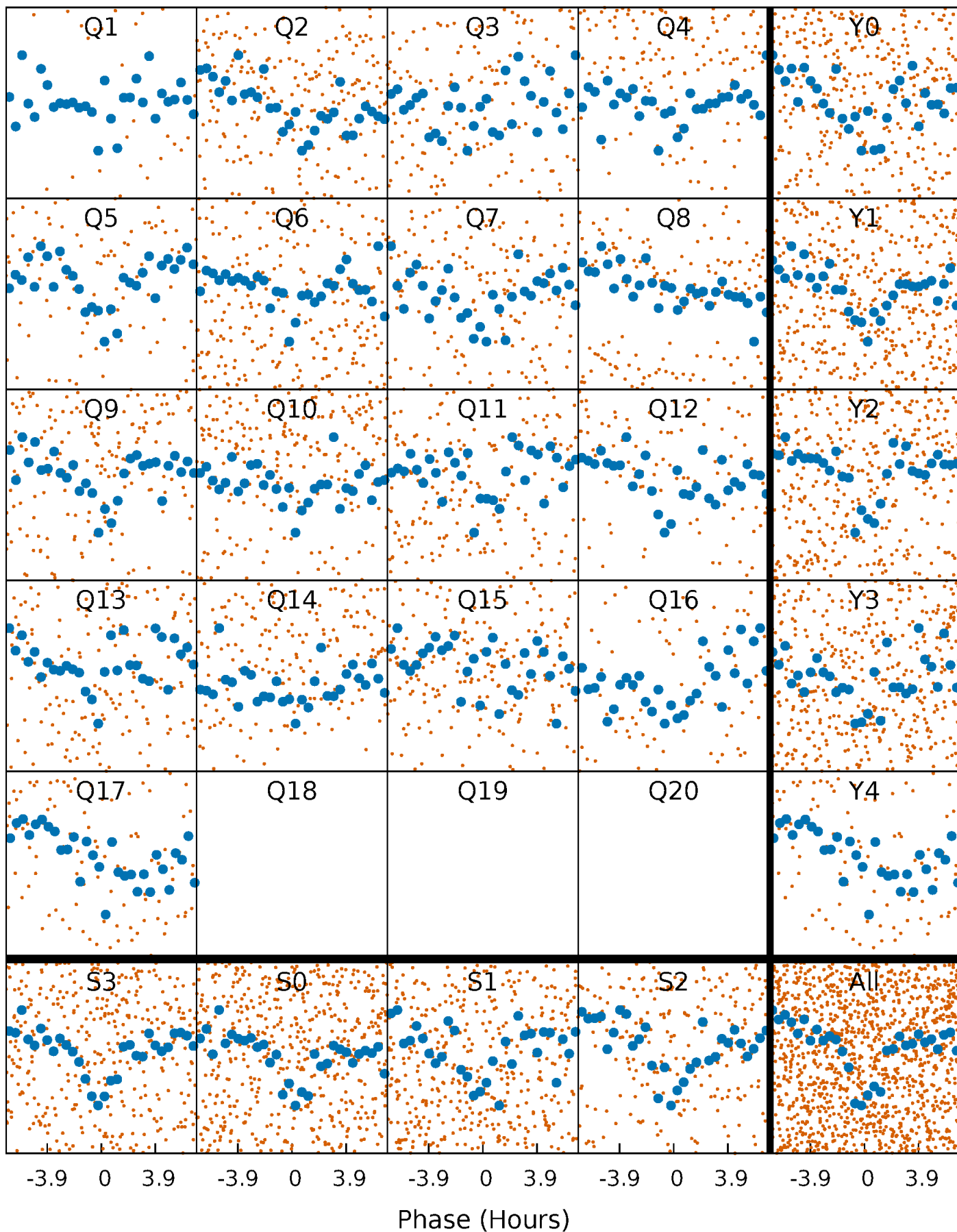


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



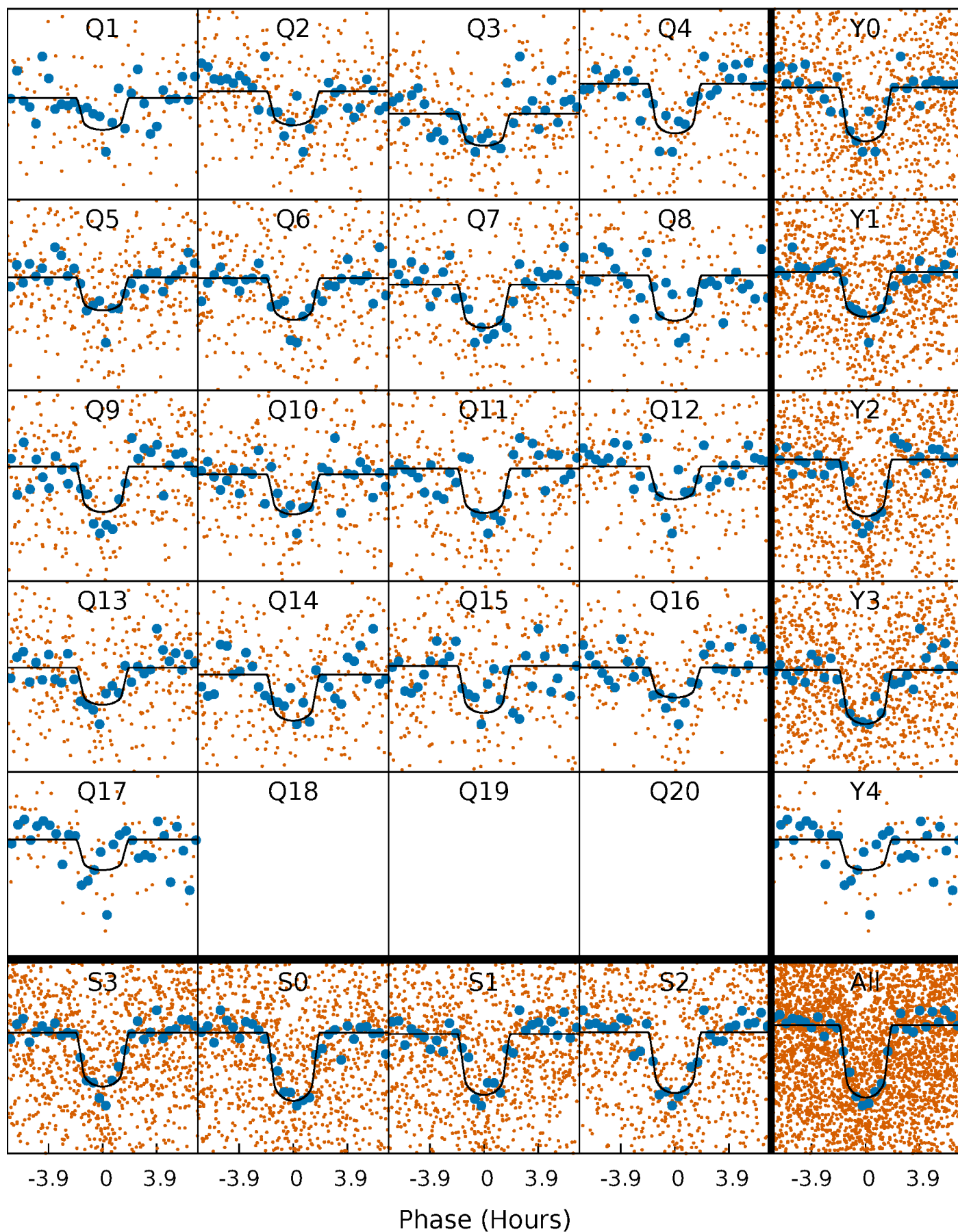
# PDC Quarter-Phased Transit Curves

TCE 011568987-02   P= 7.378695 Days    $T_0=135.821796$  (BKJD)



# DV Quarter-Phased Transit Curves

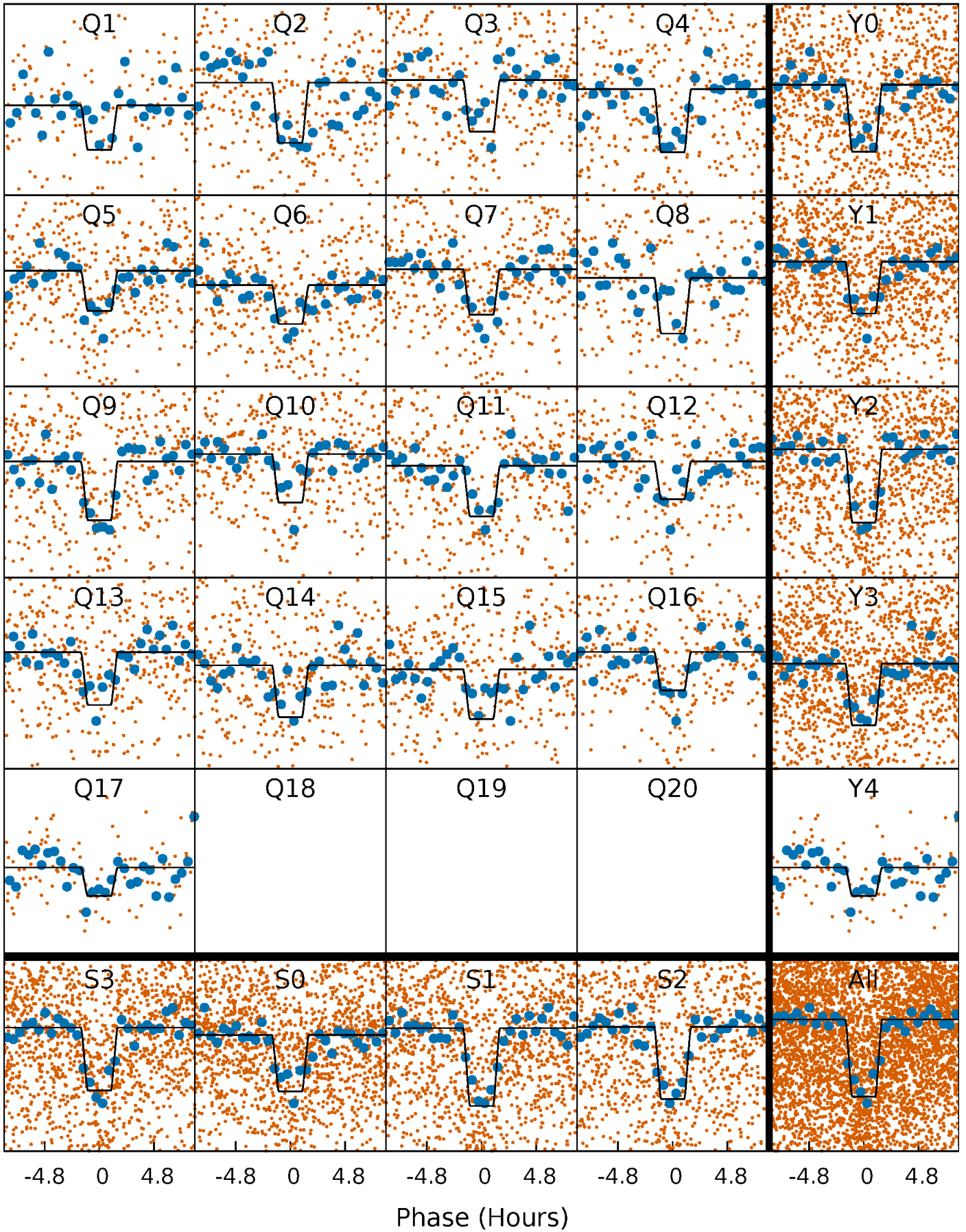
TCE 011568987-02   P= 7.378695 Days    $T_0=135.821796$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

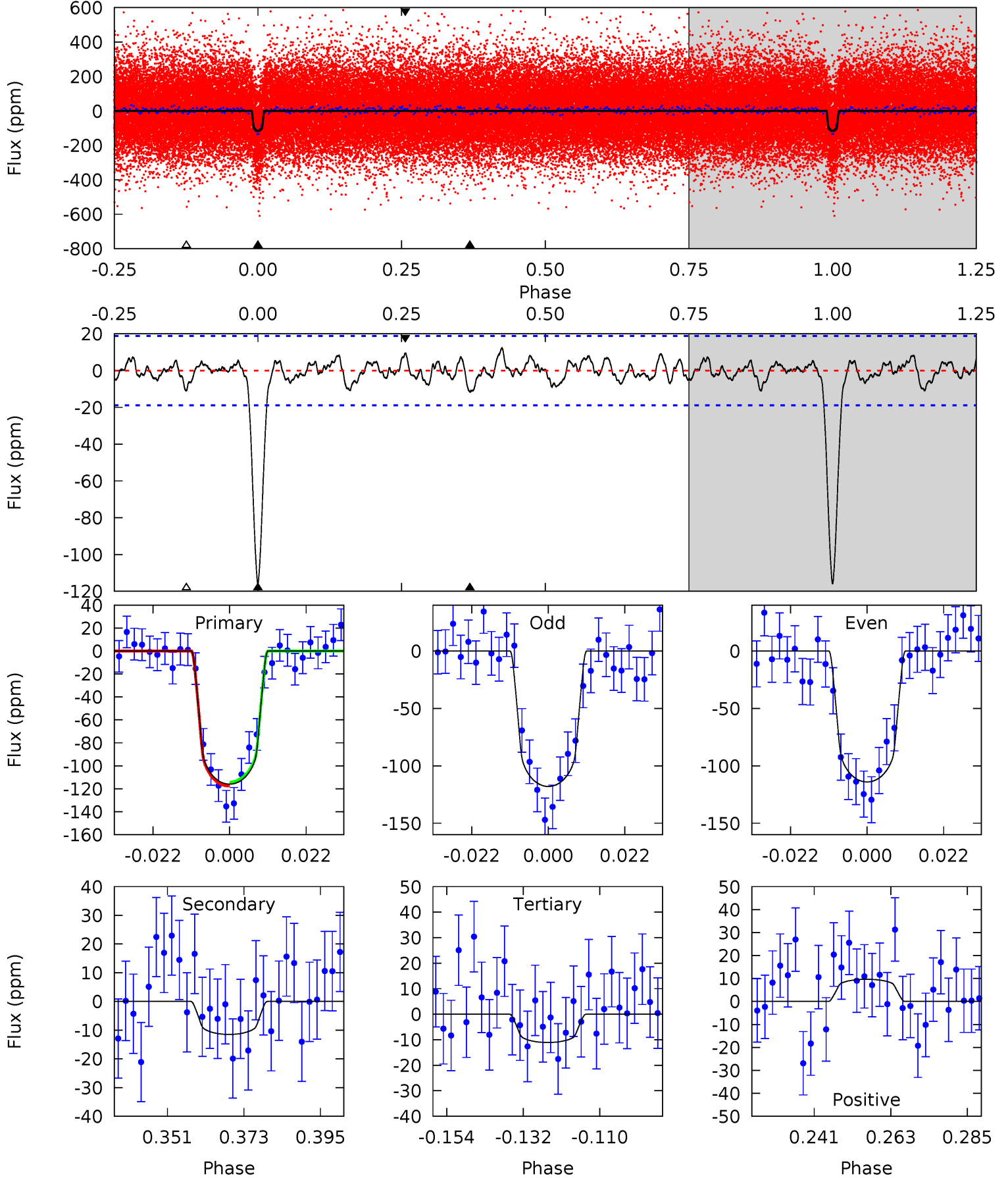
TCE 011568987-02     $P = 7.378637$  Days     $T_0 = 135.828390$  (BKJD)



# DV Model-Shift Uniqueness Test

011568987-02, P = 7.378695 Days, E = 128.443101 Days

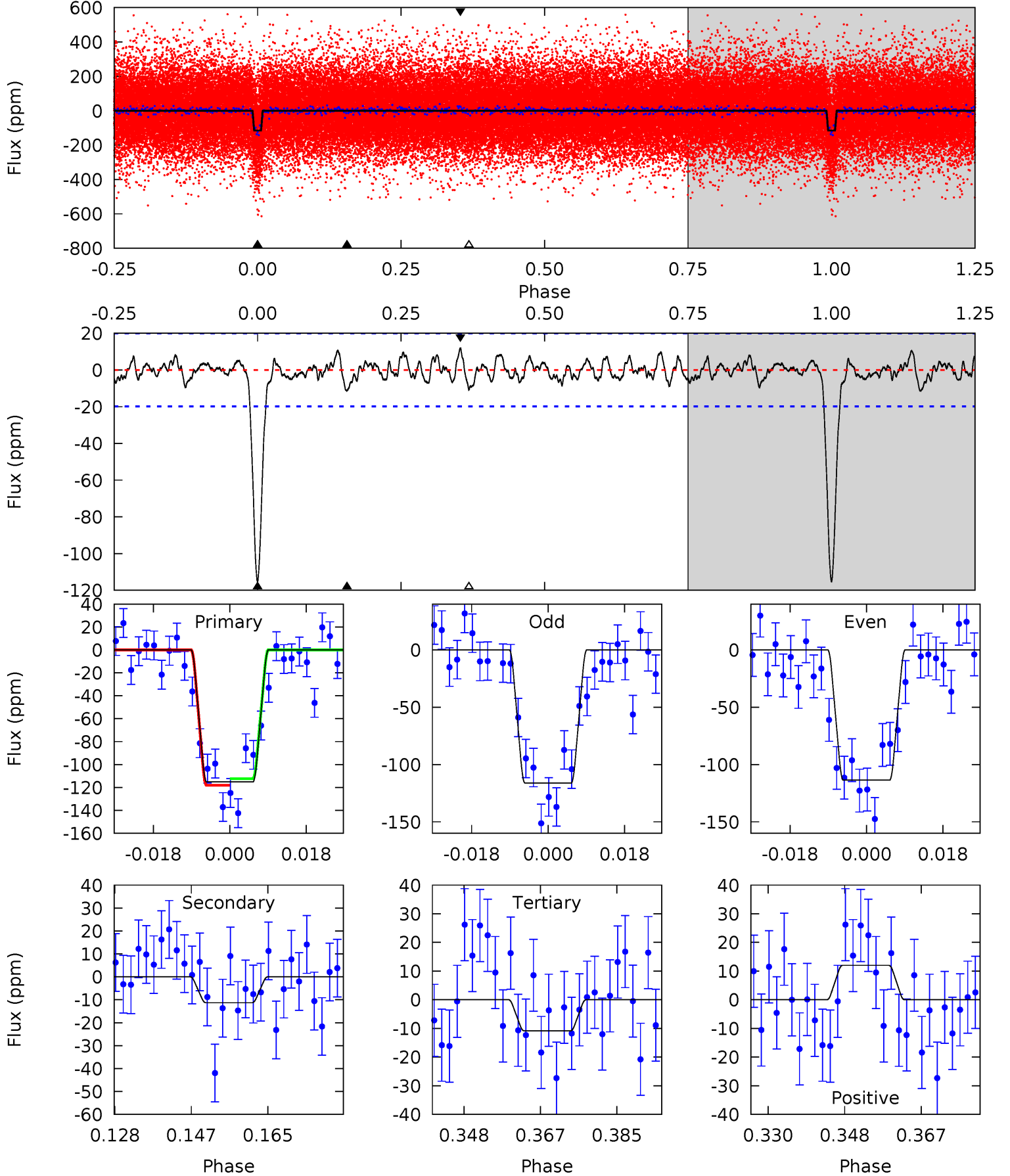
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
29.9	2.96	2.86	2.49	4.87	2.29	1.08	27.1	27.4	0.10	0.47	0.51	0.97	0.10	0.43



# Alt Model-Shift Uniqueness Test

011568987-02, P = 7.378637 Days, E = 128.449753 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
28.4	2.79	2.67	2.96	4.91	2.36	1.00	25.8	25.5	0.12	-0.17	0.30	0.95	0.09	0.72





### Stellar Parameters For KIC 011568987

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5936^{+94}_{-130}$	$4.501^{+0.019}_{-0.110}$	$0.070^{+0.150}_{-0.150}$	$0.965^{+0.139}_{-0.050}$	$1.075^{+0.053}_{-0.090}$	$1.685^{+0.172}_{-0.545}$
	+2%/-2%	+0%/-2%	+214%/-214%	+14%/-5%	+5%/-8%	+10%/-32%
Source	SPE18	SPE18	SPE18	DSEP		

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

### Secondary Eclipse Parameters for KIC 011568987-02 / KOI 0354.02

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	-11±4	$1.30^{+0.32}_{-0.38}$	$1319^{+49}_{-35}$	$3574^{+508}_{-312}$	$21^{+25}_{-10}$
Alt.	-11±4	$1.21^{+0.34}_{-0.33}$	$1321^{+44}_{-38}$	$3635^{+498}_{-366}$	$23^{+26}_{-11}$

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

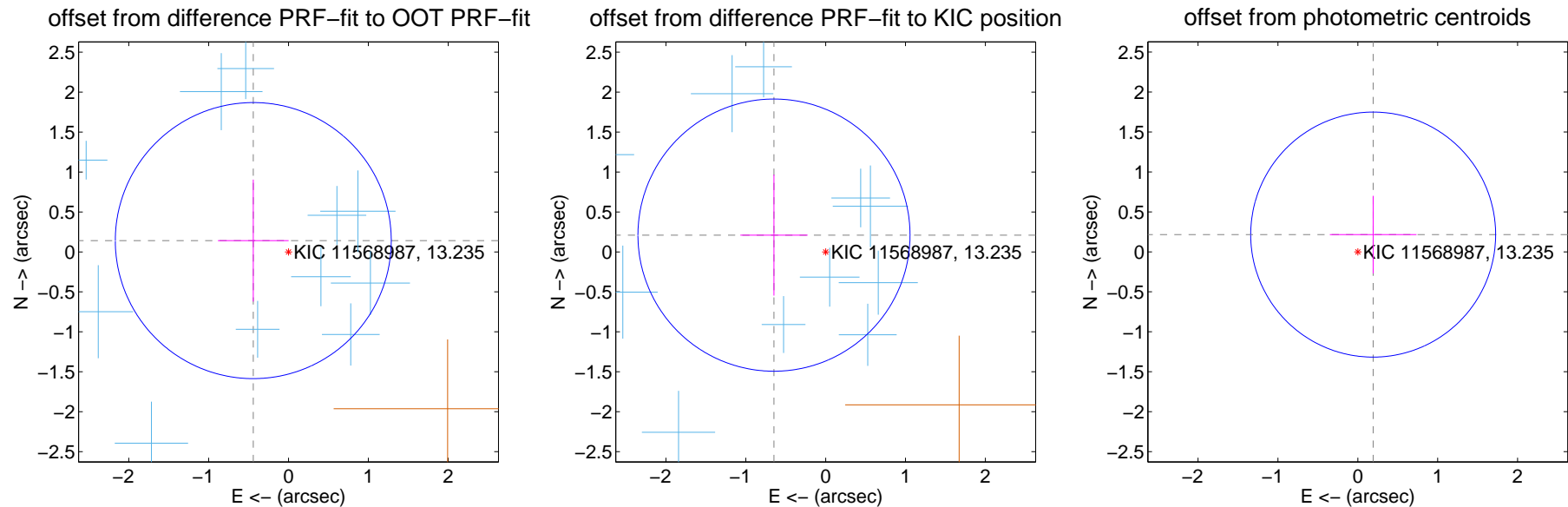
## DV Centroid Data

Supplemental centroid analysis for 011568987-02. Kepler magnitude: 13.23. Transit SNR 18.60

There are 11 quarters with good PRF difference image offsets

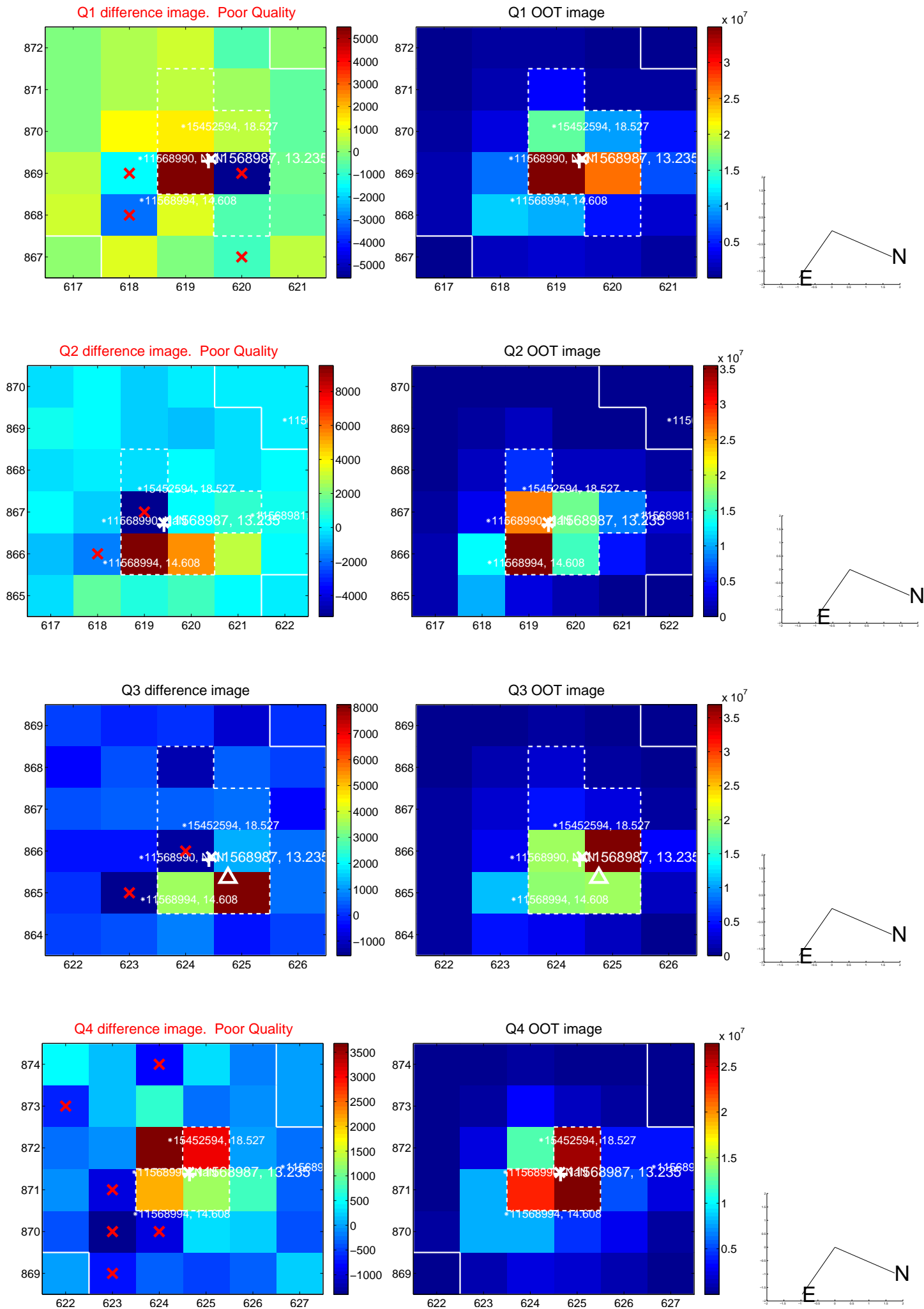
The direct PRF centroid is offset from the target star catalog position by about 0.32 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.463 \pm 0.576$	0.80	$0.441 \pm 0.443$	$0.142 \pm 0.763$
PRF-fit source offset from KIC position	$0.680 \pm 0.568$	1.20	$0.647 \pm 0.421$	$0.210 \pm 0.757$
photometric centroid source offset	$0.29 \pm 0.51$	0.57	$-0.19 \pm 0.54$	$0.22 \pm 0.49$

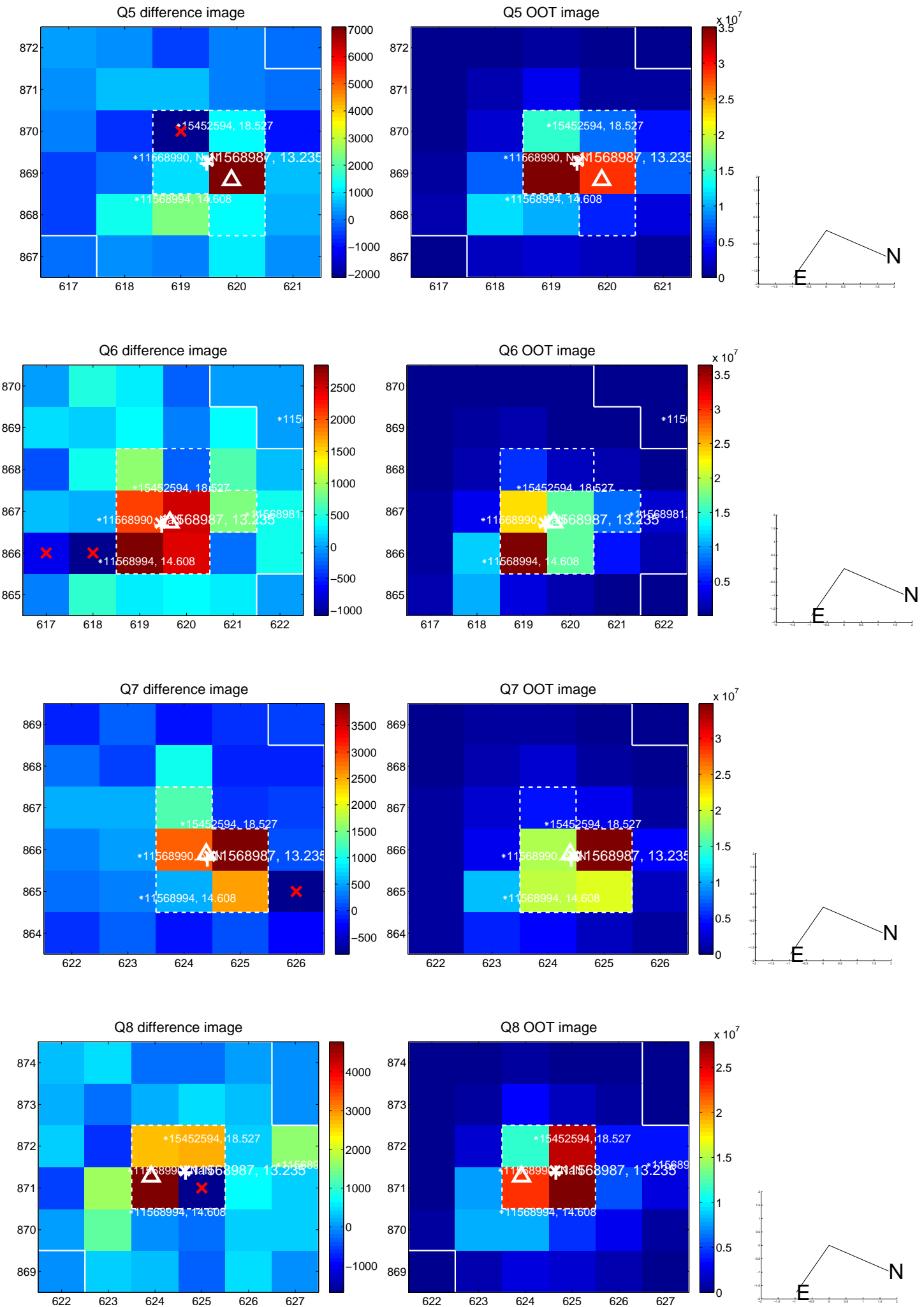


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

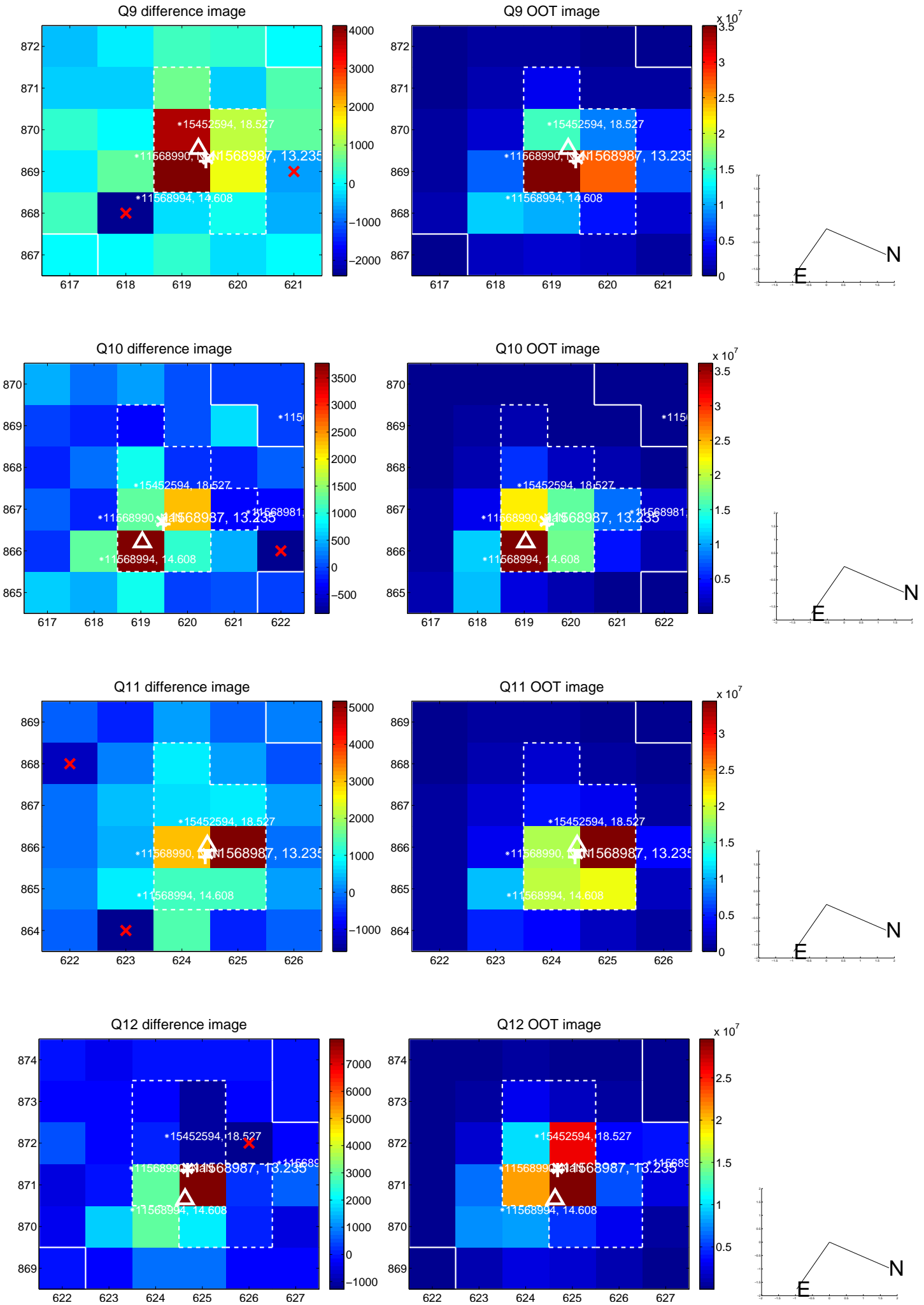
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



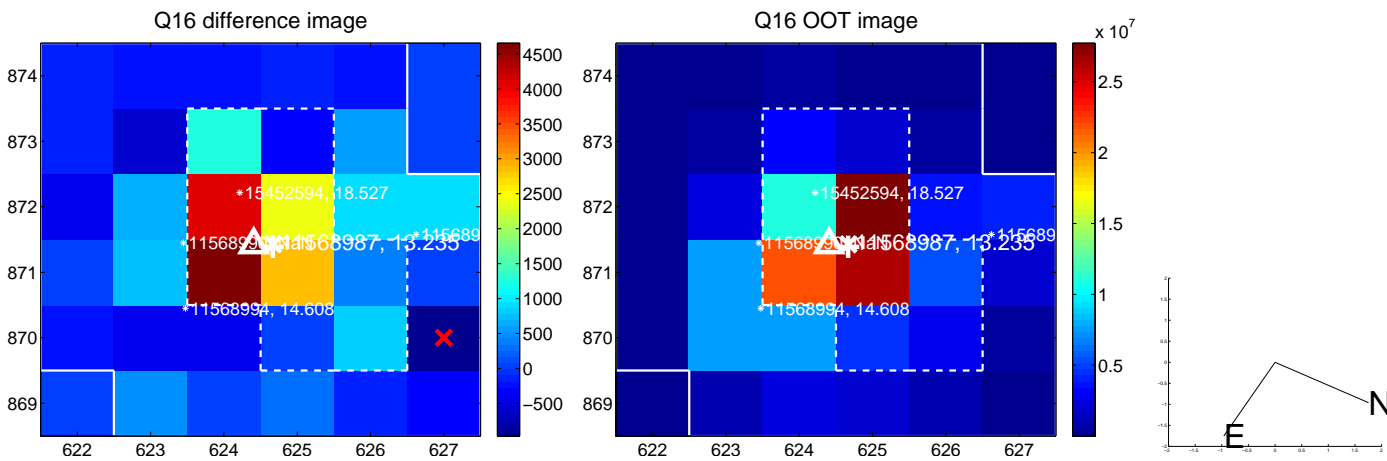
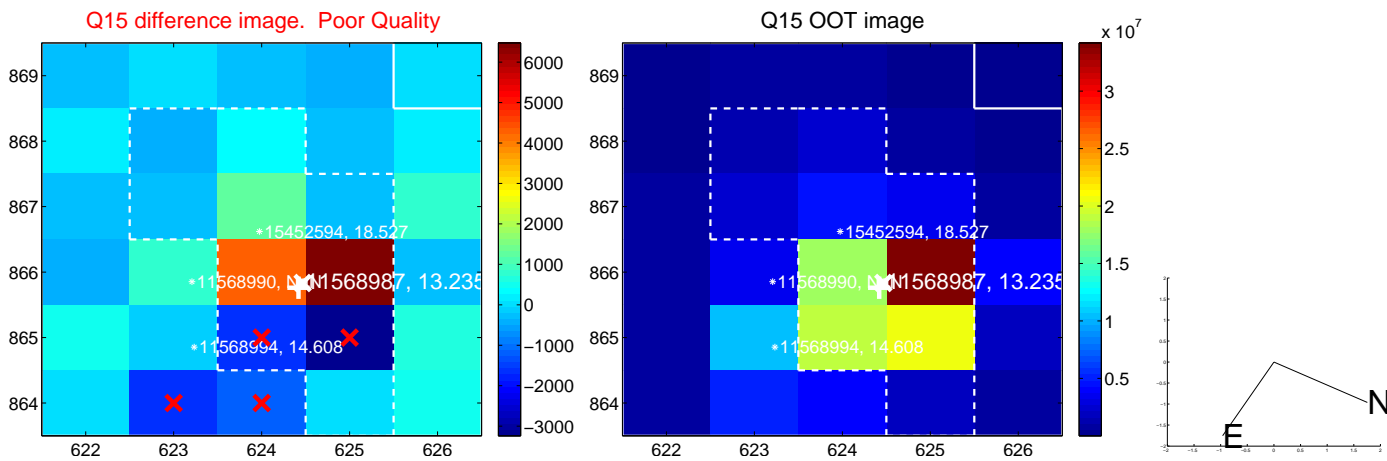
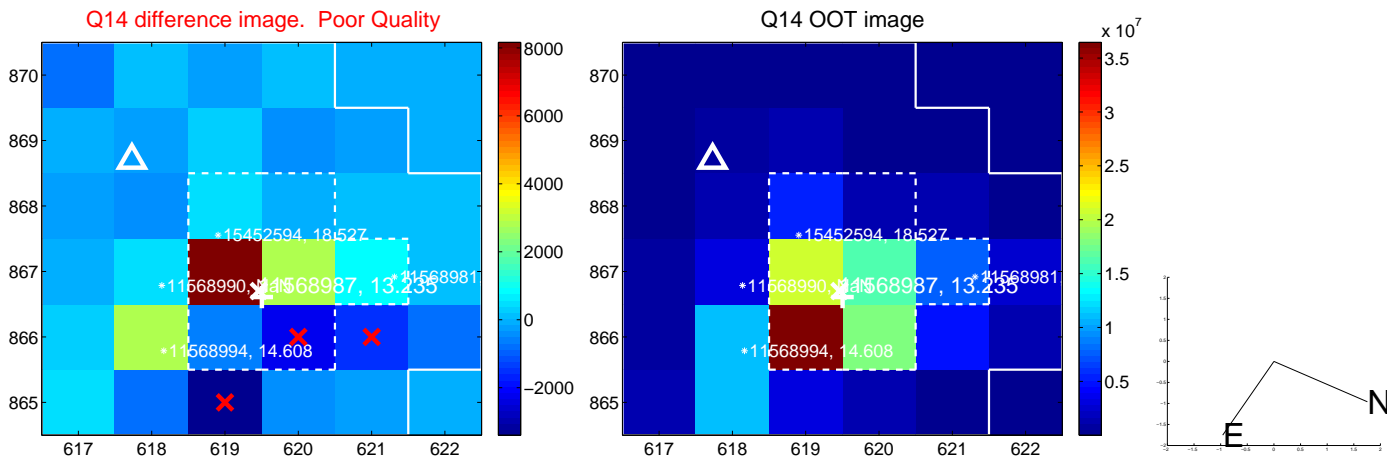
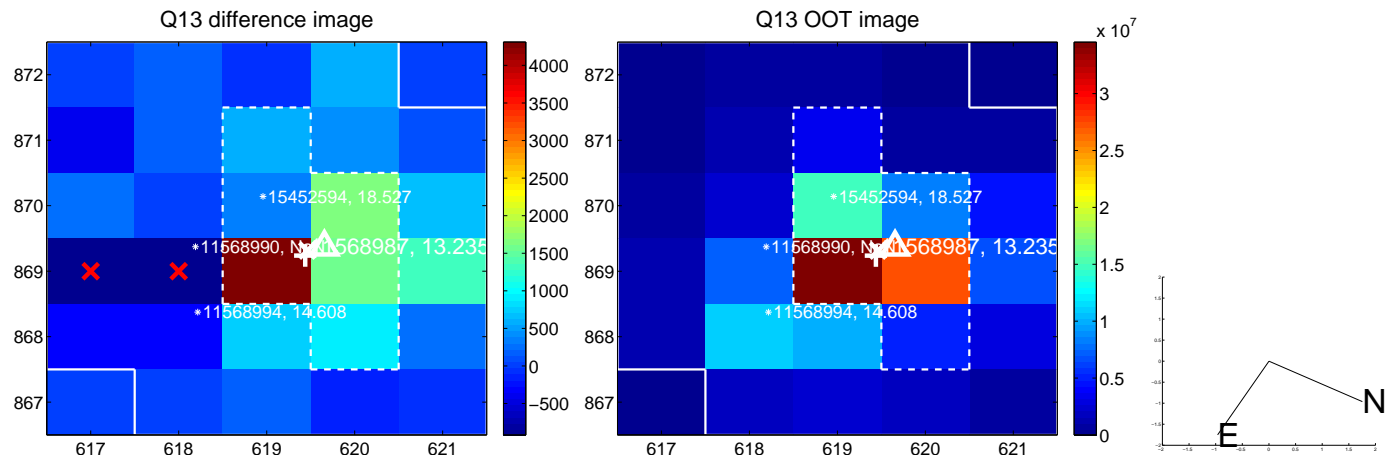
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



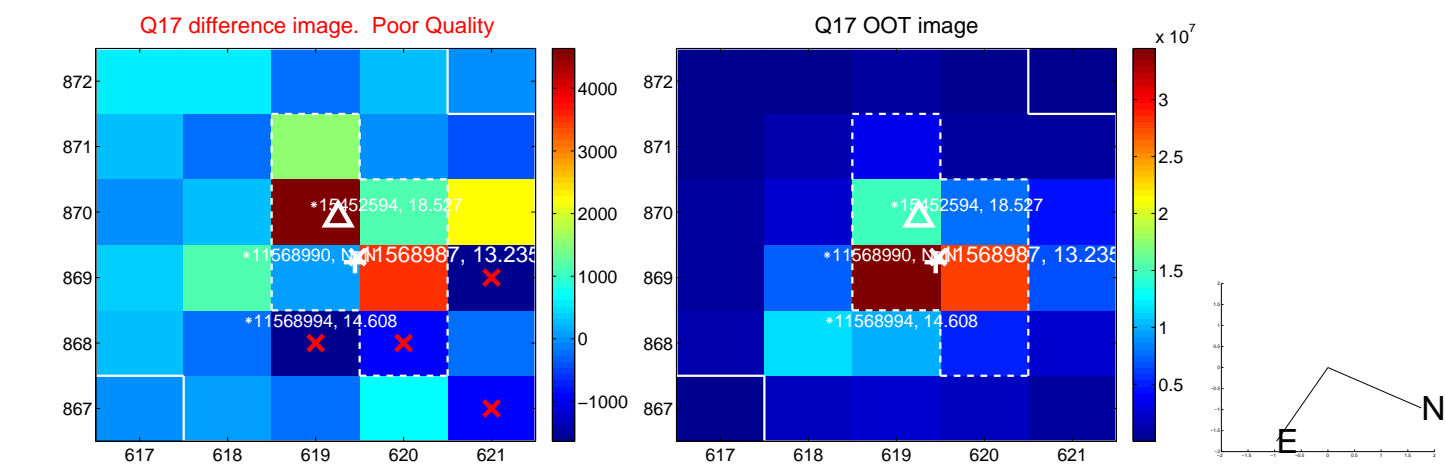
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



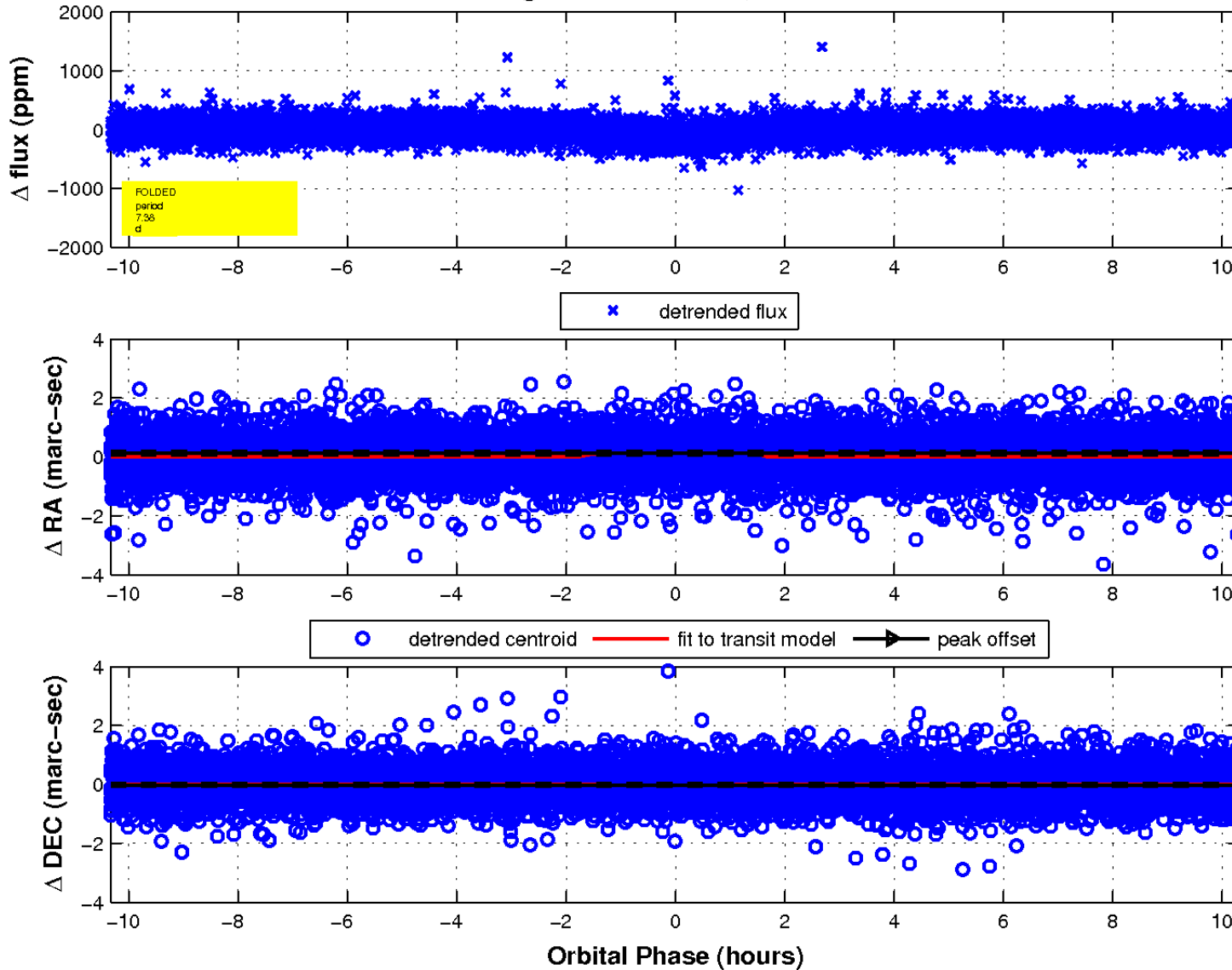
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2





UKIRT Image

Declination

