

# KIC 009093349

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009093349-01	OBS	No	340.285729	452.139044	2222.4	5.839	18.3	12.6	4.00	5130	20.53	8.02
009093349-02	OBS	No	275.213963	237.892066	290.9	0.967	19.3	2.2	4.00	5130	7.24	10.65
009093349-03	OBS	No	585.487777	238.354648	1271.6	17.182	17.7	5.4	4.00	5130	14.10	3.89
009093349-04	OBS	No	514.521268	508.165431	1341.0	8.308	20.6	7.6	4.00	5130	19.06	4.62
009093349-05	OBS	No	492.040609	523.789347	662.0	8.930	44.0	3.7	4.00	5130	10.06	4.91
009093349-06	OBS	No	394.770320	435.034848	485.5	2.295	12.0	3.5	4.00	5130	10.18	6.58
009093349-07	OBS	No	313.667348	337.970923	926.1	10.068	14.2	6.6	4.00	5130	11.83	8.94
009093349-08	OBS	No	499.232738	455.096850	301.1	12.500	12.5	-1.0	4.00	5130	6.75	4.81

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009093349-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009093349-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
009093349-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_ZUMA—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
009093349-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_ZUMA—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
009093349-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
009093349-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009093349-07	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009093349-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—ALL_TRANS_CHASES—CENT_NOFITS

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

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

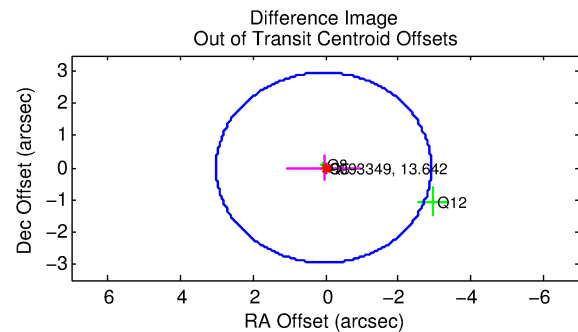
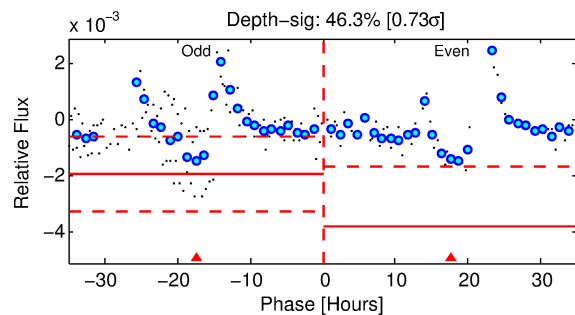
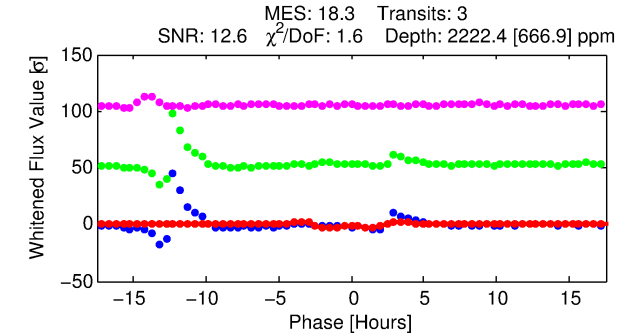
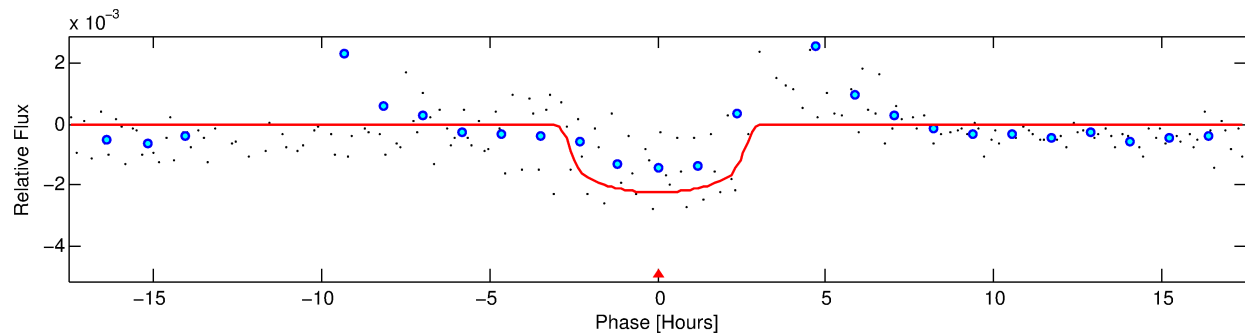
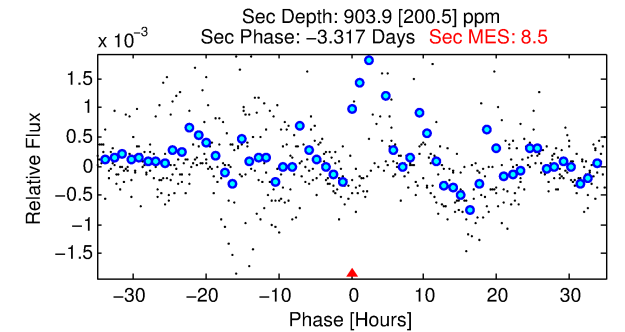
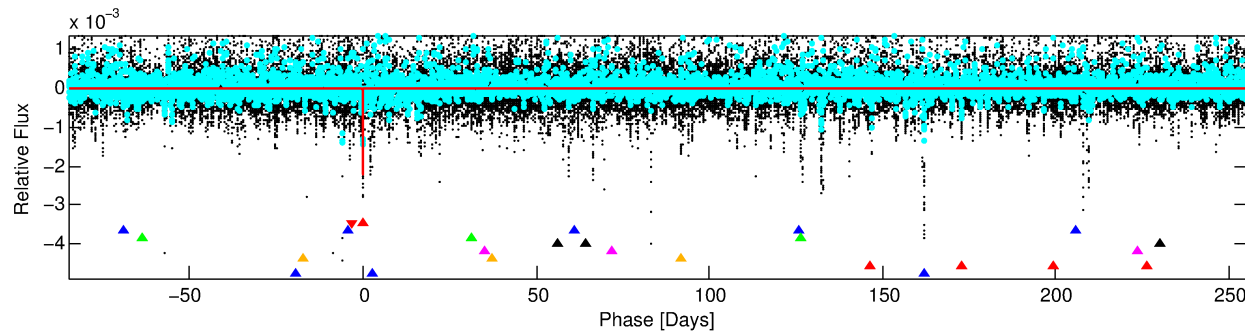
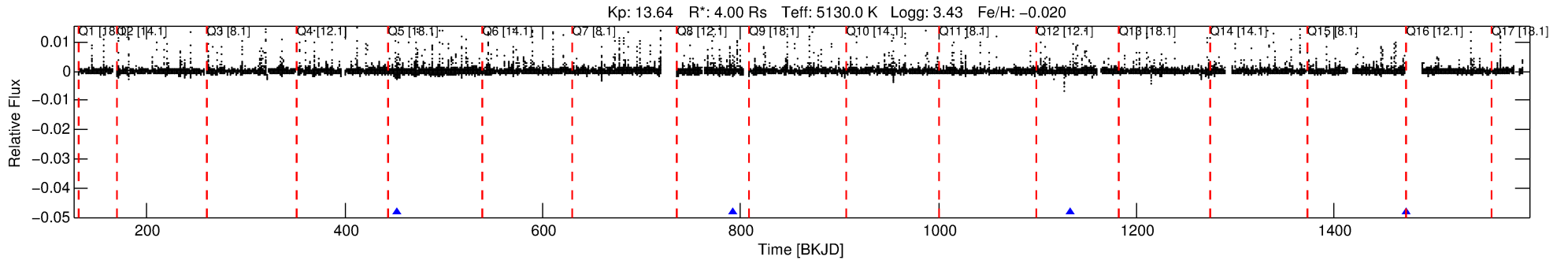
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 009093349-01

No Significant Match Found

# DV One-Page Summary

KIC: 9093349 Candidate: 1 of 8 Period: 340.286 d



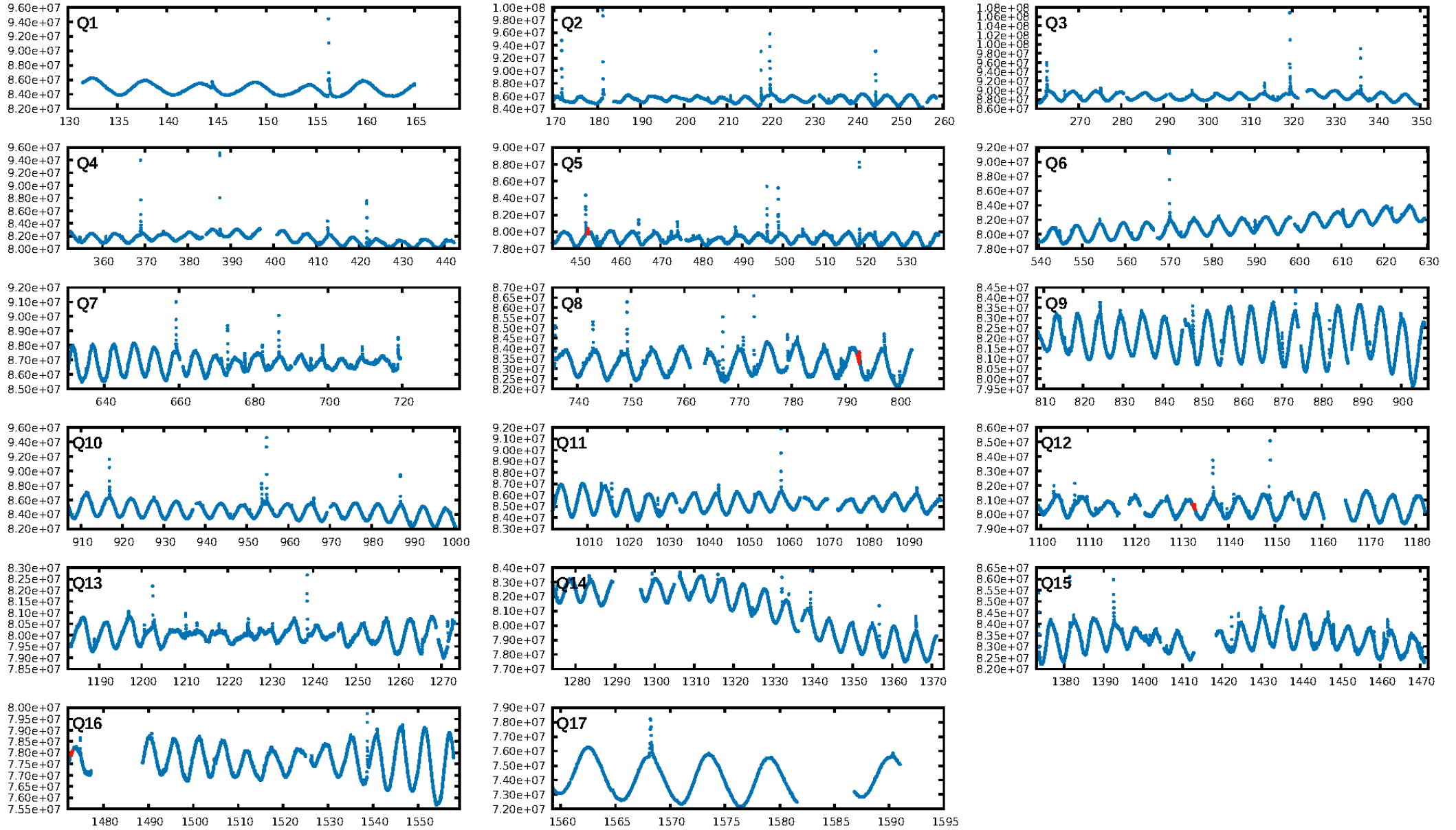
## DV Fit Results:

Period = 340.28573 [0.01303] d  
Epoch = 452.1390 [0.0185] BKJD  
Rp/R\* = 0.0470 [0.0292]  
a/R\* = 325.83 [670.31]  
b = 0.75 [1.24]  
Seff = 8.02 [6.82]  
Teq = 429 [91] K  
**Rp = 20.53 [16.71] Re**  
a = 1.1125 [0.5771] AU  
Ag = 1460.38 [2211.09] [0.66σ]  
Teffp = 4102 [1299] K [2.82σ]

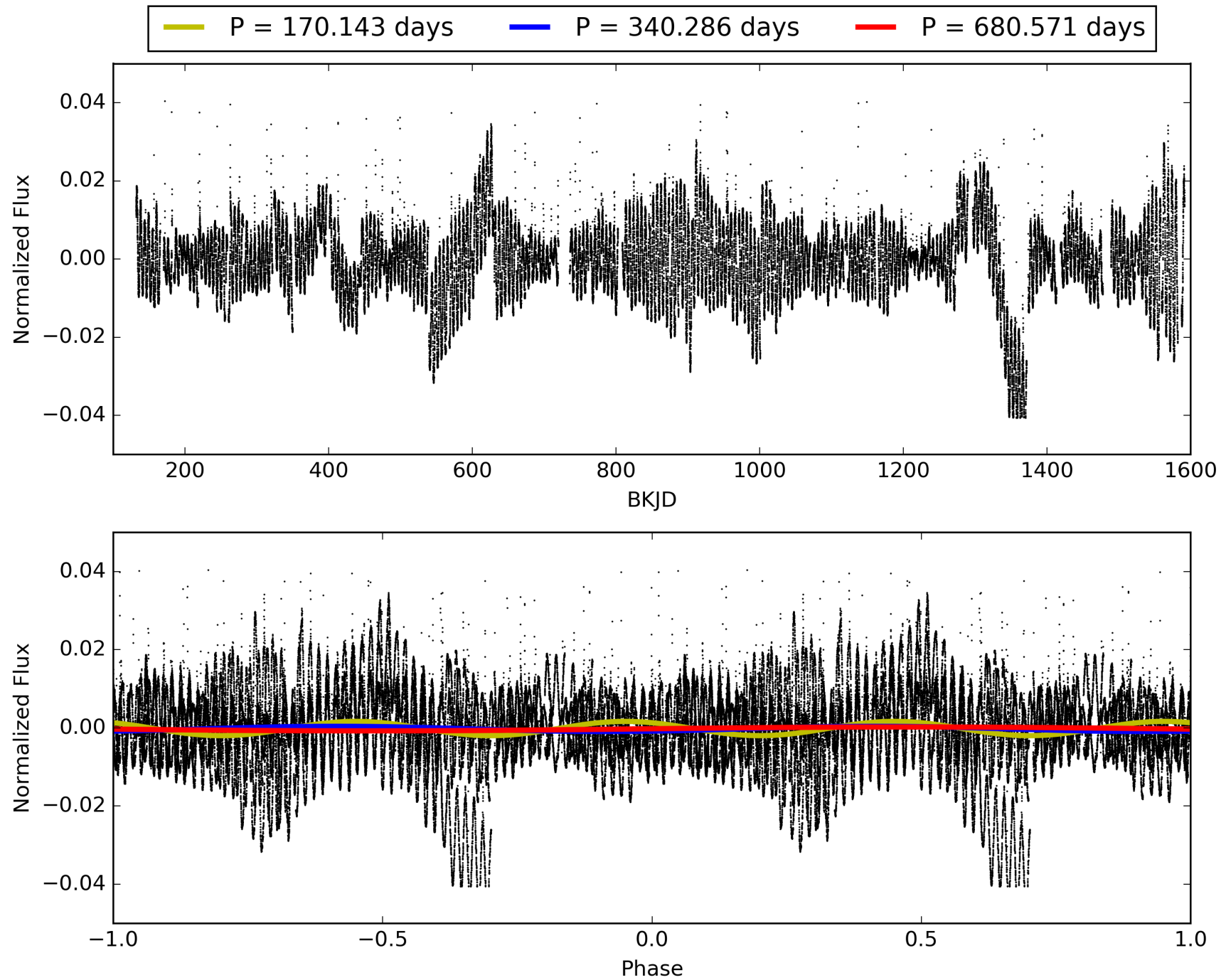
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [54.89σ]  
LongPeriod-sig: 100.0% [208.42σ]  
ModelChiSquare2-sig: 12.1%  
ModelChiSquareGof-sig: 29.4%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 1.735  
Centroid-sig: 46.4%  
Centroid-so: 0.044 arcsec [0.20σ]  
OotOffset-rm: 0.050 arcsec [0.05σ]  
KicOffset-rm: 0.100 arcsec [0.15σ]  
OotOffset-st: 0/0/2/1 [3]  
KicOffset-st: 0/0/2/1 [3]  
DiffImageQuality-fgm: 1.00 [3/3]  
DiffImageOverlap-fno: 1.00 [3/3]

# TCE 009093349-01, PDC Light Curves



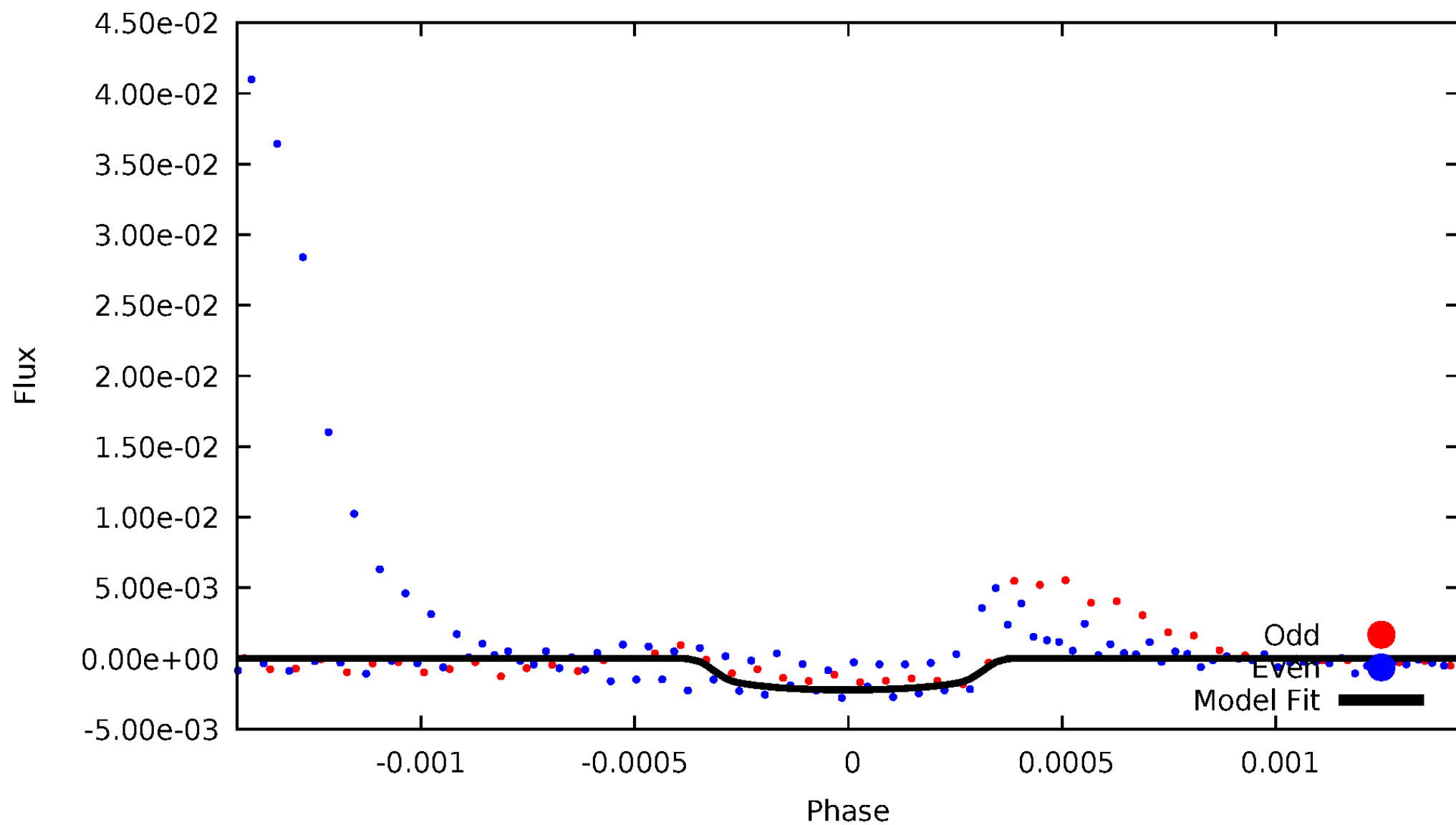
TCE 009093349-01





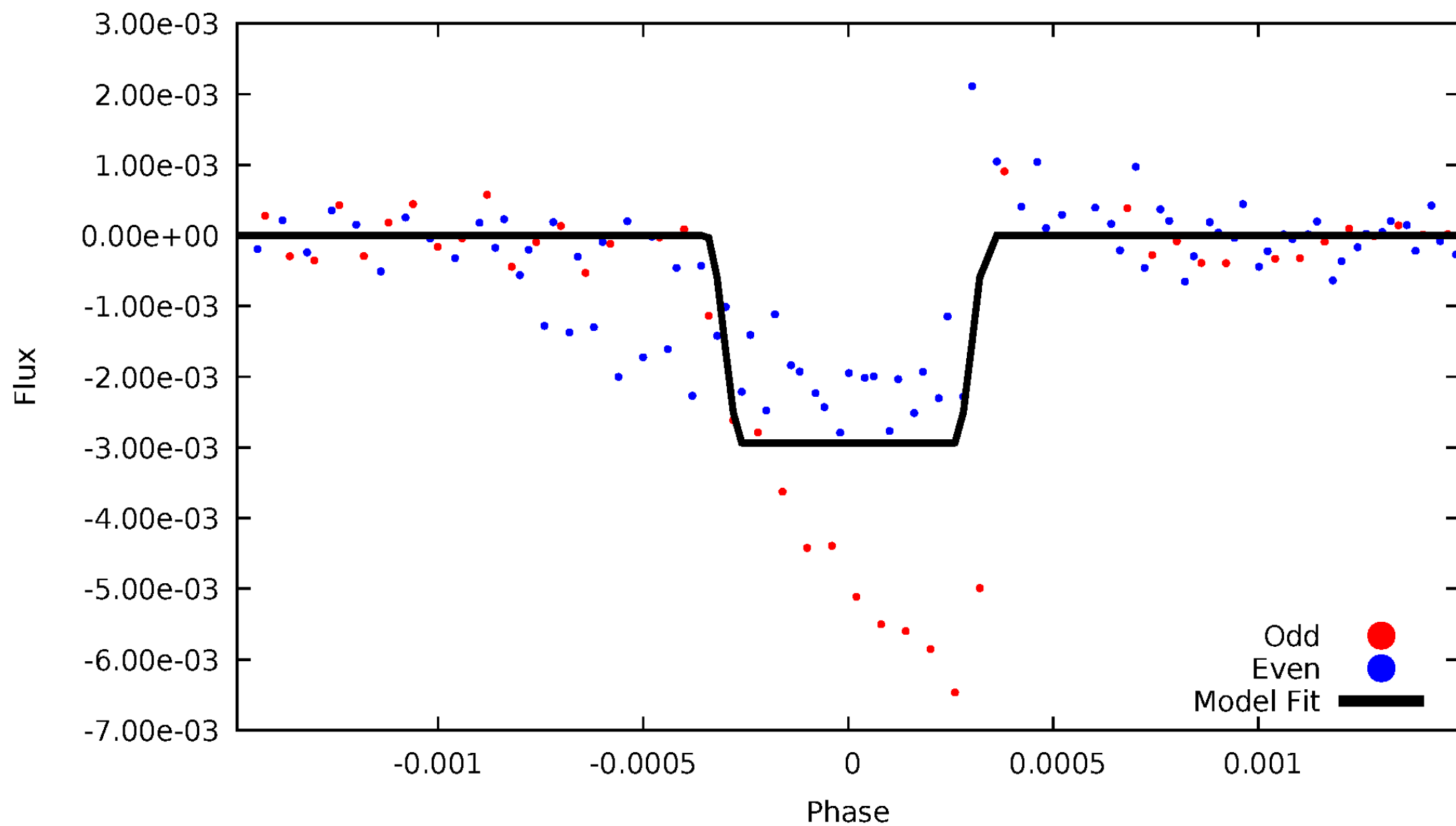
# DV Odd/Even

TCE 009093349-01



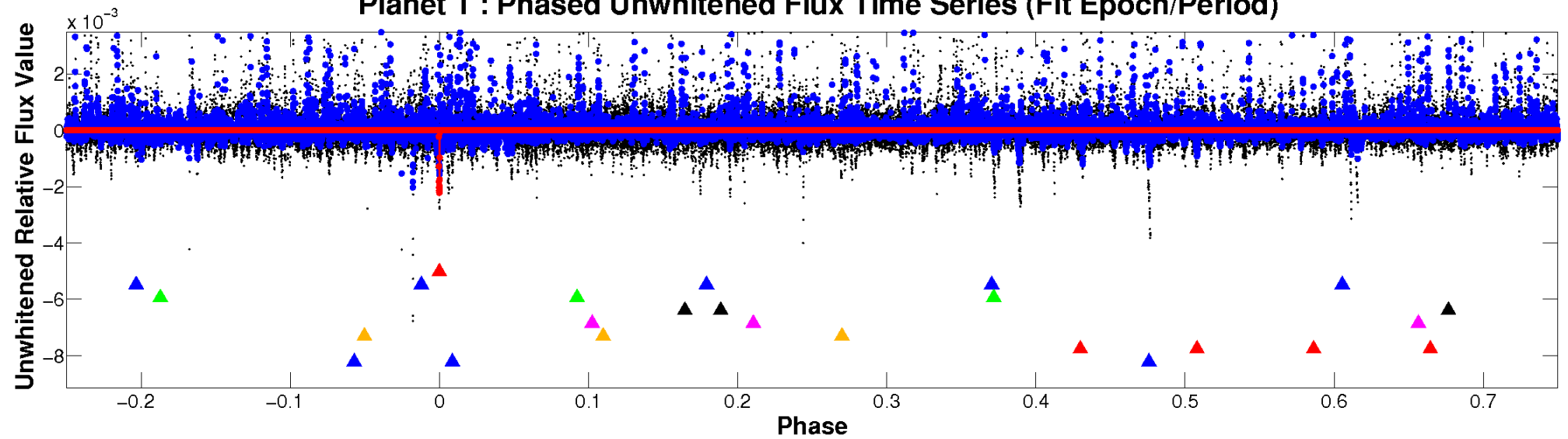
# ALT Odd/Even

TCE 009093349-01

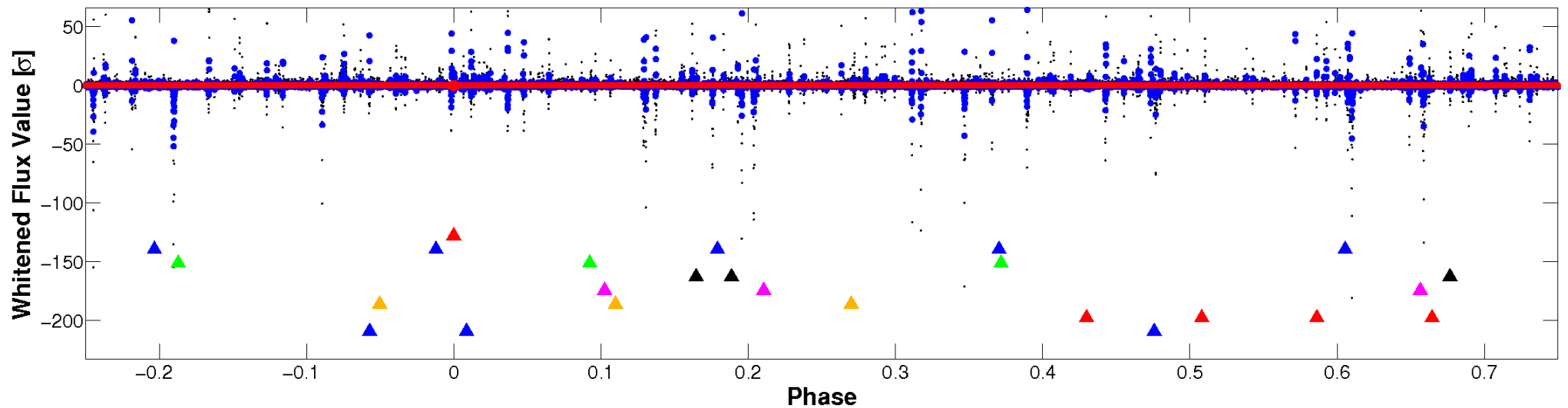


# Non-Whitened Vs. Whitened Light Curve

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

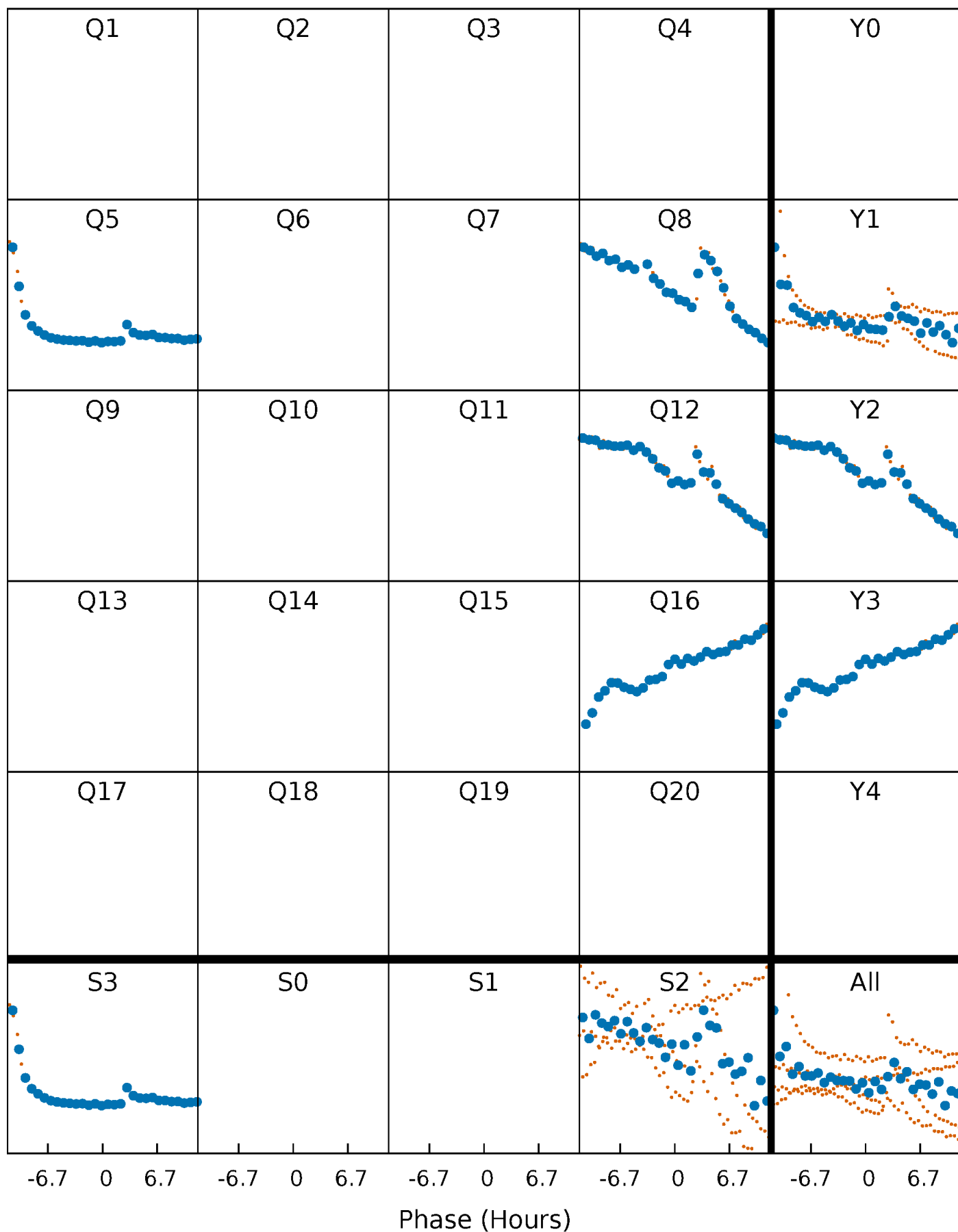


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



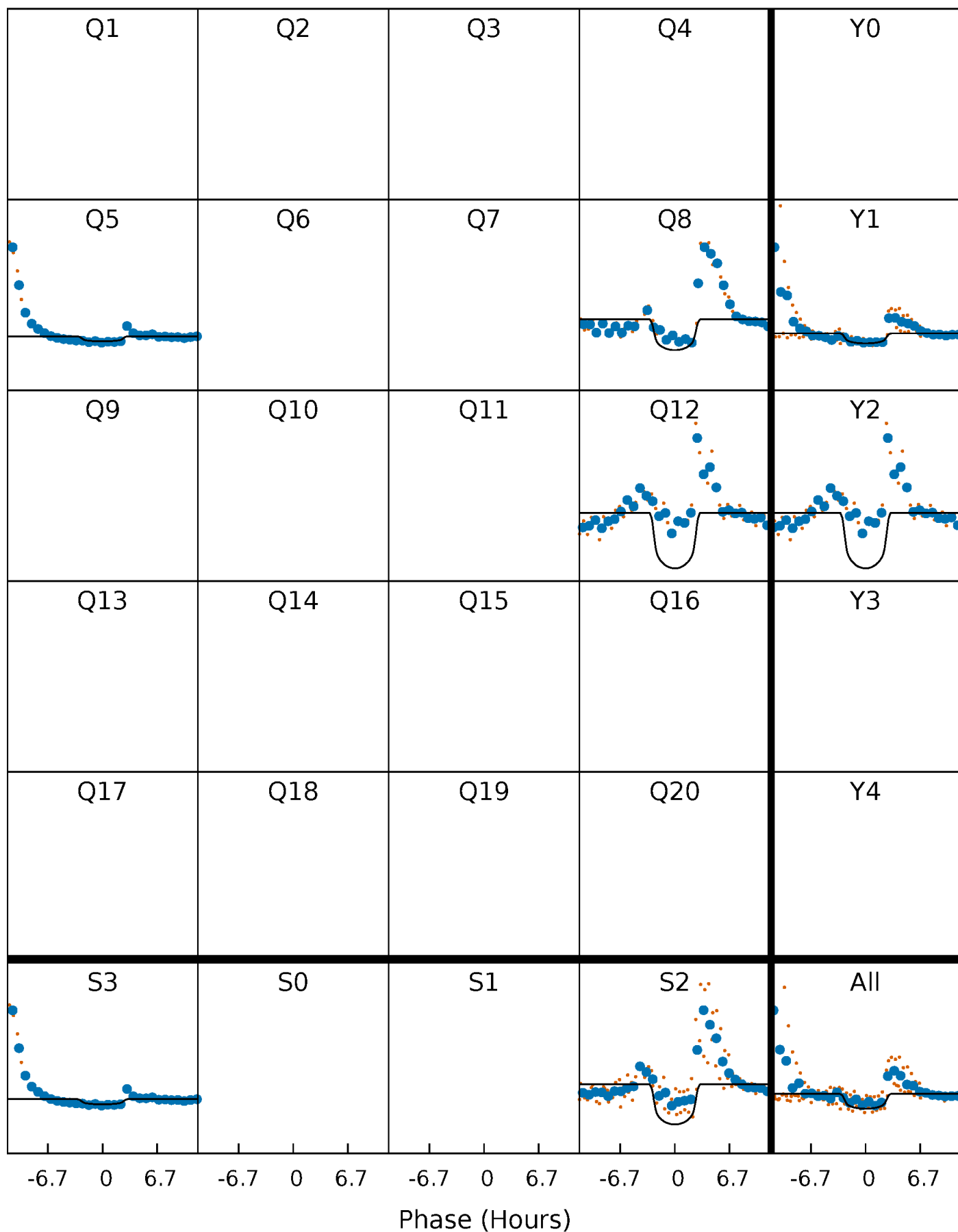
# PDC Quarter-Phased Transit Curves

TCE 009093349-01 P=340.285729 Days  $T_0=452.139044$  (BKJD)



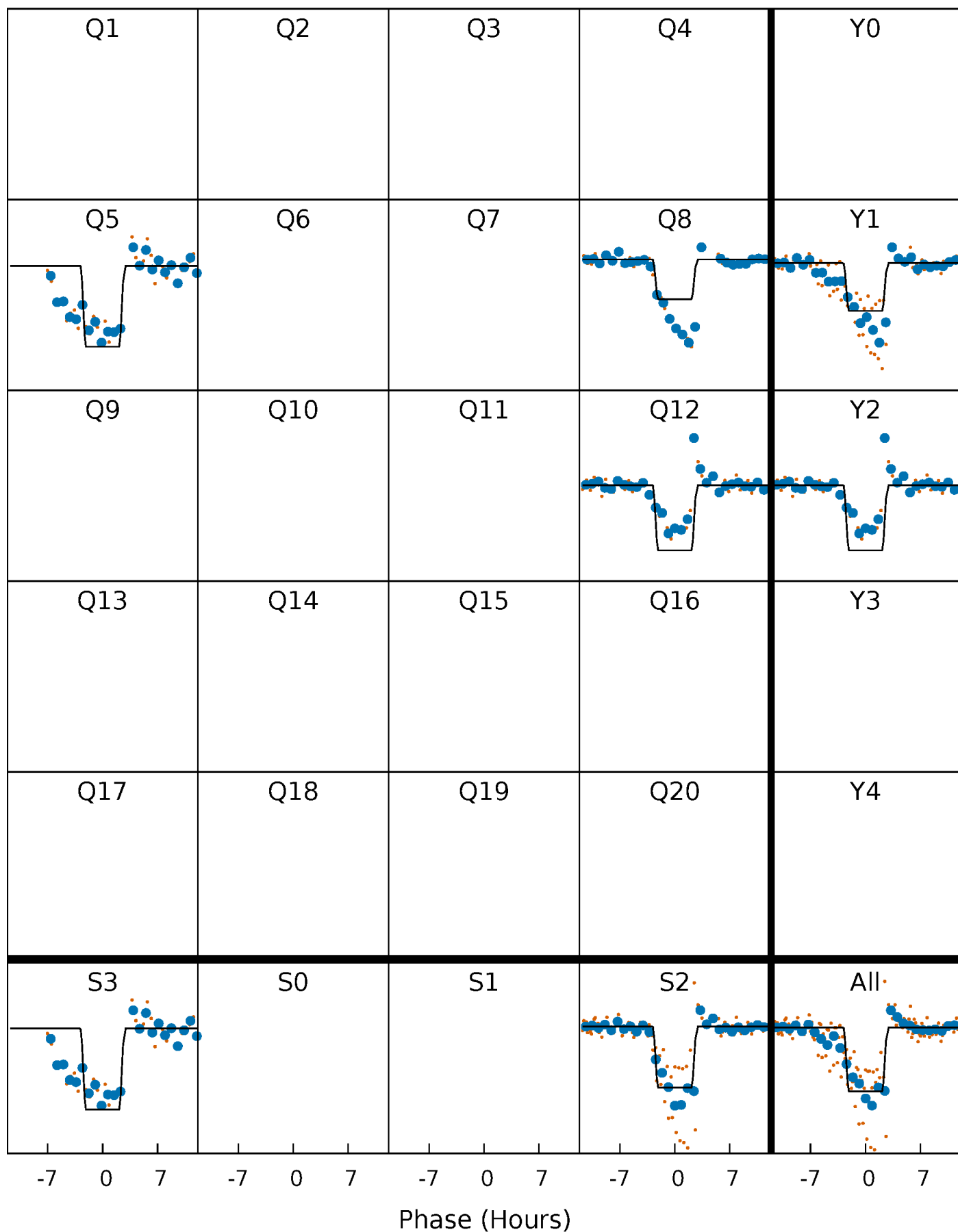
# DV Quarter-Phased Transit Curves

TCE 009093349-01     $P=340.285729$  Days     $T_0=452.139044$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 009093349-01 P=340.286886 Days  $T_0=452.140566$  (BKJD)

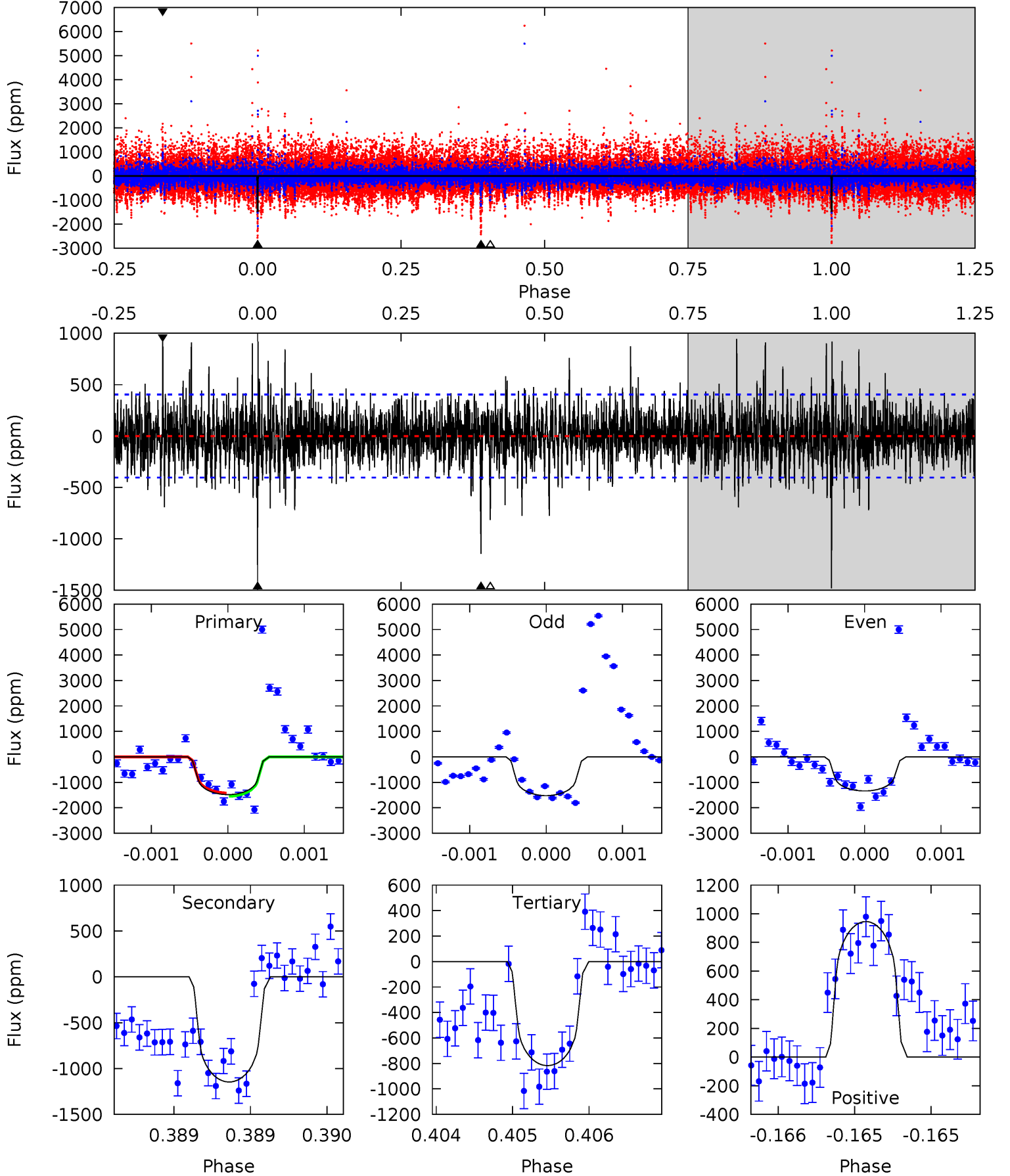




# DV Model-Shift Uniqueness Test

009093349-01, P = 340.285729 Days, E = 111.853315 Days

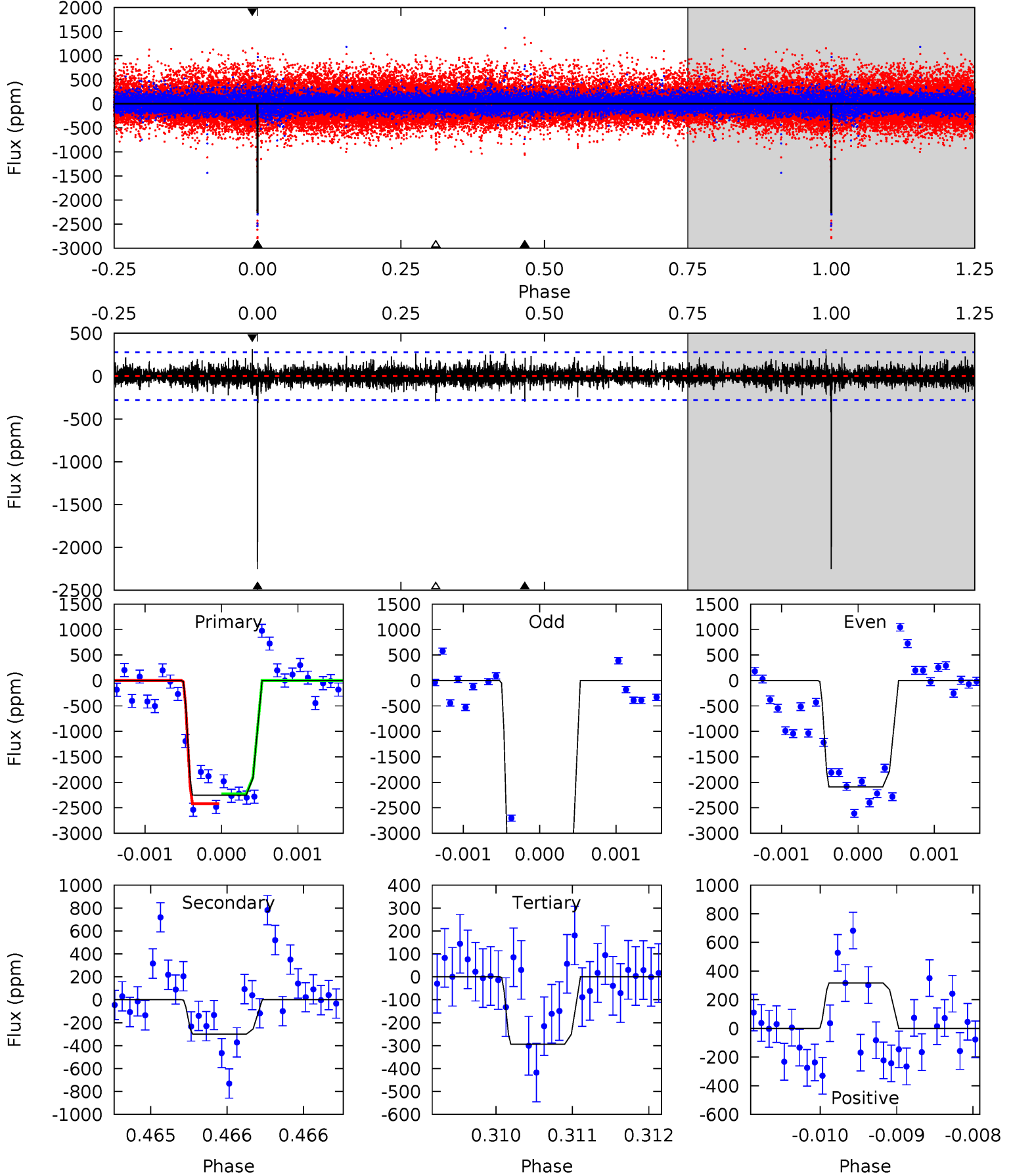
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
20.1	15.6	11.1	12.9	5.50	3.37	2.49	9.04	7.29	4.48	2.73	0.83	0.90	0.39	0.89



# Alt Model-Shift Uniqueness Test

009093349-01, P = 340.286886 Days, E = 111.853680 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
44.5	5.92	5.82	6.28	5.52	3.40	1.07	38.7	38.3	0.10	-0.36	29.1	1.23	0.12	1.82



### Stellar Parameters For KIC 009093349

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5130^{+154}_{-169}$	$3.434^{+0.497}_{-0.213}$	$-0.020^{+0.250}_{-0.300}$	$4.000^{+1.136}_{-2.109}$	$1.585^{+0.213}_{-0.639}$	$0.035^{+0.170}_{-0.018}$
	+3%/-3%	+14%/-6%	+1250%/-1500%	+28%/-53%	+13%/-40%	+488%/-52%
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 009093349-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-1146 \pm 74$	$18.87^{+14.07}_{-10.54}$	$592^{+56}_{-79}$	$4362^{+1966}_{-635}$	$2029^{+8151}_{-1322}$
Alt.	$-299 \pm 51$	$22.79^{+15.60}_{-11.98}$	$593^{+56}_{-77}$	$3320^{+823}_{-379}$	$385^{+1294}_{-244}$

$T_{max}$  = 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

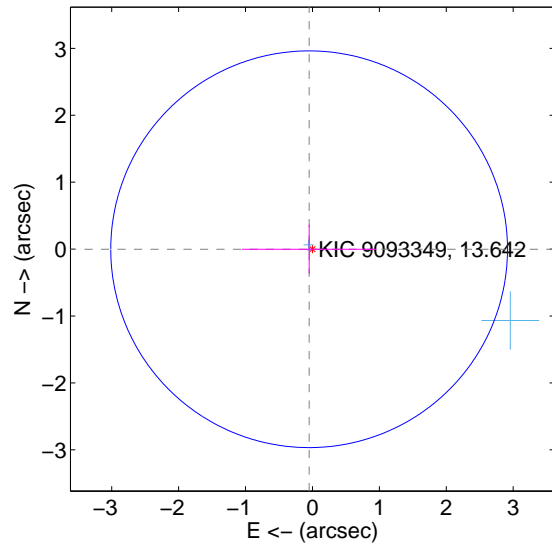
Supplemental centroid analysis for 009093349-01. Kepler magnitude: 13.64. Transit SNR 12.55

There are 3 quarters with good PRF difference image offsets

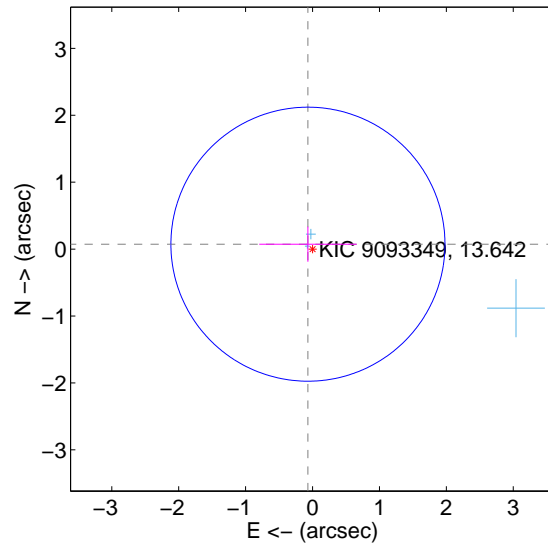
The direct PRF centroid is offset from the target star catalog position by about 0.20 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.050 \pm 0.988$	0.05	$0.050 \pm 1.005$	$-0.002 \pm 0.367$
PRF-fit source offset from KIC position	$0.100 \pm 0.683$	0.15	$0.069 \pm 0.729$	$0.073 \pm 0.263$
photometric centroid source offset	$0.04 \pm 0.22$	0.20	$-0.04 \pm 0.21$	$-0.02 \pm 0.25$

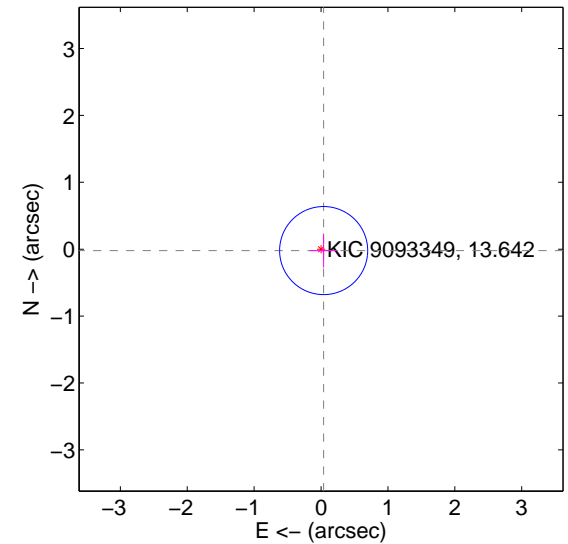
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



offset from photometric centroids

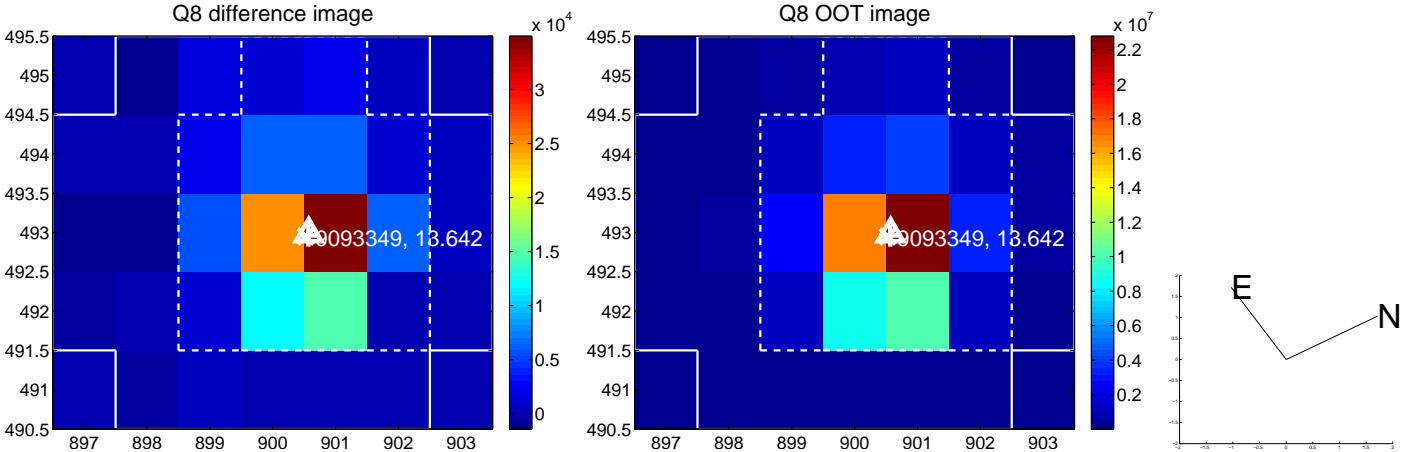
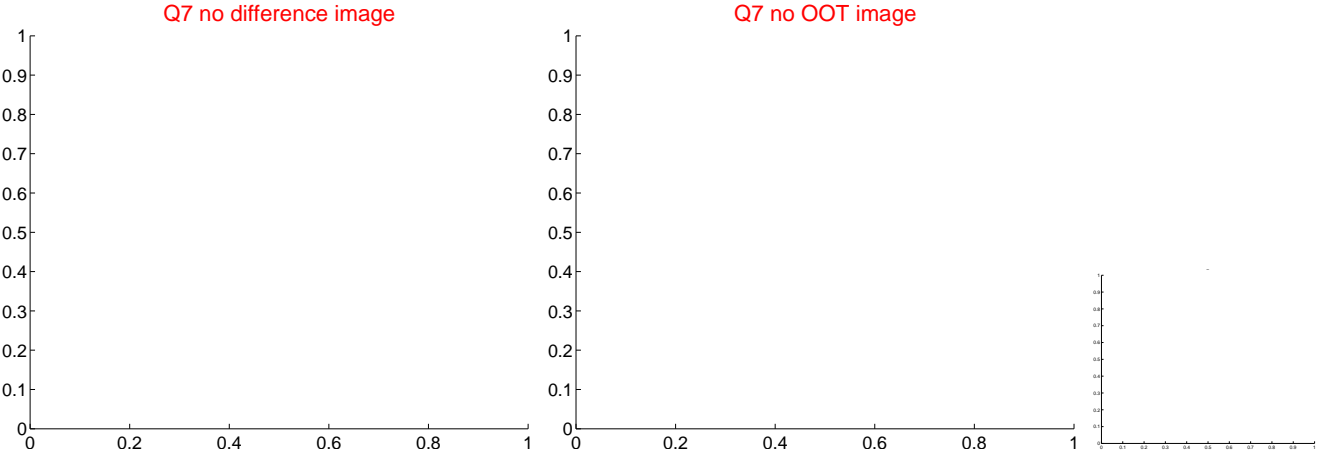
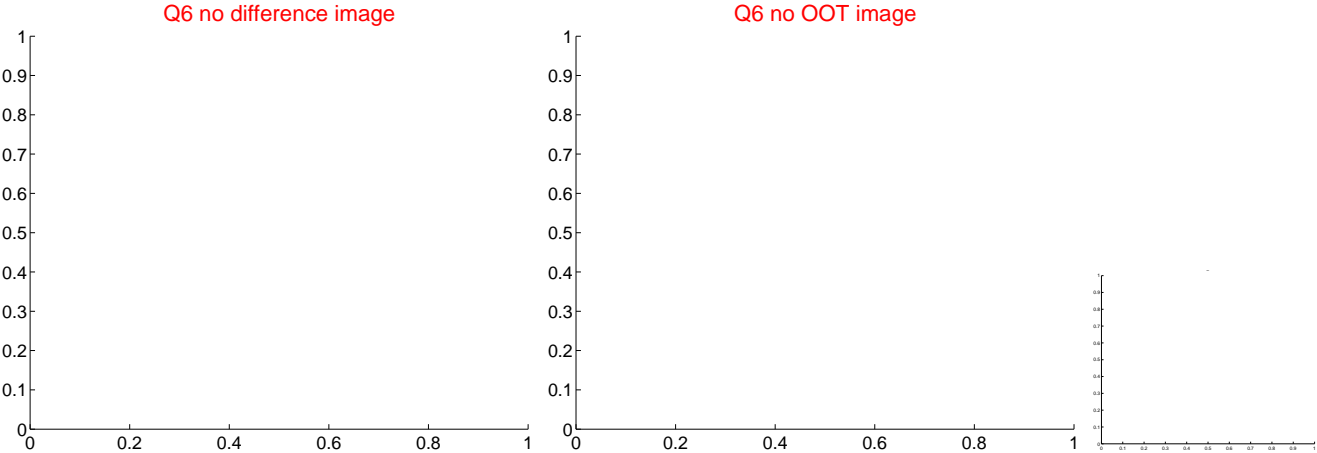
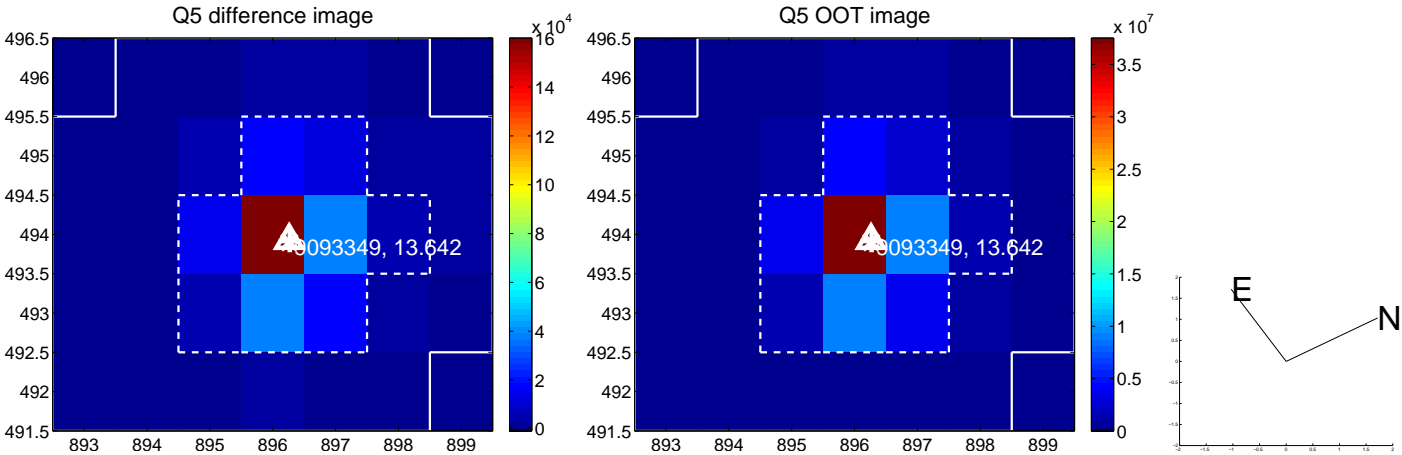


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

Q9 no difference image



Q9 no OOT image



Q10 no difference image



Q10 no OOT image



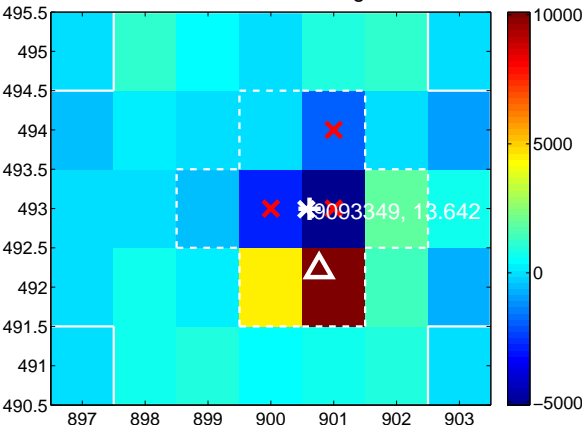
Q11 no difference image



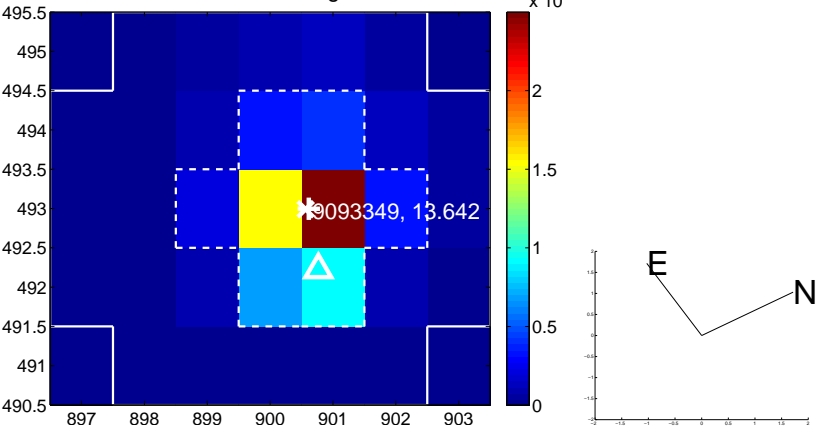
Q11 no OOT image



Q12 difference image



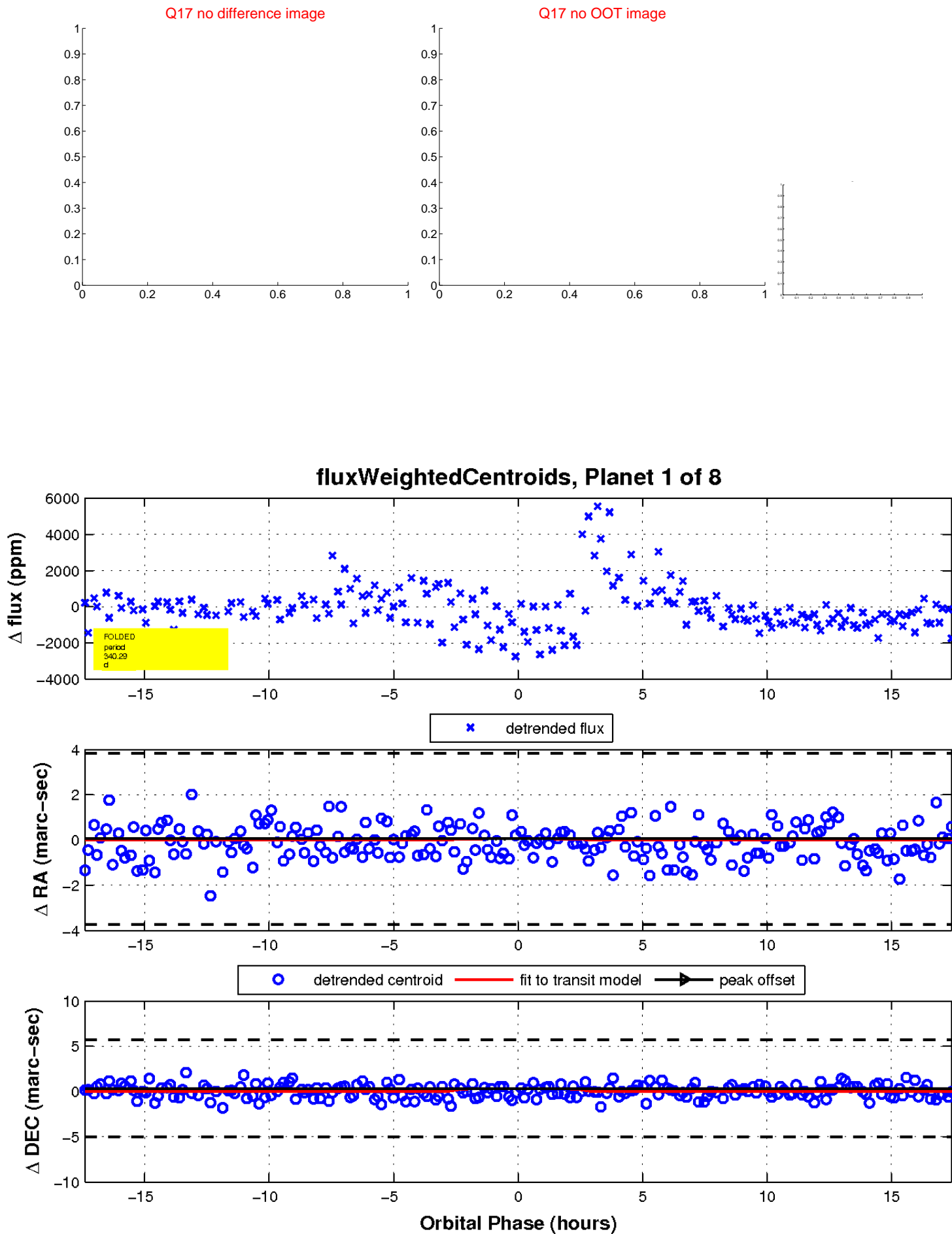
Q12 OOT image



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

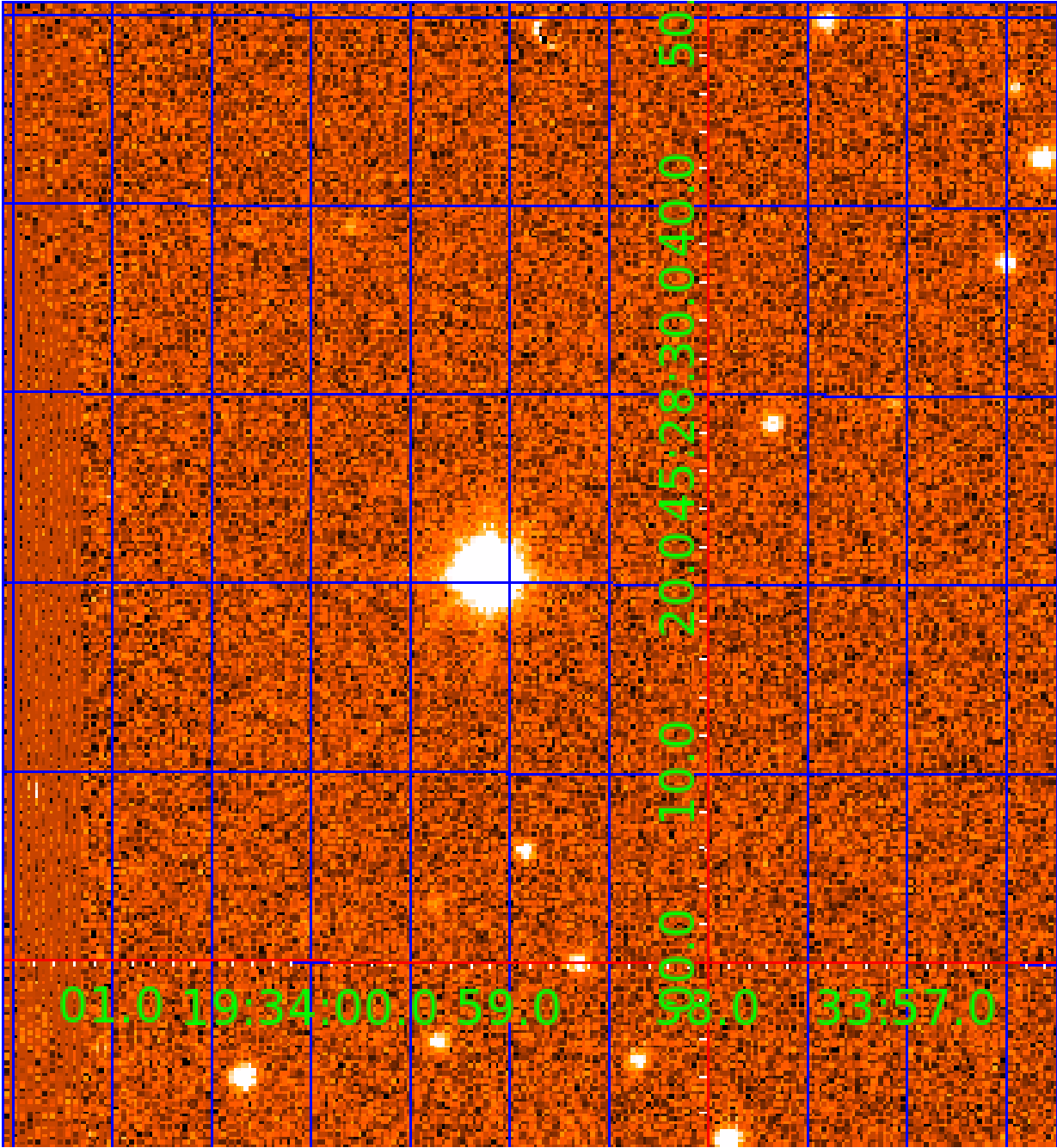


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



## KIC 009093349

## Q1-17 DR25 TCE Parameters

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009093349-02	OBS	No	275.213963	237.892066	290.9	0.967	19.3	2.2	4.00	5130	7.24	10.65
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## Robovetter Results

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009093349-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
009093349-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_ZUMA—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
009093349-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_ZUMA—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
009093349-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
009093349-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009093349-07	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009093349-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—ALL_TRANS_CHASES—CENT_NOFITS

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

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

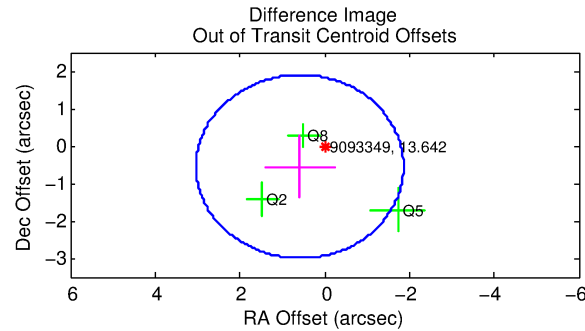
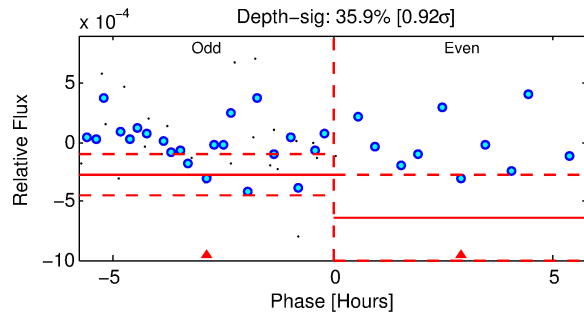
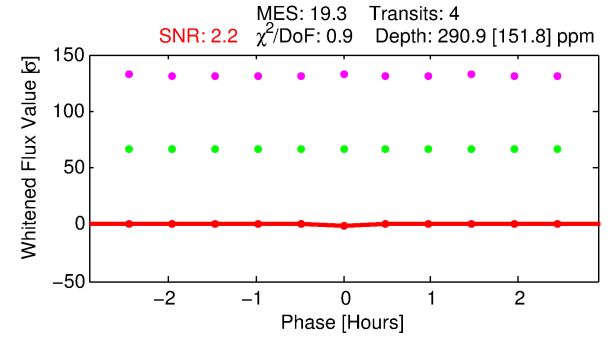
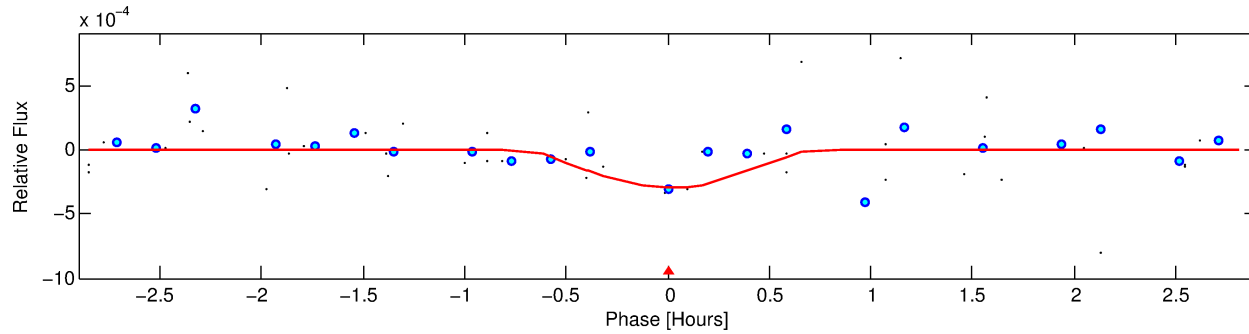
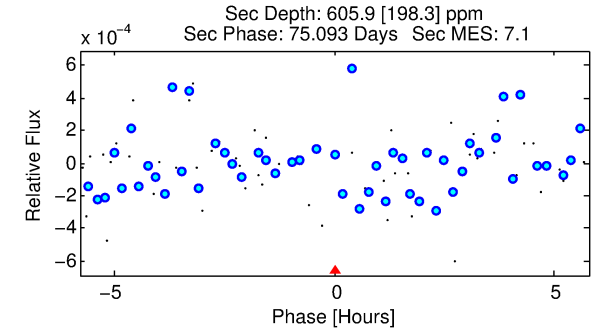
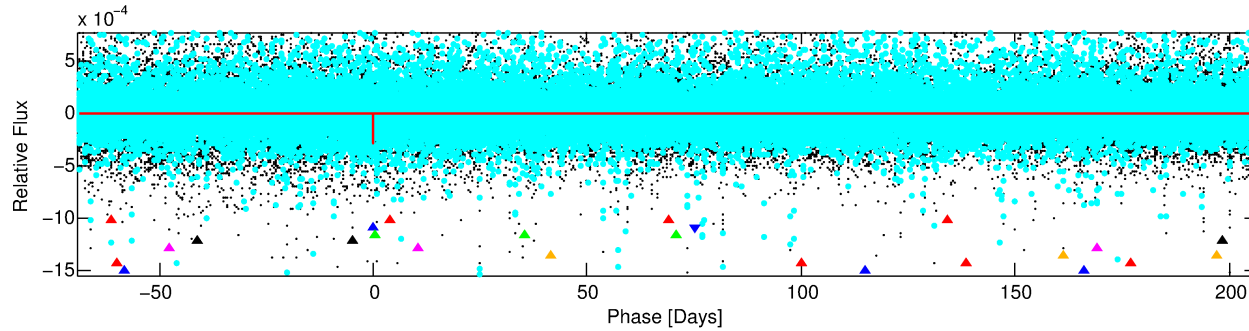
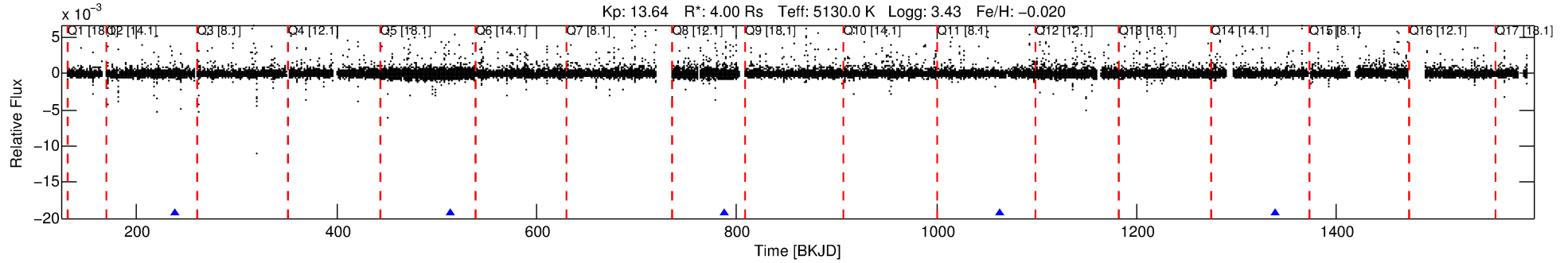
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009093349-02

No Significant Match Found

# DV One-Page Summary

KIC: 9093349 Candidate: 2 of 8 Period: 275.214 d



## DV Fit Results:

Period = 275.21396 [0.00912] d  
Epoch = 237.8921 [0.0186] BKJD  
Rp/R\* = 0.0166 [0.1235]  
a/R\* = 1703.16 [45896.77]  
b = 0.65 [24.65]  
Seff = 10.65 [9.05]  
Teq = 461 [98] K  
Rp = 7.24 [54.04] Re  
a = 0.9657 [0.5009] AU  
Ag = 5925.08 [88356.50] [0.07 $\sigma$ ]  
Teffp = 6248 [23257] K [0.25 $\sigma$ ]

## DV Diagnostic Results:

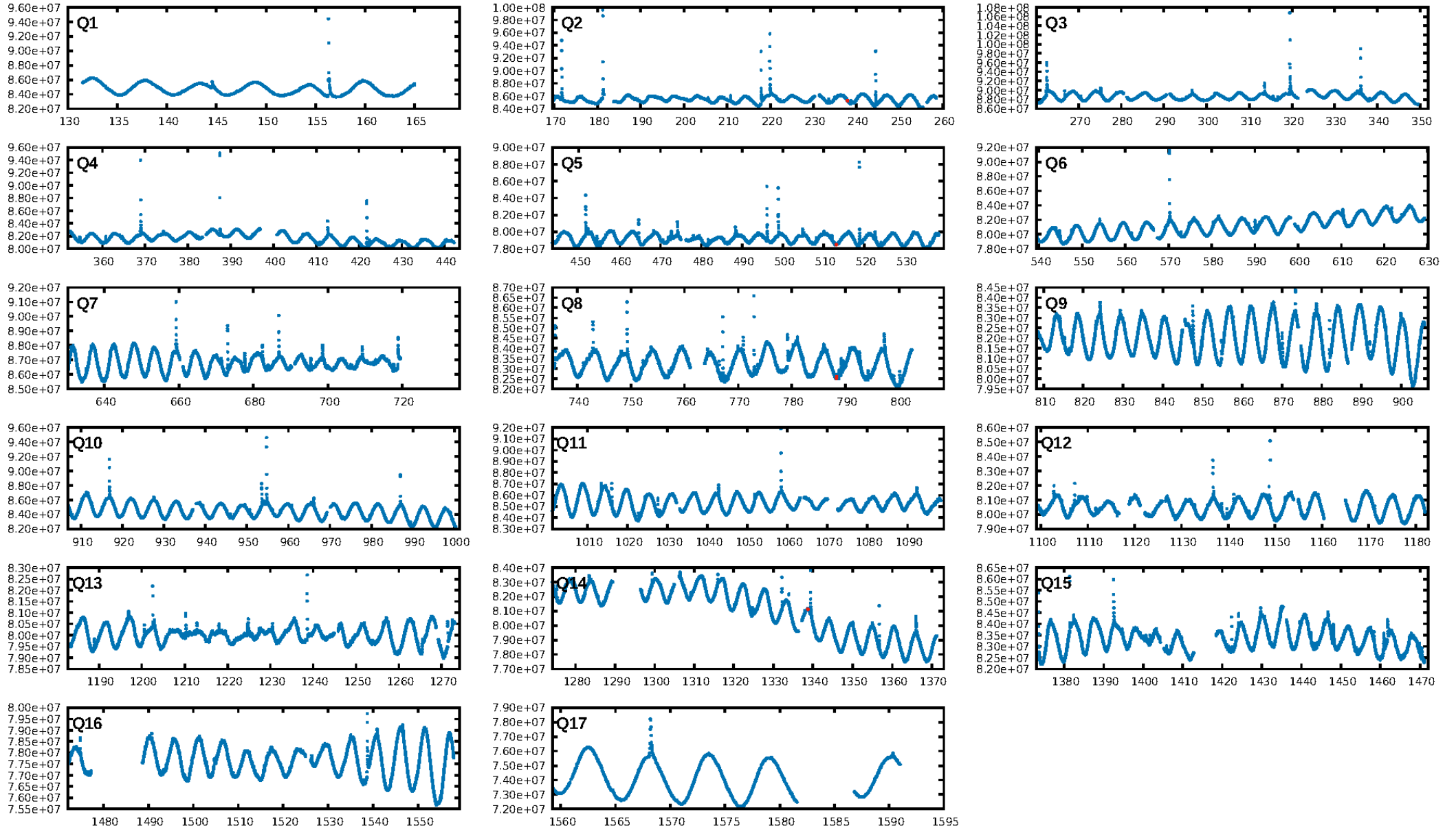
ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [91.25 $\sigma$ ]  
ModelChiSquare2-sig: 96.4%  
ModelChiSquareGof-sig: 93.8%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: 8.086  
Centroid-sig: 98.3%  
Centroid-so: 0.178 arcsec [0.06 $\sigma$ ]  
OotOffset-rm: 0.805 arcsec [0.99 $\sigma$ ]  
KicOffset-rm: 0.690 arcsec [0.85 $\sigma$ ]  
OotOffset-st: 1/0/1/1 [3]  
KicOffset-st: 1/0/1/1 [3]  
DiffImageQuality-fgm: 1.00 [3/3]  
DiffImageOverlap-fno: 0.75 [3/4]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 23:30:39 Z

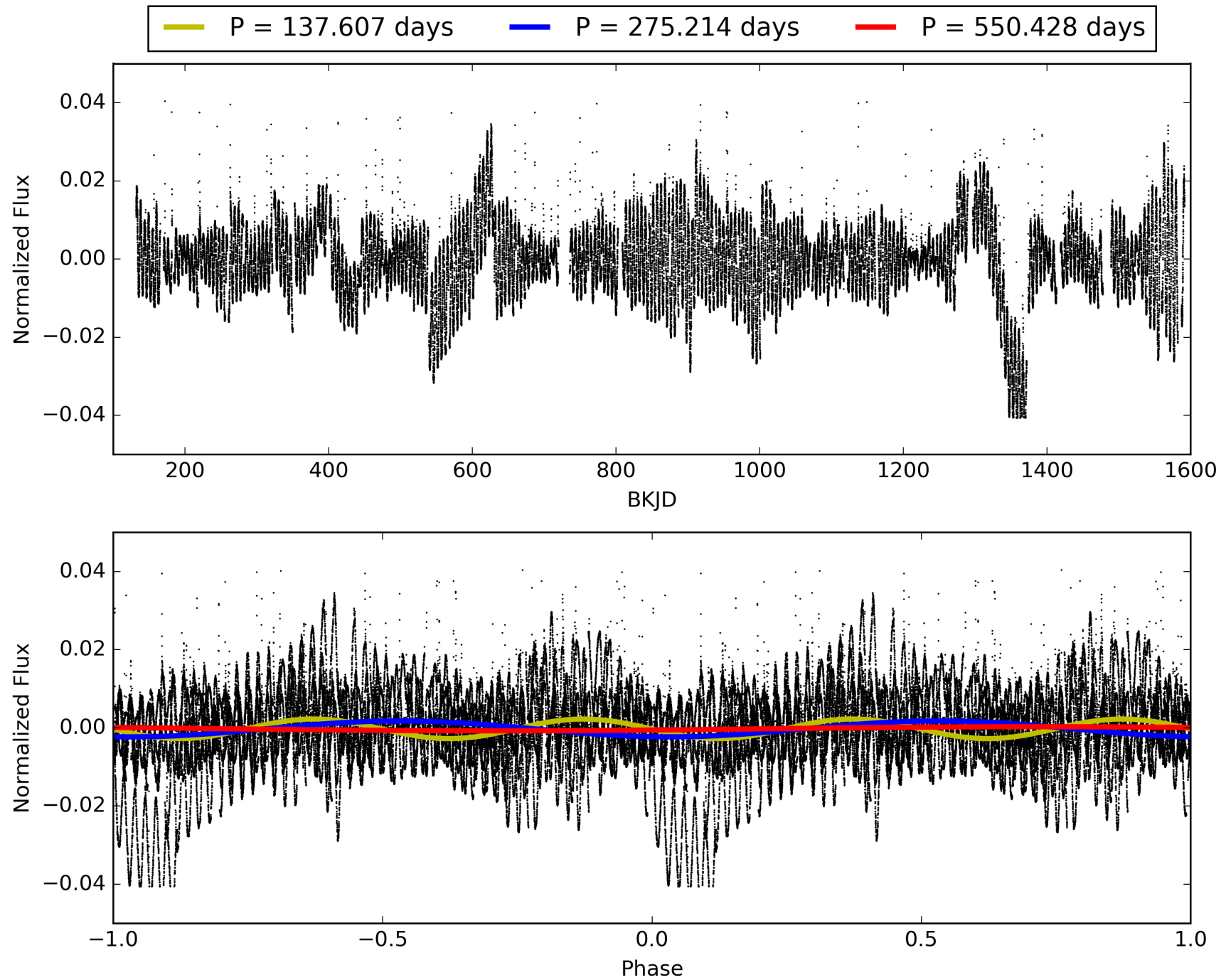
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 009093349-02, PDC Light Curves

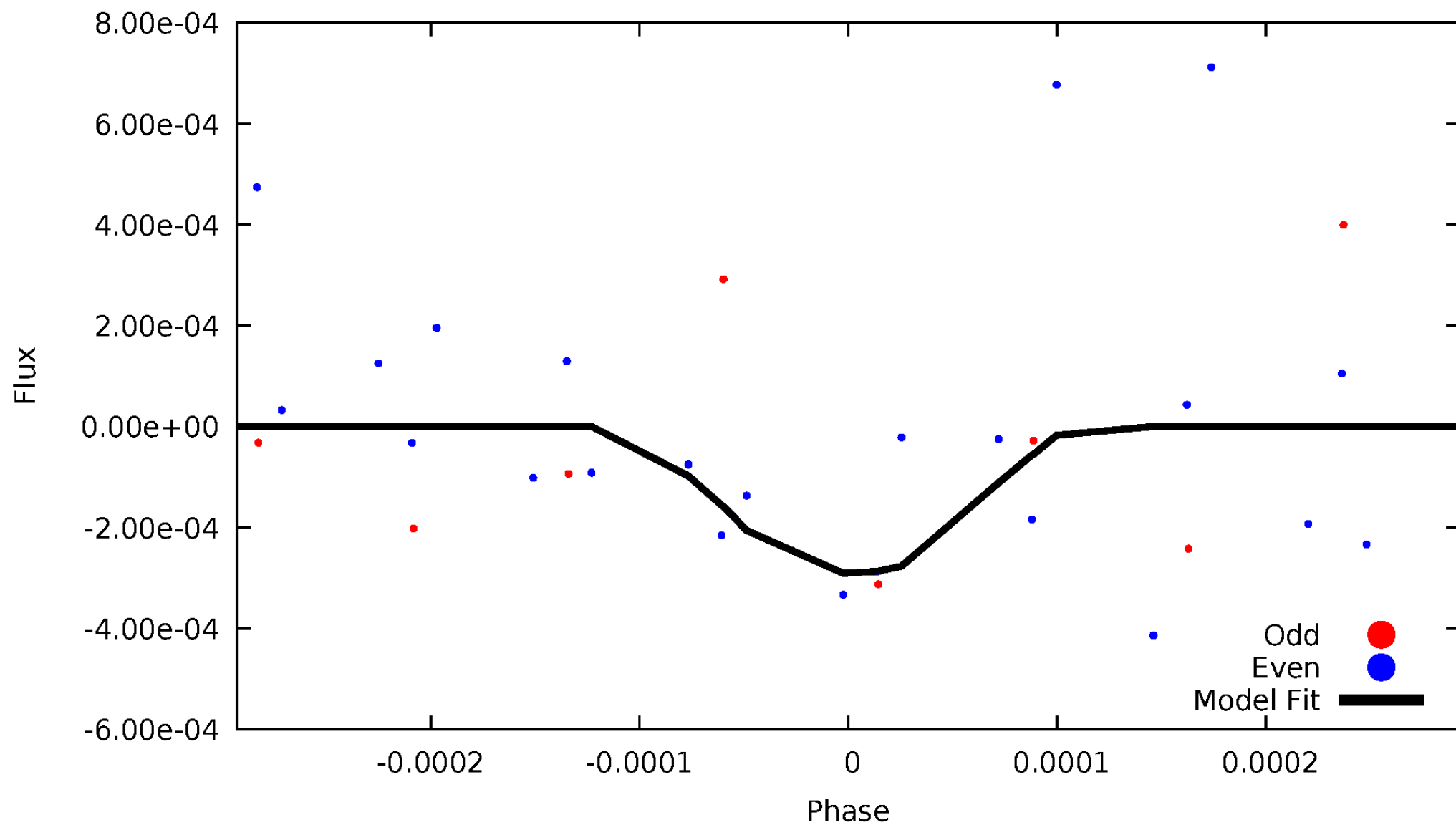


TCE 009093349-02



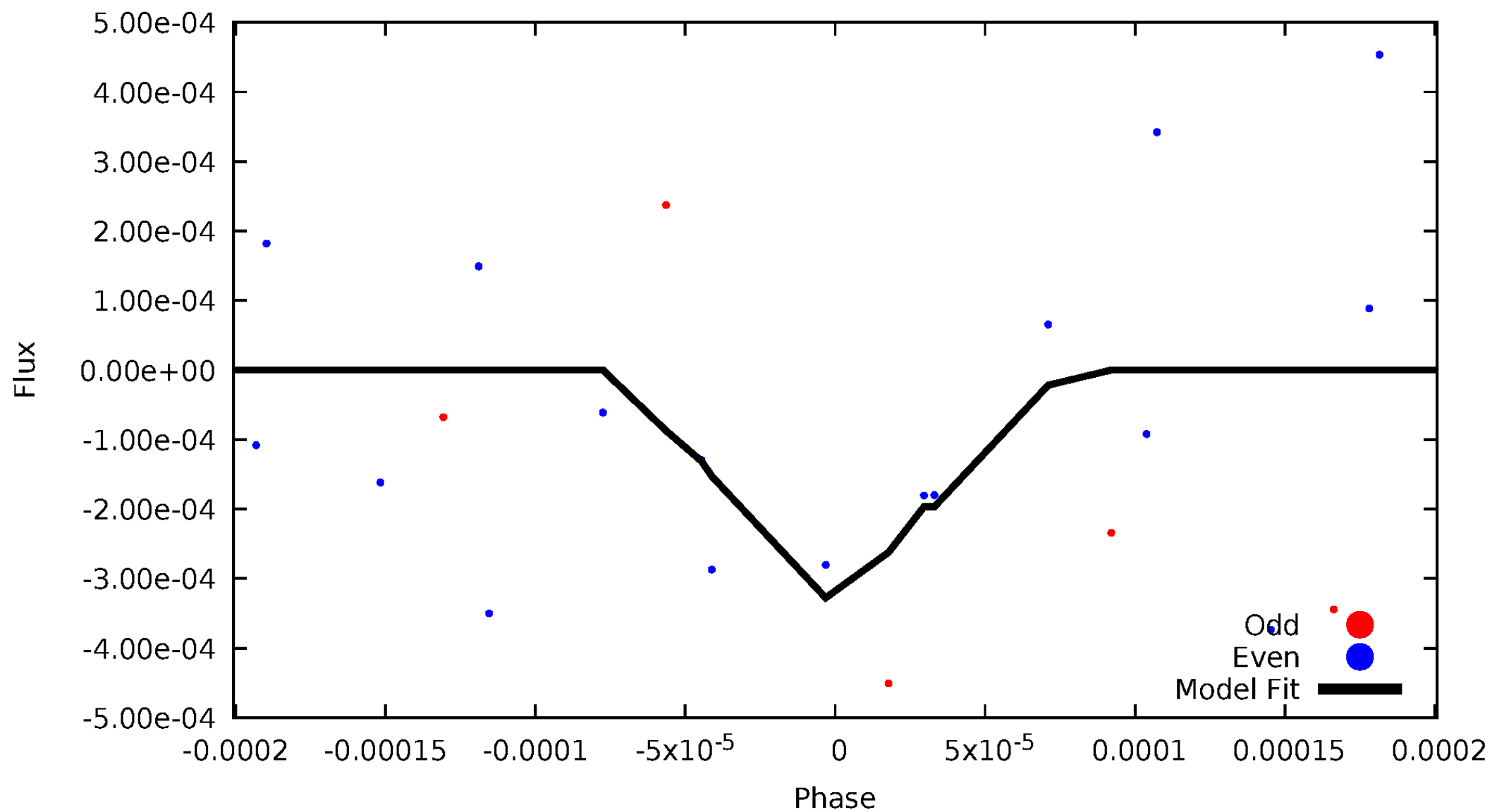
# DV Odd/Even

TCE 009093349-02



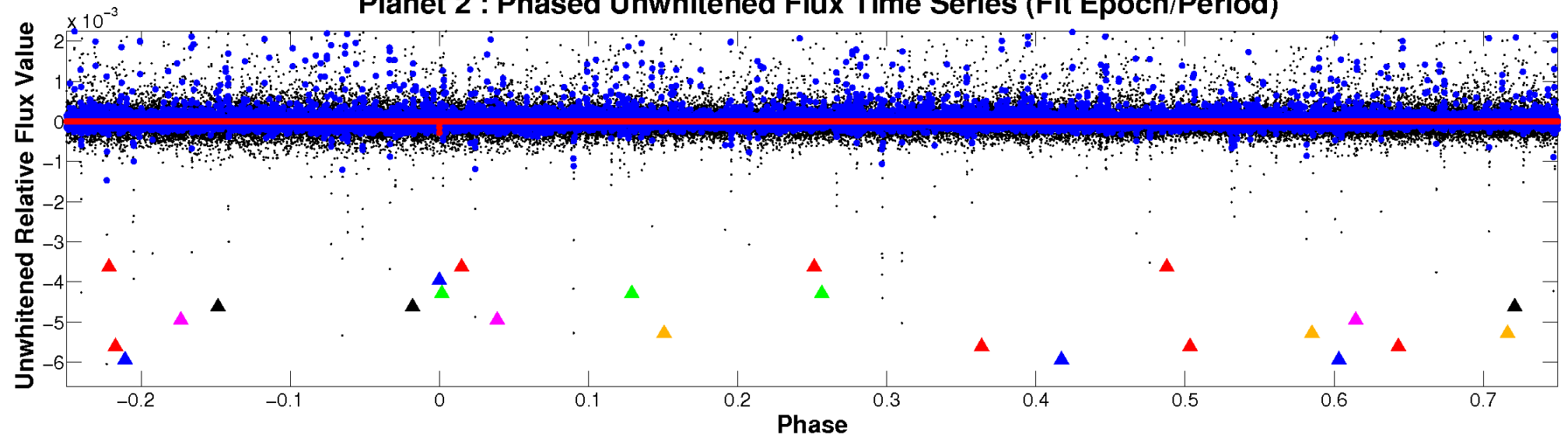
# ALT Odd/Even

TCE 009093349-02

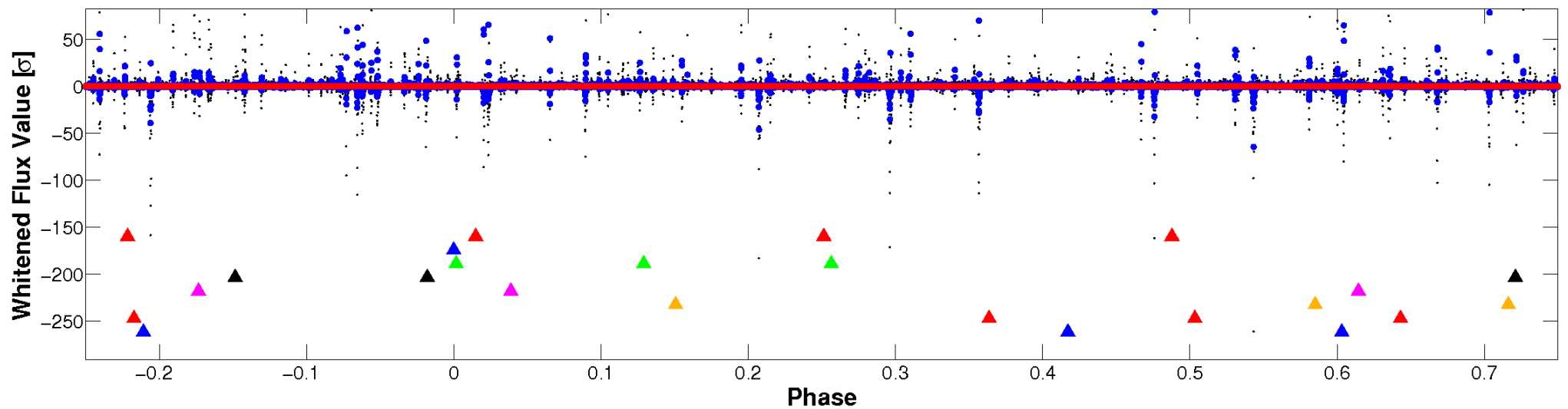


# Non-Whitened Vs. Whitened Light Curve

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

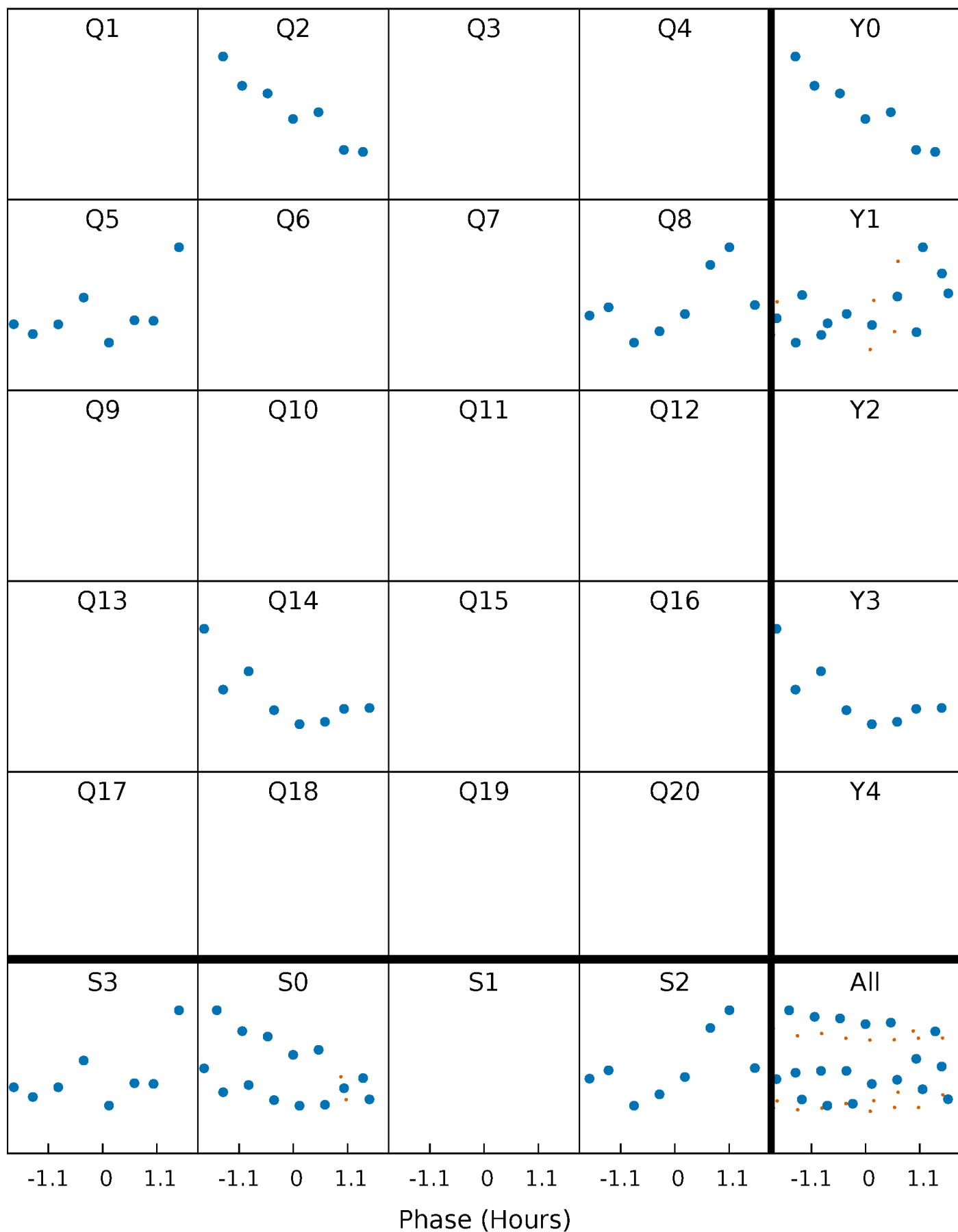


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

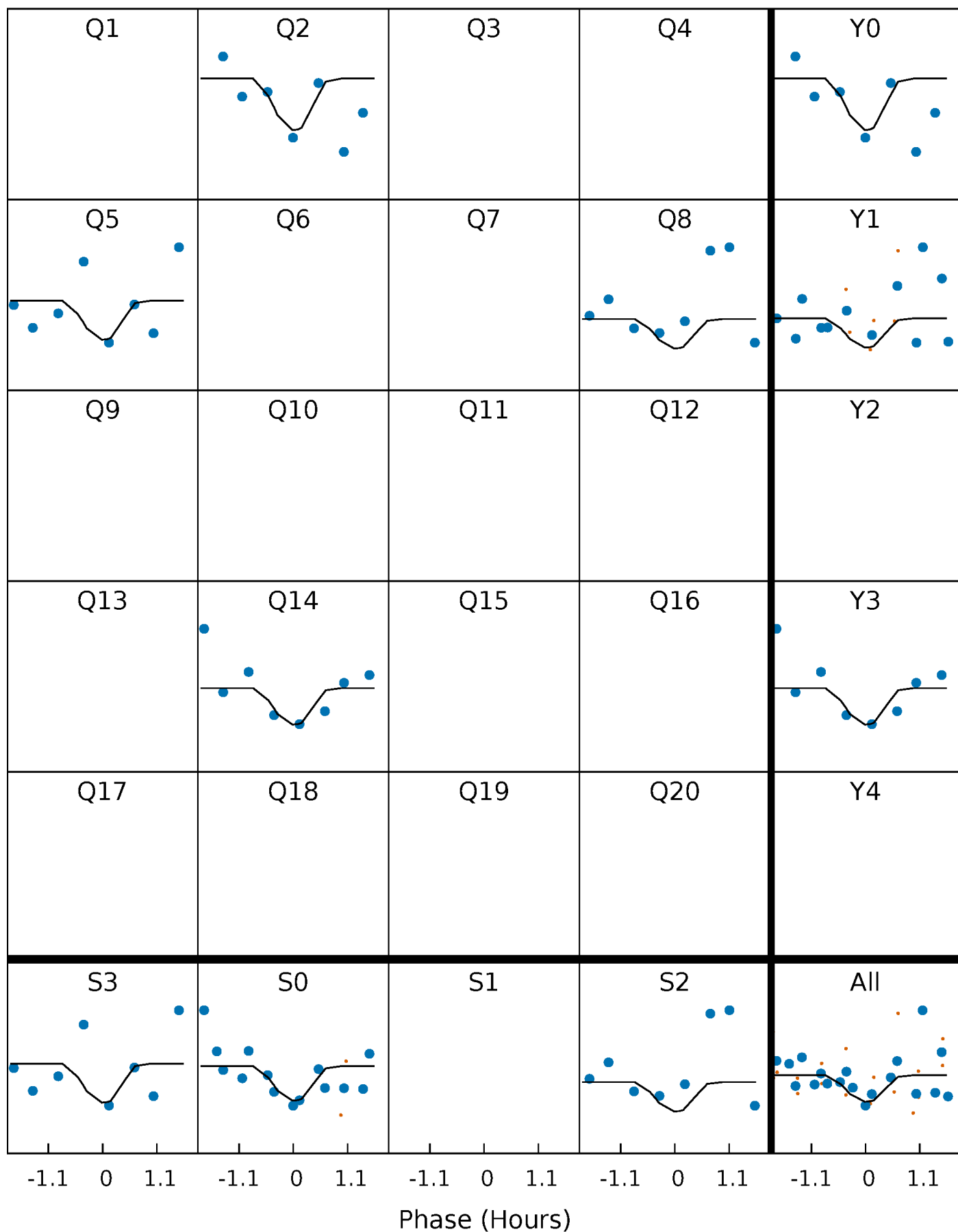
TCE 009093349-02 P=275.213963 Days  $T_0=237.892066$  (BKJD)





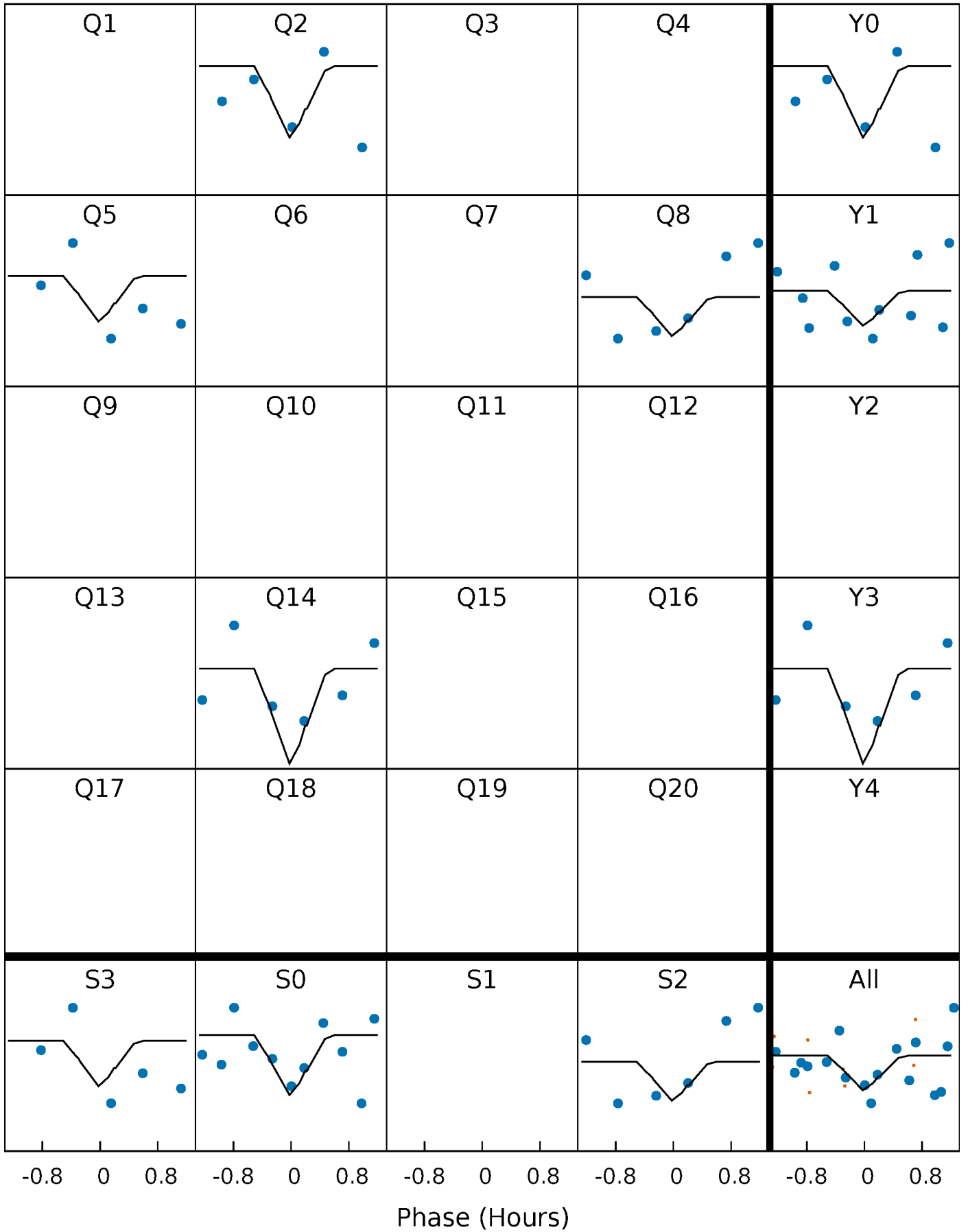
# DV Quarter-Phased Transit Curves

TCE 009093349-02 P=275.213963 Days  $T_0=237.892066$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

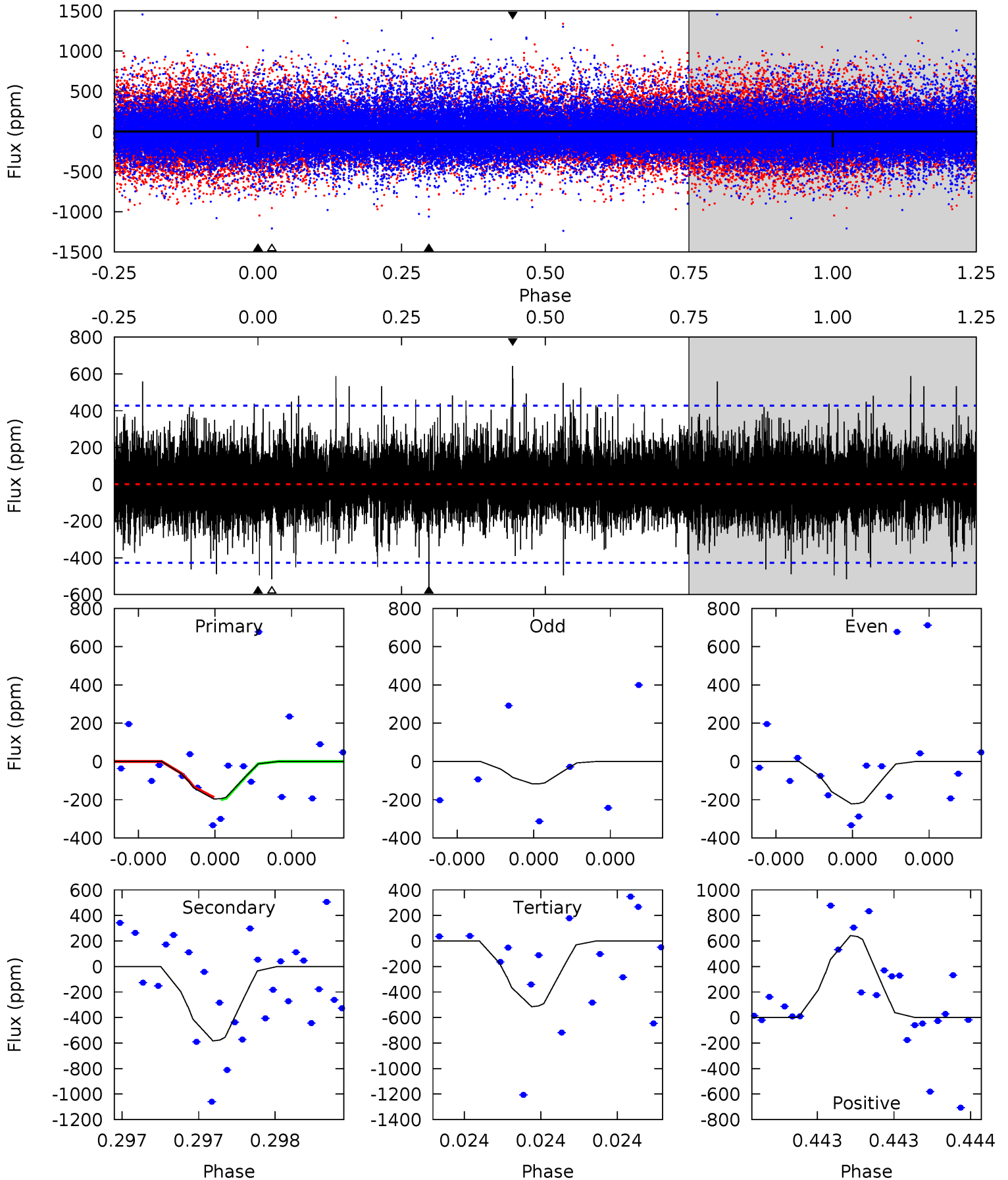
TCE 009093349-02 P=275.212808 Days  $T_0=237.892295$  (BKJD)



# DV Model-Shift Uniqueness Test

009093349-02, P = 275.213963 Days, E = 237.892066 Days

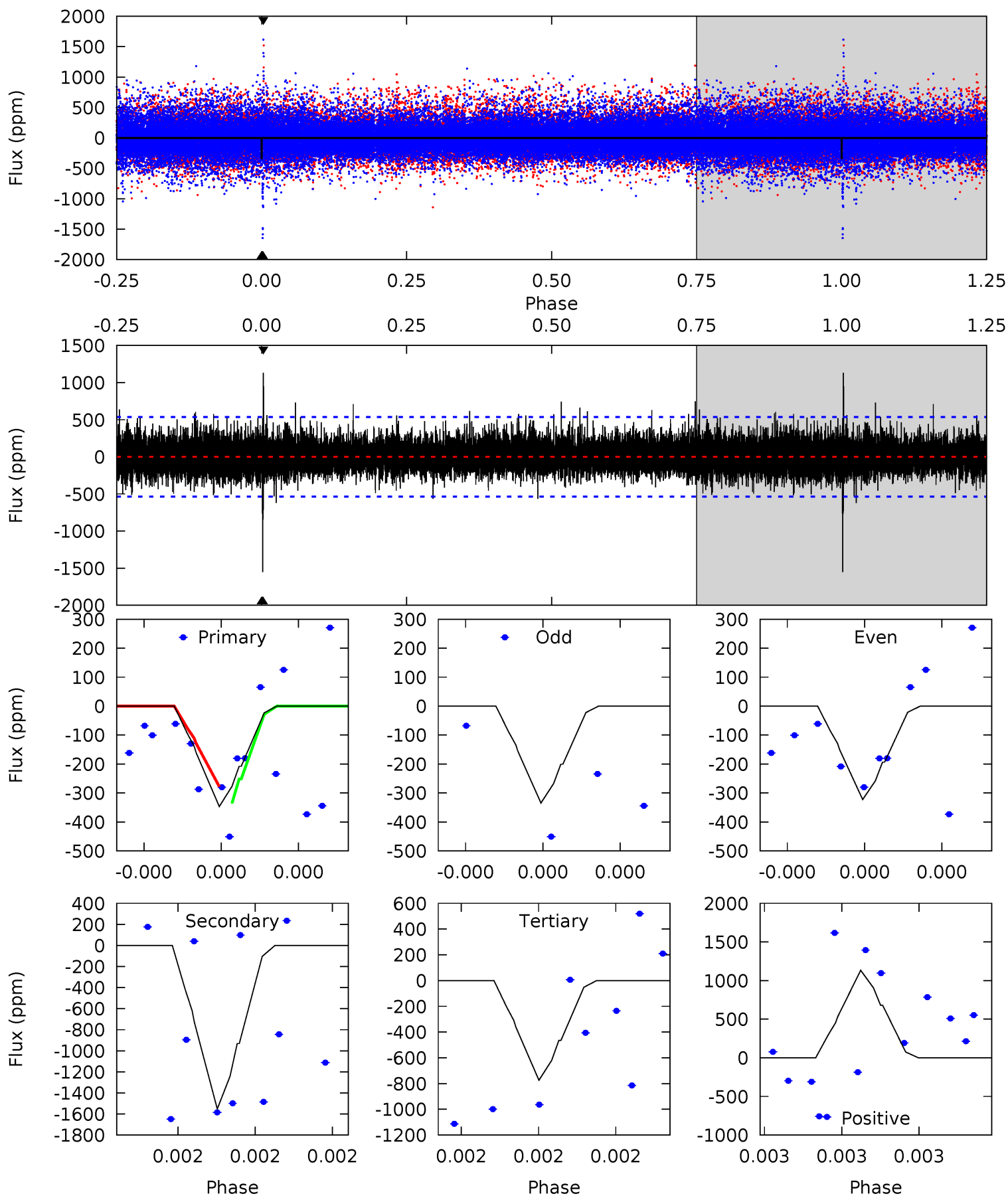
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2.65	7.85	6.94	8.65	5.75	3.75	1.45	-4.29	-6.00	0.91	-0.80	0.58	0.97	0.52	0.08



# Alt Model-Shift Uniqueness Test

009093349-02, P = 275.212808 Days, E = 237.892295 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
3.76	16.8	8.40	12.3	5.81	3.83	1.49	-4.64	-8.53	8.43	4.54	0.05	0.98	0.42	0.32



### Stellar Parameters For KIC 009093349

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5130^{+154}_{-169}$	$3.434^{+0.497}_{-0.213}$	$-0.020^{+0.250}_{-0.300}$	$4.000^{+1.136}_{-2.109}$	$1.585^{+0.213}_{-0.639}$	$0.035^{+0.170}_{-0.018}$
	+3%/-3%	+14%/-6%	+1250%/-1500%	+28%/-53%	+13%/-40%	+488%/-52%
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 009093349-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-583 \pm 74$	$33.90^{+43.89}_{-23.91}$	$637^{+61}_{-93}$	$3248^{+1692}_{-628}$	$248^{+2421}_{-197}$
Alt.	$-1552 \pm 92$	$33.88^{+42.13}_{-22.73}$	$635^{+63}_{-89}$	$3776^{+2119}_{-803}$	$648^{+5742}_{-525}$

$T_{max}$  = 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

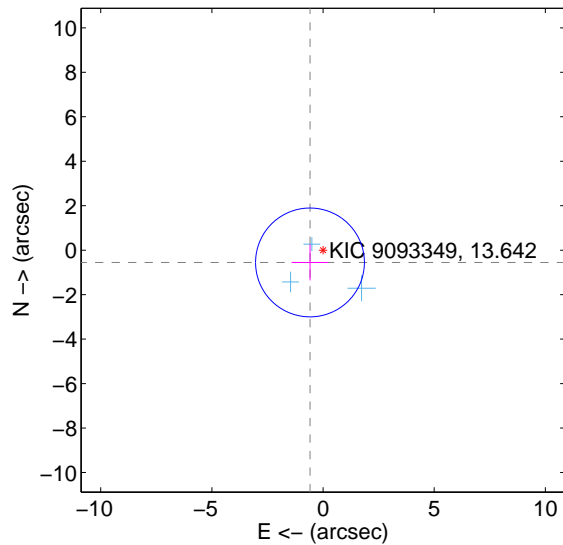
Supplemental centroid analysis for 009093349-02. Kepler magnitude: 13.64. Transit SNR 2.22

There are 3 quarters with good PRF difference image offsets

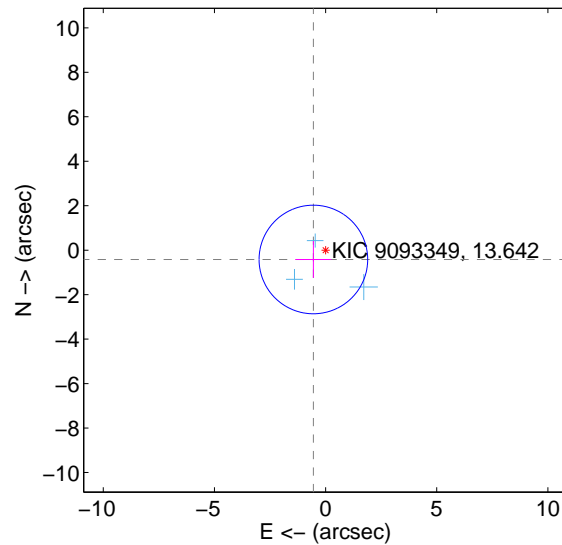
The direct PRF centroid is offset from the target star catalog position by about 0.17 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.805 \pm 0.816$	0.99	$0.587 \pm 0.824$	$-0.552 \pm 0.806$
PRF-fit source offset from KIC position	$0.690 \pm 0.814$	0.85	$0.549 \pm 0.804$	$-0.418 \pm 0.831$
photometric centroid source offset	$0.18 \pm 2.96$	0.06	$-0.11 \pm 2.67$	$-0.14 \pm 3.16$

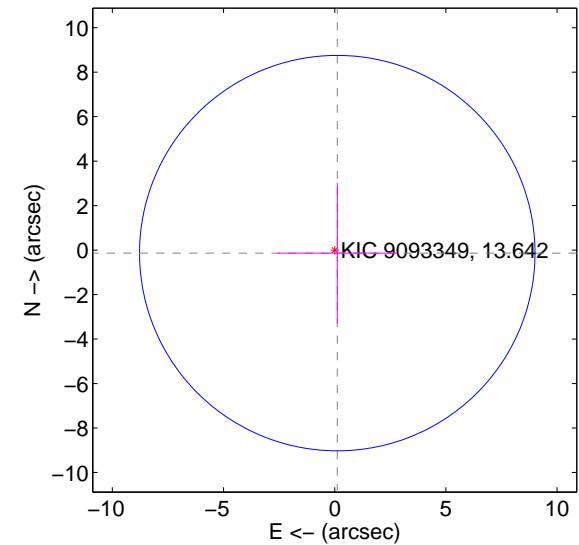
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

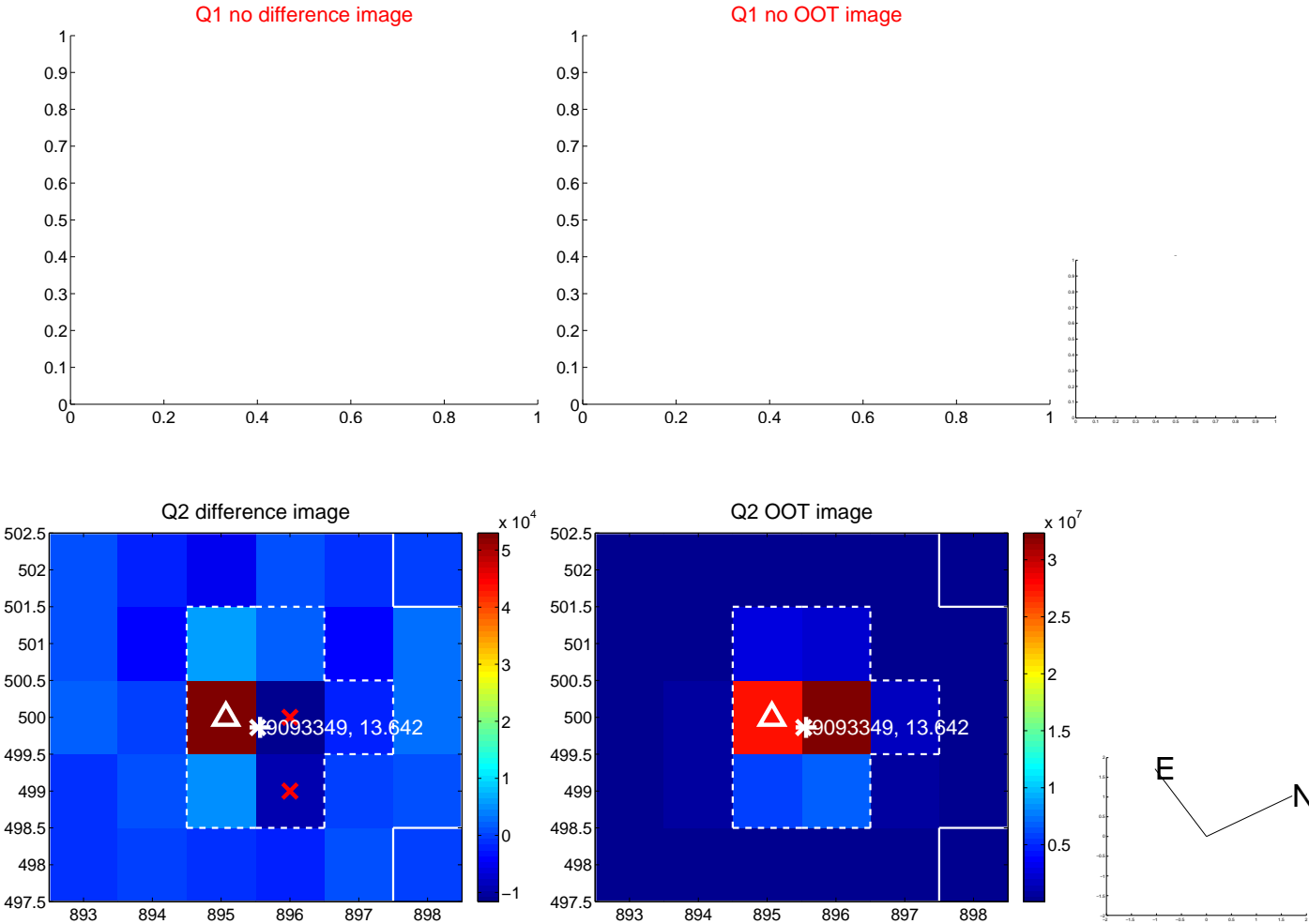


offset from photometric centroids

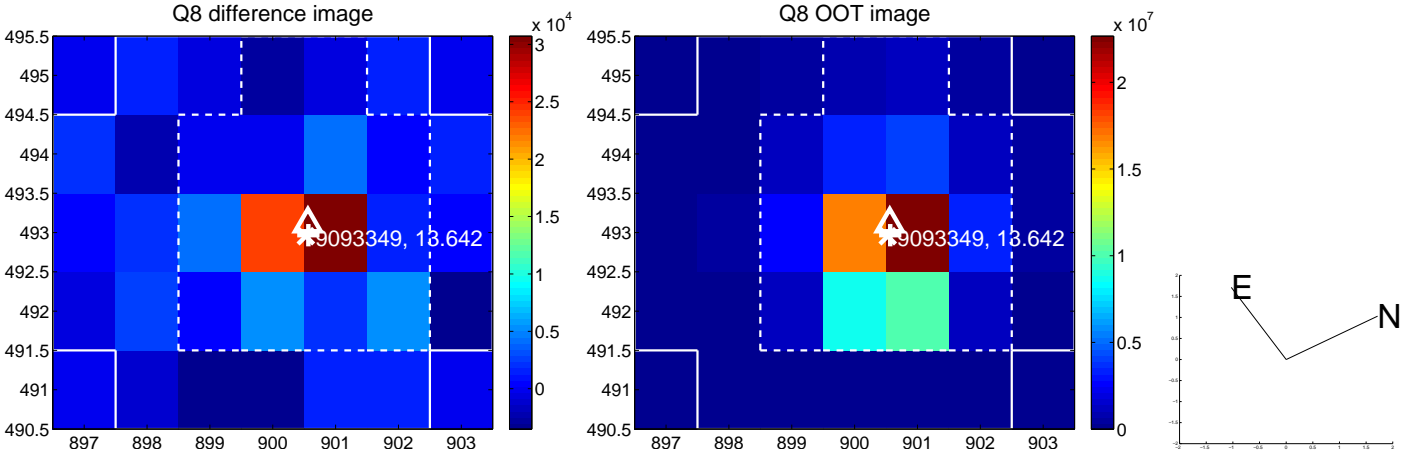
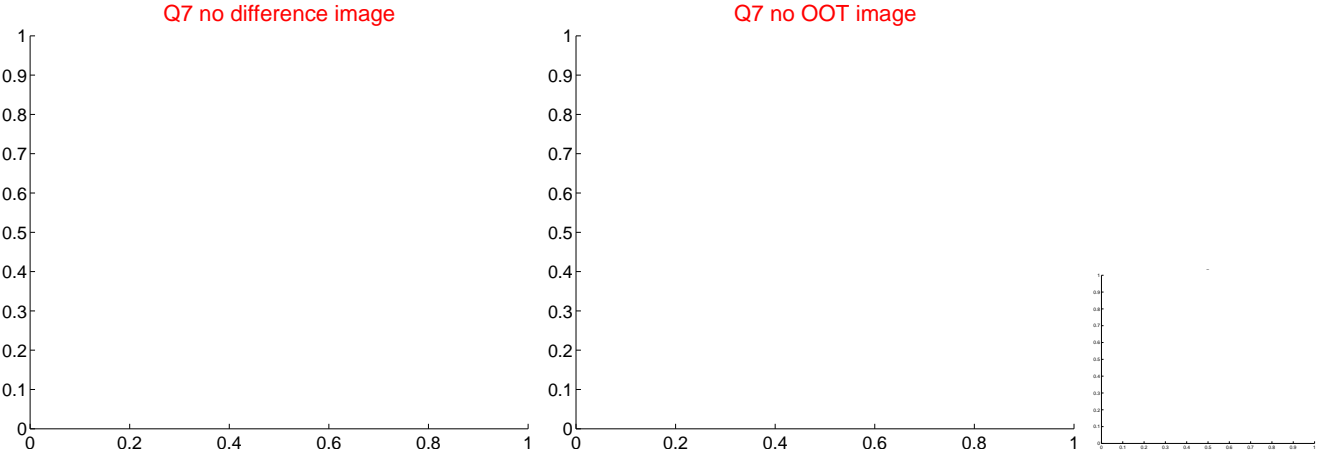
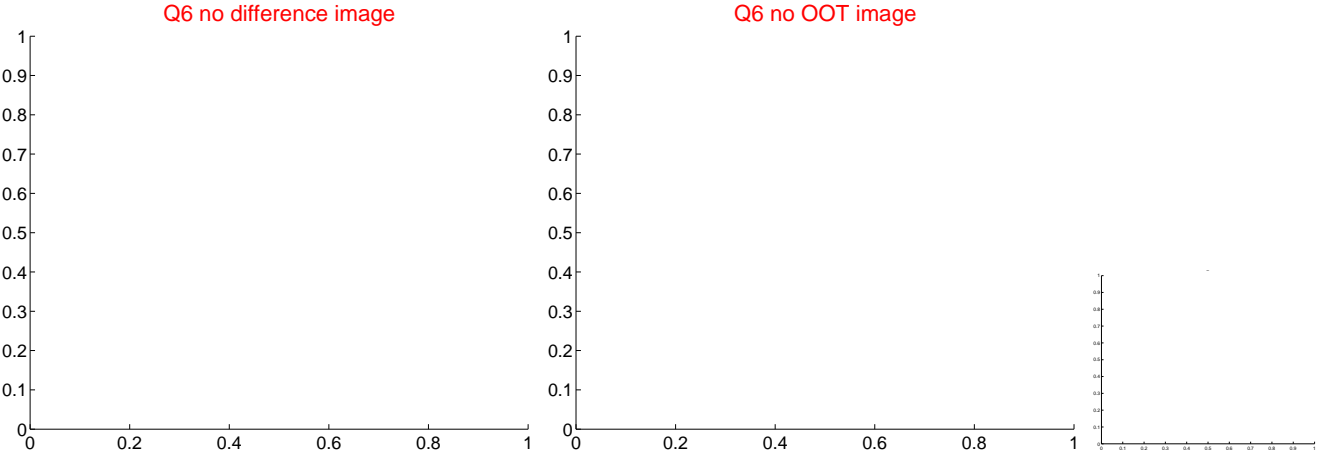
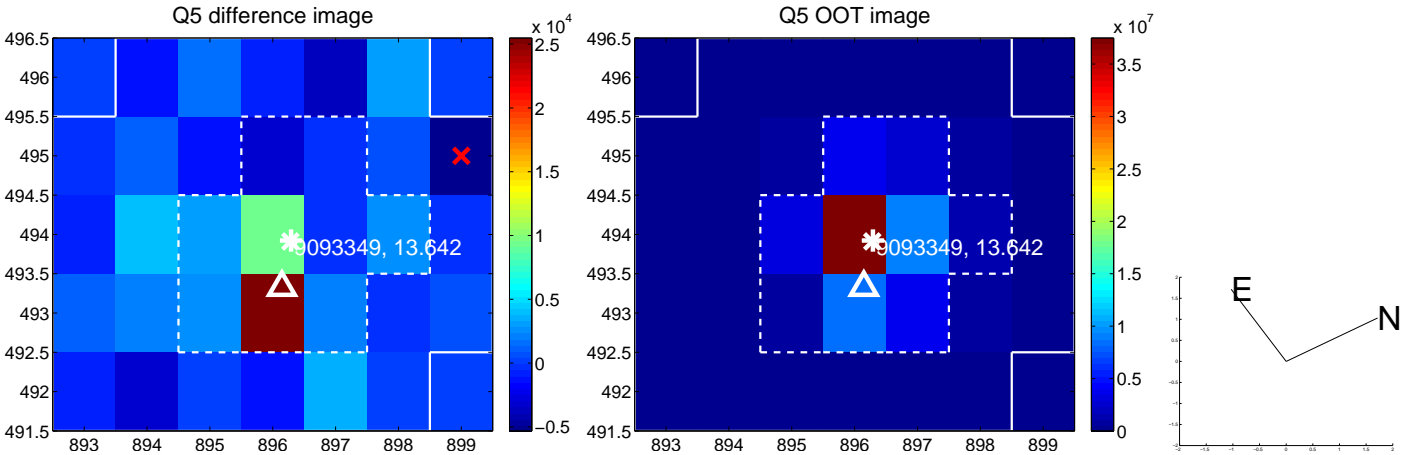


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

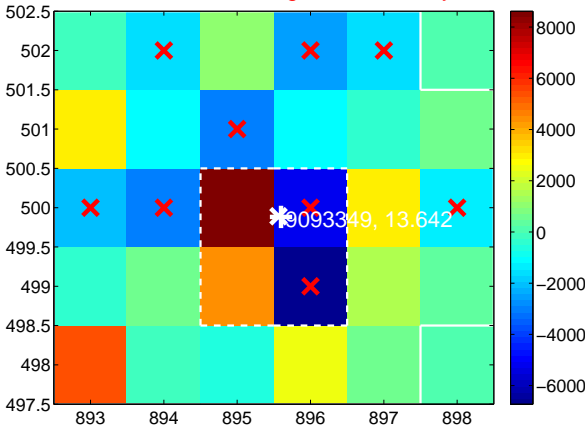
Q13 no difference image



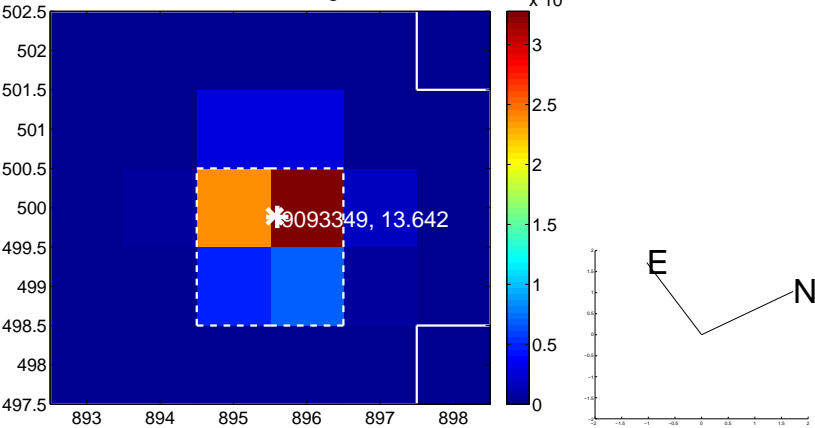
Q13 no OOT image



Q14 difference image. Poor Quality



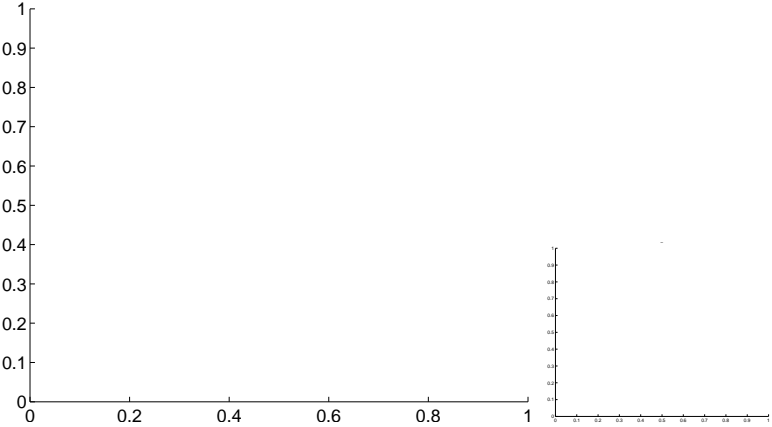
Q14 OOT image



Q15 no difference image



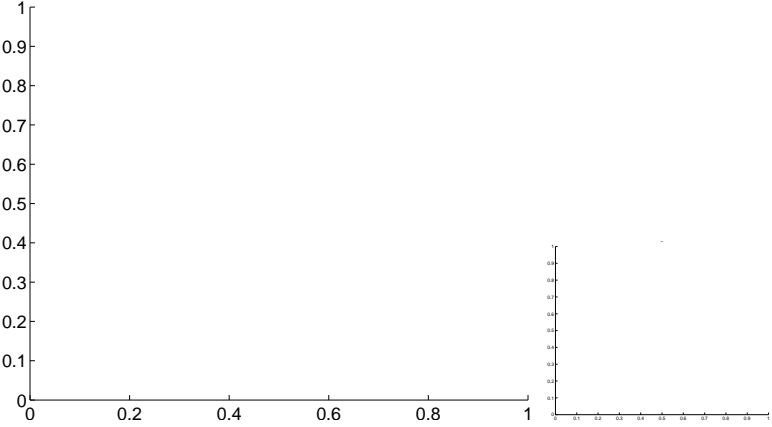
Q15 no OOT image



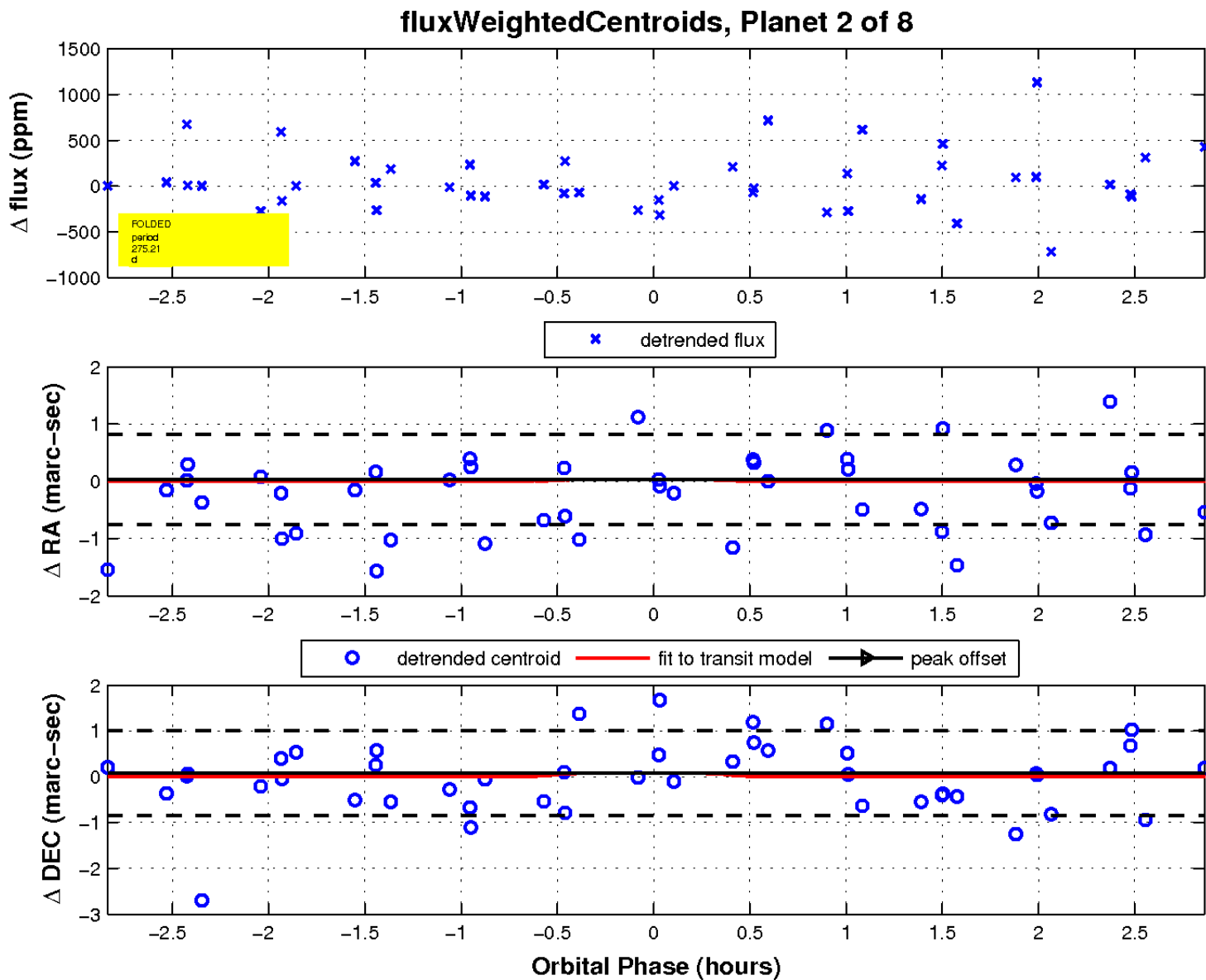
Q16 no difference image



Q16 no OOT image

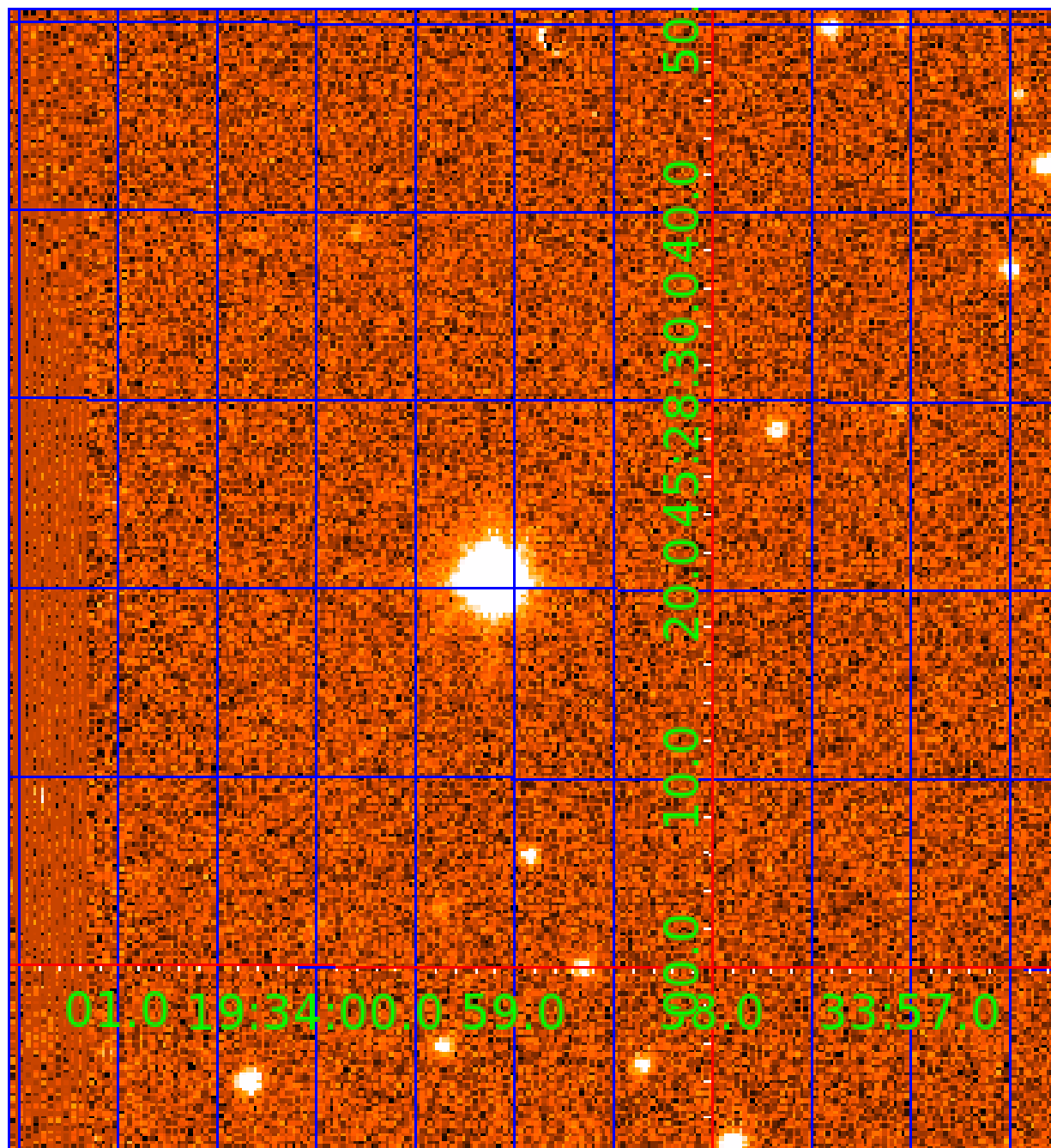


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



# UKIRT Image

Declination



# KIC 009093349

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009093349-01	OBS	No	340.285729	452.139044	2222.4	5.839	18.3	12.6	4.00	5130	20.53	8.02
009093349-02	OBS	No	275.213963	237.892066	290.9	0.967	19.3	2.2	4.00	5130	7.24	10.65
009093349-03	OBS	No	585.487777	238.354648	1271.6	17.182	17.7	5.4	4.00	5130	14.10	3.89
009093349-04	OBS	No	514.521268	508.165431	1341.0	8.308	20.6	7.6	4.00	5130	19.06	4.62
009093349-05	OBS	No	492.040609	523.789347	662.0	8.930	44.0	3.7	4.00	5130	10.06	4.91
009093349-06	OBS	No	394.770320	435.034848	485.5	2.295	12.0	3.5	4.00	5130	10.18	6.58
009093349-07	OBS	No	313.667348	337.970923	926.1	10.068	14.2	6.6	4.00	5130	11.83	8.94
009093349-08	OBS	No	499.232738	455.096850	301.1	12.500	12.5	-1.0	4.00	5130	6.75	4.81

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009093349-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009093349-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
009093349-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_ZUMA—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
009093349-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_ZUMA—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
009093349-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
009093349-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009093349-07	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009093349-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—ALL_TRANS_CHASES—CENT_NOFITS

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

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

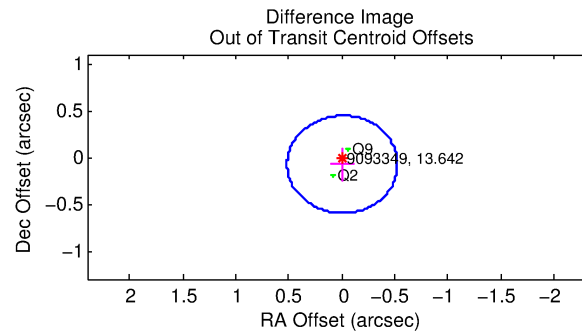
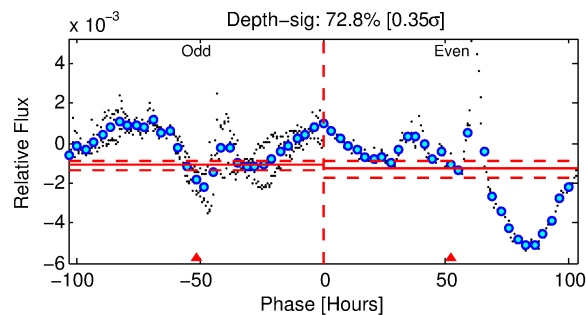
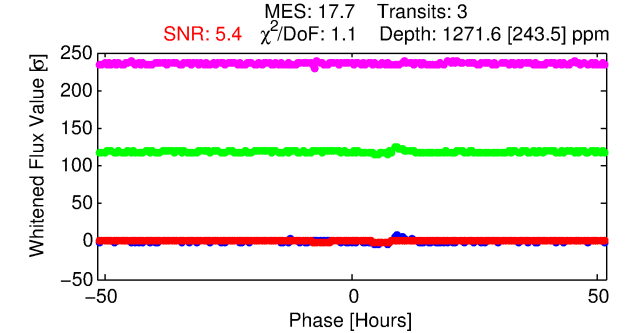
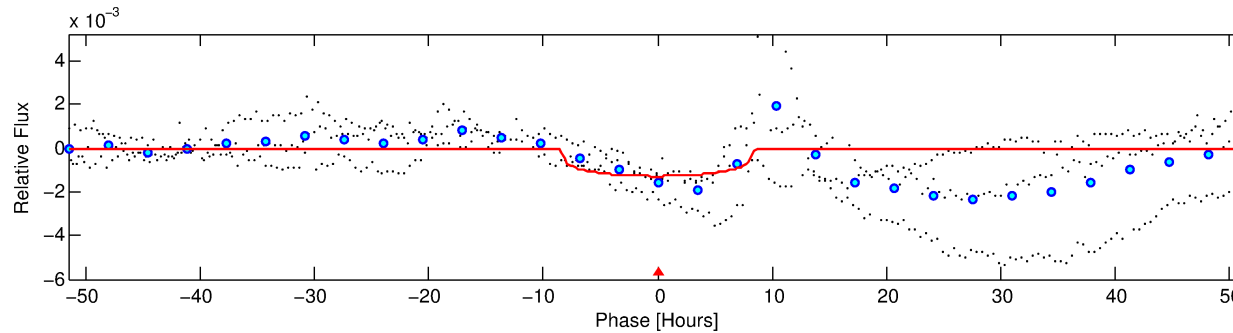
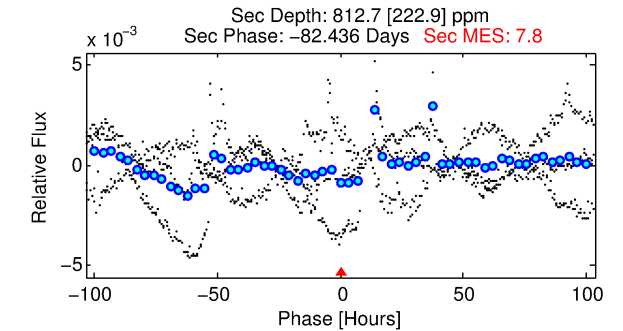
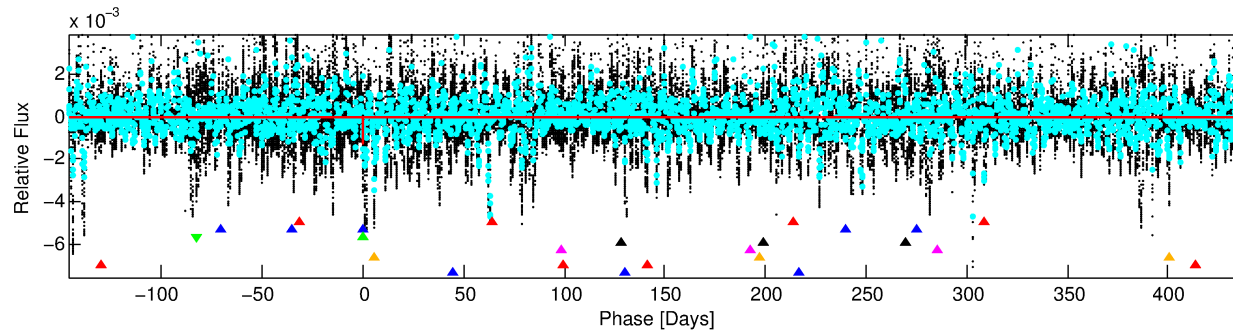
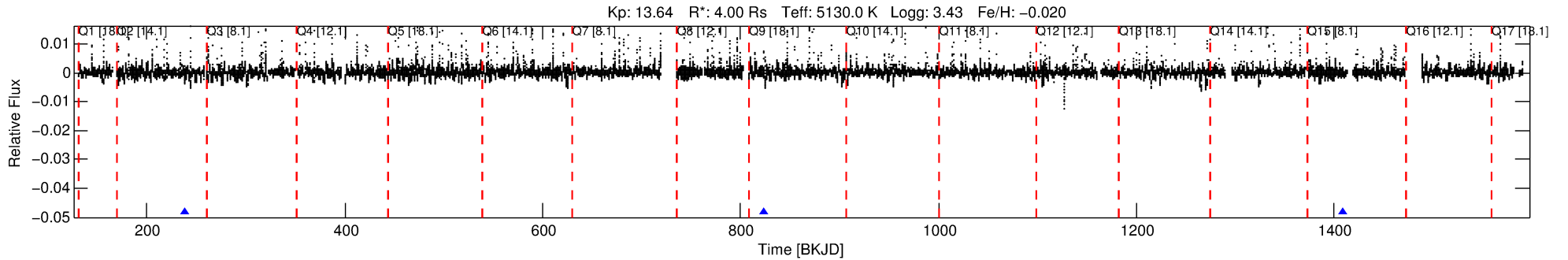
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 009093349-03

No Significant Match Found

# DV One-Page Summary

KIC: 9093349 Candidate: 3 of 8 Period: 585.488 d



## DV Fit Results:

Period = 585.48778 [0.00650] d  
Epoch = 238.3546 [0.0089] BKJD  
Rp/R\* = 0.0323 [0.0086]  
a/R\* = 253.54 [215.24]  
b = 0.34 [2.22]  
Seff = 3.89 [3.31]  
Teq = 358 [76] K  
Rp = 14.10 [8.33] Re  
a = 1.5974 [0.8286] AU  
Ag = 5736.46 [5919.60] [0.97σ]  
Teffp = 4819 [739] K [6.00σ]

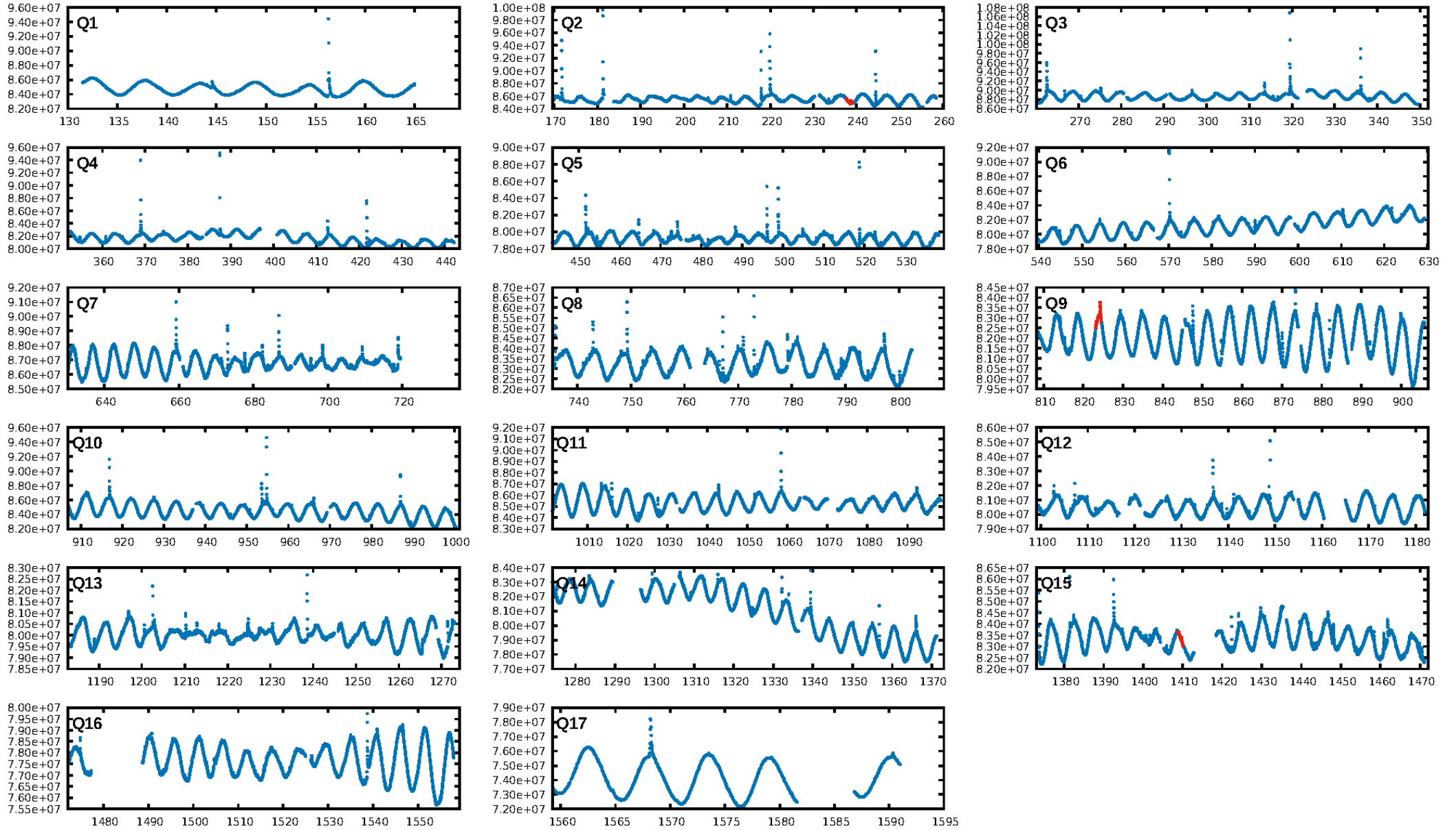
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [89.24σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 14.6%  
ModelChiSquareGof-sig: 88.7%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 0.1221  
Centroid-sig: 2.8%  
Centroid-so: 0.482 arcsec [1.99σ]  
OotOffset-rm: 0.076 arcsec [0.44σ]  
KicOffset-rm: 0.039 arcsec [0.27σ]  
OotOffset-st: 1/0/0/1 [2]  
KicOffset-st: 1/0/0/1 [2]  
DiffImageQuality-fgm: 0.50 [1/2]  
DiffImageOverlap-fno: 0.50 [1/2]

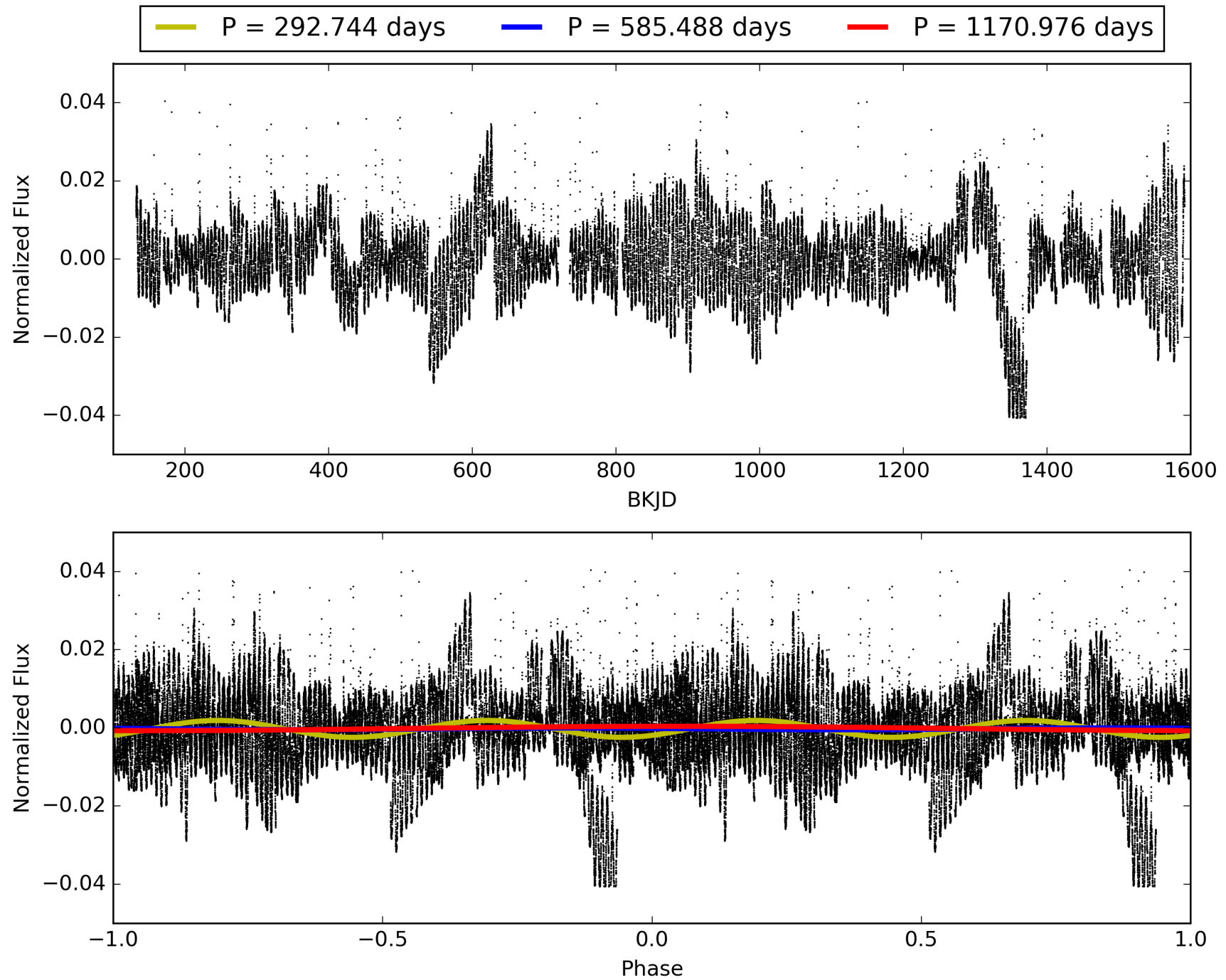
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 23:30:49 Z

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

# TCE 009093349-03, PDC Light Curves



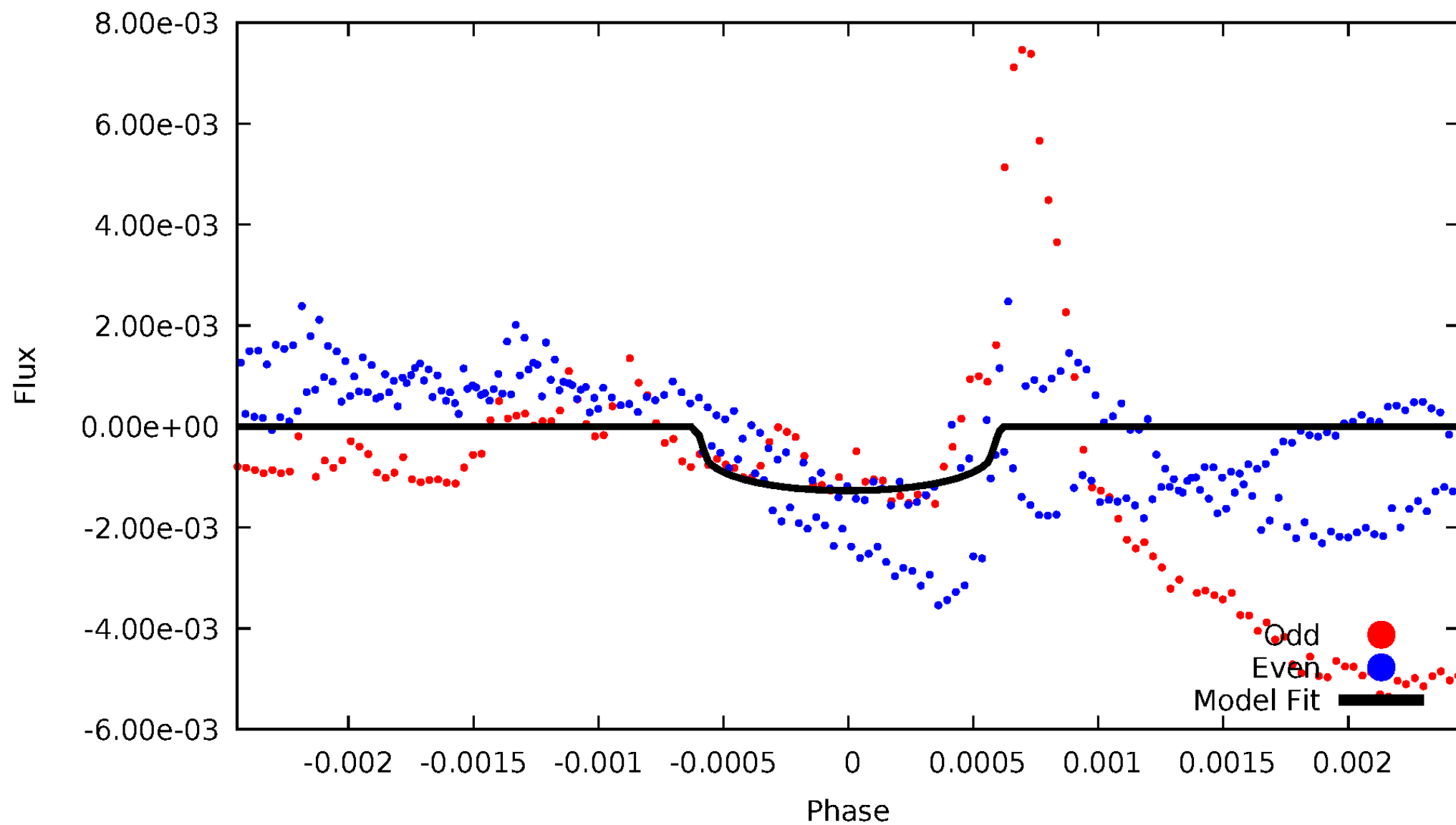
TCE 009093349-03





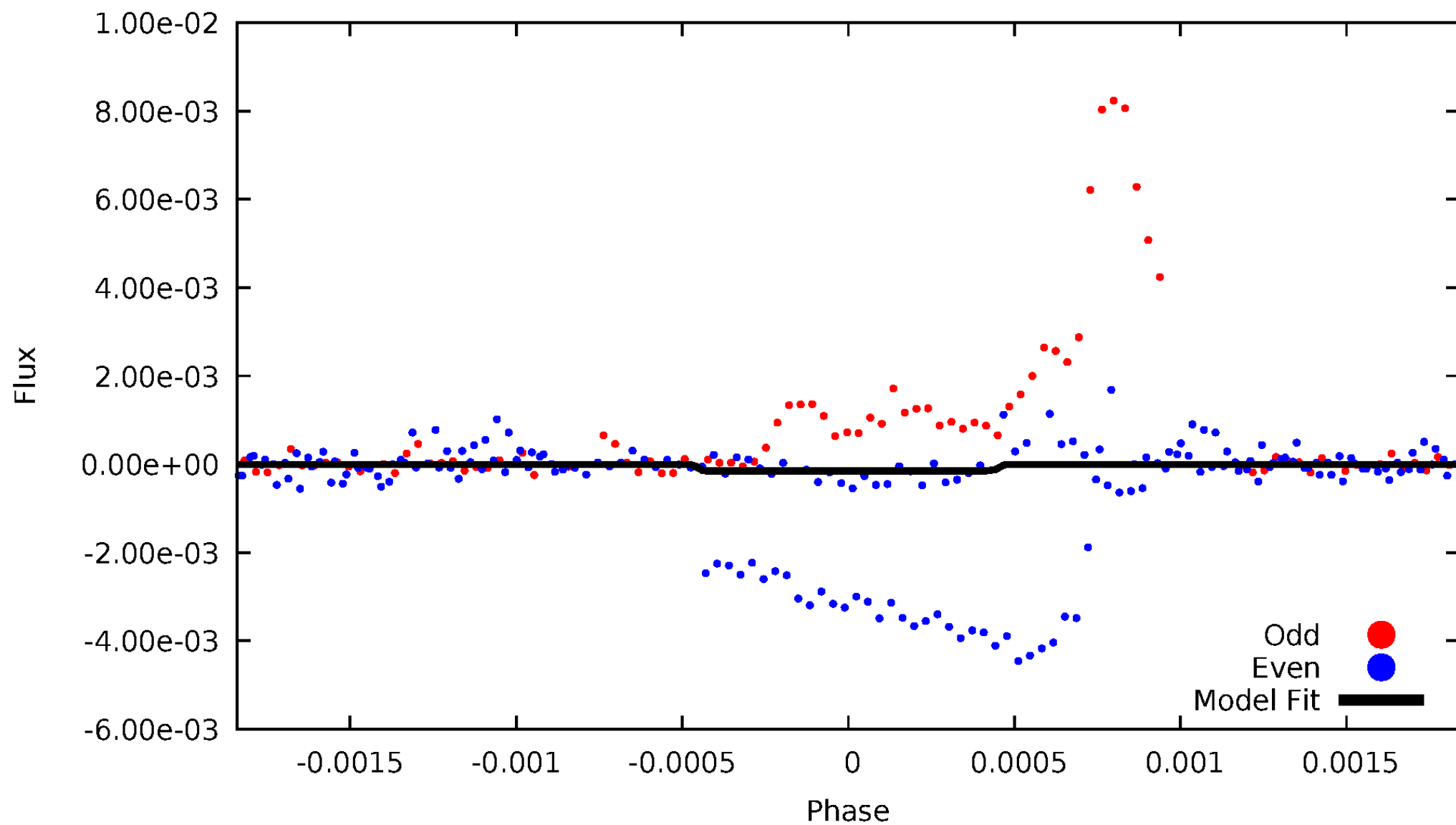
# DV Odd/Even

TCE 009093349-03



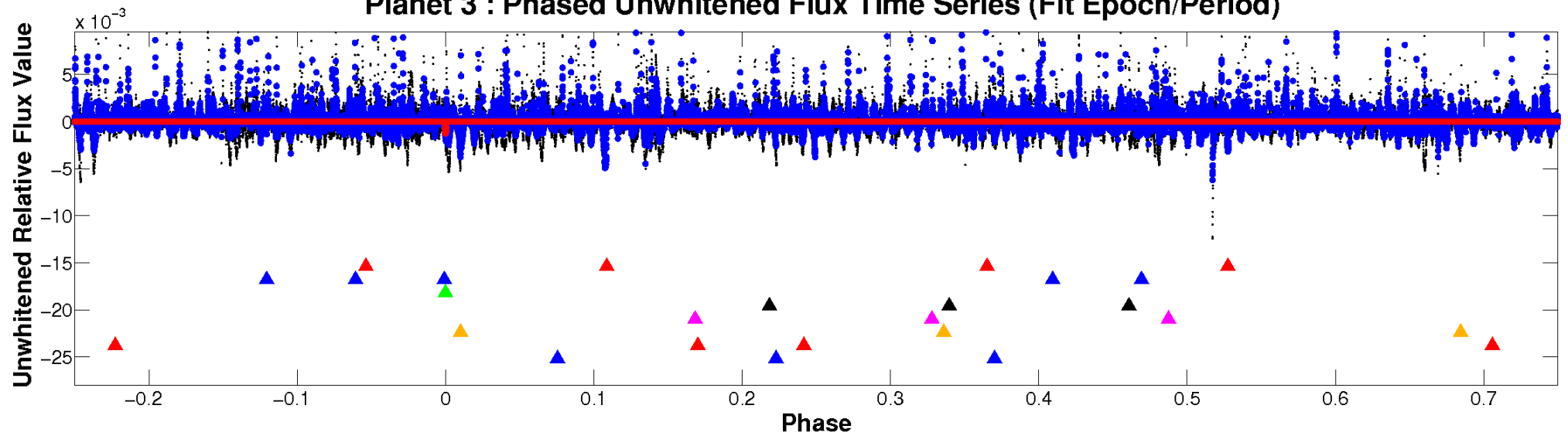
# ALT Odd/Even

TCE 009093349-03

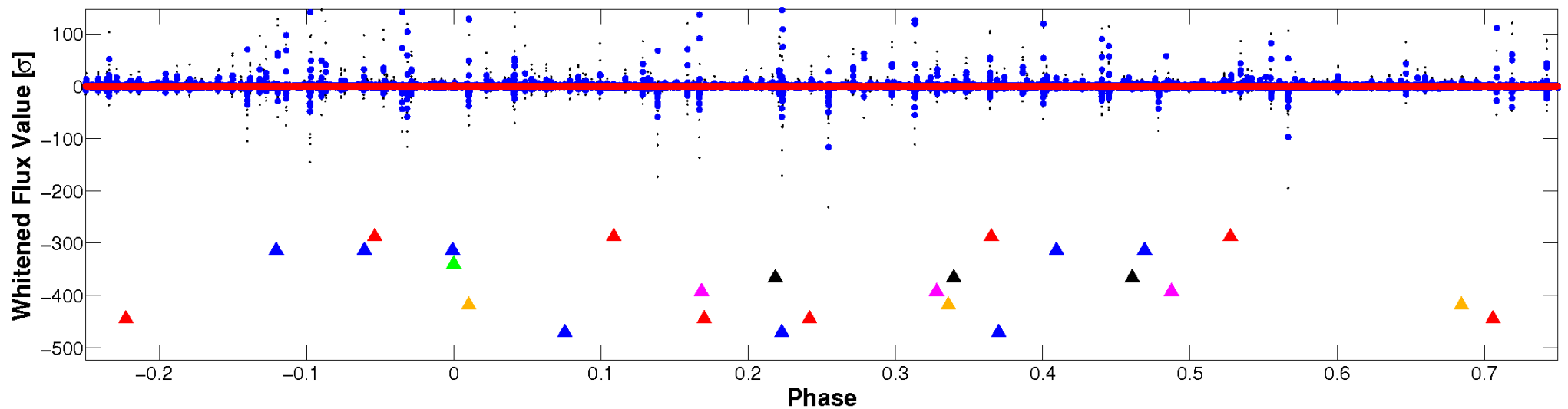


# Non-Whitened Vs. Whitened Light Curve

**Planet 3 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)**

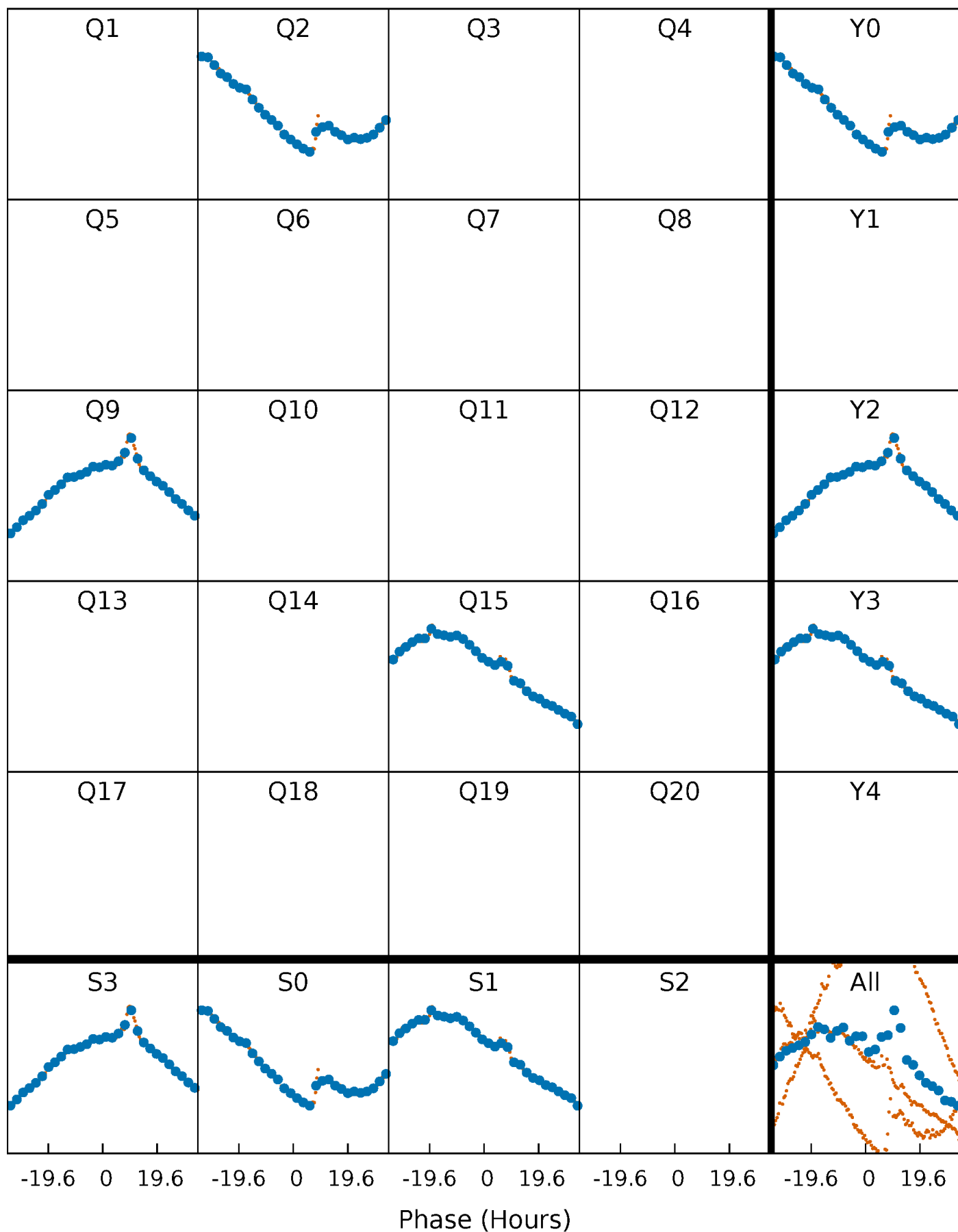


**Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



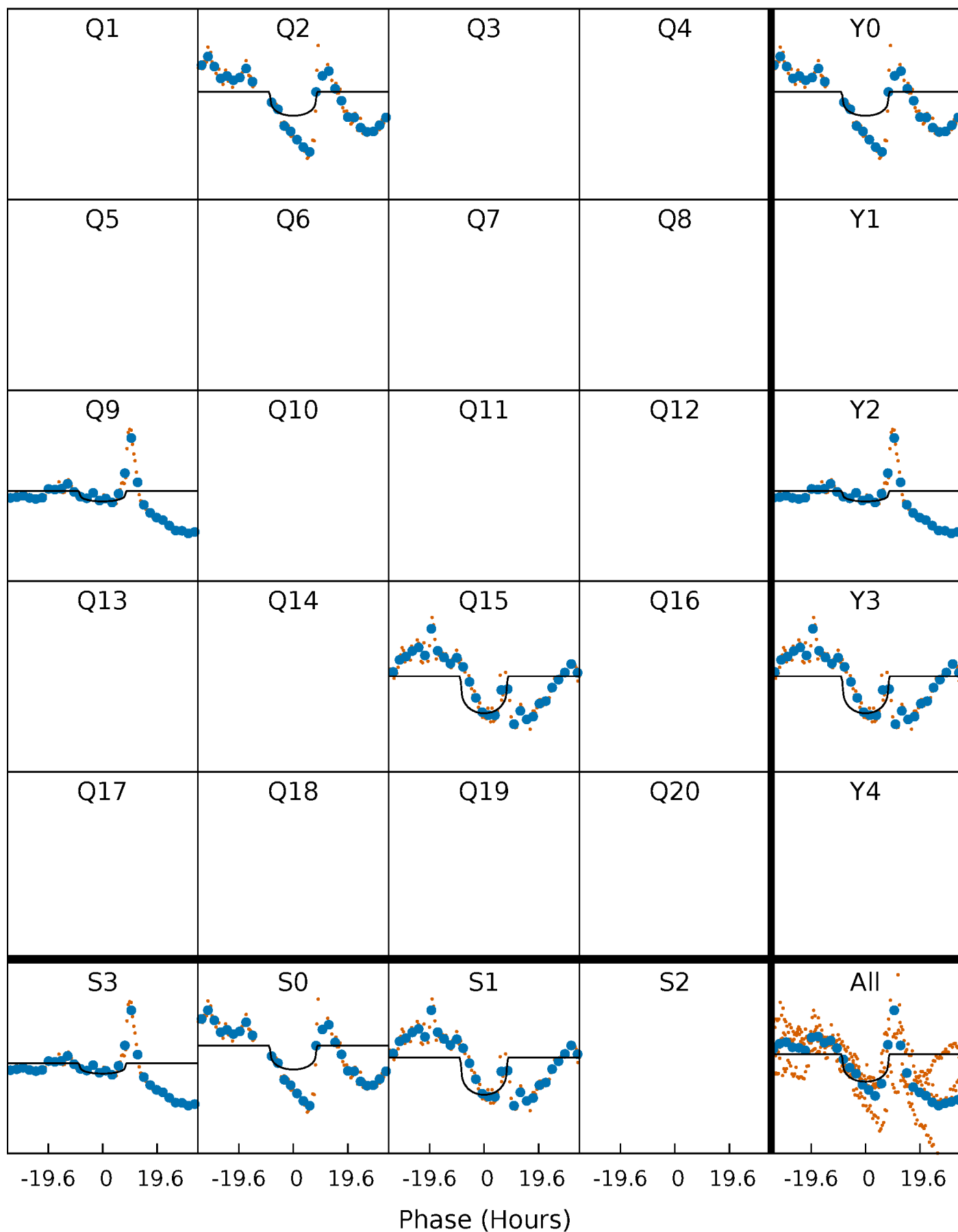
# PDC Quarter-Phased Transit Curves

TCE 009093349-03 P=585.487777 Days  $T_0=238.354648$  (BKJD)



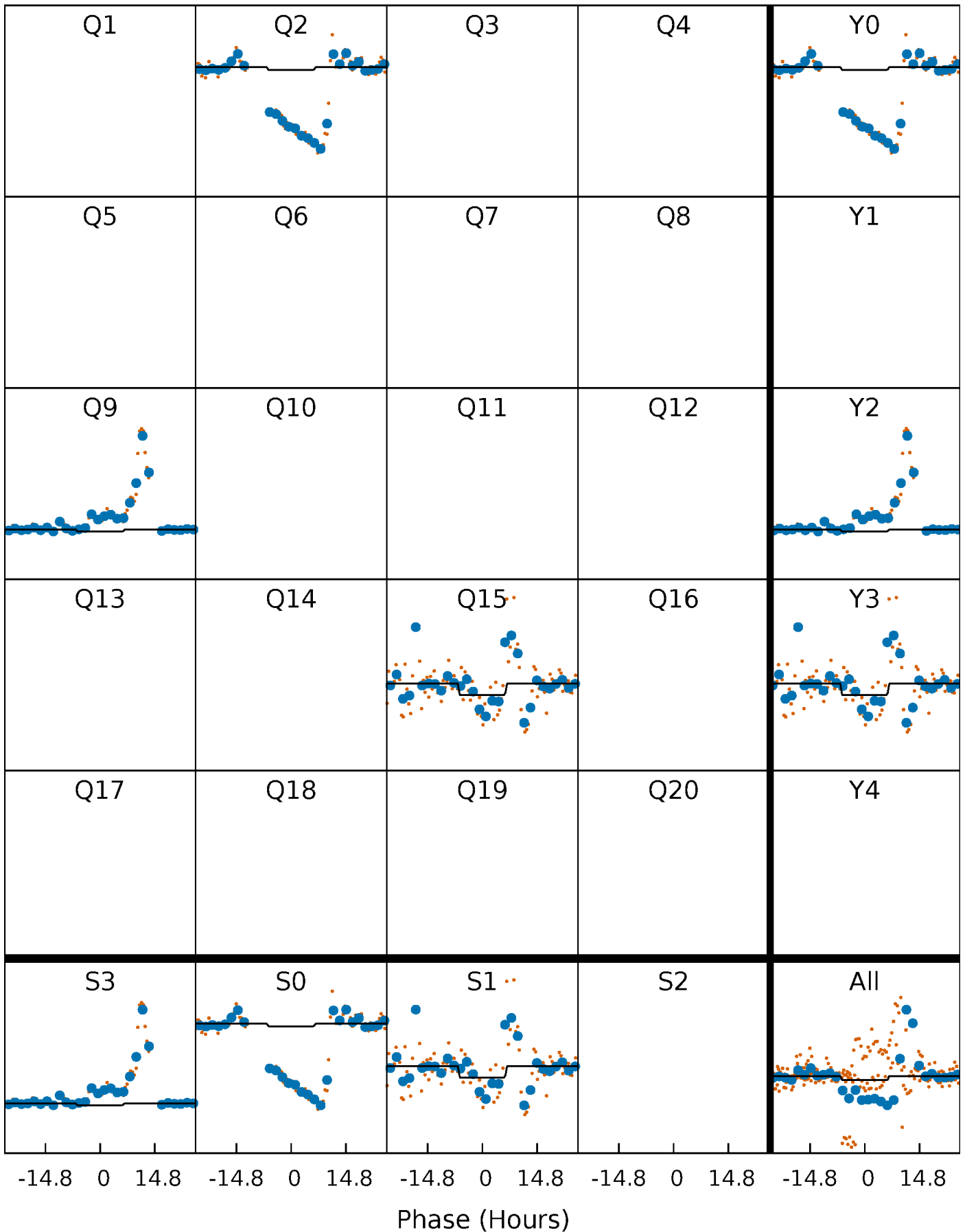
# DV Quarter-Phased Transit Curves

TCE 009093349-03     $P=585.487777$  Days     $T_0=238.354648$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

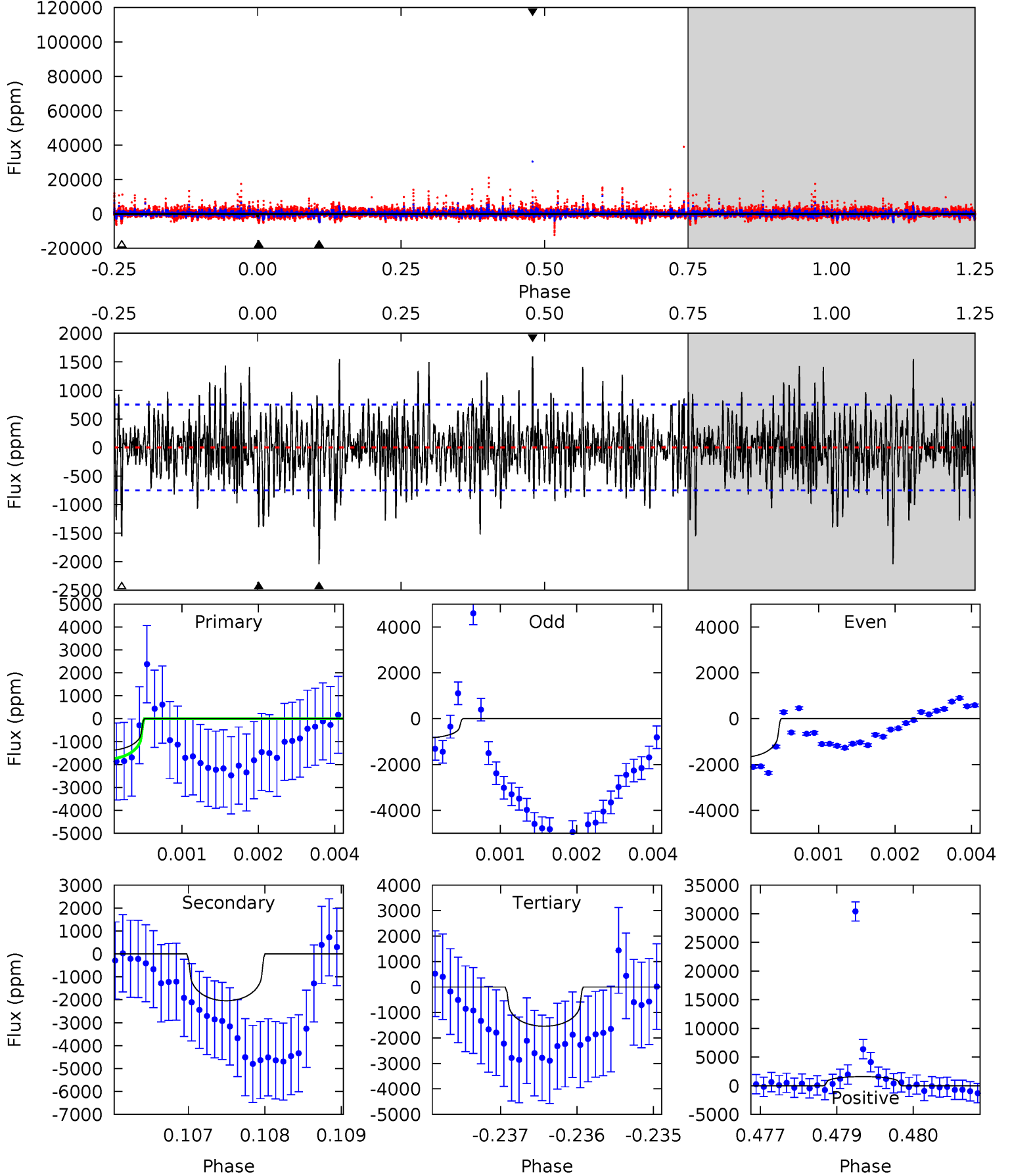
TCE 009093349-03 P=585.516851 Days  $T_0=238.265633$  (BKJD)



# DV Model-Shift Uniqueness Test

009093349-03, P = 585.487777 Days, E = 238.354648 Days

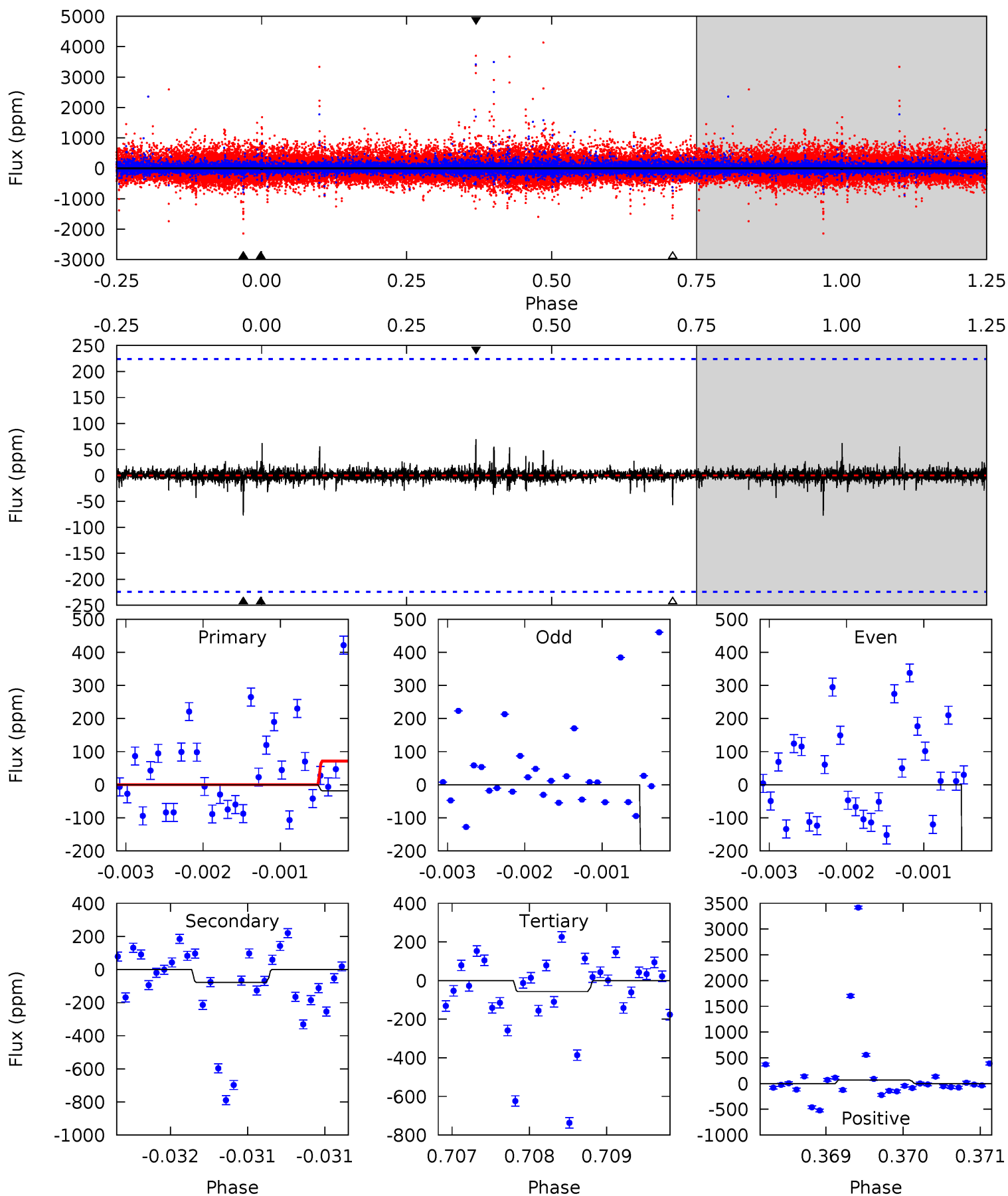
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.0	14.7	11.1	11.5	5.42	3.23	3.09	-1.05	-1.42	3.63	3.26	1.85	1.53	0.44	2.66



# Alt Model-Shift Uniqueness Test

009093349-03, P = 585.516851 Days, E = 238.265633 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
0.44	1.89	1.39	1.71	5.47	3.31	0.16	-0.95	-1.26	0.50	0.18	14.2	4.46	0.48	0.89





### Stellar Parameters For KIC 009093349

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5130^{+154}_{-169}$	$3.434^{+0.497}_{-0.213}$	$-0.020^{+0.250}_{-0.300}$	$4.000^{+1.136}_{-2.109}$	$1.585^{+0.213}_{-0.639}$	$0.035^{+0.170}_{-0.018}$
	+3%/-3%	+14%/-6%	+1250%/-1500%	+28%/-53%	+13%/-40%	+488%/-52%
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 009093349-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-2043 \pm 139$	$13.48^{+5.00}_{-5.25}$	$497^{+46}_{-67}$	$5942^{+1138}_{-648}$	$15585^{+23322}_{-7362}$
Alt.	$-77 \pm 41$	$5.24^{+3.86}_{-3.04}$	$493^{+47}_{-66}$	$4287^{+1833}_{-775}$	$3740^{+17443}_{-2844}$

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

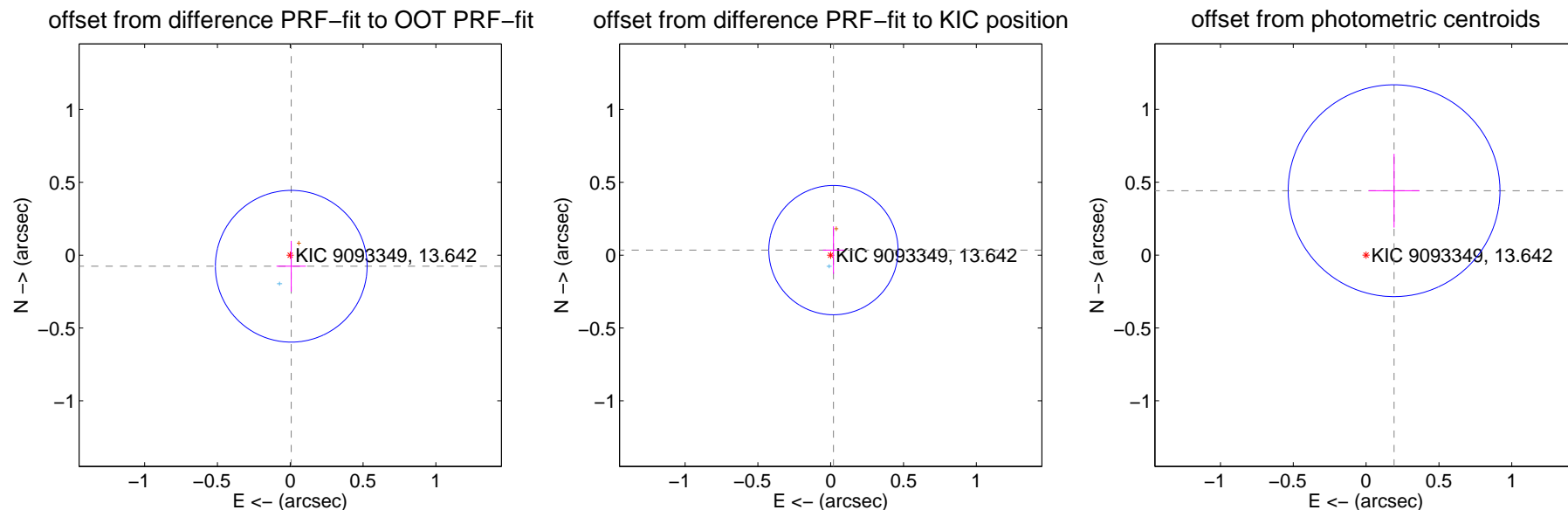
## DV Centroid Data

Supplemental centroid analysis for 009093349-03. Kepler magnitude: 13.64. Transit SNR 5.43

There are 1 quarters with good PRF difference image offsets

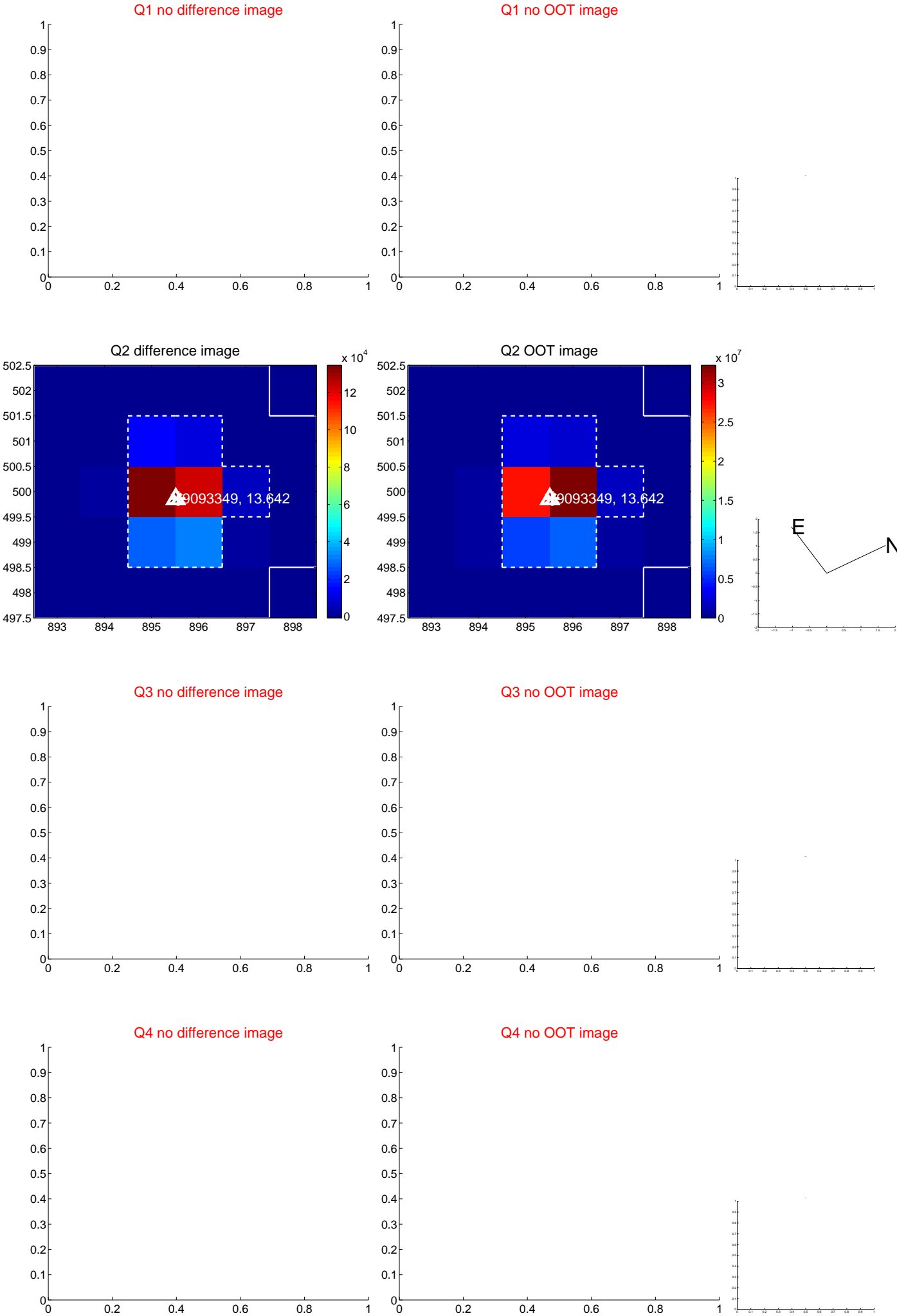
The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.076 \pm 0.174$	0.44	$-0.007 \pm 0.101$	$-0.076 \pm 0.174$
PRF-fit source offset from KIC position	$0.039 \pm 0.148$	0.27	$-0.019 \pm 0.072$	$0.035 \pm 0.164$
photometric centroid source offset	$0.48 \pm 0.24$	1.99	$-0.19 \pm 0.17$	$0.44 \pm 0.25$



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.

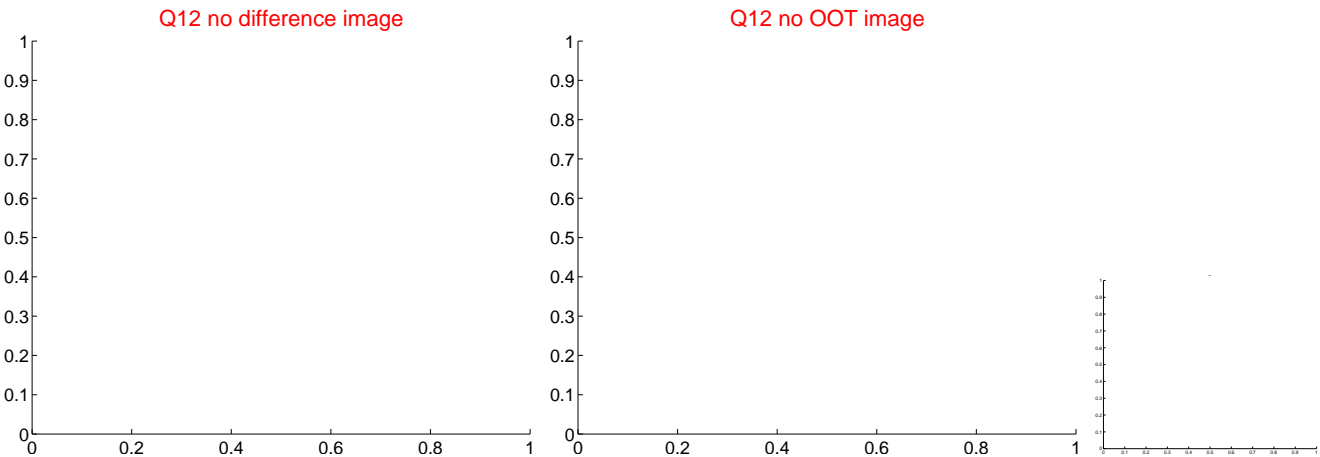
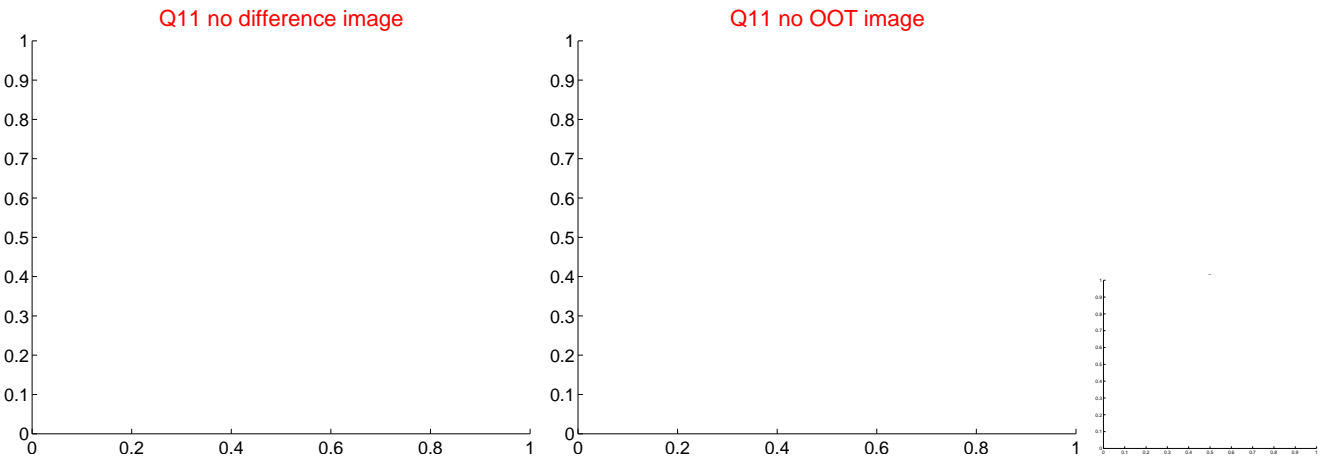
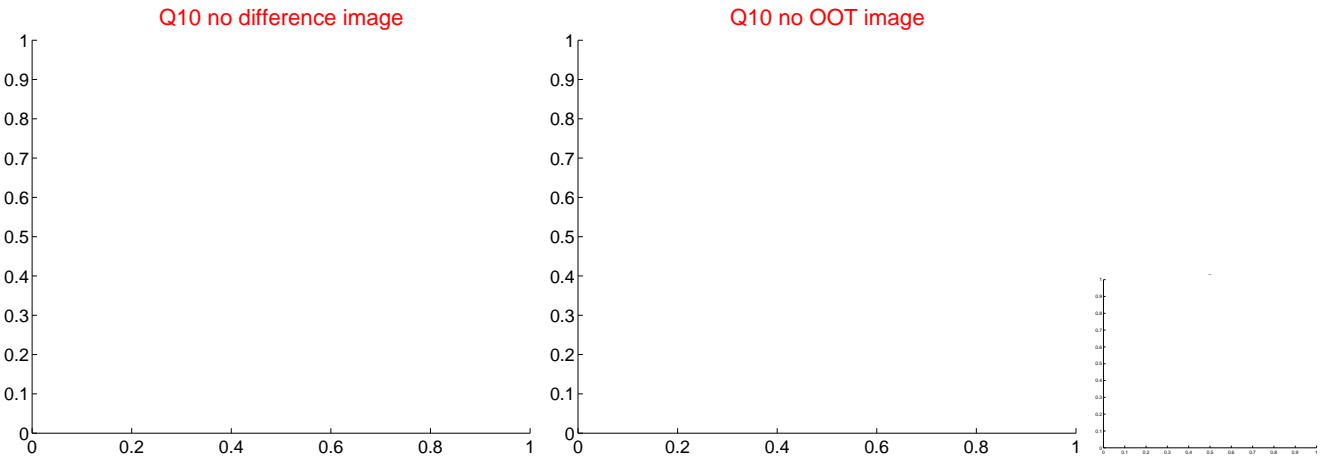
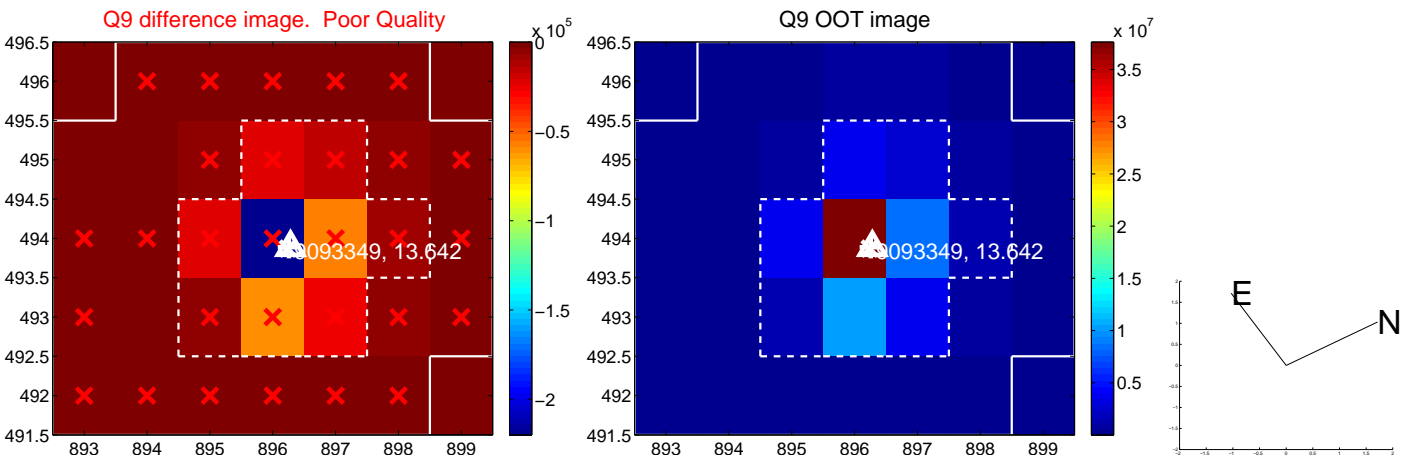
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



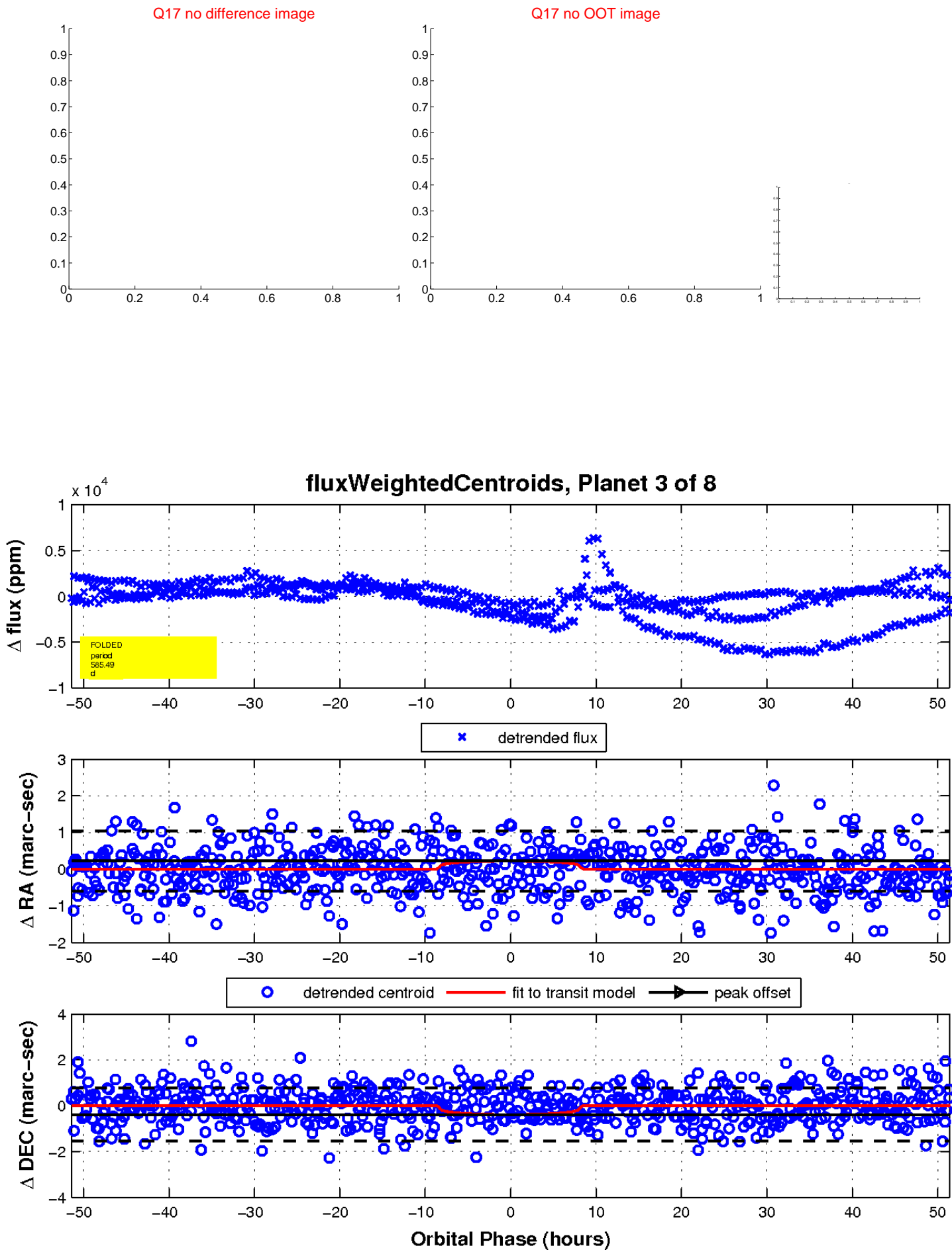
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

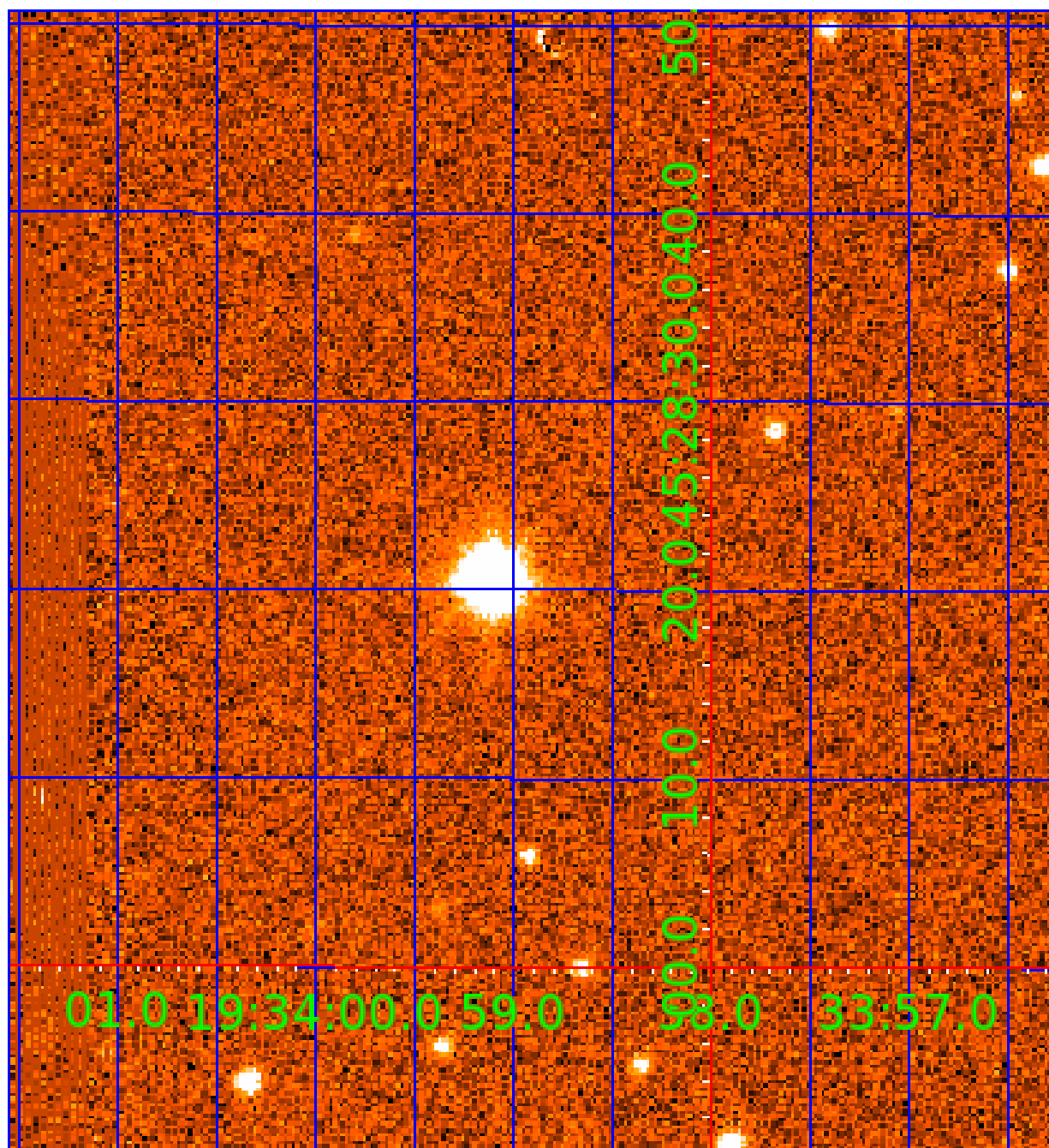


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



# UKIRT Image

Declination





# KIC 009093349

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009093349-01	OBS	No	340.285729	452.139044	2222.4	5.839	18.3	12.6	4.00	5130	20.53	8.02
009093349-02	OBS	No	275.213963	237.892066	290.9	0.967	19.3	2.2	4.00	5130	7.24	10.65
009093349-03	OBS	No	585.487777	238.354648	1271.6	17.182	17.7	5.4	4.00	5130	14.10	3.89
009093349-04	OBS	No	514.521268	508.165431	1341.0	8.308	20.6	7.6	4.00	5130	19.06	4.62
009093349-05	OBS	No	492.040609	523.789347	662.0	8.930	44.0	3.7	4.00	5130	10.06	4.91
009093349-06	OBS	No	394.770320	435.034848	485.5	2.295	12.0	3.5	4.00	5130	10.18	6.58
009093349-07	OBS	No	313.667348	337.970923	926.1	10.068	14.2	6.6	4.00	5130	11.83	8.94
009093349-08	OBS	No	499.232738	455.096850	301.1	12.500	12.5	-1.0	4.00	5130	6.75	4.81

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009093349-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009093349-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
009093349-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_ZUMA—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
009093349-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_ZUMA—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
009093349-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
009093349-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009093349-07	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009093349-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—ALL_TRANS_CHASES—CENT_NOFITS

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

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

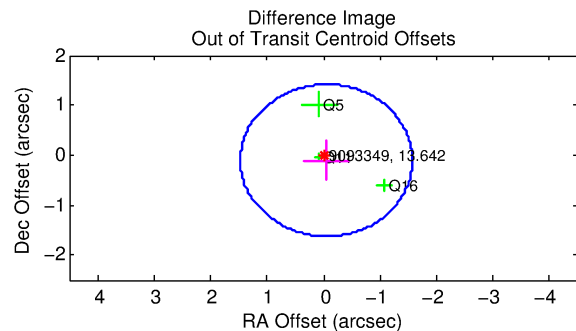
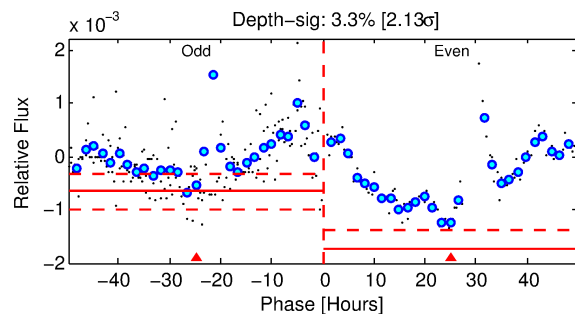
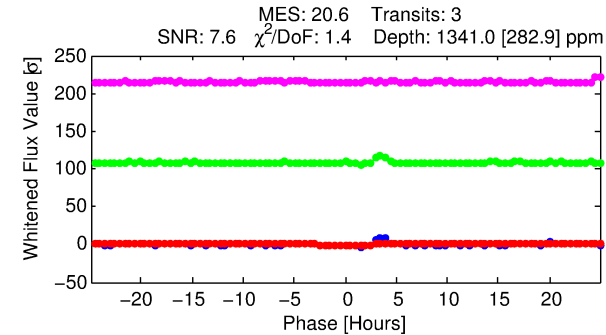
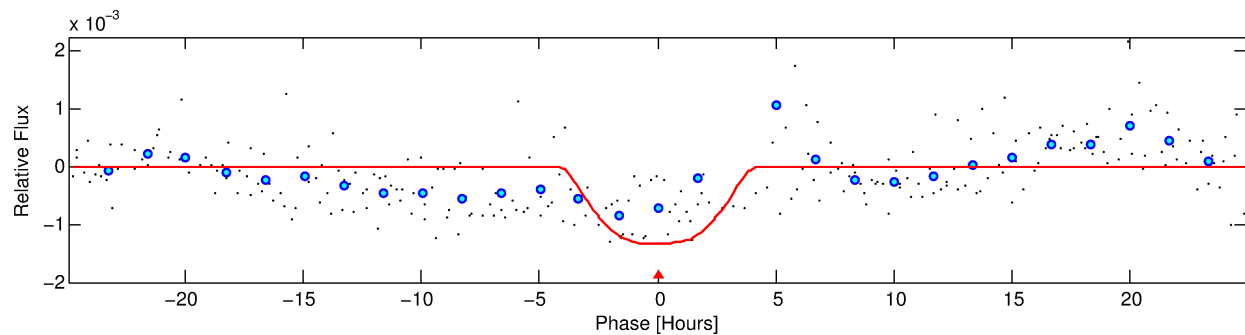
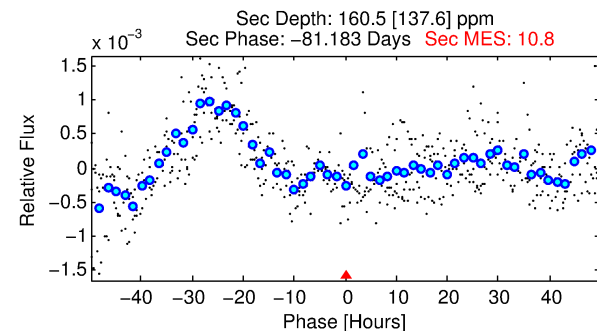
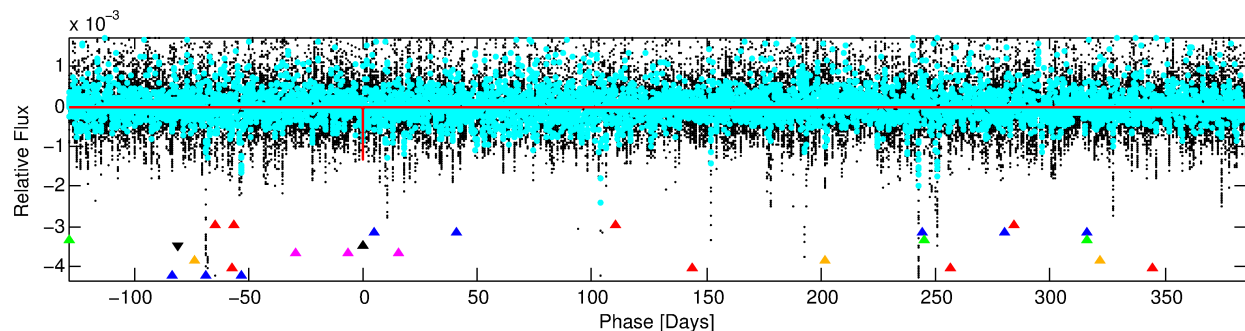
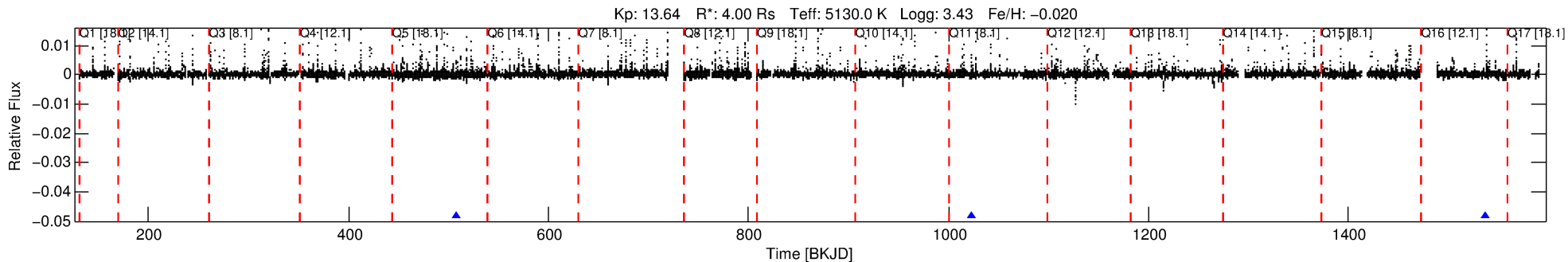
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 009093349-04

No Significant Match Found

# DV One-Page Summary

KIC: 9093349 Candidate: 4 of 8 Period: 514.521 d



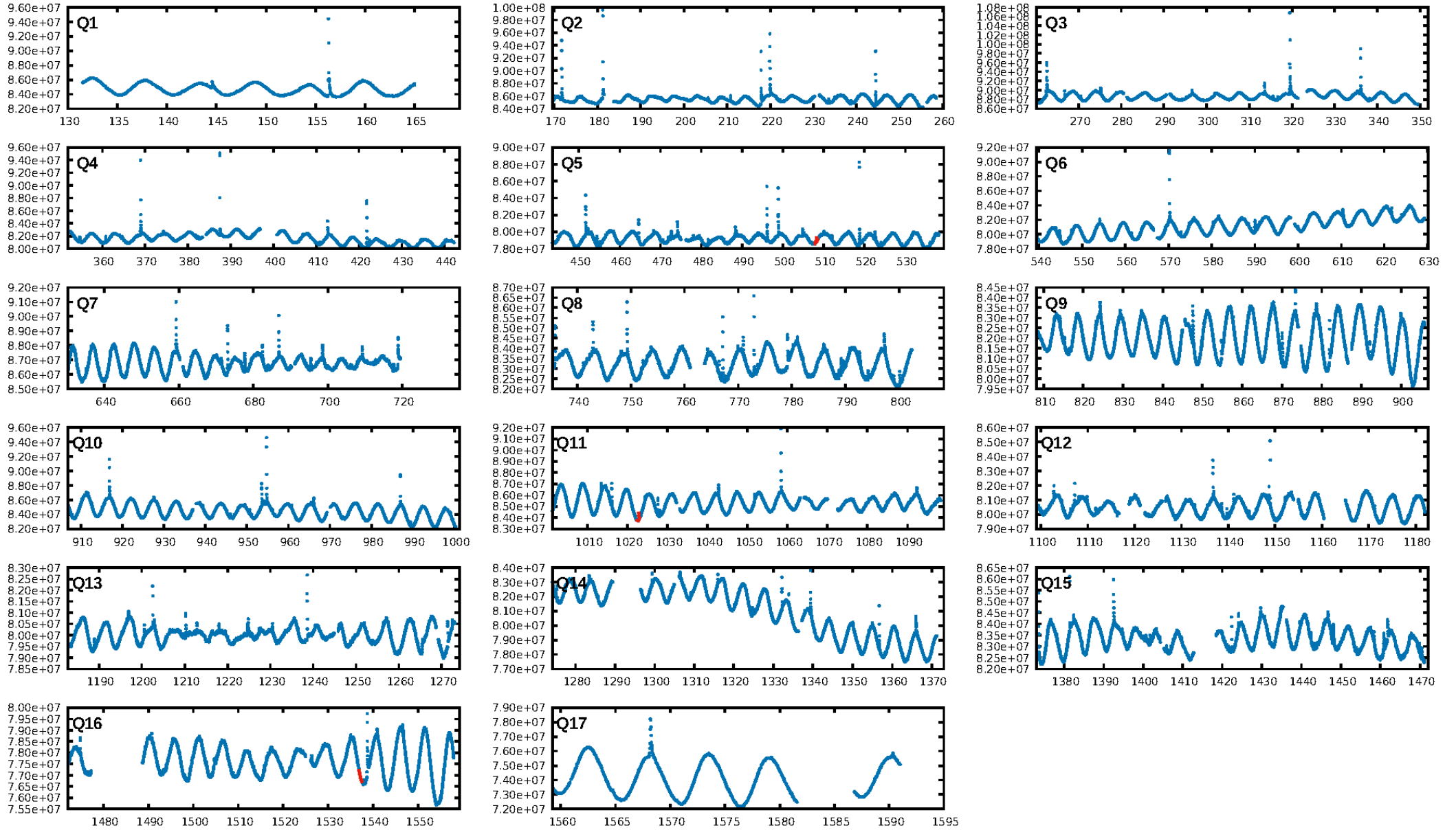
## DV Fit Results:

Period = 514.52127 [0.01439] d  
Epoch = 508.1654 [0.0189] BKJD  
Rp/R\* = 0.0437 [0.0054]  
a/R\* = 208.70 [30.65]  
b = 0.95 [0.02]  
Seff = 4.62 [3.93]  
Teff = 374 [79] K  
Rp = 19.06 [10.32] Re  
a = 1.4656 [0.7602] AU  
Ag = 522.10 [639.64] [0.81σ]  
Teffp = 2763 [623] K [3.81σ]

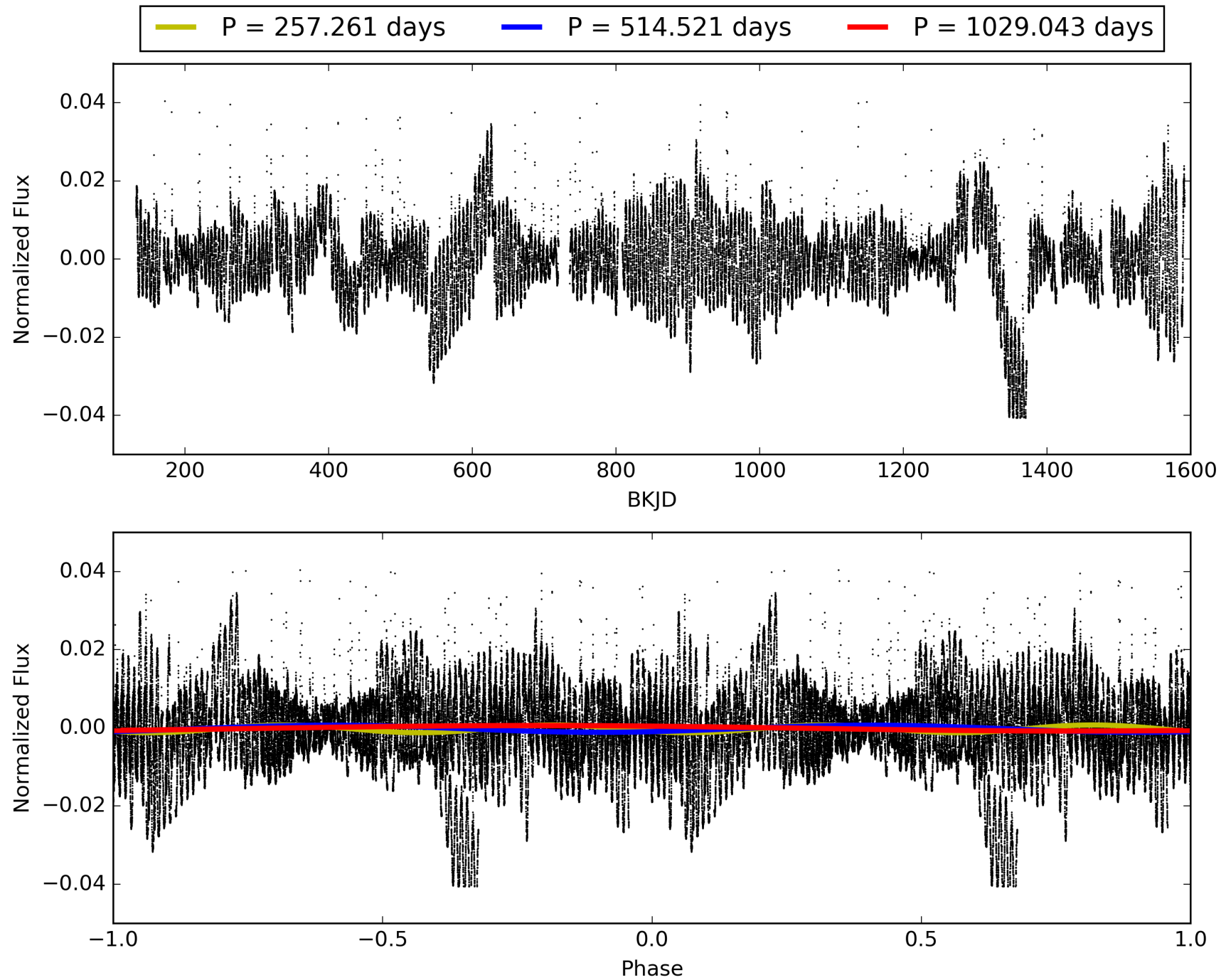
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [24.45σ]  
LongPeriod-sig: 100.0% [89.24σ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 77.9%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 6.784  
Centroid-sig: 7.2%  
Centroid-so: 0.607 arcsec [1.67σ]  
OotOffset-rm: 0.117 arcsec [0.23σ]  
OotOffset-st: 0/1/1/1 [3]  
KicOffset-rm: 0.103 arcsec [0.33σ]  
KicOffset-st: 0/1/1/1 [3]  
DiffImageQuality-fgm: 1.00 [3/3]  
DiffImageOverlap-fno: 1.00 [3/3]

# TCE 009093349-04, PDC Light Curves

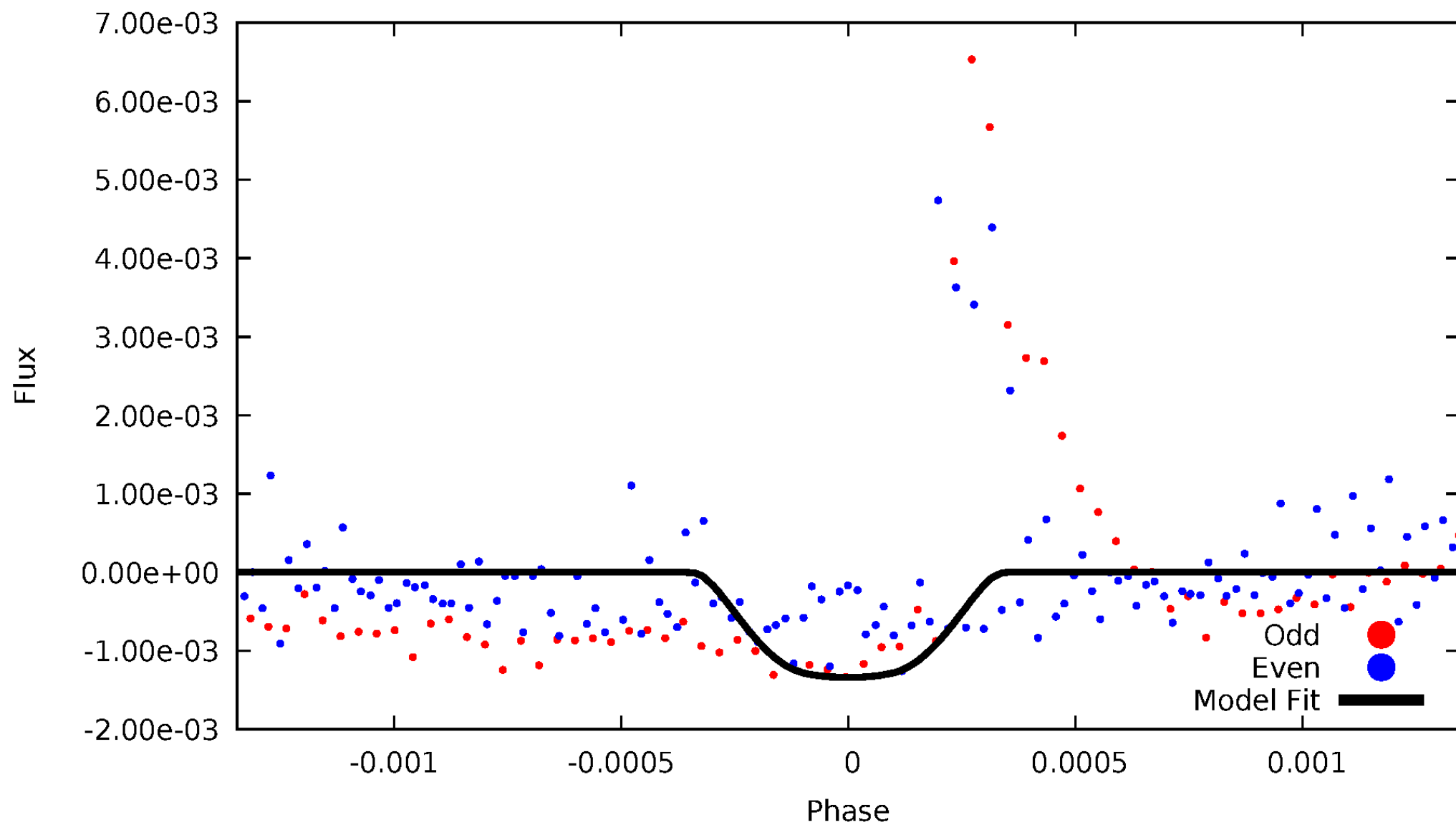


TCE 009093349-04



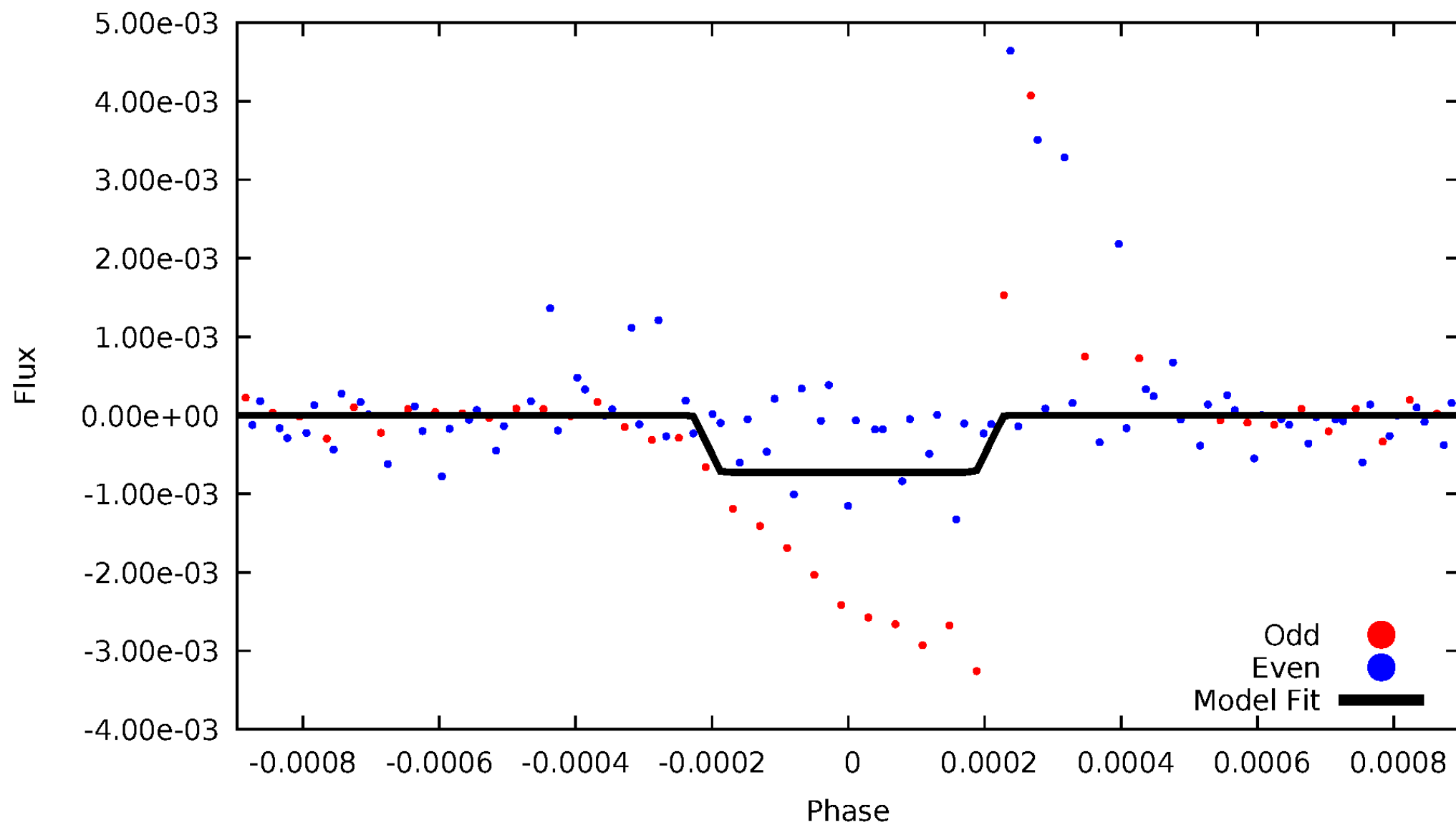
# DV Odd/Even

TCE 009093349-04



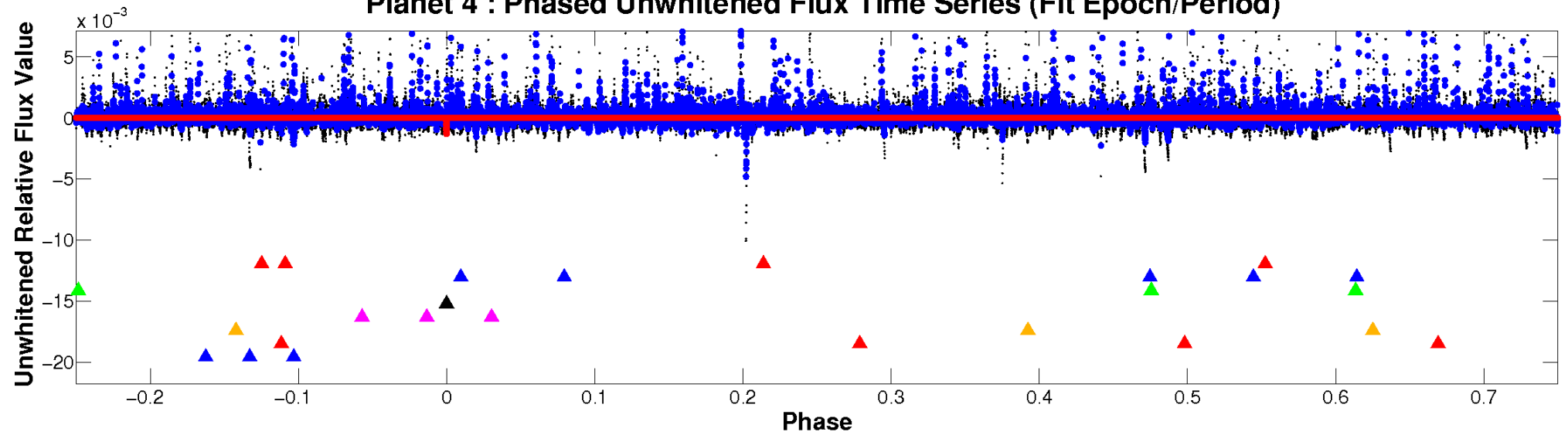
# ALT Odd/Even

TCE 009093349-04

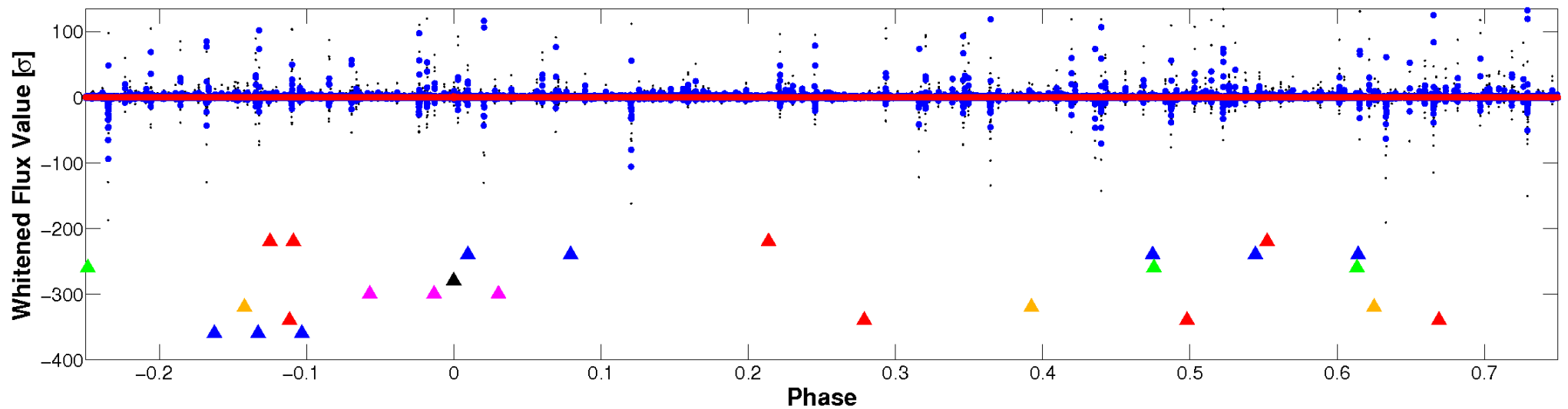


# Non-Whitened Vs. Whitened Light Curve

## Planet 4 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

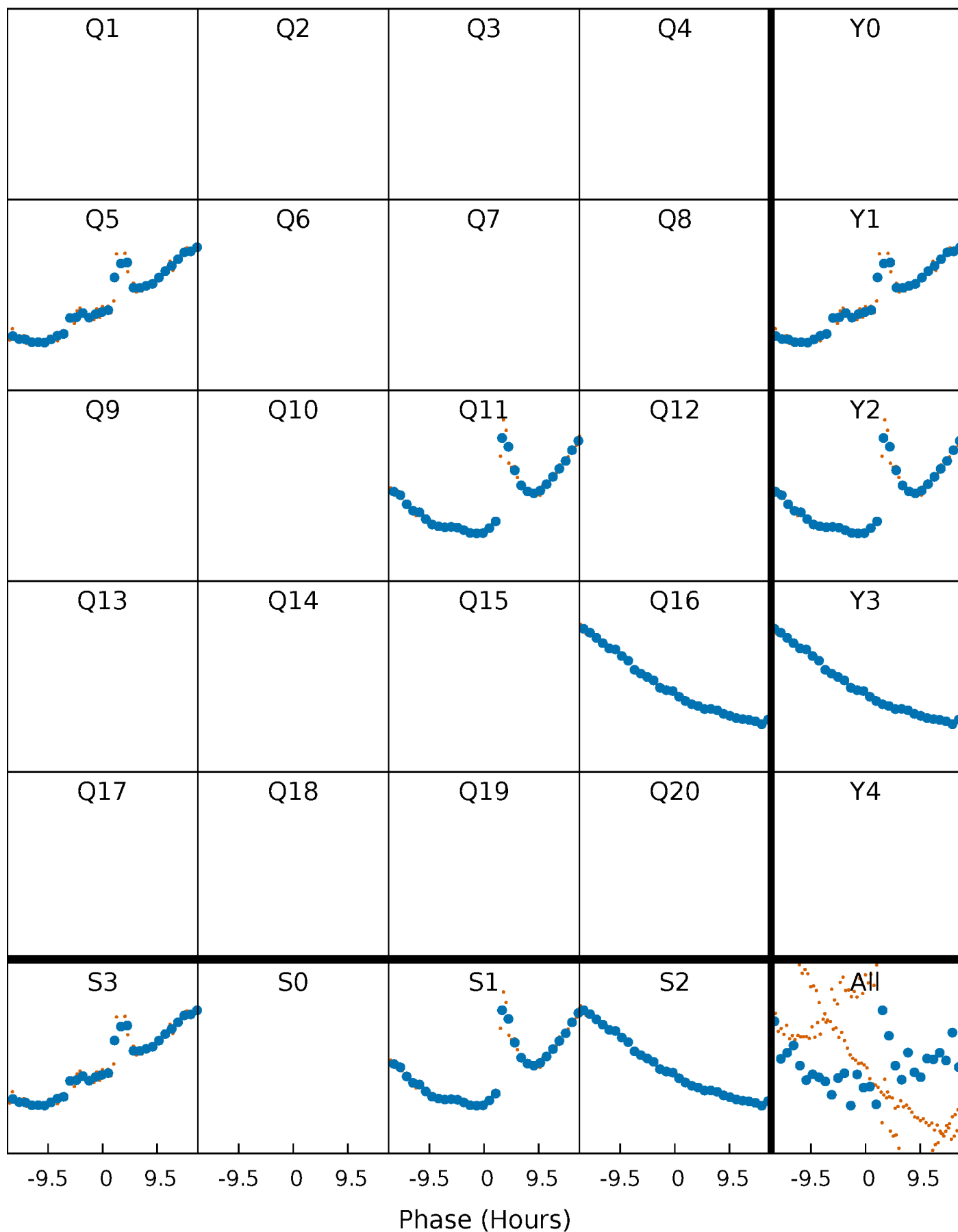


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

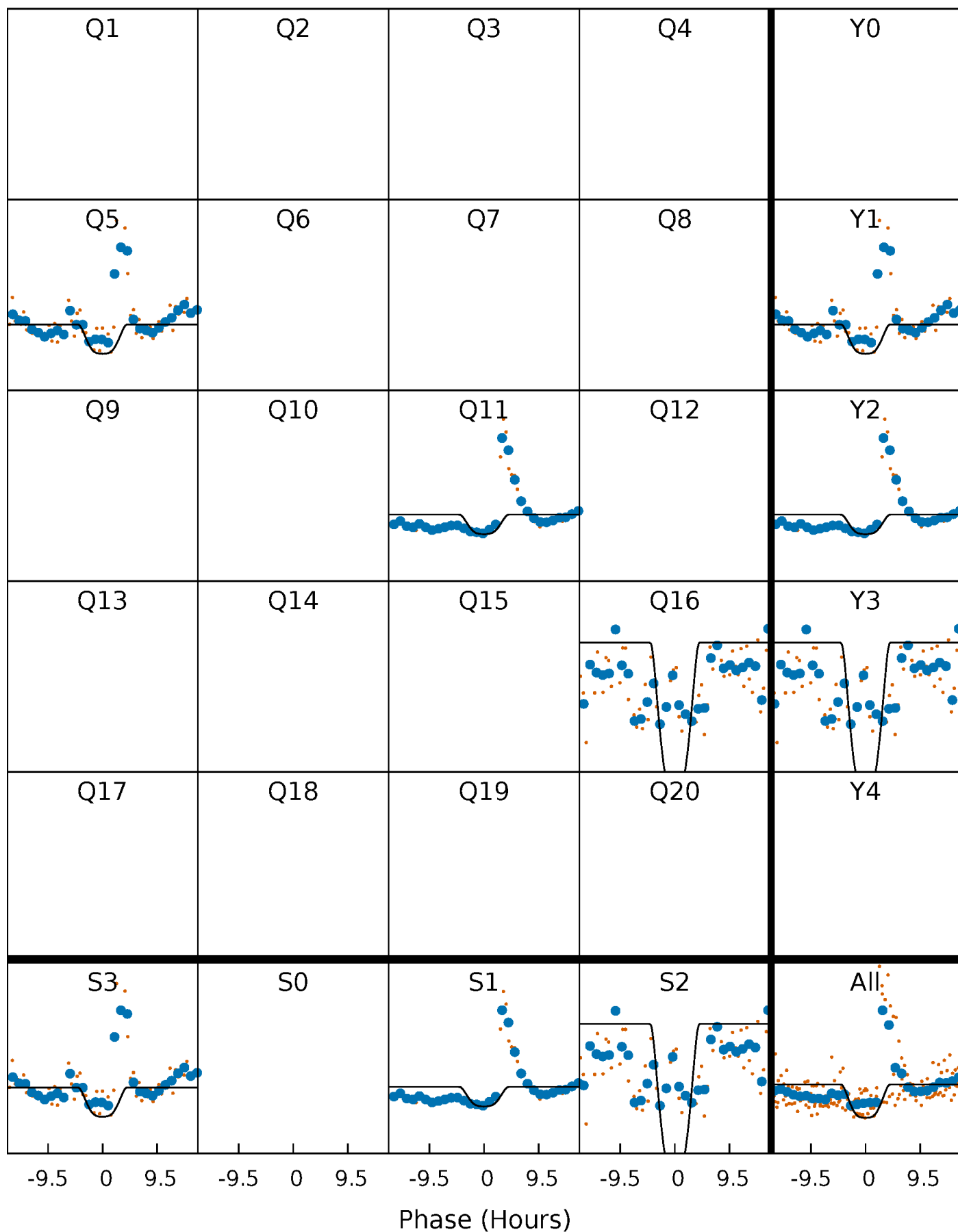
TCE 009093349-04     $P=514.521268$  Days     $T_0=508.165431$  (BKJD)





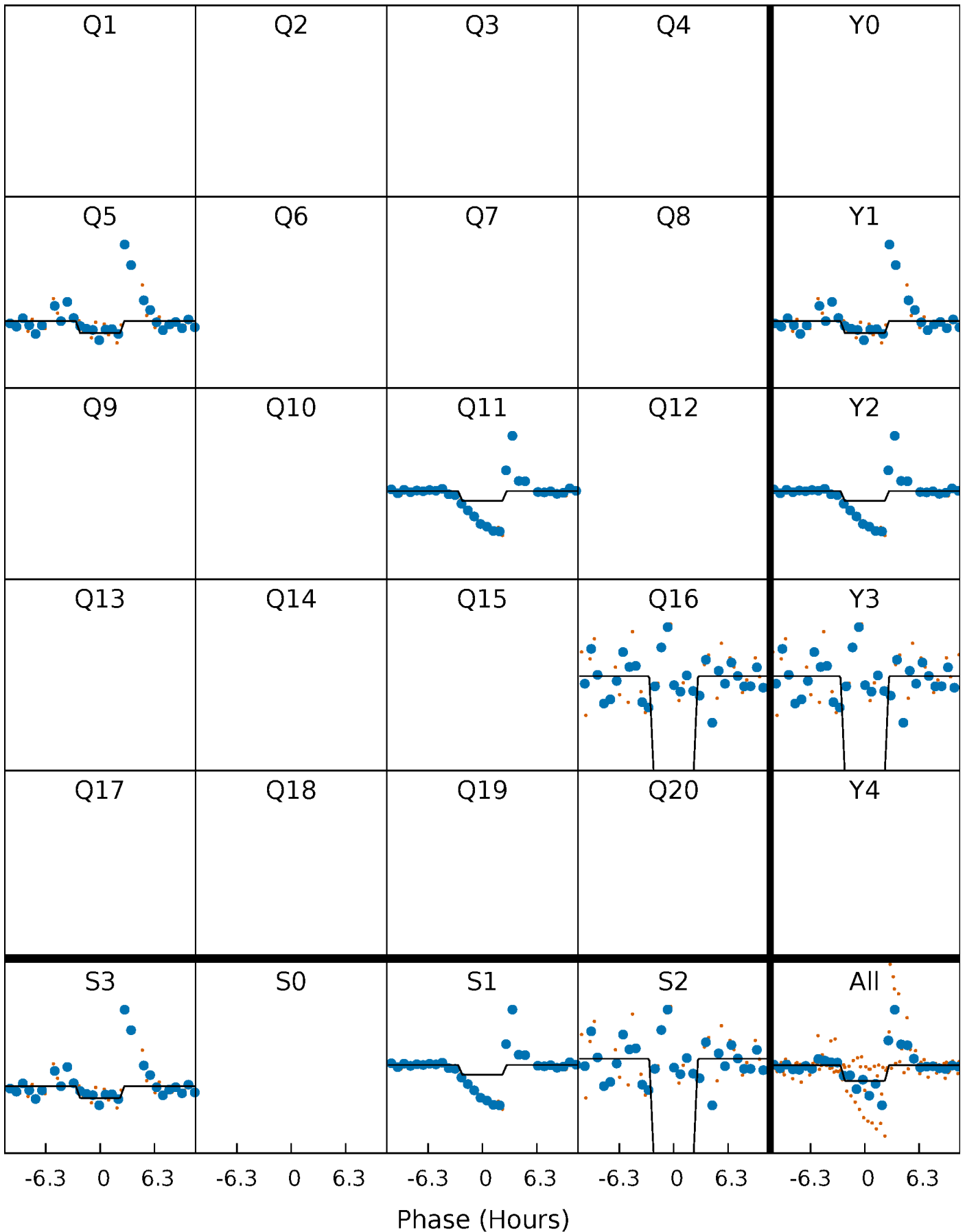
# DV Quarter-Phased Transit Curves

TCE 009093349-04     $P=514.521268$  Days     $T_0=508.165431$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

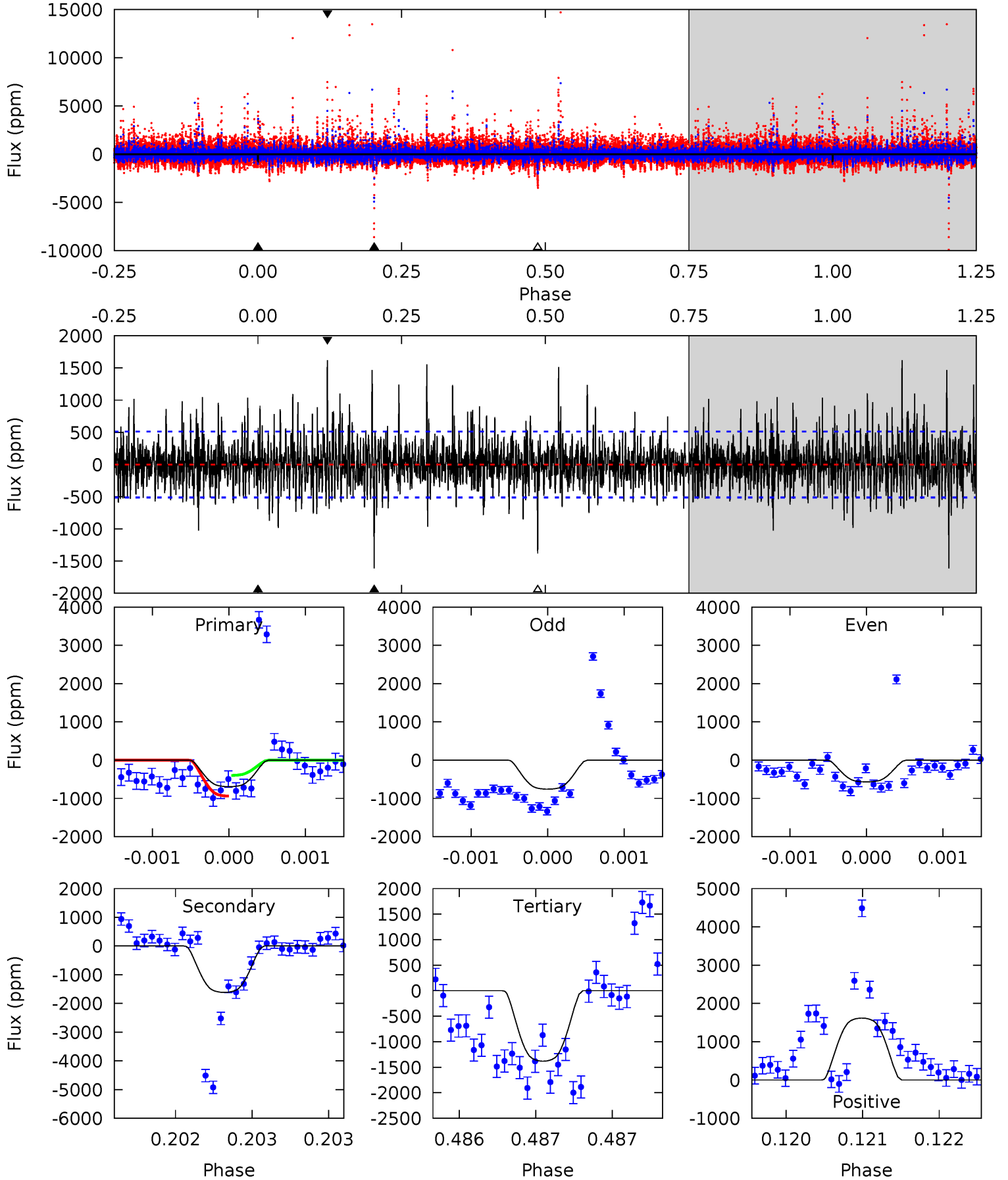
TCE 009093349-04 P=514.544286 Days  $T_0=508.144649$  (BKJD)



# DV Model-Shift Uniqueness Test

009093349-04, P = 514.521268 Days, E = 508.165431 Days

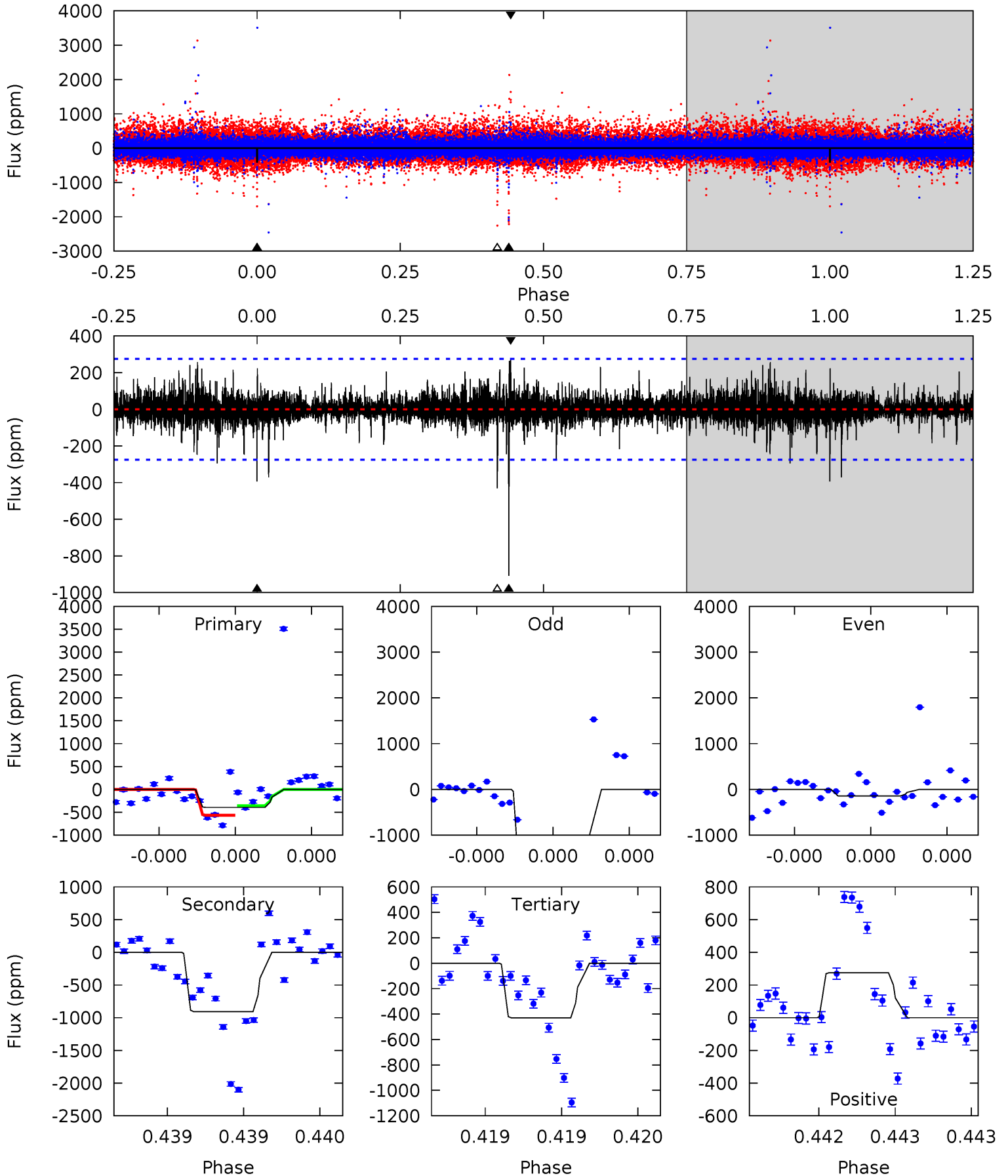
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.47	17.4	14.9	17.5	5.52	3.40	2.95	-7.43	-9.98	2.52	-0.04	0.36	0.74	0.50	2.88



# Alt Model-Shift Uniqueness Test

009093349-04, P = 514.544286 Days, E = 508.144649 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
8.00	18.5	8.76	5.61	5.60	3.52	0.95	-0.75	2.40	9.72	12.9	21.1	1.52	0.23	2.14



### Stellar Parameters For KIC 009093349

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5130^{+154}_{-169}$	$3.434^{+0.497}_{-0.213}$	$-0.020^{+0.250}_{-0.300}$	$4.000^{+1.136}_{-2.109}$	$1.585^{+0.213}_{-0.639}$	$0.035^{+0.170}_{-0.018}$
	+3%/-3%	+14%/-6%	+1250%/-1500%	+28%/-53%	+13%/-40%	+488%/-52%
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 009093349-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-1615 \pm 93$	$17.99^{+4.71}_{-5.39}$	$515^{+50}_{-74}$	$4961^{+335}_{-296}$	$5836^{+4892}_{-2226}$
Alt.	$-908 \pm 49$	$10.99^{+4.11}_{-3.37}$	$516^{+55}_{-67}$	$5357^{+657}_{-424}$	$8538^{+8813}_{-3783}$

$T_{max}$  = 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

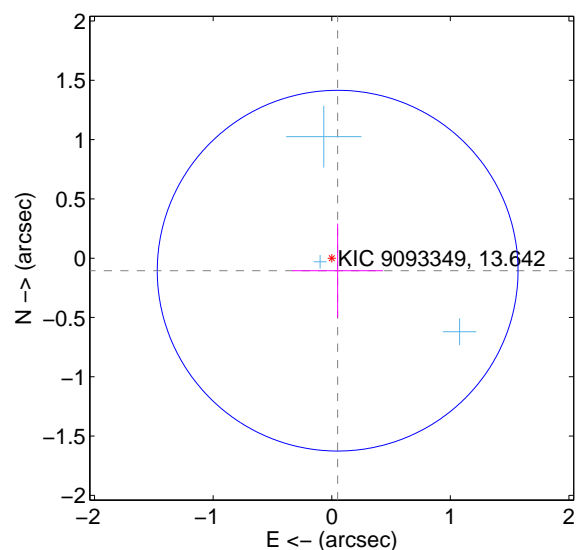
Supplemental centroid analysis for 009093349-04. Kepler magnitude: 13.64. Transit SNR 7.60

There are 3 quarters with good PRF difference image offsets

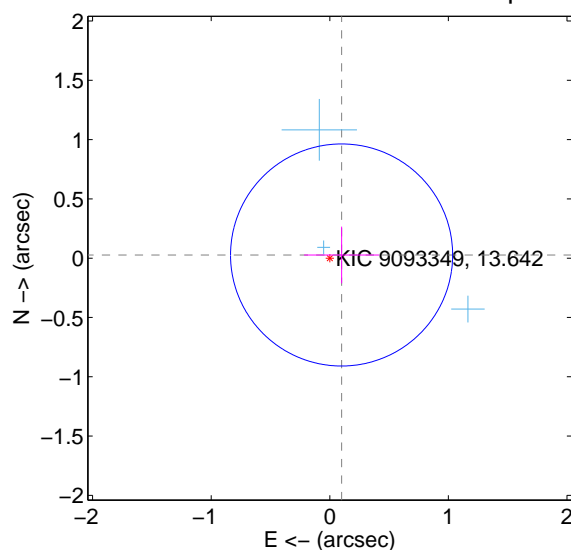
The direct PRF centroid is offset from the target star catalog position by about 0.21 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.117 \pm 0.507$	0.23	$-0.050 \pm 0.382$	$-0.105 \pm 0.397$
PRF-fit source offset from KIC position	$0.103 \pm 0.312$	0.33	$-0.100 \pm 0.317$	$0.027 \pm 0.239$
photometric centroid source offset	$0.61 \pm 0.36$	1.67	$0.20 \pm 0.28$	$0.57 \pm 0.37$

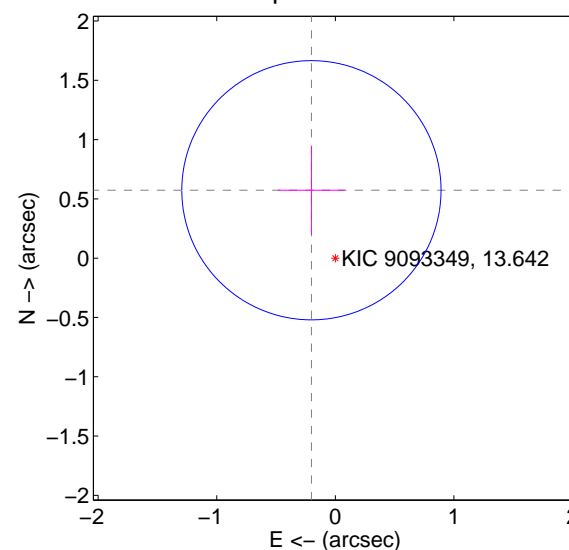
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



offset from photometric centroids

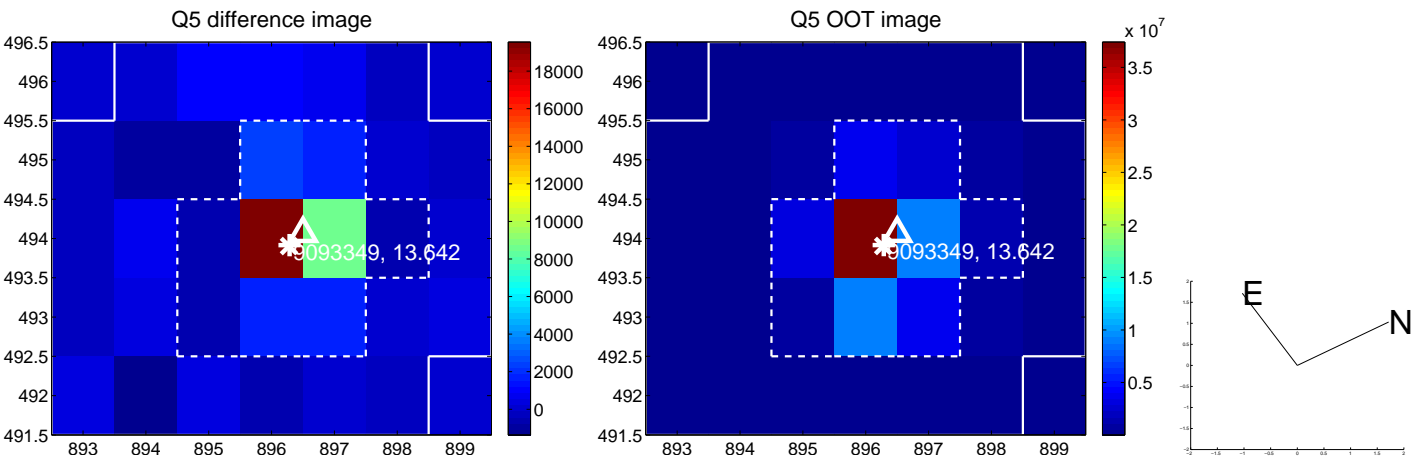


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

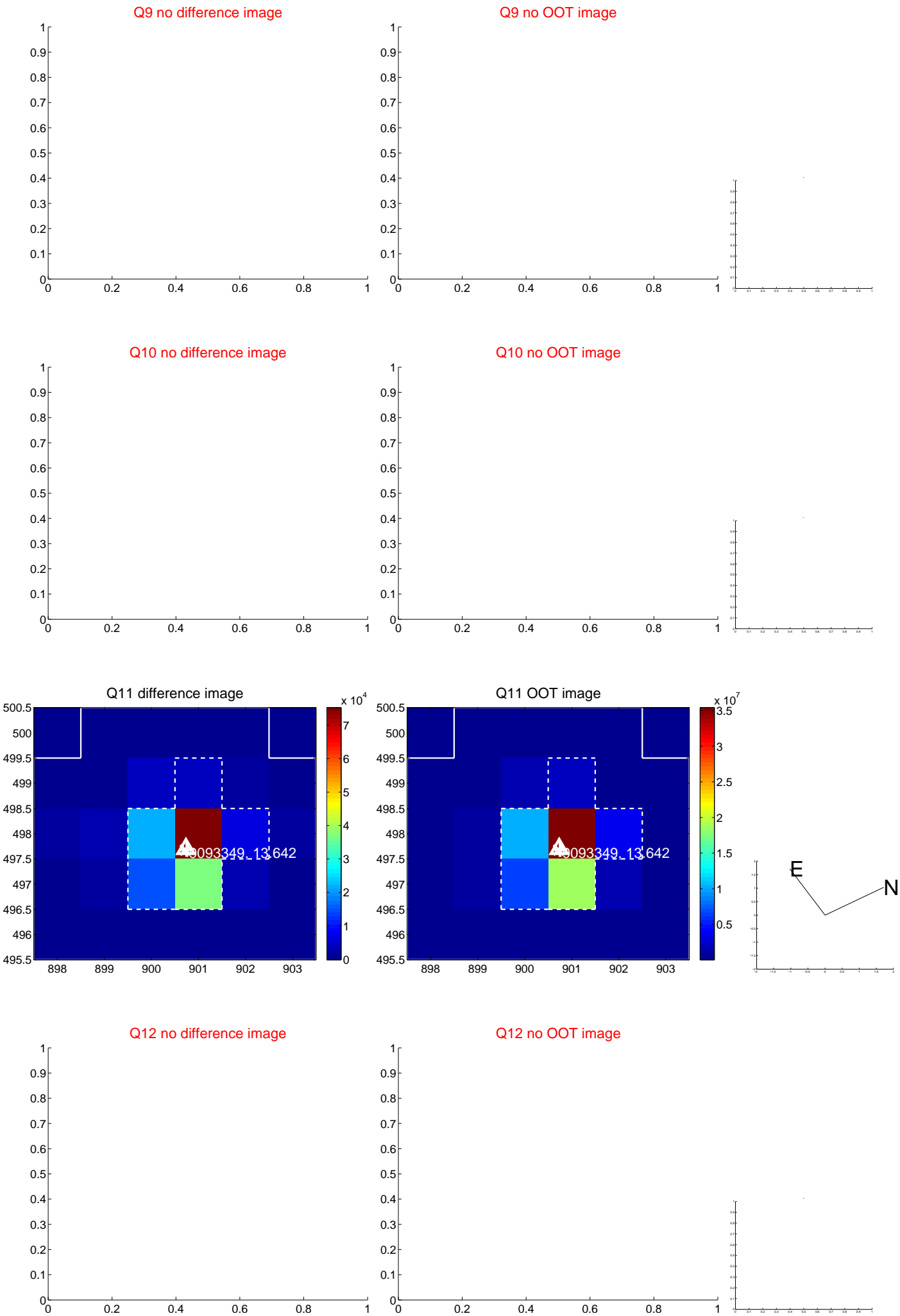


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

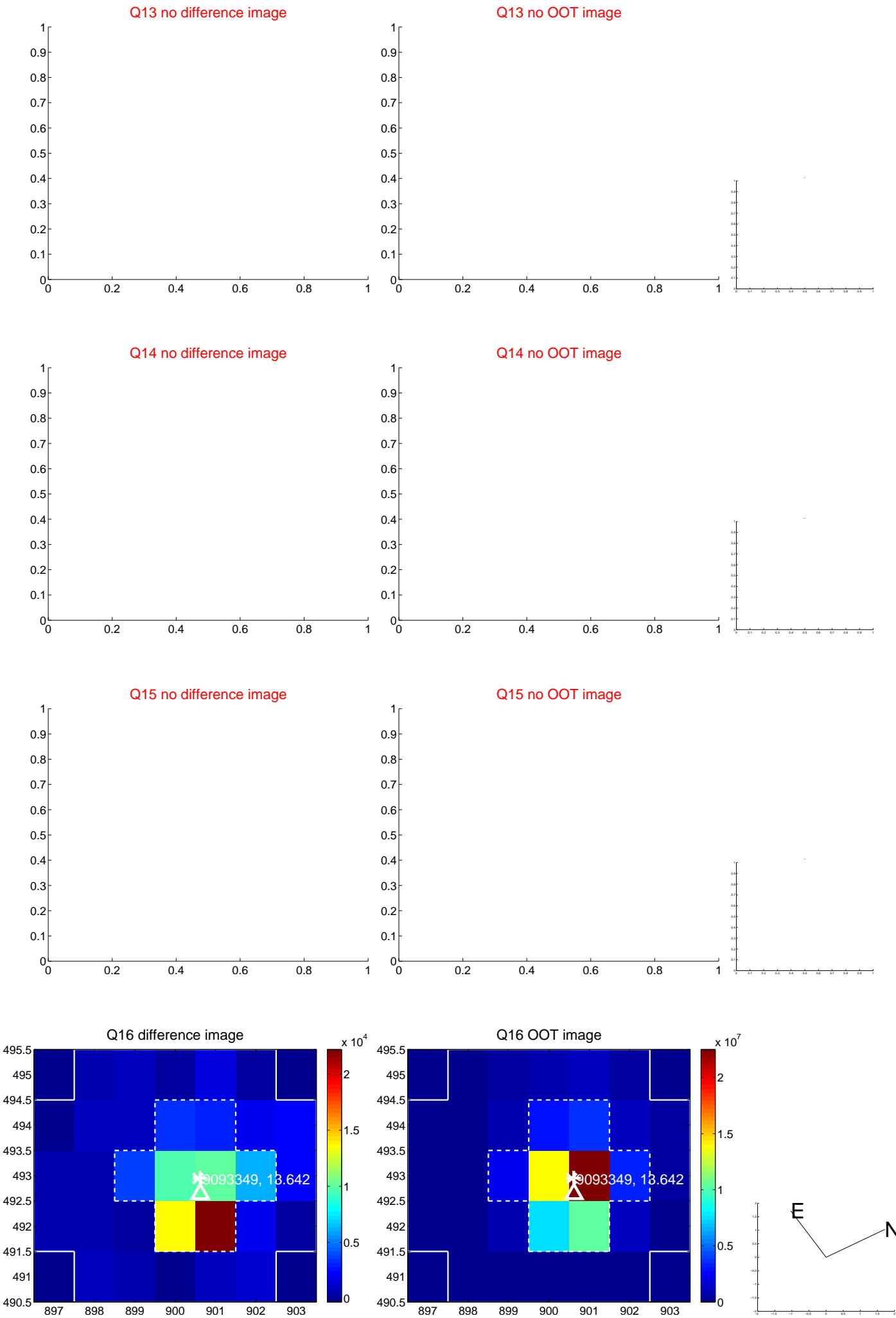




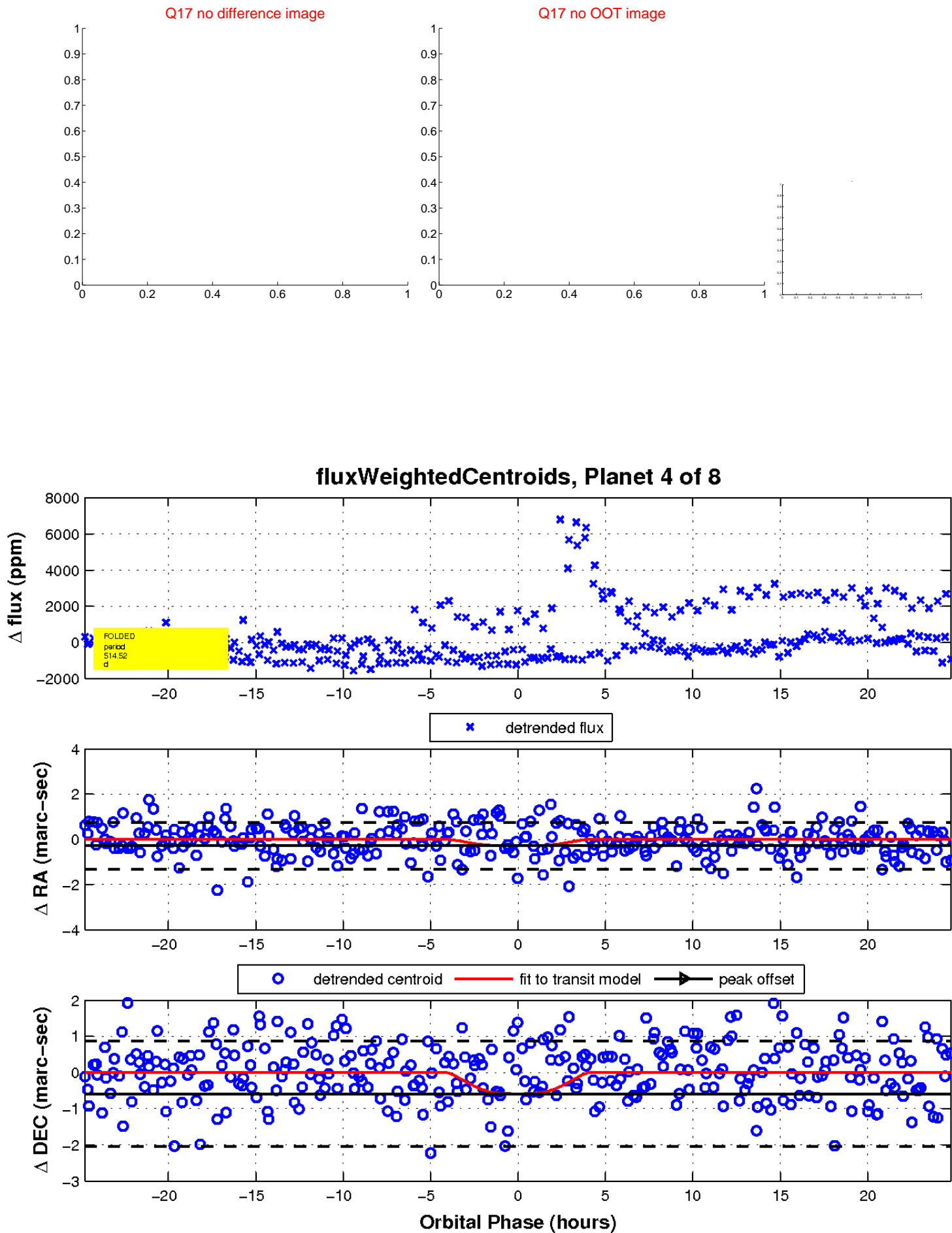
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.

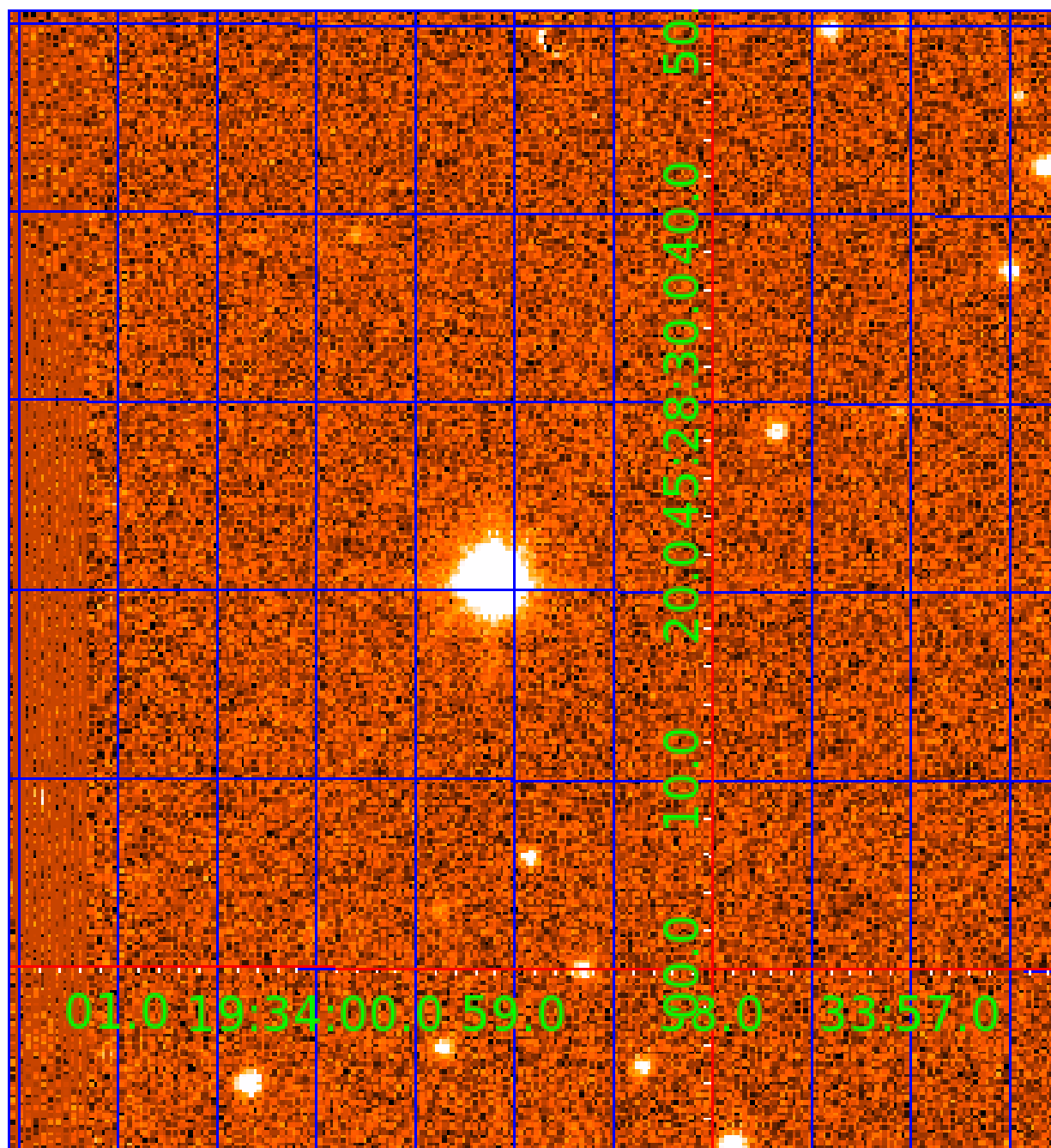


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



## UKIRT Image

Declination



# KIC 009093349

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009093349-01	OBS	No	340.285729	452.139044	2222.4	5.839	18.3	12.6	4.00	5130	20.53	8.02
009093349-02	OBS	No	275.213963	237.892066	290.9	0.967	19.3	2.2	4.00	5130	7.24	10.65
009093349-03	OBS	No	585.487777	238.354648	1271.6	17.182	17.7	5.4	4.00	5130	14.10	3.89
009093349-04	OBS	No	514.521268	508.165431	1341.0	8.308	20.6	7.6	4.00	5130	19.06	4.62
009093349-05	OBS	No	492.040609	523.789347	662.0	8.930	44.0	3.7	4.00	5130	10.06	4.91
009093349-06	OBS	No	394.770320	435.034848	485.5	2.295	12.0	3.5	4.00	5130	10.18	6.58
009093349-07	OBS	No	313.667348	337.970923	926.1	10.068	14.2	6.6	4.00	5130	11.83	8.94
009093349-08	OBS	No	499.232738	455.096850	301.1	12.500	12.5	-1.0	4.00	5130	6.75	4.81

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009093349-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009093349-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
009093349-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_ZUMA—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
009093349-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_ZUMA—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
009093349-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
009093349-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009093349-07	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009093349-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—ALL_TRANS_CHASES—CENT_NOFITS

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

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

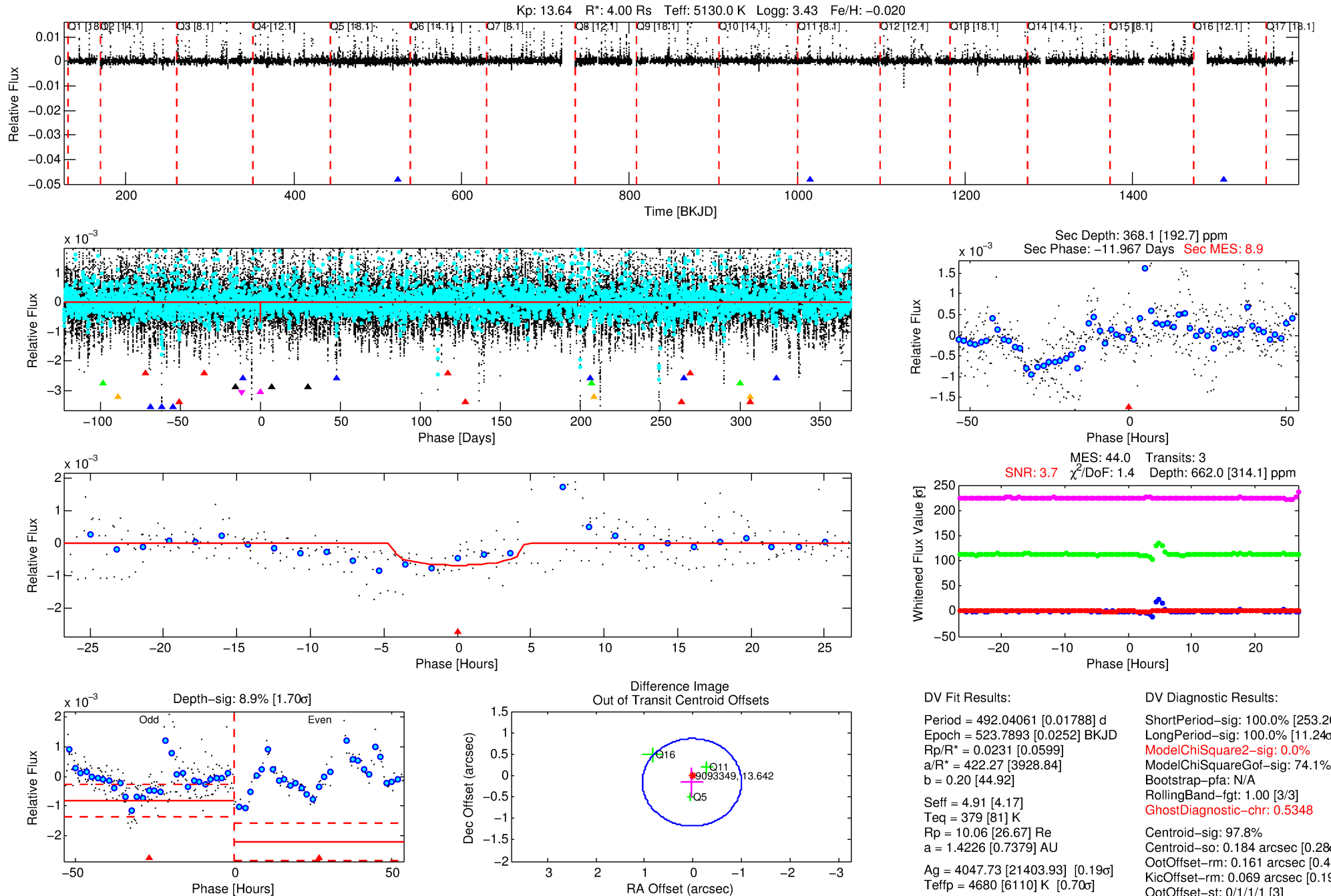
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 009093349-05

No Significant Match Found

# DV One-Page Summary

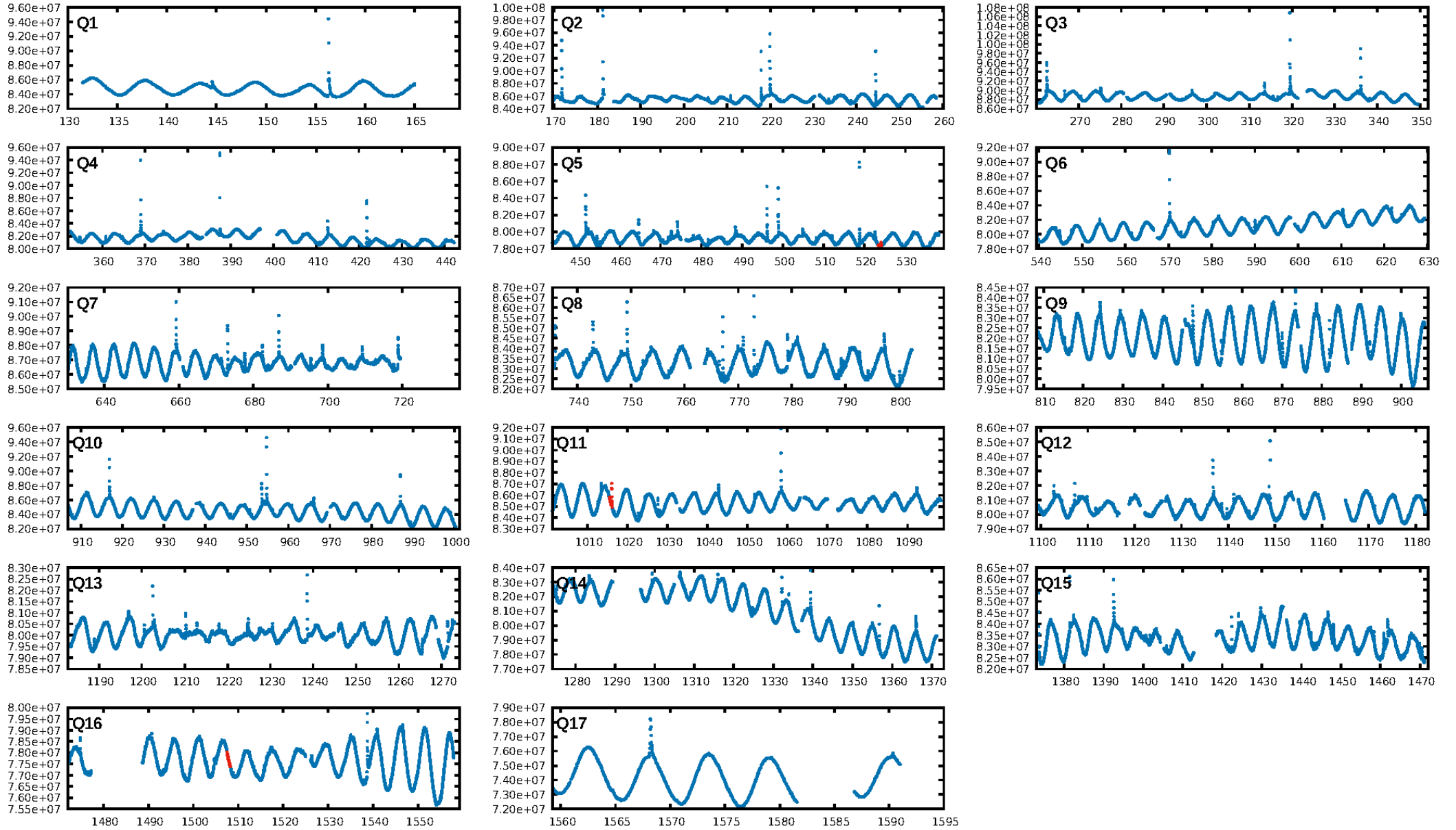
KIC: 9093349 Candidate: 5 of 8 Period: 492.041 d



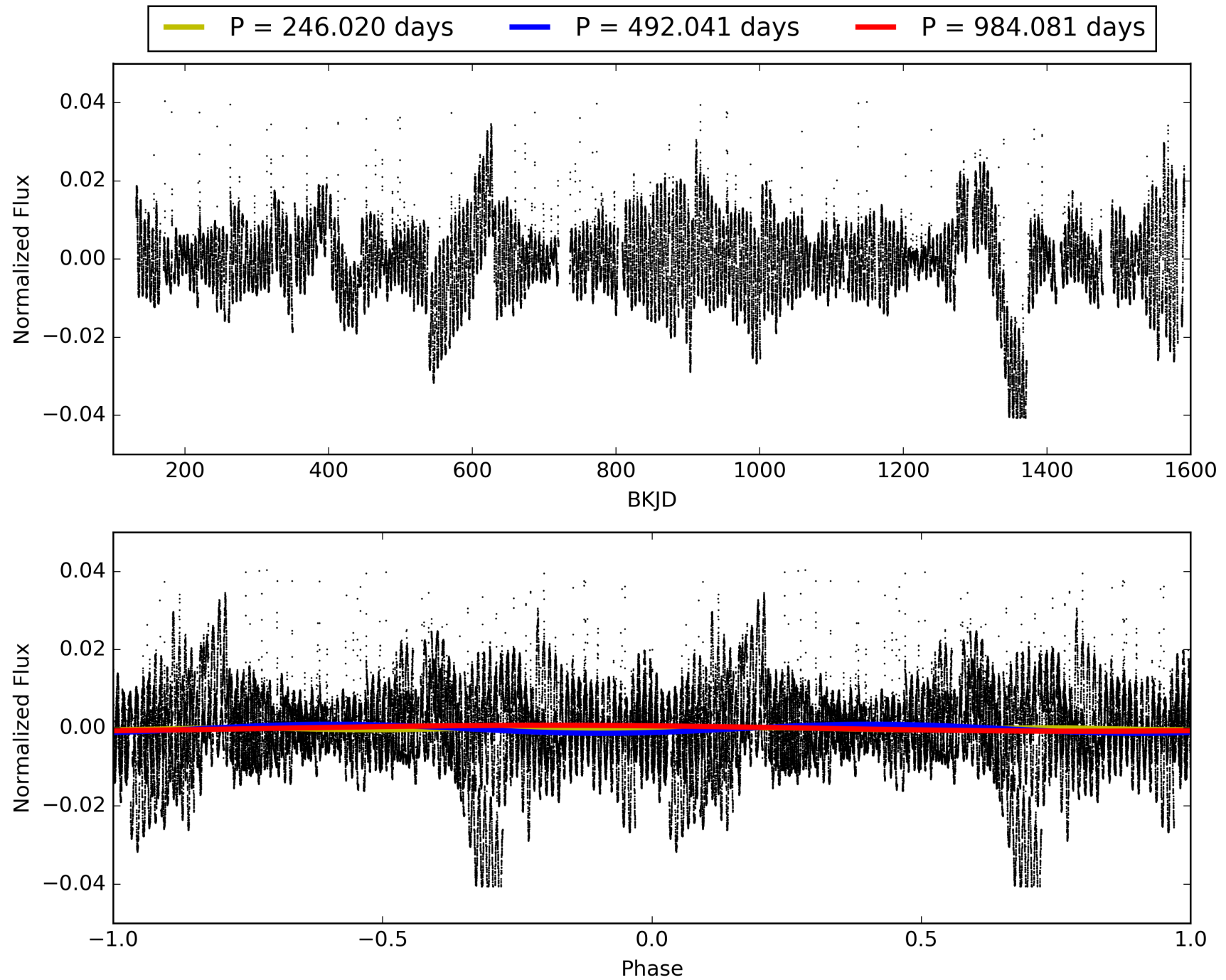
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 23:31:12 Z

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

# TCE 009093349-05, PDC Light Curves



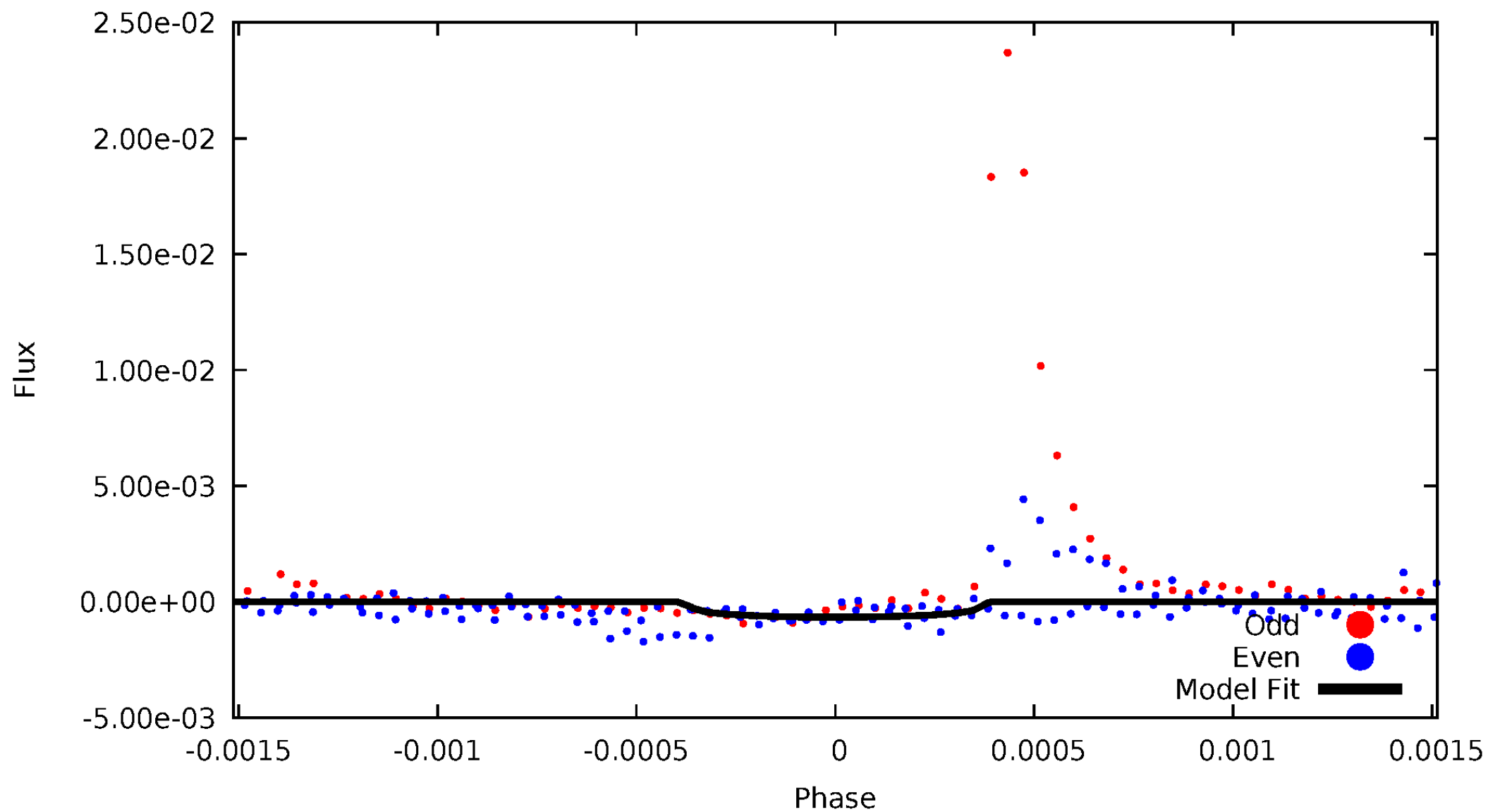
TCE 009093349-05





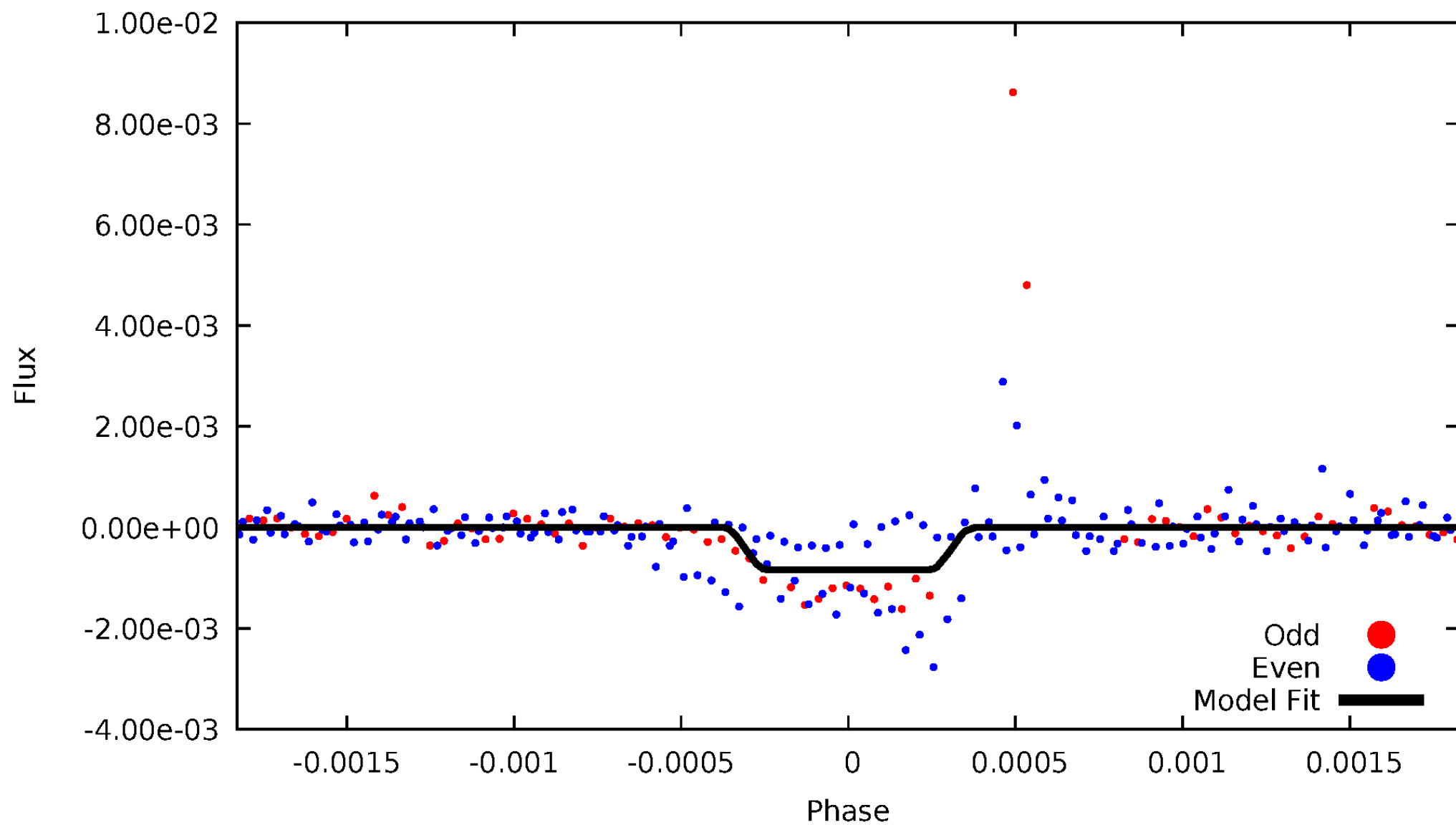
# DV Odd/Even

TCE 009093349-05



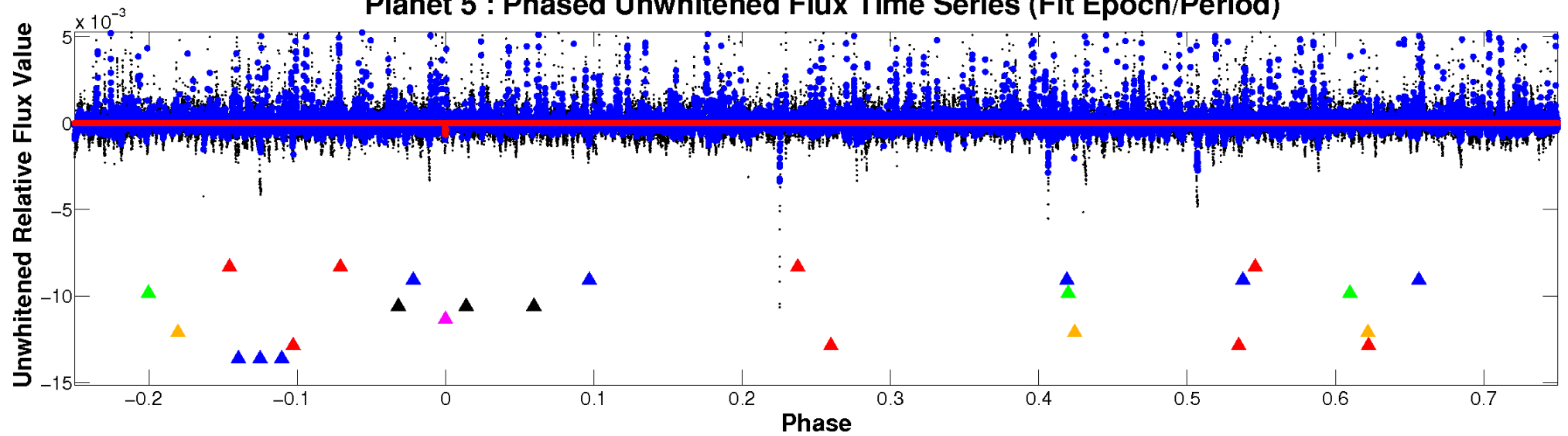
# ALT Odd/Even

TCE 009093349-05

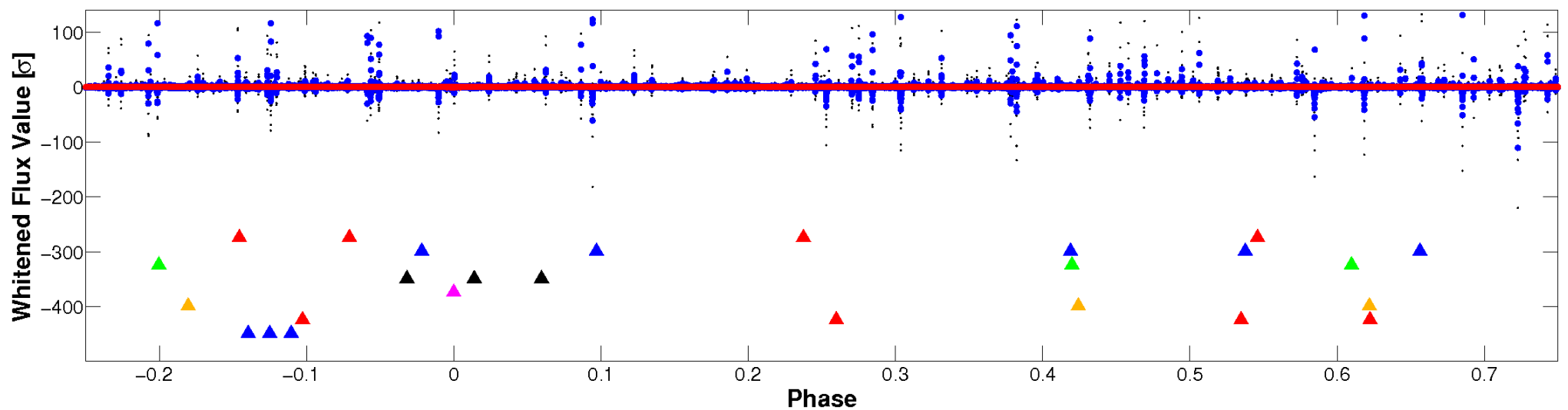


# Non-Whitened Vs. Whitened Light Curve

**Planet 5 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)**

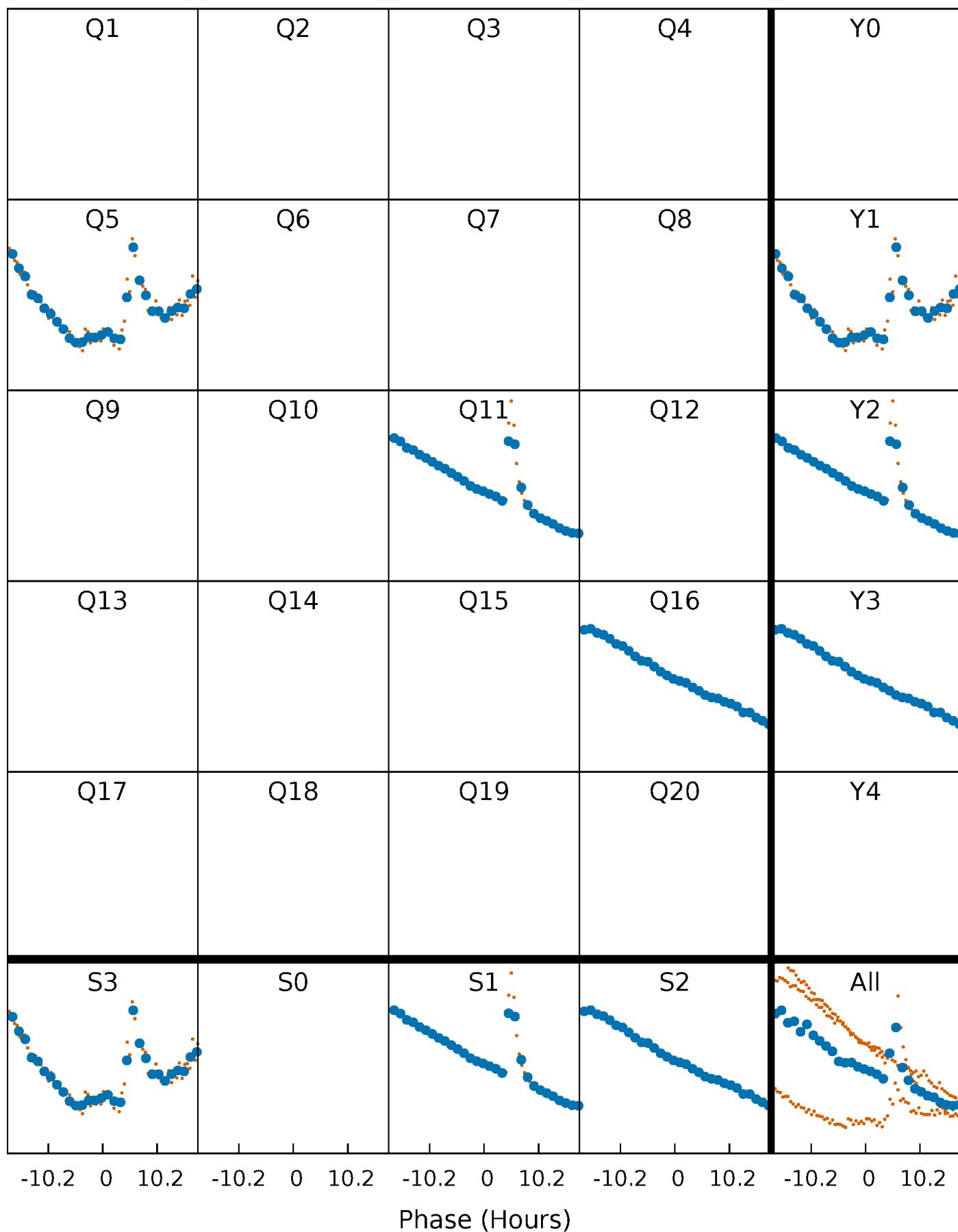


**Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



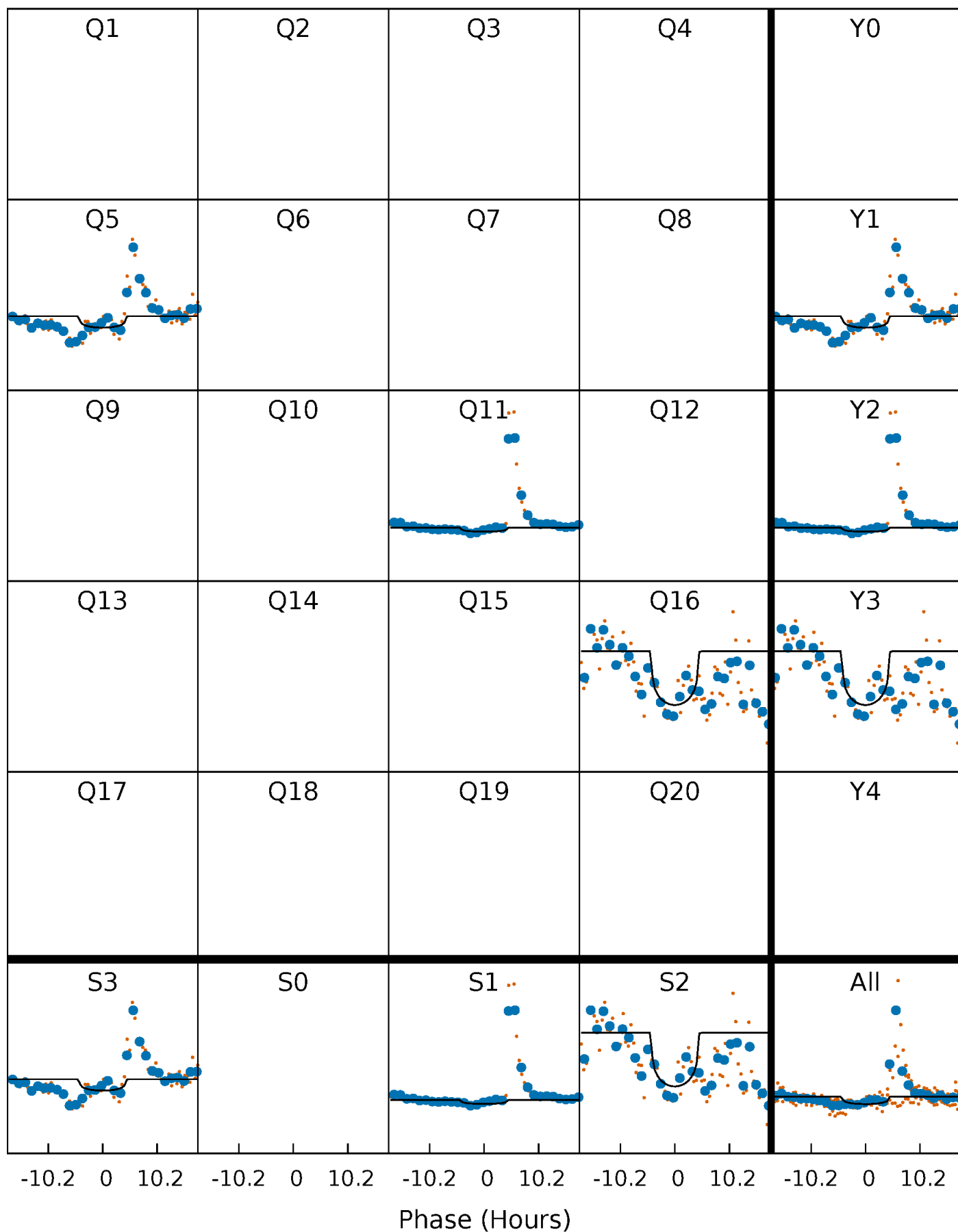
# PDC Quarter-Phased Transit Curves

TCE 009093349-05     $P=492.040609$  Days     $T_0=523.789347$  (BKJD)



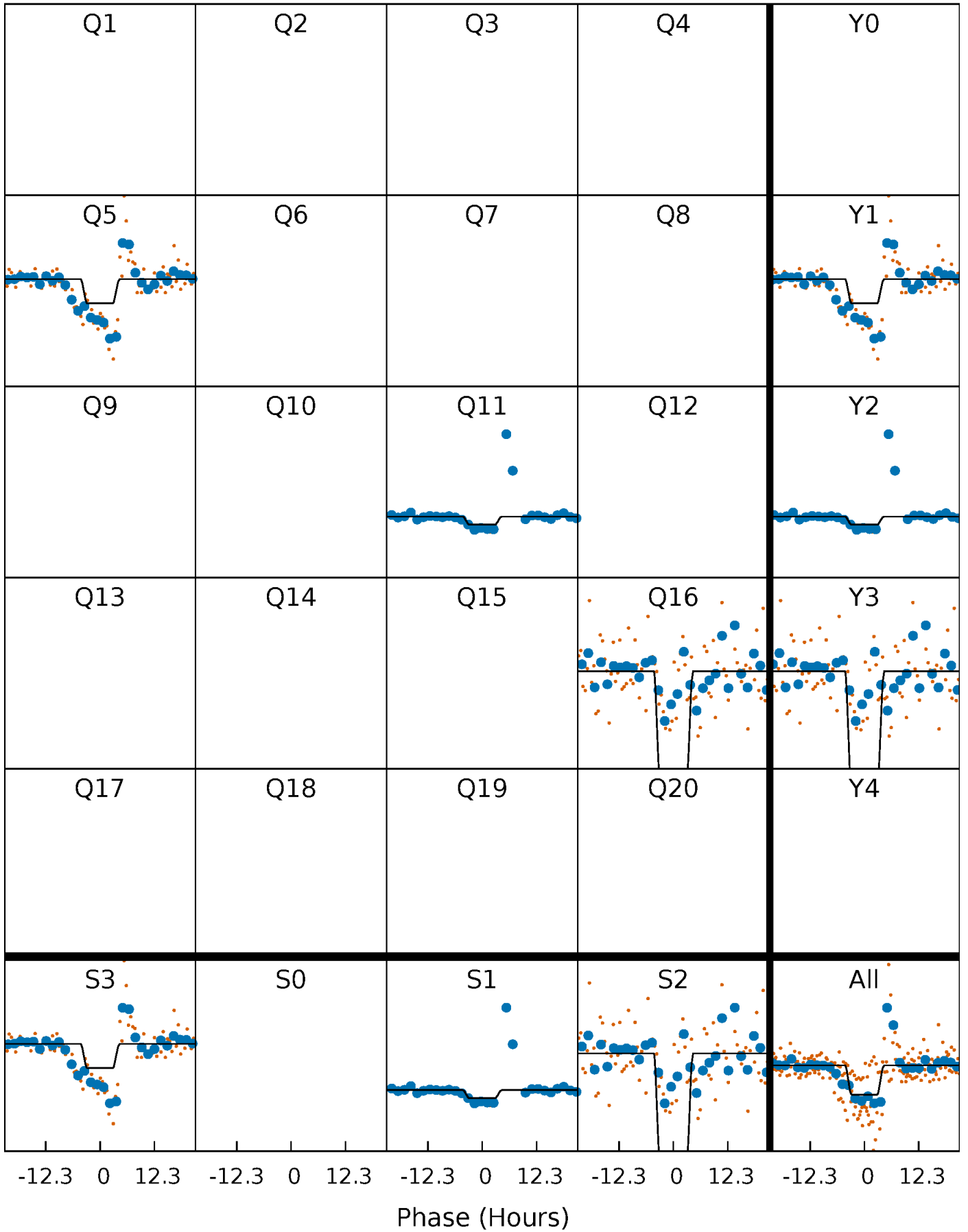
# DV Quarter-Phased Transit Curves

TCE 009093349-05     $P=492.040609$  Days     $T_0=523.789347$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

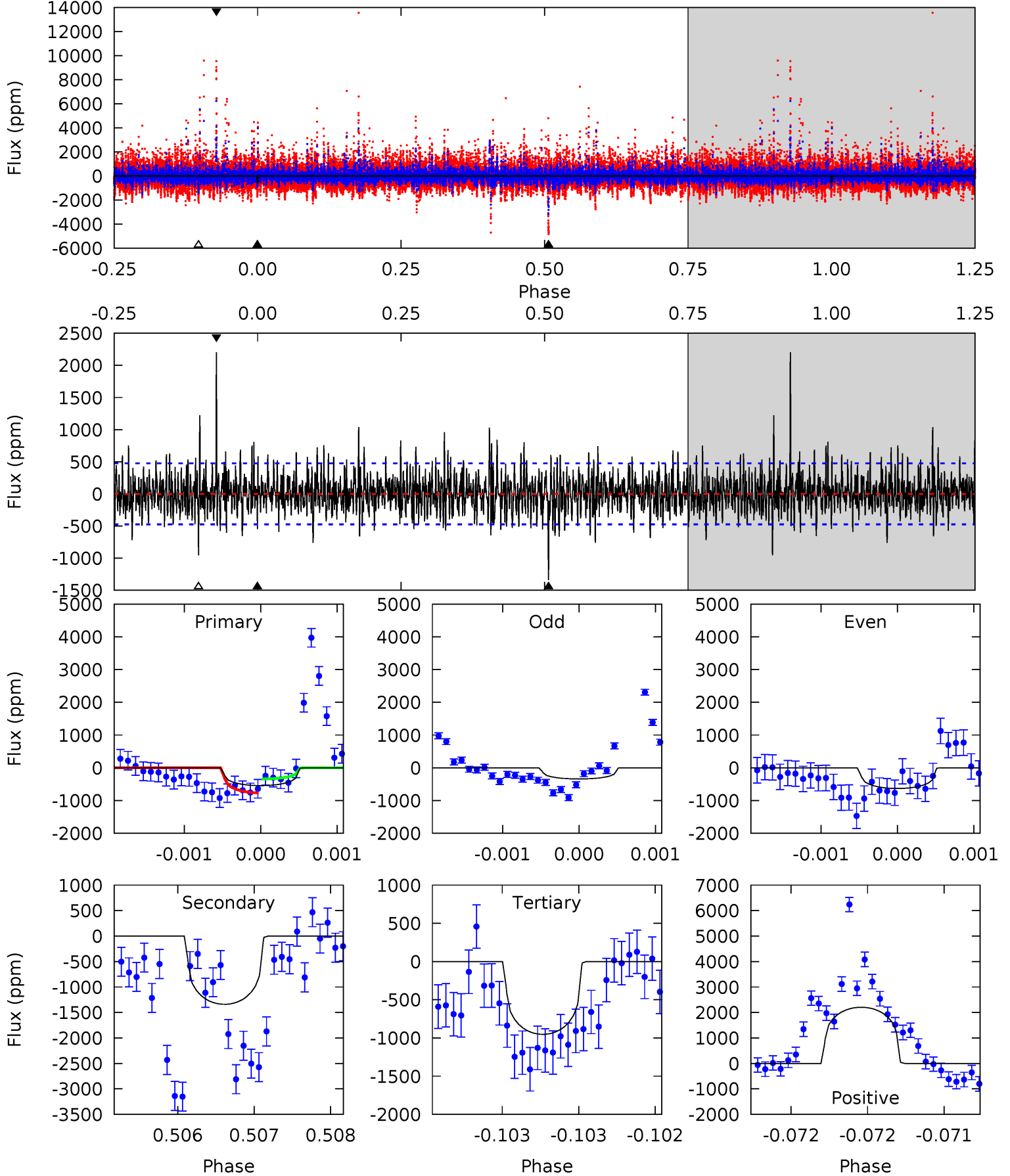
TCE 009093349-05     $P=492.046936$  Days     $T_0=523.794372$  (BKJD)



# DV Model-Shift Uniqueness Test

009093349-05, P = 492.040609 Days, E = 31.748738 Days

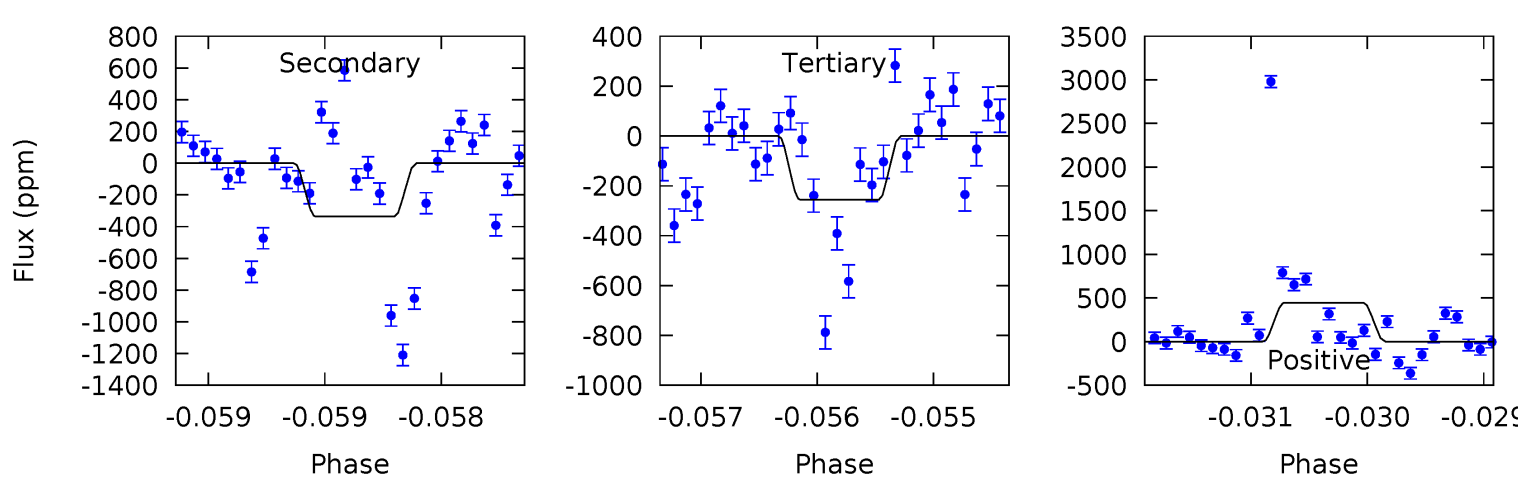
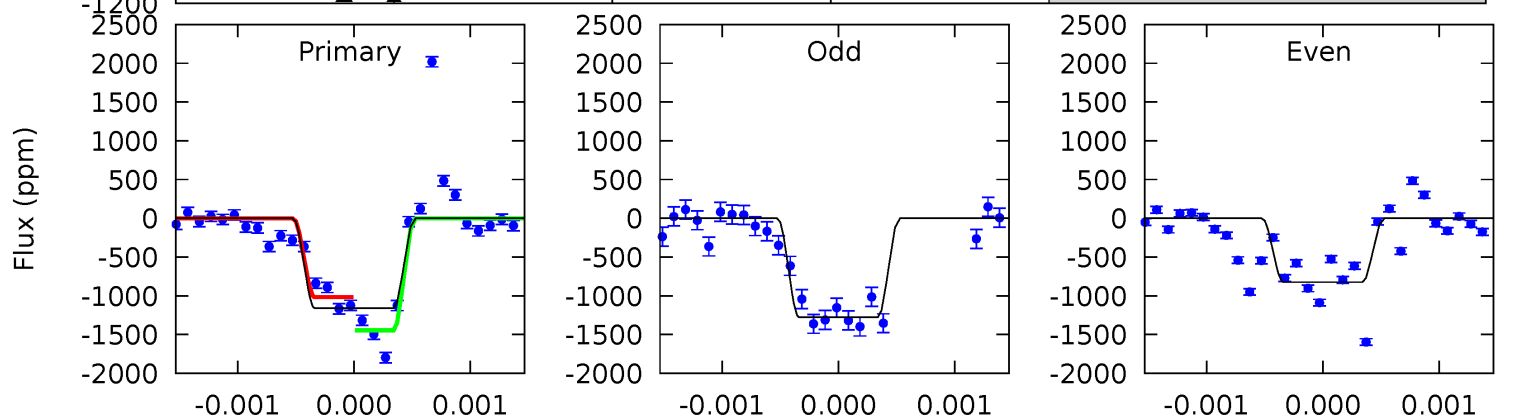
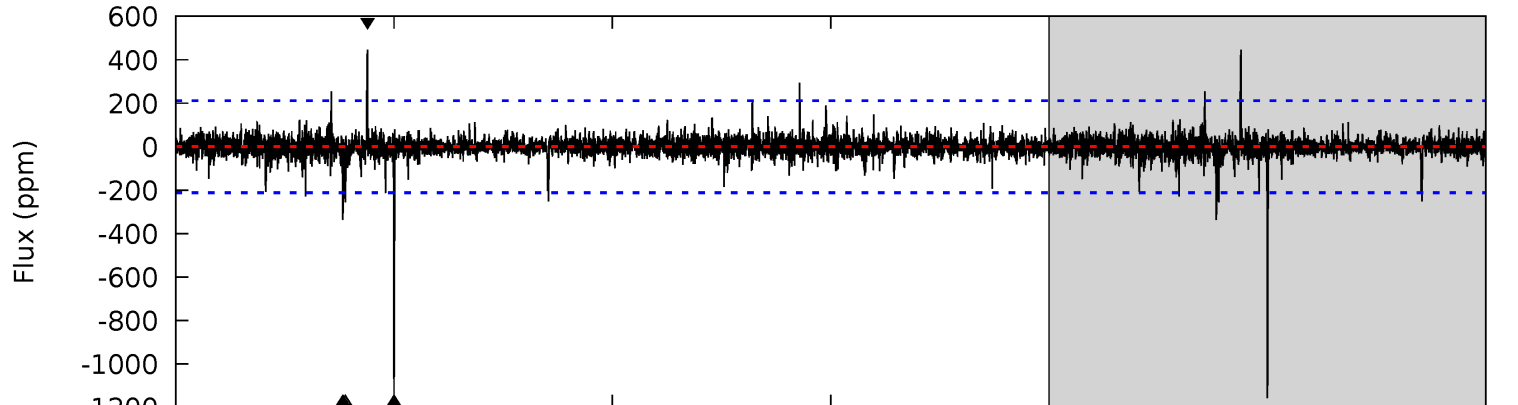
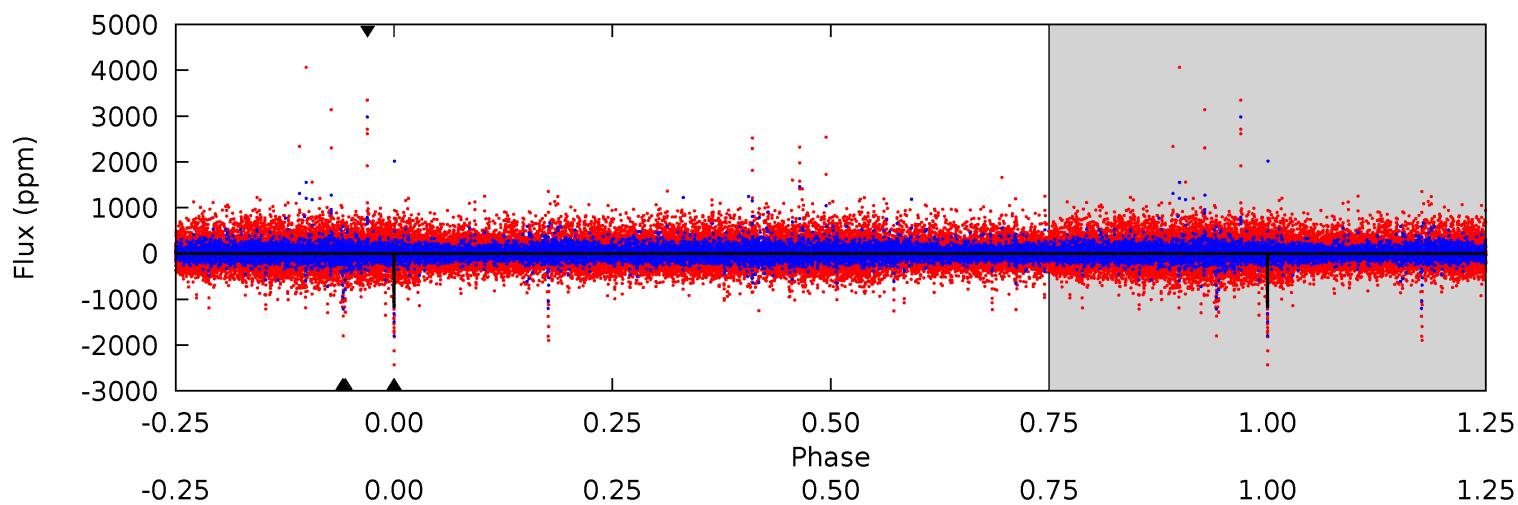
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.31	15.5	11.0	25.5	5.50	3.37	2.84	-4.72	-19.2	4.48	-10.0	0.79	0.86	0.62	2.48



# Alt Model-Shift Uniqueness Test

009093349-05, P = 492.046936 Days, E = 31.747436 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
30.2	8.76	6.65	11.6	5.51	3.38	0.90	23.5	18.5	2.11	-2.85	4.63	0.81	0.28	5.41





### Stellar Parameters For KIC 009093349

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5130^{+154}_{-169}$	$3.434^{+0.497}_{-0.213}$	$-0.020^{+0.250}_{-0.300}$	$4.000^{+1.136}_{-2.109}$	$1.585^{+0.213}_{-0.639}$	$0.035^{+0.170}_{-0.018}$
	+3%/-3%	+14%/-6%	+1250%/-1500%	+28%/-53%	+13%/-40%	+488%/-52%
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 009093349-05 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-1339 \pm 86$	$18.41^{+24.04}_{-13.22}$	$523^{+48}_{-72}$	$4661^{+4042}_{-1136}$	$4265^{+47628}_{-3426}$
Alt.	$-336 \pm 38$	$21.97^{+23.29}_{-15.19}$	$529^{+48}_{-70}$	$3452^{+1707}_{-608}$	$748^{+7135}_{-561}$

$T_{max}$  = 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

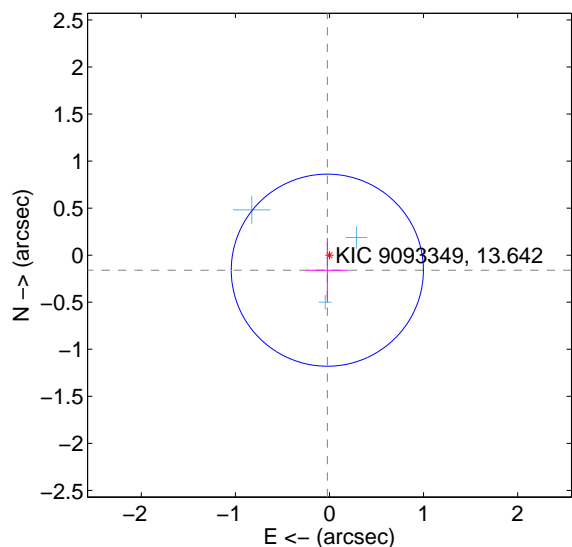
Supplemental centroid analysis for 009093349-05. Kepler magnitude: 13.64. Transit SNR 3.65

There are 3 quarters with good PRF difference image offsets

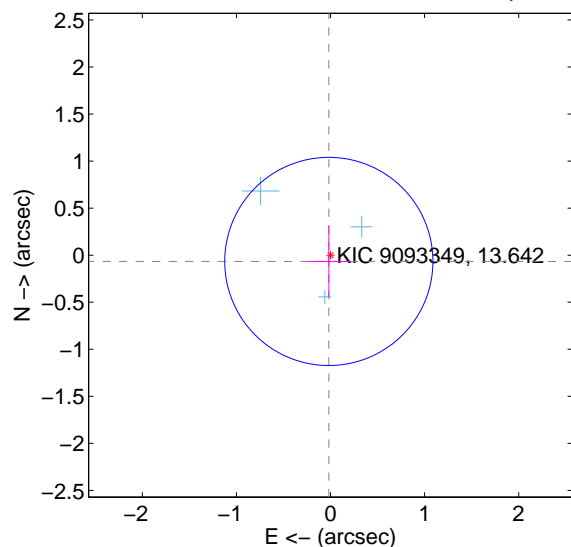
The direct PRF centroid is offset from the target star catalog position by about 0.22 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.161 \pm 0.340$	0.47	$0.023 \pm 0.223$	$-0.159 \pm 0.342$
PRF-fit source offset from KIC position	$0.069 \pm 0.369$	0.19	$0.018 \pm 0.218$	$-0.067 \pm 0.377$
photometric centroid source offset	$0.18 \pm 0.65$	0.28	$0.04 \pm 0.48$	$0.18 \pm 0.66$

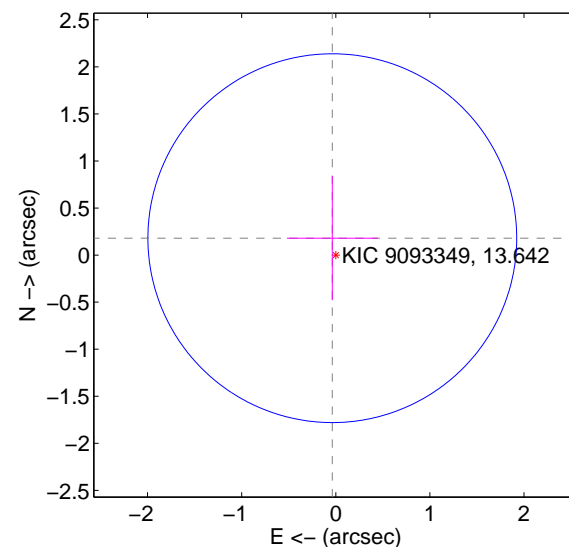
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



offset from photometric centroids

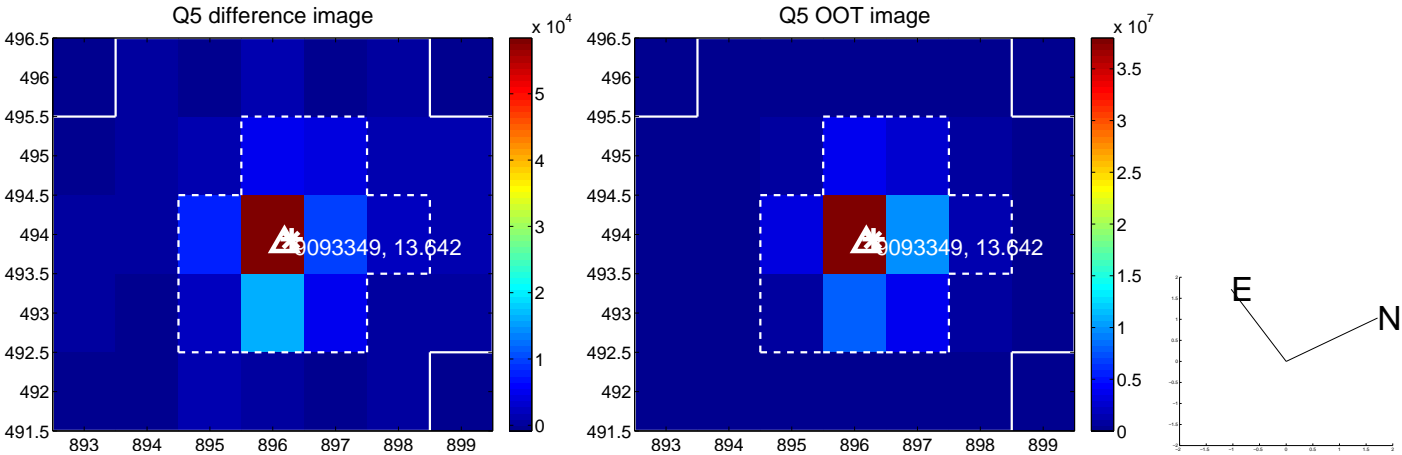


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

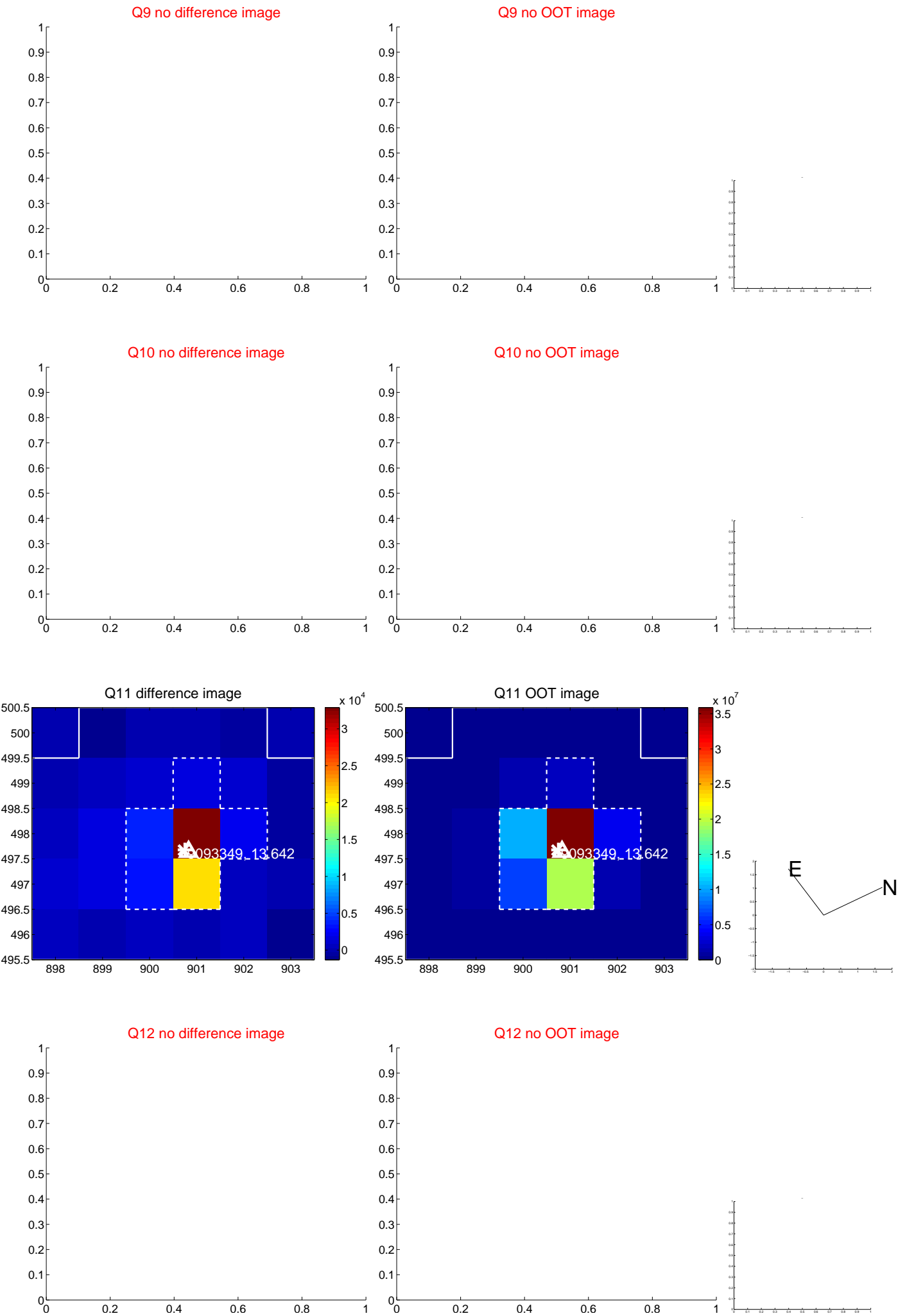
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



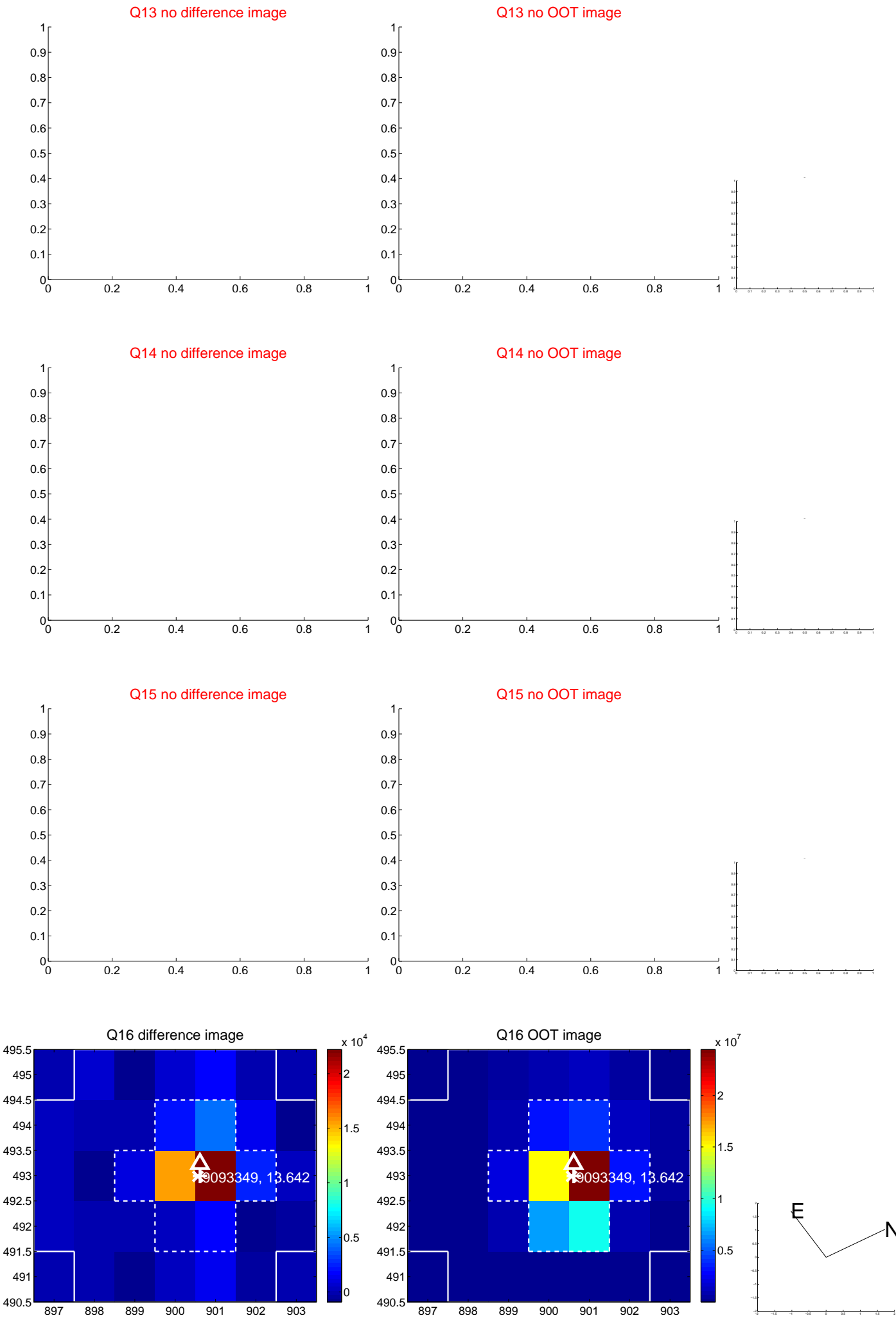
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



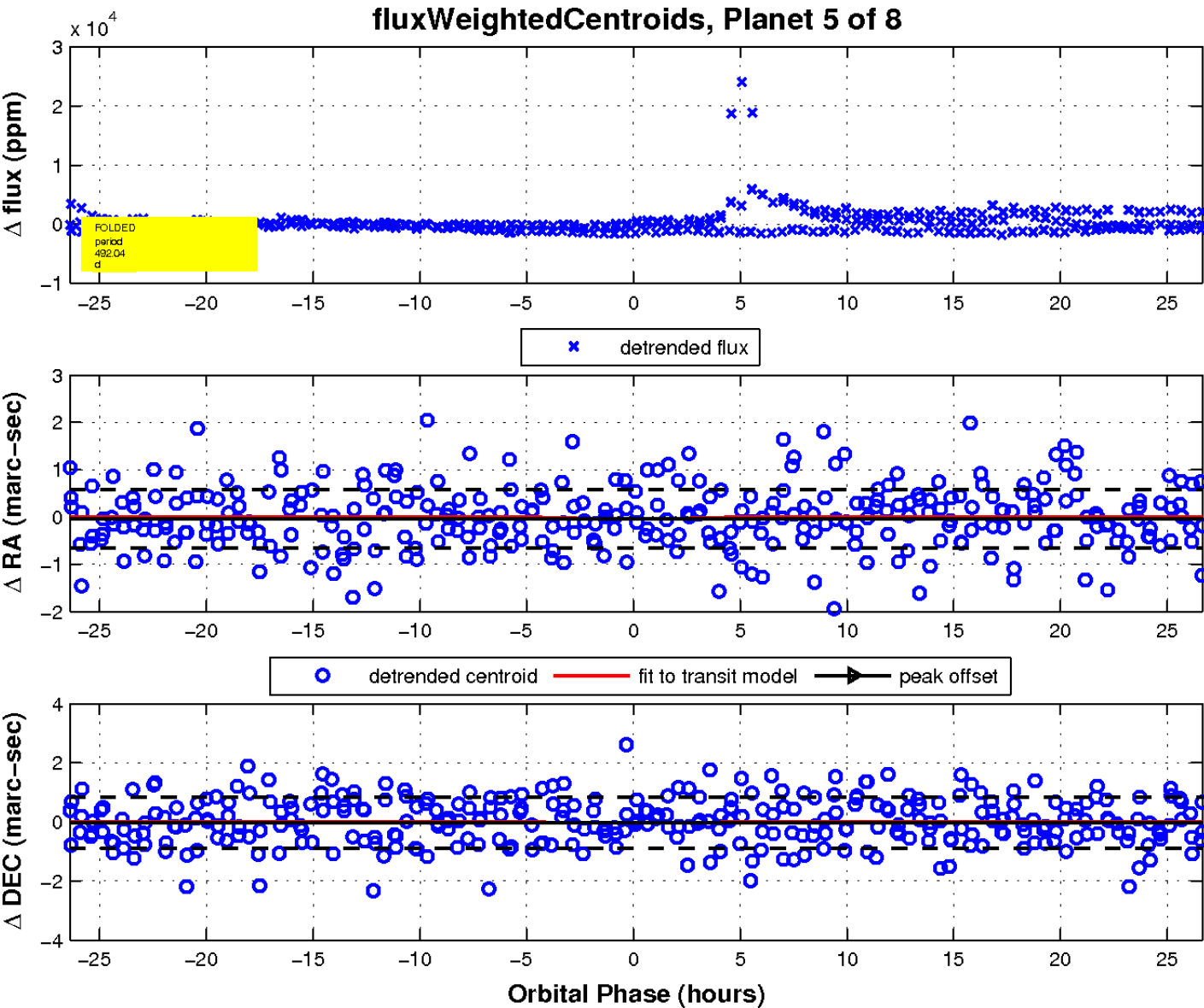
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



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

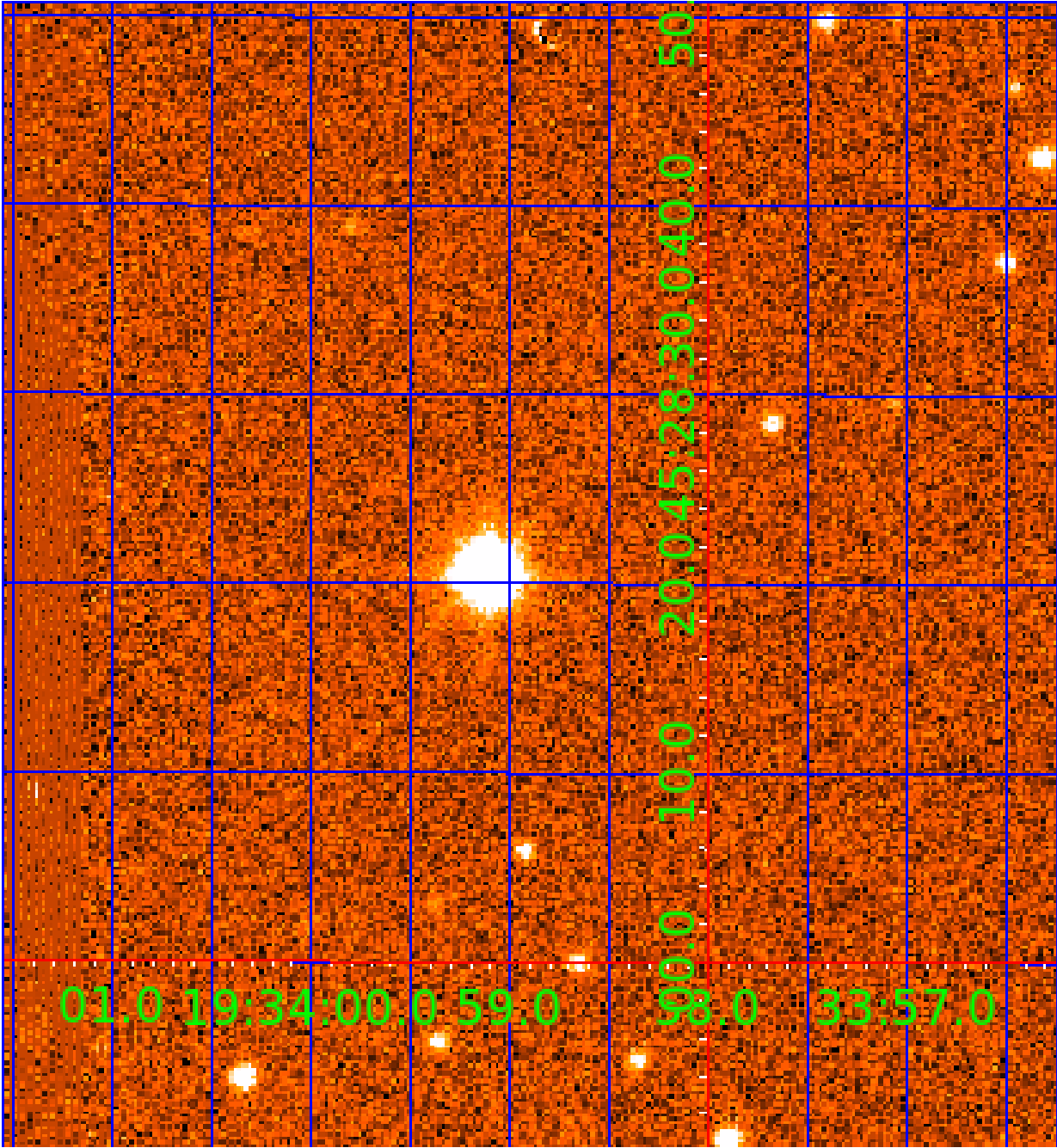


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 009093349

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009093349-01	OBS	No	340.285729	452.139044	2222.4	5.839	18.3	12.6	4.00	5130	20.53	8.02
009093349-02	OBS	No	275.213963	237.892066	290.9	0.967	19.3	2.2	4.00	5130	7.24	10.65
009093349-03	OBS	No	585.487777	238.354648	1271.6	17.182	17.7	5.4	4.00	5130	14.10	3.89
009093349-04	OBS	No	514.521268	508.165431	1341.0	8.308	20.6	7.6	4.00	5130	19.06	4.62
009093349-05	OBS	No	492.040609	523.789347	662.0	8.930	44.0	3.7	4.00	5130	10.06	4.91
009093349-06	OBS	No	394.770320	435.034848	485.5	2.295	12.0	3.5	4.00	5130	10.18	6.58
009093349-07	OBS	No	313.667348	337.970923	926.1	10.068	14.2	6.6	4.00	5130	11.83	8.94
009093349-08	OBS	No	499.232738	455.096850	301.1	12.500	12.5	-1.0	4.00	5130	6.75	4.81

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009093349-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009093349-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
009093349-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_ZUMA—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
009093349-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_ZUMA—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
009093349-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
009093349-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009093349-07	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009093349-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—ALL_TRANS_CHASES—CENT_NOFITS

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

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

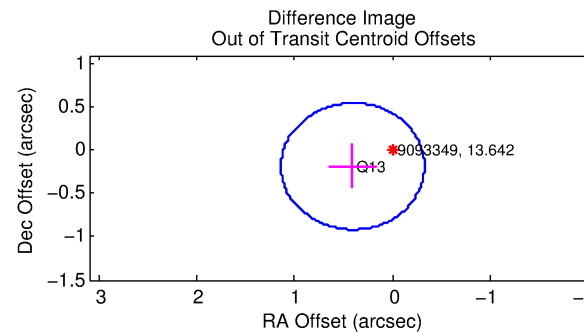
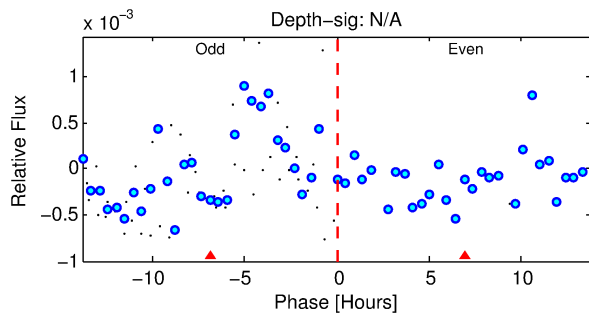
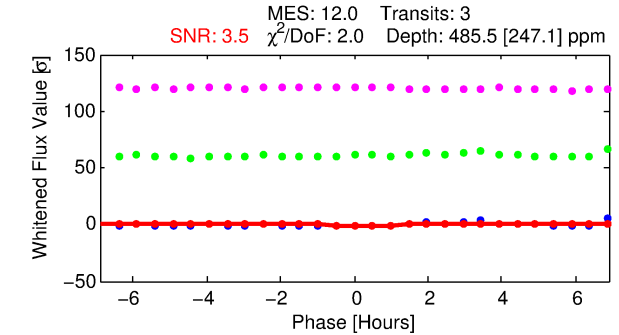
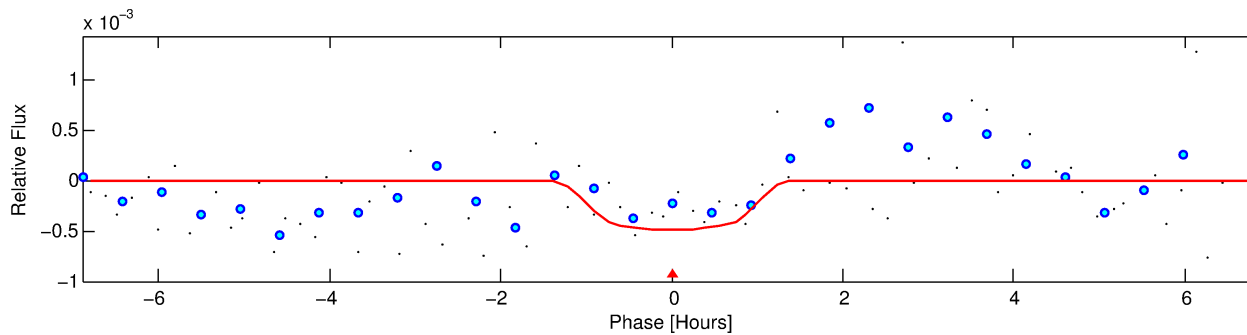
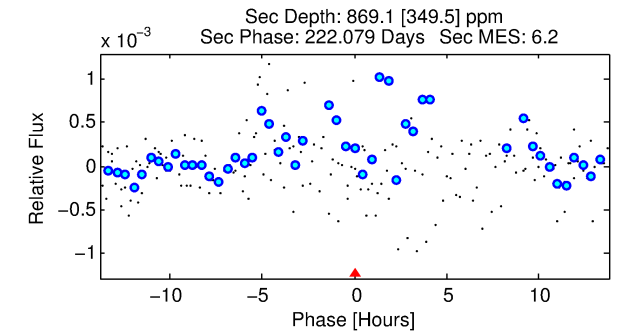
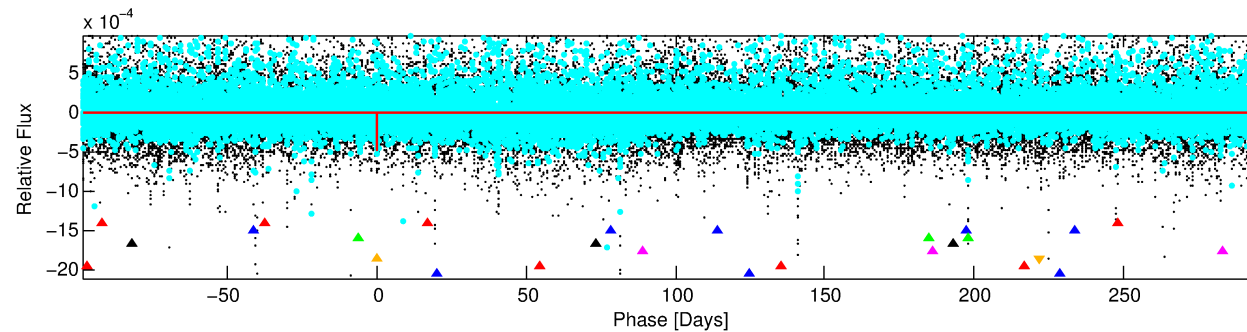
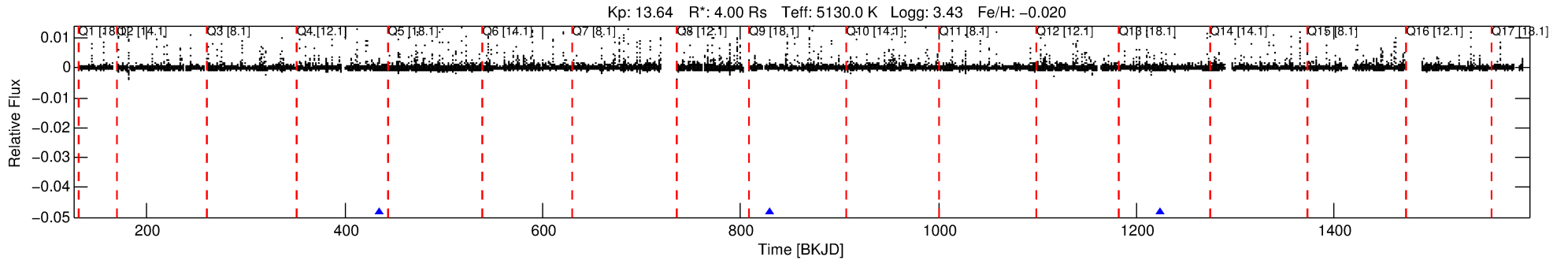
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 009093349-06

No Significant Match Found

# DV One-Page Summary

KIC: 9093349 Candidate: 6 of 8 Period: 394.770 d



## DV Fit Results:

Period = 394.77032 [0.01314] d  
Epoch = 435.0348 [0.0155] BKJD  
Rp/R\* = 0.0233 [0.1007]  
a/R\* = 755.53 [12695.89]  
b = 0.85 [5.80]  
Seff = 6.58 [5.60]  
Teq = 408 [87] K  
Rp = 10.18 [44.26] Re  
a = 1.2283 [0.6371] AU  
Ag = 6959.32 [60414.42] [0.12σ]  
Teffp = 5767 [12459] K [0.43σ]

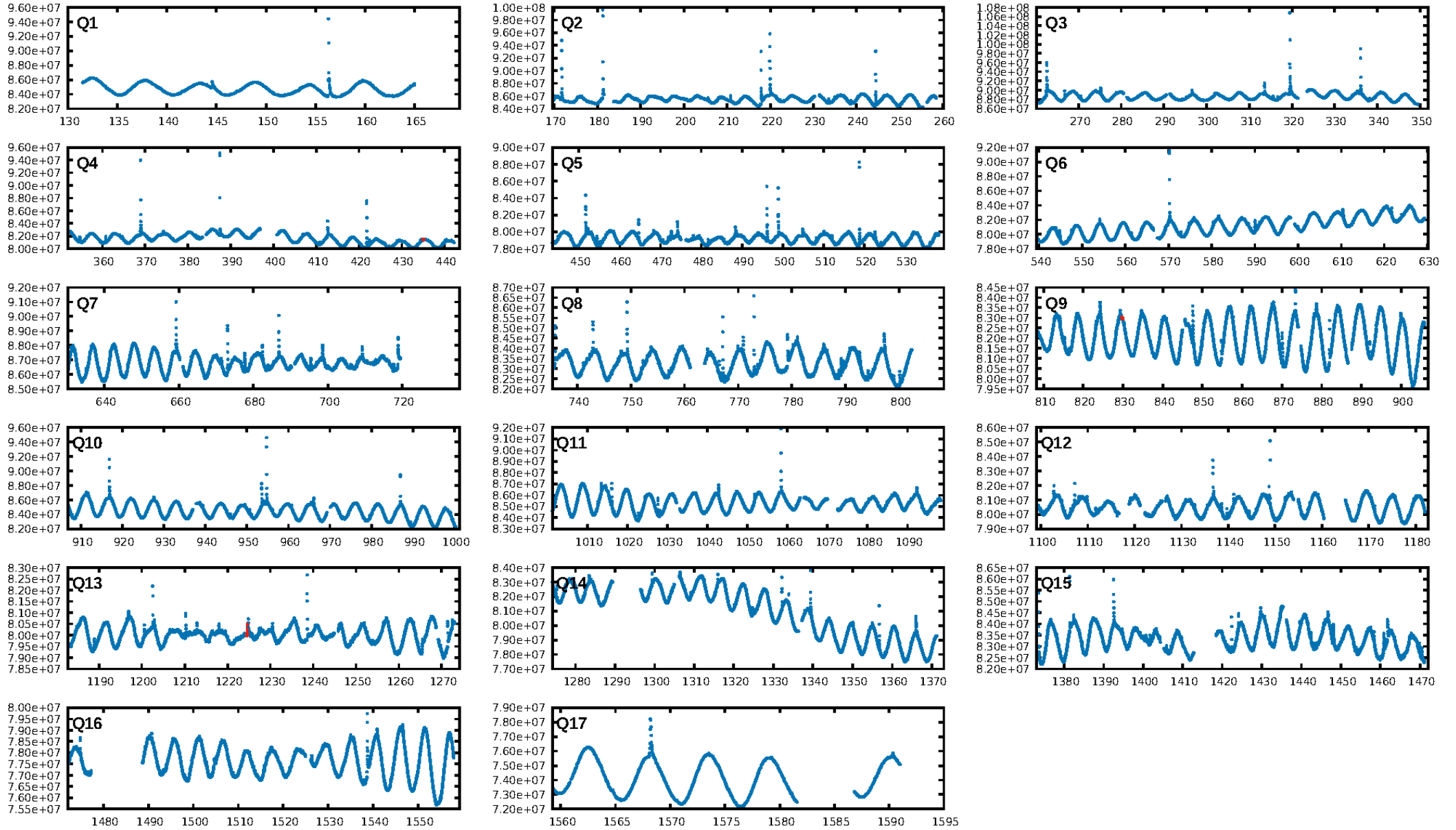
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [208.42σ]  
LongPeriod-sig: 100.0% [253.20σ]  
ModelChiSquare2-sig: 11.0%  
ModelChiSquareGof-sig: 87.6%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 0.5306  
Centroid-sig: 40.2%  
Centroid-so: 1.164 arcsec [0.76σ]  
OotOffset-rm: 0.446 arcsec [1.83σ]  
KicOffset-rm: 0.447 arcsec [1.84σ]  
OotOffset-st: 0/0/0/1 [1]  
KicOffset-st: 0/0/0/1 [1]  
DiffImageQuality-fgm: 1.00 [1/1]  
DiffImageOverlap-fno: 1.00 [3/3]

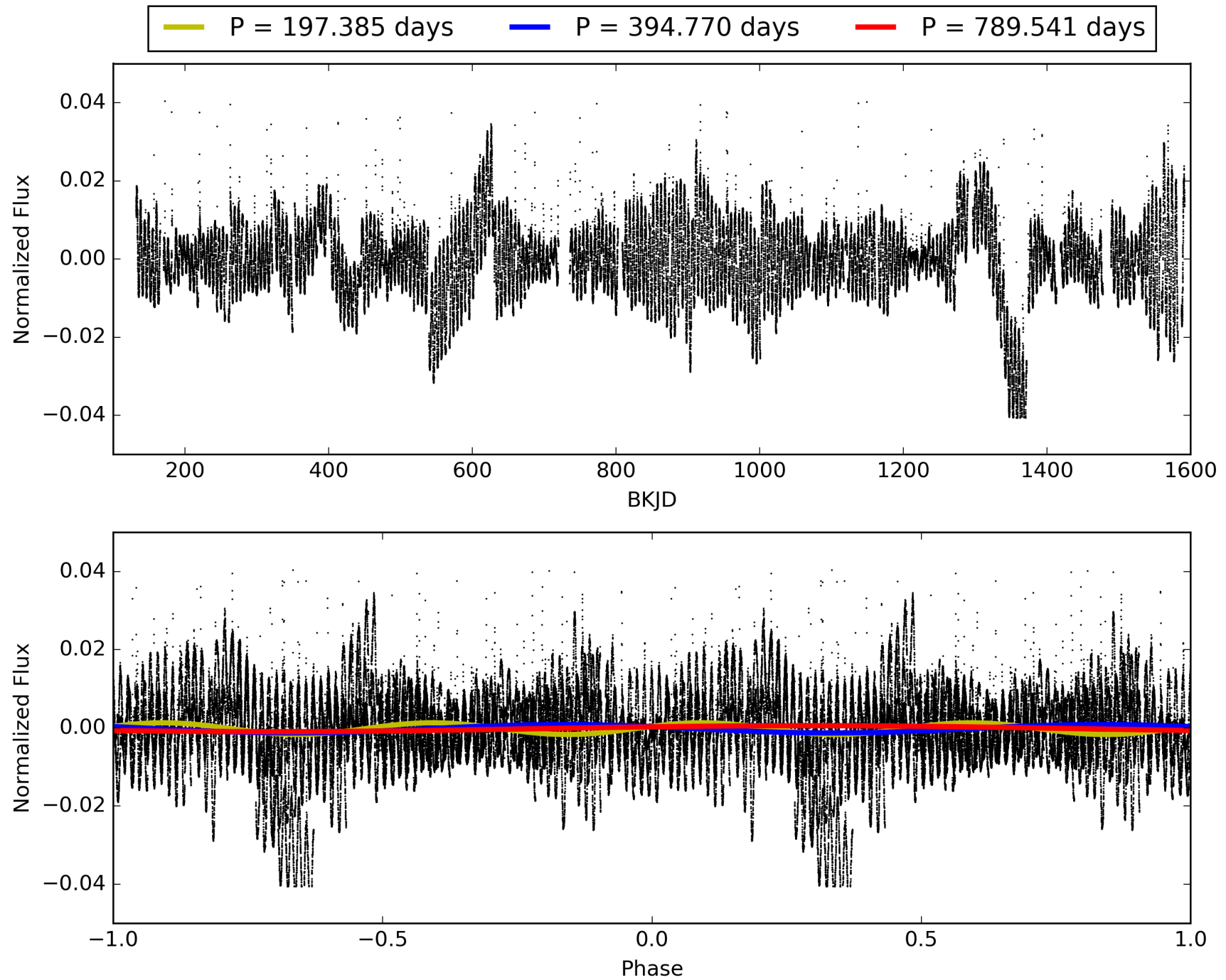
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 23:31:34 Z

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

# TCE 009093349-06, PDC Light Curves

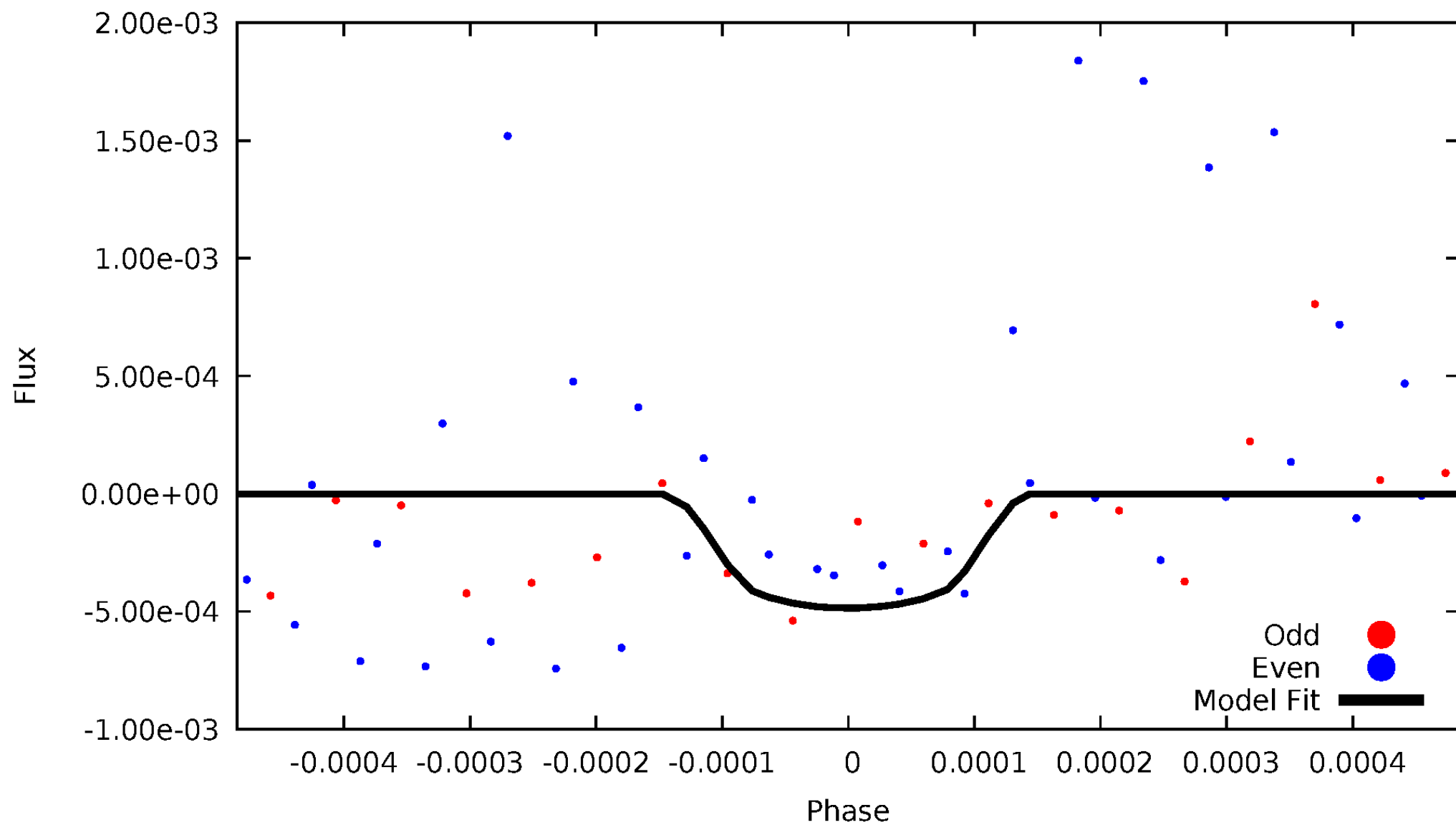


# TCE 009093349-06



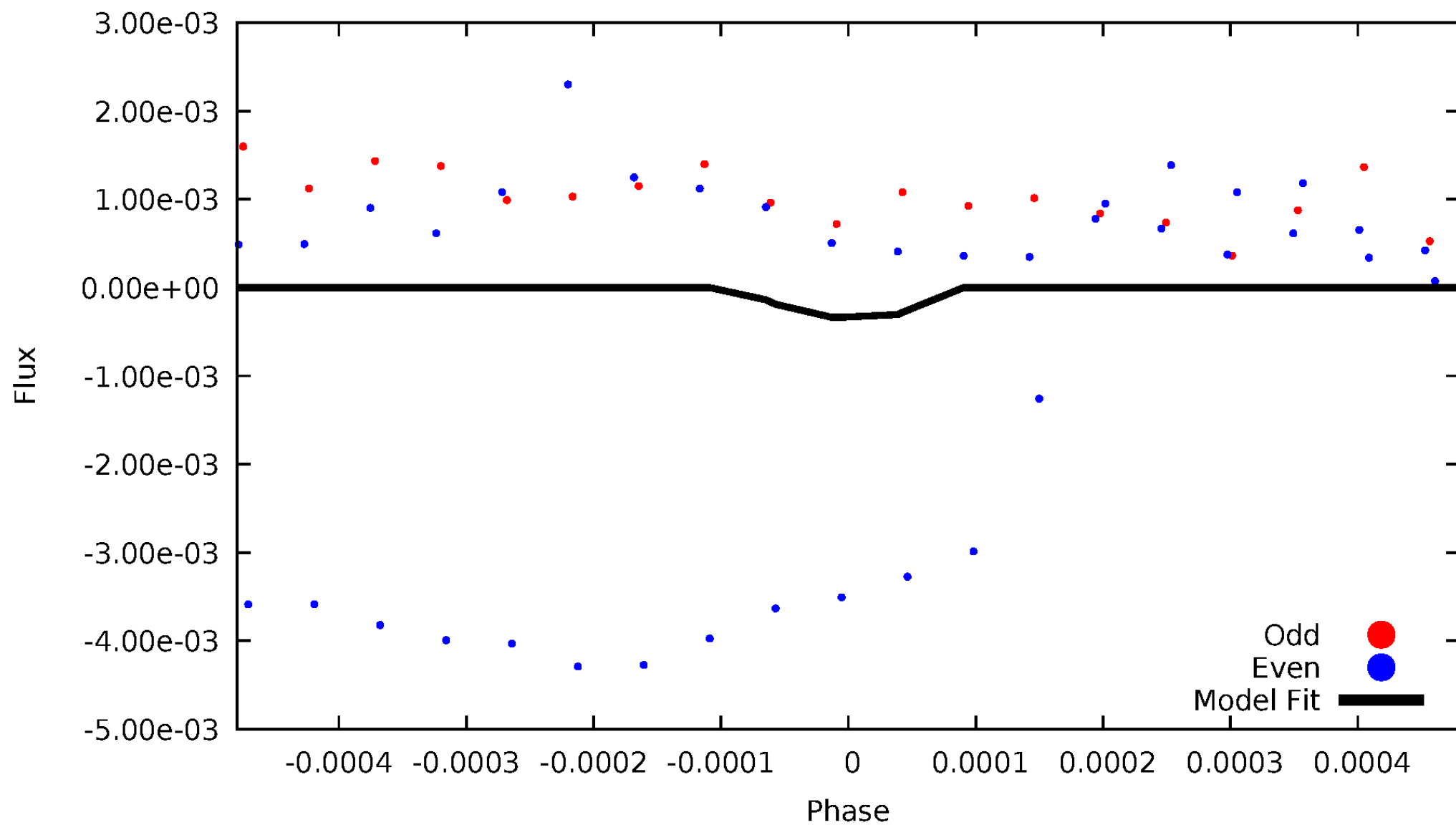
# DV Odd/Even

TCE 009093349-06



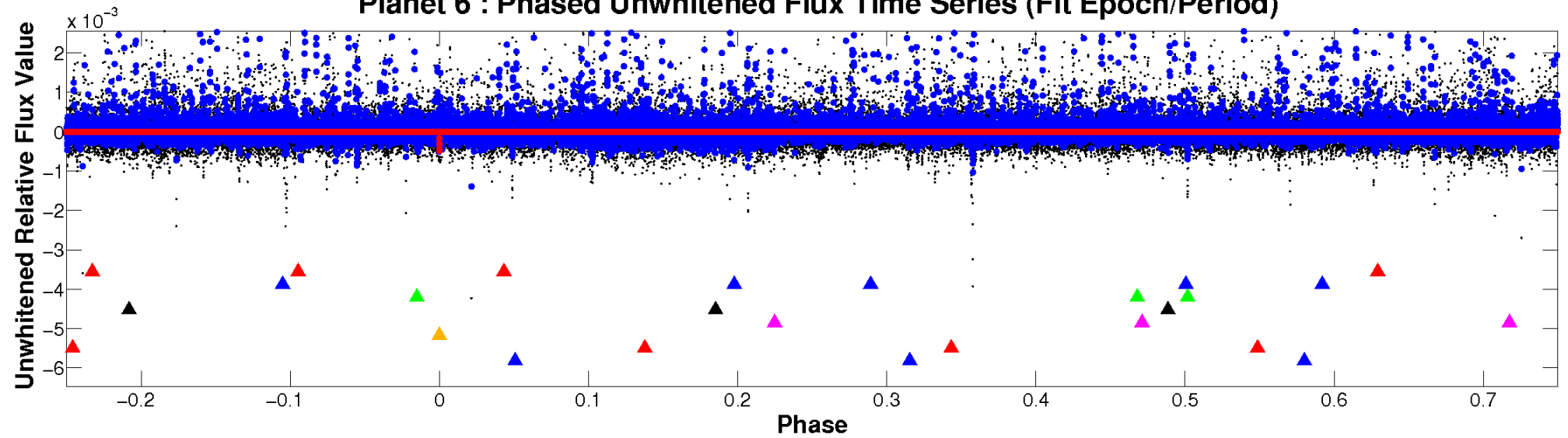
# ALT Odd/Even

TCE 009093349-06

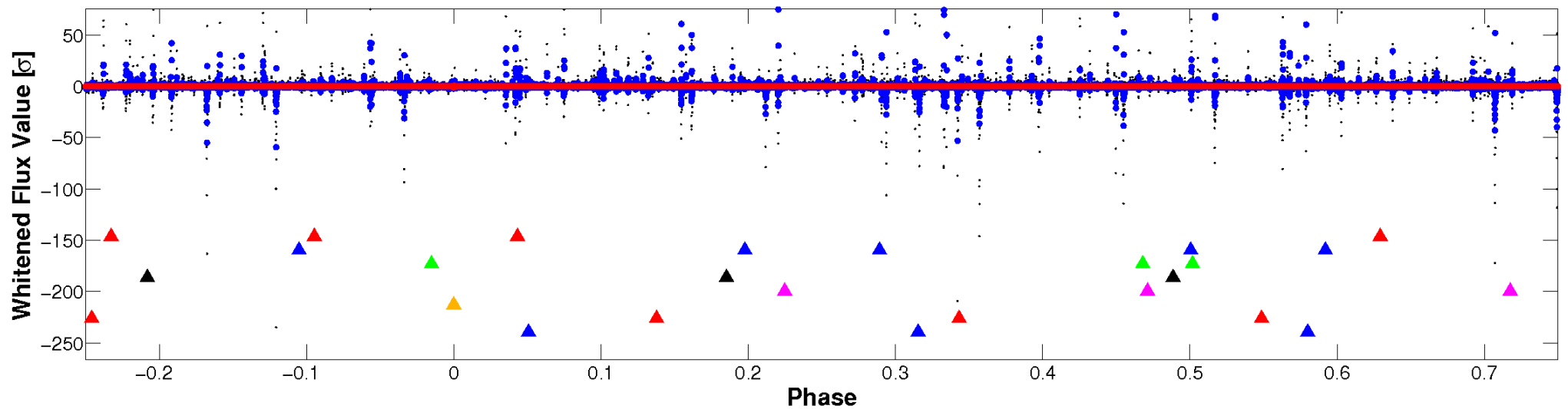


# Non-Whitened Vs. Whitened Light Curve

## Planet 6 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

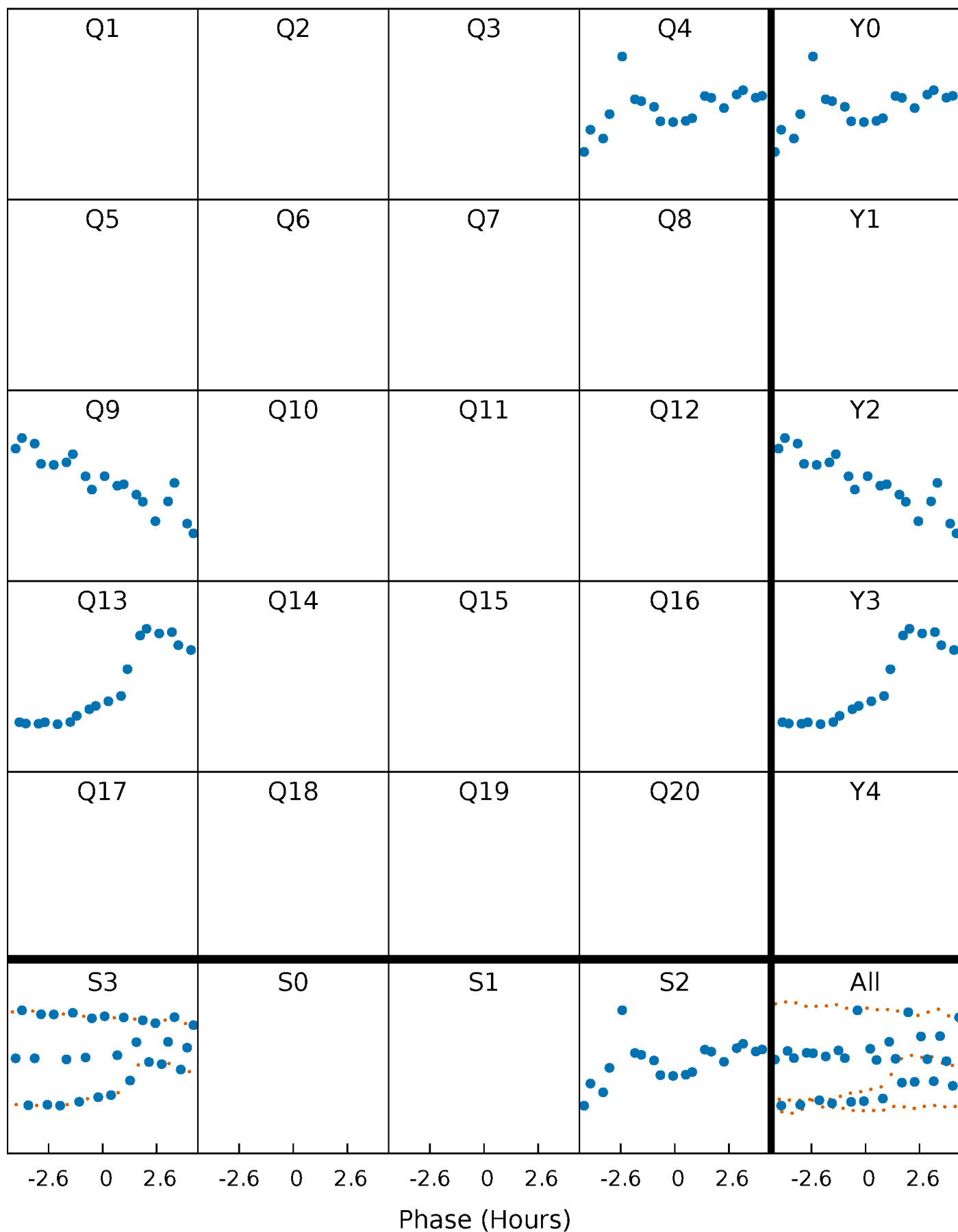


## Planet 6 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

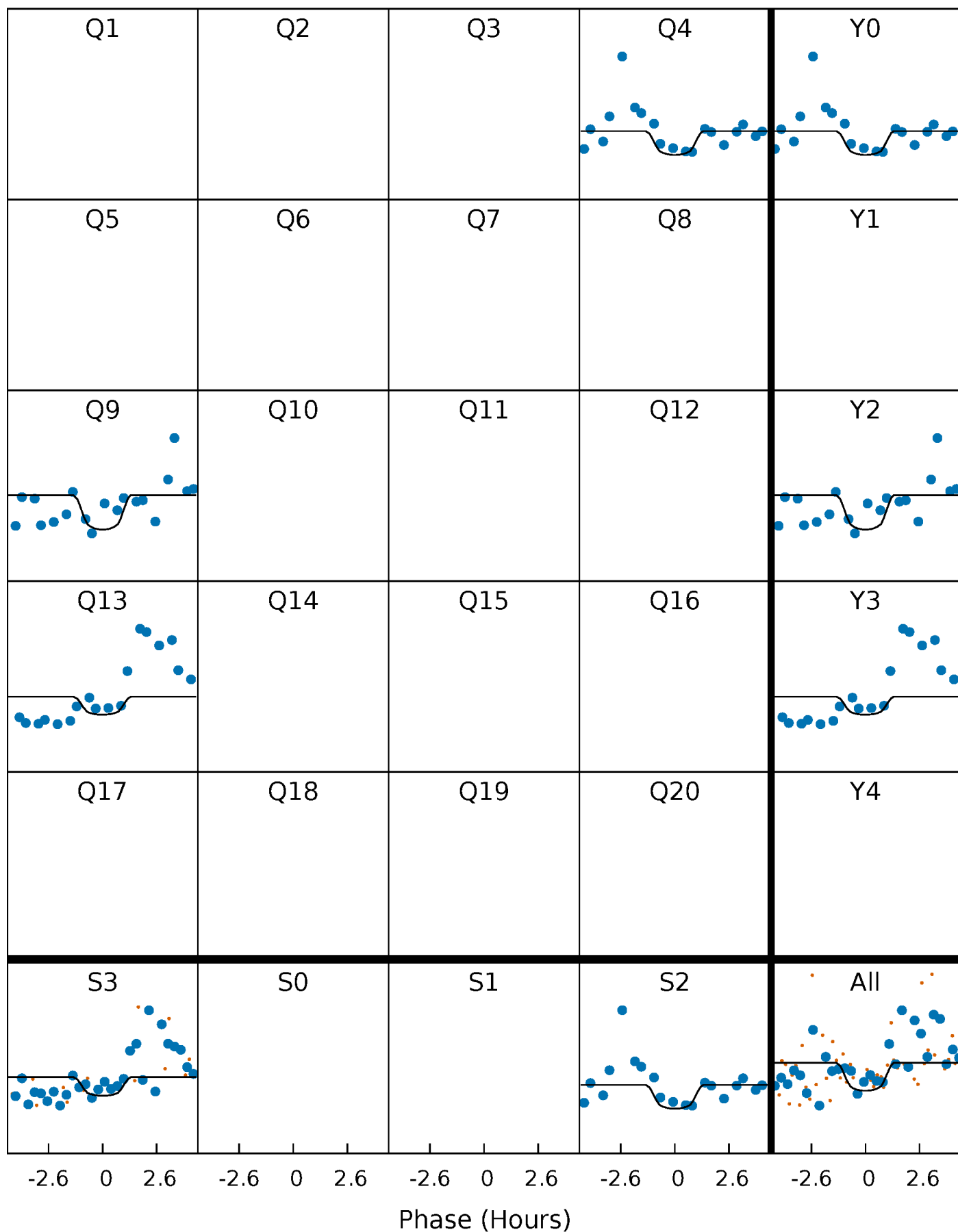
TCE 009093349-06 P=394.770320 Days  $T_0=435.034849$  (BKJD)





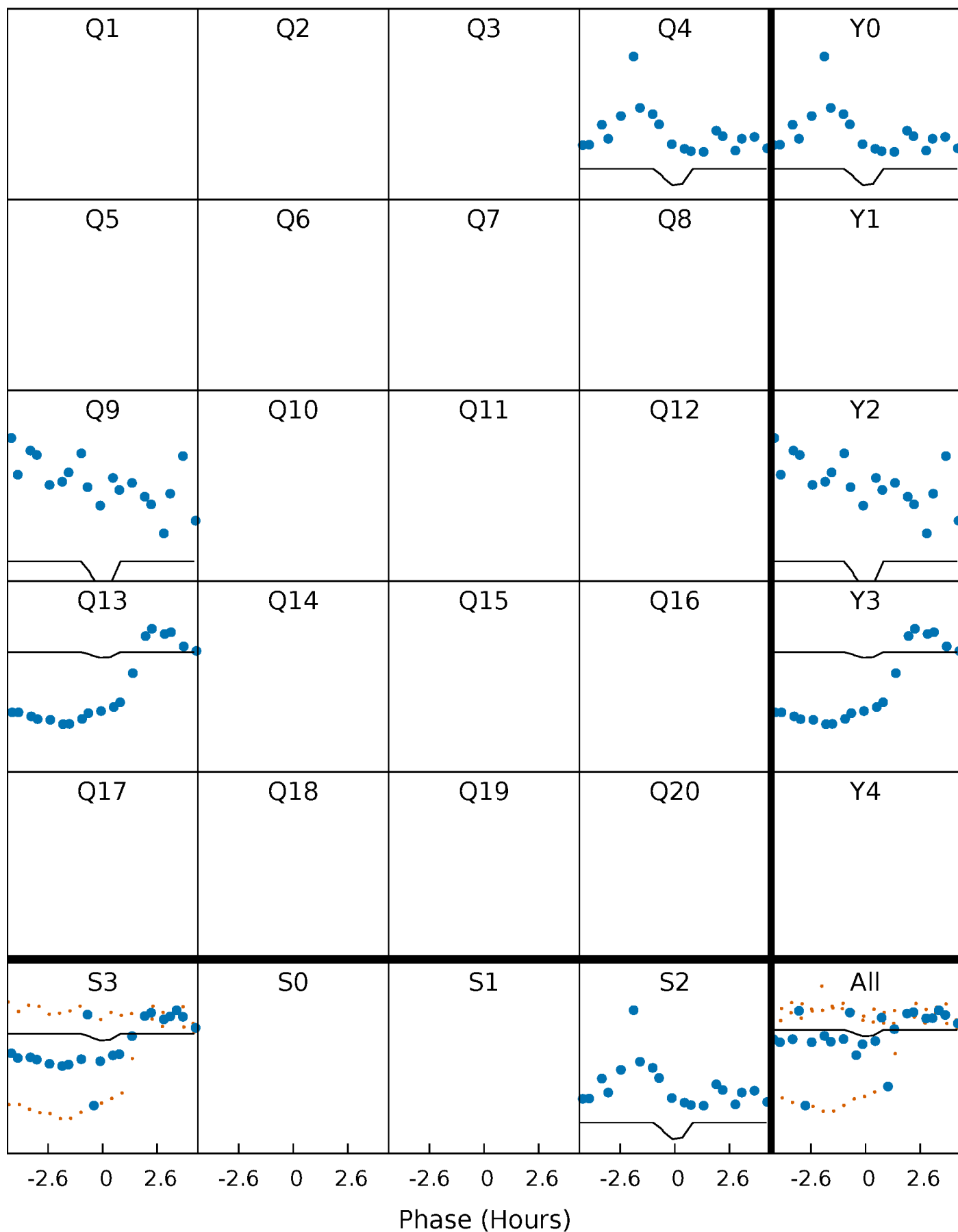
# DV Quarter-Phased Transit Curves

TCE 009093349-06     $P=394.770320$  Days     $T_0=435.034849$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

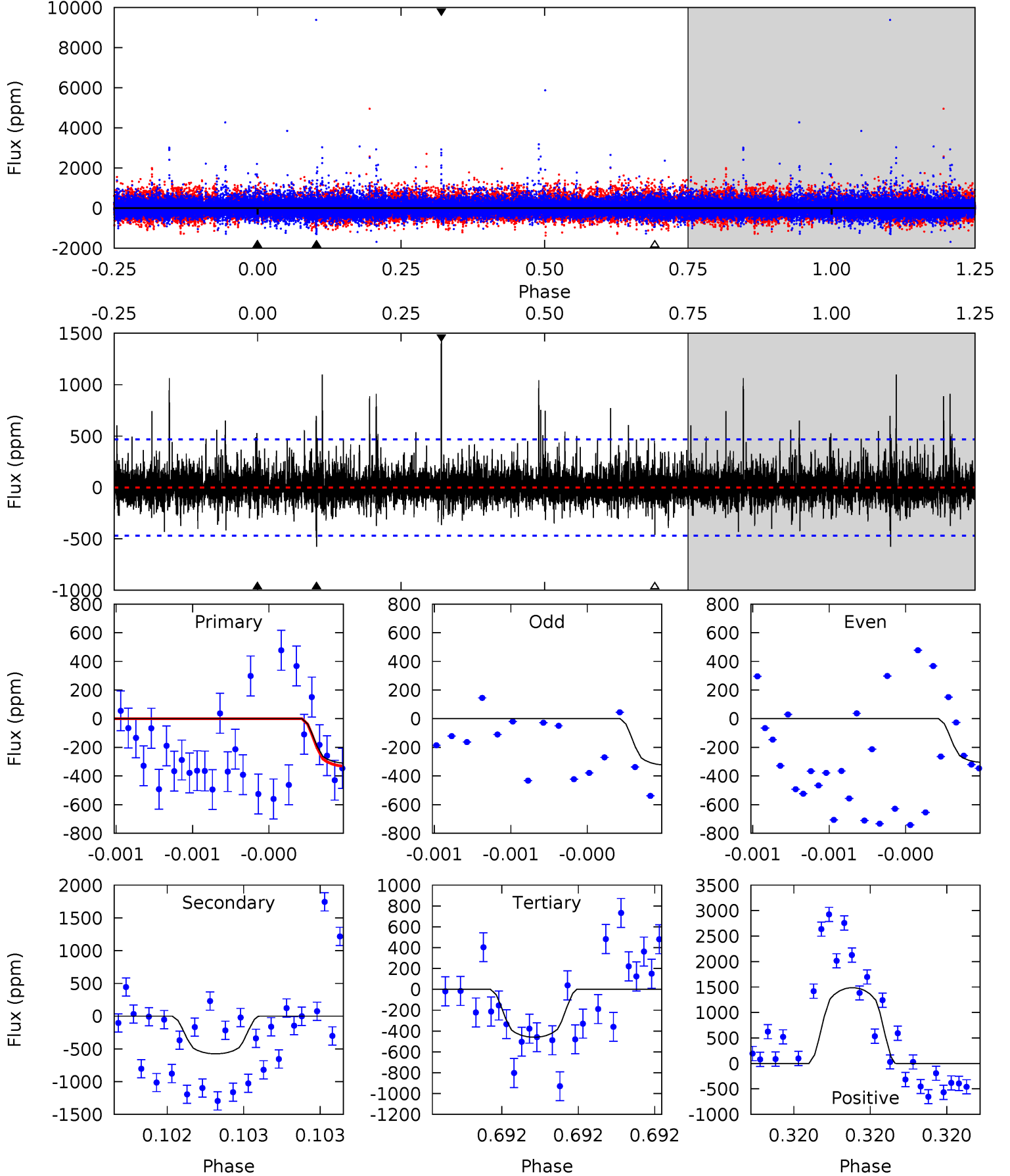
TCE 009093349-06 P=394.776379 Days  $T_0=435.015087$  (BKJD)



# DV Model-Shift Uniqueness Test

009093349-06, P = 394.770320 Days, E = 40.264529 Days

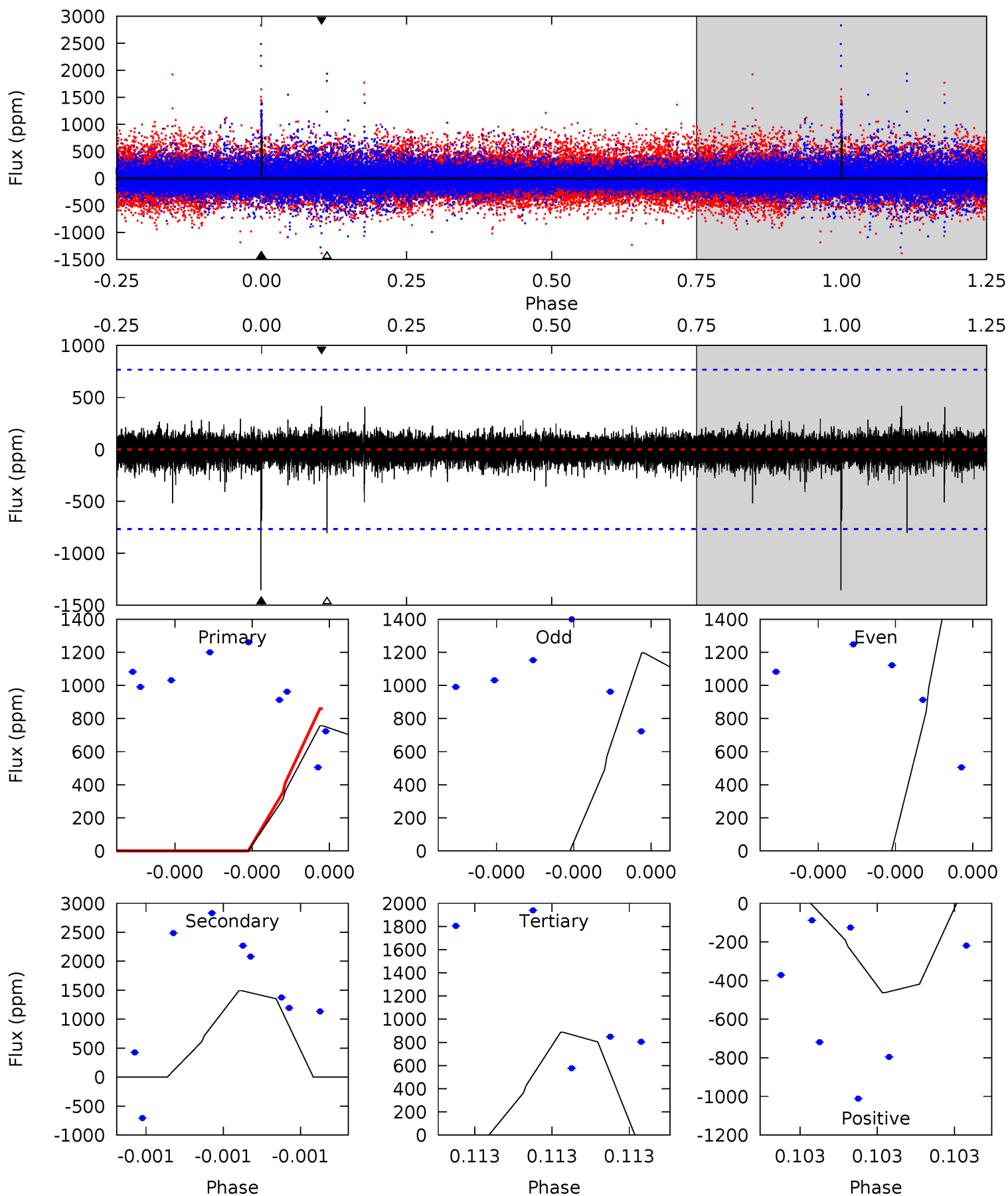
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3.76	6.98	5.58	18.0	5.69	3.65	1.39	-1.82	-14.3	1.40	-11.0	0.04	0.97	0.72	0.25



# Alt Model-Shift Uniqueness Test

009093349-06, P = 394.776379 Days, E = 40.238708 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
5.21	10.3	6.11	3.19	5.84	3.87	0.52	-0.90	2.02	4.17	7.10	3.19	-1.34	0.24	0



### Stellar Parameters For KIC 009093349

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5130^{+154}_{-169}$	$3.434^{+0.497}_{-0.213}$	$-0.020^{+0.250}_{-0.300}$	$4.000^{+1.136}_{-2.109}$	$1.585^{+0.213}_{-0.639}$	$0.035^{+0.170}_{-0.018}$
	+3%/-3%	+14%/-6%	+1250%/-1500%	+28%/-53%	+13%/-40%	+488%/-52%
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 009093349-06 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-575 \pm 82$	$29.27^{+35.03}_{-20.32}$	$567^{+54}_{-81}$	$3386^{+1802}_{-651}$	$535^{+4899}_{-430}$
Alt.	$-1352 \pm 131$	$31.45^{+36.53}_{-22.17}$	$564^{+56}_{-80}$	$3797^{+2479}_{-741}$	$1100^{+10666}_{-864}$

$T_{max}$  = 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

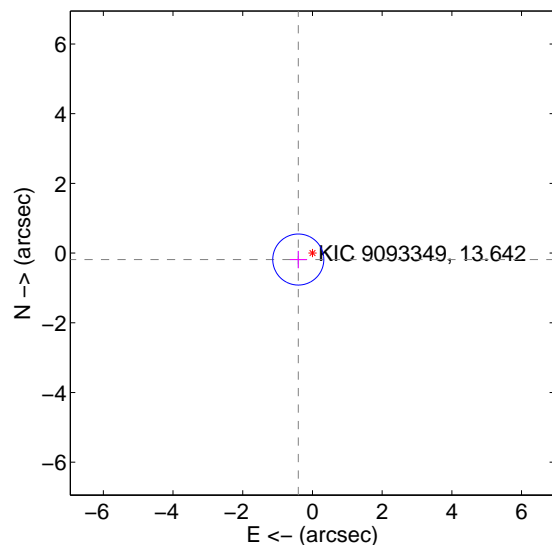
Supplemental centroid analysis for 009093349-06. Kepler magnitude: 13.64. Transit SNR 3.50

There are 1 quarters with good PRF difference image offsets

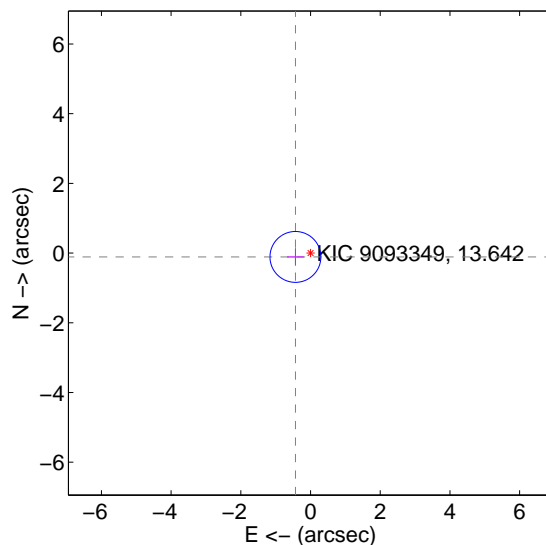
The direct PRF centroid is offset from the target star catalog position by about 0.08 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.446 \pm 0.244$	1.83	$0.406 \pm 0.243$	$-0.185 \pm 0.250$
PRF-fit source offset from KIC position	$0.447 \pm 0.243$	1.84	$0.433 \pm 0.243$	$-0.110 \pm 0.250$
photometric centroid source offset	$1.16 \pm 1.54$	0.76	$0.57 \pm 1.37$	$1.02 \pm 1.59$

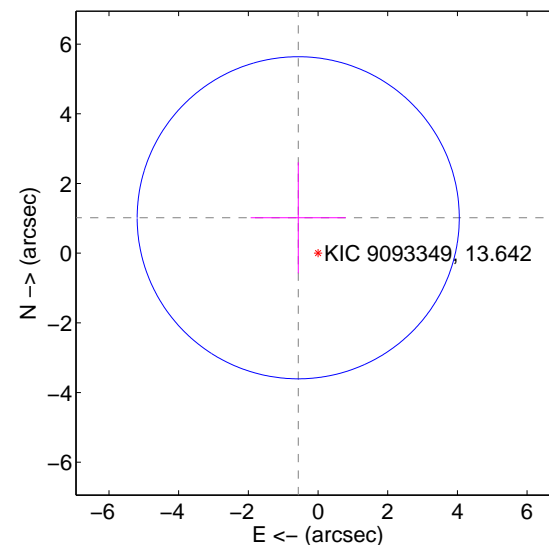
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

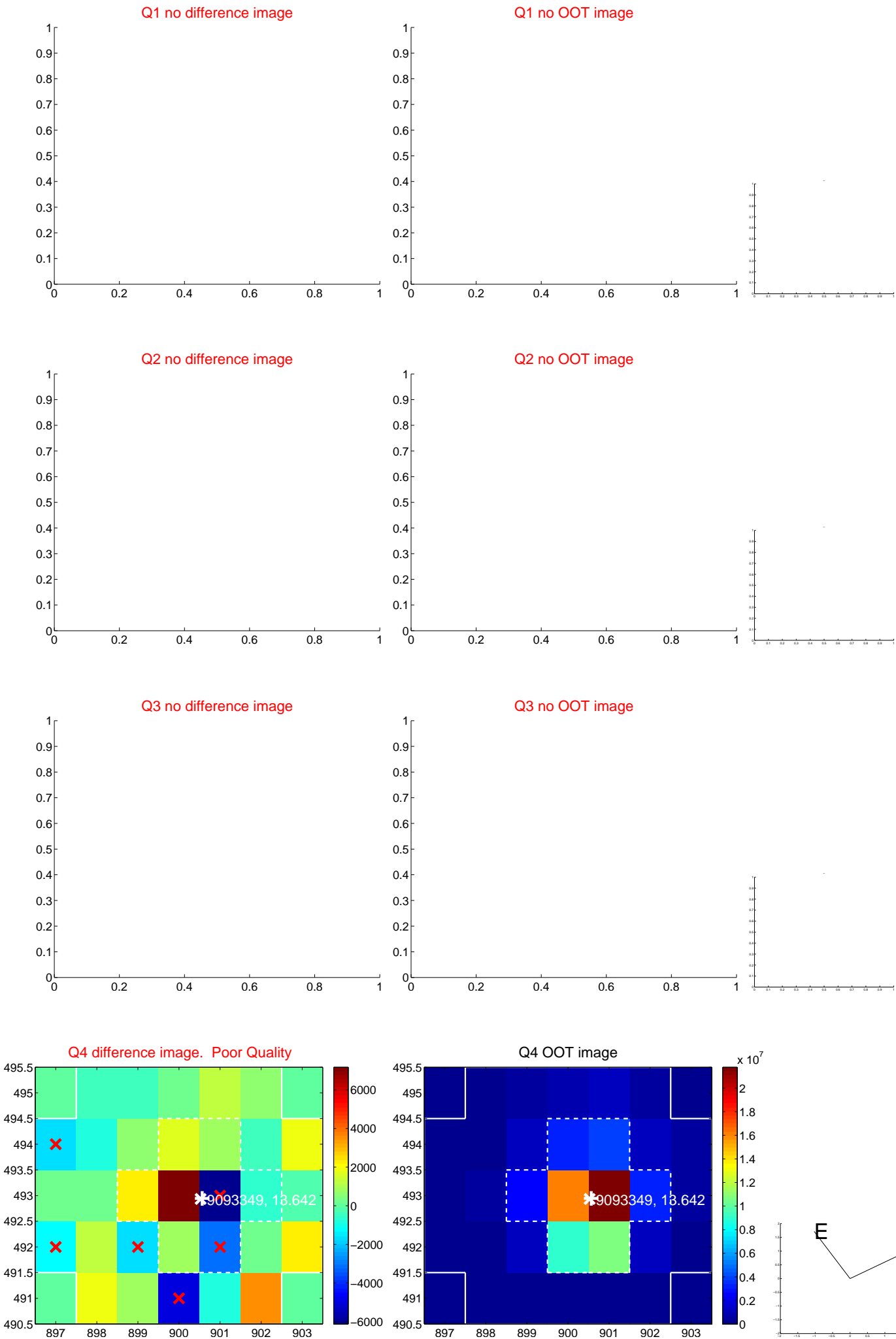


offset from photometric centroids



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 ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.

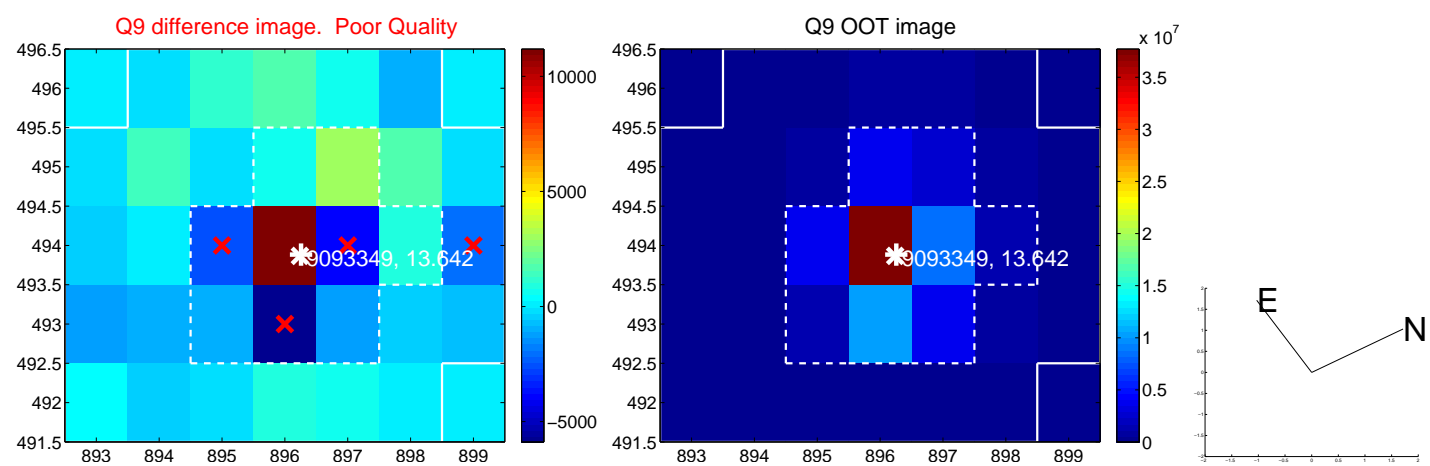


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

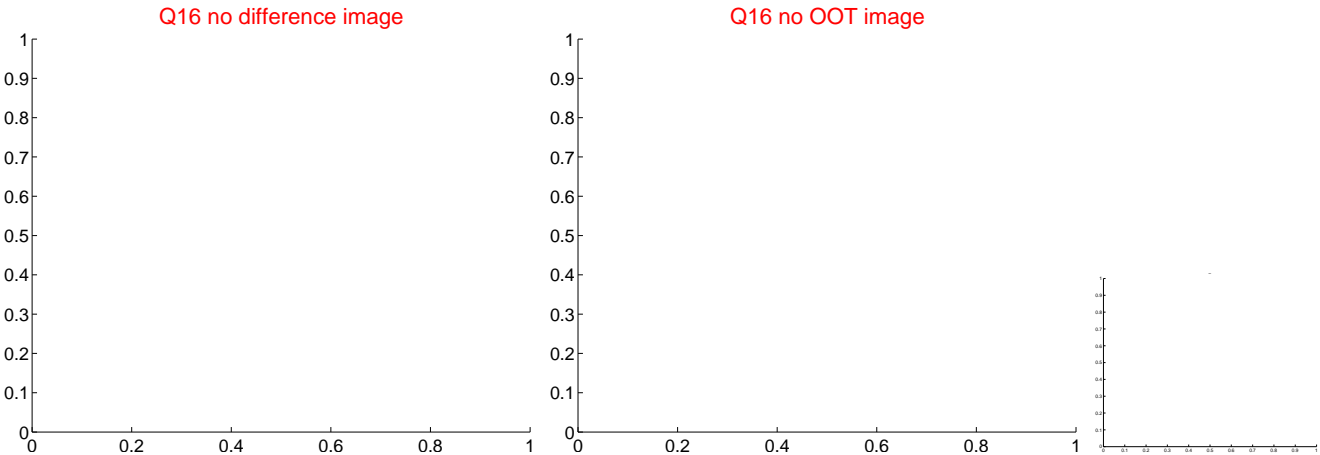
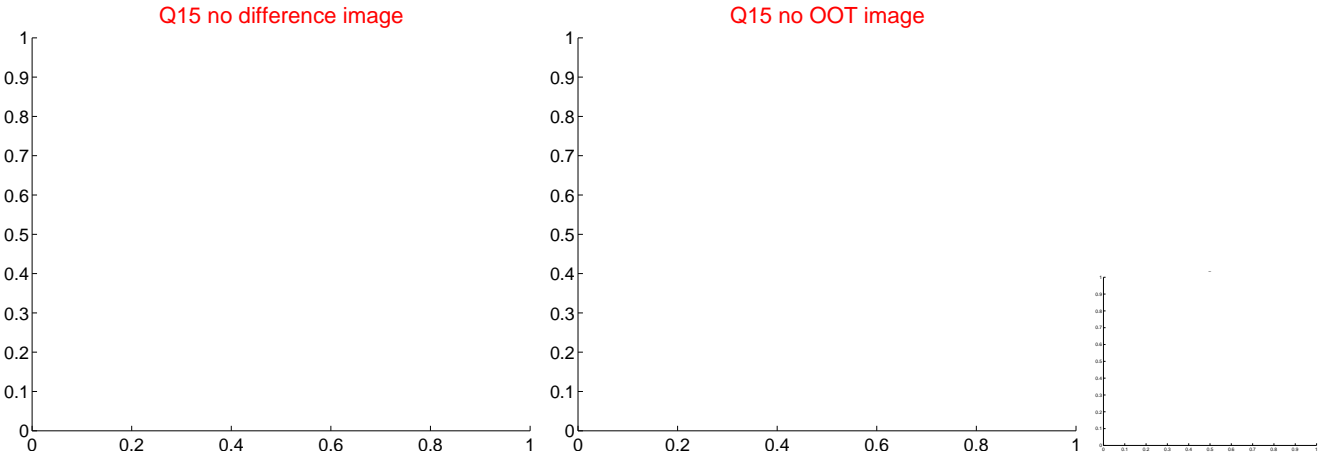
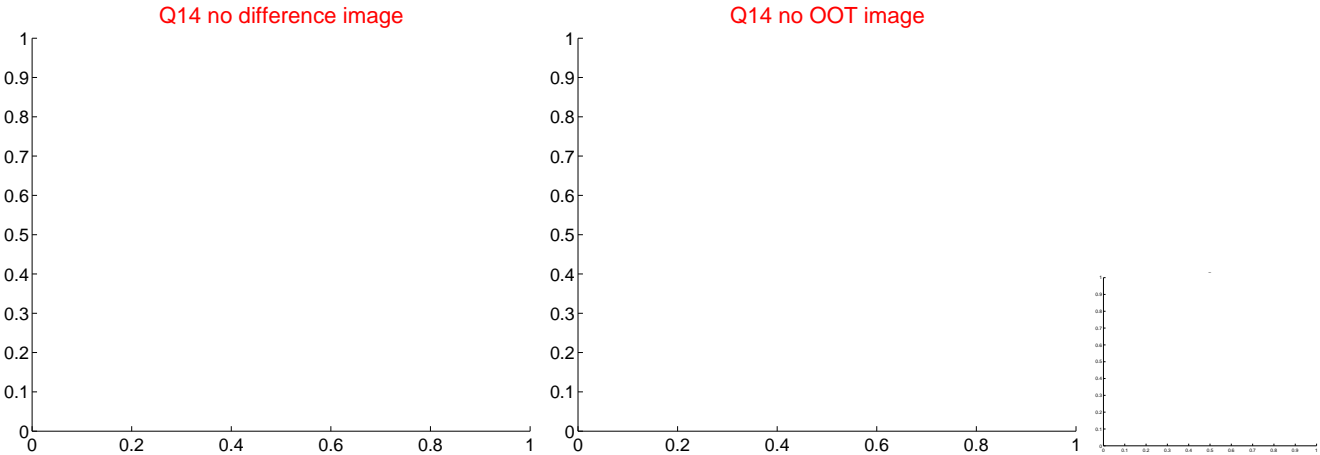
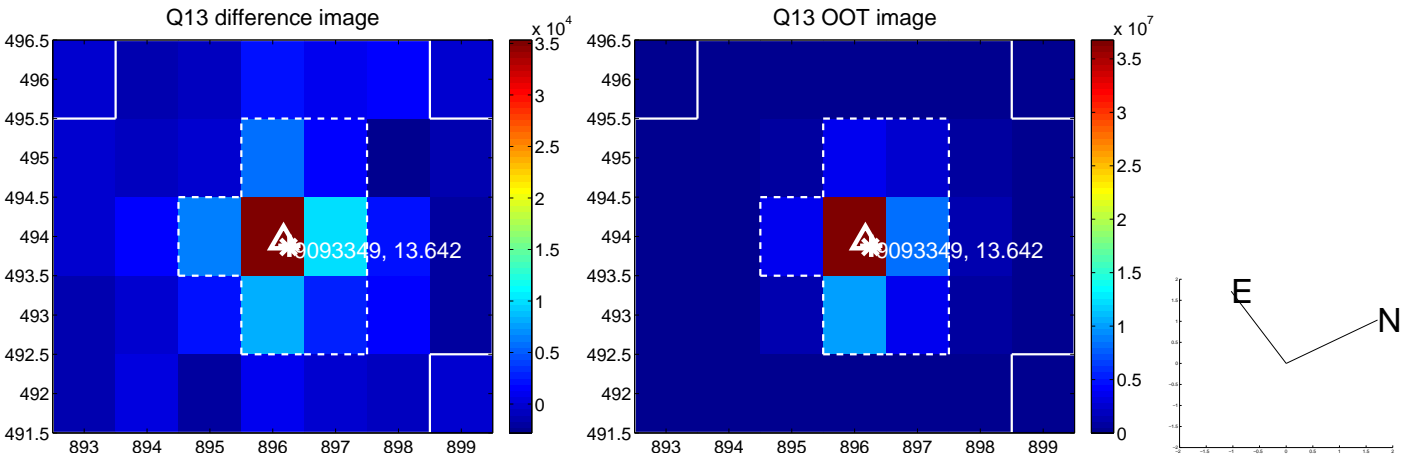




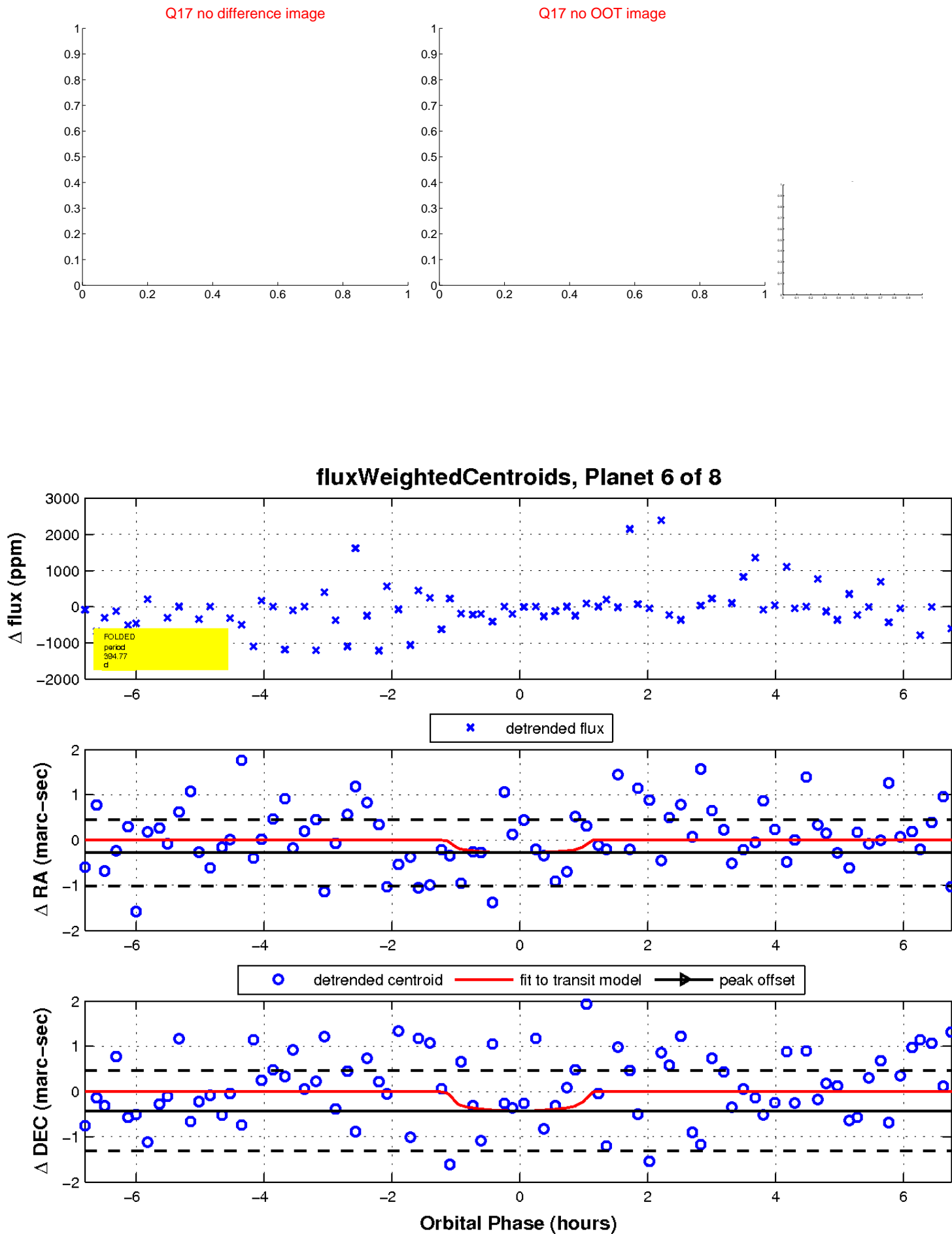
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.

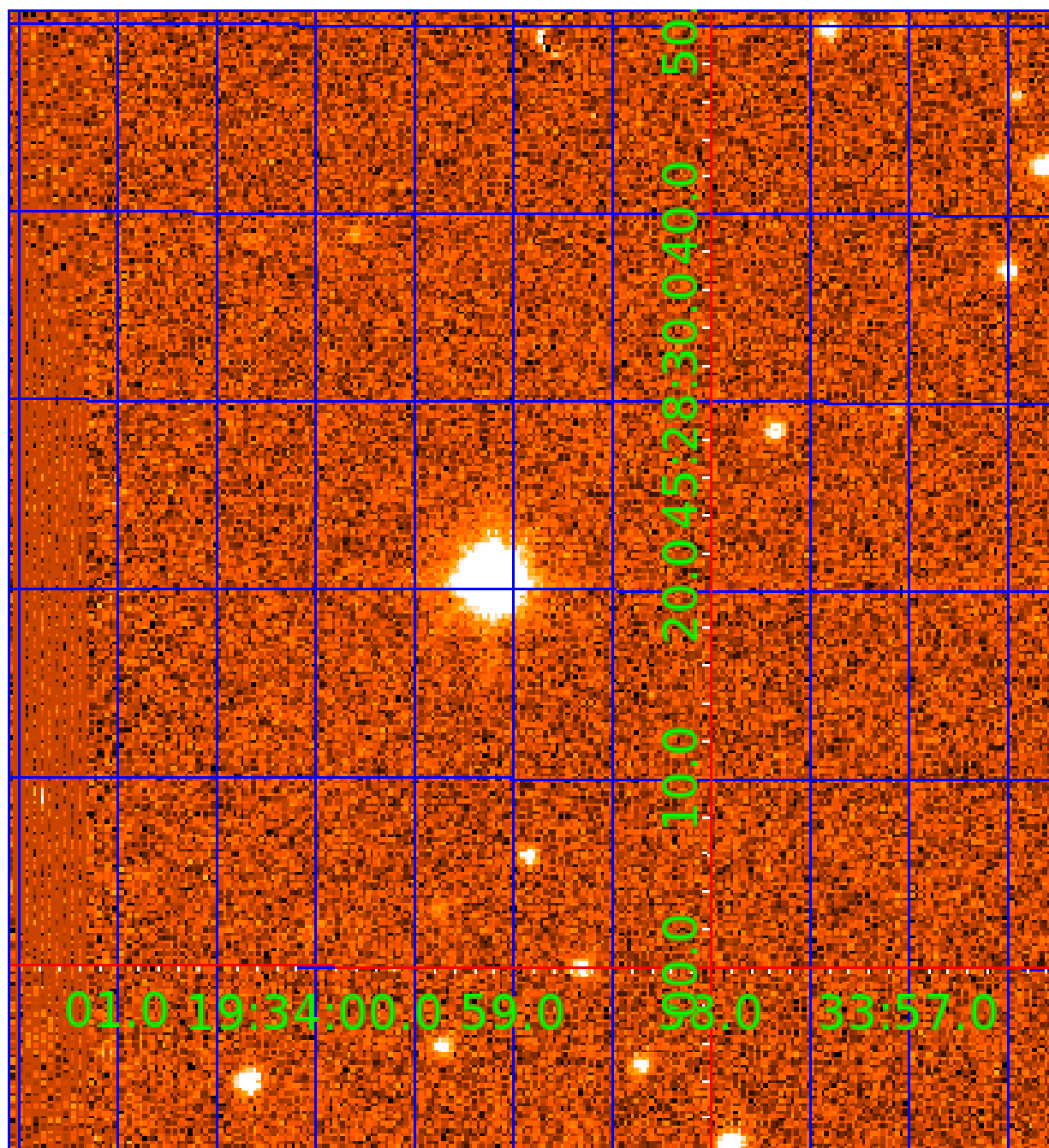


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



## KIC 009093349

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009093349-01	OBS	No	340.285729	452.139044	2222.4	5.839	18.3	12.6	4.00	5130	20.53	8.02
009093349-02	OBS	No	275.213963	237.892066	290.9	0.967	19.3	2.2	4.00	5130	7.24	10.65
009093349-03	OBS	No	585.487777	238.354648	1271.6	17.182	17.7	5.4	4.00	5130	14.10	3.89
009093349-04	OBS	No	514.521268	508.165431	1341.0	8.308	20.6	7.6	4.00	5130	19.06	4.62
009093349-05	OBS	No	492.040609	523.789347	662.0	8.930	44.0	3.7	4.00	5130	10.06	4.91
009093349-06	OBS	No	394.770320	435.034848	485.5	2.295	12.0	3.5	4.00	5130	10.18	6.58
009093349-07	OBS	No	313.667348	337.970923	926.1	10.068	14.2	6.6	4.00	5130	11.83	8.94
009093349-08	OBS	No	499.232738	455.096850	301.1	12.500	12.5	-1.0	4.00	5130	6.75	4.81

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009093349-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009093349-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
009093349-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_ZUMA—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
009093349-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_ZUMA—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
009093349-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
009093349-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009093349-07	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009093349-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—ALL_TRANS_CHASES—CENT_NOFITS

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

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

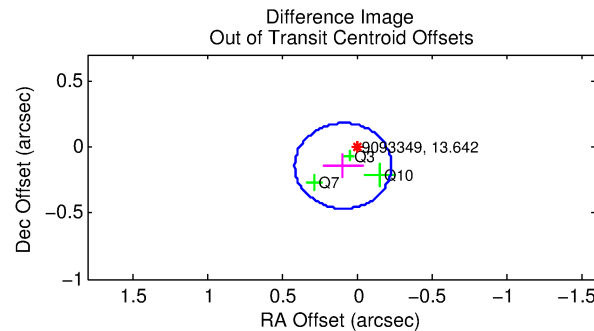
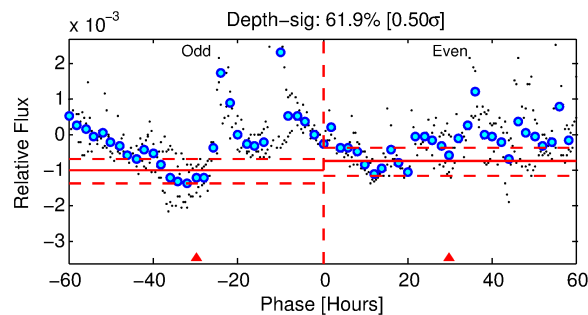
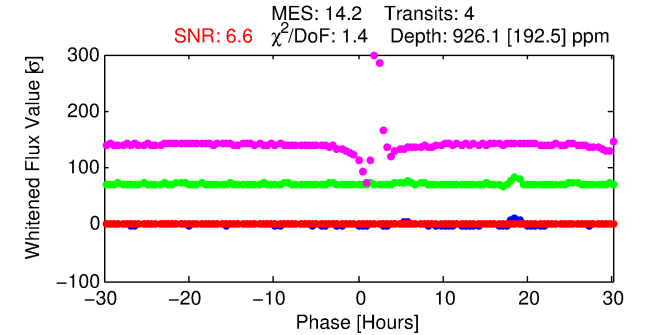
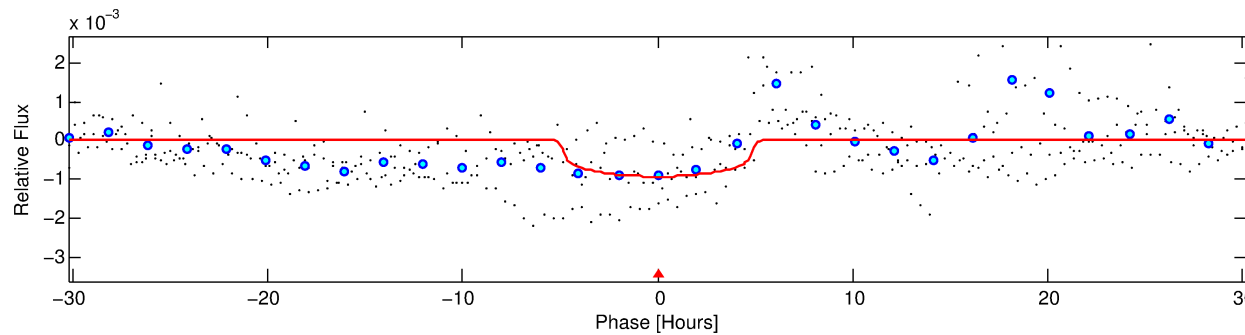
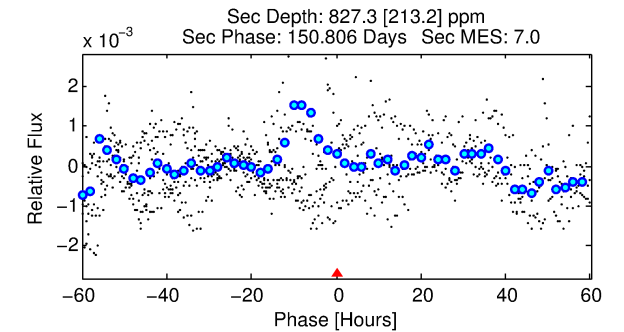
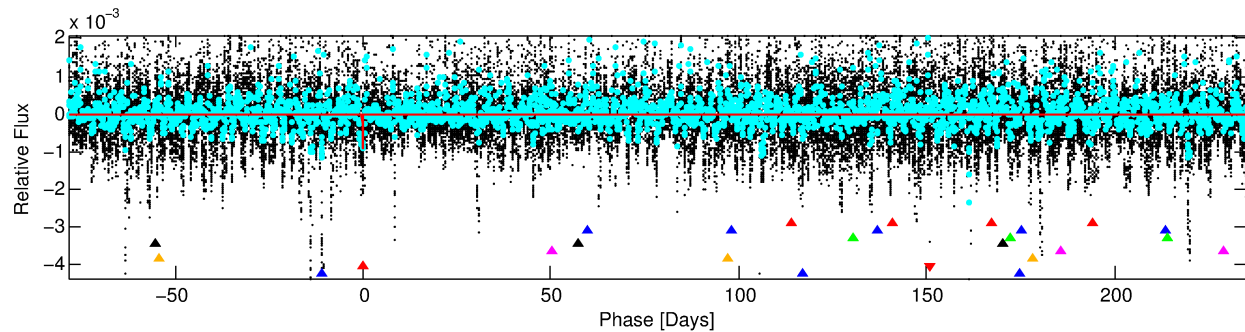
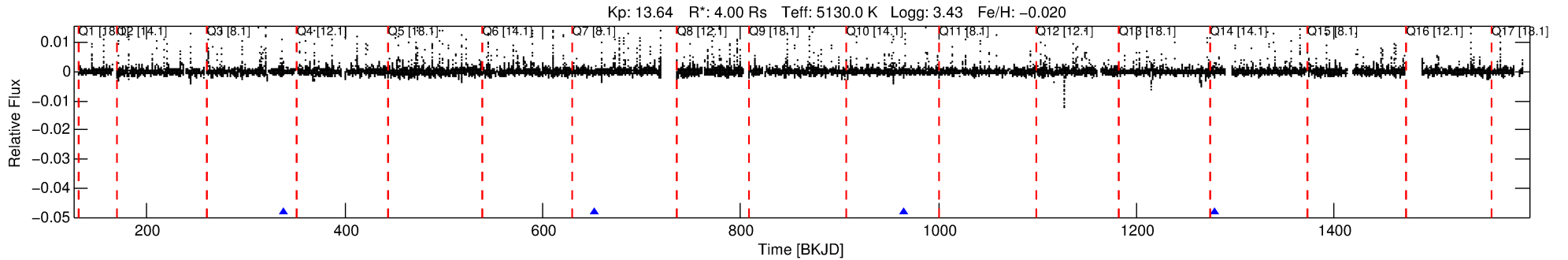
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 009093349-07

No Significant Match Found

# DV One-Page Summary

KIC: 9093349 Candidate: 7 of 8 Period: 313.667 d



## DV Fit Results:

Period = 313.66735 [0.00558] d  
Epoch = 337.9709 [0.0081] BKJD  
Rp/R\* = 0.0271 [0.0229]  
a/R\* = 244.44 [740.26]  
b = 0.01 [226.89]  
Seff = 8.94 [7.60]  
Teq = 441 [94] K  
Rp = 11.83 [11.78] Re  
a = 1.0537 [0.5466] AU  
Ag = 3609.48 [6873.88] [0.52 $\sigma$ ]  
Teffp = 5284 [2265] K [2.14 $\sigma$ ]

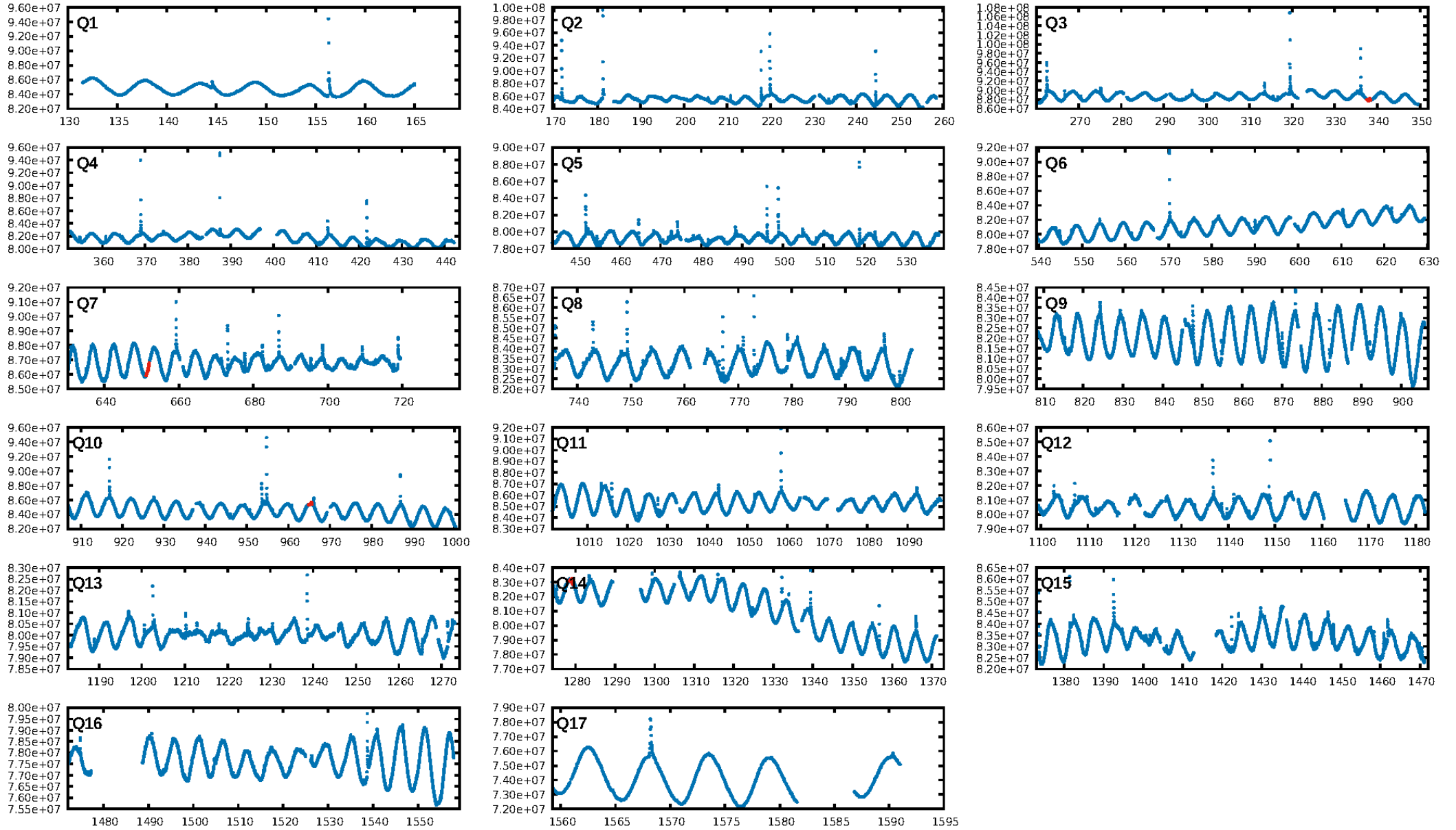
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [91.25 $\sigma$ ]  
LongPeriod-sig: 100.0% [54.89 $\sigma$ ]  
ModelChiSquare2-sig: 9.7%  
ModelChiSquareGof-sig: 98.3%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: 1.701  
Centroid-sig: 25.2%  
Centroid-so: 0.214 arcsec [0.77 $\sigma$ ]  
OotOffset-rm: 0.170 arcsec [1.58 $\sigma$ ]  
KicOffset-rm: 0.053 arcsec [0.39 $\sigma$ ]  
OotOffset-st: 1/2/0/0 [3]  
KicOffset-st: 1/2/0/0 [3]  
DiffImageQuality-fgm: 0.67 [2/3]  
DiffImageOverlap-fno: 1.00 [3/3]

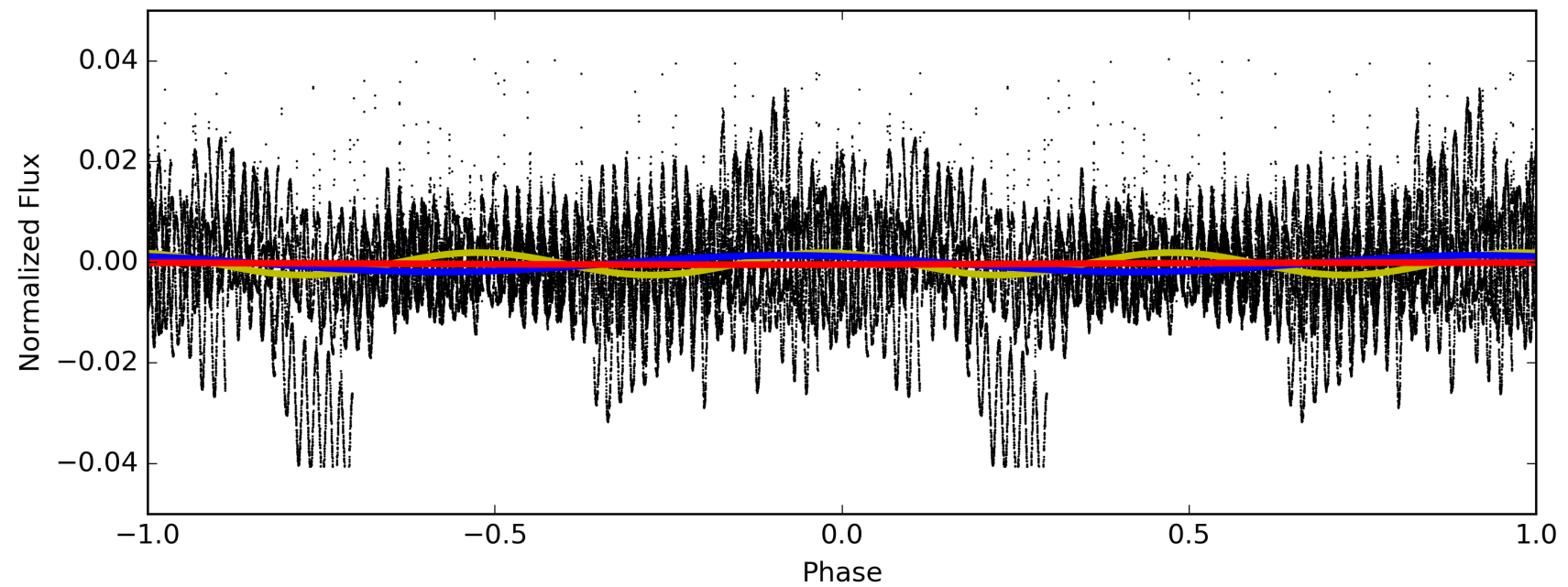
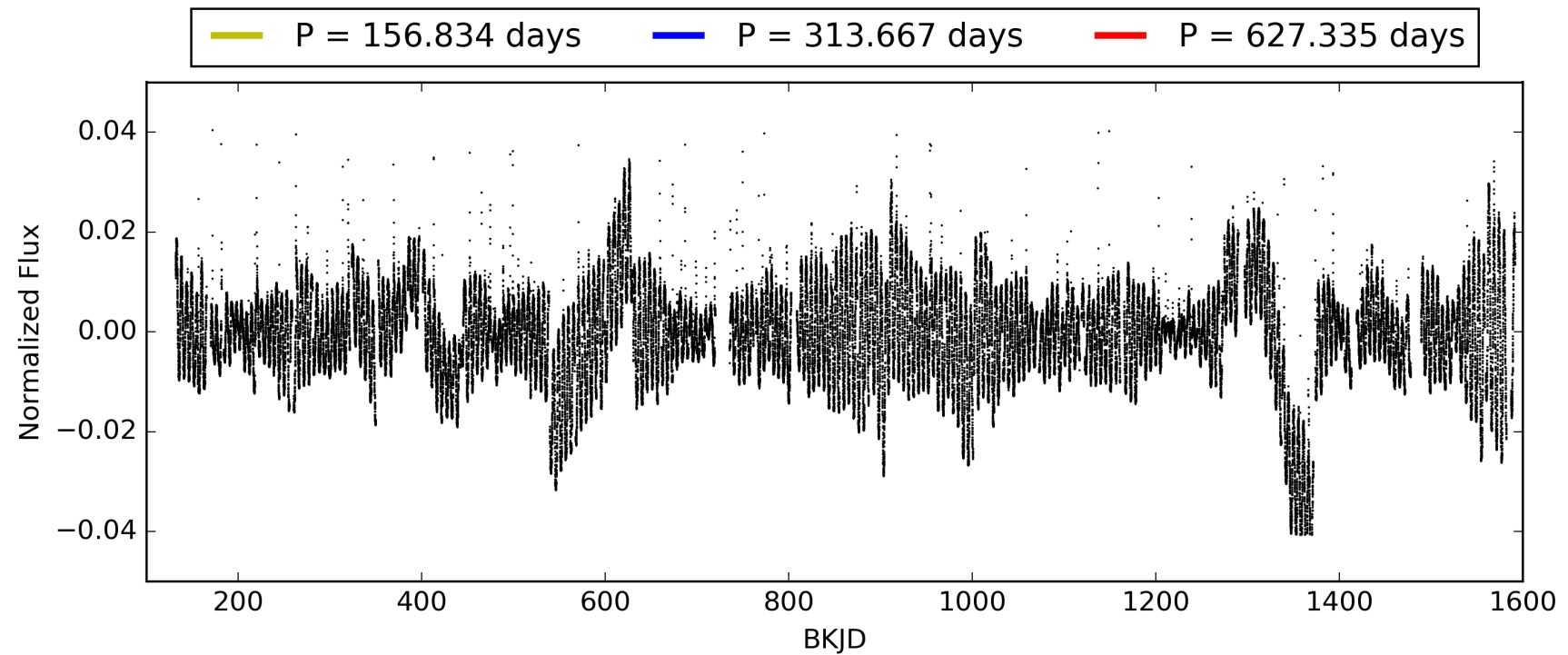
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 23:31:43 Z

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

# TCE 009093349-07, PDC Light Curves



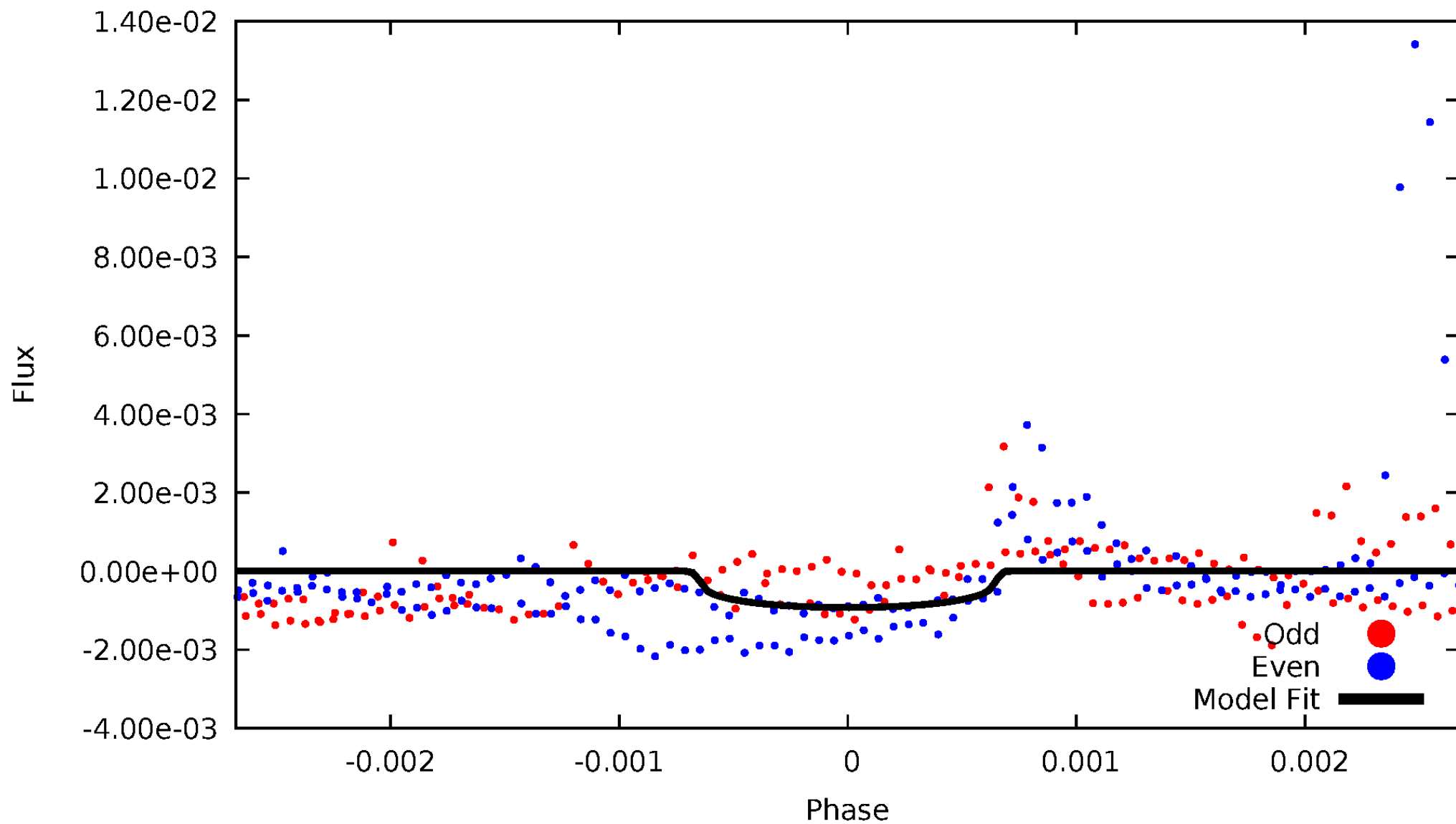
TCE 009093349-07





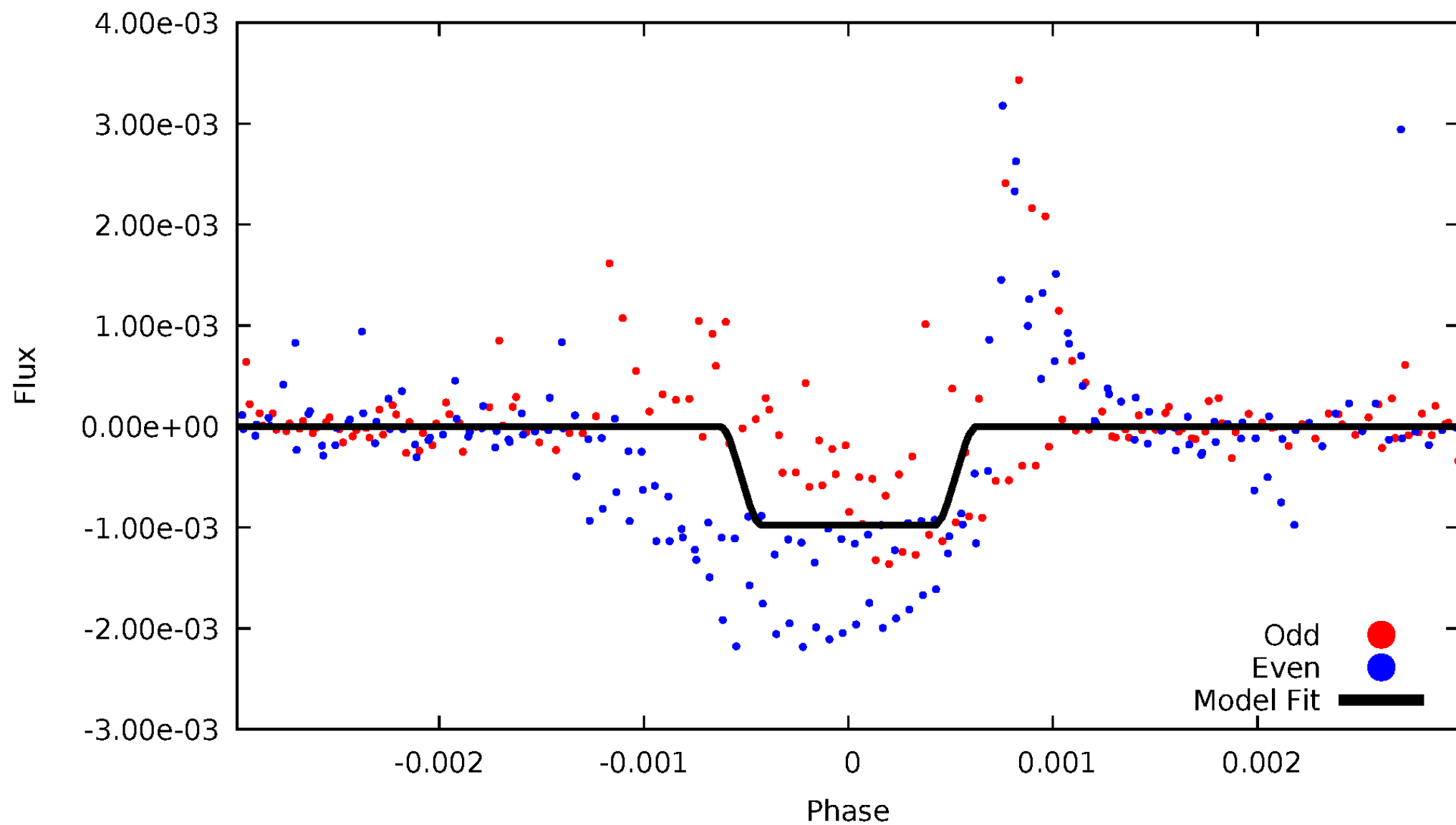
# DV Odd/Even

TCE 009093349-07



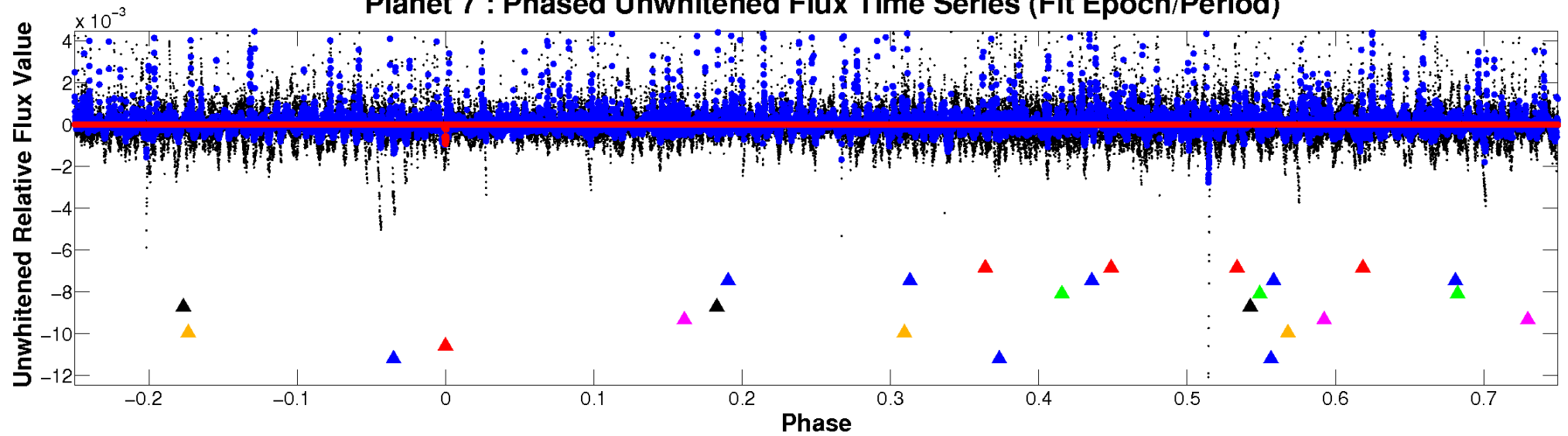
# ALT Odd/Even

TCE 009093349-07

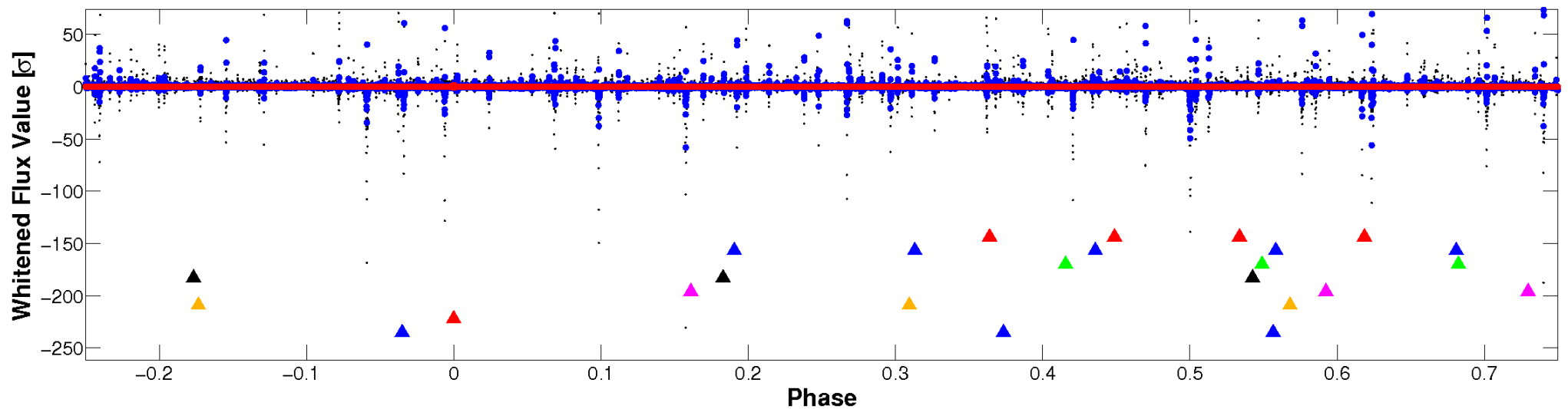


# Non-Whitened Vs. Whitened Light Curve

Planet 7 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

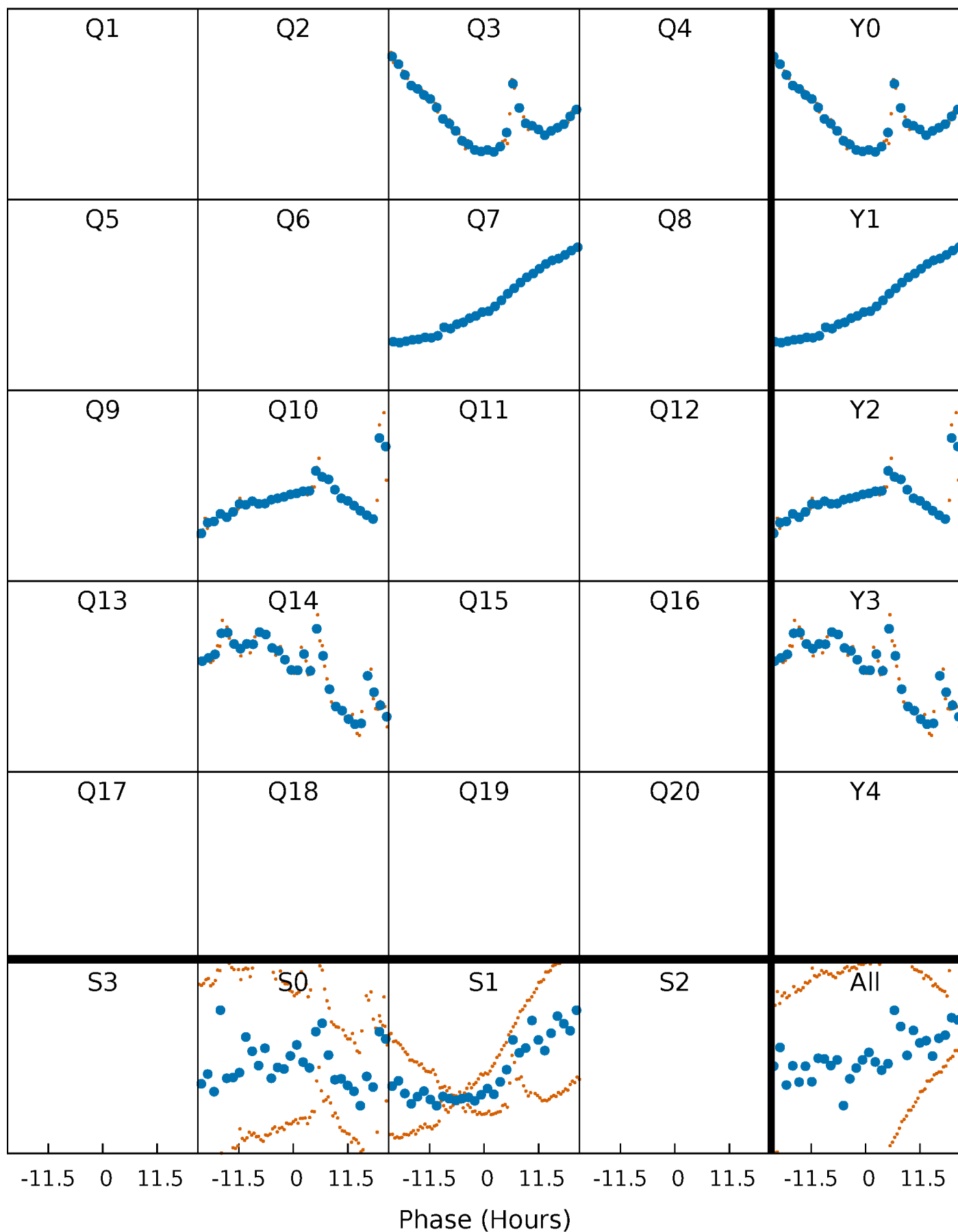


Planet 7 : Phased Whitened Flux Time Series (Fit Epoch/Period)



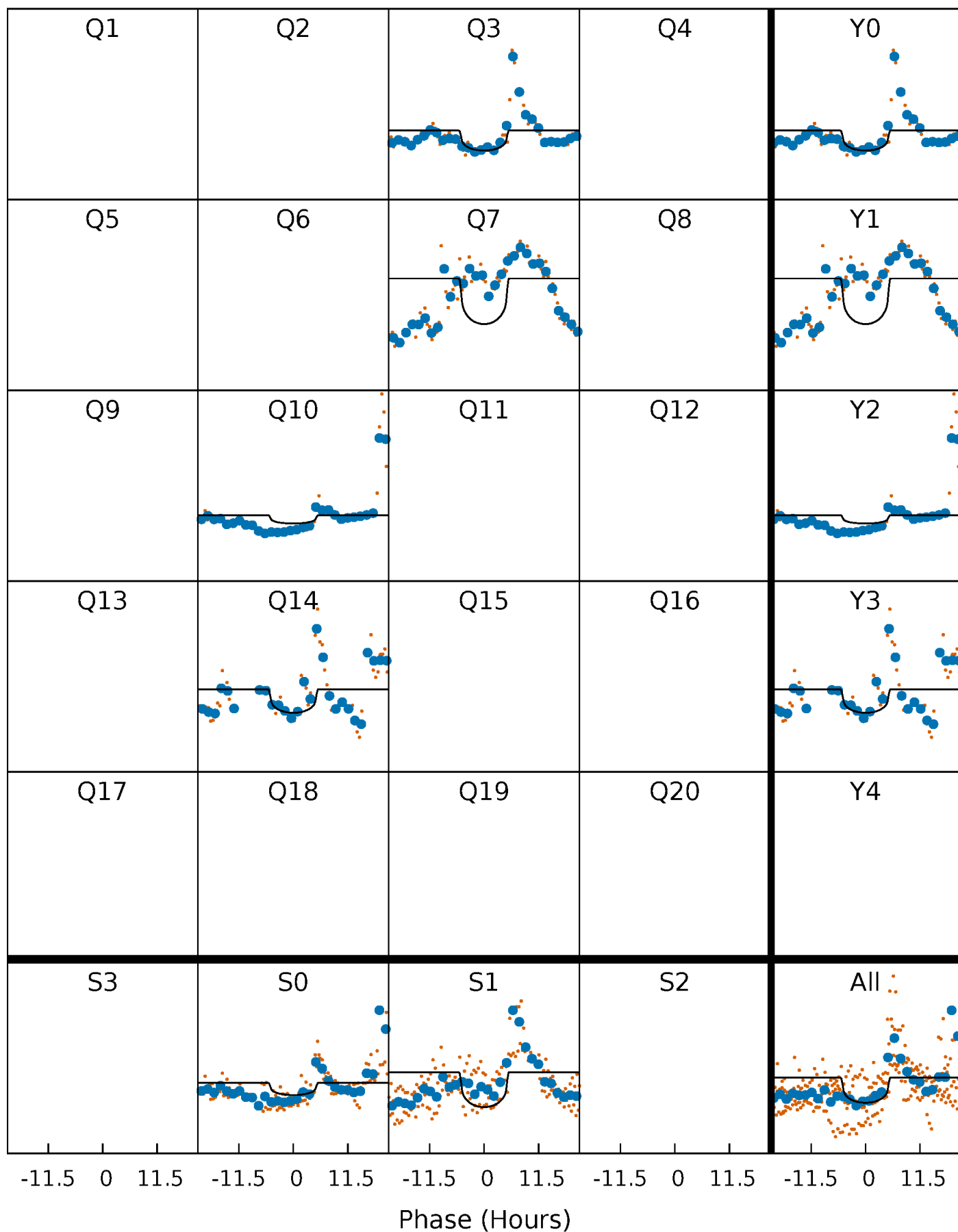
# PDC Quarter-Phased Transit Curves

TCE 009093349-07     $P=313.667348$  Days     $T_0=337.970924$  (BKJD)



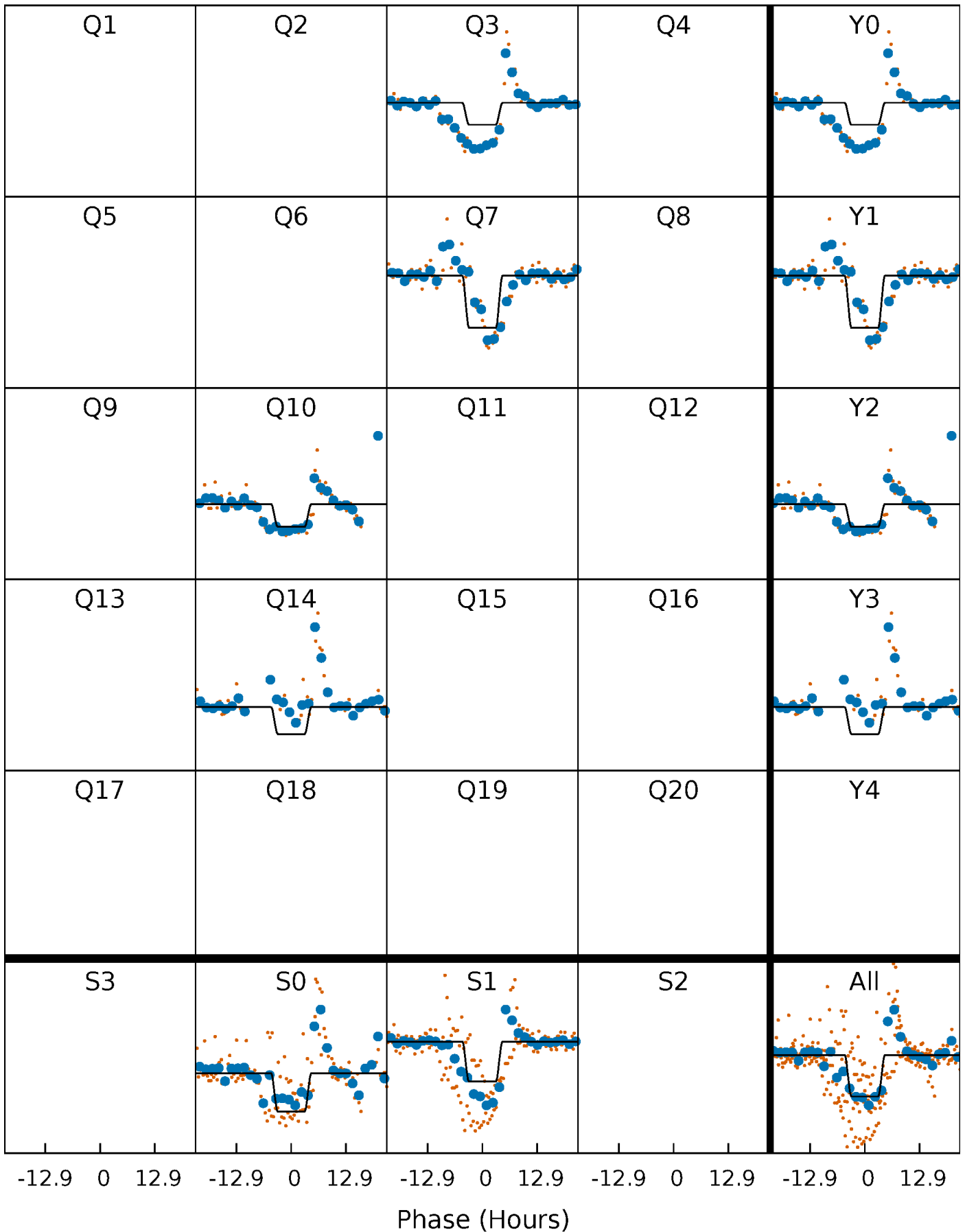
# DV Quarter-Phased Transit Curves

TCE 009093349-07     $P=313.667348$  Days     $T_0=337.970924$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

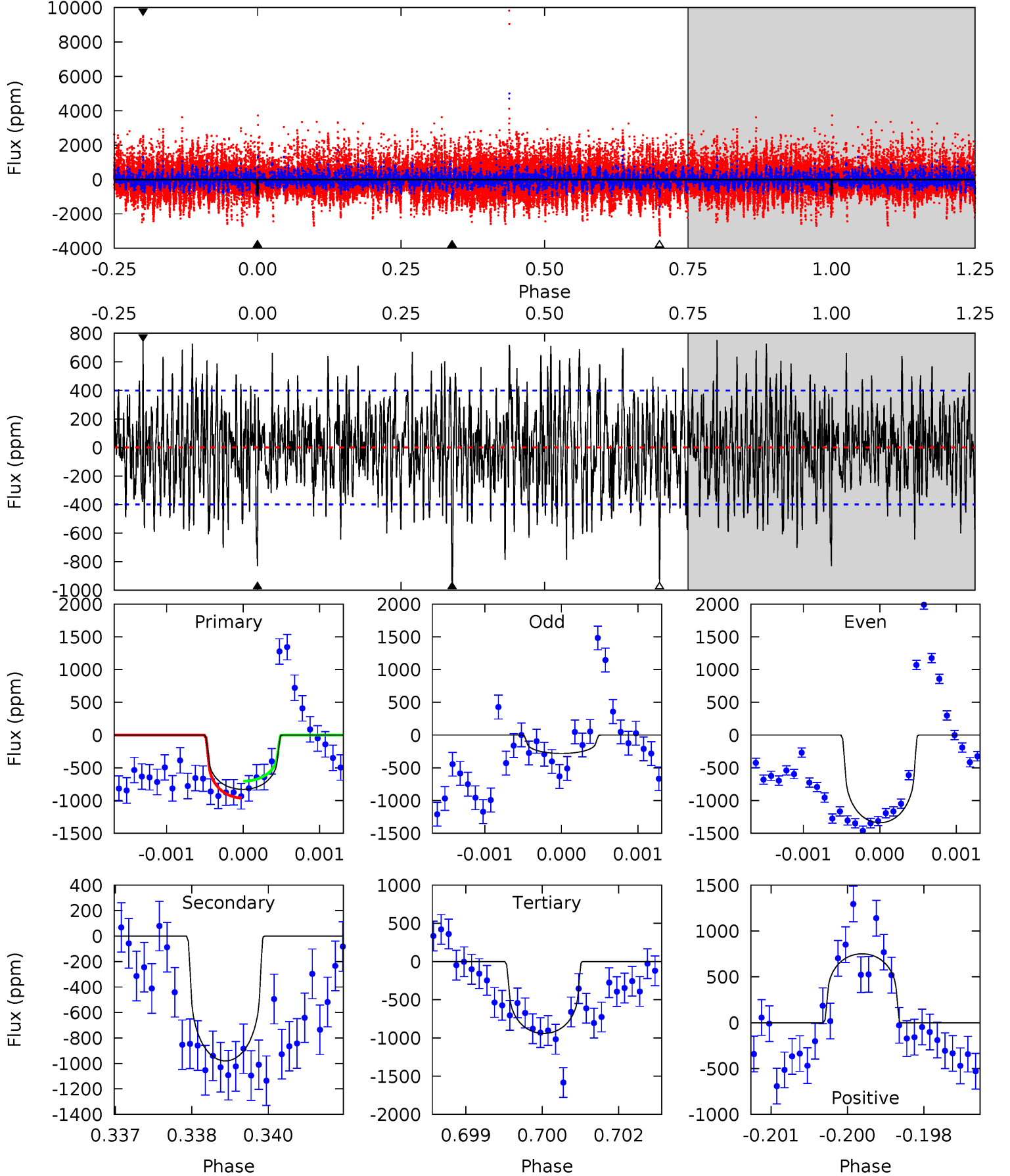
TCE 009093349-07     $P=313.648335$  Days     $T_0=337.980281$  (BKJD)



# DV Model-Shift Uniqueness Test

009093349-07, P = 313.667348 Days, E = 24.303576 Days

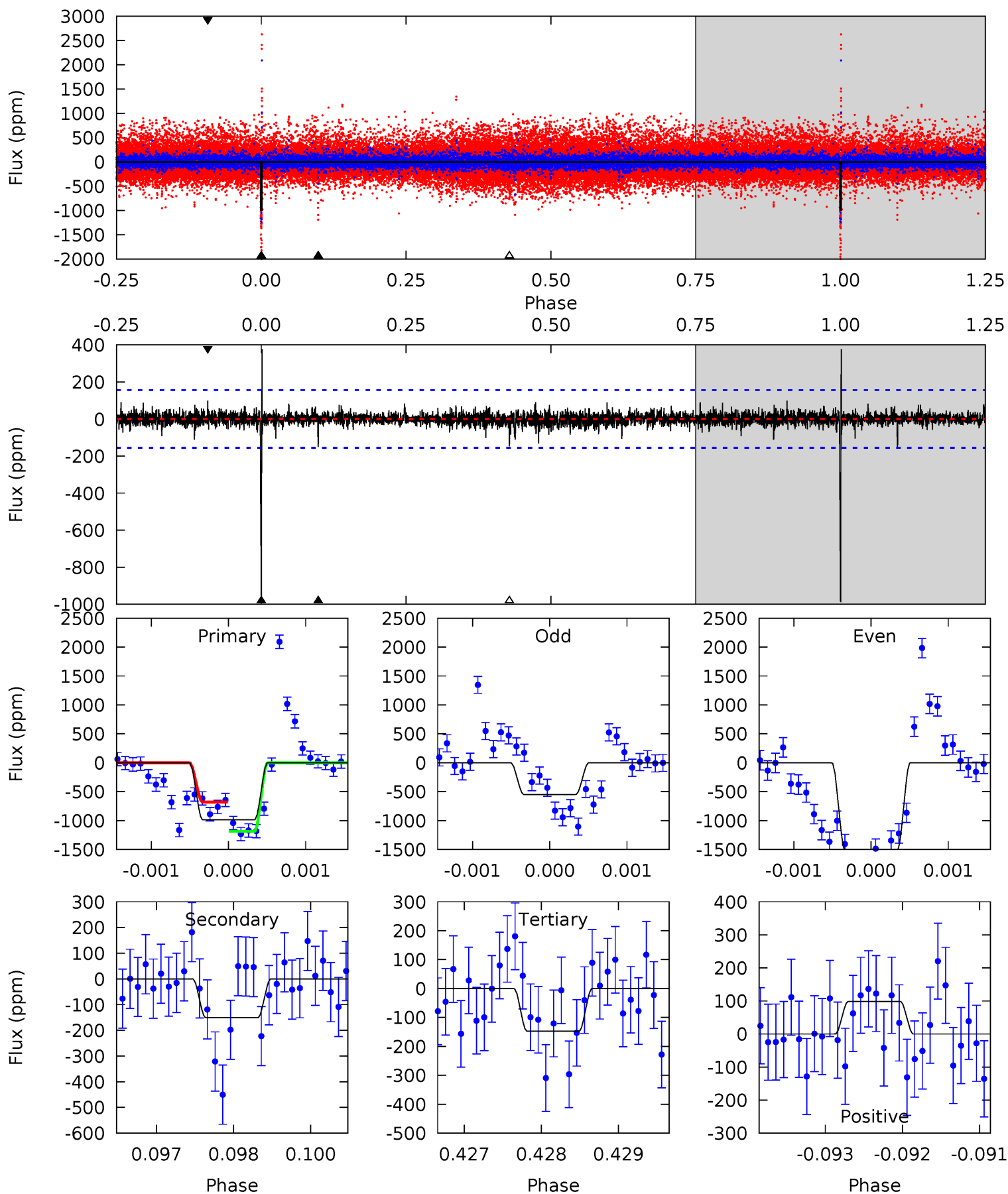
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.2	13.3	12.7	10.2	5.39	3.20	3.48	-1.50	1.07	0.53	3.10	5.17	1.08	0.43	1.75



# Alt Model-Shift Uniqueness Test

009093349-07, P = 313.648335 Days, E = 24.331946 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
34.2	5.25	5.12	3.42	5.41	3.23	0.81	29.1	30.8	0.13	1.82	16.7	1.03	0.28	8.68





### Stellar Parameters For KIC 009093349

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5130^{+154}_{-169}$	$3.434^{+0.497}_{-0.213}$	$-0.020^{+0.250}_{-0.300}$	$4.000^{+1.136}_{-2.109}$	$1.585^{+0.213}_{-0.639}$	$0.035^{+0.170}_{-0.018}$
	+3%/-3%	+14%/-6%	+1250%/-1500%	+28%/-53%	+13%/-40%	+488%/-52%
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 009093349-07 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-980 \pm 74$	$11.95^{+9.86}_{-7.57}$	$610^{+59}_{-82}$	$5245^{+3512}_{-1072}$	$4124^{+24155}_{-2914}$
Alt.	$-151 \pm 29$	$13.24^{+10.97}_{-7.57}$	$613^{+57}_{-84}$	$3542^{+1248}_{-542}$	$499^{+2212}_{-343}$

$T_{max}$  = 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

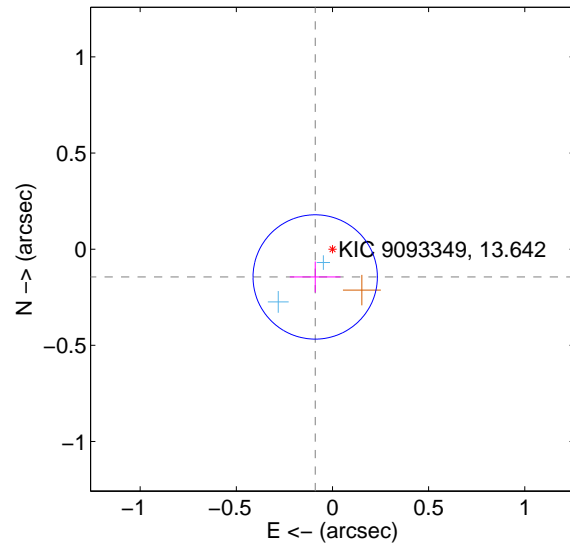
Supplemental centroid analysis for 009093349-07. Kepler magnitude: 13.64. Transit SNR 6.64

There are 2 quarters with good PRF difference image offsets

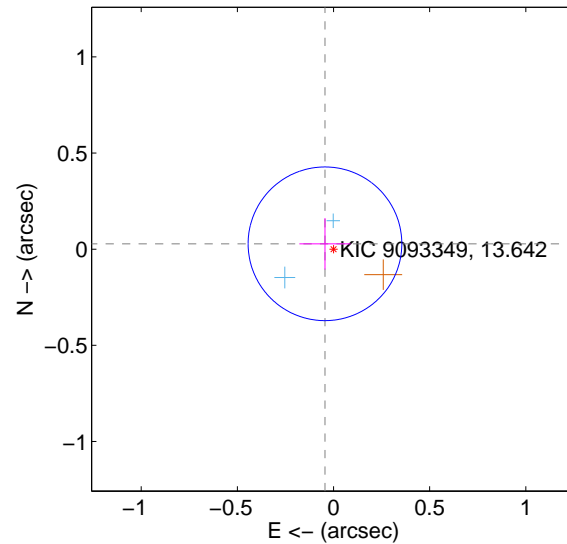
The direct PRF centroid is offset from the target star catalog position by about 0.13 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.170 \pm 0.108$	1.58	$0.090 \pm 0.132$	$-0.144 \pm 0.080$
PRF-fit source offset from KIC position	$0.053 \pm 0.133$	0.39	$0.044 \pm 0.133$	$0.028 \pm 0.133$
photometric centroid source offset	$0.21 \pm 0.28$	0.77	$-0.18 \pm 0.25$	$-0.12 \pm 0.33$

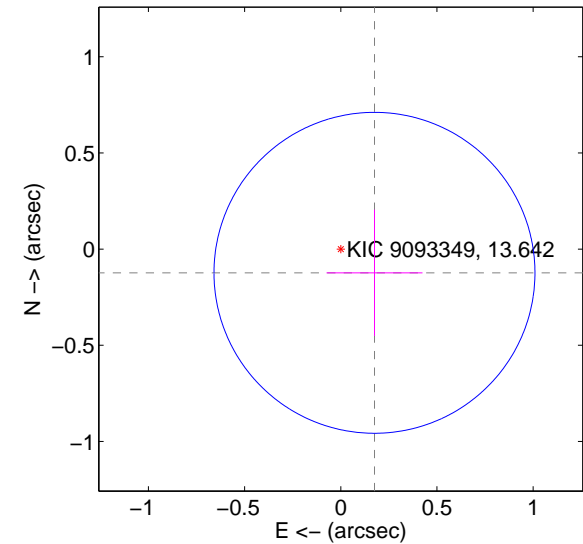
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

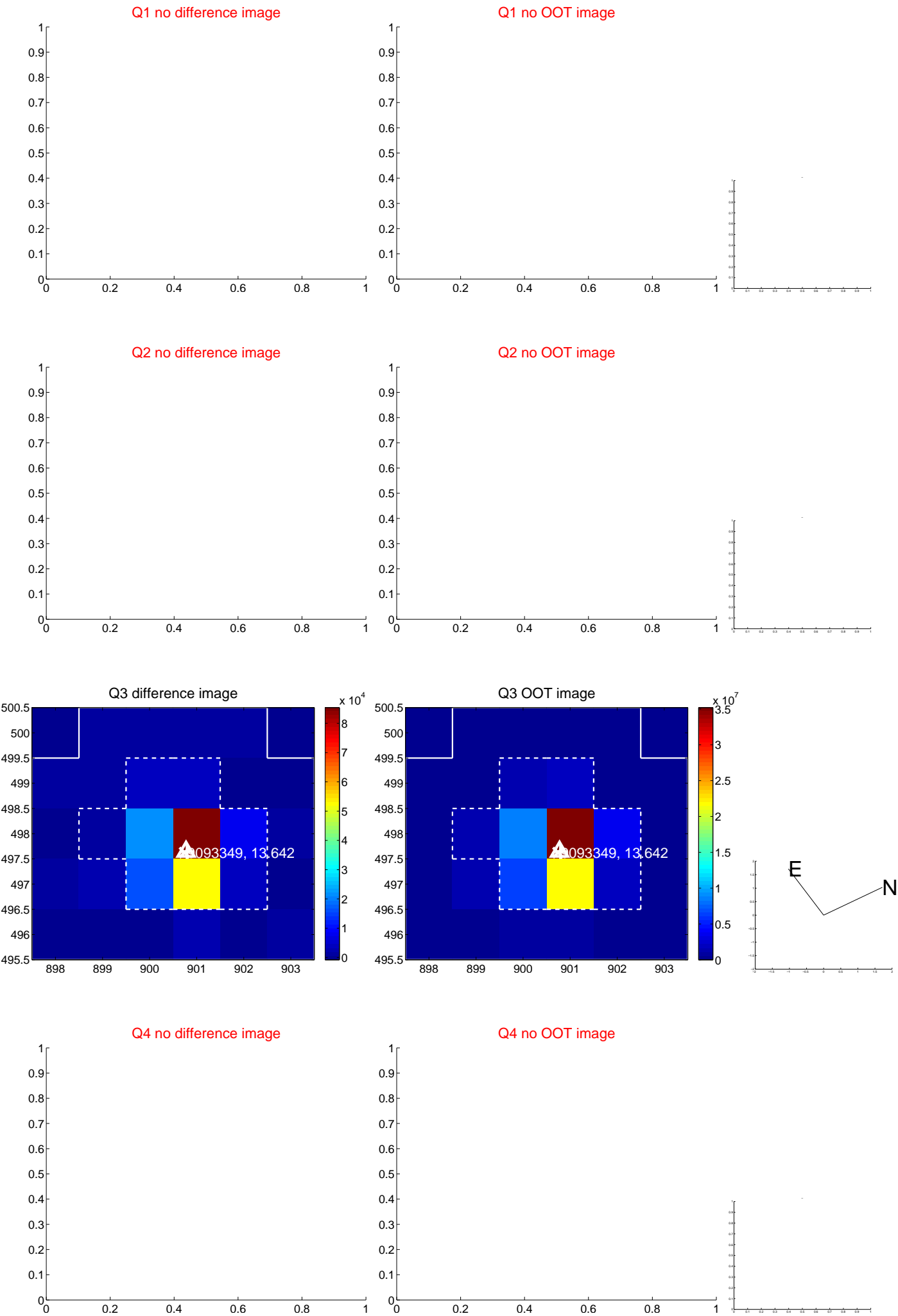


offset from photometric centroids

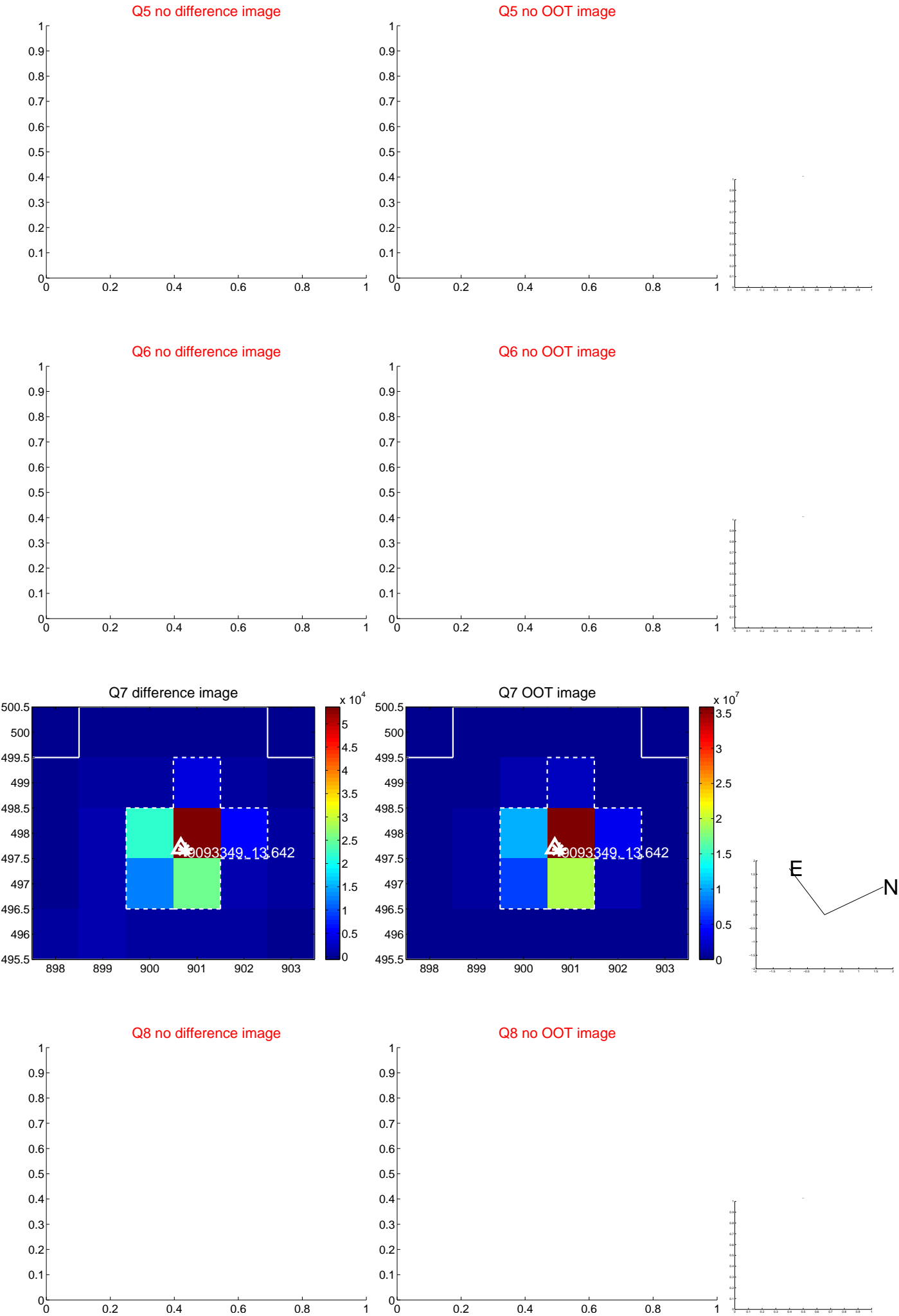


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

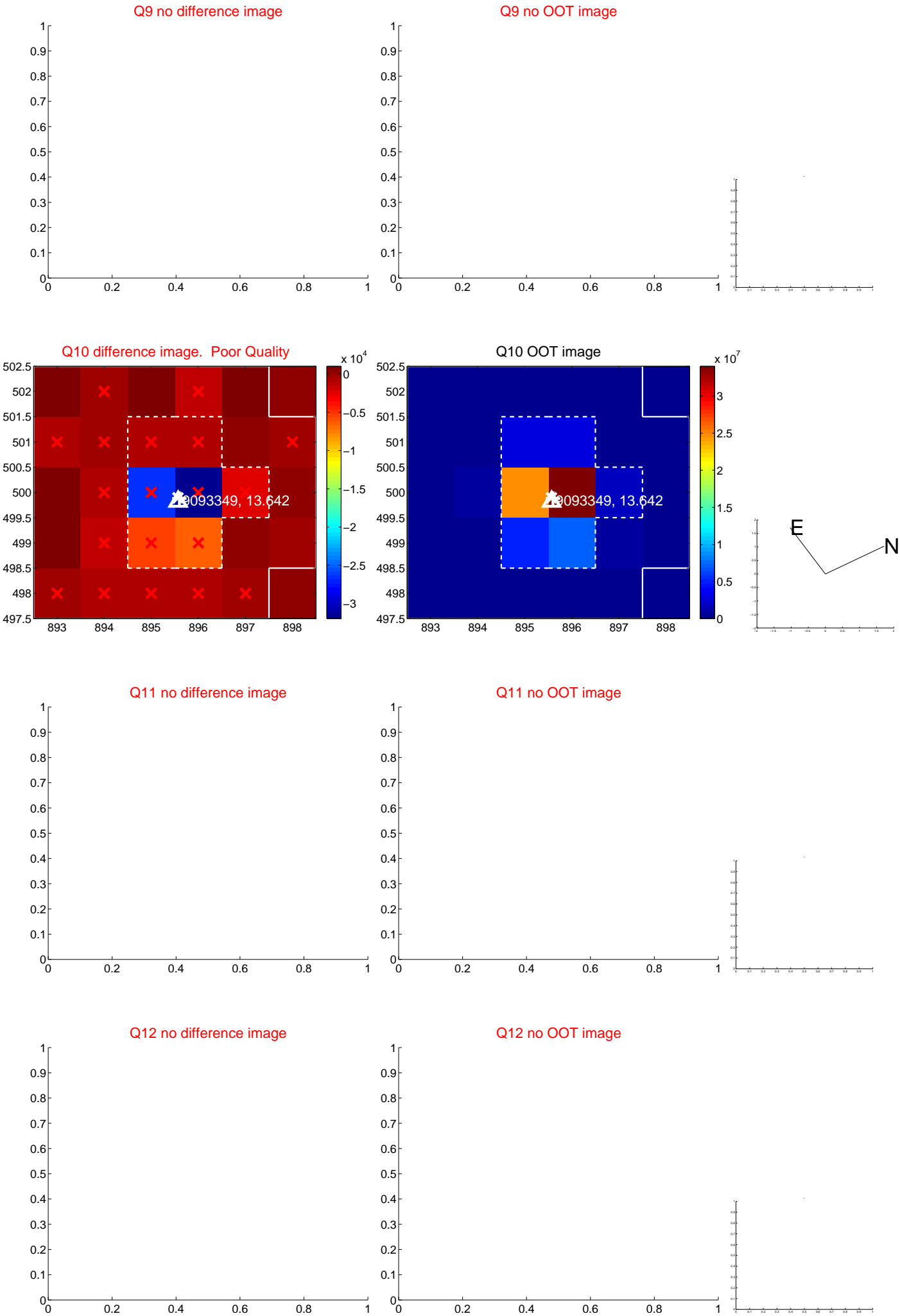
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



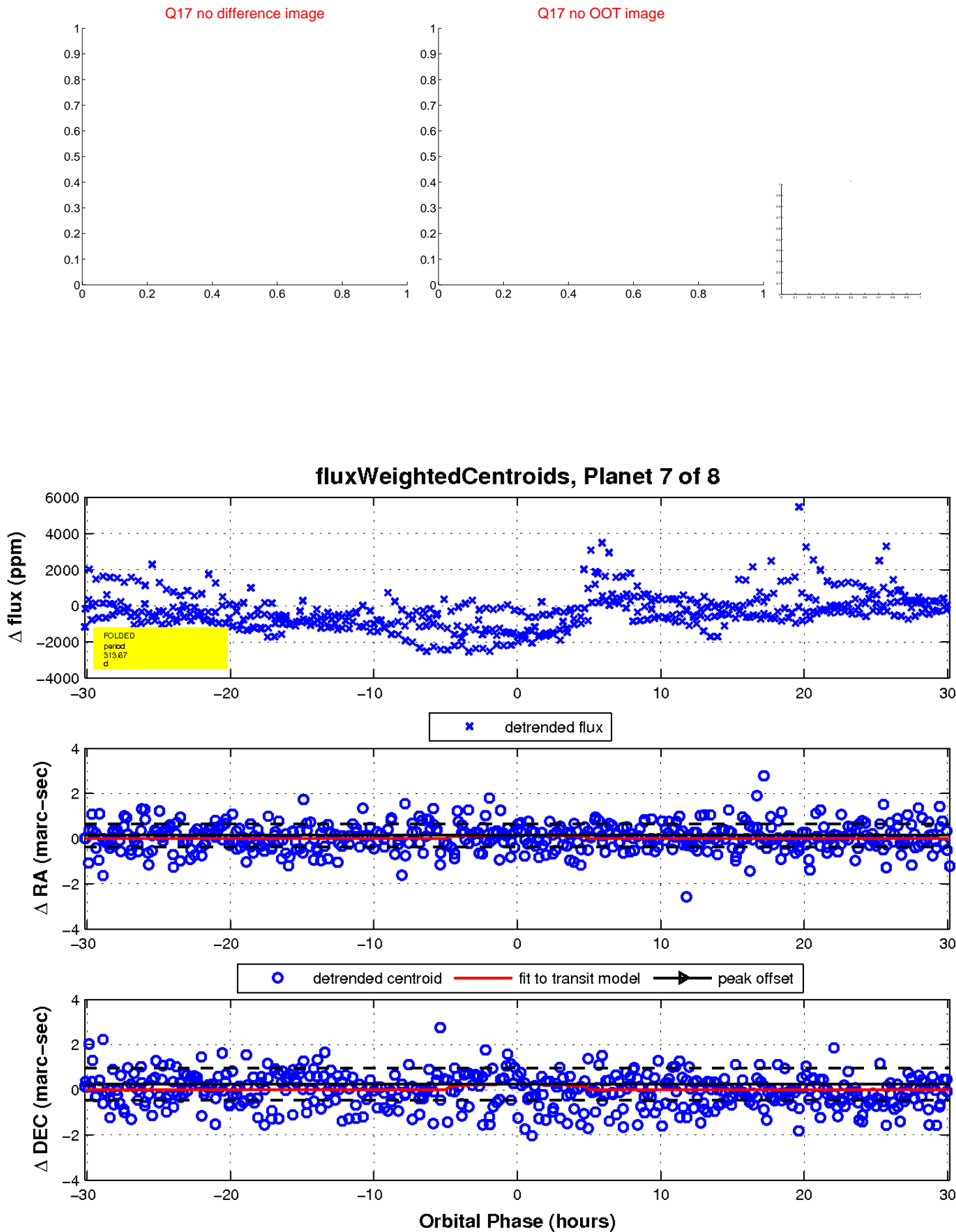
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

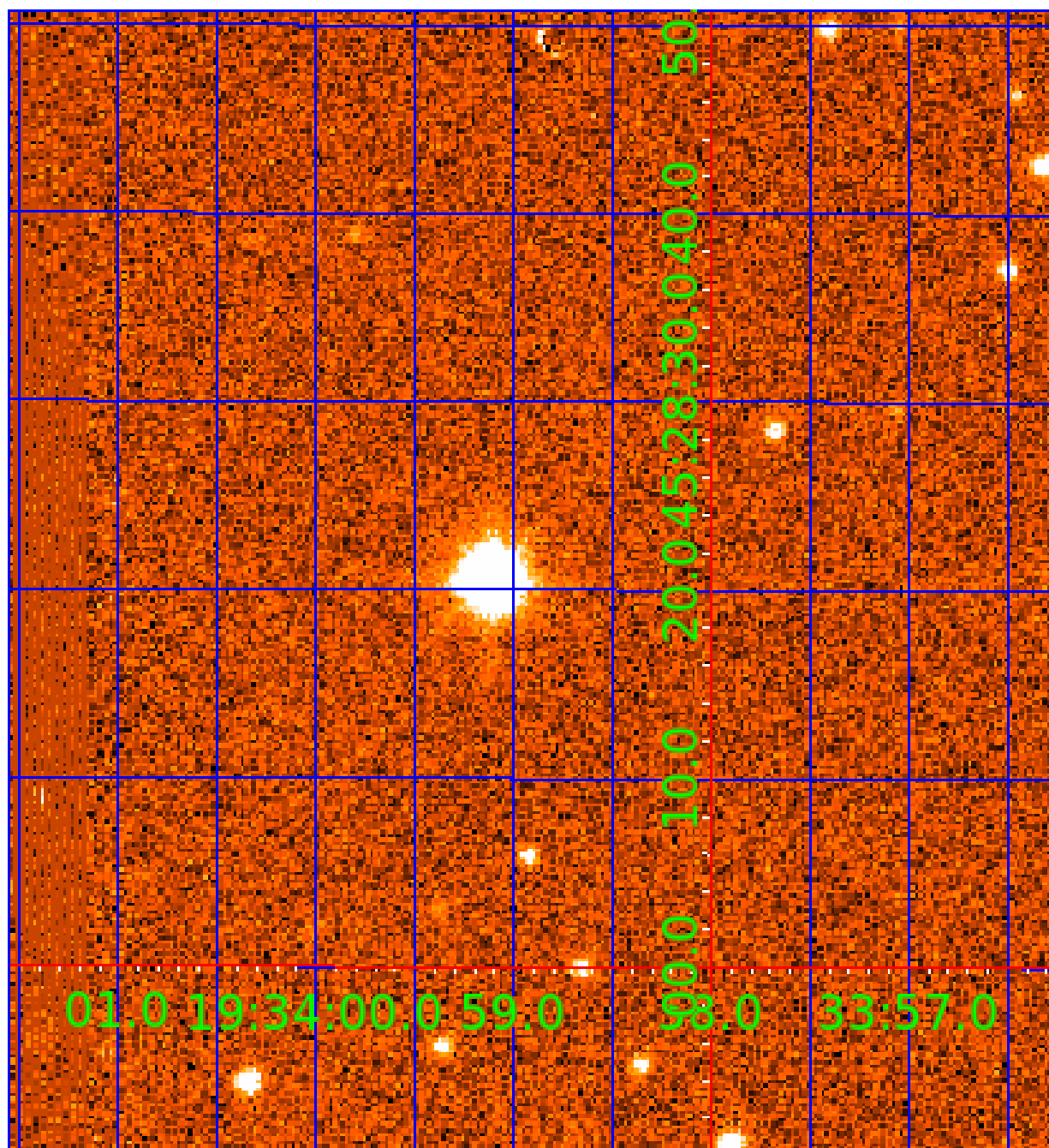


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



# UKIRT Image

Declination





## KIC 009093349

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009093349-01	OBS	No	340.285729	452.139044	2222.4	5.839	18.3	12.6	4.00	5130	20.53	8.02
009093349-02	OBS	No	275.213963	237.892066	290.9	0.967	19.3	2.2	4.00	5130	7.24	10.65
009093349-03	OBS	No	585.487777	238.354648	1271.6	17.182	17.7	5.4	4.00	5130	14.10	3.89
009093349-04	OBS	No	514.521268	508.165431	1341.0	8.308	20.6	7.6	4.00	5130	19.06	4.62
009093349-05	OBS	No	492.040609	523.789347	662.0	8.930	44.0	3.7	4.00	5130	10.06	4.91
009093349-06	OBS	No	394.770320	435.034848	485.5	2.295	12.0	3.5	4.00	5130	10.18	6.58
009093349-07	OBS	No	313.667348	337.970923	926.1	10.068	14.2	6.6	4.00	5130	11.83	8.94
009093349-08	OBS	No	499.232738	455.096850	301.1	12.500	12.5	-1.0	4.00	5130	6.75	4.81

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009093349-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009093349-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
009093349-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_ZUMA—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
009093349-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_ZUMA—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
009093349-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
009093349-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009093349-07	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009093349-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—ALL_TRANS_CHASES—CENT_NOFITS

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

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

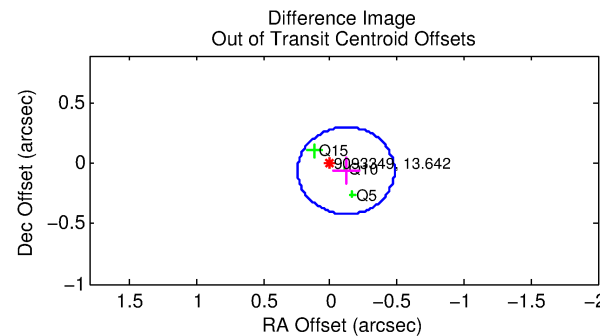
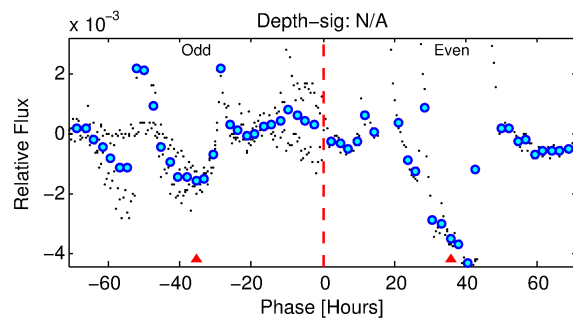
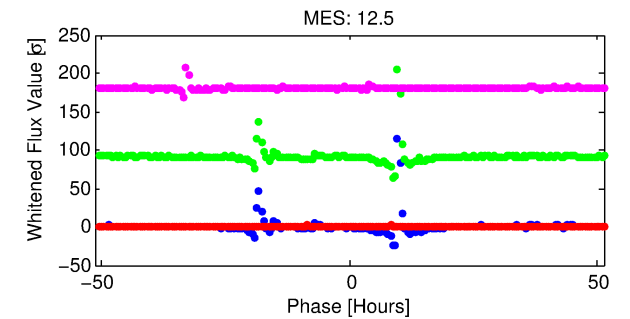
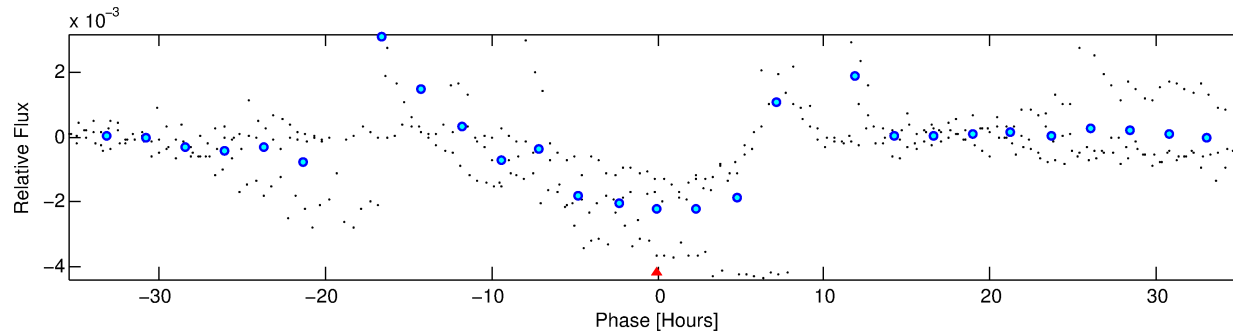
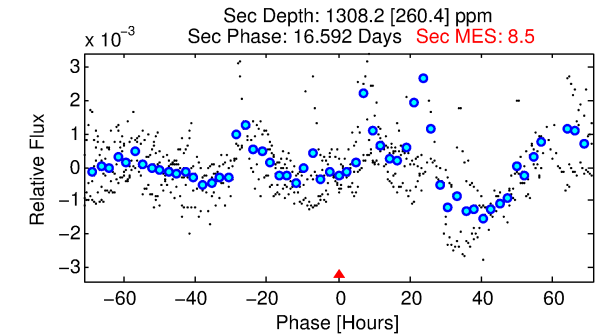
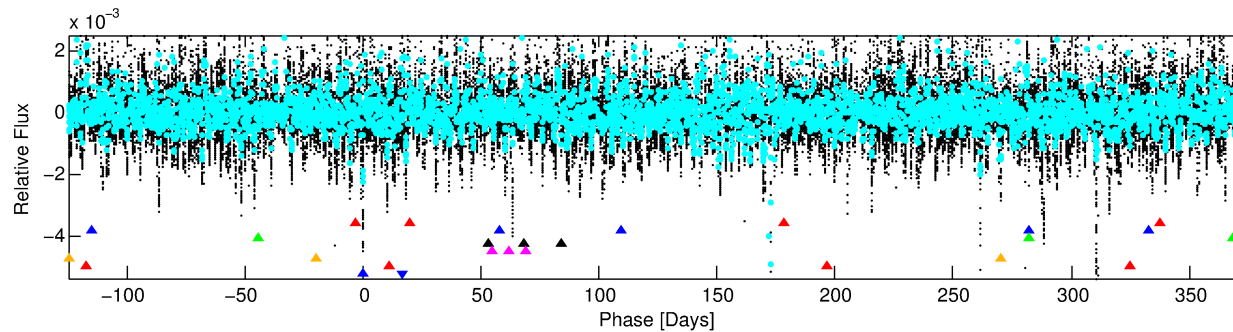
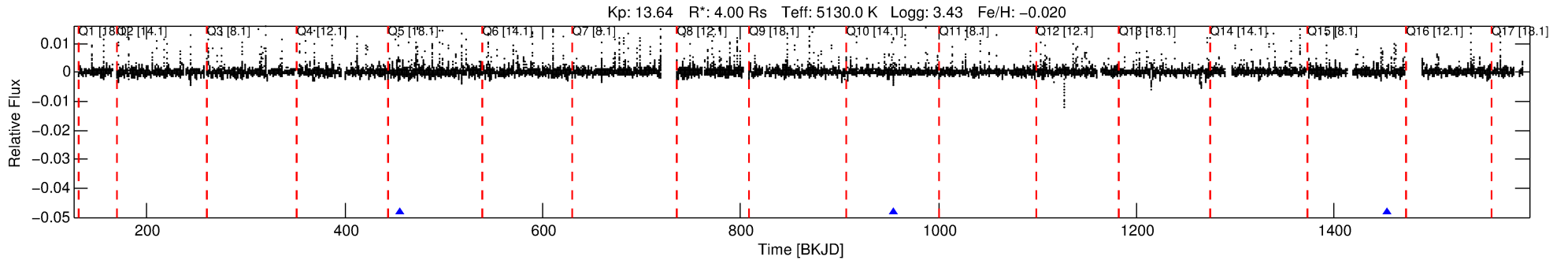
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 009093349-08

No Significant Match Found

# DV One-Page Summary

KIC: 9093349 Candidate: 8 of 8 Period: 499.233 d



## TPS TCE Results:

Period = 499.23274 d  
Epoch = 455.0968 BKJD

DV fit results are unavailable

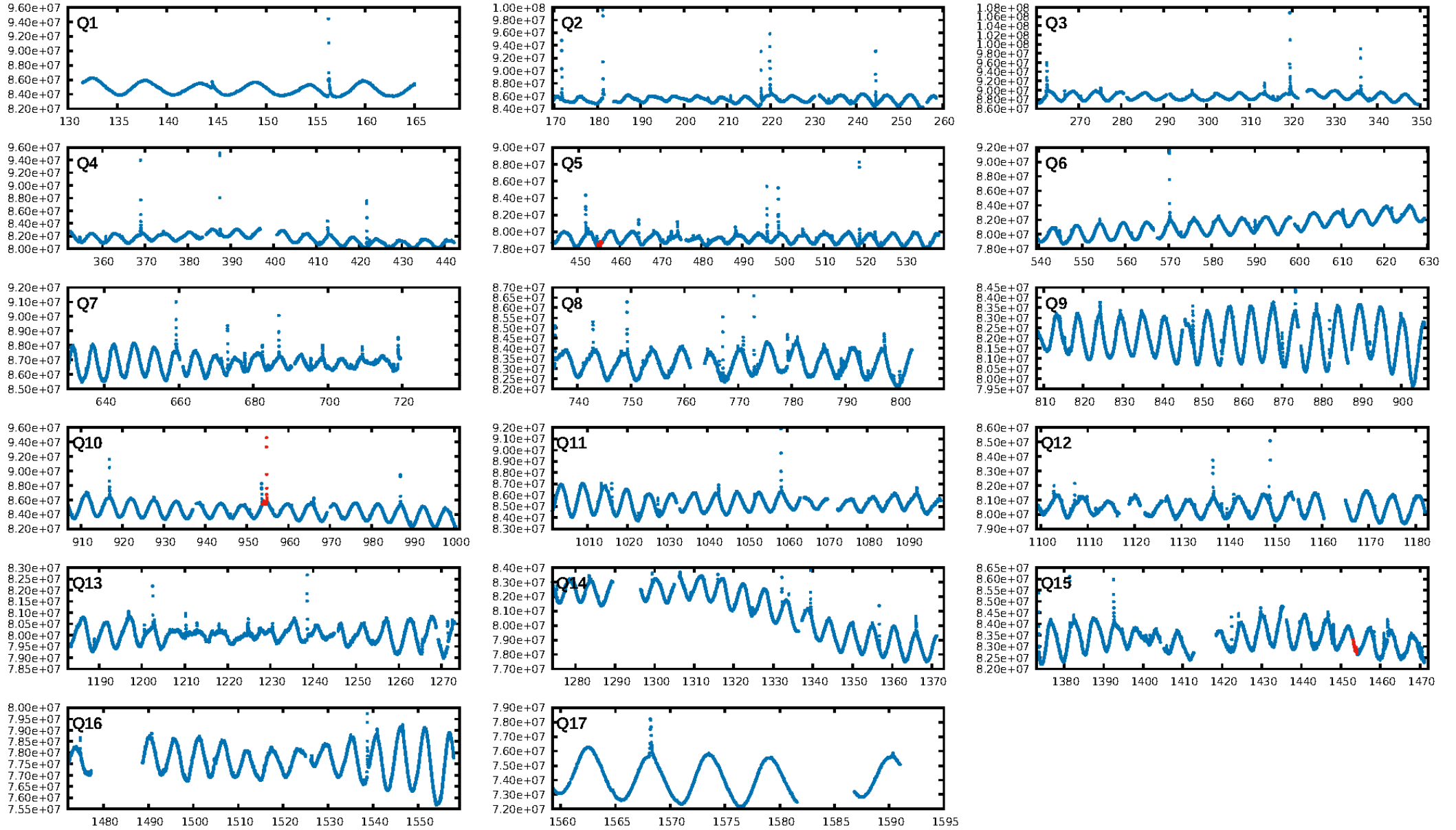
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [11.24σ]  
LongPeriod-sig: 100.0% [24.45σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 3.796  
Centroid-sig: 39.7%  
Centroid-so: 0.292 arcsec [1.23σ]  
OotOffset-rm: 0.131 arcsec [1.08σ]  
KicOffset-rm: 0.198 arcsec [2.19σ]  
OotOffset-st: 1/1/0/1 [3]  
KicOffset-st: 1/1/0/1 [3]  
DiffImageQuality-fgm: 1.00 [3/3]  
DiffImageOverlap-fno: 1.00 [3/3]

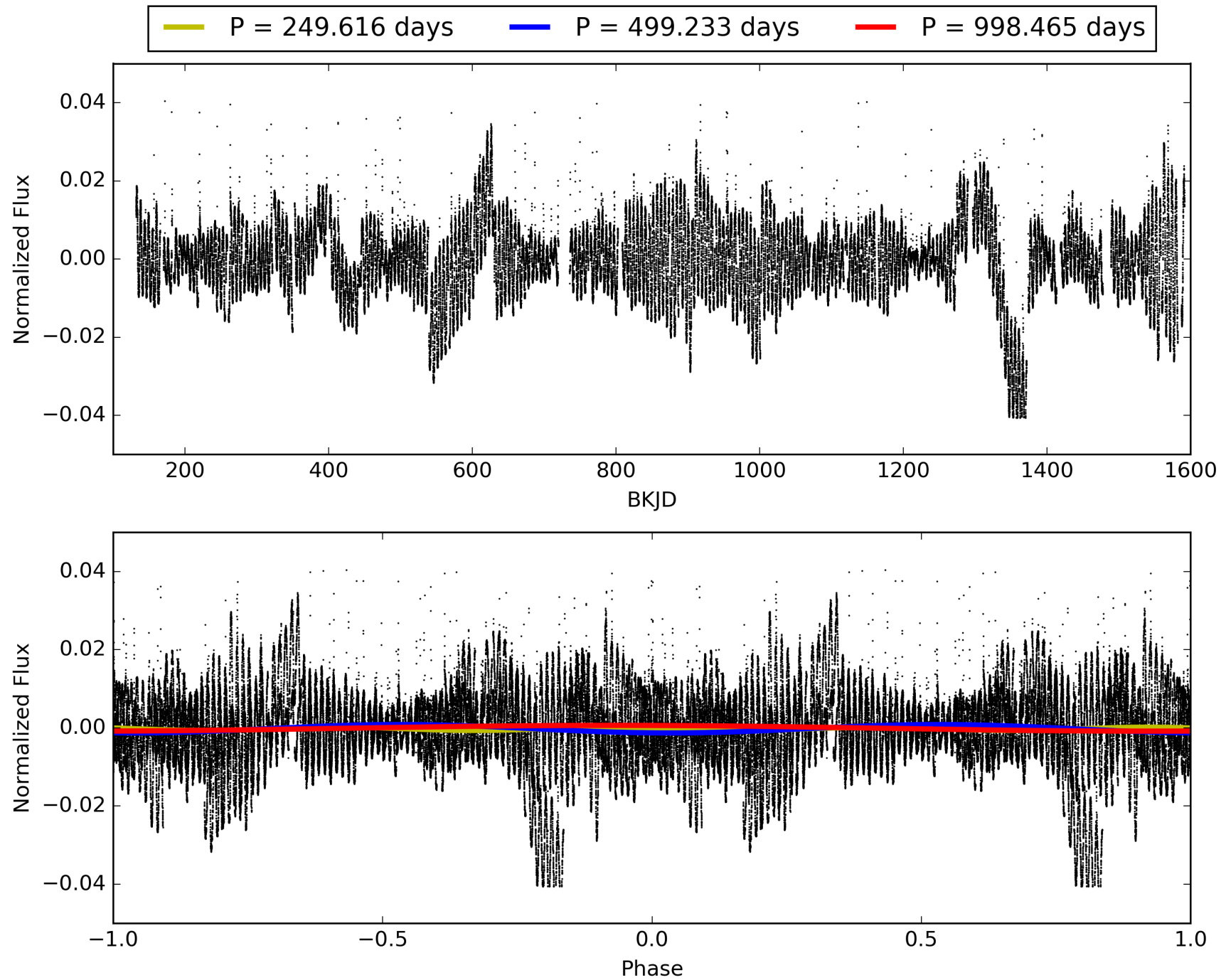
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 23:31:52 Z

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

# TCE 009093349-08, PDC Light Curves

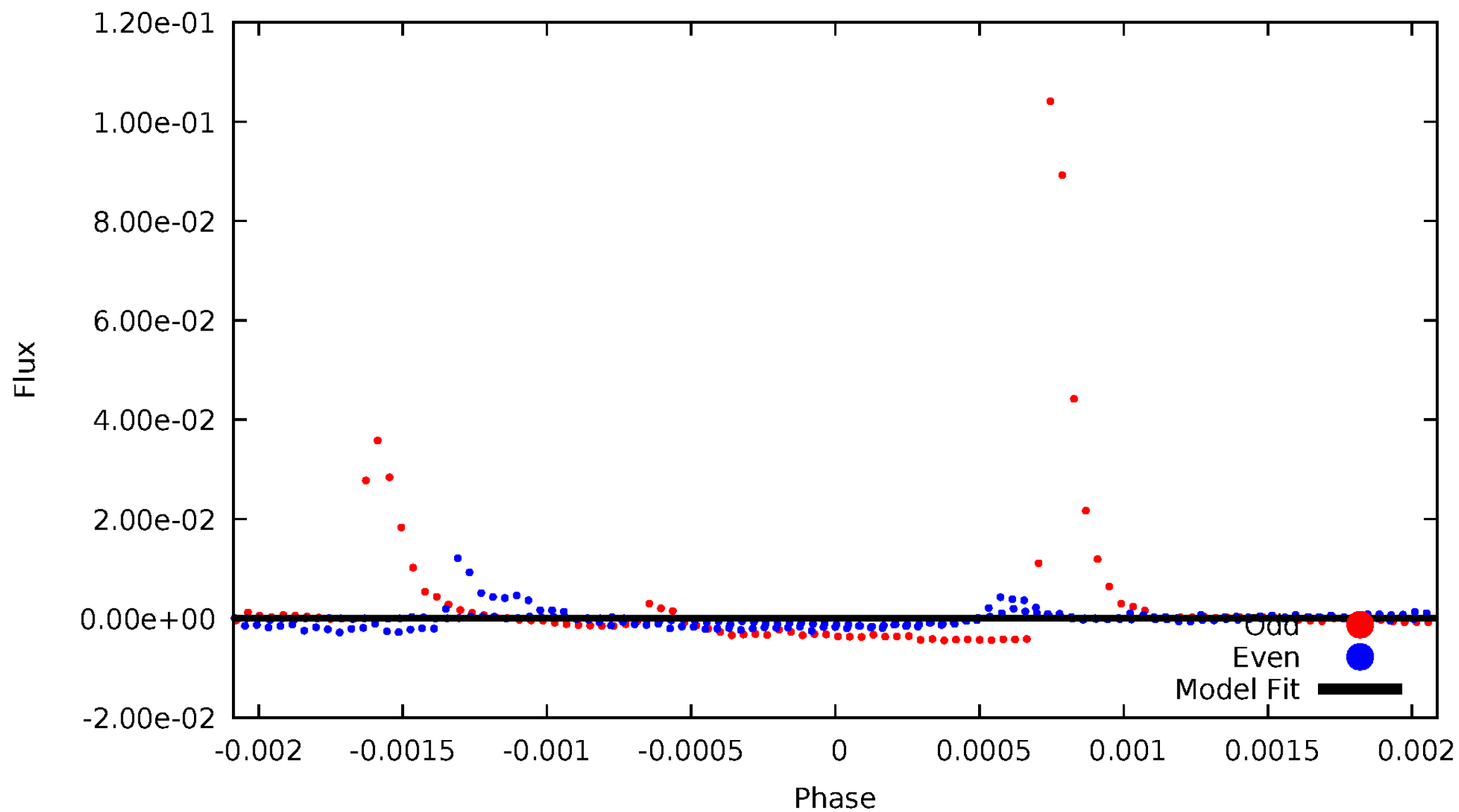


TCE 009093349-08



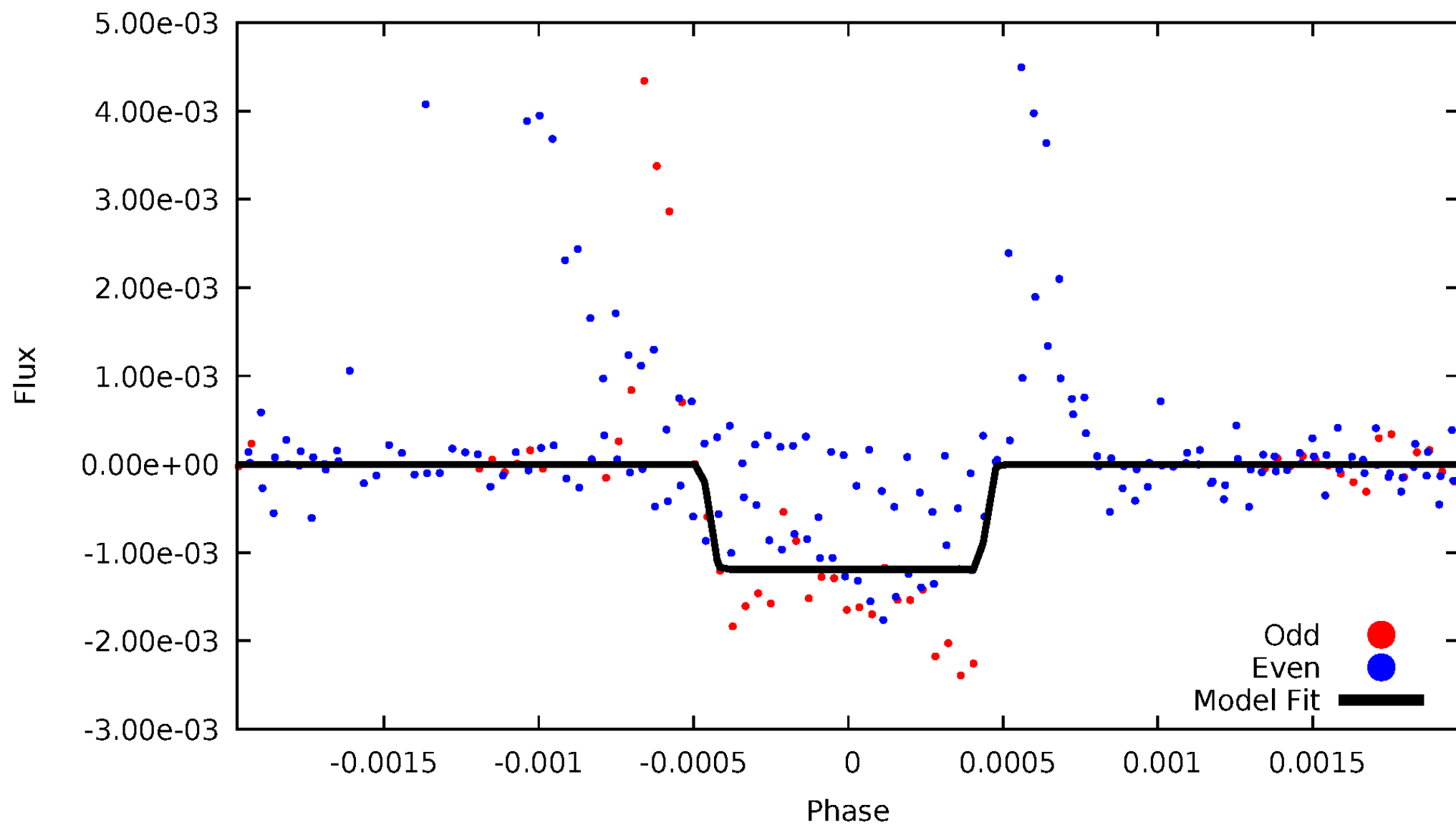
# DV Odd/Even

TCE 009093349-08



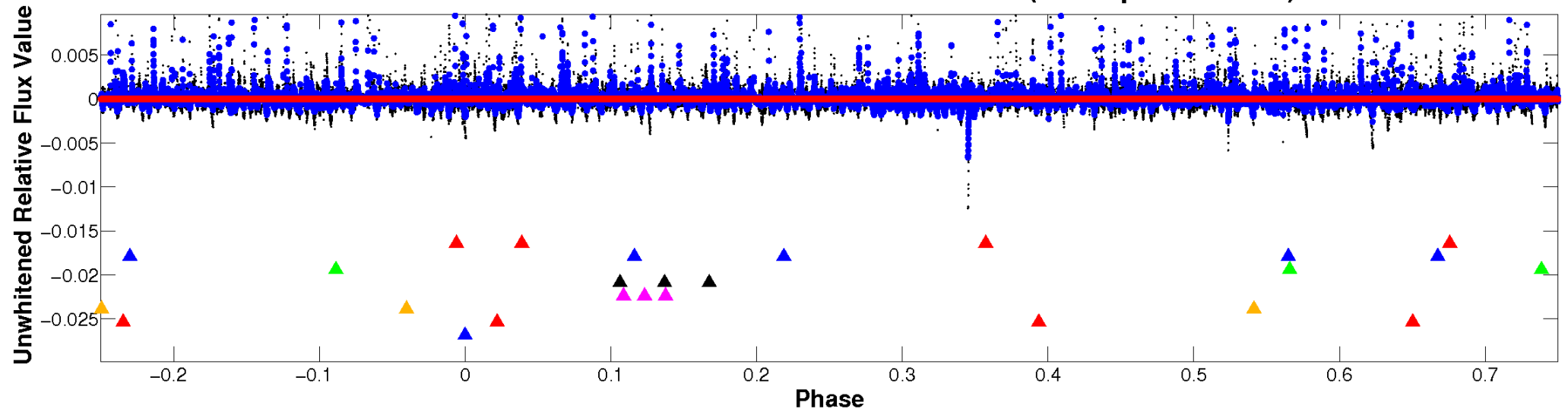
# ALT Odd/Even

TCE 009093349-08

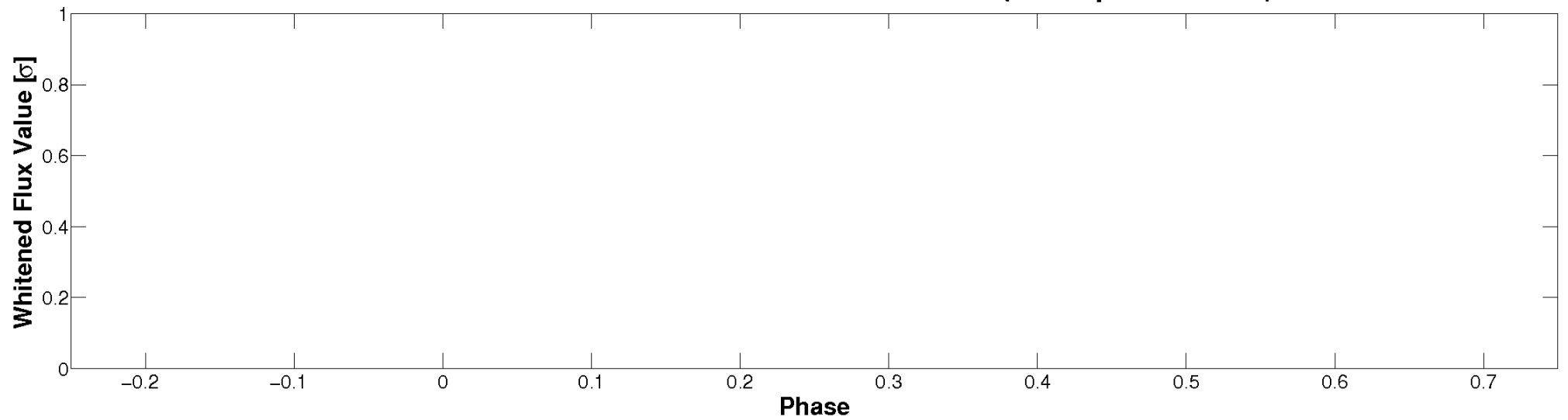


# Non-Whitened Vs. Whitened Light Curve

**Planet 8 : Phased Unwhitened Flux Time Series (TPS Epoch/Period)**

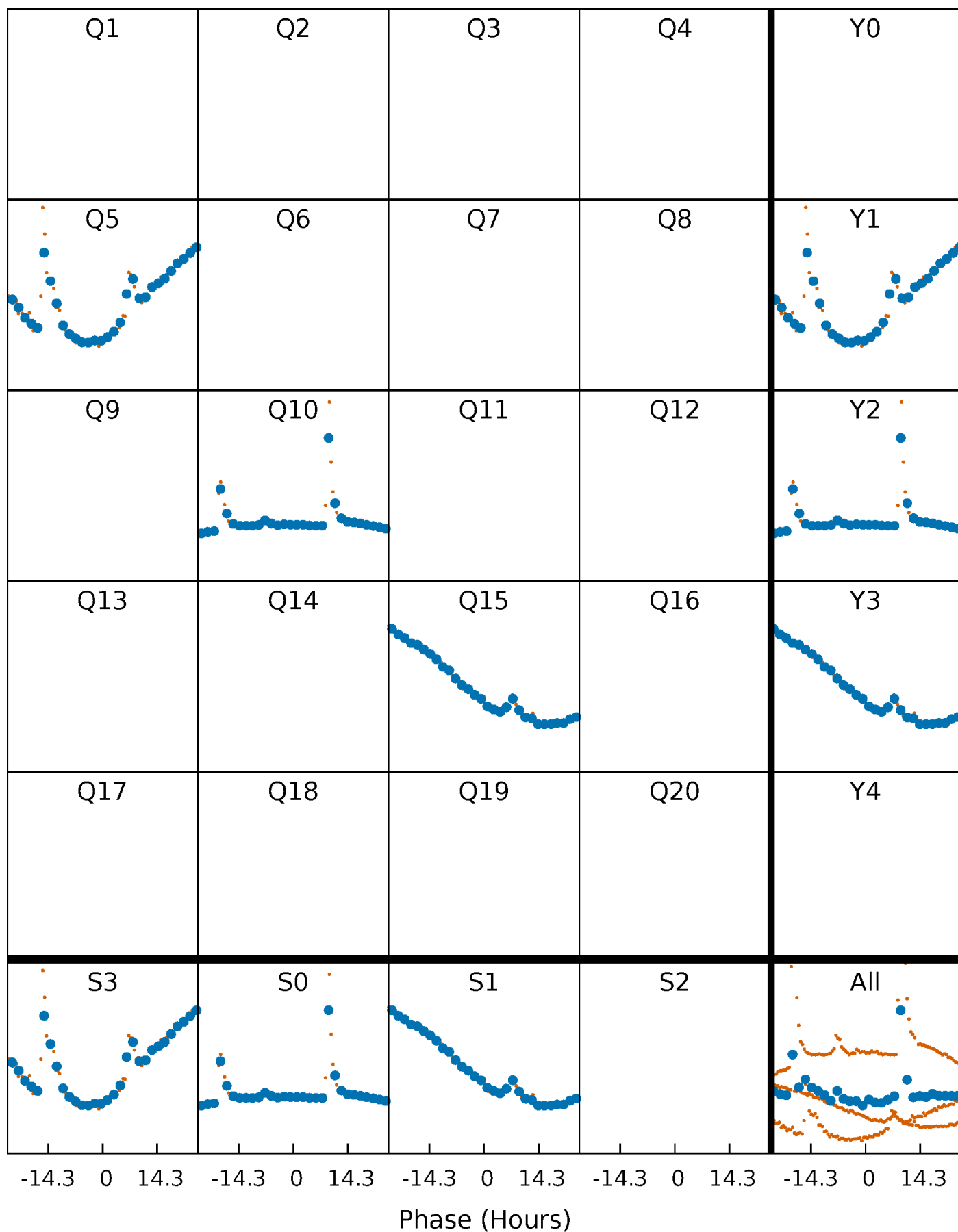


**Planet 8 : Phased Whitened Flux Time Series (TPS Epoch/Period)**



# PDC Quarter-Phased Transit Curves

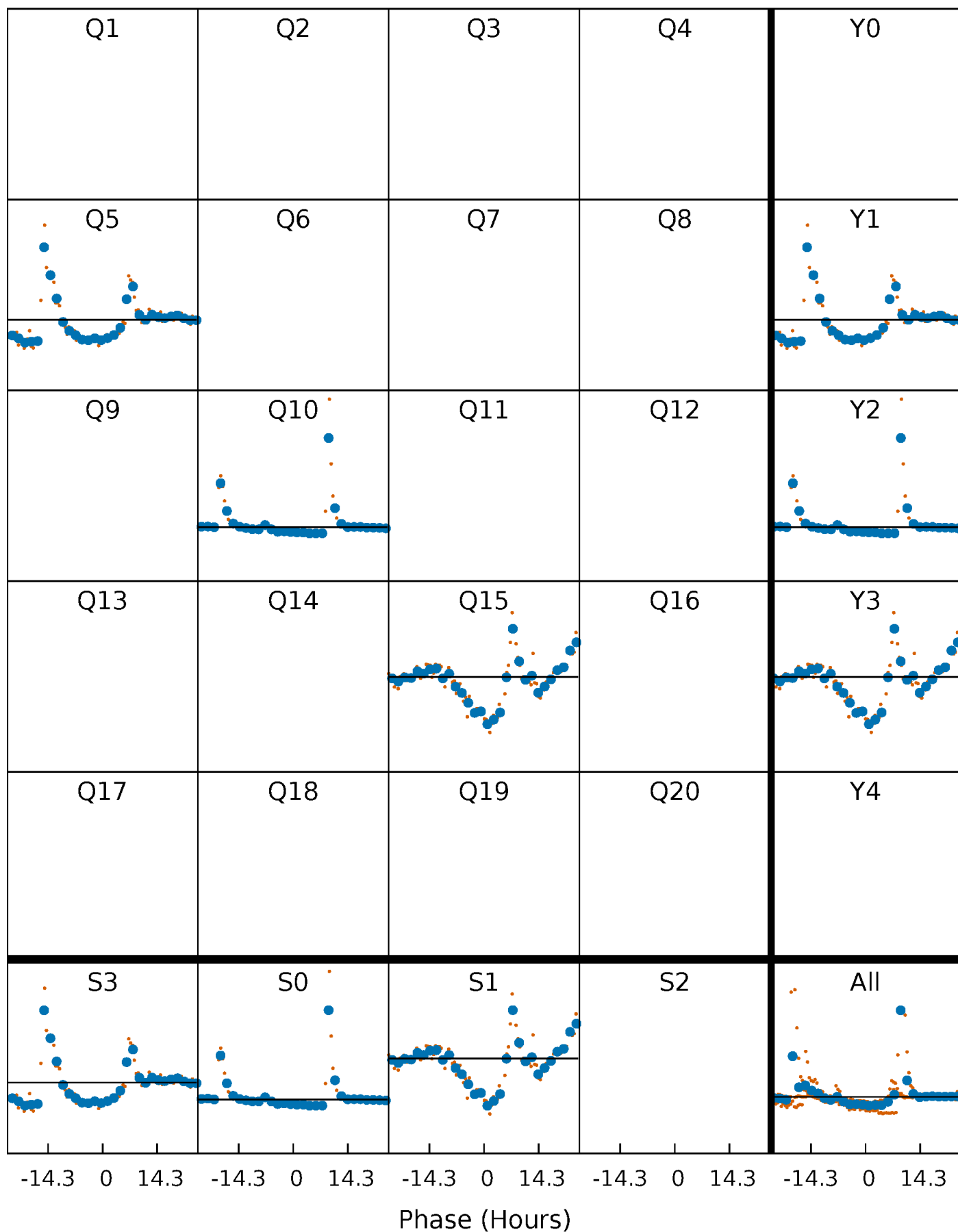
TCE 009093349-08     $P=499.232738$  Days     $T_0=455.096850$  (BKJD)





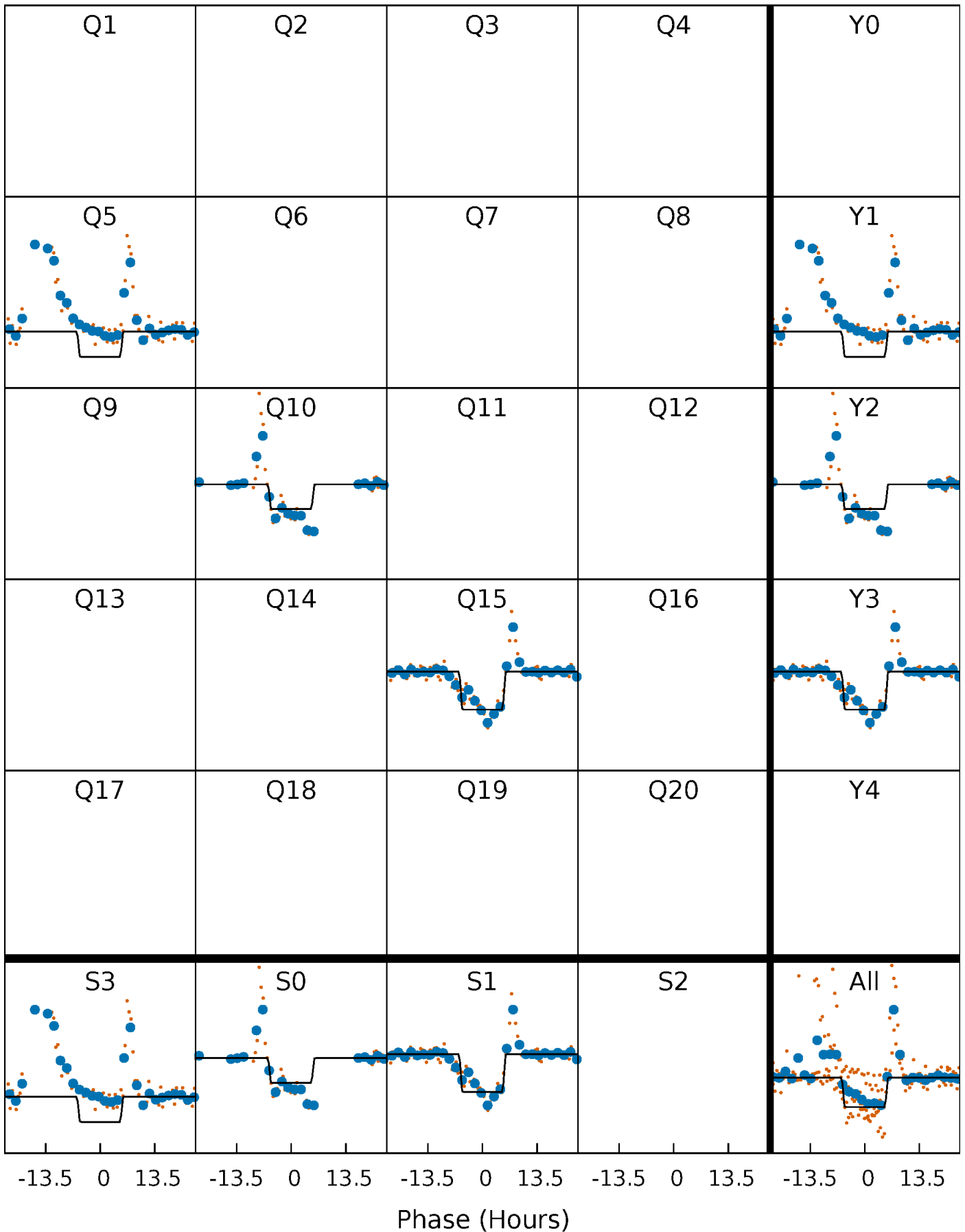
# DV Quarter-Phased Transit Curves

TCE 009093349-08     $P=499.232738$  Days     $T_0=455.096850$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

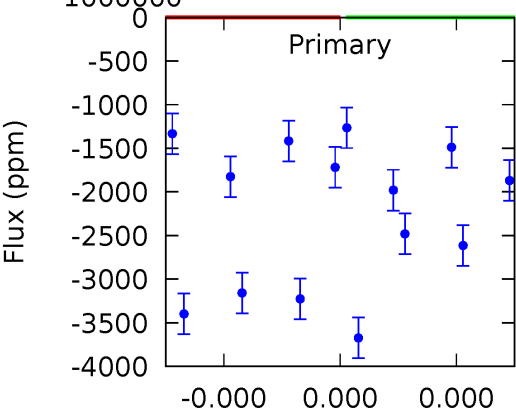
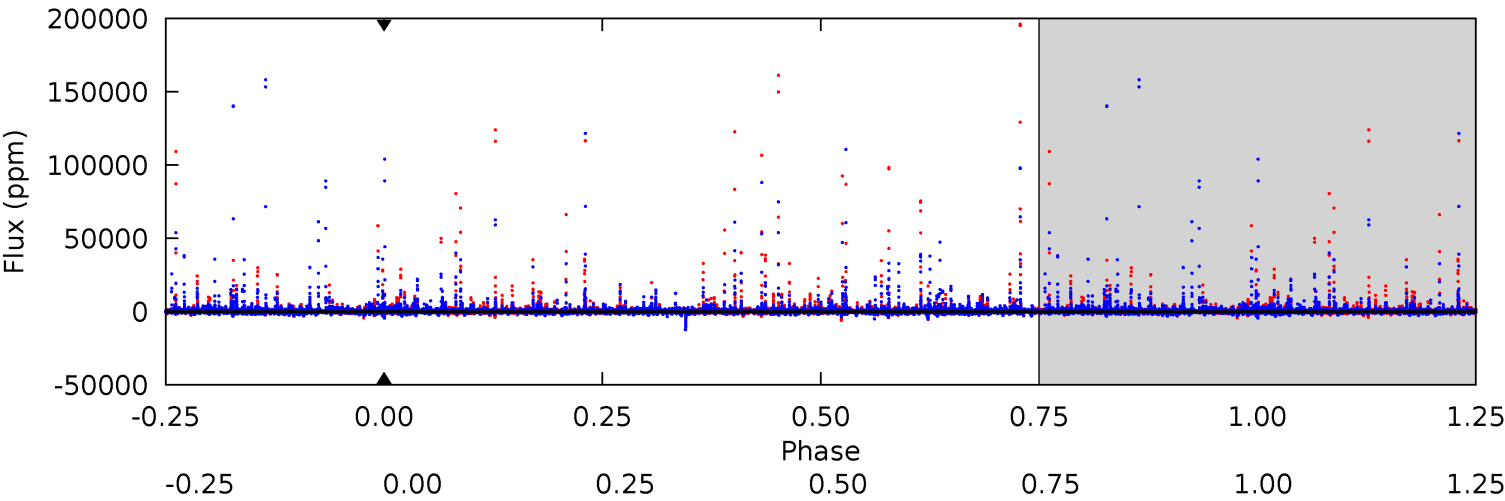
TCE 009093349-08     $P=499.232738$  Days     $T_0=455.104129$  (BKJD)



# DV Model-Shift Uniqueness Test

009093349-08, P = 499.232738 Days, E = 455.096850 Days

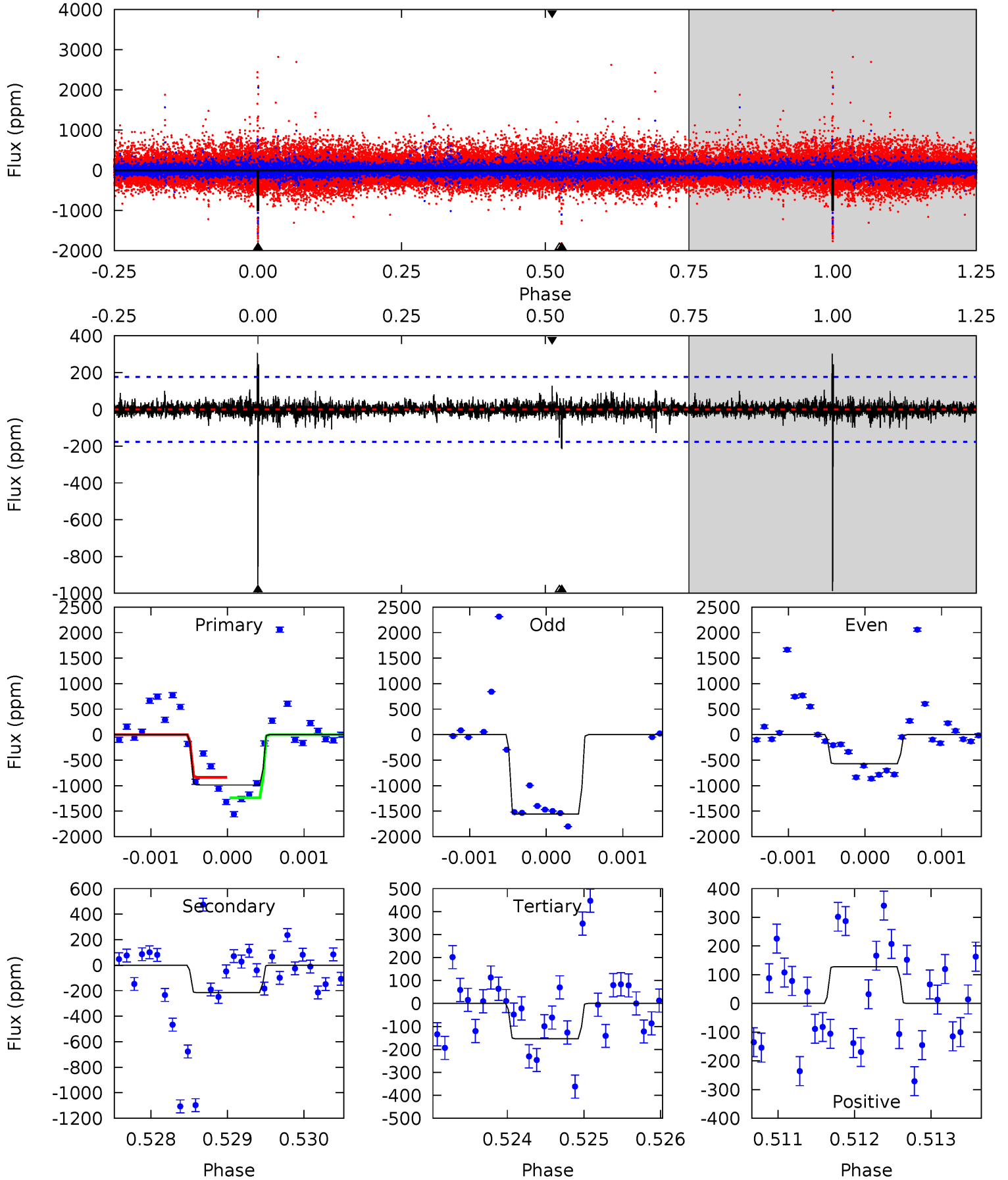
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



# Alt Model-Shift Uniqueness Test

009093349-08, P = 499.232738 Days, E = 455.104129 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
30.6	6.67	4.76	3.97	5.46	3.31	0.69	25.8	26.6	1.91	2.71	13.7	0.81	0.23	6.13



### Stellar Parameters For KIC 009093349

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5130^{+154}_{-169}$	$3.434^{+0.497}_{-0.213}$	$-0.020^{+0.250}_{-0.300}$	$4.000^{+1.136}_{-2.109}$	$1.585^{+0.213}_{-0.639}$	$0.035^{+0.170}_{-0.018}$
	+3%/-3%	+14%/-6%	+1250%/-1500%	+28%/-53%	+13%/-40%	+488%/-52%
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 009093349-08 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$0 \pm 1000000$	$26.58^{+33.71}_{-18.32}$	$516^{+53}_{-78}$	$3618^{+14033}_{-19385}$	$1249^{+310940}_{-229006}$
Alt.	$-215 \pm 32$	$33.47^{+33.93}_{-24.22}$	$523^{+51}_{-71}$	$2850^{+1293}_{-437}$	$212^{+2229}_{-162}$

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

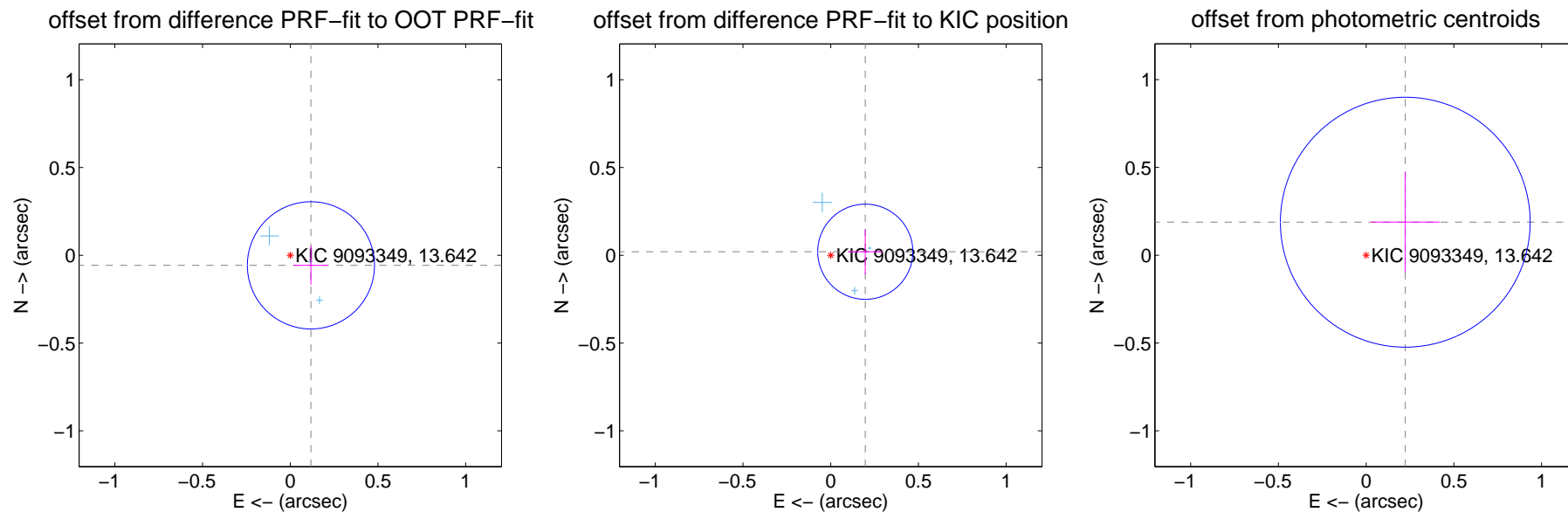
## DV Centroid Data

Supplemental centroid analysis for 009093349-08. Kepler magnitude: 13.64. Transit SNR -1.00

There are 3 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.20 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.131 \pm 0.121$	1.08	$-0.118 \pm 0.098$	$-0.057 \pm 0.110$
PRF-fit source offset from KIC position	$0.198 \pm 0.090$	2.19	$-0.197 \pm 0.096$	$0.020 \pm 0.128$
photometric centroid source offset	$0.29 \pm 0.24$	1.23	$-0.22 \pm 0.20$	$0.19 \pm 0.29$

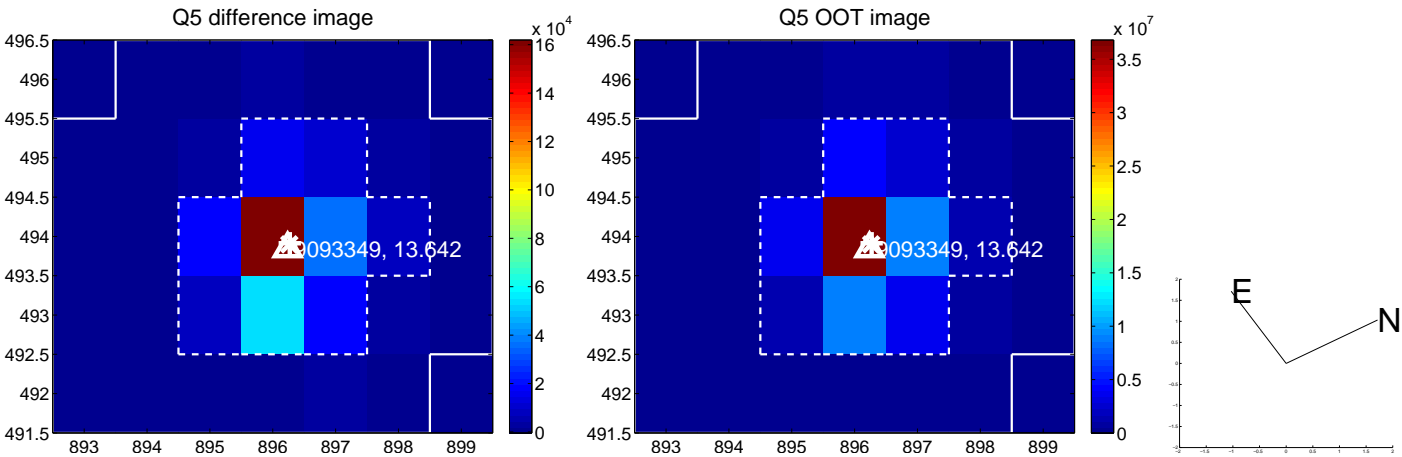


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

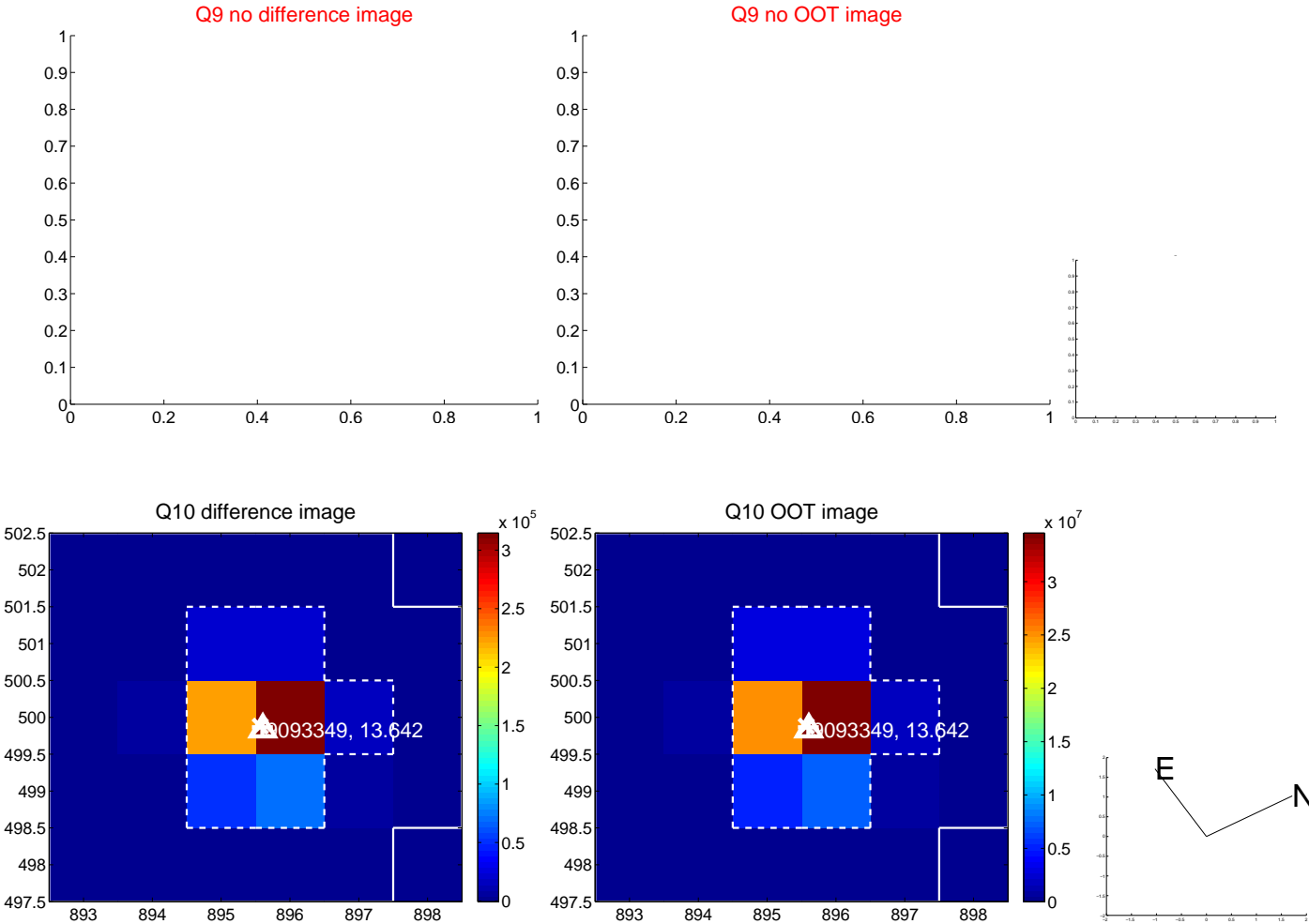


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

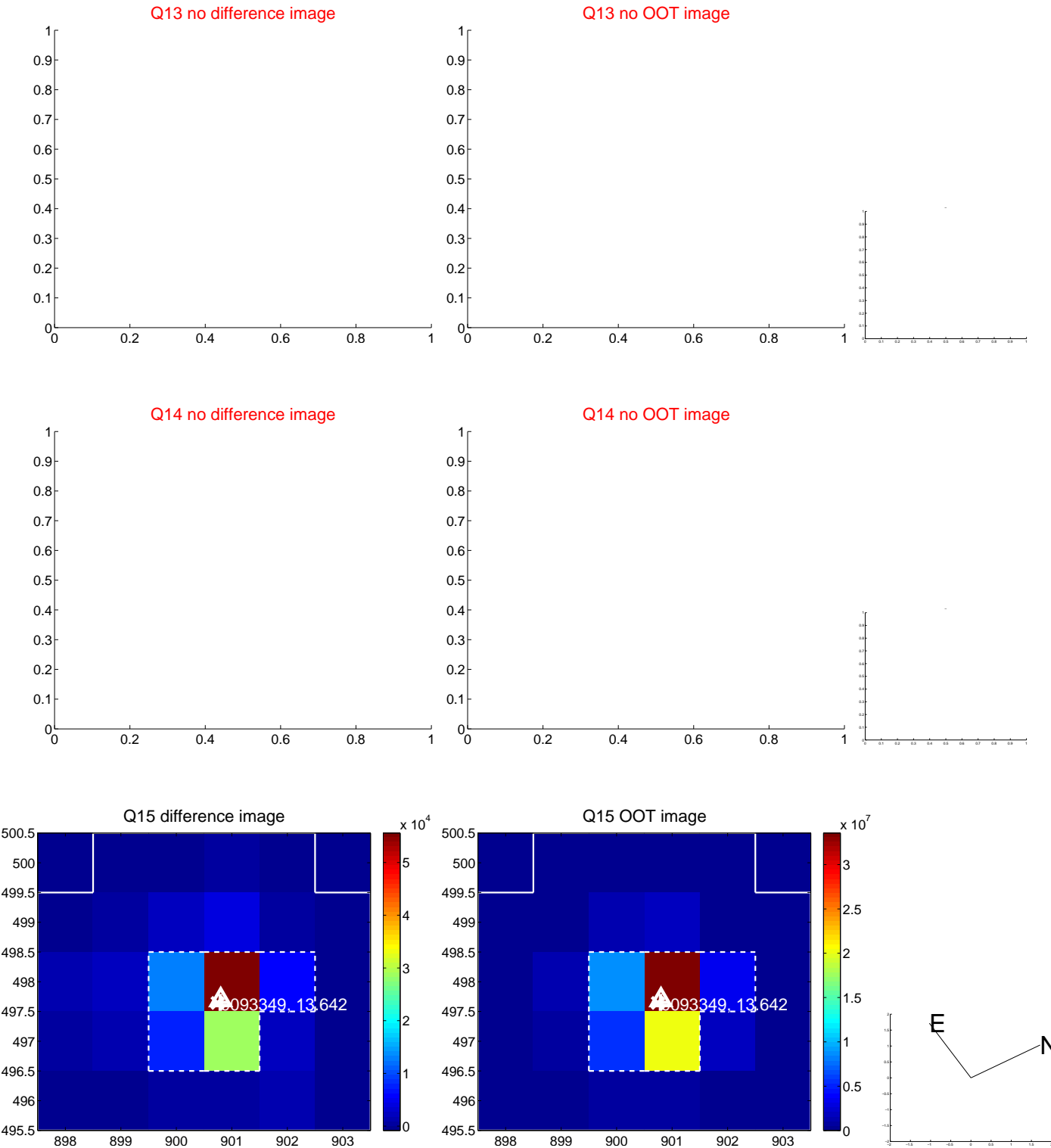




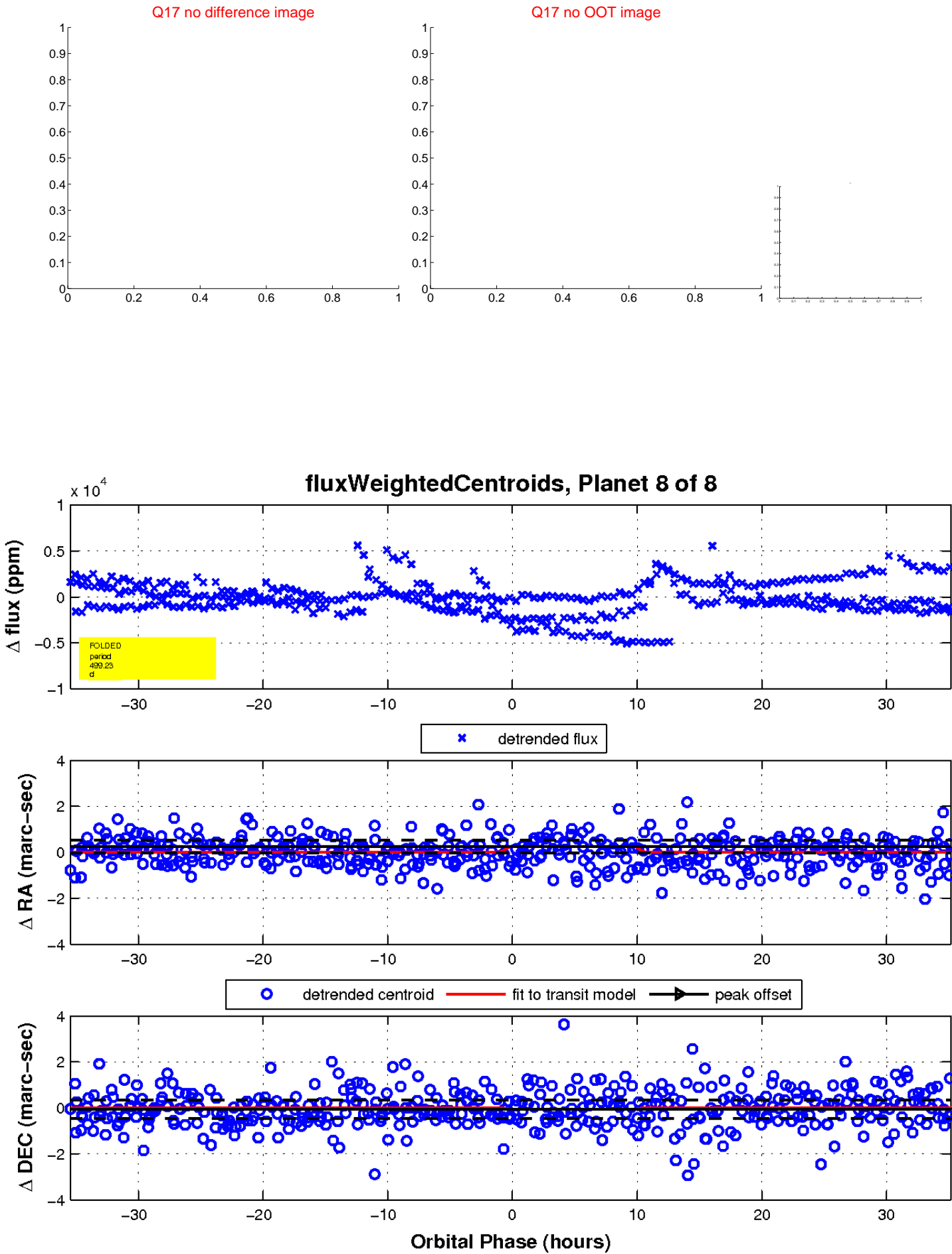
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



white ×: 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.



UKIRT Image

Declination

