

# KIC 009850387

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009850387-01	OBS	7238.01	1.374255	131.660403	94962.1	5.343	2191.4	1201.6	2.12	7053	105.32	13061.53
009850387-02	OBS	No	8.246478	139.239772	1745.2	8.681	11.2	13.8	2.12	7053	10.33	1197.82

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009850387-01	OBS	FP	0.00	0	1	0	0	SWEET_EB—DEPTH_ODDEVEN_DV—DEPTH_ODDEVEN_ALT—MOD_ODDEVEN_DV—MOD_ODDEVEN_ALT—DEEP_V_SHAPED
009850387-02	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—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.

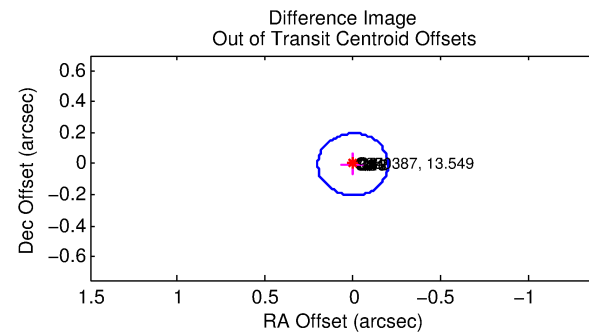
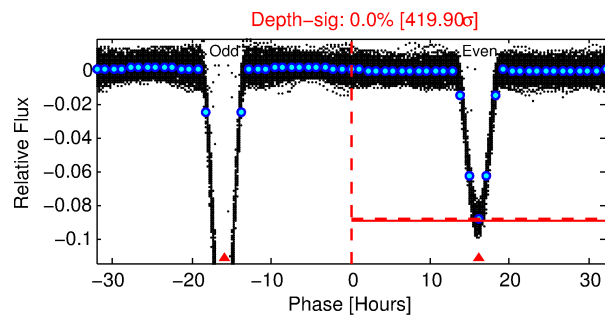
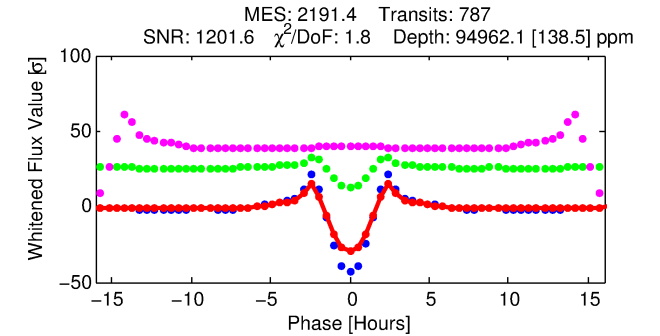
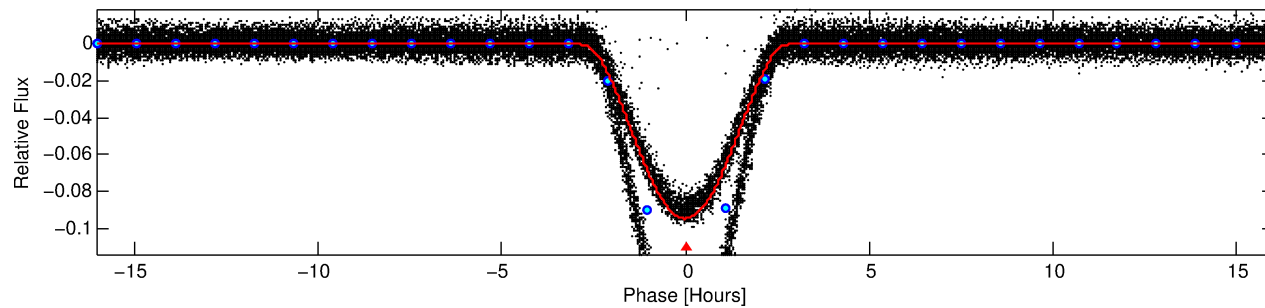
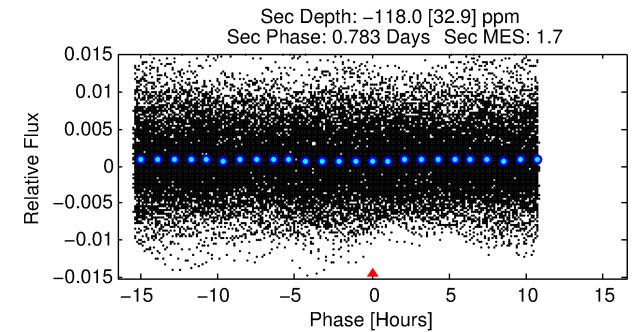
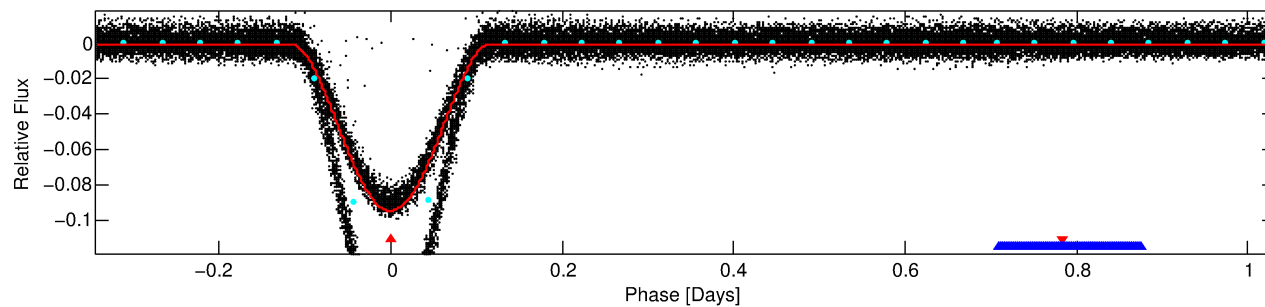
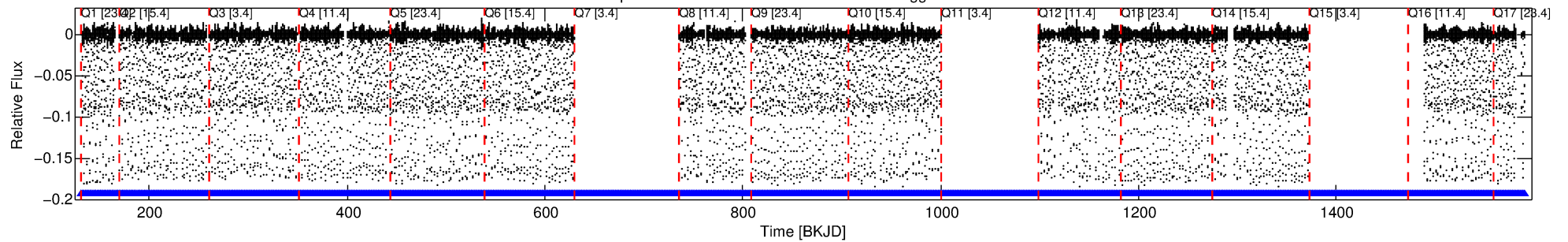
## Ephemeris Match Information For 009850387-01

No Significant Match Found

# DV One-Page Summary

KIC: 9850387 Candidate: 1 of 2 Period: 1.374 d  
KOI: K07238.01 Corr: 0.993

Kp: 13.55 R\*: 2.12 Rs Teff: 7053.0 K Logg: 3.96 Fe/H: -0.260



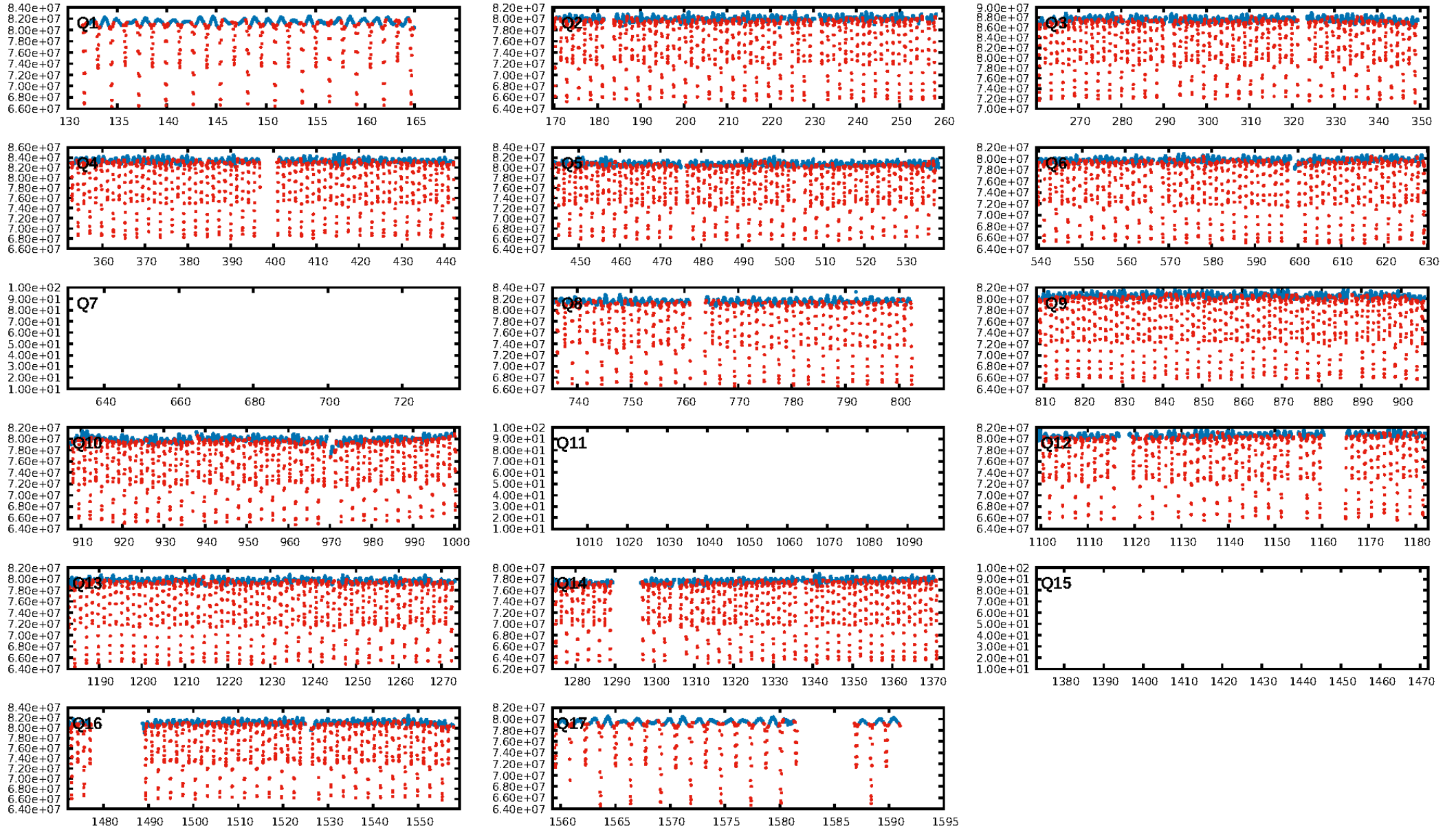
## DV Fit Results:

Period = 1.37425 [0.00000] d  
Epoch = 131.6604 [0.0000] BKJD  
Rp/R\* = 0.4551 [0.0246]  
a/R\* = 2.43 [0.02]  
b = 0.97 [0.03]  
Seff = 13061.53 [7460.24]  
Teff = 2726 [389] K  
Rp = 105.32 [39.59] Re  
a = 0.0276 [0.0096] AU  
Ag = N/A  
Teffp = N/A

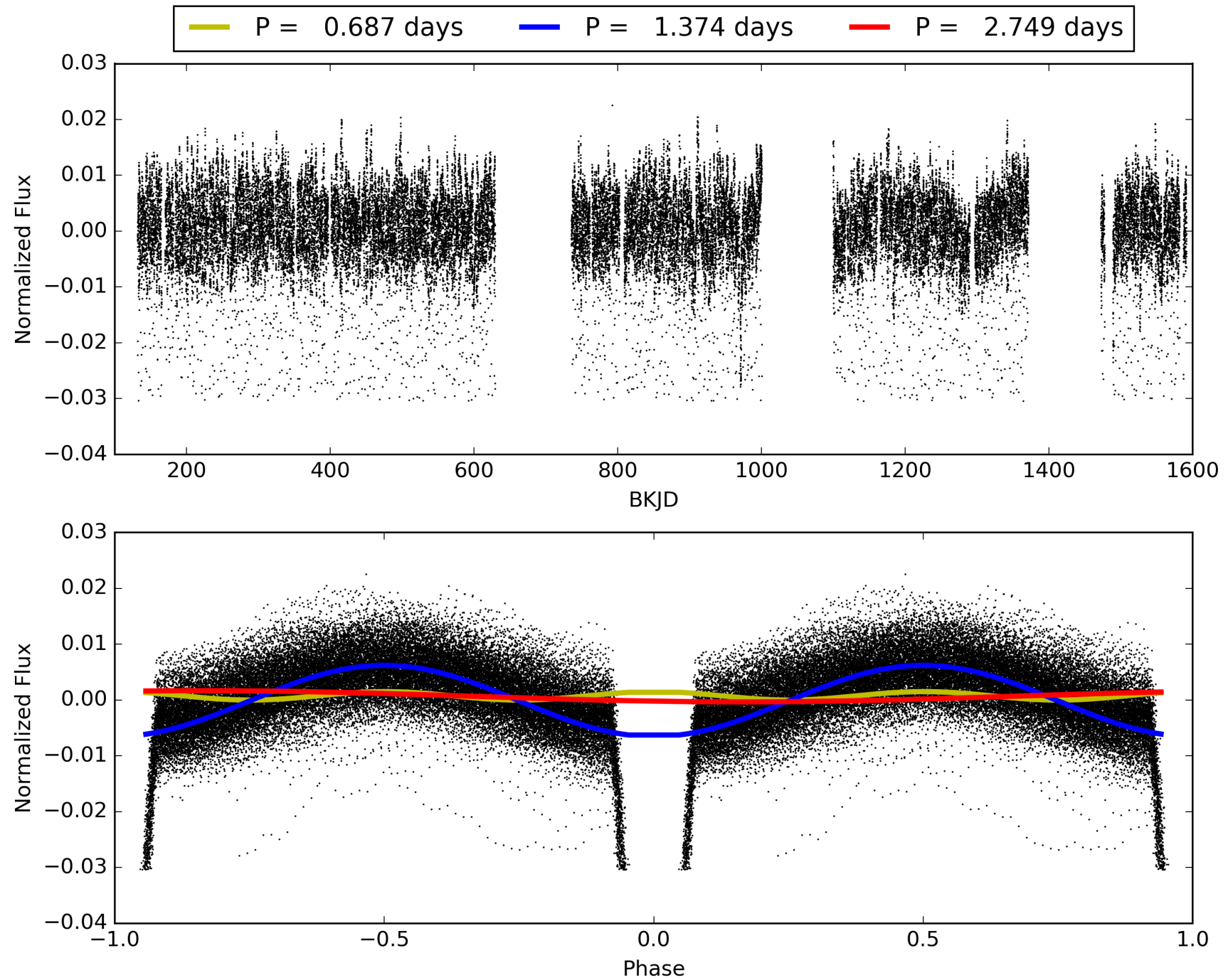
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [16.18σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [741/741]  
GhostDiagnostic-chr: N/A  
Centroid-sig: N/A  
Centroid-so: 0.078 arcsec [122.46σ]  
OotOffset-rm: 0.004 arcsec [0.07σ]  
KicOffset-rm: 0.105 arcsec [1.56σ]  
OotOffset-st: 4/1/4/5 [14]  
KicOffset-st: 4/1/4/5 [14]  
DiffImageQuality-fgm: 1.00 [14/14]  
DiffImageOverlap-fno: 1.00 [14/14]

# TCE 009850387-01, PDC Light Curves

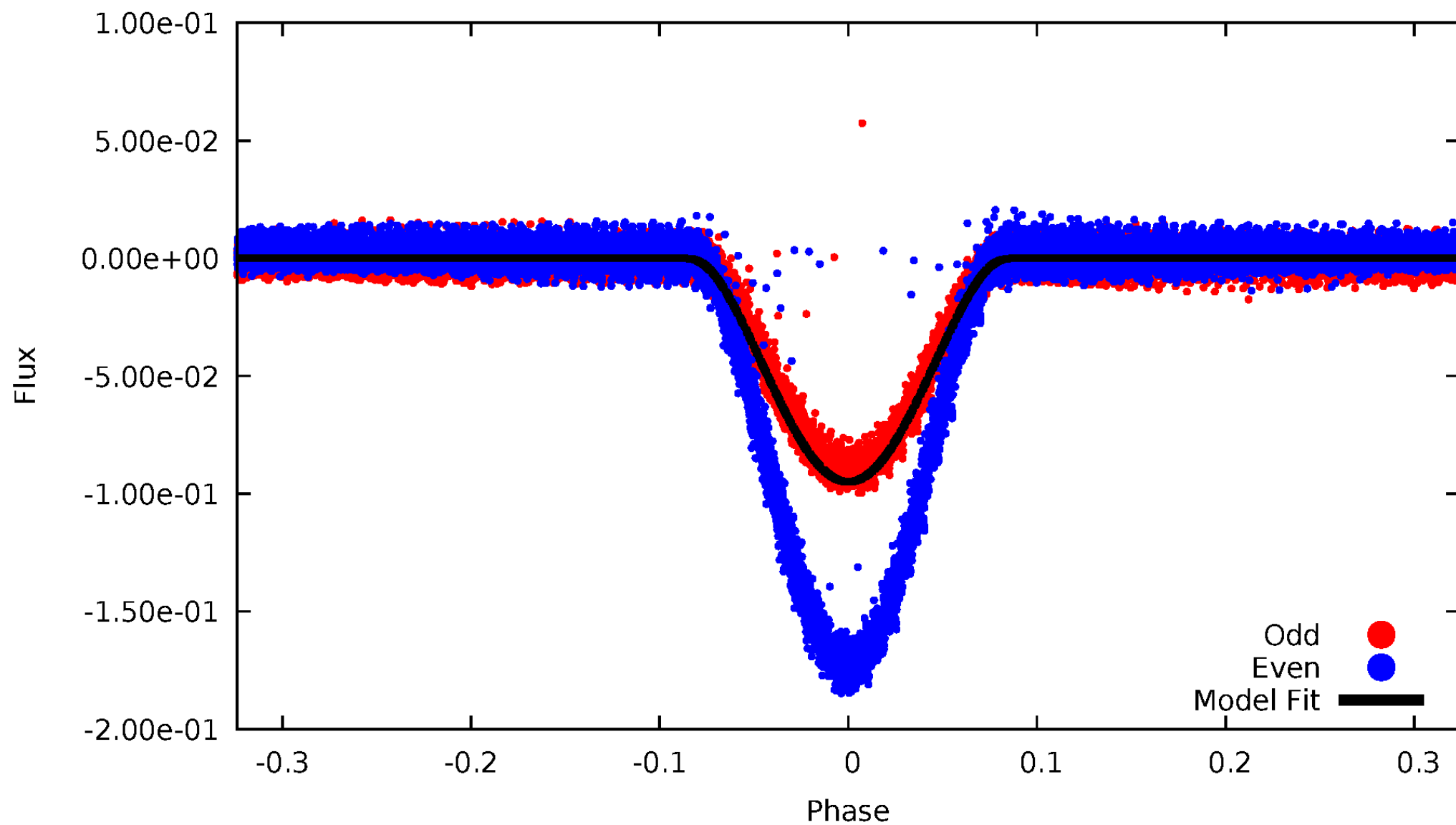


# TCE 009850387-01



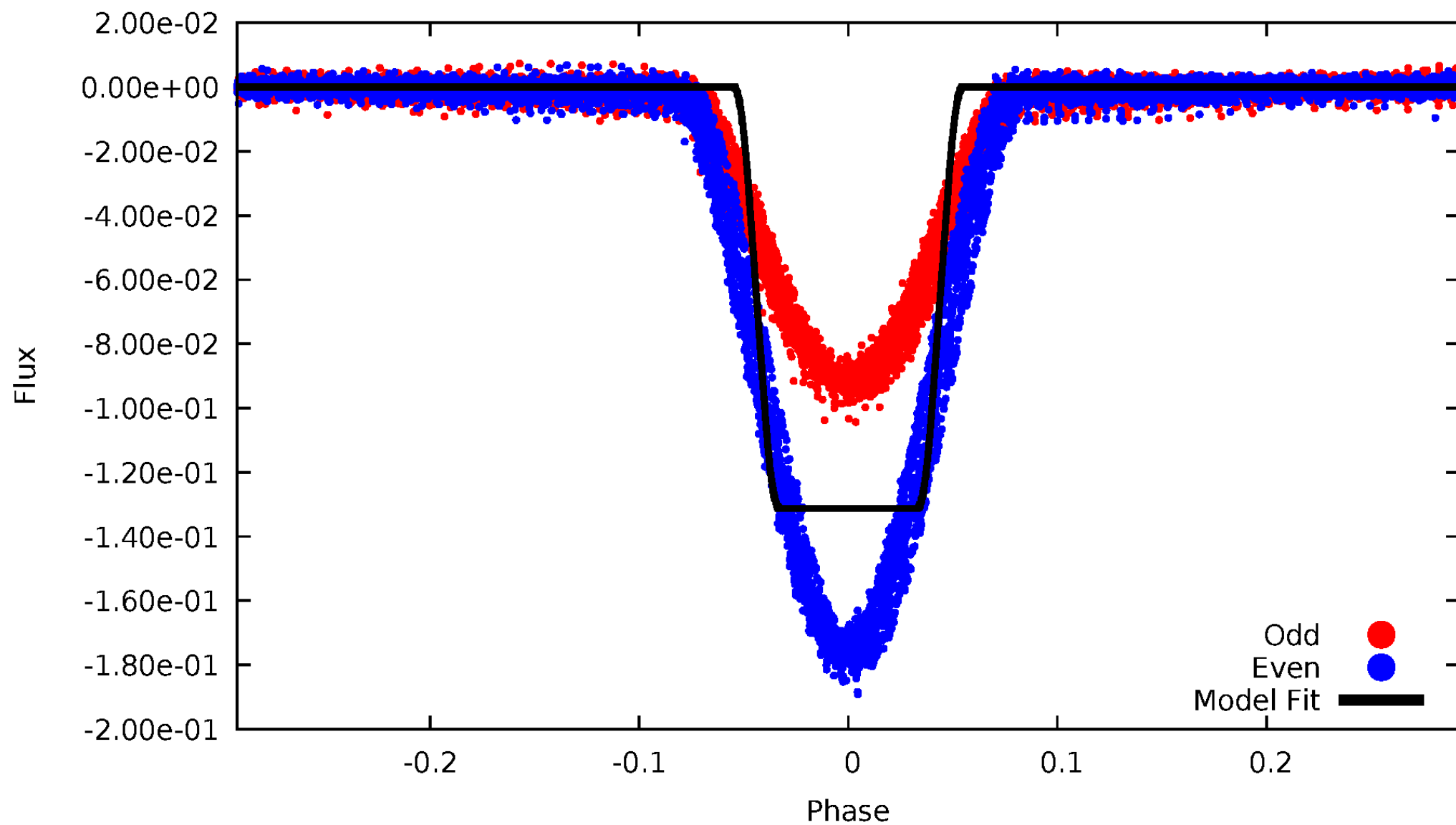
# DV Odd/Even

TCE 009850387-01



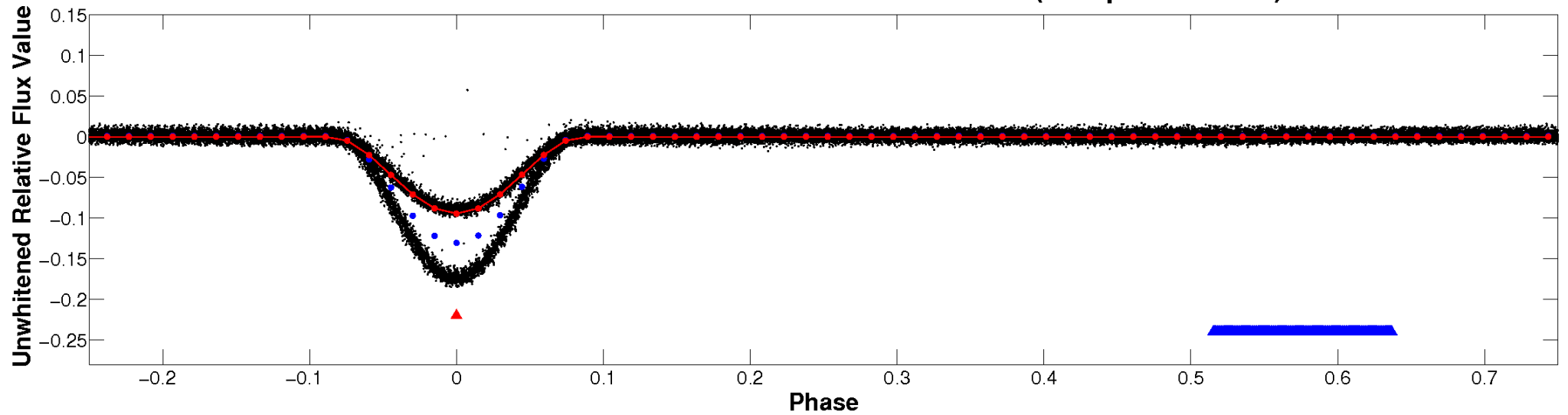
# ALT Odd/Even

TCE 009850387-01

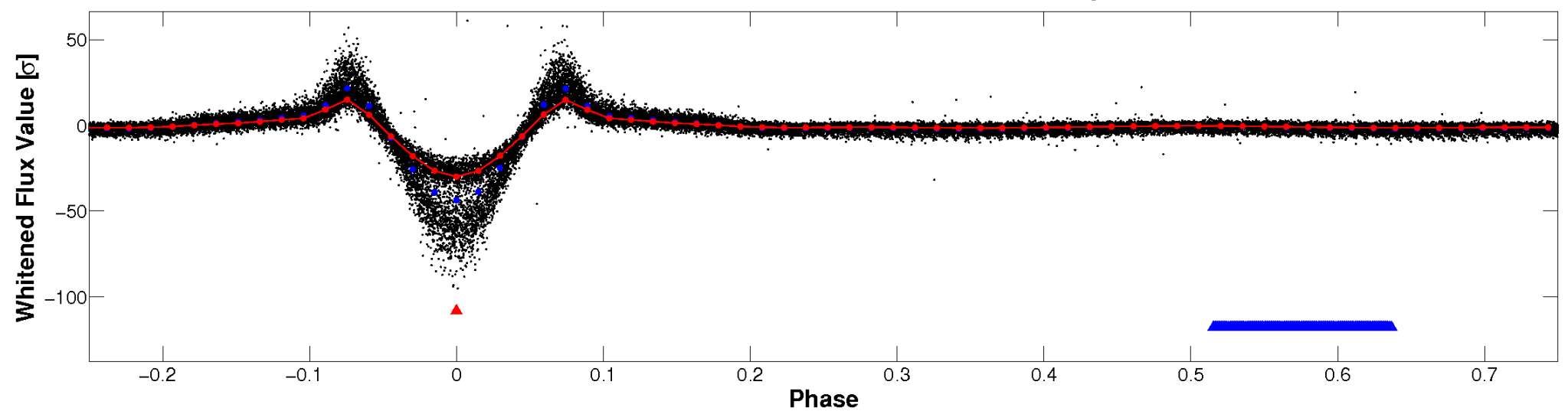


# Non-Whitened Vs. Whitened Light Curve

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

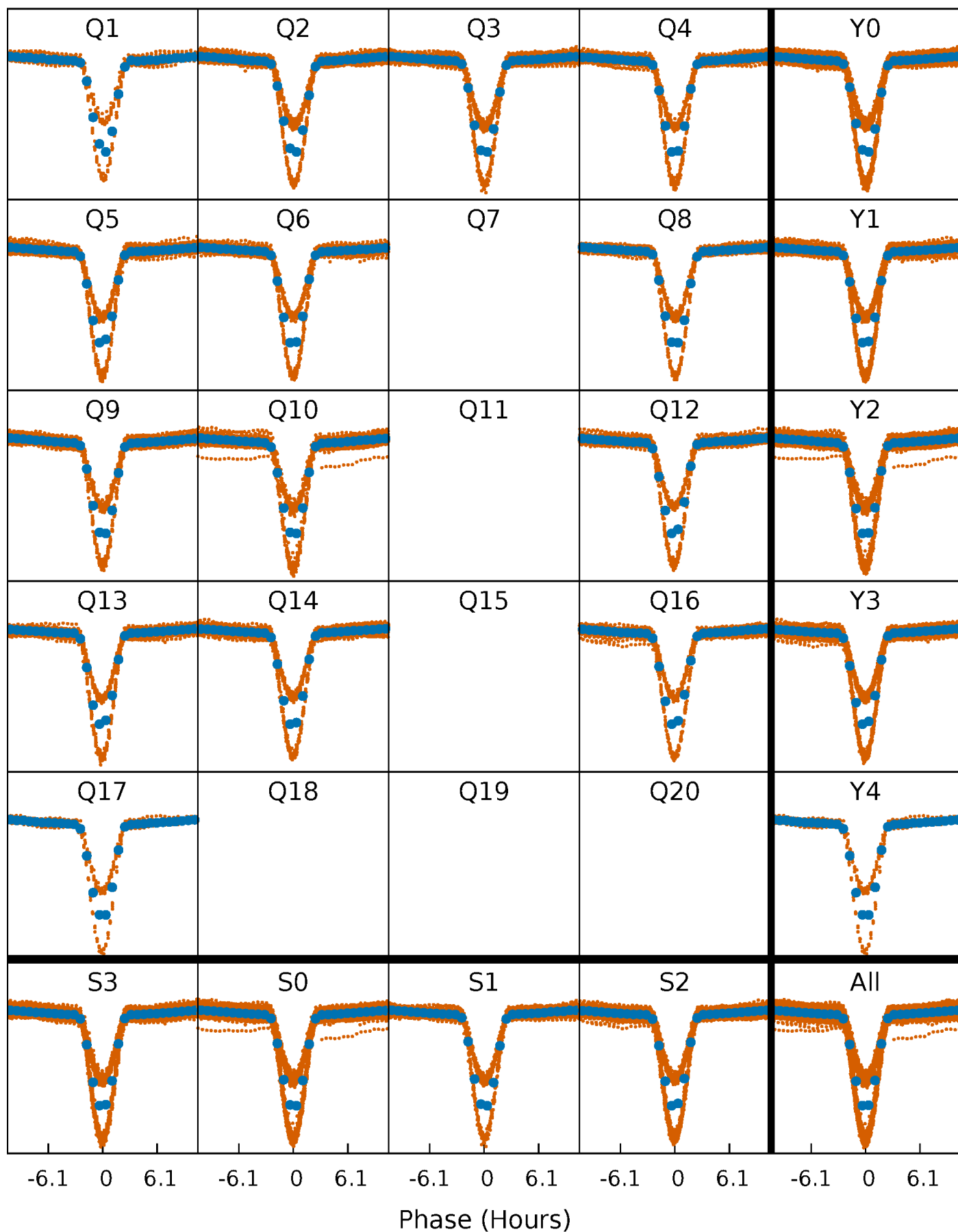


## Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

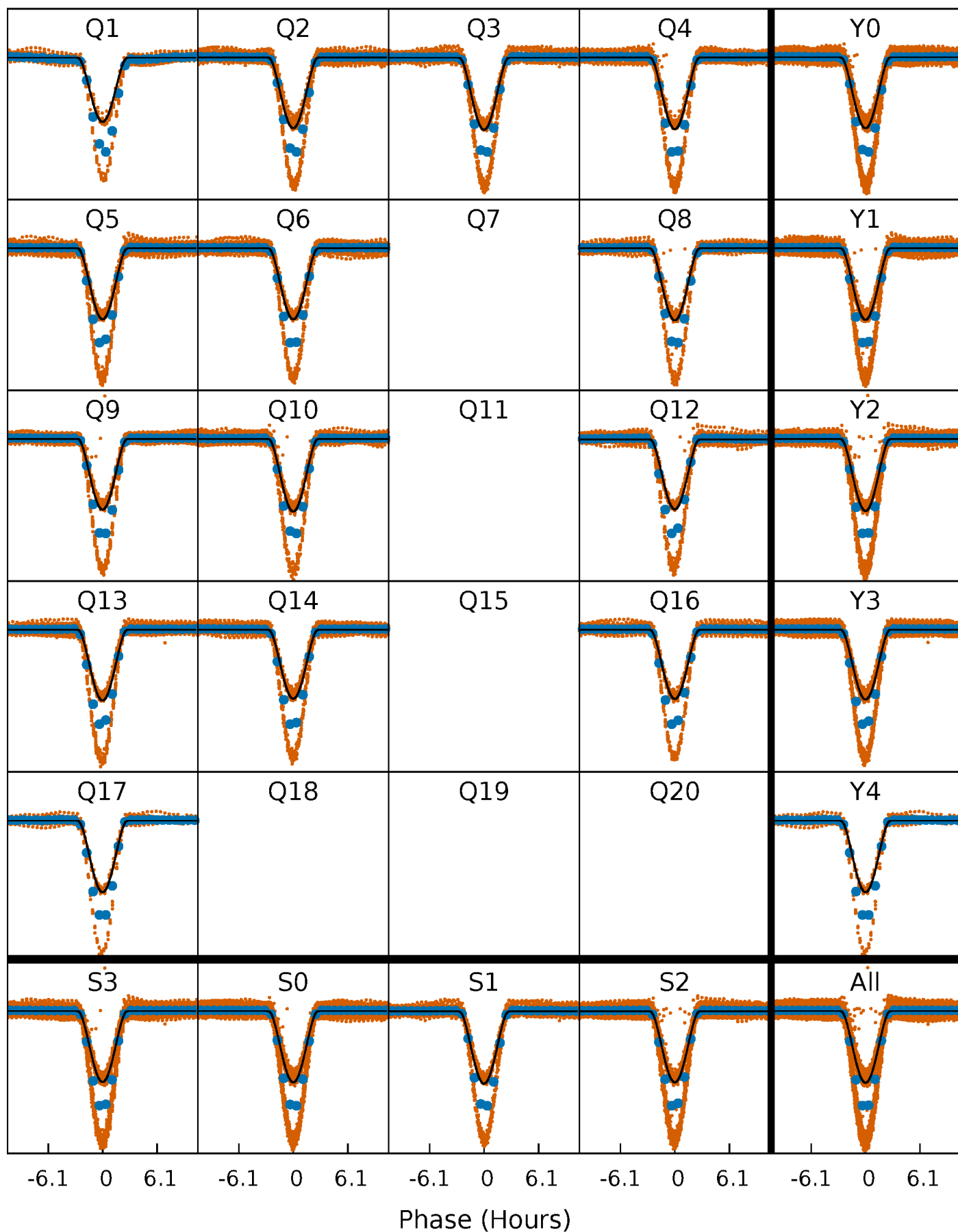
TCE 009850387-01   P= 1.374255 Days    $T_0=131.660403$  (BKJD)





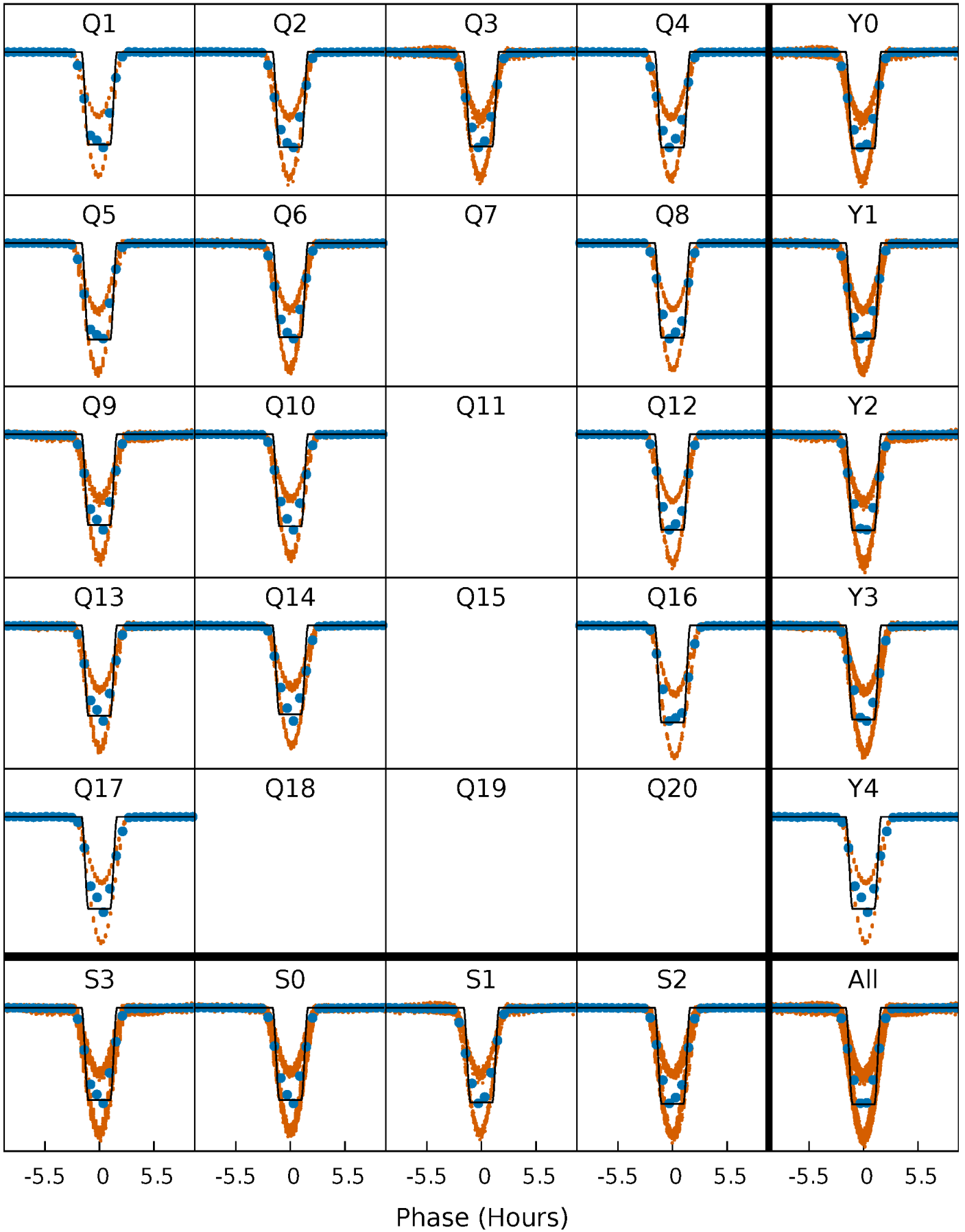
# DV Quarter-Phased Transit Curves

TCE 009850387-01 P= 1.374255 Days  $T_0=131.660403$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

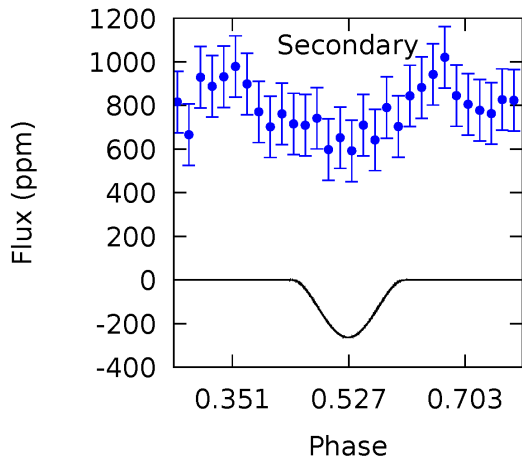
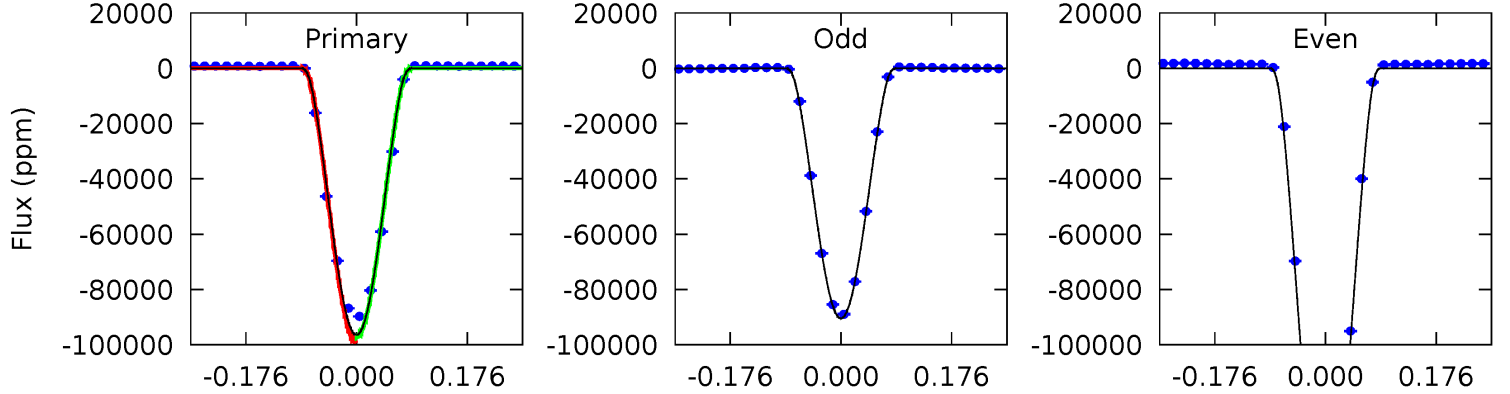
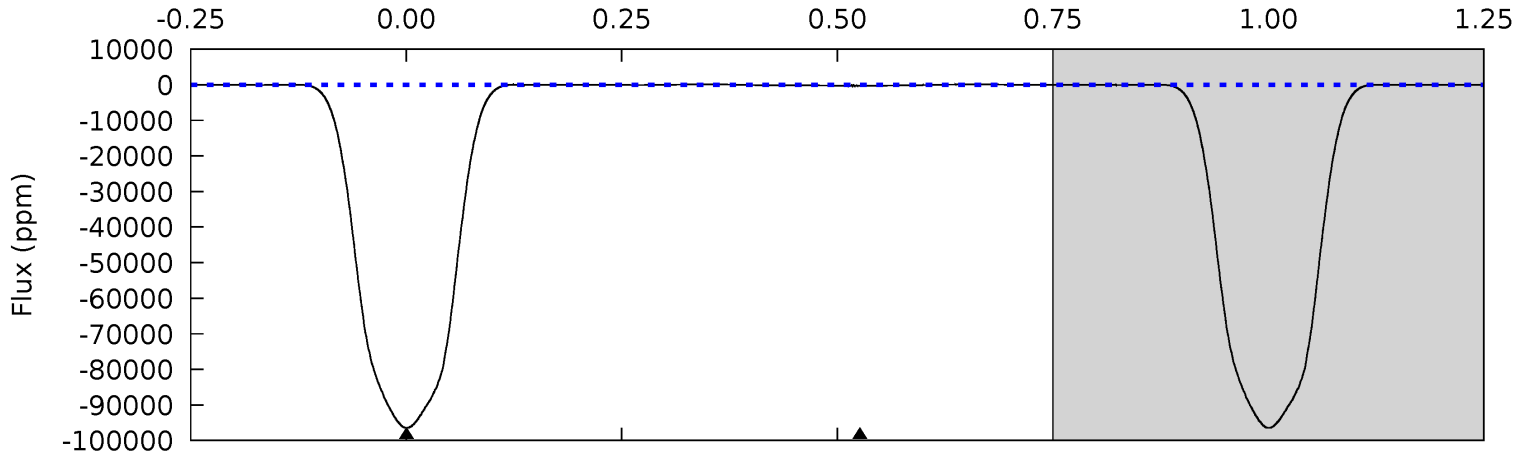
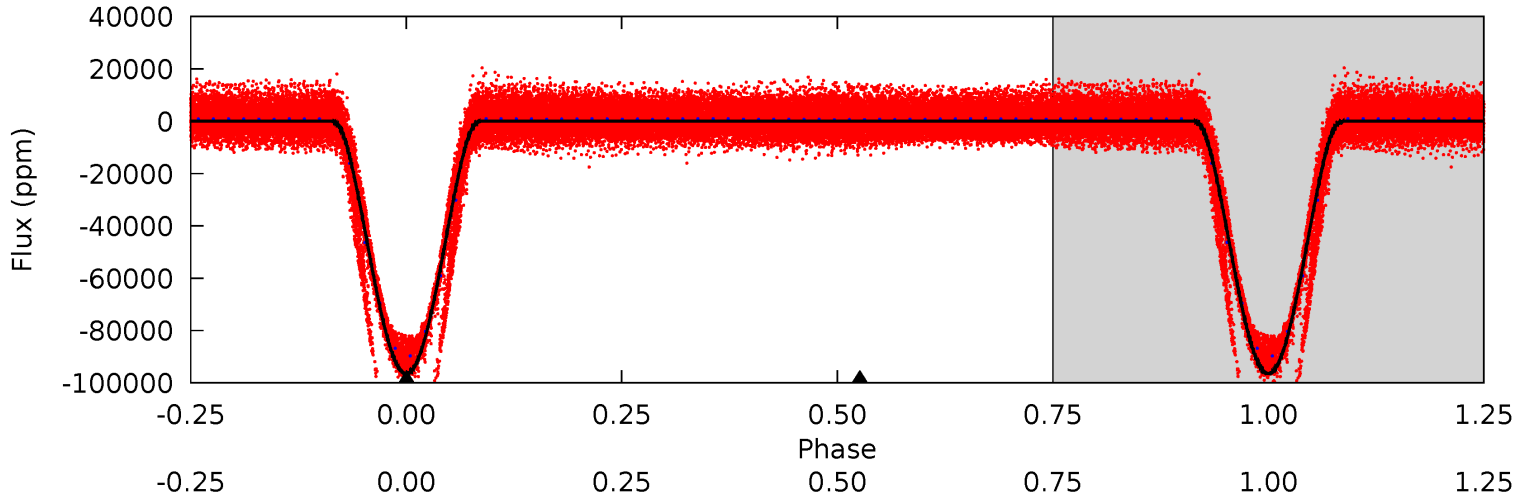
TCE 009850387-01     $P = 1.374235$  Days     $T_0 = 131.669925$  (BKJD)



# DV Model-Shift Uniqueness Test

009850387-01, P = 1.374255 Days, E = 130.286148 Days

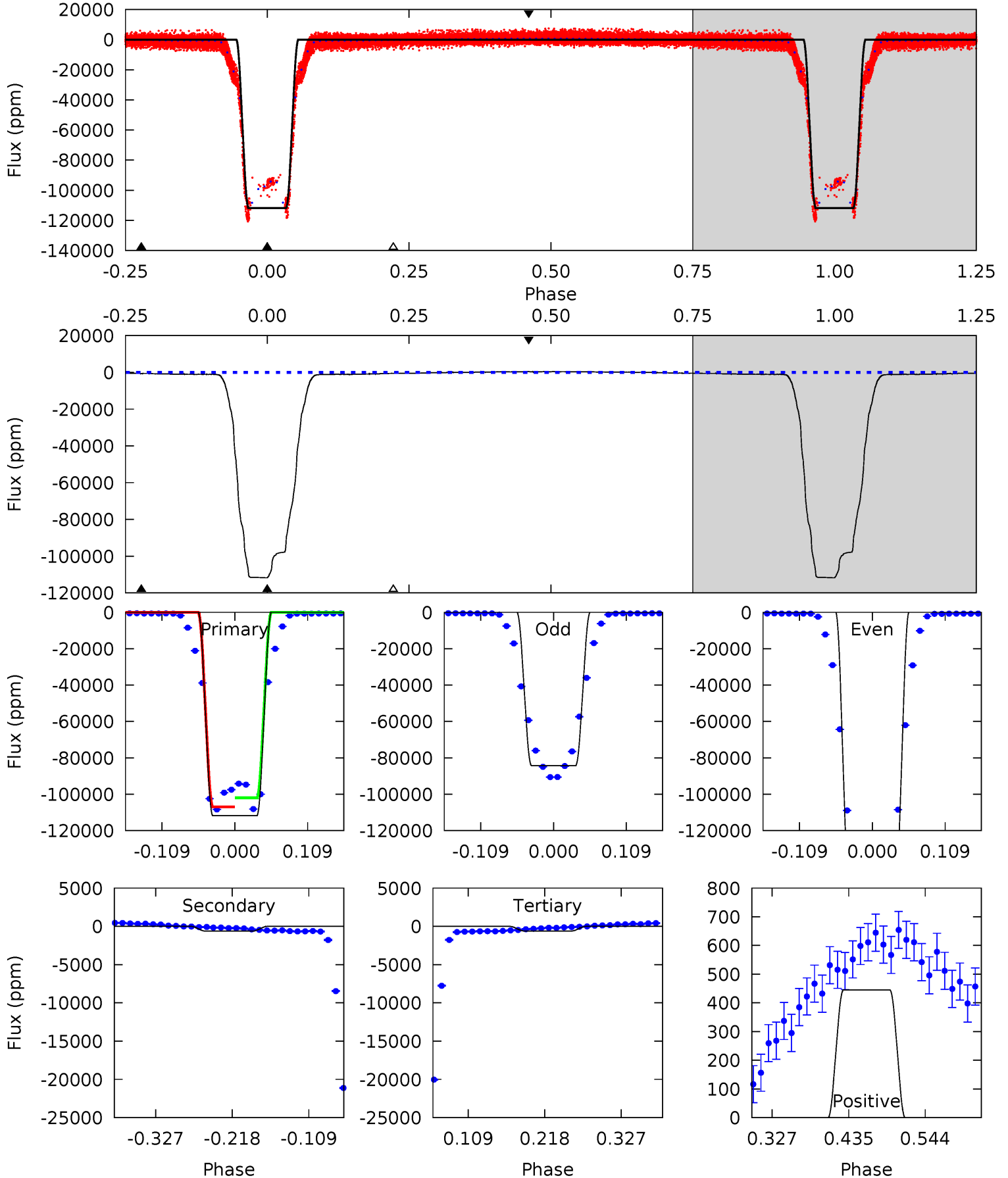
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1798	4.91	0	0	4.45	1.35	0.92	1798	1798	4.91	4.91	912.3	1.29	0.00	0



# Alt Model-Shift Uniqueness Test

009850387-01, P = 1.374235 Days, E = 130.295690 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
1769	9.94	9.65	7.04	4.55	1.60	7.29	1759	1762	0.29	2.90	1404	1.00	0.00	0



### Stellar Parameters For KIC 009850387

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7053^{+197}_{-310}$	$3.958^{+0.315}_{-0.135}$	$-0.260^{+0.250}_{-0.300}$	$2.121^{+0.526}_{-0.789}$	$1.489^{+0.182}_{-0.339}$	$0.220^{+0.498}_{-0.086}$
	+3%/-4%	+8%/-3%	+96%/-115%	+25%/-37%	+12%/-23%	+227%/-39%
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 009850387-01 / KOI 7238.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-263 \pm 54$	$102.77^{+15.28}_{-20.12}$	$3738^{+255}_{-363}$	$-3497^{+219}_{-165}$	$0.011^{+0.005}_{-0.003}$
Alt.	$-628 \pm 63$	$80.70^{+13.65}_{-15.15}$	$3742^{+263}_{-363}$	$-3444^{+241}_{-172}$	$0.040^{+0.020}_{-0.011}$

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

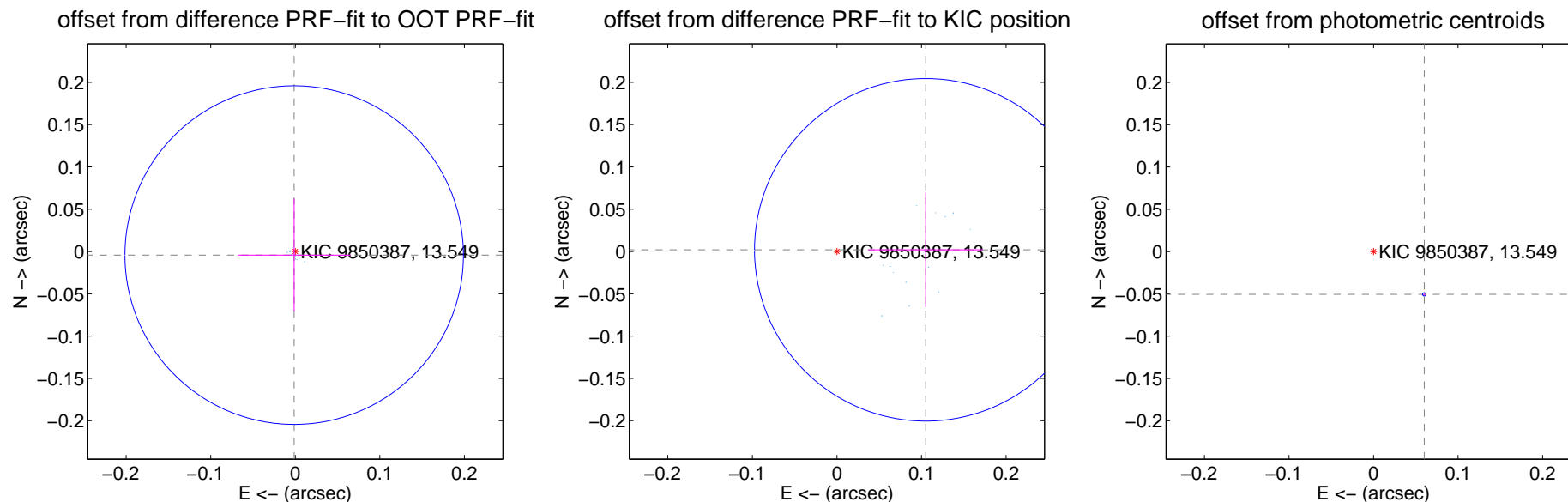
## DV Centroid Data

Supplemental centroid analysis for 009850387-01. Kepler magnitude: 13.55. Transit SNR 1201.63

There are 14 quarters with good PRF difference image offsets

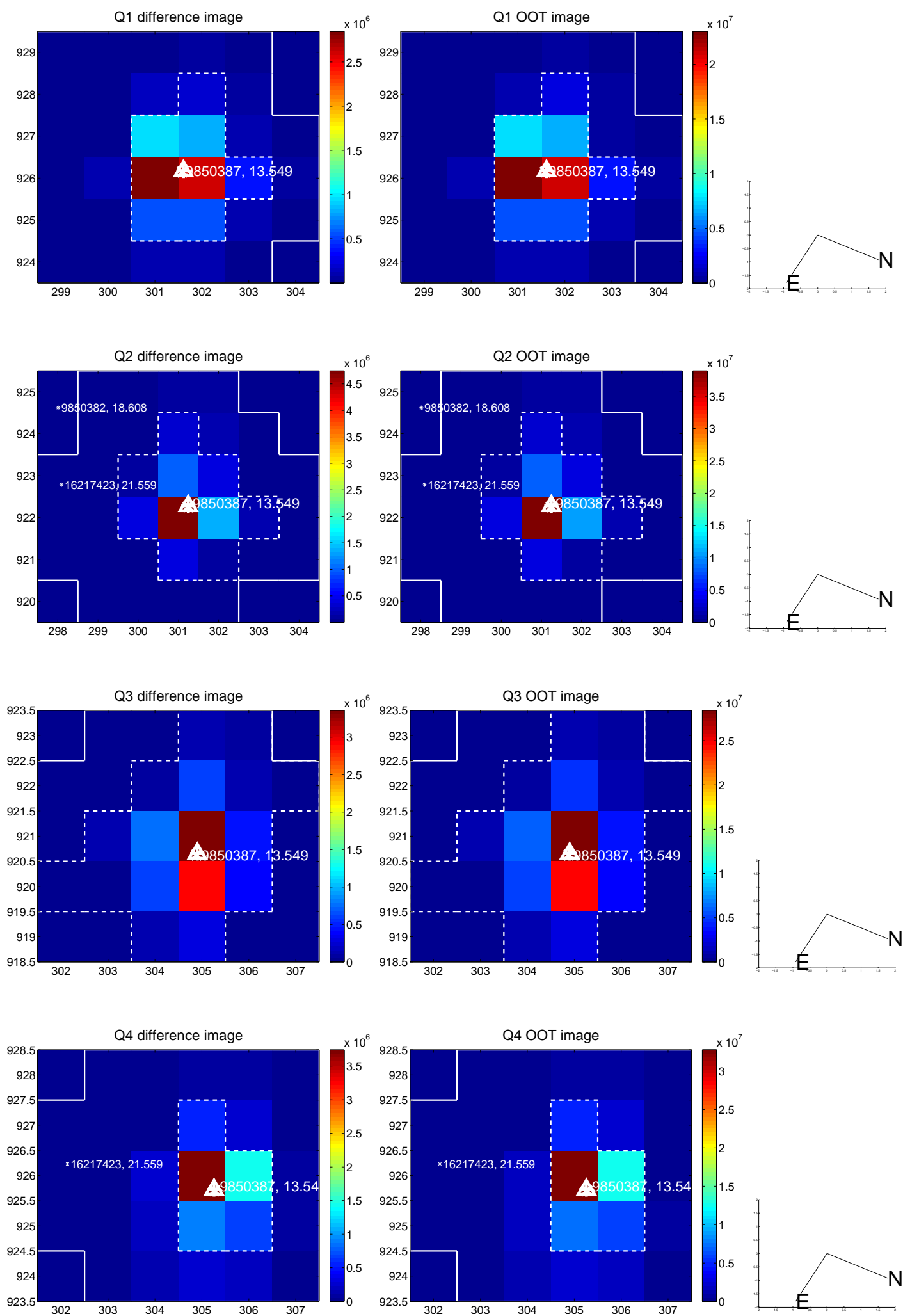
The direct PRF centroid is offset from the target star catalog position by about 0.14 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.004 \pm 0.067$	0.07	$0.001 \pm 0.067$	$-0.004 \pm 0.067$
PRF-fit source offset from KIC position	$0.105 \pm 0.067$	1.56	$-0.105 \pm 0.067$	$0.002 \pm 0.068$
photometric centroid source offset	$0.08 \pm 0.00$	122.46	$-0.06 \pm 0.00$	$-0.05 \pm 0.00$

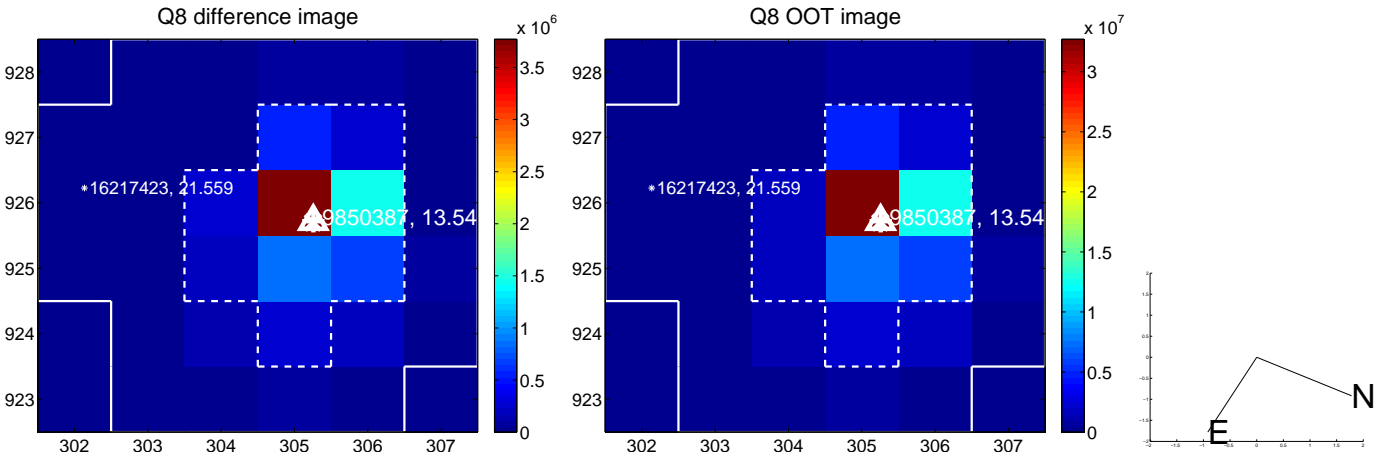
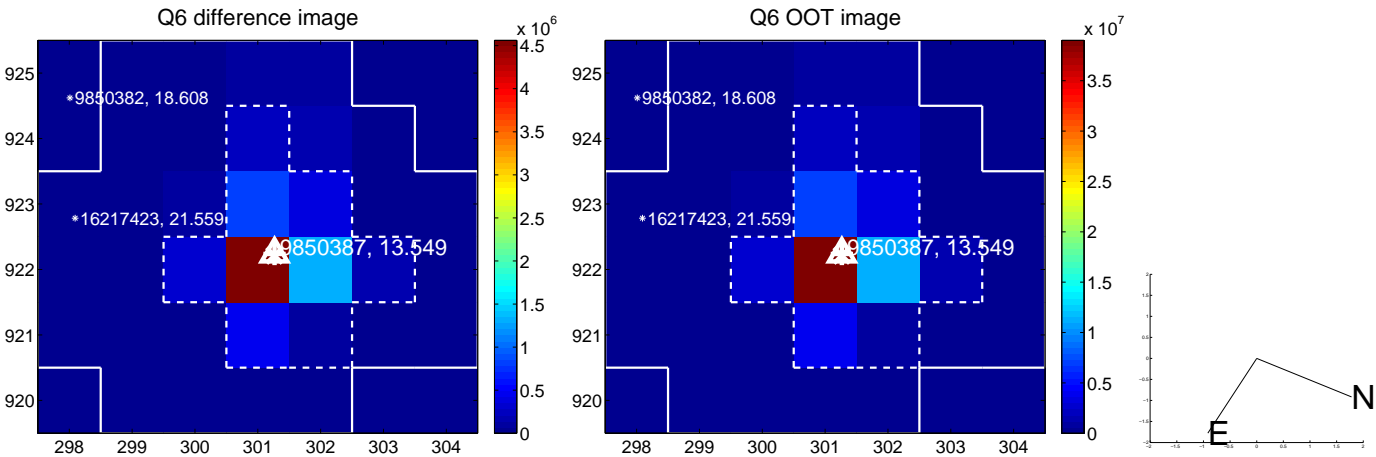
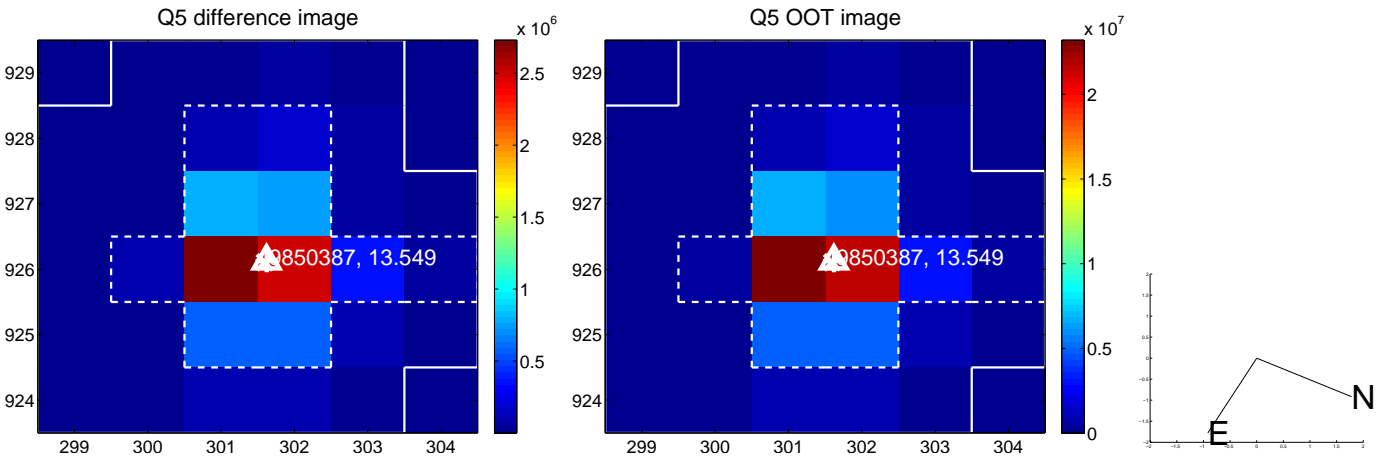


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

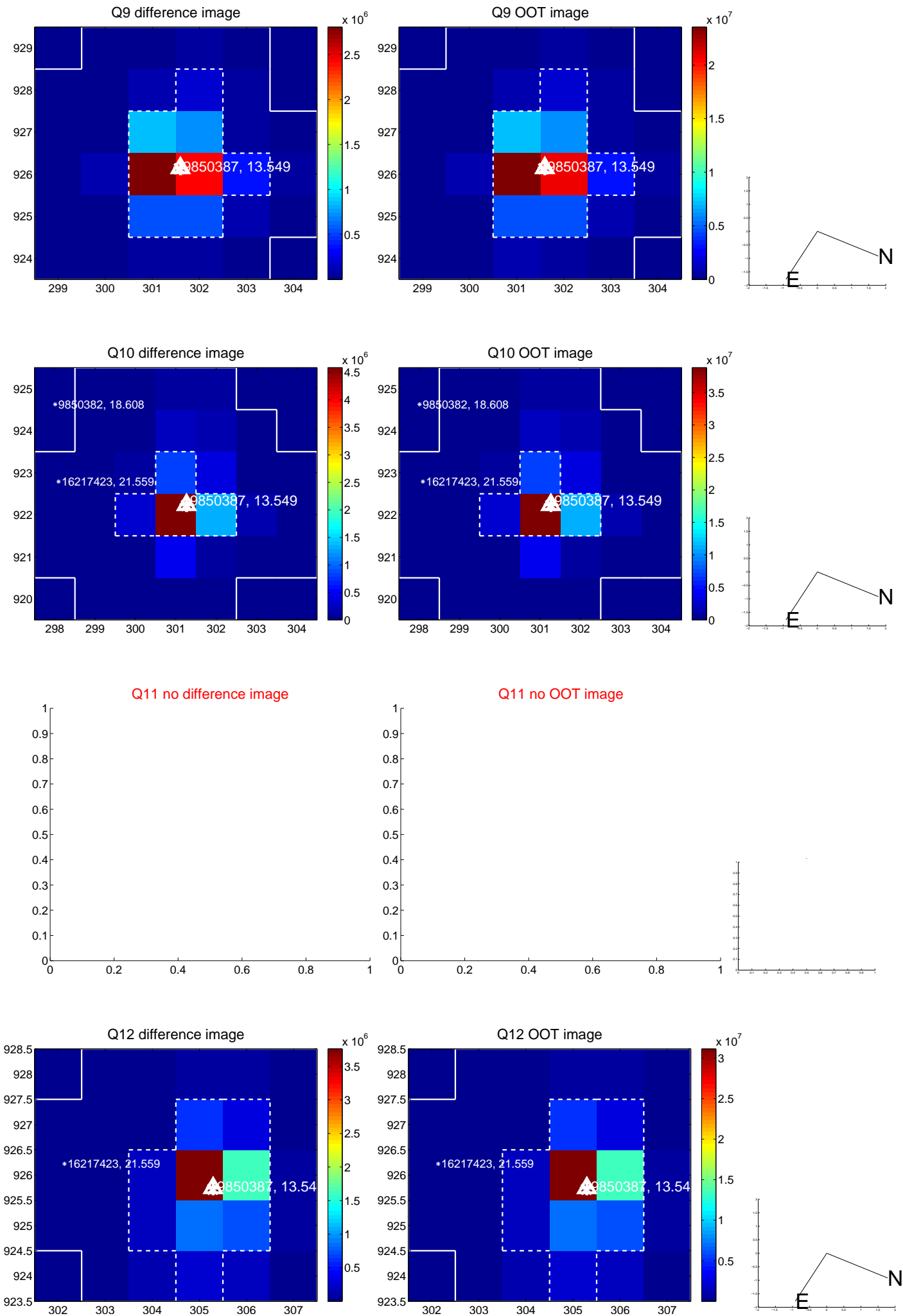


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

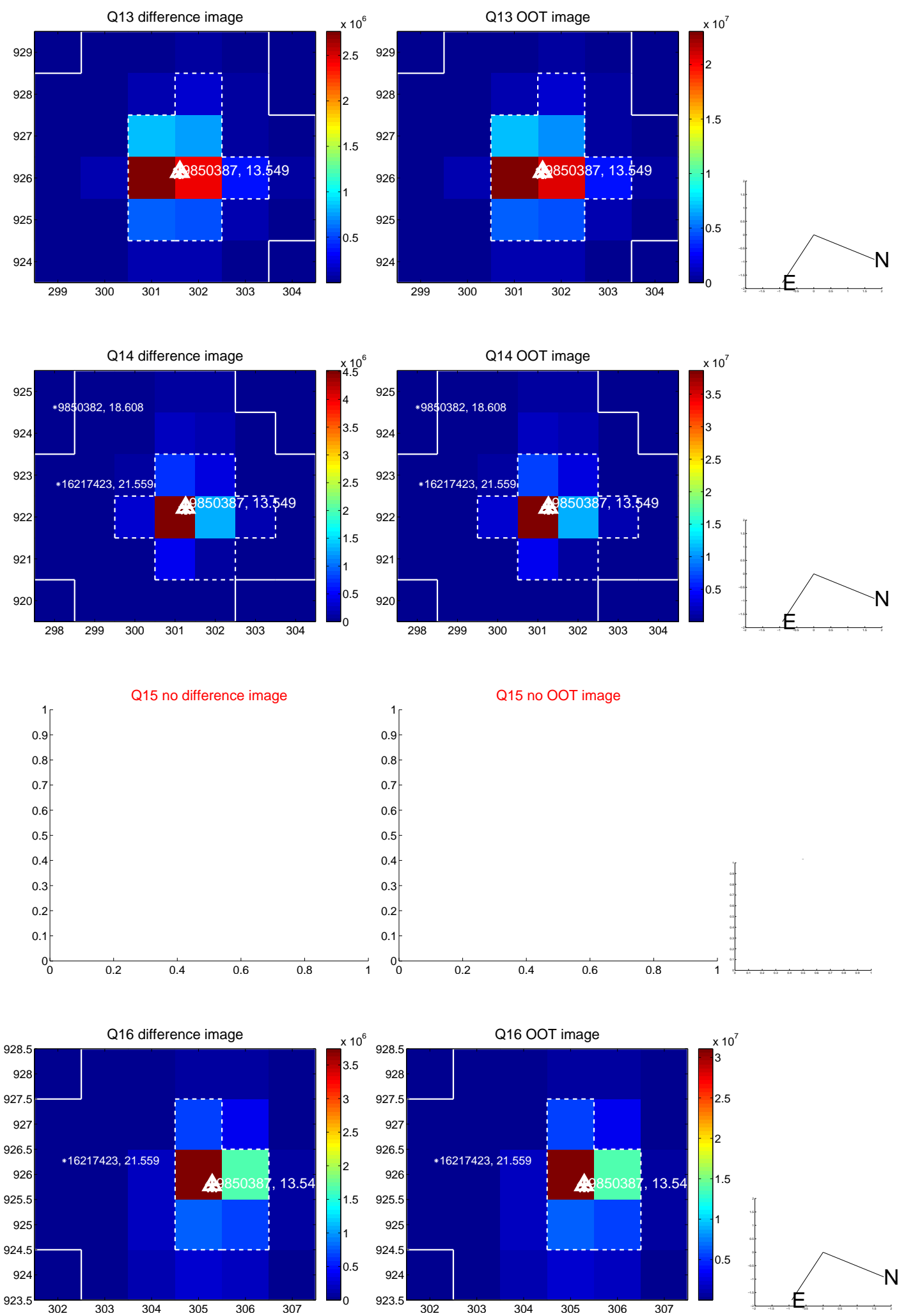




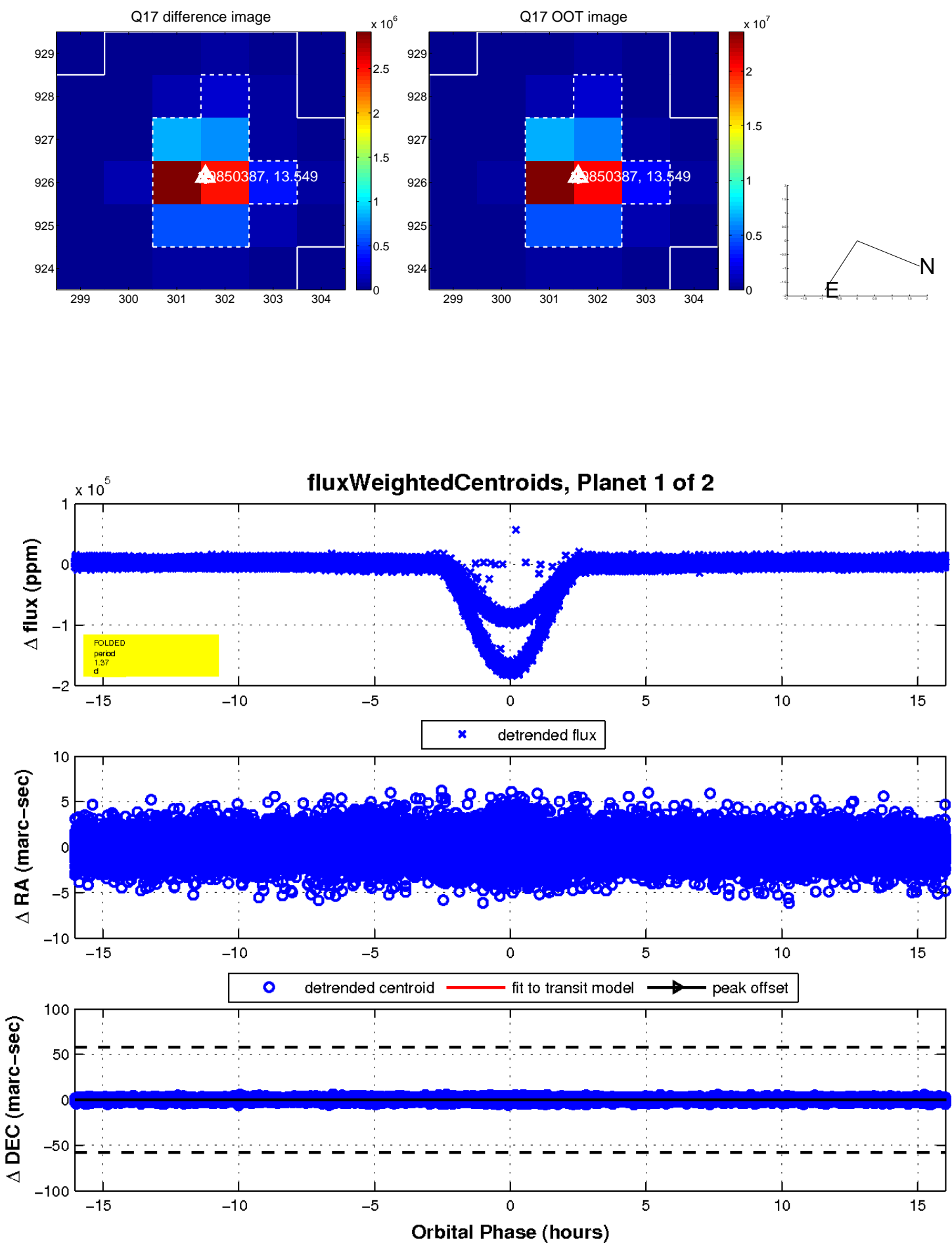
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

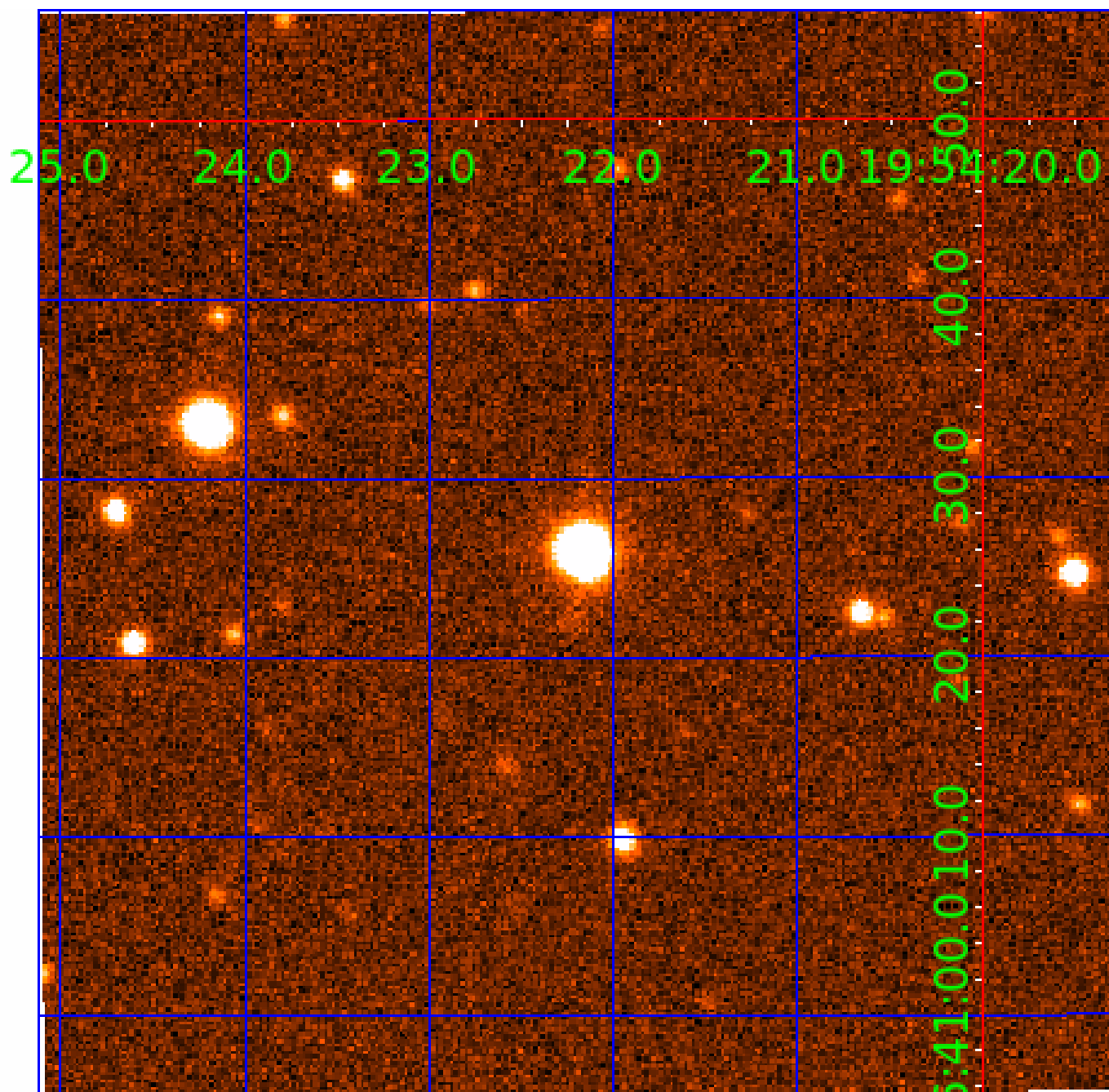


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 009850387

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009850387-01	OBS	7238.01	1.374255	131.660403	94962.1	5.343	2191.4	1201.6	2.12	7053	105.32	13061.53
009850387-02	OBS	No	8.246478	139.239772	1745.2	8.681	11.2	13.8	2.12	7053	10.33	1197.82

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009850387-01	OBS	FP	0.00	0	1	0	0	SWEET_EB—DEPTH_ODDEVEN_DV—DEPTH_ODDEVEN_ALT—MOD_ODDEVEN_DV—MOD_ODDEVEN_ALT—DEEP_V_SHAPED
009850387-02	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—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 009850387-02

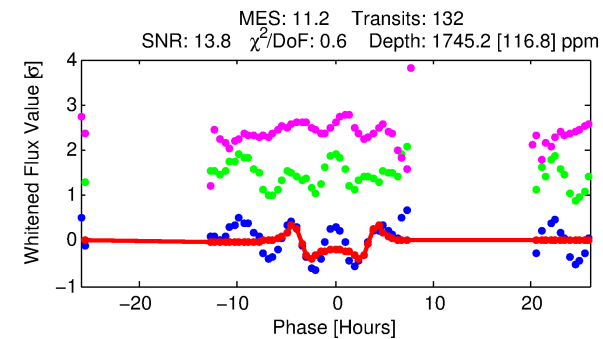
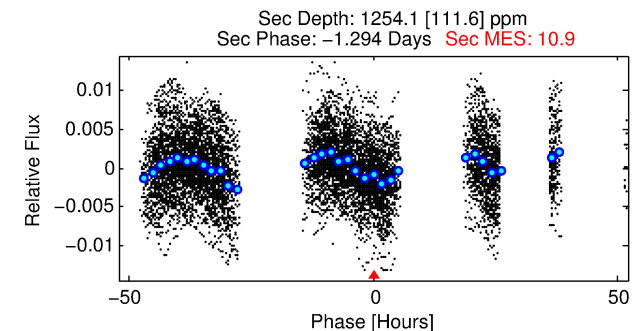
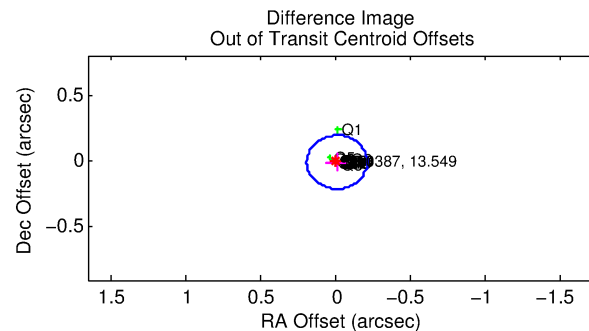
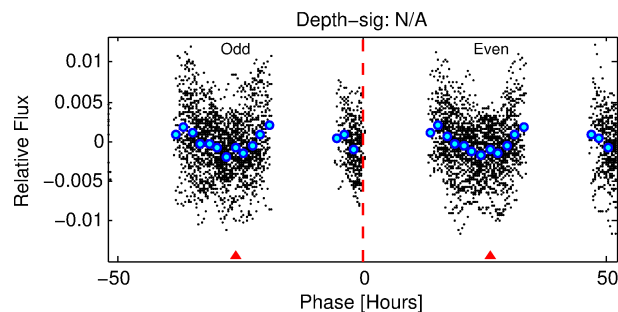
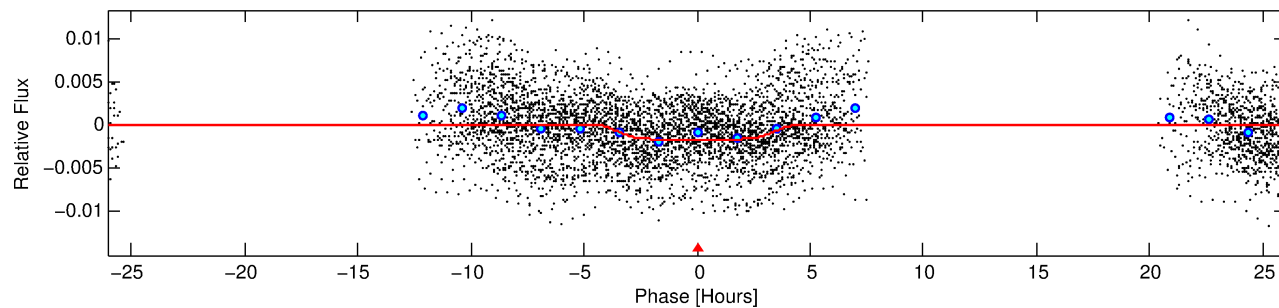
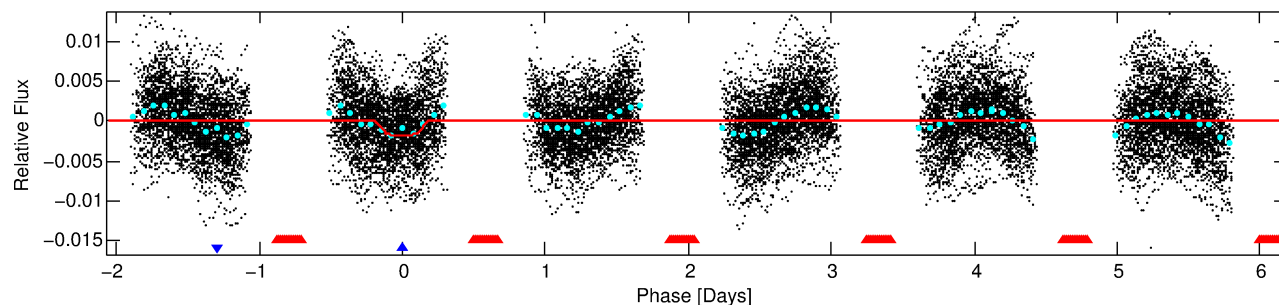
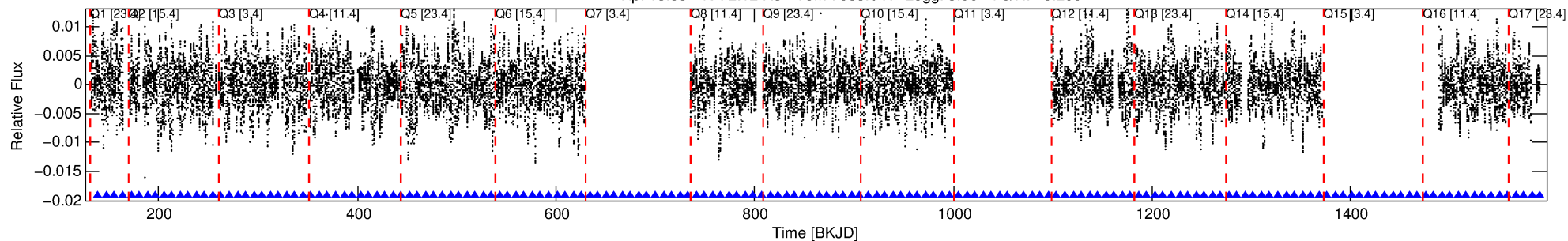
No Significant Match Found

# DV One-Page Summary

KIC: 9850387 Candidate: 2 of 2 Period: 8.246 d

KOI: K07238 Corr: No Ephemeris Match

Kp: 13.55 R\*: 2.12 Rs Teff: 7053.0 K Logg: 3.96 Fe/H: -0.260



## DV Fit Results:

Period = 8.24648 [0.00004] d  
Epoch = 139.2398 [0.0038] BKJD  
Rp/R\* = 0.0446 [0.0016]  
a/R\* = 3.95 [0.15]  
b = 0.90 [0.01]  
Seff = 1197.82 [684.15]  
Teq = 1500 [214] K  
Rp = 10.33 [3.86] Re  
a = 0.0913 [0.0316] AU  
Ag = 53.86 [29.90] [1.77σ]  
Teff = 6283 [329] K [12.20σ]

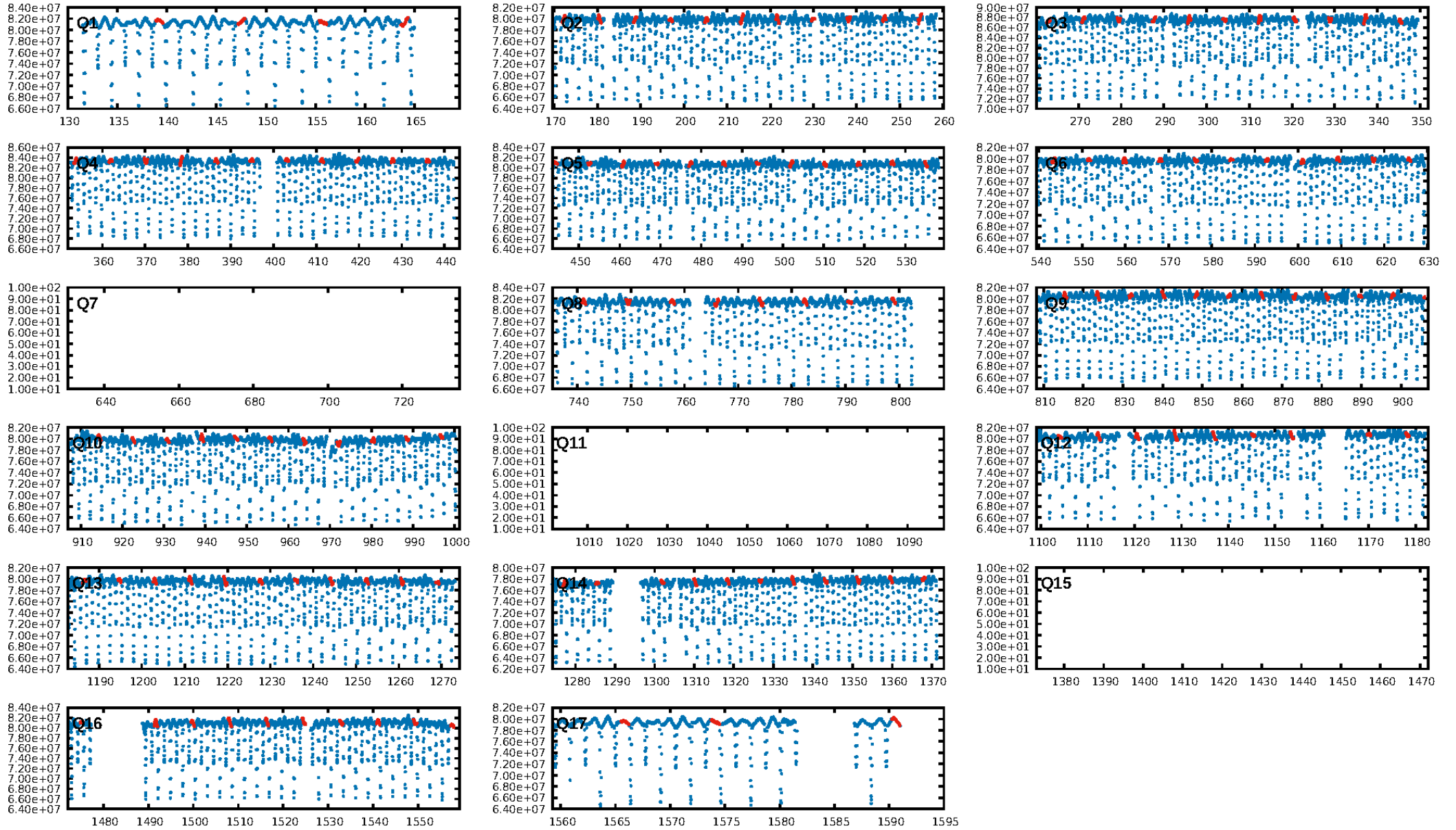
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [16.18σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 77.3%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [125/125]  
GhostDiagnostic-chr: N/A  
Centroid-sig: N/A  
Centroid-so: 0.145 arcsec [2.65σ]  
OotOffset-rm: 0.017 arcsec [0.25σ]  
KicOffset-st: 4/1/4/5 [14]  
KicOffset-st: 4/1/4/5 [14]  
DiffImageQuality-fgm: 0.00 [0/14]  
DiffImageOverlap-fno: 0.00 [0/14]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 20:39:28 Z

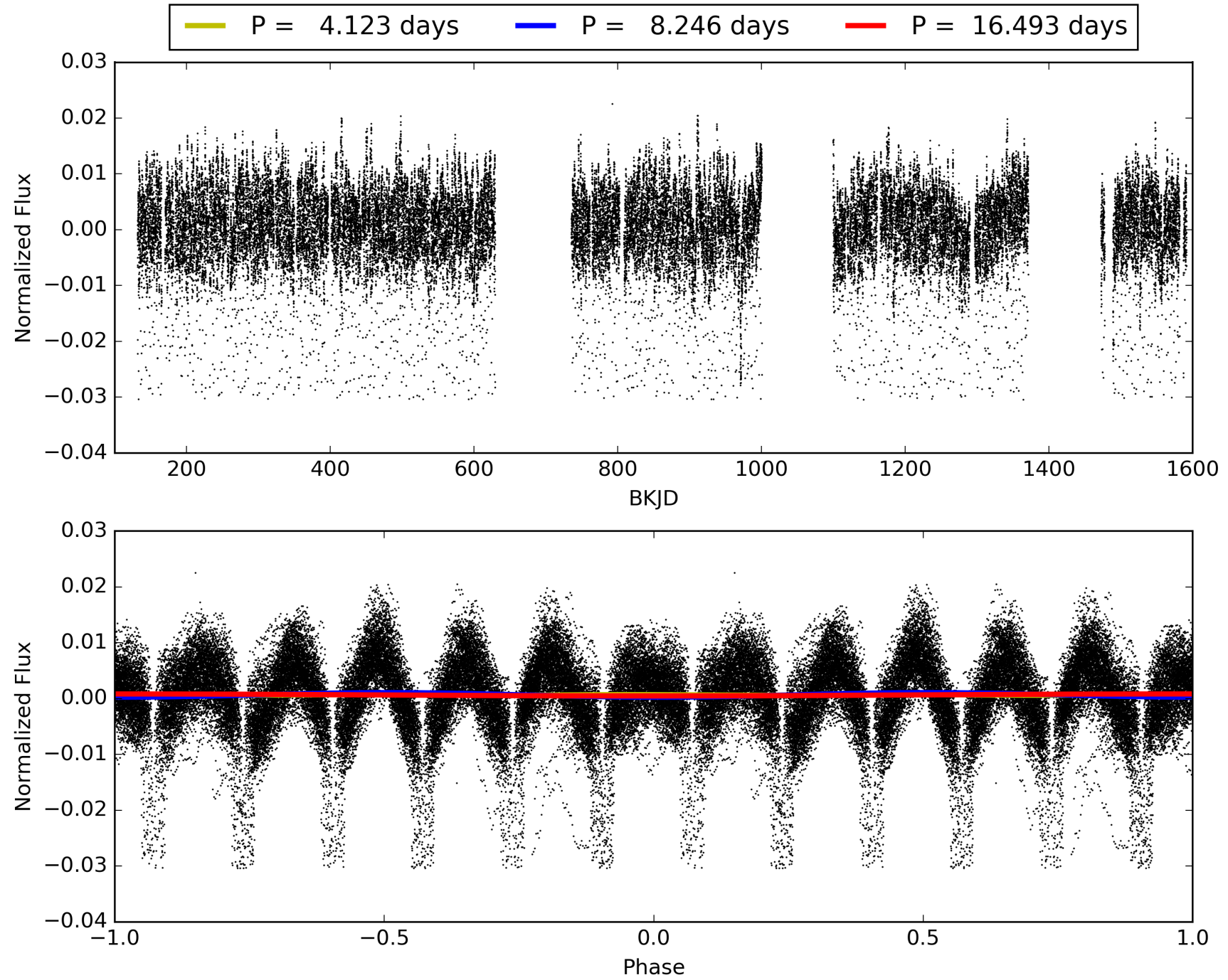
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 009850387-02, PDC Light Curves





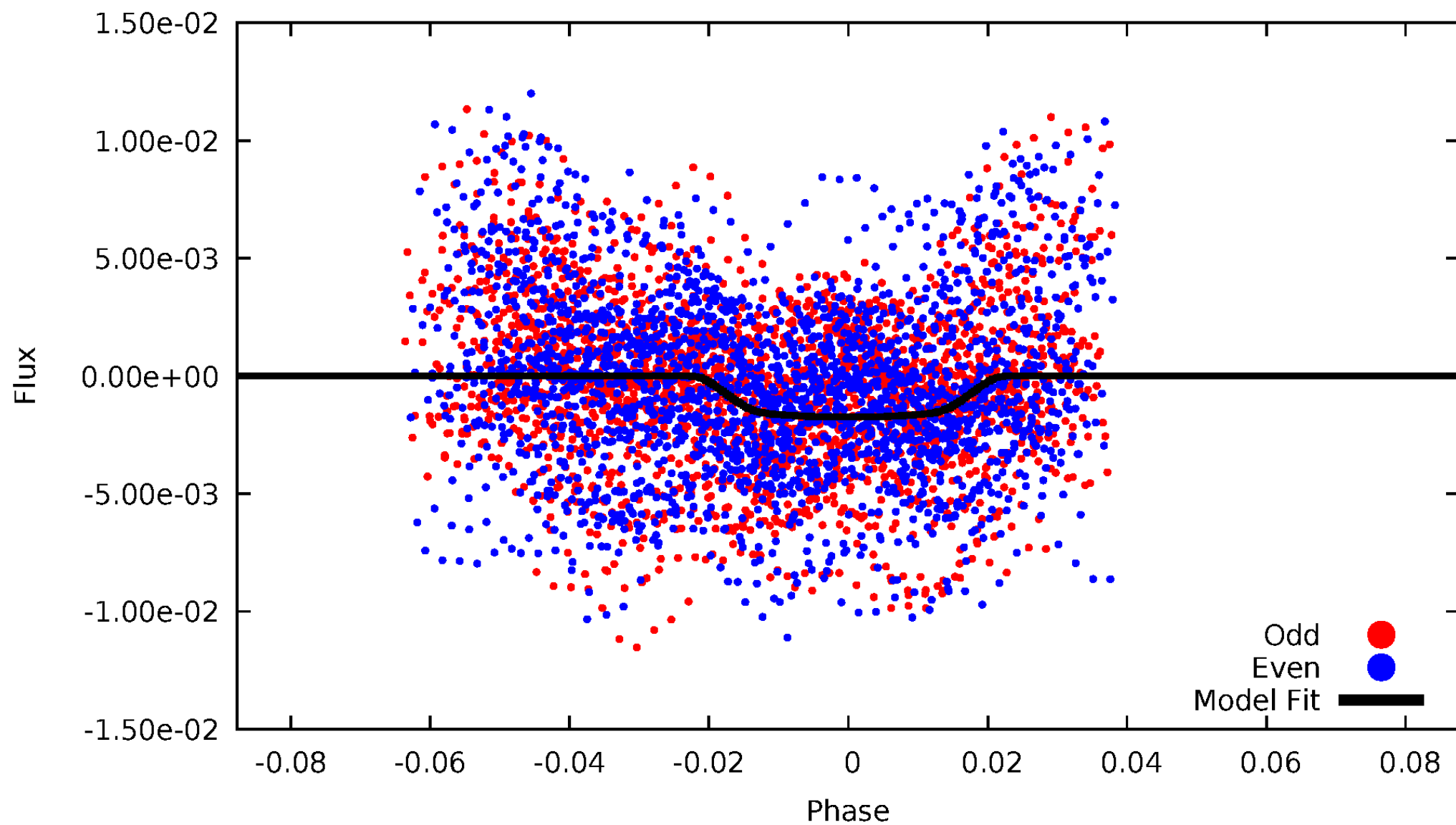
TCE 009850387-02





DV Odd/Even

TCE 009850387-02



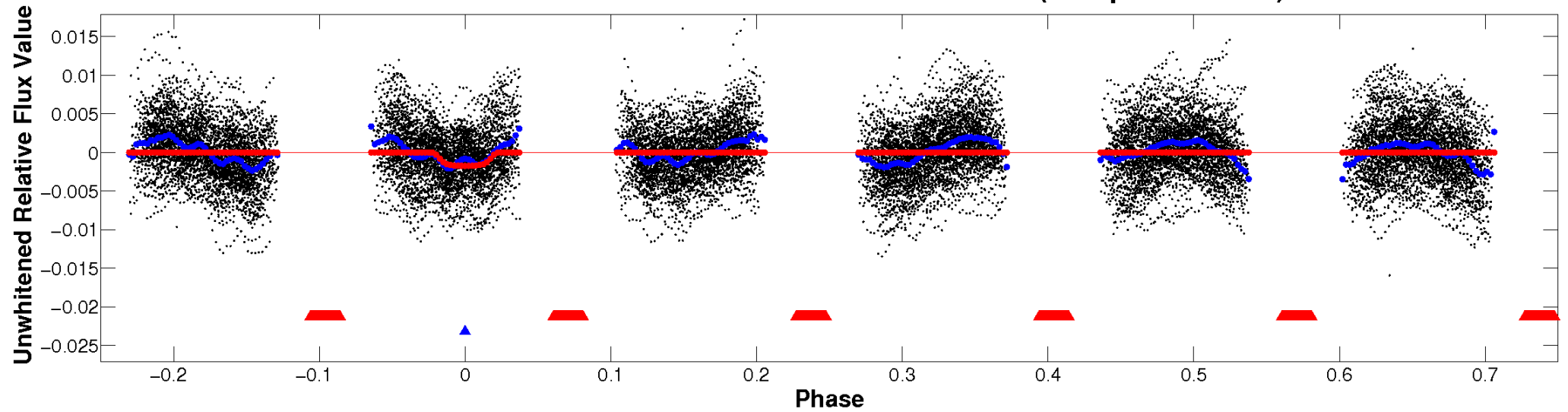


ALT Odd/Even

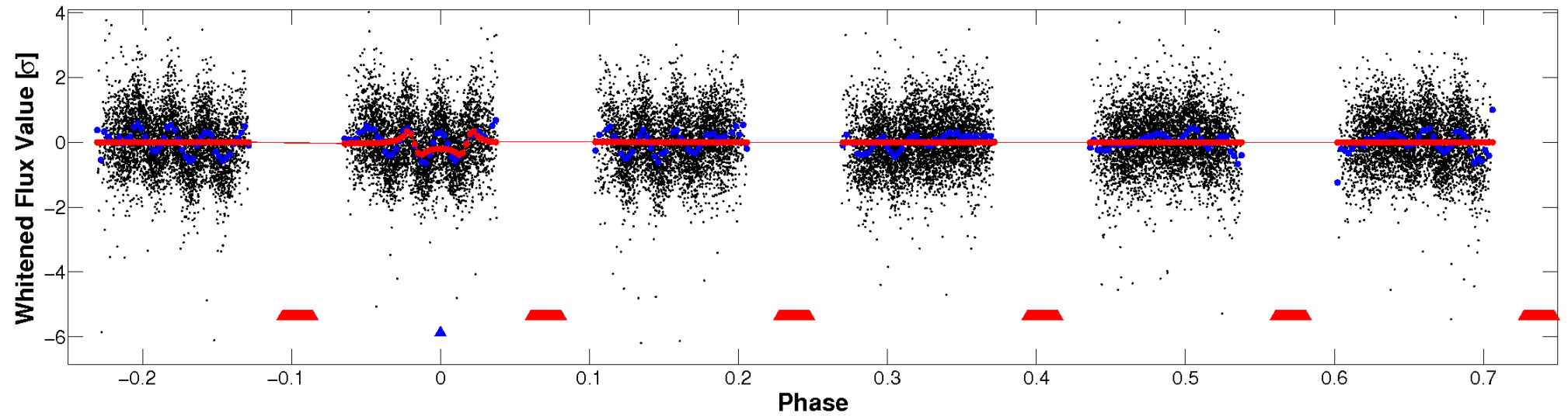
This plot does not exist for this TCE.

# Non-Whitened Vs. Whitened Light Curve

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

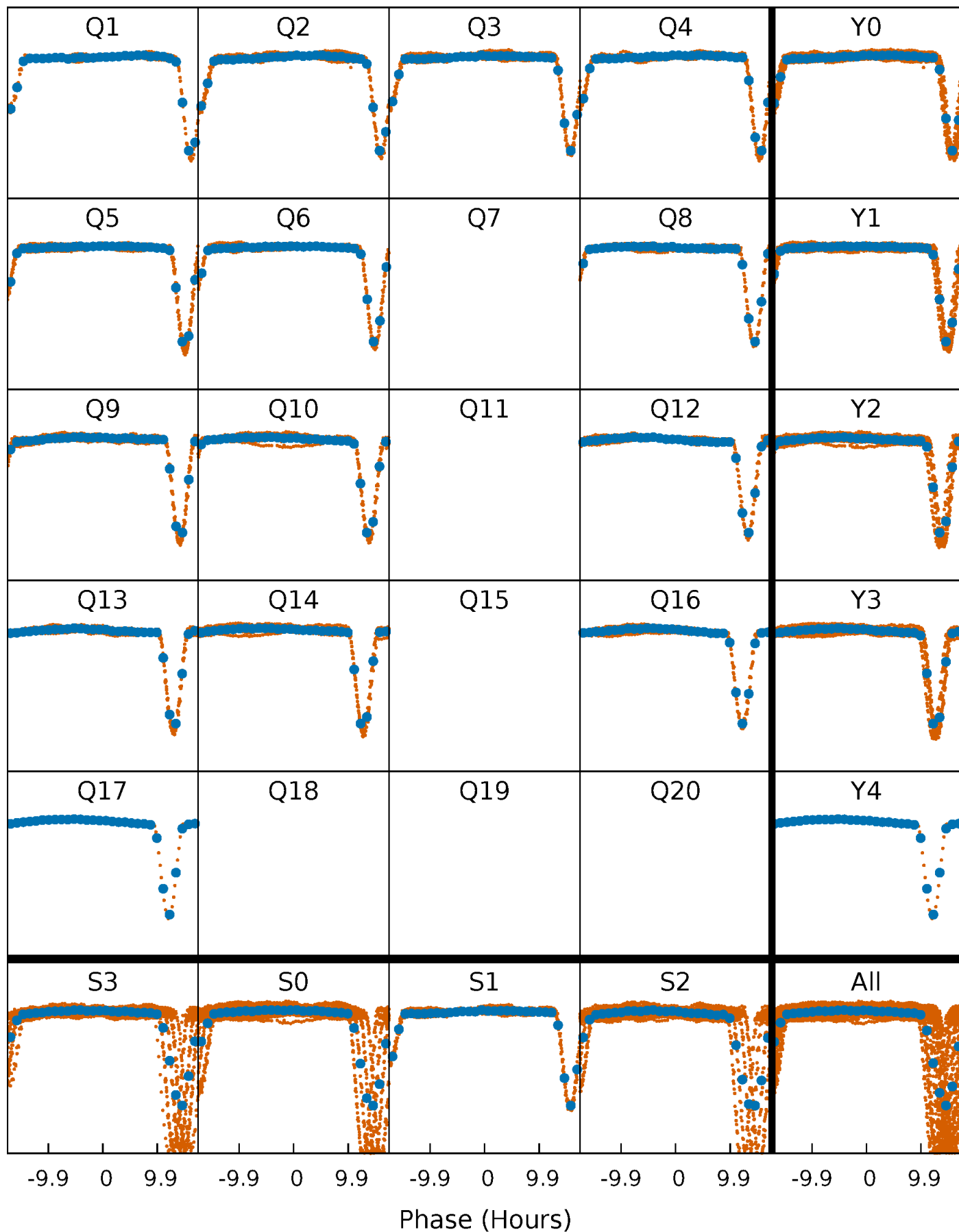


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



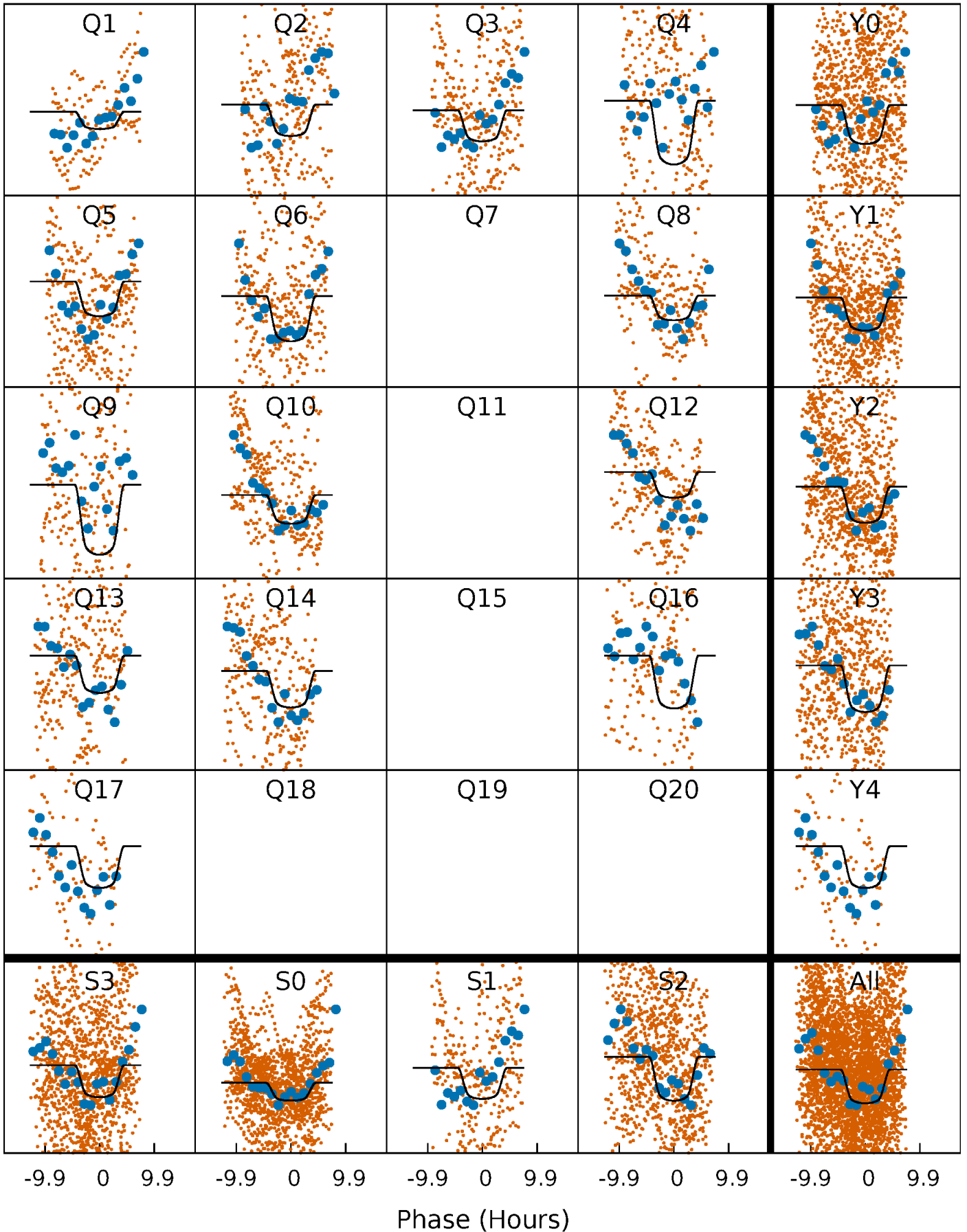
# PDC Quarter-Phased Transit Curves

TCE 009850387-02   P= 8.246478 Days    $T_0=139.239772$  (BKJD)



# DV Quarter-Phased Transit Curves

TCE 009850387-02   P= 8.246478 Days    $T_0=139.239772$  (BKJD)

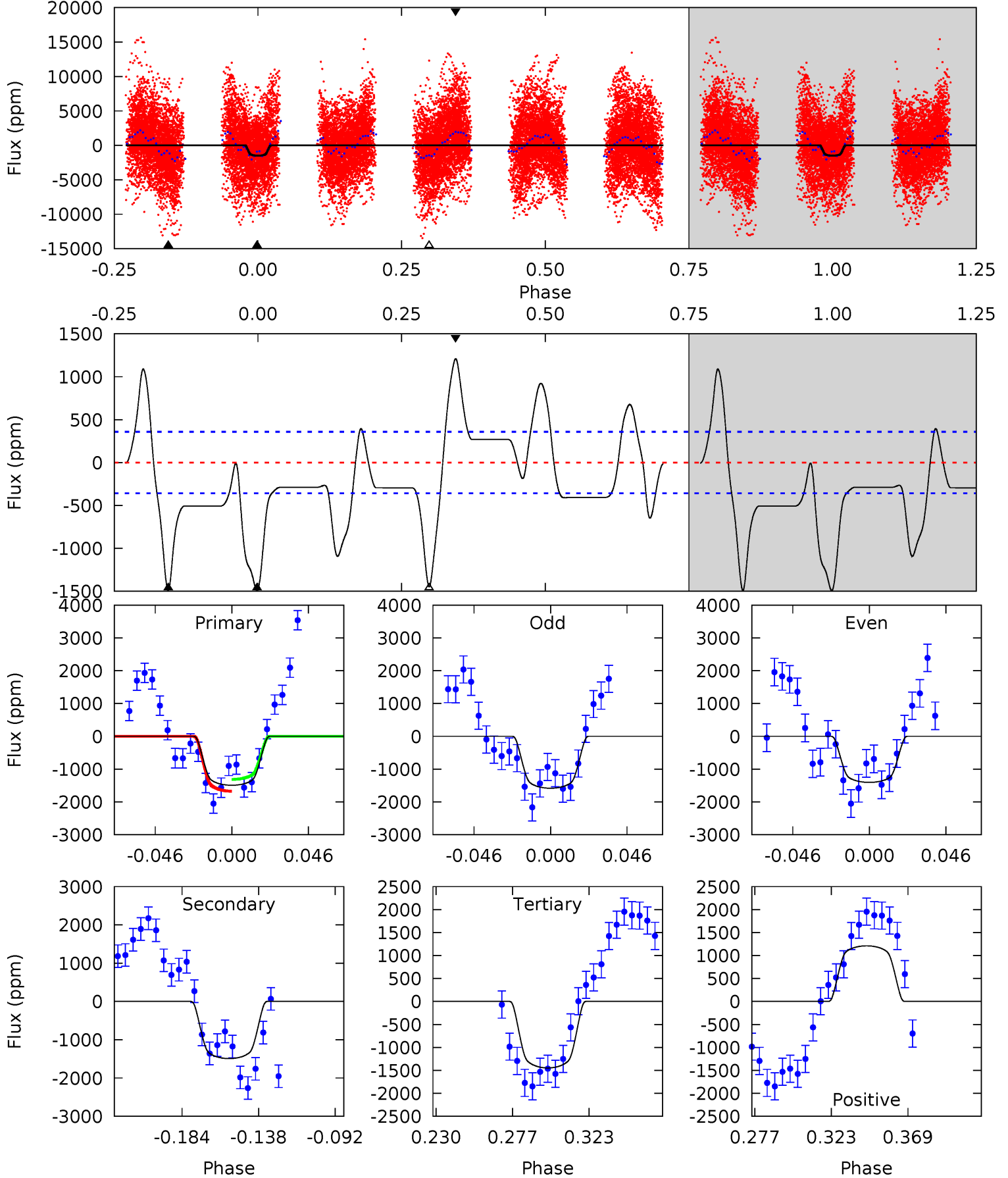


This plot does not exist for this TCE.

# DV Model-Shift Uniqueness Test

009850387-02, P = 8.246478 Days, E = 130.993294 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
19.7	19.7	19.1	16.0	4.72	1.99	8.49	0.60	3.72	0.59	3.71	1.19	1.11	0.45	2.41





## Alt Model-Shift Uniqueness Test

This plot does not exist for this TCE.

### Stellar Parameters For KIC 009850387

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7053^{+197}_{-310}$	$3.958^{+0.315}_{-0.135}$	$-0.260^{+0.250}_{-0.300}$	$2.121^{+0.526}_{-0.789}$	$1.489^{+0.182}_{-0.339}$	$0.220^{+0.498}_{-0.086}$
	+3%/-4%	+8%/-3%	+96%/-115%	+25%/-37%	+12%/-23%	+227%/-39%
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 009850387-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-1492 \pm 76$	$9.95^{+1.57}_{-1.99}$	$2049^{+150}_{-209}$	$6489^{+245}_{-316}$	$67^{+35}_{-15}$
Alt.	N/A	N/A	N/A	N/A	N/A

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

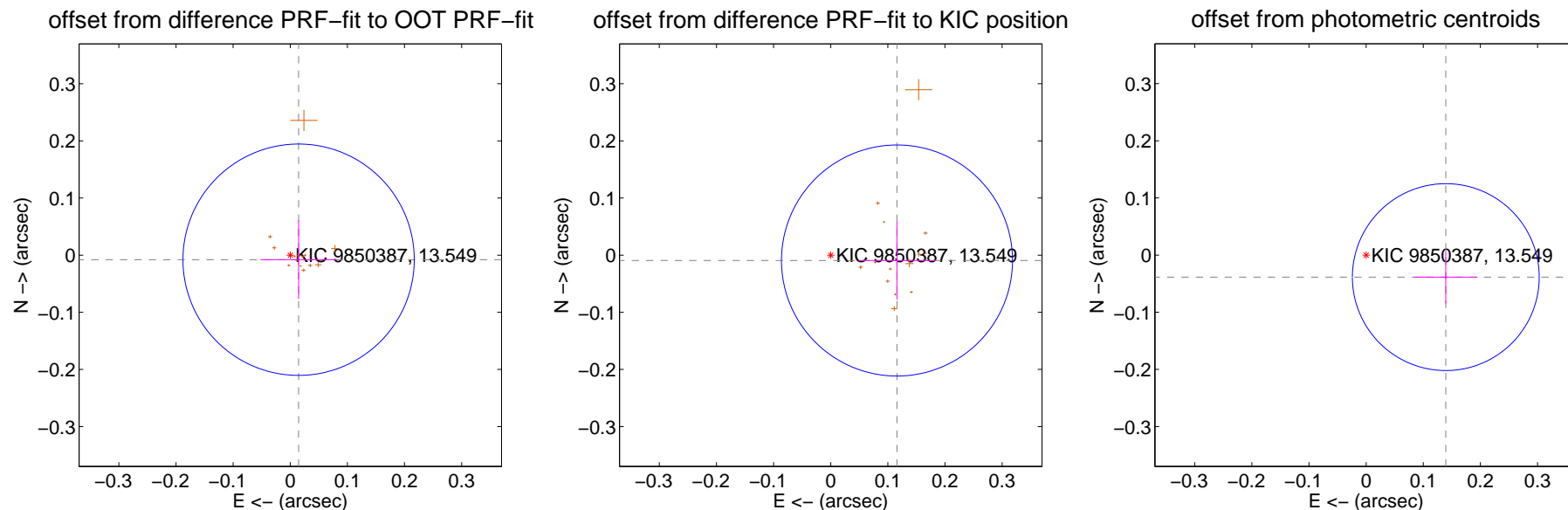
## DV Centroid Data

Supplemental centroid analysis for 009850387-02. Kepler magnitude: 13.55. Transit SNR 13.79

There are 0 quarters with good PRF difference image offsets

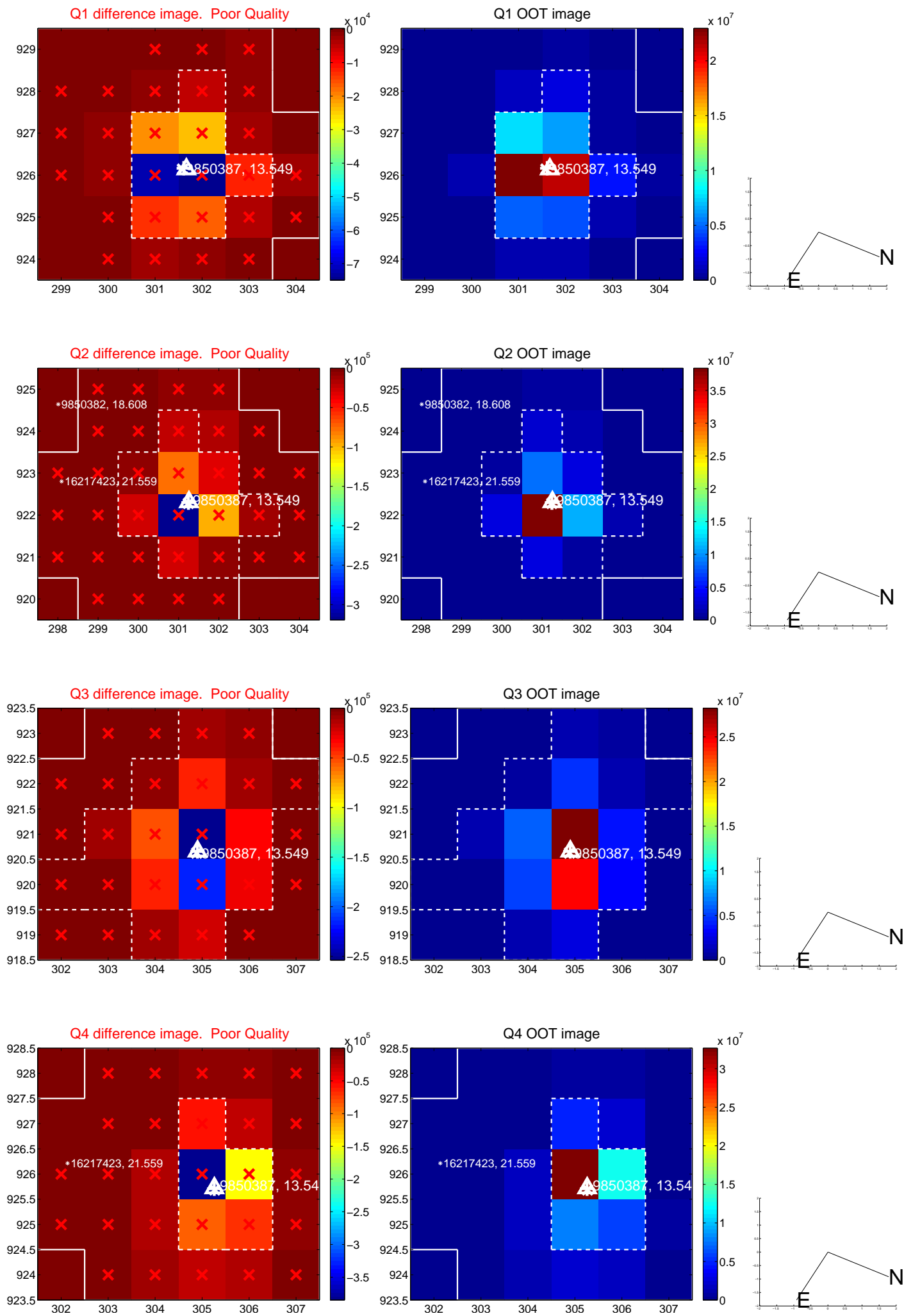
The direct PRF centroid is offset from the target star catalog position by about 0.14 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.017 \pm 0.067$	0.25	$-0.015 \pm 0.067$	$-0.008 \pm 0.069$
PRF-fit source offset from KIC position	$0.116 \pm 0.067$	1.73	$-0.116 \pm 0.067$	$-0.009 \pm 0.068$
photometric centroid source offset	$0.14 \pm 0.05$	2.65	$-0.14 \pm 0.06$	$-0.04 \pm 0.05$

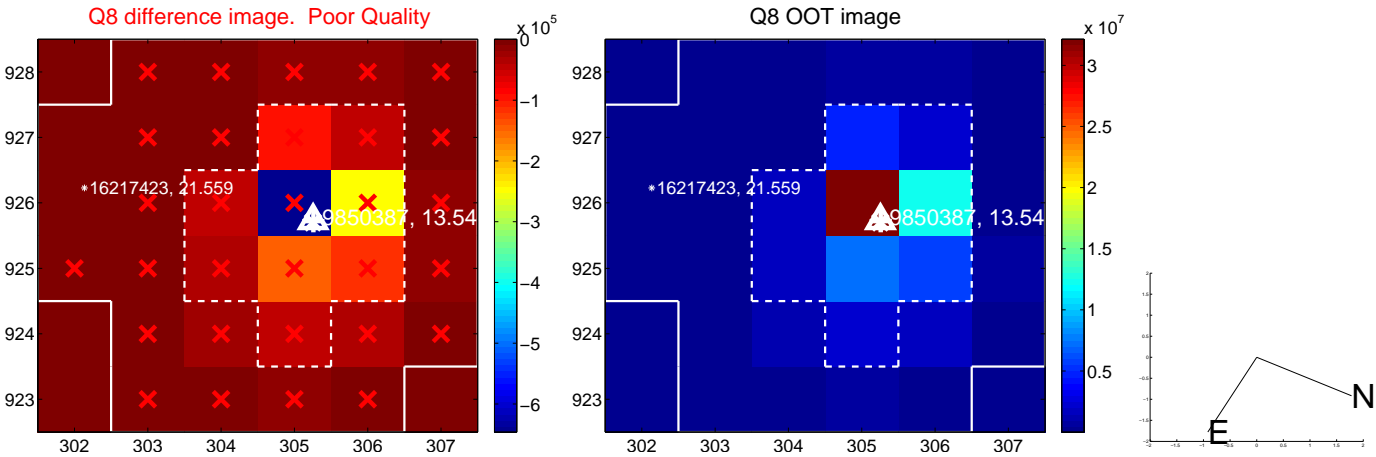
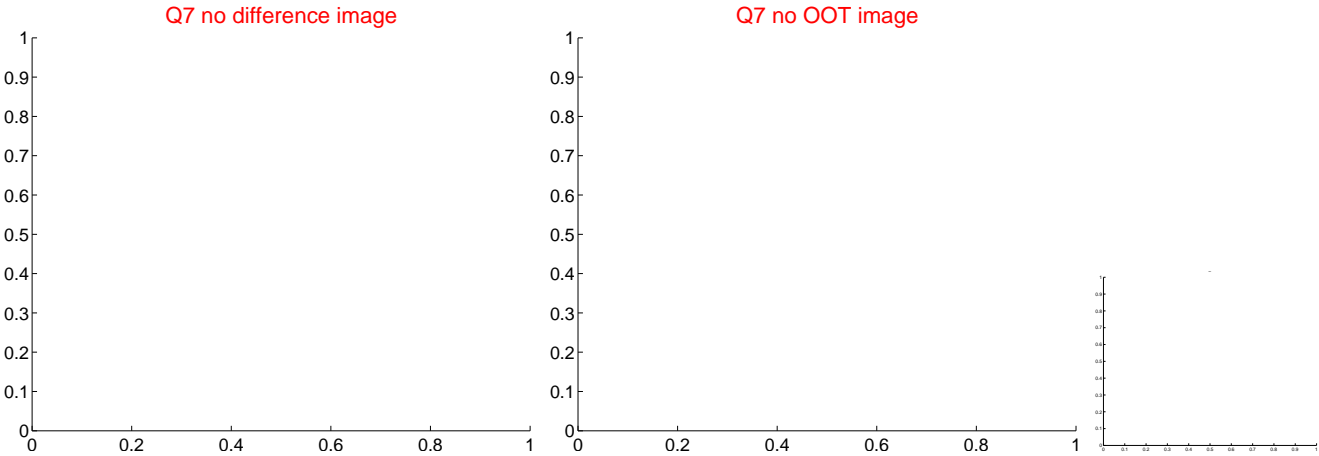
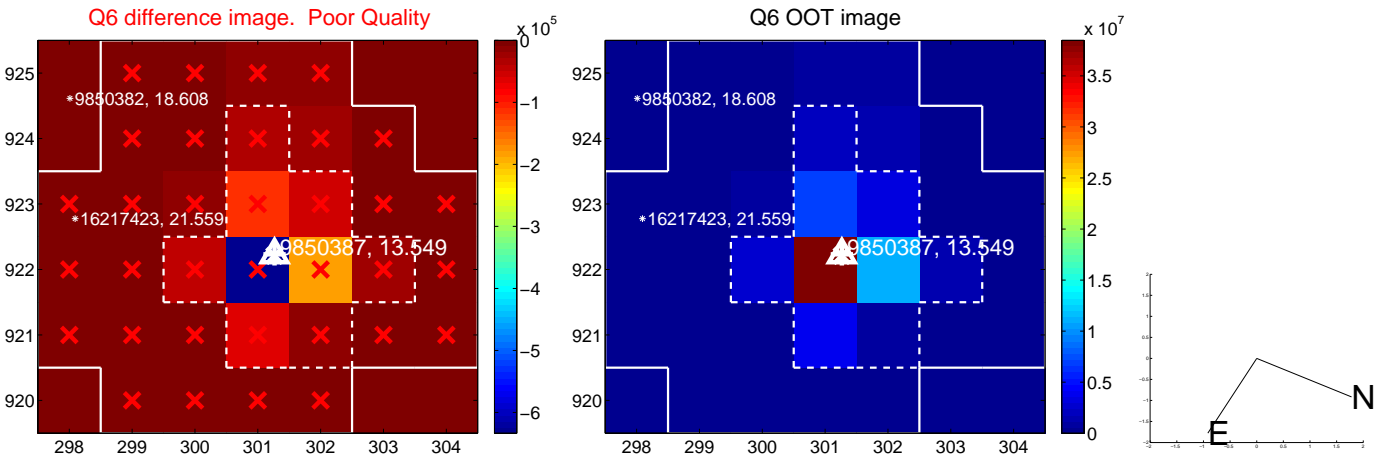
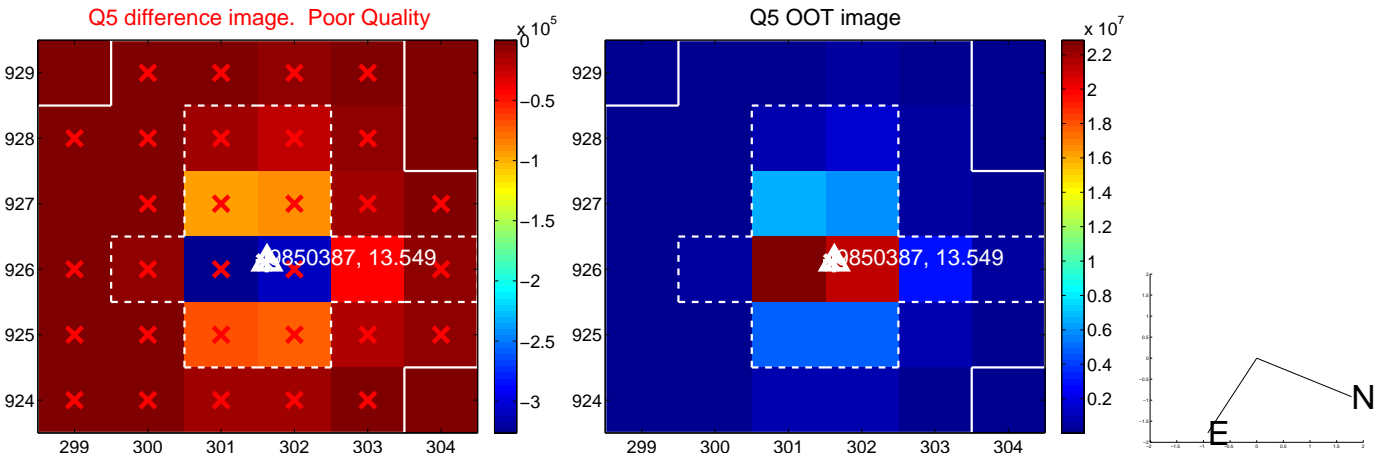


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

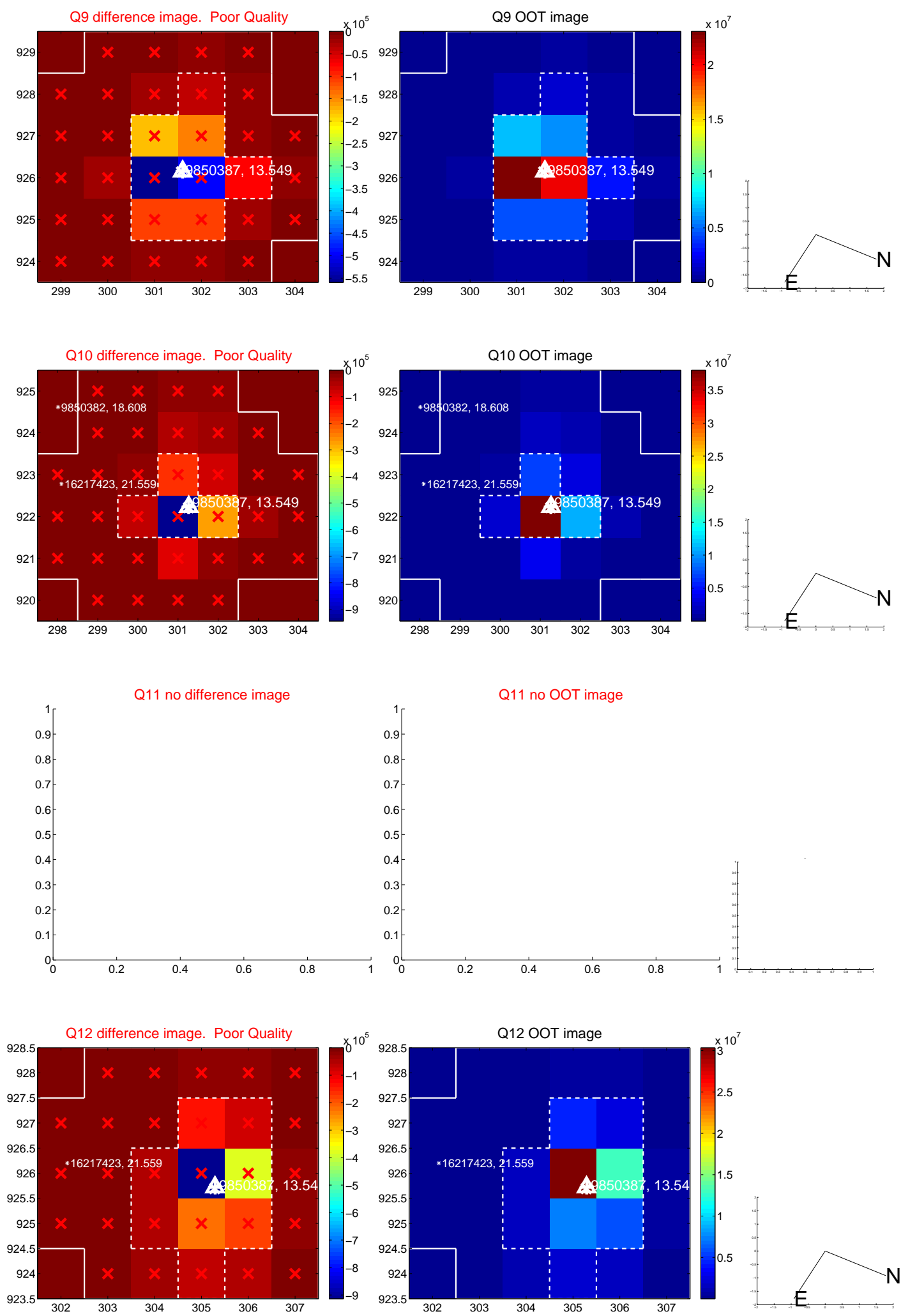
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



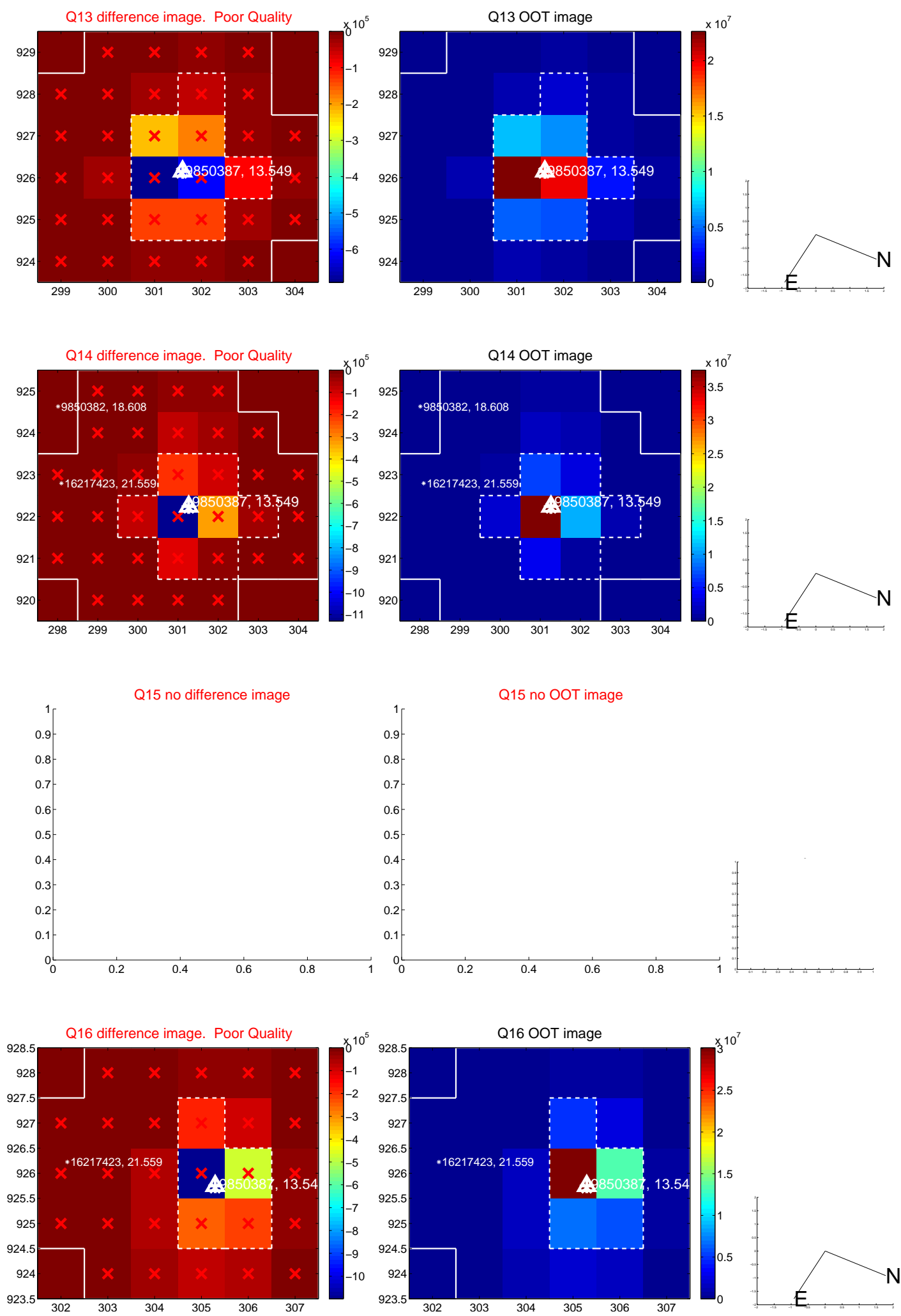
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



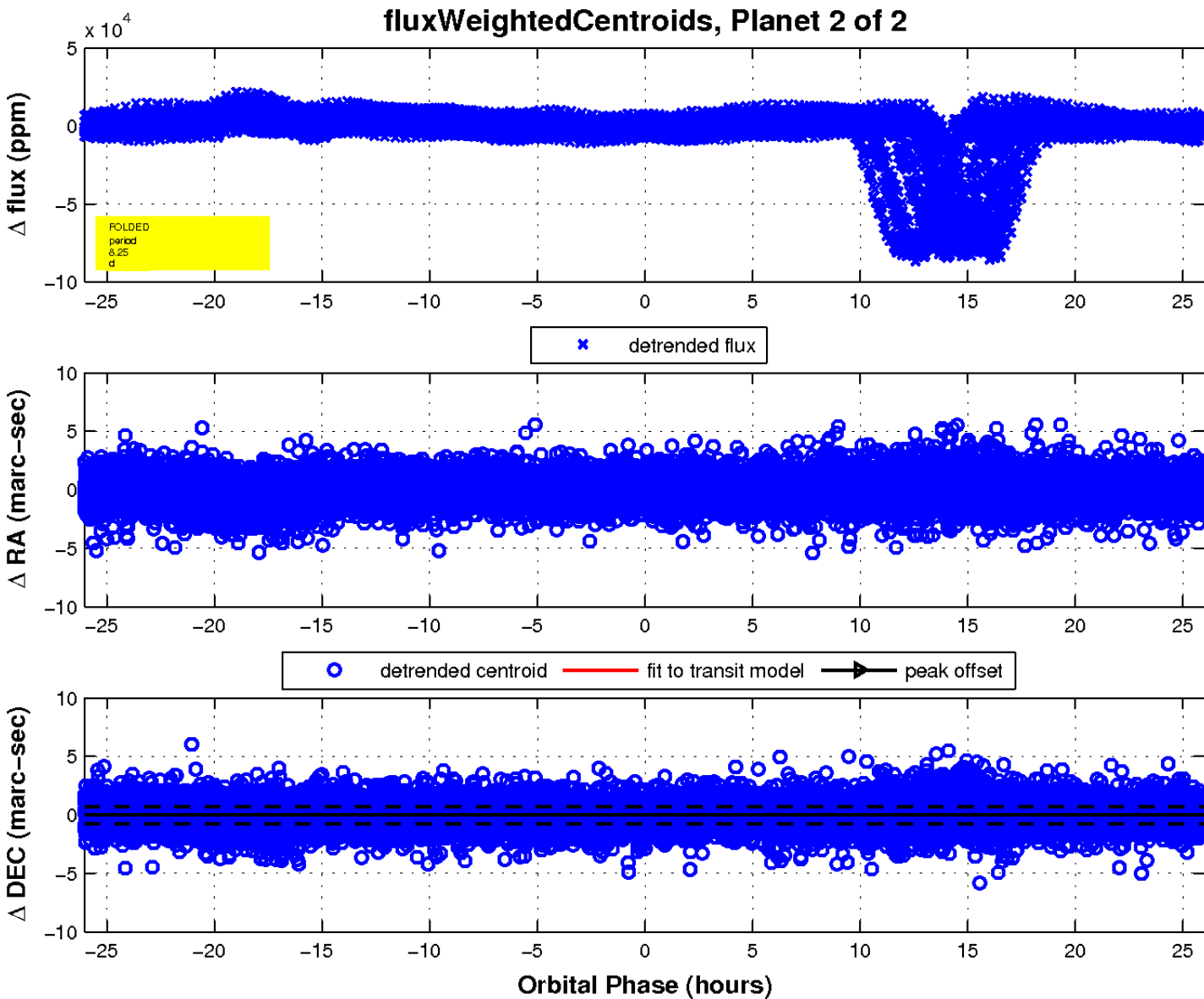
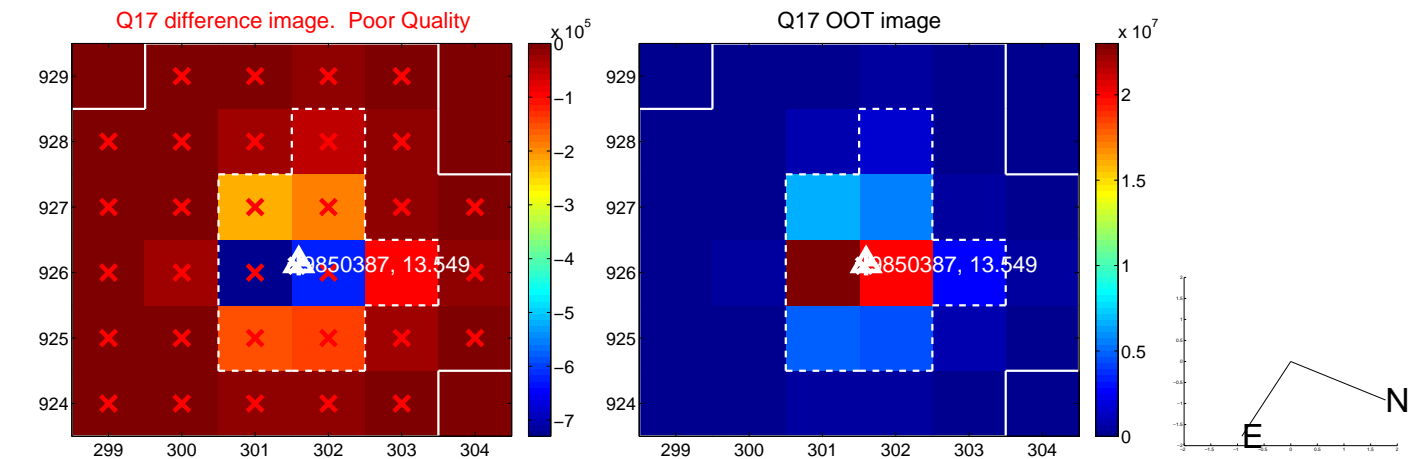
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

