

# KIC 006937131

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006937131-01	OBS	No	117.103296	195.920780	51.3	1.665	38.7	31.5	48.35	3948	43.67	2597.65
006937131-02	OBS	No	358.203546	389.477540	24.1	8.007	19.9	8.5	48.35	3948	29.44	585.01
006937131-03	OBS	No	256.641148	253.452664	43.6	2.098	18.9	17.9	48.35	3948	43.44	912.51
006937131-04	OBS	No	176.008339	233.821327	2.2	1.876	20.1	1.3	48.35	3948	9.18	1508.79
006937131-05	OBS	No	211.915402	161.715255	33.5	9.582	17.7	11.1	48.35	3948	34.00	1177.94
006937131-06	OBS	No	326.304219	430.241376	62.8	13.565	16.5	16.5	48.35	3948	45.99	662.49
006937131-07	OBS	No	68.543331	164.278275	14.4	27.831	15.6	5.8	48.35	3948	27.28	5305.42
006937131-08	OBS	No	110.649092	187.850790	448.8	2.000	17.9	-1.0	48.35	3948	96.47	2801.62
006937131-09	OBS	No	80.018968	145.132211	42.0	2.520	17.7	12.5	48.35	3948	34.75	4316.01

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006937131-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_SKYE_ZUMA—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
006937131-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_ZUMA—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_SATURATED
006937131-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
006937131-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
006937131-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_ZUMA—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_SATURATED
006937131-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_SATURATED
006937131-07	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
006937131-08	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
006937131-09	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—CENT_SATURATED

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

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

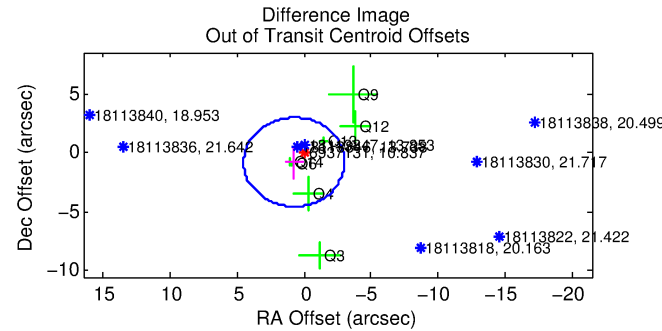
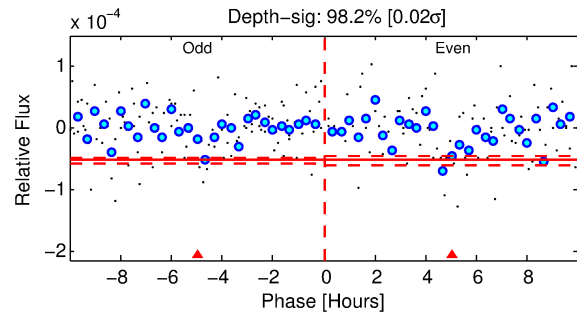
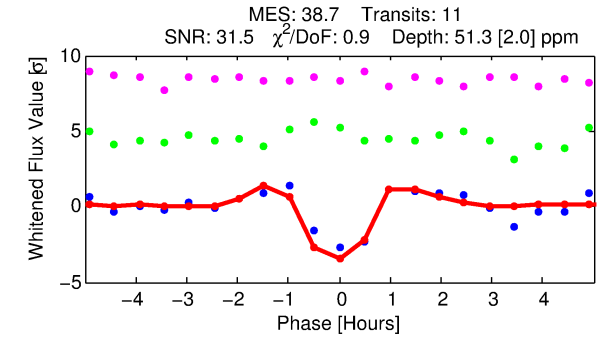
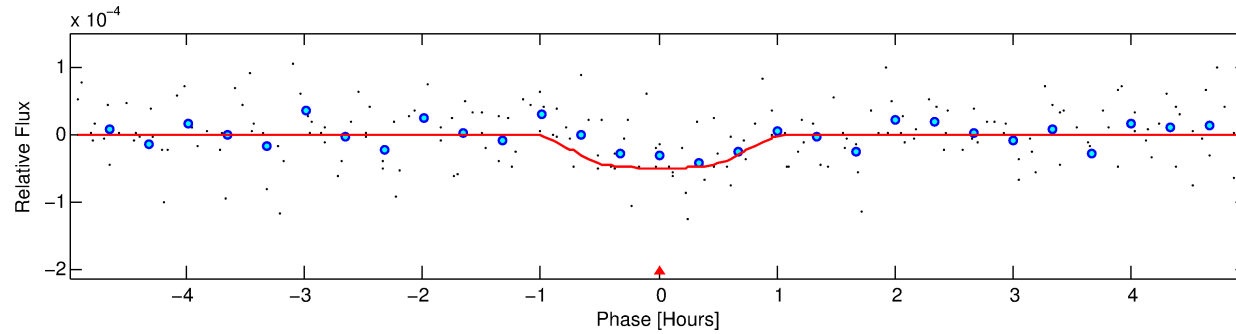
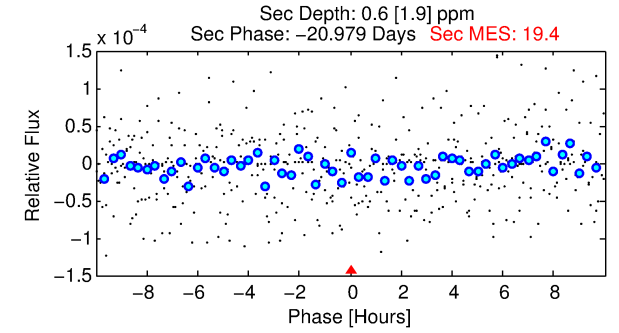
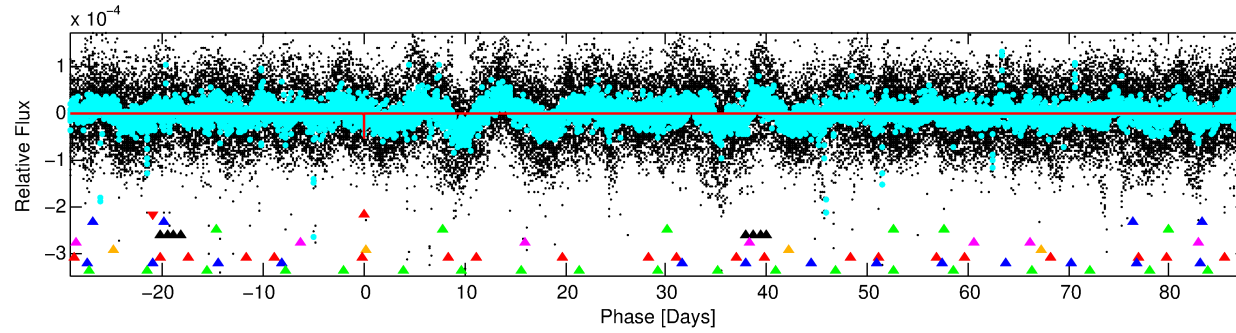
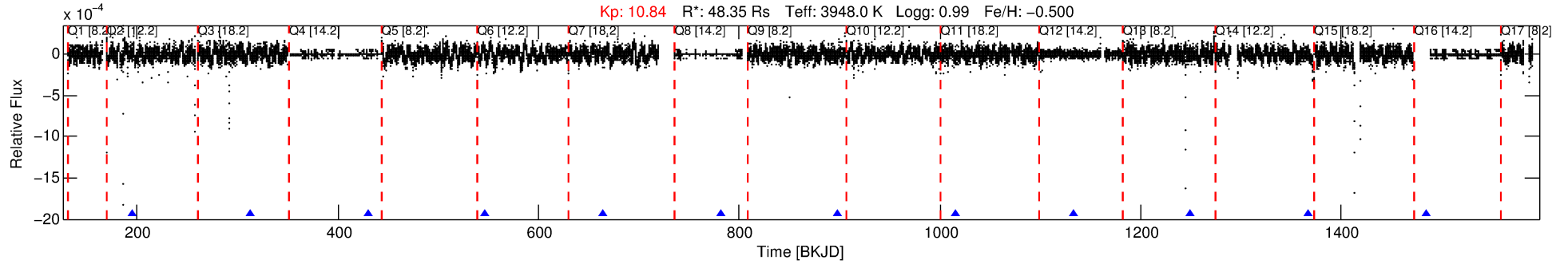
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 006937131-01

No Significant Match Found

# DV One-Page Summary

KIC: 6937131 Candidate: 1 of 9 Period: 117.103 d



## DV Fit Results:

Period = 117.10330 [0.00030] d  
Epoch = 195.9208 [0.0017] BKJD  
Rp/R\* = 0.0083 [0.0040]  
a/R\* = 245.45 [399.69]  
b = 0.90 [0.37]  
Seff = 2597.65 [581.48]  
Teq = 1820 [102] K  
Rp = 43.67 [25.01] Re  
a = 0.4426 [0.0890] AU  
Ag = 0.04 [0.11] [-8.70σ]  
Teffp = 1218 [960] K [-0.62σ]

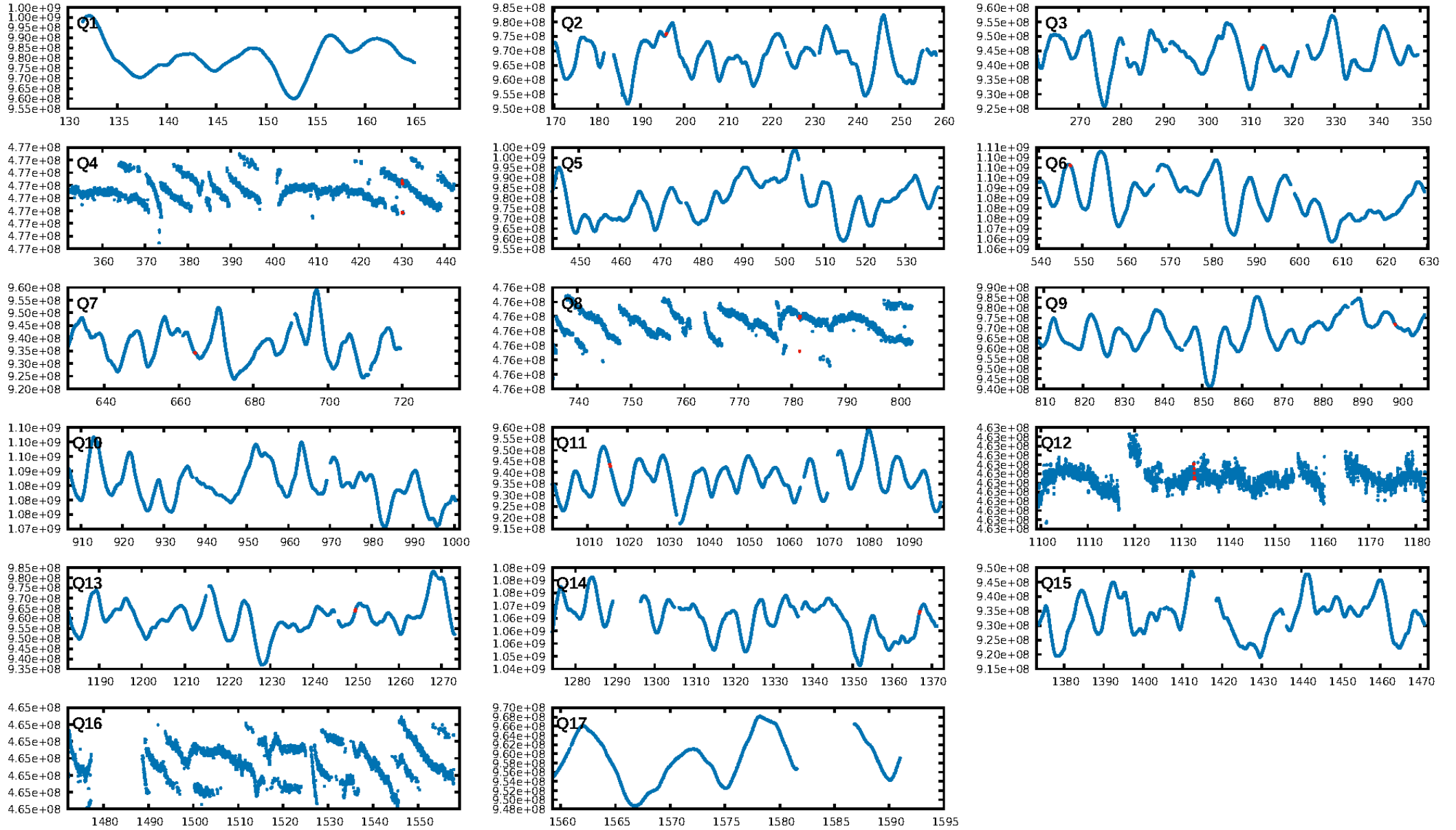
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [59.52σ]  
LongPeriod-sig: 100.0% [563.54σ]  
ModelChiSquare2-sig: 2.8%  
ModelChiSquareGof-sig: 89.3%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [11/11]  
GhostDiagnostic-chr: -4.328  
Centroid-sig: 69.6%  
Centroid-so: 3.851 arcsec [0.61σ]  
OotOffset-rm: 1.089 arcsec [0.87σ]  
OotOffset-st: 2/1/2/2 [7]  
KicOffset-rm: 1.107 arcsec [1.05σ]  
KicOffset-st: 2/1/2/2 [7]  
DiffImageQuality-fgm: 0.14 [1/7]  
DiffImageOverlap-fno: 0.82 [9/11]

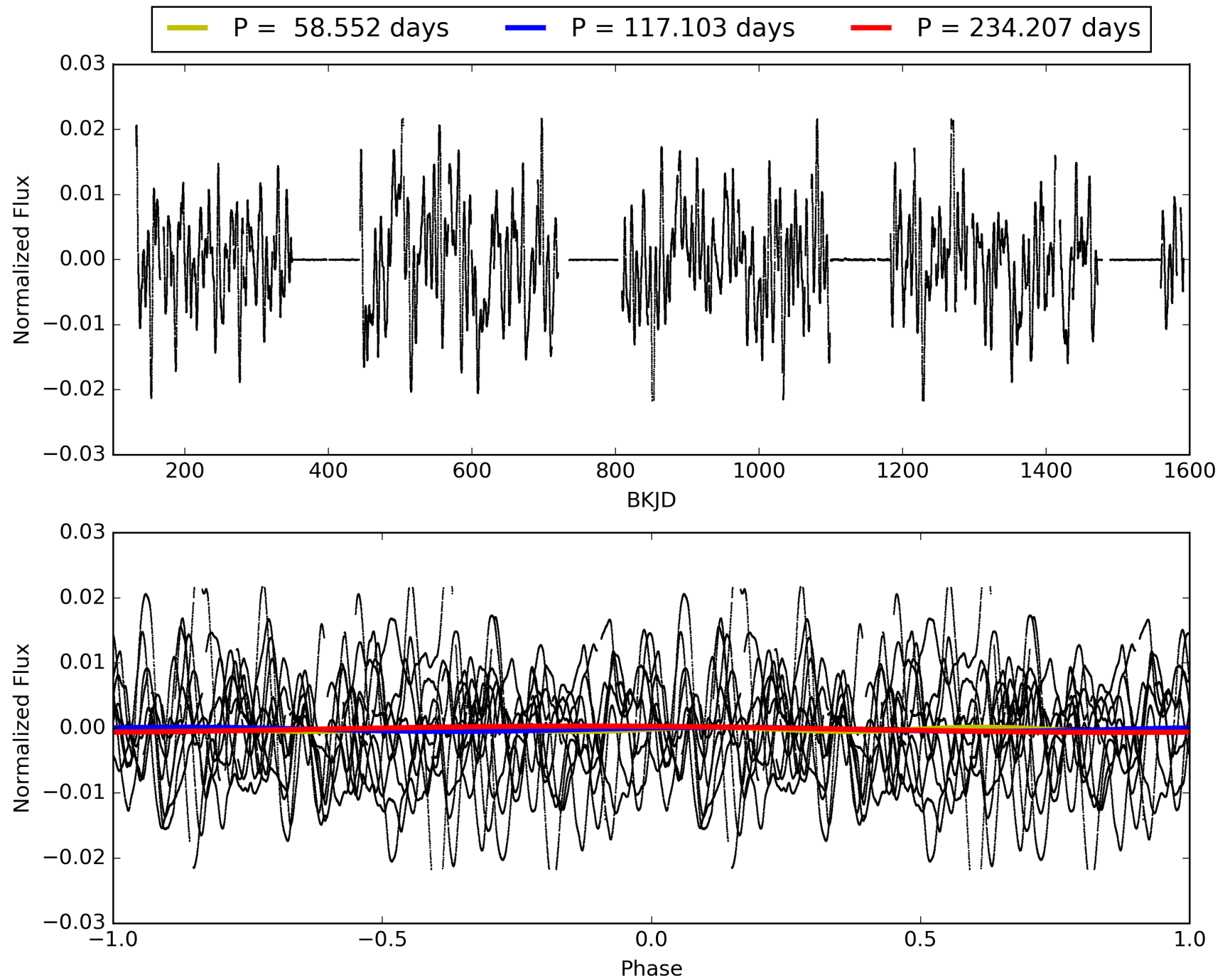
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 006937131-01, PDC Light Curves



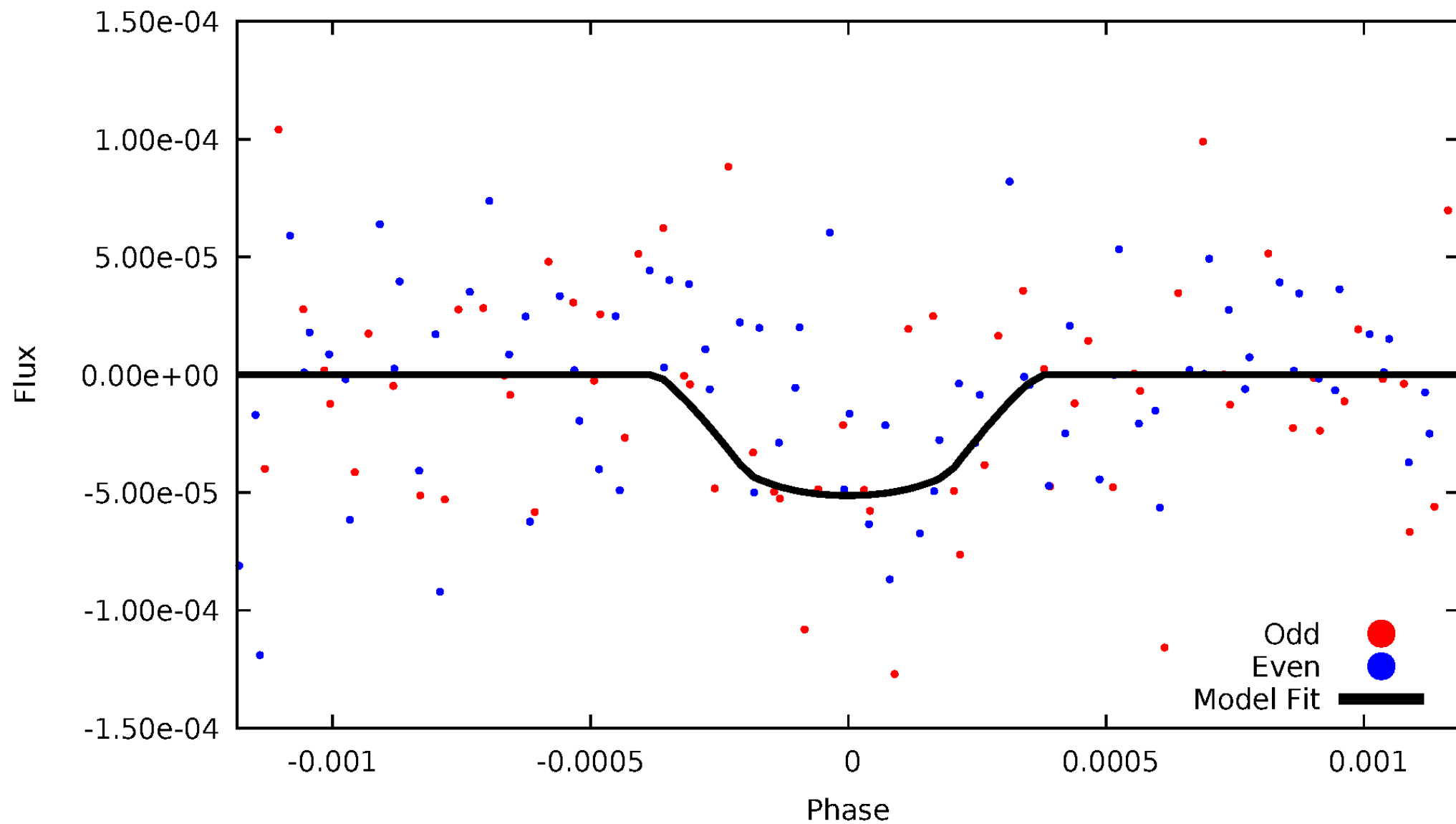
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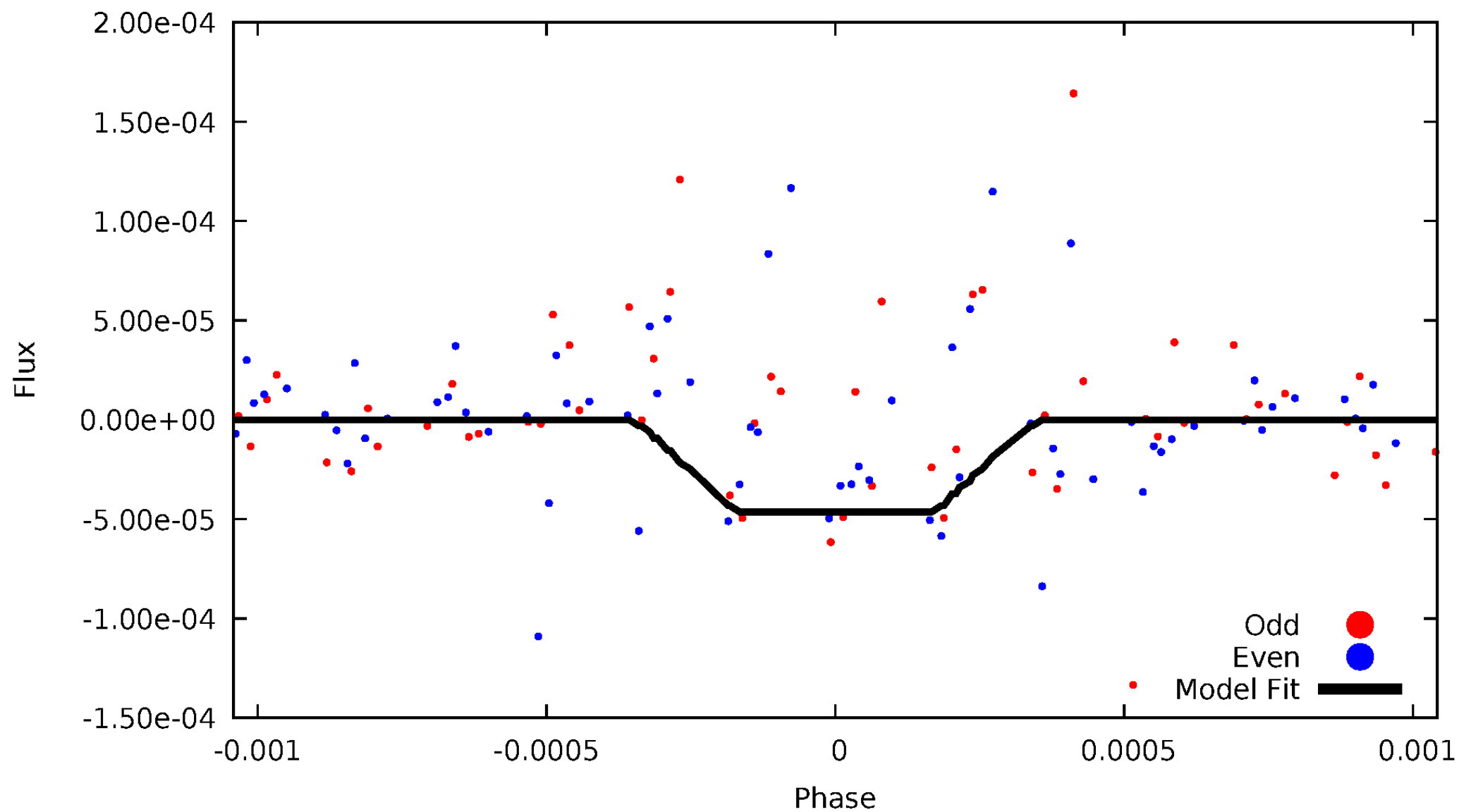
# DV Odd/Even

TCE 006937131-01



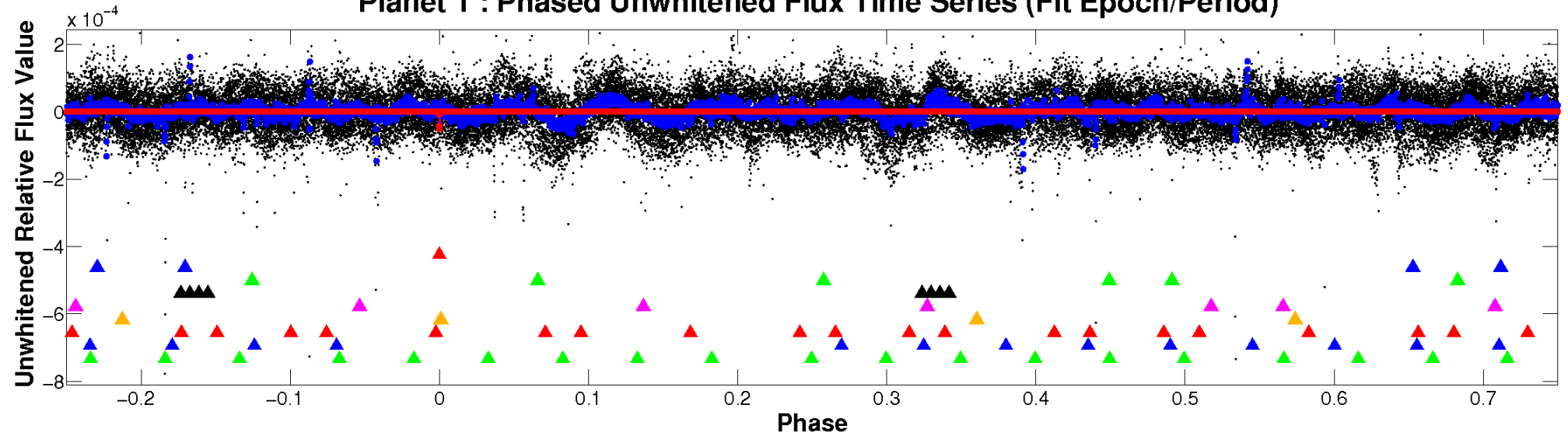
# ALT Odd/Even

TCE 006937131-01

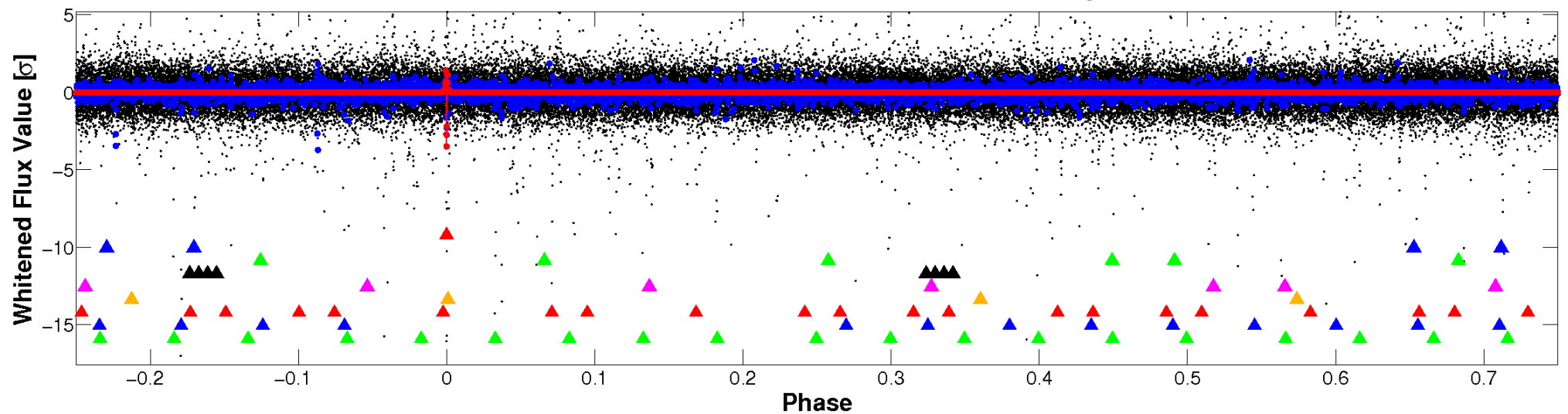


# Non-Whitened Vs. Whitened Light Curve

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

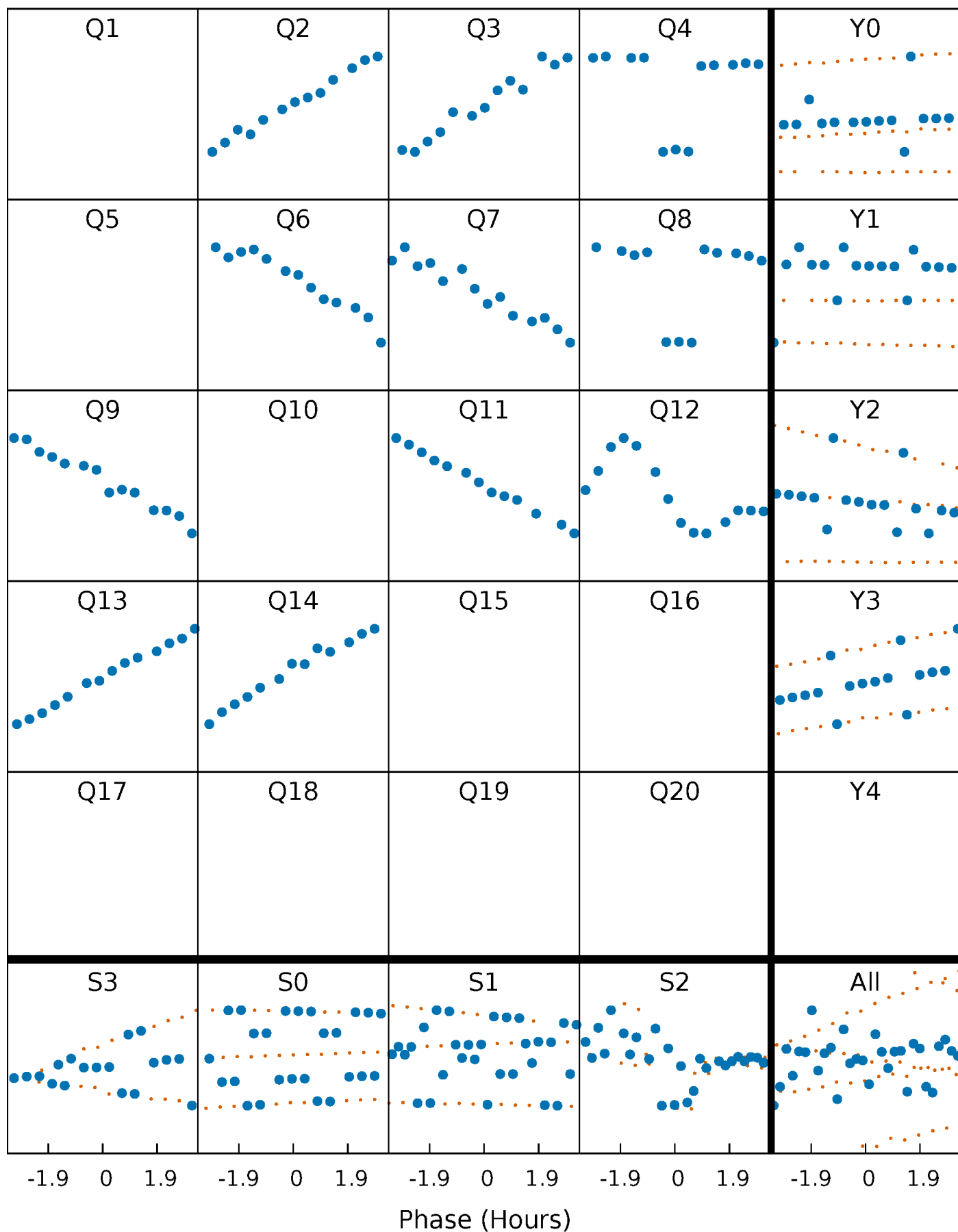


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



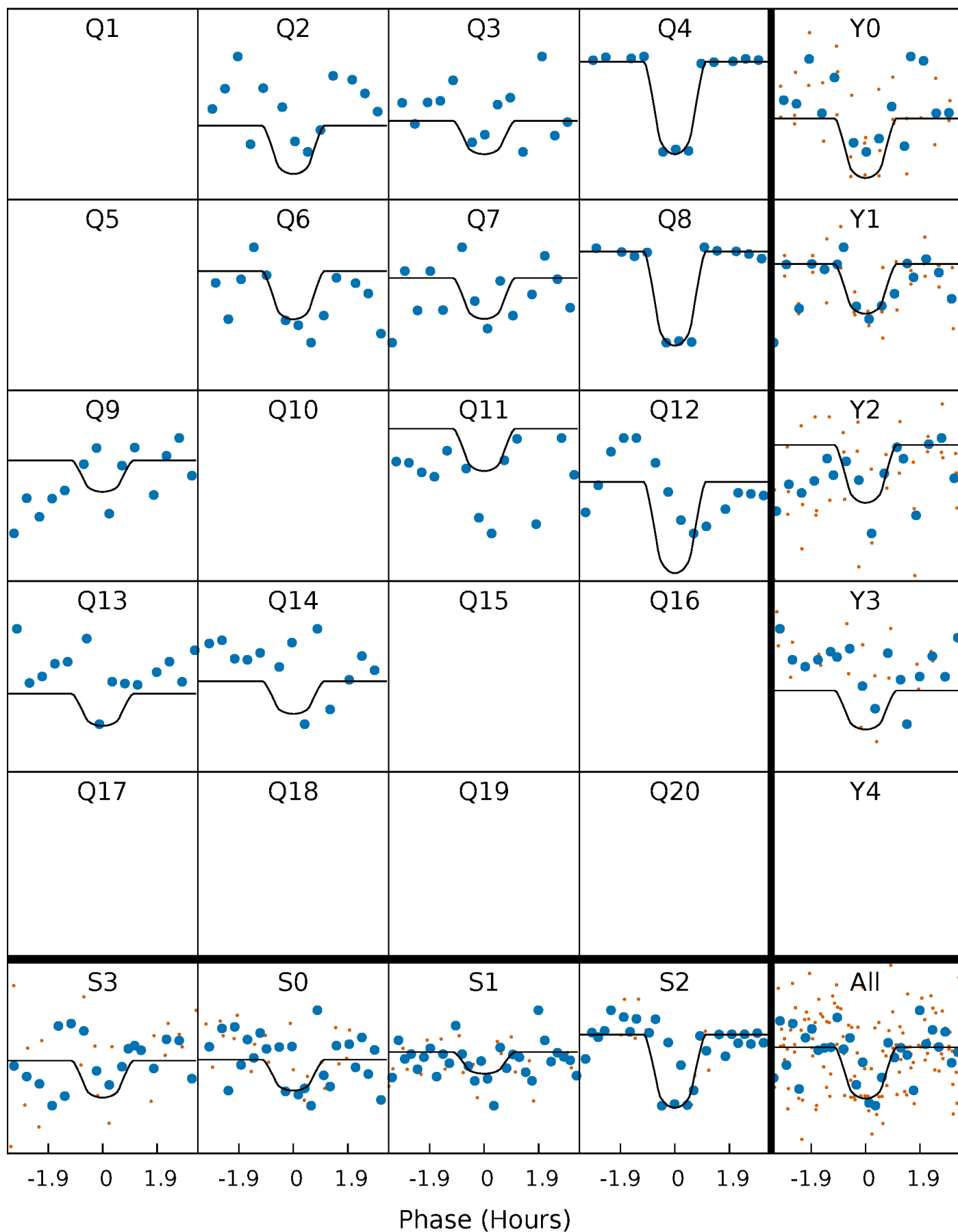
# PDC Quarter-Phased Transit Curves

TCE 006937131-01 P=117.103296 Days  $T_0=195.920780$  (BKJD)



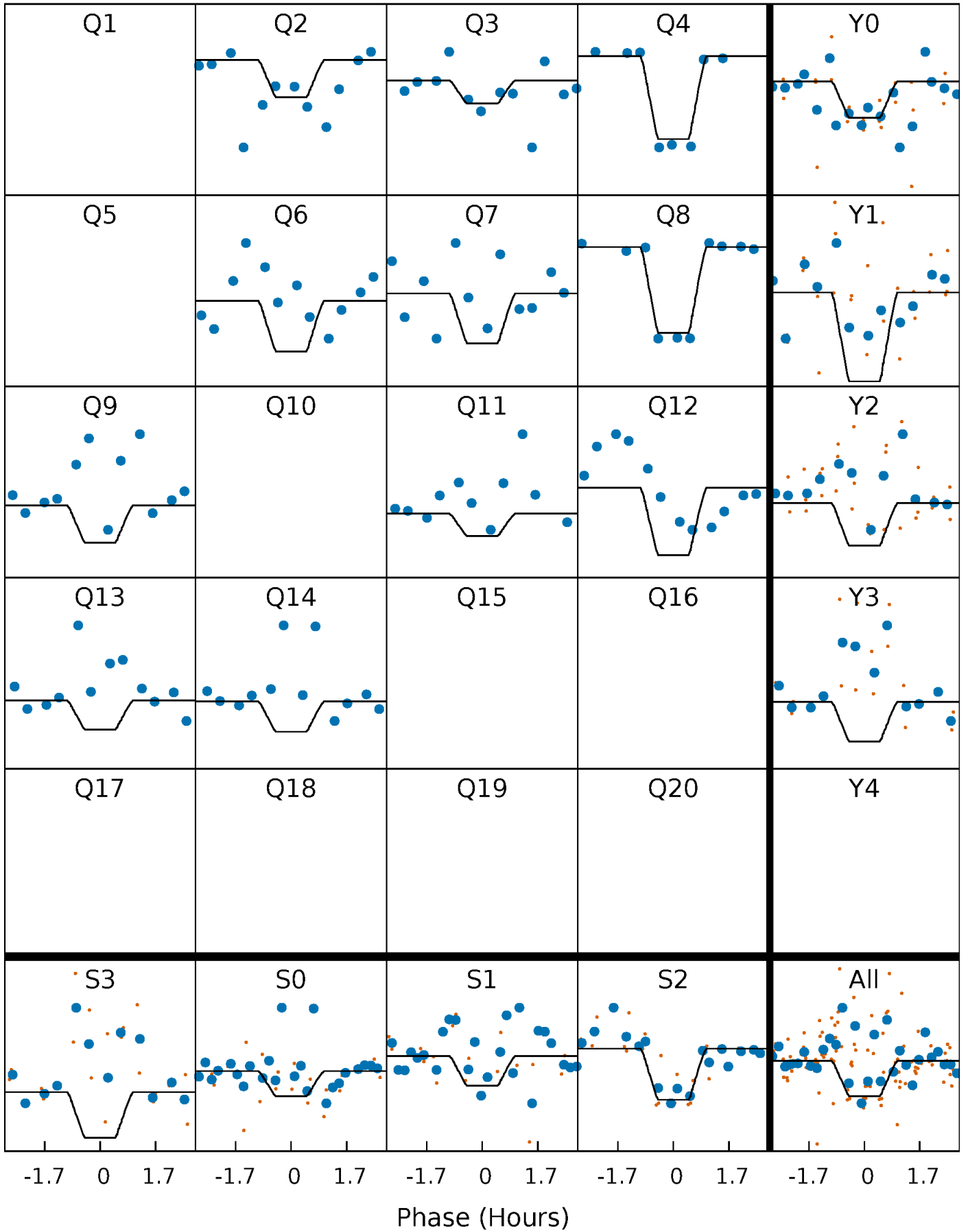
# DV Quarter-Phased Transit Curves

TCE 006937131-01 P=117.103296 Days  $T_0=195.920780$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 006937131-01 P=117.103856 Days  $T_0=195.919954$  (BKJD)

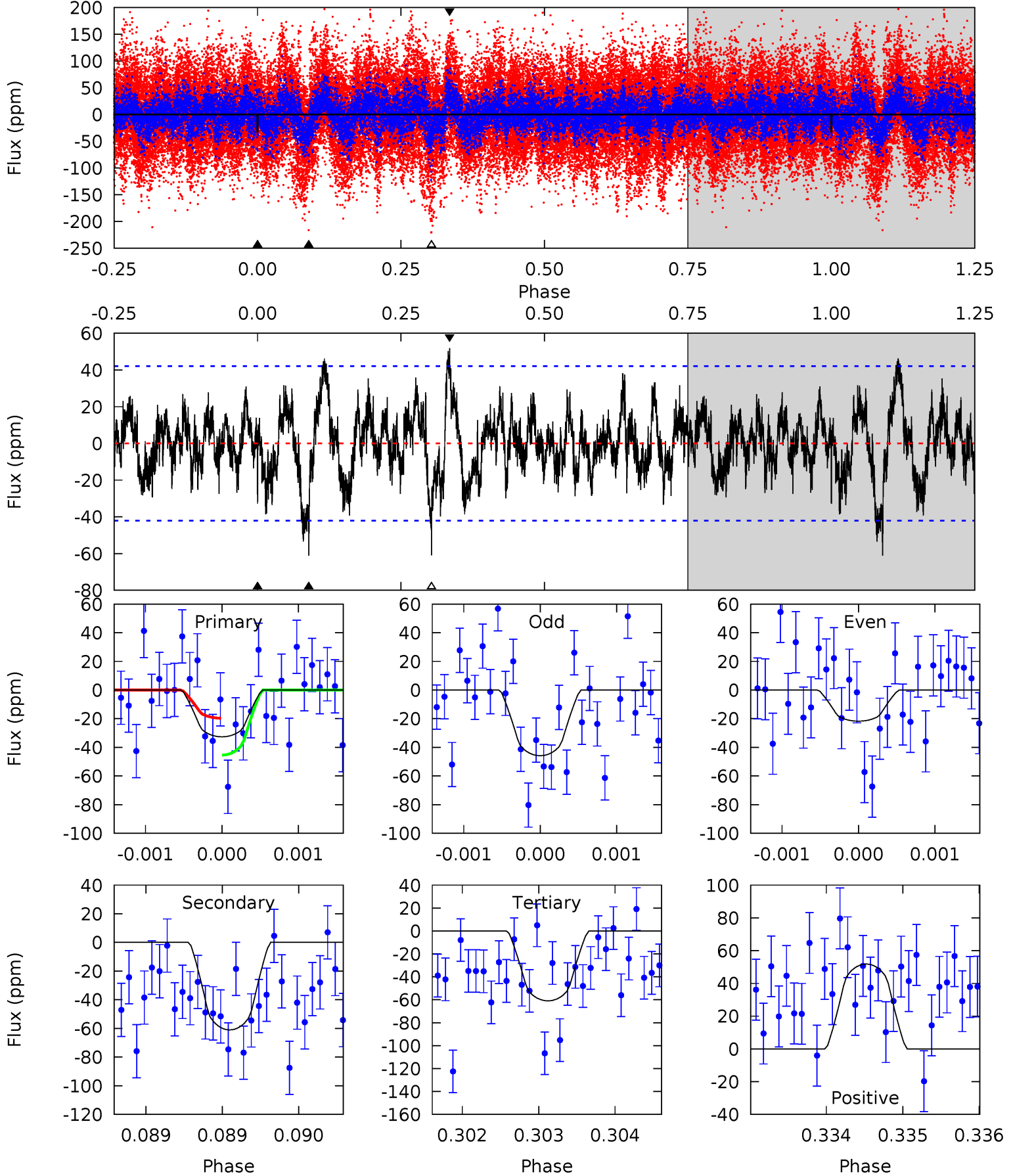




# DV Model-Shift Uniqueness Test

006937131-01, P = 117.103296 Days, E = 78.817484 Days

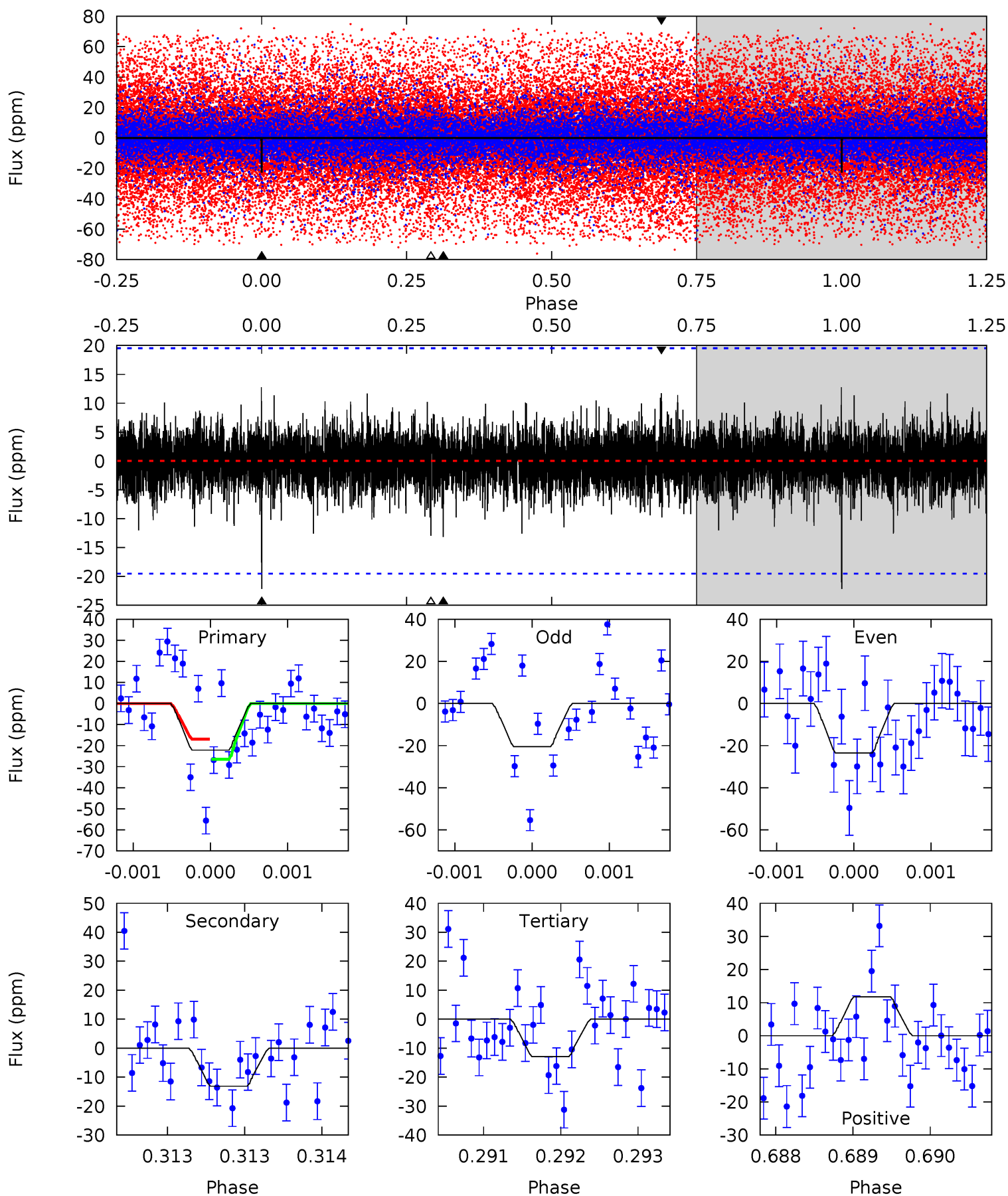
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
4.28	7.99	7.99	6.78	5.51	3.39	2.02	-3.71	-2.50	0.01	1.21	1.58	1.06	0.46	1.69



# Alt Model-Shift Uniqueness Test

006937131-01,  $P = 117.103856$  Days,  $E = 78.816098$  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
6.26	3.71	3.65	3.32	5.52	3.39	0.86	2.60	2.94	0.05	0.39	0.43	0.77	0.37	1.37



### Stellar Parameters For KIC 006937131

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$3948^{+87}_{-71}$	$0.995^{+0.033}_{-0.027}$	$-0.500^{+0.200}_{-0.150}$	$48.351^{+14.464}_{-1.523}$	$0.842^{+0.559}_{-0.029}$	$0.000^{+0.000}_{-0.000}$
	+2%/-2%	+3%/-3%	+40%/-30%	+30%/-3%	+66%/-3%	+9%/-24%
Source	PHO56	AST56	PHO56	DSEP		

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

### Secondary Eclipse Parameters for KIC 006937131-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-61 \pm 8$	$45.83^{+20.23}_{-19.29}$	$2540^{+71}_{-56}$	$3748^{+913}_{-468}$	$3.179^{+6.485}_{-1.672}$
Alt.	$-13 \pm 4$	$37.25^{+20.15}_{-19.73}$	$2541^{+61}_{-53}$	$3046^{+885}_{-679}$	$1.051^{+2.920}_{-0.641}$

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

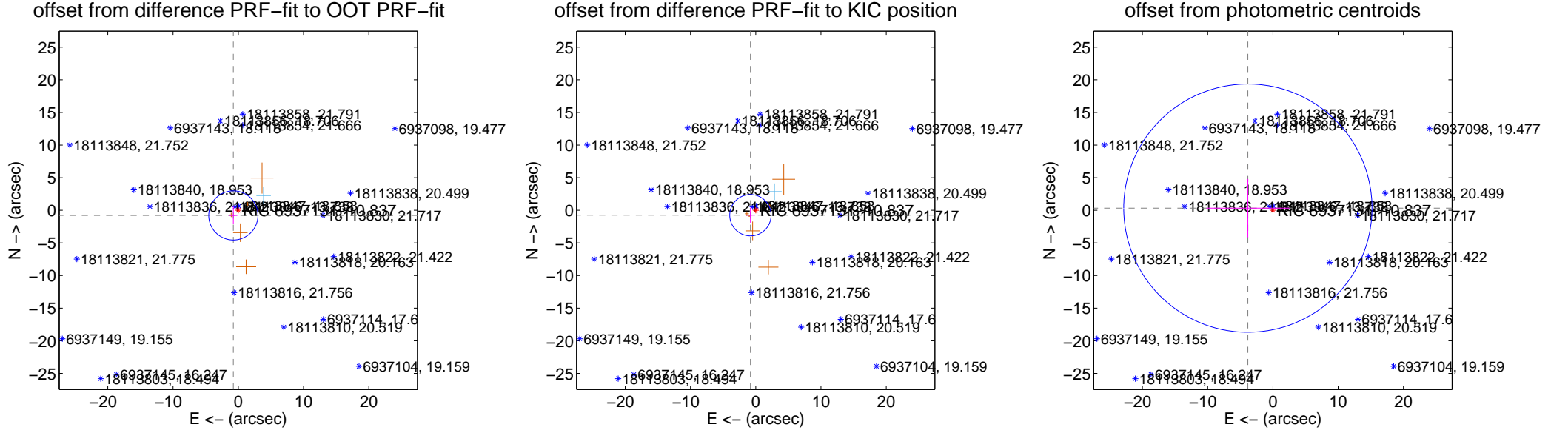
## DV Centroid Data

Supplemental centroid analysis for 006937131-01. **Kepler magnitude: 10.84.** Transit SNR 31.50

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

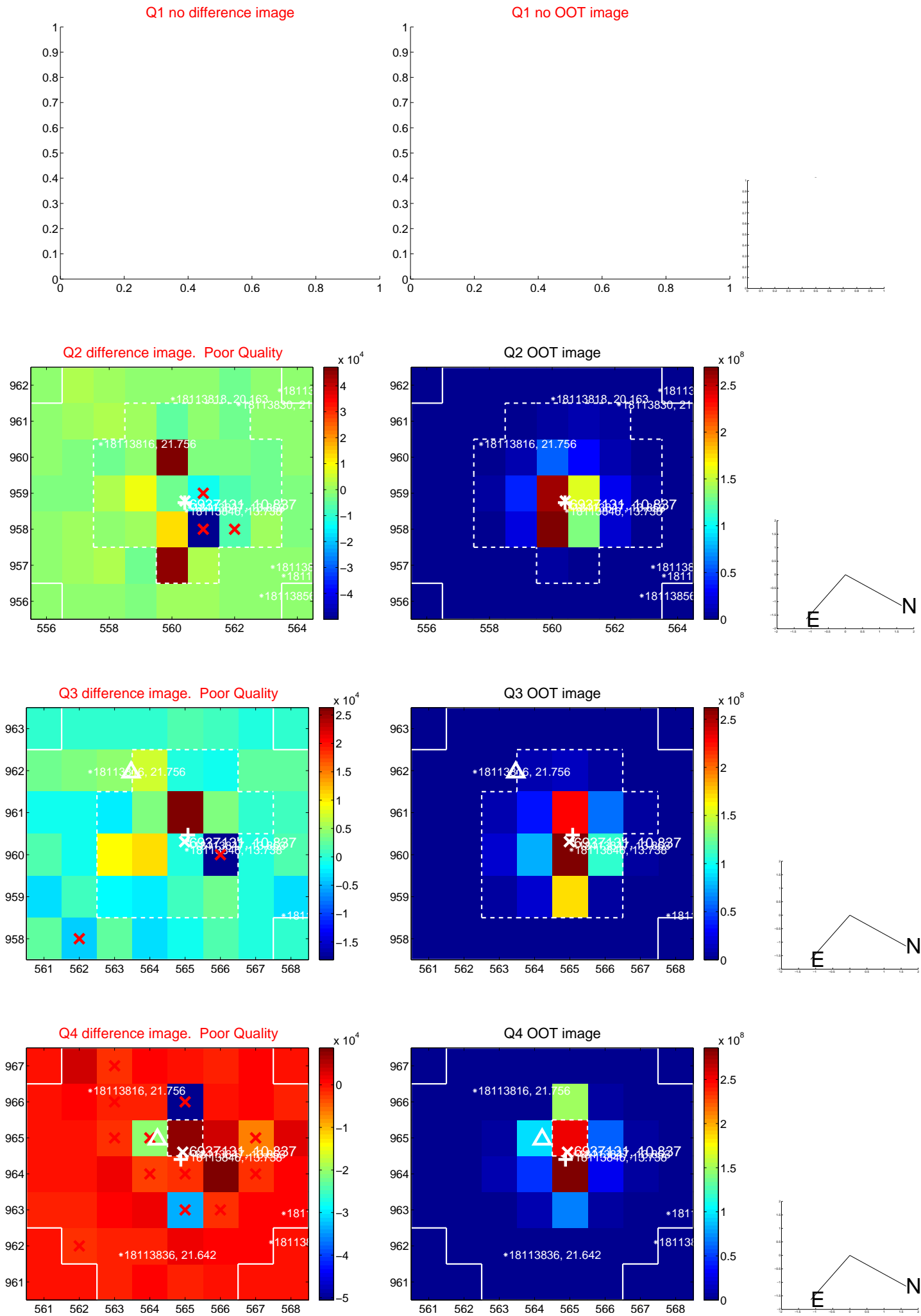
The direct PRF centroid is offset from the target star catalog position by about 0.33 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.089 \pm 1.256$	0.87	$0.758 \pm 0.605$	$-0.781 \pm 1.350$
PRF-fit source offset from KIC position	$1.107 \pm 1.056$	1.05	$0.814 \pm 0.702$	$-0.749 \pm 1.157$
photometric centroid source offset	$3.85 \pm 6.34$	0.61	$3.84 \pm 6.35$	$0.33 \pm 4.47$

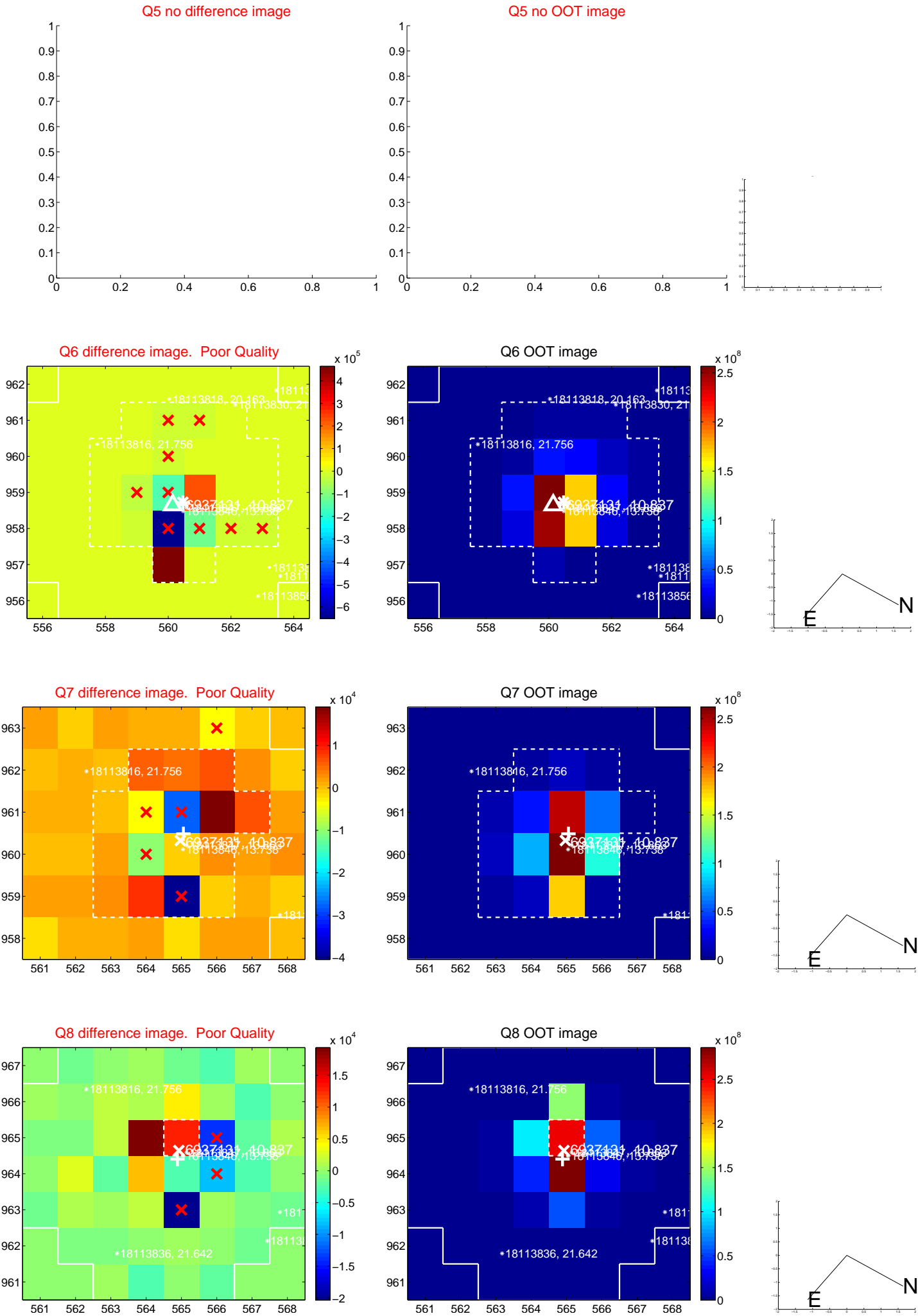


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

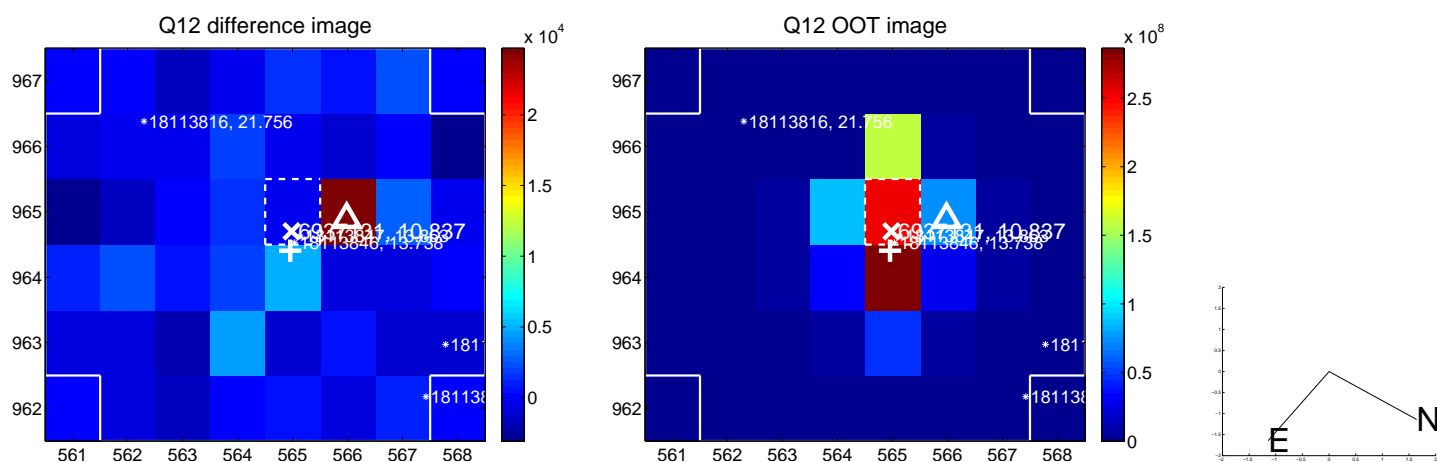
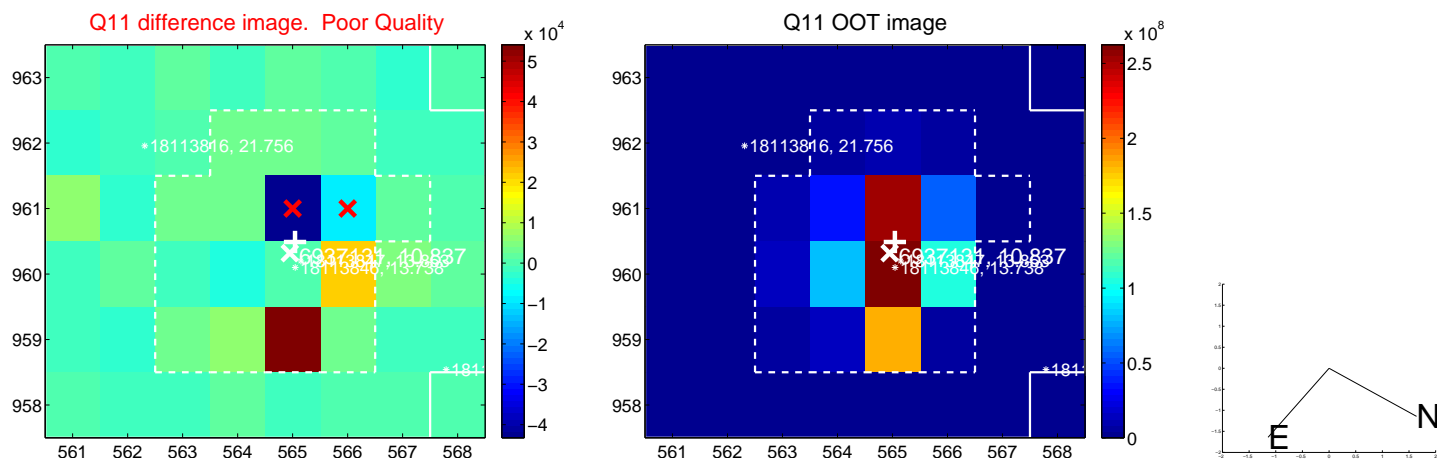
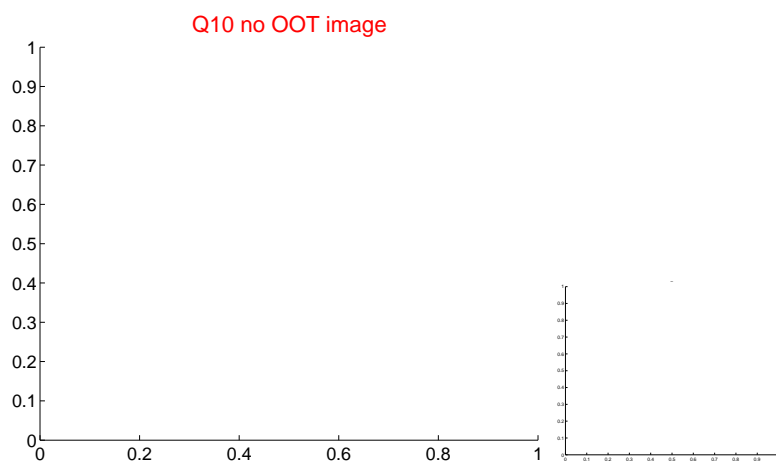
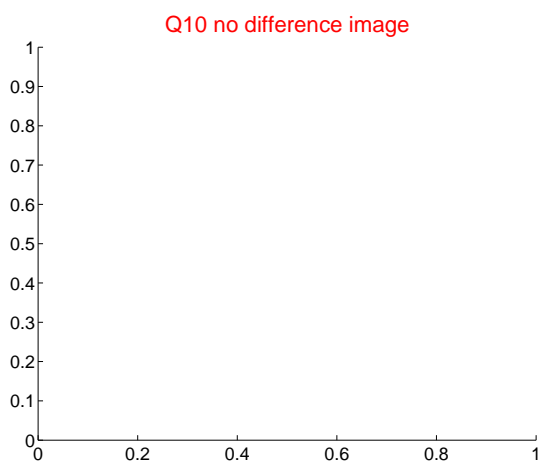
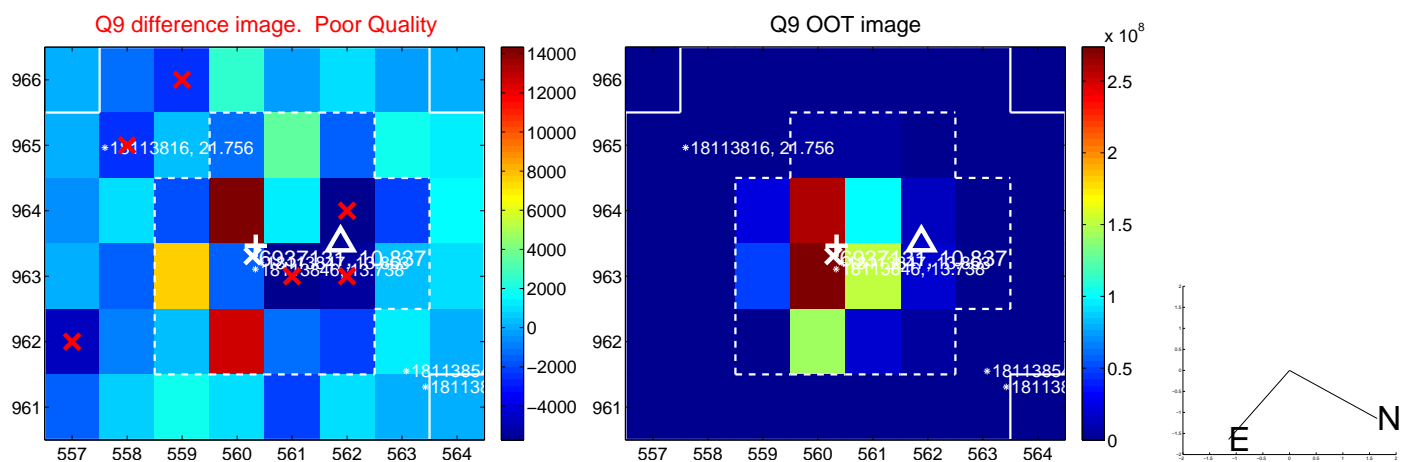


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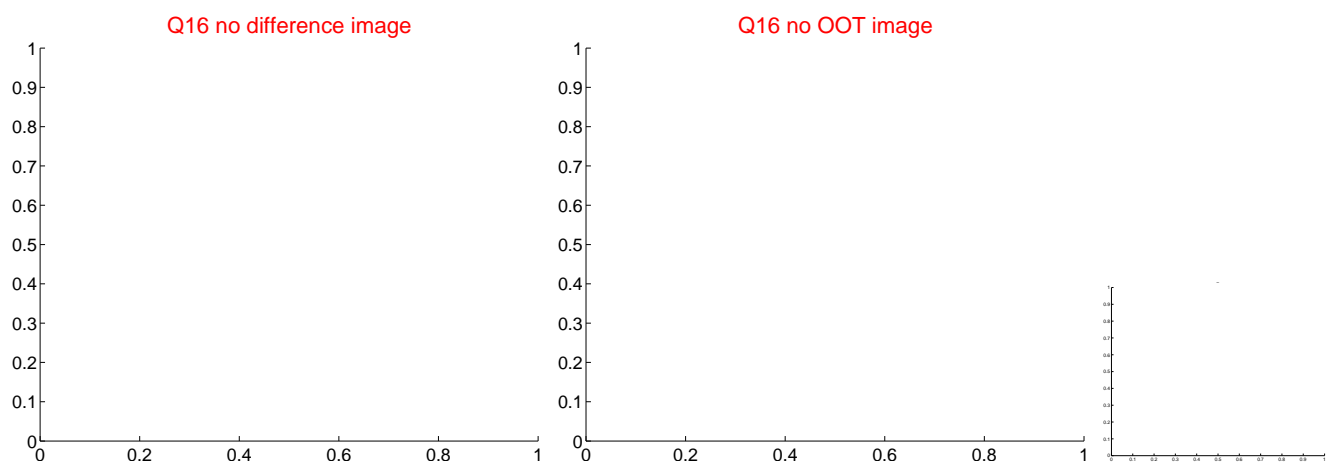
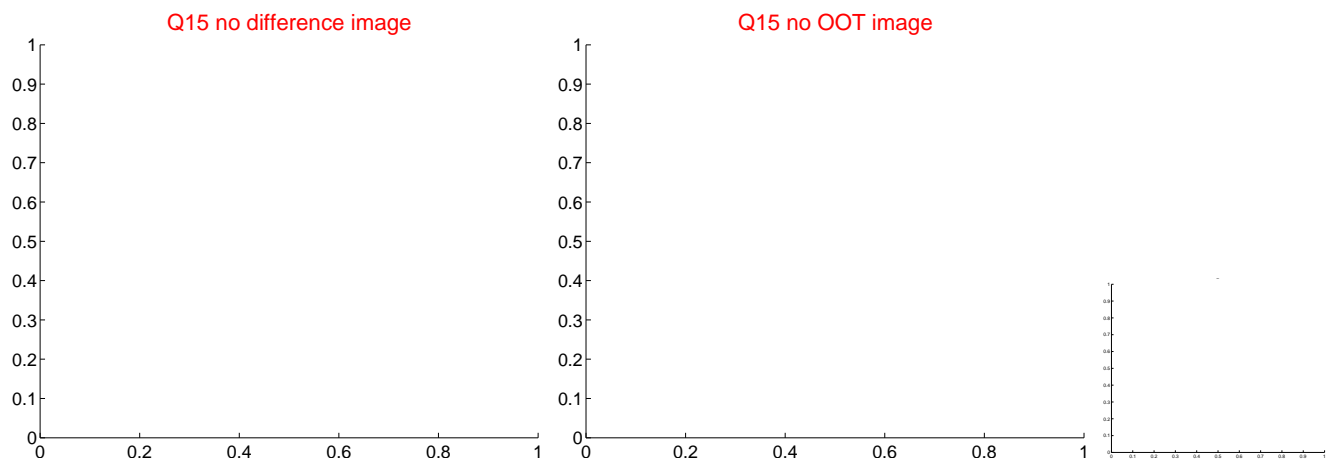
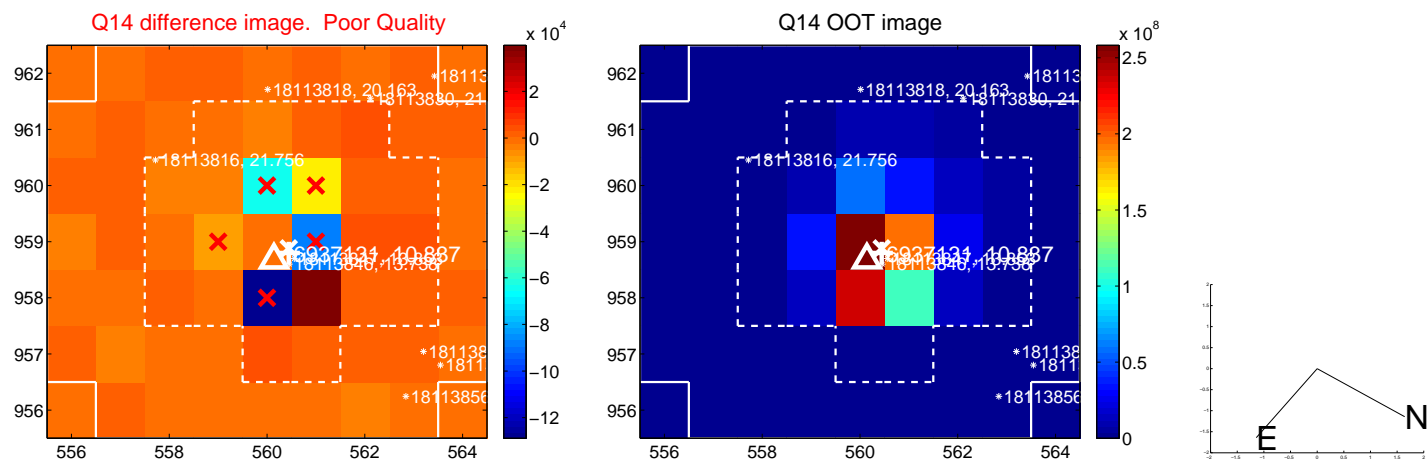
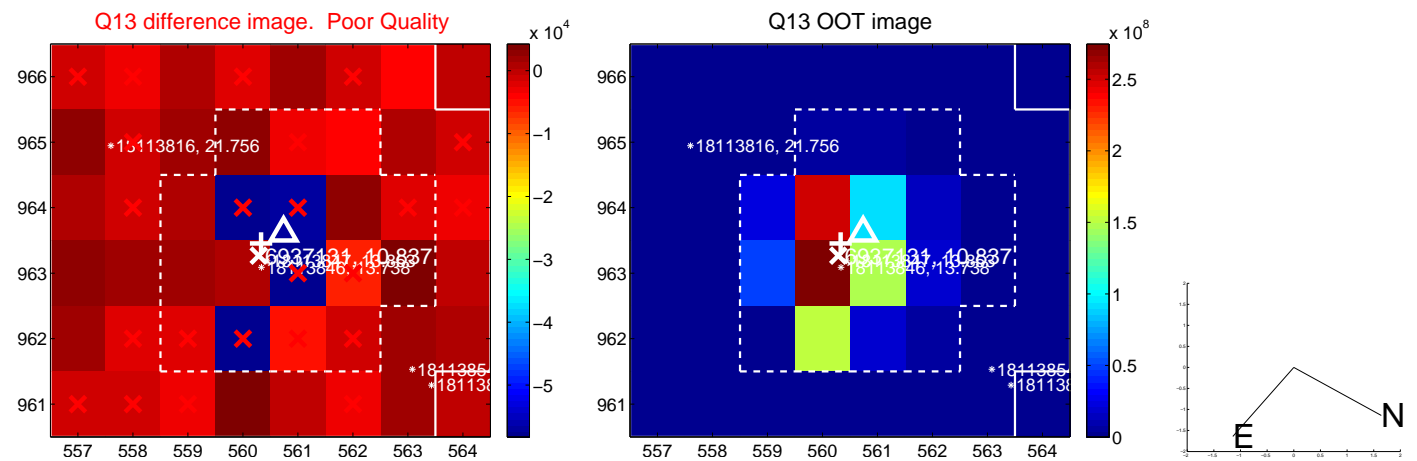




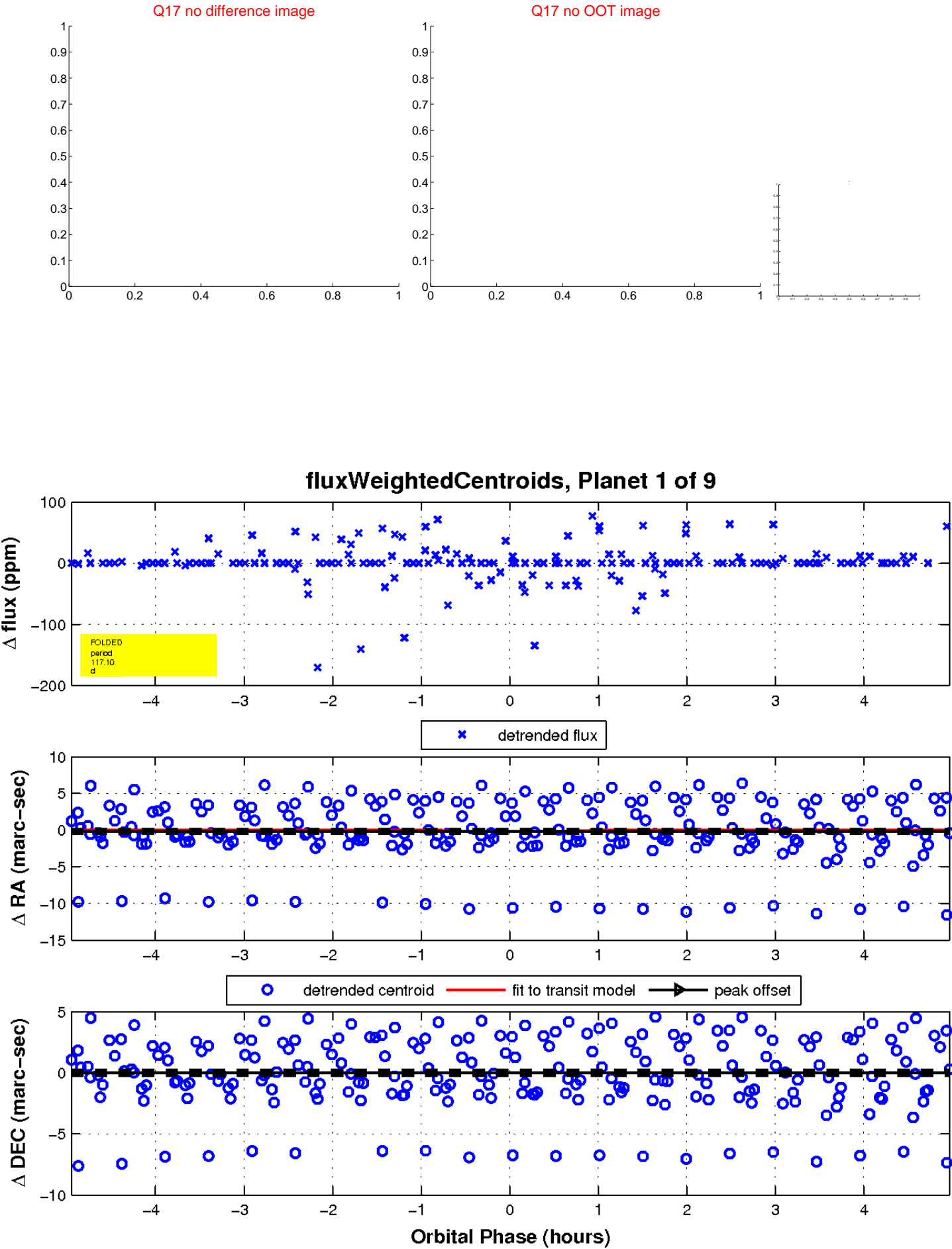
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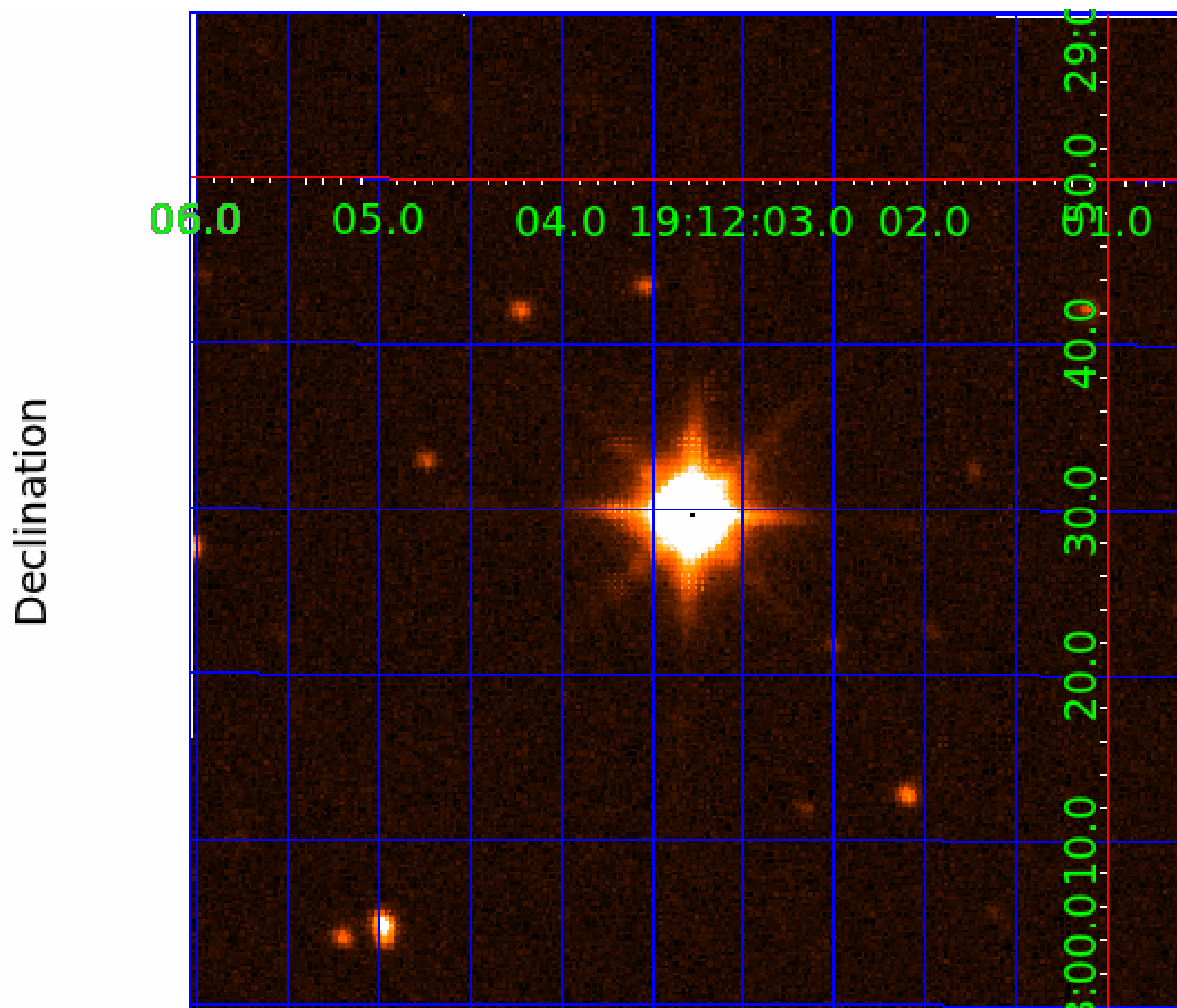
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UKIRT Image



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006937131-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_ZUMA—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_SATURATED
006937131-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_SATURATED
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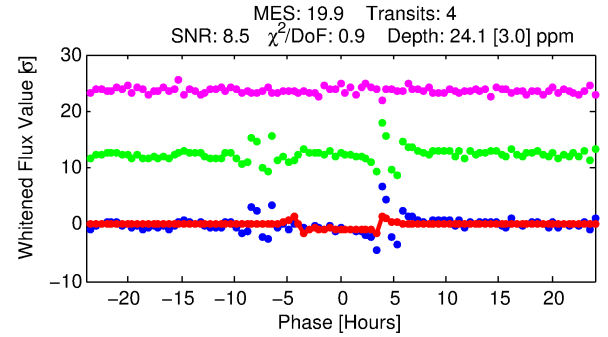
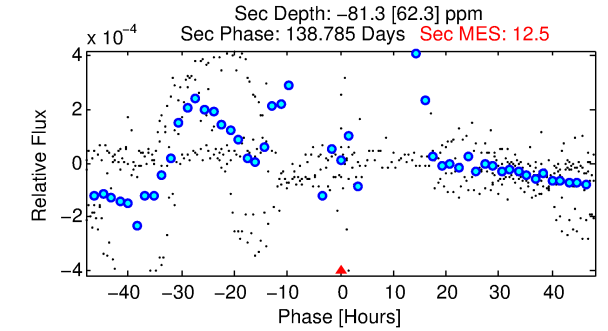
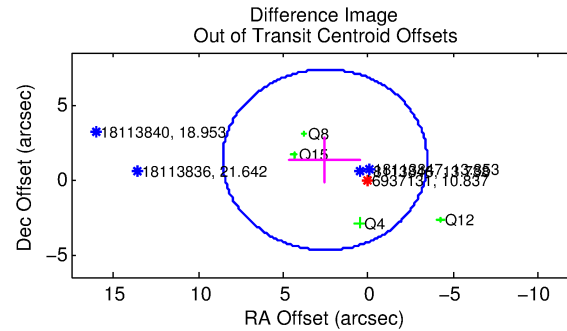
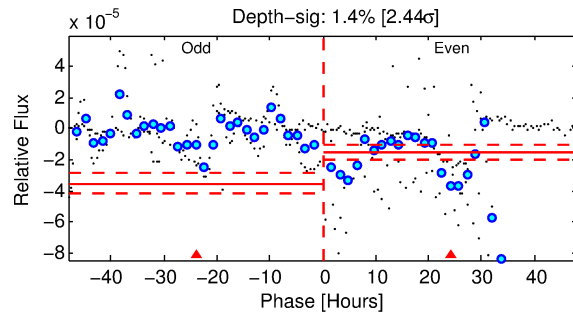
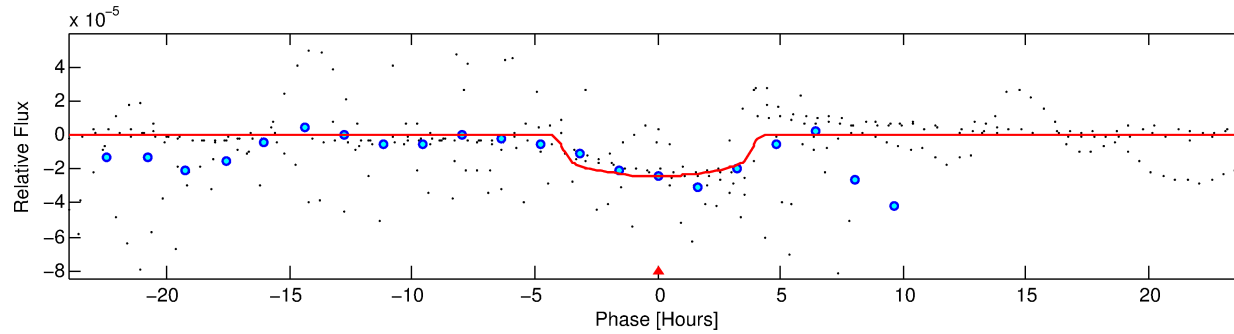
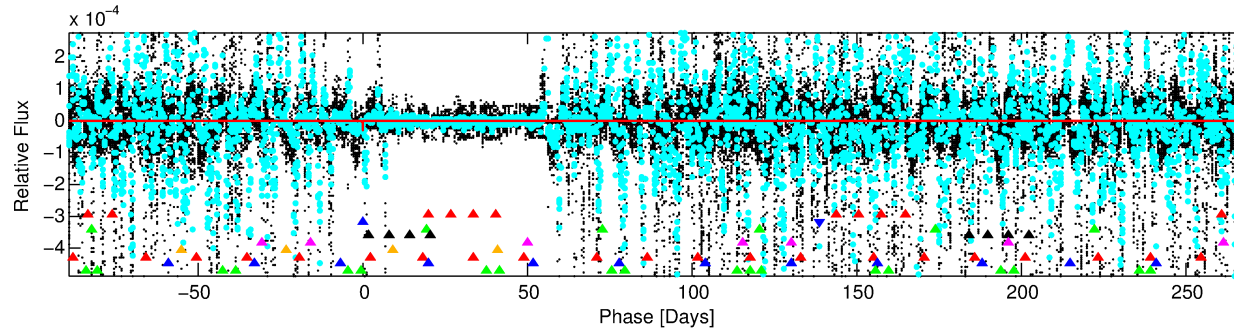
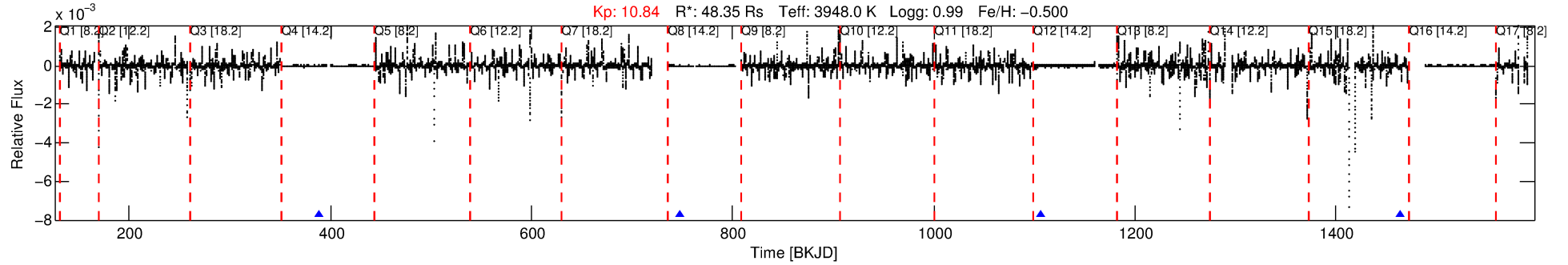
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 006937131-02

No Significant Match Found

# DV One-Page Summary

KIC: 6937131 Candidate: 2 of 9 Period: 358.204 d



## DV Fit Results:

Period = 358.20355 [0.00275] d  
Epoch = 389.4775 [0.0033] BKJD  
 $R_p/R^*$  = 0.0056 [0.0009]  
 $a/R^*$  = 160.14 [91.40]  
 $b$  = 0.89 [0.13]  
 $\text{Seff}$  = 585.01 [130.95]  
 $T_{\text{eq}}$  = 1254 [70] K  
 $R_p$  = 29.44 [9.98]  $R_e$   
 $a$  = 0.9327 [0.1875] AU  
 $\text{Ag}$  = N/A  
 $T_{\text{eff}}$  = N/A

## DV Diagnostic Results:

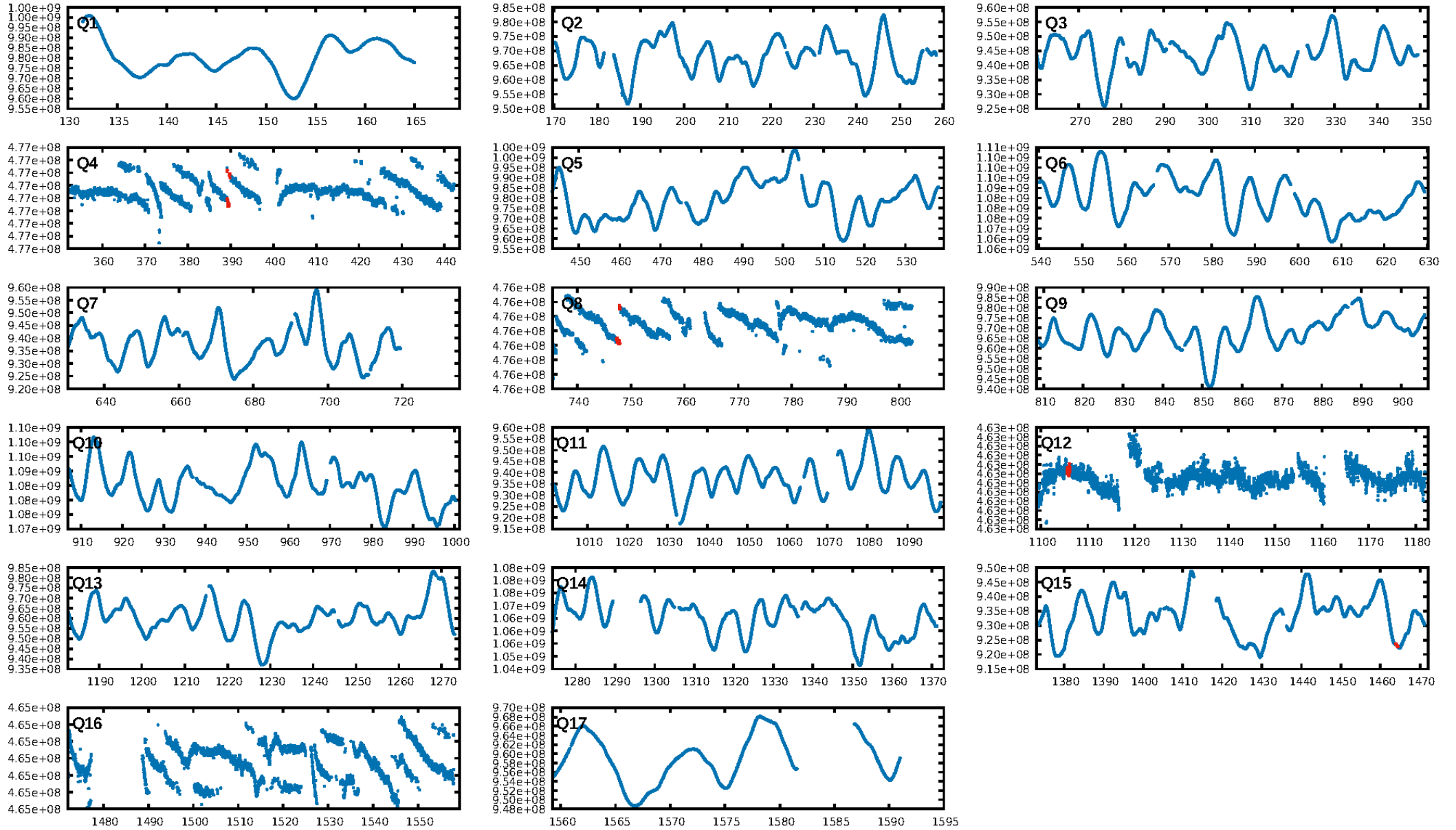
ShortPeriod-sig: 100.0% [48.60 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 6.3%  
ModelChiSquareGof-sig: 99.8%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: -1.007  
Centroid-sig: 41.3%  
Centroid-so: 15.555 arcsec [0.77 $\sigma$ ]  
OotOffset-rm: 2.852 arcsec [1.42 $\sigma$ ]  
KicOffset-rm: 3.506 arcsec [1.89 $\sigma$ ]  
OotOffset-st: 0/1/3/0 [4]  
KicOffset-st: 0/1/3/0 [4]  
DiffImageQuality-fgm: 0.25 [1/4]  
DiffImageOverlap-fno: 0.75 [3/4]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 00:46:37 Z

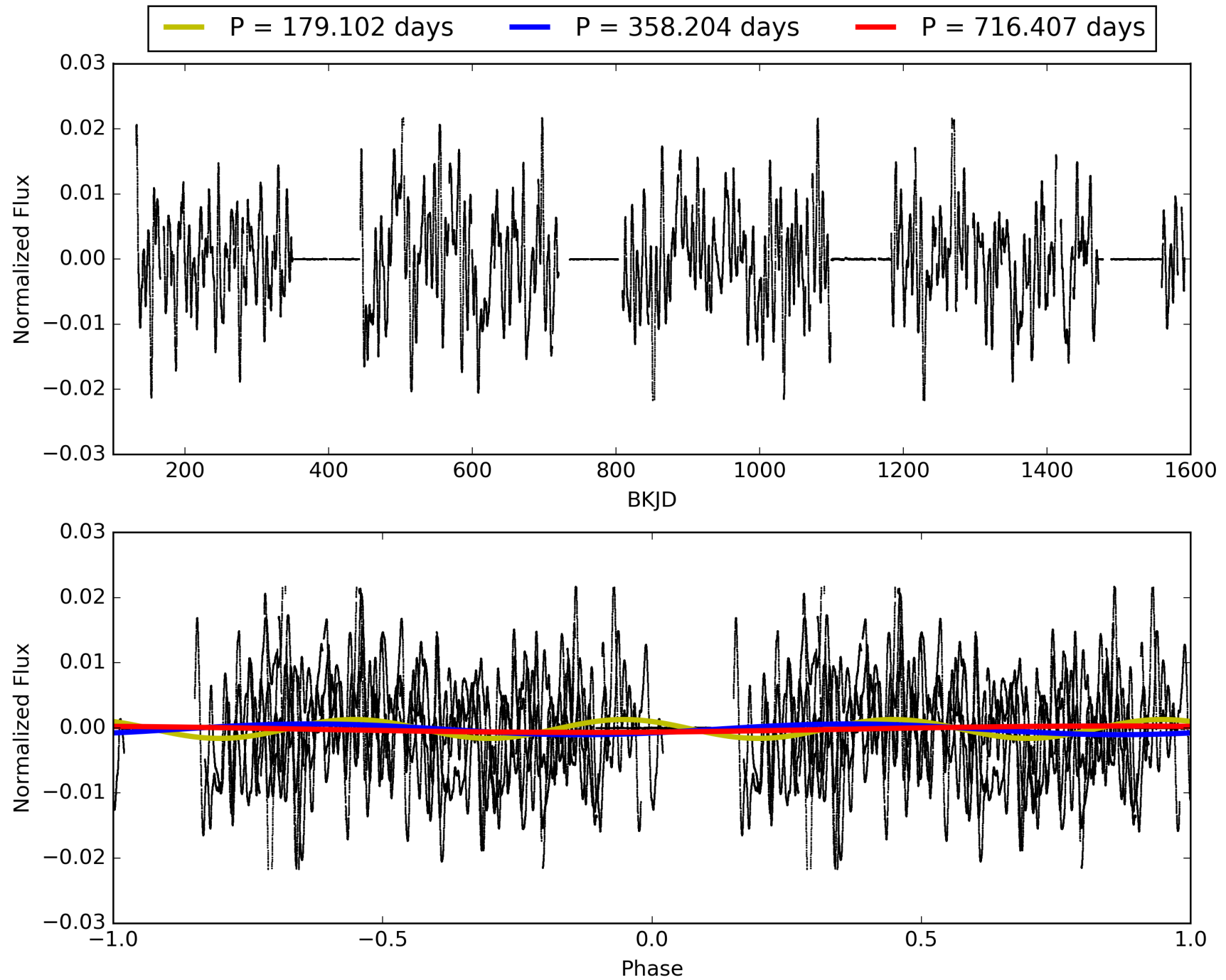
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 006937131-02, PDC Light Curves

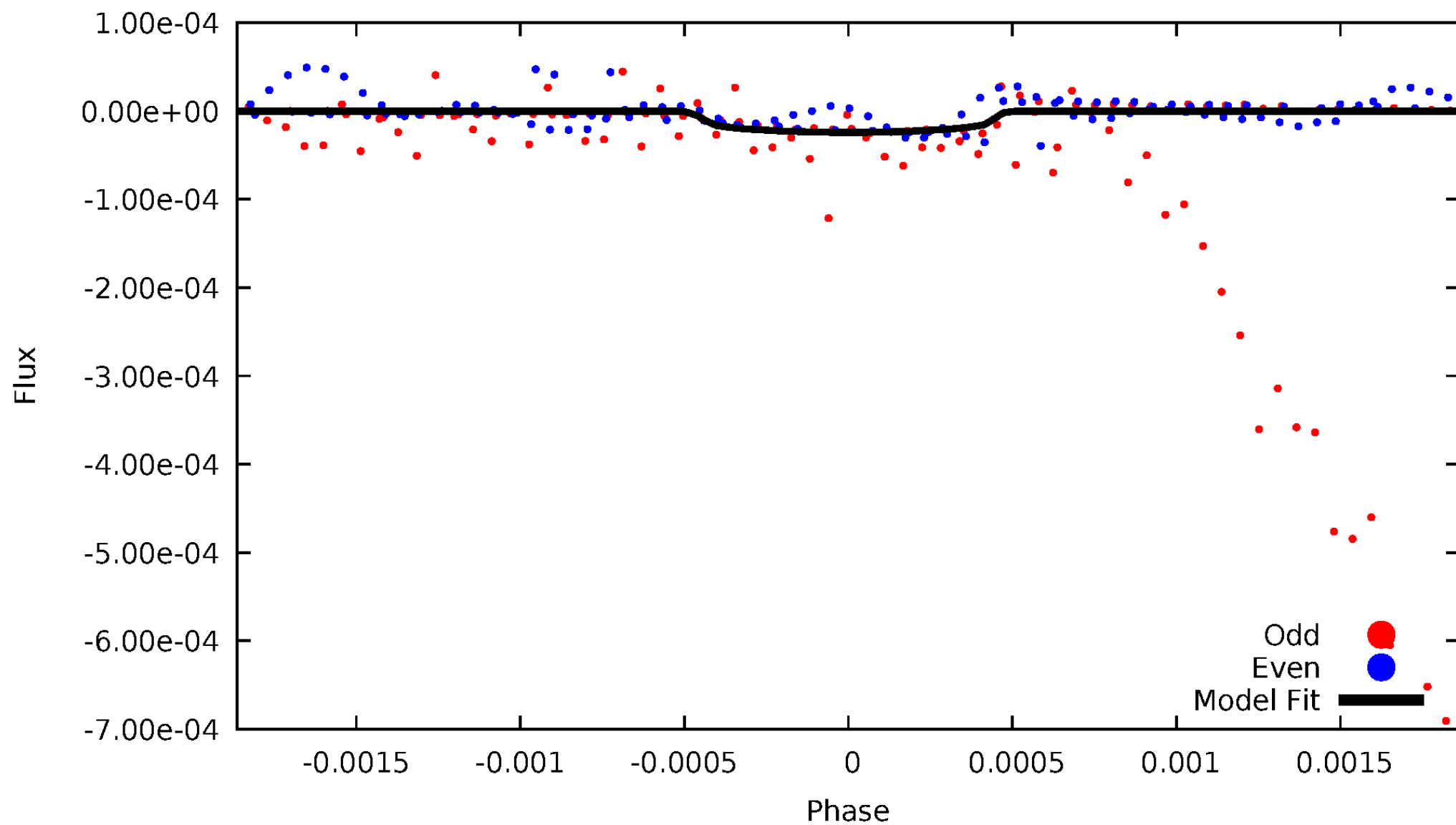


# TCE 006937131-02



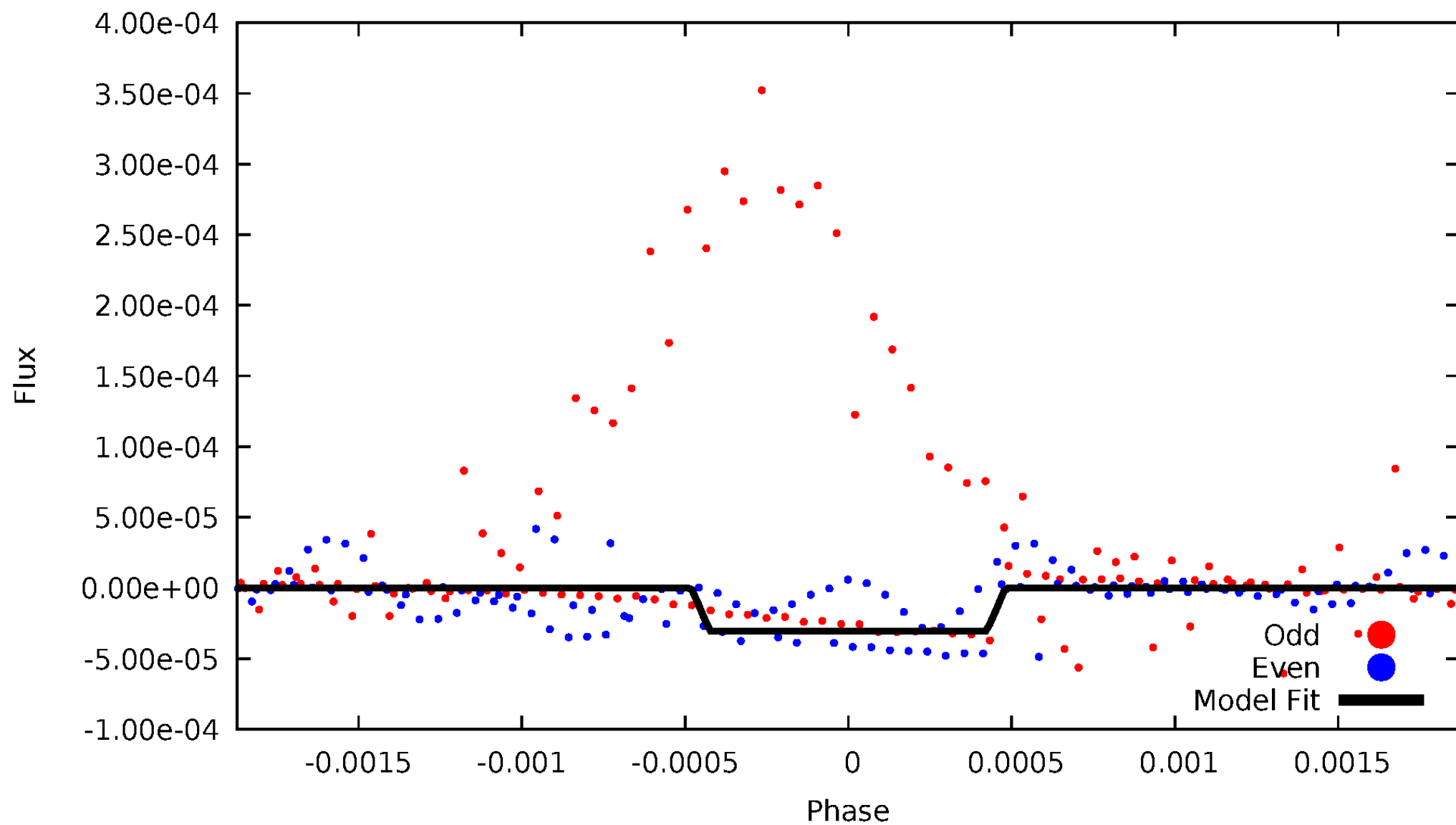
# DV Odd/Even

TCE 006937131-02



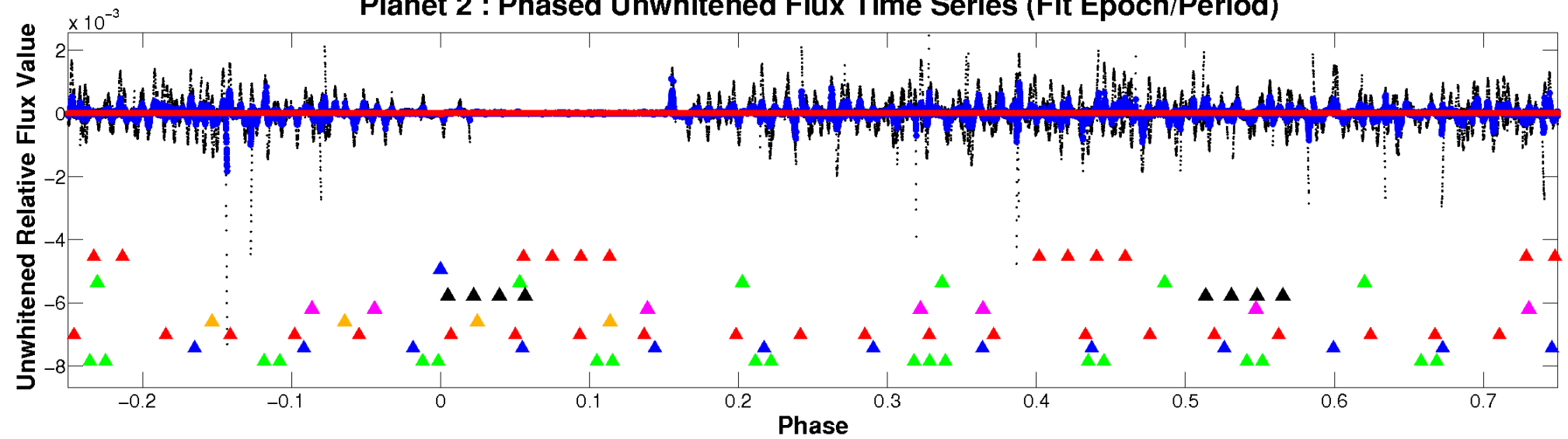
# ALT Odd/Even

TCE 006937131-02

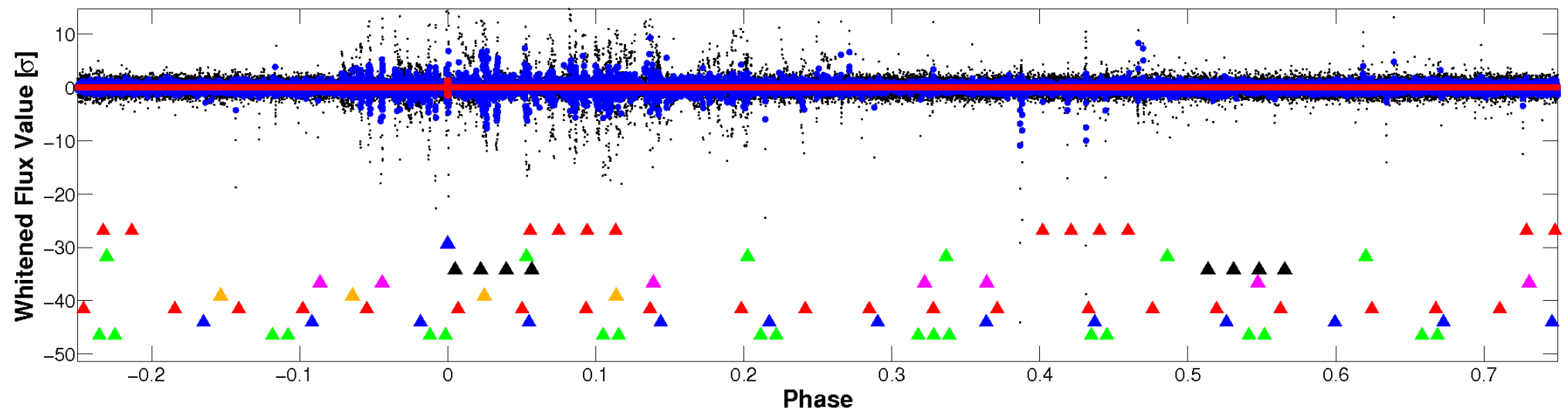


# Non-Whitened Vs. Whitened Light Curve

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

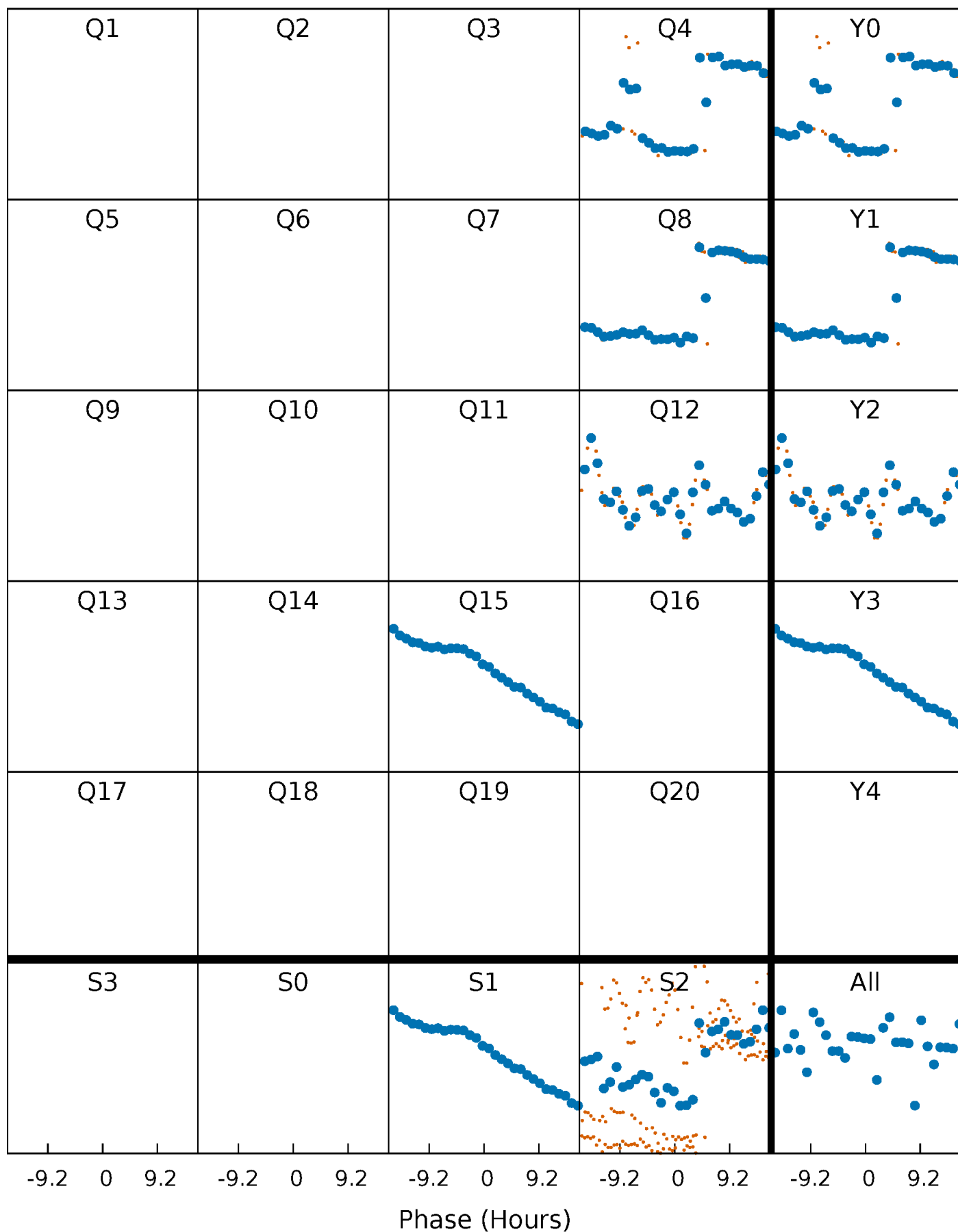


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

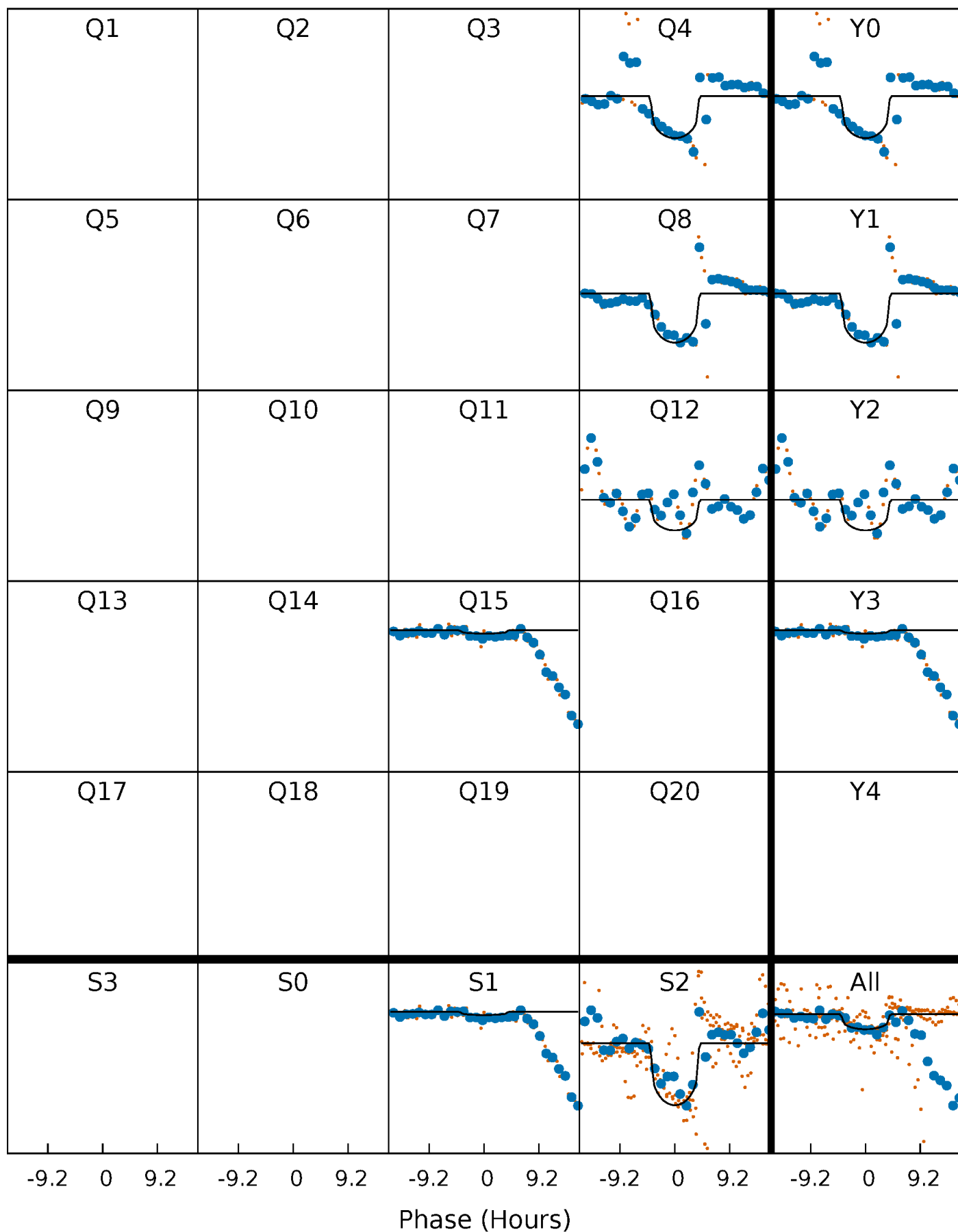
TCE 006937131-02 P=358.203546 Days  $T_0=389.477540$  (BKJD)





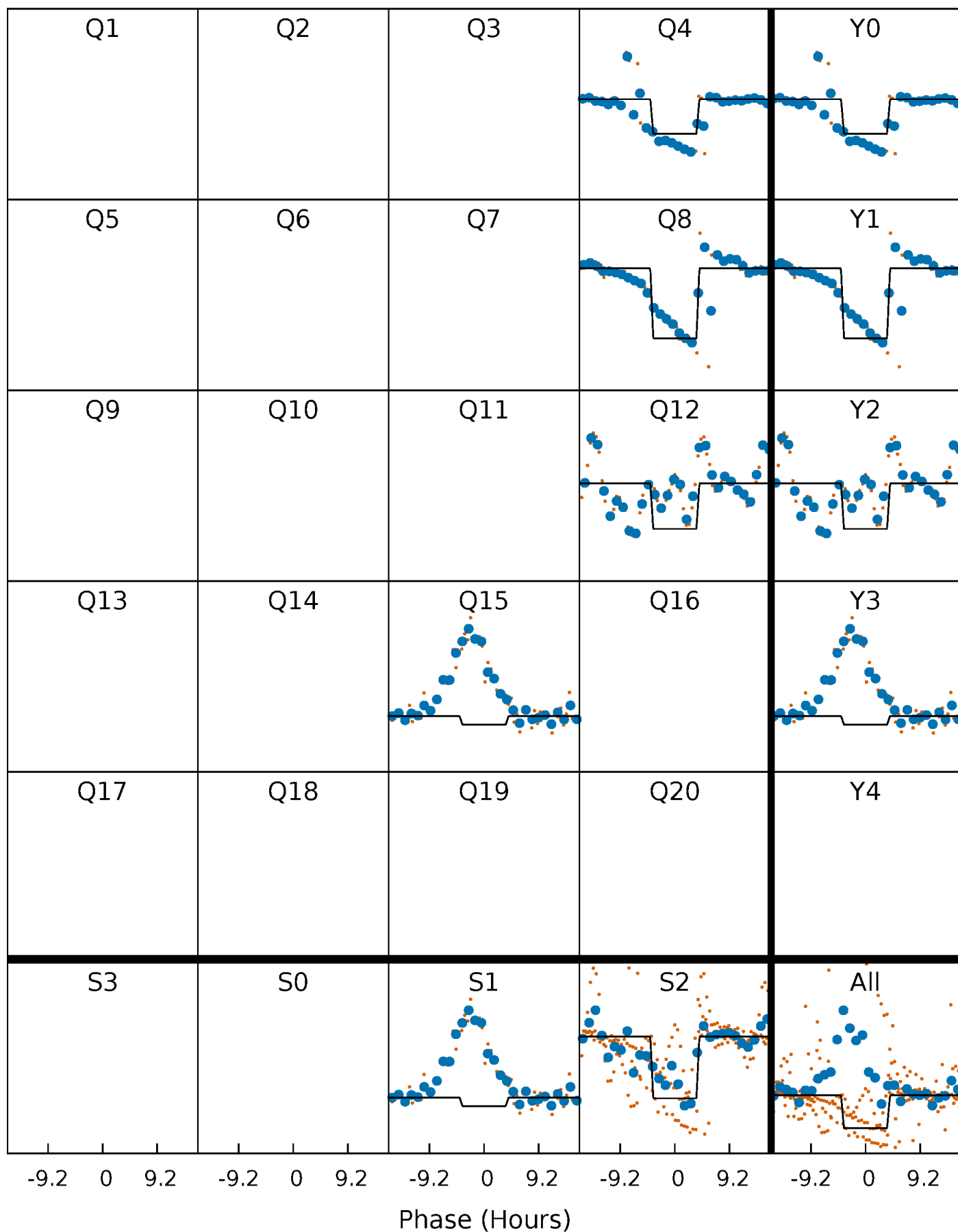
# DV Quarter-Phased Transit Curves

TCE 006937131-02 P=358.203546 Days  $T_0=389.477540$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

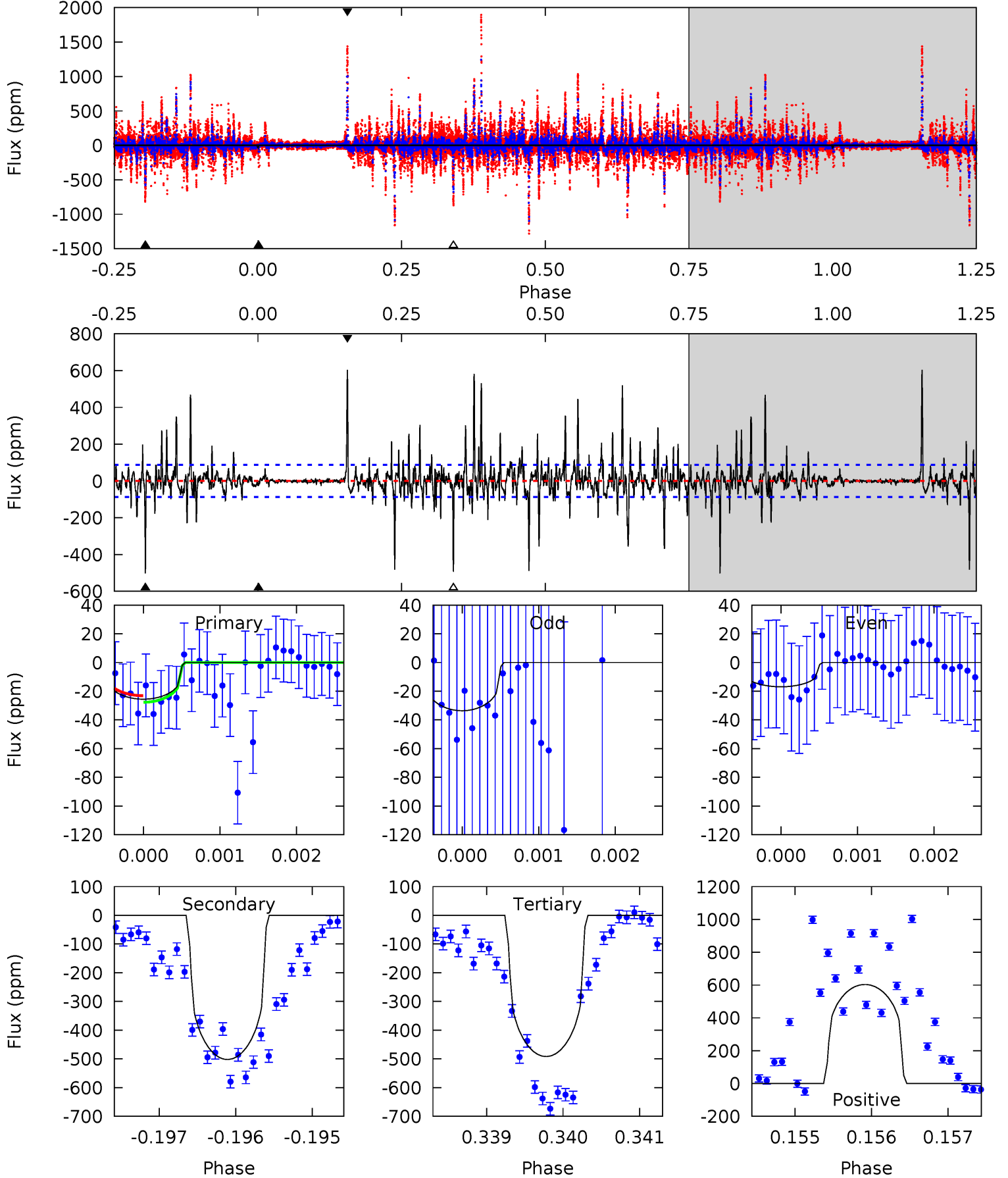
TCE 006937131-02 P=358.193496 Days  $T_0=389.478661$  (BKJD)



# DV Model-Shift Uniqueness Test

006937131-02, P = 358.203546 Days, E = 31.273994 Days

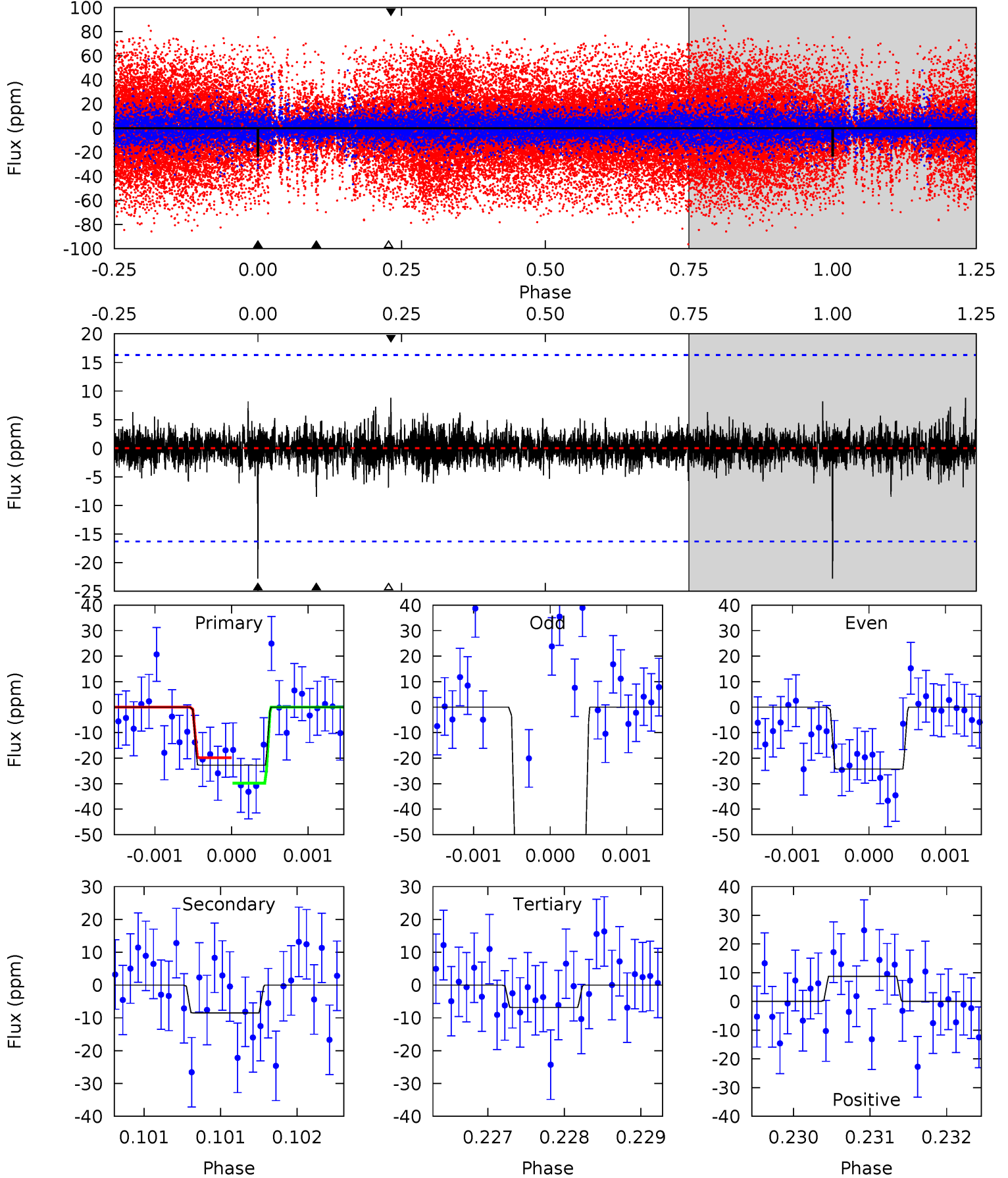
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1.60	31.4	30.8	37.8	5.46	3.31	4.79	-29.2	-36.2	0.64	-6.34	0.25	1.09	0.55	0.14



# Alt Model-Shift Uniqueness Test

006937131-02, P = 358.193496 Days, E = 31.285165 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
7.63	2.84	2.29	2.95	5.46	3.31	0.54	5.34	4.68	0.55	-0.11	9.50	-1.75	0.28	1.66



### Stellar Parameters For KIC 006937131

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$3948^{+87}_{-71}$	$0.995^{+0.033}_{-0.027}$	$-0.500^{+0.200}_{-0.150}$	$48.351^{+14.464}_{-1.523}$	$0.842^{+0.559}_{-0.029}$	$0.000^{+0.000}_{-0.000}$
	+2%/-2%	+3%/-3%	+40%/-30%	+30%/-3%	+66%/-3%	+9%/-24%
Source	PHO56	AST56	PHO56	DSEP		

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

### Secondary Eclipse Parameters for KIC 006937131-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-502 \pm 16$	$29.88^{+5.11}_{-5.13}$	$1749^{+51}_{-38}$	$7287^{+846}_{-606}$	$271^{+118}_{-68}$
Alt.	$-8 \pm 3$	$29.78^{+5.20}_{-5.27}$	$1750^{+49}_{-39}$	$3160^{+247}_{-231}$	$4.640^{+2.577}_{-1.832}$

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

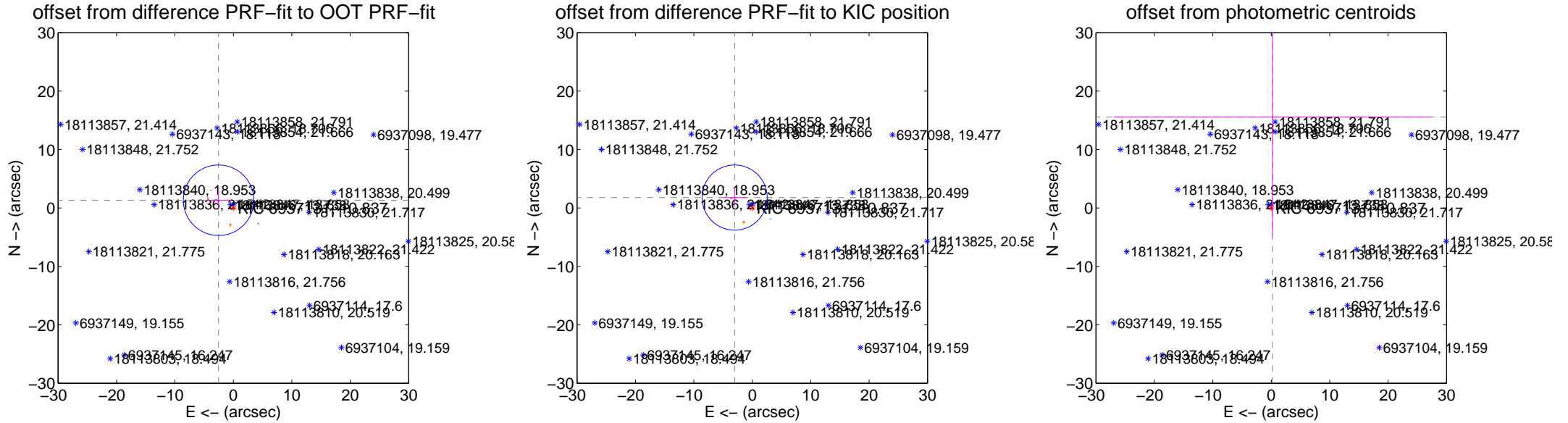
## DV Centroid Data

Supplemental centroid analysis for 006937131-02. **Kepler magnitude: 10.84.** Transit SNR 8.49

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

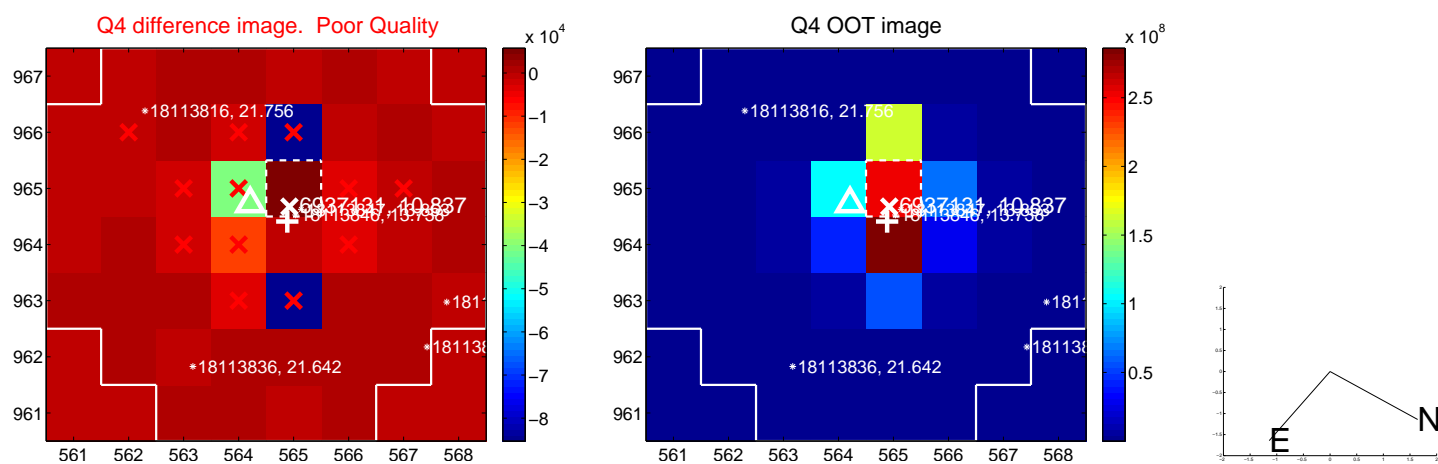
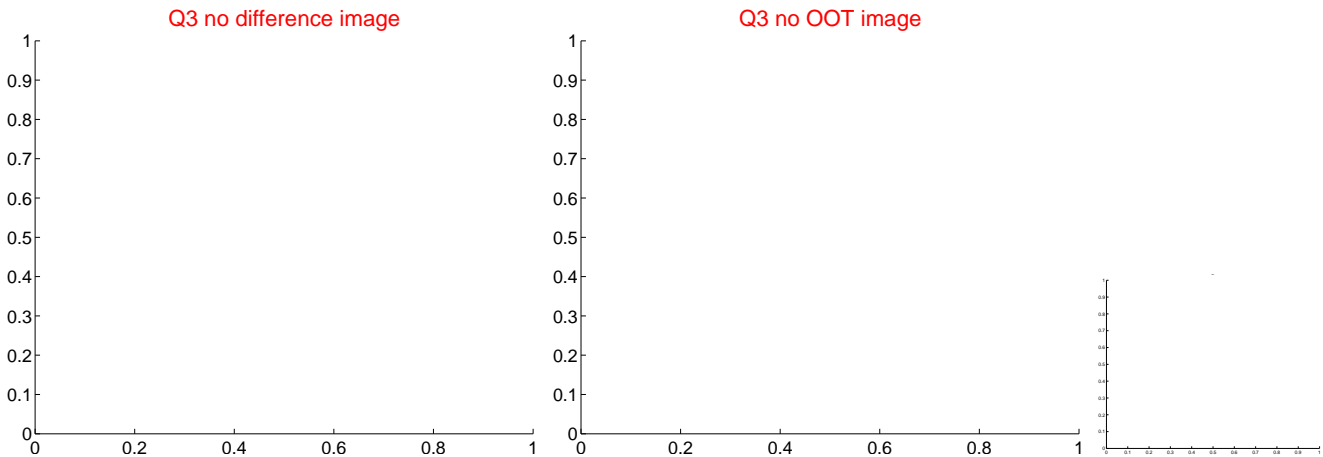
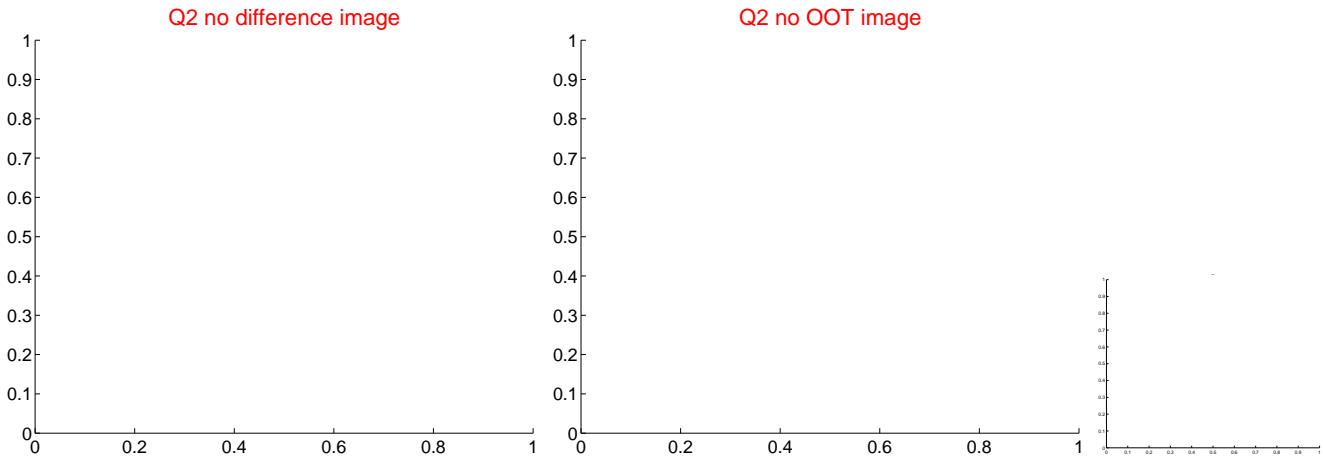
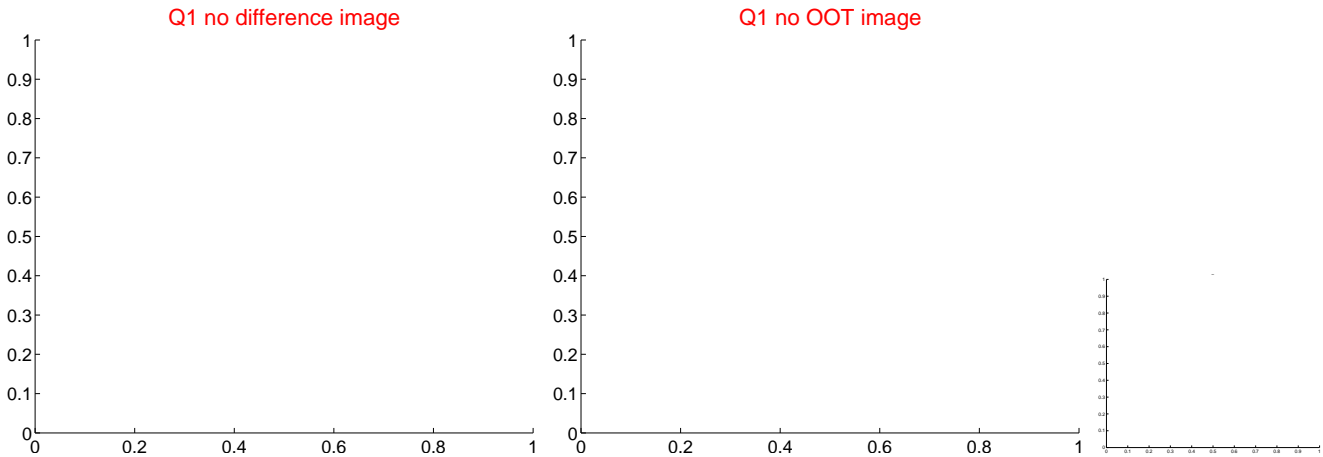
The direct PRF centroid is offset from the target star catalog position by about 0.77 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.852 \pm 2.011$	1.42	$2.527 \pm 2.123$	$1.321 \pm 1.535$
PRF-fit source offset from KIC position	$3.506 \pm 1.859$	1.89	$3.023 \pm 1.960$	$1.776 \pm 1.526$
photometric centroid source offset	$15.55 \pm 20.31$	0.77	$-0.19 \pm 27.14$	$15.55 \pm 20.31$



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.

Q5 no difference image



Q5 no OOT image



Q6 no difference image



Q6 no OOT image



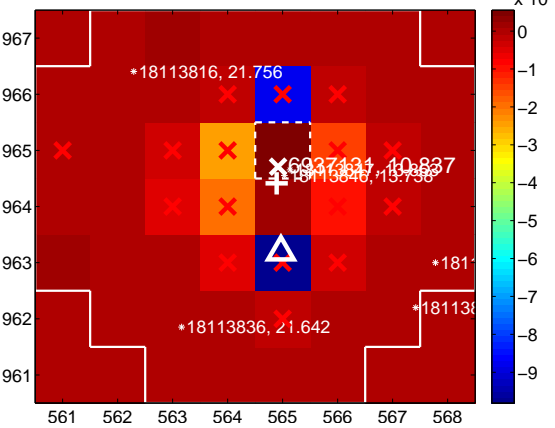
Q7 no difference image



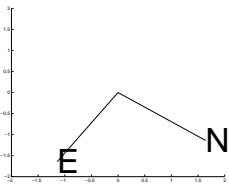
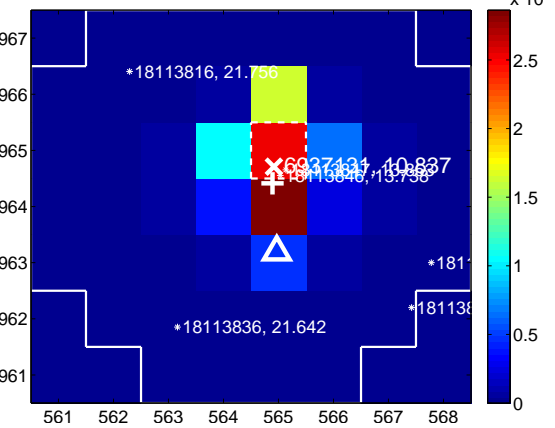
Q7 no OOT image



Q8 difference image. Poor Quality



Q8 OOT image





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

Q9 no difference image



Q9 no OOT image



Q10 no difference image



Q10 no OOT image



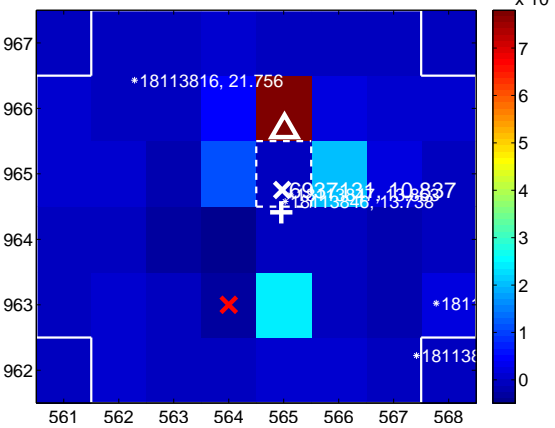
Q11 no difference image



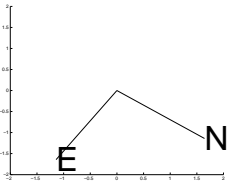
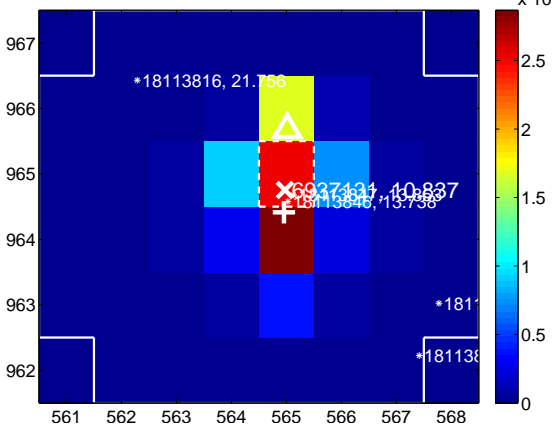
Q11 no OOT image



Q12 difference image



Q12 OOT image



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

Q13 no difference image



Q13 no OOT image



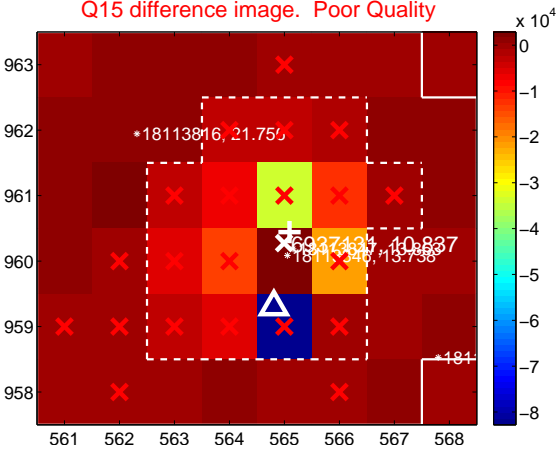
Q14 no difference image



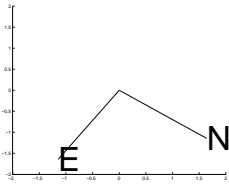
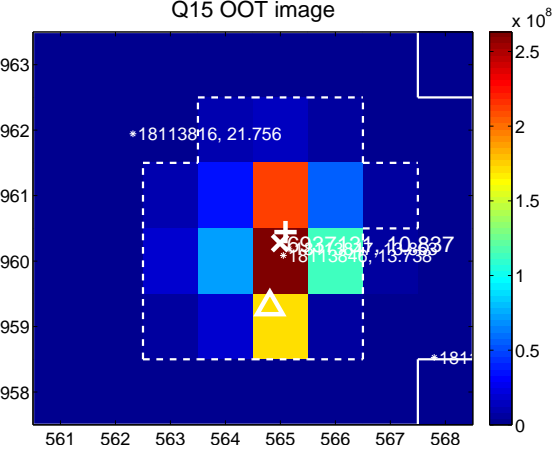
Q14 no OOT image



Q15 difference image. Poor Quality



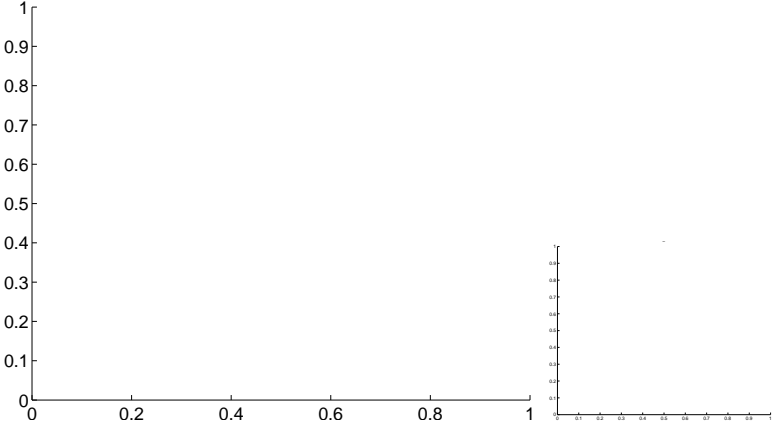
Q15 OOT image



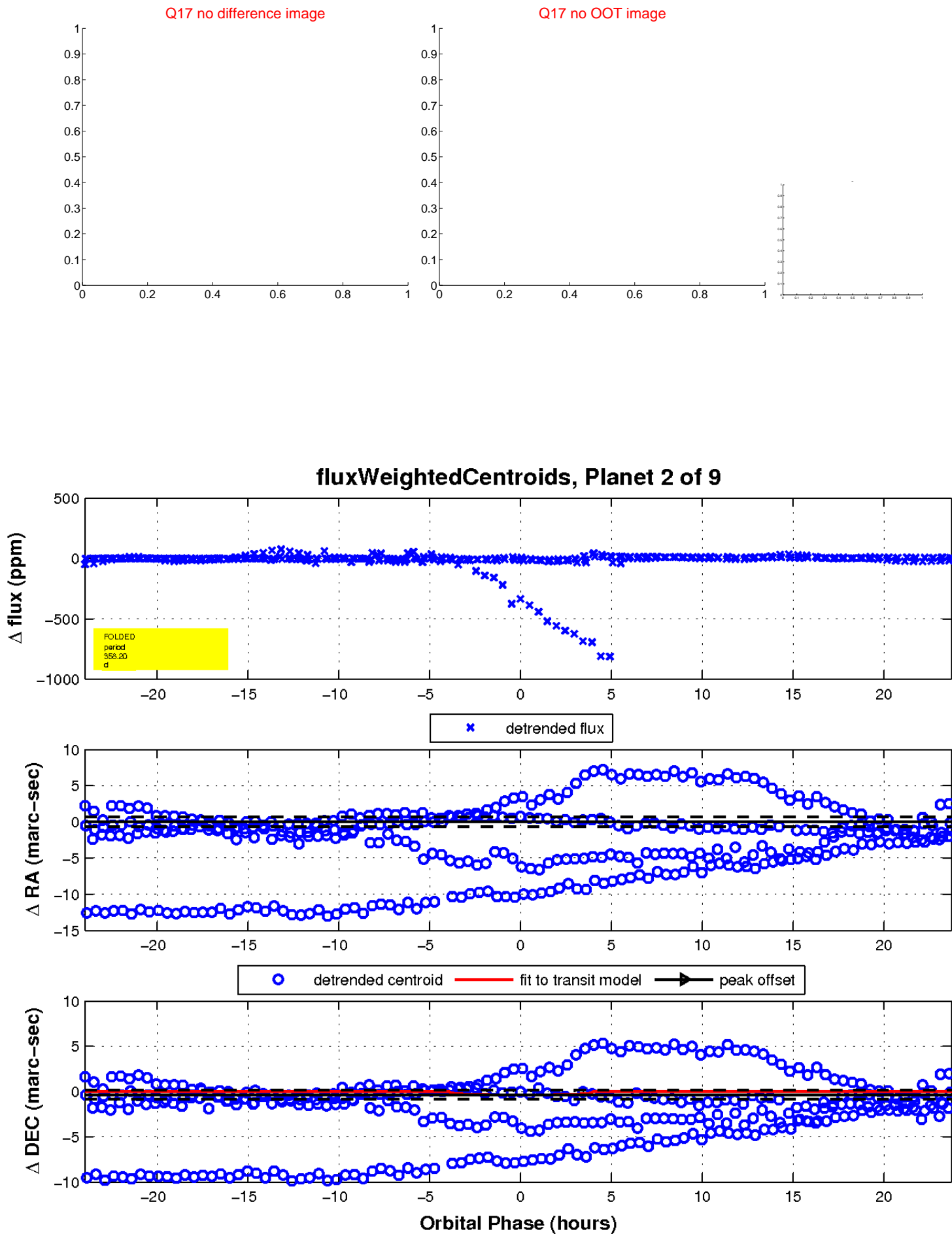
Q16 no difference image



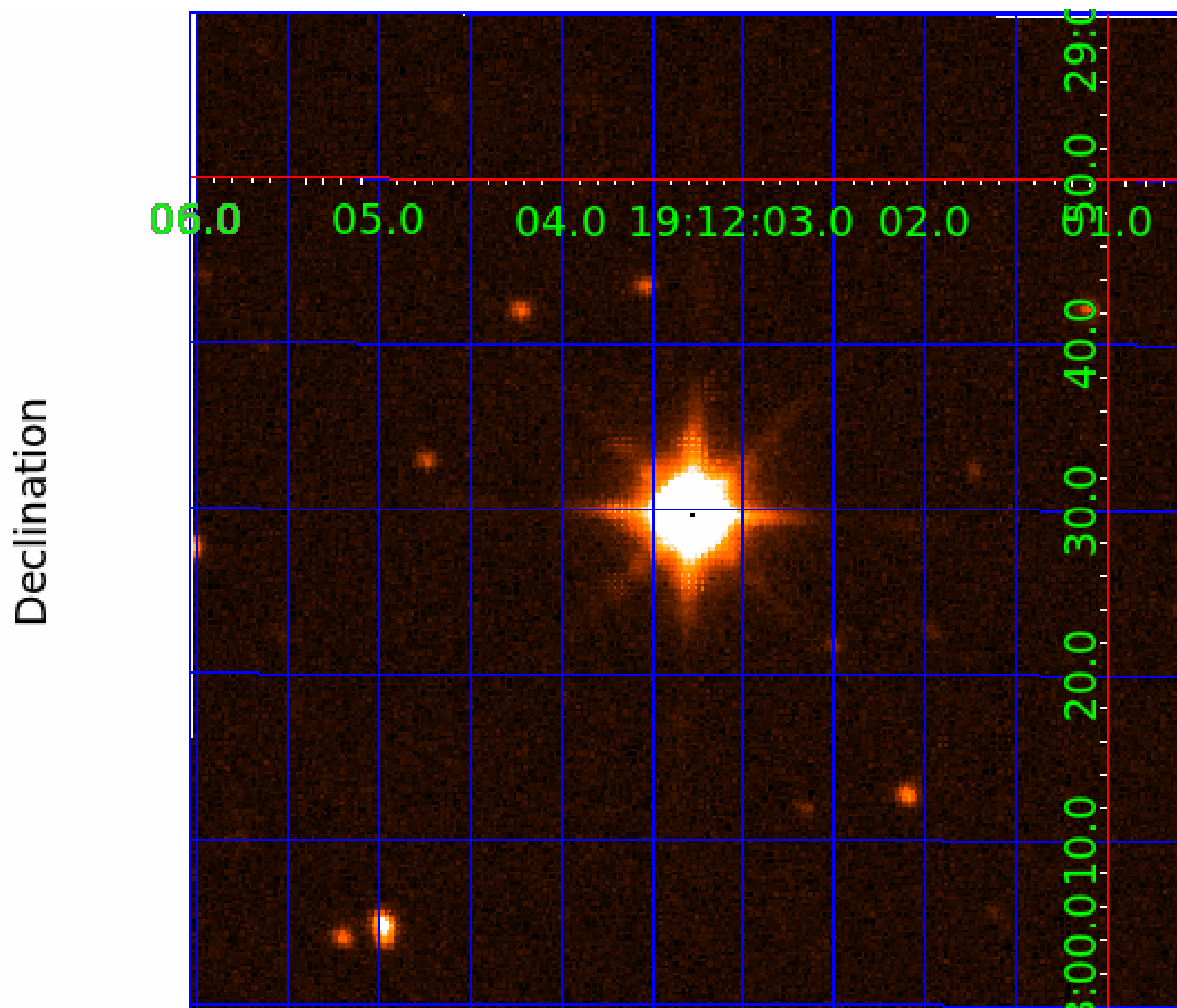
Q16 no OOT image



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



UKIRT Image



# KIC 006937131

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006937131-01	OBS	No	117.103296	195.920780	51.3	1.665	38.7	31.5	48.35	3948	43.67	2597.65
006937131-02	OBS	No	358.203546	389.477540	24.1	8.007	19.9	8.5	48.35	3948	29.44	585.01
006937131-03	OBS	No	256.641148	253.452664	43.6	2.098	18.9	17.9	48.35	3948	43.44	912.51
006937131-04	OBS	No	176.008339	233.821327	2.2	1.876	20.1	1.3	48.35	3948	9.18	1508.79
006937131-05	OBS	No	211.915402	161.715255	33.5	9.582	17.7	11.1	48.35	3948	34.00	1177.94
006937131-06	OBS	No	326.304219	430.241376	62.8	13.565	16.5	16.5	48.35	3948	45.99	662.49
006937131-07	OBS	No	68.543331	164.278275	14.4	27.831	15.6	5.8	48.35	3948	27.28	5305.42
006937131-08	OBS	No	110.649092	187.850790	448.8	2.000	17.9	-1.0	48.35	3948	96.47	2801.62
006937131-09	OBS	No	80.018968	145.132211	42.0	2.520	17.7	12.5	48.35	3948	34.75	4316.01

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006937131-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_SKYE_ZUMA—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
006937131-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_ZUMA—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_SATURATED
006937131-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
006937131-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
006937131-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_ZUMA—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_SATURATED
006937131-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_SATURATED
006937131-07	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
006937131-08	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
006937131-09	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—CENT_SATURATED

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

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

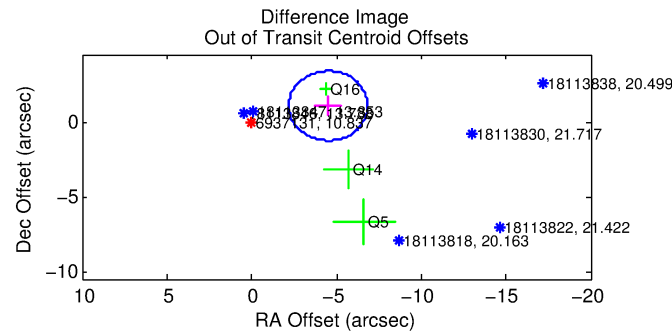
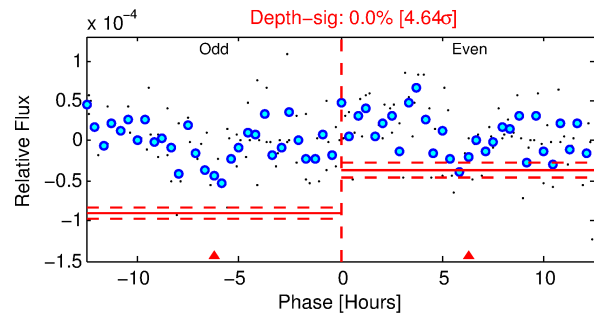
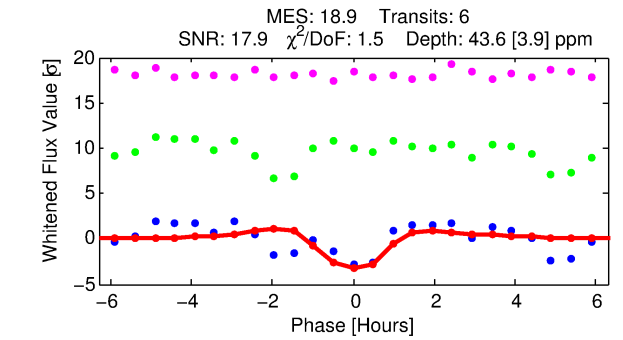
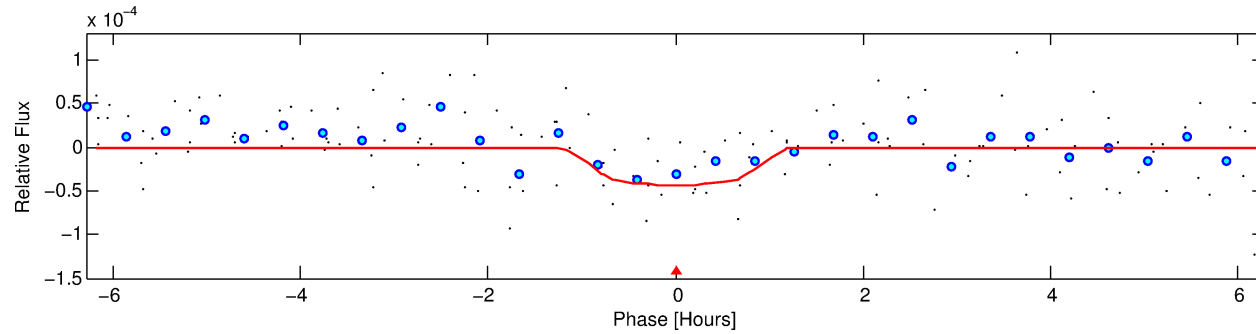
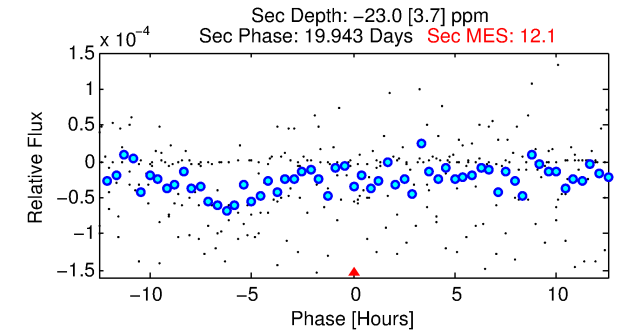
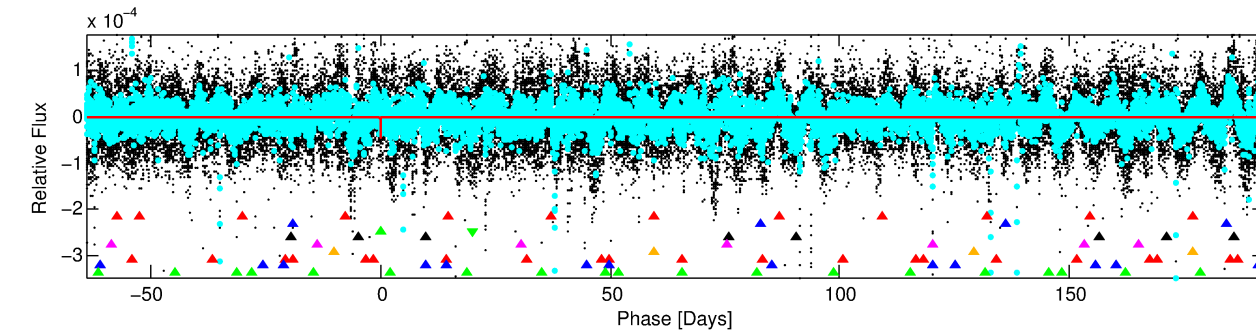
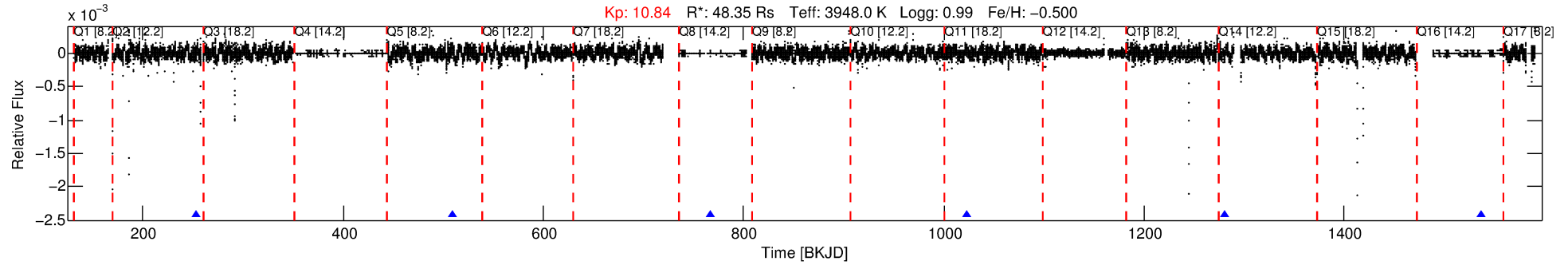
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 006937131-03

No Significant Match Found

# DV One-Page Summary

KIC: 6937131 Candidate: 3 of 9 Period: 256.641 d



## DV Fit Results:

Period = 256.64115 [0.00168] d  
Epoch = 253.4527 [0.0056] BKJD  
Rp/R\* = 0.0082 [0.0068]  
a/R\* = 331.80 [1043.37]  
b = 0.94 [0.38]  
Seff = 912.51 [204.26]  
Teff = 1401 [78] K  
Rp = 43.44 [38.10] Re  
a = 0.7468 [0.1501] AU  
Ag = N/A  
Teffp = N/A

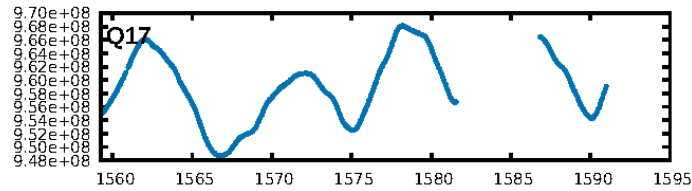
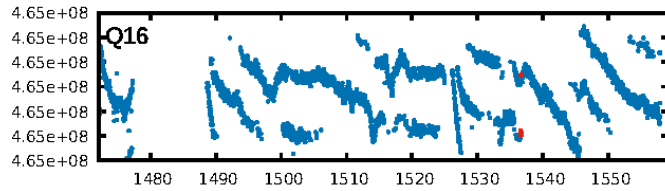
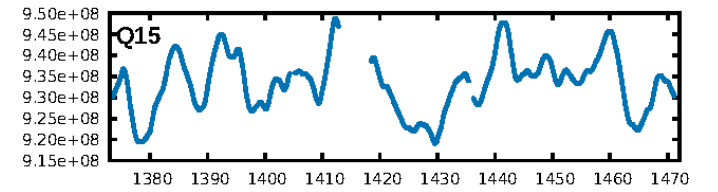
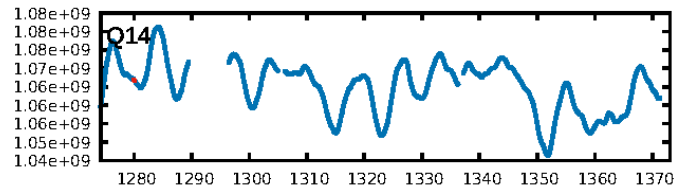
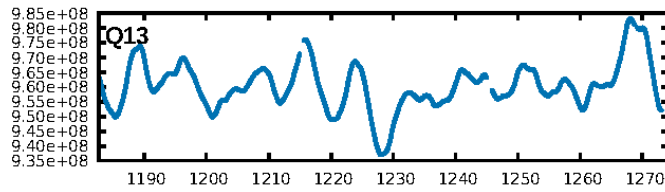
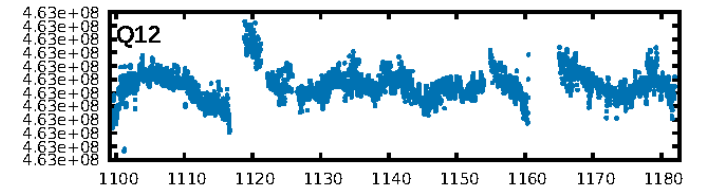
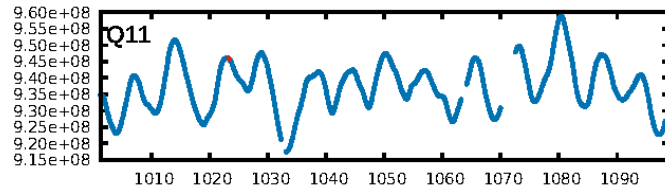
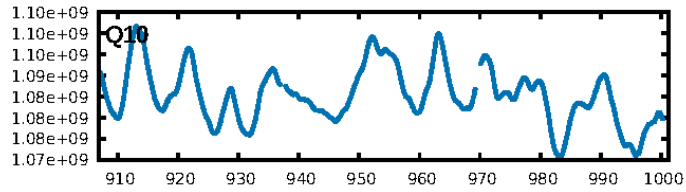
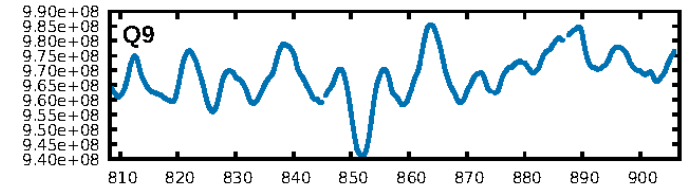
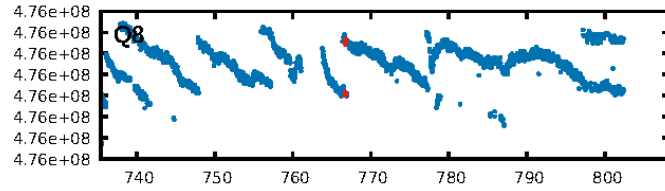
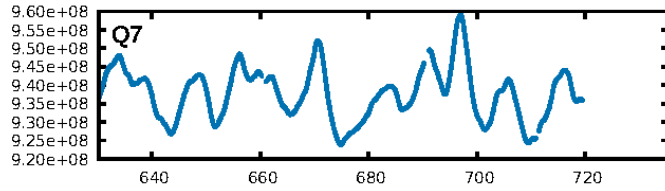
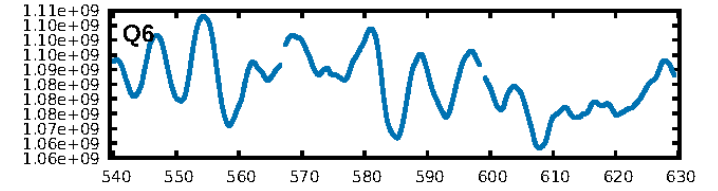
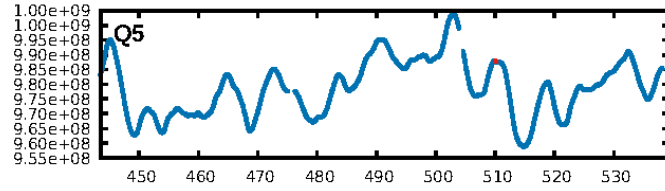
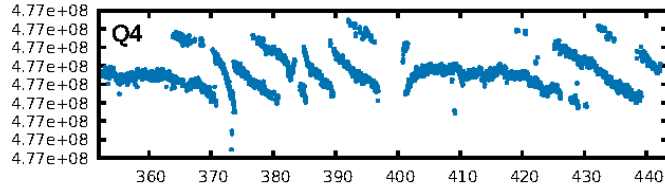
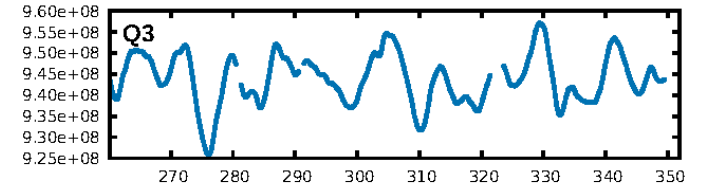
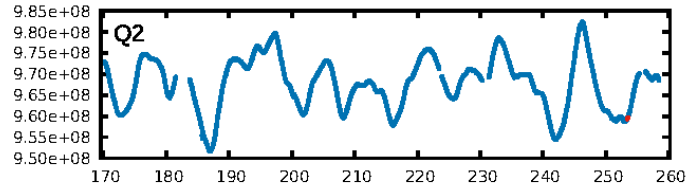
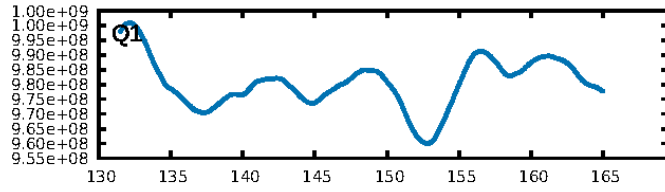
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [109.43 $\sigma$ ]  
LongPeriod-sig: 100.0% [121.80 $\sigma$ ]  
ModelChiSquare2-sig: 98.7%  
ModelChiSquareGof-sig: 97.9%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [6/6]  
GhostDiagnostic-chr: -1.739  
Centroid-sig: 86.5%  
Centroid-so: 4.279 arcsec [0.41 $\sigma$ ]  
OotOffset-rm: 4.624 arcsec [5.98 $\sigma$ ]  
KicOffset-rm: 3.972 arcsec [3.86 $\sigma$ ]  
OotOffset-st: 1/0/1/1 [3]  
KicOffset-st: 1/0/1/1 [3]  
DiffImageQuality-fgm: 0.33 [1/3]  
DiffImageOverlap-fno: 1.00 [6/6]

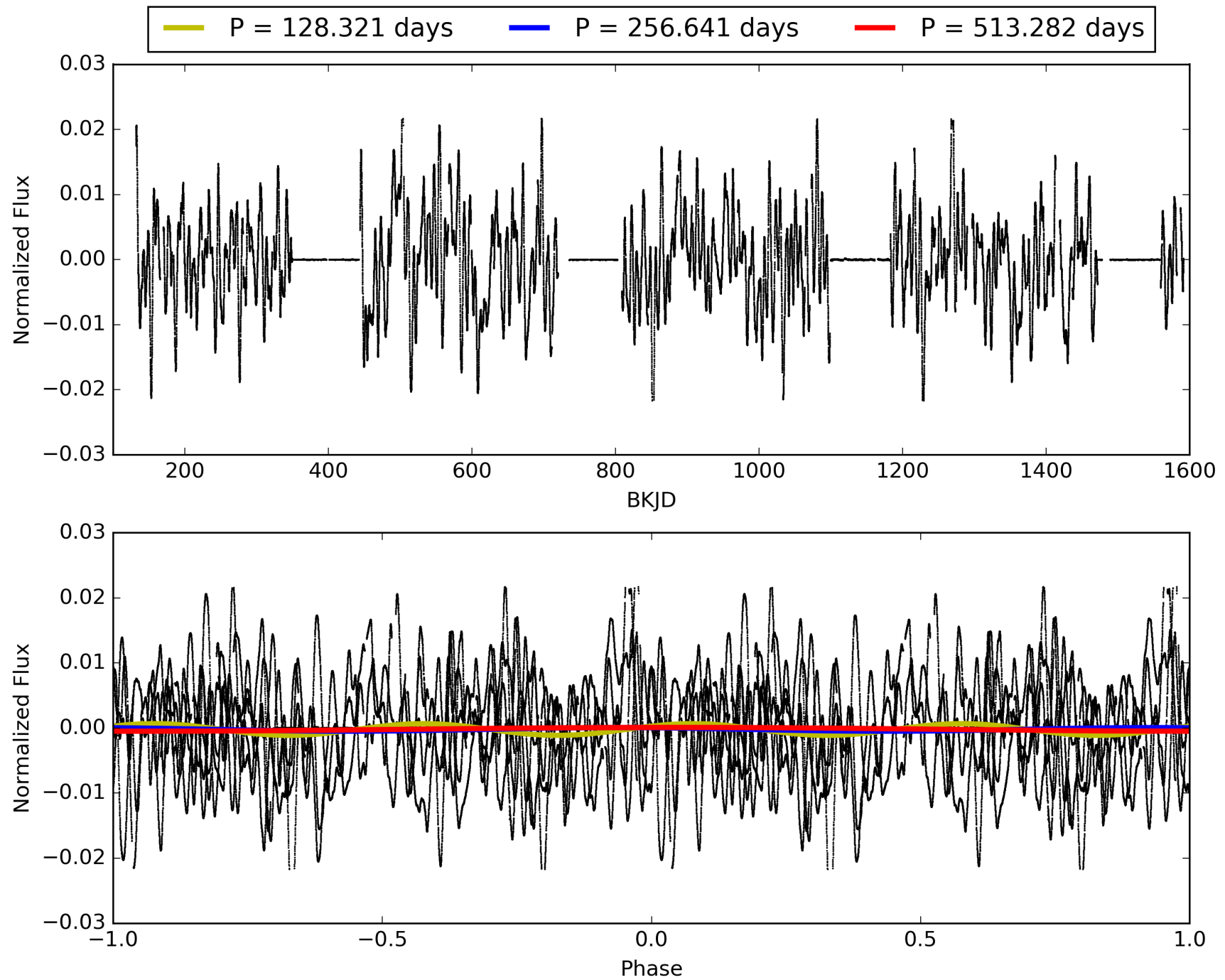
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 00:46:54 Z

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

# TCE 006937131-03, PDC Light Curves



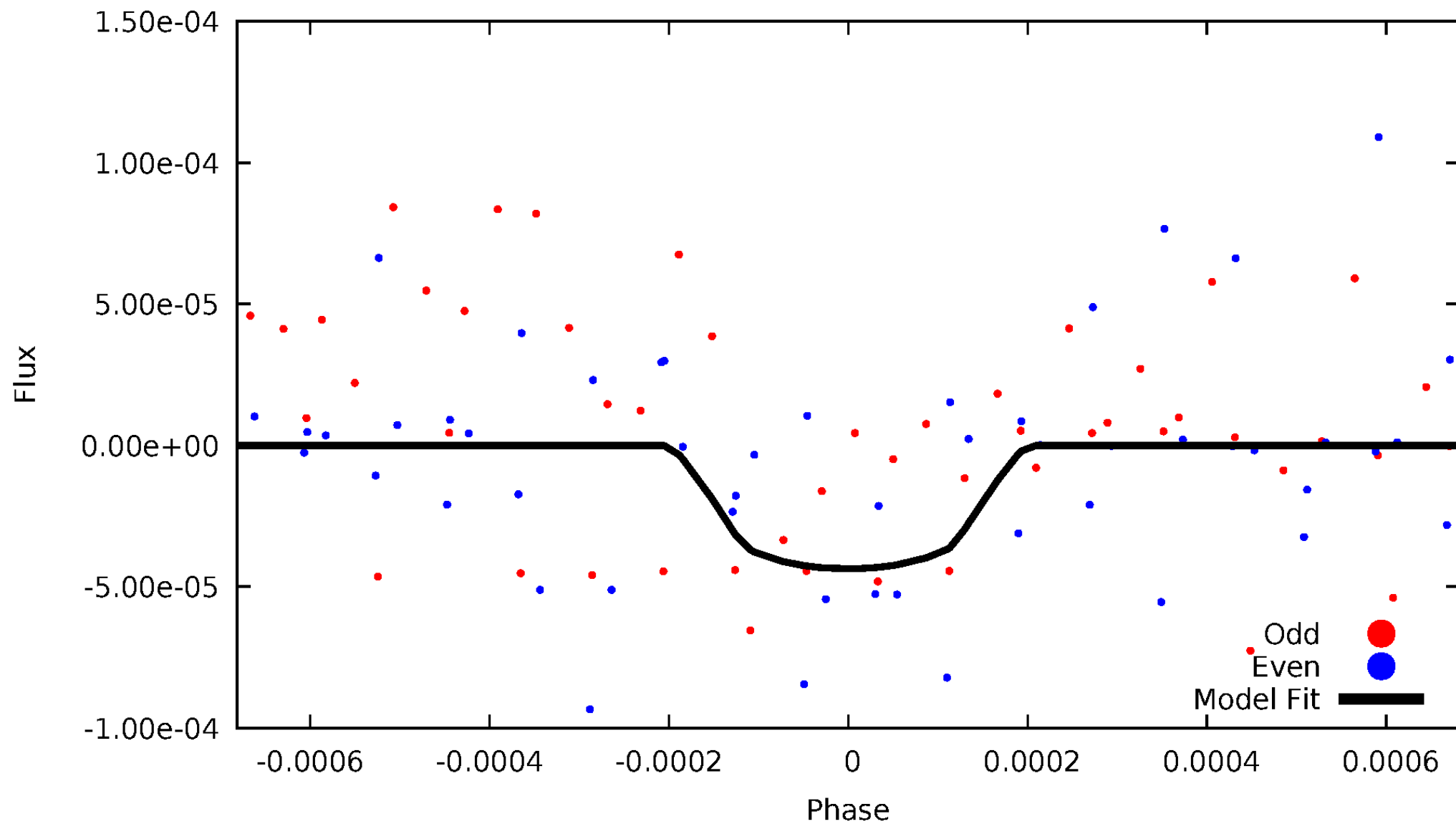
# TCE 006937131-03





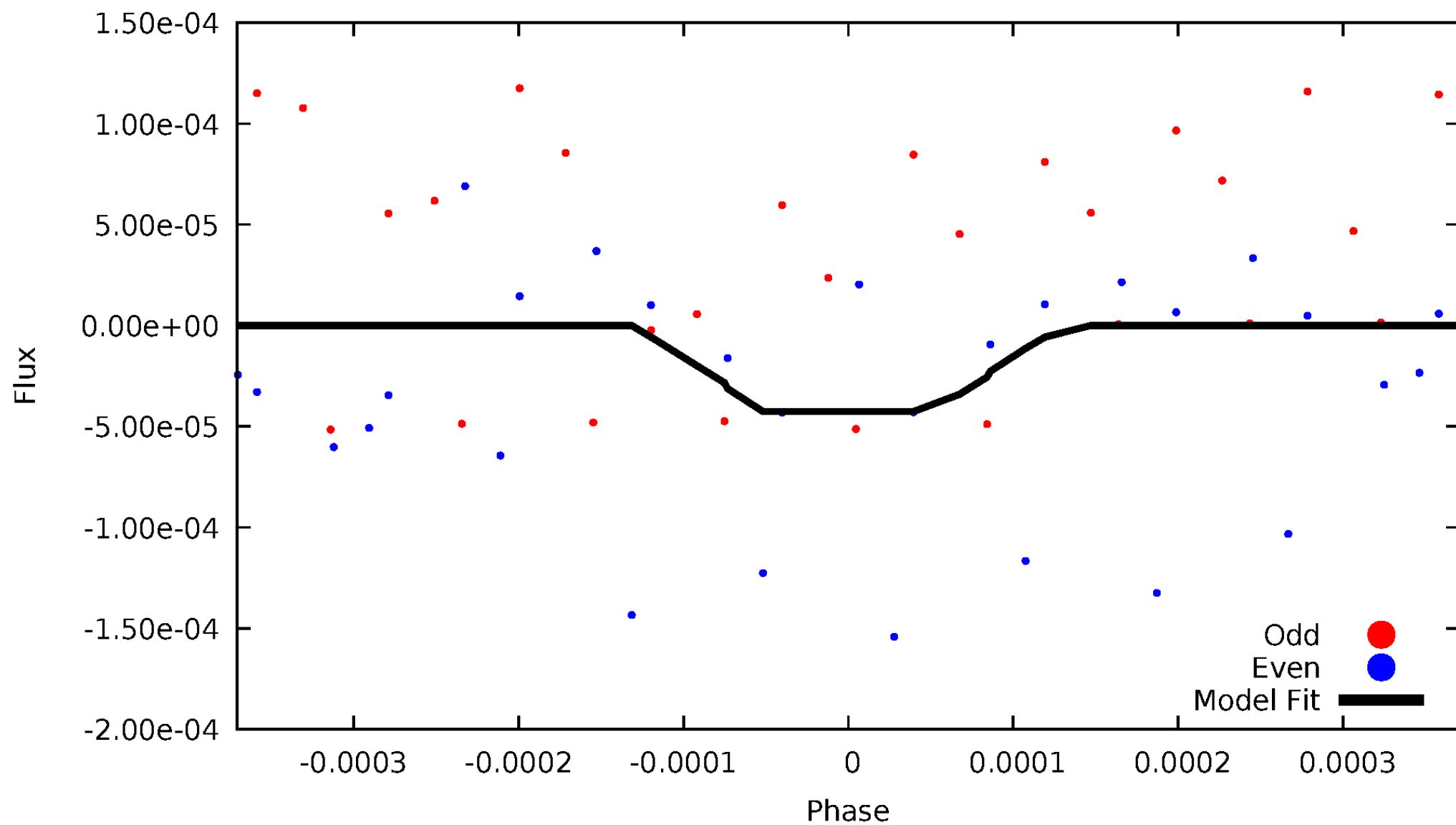
# DV Odd/Even

TCE 006937131-03



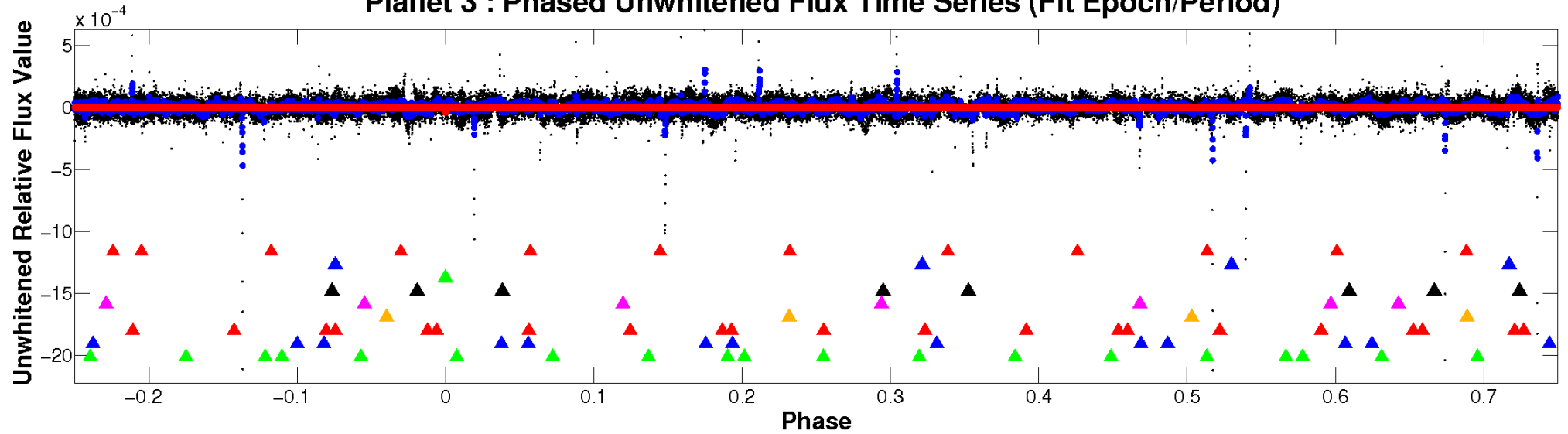
# ALT Odd/Even

TCE 006937131-03

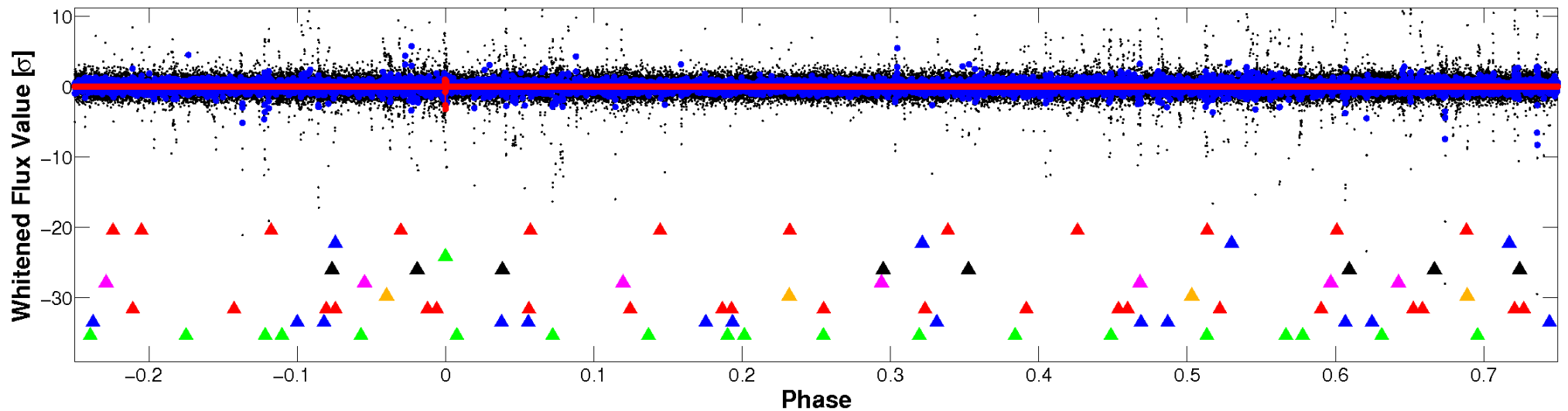


# Non-Whitened Vs. Whitened Light Curve

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

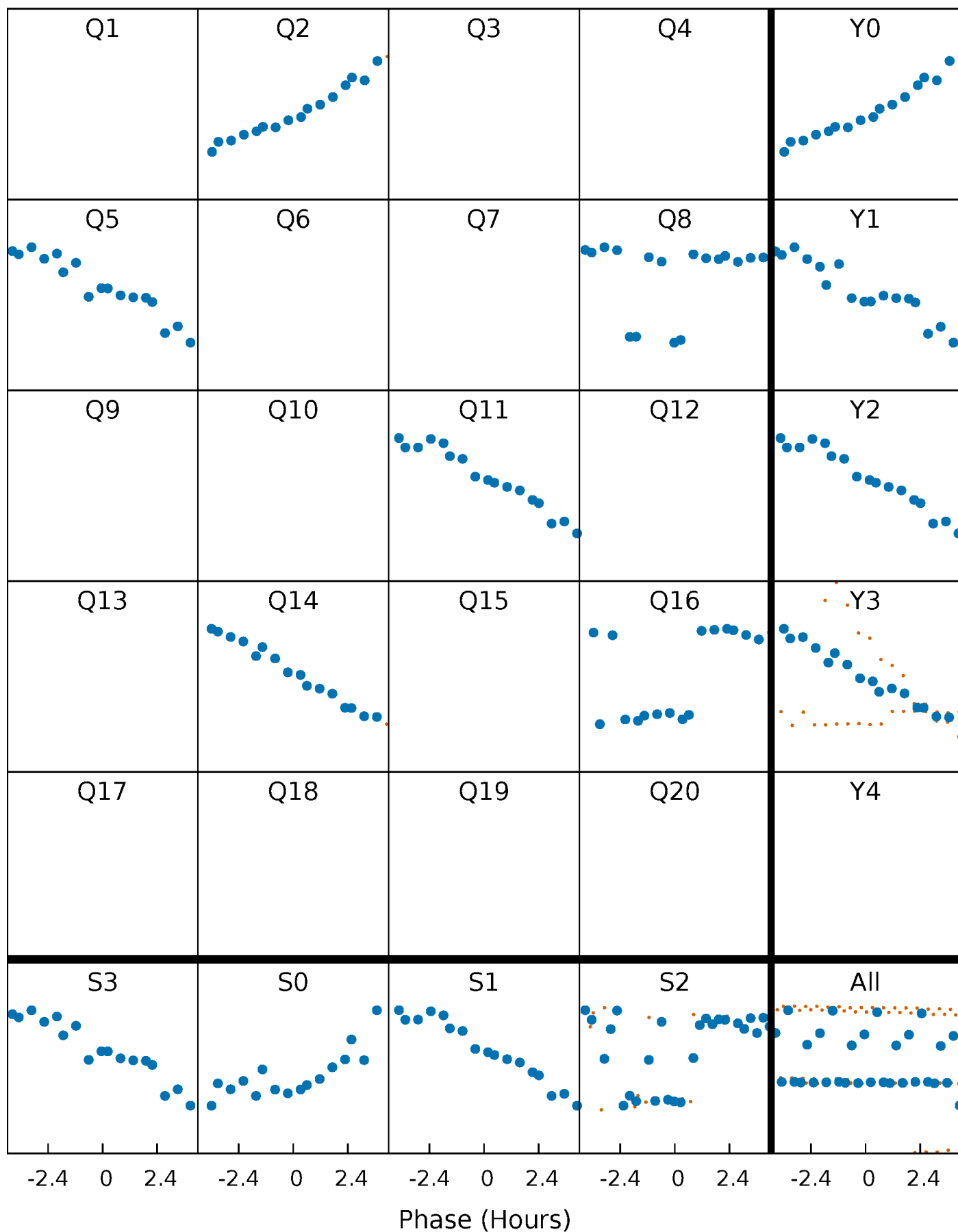


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



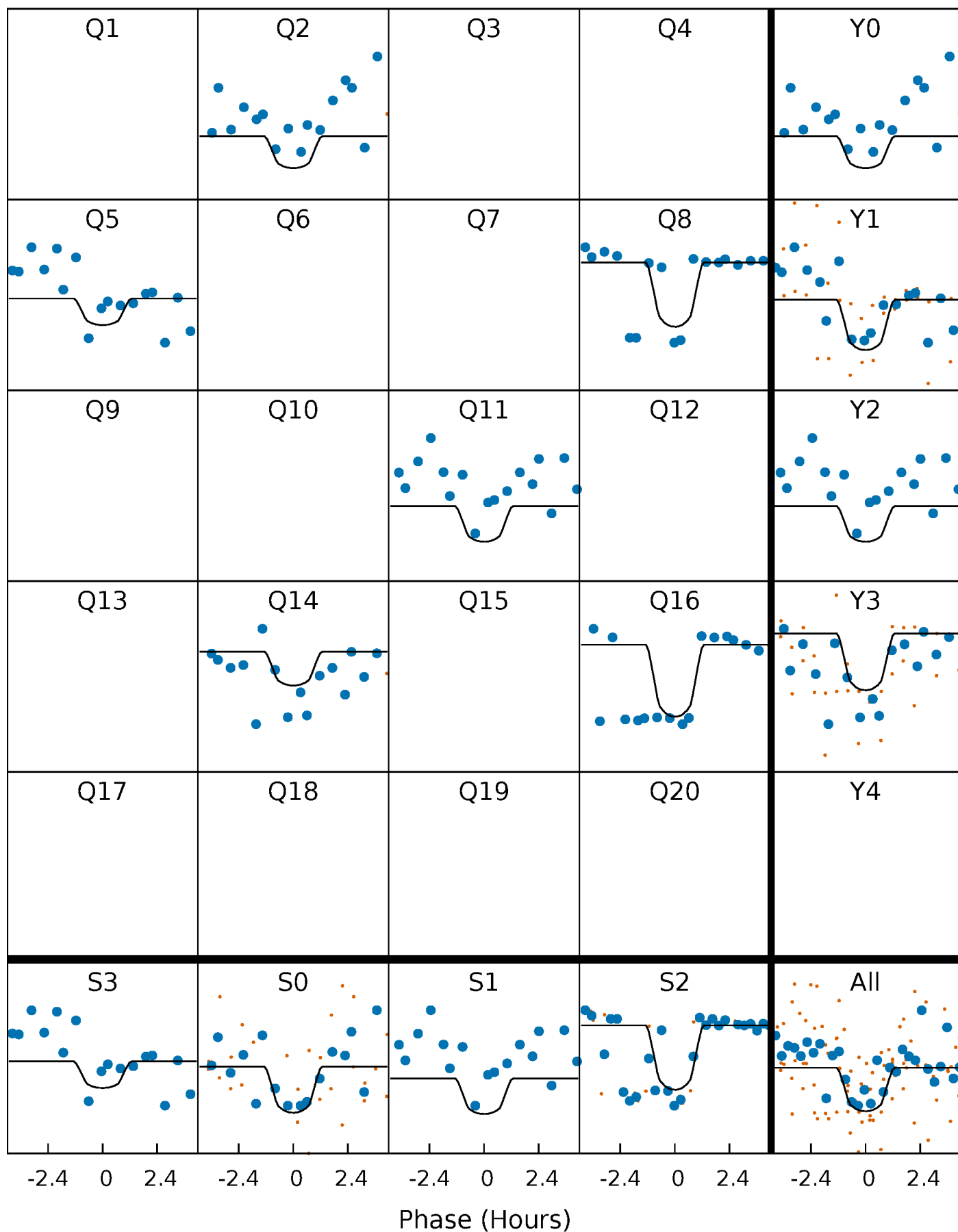
# PDC Quarter-Phased Transit Curves

TCE 006937131-03 P=256.641148 Days  $T_0=253.452664$  (BKJD)



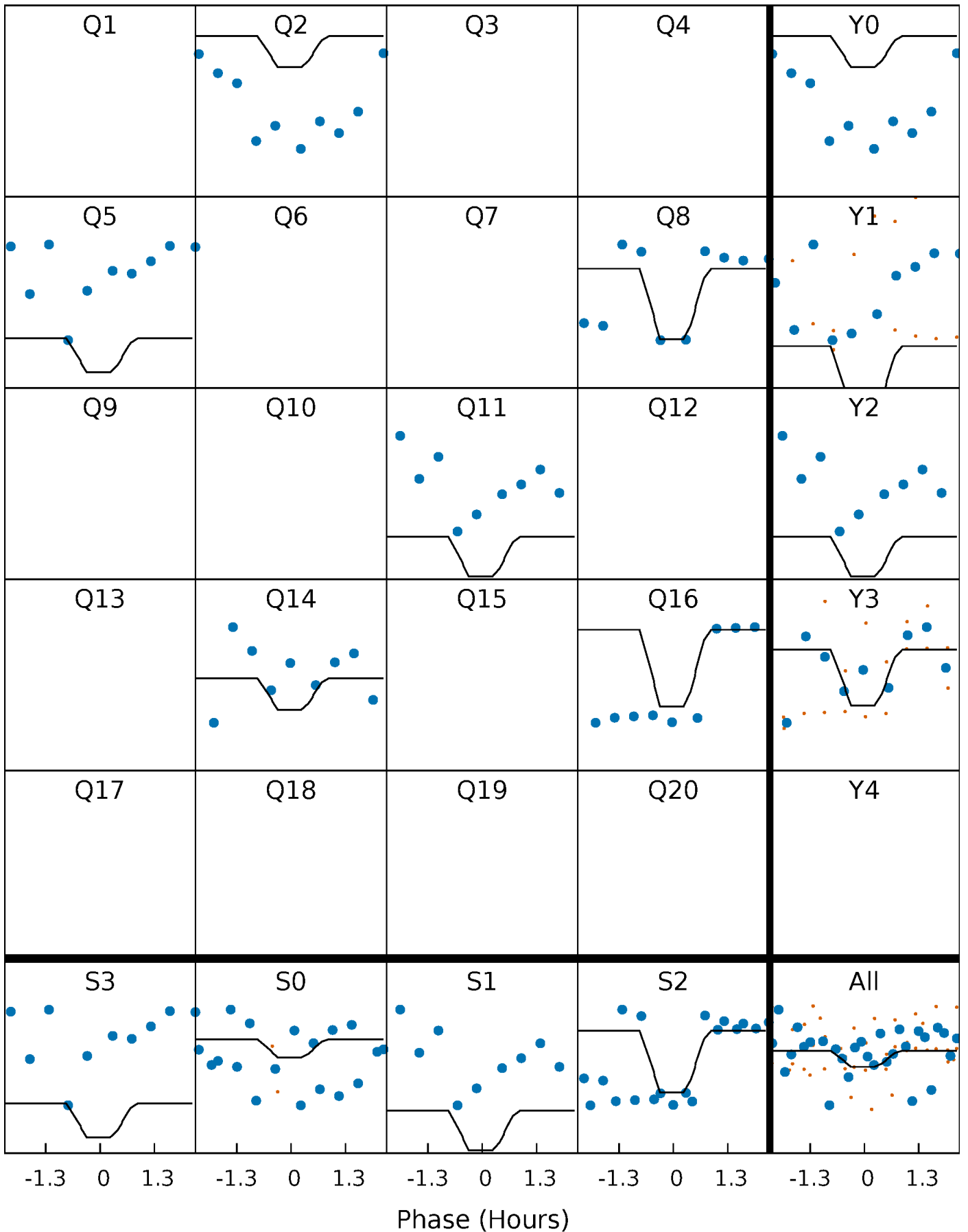
# DV Quarter-Phased Transit Curves

TCE 006937131-03 P=256.641148 Days  $T_0=253.452664$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

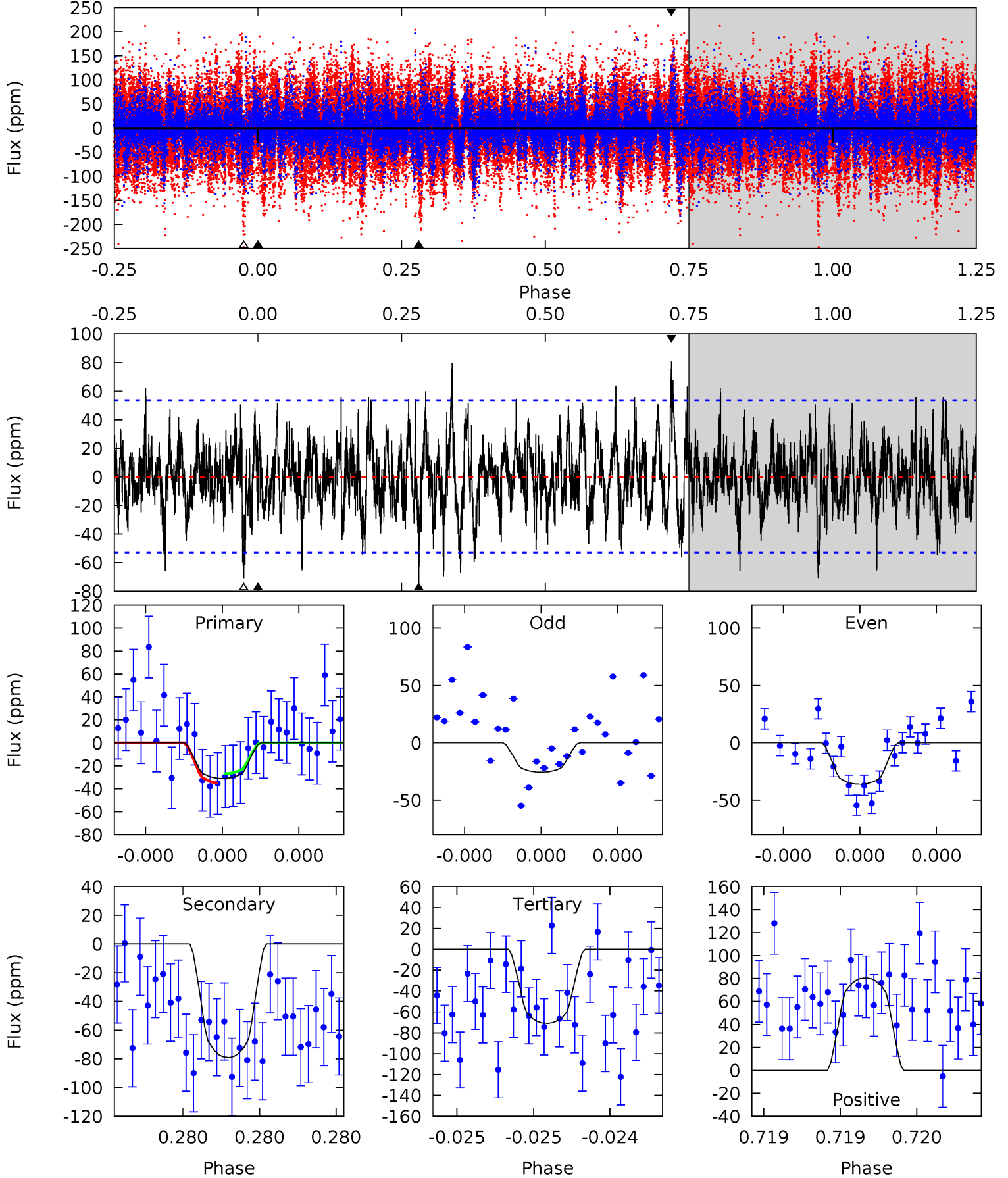
TCE 006937131-03 P=256.642297 Days  $T_0=253.454195$  (BKJD)



# DV Model-Shift Uniqueness Test

006937131-03, P = 256.641148 Days, E = 253.452664 Days

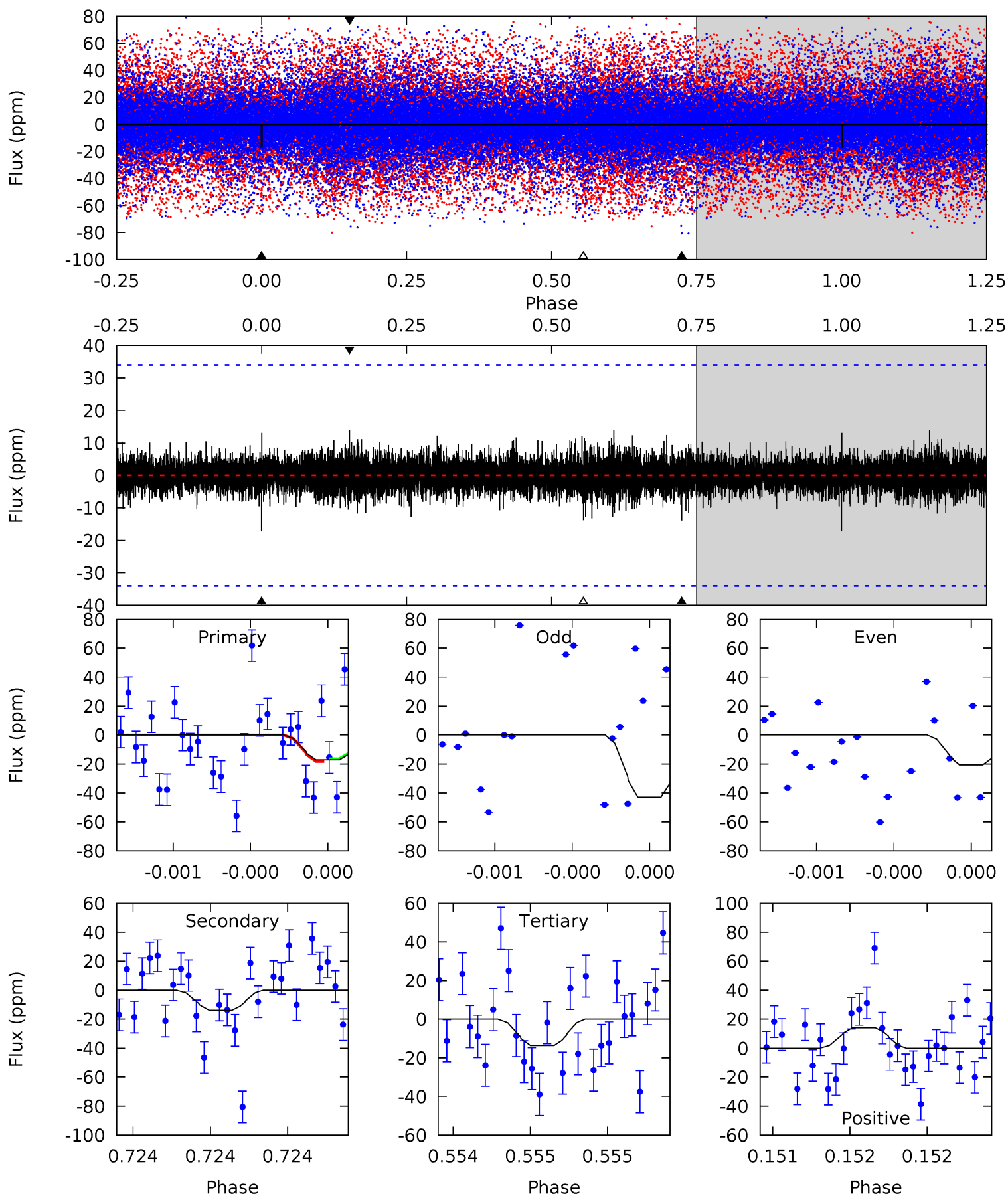
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3.26	8.32	7.48	8.49	5.61	3.53	2.14	-4.22	-5.23	0.85	-0.17	0.55	1.03	0.50	0.43



# Alt Model-Shift Uniqueness Test

006937131-03, P = 256.642297 Days, E = 253.454195 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2.87	2.31	2.29	2.34	5.68	3.65	0.51	0.59	0.54	0.02	-0.03	1.94	1.20	0.45	0.16





### Stellar Parameters For KIC 006937131

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$3948^{+87}_{-71}$	$0.995^{+0.033}_{-0.027}$	$-0.500^{+0.200}_{-0.150}$	$48.351^{+14.464}_{-1.523}$	$0.842^{+0.559}_{-0.029}$	$0.000^{+0.000}_{-0.000}$
	+2%/-2%	+3%/-3%	+40%/-30%	+30%/-3%	+66%/-3%	+9%/-24%
Source	PHO56	AST56	PHO56	DSEP		

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

### Secondary Eclipse Parameters for KIC 006937131-03 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-79 \pm 9$	$47.84^{+34.01}_{-29.83}$	$1957^{+53}_{-45}$	$3923^{+1886}_{-652}$	$11^{+66}_{-7}$
Alt.	$-14 \pm 6$	$41.34^{+35.12}_{-25.76}$	$1958^{+52}_{-46}$	$3016^{+1357}_{-654}$	$2.296^{+16.869}_{-1.706}$

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

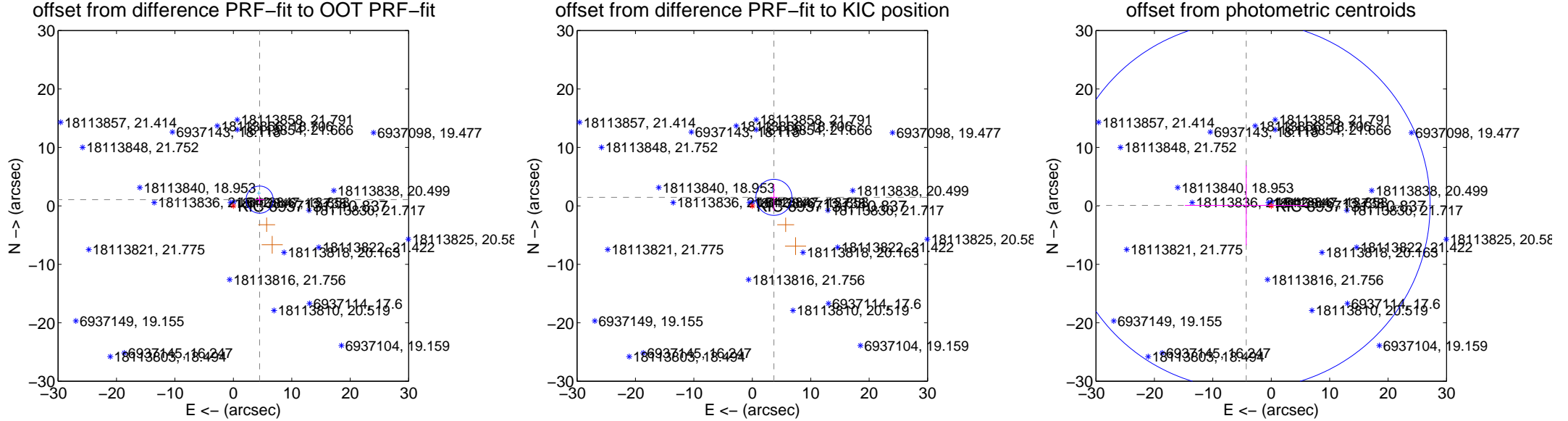
## DV Centroid Data

Supplemental centroid analysis for 006937131-03. **Kepler magnitude: 10.84.** Transit SNR 17.94

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

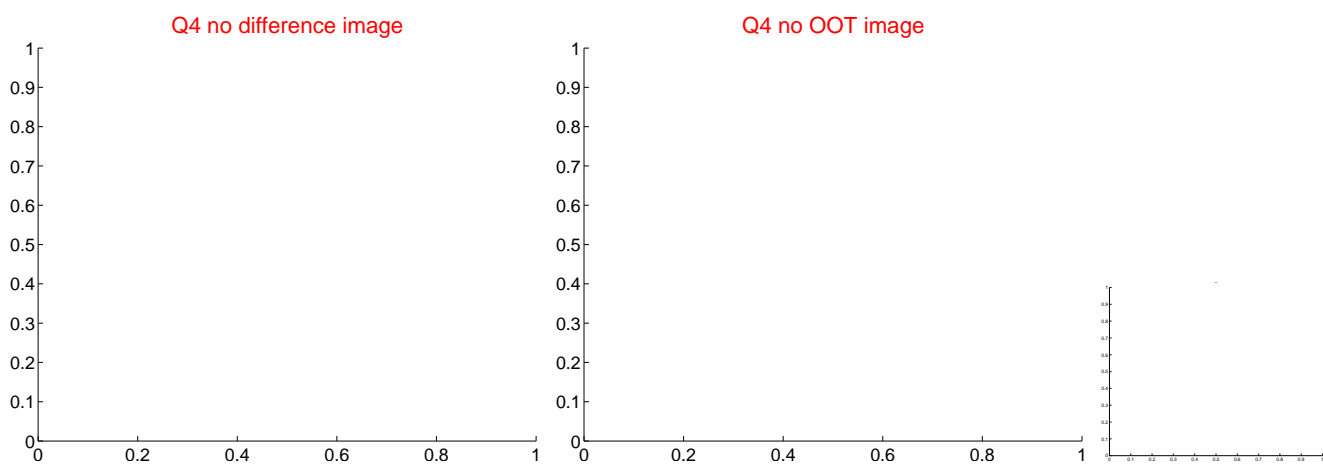
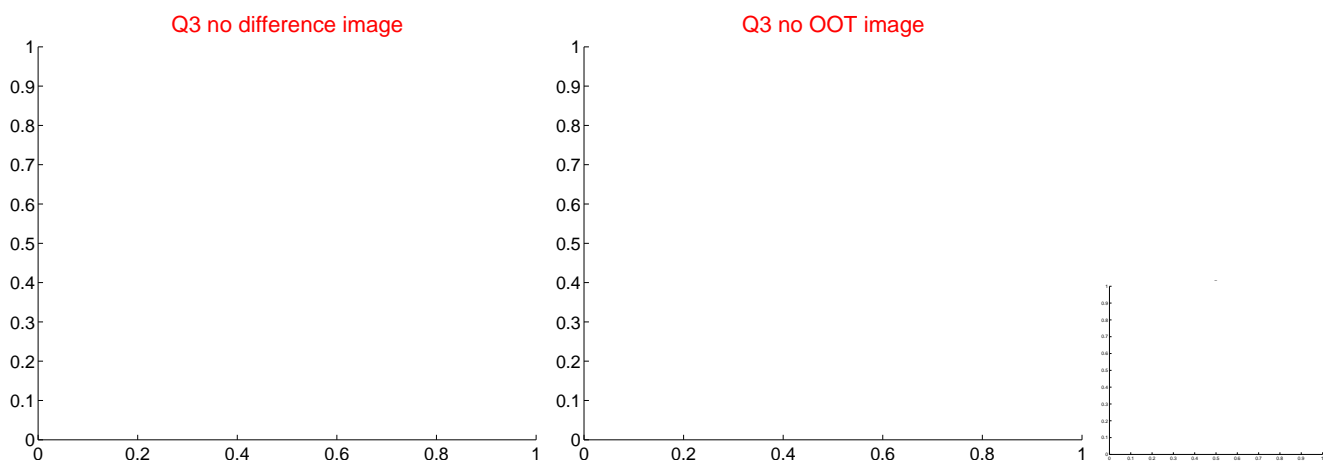
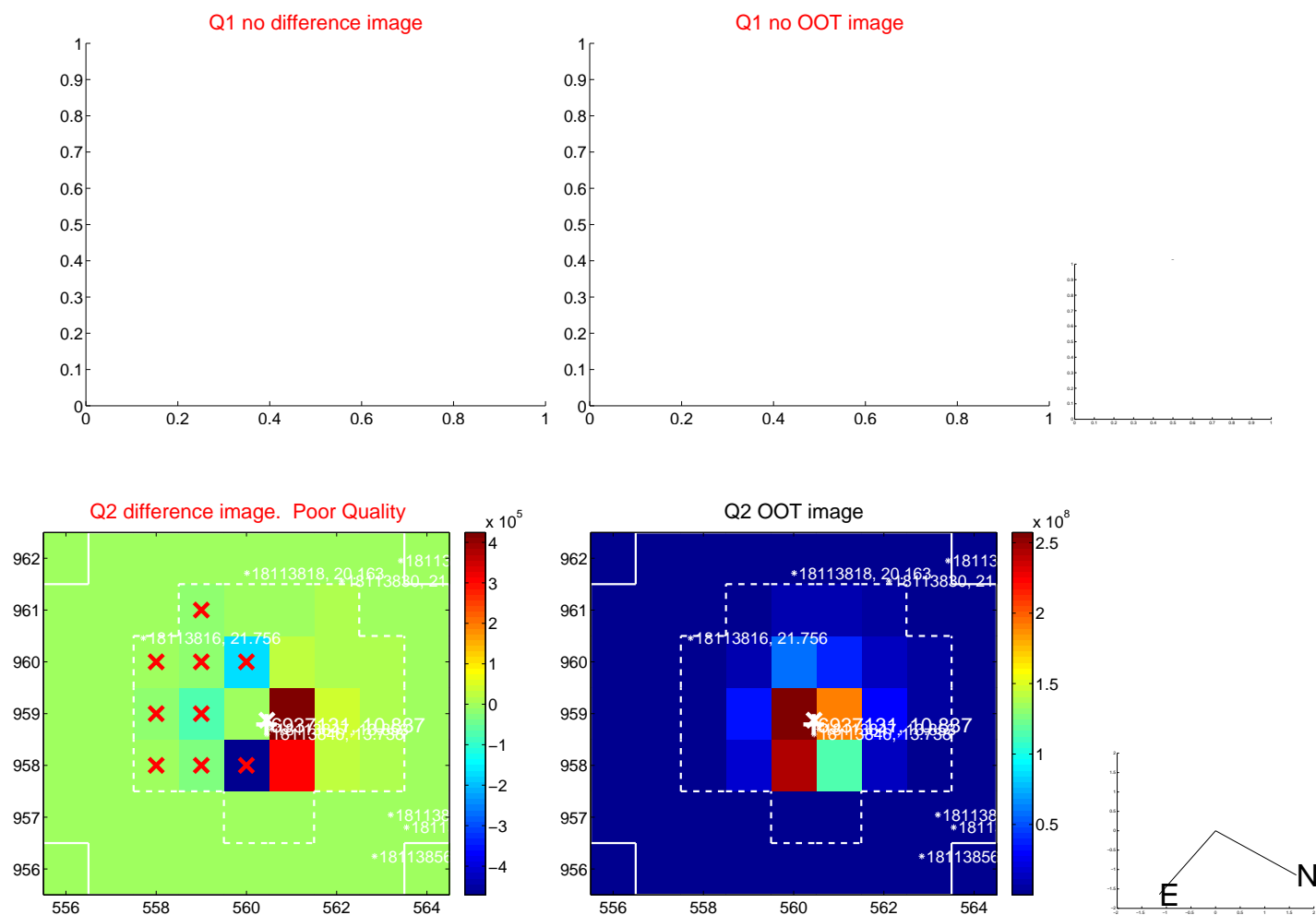
The direct PRF centroid is offset from the target star catalog position by about 1.02 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b><math>4.624 \pm 0.774</math></b>	<b>5.98</b>	$-4.500 \pm 0.779$	$1.063 \pm 0.666$
PRF-fit source offset from KIC position	<b><math>3.972 \pm 1.028</math></b>	<b>3.86</b>	$-3.694 \pm 0.639$	$1.459 \pm 2.281$
photometric centroid source offset	$4.28 \pm 10.49$	0.41	$4.28 \pm 10.49$	$0.07 \pm 6.81$

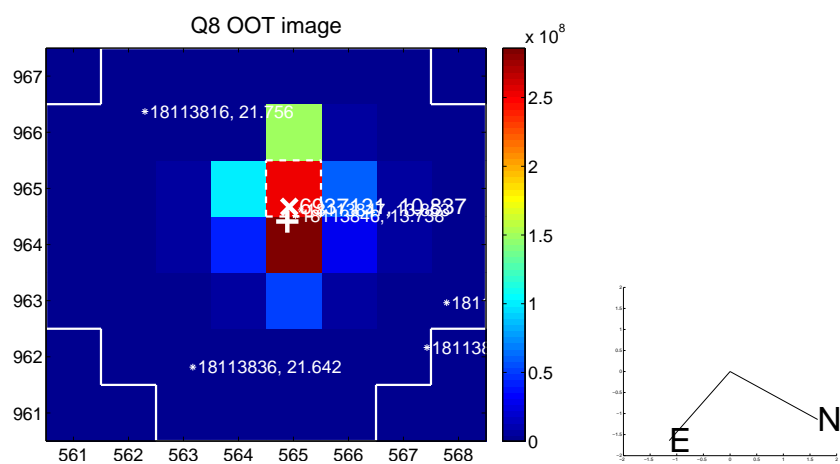
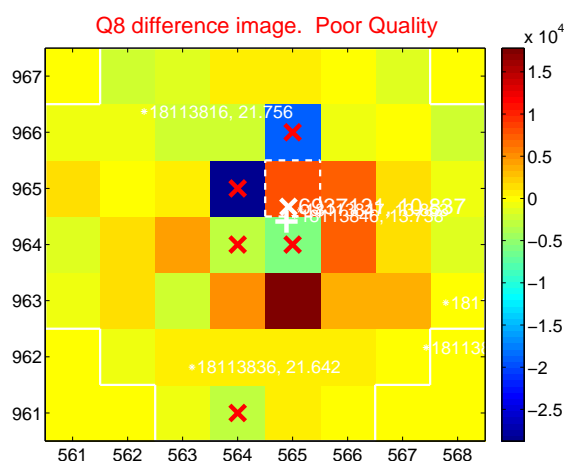
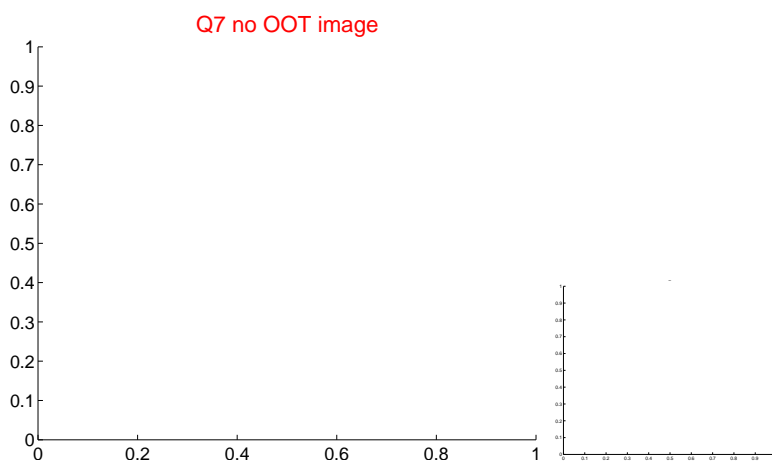
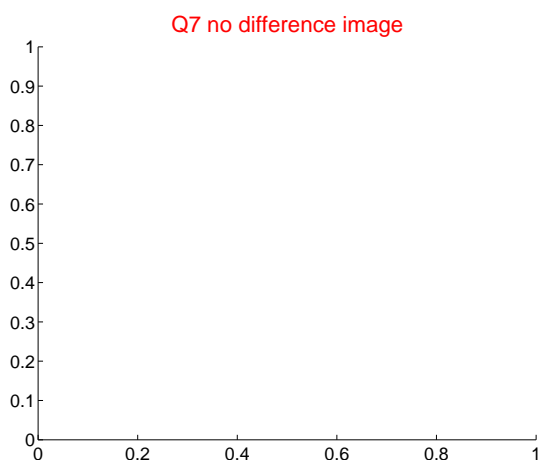
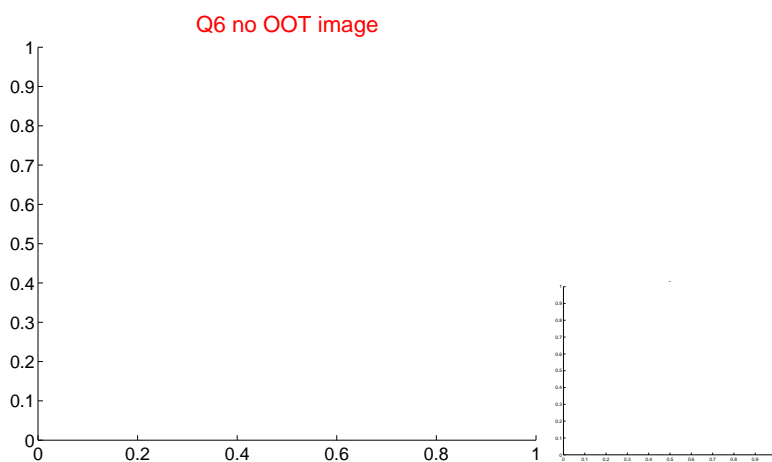
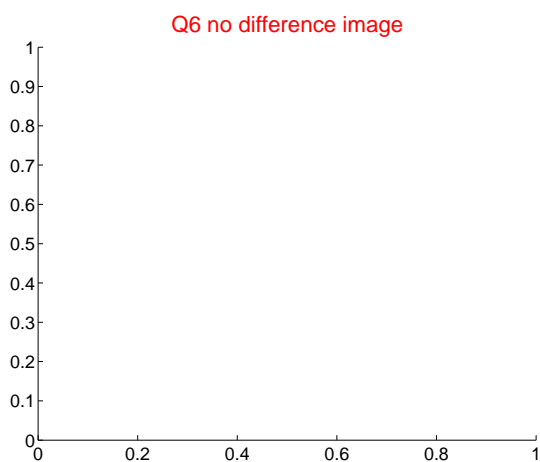
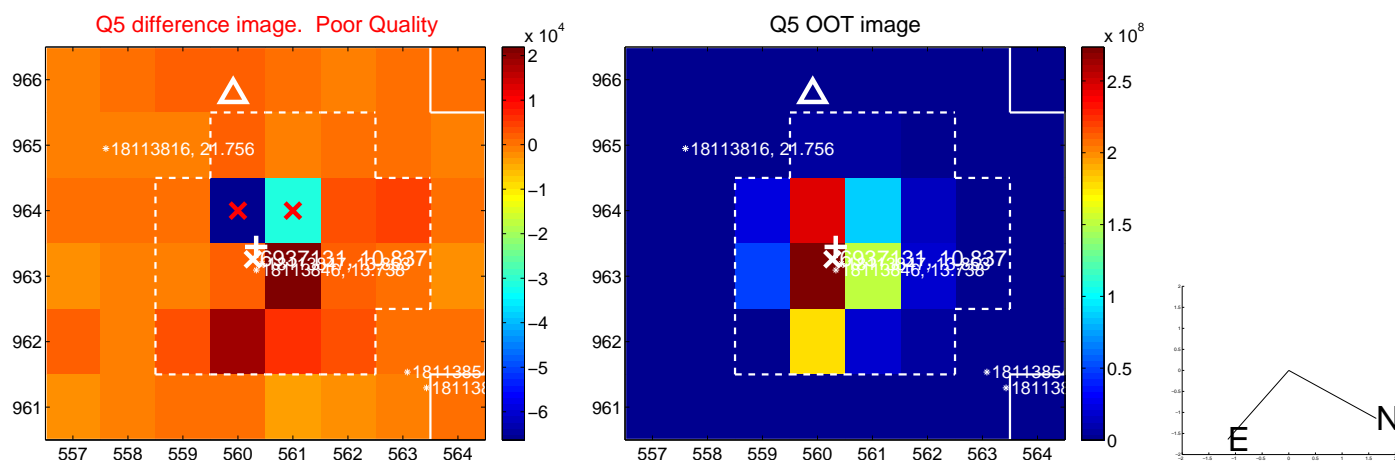


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

Q9 no difference image



Q9 no OOT image



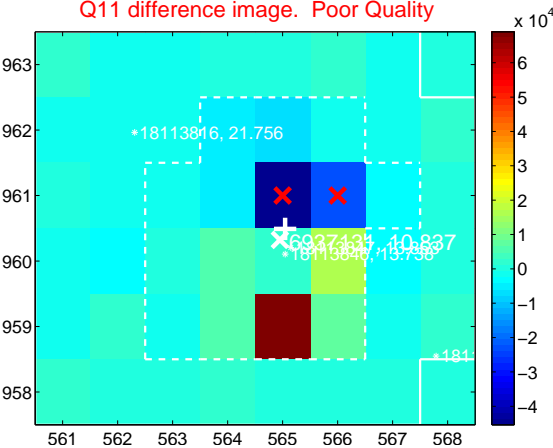
Q10 no difference image



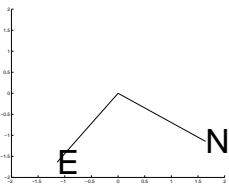
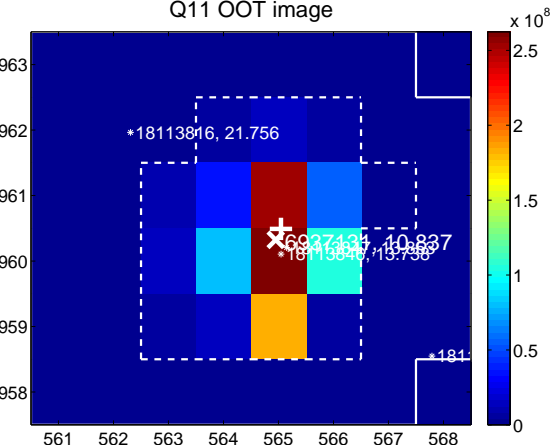
Q10 no OOT image



Q11 difference image. Poor Quality



Q11 OOT image



Q12 no difference image

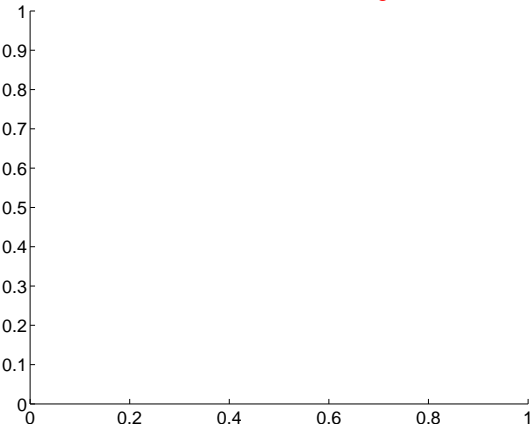


Q12 no OOT image

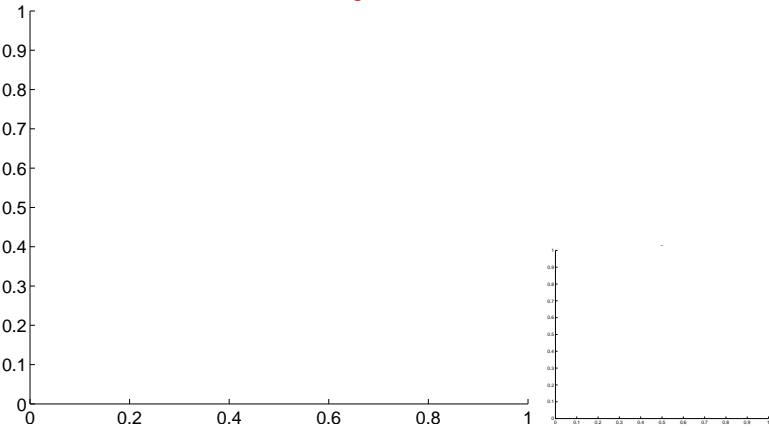


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

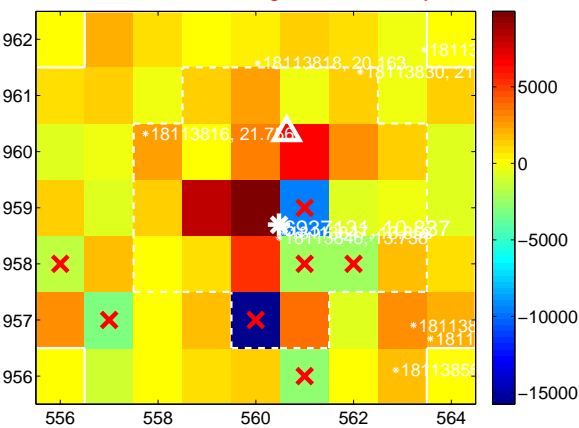
Q13 no difference image



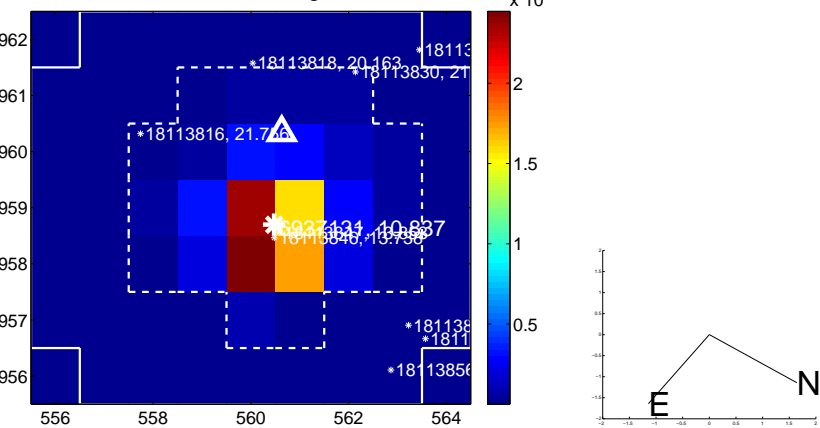
Q13 no OOT image



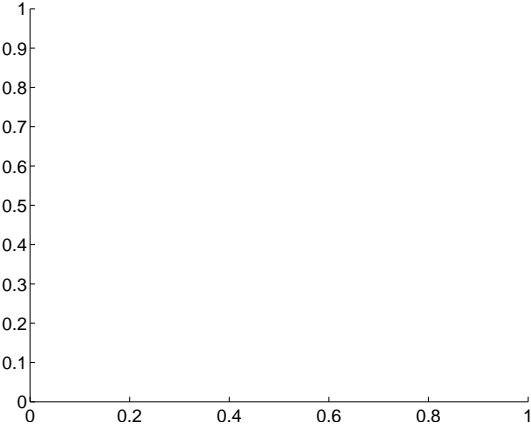
Q14 difference image. Poor Quality



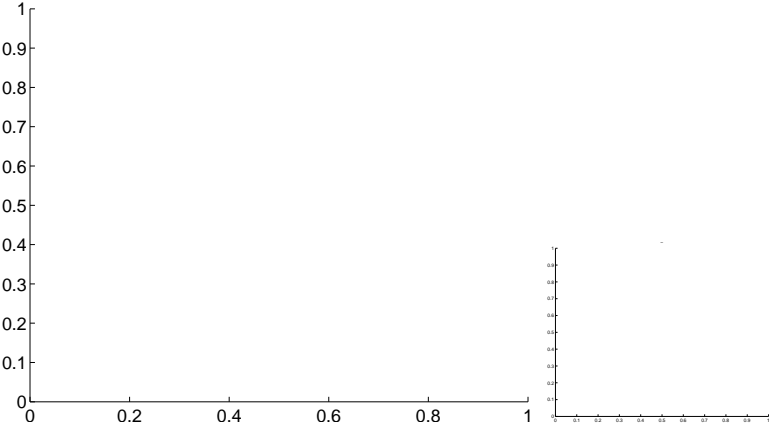
Q14 OOT image



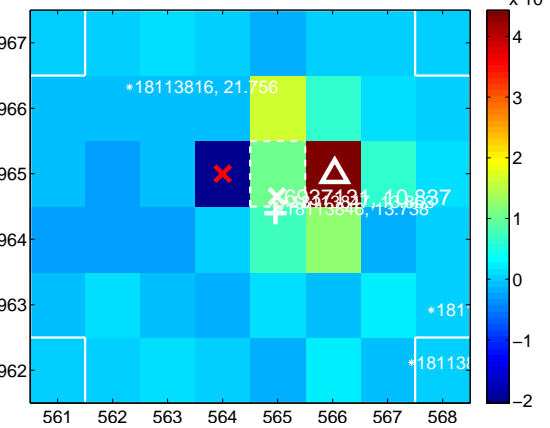
Q15 no difference image



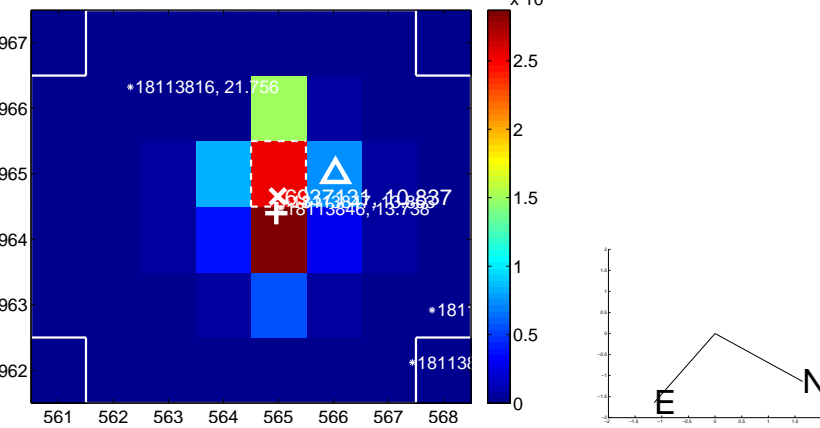
Q15 no OOT image



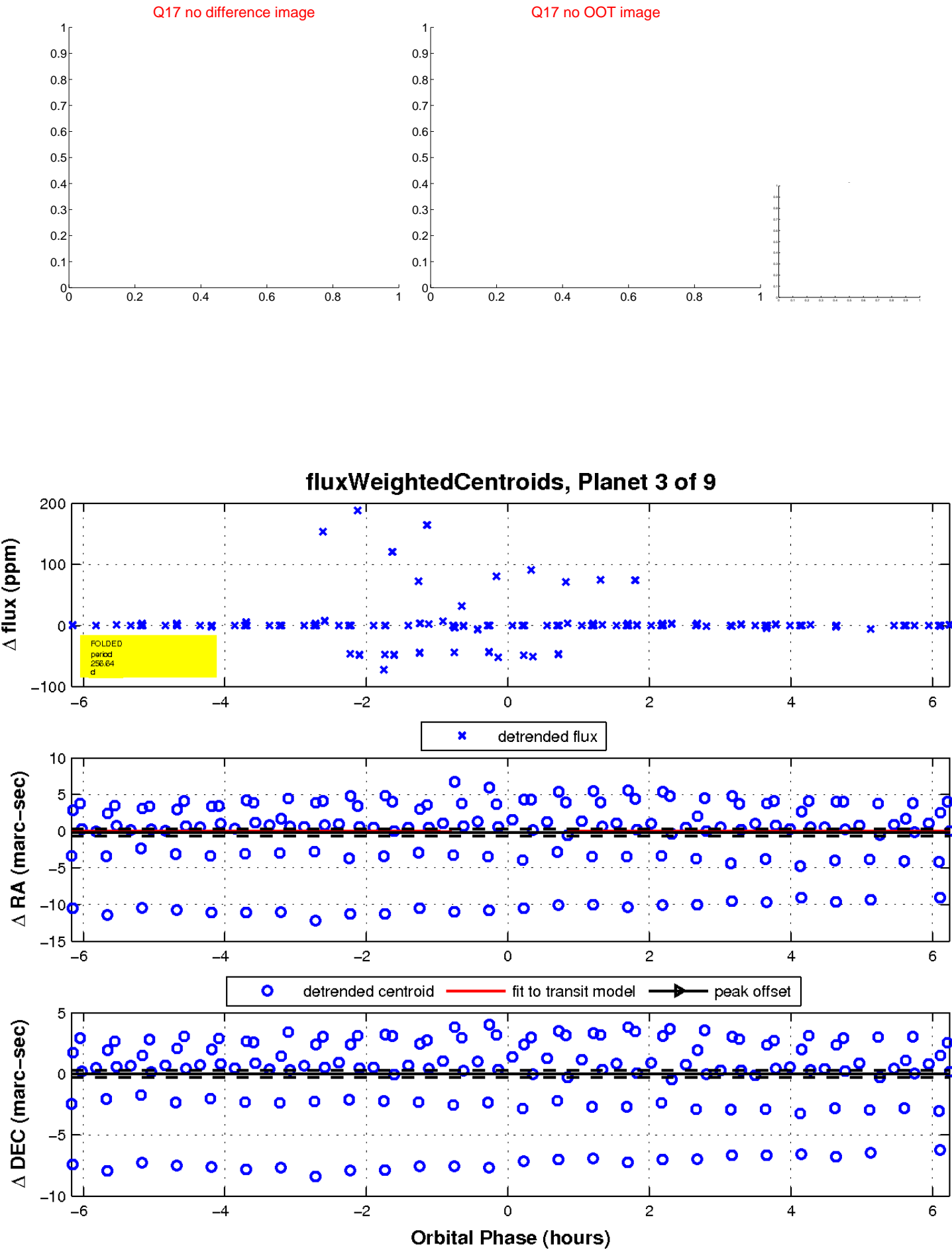
Q16 difference image



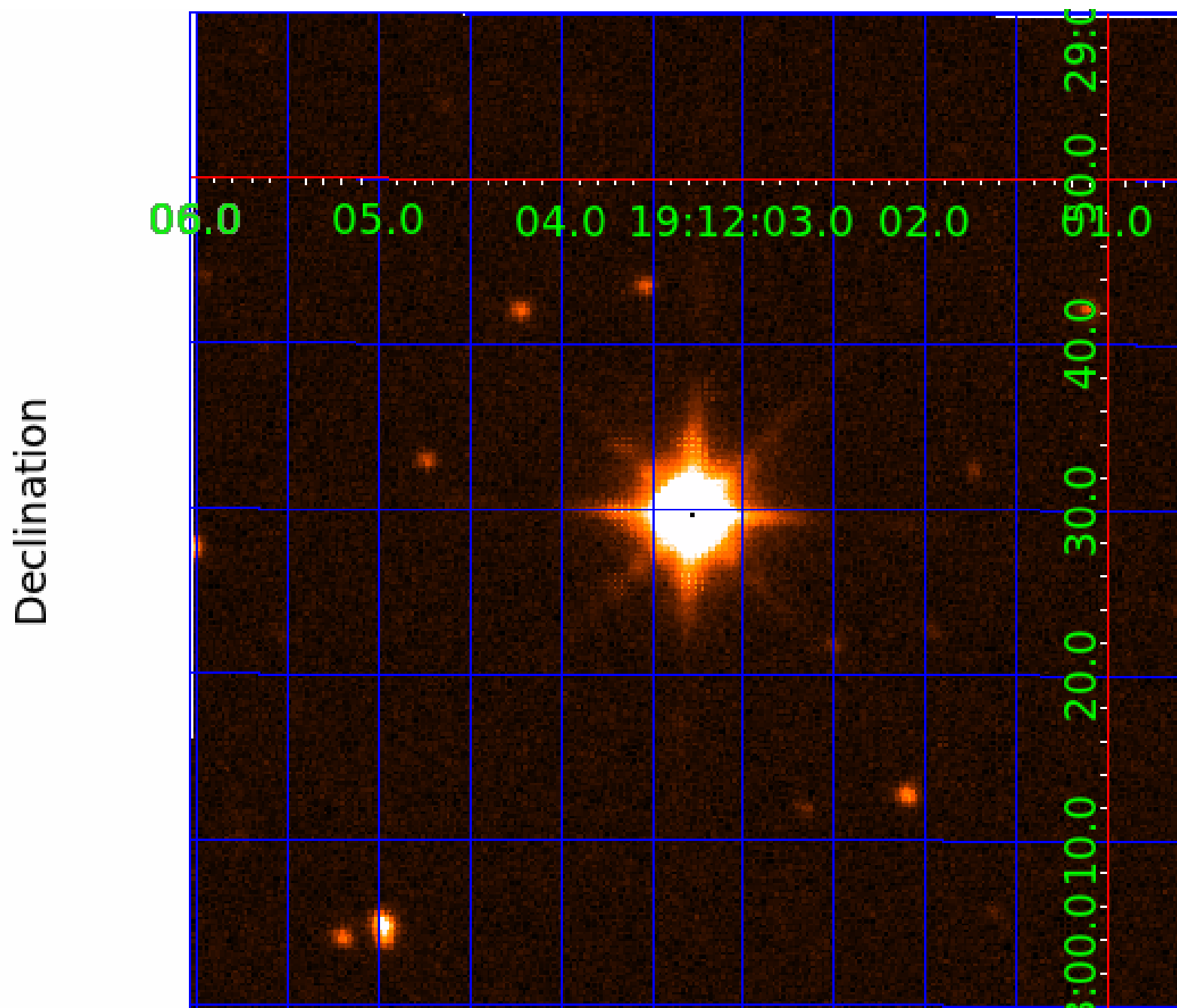
Q16 OOT image



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



UKIRT Image





# KIC 006937131

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006937131-01	OBS	No	117.103296	195.920780	51.3	1.665	38.7	31.5	48.35	3948	43.67	2597.65
006937131-02	OBS	No	358.203546	389.477540	24.1	8.007	19.9	8.5	48.35	3948	29.44	585.01
006937131-03	OBS	No	256.641148	253.452664	43.6	2.098	18.9	17.9	48.35	3948	43.44	912.51
006937131-04	OBS	No	176.008339	233.821327	2.2	1.876	20.1	1.3	48.35	3948	9.18	1508.79
006937131-05	OBS	No	211.915402	161.715255	33.5	9.582	17.7	11.1	48.35	3948	34.00	1177.94
006937131-06	OBS	No	326.304219	430.241376	62.8	13.565	16.5	16.5	48.35	3948	45.99	662.49
006937131-07	OBS	No	68.543331	164.278275	14.4	27.831	15.6	5.8	48.35	3948	27.28	5305.42
006937131-08	OBS	No	110.649092	187.850790	448.8	2.000	17.9	-1.0	48.35	3948	96.47	2801.62
006937131-09	OBS	No	80.018968	145.132211	42.0	2.520	17.7	12.5	48.35	3948	34.75	4316.01

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006937131-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_SKYE_ZUMA—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
006937131-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_ZUMA—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_SATURATED
006937131-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
006937131-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
006937131-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_ZUMA—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_SATURATED
006937131-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_SATURATED
006937131-07	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
006937131-08	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
006937131-09	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—CENT_SATURATED

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

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

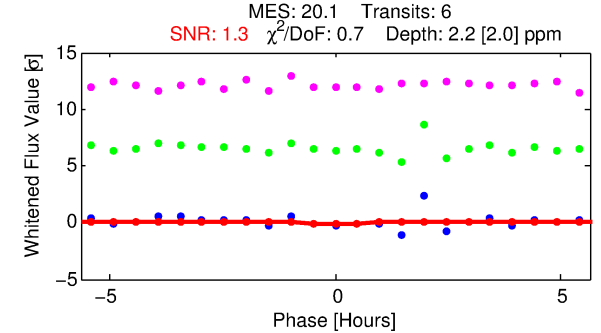
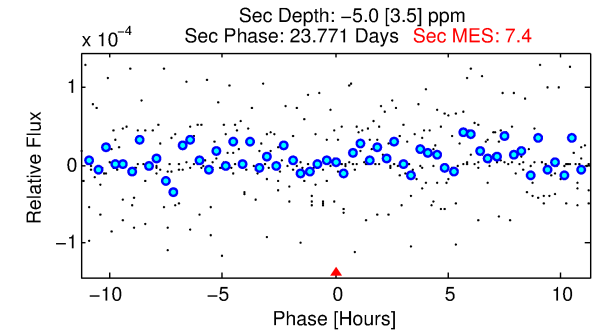
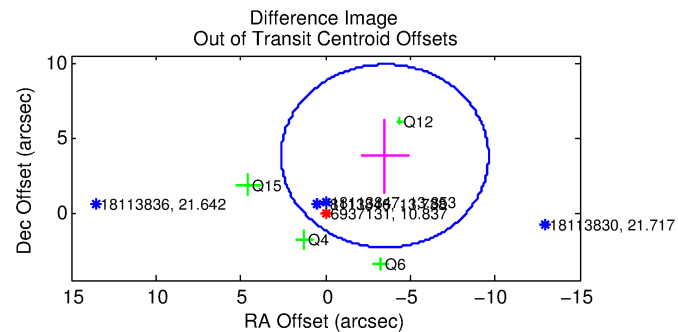
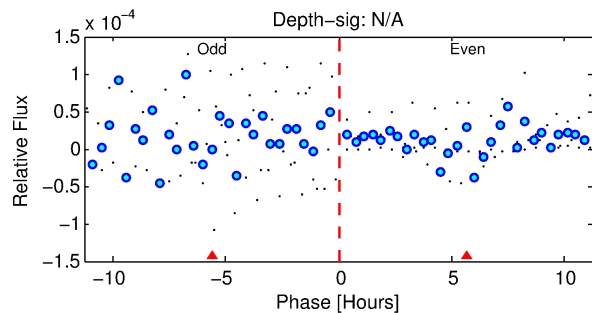
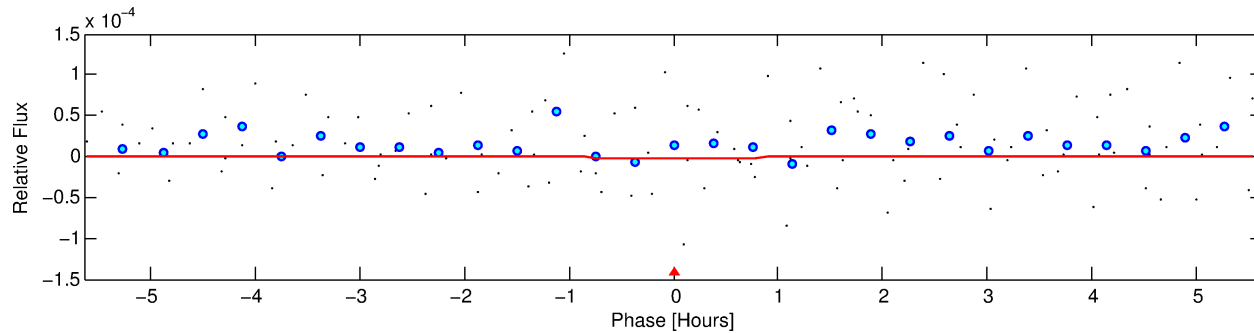
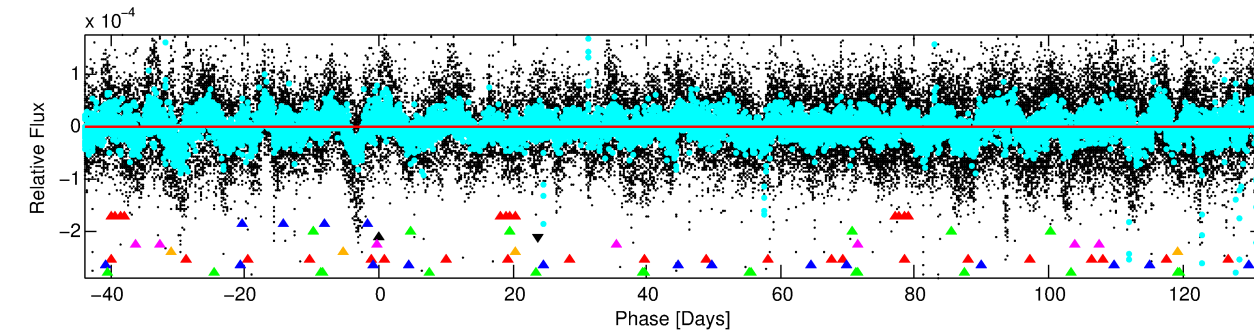
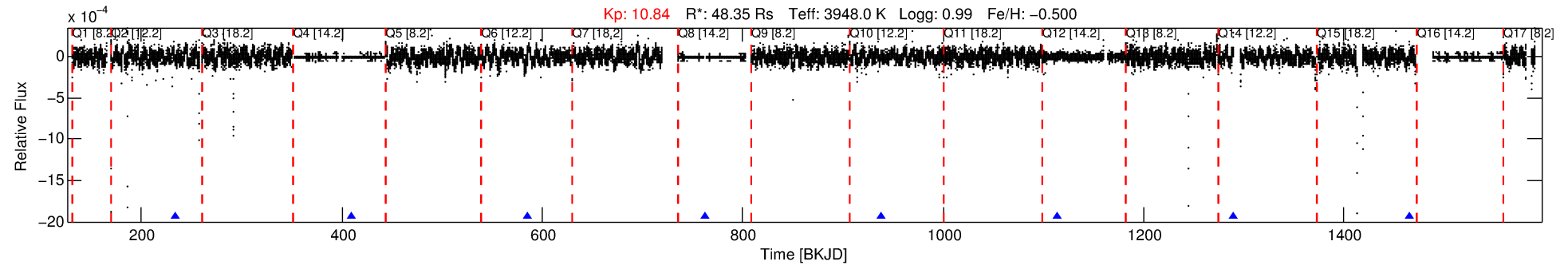
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 006937131-04

No Significant Match Found

# DV One-Page Summary

KIC: 6937131 Candidate: 4 of 9 Period: 176.008 d



## DV Fit Results:

Period = 176.00834 [0.00896] d  
Epoch = 233.8213 [0.0244] BKJD  
Rp/R\* = 0.0017 [0.0102]  
a/R\* = 306.87 [5693.17]  
b = 0.91 [4.07]  
Seff = 1508.79 [337.74]  
Teff = 1589 [89] K  
Rp = 9.18 [53.74] Re  
a = 0.5808 [0.1167] AU  
Ag = N/A  
Teffp = N/A

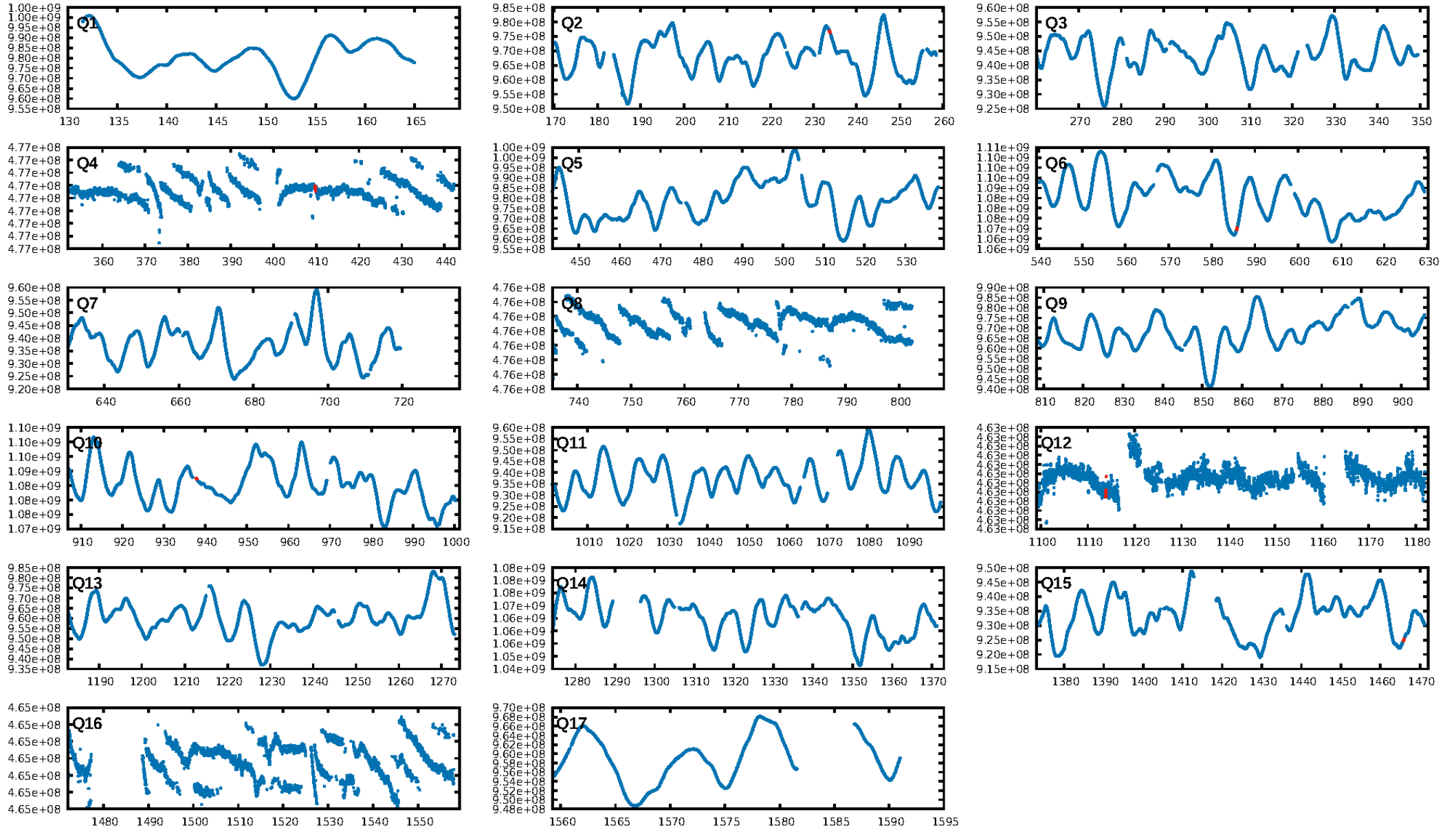
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [563.54]  
LongPeriod-sig: 100.0% [88.26]  
ModelChiSquare2-sig: 83.7%  
ModelChiSquareGof-sig: 94.5%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [6/6]  
GhostDiagnostic-chr: N/A  
Centroid-sig: N/A  
Centroid-so: N/A  
OotOffset-rm: 5.155 arcsec [2.53]  
KicOffset-rm: 5.016 arcsec [2.15]  
OotOffset-st: 1/1/2/0 [4]  
KicOffset-st: 1/1/2/0 [4]  
DiffImageQuality-fgm: 0.50 [2/4]  
DiffImageOverlap-fno: 0.60 [3/5]

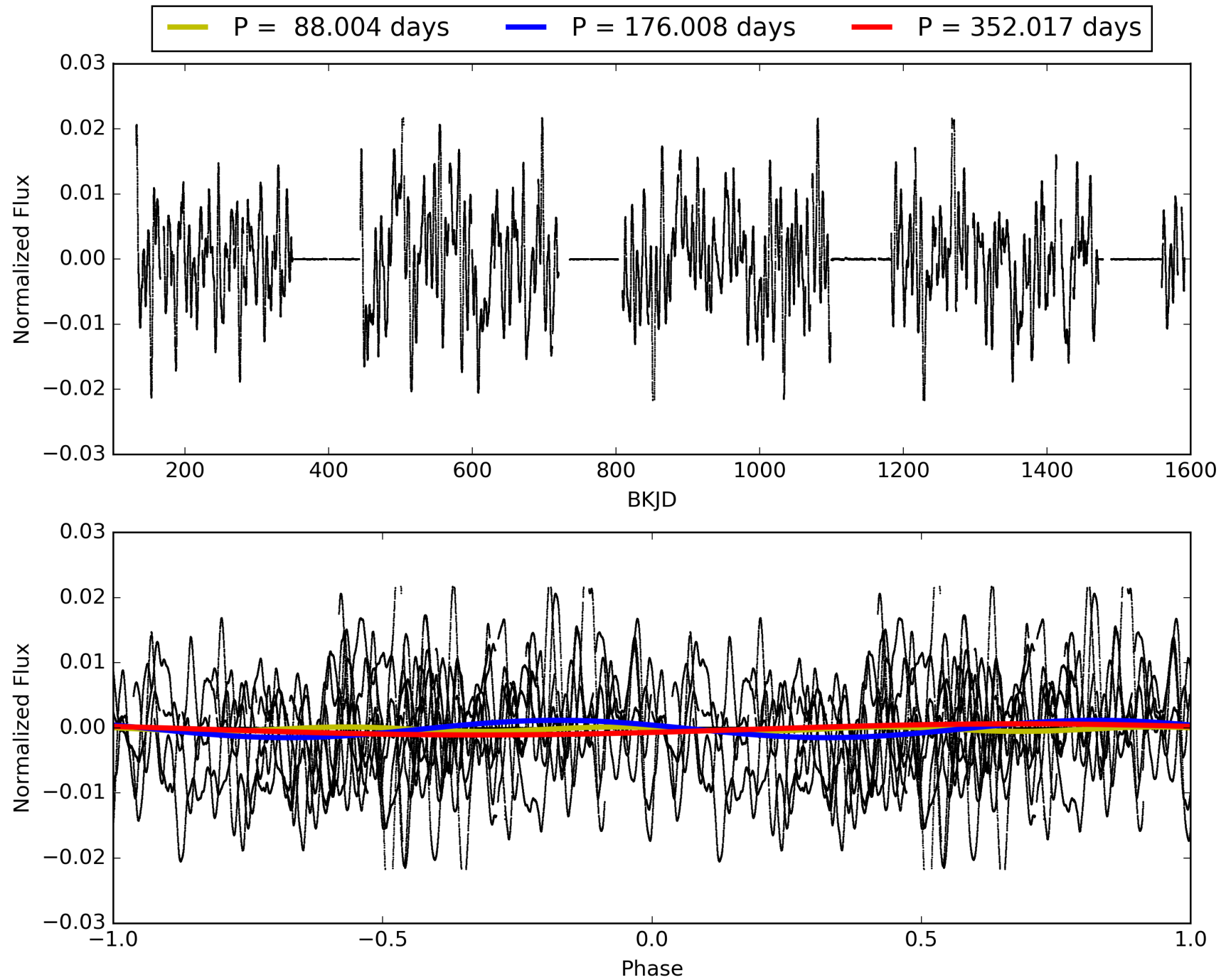
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 00:47:09 Z

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

# TCE 006937131-04, PDC Light Curves

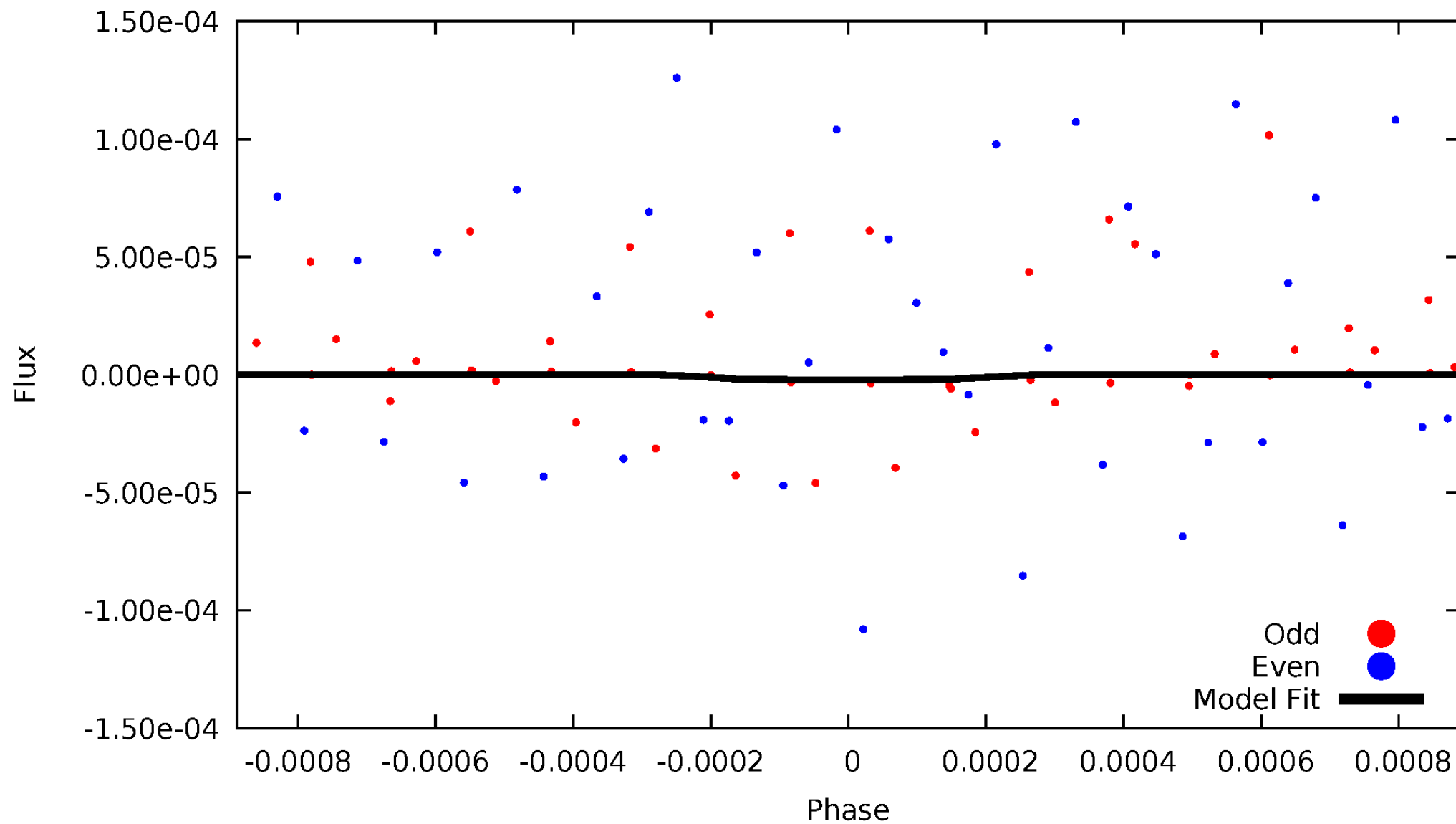


# TCE 006937131-04



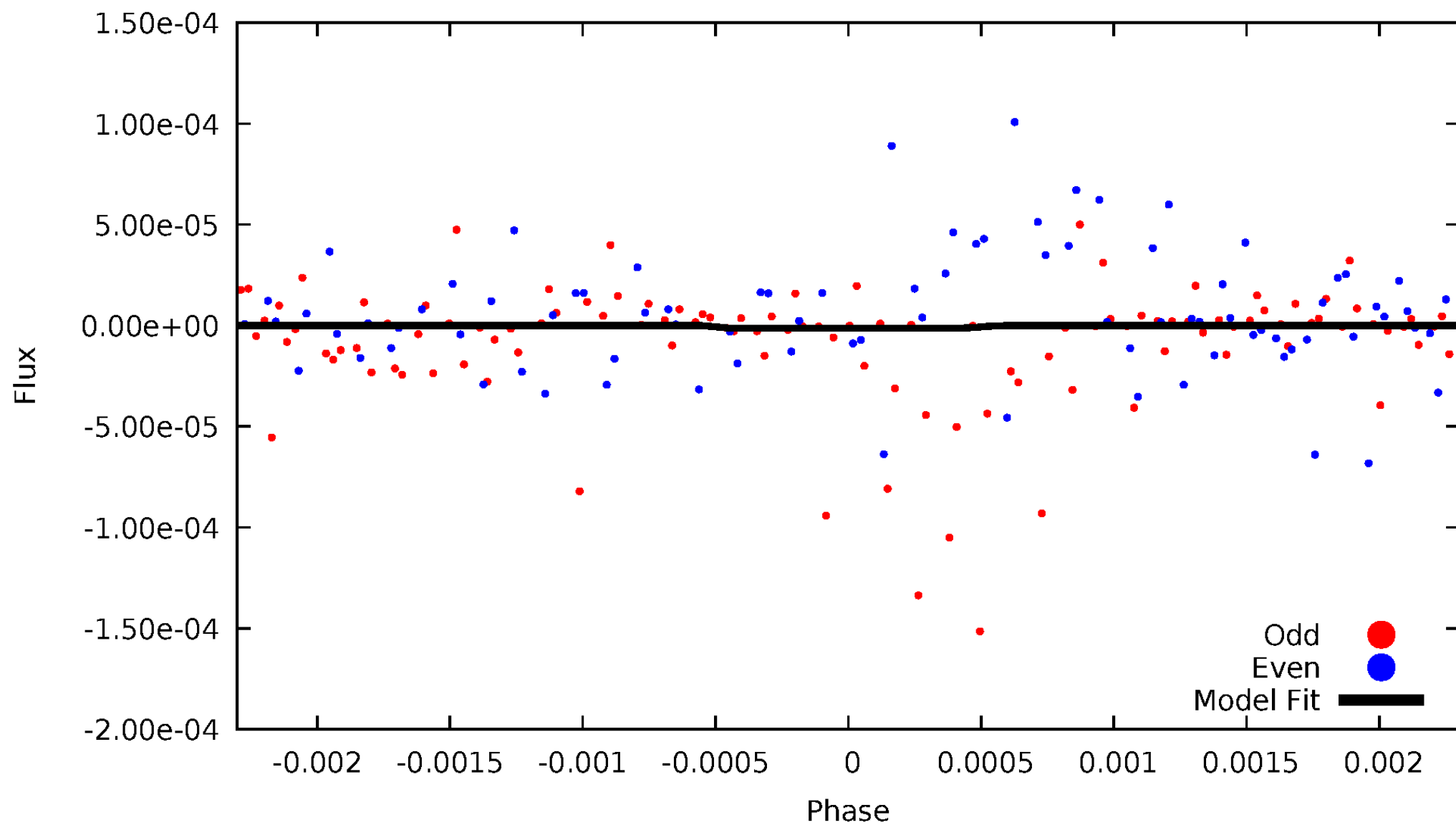
# DV Odd/Even

TCE 006937131-04



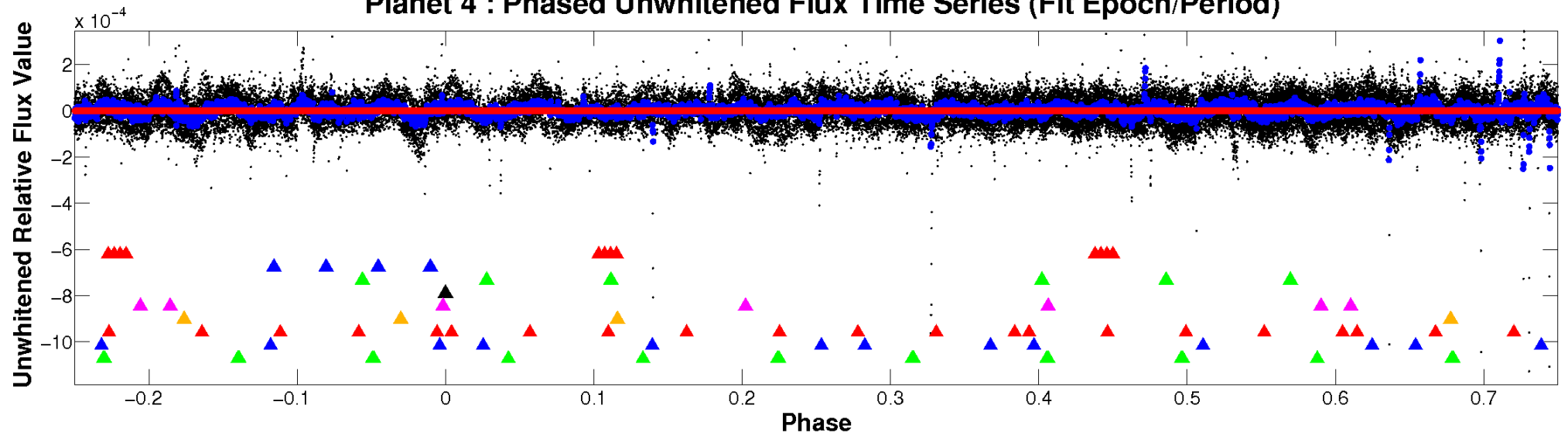
# ALT Odd/Even

TCE 006937131-04

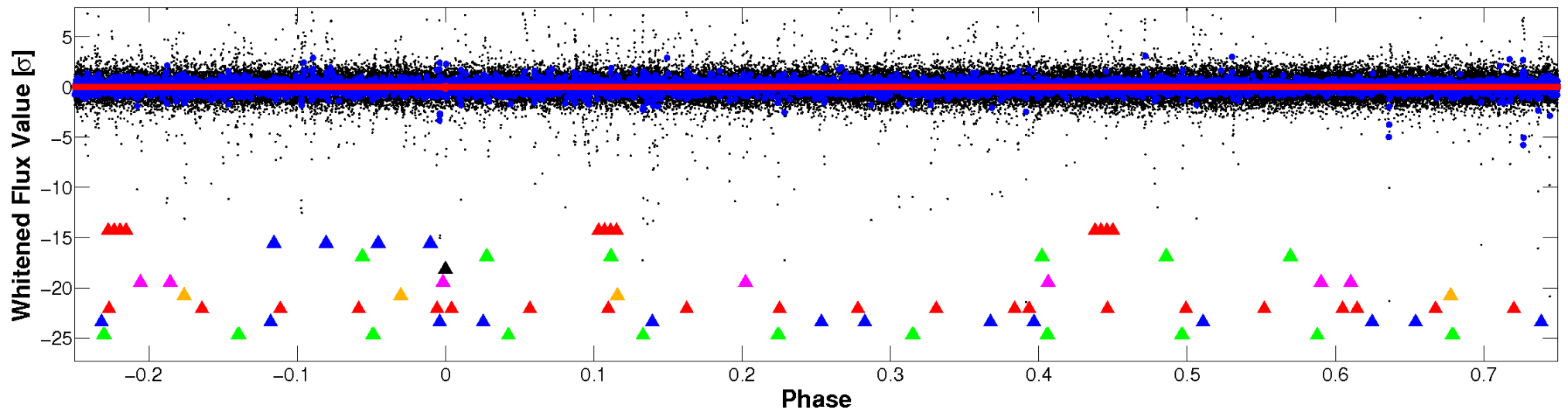


# Non-Whitened Vs. Whitened Light Curve

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

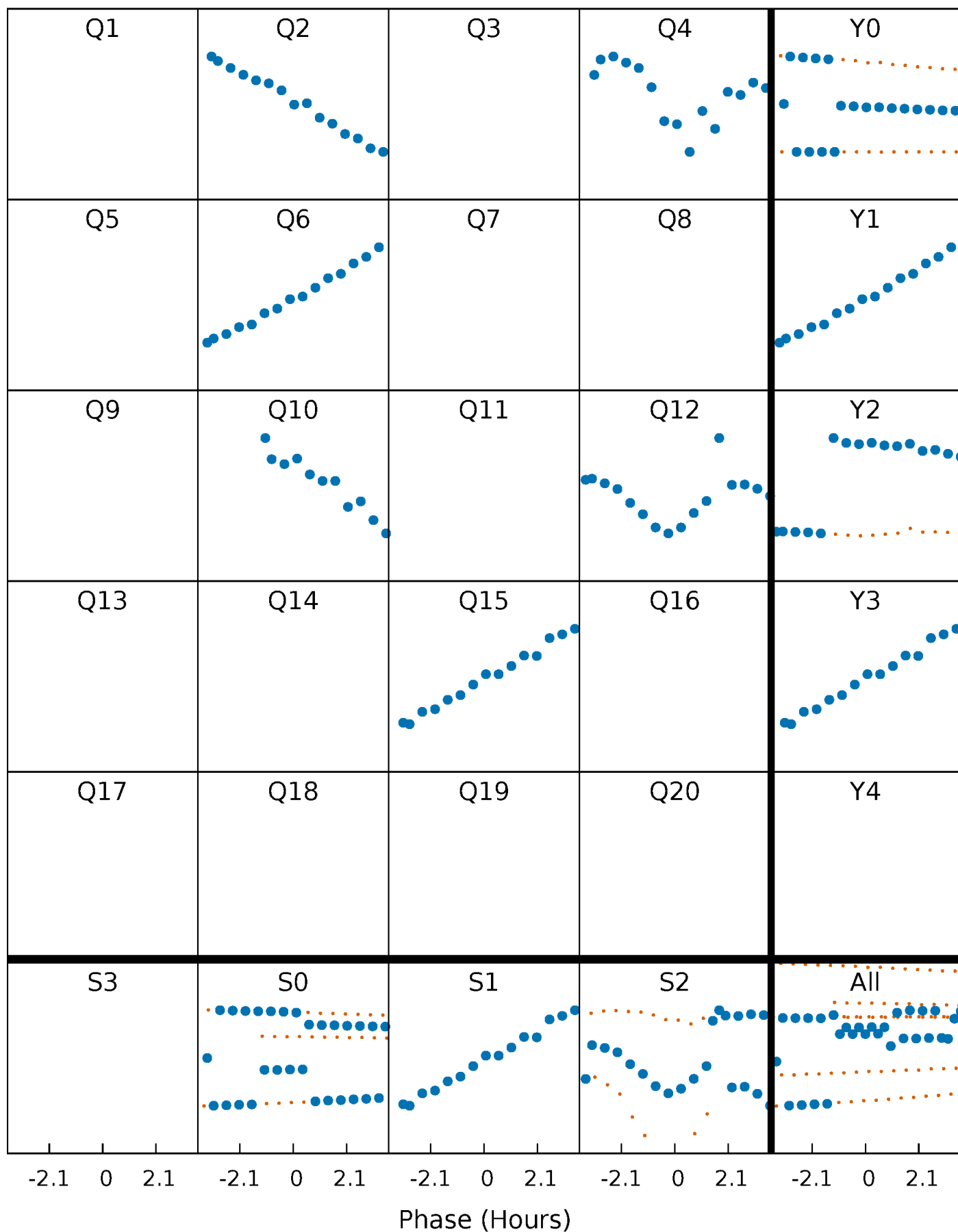


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

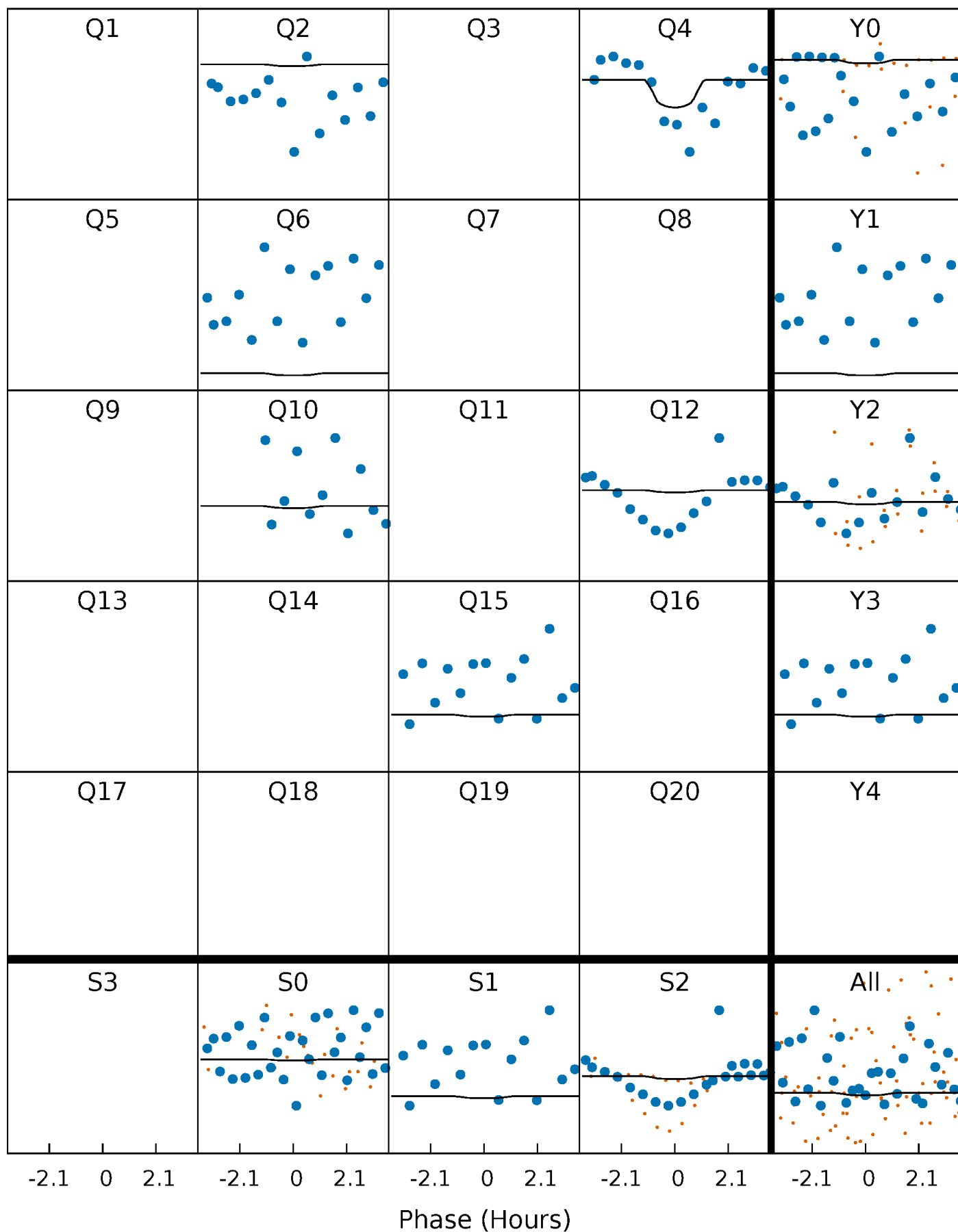
TCE 006937131-04 P=176.008339 Days  $T_0=233.821327$  (BKJD)





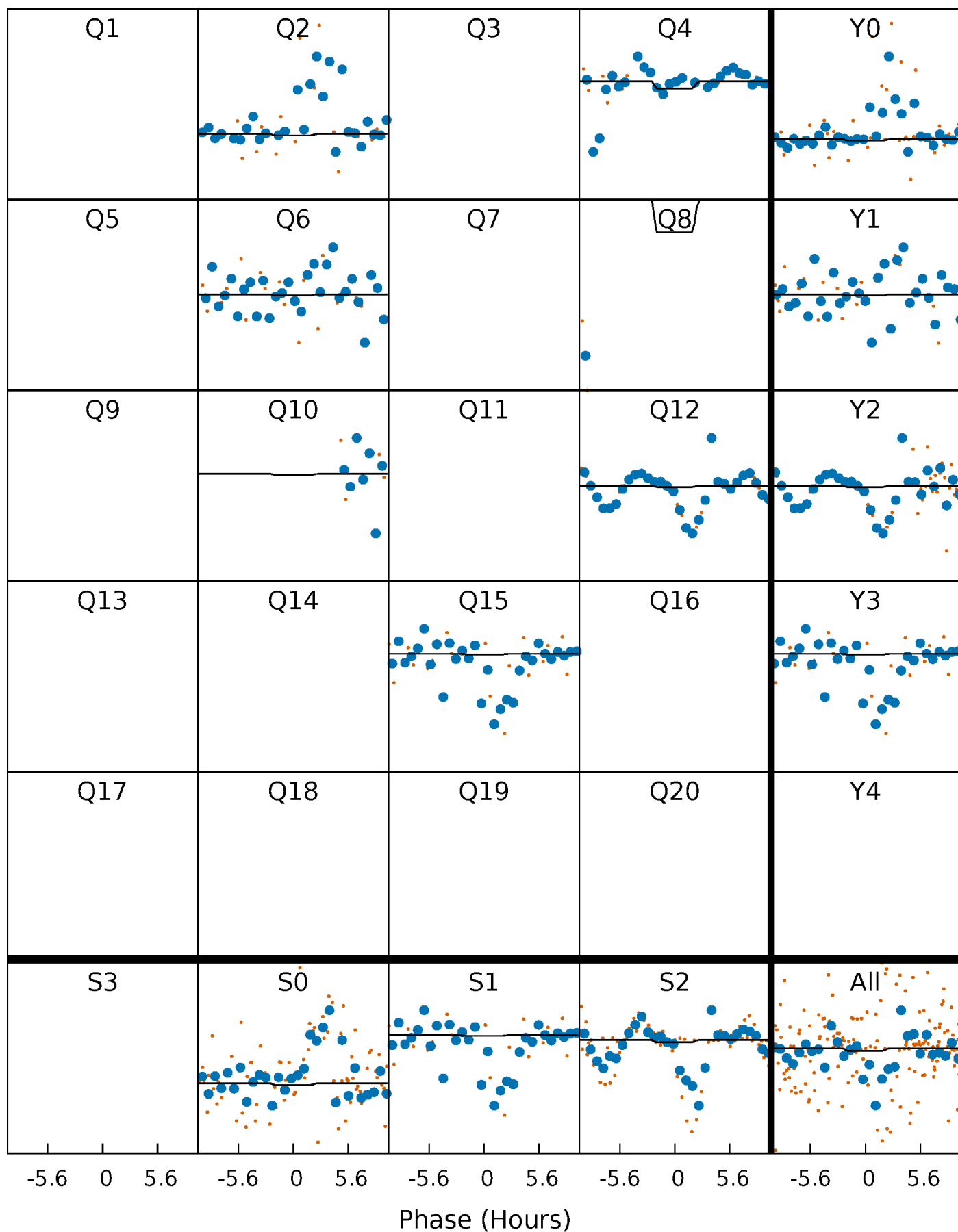
# DV Quarter-Phased Transit Curves

TCE 006937131-04 P=176.008339 Days  $T_0=233.821327$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

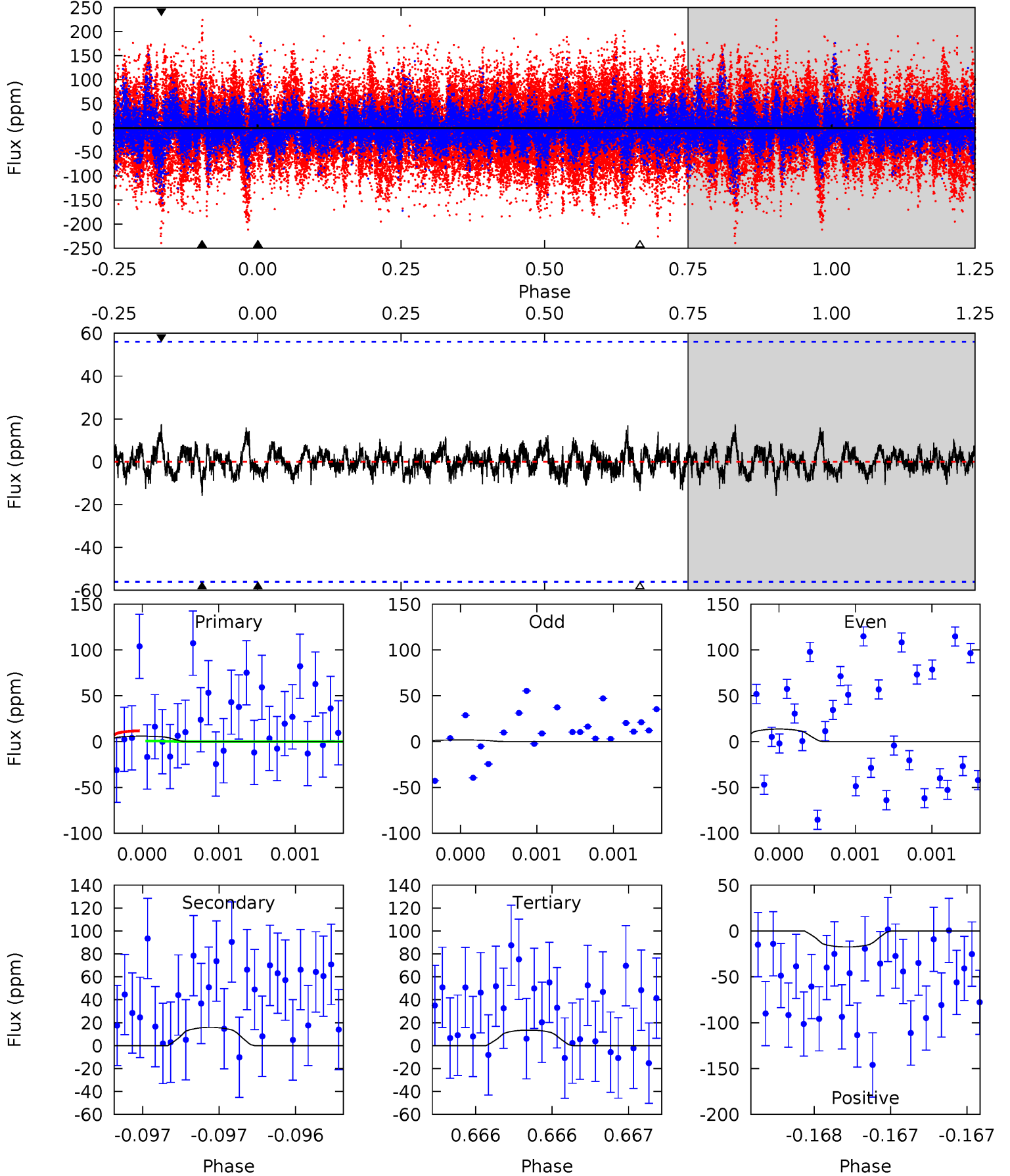
TCE 006937131-04 P=176.181164 Days  $T_0=232.876956$  (BKJD)



# DV Model-Shift Uniqueness Test

006937131-04,  $P = 176.008339$  Days,  $E = 57.812988$  Days

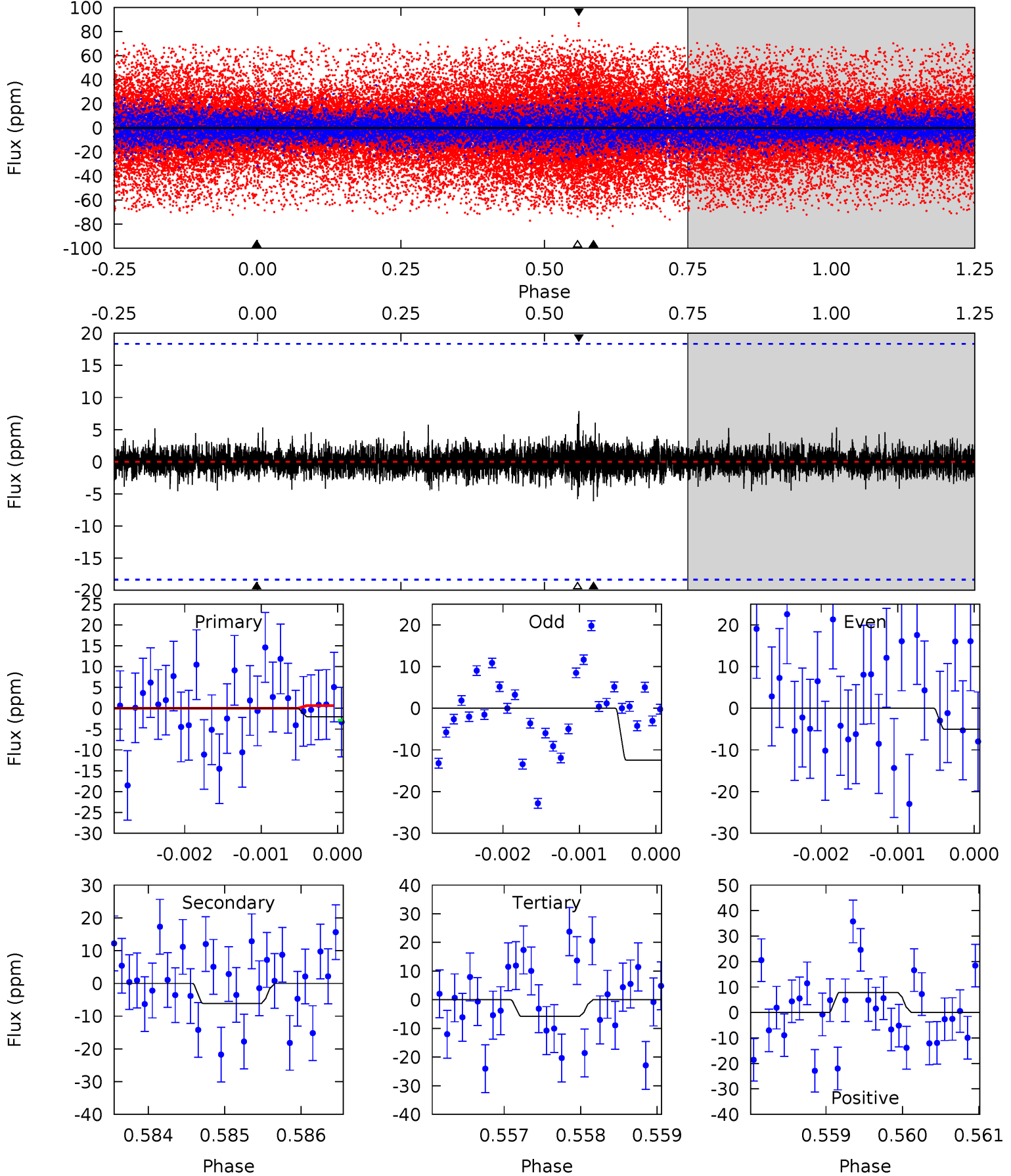
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0.59	1.58	1.35	1.74	5.57	3.48	0.44	-0.76	-1.15	0.23	-0.16	0.60	1.20	0.52	0.54



# Alt Model-Shift Uniqueness Test

006937131-04, P = 176.181164 Days, E = 56.695792 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
0.60	1.81	1.72	2.34	5.44	3.27	0.38	-1.11	-1.73	0.10	-0.52	1.10	14.3	0.56	0.33



### Stellar Parameters For KIC 006937131

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$3948^{+87}_{-71}$	$0.995^{+0.033}_{-0.027}$	$-0.500^{+0.200}_{-0.150}$	$48.351^{+14.464}_{-1.523}$	$0.842^{+0.559}_{-0.029}$	$0.000^{+0.000}_{-0.000}$
	+2%/-2%	+3%/-3%	+40%/-30%	+30%/-3%	+66%/-3%	+9%/-24%
Source	PHO56	AST56	PHO56	DSEP		

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

### Secondary Eclipse Parameters for KIC 006937131-04 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-16 \pm 10$	$38.55^{+40.36}_{-26.37}$	$2214^{+56}_{-49}$	$3043^{+1593}_{-5161}$	$1.571^{+15.492}_{-1.343}$
Alt.	$-6 \pm 3$	$41.24^{+42.58}_{-27.68}$	$2217^{+55}_{-48}$	$2530^{+1280}_{-4890}$	$0.619^{+5.029}_{-0.497}$

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

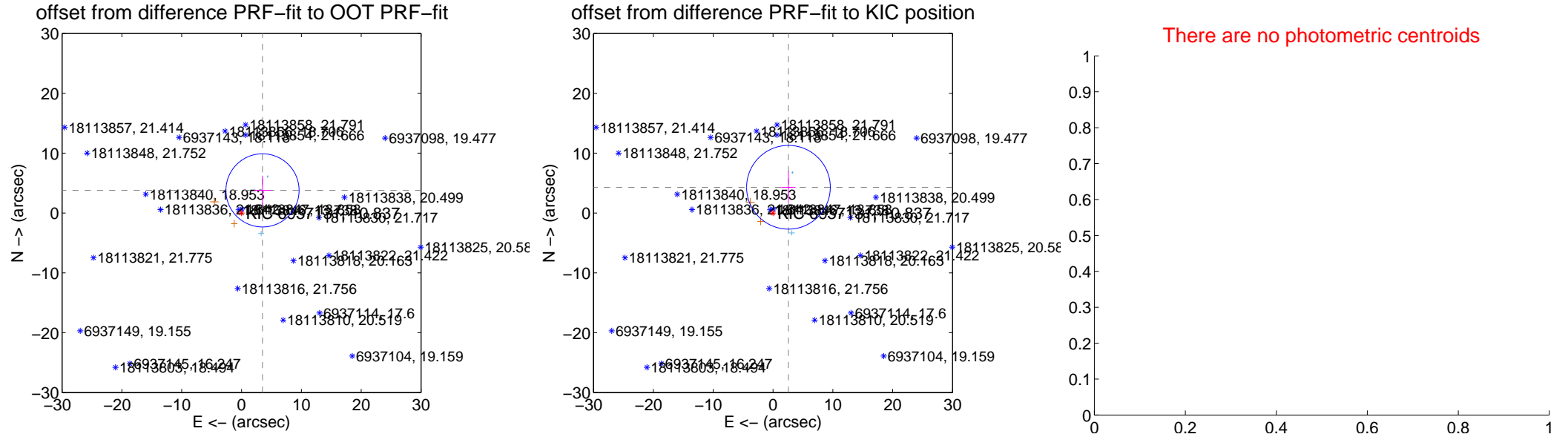
## DV Centroid Data

Supplemental centroid analysis for 006937131-04. **Kepler magnitude: 10.84.** Transit SNR 1.30

**There are 2 quarters with good PRF difference image offsets**

The direct PRF centroid is offset from the target star catalog position by about 0.77 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$5.155 \pm 2.038$	2.53	$-3.503 \pm 1.388$	$3.782 \pm 2.463$
PRF-fit source offset from KIC position	$5.016 \pm 2.331$	2.15	$-2.581 \pm 1.187$	$4.301 \pm 2.624$
photometric centroid source offset	—	—	—	—



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.

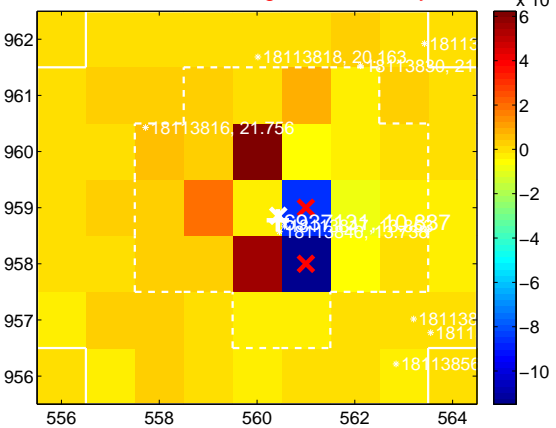
Q1 no difference image



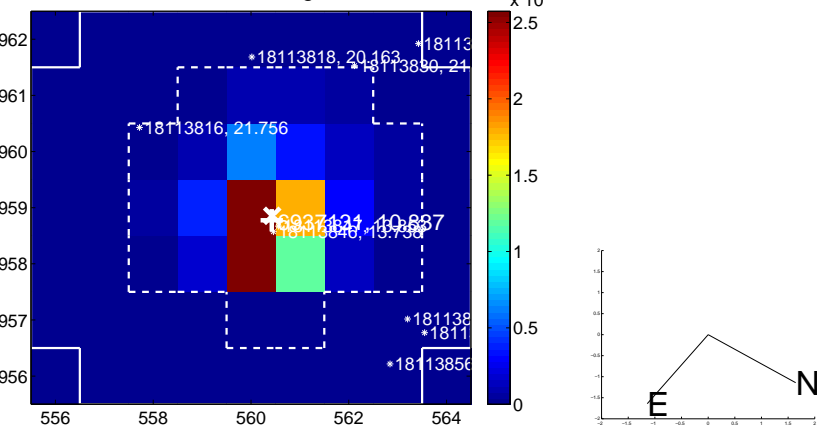
Q1 no OOT image



Q2 difference image. Poor Quality



Q2 OOT image



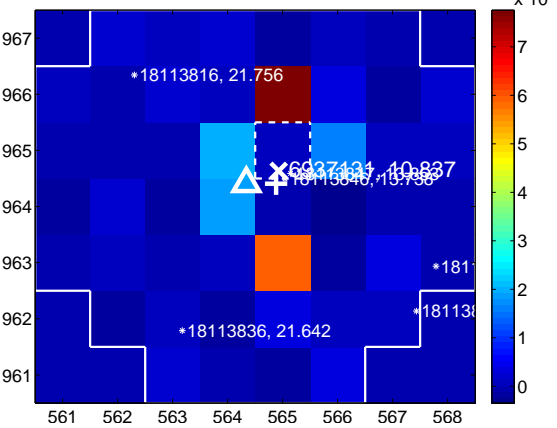
Q3 no difference image



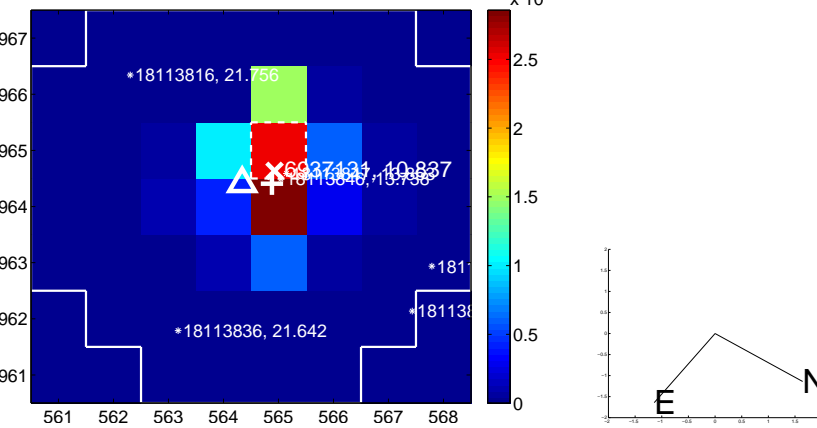
Q3 no OOT image



Q4 difference image. Poor Quality



Q4 OOT image



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

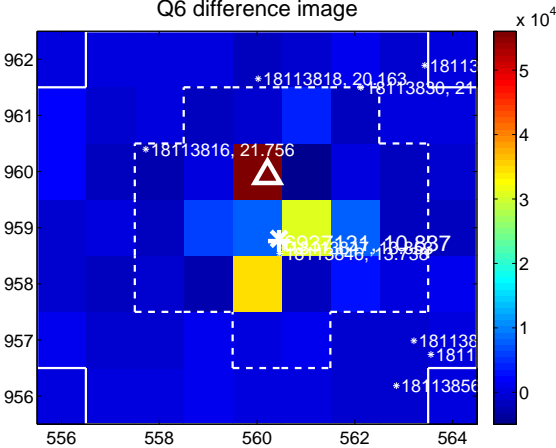
Q5 no difference image



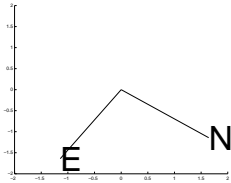
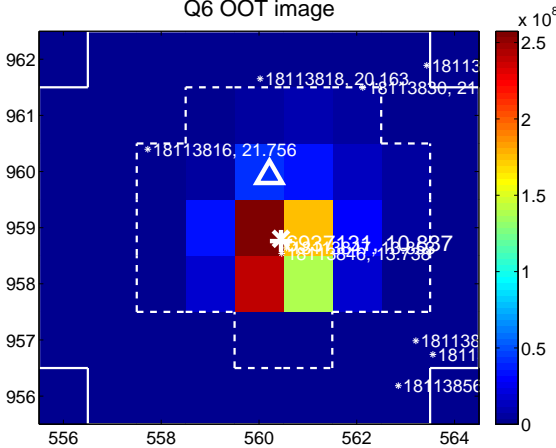
Q5 no OOT image



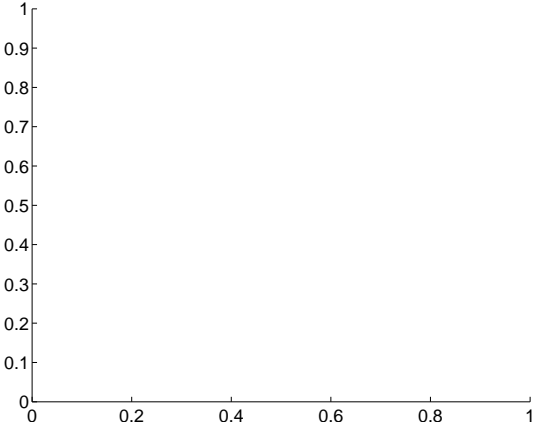
Q6 difference image



Q6 OOT image



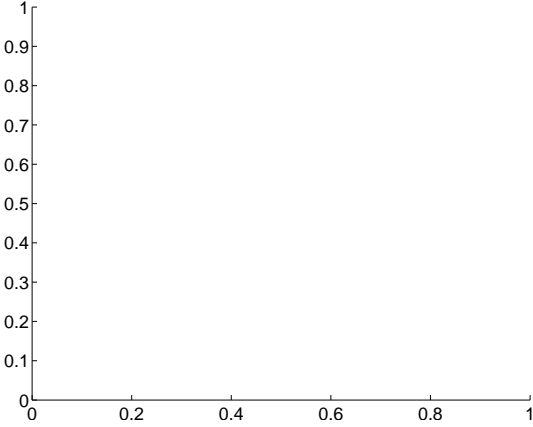
Q7 no difference image



Q7 no OOT image



Q8 no difference image

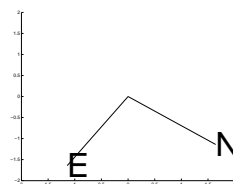
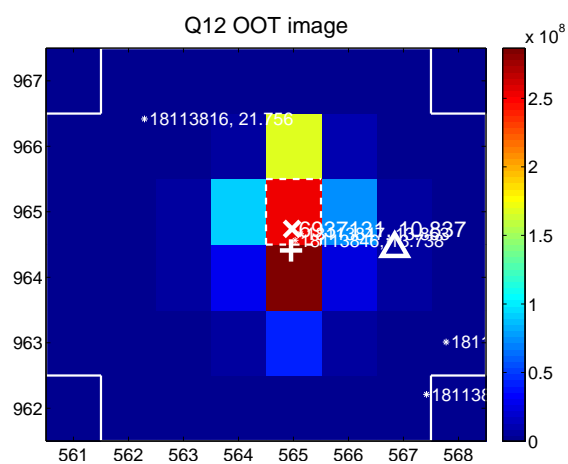
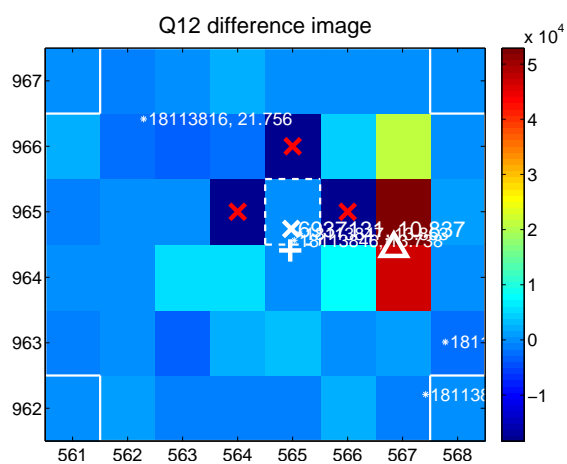


Q8 no OOT image





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.

Q13 no difference image



Q13 no OOT image



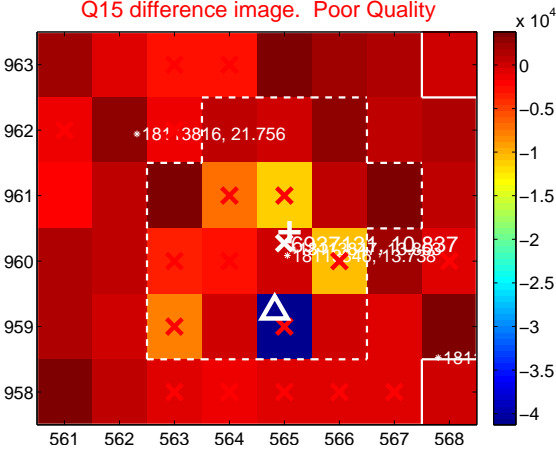
Q14 no difference image



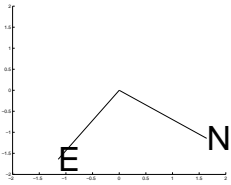
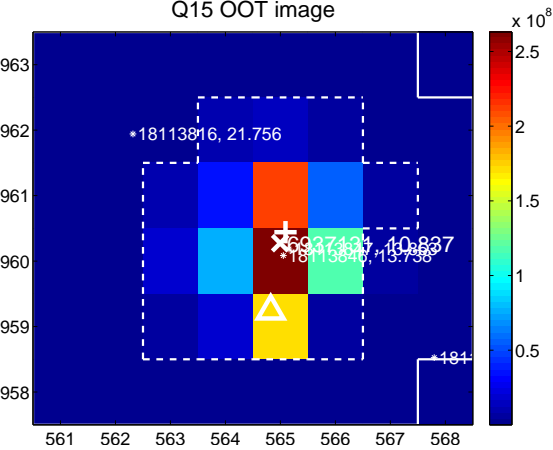
Q14 no OOT image



Q15 difference image. Poor Quality



Q15 OOT image



Q16 no difference image



Q16 no OOT image

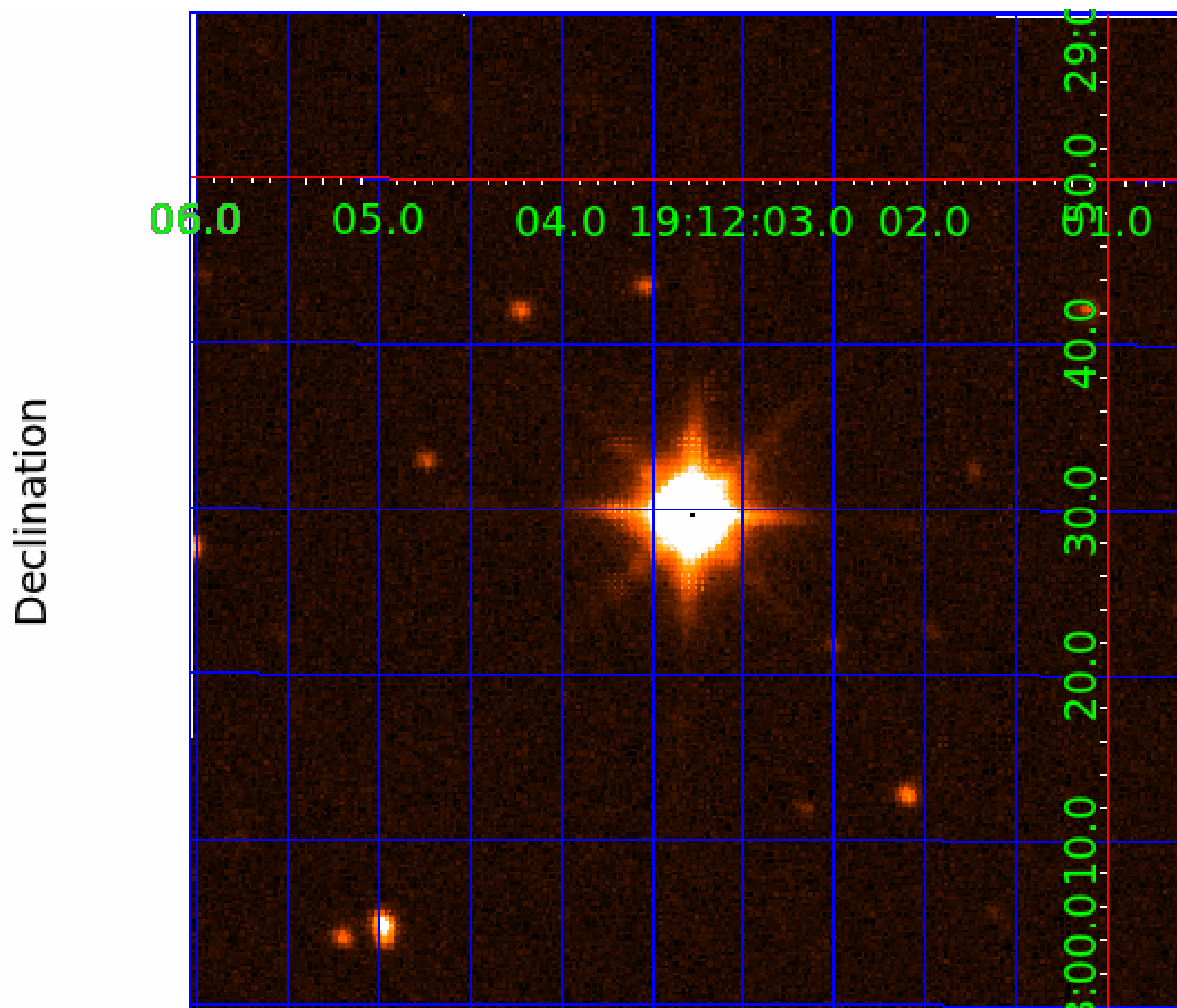


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



folded centroid time series figure for this object.

UKIRT Image



# KIC 006937131

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006937131-01	OBS	No	117.103296	195.920780	51.3	1.665	38.7	31.5	48.35	3948	43.67	2597.65
006937131-02	OBS	No	358.203546	389.477540	24.1	8.007	19.9	8.5	48.35	3948	29.44	585.01
006937131-03	OBS	No	256.641148	253.452664	43.6	2.098	18.9	17.9	48.35	3948	43.44	912.51
006937131-04	OBS	No	176.008339	233.821327	2.2	1.876	20.1	1.3	48.35	3948	9.18	1508.79
006937131-05	OBS	No	211.915402	161.715255	33.5	9.582	17.7	11.1	48.35	3948	34.00	1177.94
006937131-06	OBS	No	326.304219	430.241376	62.8	13.565	16.5	16.5	48.35	3948	45.99	662.49
006937131-07	OBS	No	68.543331	164.278275	14.4	27.831	15.6	5.8	48.35	3948	27.28	5305.42
006937131-08	OBS	No	110.649092	187.850790	448.8	2.000	17.9	-1.0	48.35	3948	96.47	2801.62
006937131-09	OBS	No	80.018968	145.132211	42.0	2.520	17.7	12.5	48.35	3948	34.75	4316.01

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006937131-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_SKYE_ZUMA—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
006937131-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_ZUMA—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_SATURATED
006937131-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
006937131-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
006937131-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_ZUMA—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_SATURATED
006937131-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_SATURATED
006937131-07	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
006937131-08	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
006937131-09	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—CENT_SATURATED

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

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

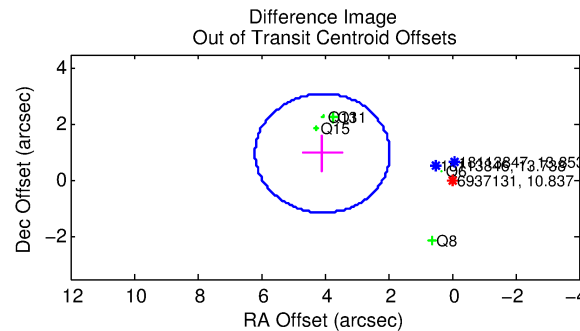
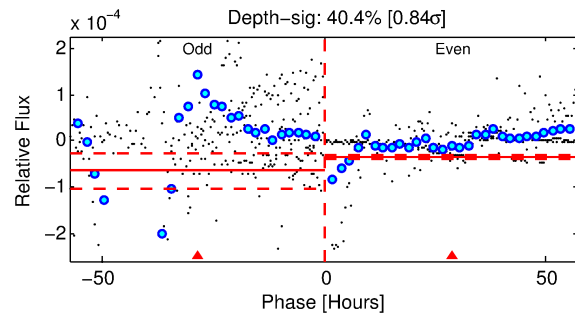
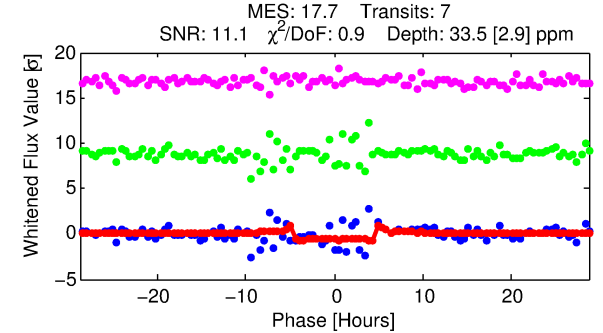
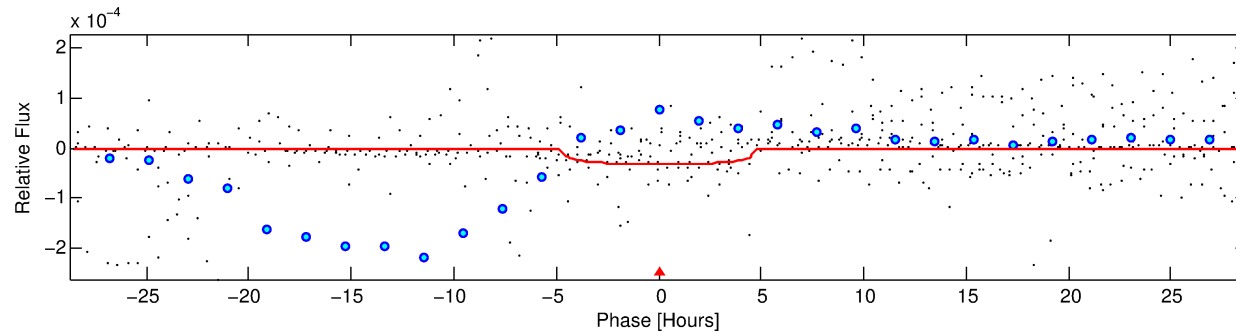
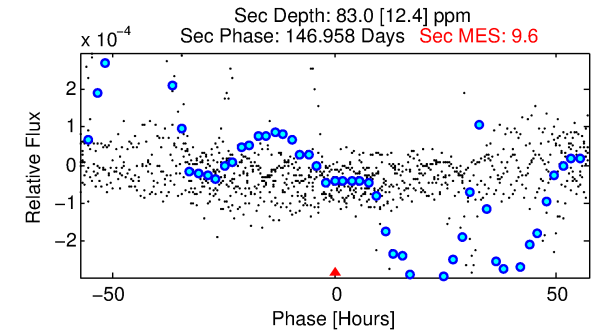
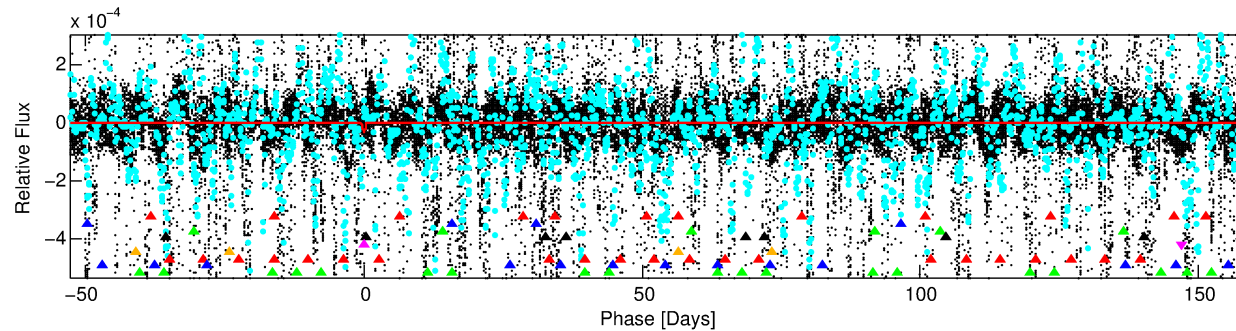
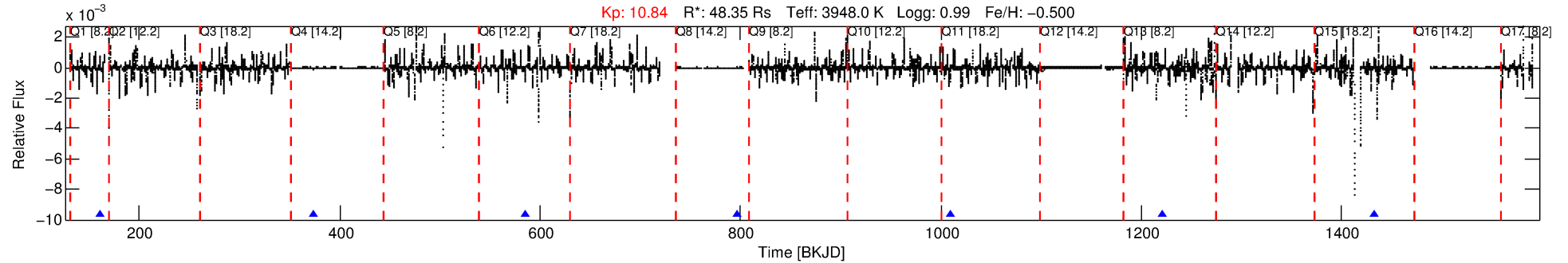
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 006937131-05

No Significant Match Found

# DV One-Page Summary

KIC: 6937131 Candidate: 5 of 9 Period: 211.915 d



## DV Fit Results:

Period = 211.91540 [0.00325] d  
Epoch = 161.7153 [0.0055] BKJD  
Rp/R\* = 0.0064 [0.0010]  
a/R\* = 84.54 [41.28]  
b = 0.87 [0.13]  
Seff = 1177.94 [263.68]  
Teq = 1494 [84] K  
Rp = 34.00 [11.43] Re  
a = 0.6573 [0.1321] AU  
Ag = 17.07 [6.80] [2.36σ]  
Teffp = 4695 [413] K [7.59σ]

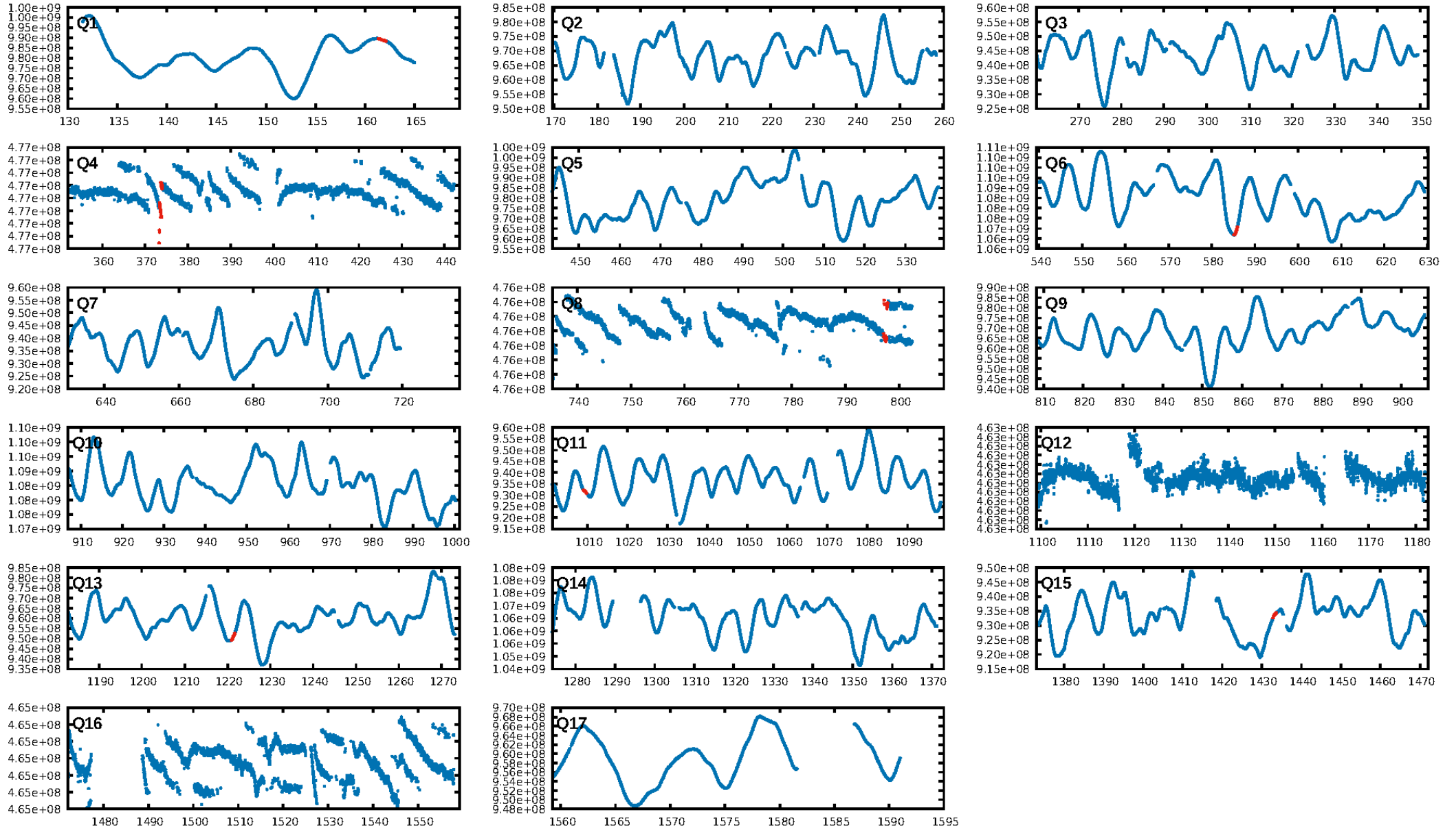
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [88.26σ]  
LongPeriod-sig: 100.0% [109.43σ]  
ModelChiSquare2-sig: 74.5%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [6/6]  
GhostDiagnostic-chr: 6.717  
Centroid-sig: 2.0%  
Centroid-so: 17.118 arcsec [1.67σ]  
OotOffset-rm: 4.183 arcsec [5.93σ]  
KicOffset-rm: 3.464 arcsec [4.18σ]  
OotOffset-st: 1/2/1/1 [5]  
KicOffset-st: 1/2/1/1 [5]  
DiffImageQuality-fgm: 0.60 [3/5]  
DiffImageOverlap-fno: 0.83 [5/6]

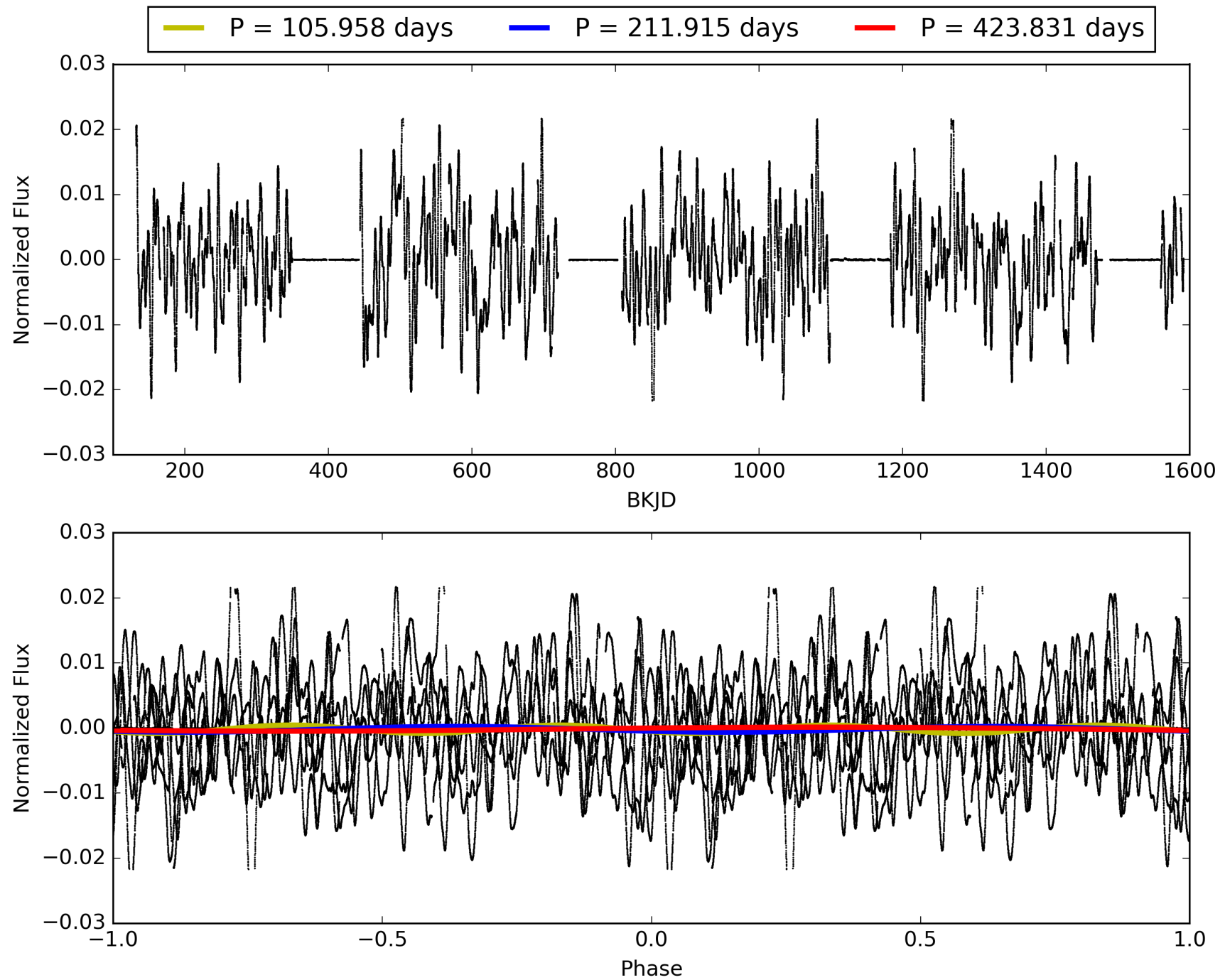
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 00:47:18 Z

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

# TCE 006937131-05, PDC Light Curves



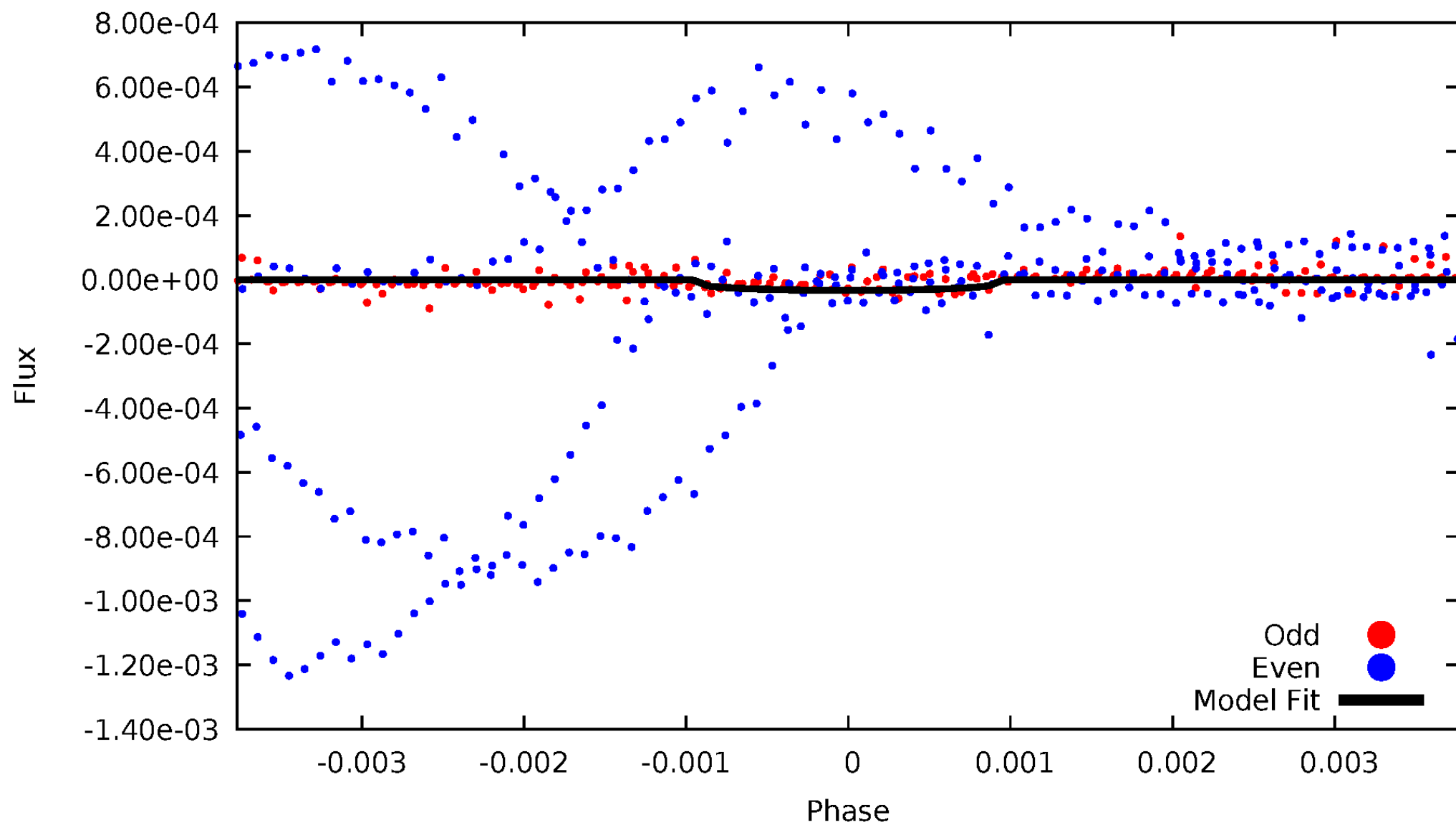
# TCE 006937131-05





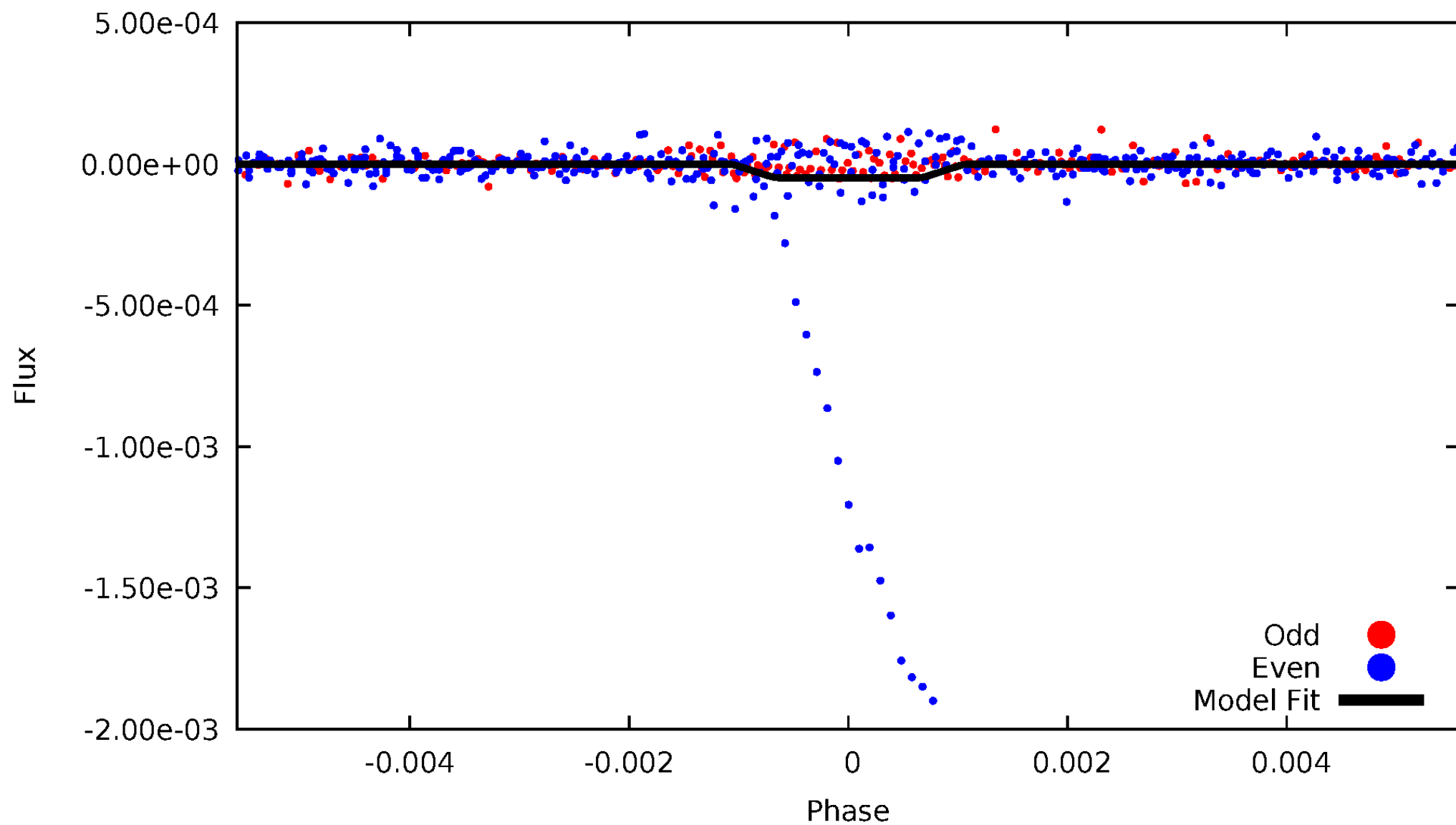
# DV Odd/Even

TCE 006937131-05



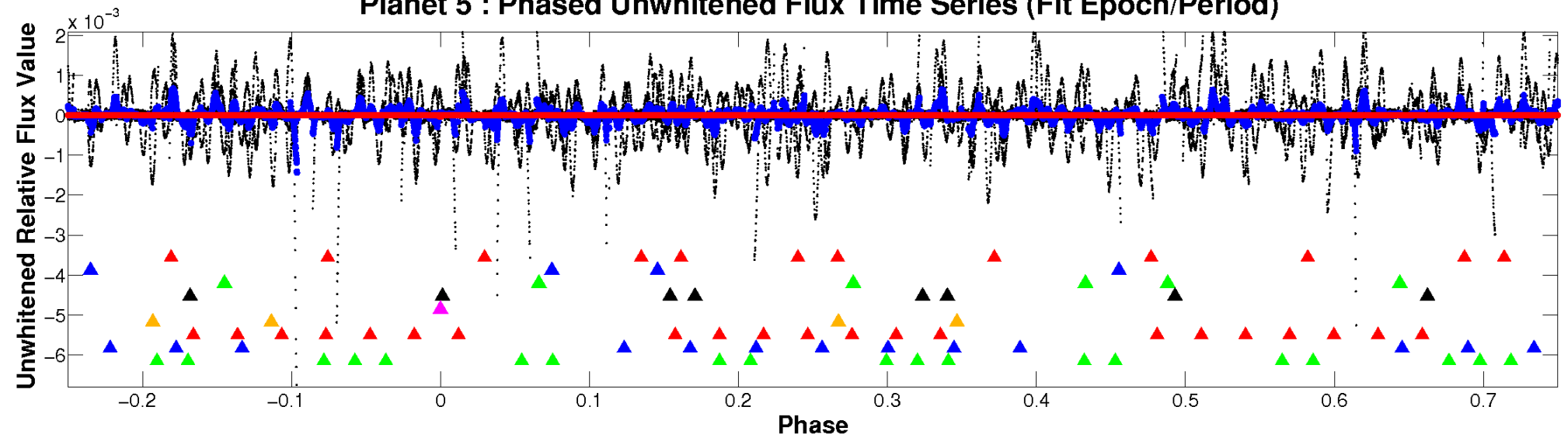
# ALT Odd/Even

TCE 006937131-05

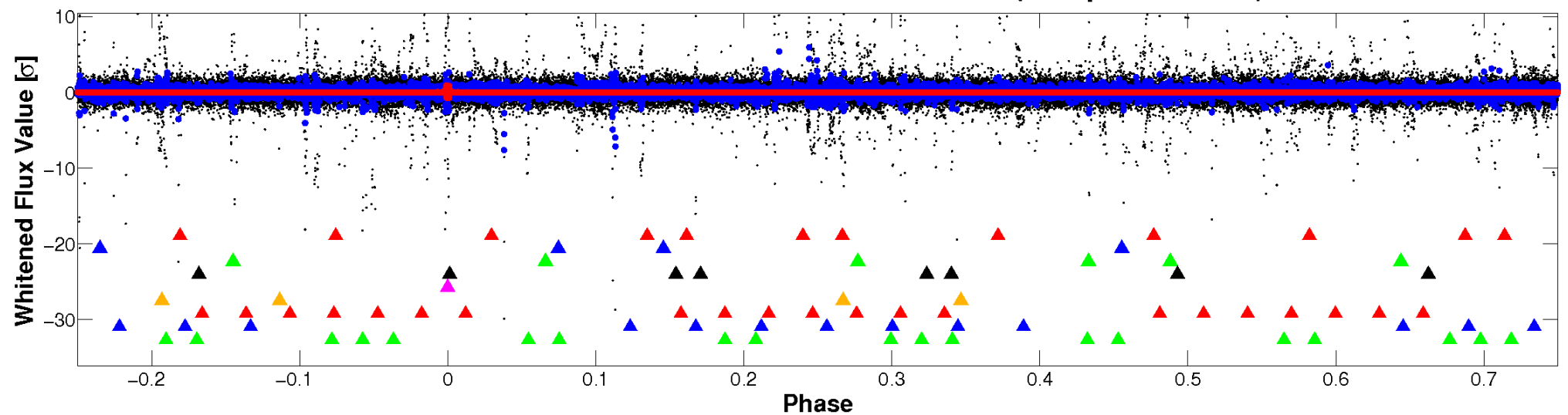


# Non-Whitened Vs. Whitened Light Curve

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

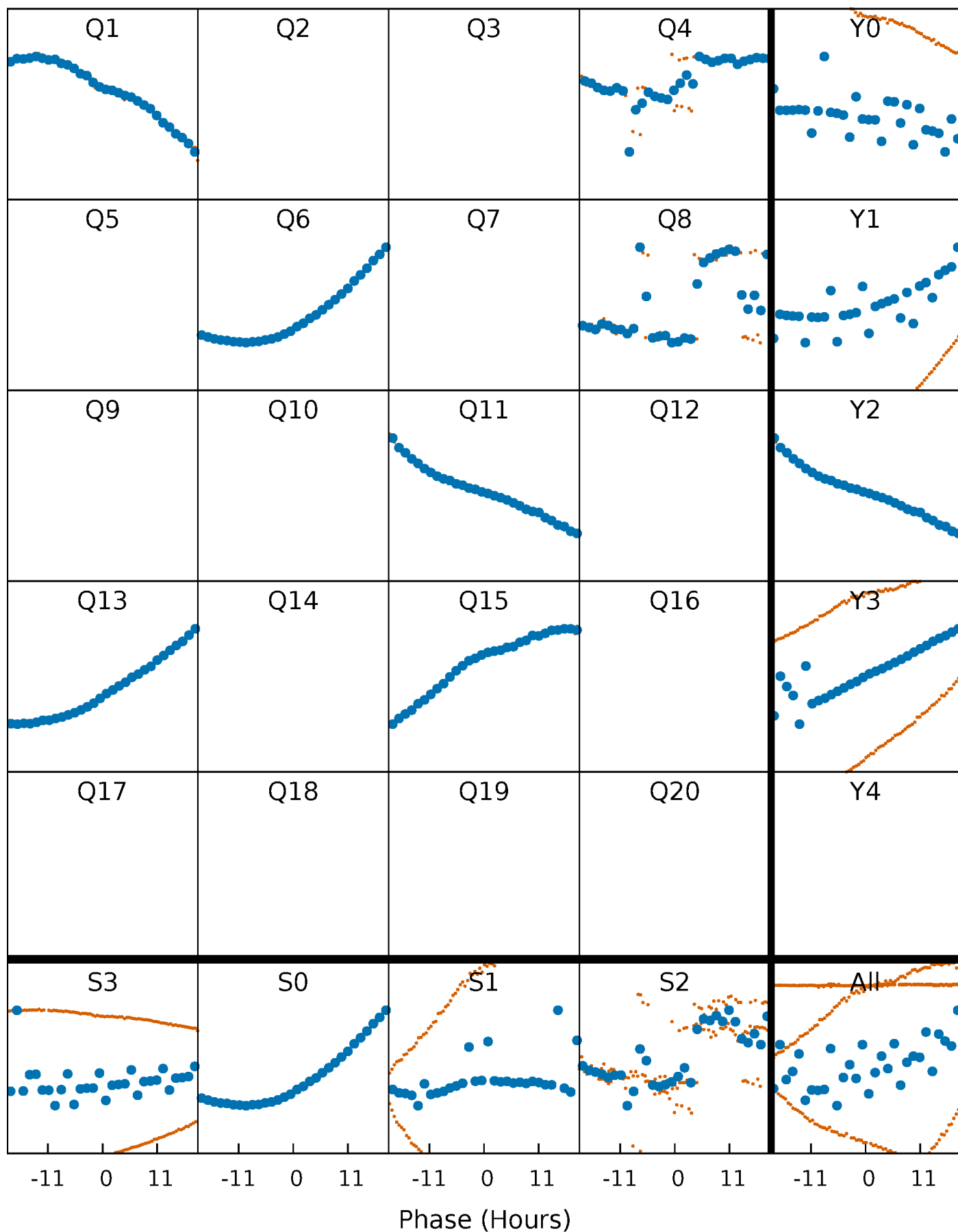


Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)



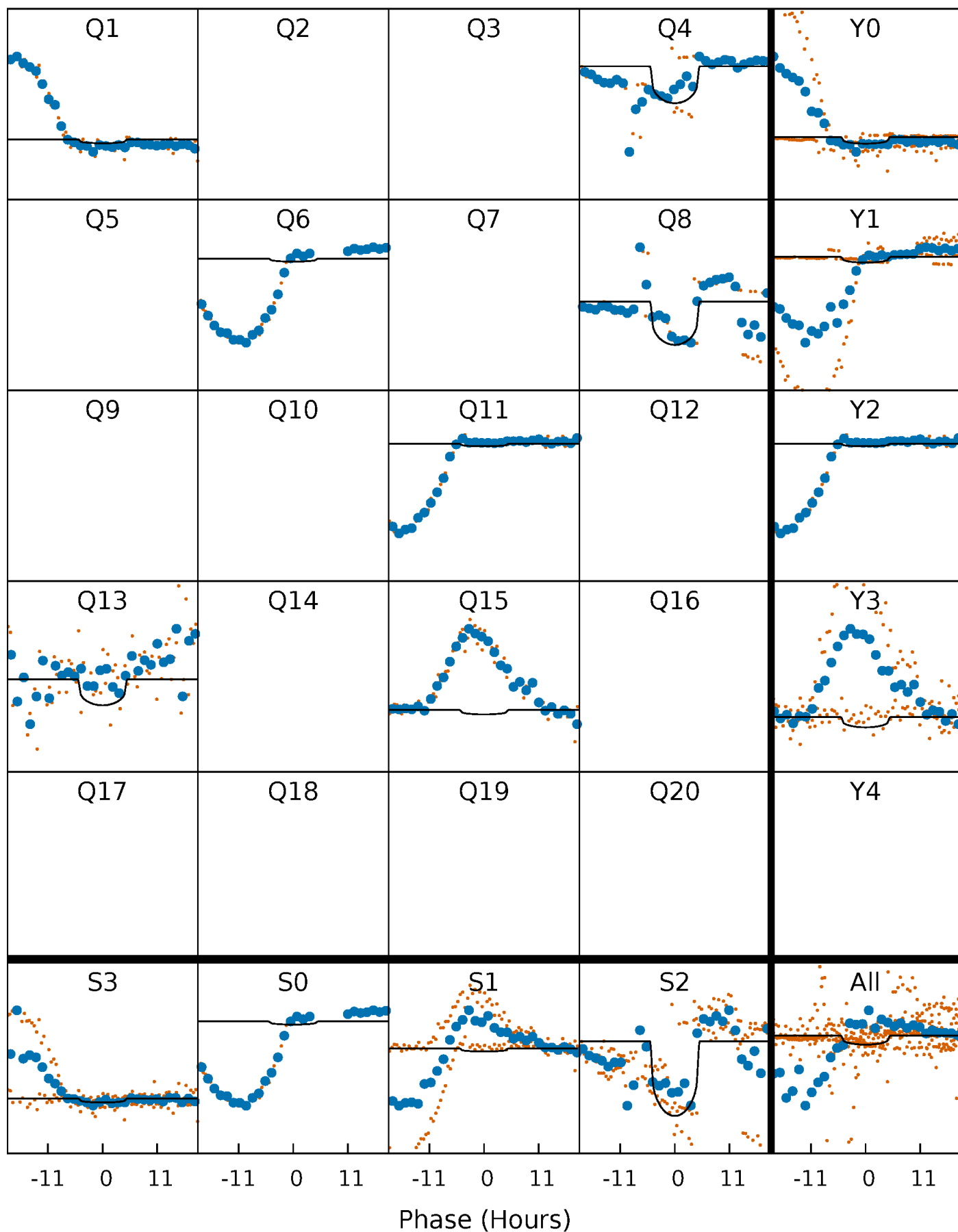
# PDC Quarter-Phased Transit Curves

TCE 006937131-05     $P=211.915402$  Days     $T_0=161.715255$  (BKJD)



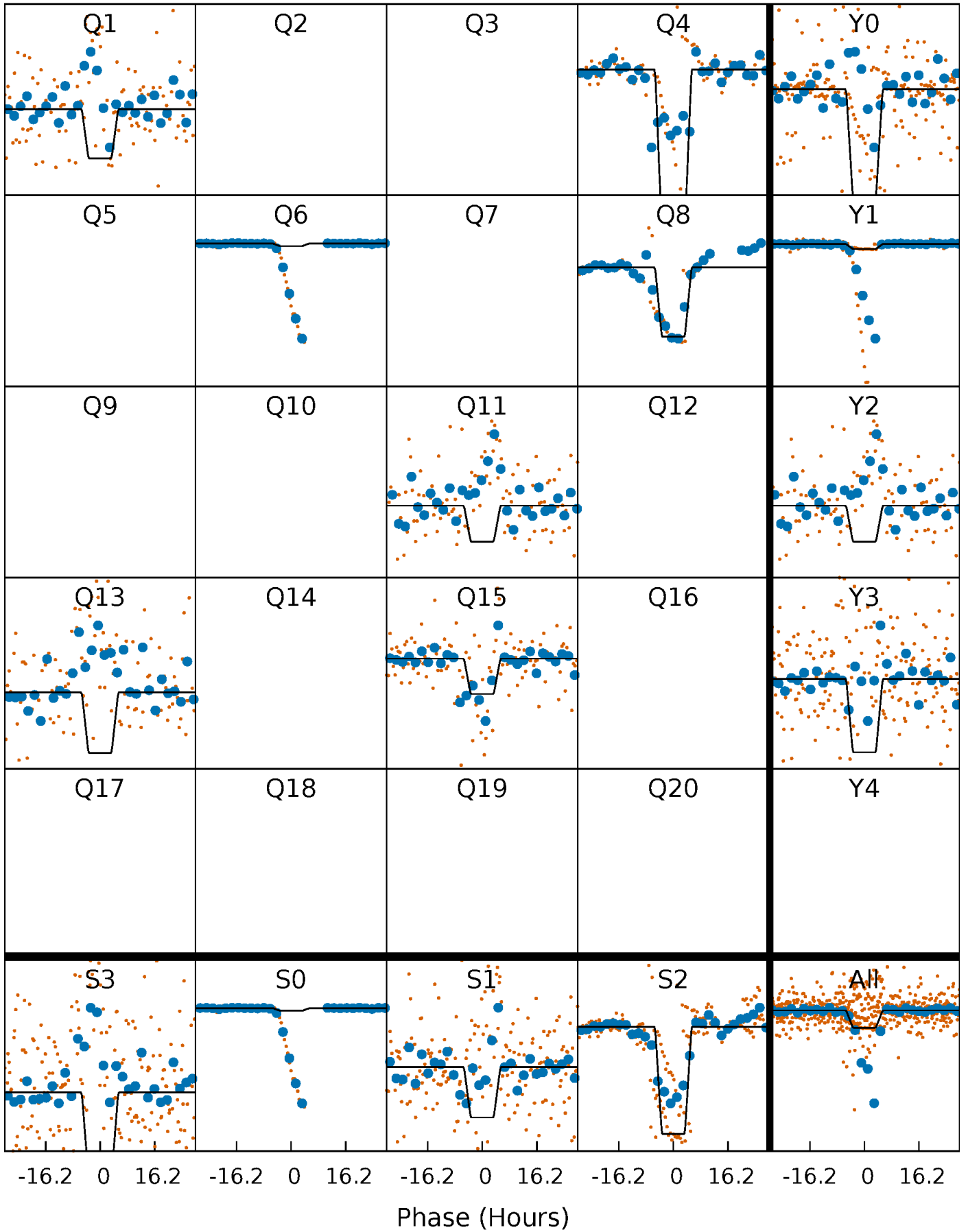
# DV Quarter-Phased Transit Curves

TCE 006937131-05     $P=211.915402$  Days     $T_0=161.715255$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

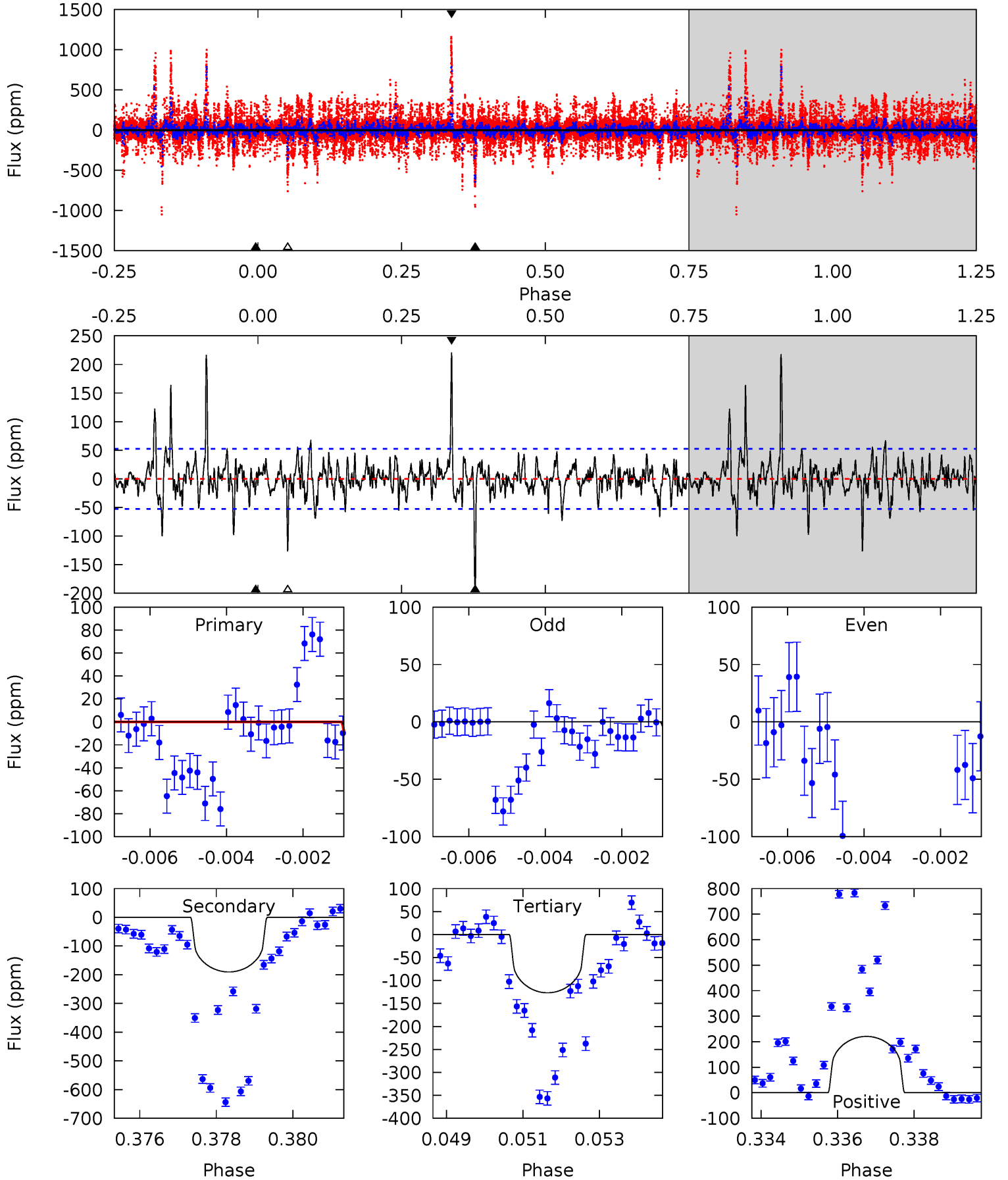
TCE 006937131-05     $P=211.970940$  Days     $T_0=161.586235$  (BKJD)



# DV Model-Shift Uniqueness Test

006937131-05, P = 211.915402 Days, E = 161.715255 Days

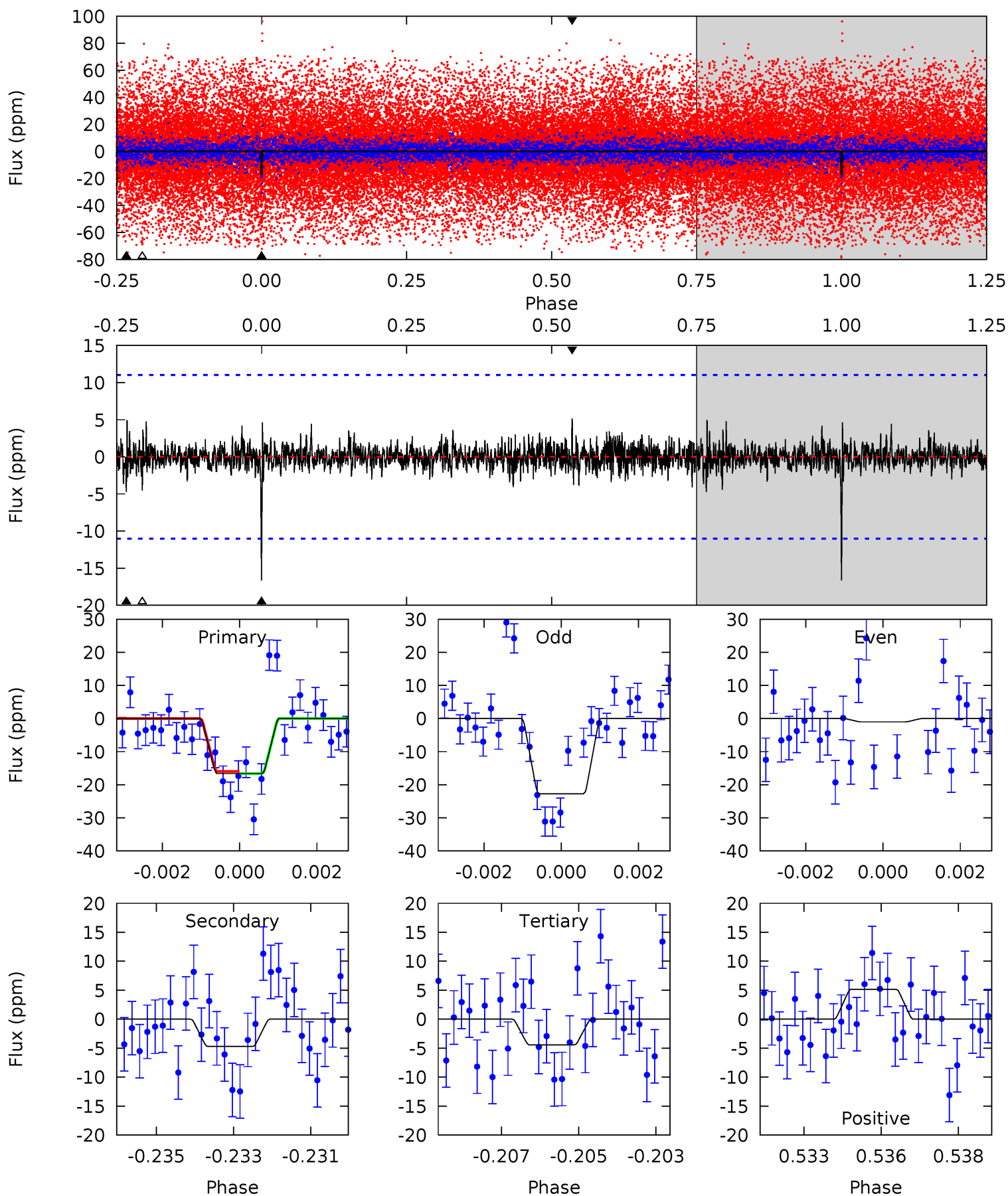
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1.63	19.3	12.8	22.3	5.33	3.10	2.61	-11.2	-20.7	6.42	-3.09	0.40	-2.18	0.54	1.46



# Alt Model-Shift Uniqueness Test

006937131-05, P = 211.970940 Days, E = 161.586235 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.01	2.27	2.13	2.49	5.31	3.07	0.55	5.88	5.53	0.14	-0.21	5.59	9.07	0.24	0.15





### Stellar Parameters For KIC 006937131

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$3948^{+87}_{-71}$	$0.995^{+0.033}_{-0.027}$	$-0.500^{+0.200}_{-0.150}$	$48.351^{+14.464}_{-1.523}$	$0.842^{+0.559}_{-0.029}$	$0.000^{+0.000}_{-0.000}$
	+2%/-2%	+3%/-3%	+40%/-30%	+30%/-3%	+66%/-3%	+9%/-24%
Source	PHO56	AST56	PHO56	DSEP		

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

### Secondary Eclipse Parameters for KIC 006937131-05 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-190 \pm 10$	$34.05^{+5.81}_{-5.42}$	$2084^{+53}_{-47}$	$5338^{+426}_{-360}$	$39^{+16}_{-10}$
Alt.	$-5 \pm 2$	$36.57^{+5.96}_{-5.58}$	$2087^{+54}_{-47}$	$2616^{+267}_{-422}$	$0.817^{+0.577}_{-0.400}$

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

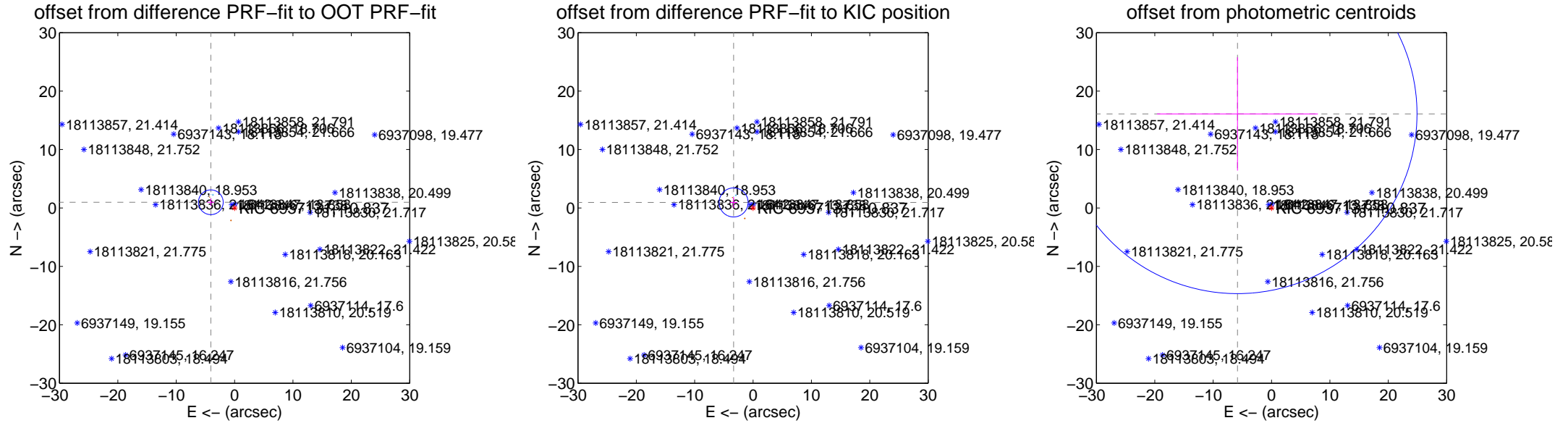
## DV Centroid Data

Supplemental centroid analysis for 006937131-05. **Kepler magnitude: 10.84.** Transit SNR 11.06

**There are 3 quarters with good PRF difference image offsets**

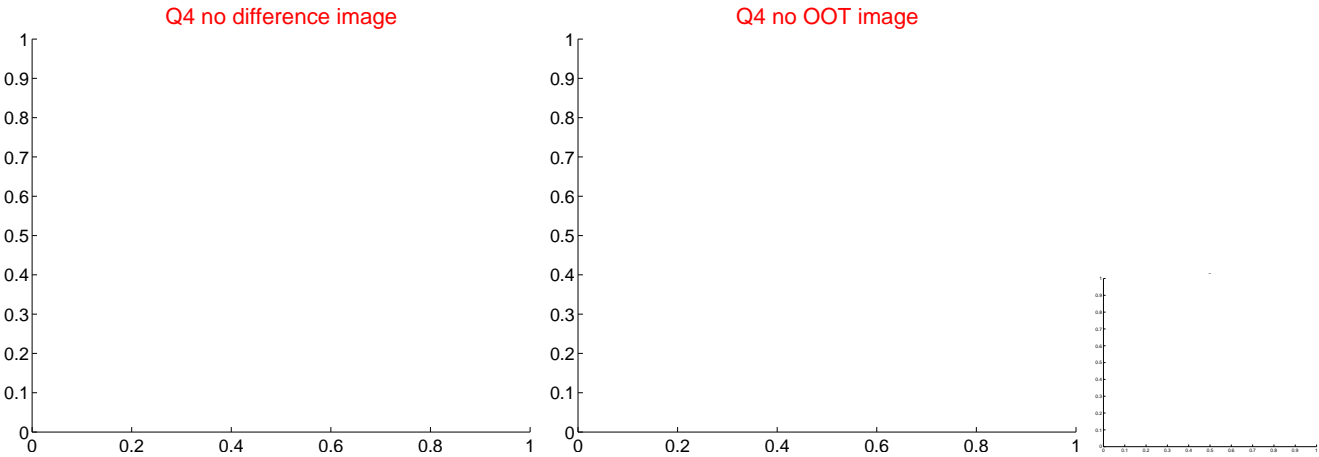
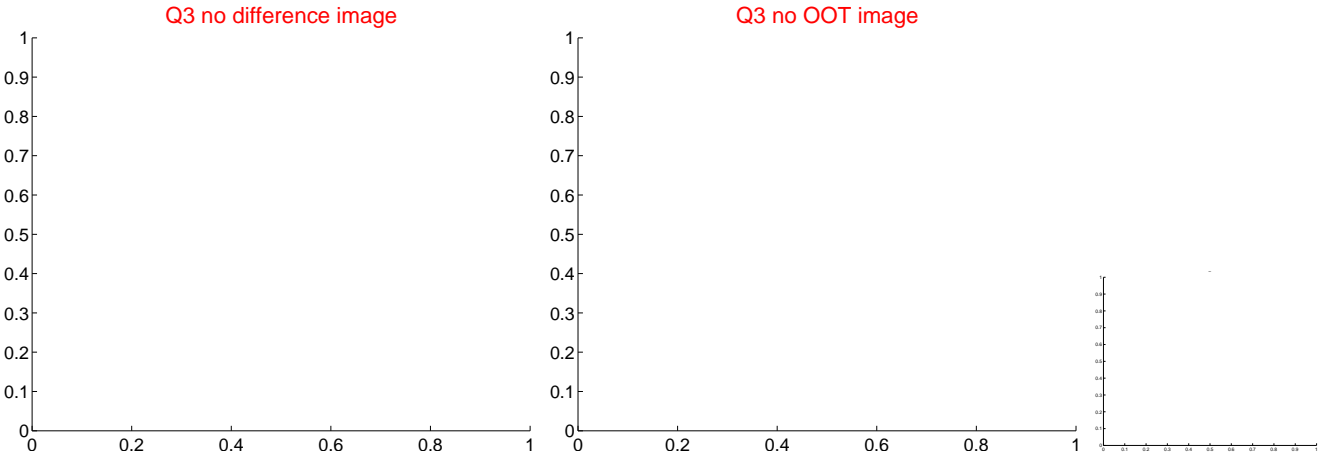
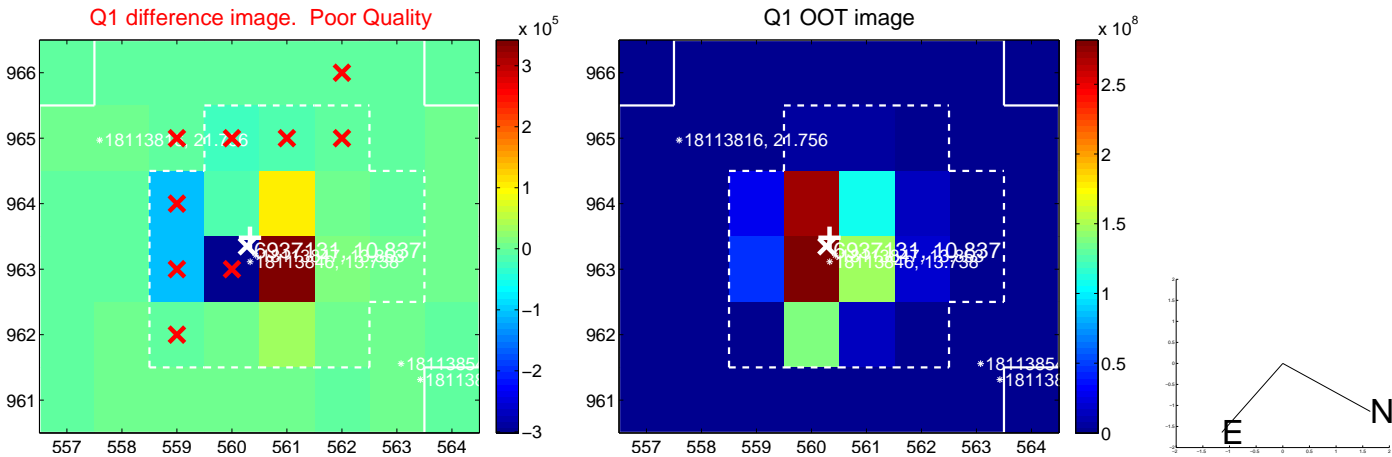
The direct PRF centroid is offset from the target star catalog position by about 0.74 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b><math>4.183 \pm 0.706</math></b>	<b>5.93</b>	$4.068 \pm 0.601$	$0.976 \pm 0.645$
PRF-fit source offset from KIC position	<b><math>3.464 \pm 0.829</math></b>	<b>4.18</b>	$3.333 \pm 0.632$	$0.945 \pm 0.925$
photometric centroid source offset	$17.12 \pm 10.25$	1.67	$5.84 \pm 13.78$	$16.09 \pm 9.69$



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.

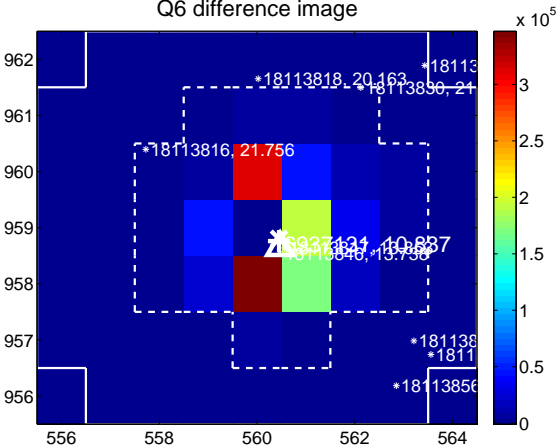
Q5 no difference image



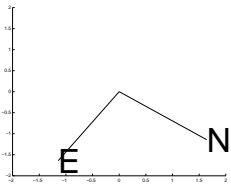
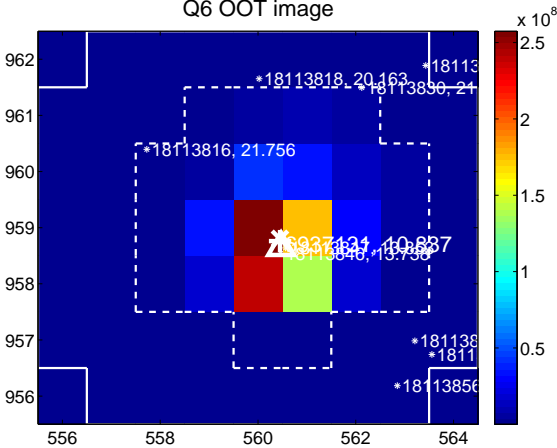
Q5 no OOT image



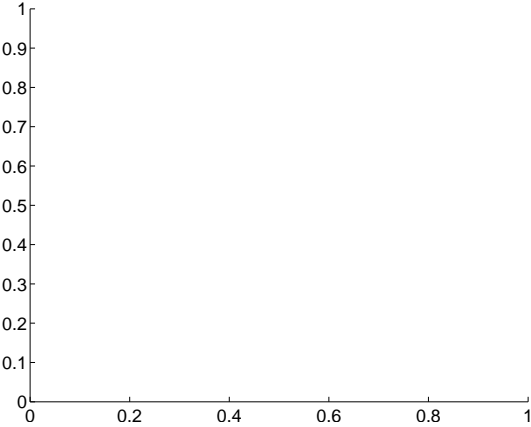
Q6 difference image



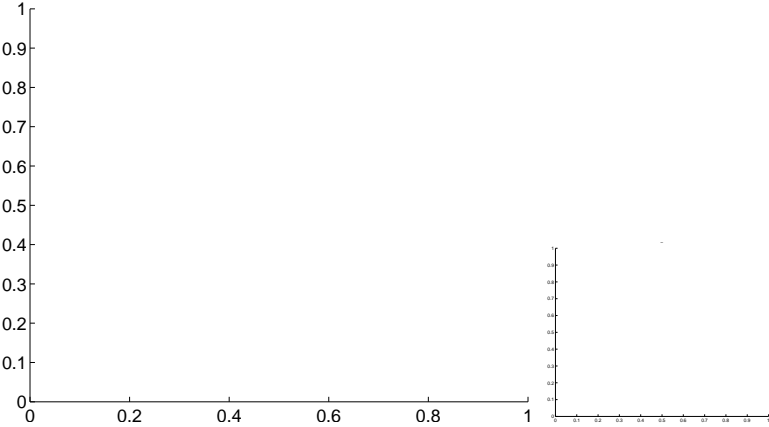
Q6 OOT image



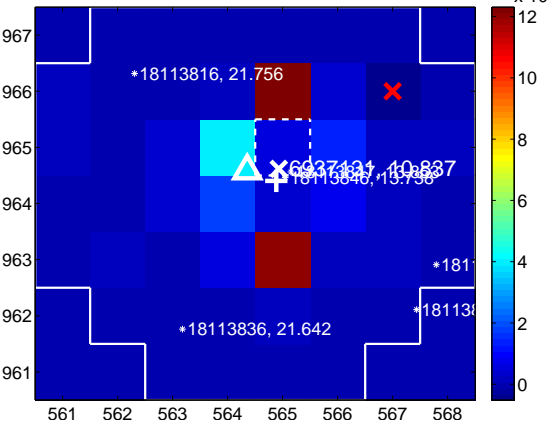
Q7 no difference image



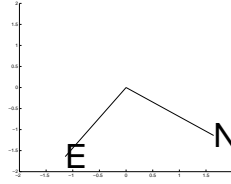
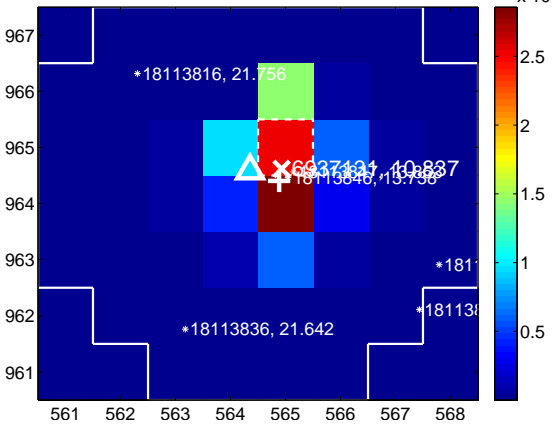
Q7 no OOT image



Q8 difference image. Poor Quality



Q8 OOT image



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

Q9 no difference image



Q9 no OOT image



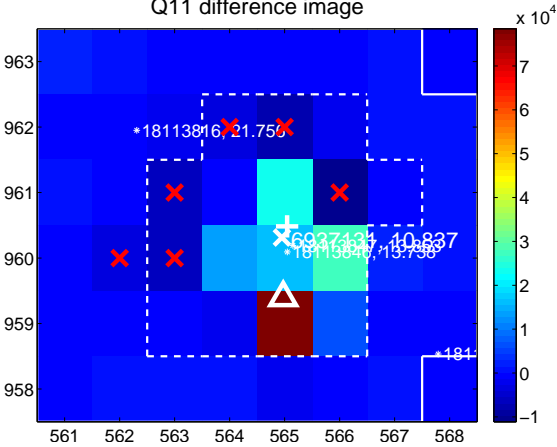
Q10 no difference image



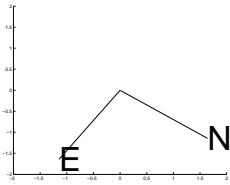
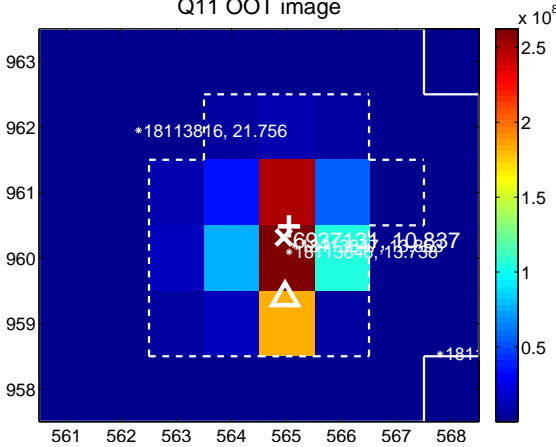
Q10 no OOT image



Q11 difference image



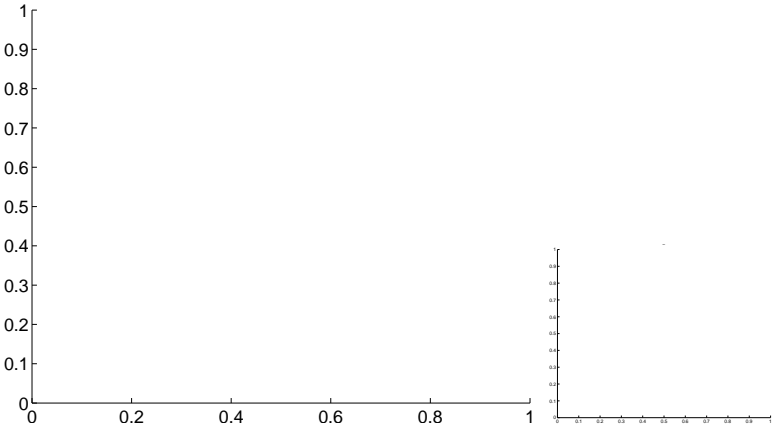
Q11 OOT image



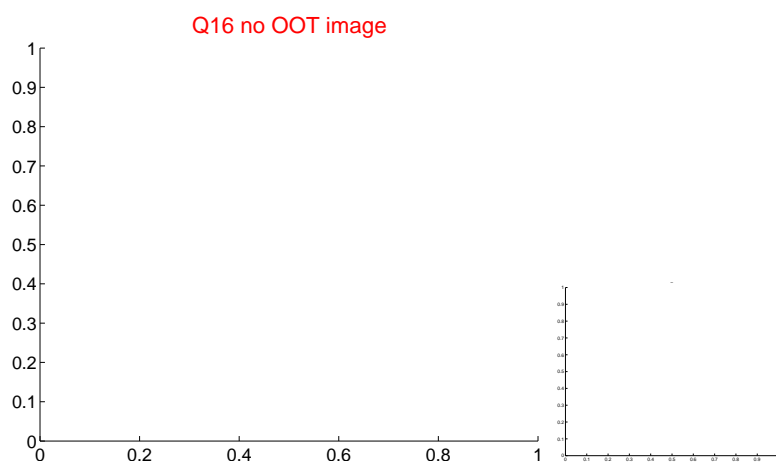
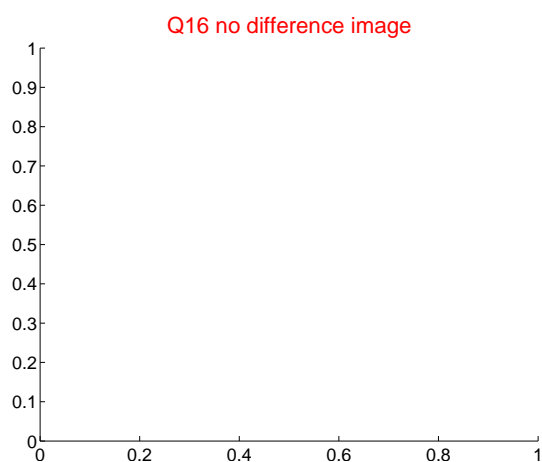
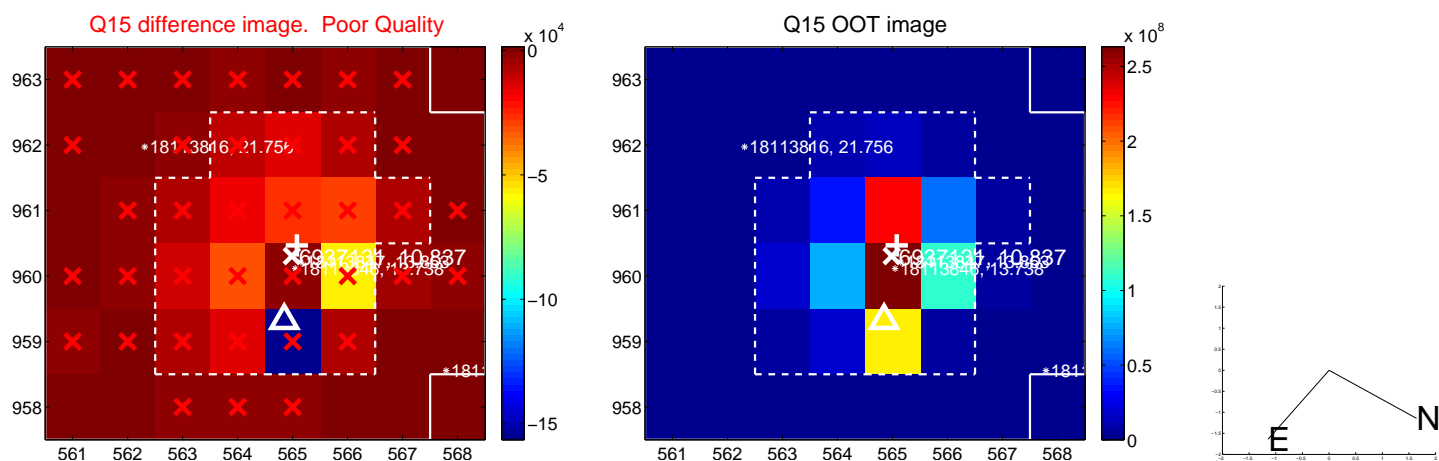
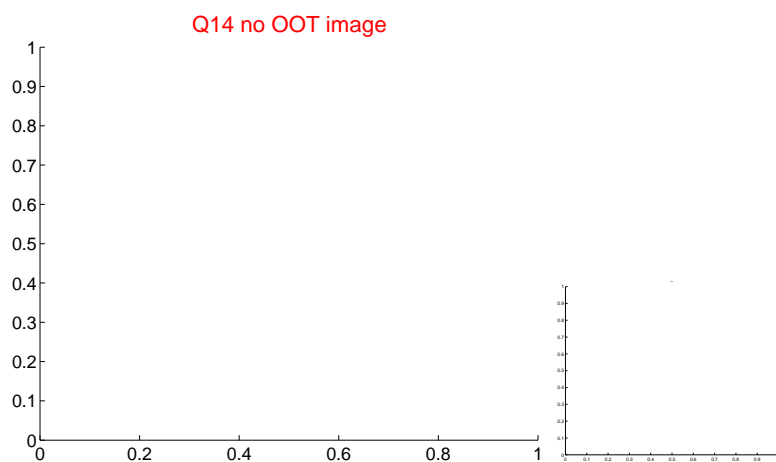
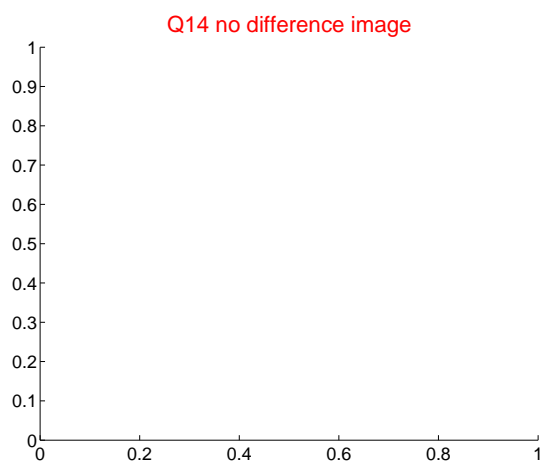
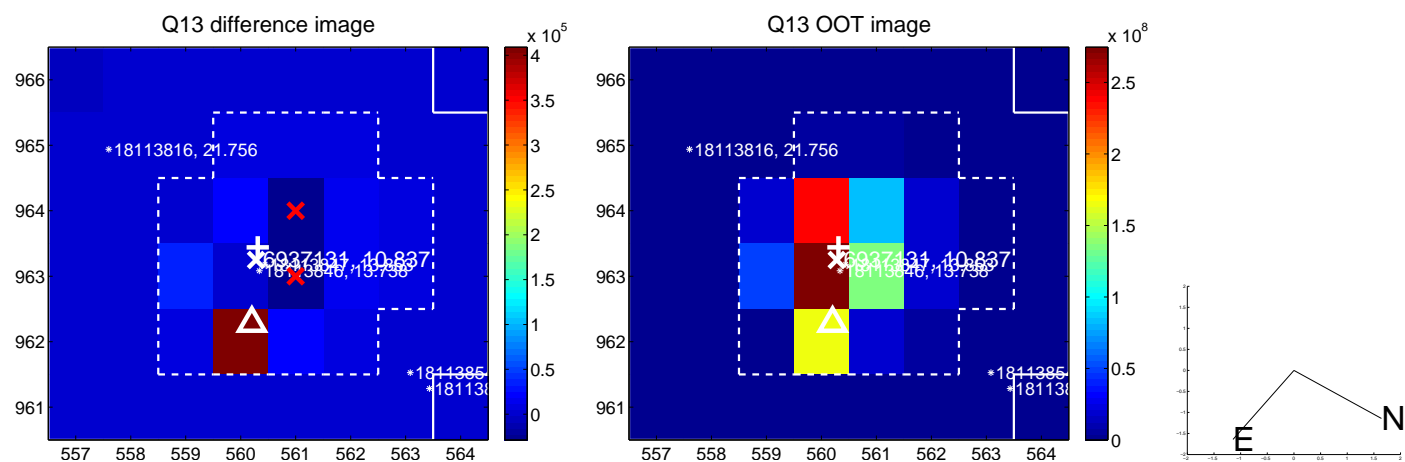
Q12 no difference image



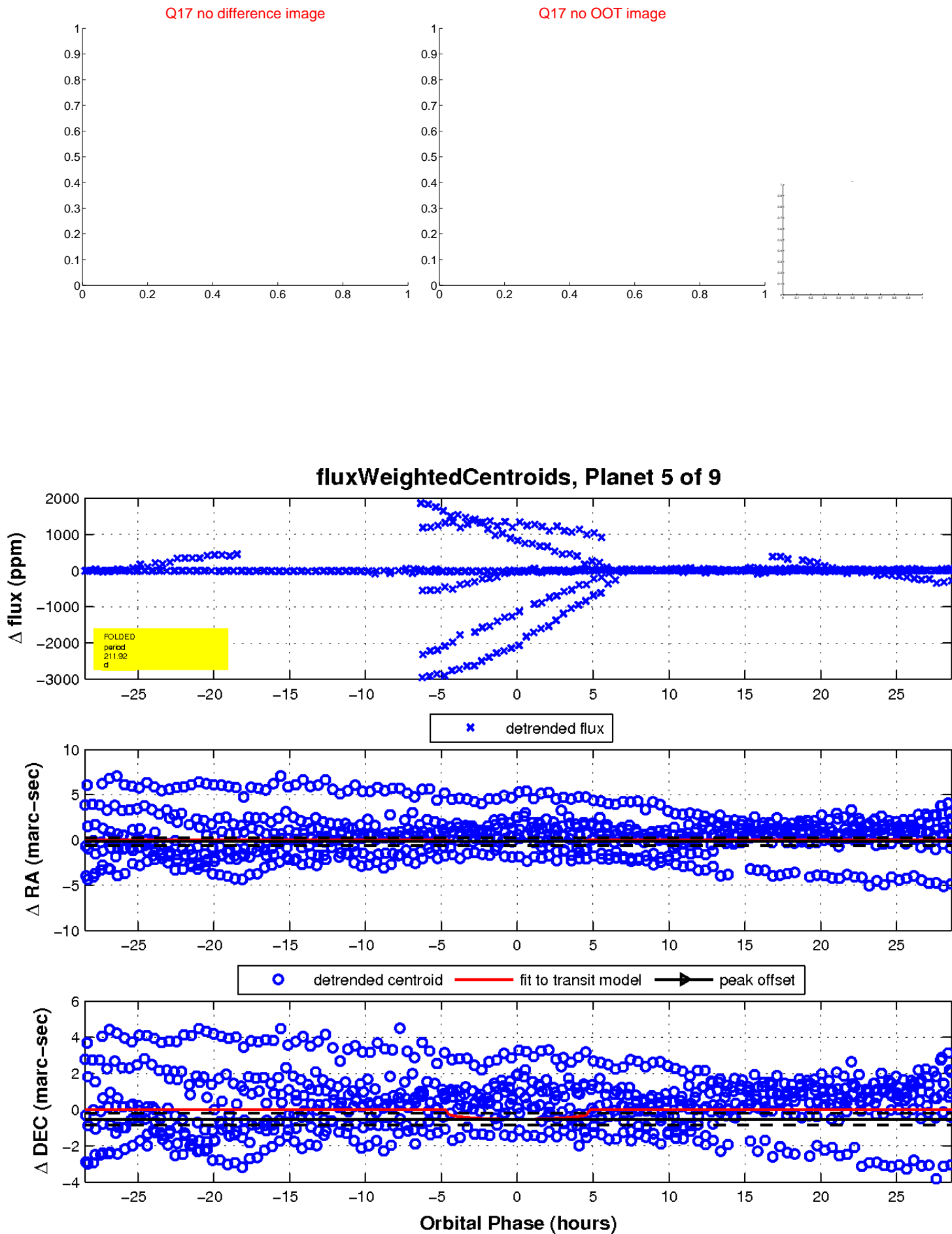
Q12 no OOT image



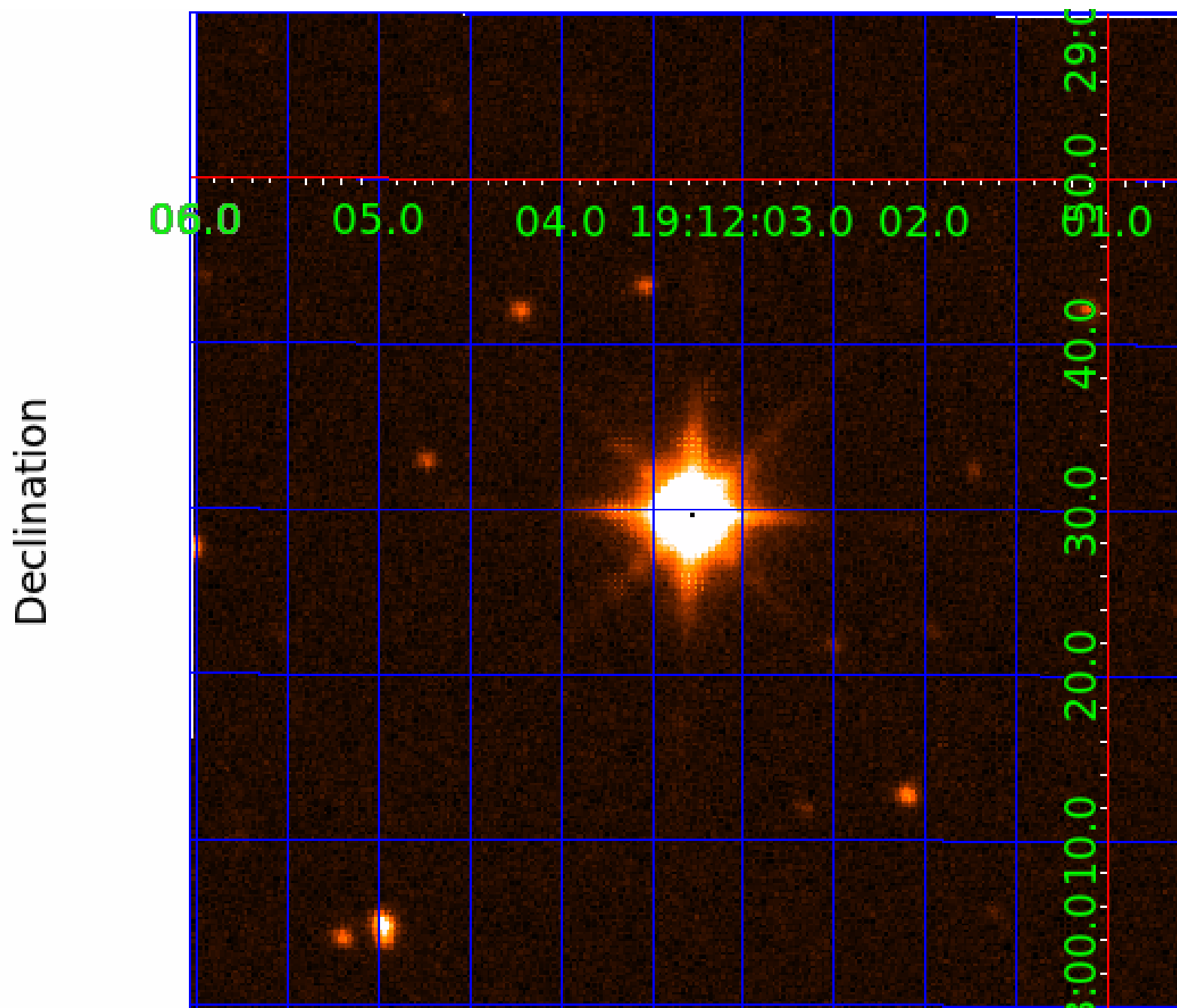
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image





# KIC 006937131

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006937131-01	OBS	No	117.103296	195.920780	51.3	1.665	38.7	31.5	48.35	3948	43.67	2597.65
006937131-02	OBS	No	358.203546	389.477540	24.1	8.007	19.9	8.5	48.35	3948	29.44	585.01
006937131-03	OBS	No	256.641148	253.452664	43.6	2.098	18.9	17.9	48.35	3948	43.44	912.51
006937131-04	OBS	No	176.008339	233.821327	2.2	1.876	20.1	1.3	48.35	3948	9.18	1508.79
006937131-05	OBS	No	211.915402	161.715255	33.5	9.582	17.7	11.1	48.35	3948	34.00	1177.94
006937131-06	OBS	No	326.304219	430.241376	62.8	13.565	16.5	16.5	48.35	3948	45.99	662.49
006937131-07	OBS	No	68.543331	164.278275	14.4	27.831	15.6	5.8	48.35	3948	27.28	5305.42
006937131-08	OBS	No	110.649092	187.850790	448.8	2.000	17.9	-1.0	48.35	3948	96.47	2801.62
006937131-09	OBS	No	80.018968	145.132211	42.0	2.520	17.7	12.5	48.35	3948	34.75	4316.01

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006937131-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_SKYE_ZUMA—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
006937131-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_ZUMA—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_SATURATED
006937131-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
006937131-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
006937131-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_ZUMA—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_SATURATED
006937131-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_SATURATED
006937131-07	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
006937131-08	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
006937131-09	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—CENT_SATURATED

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

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

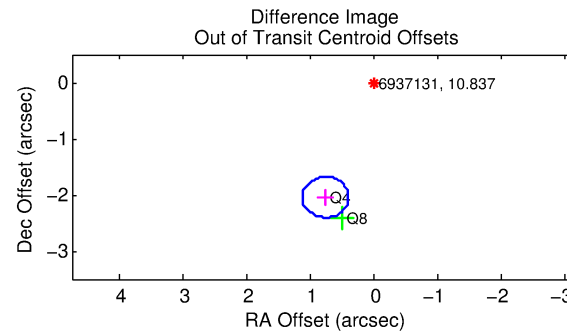
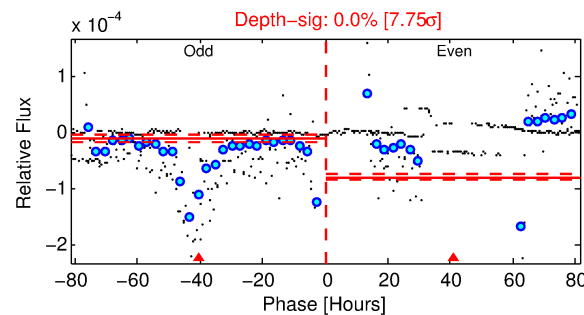
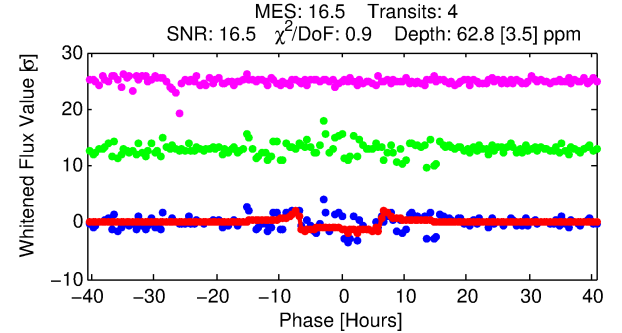
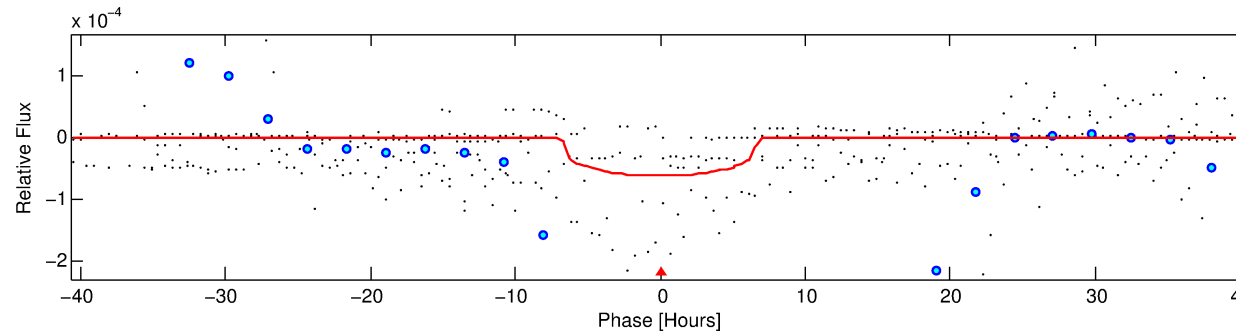
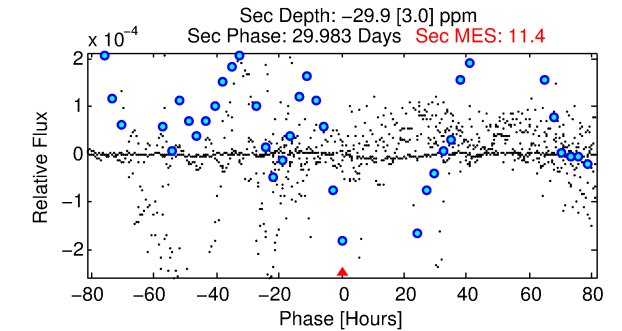
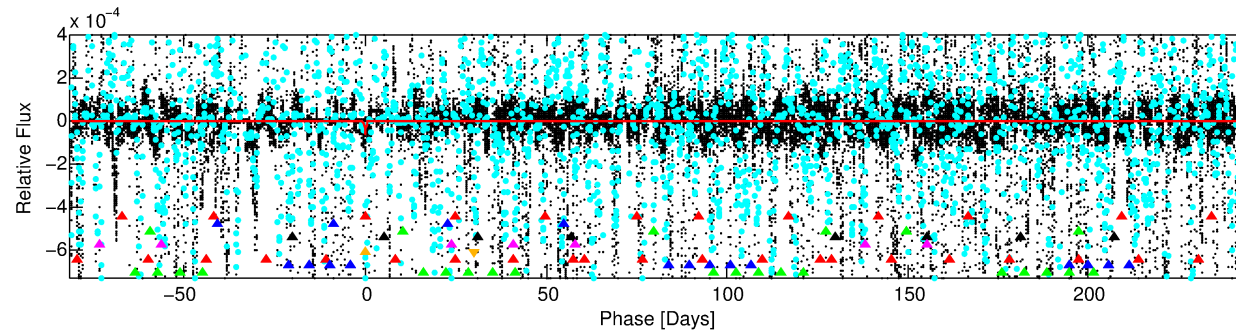
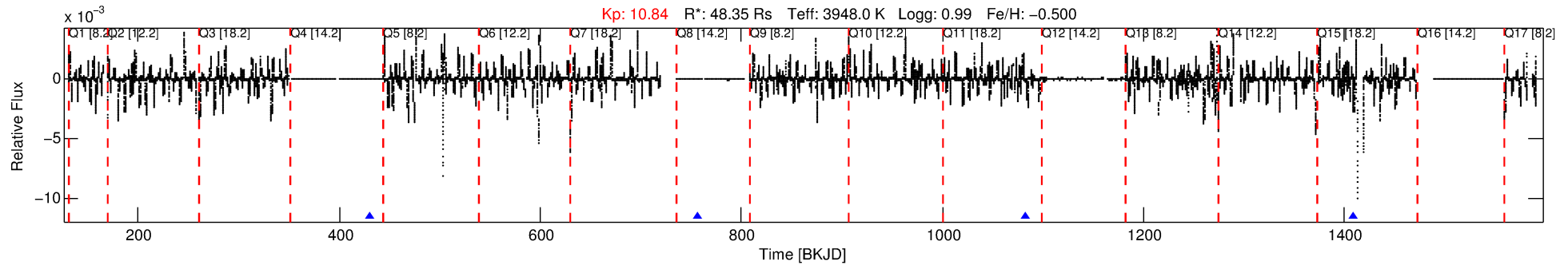
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 006937131-06

No Significant Match Found

# DV One-Page Summary

KIC: 6937131 Candidate: 6 of 9 Period: 326.304 d



## DV Fit Results:

Period = 326.30422 [0.00420] d  
Epoch = 430.2414 [0.0038] BKJD  
Rp/R\* = 0.0087 [0.0009]  
a/R\* = 96.22 [31.67]  
b = 0.86 [0.10]  
Seff = 662.49 [148.30]  
Teq = 1294 [72] K  
Rp = 45.99 [14.52] Re  
a = 0.8764 [0.1762] AU  
Ag = N/A  
Teffp = N/A

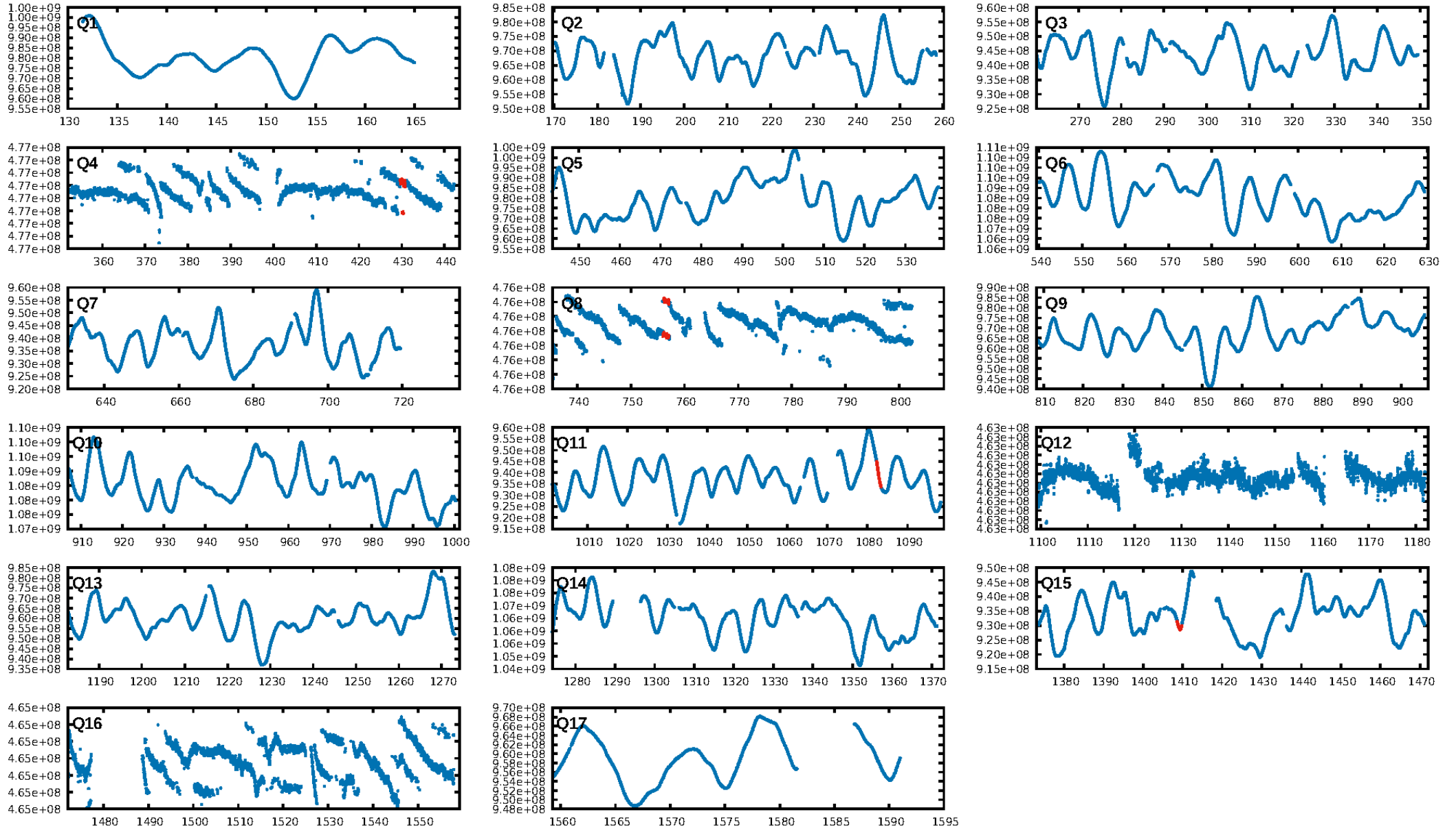
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [121.80σ]  
LongPeriod-sig: 100.0% [48.60σ]  
ModelChiSquare2-sig: 1.4%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: -0.8089  
Centroid-sig: 0.1%  
Centroid-so: 19.966 arcsec [2.29σ]  
OotOffset-rm: 2.184 arcsec [18.11σ]  
KicOffset-rm: 2.347 arcsec [19.82σ]  
OotOffset-st: 0/0/2/0 [2]  
KicOffset-st: 0/0/2/0 [2]  
DiffImageQuality-fgm: 0.00 [0/2]  
DiffImageOverlap-fno: 0.50 [1/2]

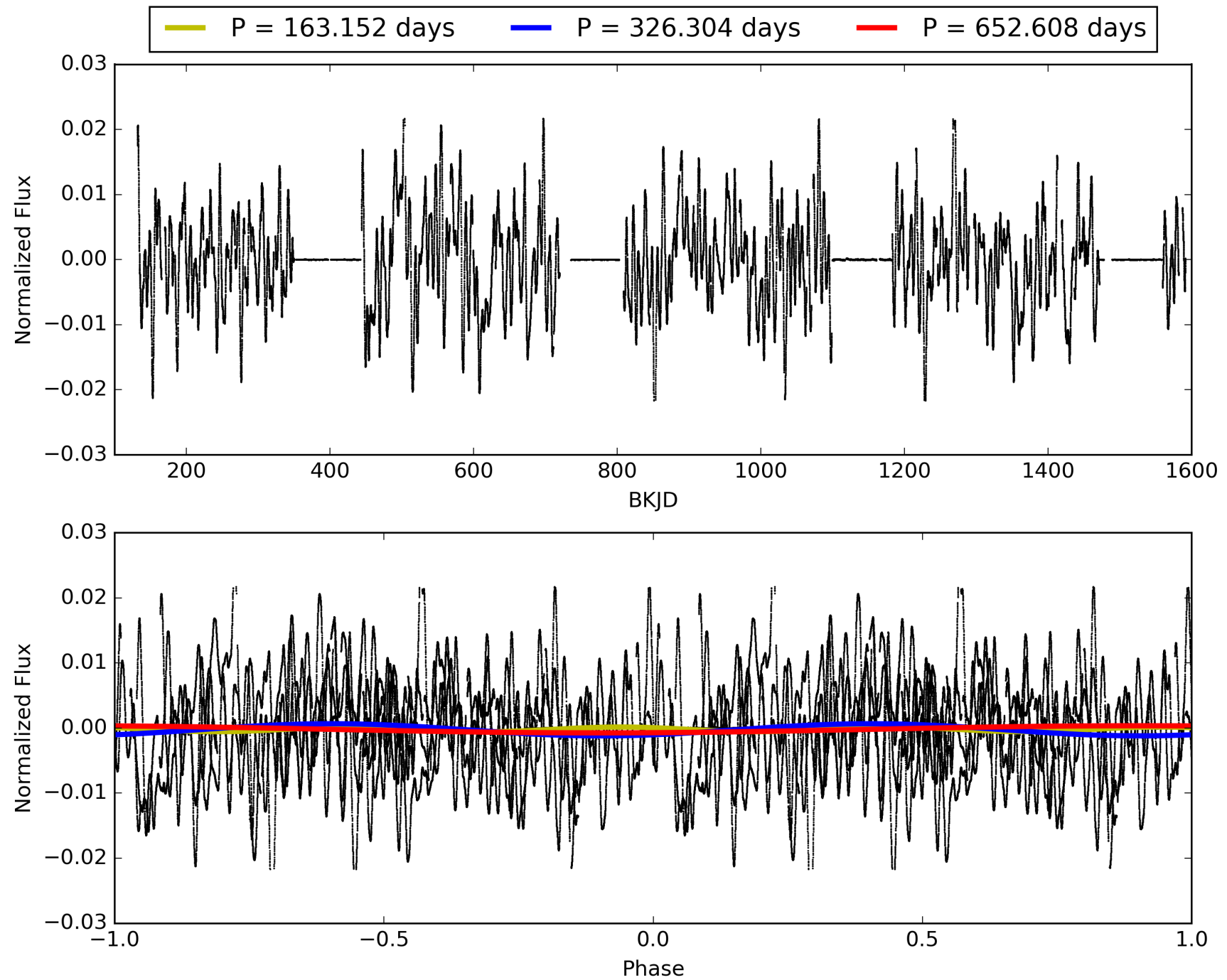
Software Revision: svn-ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 00:47:25 Z

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

# TCE 006937131-06, PDC Light Curves

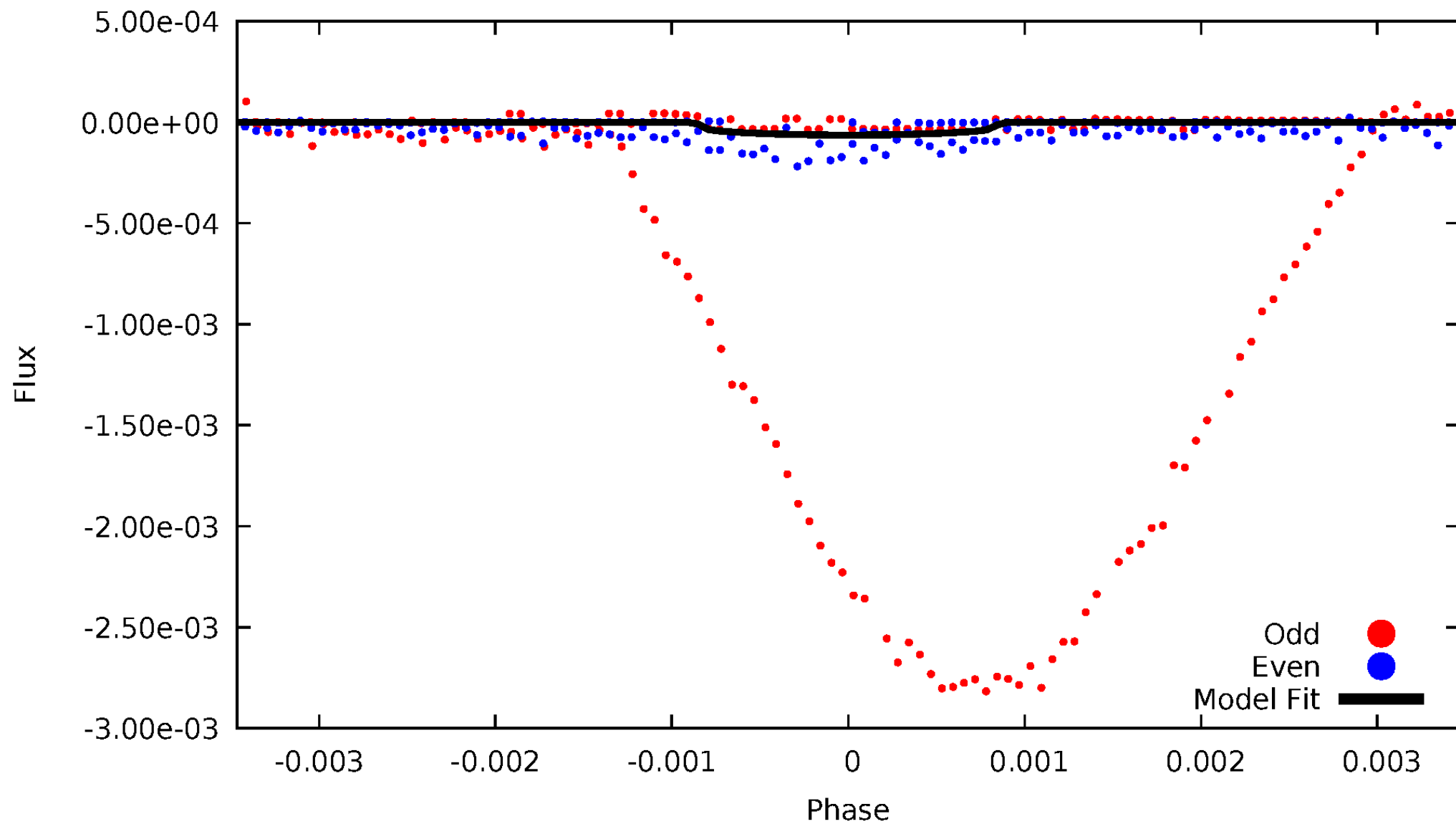


TCE 006937131-06



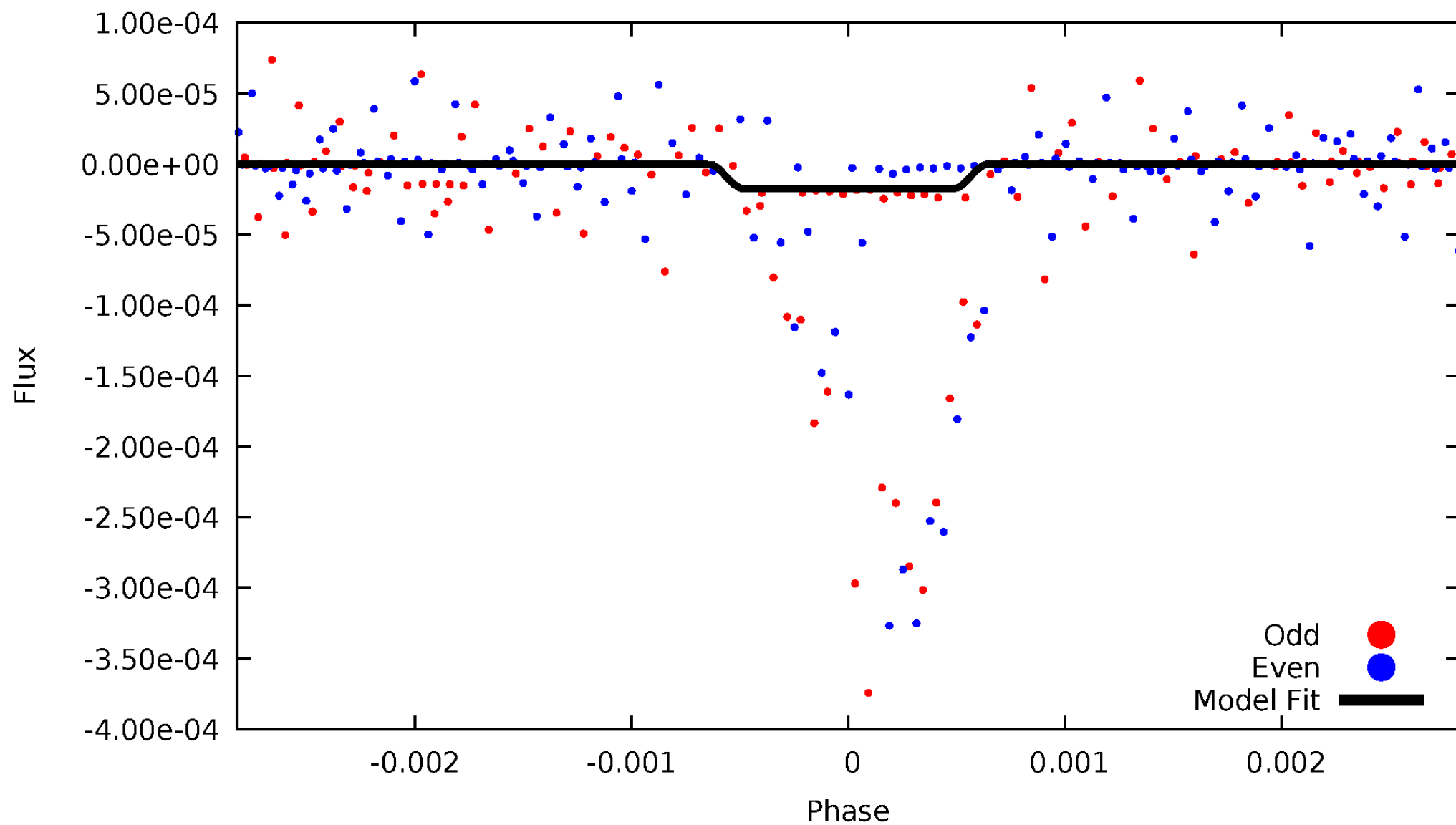
# DV Odd/Even

TCE 006937131-06



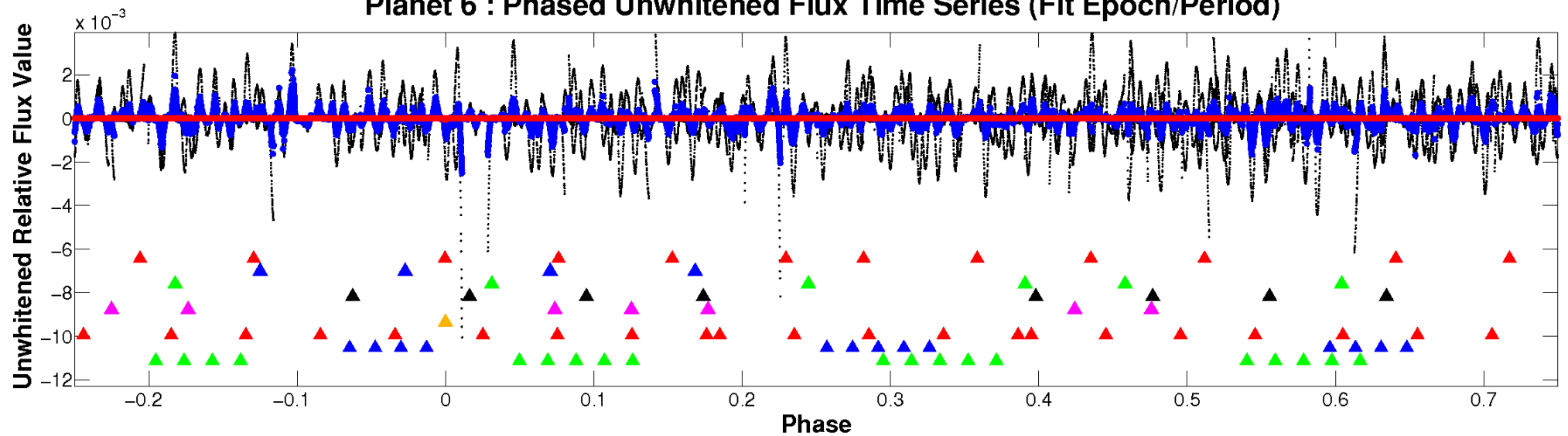
# ALT Odd/Even

TCE 006937131-06

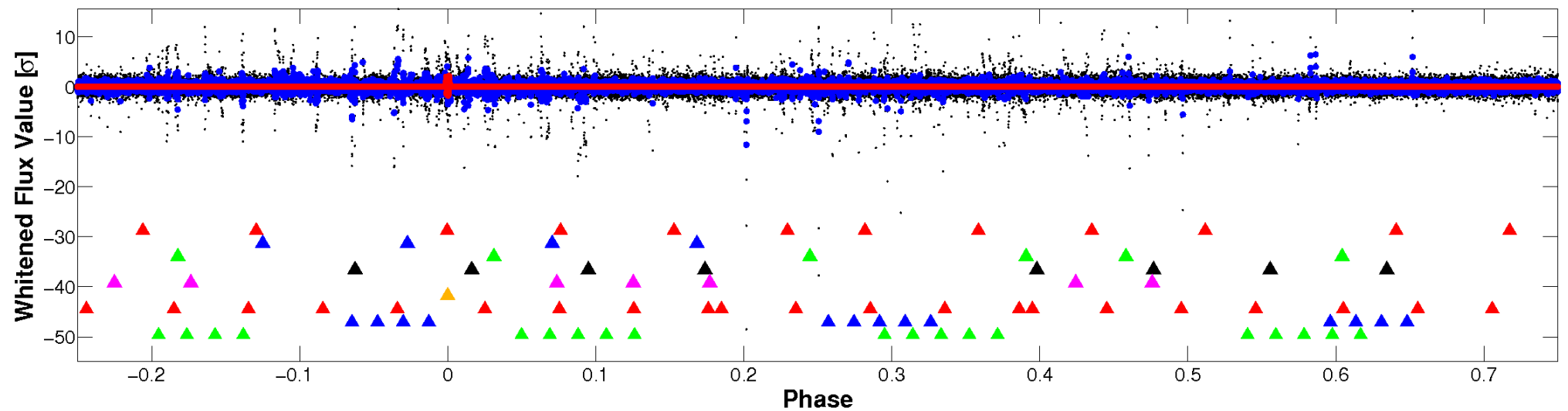


# Non-Whitened Vs. Whitened Light Curve

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

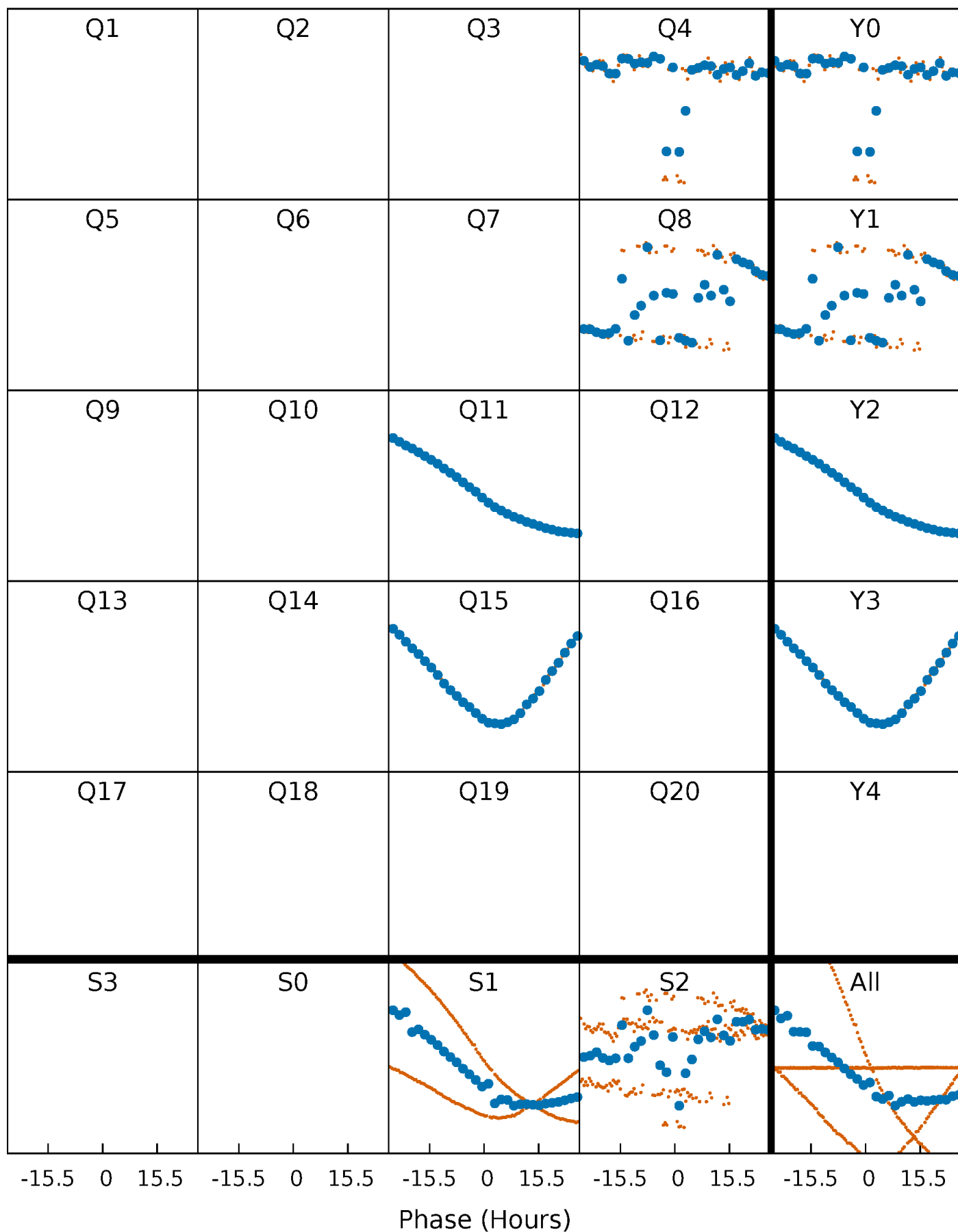


## Planet 6 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

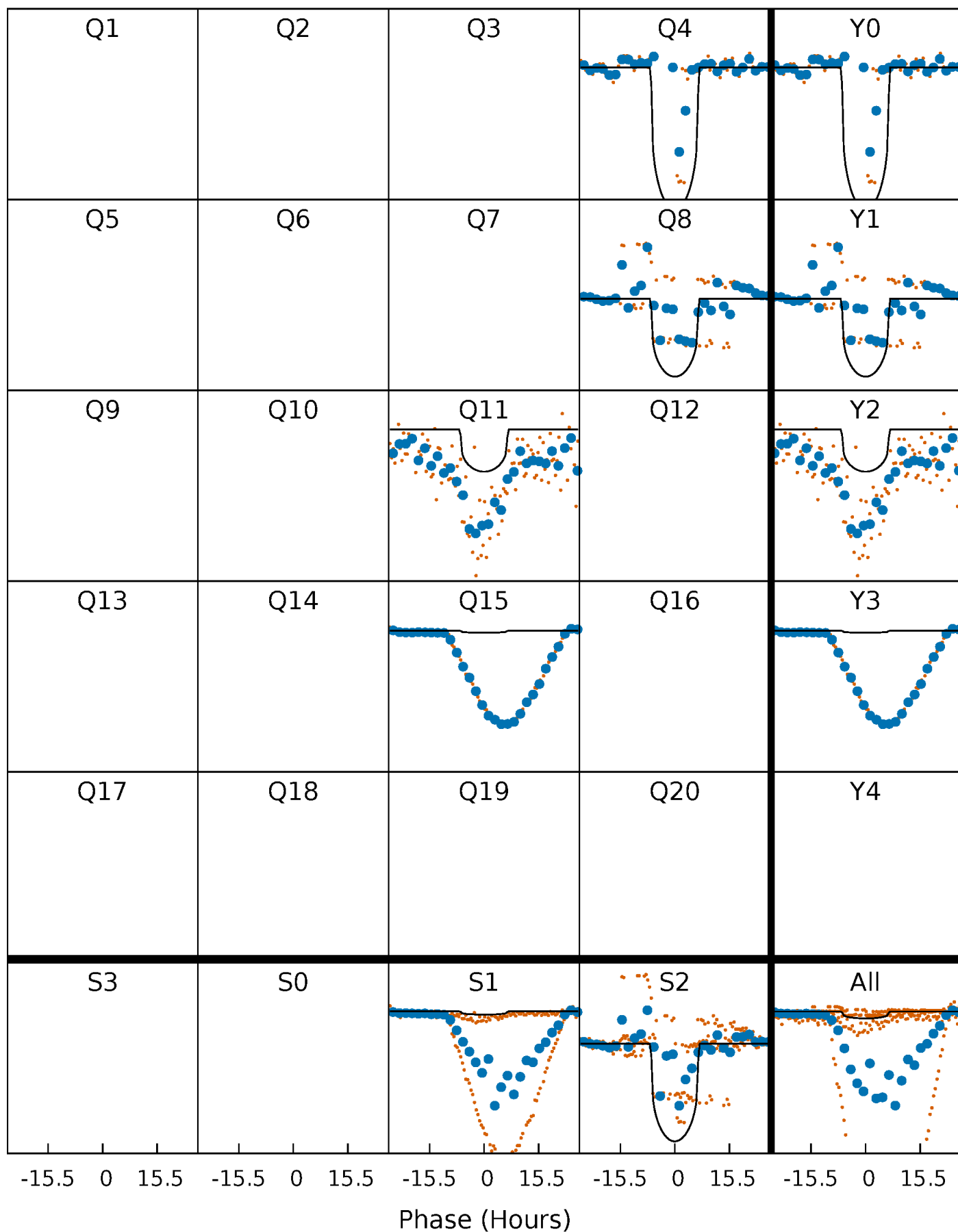
TCE 006937131-06 P=326.304218 Days  $T_0=430.241376$  (BKJD)





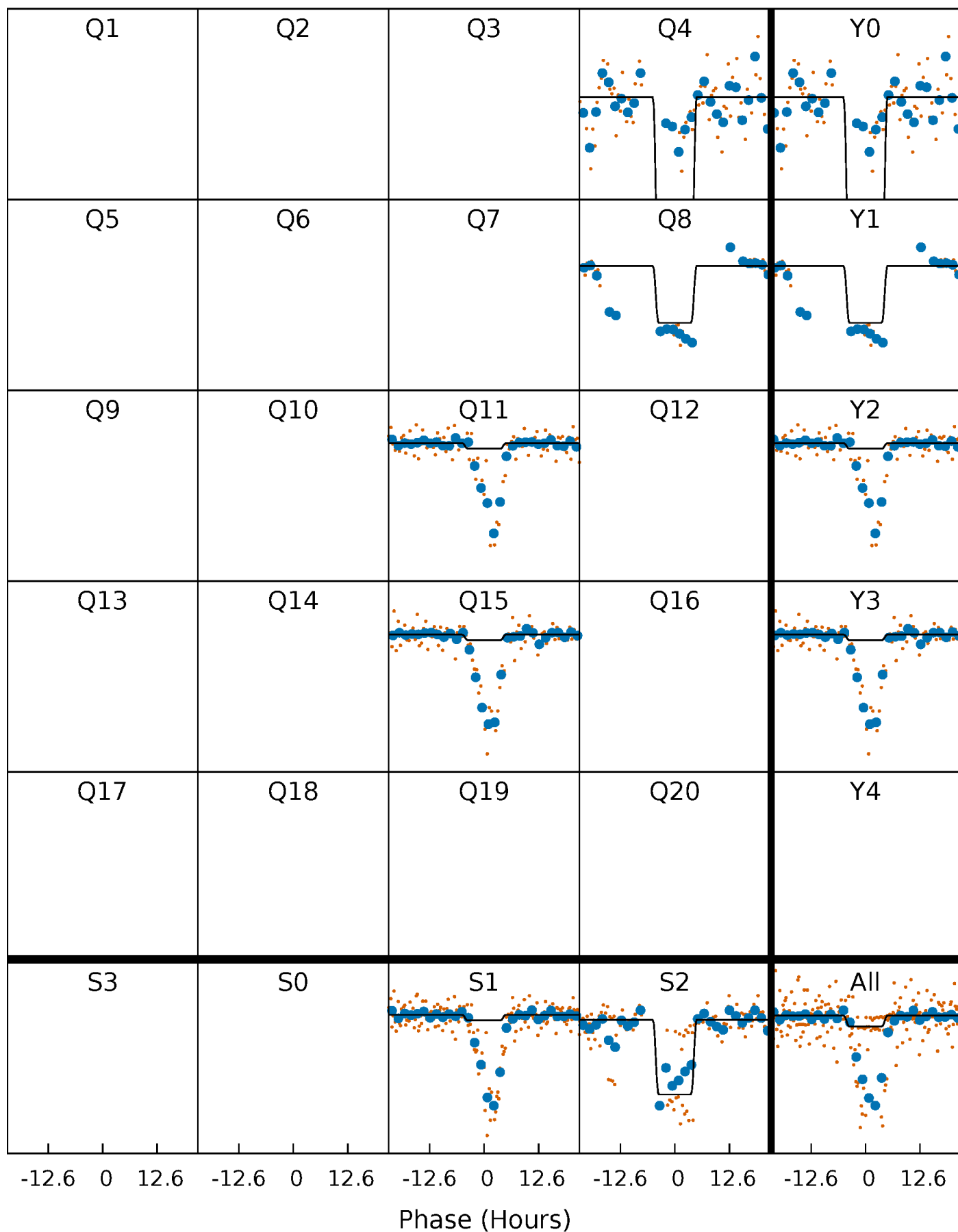
# DV Quarter-Phased Transit Curves

TCE 006937131-06 P=326.304218 Days  $T_0=430.241376$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

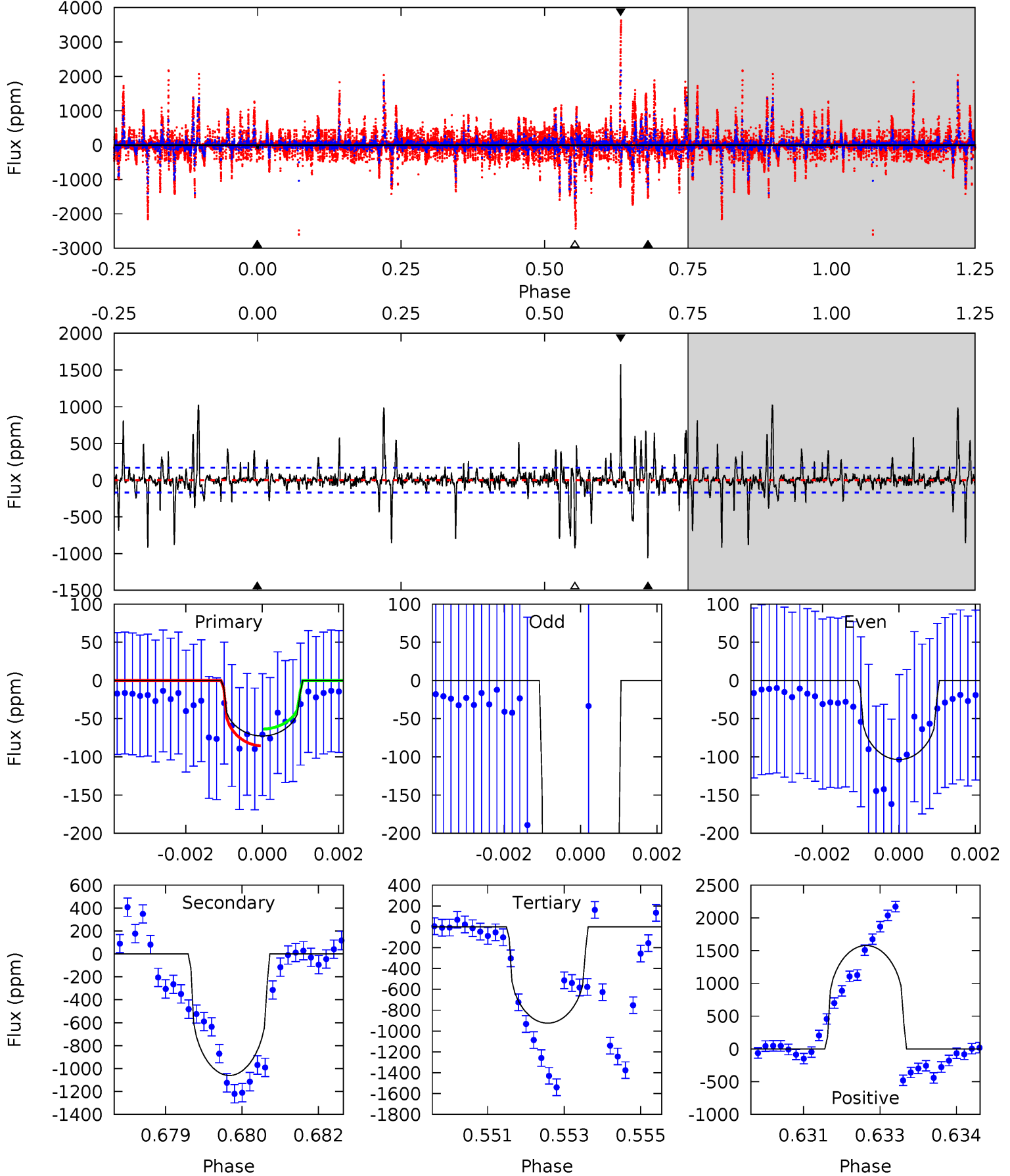
TCE 006937131-06 P=326.296708 Days  $T_0=430.324988$  (BKJD)



# DV Model-Shift Uniqueness Test

006937131-06, P = 326.304218 Days, E = 103.937158 Days

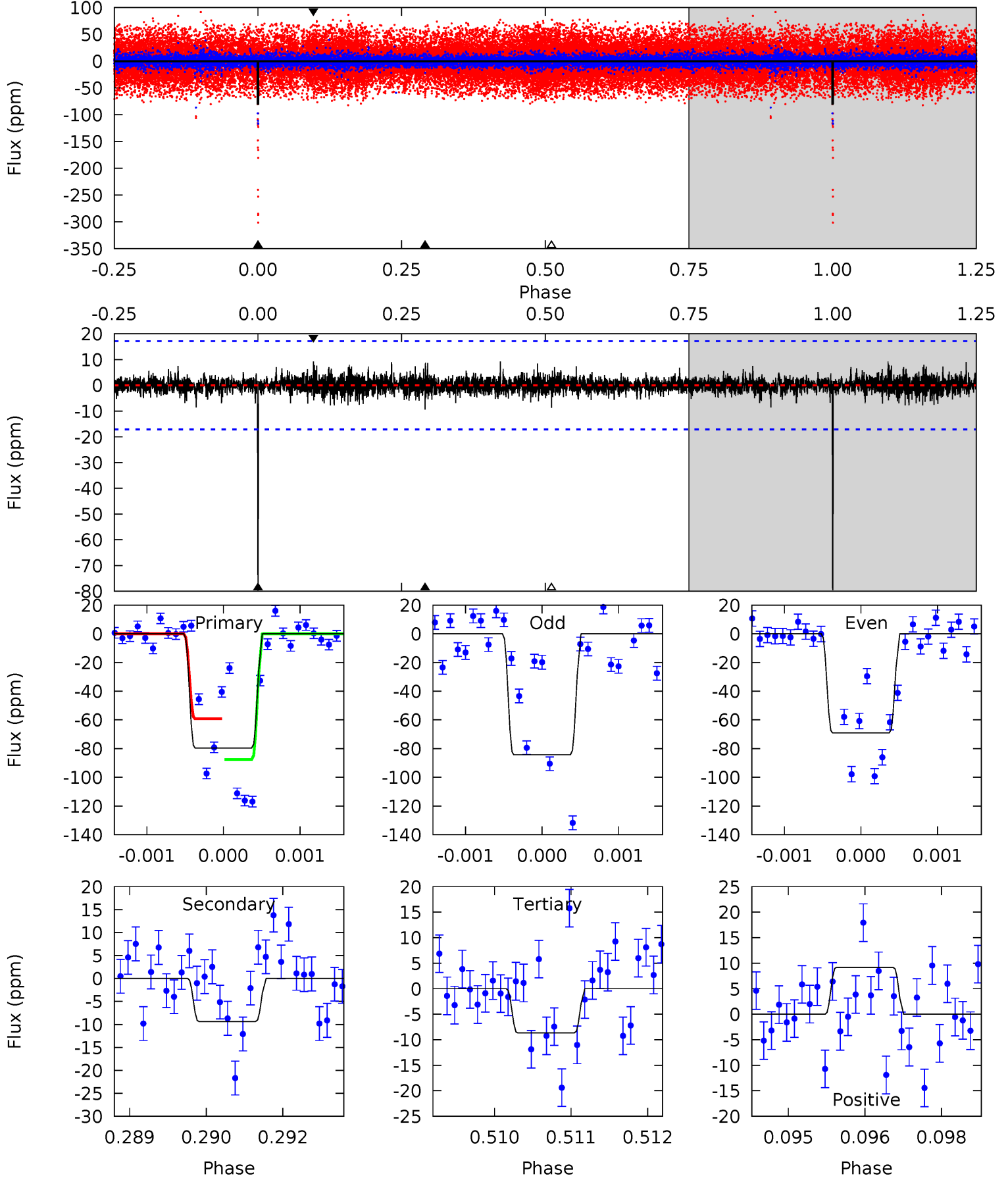
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2.30	33.5	29.2	49.9	5.36	3.14	5.04	-26.9	-47.6	4.29	-16.4	7.42	7.40	0.60	0



# Alt Model-Shift Uniqueness Test

006937131-06, P = 326.296708 Days, E = 104.028280 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
25.1	2.95	2.73	2.89	5.41	3.22	0.60	22.3	22.2	0.22	0.06	2.48	1.04	0.10	4.54



### Stellar Parameters For KIC 006937131

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$3948^{+87}_{-71}$	$0.995^{+0.033}_{-0.027}$	$-0.500^{+0.200}_{-0.150}$	$48.351^{+14.464}_{-1.523}$	$0.842^{+0.559}_{-0.029}$	$0.000^{+0.000}_{-0.000}$
	+2%/-2%	+3%/-3%	+40%/-30%	+30%/-3%	+66%/-3%	+9%/-24%
Source	PHO56	AST56	PHO56	DSEP		

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

### Secondary Eclipse Parameters for KIC 006937131-06 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-1060 \pm 32$	$45.62^{+5.79}_{-4.74}$	$1805^{+50}_{-40}$	$7063^{+508}_{-447}$	$216^{+50}_{-42}$
Alt.	$-9 \pm 3$	$22.17^{+5.16}_{-4.61}$	$1806^{+50}_{-38}$	$3514^{+348}_{-312}$	$7.920^{+5.744}_{-3.539}$

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

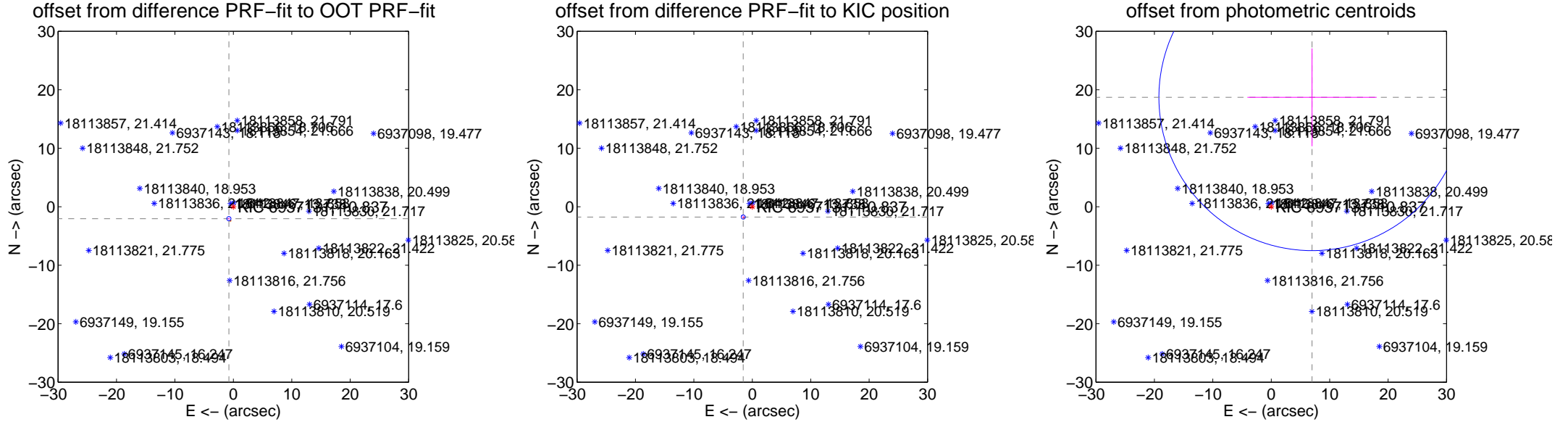
## DV Centroid Data

Supplemental centroid analysis for 006937131-06. **Kepler magnitude: 10.84.** Transit SNR 16.49

**There are 0 quarters with good PRF difference image offsets**

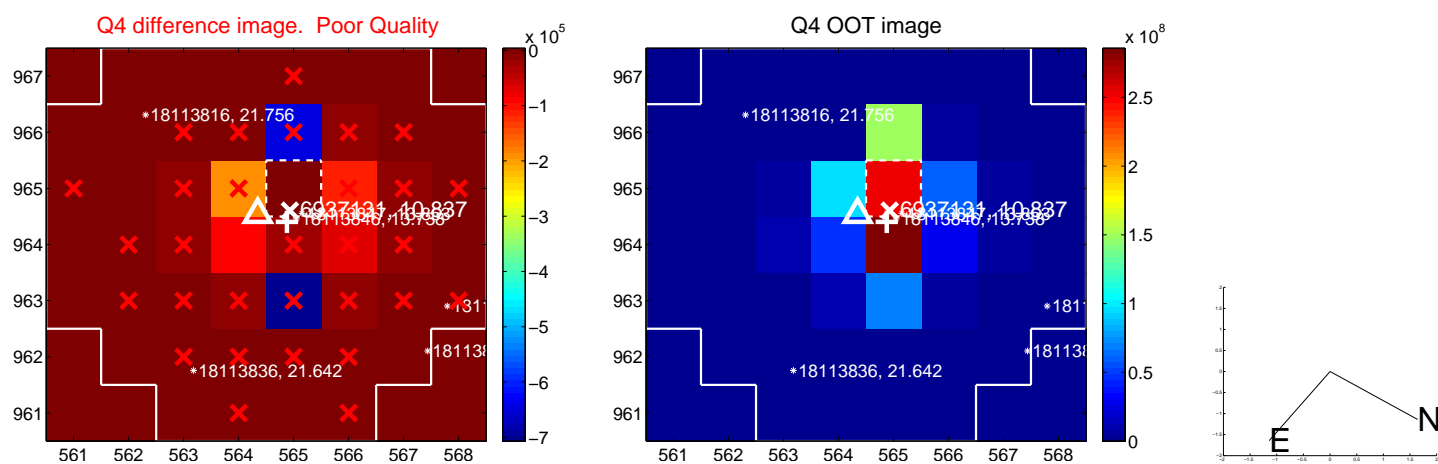
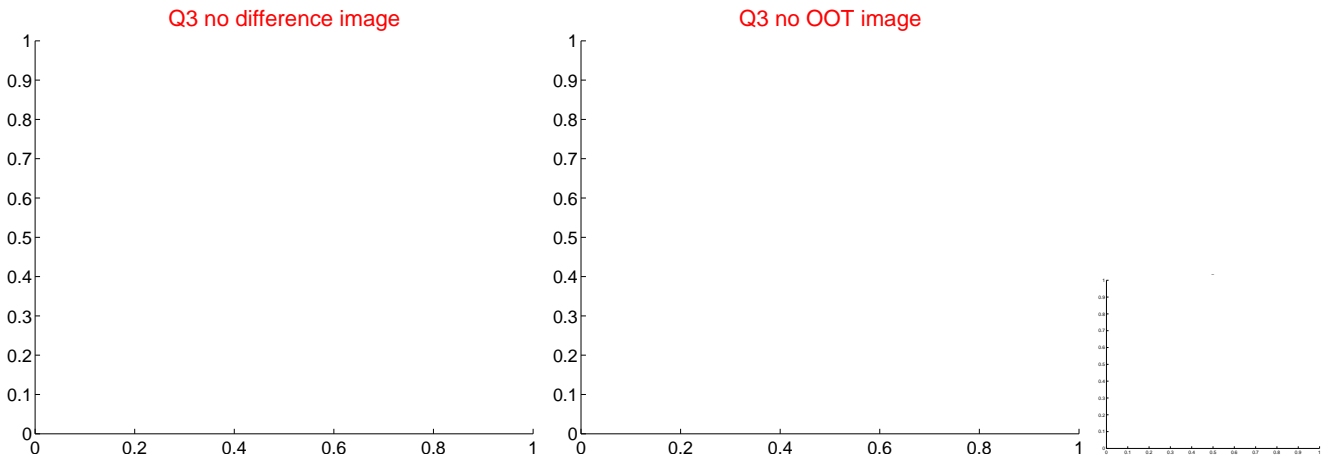
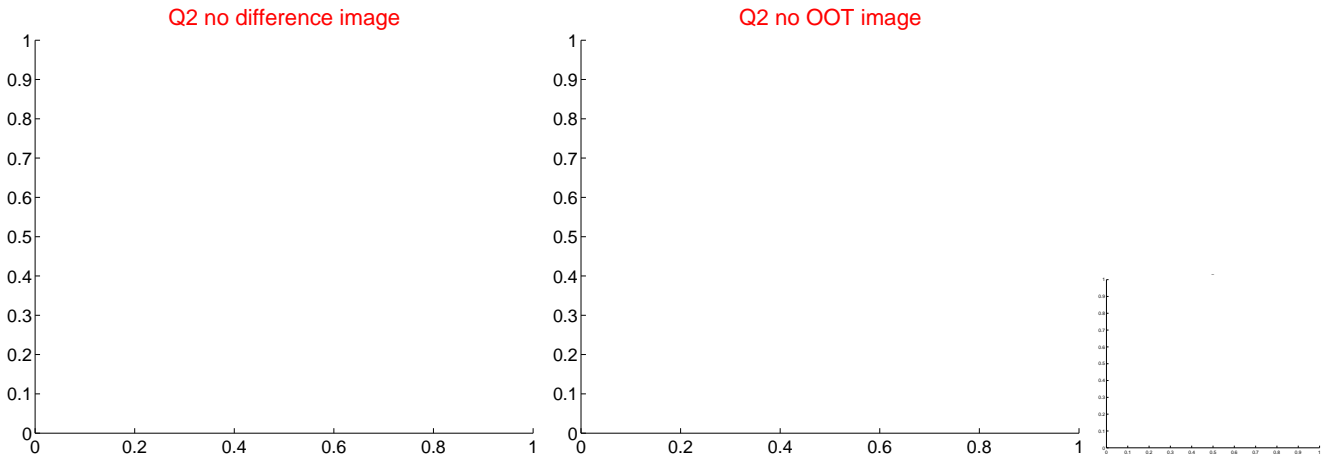
The direct PRF centroid is offset from the target star catalog position by about 1.12 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b><math>2.184 \pm 0.121</math></b>	<b>18.11</b>	$0.764 \pm 0.114$	$-2.045 \pm 0.121$
PRF-fit source offset from KIC position	<b><math>2.347 \pm 0.118</math></b>	<b>19.82</b>	$1.548 \pm 0.114$	$-1.765 \pm 0.121$
photometric centroid source offset	$19.97 \pm 8.74$	2.29	$-6.98 \pm 11.06$	$18.70 \pm 8.36$

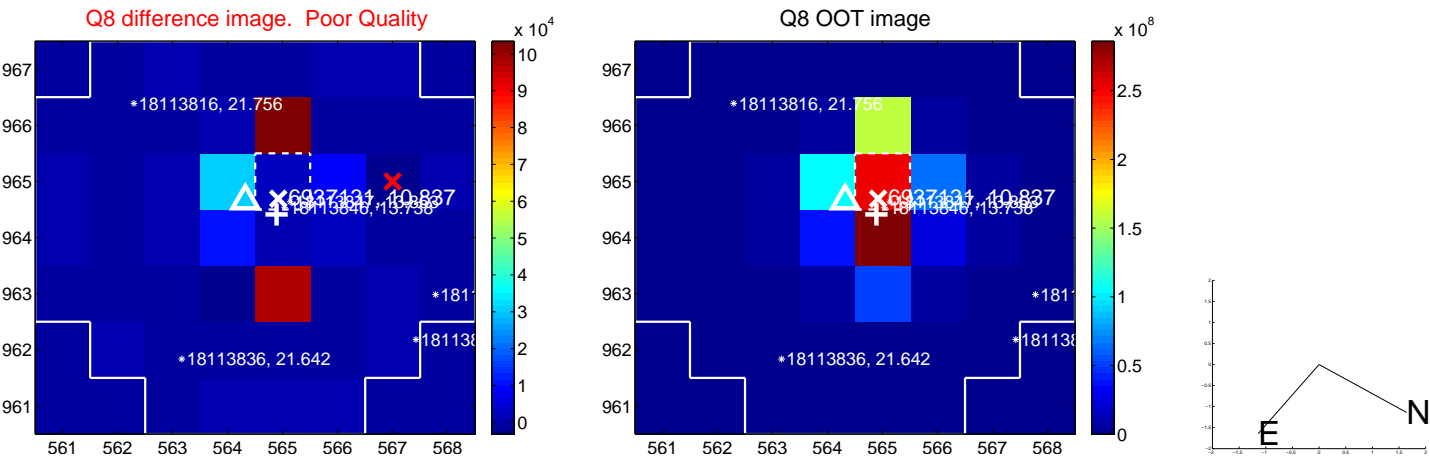


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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





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

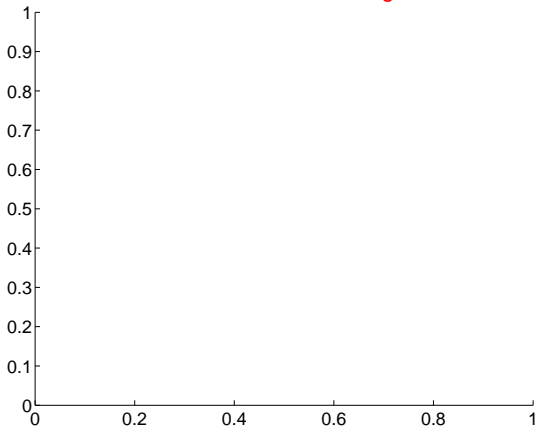


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

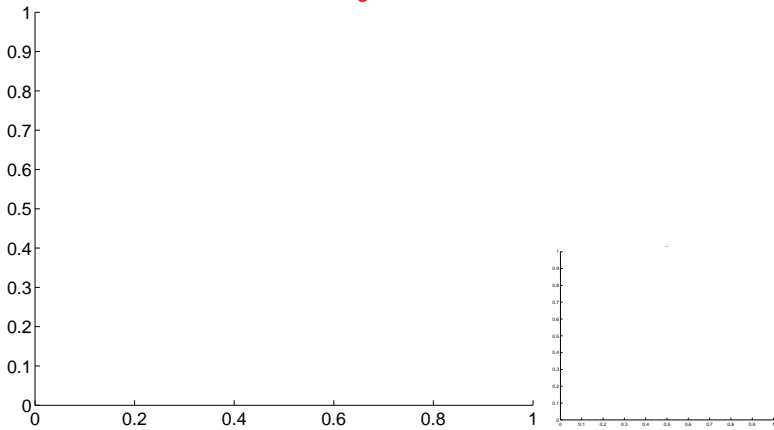


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

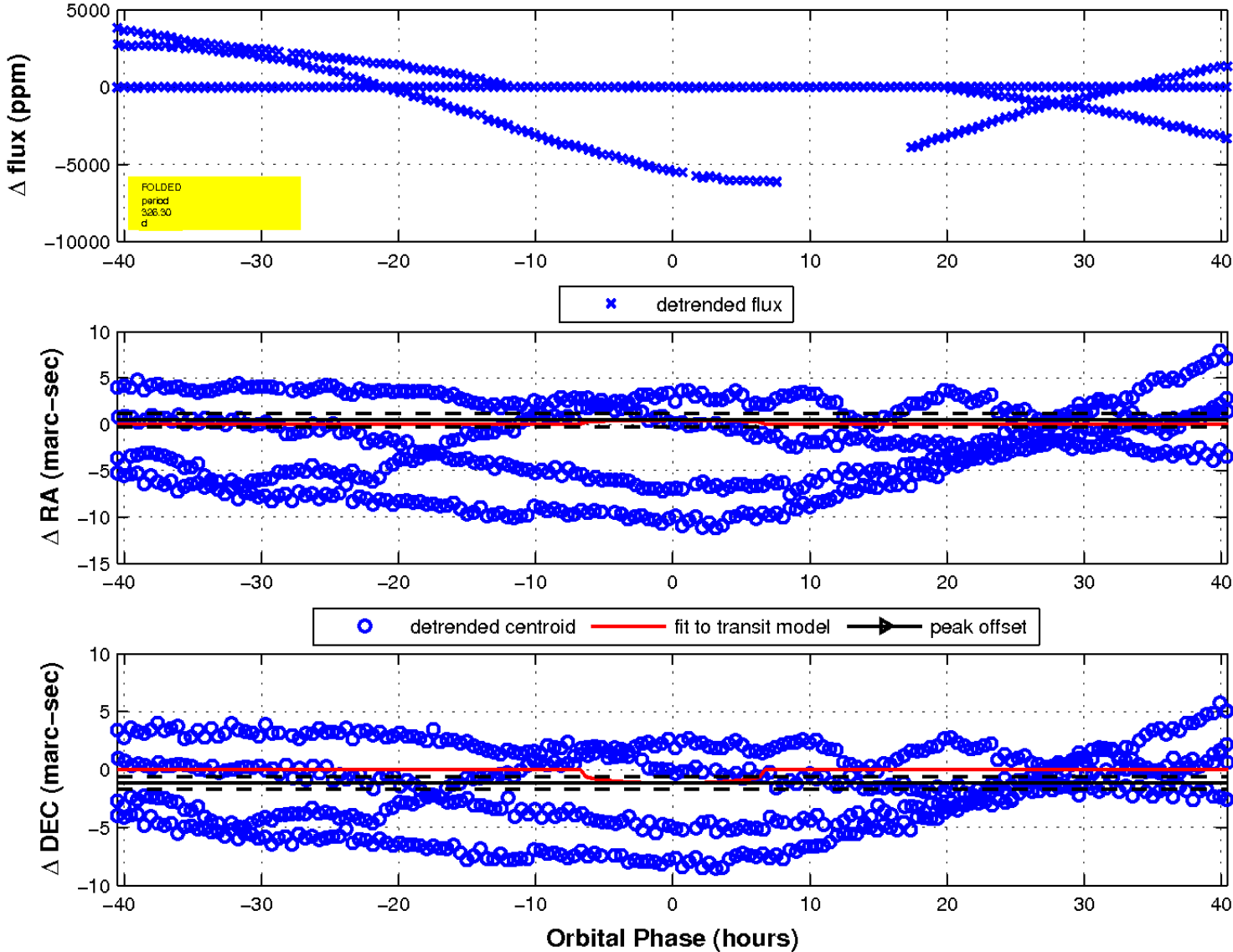
Q17 no difference image



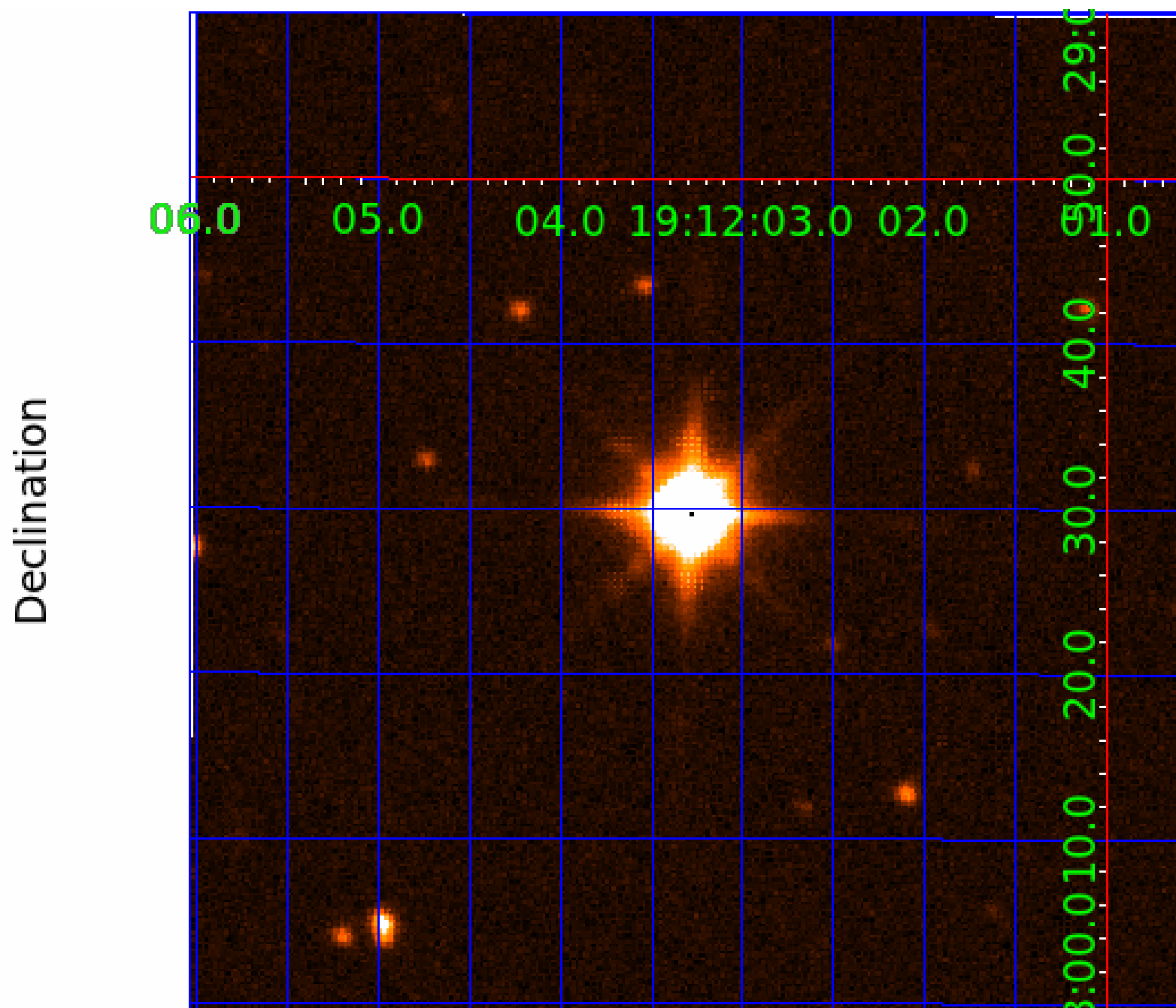
Q17 no OOT image



fluxWeightedCentroids, Planet 6 of 9



UKIRT Image



# KIC 006937131

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006937131-01	OBS	No	117.103296	195.920780	51.3	1.665	38.7	31.5	48.35	3948	43.67	2597.65
006937131-02	OBS	No	358.203546	389.477540	24.1	8.007	19.9	8.5	48.35	3948	29.44	585.01
006937131-03	OBS	No	256.641148	253.452664	43.6	2.098	18.9	17.9	48.35	3948	43.44	912.51
006937131-04	OBS	No	176.008339	233.821327	2.2	1.876	20.1	1.3	48.35	3948	9.18	1508.79
006937131-05	OBS	No	211.915402	161.715255	33.5	9.582	17.7	11.1	48.35	3948	34.00	1177.94
006937131-06	OBS	No	326.304219	430.241376	62.8	13.565	16.5	16.5	48.35	3948	45.99	662.49
006937131-07	OBS	No	68.543331	164.278275	14.4	27.831	15.6	5.8	48.35	3948	27.28	5305.42
006937131-08	OBS	No	110.649092	187.850790	448.8	2.000	17.9	-1.0	48.35	3948	96.47	2801.62
006937131-09	OBS	No	80.018968	145.132211	42.0	2.520	17.7	12.5	48.35	3948	34.75	4316.01

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006937131-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_SKYE_ZUMA—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
006937131-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_ZUMA—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_SATURATED
006937131-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
006937131-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
006937131-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_ZUMA—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_SATURATED
006937131-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_SATURATED
006937131-07	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
006937131-08	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
006937131-09	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—CENT_SATURATED

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

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

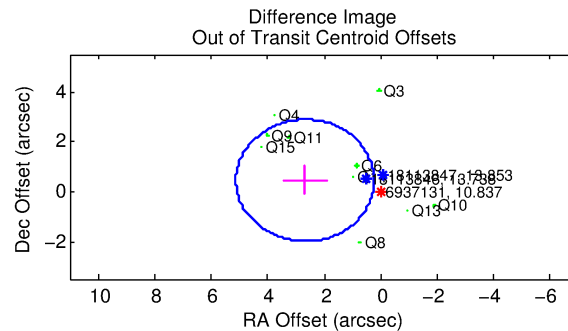
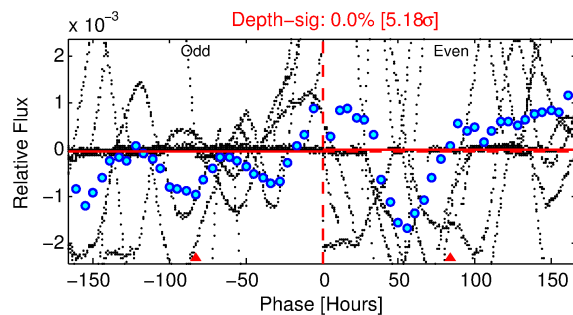
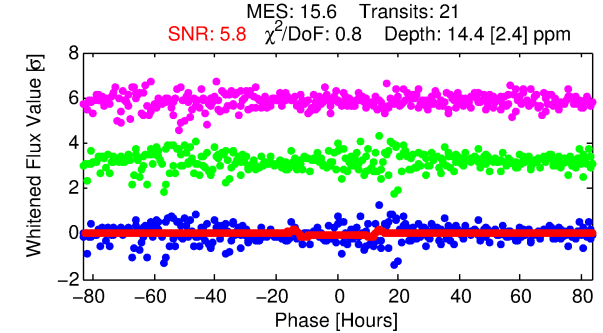
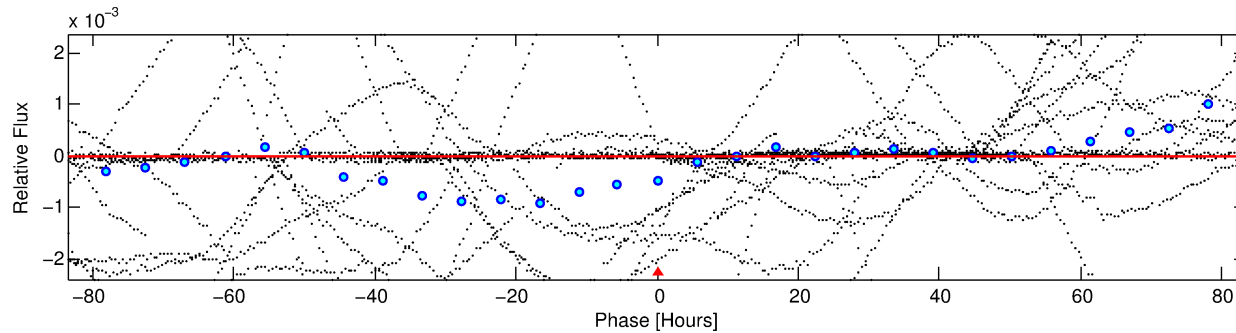
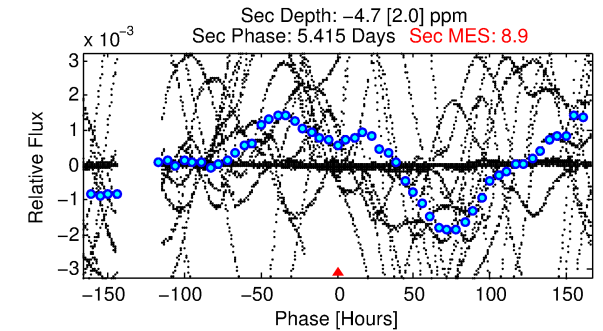
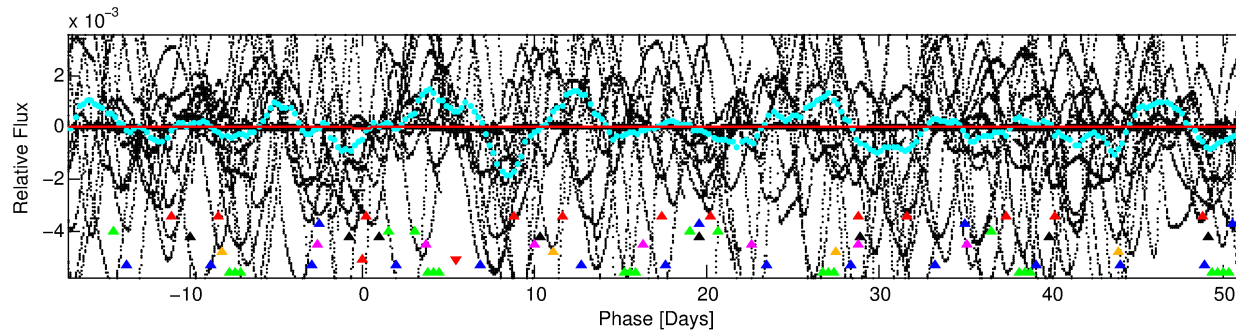
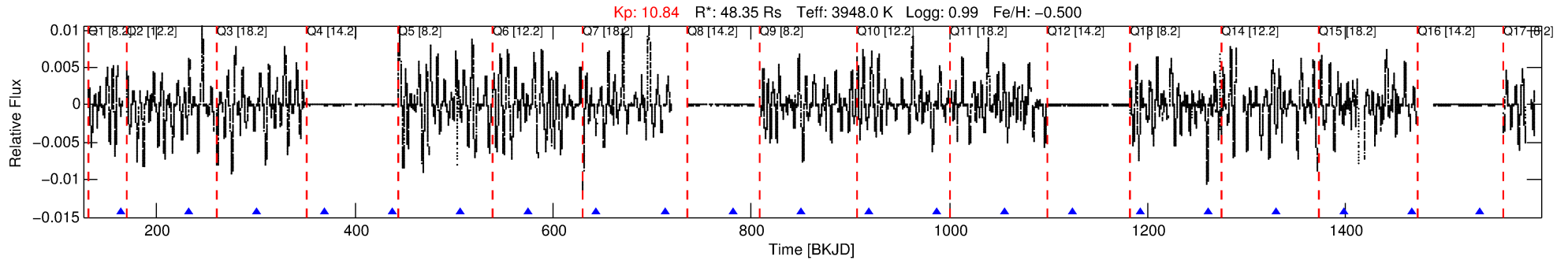
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 006937131-07

No Significant Match Found

# DV One-Page Summary

KIC: 6937131 Candidate: 7 of 9 Period: 68.543 d



## DV Fit Results:

Period = 68.54333 [0.00206] d  
Epoch = 164.2783 [0.0221] BKJD  
Rp/R\* = 0.0052 [0.0005]  
a/R\* = 4.73 [0.49]  
b = 0.97 [0.01]  
Seff = 5305.42 [1187.61]  
Teq = 2176 [122] K  
Rp = 27.28 [8.52] Re  
a = 0.3097 [0.0623] AU  
Ag = N/A  
Teffp = N/A

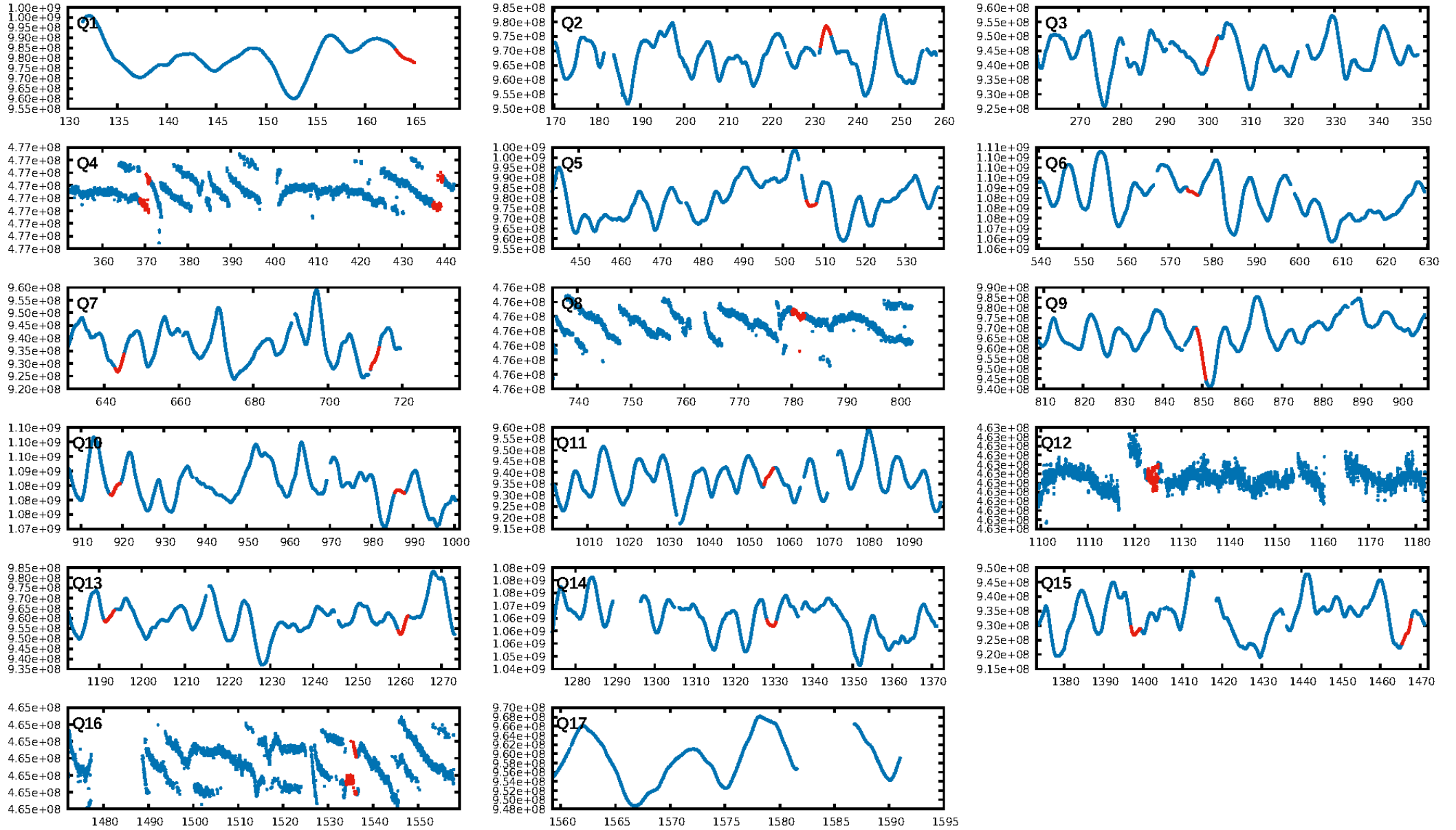
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [9.86σ]  
ModelChiSquare2-sig: 48.7%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [20/20]  
GhostDiagnostic-chr: 1.888  
Centroid-sig: 74.5%  
Centroid-so: 12.428 arcsec [0.50σ]  
OotOffset-rm: 2.716 arcsec [3.34σ]  
KicOffset-rm: 2.482 arcsec [3.29σ]  
OotOffset-st: 3/3/2/2 [10]  
KicOffset-st: 3/3/2/2 [10]  
DiffImageQuality-fgm: 0.40 [4/10]  
DiffImageOverlap-fno: 0.80 [8/10]

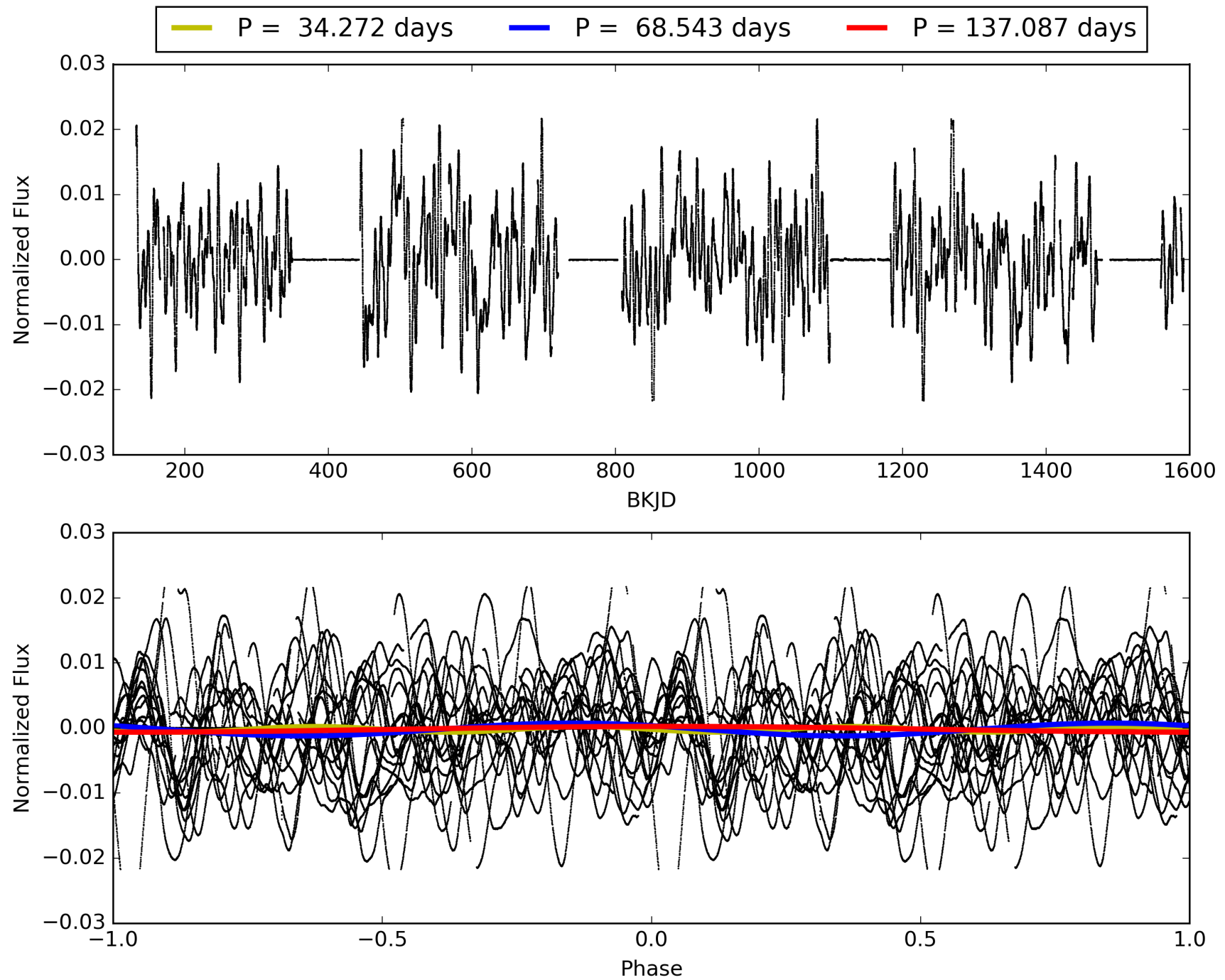
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 00:47:31 Z

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

# TCE 006937131-07, PDC Light Curves



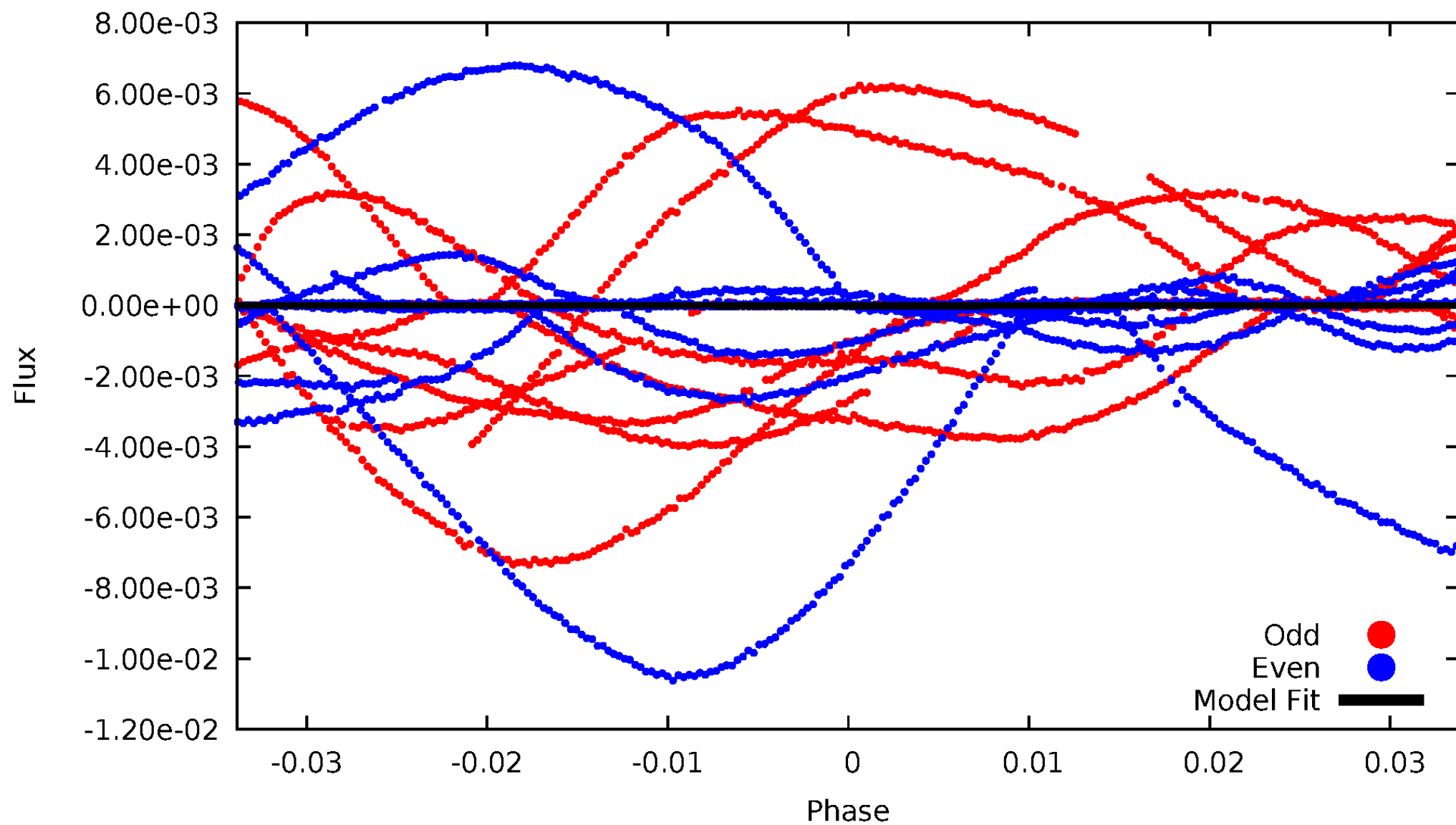
# TCE 006937131-07





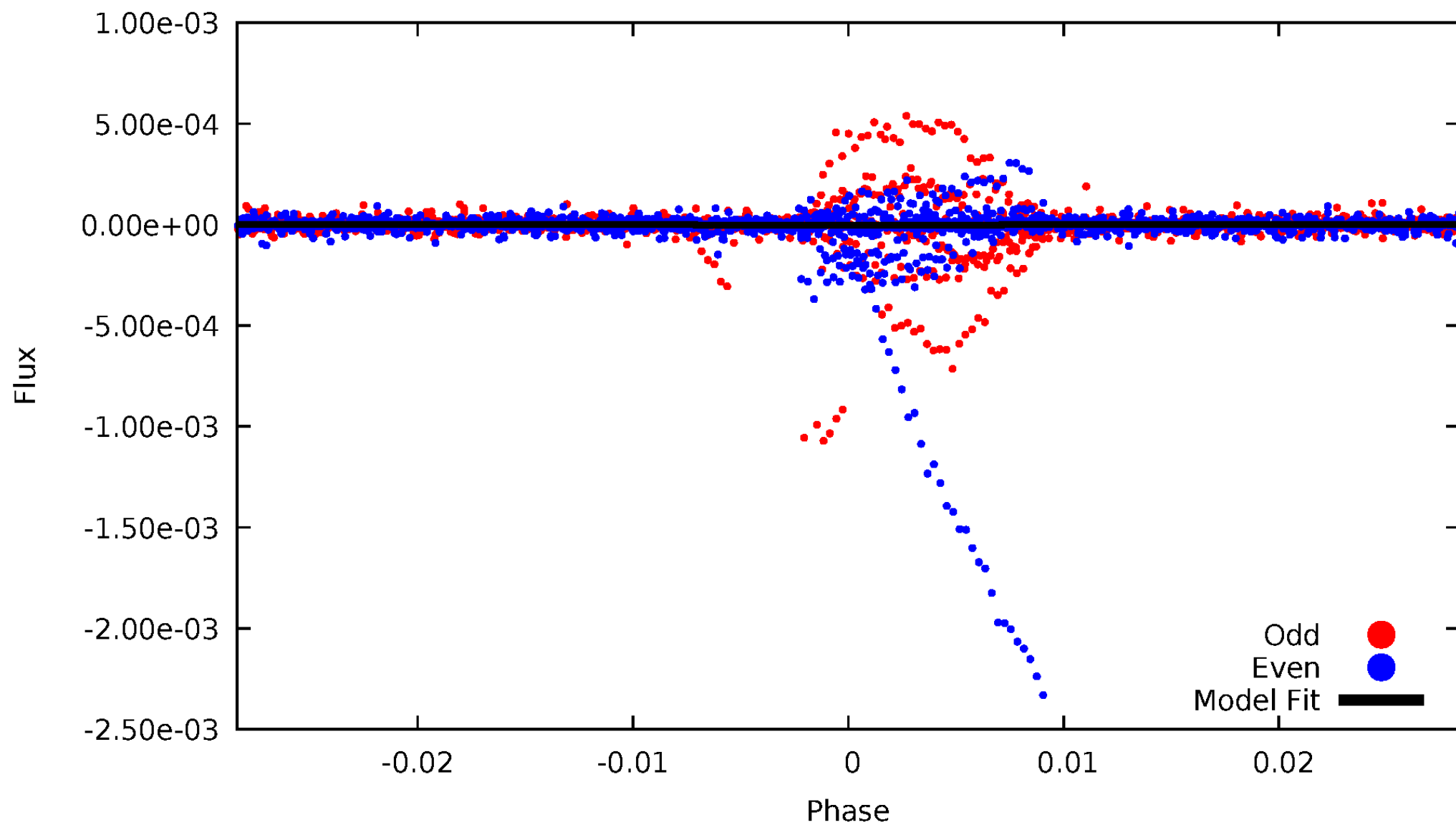
# DV Odd/Even

TCE 006937131-07



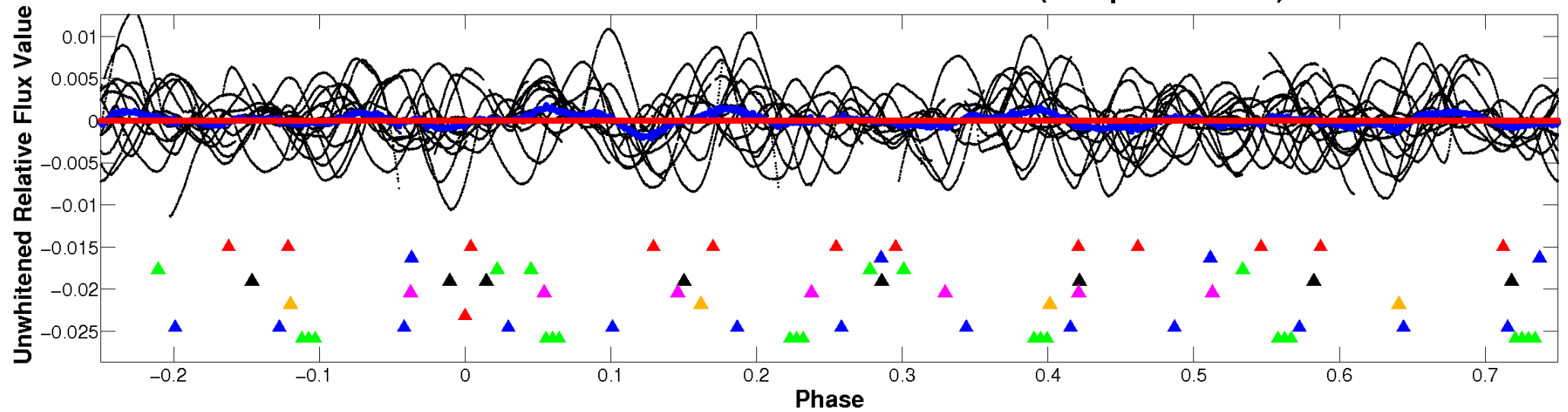
# ALT Odd/Even

TCE 006937131-07

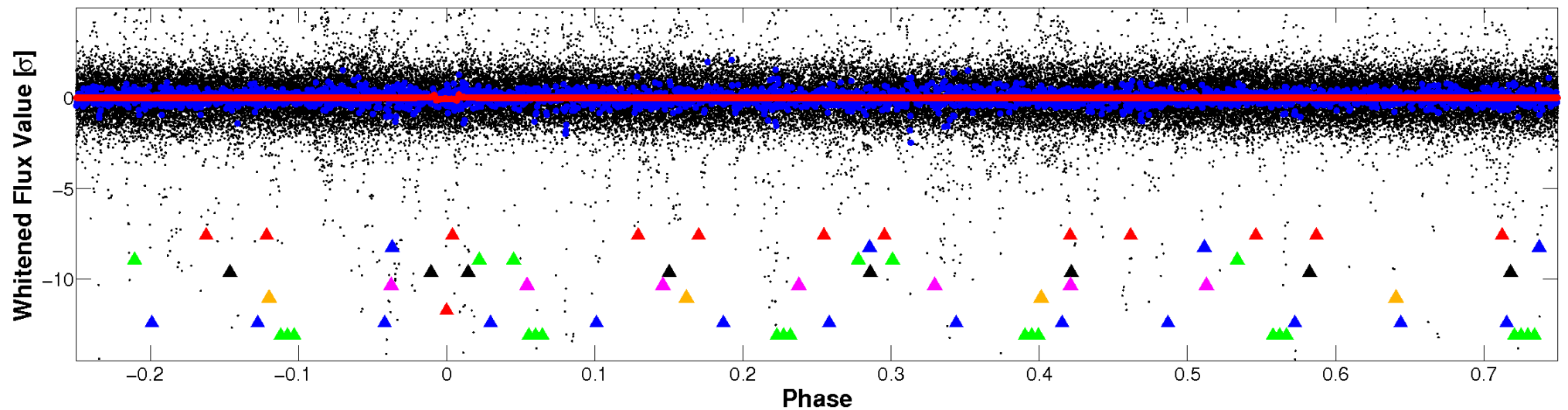


# Non-Whitened Vs. Whitened Light Curve

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

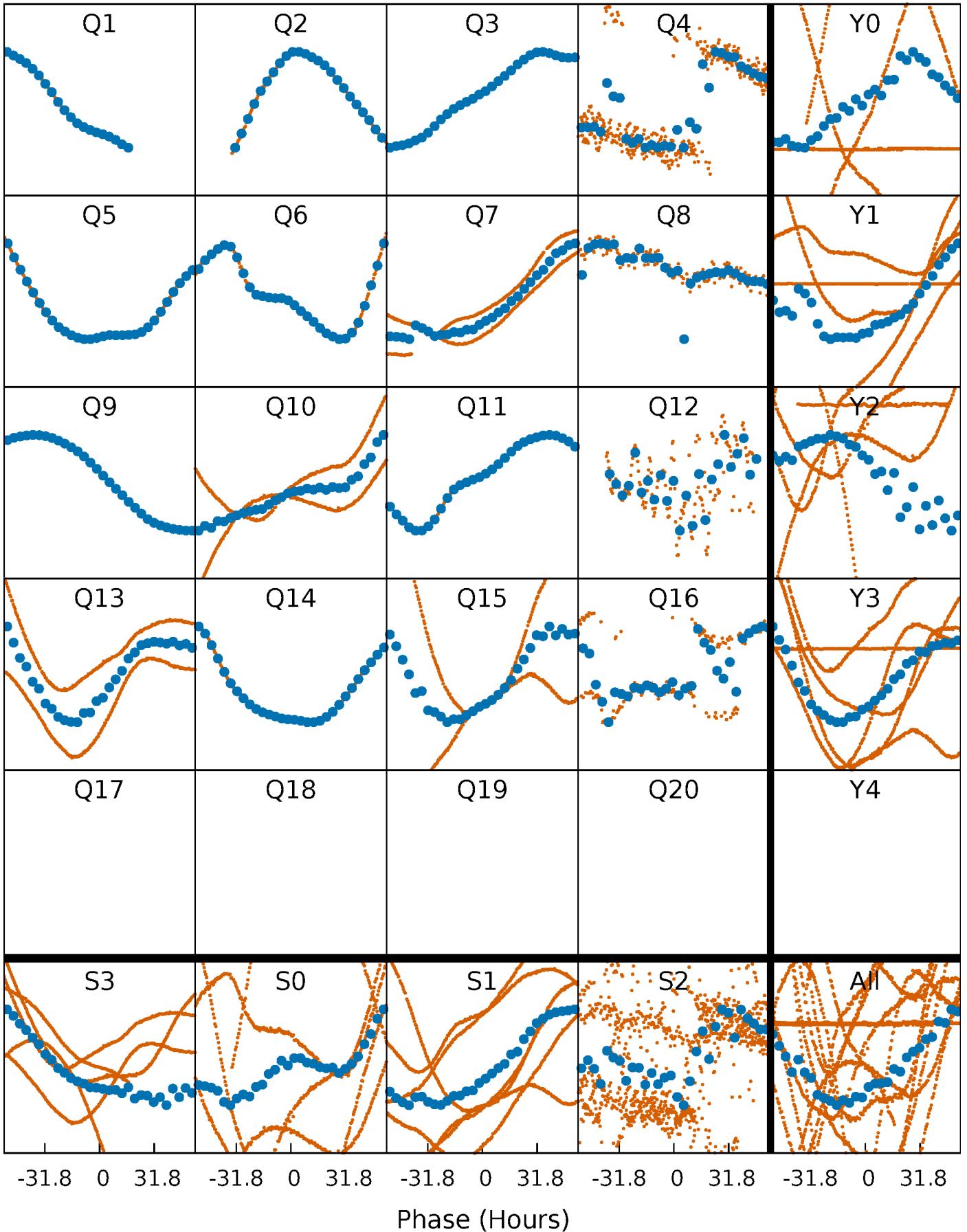


Planet 7 : Phased Whitened Flux Time Series (Fit Epoch/Period)



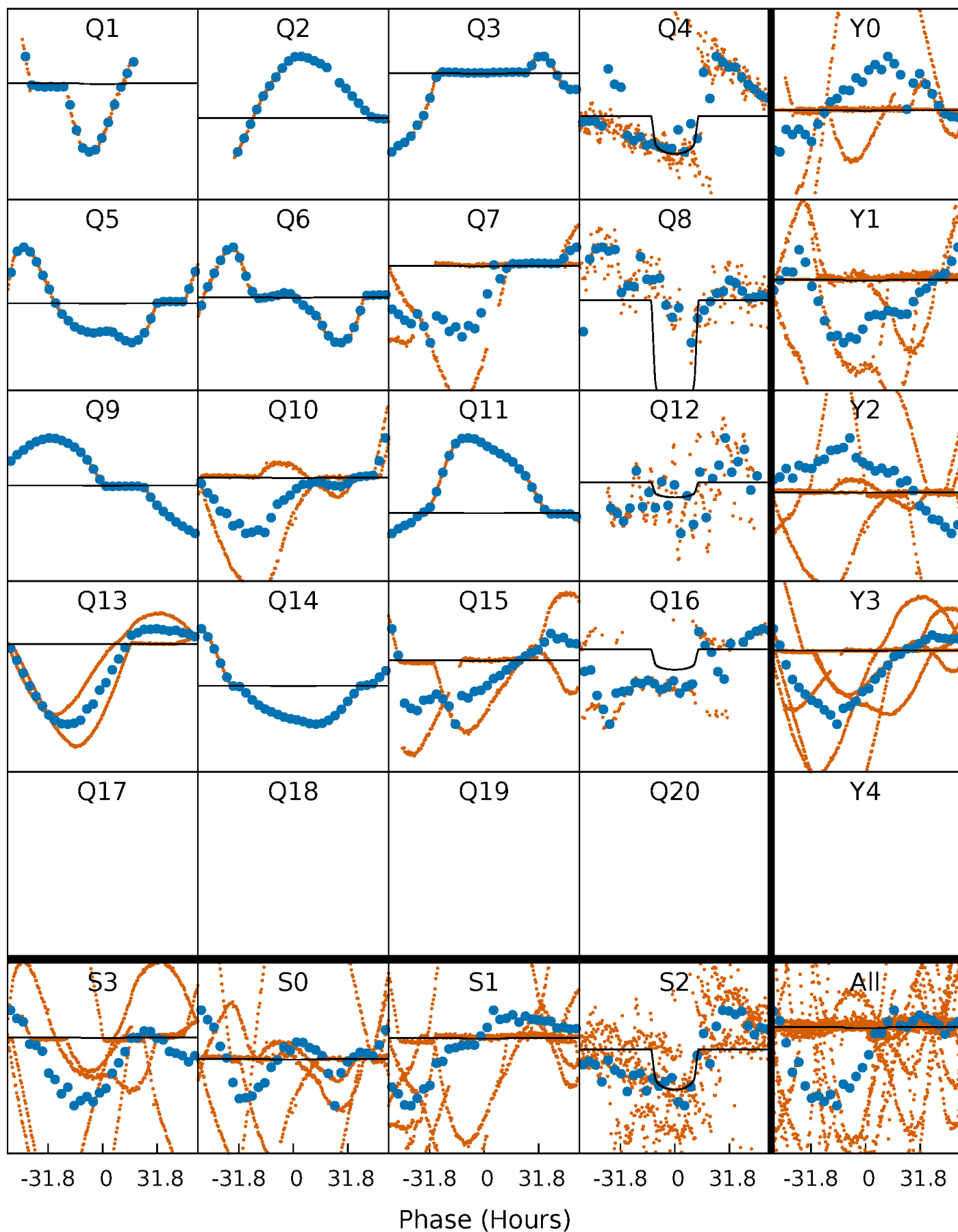
# PDC Quarter-Phased Transit Curves

TCE 006937131-07 P= 68.543331 Days  $T_0=164.278275$  (BKJD)



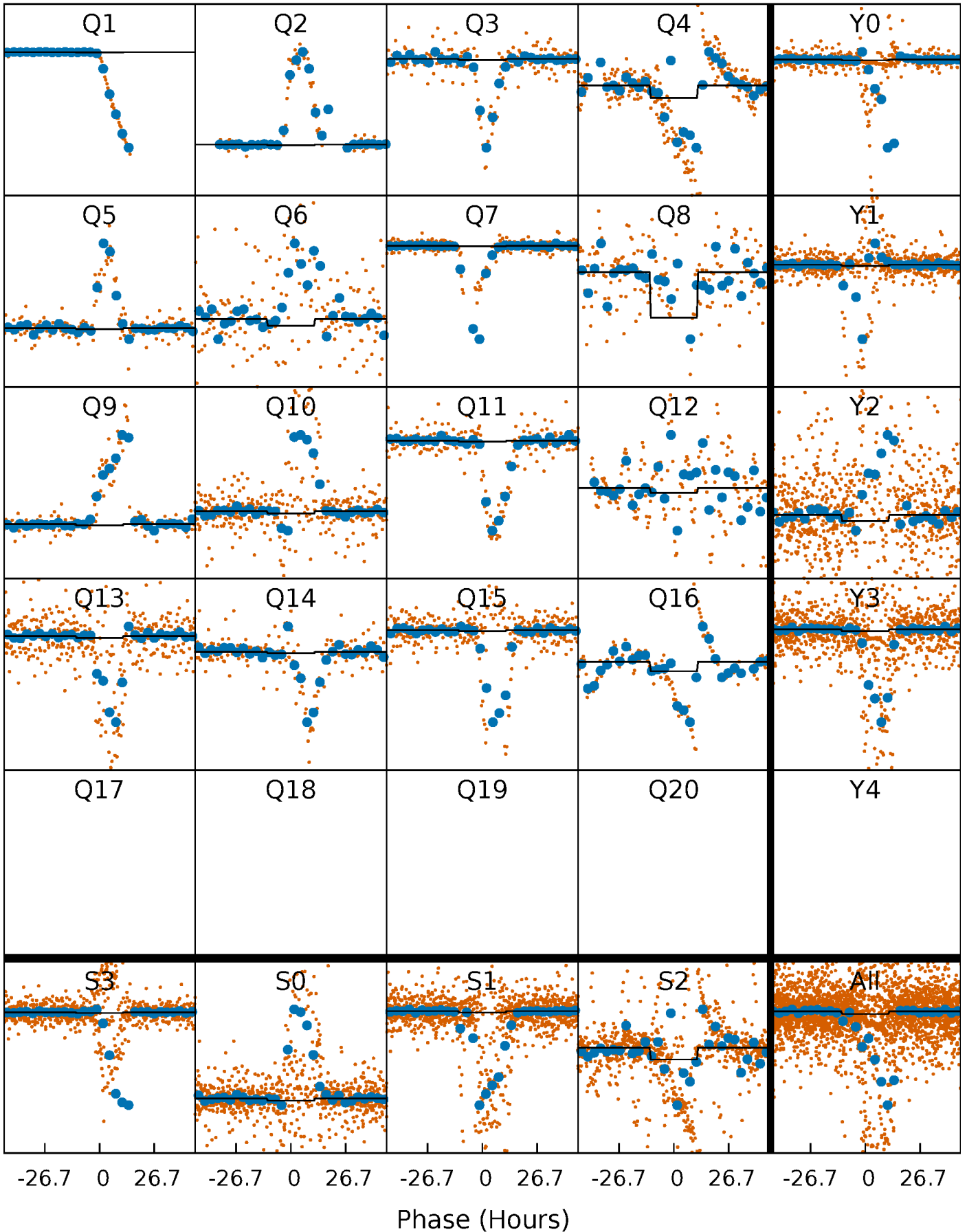
# DV Quarter-Phased Transit Curves

TCE 006937131-07   P= 68.543331 Days    $T_0=164.278275$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

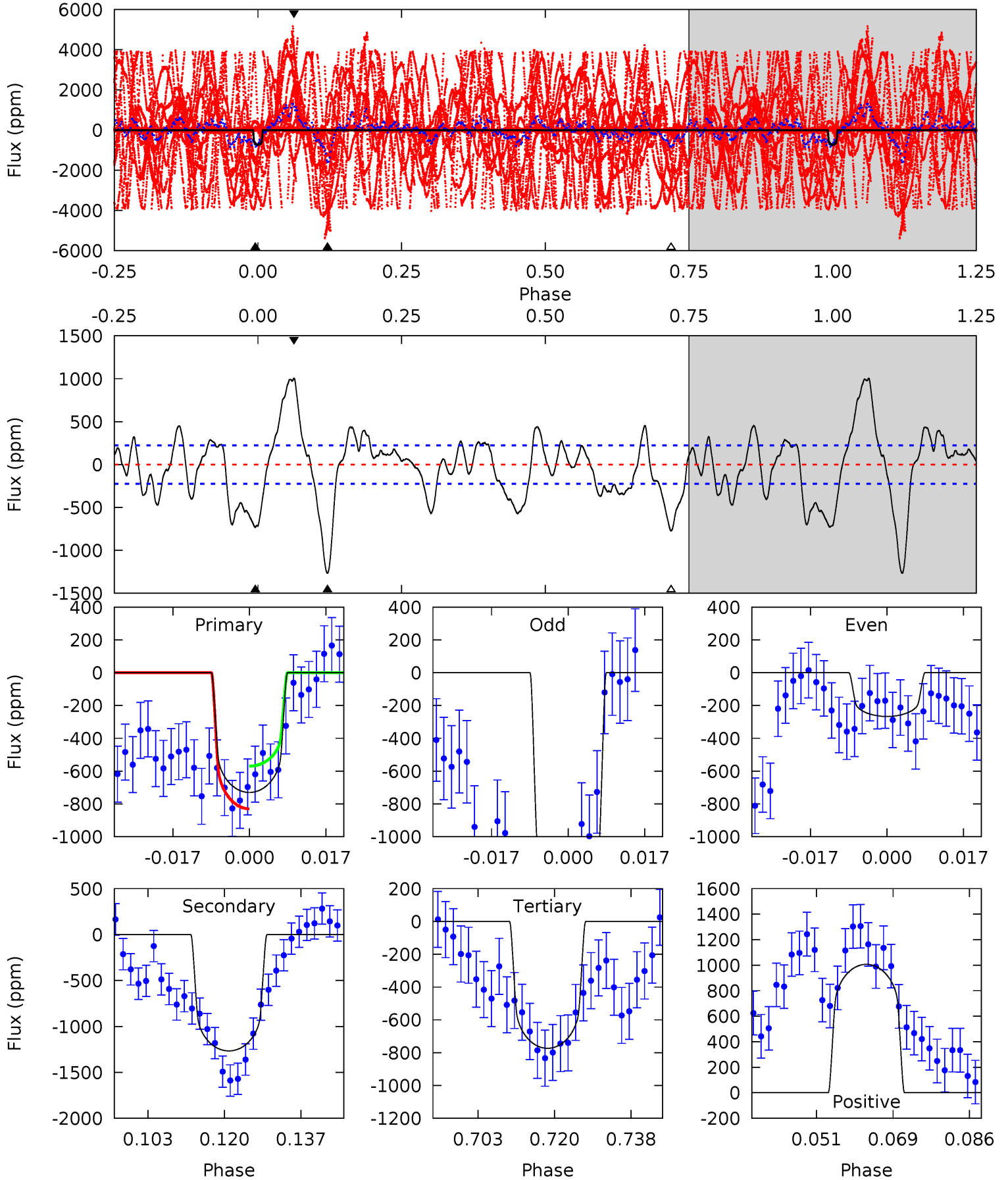
TCE 006937131-07     $P = 68.540619$  Days     $T_0 = 164.364189$  (BKJD)



# DV Model-Shift Uniqueness Test

006937131-07, P = 68.543331 Days, E = 95.734944 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
16.1	27.9	17.0	22.2	4.92	2.38	7.14	-0.95	-6.08	10.9	5.73	12.2	20.1	0.44	2.93

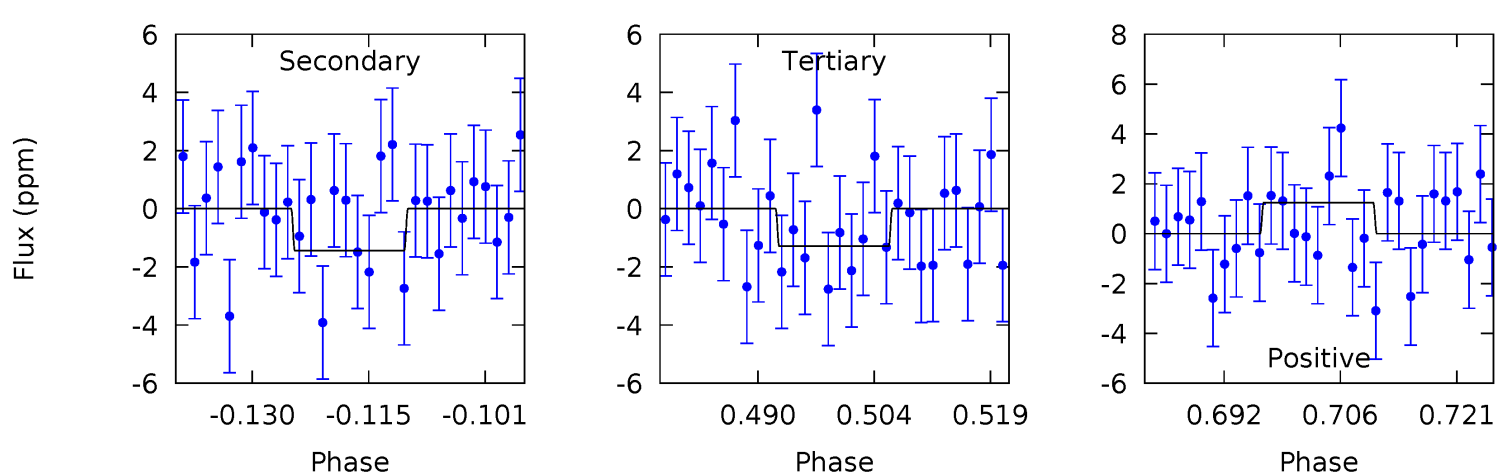
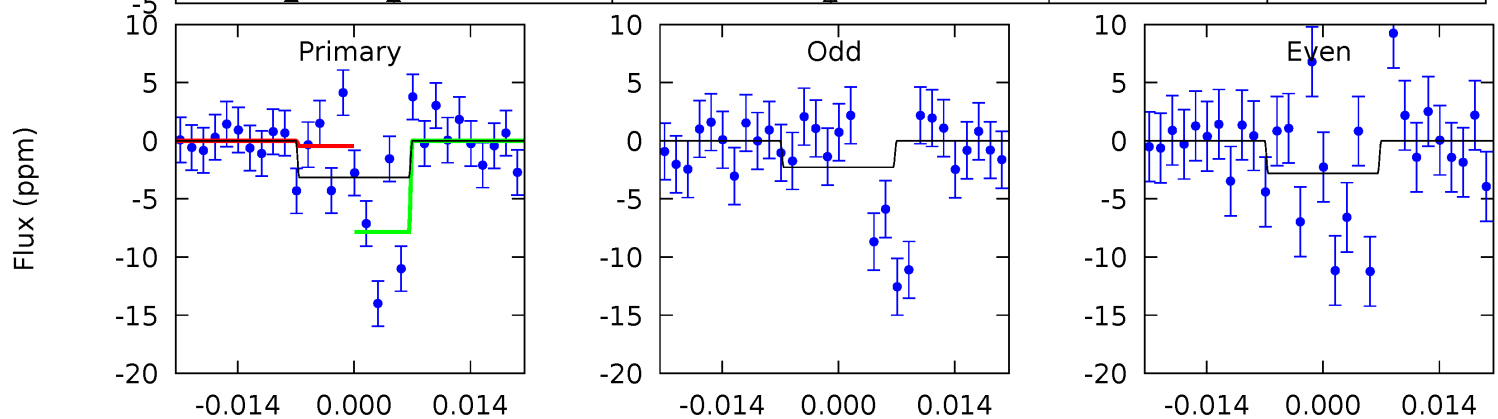
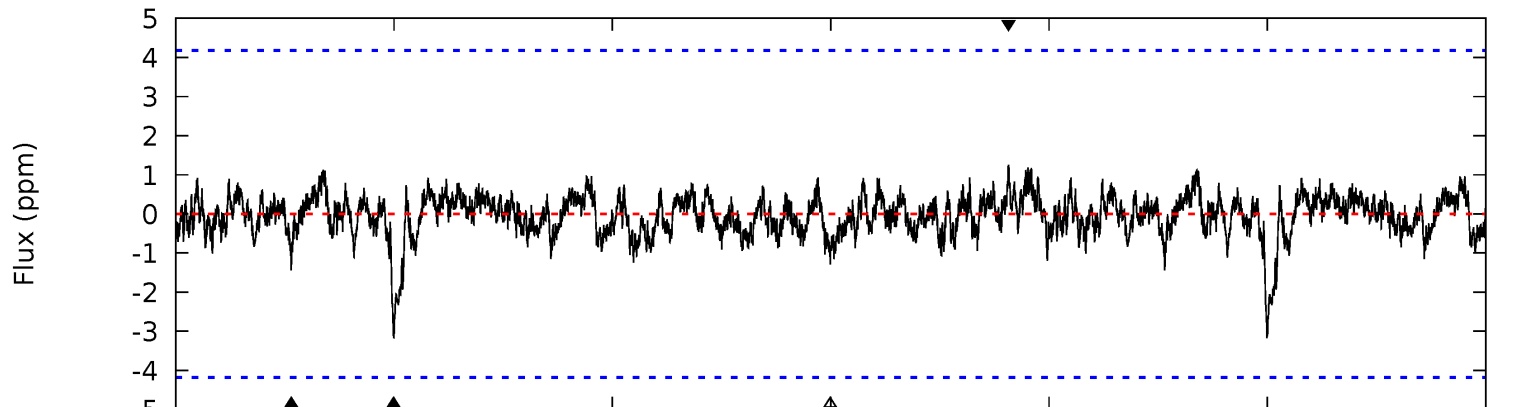
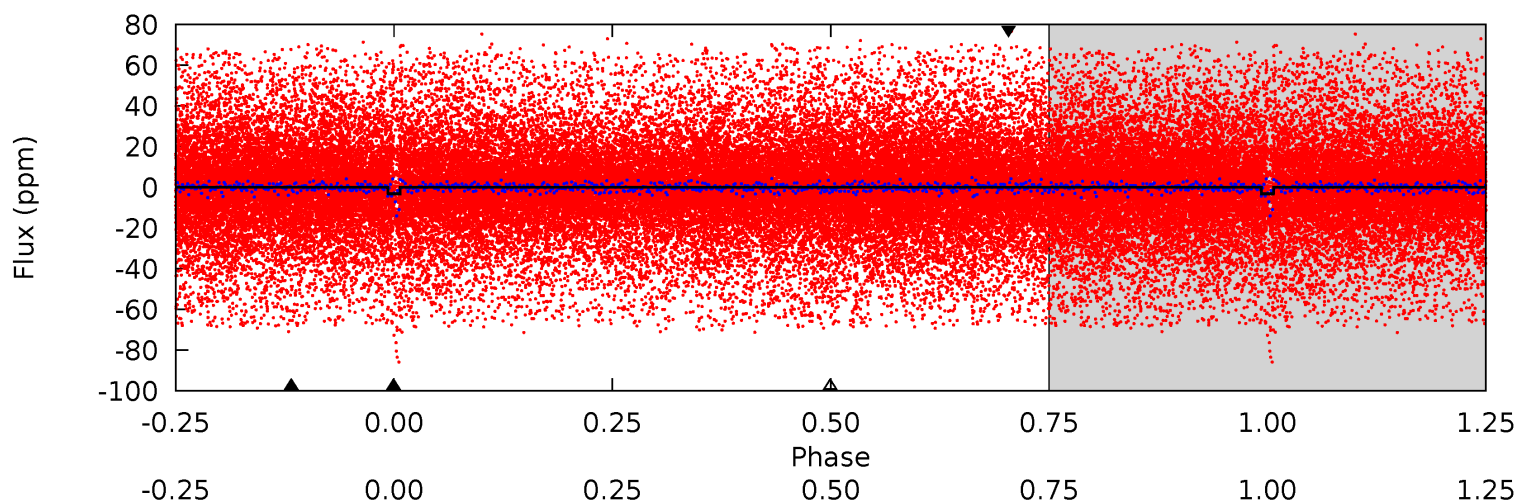




# Alt Model-Shift Uniqueness Test

006937131-07, P = 68.540619 Days, E = 95.823570 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3.76	1.71	1.53	1.48	4.96	2.45	0.50	2.23	2.28	0.18	0.22	0.31	5.59	0.28	0





### Stellar Parameters For KIC 006937131

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$3948^{+87}_{-71}$	$0.995^{+0.033}_{-0.027}$	$-0.500^{+0.200}_{-0.150}$	$48.351^{+14.464}_{-1.523}$	$0.842^{+0.559}_{-0.029}$	$0.000^{+0.000}_{-0.000}$
	+2%/-2%	+3%/-3%	+40%/-30%	+30%/-3%	+66%/-3%	+9%/-24%
Source	PHO56	AST56	PHO56	DSEP		

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

### Secondary Eclipse Parameters for KIC 006937131-07 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-1267 \pm 45$	$27.28^{+2.86}_{-2.76}$	$3036^{+80}_{-67}$	$10439^{+1017}_{-780}$	$90^{+20}_{-14}$
Alt.	$-1 \pm 1$	$9.33^{+2.43}_{-2.40}$	$3031^{+85}_{-63}$	$3215^{+612}_{-1287}$	$0.835^{+1.090}_{-0.528}$

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

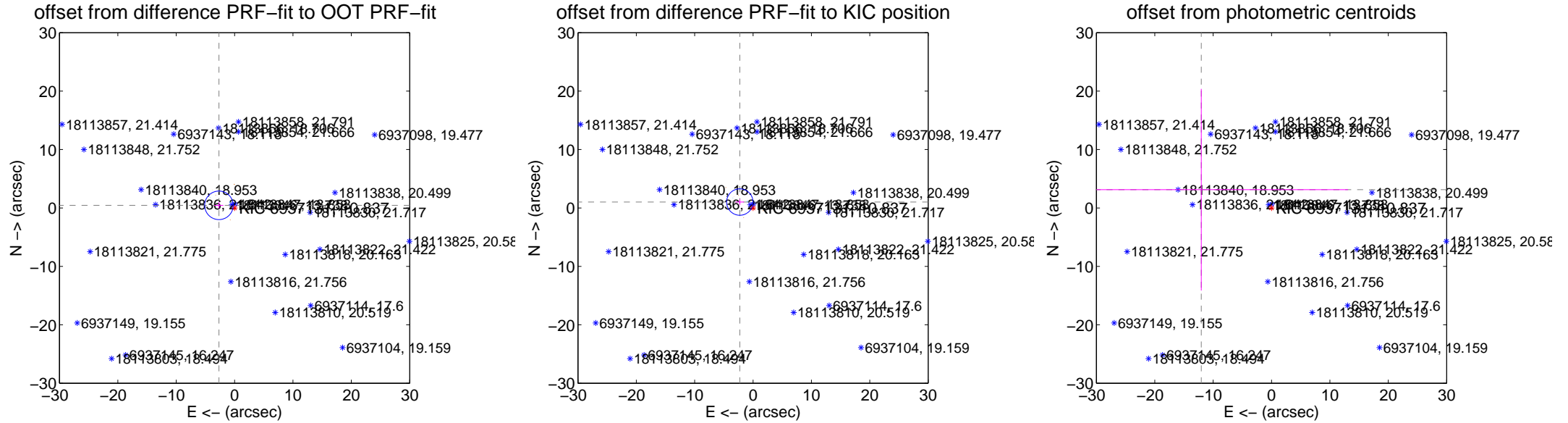
## DV Centroid Data

Supplemental centroid analysis for 006937131-07. **Kepler magnitude: 10.84.** Transit SNR 5.77

There are 4 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.78 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b><math>2.716 \pm 0.814</math></b>	<b>3.34</b>	$2.679 \pm 0.759$	$0.449 \pm 0.561$
PRF-fit source offset from KIC position	<b><math>2.482 \pm 0.753</math></b>	<b>3.29</b>	$2.268 \pm 0.716$	$1.009 \pm 0.480$
photometric centroid source offset	$12.43 \pm 24.72$	0.50	$12.03 \pm 25.15$	$3.13 \pm 17.26$



Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three- $\sigma$ . Red \*: target star. Blue \*: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

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

Q1 no difference image



Q1 no OOT image



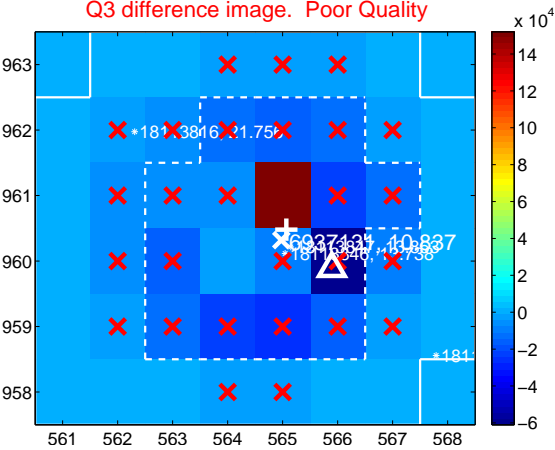
Q2 no difference image



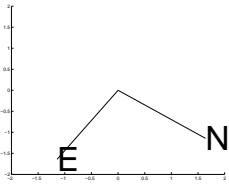
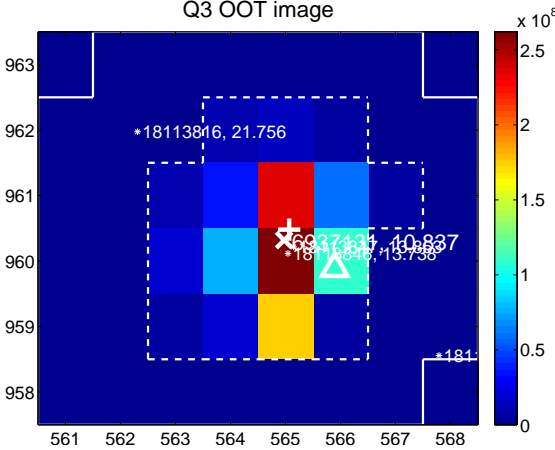
Q2 no OOT image



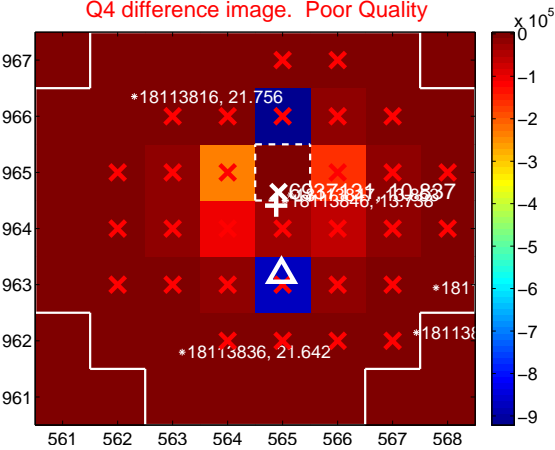
Q3 difference image. Poor Quality



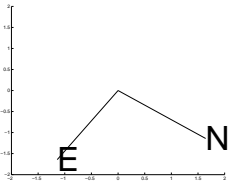
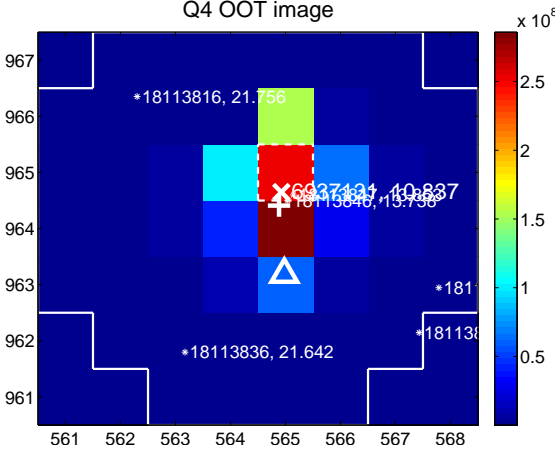
Q3 OOT image



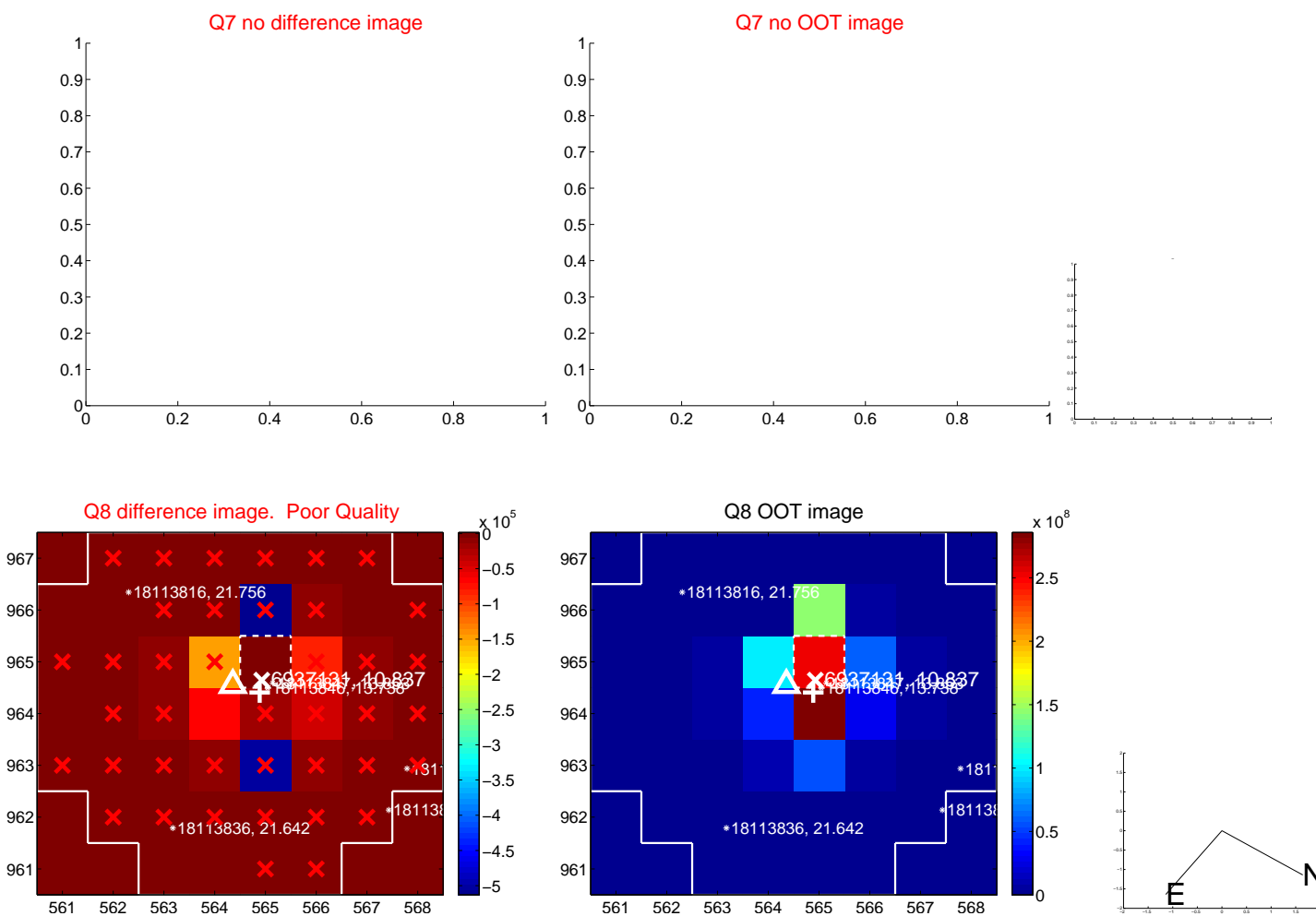
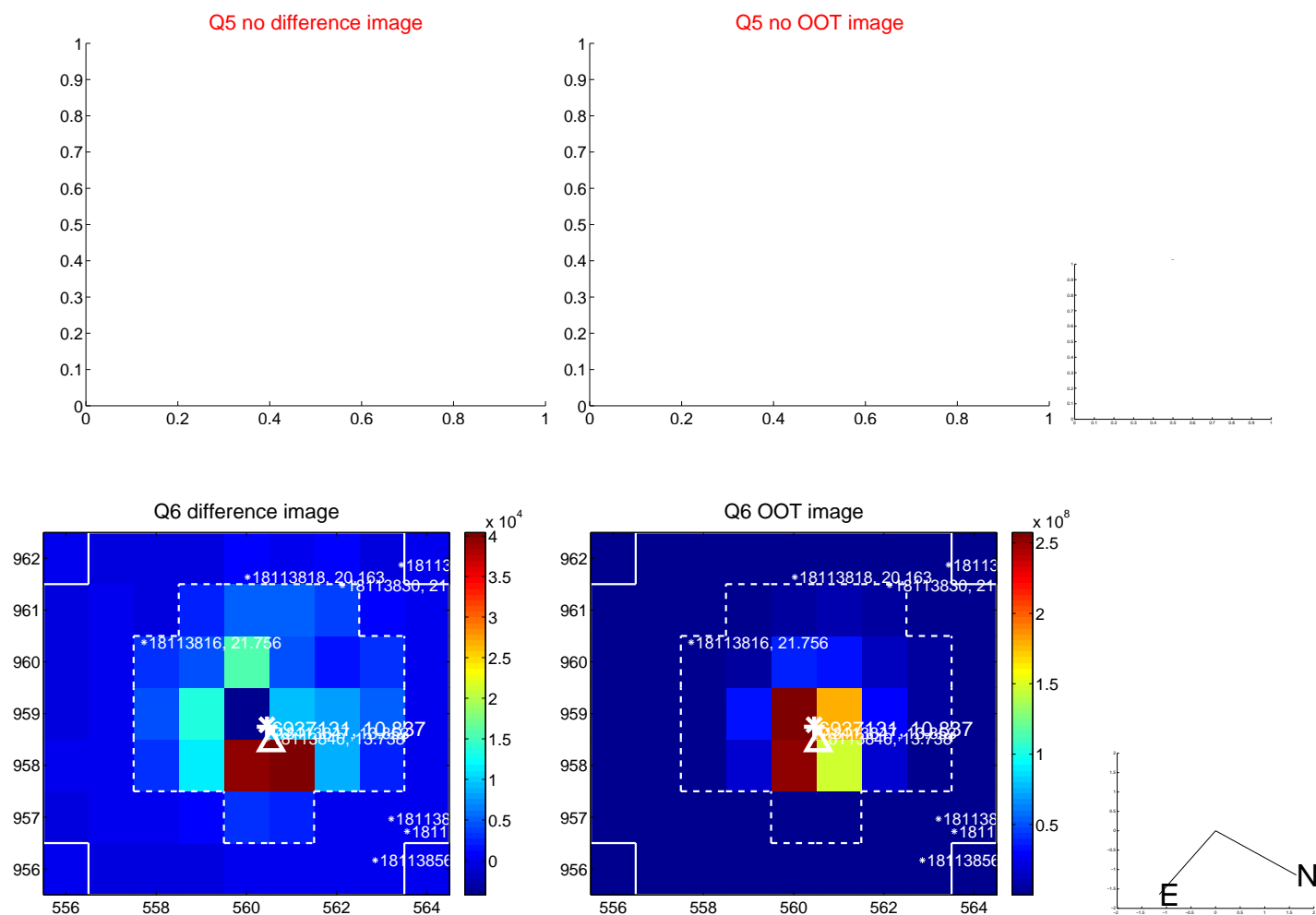
Q4 difference image. Poor Quality



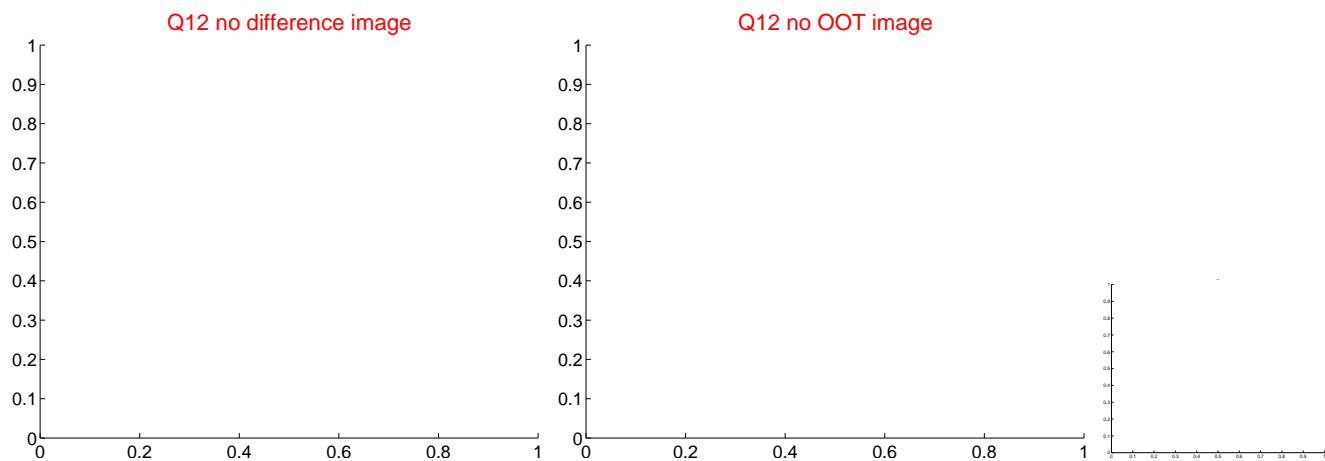
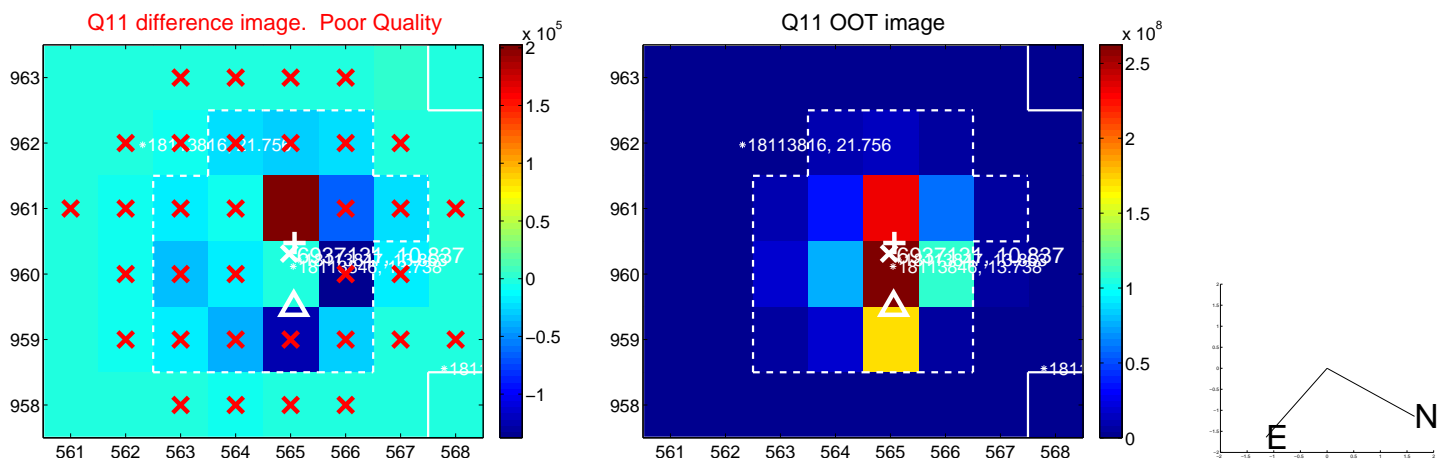
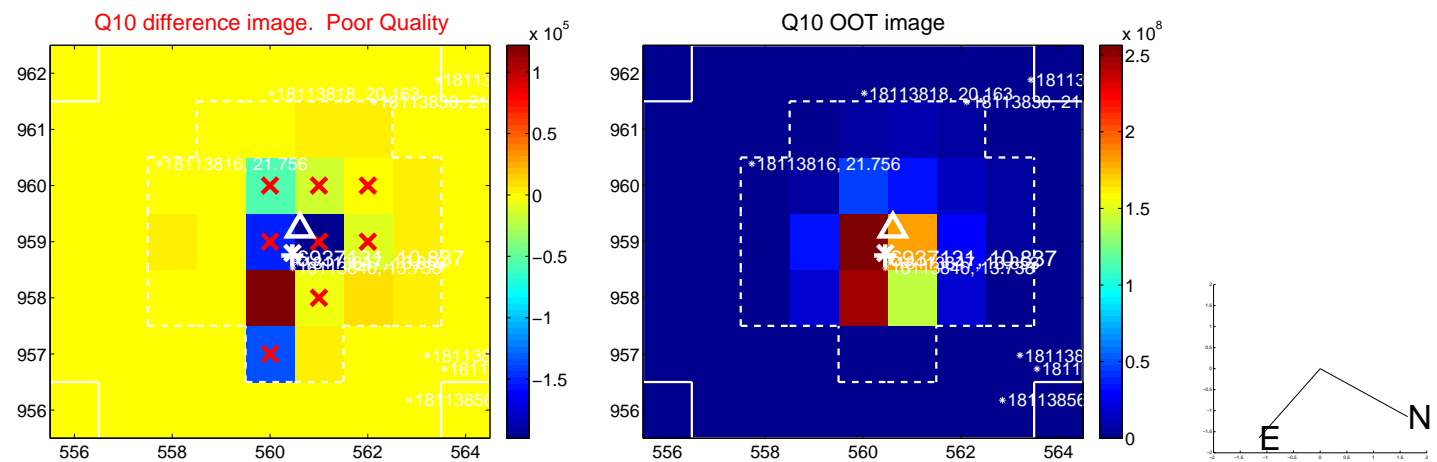
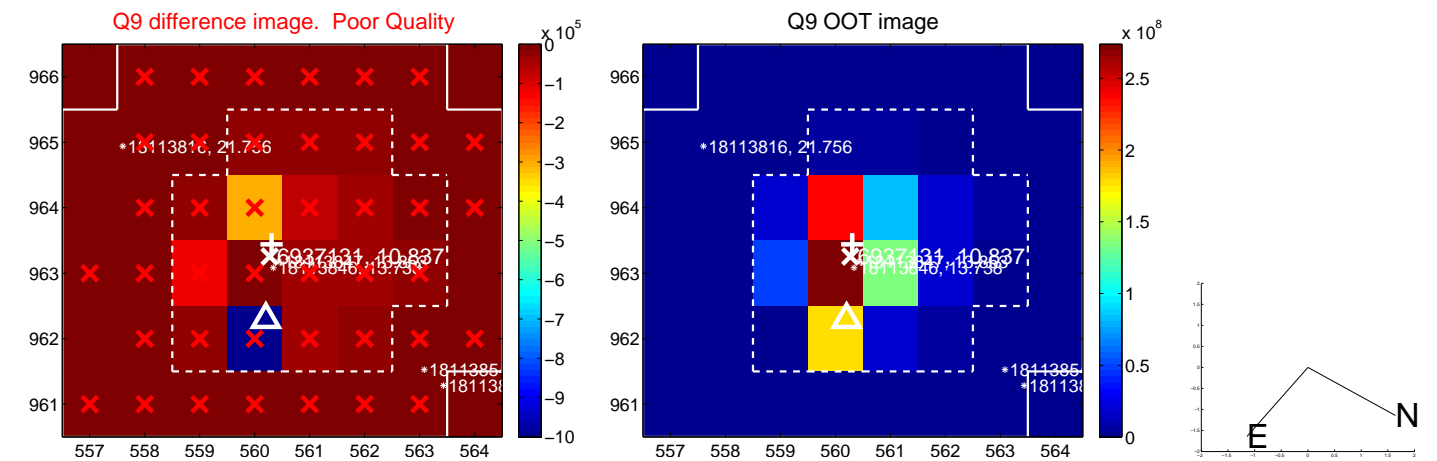
Q4 OOT image



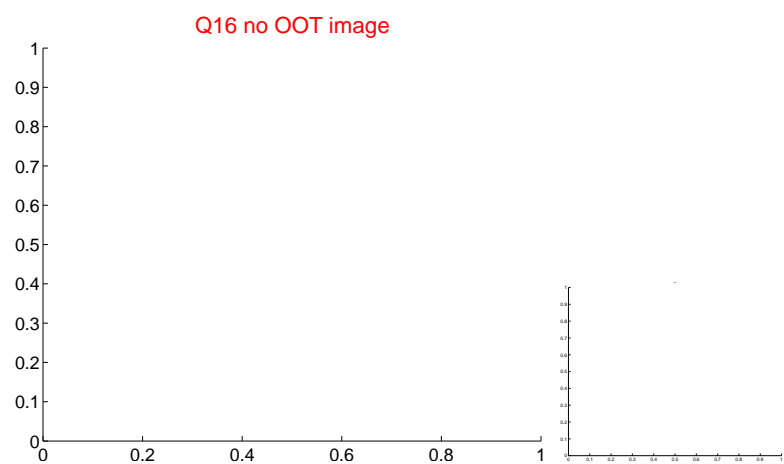
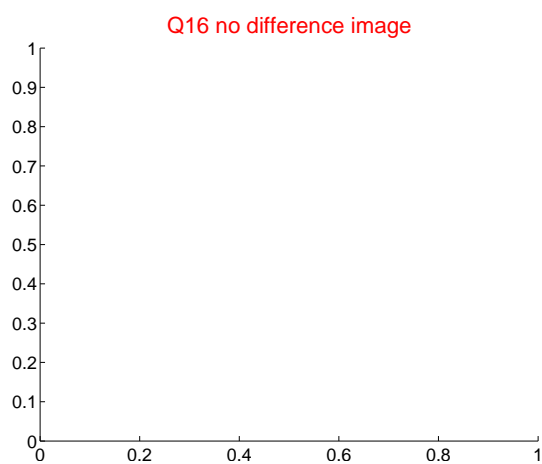
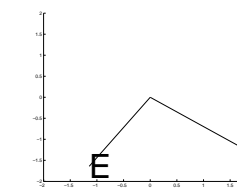
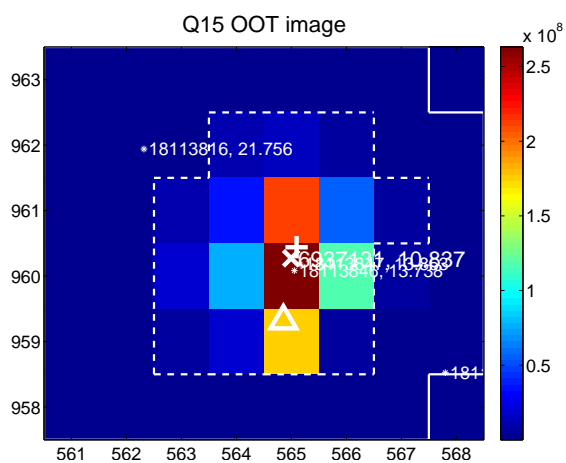
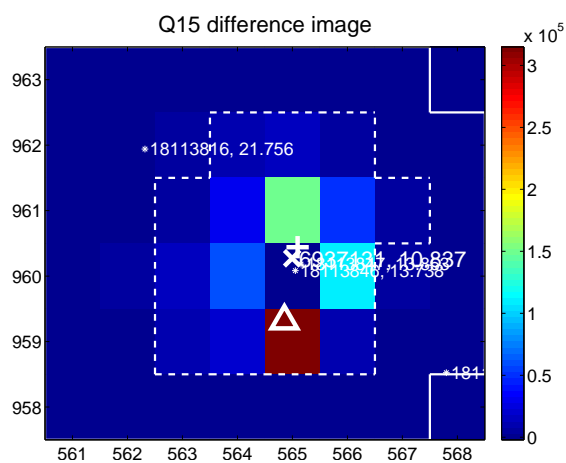
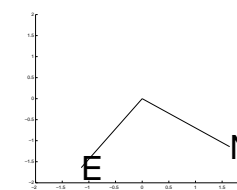
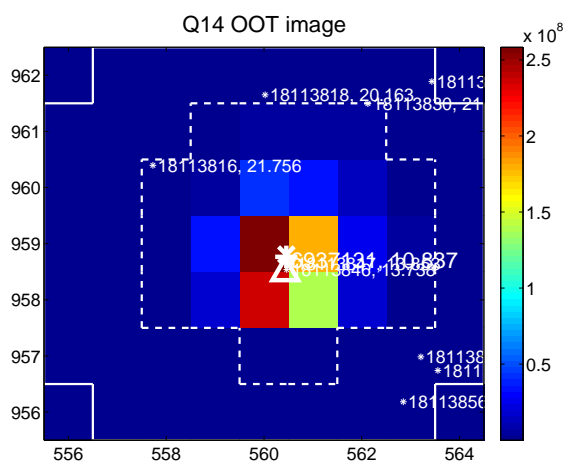
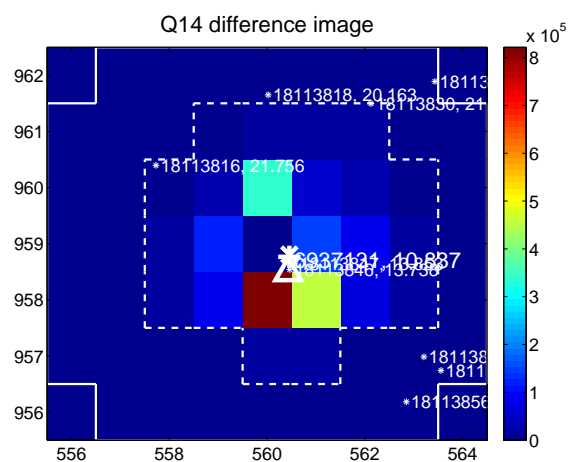
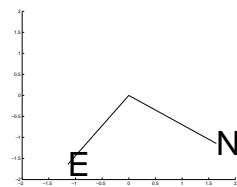
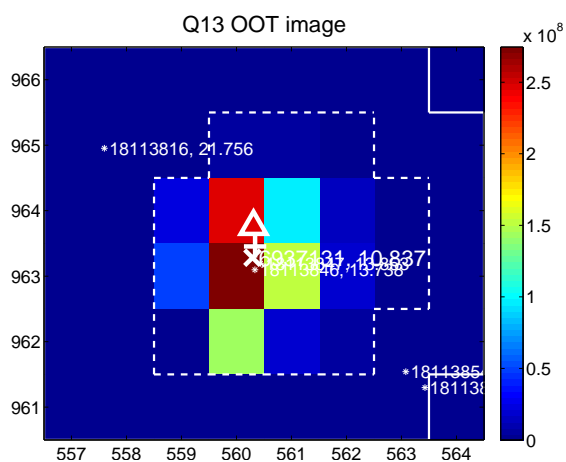
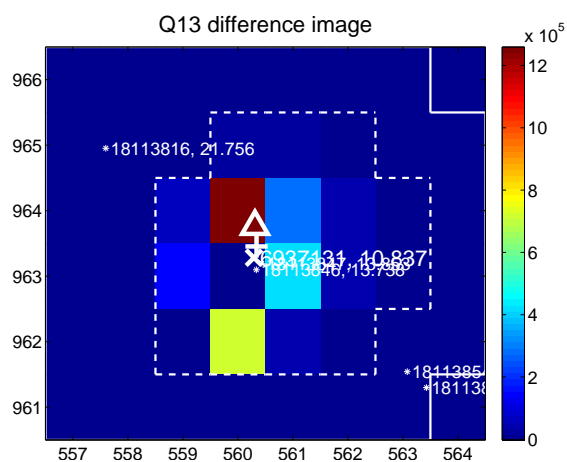
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value



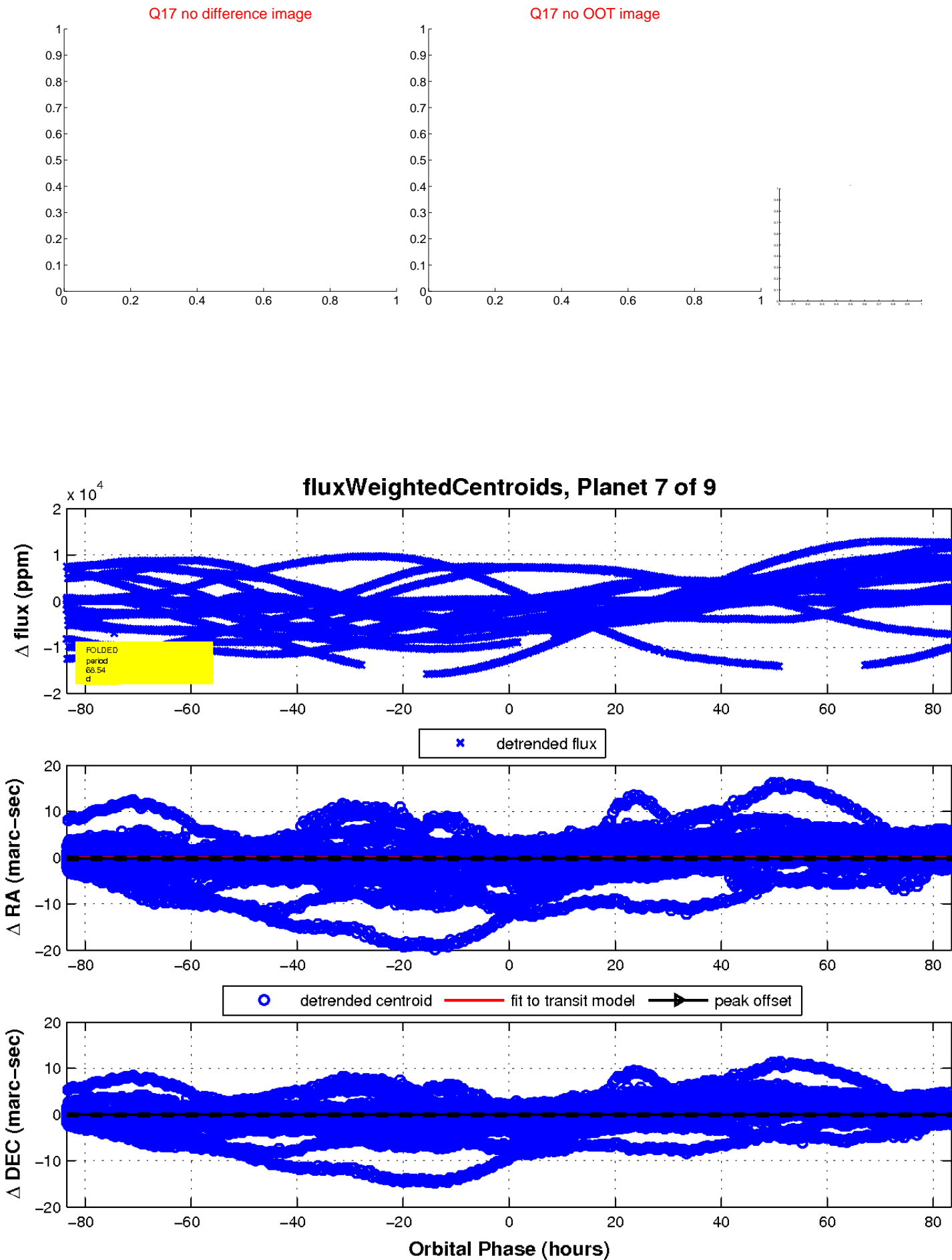
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



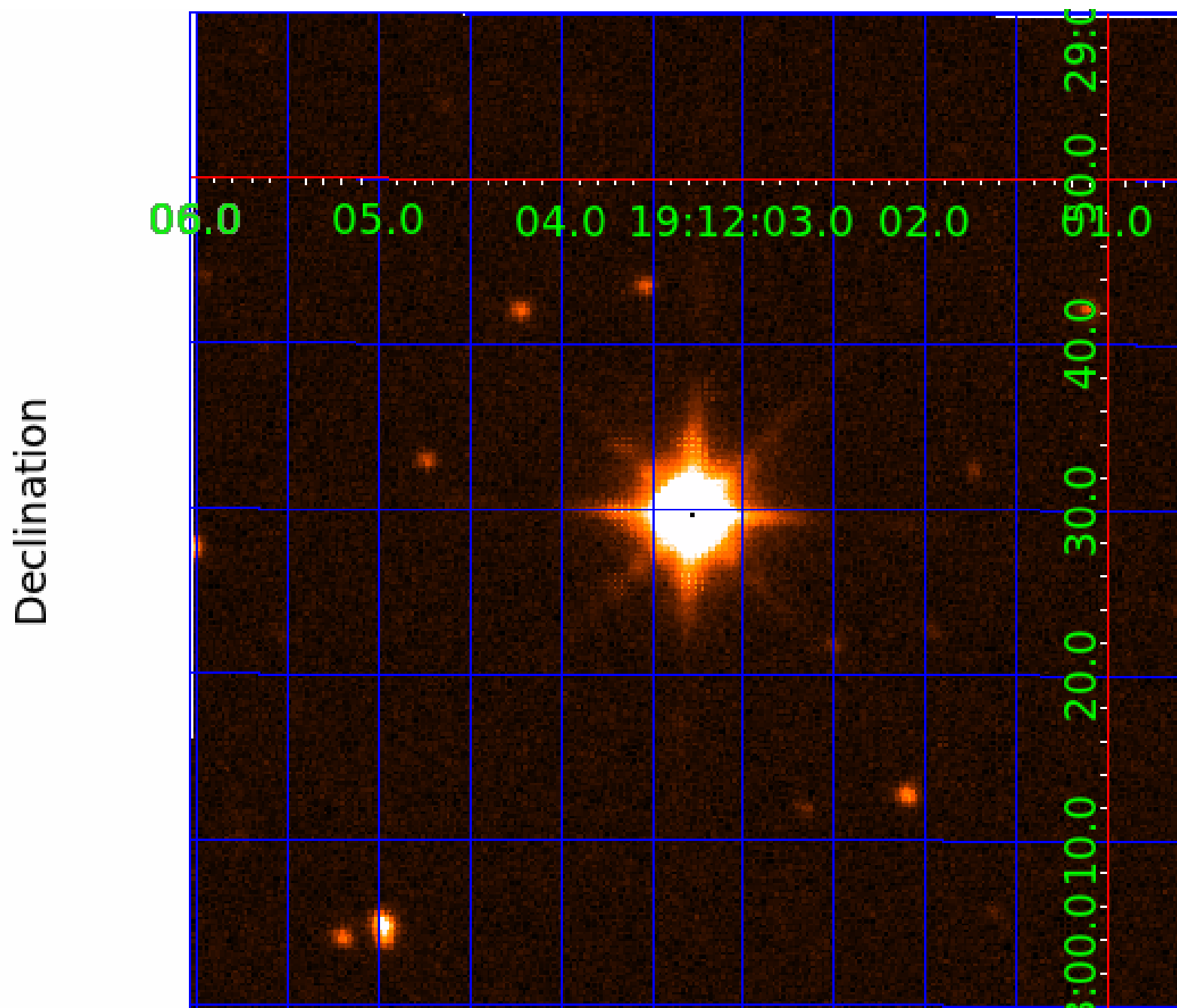
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image





# KIC 006937131

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006937131-01	OBS	No	117.103296	195.920780	51.3	1.665	38.7	31.5	48.35	3948	43.67	2597.65
006937131-02	OBS	No	358.203546	389.477540	24.1	8.007	19.9	8.5	48.35	3948	29.44	585.01
006937131-03	OBS	No	256.641148	253.452664	43.6	2.098	18.9	17.9	48.35	3948	43.44	912.51
006937131-04	OBS	No	176.008339	233.821327	2.2	1.876	20.1	1.3	48.35	3948	9.18	1508.79
006937131-05	OBS	No	211.915402	161.715255	33.5	9.582	17.7	11.1	48.35	3948	34.00	1177.94
006937131-06	OBS	No	326.304219	430.241376	62.8	13.565	16.5	16.5	48.35	3948	45.99	662.49
006937131-07	OBS	No	68.543331	164.278275	14.4	27.831	15.6	5.8	48.35	3948	27.28	5305.42
006937131-08	OBS	No	110.649092	187.850790	448.8	2.000	17.9	-1.0	48.35	3948	96.47	2801.62
006937131-09	OBS	No	80.018968	145.132211	42.0	2.520	17.7	12.5	48.35	3948	34.75	4316.01

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006937131-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_SKYE_ZUMA—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
006937131-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_ZUMA—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_SATURATED
006937131-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
006937131-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
006937131-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_ZUMA—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_SATURATED
006937131-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_SATURATED
006937131-07	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
006937131-08	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
006937131-09	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—CENT_SATURATED

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

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

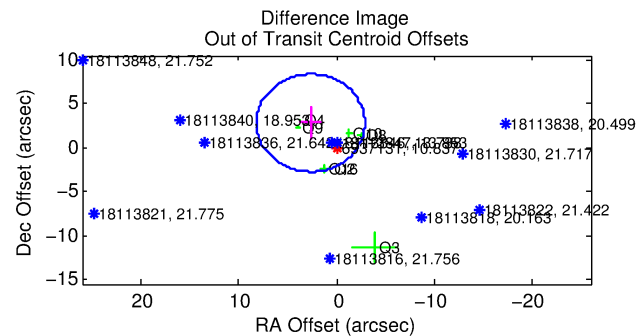
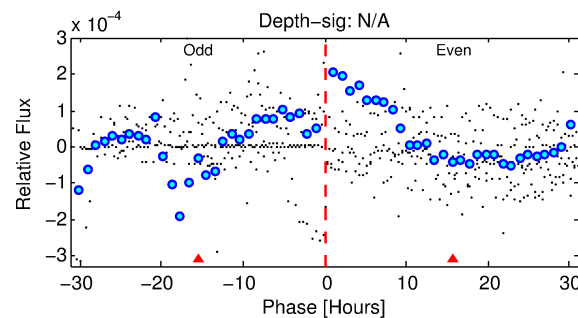
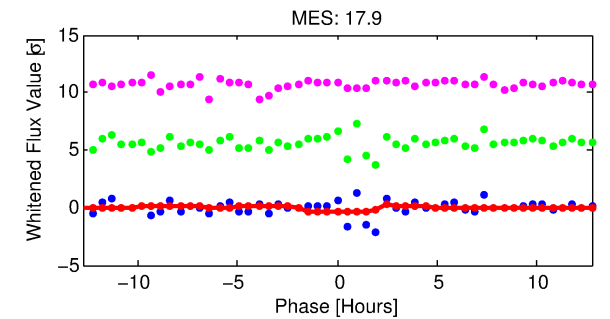
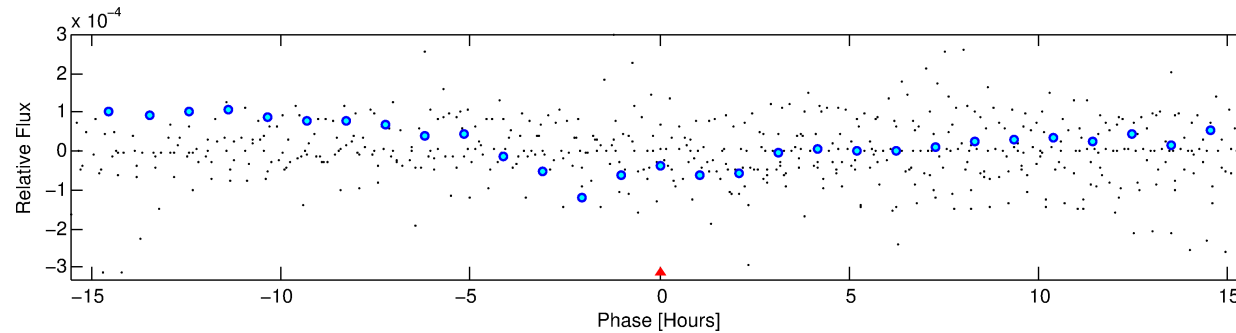
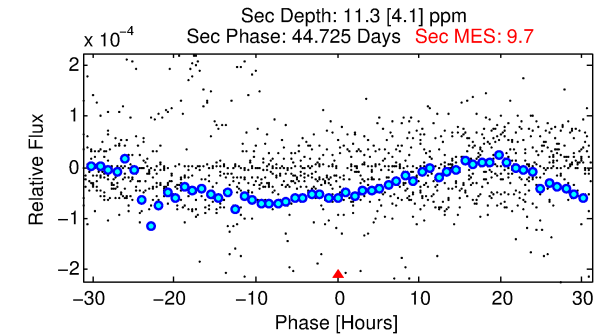
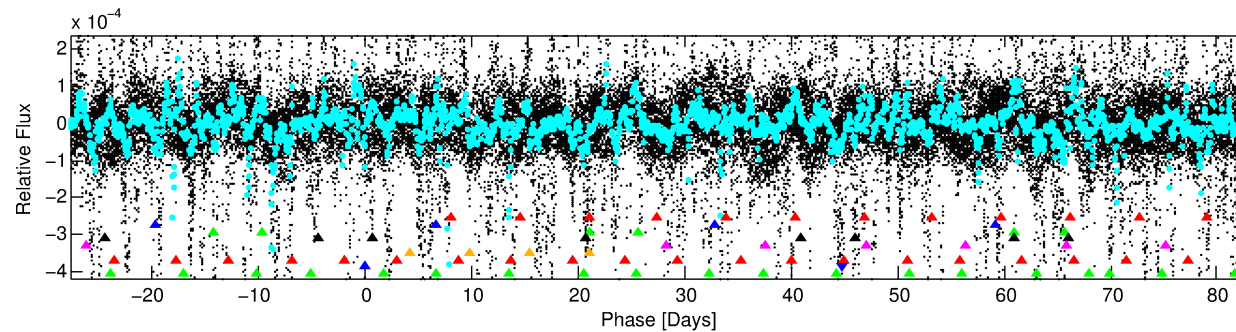
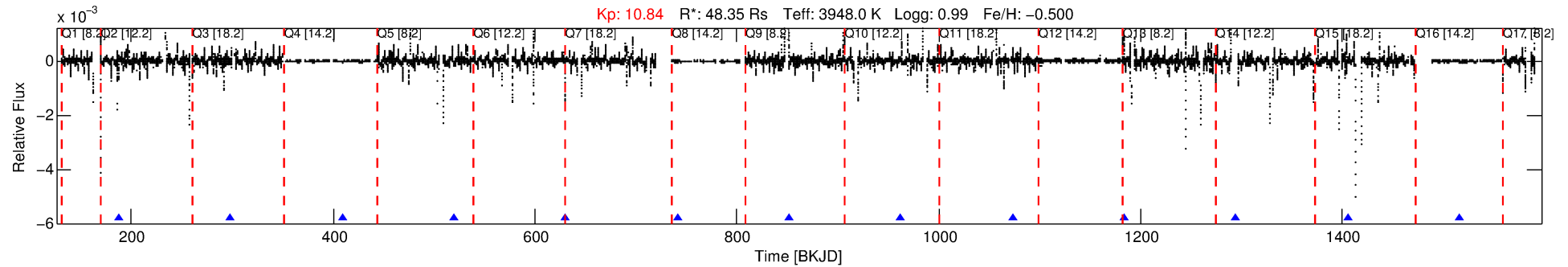
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 006937131-08

No Significant Match Found

# DV One-Page Summary

KIC: 6937131 Candidate: 8 of 9 Period: 110.649 d



TPS TCE Results:

Period = 110.64909 d  
Epoch = 187.8508 BKJD

DV fit results are unavailable

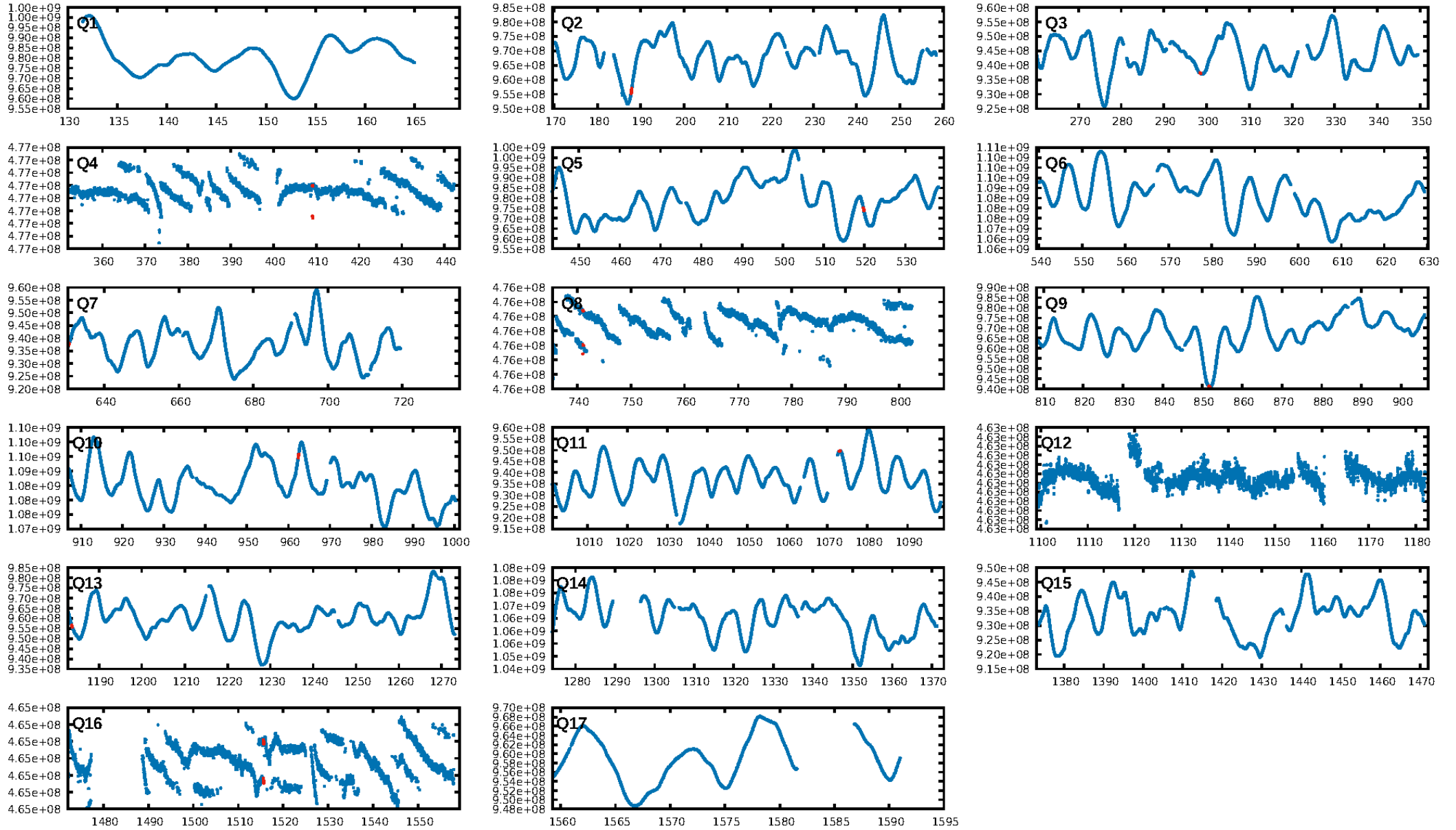
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [228.48σ]  
LongPeriod-sig: 100.0% [59.52σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [11/11]  
GhostDiagnostic-chr: -1.085  
Centroid-sig: 36.3%  
Centroid-so: 8.507 arcsec [0.91σ]  
OotOffset-rm: 3.879 arcsec [2.09σ]  
KicOffset-rm: 4.228 arcsec [2.17σ]  
OotOffset-st: 2/1/3/1 [7]  
KicOffset-st: 2/1/3/1 [7]  
DiffImageQuality-fgm: 0.14 [1/7]  
DiffImageOverlap-fno: 1.00 [8/8]

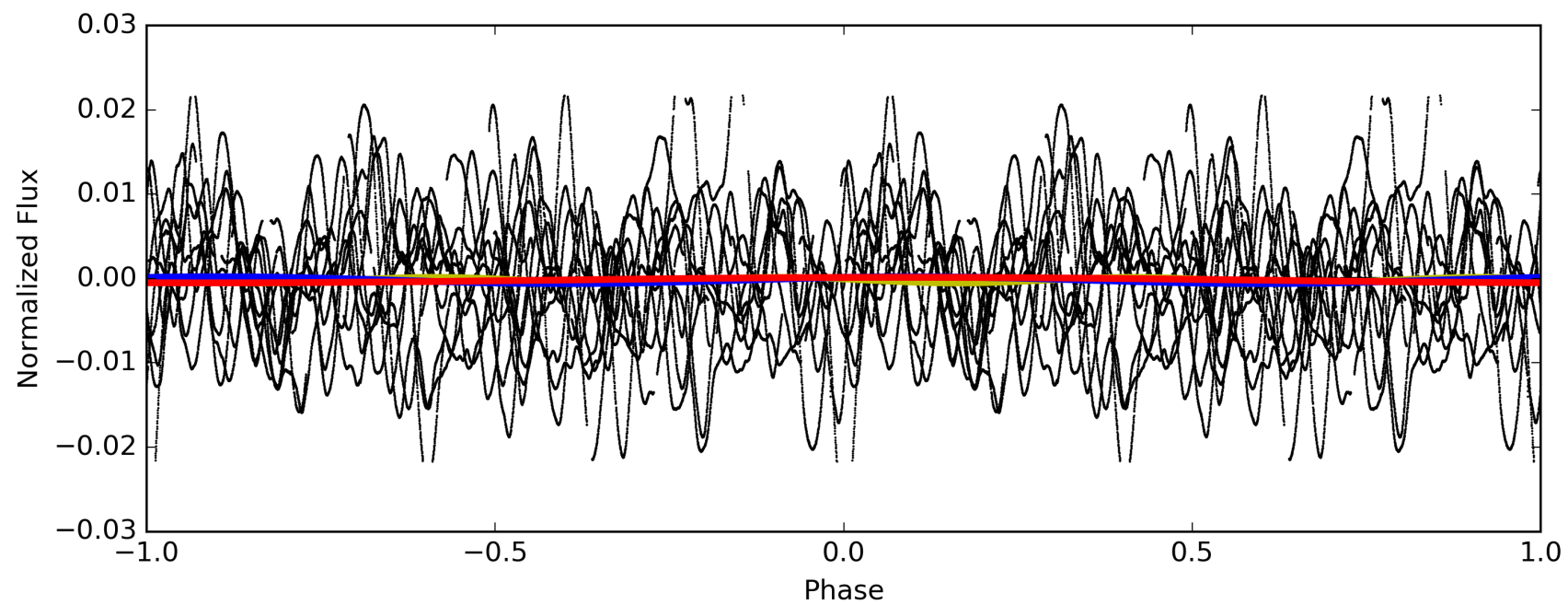
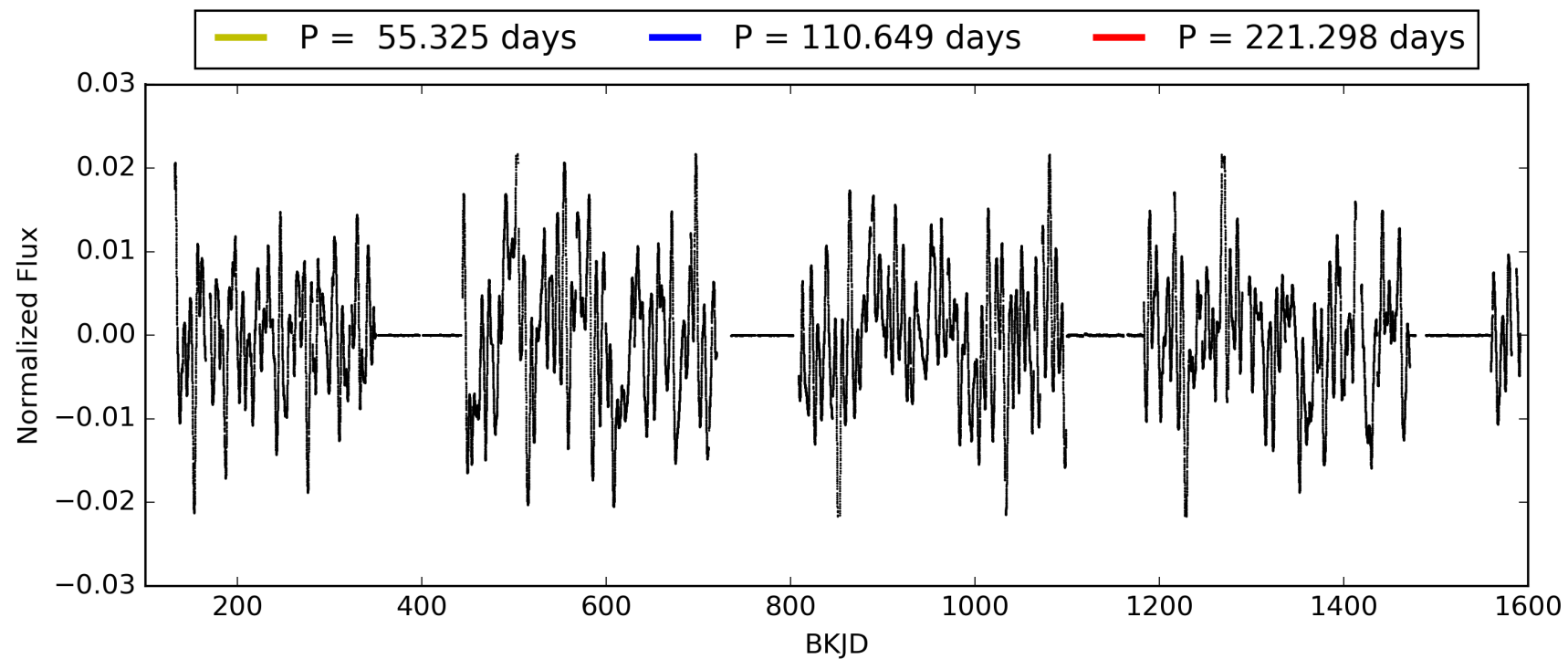
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 00:47:38 Z

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

# TCE 006937131-08, PDC Light Curves

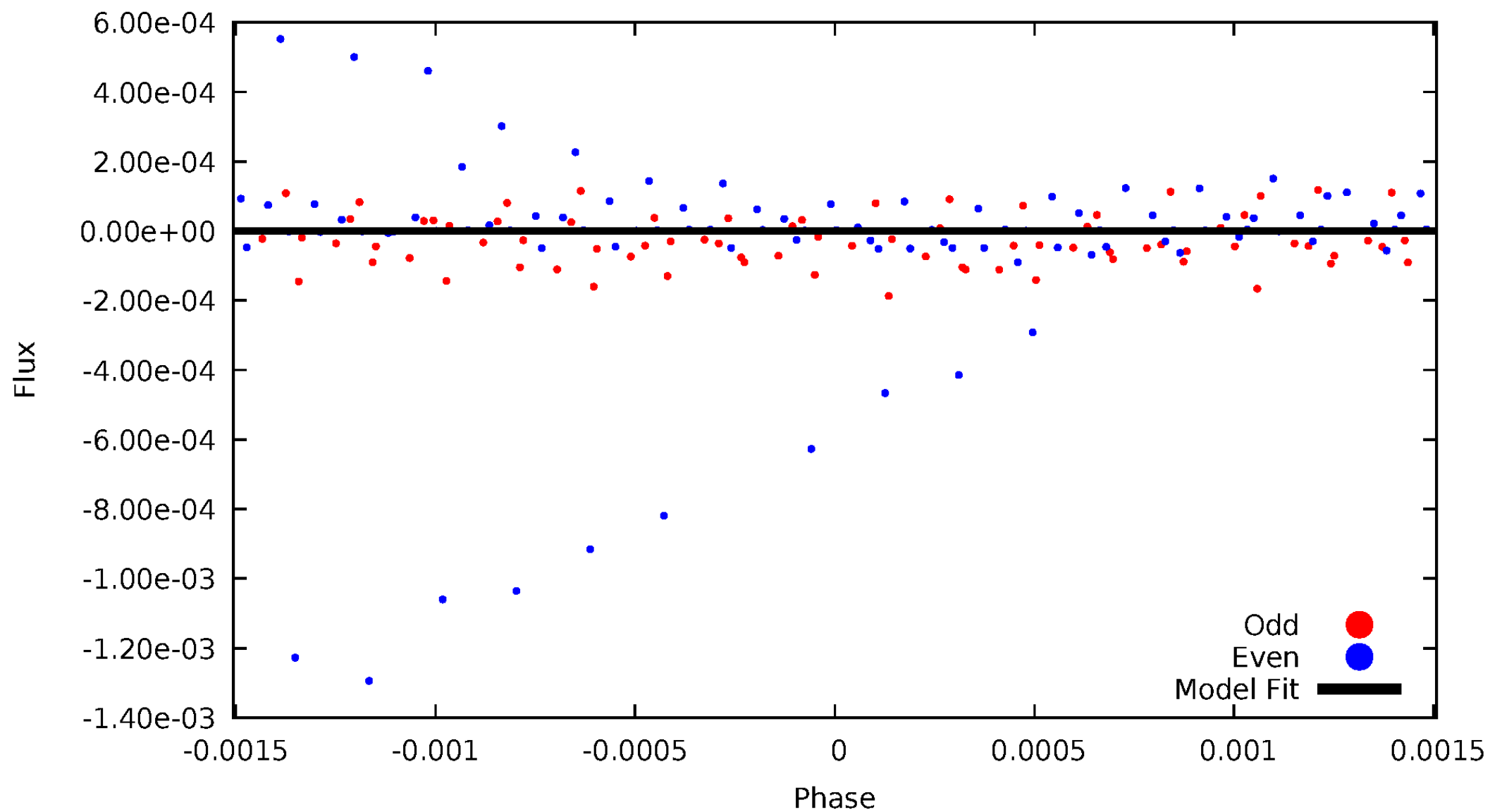


TCE 006937131-08



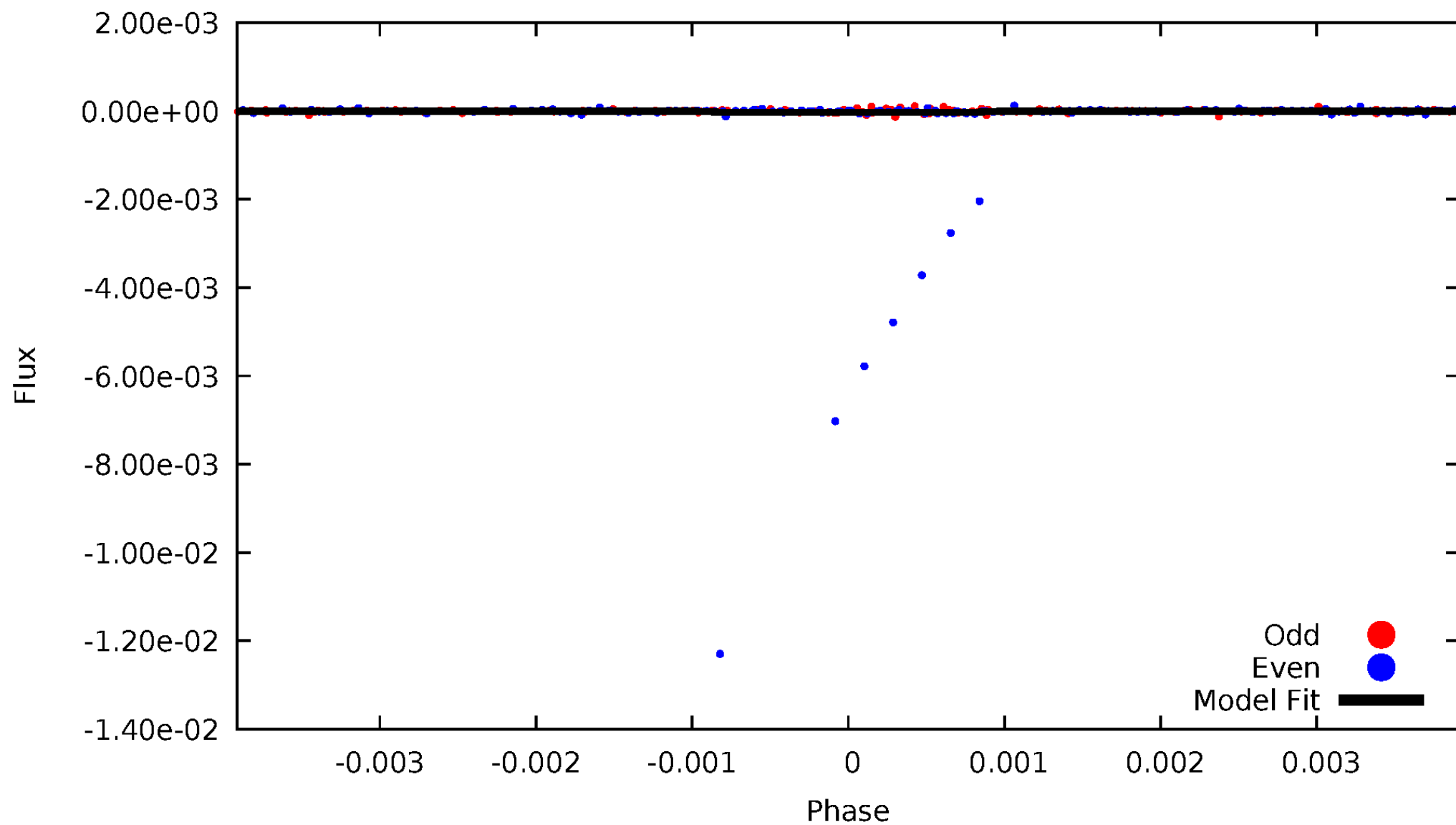
# DV Odd/Even

TCE 006937131-08



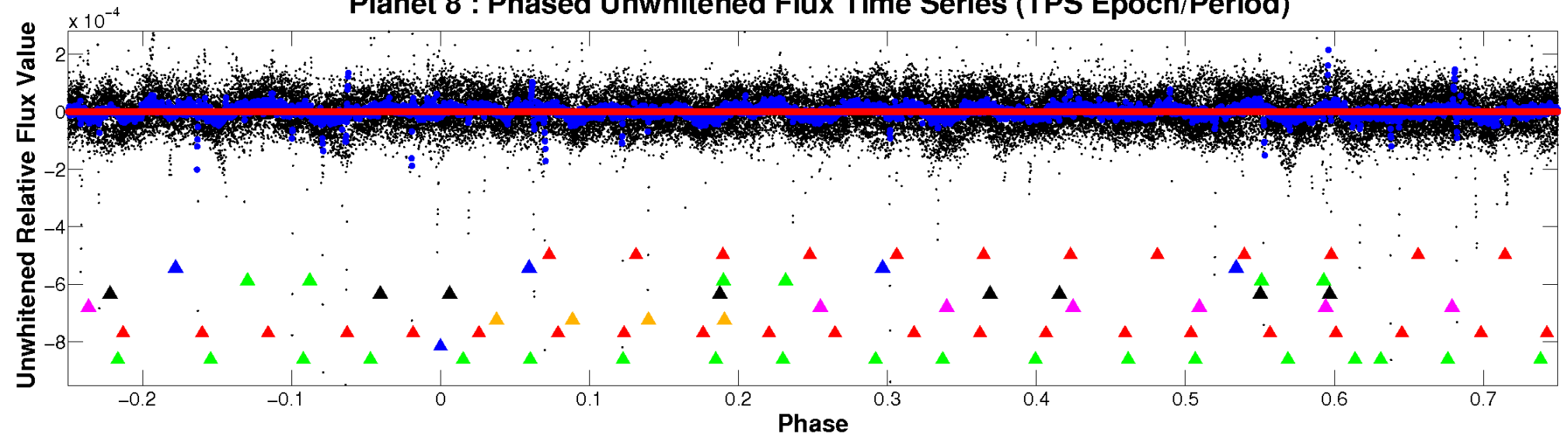
# ALT Odd/Even

TCE 006937131-08

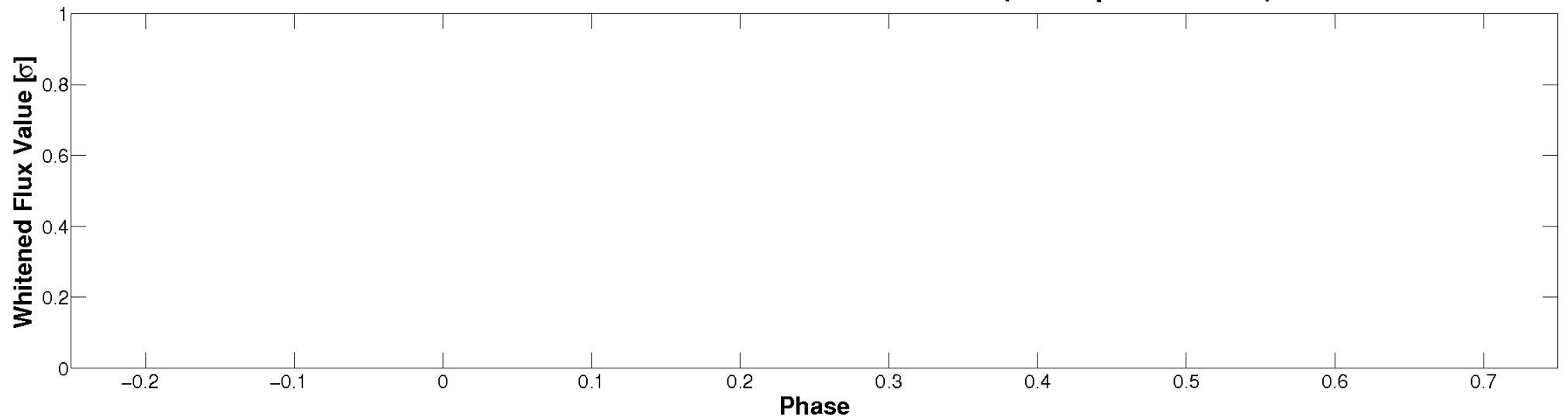


# Non-Whitened Vs. Whitened Light Curve

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

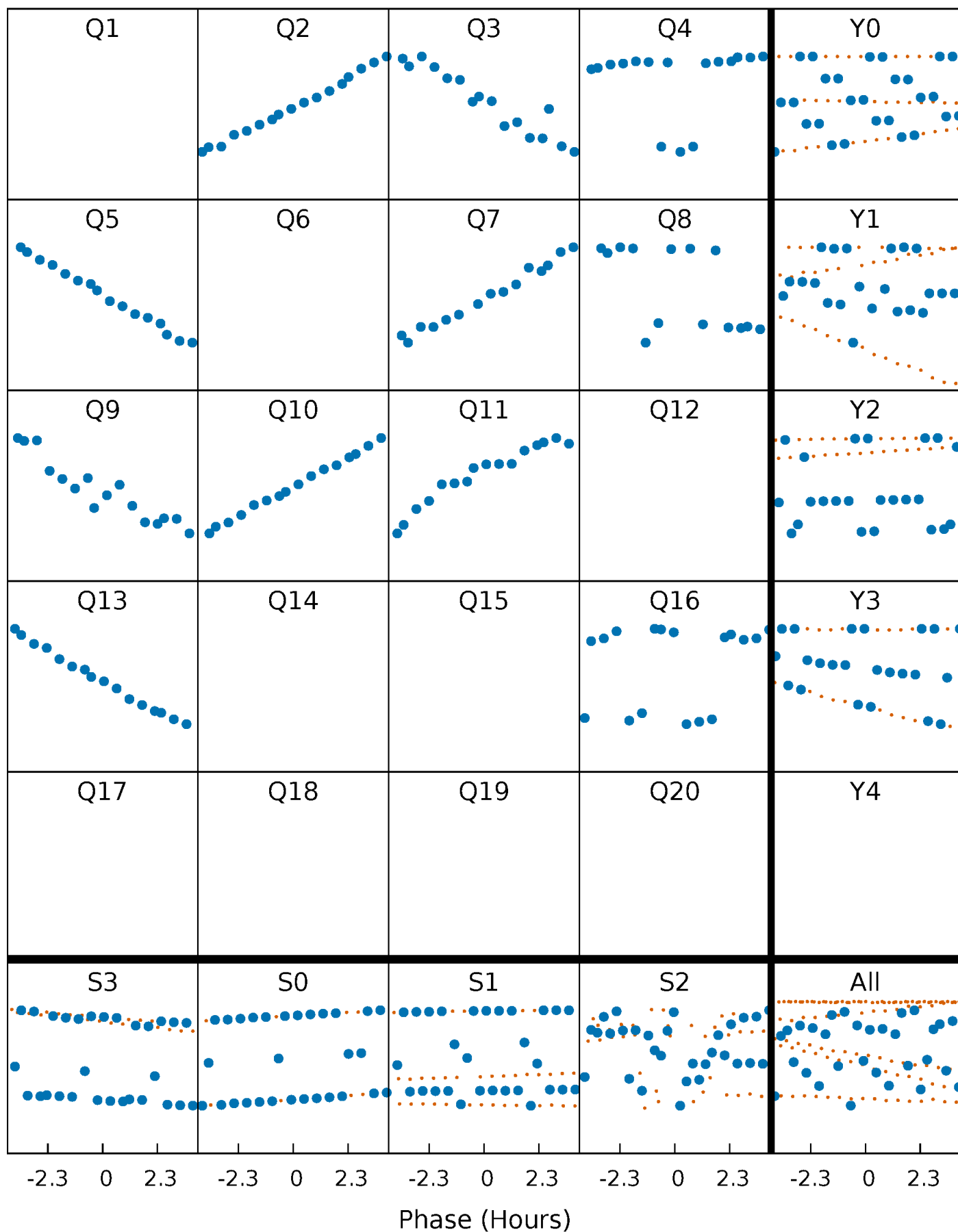


**Planet 8 : Phased Whitened Flux Time Series (TPS Epoch/Period)**



# PDC Quarter-Phased Transit Curves

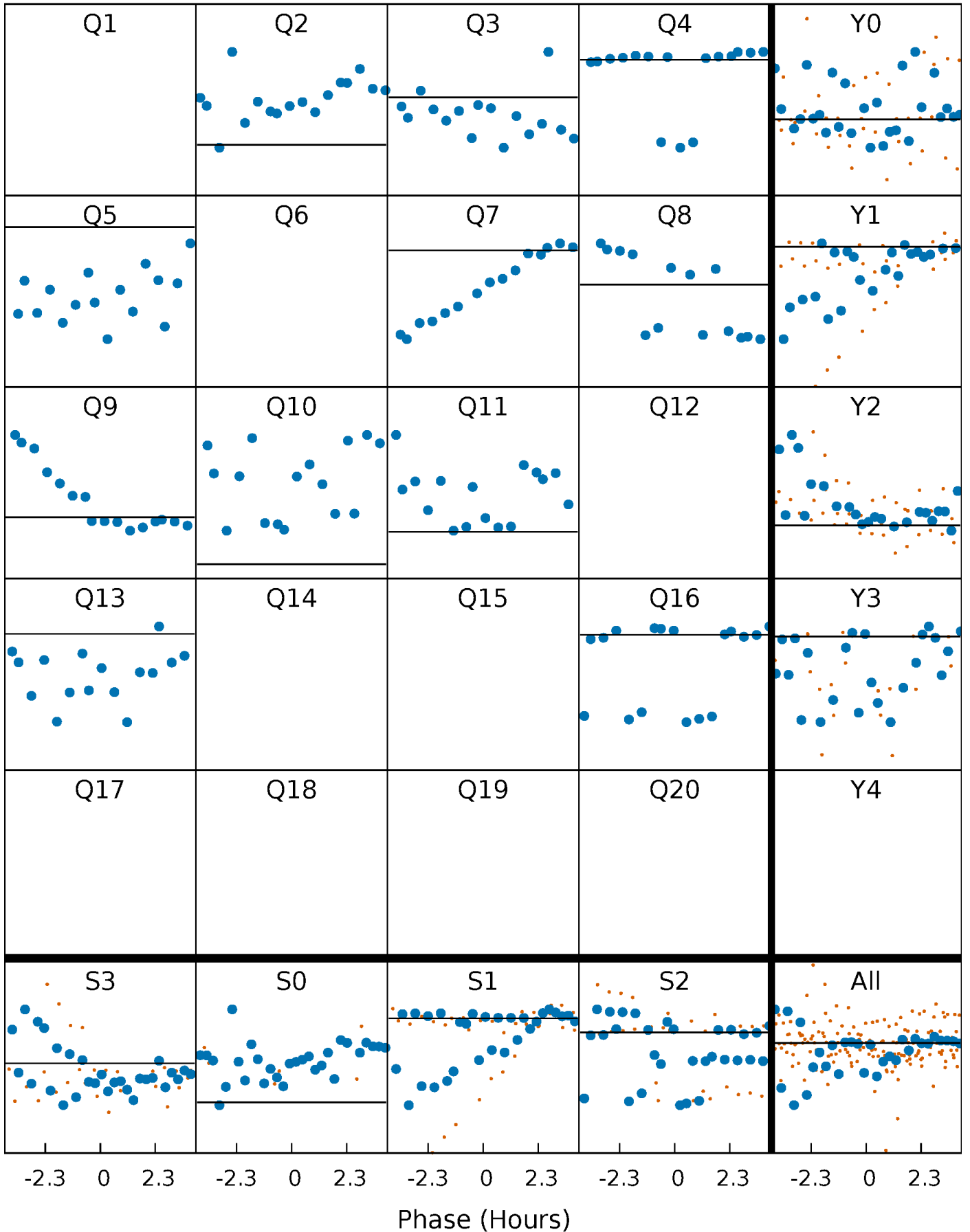
TCE 006937131-08 P=110.649092 Days  $T_0=187.850790$  (BKJD)





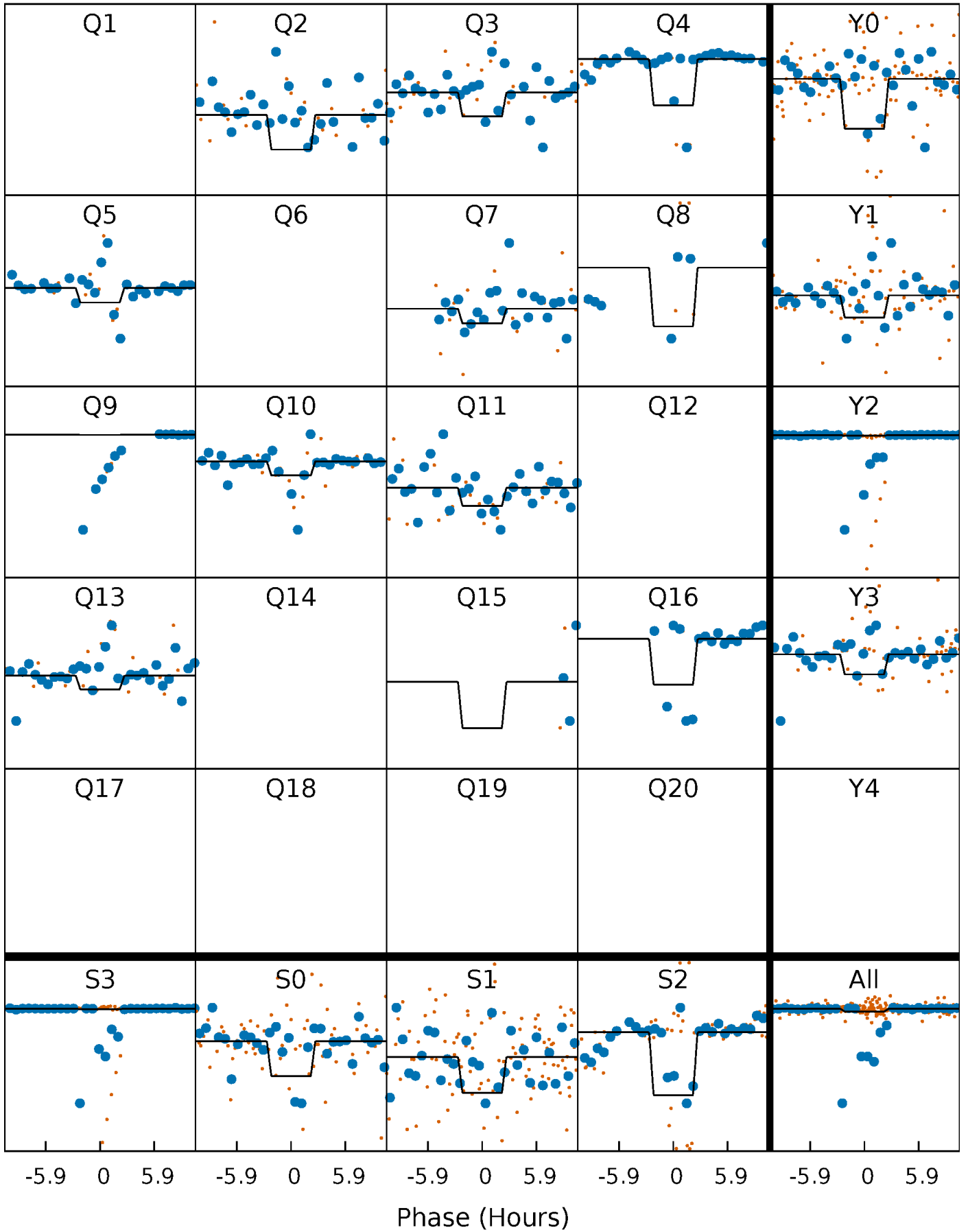
# DV Quarter-Phased Transit Curves

TCE 006937131-08 P=110.649092 Days  $T_0=187.850790$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

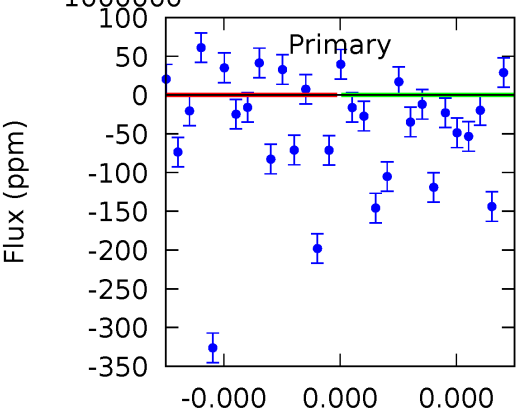
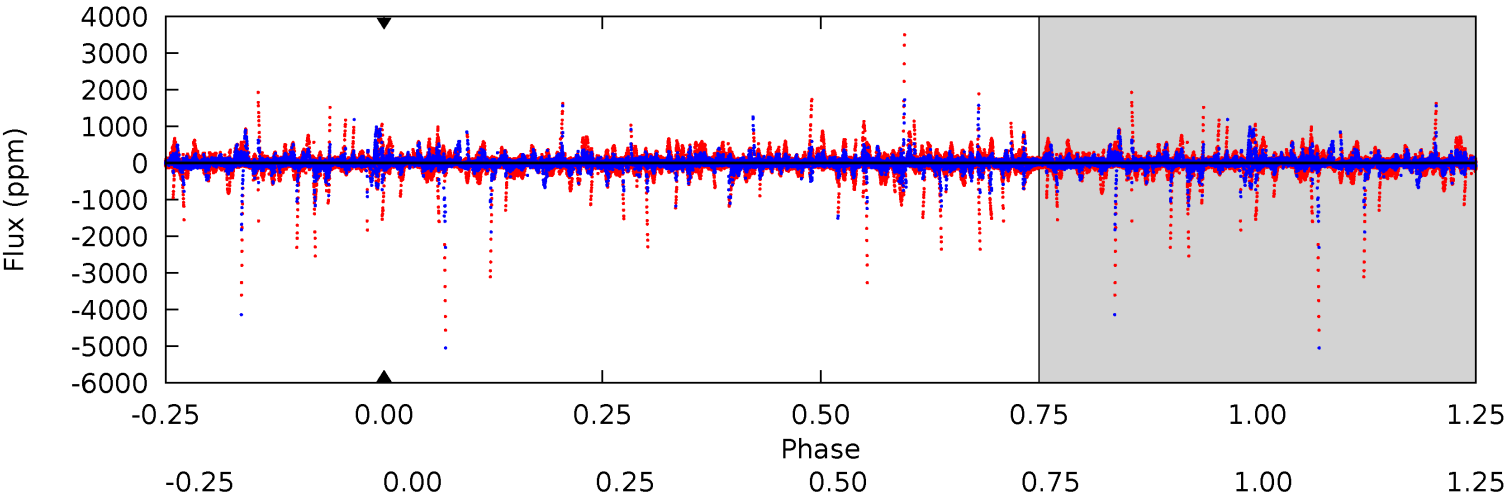
TCE 006937131-08 P=110.649092 Days  $T_0=187.808492$  (BKJD)



# DV Model-Shift Uniqueness Test

006937131-08, P = 110.649092 Days, E = 77.201698 Days

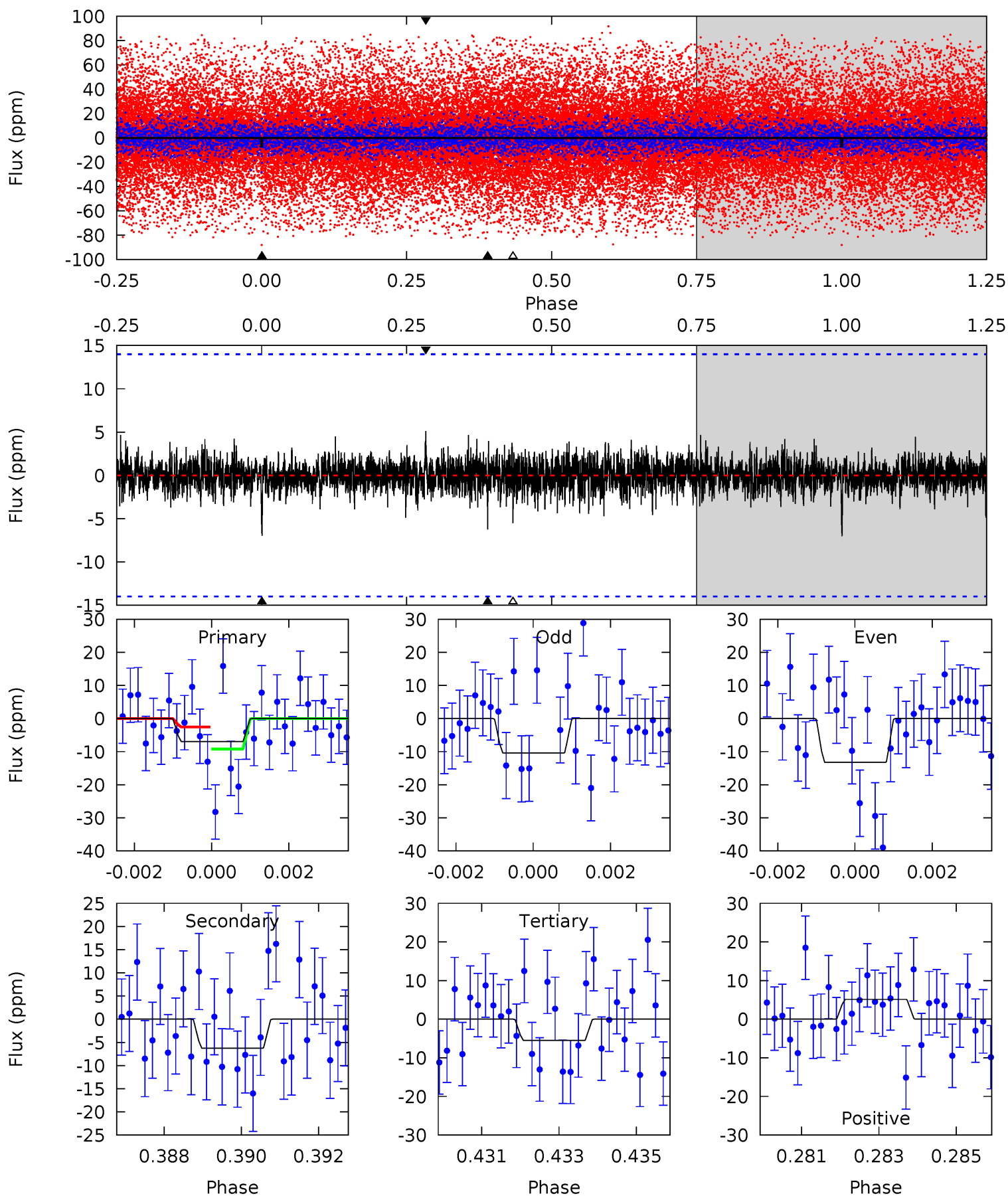
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



# Alt Model-Shift Uniqueness Test

006937131-08, P = 110.649092 Days, E = 77.159400 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2.66	2.38	2.10	1.95	5.33	3.09	0.48	0.56	0.71	0.28	0.43	0.53	97.2	0.42	1.30



### Stellar Parameters For KIC 006937131

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$3948^{+87}_{-71}$	$0.995^{+0.033}_{-0.027}$	$-0.500^{+0.200}_{-0.150}$	$48.351^{+14.464}_{-1.523}$	$0.842^{+0.559}_{-0.029}$	$0.000^{+0.000}_{-0.000}$
	+2%/-2%	+3%/-3%	+40%/-30%	+30%/-3%	+66%/-3%	+9%/-24%
Source	PHO56	AST56	PHO56	DSEP		

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

### Secondary Eclipse Parameters for KIC 006937131-08 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$0 \pm 1000000$	$388.25^{+427.44}_{-270.56}$	$2590^{+66}_{-54}$	$-3423^{+13567}_{-5881}$	$-1.074^{+156.507}_{-125.316}$
Alt.	$-6 \pm 3$	$377.91^{+389.12}_{-265.79}$	$2589^{+72}_{-57}$	$-2698^{+69}_{-57}$	$0.004^{+0.044}_{-0.003}$

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

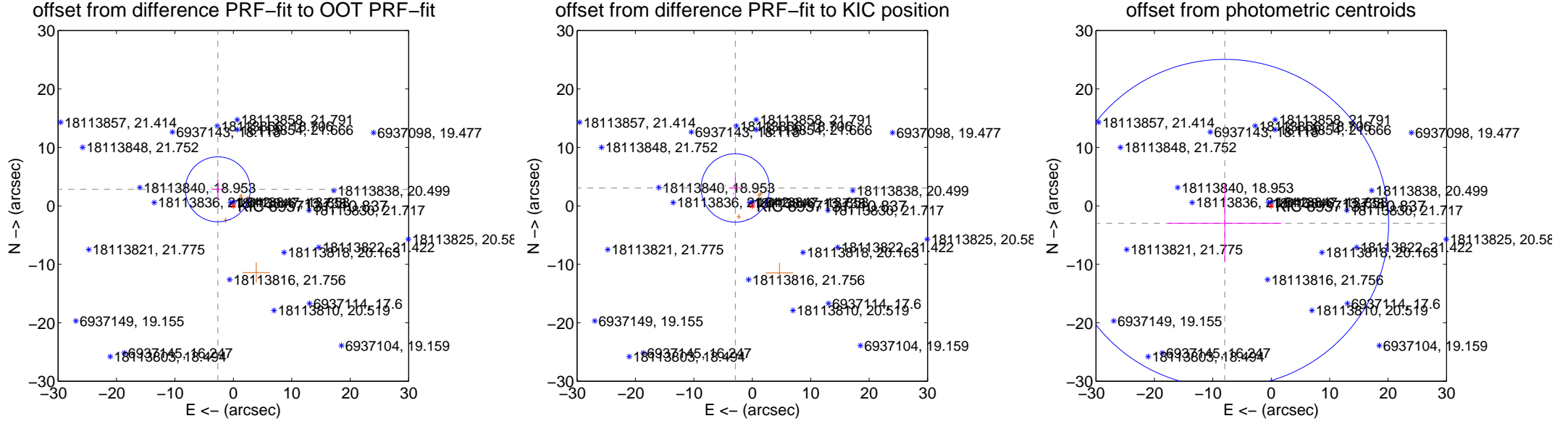
## DV Centroid Data

Supplemental centroid analysis for 006937131-08. **Kepler magnitude: 10.84.** Transit SNR -1.00

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

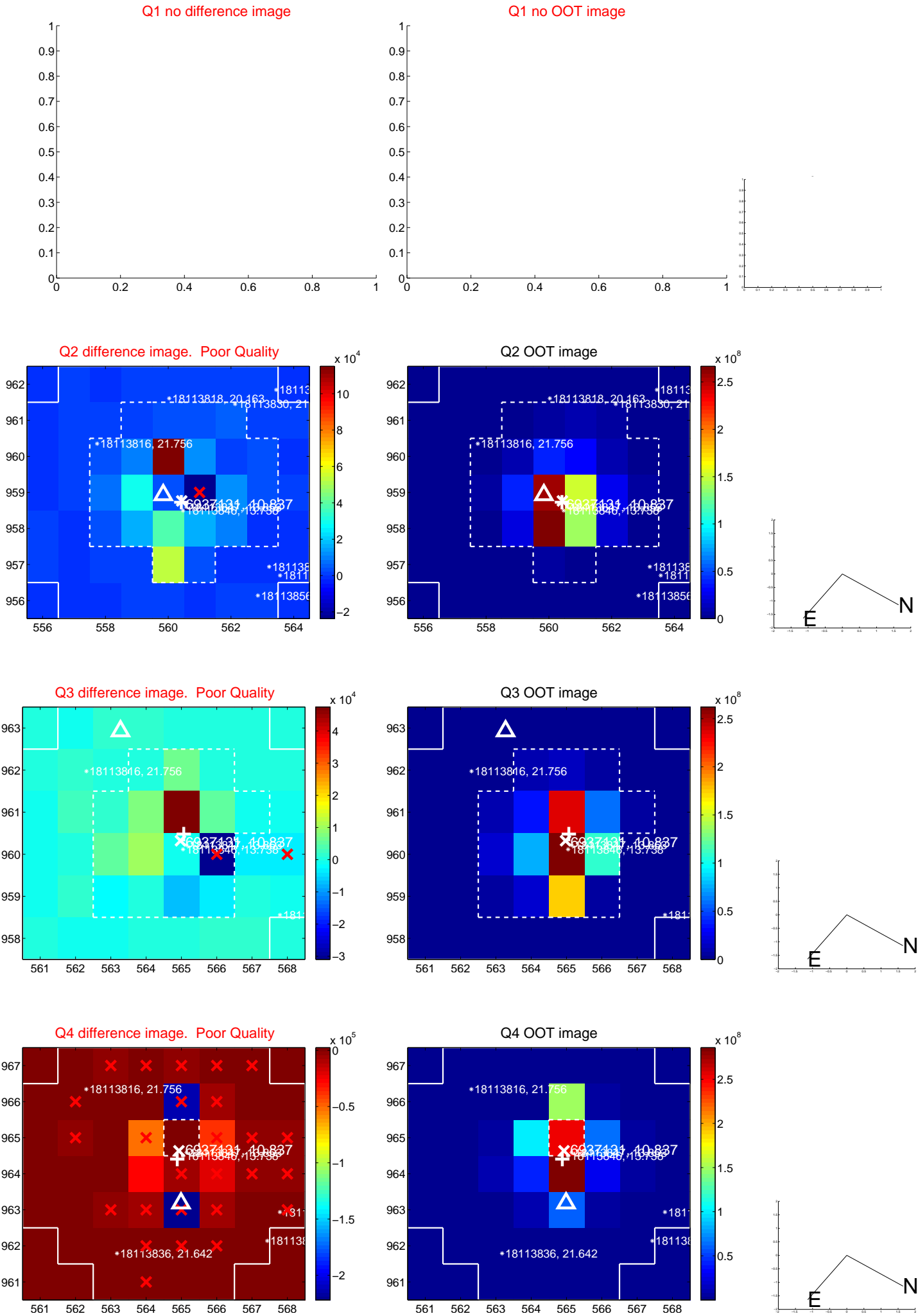
The direct PRF centroid is offset from the target star catalog position by about 1.15 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$3.879 \pm 1.852$	2.09	$2.652 \pm 1.060$	$2.831 \pm 1.776$
PRF-fit source offset from KIC position	$4.228 \pm 1.951$	2.17	$2.909 \pm 1.083$	$3.069 \pm 1.853$
photometric centroid source offset	$8.51 \pm 9.35$	0.91	$7.96 \pm 9.67$	$-2.99 \pm 6.63$

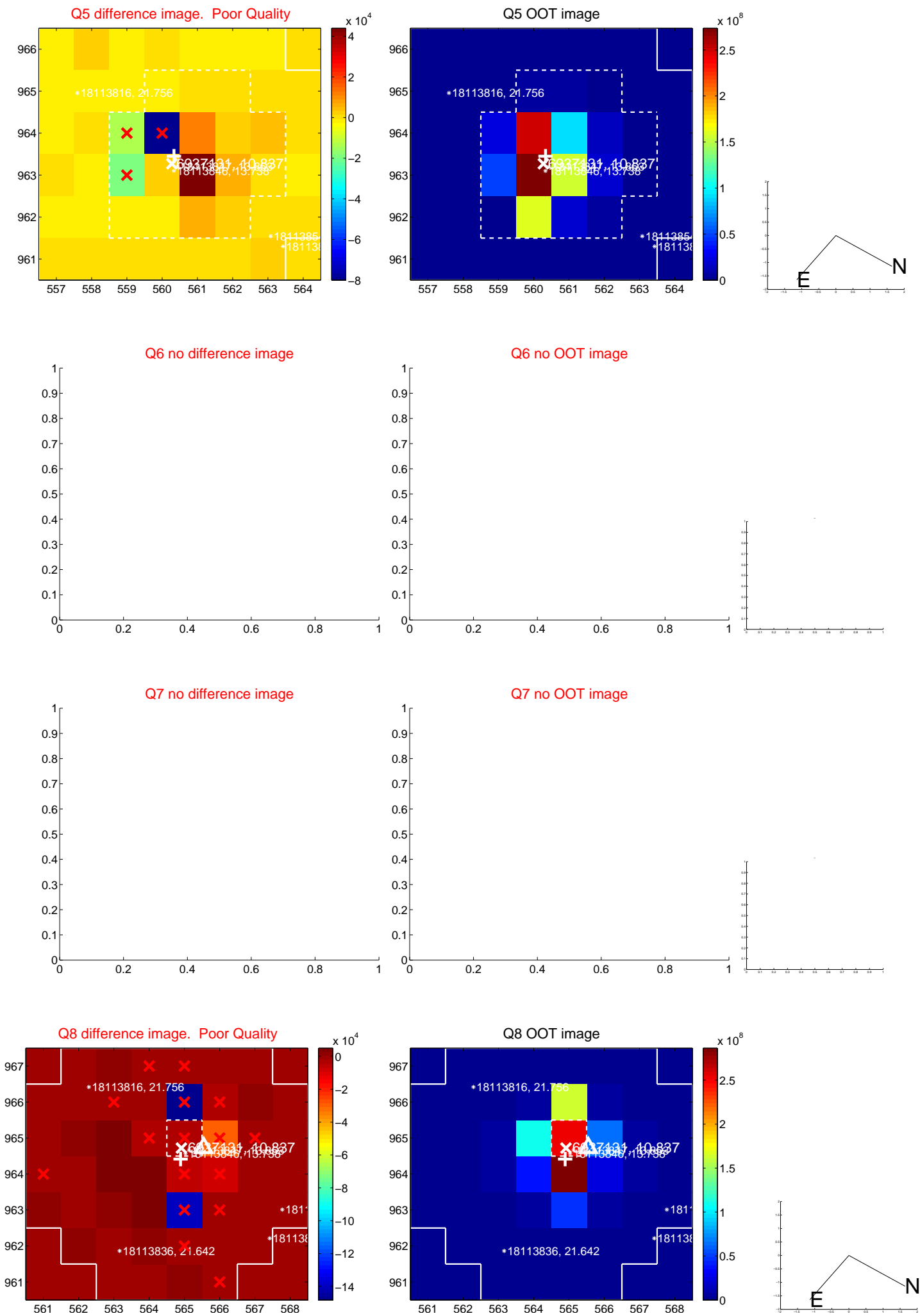


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

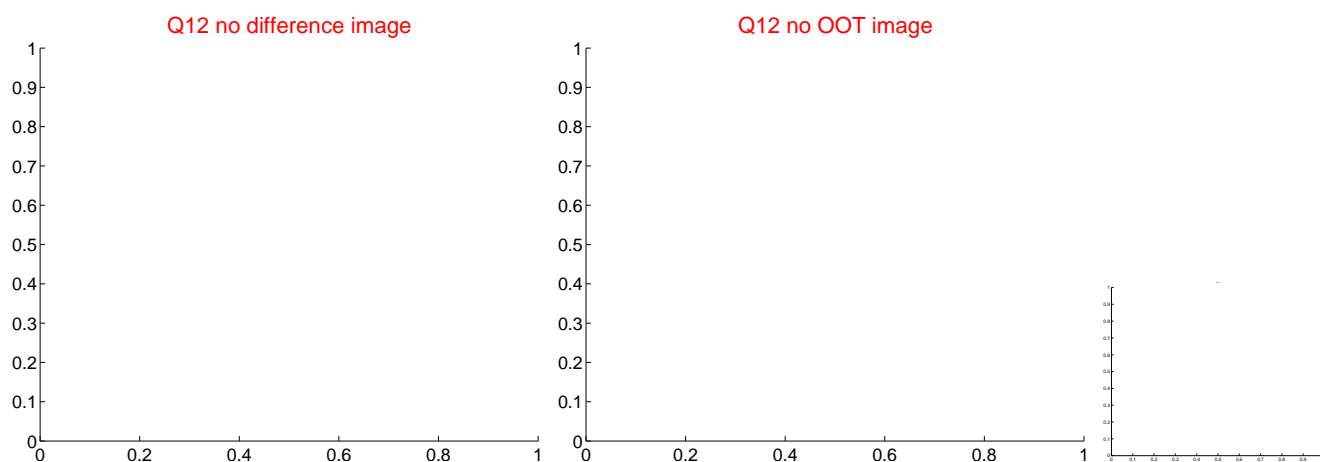
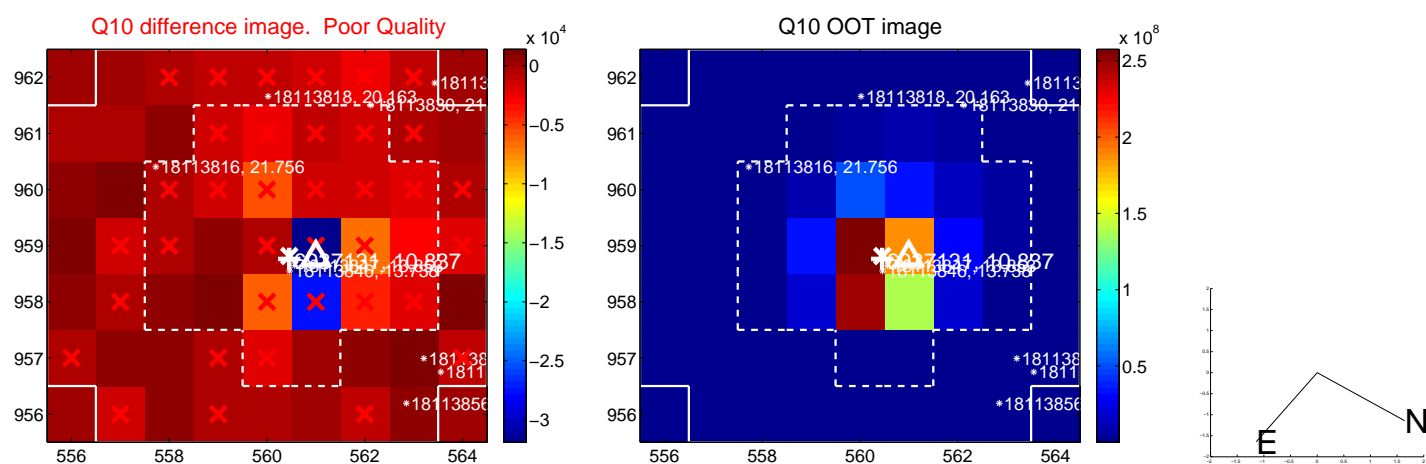
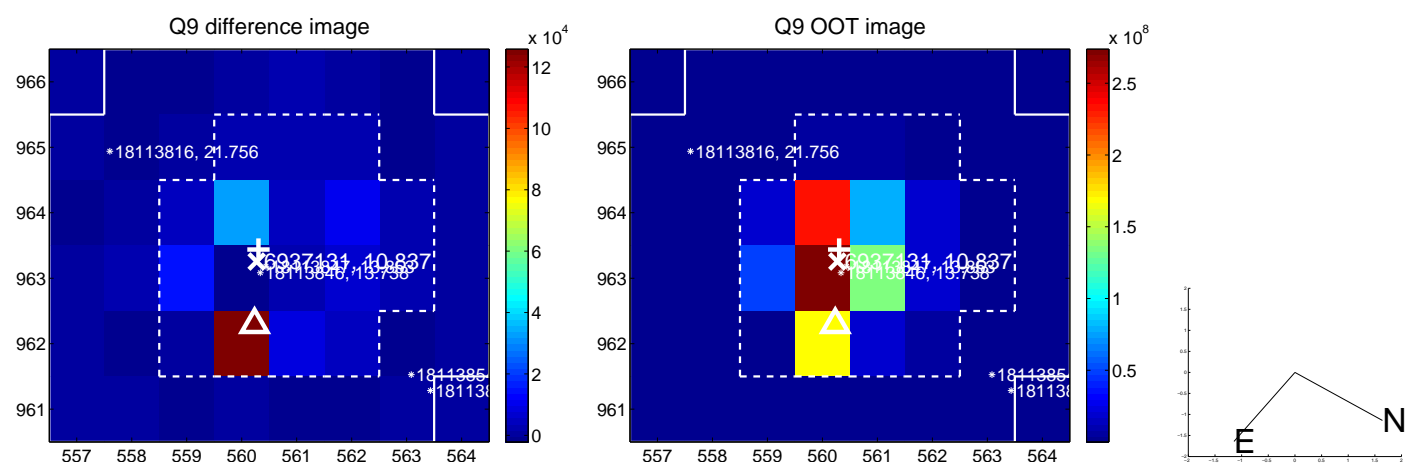


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

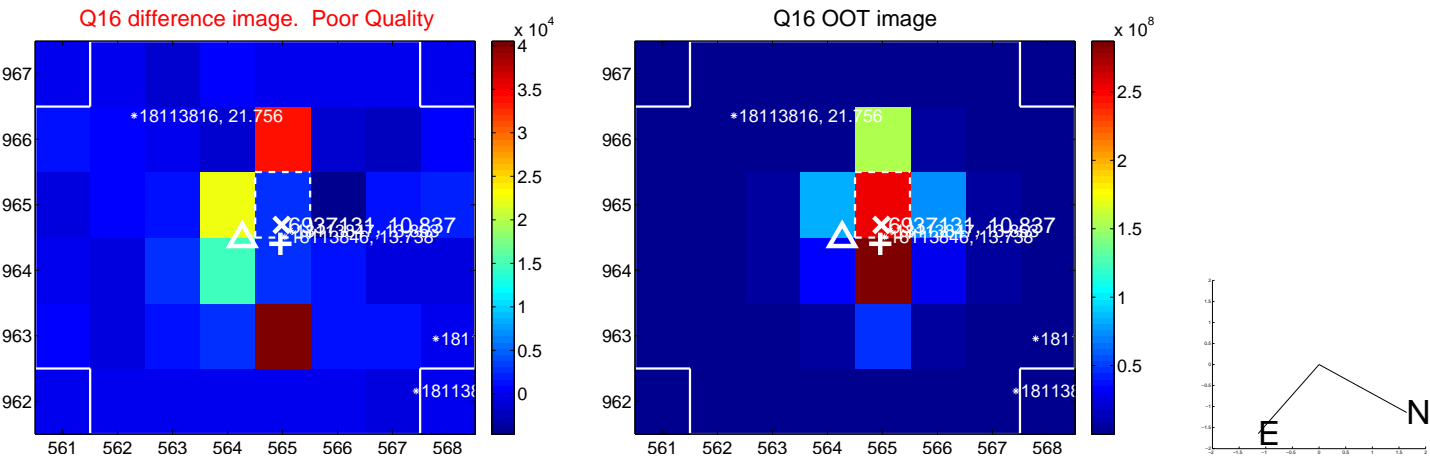




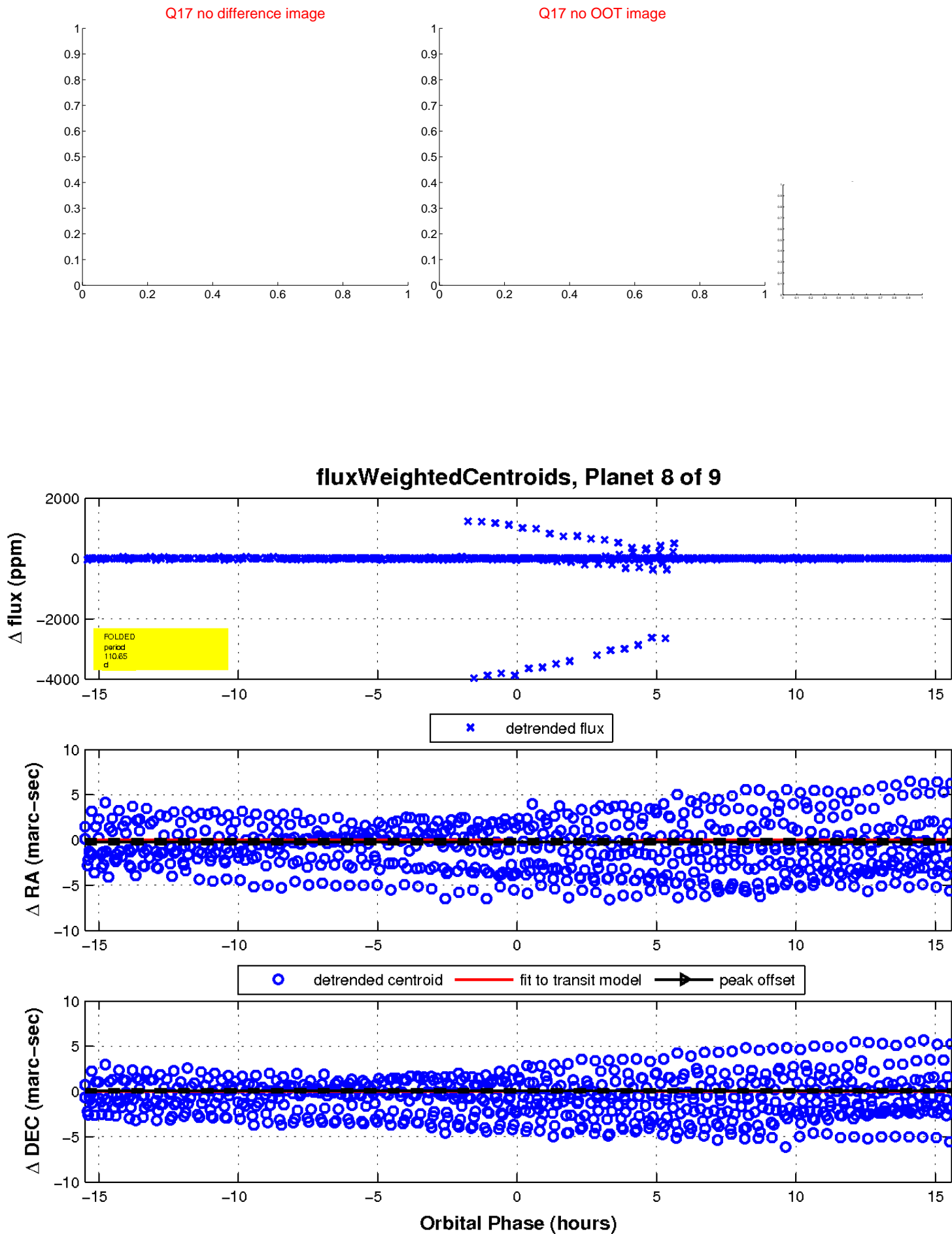
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value



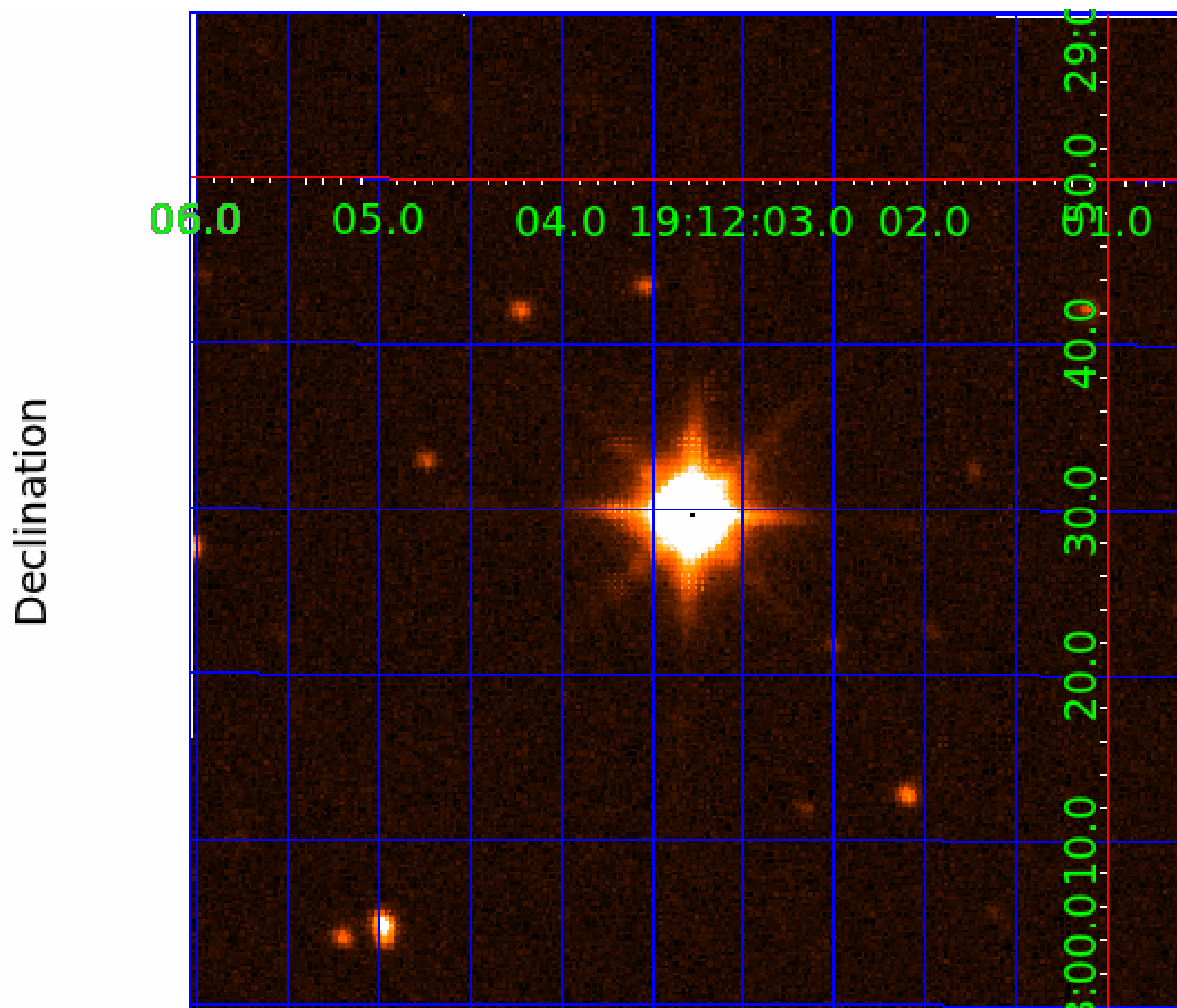
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image



# KIC 006937131

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006937131-01	OBS	No	117.103296	195.920780	51.3	1.665	38.7	31.5	48.35	3948	43.67	2597.65
006937131-02	OBS	No	358.203546	389.477540	24.1	8.007	19.9	8.5	48.35	3948	29.44	585.01
006937131-03	OBS	No	256.641148	253.452664	43.6	2.098	18.9	17.9	48.35	3948	43.44	912.51
006937131-04	OBS	No	176.008339	233.821327	2.2	1.876	20.1	1.3	48.35	3948	9.18	1508.79
006937131-05	OBS	No	211.915402	161.715255	33.5	9.582	17.7	11.1	48.35	3948	34.00	1177.94
006937131-06	OBS	No	326.304219	430.241376	62.8	13.565	16.5	16.5	48.35	3948	45.99	662.49
006937131-07	OBS	No	68.543331	164.278275	14.4	27.831	15.6	5.8	48.35	3948	27.28	5305.42
006937131-08	OBS	No	110.649092	187.850790	448.8	2.000	17.9	-1.0	48.35	3948	96.47	2801.62
006937131-09	OBS	No	80.018968	145.132211	42.0	2.520	17.7	12.5	48.35	3948	34.75	4316.01

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006937131-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_SKYE_ZUMA—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
006937131-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_ZUMA—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_SATURATED
006937131-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
006937131-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
006937131-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_ZUMA—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_SATURATED
006937131-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_SATURATED
006937131-07	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
006937131-08	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
006937131-09	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—CENT_SATURATED

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

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

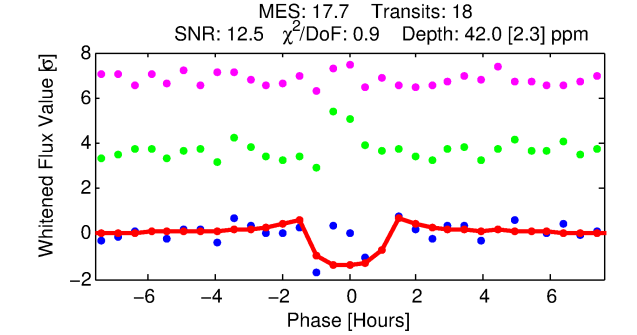
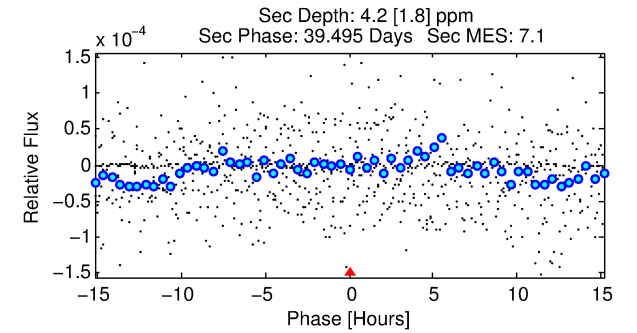
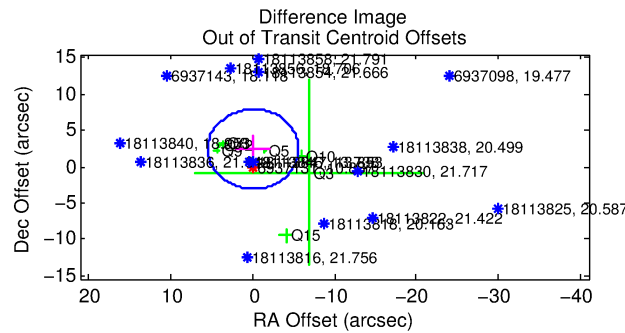
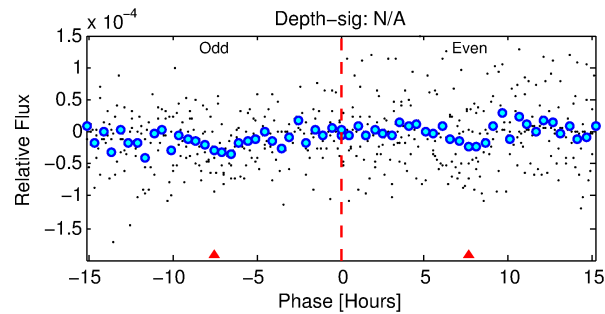
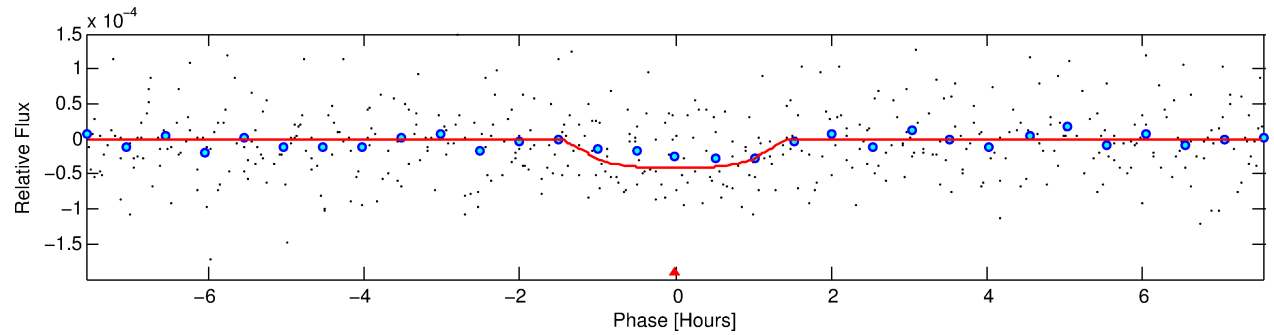
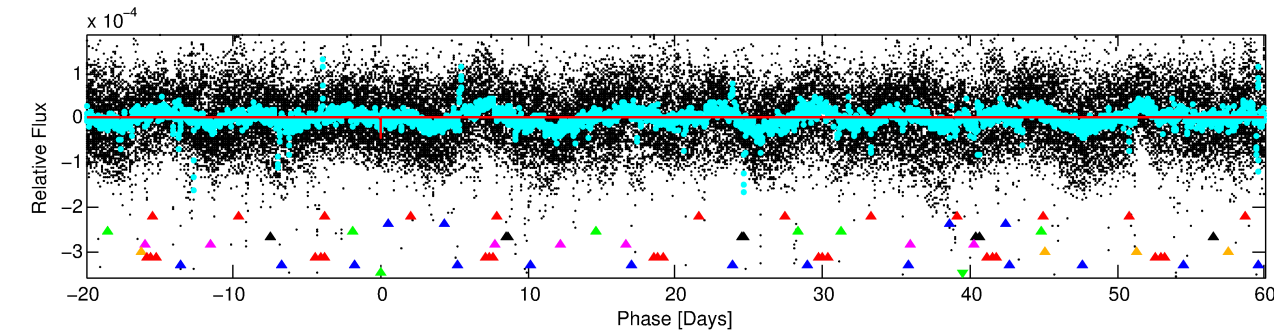
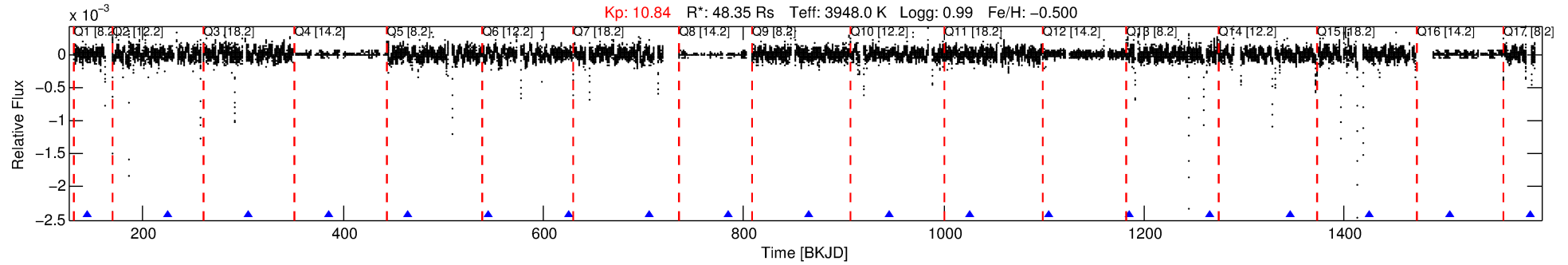
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 006937131-09

No Significant Match Found

# DV One-Page Summary

KIC: 6937131 Candidate: 9 of 9 Period: 80.019 d



## DV Fit Results:

Period = 80.01897 [0.00039] d  
Epoch = 145.1322 [0.0034] BKJD  
Rp/R\* = 0.0066 [0.0020]  
a/R\* = 159.12 [126.82]  
b = 0.76 [0.46]  
Seff = 4316.01 [966.13]  
Teff = 2067 [116] K  
Rp = 34.75 [14.67] Re  
a = 0.3434 [0.0690] AU  
Ag = 0.22 [0.17] [-4.54] $\sigma$   
Teffp = 2200 [405] K [0.32] $\sigma$

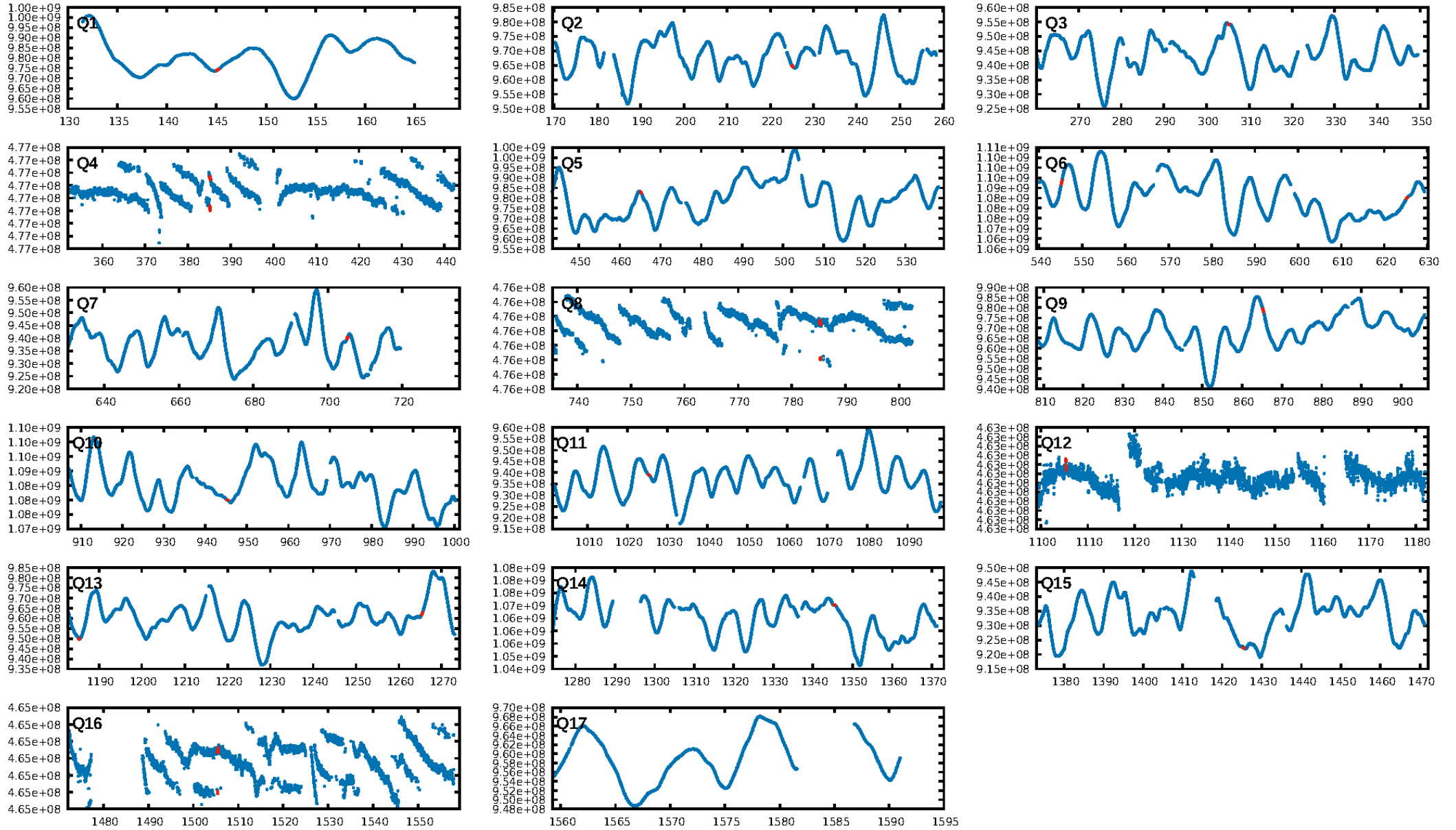
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [9.86] $\sigma$   
LongPeriod-sig: 100.0% [228.48] $\sigma$   
ModelChiSquare2-sig: 7.1%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [17/17]  
GhostDiagnostic-chr: -2.1  
Centroid-sig: 1.0%  
Centroid-so: 12.039 arcsec [2.12] $\sigma$   
OotOffset-rm: 2.424 arcsec [1.32] $\sigma$   
KicOffset-rm: 2.402 arcsec [1.31] $\sigma$   
OotOffset-st: 1/2/2/2 [7]  
KicOffset-st: 1/2/2/2 [7]  
DiffImageQuality-fgm: 0.14 [1/7]  
DiffImageOverlap-fno: 1.00 [14/14]

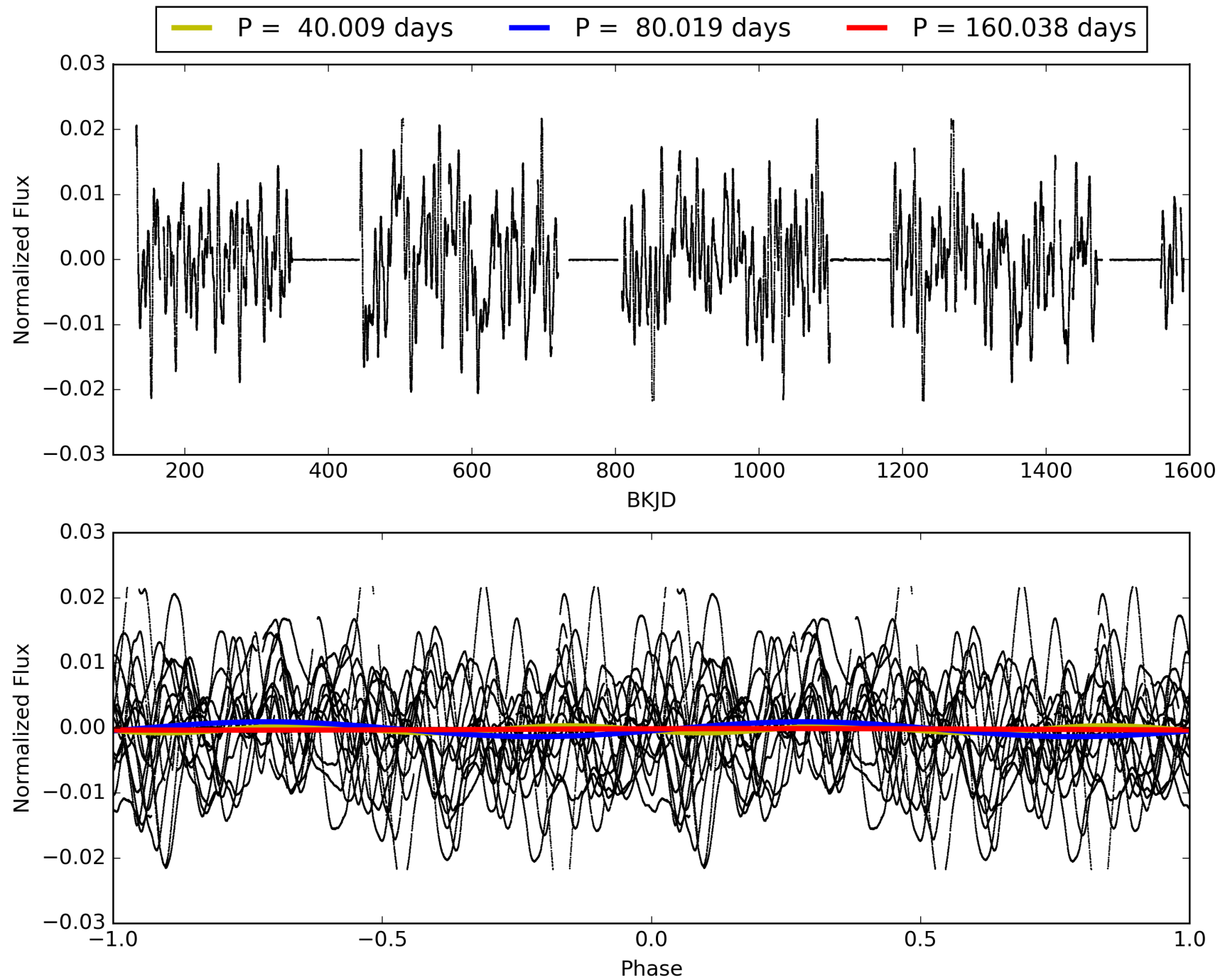
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 00:47:46 Z

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

# TCE 006937131-09, PDC Light Curves



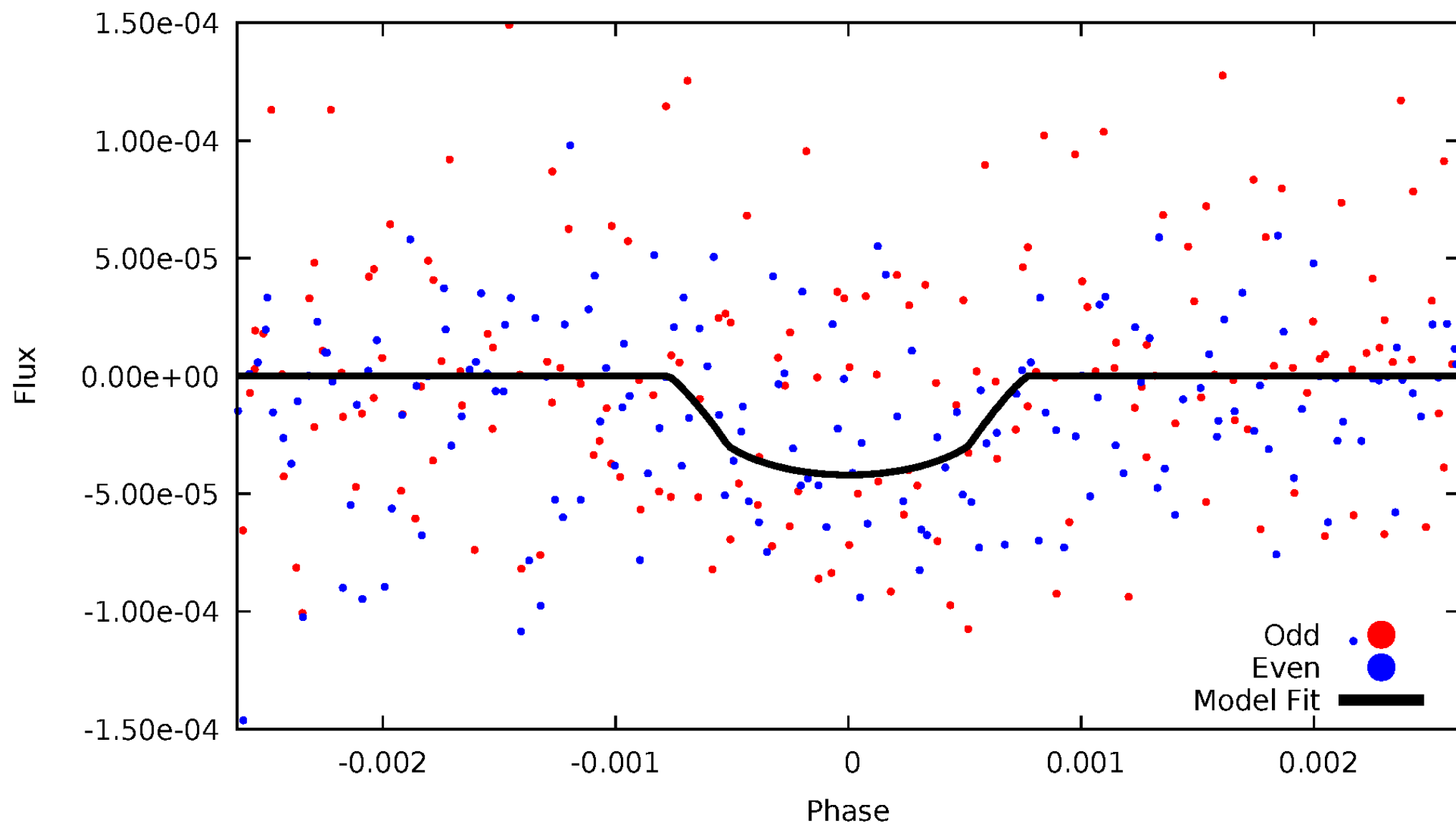
# TCE 006937131-09





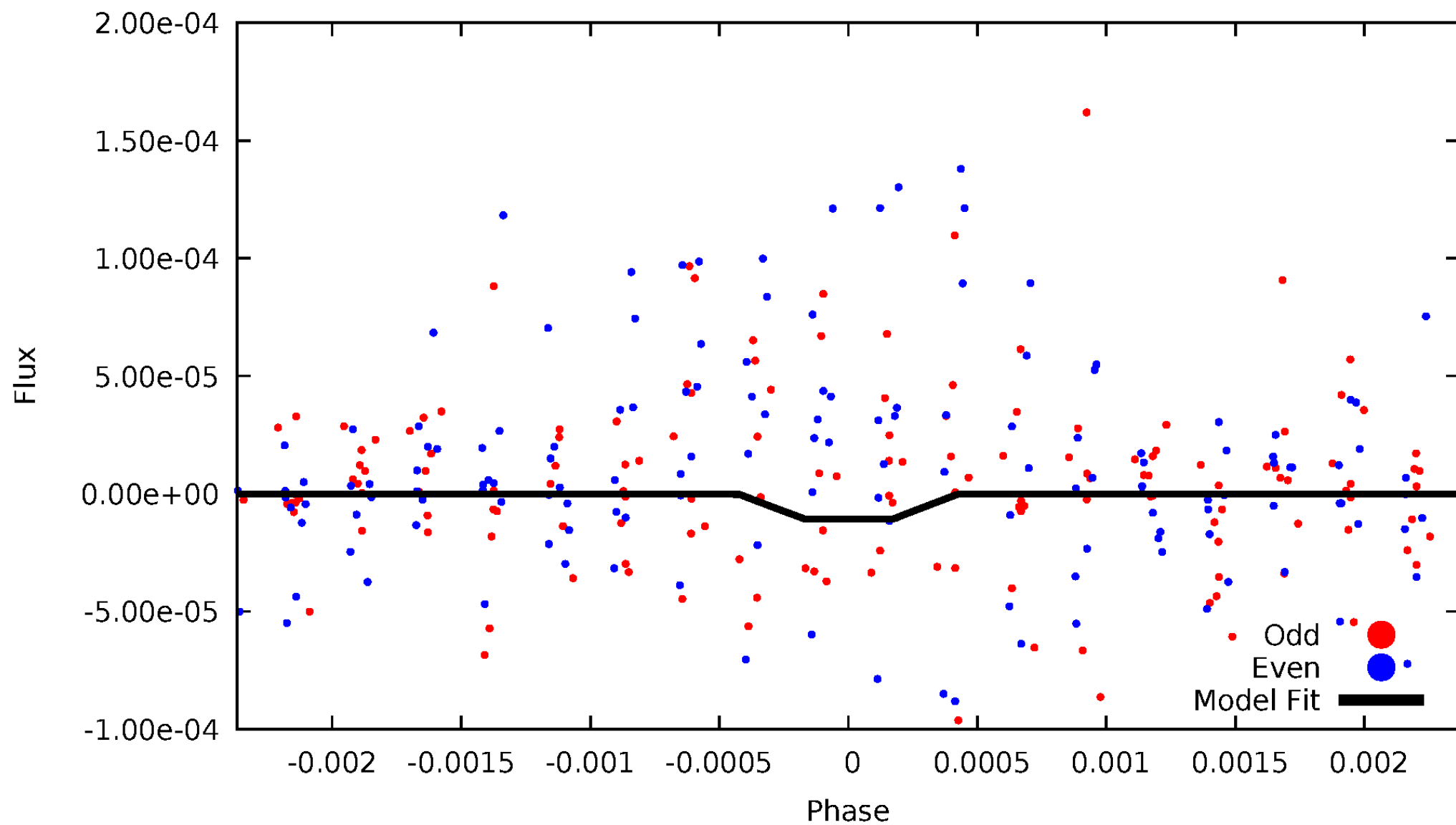
# DV Odd/Even

TCE 006937131-09



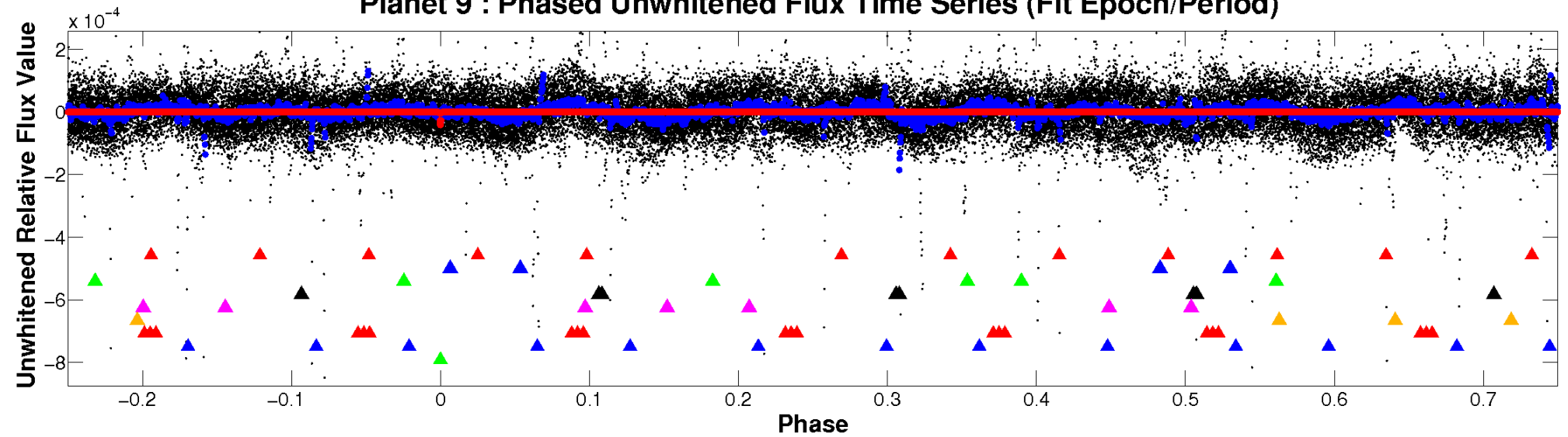
# ALT Odd/Even

TCE 006937131-09

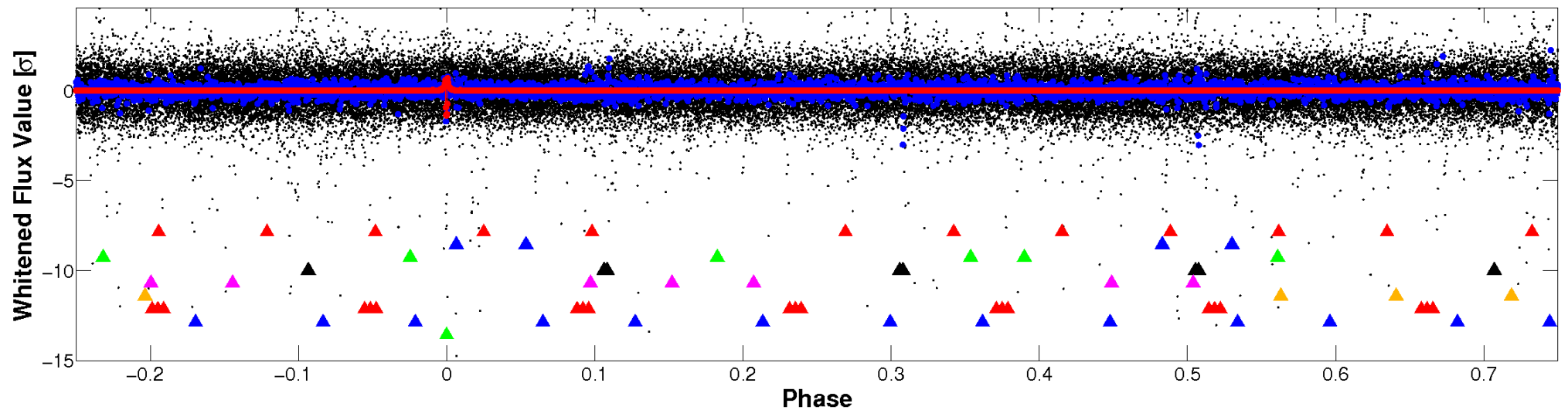


# Non-Whitened Vs. Whitened Light Curve

## Planet 9 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

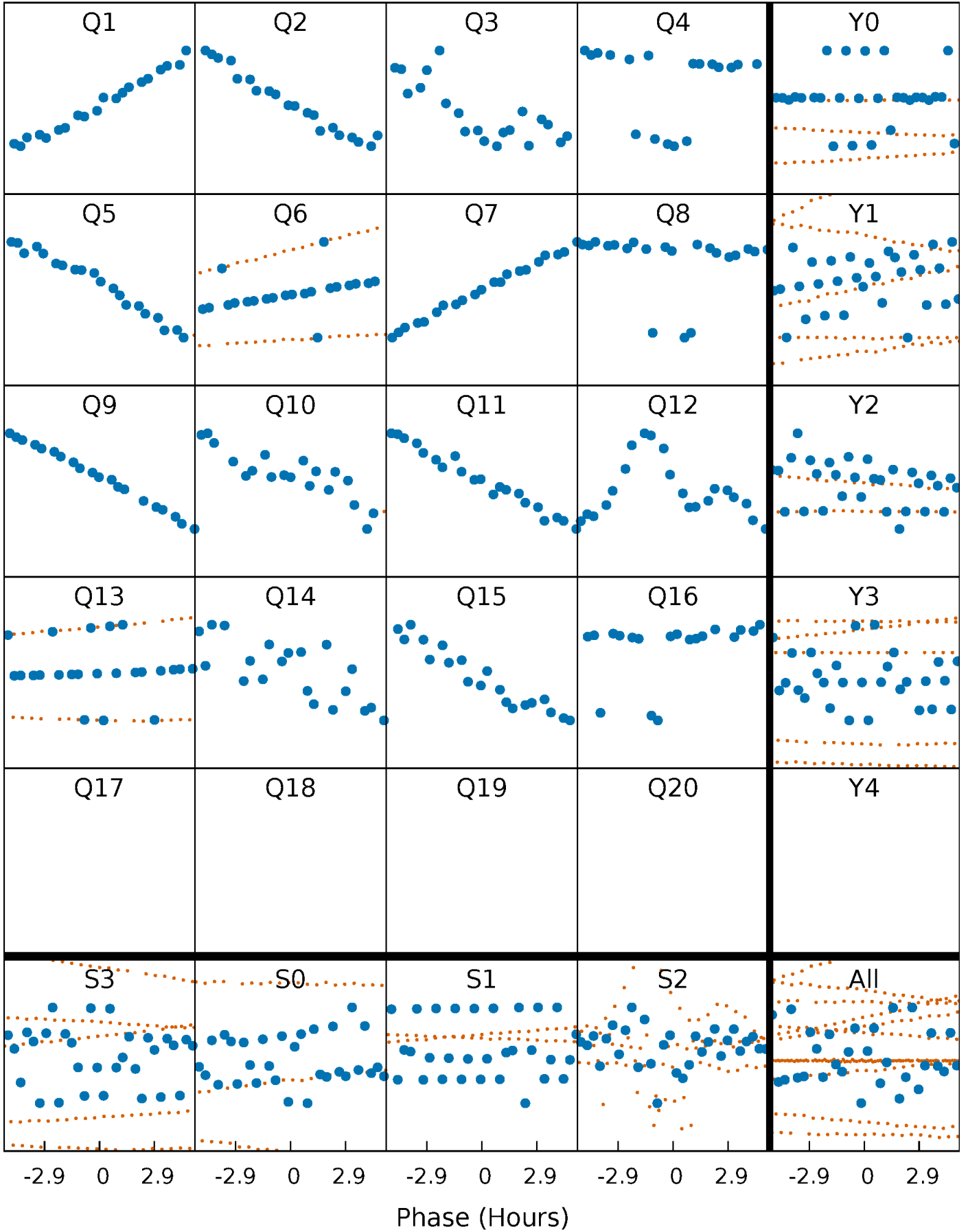


## Planet 9 : Phased Whitened Flux Time Series (Fit Epoch/Period)



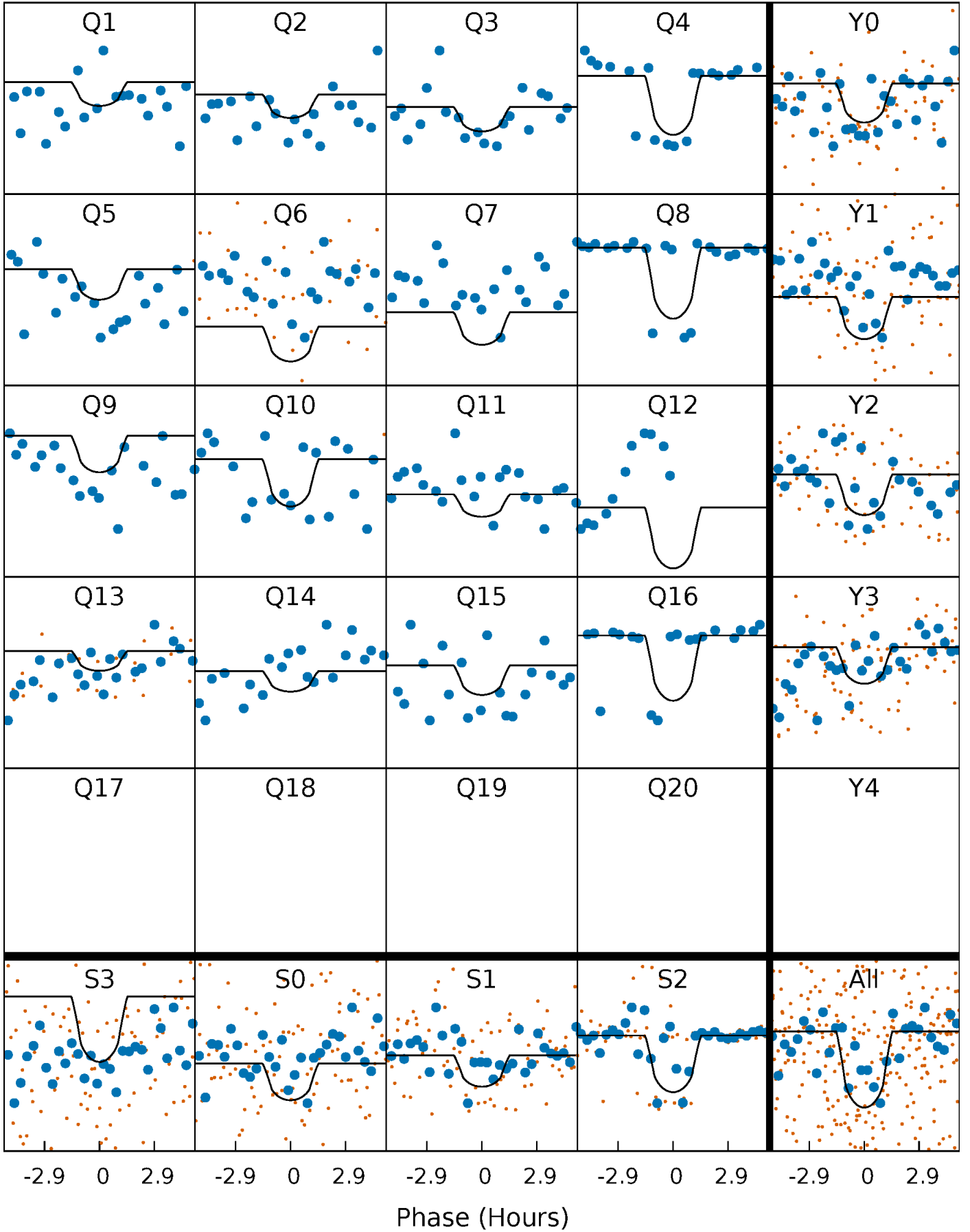
# PDC Quarter-Phased Transit Curves

TCE 006937131-09     $P = 80.018968$  Days     $T_0 = 145.132211$  (BKJD)



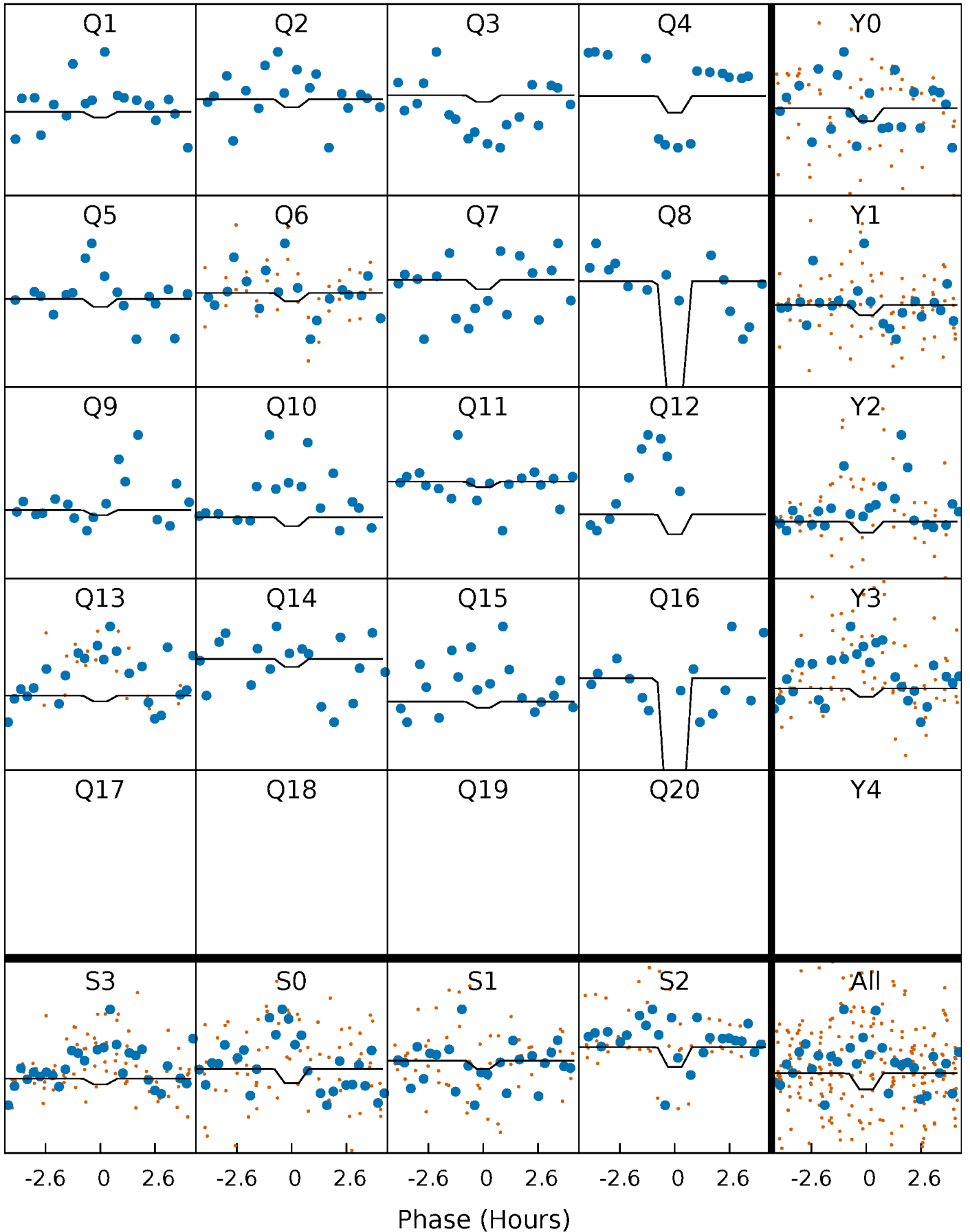
# DV Quarter-Phased Transit Curves

TCE 006937131-09     $P = 80.018968$  Days     $T_0 = 145.132211$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

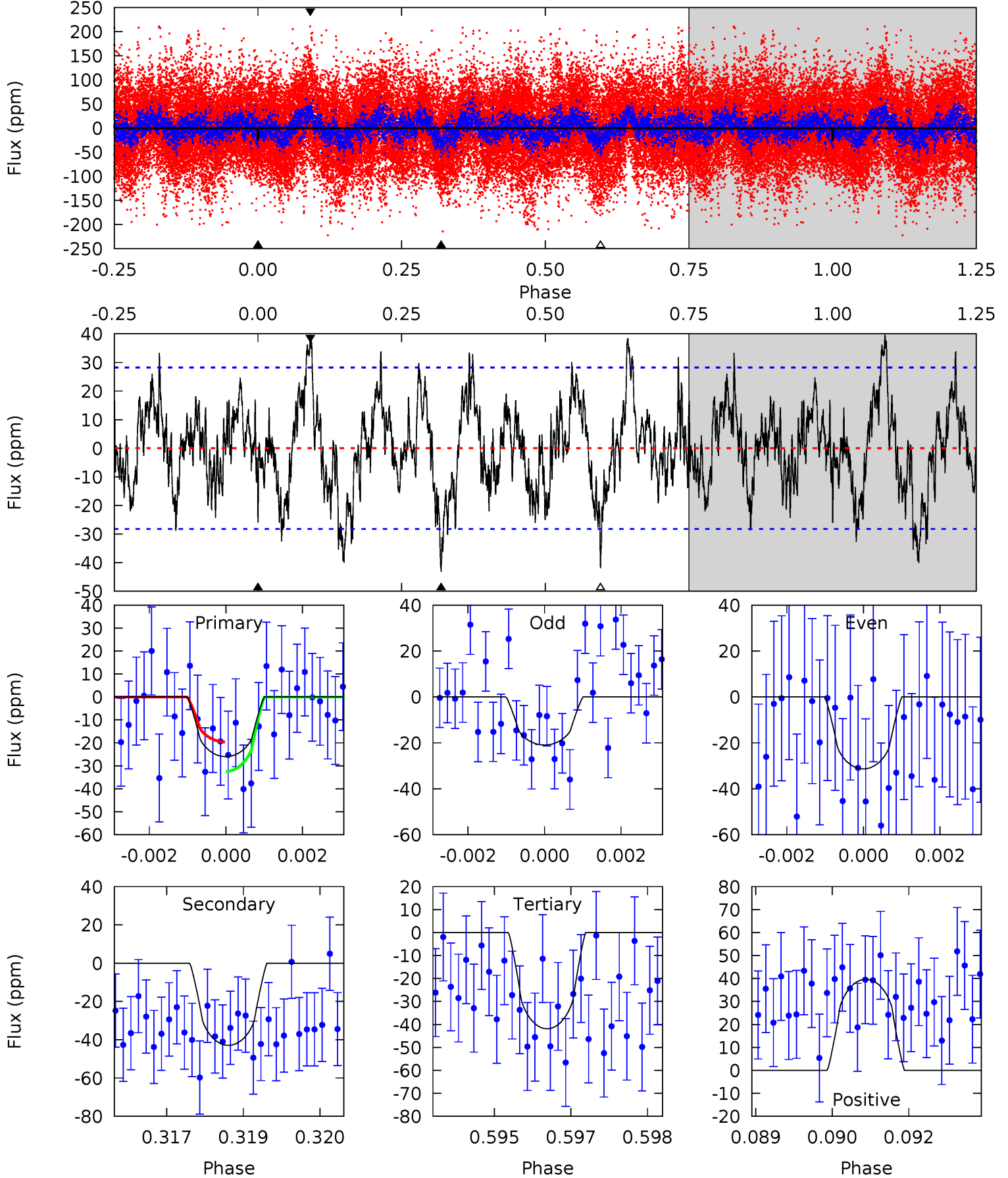
TCE 006937131-09   P= 80.017576 Days    $T_0=145.132497$  (BKJD)



# DV Model-Shift Uniqueness Test

006937131-09, P = 80.018968 Days, E = 65.113243 Days

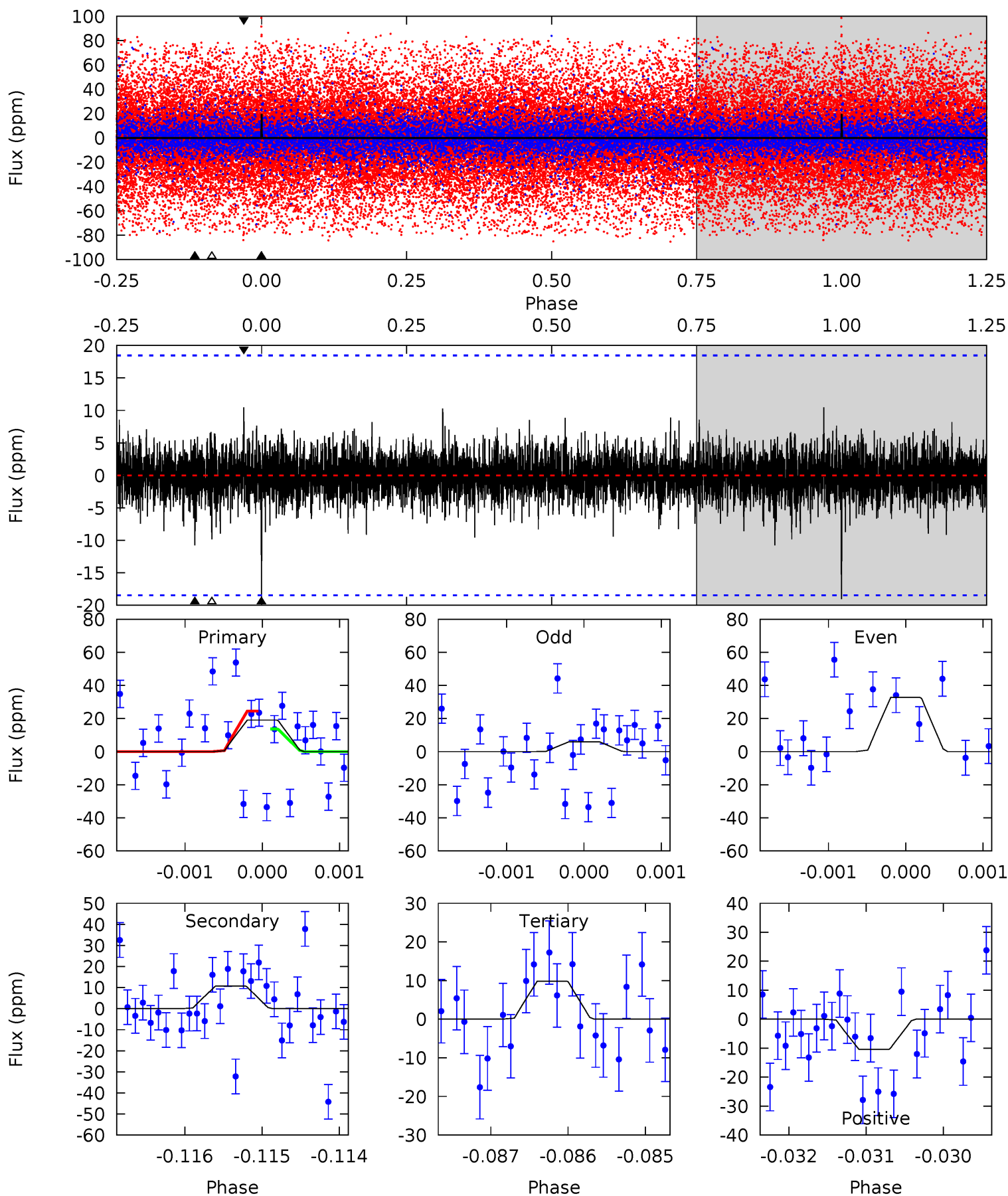
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
4.96	8.18	7.98	7.56	5.37	3.17	2.69	-3.03	-2.61	0.20	0.62	0.99	0.95	0.48	1.22



# Alt Model-Shift Uniqueness Test

006937131-09, P = 80.017576 Days, E = 65.114921 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.65	3.19	2.92	3.10	5.48	3.33	0.72	2.73	2.55	0.27	0.09	3.98	0.96	0.35	1.60





### Stellar Parameters For KIC 006937131

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$3948^{+87}_{-71}$	$0.995^{+0.033}_{-0.027}$	$-0.500^{+0.200}_{-0.150}$	$48.351^{+14.464}_{-1.523}$	$0.842^{+0.559}_{-0.029}$	$0.000^{+0.000}_{-0.000}$
	+2%/-2%	+3%/-3%	+40%/-30%	+30%/-3%	+66%/-3%	+9%/-24%
Source	PHO56	AST56	PHO56	DSEP		

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

### Secondary Eclipse Parameters for KIC 006937131-09 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-43 \pm 5$	$34.74^{+10.96}_{-10.89}$	$2886^{+73}_{-63}$	$3850^{+639}_{-385}$	$2.296^{+2.516}_{-0.953}$
Alt.	$-11 \pm 3$	$18.72^{+10.01}_{-9.81}$	$2881^{+80}_{-63}$	$3751^{+1443}_{-665}$	$2.024^{+6.643}_{-1.232}$

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

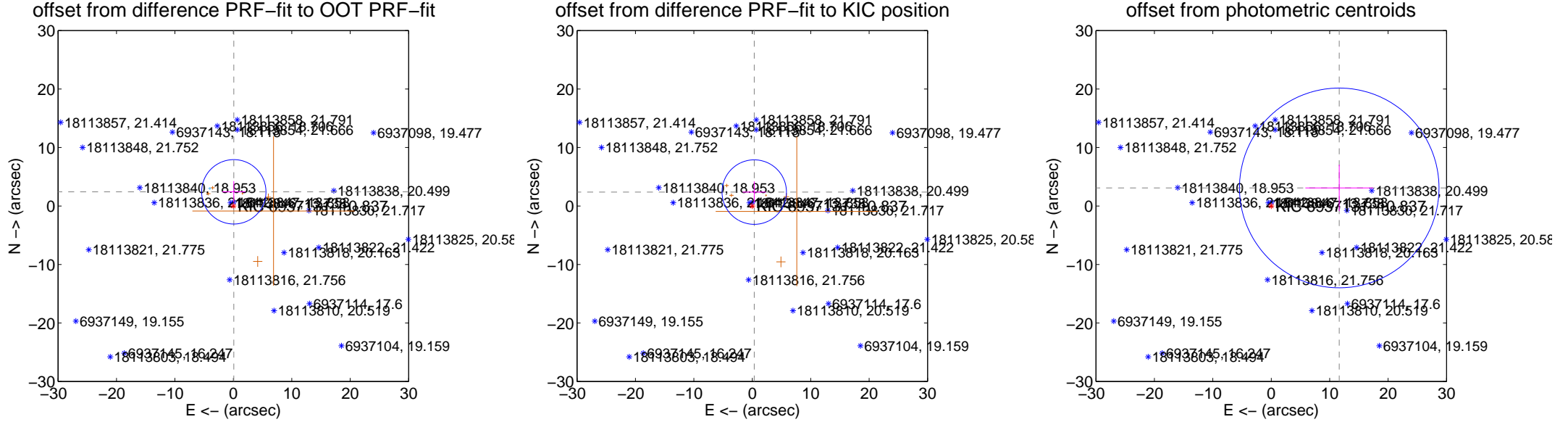
## DV Centroid Data

Supplemental centroid analysis for 006937131-09. **Kepler magnitude: 10.84.** Transit SNR 12.53

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

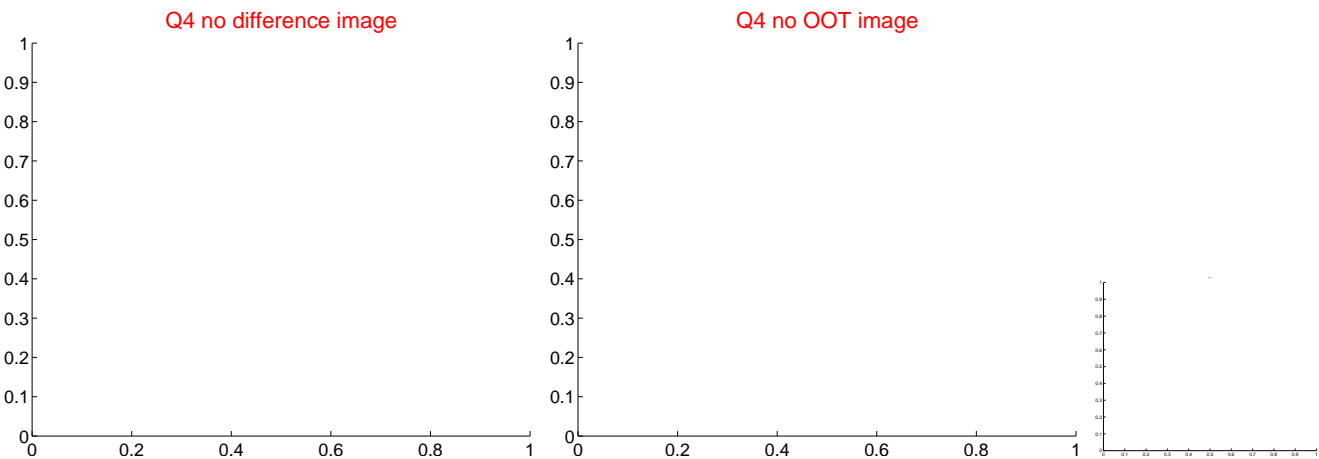
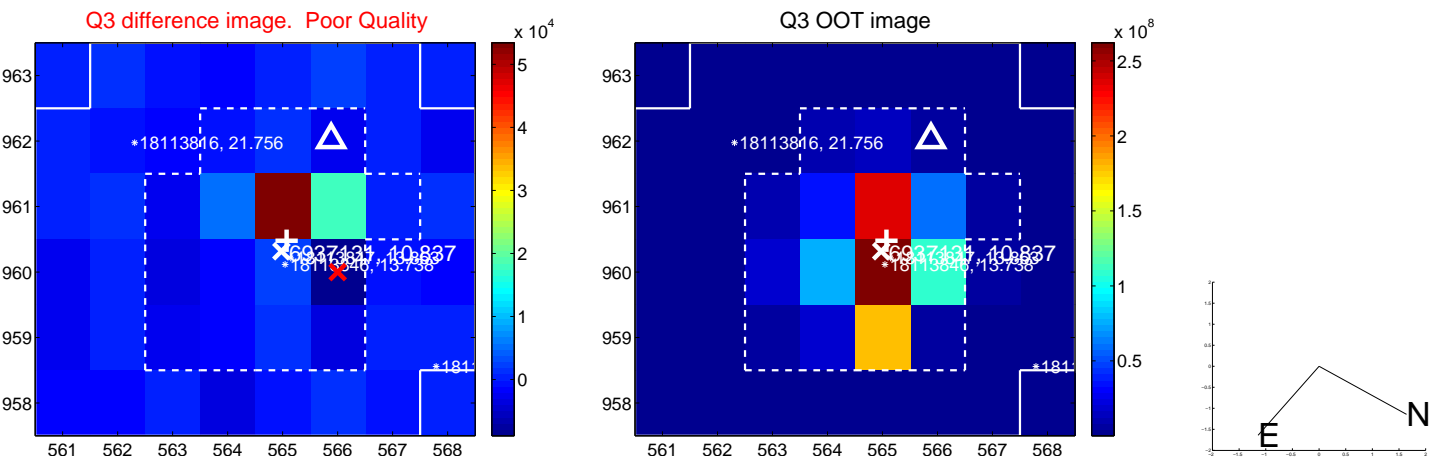
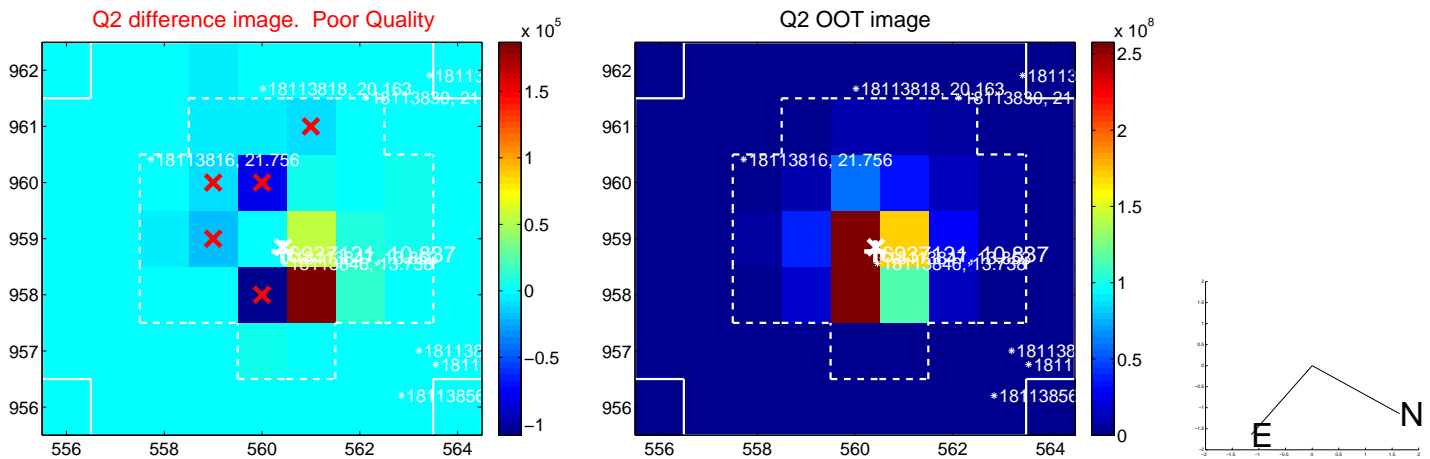
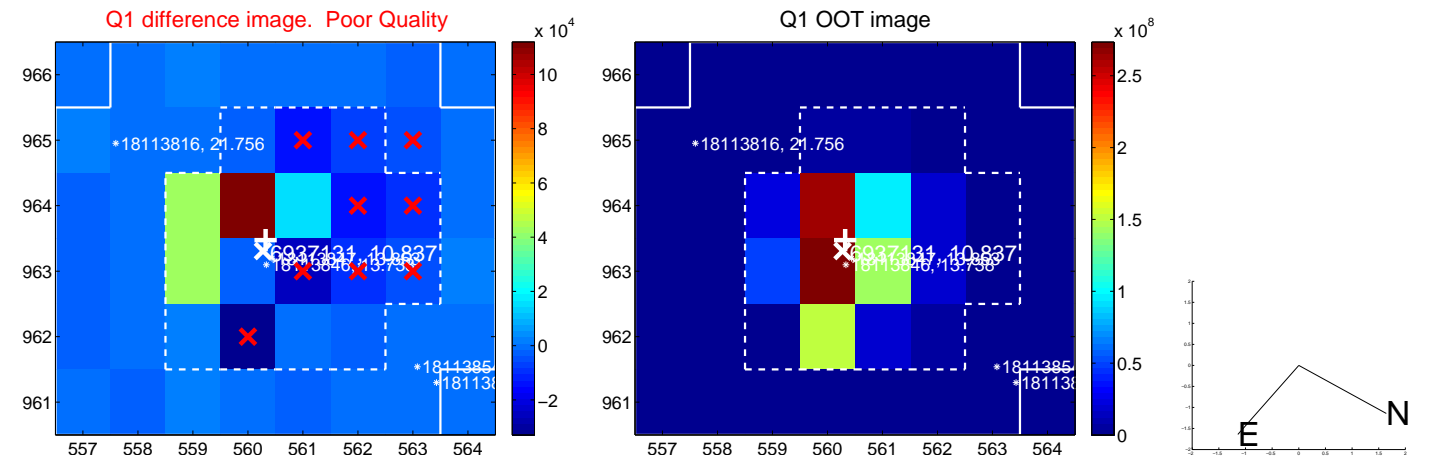
The direct PRF centroid is offset from the target star catalog position by about 0.73 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.424 \pm 1.835$	1.32	$-0.078 \pm 1.990$	$2.423 \pm 1.835$
PRF-fit source offset from KIC position	$2.402 \pm 1.838$	1.31	$-0.333 \pm 1.990$	$2.379 \pm 1.835$
photometric centroid source offset	$12.04 \pm 5.69$	2.12	$-11.64 \pm 5.79$	$3.09 \pm 3.96$

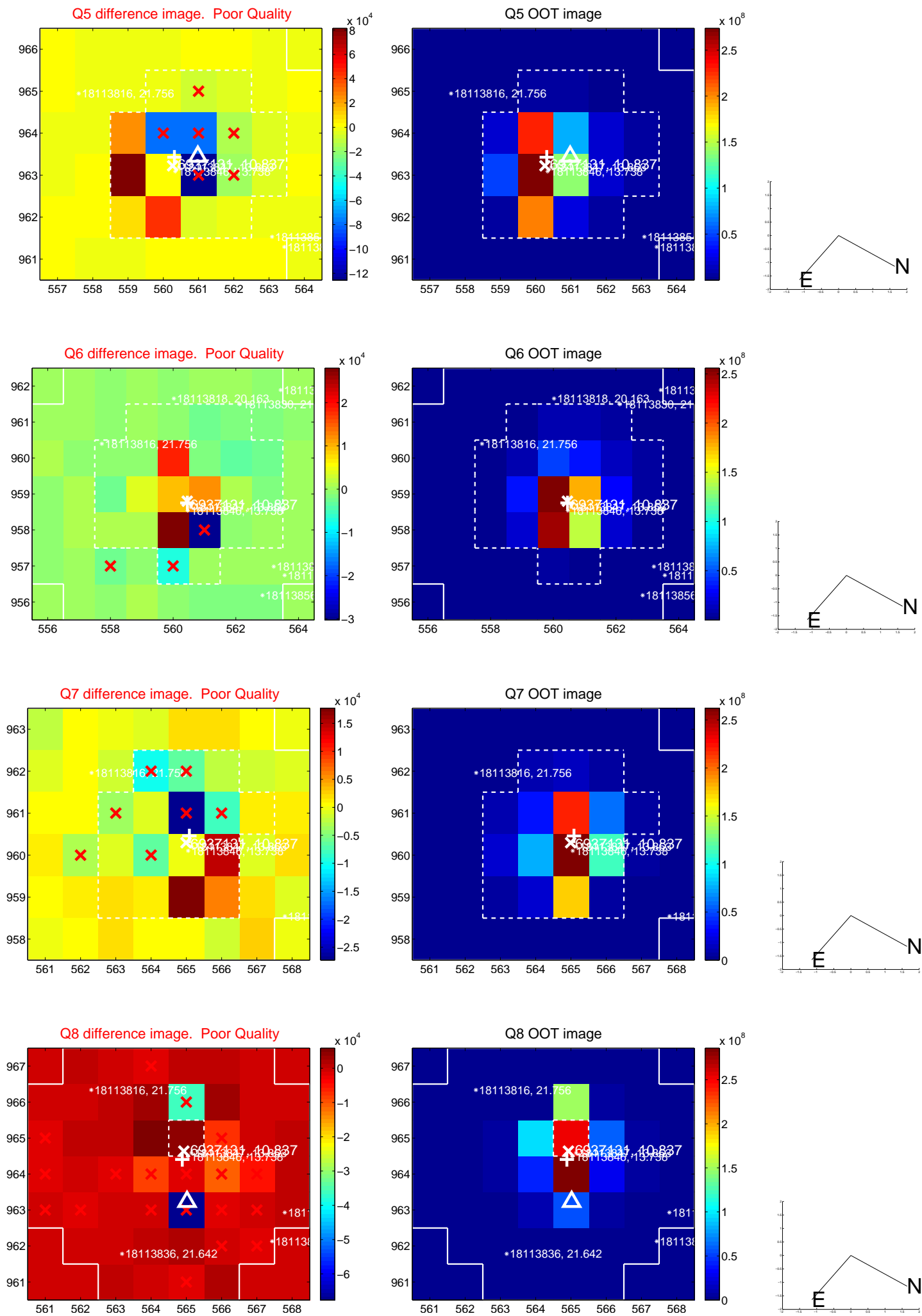


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

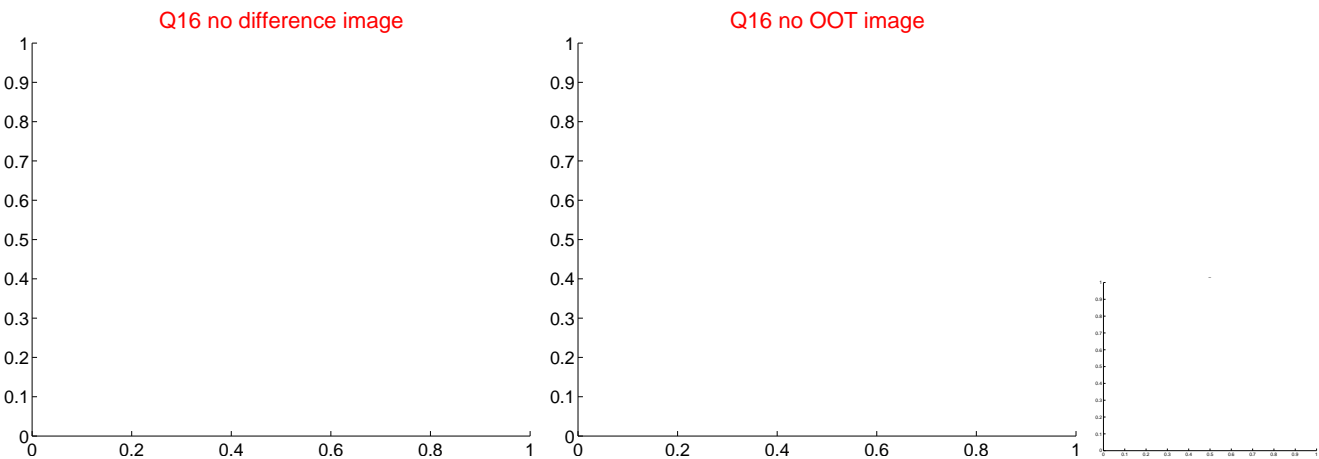
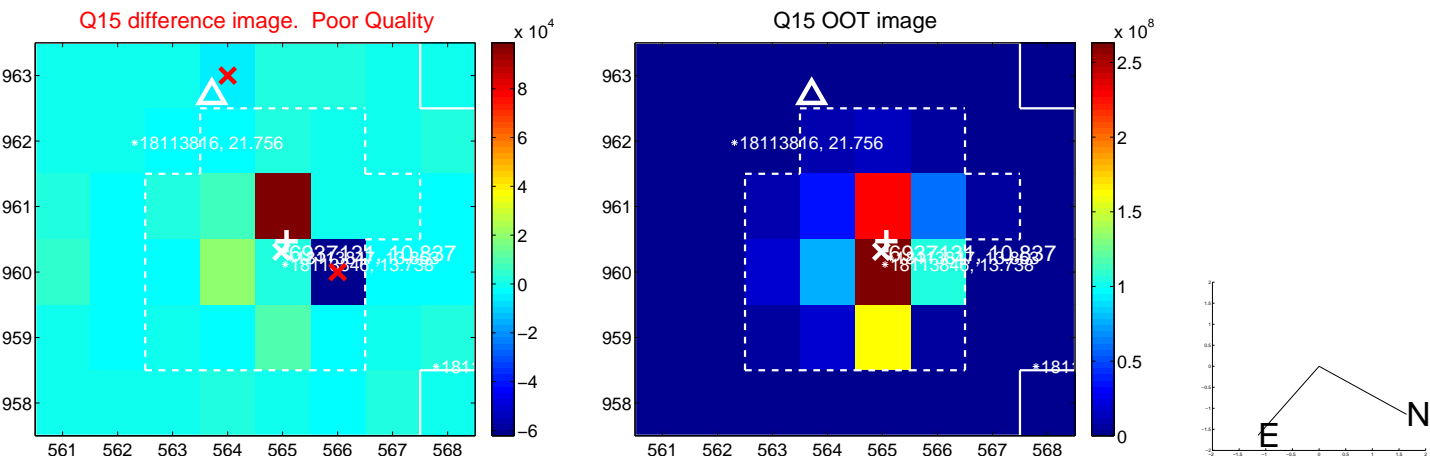
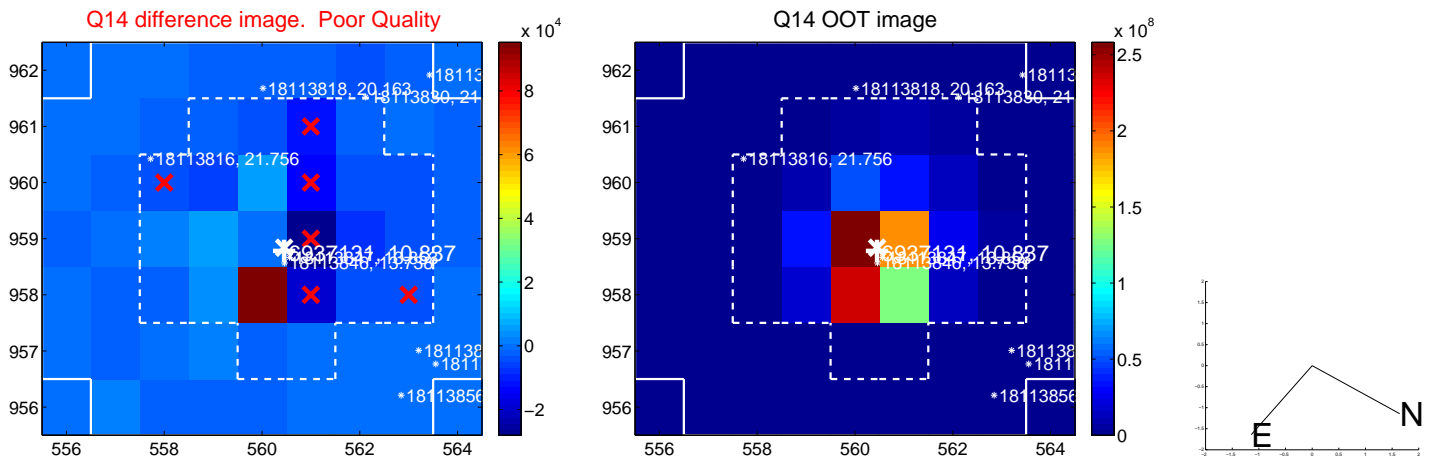
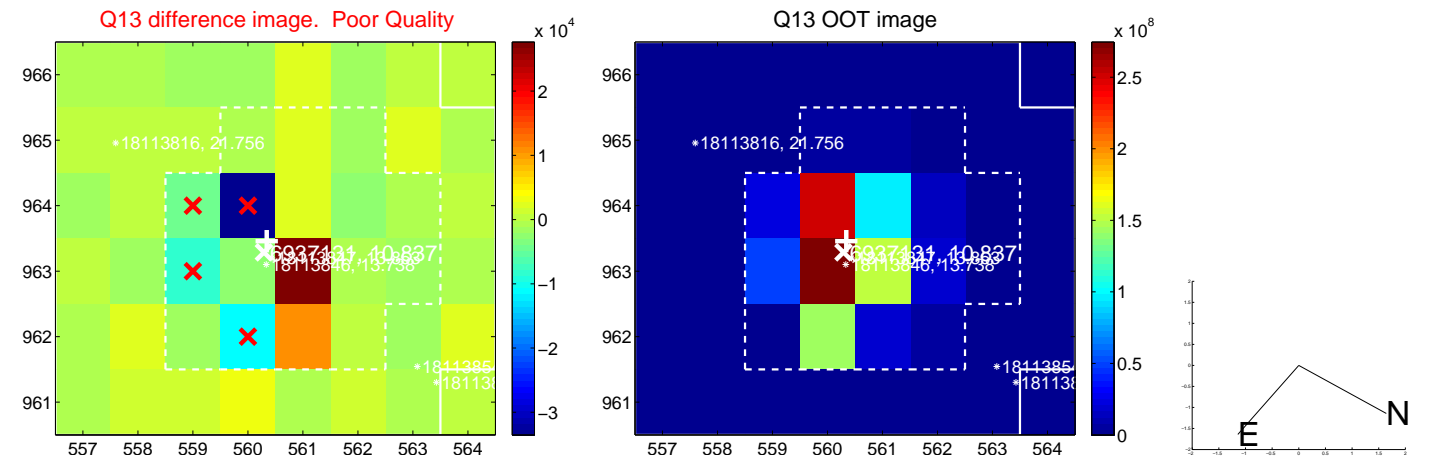


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

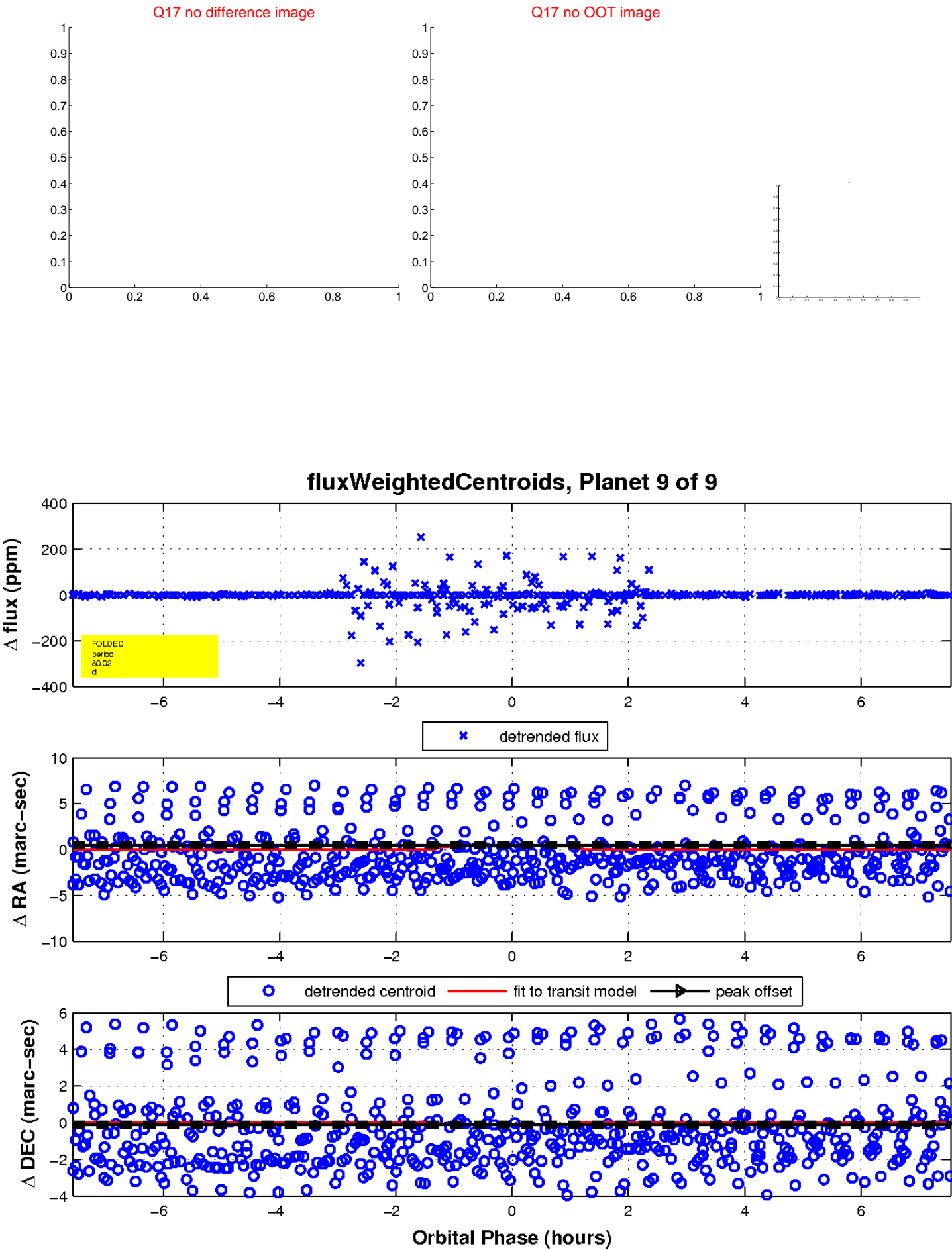




white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image

