

KIC 003964562

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})
003964562-01	OBS	0015.01	3.012476	132.247019	1096.5	3.115	372.4	281.4	2.03	8601	12.12	7487.42
003964562-02	OBS	No	3.012477	133.751776	147.3	2.793	44.8	47.7	2.03	8601	3.24	7487.41

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003964562-01	OBS	FP	0.00	0	1	1	1	MOD_SEC_DV—MOD_SEC_ALT—DEEP_V_SHAPED—HAS_SEC_TCE—CENT_RESOLVED_OFFSET—EPHEM_MATCH
003964562-02	OBS	FP	0.00	1	1	1	1	IS_SEC_TCE—CENT_RESOLVED_OFFSET—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 003964562-01

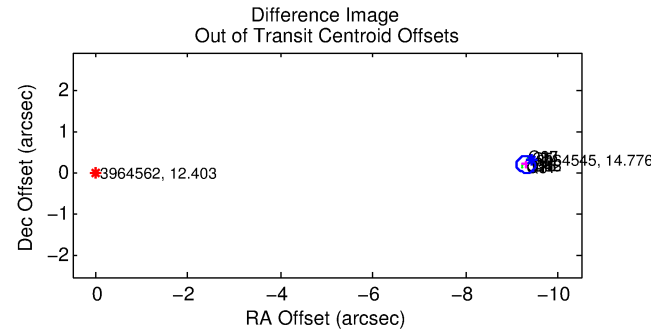
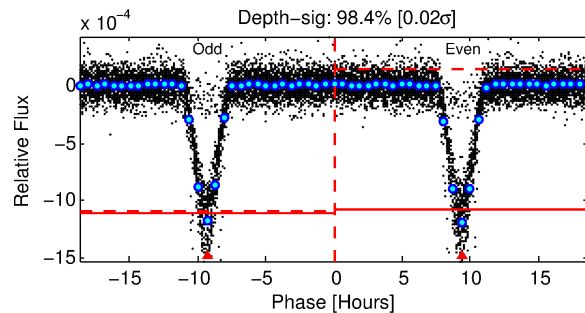
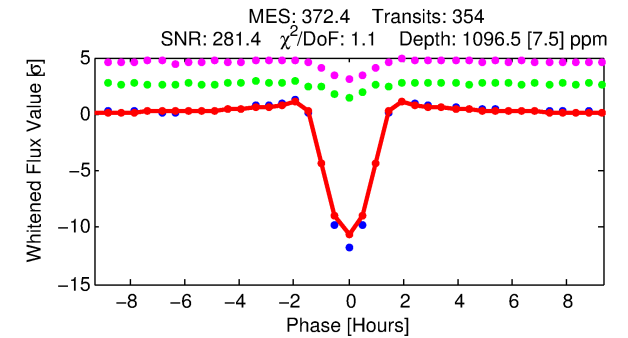
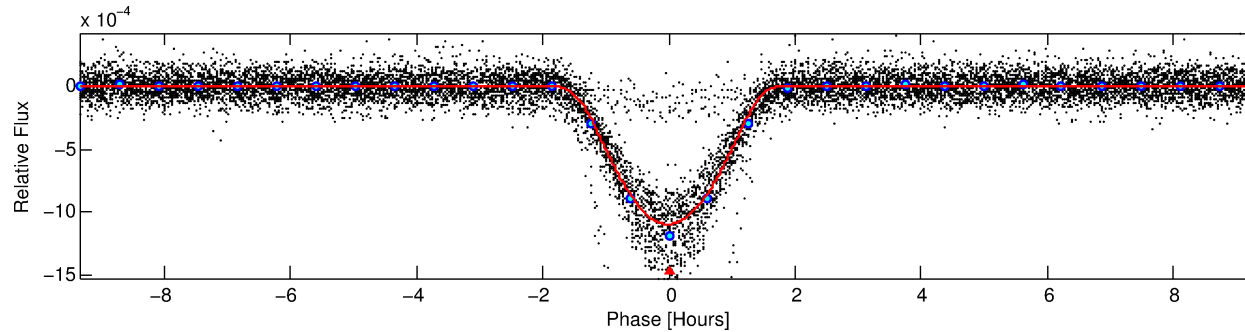
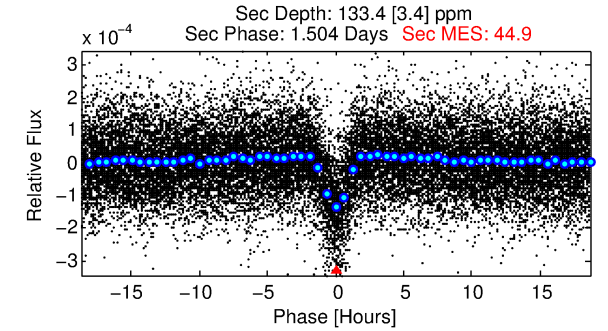
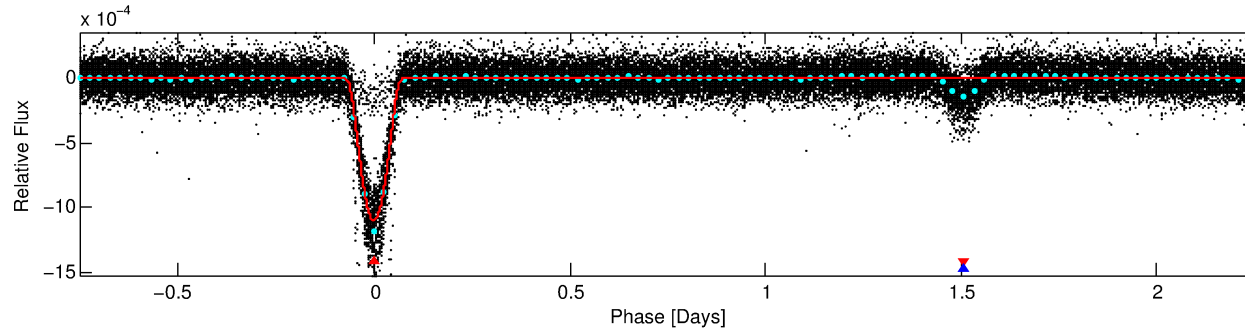
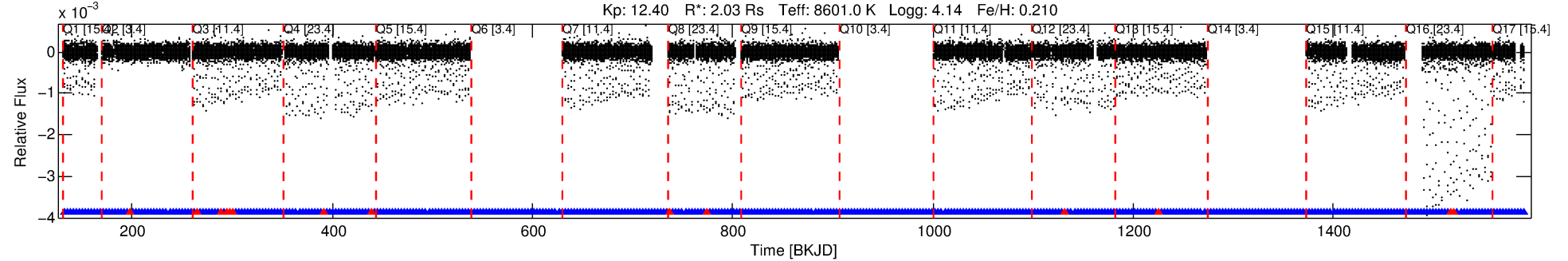
TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ($''$)	Δ Row	Δ Col	m_2	m_1	D_2/D_1	Mechanism	Flag	σ_P	σ_T
003964562-01	3964562	3542.01	3964545	1:1	9.4	-2	2	14.78	12.41	188.18	Direct-PRF	0	0.01	0.02

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: 3964562 Candidate: 1 of 2 Period: 3.012 d
KOI: K00015.01 Corr: 0.997

Kp: 12.40 R*: 2.03 Rs Teff: 8601.0 K Logg: 4.14 Fe/H: 0.210



DV Fit Results:

Period = 3.01248 [0.00000] d
Epoch = 132.2470 [0.0002] BKJD
Rp/R* = 0.0547 [0.0070]
a/R* = 2.72 [0.07]
b = 1.00 [0.01]
Seff = 7487.42 [2927.86]
Teq = 2372 [232] K
Rp = 12.12 [3.87] Re
a = 0.0520 [0.0125] AU
Ag = 1.35 [0.58] [0.61σ]
Teff = 3953 [316] K [4.03σ]

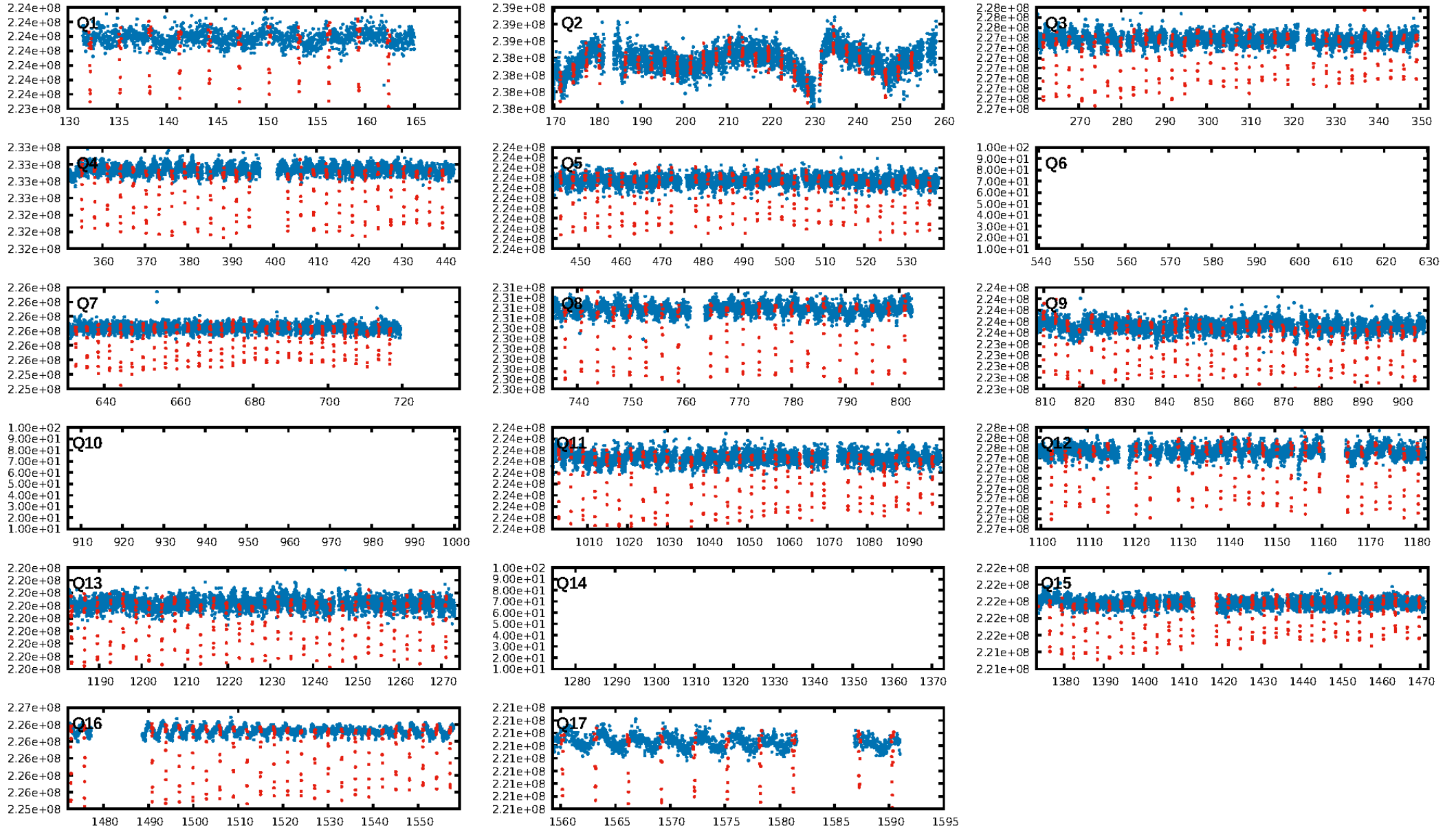
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 0.0% [0.00σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 0.00e+00
RollingBand-fgt: 0.96 [319/333]
GhostDiagnostic-chr: -0.7242
Centroid-sig: N/A
Centroid-so: 84.355 arcsec [958.84σ]
OotOffset-rm: 9.301 arcsec [135.98σ]
KicOffset-rm: 9.450 arcsec [135.98σ]
OotOffset-st: 1/4/4/5 [14]
KicOffset-st: 1/4/4/5 [14]
DiffImageQuality-fgm: 1.00 [14/14]
DiffImageOverlap-fno: 1.00 [14/14]

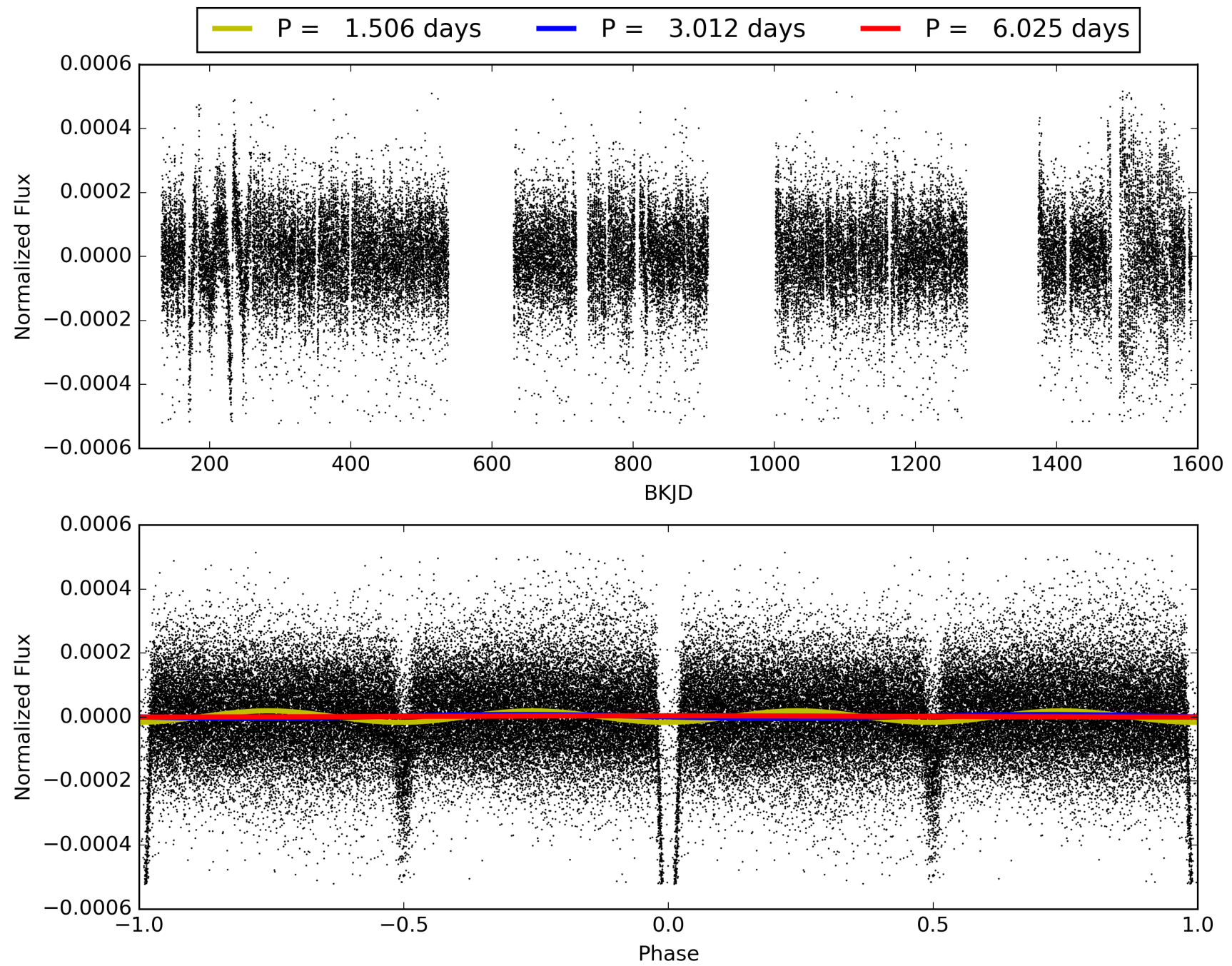
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 09:06:19 Z

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

TCE 003964562-01, PDC Light Curves

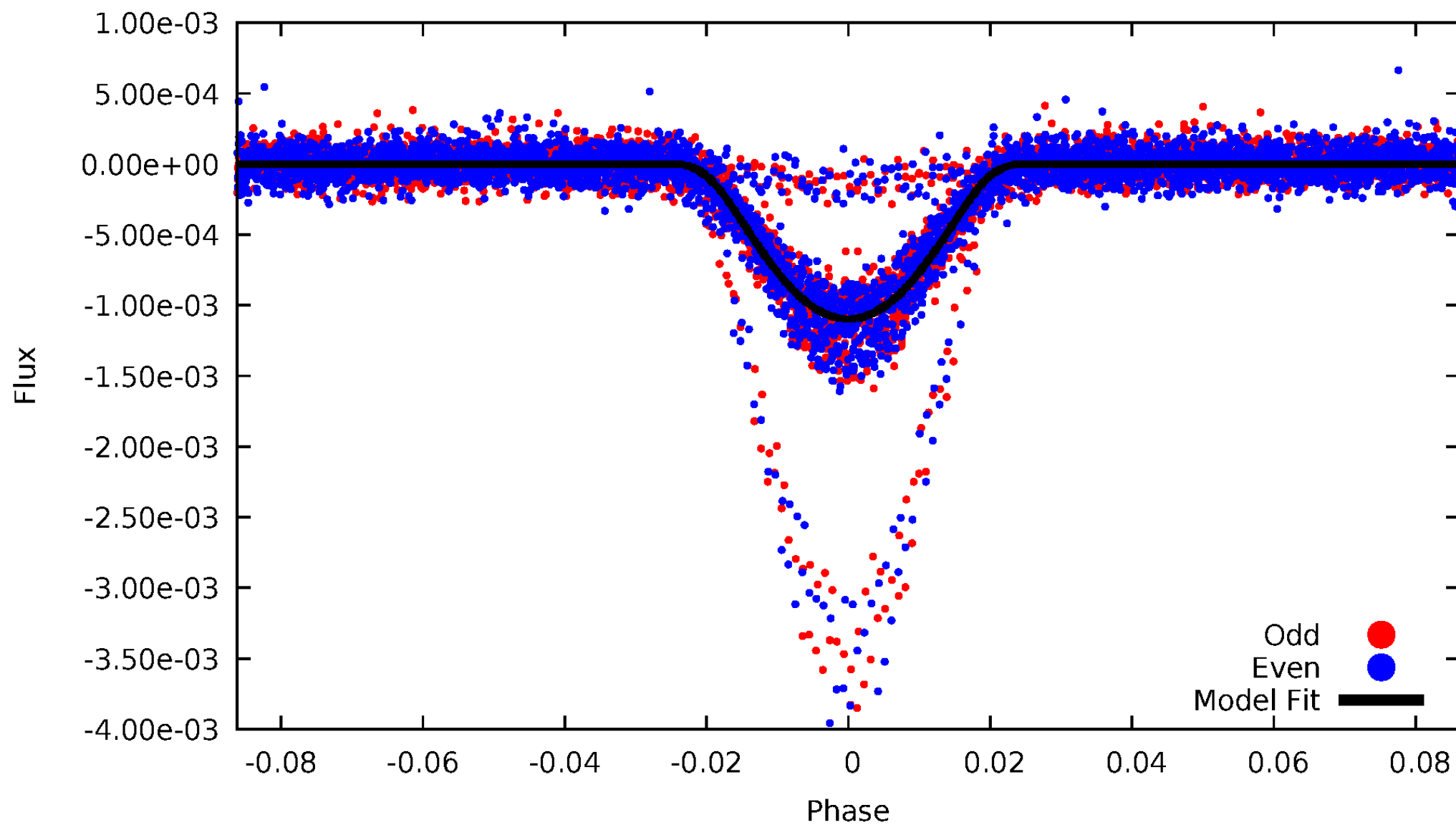


TCE 003964562-01



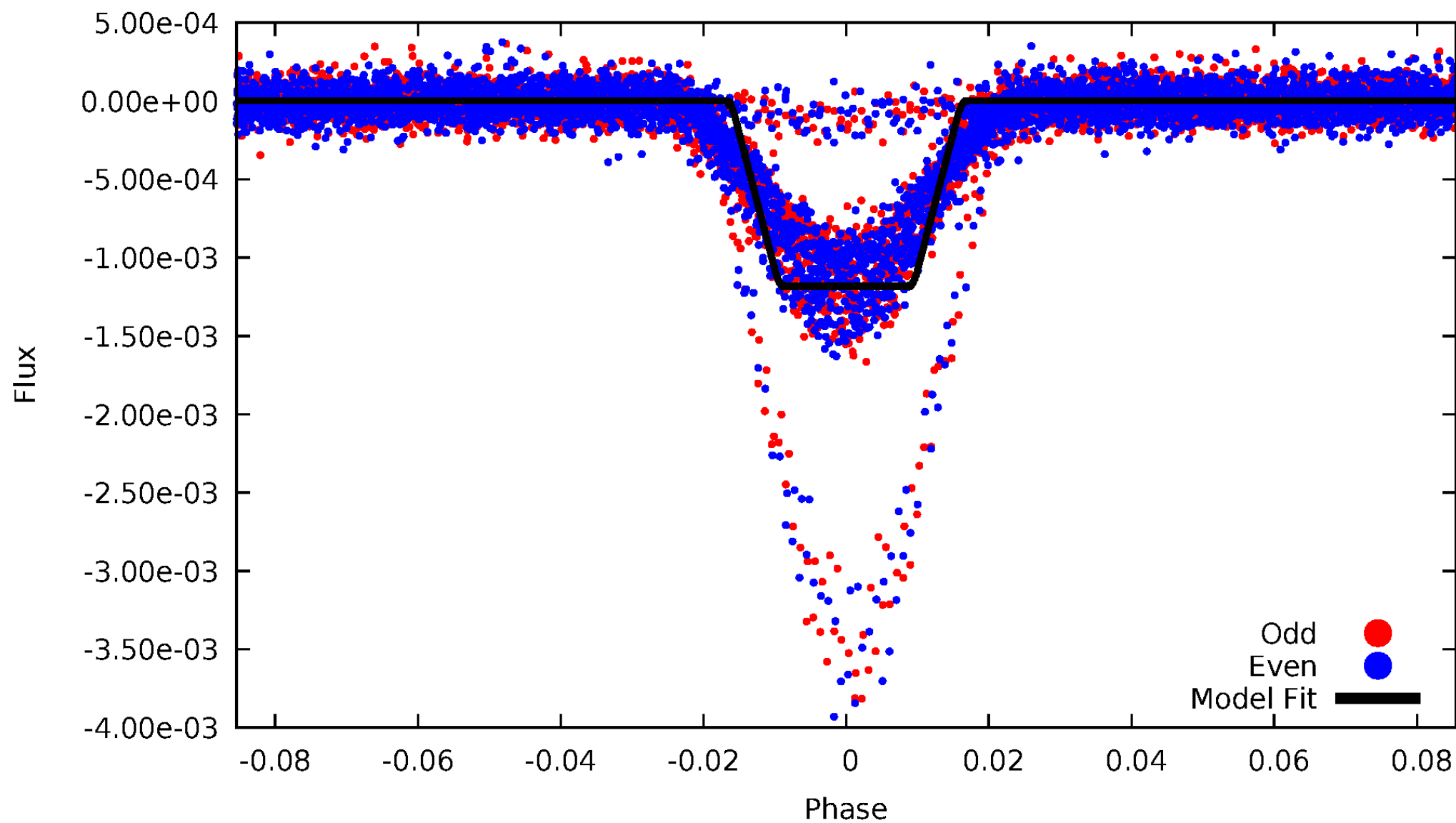
DV Odd/Even

TCE 003964562-01



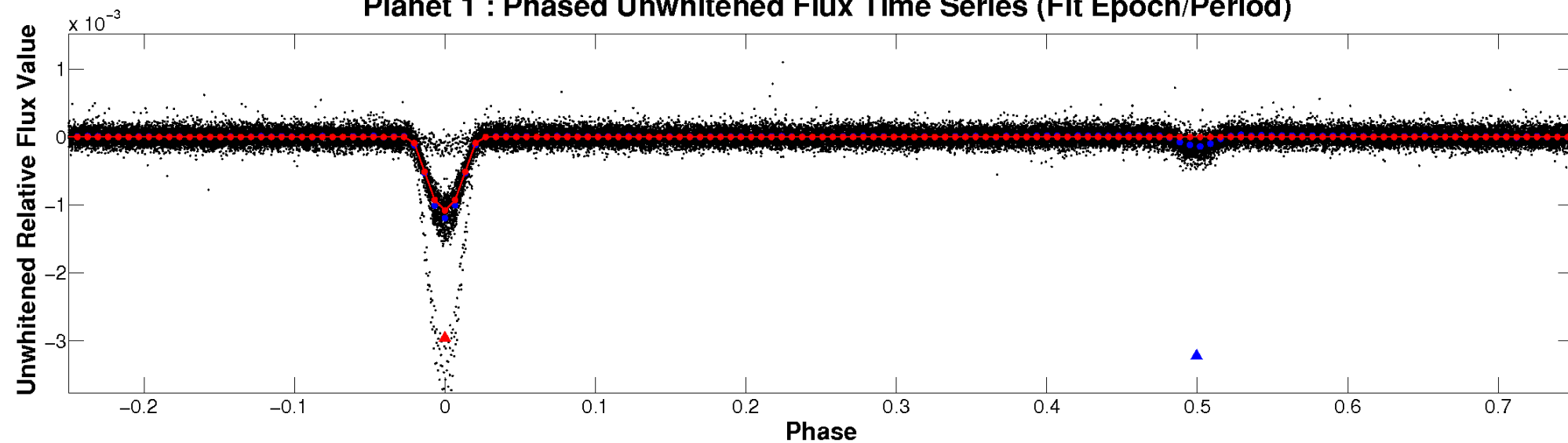
ALT Odd/Even

TCE 003964562-01

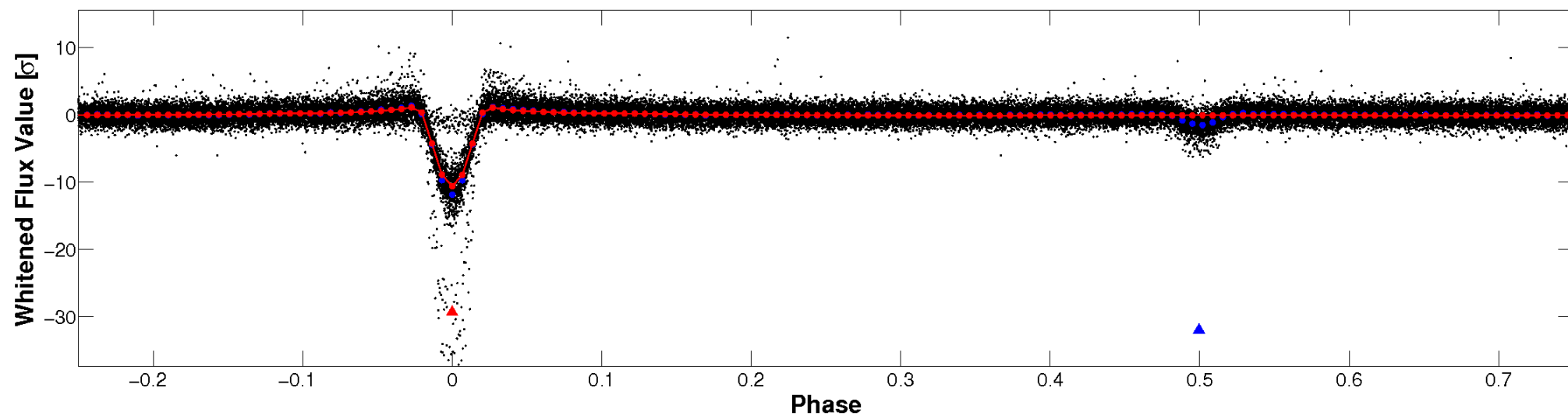


Non-Whitened Vs. Whitened Light Curve

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

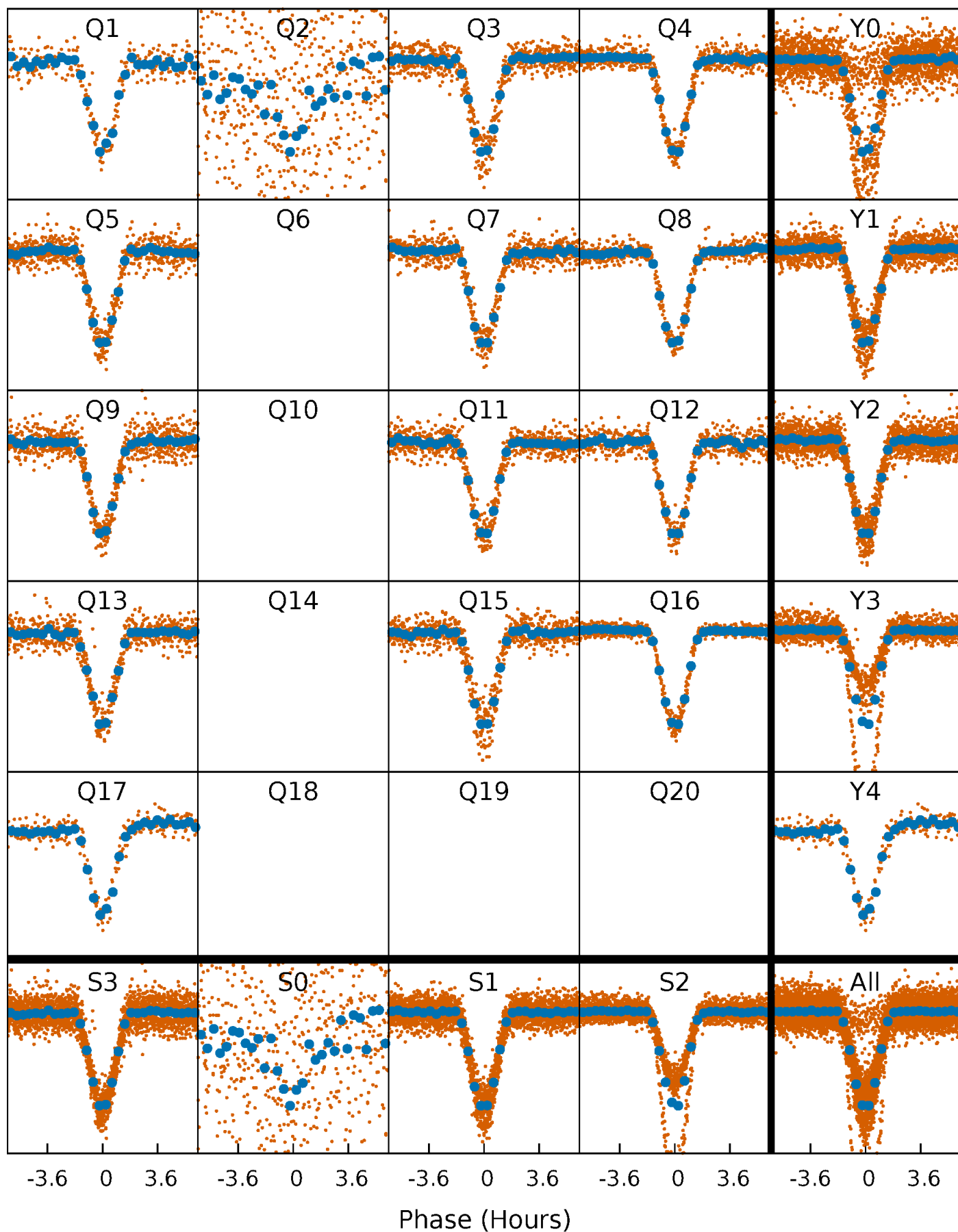


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



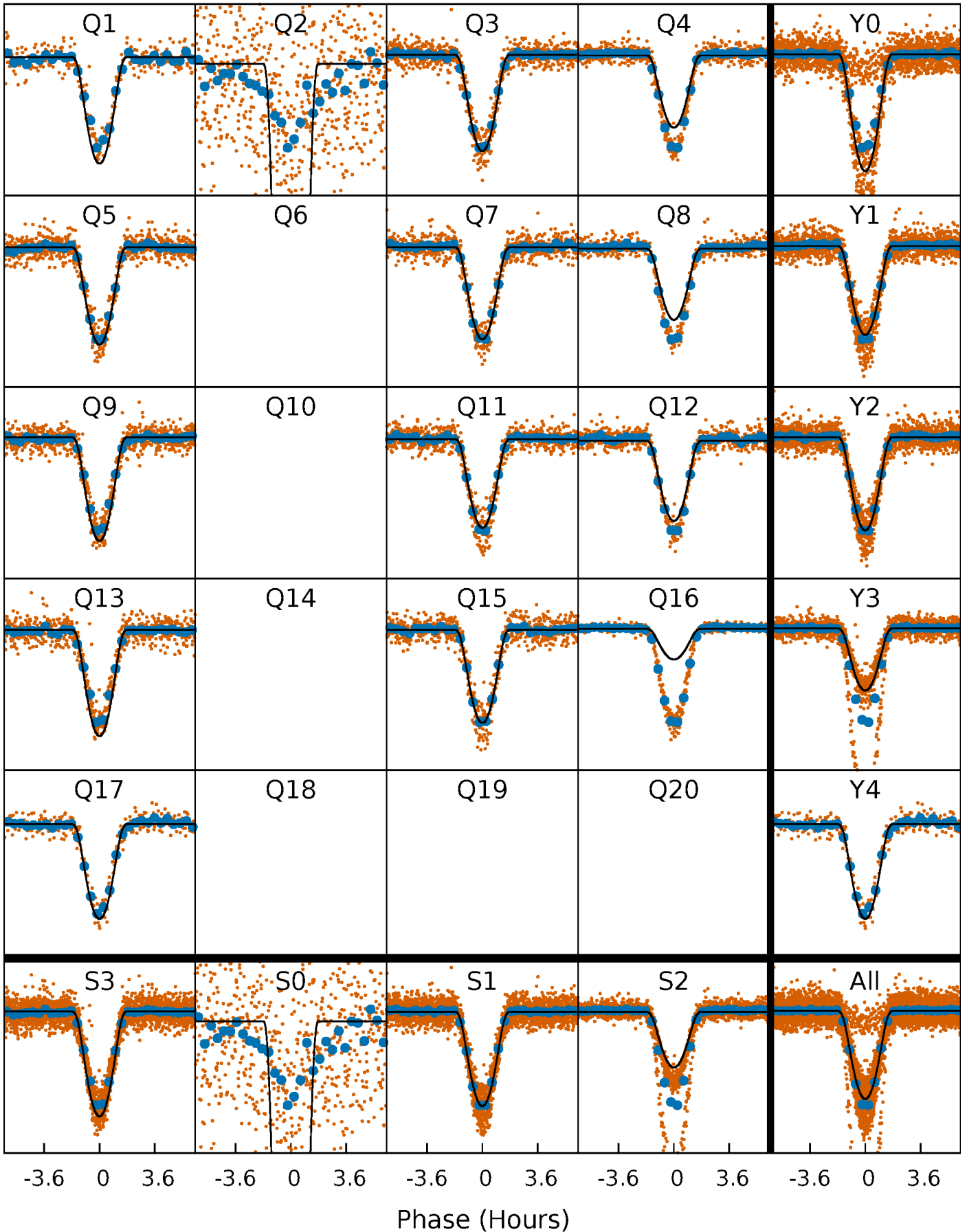
PDC Quarter-Phased Transit Curves

TCE 003964562-01 P= 3.012476 Days $T_0=132.247019$ (BKJD)



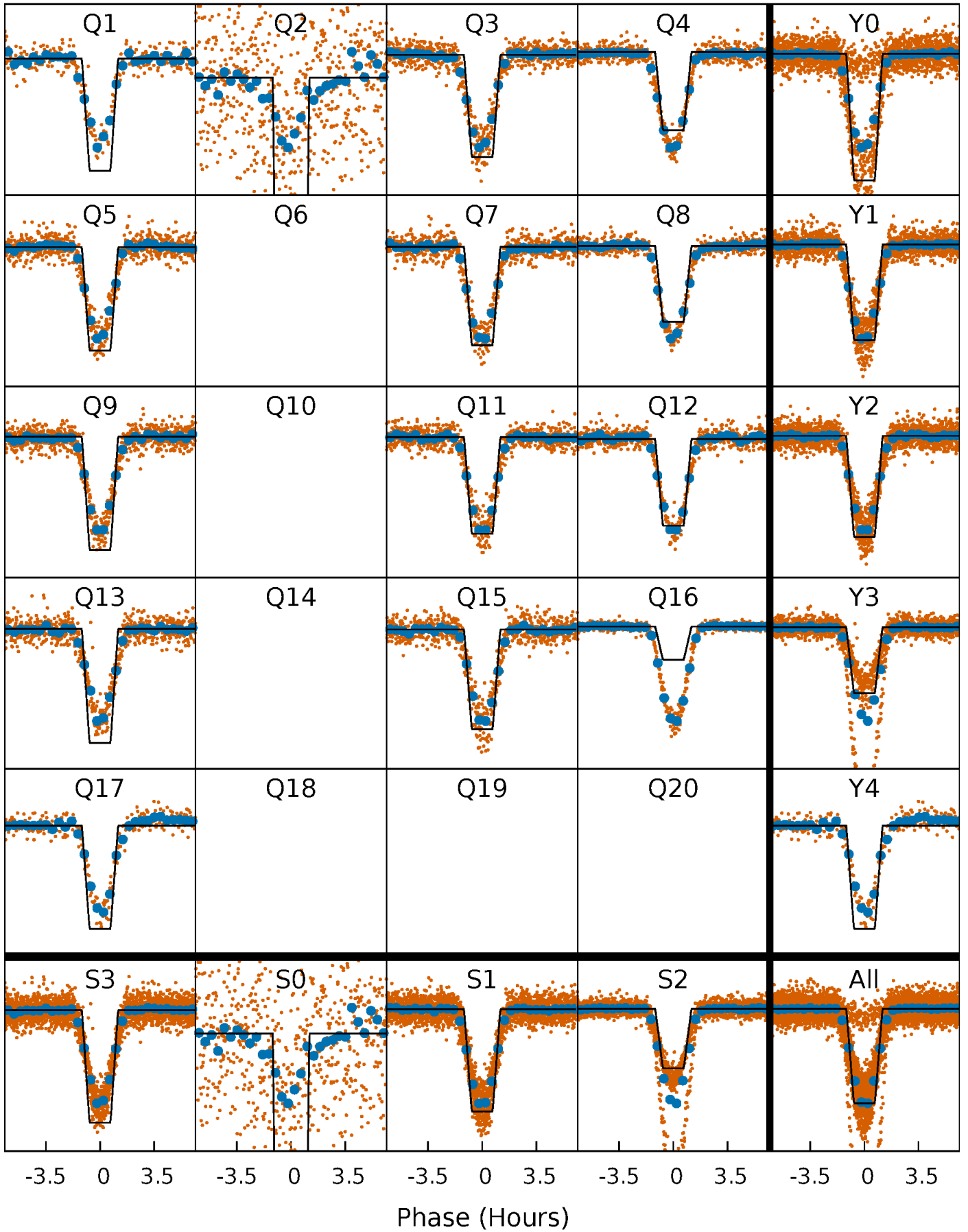
DV Quarter-Phased Transit Curves

TCE 003964562-01 P= 3.012476 Days $T_0=132.247019$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

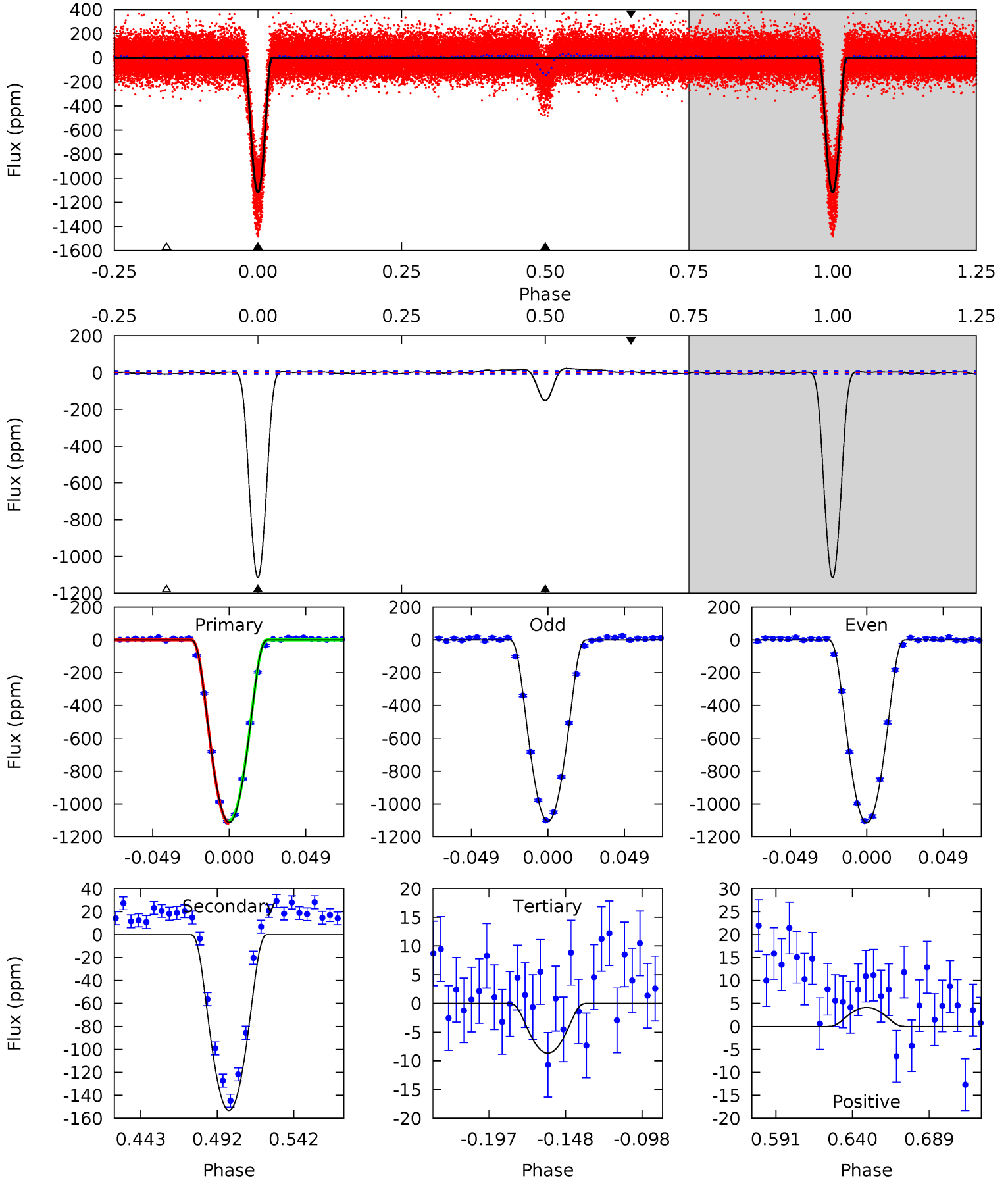
TCE 003964562-01 P= 3.012462 Days $T_0=132.250580$ (BKJD)



DV Model-Shift Uniqueness Test

003964562-01, P = 3.012476 Days, E = 129.234543 Days

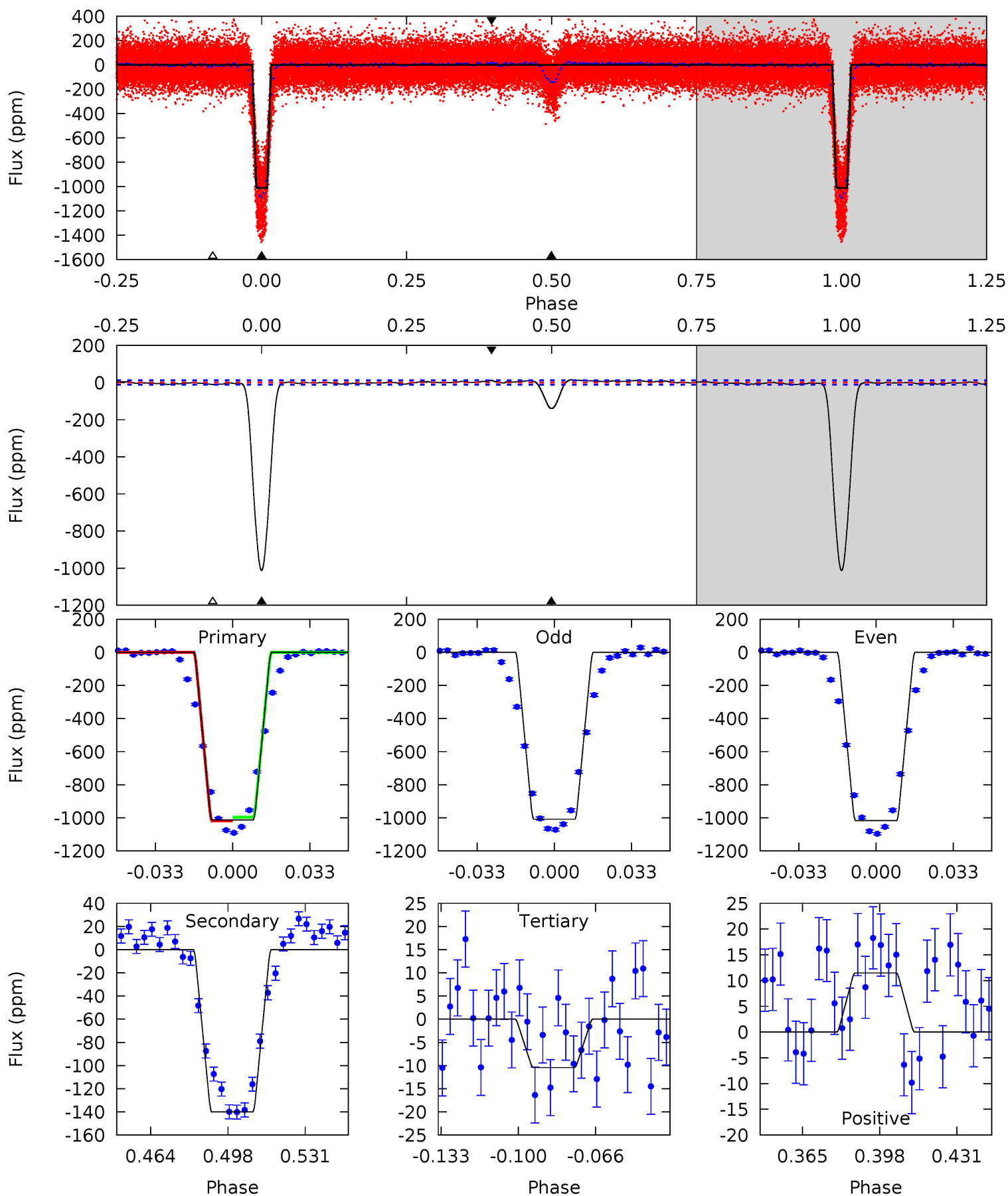
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
602.6	82.9	4.69	2.23	4.71	1.97	3.48	598.0	600.4	78.2	80.6	2.54	1.10	0.02	3.61



Alt Model-Shift Uniqueness Test

003964562-01, P = 3.012462 Days, E = 129.238118 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
419.2	57.9	4.32	4.75	4.79	2.13	2.32	414.9	414.5	53.6	53.2	1.71	1.12	0.02	4.62



Stellar Parameters For KIC 003964562

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	8601^{+240}_{-412}	$4.137^{+0.098}_{-0.182}$	$0.210^{+0.150}_{-0.650}$	$2.031^{+0.595}_{-0.396}$	$2.063^{+0.344}_{-0.459}$	$0.347^{+0.187}_{-0.165}$
	+3%/-5%	+2%/-4%	+71%/-310%	+29%/-19%	+17%/-22%	+54%/-48%
Source	KIC0	KIC0	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 003964562-01 / KOI 0015.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-153 ± 2	$12.52^{+2.42}_{-2.19}$	3345^{+240}_{-212}	3986^{+256}_{-242}	$1.418^{+0.582}_{-0.411}$
Alt.	-140 ± 2	$7.61^{+2.17}_{-1.66}$	3338^{+238}_{-215}	4825^{+525}_{-400}	$3.456^{+2.140}_{-1.246}$

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 $A_{obs} \gg 1.0$

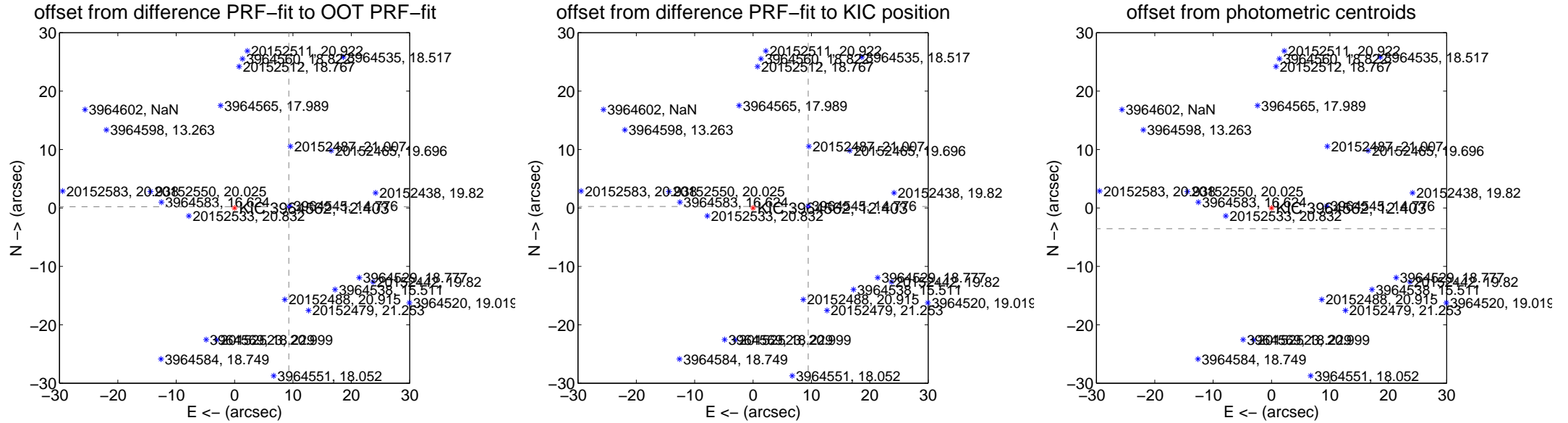
DV Centroid Data

Supplemental centroid analysis for 003964562-01. Kepler magnitude: 12.40. Transit SNR 281.37

There are 14 quarters with good PRF difference image offsets

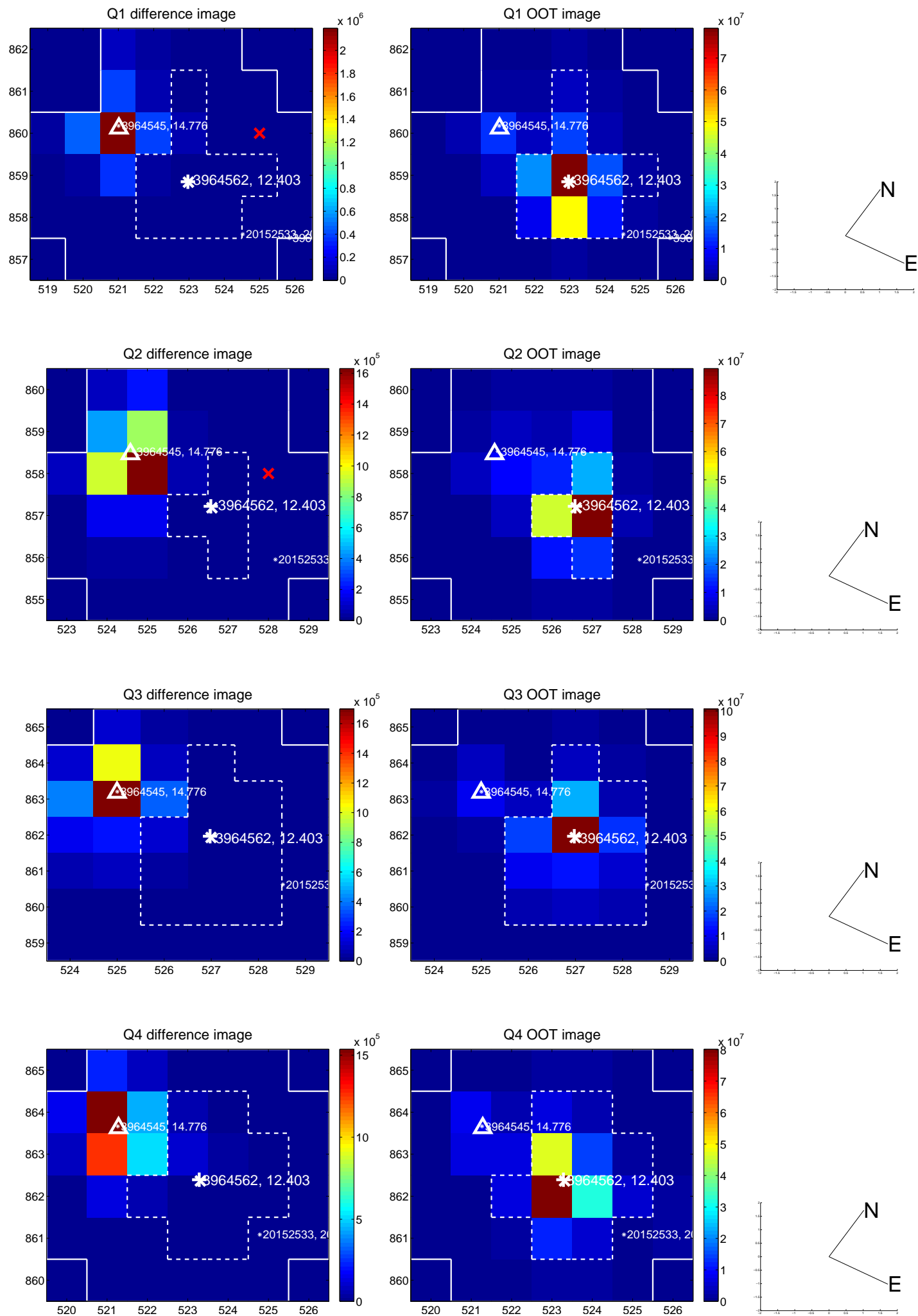
The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	9.301 \pm 0.068	135.98	-9.298 \pm 0.068	0.202 \pm 0.071
PRF-fit source offset from KIC position	9.450 \pm 0.069	135.98	-9.447 \pm 0.069	0.243 \pm 0.069
photometric centroid source offset	84.36 \pm 0.09	958.84	-84.28 \pm 0.09	-3.55 \pm 0.04

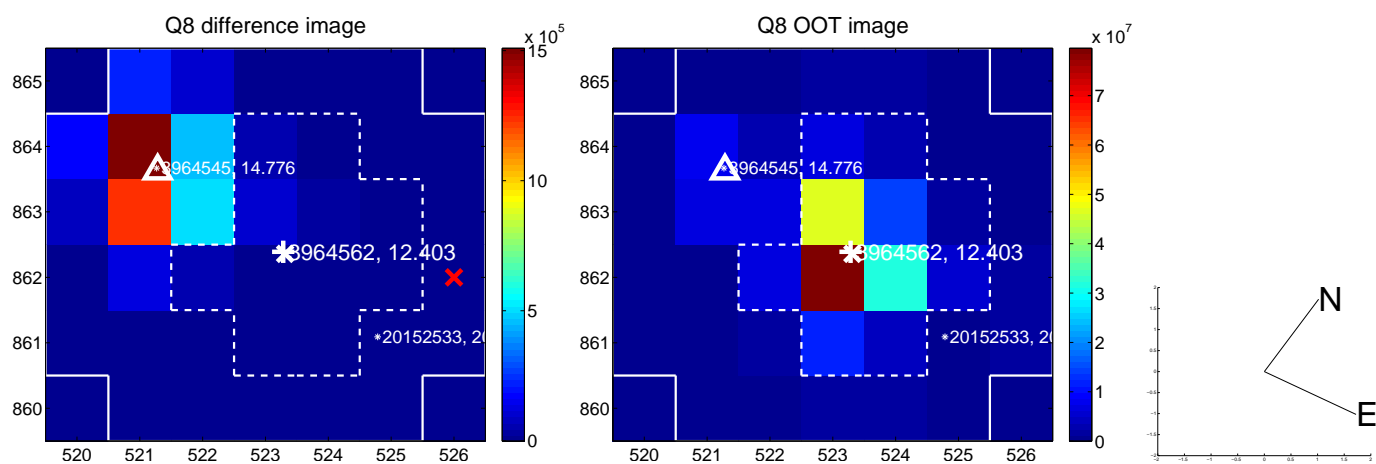
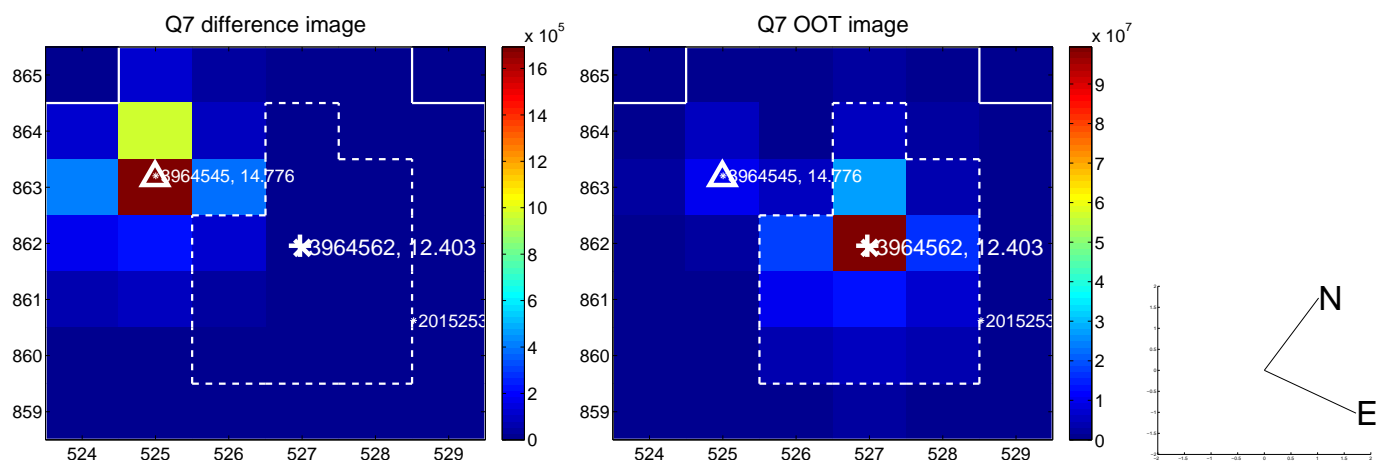
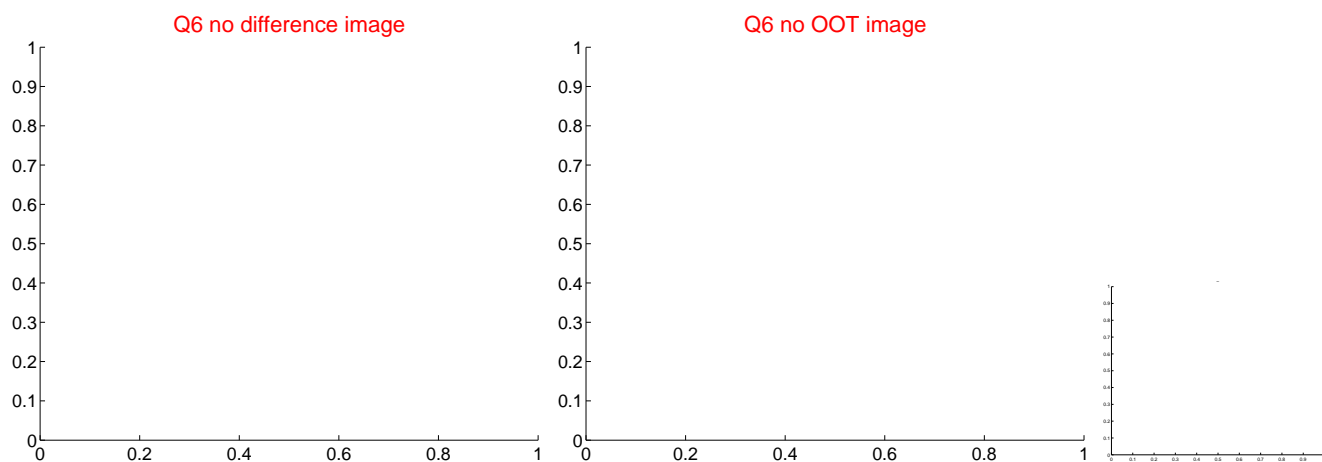
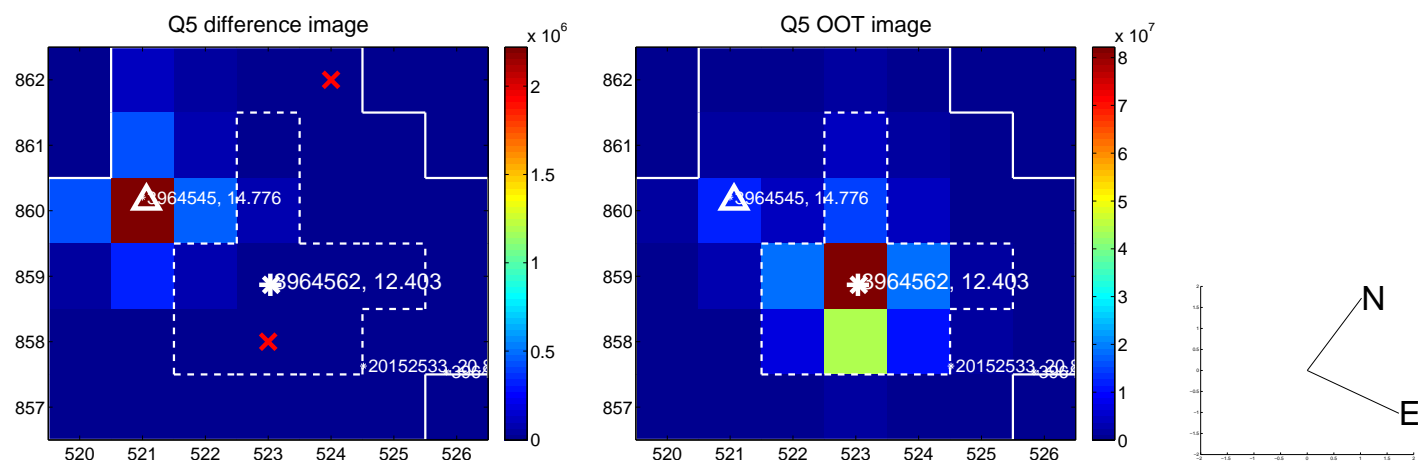


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

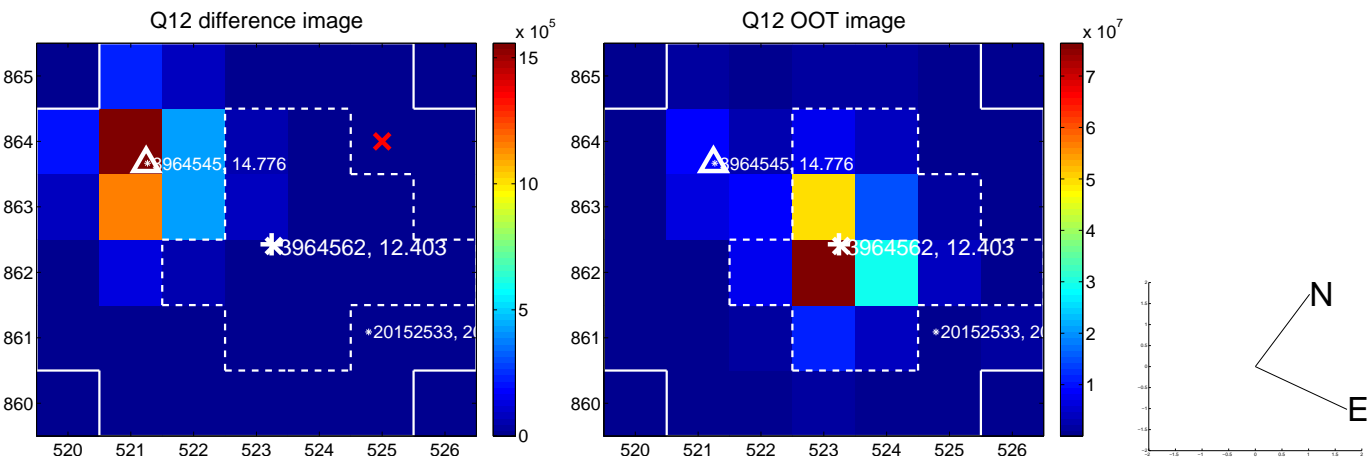
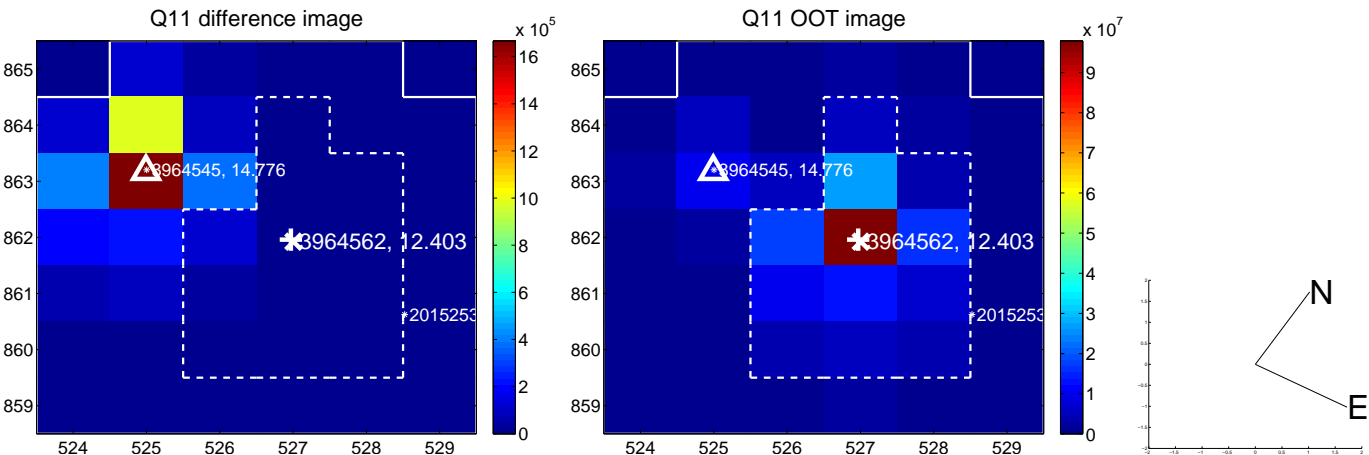
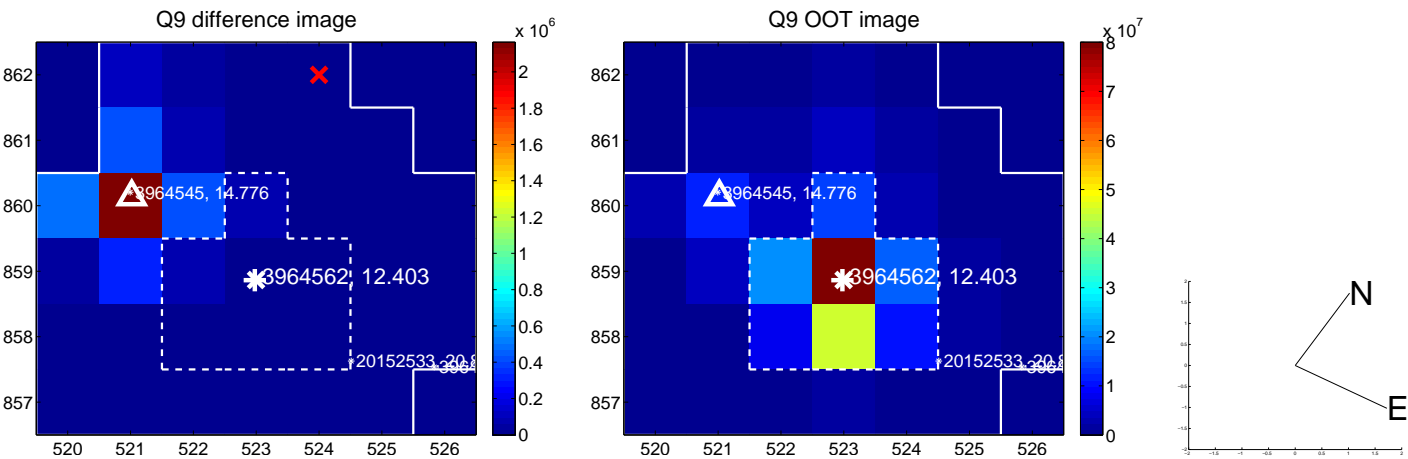
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



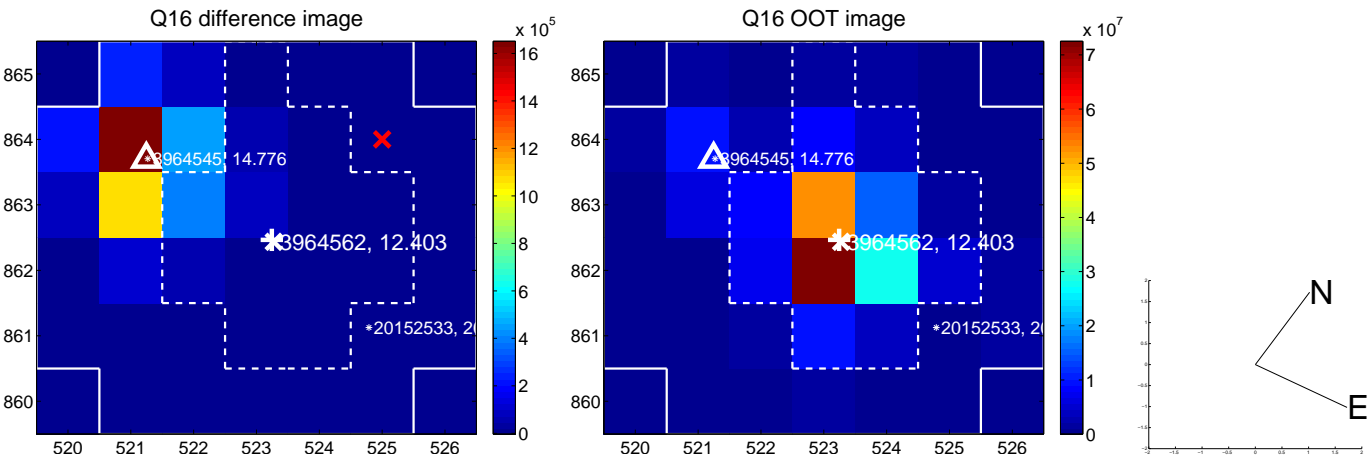
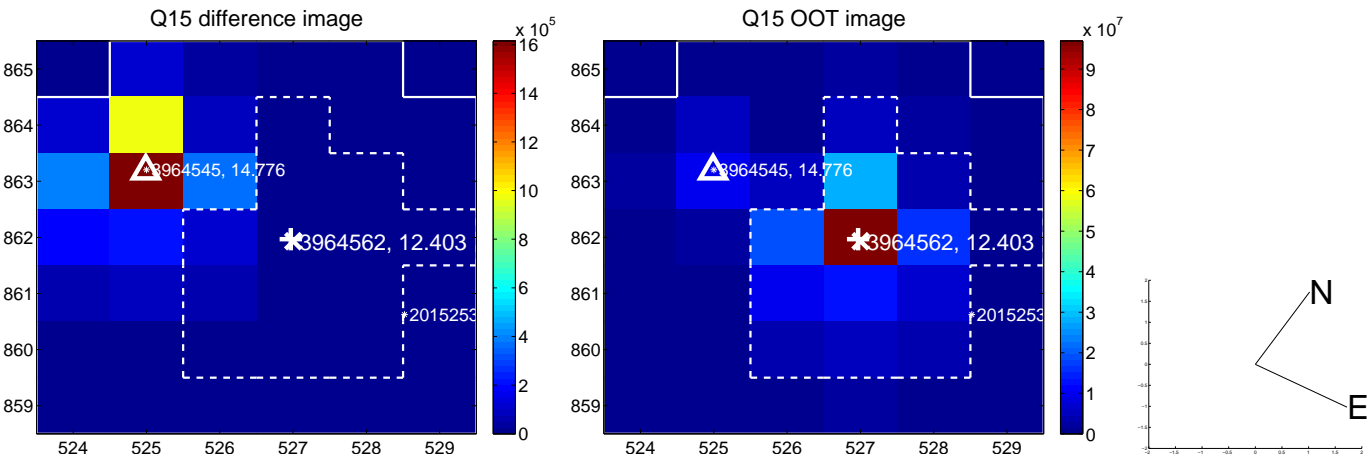
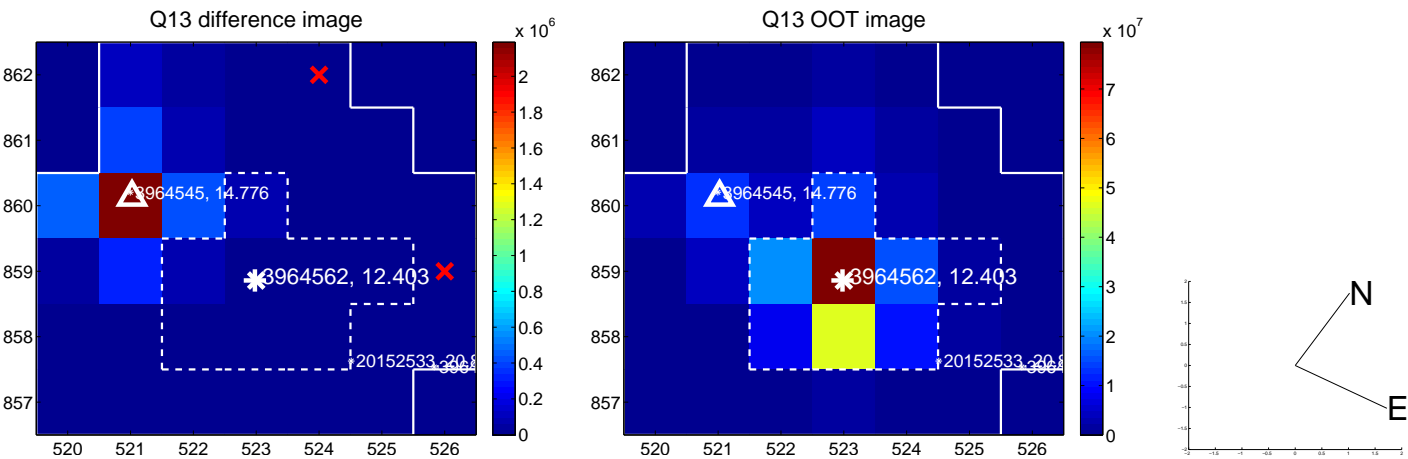
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value



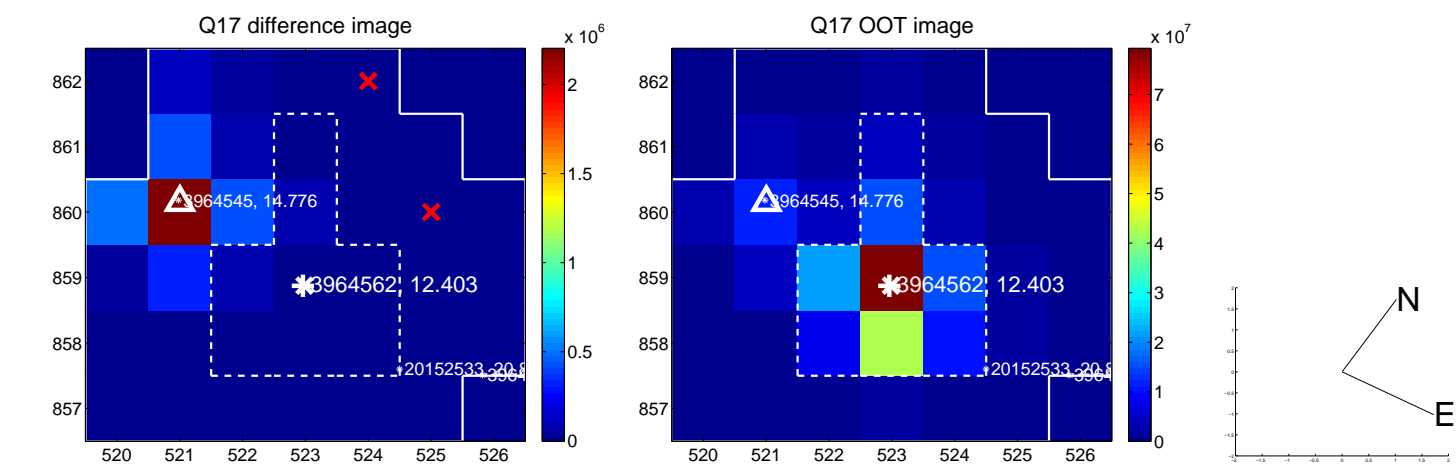
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



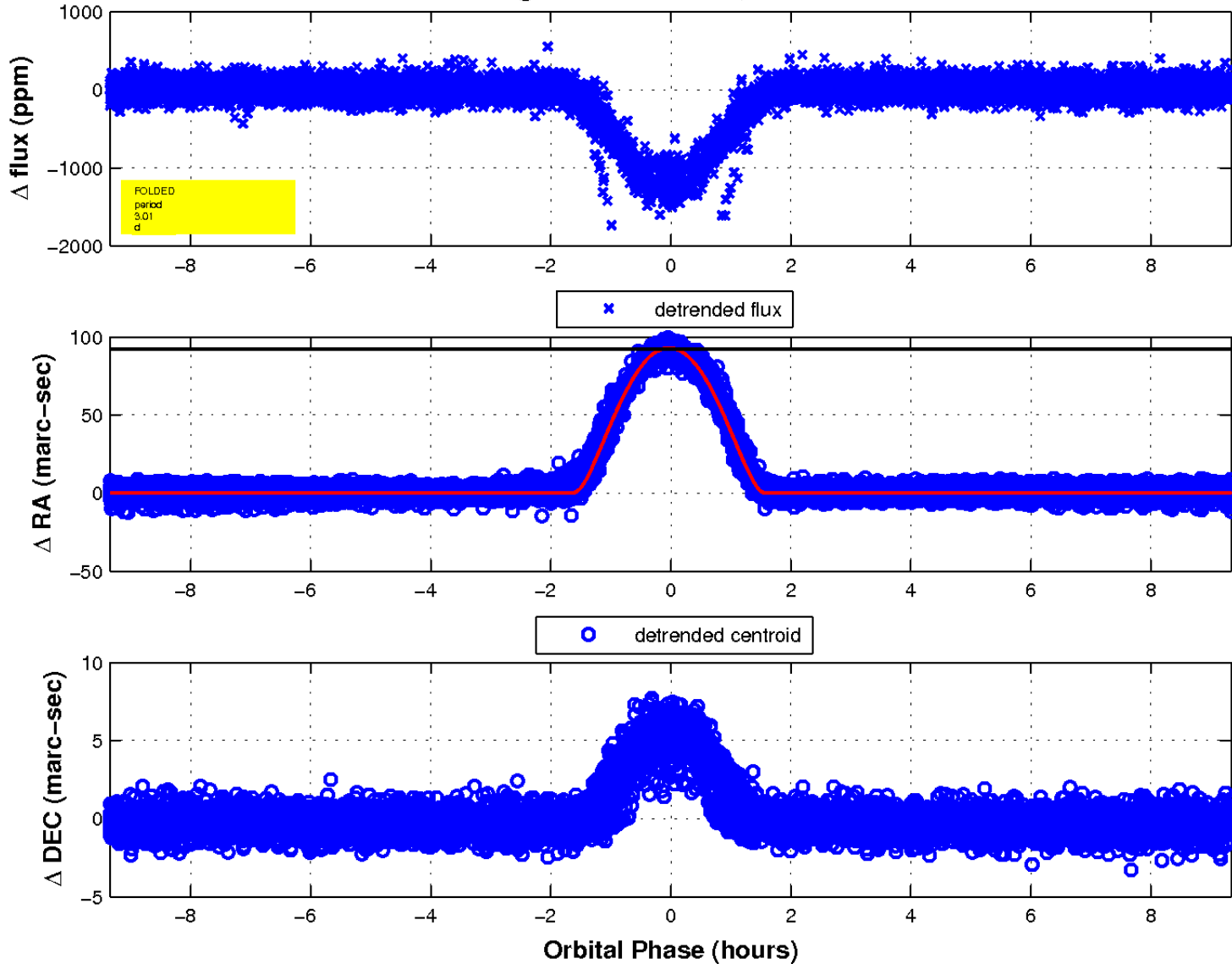
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



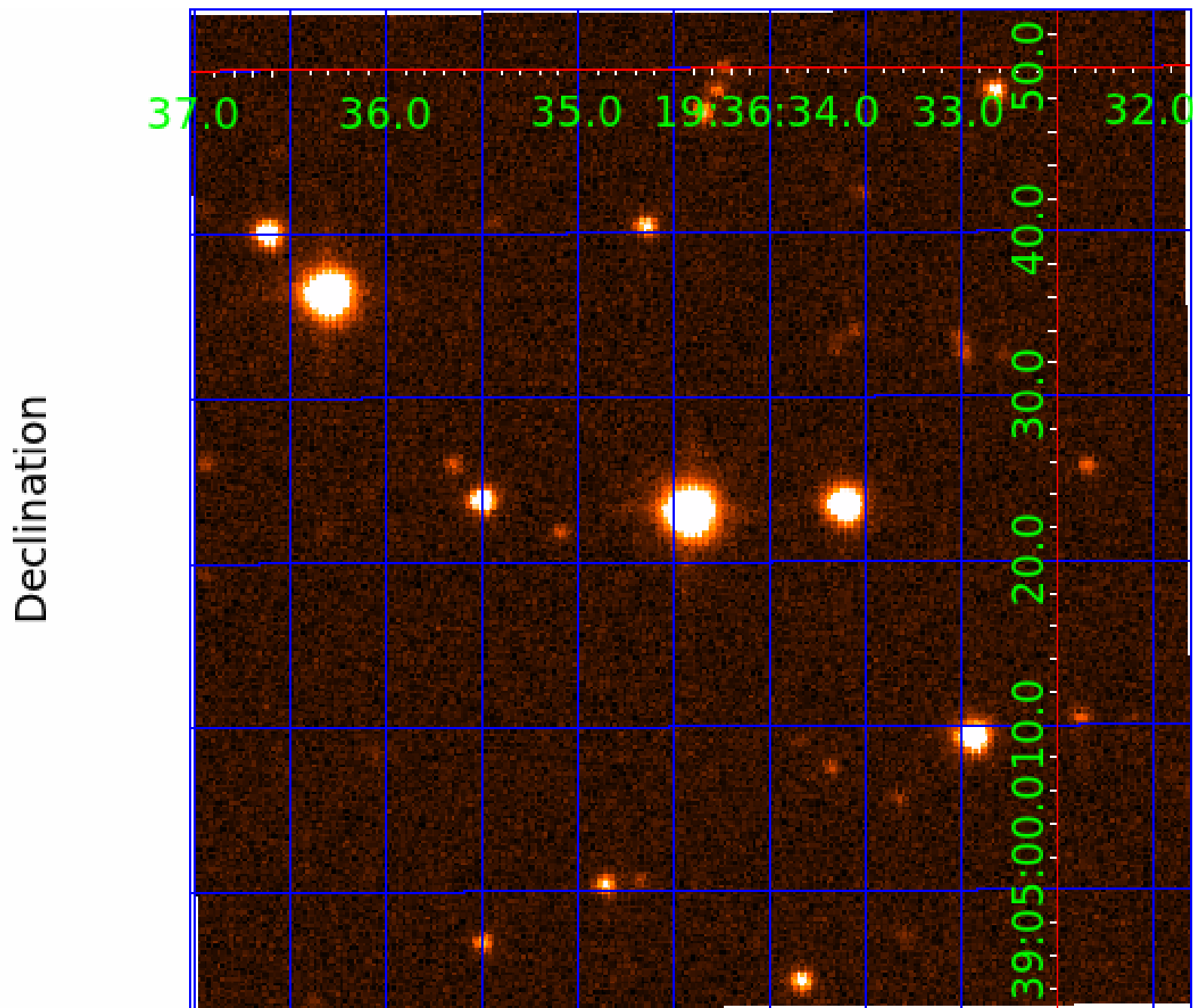
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



fluxWeightedCentroids, Planet 1 of 2



UKIRT Image



KIC 003964562

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})
003964562-01	OBS	0015.01	3.012476	132.247019	1096.5	3.115	372.4	281.4	2.03	8601	12.12	7487.42
003964562-02	OBS	No	3.012477	133.751776	147.3	2.793	44.8	47.7	2.03	8601	3.24	7487.41

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003964562-01	OBS	FP	0.00	0	1	1	1	MOD_SEC_DV—MOD_SEC_ALT—DEEP_V_SHAPED—HAS_SEC_TCE—CENT_RESOLVED_OFFSET—EPHEM_MATCH
003964562-02	OBS	FP	0.00	1	1	1	1	IS_SEC_TCE—CENT_RESOLVED_OFFSET—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 003964562-02

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
003964562-02	3964562	003964545-02	3964545	1:1	9.4	-2	2	14.78	12.41	168.24	Direct-PRF	0	0.00	0.05

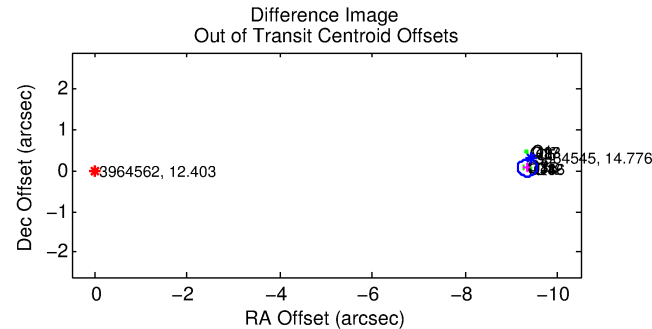
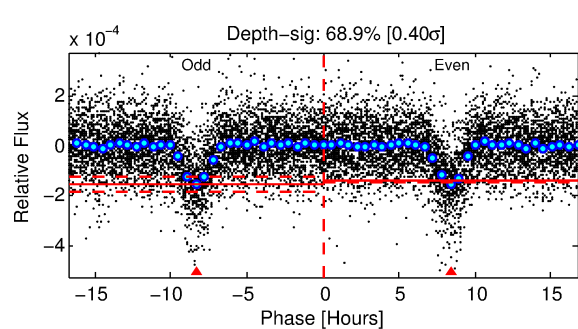
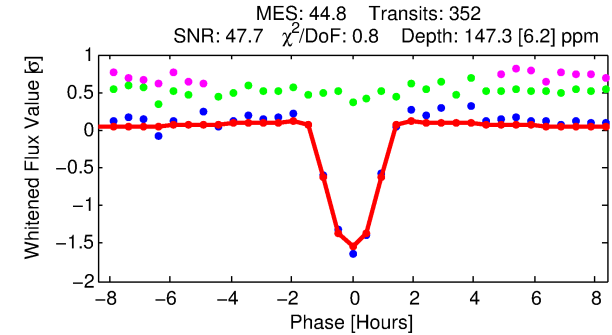
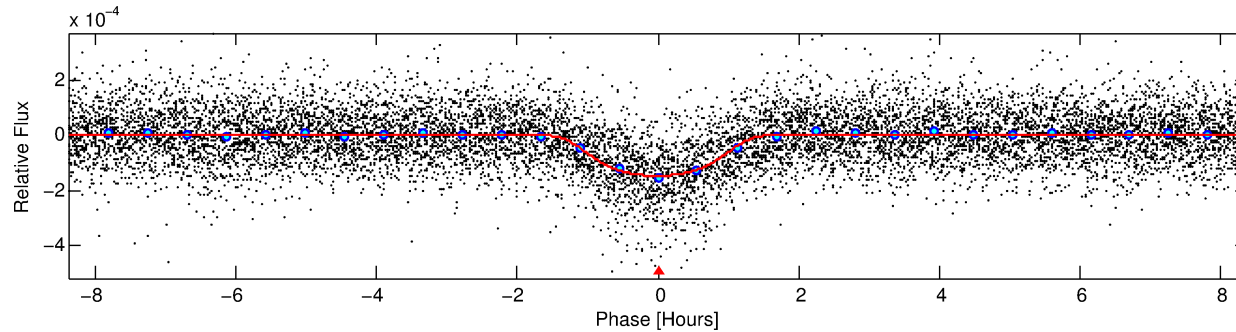
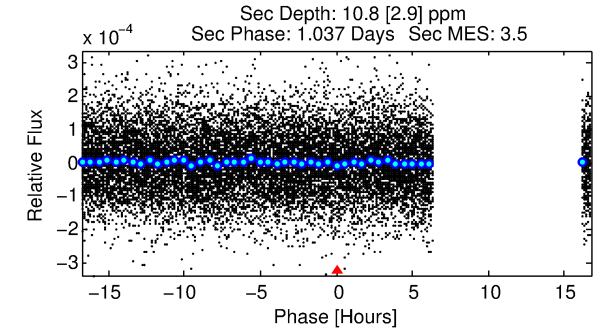
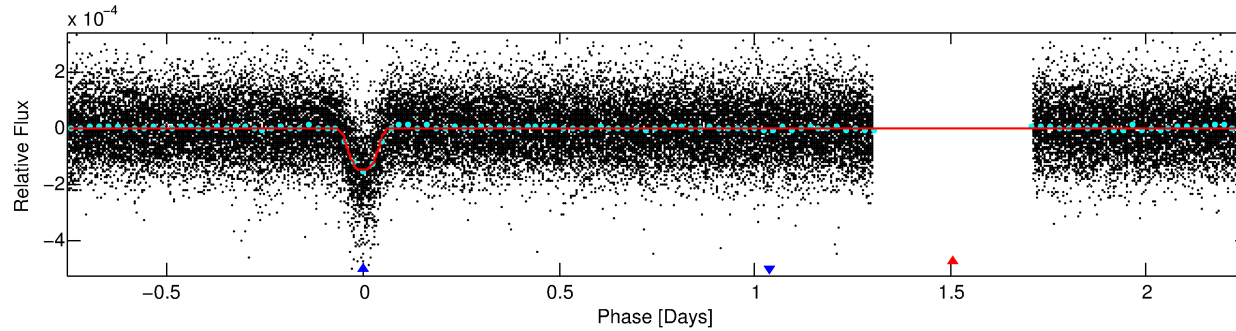
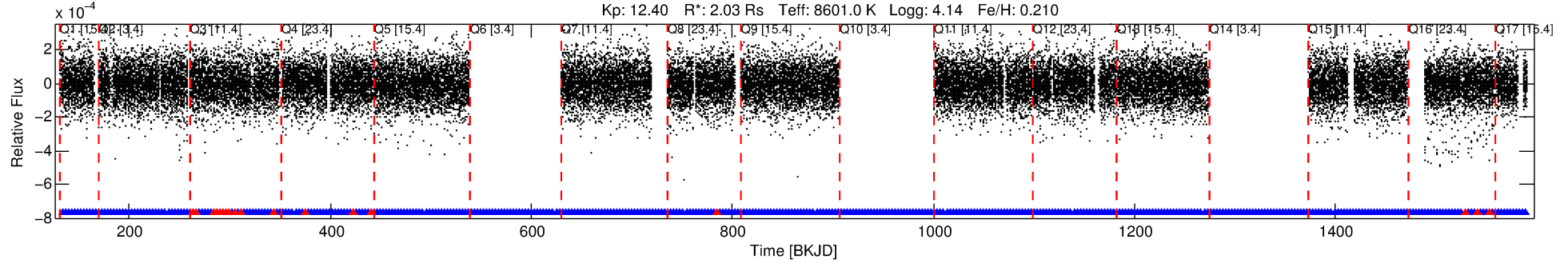
Notes: $P_1:P_2$ is the period ratio. Dist is the distance in arcseconds. Δ Row and Δ Col are the number of pixels apart in row and column. m_2 and m_1 are the magnitudes of the parent and child. D_2/D_1 is the parent's transit depth divided by the child's. σ_P and σ_T are the significance of the match 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: 3964562 Candidate: 2 of 2 Period: 3.012 d

KOI: K00015 Corr: No Ephemeris Match

Kp: 12.40 R*: 2.03 Rs Teff: 8601.0 K Logg: 4.14 Fe/H: 0.210



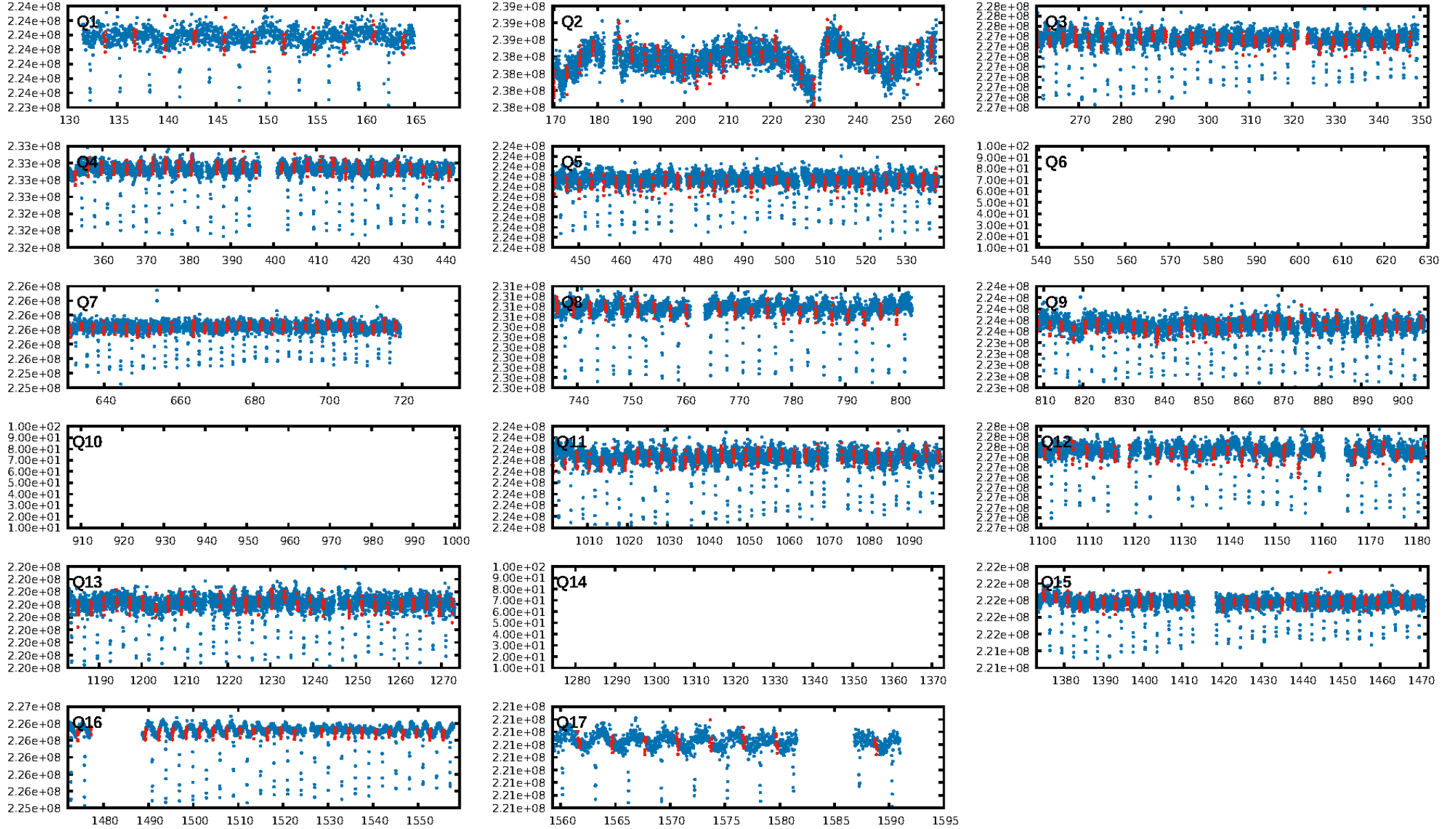
DV Fit Results:

Period = 3.01248 [0.00000] d
Epoch = 133.7518 [0.0010] BKJD
Rp/R* = 0.0146 [0.0004]
a/R* = 2.24 [0.10]
b = 0.98 [0.00]
Seff = 7487.41 [2927.86]
Teq = 2372 [232] K
Rp = 3.24 [0.95] Re
a = 0.0520 [0.0125] AU
Ag = 1.53 [0.67] [0.79σ]
Teff = 4076 [339] K [4.15σ]

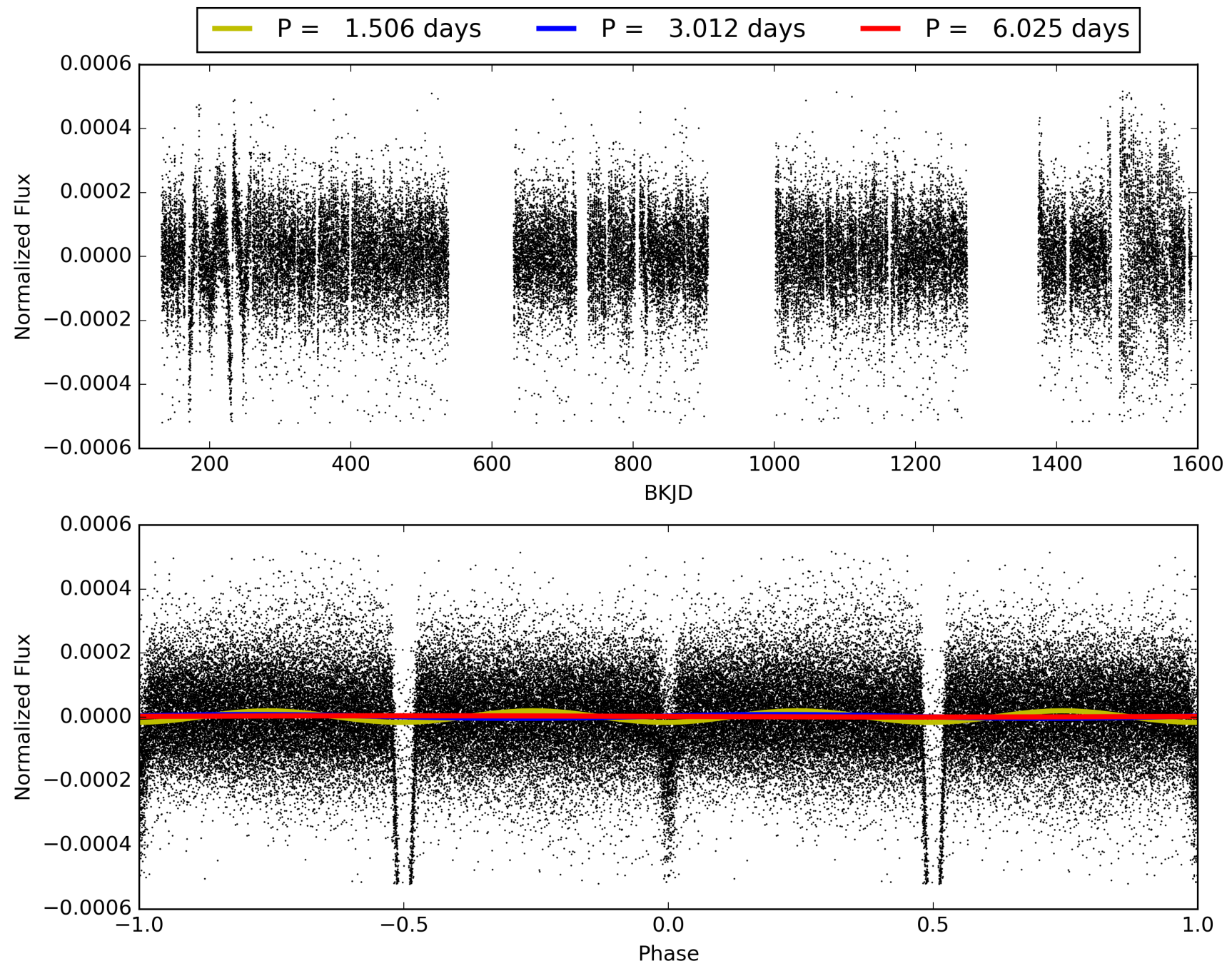
DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: N/A
ModelChiSquareGoF-sig: N/A
Bootstrap-pfa: 0.00e+00
RollingBand-fgt: 0.95 [315/333]
GhostDiagnostic-chr: -0.5425
Centroid-sig: N/A
Centroid-so: 7.446 arcsec [12.03σ]
OotOffset-rm: 9.337 arcsec [133.10σ]
KicOffset-rm: 9.482 arcsec [133.39σ]
OotOffset-st: 1/4/4/5 [14]
KicOffset-st: 1/4/4/5 [14]
DiffImageQuality-fgm: 1.00 [14/14]
DiffImageOverlap-fno: 1.00 [14/14]

TCE 003964562-02, PDC Light Curves

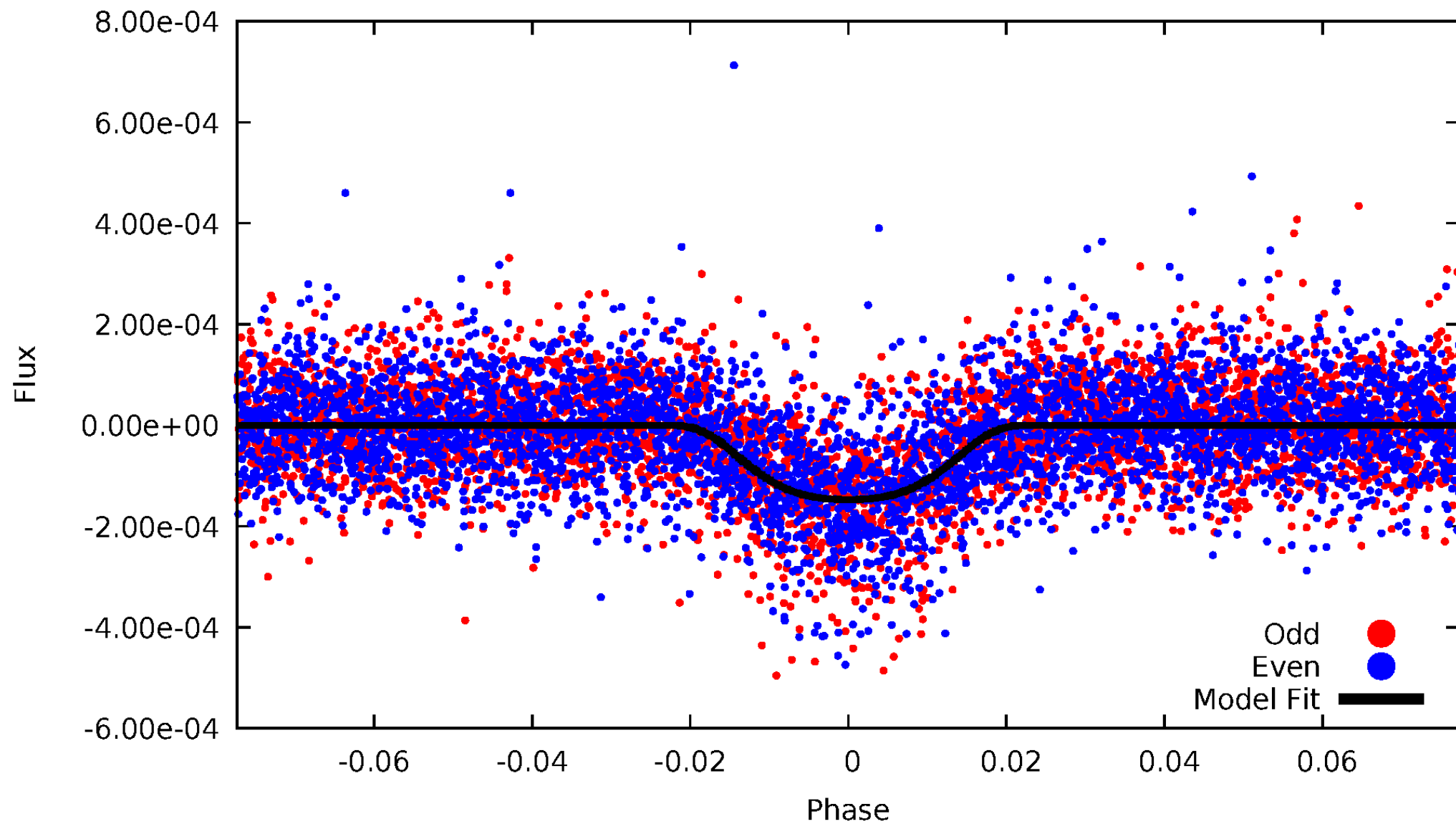


TCE 003964562-02



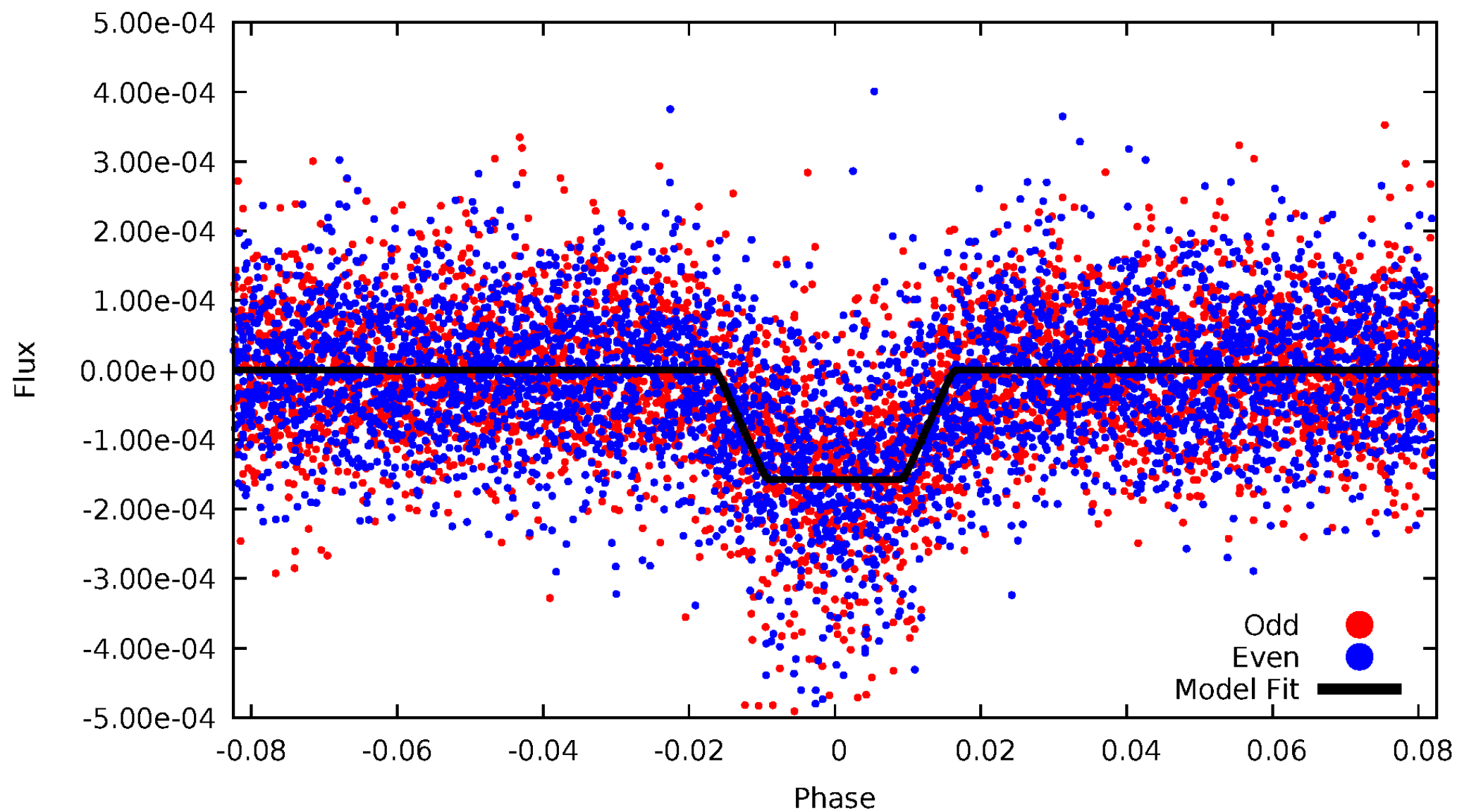
DV Odd/Even

TCE 003964562-02



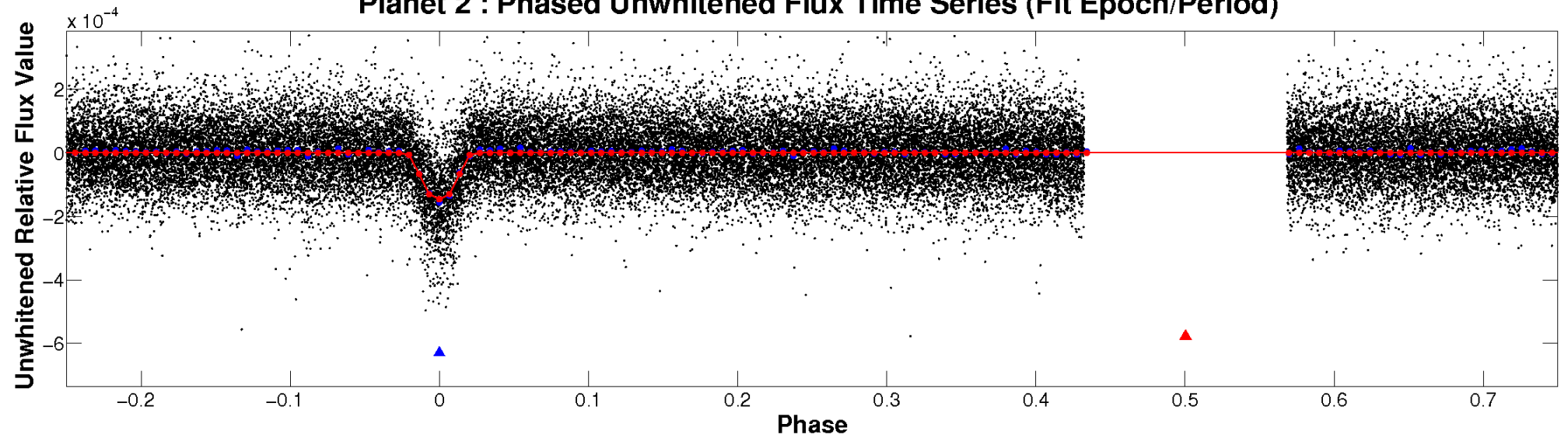
ALT Odd/Even

TCE 003964562-02

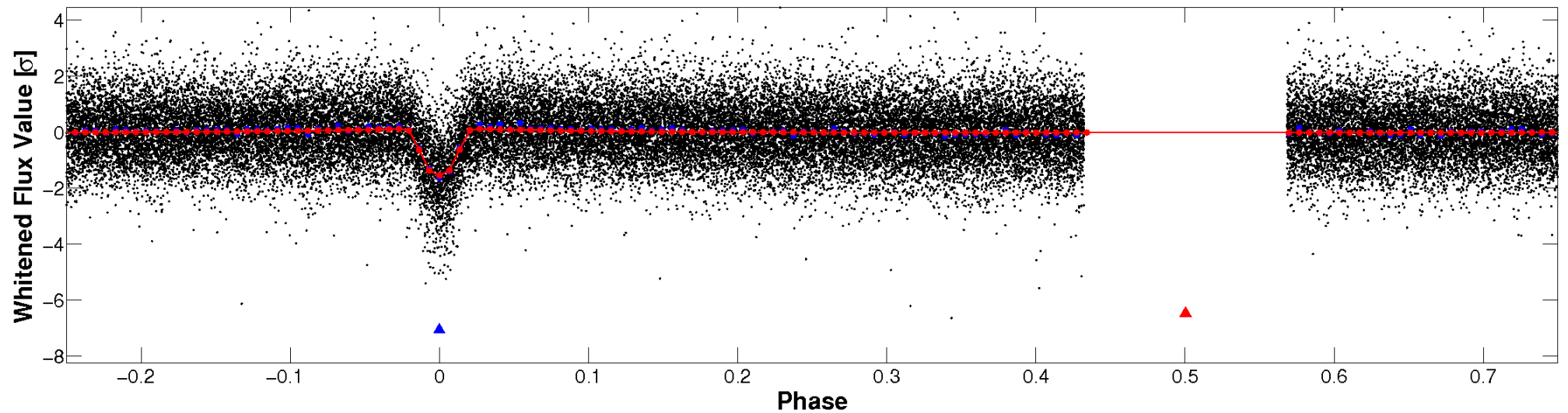


Non-Whitened Vs. Whitened Light Curve

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

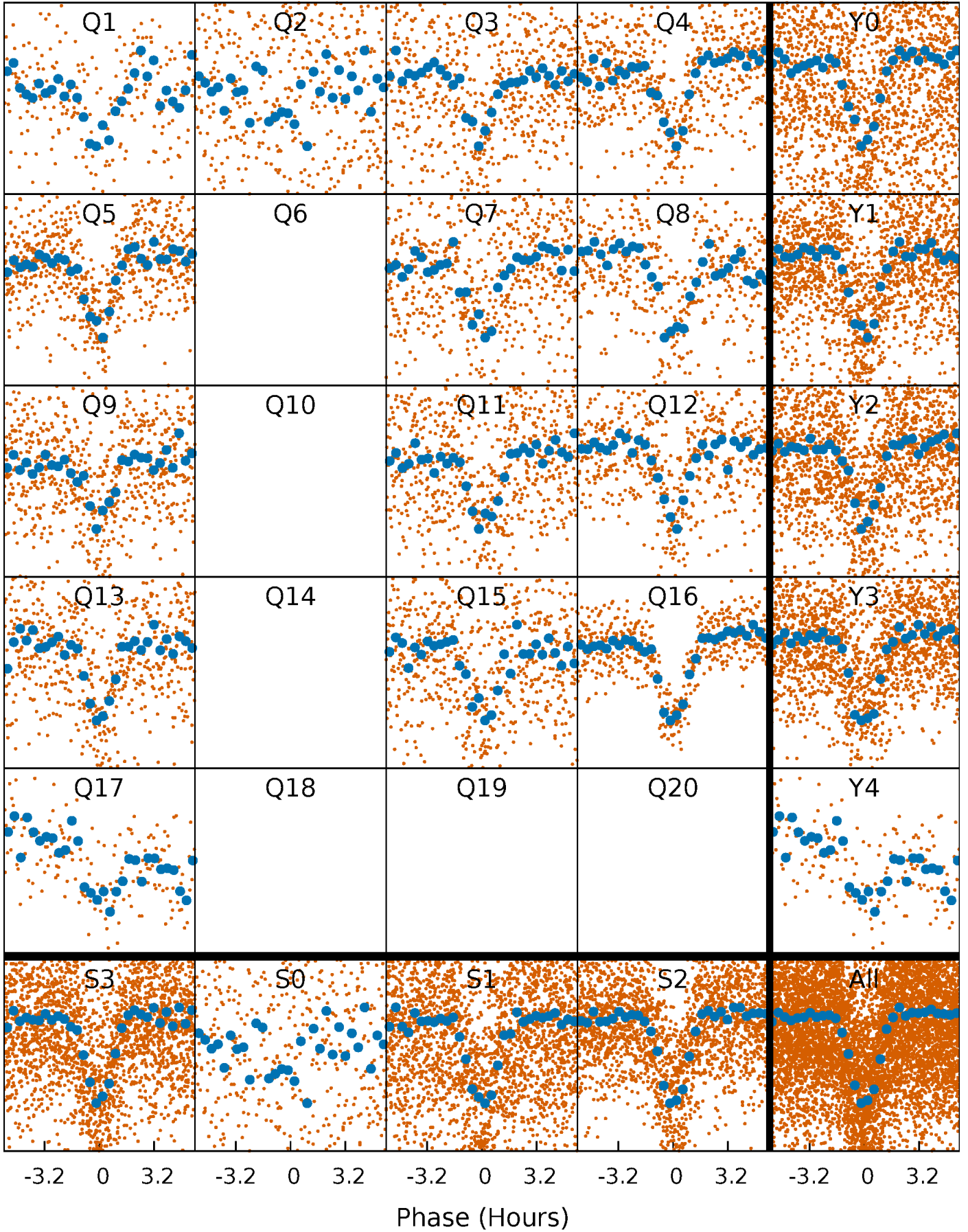


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



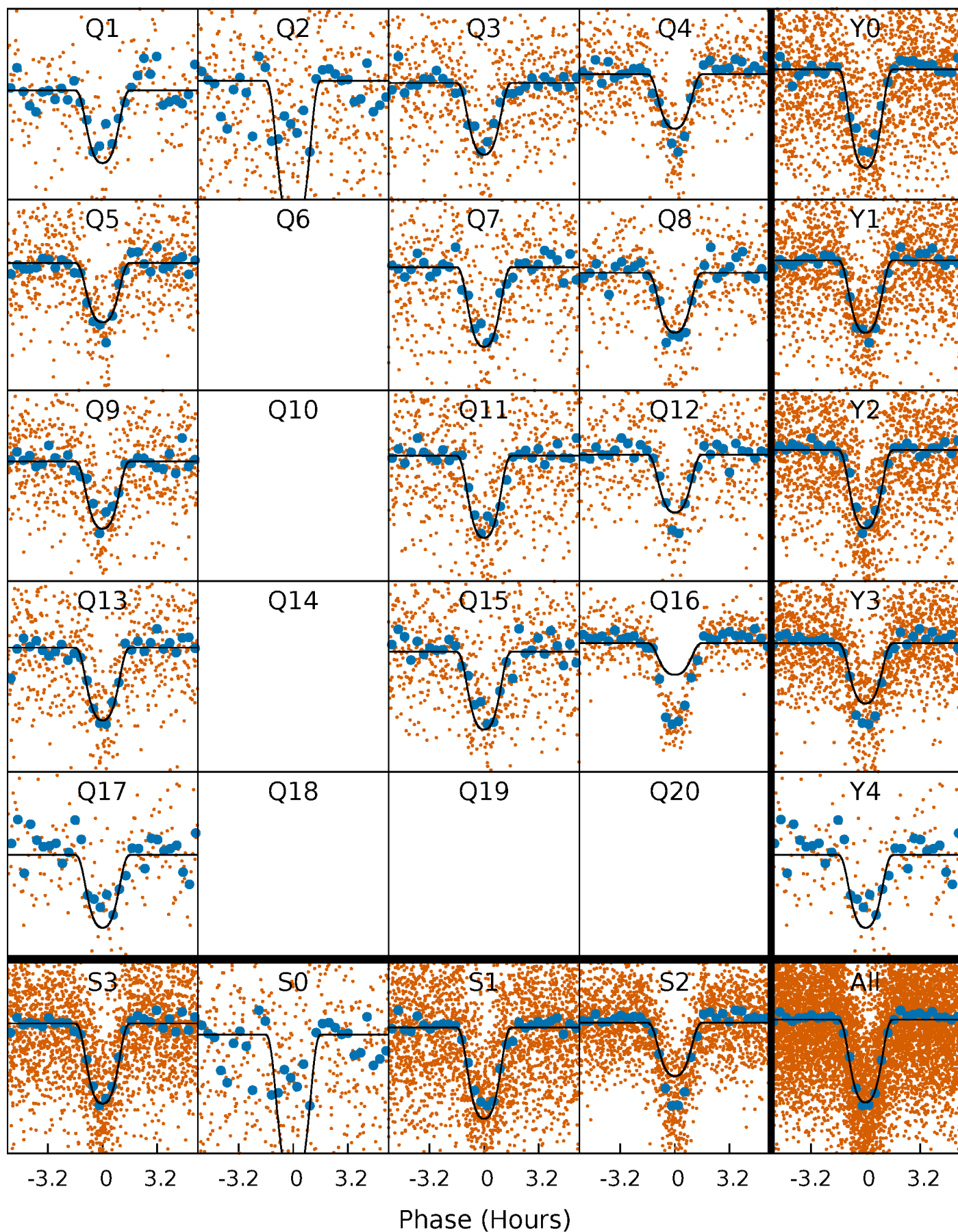
PDC Quarter-Phased Transit Curves

TCE 003964562-02 P= 3.012477 Days $T_0=133.751776$ (BKJD)



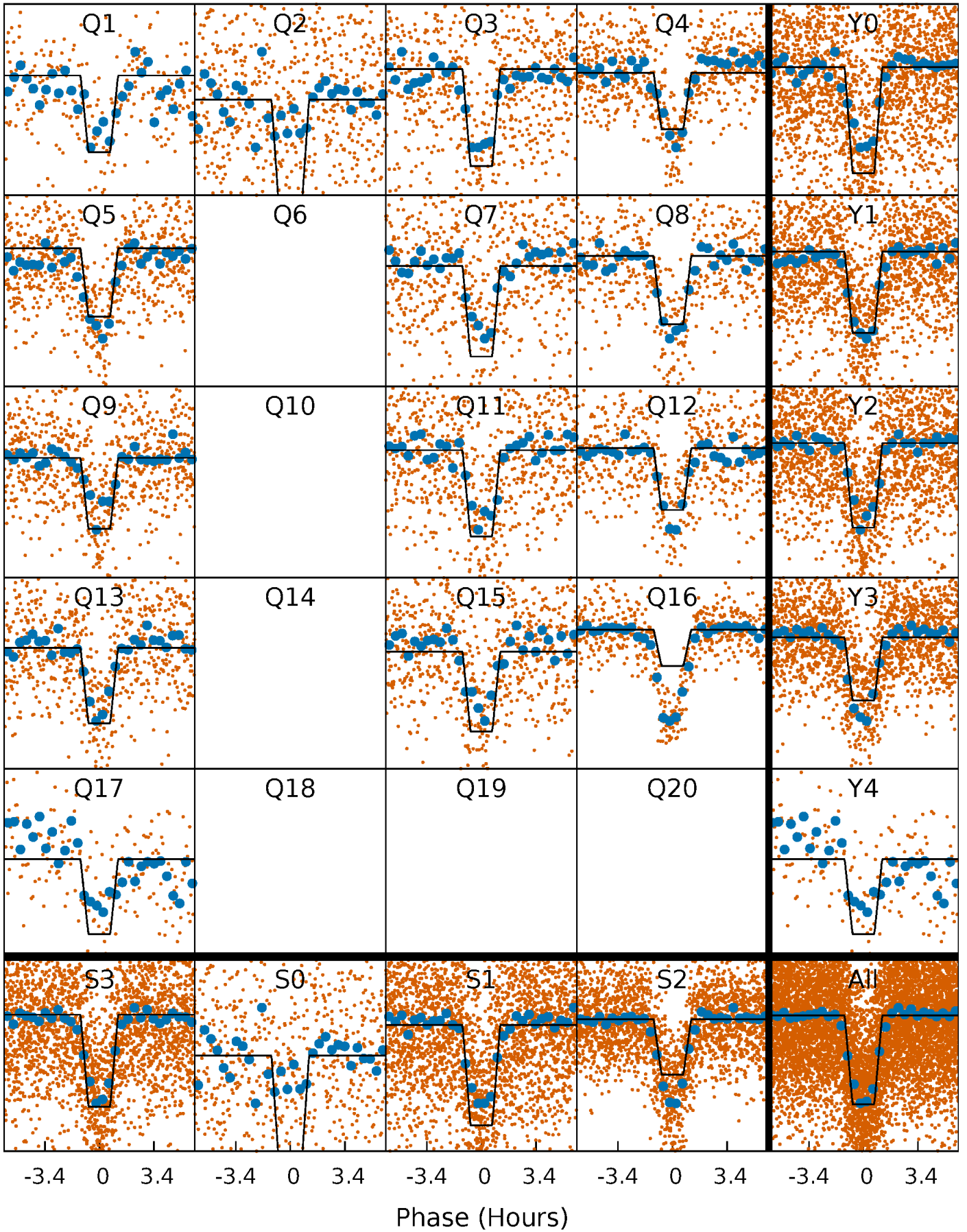
DV Quarter-Phased Transit Curves

TCE 003964562-02 P= 3.012477 Days $T_0=133.751776$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

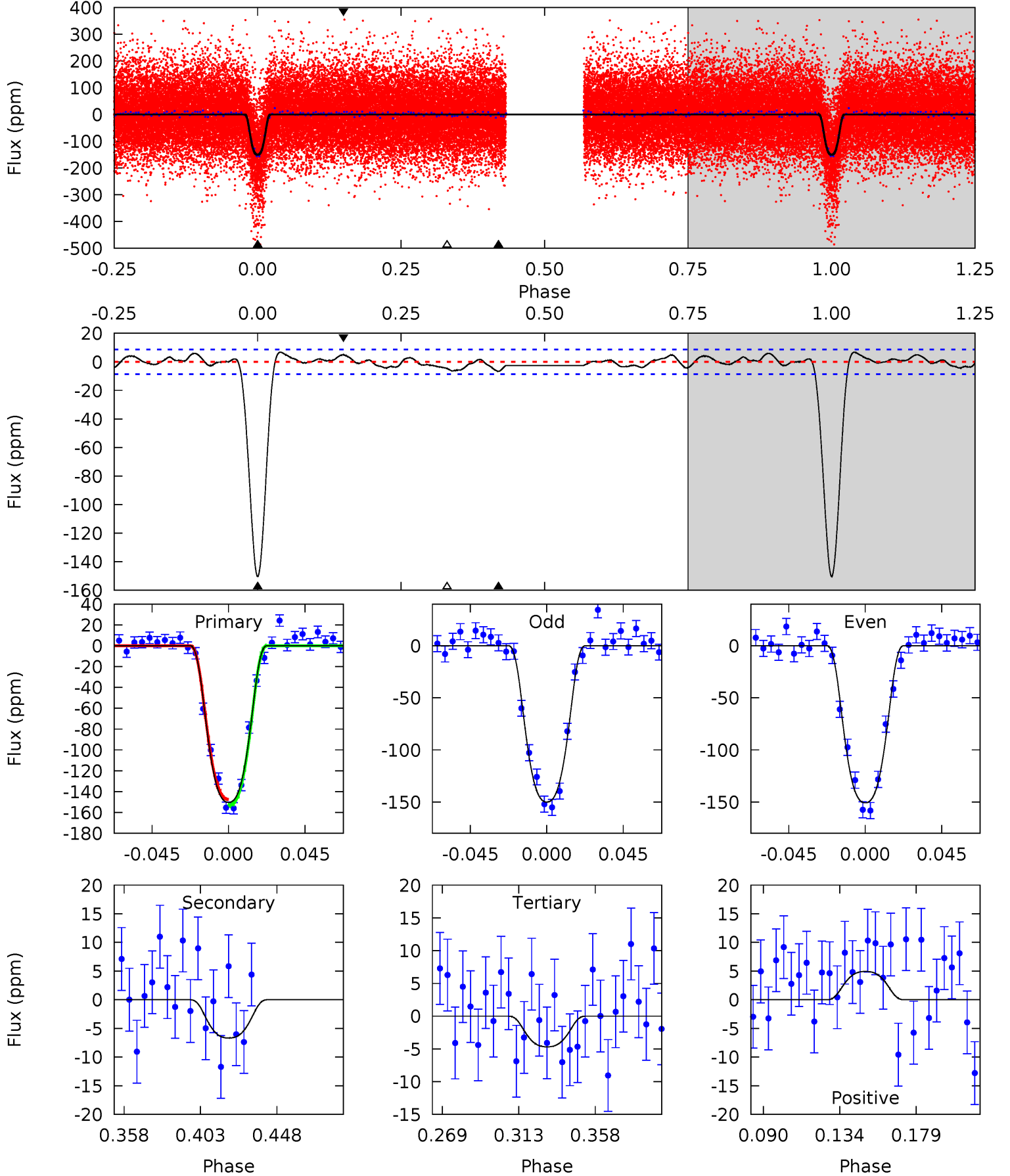
TCE 003964562-02 $P = 3.012496$ Days $T_0 = 133.747106$ (BKJD)



DV Model-Shift Uniqueness Test

003964562-02, P = 3.012477 Days, E = 130.739299 Days

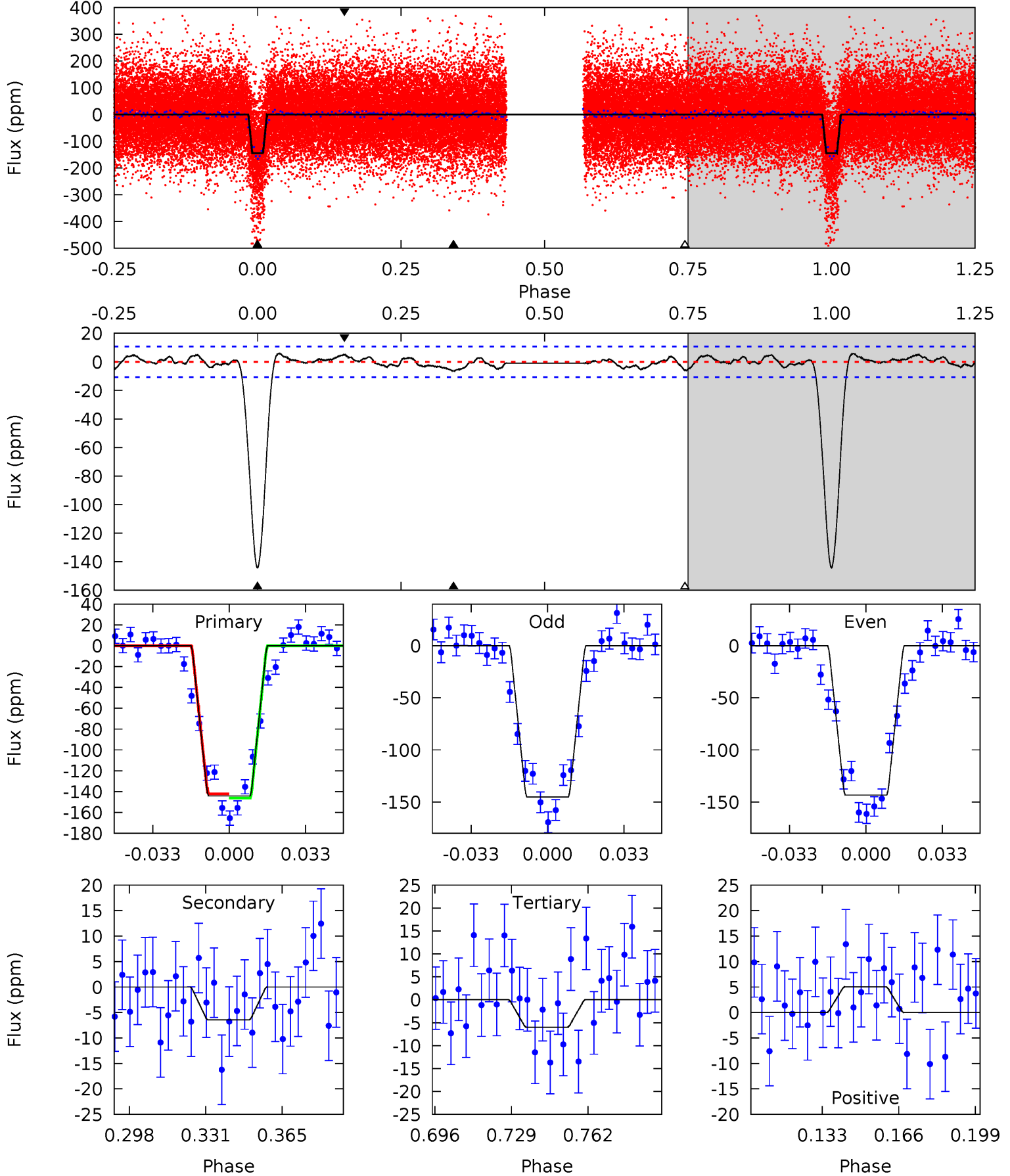
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
82.4	3.66	2.57	2.71	4.73	2.01	1.49	79.8	79.7	1.09	0.95	0.19	1.04	0.04	1.62



Alt Model-Shift Uniqueness Test

003964562-02, P = 3.012496 Days, E = 130.734610 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
64.7	2.88	2.68	2.25	4.79	2.13	1.16	62.0	62.5	0.20	0.63	0.40	1.05	0.04	0.91



Stellar Parameters For KIC 003964562

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	8601^{+240}_{-412}	$4.137^{+0.098}_{-0.182}$	$0.210^{+0.150}_{-0.650}$	$2.031^{+0.595}_{-0.396}$	$2.063^{+0.344}_{-0.459}$	$0.347^{+0.187}_{-0.165}$
	+3%/-5%	+2%/-4%	+71%/-310%	+29%/-19%	+17%/-22%	+54%/-48%
Source	KIC0	KIC0	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 003964562-02 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-7 ± 2	$3.29^{+0.55}_{-0.41}$	3337^{+255}_{-212}	3568^{+253}_{-340}	$0.891^{+0.338}_{-0.296}$
Alt.	-6 ± 2	$2.83^{+0.45}_{-0.32}$	3343^{+233}_{-210}	3774^{+312}_{-425}	$1.109^{+0.515}_{-0.435}$

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 $A_{obs} \gg 1.0$

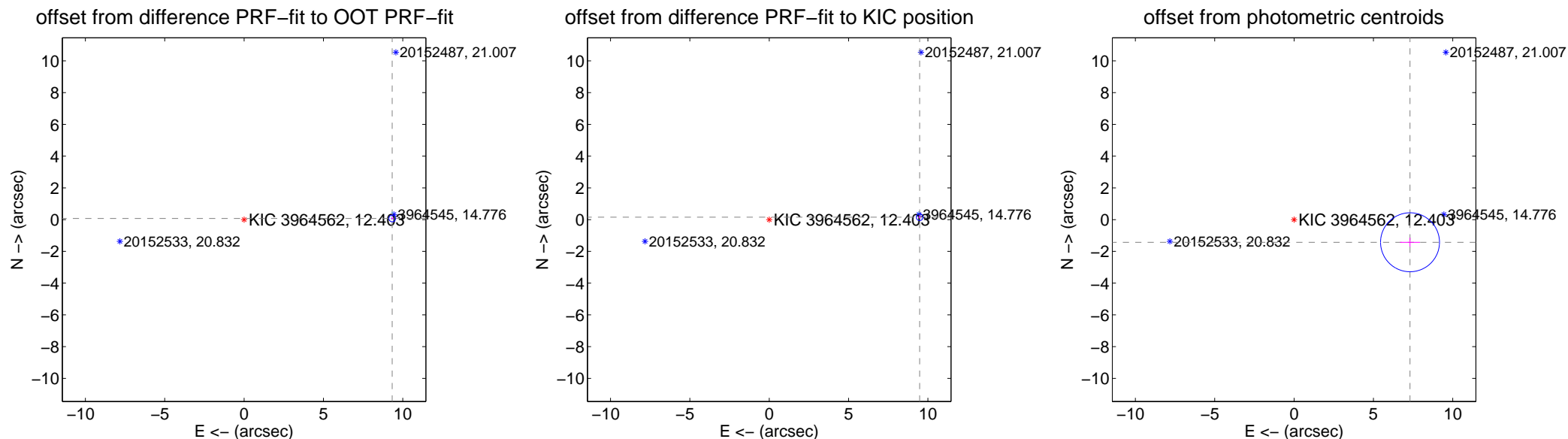
DV Centroid Data

Supplemental centroid analysis for 003964562-02. Kepler magnitude: 12.40. Transit SNR 47.73

There are 14 quarters with good PRF difference image offsets

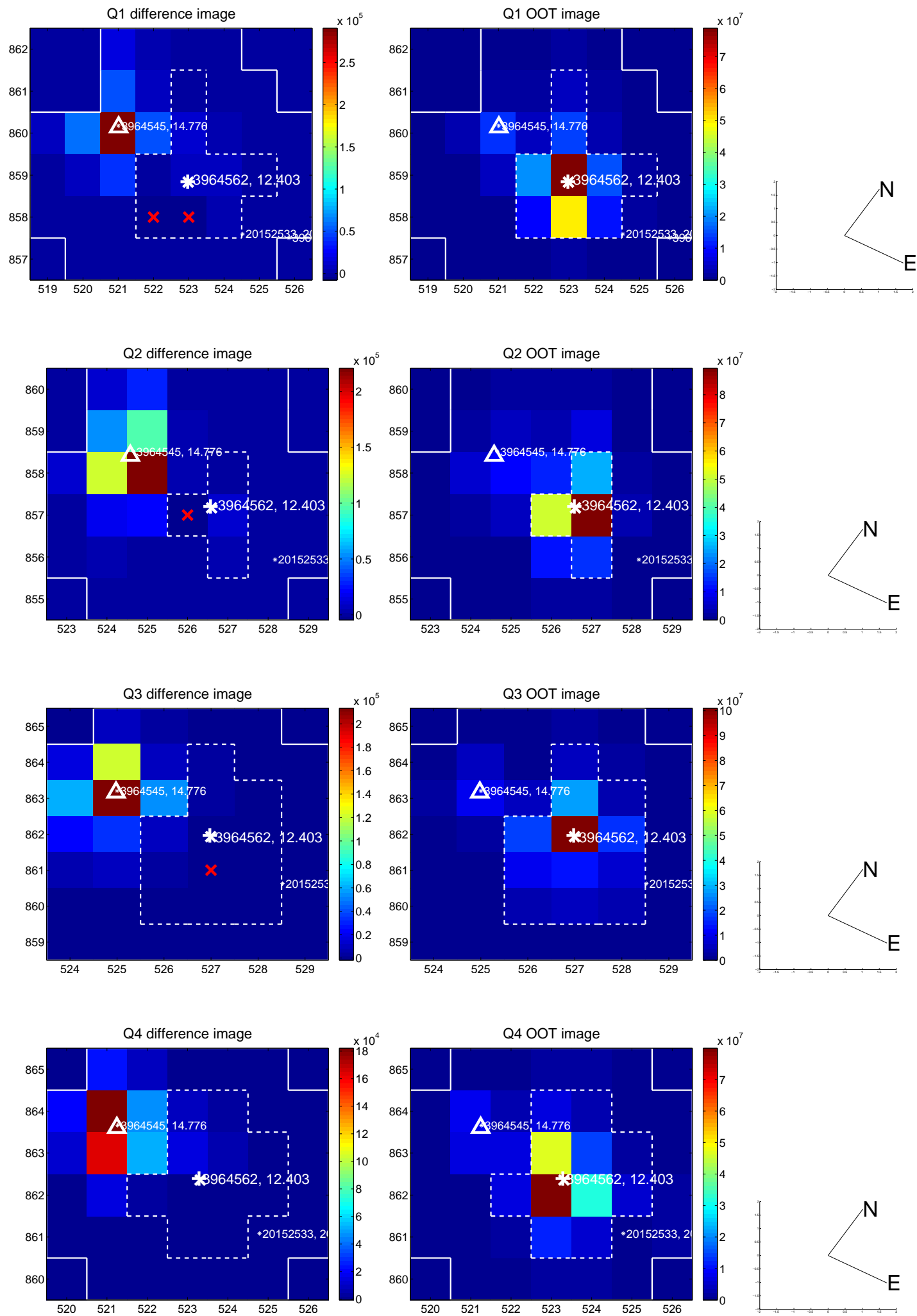
The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	9.337 \pm 0.070	133.10	-9.337 \pm 0.070	0.074 \pm 0.078
PRF-fit source offset from KIC position	9.482 \pm 0.071	133.39	-9.480 \pm 0.071	0.156 \pm 0.075
photometric centroid source offset	7.45 \pm 0.62	12.03	-7.31 \pm 0.63	-1.43 \pm 0.29

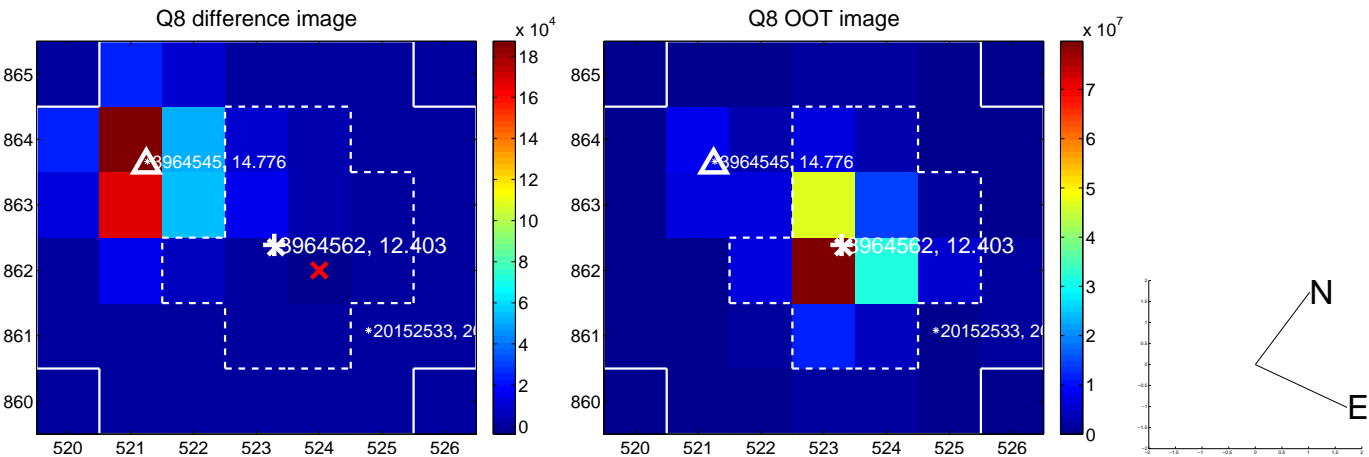
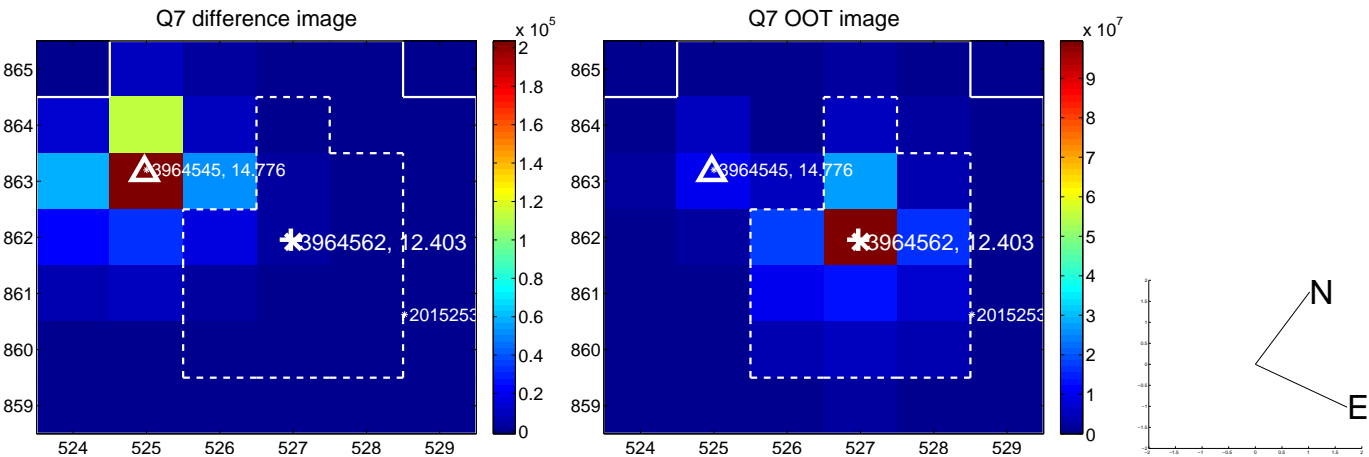
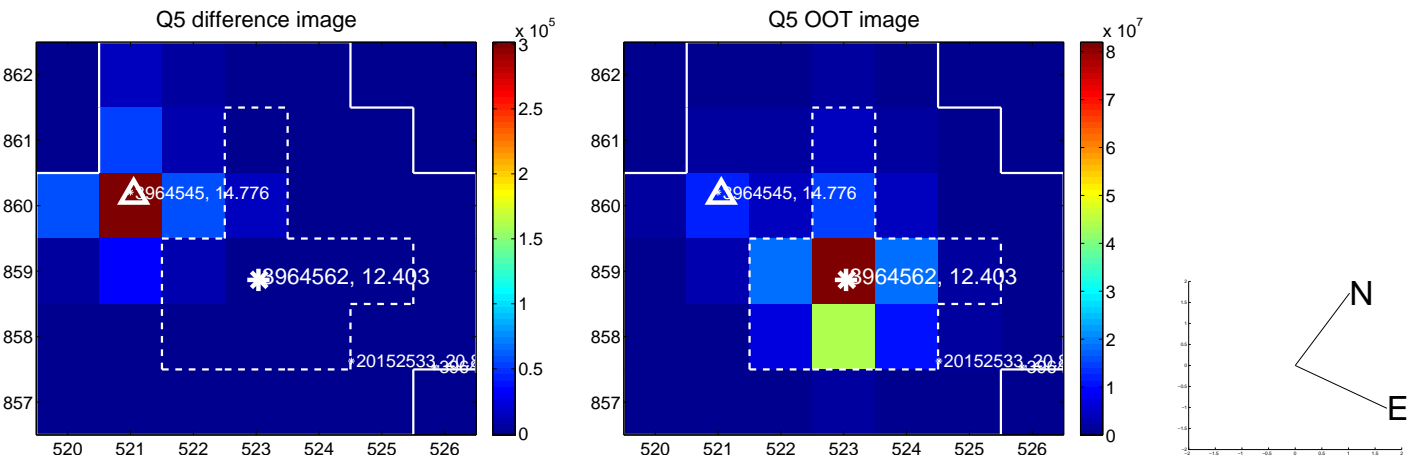


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

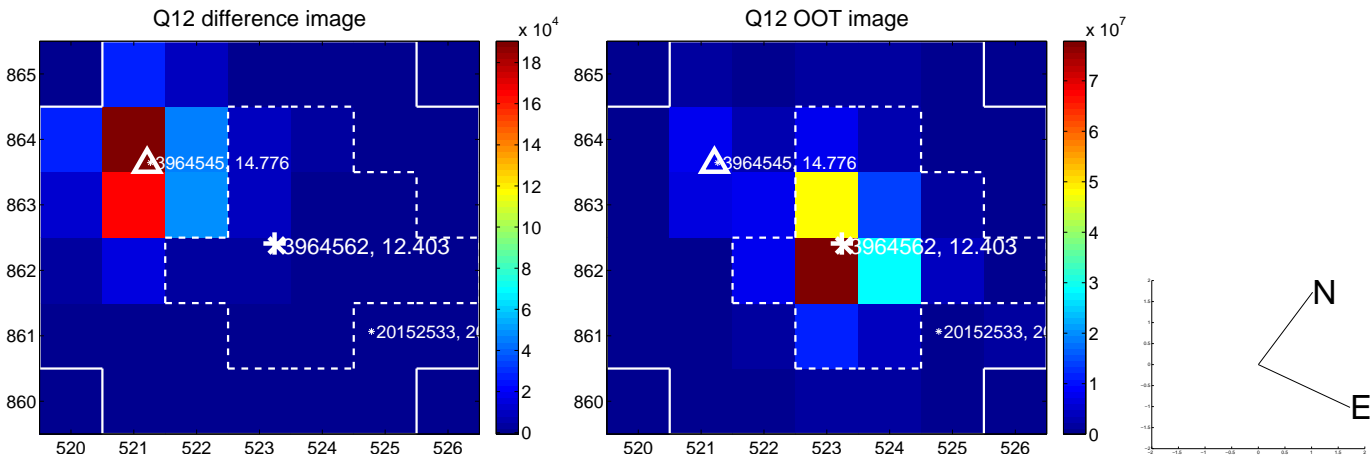
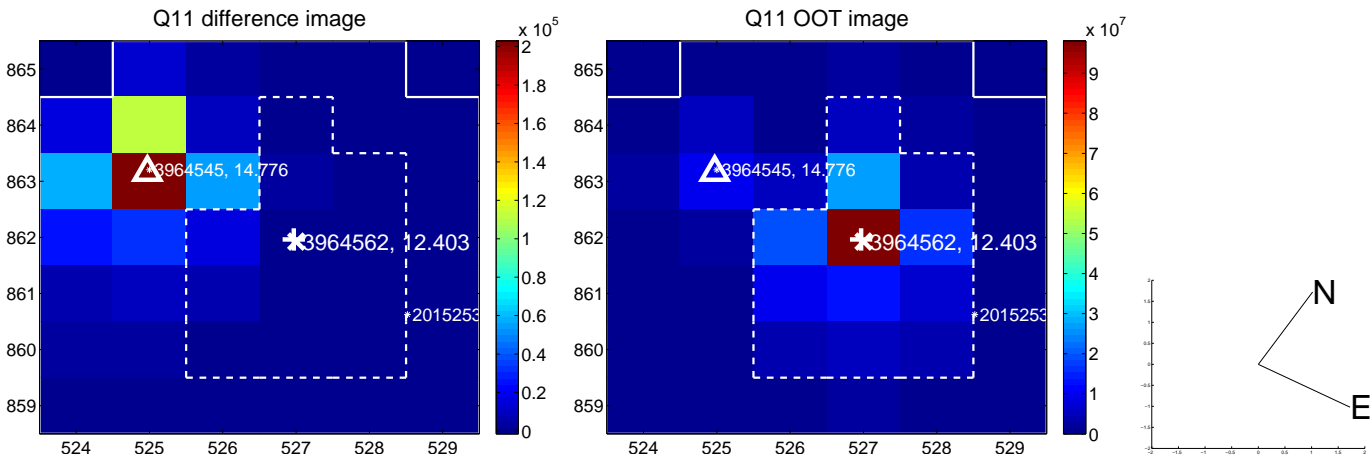
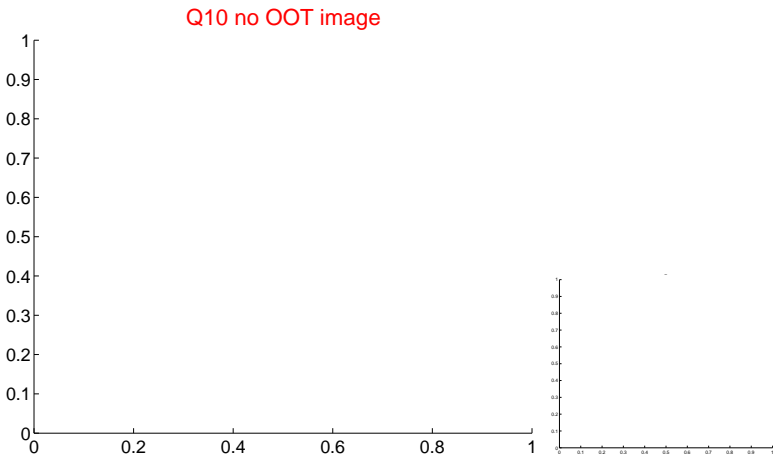
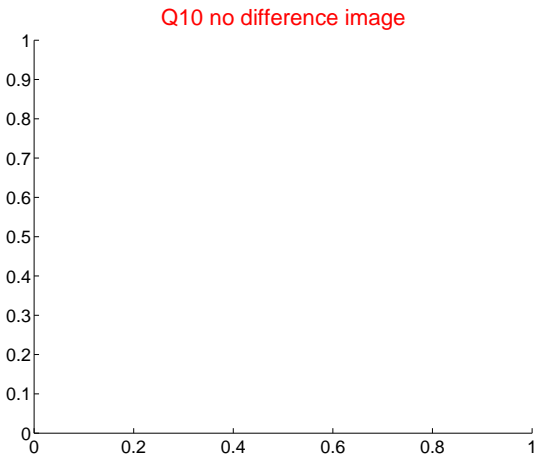
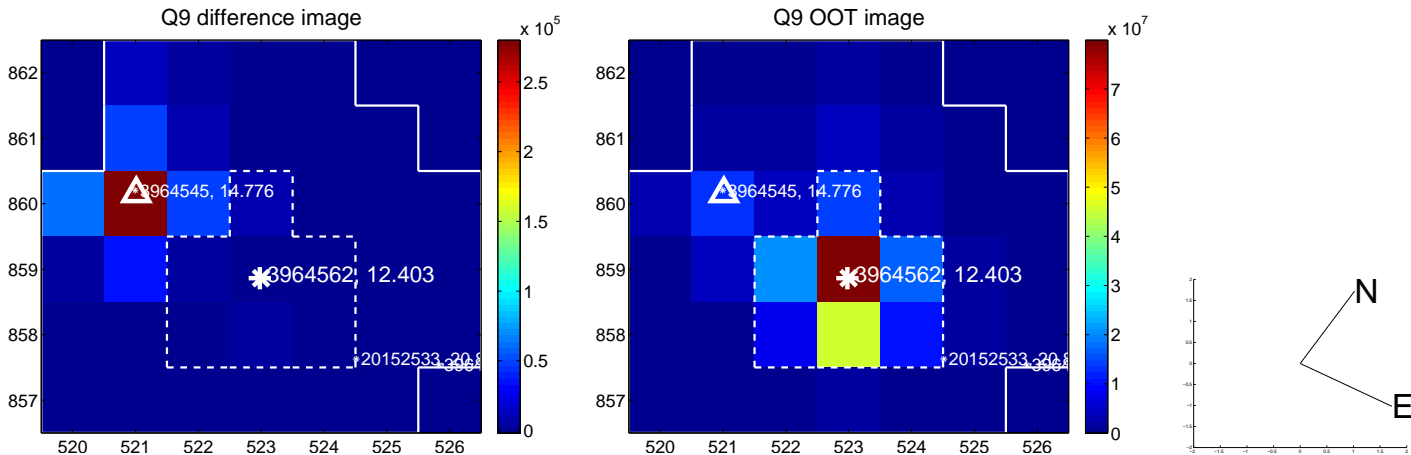
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



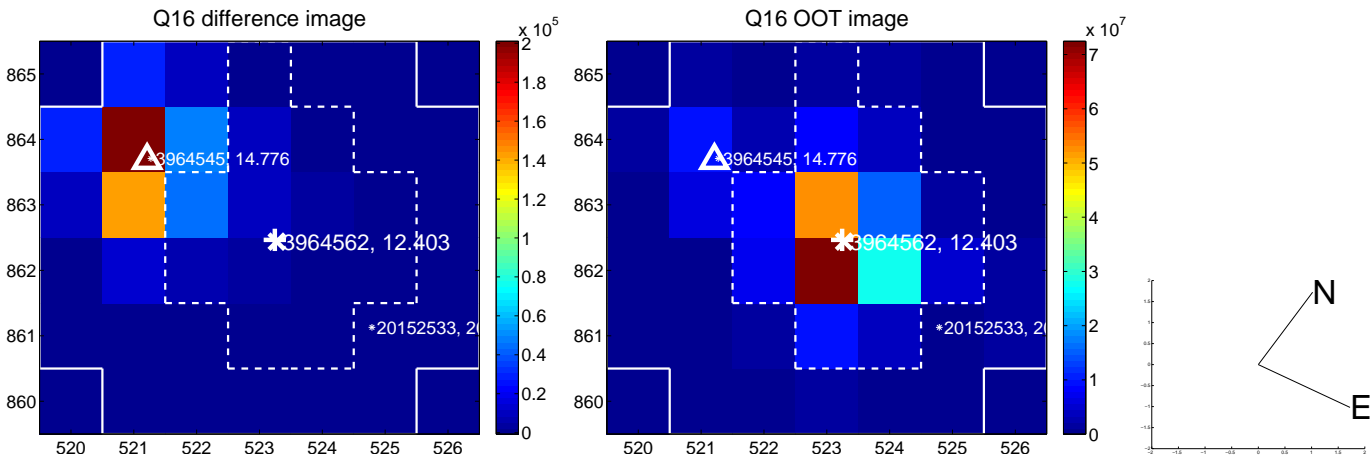
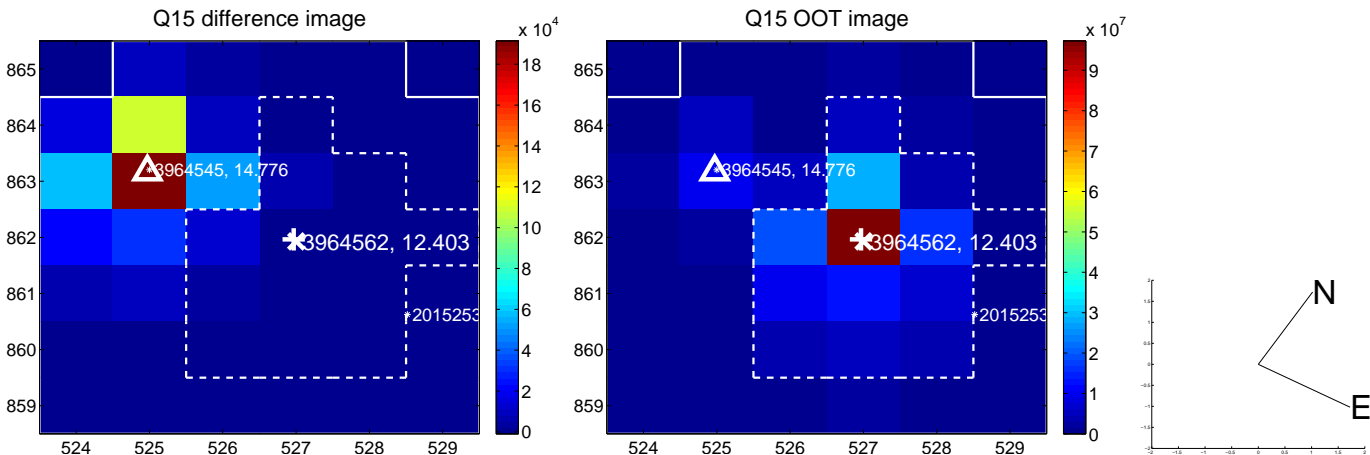
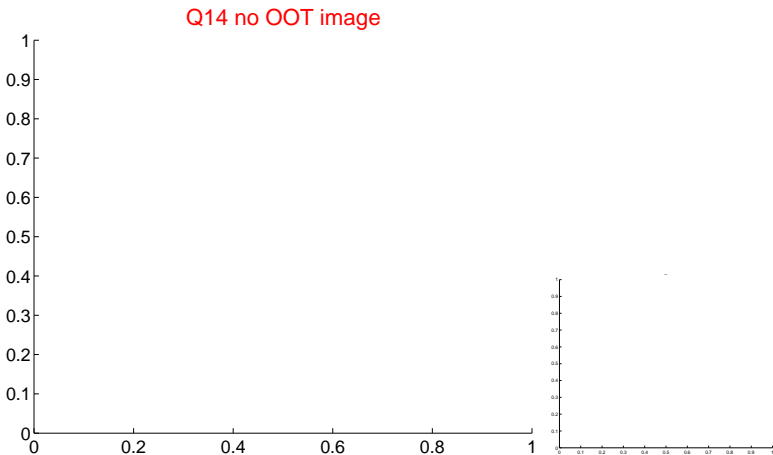
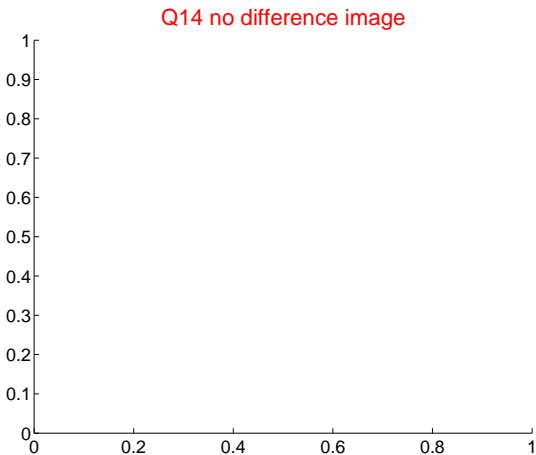
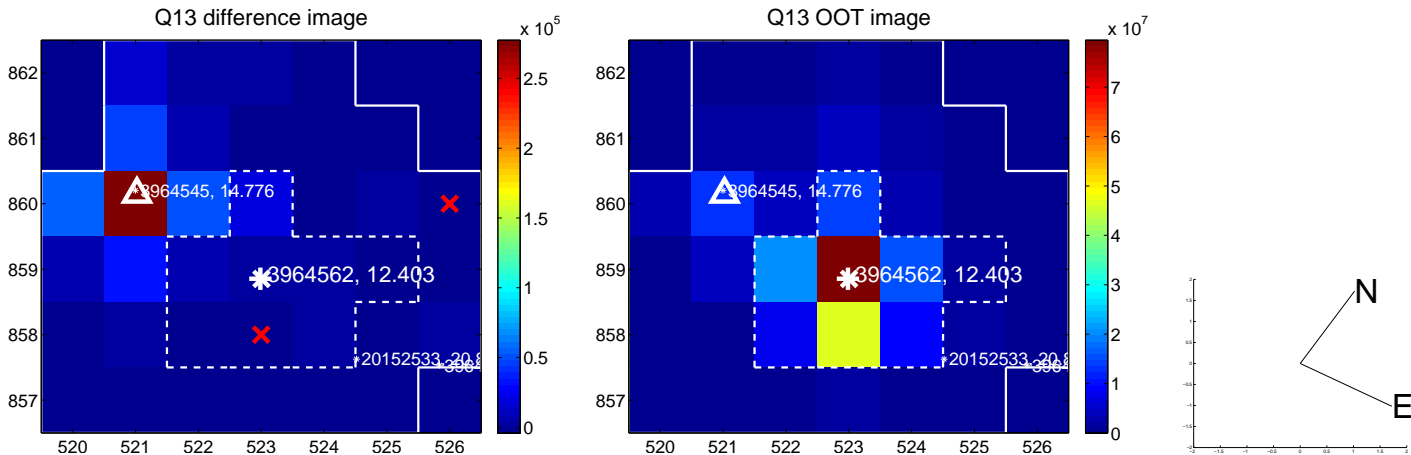
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



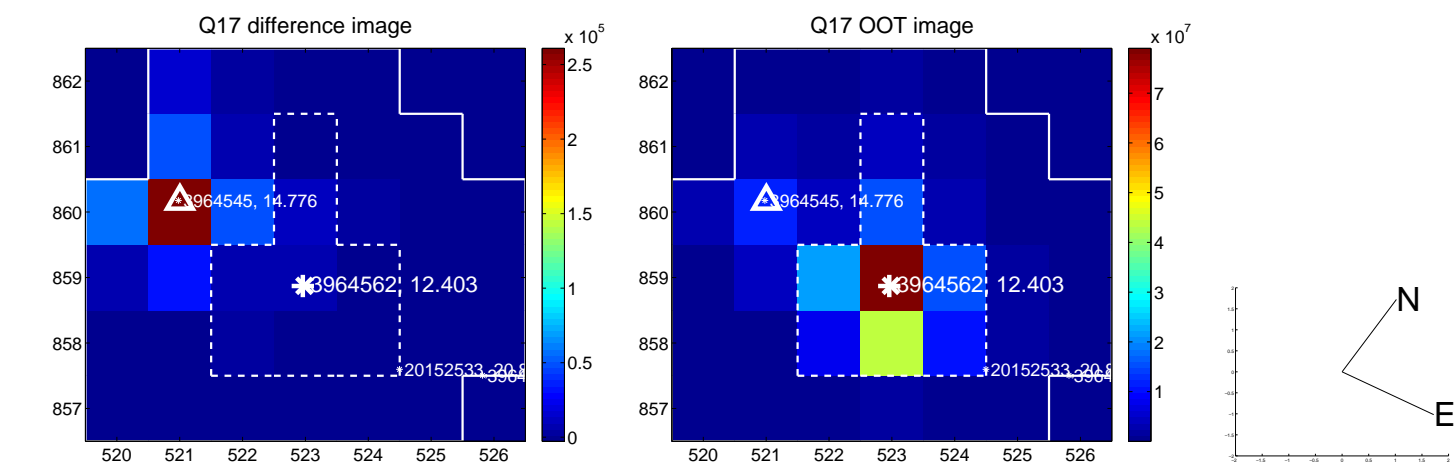
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



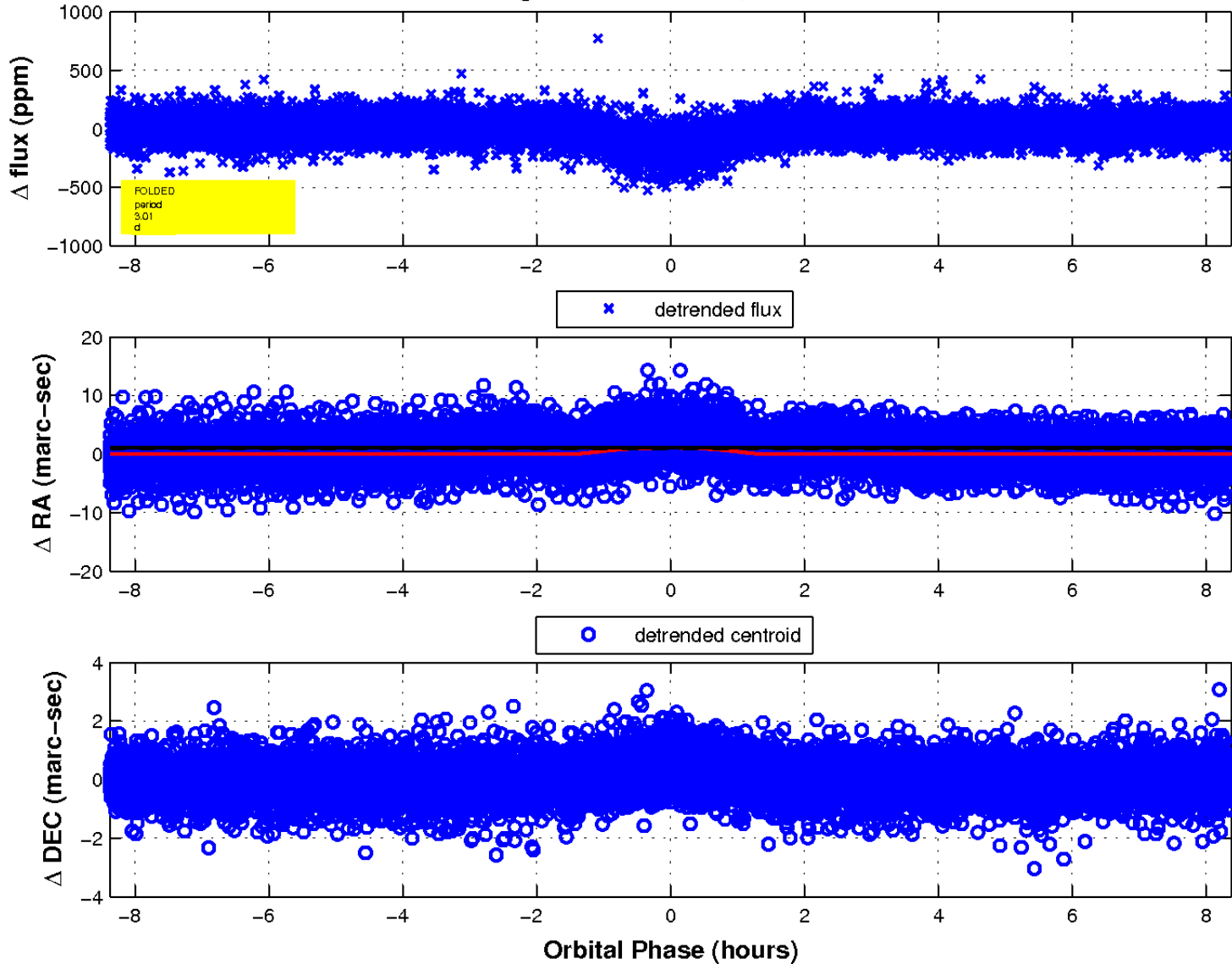
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

