

KIC 006864891

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})
006864891-01	OBS	5330.01	40.880128	163.360987	388.2	5.830	8.1	8.2	0.47	3746	1.04	1.18
006864891-02	OBS	No	40.878064	158.322141	480.0	7.843	7.6	8.6	0.47	3746	2.00	1.18

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006864891-01	OBS	FP	0.00	0	1	0	1	MOD_SEC_DV—HAS_SEC_TCE—EPHEM_MATCH
006864891-02	OBS	FP	0.00	1	1	1	1	IS_SEC_TCE—HALO_GHOST—EPHEM_MATCH

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 006864891-01

TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ($''$)	Δ Row	Δ Col	m_2	m_1	D_2/D_1	Mechanism	Flag	σ_P	σ_T
006864891-01	6864891	006864859-02	6864859	1:1	49.3	12	0	11.66	15.94	655.74	Direct-PRF	0	1.25	1.28

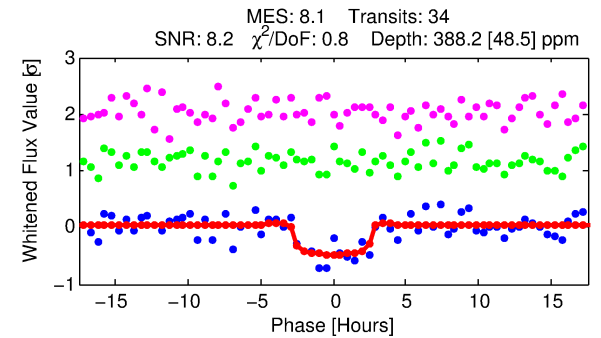
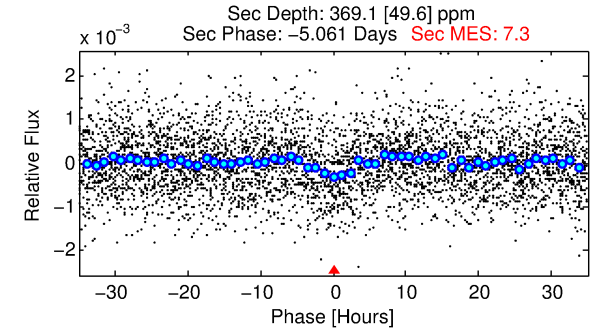
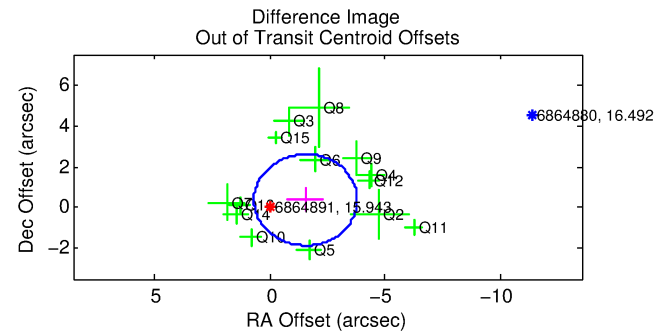
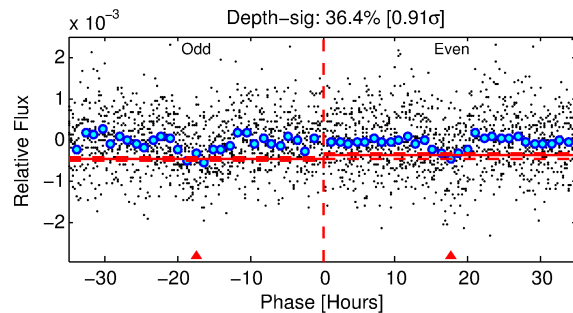
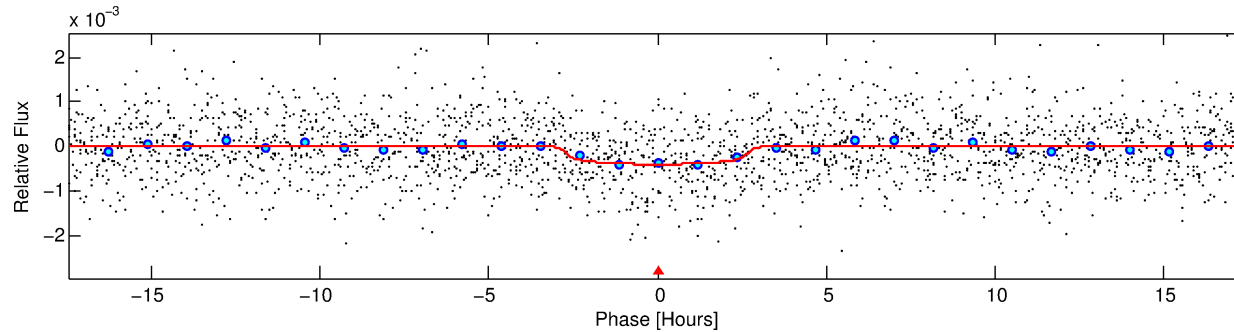
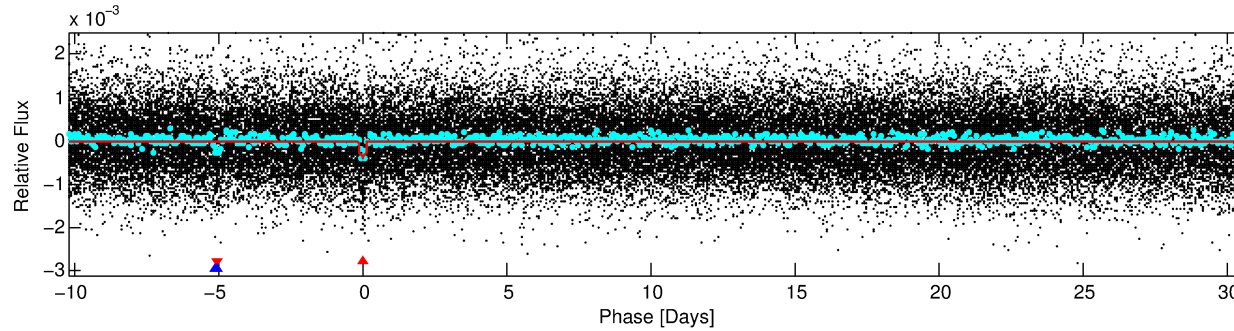
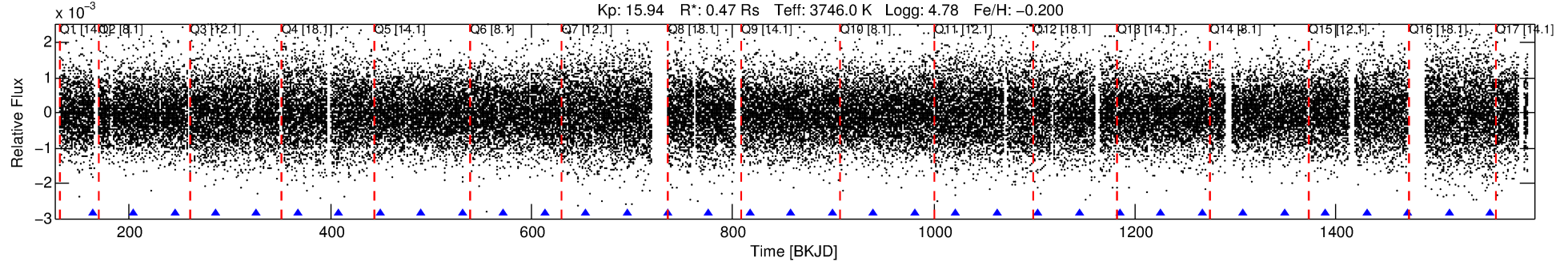
Notes: $P_1:P_2$ is the period ratio. Dist is the distance in arcseconds. Δ Row and Δ Col are the number of pixels apart in row and column. m_2 and m_1 are the magnitudes of the parent and child. D_2/D_1 is the parent's transit depth divided by the child's. σ_P and σ_T are the significance of the match in period and epoch. For a match to be considered significant $\sigma_P < 5.0$ and $\sigma_T < 5.0$. Matches which have σ_P and σ_T very close to this cutoff should receive extra scrutiny, especially if the period ratio is very large.

DV One-Page Summary

KIC: 6864891 Candidate: 1 of 2 Period: 40.880 d

KOI: K05330.01 Corr: 0.944

Kp: 15.94 R*: 0.47 Rs Teff: 3746.0 K Logg: 4.78 Fe/H: -0.200



DV Fit Results:

Period = 40.88013 [0.00063] d
Epoch = 163.3610 [0.0122] BKJD
Rp/R* = 0.0204 [0.0082]
a/R* = 31.06 [58.13]
b = 0.84 [0.66]
Seff = 1.18 [0.12]
Teq = 266 [7] K
Rp = 1.04 [0.43] Re
a = 0.1816 [0.0108] AU
Ag = 6156.80 [5075.64] [1.21σ]
Teffp = 3637 [748] K [4.51σ]

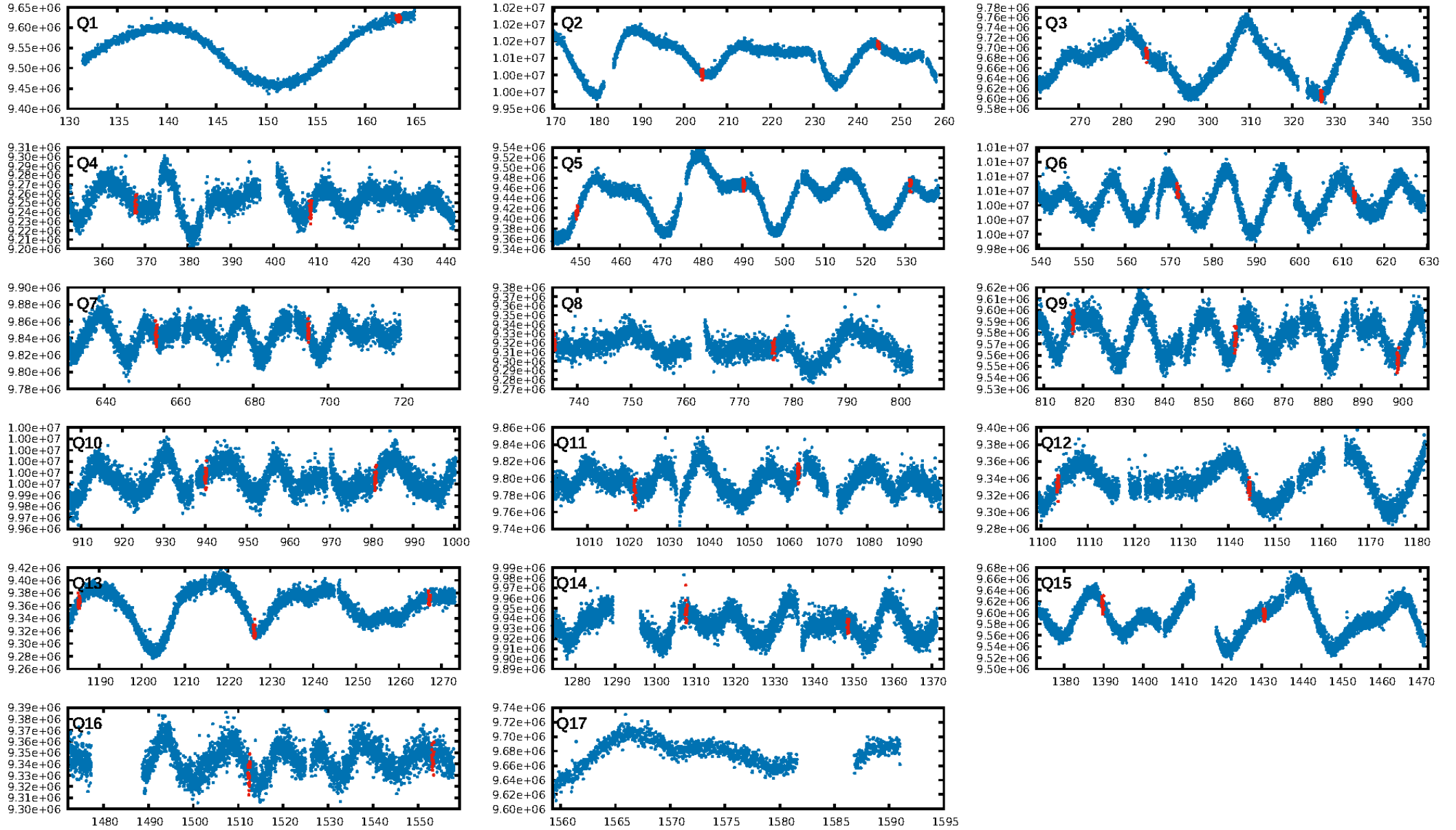
DV Diagnostic Results:

ShortPeriod-sig: 0.4% [0.01σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 32.6%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 7.61e-16
RollingBand-fgt: 1.00 [33/33]
GhostDiagnostic-chr: 0.3965
Centroid-sig: 0.1%
Centroid-so: 2.989 arcsec [2.18σ]
OotOffset-rm: 1.595 arcsec [2.14σ]
OotOffset-st: 4/4/4/2 [14]
KicOffset-rm: 1.672 arcsec [2.24σ]
KicOffset-st: 4/4/4/2 [14]
DiffImageQuality-fgm: 0.14 [2/14]
DiffImageOverlap-fno: 1.00 [15/15]

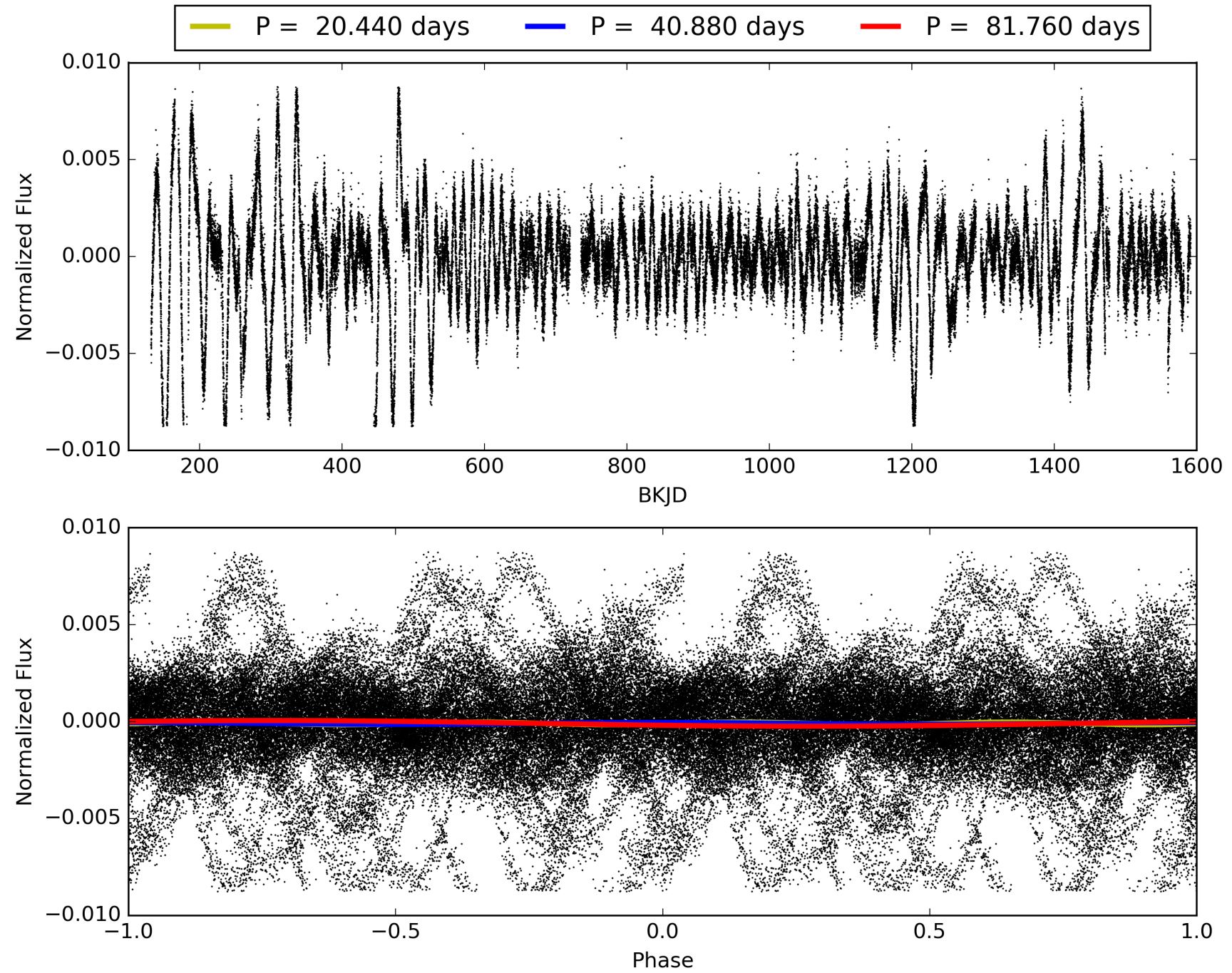
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 07:05:12 Z

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

TCE 006864891-01, PDC Light Curves

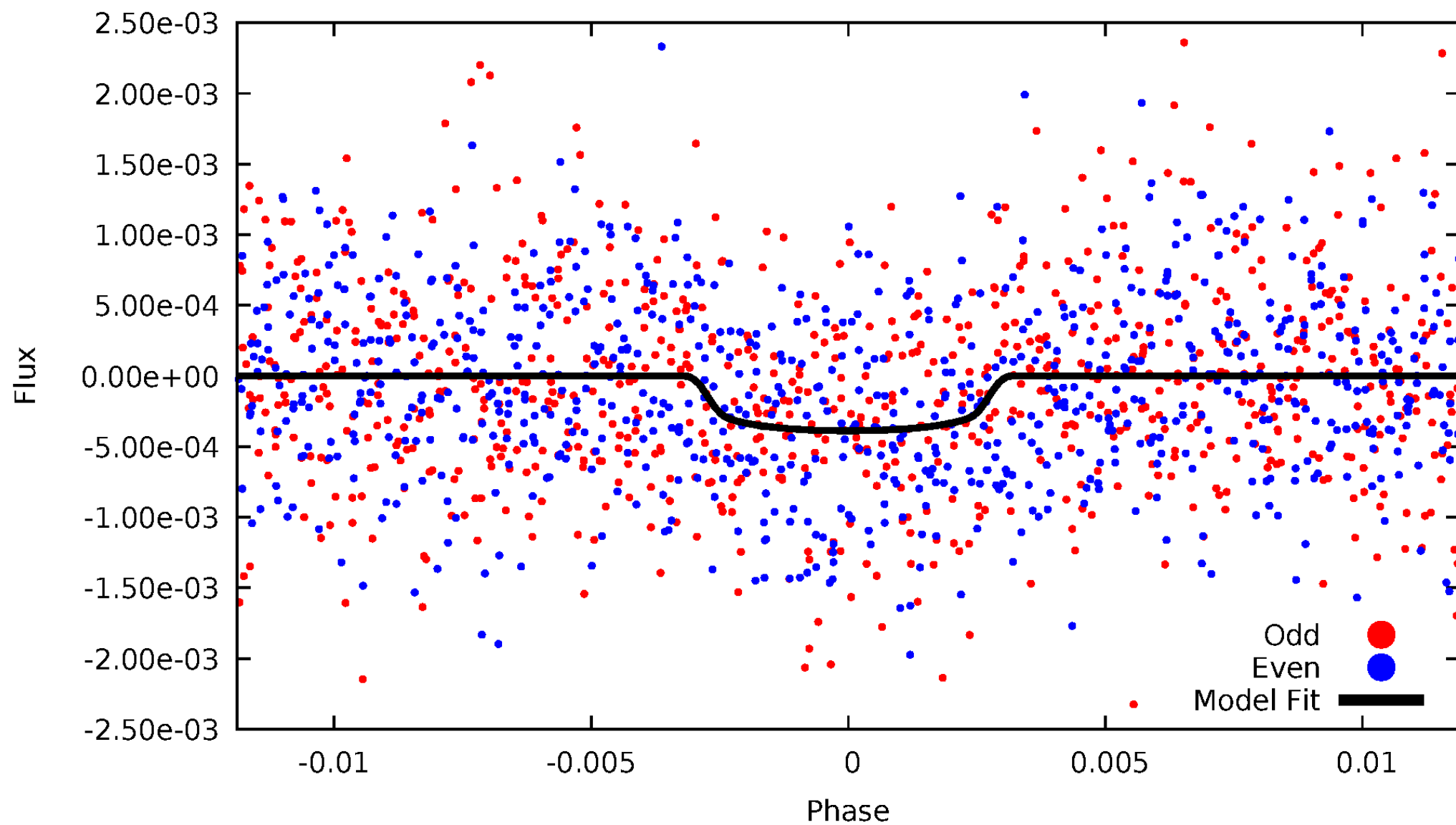


TCE 006864891-01



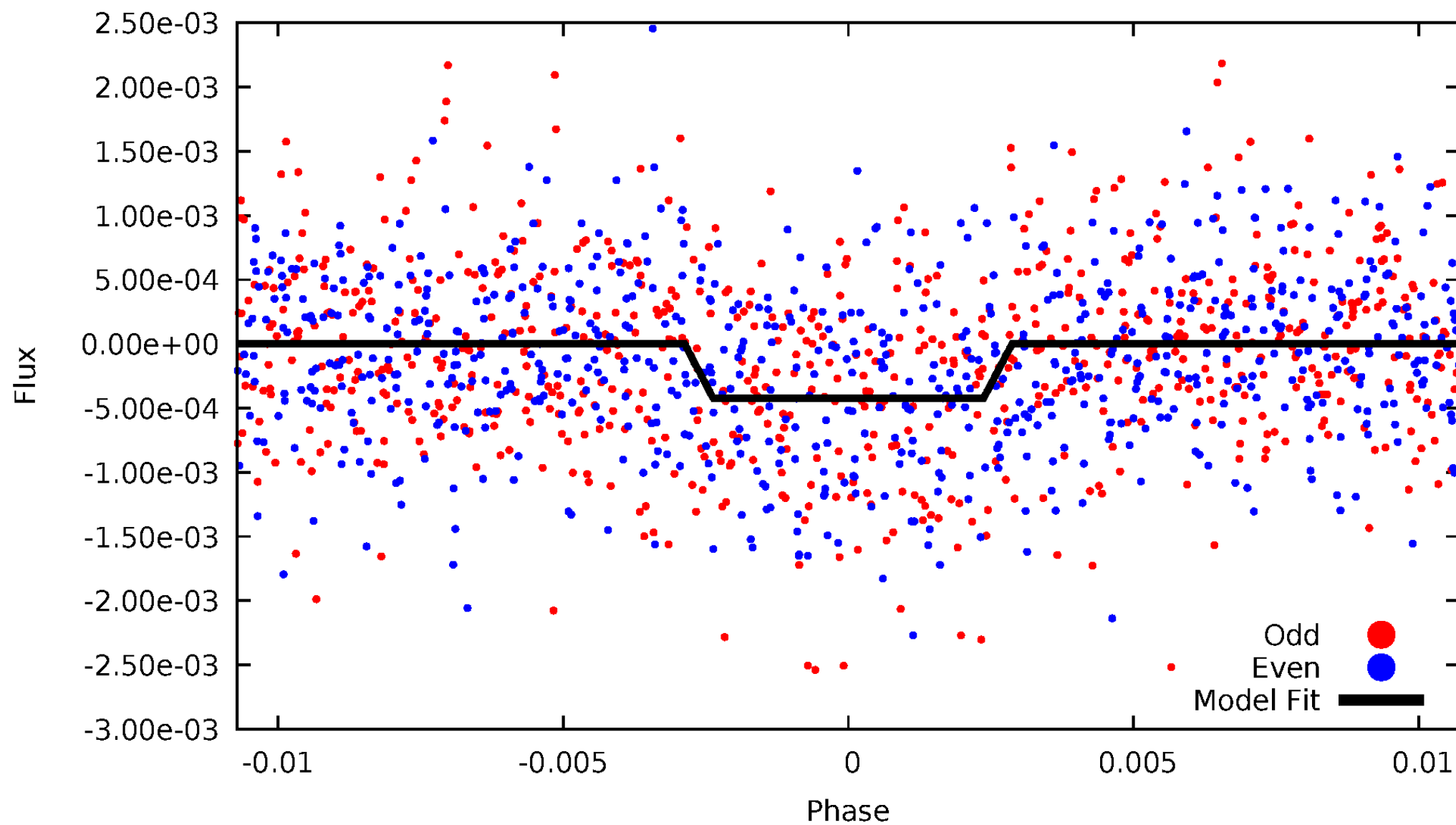
DV Odd/Even

TCE 006864891-01



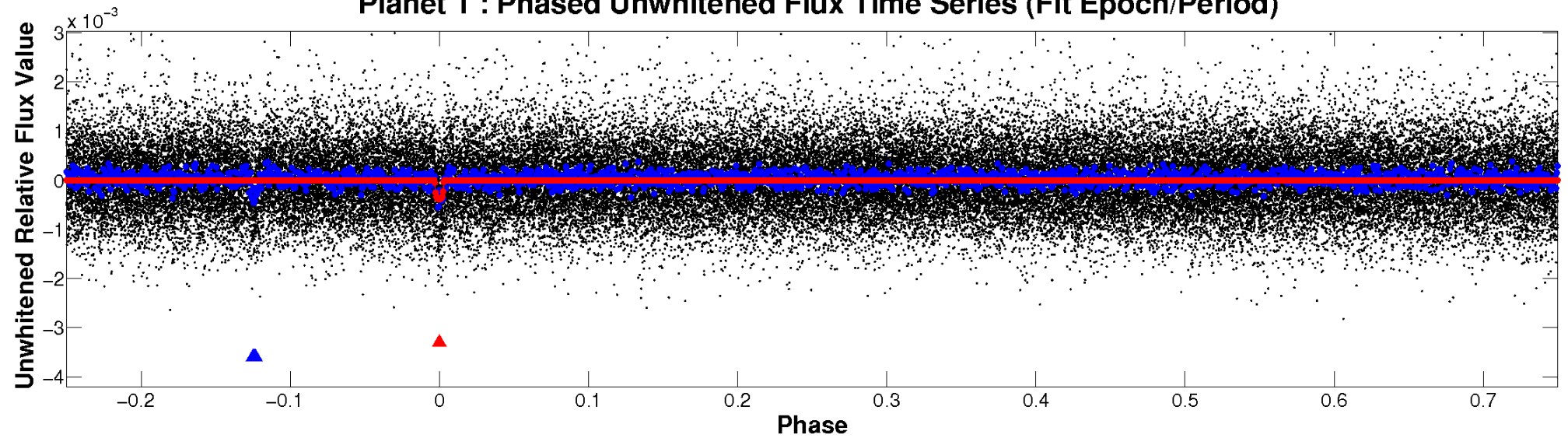
ALT Odd/Even

TCE 006864891-01

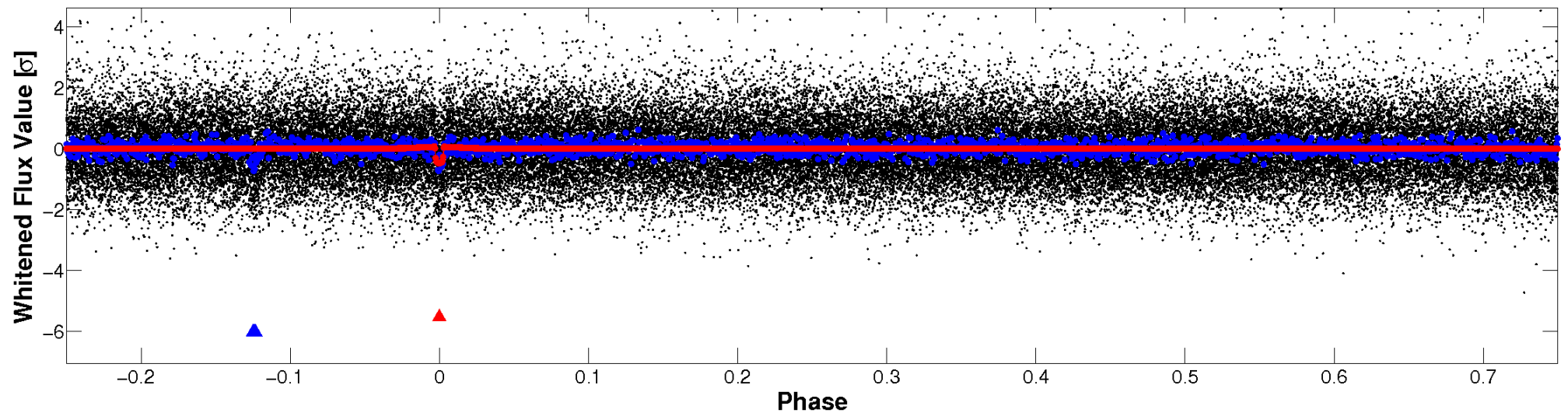


Non-Whitened Vs. Whitened Light Curve

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

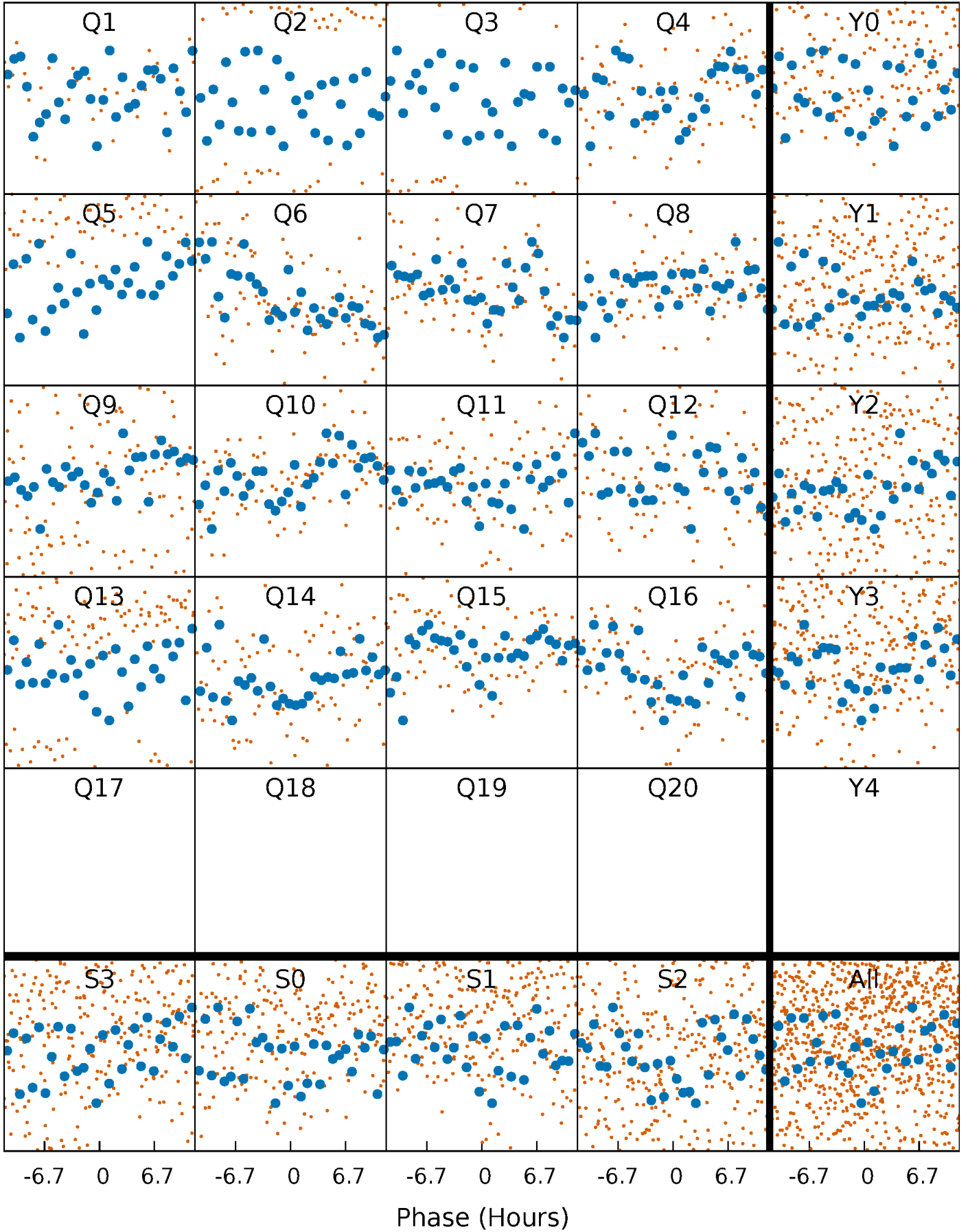


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



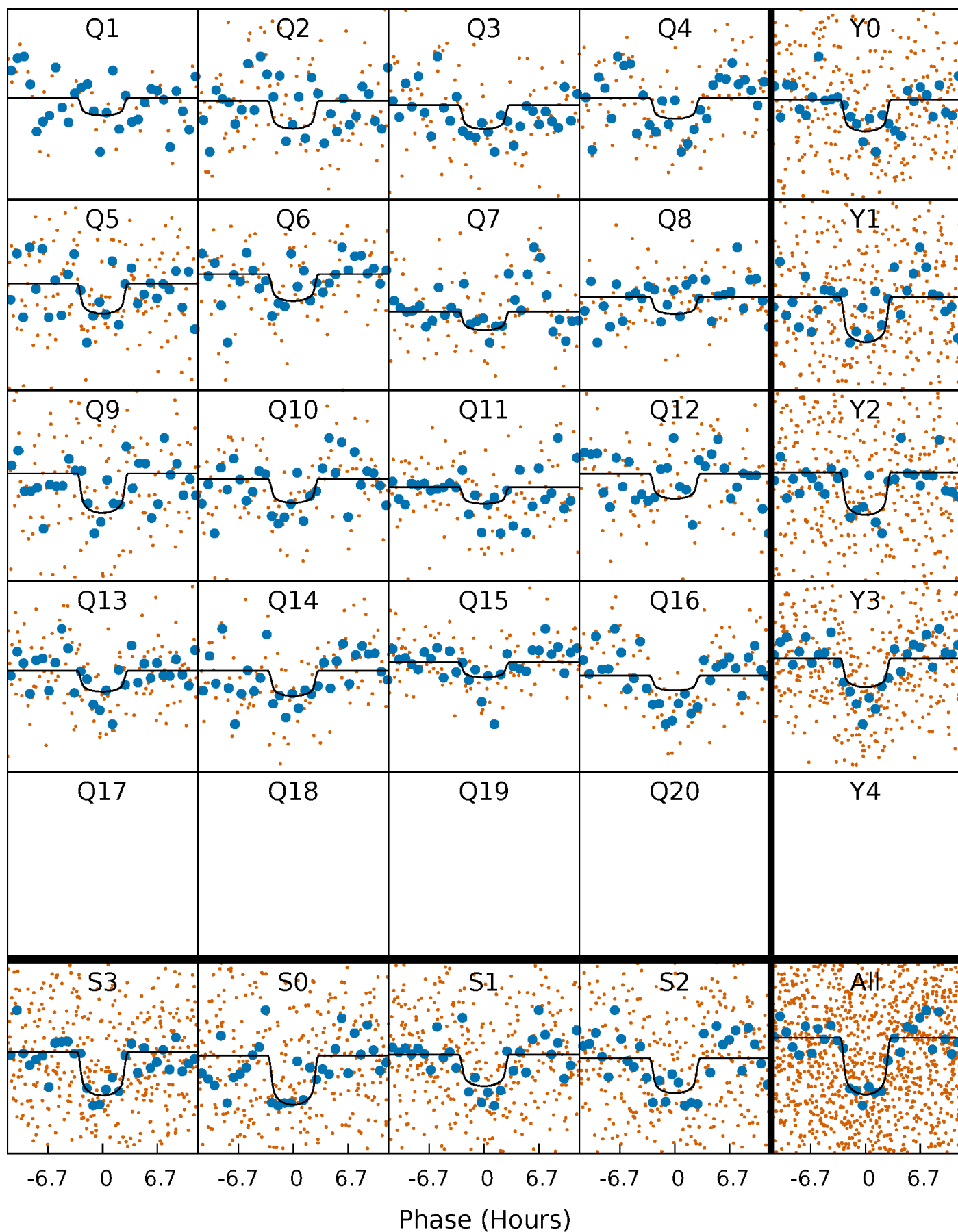
PDC Quarter-Phased Transit Curves

TCE 006864891-01 P= 40.880128 Days $T_0=163.360987$ (BKJD)



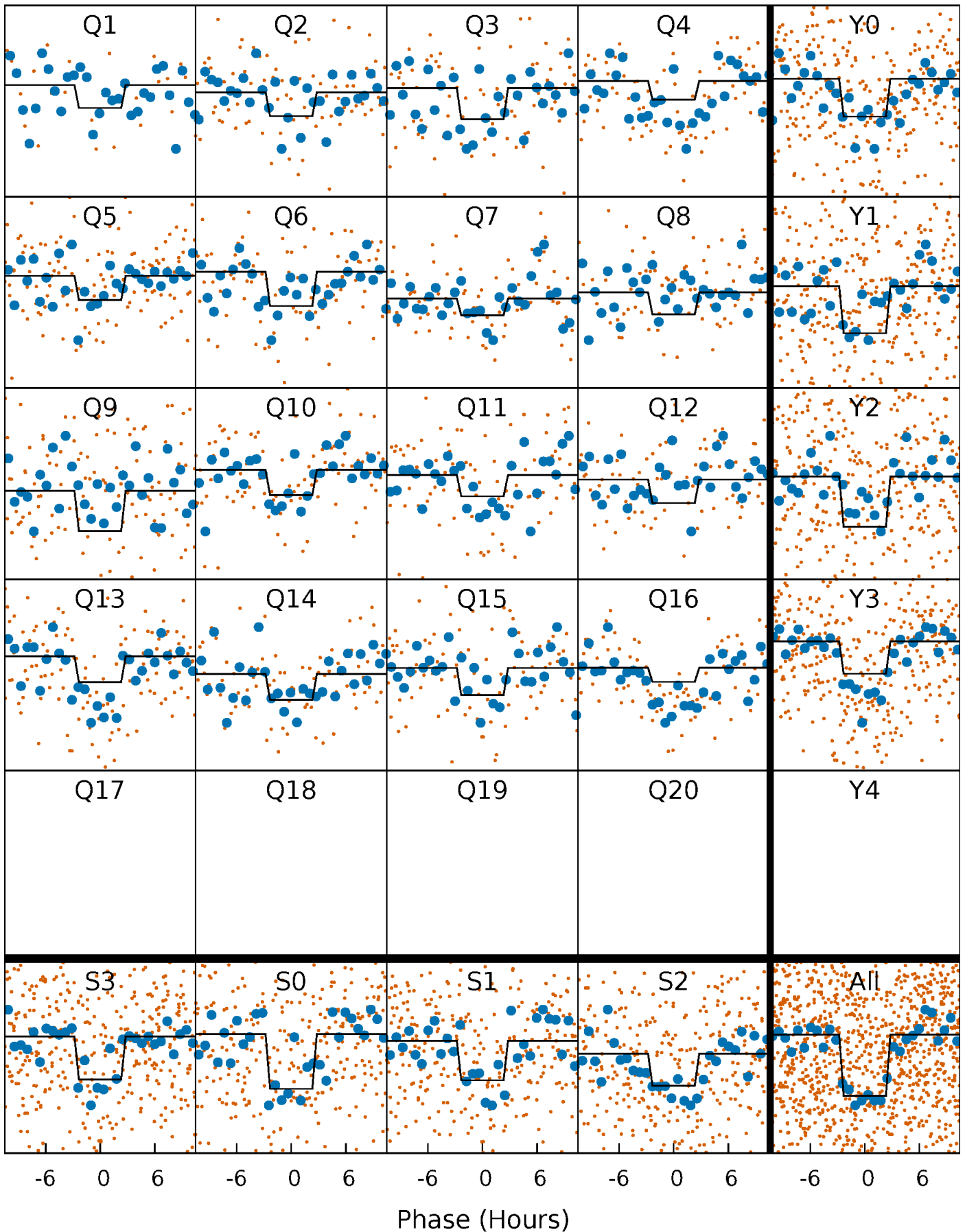
DV Quarter-Phased Transit Curves

TCE 006864891-01 P= 40.880128 Days $T_0=163.360987$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

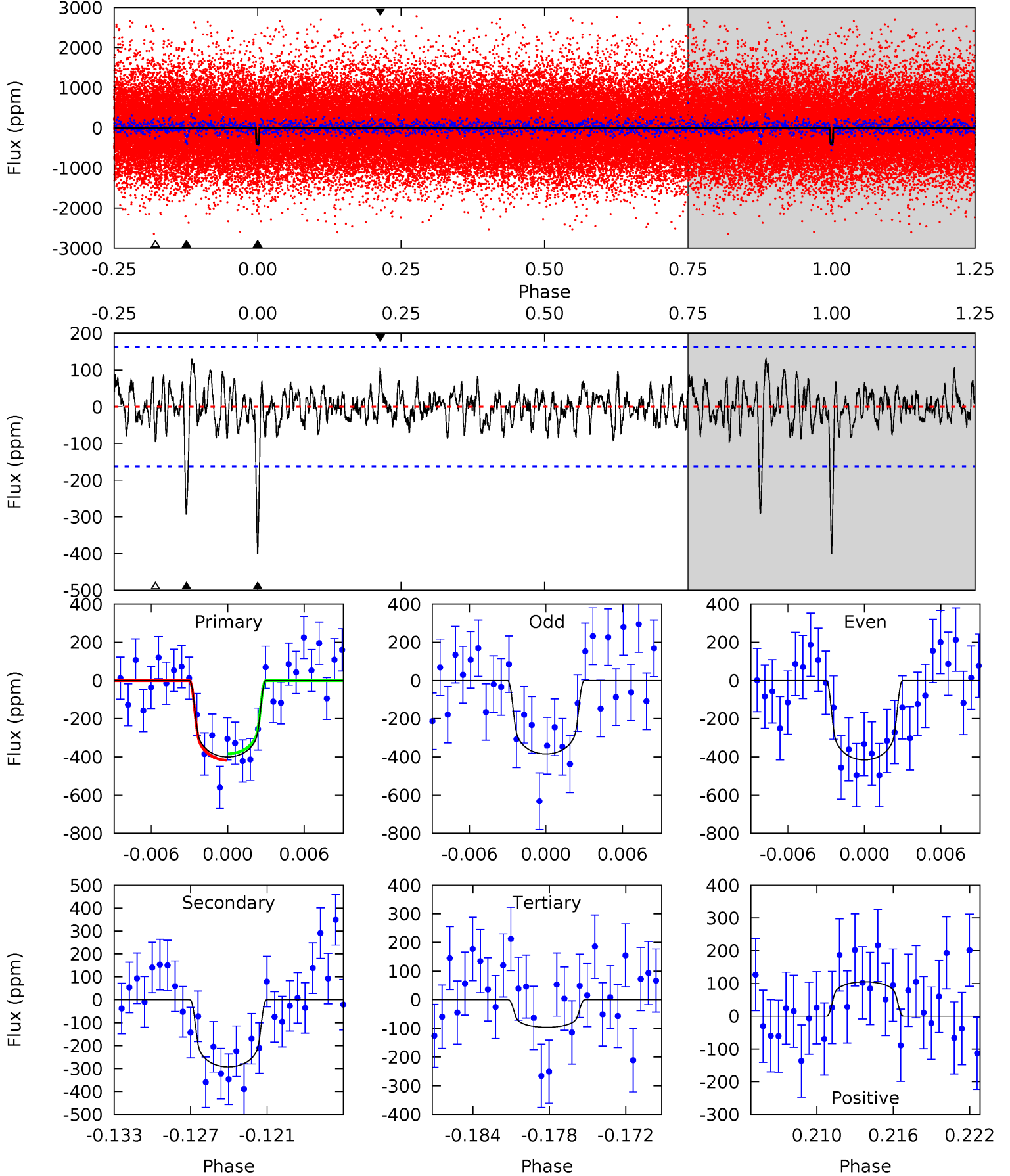
TCE 006864891-01 P= 40.879633 Days $T_0=163.366669$ (BKJD)



DV Model-Shift Uniqueness Test

006864891-01, P = 40.880128 Days, E = 122.480859 Days

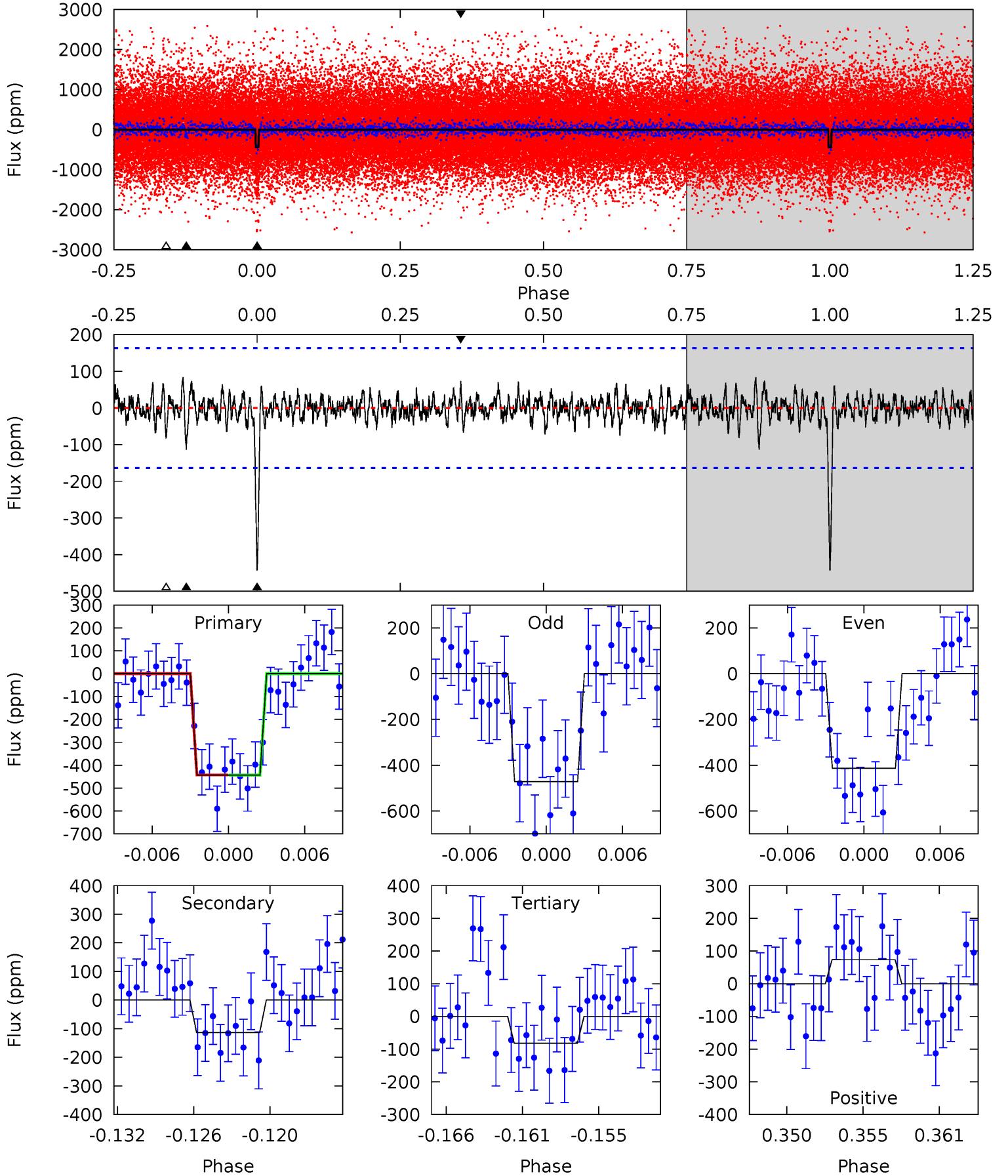
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.6	9.20	3.01	3.29	5.11	2.73	1.19	9.56	9.28	6.18	5.91	0.49	0.98	0.25	0.52



Alt Model-Shift Uniqueness Test

006864891-01, $P = 40.879633$ Days, $E = 122.487036$ Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.9	3.56	2.58	2.30	5.13	2.76	0.79	11.3	11.6	0.98	1.26	0.92	1.17	0.16	0.01



Stellar Parameters For KIC 006864891

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	3746^{+59}_{-59}	$4.775^{+0.042}_{-0.025}$	$-0.200^{+0.100}_{-0.100}$	$0.469^{+0.028}_{-0.035}$	$0.480^{+0.029}_{-0.031}$	$6.527^{+1.175}_{-0.741}$
	+2%/-2%	+1%/-1%	+50%/-50%	+6%/-7%	+6%/-6%	+18%/-11%
Source	PHO2	PHO2	PHO2	DSEP		

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

Secondary Eclipse Parameters for KIC 006864891-01 / KOI 5330.01

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-293 ± 32	$1.03^{+0.44}_{-0.44}$	370^{+7}_{-8}	3568^{+741}_{-402}	5158^{+10044}_{-2748}
Alt.	-113 ± 32	$1.03^{+0.41}_{-0.40}$	370^{+7}_{-8}	3053^{+536}_{-297}	1870^{+3341}_{-997}

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

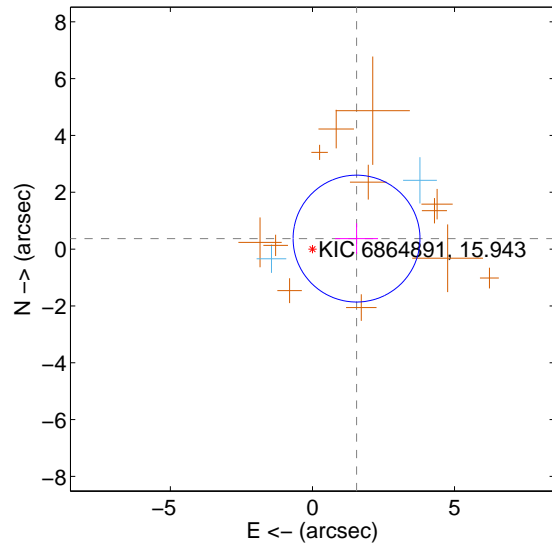
Supplemental centroid analysis for 006864891-01. Kepler magnitude: 15.94. Transit SNR 8.21

There are 2 quarters with good PRF difference image offsets

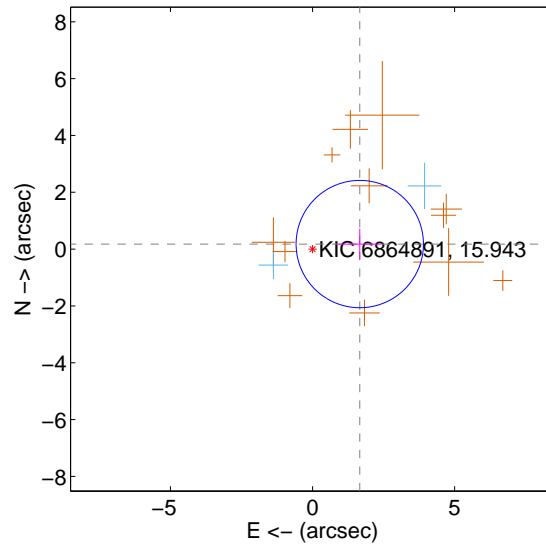
The direct PRF centroid is offset from the target star catalog position by about 0.39 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.595 ± 0.744	2.14	-1.552 ± 0.754	0.369 ± 0.542
PRF-fit source offset from KIC position	1.672 ± 0.747	2.24	-1.663 ± 0.749	0.177 ± 0.542
photometric centroid source offset	2.99 ± 1.37	2.18	-2.08 ± 1.43	2.15 ± 1.31

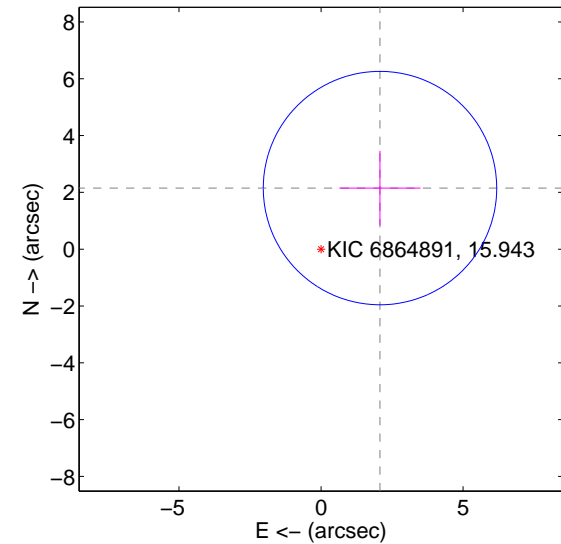
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

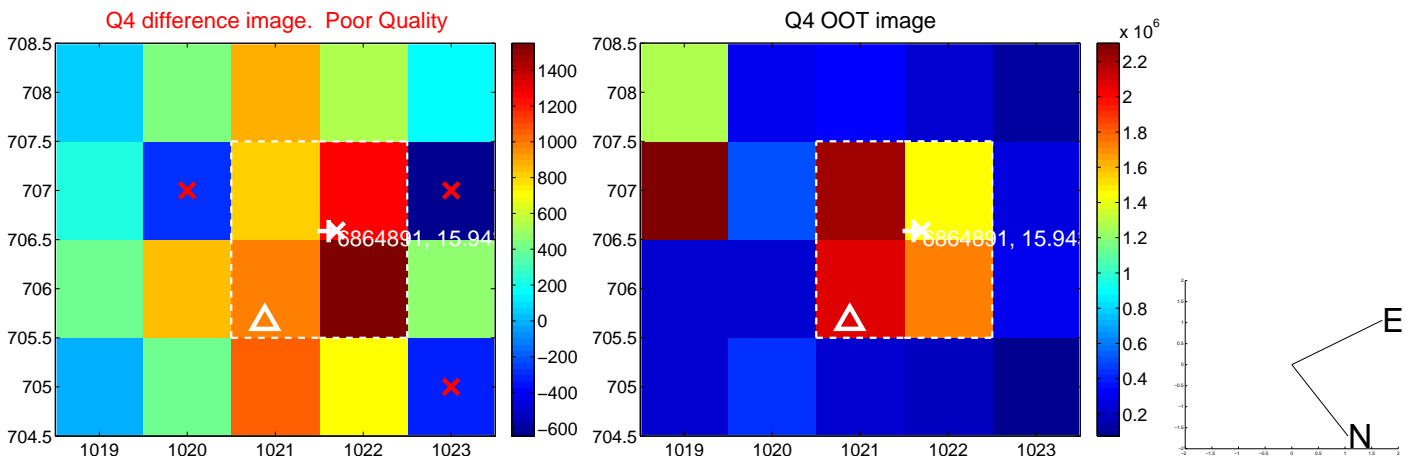
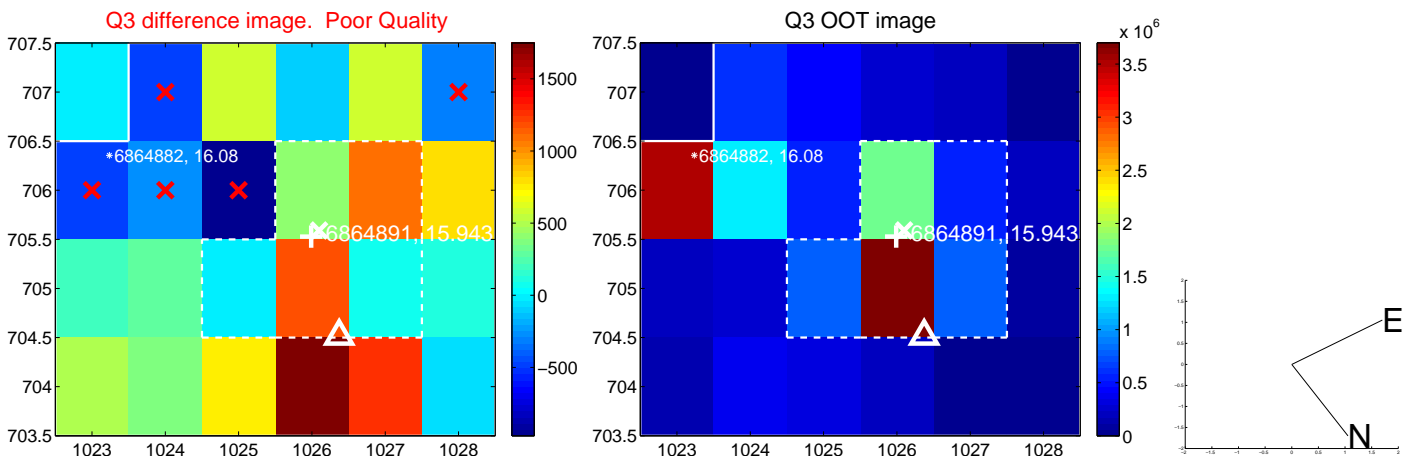
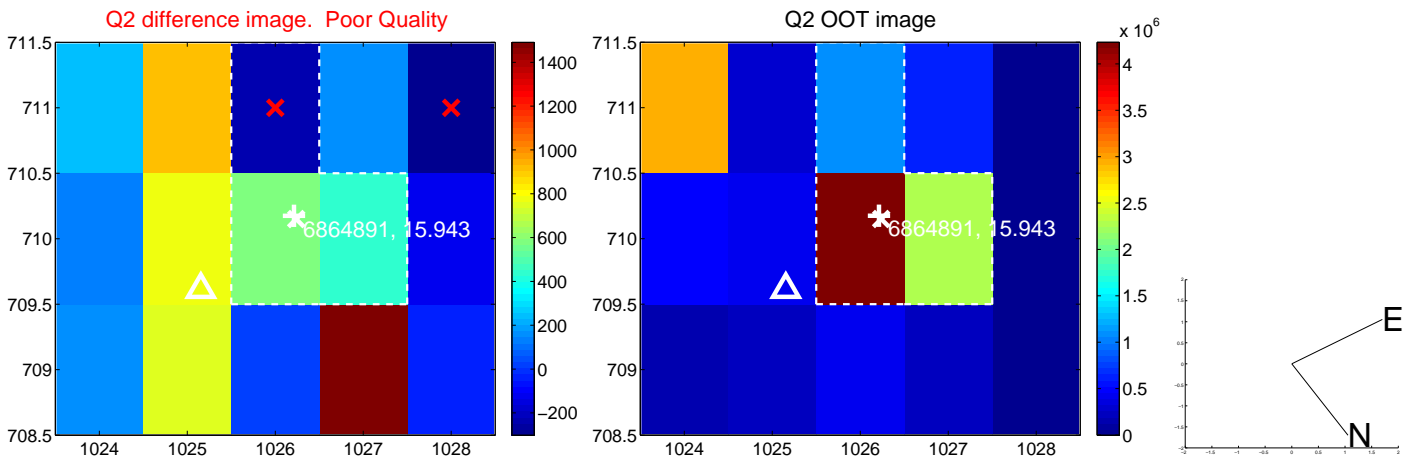
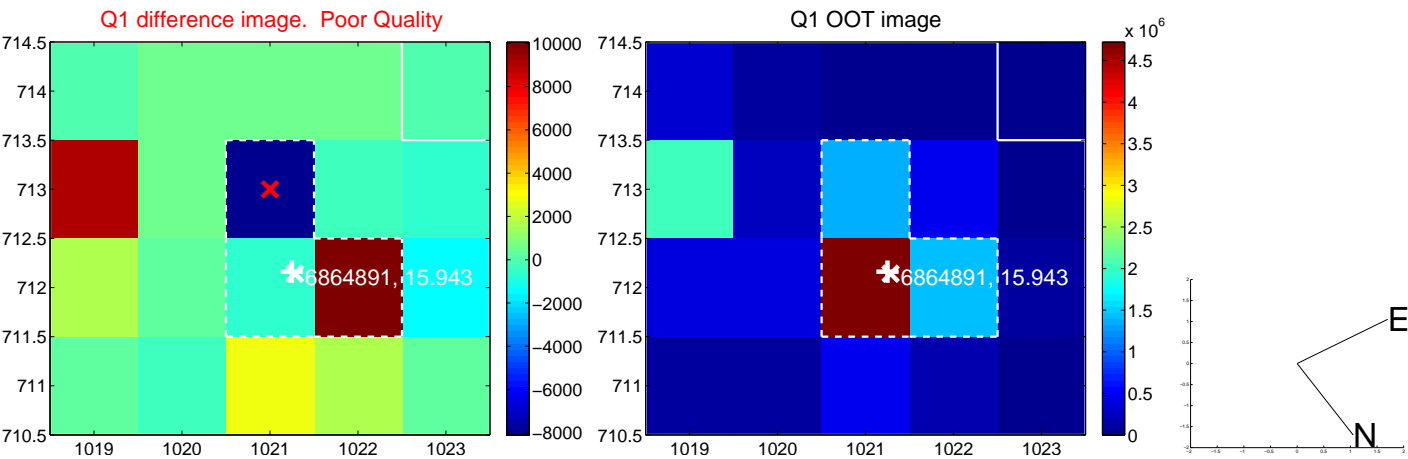


offset from photometric centroids

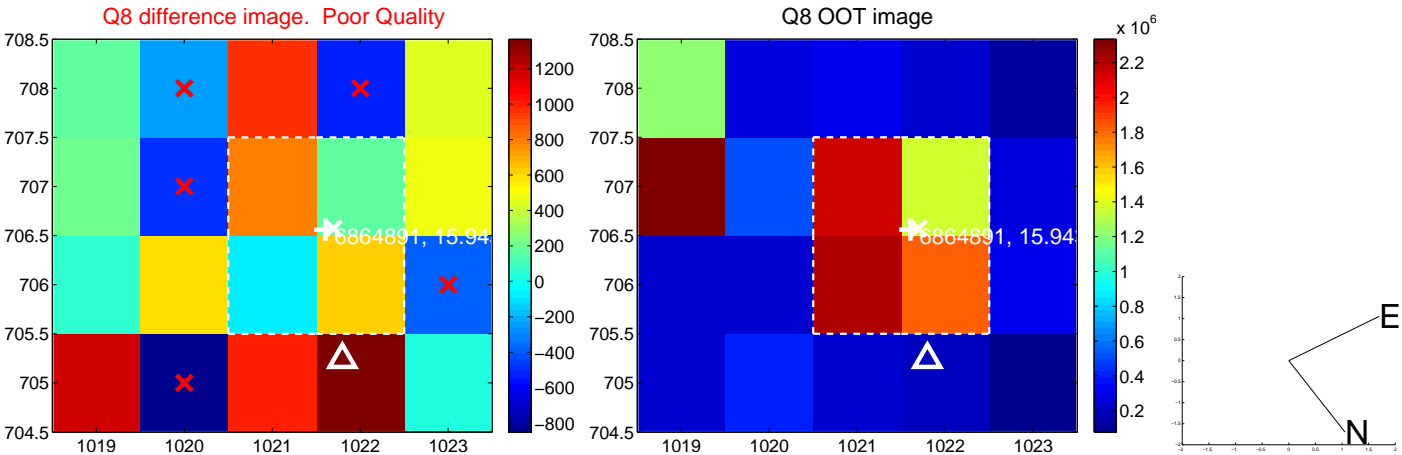
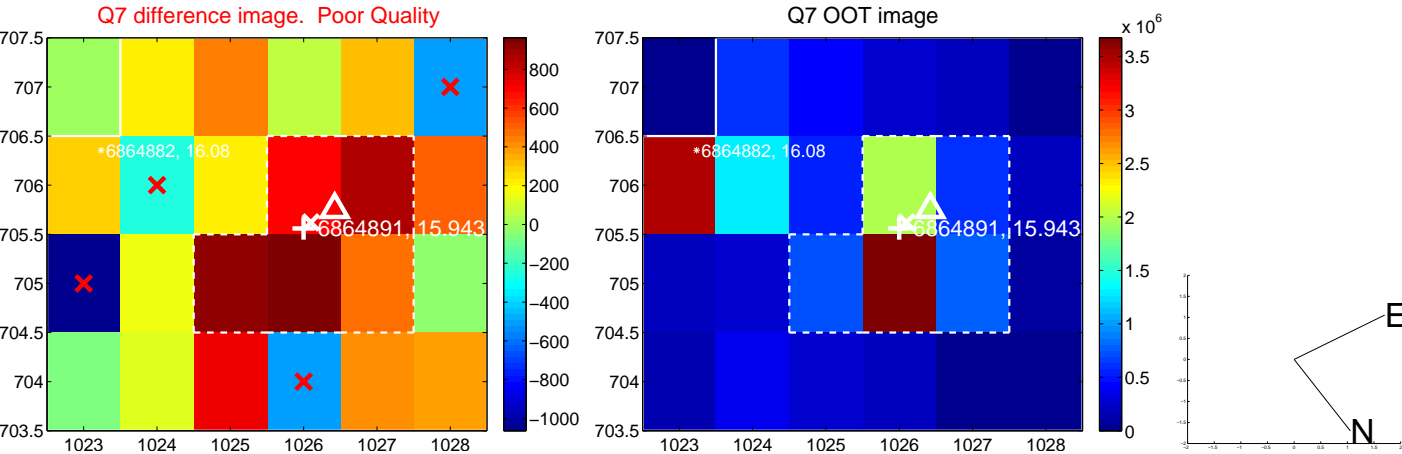
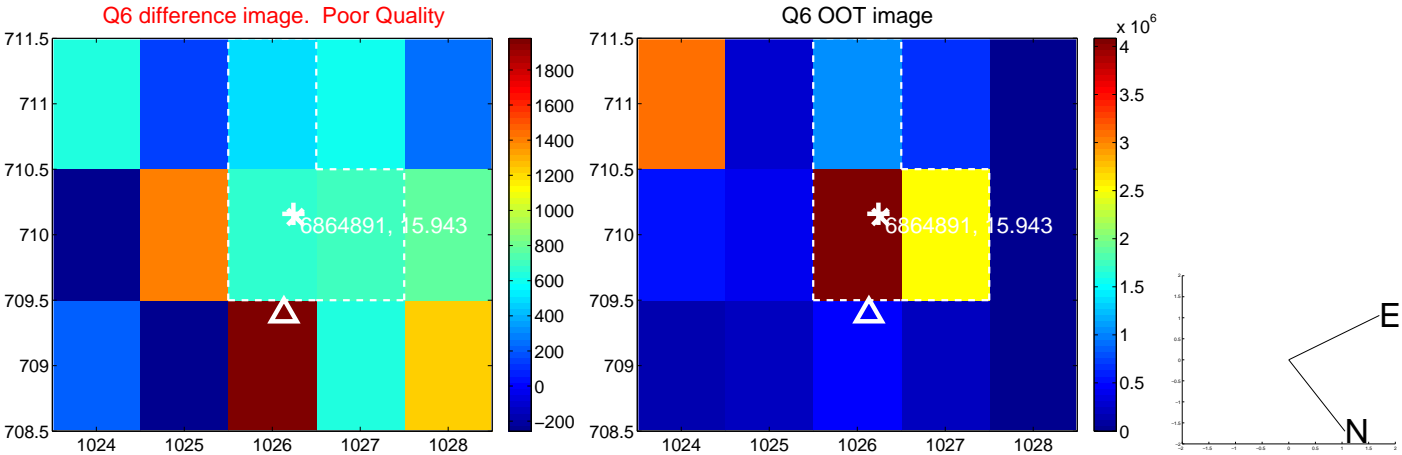
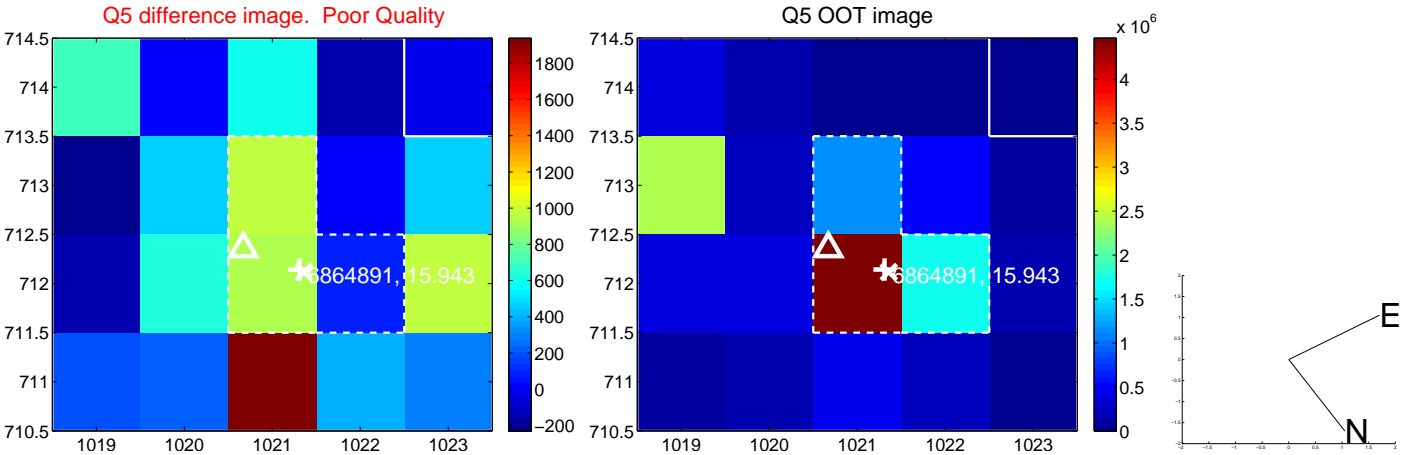


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

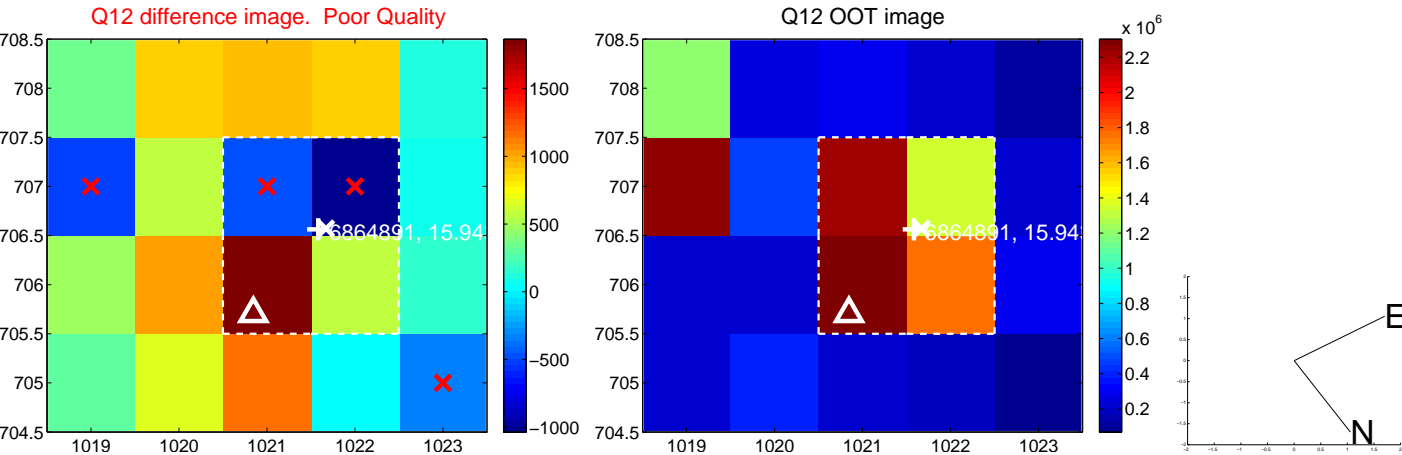
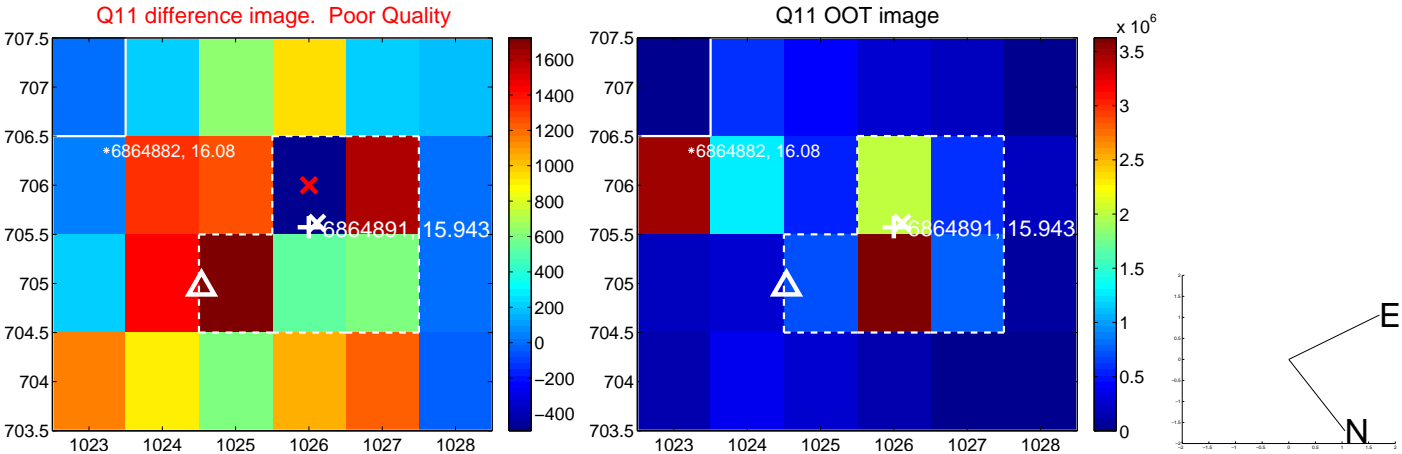
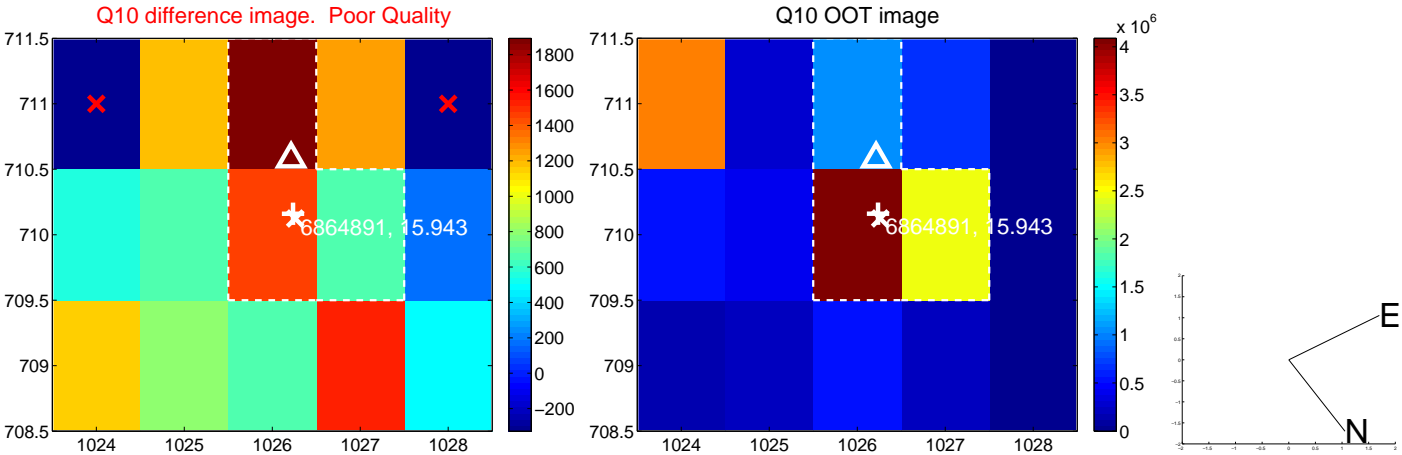
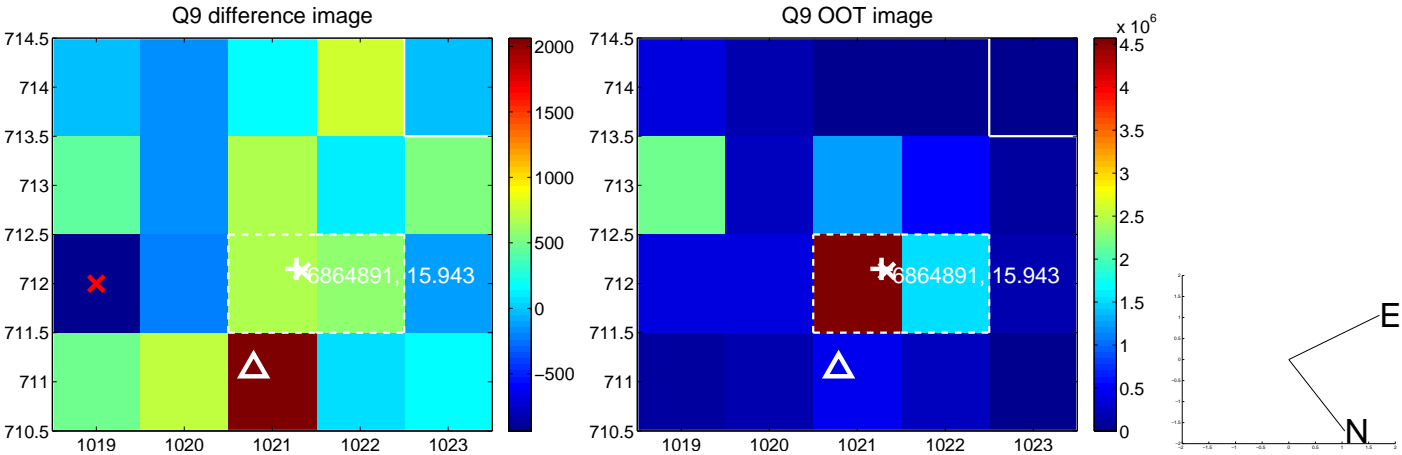
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



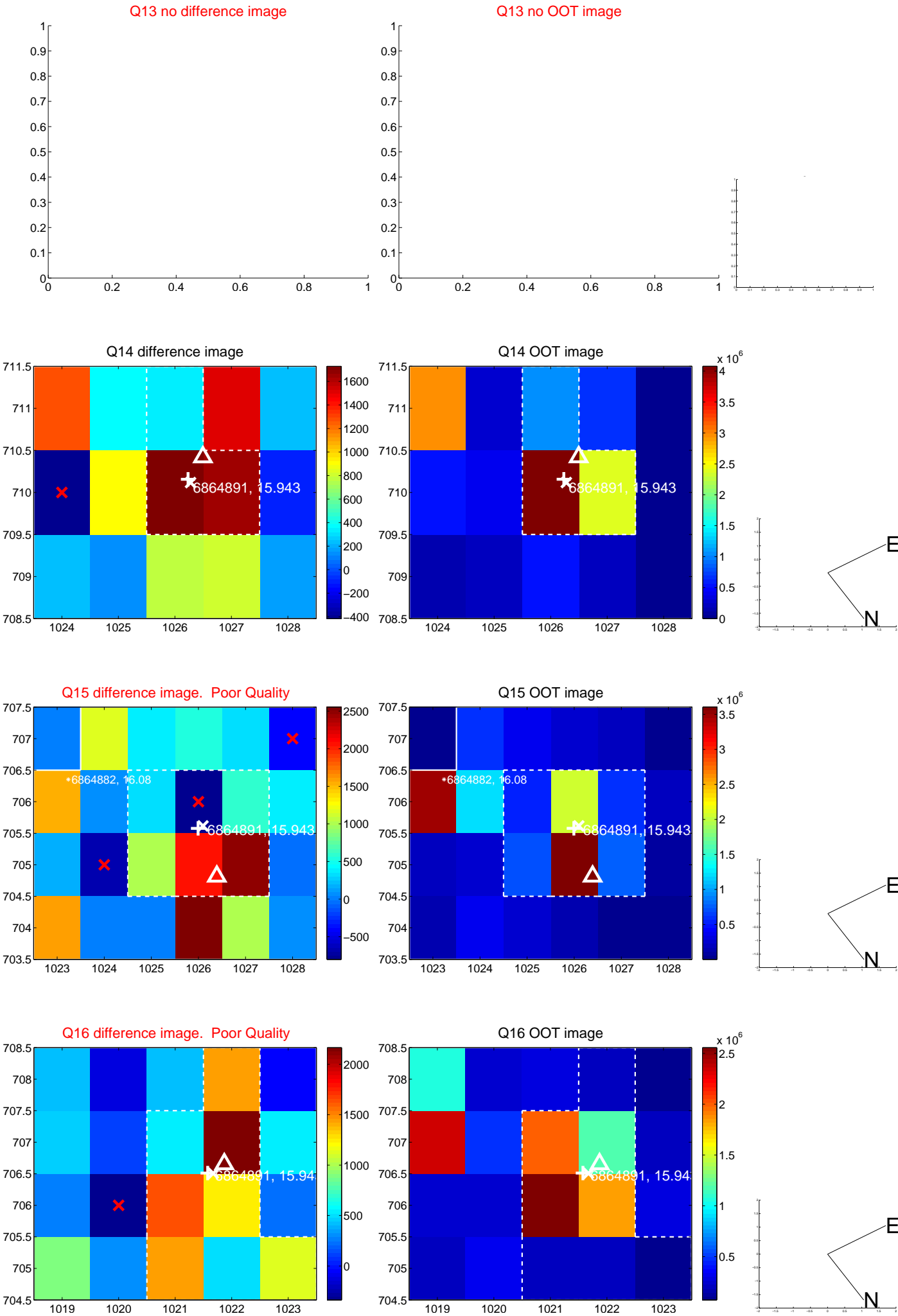
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



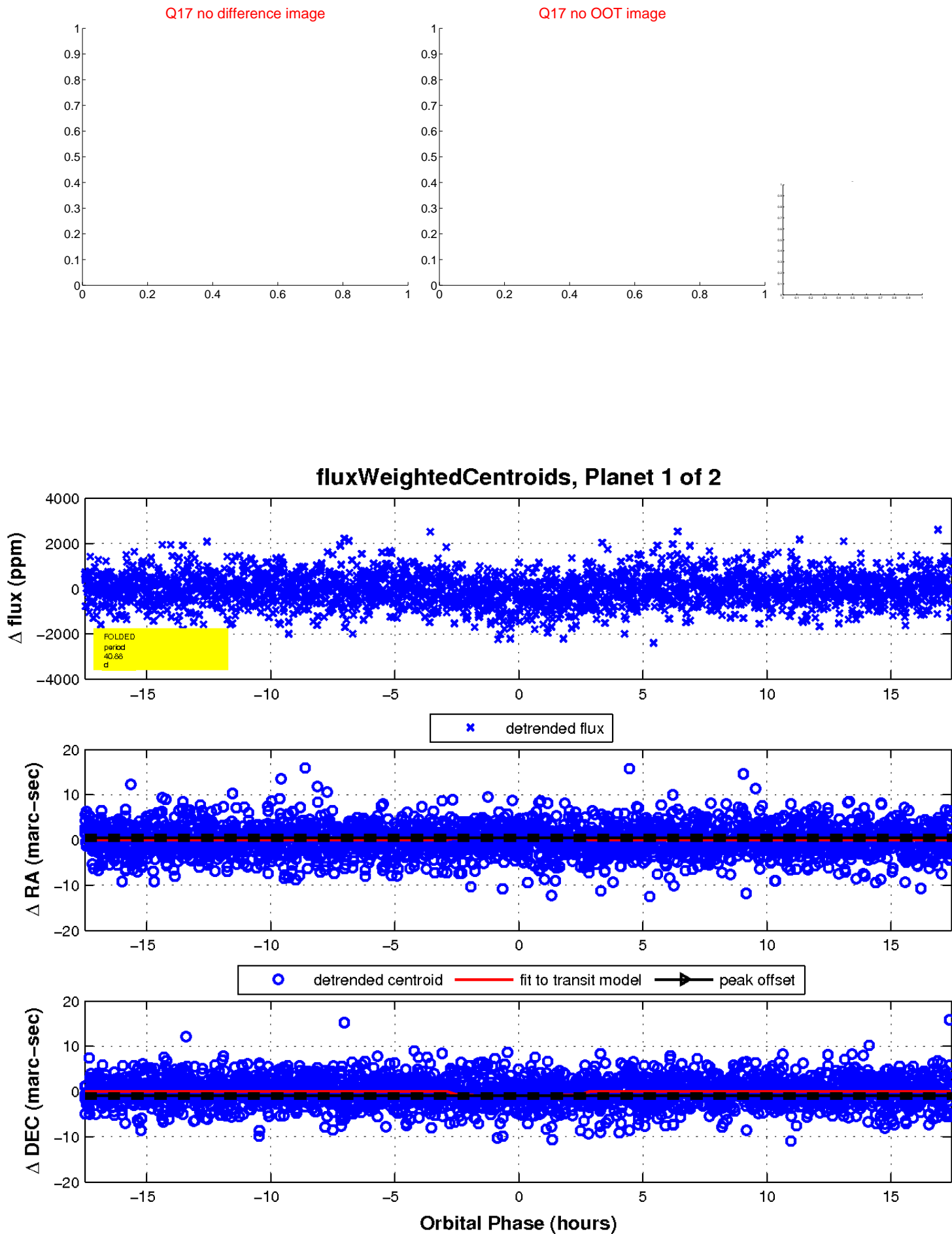
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

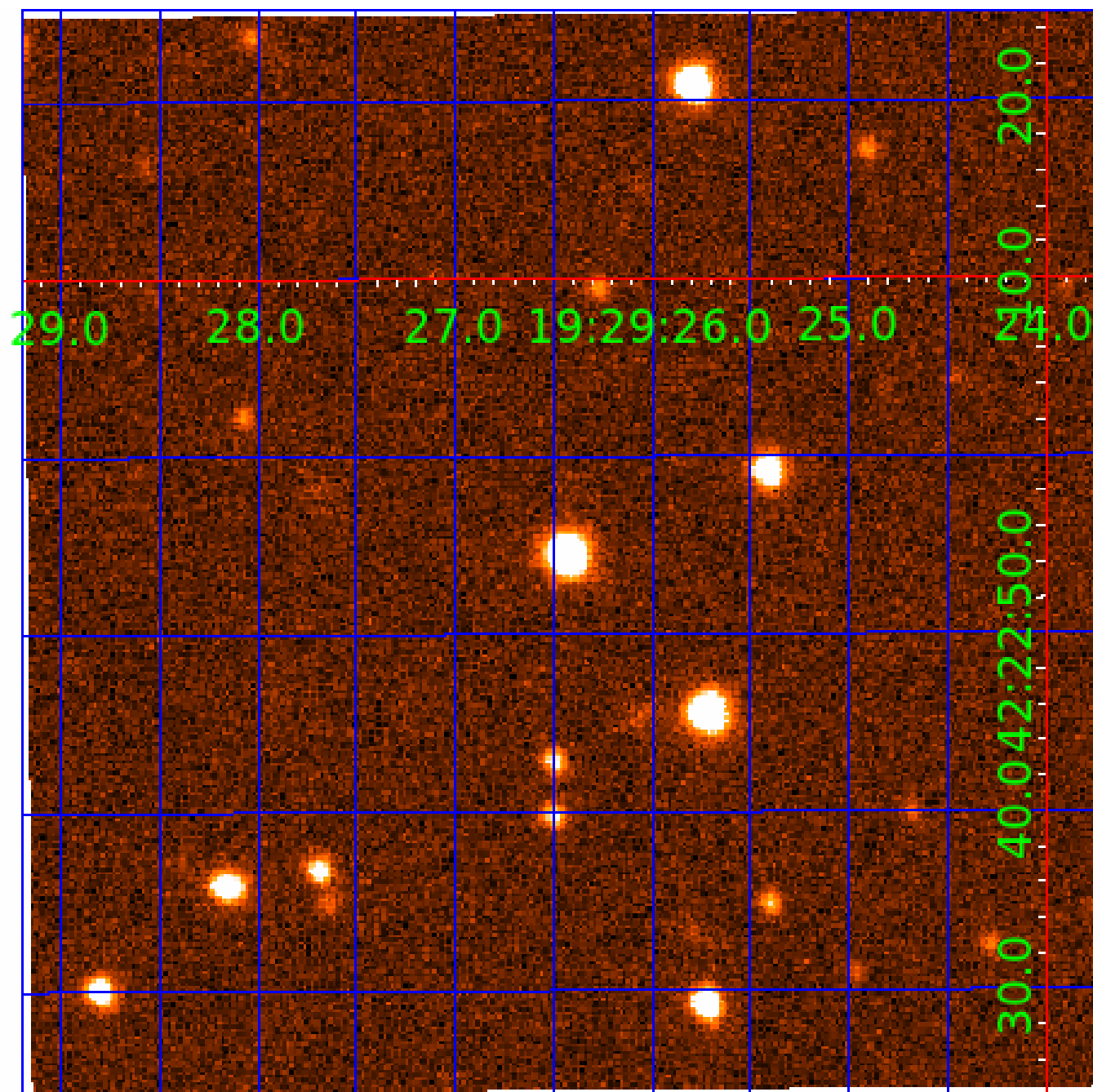


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 006864891

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})
006864891-01	OBS	5330.01	40.880128	163.360987	388.2	5.830	8.1	8.2	0.47	3746	1.04	1.18
006864891-02	OBS	No	40.878064	158.322141	480.0	7.843	7.6	8.6	0.47	3746	2.00	1.18

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006864891-01	OBS	FP	0.00	0	1	0	1	MOD_SEC_DV—HAS_SEC_TCE—EPHEM_MATCH
006864891-02	OBS	FP	0.00	1	1	1	1	IS_SEC_TCE—HALO_GHOST—EPHEM_MATCH

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 006864891-02

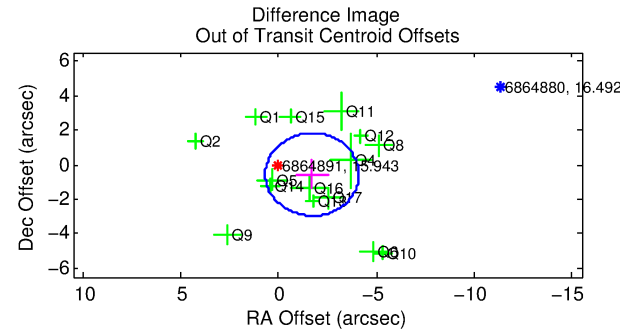
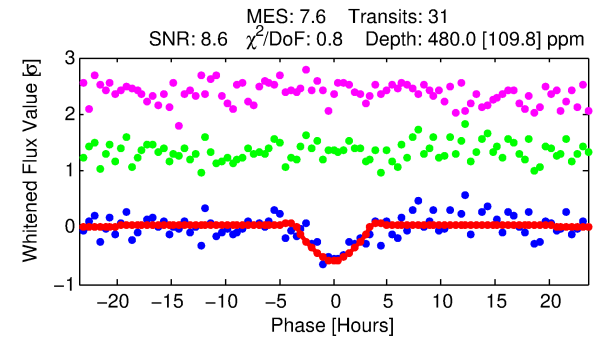
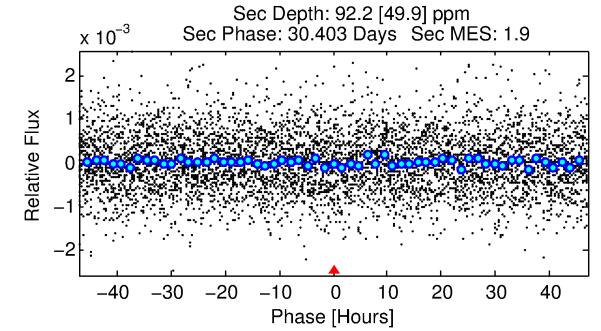
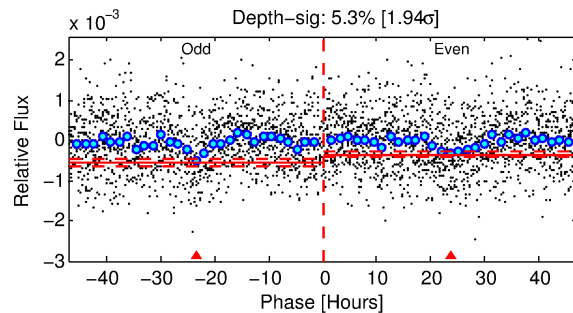
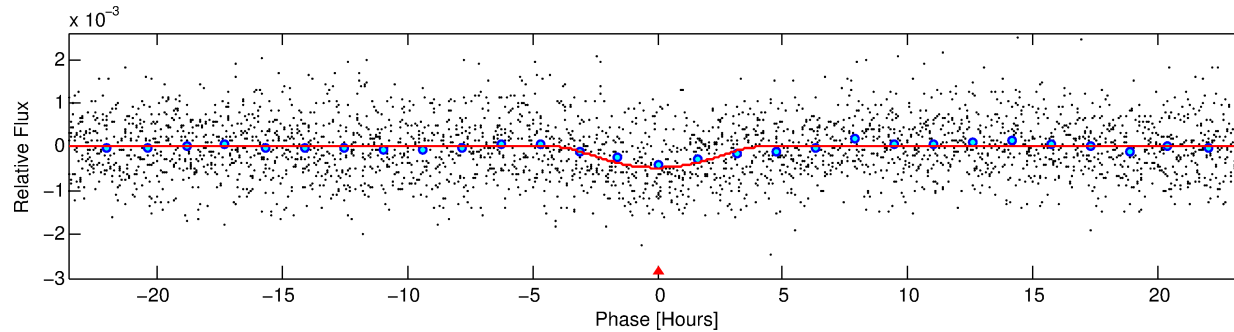
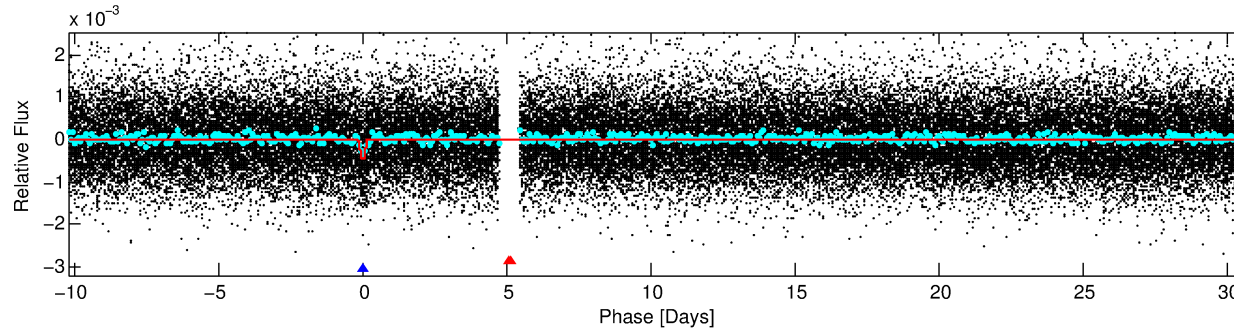
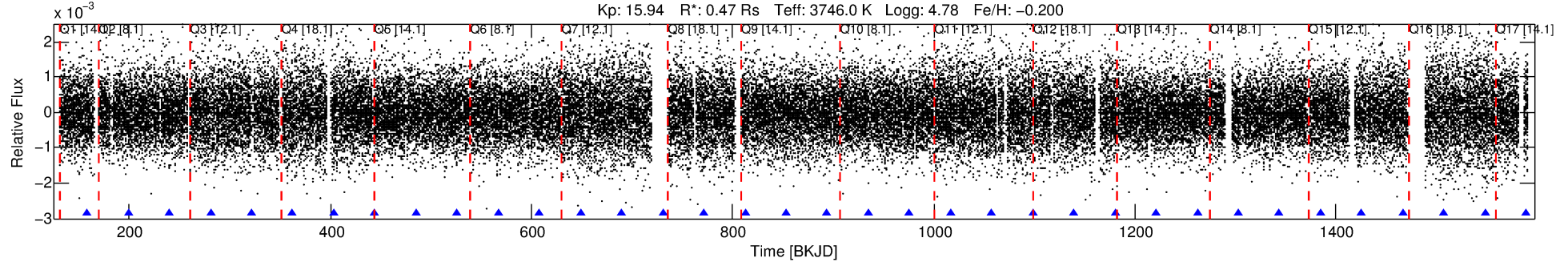
TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ($''$)	Δ Row	Δ Col	m_2	m_1	D_2/D_1	Mechanism	Flag	σ_P	σ_T
006864891-02	6864891	006864859-01	6864859	1:1	49.3	12	0	11.66	15.94	536.38	Direct-PRF	0	0.10	0.24

Notes: $P_1:P_2$ is the period ratio. Dist is the distance in arcseconds. Δ Row and Δ Col are the number of pixels apart in row and column. m_2 and m_1 are the magnitudes of the parent and child. D_2/D_1 is the parent's transit depth divided by the child's. σ_P and σ_T are the significance of the match in period and epoch. For a match to be considered significant $\sigma_P < 5.0$ and $\sigma_T < 5.0$. Matches which have σ_P and σ_T very close to this cutoff should receive extra scrutiny, especially if the period ratio is very large.

DV One-Page Summary

KIC: 6864891 Candidate: 2 of 2 Period: 40.878 d
KOI: K05330 Corr: No Ephemeris Match

Kp: 15.94 R*: 0.47 Rs Teff: 3746.0 K Logg: 4.78 Fe/H: -0.200



DV Fit Results:

Period = 40.87806 [0.00095] d
Epoch = 158.3221 [0.0199] BKJD
Rp/R* = 0.0392 [0.1415]
a/R* = 11.60 [10.59]
b = 1.00 [0.21]
Seff = 1.18 [0.12]
Teq = 266 [7] K
Rp = 2.00 [7.24] Re
a = 0.1816 [0.0108] AU
Ag = 416.40 [3017.27] [0.14σ]
Teffp = 1855 [3360] K [0.47σ]

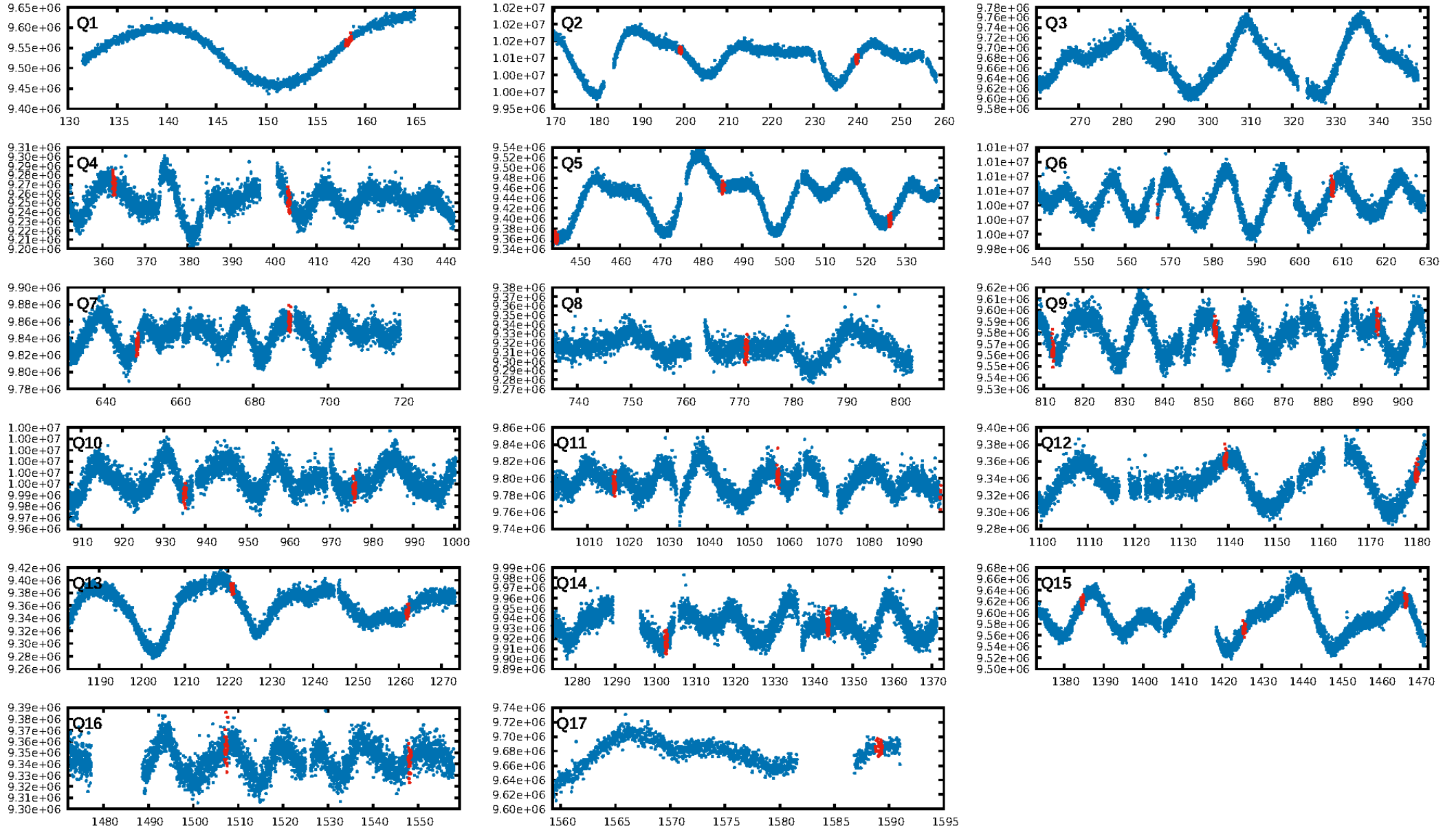
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 0.4% [0.01σ]
ModelChiSquare2-sig: 97.2%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 4.26e-14
RollingBand-fgt: 1.00 [29/29]
GhostDiagnostic-chr: -0.0477
Centroid-sig: 33.1%
Centroid-so: 1.543 arcsec [1.24σ]
OotOffset-rm: 1.799 arcsec [2.26σ]
KicOffset-rm: 2.073 arcsec [2.57σ]
OotOffset-st: 4/2/4/5 [15]
KicOffset-st: 4/2/4/5 [15]
DiffImageQuality-fgm: 0.13 [2/15]
DiffImageOverlap-fno: 1.00 [16/16]

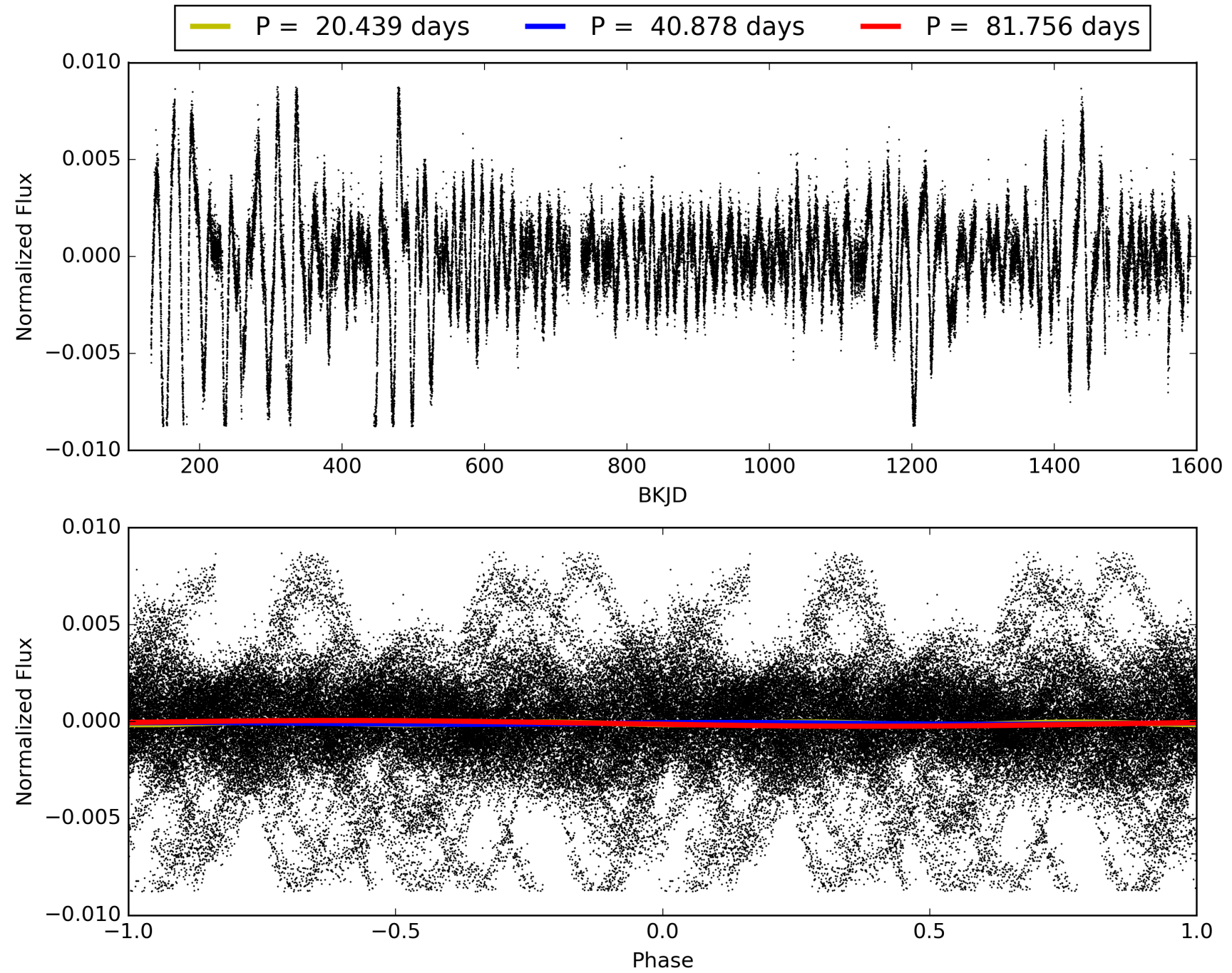
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 07:05:19 Z

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

TCE 006864891-02, PDC Light Curves

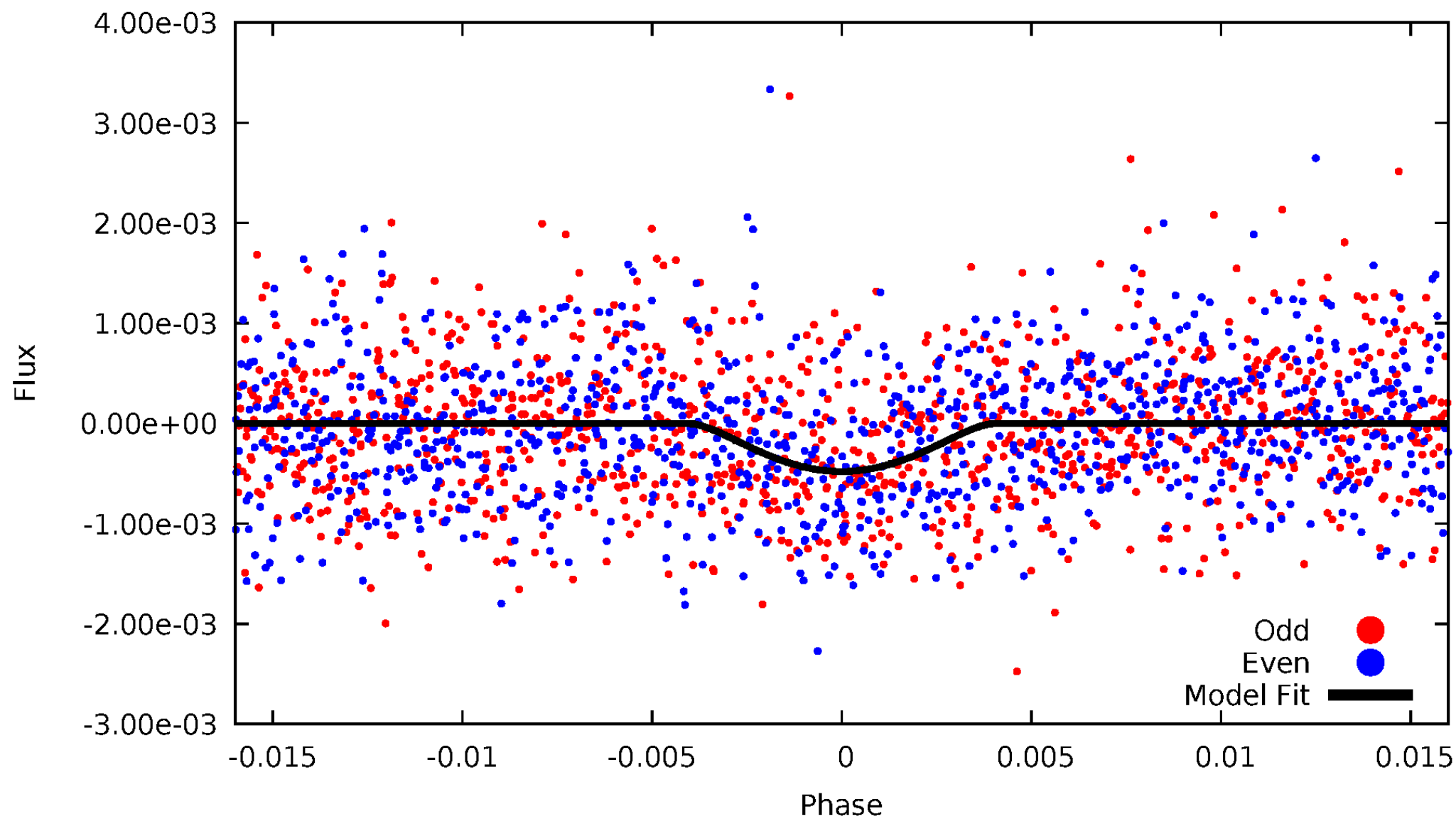


TCE 006864891-02



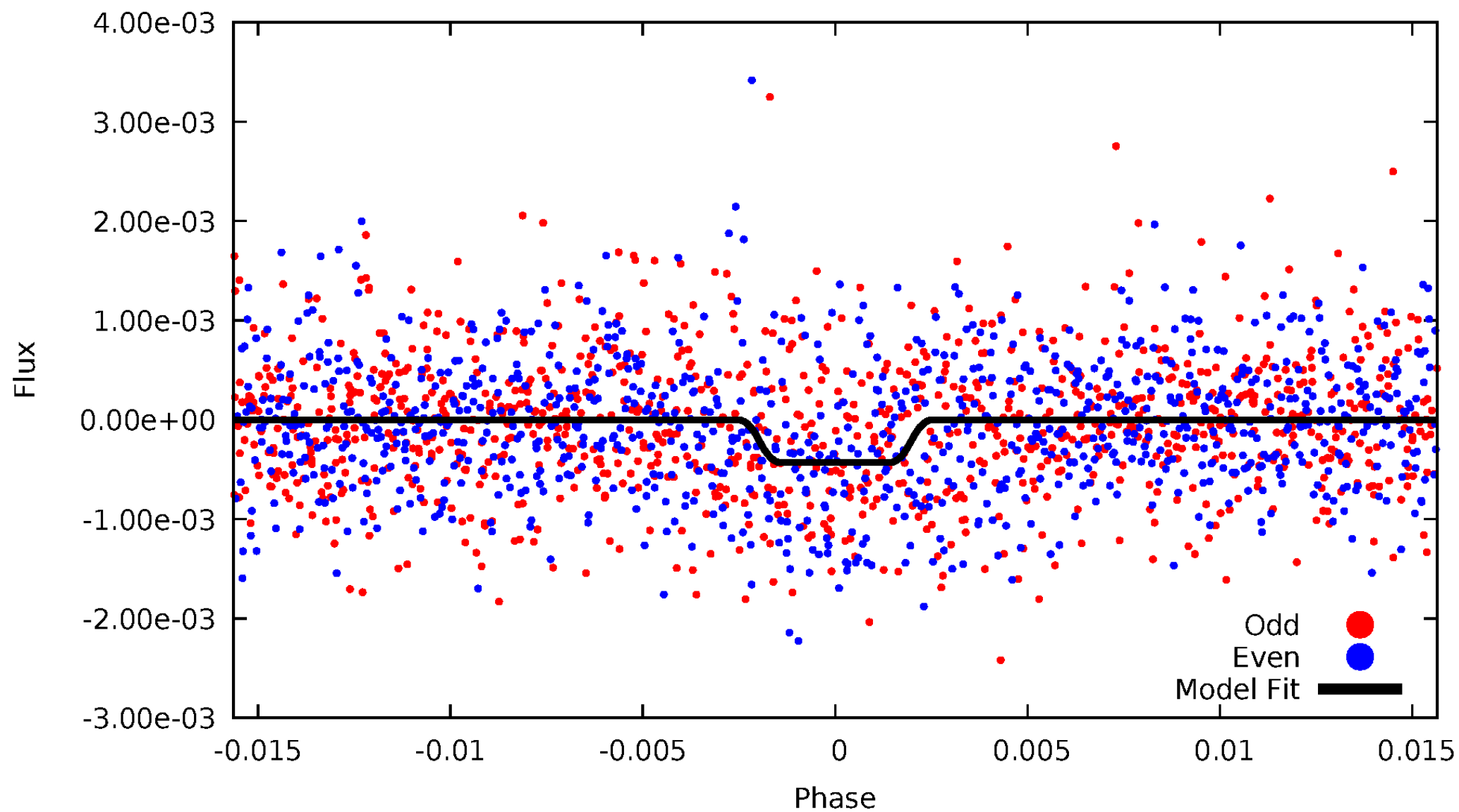
DV Odd/Even

TCE 006864891-02



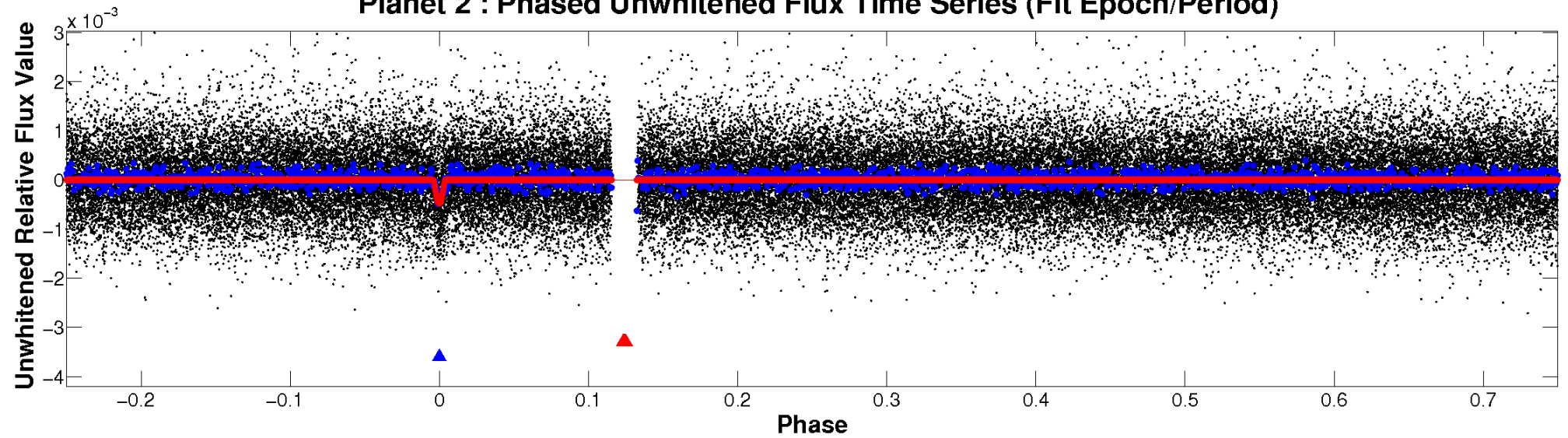
ALT Odd/Even

TCE 006864891-02

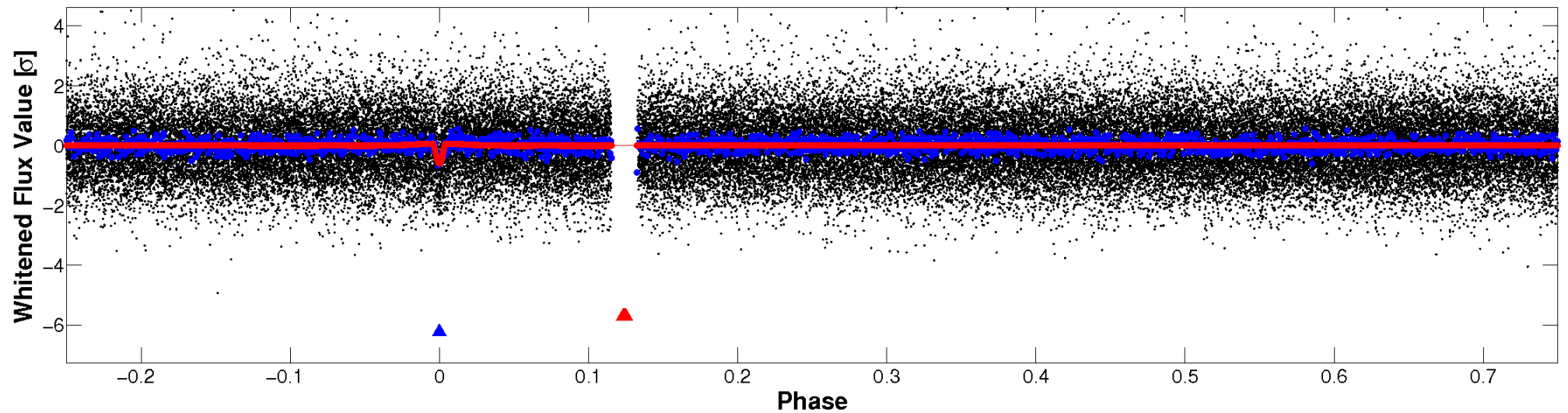


Non-Whitened Vs. Whitened Light Curve

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

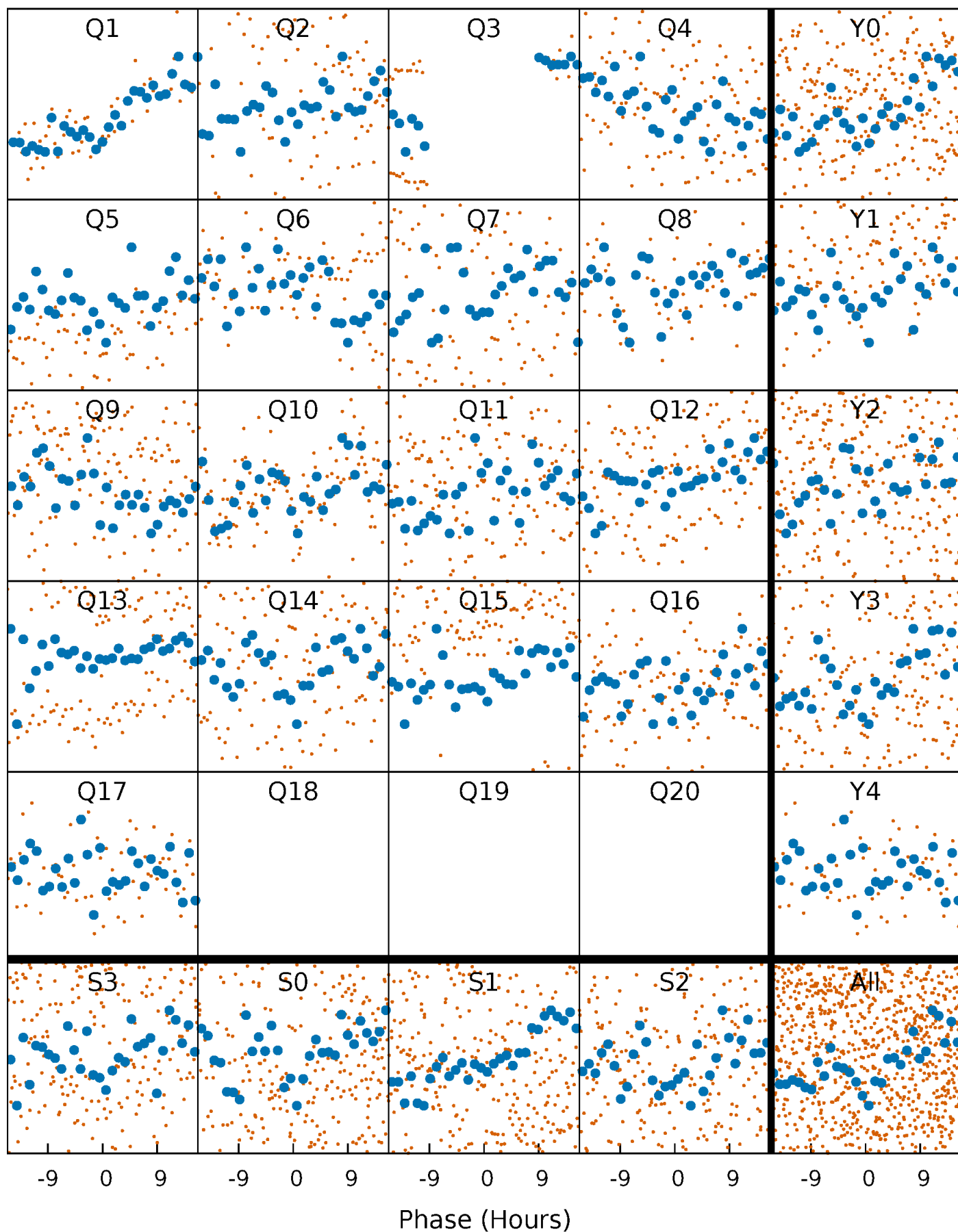


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



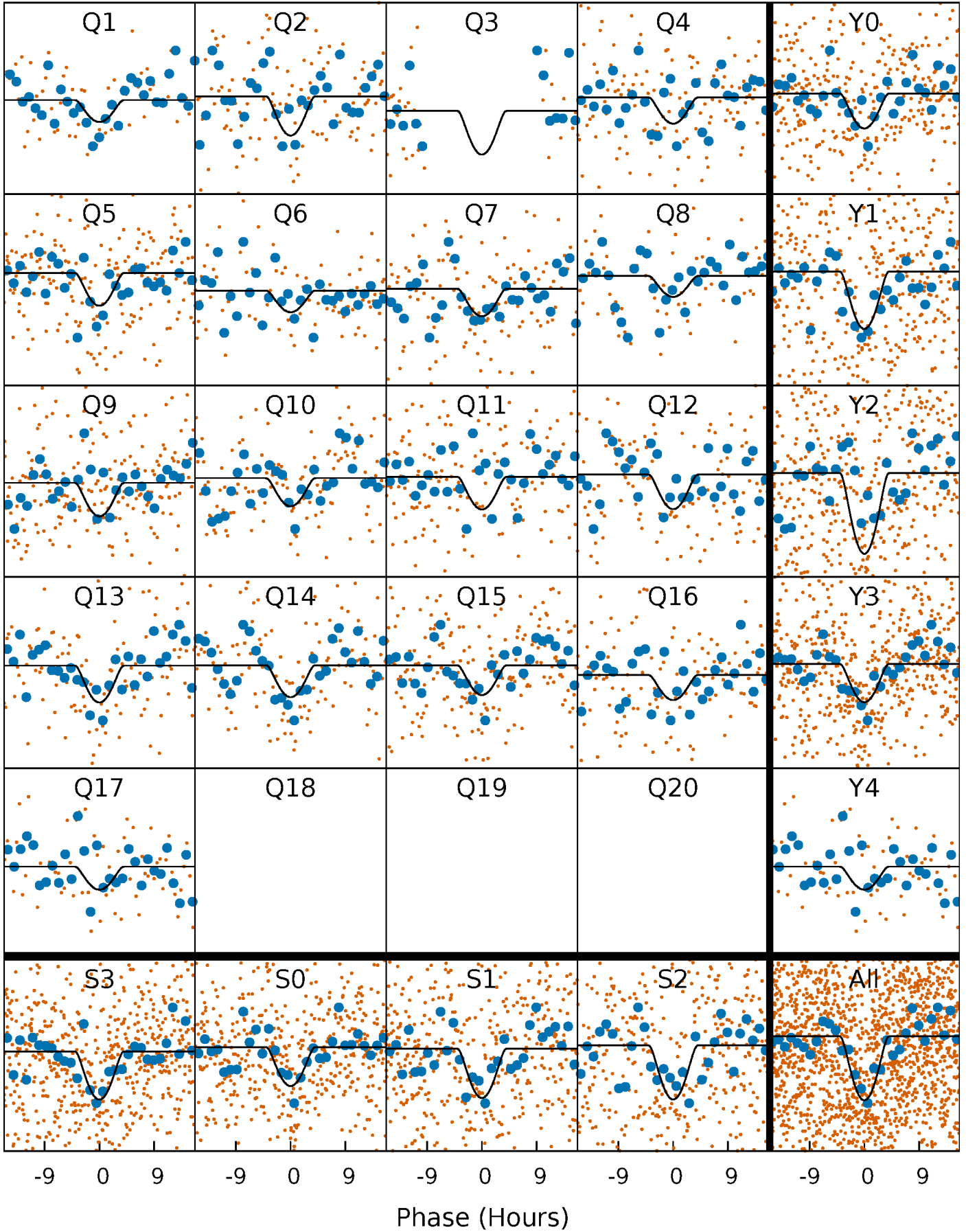
PDC Quarter-Phased Transit Curves

TCE 006864891-02 P= 40.878064 Days $T_0=158.322141$ (BKJD)



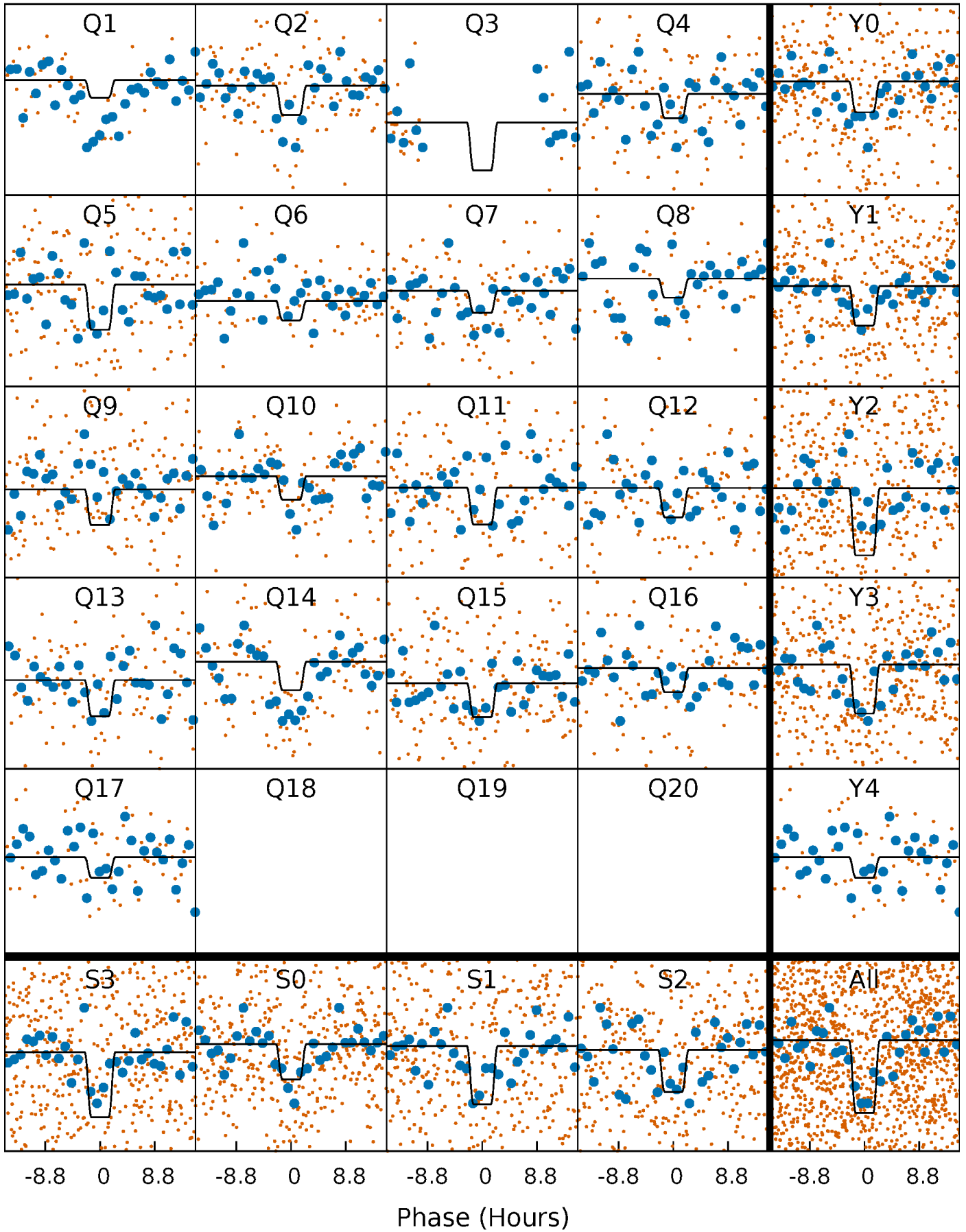
DV Quarter-Phased Transit Curves

TCE 006864891-02 $P = 40.878064$ Days $T_0 = 158.322141$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

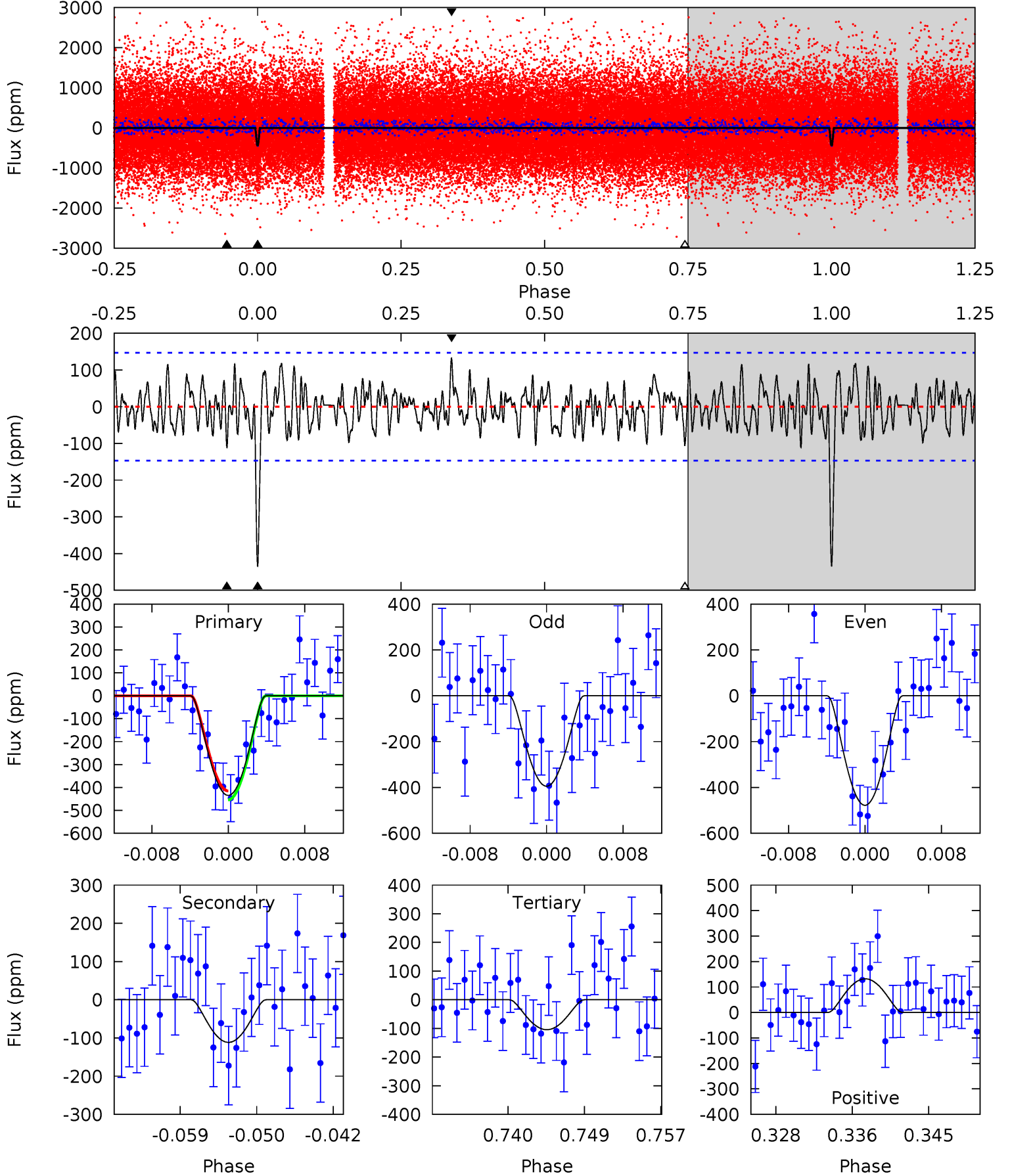
TCE 006864891-02 P= 40.878244 Days $T_0=158.329466$ (BKJD)



DV Model-Shift Uniqueness Test

006864891-02, P = 40.878064 Days, E = 117.444077 Days

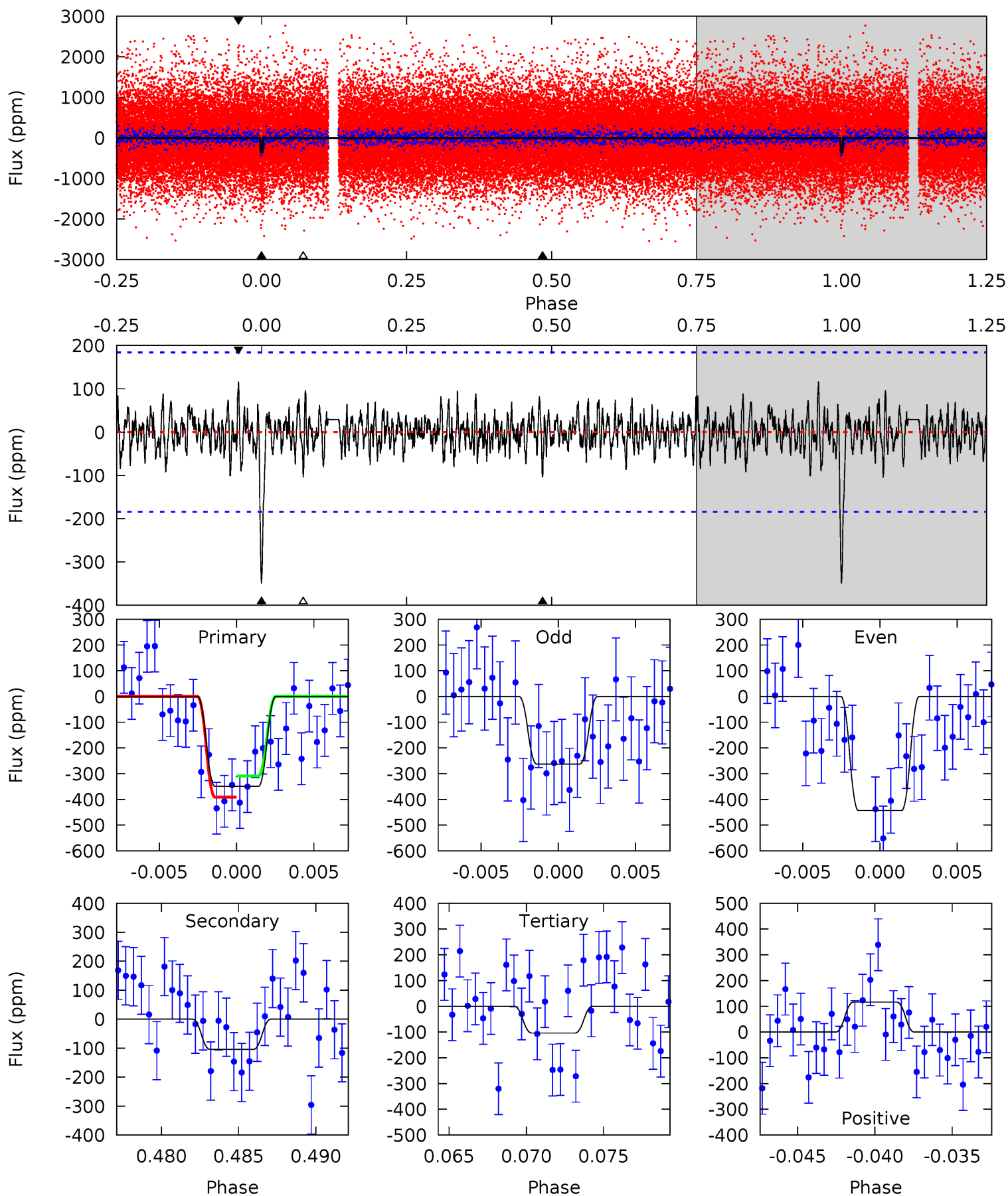
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.0	3.84	3.60	4.56	5.06	2.64	1.53	11.4	10.4	0.24	-0.71	1.44	0.97	0.23	0.67



Alt Model-Shift Uniqueness Test

006864891-02, $P = 40.878244$ Days, $E = 117.451222$ Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.80	2.92	2.91	3.26	5.16	2.81	0.91	6.89	6.54	0.01	-0.34	2.54	1.11	0.25	1.16



Stellar Parameters For KIC 006864891

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	3746^{+59}_{-59}	$4.775^{+0.042}_{-0.025}$	$-0.200^{+0.100}_{-0.100}$	$0.469^{+0.028}_{-0.035}$	$0.480^{+0.029}_{-0.031}$	$6.527^{+1.175}_{-0.741}$
	+2%/-2%	+1%/-1%	+50%/-50%	+6%/-7%	+6%/-6%	+18%/-11%
Source	PHO2	PHO2	PHO2	DSEP		

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

Secondary Eclipse Parameters for KIC 006864891-02 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-112 ± 29	$5.94^{+5.53}_{-4.08}$	370^{+8}_{-8}	2007^{+590}_{-242}	57^{+479}_{-42}
Alt.	-104 ± 36	$5.35^{+5.43}_{-3.80}$	370^{+8}_{-8}	2024^{+717}_{-268}	61^{+740}_{-47}

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 $A_{\text{obs}} \gg 1.0$

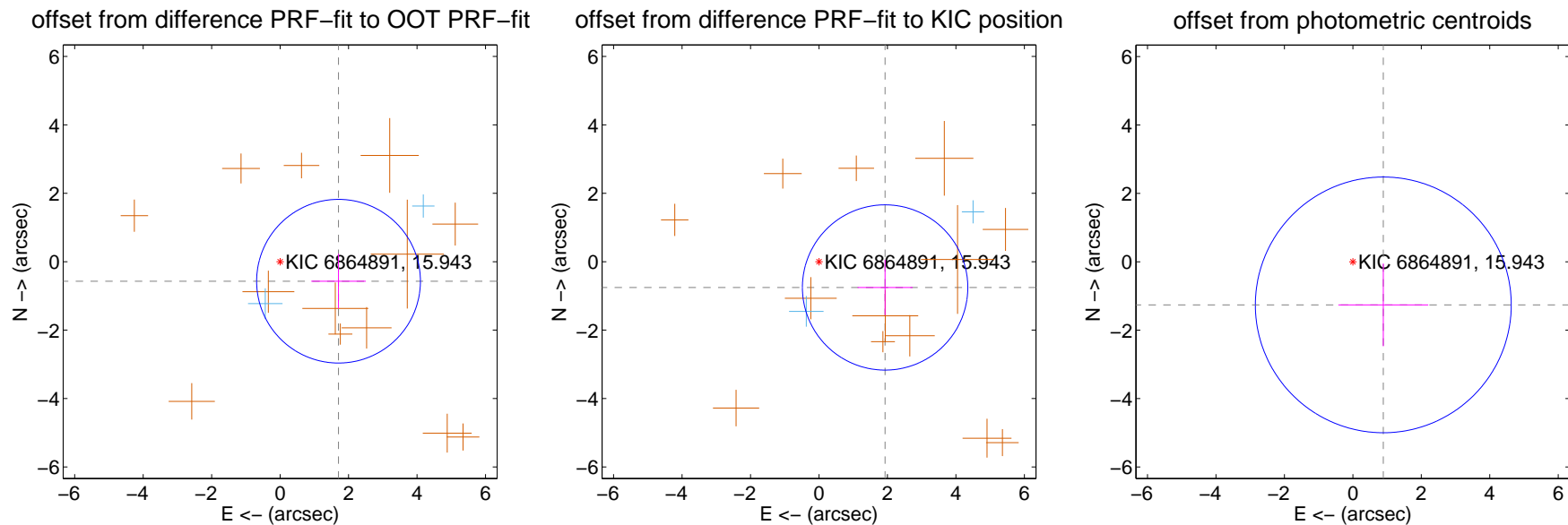
DV Centroid Data

Supplemental centroid analysis for 006864891-02. Kepler magnitude: 15.94. Transit SNR 8.57

There are 2 quarters with good PRF difference image offsets

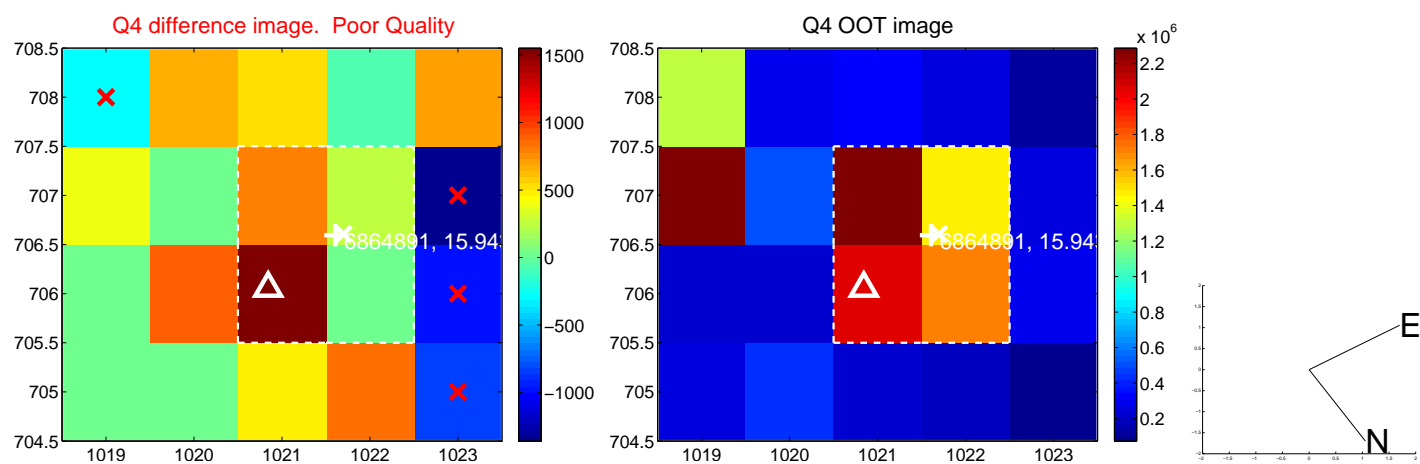
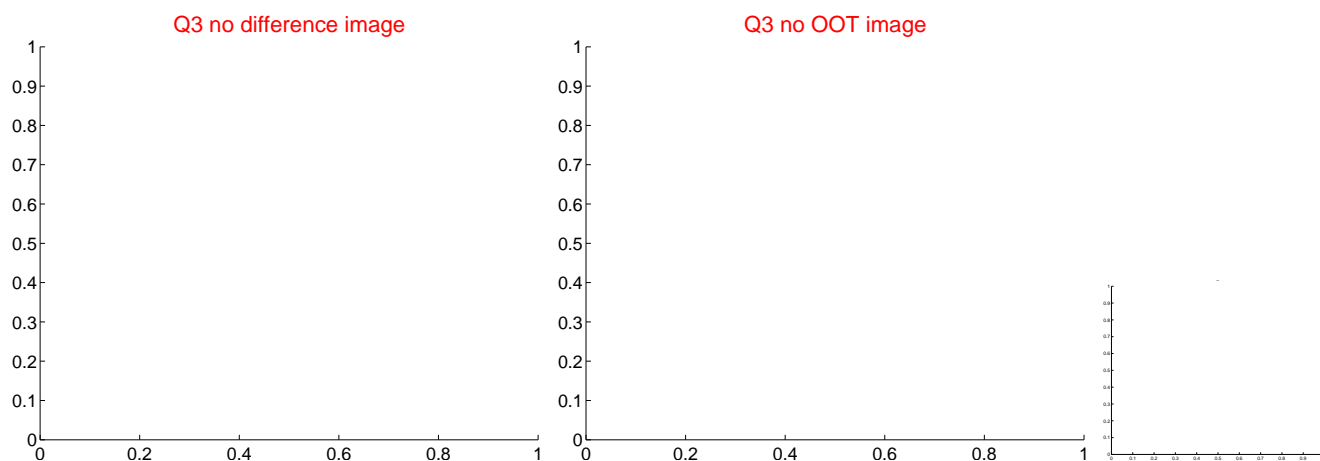
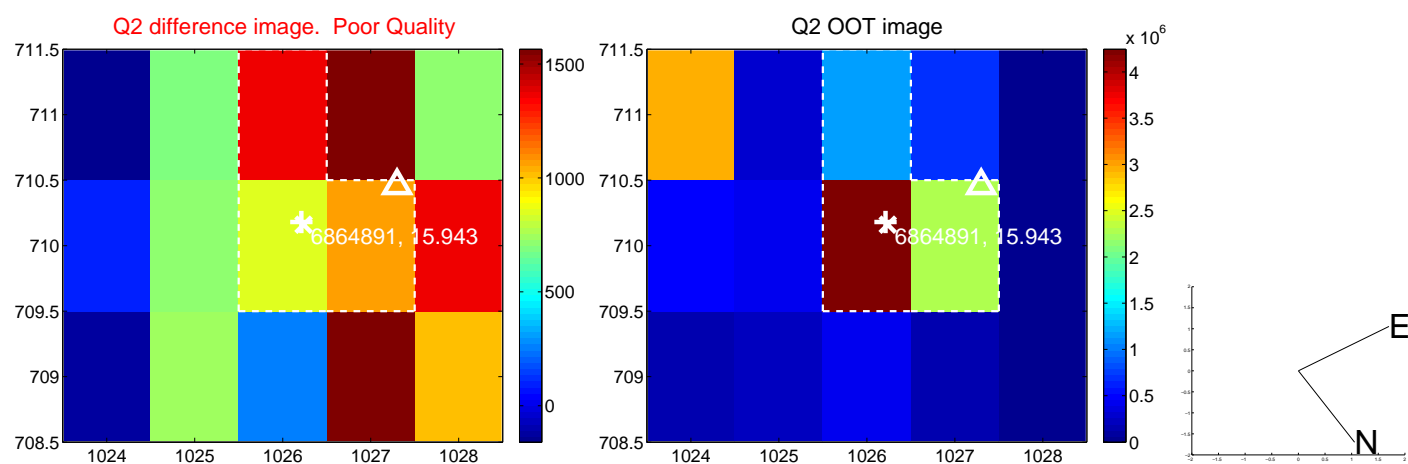
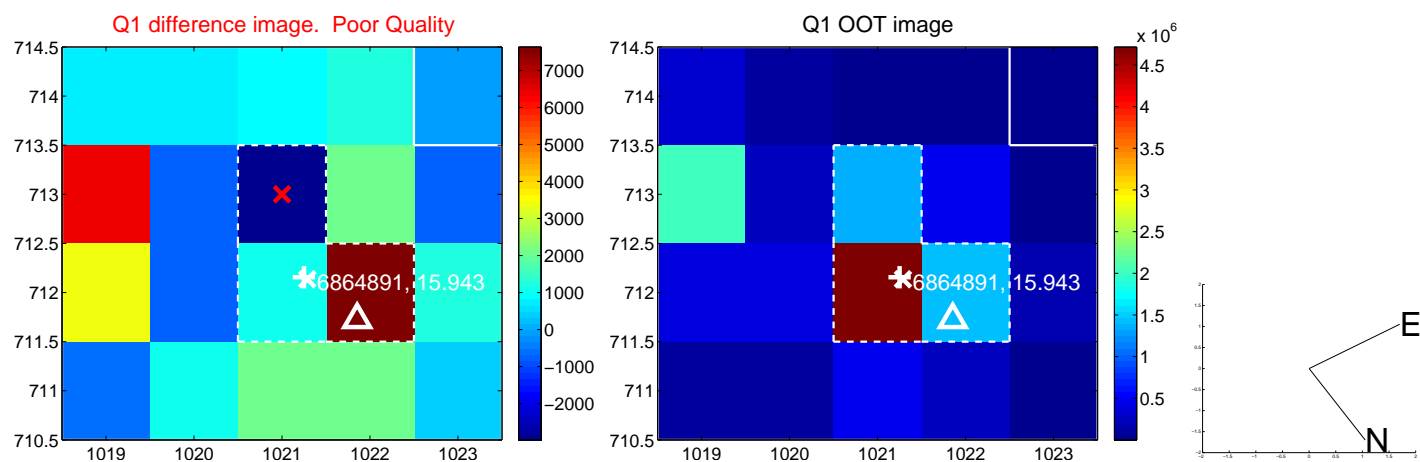
The direct PRF centroid is offset from the target star catalog position by about 0.26 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.799 ± 0.797	2.26	-1.706 ± 0.797	-0.570 ± 0.803
PRF-fit source offset from KIC position	2.073 ± 0.805	2.57	-1.931 ± 0.805	-0.753 ± 0.809
photometric centroid source offset	1.54 ± 1.25	1.24	-0.89 ± 1.31	-1.26 ± 1.21

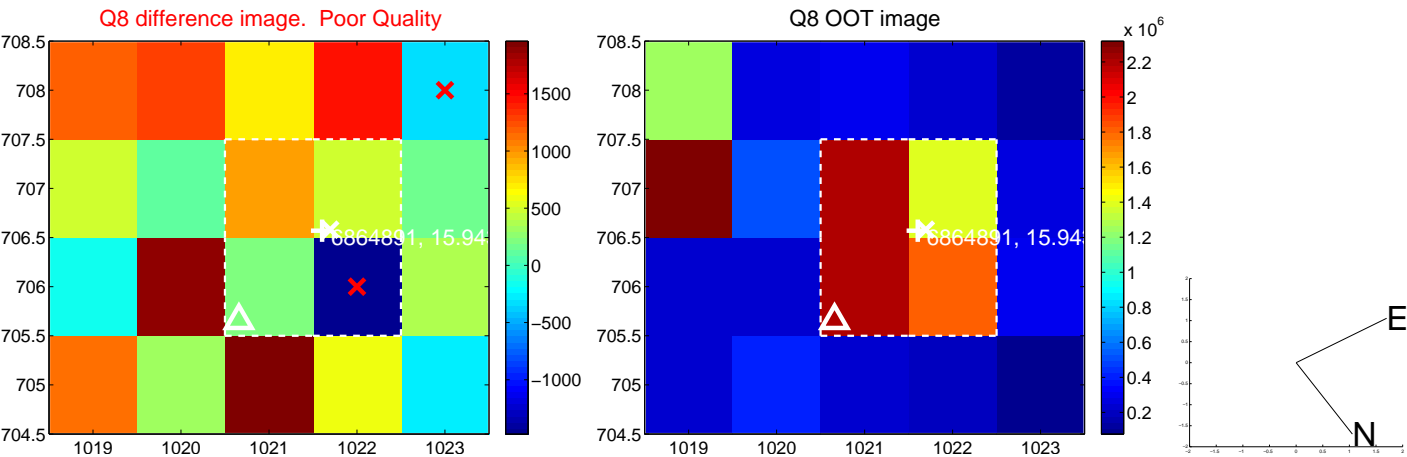
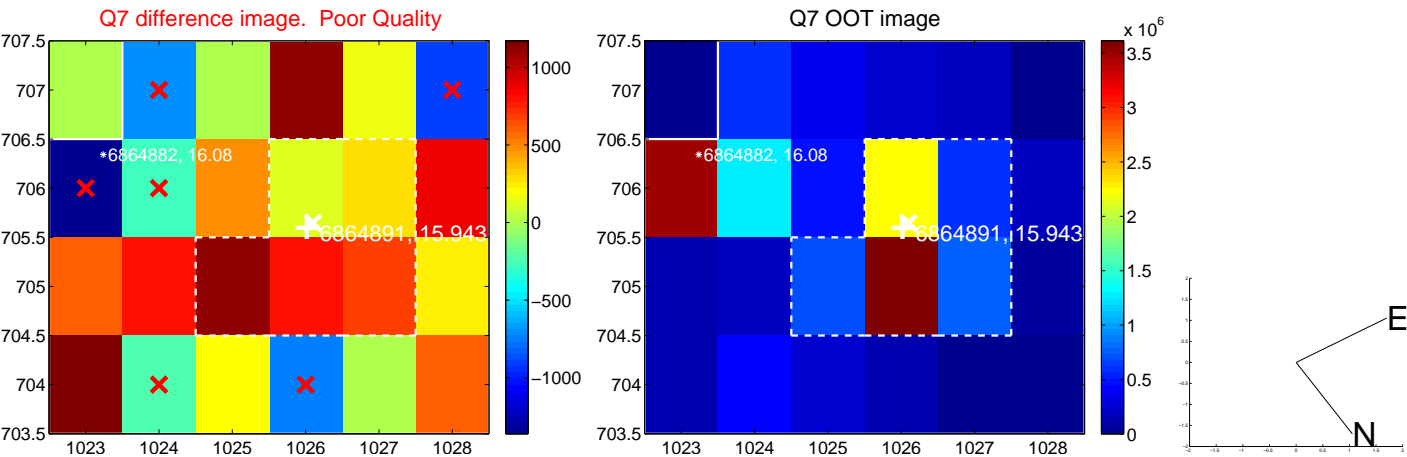
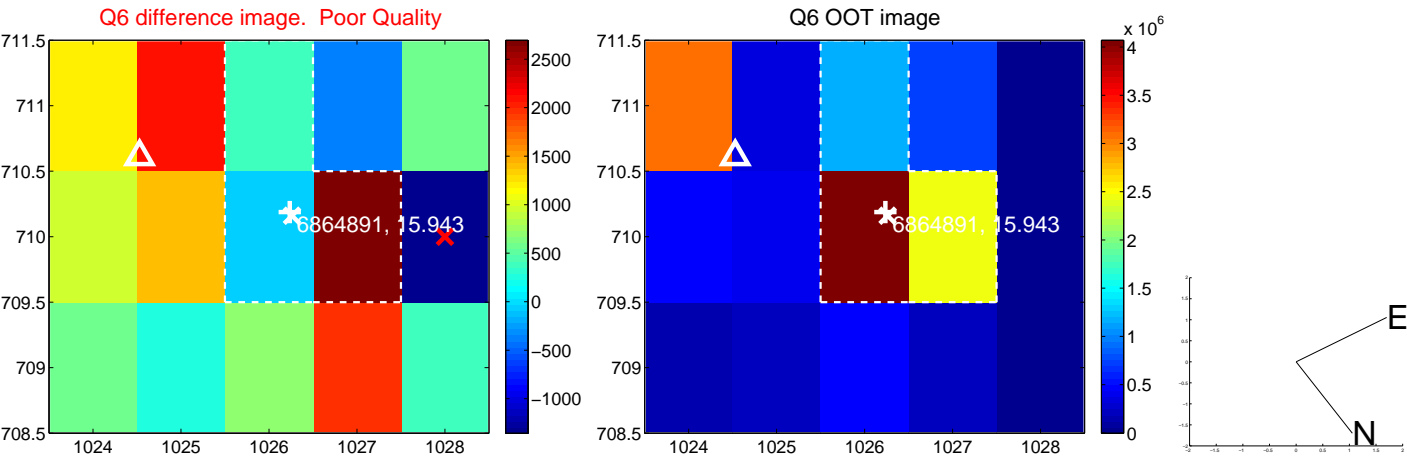
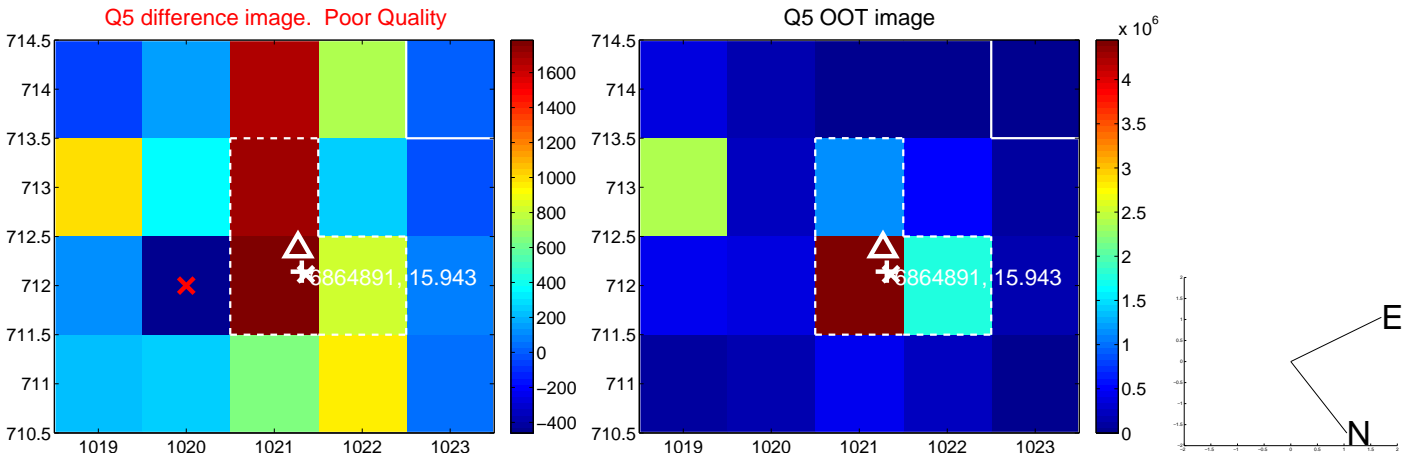


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

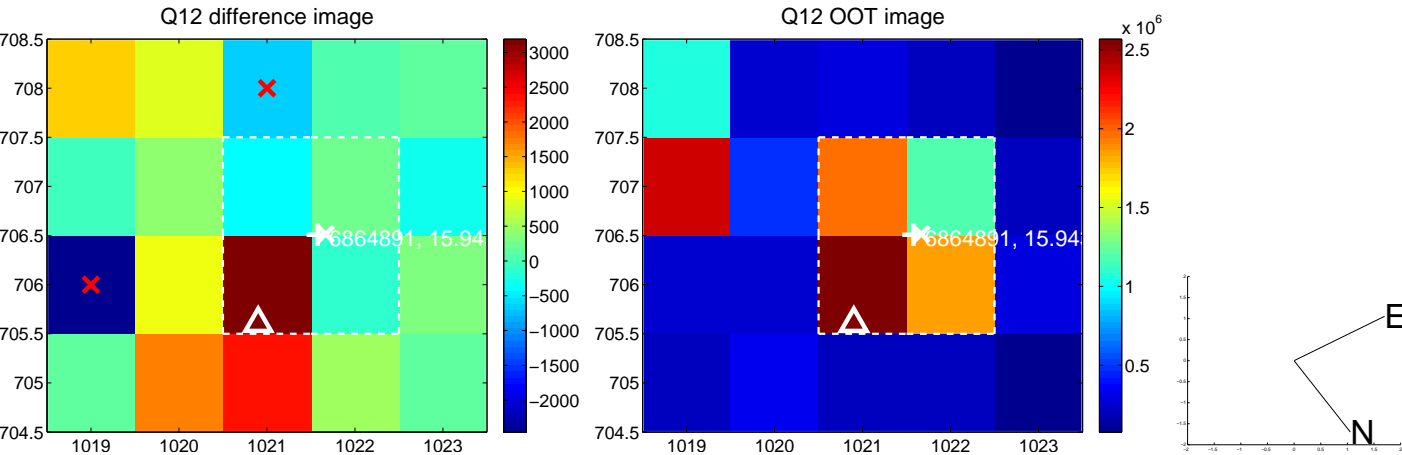
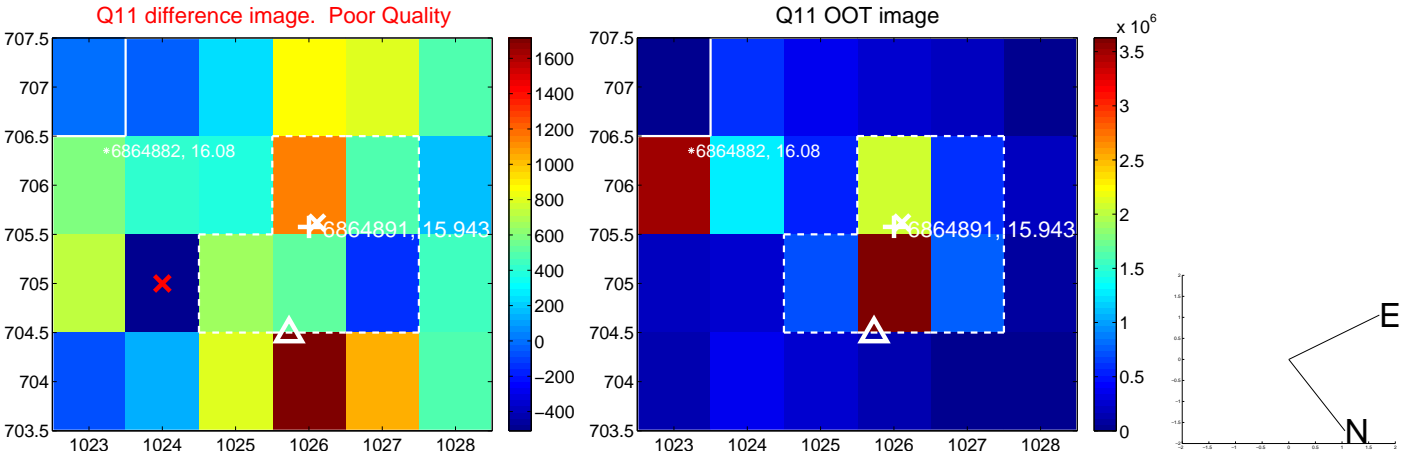
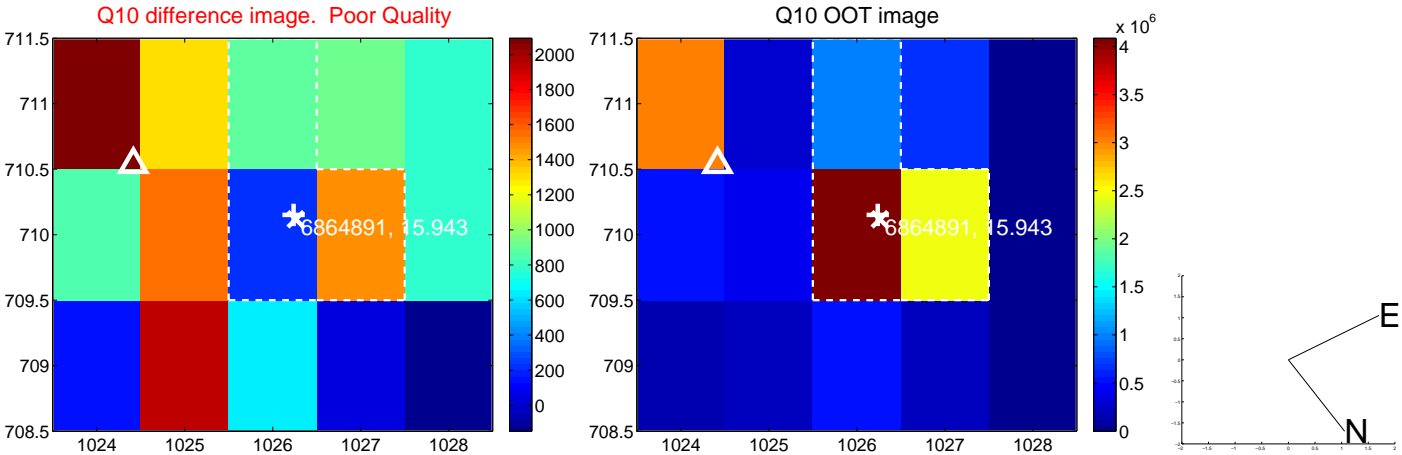
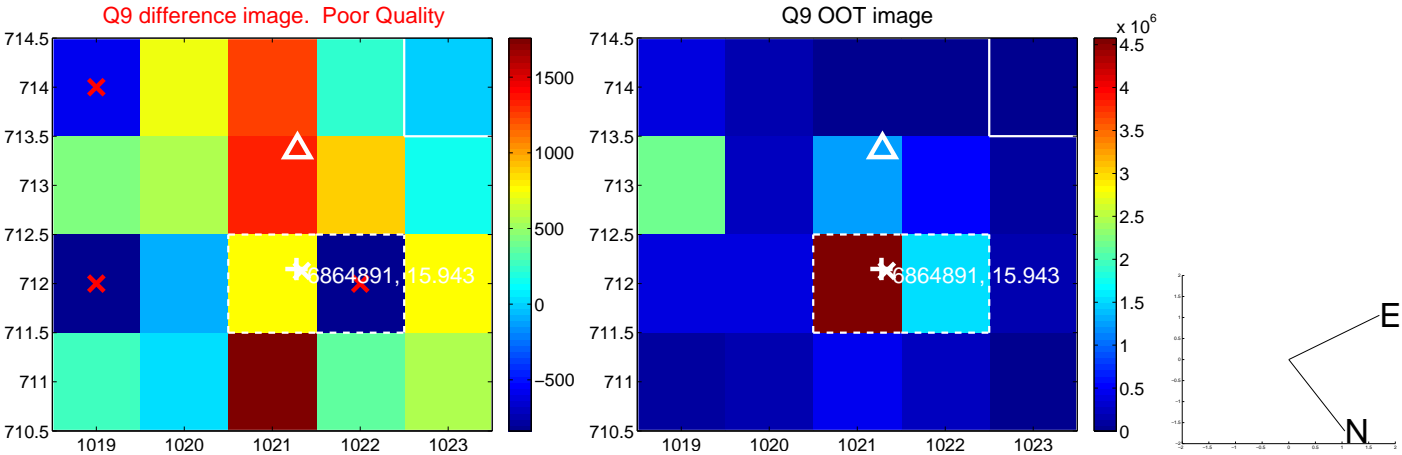
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



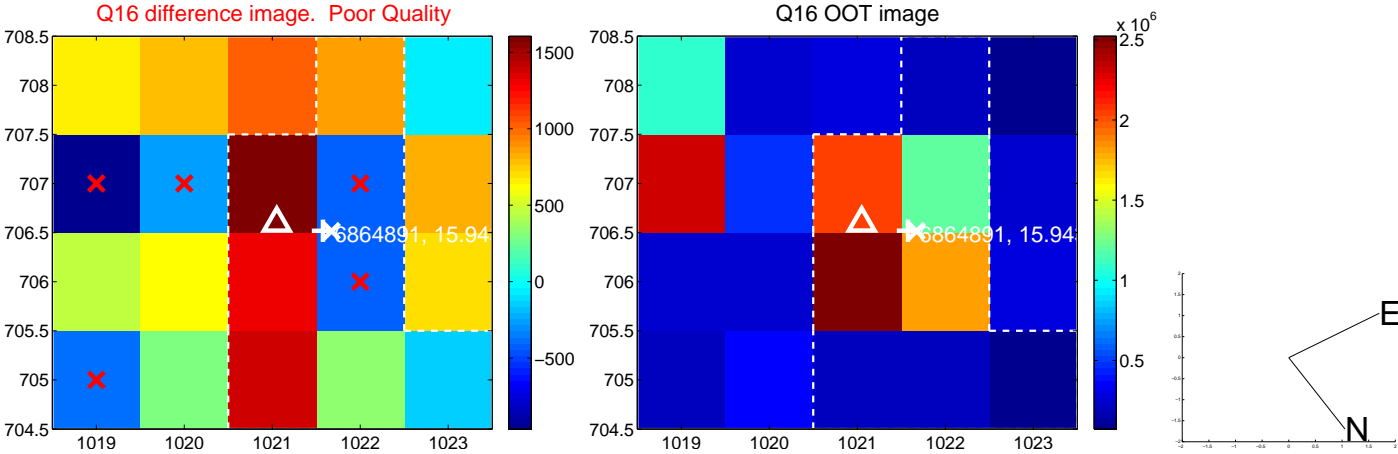
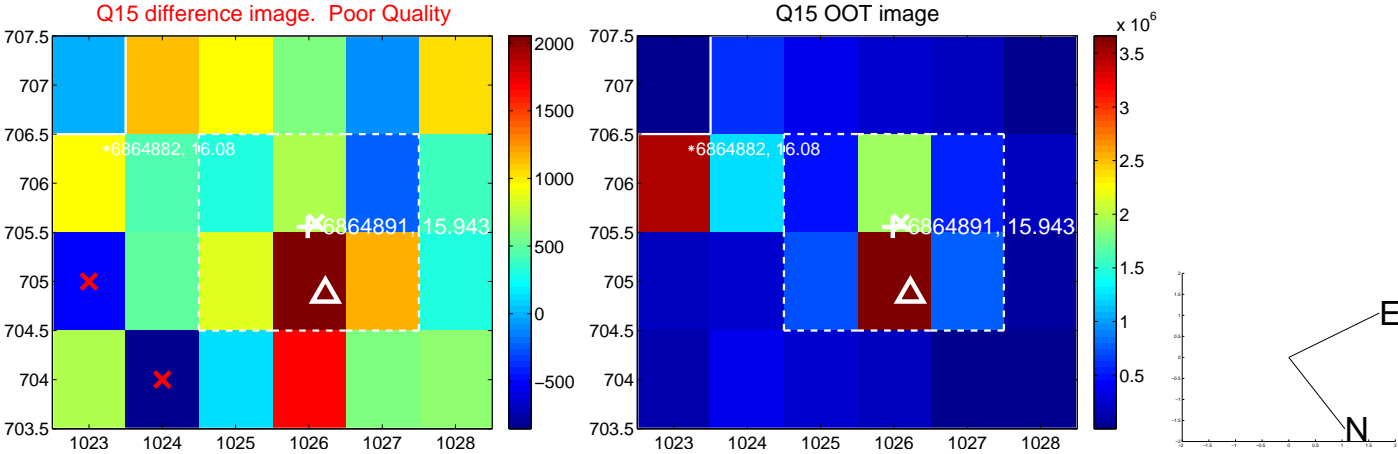
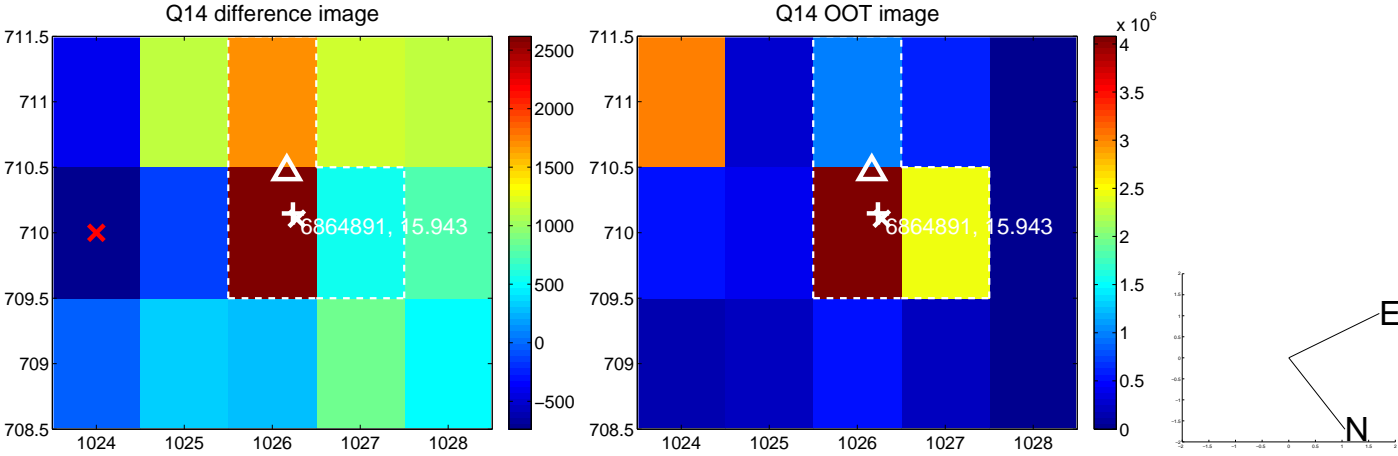
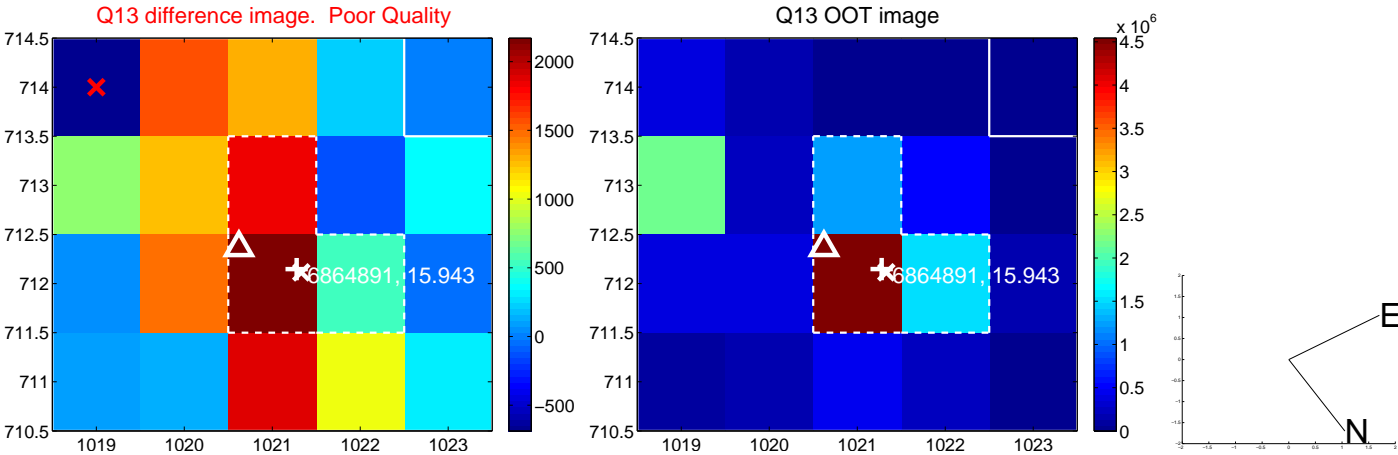
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



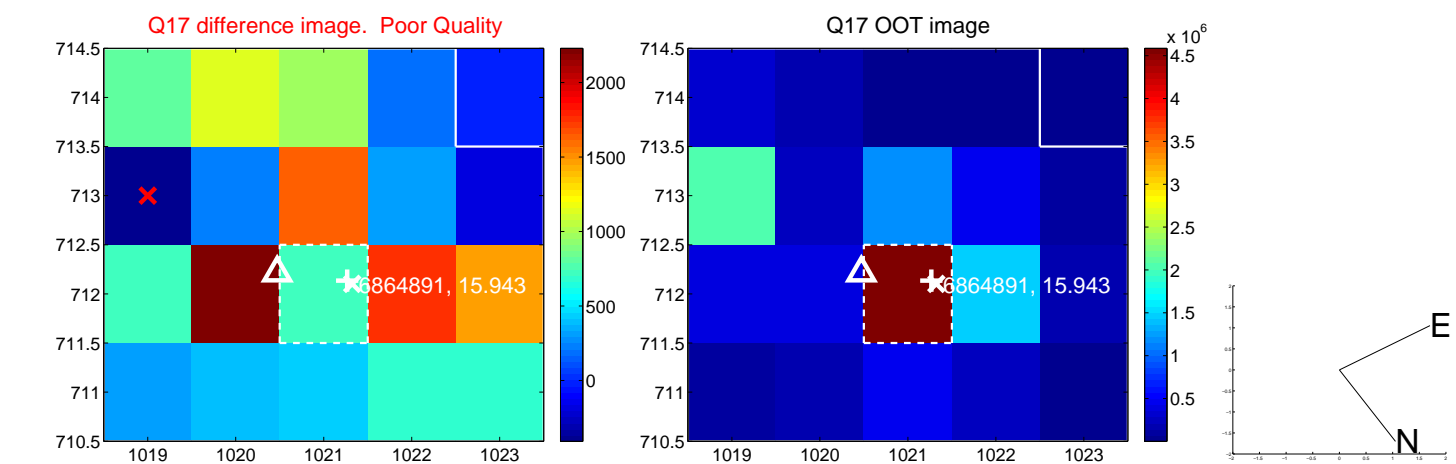
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



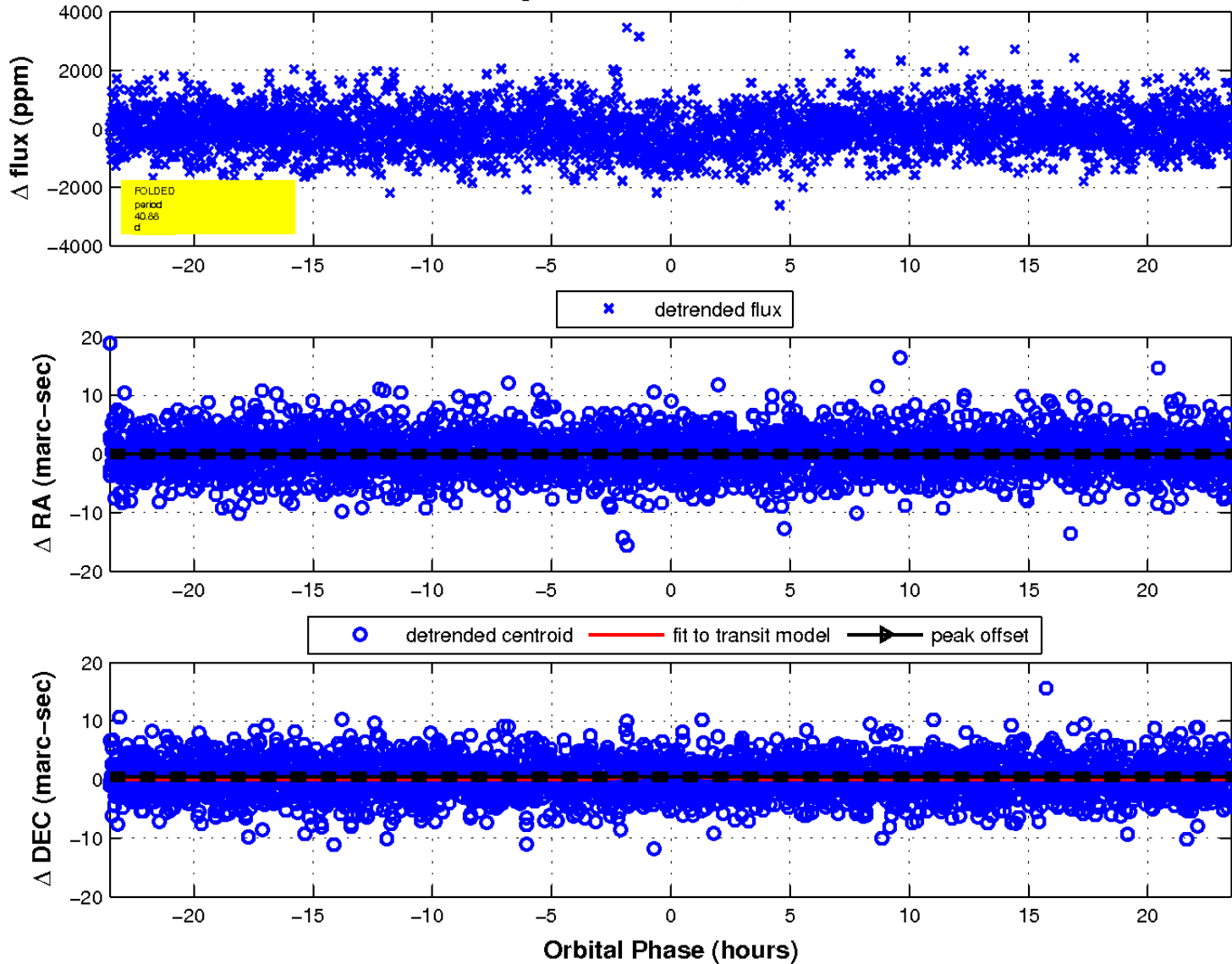
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

