

# KIC 008687199

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008687199-01	OBS	No	480.522136	403.827514	168.9	10.429	9.1	8.6	1.59	6465	2.25	2.69
008687199-02	OBS	No	374.810011	135.581192	164.1	26.148	11.1	11.0	1.59	6465	2.20	3.74

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008687199-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—CENT_FEW_DIFFS
008687199-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_SKYE—LPP_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

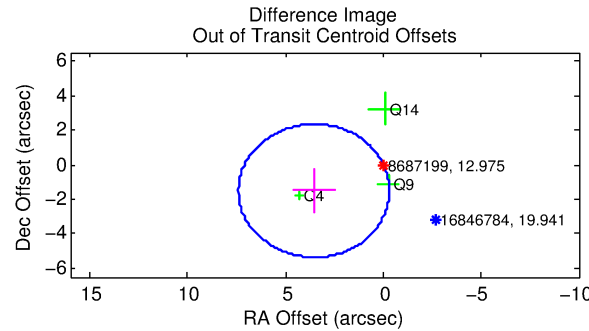
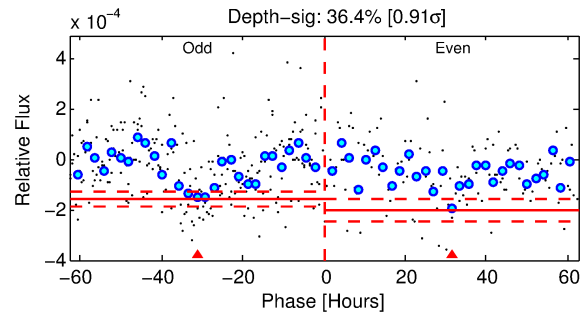
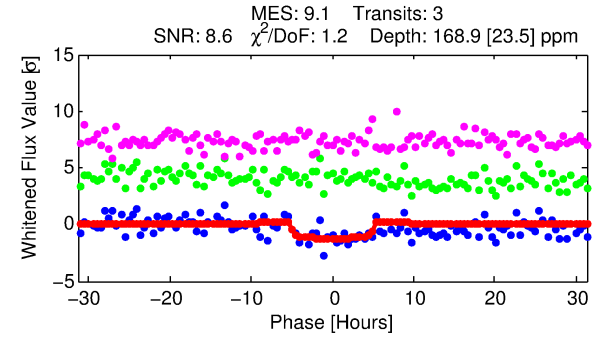
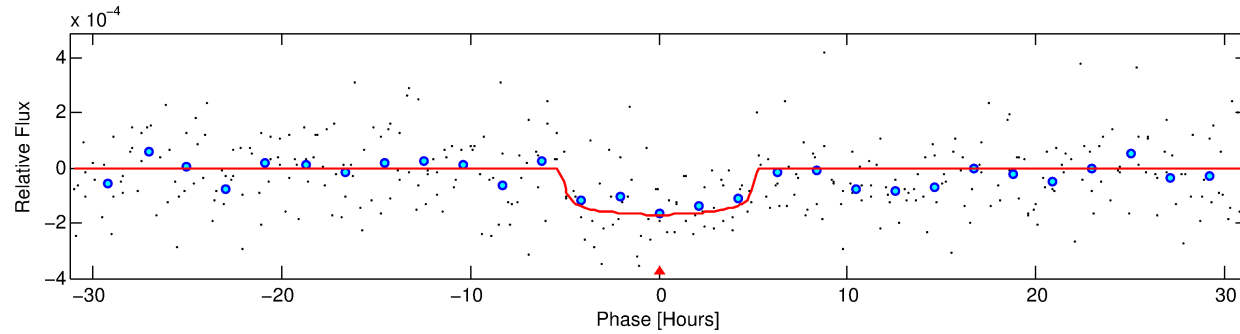
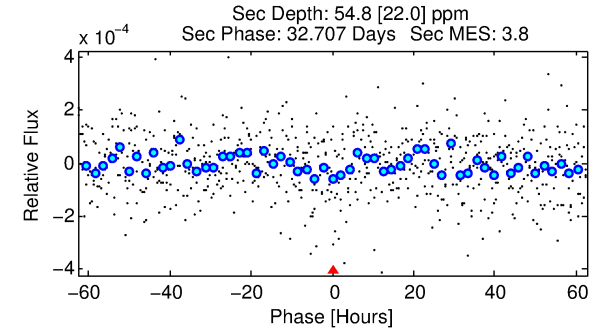
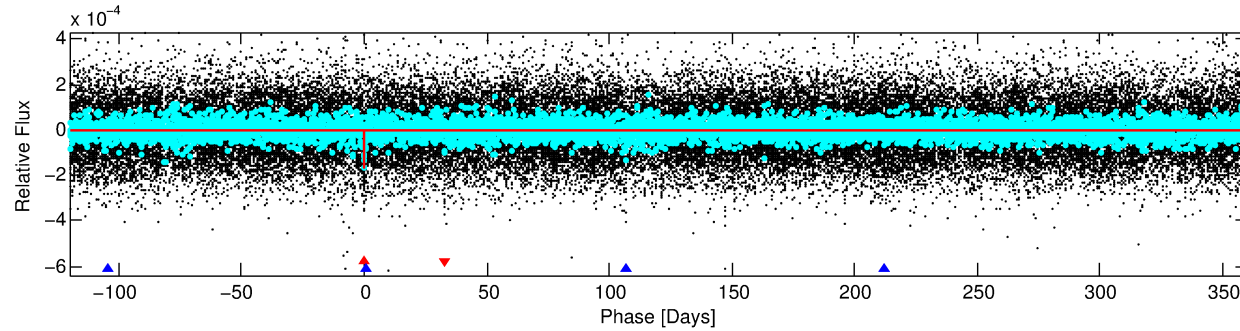
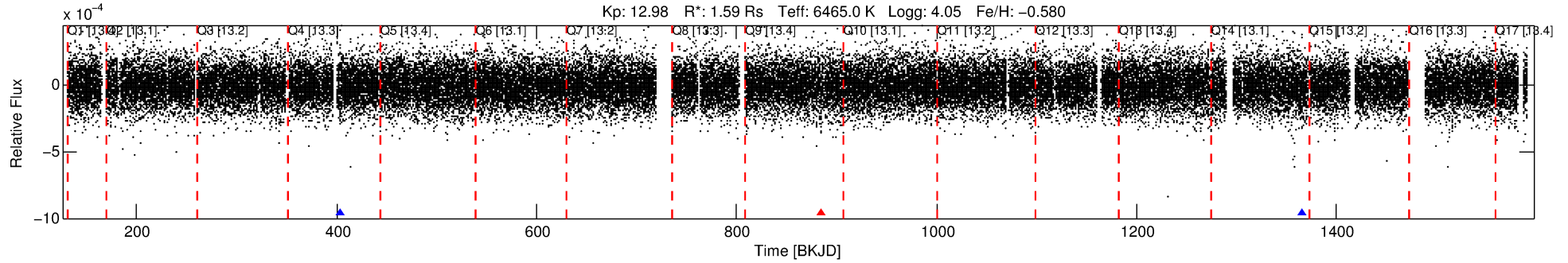
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 008687199-01

No Significant Match Found

# DV One-Page Summary

KIC: 8687199 Candidate: 1 of 2 Period: 480.522 d



## DV Fit Results:

Period = 480.52214 [0.01390] d  
Epoch = 403.8275 [0.0165] BKJD  
Rp/R\* = 0.0130 [0.0070]  
a/R\* = 232.24 [703.43]  
b = 0.77 [1.61]  
Seff = 2.69 [1.18]  
Teq = 326 [36] K  
Rp = 2.25 [1.37] Re  
a = 1.2112 [0.3282] AU  
Ag = 8729.00 [10664.09] [0.82σ]  
Teffp = 4879 [1403] K [3.24σ]

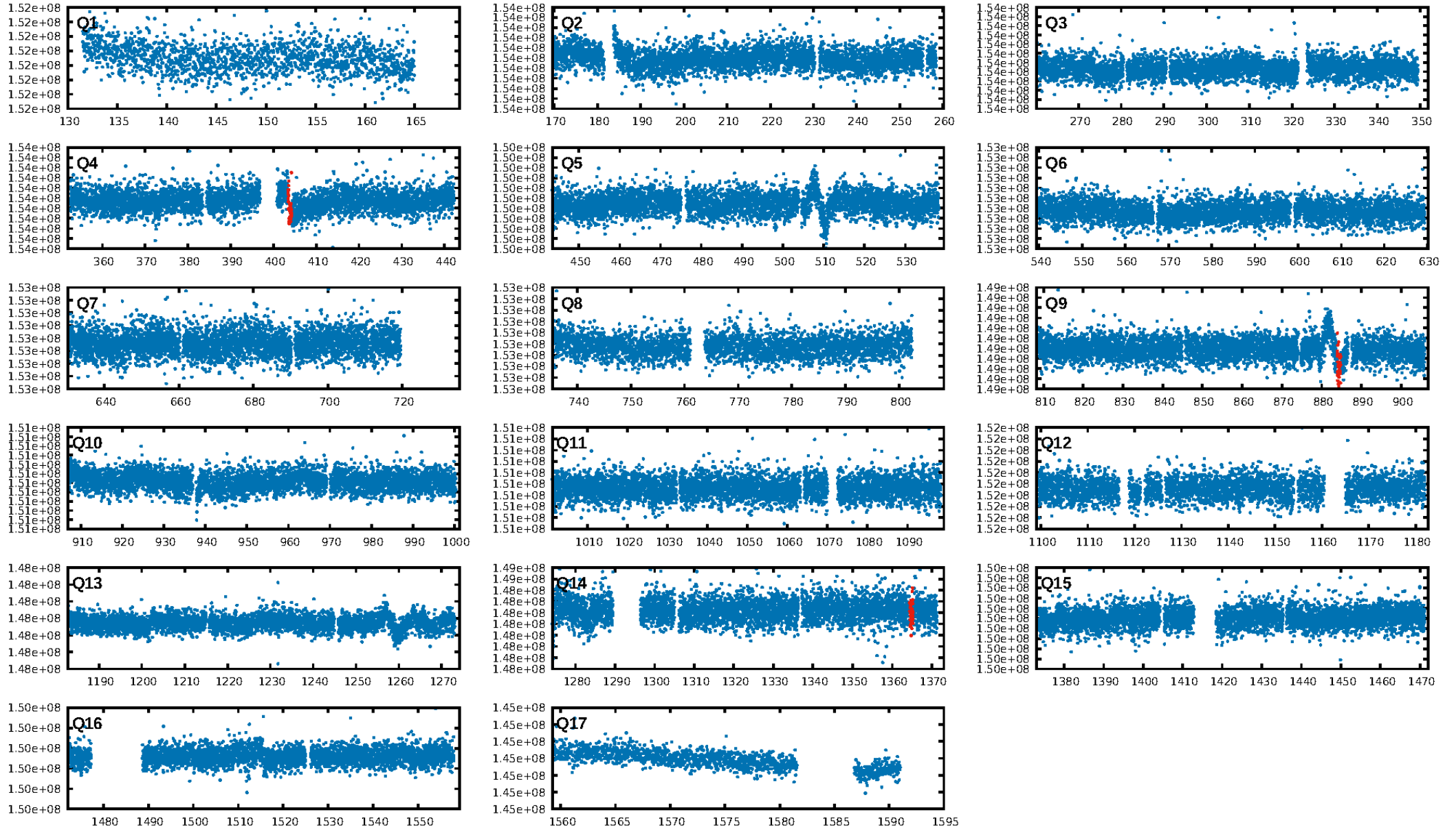
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [90.12σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 1.4%  
ModelChiSquareGof-sig: 99.7%  
Bootstrap-pfa: 1.43e-10  
RollingBand-fgt: 0.67 [2/3]  
GhostDiagnostic-chr: -1.845  
Centroid-sig: 1.2%  
Centroid-so: 3.610 arcsec [1.98σ]  
OotOffset-rm: 3.856 arcsec [3.00σ]  
OotOffset-st: 1/0/1/1 [3]  
KicOffset-rm: 3.846 arcsec [2.06σ]  
KicOffset-st: 1/0/1/1 [3]  
DiffImageQuality-fgm: 0.67 [2/3]  
DiffImageOverlap-fno: 0.67 [2/3]

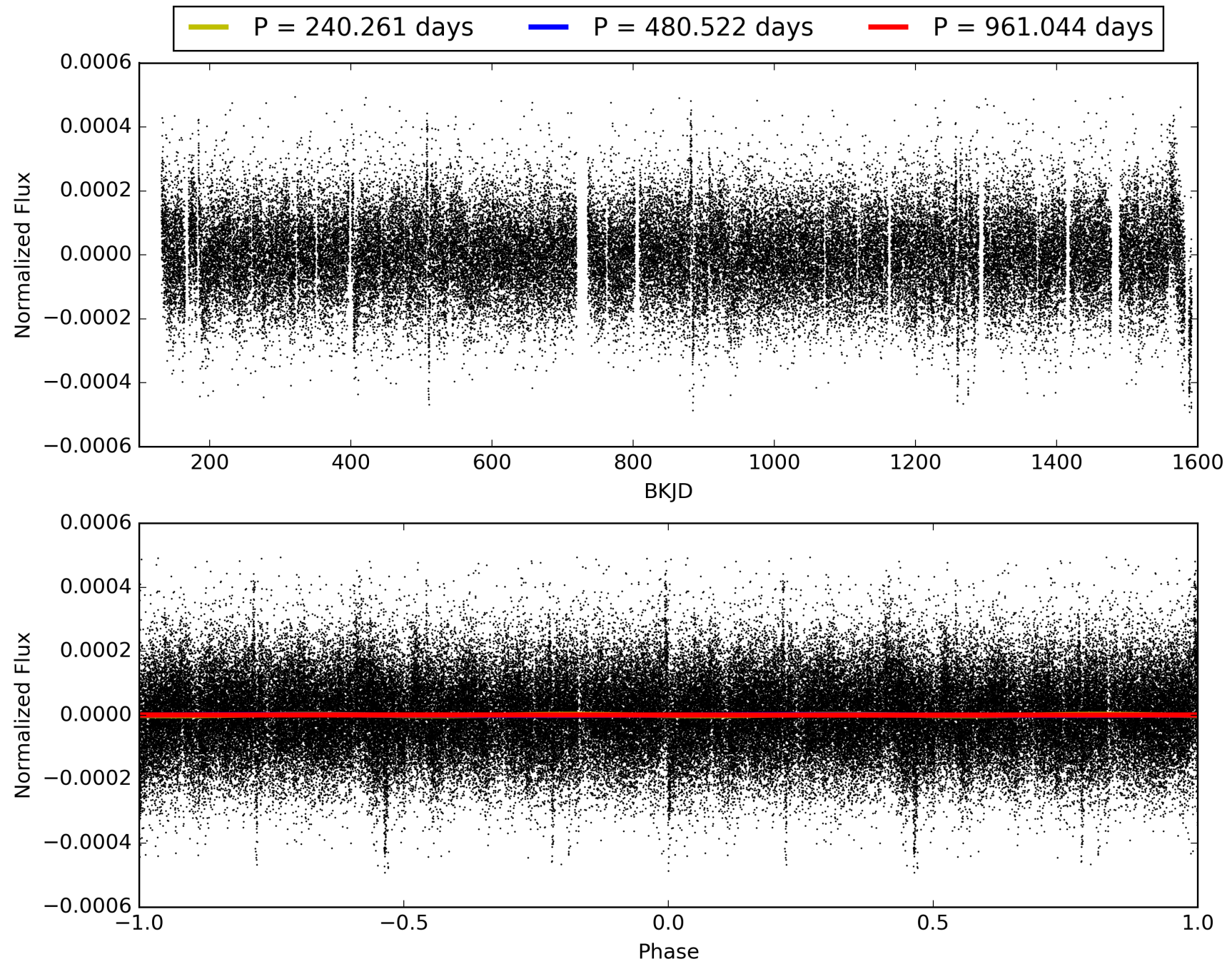
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 18:20:54 Z

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

# TCE 008687199-01, PDC Light Curves

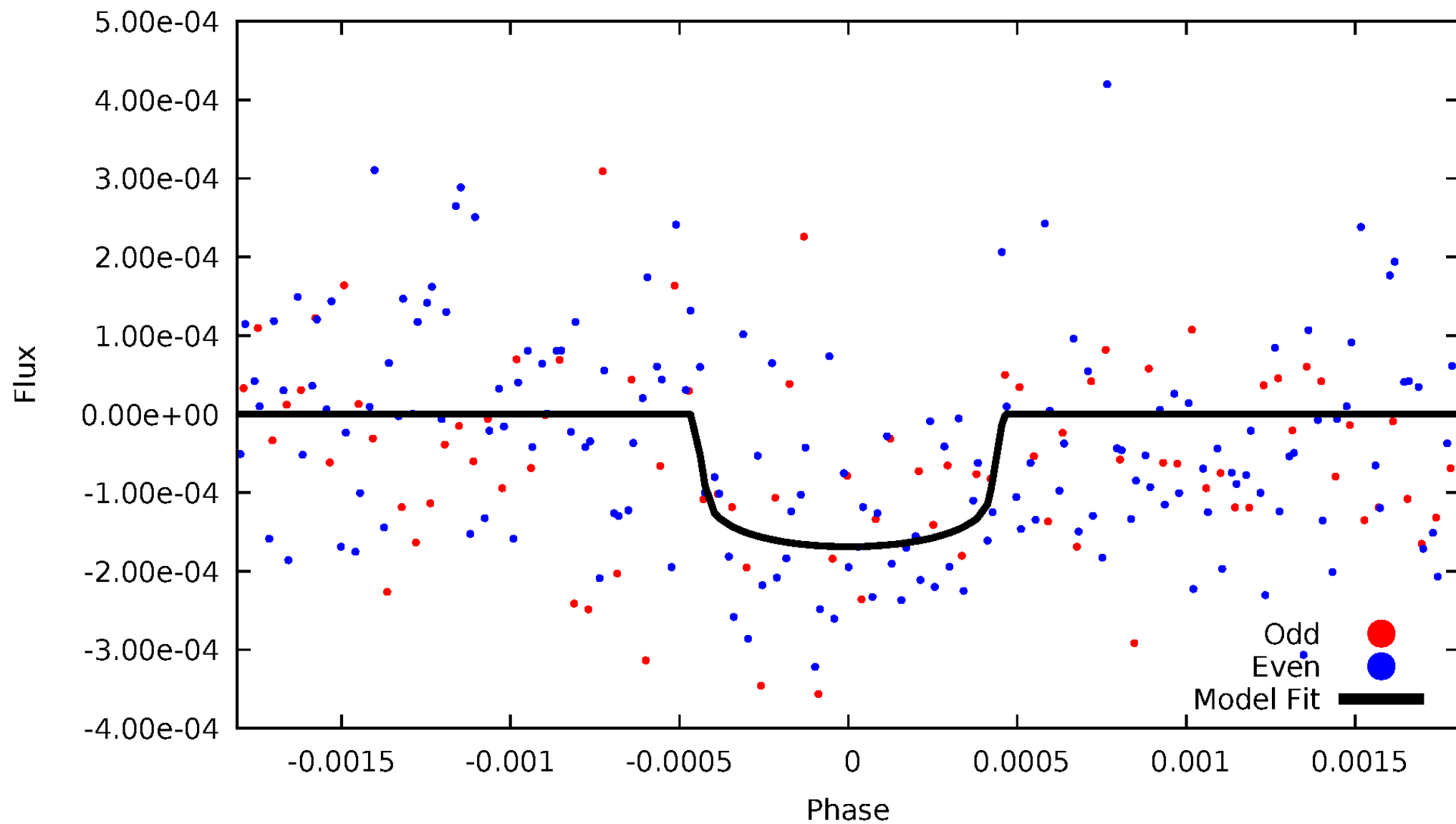


TCE 008687199-01



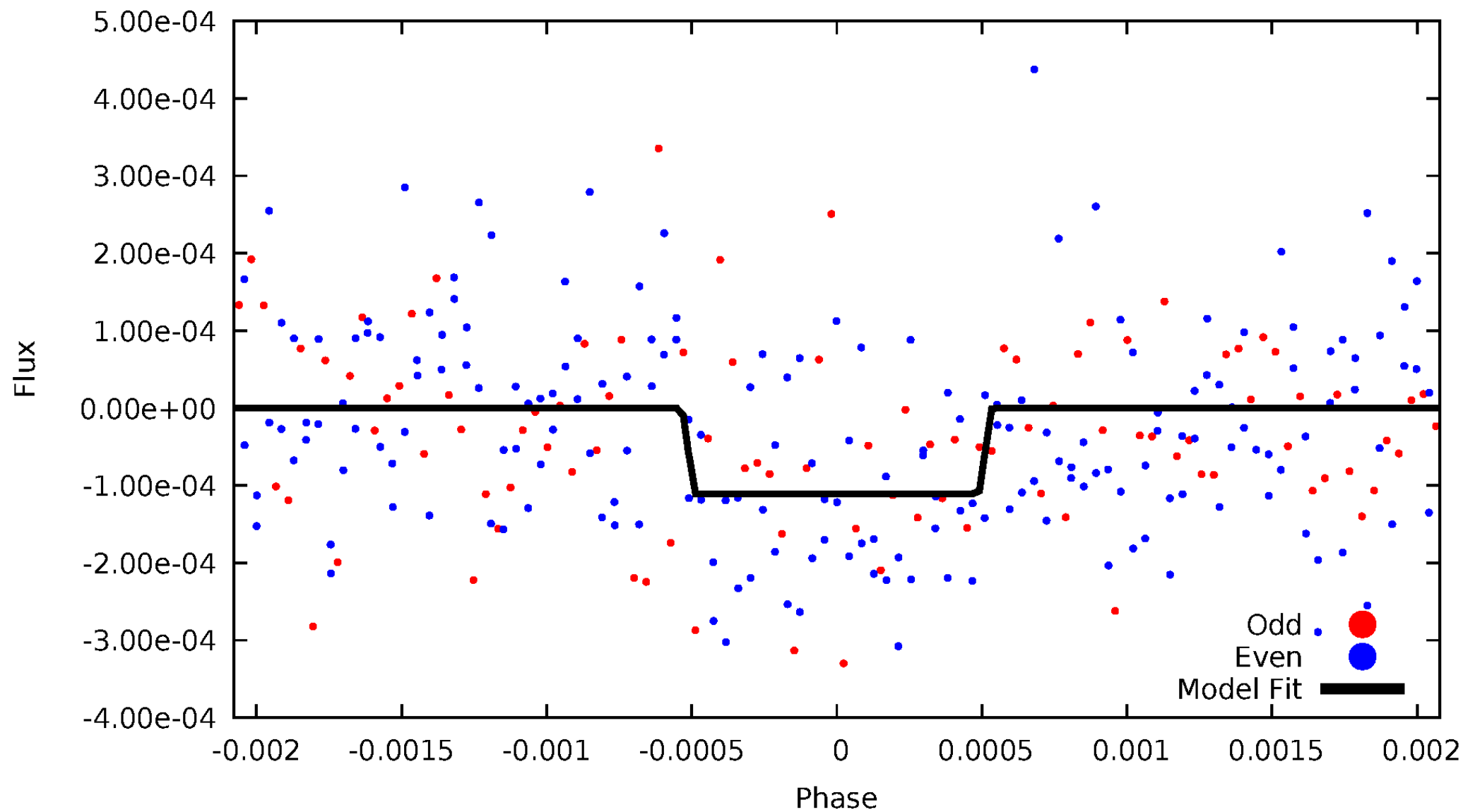
# DV Odd/Even

TCE 008687199-01



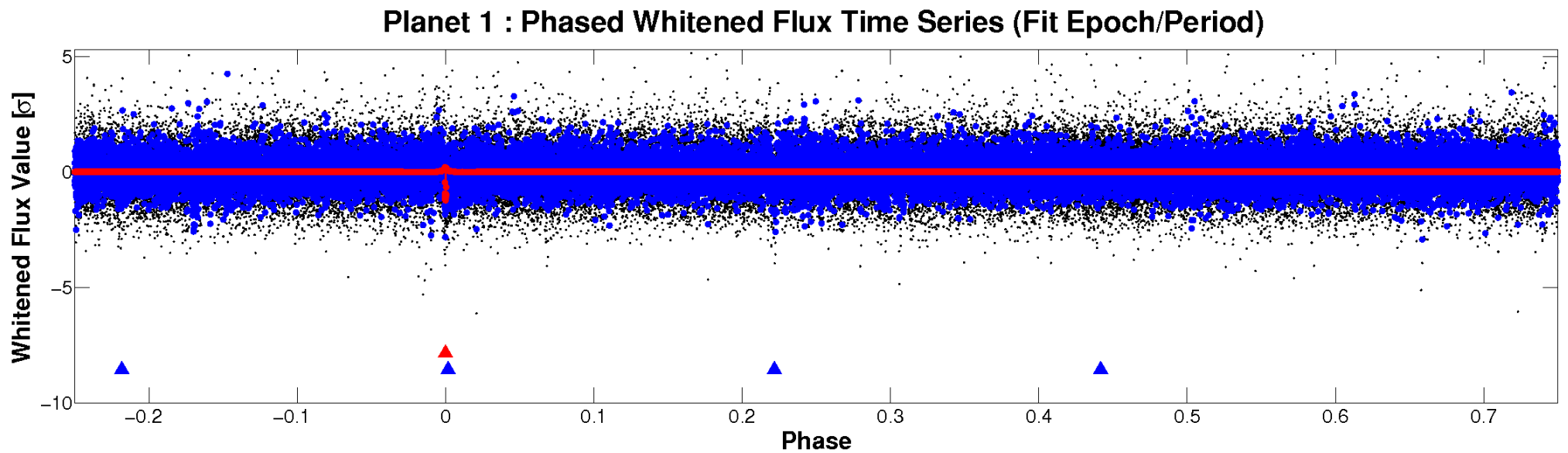
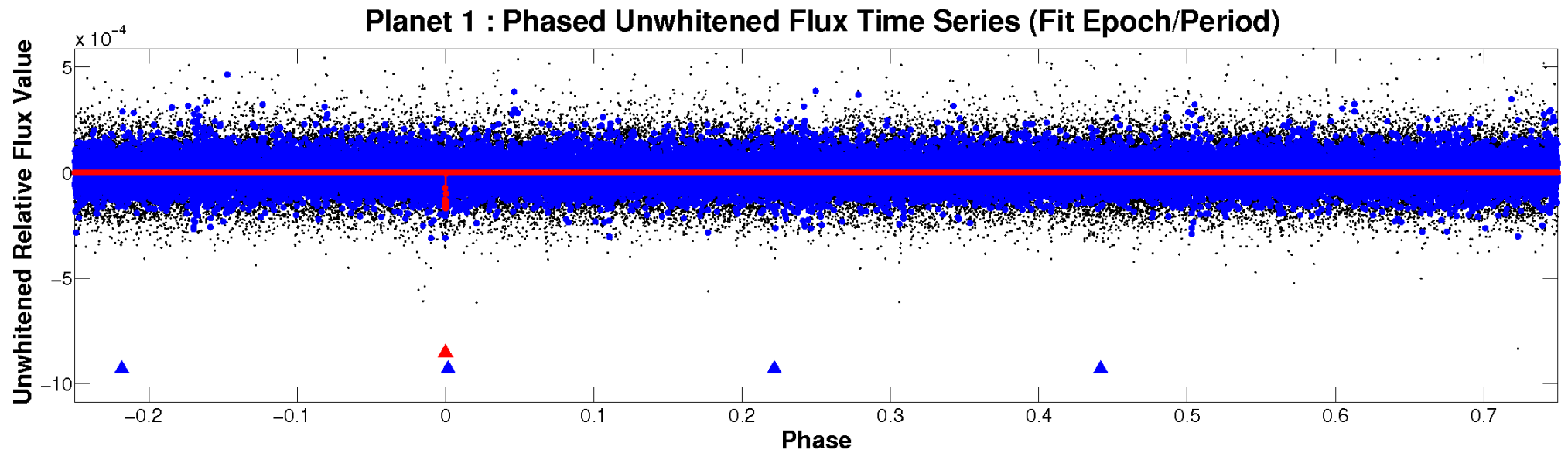
# ALT Odd/Even

TCE 008687199-01





# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

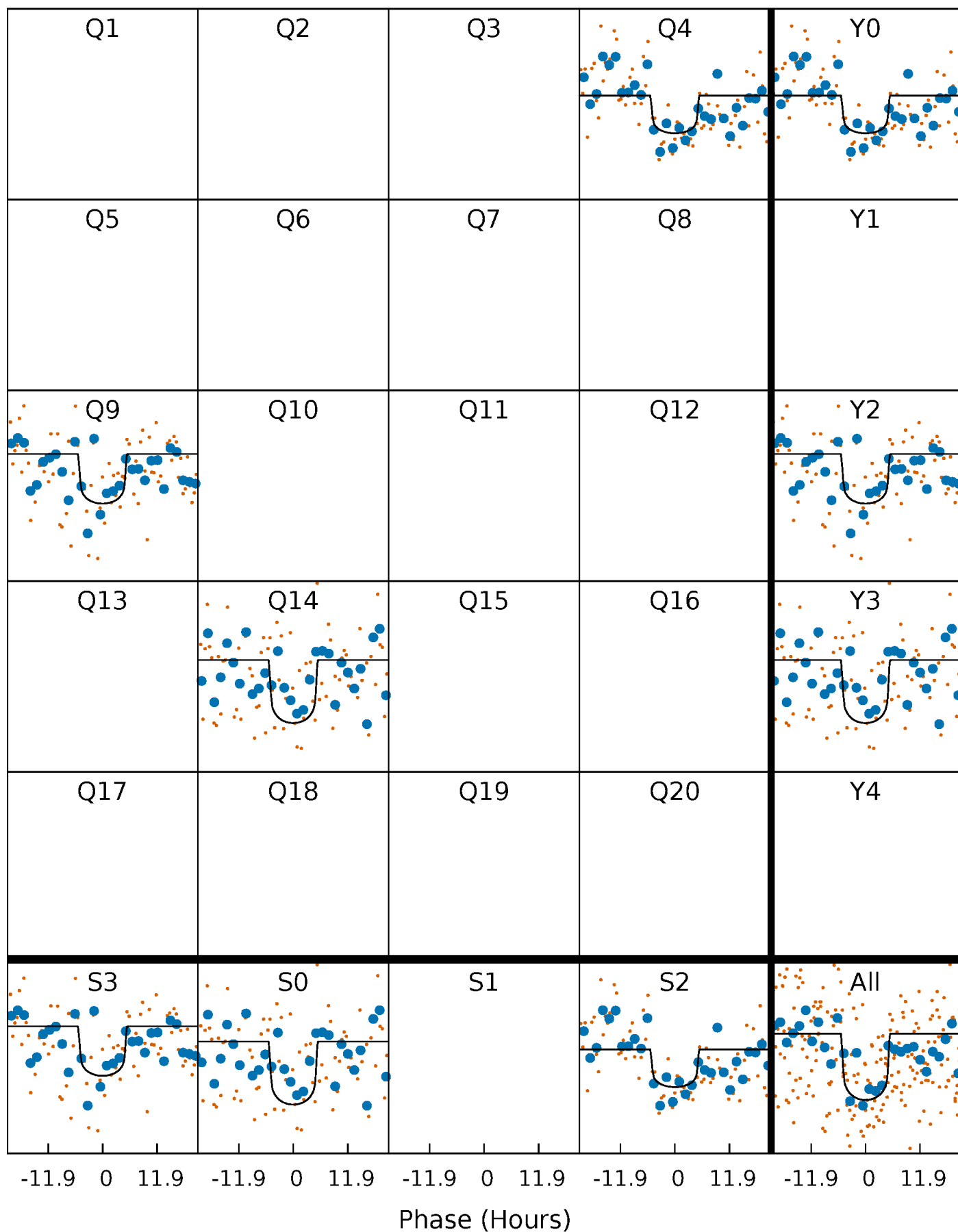
TCE 008687199-01 P=480.522136 Days  $T_0=403.827514$  (BKJD)





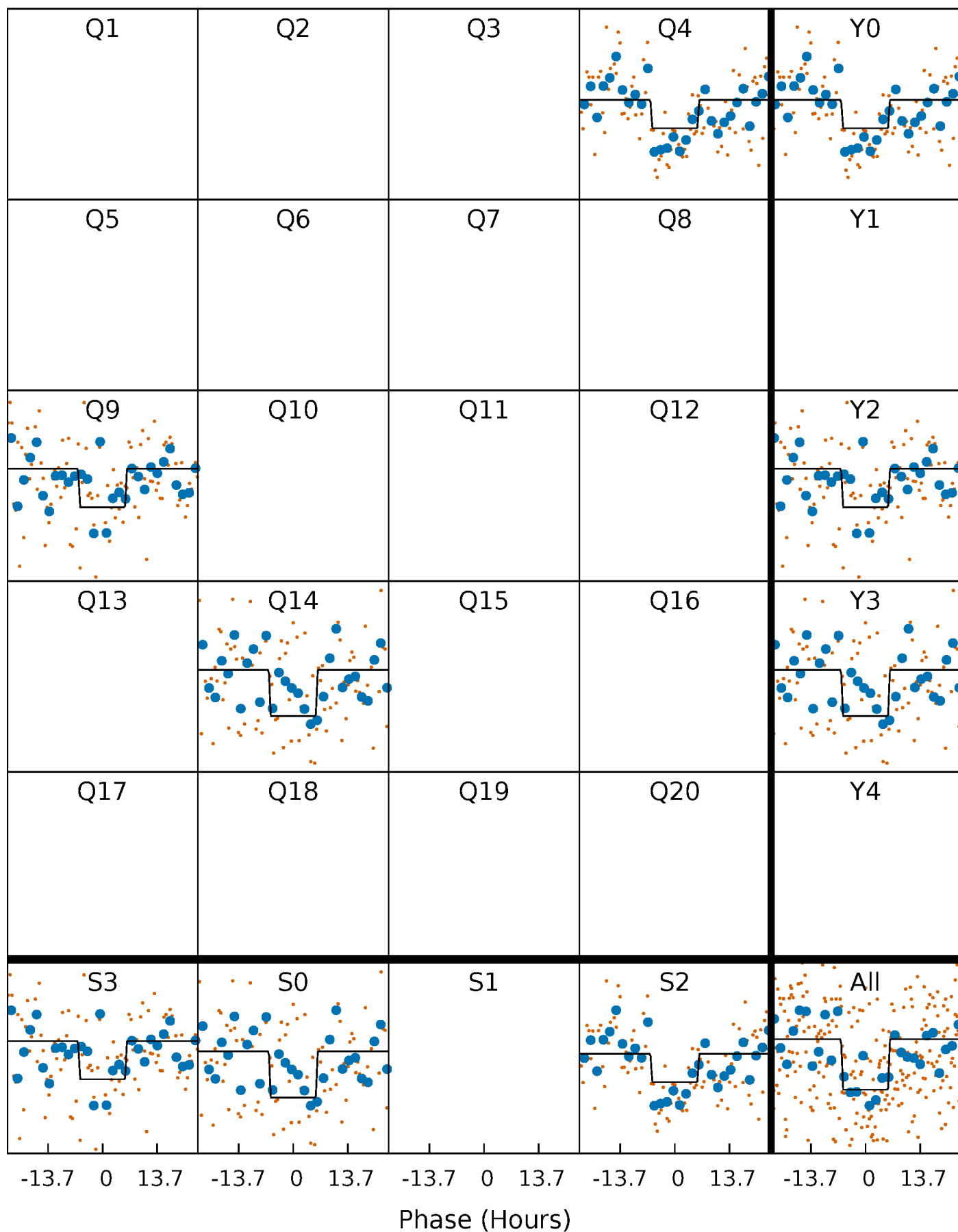
# DV Quarter-Phased Transit Curves

TCE 008687199-01 P=480.522136 Days  $T_0=403.827514$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

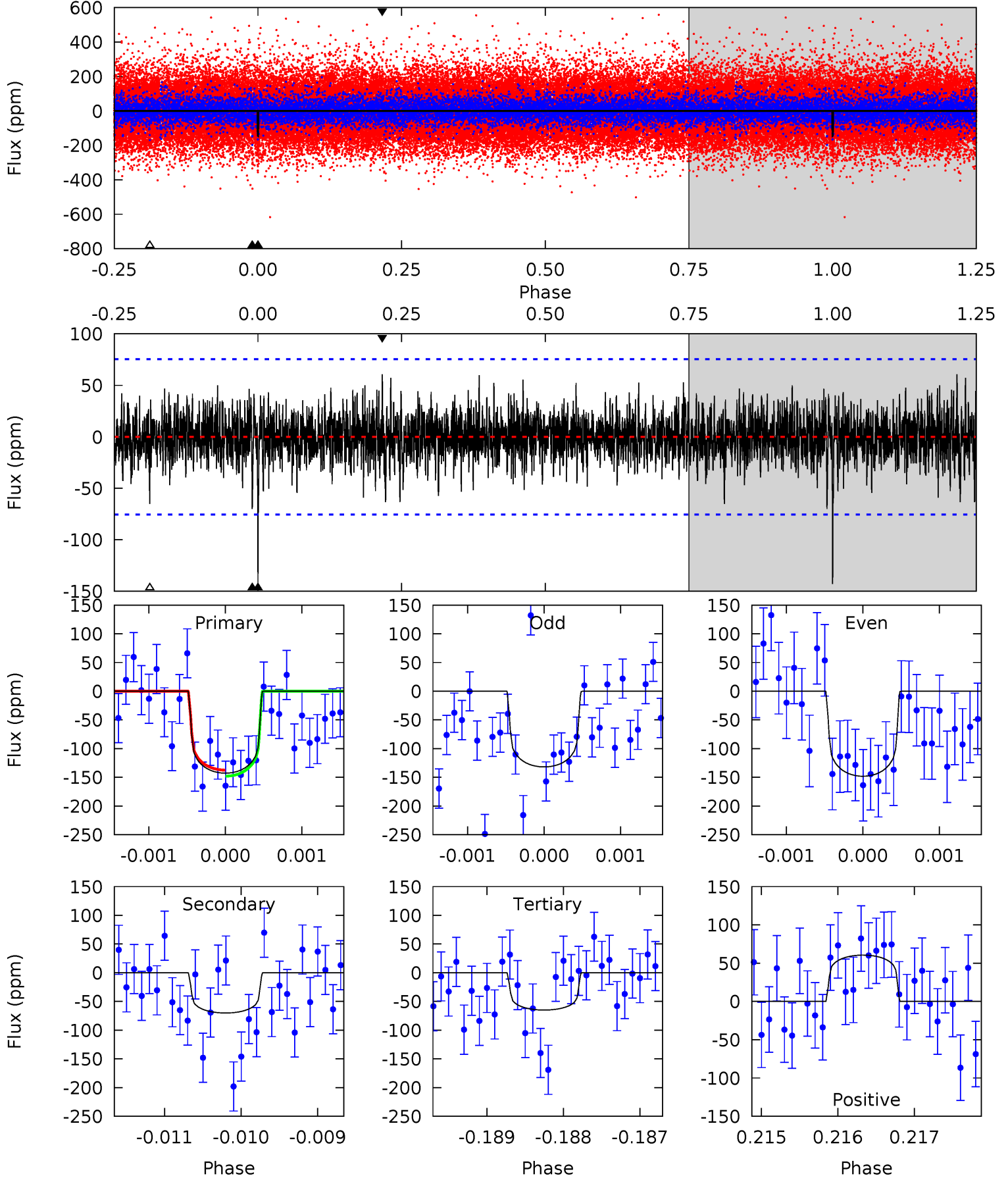
TCE 008687199-01 P=480.427052 Days  $T_0=403.868531$  (BKJD)



# DV Model-Shift Uniqueness Test

008687199-01, P = 480.522136 Days, E = 403.827514 Days

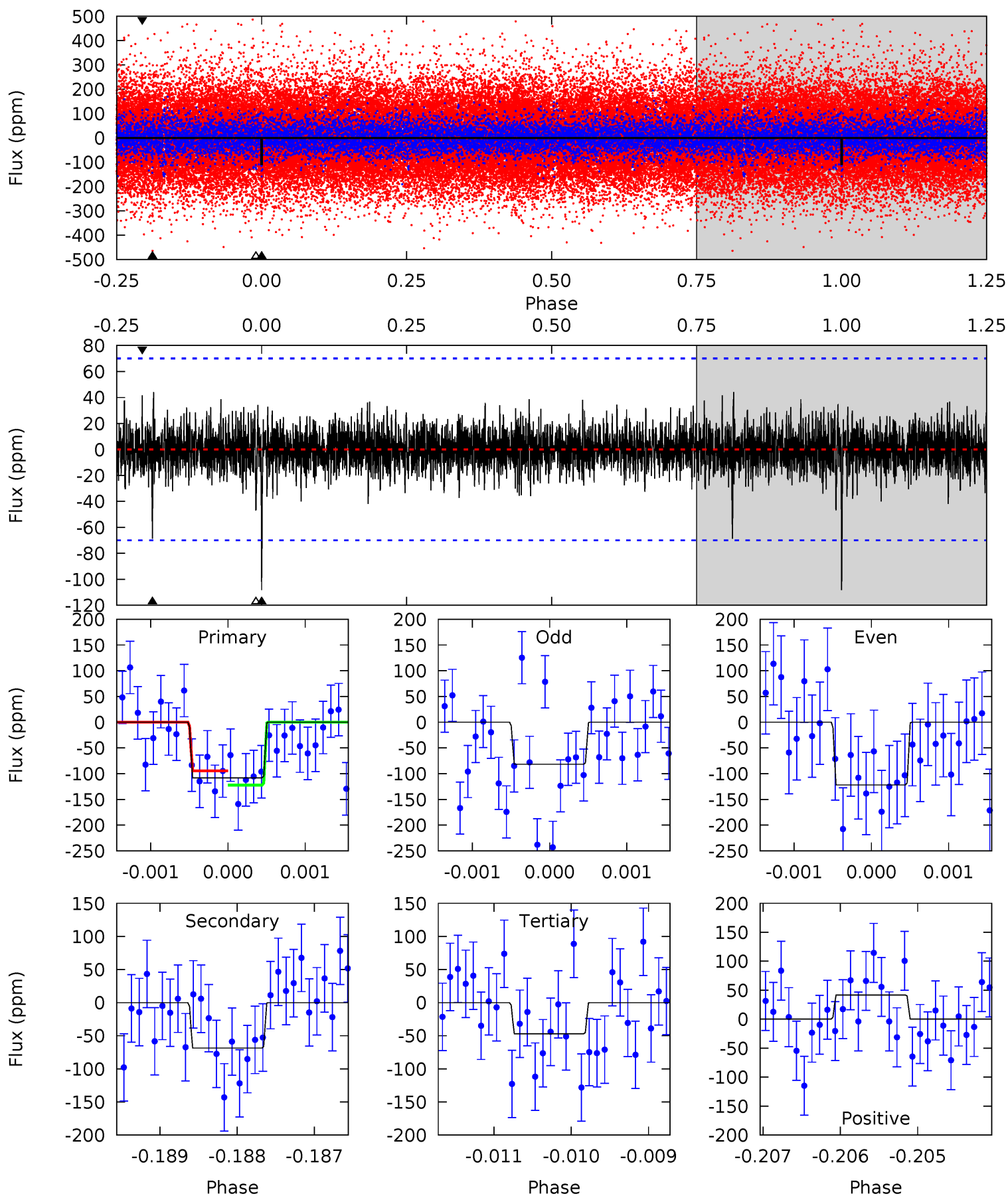
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.3	5.08	4.70	4.38	5.46	3.30	1.23	5.63	5.95	0.37	0.69	0.56	1.08	0.30	0.38



# Alt Model-Shift Uniqueness Test

008687199-01, P = 480.427052 Days, E = 403.868531 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
8.41	5.33	3.64	3.24	5.44	3.27	0.87	4.77	5.18	1.69	2.09	1.48	1.33	0.29	1.08



### Stellar Parameters For KIC 008687199

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6465^{+175}_{-175}$	$4.048^{+0.247}_{-0.133}$	$-0.580^{+0.350}_{-0.300}$	$1.587^{+0.346}_{-0.461}$	$1.027^{+0.177}_{-0.118}$	$0.362^{+0.504}_{-0.135}$
	+3%/-3%	+6%/-3%	+60%/-52%	+22%/-29%	+17%/-11%	+139%/-37%
Source	PHO1	FLK73	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 008687199-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-70 \pm 14$	$2.24^{+1.37}_{-1.12}$	$454^{+29}_{-36}$	$5137^{+2189}_{-812}$	$10742^{+34710}_{-6192}$
Alt.	$-69 \pm 13$	$1.90^{+1.19}_{-1.01}$	$453^{+29}_{-36}$	$5524^{+3078}_{-1002}$	$14801^{+60364}_{-9095}$

$T_{max}$  = 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

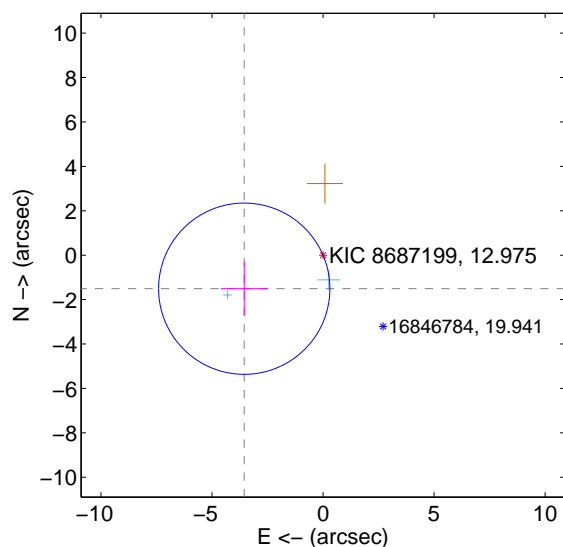
Supplemental centroid analysis for 008687199-01. Kepler magnitude: 12.97. Transit SNR 8.64

There are 2 quarters with good PRF difference image offsets

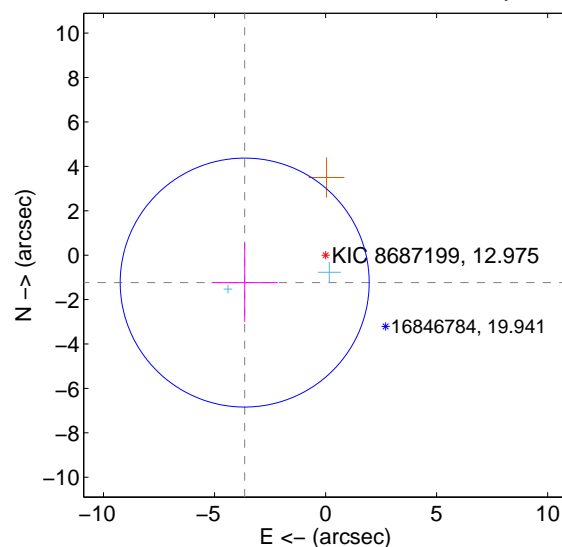
The direct PRF centroid is offset from the target star catalog position by about 0.27 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$3.856 \pm 1.285$	3.00	$3.548 \pm 1.057$	$-1.510 \pm 1.213$
PRF-fit source offset from KIC position	$3.846 \pm 1.868$	2.06	$3.642 \pm 1.492$	$-1.234 \pm 1.771$
photometric centroid source offset	$3.61 \pm 1.82$	1.98	$1.40 \pm 1.91$	$3.33 \pm 1.81$

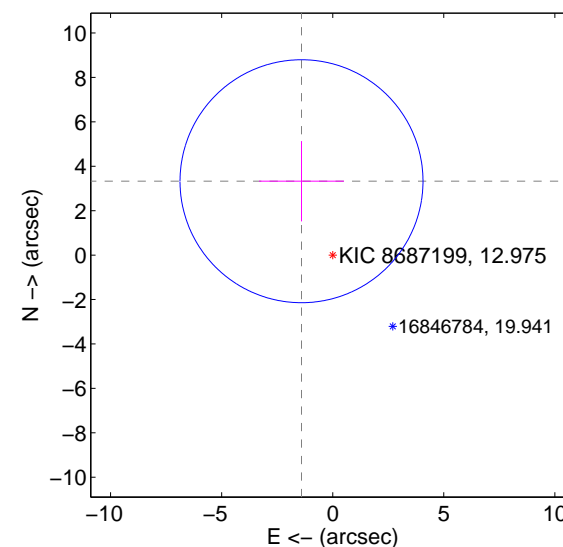
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

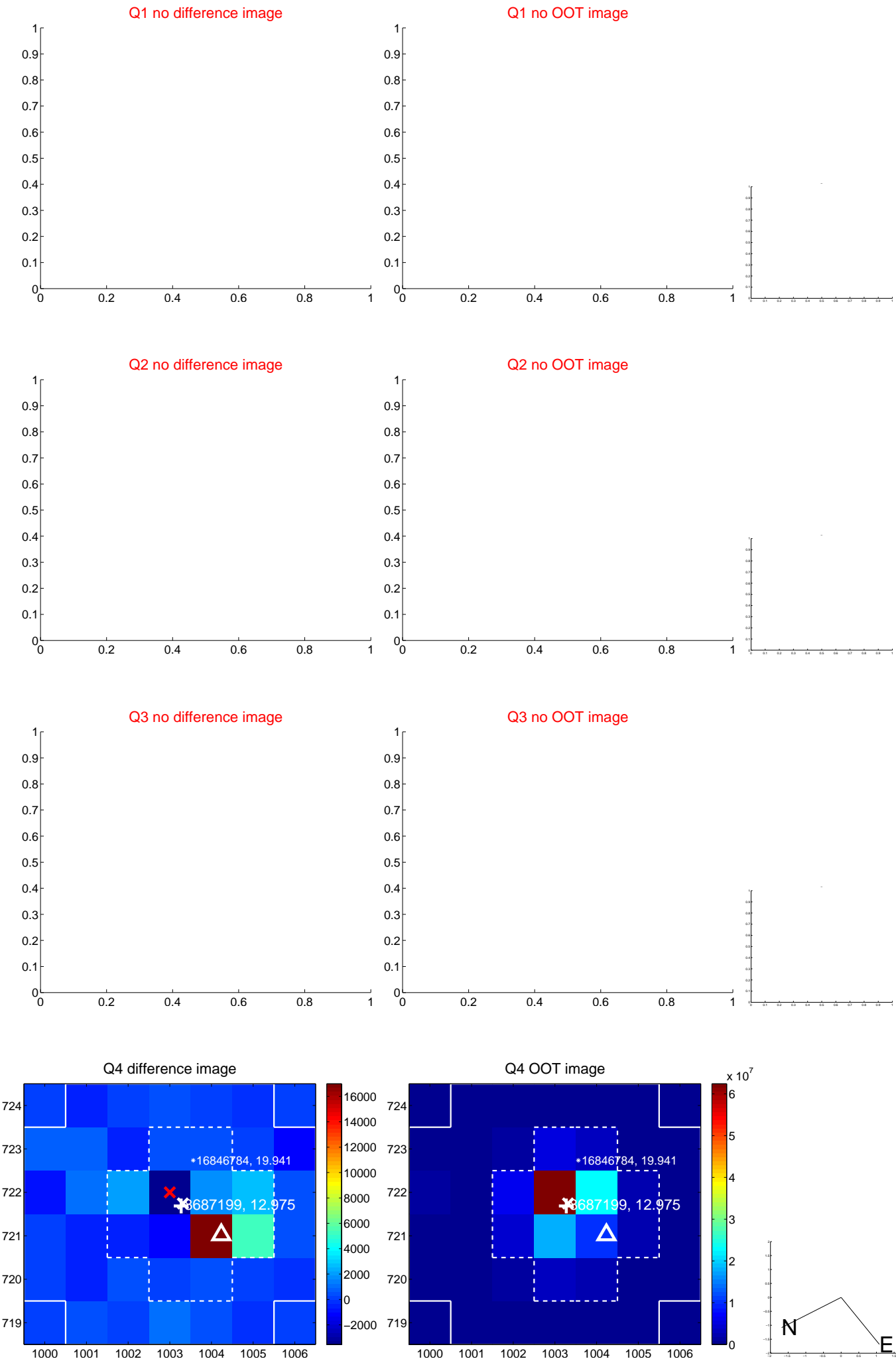


offset from photometric centroids



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.

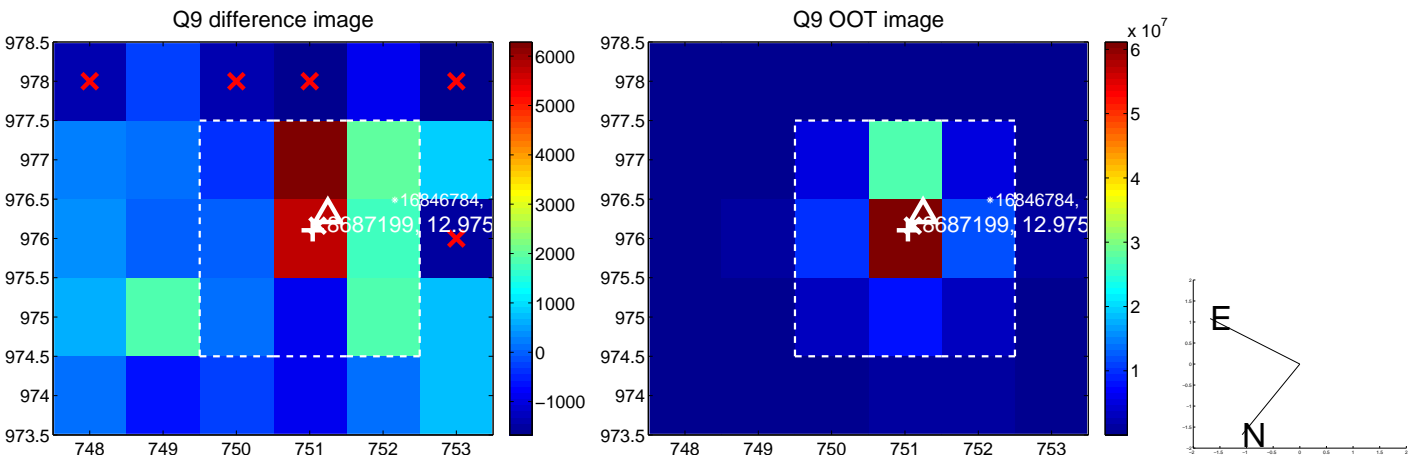




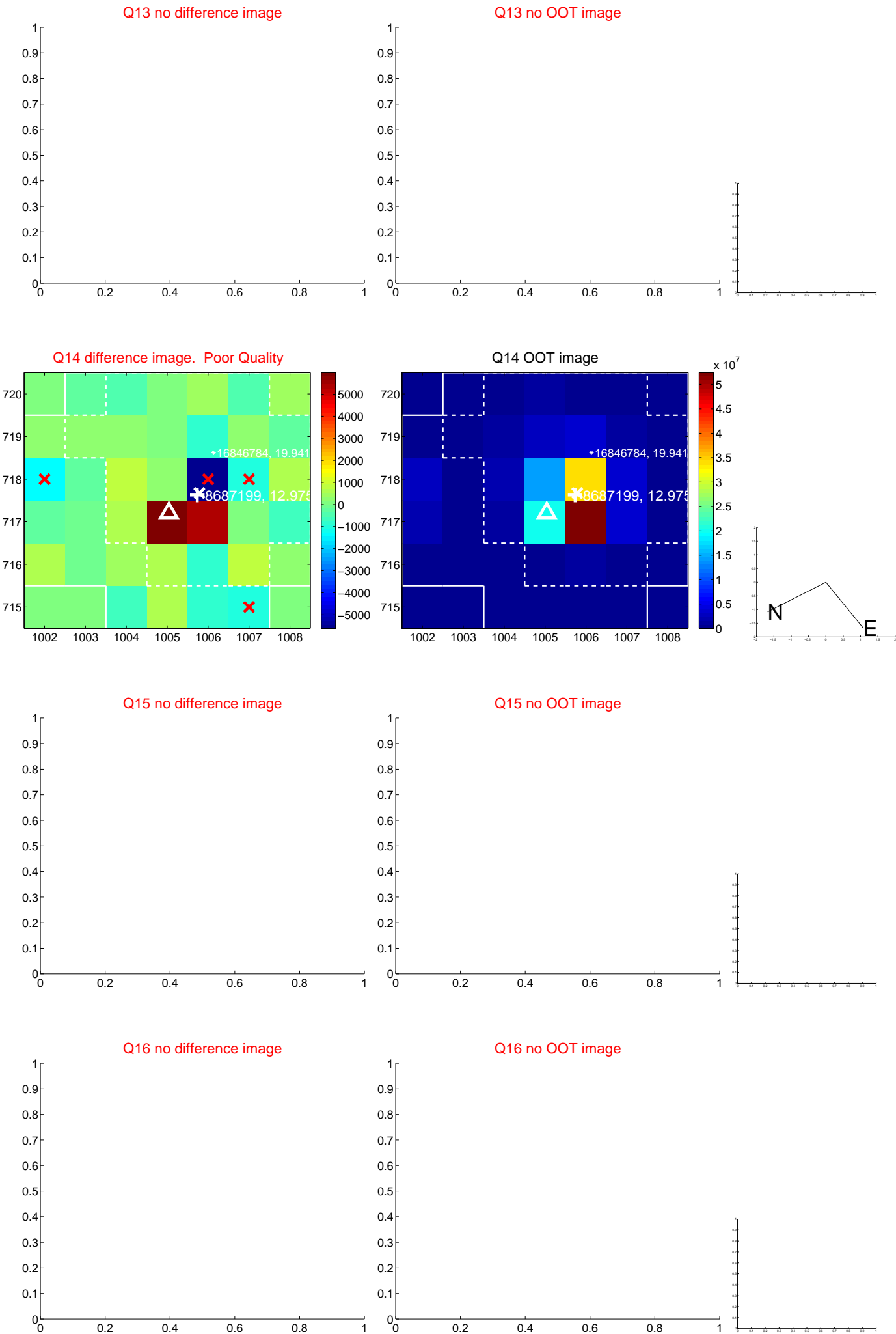
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



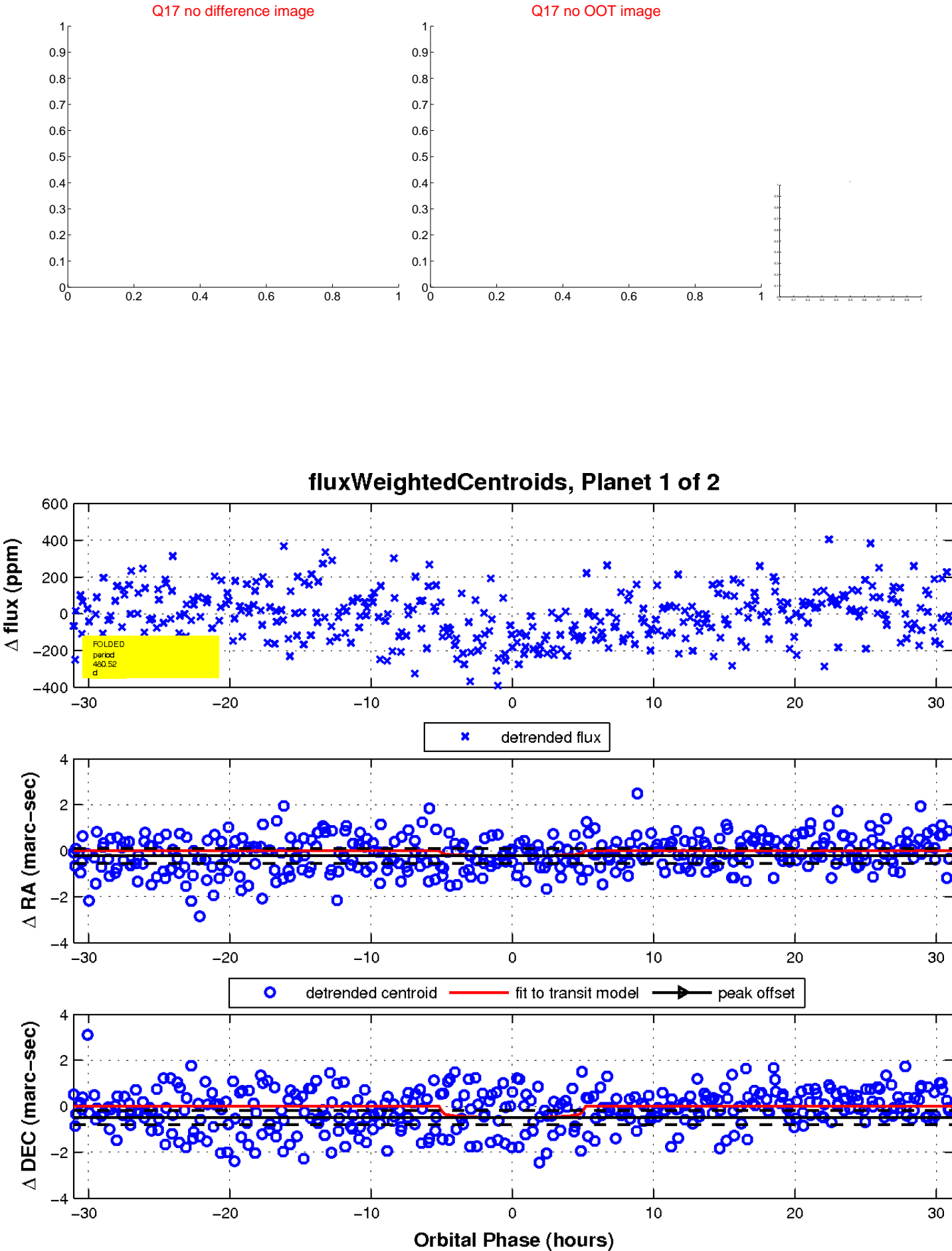
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

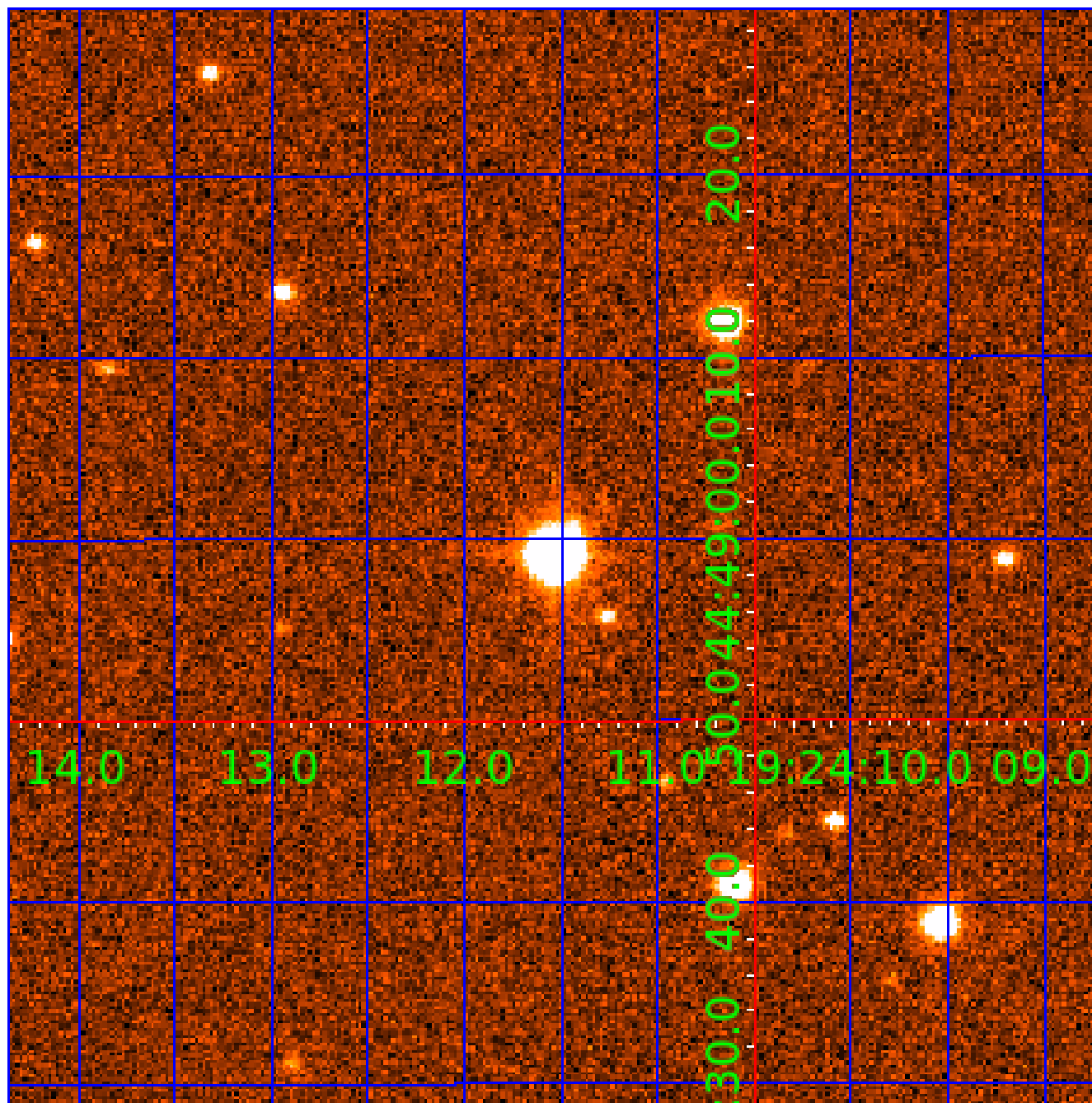


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 008687199

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008687199-01	OBS	No	480.522136	403.827514	168.9	10.429	9.1	8.6	1.59	6465	2.25	2.69
008687199-02	OBS	No	374.810011	135.581192	164.1	26.148	11.1	11.0	1.59	6465	2.20	3.74

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008687199-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—CENT_FEW_DIFFS
008687199-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_SKYE—LPP_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

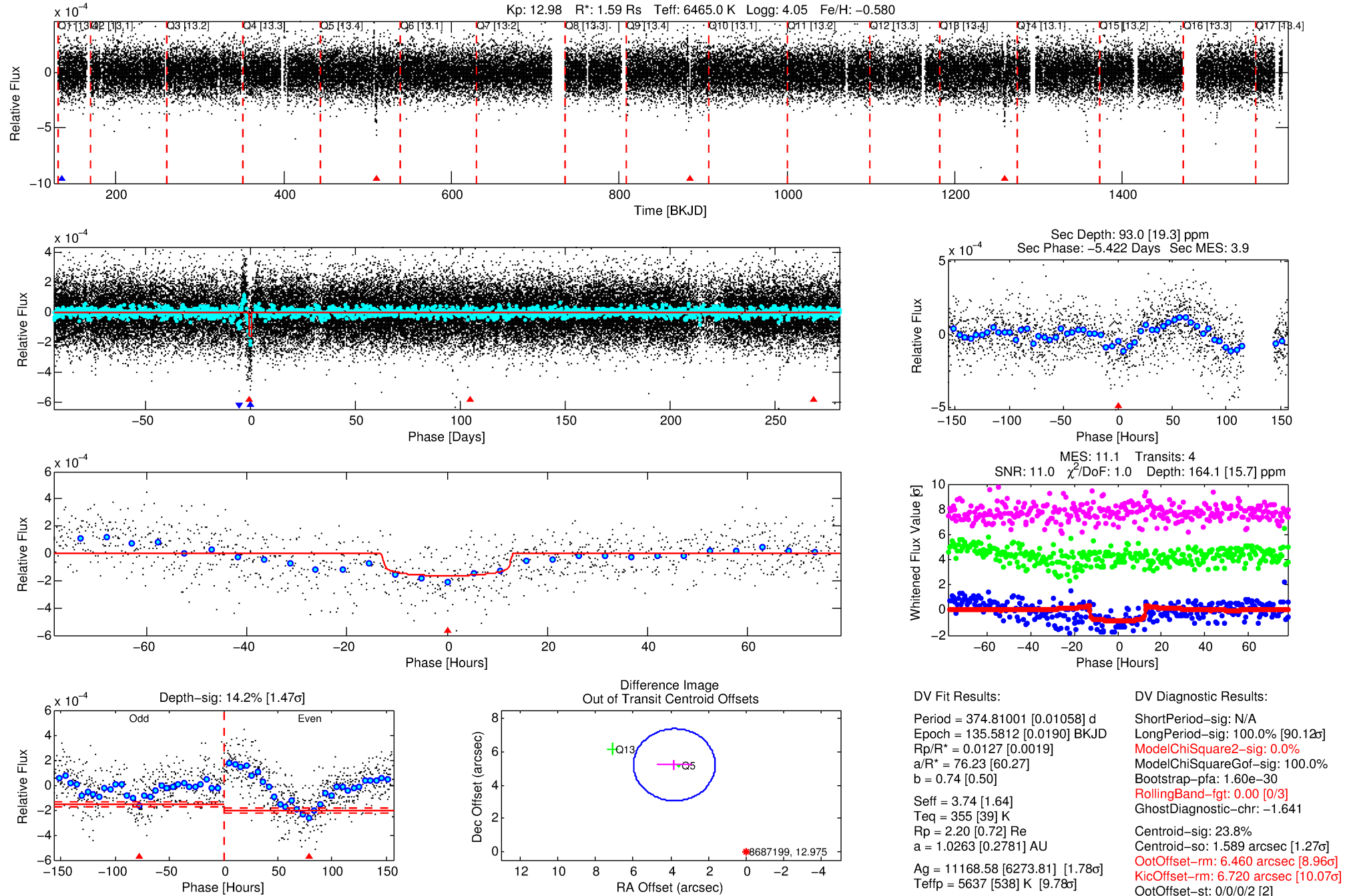
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 008687199-02

No Significant Match Found

# DV One-Page Summary

KIC: 8687199 Candidate: 2 of 2 Period: 374.810 d

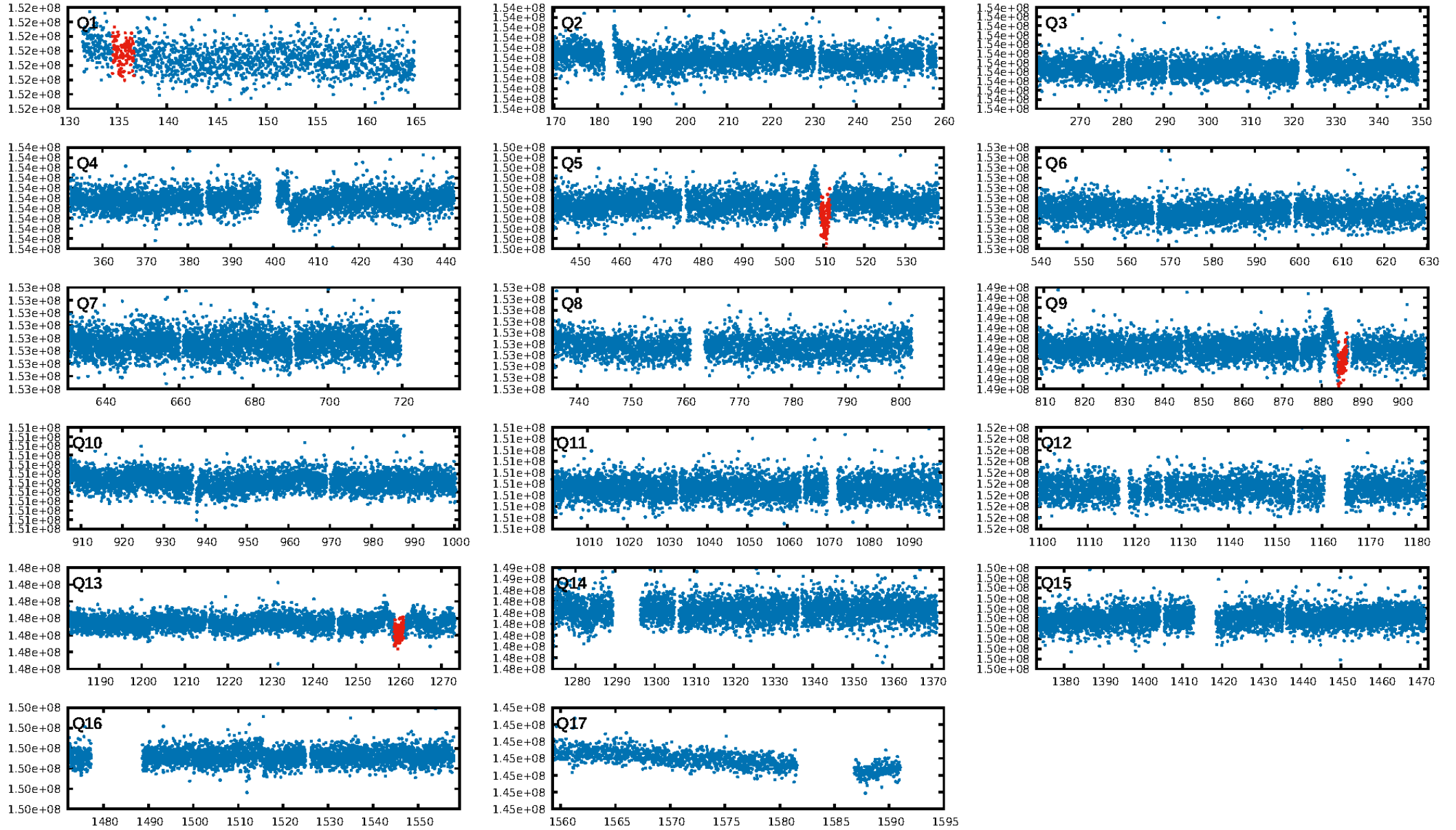


Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 18:21:02 Z

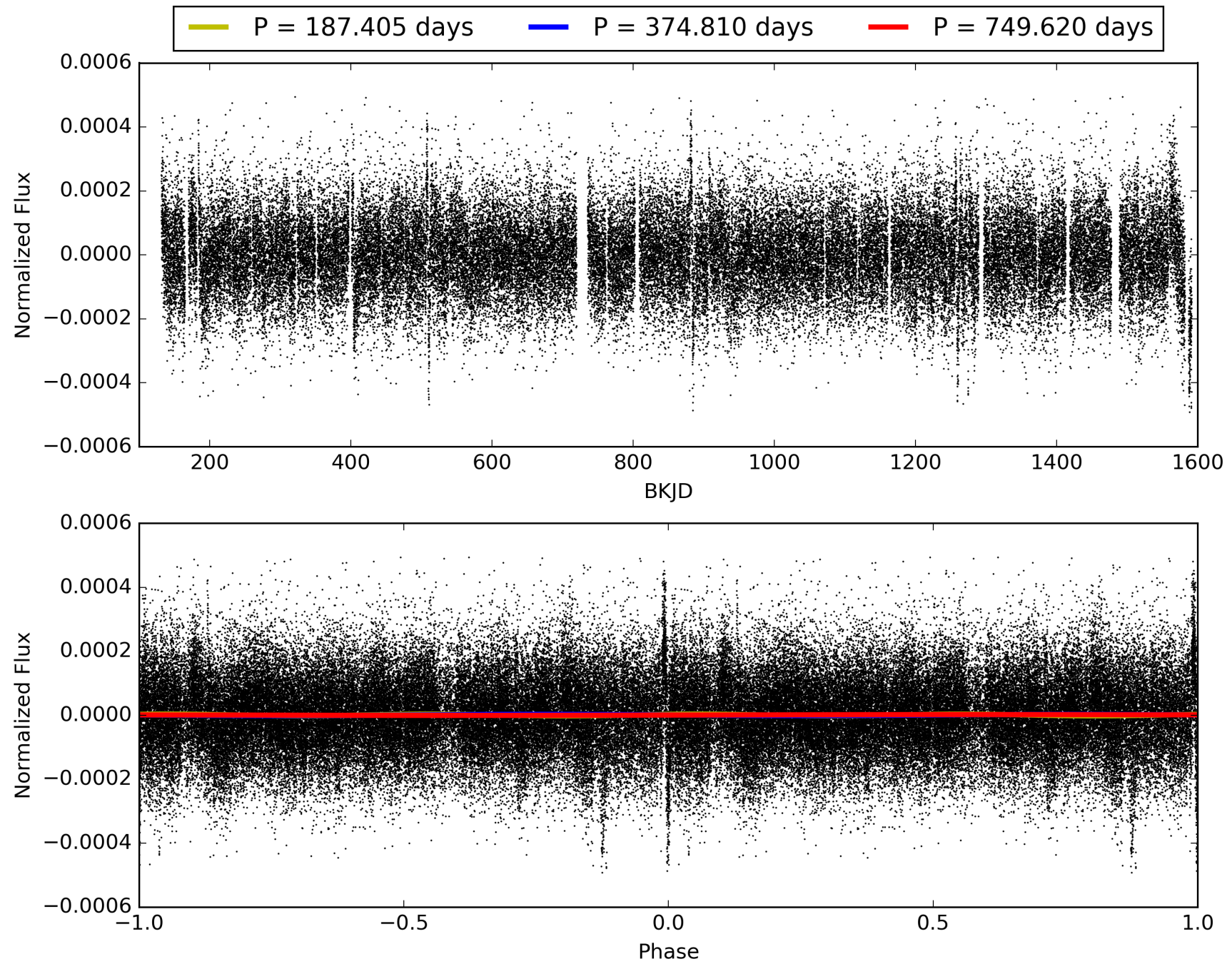
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 008687199-02, PDC Light Curves

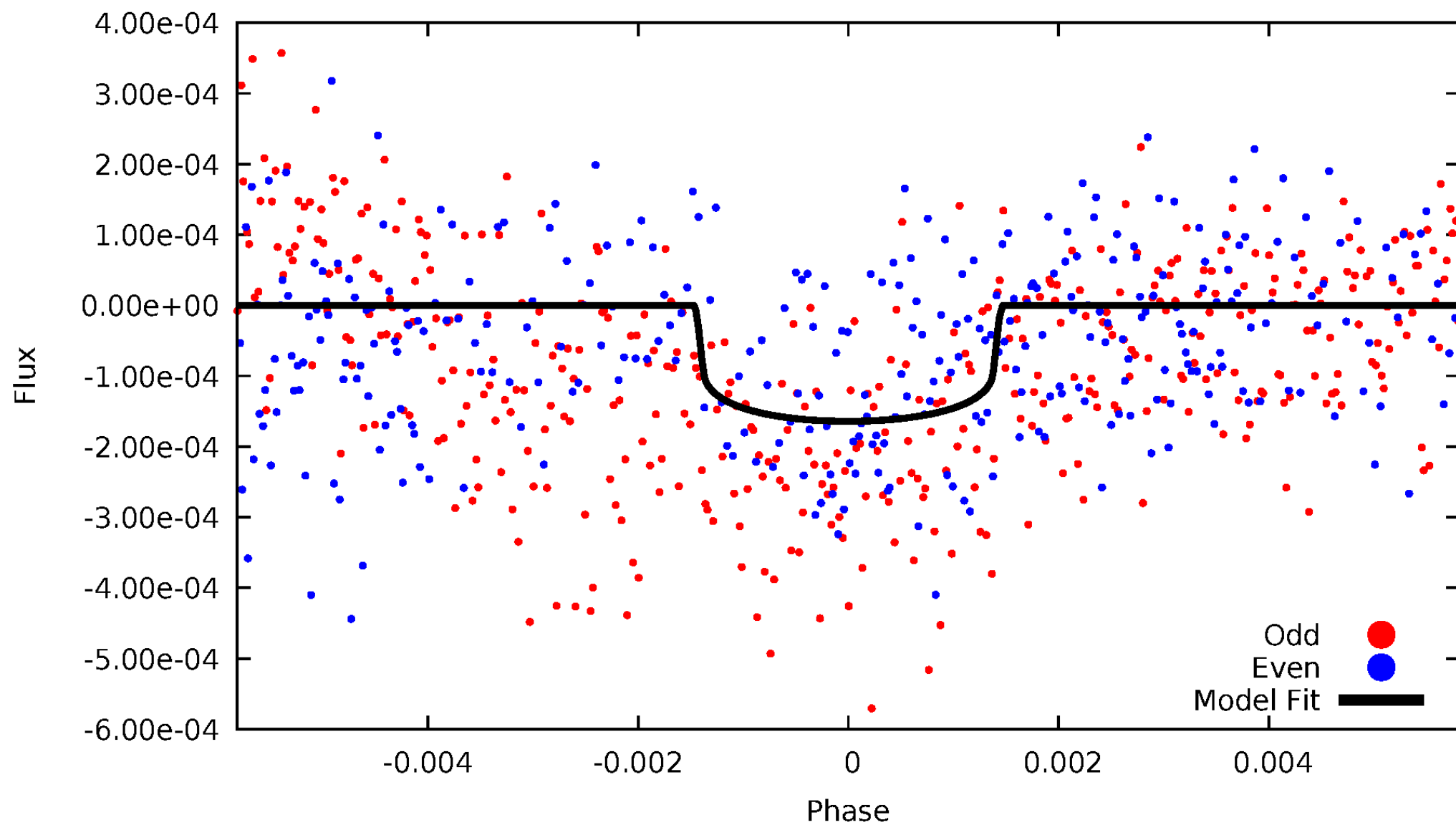


TCE 008687199-02



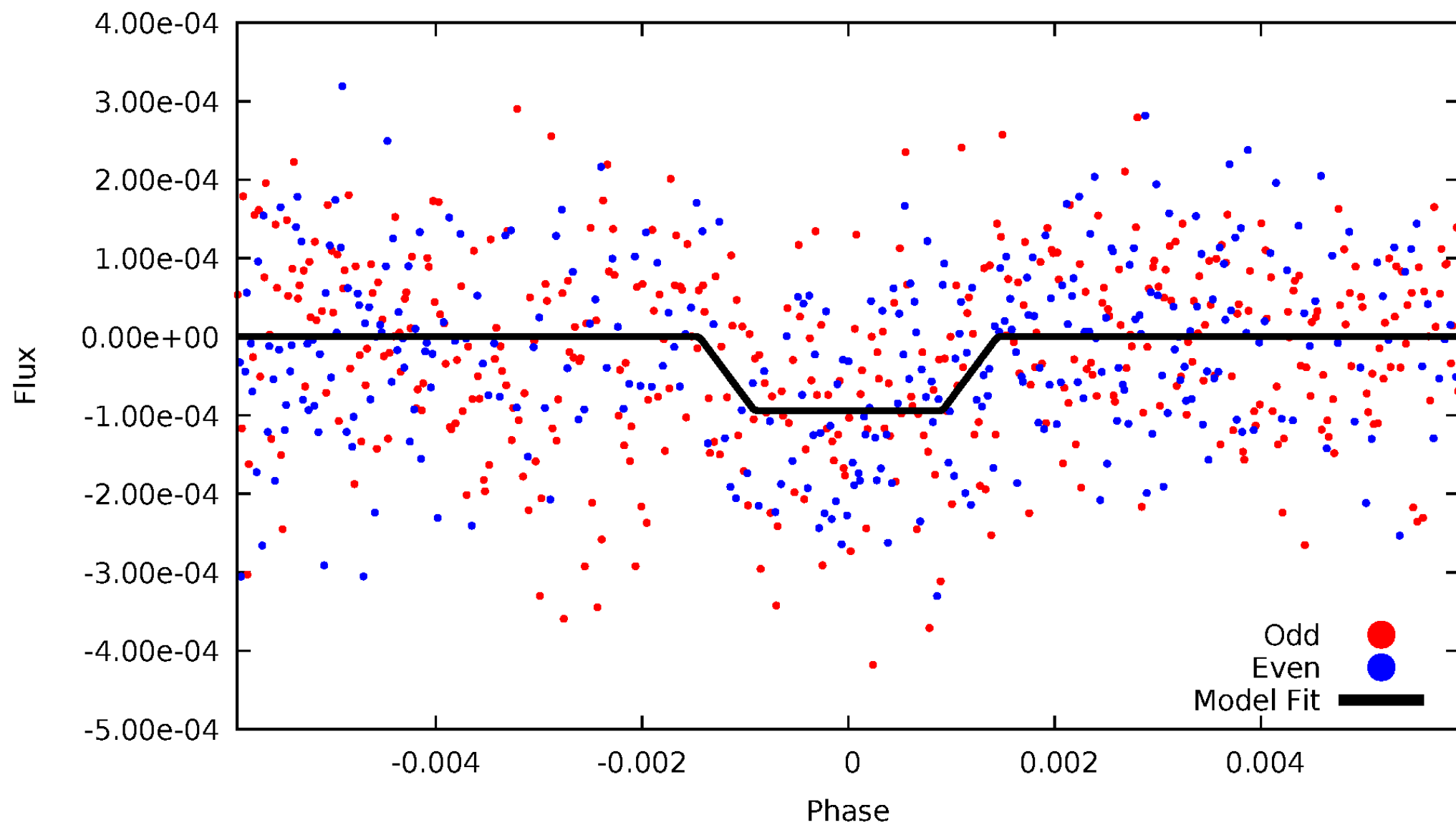
# DV Odd/Even

TCE 008687199-02



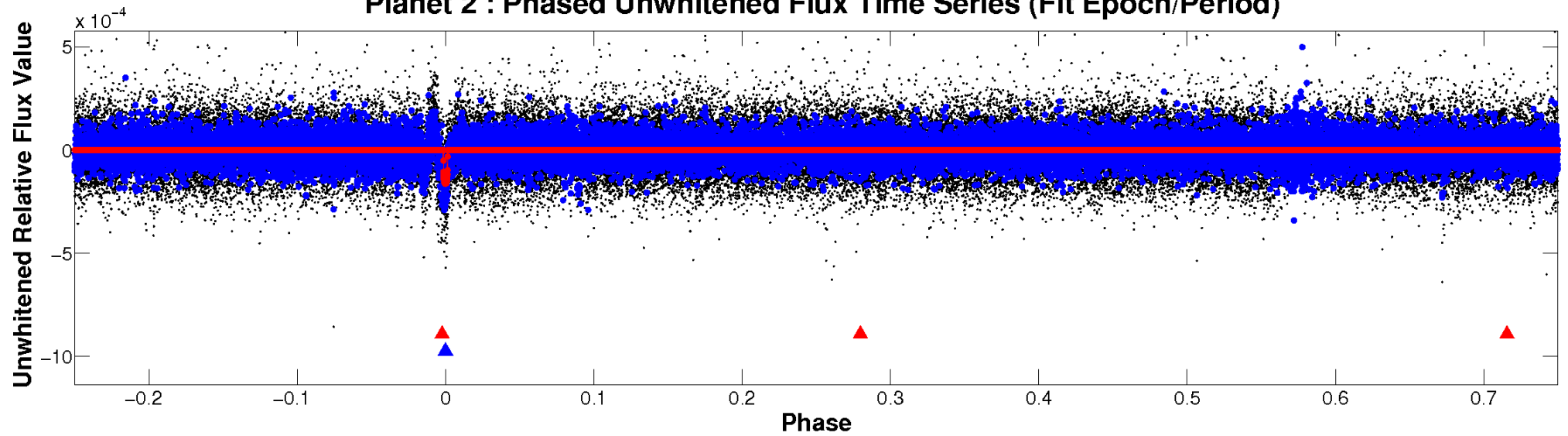
# ALT Odd/Even

TCE 008687199-02

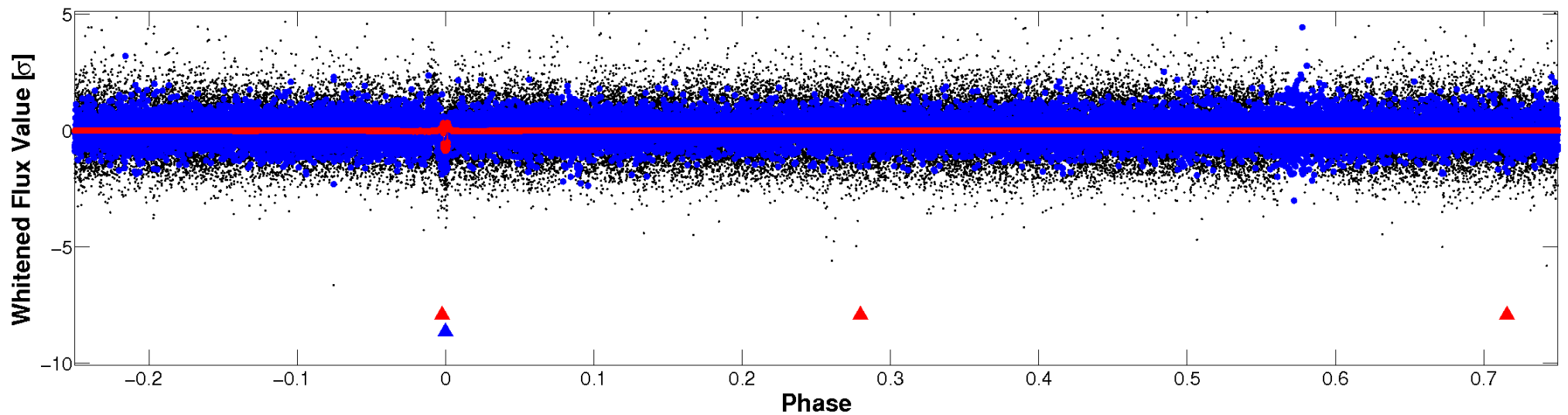


# Non-Whitened Vs. Whitened Light Curve

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

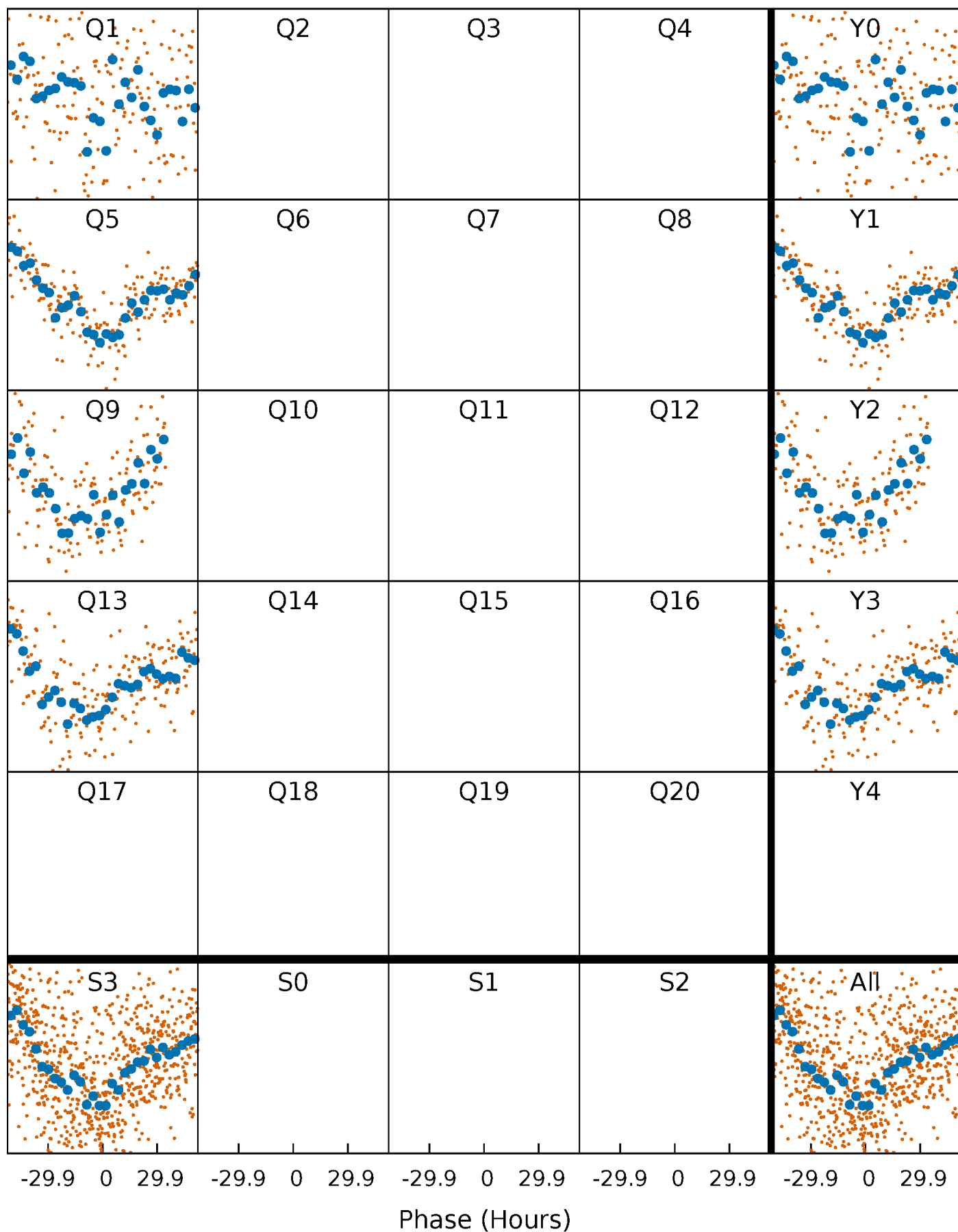


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



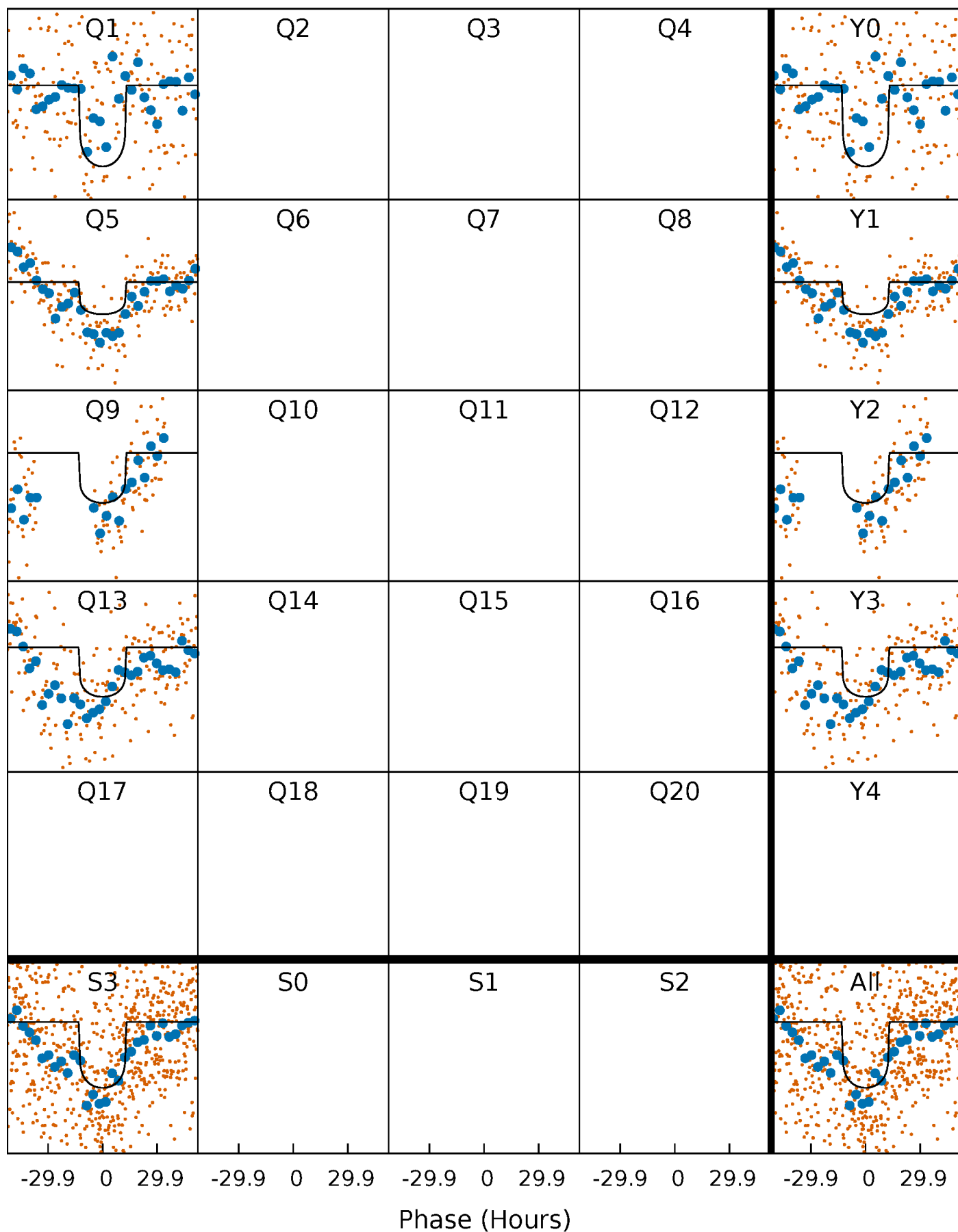
# PDC Quarter-Phased Transit Curves

TCE 008687199-02     $P=374.810011$  Days     $T_0=135.581192$  (BKJD)



# DV Quarter-Phased Transit Curves

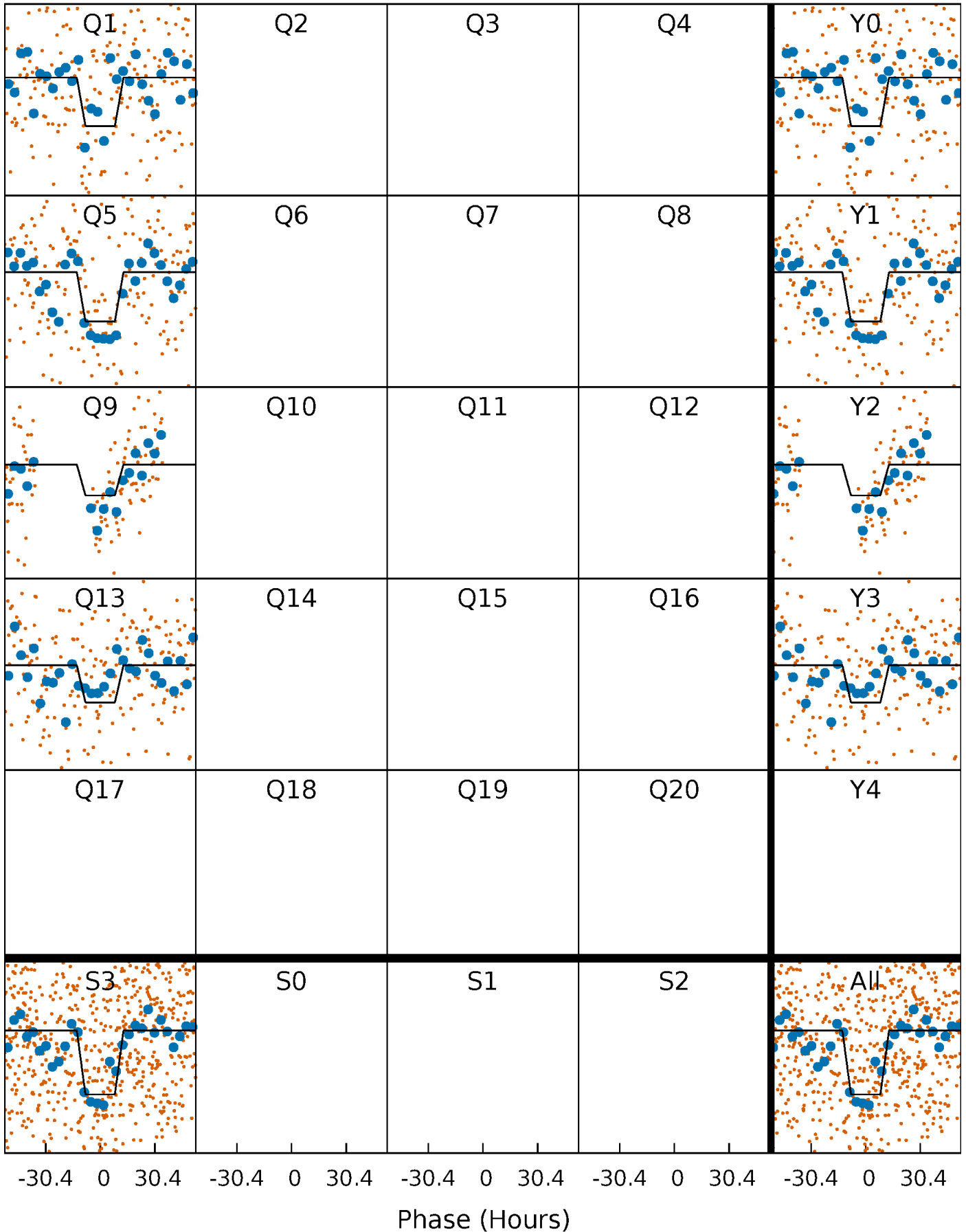
TCE 008687199-02     $P=374.810011$  Days     $T_0=135.581192$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

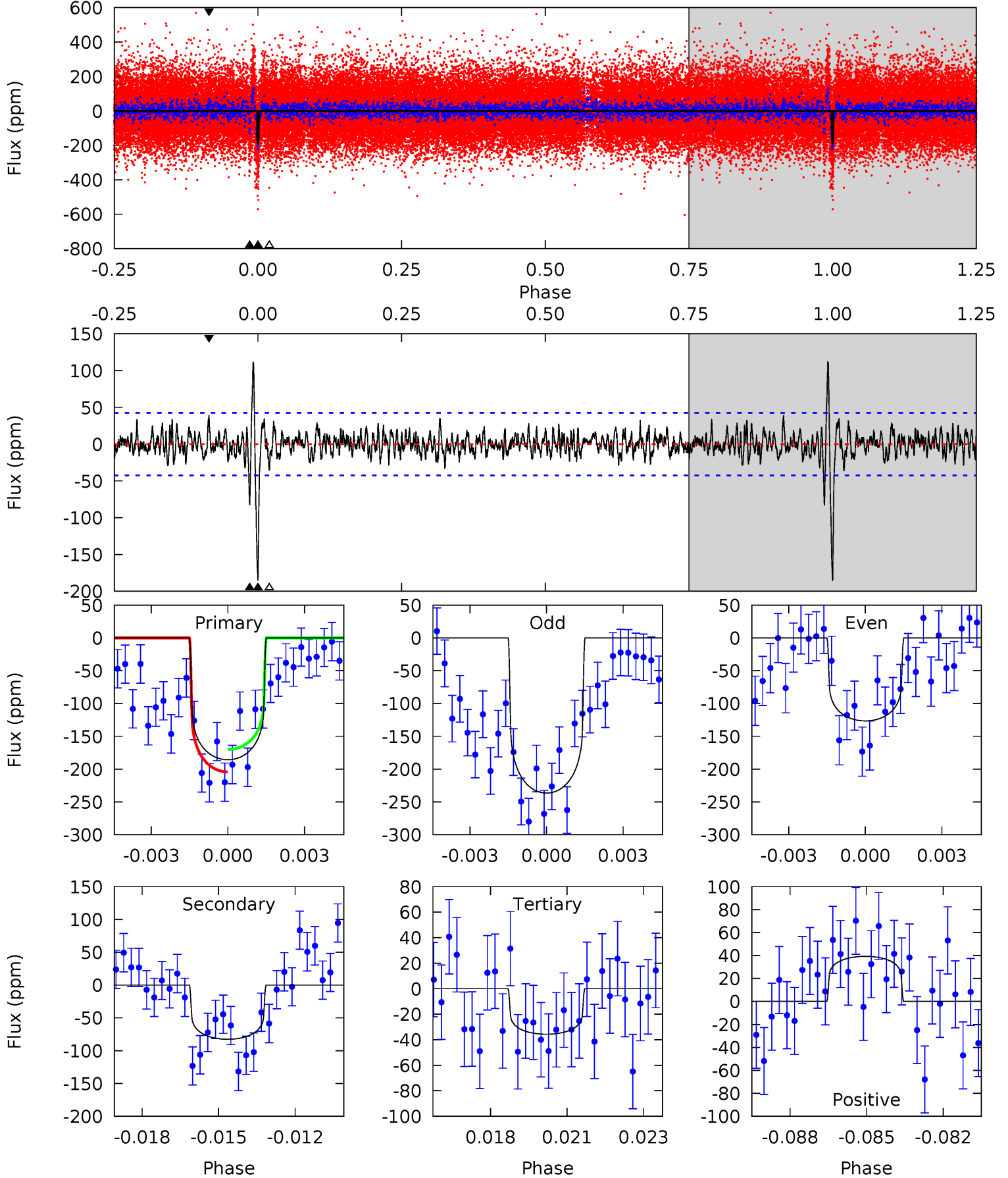
TCE 008687199-02   P=374.805980 Days    $T_0=135.577955$  (BKJD)



# DV Model-Shift Uniqueness Test

008687199-02, P = 374.810011 Days, E = 135.581192 Days

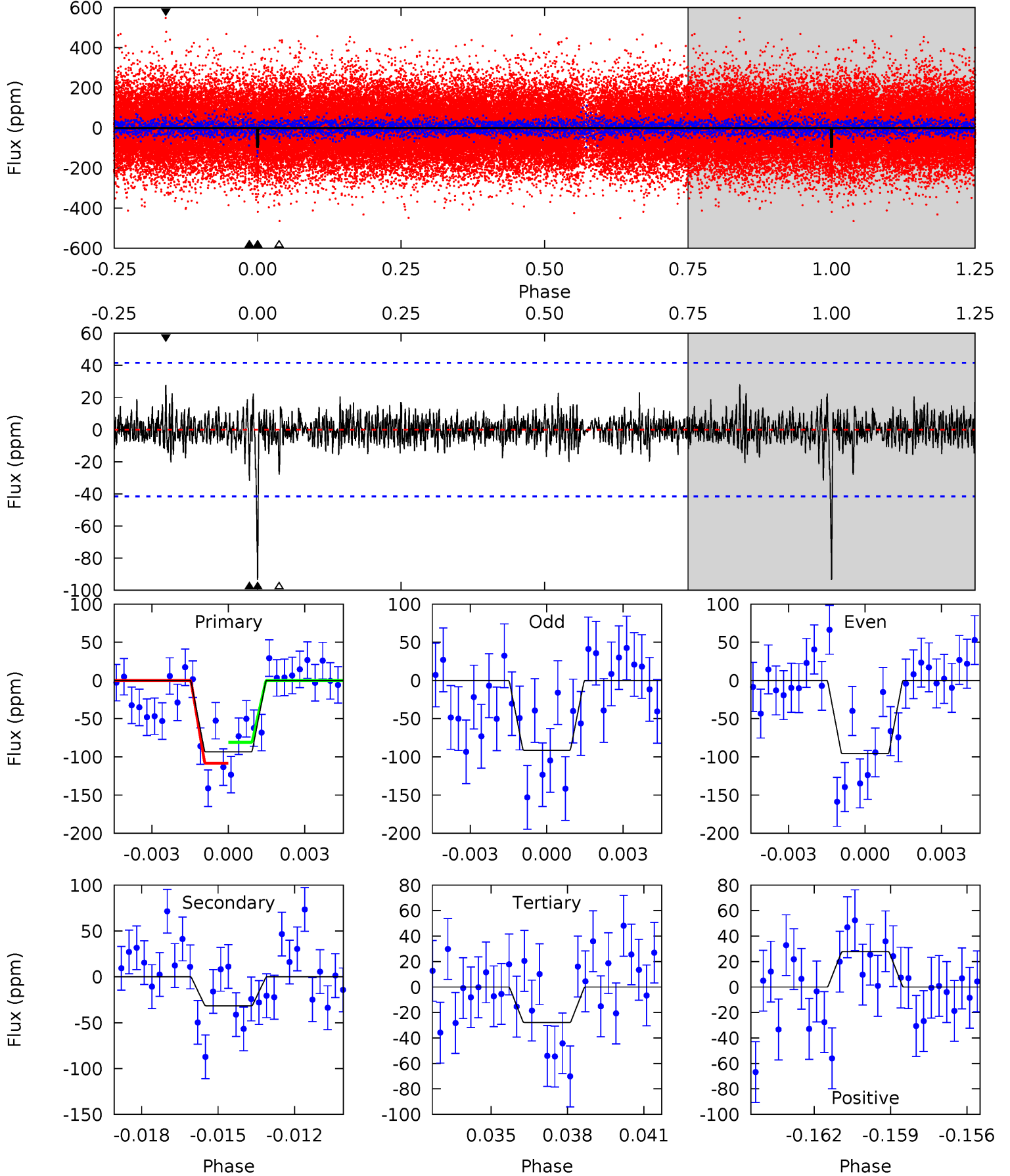
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
23.0	10.2	4.41	4.86	5.26	2.97	1.67	18.6	18.1	5.81	5.37	6.80	0.93	0.38	2.11



# Alt Model-Shift Uniqueness Test

008687199-02,  $P = 374.805980$  Days,  $E = 135.577955$  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
11.8	3.99	3.52	3.51	5.26	2.97	0.81	8.30	8.31	0.47	0.48	0.28	1.00	0.23	1.73



### Stellar Parameters For KIC 008687199

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6465^{+175}_{-175}$	$4.048^{+0.247}_{-0.133}$	$-0.580^{+0.350}_{-0.300}$	$1.587^{+0.346}_{-0.461}$	$1.027^{+0.177}_{-0.118}$	$0.362^{+0.504}_{-0.135}$
	+3%/-3%	+6%/-3%	+60%/-52%	+22%/-29%	+17%/-11%	+139%/-37%
Source	PHO1	FLK73	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 008687199-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-83 \pm 8$	$2.19^{+0.45}_{-0.46}$	$492^{+31}_{-37}$	$5474^{+505}_{-380}$	$10112^{+6383}_{-3188}$
Alt.	$-32 \pm 8$	$1.66^{+0.38}_{-0.41}$	$490^{+33}_{-38}$	$5004^{+531}_{-469}$	$6899^{+5449}_{-2856}$

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

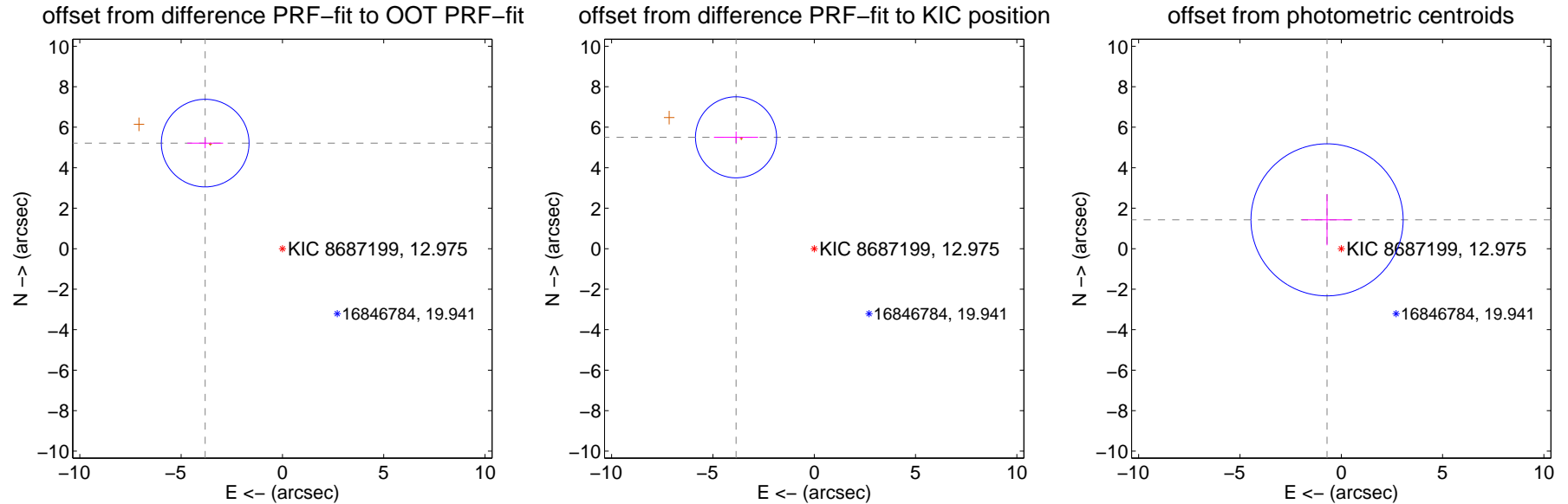
## DV Centroid Data

Supplemental centroid analysis for 008687199-02. Kepler magnitude: 12.97. Transit SNR 10.97

There are 0 quarters with good PRF difference image offsets

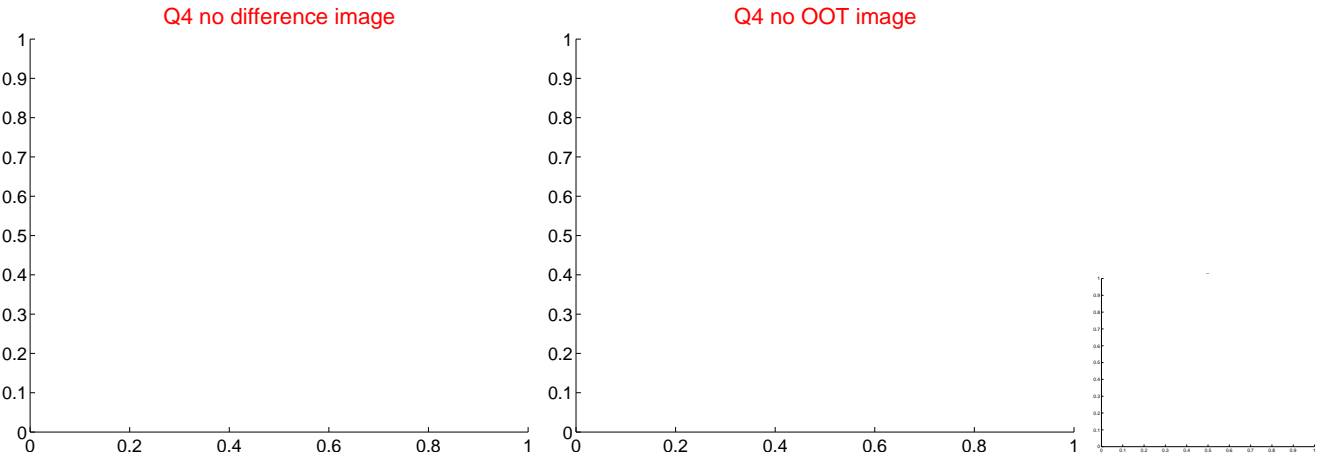
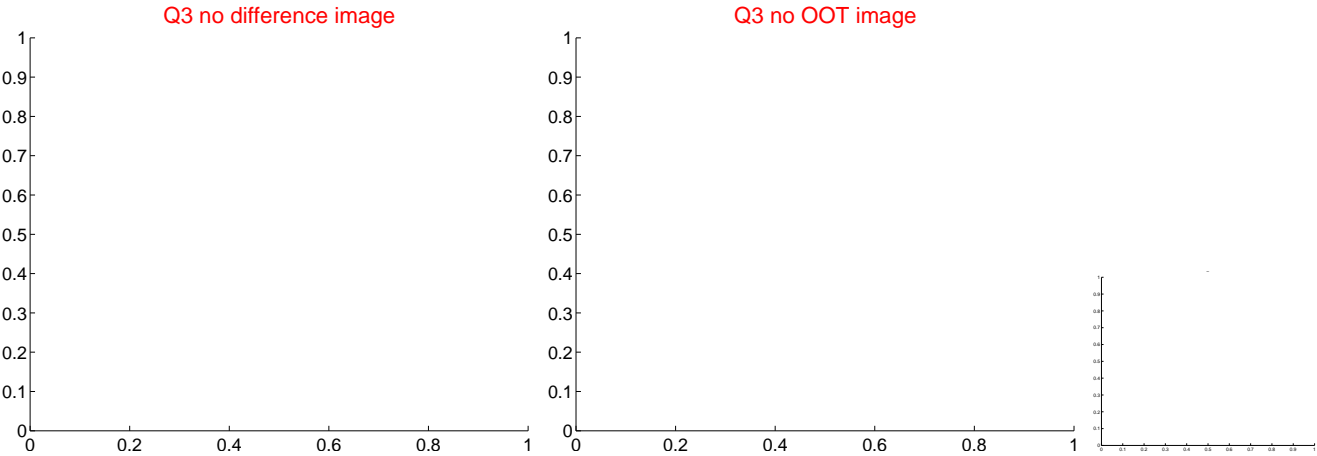
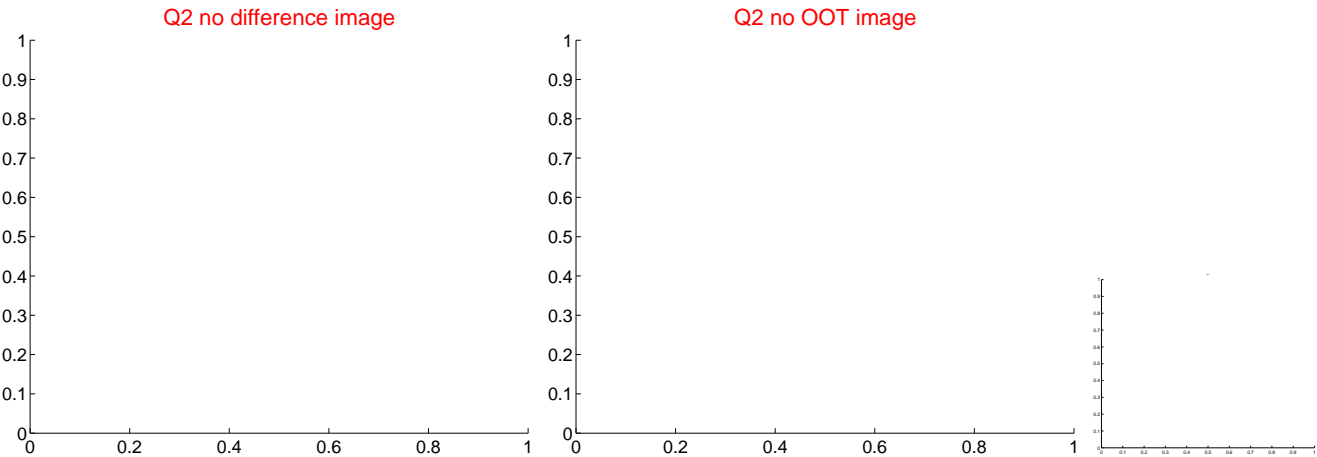
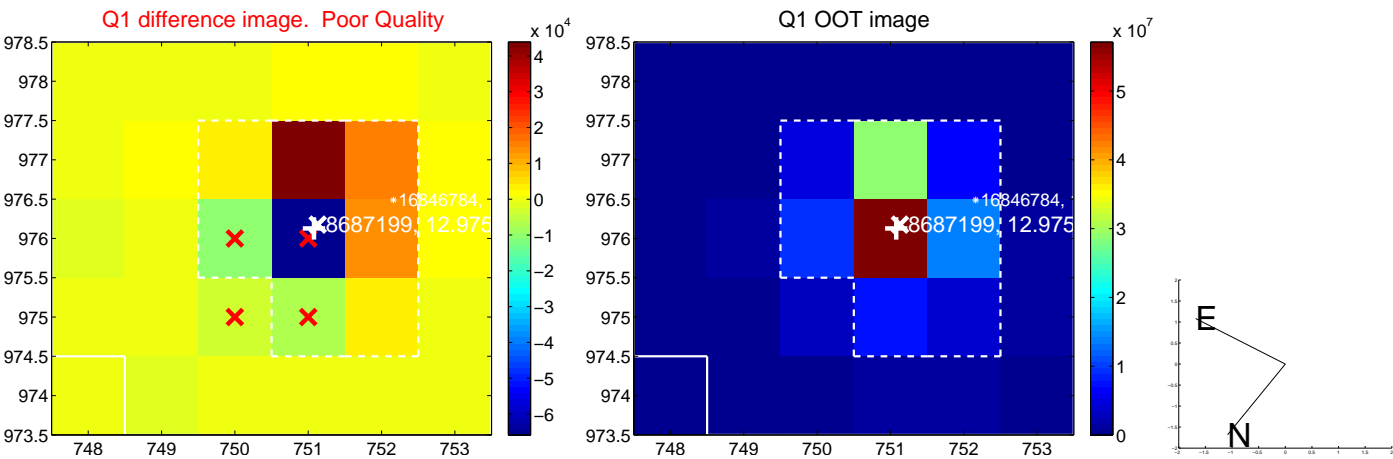
The direct PRF centroid is offset from the target star catalog position by about 0.34 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$6.460 \pm 0.721$	8.96	$3.811 \pm 0.884$	$5.216 \pm 0.254$
PRF-fit source offset from KIC position	$6.720 \pm 0.667$	10.07	$3.859 \pm 1.089$	$5.501 \pm 0.285$
photometric centroid source offset	$1.59 \pm 1.25$	1.27	$0.70 \pm 1.24$	$1.43 \pm 1.25$

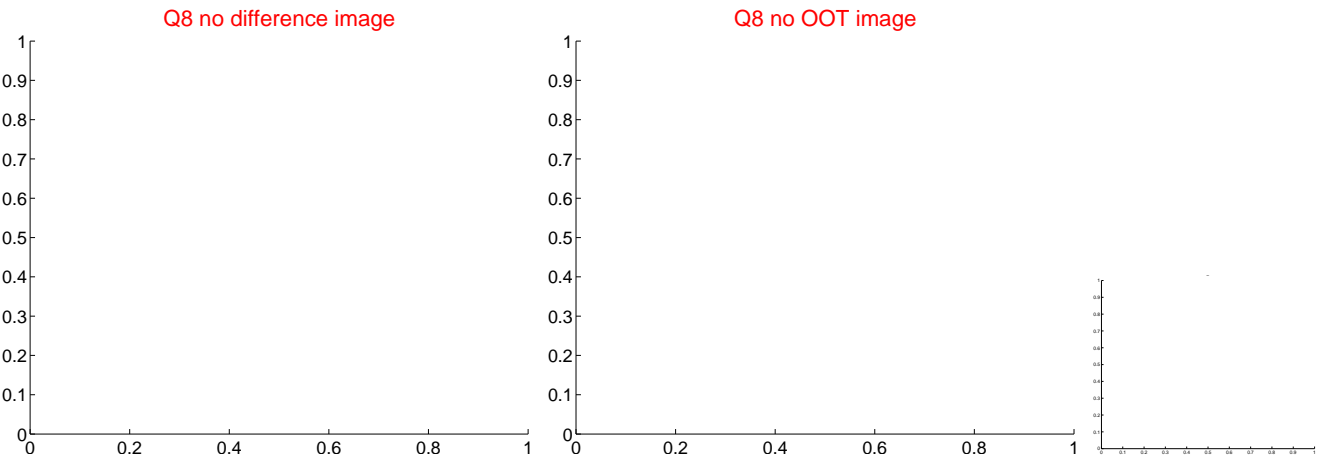
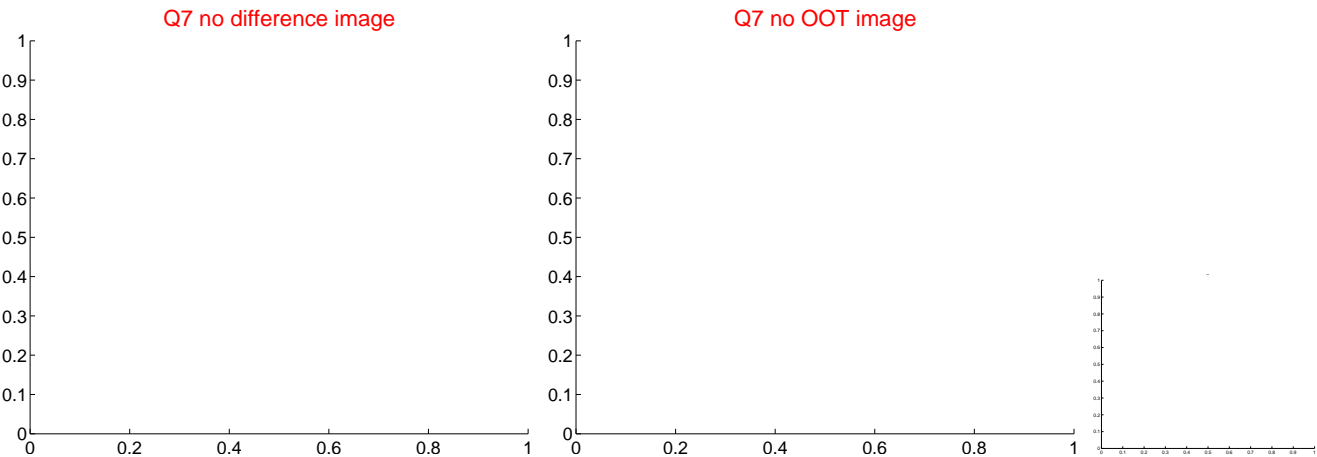
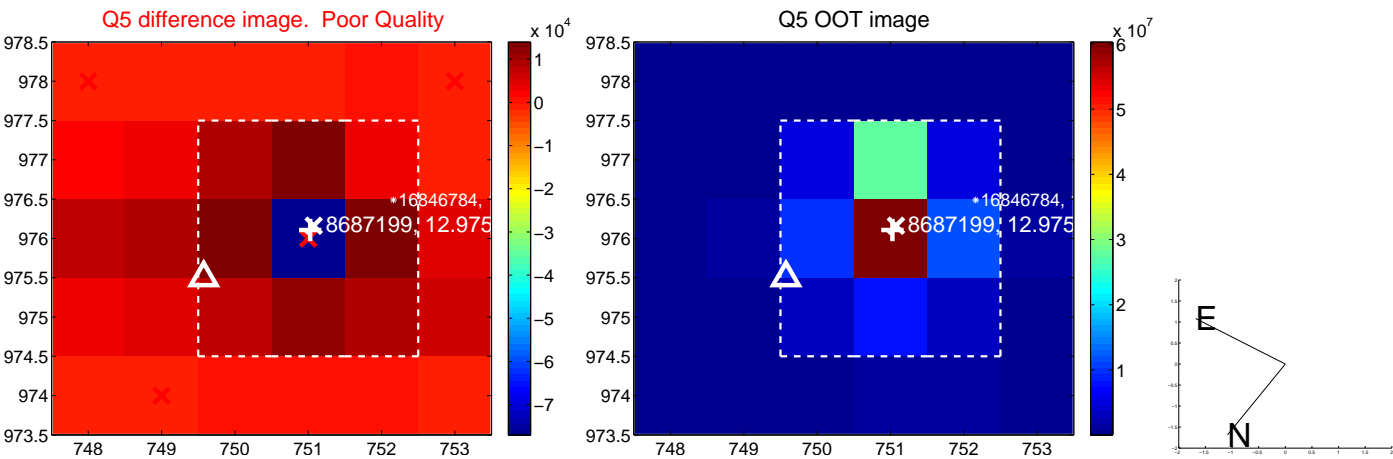


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three- $\sigma$ . 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 ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



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

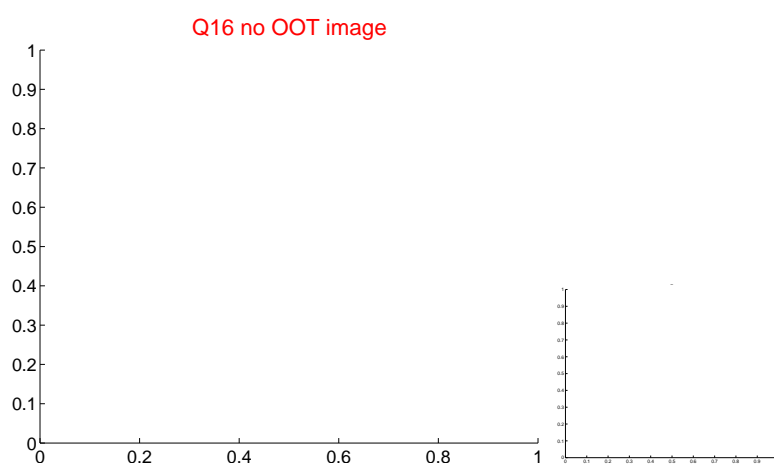
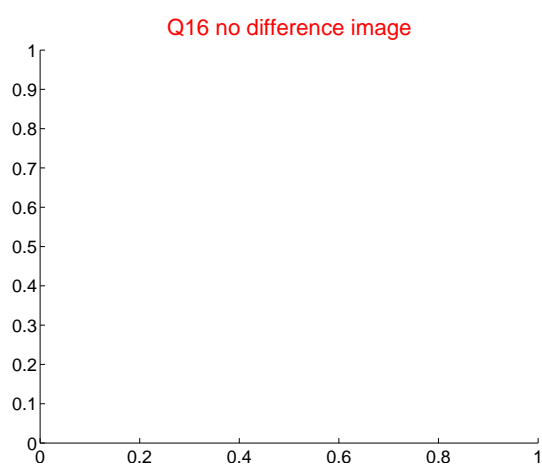
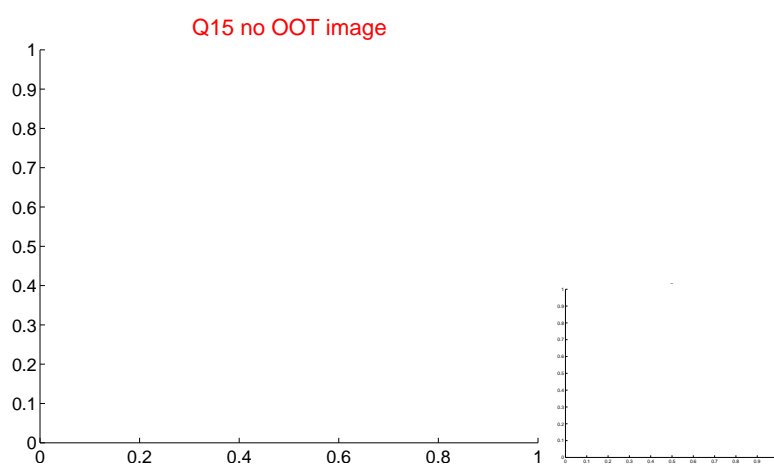
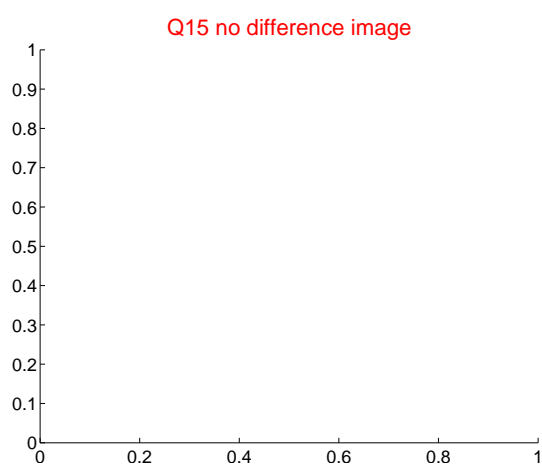
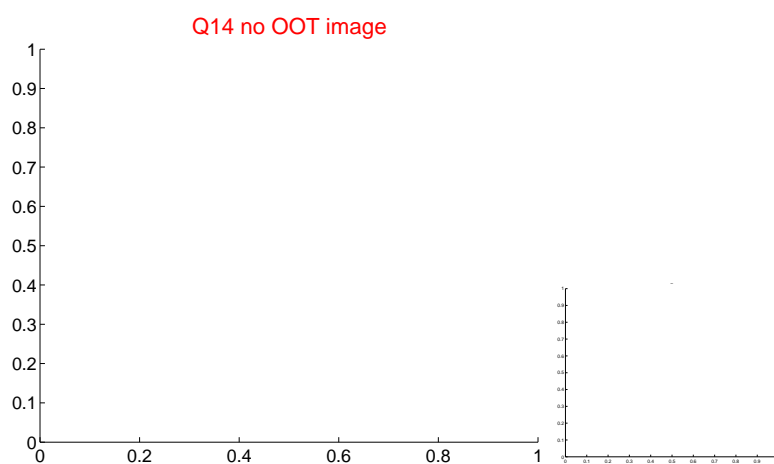
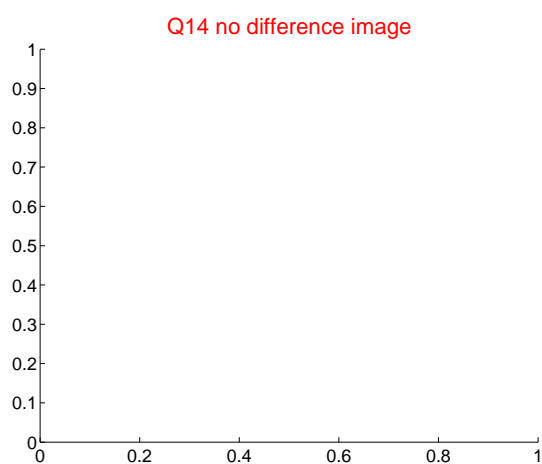
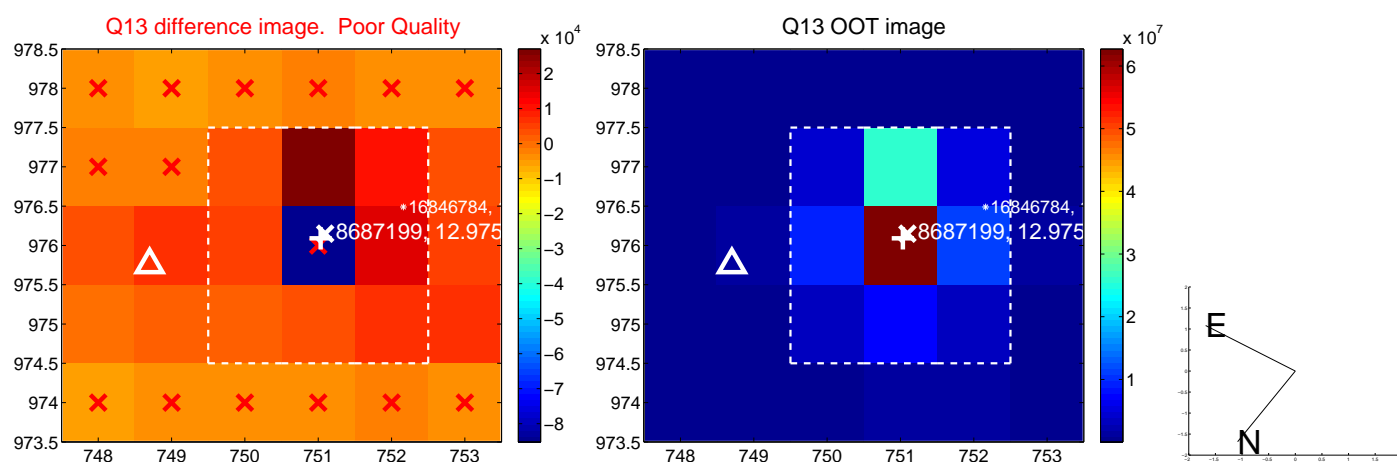




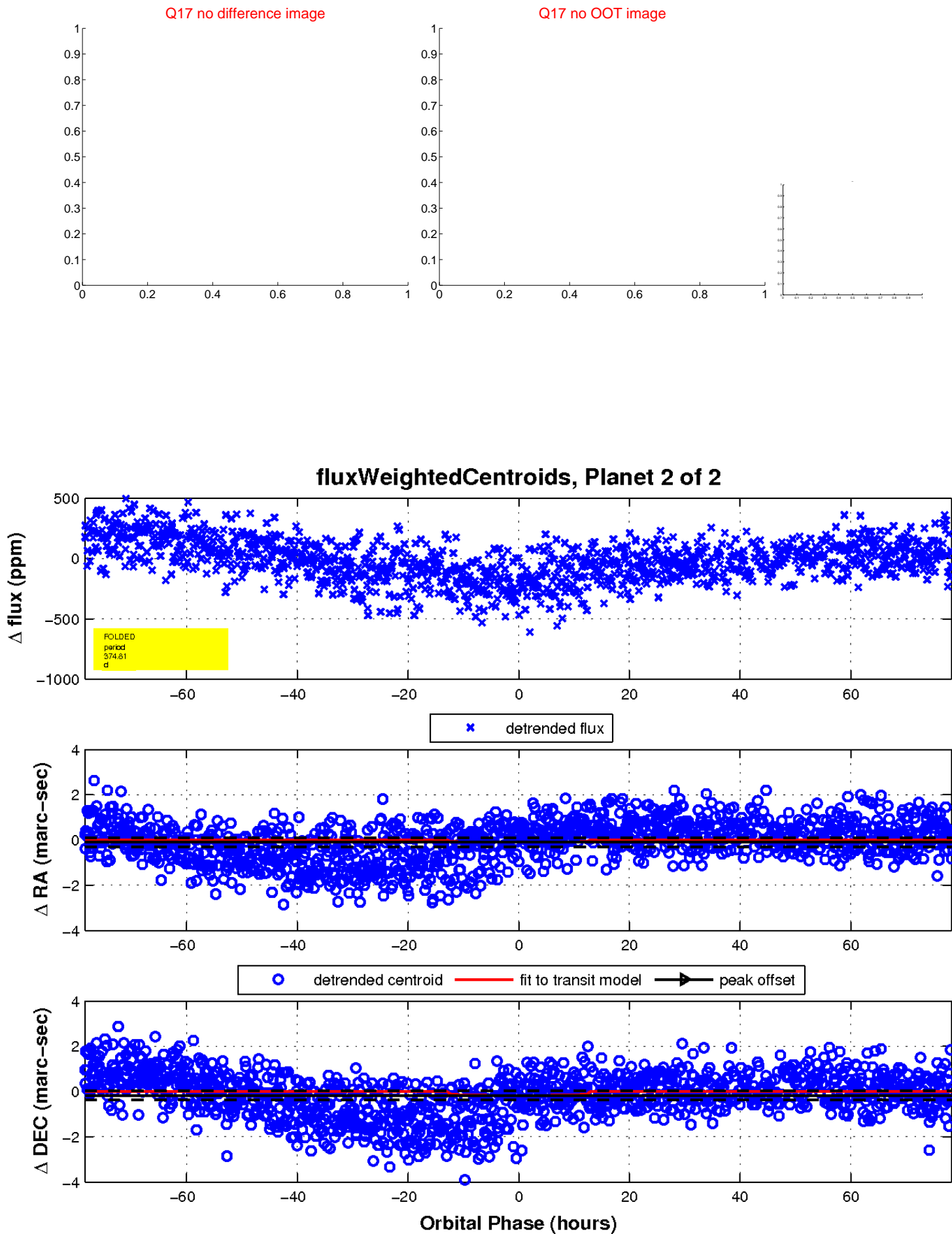
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

