

# KIC 004243984

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004243984-01	OBS	No	0.527497	131.573715	64.0	1.795	12.0	11.2	1.51	7066	1.41	25881.95
004243984-02	OBS	No	3.452418	132.904853	143.7	2.036	7.4	7.2	1.51	7066	1.89	2114.10

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004243984-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
004243984-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT

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

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

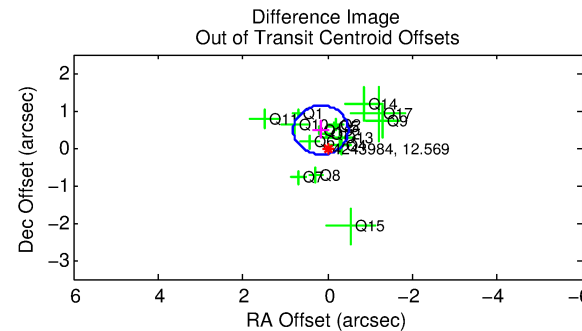
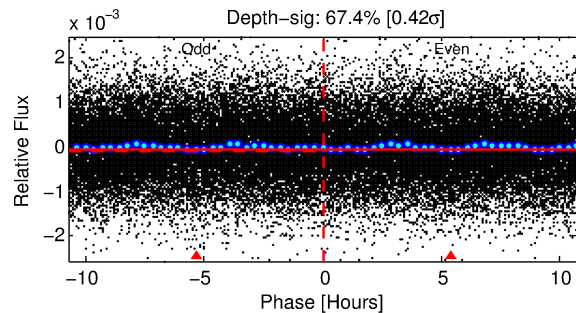
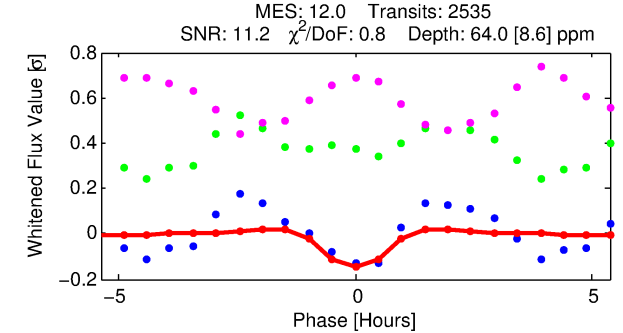
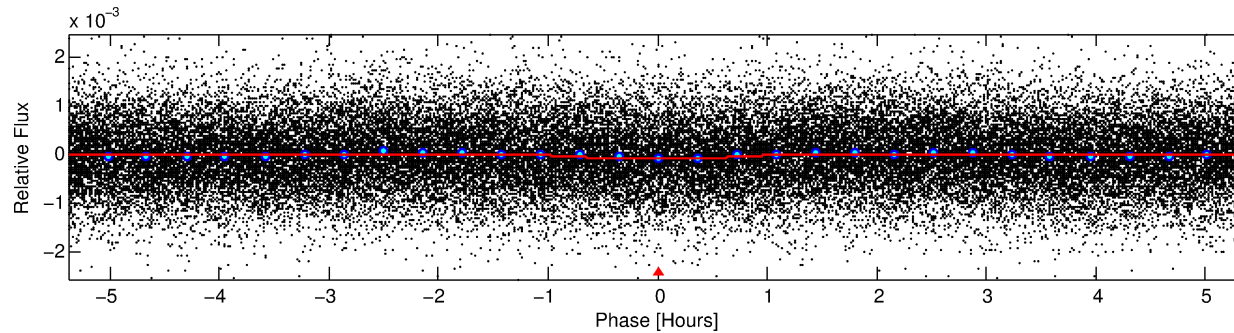
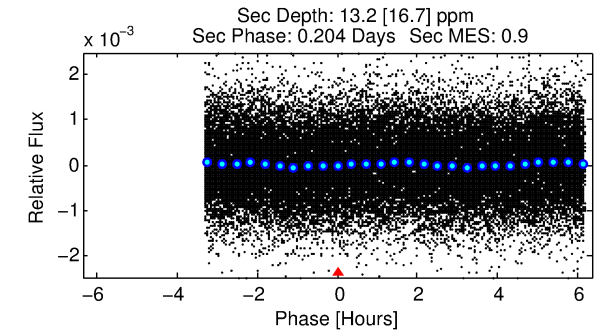
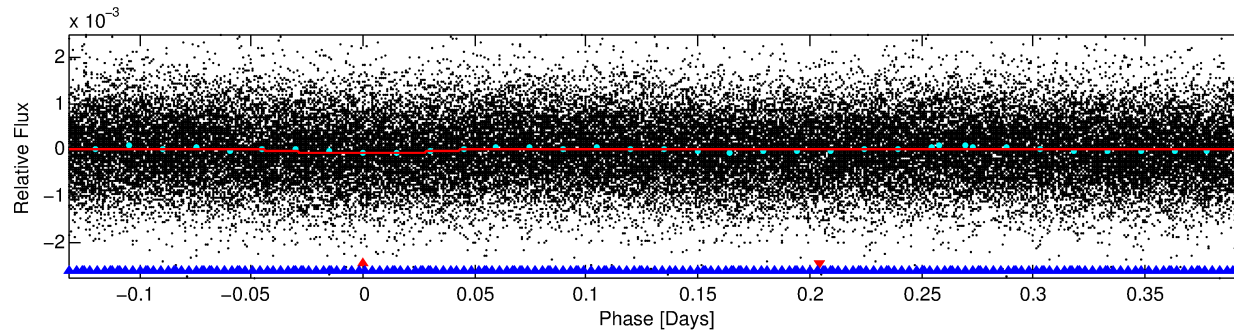
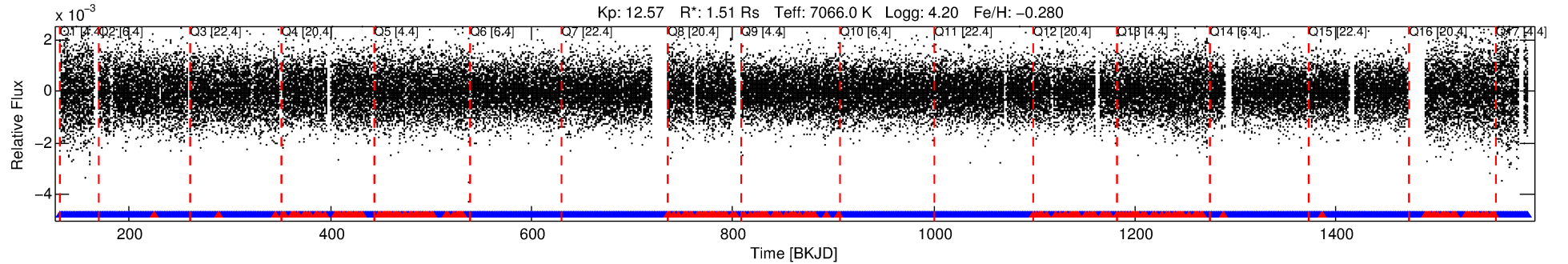
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 004243984-01

No Significant Match Found

# DV One-Page Summary

KIC: 4243984 Candidate: 1 of 2 Period: 0.527 d



## DV Fit Results:

Period = 0.52750 [0.00001] d  
Epoch = 131.5737 [0.0023] BKJD  
Rp/R\* = 0.0085 [0.0047]  
a/R\* = 1.38 [2.24]  
b = 0.90 [0.71]  
Seff = 25881.95 [10463.07]  
Teq = 3234 [327] K  
Rp = 1.41 [0.90] Re  
a = 0.0140 [0.0036] AU  
Ag = 0.72 [1.24] [-0.23 $\sigma$ ]  
Teffp = 4605 [1948] K [0.69 $\sigma$ ]

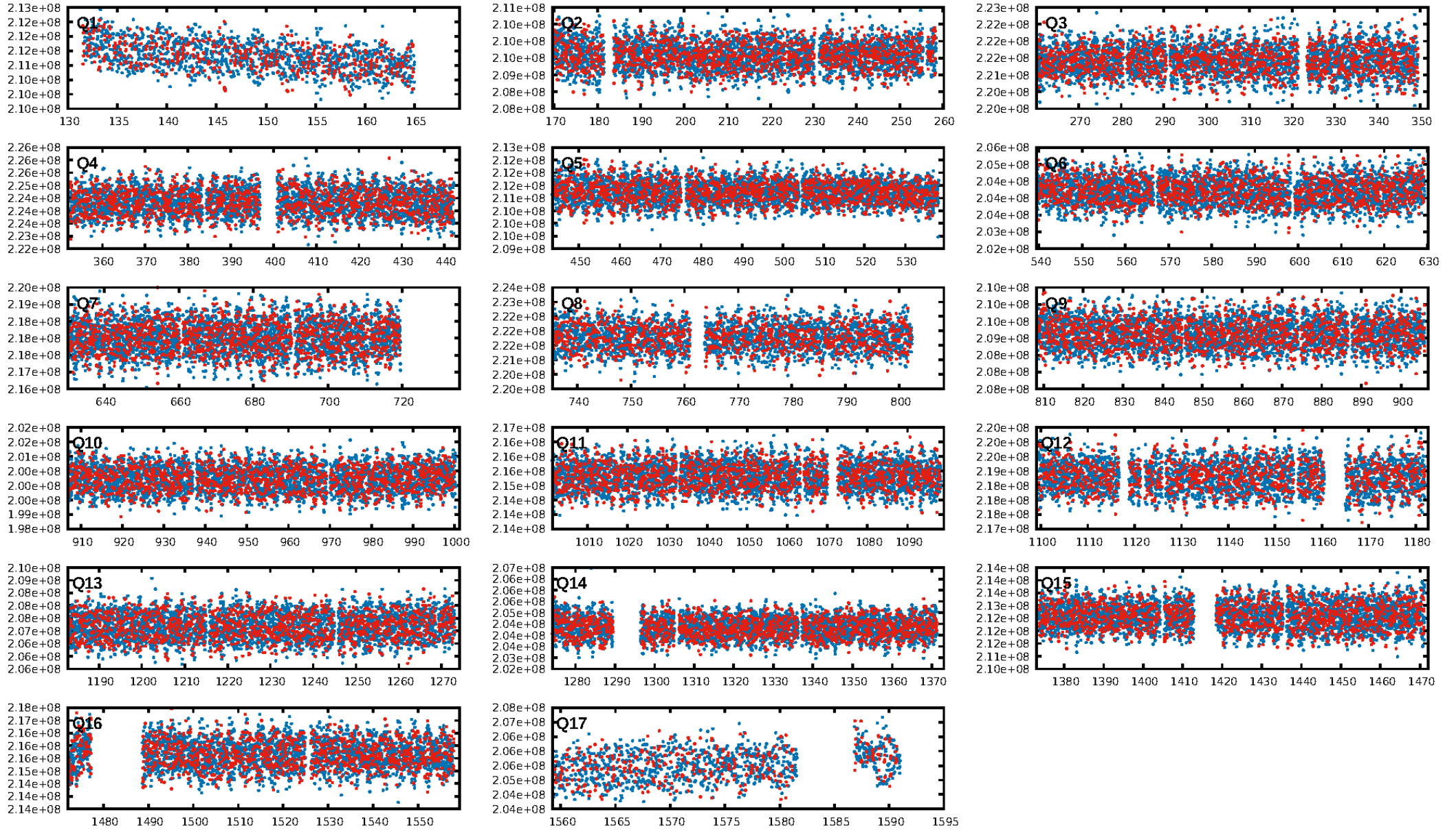
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [25.86 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 6.13e-32  
RollingBand-fgt: 0.90 [2178/2421]  
GhostDiagnostic-chr: 1.941  
Centroid-sig: 5.6%  
Centroid-so: 0.117 arcsec [0.46 $\sigma$ ]  
OotOffset-rm: 0.505 arcsec [2.32 $\sigma$ ]  
KicOffset-rm: 0.337 arcsec [1.65 $\sigma$ ]  
OotOffset-st: 4/3/4/5 [16]  
KicOffset-st: 4/3/4/5 [16]  
DiffImageQuality-fgm: 0.44 [7/16]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 15:41:27 Z

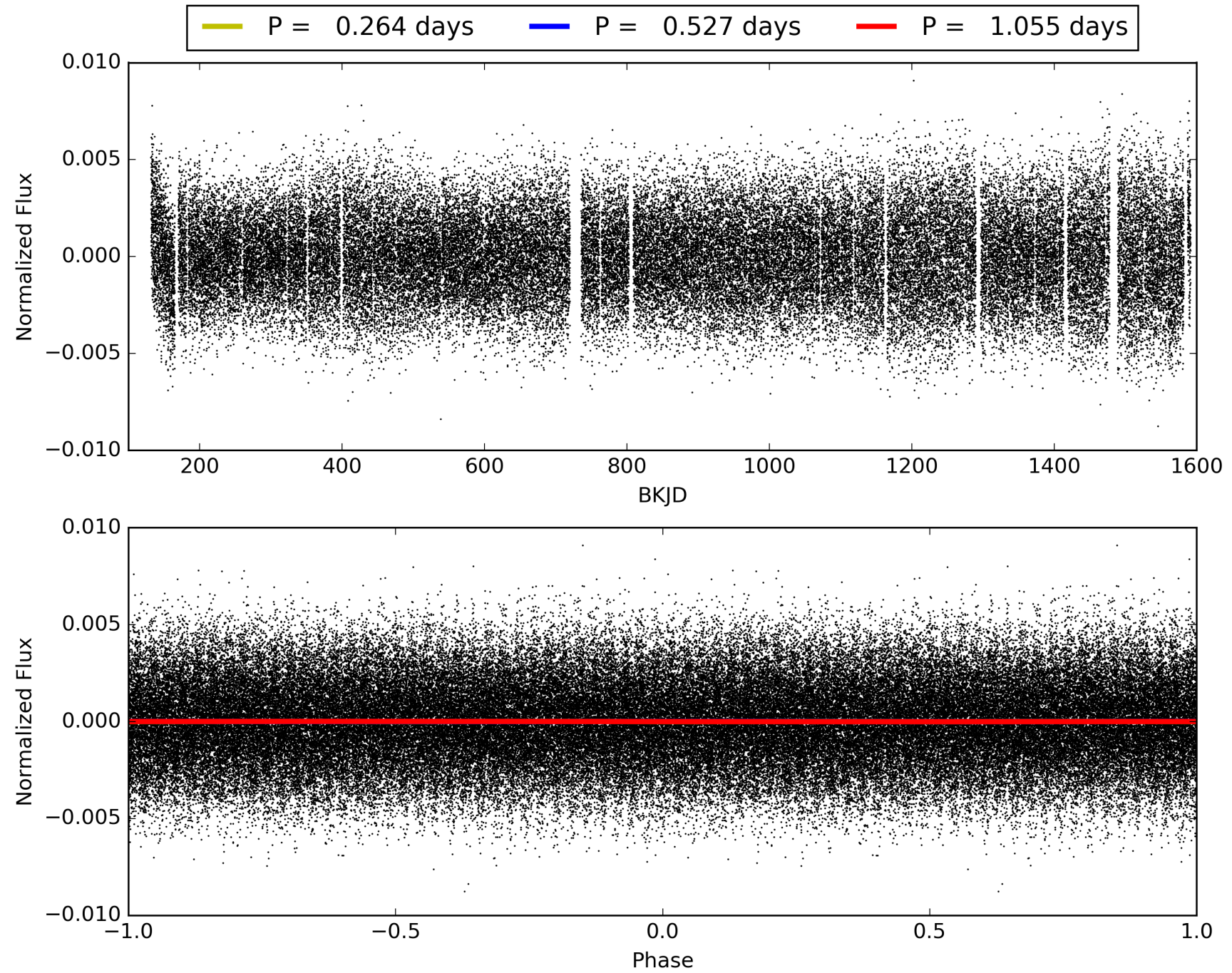
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 004243984-01, PDC Light Curves



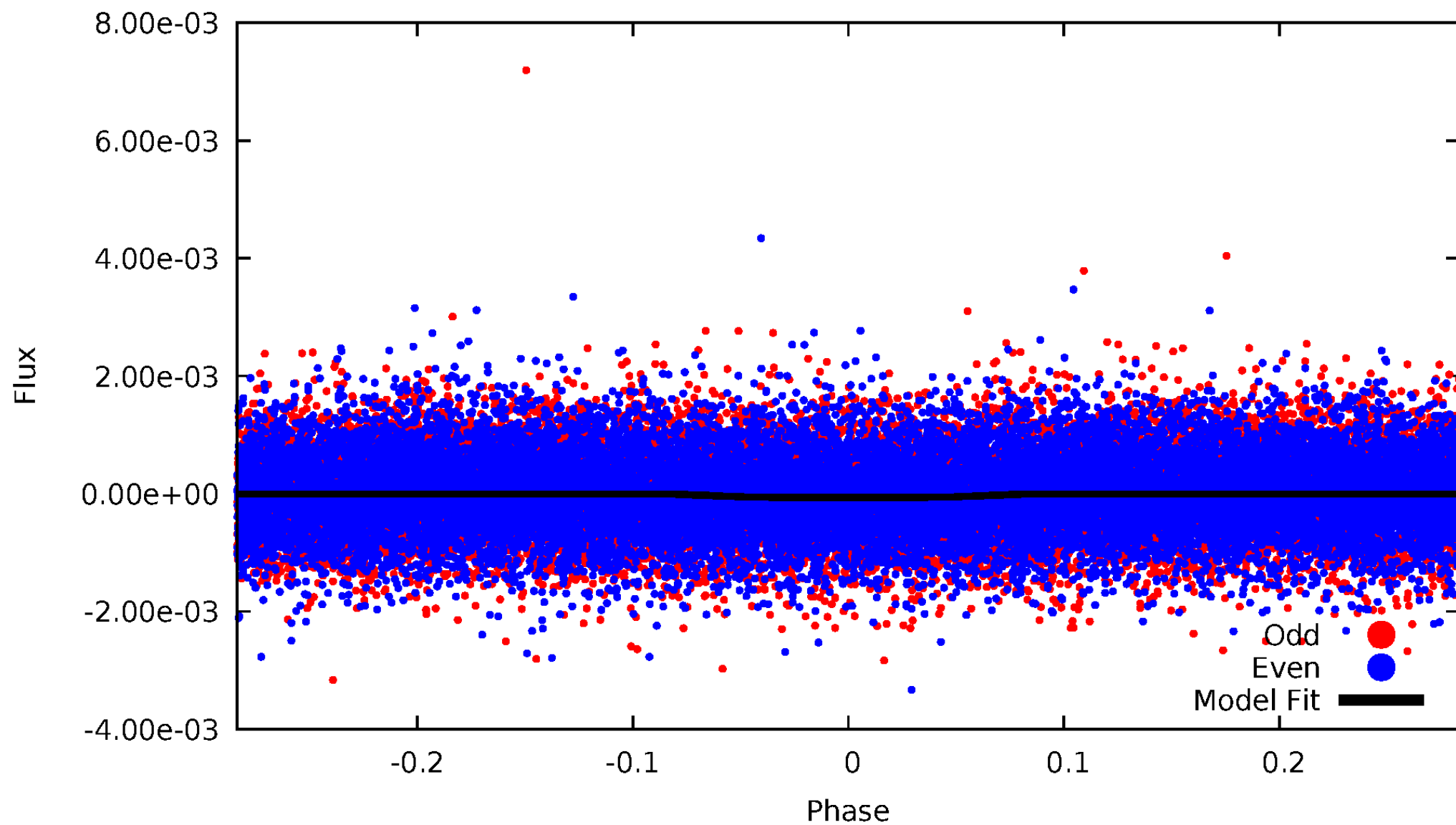


TCE 004243984-01



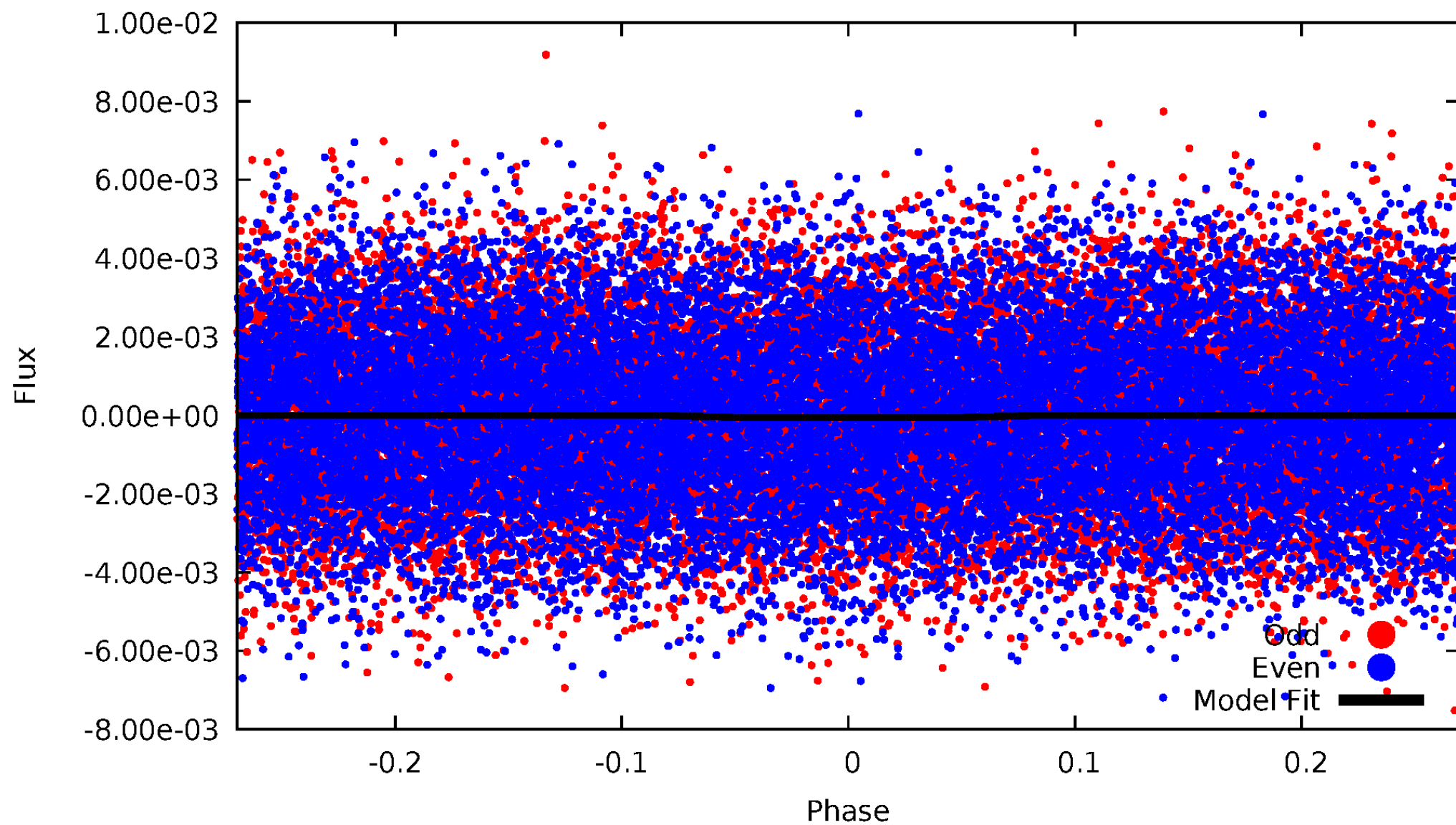
# DV Odd/Even

TCE 004243984-01

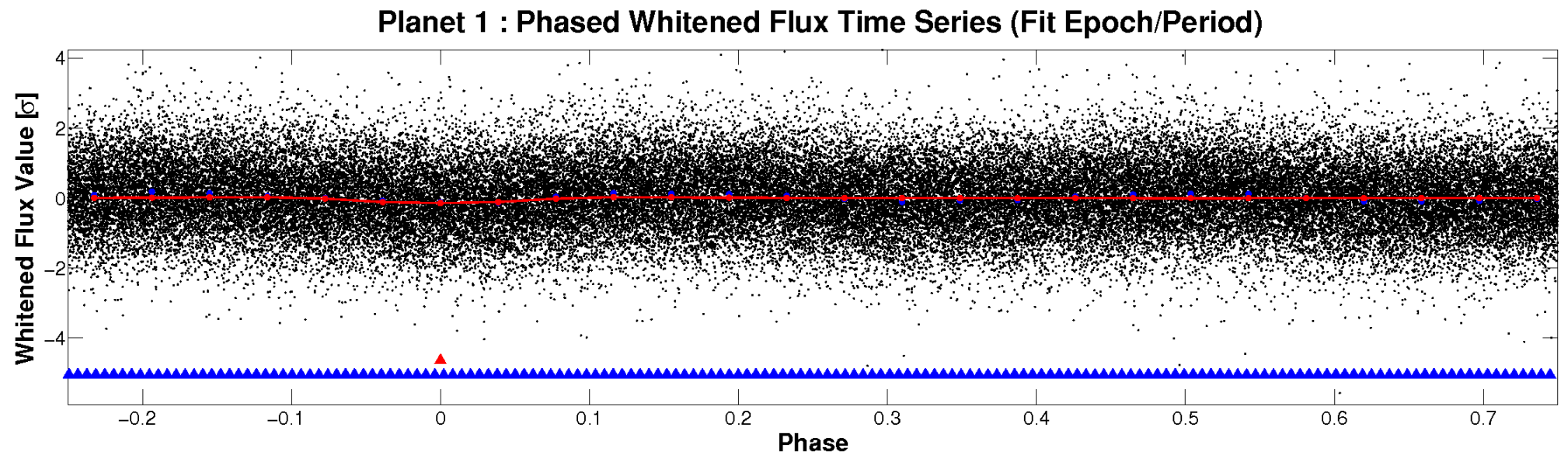
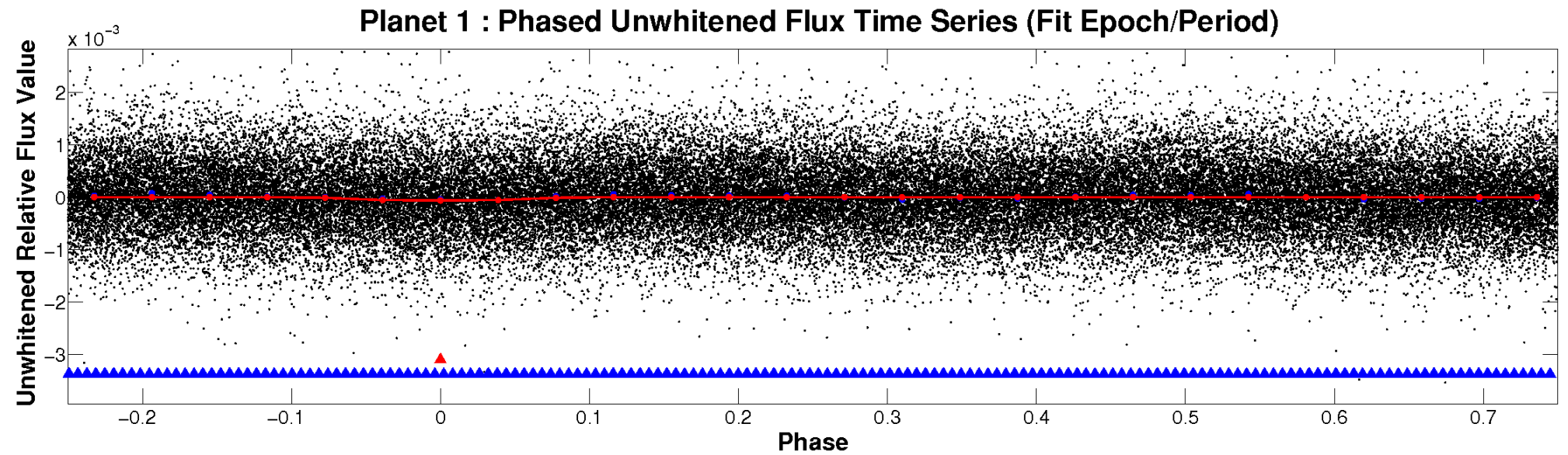


# ALT Odd/Even

TCE 004243984-01



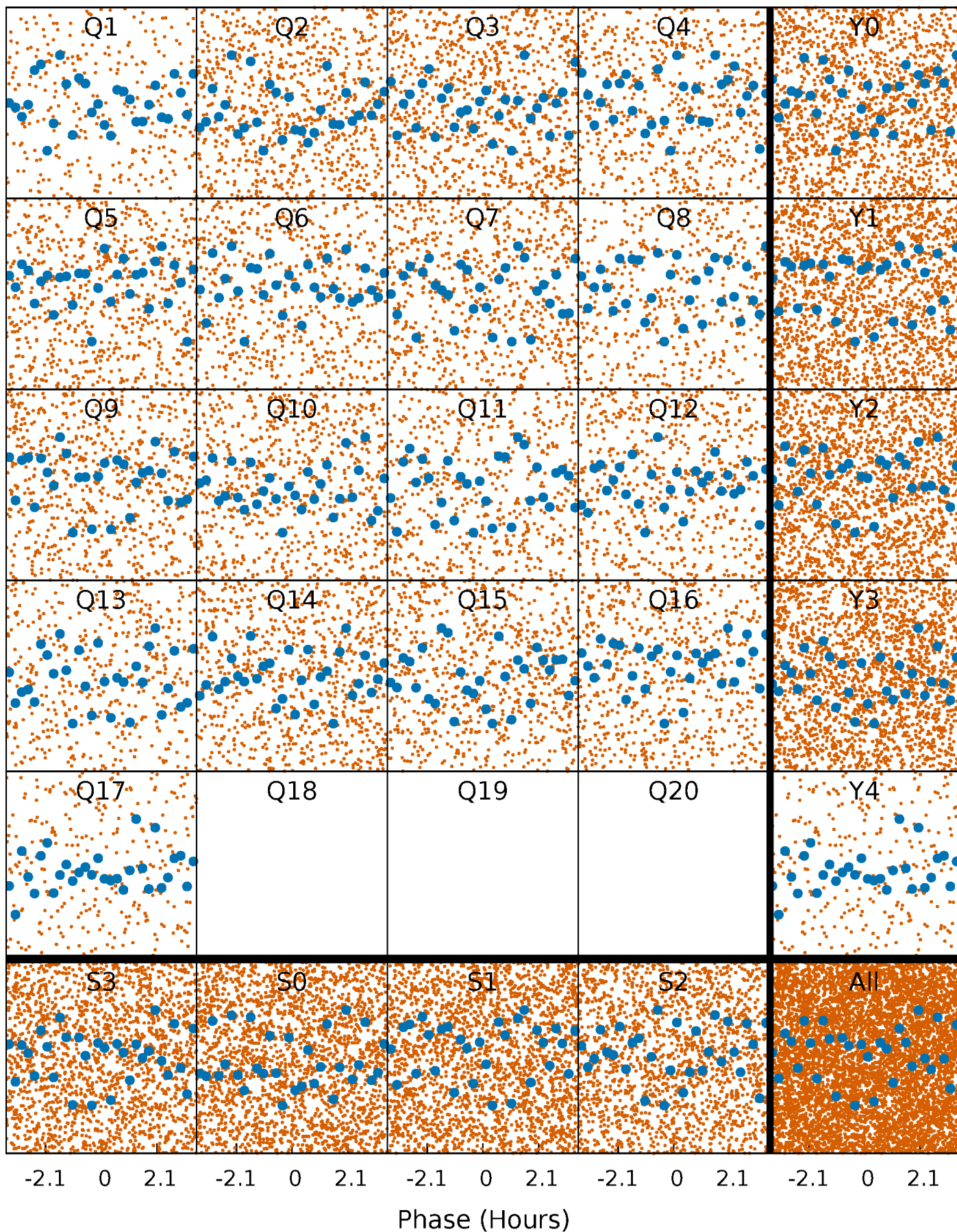
# Non-Whitened Vs. Whitened Light Curve





# PDC Quarter-Phased Transit Curves

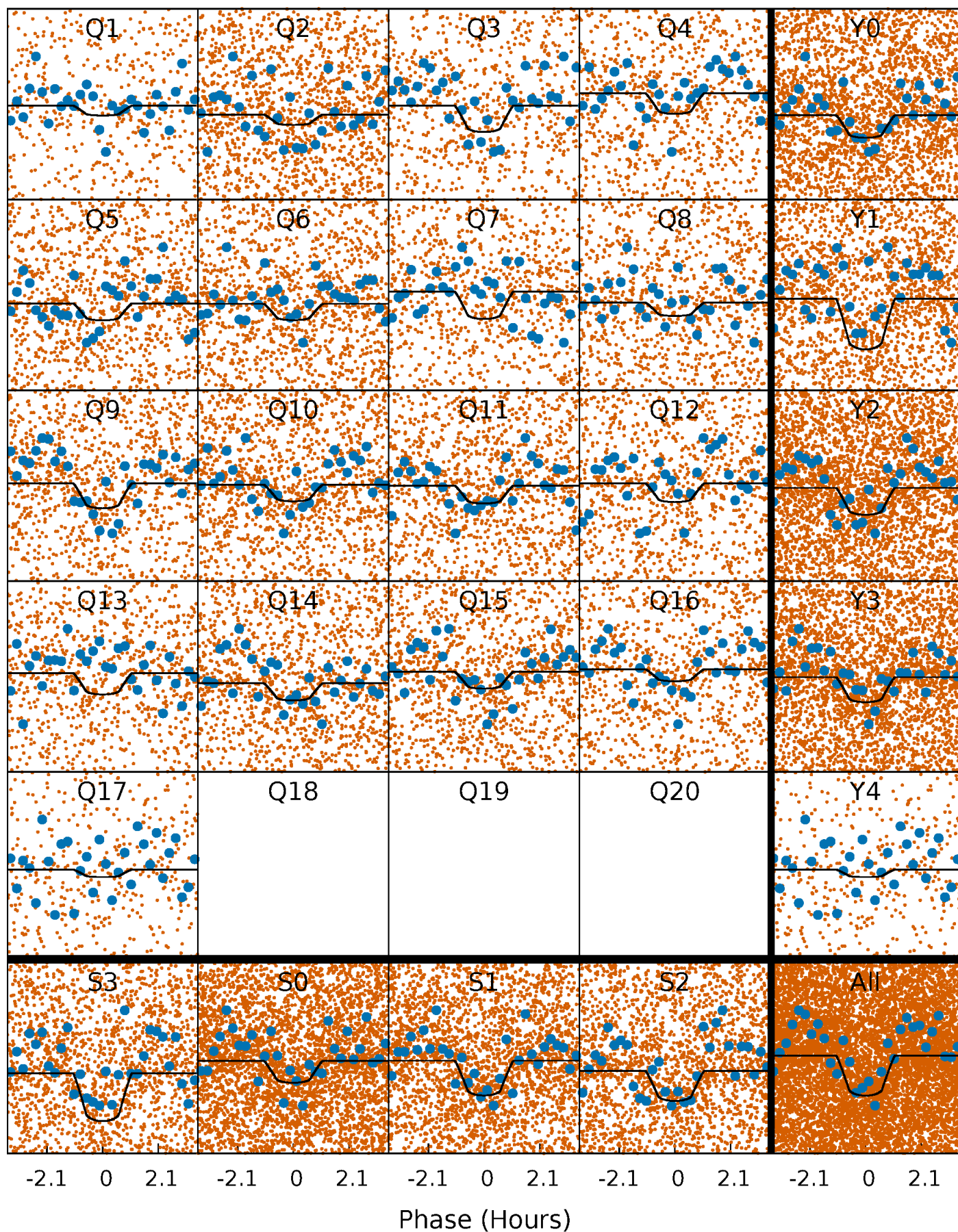
TCE 004243984-01 P= 0.527497 Days  $T_0=131.573715$  (BKJD)





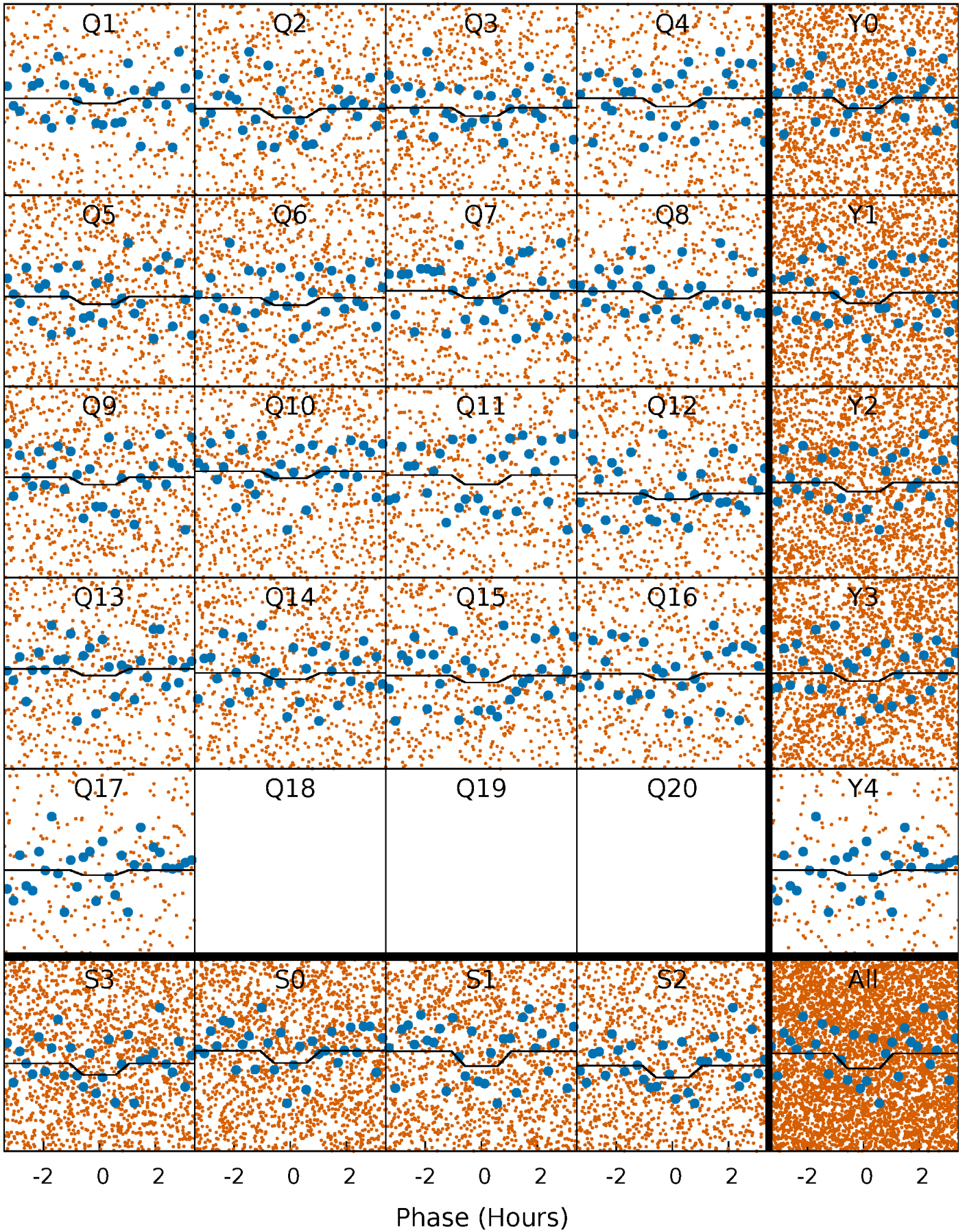
# DV Quarter-Phased Transit Curves

TCE 004243984-01 P= 0.527497 Days  $T_0=131.573715$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

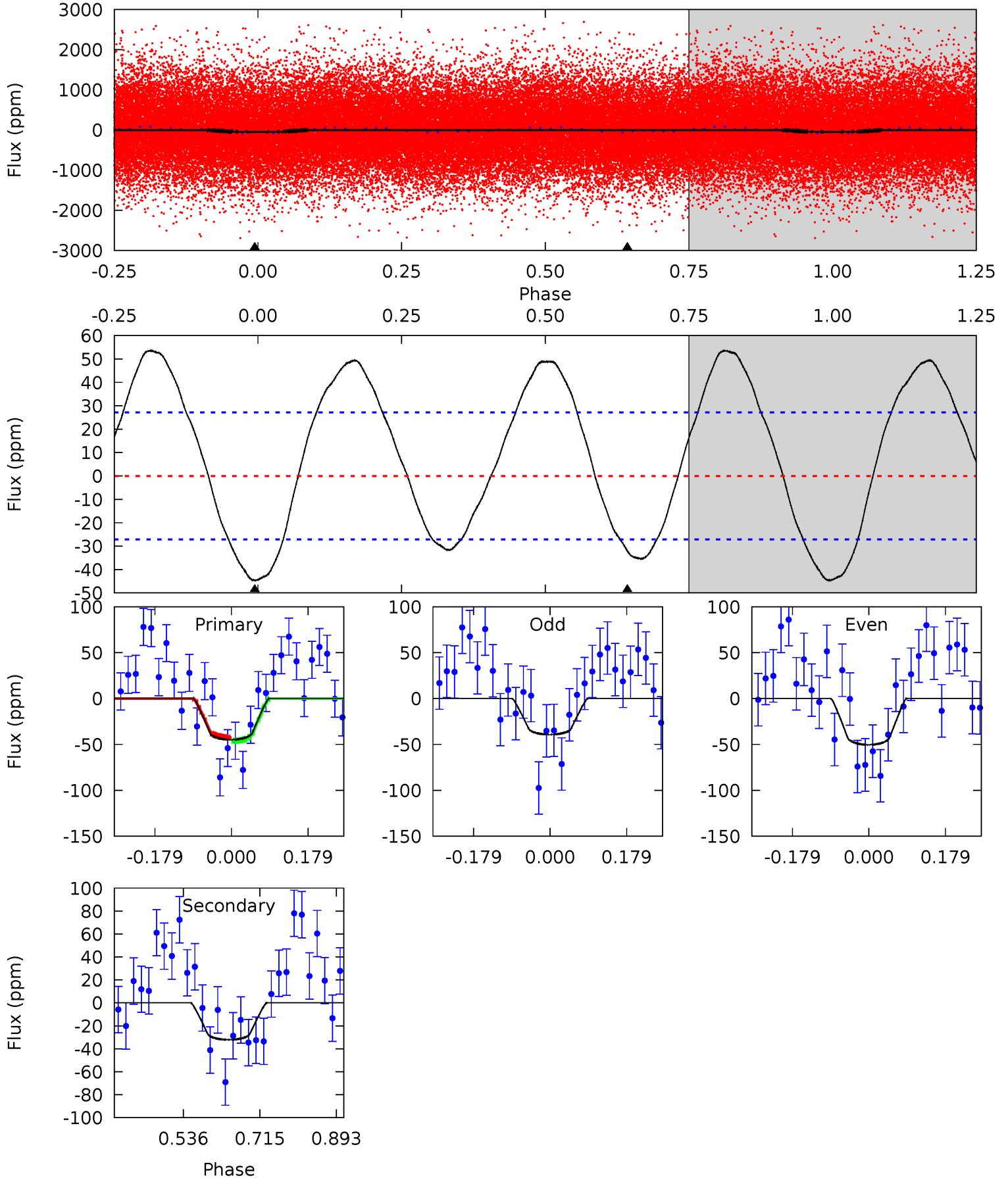
TCE 004243984-01   P= 0.527494 Days    $T_0=131.570801$  (BKJD)



# DV Model-Shift Uniqueness Test

004243984-01, P = 0.527497 Days, E = 131.046218 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
7.33	5.26	0	0	4.44	1.34	4.04	7.33	7.33	5.26	5.26	0.92	0.81	0.54	0.30

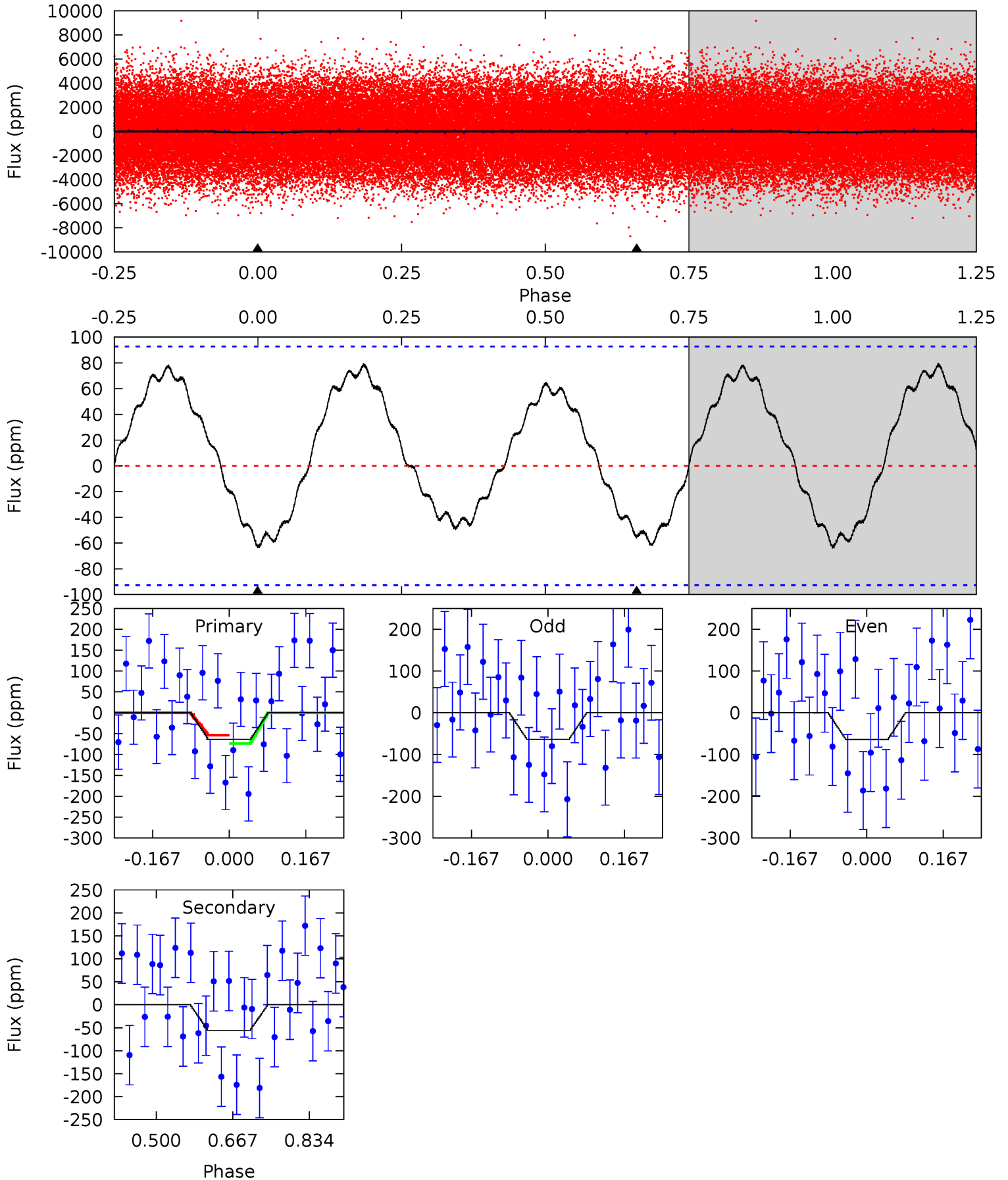




# Alt Model-Shift Uniqueness Test

004243984-01, P = 0.527494 Days, E = 131.043307 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
3.06	2.68	0	0	4.46	1.38	1.91	3.06	3.06	2.68	2.68	0.00	1.14	0.55	0.48





### Stellar Parameters For KIC 004243984

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7066^{+228}_{-313}$	$4.202^{+0.144}_{-0.192}$	$-0.280^{+0.250}_{-0.350}$	$1.512^{+0.482}_{-0.321}$	$1.334^{+0.200}_{-0.220}$	$0.543^{+0.404}_{-0.267}$
	+3%/-4%	+3%/-5%	+89%/-125%	+32%/-21%	+15%/-16%	+74%/-49%
Source	KIC0	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 004243984-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-32 \pm 6$	$1.44^{+0.90}_{-0.77}$	$4540^{+360}_{-316}$	$5377^{+3050}_{-1267}$	$1.606^{+5.614}_{-0.988}$
Alt.	$-56 \pm 21$	$1.28^{+0.87}_{-0.69}$	$4542^{+352}_{-313}$	$6590^{+4854}_{-1572}$	$3.474^{+14.207}_{-2.306}$

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

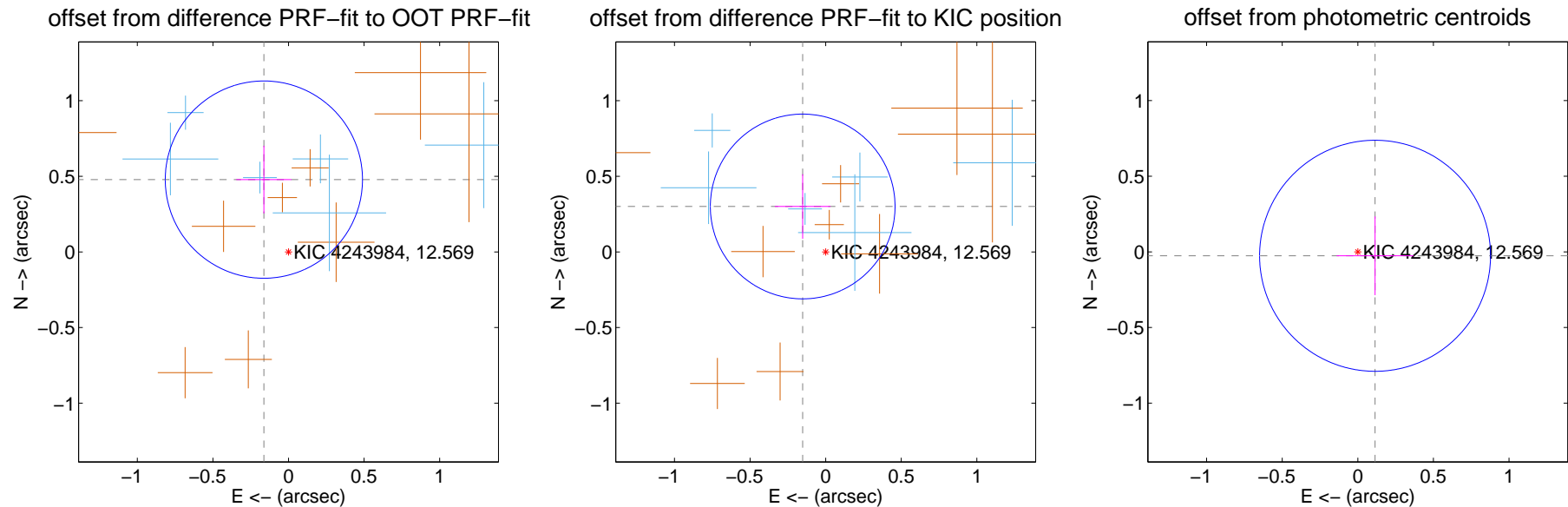
## DV Centroid Data

Supplemental centroid analysis for 004243984-01. Kepler magnitude: 12.57. Transit SNR 11.20

There are 7 quarters with good PRF difference image offsets

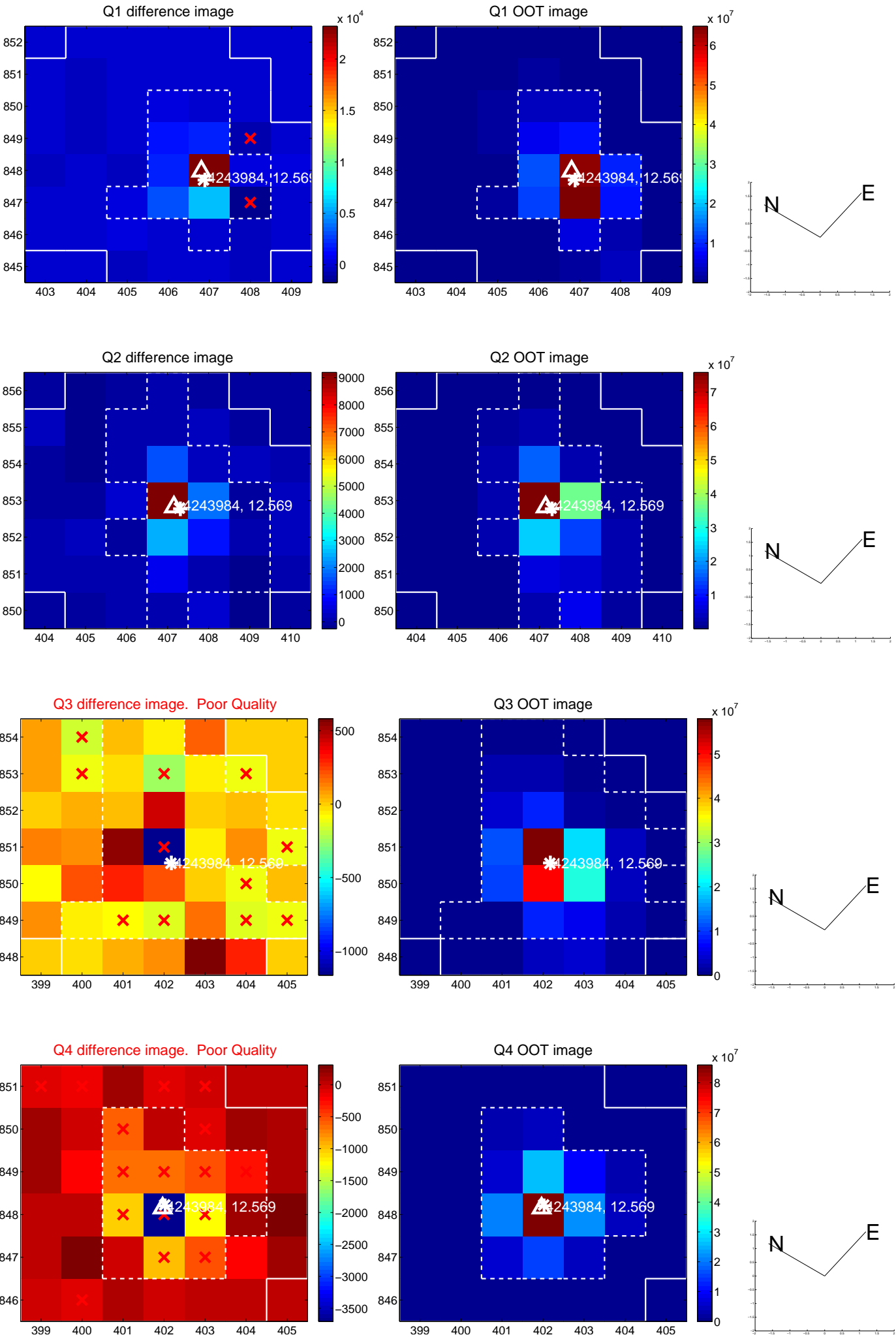
The direct PRF centroid is offset from the target star catalog position by about 0.16 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.505 \pm 0.217$	2.32	$0.163 \pm 0.183$	$0.478 \pm 0.224$
PRF-fit source offset from KIC position	$0.337 \pm 0.204$	1.65	$0.152 \pm 0.184$	$0.300 \pm 0.213$
photometric centroid source offset	$0.12 \pm 0.25$	0.46	$-0.11 \pm 0.25$	$-0.03 \pm 0.26$

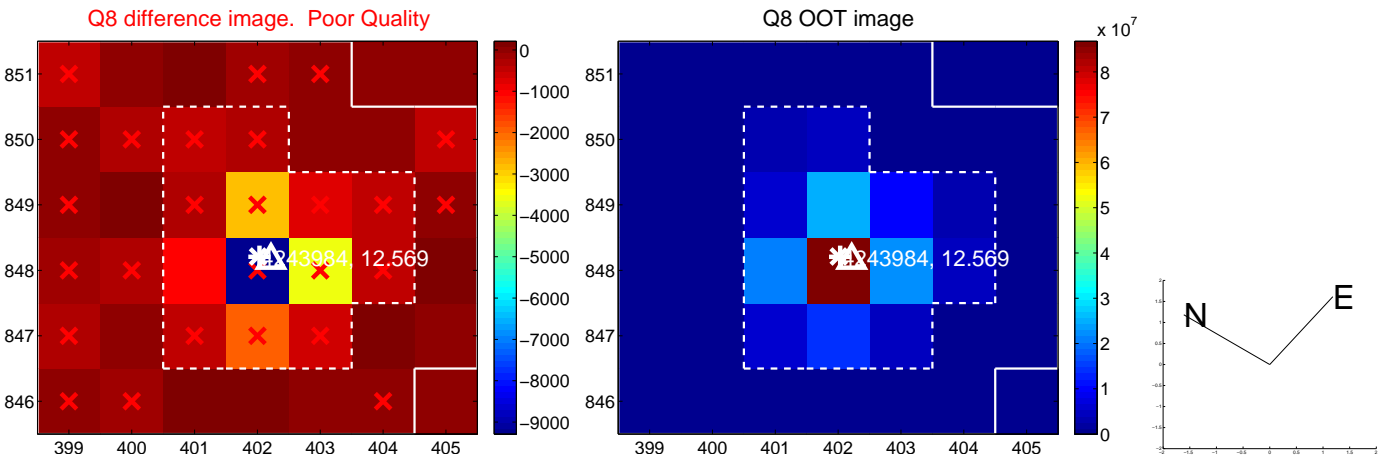
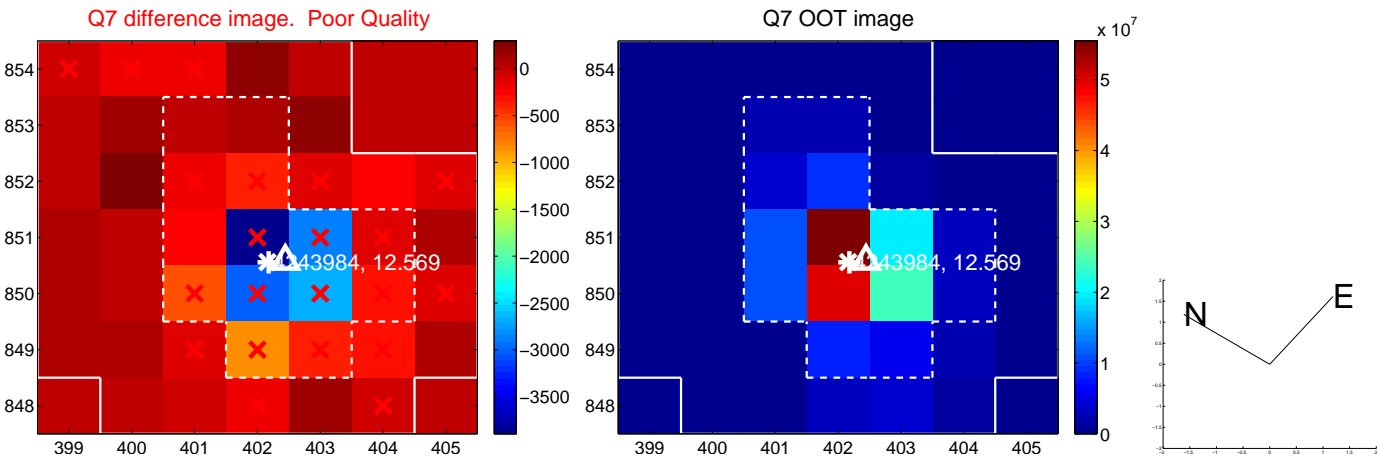
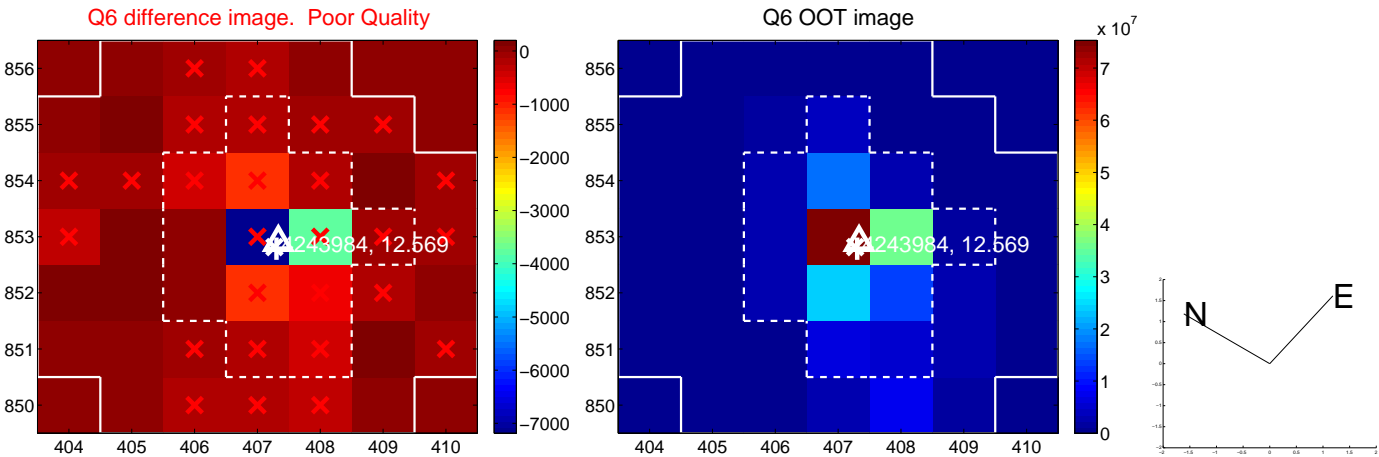
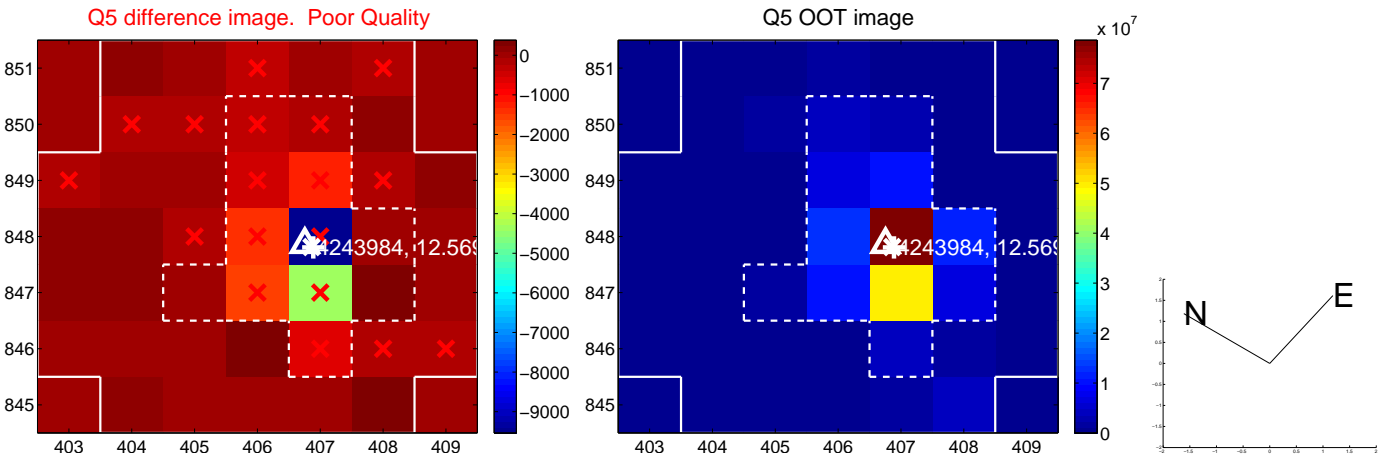


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

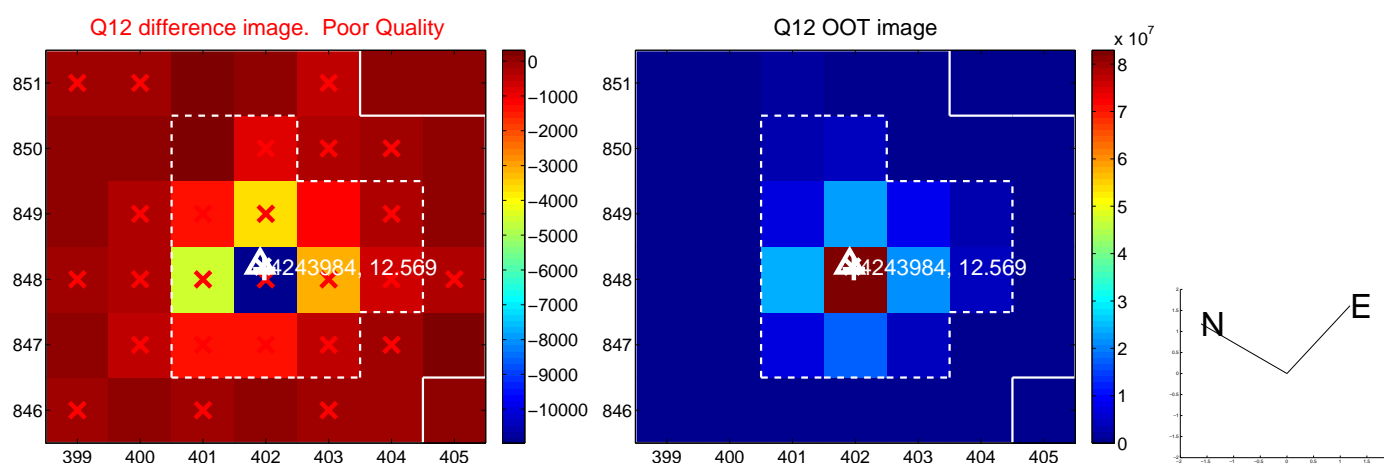
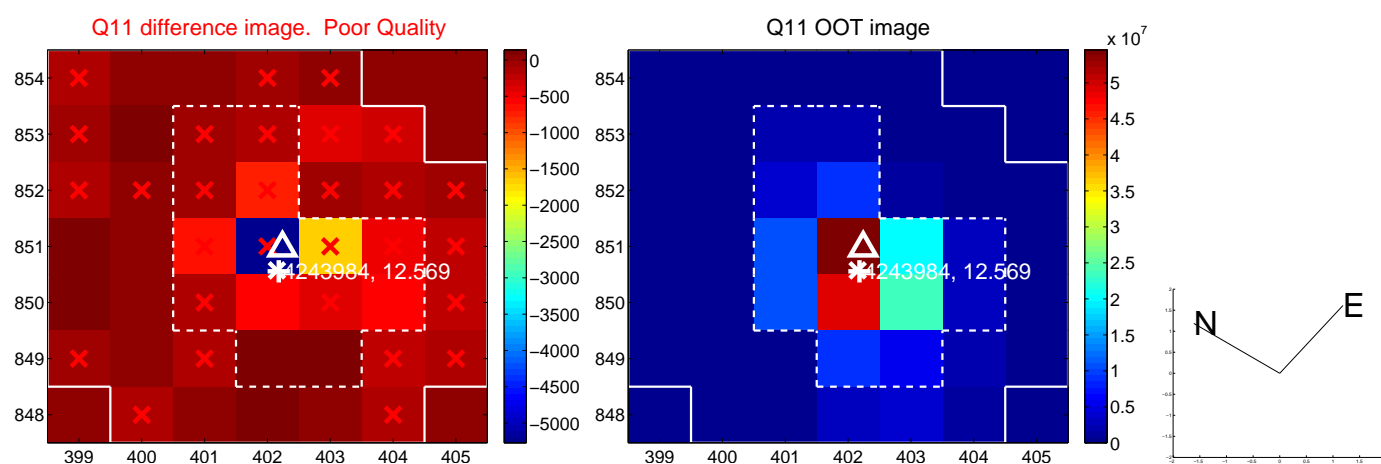
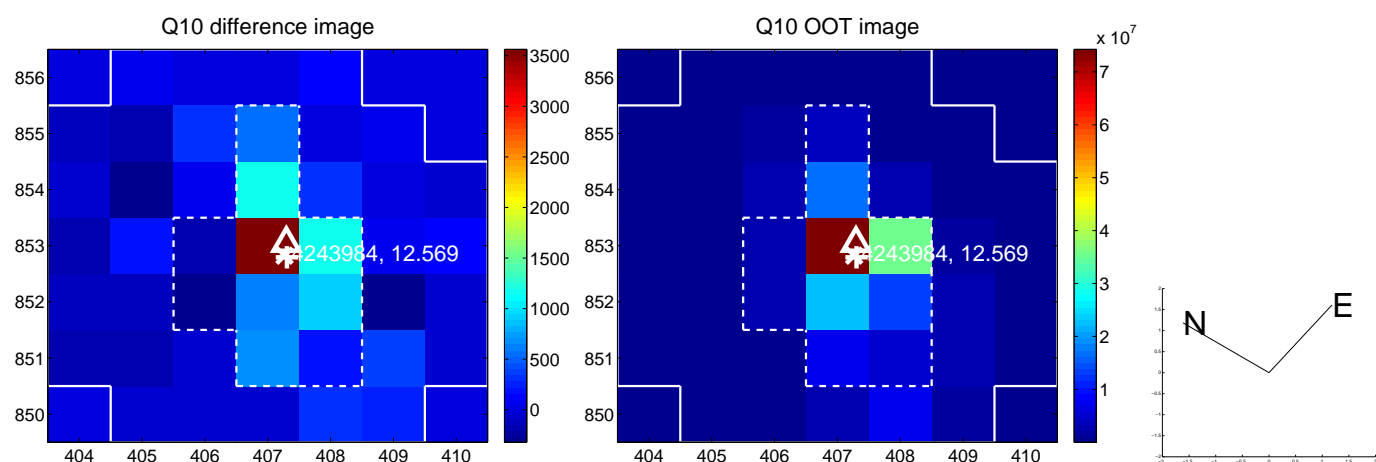
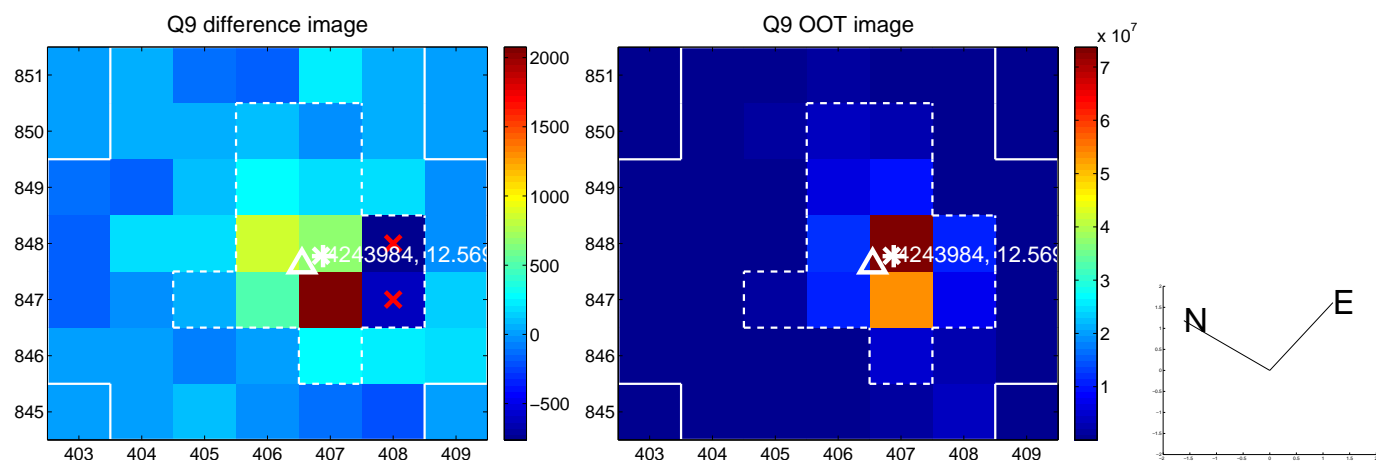


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

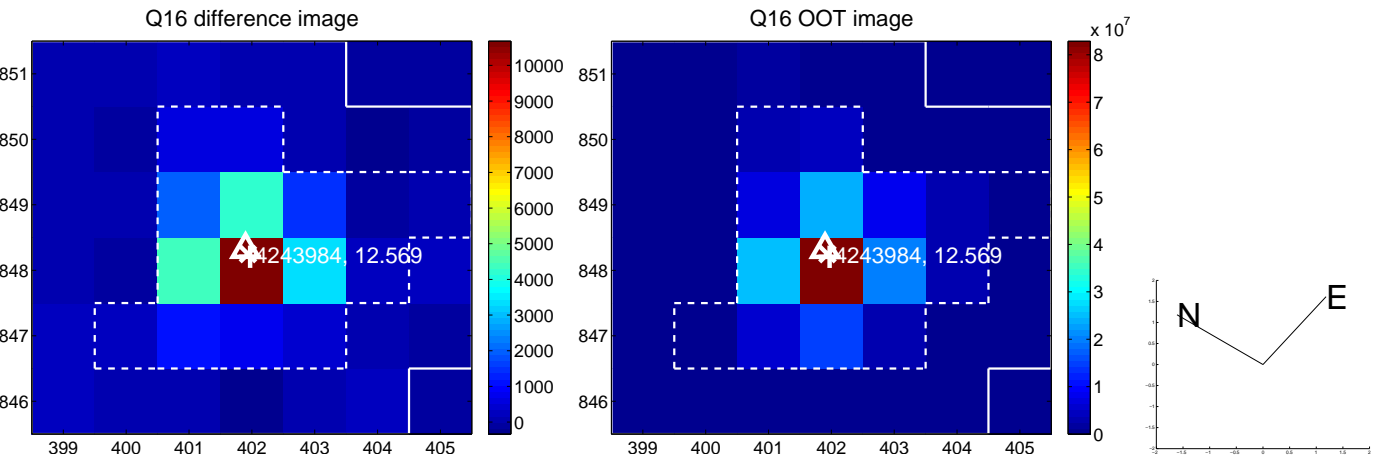
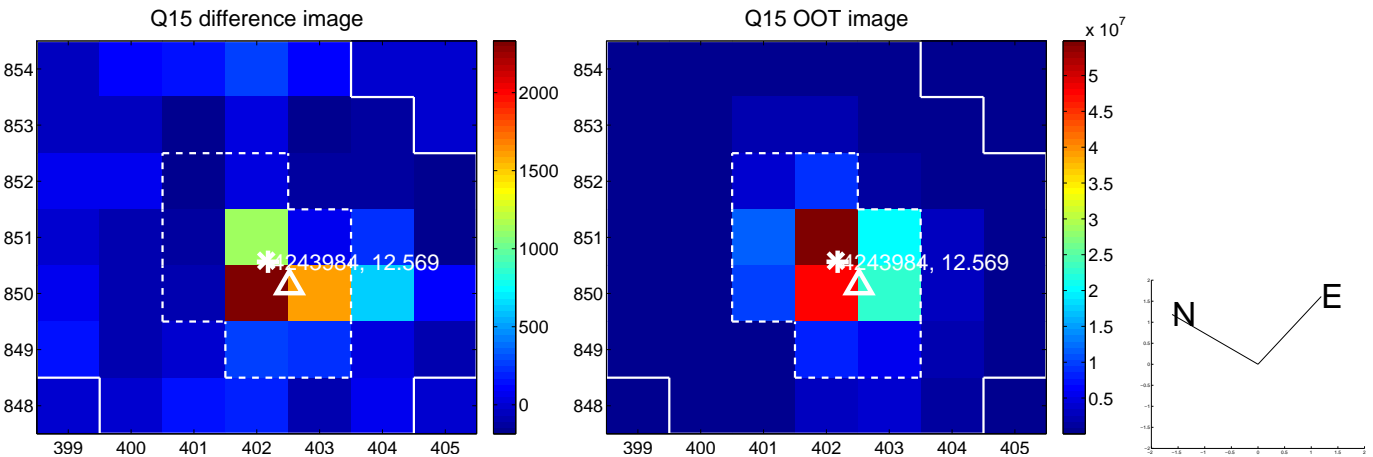
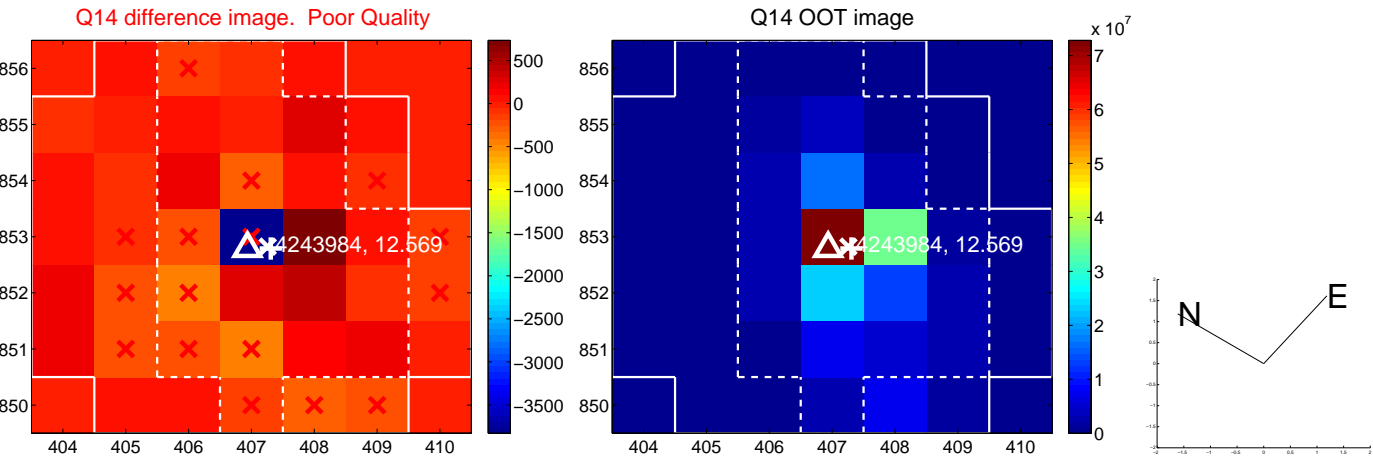
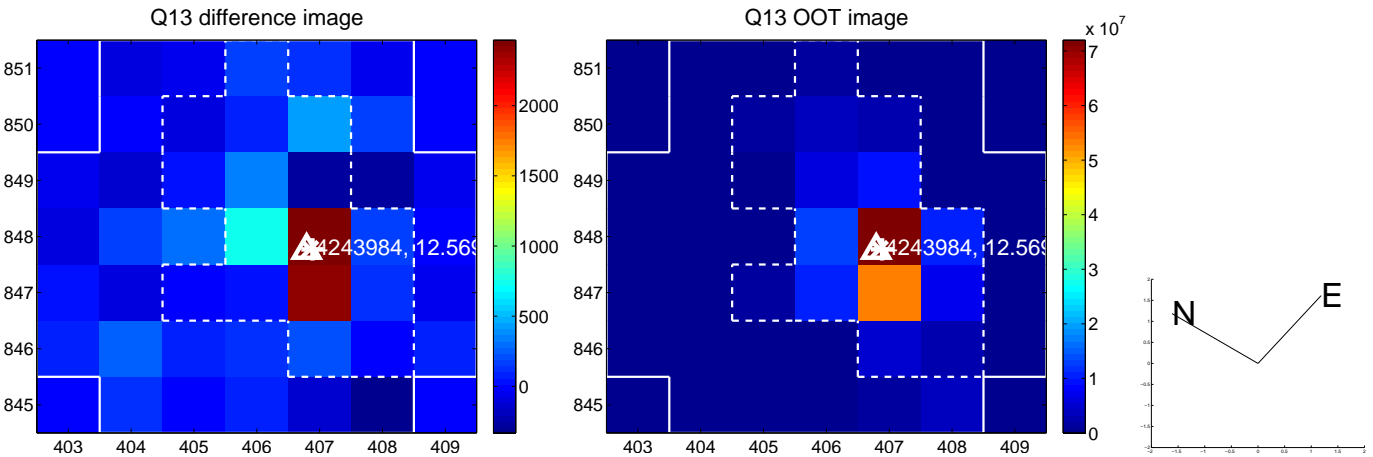




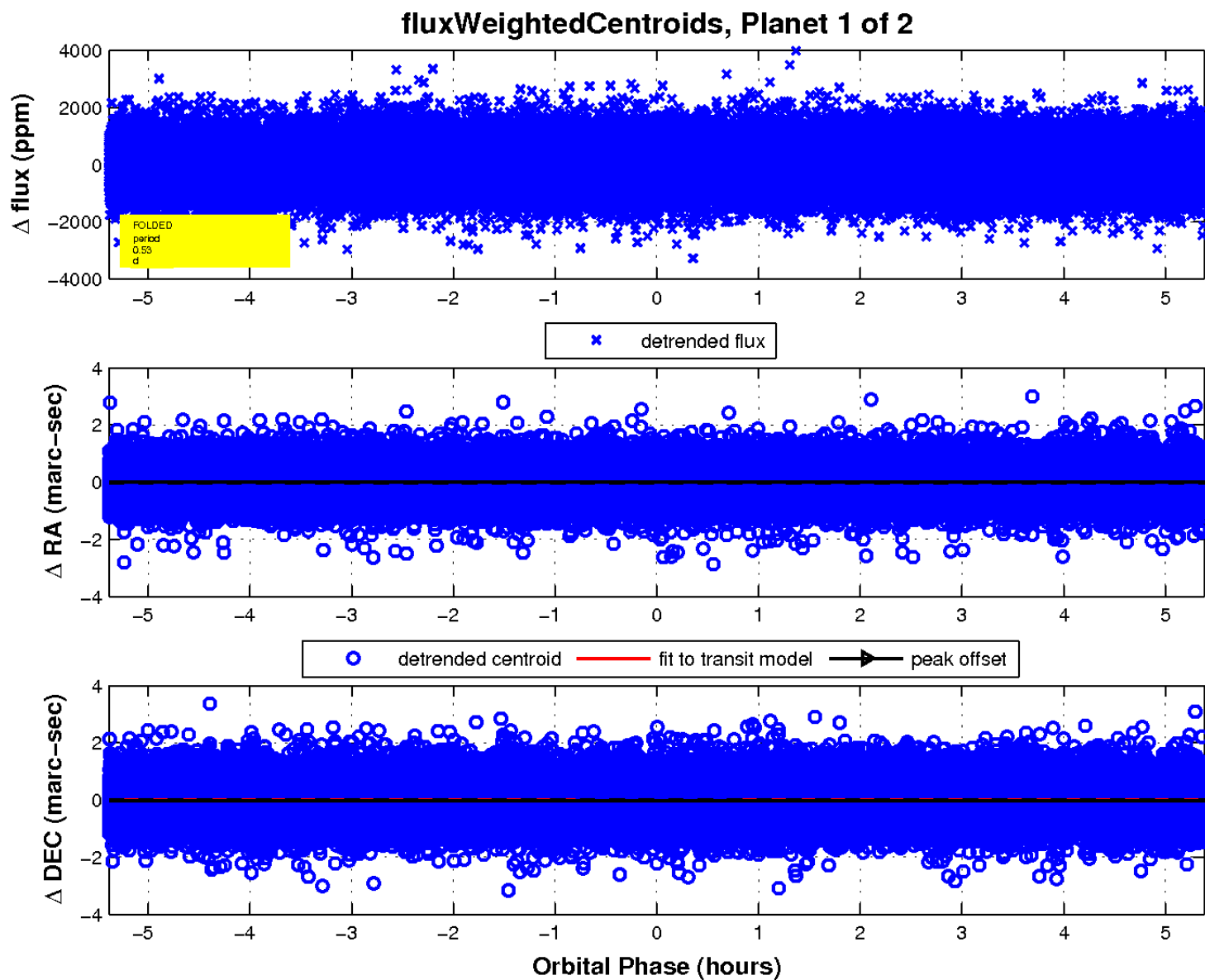
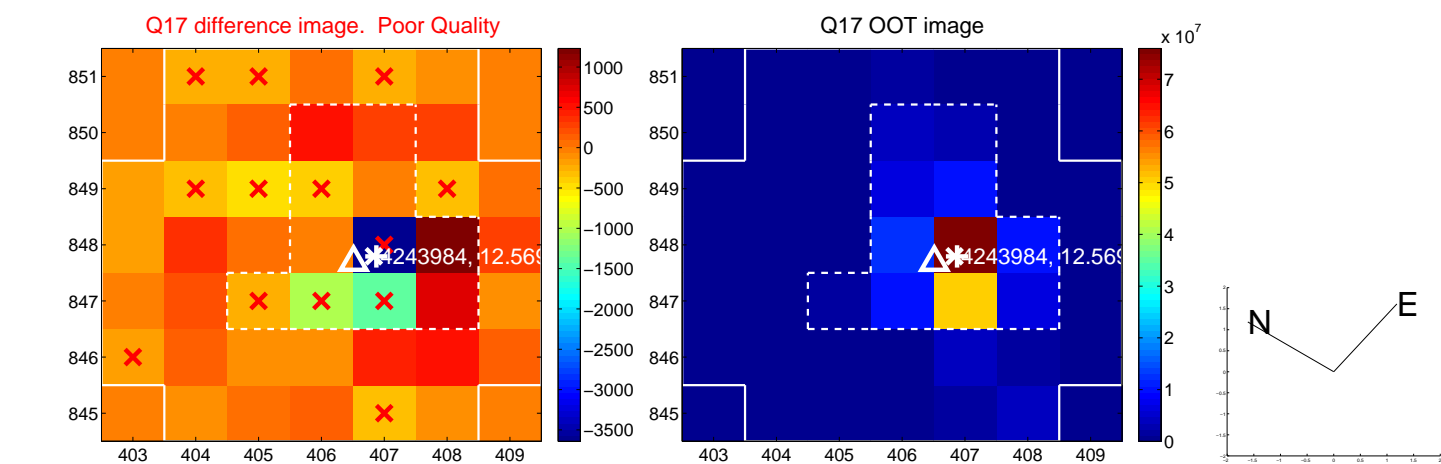
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

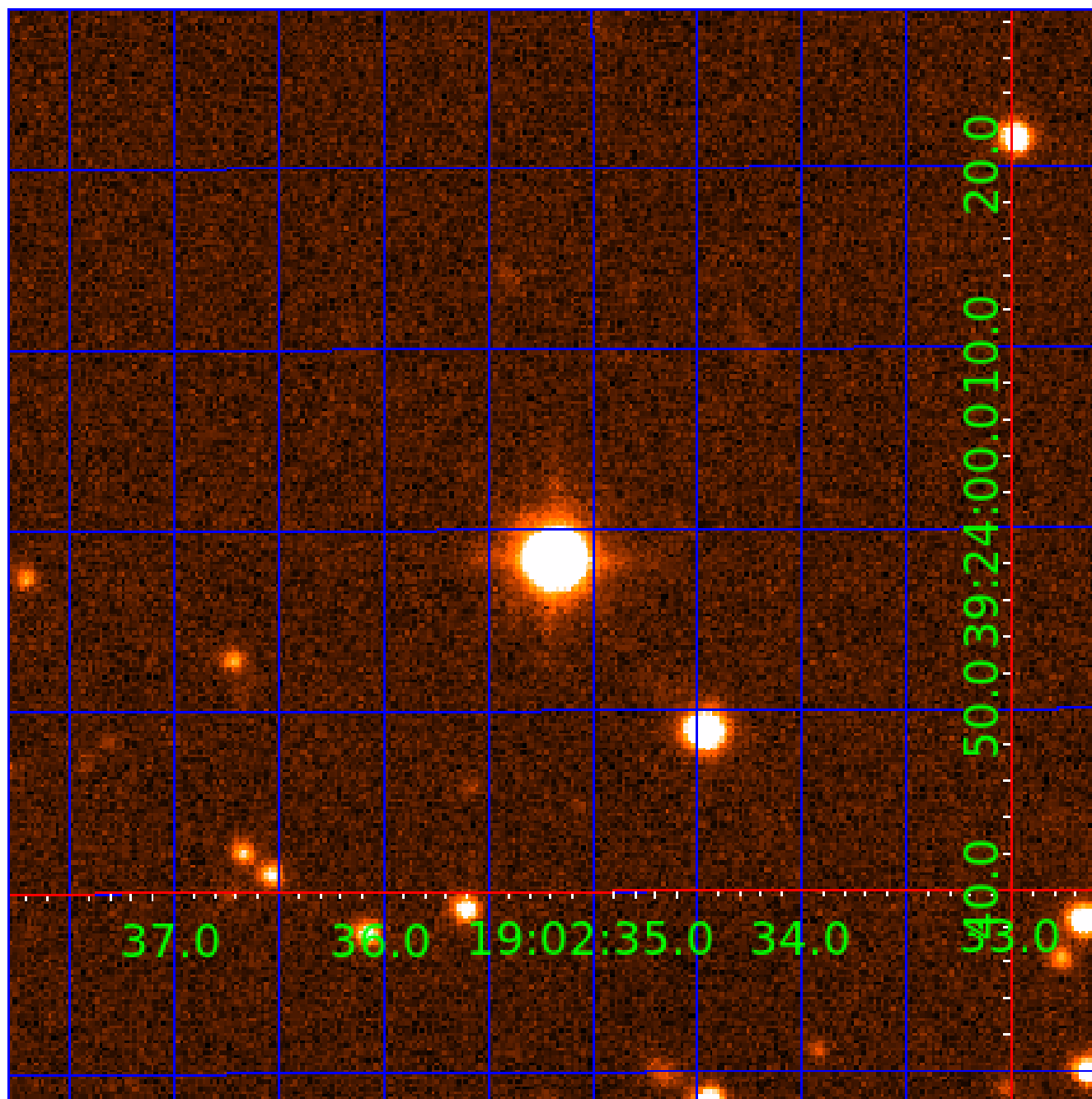


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 004243984

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004243984-01	OBS	No	0.527497	131.573715	64.0	1.795	12.0	11.2	1.51	7066	1.41	25881.95
004243984-02	OBS	No	3.452418	132.904853	143.7	2.036	7.4	7.2	1.51	7066	1.89	2114.10

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004243984-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
004243984-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT

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

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

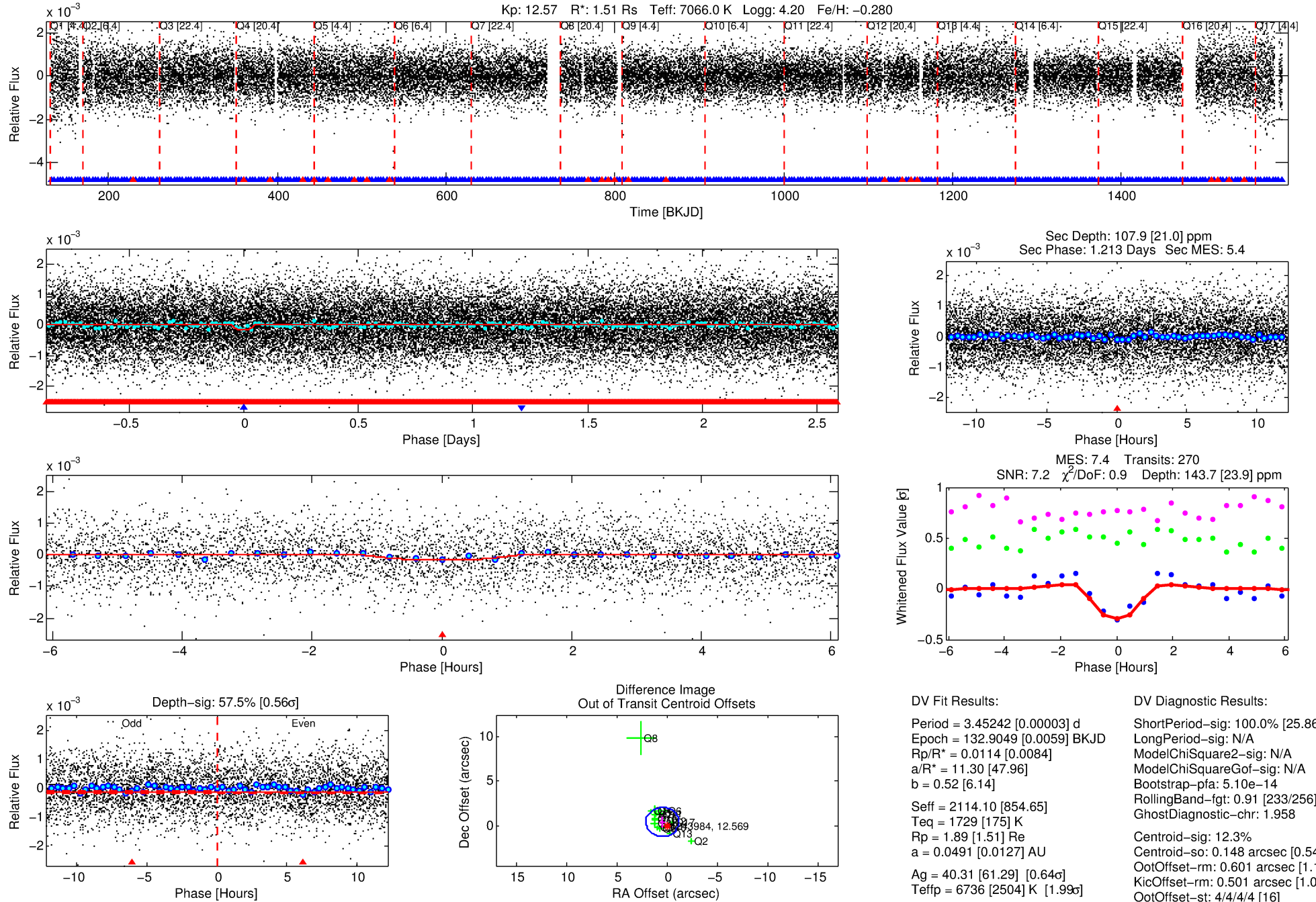
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 004243984-02

No Significant Match Found

# DV One-Page Summary

KIC: 4243984 Candidate: 2 of 2 Period: 3.452 d



## DV Fit Results:

Period = 3.45242 [0.00003] d  
Epoch = 132.9049 [0.0059] BKJD  
Rp/R\* = 0.0114 [0.0084]  
a/R\* = 11.30 [47.96]  
b = 0.52 [6.14]  
Seff = 2114.10 [854.65]  
Teq = 1729 [175] K  
Rp = 1.89 [1.51] Re  
a = 0.0491 [0.0127] AU  
Ag = 40.31 [61.29] [0.64 $\sigma$ ]  
Teffp = 6736 [2504] K [1.99 $\sigma$ ]

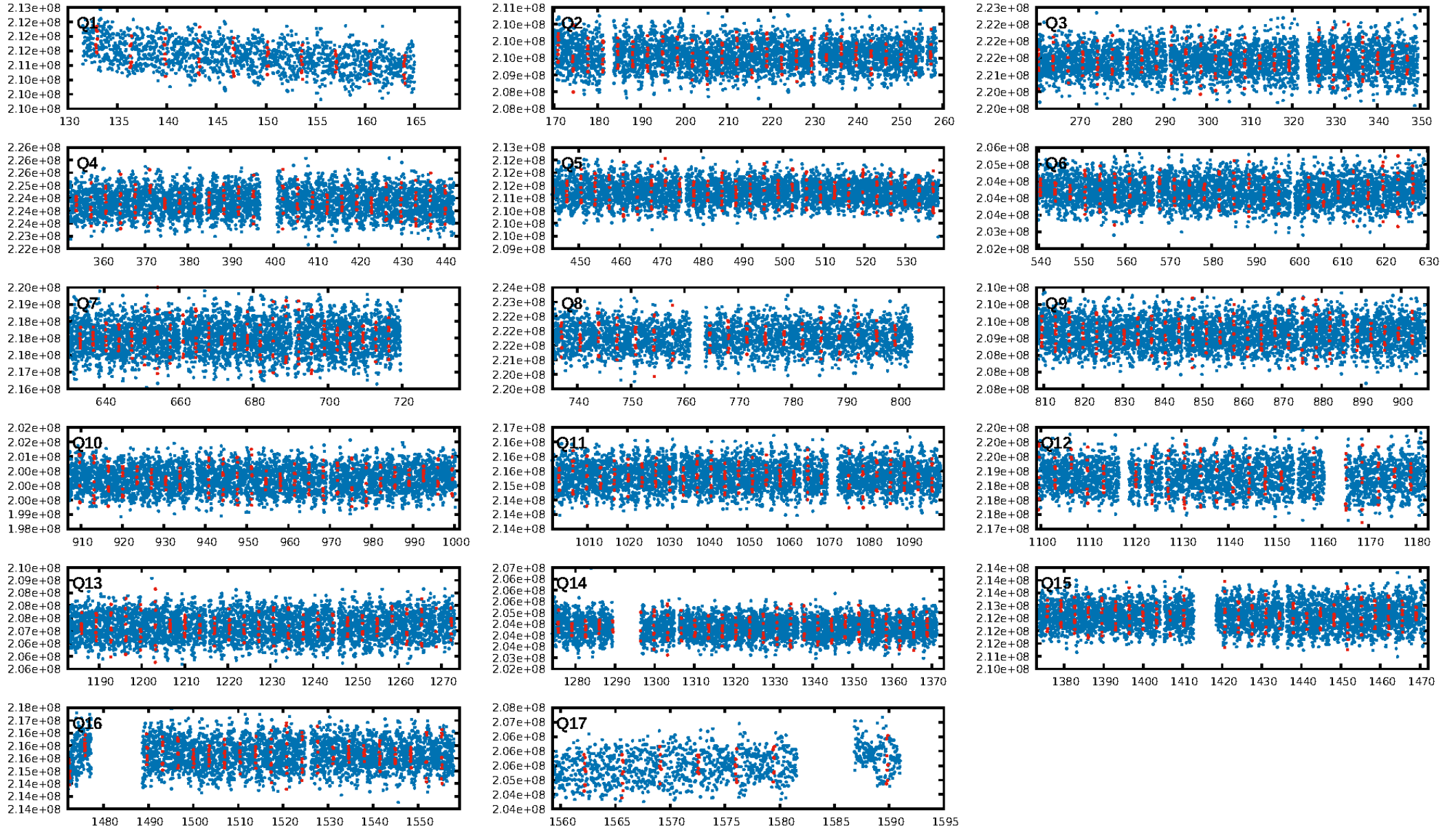
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [25.86 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 5.10e-14  
RollingBand-fgt: 0.91 [233/256]  
GhostDiagnostic-chr: 1.958  
Centroid-sig: 12.3%  
Centroid-so: 0.148 arcsec [0.54 $\sigma$ ]  
OotOffset-rm: 0.601 arcsec [1.10 $\sigma$ ]  
KicOffset-rm: 0.501 arcsec [1.01 $\sigma$ ]  
OotOffset-st: 4/4/4/4 [16]  
KicOffset-st: 4/4/4/4 [16]  
DiffImageQuality-fgm: 0.75 [12/16]  
DiffImageOverlap-fno: 0.00 [0/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 15:41:37 Z

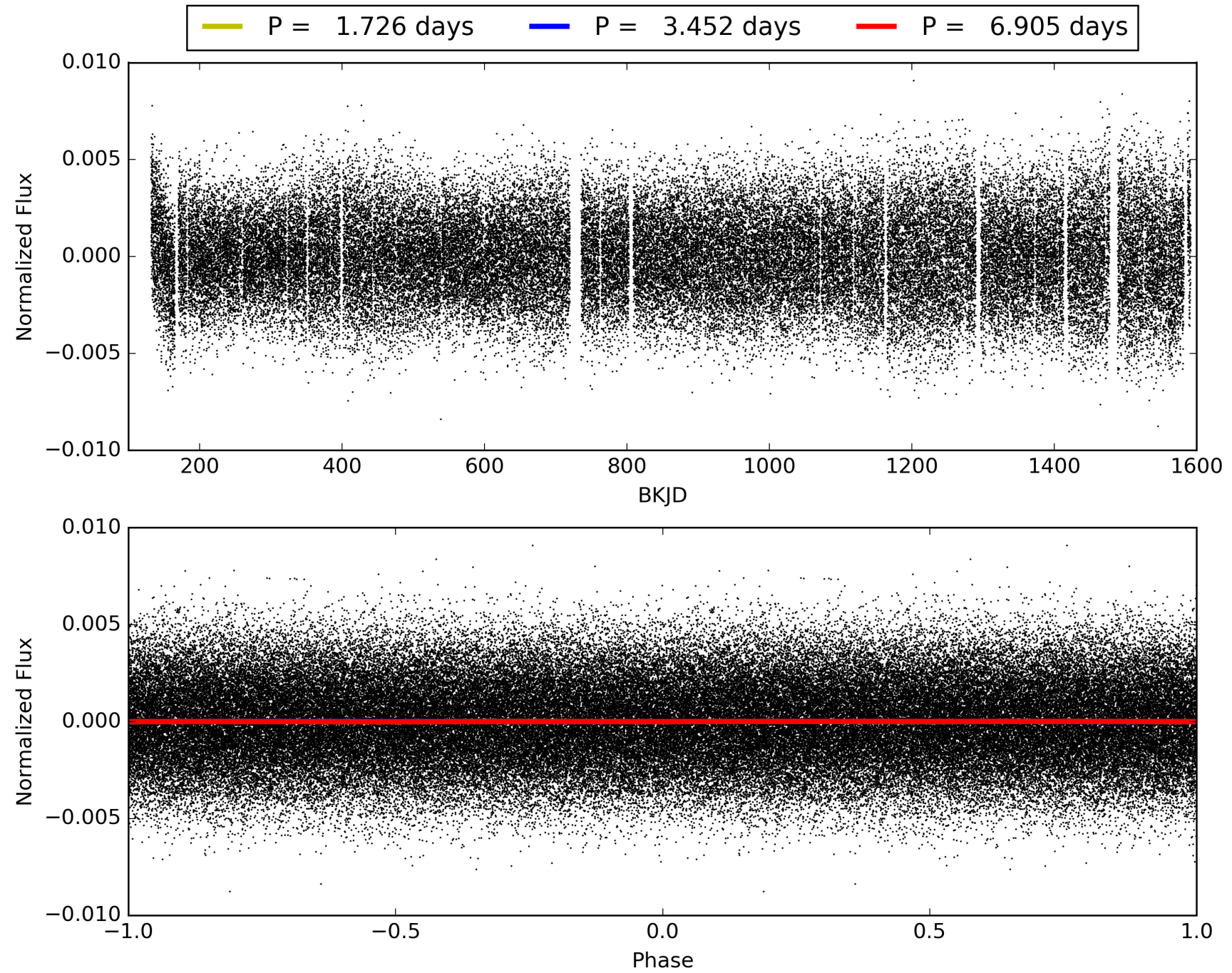
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 004243984-02, PDC Light Curves



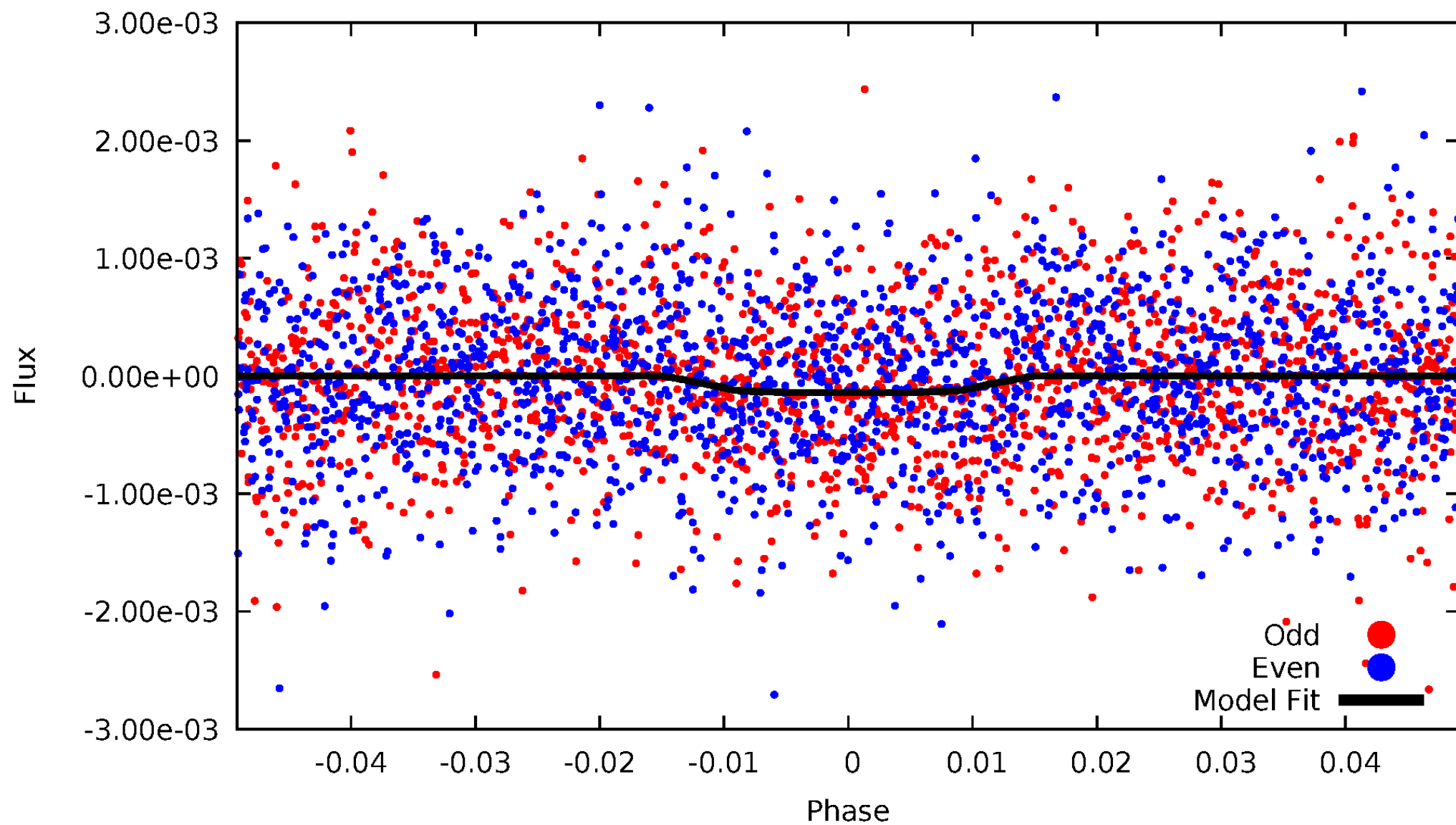


TCE 004243984-02



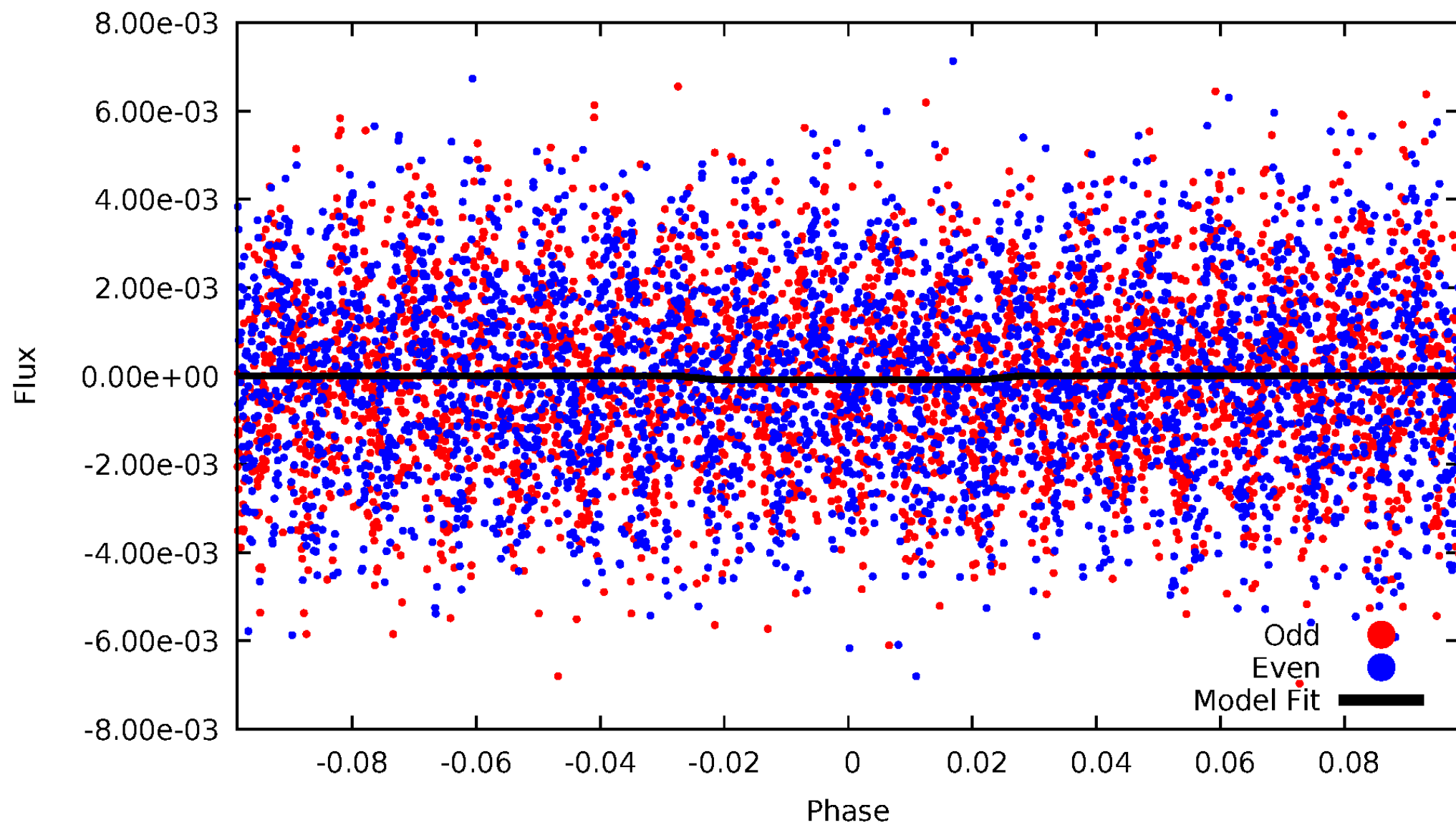
DV Odd/Even

TCE 004243984-02



# ALT Odd/Even

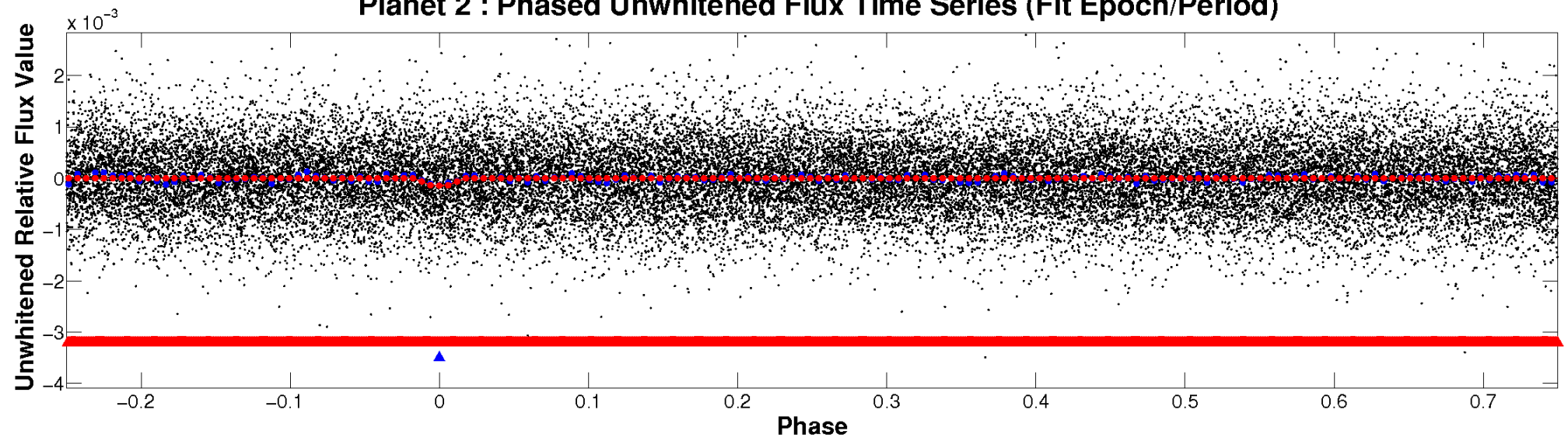
TCE 004243984-02



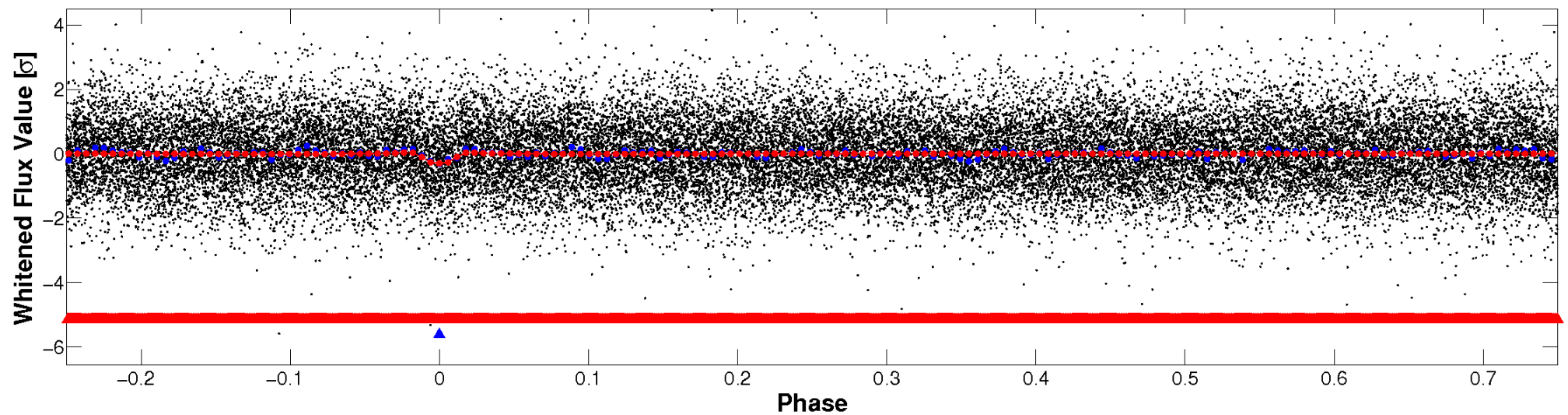


# Non-Whitened Vs. Whitened Light Curve

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

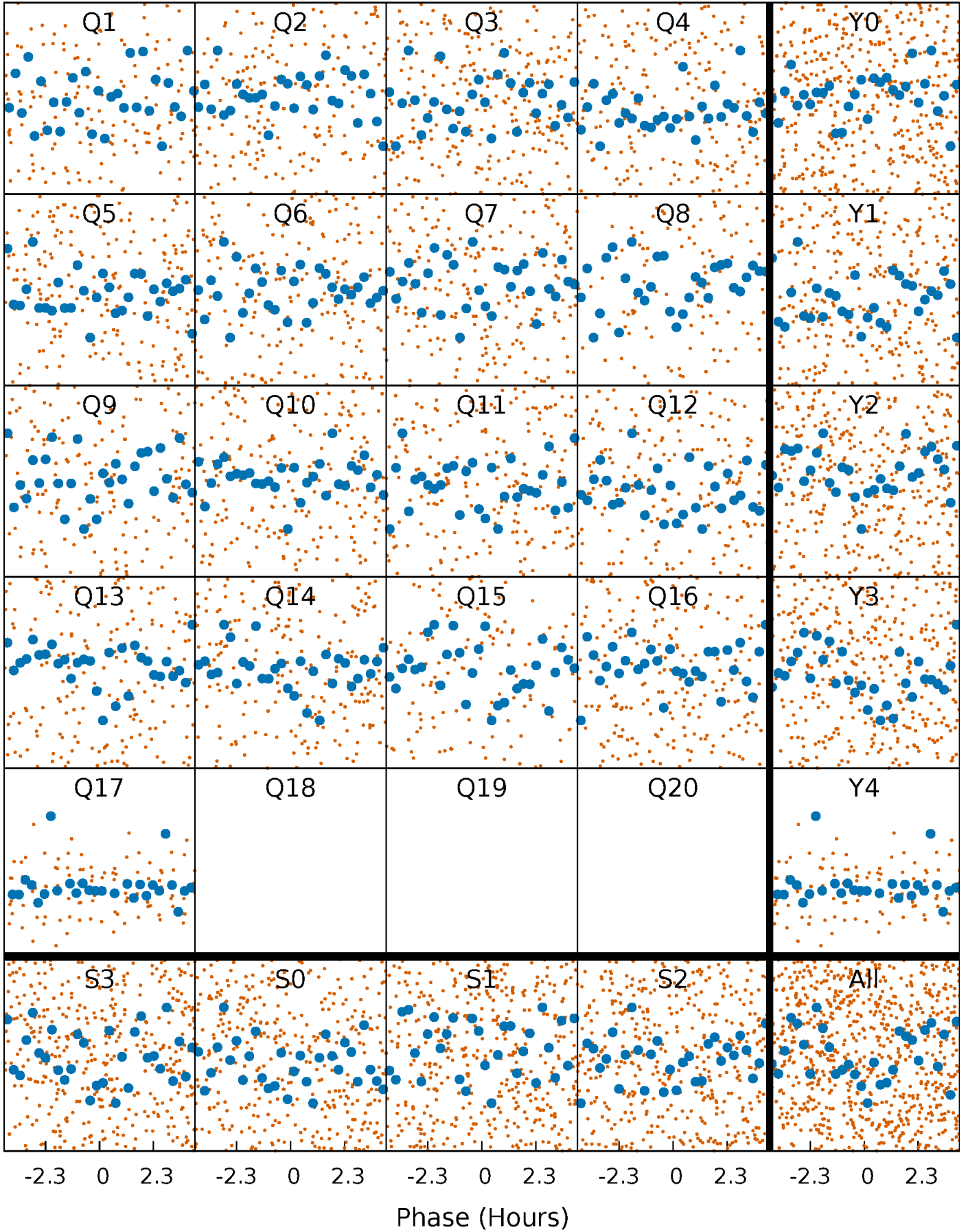


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



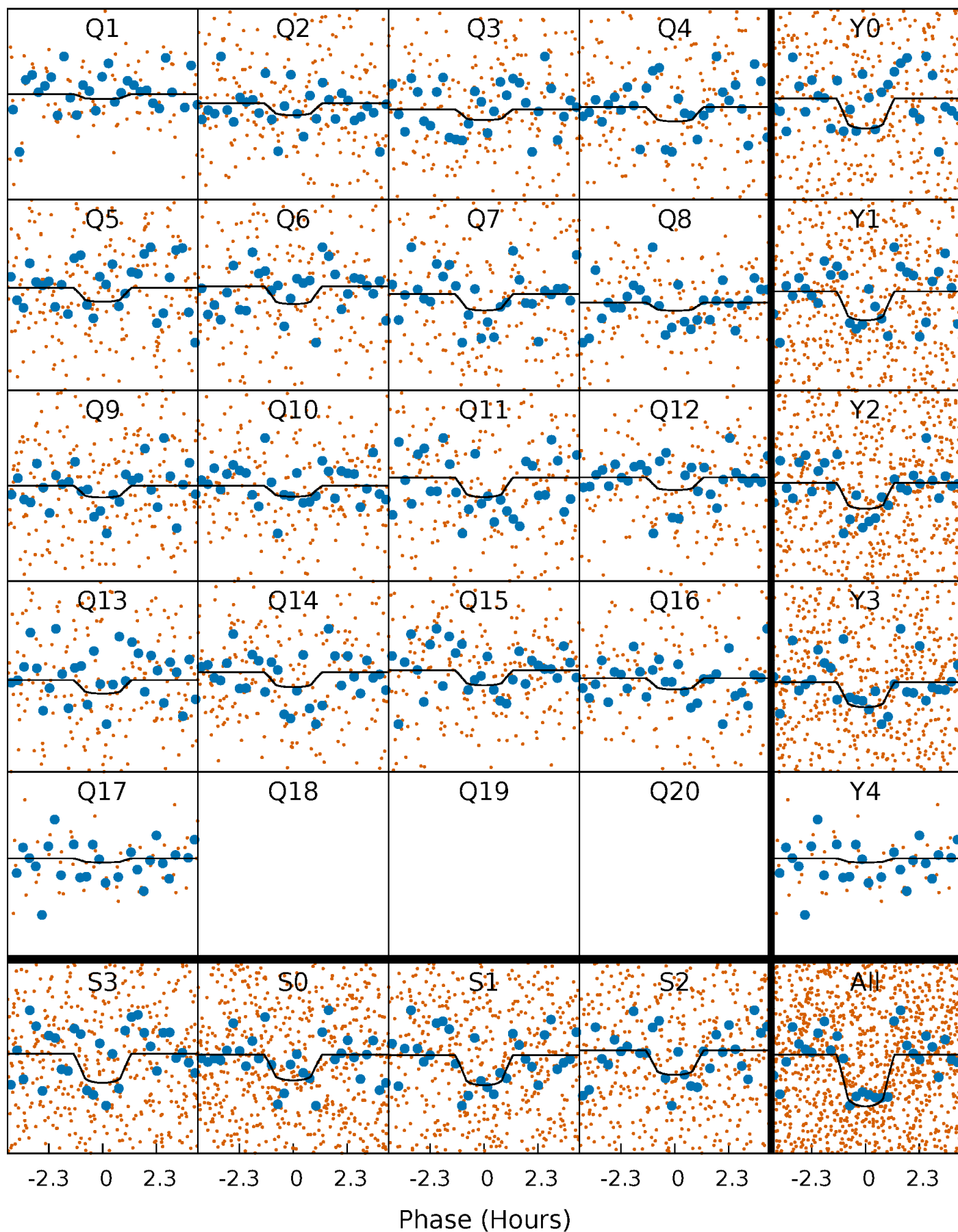
# PDC Quarter-Phased Transit Curves

TCE 004243984-02 P= 3.452418 Days  $T_0=132.904853$  (BKJD)



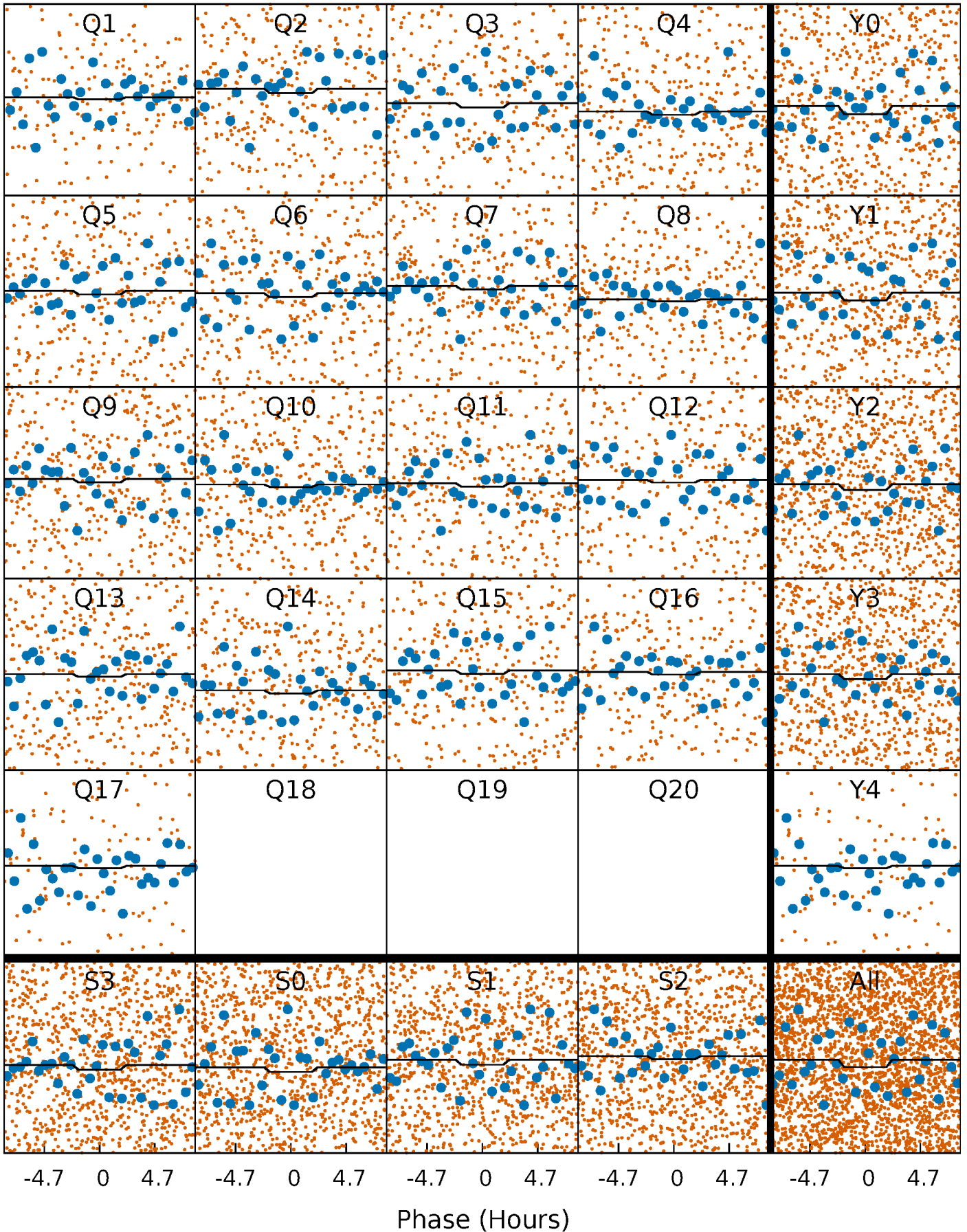
# DV Quarter-Phased Transit Curves

TCE 004243984-02   P= 3.452418 Days    $T_0=132.904853$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 004243984-02     $P = 3.452551$  Days     $T_0 = 132.802116$  (BKJD)

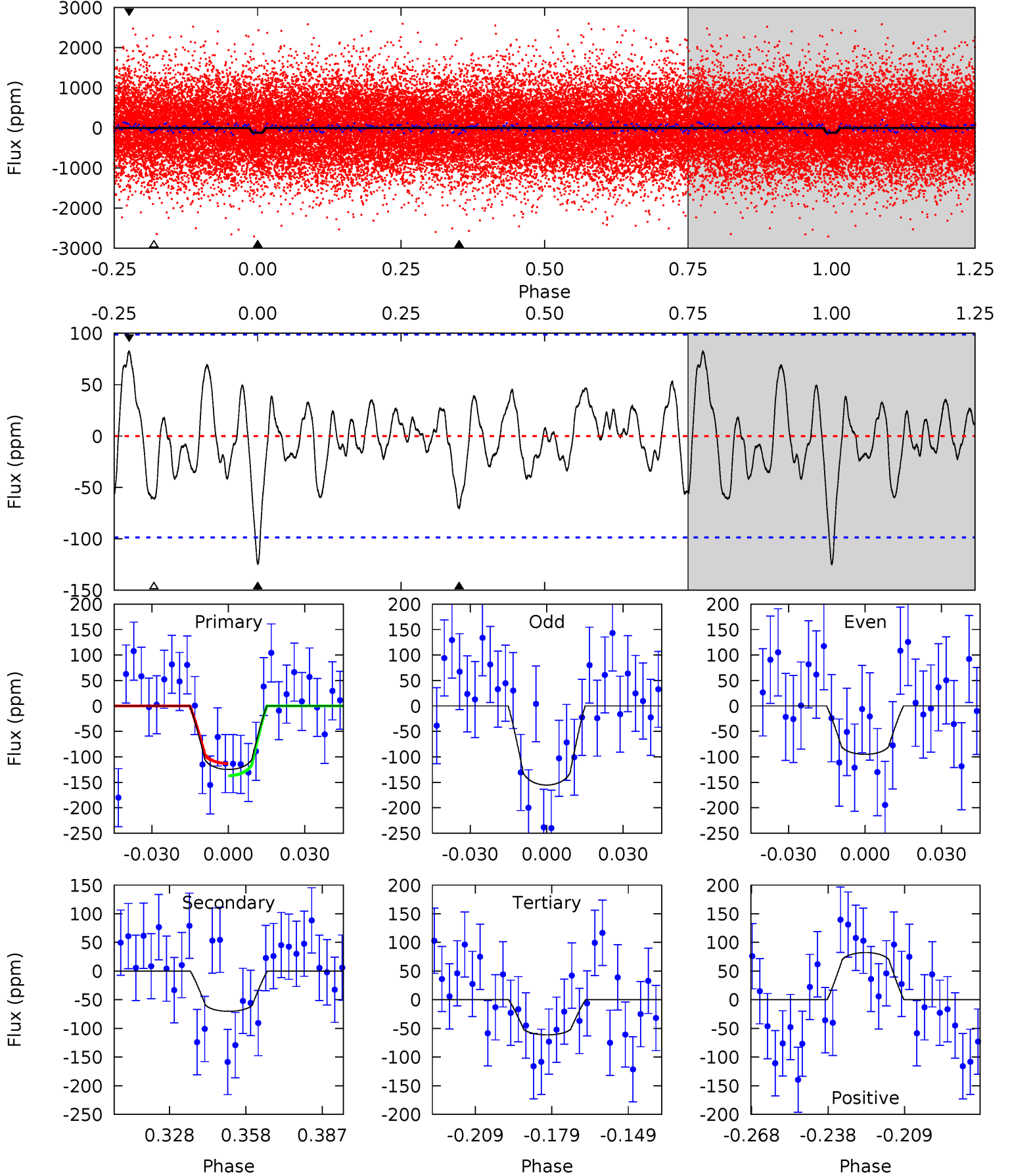




# DV Model-Shift Uniqueness Test

004243984-02, P = 3.452418 Days, E = 129.452435 Days

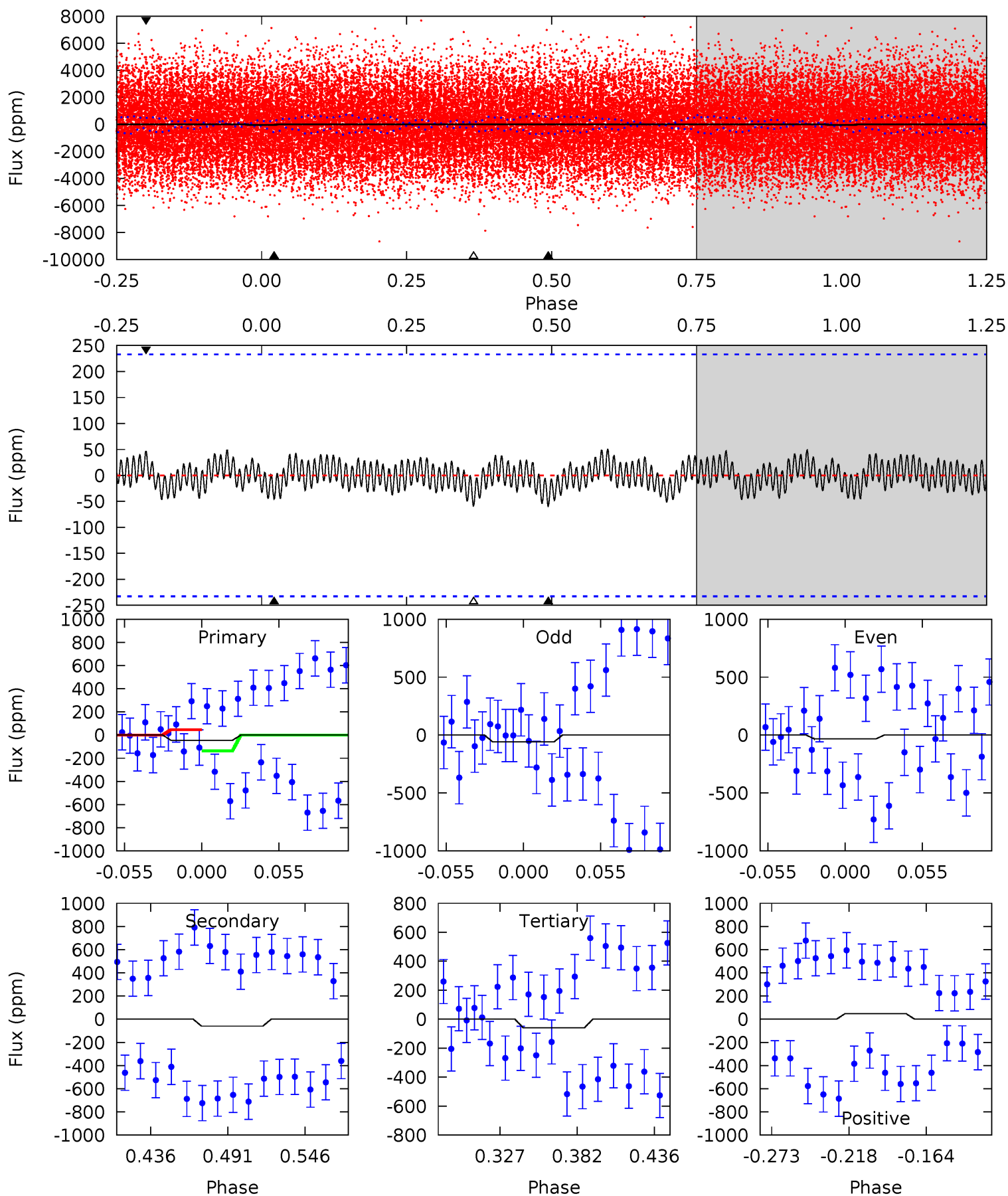
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.09	3.43	2.99	4.02	4.81	2.17	1.35	3.11	2.07	0.44	-0.60	1.48	0.93	0.40	0.58



# Alt Model-Shift Uniqueness Test

004243984-02, P = 3.452551 Days, E = 129.349565 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
0.92	1.20	1.18	0.94	4.69	1.92	0.43	-0.26	-0.02	0.02	0.26	0.25	0.80	0.46	0.89





### Stellar Parameters For KIC 004243984

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7066^{+228}_{-313}$	$4.202^{+0.144}_{-0.192}$	$-0.280^{+0.250}_{-0.350}$	$1.512^{+0.482}_{-0.321}$	$1.334^{+0.200}_{-0.220}$	$0.543^{+0.404}_{-0.267}$
	+3%/-4%	+3%/-5%	+89%/-125%	+32%/-21%	+15%/-16%	+74%/-49%
Source	KIC0	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 004243984-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-70 \pm 20$	$2.15^{+1.36}_{-1.20}$	$2424^{+185}_{-168}$	$5575^{+3275}_{-1059}$	$20^{+82}_{-13}$
Alt.	$-60 \pm 50$	$1.71^{+1.37}_{-1.03}$	$2424^{+208}_{-161}$	$5769^{+4312}_{-1953}$	$23^{+120}_{-20}$

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

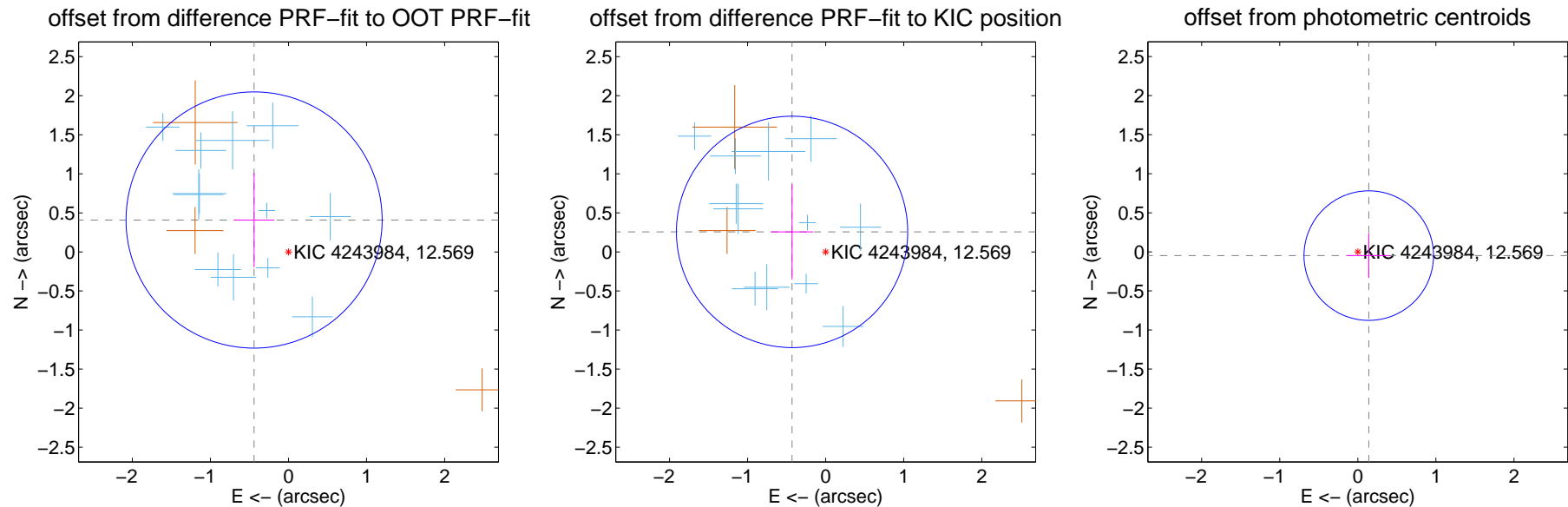
## DV Centroid Data

Supplemental centroid analysis for 004243984-02. Kepler magnitude: 12.57. Transit SNR 7.22

There are 12 quarters with good PRF difference image offsets

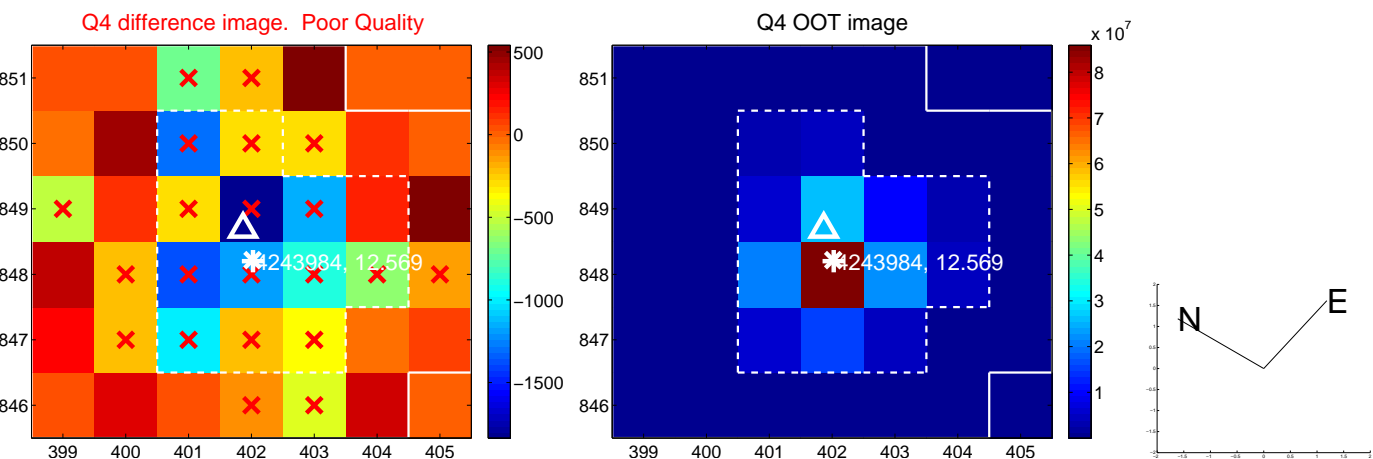
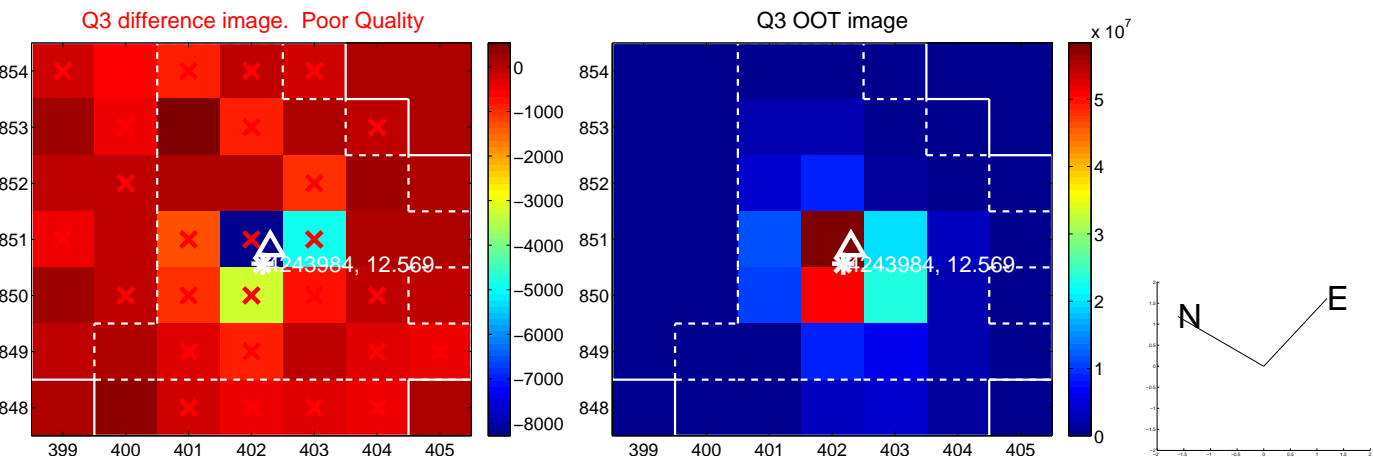
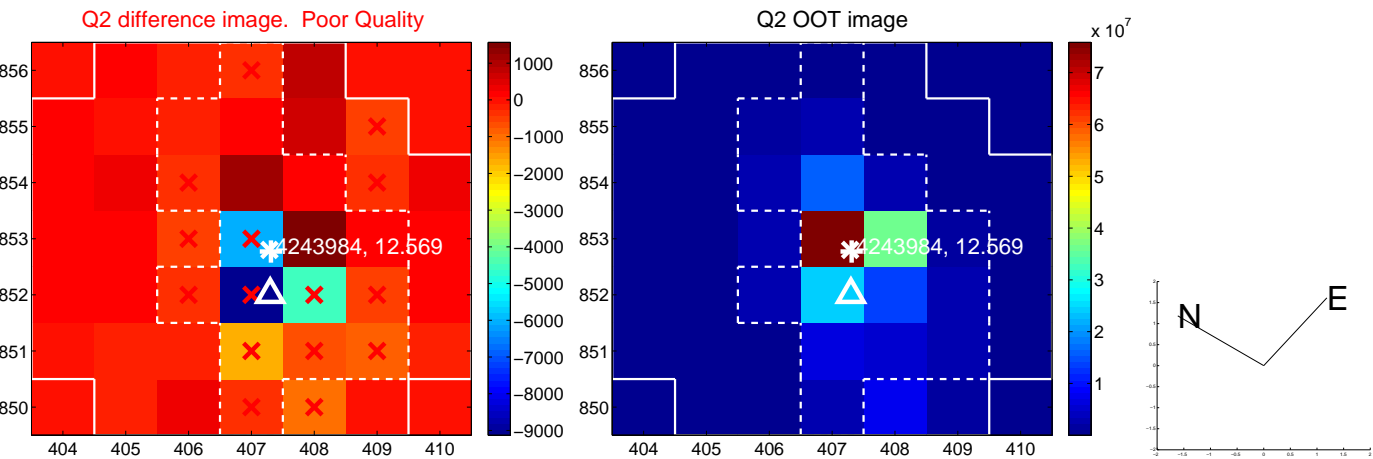
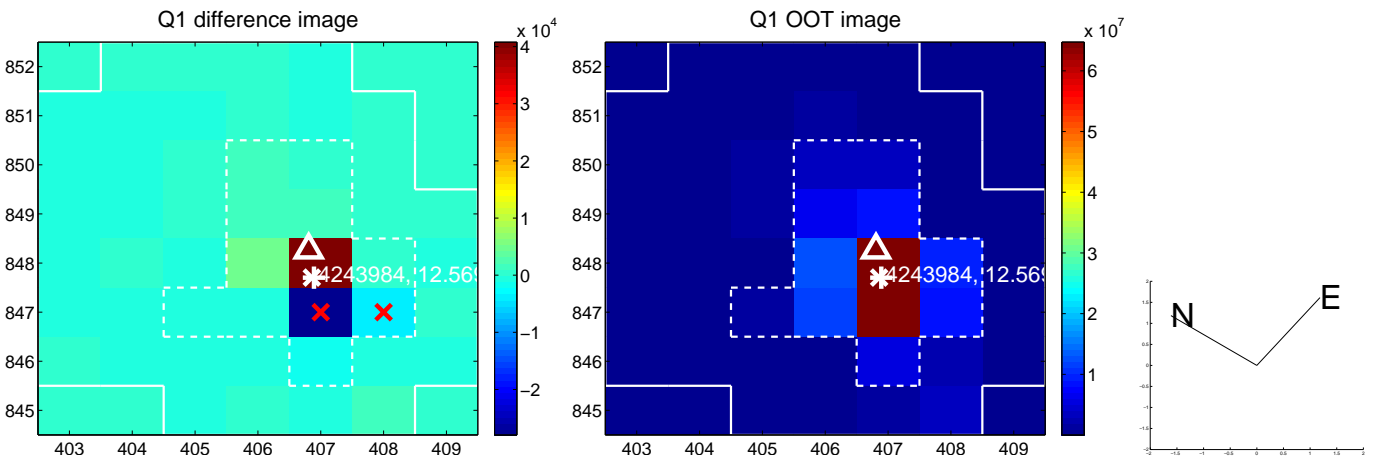
The direct PRF centroid is offset from the target star catalog position by about 0.16 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.601 \pm 0.547$	1.10	$0.441 \pm 0.262$	$0.408 \pm 0.604$
PRF-fit source offset from KIC position	$0.501 \pm 0.494$	1.01	$0.430 \pm 0.270$	$0.256 \pm 0.609$
photometric centroid source offset	$0.15 \pm 0.28$	0.54	$-0.14 \pm 0.28$	$-0.05 \pm 0.29$

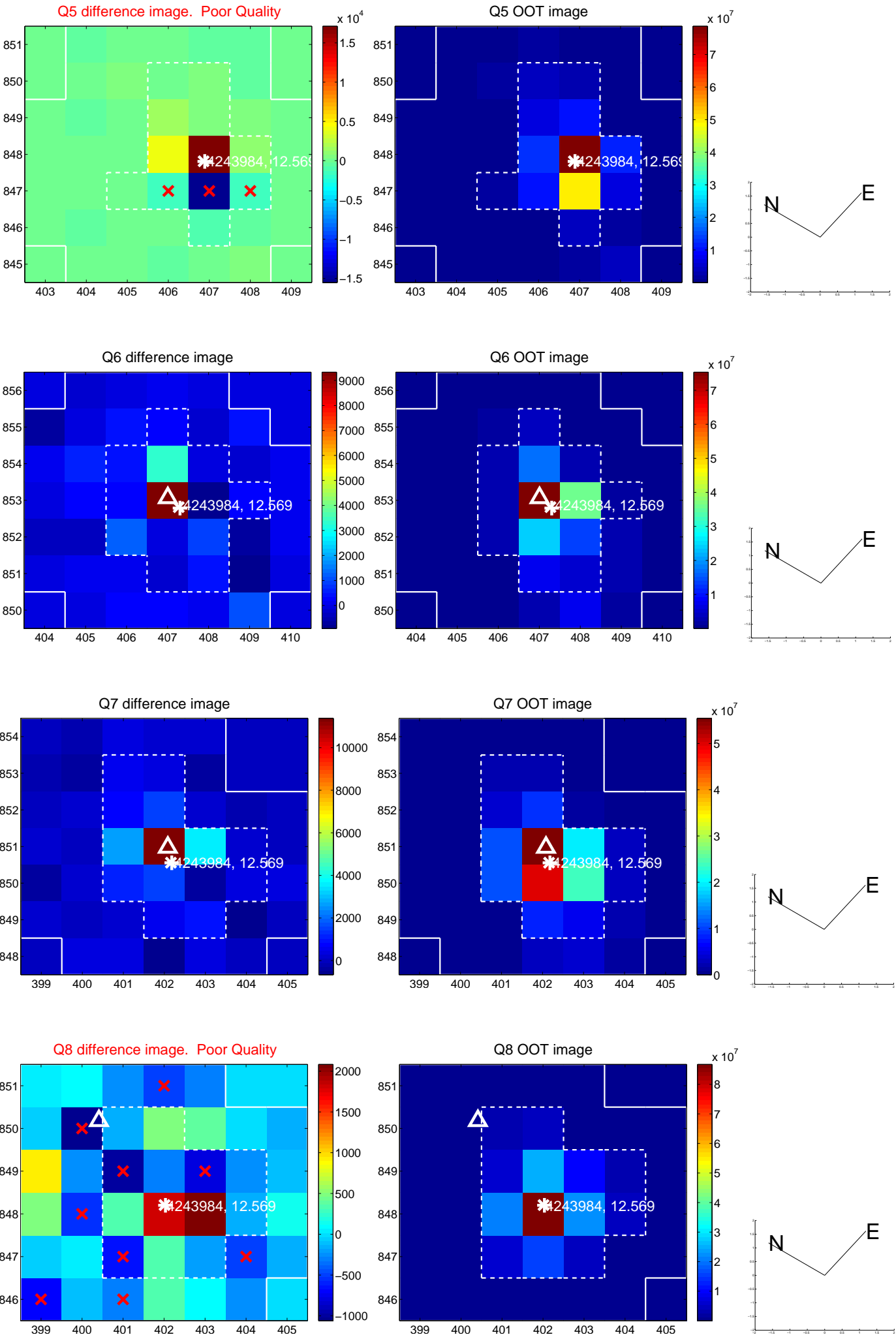


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

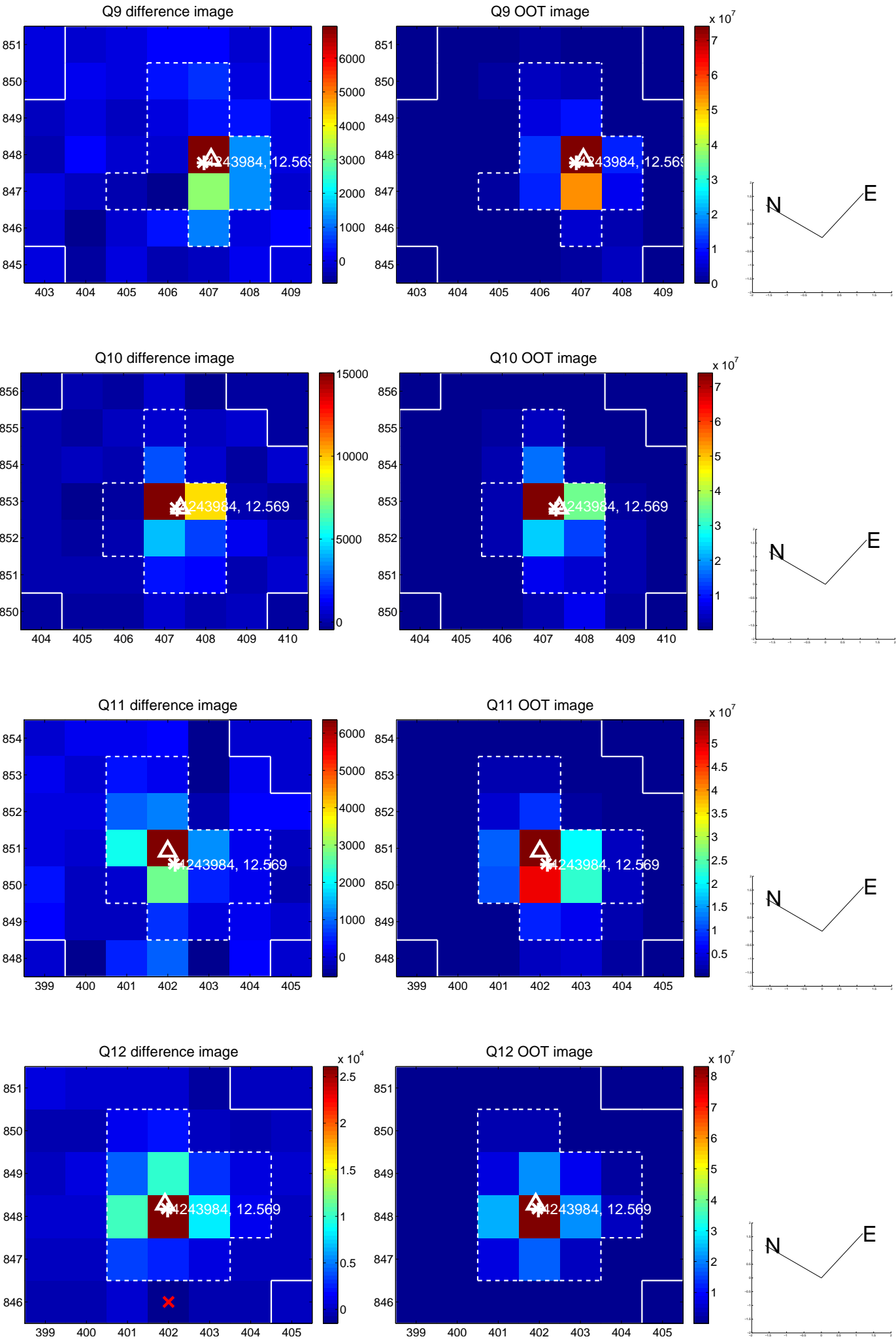
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



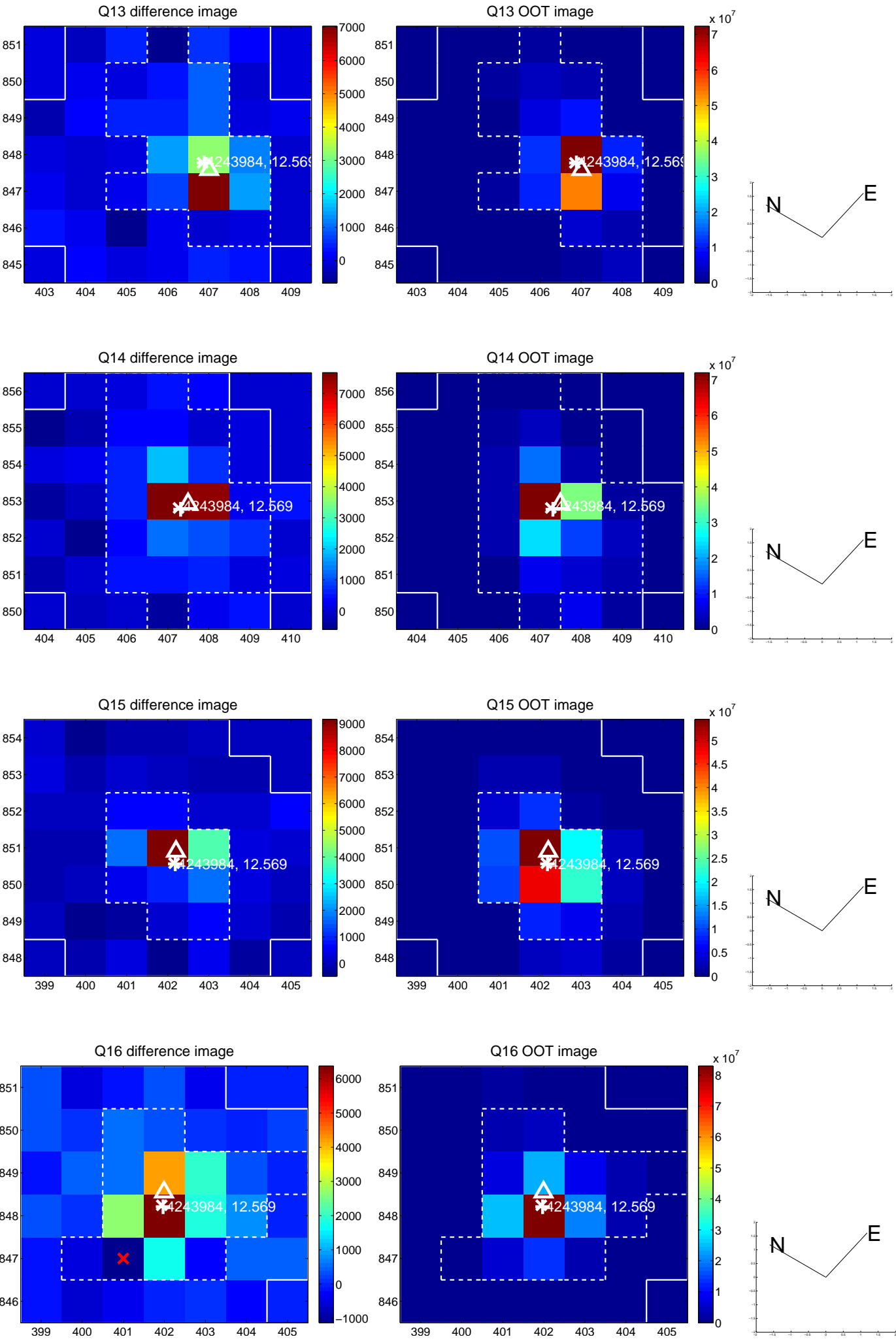
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\Delta$ : difference centroid. red  $\times$ : large negative pixel value.



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

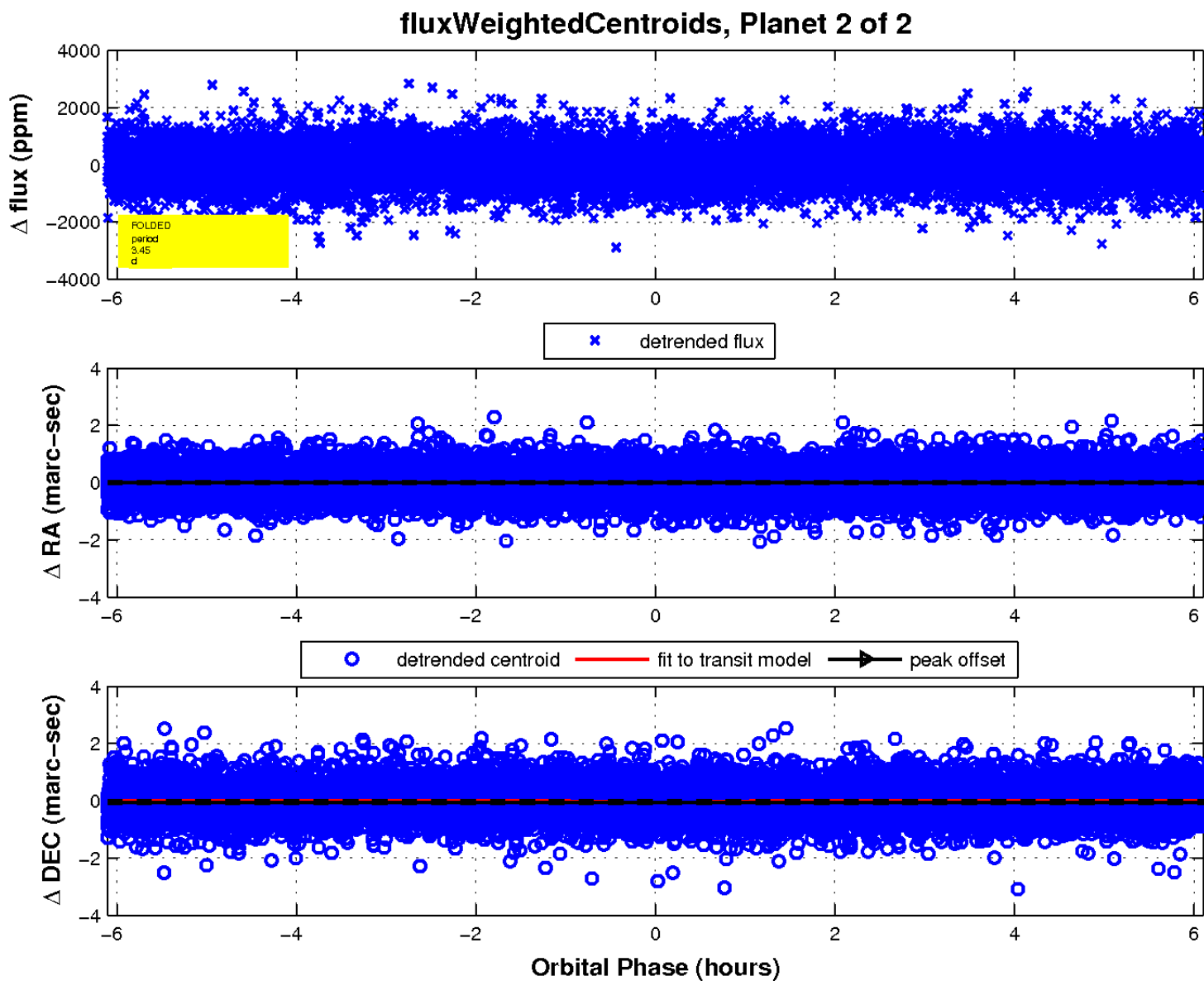
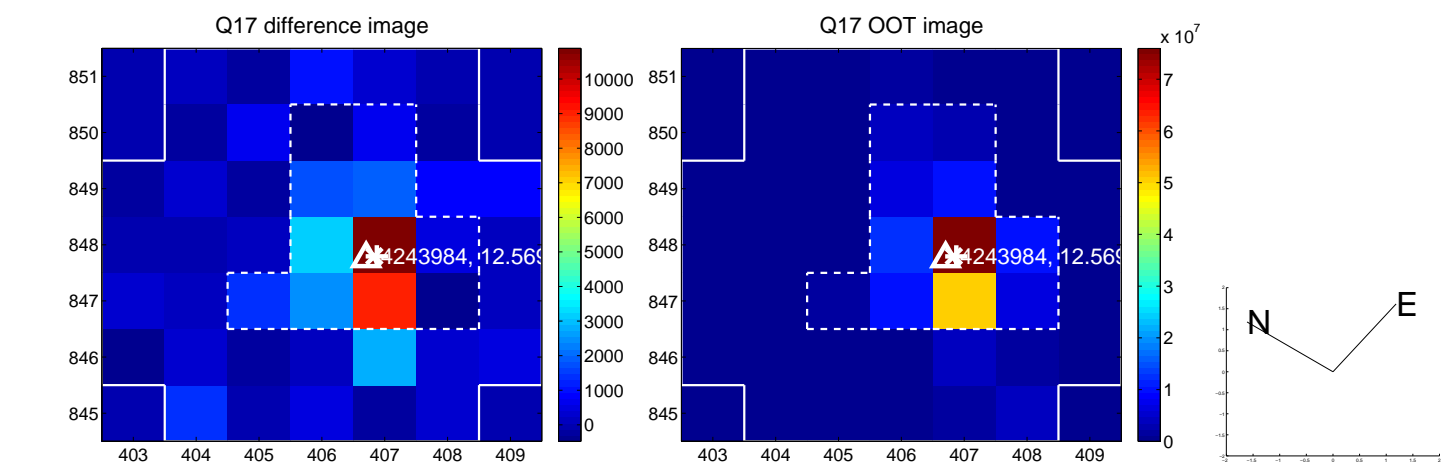


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





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



UKIRT Image

Declination

