

# KIC 009827094

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009827094-01	OBS	No	218.138176	285.922591	604.4	2.950	15.0	7.6	1.09	5790	2.81	2.69
009827094-02	OBS	No	465.230842	241.636705	611.3	2.558	15.8	6.9	1.09	5790	2.98	0.98
009827094-05	OBS	No	668.673525	193.262405	929.6	6.521	15.0	9.8	1.09	5790	3.95	0.60
009827094-06	OBS	No	406.356904	281.910599	560.7	3.183	11.1	6.4	1.09	5790	2.81	1.17
009827094-07	OBS	8186.01	241.899294	248.697460	300.8	7.500	10.6	-1.0	1.09	5790	1.88	2.34

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009827094-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—CENT_FEW_DIFFS
009827094-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009827094-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
009827094-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—CENT_FEW_DIFFS
009827094-07	OBS	FP	0.00	1	0	1	0	INCONSISTENT_TRANS—CENT_NOFITS—HALO_GHOST

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

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

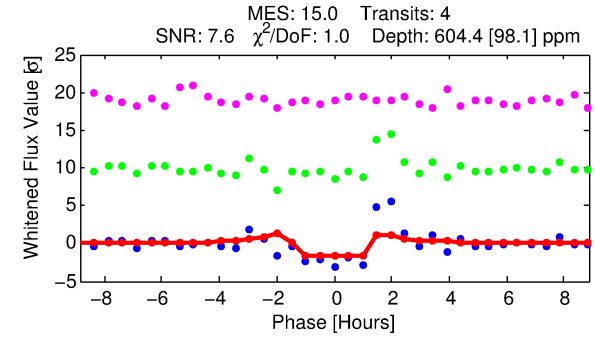
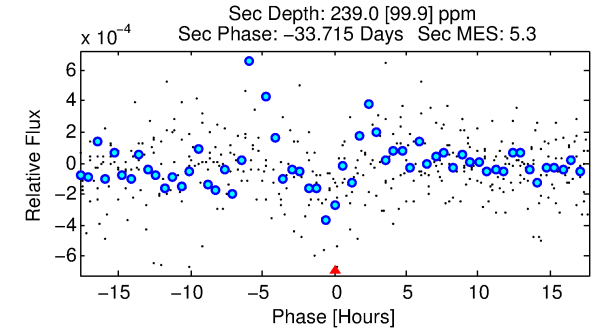
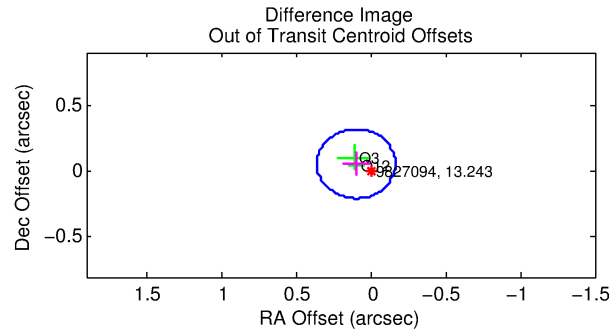
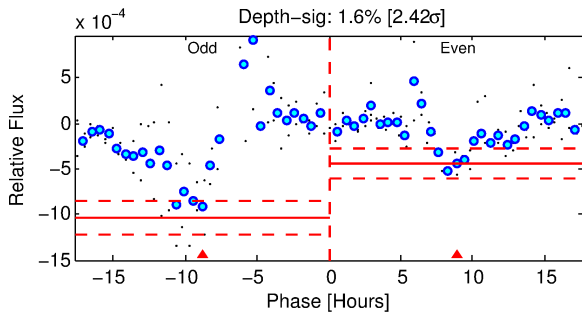
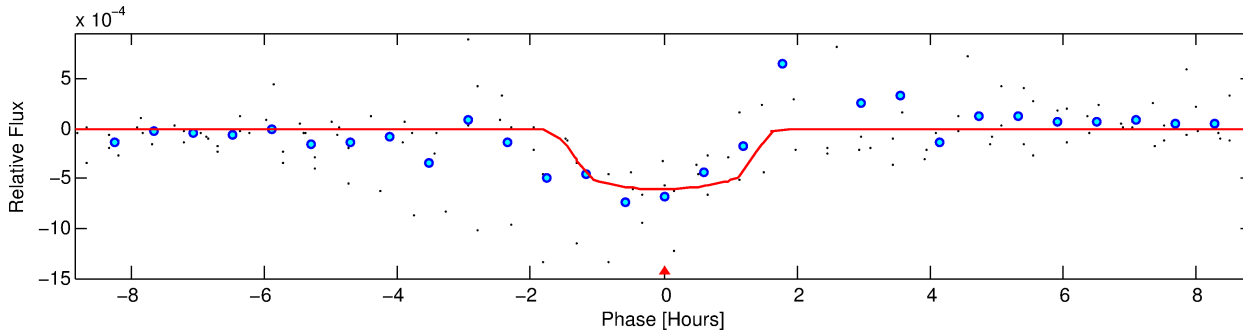
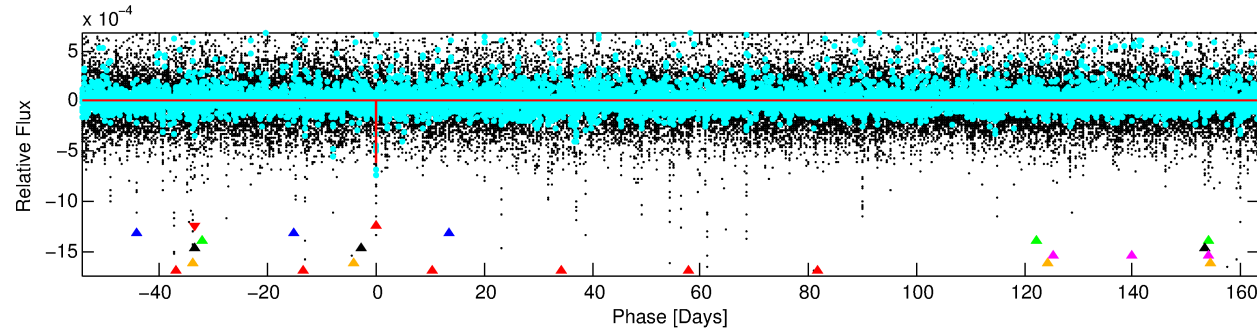
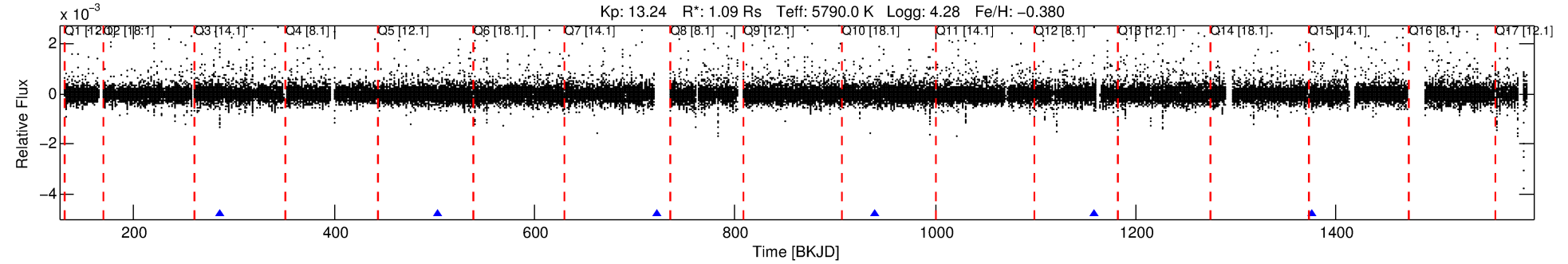
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 009827094-01

No Significant Match Found

# DV One-Page Summary

KIC: 9827094 Candidate: 1 of 7 Period: 218.138 d



## DV Fit Results:

Period = 218.13818 [0.00164] d  
Epoch = 285.9226 [0.0055] BKJD  
Rp/R\* = 0.0237 [0.0253]  
a/R\* = 452.78 [2223.80]  
b = 0.64 [4.65]  
Seff = 2.69 [1.16]  
Teq = 326 [35] K  
Rp = 2.81 [3.12] Re  
a = 0.6662 [0.1793] AU  
Ag = 7368.56 [16334.31] [0.45σ]  
Teffp = 4676 [2548] K [1.71σ]

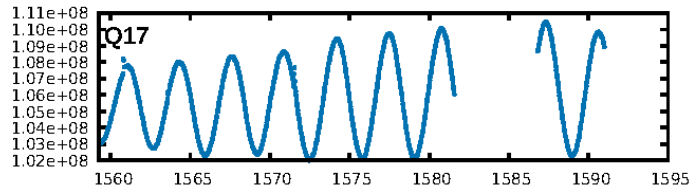
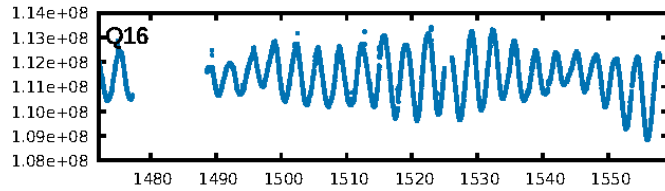
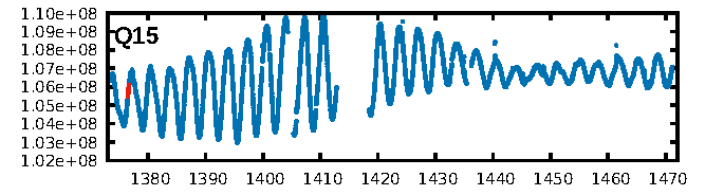
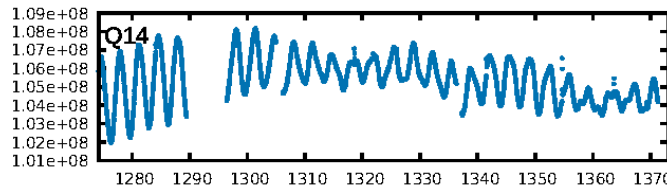
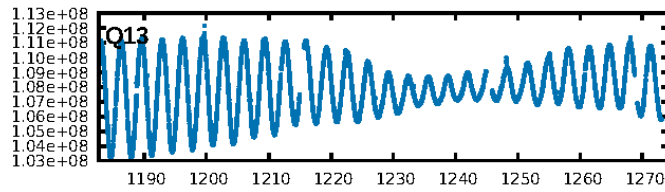
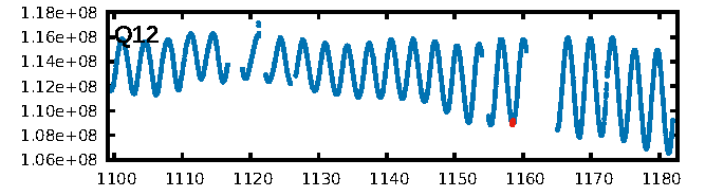
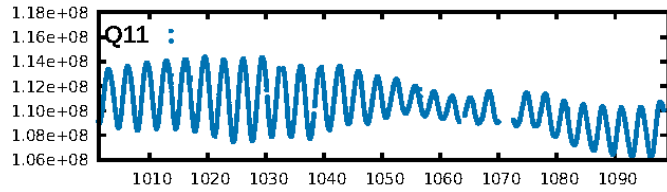
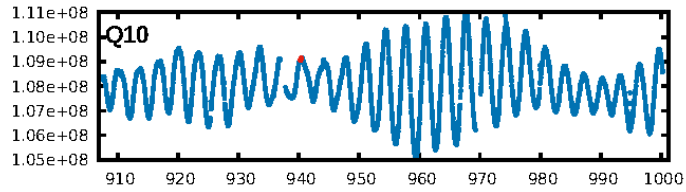
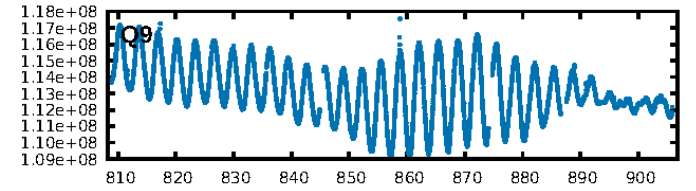
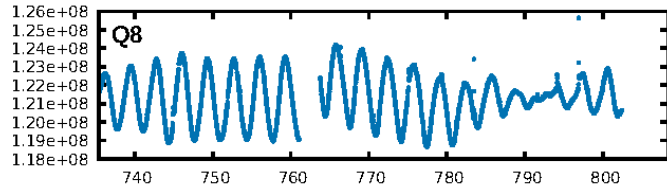
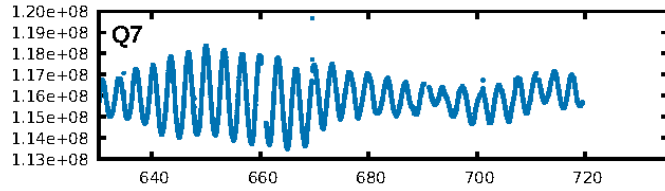
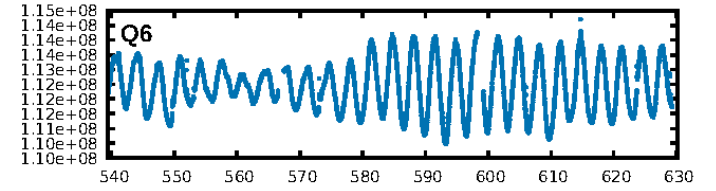
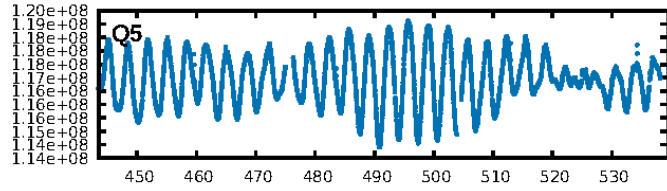
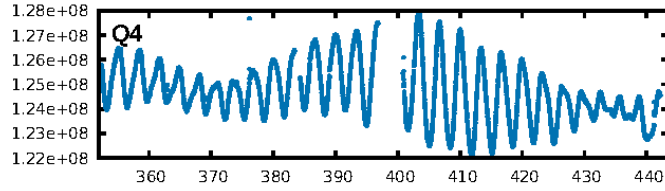
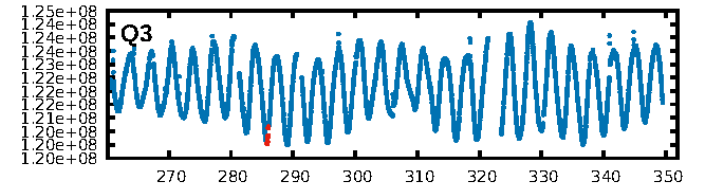
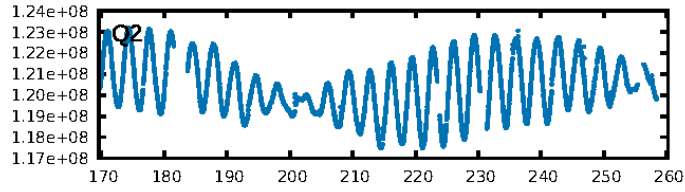
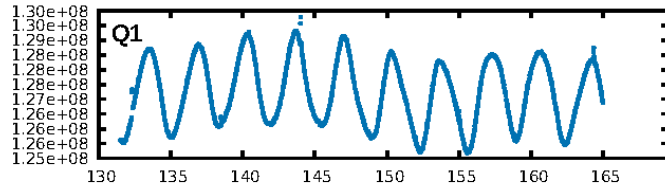
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [70.76σ]  
ModelChiSquare2-sig: 10.2%  
ModelChiSquareGof-sig: 96.2%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: 1.758  
Centroid-sig: 89.5%  
Centroid-so: 0.085 arcsec [0.13σ]  
OotOffset-rm: 0.112 arcsec [1.28σ]  
OotOffset-st: 0/1/1/0 [2]  
KicOffset-rm: 0.272 arcsec [3.12σ]  
KicOffset-st: 0/1/1/0 [2]  
DiffImageQuality-fgm: 1.00 [2/2]  
DiffImageOverlap-fno: 1.00 [4/4]

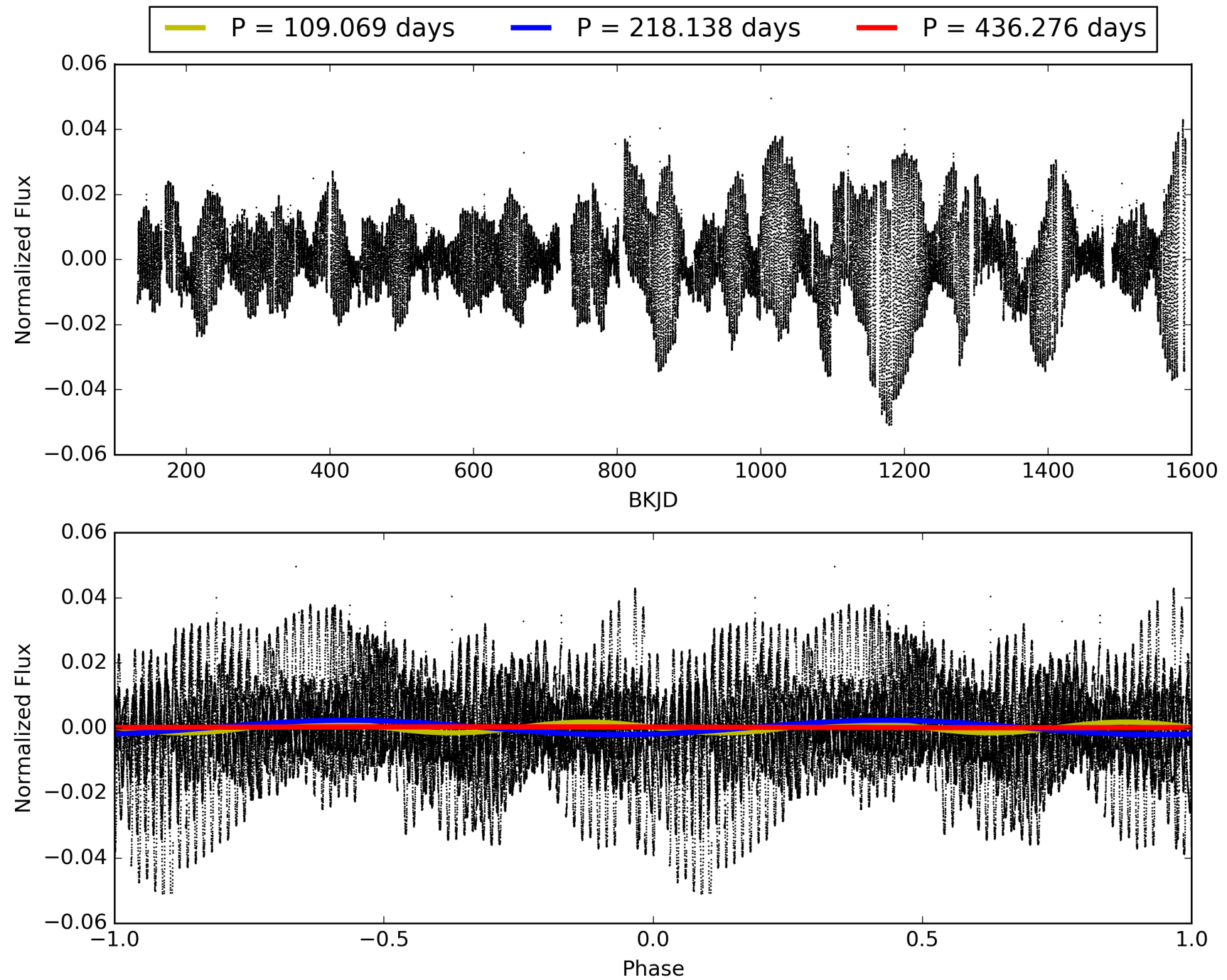
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:14:58 Z

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

# TCE 009827094-01, PDC Light Curves



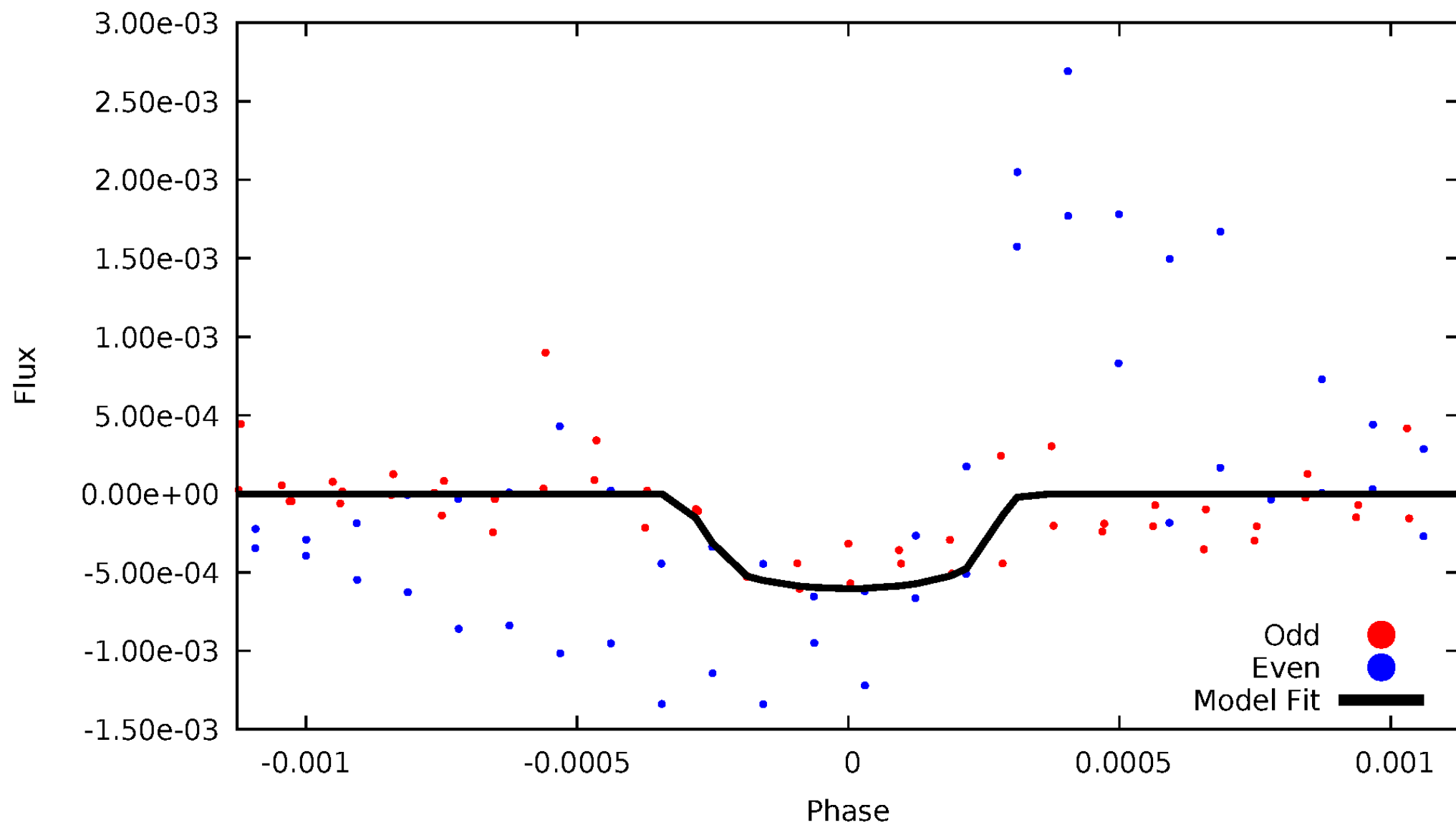
TCE 009827094-01





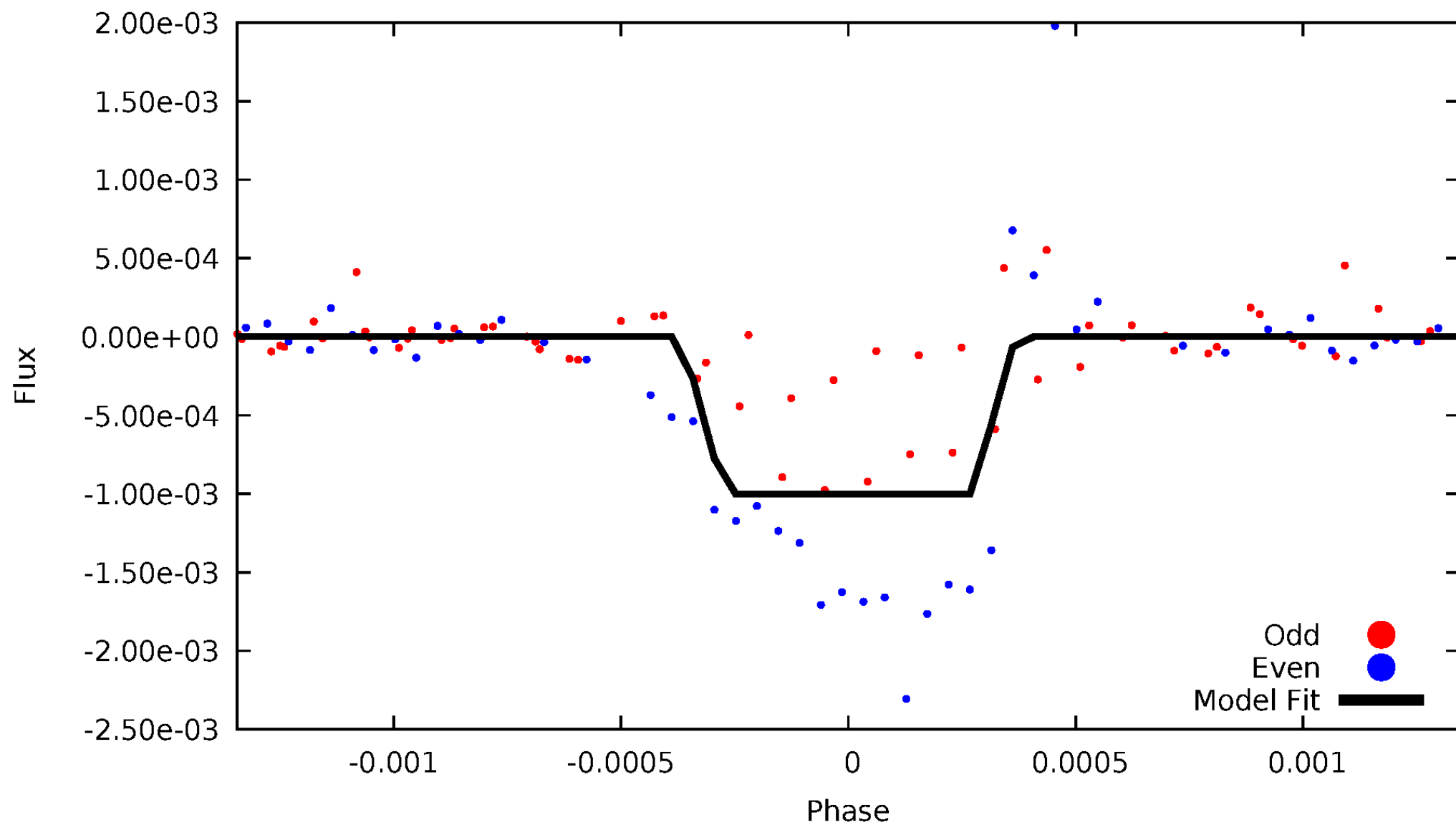
# DV Odd/Even

TCE 009827094-01



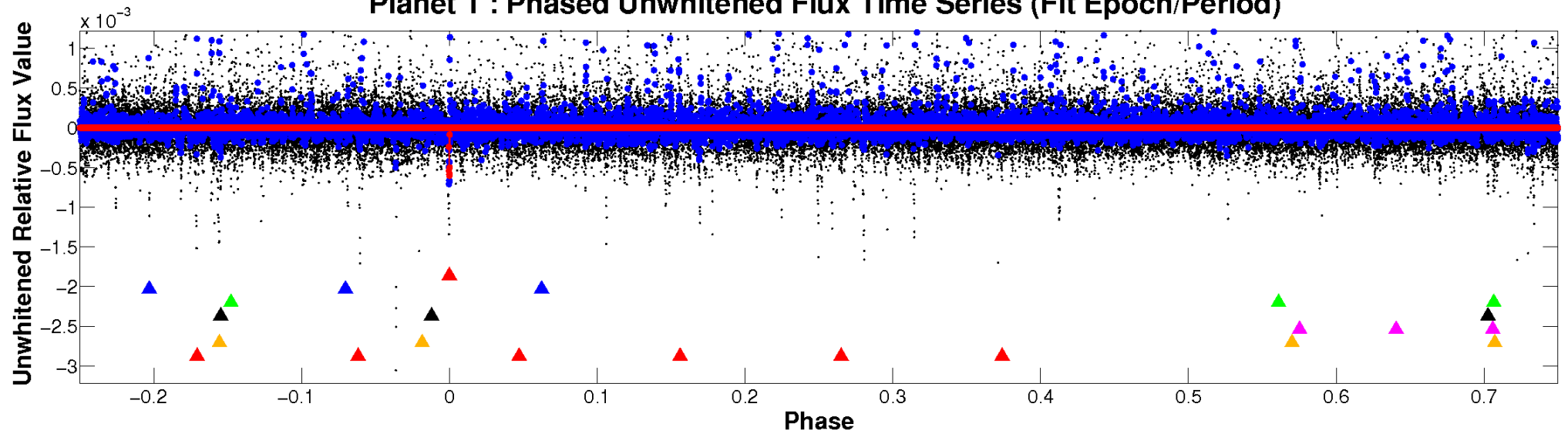
# ALT Odd/Even

TCE 009827094-01

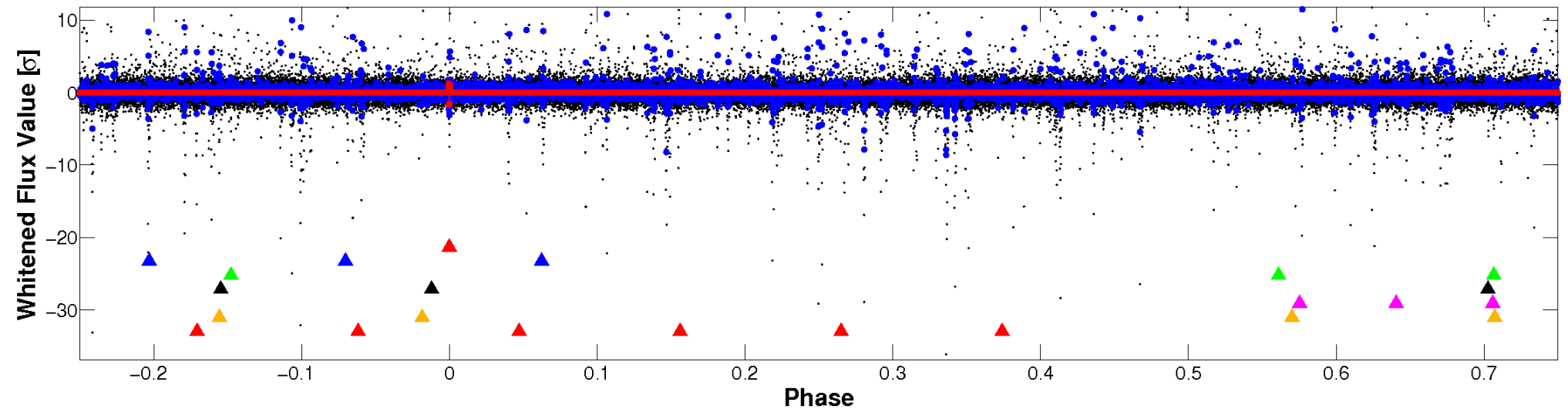


# Non-Whitened Vs. Whitened Light Curve

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

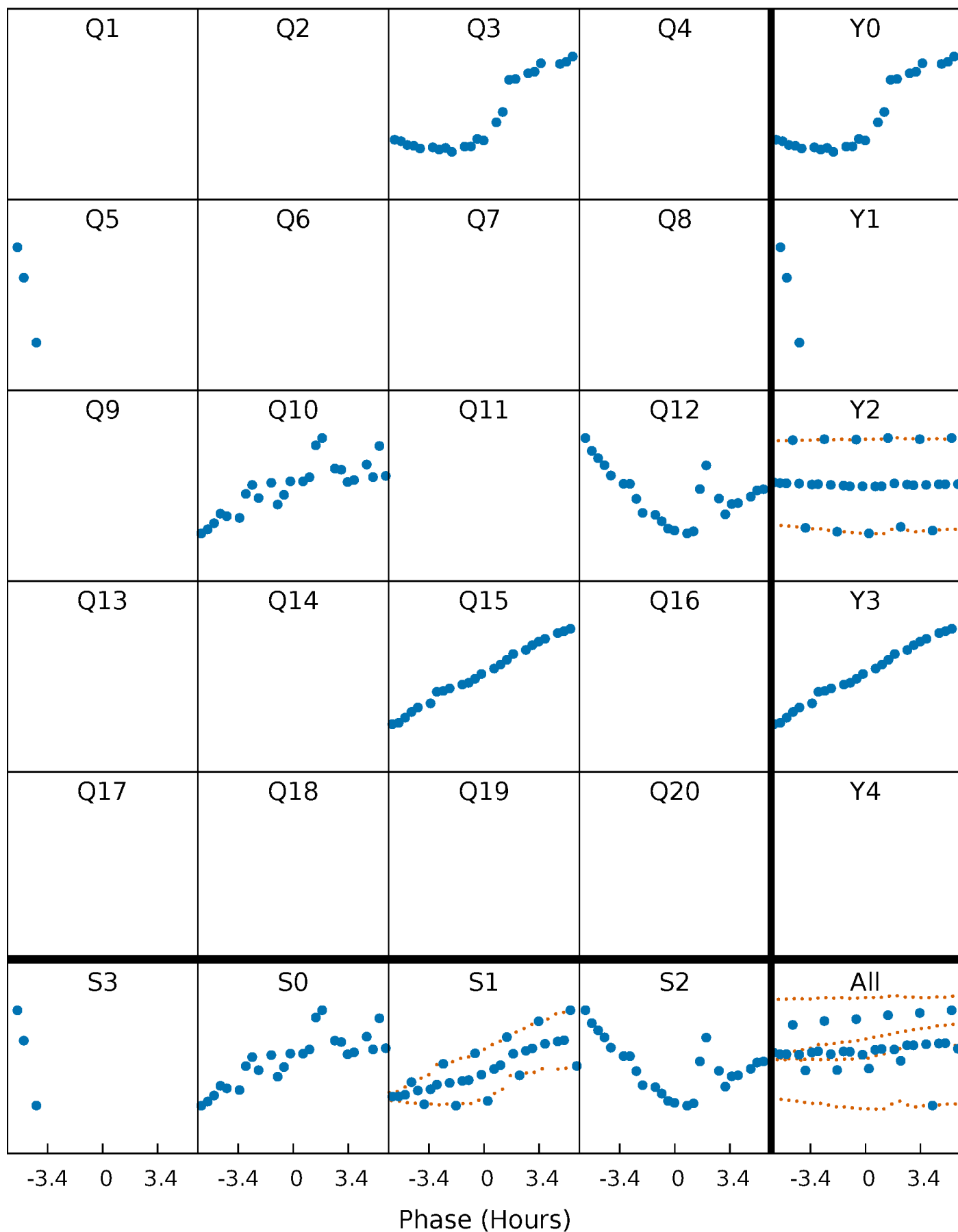


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



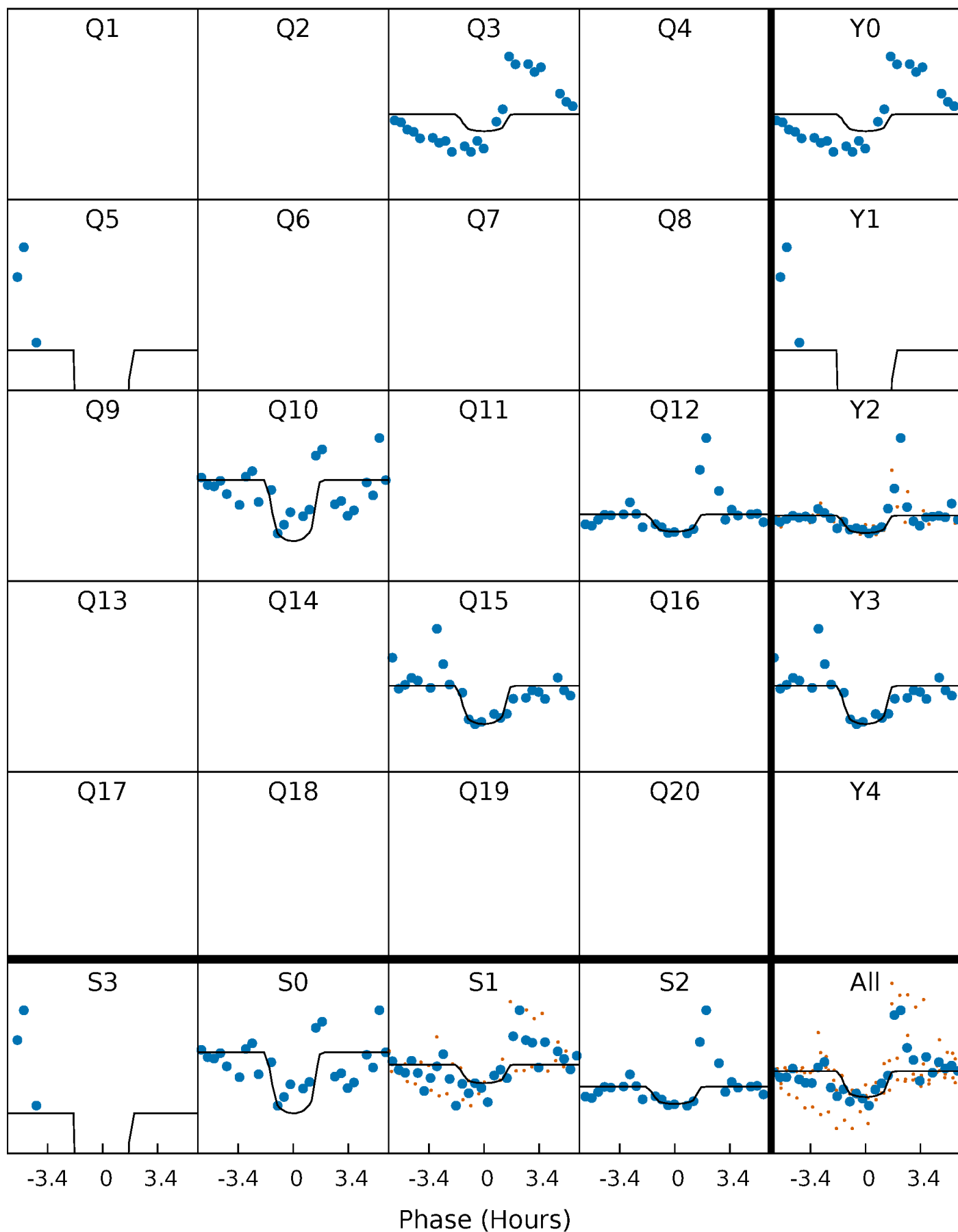
# PDC Quarter-Phased Transit Curves

TCE 009827094-01 P=218.138176 Days  $T_0=285.922591$  (BKJD)



# DV Quarter-Phased Transit Curves

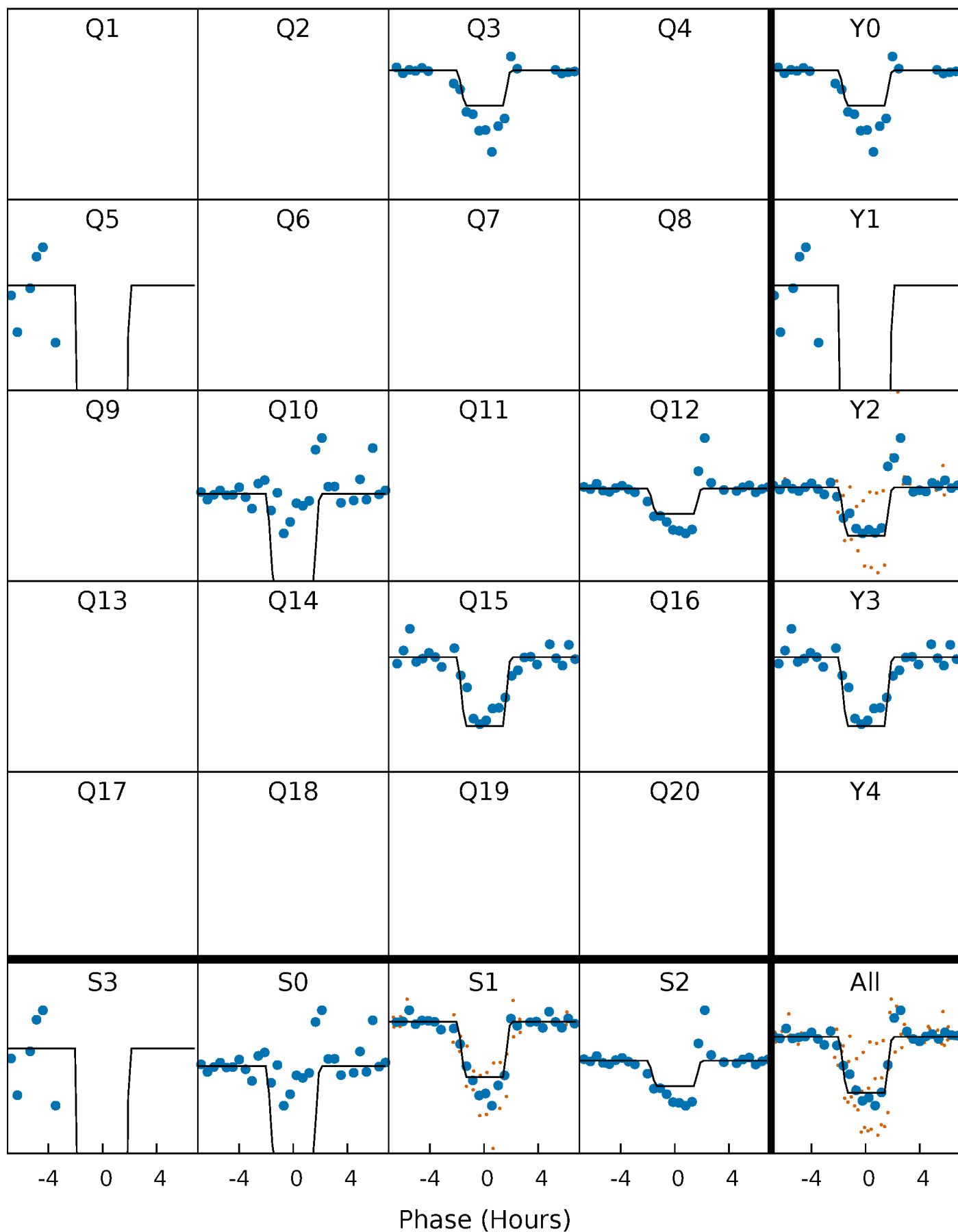
TCE 009827094-01 P=218.138176 Days  $T_0=285.922591$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

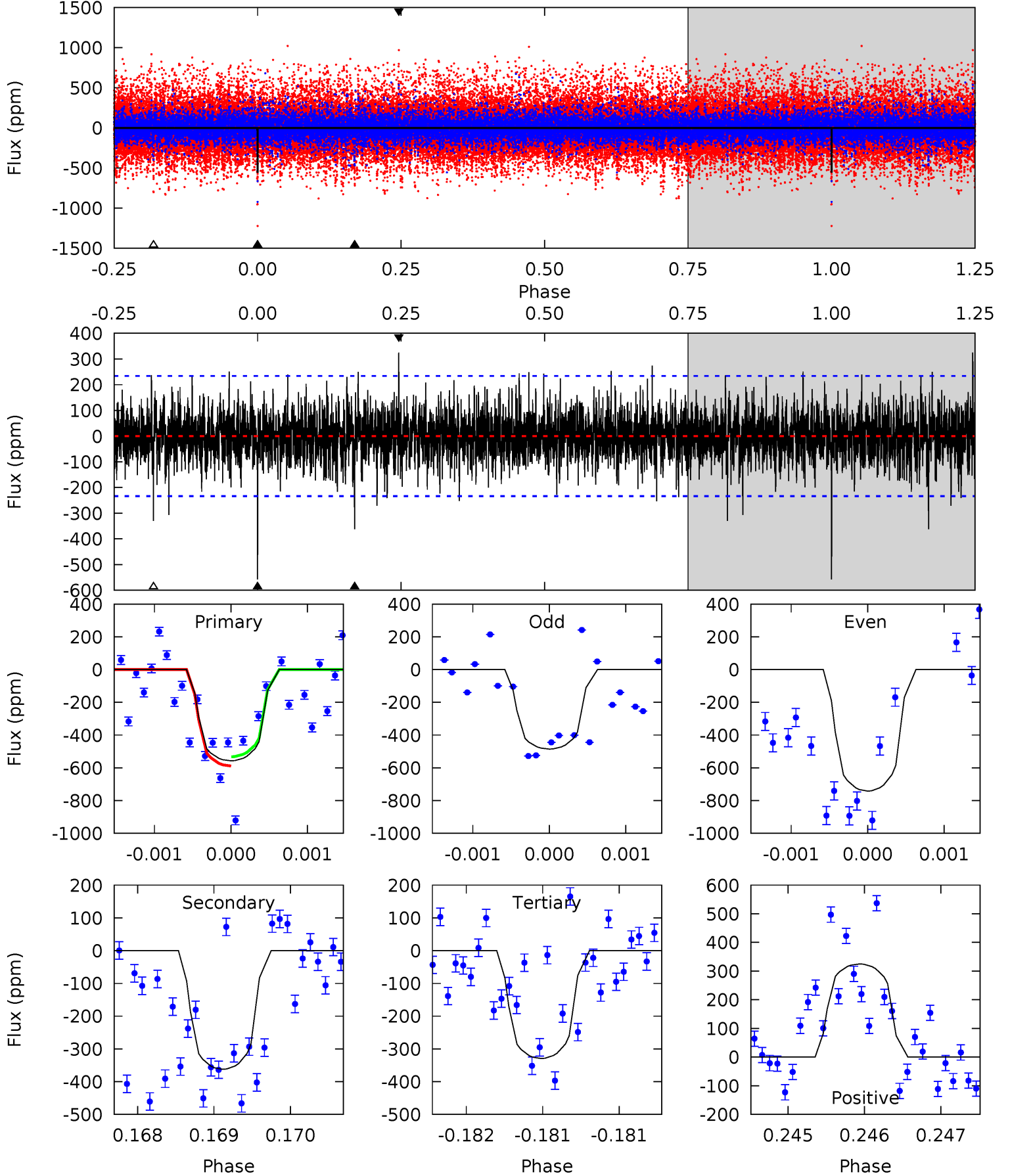
TCE 009827094-01 P=218.140712 Days  $T_0=285.901566$  (BKJD)



# DV Model-Shift Uniqueness Test

009827094-01, P = 218.138176 Days, E = 67.784415 Days

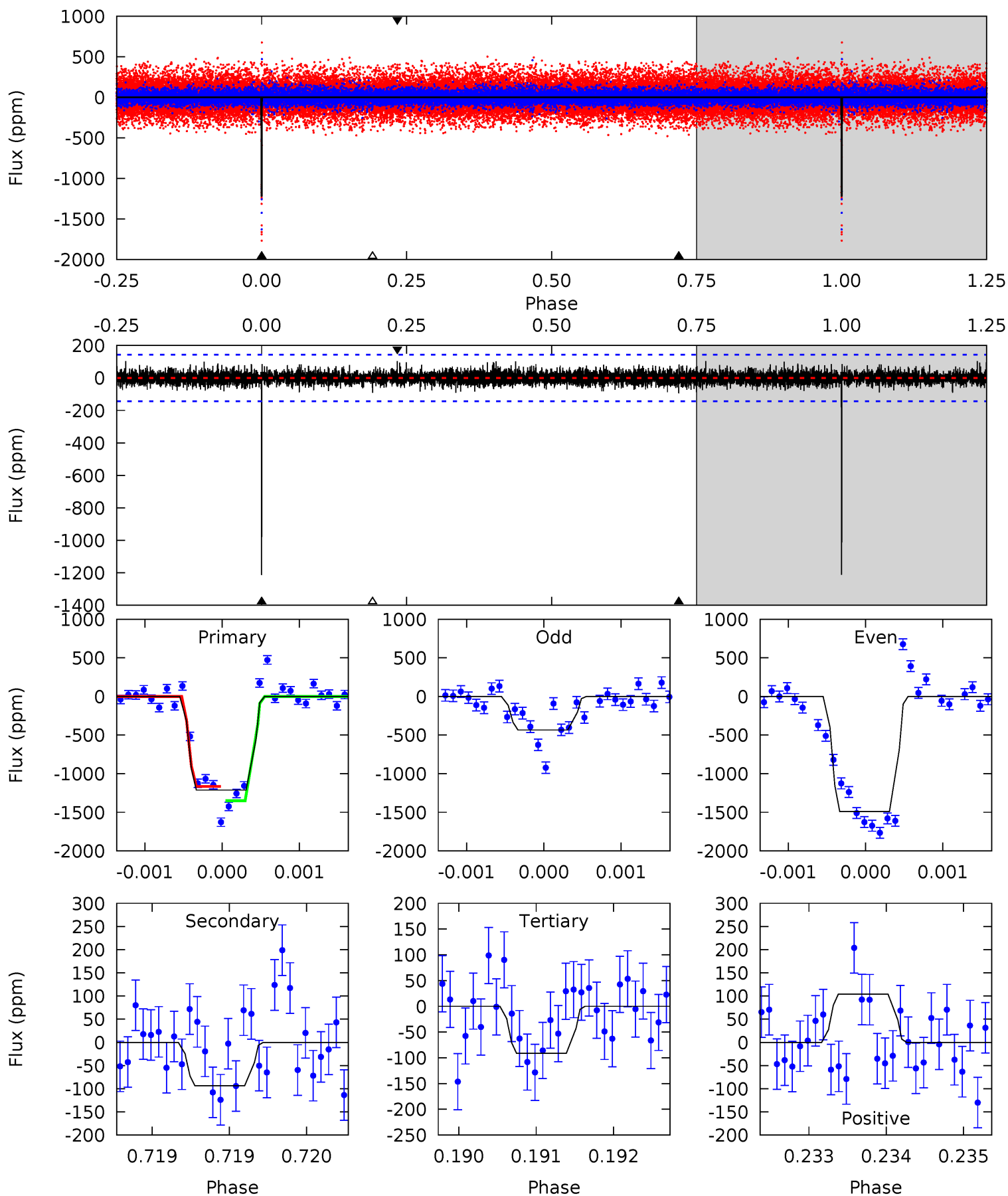
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.2	8.58	7.80	7.70	5.54	3.43	1.65	5.40	5.51	0.78	0.88	3.17	1.03	0.37	0.67



# Alt Model-Shift Uniqueness Test

009827094-01, P = 218.140712 Days, E = 67.760854 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
46.5	3.59	3.51	3.99	5.50	3.37	0.90	43.0	42.5	0.08	-0.40	24.1	0.89	0.08	3.34



### Stellar Parameters For KIC 009827094

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5790^{+155}_{-155}$	$4.283^{+0.242}_{-0.198}$	$-0.380^{+0.300}_{-0.250}$	$1.088^{+0.318}_{-0.260}$	$0.829^{+0.123}_{-0.061}$	$0.907^{+1.211}_{-0.454}$
	+3%/-3%	+6%/-5%	+79%/-66%	+29%/-24%	+15%/-7%	+133%/-50%
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 009827094-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-362 \pm 42$	$3.39^{+2.95}_{-2.22}$	$455^{+36}_{-33}$	$4840^{+3391}_{-1042}$	$7988^{+57809}_{-5820}$
Alt.	$-94 \pm 26$	$4.24^{+3.13}_{-2.46}$	$456^{+36}_{-36}$	$3465^{+1229}_{-540}$	$1292^{+5882}_{-914}$

$T_{max}$  = 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

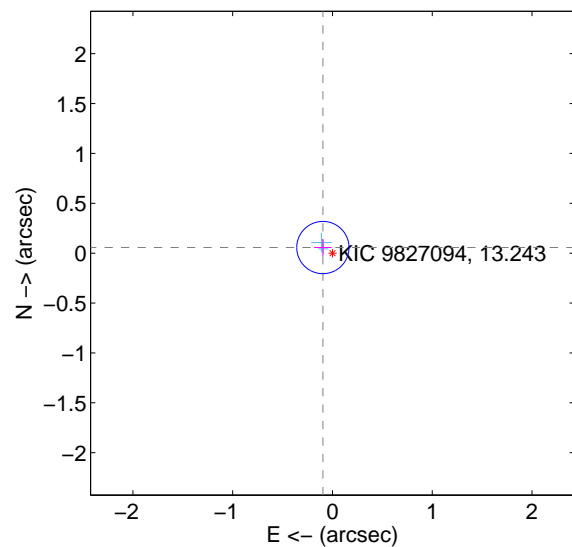
Supplemental centroid analysis for 009827094-01. Kepler magnitude: 13.24. Transit SNR 7.55

There are 2 quarters with good PRF difference image offsets

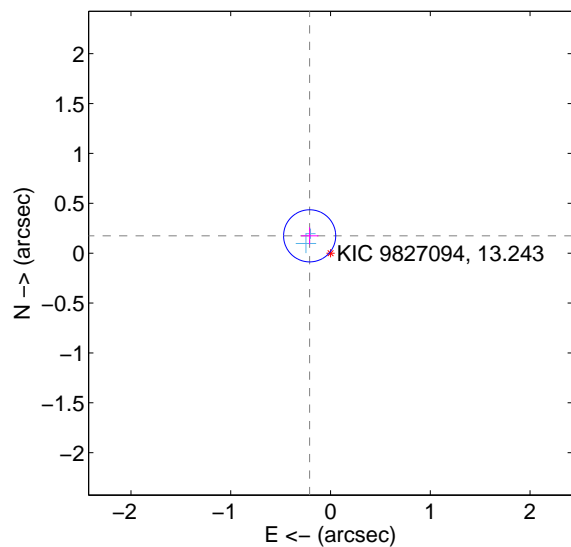
The direct PRF centroid is offset from the target star catalog position by about 0.19 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.112 \pm 0.087$	1.28	$0.096 \pm 0.088$	$0.056 \pm 0.086$
PRF-fit source offset from KIC position	<b><math>0.272 \pm 0.087</math></b>	<b>3.12</b>	$0.209 \pm 0.088$	$0.174 \pm 0.086$
photometric centroid source offset	$0.08 \pm 0.65$	0.13	$0.07 \pm 0.66$	$-0.05 \pm 0.60$

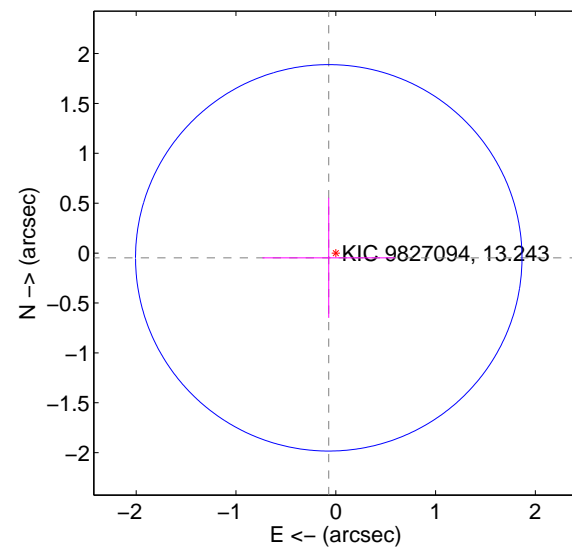
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



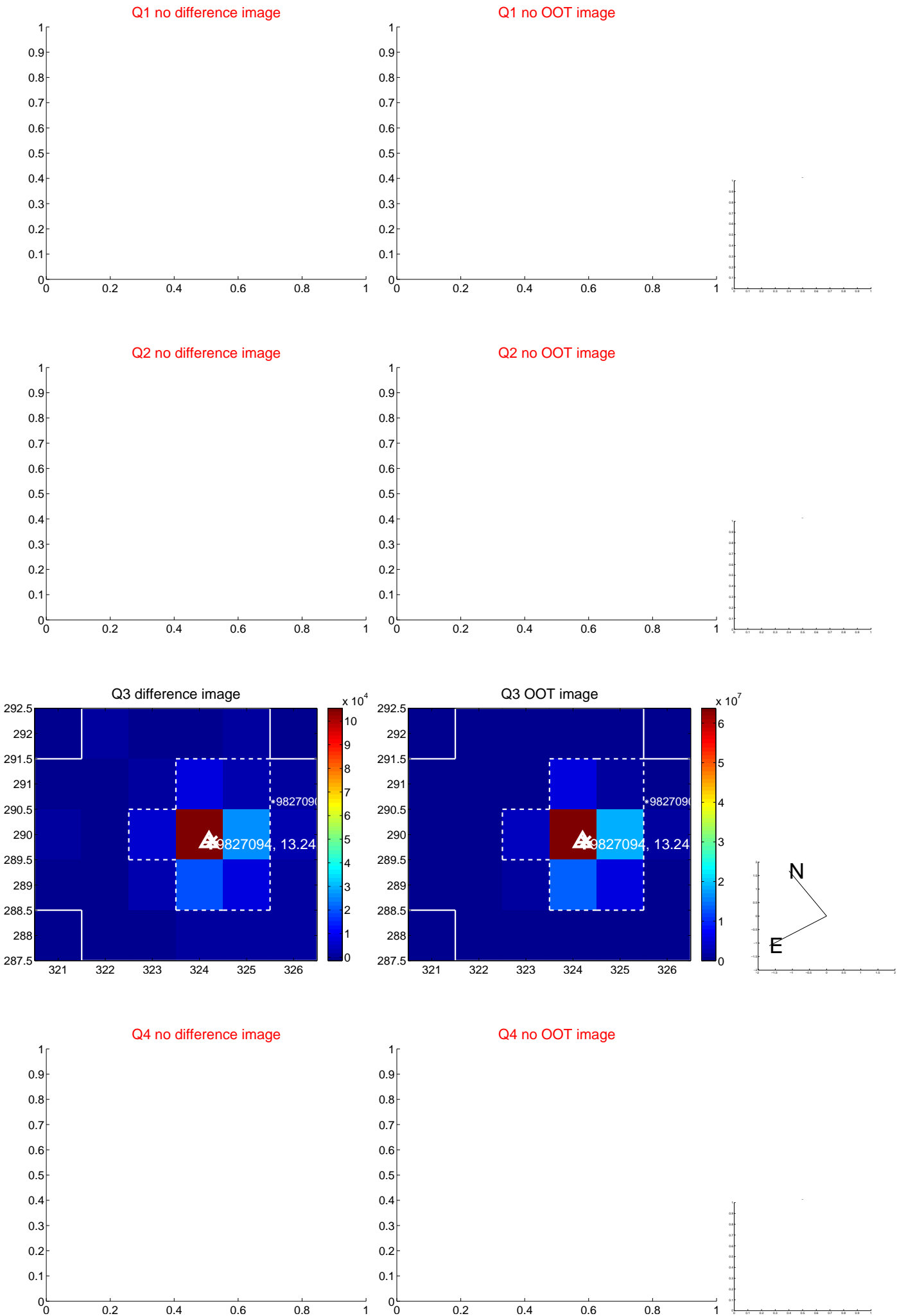
offset from photometric centroids



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.



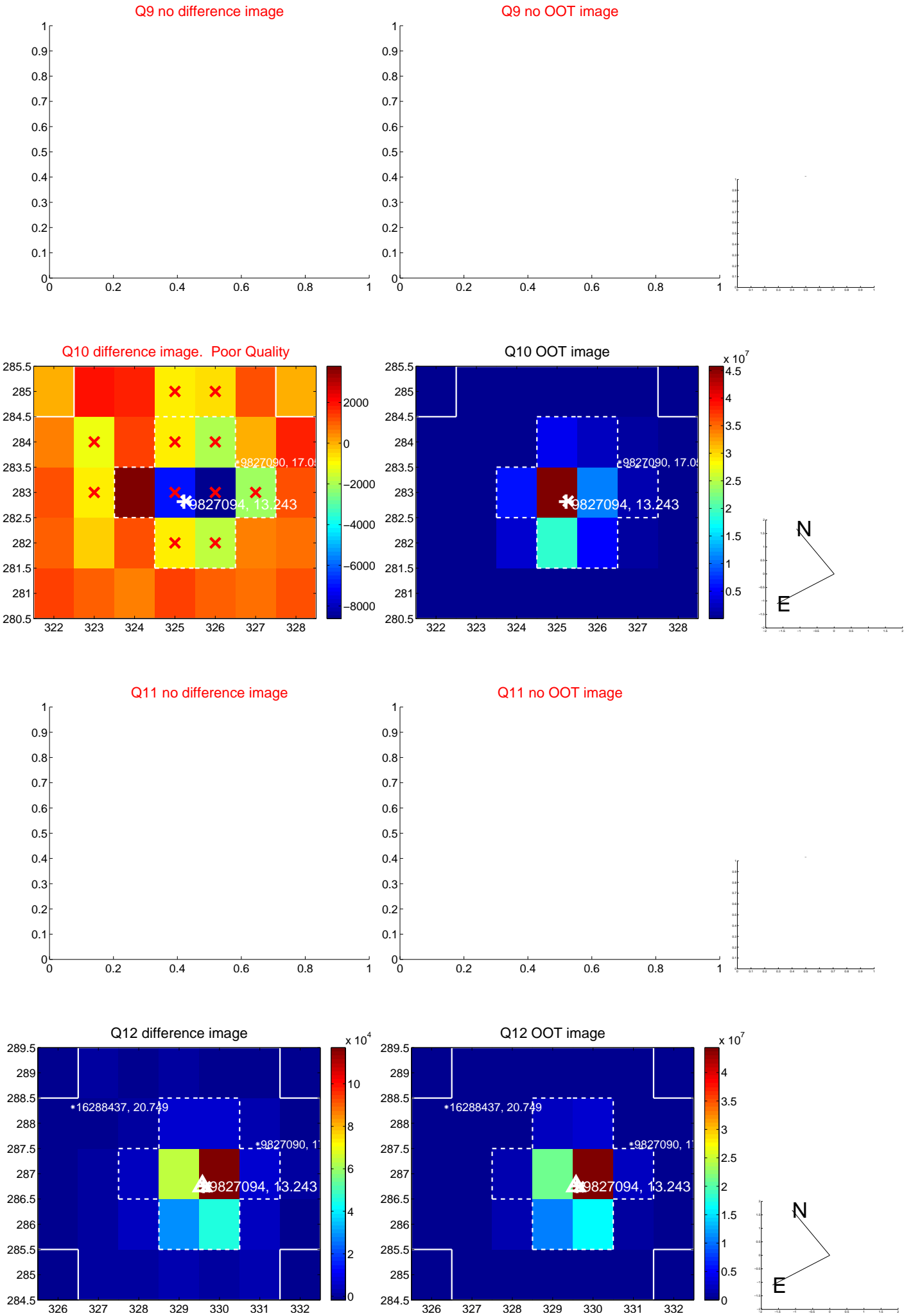
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



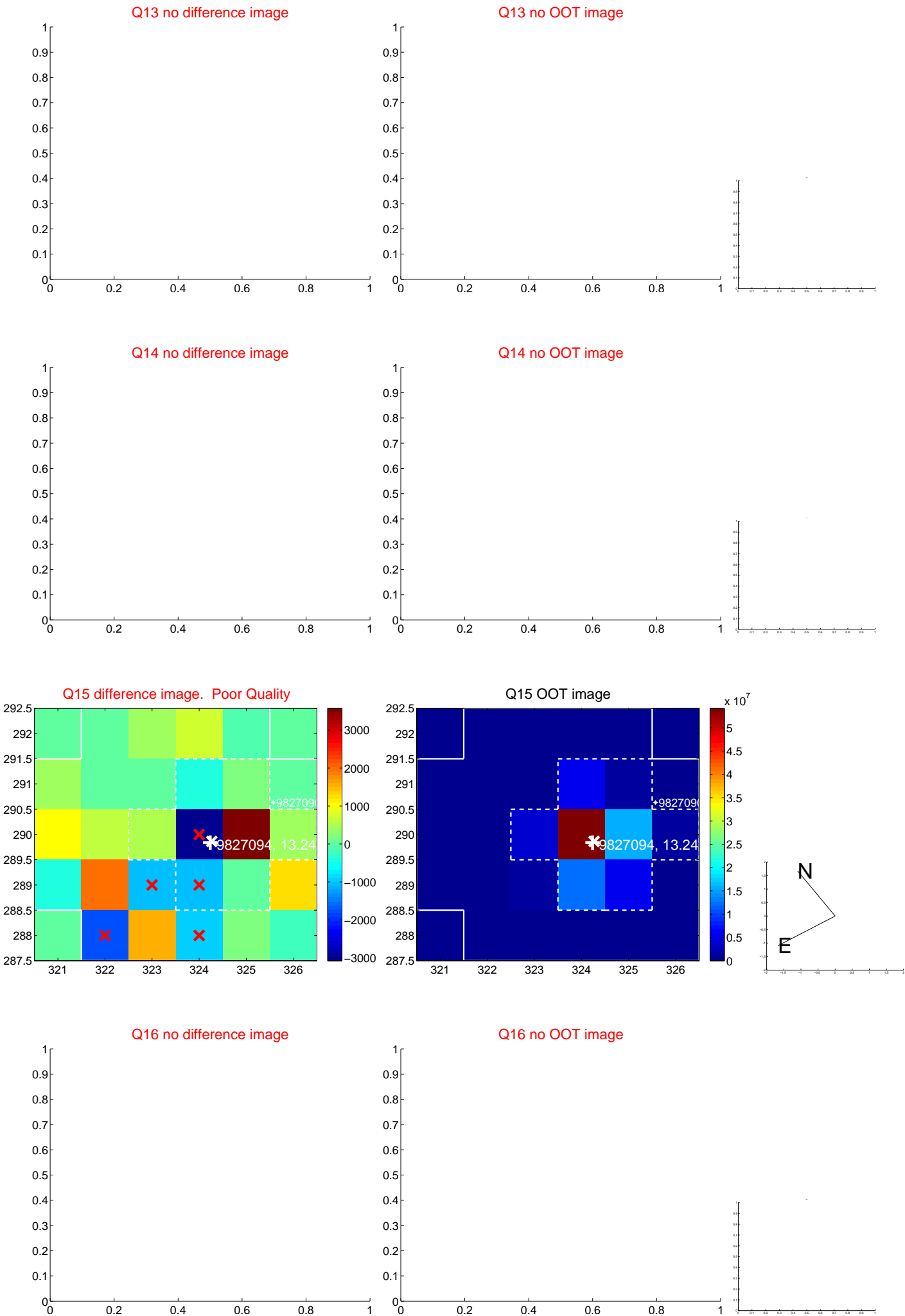
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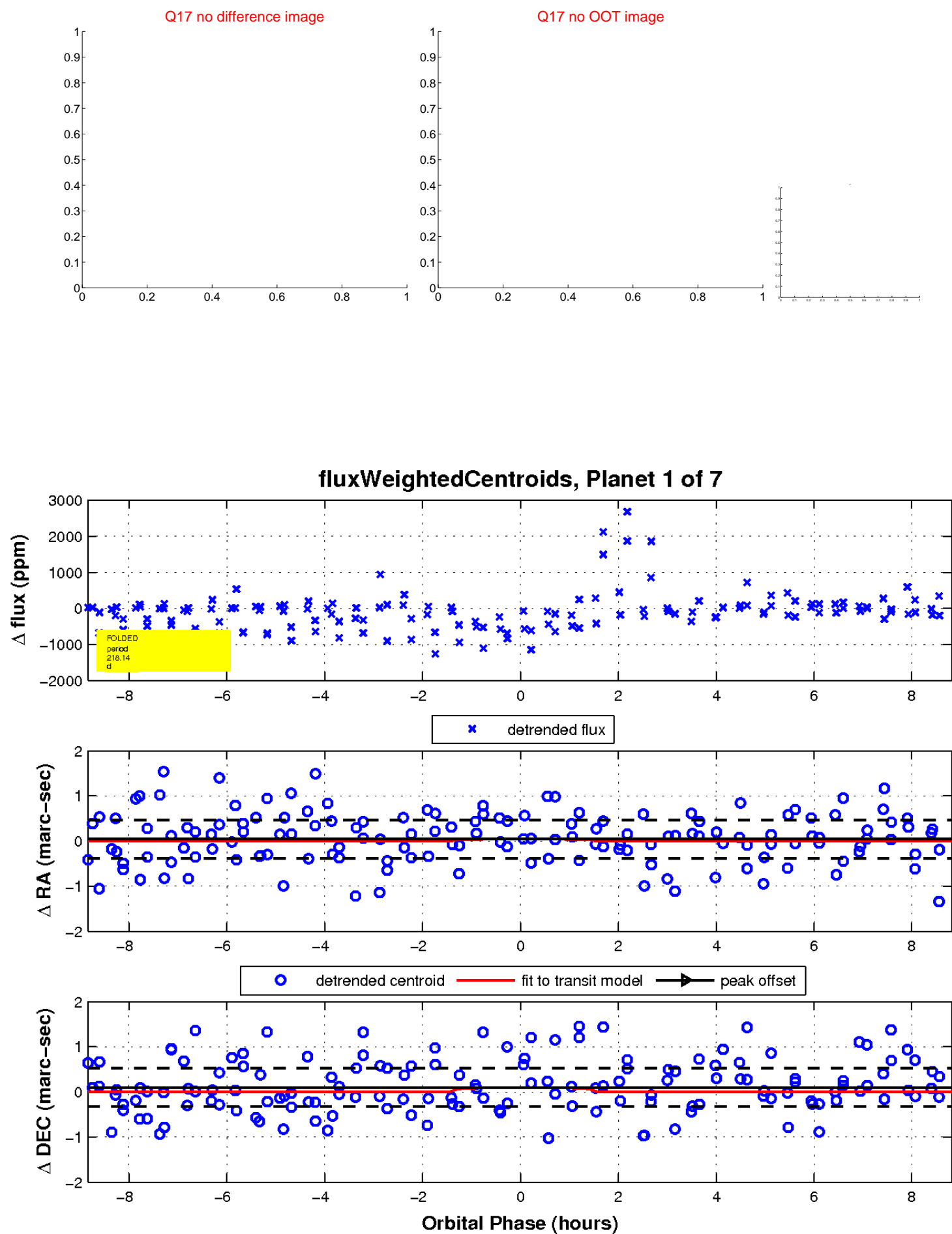
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



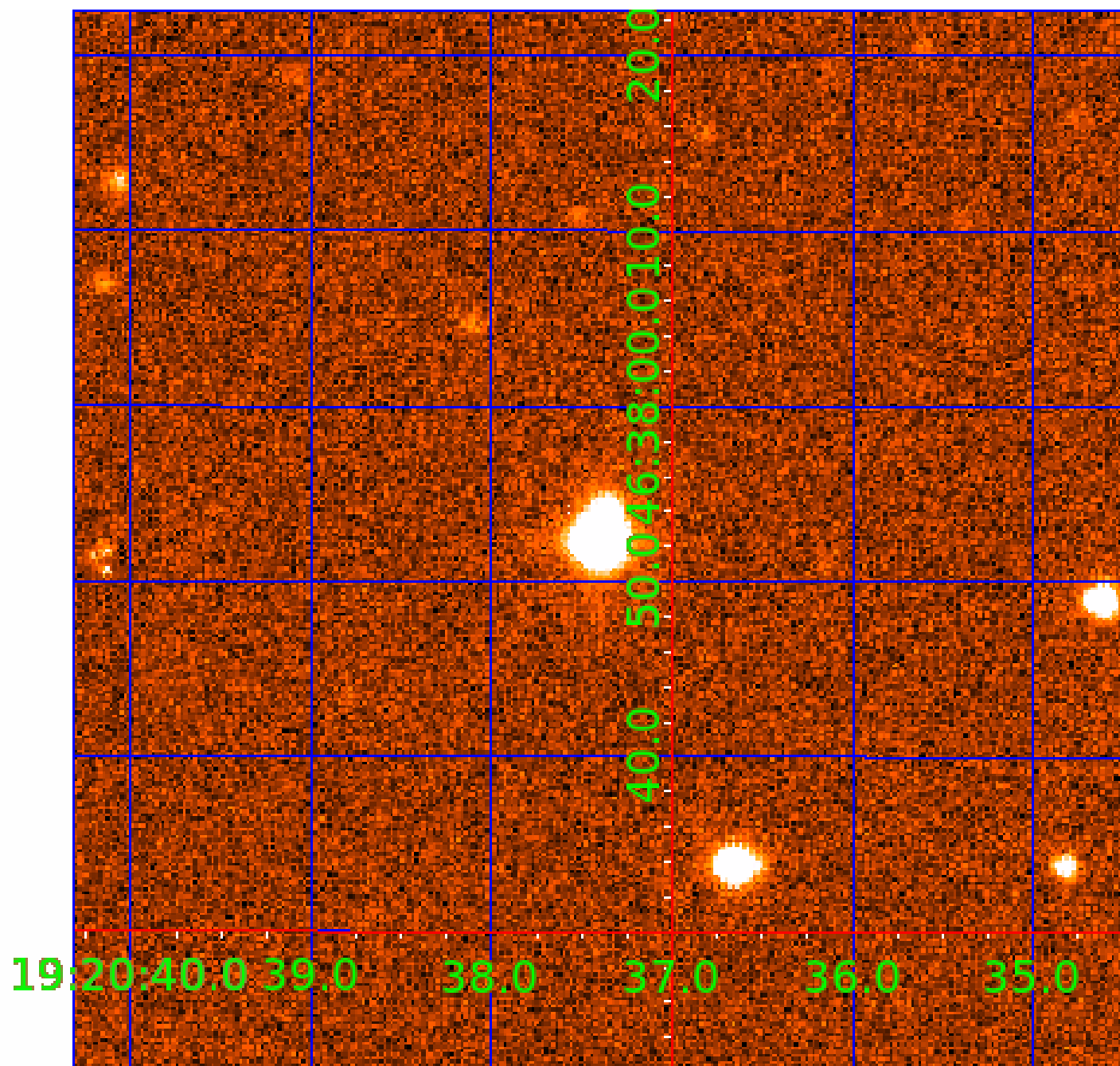
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image

Declination



# KIC 009827094

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
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## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
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009827094-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009827094-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
009827094-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—CENT_FEW_DIFFS
009827094-07	OBS	FP	0.00	1	0	1	0	INCONSISTENT_TRANS—CENT_NOFITS—HALO_GHOST

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

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

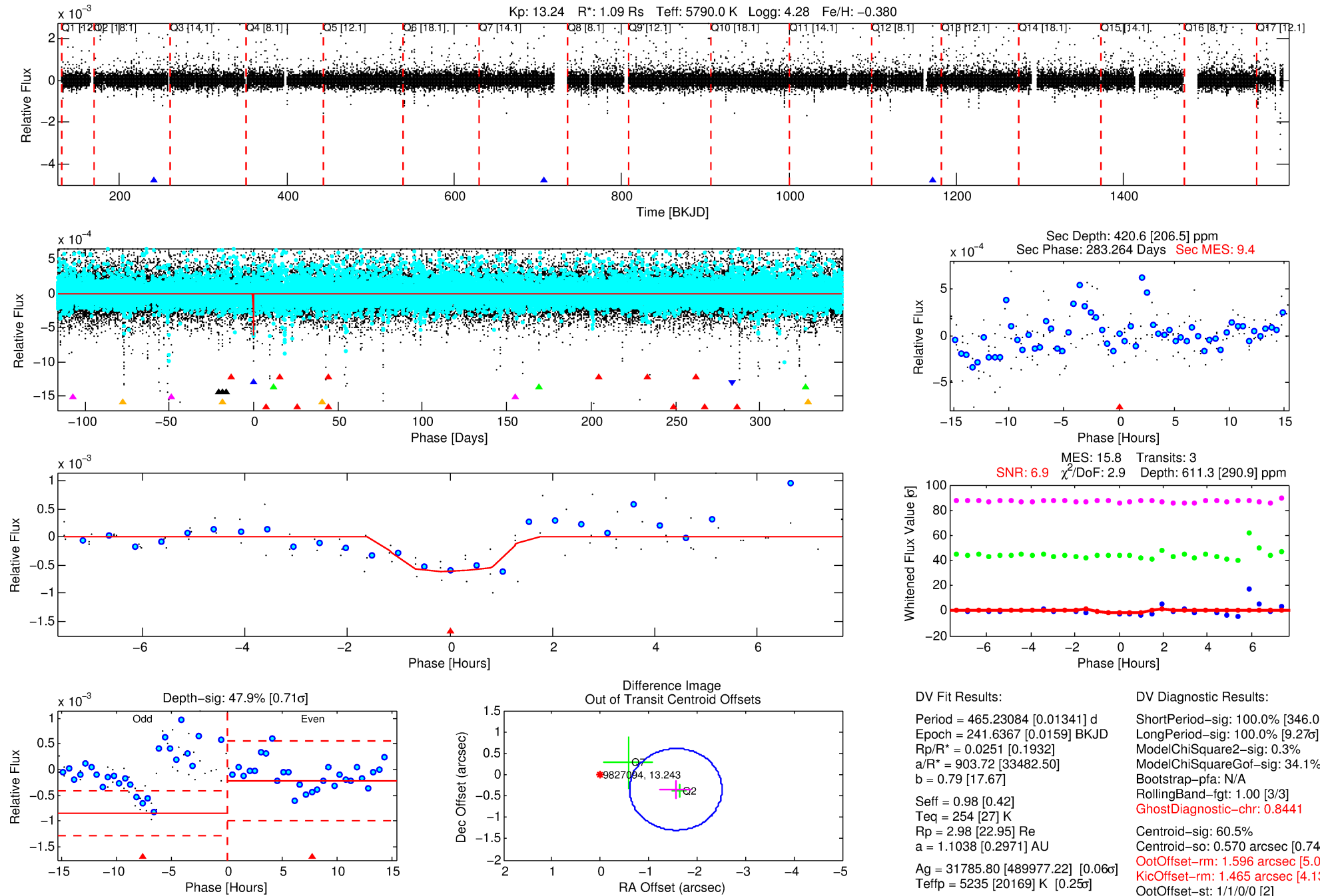
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009827094-02

No Significant Match Found

# DV One-Page Summary

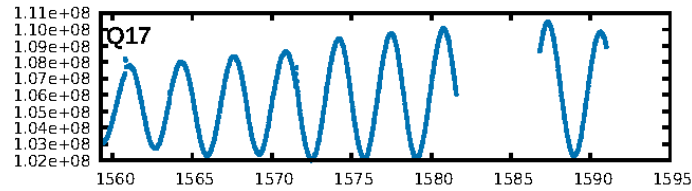
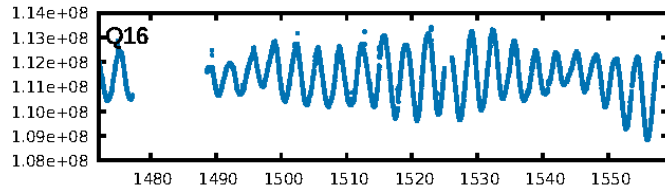
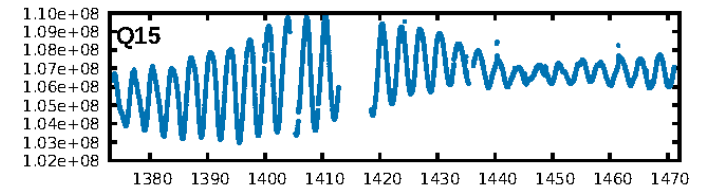
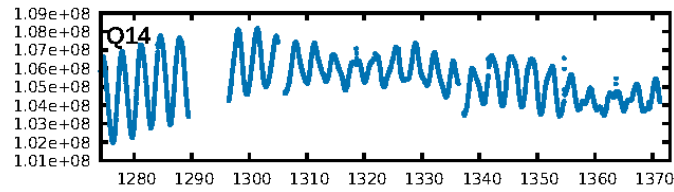
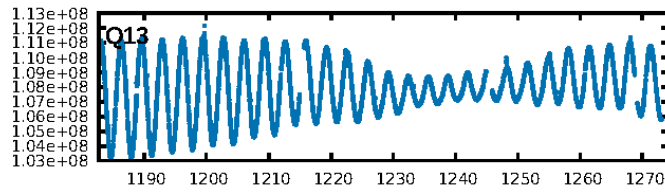
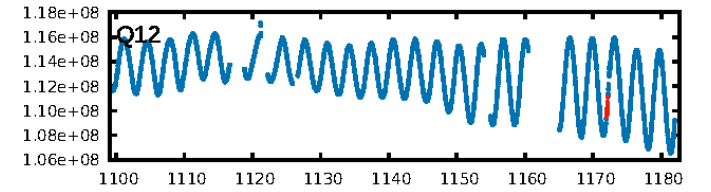
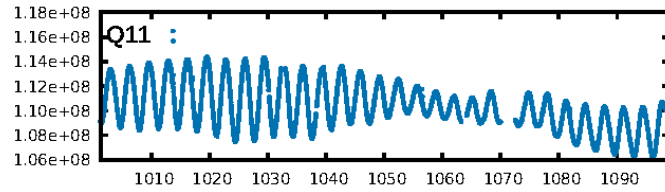
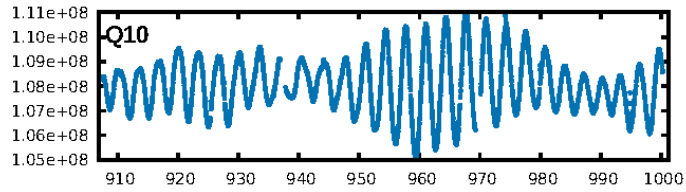
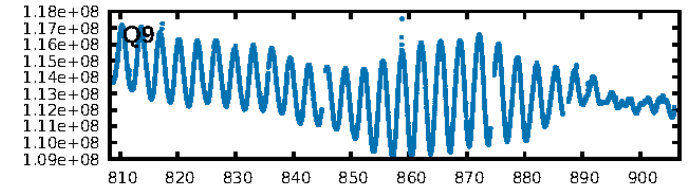
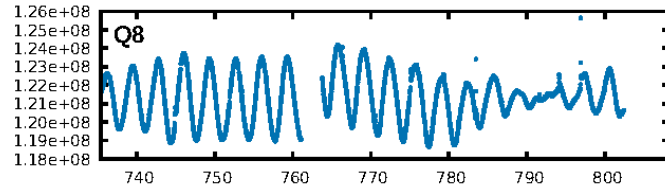
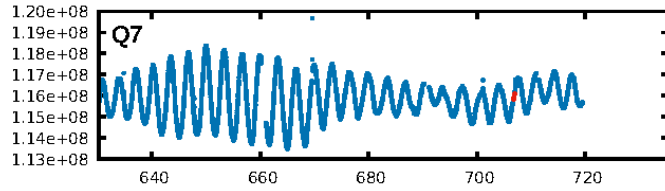
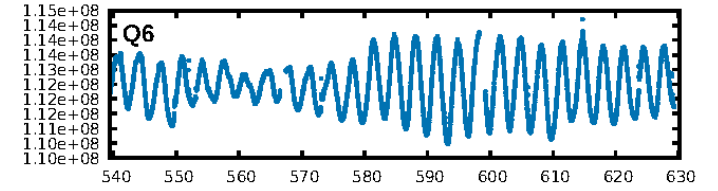
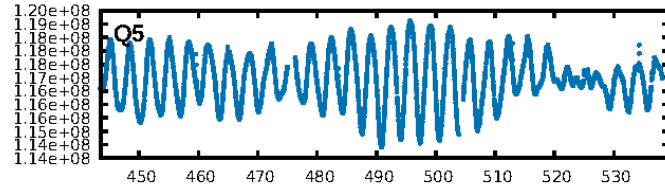
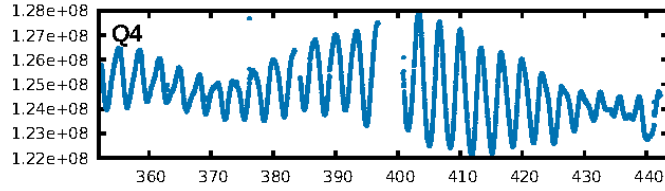
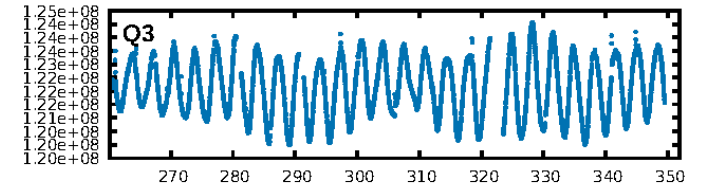
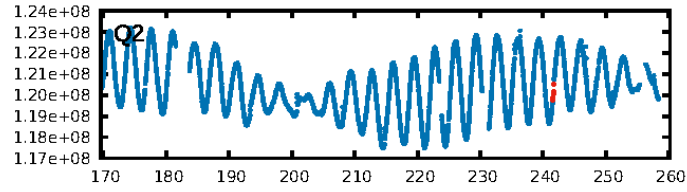
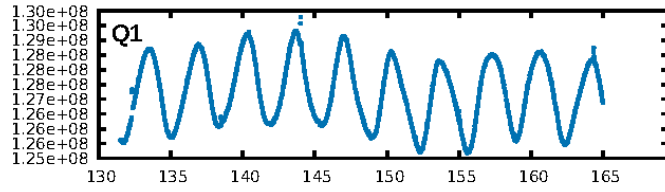
KIC: 9827094 Candidate: 2 of 7 Period: 465.231 d



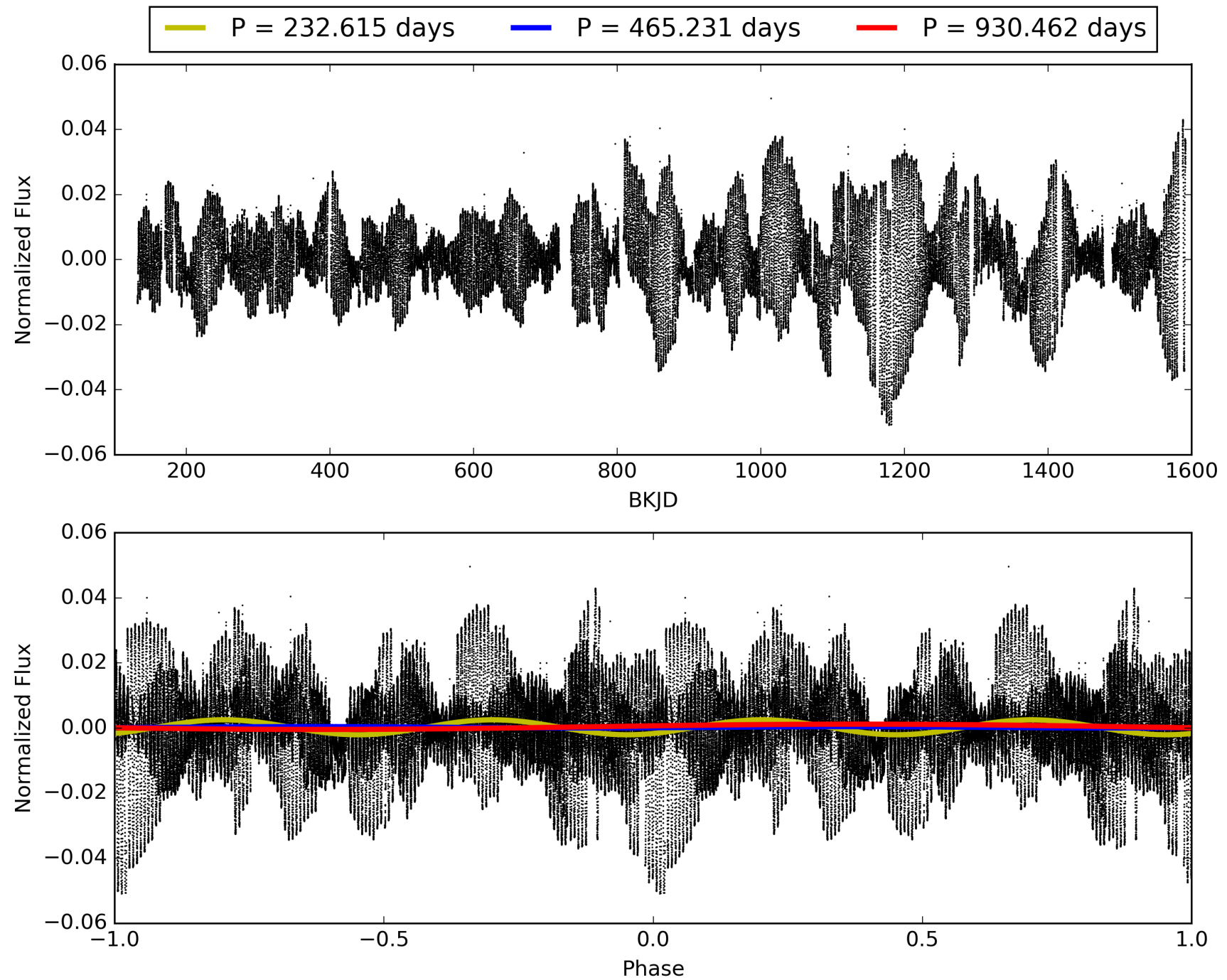
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:15:21 Z

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

# TCE 009827094-02, PDC Light Curves



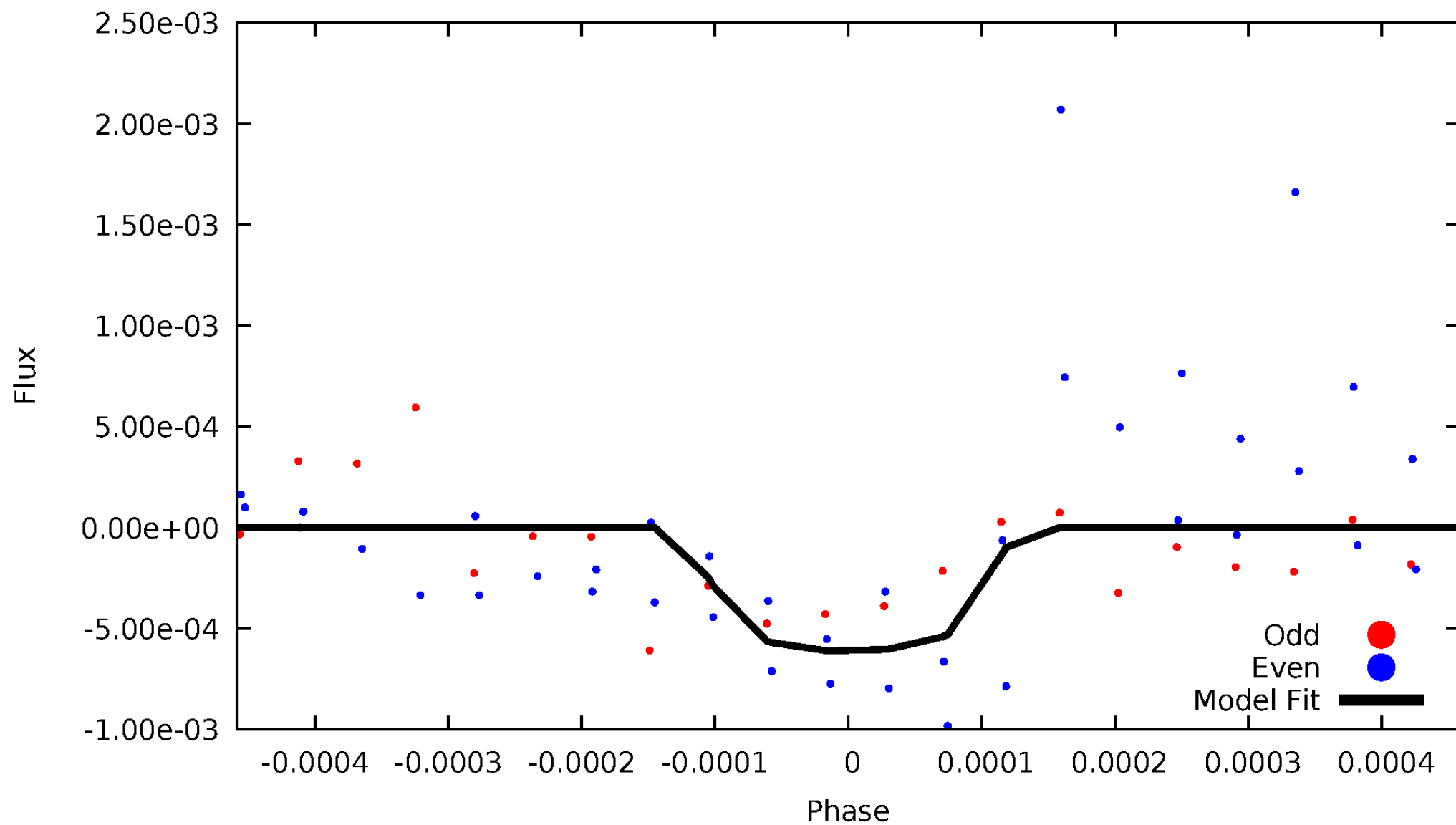
TCE 009827094-02





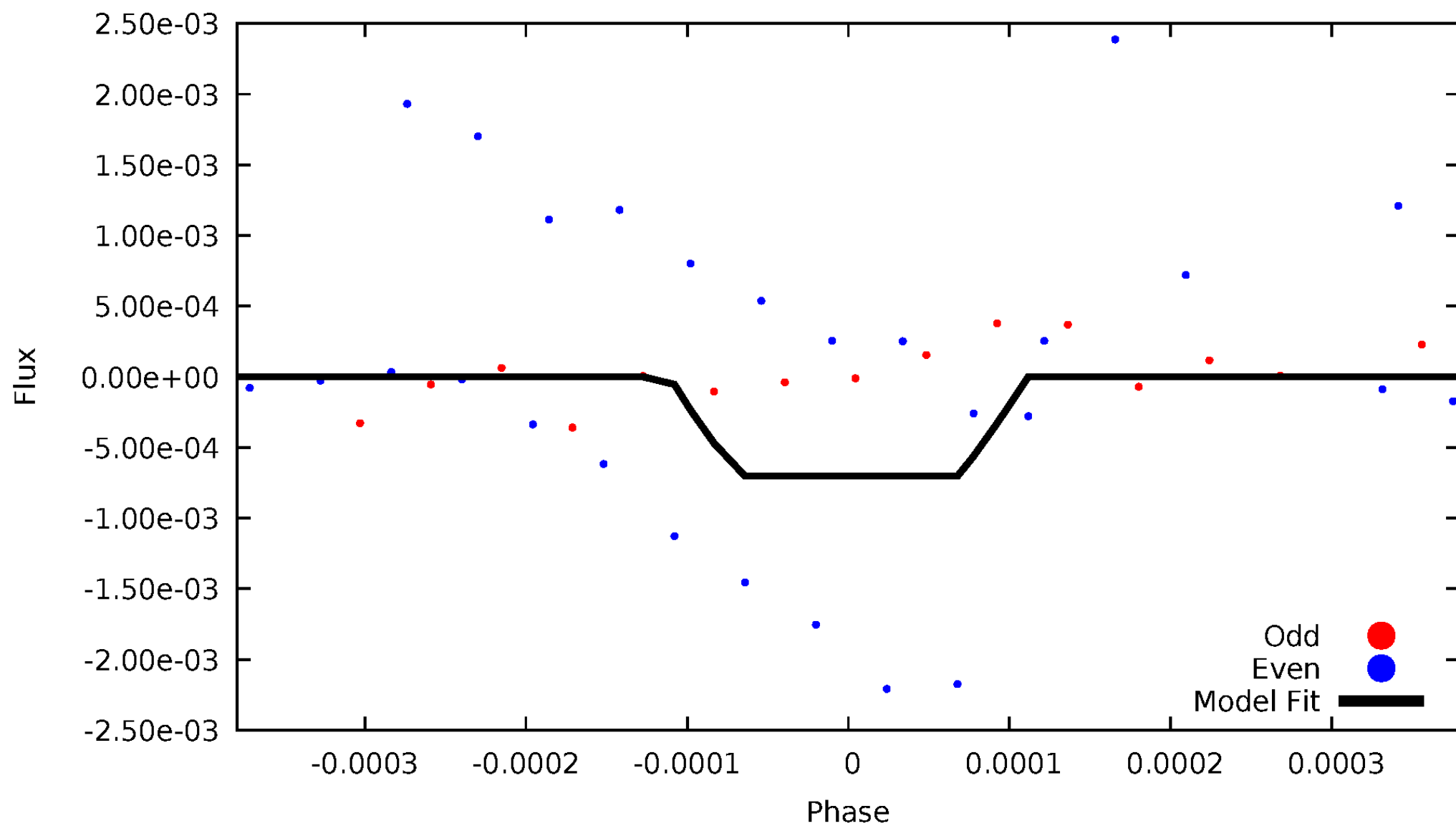
# DV Odd/Even

TCE 009827094-02



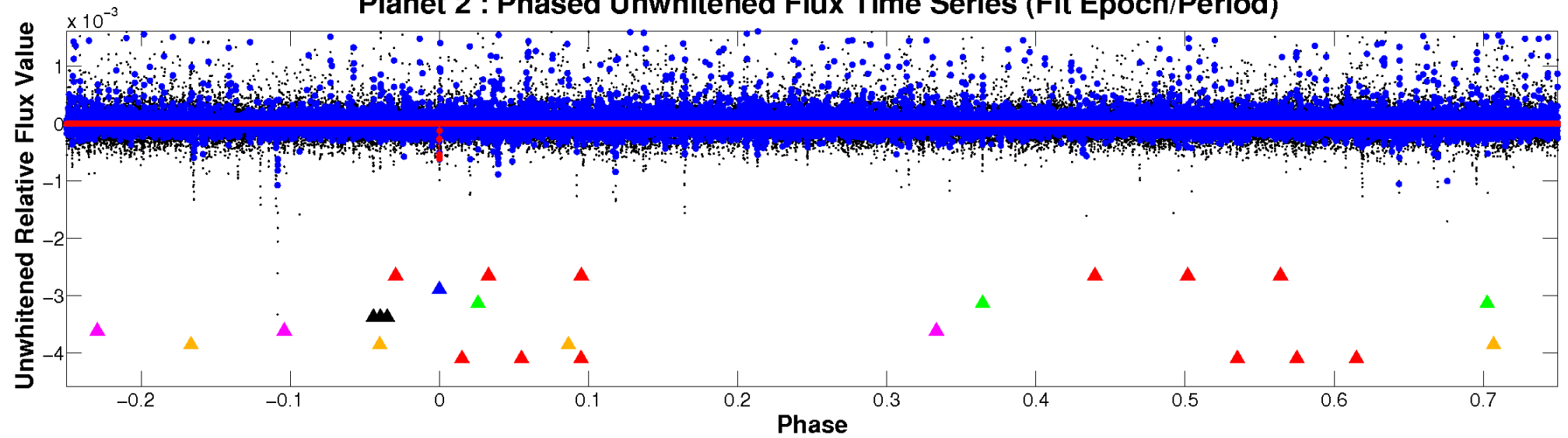
# ALT Odd/Even

TCE 009827094-02

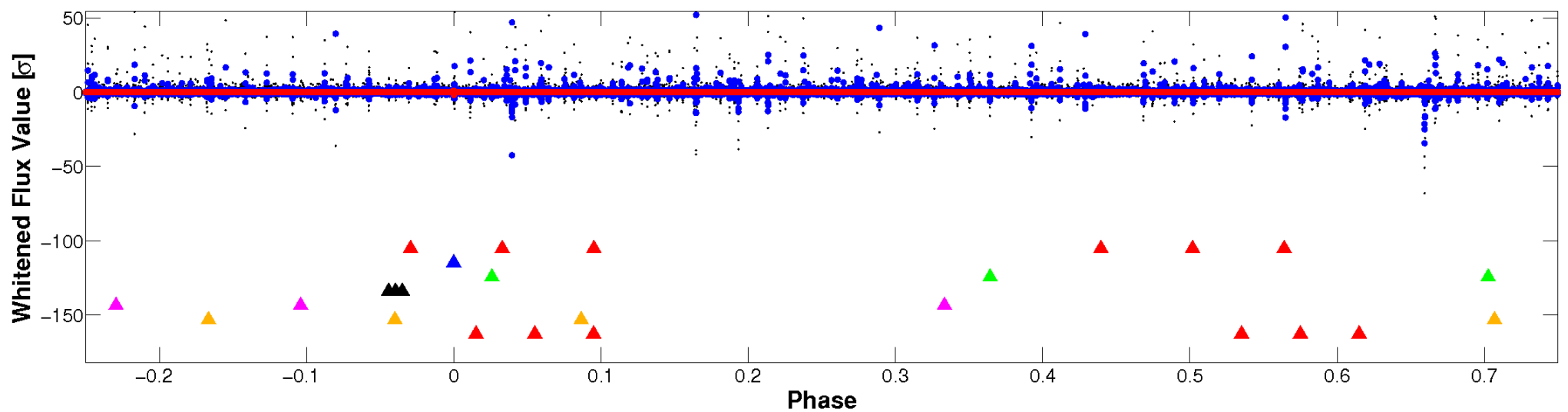


# Non-Whitened Vs. Whitened Light Curve

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

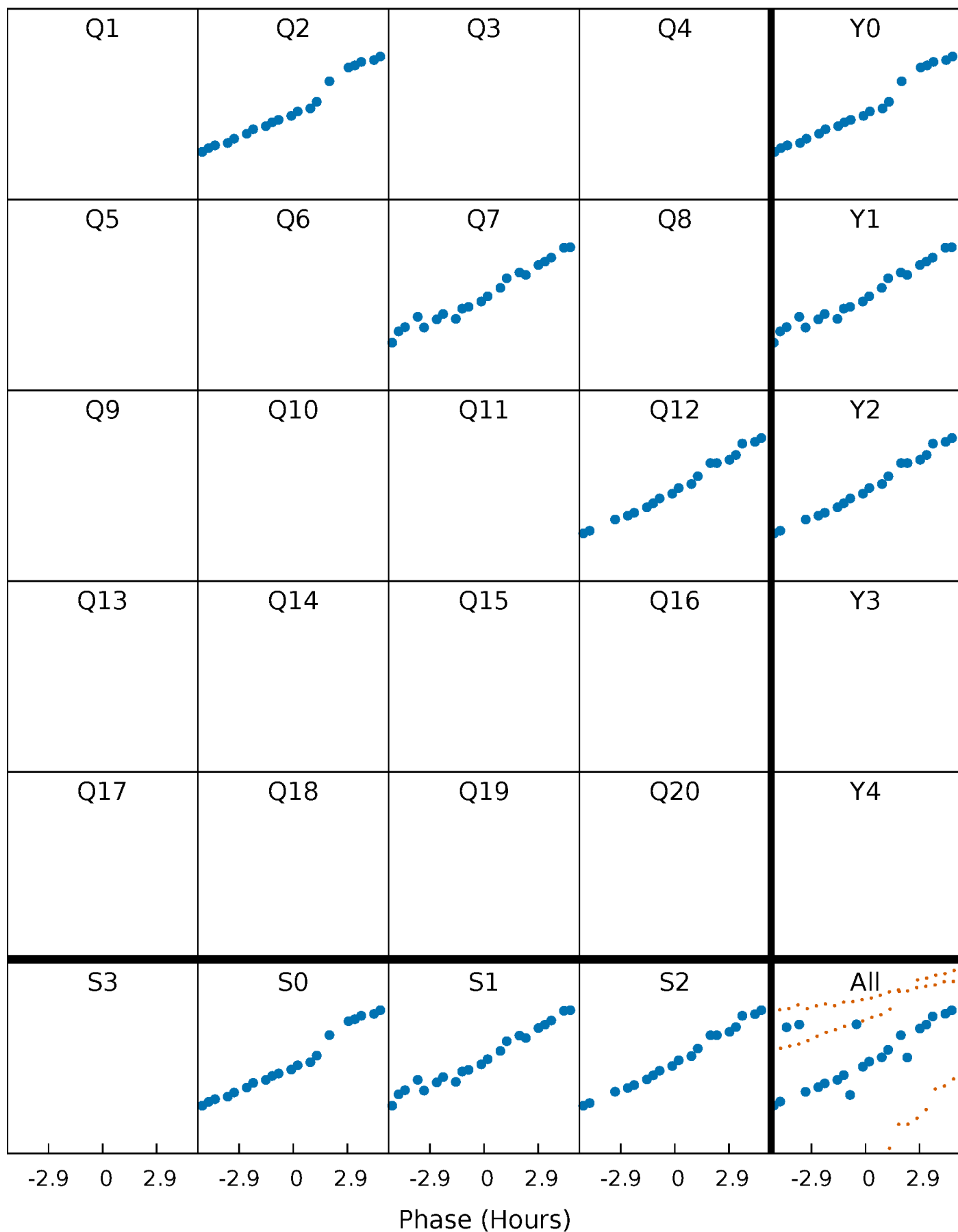


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



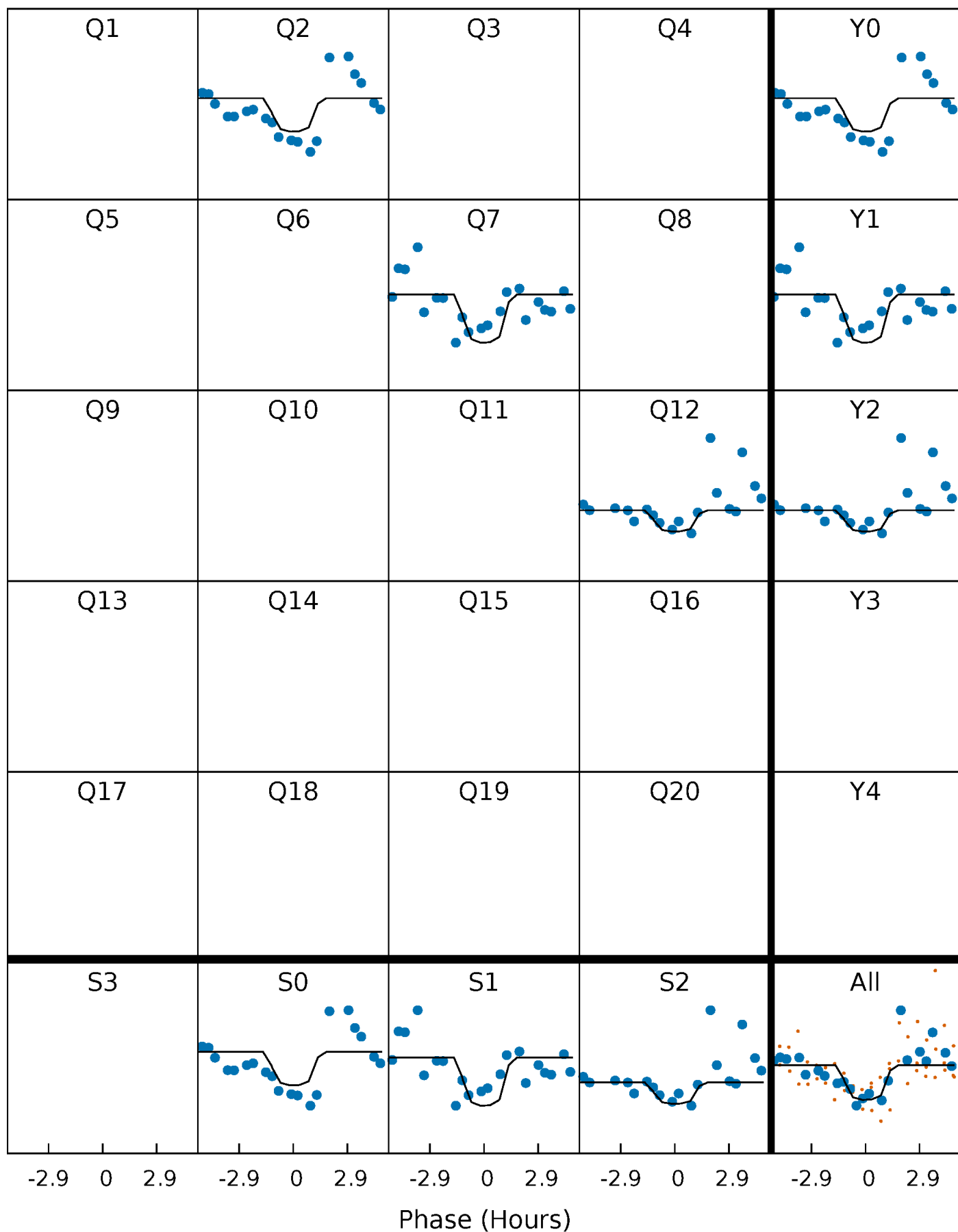
# PDC Quarter-Phased Transit Curves

TCE 009827094-02 P=465.230842 Days  $T_0=241.636705$  (BKJD)



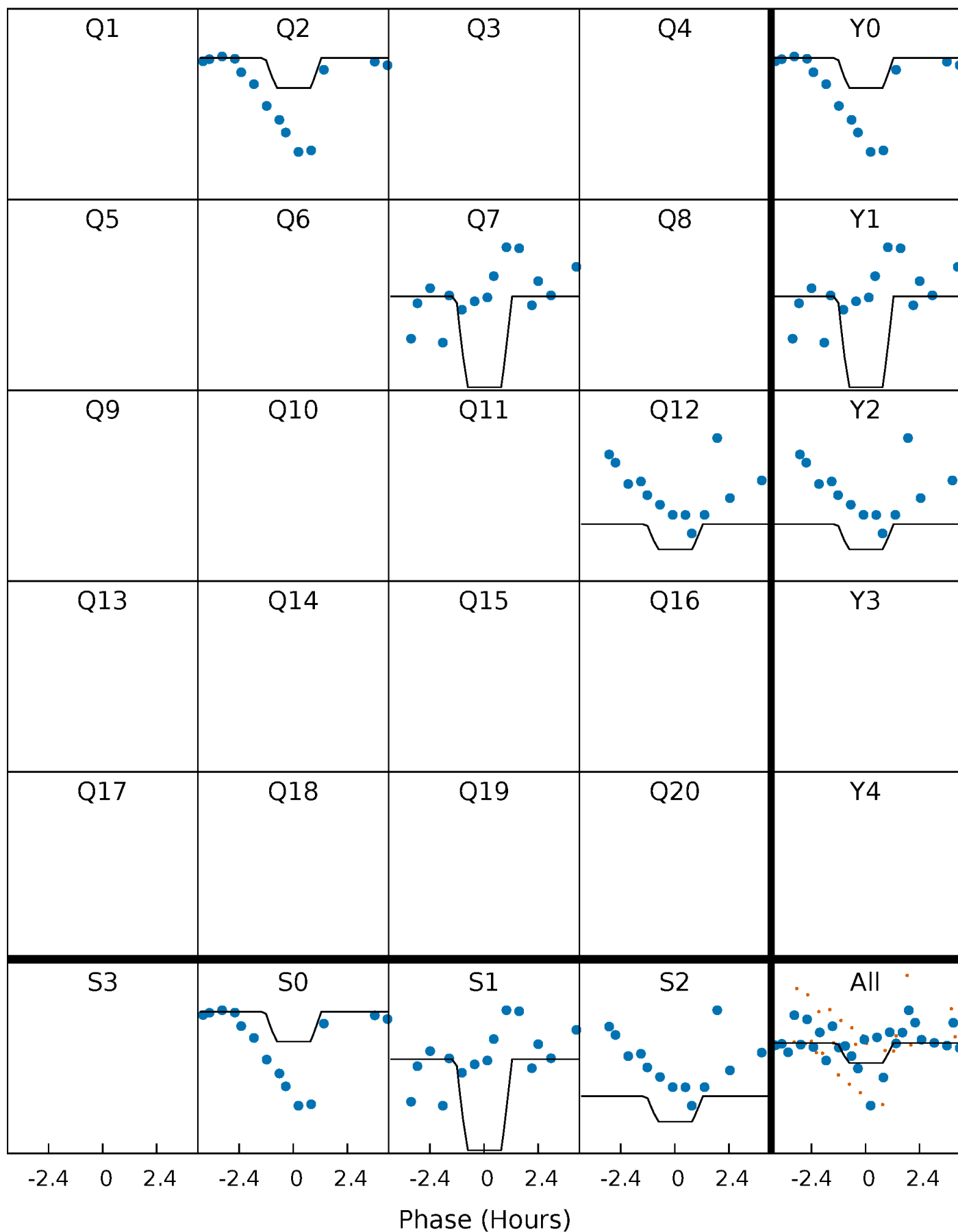
# DV Quarter-Phased Transit Curves

TCE 009827094-02 P=465.230842 Days  $T_0=241.636705$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

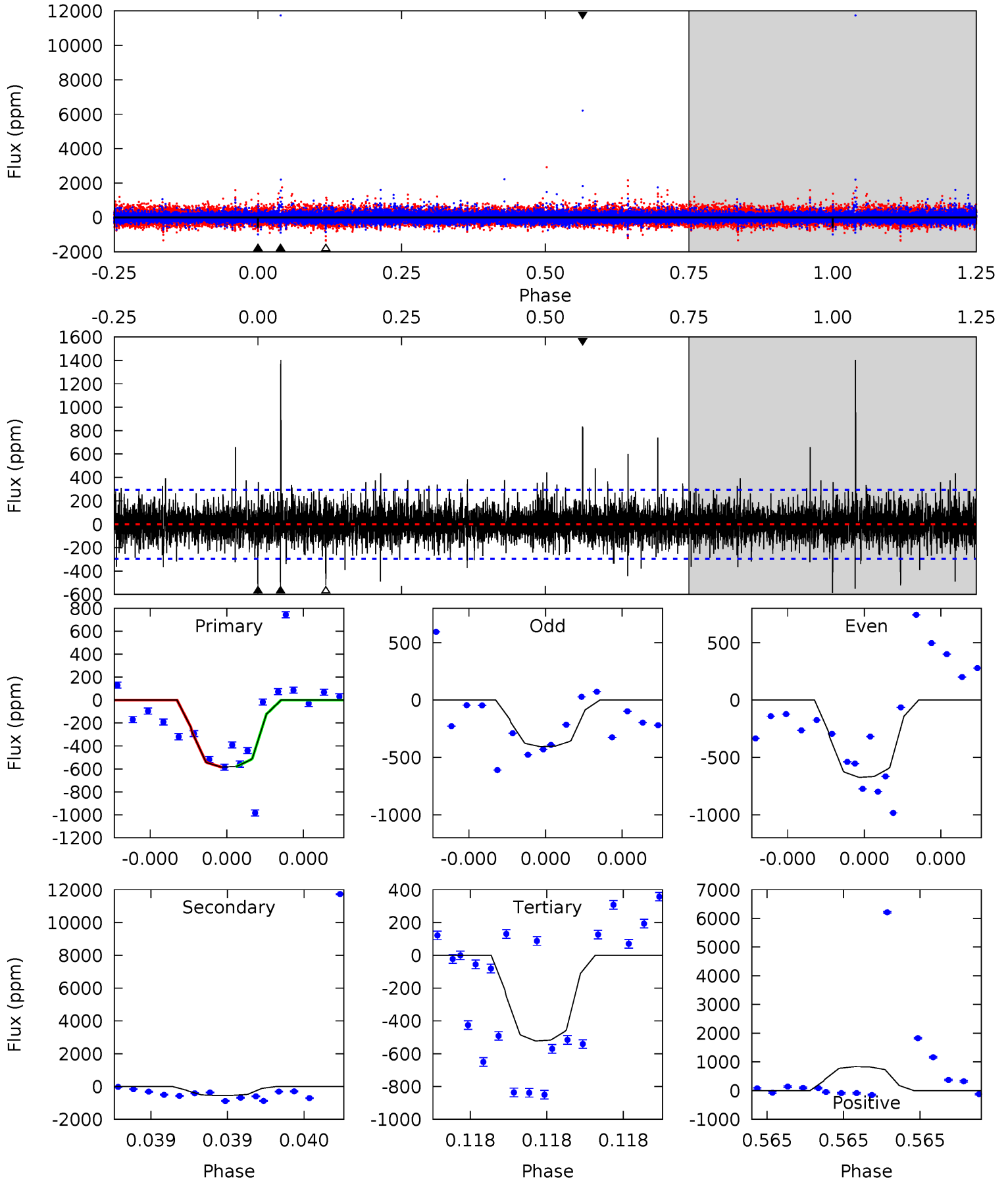
TCE 009827094-02 P=465.217672 Days  $T_0=241.660243$  (BKJD)



# DV Model-Shift Uniqueness Test

009827094-02, P = 465.230842 Days, E = 241.636705 Days

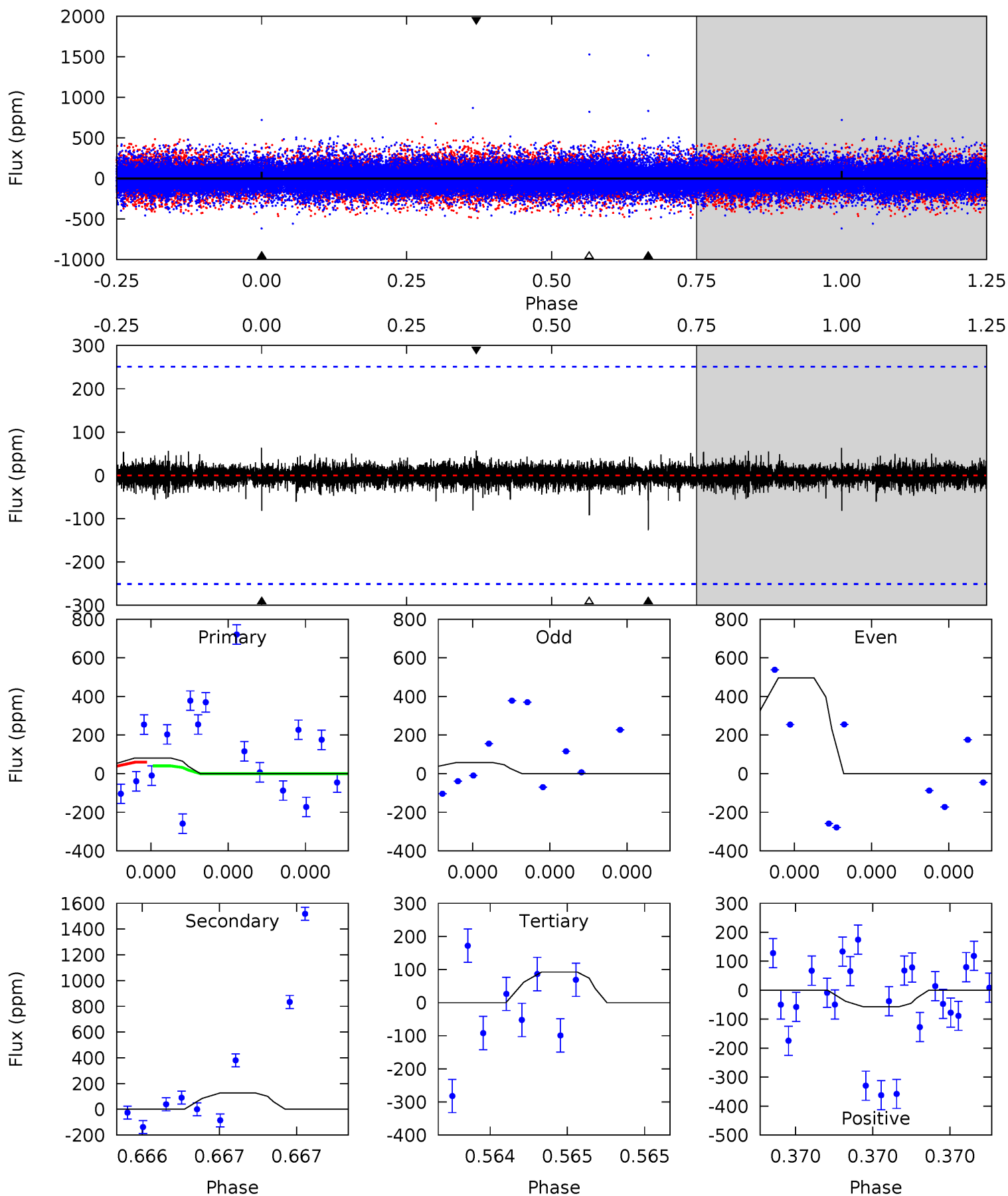
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.3	10.6	10.1	16.2	5.71	3.69	1.74	1.20	-4.84	0.50	-5.54	1.71	1.22	0.71	0.05



# Alt Model-Shift Uniqueness Test

009827094-02, P = 465.217672 Days, E = 241.660243 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
1.86	2.90	2.11	1.31	5.74	3.73	0.26	-0.26	0.55	0.79	1.59	5.44	-8.95	0.33	0.21





### Stellar Parameters For KIC 009827094

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5790^{+155}_{-155}$	$4.283^{+0.242}_{-0.198}$	$-0.380^{+0.300}_{-0.250}$	$1.088^{+0.318}_{-0.260}$	$0.829^{+0.123}_{-0.061}$	$0.907^{+1.211}_{-0.454}$
	+3%/-3%	+6%/-5%	+79%/-66%	+29%/-24%	+15%/-7%	+133%/-50%
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 009827094-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-548 \pm 52$	$15.72^{+17.59}_{-11.10}$	$353^{+28}_{-27}$	$3086^{+1565}_{-575}$	$1540^{+16082}_{-1214}$
Alt.	$-127 \pm 44$	$16.52^{+19.97}_{-11.51}$	$353^{+30}_{-30}$	$2494^{+944}_{-415}$	$326^{+3024}_{-269}$

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

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

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

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

## DV Centroid Data

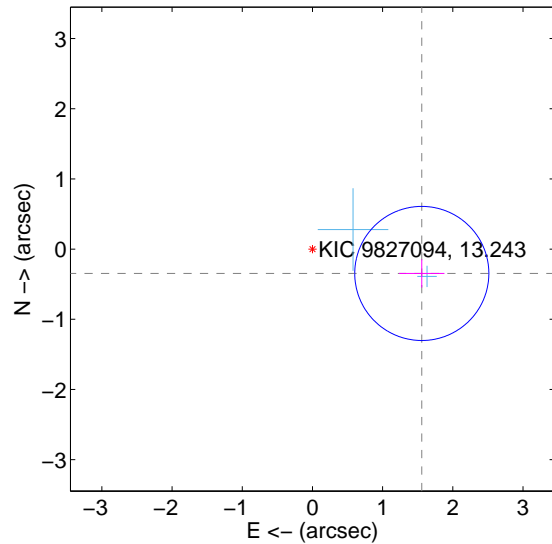
Supplemental centroid analysis for 009827094-02. Kepler magnitude: 13.24. Transit SNR 6.88

There are 2 quarters with good PRF difference image offsets

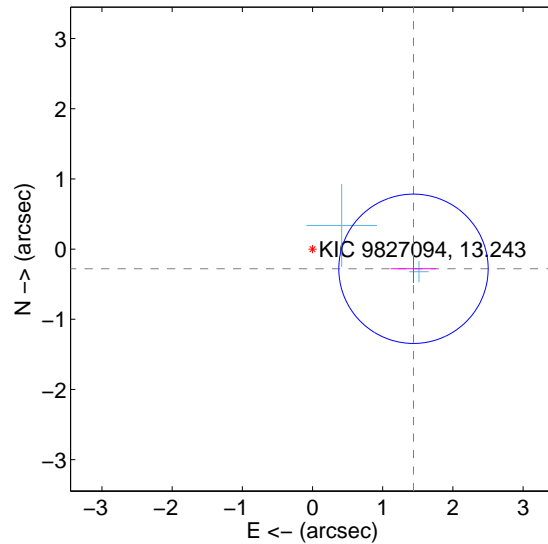
The direct PRF centroid is offset from the target star catalog position by about 0.17 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.596 \pm 0.318$	5.01	$-1.558 \pm 0.323$	$-0.347 \pm 0.200$
PRF-fit source offset from KIC position	$1.465 \pm 0.355$	4.13	$-1.438 \pm 0.325$	$-0.280 \pm 0.202$
photometric centroid source offset	$0.57 \pm 0.77$	0.74	$0.02 \pm 0.85$	$0.57 \pm 0.77$

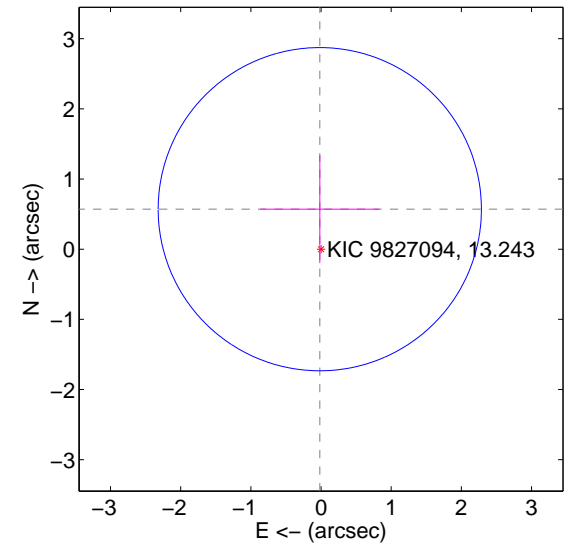
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

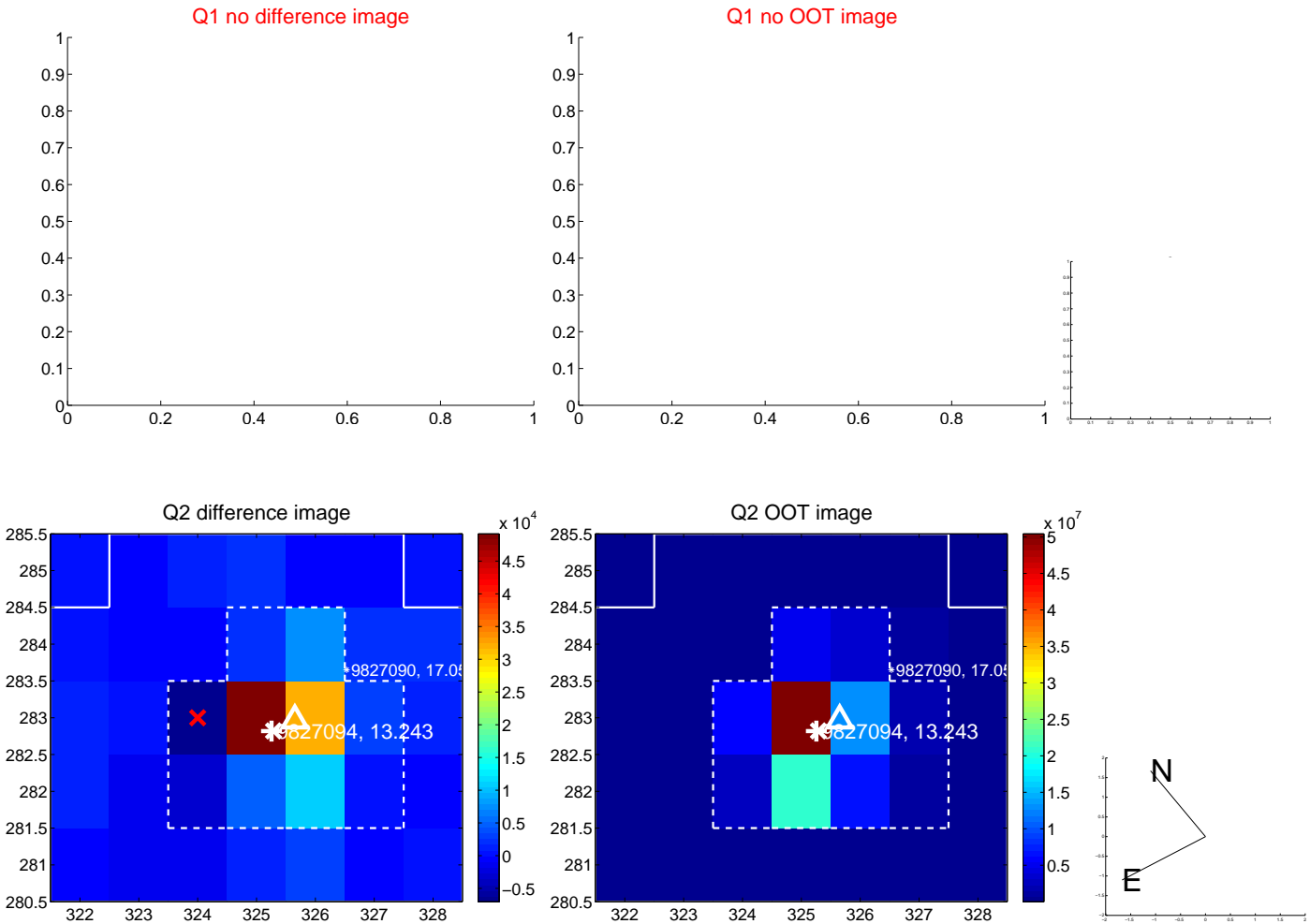


offset from photometric centroids

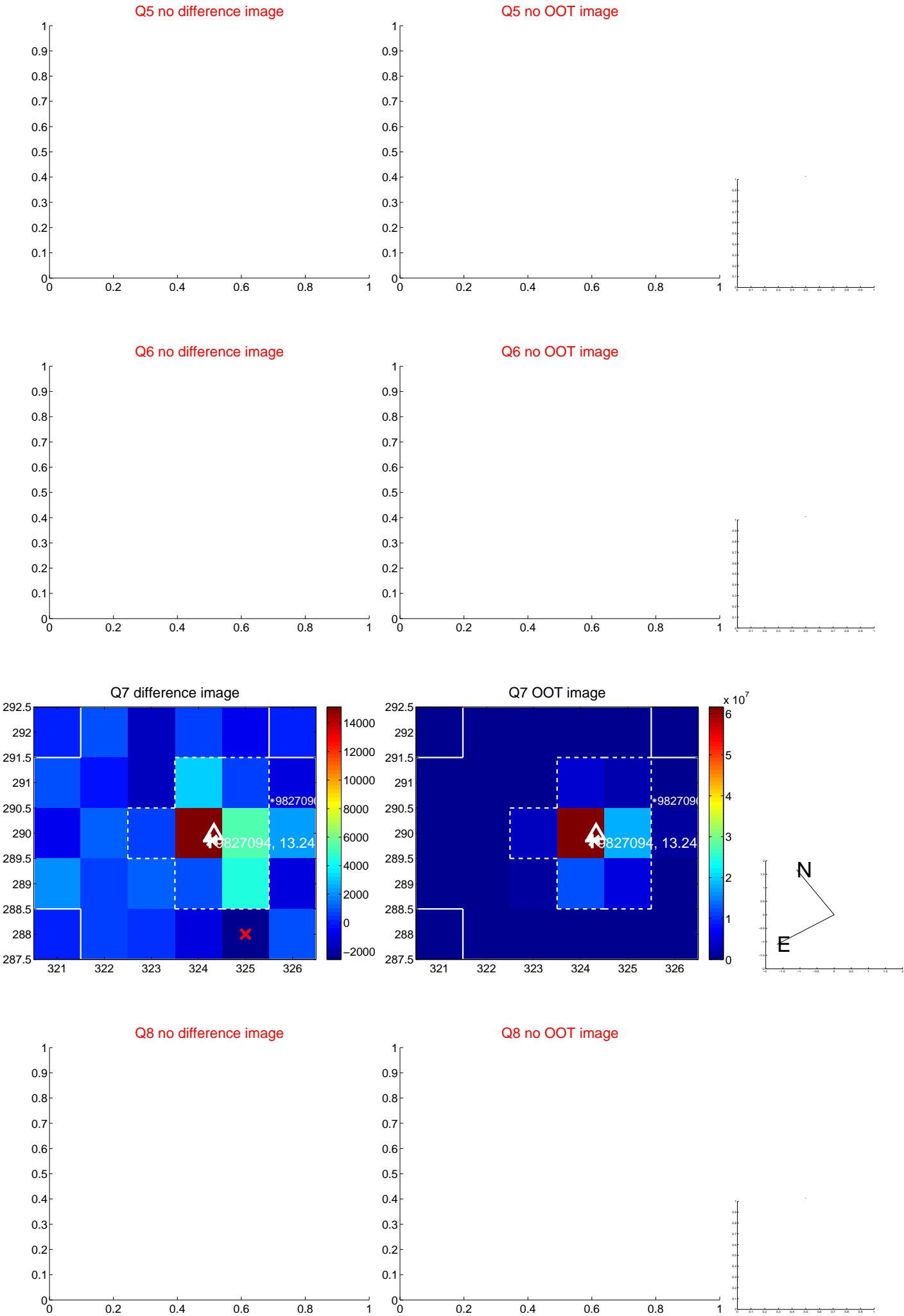


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



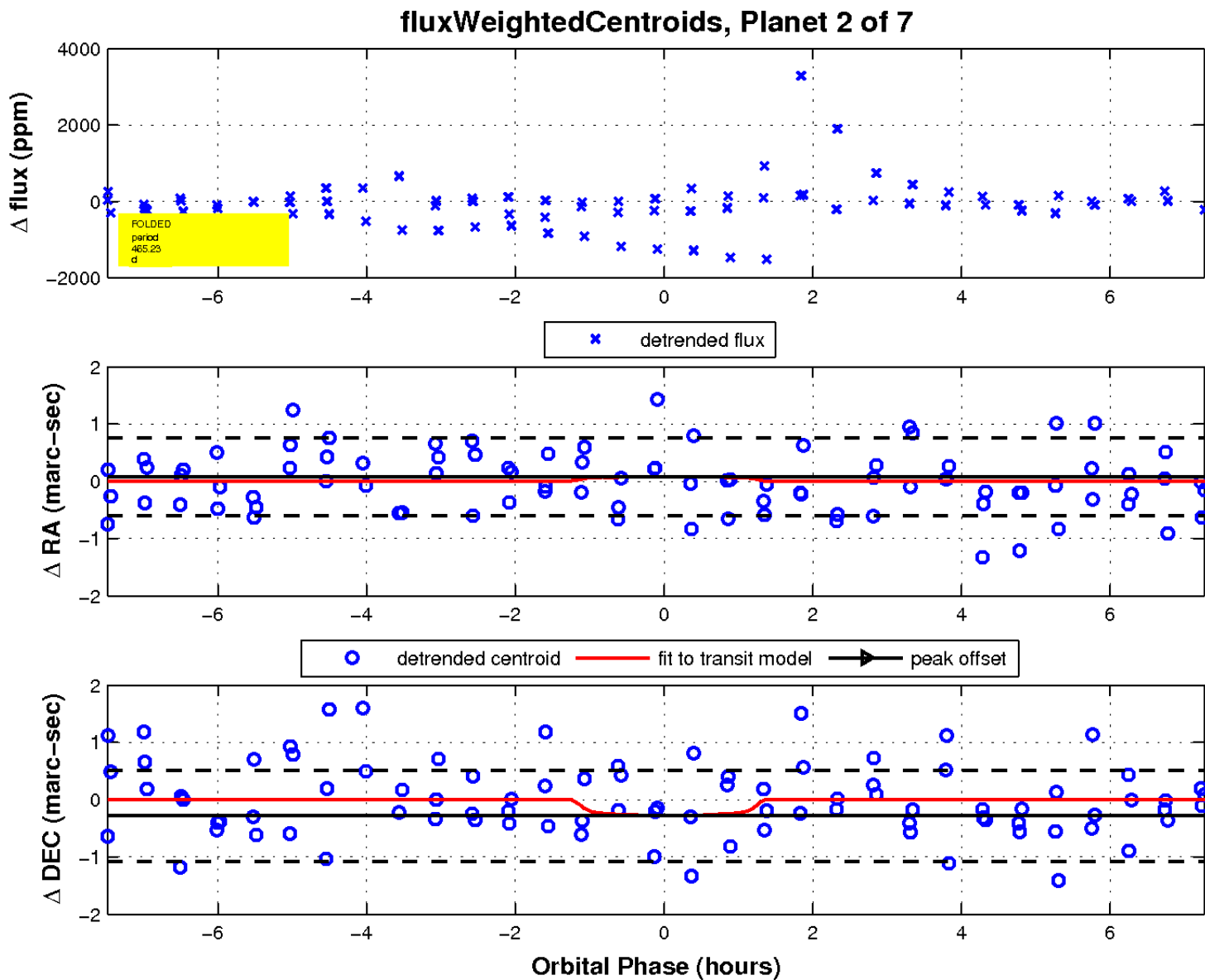
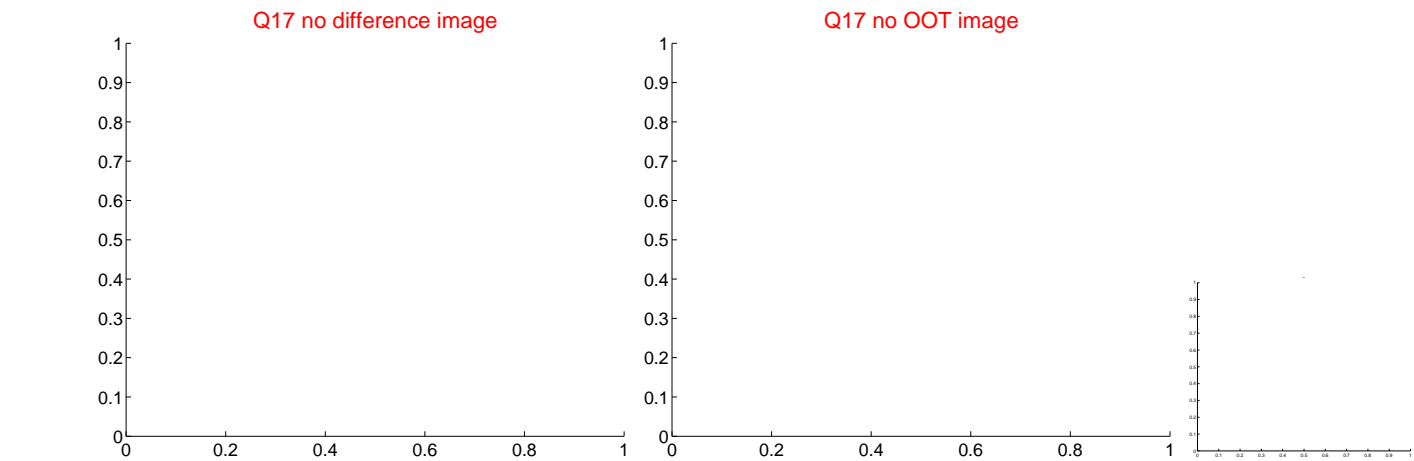
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

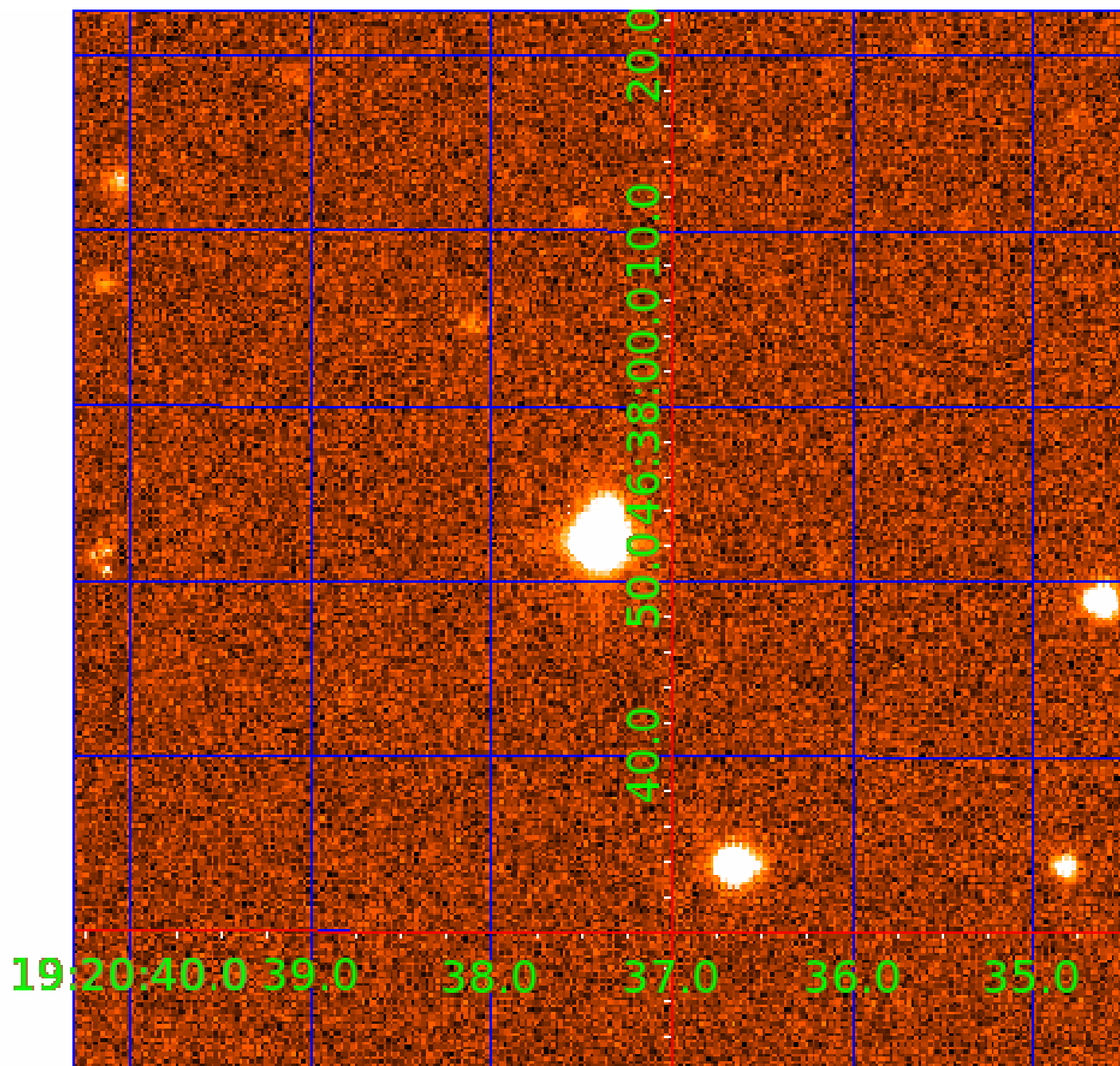


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 009827094

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009827094-01	OBS	No	218.138176	285.922591	604.4	2.950	15.0	7.6	1.09	5790	2.81	2.69
009827094-02	OBS	No	465.230842	241.636705	611.3	2.558	15.8	6.9	1.09	5790	2.98	0.98
009827094-05	OBS	No	668.673525	193.262405	929.6	6.521	15.0	9.8	1.09	5790	3.95	0.60
009827094-06	OBS	No	406.356904	281.910599	560.7	3.183	11.1	6.4	1.09	5790	2.81	1.17
009827094-07	OBS	8186.01	241.899294	248.697460	300.8	7.500	10.6	-1.0	1.09	5790	1.88	2.34

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009827094-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—CENT_FEW_DIFFS
009827094-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009827094-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
009827094-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—CENT_FEW_DIFFS
009827094-07	OBS	FP	0.00	1	0	1	0	INCONSISTENT_TRANS—CENT_NOFITS—HALO_GHOST

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

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

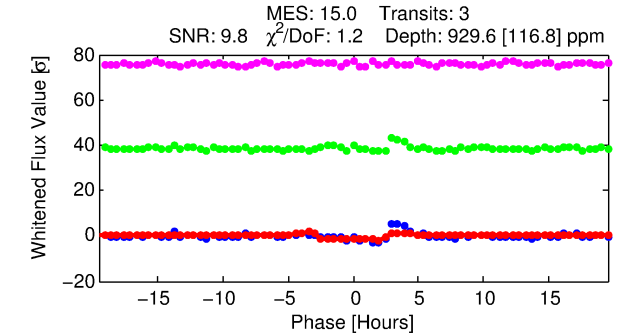
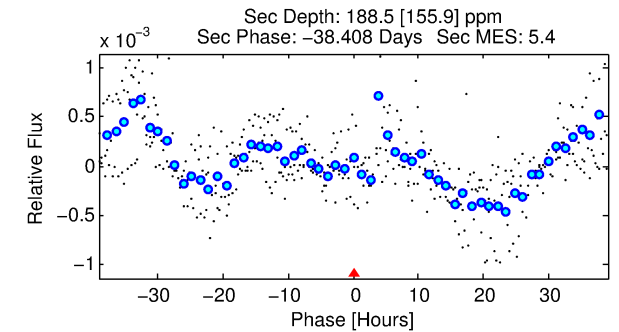
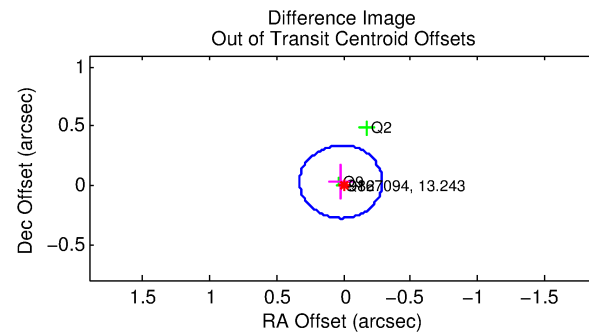
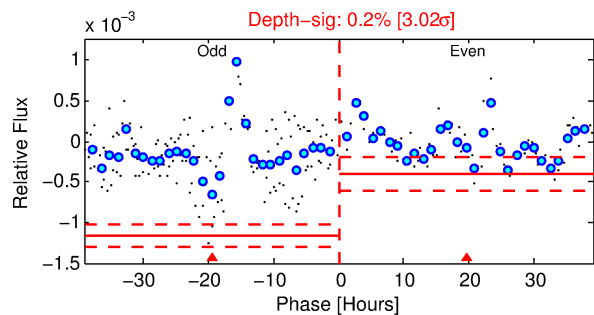
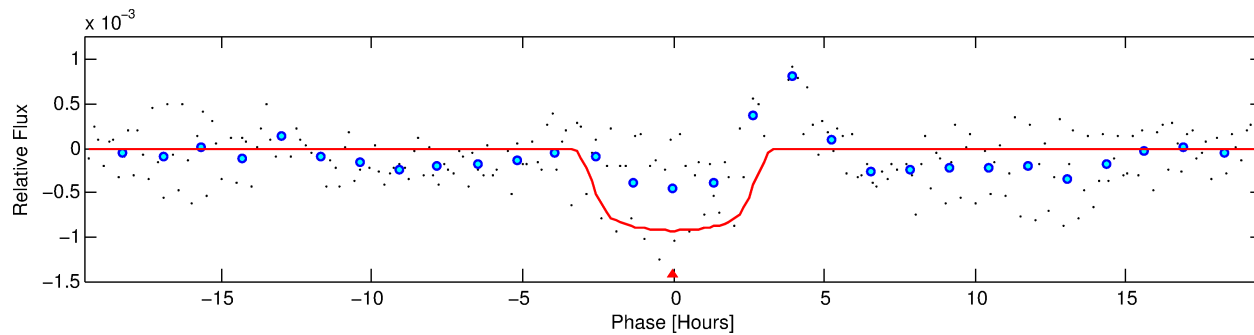
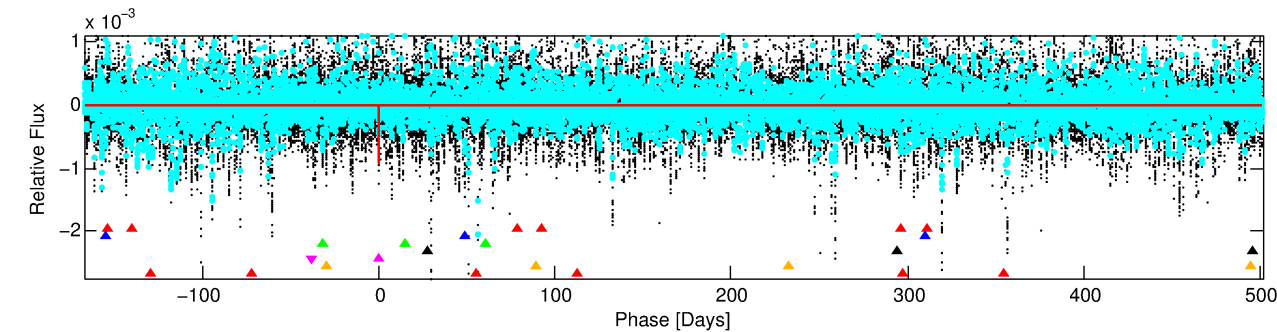
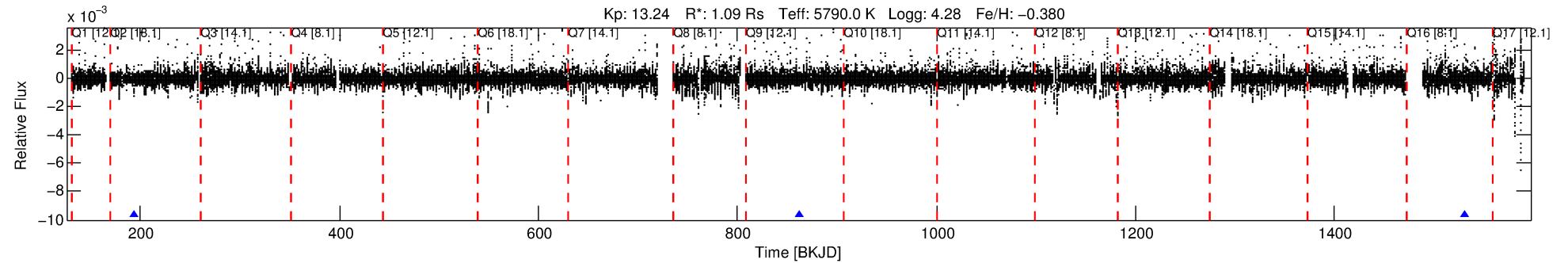
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009827094-05

No Significant Match Found

# DV One-Page Summary

KIC: 9827094 Candidate: 5 of 7 Period: 668.674 d



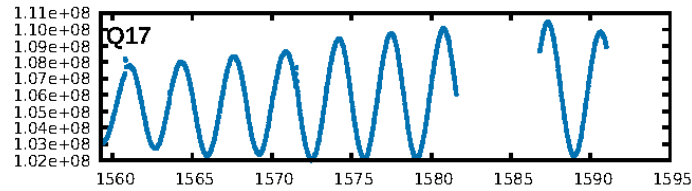
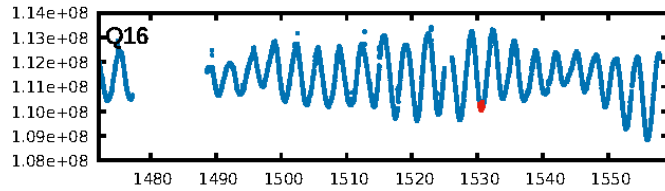
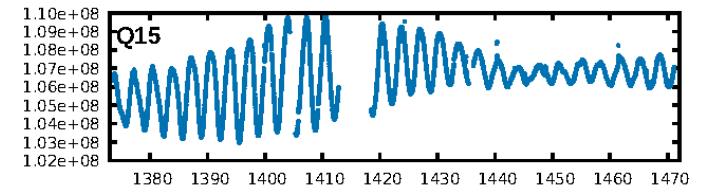
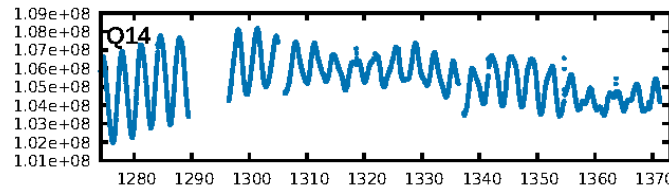
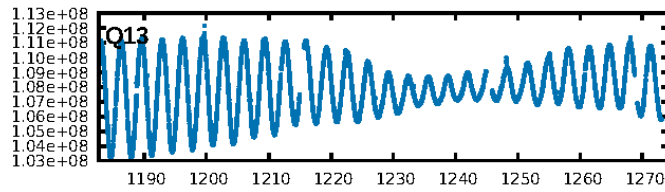
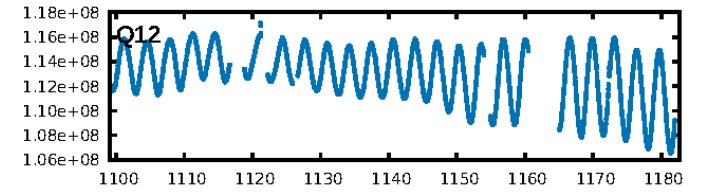
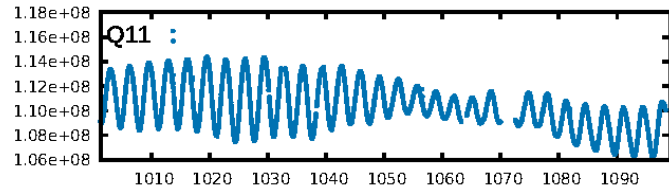
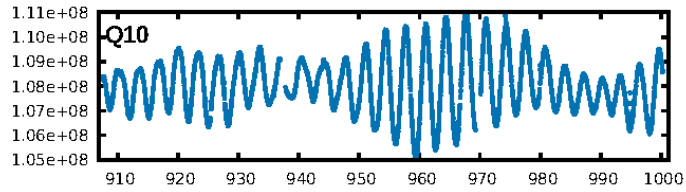
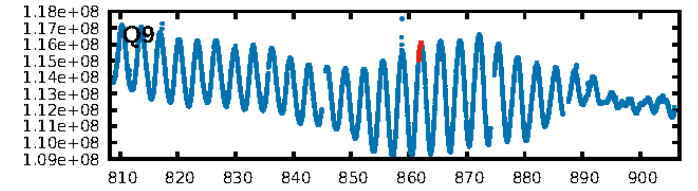
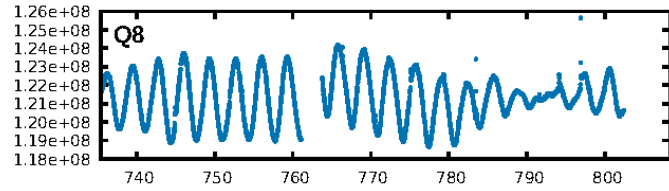
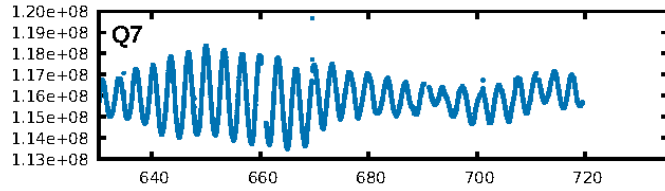
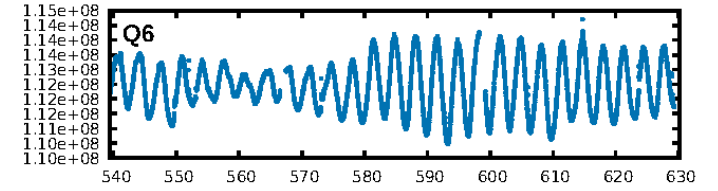
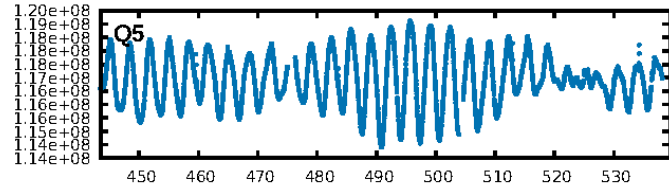
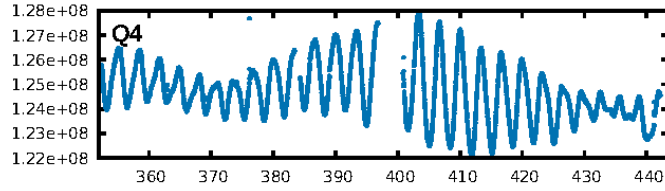
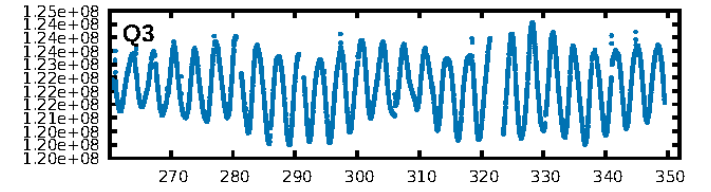
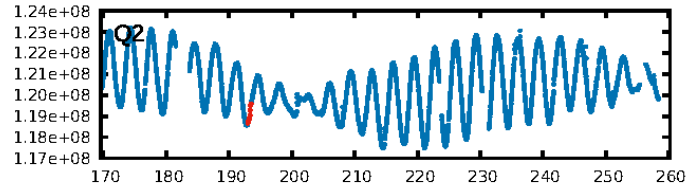
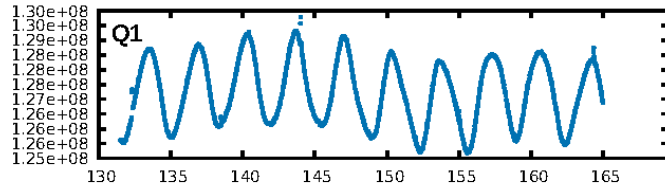
## DV Fit Results:

Period = 668.67352 [0.00510] d  
Epoch = 193.2624 [0.0068] BKJD  
Rp/R\* = 0.0333 [0.0028]  
a/R\* = 385.83 [84.28]  
b = 0.91 [0.04]  
Seff = 0.60 [0.26]  
Teq = 225 [24] K  
Rp = 3.95 [1.20] Re  
a = 1.4058 [0.3784] AU  
Ag = 13106.97 [12360.40] [1.06σ]  
Teffp = 3717 [791] K [4.41σ]

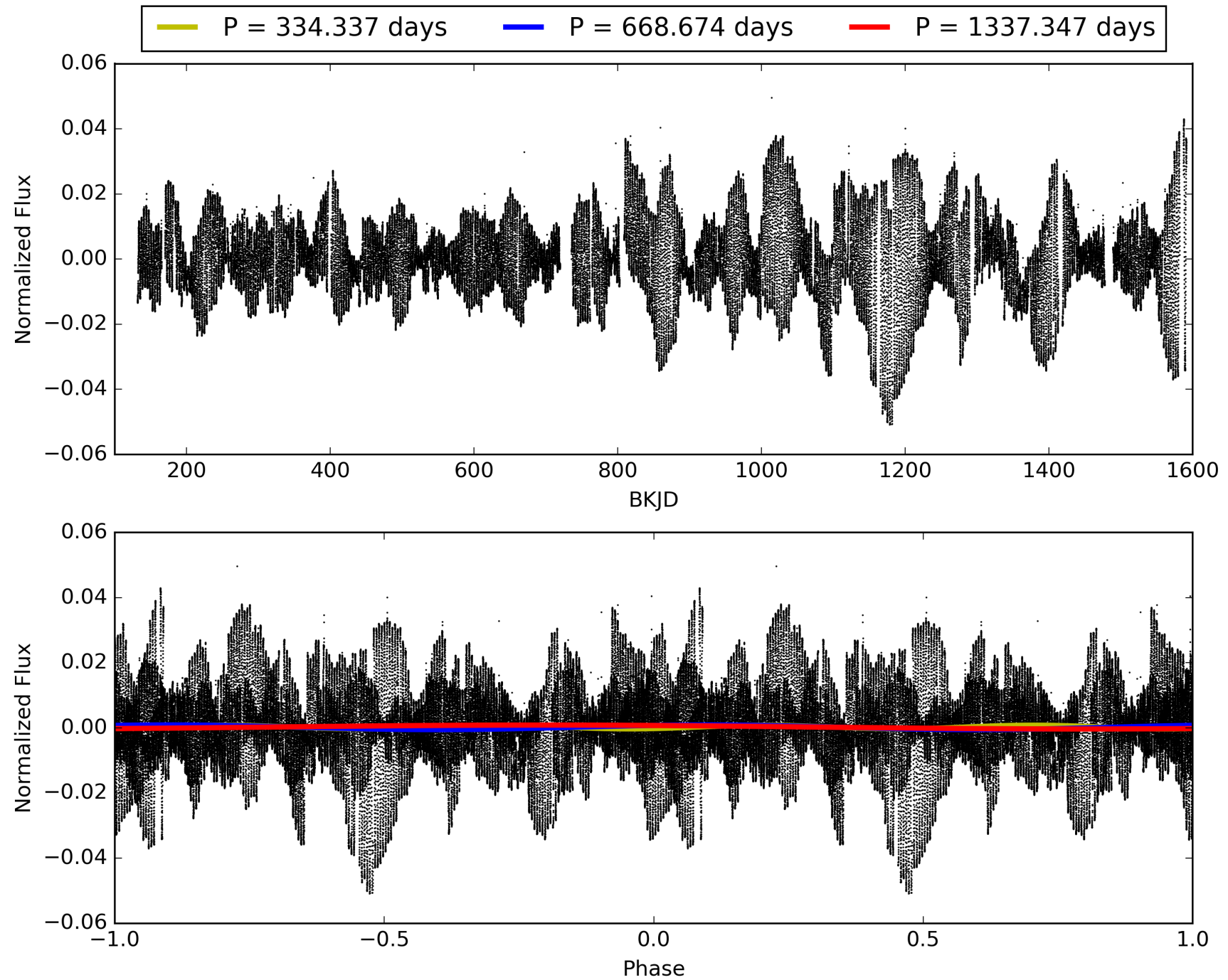
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [159.52σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 9.2%  
ModelChiSquareGof-sig: 51.3%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 1.342  
Centroid-sig: 14.3%  
Centroid-so: 0.526 arcsec [1.36σ]  
OotOffset-rm: 0.035 arcsec [0.34σ]  
KicOffset-rm: 0.178 arcsec [1.64σ]  
OotOffset-st: 1/0/1/1 [3]  
KicOffset-st: 1/0/1/1 [3]  
DiffImageQuality-fgm: 0.67 [2/3]  
DiffImageOverlap-fno: 1.00 [3/3]

# TCE 009827094-05, PDC Light Curves

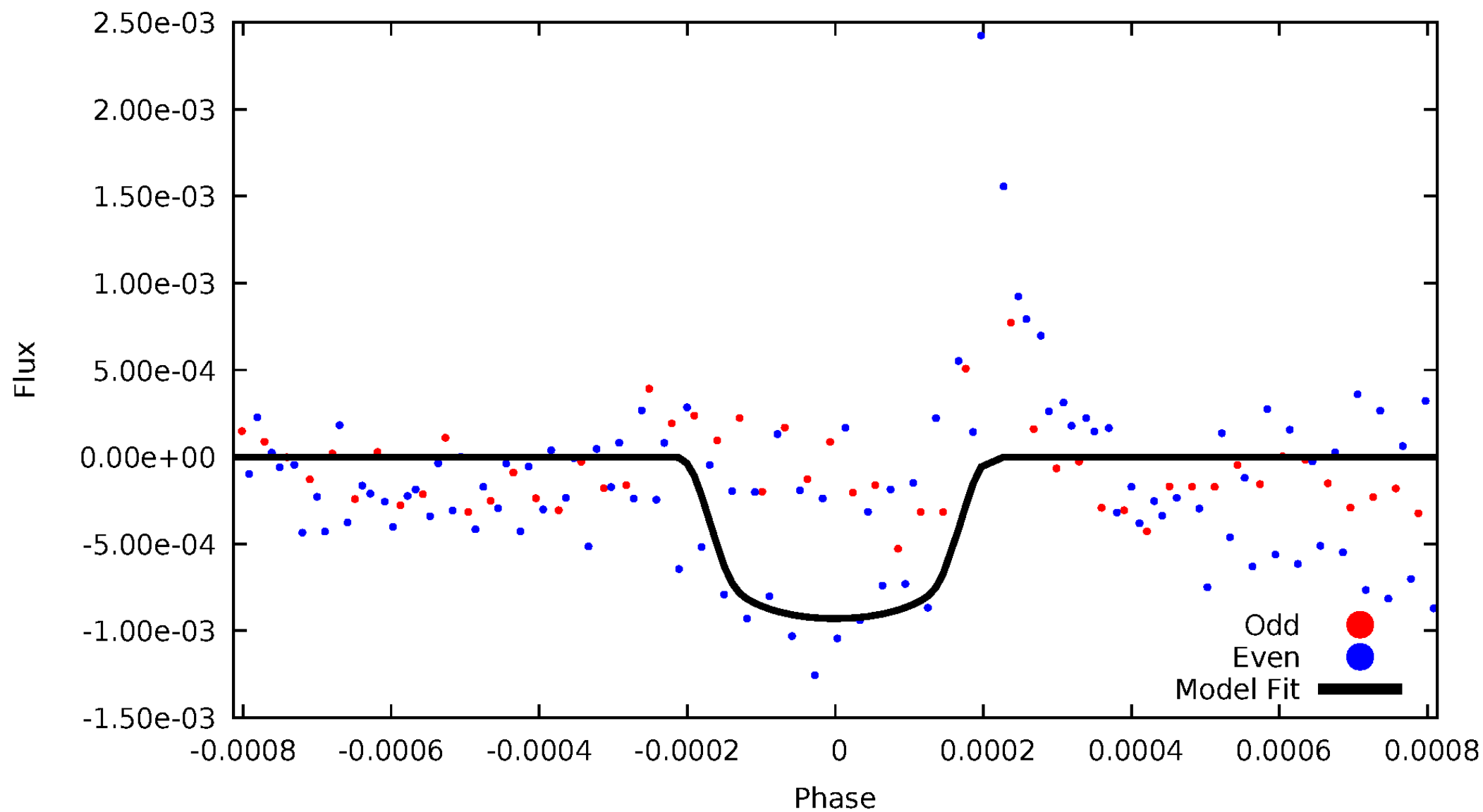


TCE 009827094-05



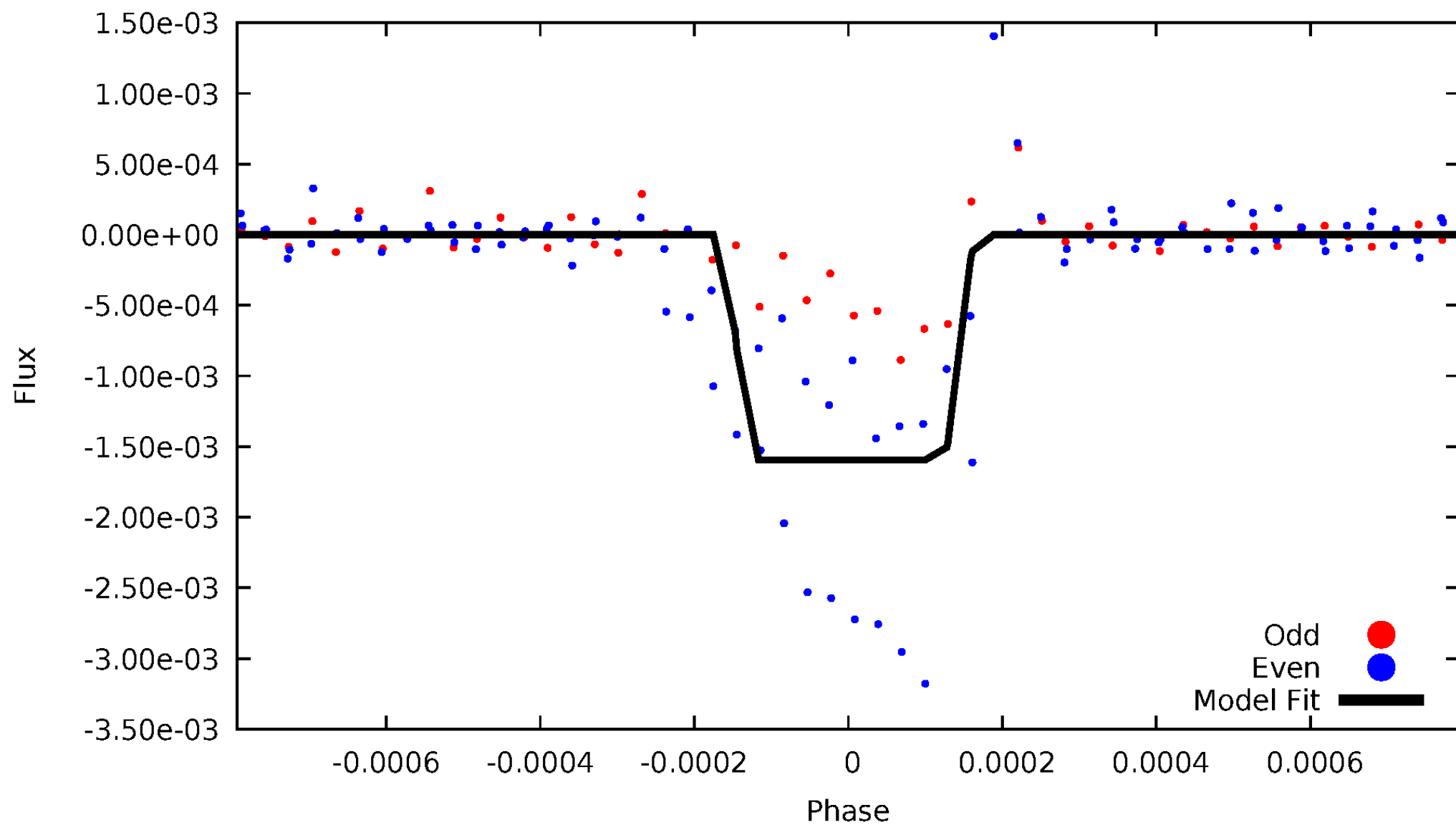
# DV Odd/Even

TCE 009827094-05



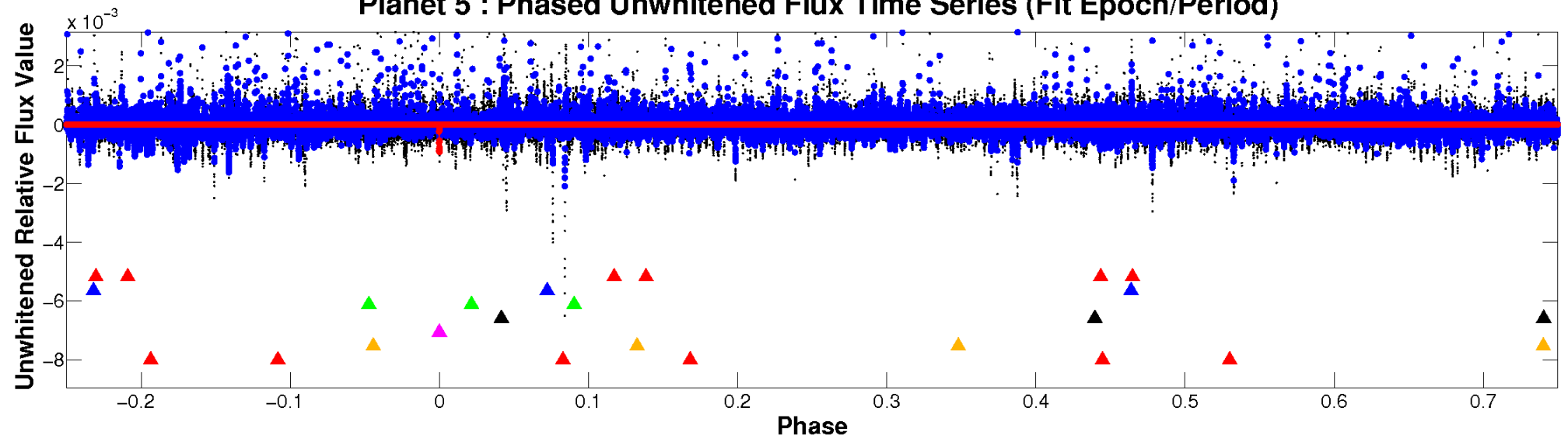
# ALT Odd/Even

TCE 009827094-05

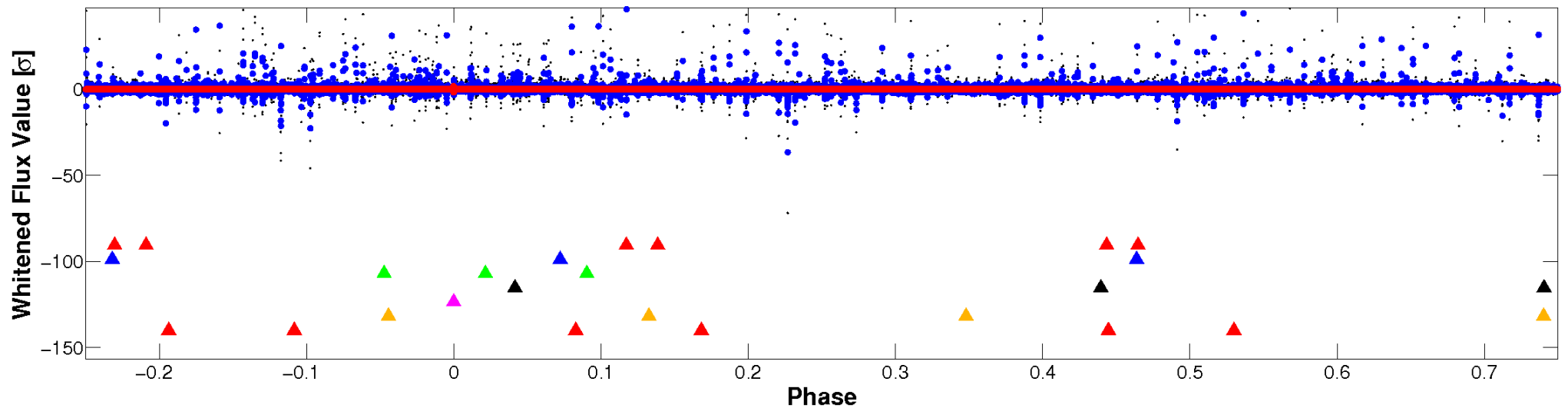


# Non-Whitened Vs. Whitened Light Curve

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

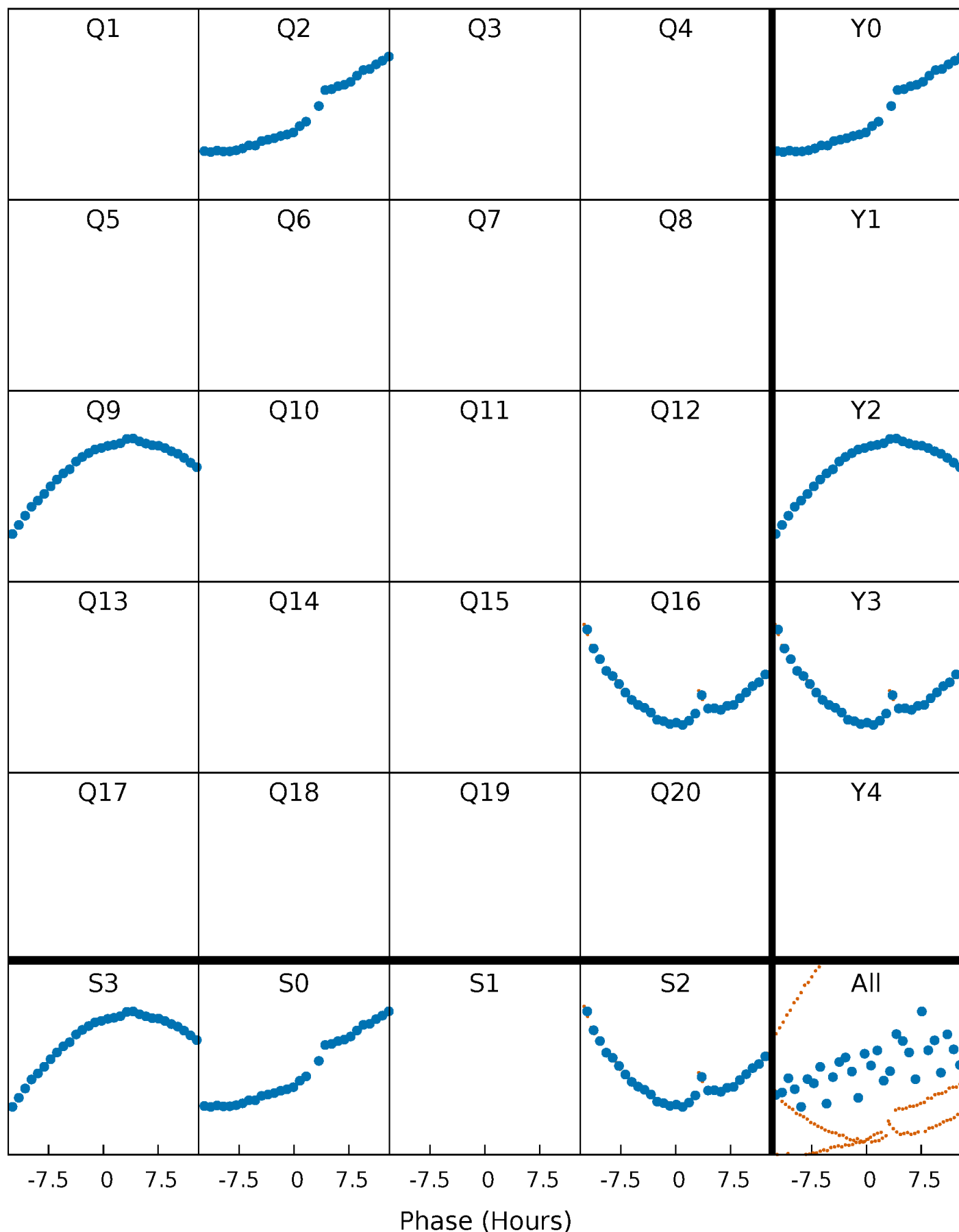


## Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

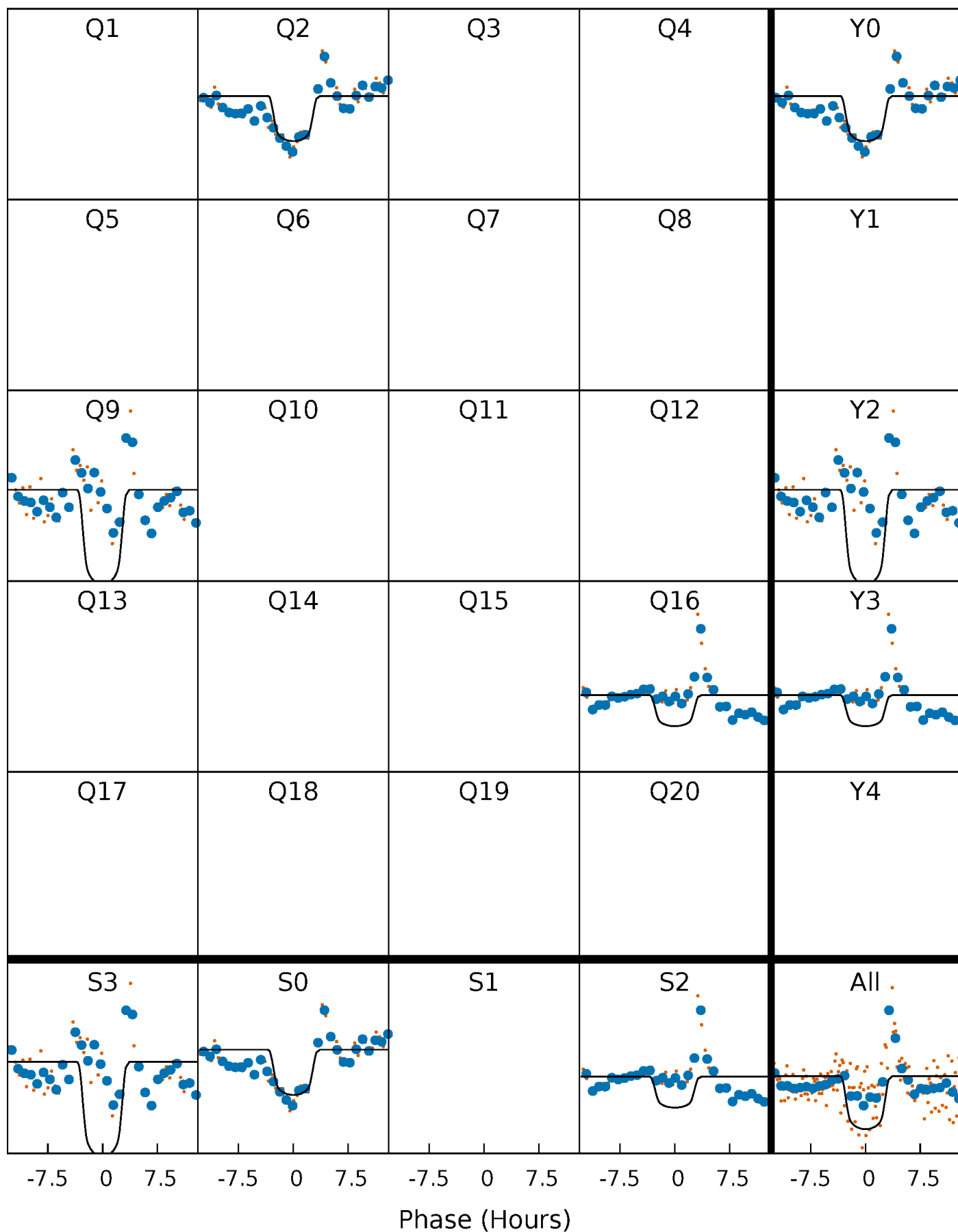
TCE 009827094-05     $P=668.673525$  Days     $T_0=193.262405$  (BKJD)





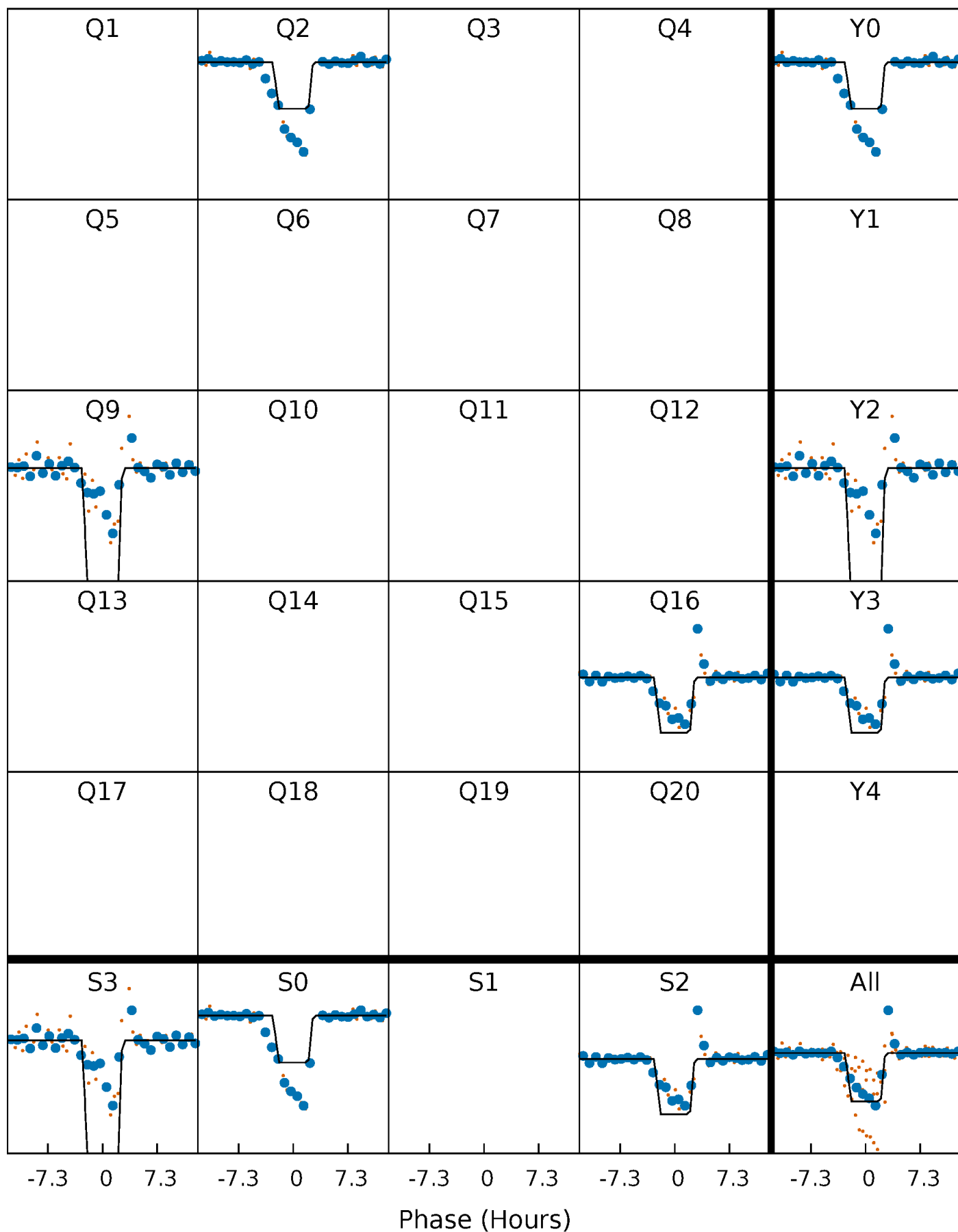
# DV Quarter-Phased Transit Curves

TCE 009827094-05     $P=668.673525$  Days     $T_0=193.262405$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

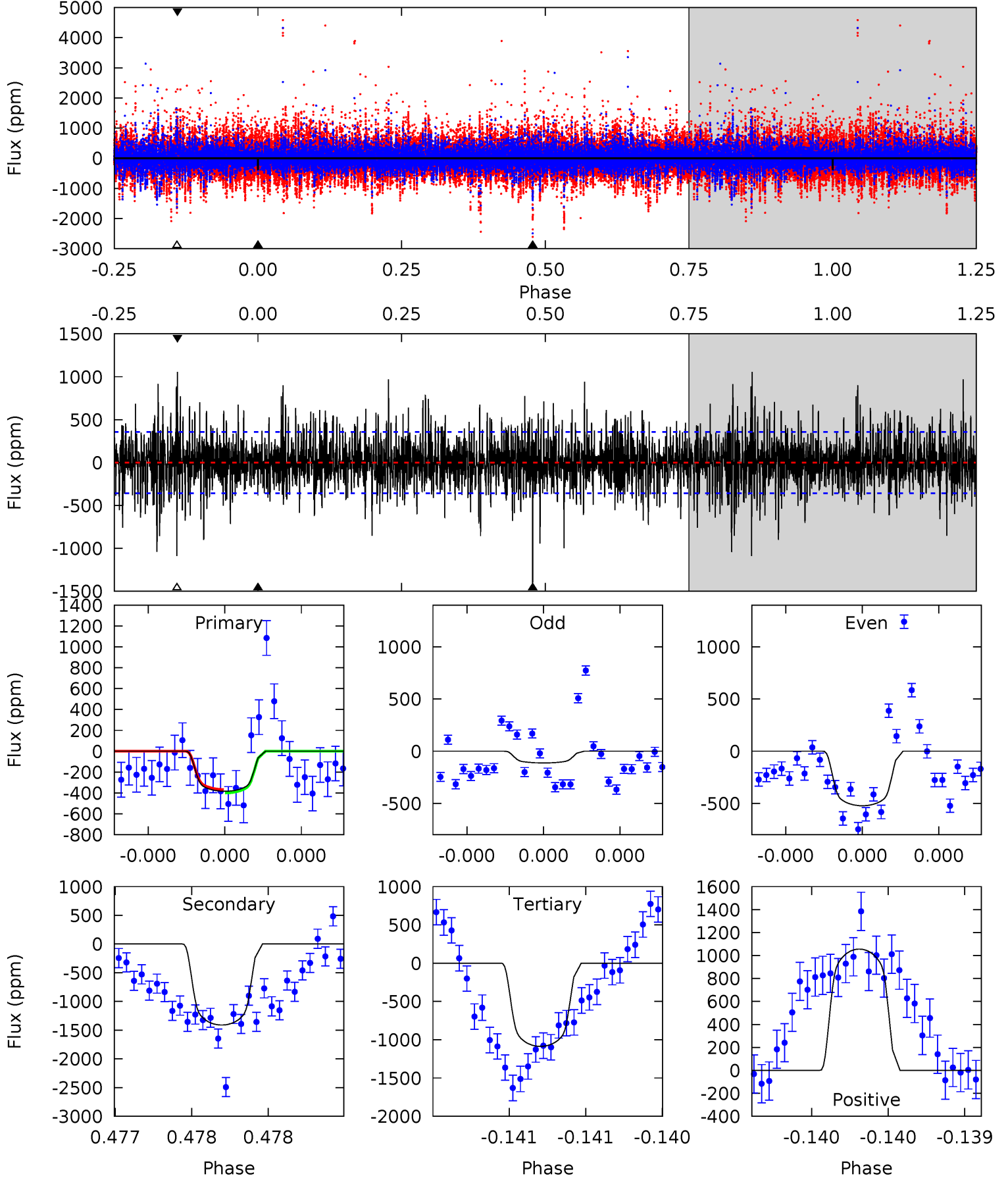
TCE 009827094-05 P=668.667817 Days  $T_0=193.279183$  (BKJD)



# DV Model-Shift Uniqueness Test

009827094-05, P = 668.673525 Days, E = 193.262405 Days

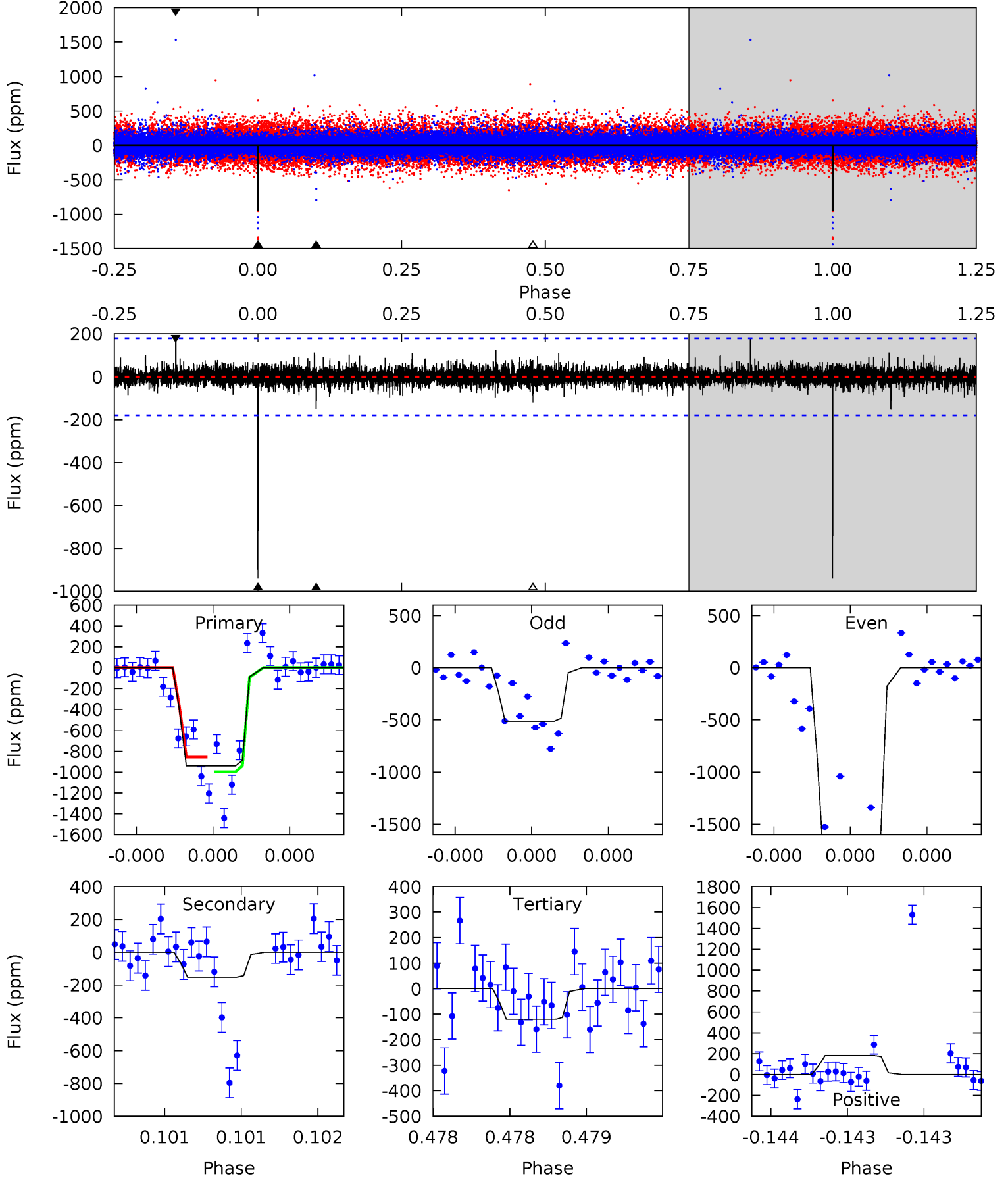
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.01	22.1	17.0	16.5	5.60	3.52	3.50	-11.0	-10.5	5.07	5.55	2.37	3.45	0.43	0.25



# Alt Model-Shift Uniqueness Test

009827094-05, P = 668.667817 Days, E = 193.279183 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
29.5	4.76	3.76	5.70	5.64	3.59	0.63	25.7	23.8	1.01	-0.93	23.0	1.27	0.16	0



### Stellar Parameters For KIC 009827094

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5790^{+155}_{-155}$	$4.283^{+0.242}_{-0.198}$	$-0.380^{+0.300}_{-0.250}$	$1.088^{+0.318}_{-0.260}$	$0.829^{+0.123}_{-0.061}$	$0.907^{+1.211}_{-0.454}$
	+3%/-3%	+6%/-5%	+79%/-66%	+29%/-24%	+15%/-7%	+133%/-50%
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 009827094-05 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-1411 \pm 64$	$3.93^{+0.80}_{-0.61}$	$312^{+26}_{-23}$	$6155^{+326}_{-293}$	$101641^{+39516}_{-31062}$
Alt.	$-152 \pm 32$	$4.70^{+0.85}_{-0.69}$	$313^{+27}_{-23}$	$3657^{+147}_{-177}$	$7543^{+3252}_{-2610}$

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

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

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

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

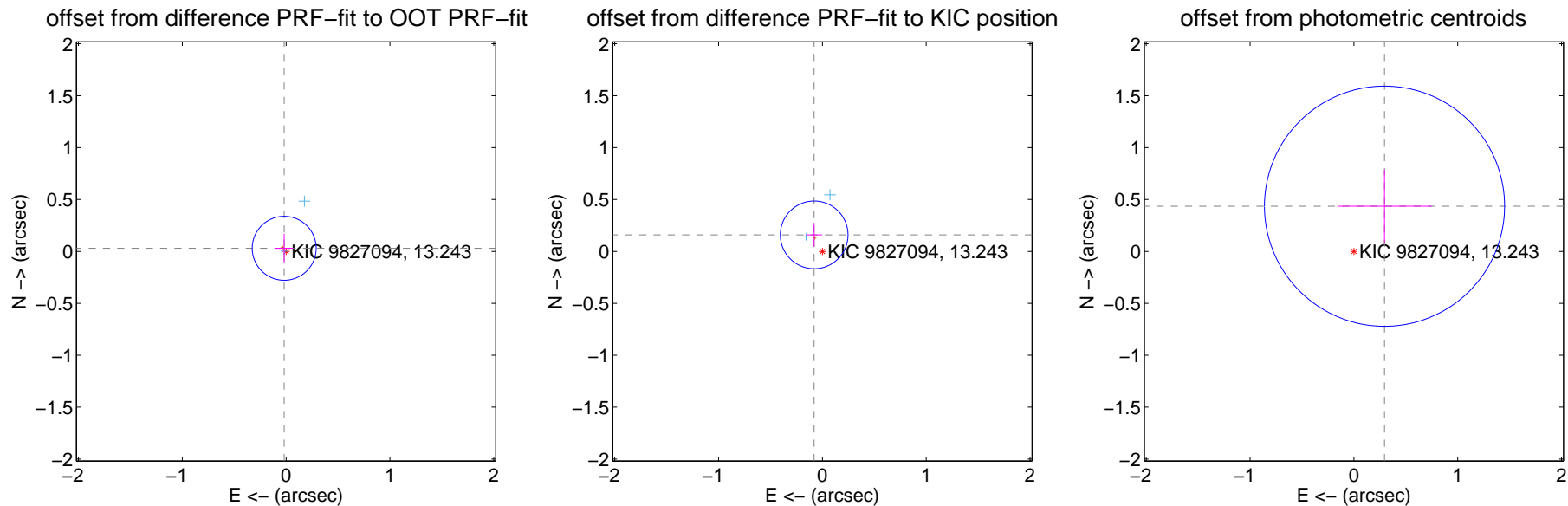
## DV Centroid Data

Supplemental centroid analysis for 009827094-05. Kepler magnitude: 13.24. Transit SNR 9.85

There are 2 quarters with good PRF difference image offsets

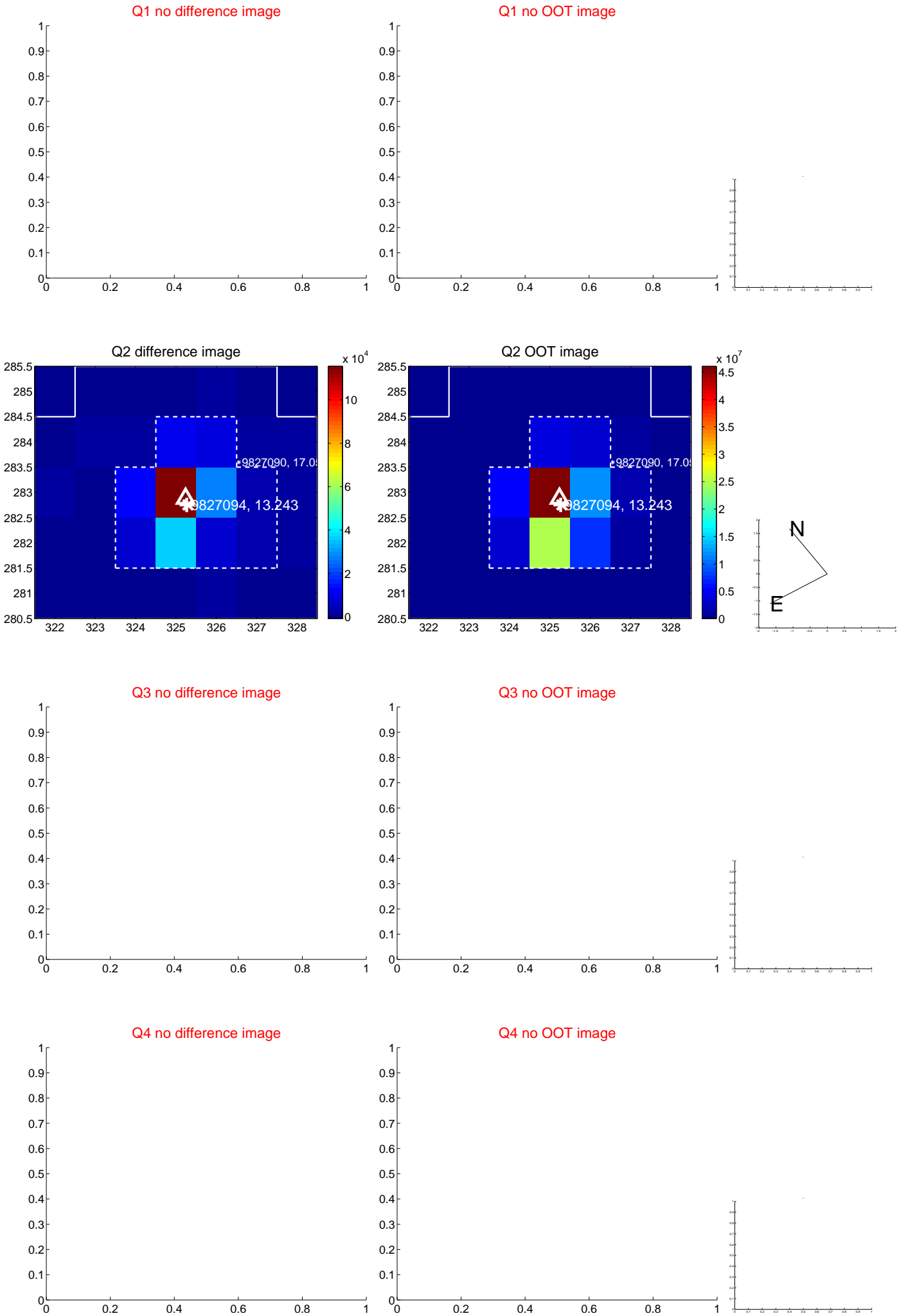
The direct PRF centroid is offset from the target star catalog position by about 0.20 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.035 \pm 0.103$	0.34	$0.018 \pm 0.085$	$0.030 \pm 0.140$
PRF-fit source offset from KIC position	$0.178 \pm 0.109$	1.64	$0.079 \pm 0.078$	$0.159 \pm 0.115$
photometric centroid source offset	$0.53 \pm 0.39$	1.36	$-0.30 \pm 0.45$	$0.44 \pm 0.35$



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.

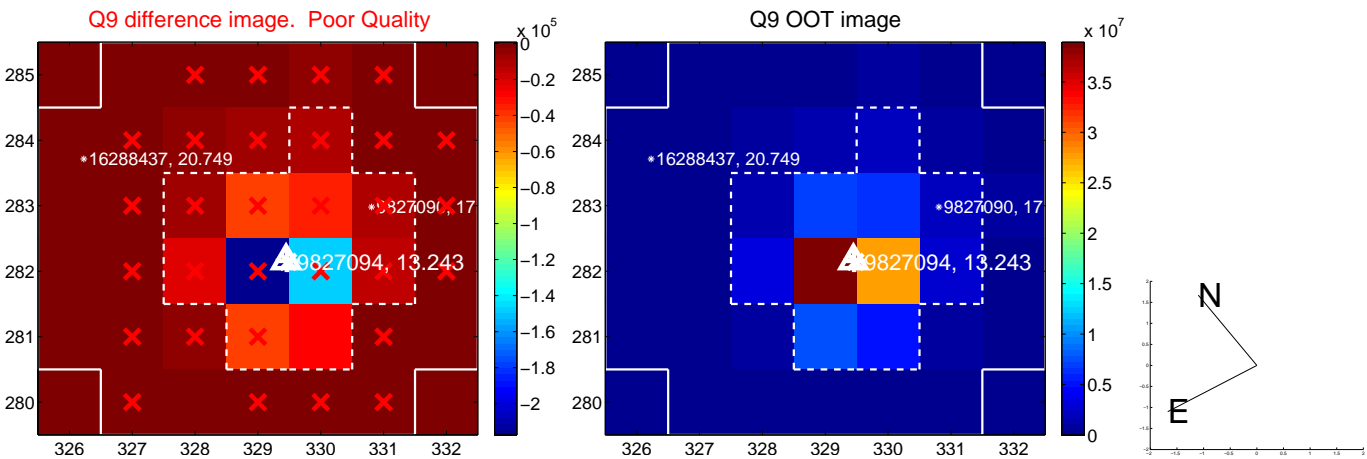


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

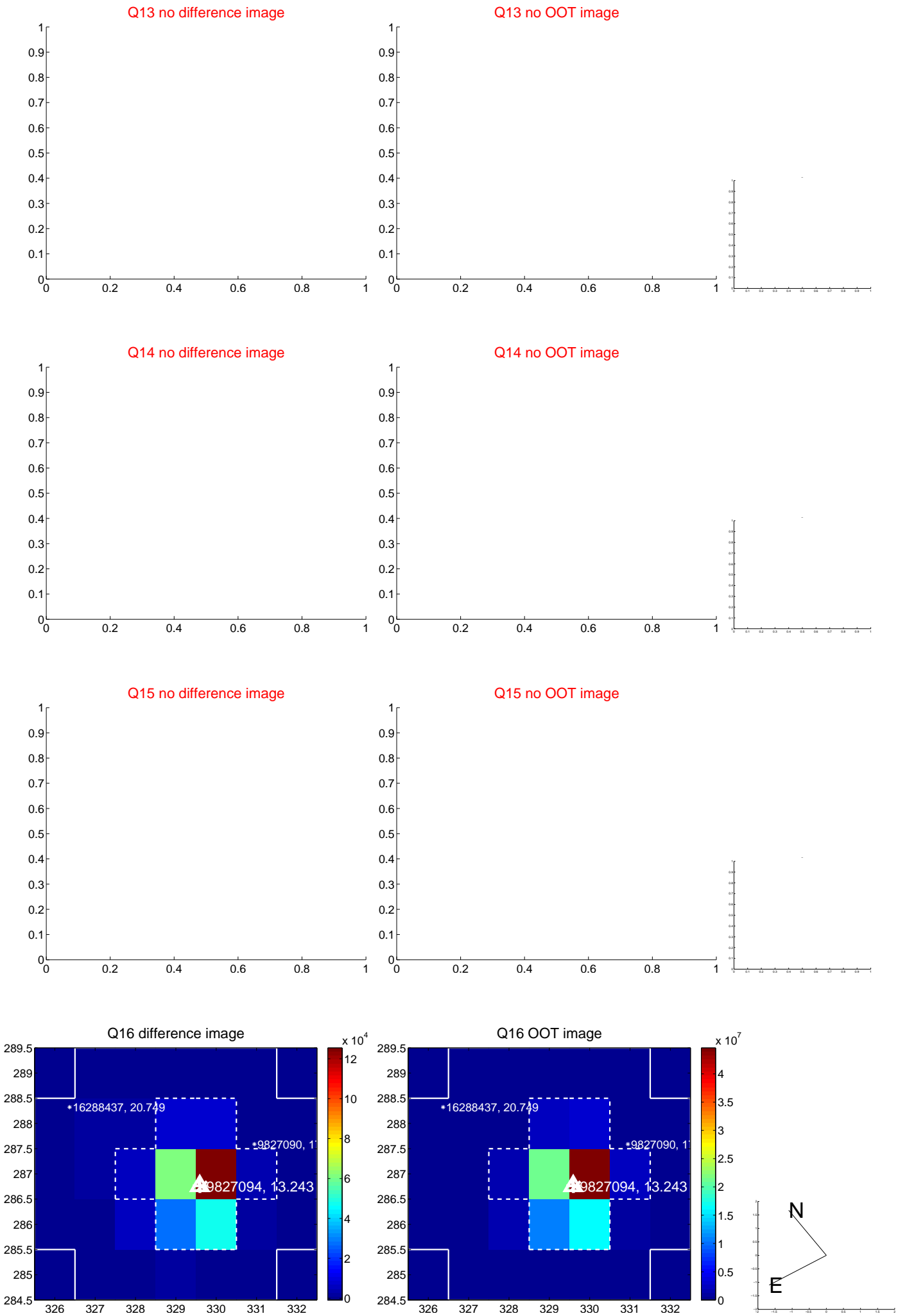




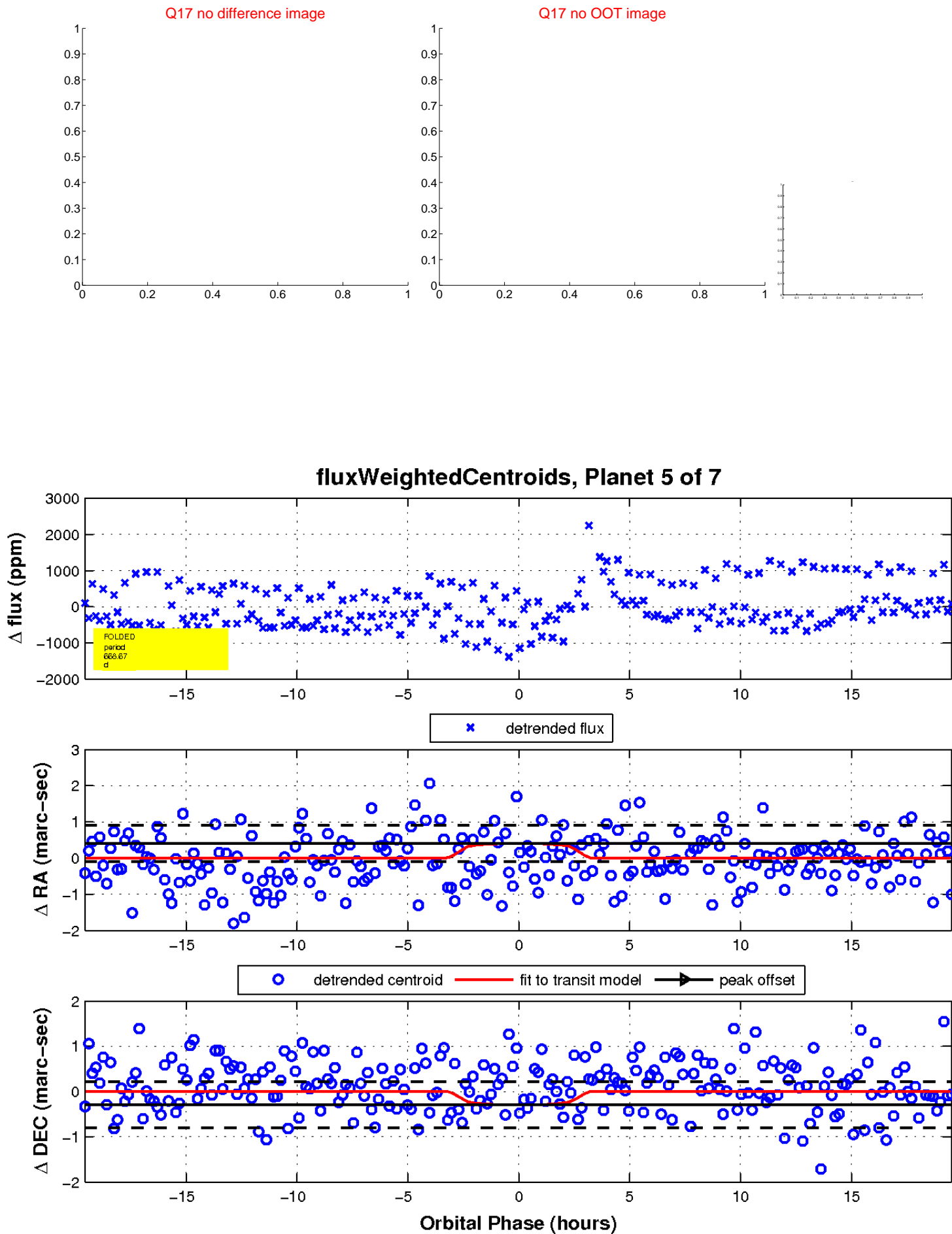
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

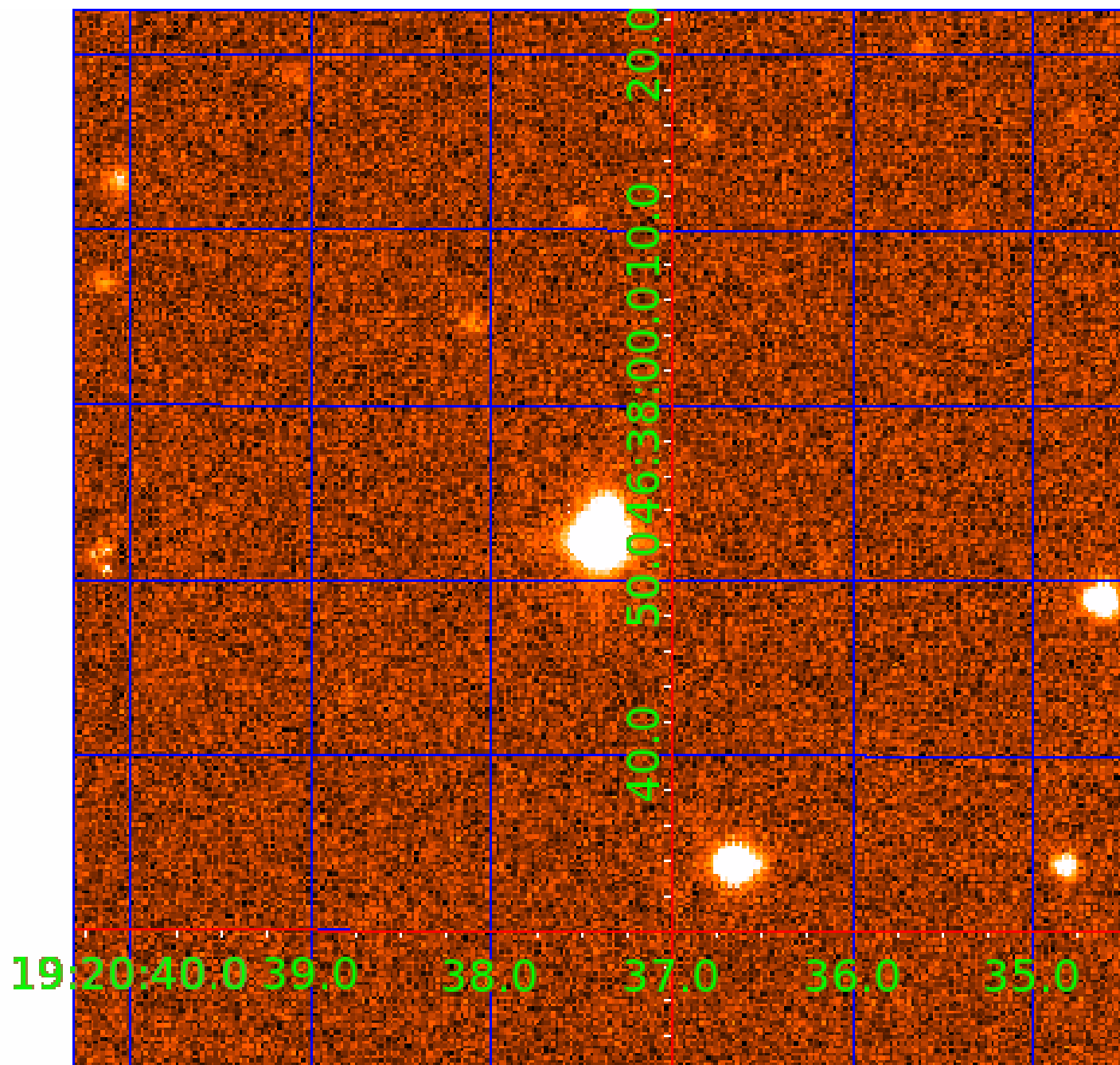


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 009827094

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009827094-01	OBS	No	218.138176	285.922591	604.4	2.950	15.0	7.6	1.09	5790	2.81	2.69
009827094-02	OBS	No	465.230842	241.636705	611.3	2.558	15.8	6.9	1.09	5790	2.98	0.98
009827094-05	OBS	No	668.673525	193.262405	929.6	6.521	15.0	9.8	1.09	5790	3.95	0.60
009827094-06	OBS	No	406.356904	281.910599	560.7	3.183	11.1	6.4	1.09	5790	2.81	1.17
009827094-07	OBS	8186.01	241.899294	248.697460	300.8	7.500	10.6	-1.0	1.09	5790	1.88	2.34

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009827094-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—CENT_FEW_DIFFS
009827094-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009827094-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
009827094-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—CENT_FEW_DIFFS
009827094-07	OBS	FP	0.00	1	0	1	0	INCONSISTENT_TRANS—CENT_NOFITS—HALO_GHOST

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

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

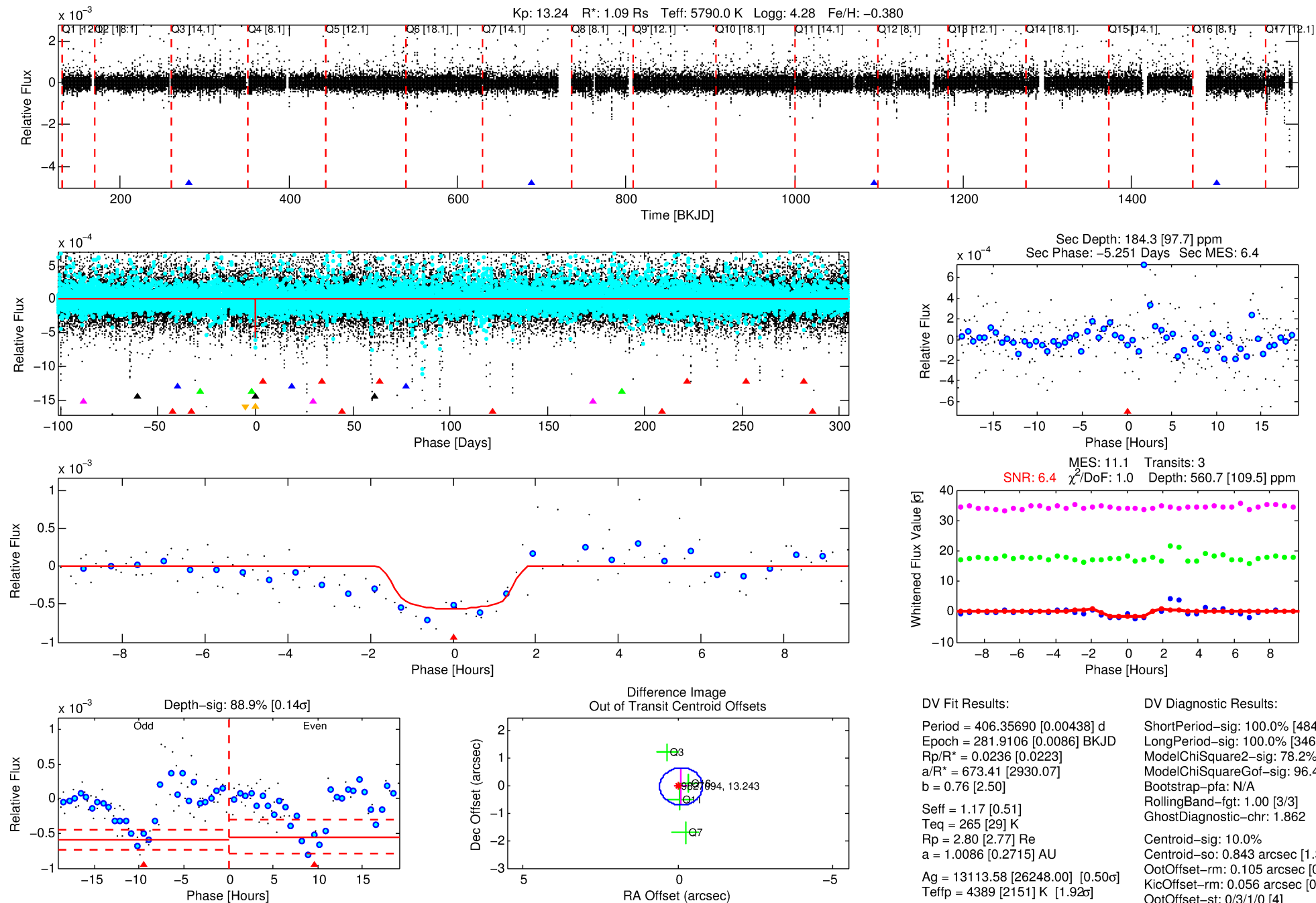
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009827094-06

No Significant Match Found

# DV One-Page Summary

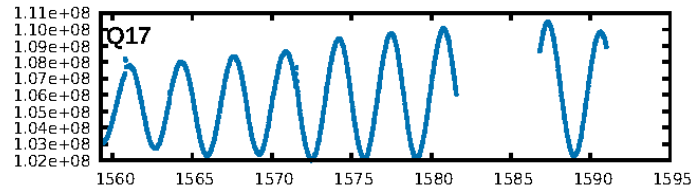
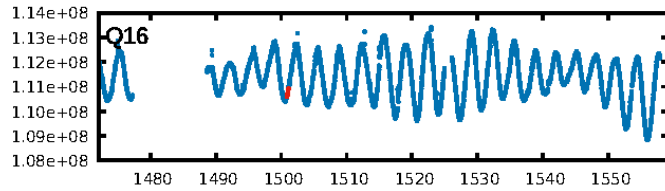
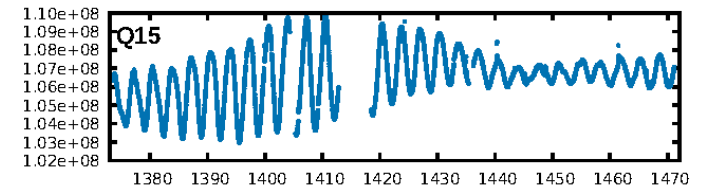
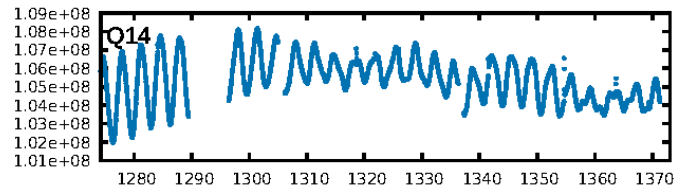
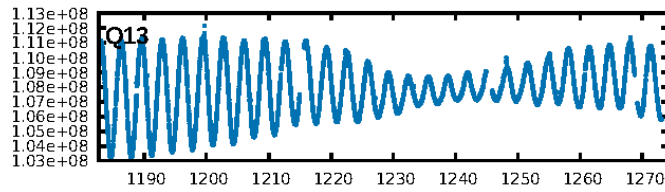
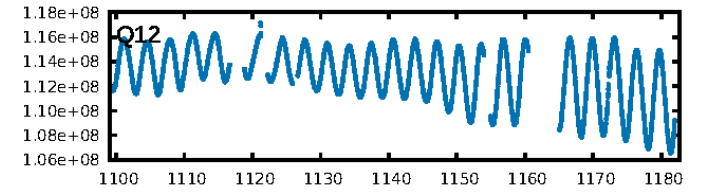
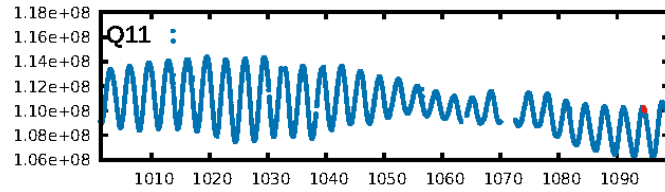
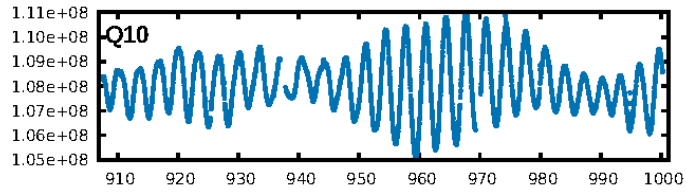
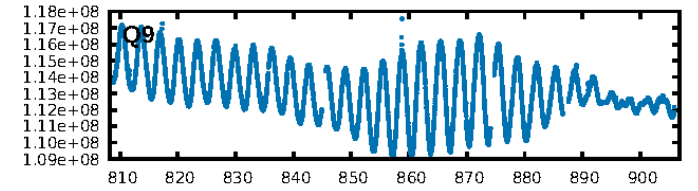
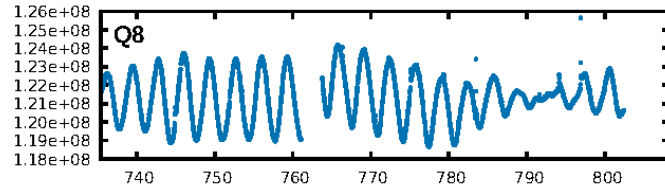
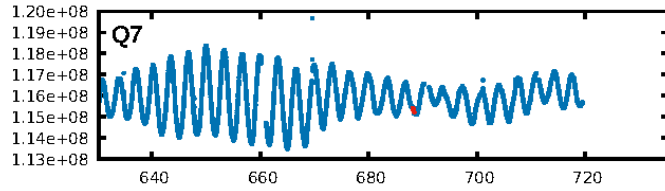
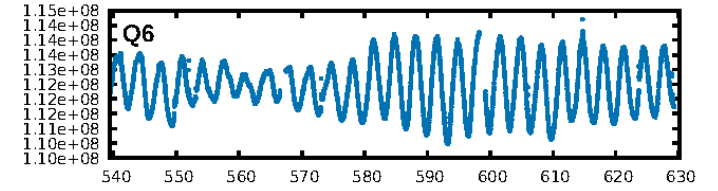
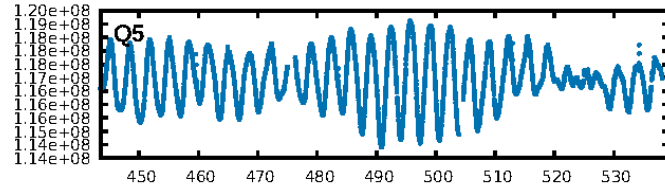
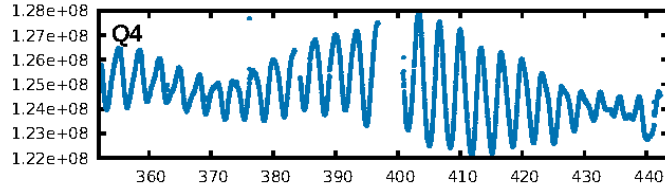
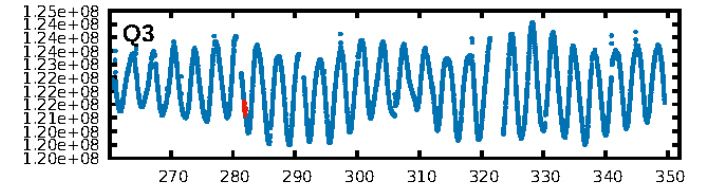
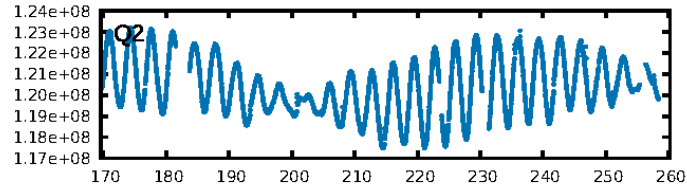
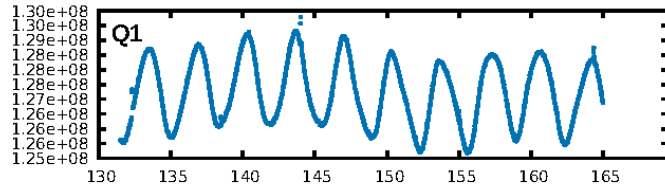
KIC: 9827094 Candidate: 6 of 7 Period: 406.357 d



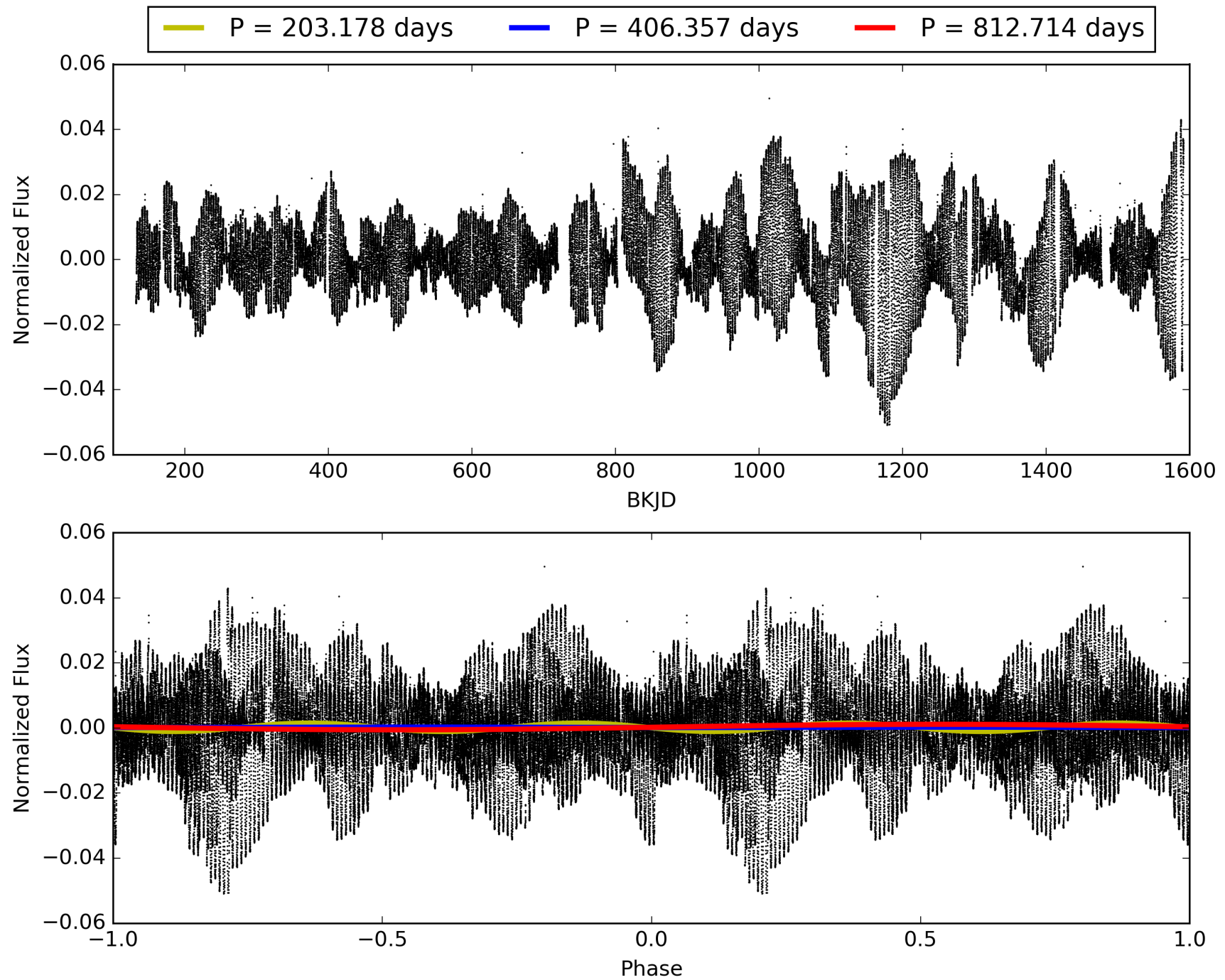
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:16:44 Z

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

# TCE 009827094-06, PDC Light Curves



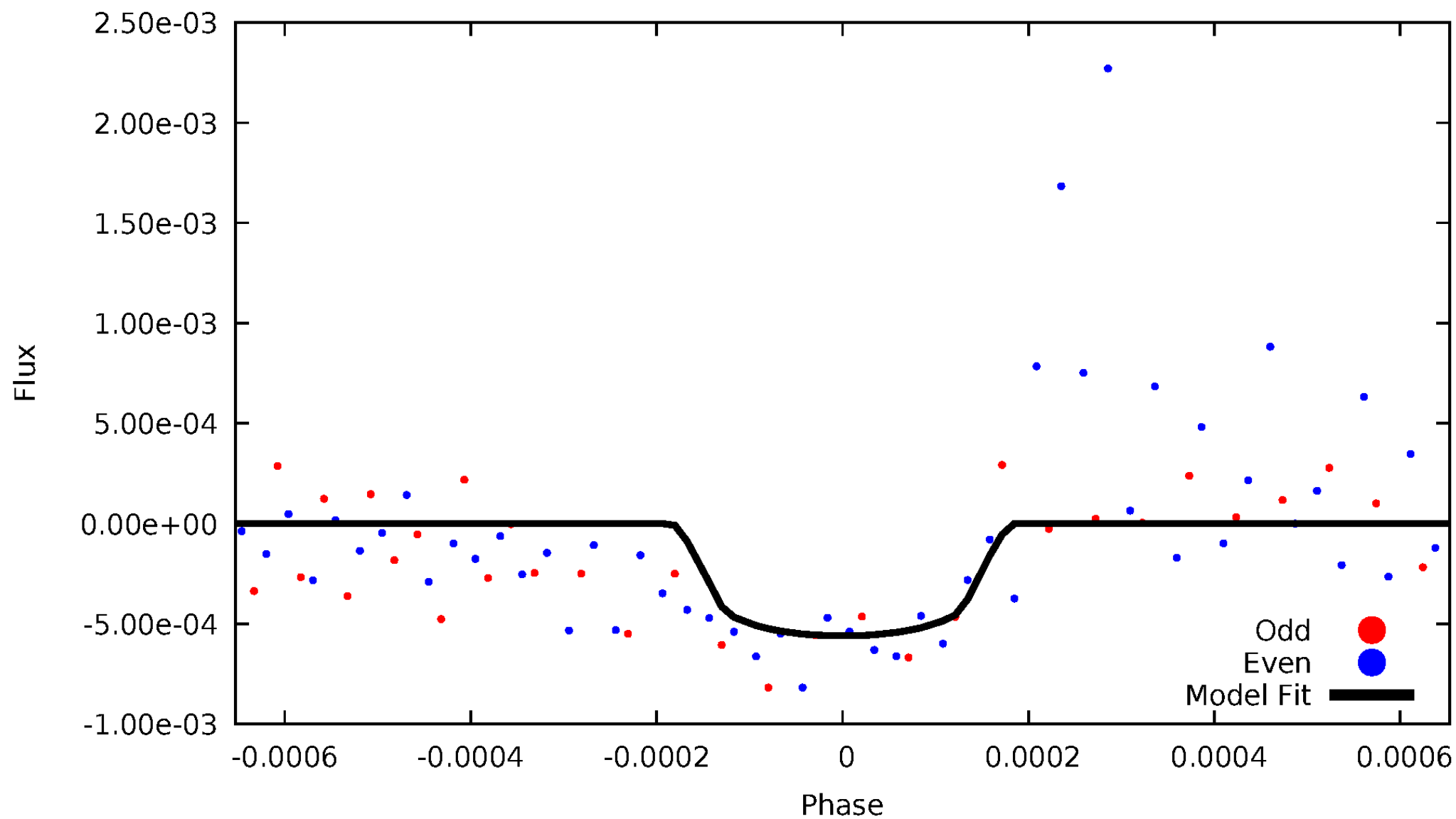
TCE 009827094-06





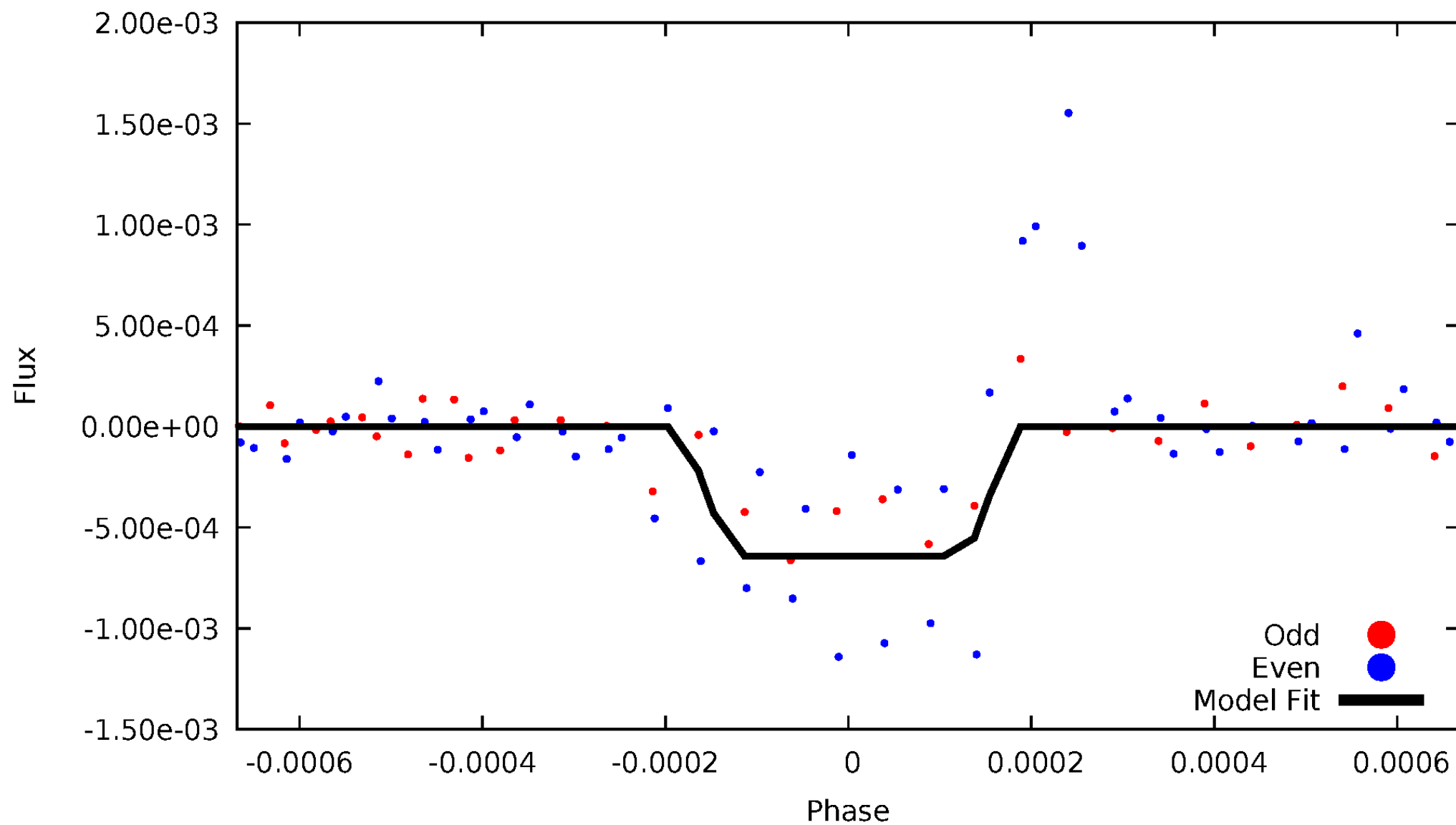
# DV Odd/Even

TCE 009827094-06



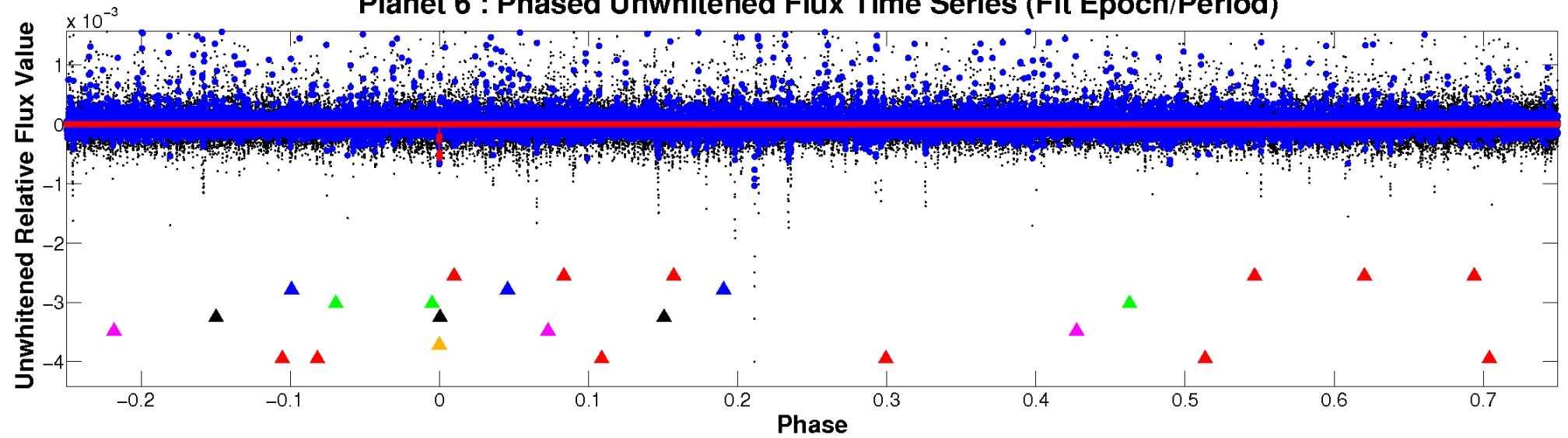
# ALT Odd/Even

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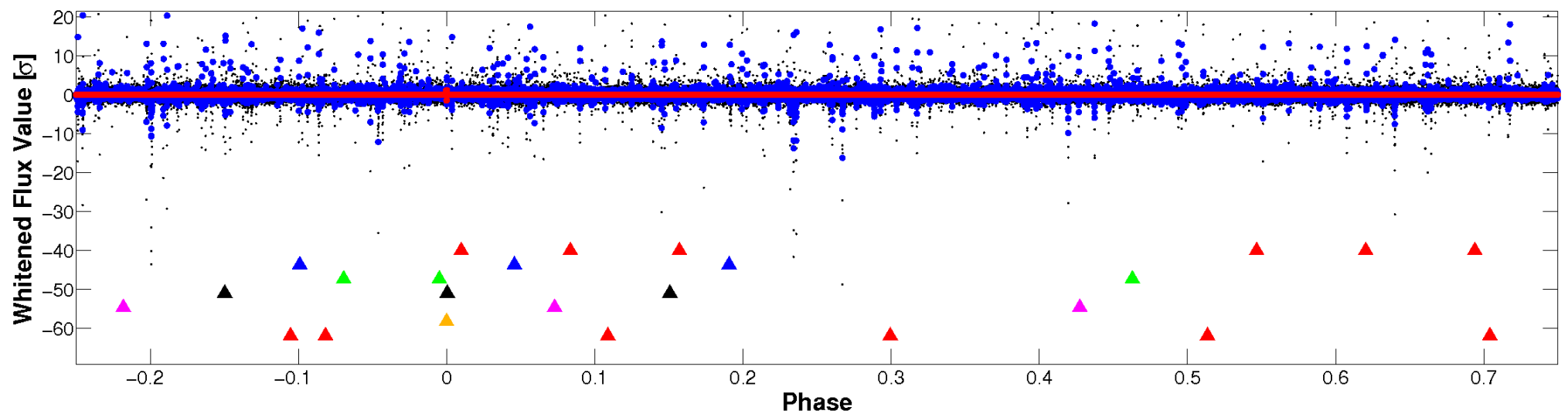


# Non-Whitened Vs. Whitened Light Curve

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

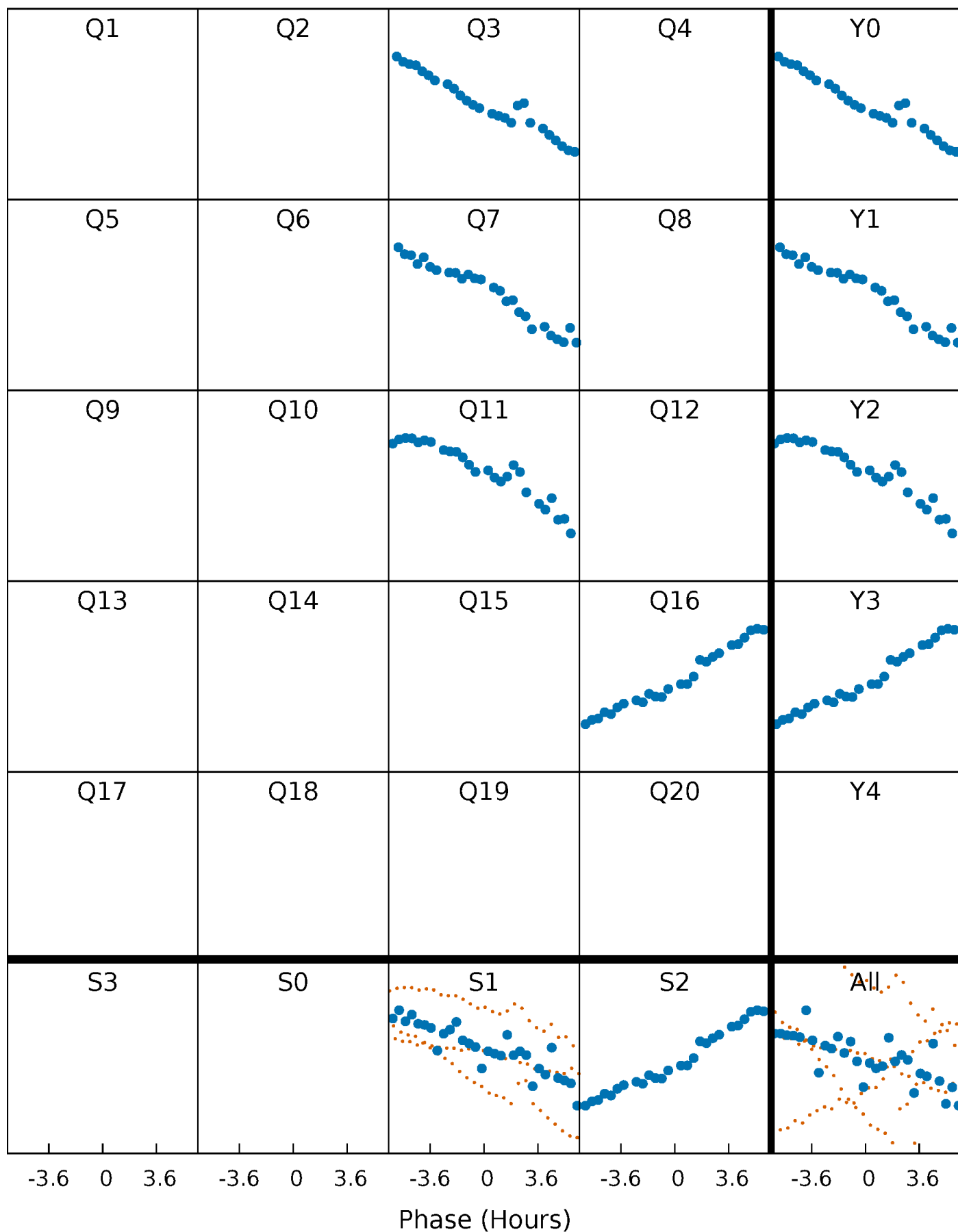


## Planet 6 : Phased Whitened Flux Time Series (Fit Epoch/Period)



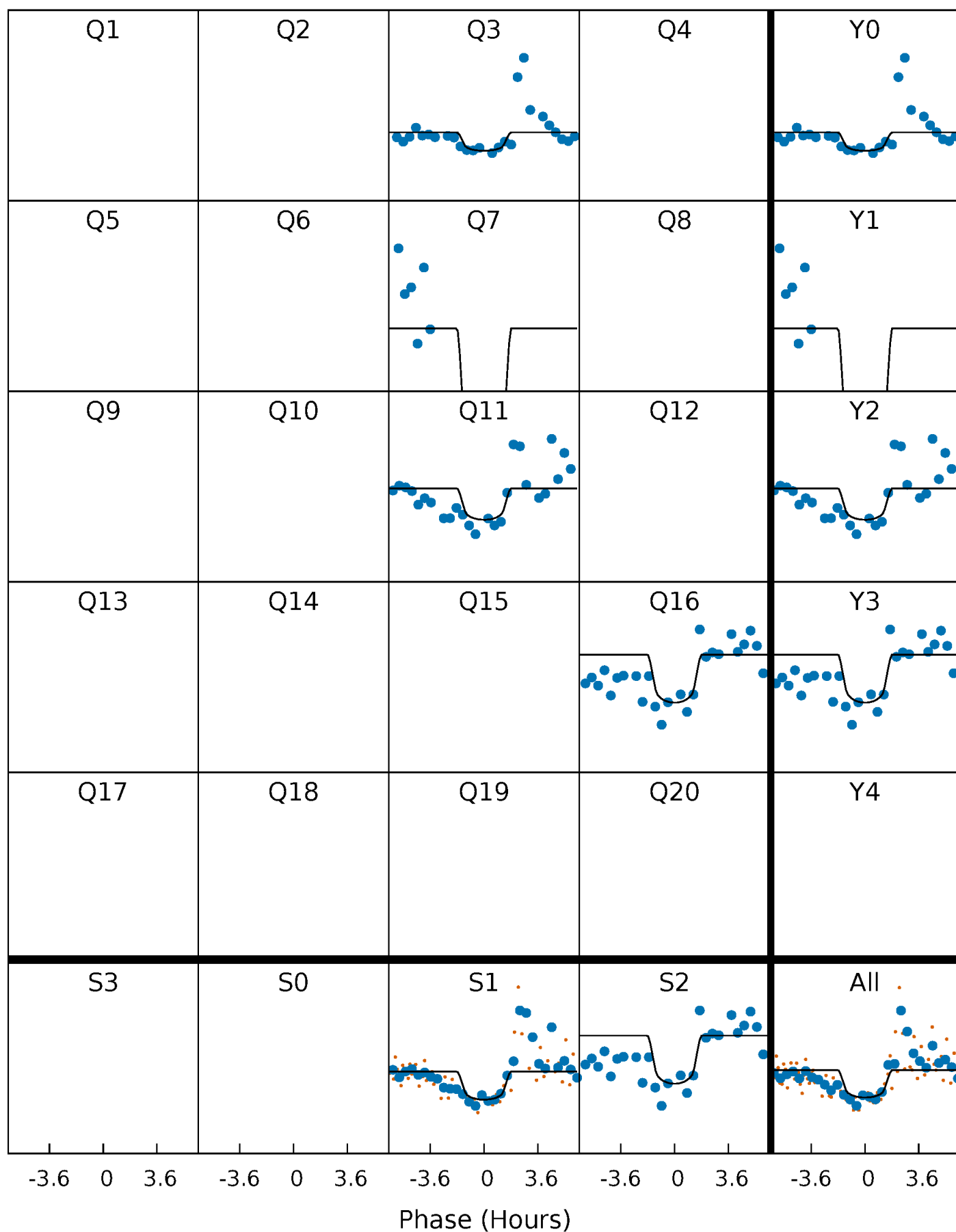
# PDC Quarter-Phased Transit Curves

TCE 009827094-06 P=406.356904 Days  $T_0=281.910599$  (BKJD)



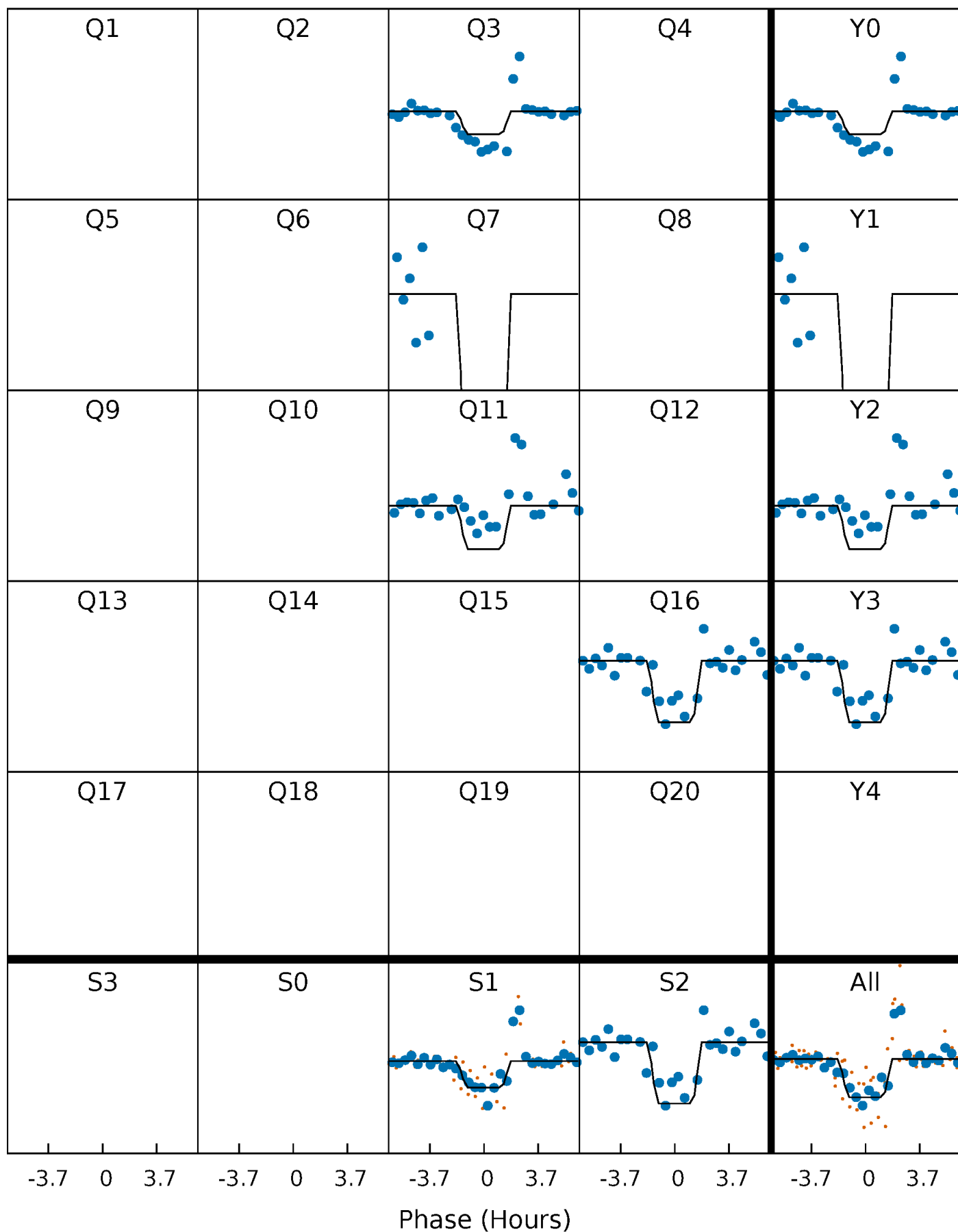
## DV Quarter-Phased Transit Curves

TCE 009827094-06 P=406.356904 Days  $T_0=281.910599$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

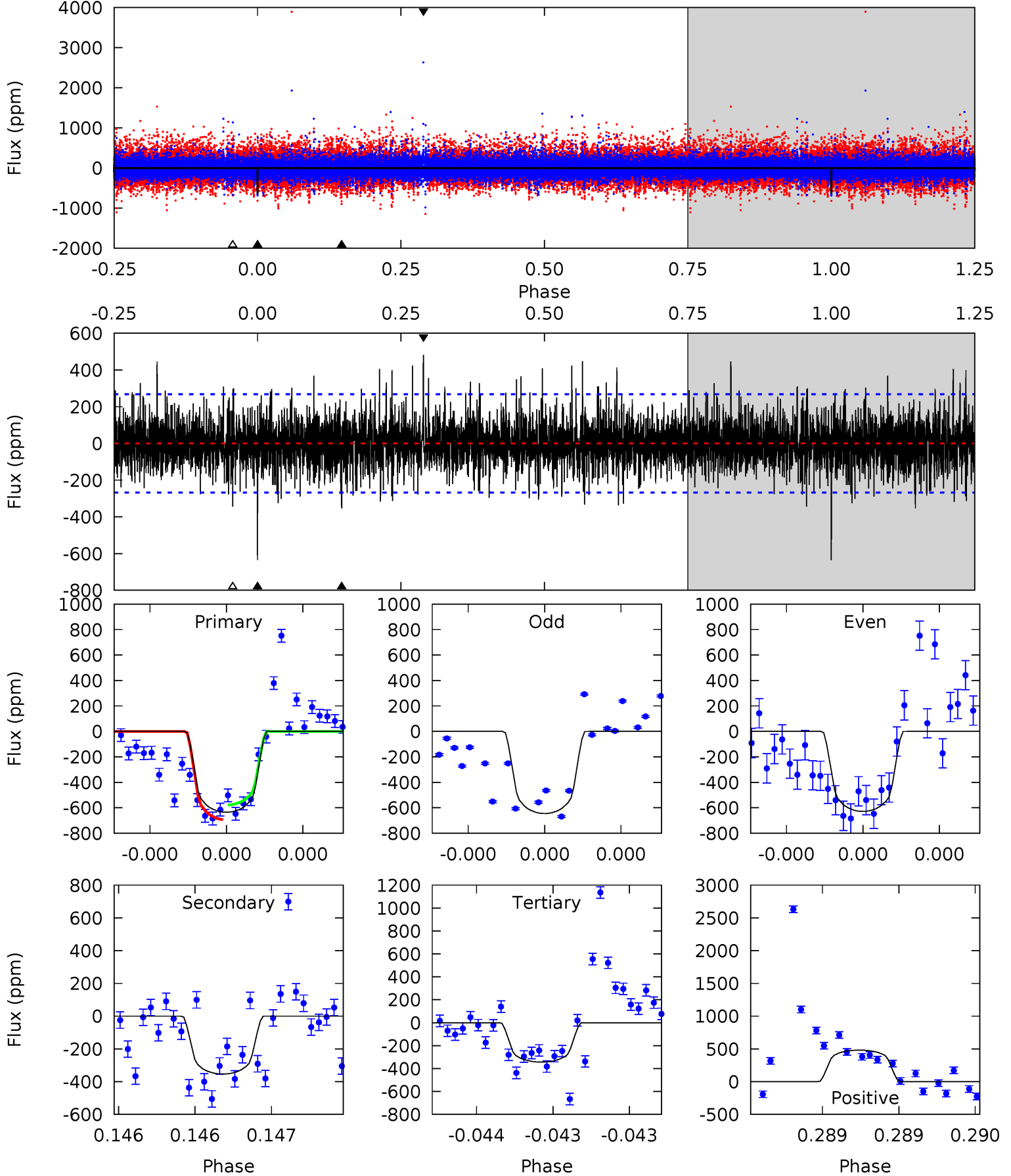
TCE 009827094-06 P=406.348585 Days  $T_0=281.928776$  (BKJD)



# DV Model-Shift Uniqueness Test

009827094-06, P = 406.356904 Days, E = 281.910599 Days

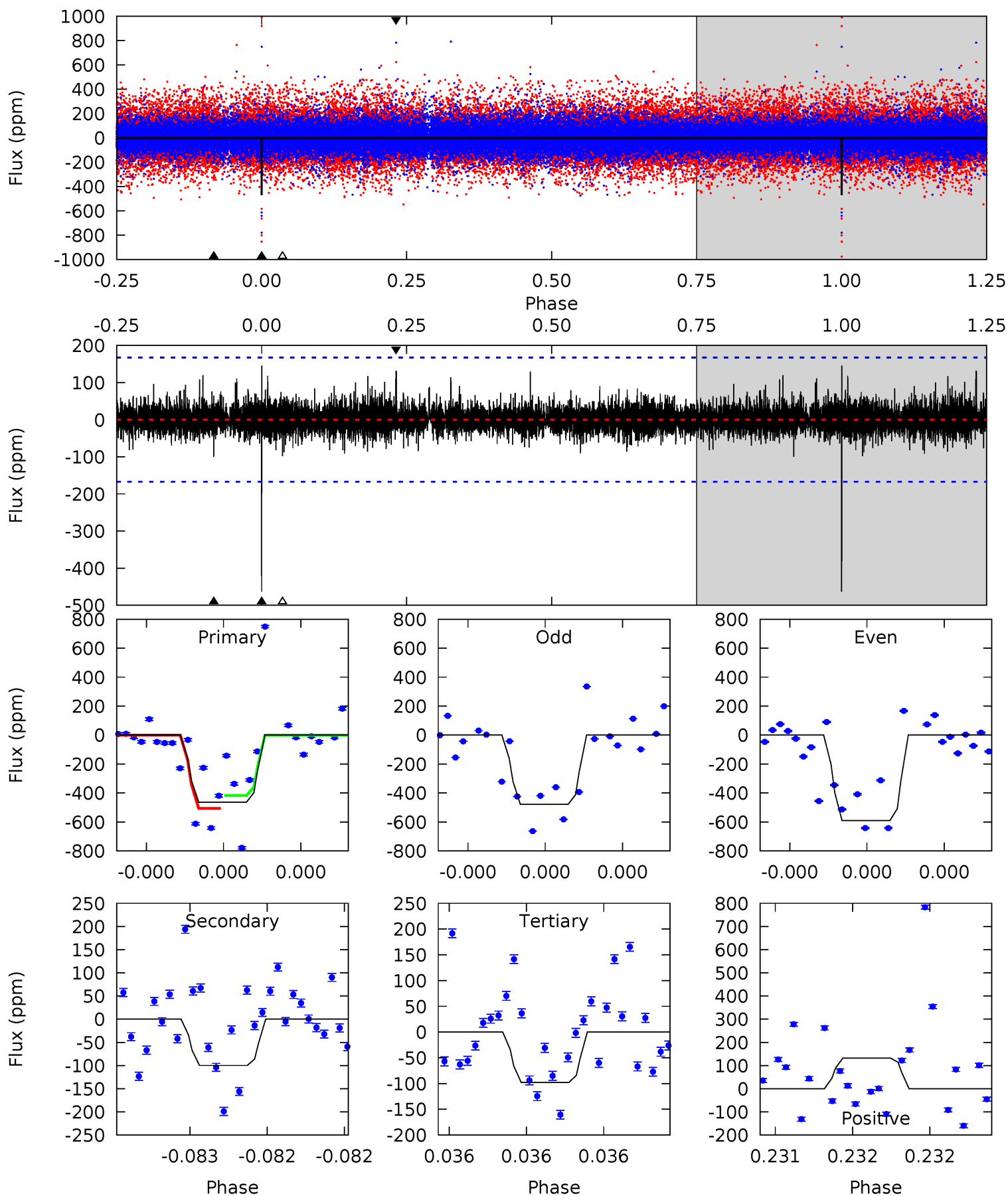
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.3	7.43	7.21	10.1	5.63	3.57	1.92	6.12	3.21	0.22	-2.69	0.13	0.98	0.43	1.21



# Alt Model-Shift Uniqueness Test

009827094-06, P = 406.348585 Days, E = 281.928776 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
15.6	3.36	3.29	4.45	5.63	3.57	0.74	12.3	11.1	0.07	-1.09	1.90	1.22	0.24	0





### Stellar Parameters For KIC 009827094

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5790^{+155}_{-155}$	$4.283^{+0.242}_{-0.198}$	$-0.380^{+0.300}_{-0.250}$	$1.088^{+0.318}_{-0.260}$	$0.829^{+0.123}_{-0.061}$	$0.907^{+1.211}_{-0.454}$
	+3%/-3%	+6%/-5%	+79%/-66%	+29%/-24%	+15%/-7%	+133%/-50%
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 009827094-06 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-353 \pm 48$	$3.37^{+2.84}_{-2.18}$	$372^{+30}_{-29}$	$4870^{+3385}_{-984}$	$17892^{+118348}_{-12589}$
Alt.	$-100 \pm 30$	$3.38^{+2.54}_{-2.05}$	$368^{+30}_{-28}$	$3770^{+1528}_{-596}$	$4779^{+25746}_{-3258}$

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

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

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

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

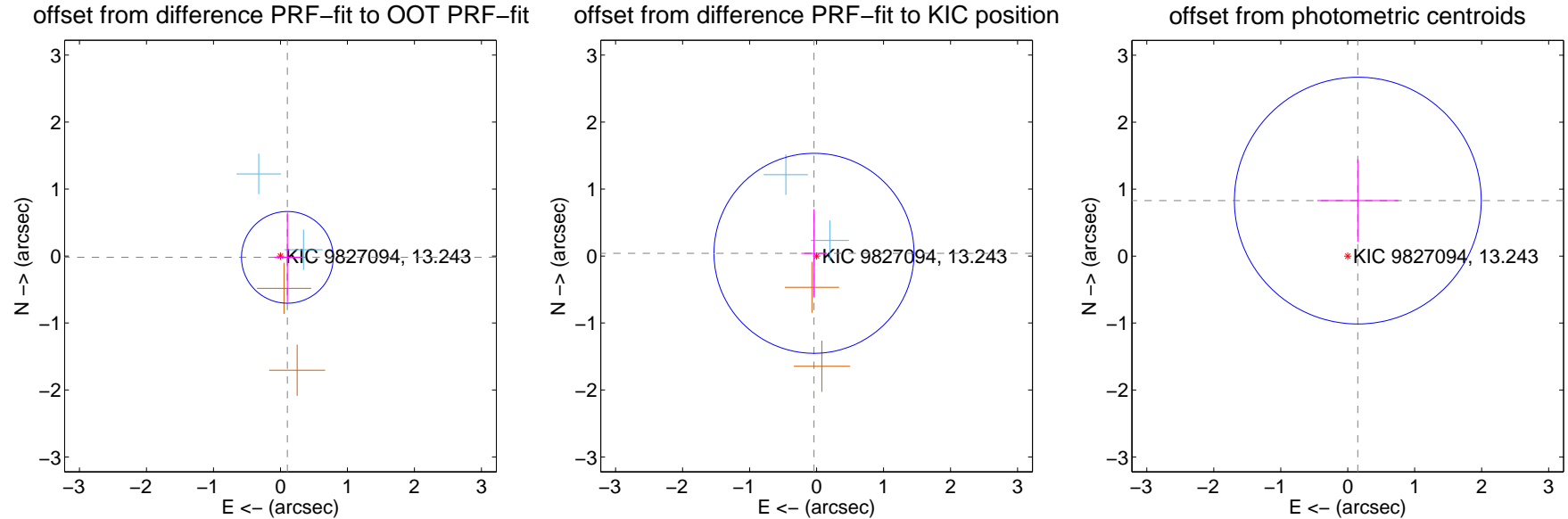
## DV Centroid Data

Supplemental centroid analysis for 009827094-06. Kepler magnitude: 13.24. Transit SNR 6.43

There are 2 quarters with good PRF difference image offsets

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

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.105 \pm 0.228$	0.46	$-0.103 \pm 0.194$	$-0.020 \pm 0.668$
PRF-fit source offset from KIC position	$0.056 \pm 0.498$	0.11	$0.038 \pm 0.190$	$0.041 \pm 0.658$
photometric centroid source offset	$0.84 \pm 0.61$	1.37	$-0.15 \pm 0.60$	$0.83 \pm 0.61$



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.

Q1 no difference image



Q1 no OOT image



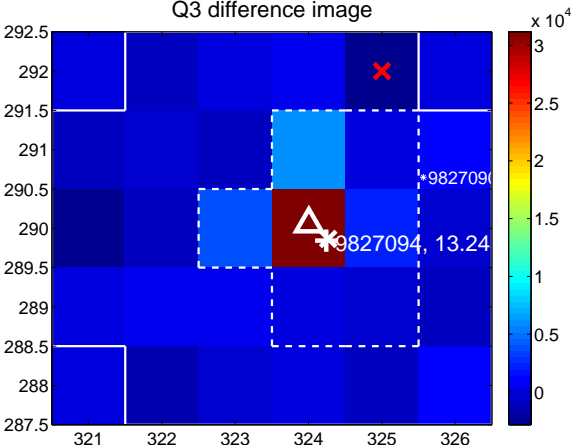
Q2 no difference image



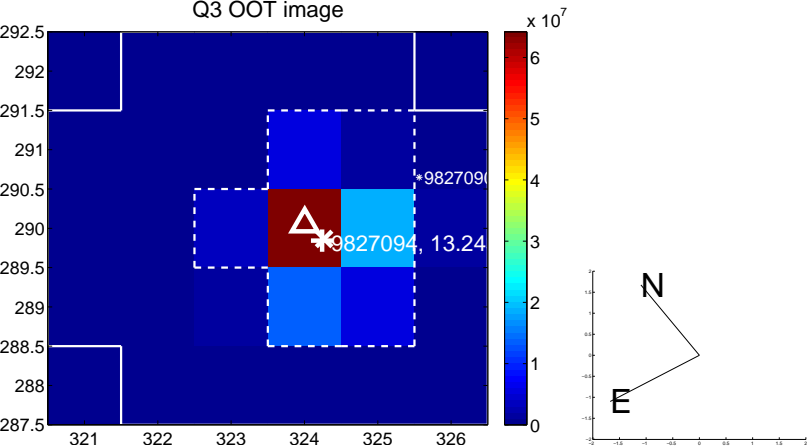
Q2 no OOT image



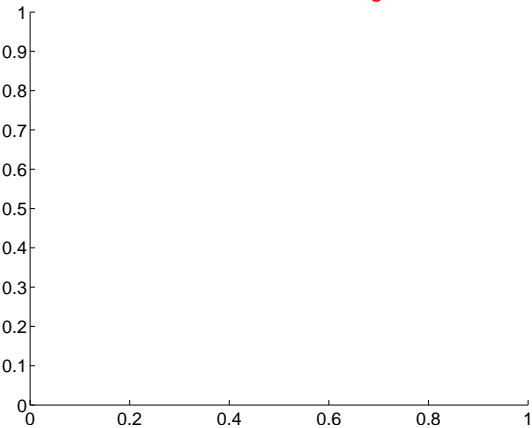
Q3 difference image



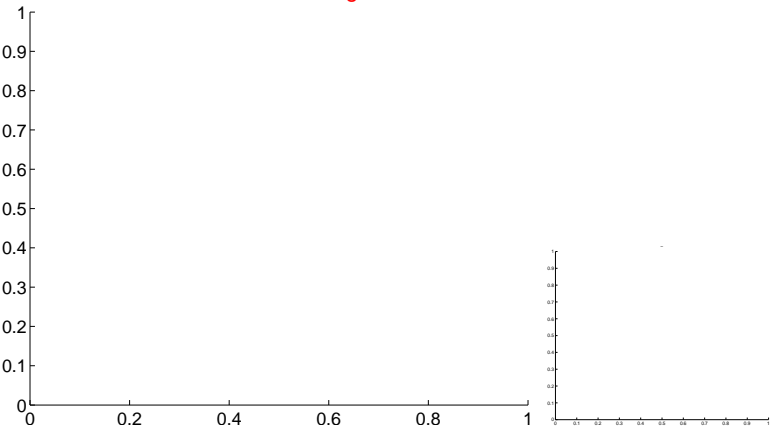
Q3 OOT image



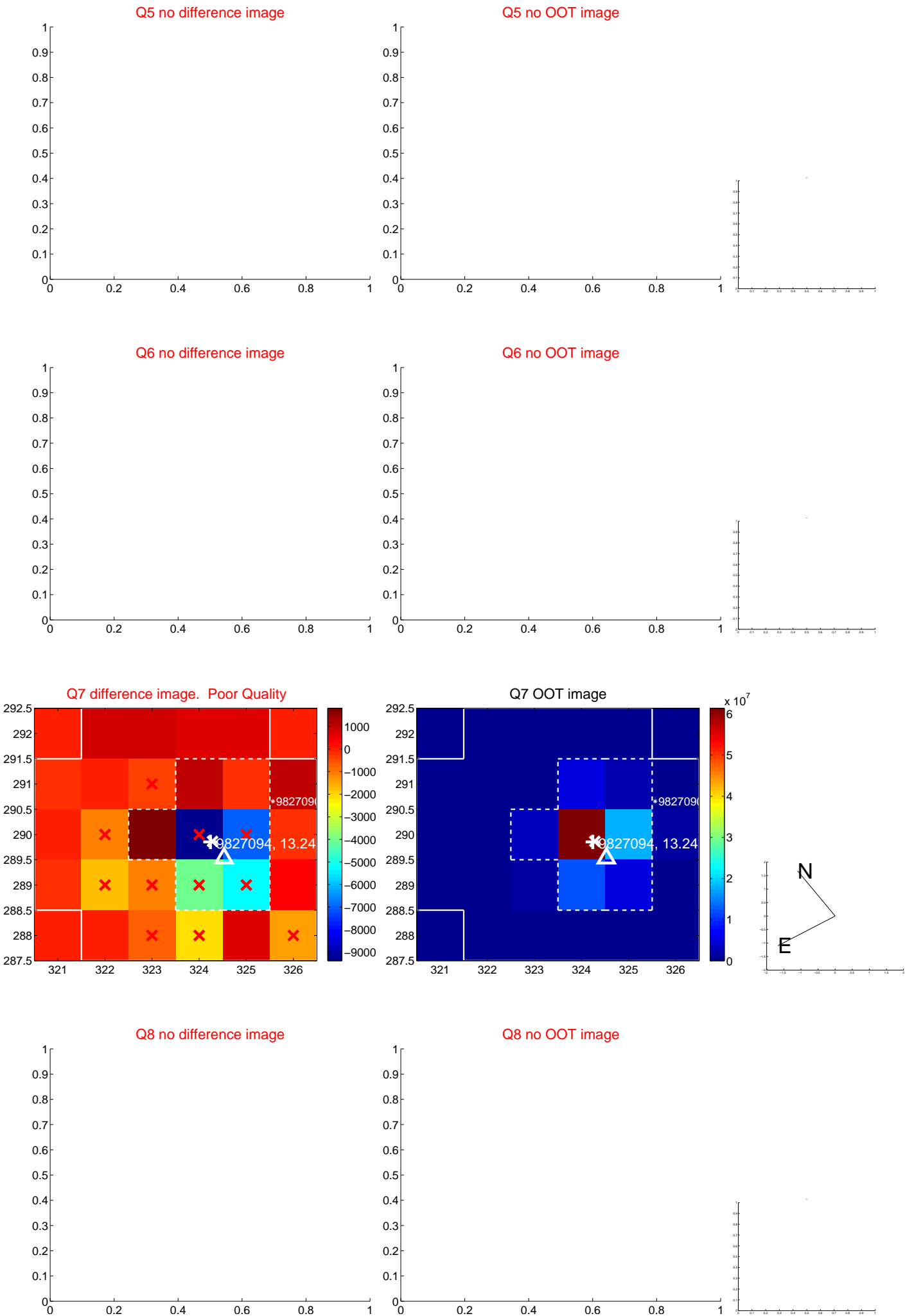
Q4 no difference image



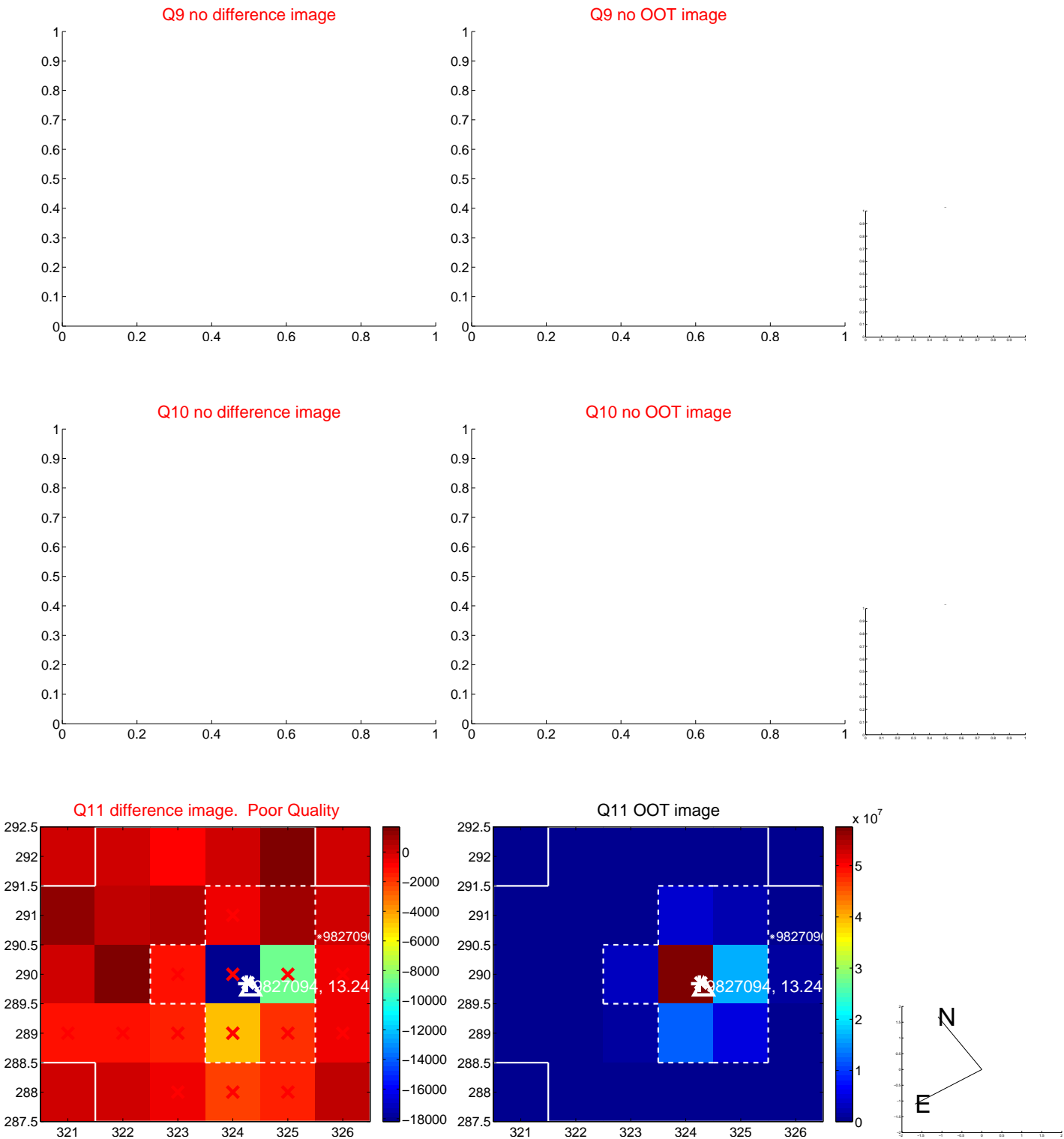
Q4 no OOT image



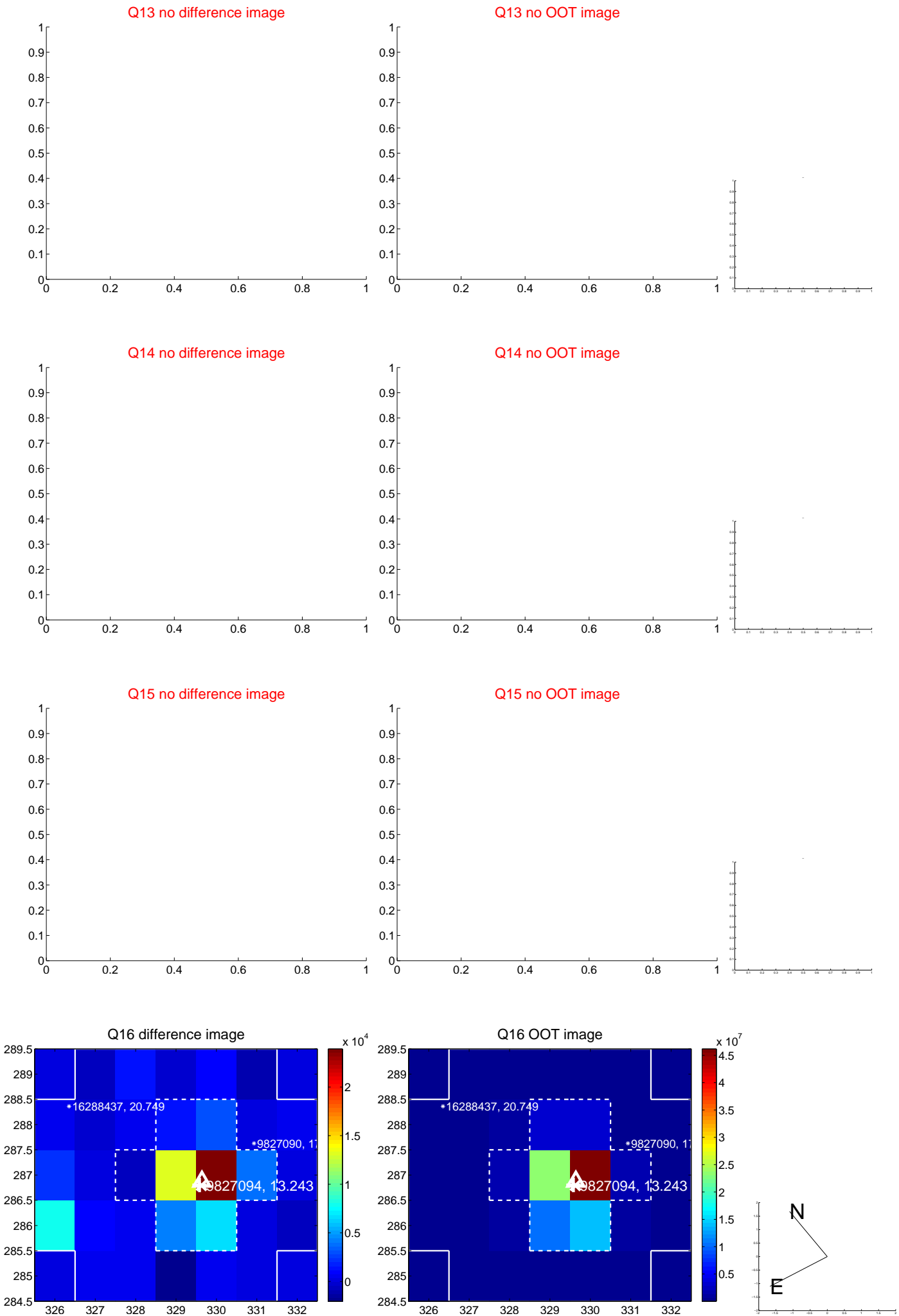
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



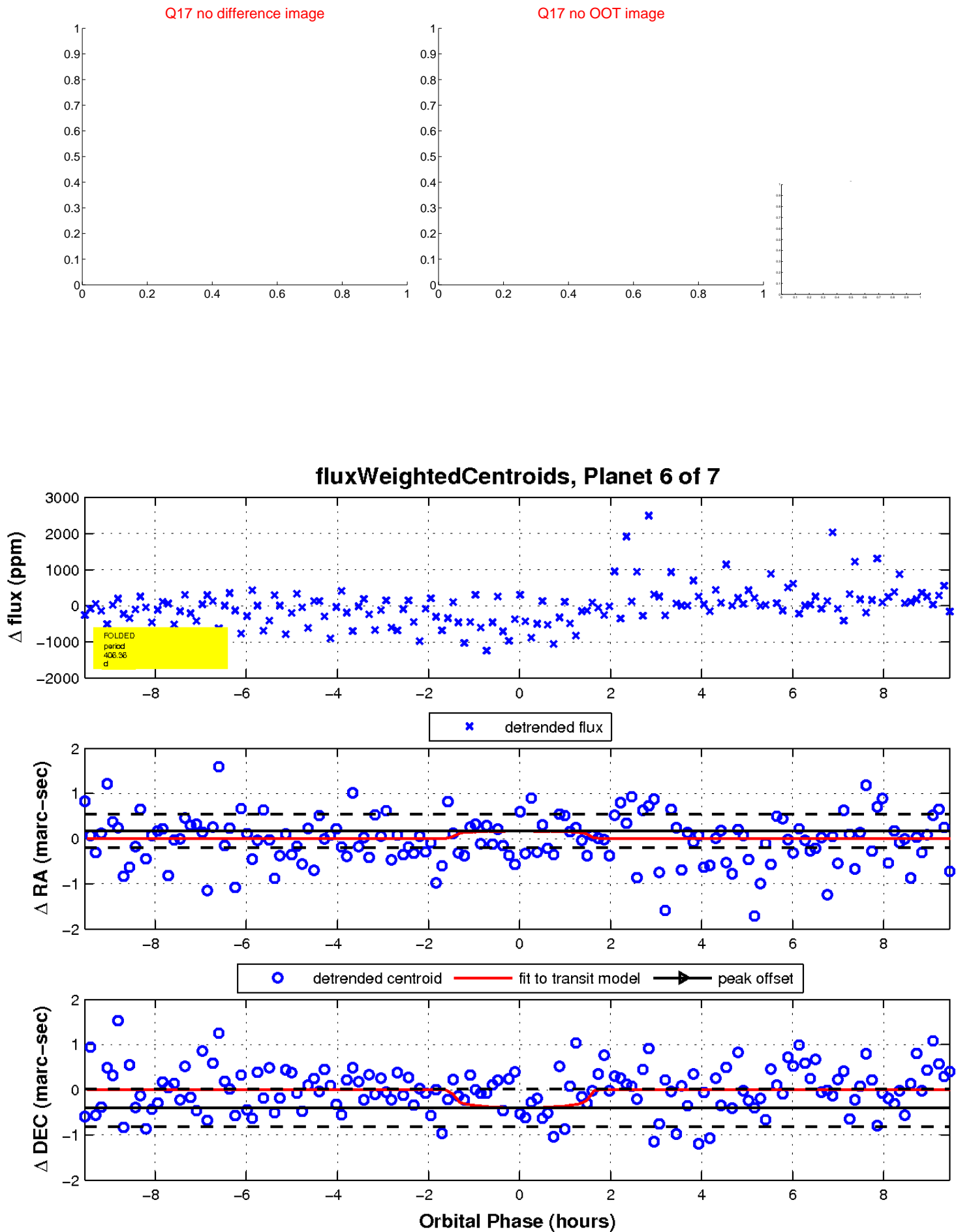
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



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

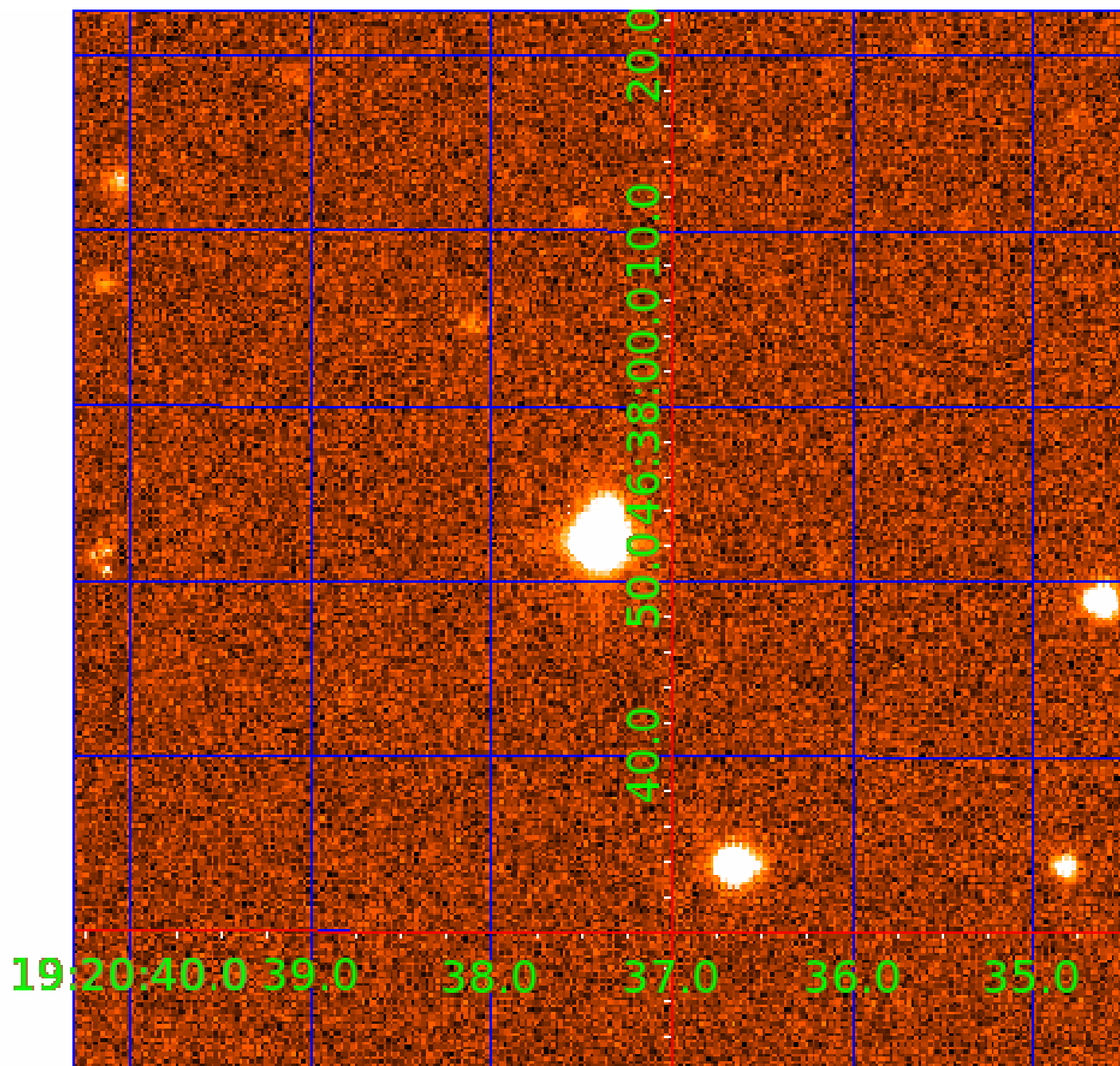


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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Declination





# KIC 009827094

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009827094-01	OBS	No	218.138176	285.922591	604.4	2.950	15.0	7.6	1.09	5790	2.81	2.69
009827094-02	OBS	No	465.230842	241.636705	611.3	2.558	15.8	6.9	1.09	5790	2.98	0.98
009827094-05	OBS	No	668.673525	193.262405	929.6	6.521	15.0	9.8	1.09	5790	3.95	0.60
009827094-06	OBS	No	406.356904	281.910599	560.7	3.183	11.1	6.4	1.09	5790	2.81	1.17
009827094-07	OBS	8186.01	241.899294	248.697460	300.8	7.500	10.6	-1.0	1.09	5790	1.88	2.34

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009827094-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—CENT_FEW_DIFFS
009827094-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009827094-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
009827094-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—CENT_FEW_DIFFS
009827094-07	OBS	FP	0.00	1	0	1	0	INCONSISTENT_TRANS—CENT_NOFITS—HALO_GHOST

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

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

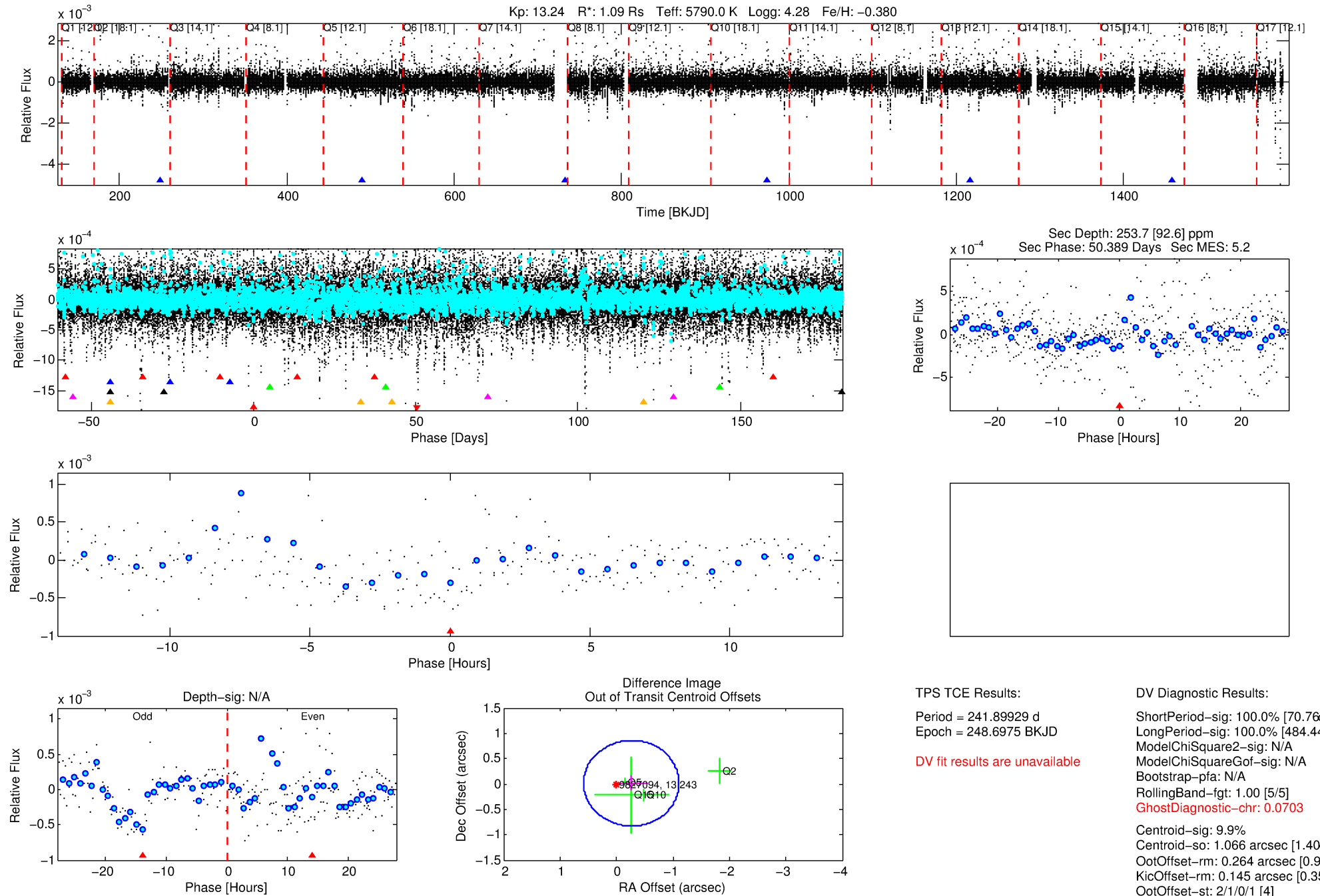
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 009827094-07

No Significant Match Found

# DV One-Page Summary

KIC: 9827094 Candidate: 7 of 7 Period: 241.899 d



## TPS TCE Results:

Period = 241.89929 d  
Epoch = 248.6975 BKJD

DV fit results are unavailable

## DV Diagnostic Results:

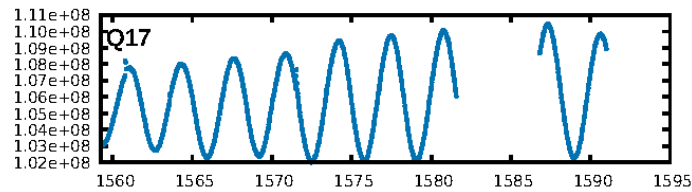
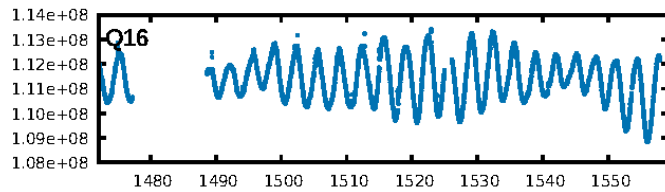
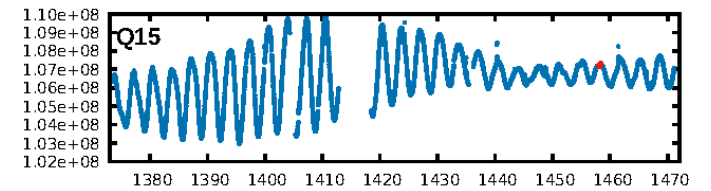
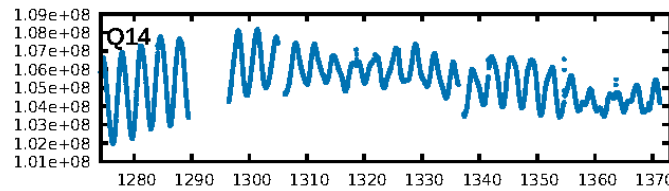
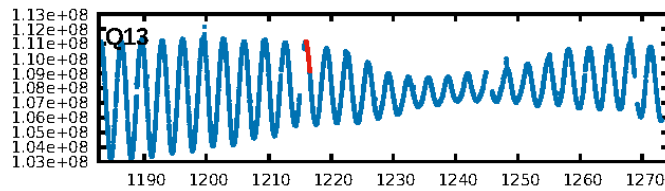
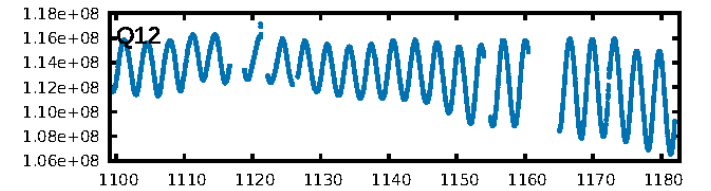
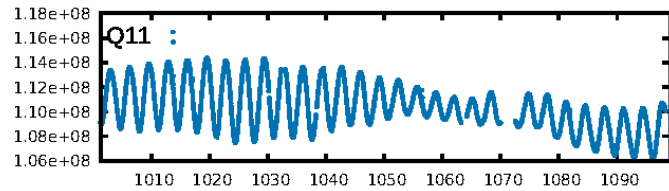
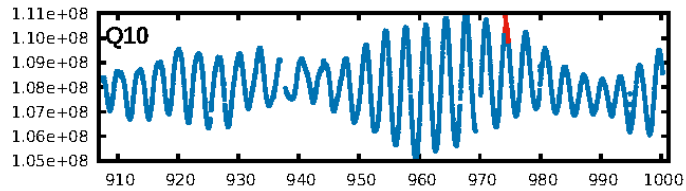
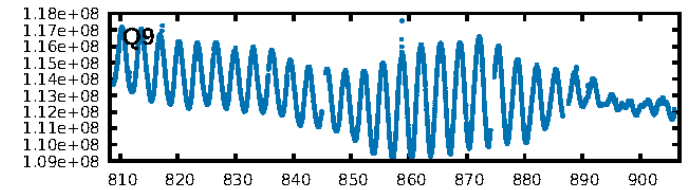
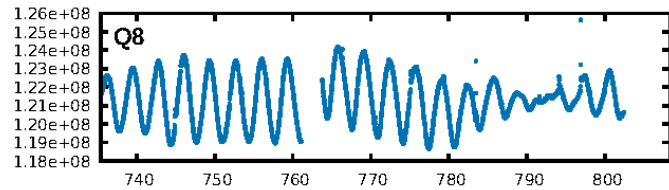
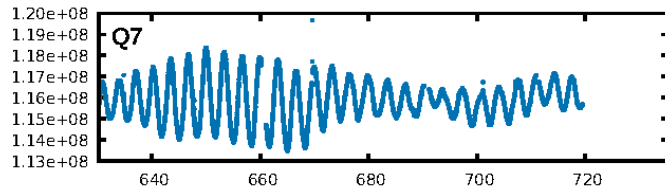
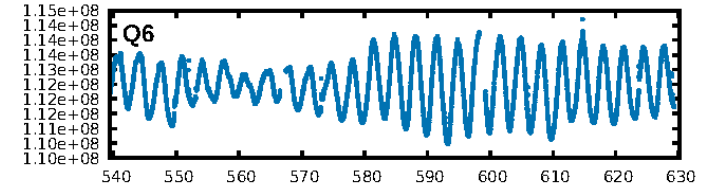
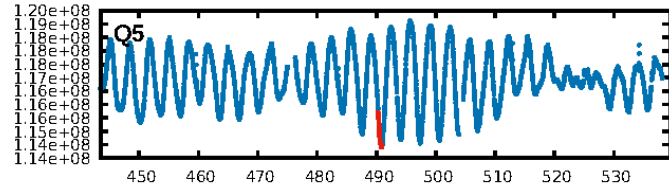
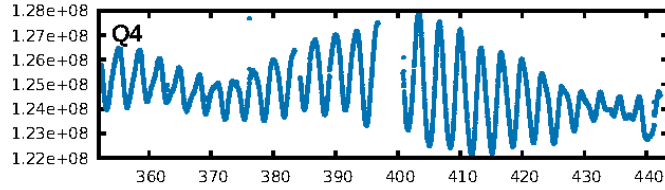
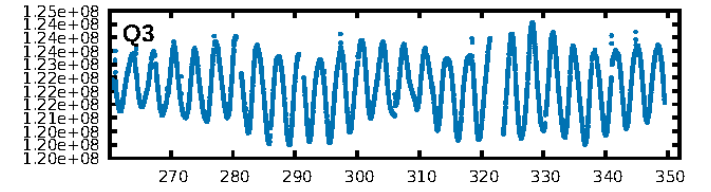
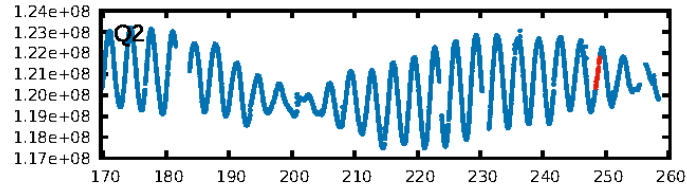
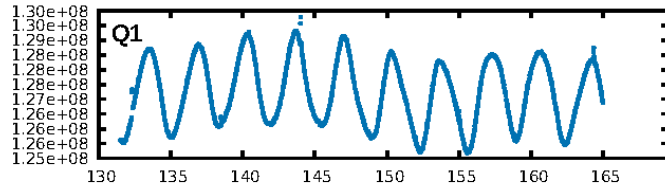
ShortPeriod-sig: 100.0% [70.76 $\sigma$ ]  
LongPeriod-sig: 100.0% [484.44 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [5/5]  
GhostDiagnostic-chr: 0.0703

Centroid-sig: 9.9%  
Centroid-so: 1.066 arcsec [1.40 $\sigma$ ]  
OotOffset-rm: 0.264 arcsec [0.94 $\sigma$ ]  
KicOffset-rm: 0.145 arcsec [0.35 $\sigma$ ]  
OotOffset-st: 2/1/0/1 [4]  
KicOffset-st: 2/1/0/1 [4]  
DiffImageQuality-fgm: 0.50 [2/4]  
DiffImageOverlap-fno: 1.00 [4/4]

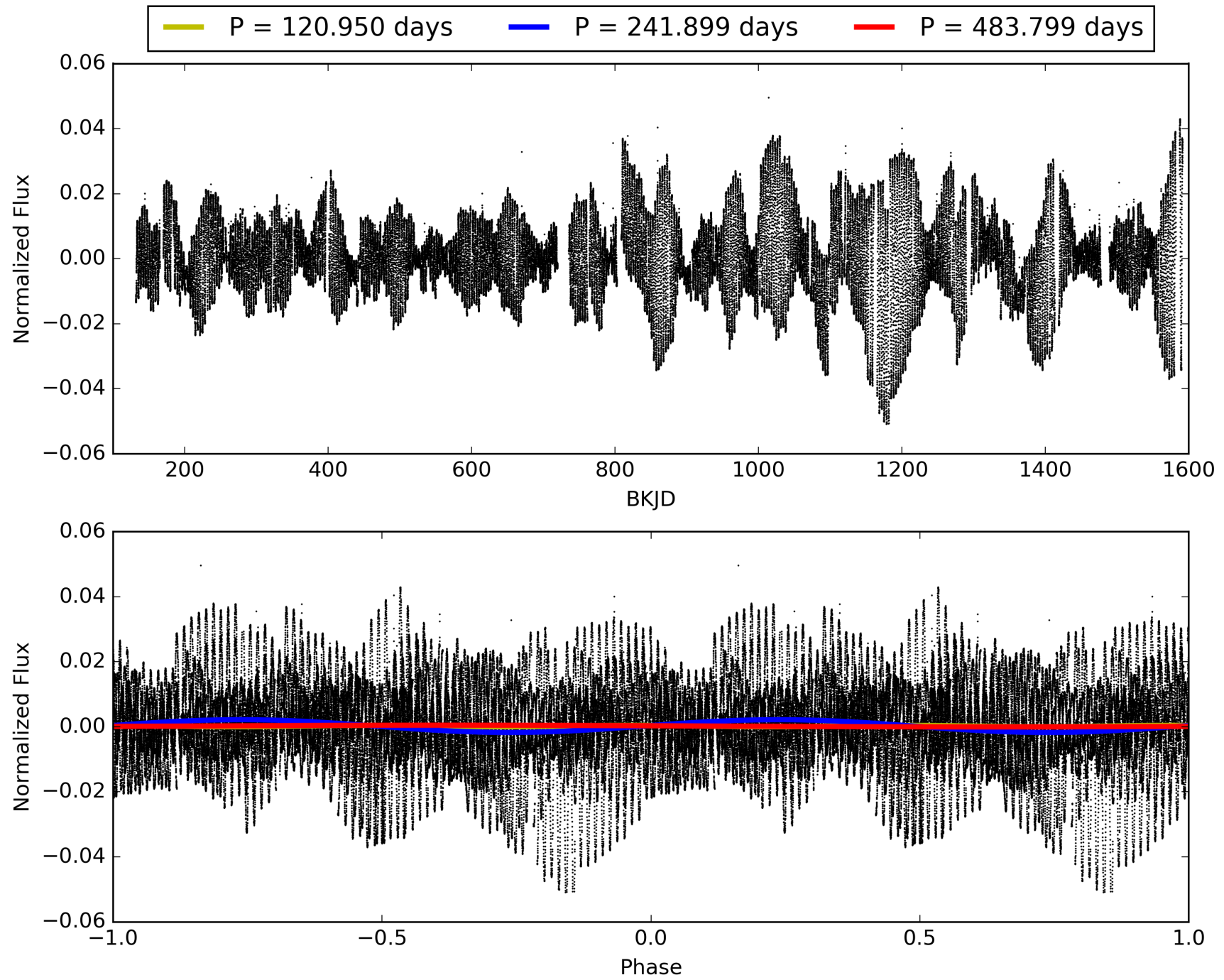
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:16:55 Z

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

# TCE 009827094-07, PDC Light Curves

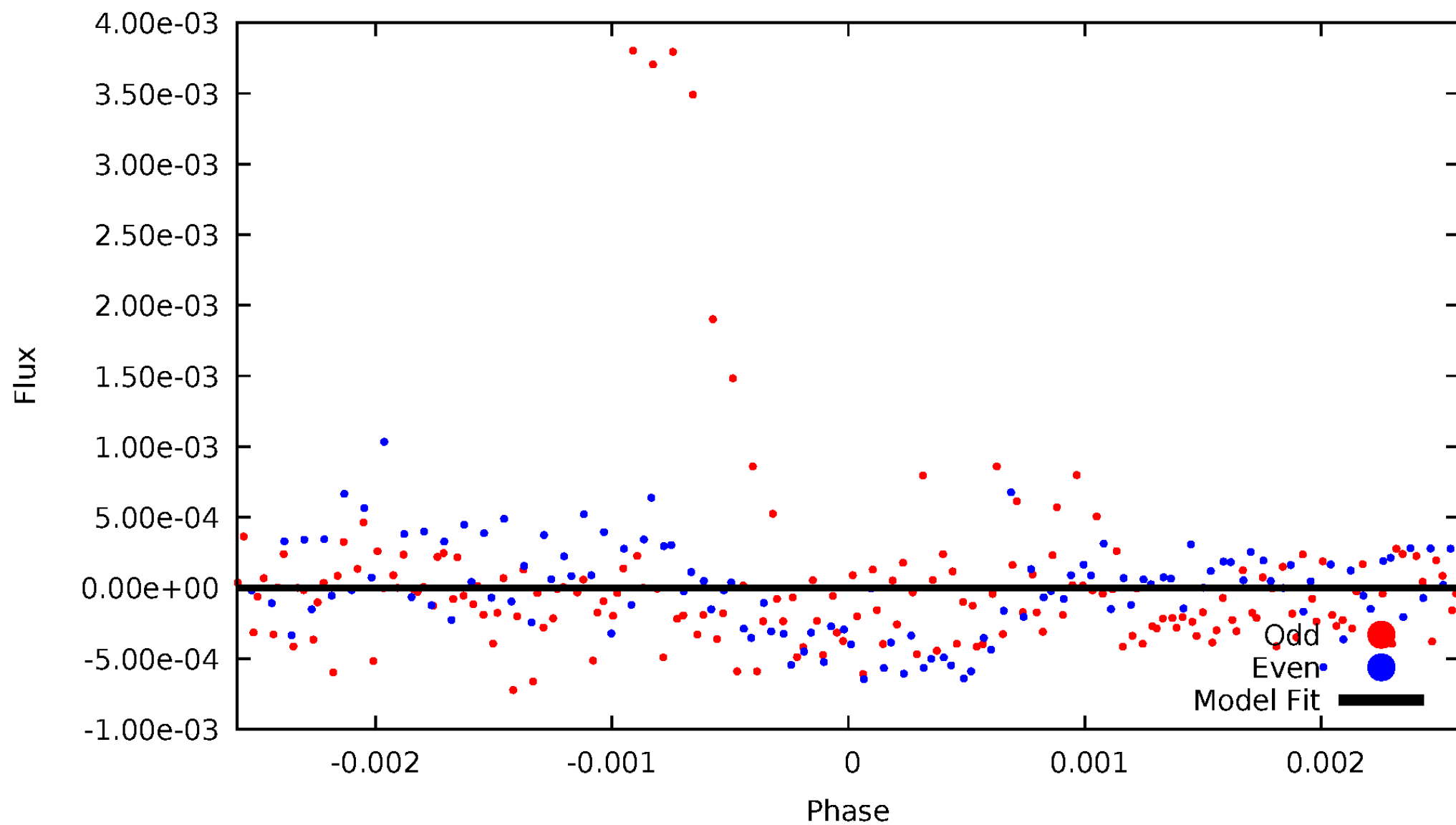


TCE 009827094-07



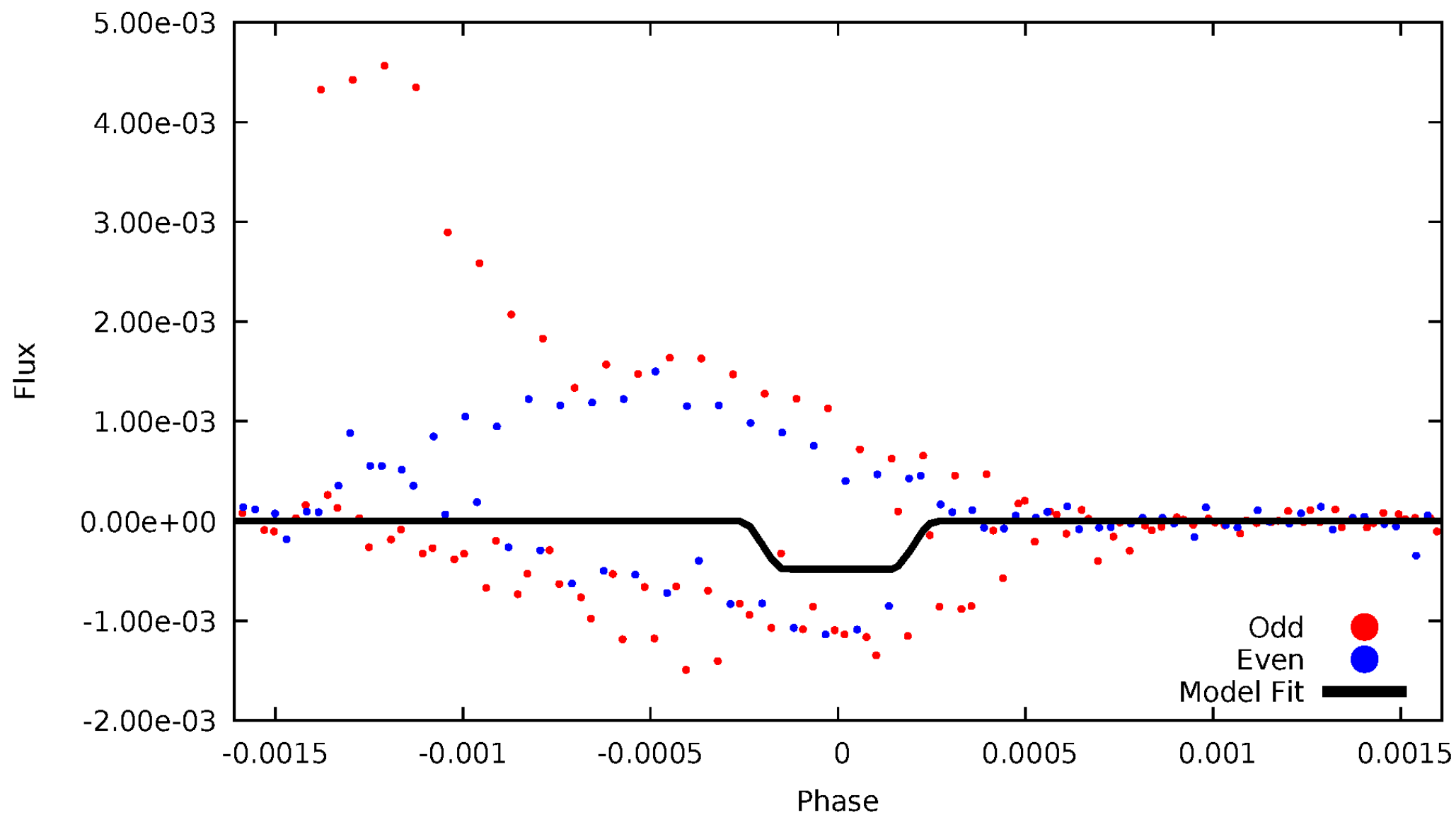
# DV Odd/Even

TCE 009827094-07



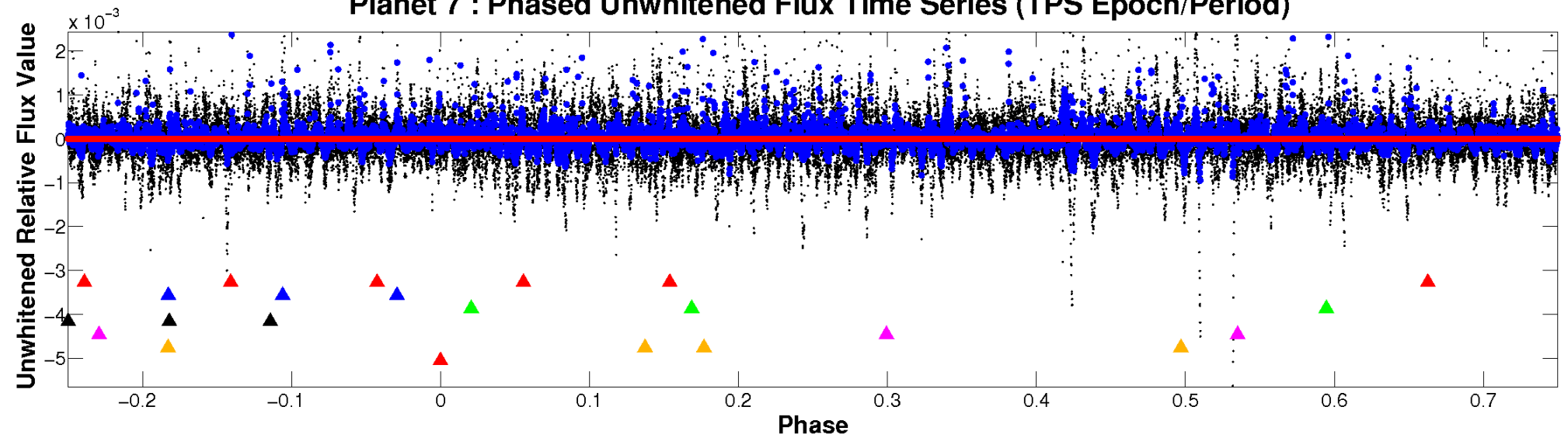
# ALT Odd/Even

TCE 009827094-07



# Non-Whitened Vs. Whitened Light Curve

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

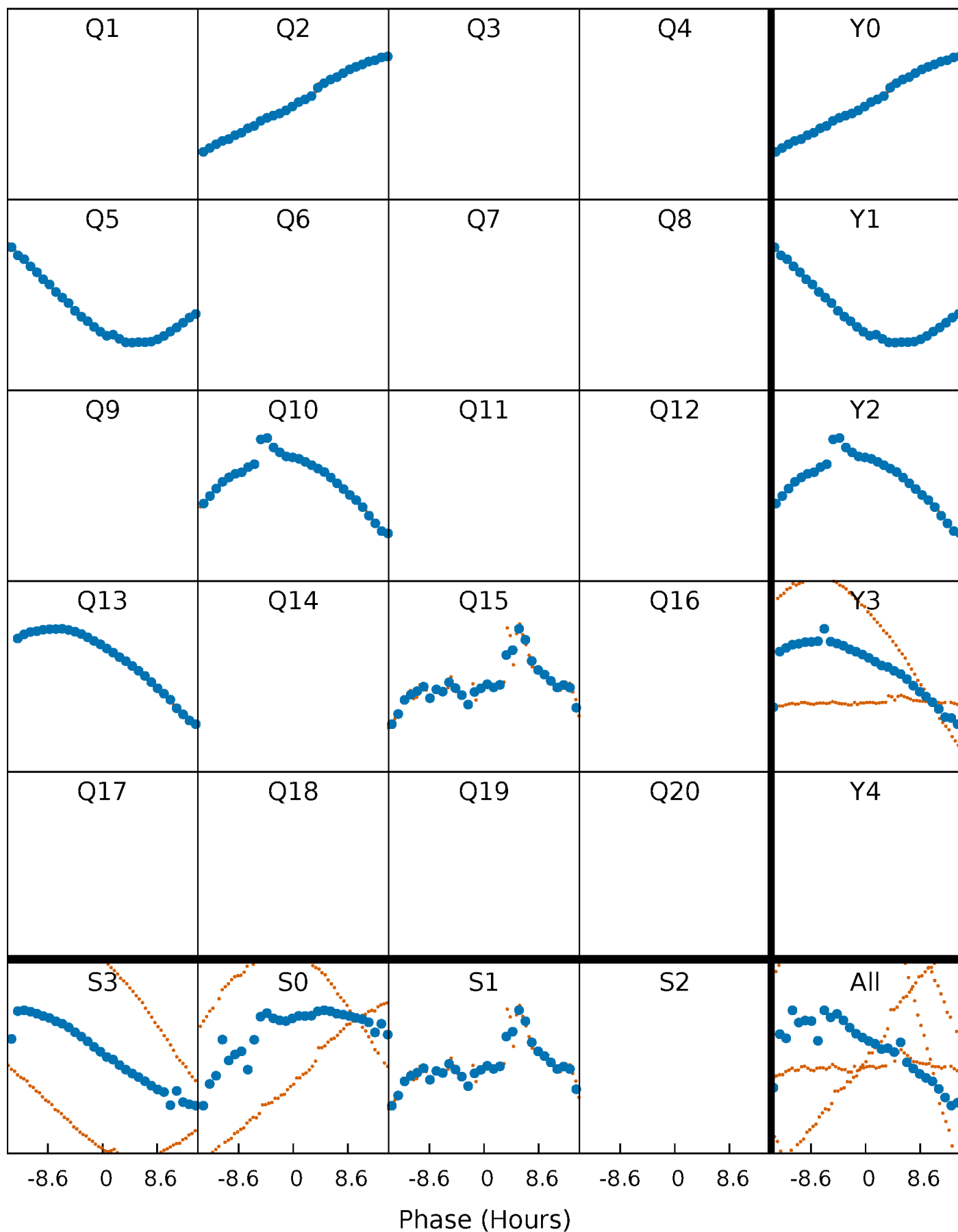


**Planet 7 : Phased Whitened Flux Time Series (TPS Epoch/Period)**



# PDC Quarter-Phased Transit Curves

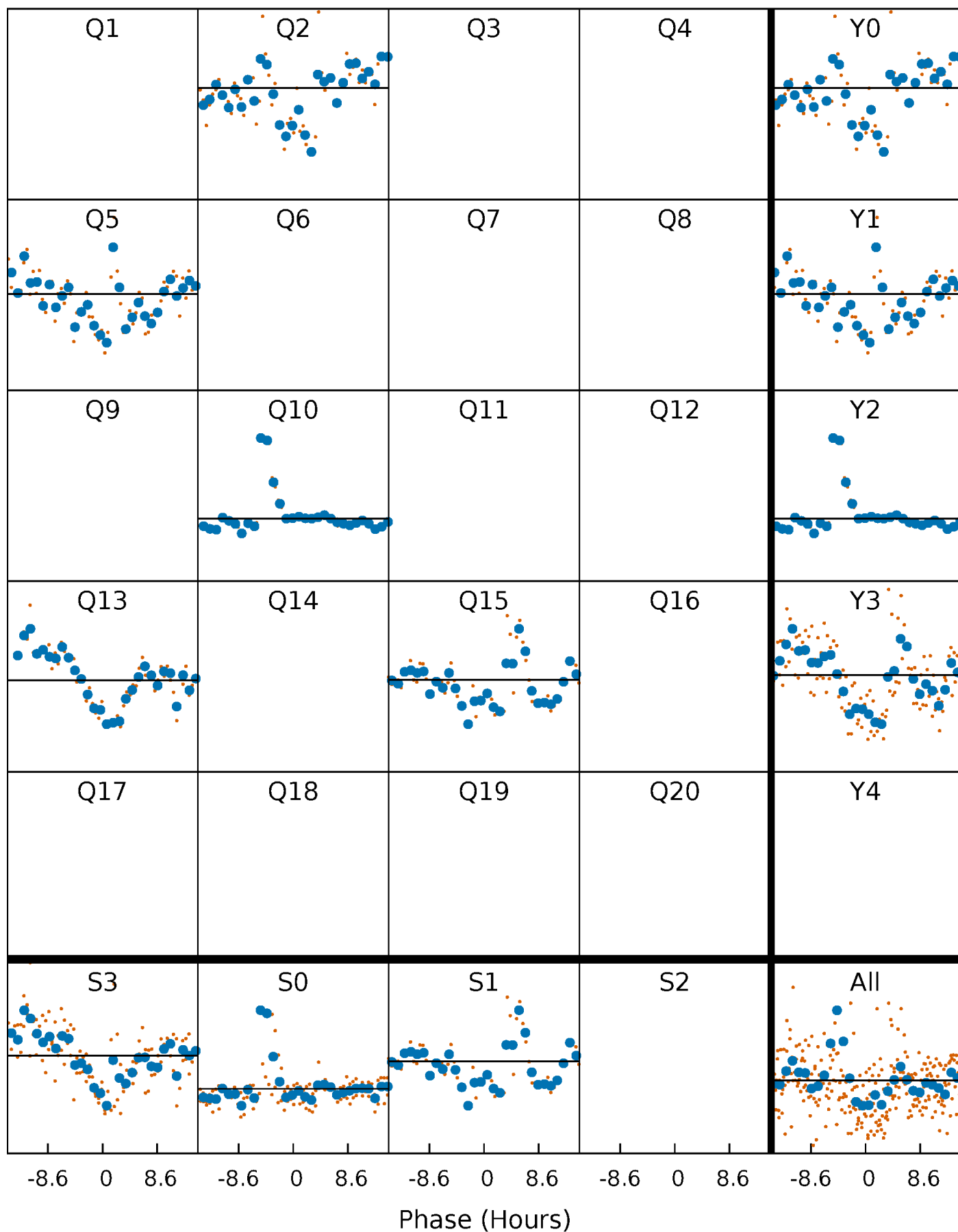
TCE 009827094-07     $P=241.899294$  Days     $T_0=248.697460$  (BKJD)





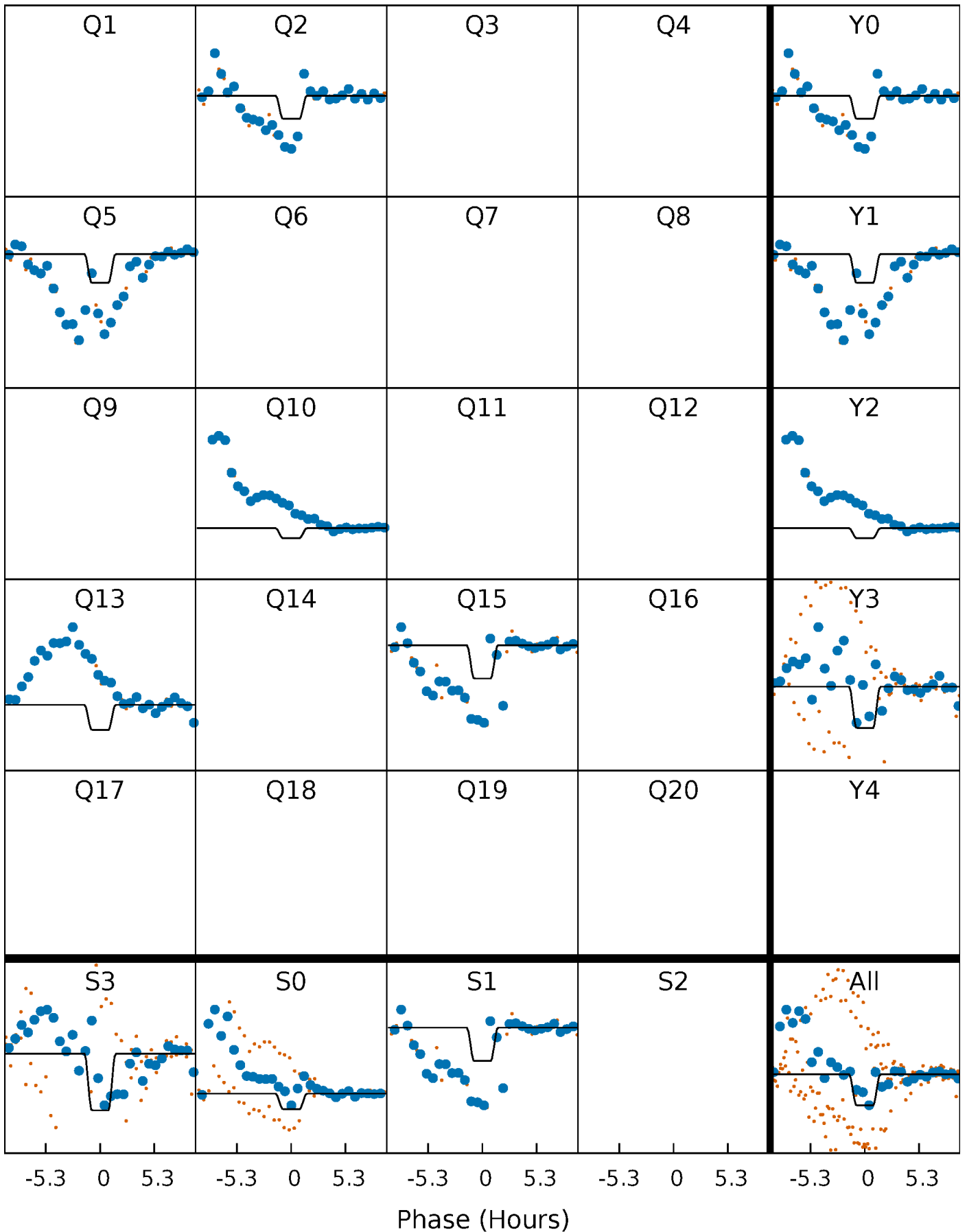
# DV Quarter-Phased Transit Curves

TCE 009827094-07     $P=241.899294$  Days     $T_0=248.697460$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

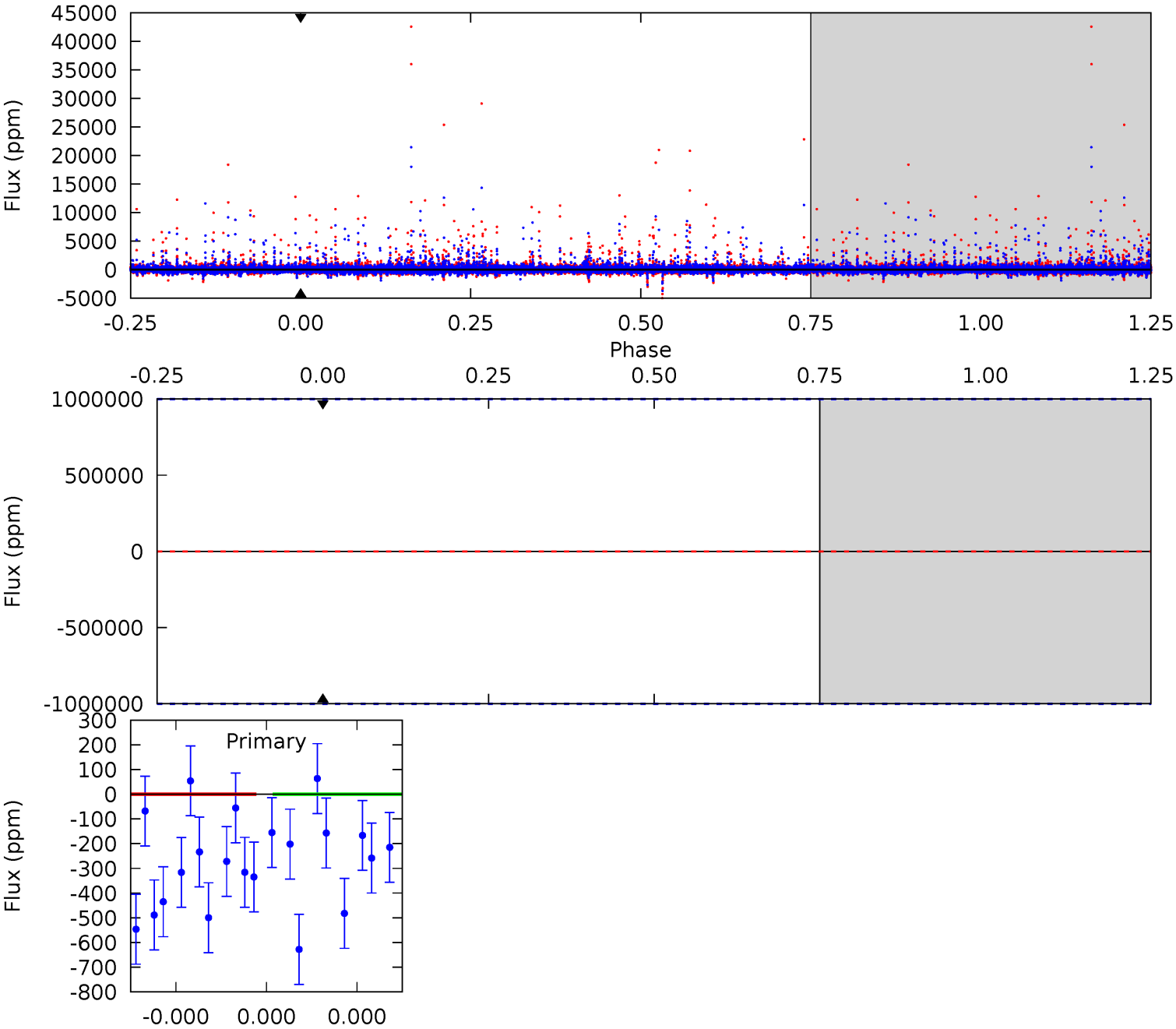
TCE 009827094-07     $P=241.899294$  Days     $T_0=248.810573$  (BKJD)



# DV Model-Shift Uniqueness Test

009827094-07, P = 241.899294 Days, E = 6.798166 Days

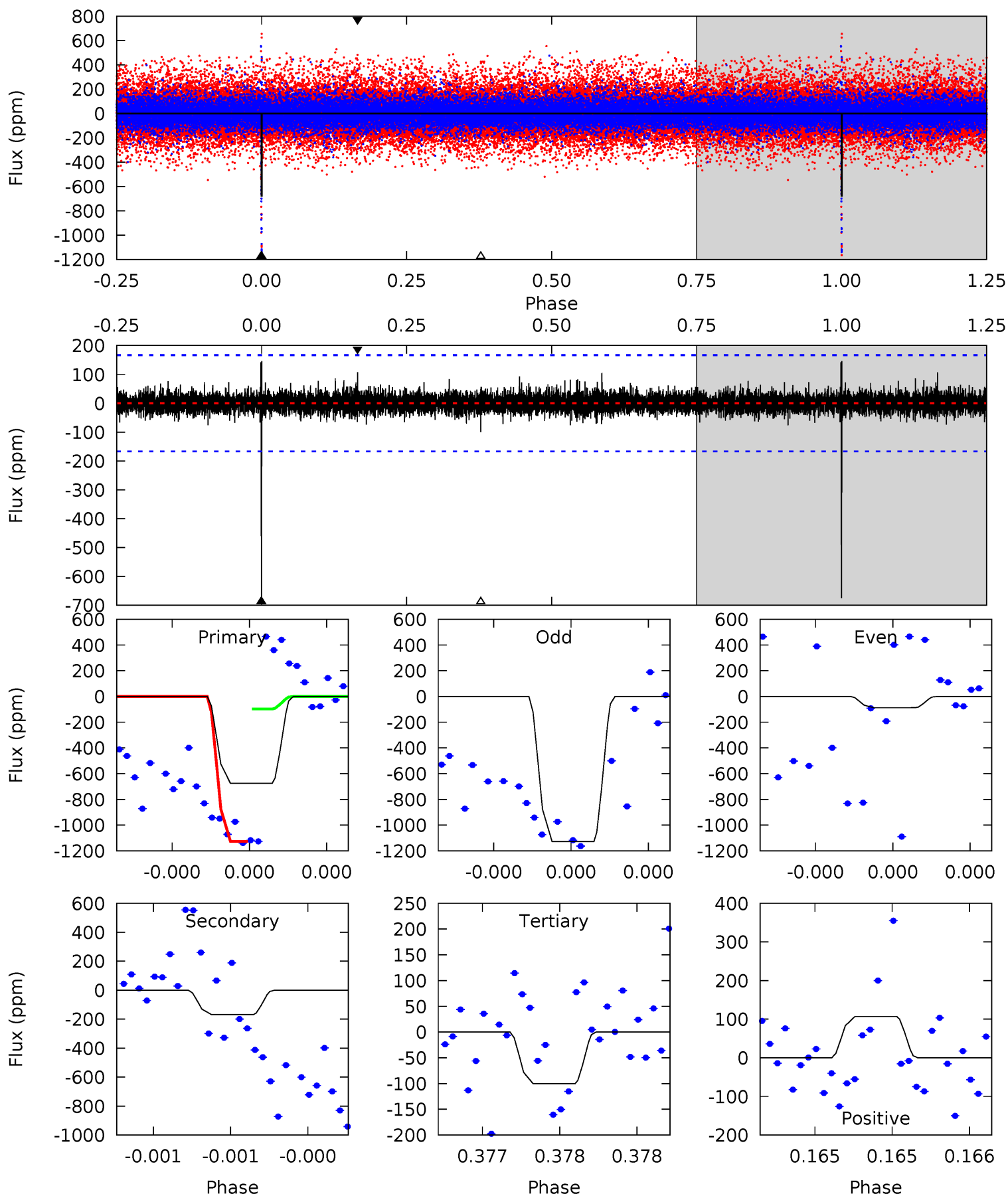
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



# Alt Model-Shift Uniqueness Test

009827094-07, P = 241.899294 Days, E = 6.911279 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
22.6	5.64	3.36	3.58	5.58	3.49	0.66	19.3	19.0	2.28	2.06	18.6	0.28	0.18	16.7



### Stellar Parameters For KIC 009827094

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5790^{+155}_{-155}$	$4.283^{+0.242}_{-0.198}$	$-0.380^{+0.300}_{-0.250}$	$1.088^{+0.318}_{-0.260}$	$0.829^{+0.123}_{-0.061}$	$0.907^{+1.211}_{-0.454}$
	+3%/-3%	+6%/-5%	+79%/-66%	+29%/-24%	+15%/-7%	+133%/-50%
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 009827094-07 / KOI 8186.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$0 \pm 1000000$	$8.37^{+9.26}_{-5.74}$	$439^{+38}_{-35}$	$-4594^{+27181}_{-17951}$	$-6139.216^{+782966.283}_{-723487.696}$
Alt.	$-168 \pm 30$	$9.44^{+9.02}_{-6.55}$	$439^{+37}_{-36}$	$2998^{+1462}_{-492}$	$549^{+5485}_{-415}$

$T_{\text{max}}$  = Theoretical Maximum Planetary Temperature  
 $T_{\text{obs}}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )  
 $A_{\text{obs}}$  = Observed Albedo (Assuming  $T=0$ )

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

## DV Centroid Data

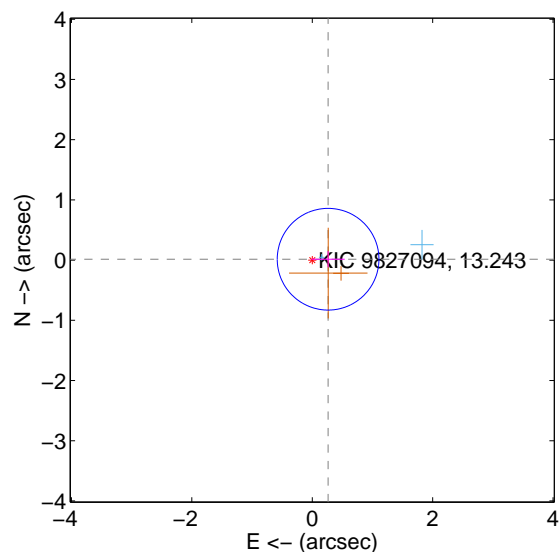
Supplemental centroid analysis for 009827094-07. Kepler magnitude: 13.24. Transit SNR -1.00

There are 2 quarters with good PRF difference image offsets

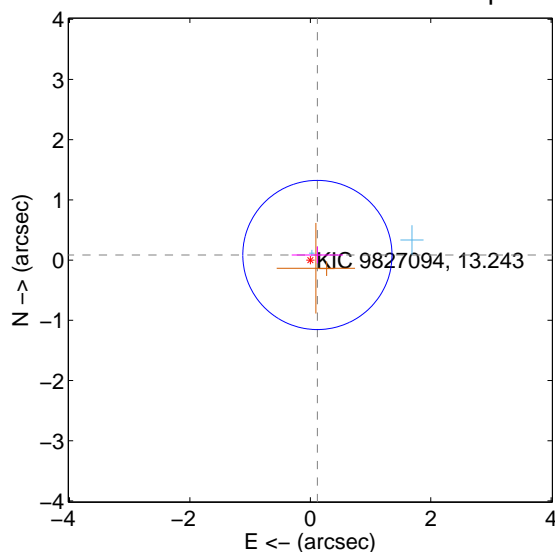
The direct PRF centroid is offset from the target star catalog position by about 0.19 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.264 \pm 0.282$	0.94	$-0.263 \pm 0.277$	$0.015 \pm 0.135$
PRF-fit source offset from KIC position	$0.145 \pm 0.413$	0.35	$-0.118 \pm 0.426$	$0.085 \pm 0.140$
photometric centroid source offset	$1.07 \pm 0.76$	1.40	$-0.59 \pm 0.84$	$0.88 \pm 0.72$

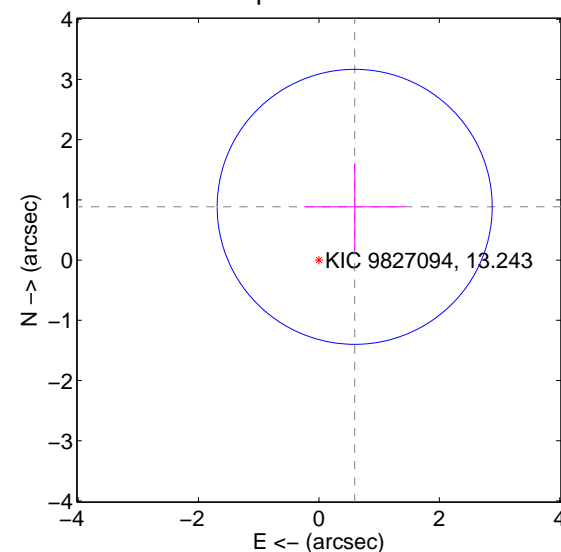
offset from difference PRF-fit to OOT PRF-fit



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.

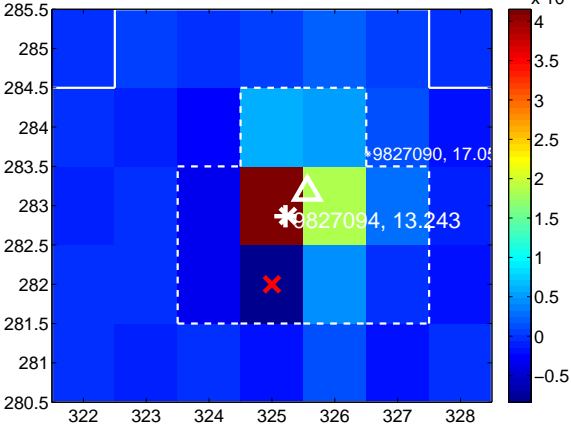
Q1 no difference image



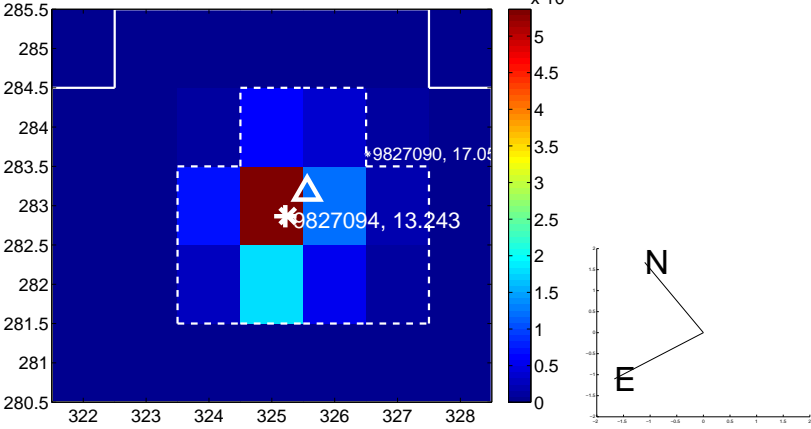
Q1 no OOT image



Q2 difference image



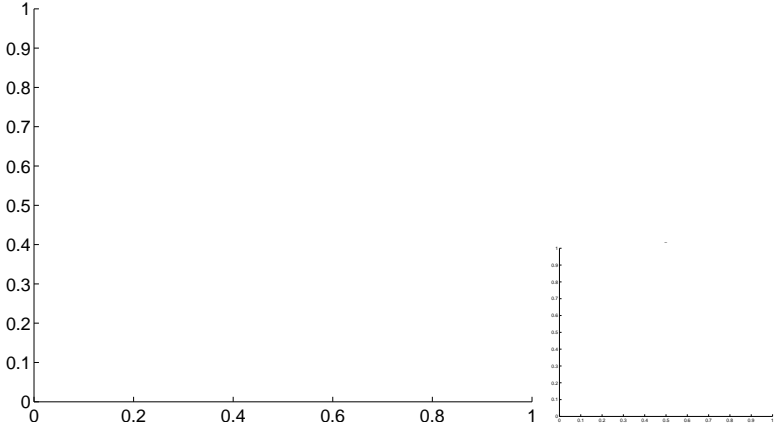
Q2 OOT image



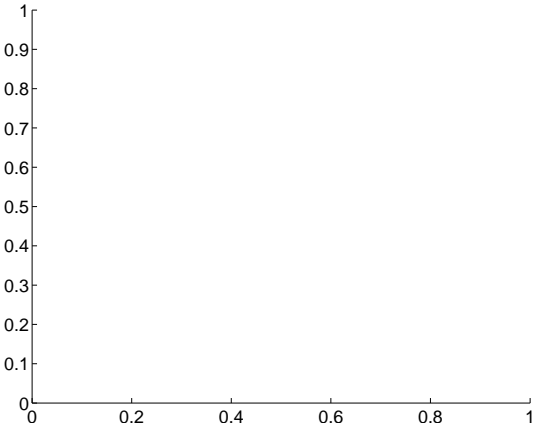
Q3 no difference image



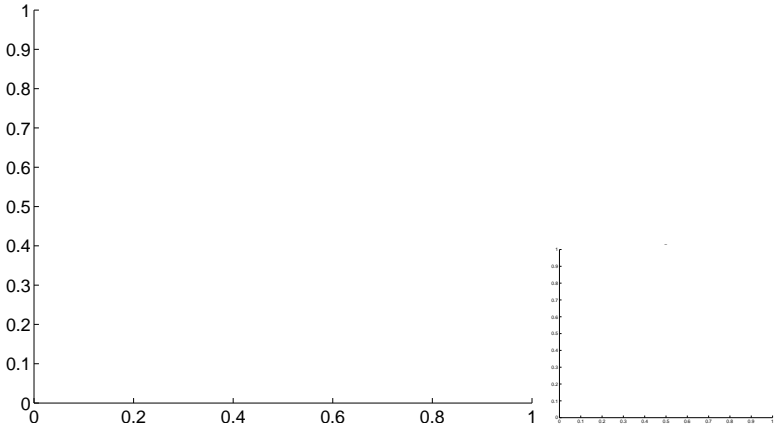
Q3 no OOT image



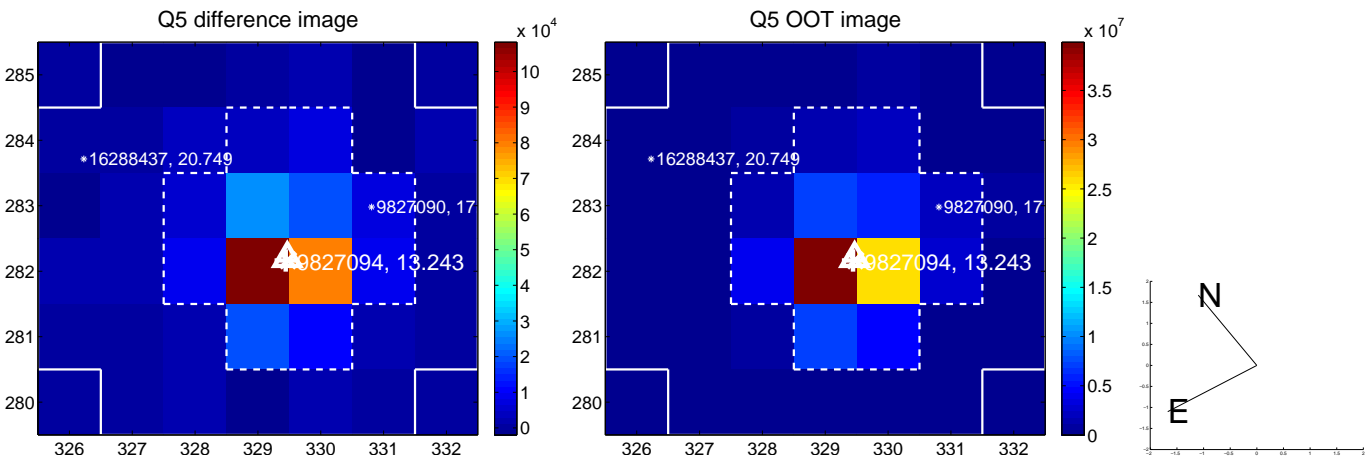
Q4 no difference image



Q4 no OOT image

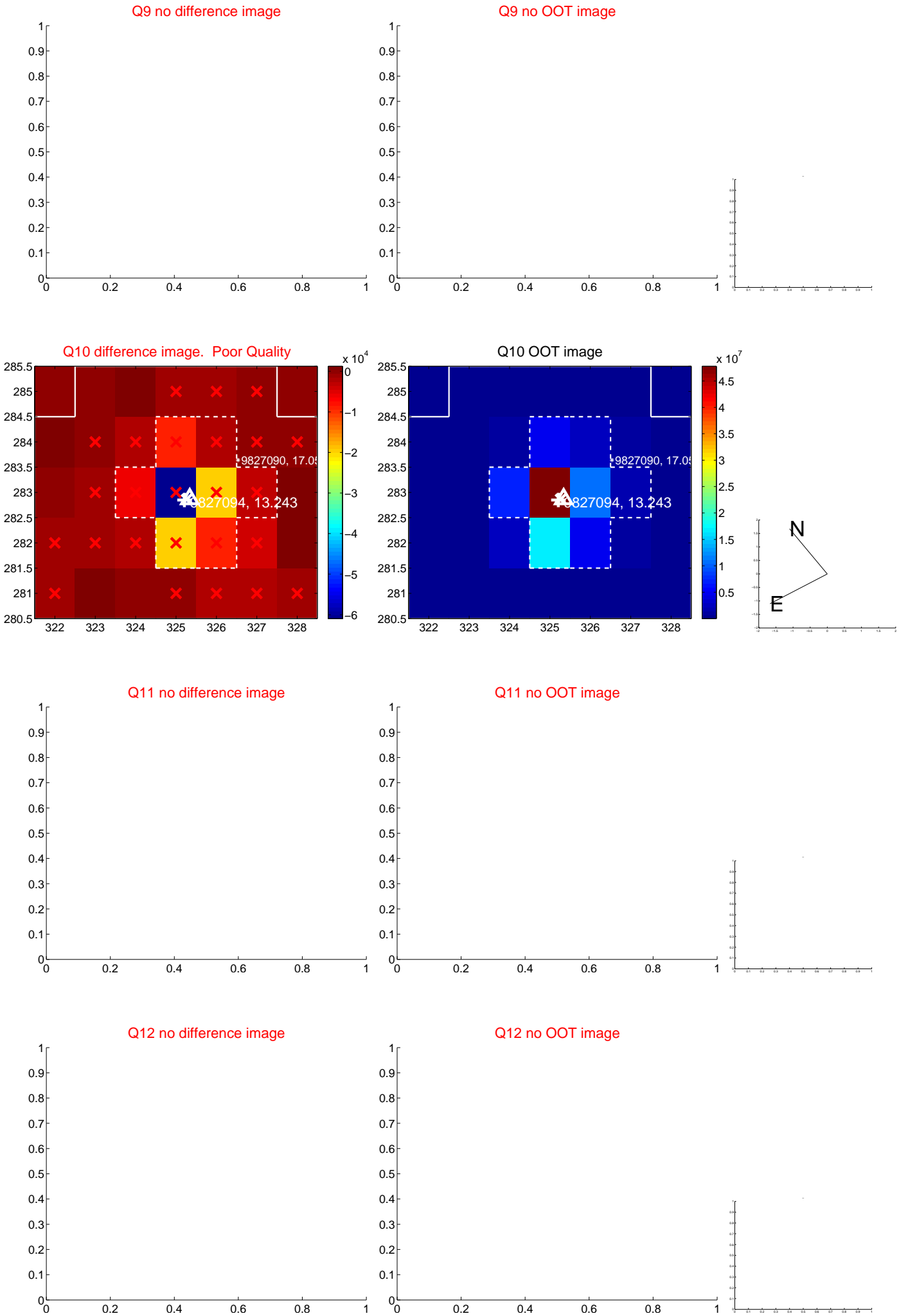


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

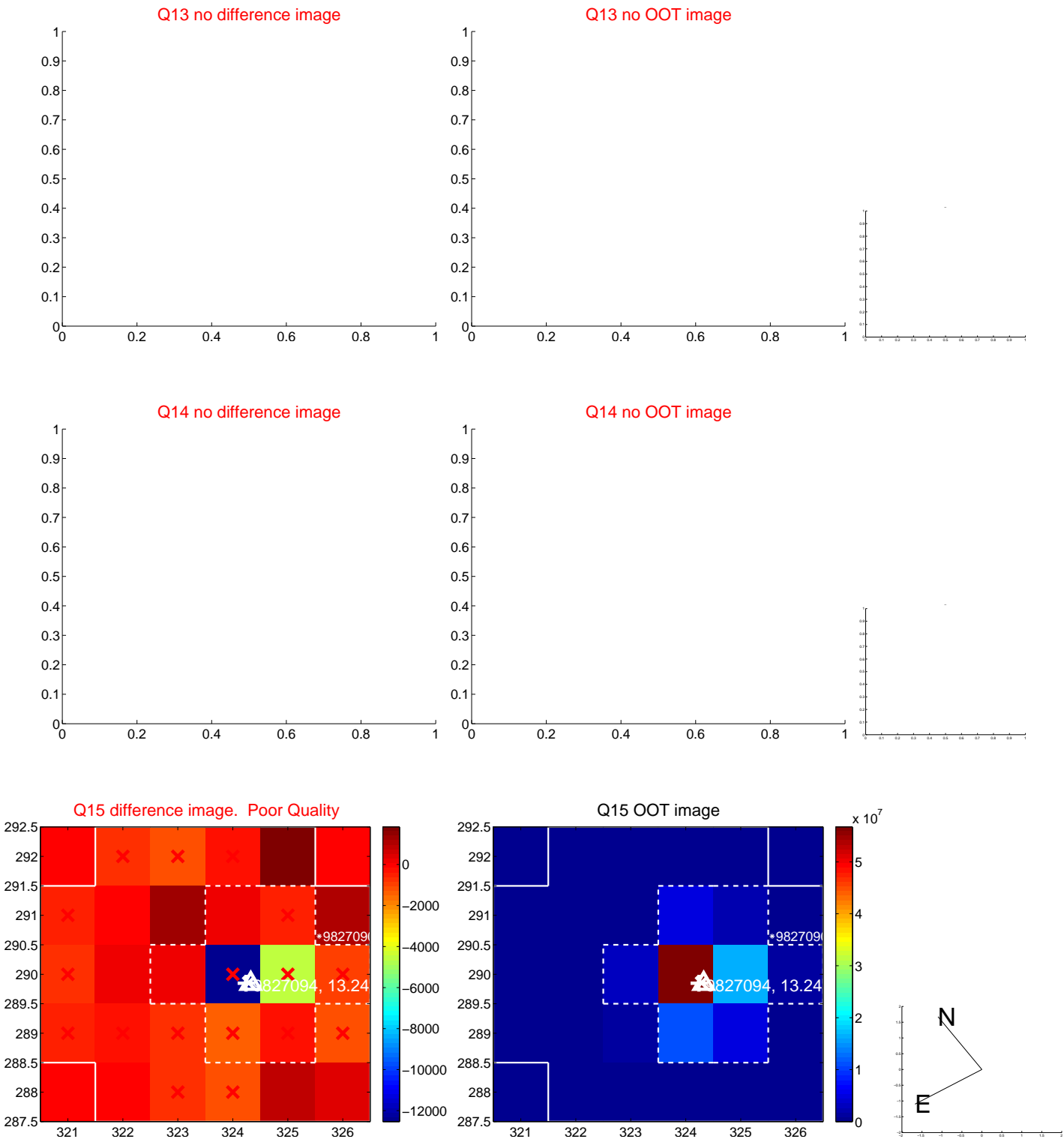




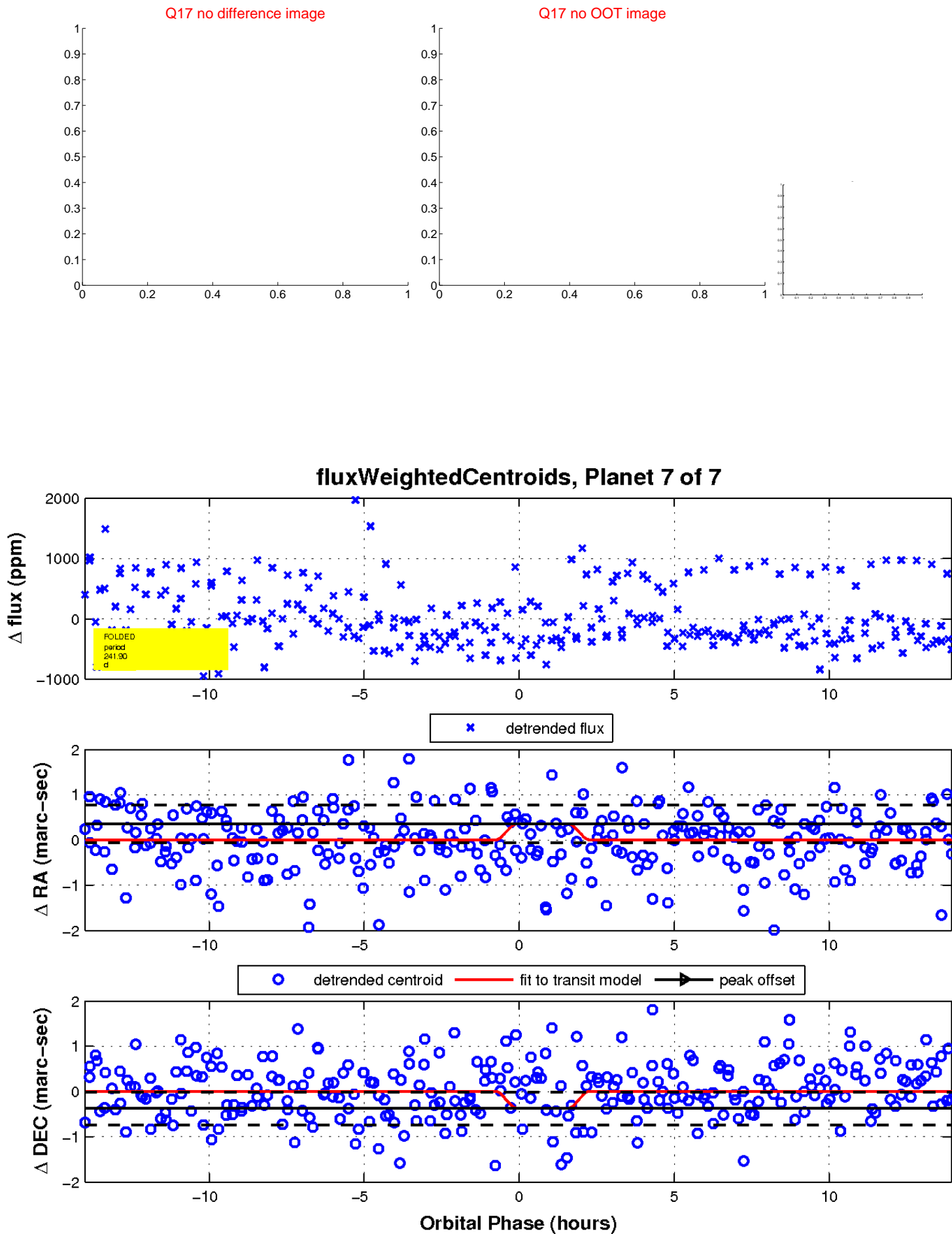
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

