

# KIC 002696938

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
002696938-01	OBS	No	342.957490	318.021165	339.5	10.605	22.8	5.2	1.46	6484	2.92	3.38
002696938-02	OBS	No	417.041578	266.987338	543.7	24.035	12.6	13.1	1.46	6484	6.52	2.61
002696938-03	OBS	No	291.992005	279.284227	619.7	40.497	11.0	12.4	1.46	6484	6.93	4.19
002696938-04	OBS	No	429.742064	244.561690	245.4	19.502	9.6	8.0	1.46	6484	2.43	2.50
002696938-05	OBS	No	316.817135	373.894776	387.4	20.024	8.6	7.9	1.46	6484	3.40	3.76
002696938-06	OBS	No	302.428737	376.582428	291.7	4.961	9.3	7.6	1.46	6484	2.74	4.00

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002696938-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_SATURATED
002696938-02	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
002696938-03	OBS	FP	0.00	1	0	0	0	LPP_DV—INCONSISTENT_TRANS—CENT_SATURATED
002696938-04	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—INCONSISTENT_TRANS—CENT_SATURATED
002696938-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_SATURATED
002696938-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_SATURATED

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

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

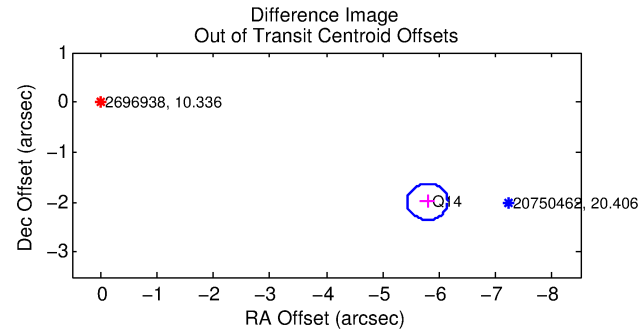
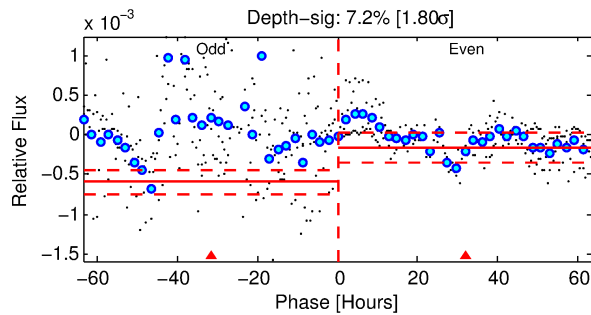
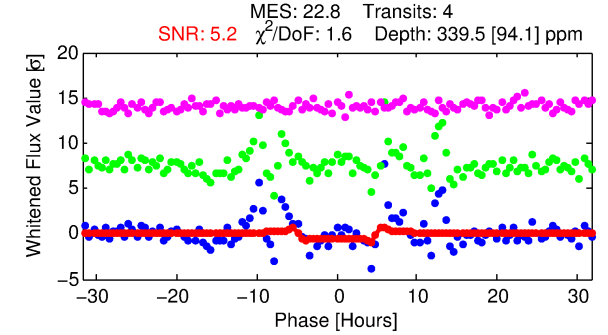
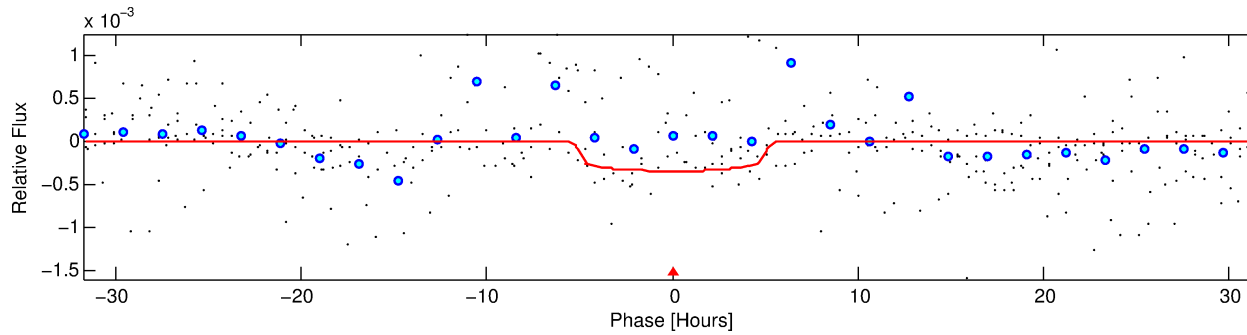
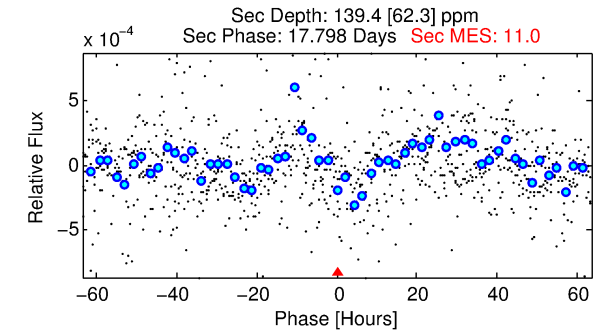
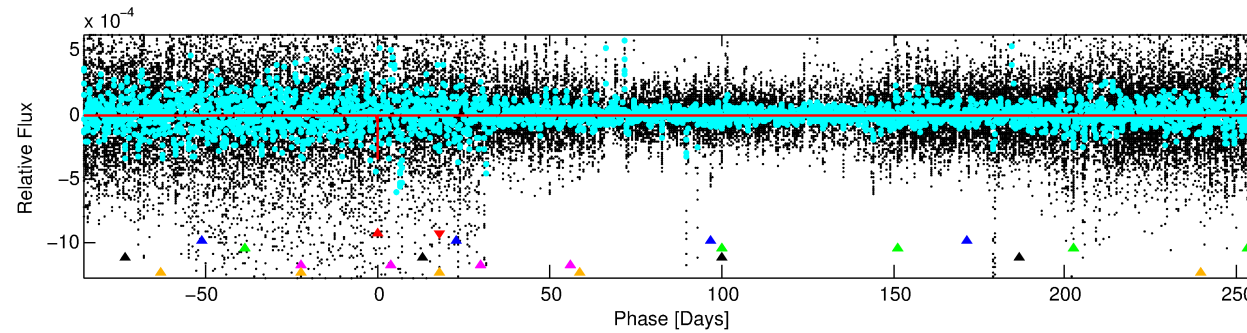
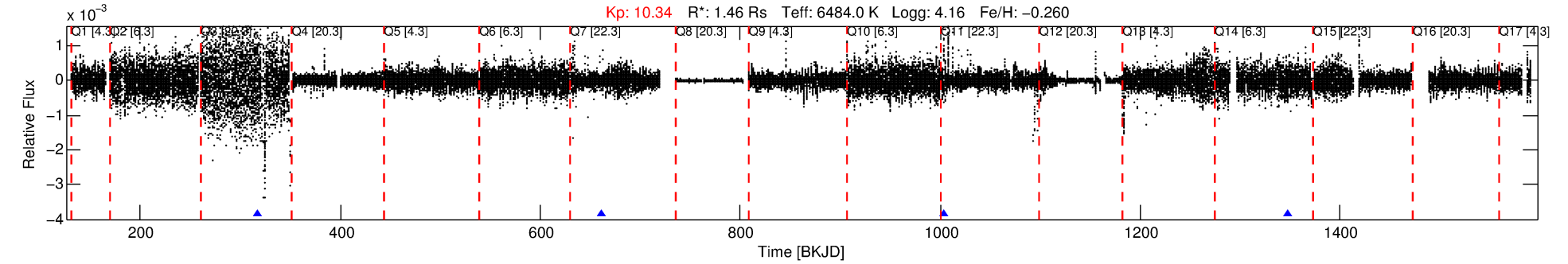
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 002696938-01

No Significant Match Found

# DV One-Page Summary

KIC: 2696938 Candidate: 1 of 6 Period: 342.957 d



## DV Fit Results:

Period = 342.95749 [0.01129] d  
Epoch = 318.0212 [0.0216] BKJD  
 $R_p/R^* = 0.0184$  [0.0137]  
 $a/R^* = 167.98$  [657.76]  
 $b = 0.76$  [2.22]  
 $\text{Seff} = 3.38$  [1.32]  
 $T_{\text{eq}} = 346$  [34] K  
 $R_p = 2.92$  [2.34]  $R_e$   
 $a = 0.9961$  [0.2502] AU  
 $A_g = 8935.16$  [14328.91] [0.62σ]  
 $T_{\text{eff}} = 5199$  [2032] K [2.39σ]

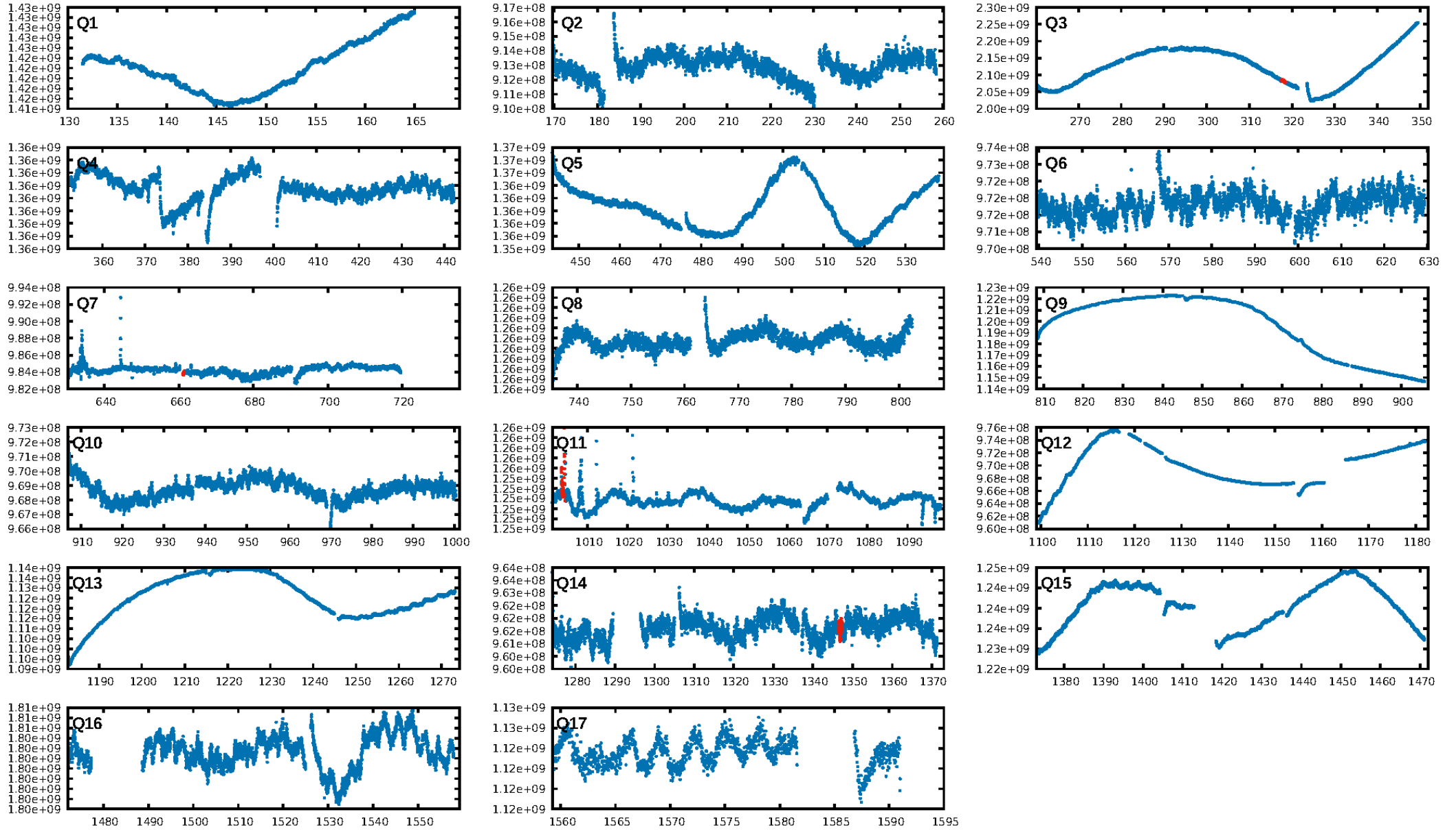
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [27.69σ]  
LongPeriod-sig: 100.0% [67.68σ]  
ModelChiSquare2-sig: 3.1%  
ModelChiSquareGof-sig: 40.6%  
Bootstrap-pfa: 1.25e-20  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: N/A  
Centroid-sig: 69.4%  
Centroid-so: 1.620 arcsec [2.34σ]  
**OotOffset-rm: 6.122 arcsec [50.61σ]**  
**KicOffset-rm: 5.722 arcsec [47.97σ]**  
OotOffset-st: 1/0/0/0 [1]  
KicOffset-st: 1/0/0/0 [1]  
DiffImageQuality-fgm: 0.00 [0/1]  
DiffImageOverlap-fno: 1.00 [2/2]

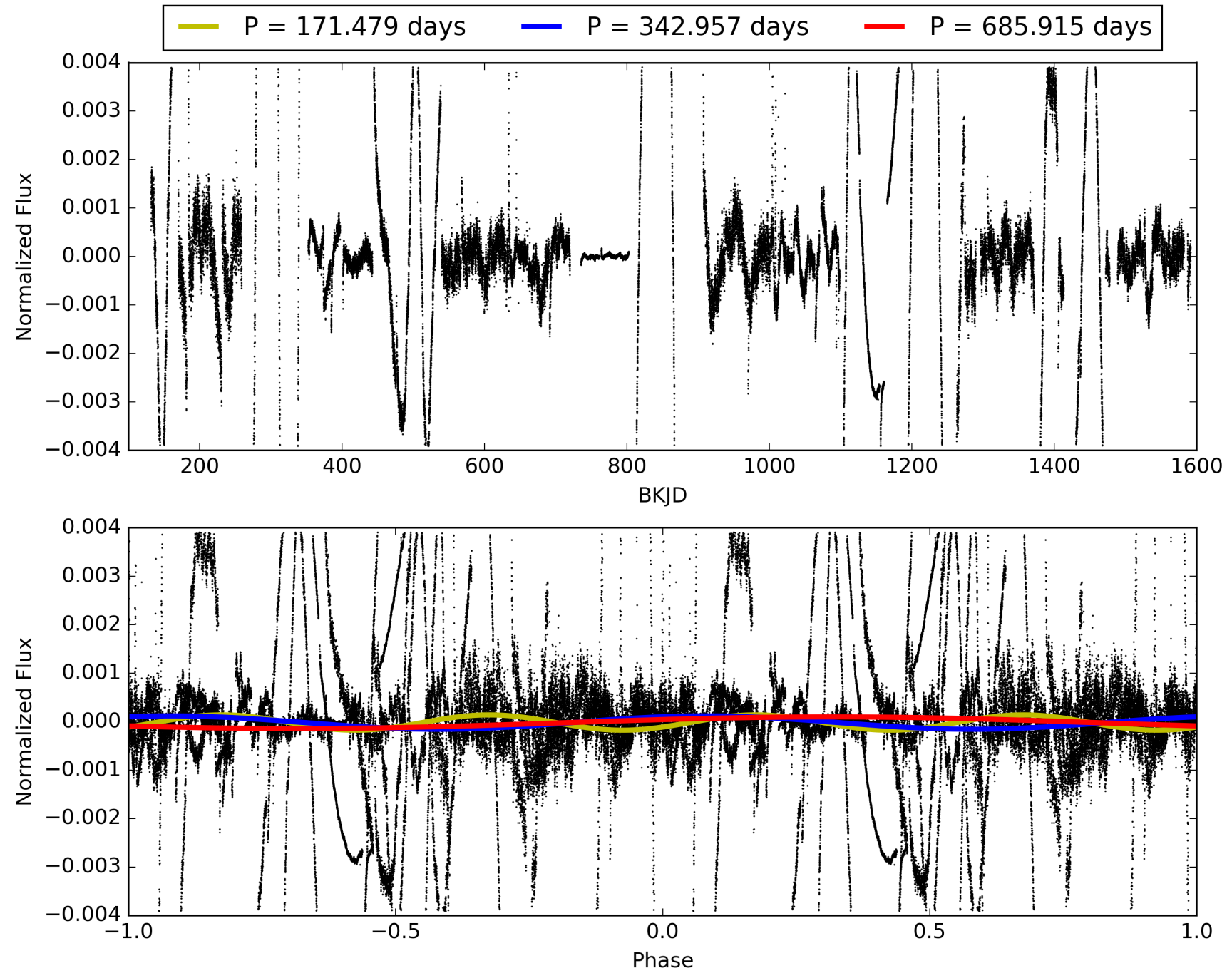
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 22:08:46 Z

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

# TCE 002696938-01, PDC Light Curves



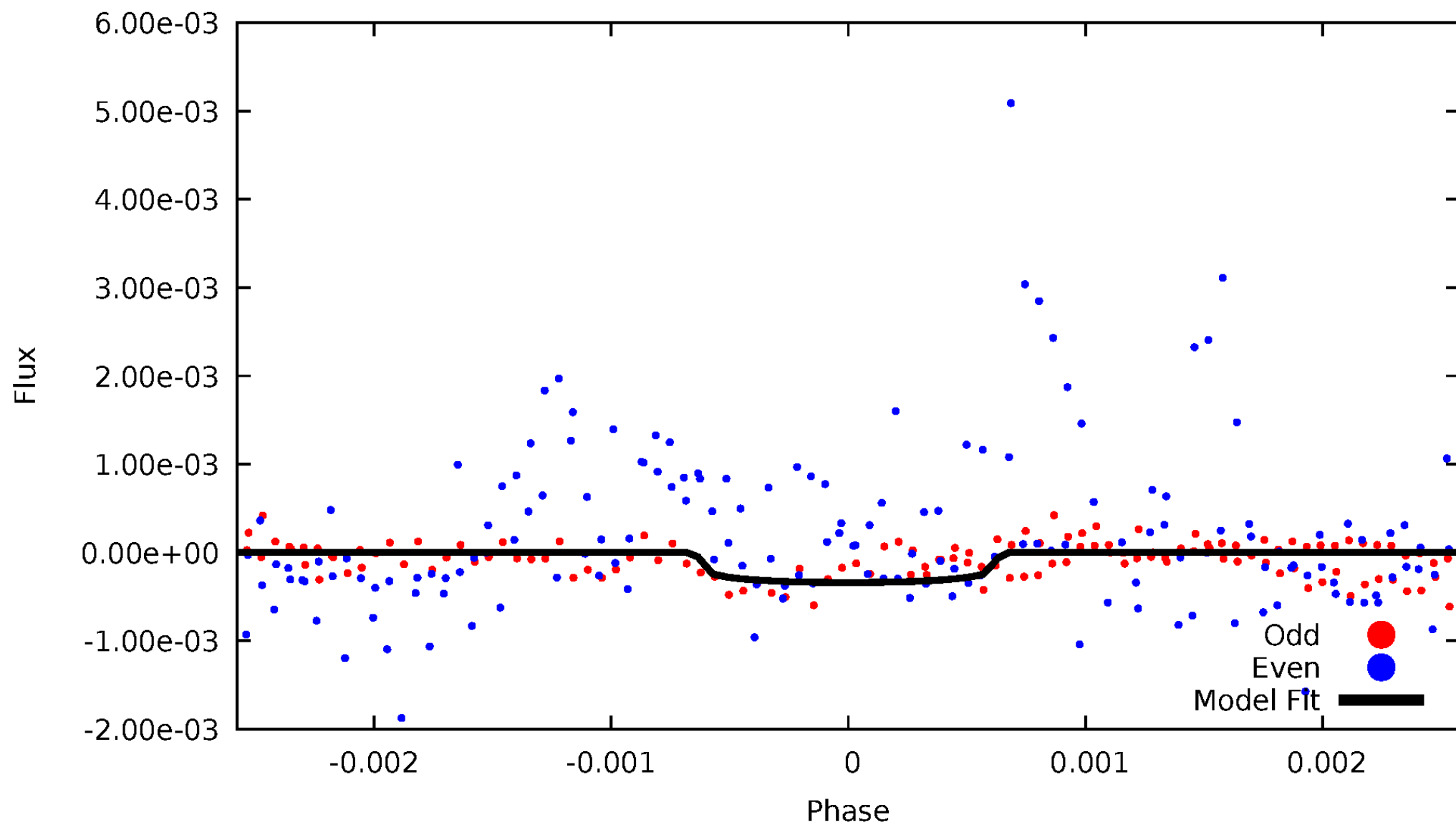
TCE 002696938-01





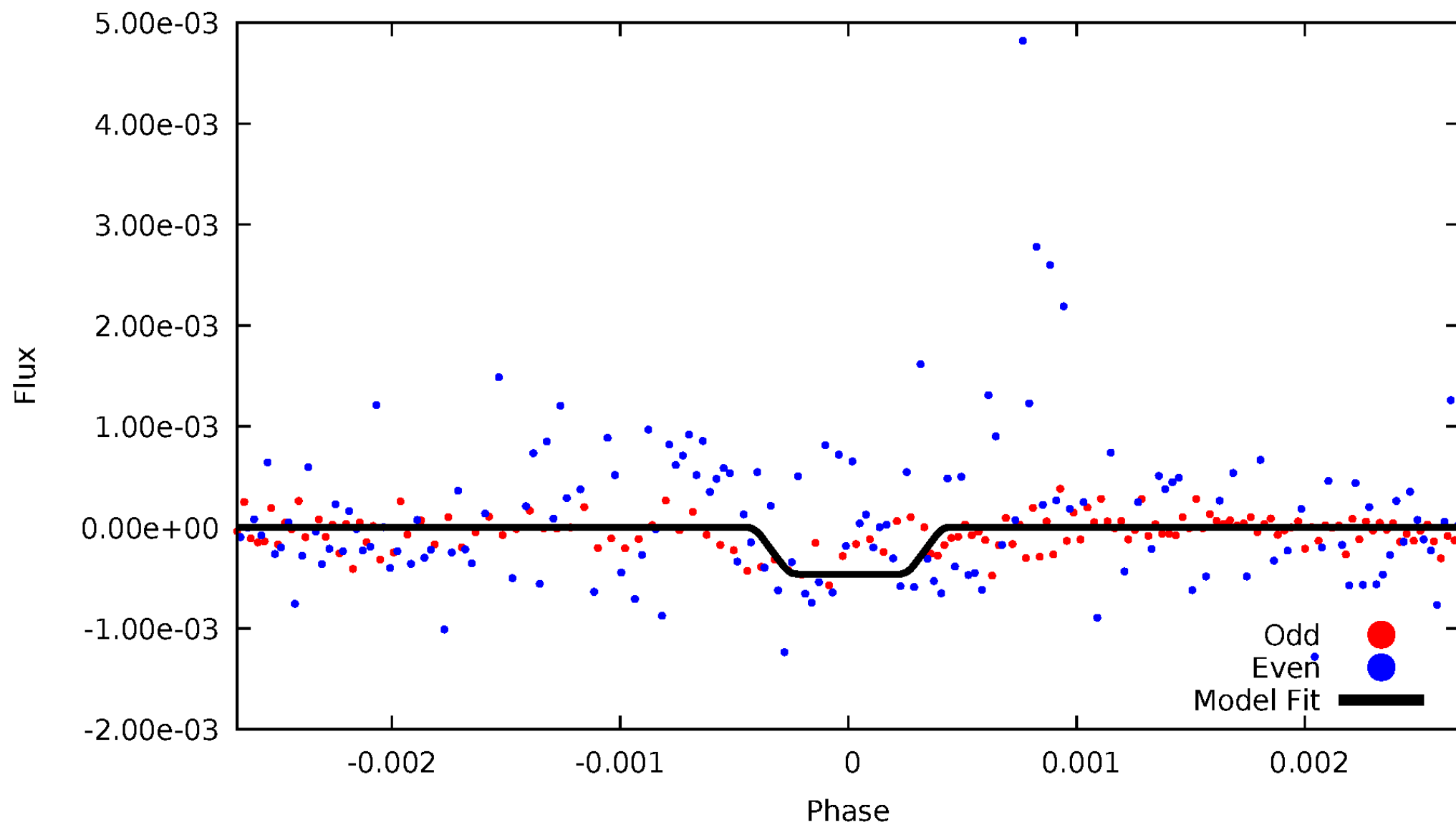
# DV Odd/Even

TCE 002696938-01



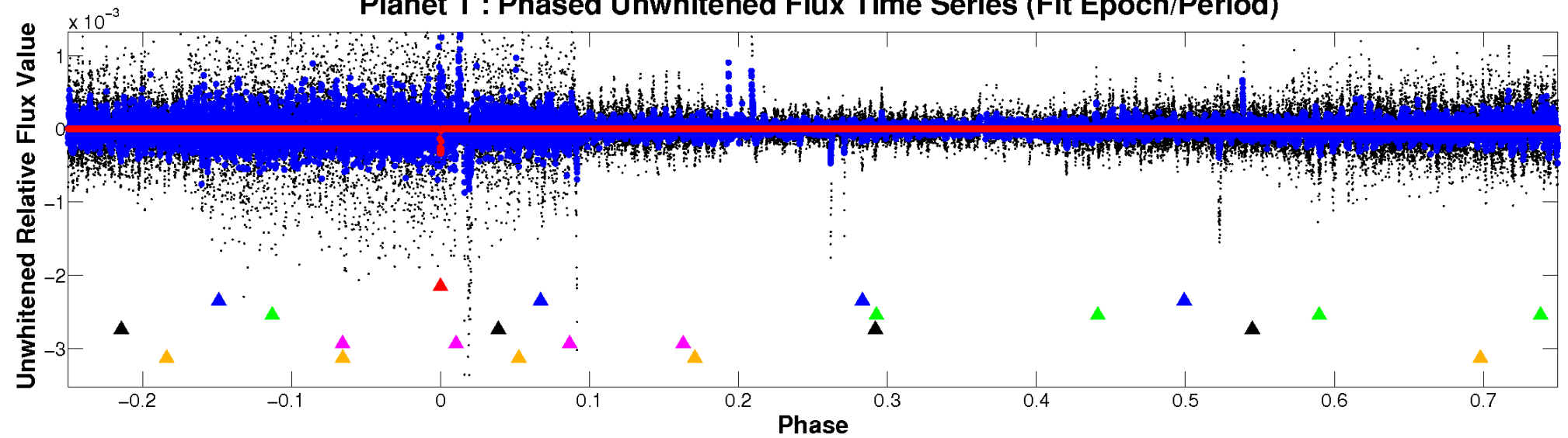
# ALT Odd/Even

TCE 002696938-01

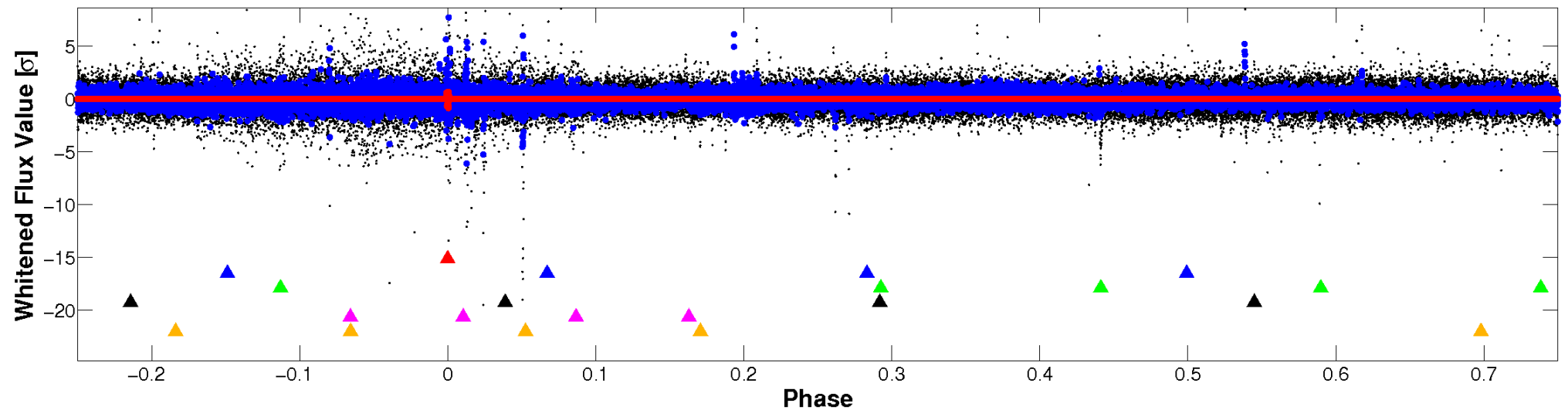


# Non-Whitened Vs. Whitened Light Curve

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

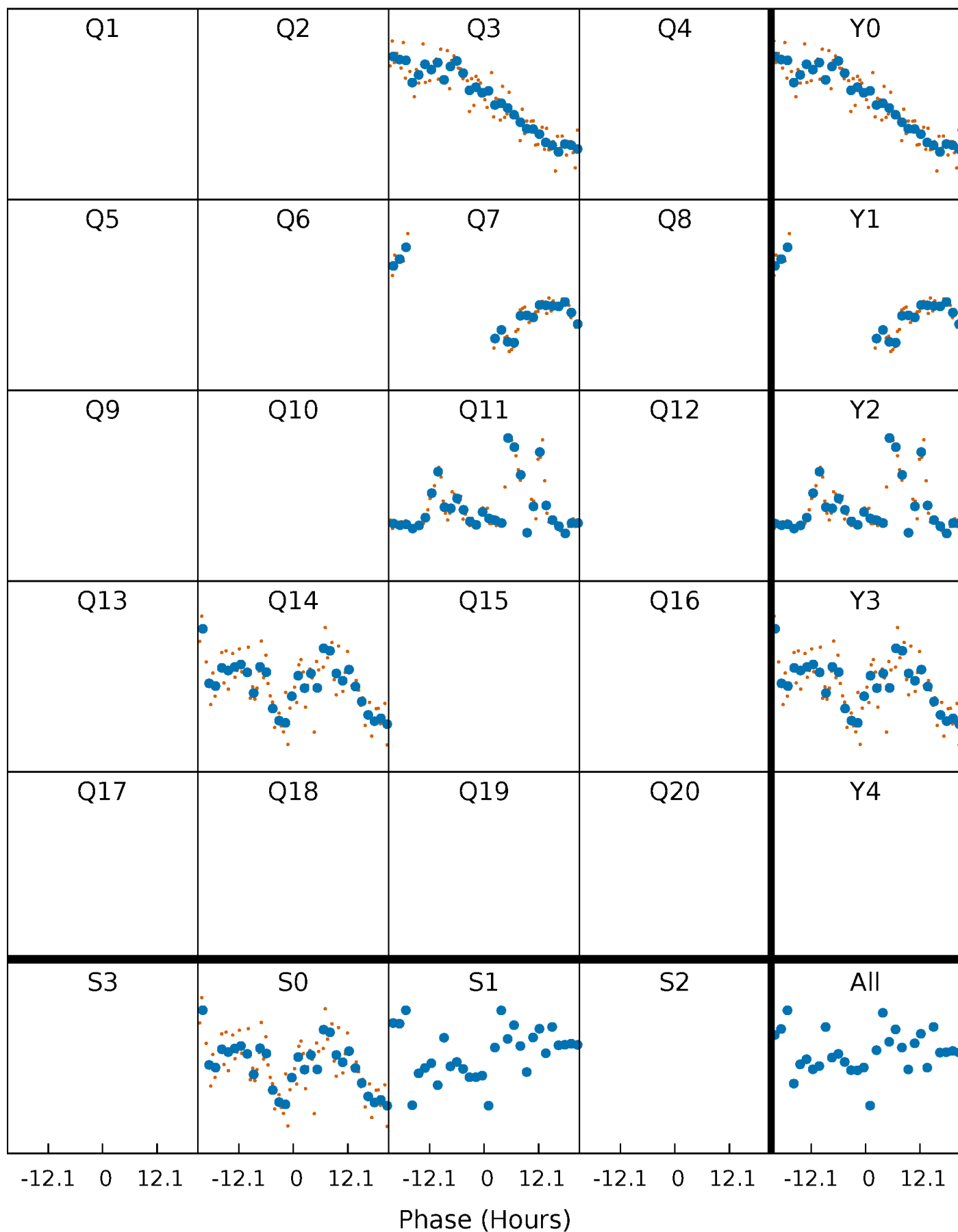


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



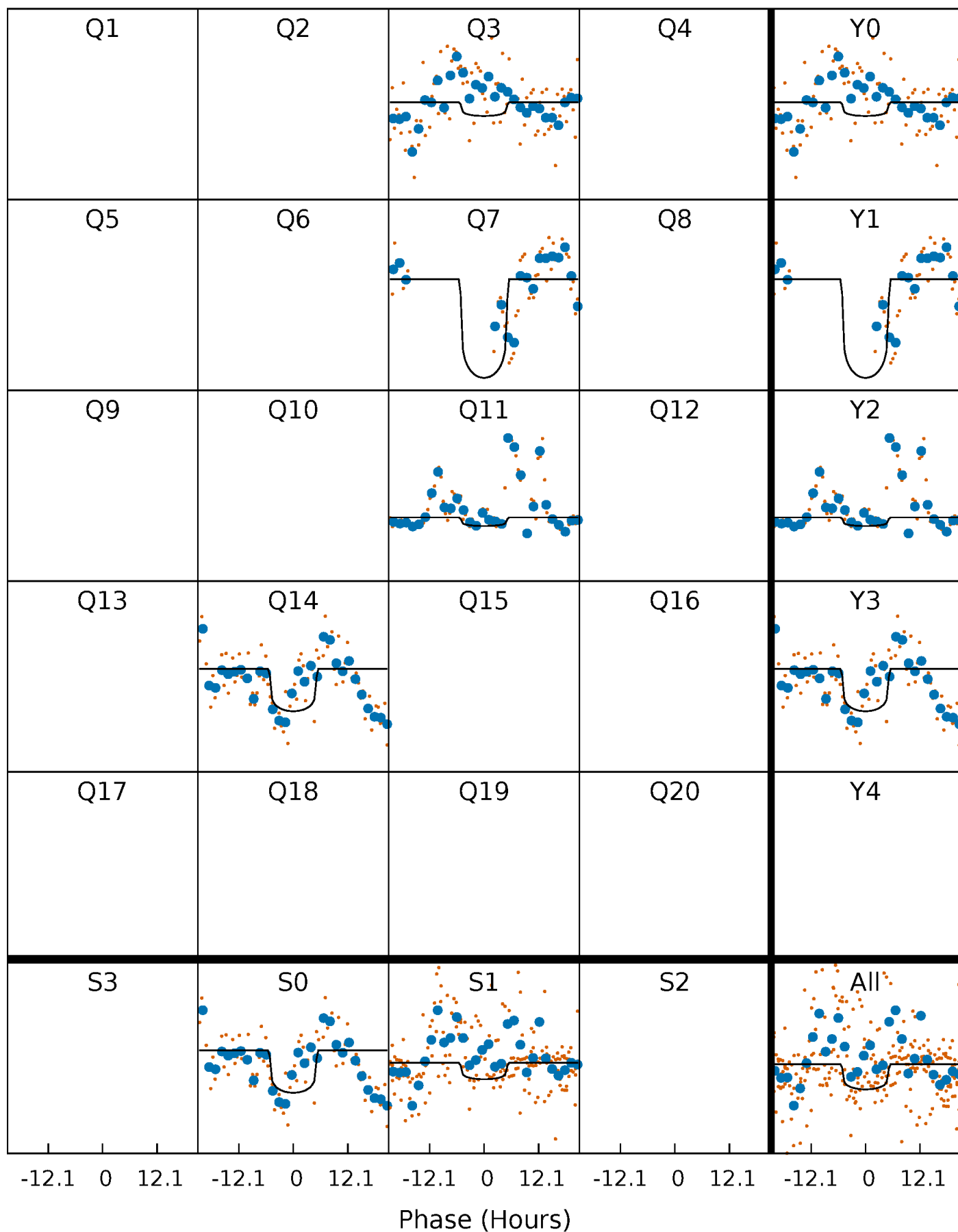
# PDC Quarter-Phased Transit Curves

TCE 002696938-01 P=342.957490 Days  $T_0=318.021165$  (BKJD)



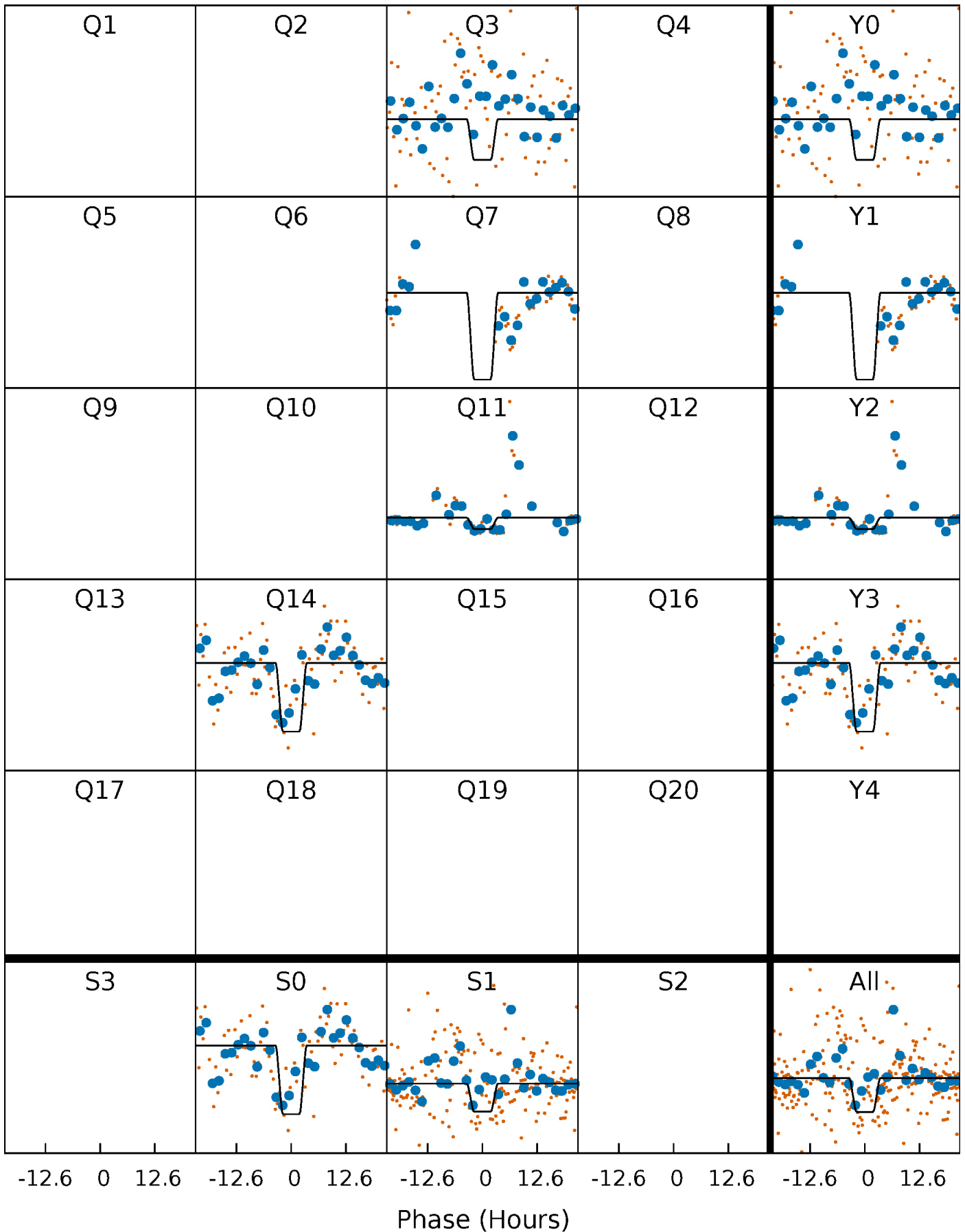
# DV Quarter-Phased Transit Curves

TCE 002696938-01   P=342.957490 Days    $T_0=318.021165$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 002696938-01 P=342.963682 Days  $T_0=317.981615$  (BKJD)

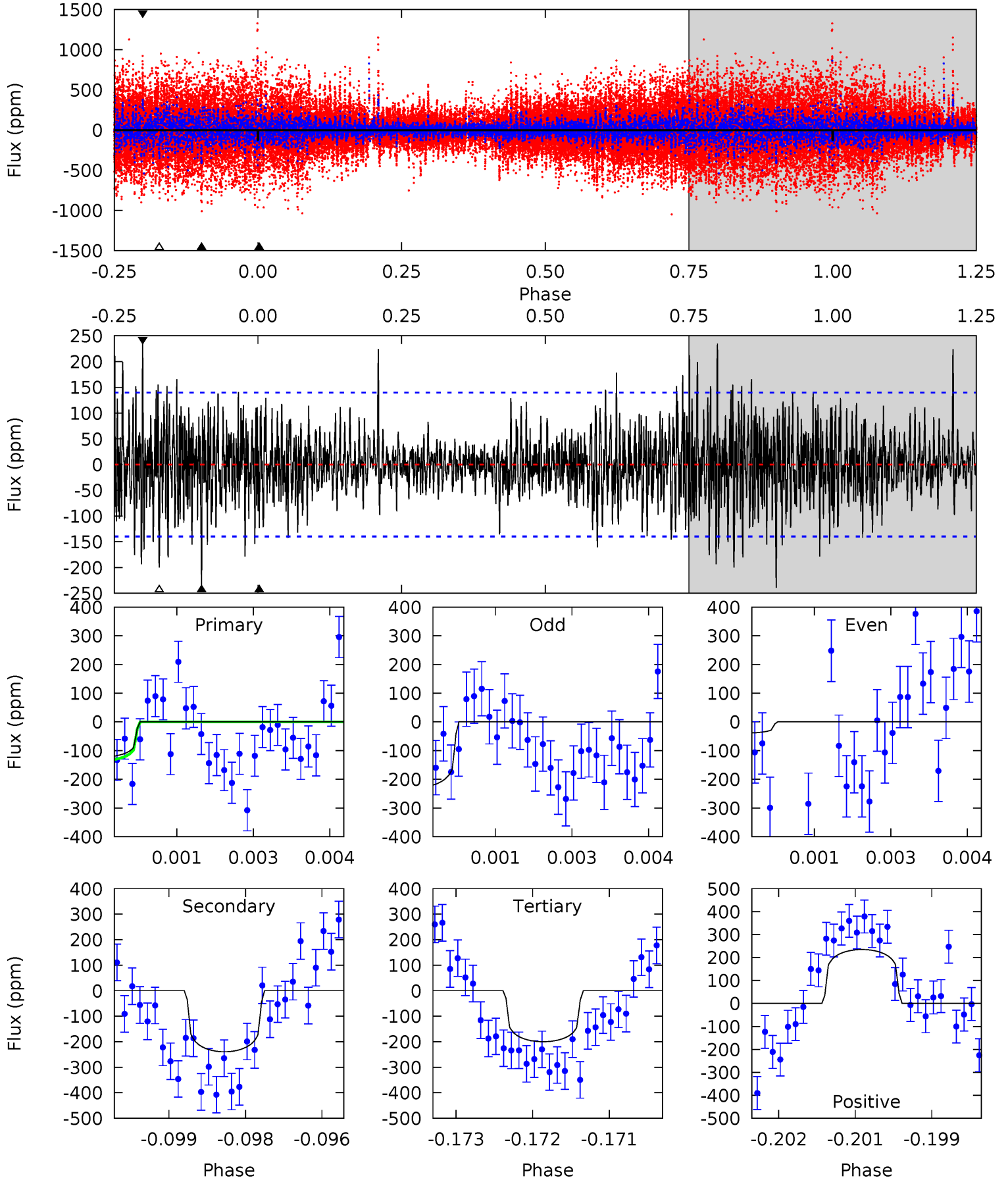




# DV Model-Shift Uniqueness Test

002696938-01, P = 342.957490 Days, E = 318.021165 Days

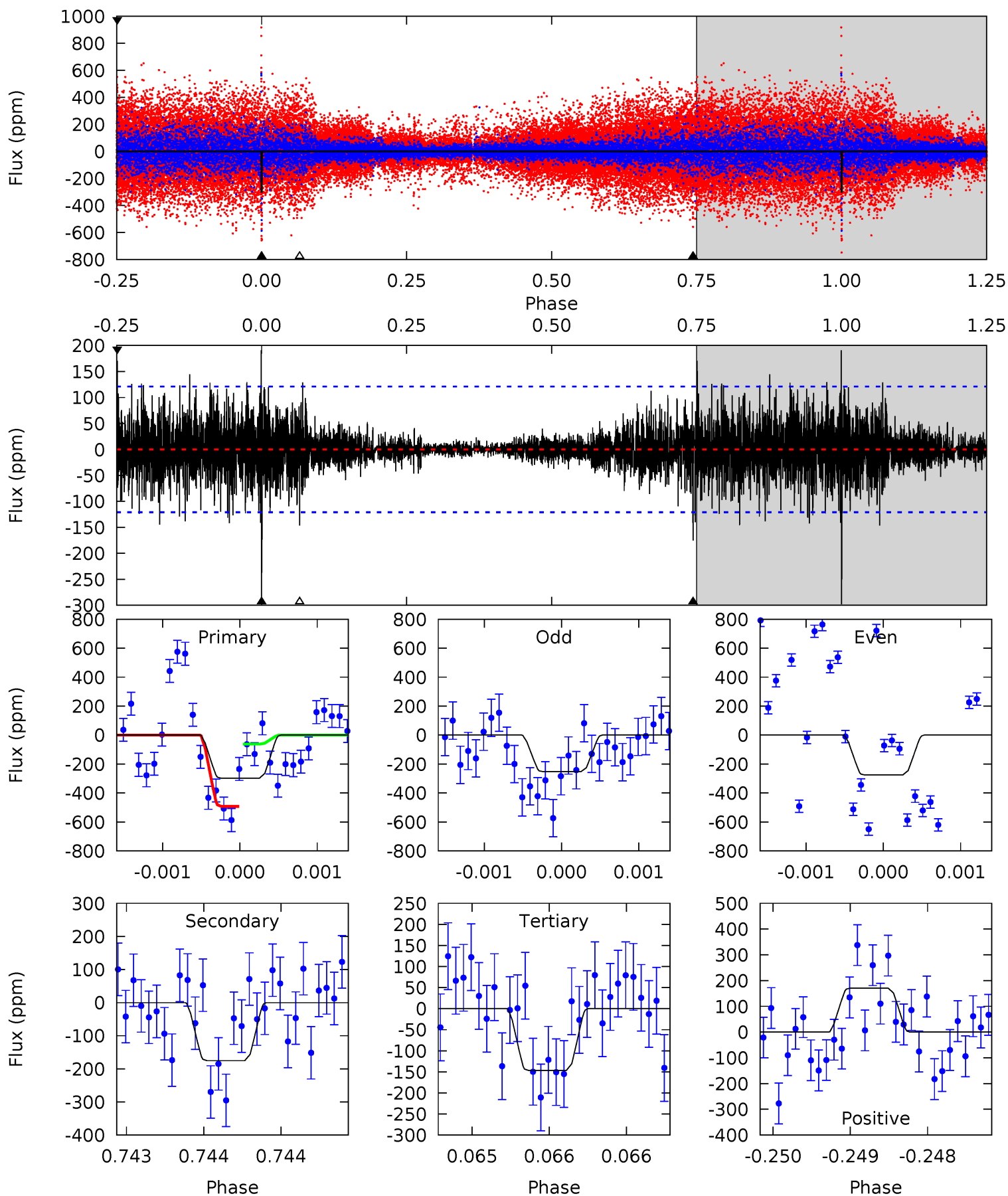
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
4.74	9.26	7.73	9.08	5.40	3.22	1.98	-2.99	-4.34	1.53	0.18	3.47	0.21	0.50	0.03



# Alt Model-Shift Uniqueness Test

002696938-01, P = 342.963682 Days, E = 317.981615 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
13.5	7.94	6.64	7.72	5.48	3.34	1.34	6.86	5.78	1.30	0.22	0.53	0.97	0.39	8.80



### Stellar Parameters For KIC 002696938

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6484^{+146}_{-178}$	$4.161^{+0.209}_{-0.171}$	$-0.260^{+0.250}_{-0.300}$	$1.456^{+0.422}_{-0.346}$	$1.119^{+0.193}_{-0.129}$	$0.511^{+0.594}_{-0.239}$
	+2%/-3%	+5%/-4%	+96%/-115%	+29%/-24%	+17%/-12%	+116%/-47%
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 002696938-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-239 \pm 26$	$3.25^{+2.13}_{-1.93}$	$481^{+39}_{-36}$	$5699^{+3780}_{-1169}$	$12937^{+62311}_{-8308}$
Alt.	$-175 \pm 22$	$3.53^{+2.41}_{-1.81}$	$482^{+38}_{-35}$	$5037^{+2270}_{-878}$	$7832^{+23893}_{-5134}$

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

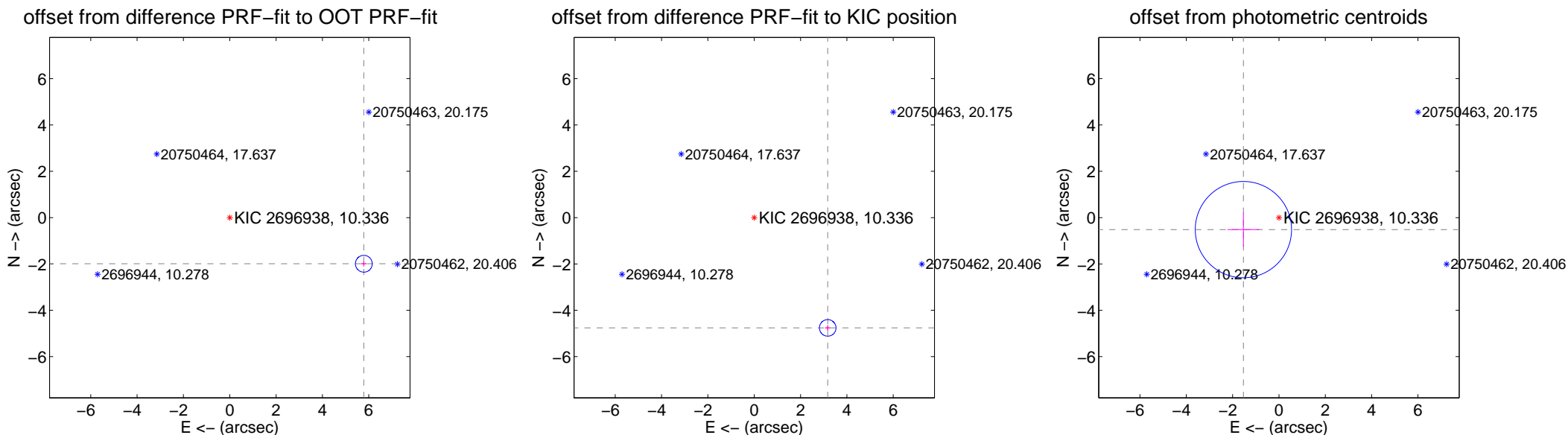
## DV Centroid Data

Supplemental centroid analysis for 002696938-01. **Kepler magnitude: 10.34.** Transit SNR 5.24

There are 0 quarters with good PRF difference image offsets

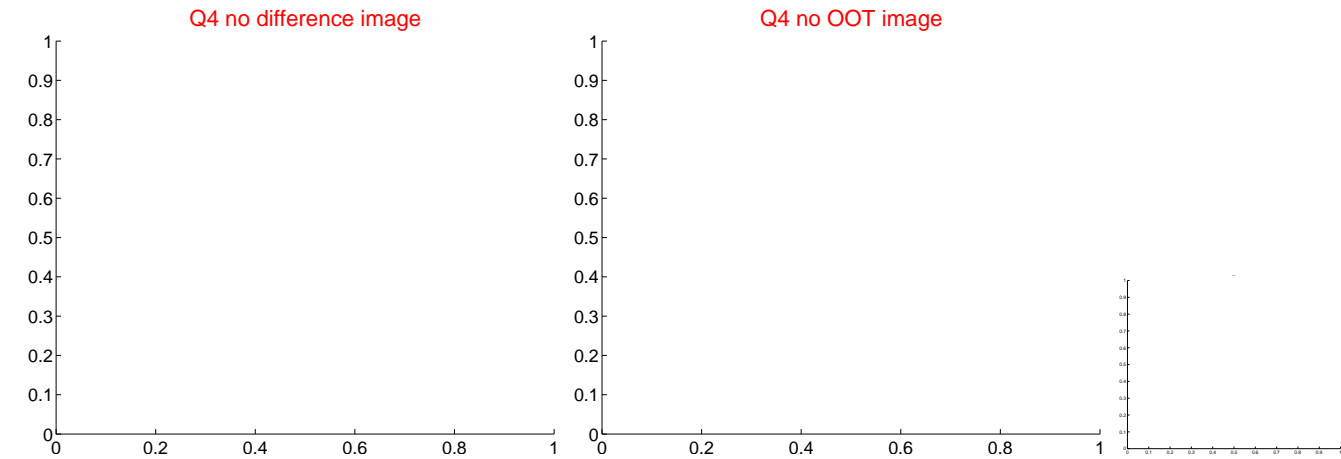
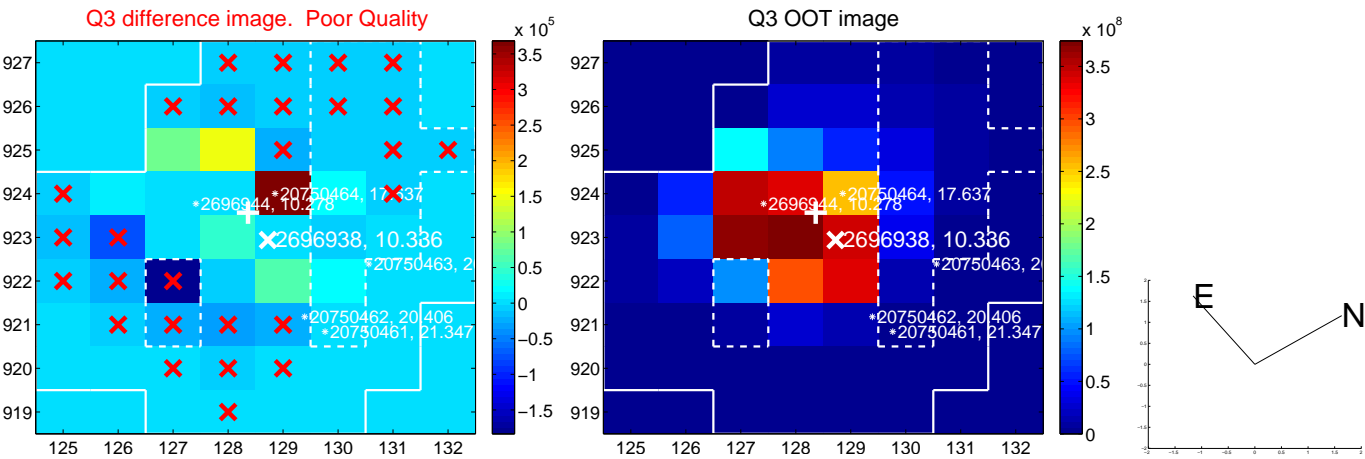
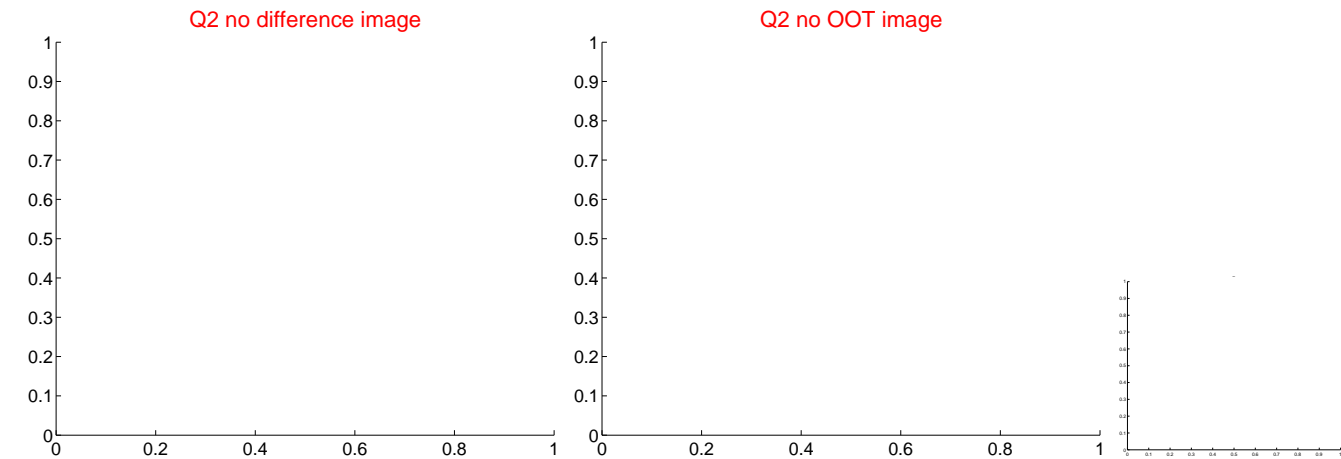
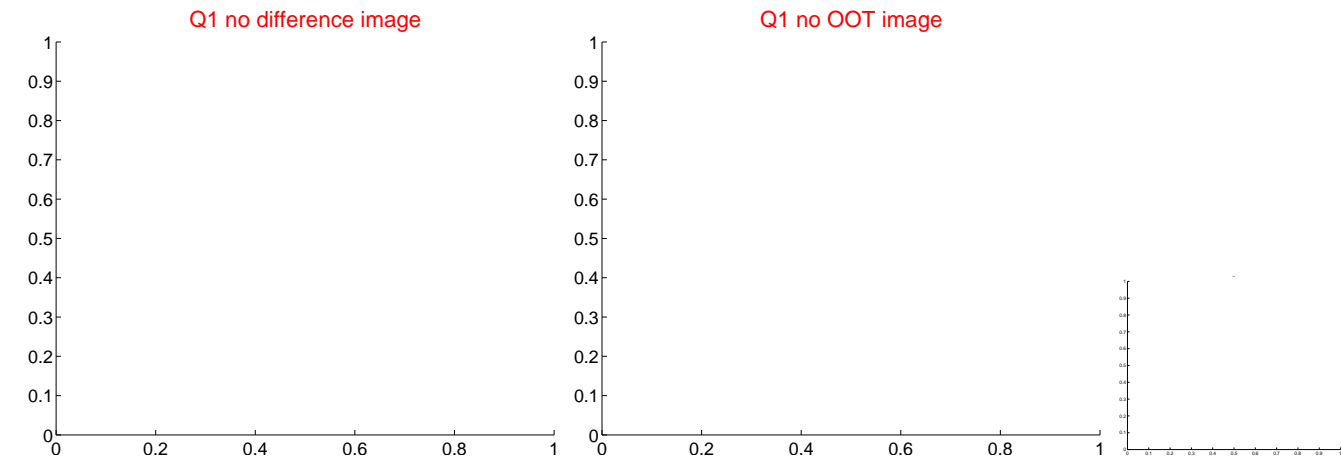
The OOT PRF centroid is offset from the target star catalog position by about 3.81 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b><math>6.122 \pm 0.121</math></b>	<b>50.61</b>	$-5.789 \pm 0.121$	$-1.992 \pm 0.118$
PRF-fit source offset from KIC position	<b><math>5.722 \pm 0.119</math></b>	<b>47.97</b>	$-3.174 \pm 0.121$	$-4.761 \pm 0.118$
photometric centroid source offset	$1.62 \pm 0.69$	2.34	$1.53 \pm 0.69$	$-0.52 \pm 0.73$



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.

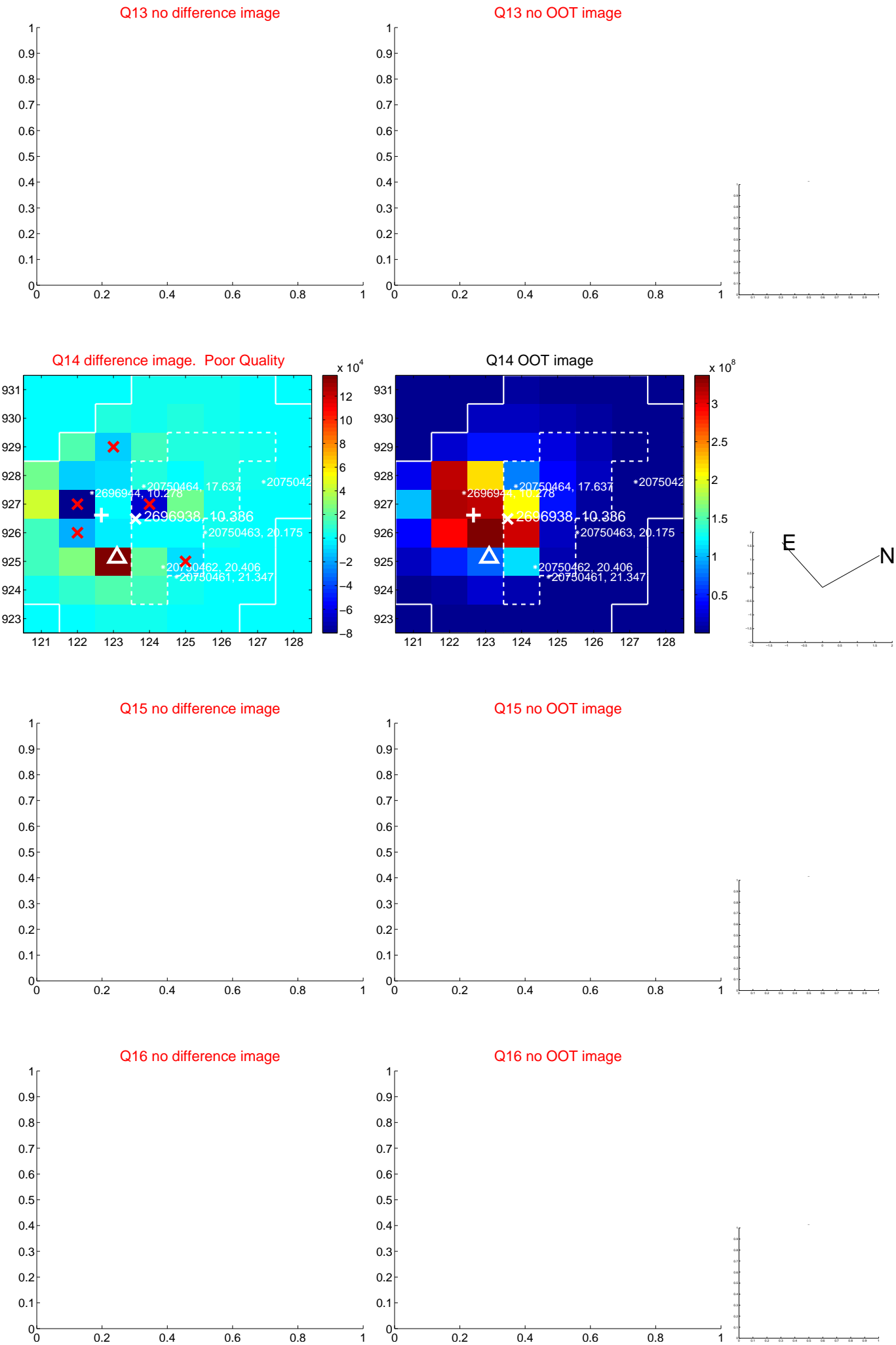




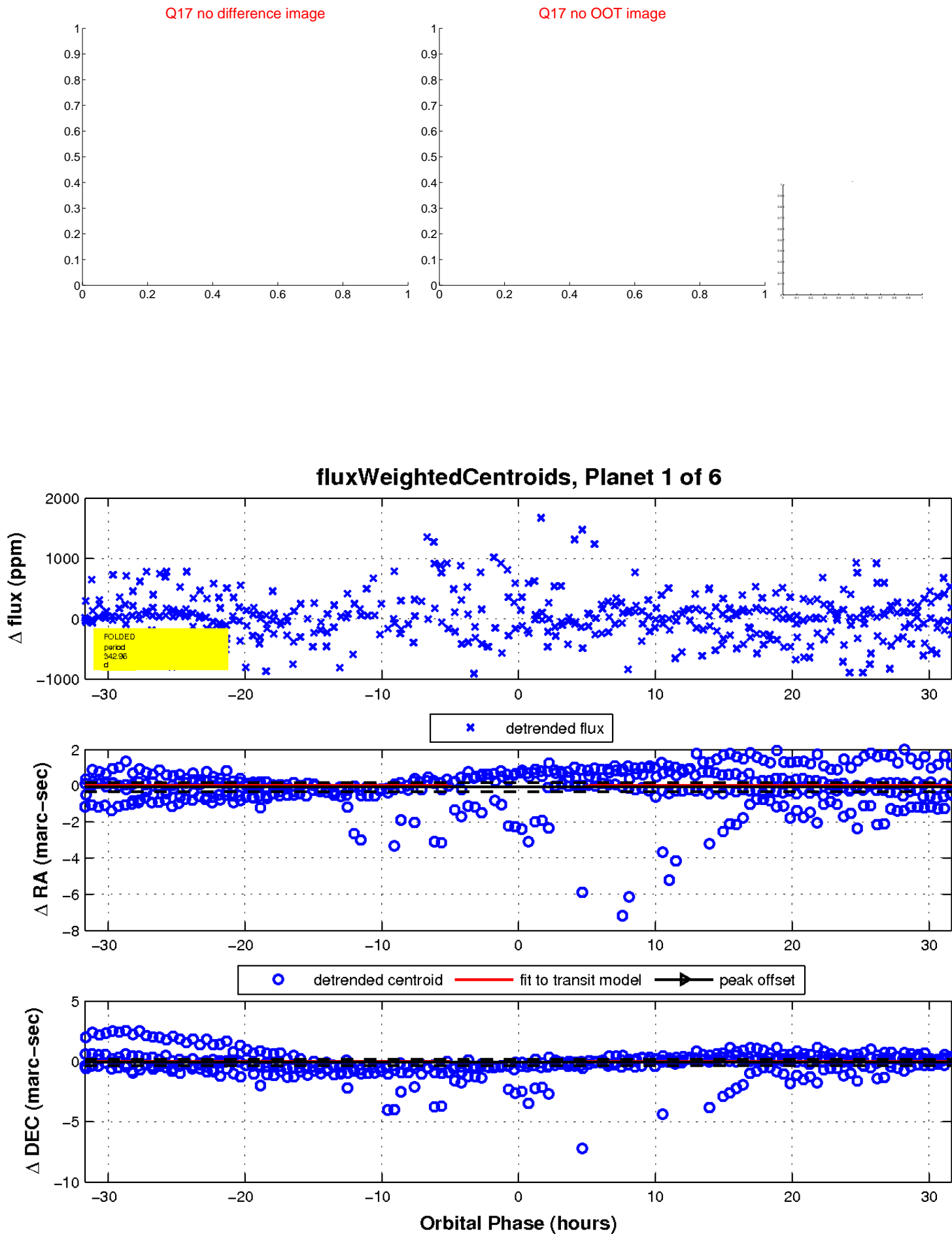
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white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

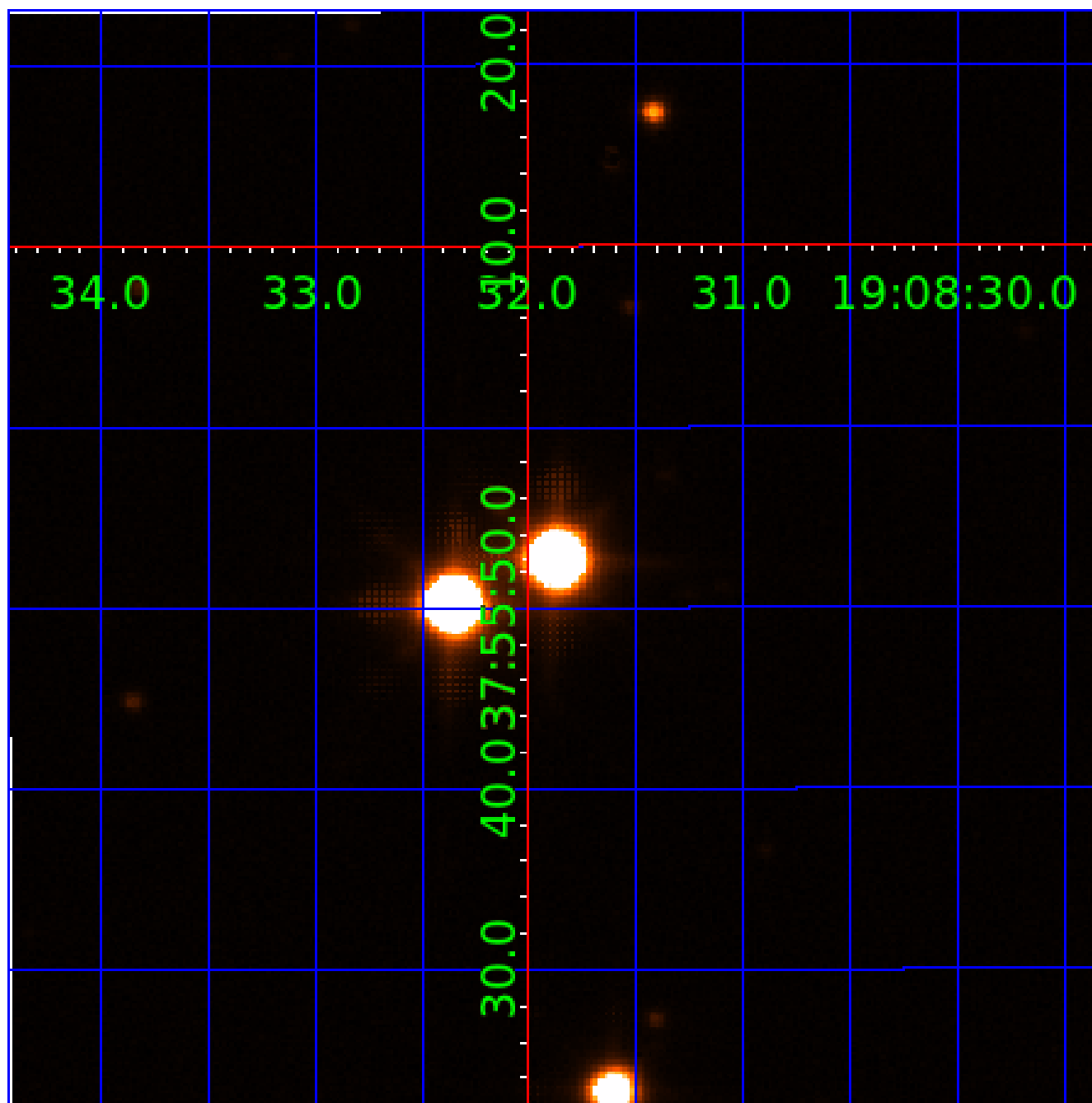


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UKIRT Image

Declination



# KIC 002696938

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
002696938-01	OBS	No	342.957490	318.021165	339.5	10.605	22.8	5.2	1.46	6484	2.92	3.38
002696938-02	OBS	No	417.041578	266.987338	543.7	24.035	12.6	13.1	1.46	6484	6.52	2.61
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002696938-02	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
002696938-03	OBS	FP	0.00	1	0	0	0	LPP_DV—INCONSISTENT_TRANS—CENT_SATURATED
002696938-04	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—INCONSISTENT_TRANS—CENT_SATURATED
002696938-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_SATURATED
002696938-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_SATURATED

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

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

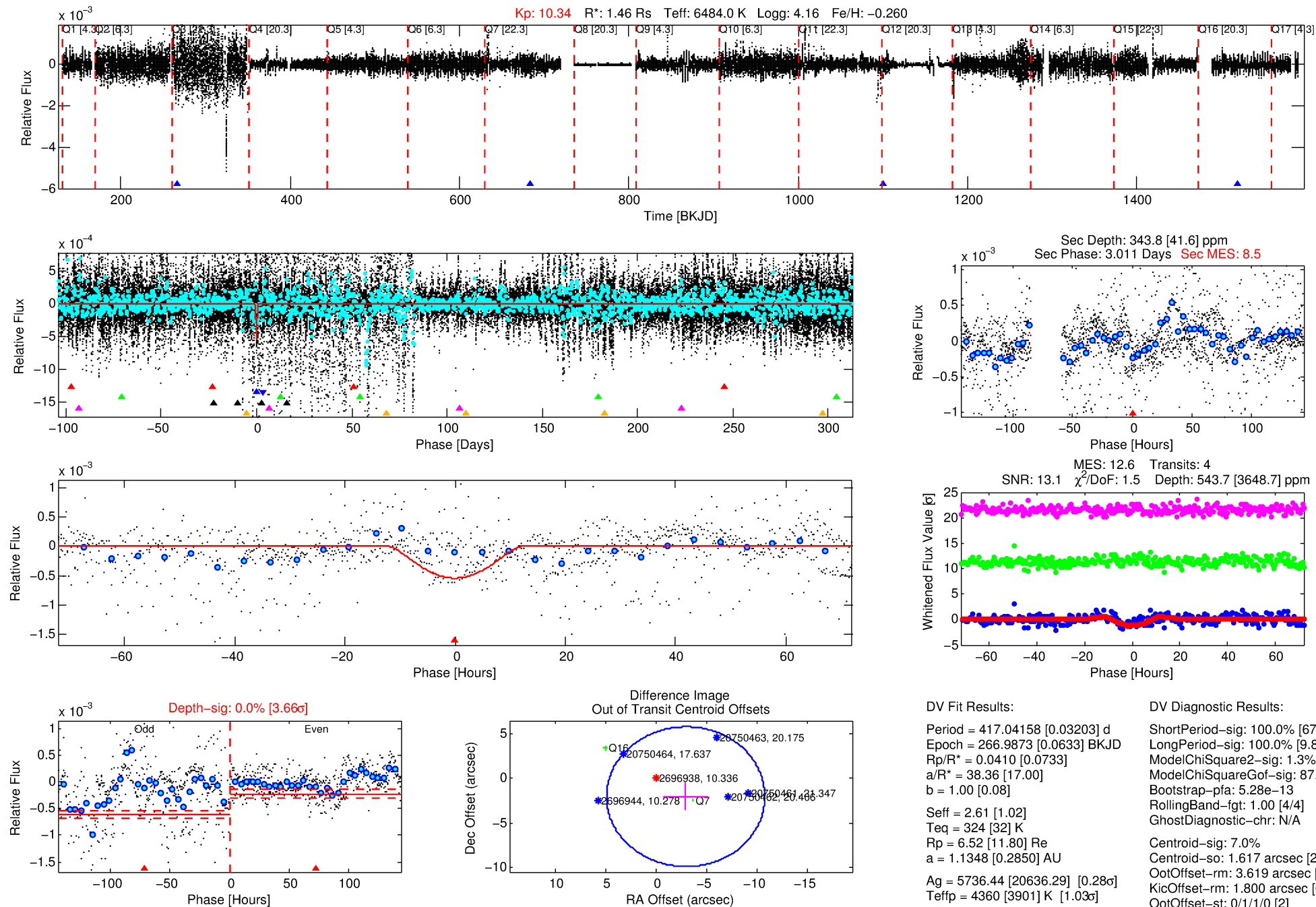
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 002696938-02

No Significant Match Found

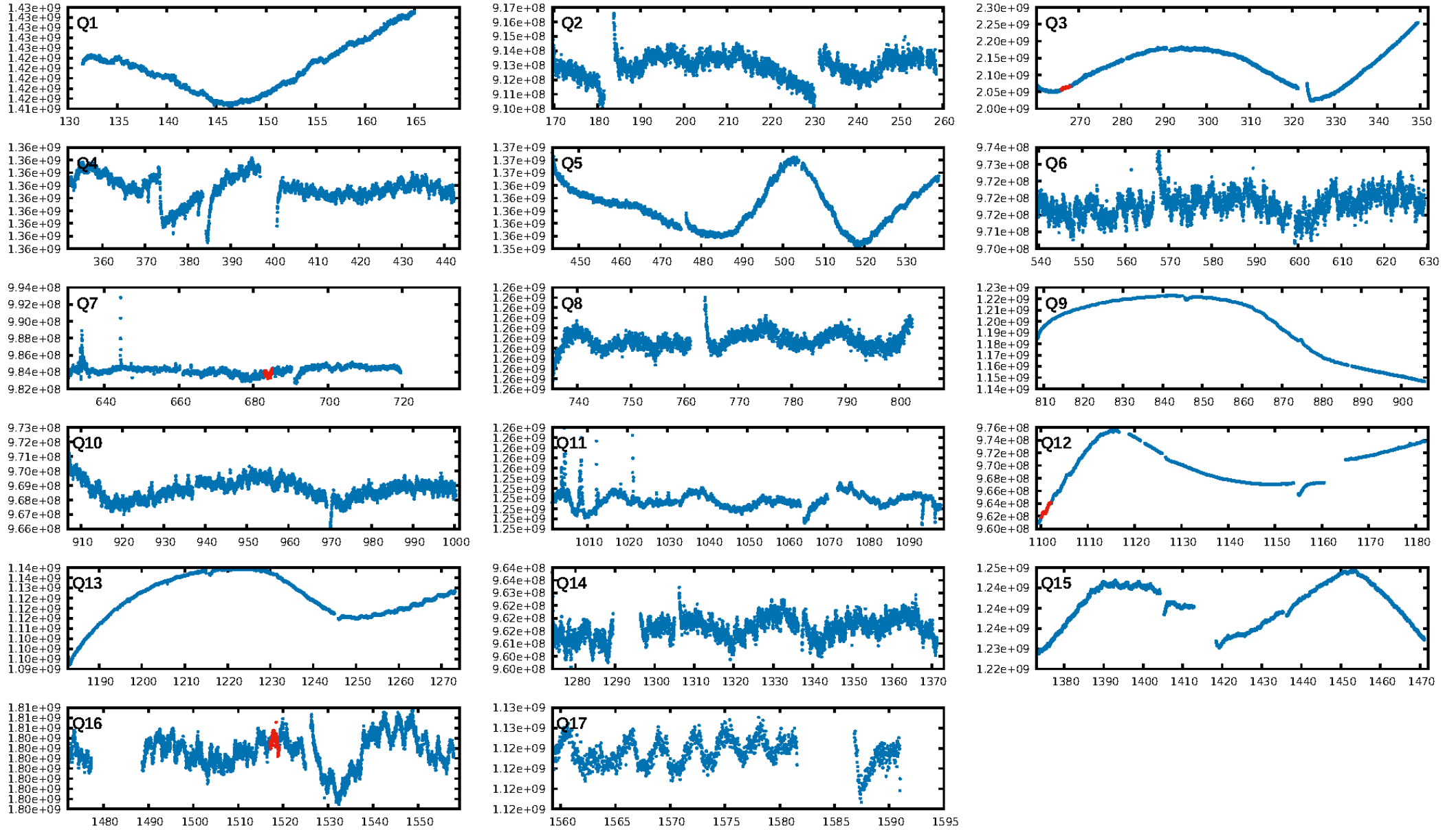
# DV One-Page Summary

KIC: 2696938 Candidate: 2 of 6 Period: 417.042 d

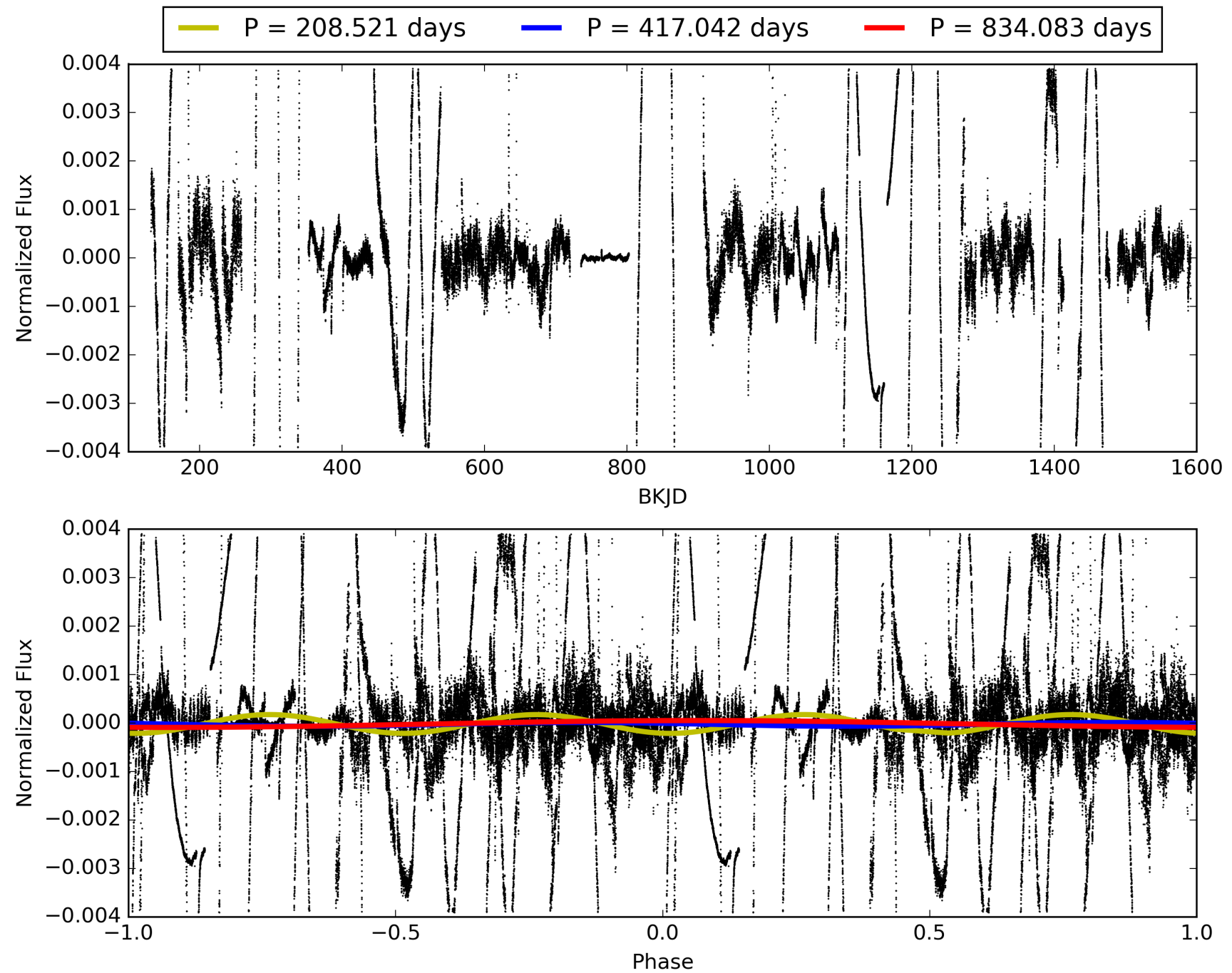




# TCE 002696938-02, PDC Light Curves

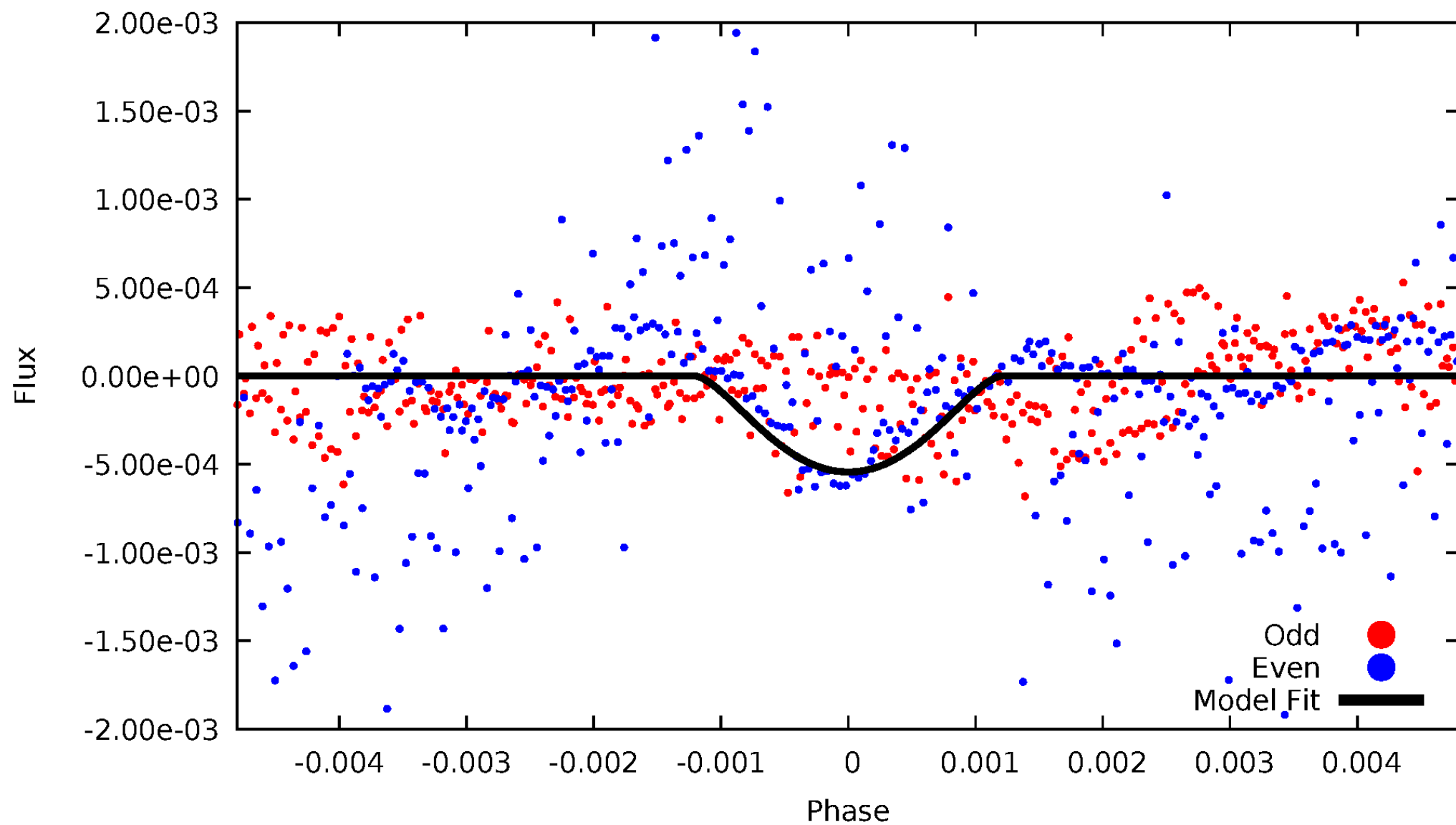


TCE 002696938-02



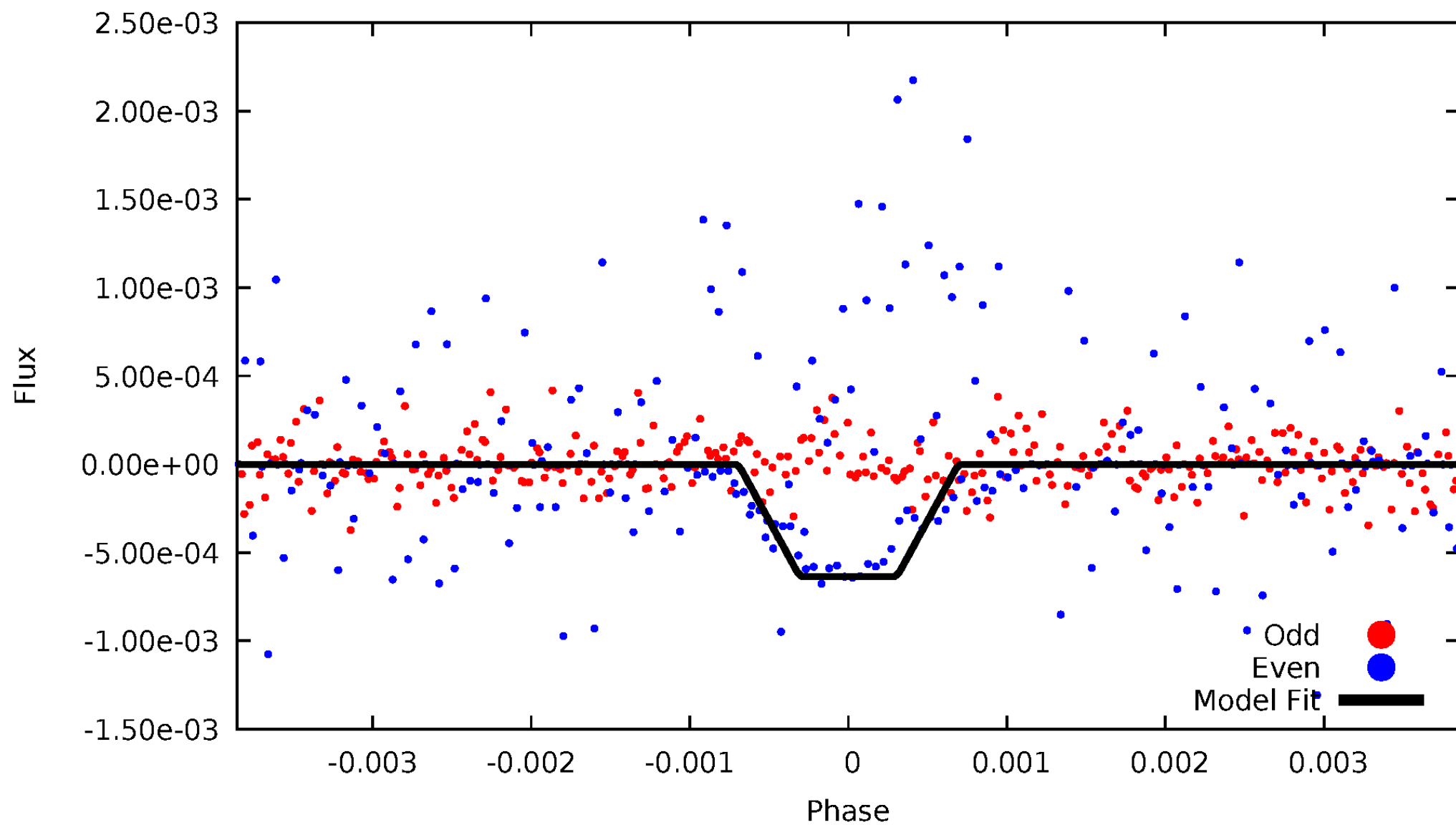
# DV Odd/Even

TCE 002696938-02



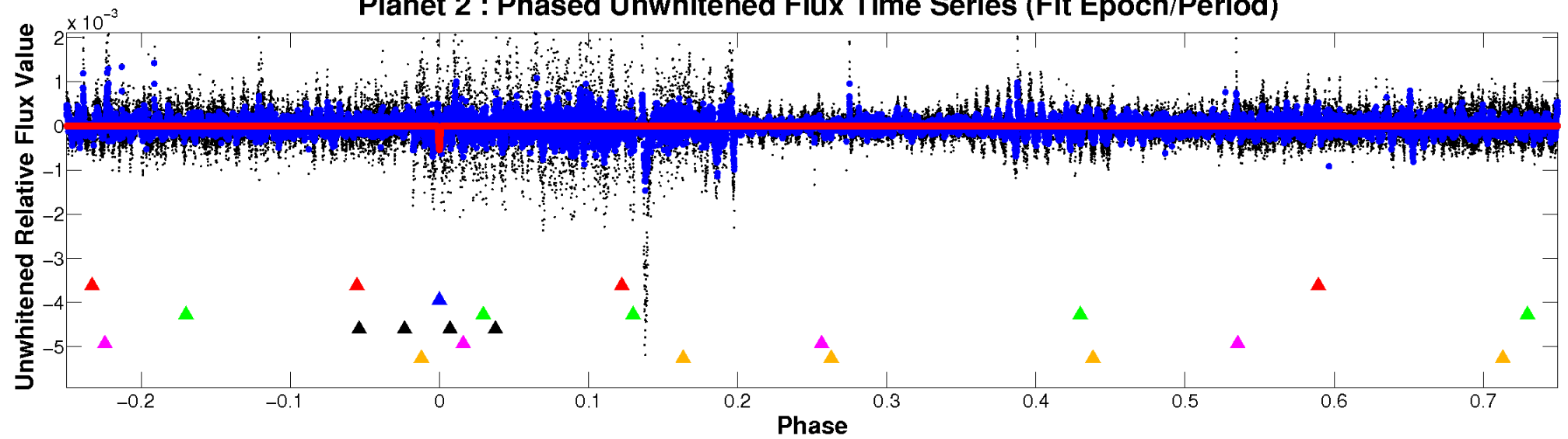
# ALT Odd/Even

TCE 002696938-02

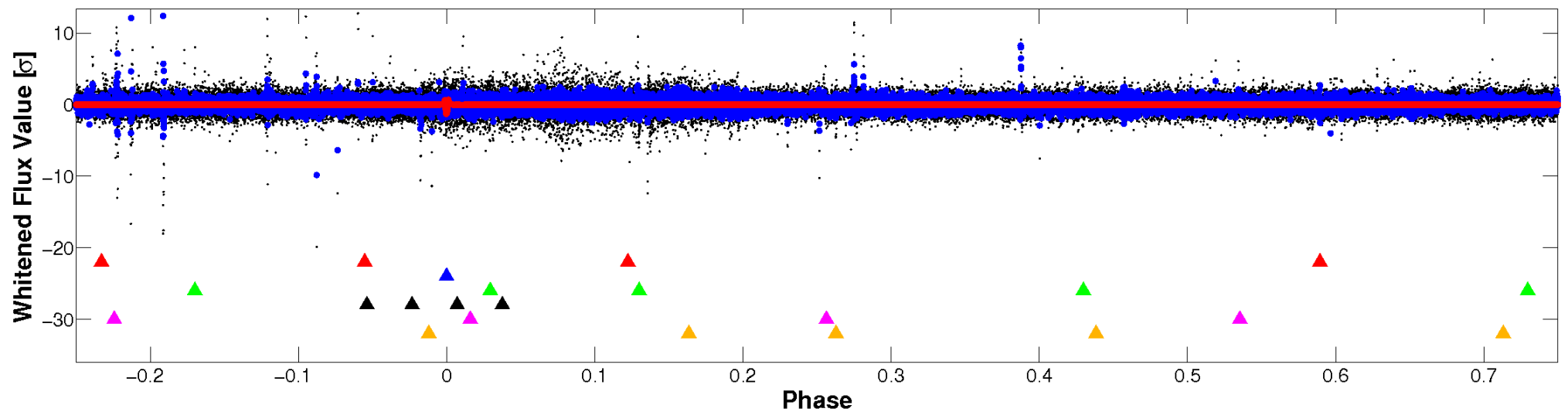


# Non-Whitened Vs. Whitened Light Curve

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

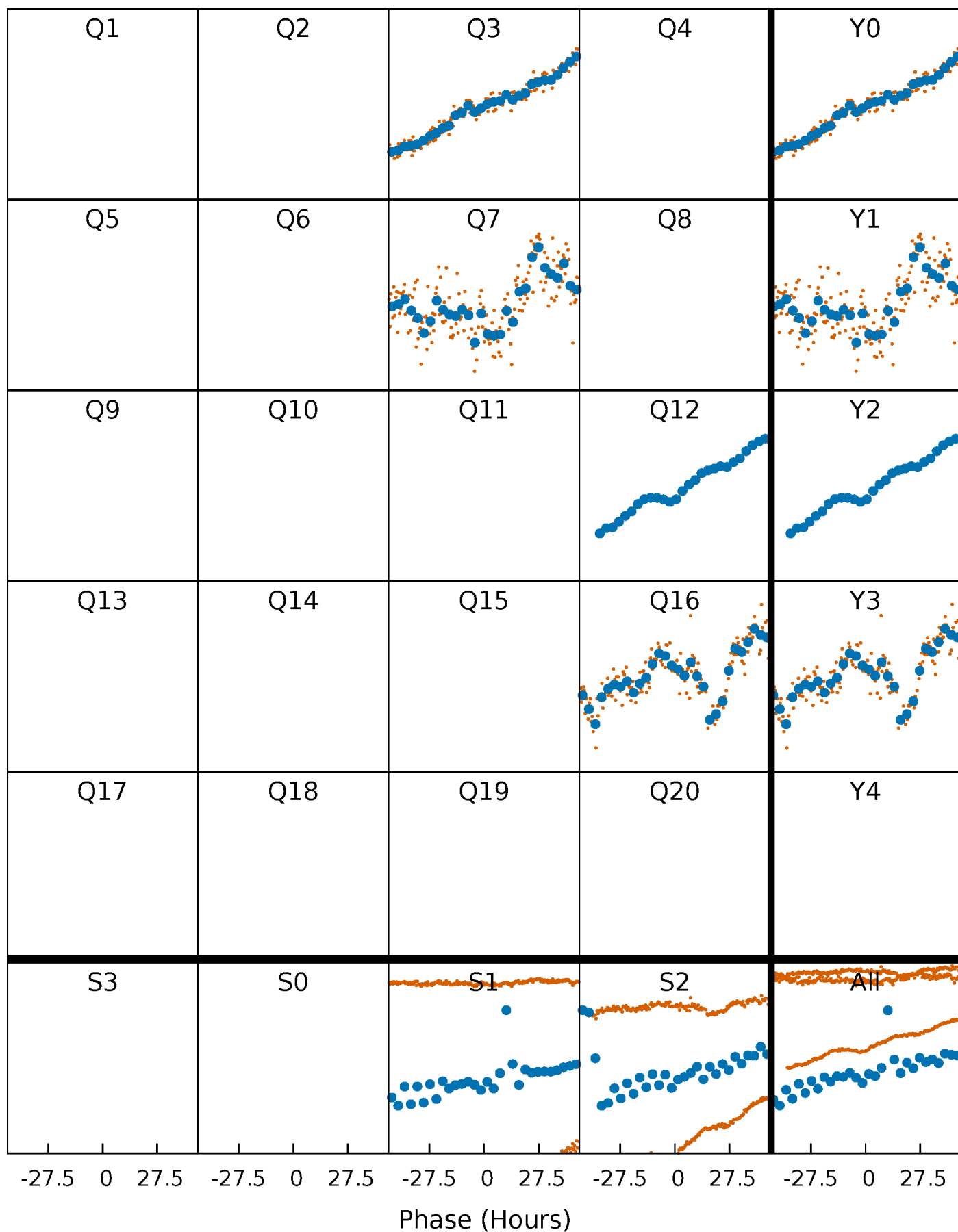


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

TCE 002696938-02     $P=417.041578$  Days     $T_0=266.987338$  (BKJD)





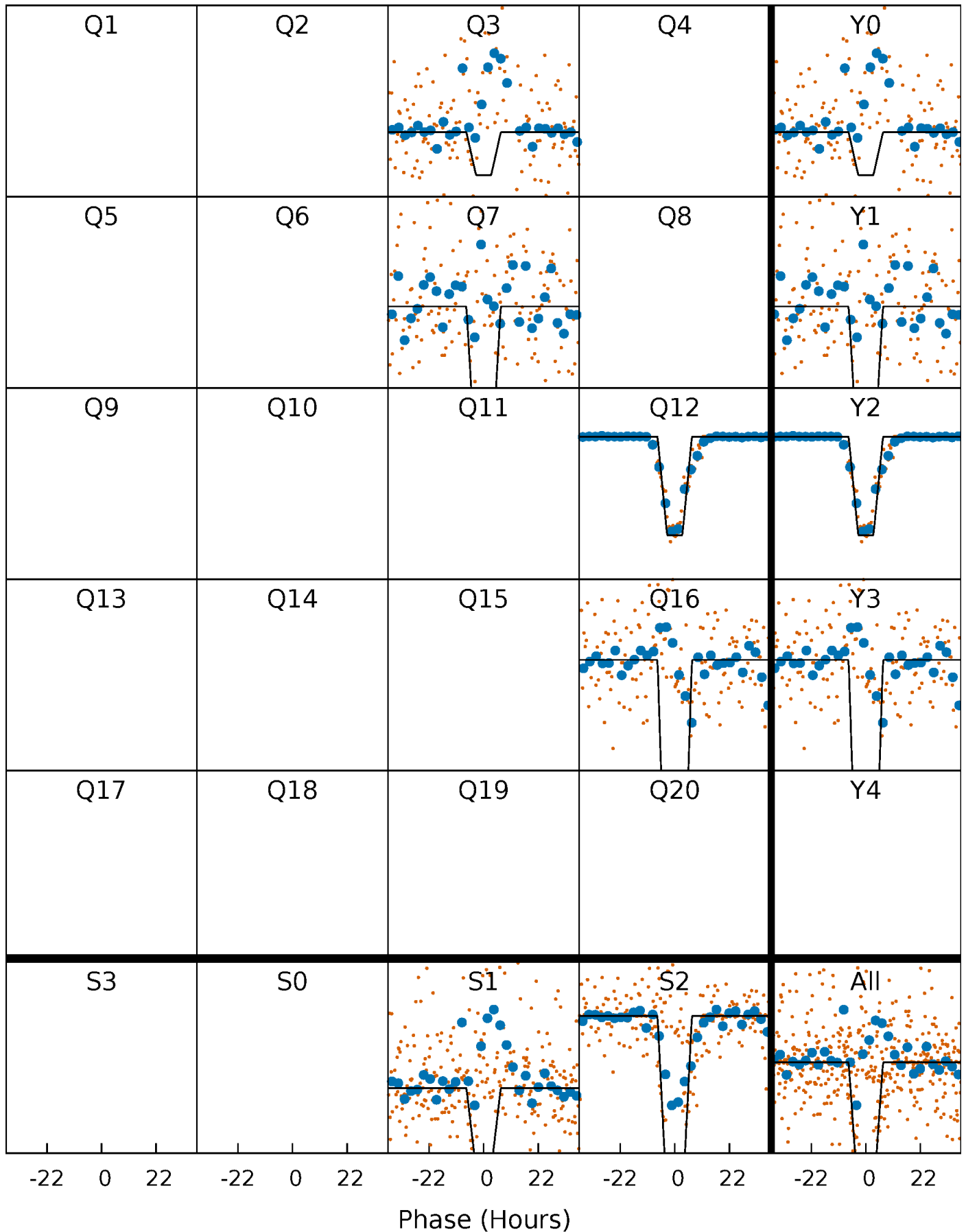
# DV Quarter-Phased Transit Curves

TCE 002696938-02 P=417.041578 Days  $T_0=266.987338$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

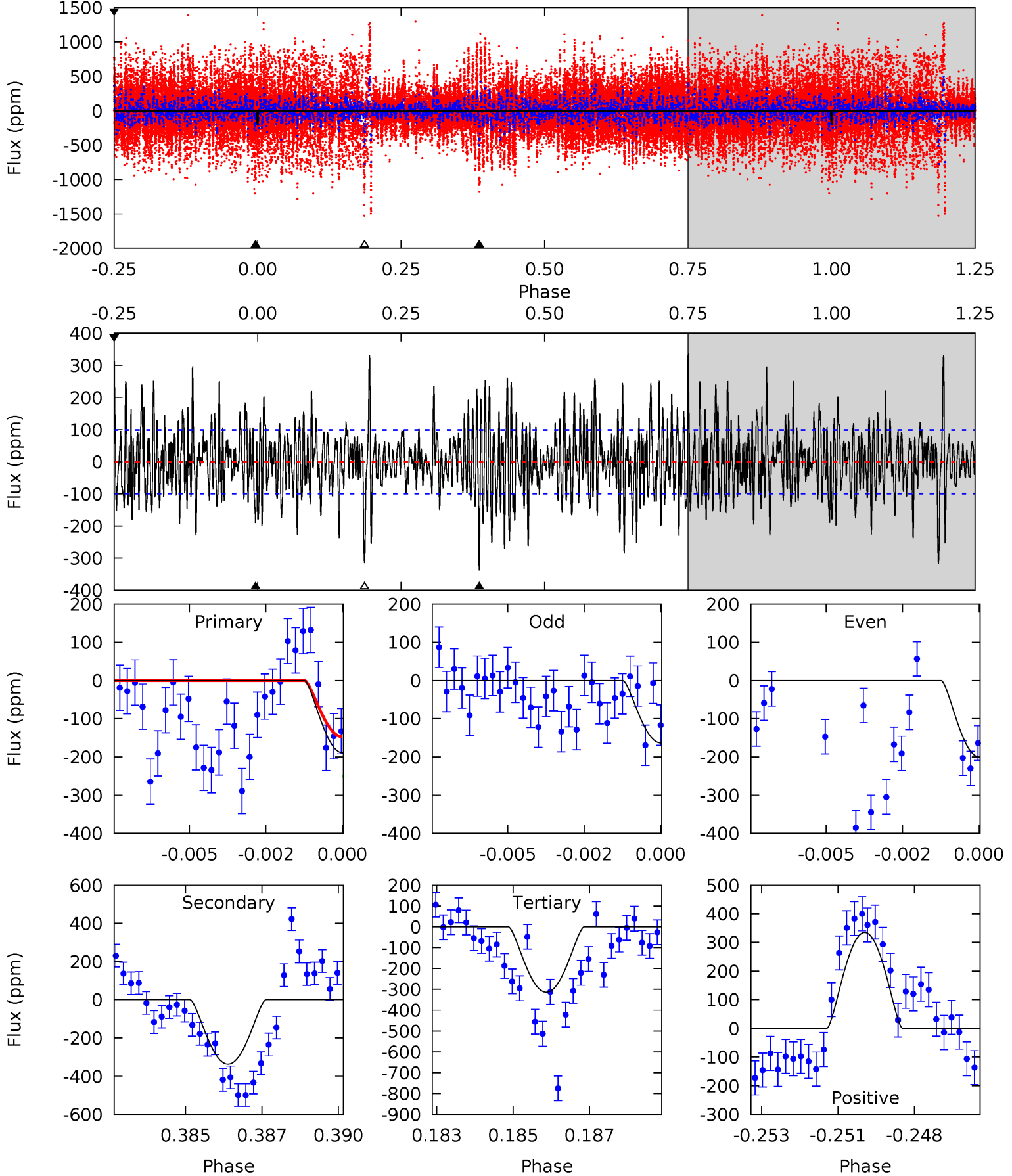
TCE 002696938-02 P=417.014904 Days  $T_0=267.001658$  (BKJD)



# DV Model-Shift Uniqueness Test

002696938-02, P = 417.041578 Days, E = 266.987338 Days

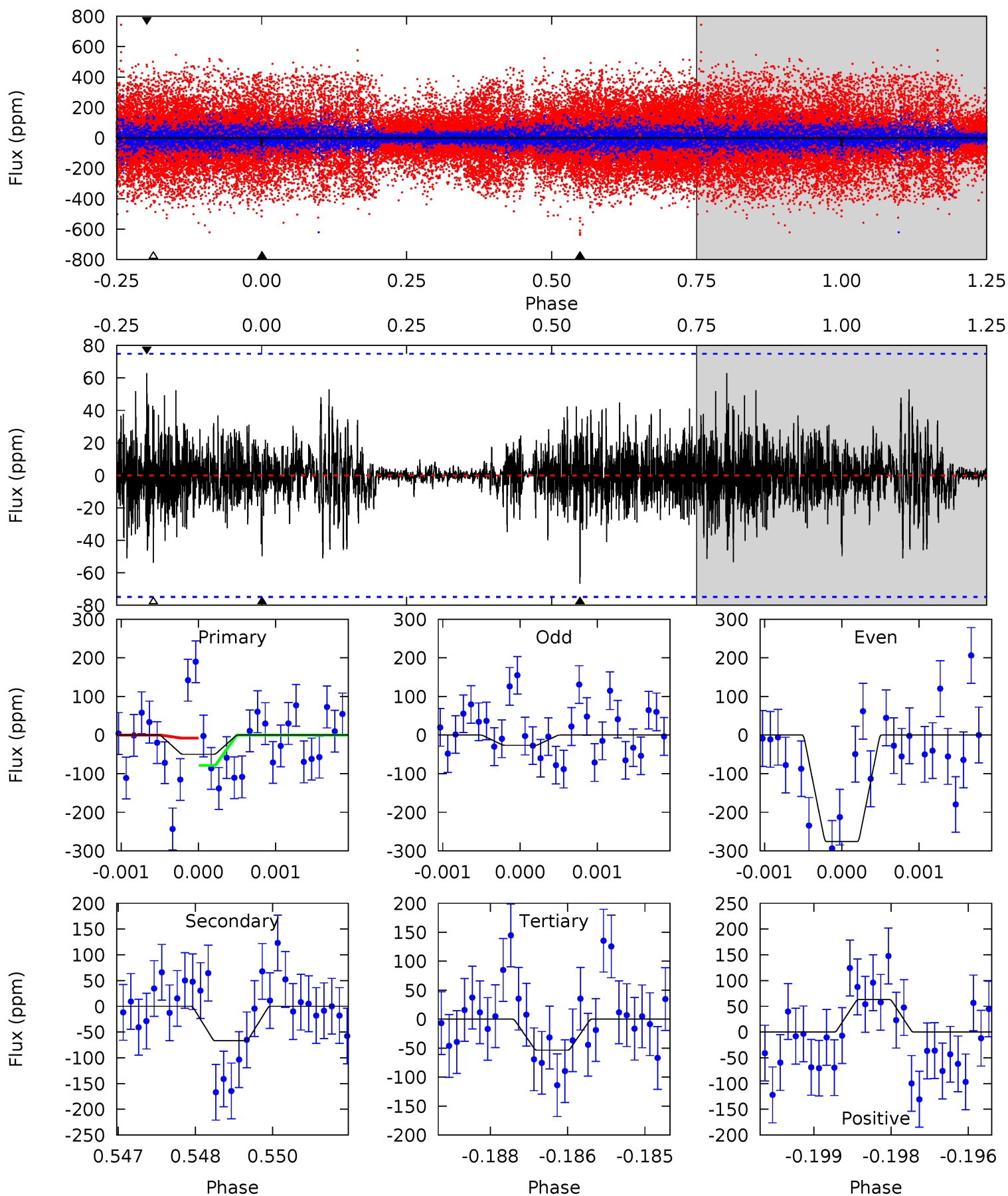
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.1	18.0	16.8	17.9	5.29	3.03	4.97	-6.69	-7.81	1.23	0.11	0.89	0.49	0.50	2.89



# Alt Model-Shift Uniqueness Test

002696938-02, P = 417.014904 Days, E = 267.001658 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
3.58	4.81	3.85	4.53	5.39	3.19	0.90	-0.27	-0.96	0.96	0.27	9.00	2.29	0.49	2.63



### Stellar Parameters For KIC 002696938

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6484^{+146}_{-178}$	$4.161^{+0.209}_{-0.171}$	$-0.260^{+0.250}_{-0.300}$	$1.456^{+0.422}_{-0.346}$	$1.119^{+0.193}_{-0.129}$	$0.511^{+0.594}_{-0.239}$
	+2%/-3%	+5%/-4%	+96%/-115%	+29%/-24%	+17%/-12%	+116%/-47%
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 002696938-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-337 \pm 19$	$10.59^{+10.16}_{-7.12}$	$451^{+34}_{-33}$	$3774^{+2125}_{-673}$	$2163^{+18568}_{-1595}$
Alt.	$-67 \pm 14$	$9.29^{+9.83}_{-6.54}$	$451^{+34}_{-31}$	$3064^{+1581}_{-532}$	$539^{+5517}_{-407}$

$T_{max}$  = 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

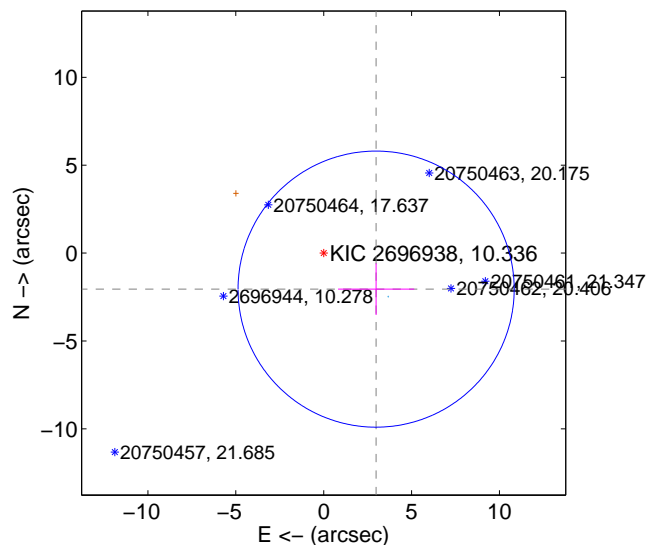
Supplemental centroid analysis for 002696938-02. **Kepler magnitude: 10.34.** Transit SNR 13.13

**There are 1 quarters with good PRF difference image offsets**

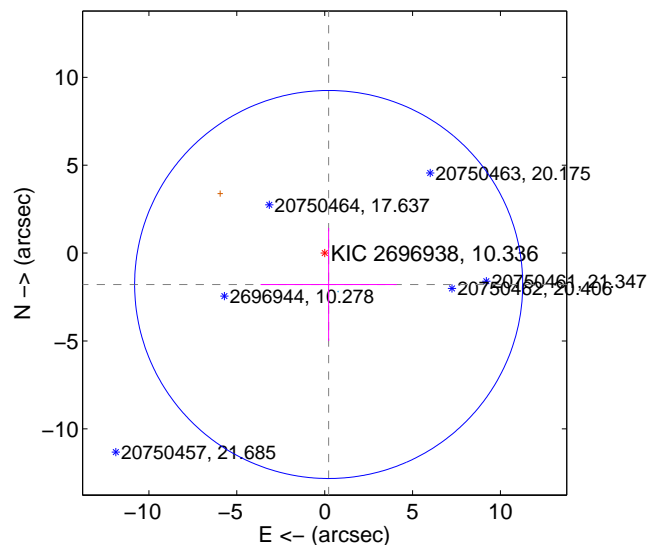
The direct PRF centroid is offset from the target star catalog position by about 0.95 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$3.619 \pm 2.618$	1.38	$-2.983 \pm 2.168$	$-2.050 \pm 1.470$
PRF-fit source offset from KIC position	$1.800 \pm 3.679$	0.49	$-0.227 \pm 3.873$	$-1.786 \pm 3.217$
photometric centroid source offset	$1.62 \pm 0.59$	2.72	$0.90 \pm 0.77$	$-1.34 \pm 0.49$

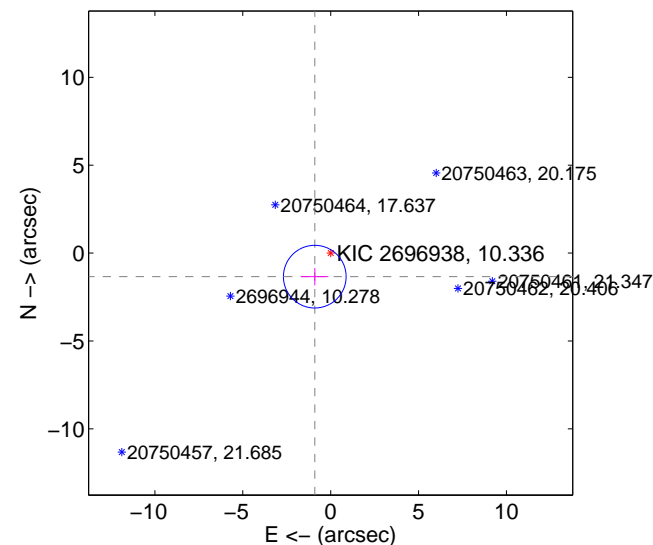
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



offset from photometric centroids

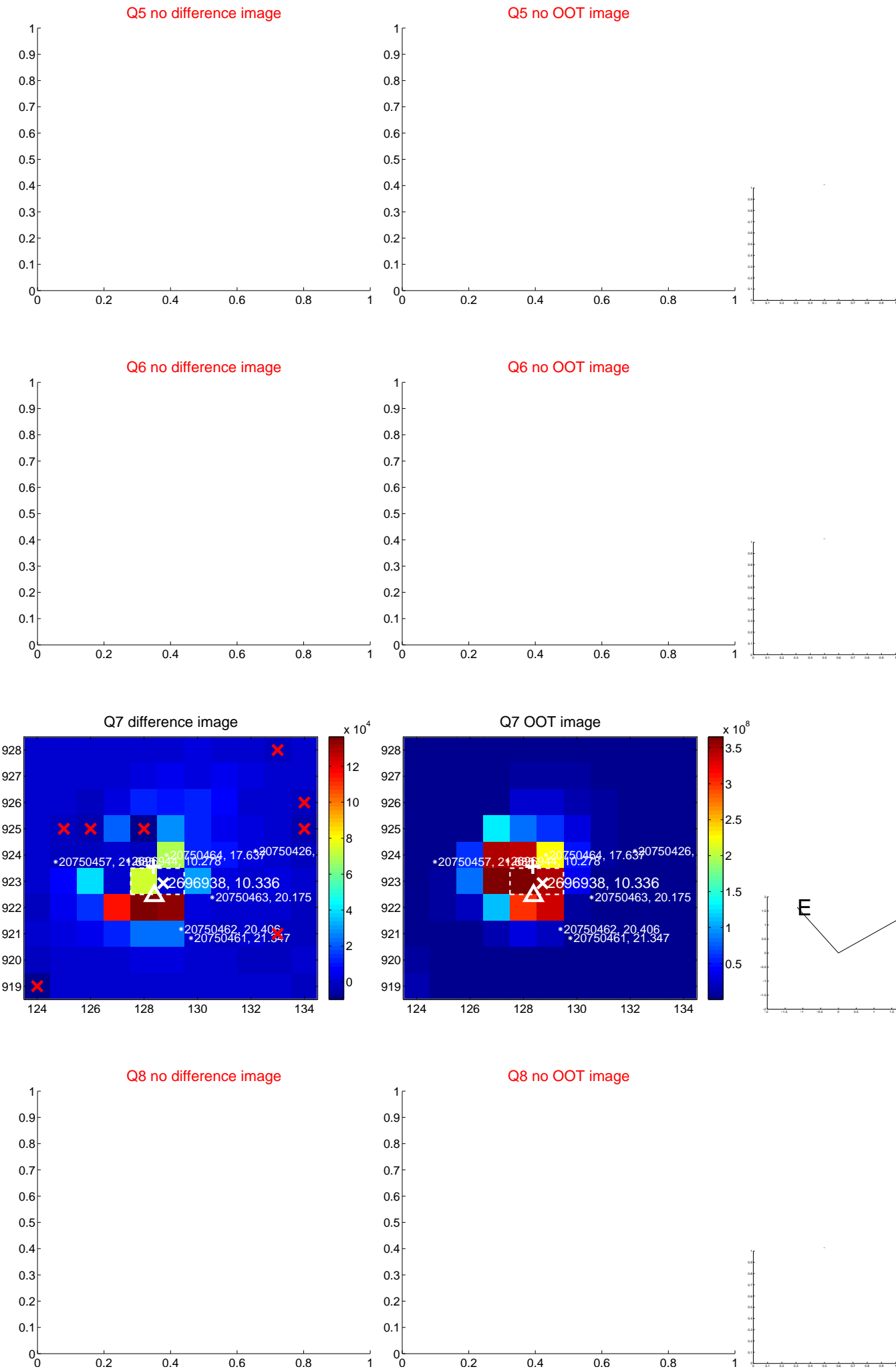


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

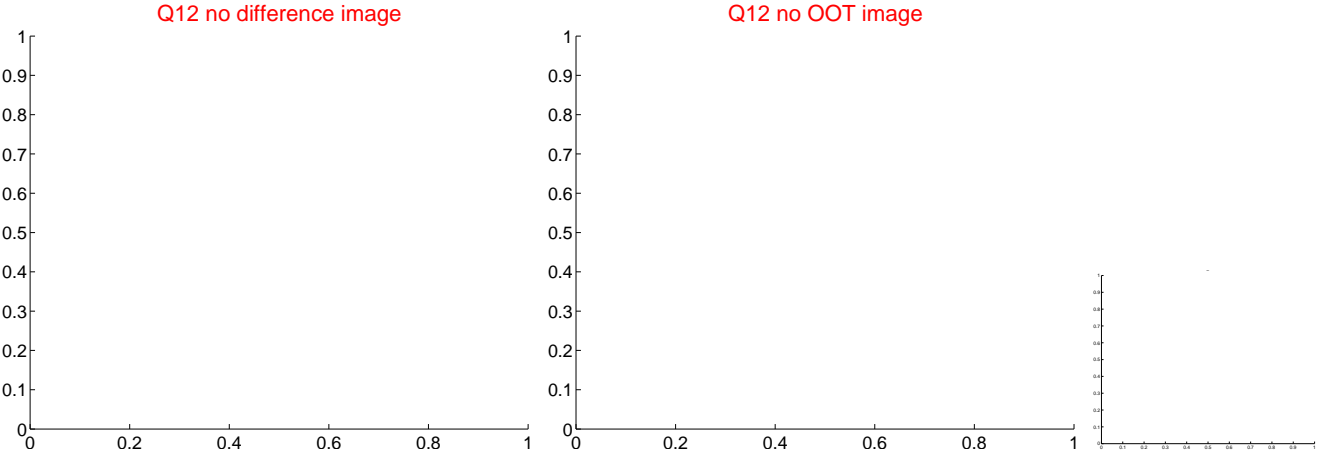
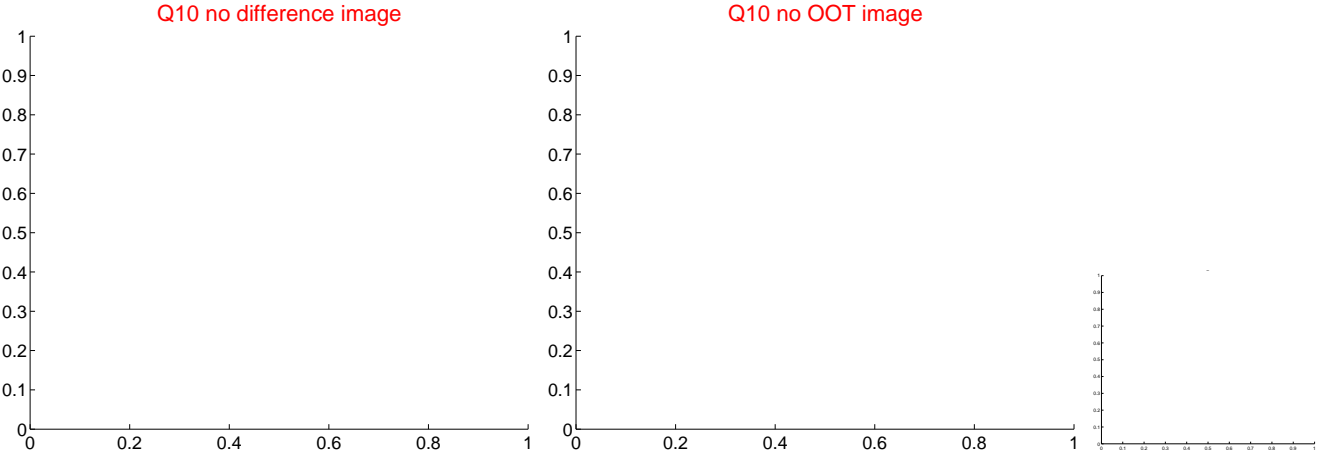


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

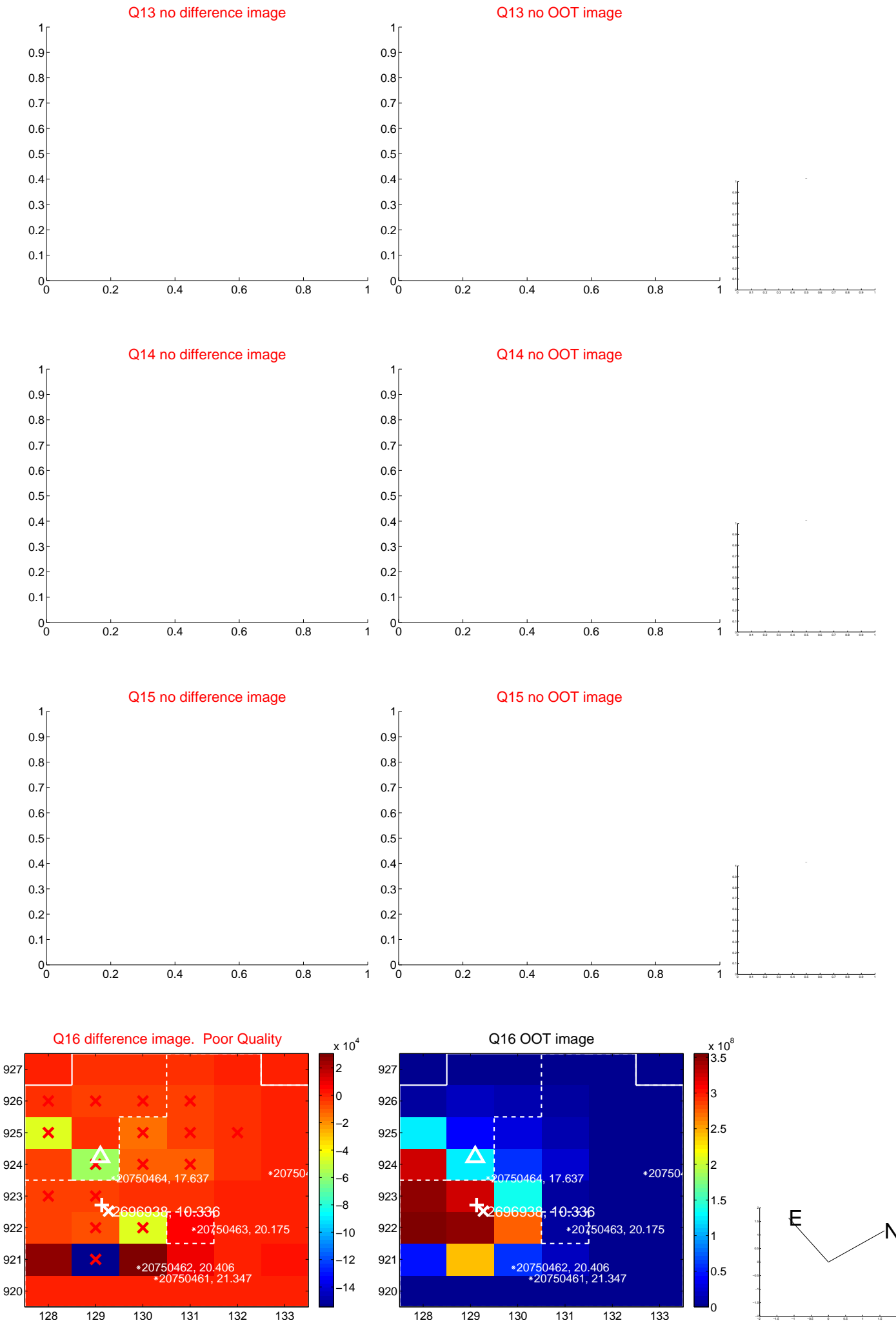




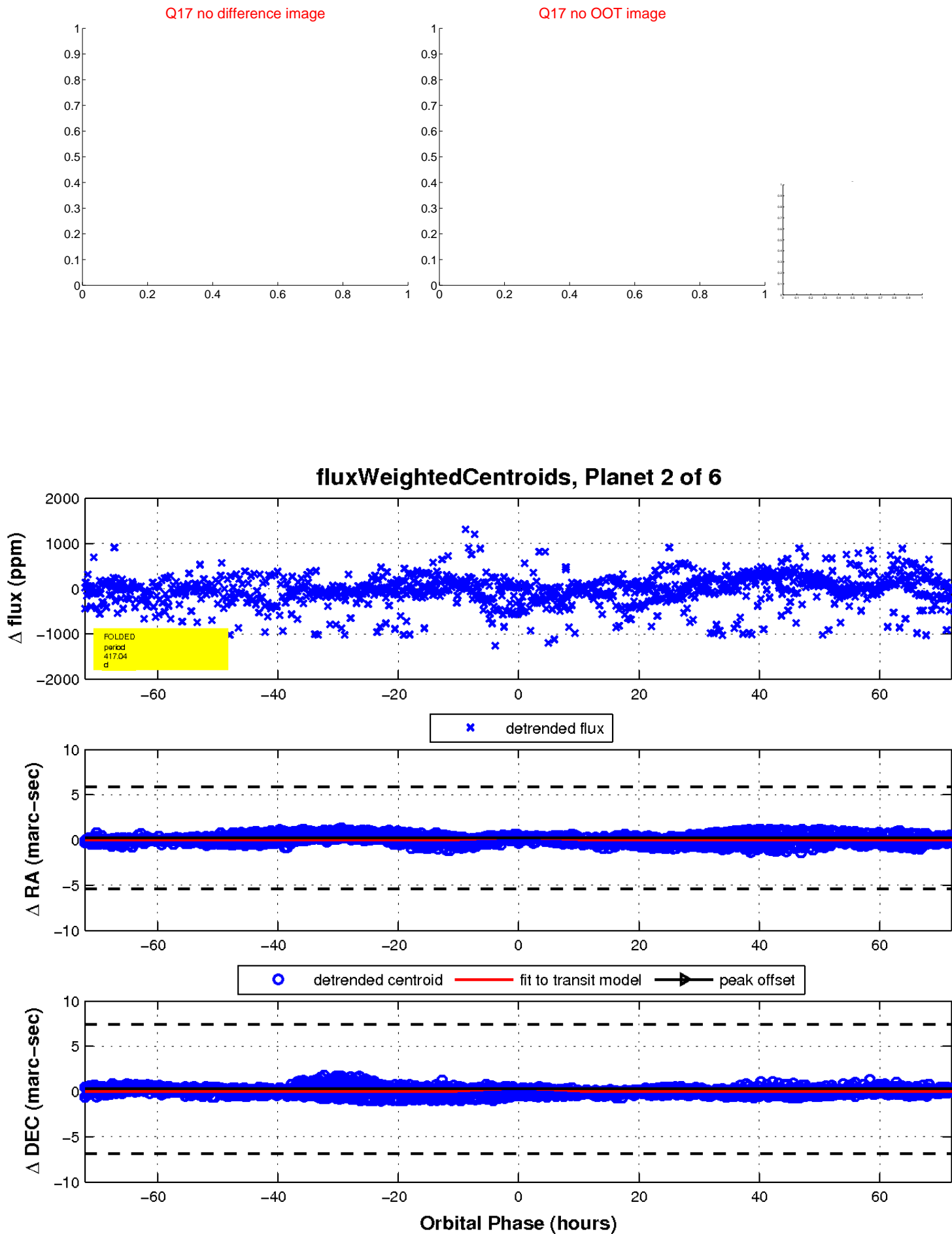
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

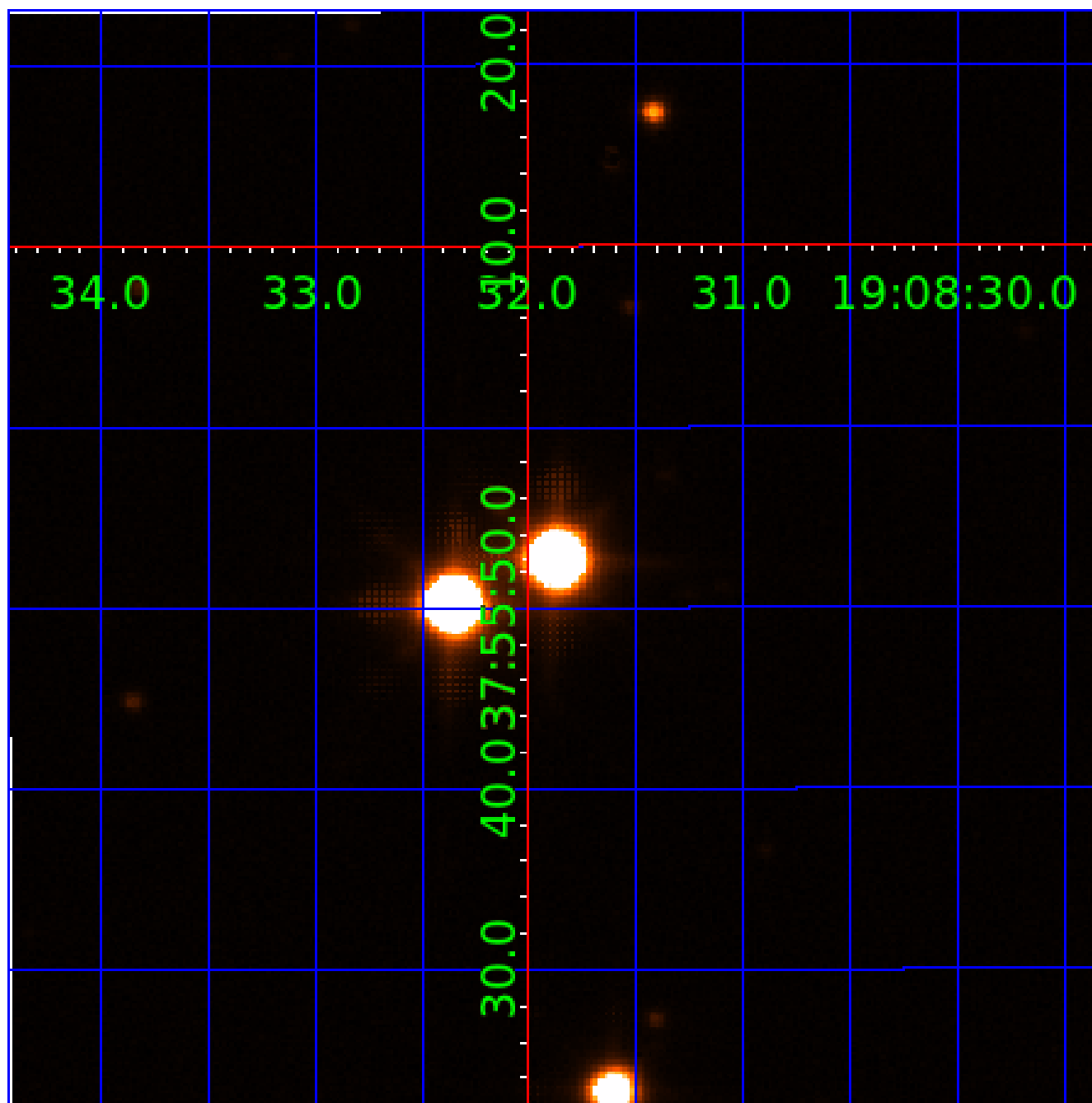


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 002696938

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
002696938-01	OBS	No	342.957490	318.021165	339.5	10.605	22.8	5.2	1.46	6484	2.92	3.38
002696938-02	OBS	No	417.041578	266.987338	543.7	24.035	12.6	13.1	1.46	6484	6.52	2.61
002696938-03	OBS	No	291.992005	279.284227	619.7	40.497	11.0	12.4	1.46	6484	6.93	4.19
002696938-04	OBS	No	429.742064	244.561690	245.4	19.502	9.6	8.0	1.46	6484	2.43	2.50
002696938-05	OBS	No	316.817135	373.894776	387.4	20.024	8.6	7.9	1.46	6484	3.40	3.76
002696938-06	OBS	No	302.428737	376.582428	291.7	4.961	9.3	7.6	1.46	6484	2.74	4.00

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002696938-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_SATURATED
002696938-02	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
002696938-03	OBS	FP	0.00	1	0	0	0	LPP_DV—INCONSISTENT_TRANS—CENT_SATURATED
002696938-04	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—INCONSISTENT_TRANS—CENT_SATURATED
002696938-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_SATURATED
002696938-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_SATURATED

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

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

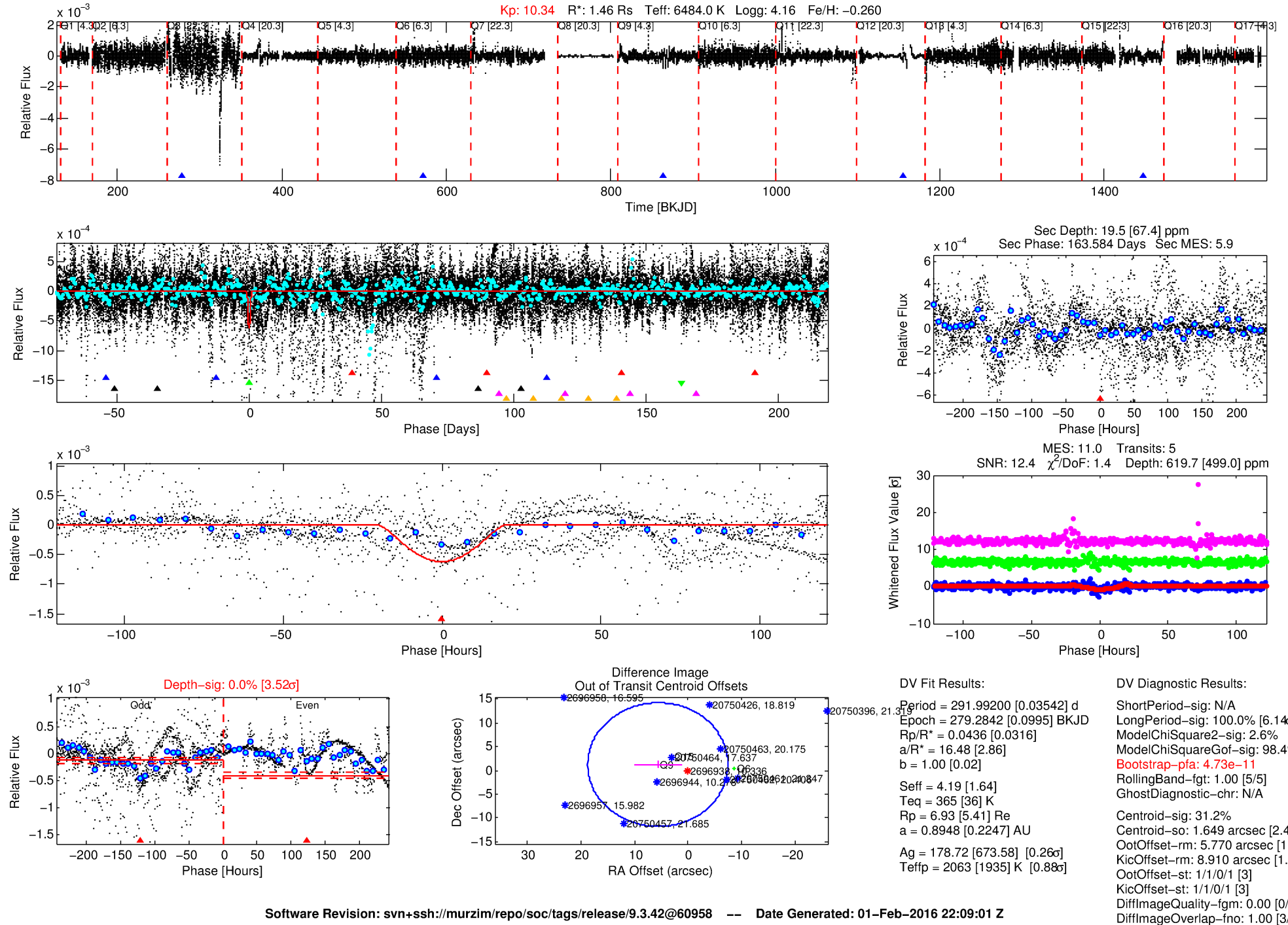
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 002696938-03

No Significant Match Found

# DV One-Page Summary

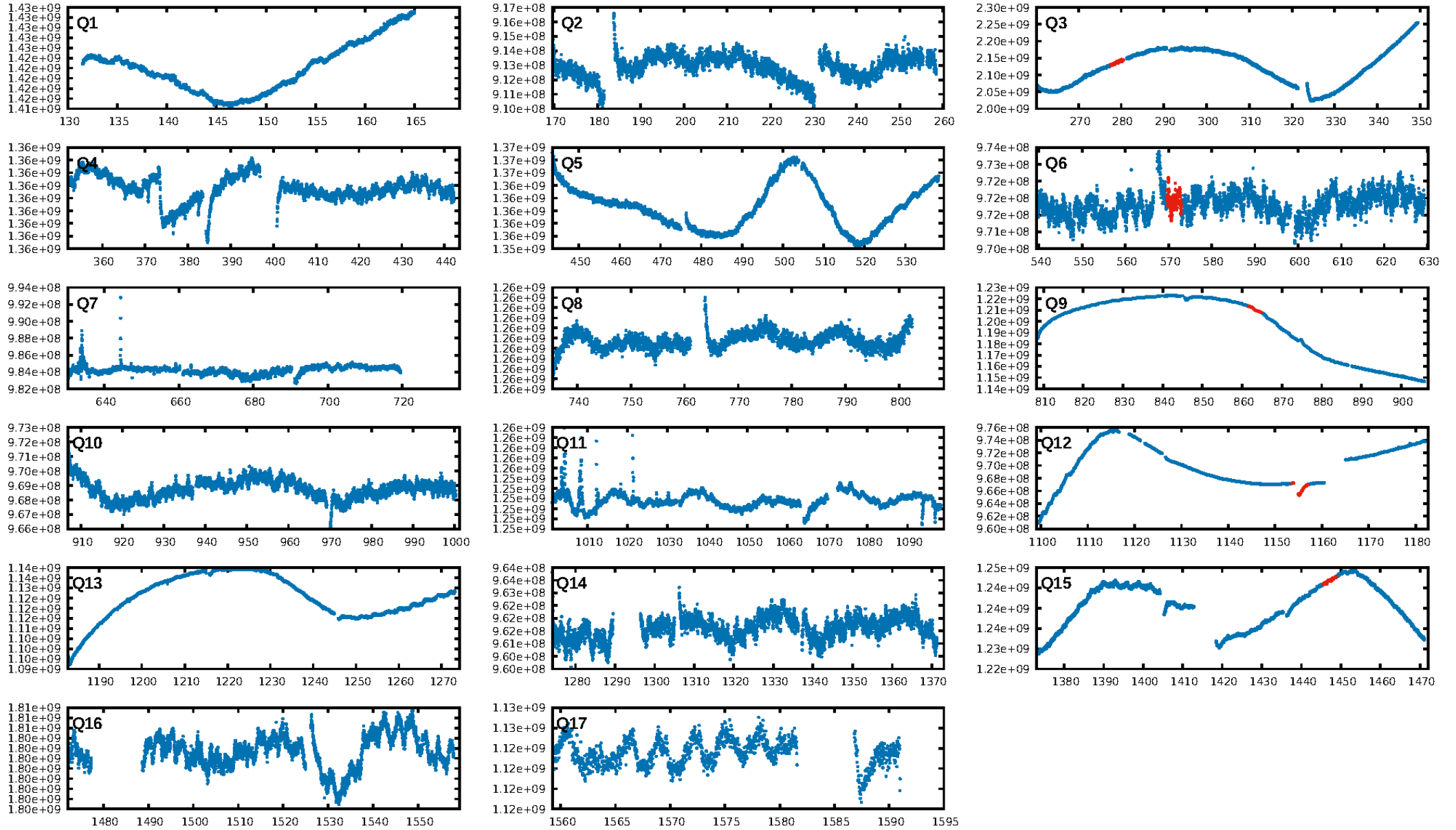
KIC: 2696938 Candidate: 3 of 6 Period: 291.992 d



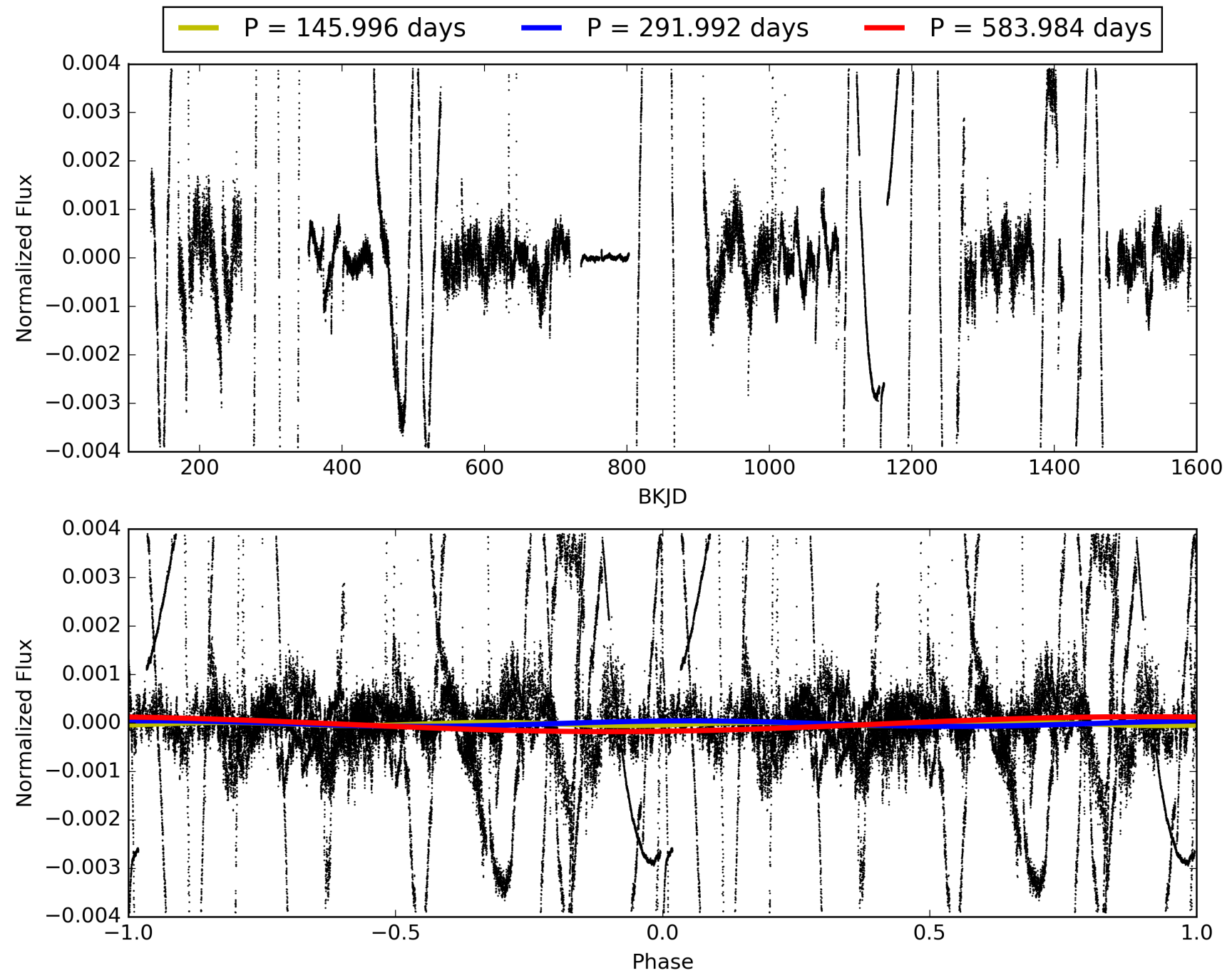
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 22:09:01 Z

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

# TCE 002696938-03, PDC Light Curves



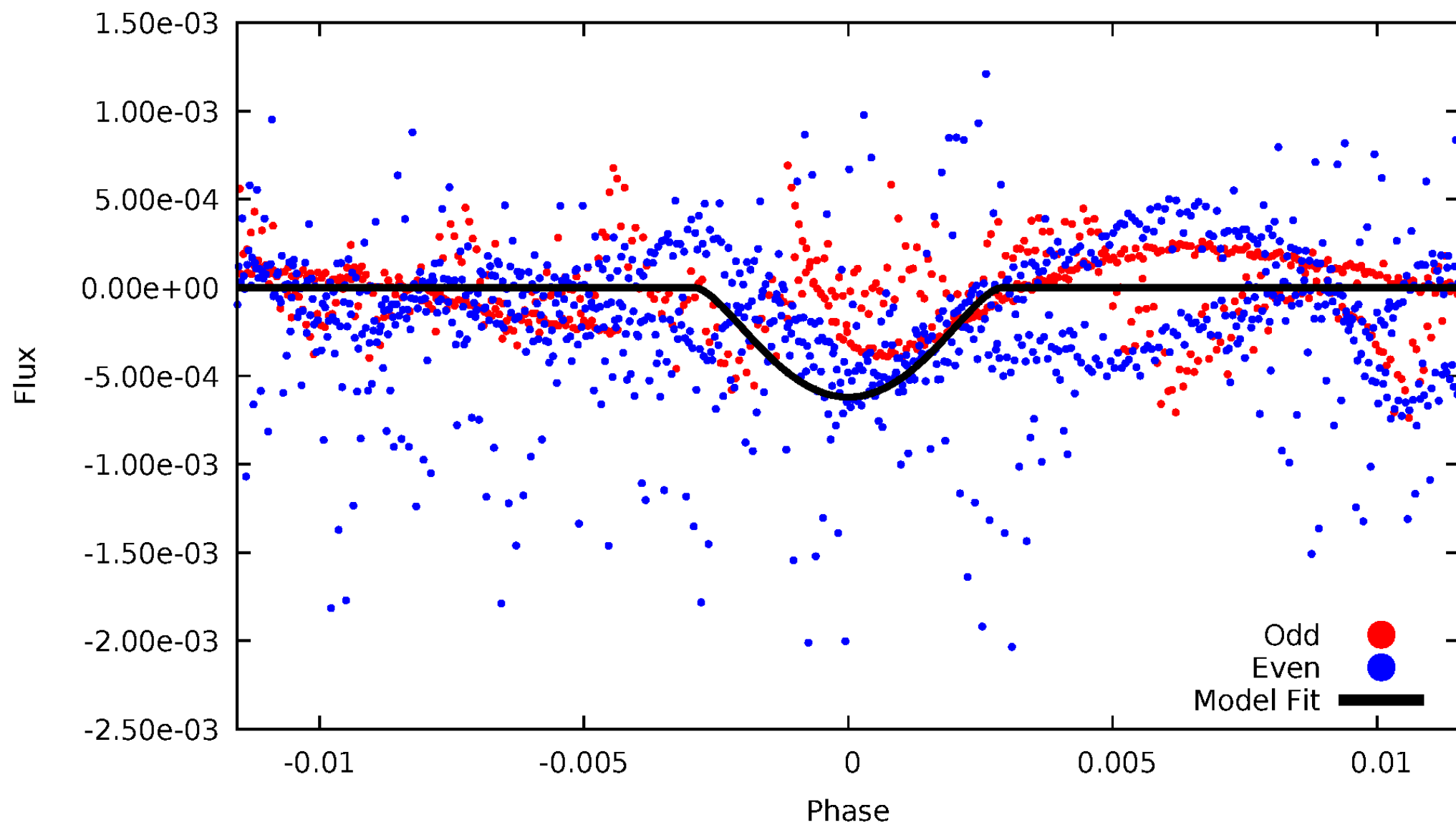
# TCE 002696938-03





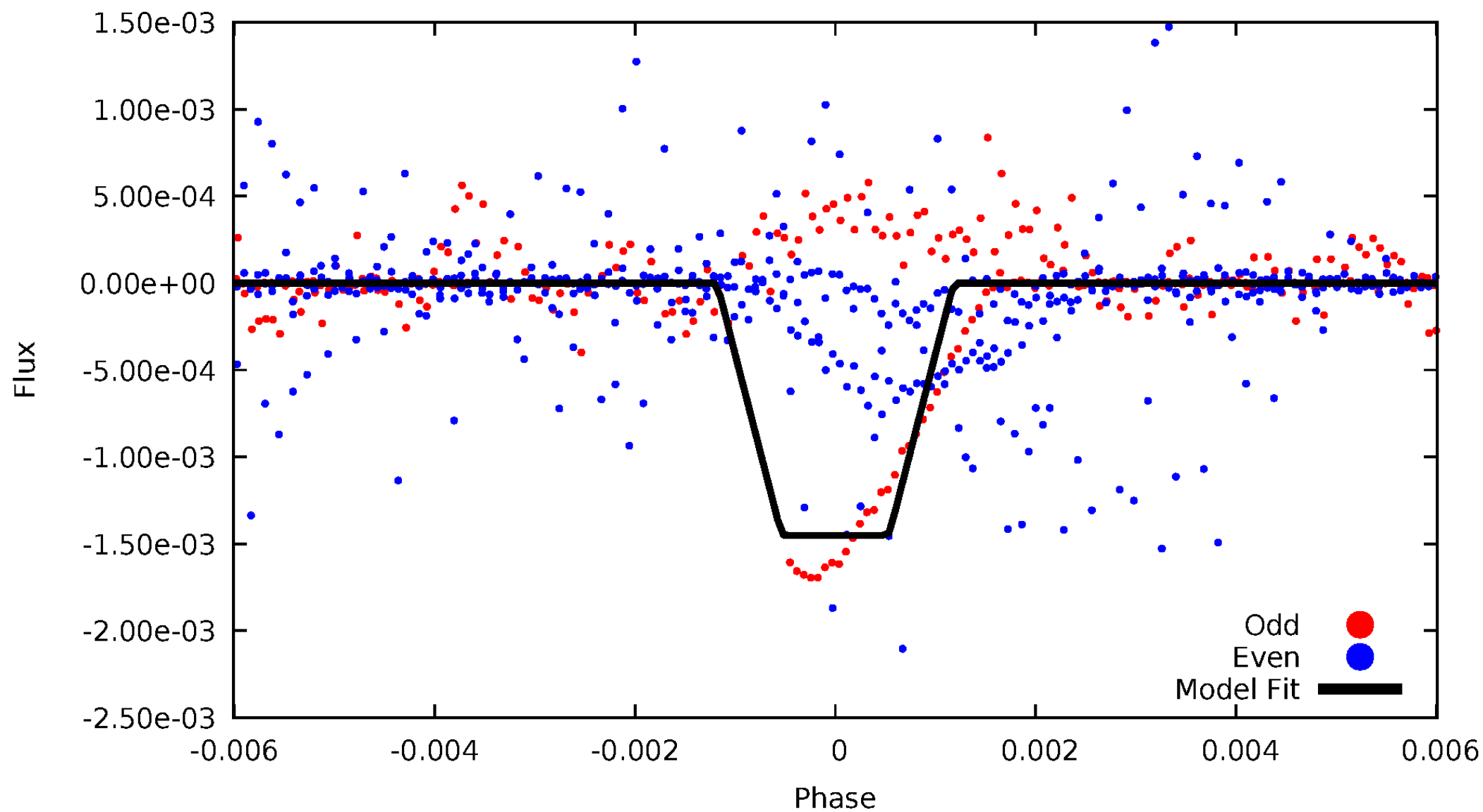
# DV Odd/Even

TCE 002696938-03



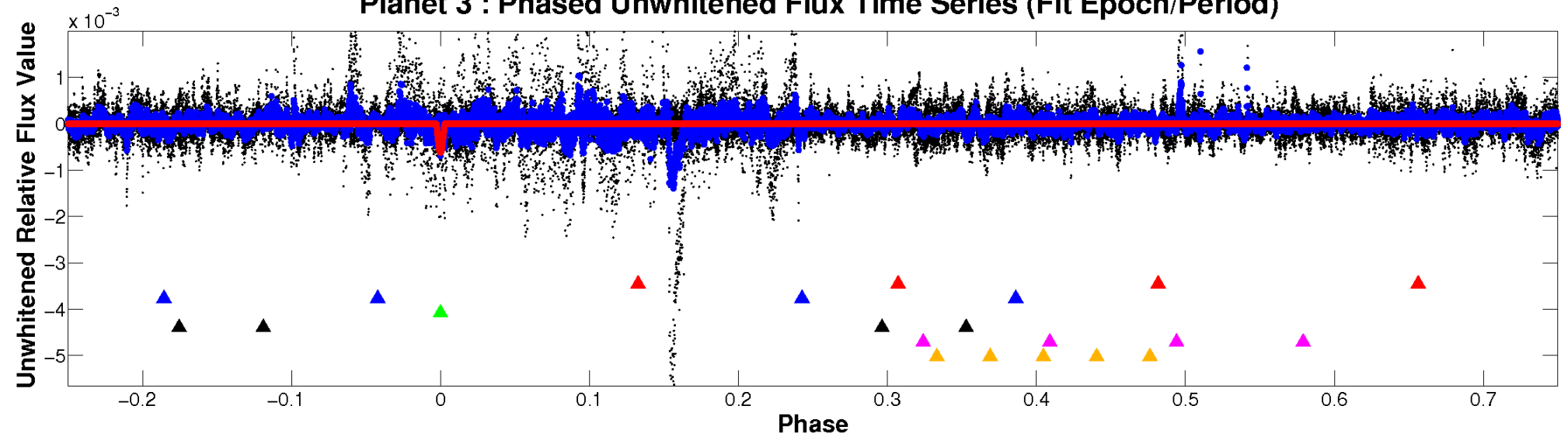
# ALT Odd/Even

TCE 002696938-03

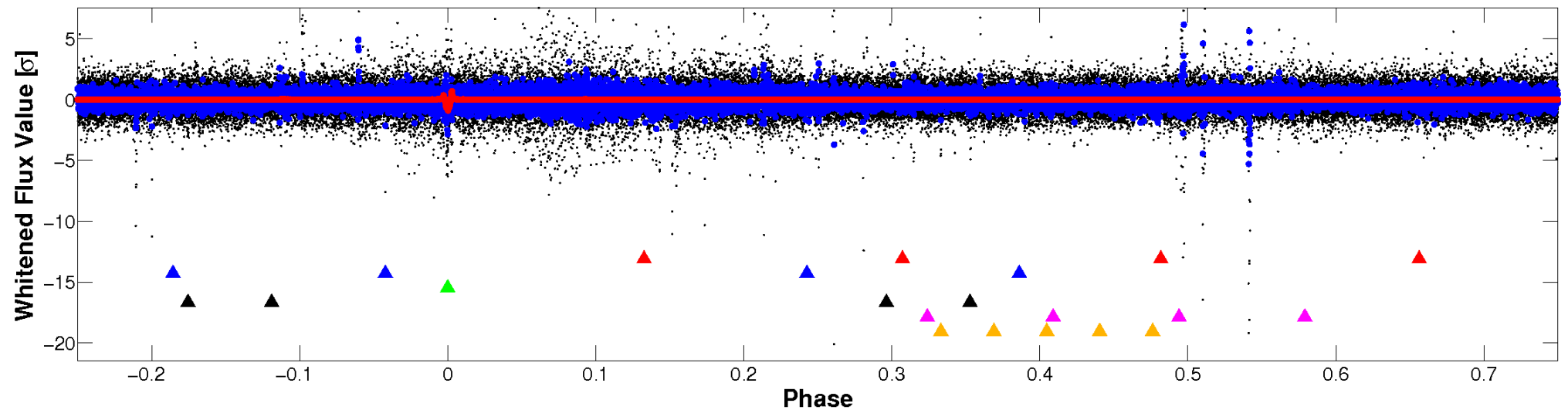


# Non-Whitened Vs. Whitened Light Curve

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

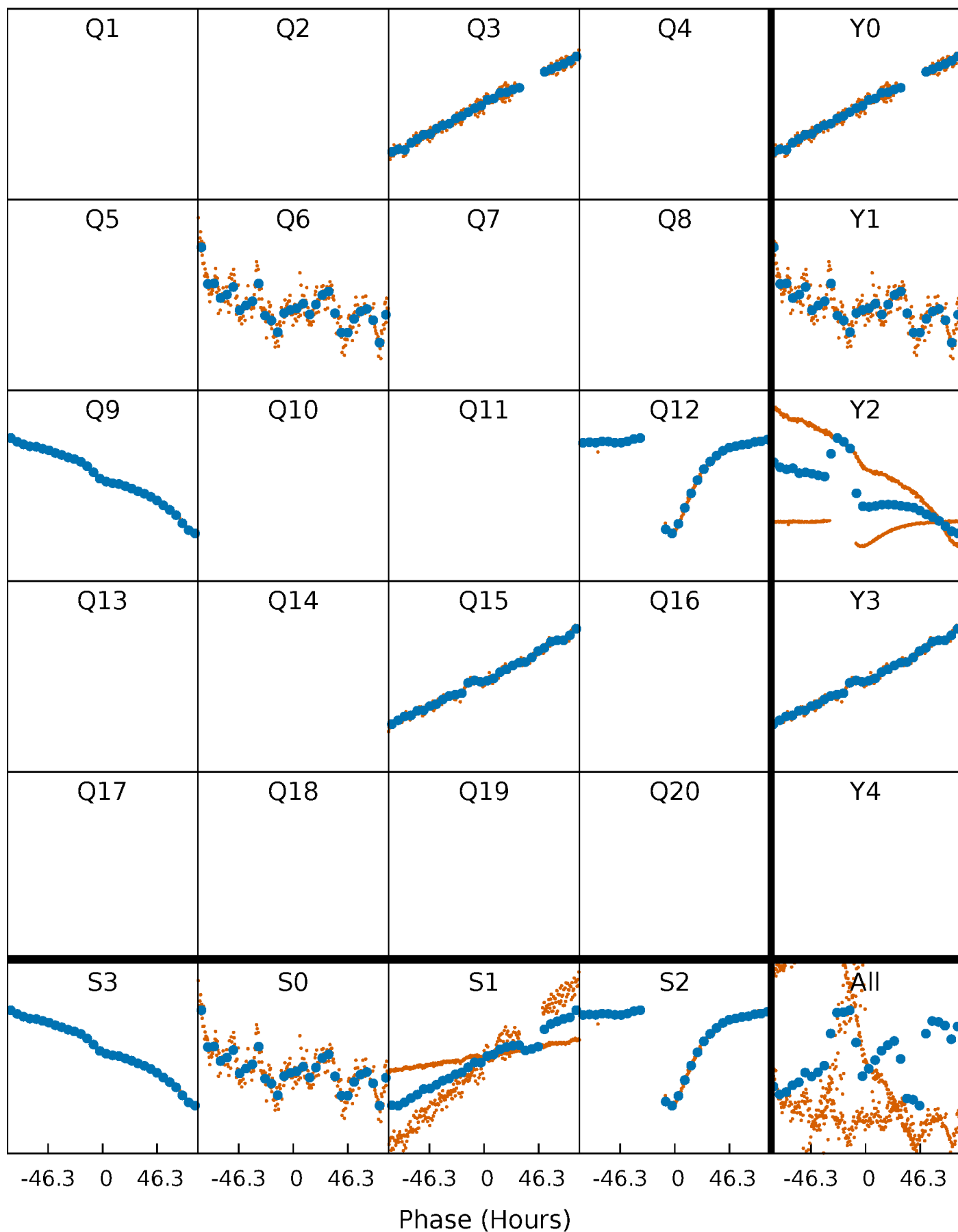


**Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



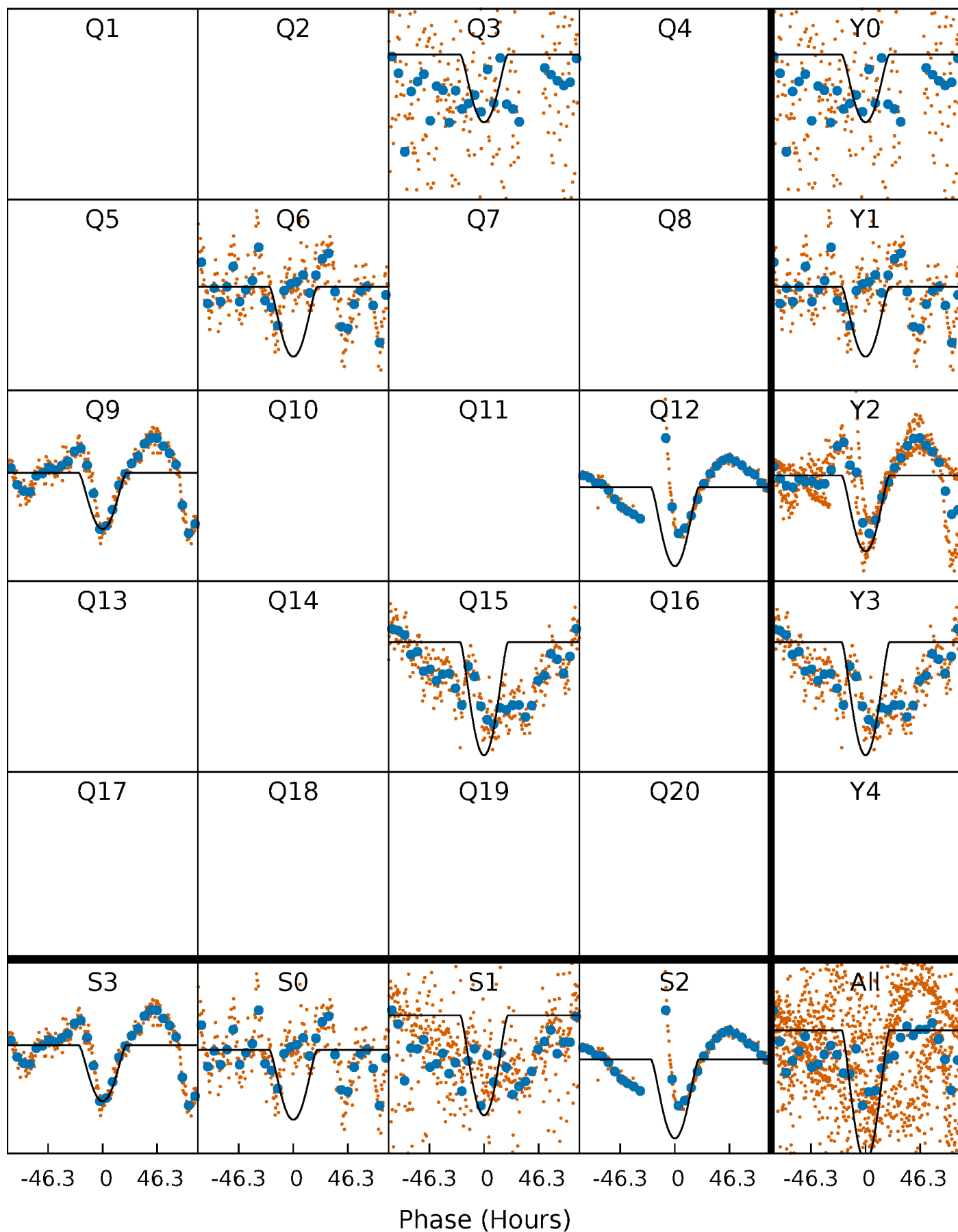
# PDC Quarter-Phased Transit Curves

TCE 002696938-03 P=291.992005 Days  $T_0=279.284227$  (BKJD)



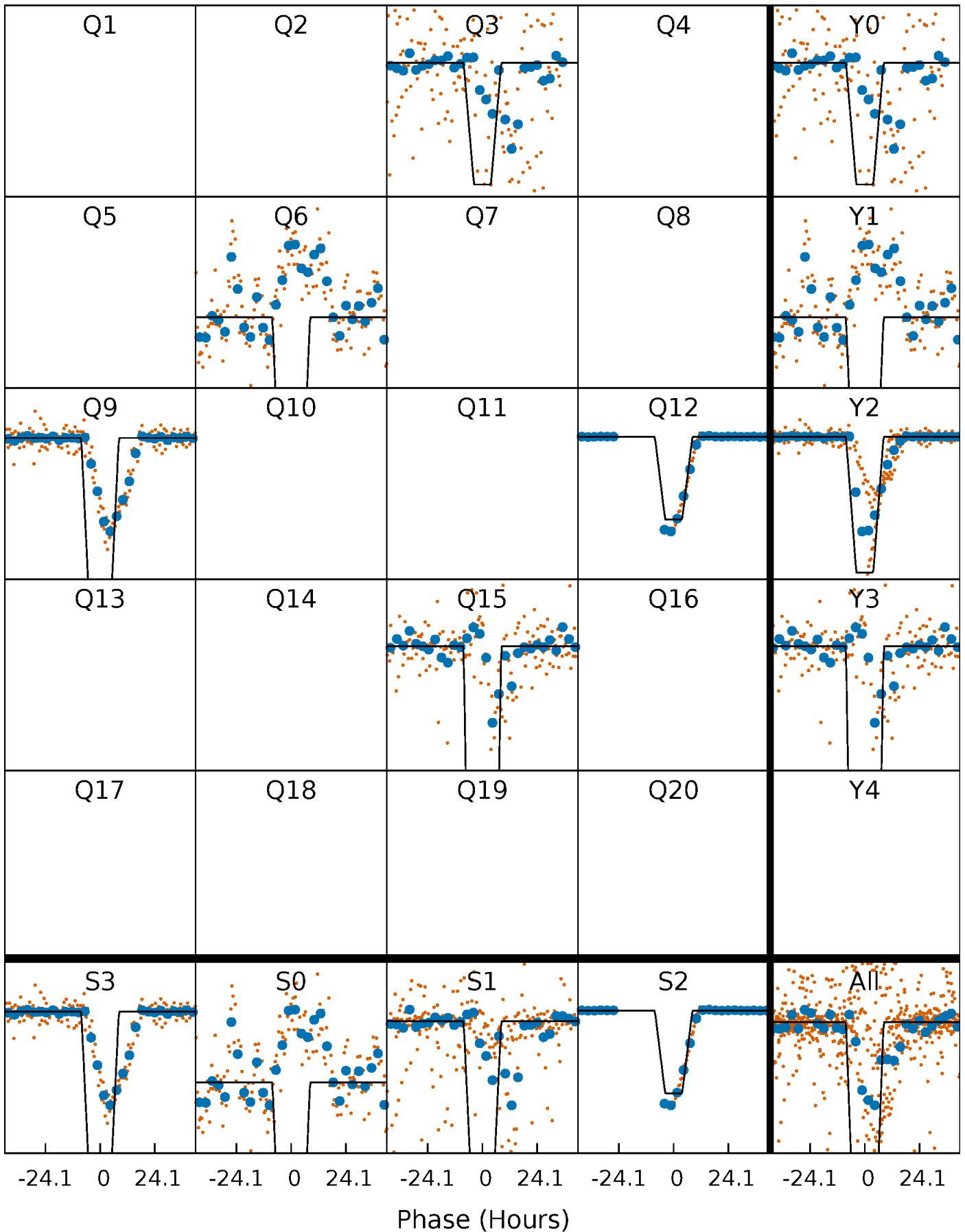
# DV Quarter-Phased Transit Curves

TCE 002696938-03     $P=291.992005$  Days     $T_0=279.284227$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

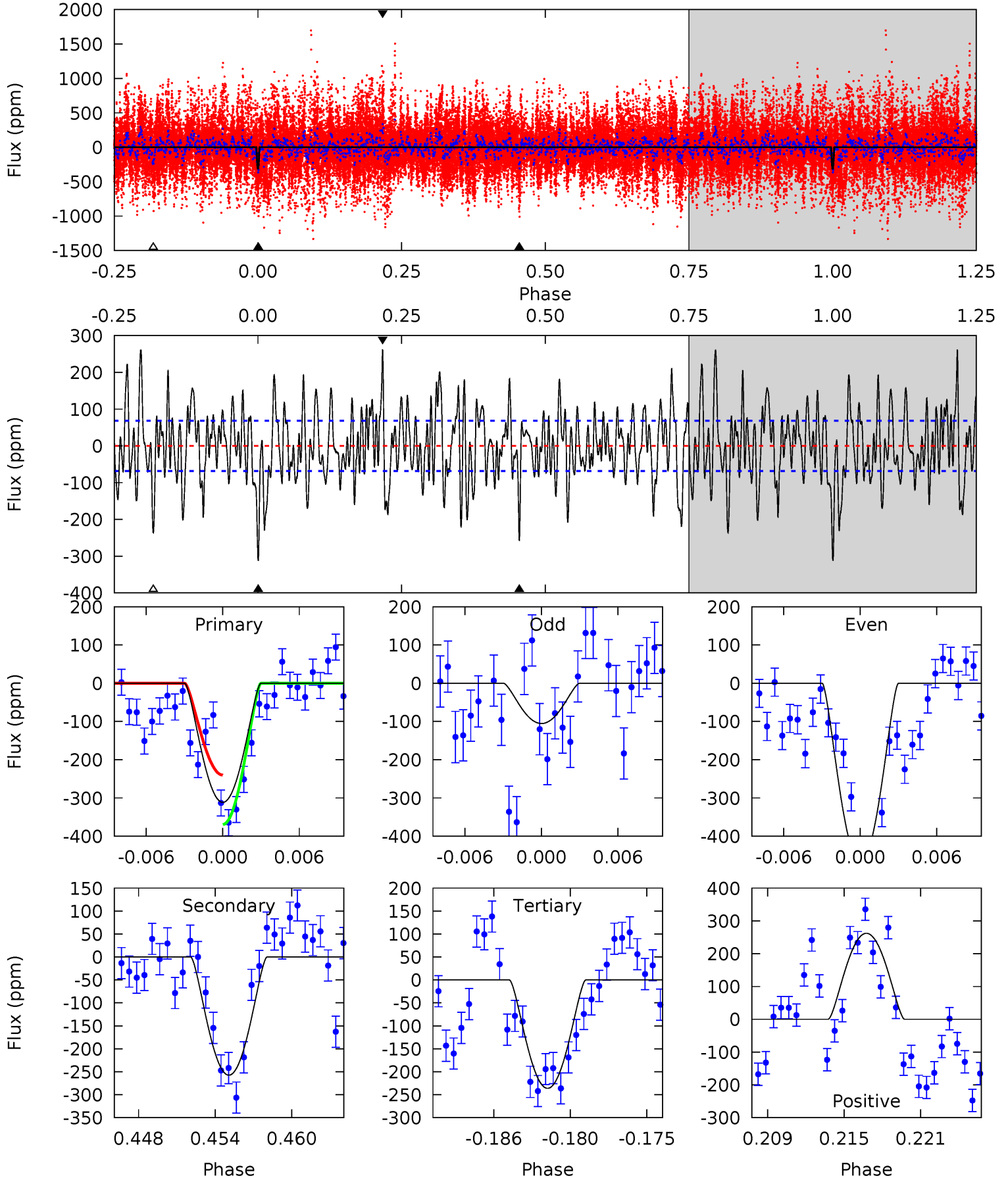
TCE 002696938-03 P=291.995572 Days  $T_0=279.071644$  (BKJD)



# DV Model-Shift Uniqueness Test

002696938-03, P = 291.992005 Days, E = 279.284227 Days

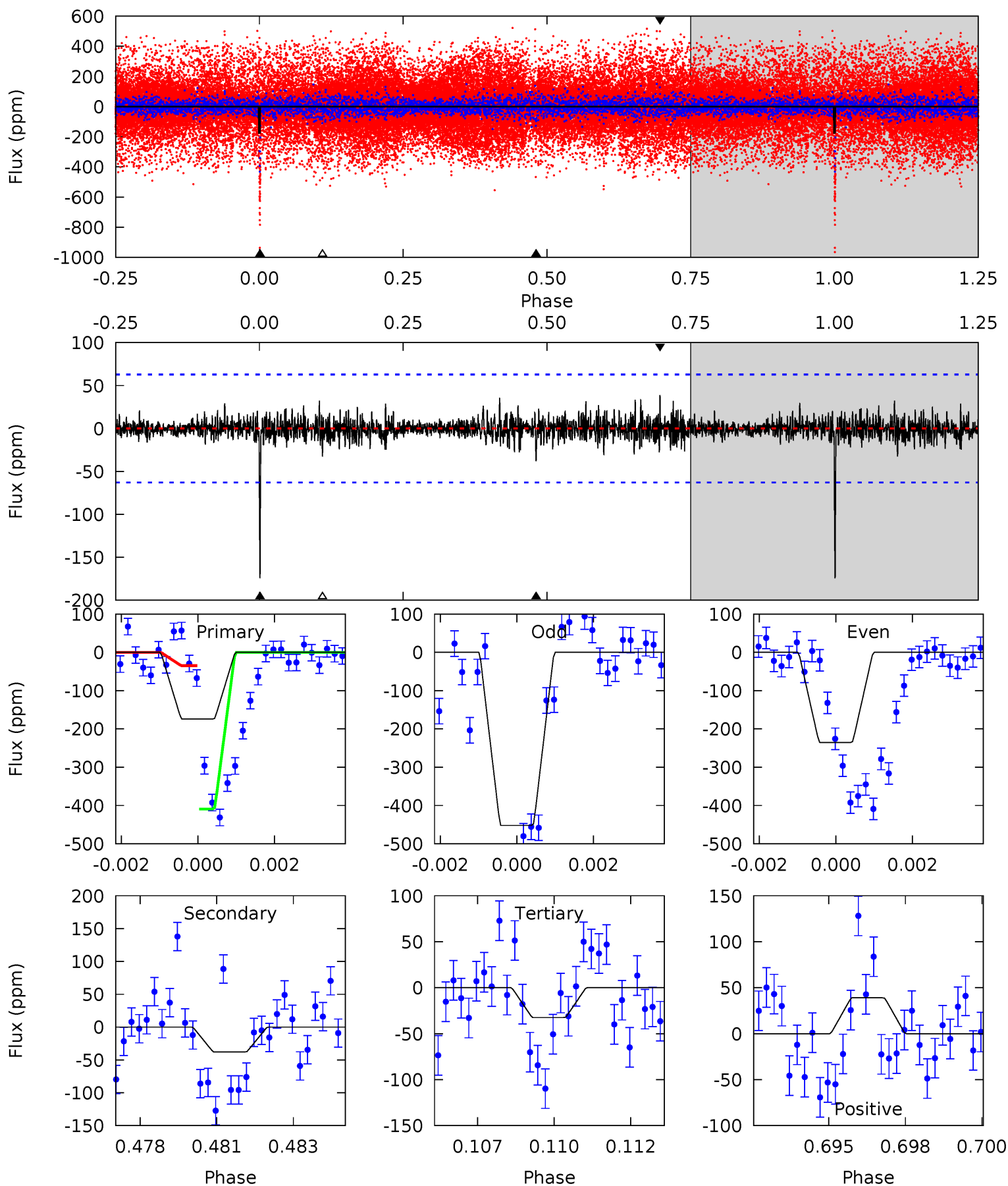
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
23.4	19.3	17.7	19.7	5.13	2.76	6.43	5.65	3.71	1.60	-0.35	13.1	0.73	0.46	4.87



# Alt Model-Shift Uniqueness Test

002696938-03, P = 291.995572 Days, E = 279.071644 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
14.6	3.19	2.73	3.27	5.29	3.03	0.72	11.9	11.4	0.46	-0.09	10.3	1.18	0.18	0





### Stellar Parameters For KIC 002696938

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6484^{+146}_{-178}$	$4.161^{+0.209}_{-0.171}$	$-0.260^{+0.250}_{-0.300}$	$1.456^{+0.422}_{-0.346}$	$1.119^{+0.193}_{-0.129}$	$0.511^{+0.594}_{-0.239}$
	+2%/-3%	+5%/-4%	+96%/-115%	+29%/-24%	+17%/-12%	+116%/-47%
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 002696938-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-257 \pm 13$	$7.72^{+4.80}_{-4.21}$	$507^{+37}_{-35}$	$4026^{+1462}_{-570}$	$1995^{+7508}_{-1263}$
Alt.	$-38 \pm 12$	$6.47^{+4.88}_{-3.80}$	$506^{+42}_{-34}$	$3113^{+1034}_{-458}$	$382^{+1944}_{-266}$

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

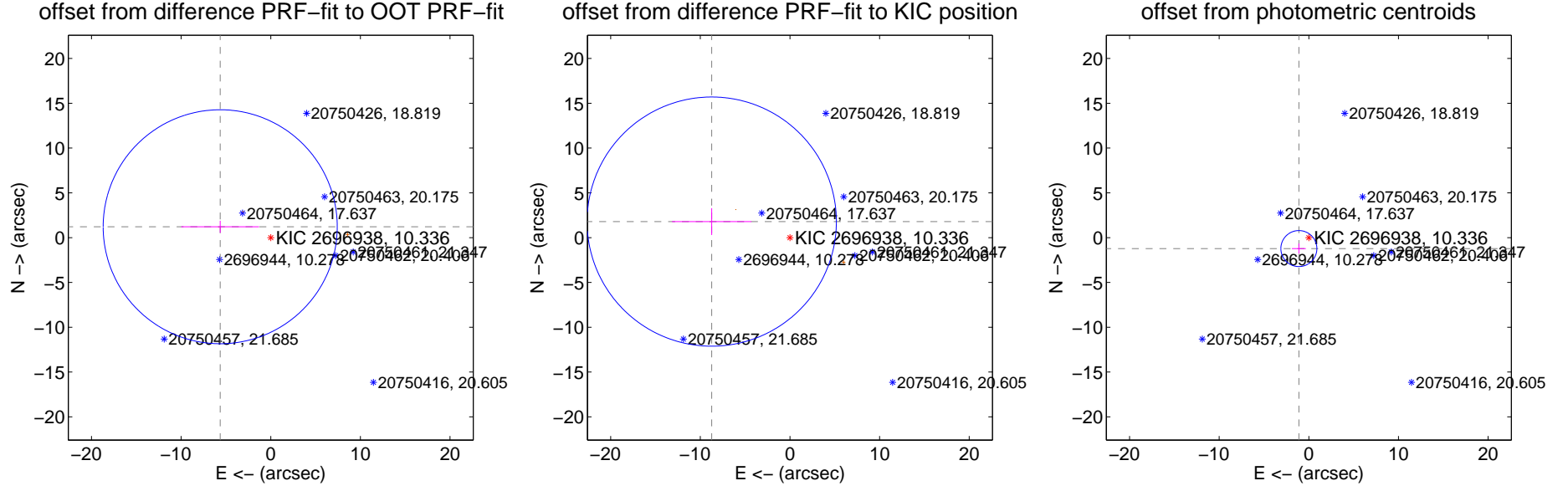
## DV Centroid Data

Supplemental centroid analysis for 002696938-03. **Kepler magnitude: 10.34.** Transit SNR 12.38

There are 0 quarters with good PRF difference image offsets

The OOT PRF centroid is offset from the target star catalog position by about 2.95 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$5.770 \pm 4.353$	1.33	$5.641 \pm 4.336$	$1.217 \pm 0.672$
PRF-fit source offset from KIC position	$8.910 \pm 4.636$	1.92	$8.728 \pm 4.434$	$1.792 \pm 1.501$
photometric centroid source offset	$1.65 \pm 0.67$	2.46	$1.11 \pm 0.78$	$-1.22 \pm 0.56$

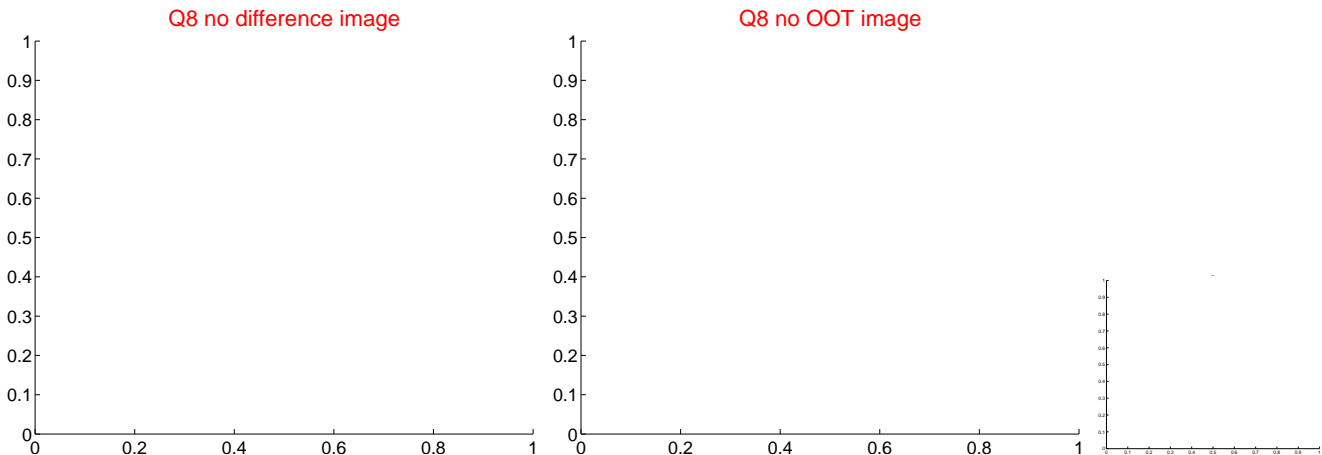
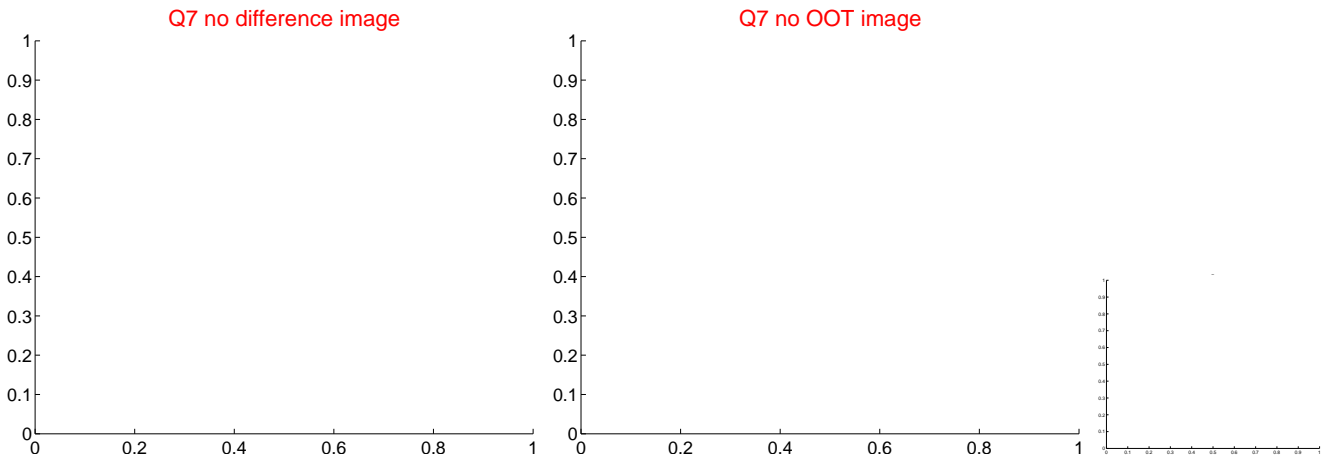
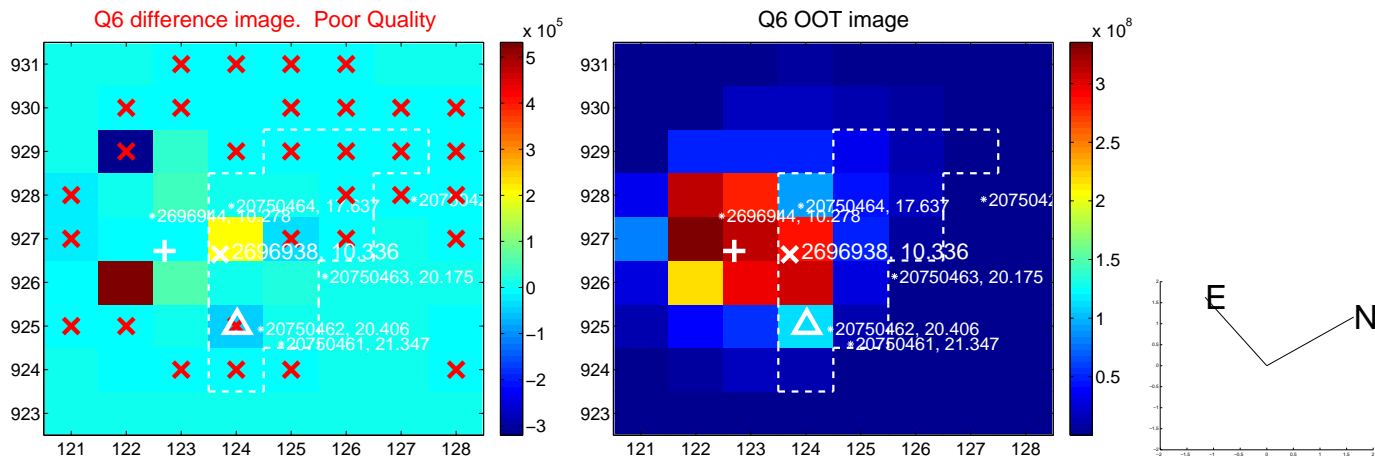
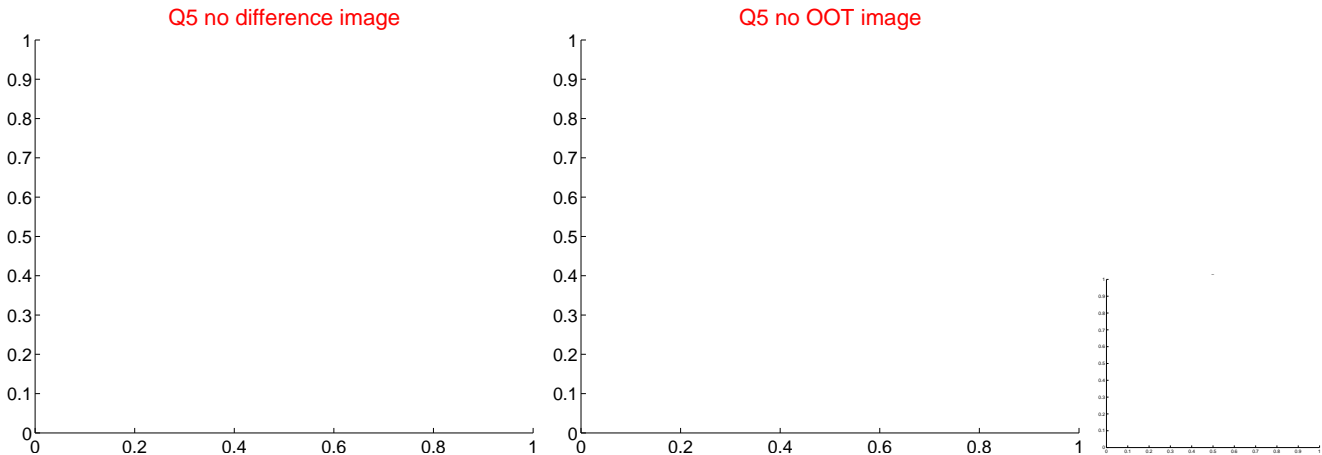


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

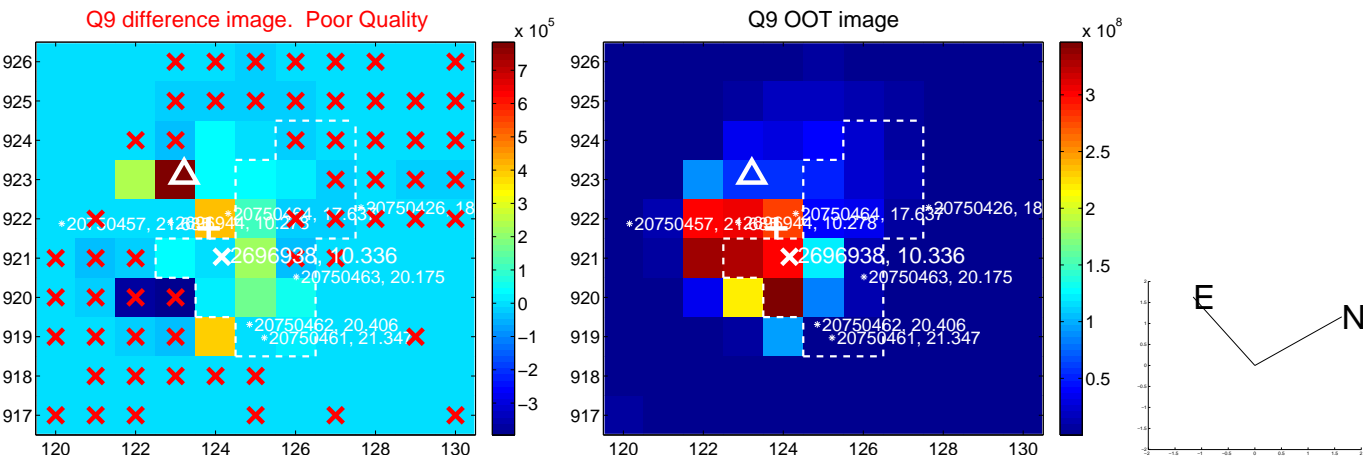
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



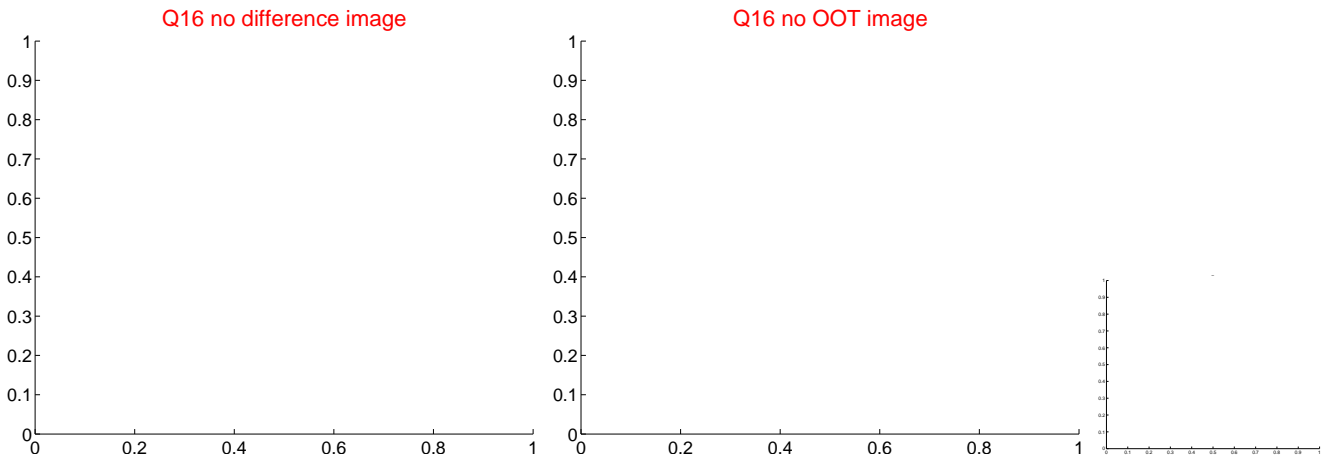
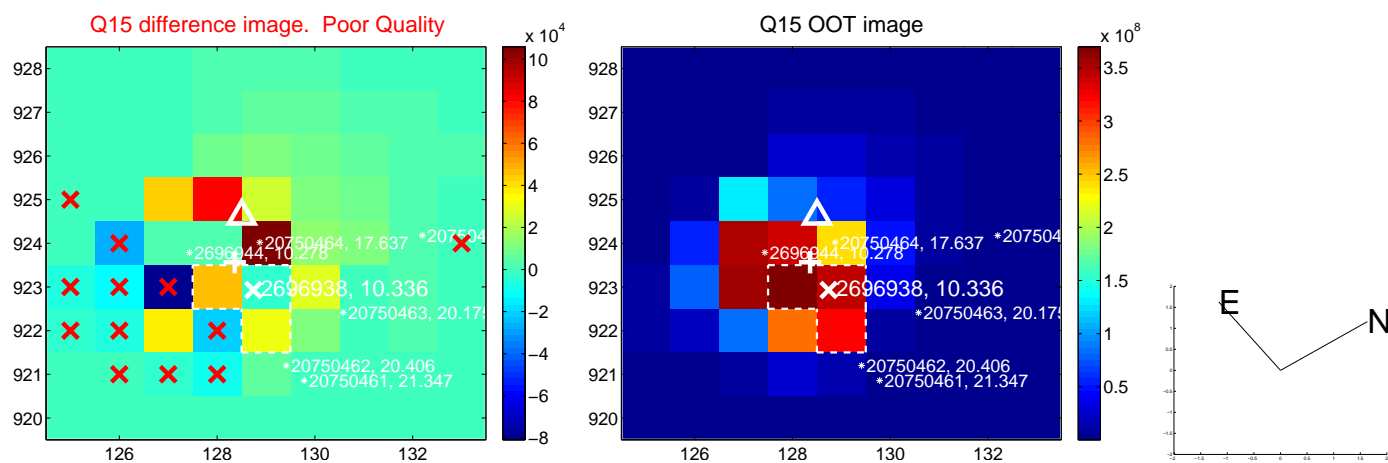
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value



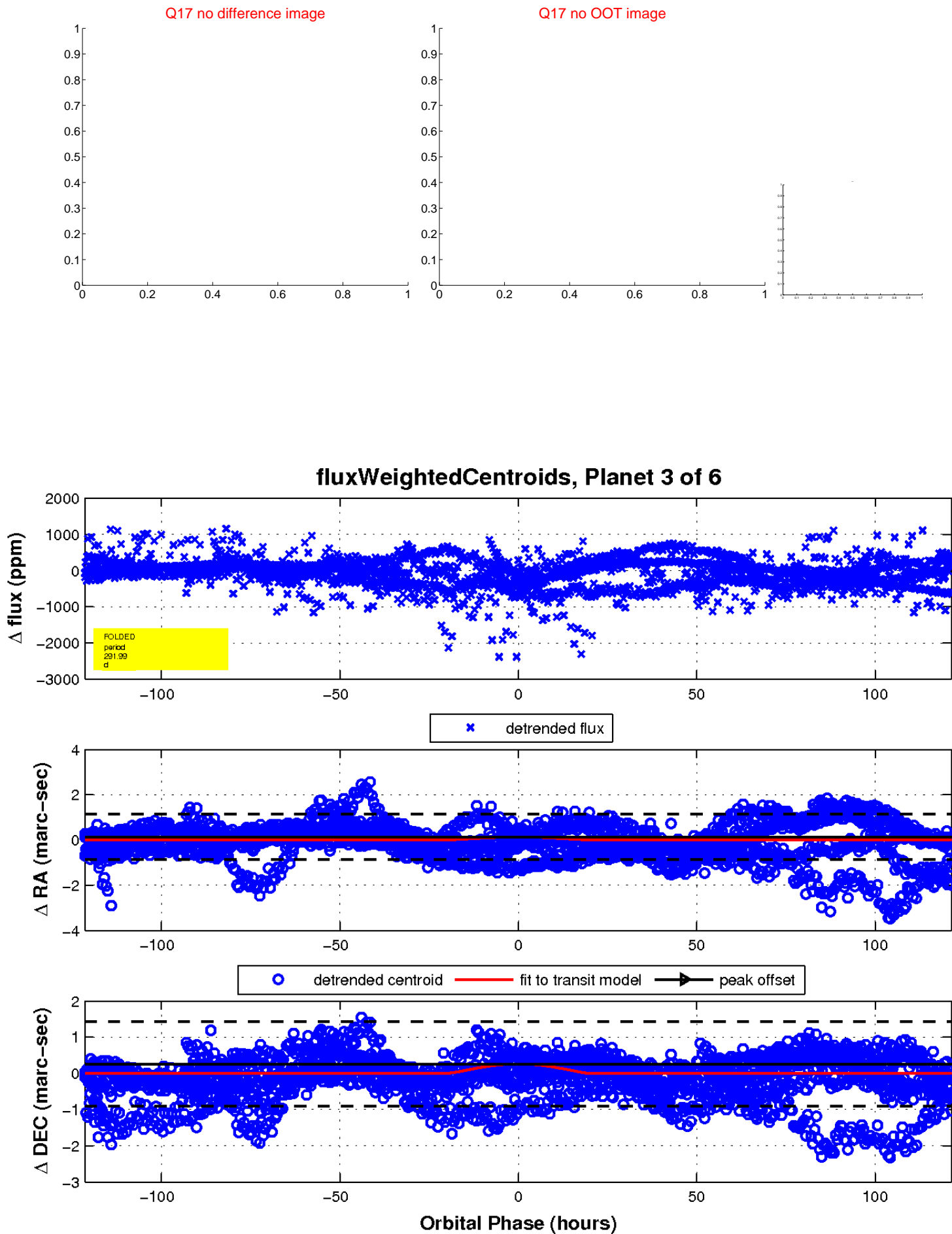
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

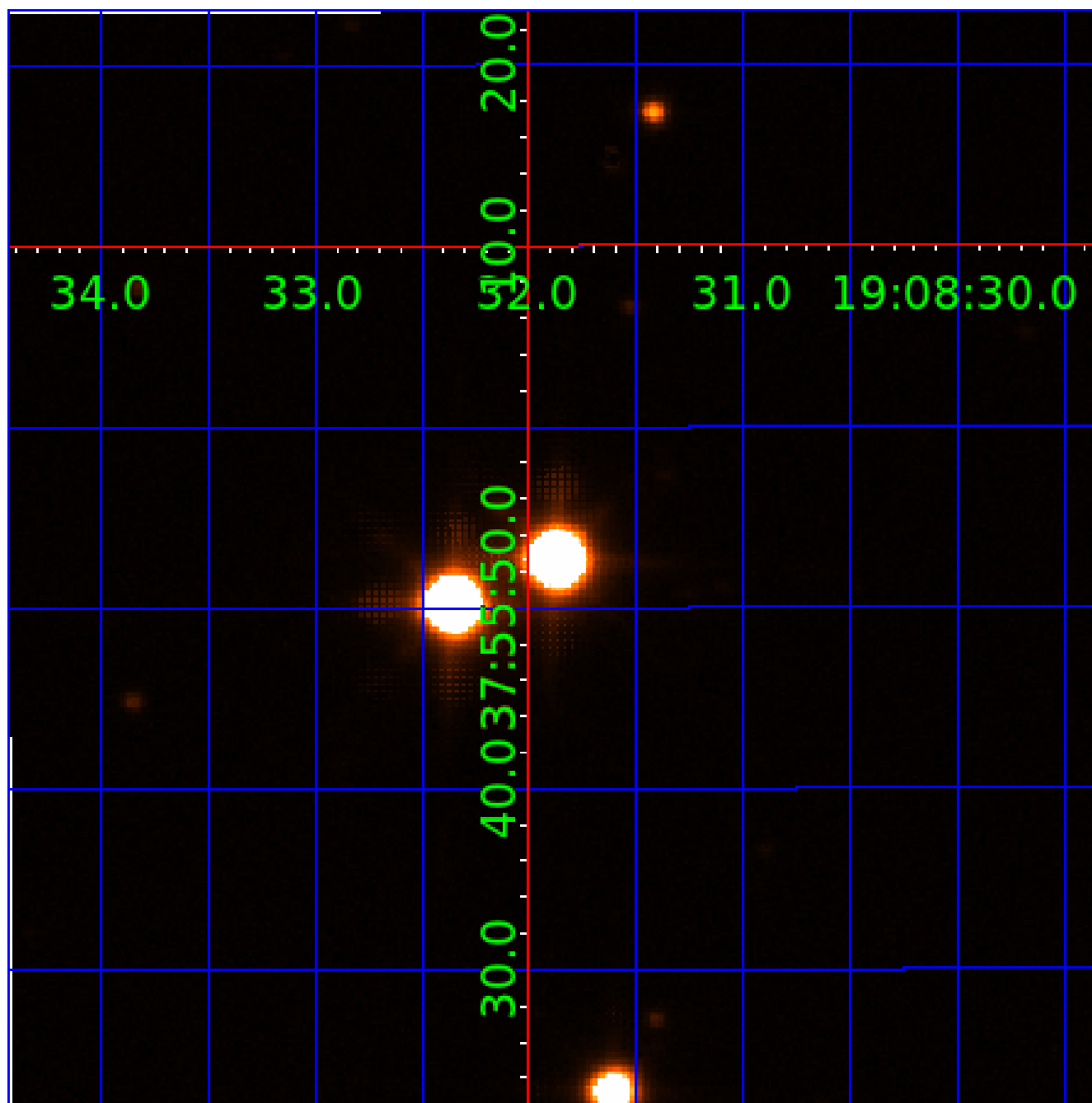


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 002696938

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
002696938-01	OBS	No	342.957490	318.021165	339.5	10.605	22.8	5.2	1.46	6484	2.92	3.38
002696938-02	OBS	No	417.041578	266.987338	543.7	24.035	12.6	13.1	1.46	6484	6.52	2.61
002696938-03	OBS	No	291.992005	279.284227	619.7	40.497	11.0	12.4	1.46	6484	6.93	4.19
002696938-04	OBS	No	429.742064	244.561690	245.4	19.502	9.6	8.0	1.46	6484	2.43	2.50
002696938-05	OBS	No	316.817135	373.894776	387.4	20.024	8.6	7.9	1.46	6484	3.40	3.76
002696938-06	OBS	No	302.428737	376.582428	291.7	4.961	9.3	7.6	1.46	6484	2.74	4.00

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002696938-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_SATURATED
002696938-02	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
002696938-03	OBS	FP	0.00	1	0	0	0	LPP_DV—INCONSISTENT_TRANS—CENT_SATURATED
002696938-04	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—INCONSISTENT_TRANS—CENT_SATURATED
002696938-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_SATURATED
002696938-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_SATURATED

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

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

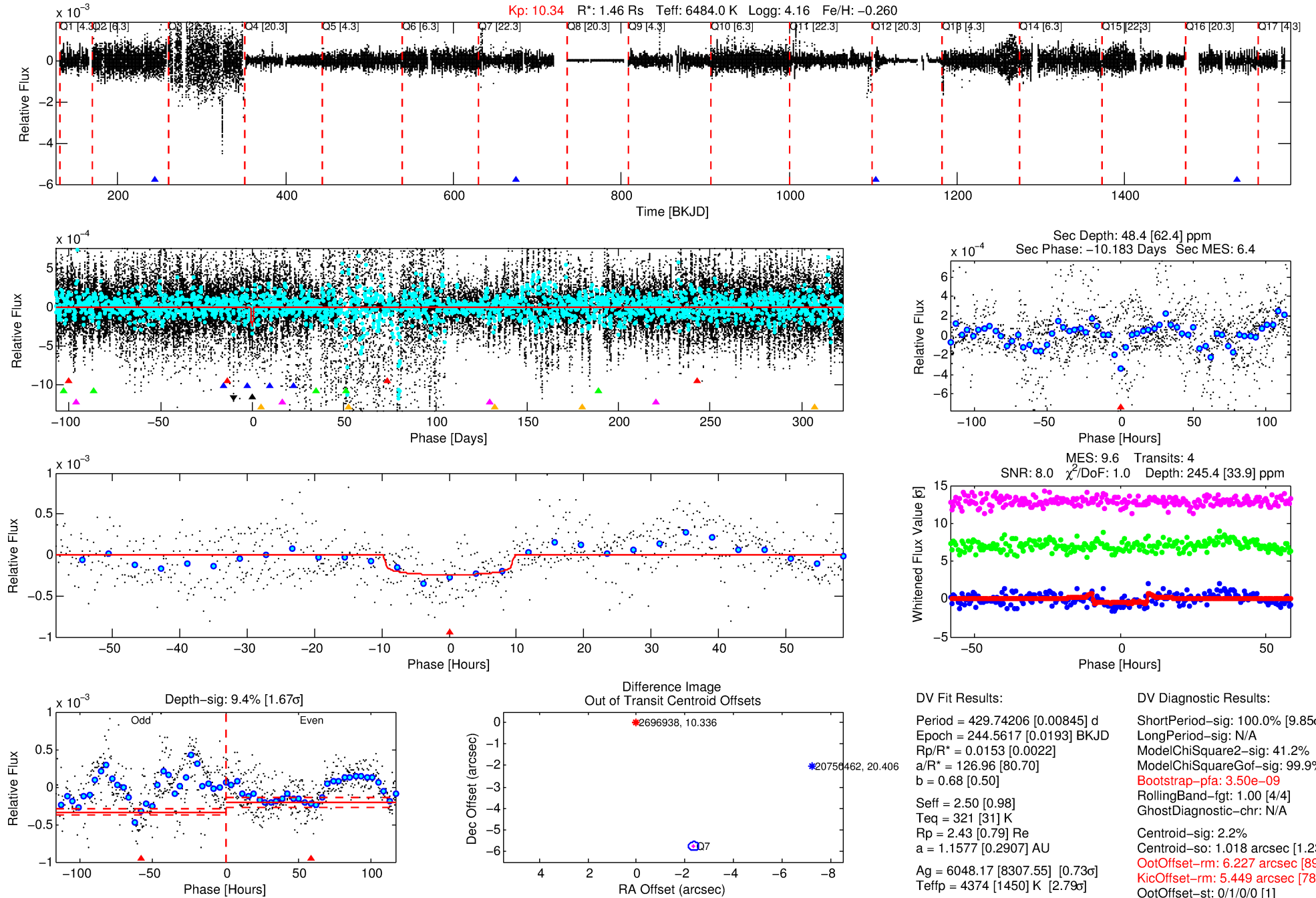
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 002696938-04

No Significant Match Found

# DV One-Page Summary

KIC: 2696938 Candidate: 4 of 6 Period: 429.742 d



## DV Fit Results:

Period = 429.74206 [0.00845] d  
Epoch = 244.5617 [0.0193] BKJD  
Rp/R\* = 0.0153 [0.0022]  
a/R\* = 126.96 [80.70]  
b = 0.68 [0.50]  
Seff = 2.50 [0.98]  
Teq = 321 [31] K  
Rp = 2.43 [0.79] Re  
a = 1.1577 [0.2907] AU  
Ag = 6048.17 [8307.55] [0.73 $\sigma$ ]  
Teffp = 4374 [1450] K [2.79 $\sigma$ ]

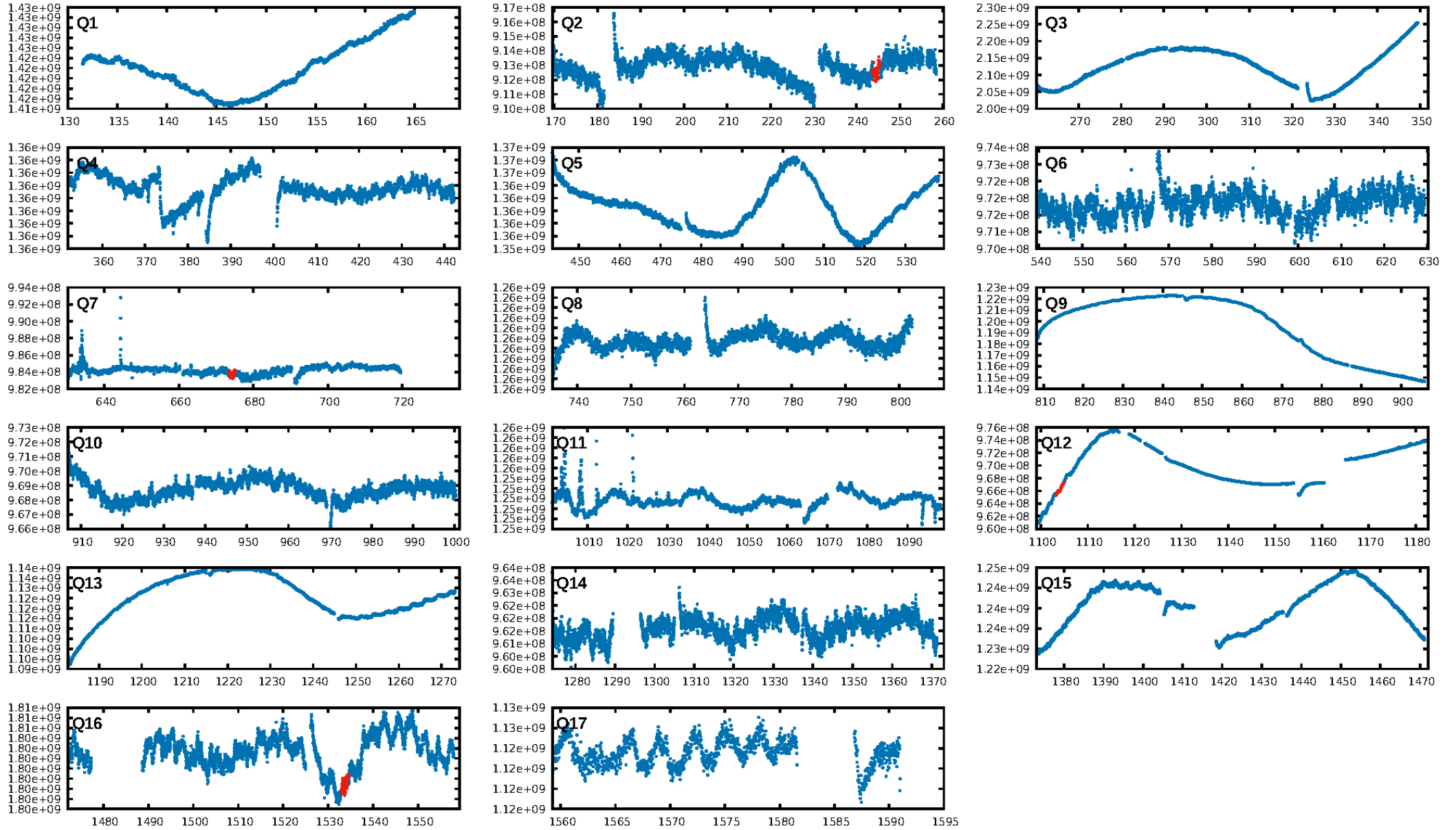
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [9.85 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 41.2%  
ModelChiSquareGof-sig: 99.9%  
Bootstrap-pfa: 3.50e-09  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: N/A  
Centroid-sig: 2.2%  
Centroid-so: 1.018 arcsec [1.23 $\sigma$ ]  
OotOffset-rm: 6.227 arcsec [89.52 $\sigma$ ]  
KicOffset-rm: 5.449 arcsec [78.45 $\sigma$ ]  
OotOffset-st: 0/1/0/0 [1]  
KicOffset-st: 0/1/0/0 [1]  
DiffImageQuality-fgm: 1.00 [1/1]  
DiffImageOverlap-fno: 1.00 [2/2]

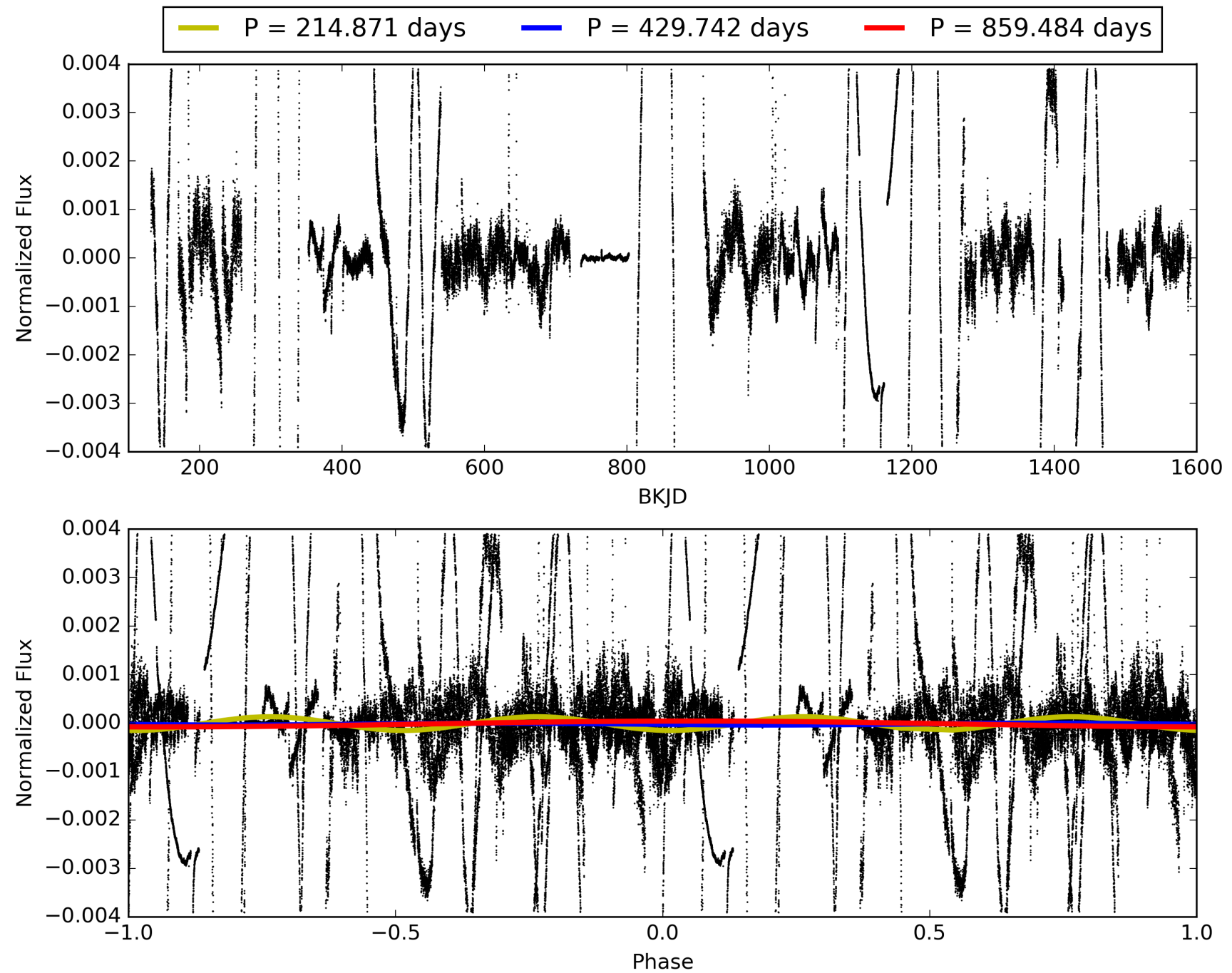
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 22:09:09 Z

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

# TCE 002696938-04, PDC Light Curves

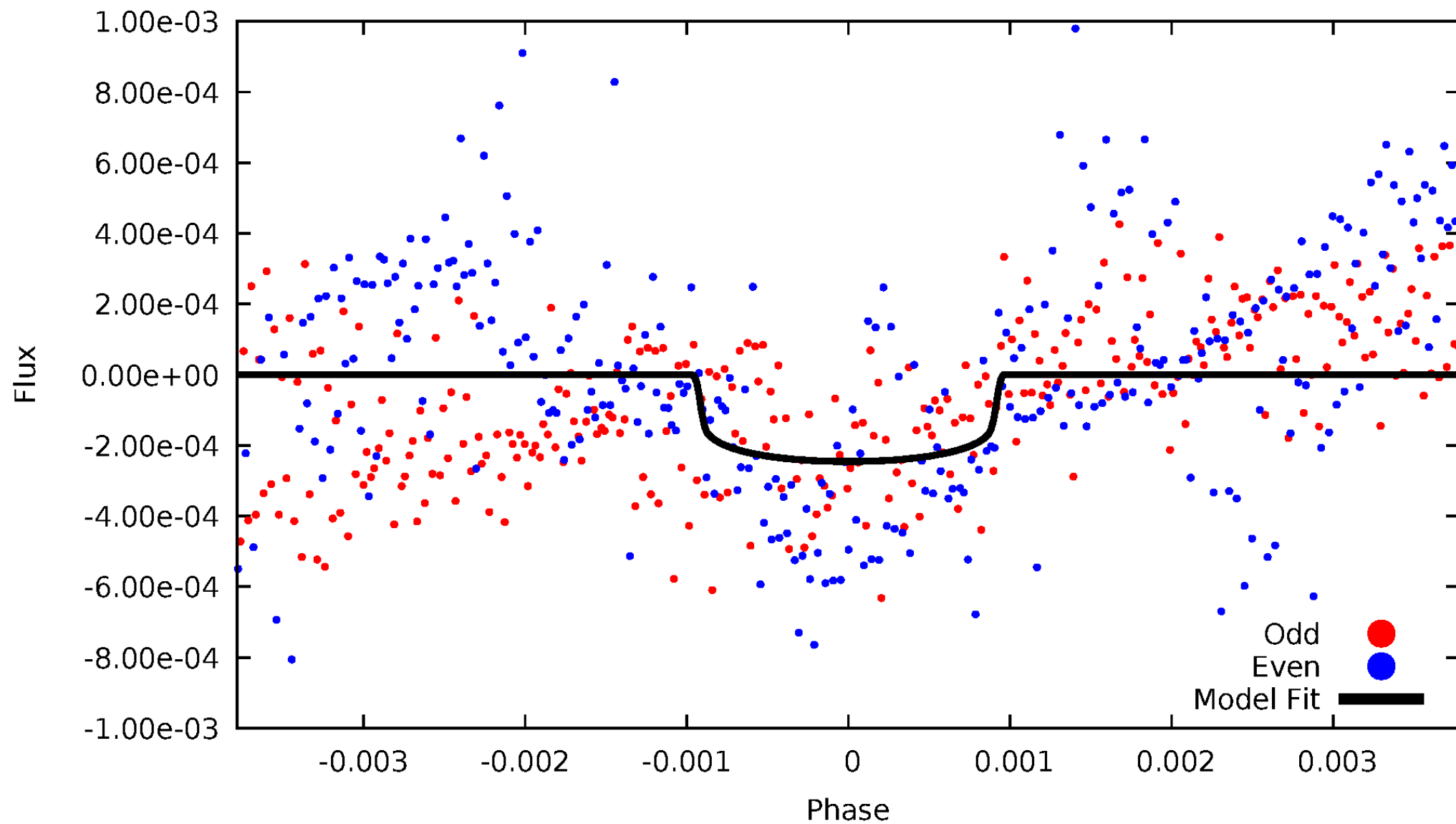


TCE 002696938-04



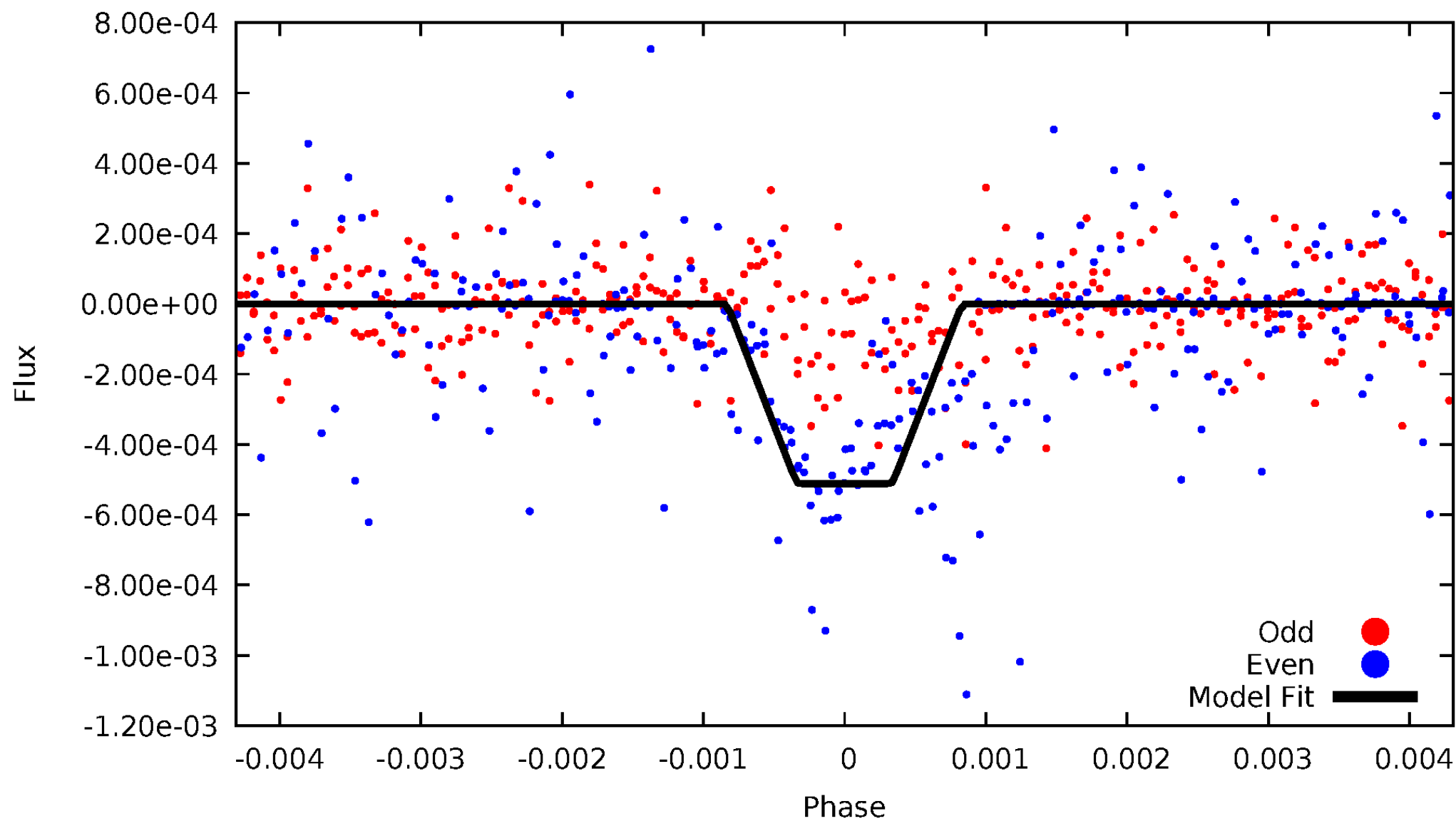
# DV Odd/Even

TCE 002696938-04



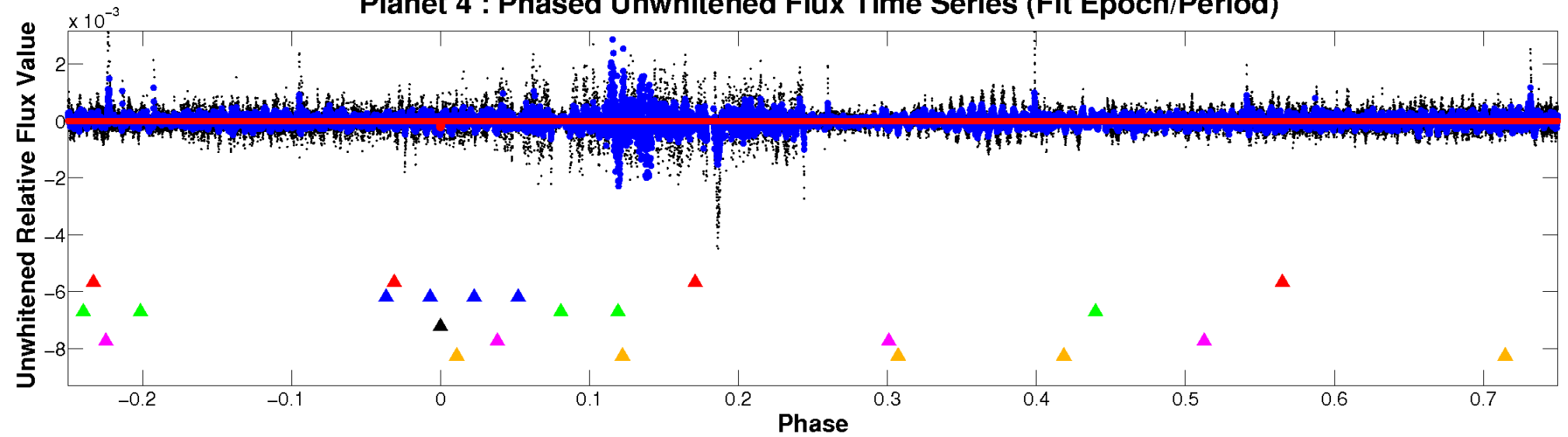
# ALT Odd/Even

TCE 002696938-04

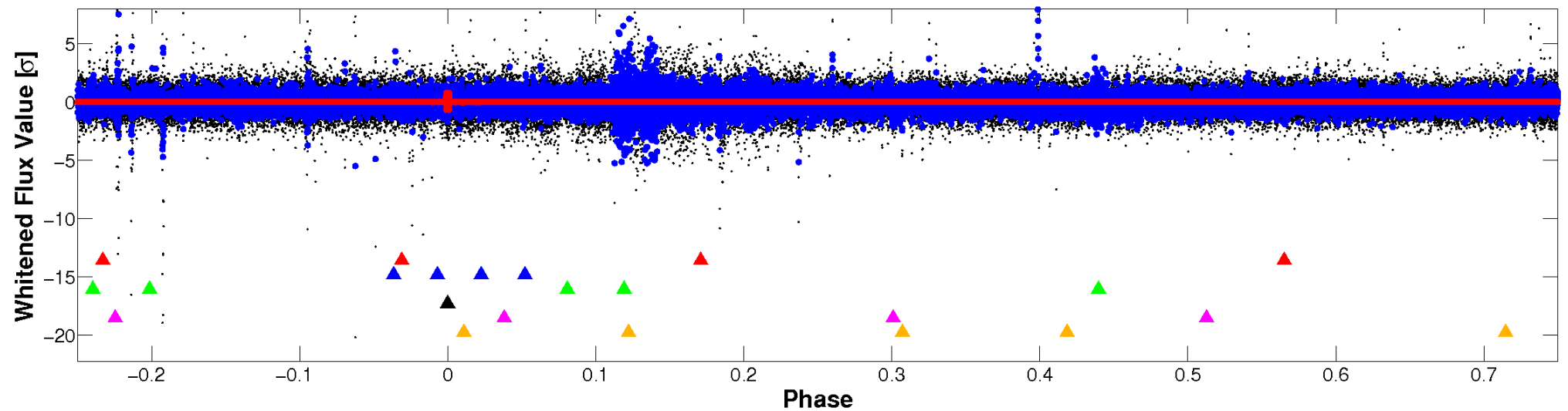


# Non-Whitened Vs. Whitened Light Curve

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

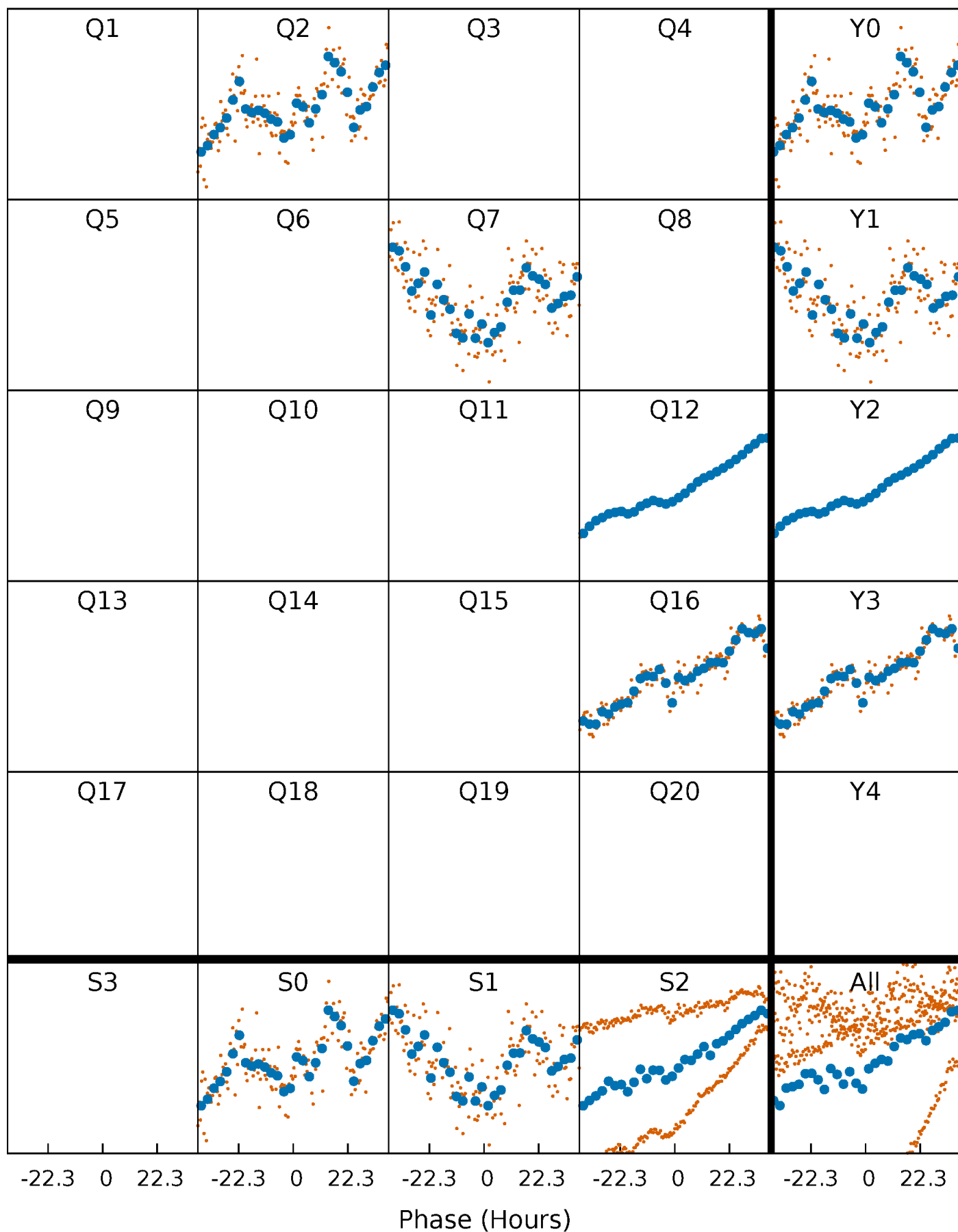


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

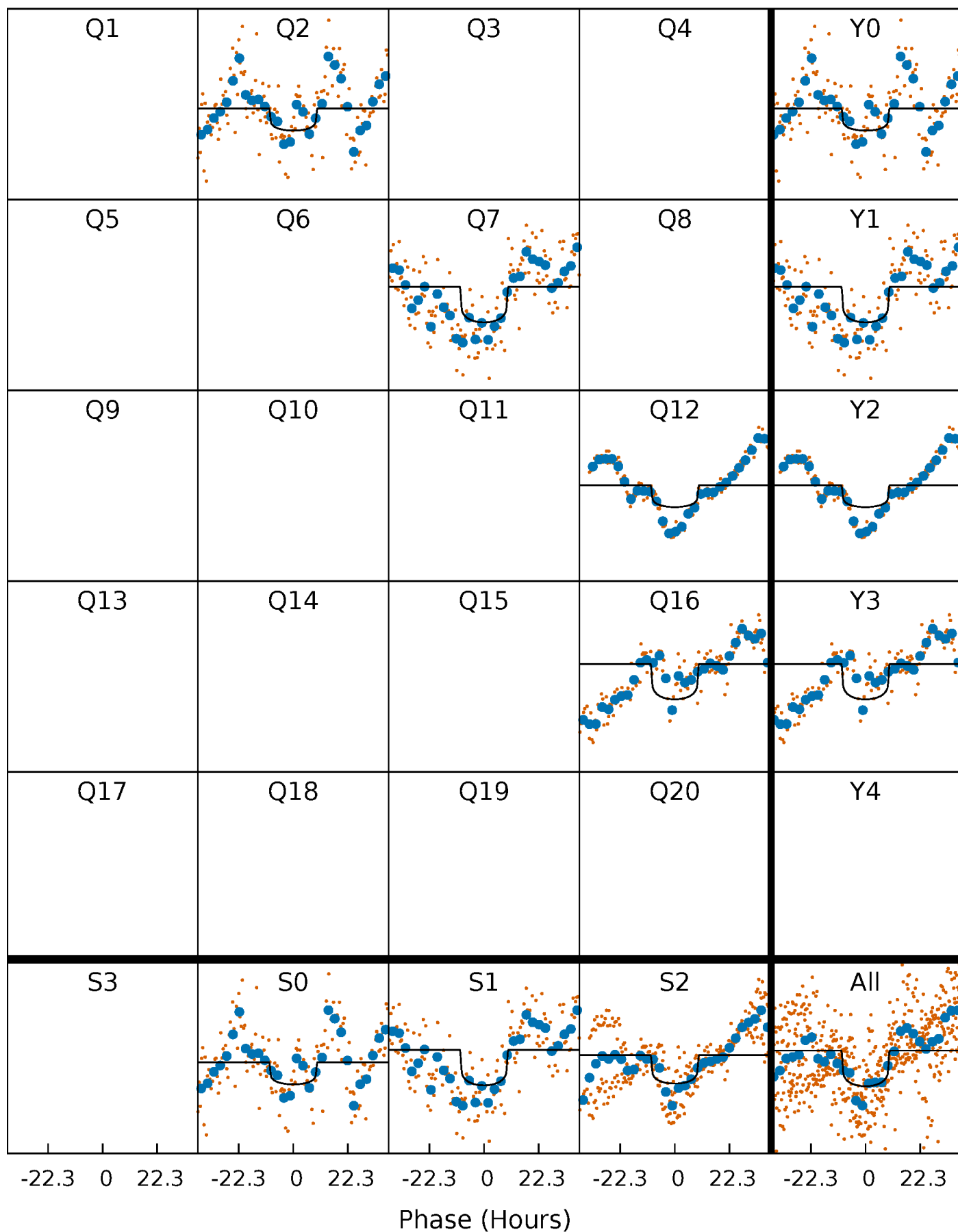
TCE 002696938-04     $P=429.742064$  Days     $T_0=244.561690$  (BKJD)





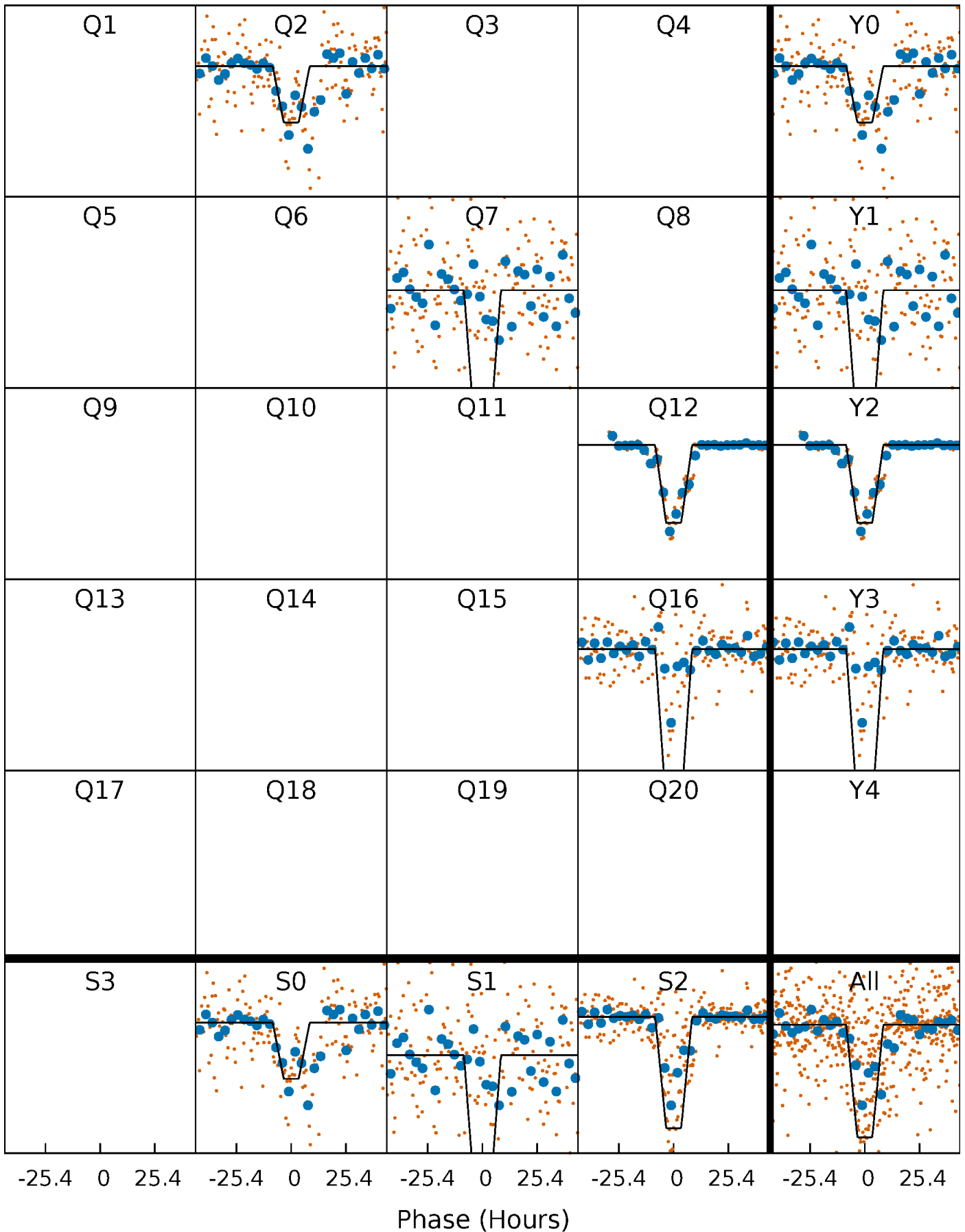
# DV Quarter-Phased Transit Curves

TCE 002696938-04     $P=429.742064$  Days     $T_0=244.561690$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

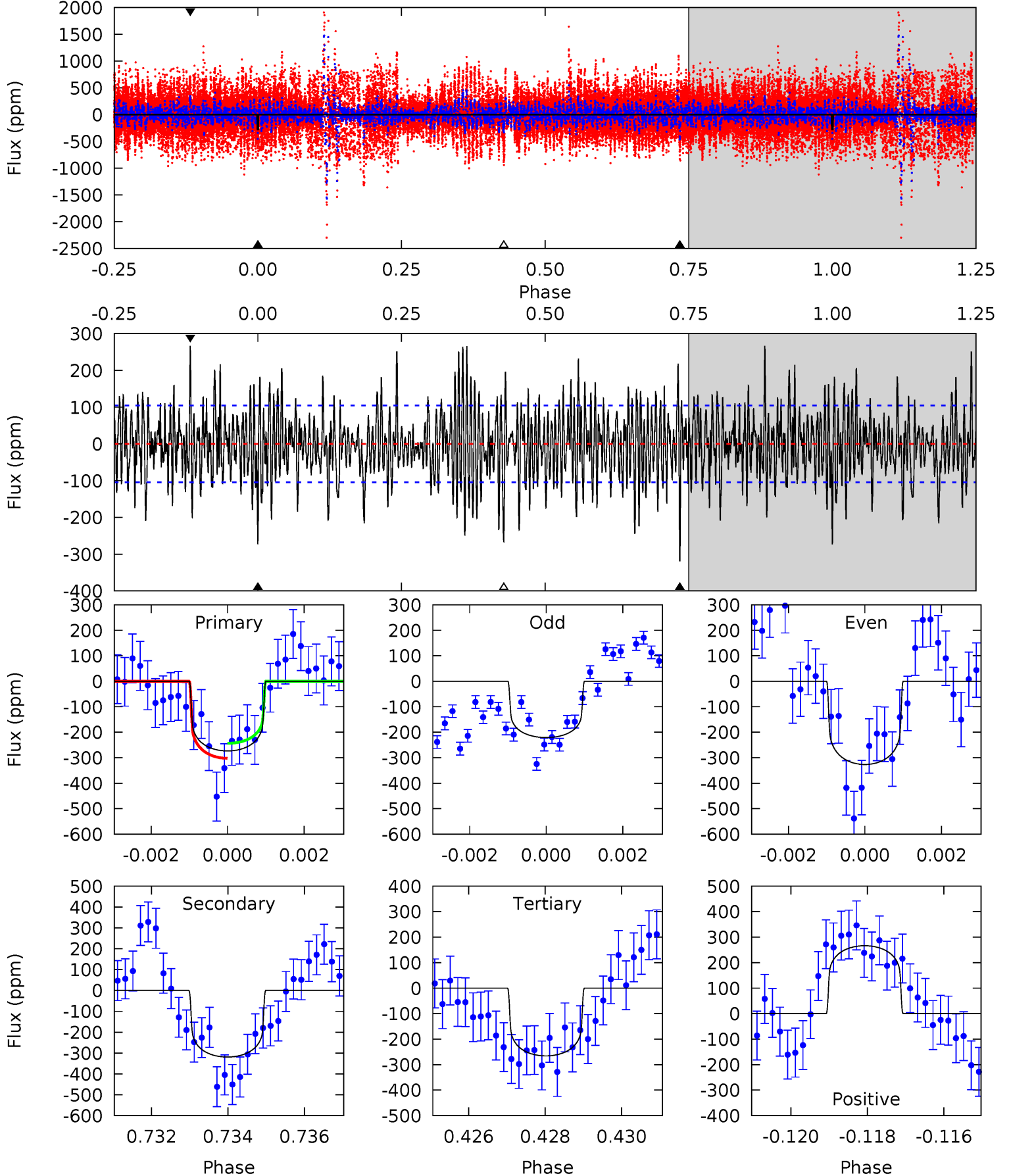
TCE 002696938-04     $P=429.758634$  Days     $T_0=244.529711$  (BKJD)



# DV Model-Shift Uniqueness Test

002696938-04, P = 429.742064 Days, E = 244.561690 Days

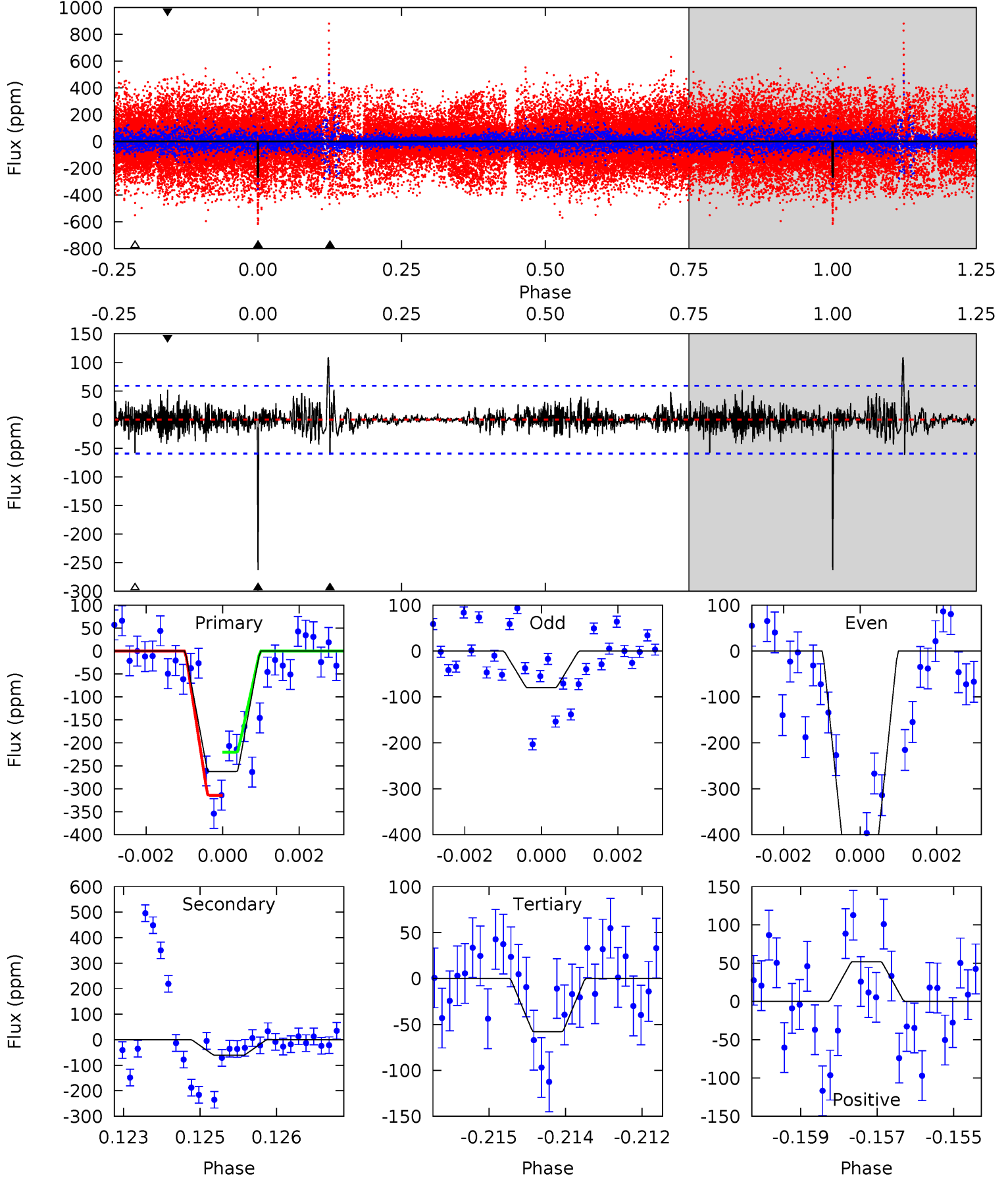
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
14.0	16.3	13.6	13.6	5.33	3.10	4.17	0.39	0.37	2.73	2.71	2.48	1.00	0.45	1.58



# Alt Model-Shift Uniqueness Test

002696938-04, P = 429.758634 Days, E = 244.529711 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
23.8	5.54	5.25	4.71	5.36	3.14	1.09	18.6	19.1	0.29	0.83	17.7	0.95	0.29	4.43



### Stellar Parameters For KIC 002696938

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6484^{+146}_{-178}$	$4.161^{+0.209}_{-0.171}$	$-0.260^{+0.250}_{-0.300}$	$1.456^{+0.422}_{-0.346}$	$1.119^{+0.193}_{-0.129}$	$0.511^{+0.594}_{-0.239}$
	+2%/-3%	+5%/-4%	+96%/-115%	+29%/-24%	+17%/-12%	+116%/-47%
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 002696938-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	-319±20	$2.42^{+0.52}_{-0.44}$	$445^{+33}_{-30}$	$7029^{+635}_{-535}$	$40322^{+19481}_{-12213}$
Alt.	-61±11	$3.58^{+0.68}_{-0.61}$	$446^{+33}_{-32}$	$4104^{+231}_{-222}$	$3566^{+1696}_{-1169}$

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

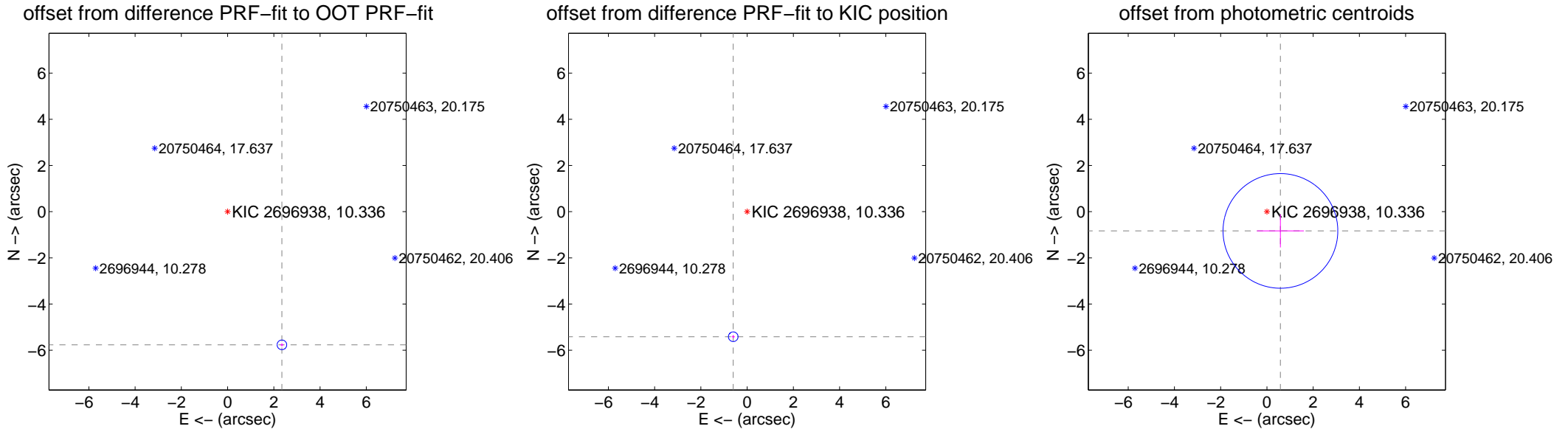
## DV Centroid Data

Supplemental centroid analysis for 002696938-04. **Kepler magnitude: 10.34.** Transit SNR 7.97

There are 1 quarters with good PRF difference image offsets

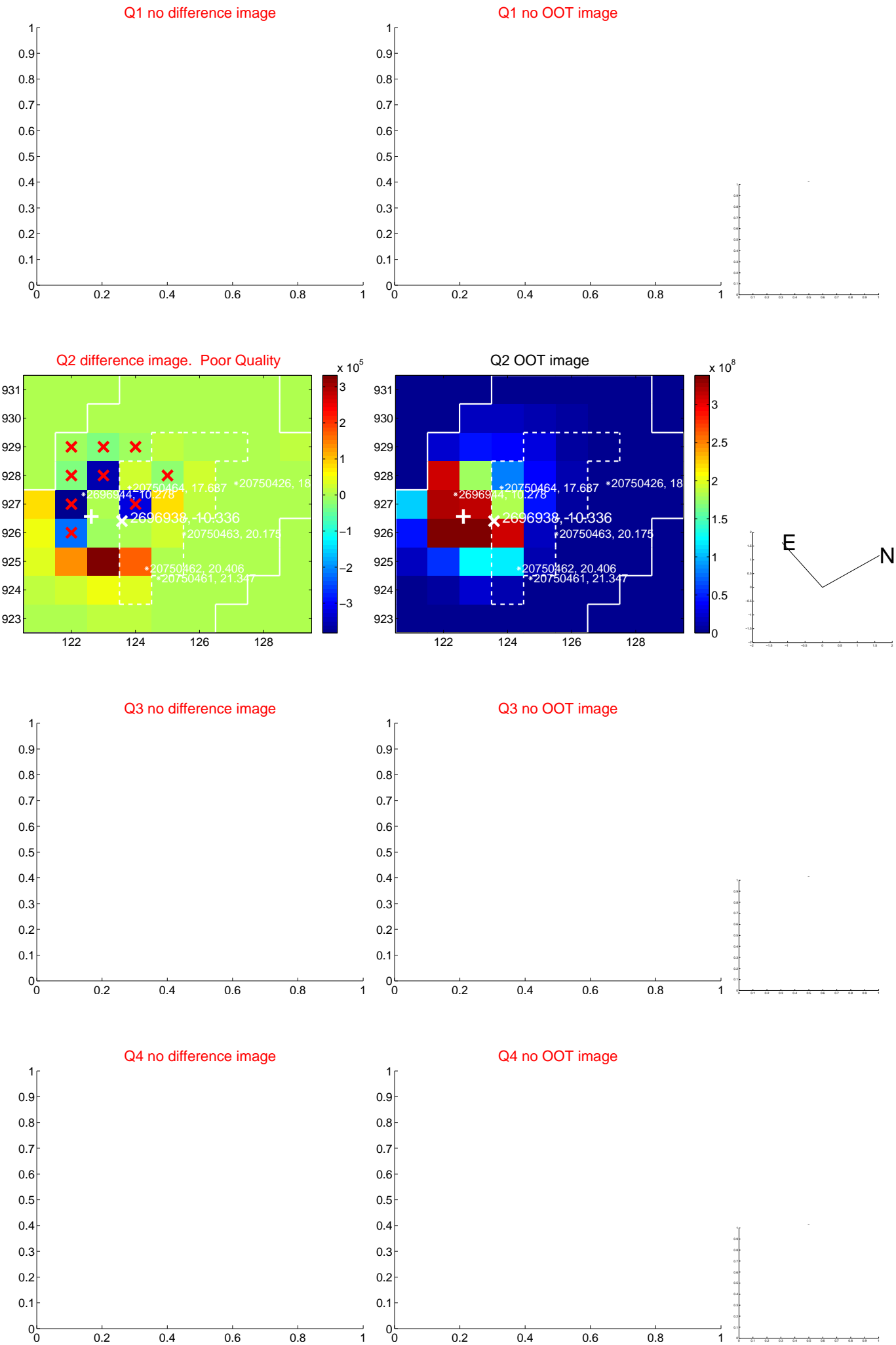
The OOT PRF centroid is offset from the target star catalog position by about 2.97 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b><math>6.227 \pm 0.070</math></b>	<b>89.52</b>	$-2.350 \pm 0.070$	$-5.767 \pm 0.069$
PRF-fit source offset from KIC position	<b><math>5.449 \pm 0.069</math></b>	<b>78.45</b>	$0.601 \pm 0.070$	$-5.416 \pm 0.069$
photometric centroid source offset	$1.02 \pm 0.83$	1.23	$-0.58 \pm 1.02$	$-0.83 \pm 0.72$

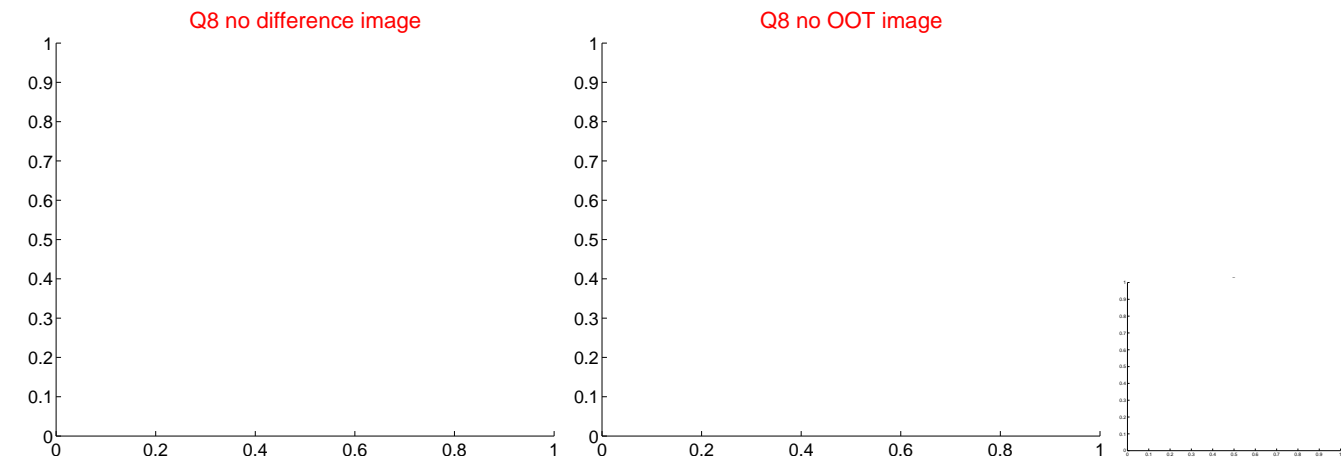
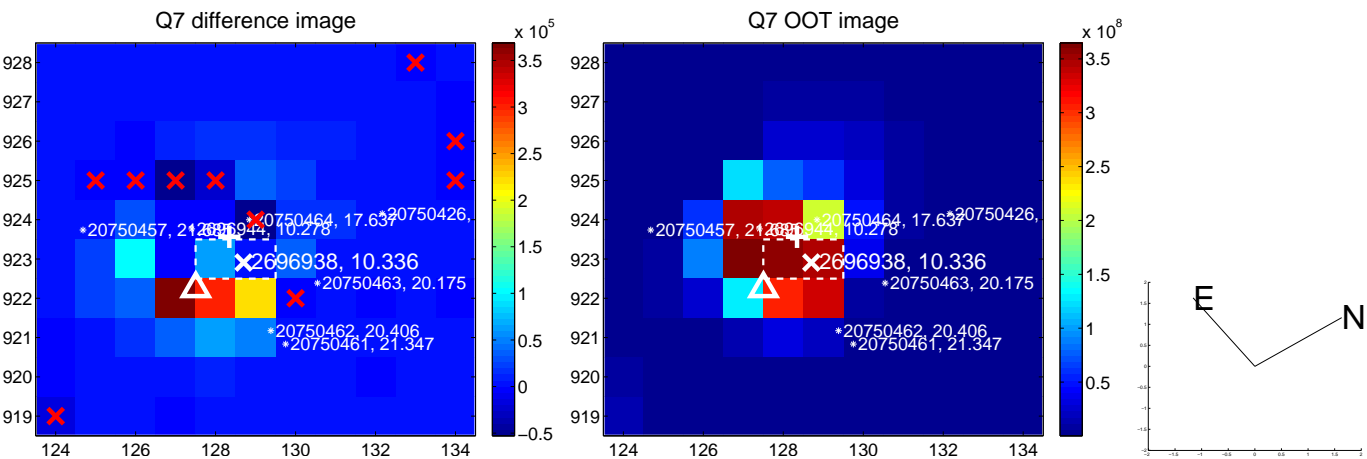


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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





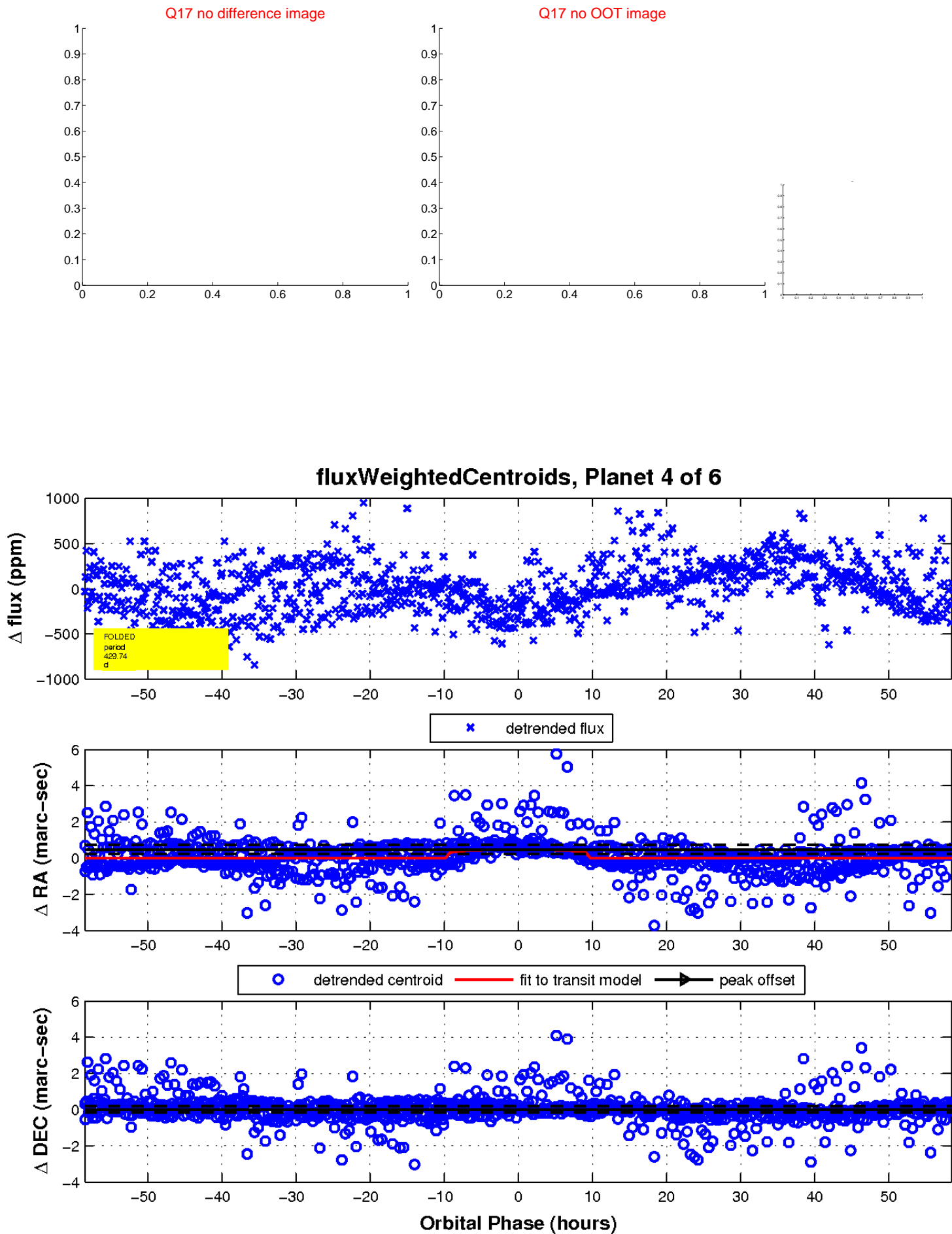
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

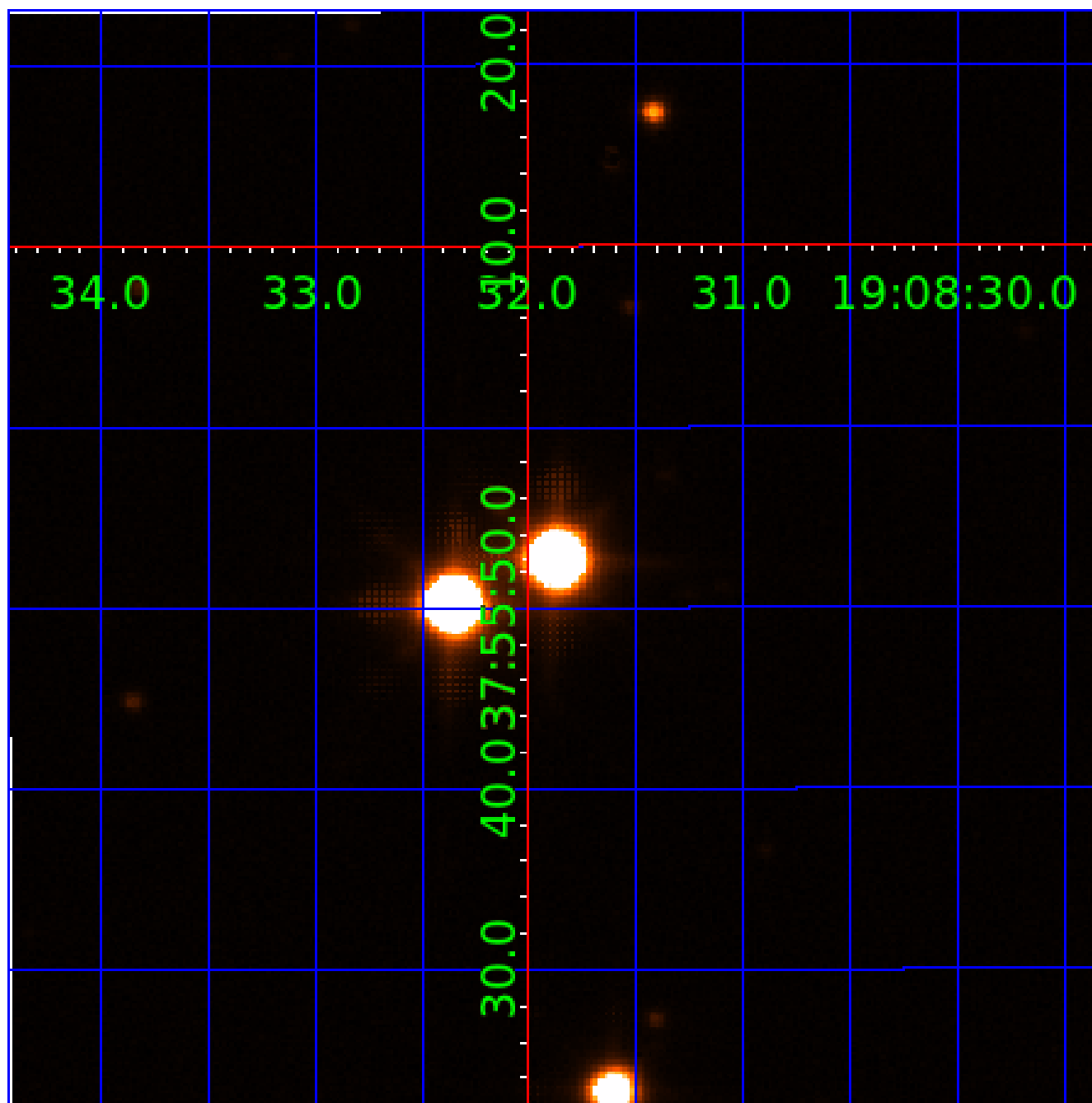


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 002696938

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
002696938-01	OBS	No	342.957490	318.021165	339.5	10.605	22.8	5.2	1.46	6484	2.92	3.38
002696938-02	OBS	No	417.041578	266.987338	543.7	24.035	12.6	13.1	1.46	6484	6.52	2.61
002696938-03	OBS	No	291.992005	279.284227	619.7	40.497	11.0	12.4	1.46	6484	6.93	4.19
002696938-04	OBS	No	429.742064	244.561690	245.4	19.502	9.6	8.0	1.46	6484	2.43	2.50
002696938-05	OBS	No	316.817135	373.894776	387.4	20.024	8.6	7.9	1.46	6484	3.40	3.76
002696938-06	OBS	No	302.428737	376.582428	291.7	4.961	9.3	7.6	1.46	6484	2.74	4.00

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002696938-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_SATURATED
002696938-02	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
002696938-03	OBS	FP	0.00	1	0	0	0	LPP_DV—INCONSISTENT_TRANS—CENT_SATURATED
002696938-04	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—INCONSISTENT_TRANS—CENT_SATURATED
002696938-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_SATURATED
002696938-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_SATURATED

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

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

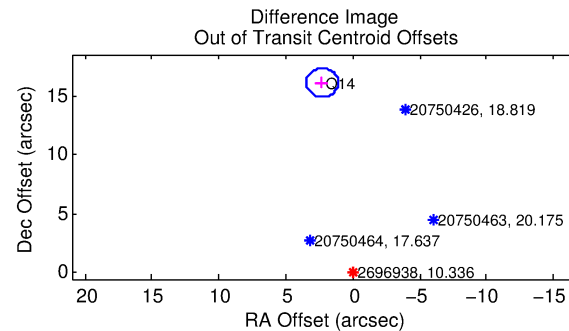
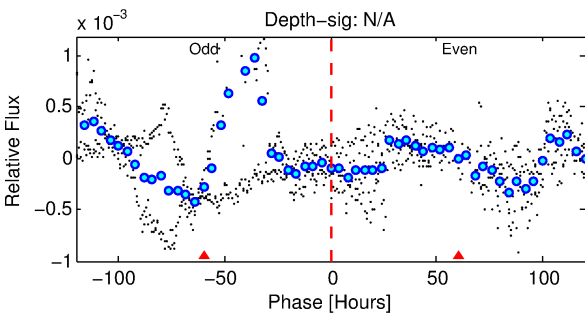
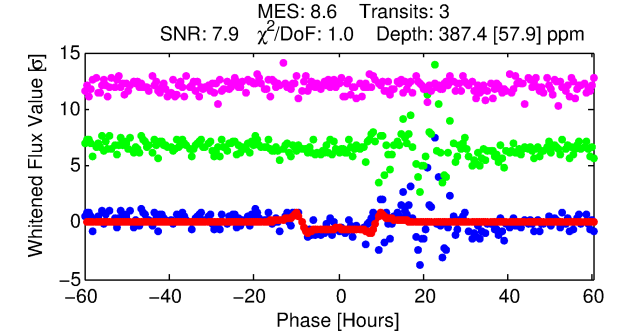
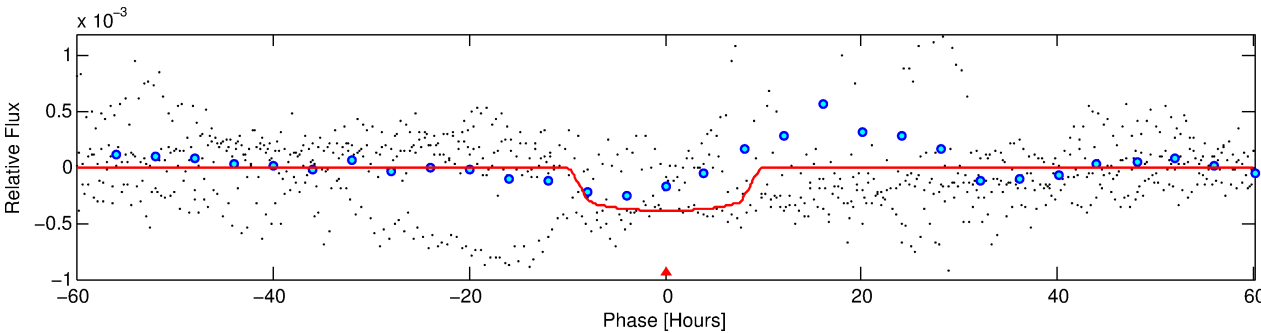
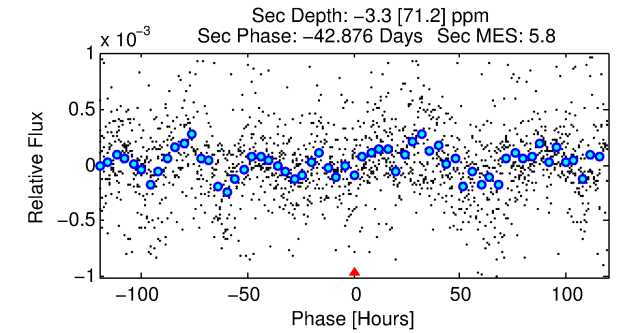
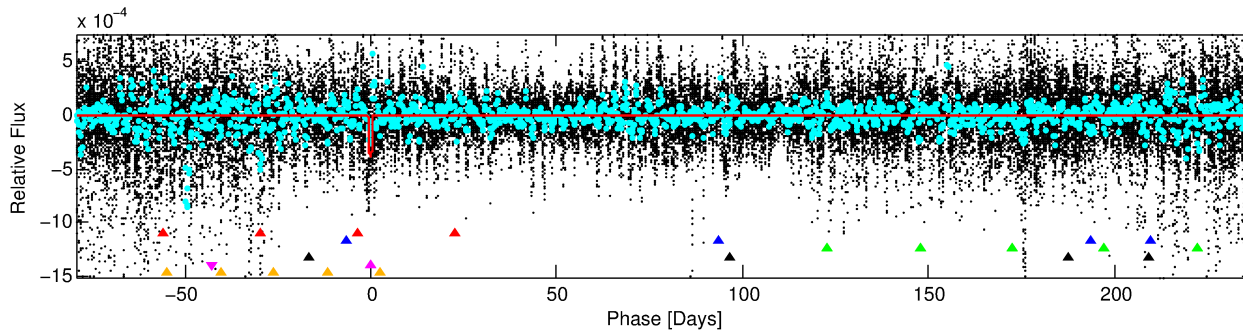
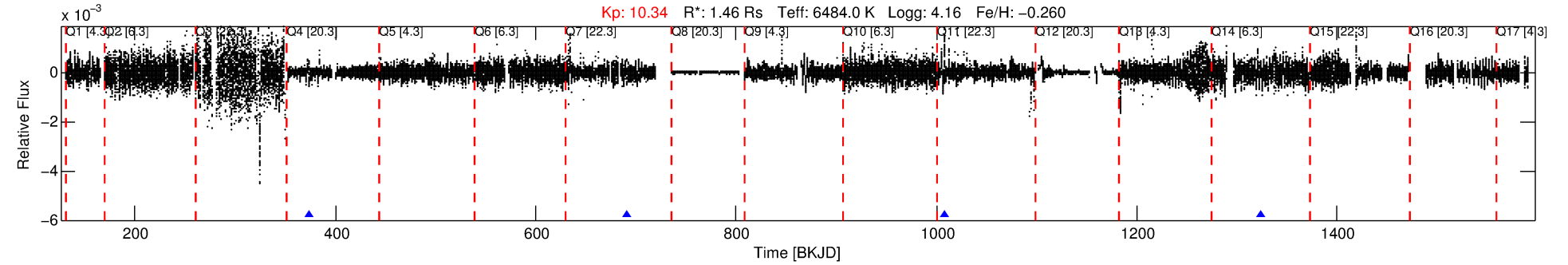
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 002696938-05

No Significant Match Found

# DV One-Page Summary

KIC: 2696938 Candidate: 5 of 6 Period: 316.817 d



## DV Fit Results:

Period = 316.81714 [0.00856] d  
Epoch = 373.8948 [0.0121] BKJD  
Rp/R\* = 0.0214 [0.0018]  
a/R\* = 54.24 [7.78]  
b = 0.92 [0.03]  
Seff = 3.76 [1.47]  
Teq = 355 [35] K  
Rp = 3.40 [1.02] Re  
a = 0.9448 [0.2373] AU  
Ag = N/A  
Teffp = N/A

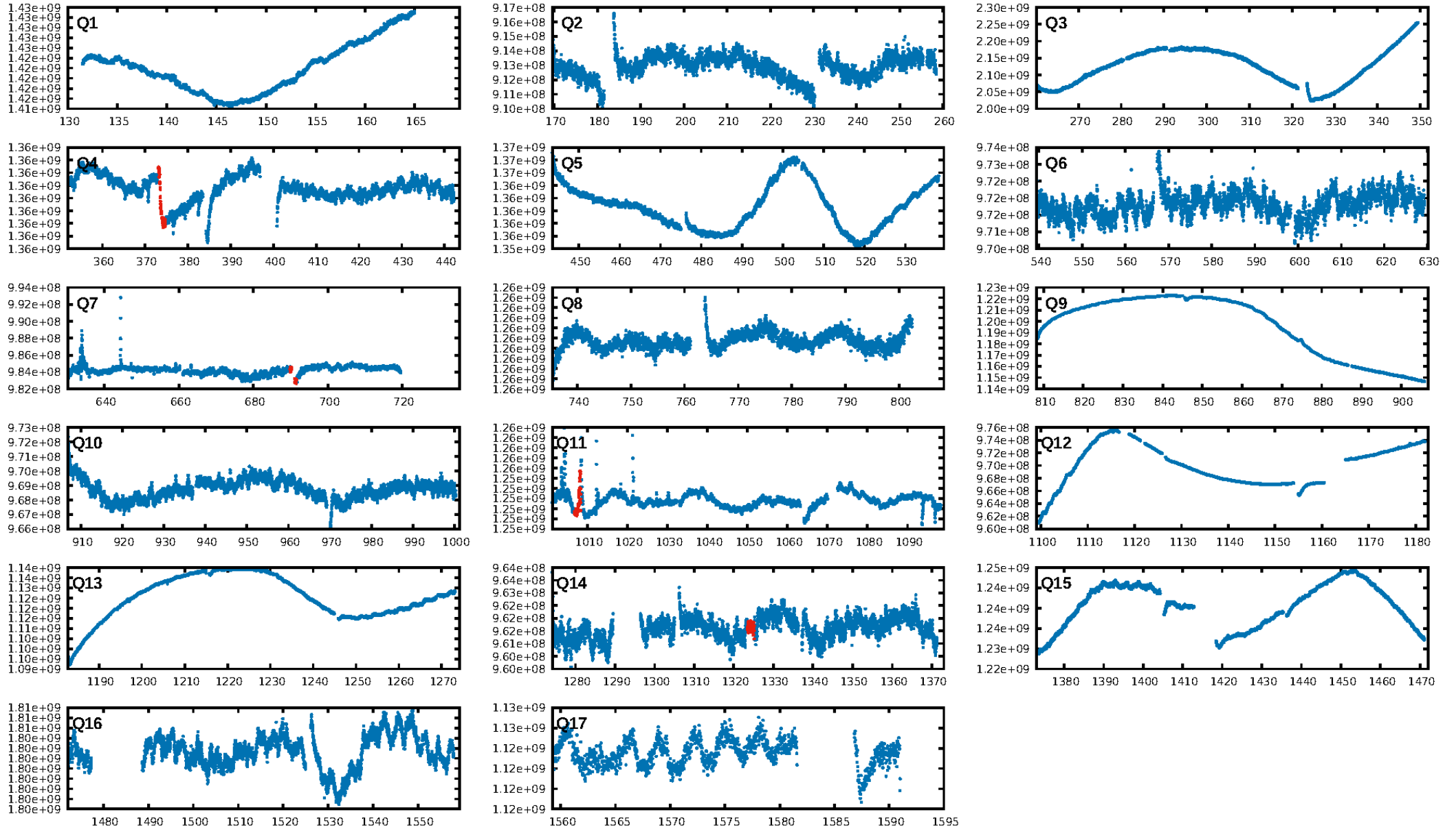
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [16.74σ]  
LongPeriod-sig: 100.0% [27.69σ]  
ModelChiSquare2-sig: 33.9%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 4.01e-08**  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: N/A  
Centroid-sig: 4.4%  
Centroid-so: 2.458 arcsec [2.99σ]  
**OotOffset-rm: 16.253 arcsec [40.08σ]**  
**KicOffset-rm: 14.038 arcsec [34.65σ]**  
OotOffset-st: 1/0/0/0 [1]  
KicOffset-st: 1/0/0/0 [1]  
DiffImageQuality-fgm: 0.00 [0/1]  
DiffImageOverlap-fno: 1.00 [1/1]

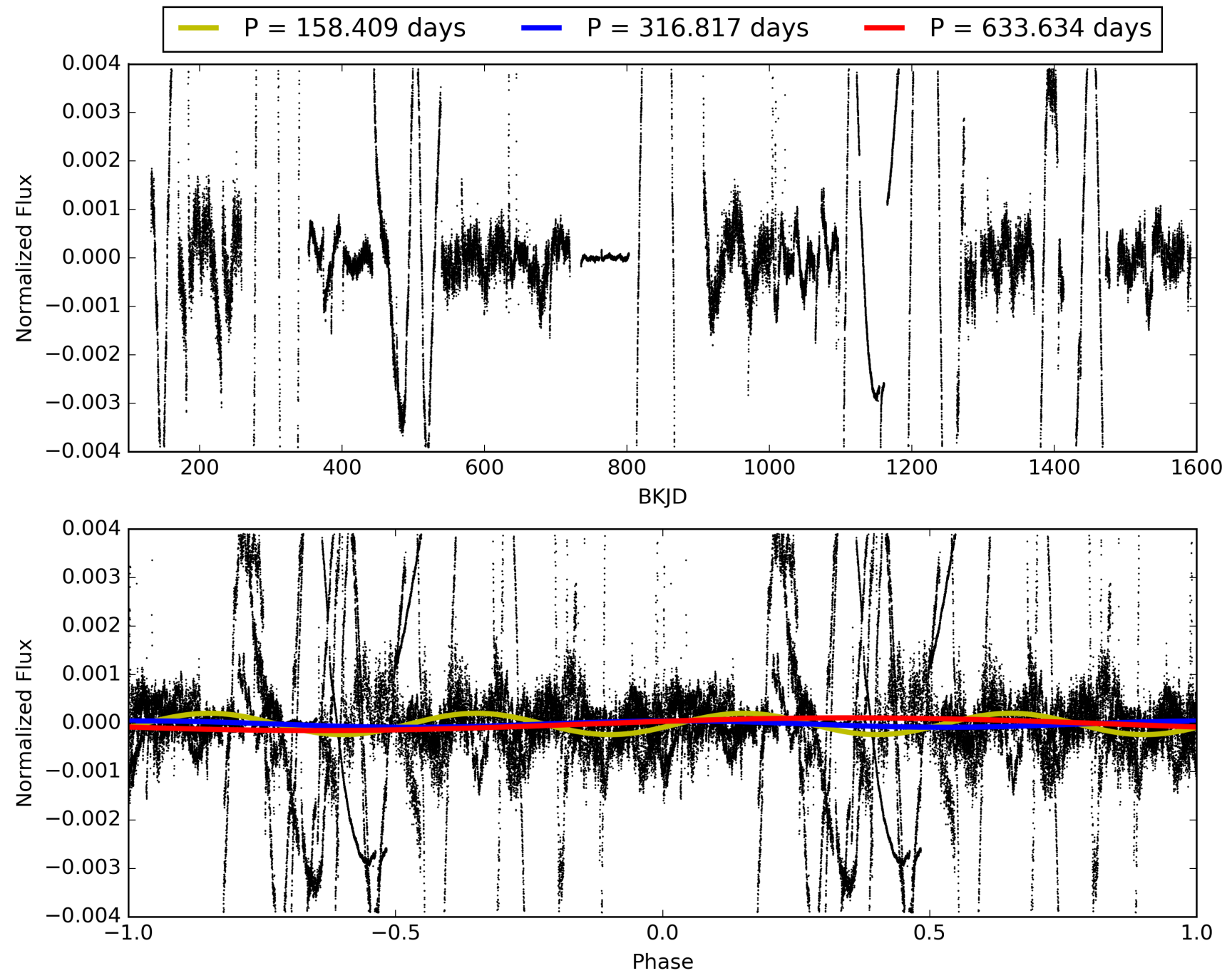
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 22:09:16 Z

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

# TCE 002696938-05, PDC Light Curves



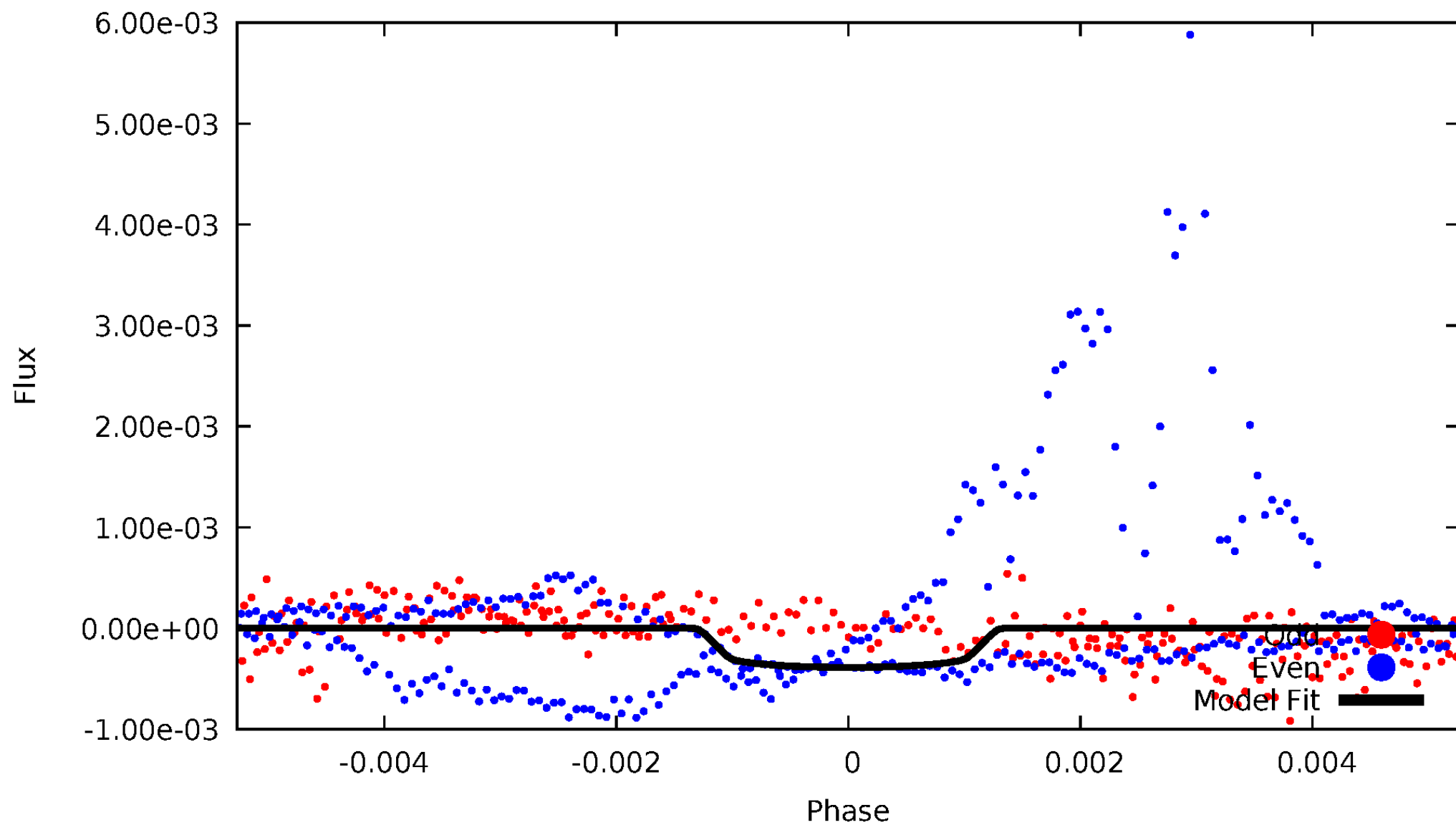
TCE 002696938-05





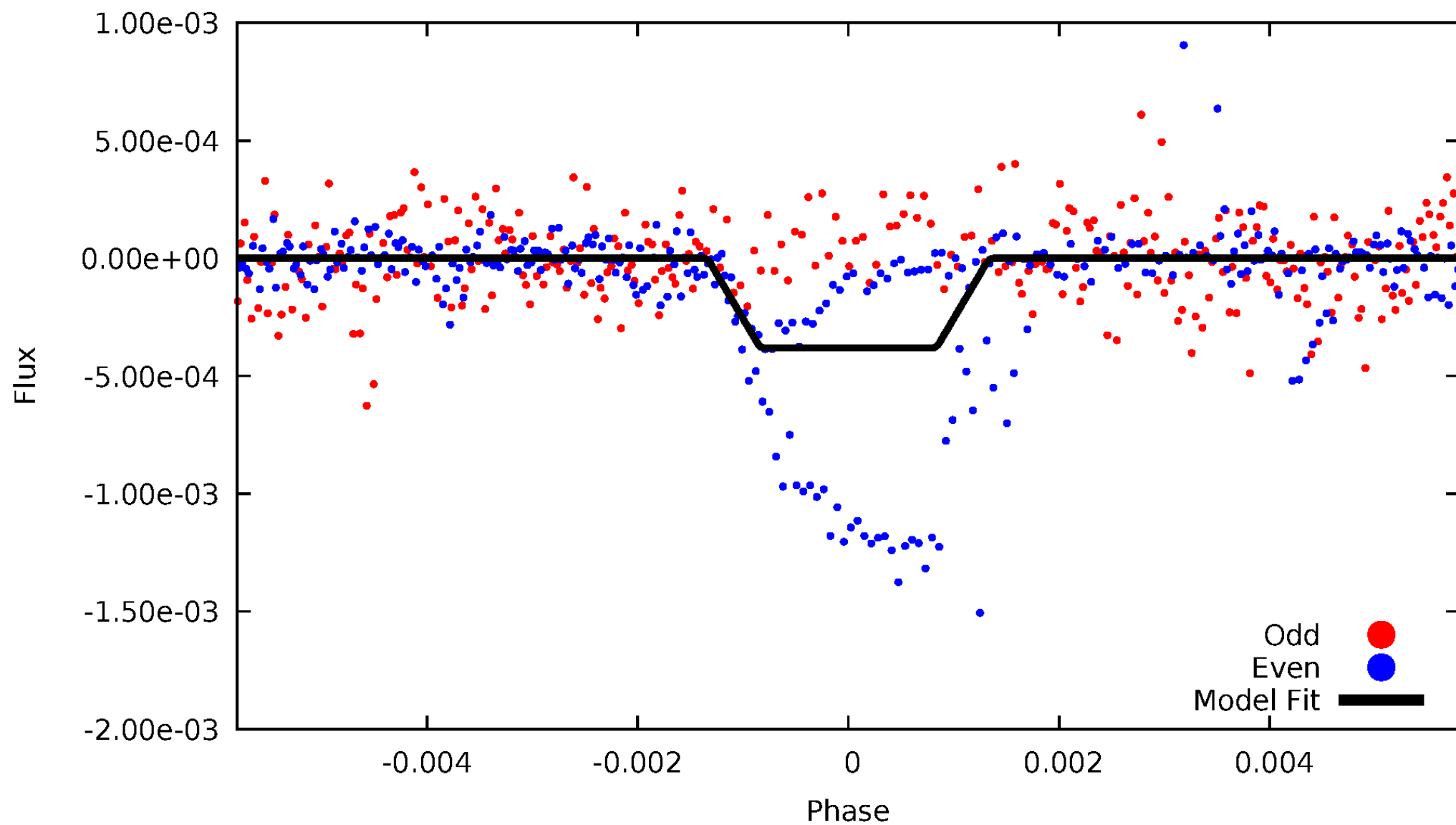
# DV Odd/Even

TCE 002696938-05



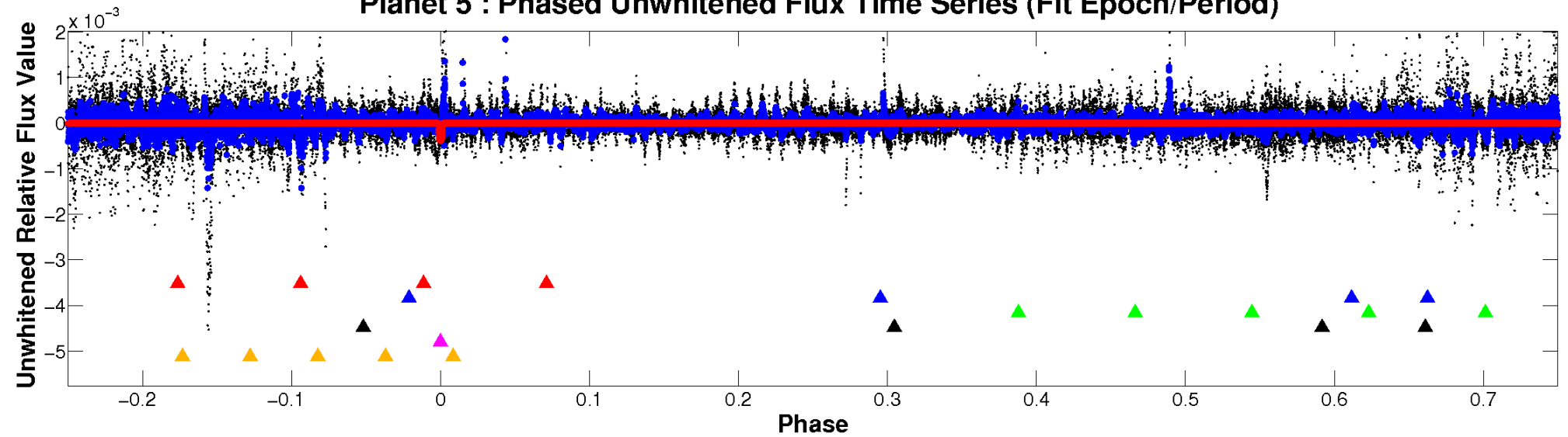
# ALT Odd/Even

TCE 002696938-05

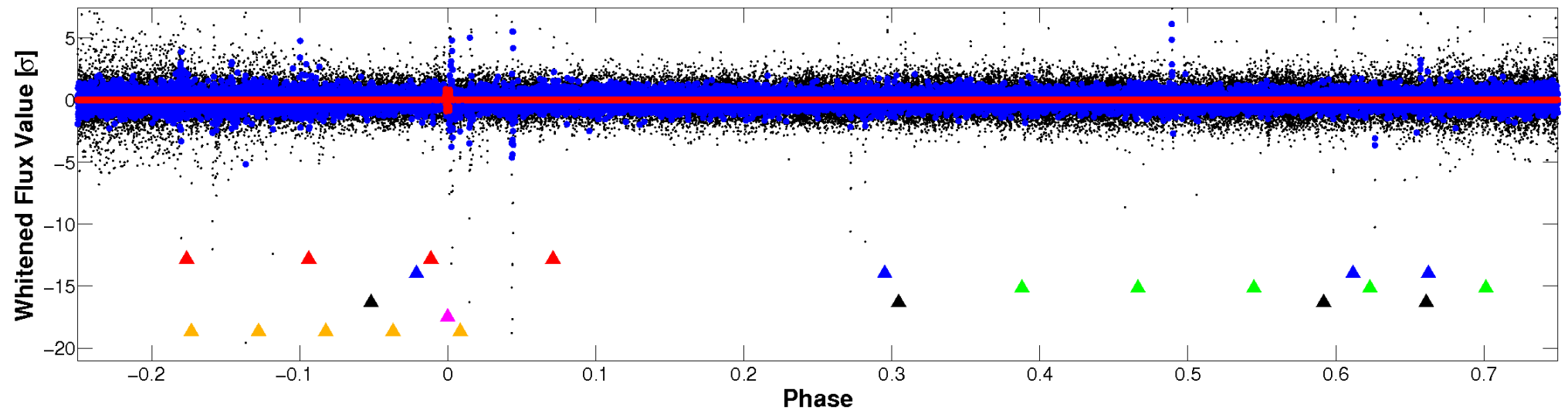


# Non-Whitened Vs. Whitened Light Curve

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

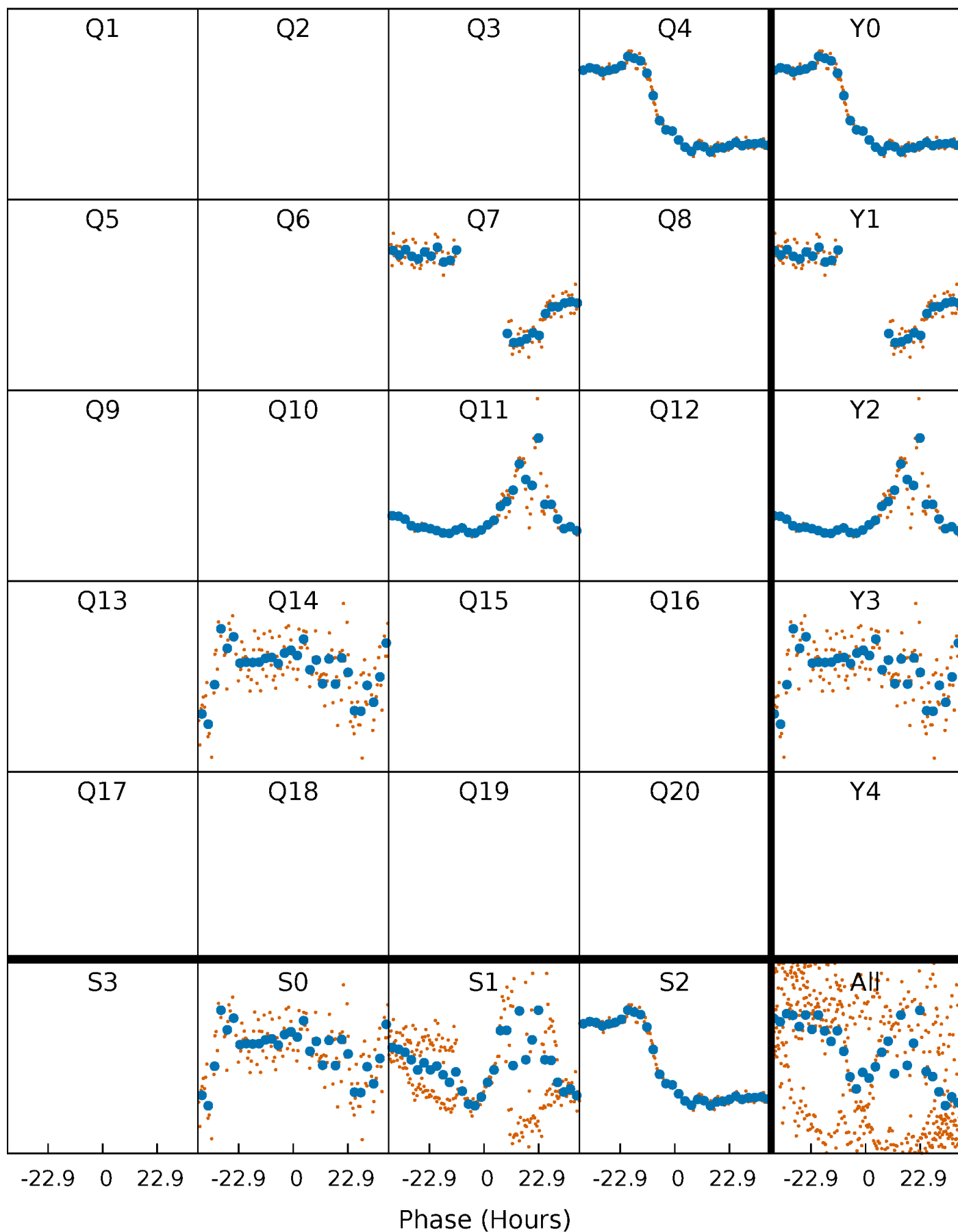


Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)



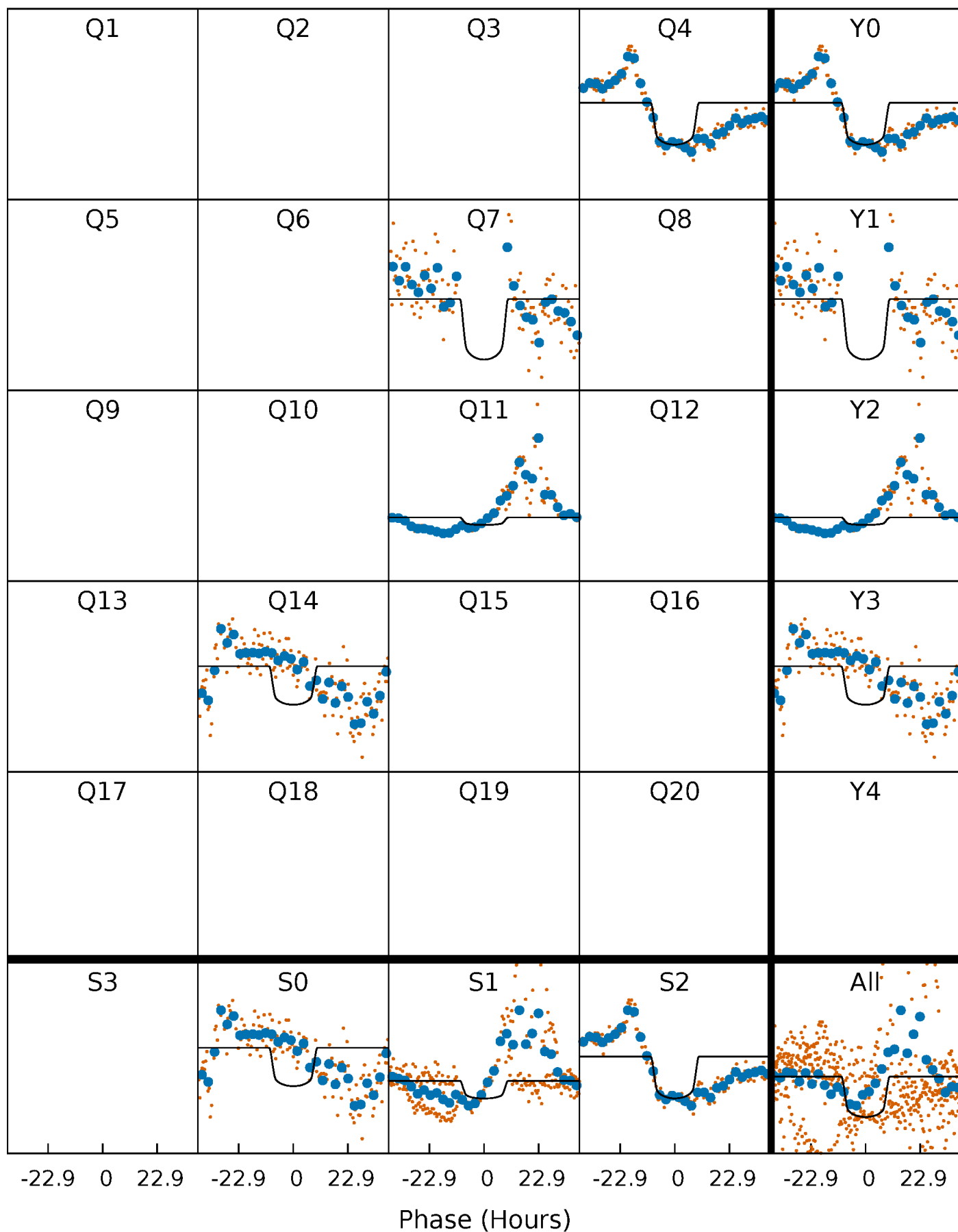
# PDC Quarter-Phased Transit Curves

TCE 002696938-05     $P=316.817135$  Days     $T_0=373.894775$  (BKJD)



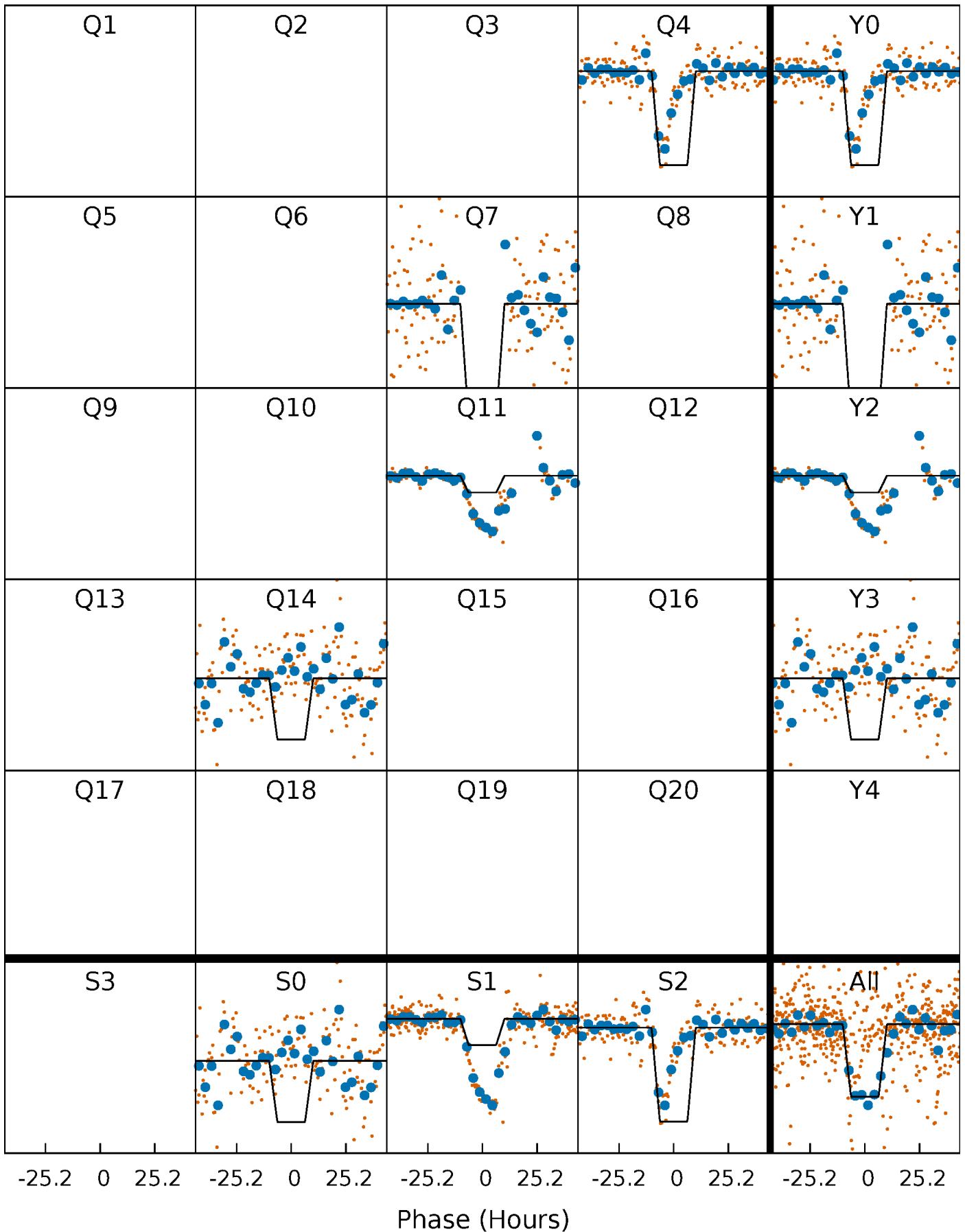
# DV Quarter-Phased Transit Curves

TCE 002696938-05     $P=316.817135$  Days     $T_0=373.894775$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

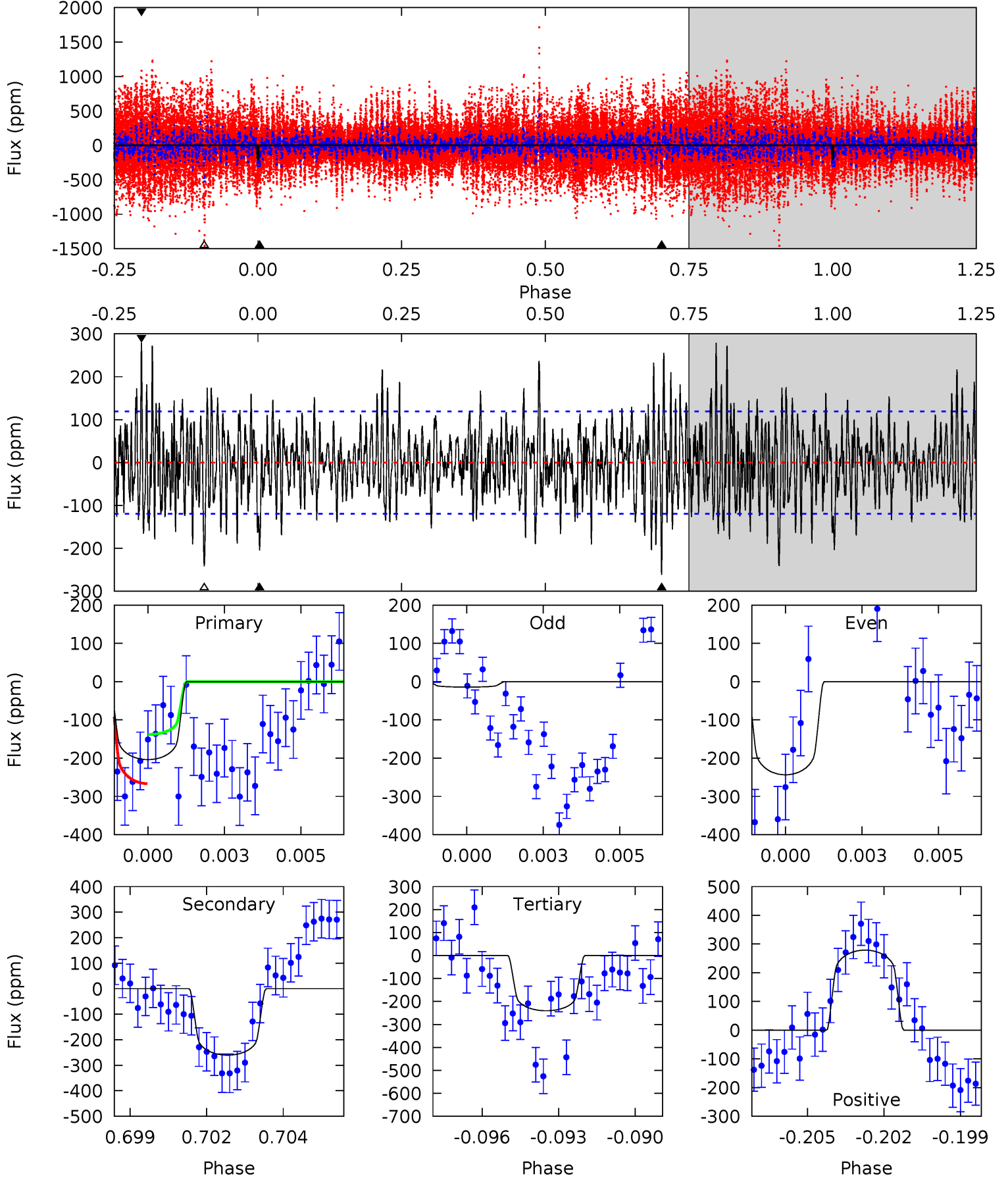
TCE 002696938-05     $P=316.829159$  Days     $T_0=373.856402$  (BKJD)



# DV Model-Shift Uniqueness Test

002696938-05, P = 316.817135 Days, E = 57.077640 Days

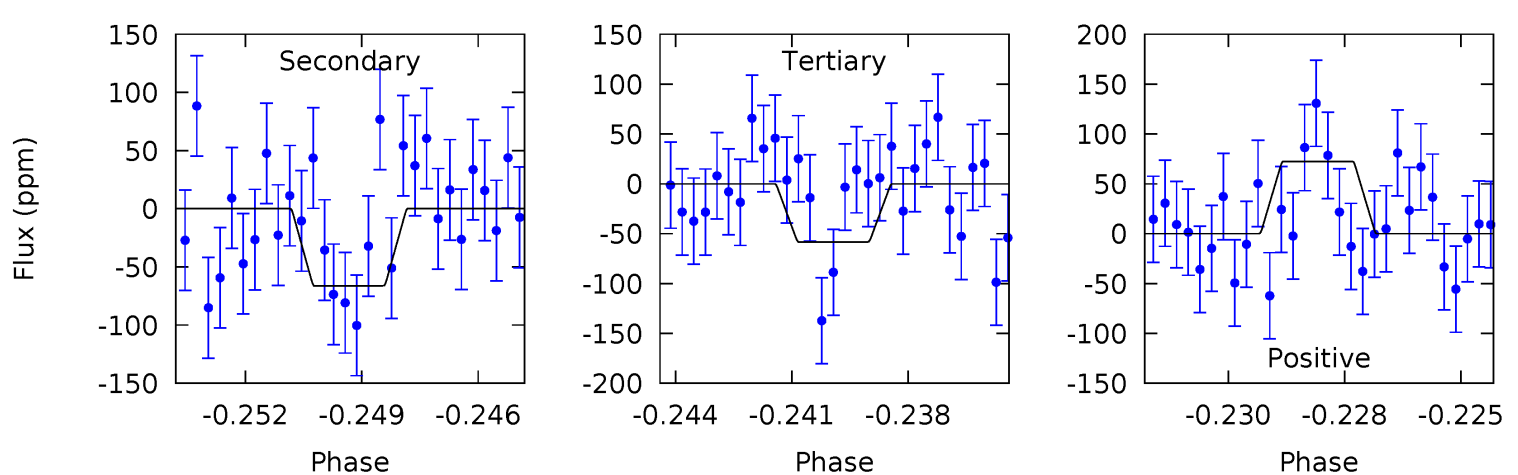
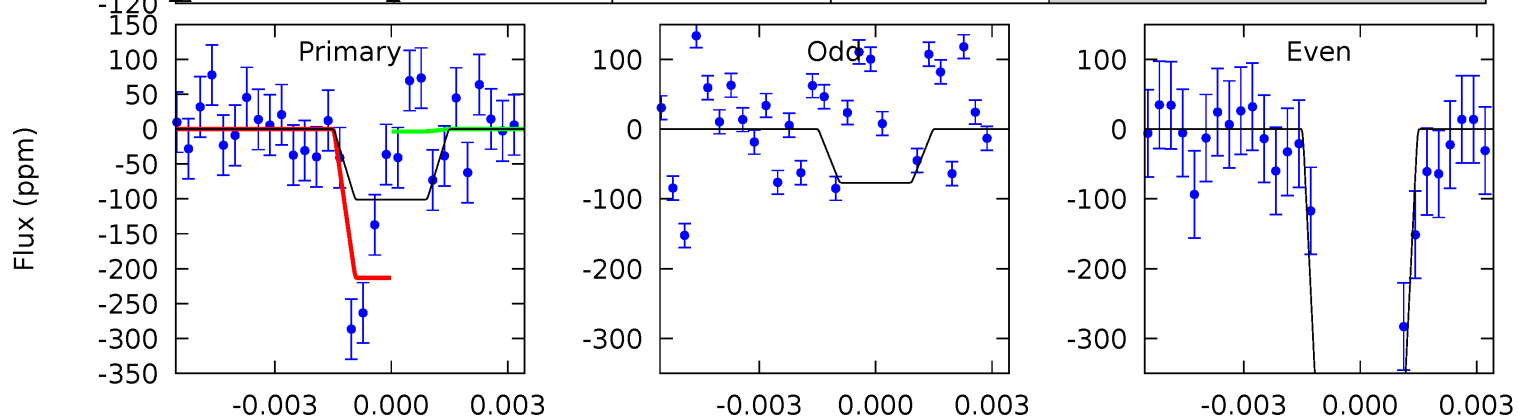
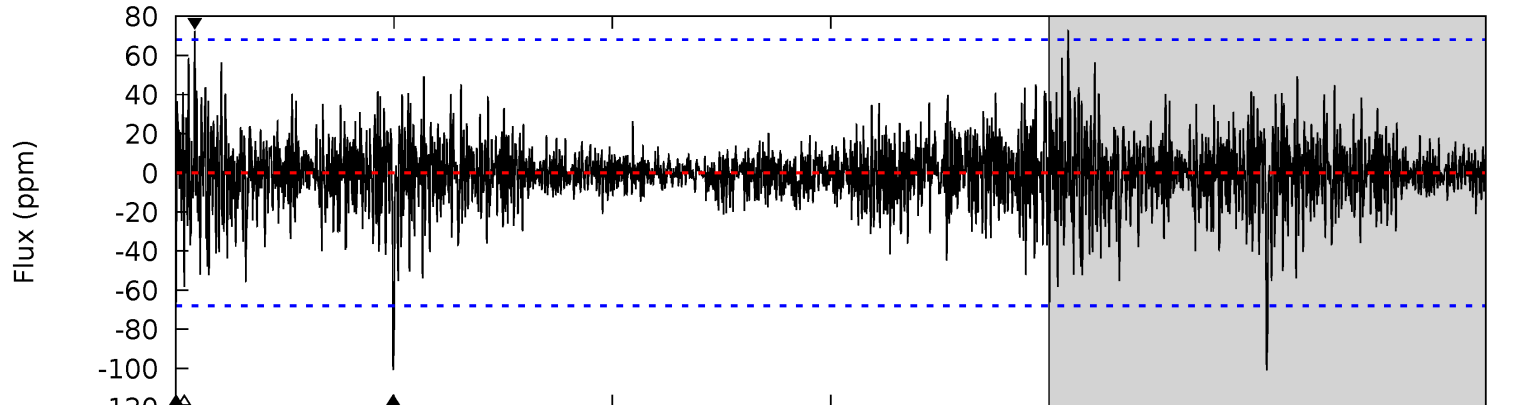
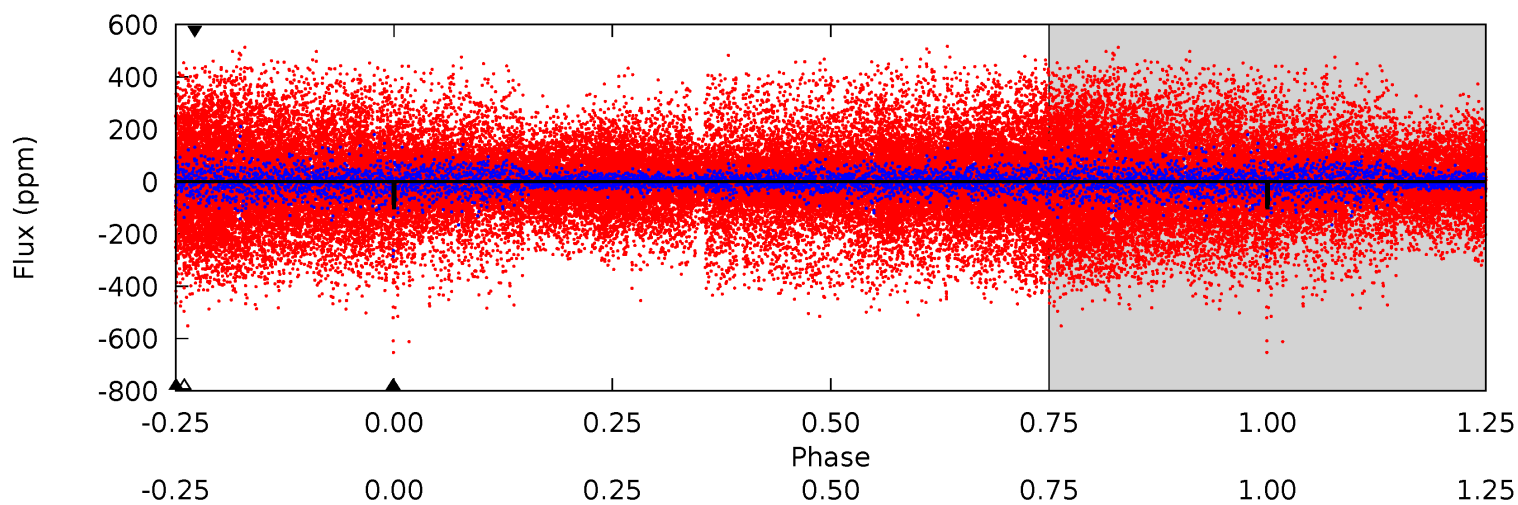
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.02	11.5	10.6	12.3	5.27	3.00	3.16	-1.62	-3.32	0.88	-0.81	4.73	3.38	0.52	2.79



# Alt Model-Shift Uniqueness Test

002696938-05, P = 316.829159 Days, E = 57.027243 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
7.82	5.13	4.52	5.61	5.27	3.00	1.04	3.30	2.21	0.61	-0.48	22.6	2.27	0.42	8.04





### Stellar Parameters For KIC 002696938

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6484^{+146}_{-178}$	$4.161^{+0.209}_{-0.171}$	$-0.260^{+0.250}_{-0.300}$	$1.456^{+0.422}_{-0.346}$	$1.119^{+0.193}_{-0.129}$	$0.511^{+0.594}_{-0.239}$
	+2%/-3%	+5%/-4%	+96%/-115%	+29%/-24%	+17%/-12%	+116%/-47%
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 002696938-05 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-260 \pm 23$	$3.39^{+0.65}_{-0.50}$	$494^{+38}_{-35}$	$5613^{+300}_{-235}$	$11125^{+4205}_{-3211}$
Alt.	$-66 \pm 13$	$3.08^{+0.58}_{-0.47}$	$495^{+34}_{-33}$	$4387^{+243}_{-242}$	$3365^{+1588}_{-1048}$

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

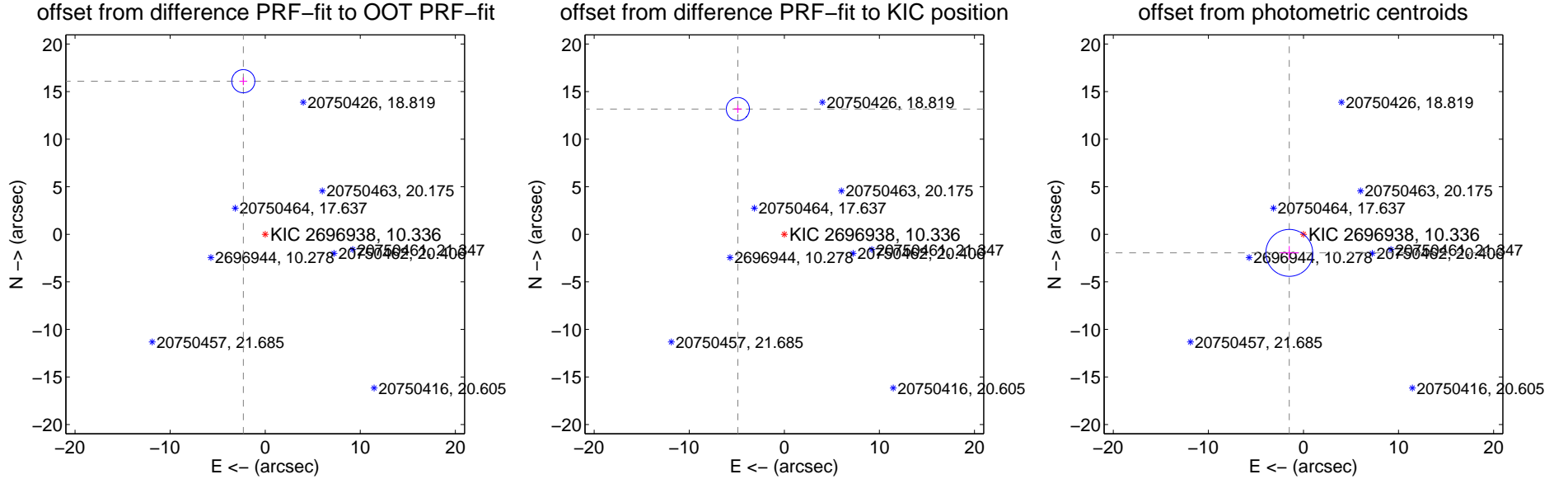
## DV Centroid Data

Supplemental centroid analysis for 002696938-05. **Kepler magnitude: 10.34.** Transit SNR 7.91

There are 0 quarters with good PRF difference image offsets

The OOT PRF centroid is offset from the target star catalog position by about 3.91 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b>16.253 <math>\pm</math> 0.406</b>	<b>40.08</b>	2.301 $\pm$ 0.402	16.090 $\pm$ 0.406
PRF-fit source offset from KIC position	<b>14.038 <math>\pm</math> 0.405</b>	<b>34.65</b>	4.886 $\pm$ 0.402	13.160 $\pm$ 0.406
photometric centroid source offset	2.46 $\pm$ 0.82	2.99	1.49 $\pm$ 0.98	-1.95 $\pm$ 0.72



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.



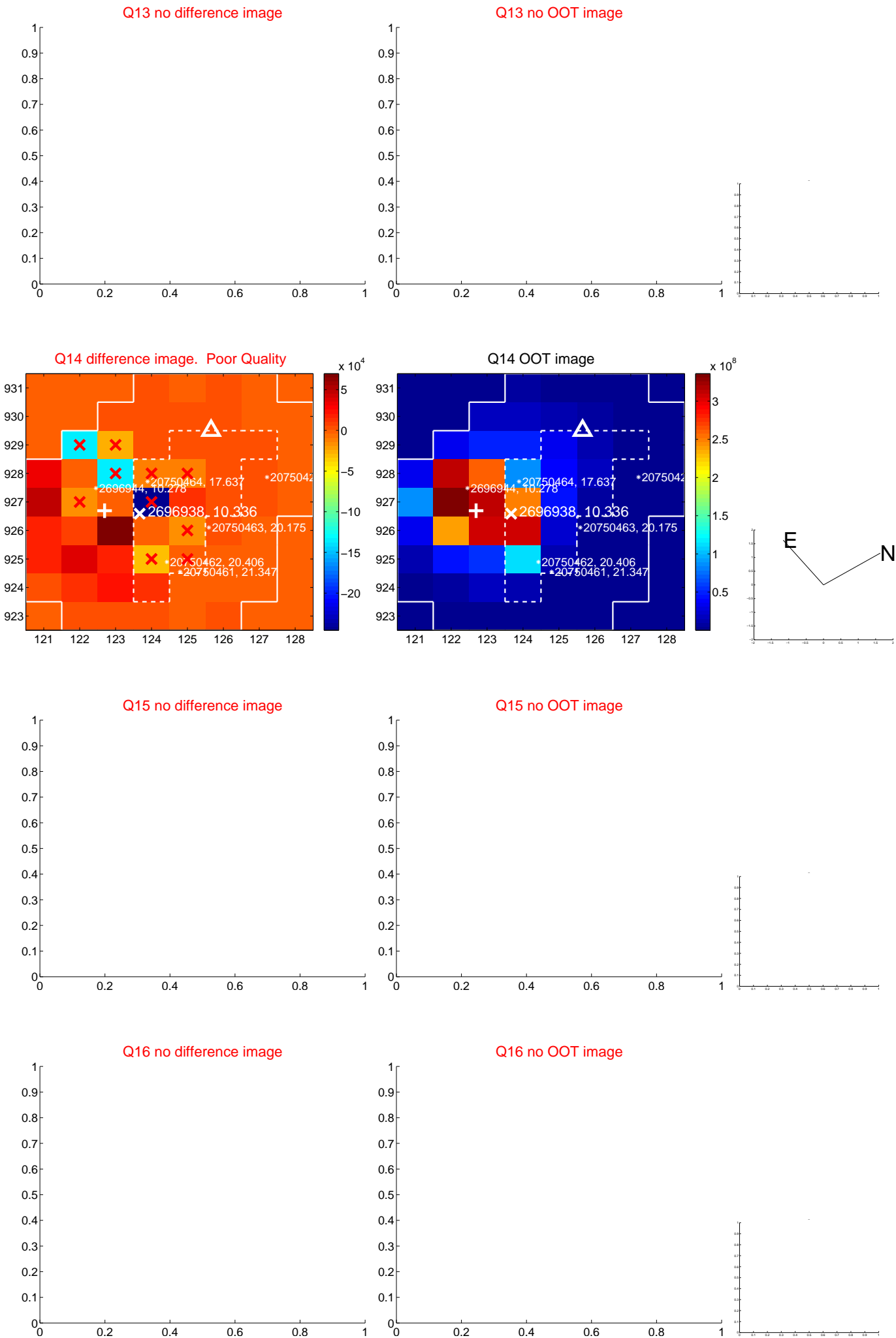
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



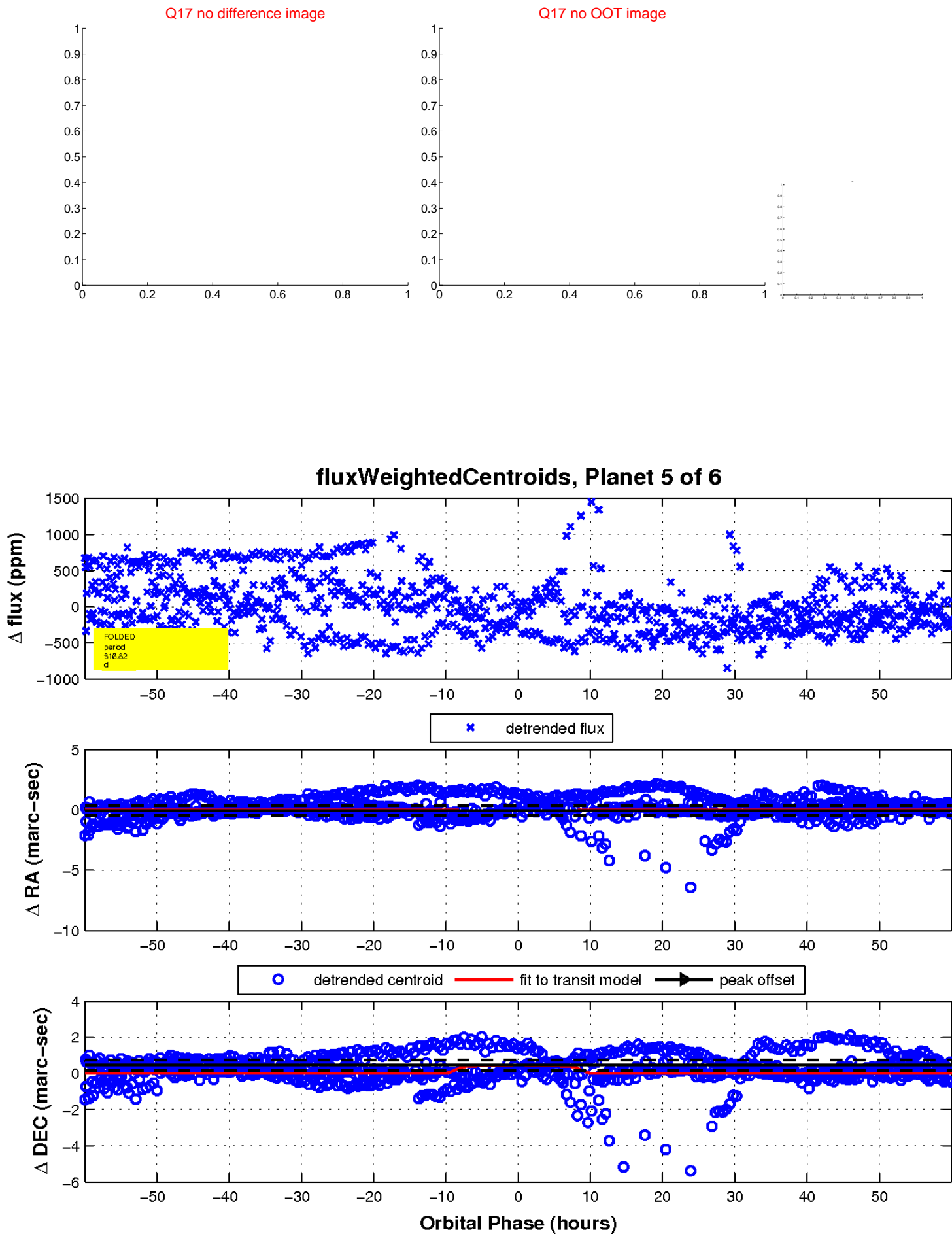
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

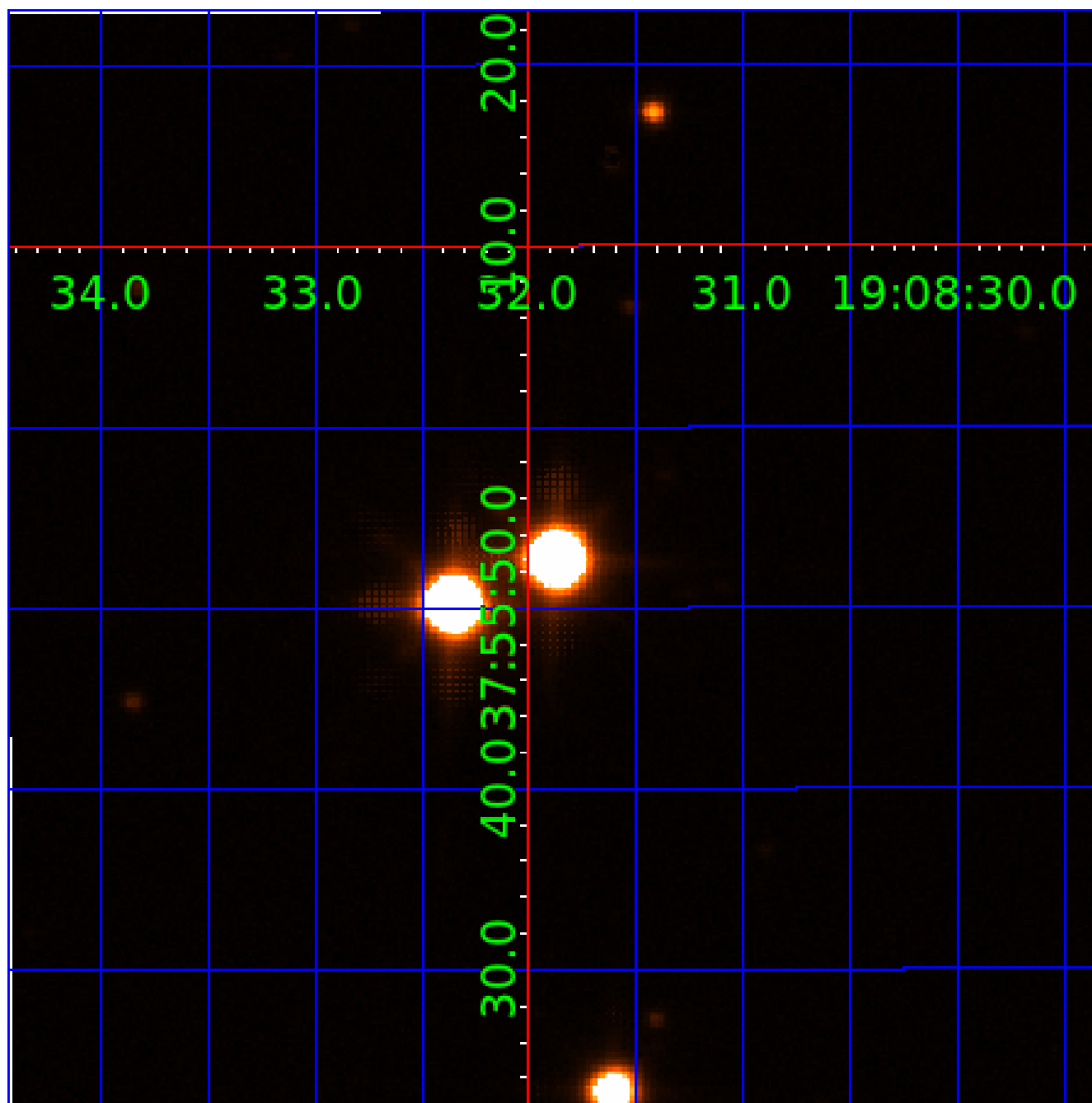


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 002696938

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
002696938-01	OBS	No	342.957490	318.021165	339.5	10.605	22.8	5.2	1.46	6484	2.92	3.38
002696938-02	OBS	No	417.041578	266.987338	543.7	24.035	12.6	13.1	1.46	6484	6.52	2.61
002696938-03	OBS	No	291.992005	279.284227	619.7	40.497	11.0	12.4	1.46	6484	6.93	4.19
002696938-04	OBS	No	429.742064	244.561690	245.4	19.502	9.6	8.0	1.46	6484	2.43	2.50
002696938-05	OBS	No	316.817135	373.894776	387.4	20.024	8.6	7.9	1.46	6484	3.40	3.76
002696938-06	OBS	No	302.428737	376.582428	291.7	4.961	9.3	7.6	1.46	6484	2.74	4.00

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002696938-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_SATURATED
002696938-02	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
002696938-03	OBS	FP	0.00	1	0	0	0	LPP_DV—INCONSISTENT_TRANS—CENT_SATURATED
002696938-04	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—INCONSISTENT_TRANS—CENT_SATURATED
002696938-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_SATURATED
002696938-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_SATURATED

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

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

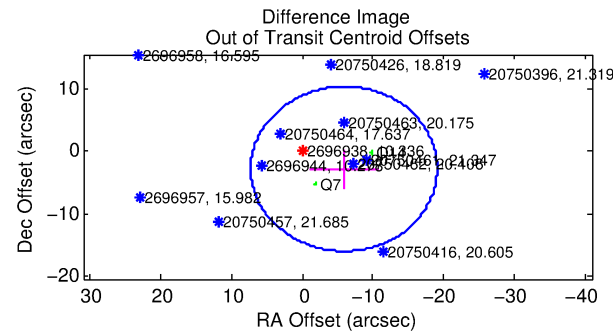
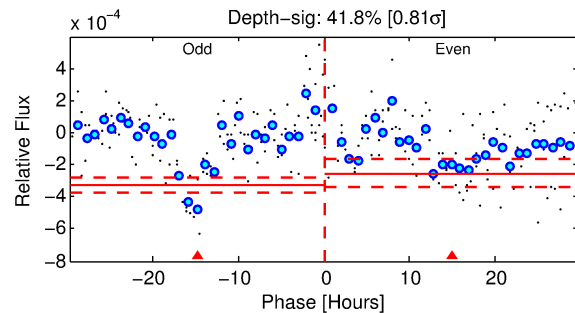
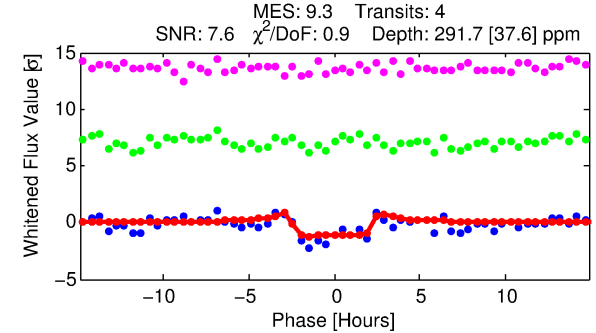
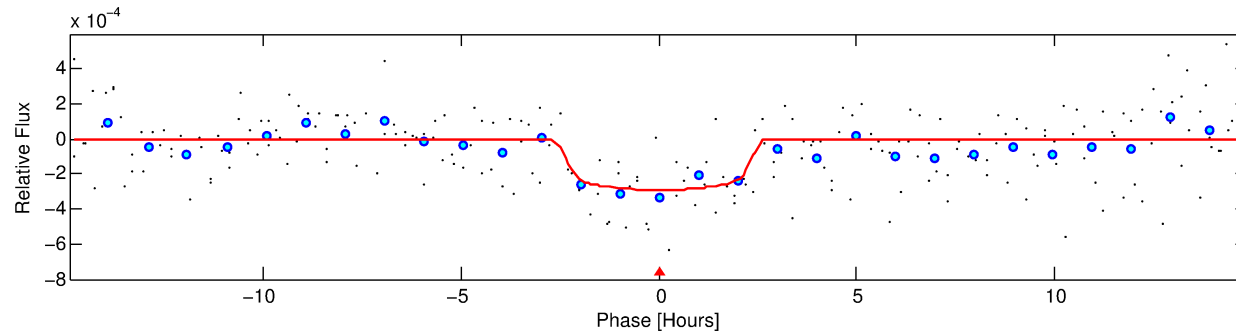
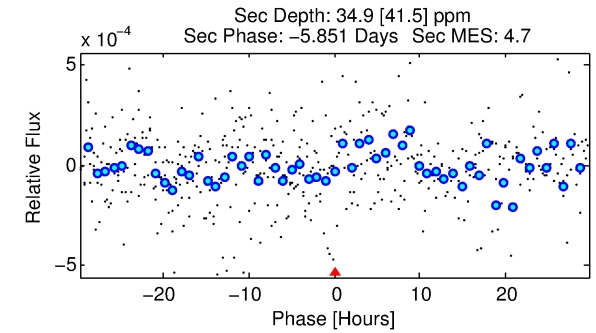
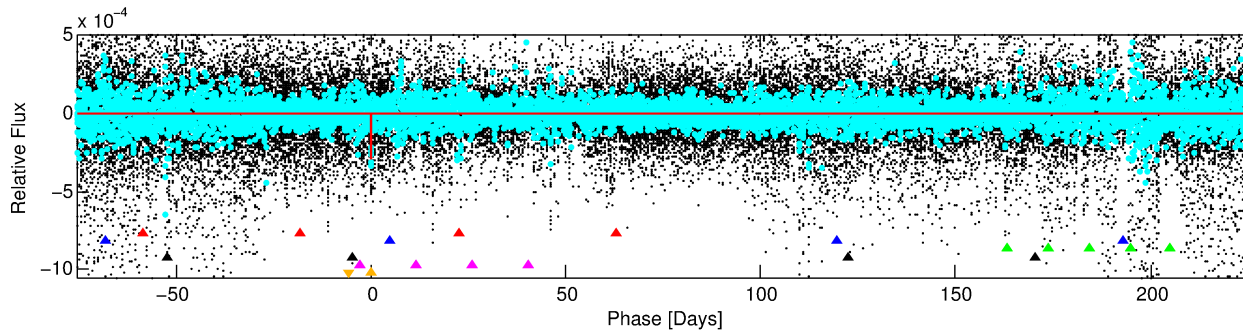
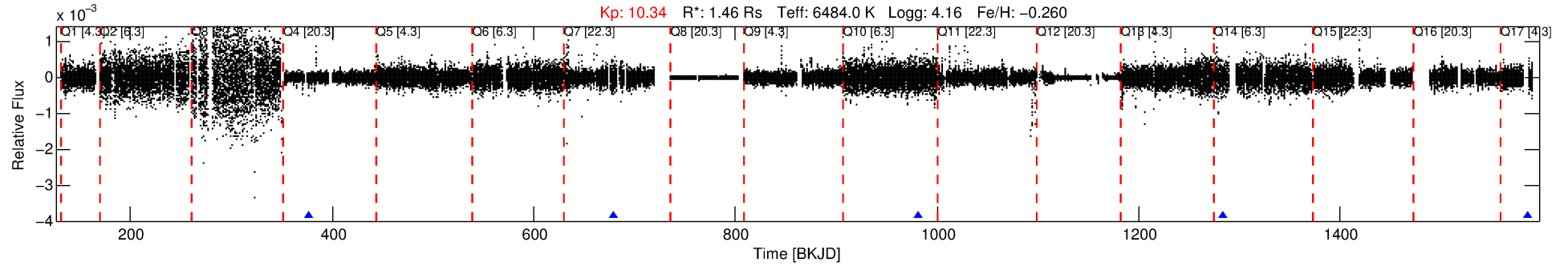
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 002696938-06

No Significant Match Found

# DV One-Page Summary

KIC: 2696938 Candidate: 6 of 6 Period: 302.429 d



## DV Fit Results:

Period = 302.42874 [0.00394] d  
Epoch = 376.5824 [0.0051] BKJD  
Rp/R\* = 0.0172 [0.0064]  
a/R\* = 297.64 [589.29]  
b = 0.79 [0.94]  
Seff = 4.00 [1.56]  
Teq = 361 [35] K  
Rp = 2.74 [1.28] Re  
a = 0.9160 [0.2300] AU  
Ag = 2151.29 [3116.89] [0.69σ]  
Teff = 3797 [1333] K [2.58σ]

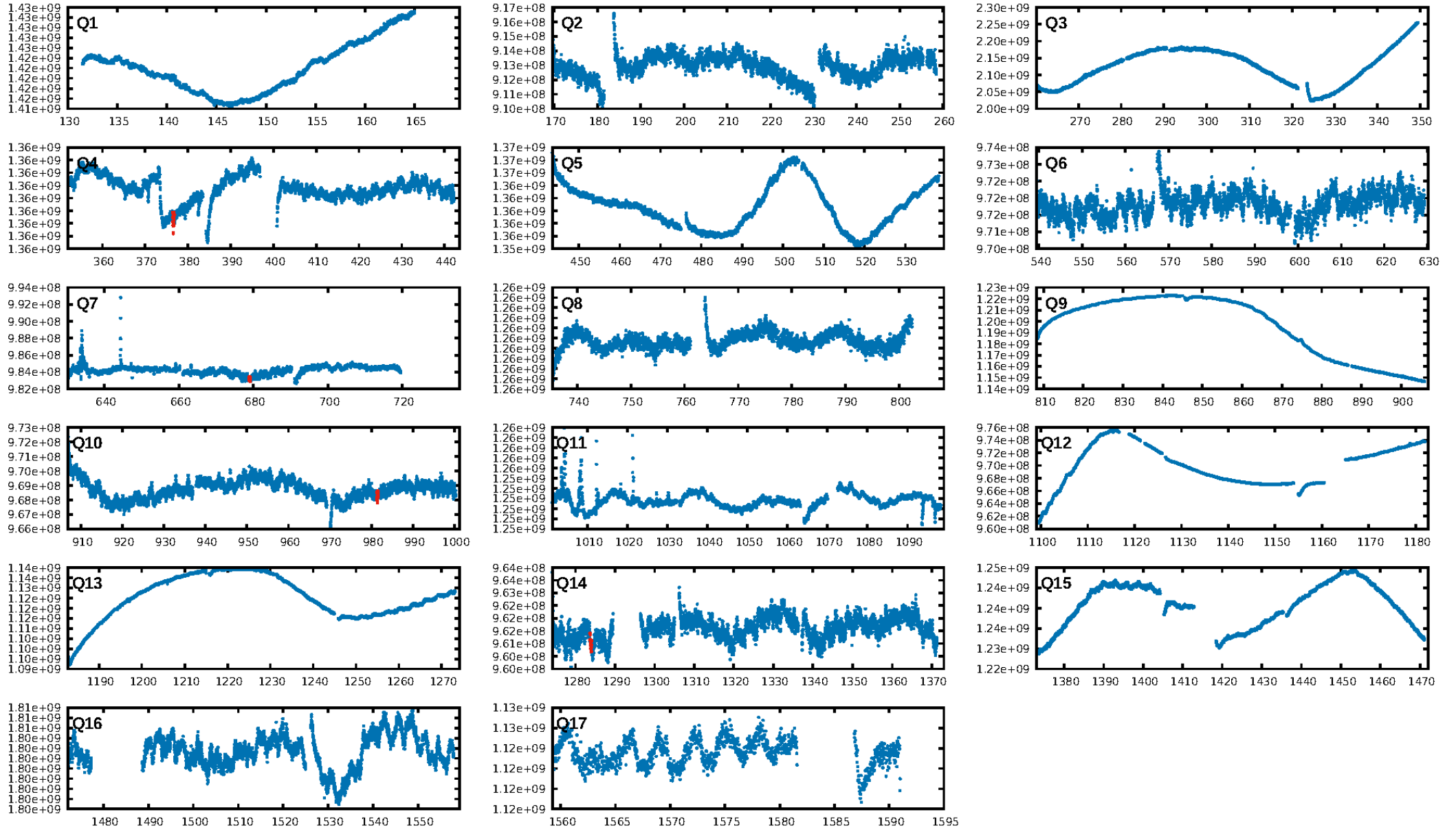
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [6.14σ]  
LongPeriod-sig: 100.0% [16.74σ]  
ModelChiSquare2-sig: 93.1%  
ModelChiSquareGof-sig: 99.6%  
**Bootstrap-pfa: 2.32e-08**  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: N/A  
Centroid-sig: 3.9%  
Centroid-so: 1.454 arcsec [2.41σ]  
OotOffset-rm: 6.553 arcsec [1.49σ]  
KicOffset-rm: 4.251 arcsec [2.16σ]  
OotOffset-st: 1/1/0/0 [2]  
KicOffset-st: 1/1/0/0 [2]  
DiffImageQuality-fgm: 0.50 [1/2]  
DiffImageOverlap-fno: 1.00 [4/4]

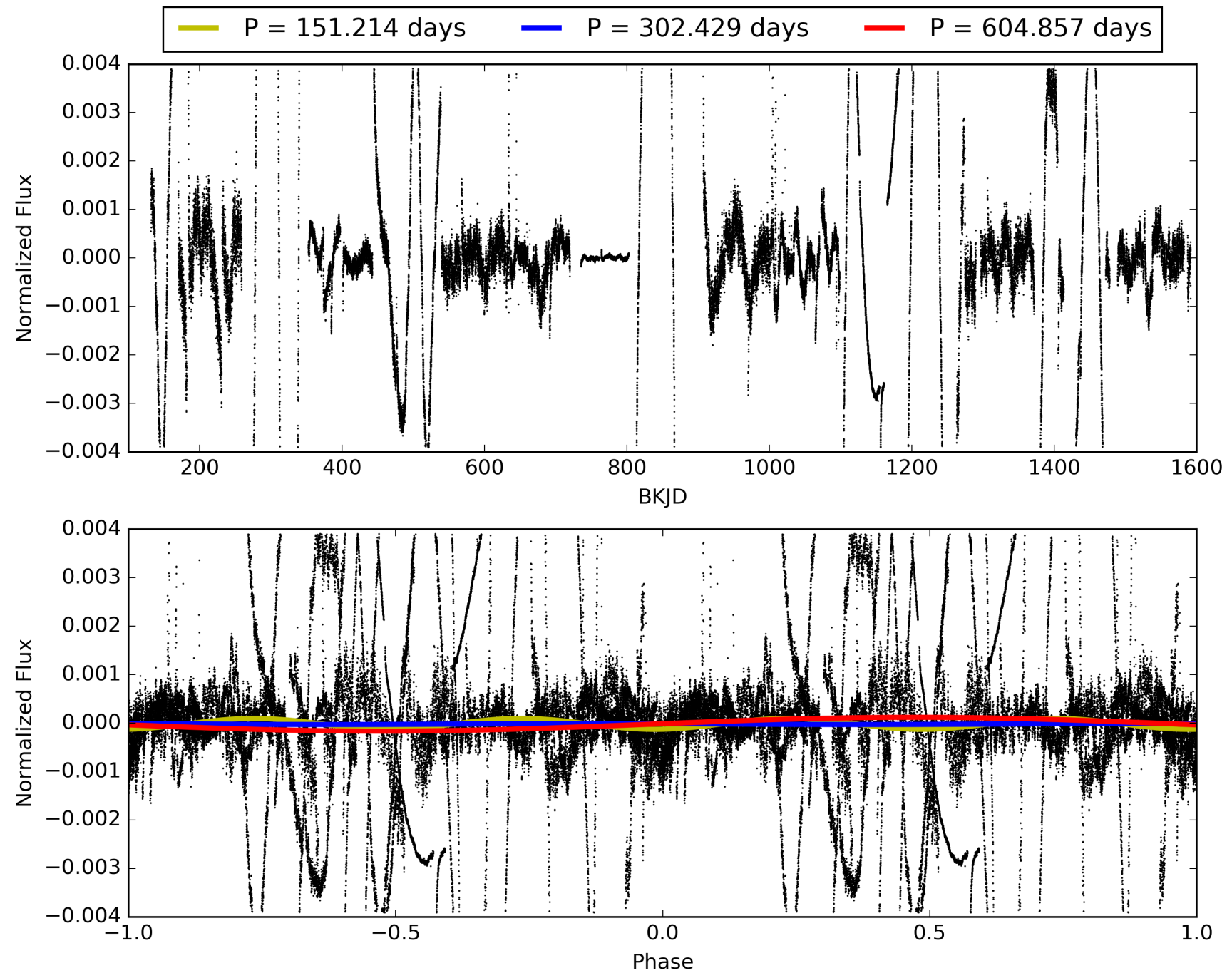
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 22:09:27 Z

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

# TCE 002696938-06, PDC Light Curves

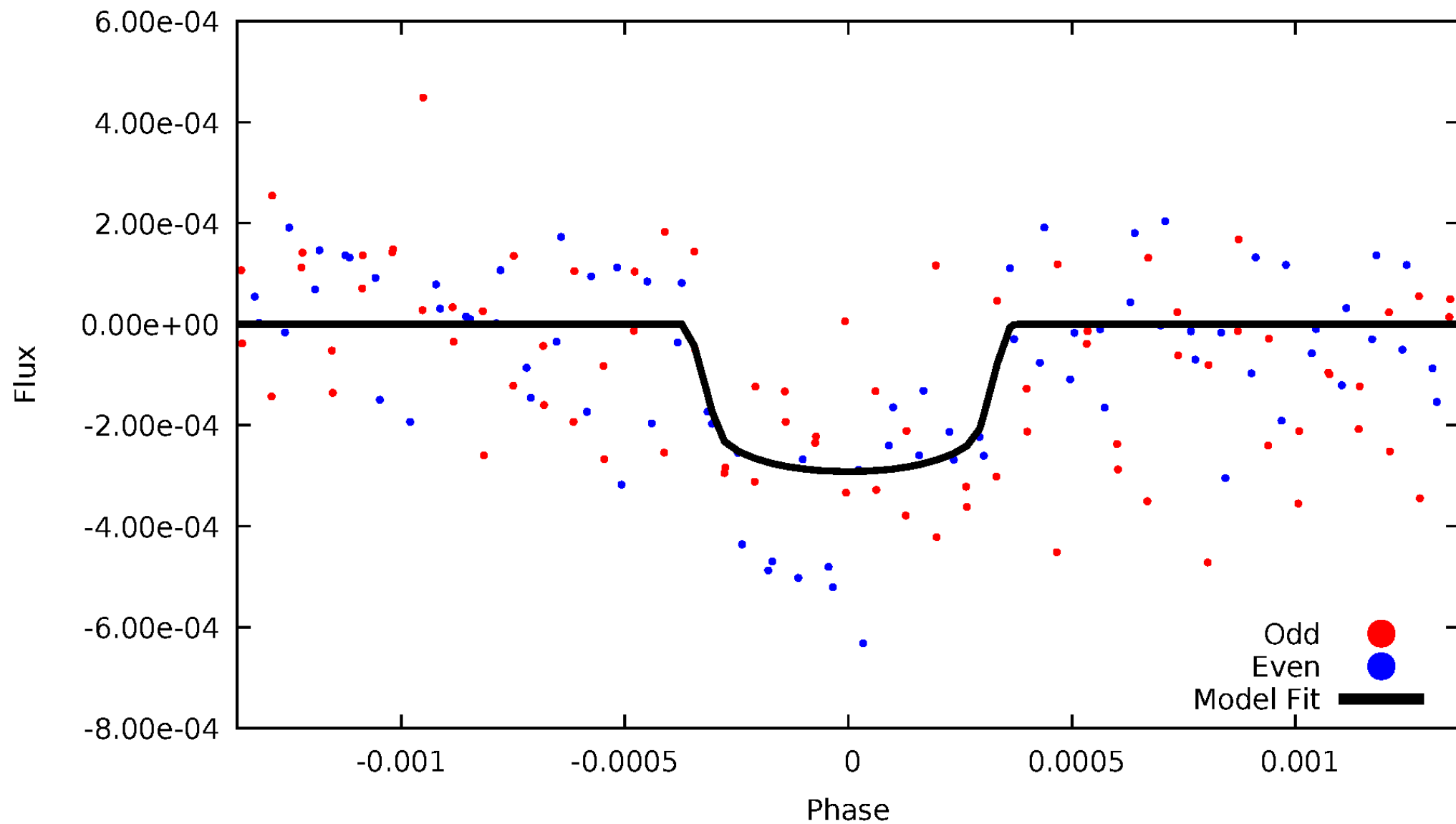


# TCE 002696938-06



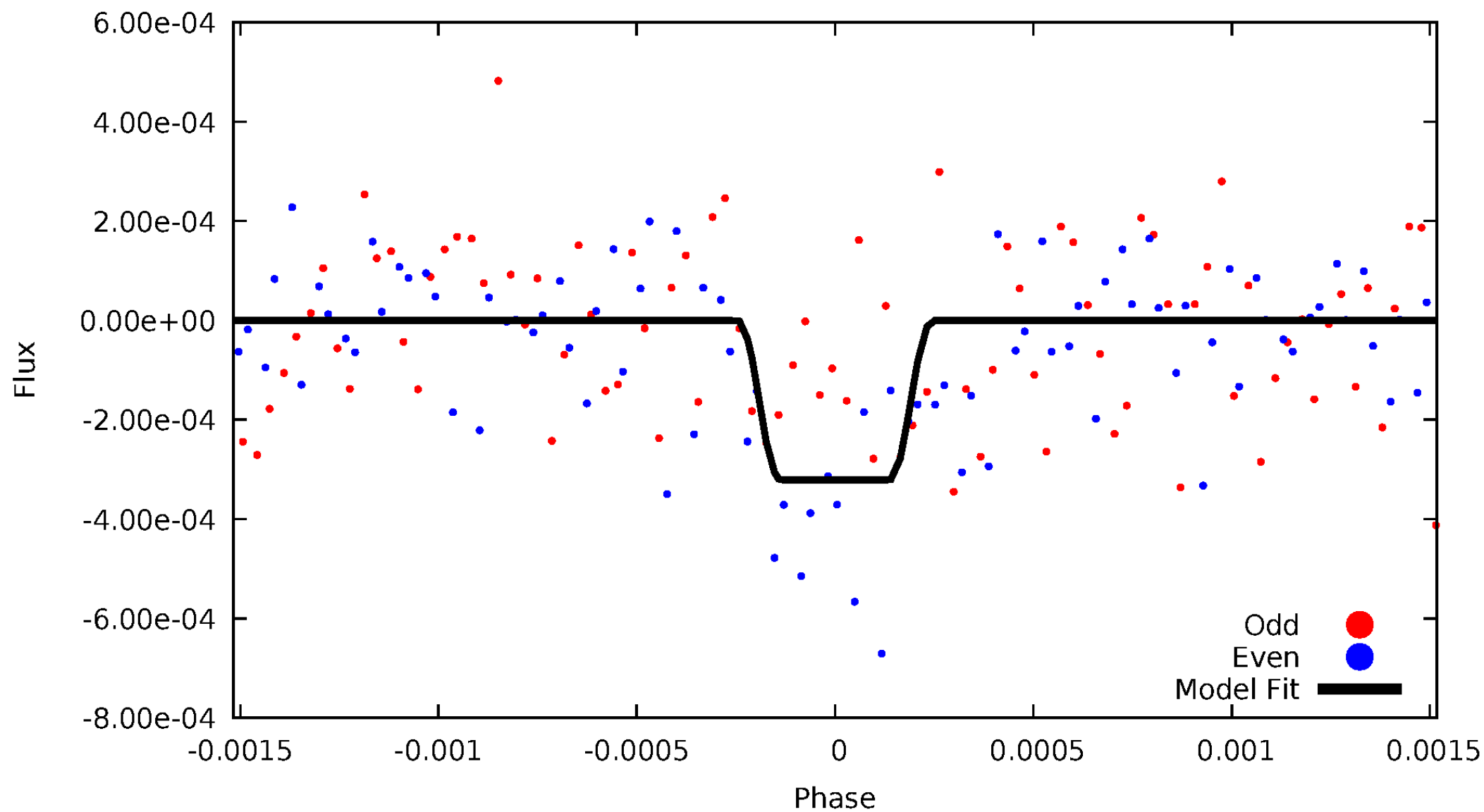
# DV Odd/Even

TCE 002696938-06



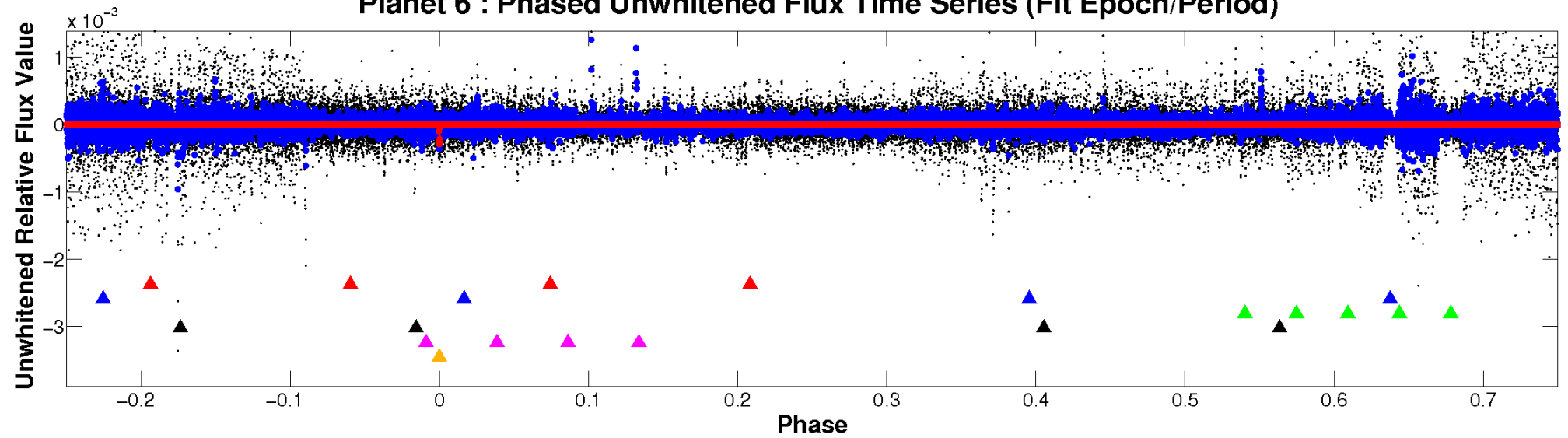
# ALT Odd/Even

TCE 002696938-06

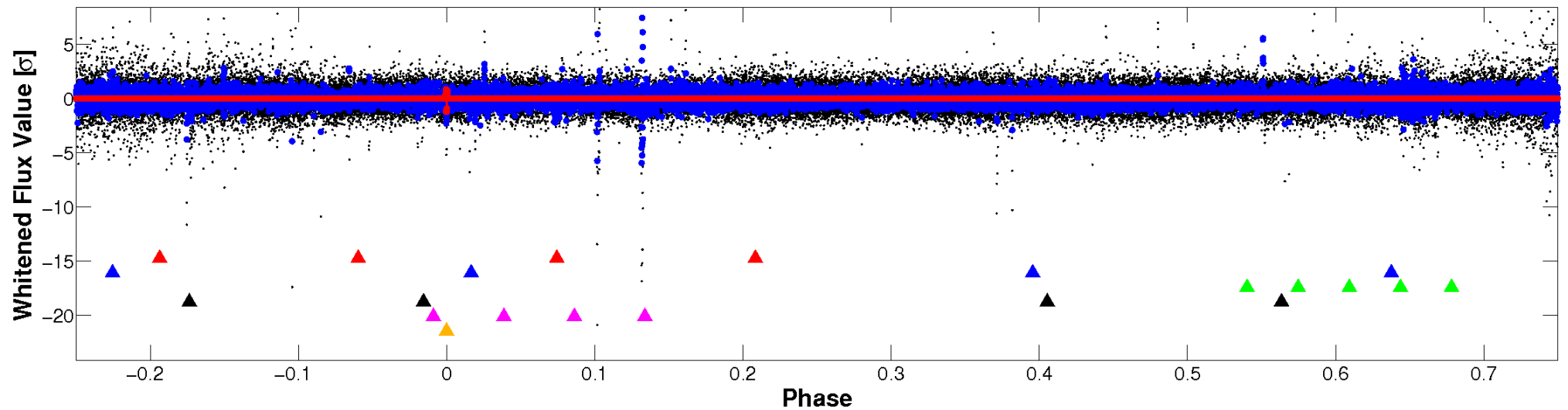


# Non-Whitened Vs. Whitened Light Curve

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

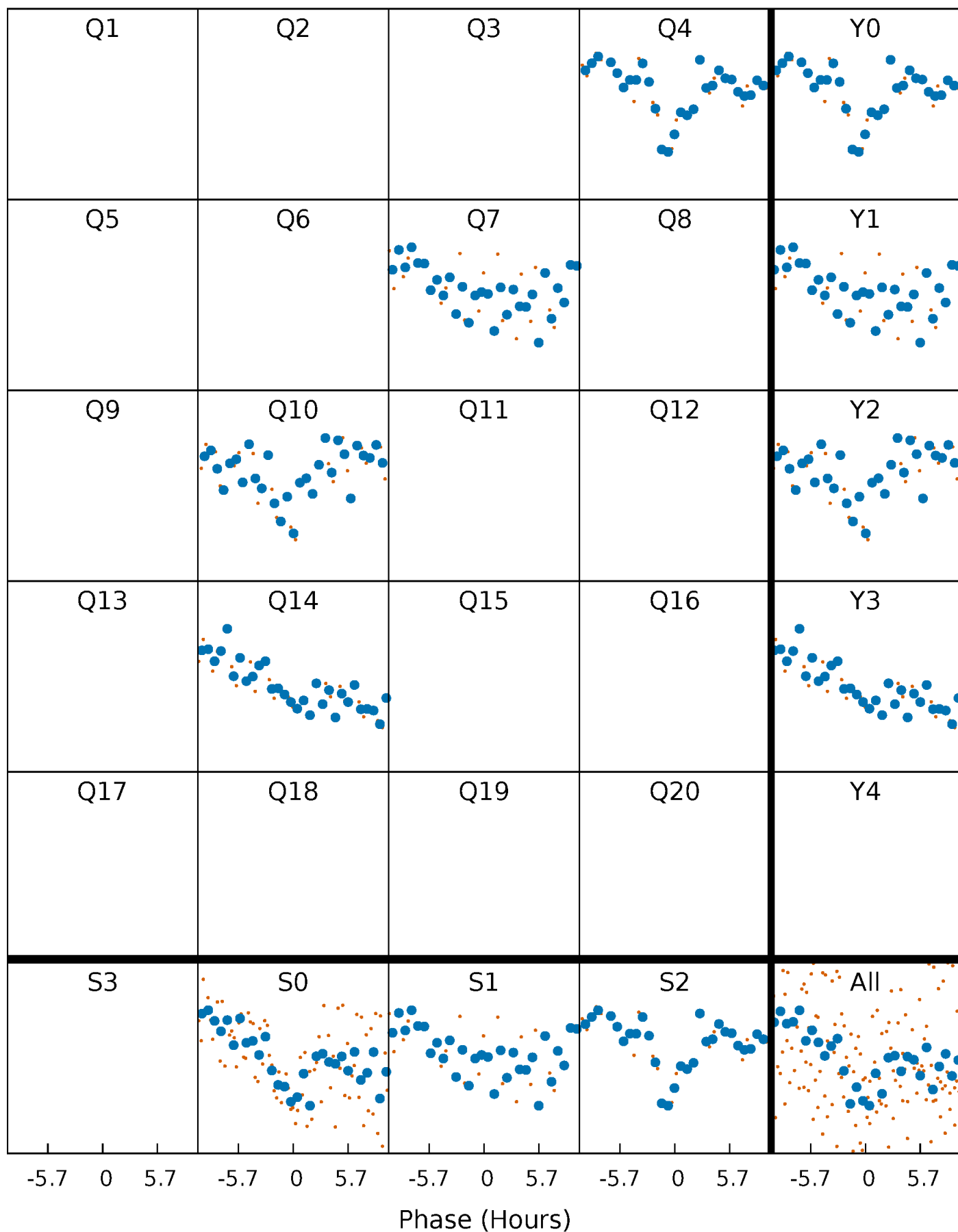


Planet 6 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

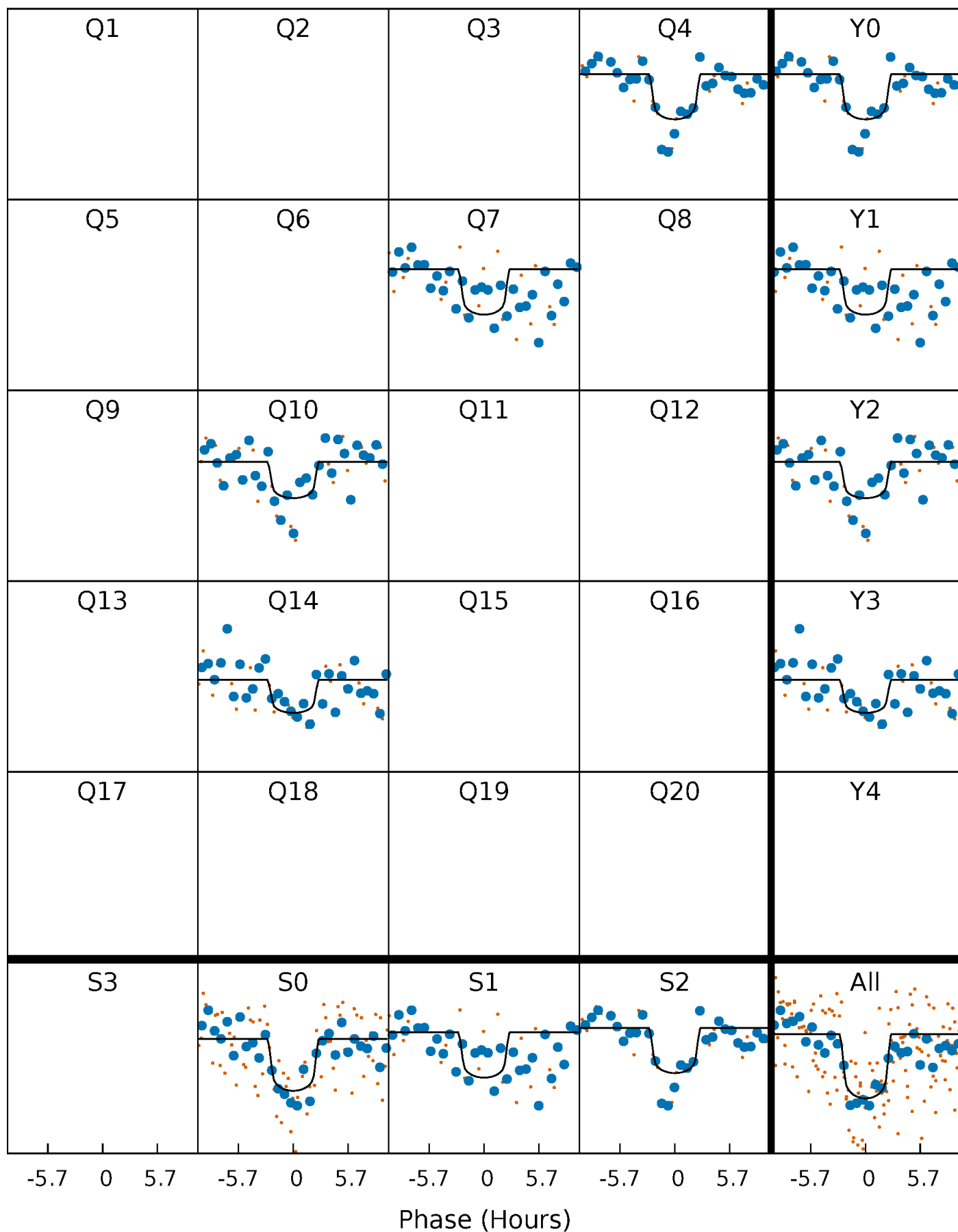
TCE 002696938-06 P=302.428737 Days  $T_0=376.582428$  (BKJD)





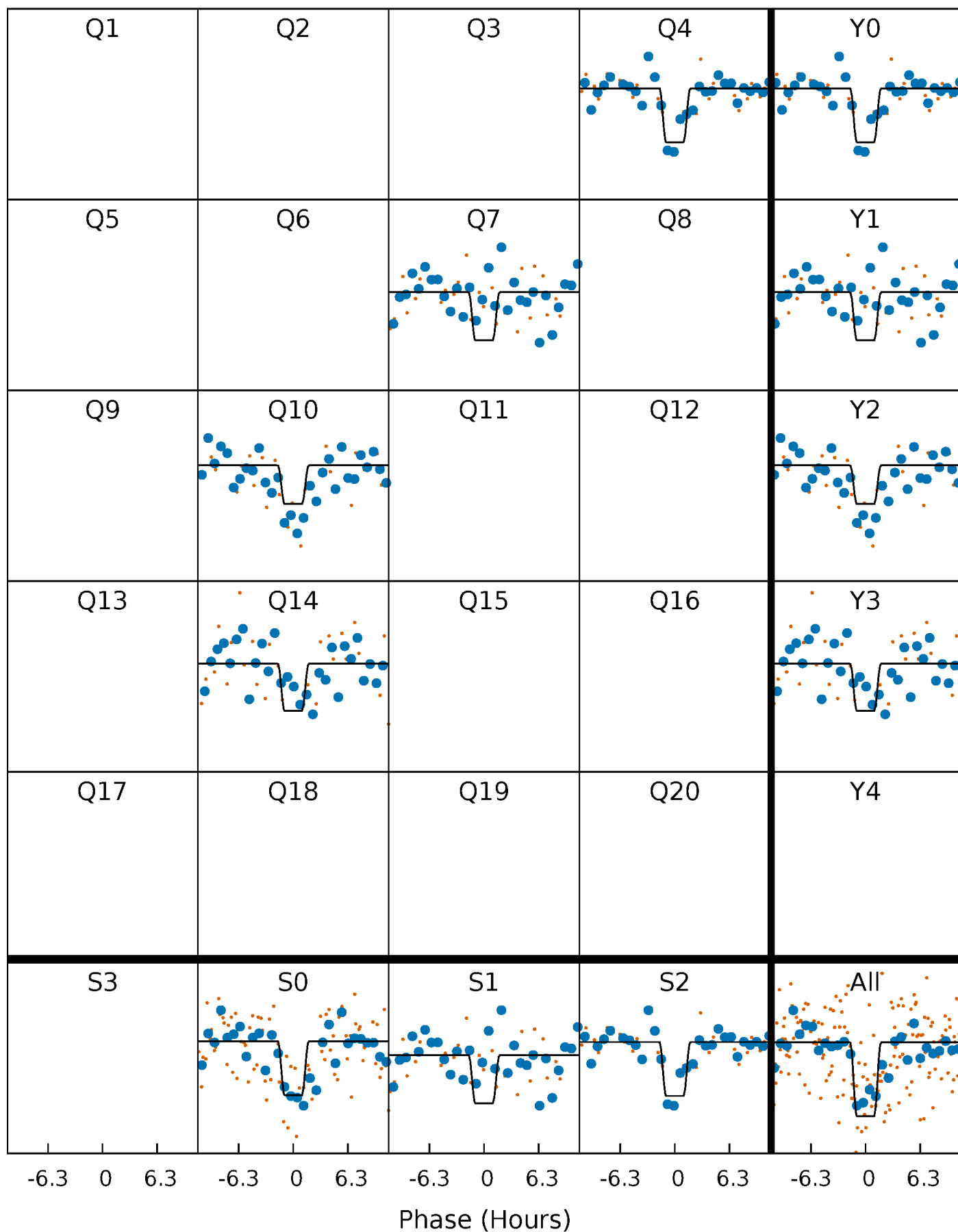
# DV Quarter-Phased Transit Curves

TCE 002696938-06     $P=302.428737$  Days     $T_0=376.582428$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

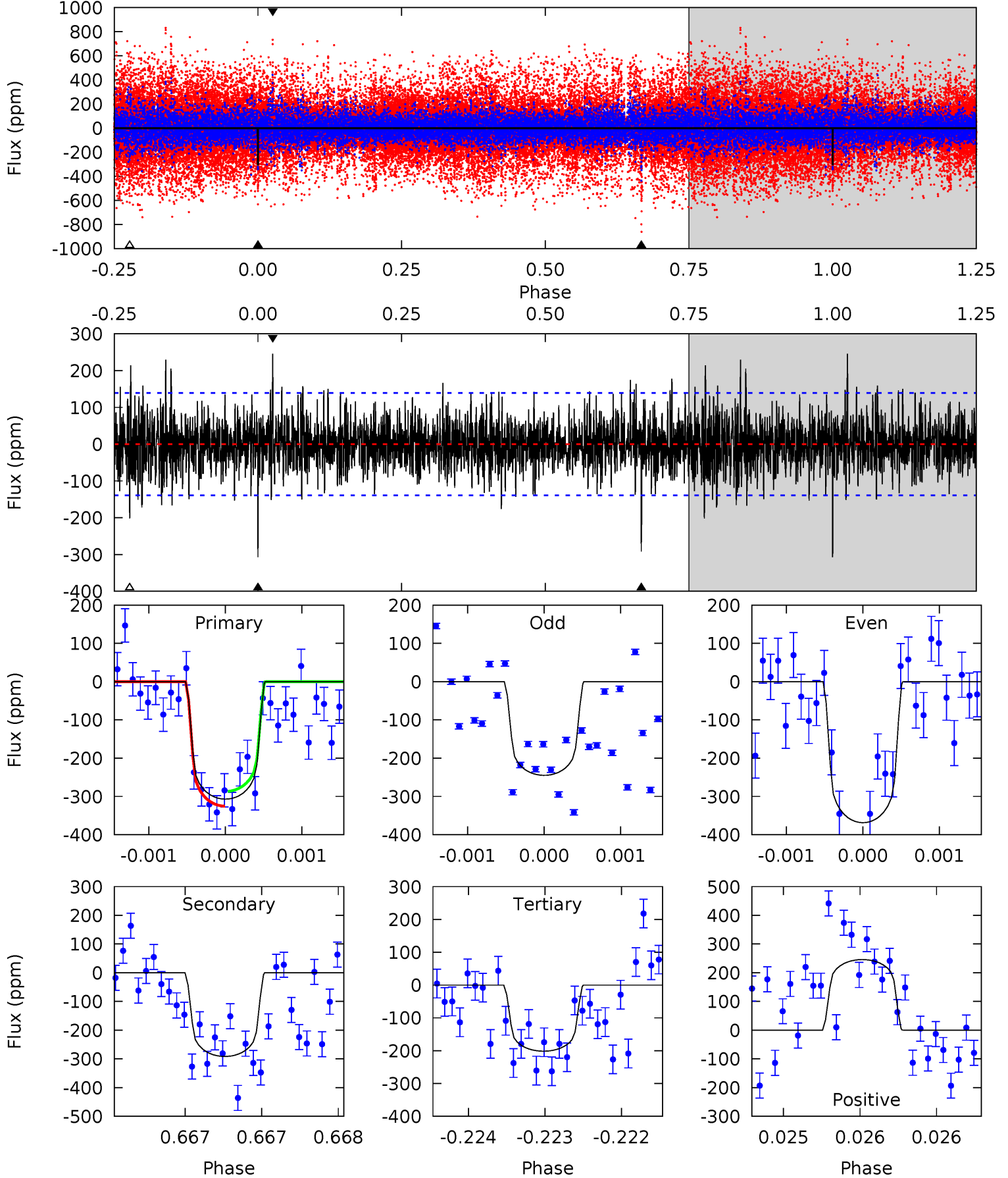
TCE 002696938-06 P=302.423499 Days  $T_0=376.567392$  (BKJD)



# DV Model-Shift Uniqueness Test

002696938-06, P = 302.428737 Days, E = 74.153691 Days

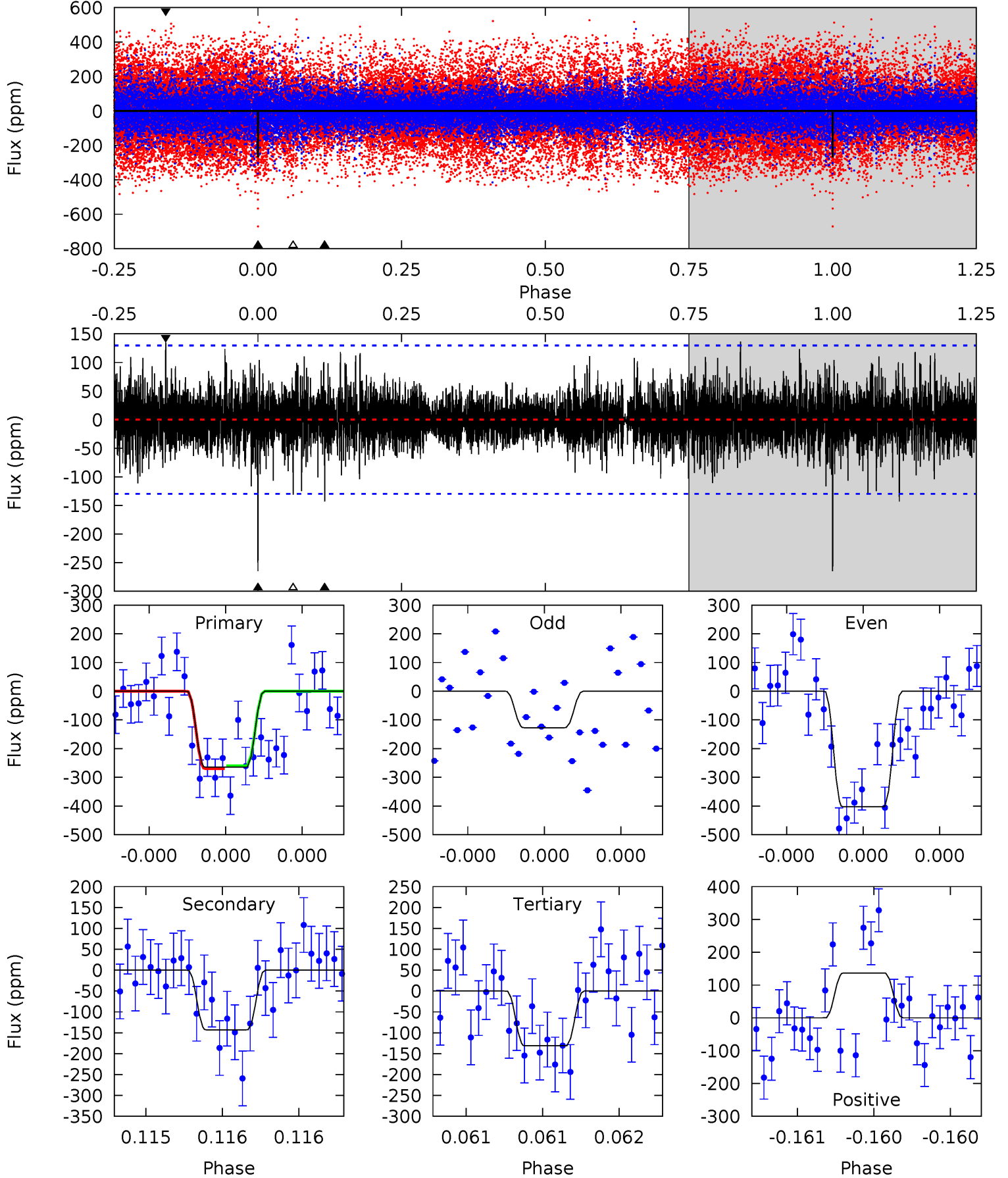
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.2	11.5	7.98	9.73	5.51	3.38	2.03	4.17	2.42	3.56	1.81	2.40	0.95	0.44	0.76



# Alt Model-Shift Uniqueness Test

002696938-06, P = 302.423499 Days, E = 74.143893 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
11.4	6.15	5.64	5.88	5.58	3.48	1.26	5.74	5.50	0.51	0.27	5.89	1.04	0.34	0.20



### Stellar Parameters For KIC 002696938

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6484^{+146}_{-178}$	$4.161^{+0.209}_{-0.171}$	$-0.260^{+0.250}_{-0.300}$	$1.456^{+0.422}_{-0.346}$	$1.119^{+0.193}_{-0.129}$	$0.511^{+0.594}_{-0.239}$
	+2%/-3%	+5%/-4%	+96%/-115%	+29%/-24%	+17%/-12%	+116%/-47%
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 002696938-06 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-292 \pm 25$	$2.69^{+1.08}_{-1.00}$	$500^{+32}_{-35}$	$6403^{+1991}_{-920}$	$18475^{+29700}_{-9025}$
Alt.	$-143 \pm 23$	$2.79^{+1.14}_{-1.13}$	$500^{+39}_{-37}$	$5354^{+1404}_{-712}$	$8834^{+14248}_{-4596}$

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

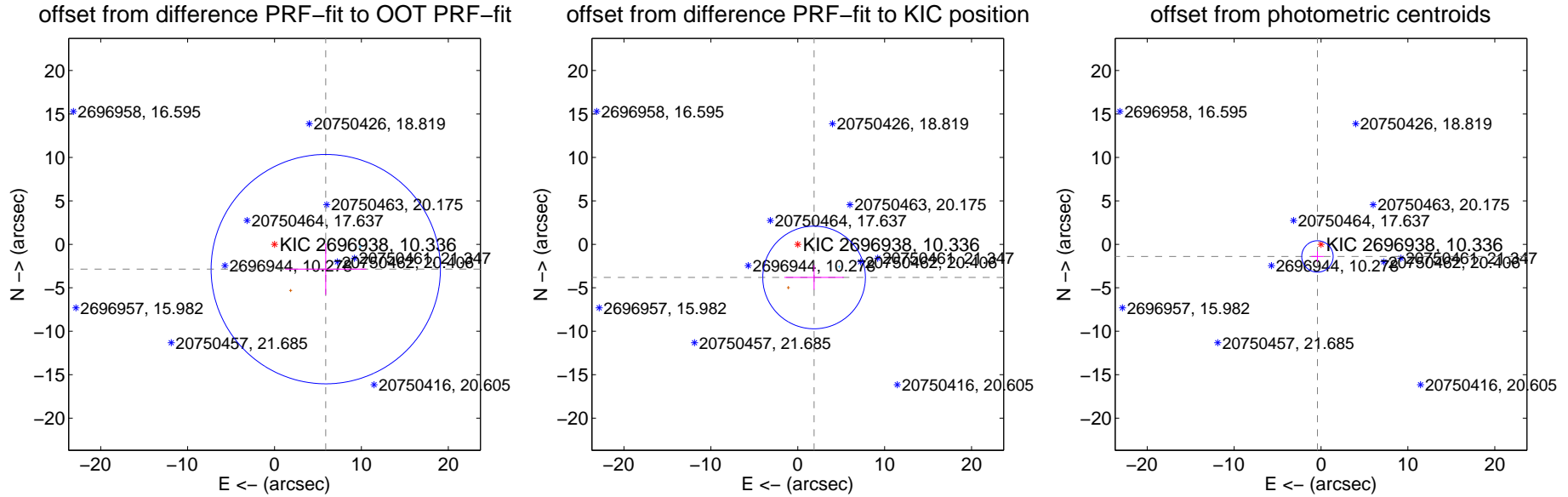
## DV Centroid Data

Supplemental centroid analysis for 002696938-06. **Kepler magnitude: 10.34.** Transit SNR 7.63

There are 1 quarters with good PRF difference image offsets

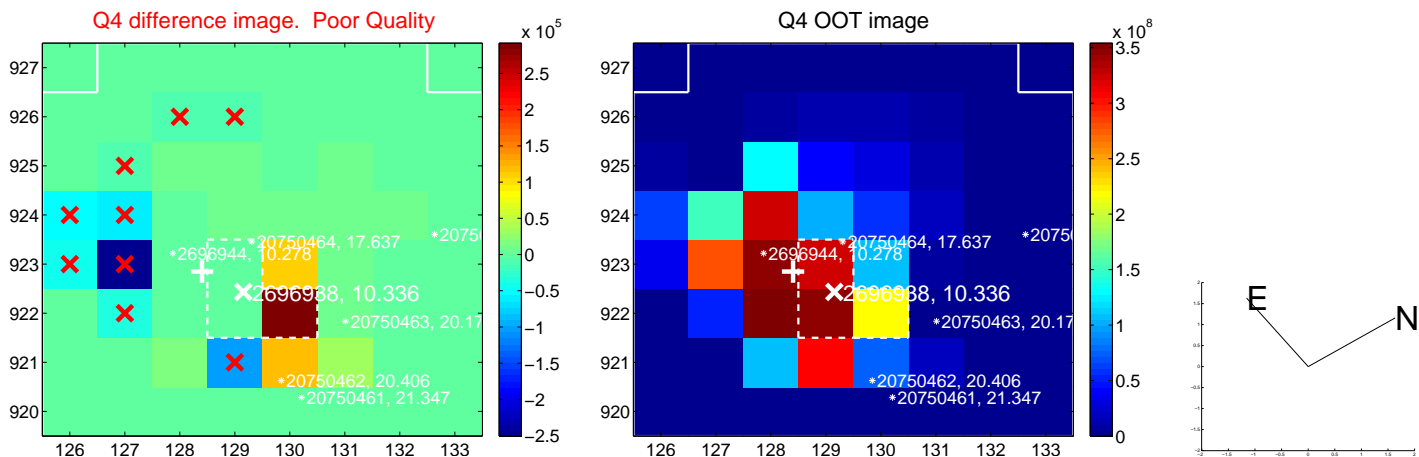
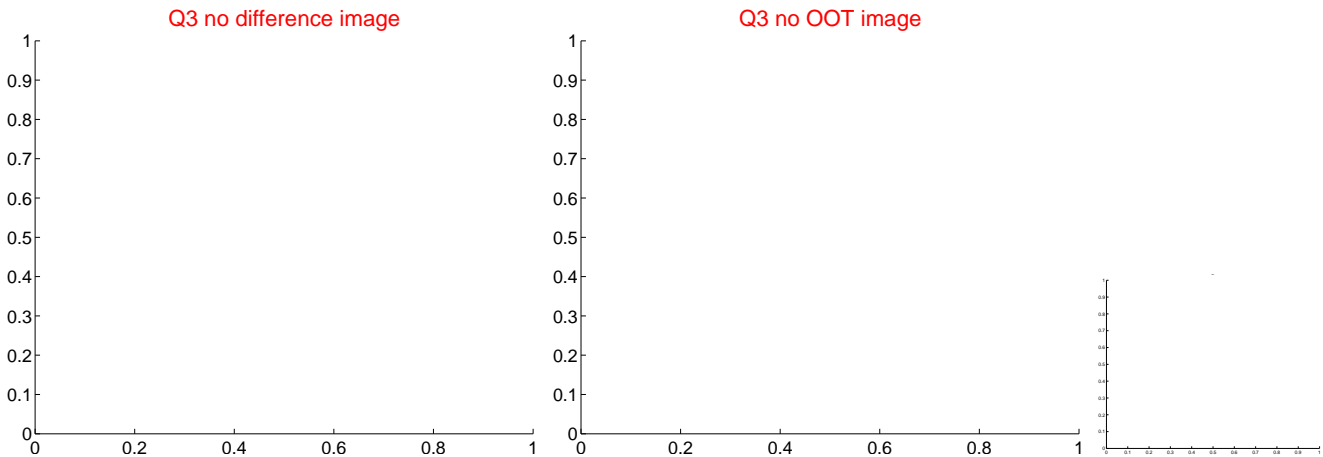
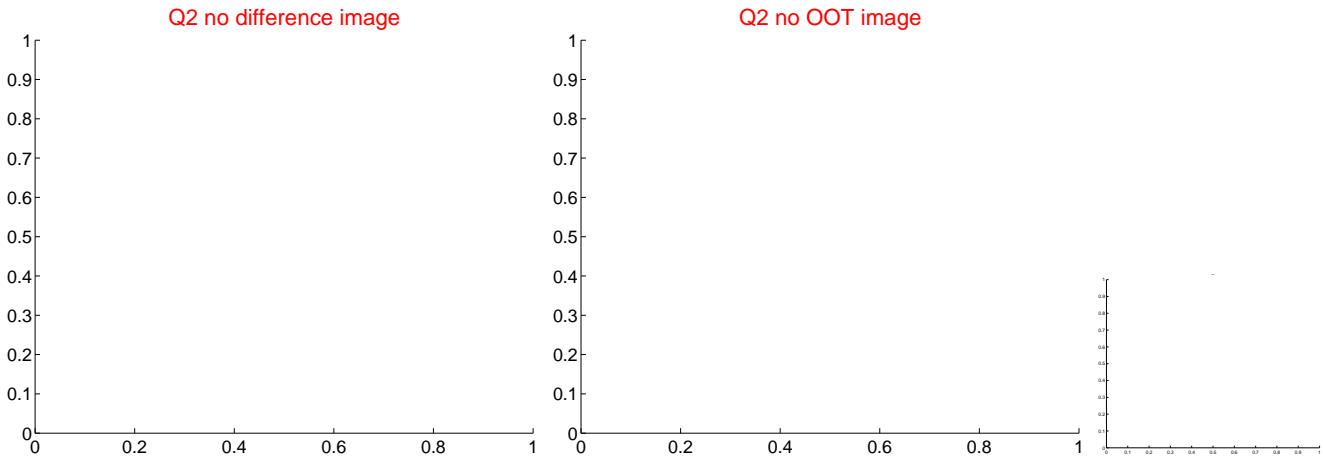
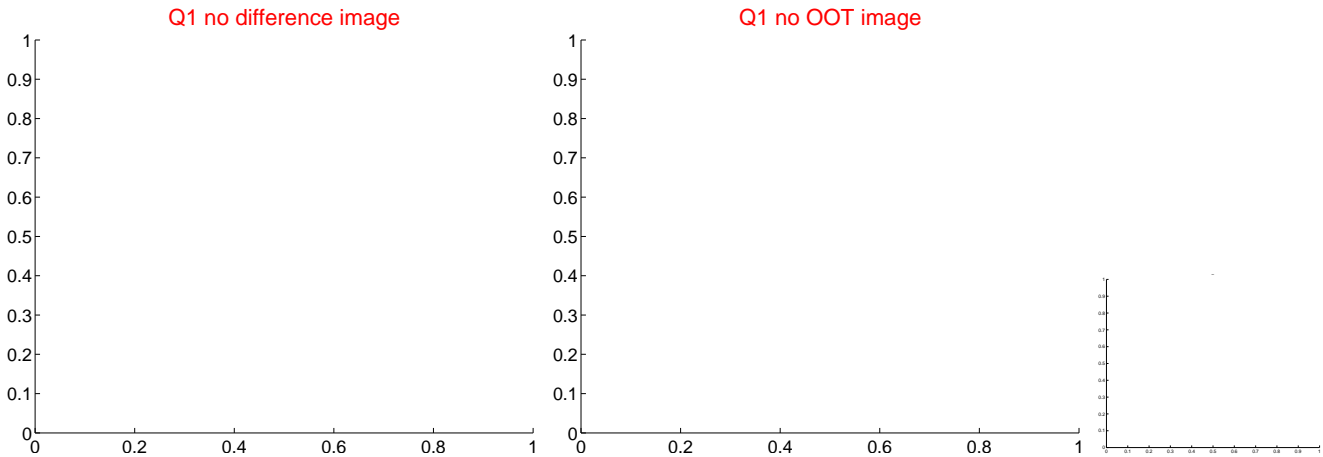
The OOT PRF centroid is offset from the target star catalog position by about 5.58 arcsec so the offset from difference PRF-fit to OOT-PRF-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$6.553 \pm 4.399$	1.49	$-5.899 \pm 4.675$	$-2.855 \pm 2.945$
PRF-fit source offset from KIC position	$4.251 \pm 1.969$	2.16	$-1.880 \pm 3.425$	$-3.813 \pm 1.402$
photometric centroid source offset	$1.45 \pm 0.60$	2.41	$0.41 \pm 0.71$	$-1.39 \pm 0.59$

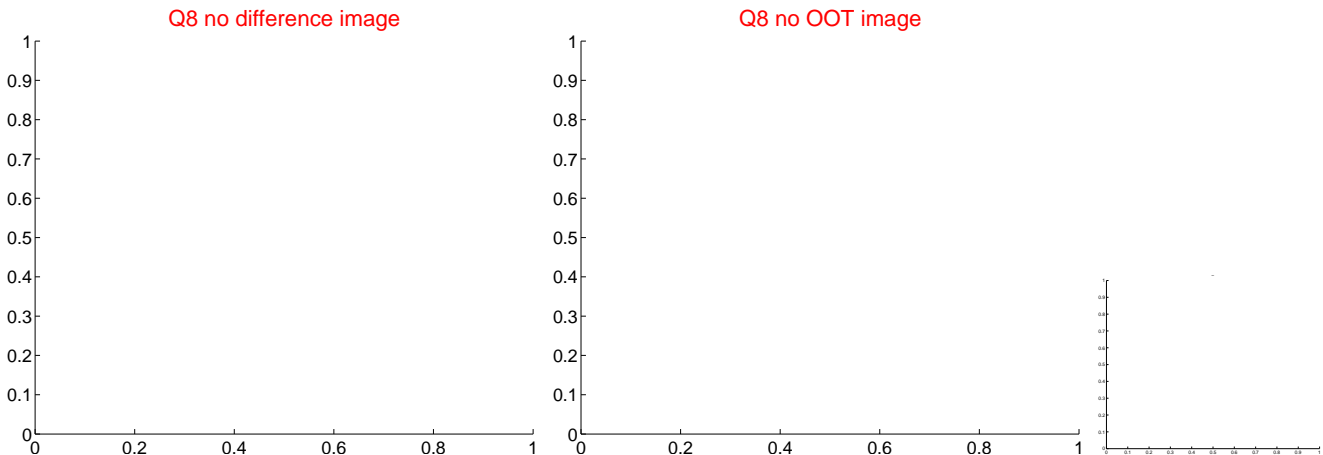
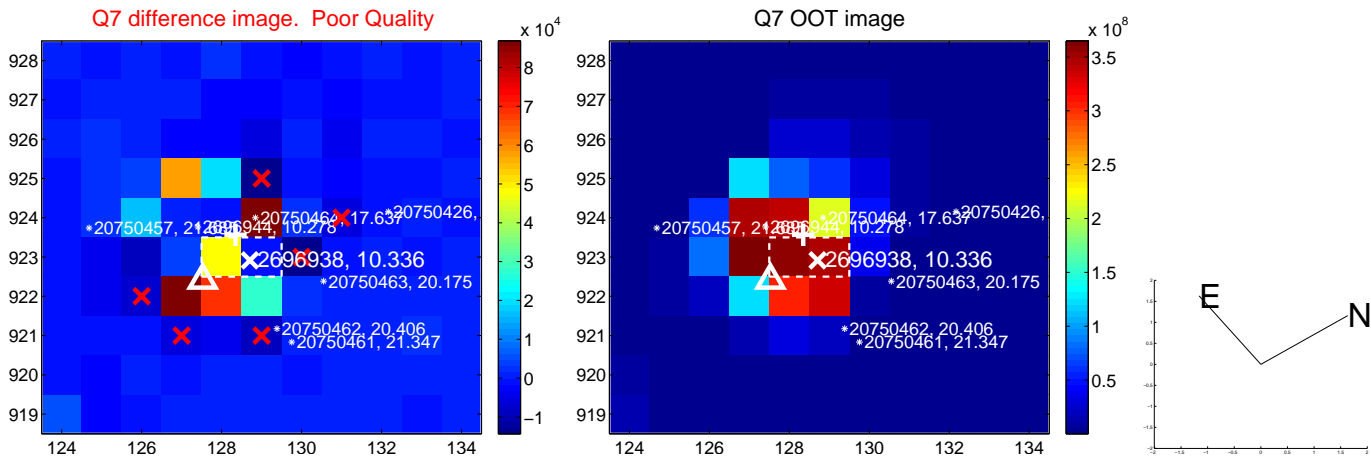


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

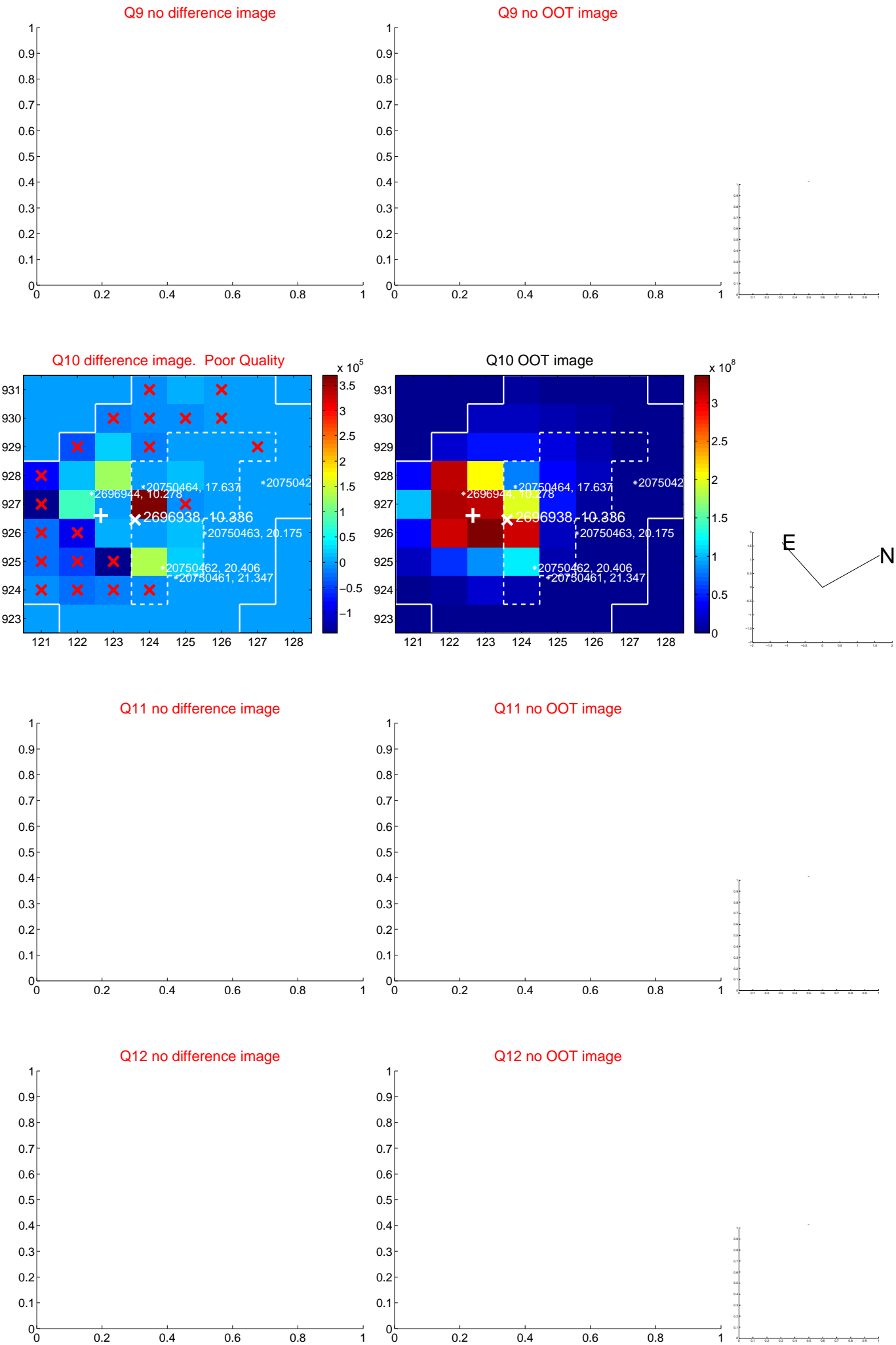


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value

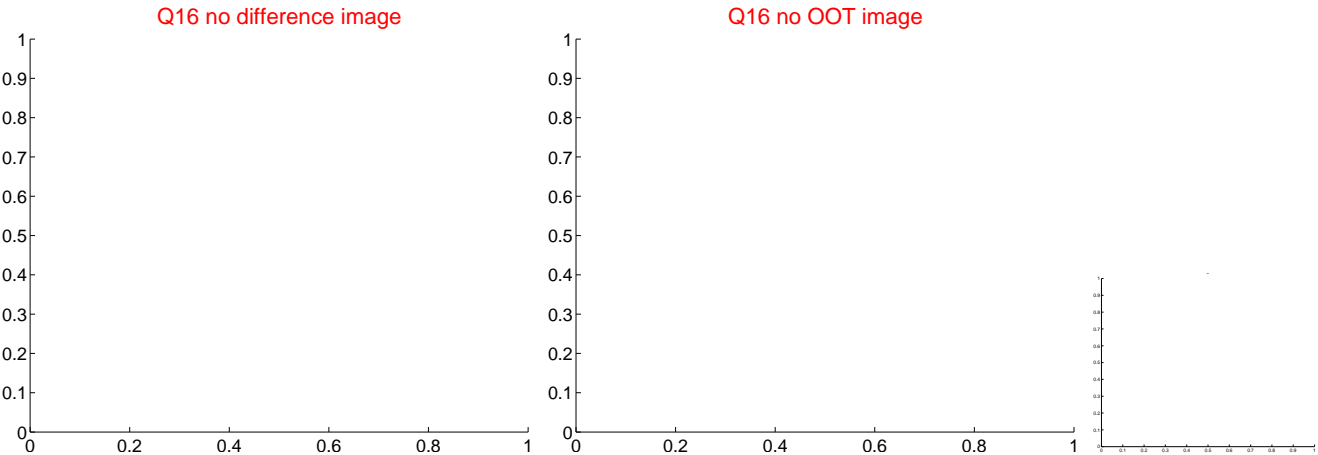
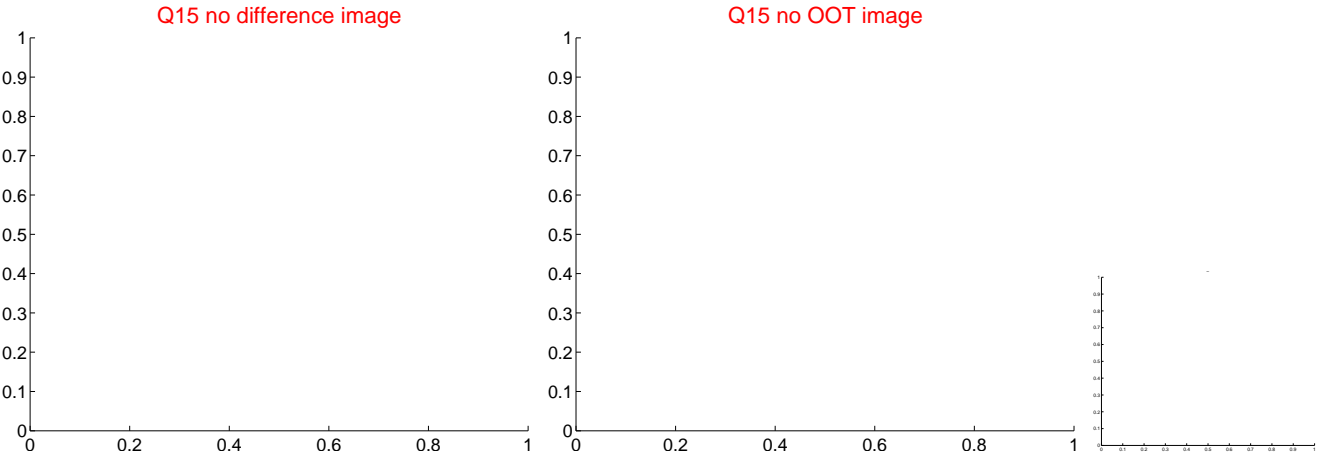
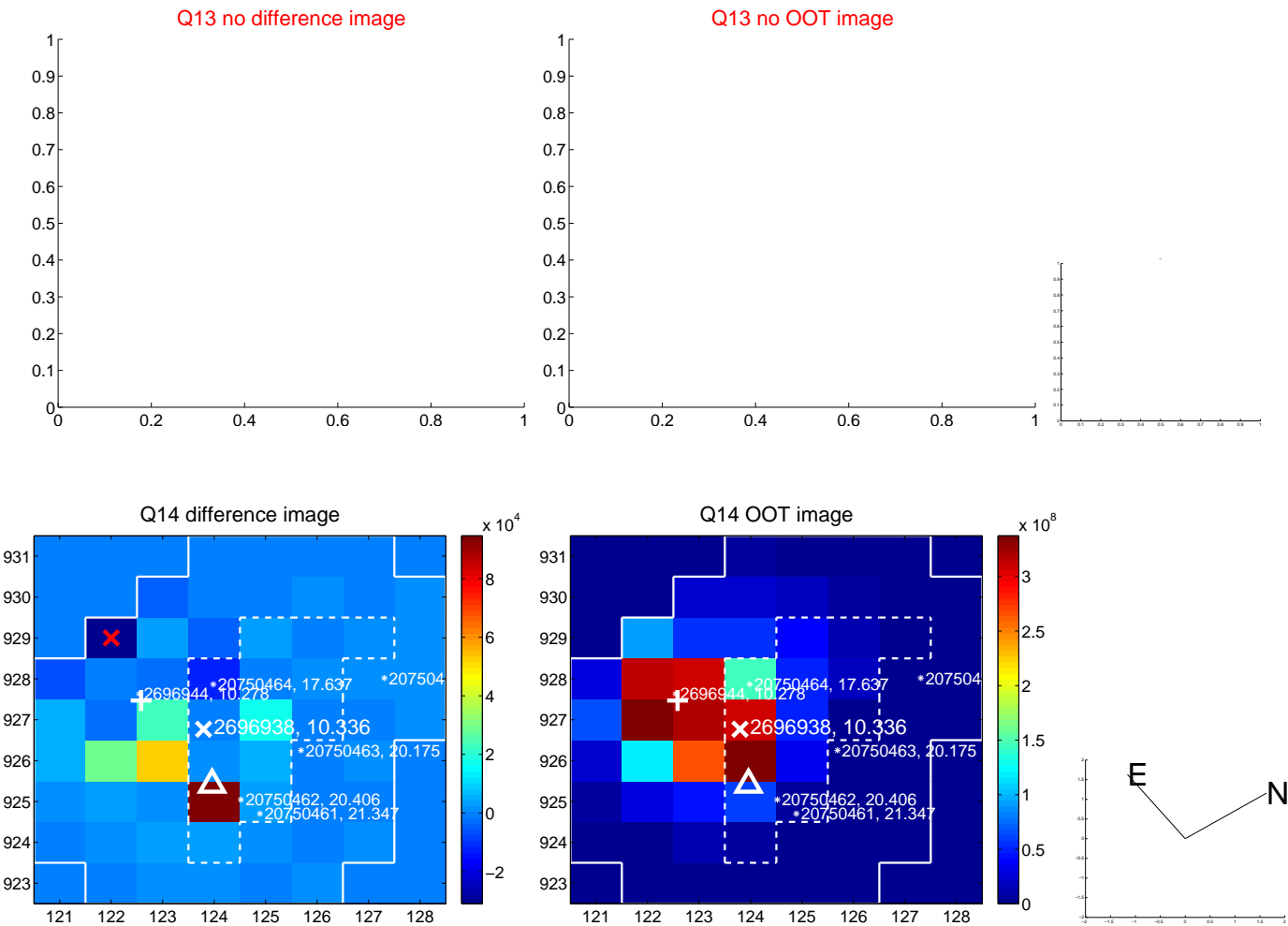




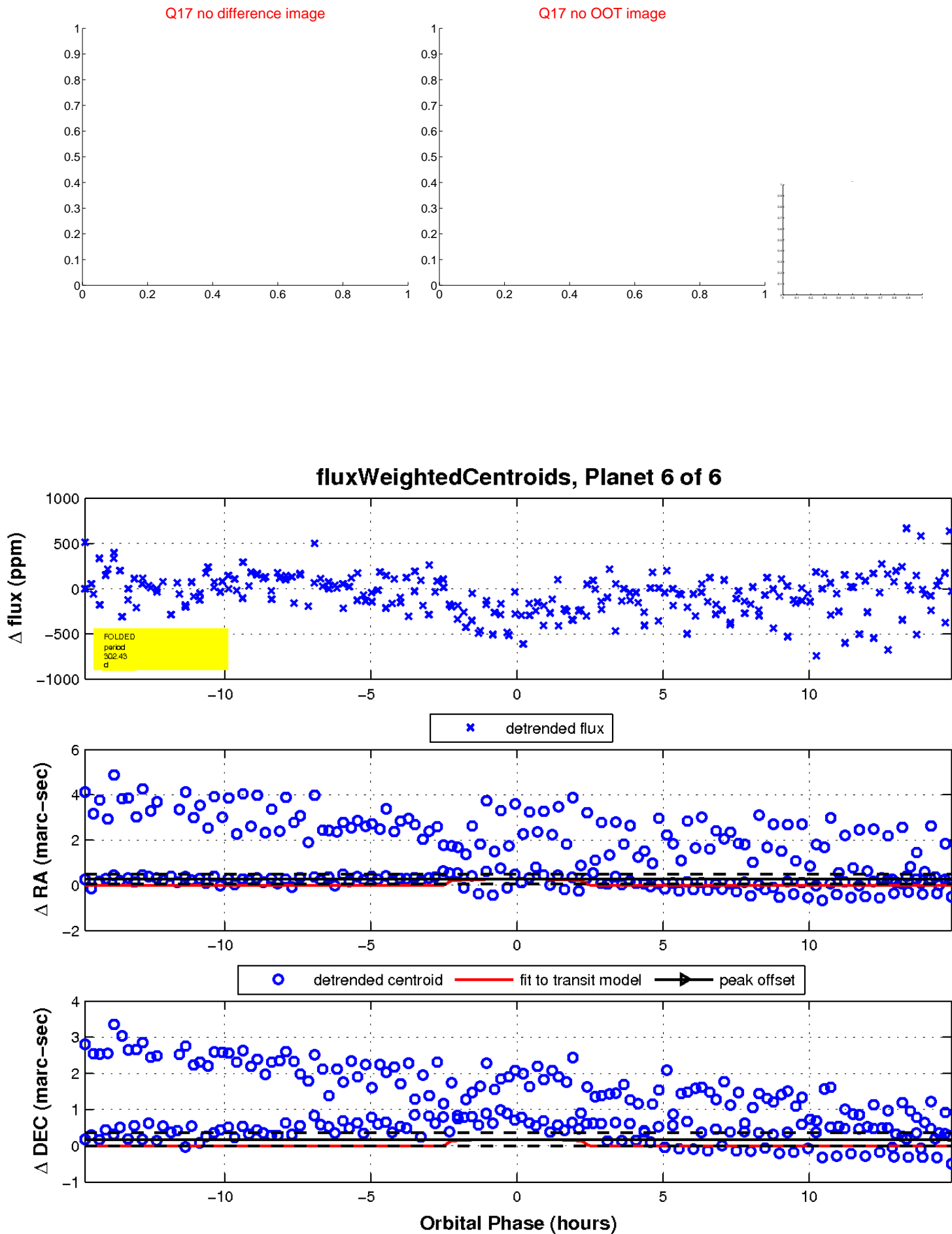
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

