

# KIC 007818940

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
007818940-01	OBS	No	1.029500	131.783731	28.6	5.988	8.6	8.6	1.97	7118	1.10	18829.59
007818940-02	OBS	No	158.692889	188.761655	1056.5	5.577	17.5	9.4	1.97	7118	6.48	22.78
007818940-03	OBS	No	81.075497	193.330754	741.5	21.332	10.1	4.6	1.97	7118	6.55	55.78
007818940-04	OBS	No	113.534821	202.242522	237.6	2.844	7.8	3.1	1.97	7118	3.48	35.60

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007818940-01	OBS	FP	0.00	1	0	0	0	LPP_DV
007818940-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—HALO_GHOST
007818940-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_DV
007818940-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—HALO_GHOST

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

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

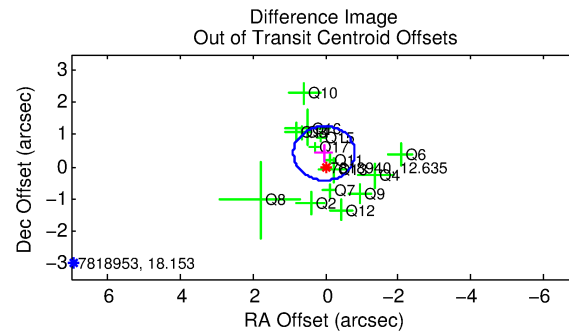
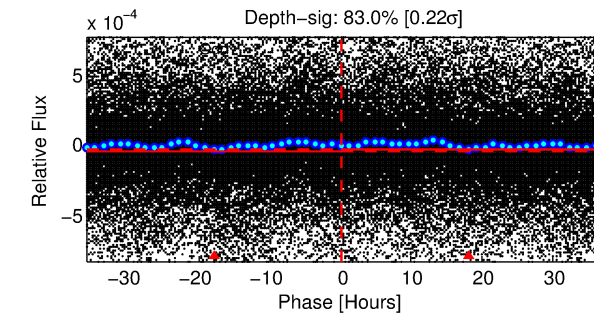
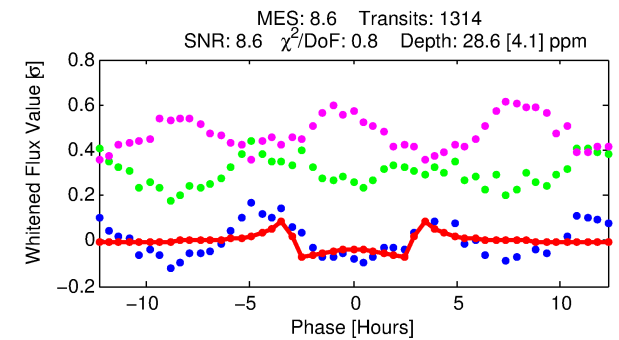
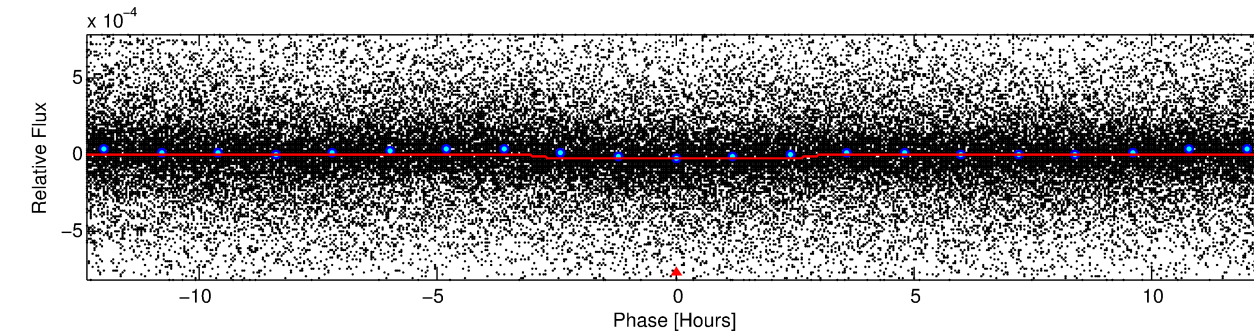
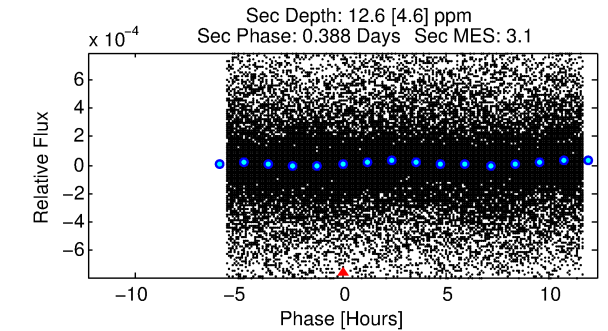
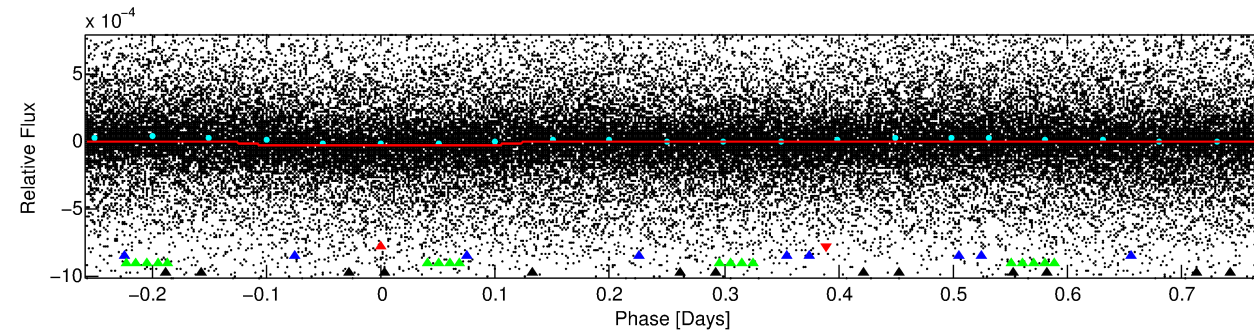
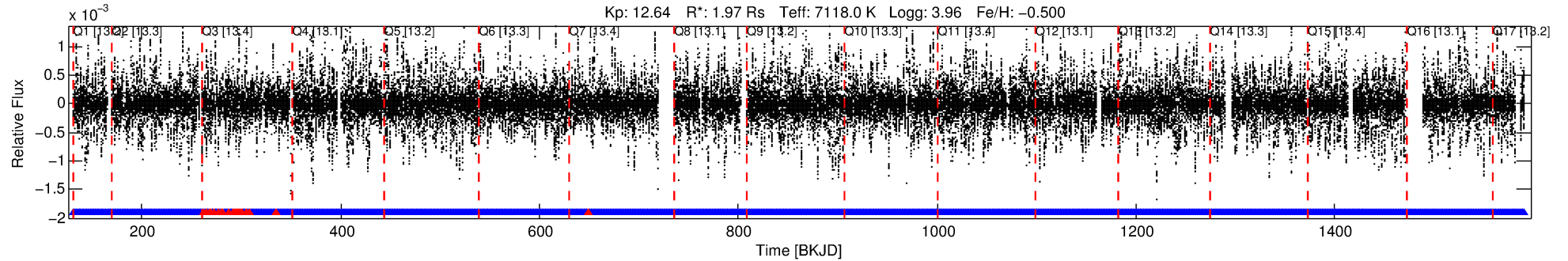
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 007818940-01

No Significant Match Found

# DV One-Page Summary

KIC: 7818940 Candidate: 1 of 4 Period: 1.030 d



## DV Fit Results:

Period = 1.02950 [0.00001] d  
Epoch = 131.7837 [0.0024] BKJD  
Rp/R\* = 0.0051 [0.0015]  
a/R\* = 1.32 [0.94]  
b = 0.59 [1.89]  
Seff = 18829.59 [8567.77]  
Teff = 2987 [340] K  
Rp = 1.10 [0.46] Re  
a = 0.0218 [0.0060] AU  
Ag = 2.70 [2.17] [0.78σ]  
Teffp = 5920 [1017] K [2.74σ]

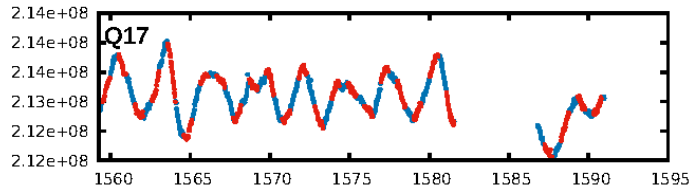
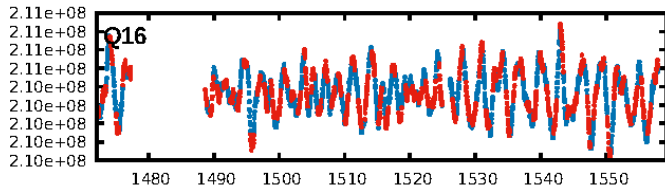
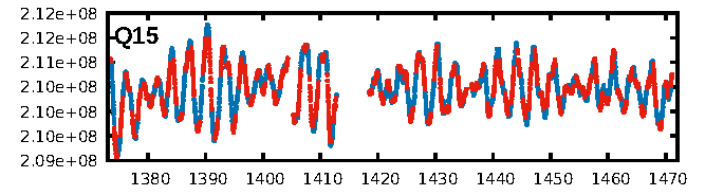
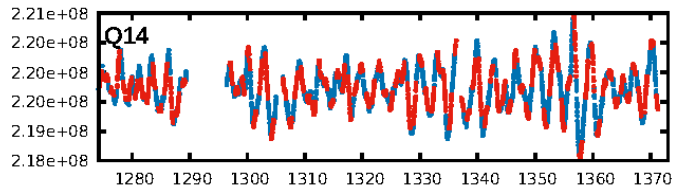
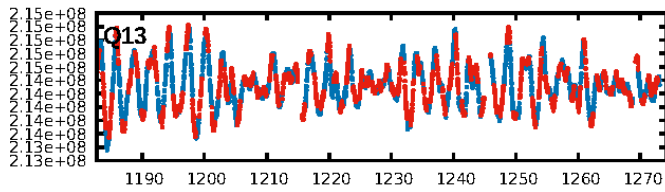
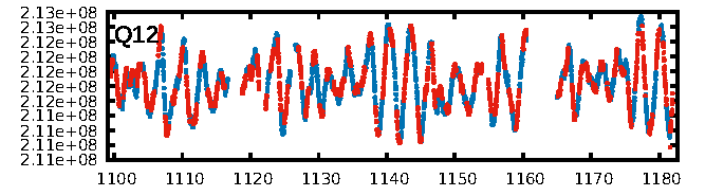
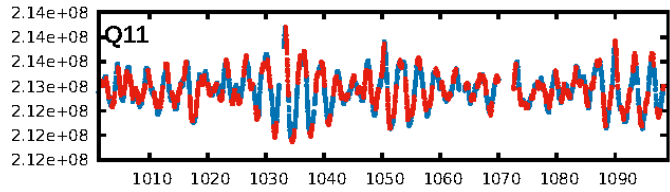
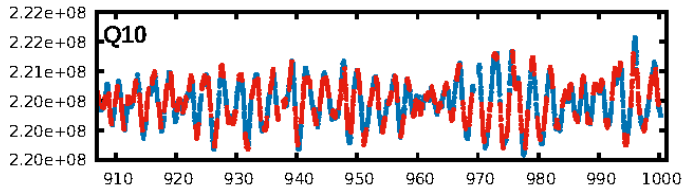
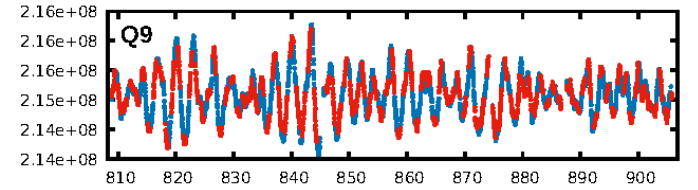
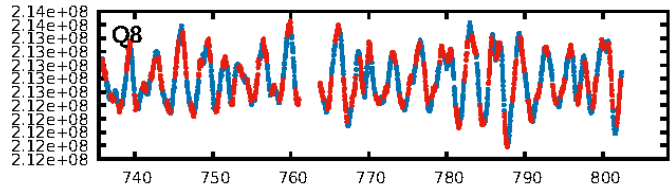
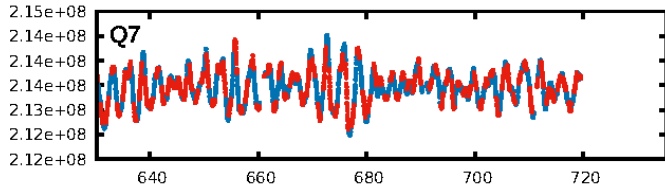
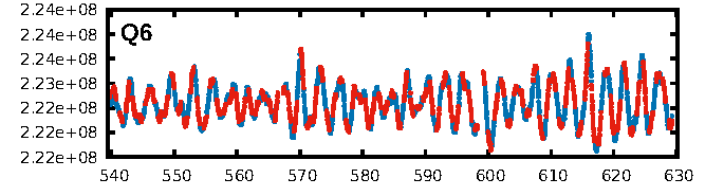
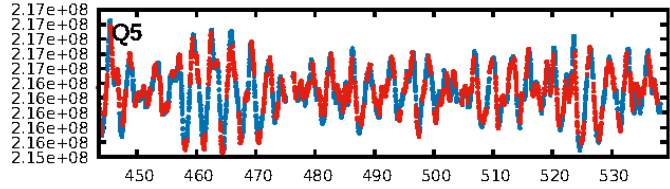
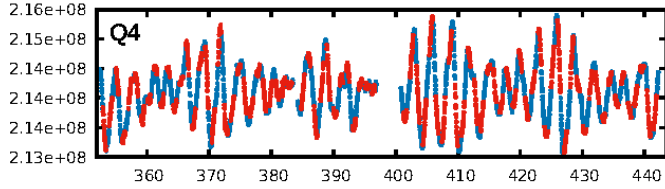
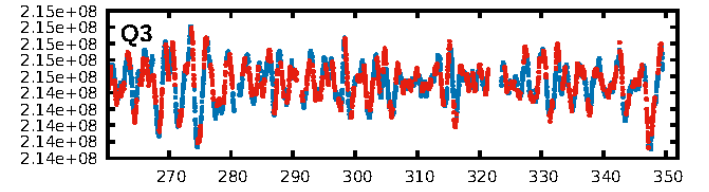
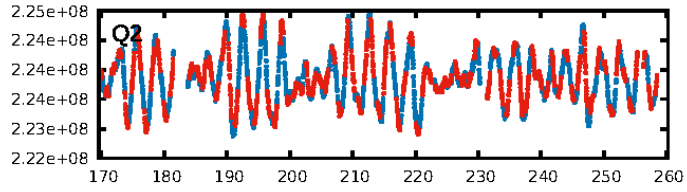
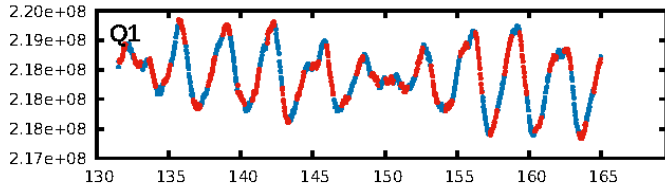
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [86.71σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.10e-22  
RollingBand-fgt: 0.98 [1232/1255]  
GhostDiagnostic-chr: 5.511  
Centroid-sig: N/A  
Centroid-so: 0.698 arcsec [1.64σ]  
OotOffset-rm: 0.418 arcsec [1.49σ]  
KicOffset-rm: 0.615 arcsec [2.13σ]  
OotOffset-st: 4/4/4/3 [15]  
KicOffset-st: 4/4/4/3 [15]  
DiffImageQuality-fgm: 0.60 [9/15]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 10:17:41 Z

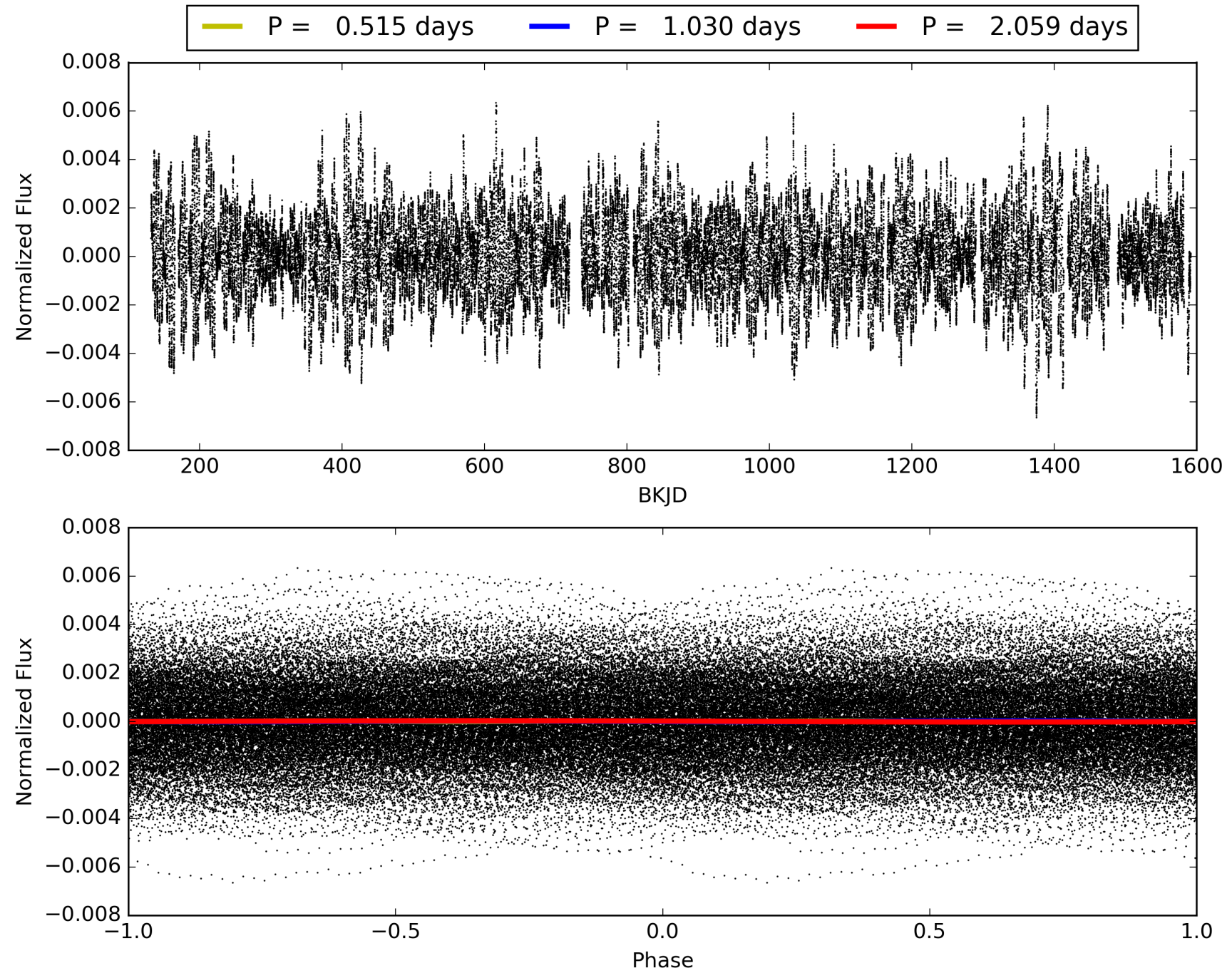
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

## TCE 007818940-01, PDC Light Curves





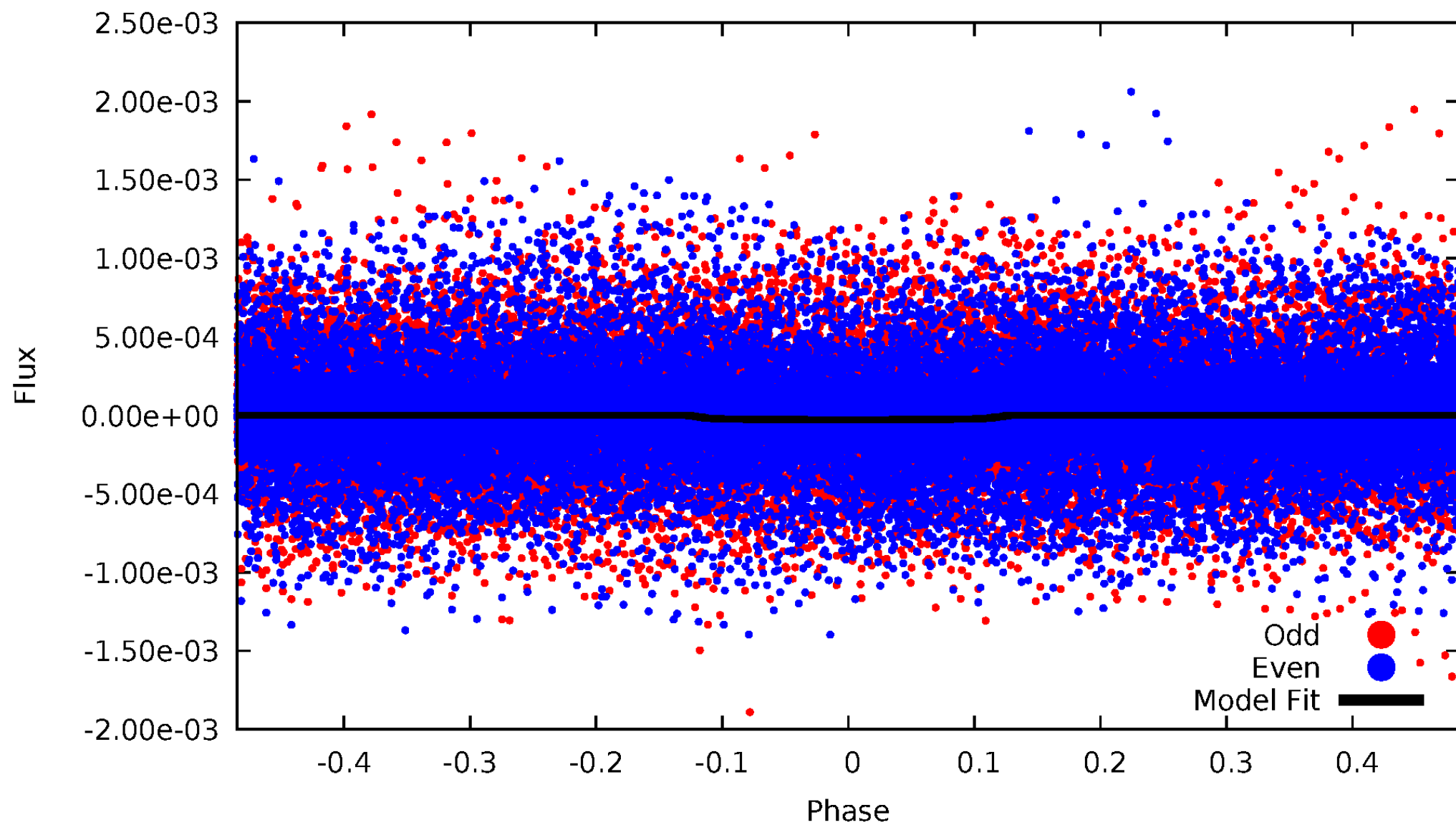
TCE 007818940-01





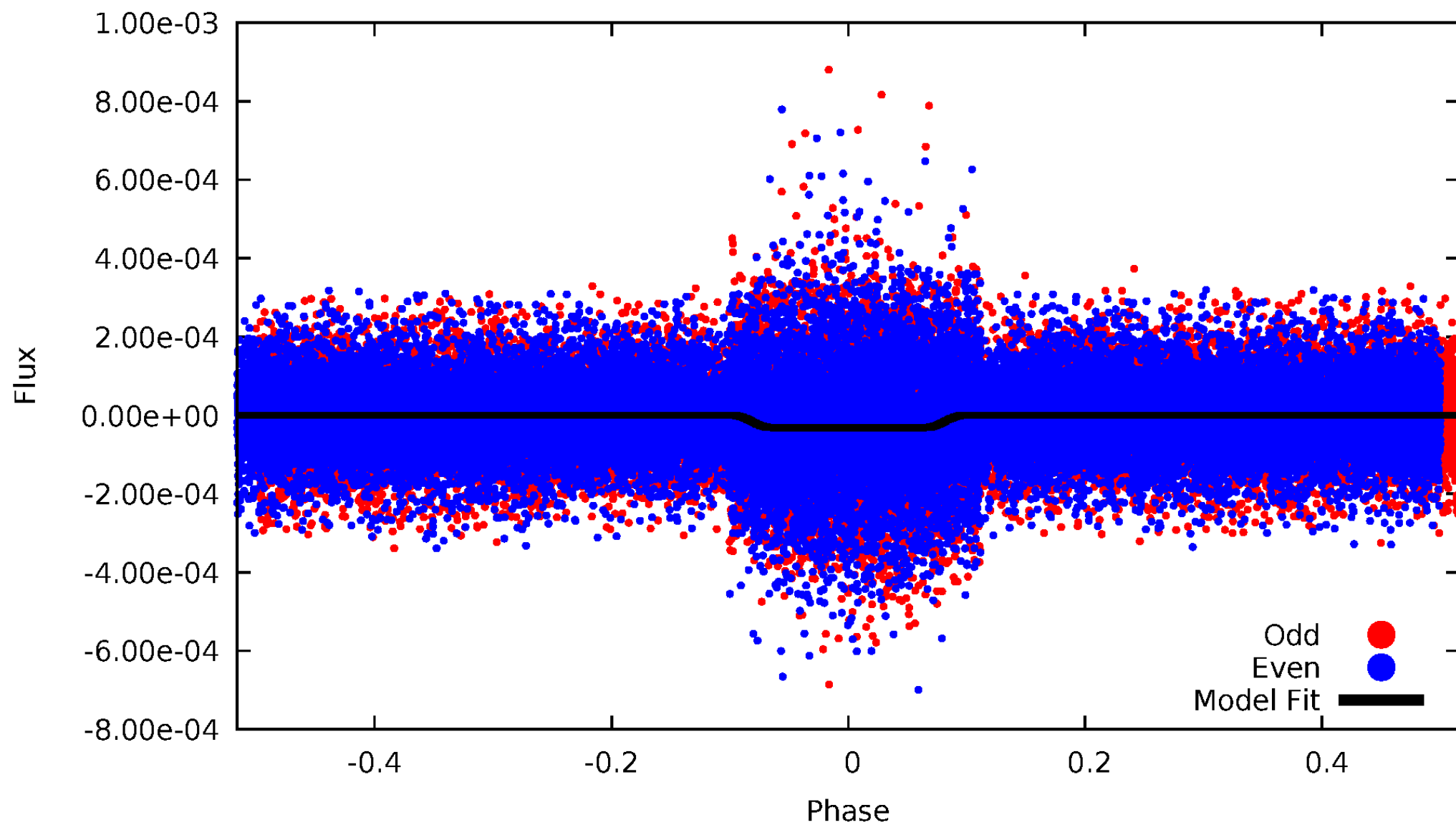
# DV Odd/Even

TCE 007818940-01

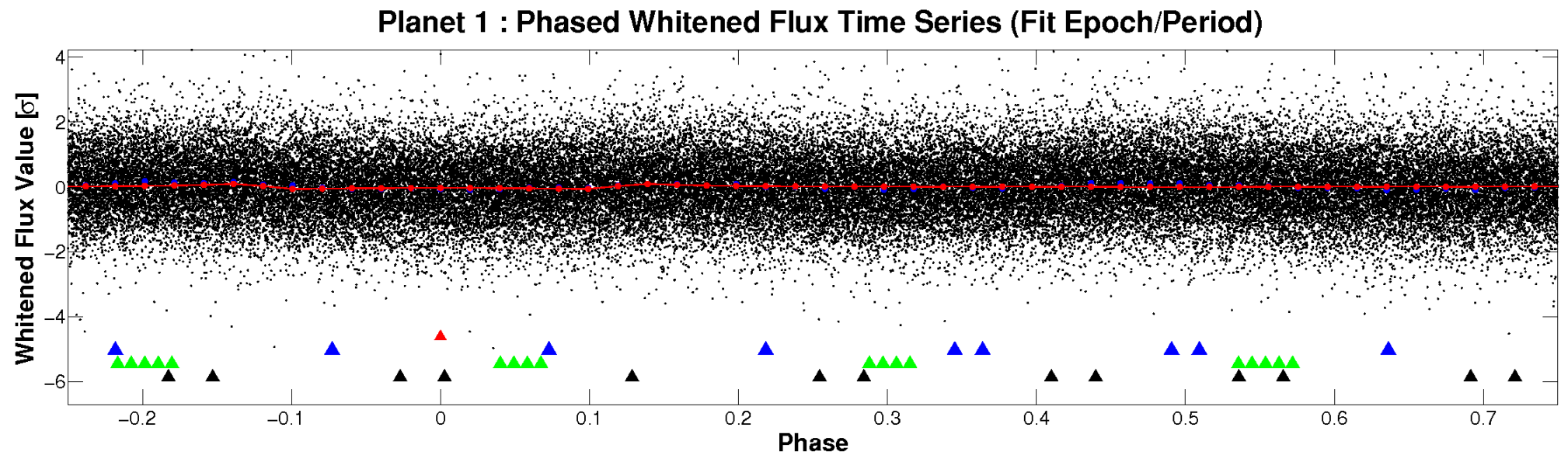
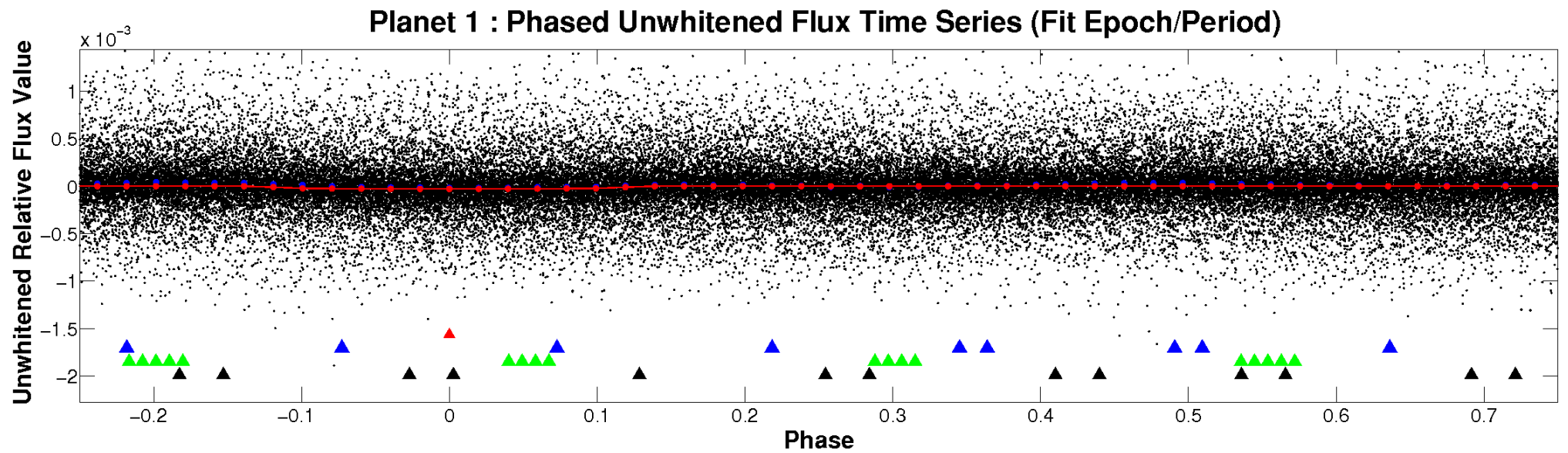


# ALT Odd/Even

TCE 007818940-01



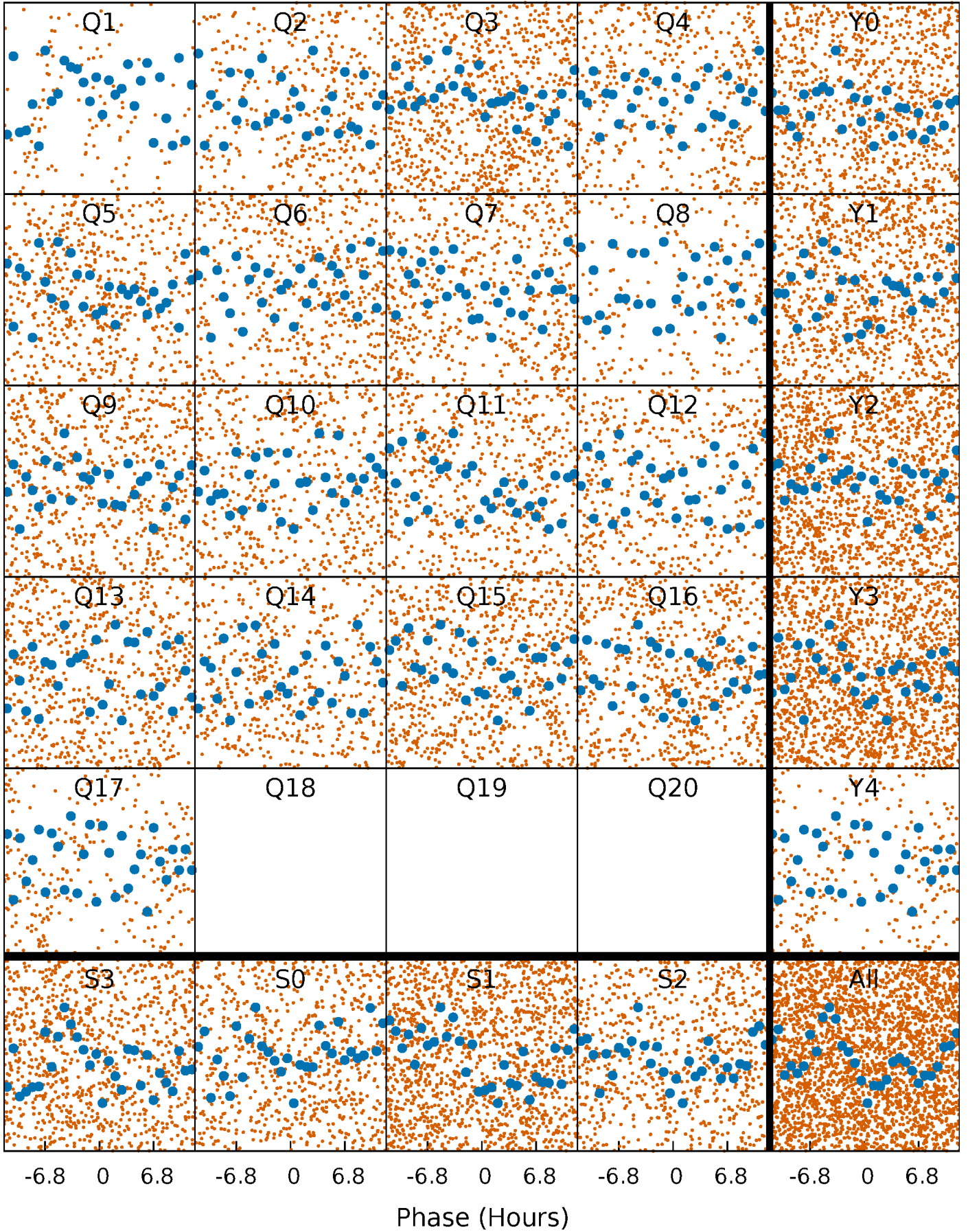
# Non-Whitened Vs. Whitened Light Curve





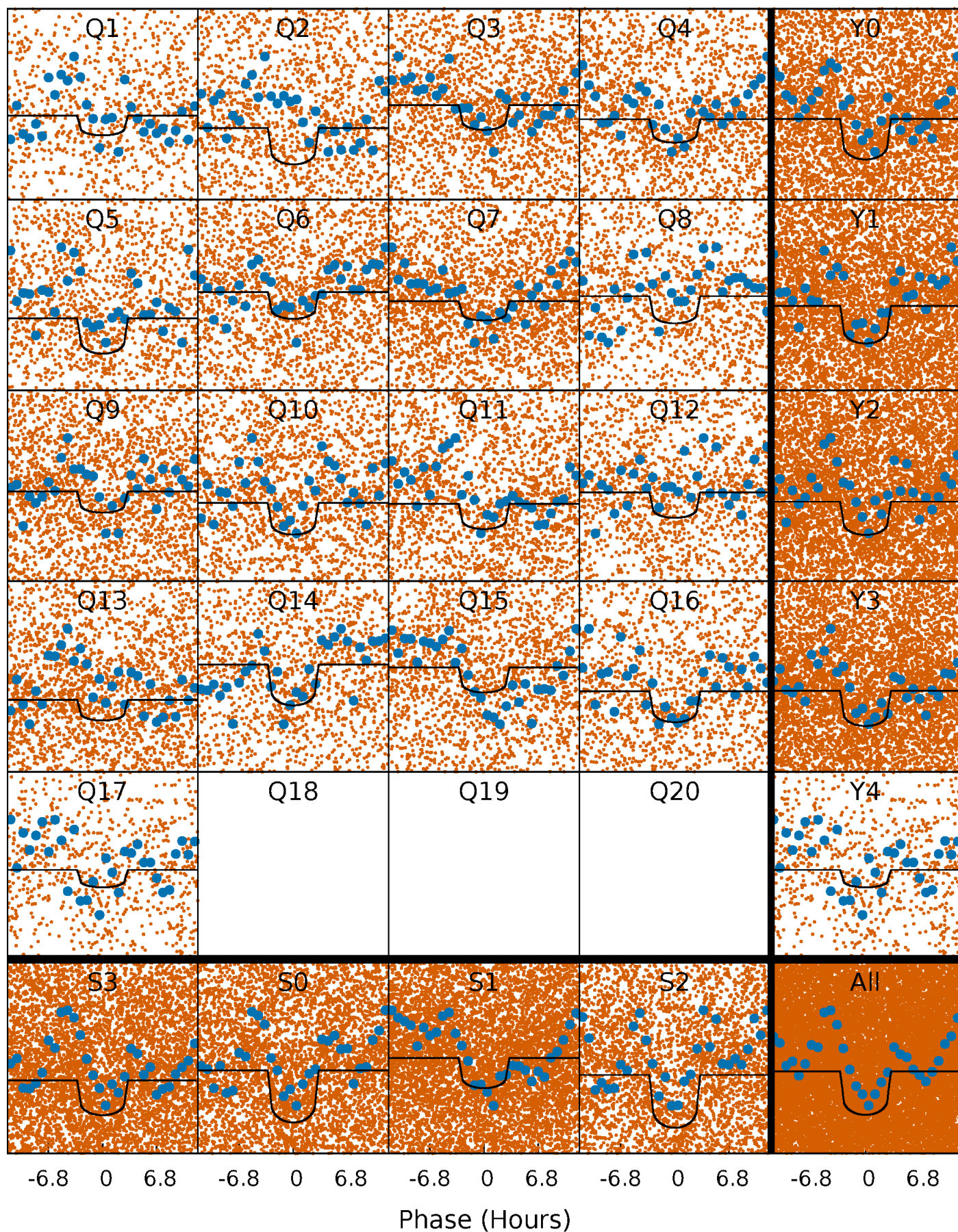
# PDC Quarter-Phased Transit Curves

TCE 007818940-01   P= 1.029500 Days    $T_0=131.783731$  (BKJD)



# DV Quarter-Phased Transit Curves

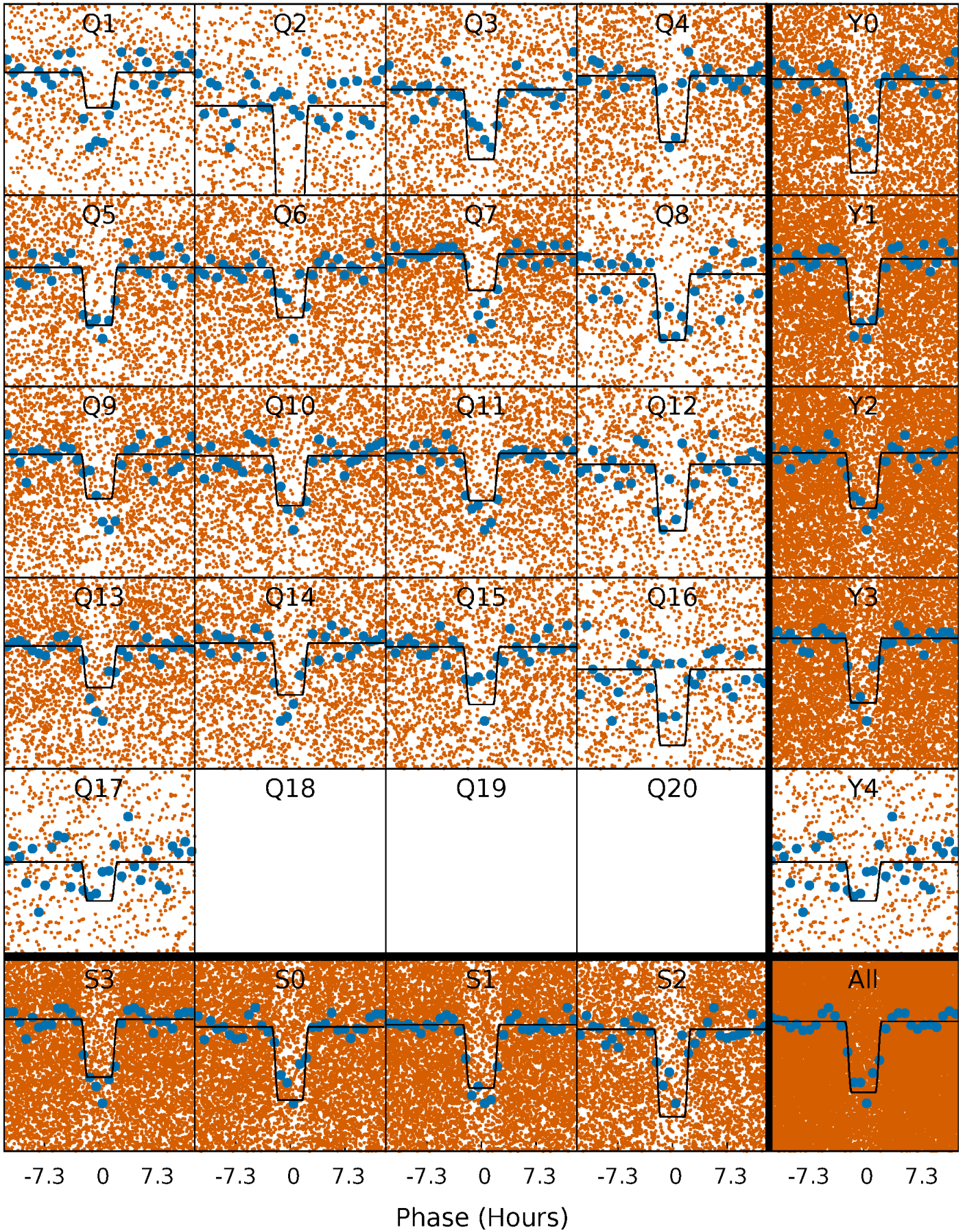
TCE 007818940-01 P= 1.029500 Days  $T_0=131.783731$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

TCE 007818940-01 P= 1.029477 Days  $T_0=131.792635$  (BKJD)

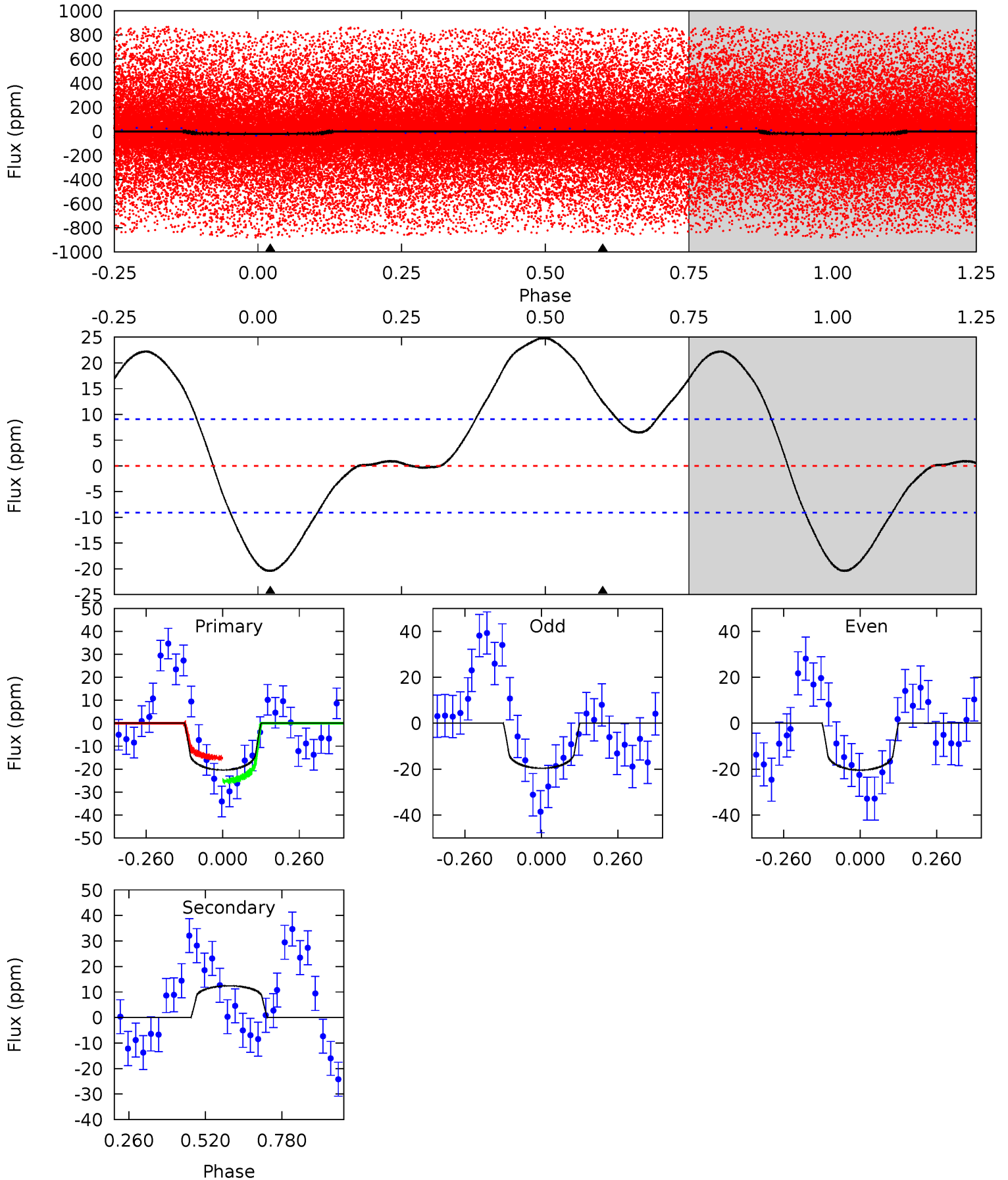




# DV Model-Shift Uniqueness Test

007818940-01, P = 1.029500 Days, E = 130.754231 Days

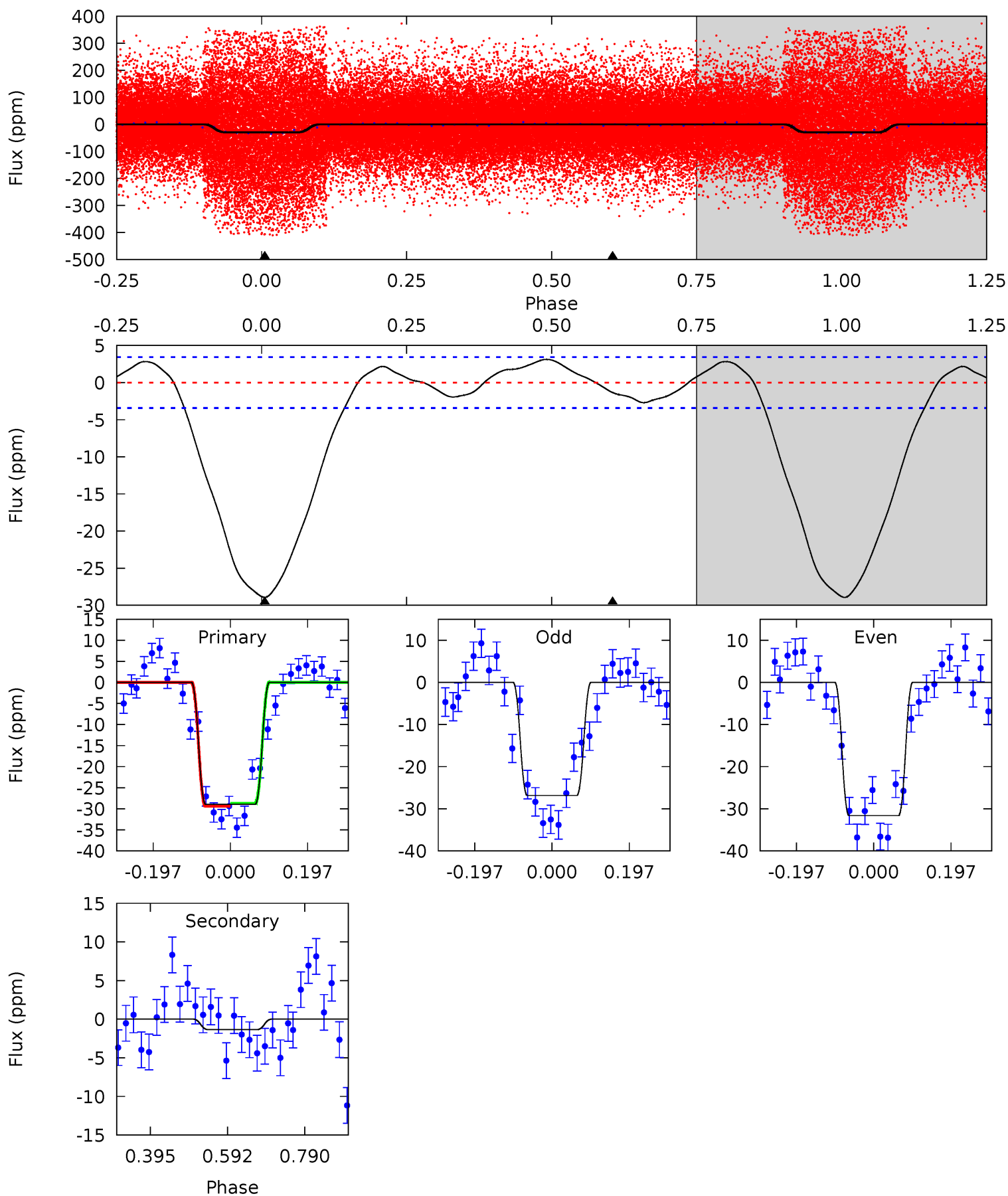
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.80	-5.97	0	0	4.36	1.13	0.80	9.80	9.80	-5.97	-5.97	0.19	0.42	0.55	2.43



# Alt Model-Shift Uniqueness Test

007818940-01, P = 1.029477 Days, E = 130.763158 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
37.3	1.73	0	0	4.42	1.29	1.72	37.3	37.3	1.73	1.73	3.08	0.89	0.10	0.46



### Stellar Parameters For KIC 007818940

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7118^{+193}_{-236}$	$3.962^{+0.252}_{-0.108}$	$-0.500^{+0.300}_{-0.250}$	$1.968^{+0.393}_{-0.589}$	$1.294^{+0.221}_{-0.181}$	$0.239^{+0.344}_{-0.092}$
	+3%/-3%	+6%/-3%	+60%/-50%	+20%/-30%	+17%/-14%	+144%/-38%
Source	PHO1	FLK73	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 007818940-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$12 \pm 2$	$1.04^{+0.38}_{-0.30}$	$4099^{+236}_{-305}$	$-5957^{+614}_{-1034}$	$-2.940^{+1.339}_{-3.084}$
Alt.	$-1 \pm 1$	$1.15^{+0.38}_{-0.33}$	$4110^{+257}_{-337}$	$-2865^{+6507}_{-685}$	$0.248^{+0.331}_{-0.149}$

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



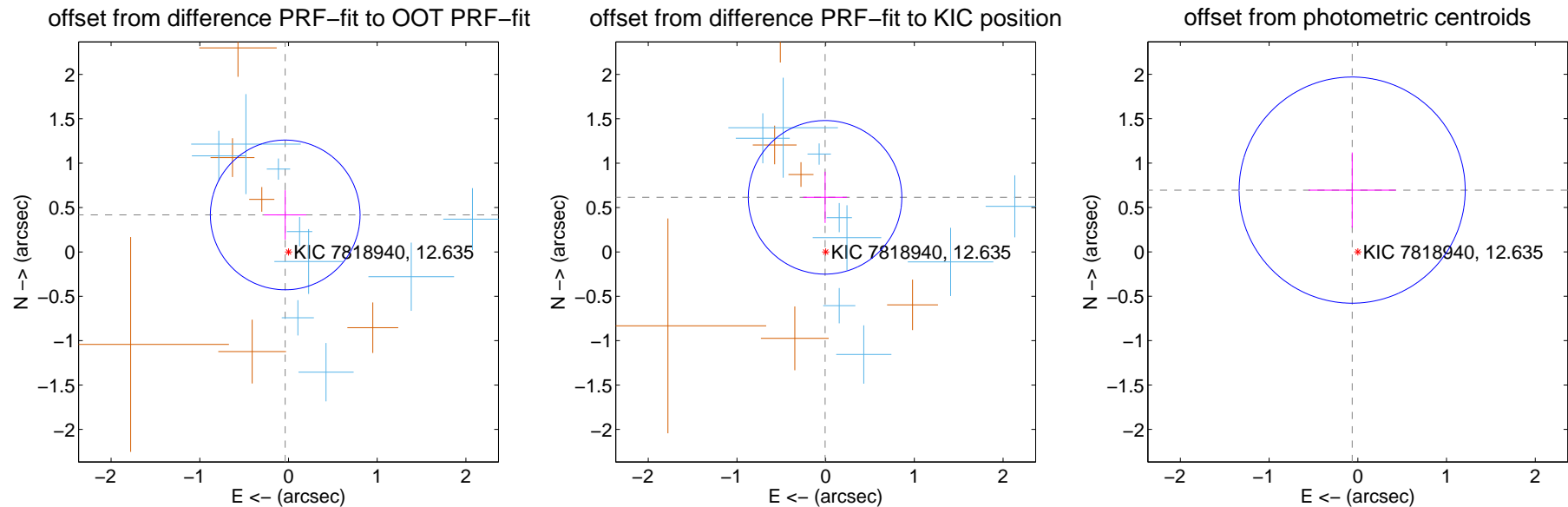
## DV Centroid Data

Supplemental centroid analysis for 007818940-01. Kepler magnitude: 12.63. Transit SNR 8.60

There are 9 quarters with good PRF difference image offsets

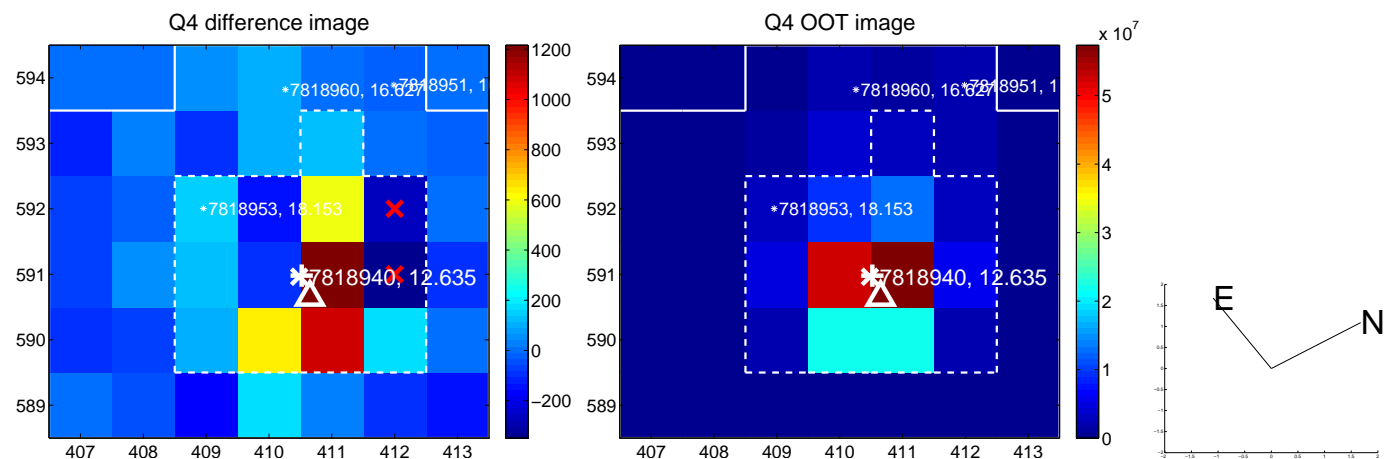
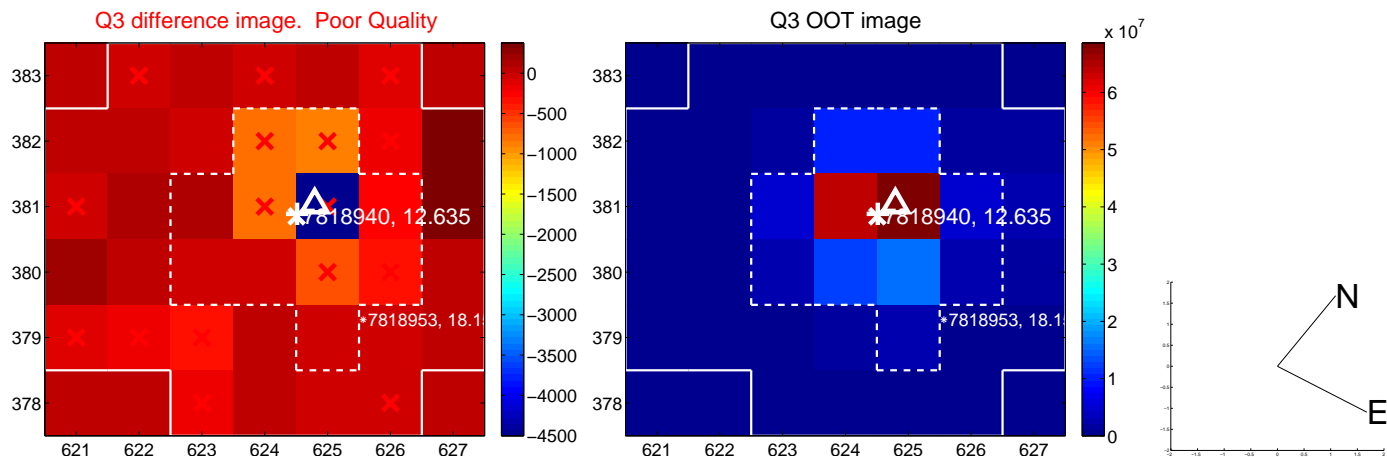
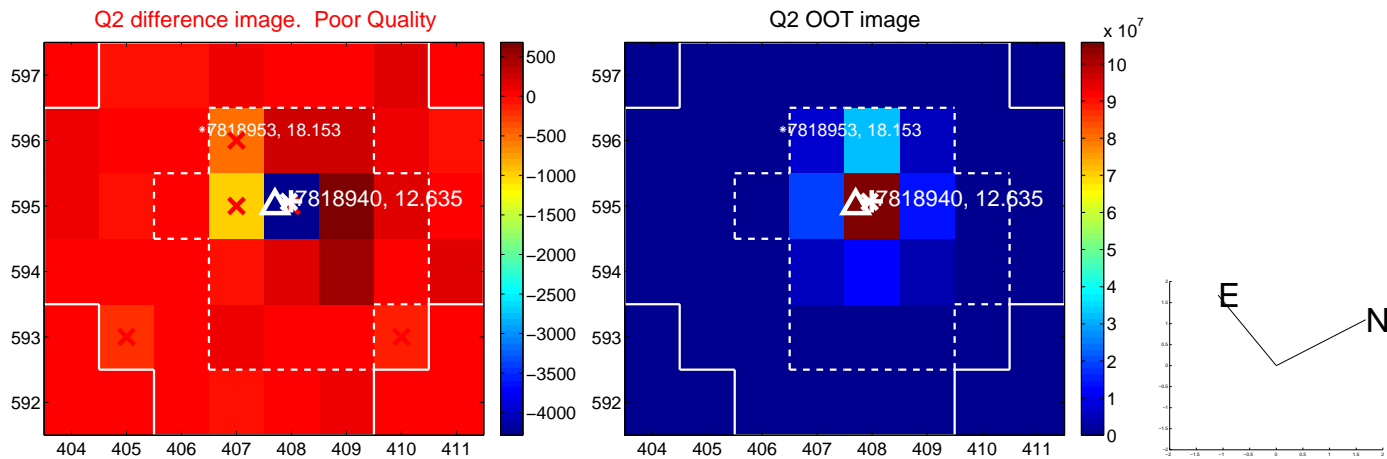
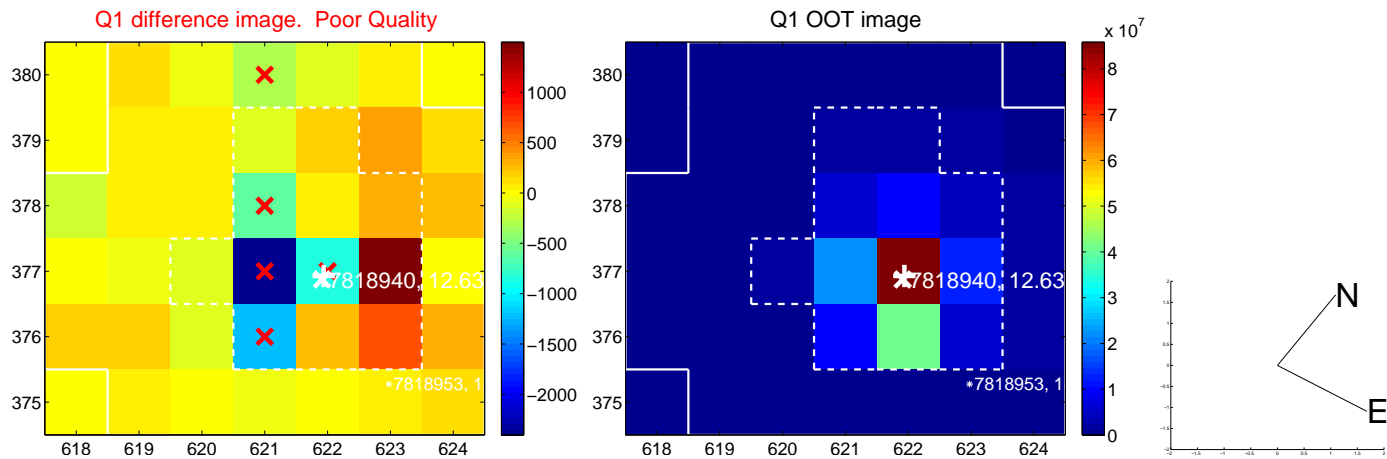
The direct PRF centroid is offset from the target star catalog position by about 0.28 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.418 \pm 0.281$	1.49	$0.037 \pm 0.238$	$0.417 \pm 0.278$
PRF-fit source offset from KIC position	$0.615 \pm 0.288$	2.13	$0.007 \pm 0.248$	$0.615 \pm 0.288$
photometric centroid source offset	$0.70 \pm 0.42$	1.64	$0.06 \pm 0.49$	$0.70 \pm 0.42$

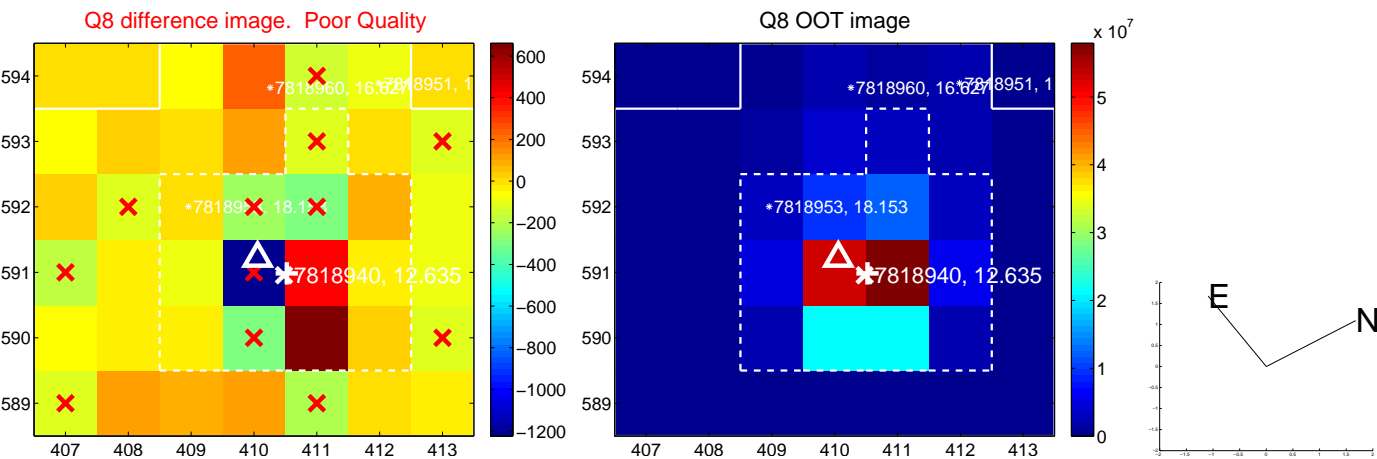
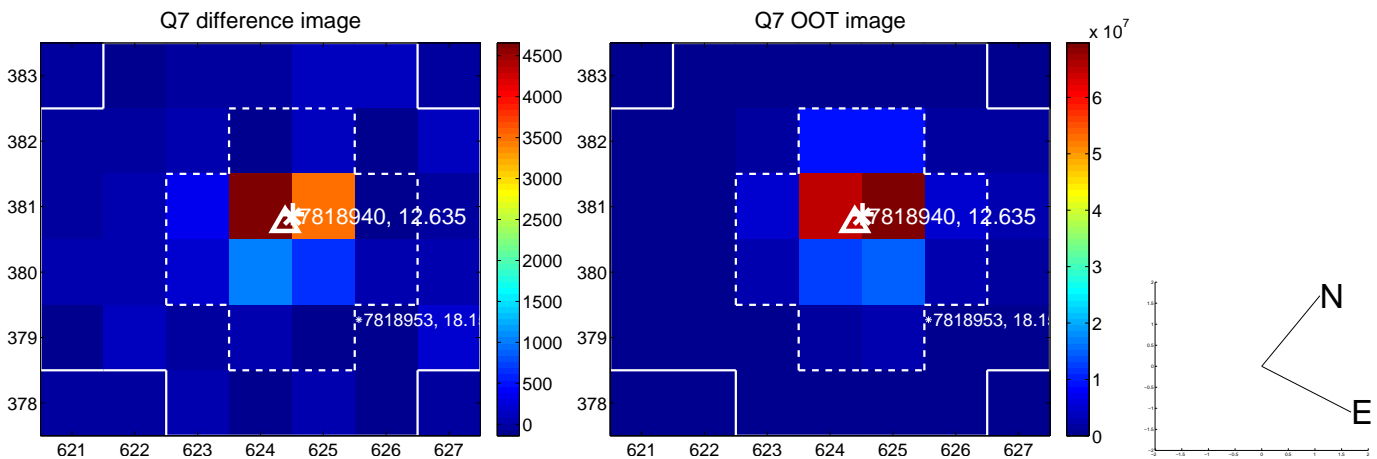
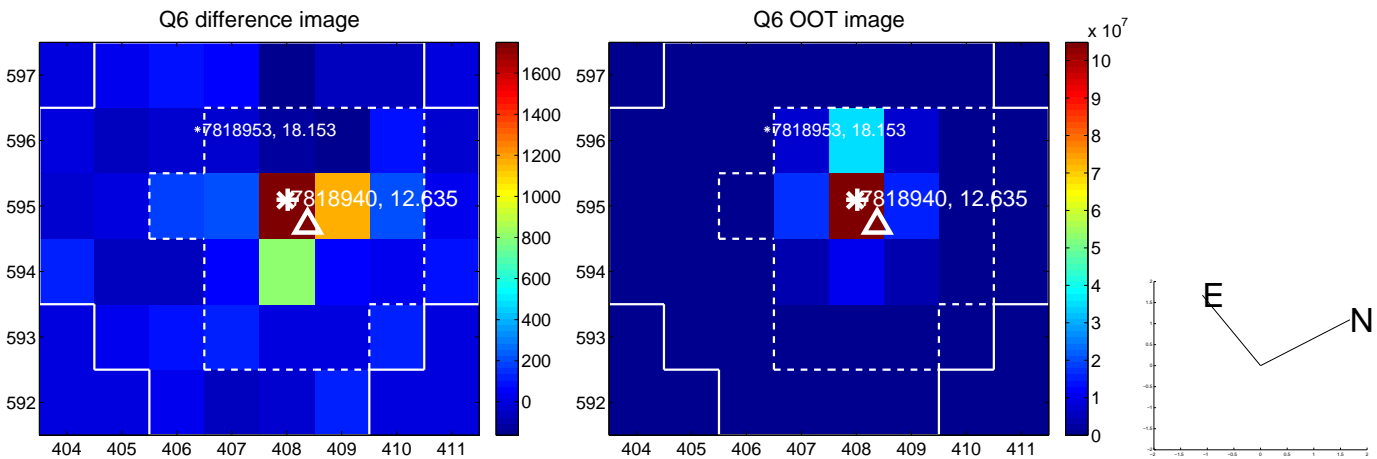
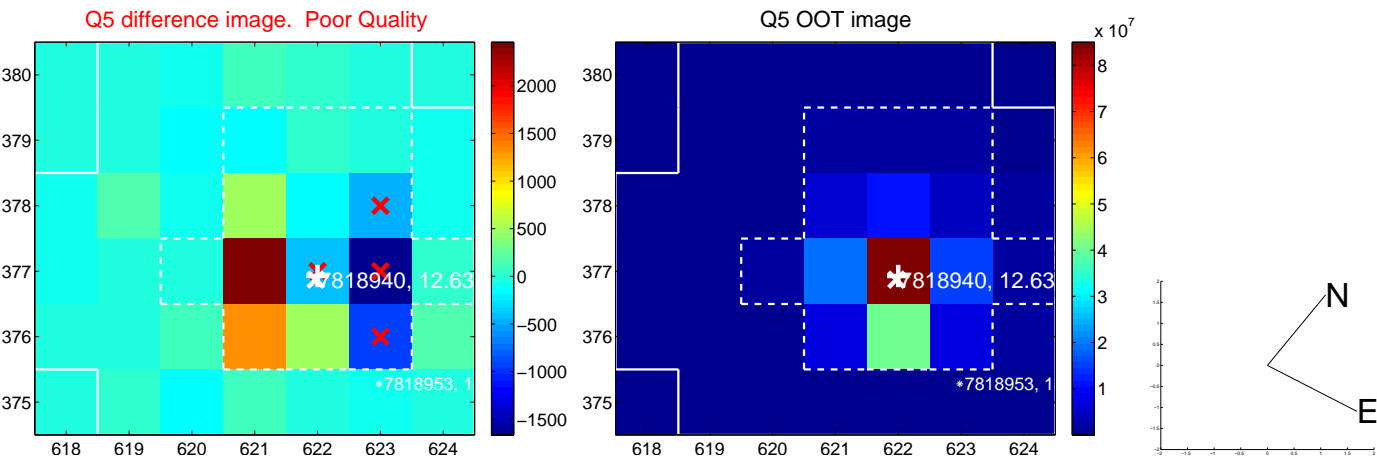


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

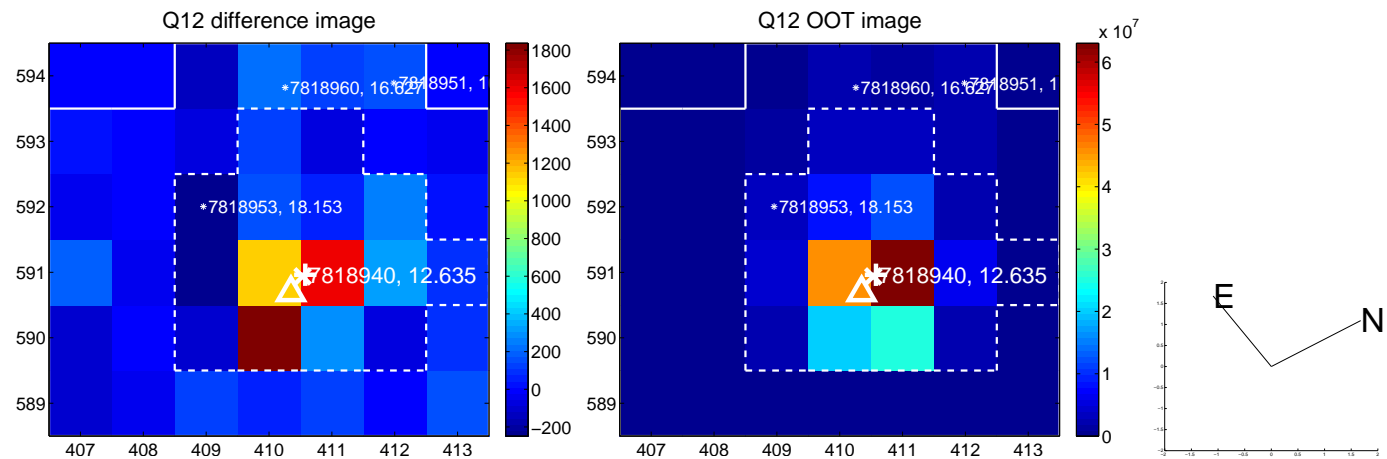
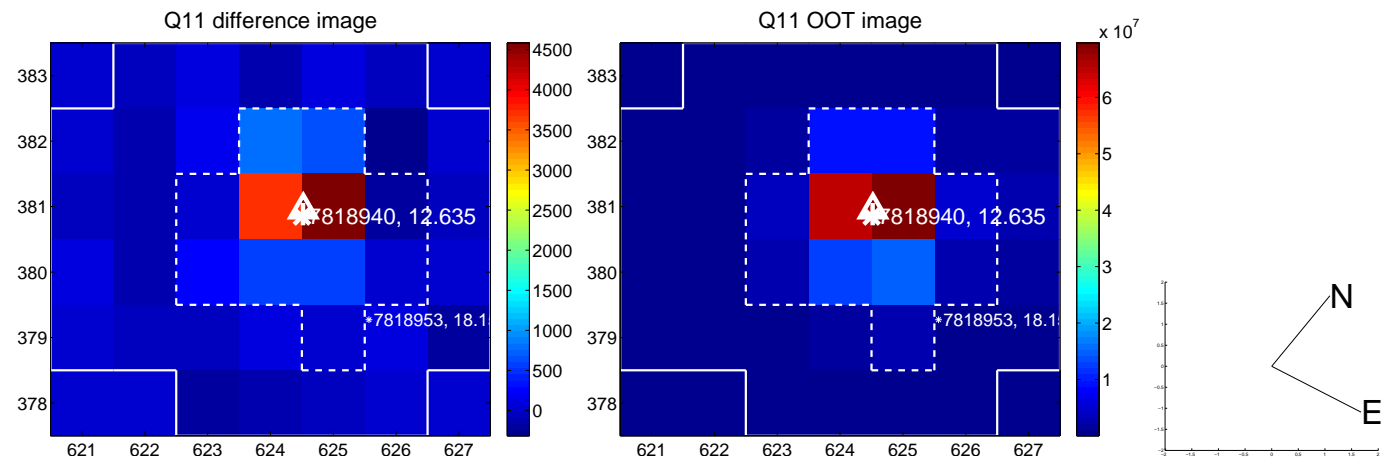
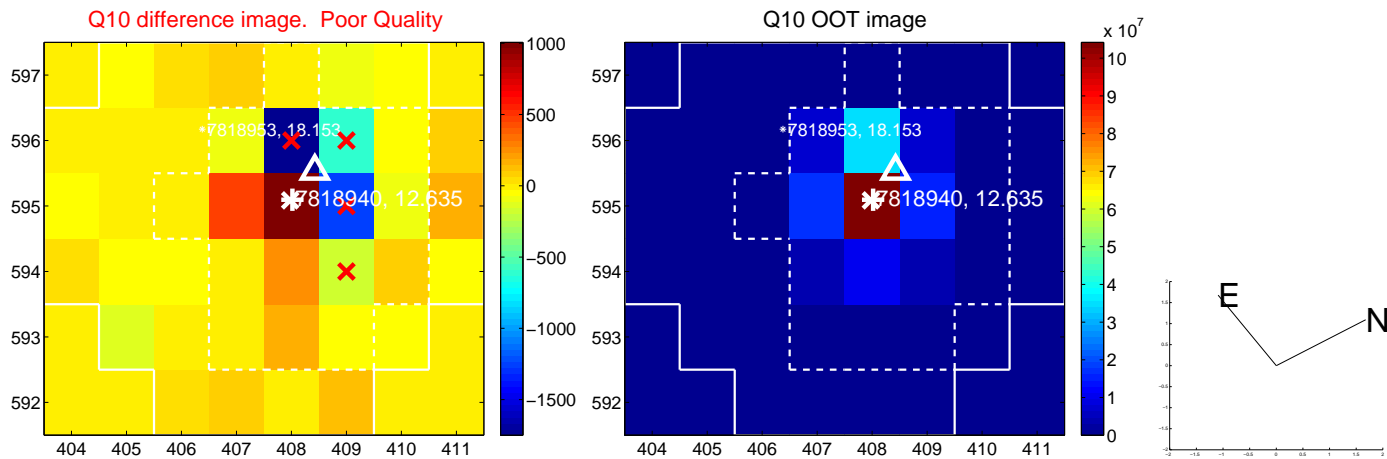
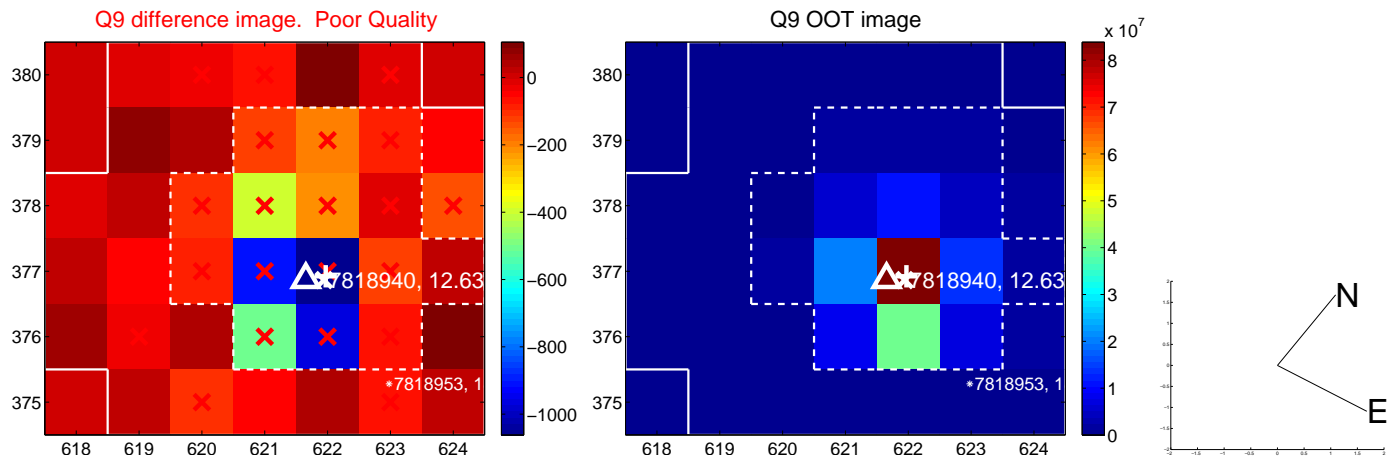


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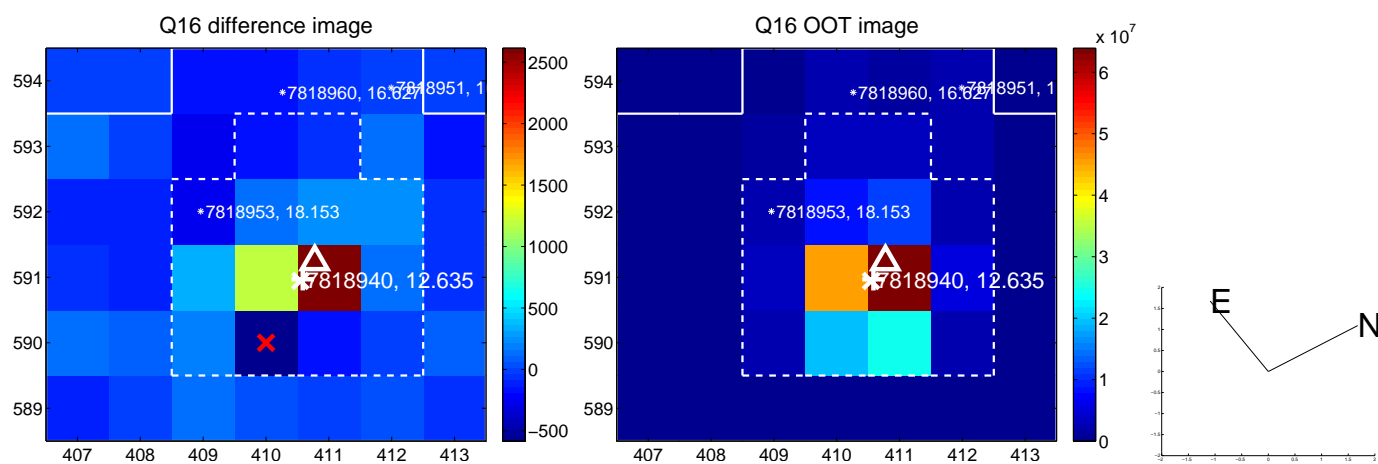
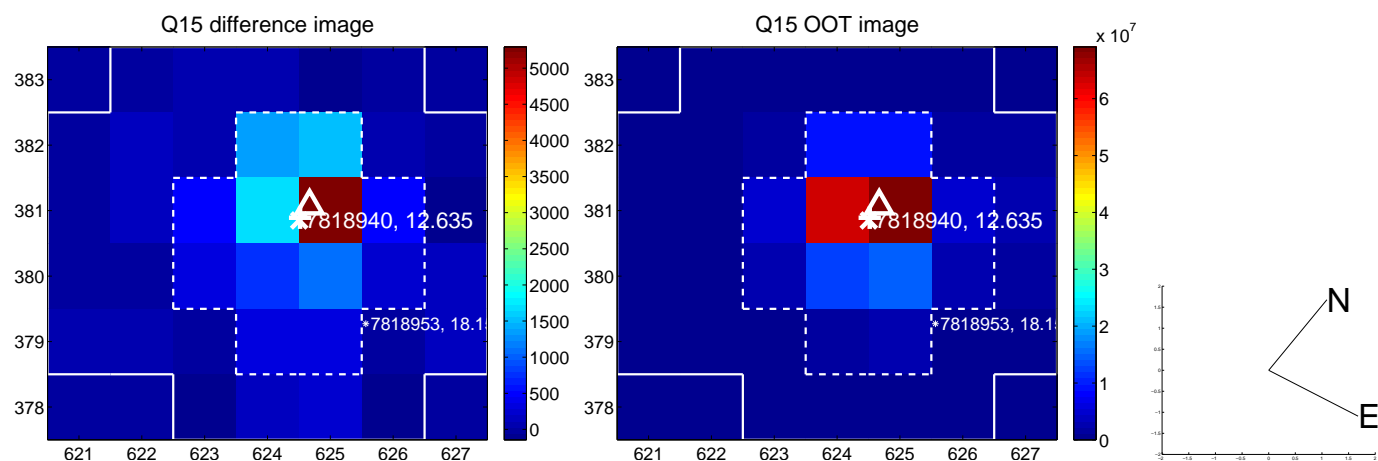
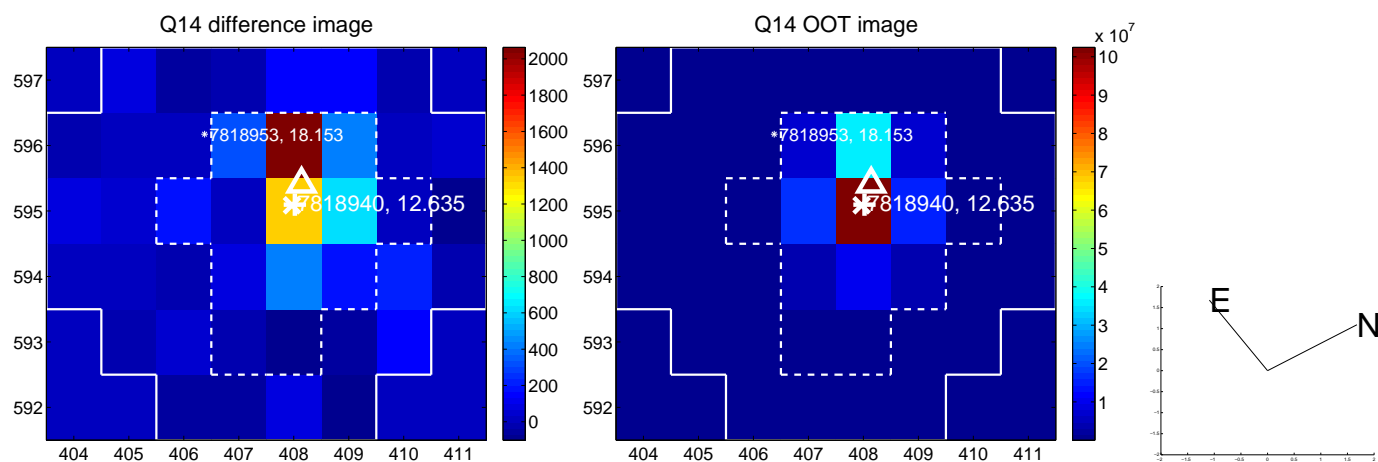
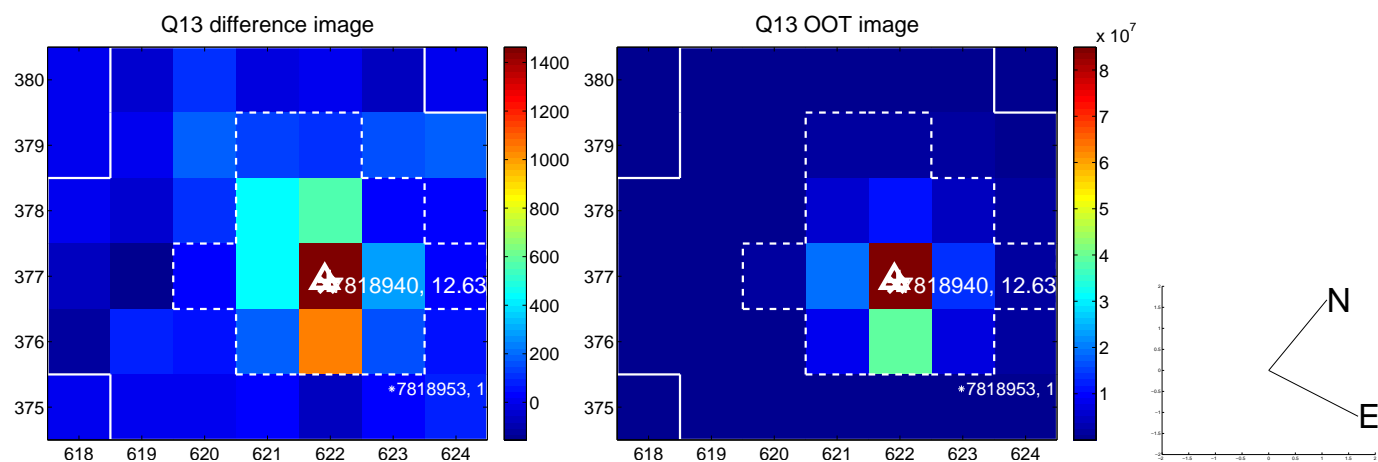




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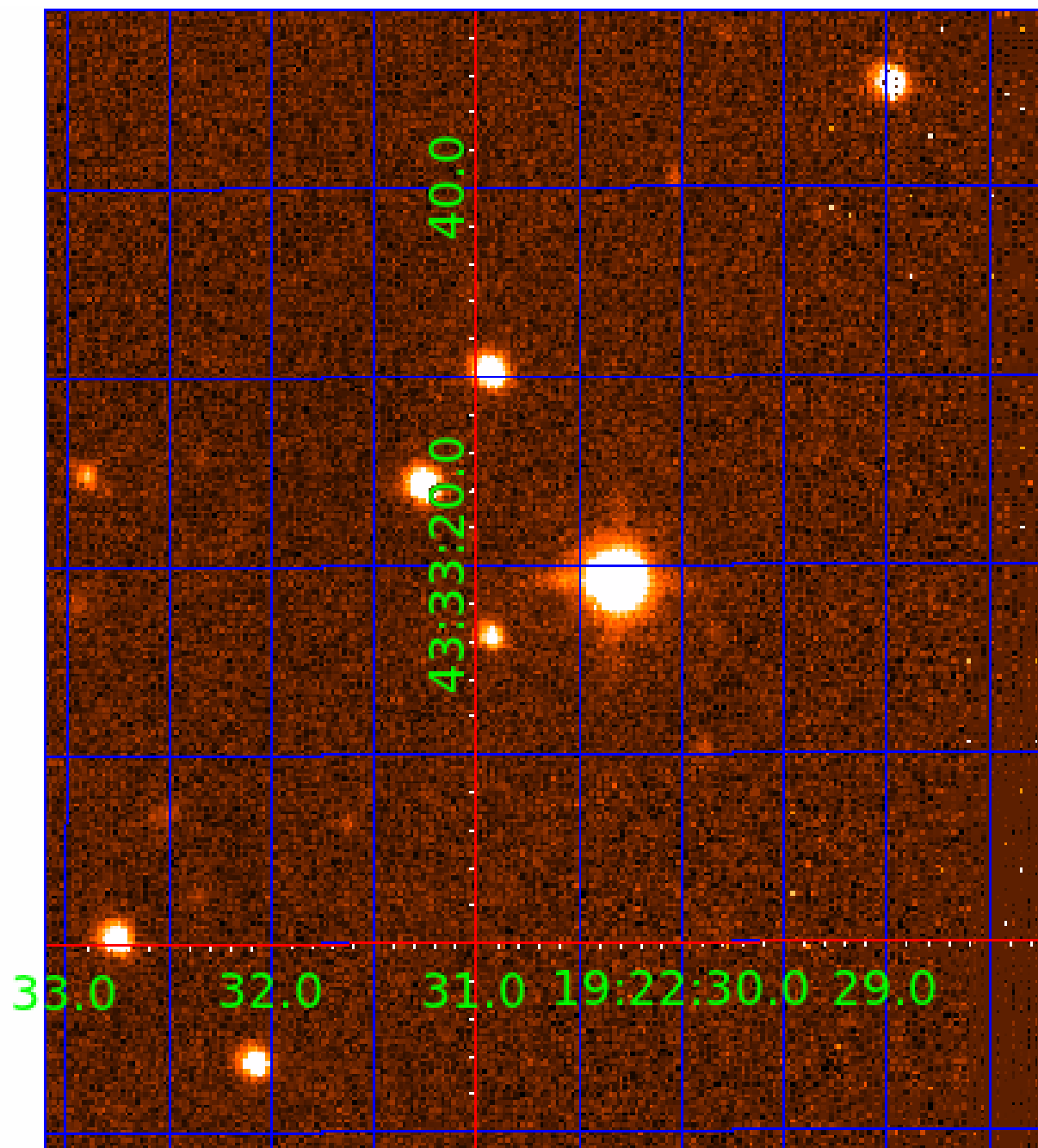
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UKIRT Image

Declination



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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.

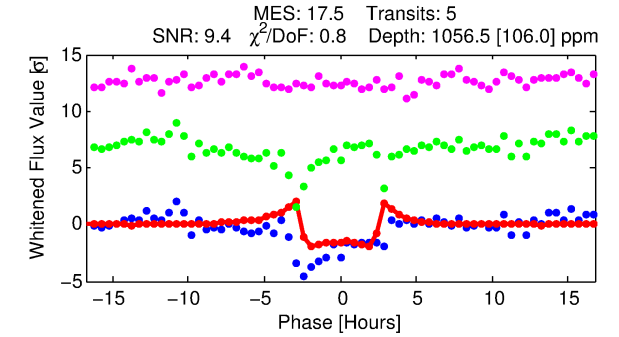
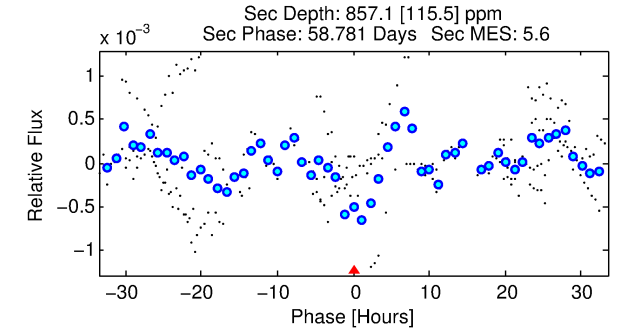
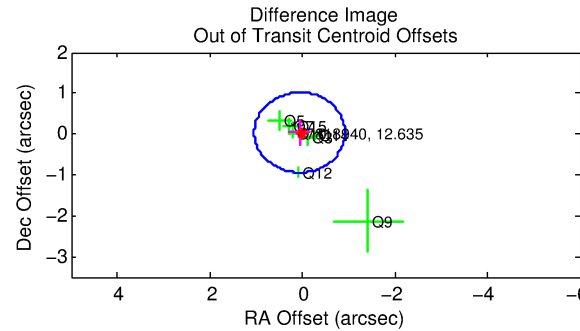
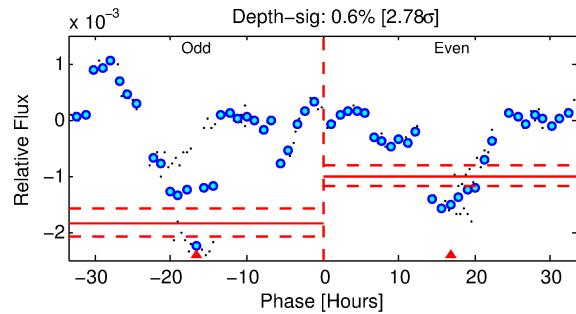
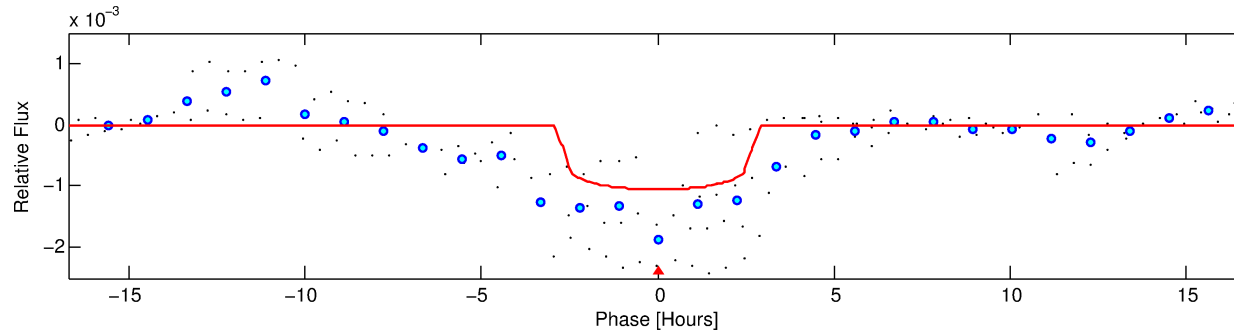
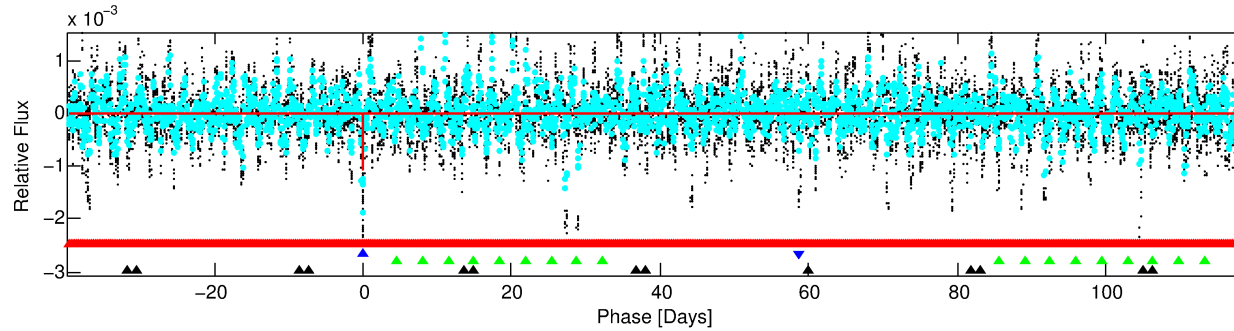
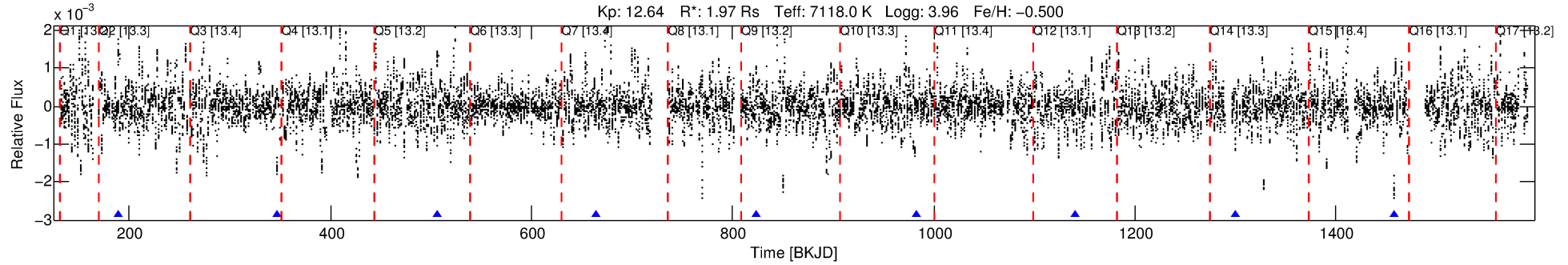
## Ephemeris Match Information For 007818940-02

No Significant Match Found



# DV One-Page Summary

KIC: 7818940 Candidate: 2 of 4 Period: 158.693 d



## DV Fit Results:

Period = 158.69289 [0.00080] d  
Epoch = 188.7617 [0.0033] BKJD  
Rp/R\* = 0.0302 [0.0123]  
a/R\* = 221.36 [508.74]  
b = 0.16 [14.41]  
Seff = 22.78 [10.37]  
Teq = 557 [63] K  
Rp = 6.48 [3.27] Re  
a = 0.6253 [0.1738] AU  
Ag = 4385.34 [4082.07] [1.07 $\sigma$ ]  
Teffp = 7009 [1460] K [4.41 $\sigma$ ]

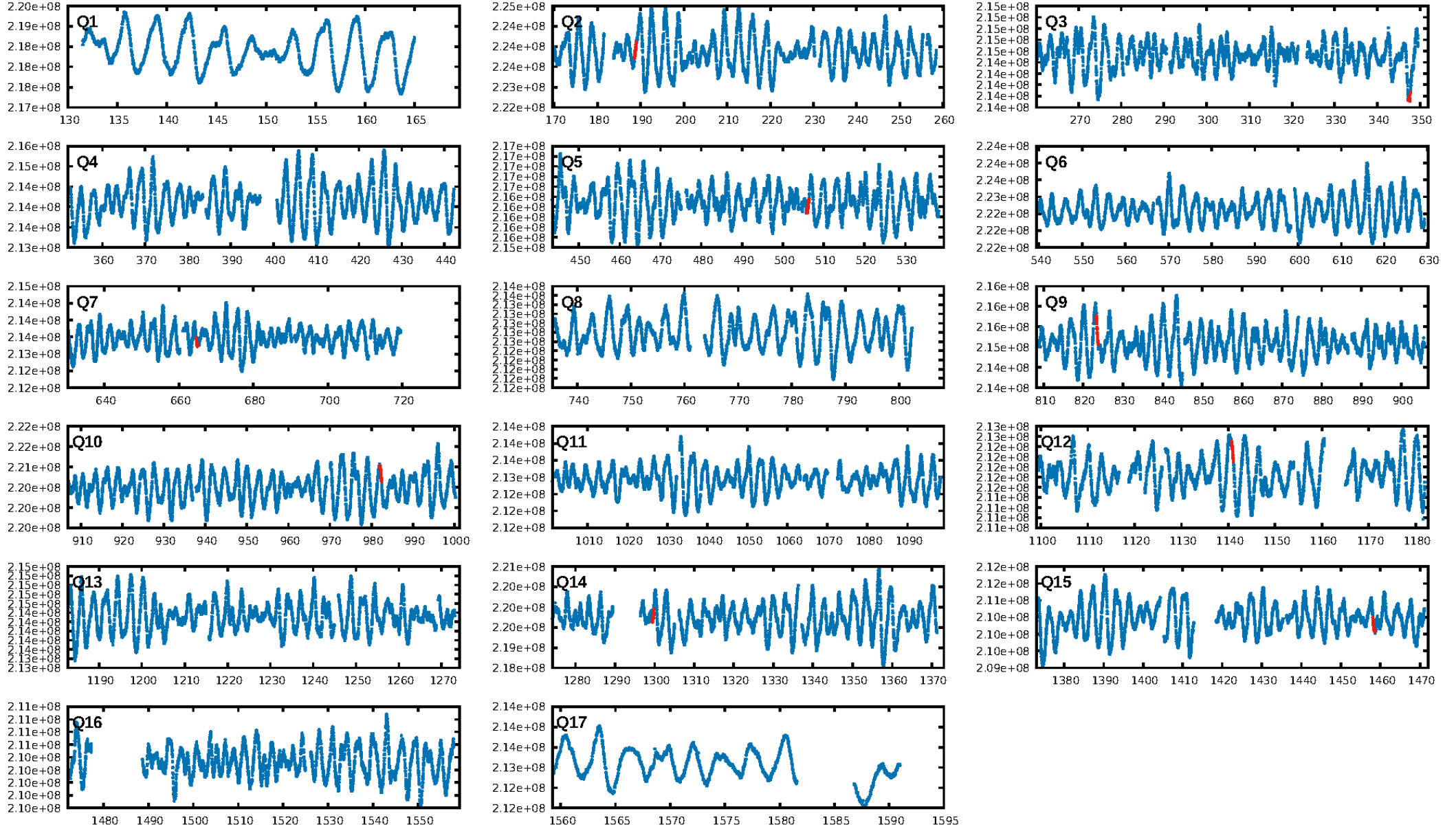
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [173.12 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 2.19e-34  
RollingBand-fgt: 1.00 [5/5]  
GhostDiagnostic-chr: 0.1292  
Centroid-sig: N/A  
Centroid-so: 0.108 arcsec [0.68 $\sigma$ ]  
OotOffset-rm: 0.072 arcsec [0.22 $\sigma$ ]  
KicOffset-rm: 0.189 arcsec [0.65 $\sigma$ ]  
OotOffset-st: 2/3/1/2 [8]  
KicOffset-st: 2/3/1/2 [8]  
DiffImageQuality-fgm: 0.62 [5/8]  
DiffImageOverlap-fno: 0.00 [0/9]

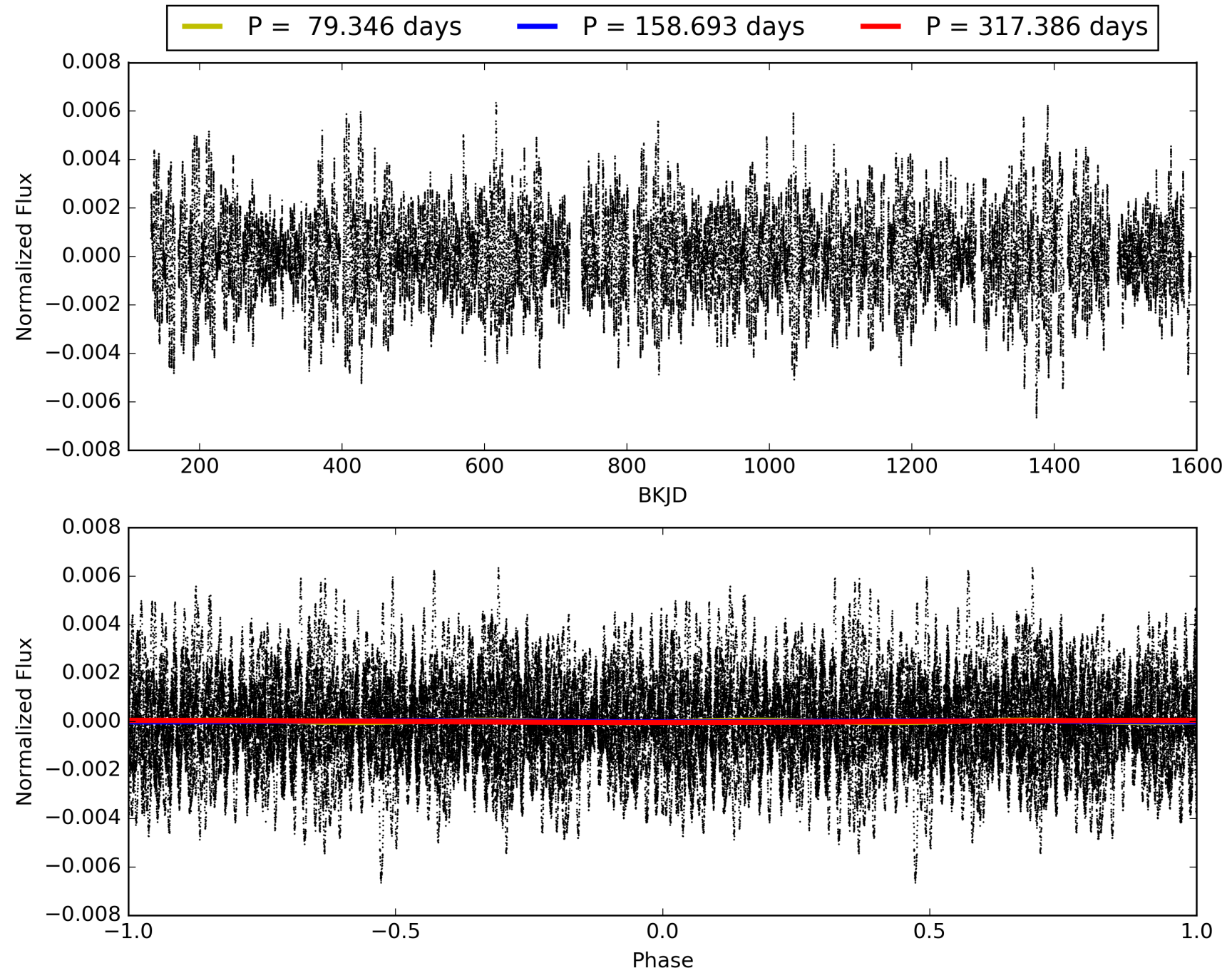
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 10:17:52 Z

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

# TCE 007818940-02, PDC Light Curves

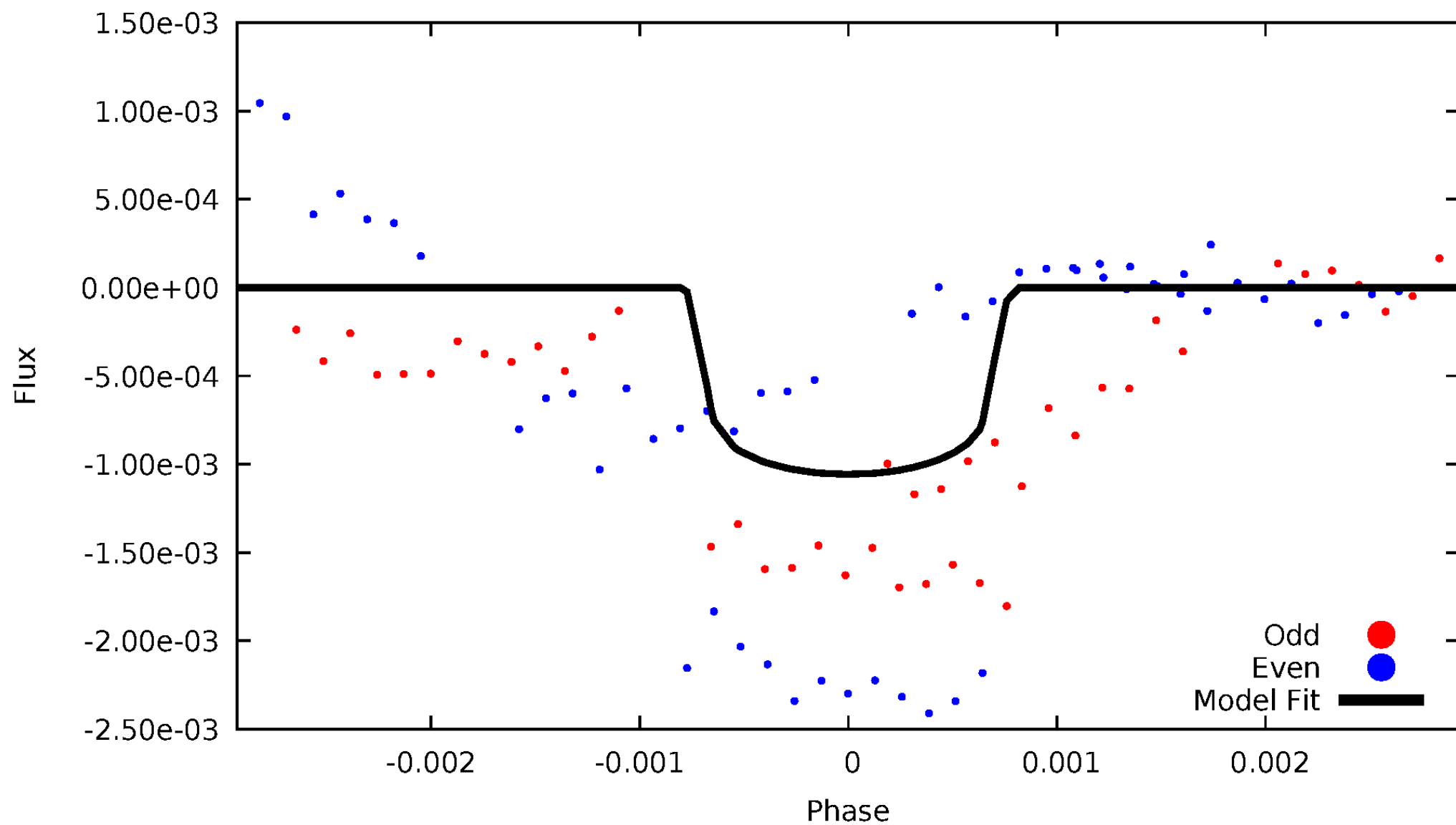


TCE 007818940-02



# DV Odd/Even

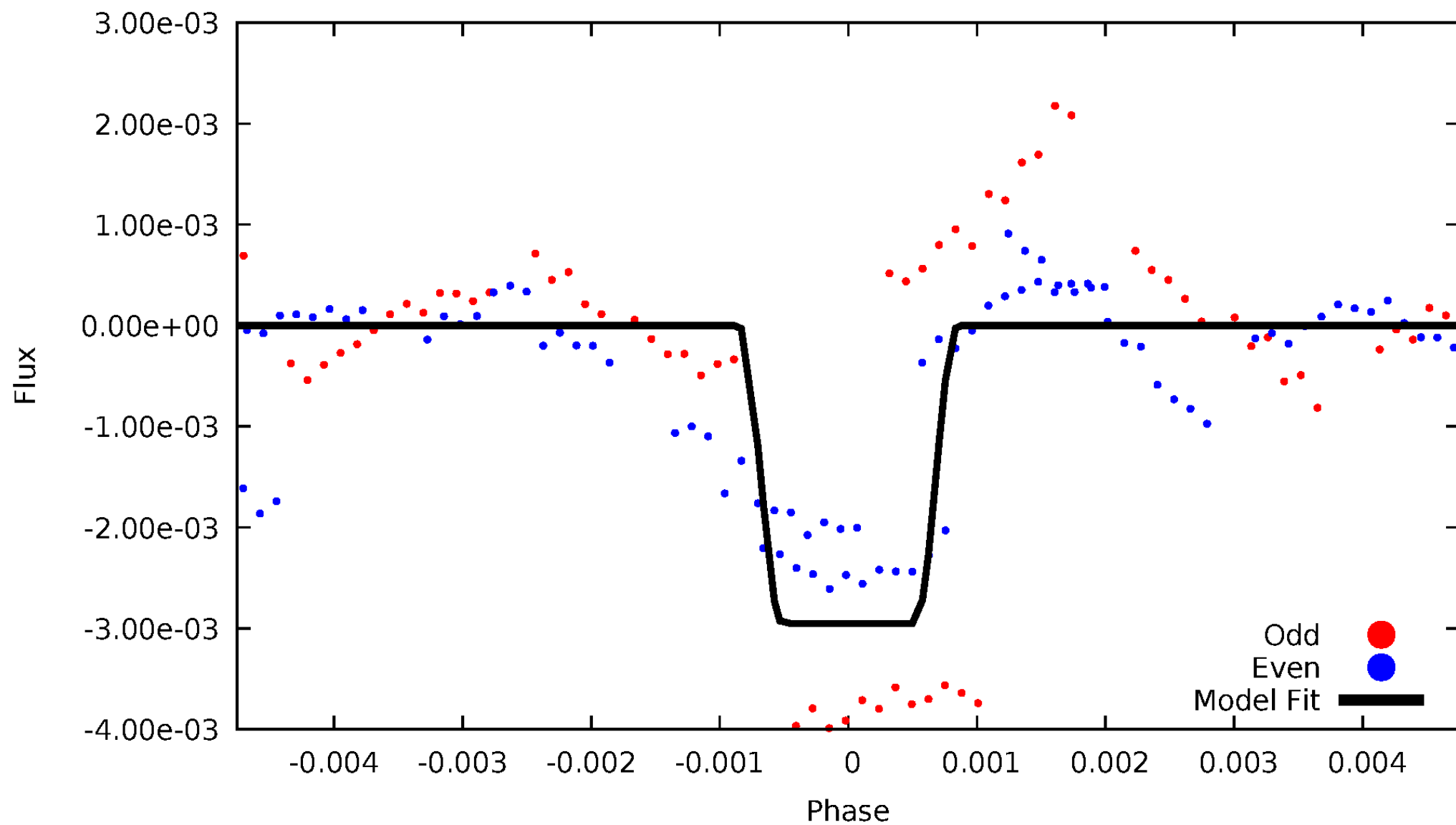
TCE 007818940-02





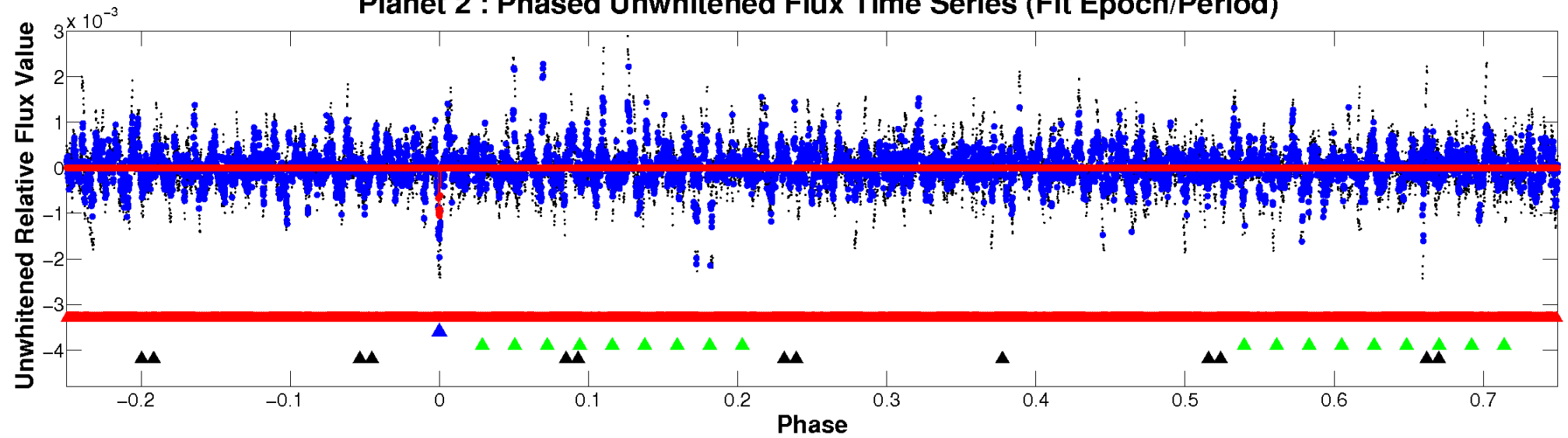
# ALT Odd/Even

TCE 007818940-02

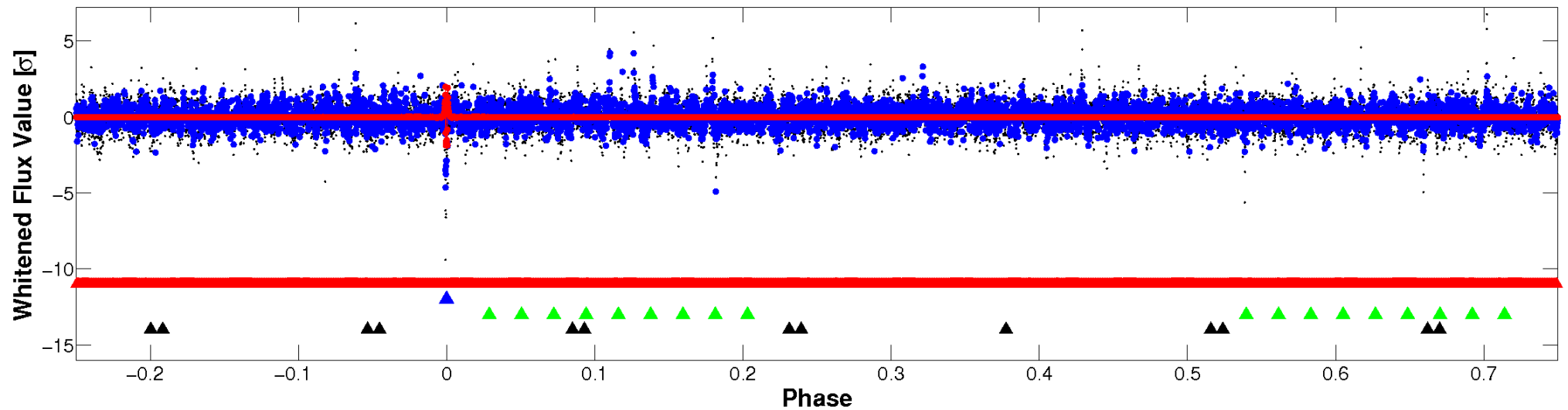


# Non-Whitened Vs. Whitened Light Curve

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

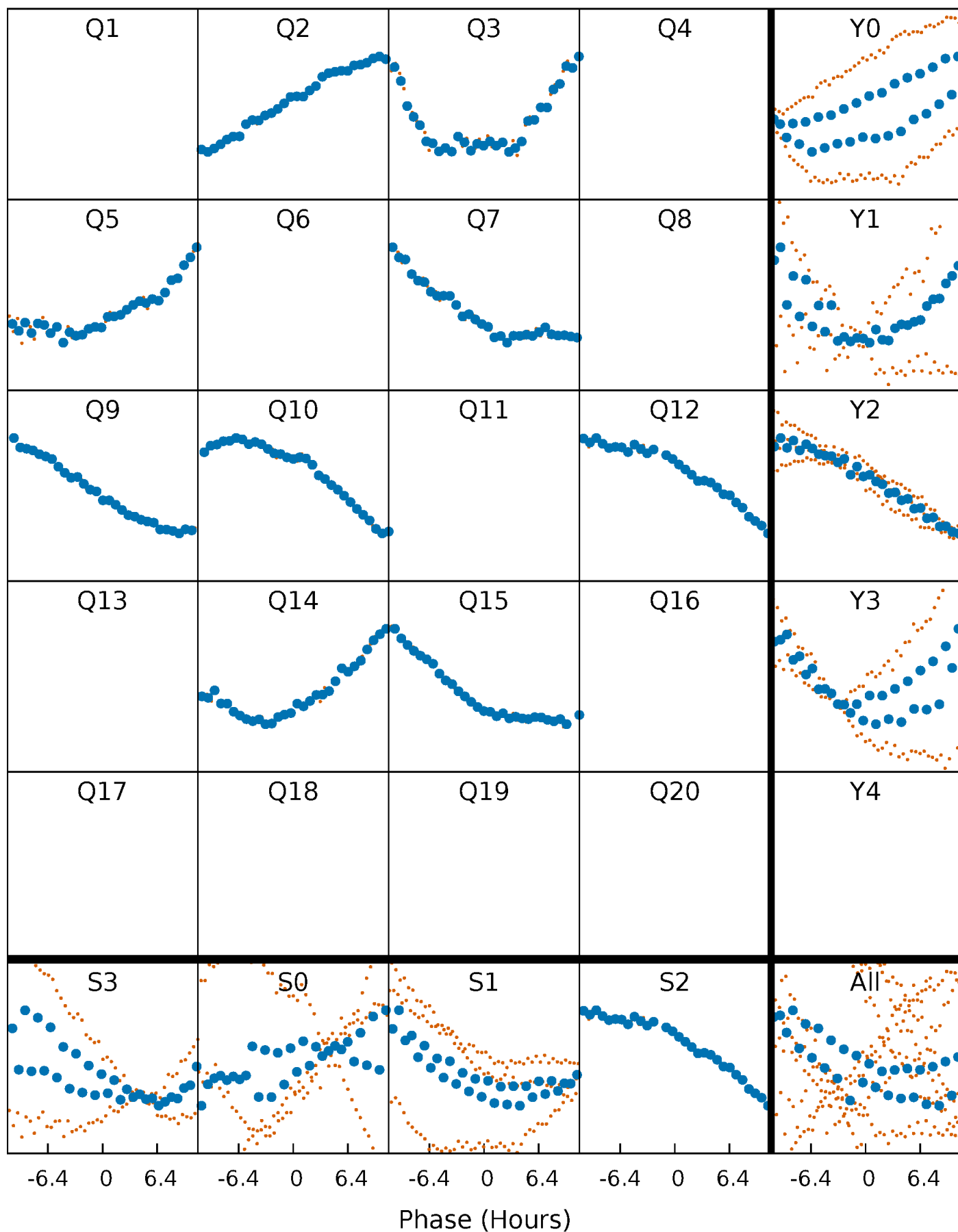


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



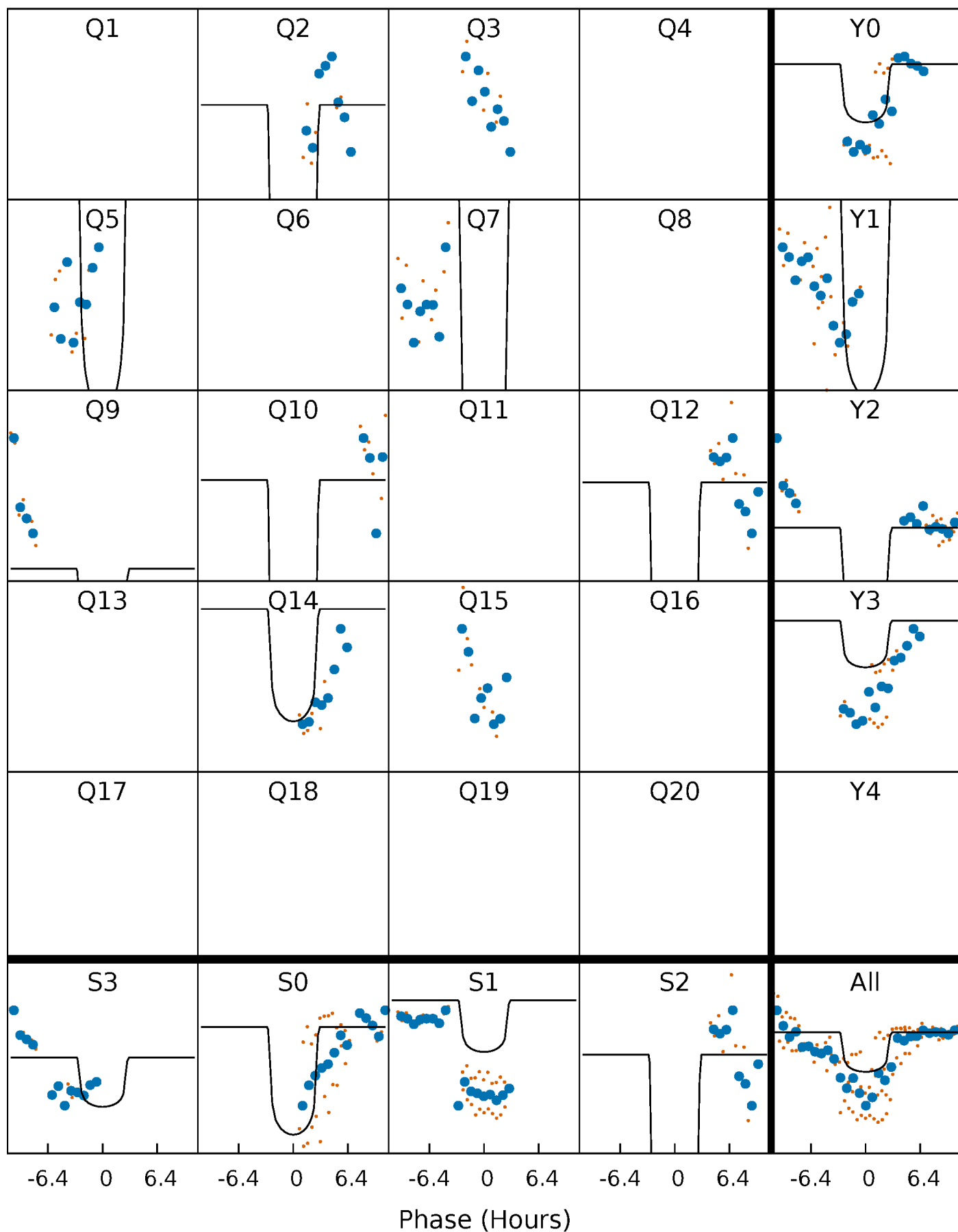
# PDC Quarter-Phased Transit Curves

TCE 007818940-02 P=158.692889 Days  $T_0=188.761655$  (BKJD)



# DV Quarter-Phased Transit Curves

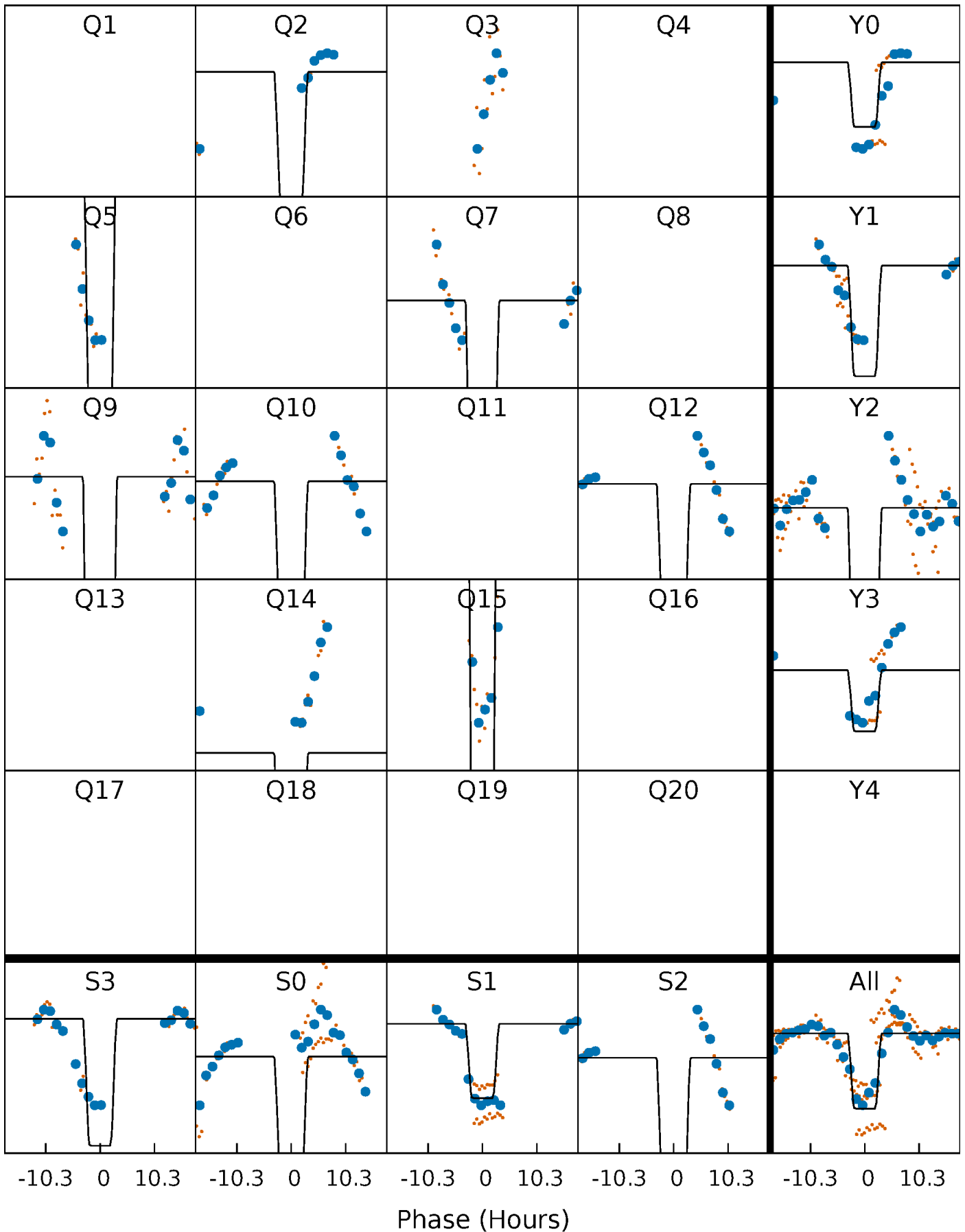
TCE 007818940-02 P=158.692889 Days  $T_0=188.761655$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

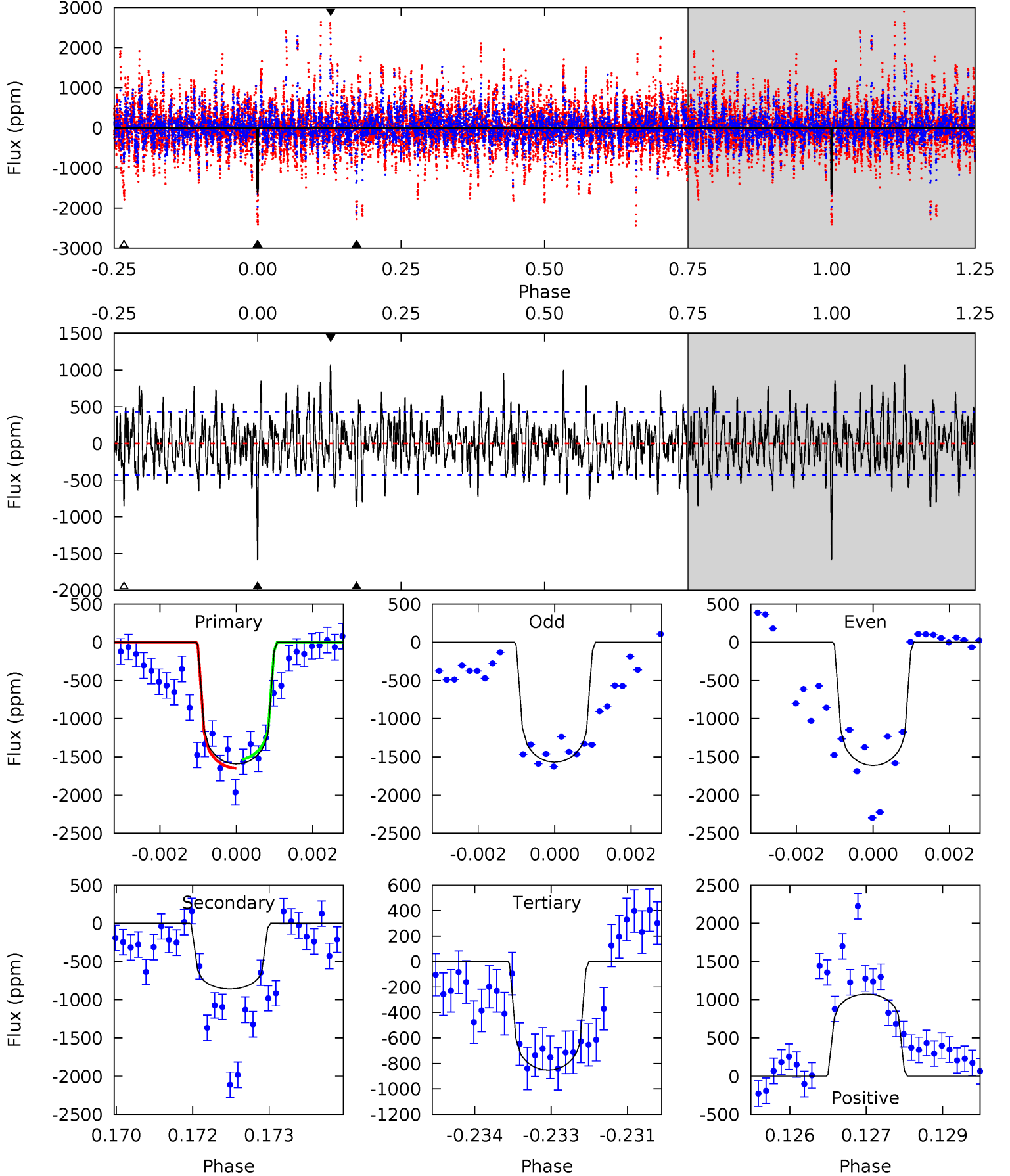
TCE 007818940-02 P=158.696032 Days  $T_0=188.718733$  (BKJD)



# DV Model-Shift Uniqueness Test

007818940-02,  $P = 158.692889$  Days,  $E = 30.068766$  Days

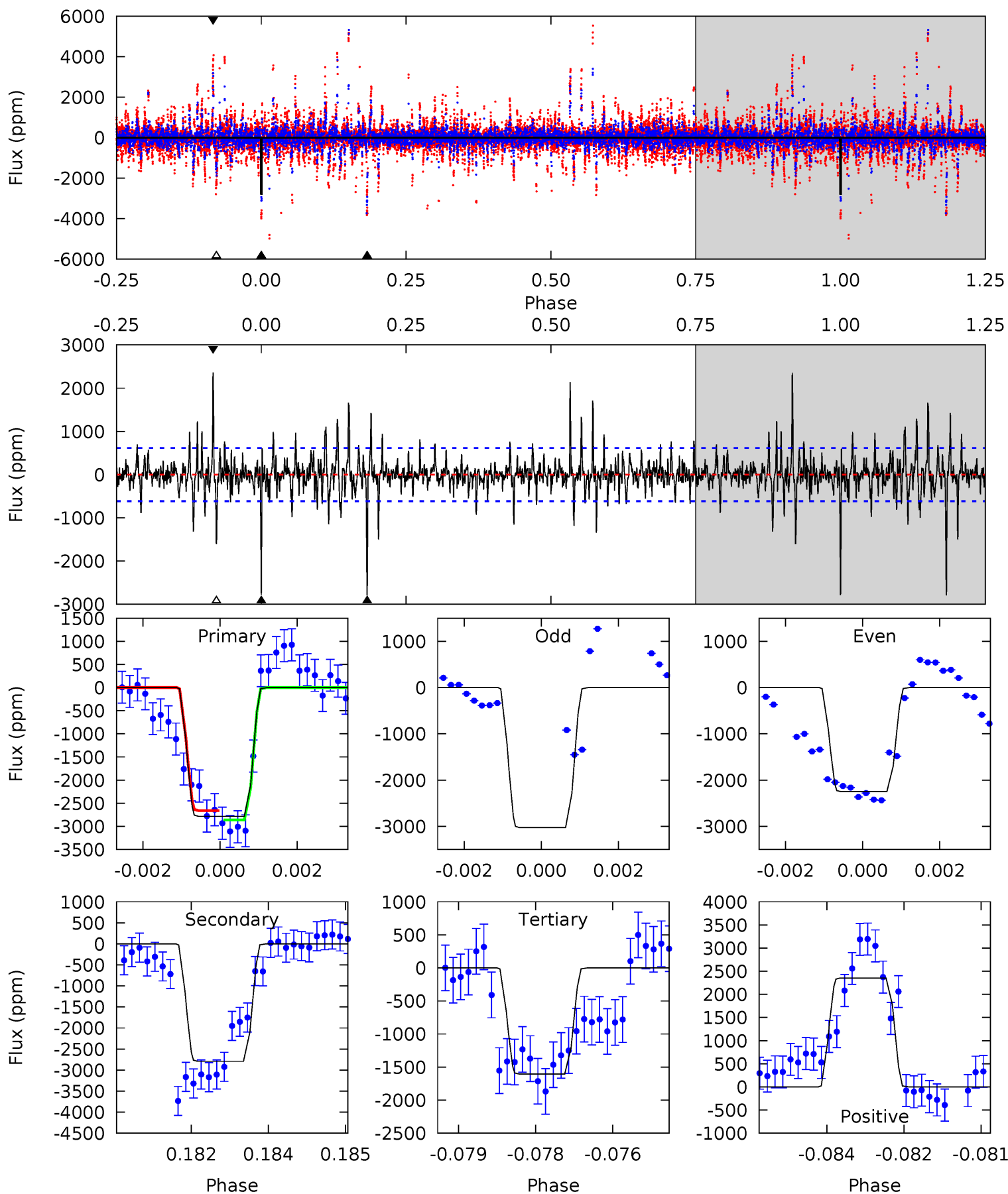
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
19.8	10.7	10.6	13.4	5.37	3.17	3.52	9.22	6.46	0.08	-2.69	0.27	1.02	0.40	0.71



# Alt Model-Shift Uniqueness Test

007818940-02, P = 158.696032 Days, E = 30.022701 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
24.2	24.3	14.0	20.5	5.37	3.16	2.96	10.3	3.75	10.3	3.82	2.97	0.82	0.46	0.87



### Stellar Parameters For KIC 007818940

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7118^{+193}_{-236}$	$3.962^{+0.252}_{-0.108}$	$-0.500^{+0.300}_{-0.250}$	$1.968^{+0.393}_{-0.589}$	$1.294^{+0.221}_{-0.181}$	$0.239^{+0.344}_{-0.092}$
	+3%/-3%	+6%/-3%	+60%/-50%	+20%/-30%	+17%/-14%	+144%/-38%
Source	PHO1	FLK73	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 007818940-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-858 \pm 80$	$6.28^{+2.72}_{-2.49}$	$765^{+47}_{-55}$	$6939^{+2497}_{-1104}$	$4617^{+8179}_{-2292}$
Alt.	$-2791 \pm 115$	$11.22^{+2.92}_{-2.86}$	$765^{+48}_{-60}$	$6937^{+1146}_{-694}$	$4825^{+3886}_{-1795}$

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



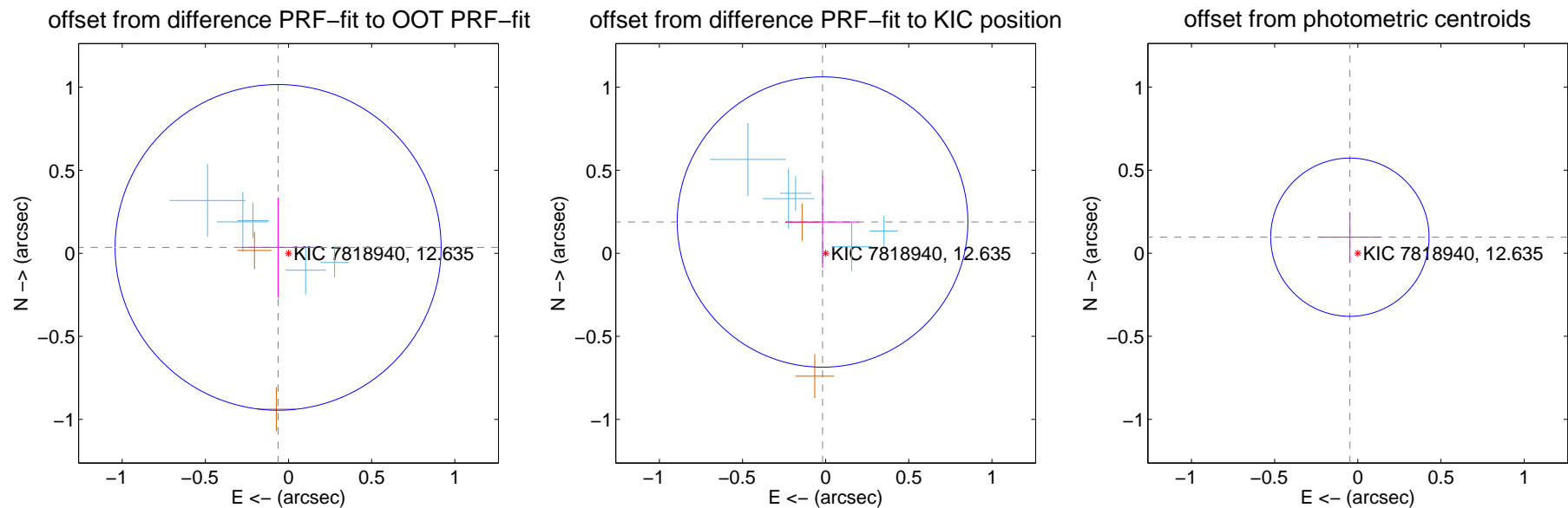
## DV Centroid Data

Supplemental centroid analysis for 007818940-02. Kepler magnitude: 12.63. Transit SNR 9.38

There are 5 quarters with good PRF difference image offsets

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

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.072 \pm 0.327$	0.22	$0.062 \pm 0.222$	$0.036 \pm 0.300$
PRF-fit source offset from KIC position	$0.189 \pm 0.291$	0.65	$0.019 \pm 0.217$	$0.188 \pm 0.276$
photometric centroid source offset	$0.11 \pm 0.16$	0.68	$0.05 \pm 0.18$	$0.10 \pm 0.15$



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.

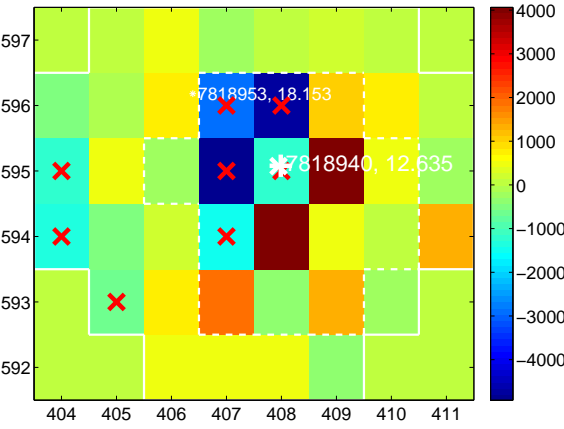
Q1 no difference image



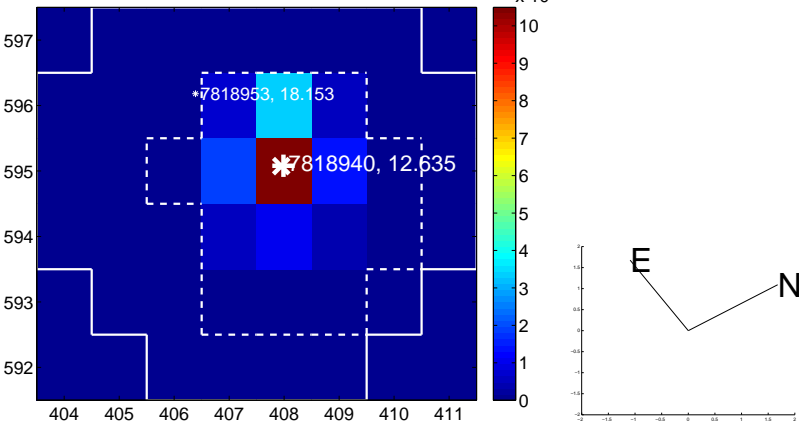
Q1 no OOT image



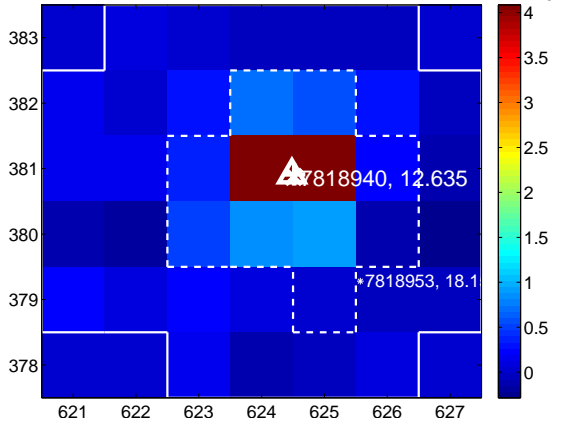
Q2 difference image. Poor Quality



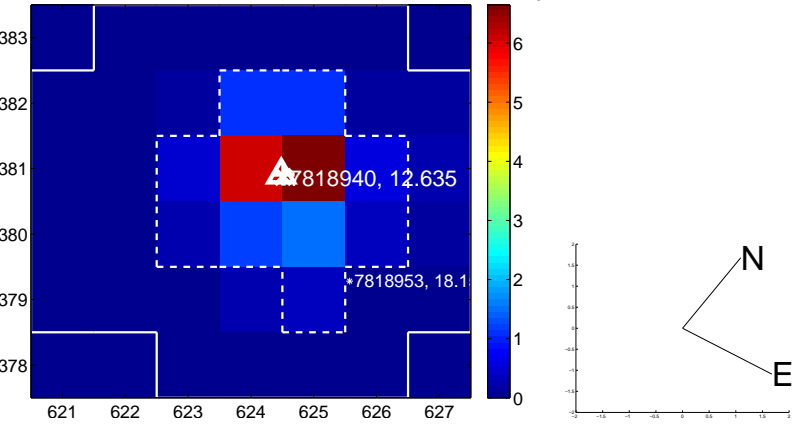
Q2 OOT image



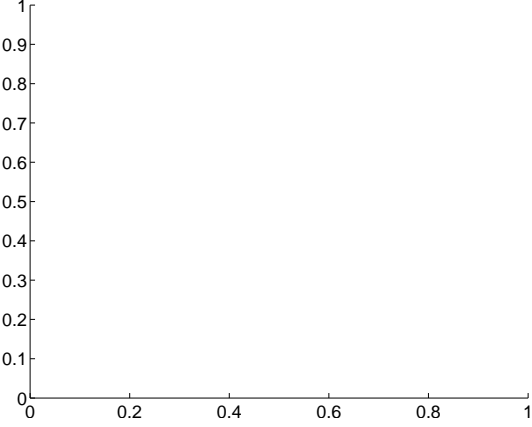
Q3 difference image



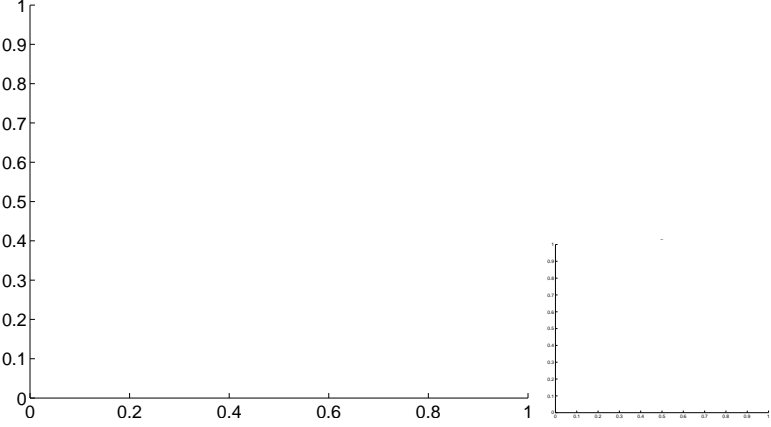
Q3 OOT image



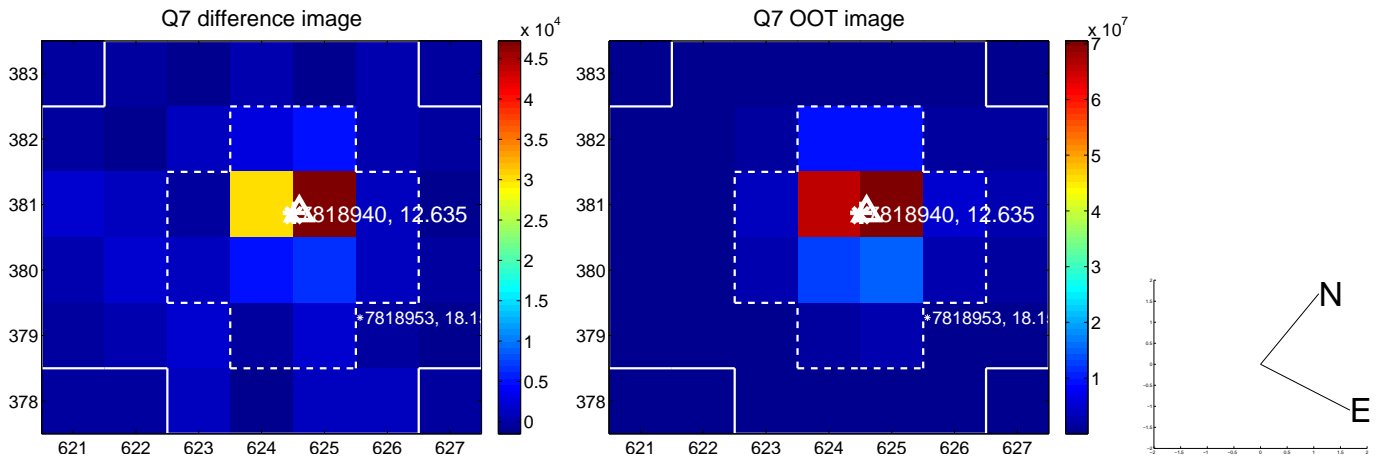
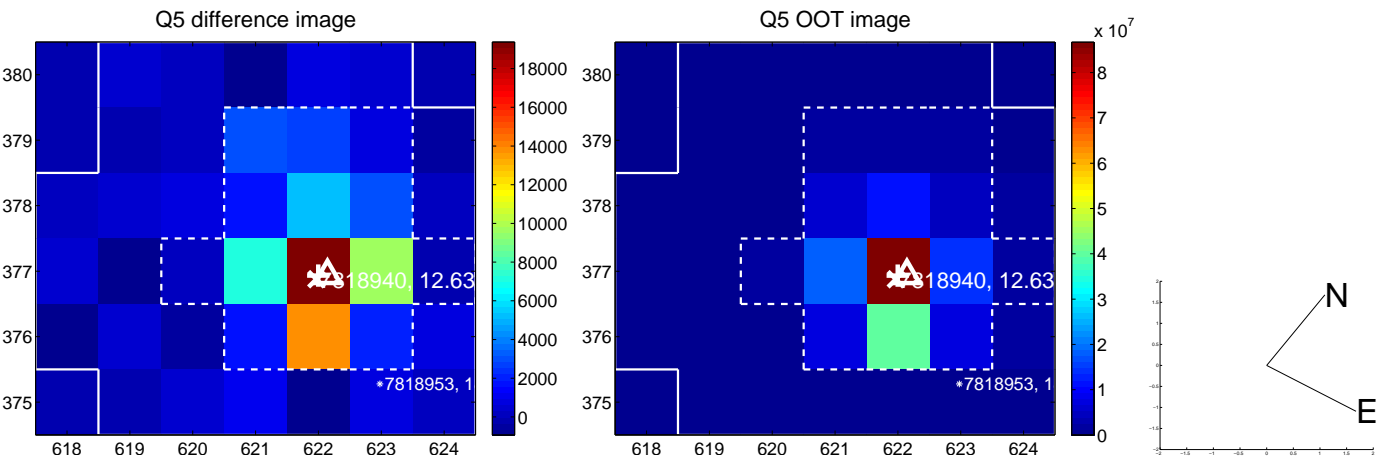
Q4 no difference image



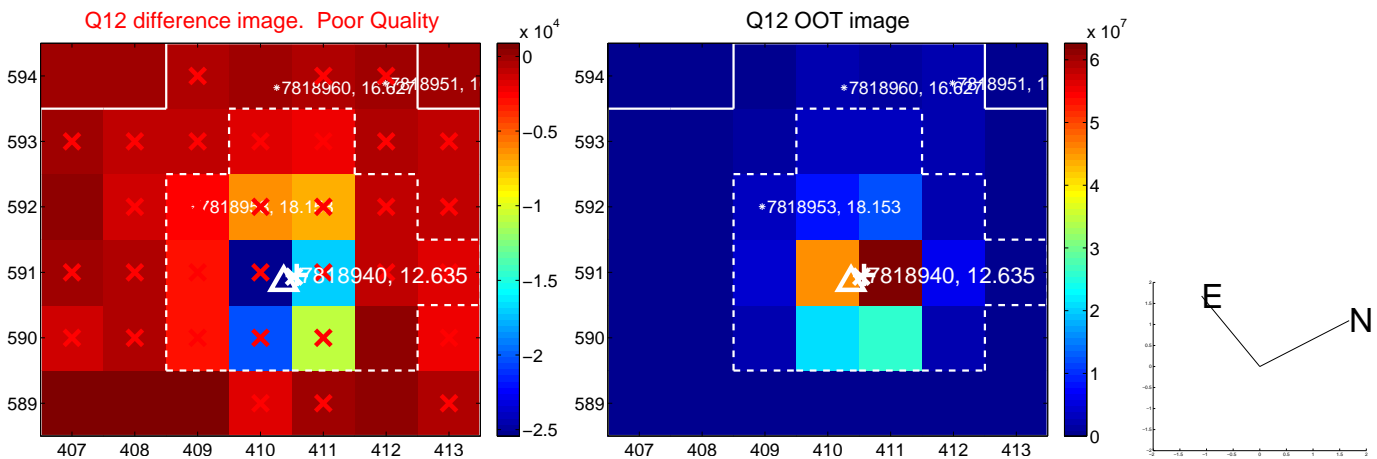
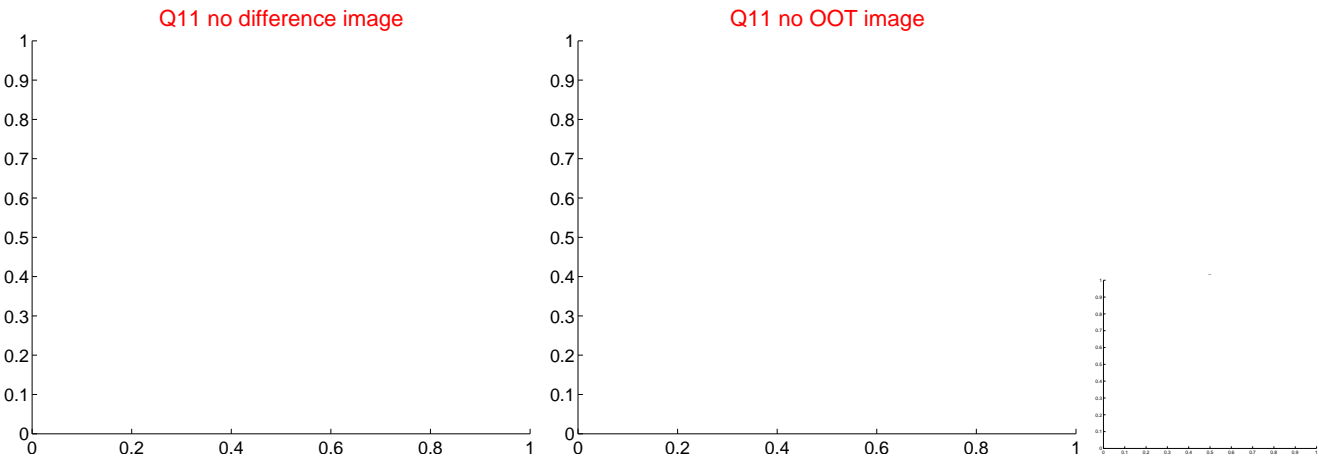
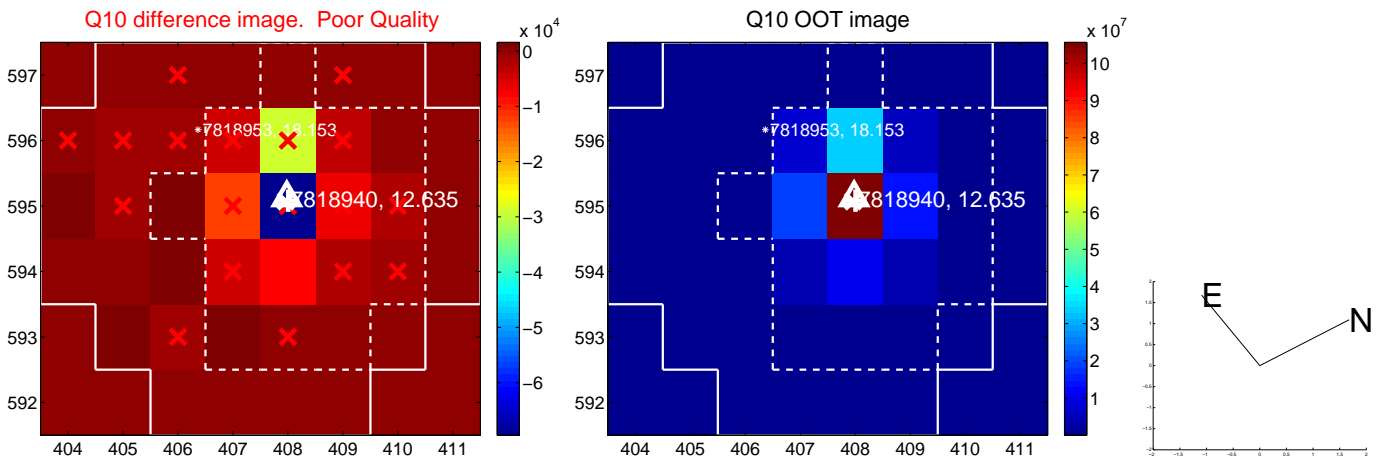
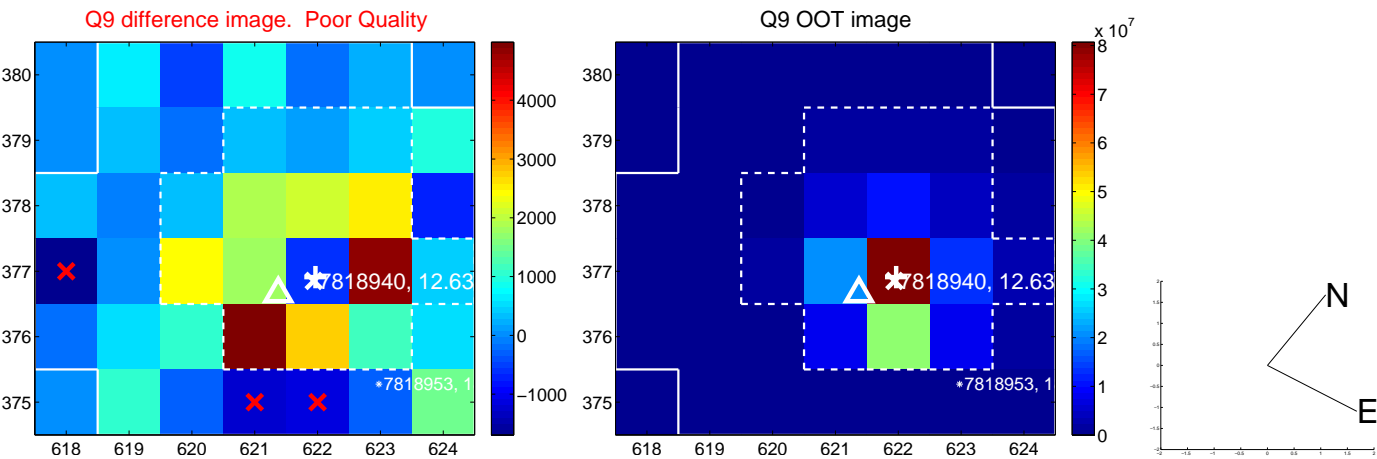
Q4 no OOT image



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



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



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

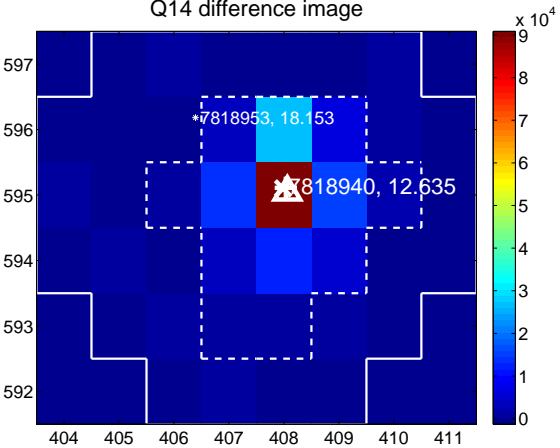
Q13 no difference image



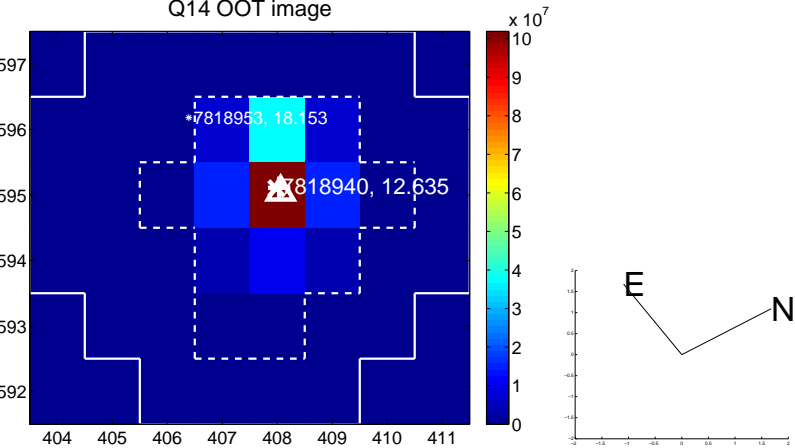
Q13 no OOT image



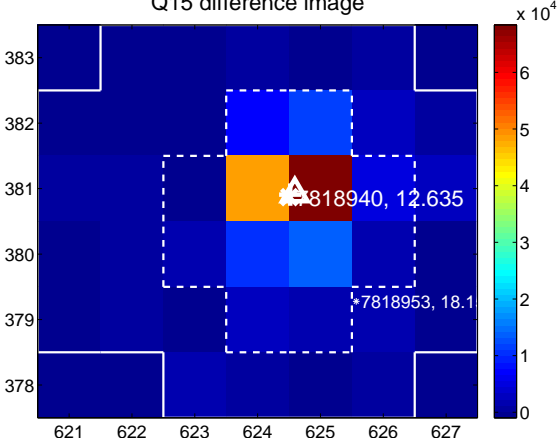
Q14 difference image



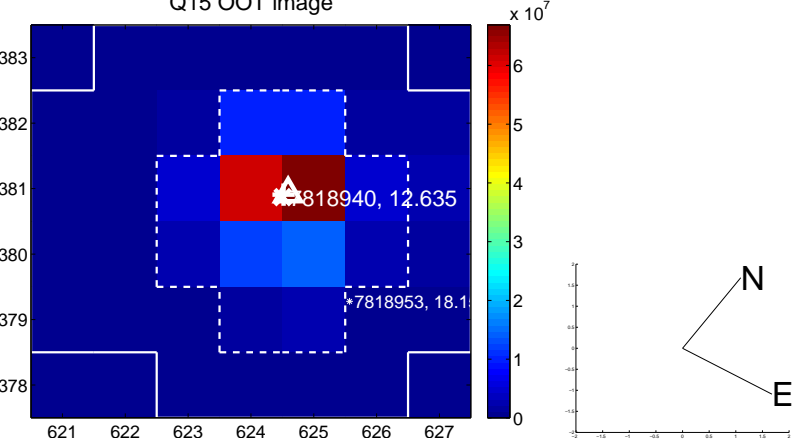
Q14 OOT image



Q15 difference image



Q15 OOT image



Q16 no difference image

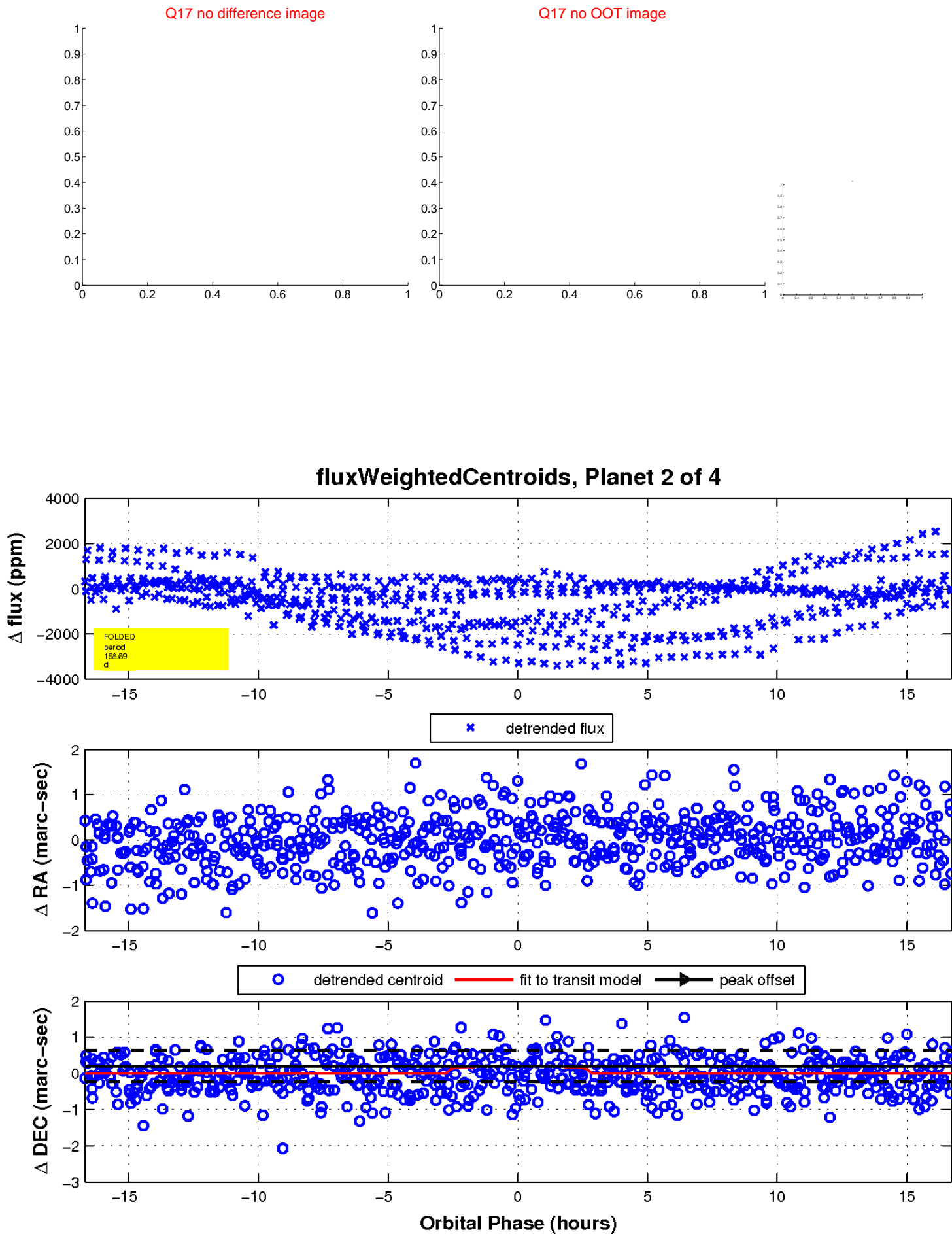


Q16 no OOT image



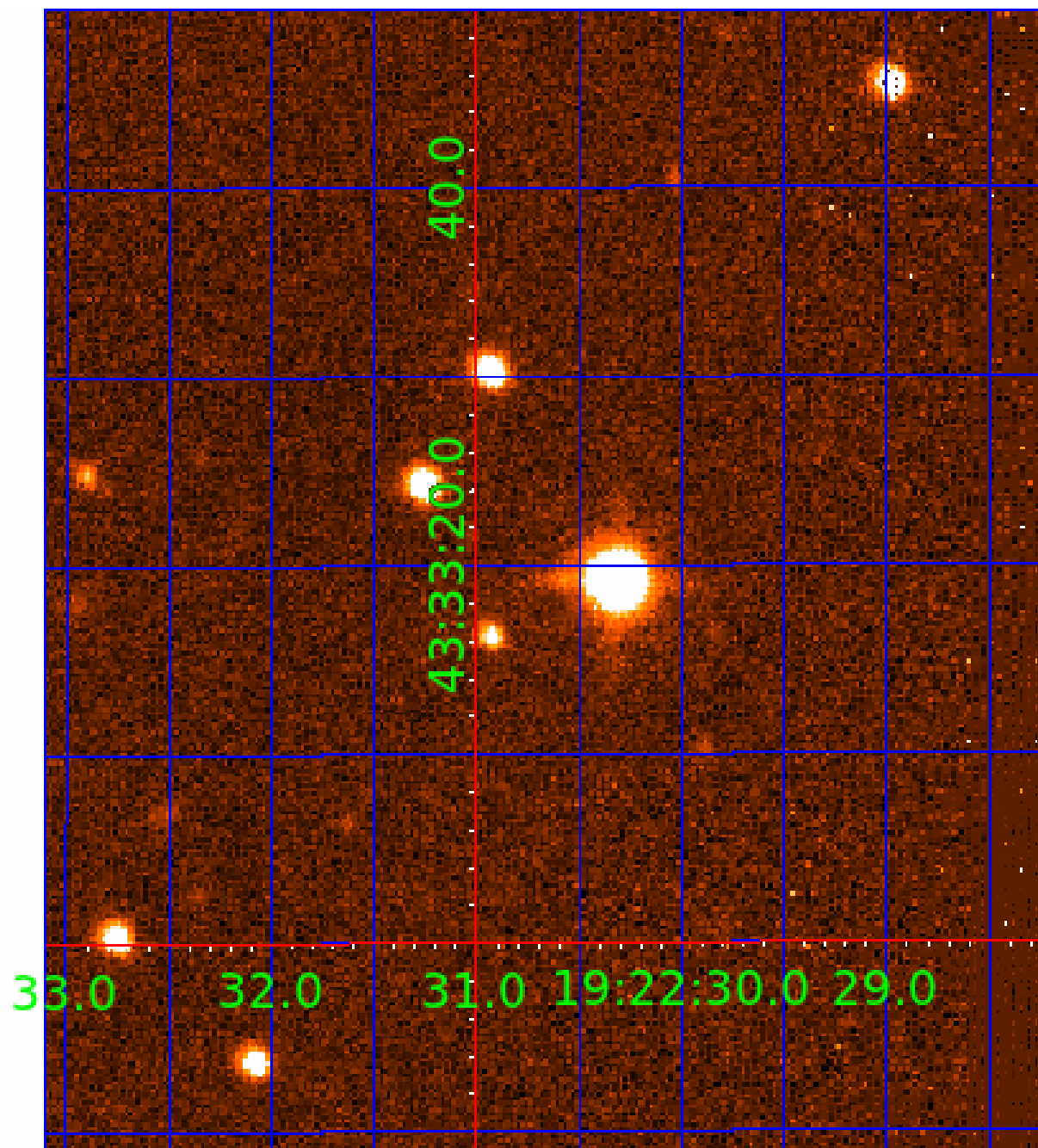


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 007818940

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
007818940-01	OBS	No	1.029500	131.783731	28.6	5.988	8.6	8.6	1.97	7118	1.10	18829.59
007818940-02	OBS	No	158.692889	188.761655	1056.5	5.577	17.5	9.4	1.97	7118	6.48	22.78
007818940-03	OBS	No	81.075497	193.330754	741.5	21.332	10.1	4.6	1.97	7118	6.55	55.78
007818940-04	OBS	No	113.534821	202.242522	237.6	2.844	7.8	3.1	1.97	7118	3.48	35.60

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007818940-01	OBS	FP	0.00	1	0	0	0	LPP_DV
007818940-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—HALO_GHOST
007818940-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_DV
007818940-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV— MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—HALO_GHOST

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

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

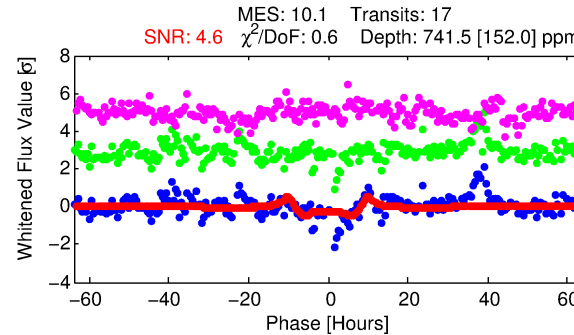
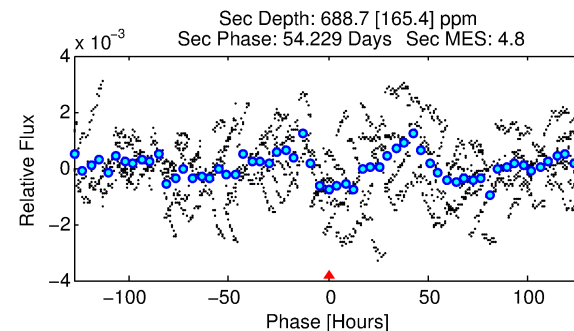
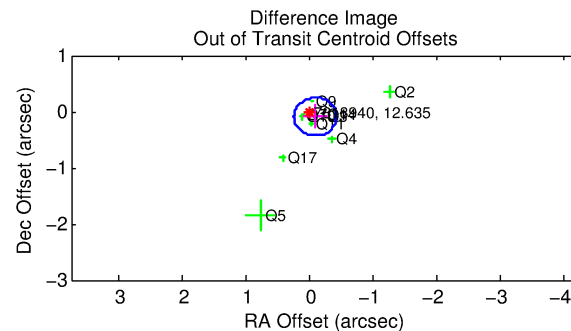
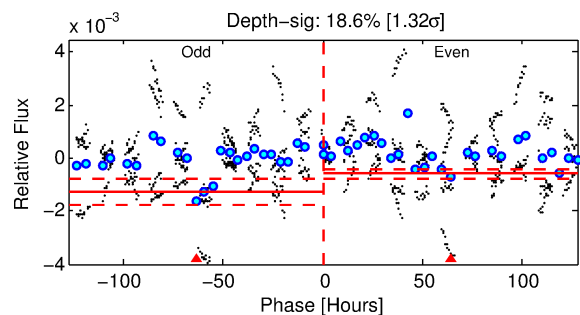
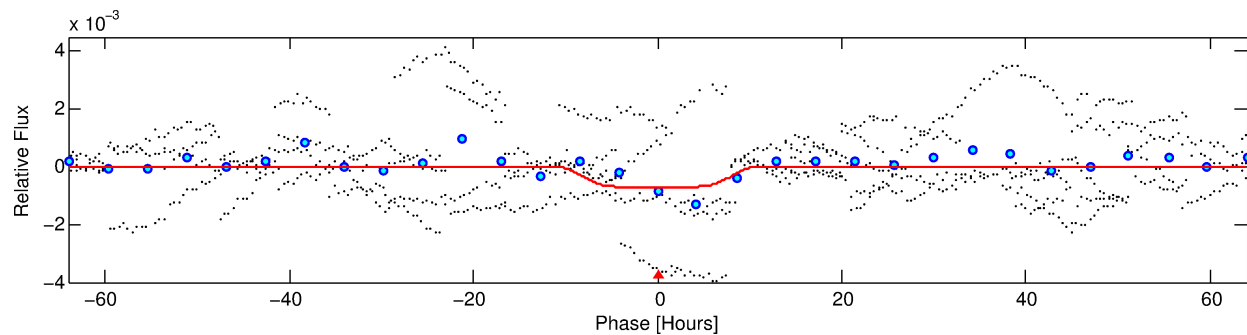
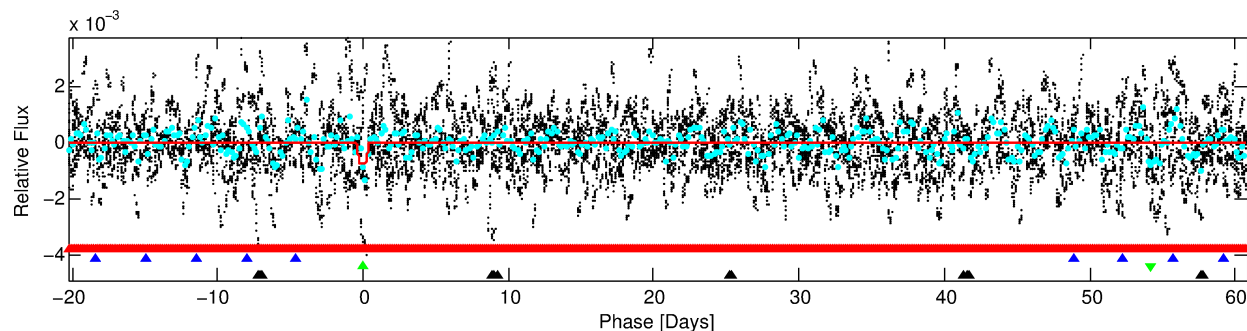
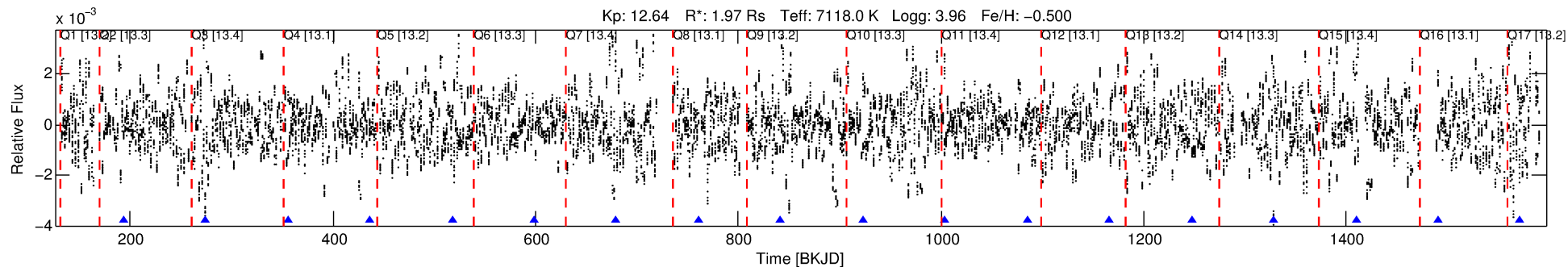
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 007818940-03

No Significant Match Found

# DV One-Page Summary

KIC: 7818940 Candidate: 3 of 4 Period: 81.075 d



## DV Fit Results:

Period = 81.07550 [0.00277] d  
Epoch = 193.3308 [0.0278] BKJD  
Rp/R\* = 0.0305 [0.0032]  
a/R\* = 11.72 [0.97]  
b = 0.95 [0.01]  
Seff = 55.78 [25.38]  
Teff = 697 [79] K  
Rp = 6.55 [2.08] Re  
a = 0.3996 [0.1110] AU  
Ag = 1411.31 [761.72] [1.85 $\sigma$ ]  
Teffp = 6604 [571] K [10.25 $\sigma$ ]

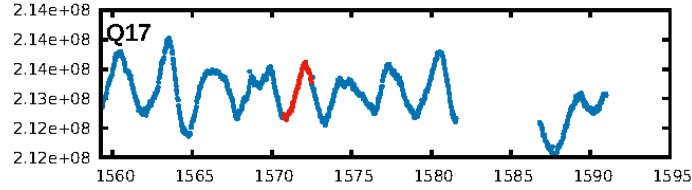
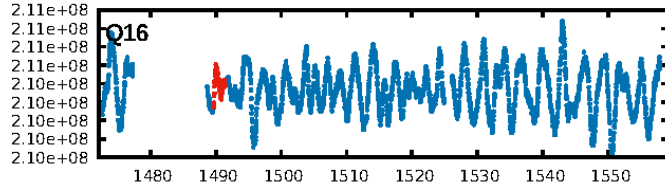
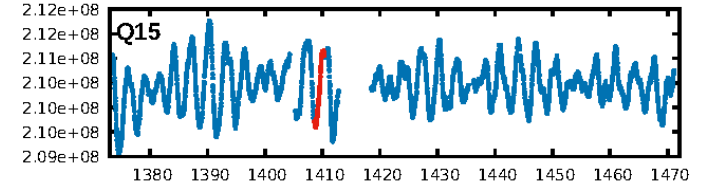
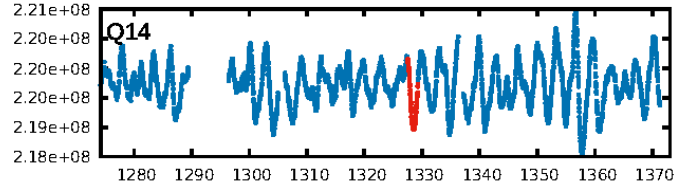
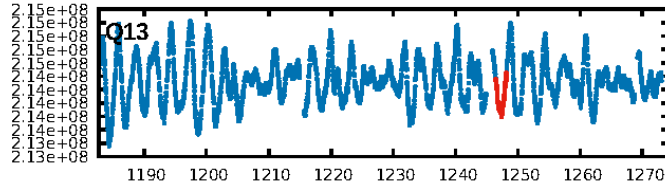
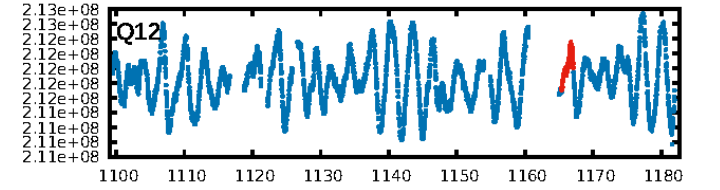
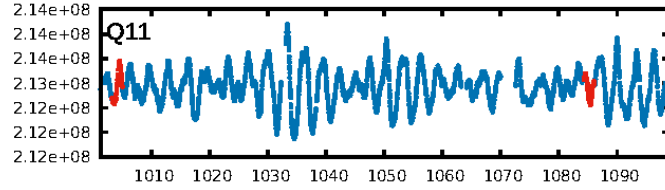
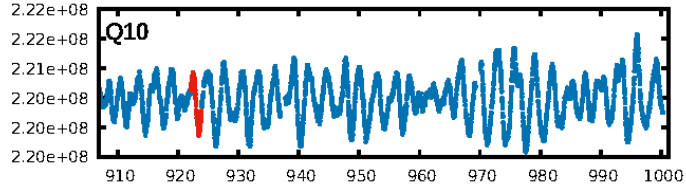
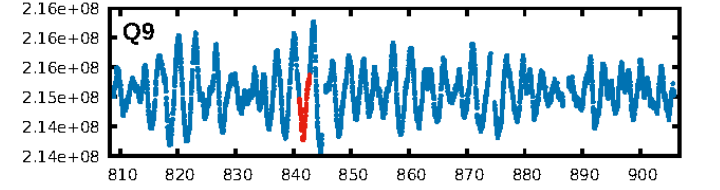
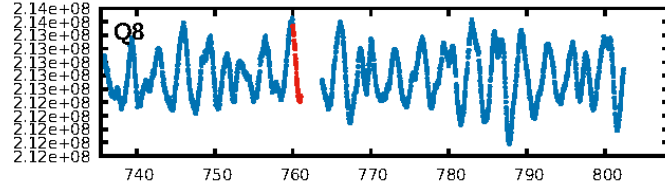
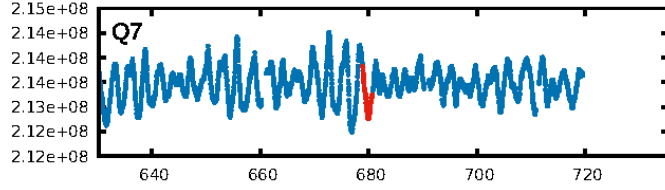
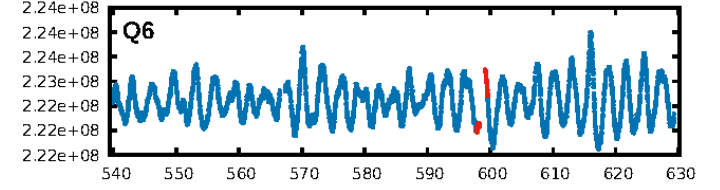
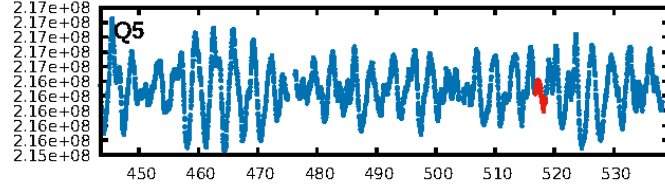
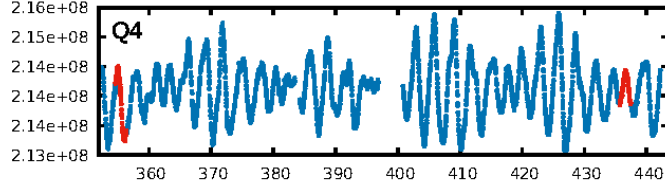
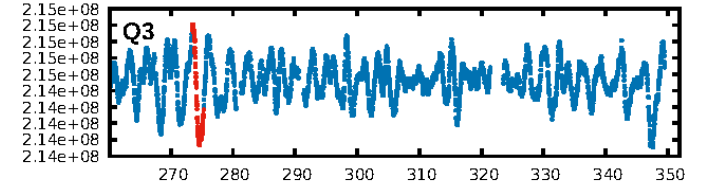
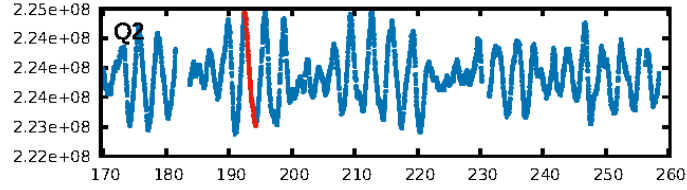
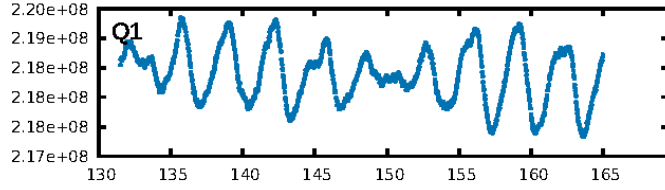
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [86.71 $\sigma$ ]  
LongPeriod-sig: 100.0% [36.20 $\sigma$ ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 1.32e-16  
RollingBand-fgt: 1.00 [16/16]  
GhostDiagnostic-chr: -0.2561  
Centroid-sig: N/A  
Centroid-so: 0.336 arcsec [2.55 $\sigma$ ]  
OotOffset-rm: 0.127 arcsec [1.13 $\sigma$ ]  
KicOffset-rm: 0.156 arcsec [0.71 $\sigma$ ]  
OotOffset-st: 3/3/1/3 [10]  
KicOffset-st: 3/3/1/3 [10]  
DiffImageQuality-fgm: 0.80 [8/10]  
DiffImageOverlap-fno: 0.00 [0/10]

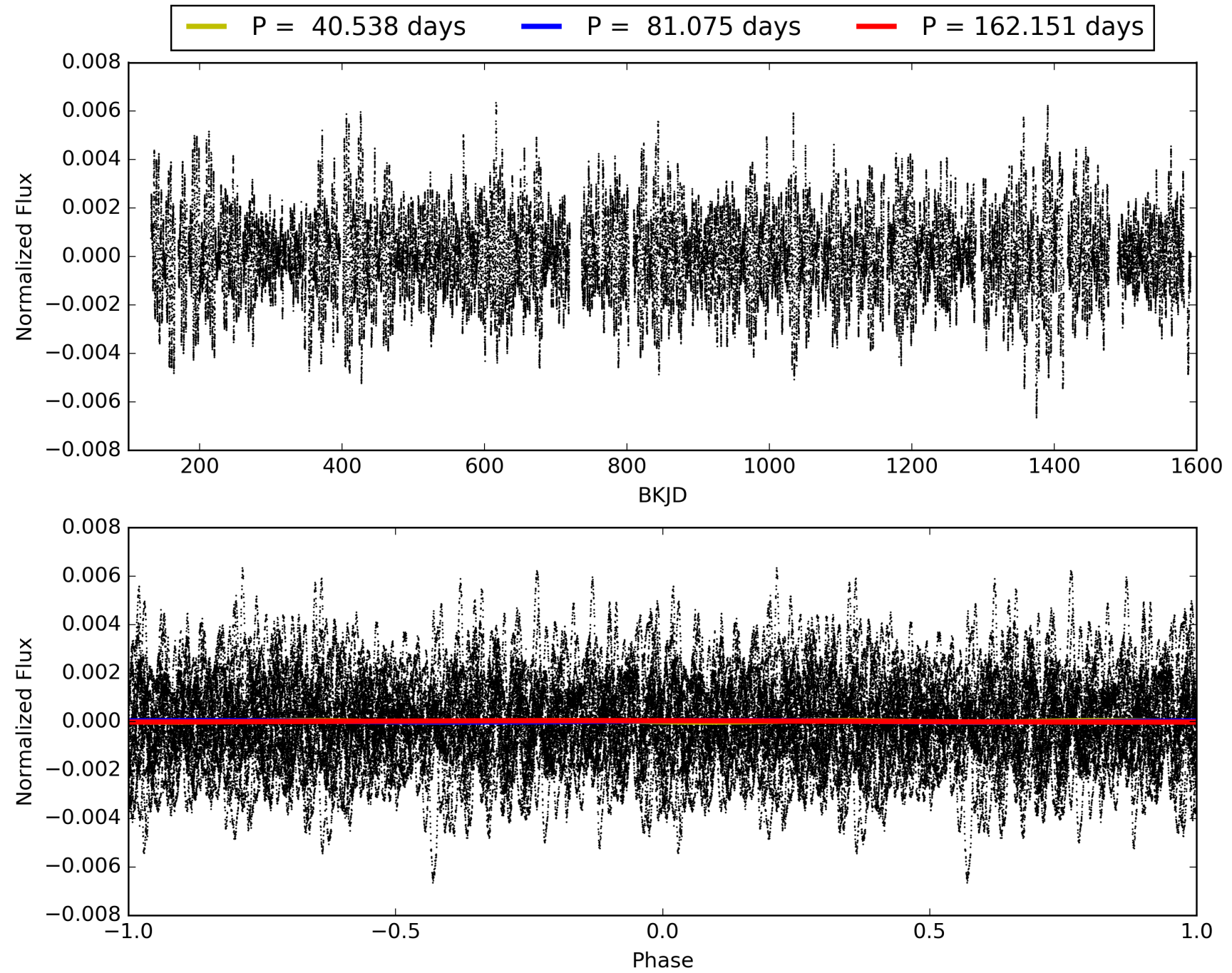
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 10:17:56 Z

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

# TCE 007818940-03, PDC Light Curves



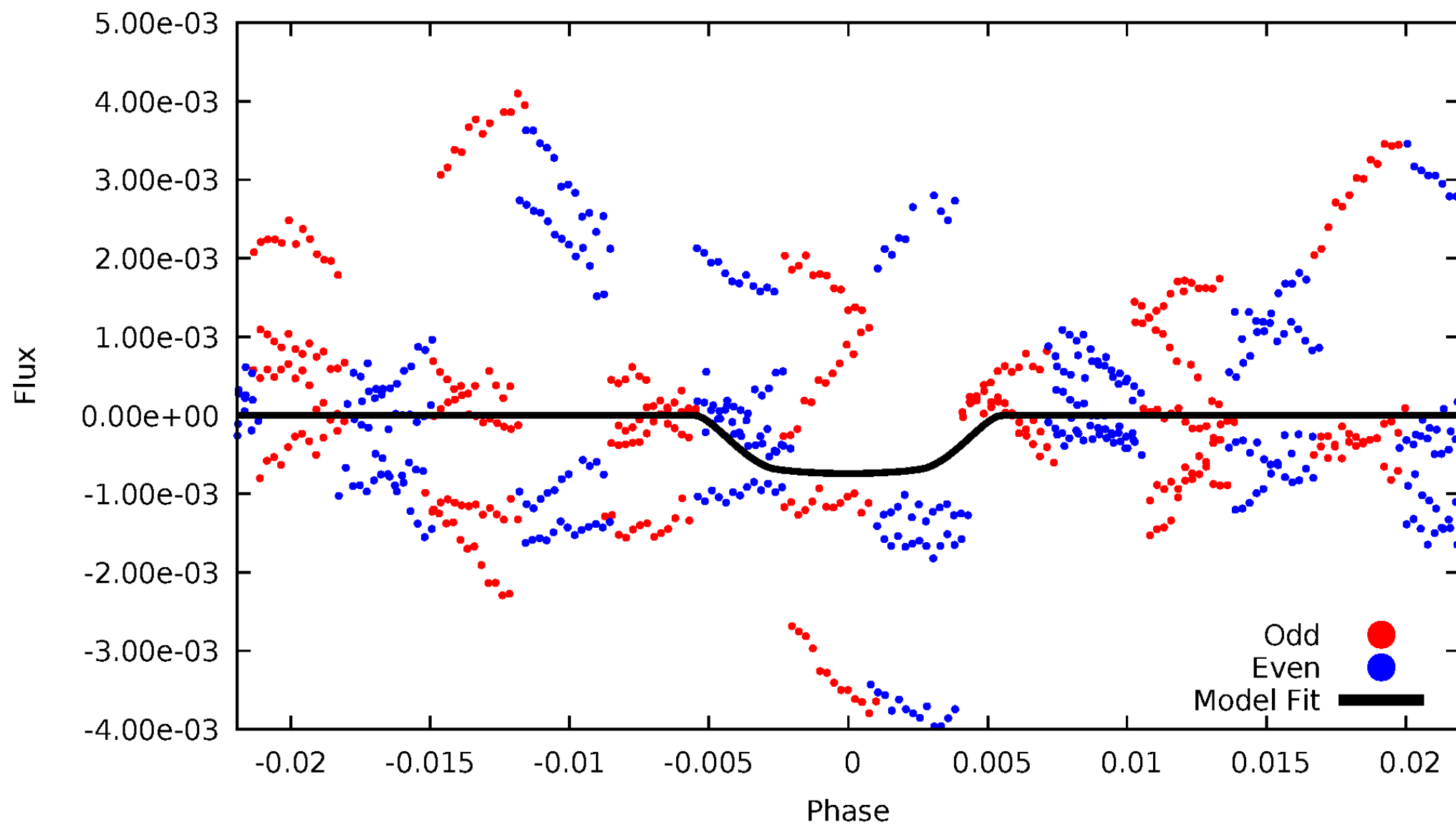
TCE 007818940-03





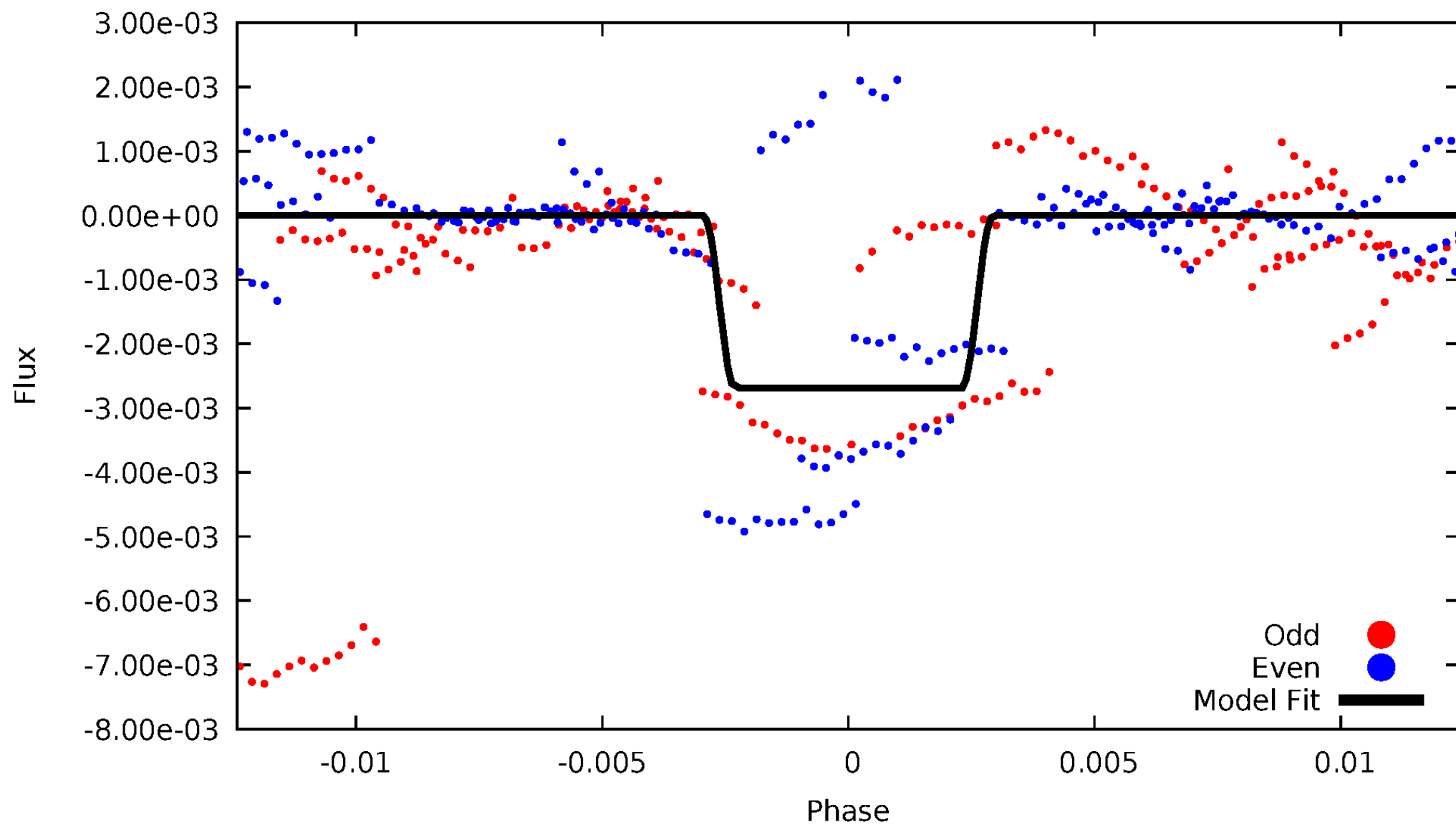
# DV Odd/Even

TCE 007818940-03

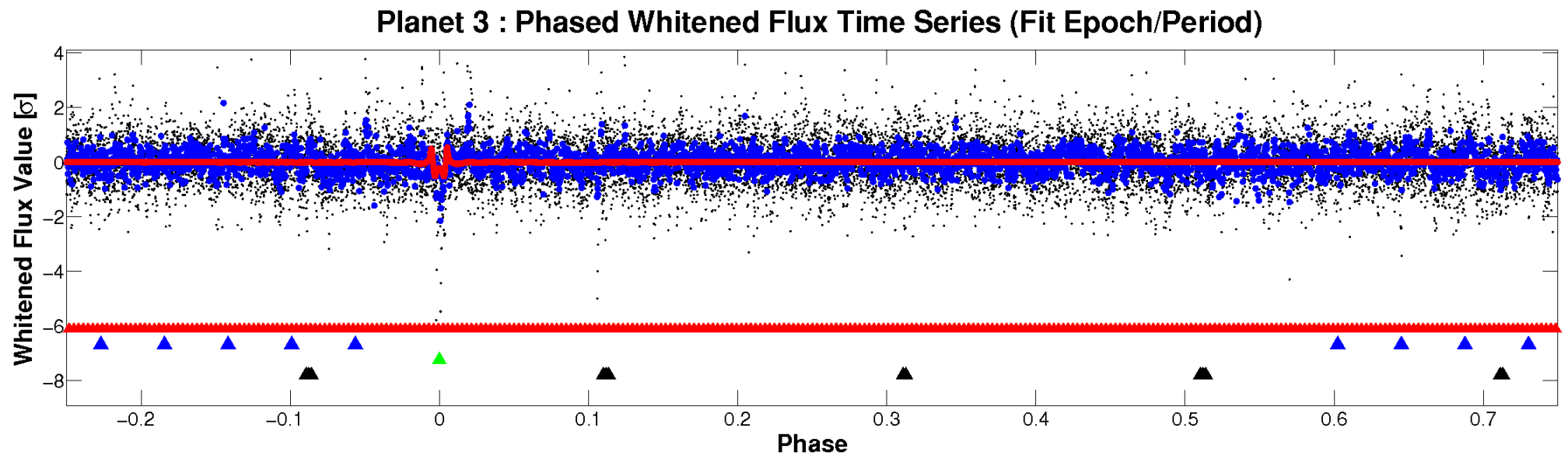
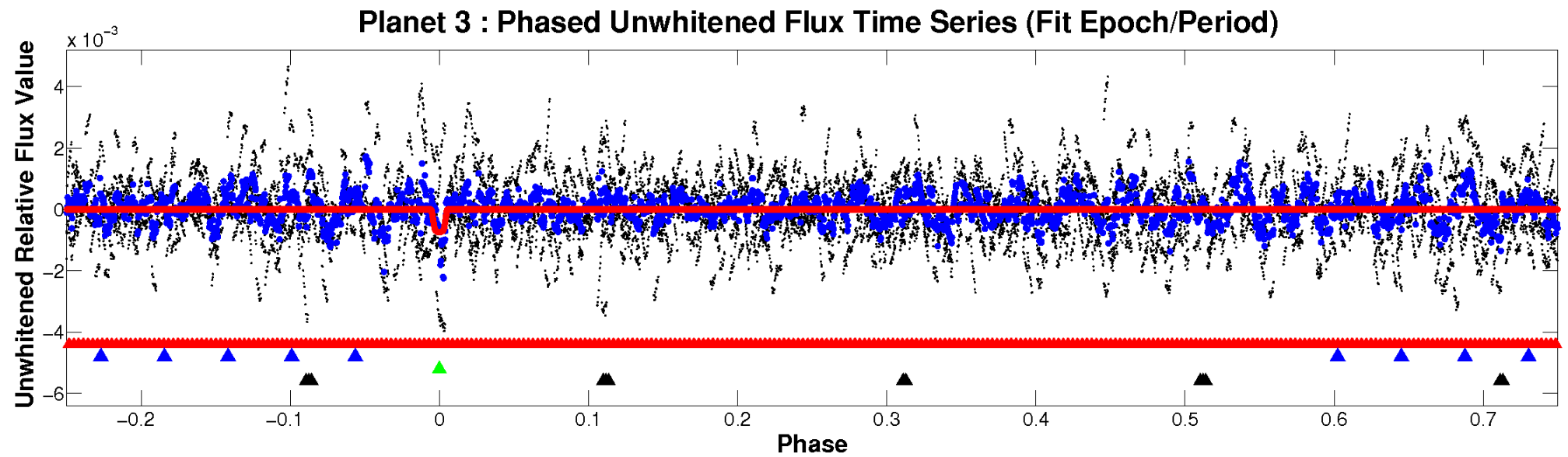


# ALT Odd/Even

TCE 007818940-03

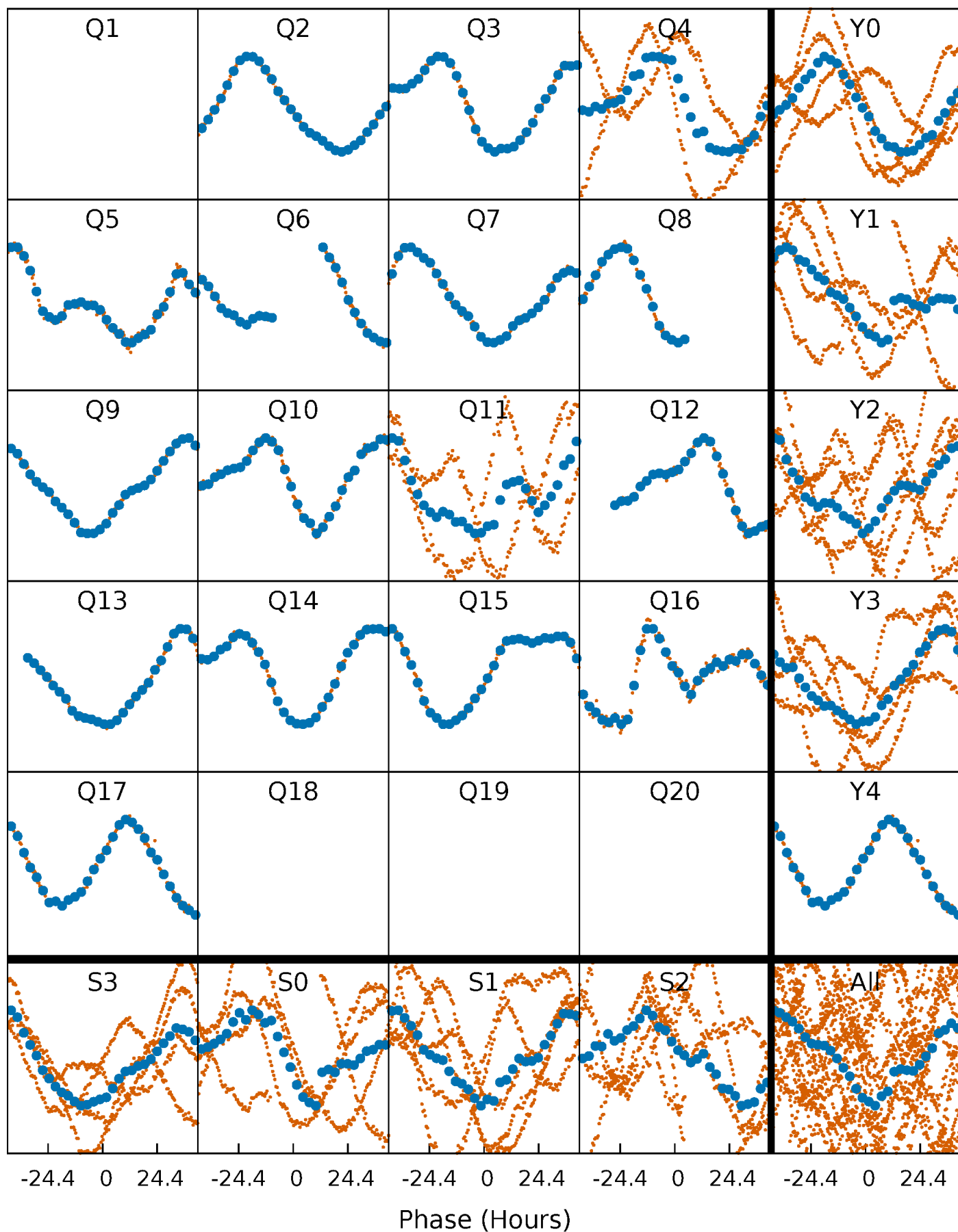


# Non-Whitened Vs. Whitened Light Curve



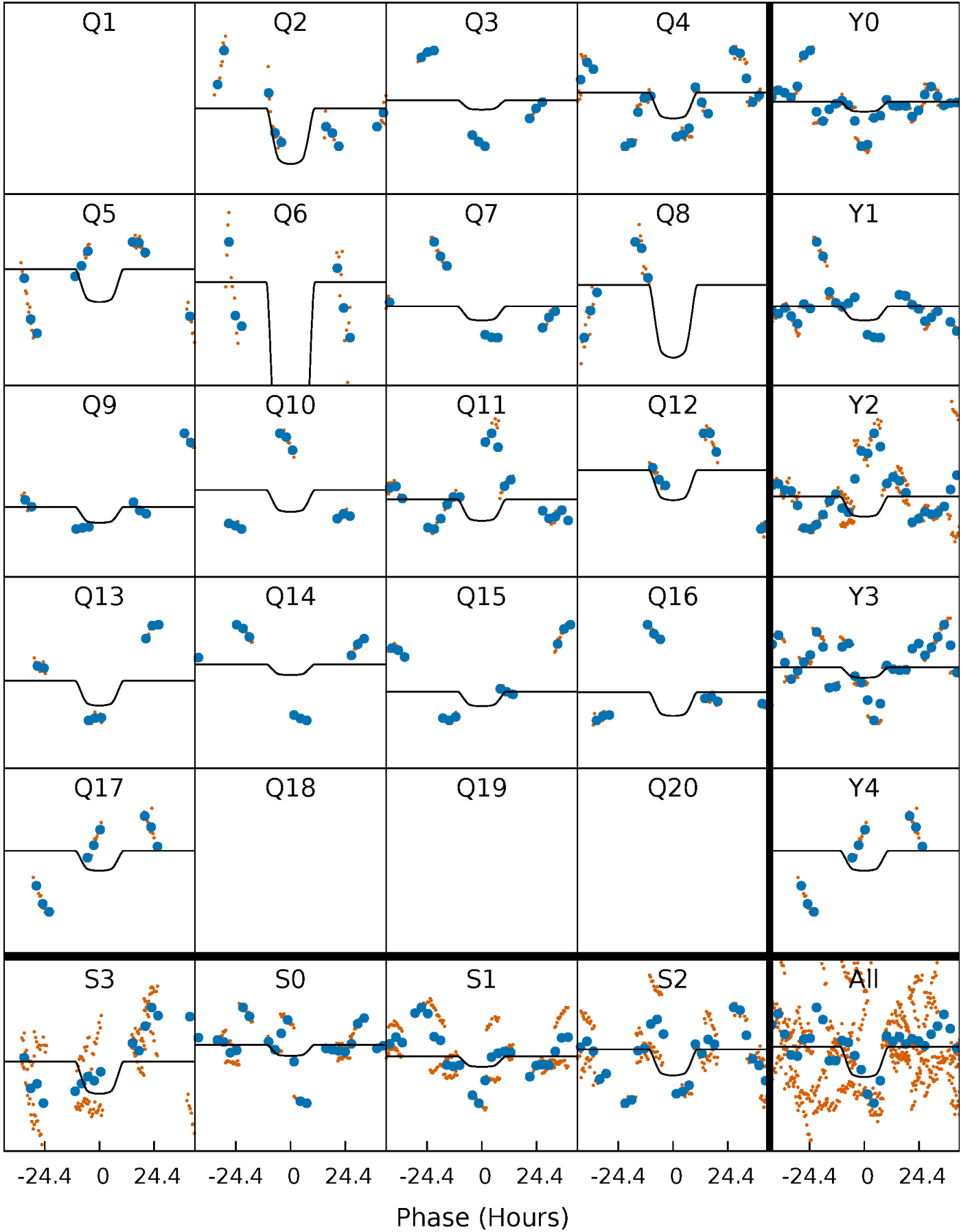
# PDC Quarter-Phased Transit Curves

TCE 007818940-03 P= 81.075497 Days  $T_0=193.330754$  (BKJD)



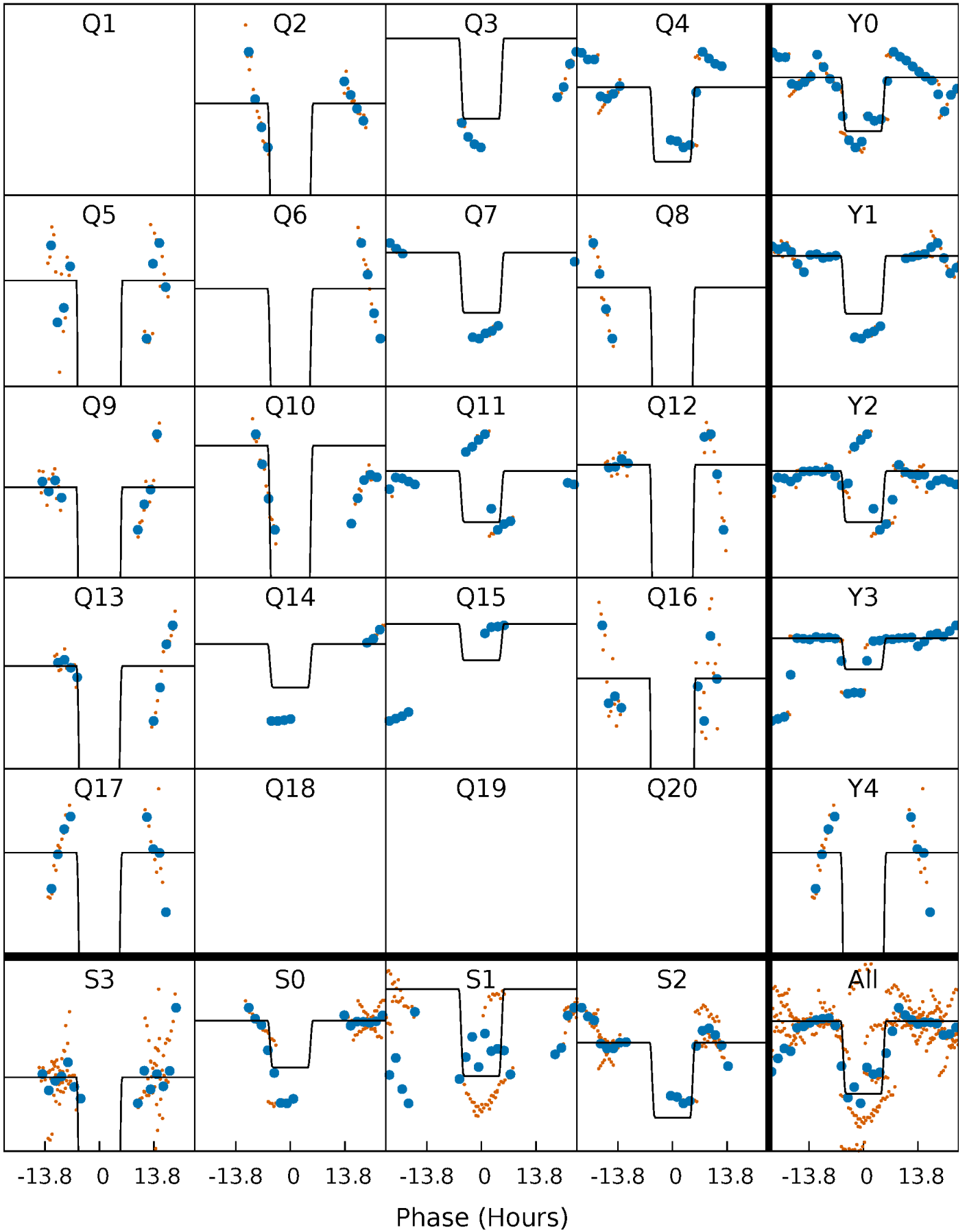
# DV Quarter-Phased Transit Curves

TCE 007818940-03 P= 81.075497 Days  $T_0=193.330754$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 007818940-03   P= 81.092639 Days    $T_0=193.388959$  (BKJD)

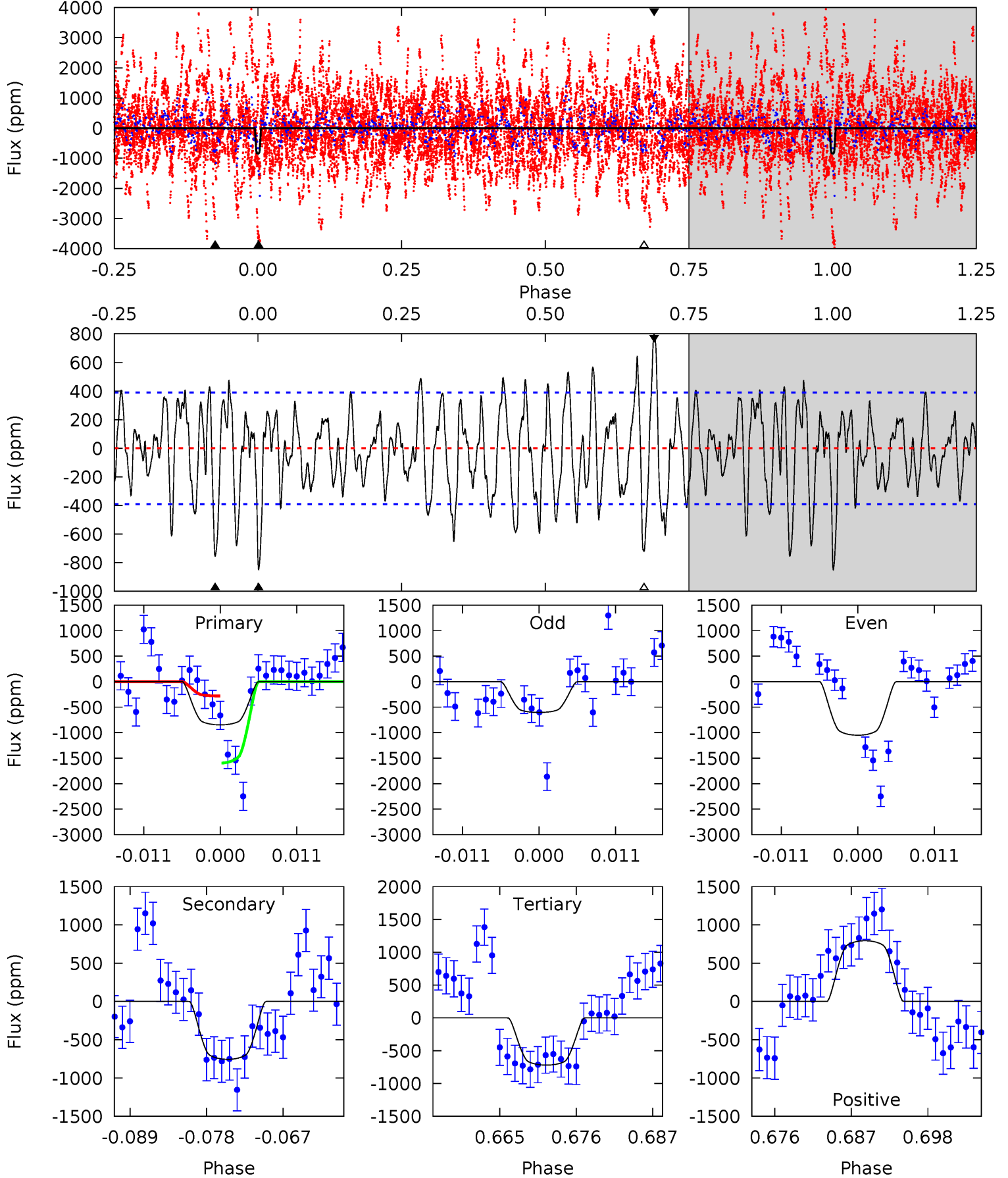




# DV Model-Shift Uniqueness Test

007818940-03, P = 81.075497 Days, E = 112.255257 Days

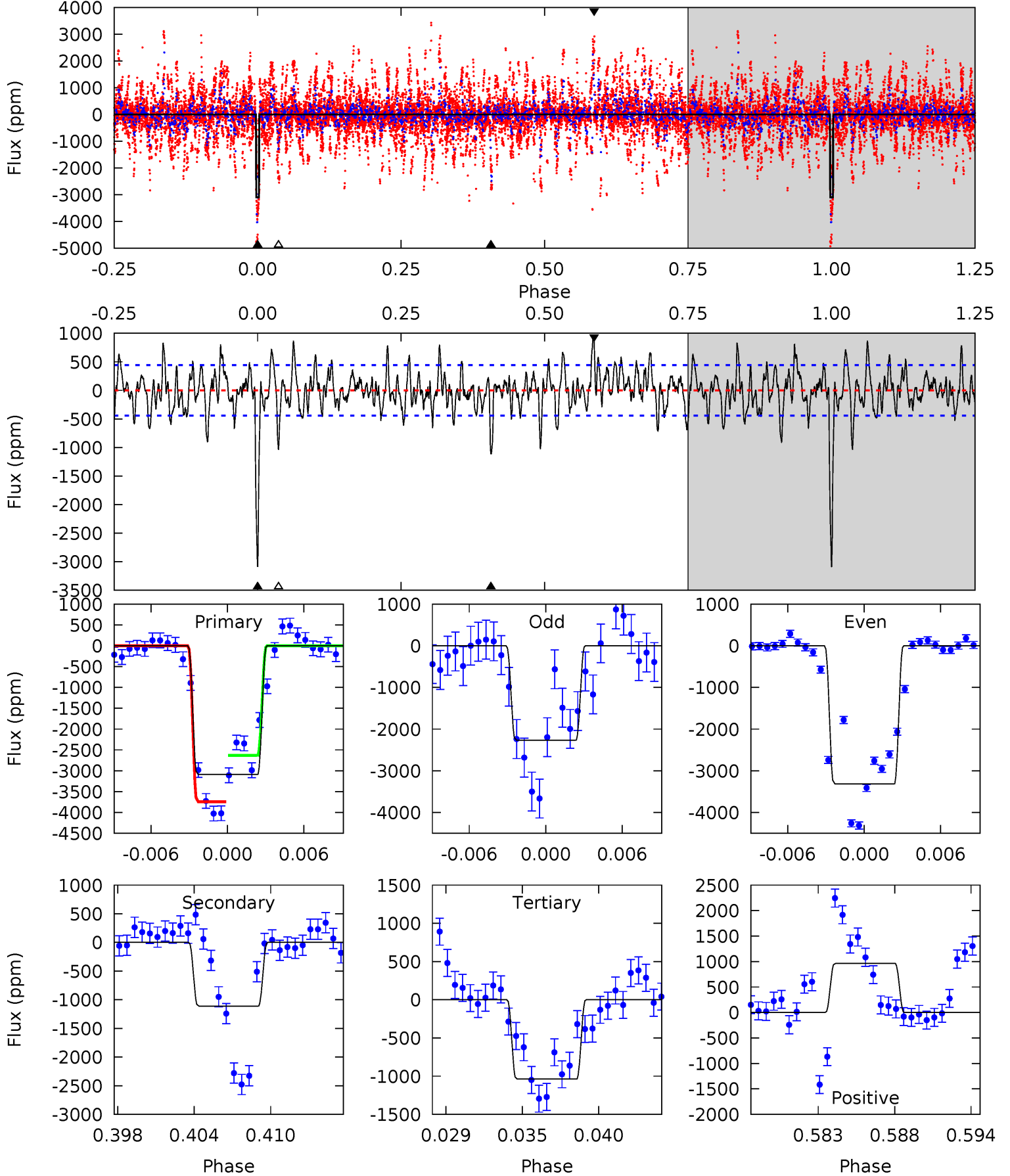
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.9	9.69	9.23	10.2	5.01	2.54	3.49	1.64	0.70	0.46	-0.48	2.80	15.1	0.48	8.44



# Alt Model-Shift Uniqueness Test

007818940-03, P = 81.092639 Days, E = 112.296320 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
35.9	12.9	12.1	11.2	5.13	2.76	3.23	23.9	24.7	0.86	1.71	4.94	0.80	0.24	6.42



### Stellar Parameters For KIC 007818940

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7118^{+193}_{-236}$	$3.962^{+0.252}_{-0.108}$	$-0.500^{+0.300}_{-0.250}$	$1.968^{+0.393}_{-0.589}$	$1.294^{+0.221}_{-0.181}$	$0.239^{+0.344}_{-0.092}$
	+3%/-3%	+6%/-3%	+60%/-50%	+20%/-30%	+17%/-14%	+144%/-38%
Source	PHO1	FLK73	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 007818940-03 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-756 \pm 78$	$6.42^{+1.10}_{-1.09}$	$962^{+60}_{-74}$	$6718^{+496}_{-438}$	$1646^{+734}_{-438}$
Alt.	$-1111 \pm 86$	$10.91^{+1.49}_{-1.85}$	$956^{+64}_{-74}$	$5658^{+249}_{-233}$	$834^{+349}_{-190}$

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

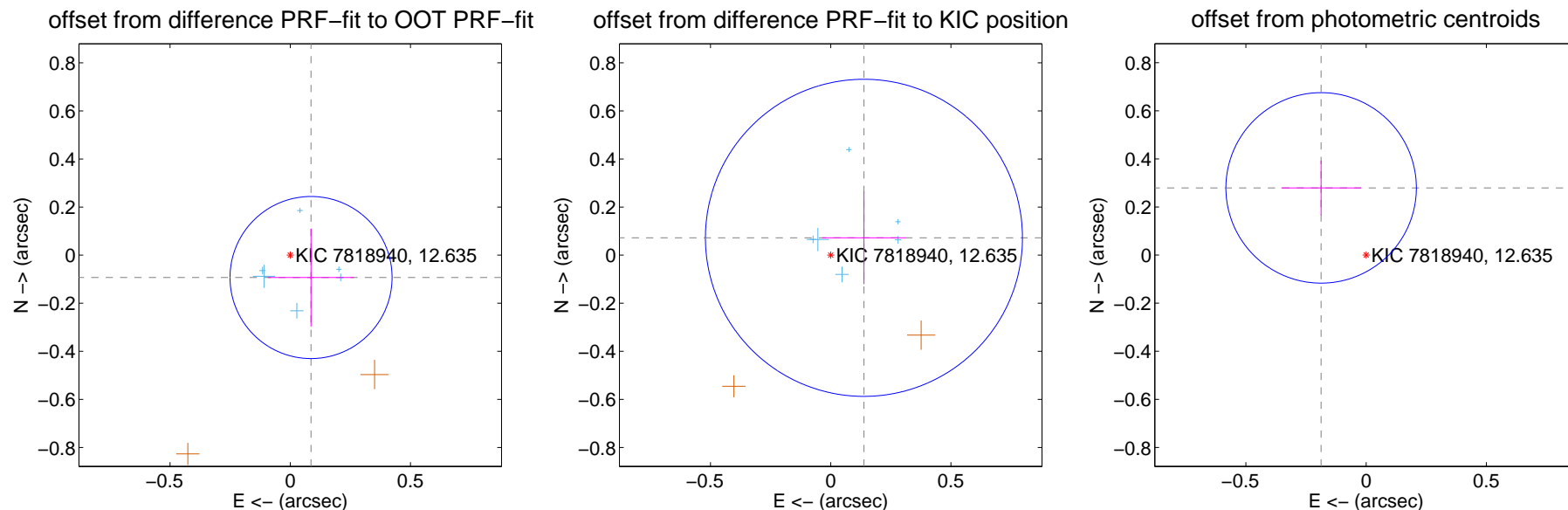
## DV Centroid Data

Supplemental centroid analysis for 007818940-03. Kepler magnitude: 12.63. Transit SNR 4.61

There are 8 quarters with good PRF difference image offsets

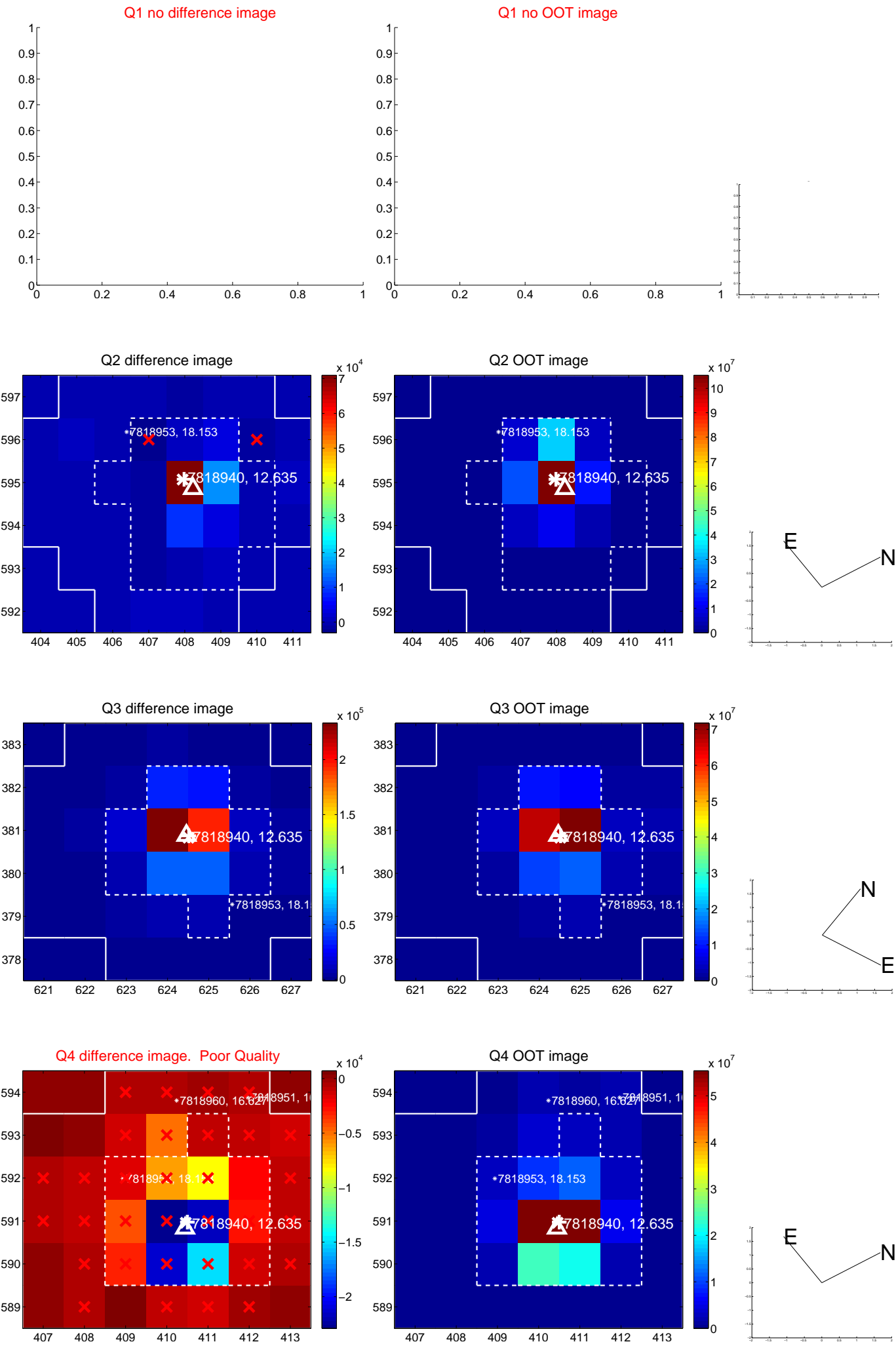
The direct PRF centroid is offset from the target star catalog position by about 0.28 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.127 \pm 0.112$	1.13	$-0.086 \pm 0.179$	$-0.093 \pm 0.204$
PRF-fit source offset from KIC position	$0.156 \pm 0.220$	0.71	$-0.138 \pm 0.174$	$0.072 \pm 0.193$
photometric centroid source offset	$0.34 \pm 0.13$	2.55	$0.19 \pm 0.17$	$0.28 \pm 0.11$

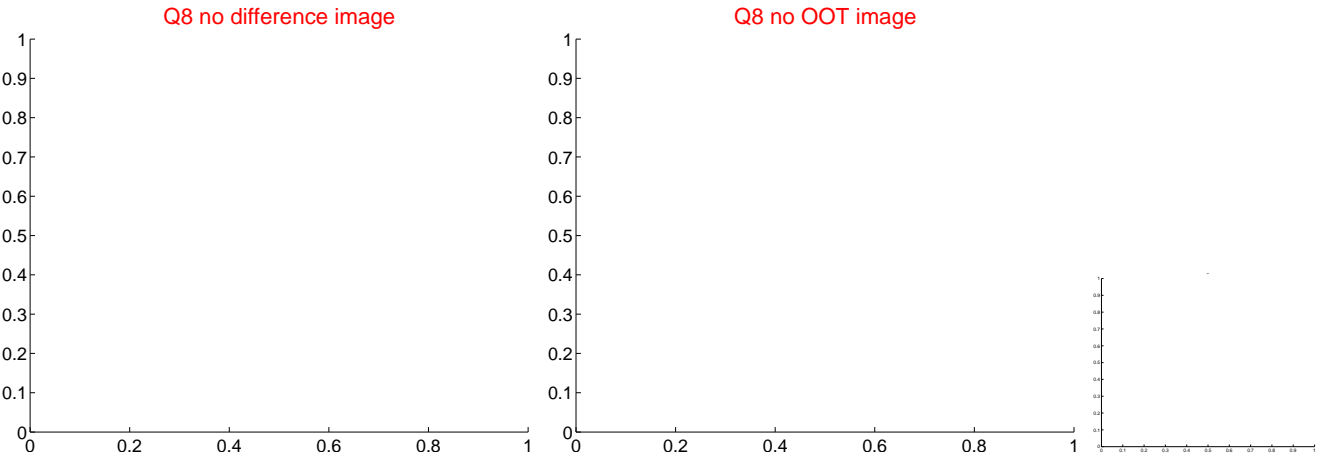
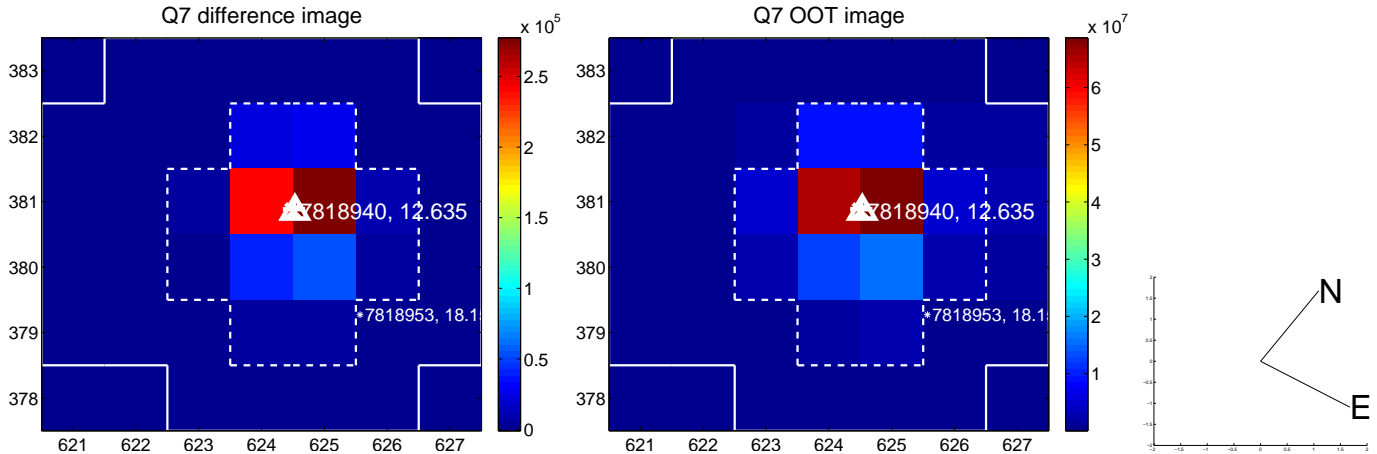
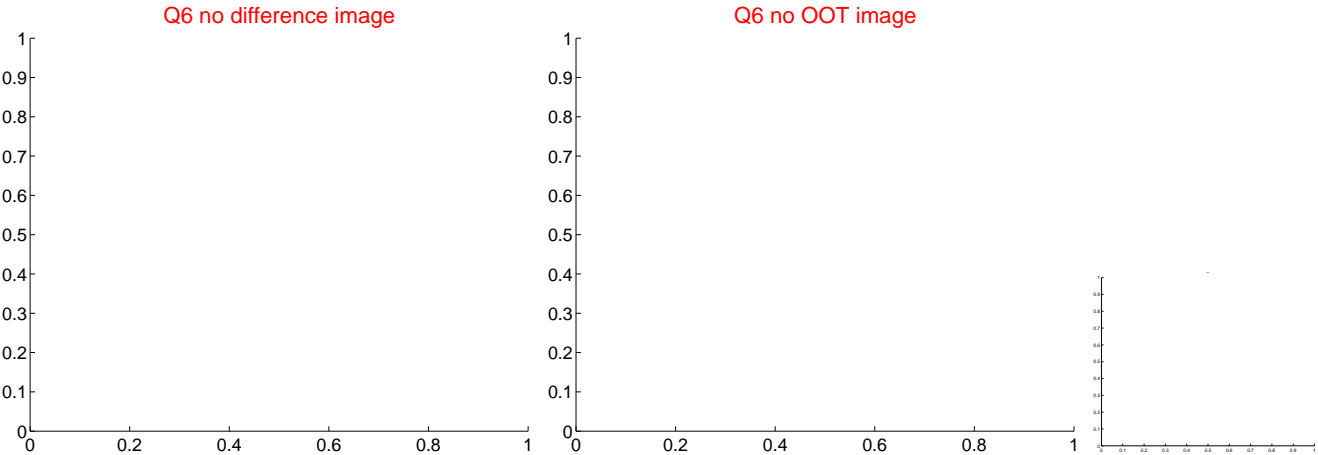
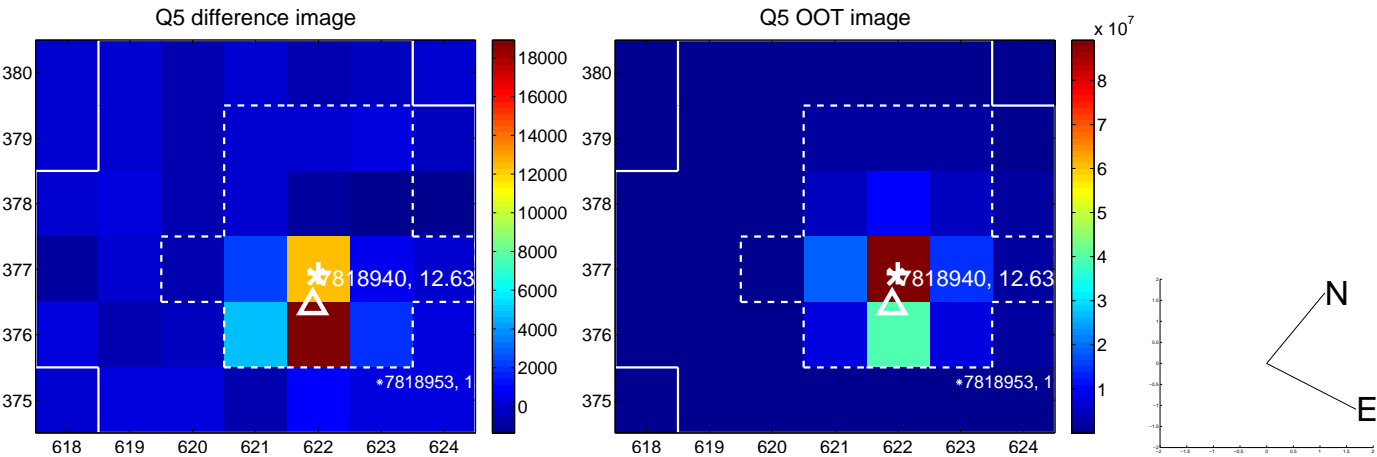


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

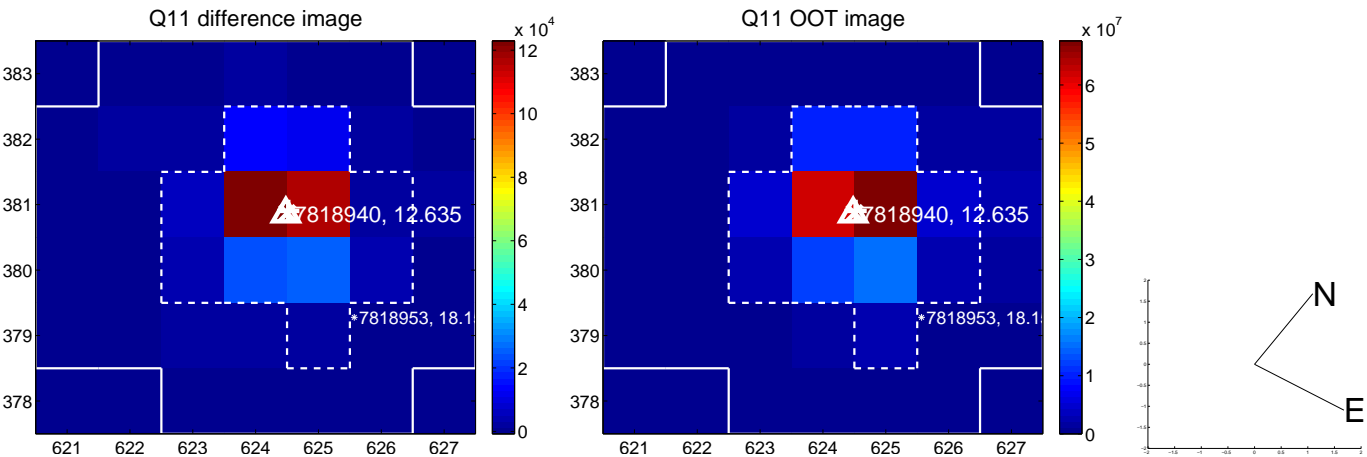
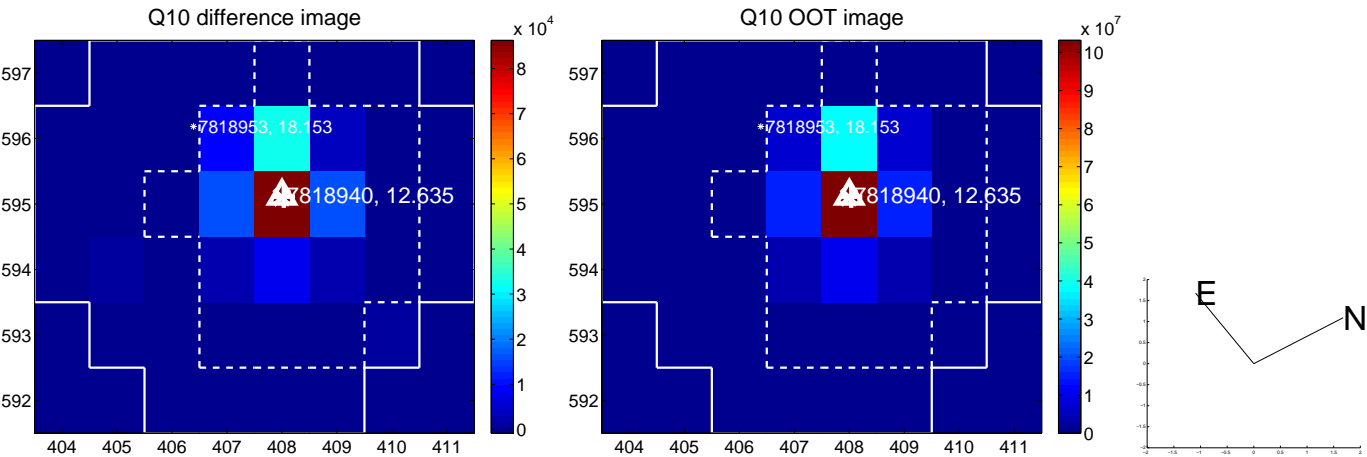
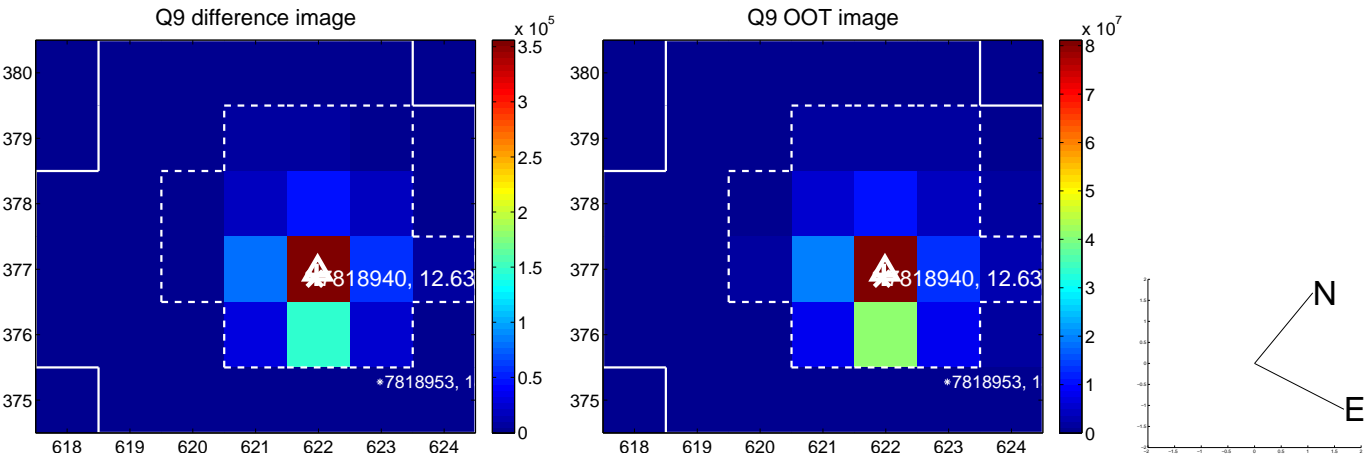


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.

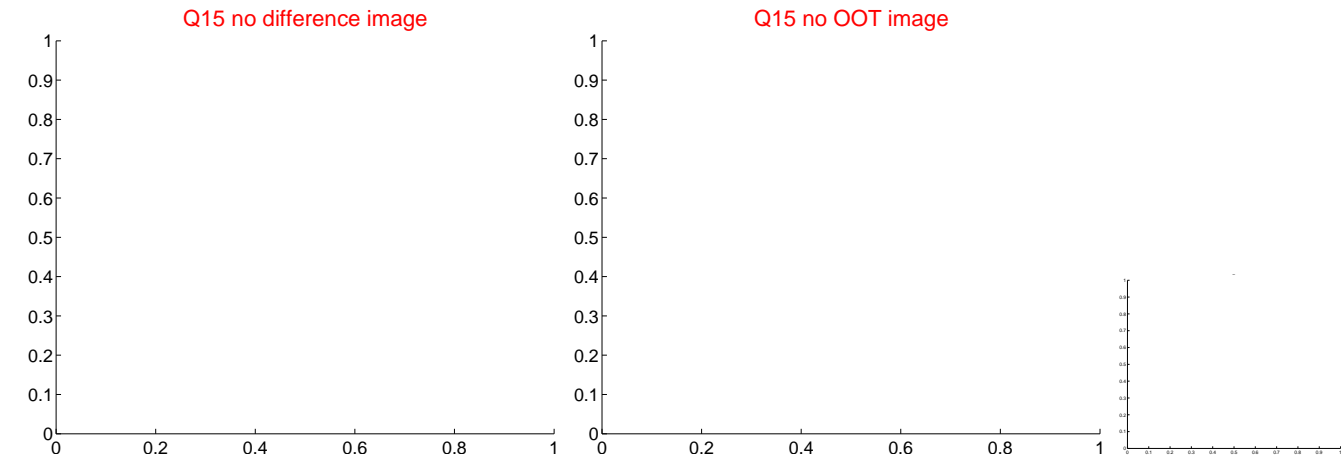
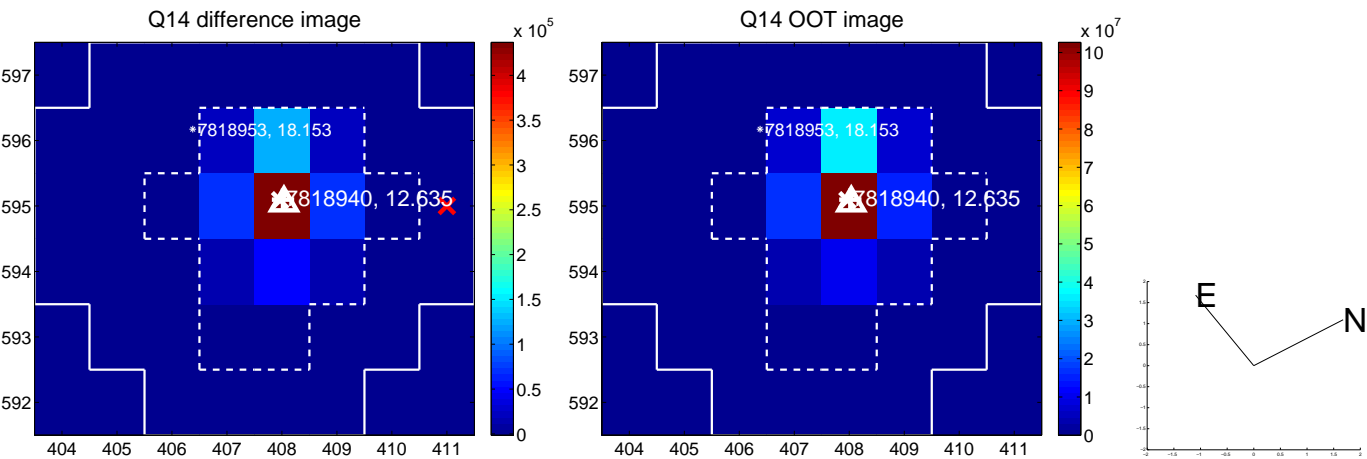




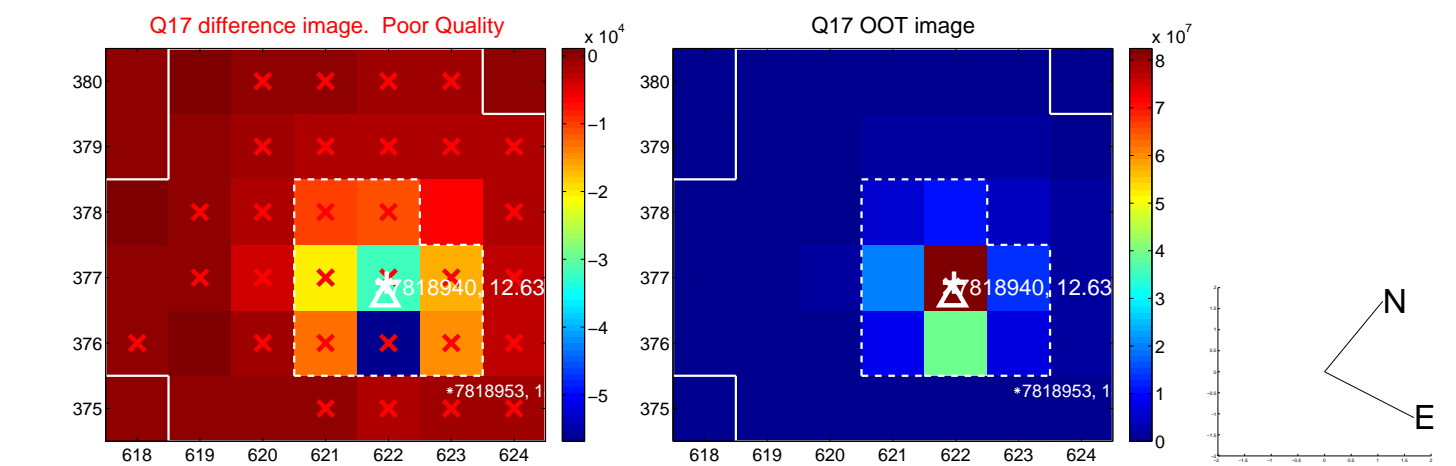
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



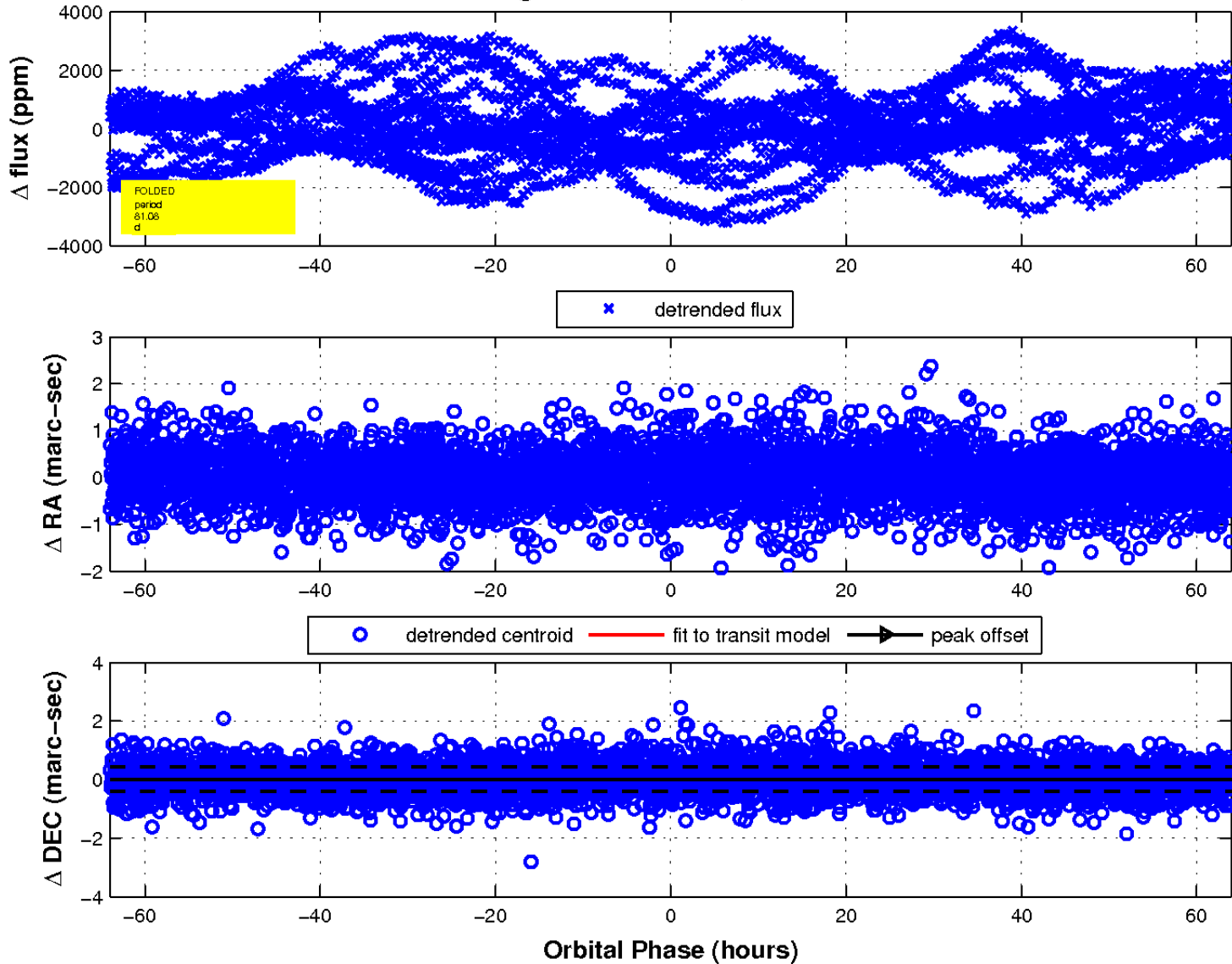
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

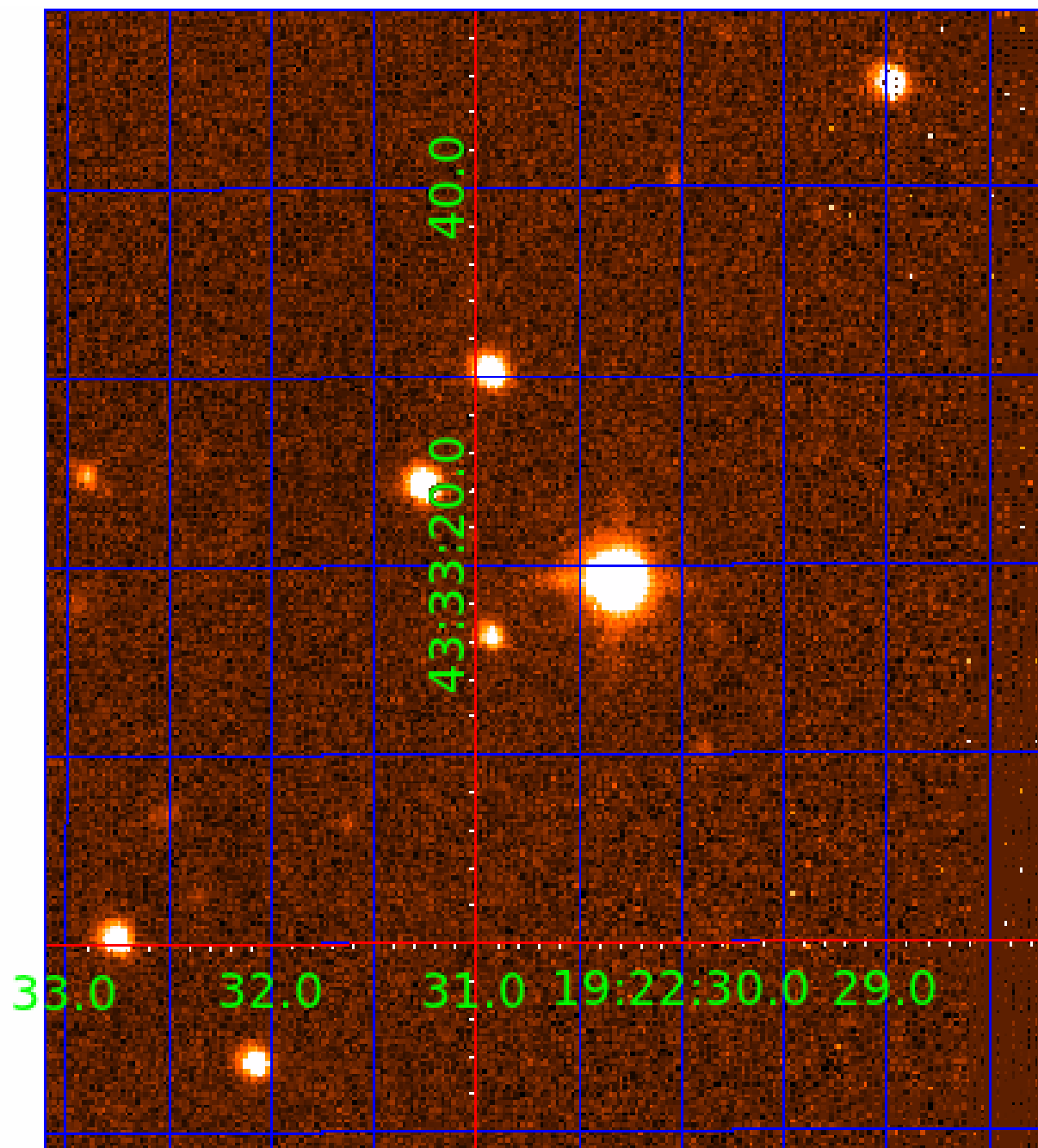


fluxWeightedCentroids, Planet 3 of 4



UKIRT Image

Declination



# KIC 007818940

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
007818940-01	OBS	No	1.029500	131.783731	28.6	5.988	8.6	8.6	1.97	7118	1.10	18829.59
007818940-02	OBS	No	158.692889	188.761655	1056.5	5.577	17.5	9.4	1.97	7118	6.48	22.78
007818940-03	OBS	No	81.075497	193.330754	741.5	21.332	10.1	4.6	1.97	7118	6.55	55.78
007818940-04	OBS	No	113.534821	202.242522	237.6	2.844	7.8	3.1	1.97	7118	3.48	35.60

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007818940-01	OBS	FP	0.00	1	0	0	0	LPP_DV
007818940-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—HALO_GHOST
007818940-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_DV
007818940-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV— MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—HALO_GHOST

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

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

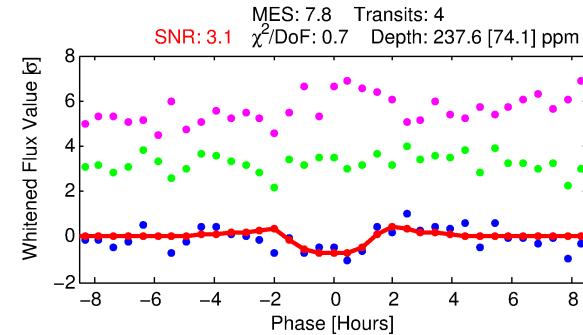
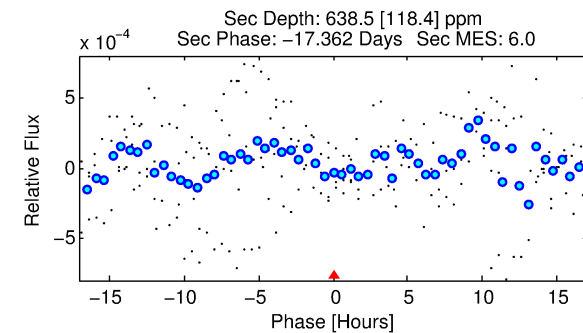
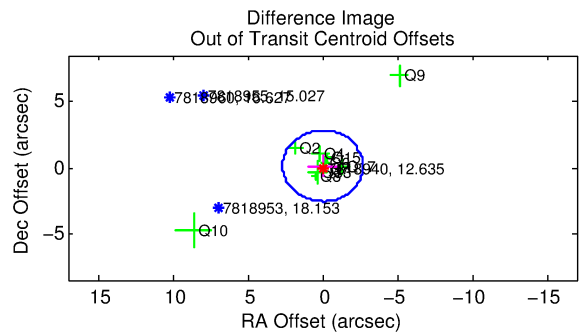
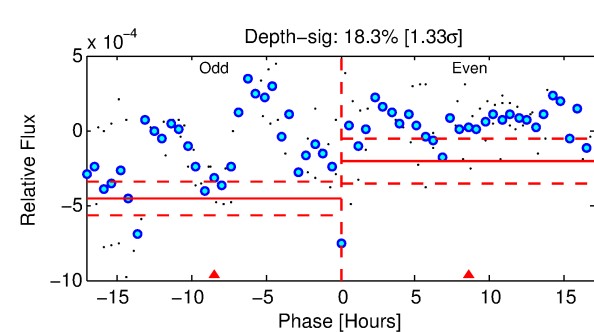
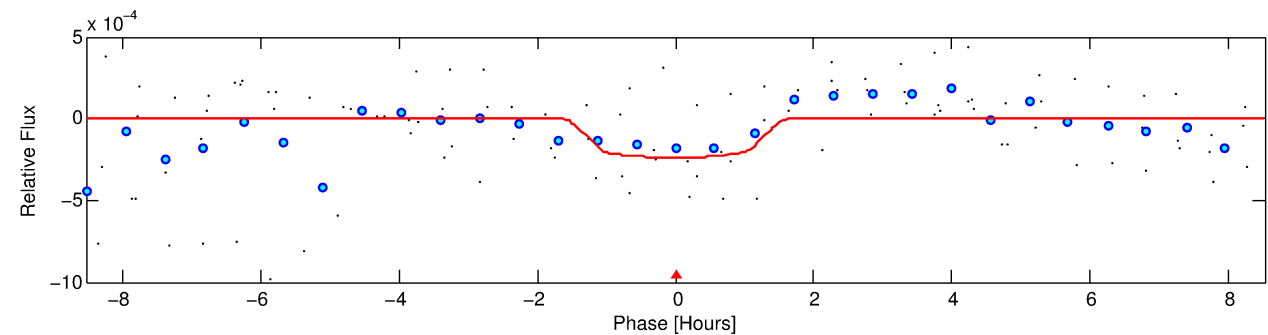
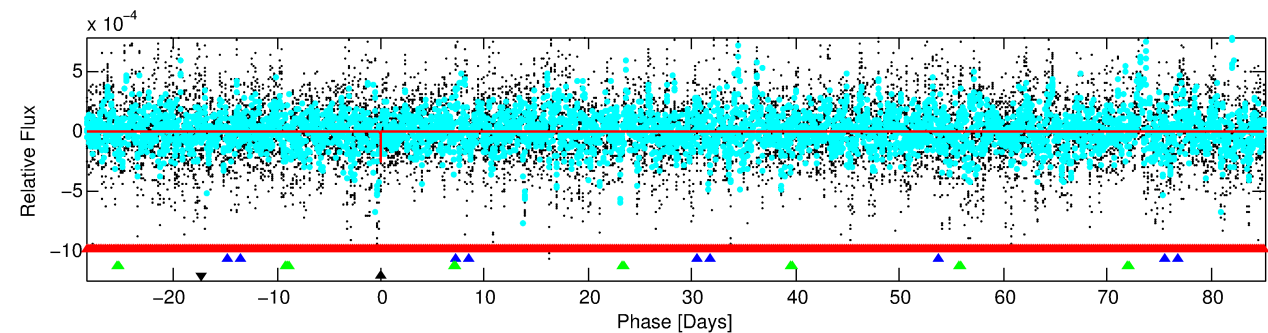
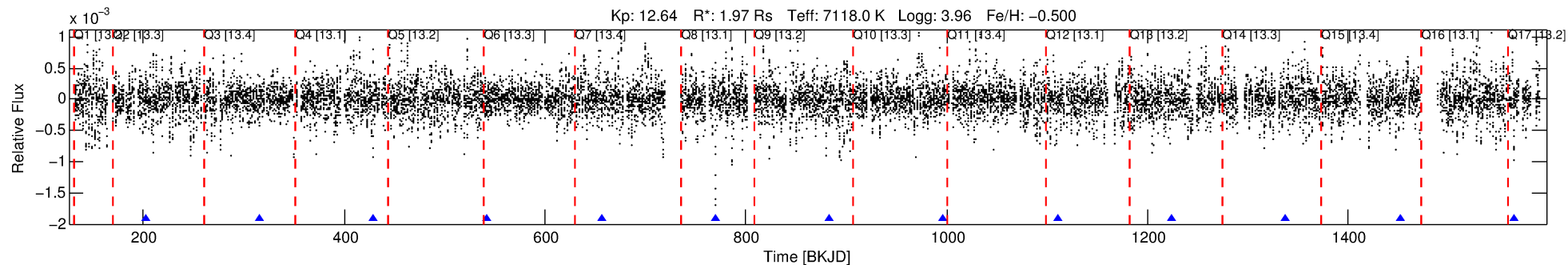
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 007818940-04

No Significant Match Found

# DV One-Page Summary

KIC: 7818940 Candidate: 4 of 4 Period: 113.535 d



## DV Fit Results:

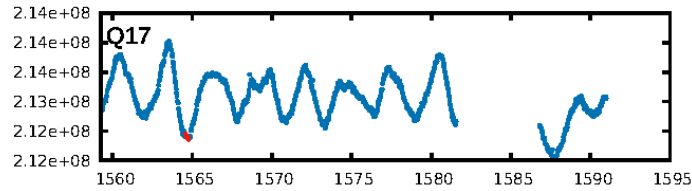
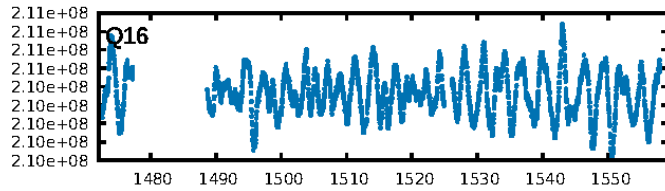
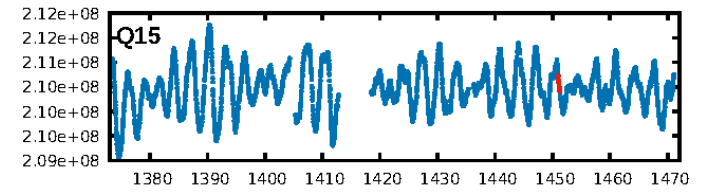
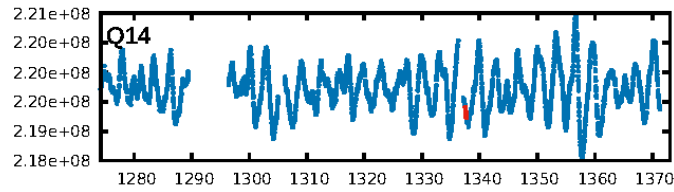
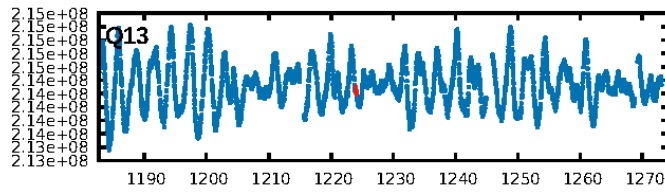
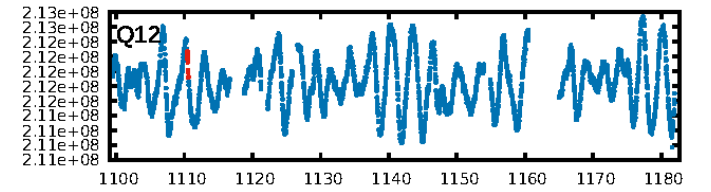
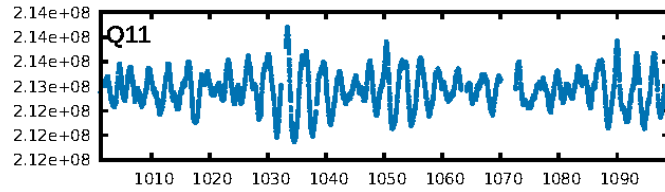
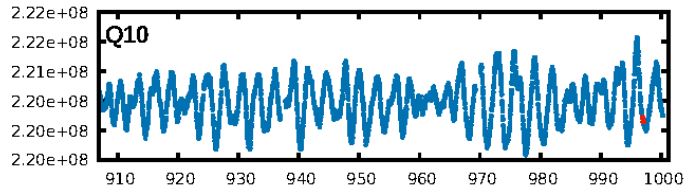
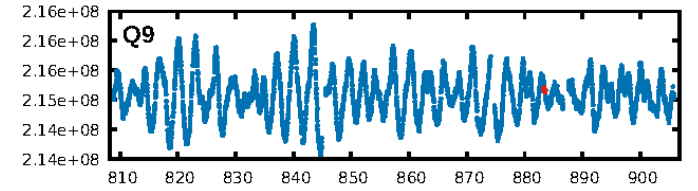
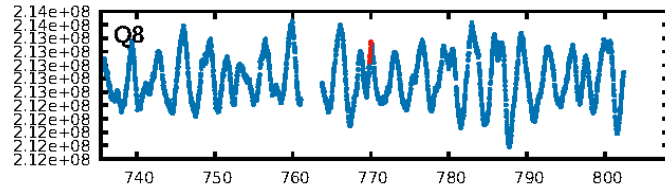
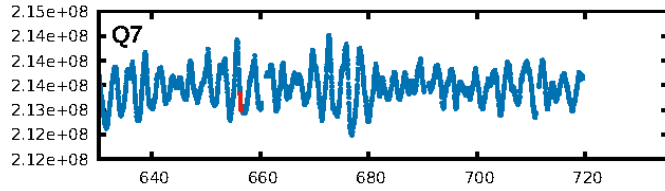
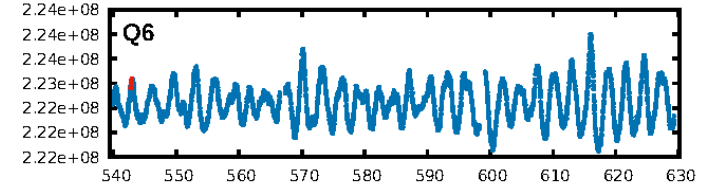
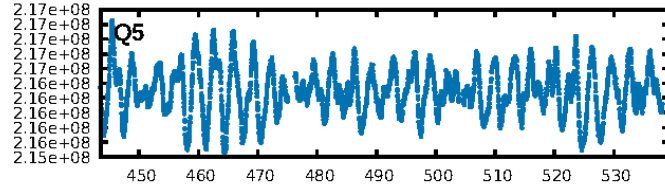
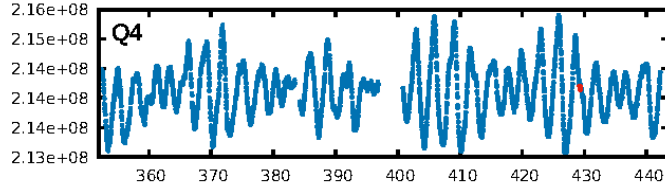
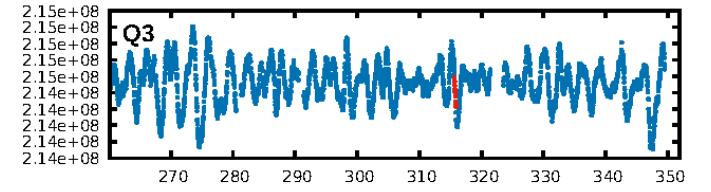
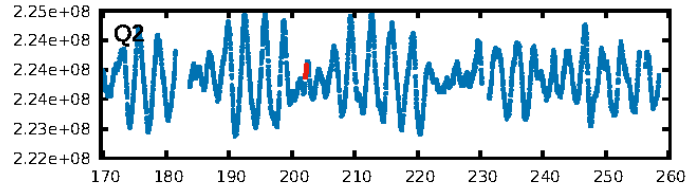
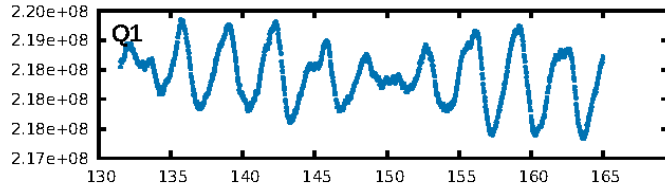
Period = 113.53482 [0.00160] d  
Epoch = 202.2425 [0.0107] BKJD  
Rp/R\* = 0.0162 [0.0389]  
a/R\* = 154.88 [2327.46]  
b = 0.88 [3.87]  
Seff = 35.60 [16.20]  
Teff = 623 [71] K  
Rp = 3.48 [8.42] Re  
a = 0.5002 [0.1390] AU  
Ag = 7276.72 [35170.11] [0.21 $\sigma$ ]  
Teffp = 8895 [10708] K [0.77 $\sigma$ ]

## DV Diagnostic Results:

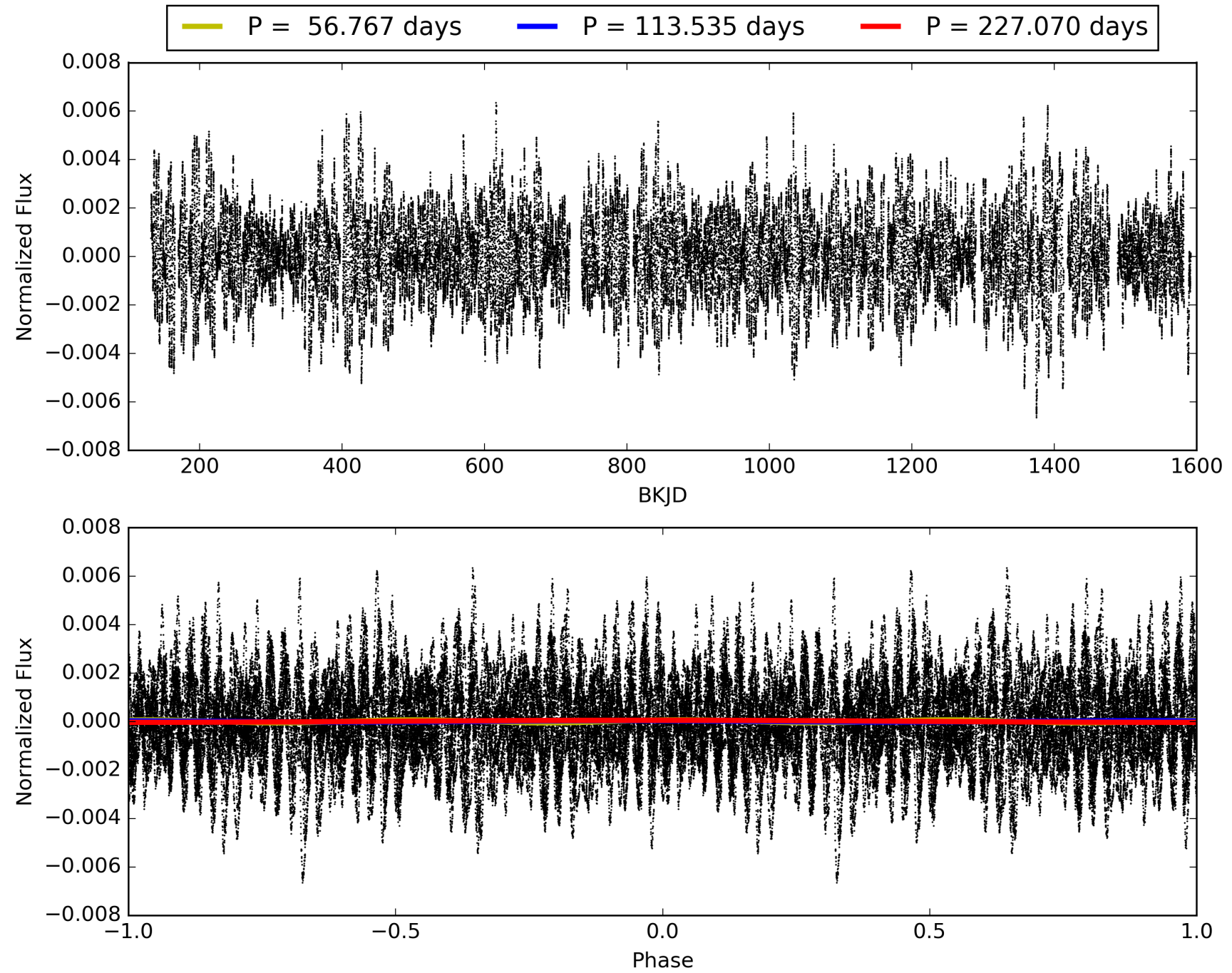
ShortPeriod-sig: 100.0% [36.20 $\sigma$ ]  
LongPeriod-sig: 100.0% [173.12 $\sigma$ ]  
ModelChiSquare2-sig: 7.0%  
ModelChiSquareGof-sig: 99.7%  
**Bootstrap-pfa: 4.47e-11**  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: 0.203  
Centroid-sig: N/A  
Centroid-so: 1.237 arcsec [1.71 $\sigma$ ]  
OotOffset-rm: 0.128 arcsec [0.14 $\sigma$ ]  
KicOffset-rm: 0.298 arcsec [0.31 $\sigma$ ]  
OotOffset-st: 3/3/2/3 [11]  
KicOffset-st: 3/3/2/3 [11]  
DiffImageQuality-fgm: 0.45 [5/11]  
DiffImageOverlap-fno: 0.27 [3/11]



# TCE 007818940-04, PDC Light Curves

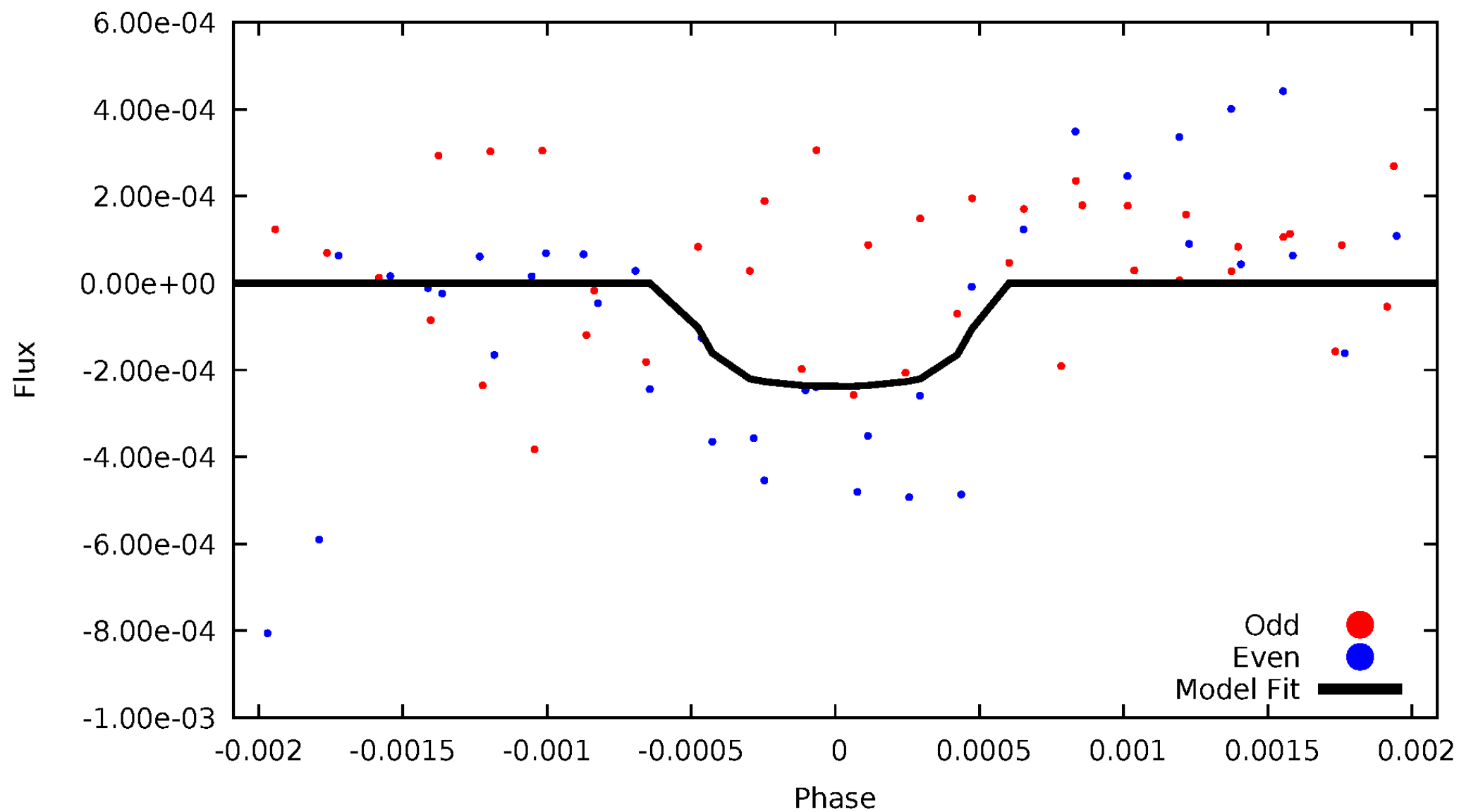


TCE 007818940-04



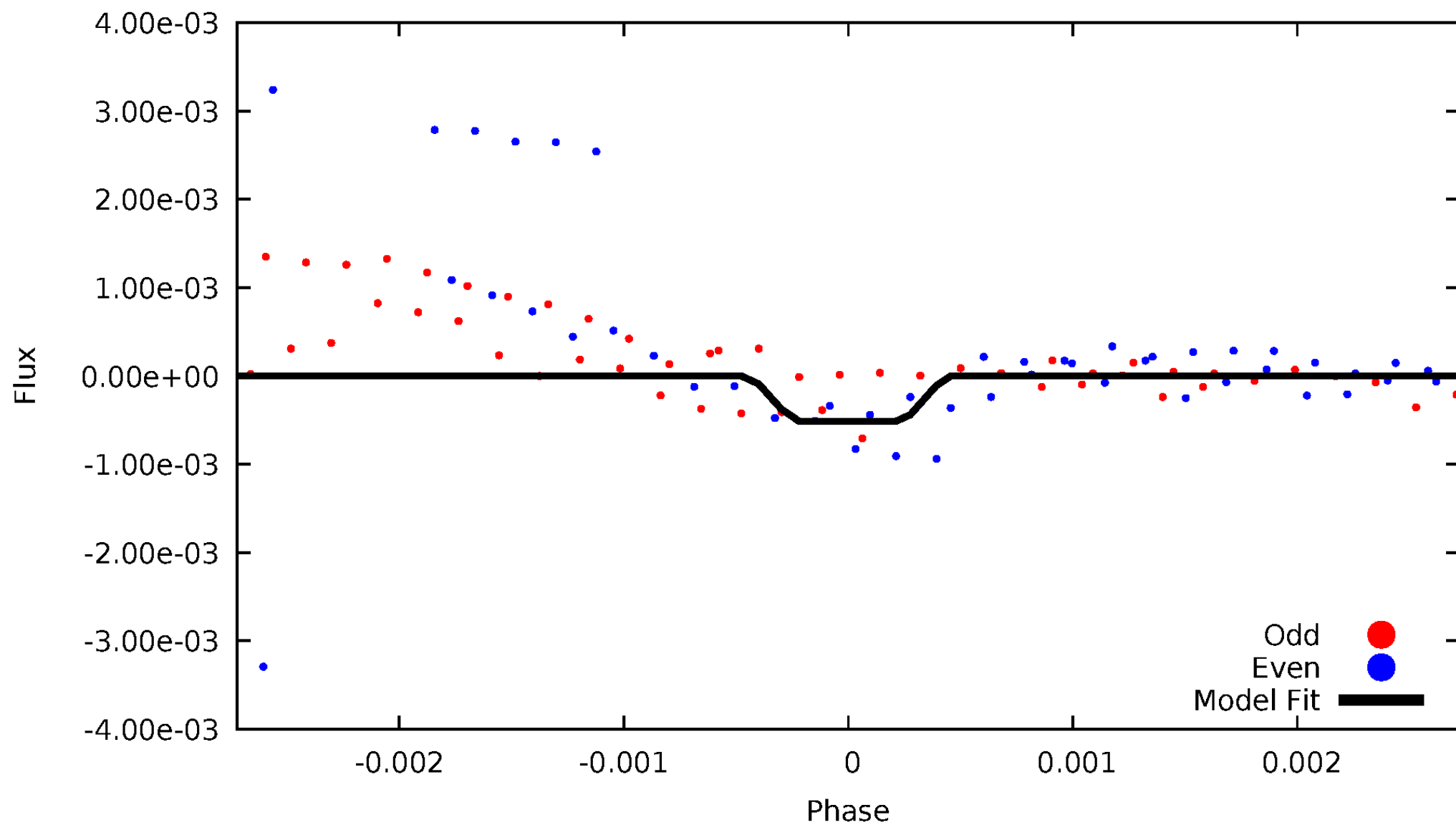
# DV Odd/Even

TCE 007818940-04



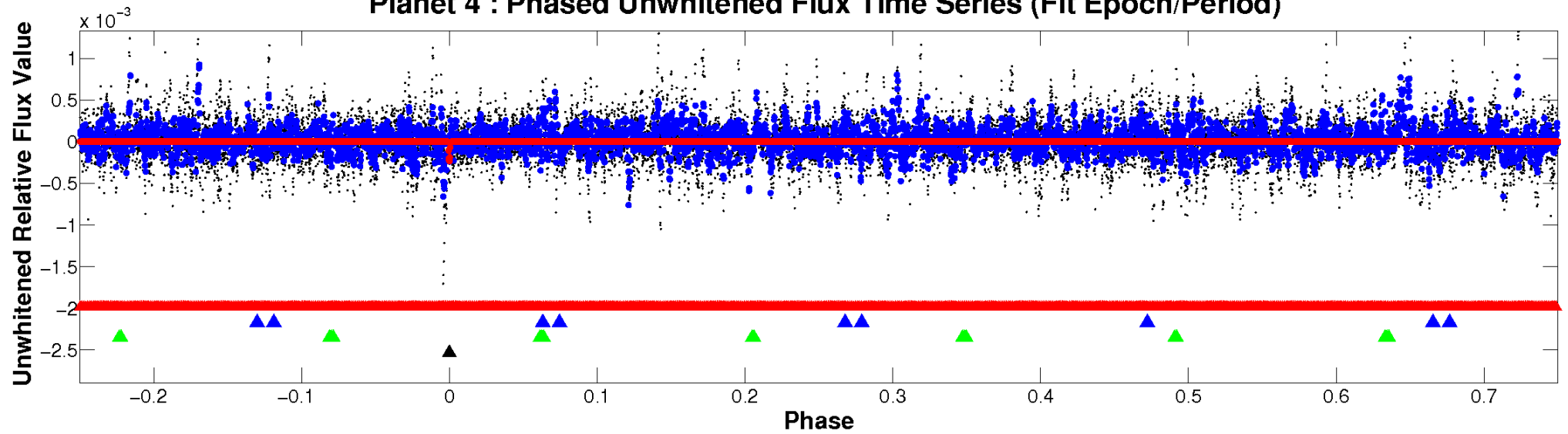
# ALT Odd/Even

TCE 007818940-04

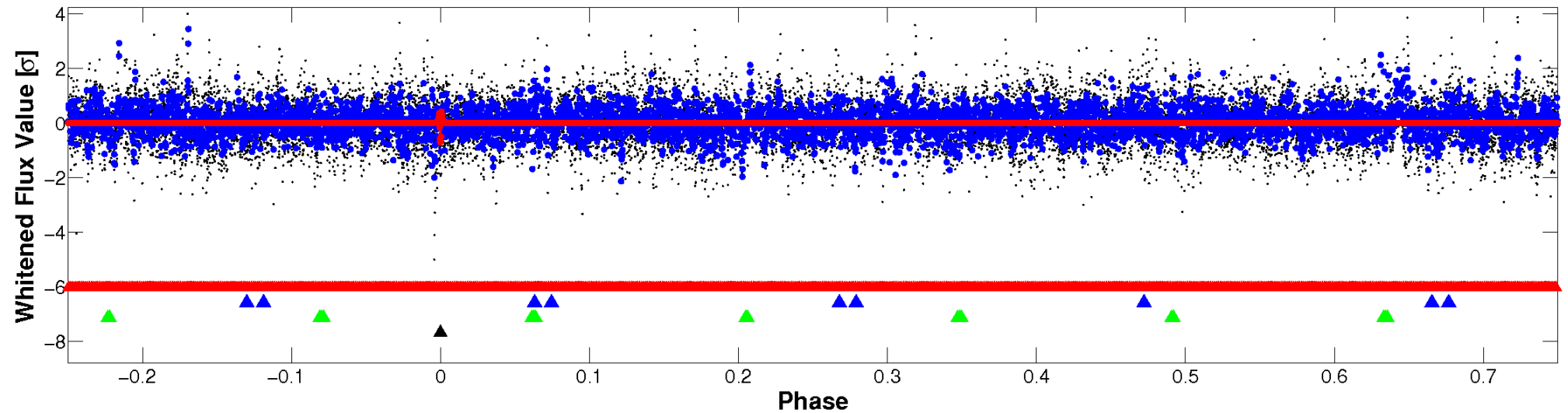


# Non-Whitened Vs. Whitened Light Curve

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

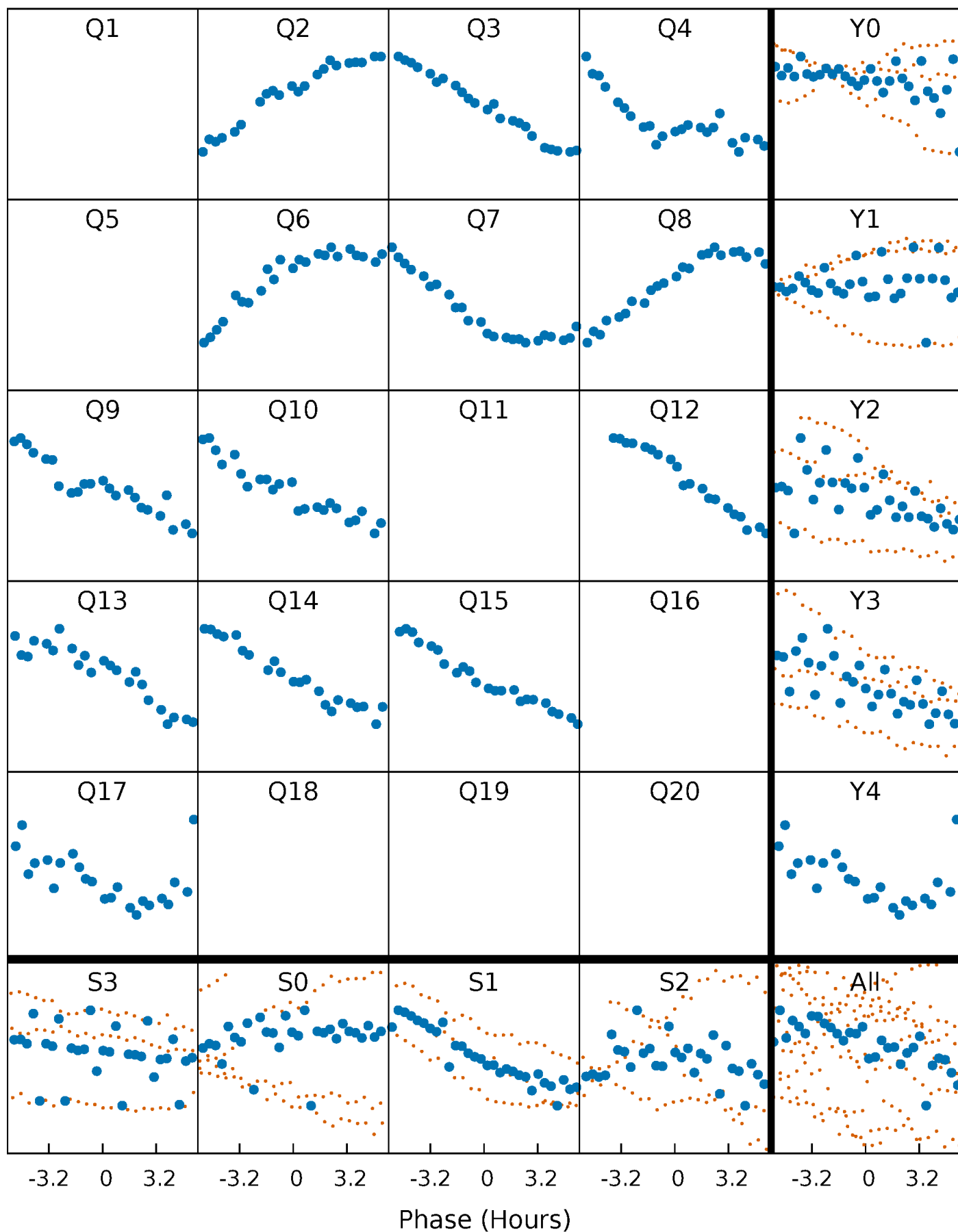


**Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



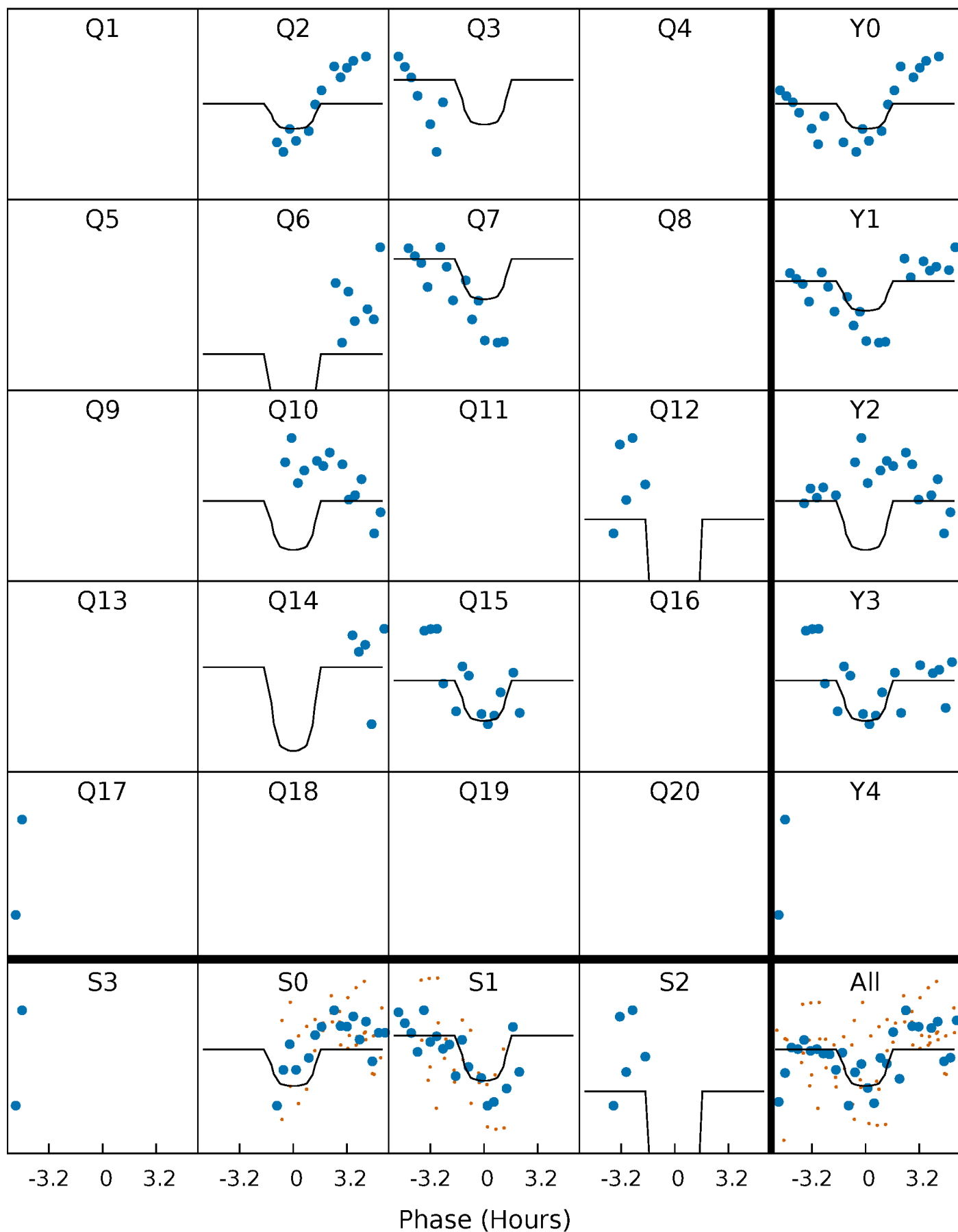
# PDC Quarter-Phased Transit Curves

TCE 007818940-04 P=113.534821 Days  $T_0=202.242522$  (BKJD)



# DV Quarter-Phased Transit Curves

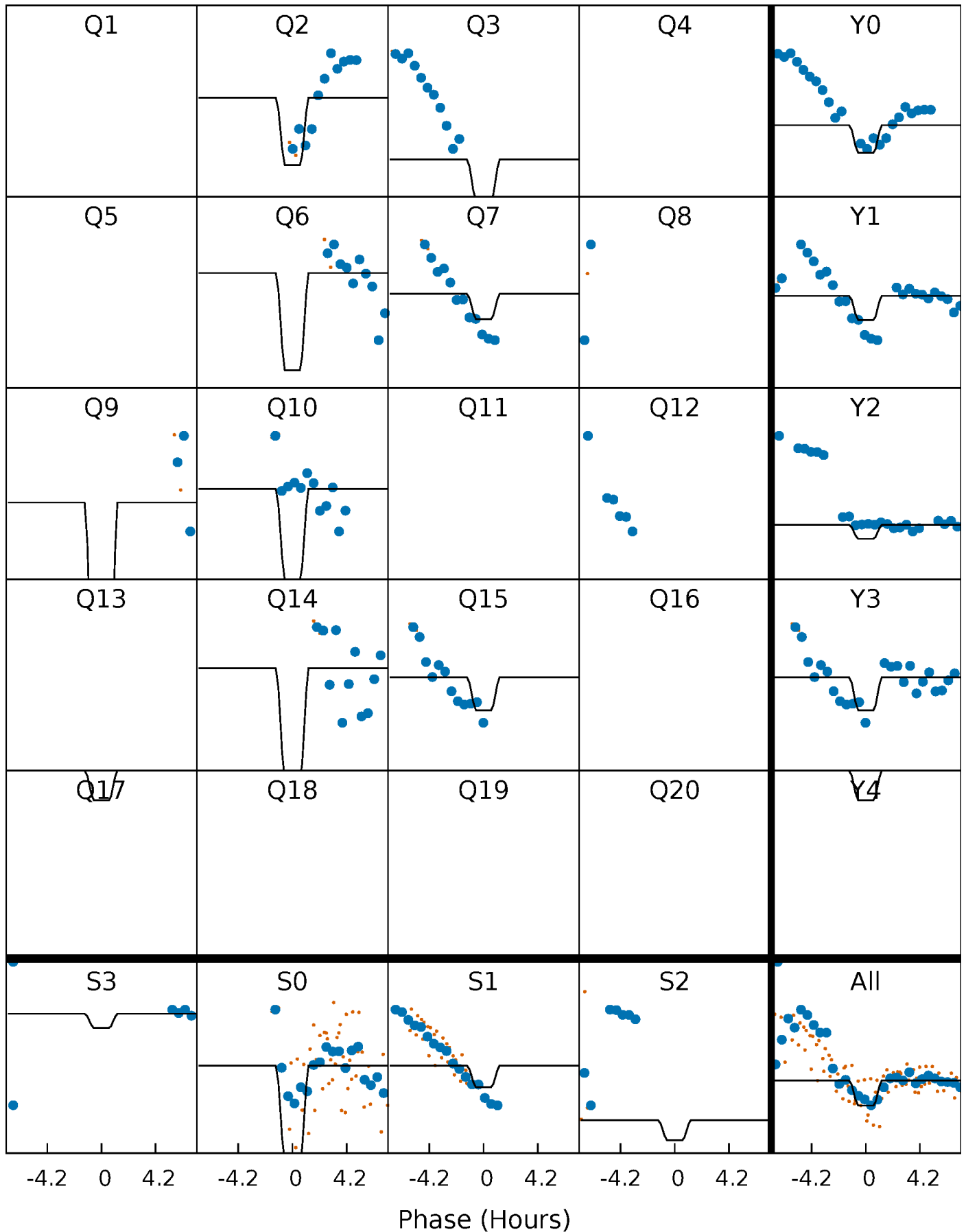
TCE 007818940-04 P=113.534821 Days  $T_0=202.242522$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

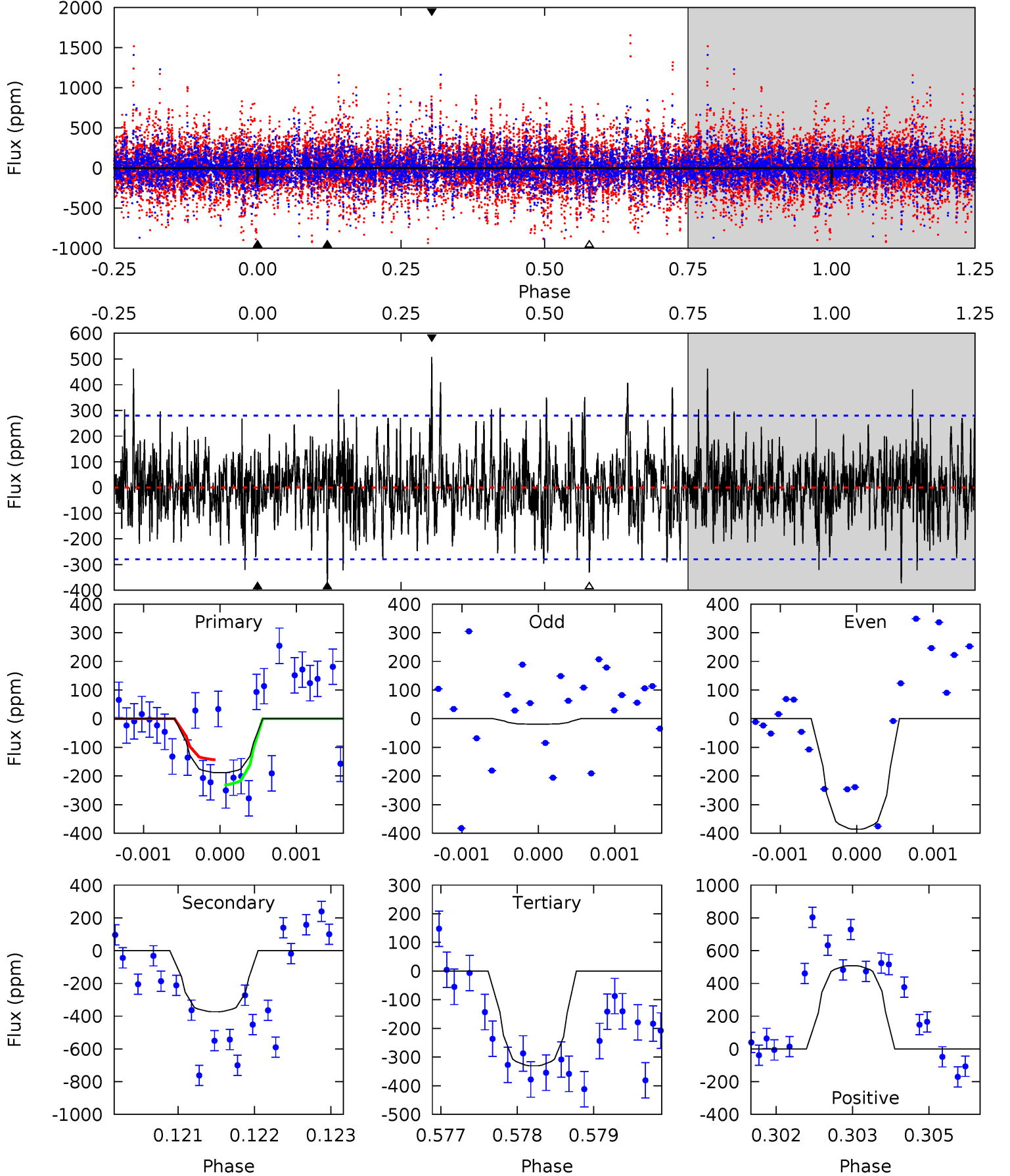
TCE 007818940-04 P=113.545794 Days  $T_0=202.203596$  (BKJD)



# DV Model-Shift Uniqueness Test

007818940-04, P = 113.534821 Days, E = 88.707701 Days

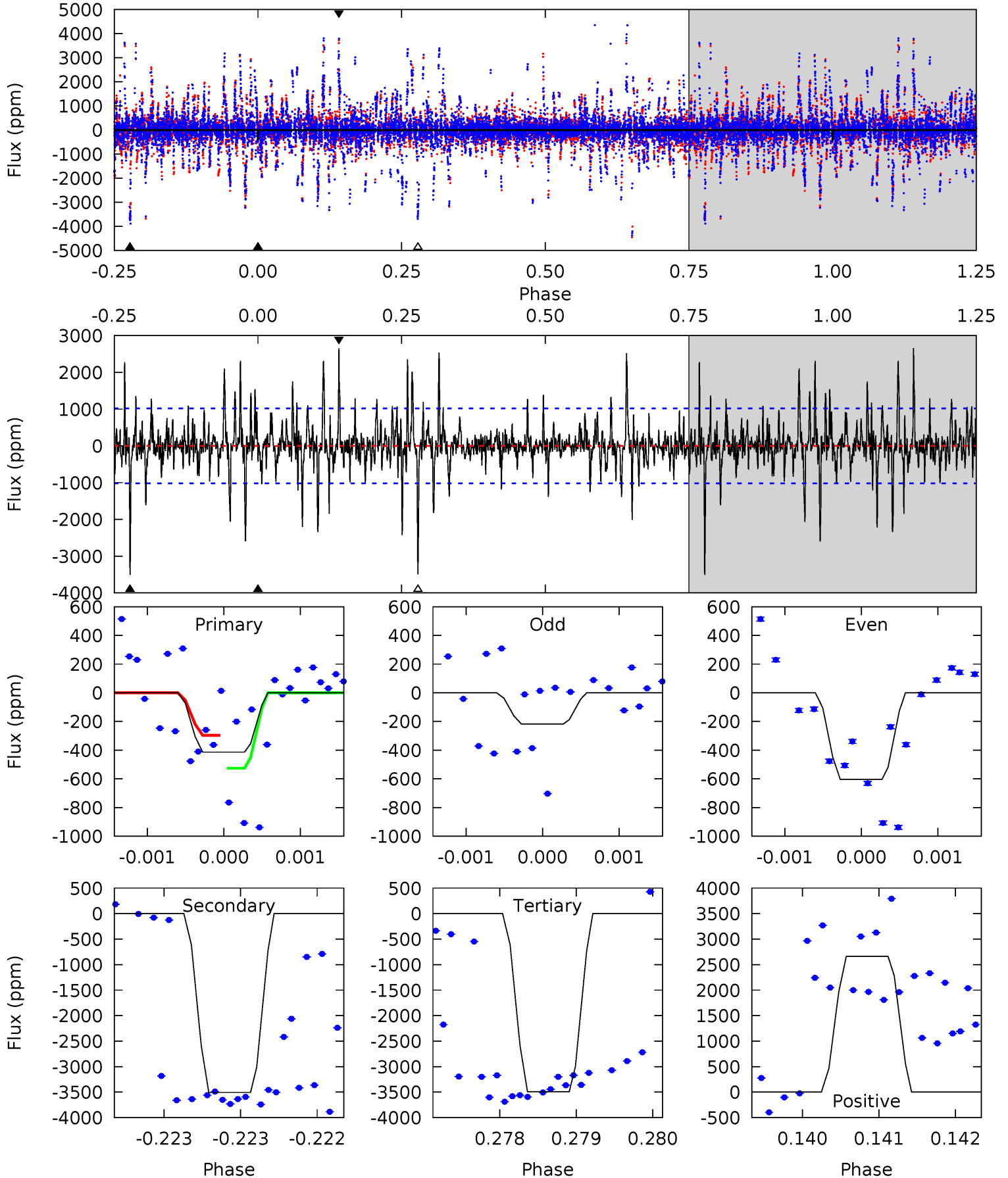
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3.66	7.25	6.42	9.87	5.44	3.27	2.01	-2.76	-6.21	0.83	-2.63	3.47	0.74	0.58	0.86



# Alt Model-Shift Uniqueness Test

007818940-04, P = 113.545794 Days, E = 88.657802 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
2.23	18.9	18.8	14.3	5.49	3.36	2.63	-16.6	-12.1	0.08	4.56	0.86	0.93	0.43	0.63



### Stellar Parameters For KIC 007818940

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (g \cdot \text{cm}^{-3})$
	$7118^{+193}_{-236}$	$3.962^{+0.252}_{-0.108}$	$-0.500^{+0.300}_{-0.250}$	$1.968^{+0.393}_{-0.589}$	$1.294^{+0.221}_{-0.181}$	$0.239^{+0.344}_{-0.092}$
	+3%/-3%	+6%/-3%	+60%/-50%	+20%/-30%	+17%/-14%	+144%/-38%
Source	PHO1	FLK73	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 007818940-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-373 \pm 51$	$7.03^{+7.02}_{-4.88}$	$858^{+56}_{-64}$	$5353^{+5324}_{-1254}$	$1055^{+8784}_{-793}$
Alt.	$-3507 \pm 185$	$7.47^{+7.92}_{-5.05}$	$861^{+57}_{-73}$	$9547^{+19882}_{-3190}$	$8465^{+73258}_{-6342}$

$T_{max}$  = 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

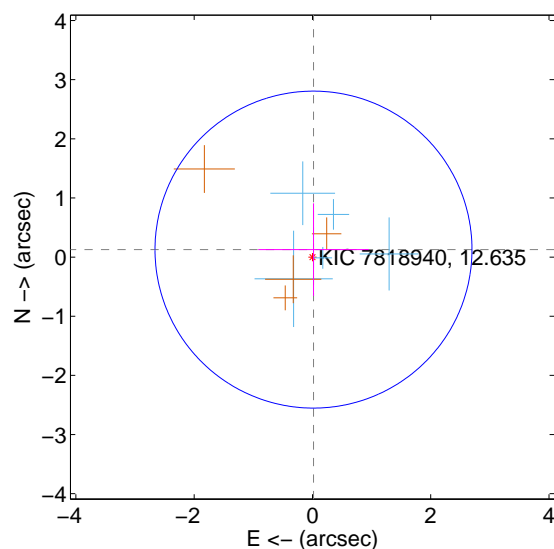
Supplemental centroid analysis for 007818940-04. Kepler magnitude: 12.63. Transit SNR 3.11

There are 5 quarters with good PRF difference image offsets

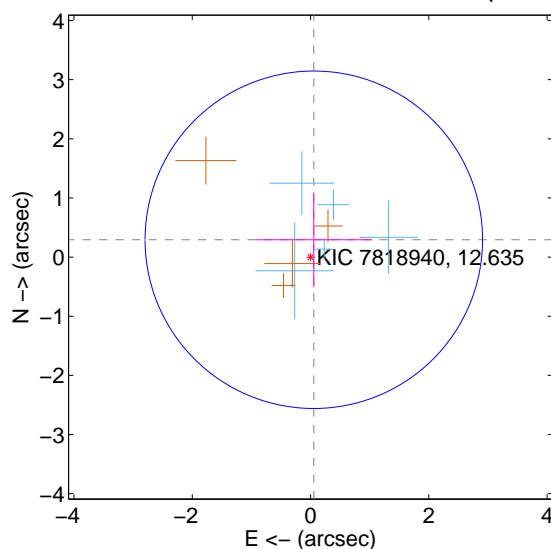
The direct PRF centroid is offset from the target star catalog position by about 0.28 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.128 \pm 0.893$	0.14	$-0.018 \pm 0.935$	$0.127 \pm 0.782$
PRF-fit source offset from KIC position	$0.298 \pm 0.951$	0.31	$-0.056 \pm 0.982$	$0.293 \pm 0.801$
photometric centroid source offset	$1.24 \pm 0.72$	1.71	$-0.06 \pm 0.85$	$1.24 \pm 0.72$

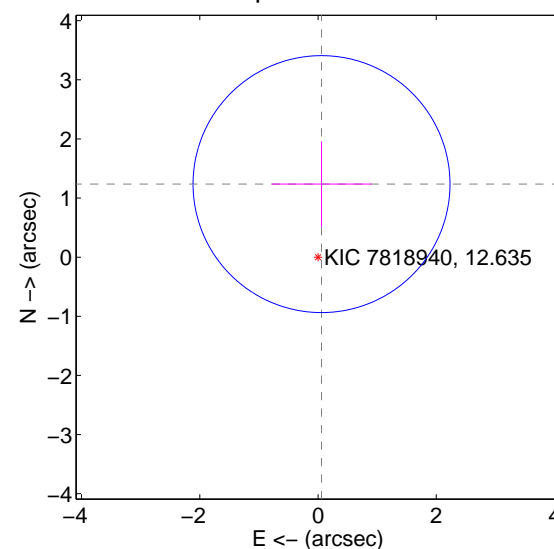
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

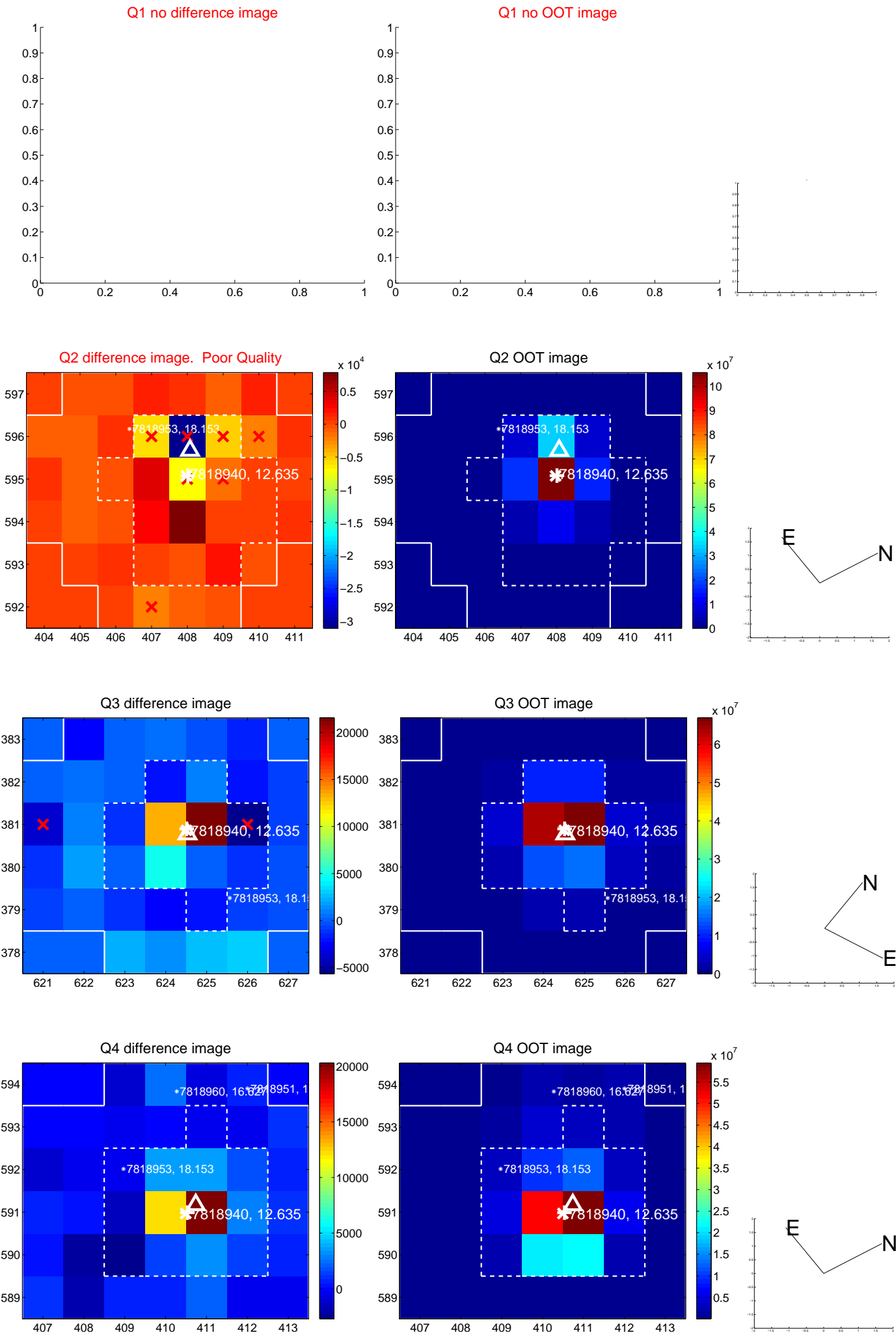


offset from photometric centroids

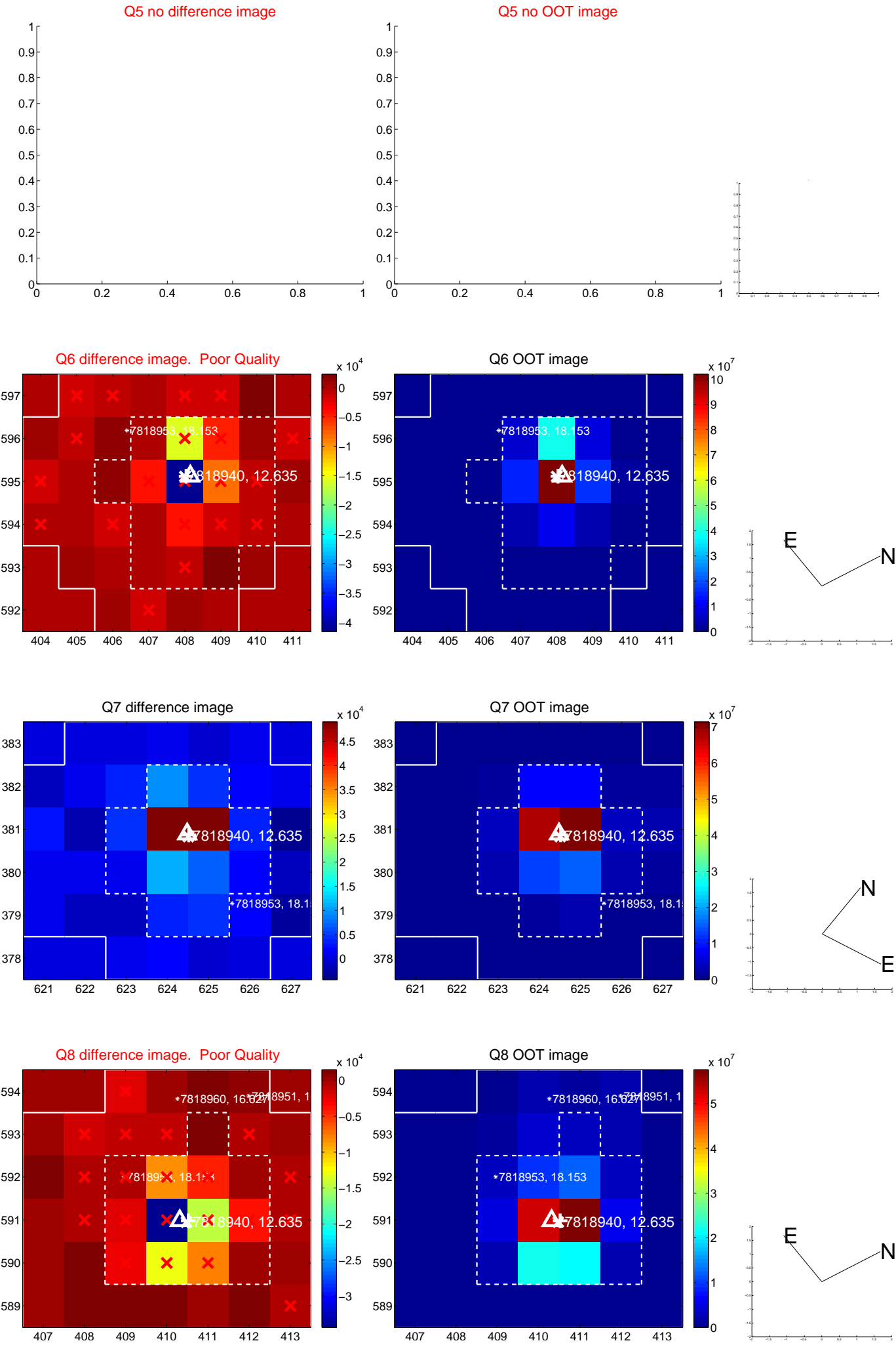


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

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

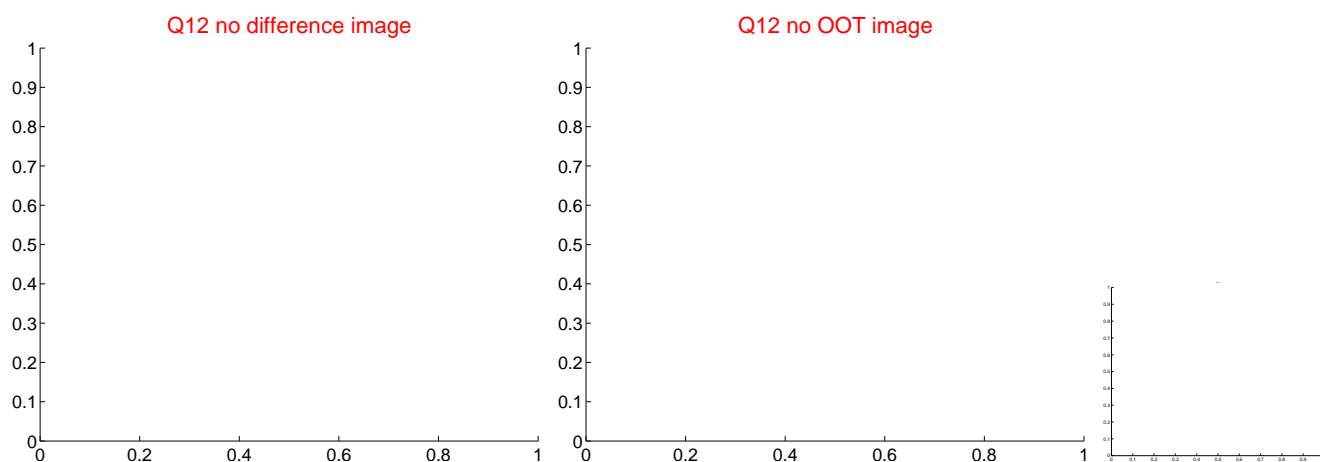
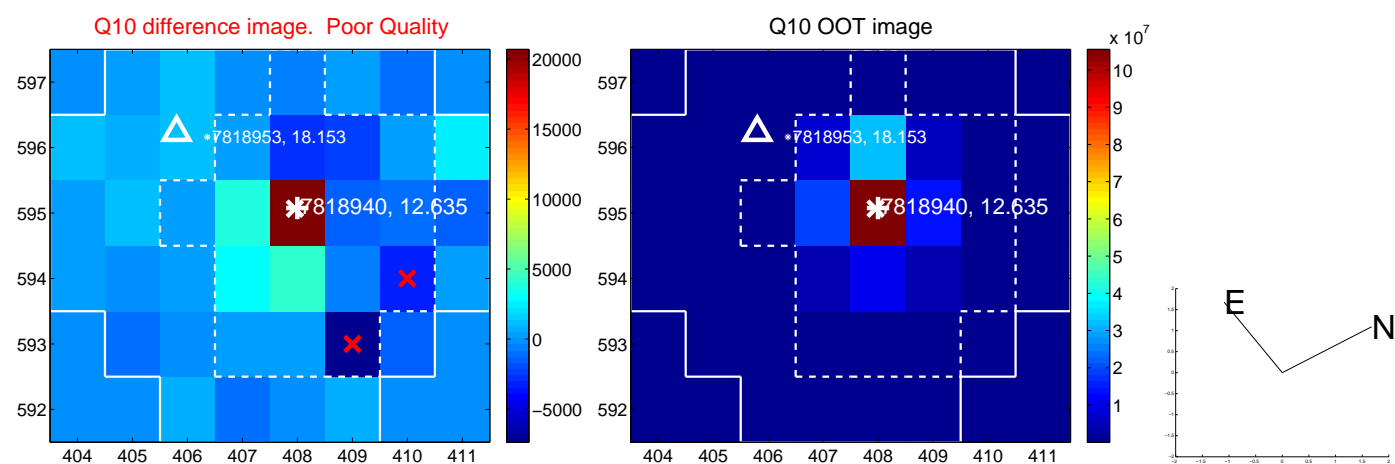
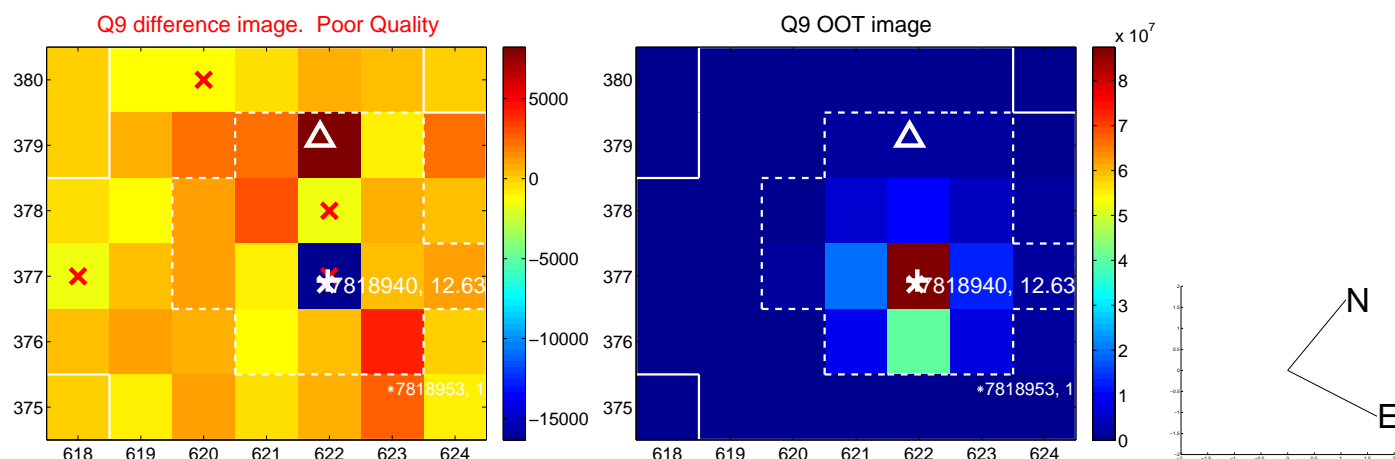


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

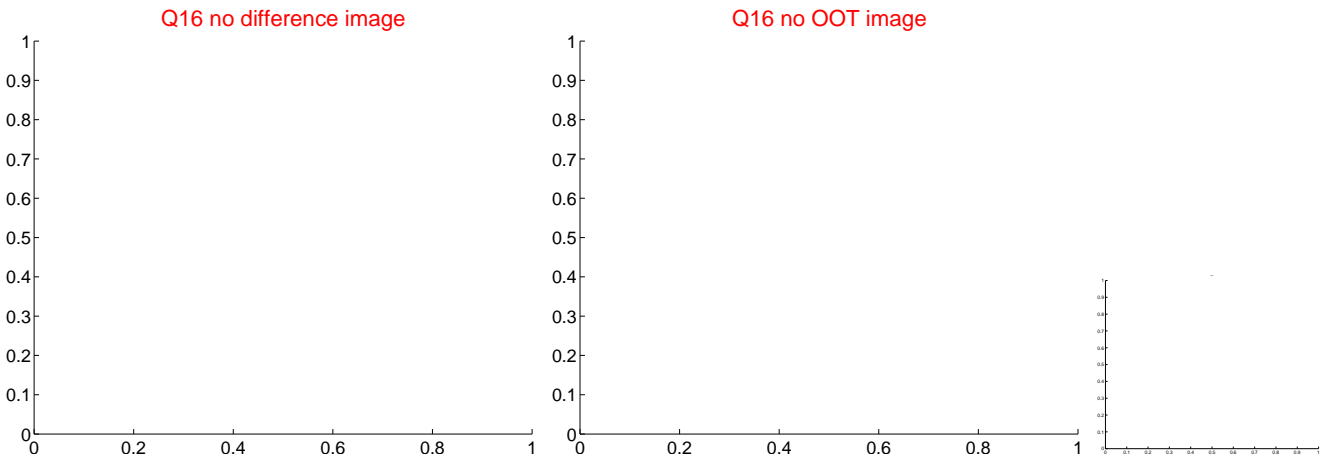
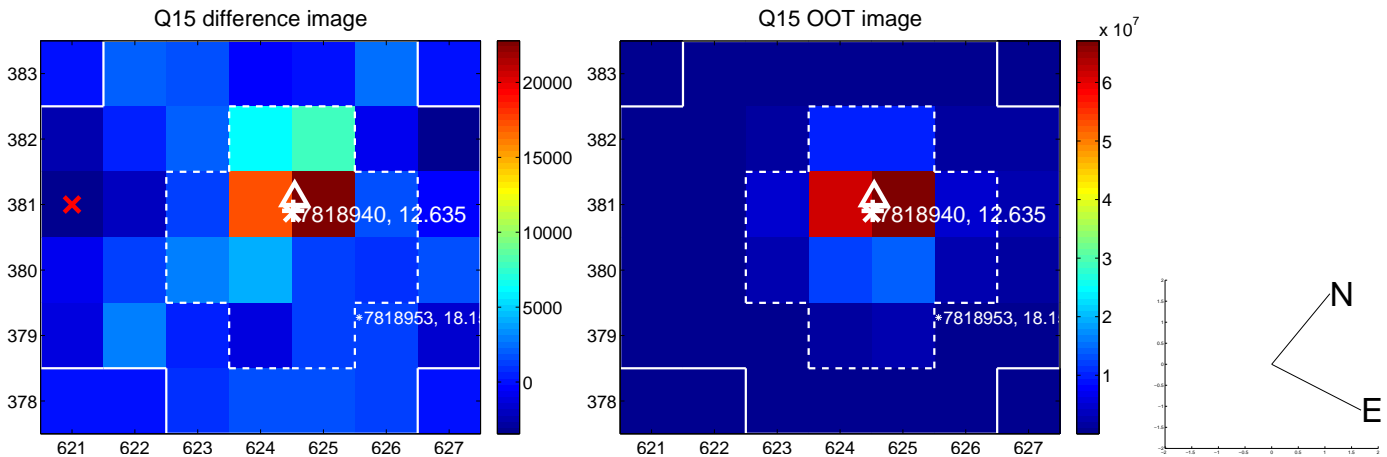
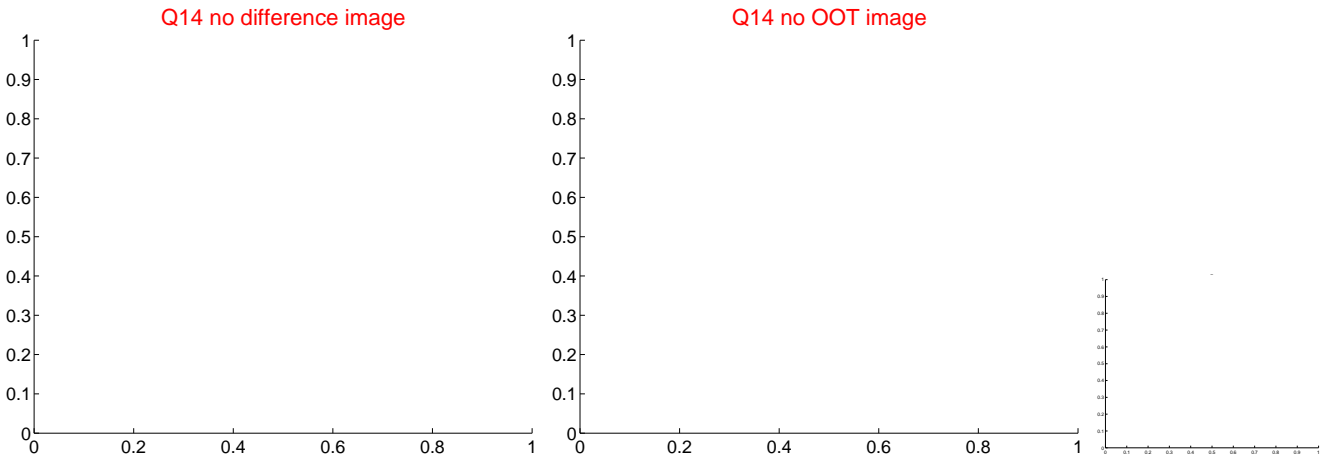
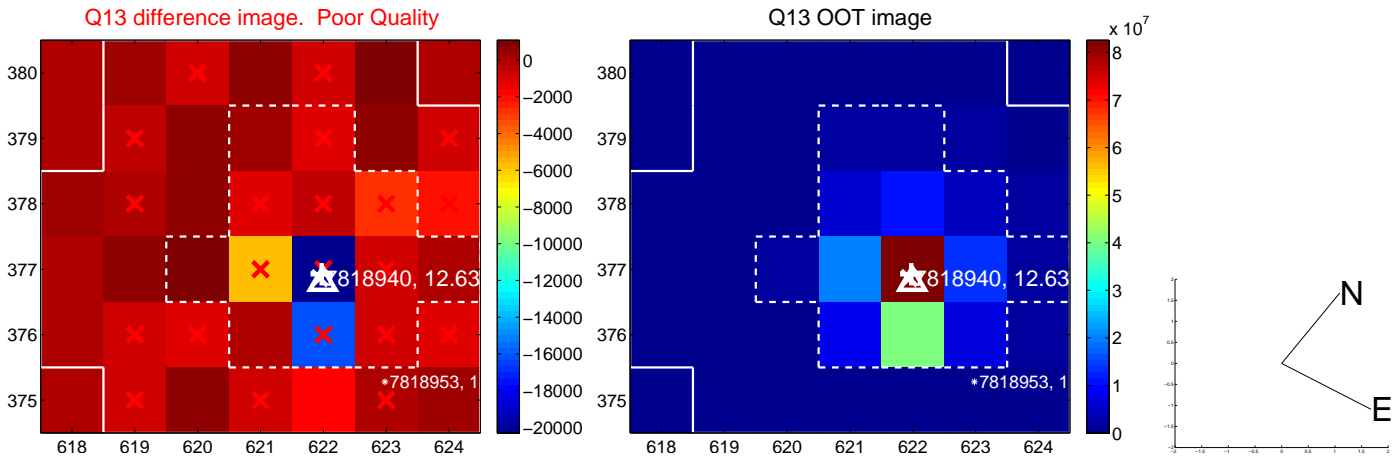




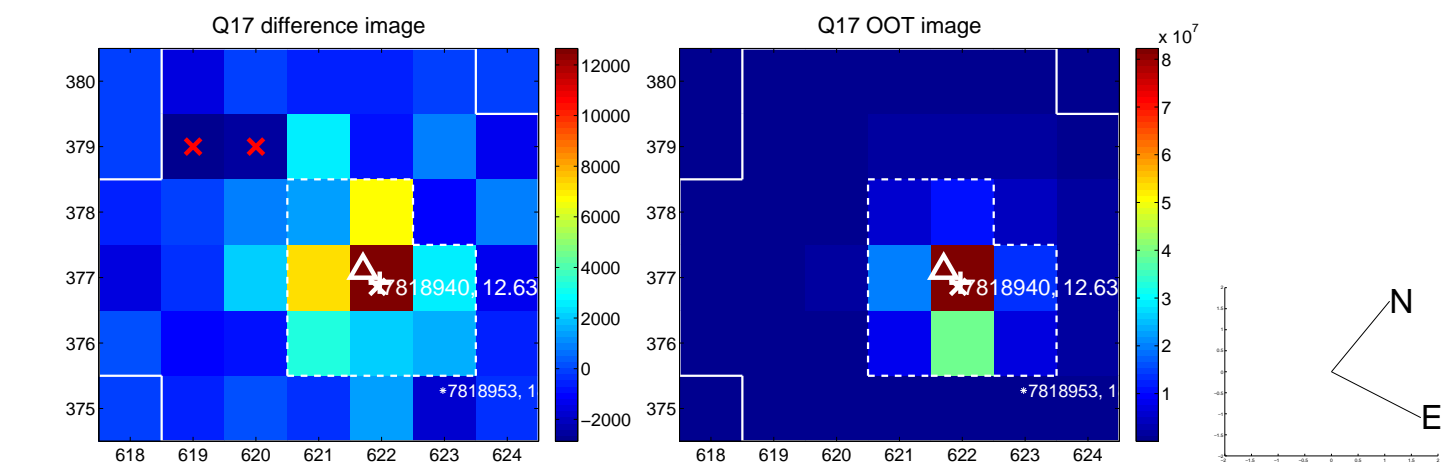
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



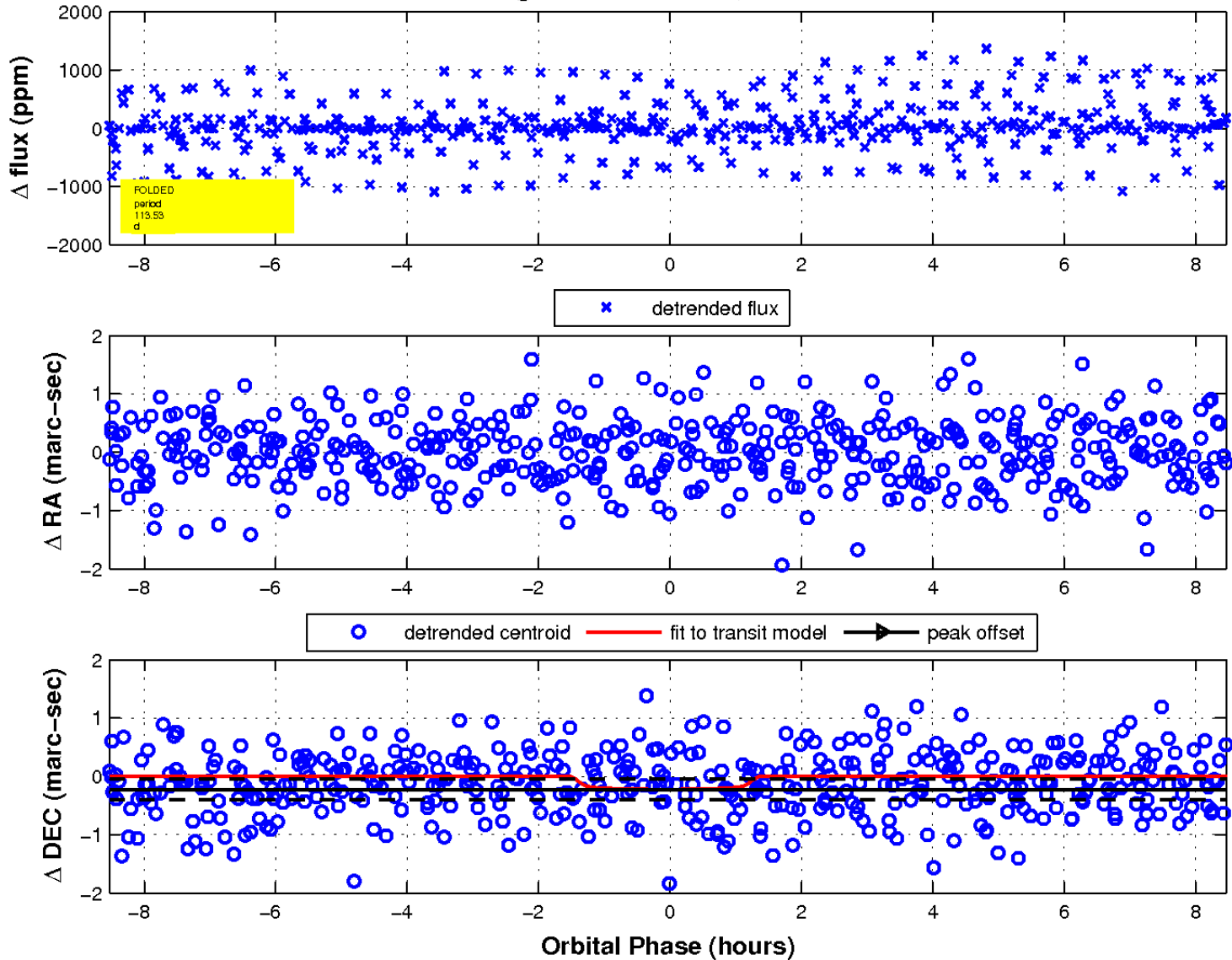
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 4 of 4



UKIRT Image

Declination

