

KIC 004816098

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})
004816098-01	OBS	No	0.936766	132.138474	29.1	6.427	8.4	4.5	1.22	6232	0.70	5033.29
004816098-02	OBS	No	41.956216	161.486583	1732.8	4.368	10.0	9.4	1.22	6232	9.56	31.64

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004816098-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—CENT_SATURATED
004816098-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—CENT_SATURATED

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

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

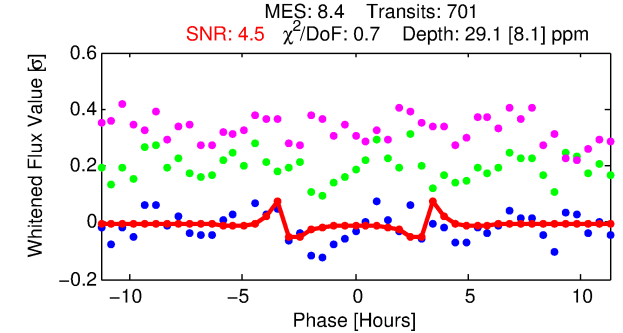
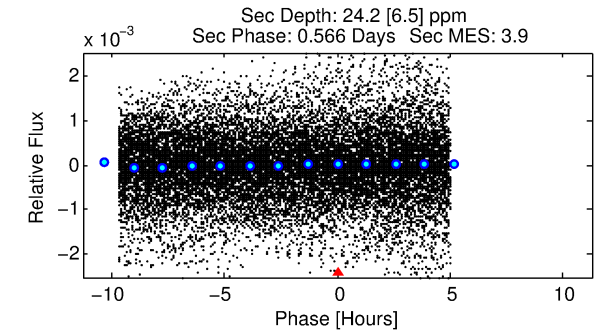
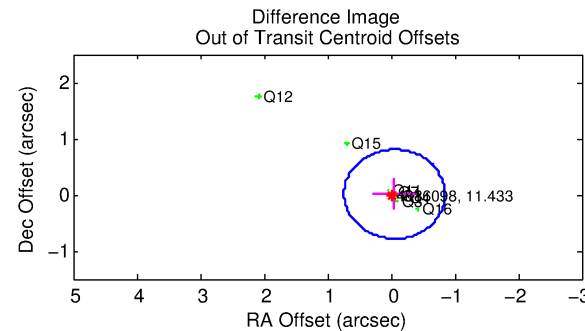
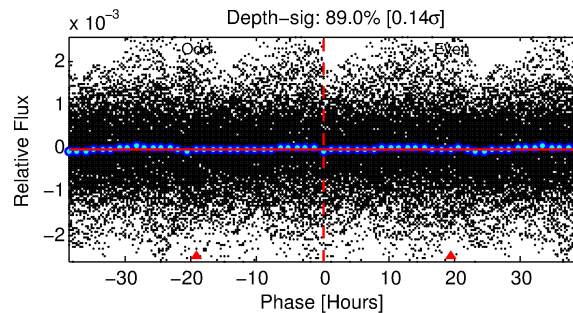
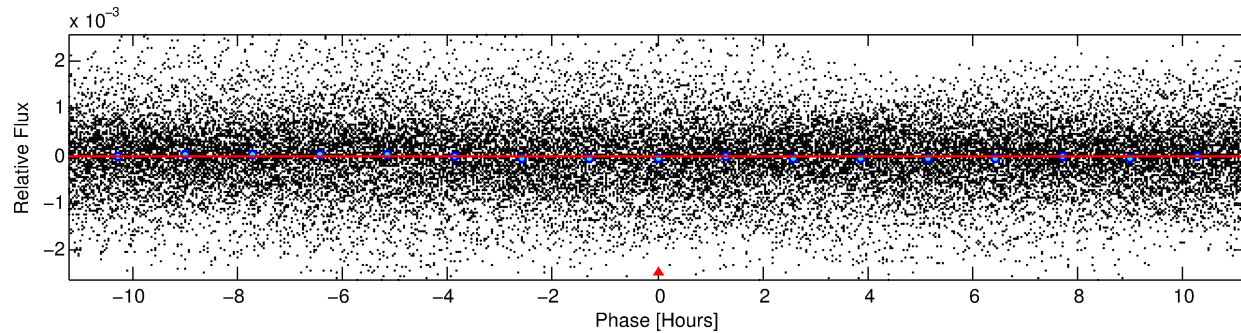
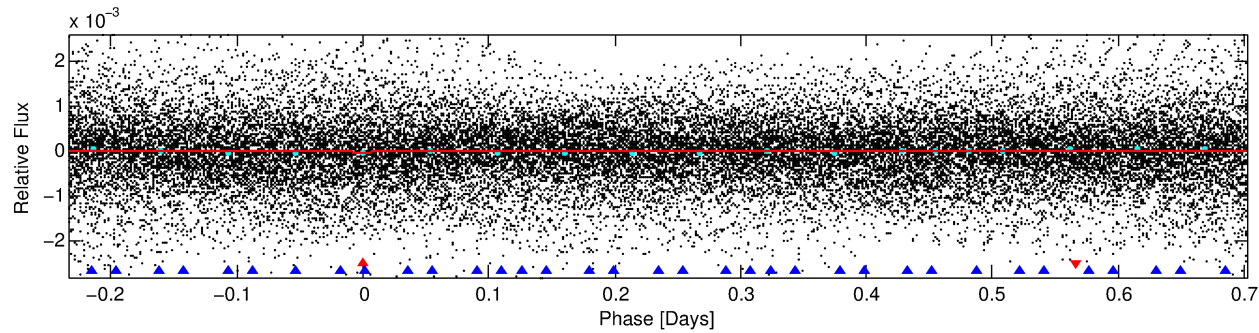
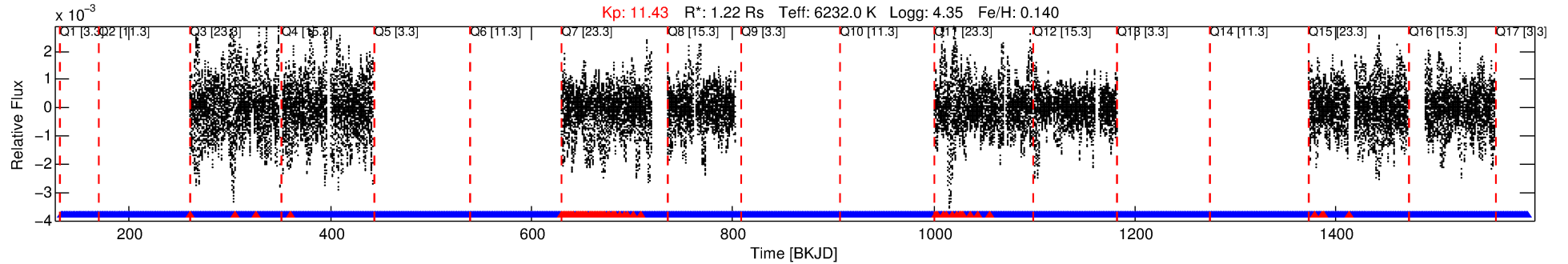
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 004816098-01

No Significant Match Found

DV One-Page Summary

KIC: 4816098 Candidate: 1 of 2 Period: 0.937 d



DV Fit Results:

Period = 0.93677 [0.00002] d
Epoch = 132.1385 [0.0024] BKJD
 R_p/R^* = 0.0053 [0.0018]
 a/R^* = 1.16 [0.52]
 b = 0.69 [1.32]
 S_{eff} = 5033.29 [2147.55]
 T_{eq} = 2148 [229] K
 R_p = 0.70 [0.34] R_{e}
 a = 0.0199 [0.0055] AU
 A_g = 10.80 [9.05] [1.08 σ]
 T_{eff} = 6020 [1142] K [3.32 σ]

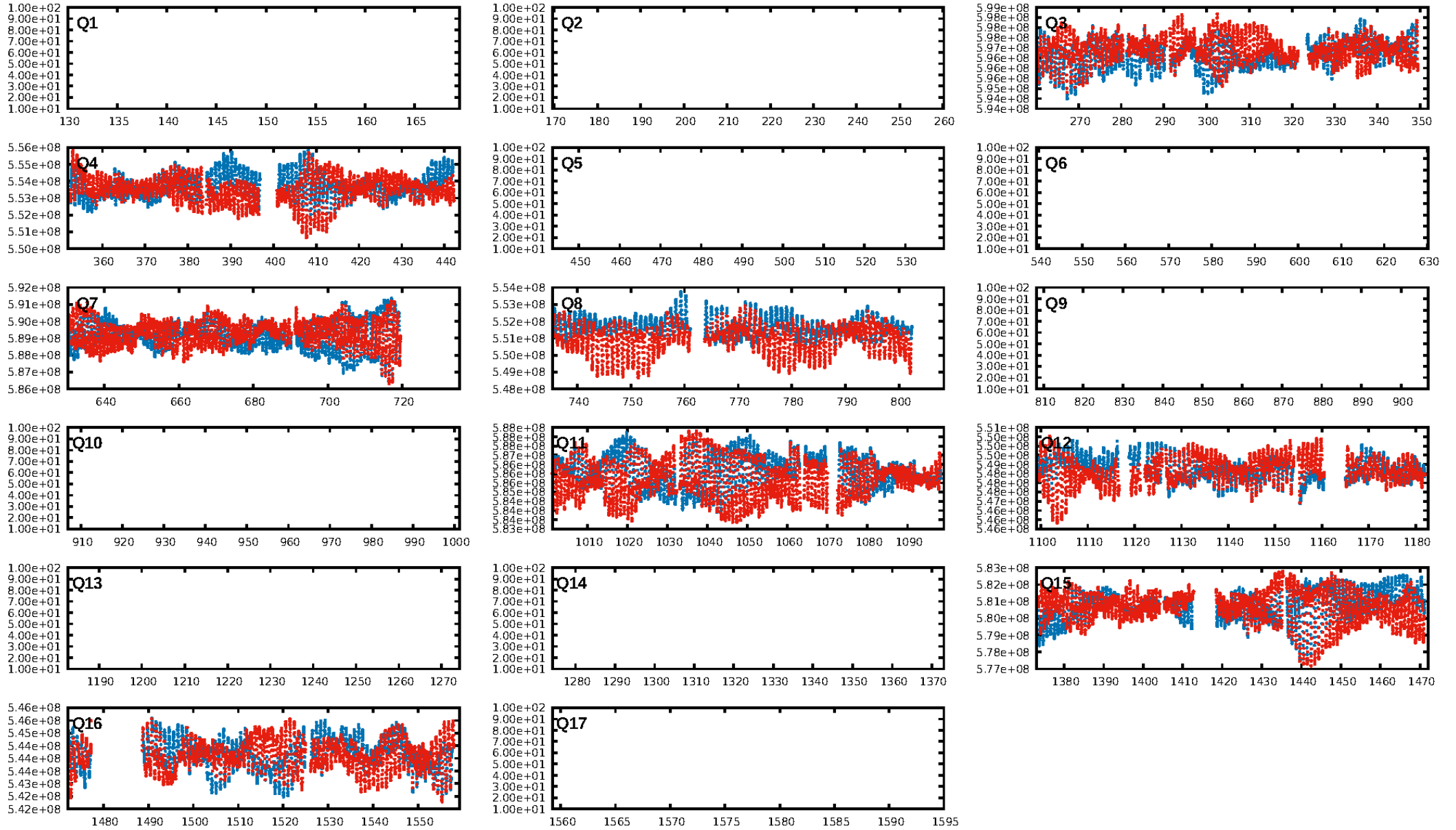
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [126.68 σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 1.67e-09
RollingBand-fgt: 0.90 [628/701]
GhostDiagnostic-chr: 2.18
Centroid-sig: 0.2%
Centroid-so: 0.942 arcsec [1.78 σ]
OotOffset-rm: 0.053 arcsec [0.20 σ]
KicOffset-rm: 0.161 arcsec [1.49 σ]
OotOffset-st: 0/4/4/0 [8]
KicOffset-st: 0/4/4/0 [8]
DiffImageQuality-fgm: 0.75 [6/8]
DiffImageOverlap-fno: 1.00 [8/8]

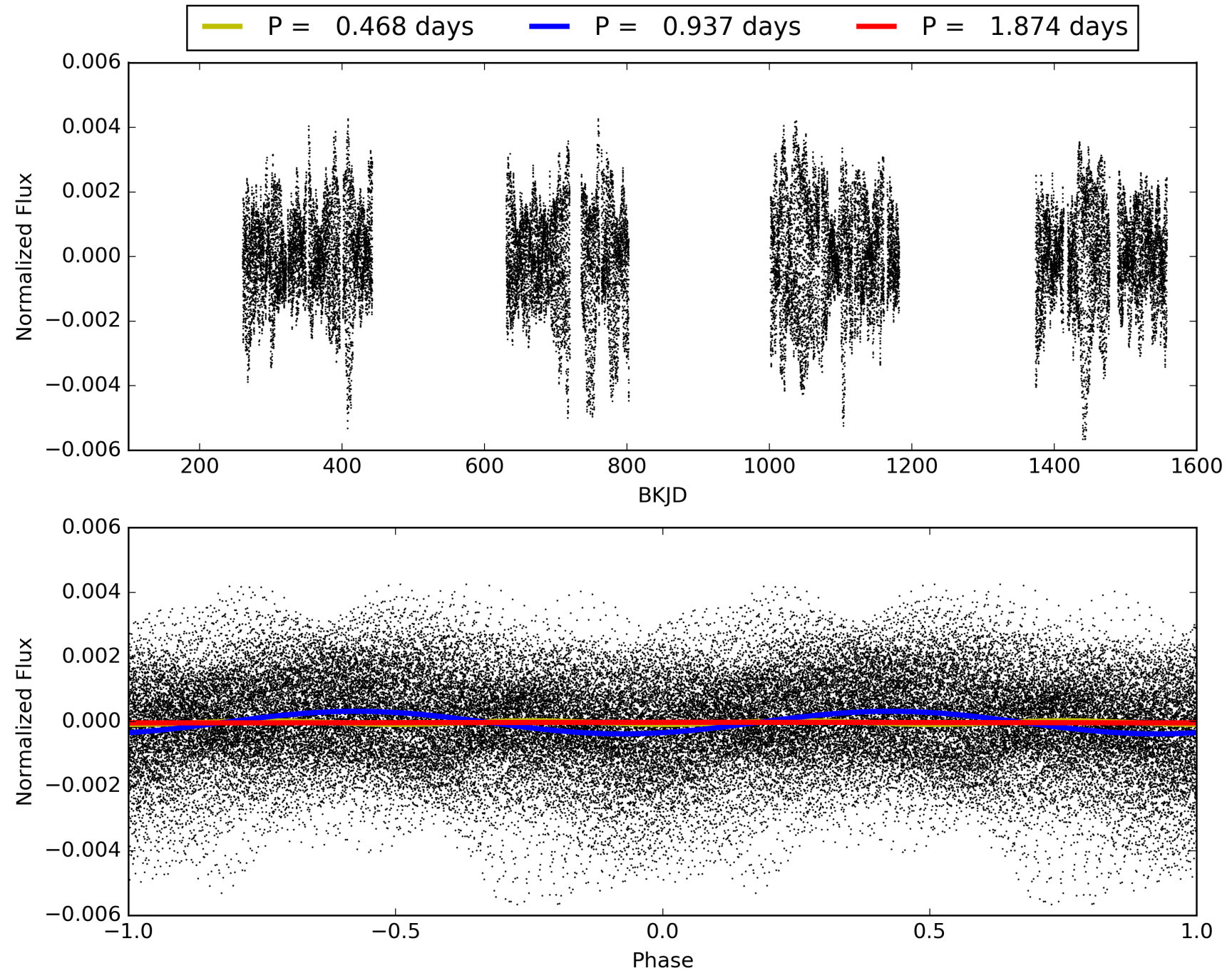
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 05:27:39 Z

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

TCE 004816098-01, PDC Light Curves

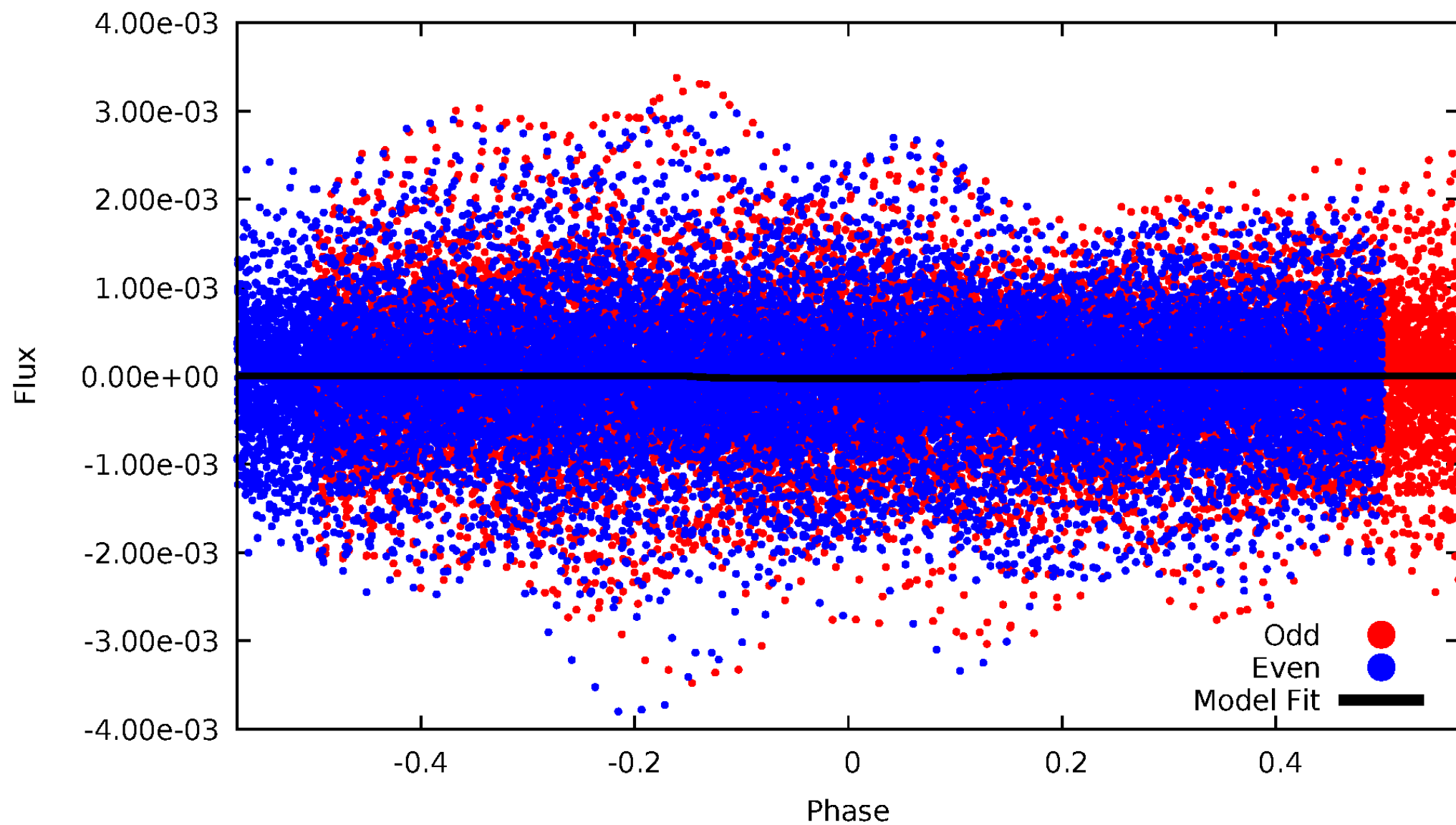


TCE 004816098-01



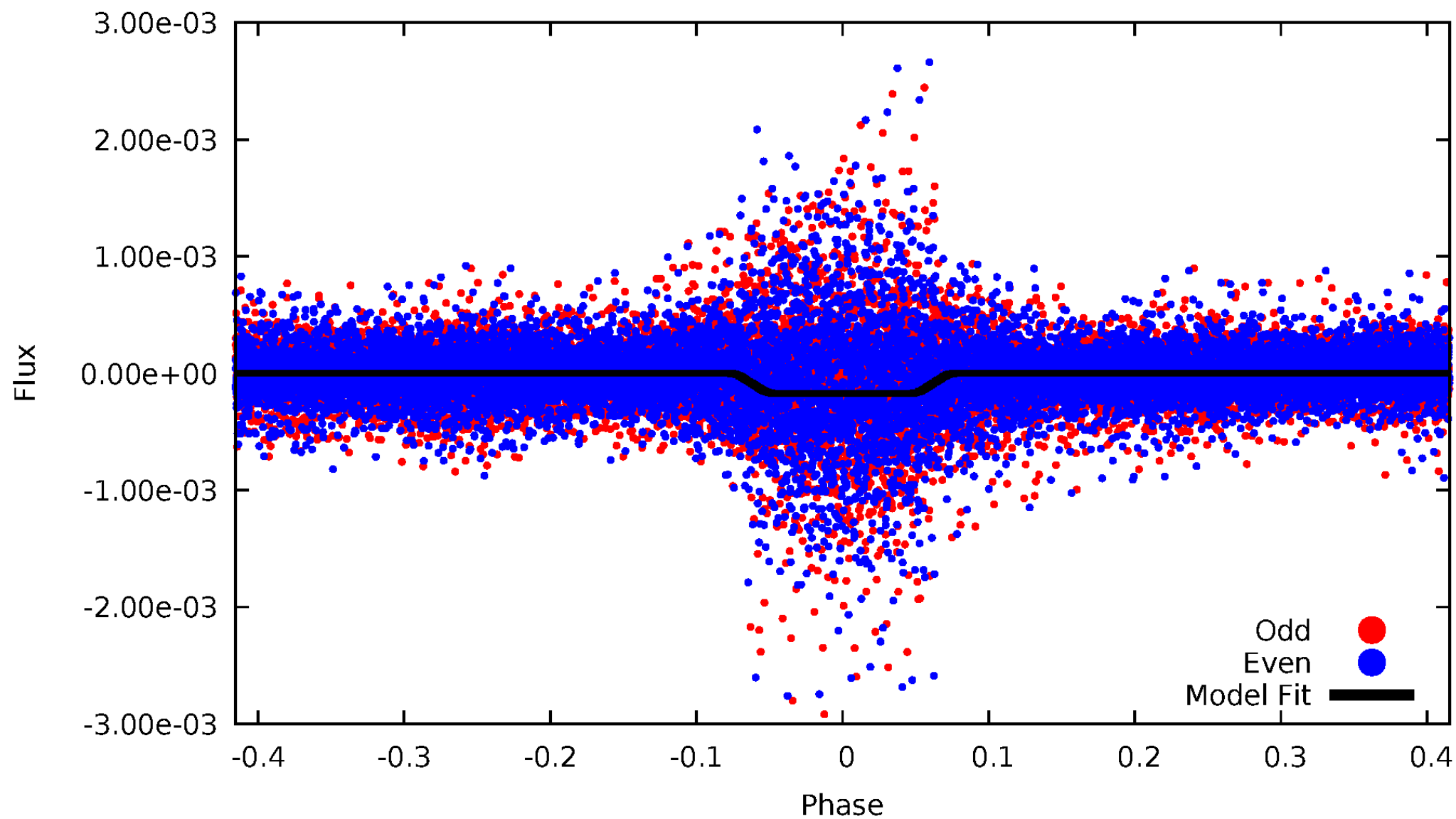
DV Odd/Even

TCE 004816098-01



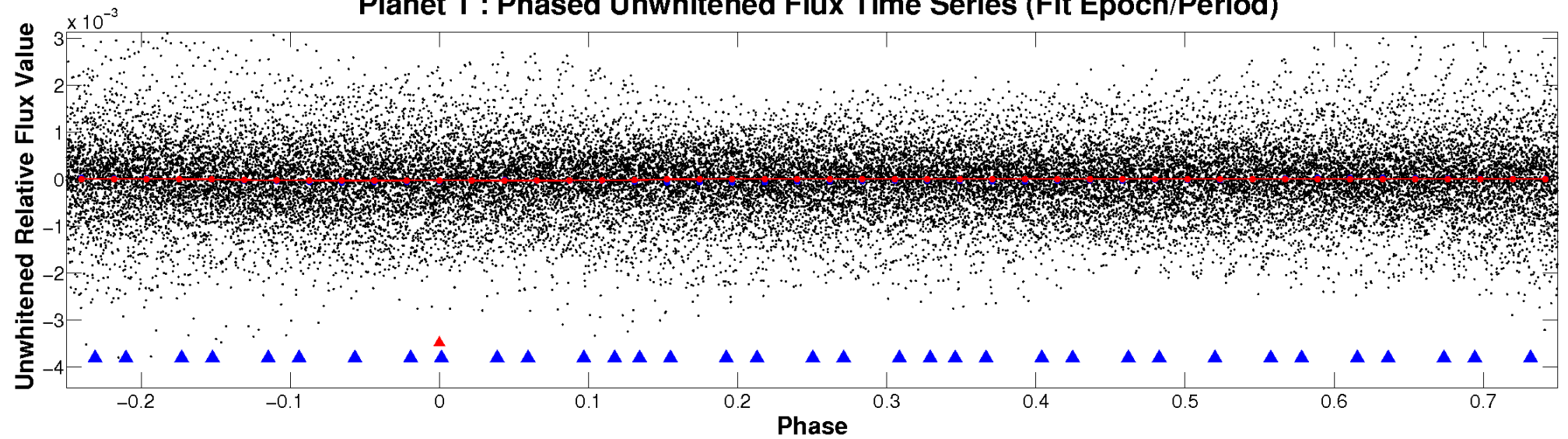
ALT Odd/Even

TCE 004816098-01

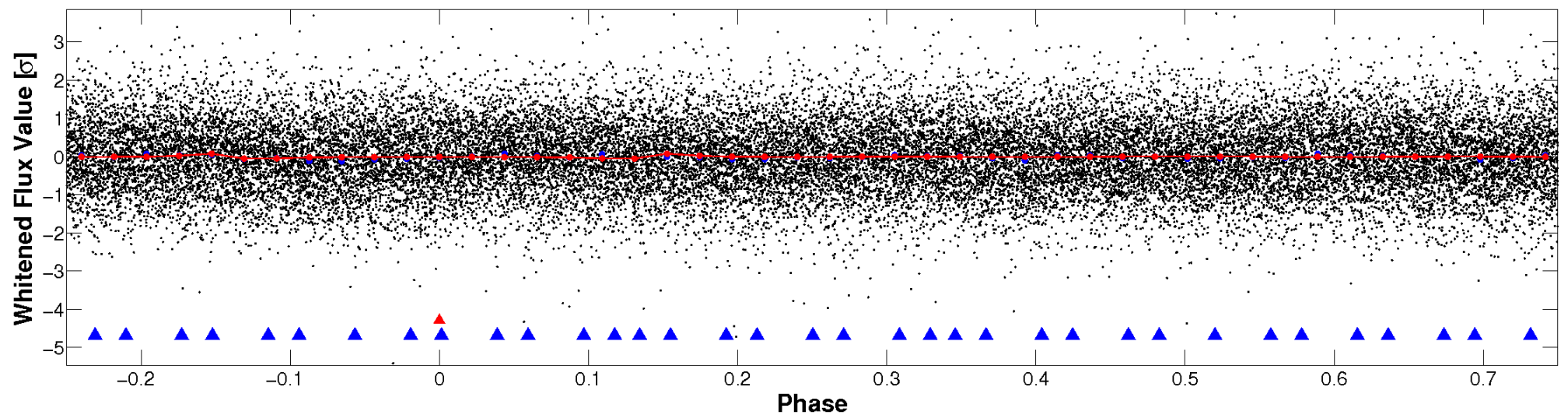


Non-Whitened Vs. Whitened Light Curve

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

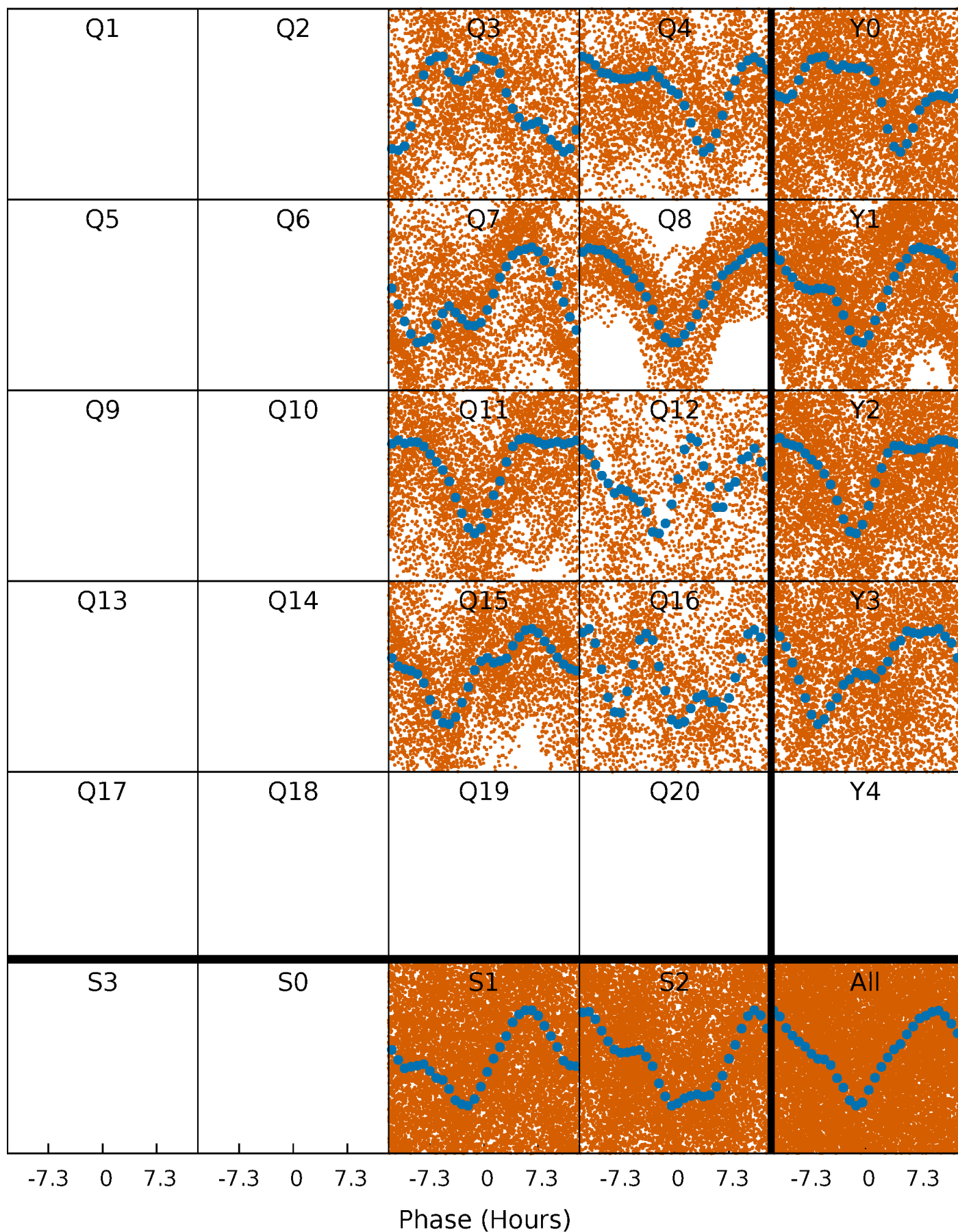


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



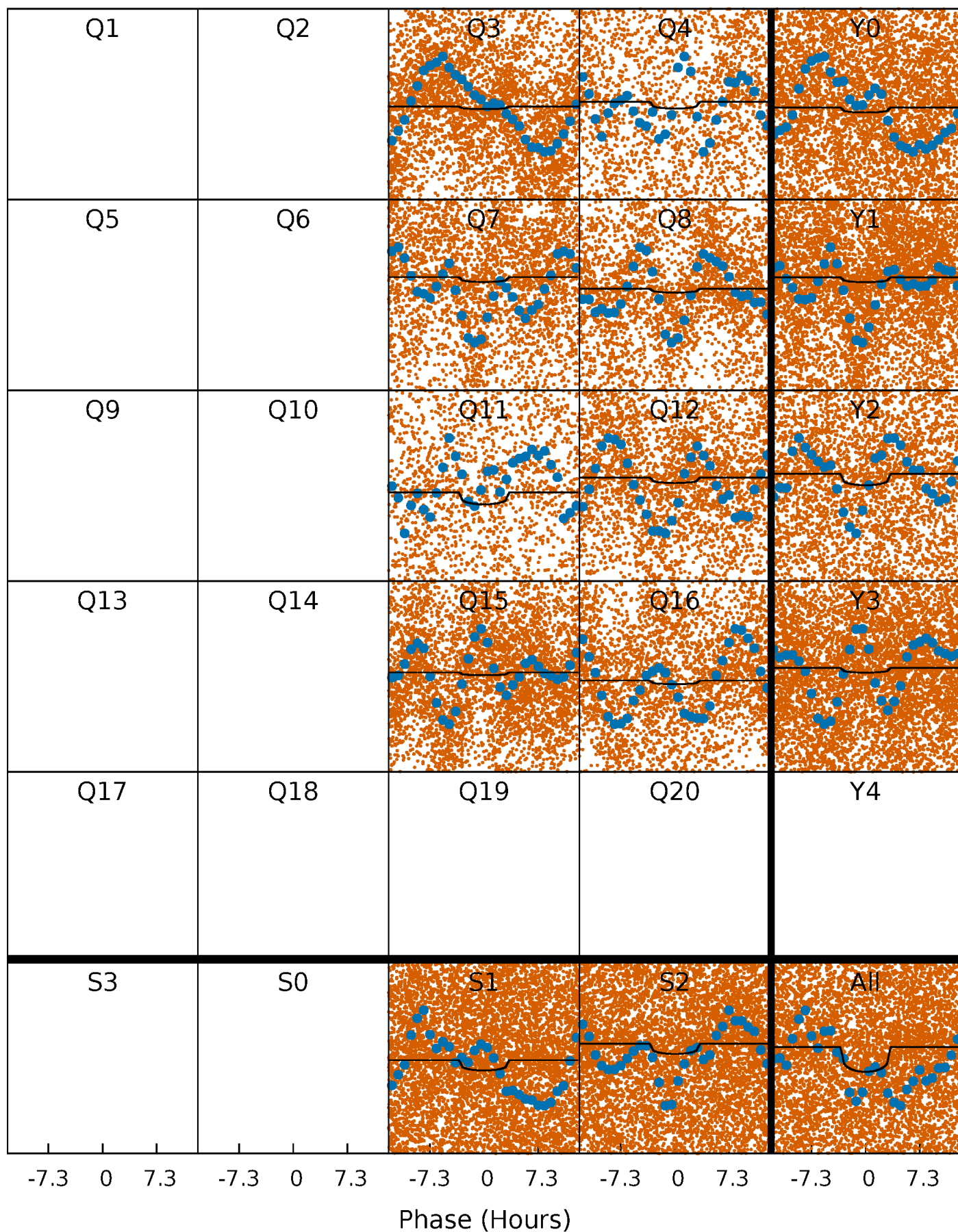
PDC Quarter-Phased Transit Curves

TCE 004816098-01 P= 0.936766 Days $T_0=132.138475$ (BKJD)



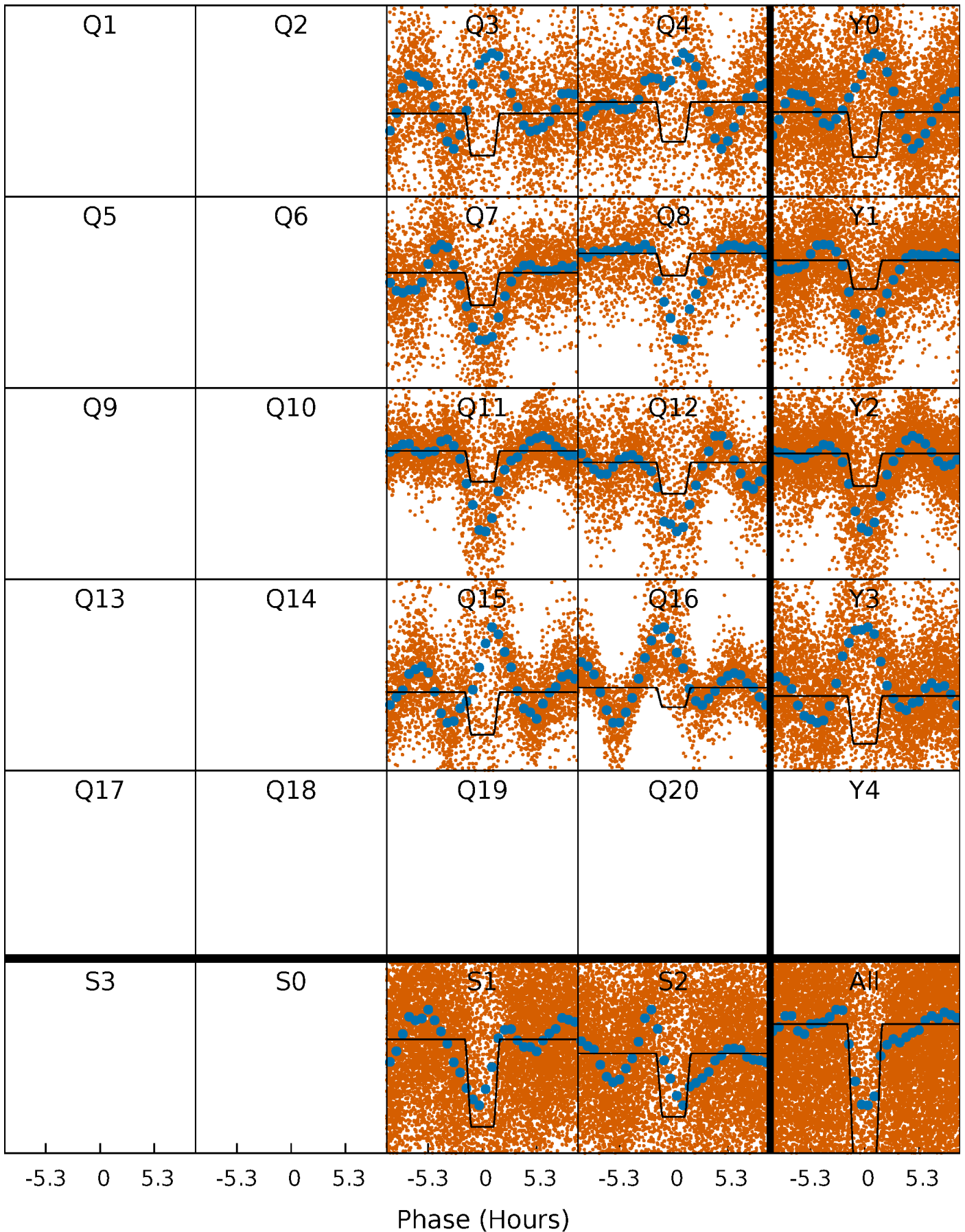
DV Quarter-Phased Transit Curves

TCE 004816098-01 P= 0.936766 Days $T_0=132.138475$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

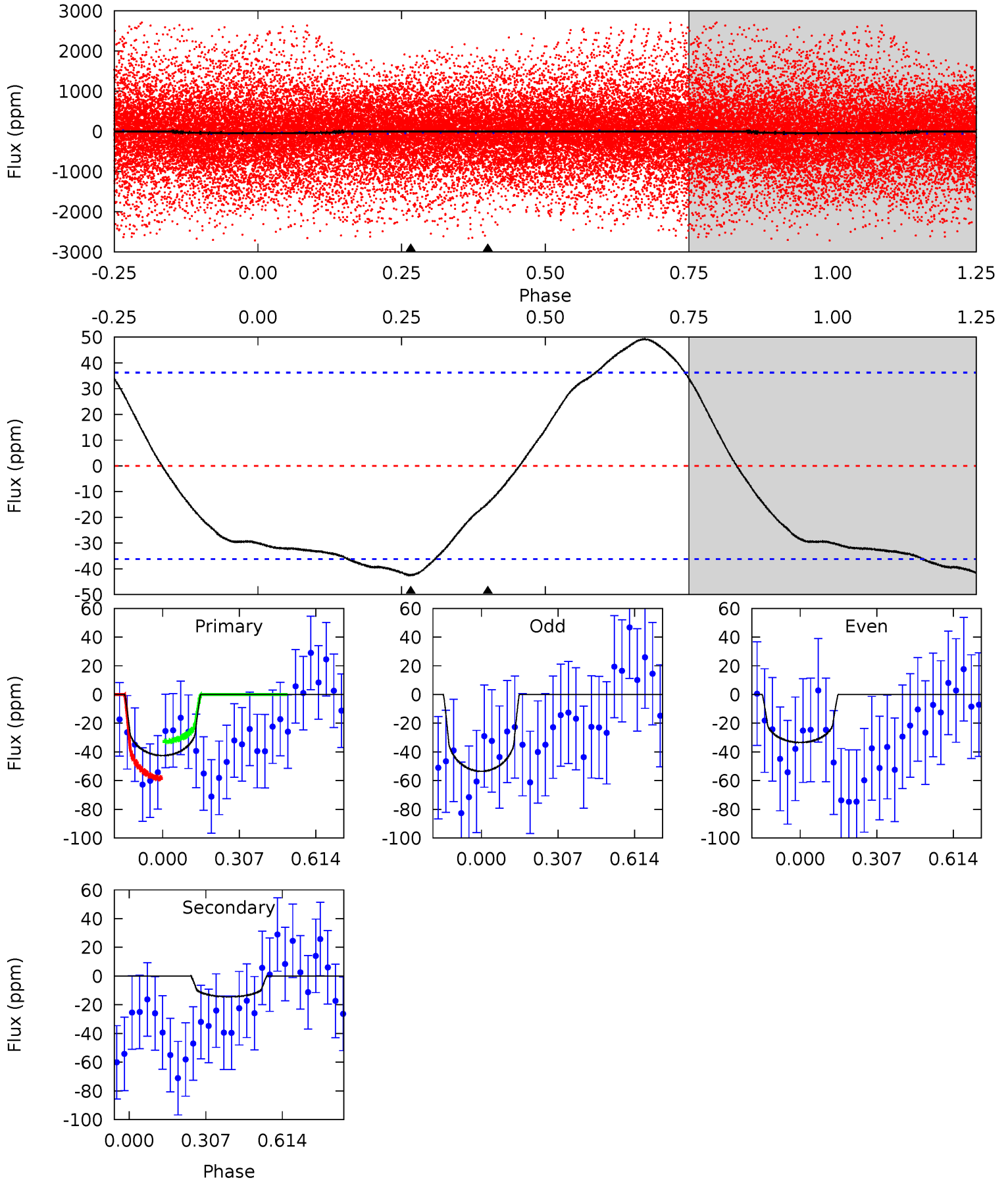
TCE 004816098-01 P= 0.936703 Days $T_0=132.129433$ (BKJD)



DV Model-Shift Uniqueness Test

004816098-01, P = 0.936766 Days, E = 132.138475 Days

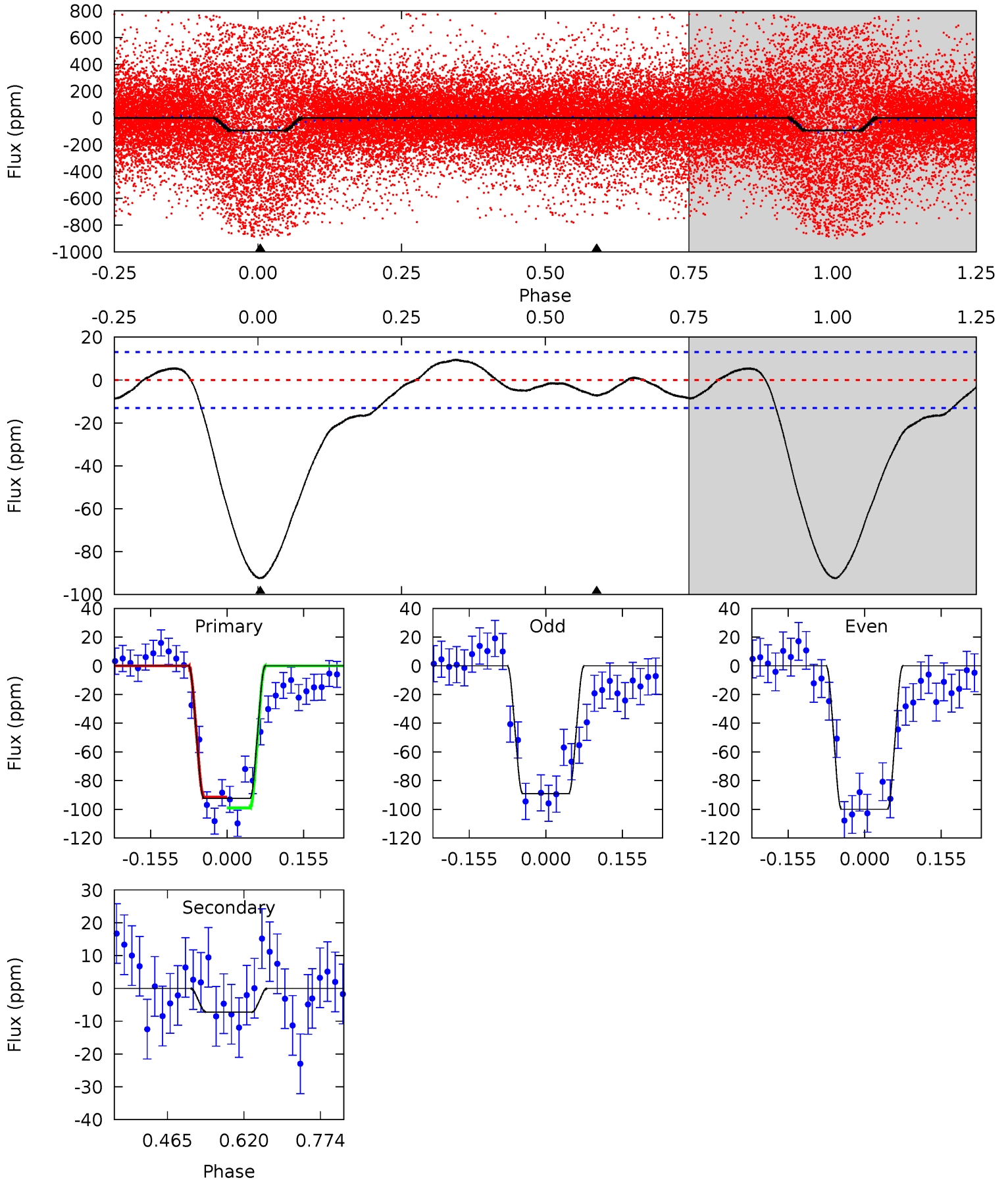
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.08	1.73	0	0	4.32	1.02	2.90	5.08	5.08	1.73	1.73	1.23	0.78	0.54	1.58



Alt Model-Shift Uniqueness Test

004816098-01, P = 0.936703 Days, E = 132.129433 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
31.6	2.47	0	0	4.47	1.42	2.75	31.6	31.6	2.47	2.47	1.85	1.21	0.09	1.23



Stellar Parameters For KIC 004816098

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6232^{+195}_{-260}	$4.348^{+0.090}_{-0.210}$	$0.140^{+0.200}_{-0.300}$	$1.216^{+0.409}_{-0.175}$	$1.208^{+0.164}_{-0.164}$	$0.947^{+0.387}_{-0.524}$
	+3%/-4%	+2%/-5%	+143%/-214%	+34%/-14%	+14%/-14%	+41%/-55%
Source	PHO54	PHO54	PHO54	DSEP		

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

Secondary Eclipse Parameters for KIC 004816098-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-14 ± 8	$0.72^{+0.29}_{-0.26}$	3036^{+234}_{-179}	5210^{+1504}_{-1035}	$5.684^{+10.808}_{-3.751}$
Alt.	-7 ± 3	$1.79^{+0.39}_{-0.31}$	3041^{+248}_{-189}	2889^{+417}_{-5456}	$0.479^{+0.287}_{-0.243}$

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 $A_{obs} \gg 1.0$

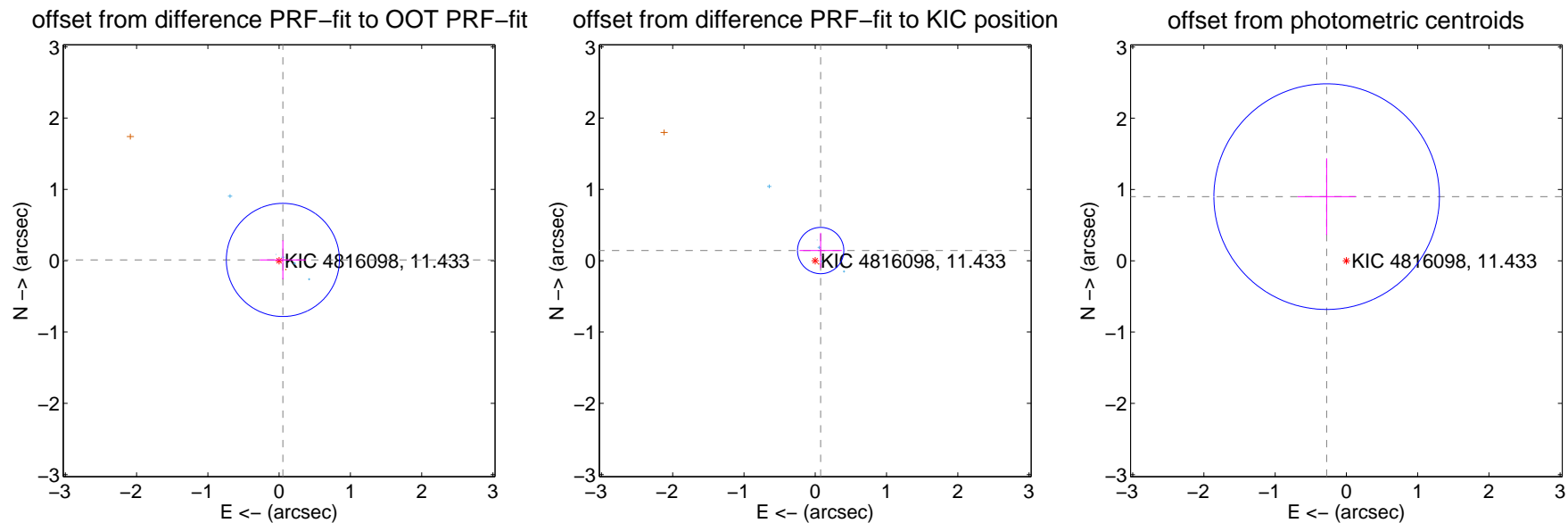
DV Centroid Data

Supplemental centroid analysis for 004816098-01. **Kepler magnitude: 11.43.** Transit SNR 4.49

There are 6 quarters with good PRF difference image offsets

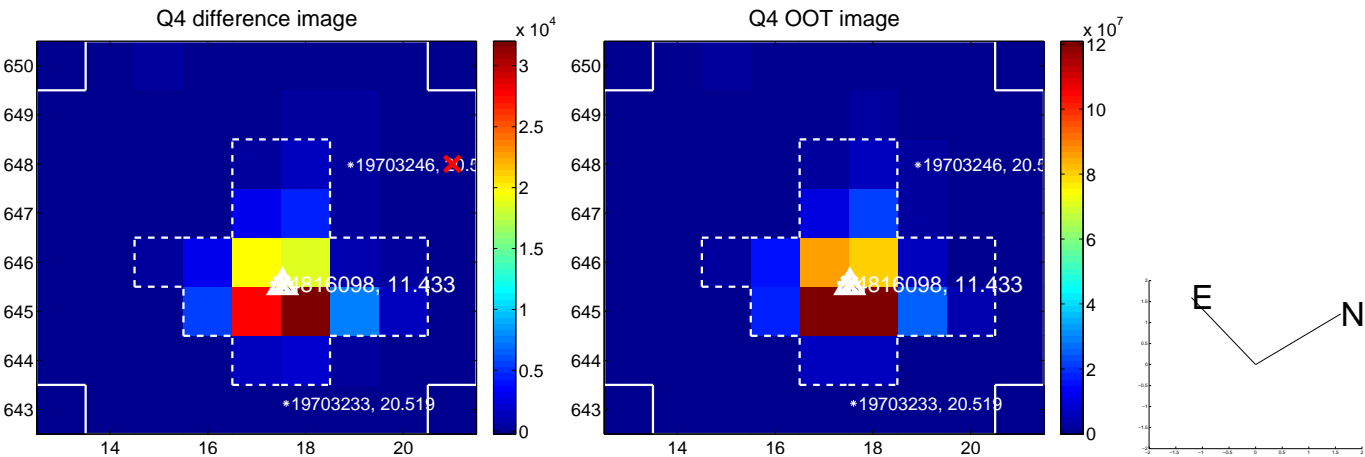
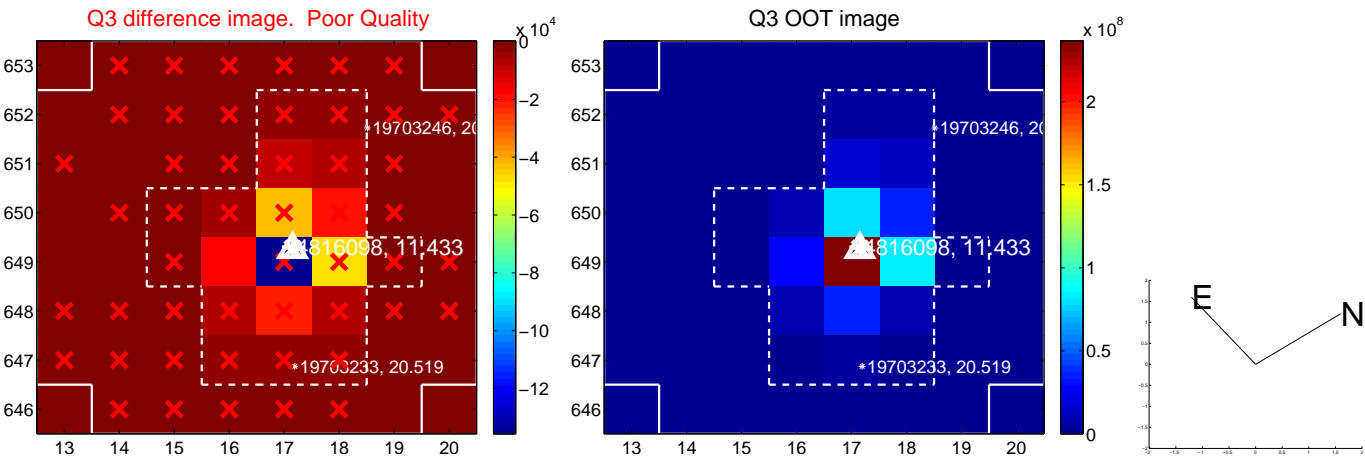
The direct PRF centroid is offset from the target star catalog position by about 0.11 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.053 ± 0.264	0.20	-0.052 ± 0.323	0.011 ± 0.273
PRF-fit source offset from KIC position	0.161 ± 0.108	1.49	-0.076 ± 0.297	0.142 ± 0.248
photometric centroid source offset	0.94 ± 0.53	1.78	0.28 ± 0.41	0.90 ± 0.54

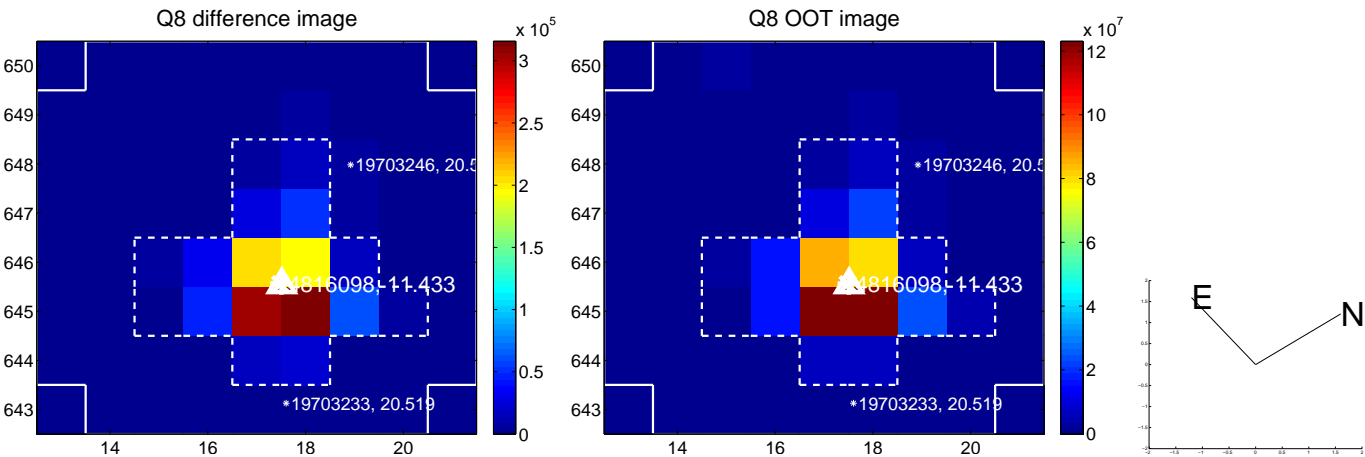
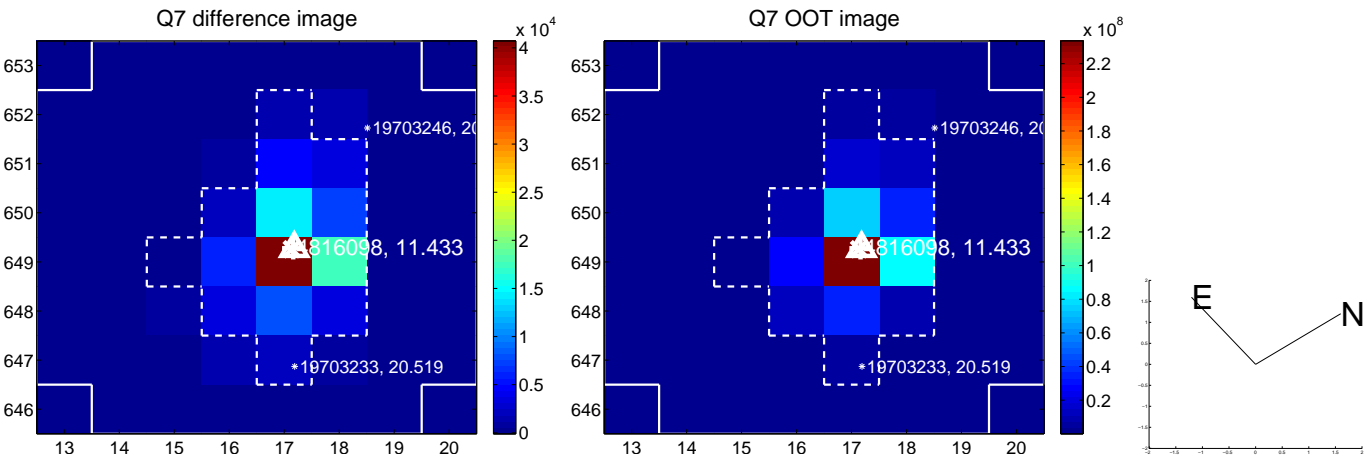


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

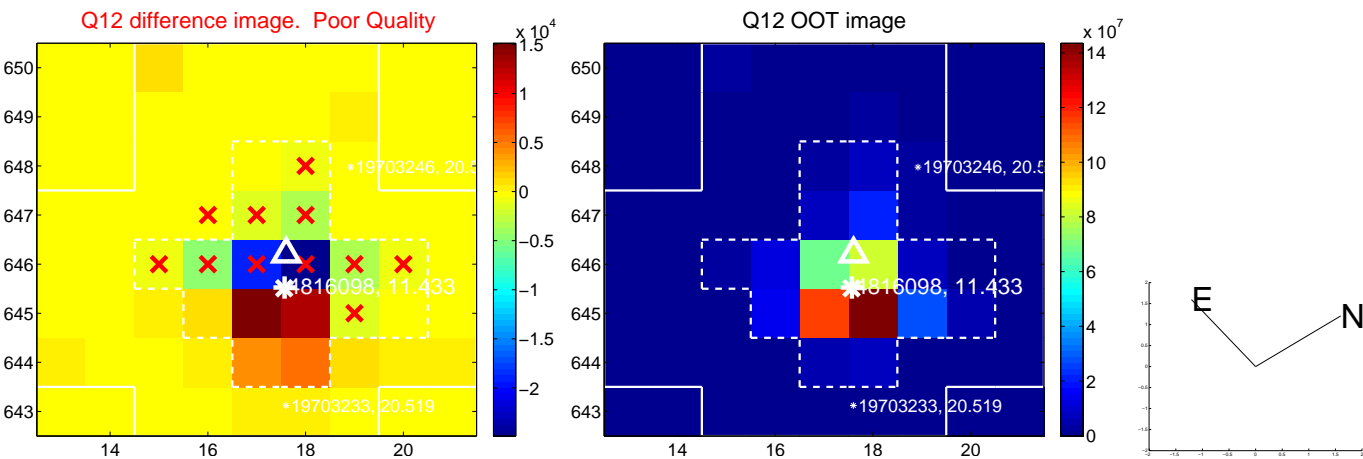
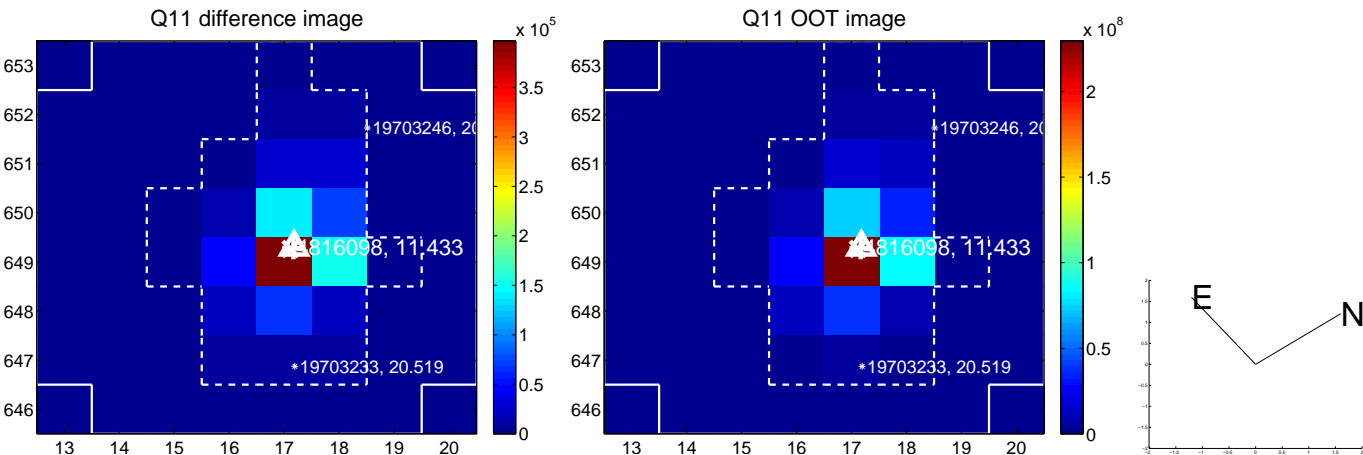
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



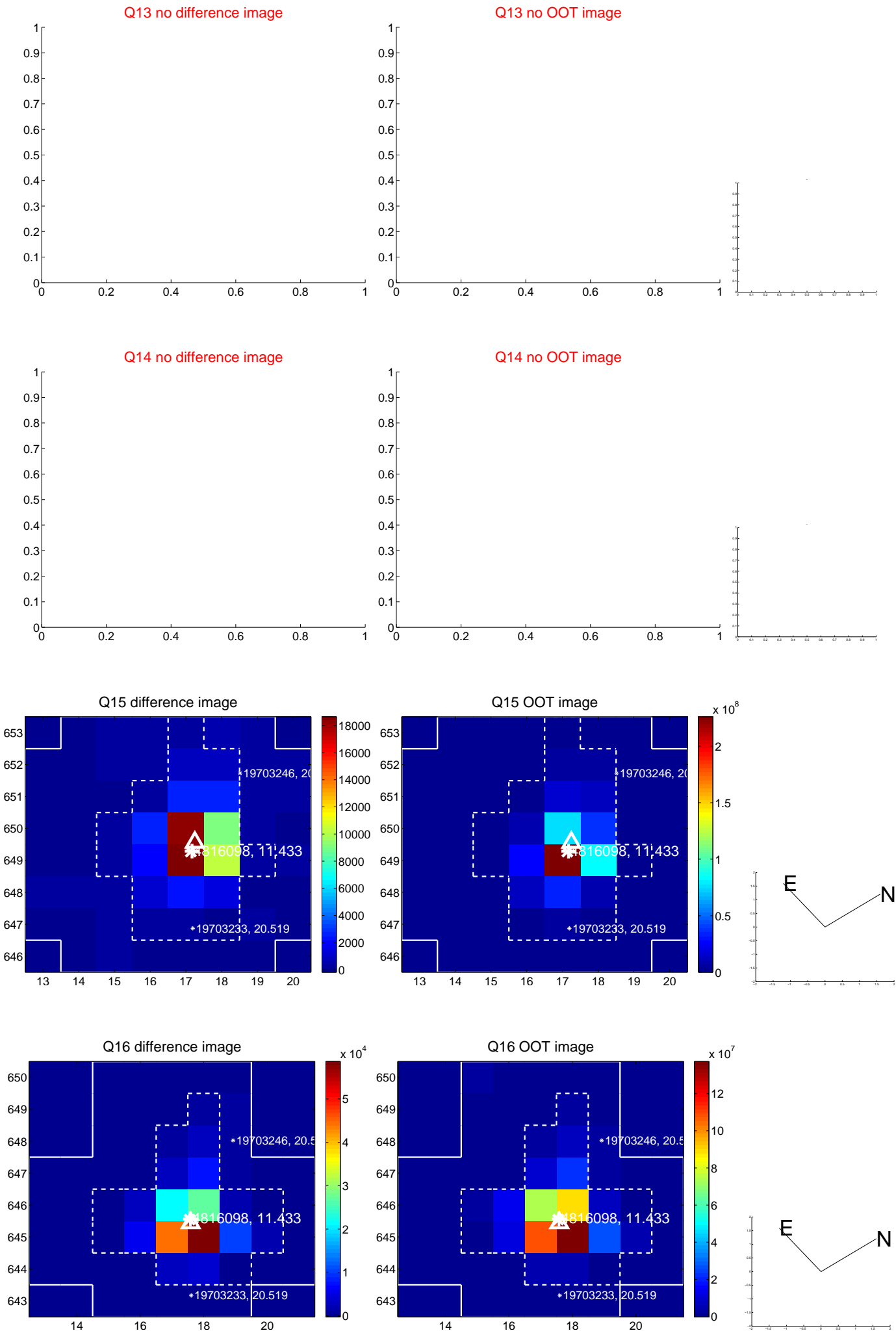
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



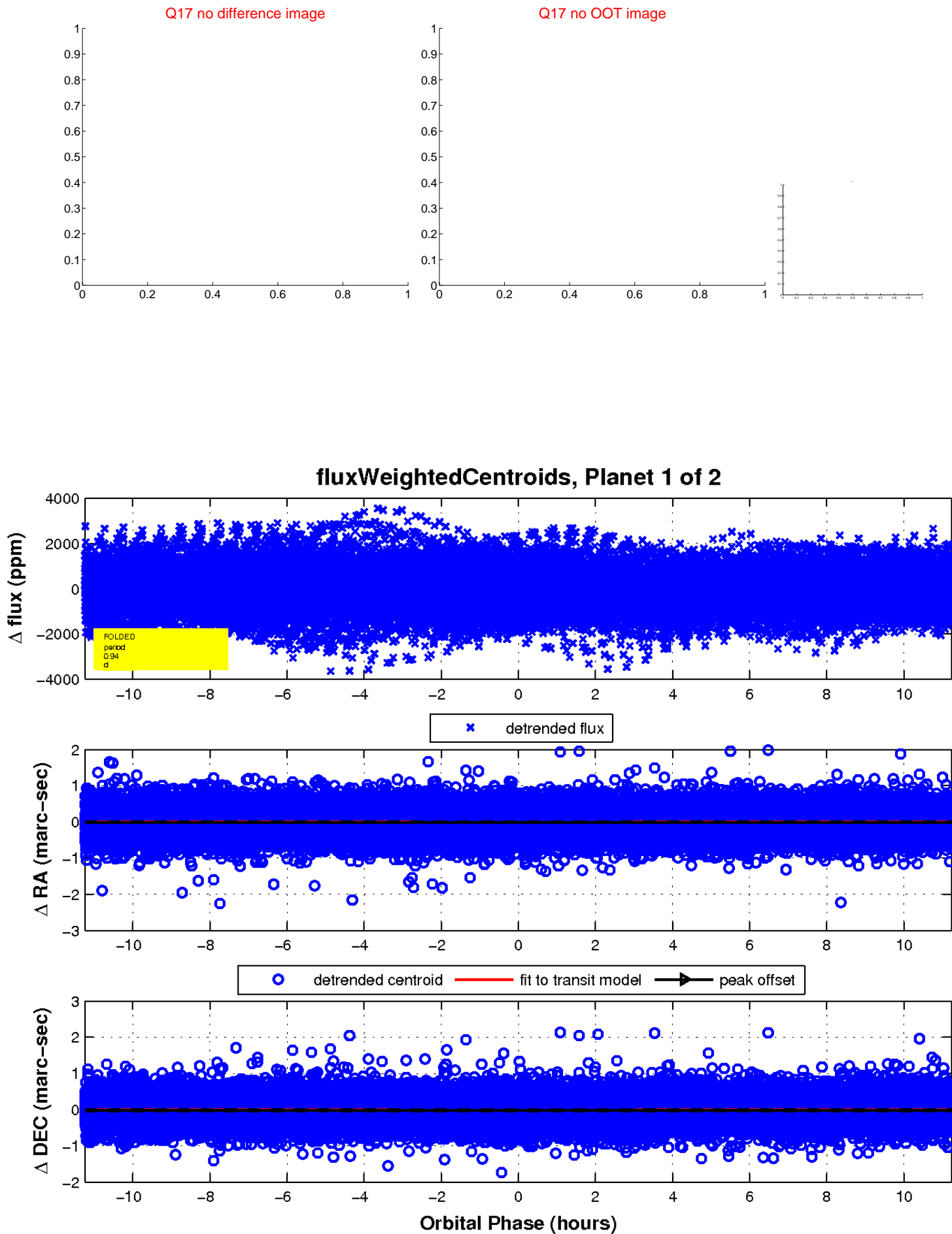
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

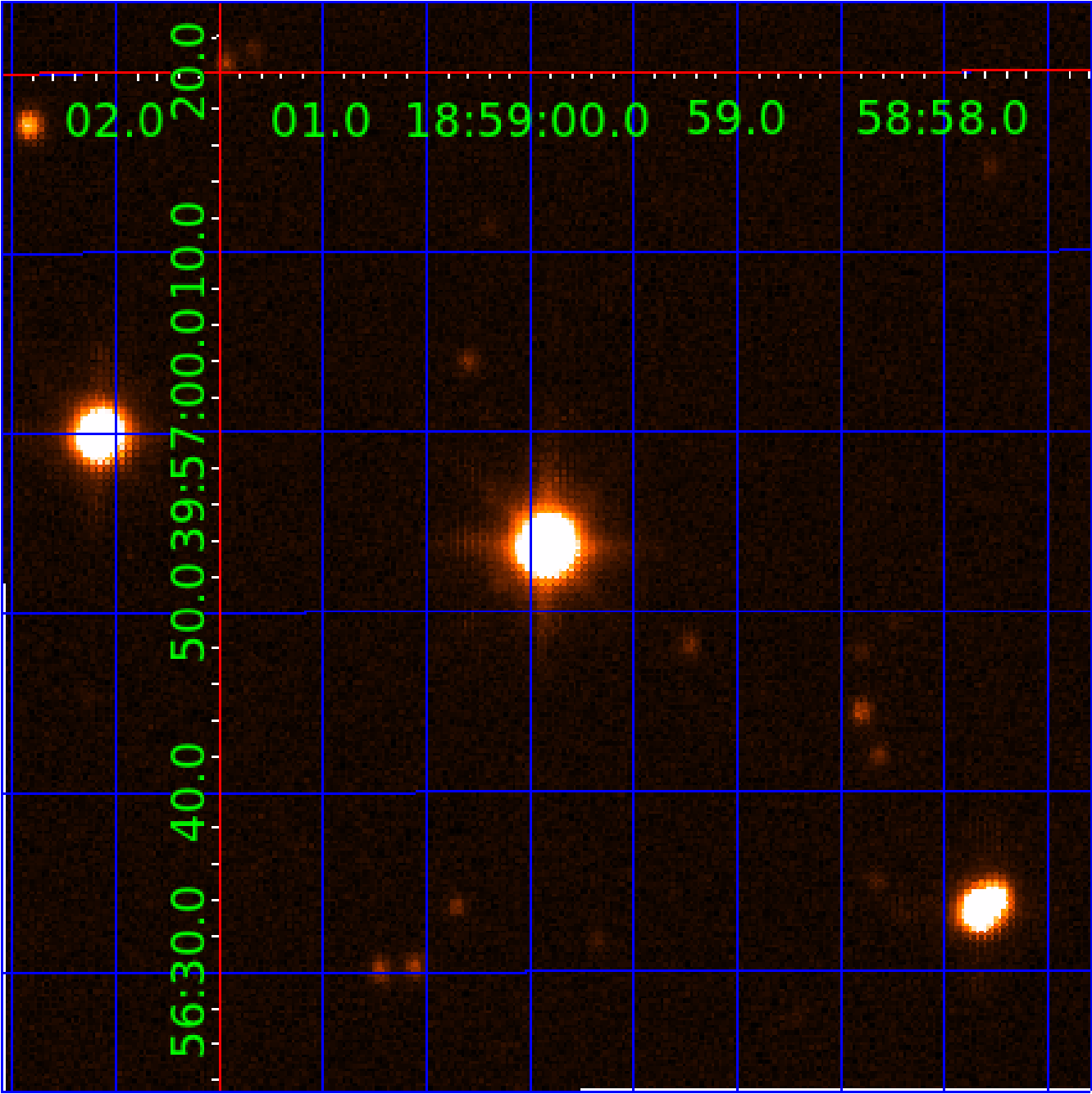


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 004816098

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})
004816098-01	OBS	No	0.936766	132.138474	29.1	6.427	8.4	4.5	1.22	6232	0.70	5033.29
004816098-02	OBS	No	41.956216	161.486583	1732.8	4.368	10.0	9.4	1.22	6232	9.56	31.64

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004816098-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—CENT_SATURATED
004816098-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—CENT_SATURATED

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

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

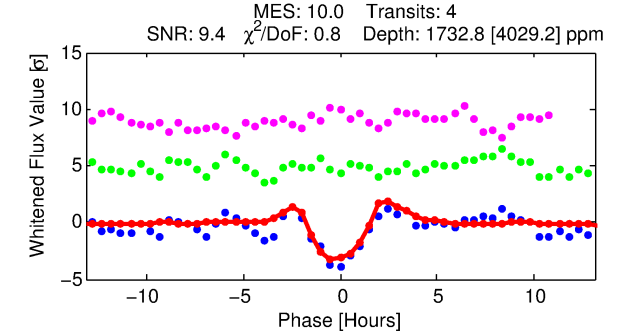
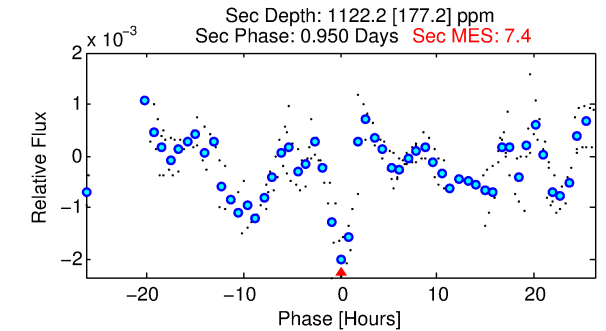
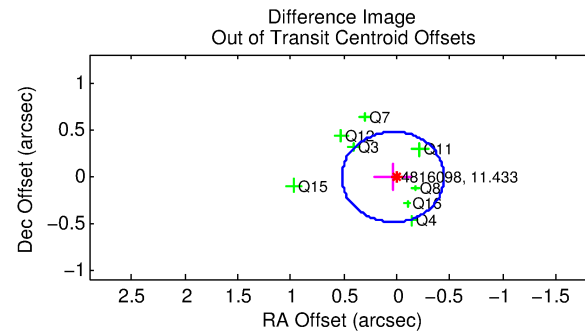
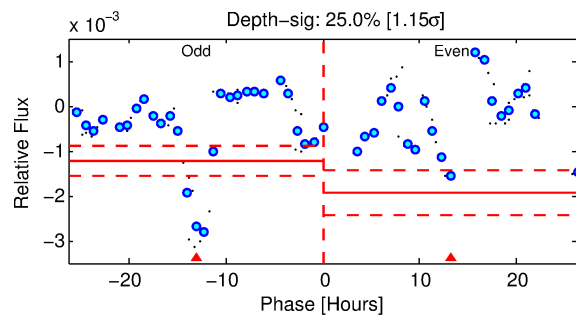
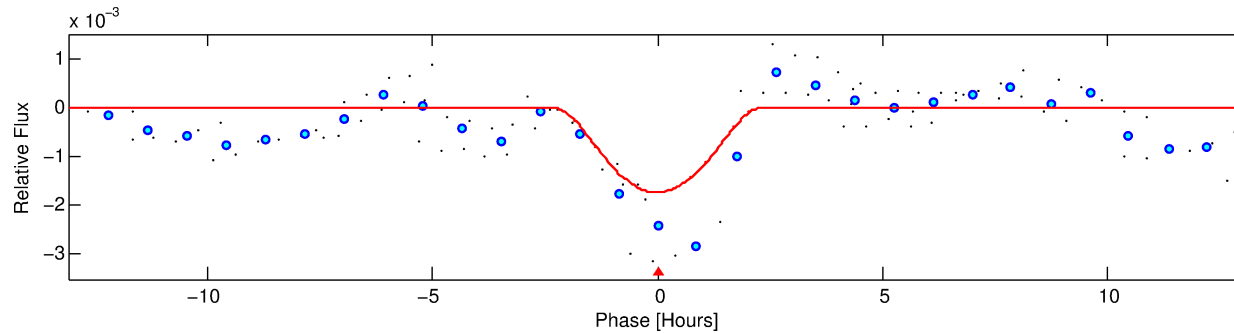
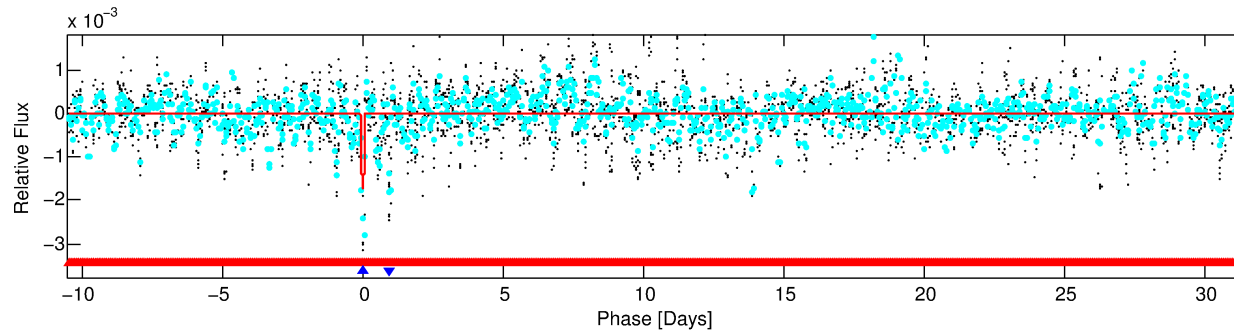
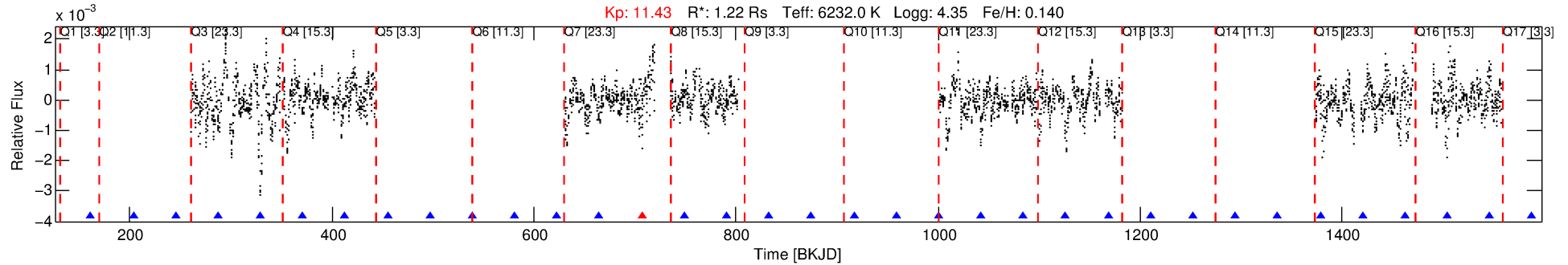
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 004816098-02

No Significant Match Found

DV One-Page Summary

KIC: 4816098 Candidate: 2 of 2 Period: 41.956 d



DV Fit Results:

Period = 41.95622 [0.00041] d
Epoch = 161.4866 [0.0076] BKJD
Rp/R* = 0.0720 [0.1839]
a/R* = 28.37 [15.62]
b = 1.00 [0.38]
Seff = 31.64 [13.50]
Teq = 605 [65] K
Rp = 9.56 [24.62] Re
a = 0.2513 [0.0694] AU
Ag = 426.58 [2185.61] [0.19 σ]
Teffp = 4250 [5430] K [0.67 σ]

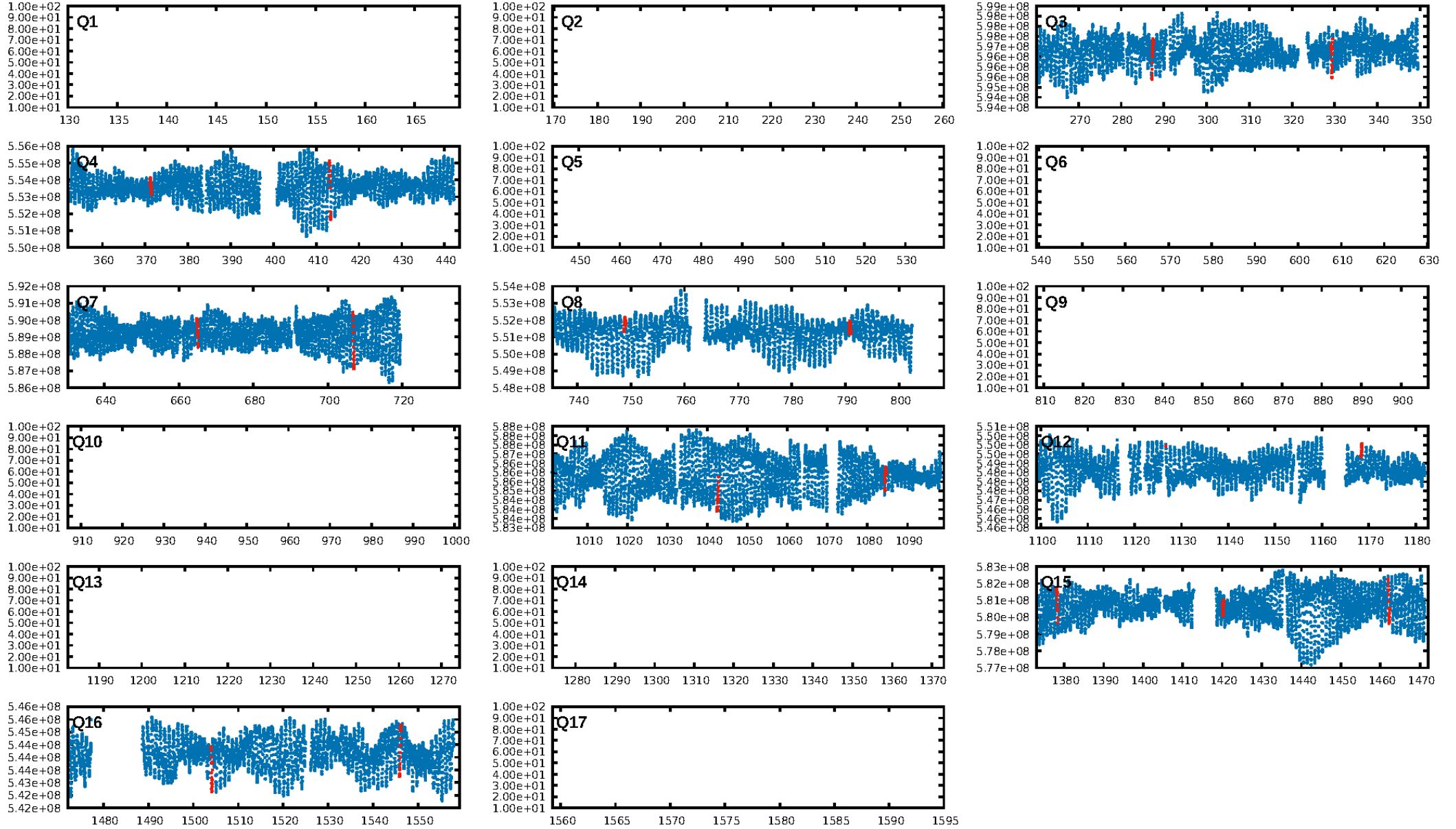
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [126.68 σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 10.2%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 8.27e-13
RollingBand-fgt: 0.75 [3/4]
GhostDiagnostic-chr: 5.193
Centroid-sig: 7.2%
Centroid-so: 0.067 arcsec [0.75 σ]
OotOffset-rm: 0.036 arcsec [0.22 σ]
KicOffset-rm: 0.102 arcsec [0.61 σ]
OotOffset-st: 0/4/4/0 [8]
KicOffset-st: 0/4/4/0 [8]
DiffImageQuality-fgm: 0.62 [5/8]
DiffImageOverlap-fno: 0.00 [0/8]

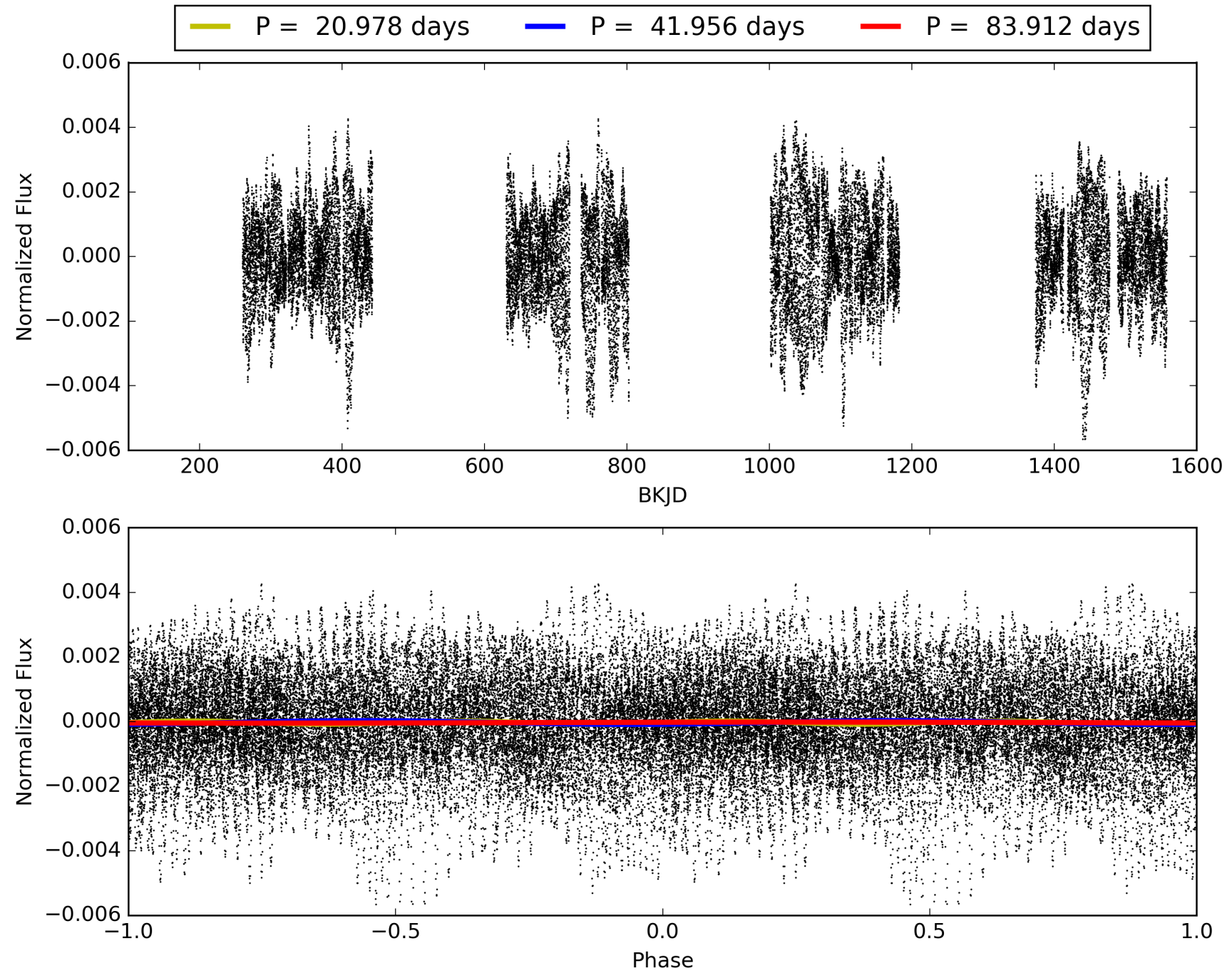
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 05:27:46 Z

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

TCE 004816098-02, PDC Light Curves

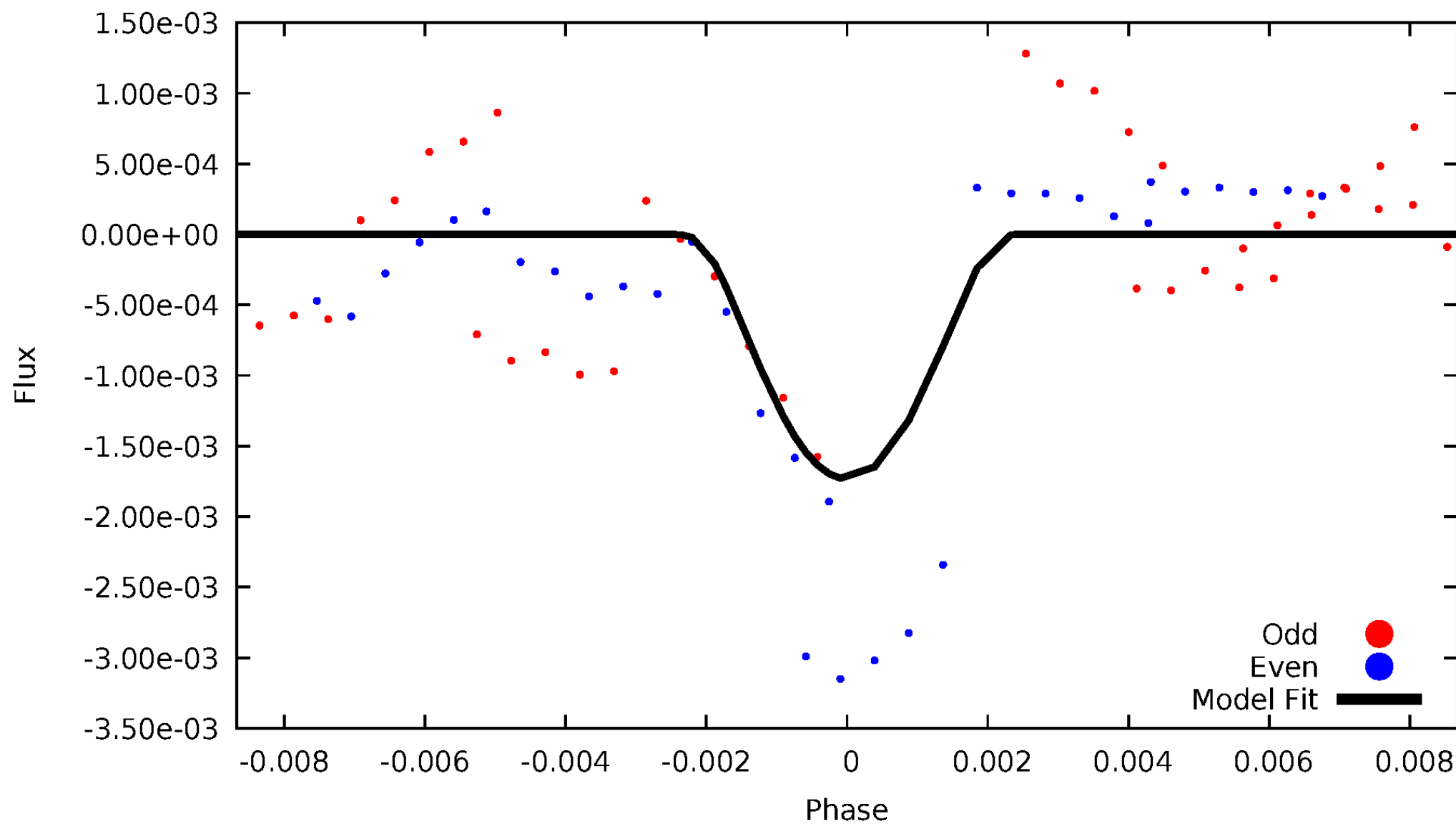


TCE 004816098-02



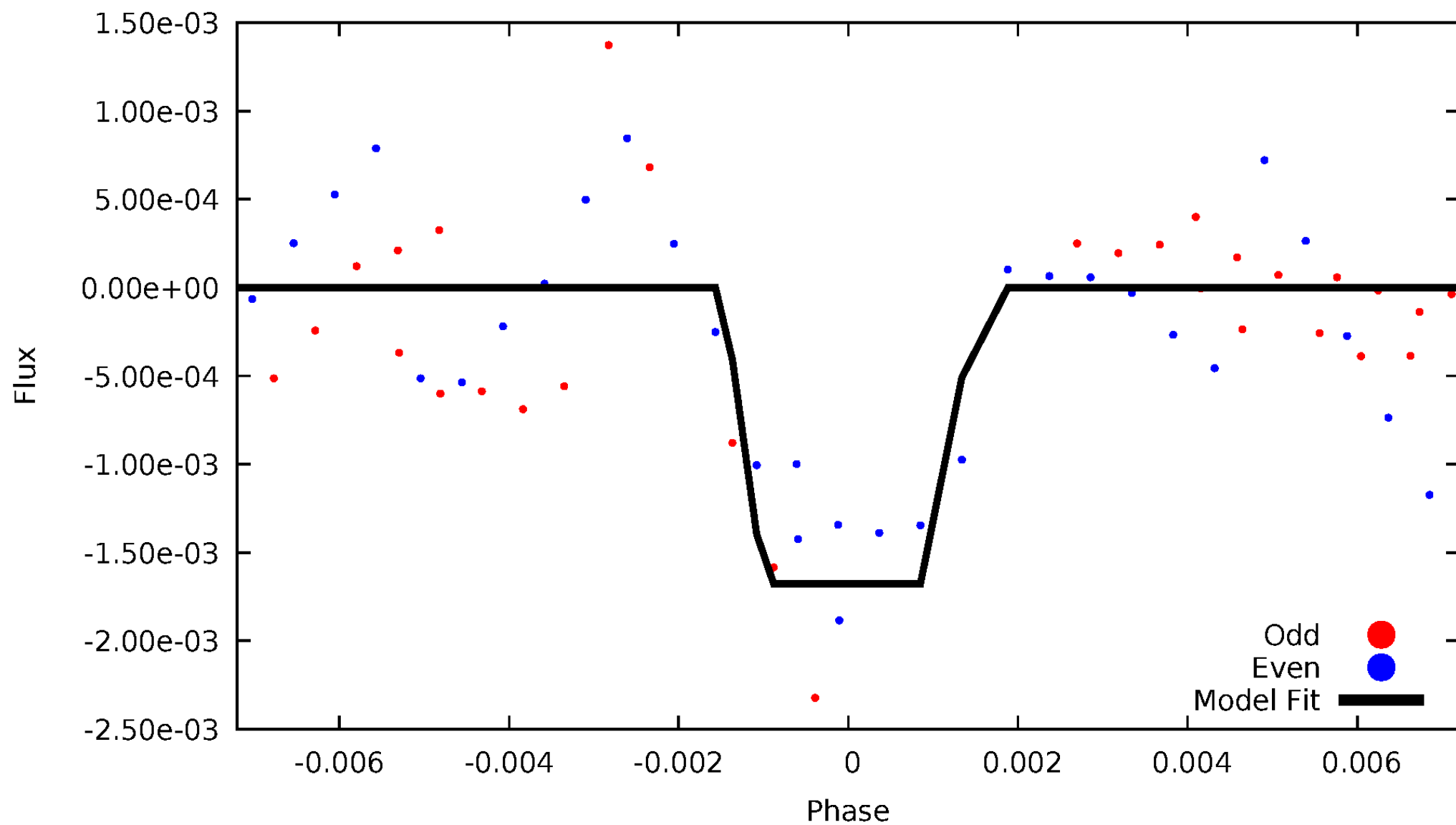
DV Odd/Even

TCE 004816098-02



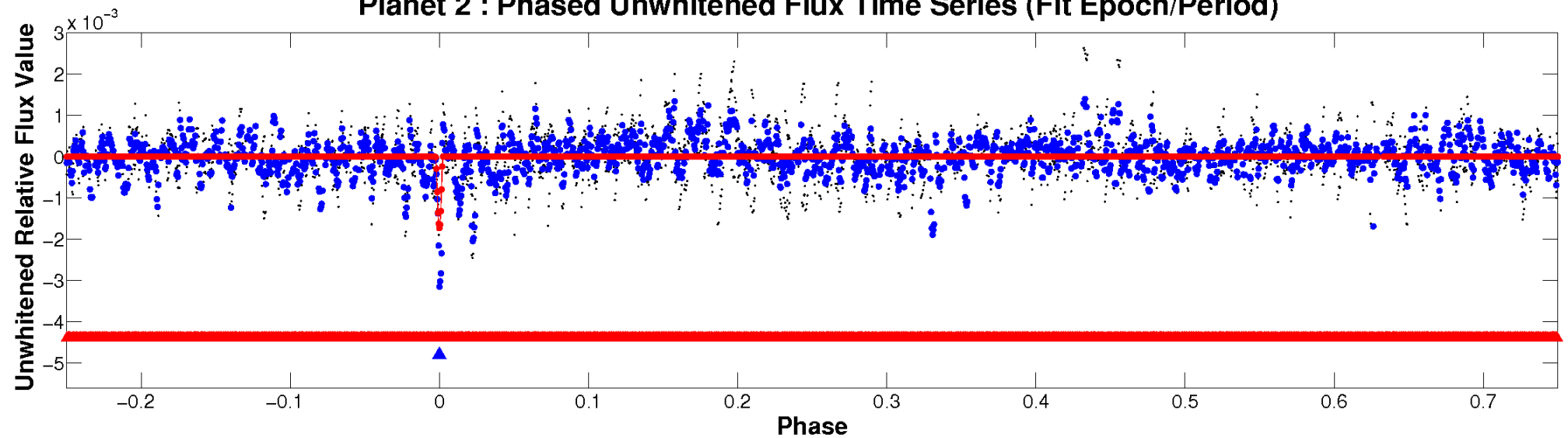
ALT Odd/Even

TCE 004816098-02

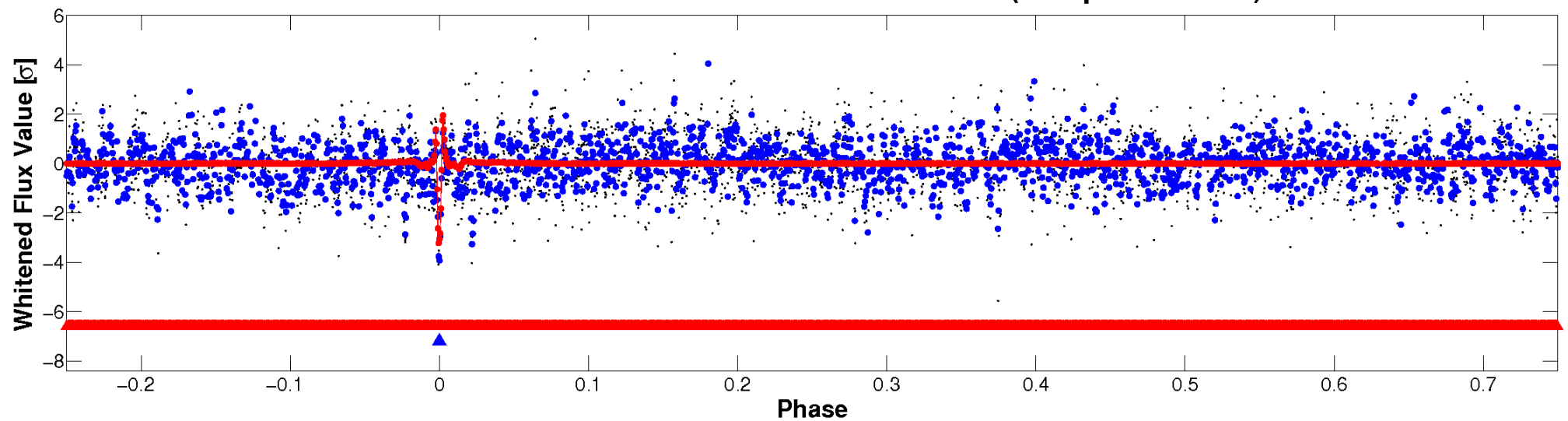


Non-Whitened Vs. Whitened Light Curve

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

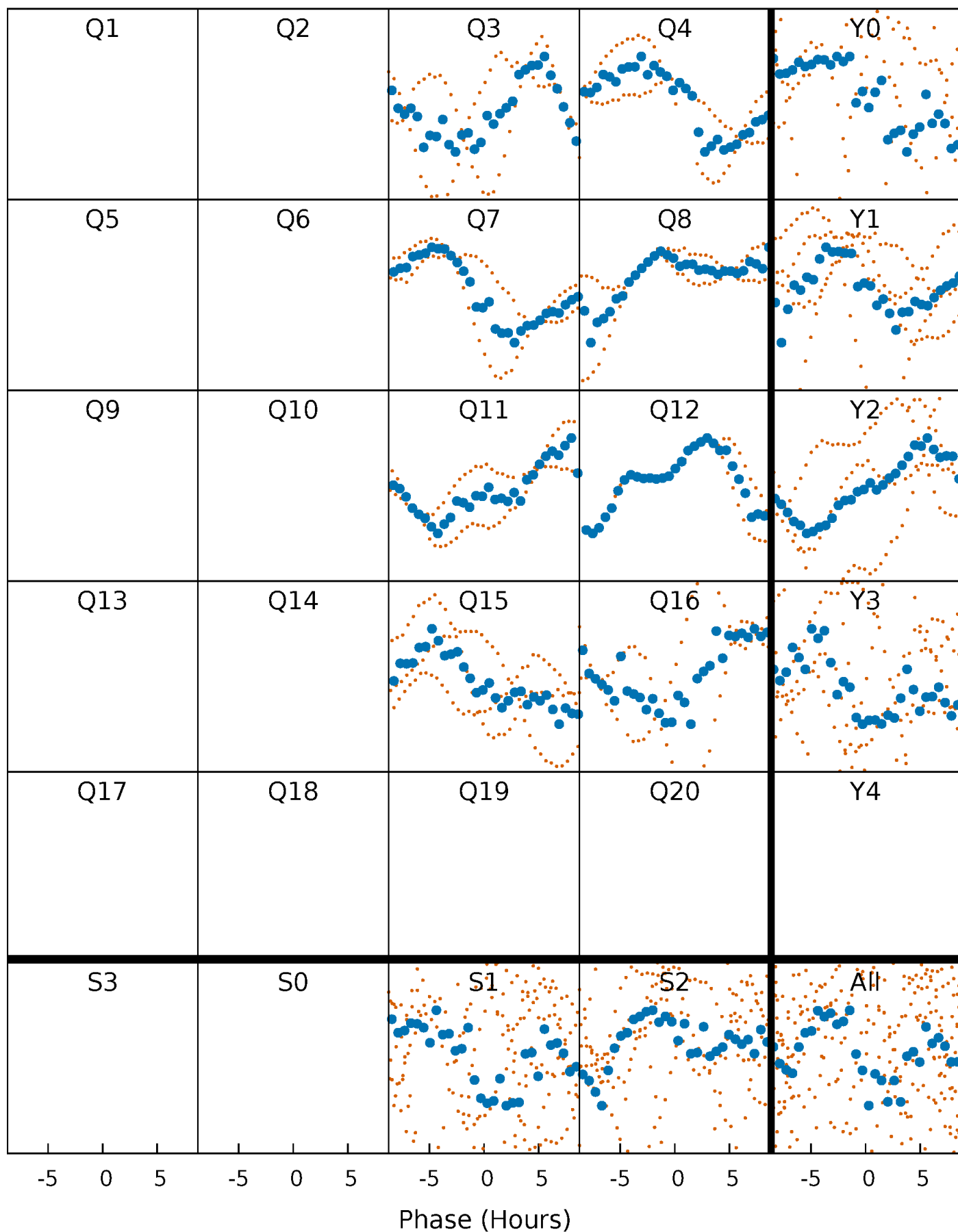


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



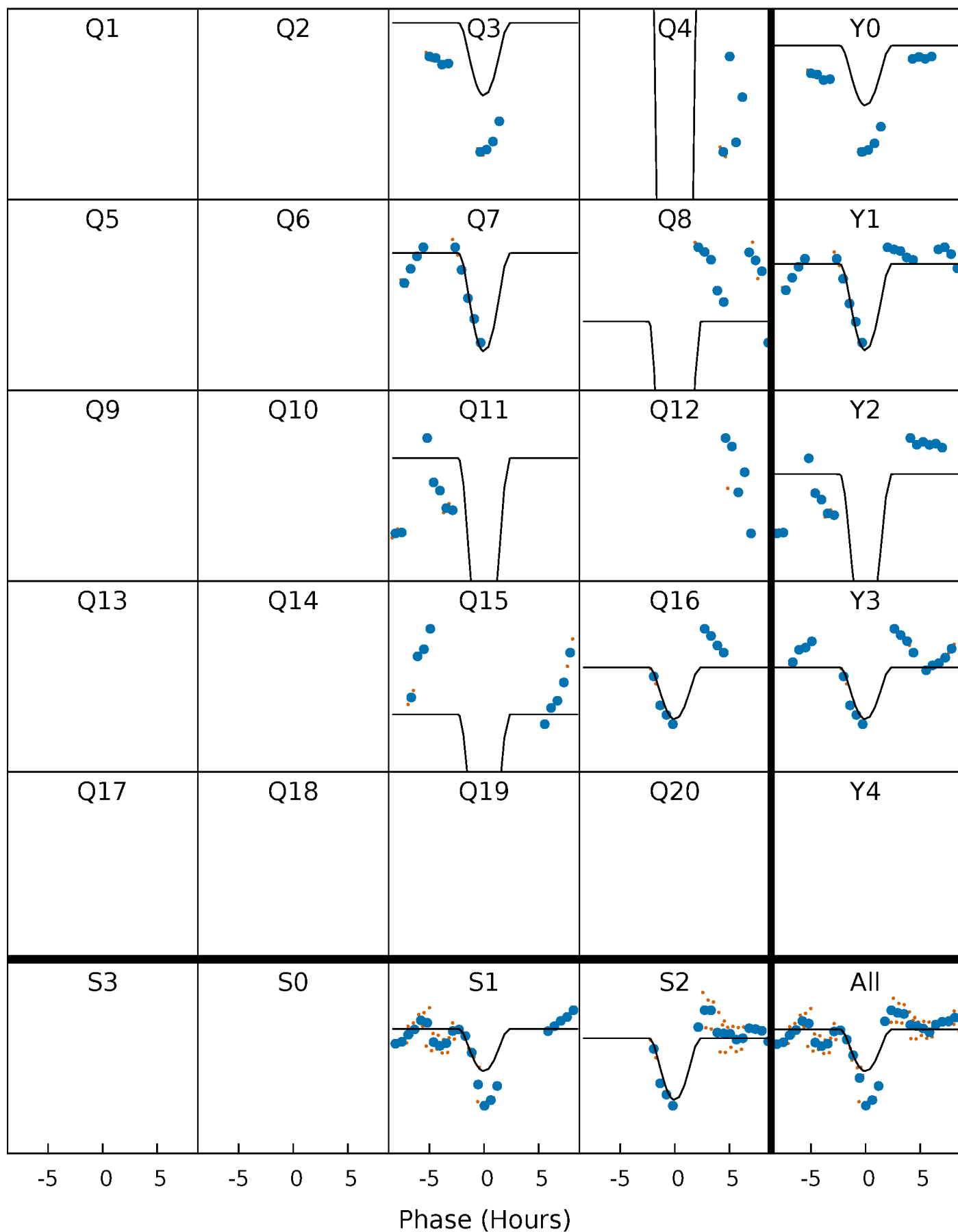
PDC Quarter-Phased Transit Curves

TCE 004816098-02 $P = 41.956216$ Days $T_0 = 161.486583$ (BKJD)



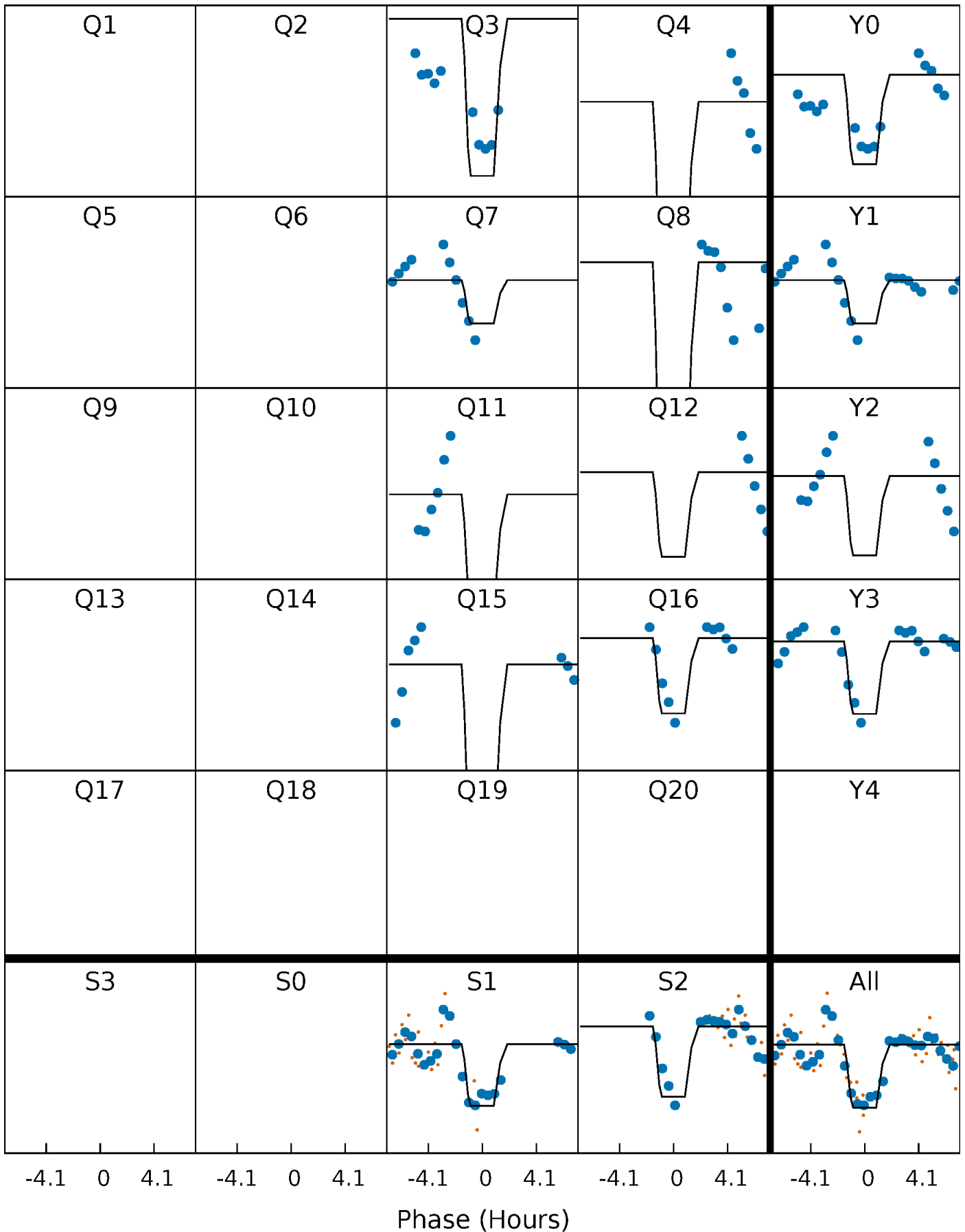
DV Quarter-Phased Transit Curves

TCE 004816098-02 $P = 41.956216$ Days $T_0 = 161.486583$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

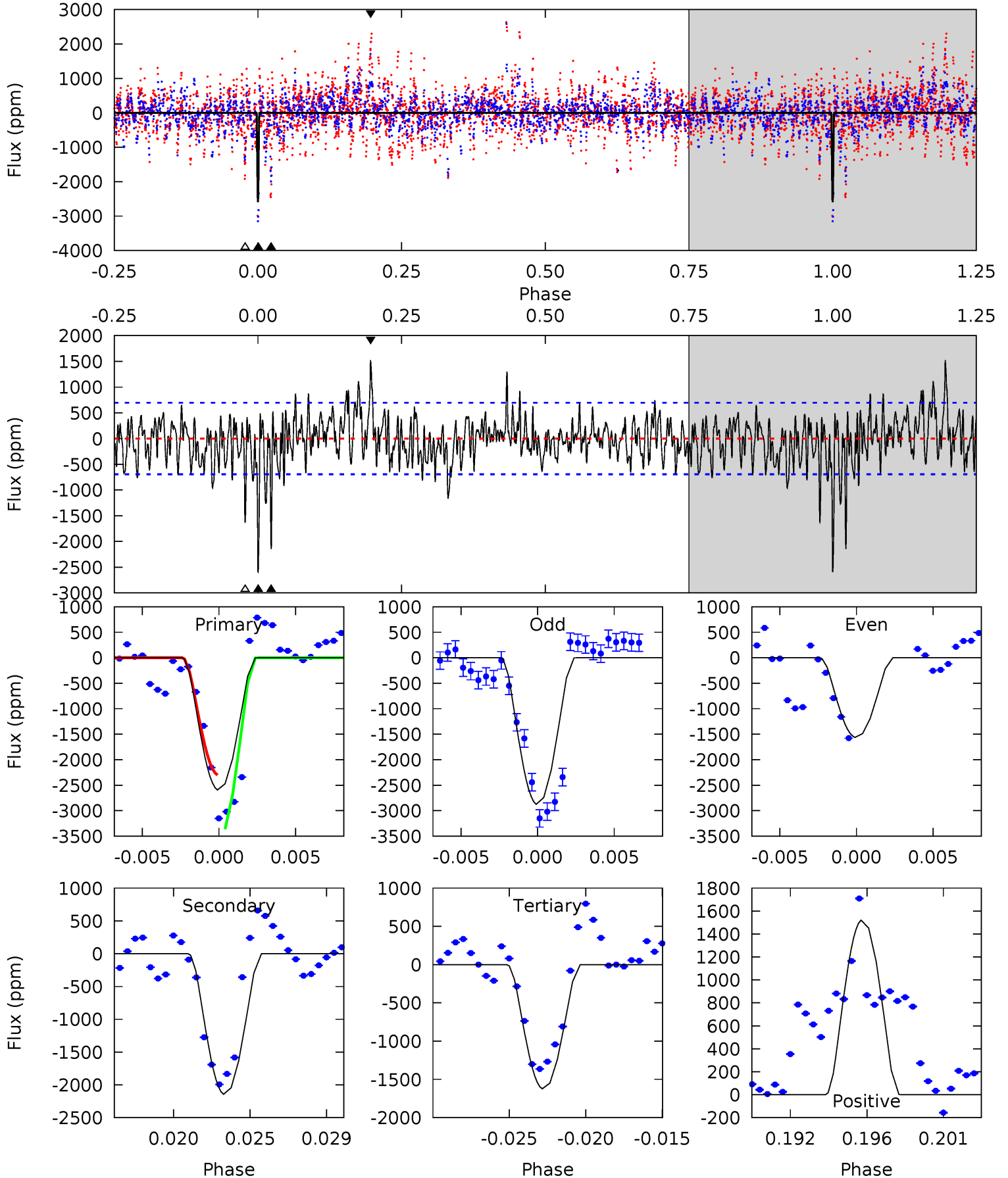
TCE 004816098-02 $P = 41.955950$ Days $T_0 = 161.488798$ (BKJD)



DV Model-Shift Uniqueness Test

004816098-02, P = 41.956216 Days, E = 161.486583 Days

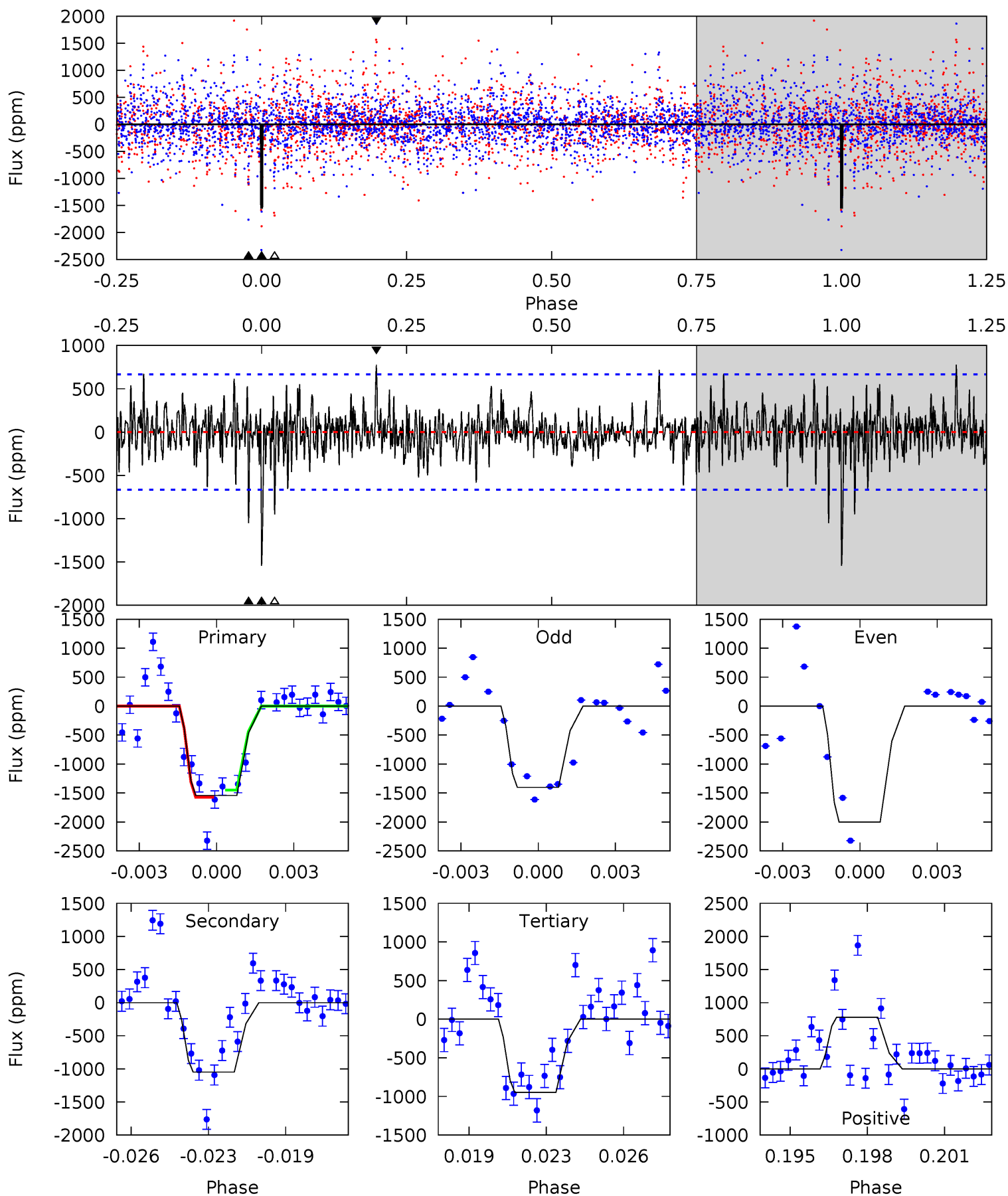
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
19.3	15.9	12.1	11.3	5.16	2.81	2.69	7.20	7.96	3.87	4.63	4.81	0.64	0.37	3.55



Alt Model-Shift Uniqueness Test

004816098-02, P = 41.955950 Days, E = 161.488798 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.1	8.26	7.46	6.12	5.24	2.94	1.51	4.67	6.01	0.80	2.14	2.07	1.05	0.34	0.44



Stellar Parameters For KIC 004816098

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6232^{+195}_{-260}	$4.348^{+0.090}_{-0.210}$	$0.140^{+0.200}_{-0.300}$	$1.216^{+0.409}_{-0.175}$	$1.208^{+0.164}_{-0.164}$	$0.947^{+0.387}_{-0.524}$
	+3%/-4%	+2%/-5%	+143%/-214%	+34%/-14%	+14%/-14%	+41%/-55%
Source	PHO54	PHO54	PHO54	DSEP		

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

Secondary Eclipse Parameters for KIC 004816098-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-2144 ± 135	$20.66^{+22.02}_{-14.06}$	854^{+64}_{-51}	3807^{+2292}_{-753}	169^{+1584}_{-128}
Alt.	-1049 ± 127	$20.13^{+21.61}_{-14.53}$	861^{+64}_{-53}	3439^{+2191}_{-657}	88^{+1090}_{-67}

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

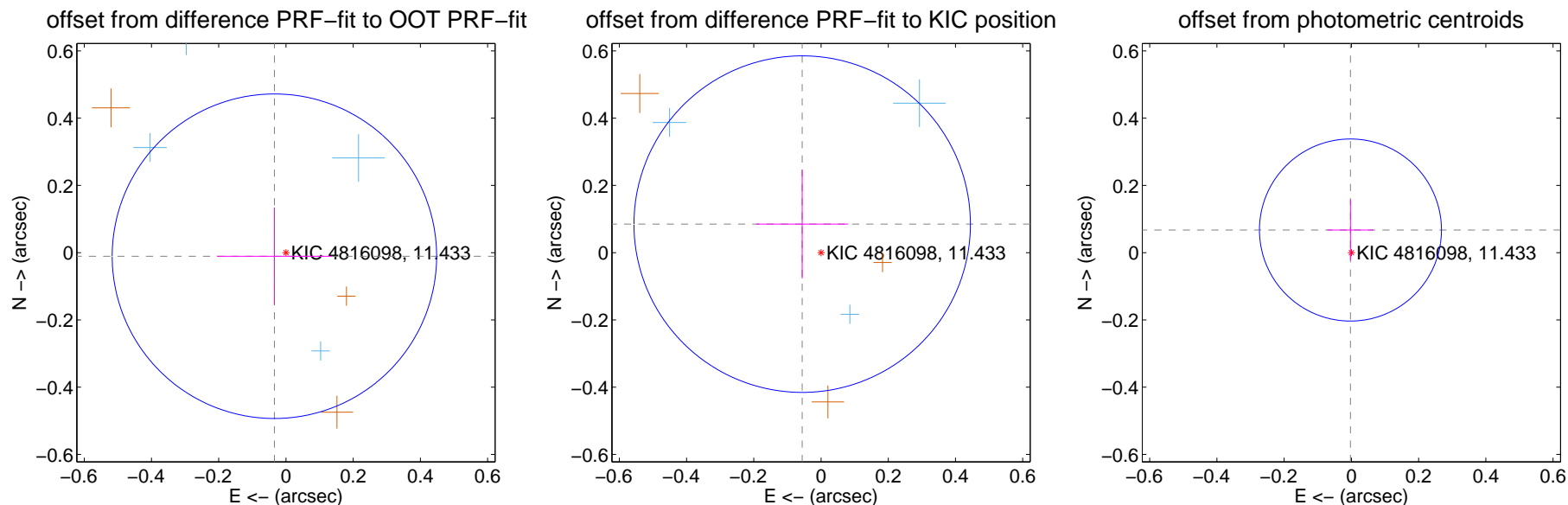
DV Centroid Data

Supplemental centroid analysis for 004816098-02. **Kepler magnitude: 11.43.** Transit SNR 9.42

There are 5 quarters with good PRF difference image offsets

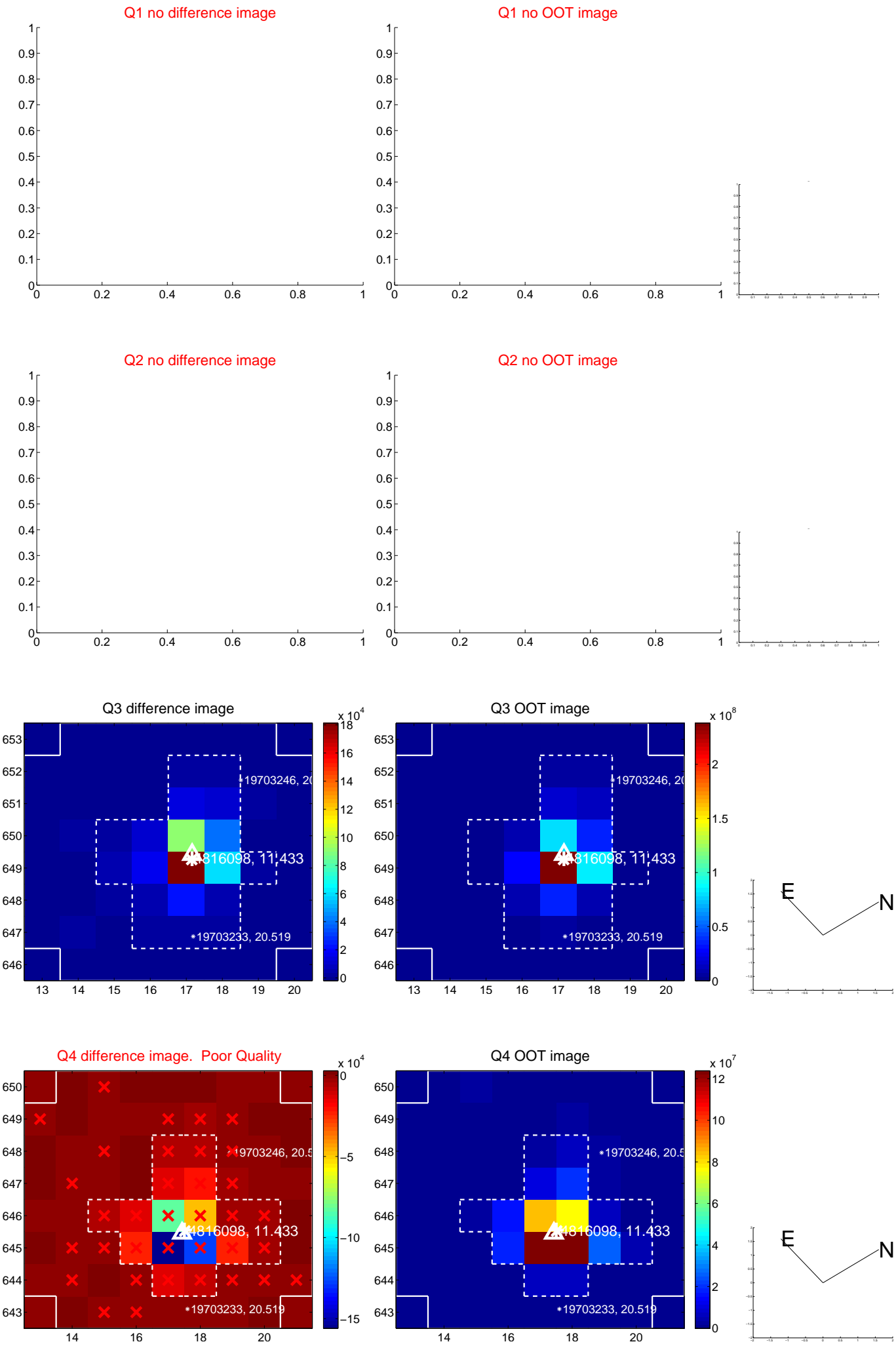
The direct PRF centroid is offset from the target star catalog position by about 0.11 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.036 ± 0.161	0.22	0.034 ± 0.171	-0.011 ± 0.145
PRF-fit source offset from KIC position	0.102 ± 0.167	0.61	0.056 ± 0.137	0.085 ± 0.162
photometric centroid source offset	0.07 ± 0.09	0.75	0.00 ± 0.07	0.07 ± 0.09

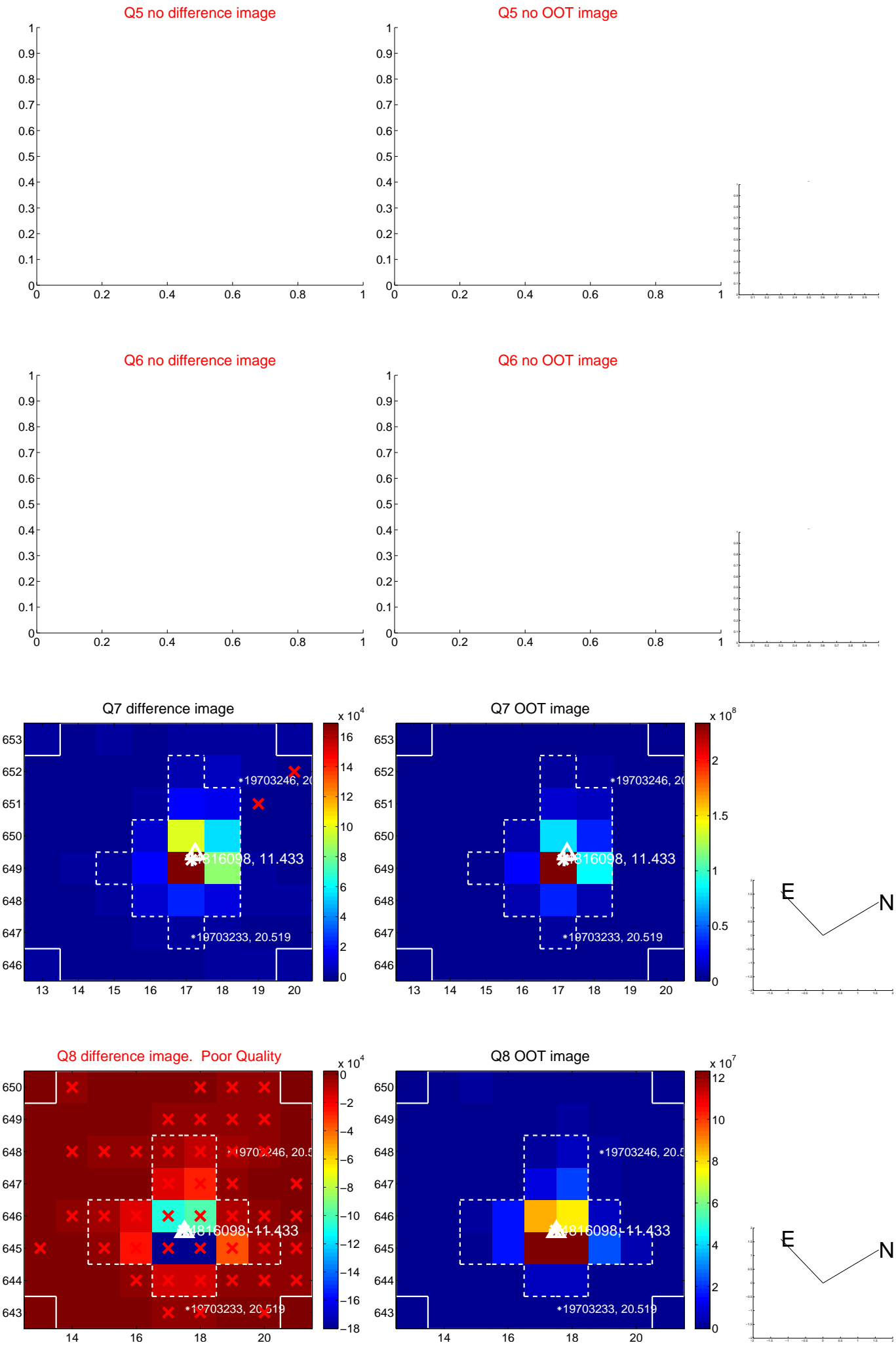


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

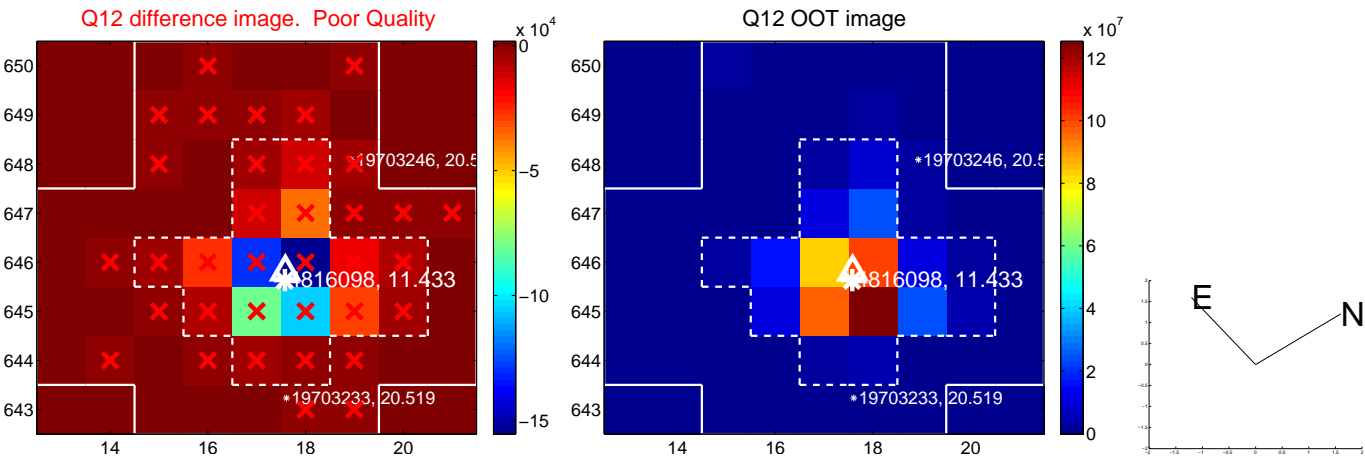
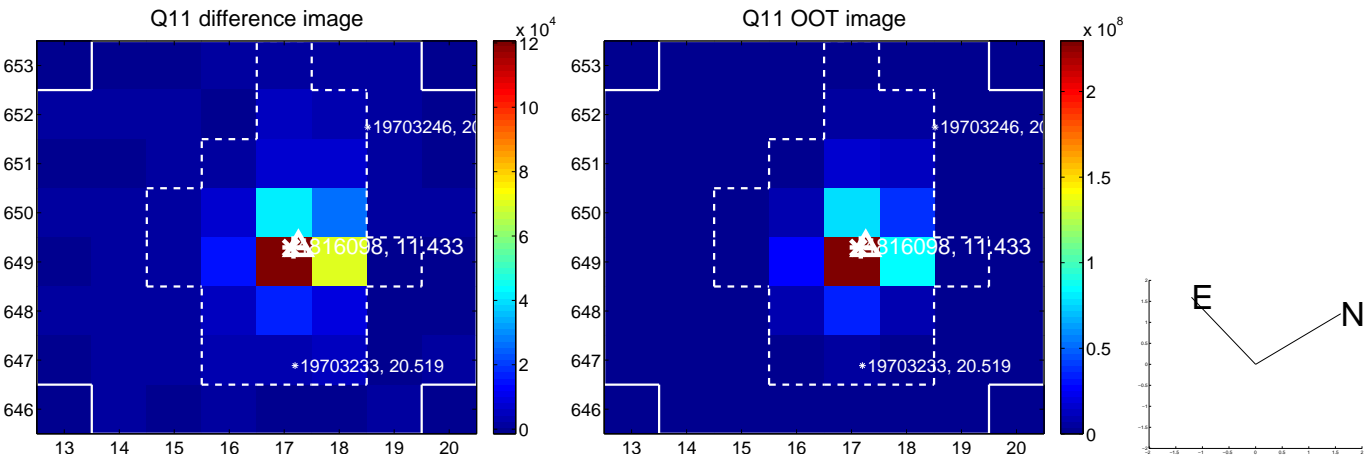
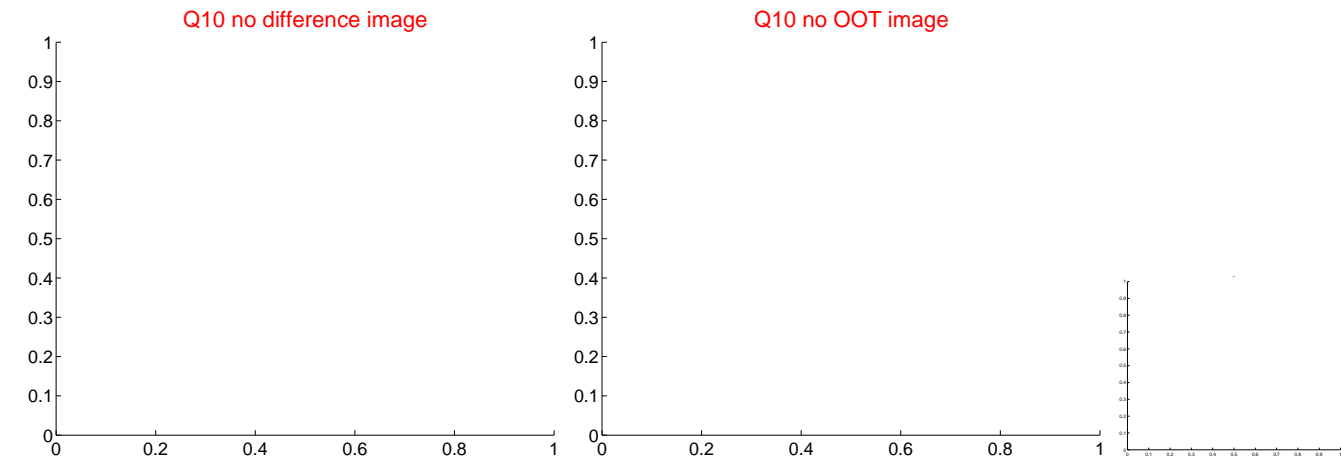
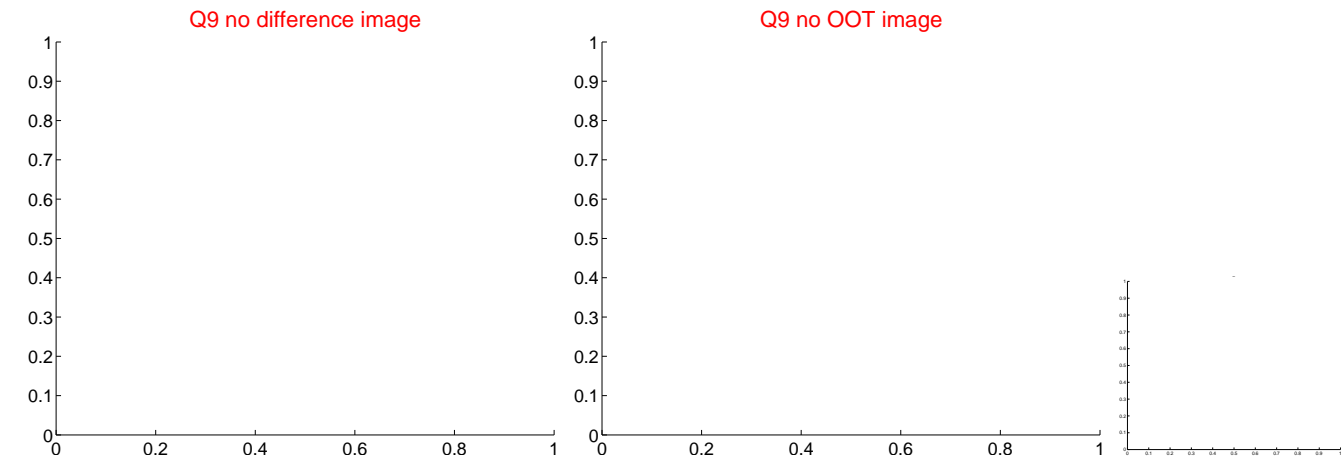
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



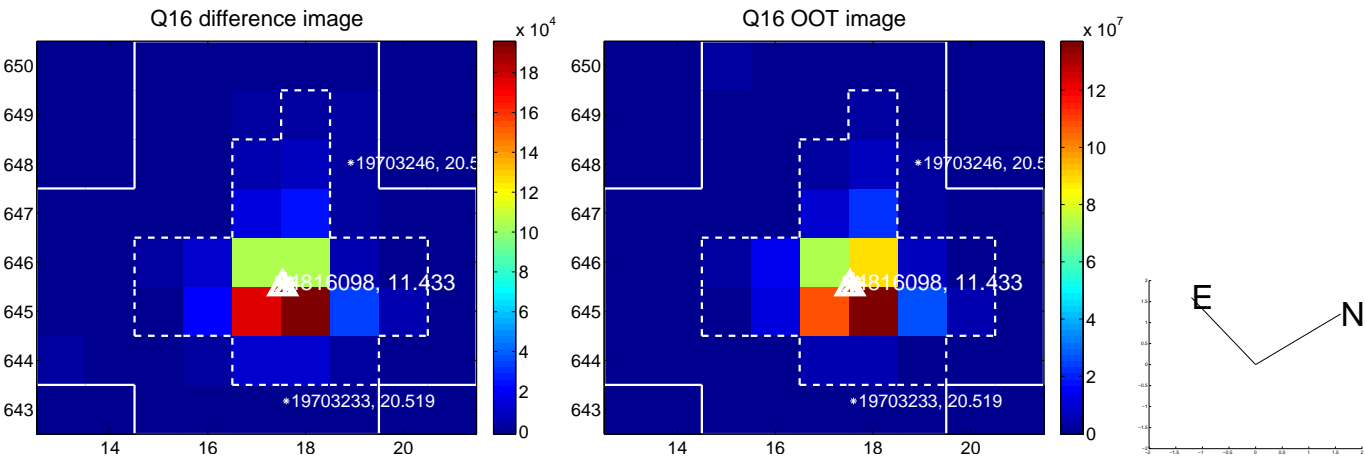
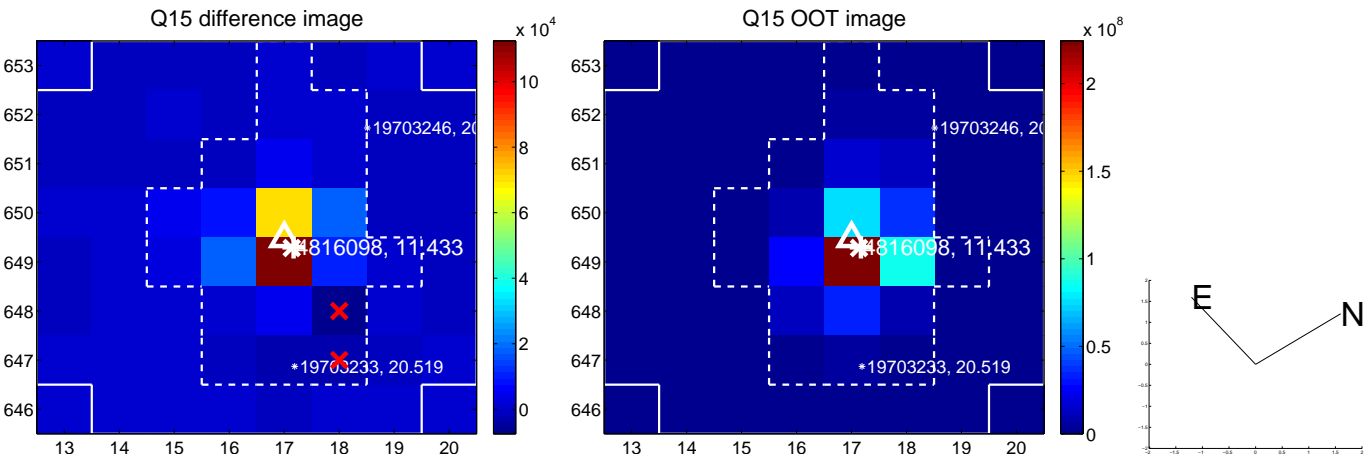
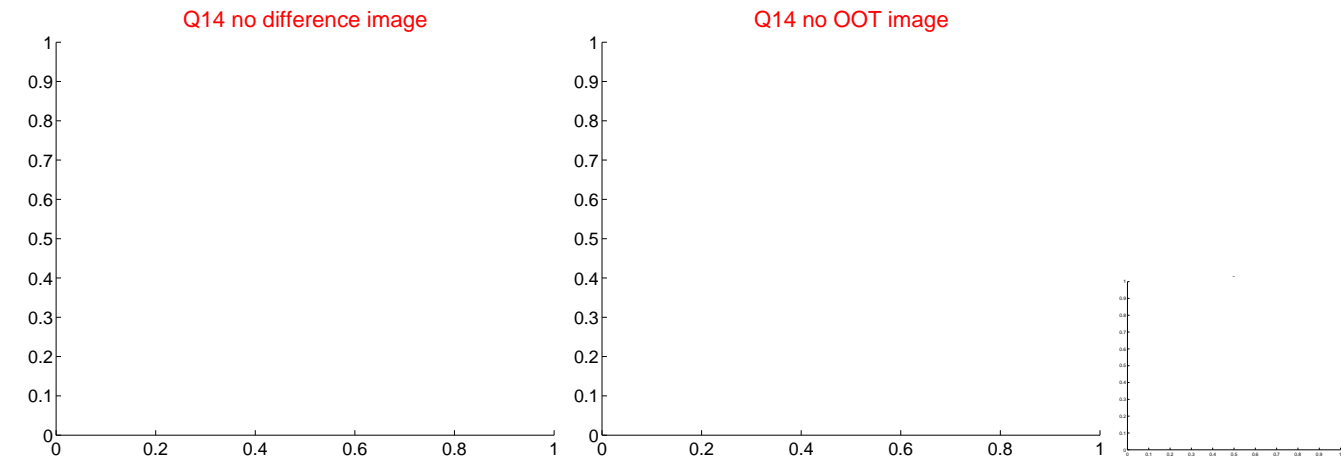
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



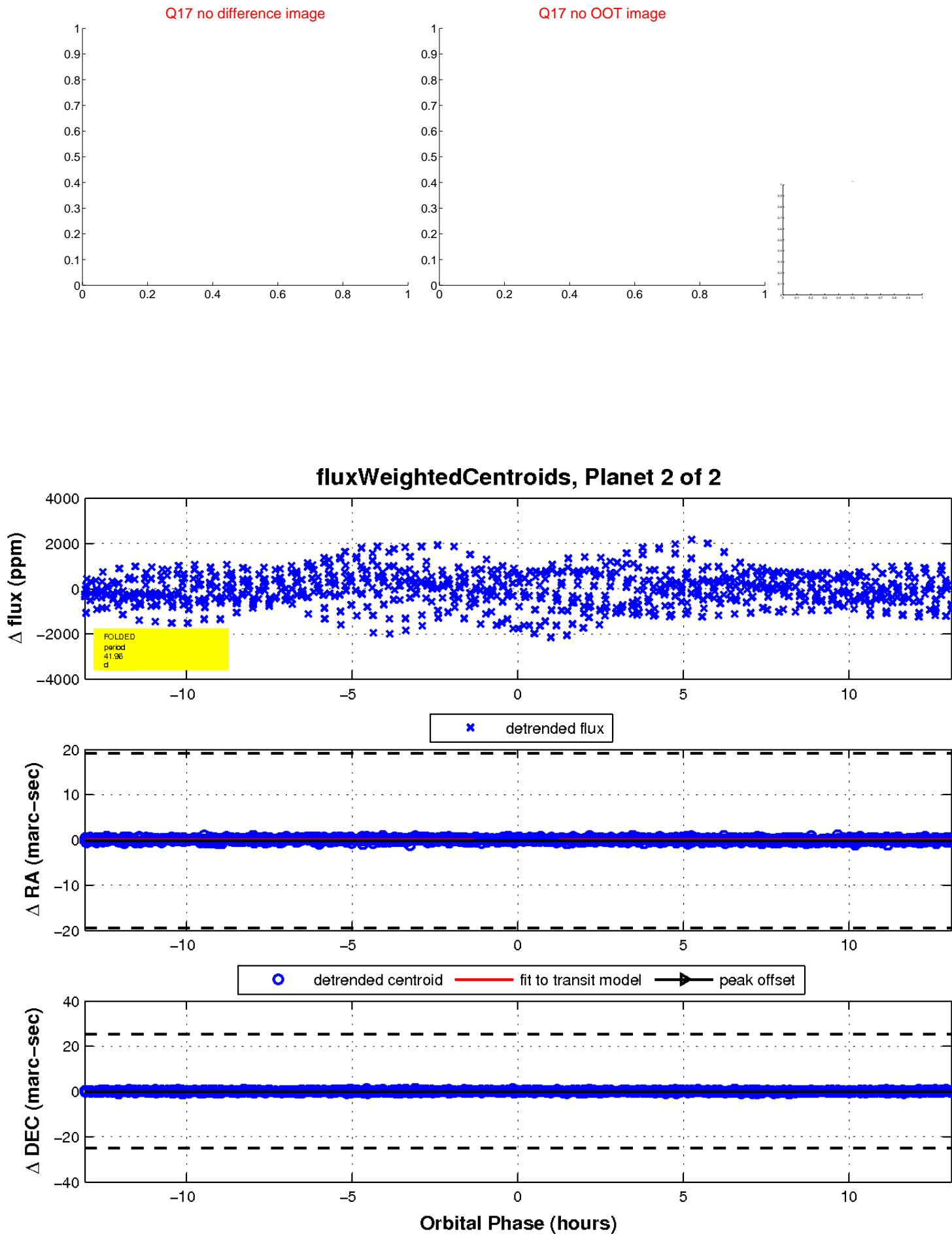
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



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



UKIRT Image

Declination

