

KIC 012164770

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})
012164770-01	OBS	2088.01	2.630080	132.230654	265.7	9.418	29.9	35.9	1.09	6338	3.47	1135.78
012164770-02	OBS	No	465.543852	463.562162	1059.7	76.578	17.5	9.8	1.09	6338	3.90	1.14

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012164770-01	OBS	FP	0.00	0	0	1	1	CENT_RESOLVED_OFFSET—EPHEM_MATCH
012164770-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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 012164770-01

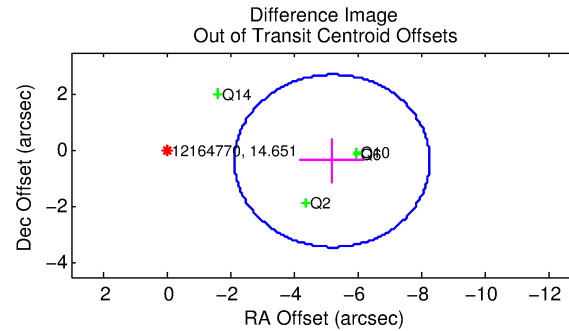
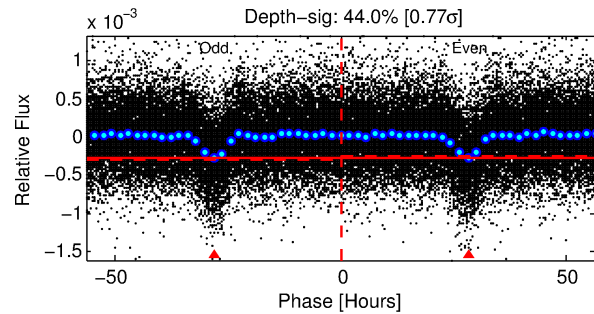
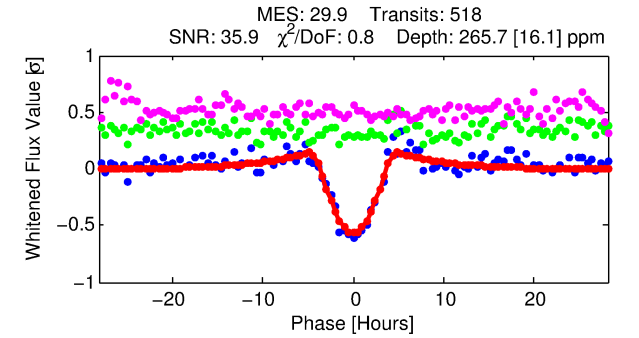
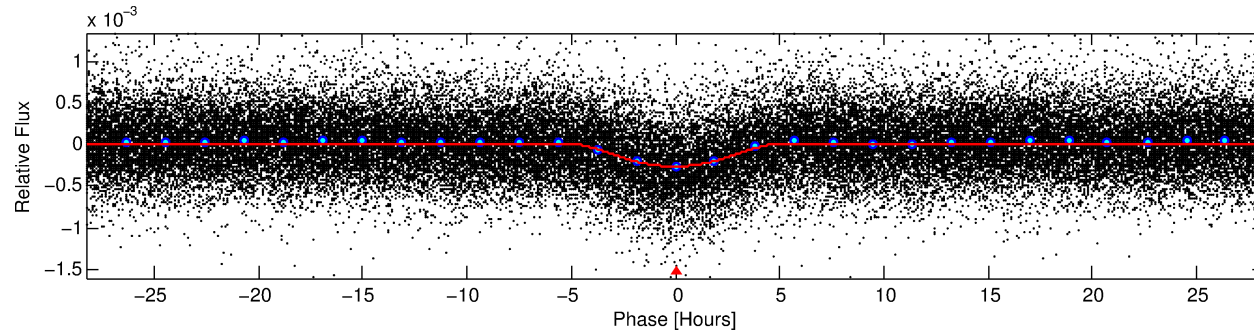
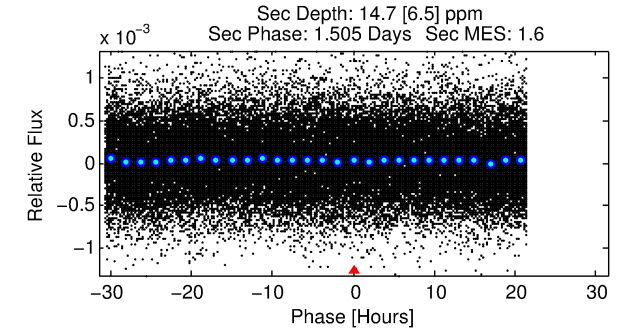
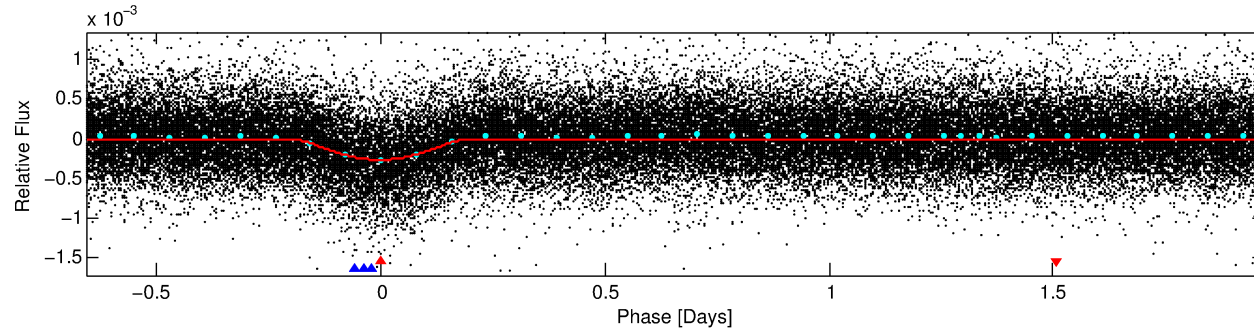
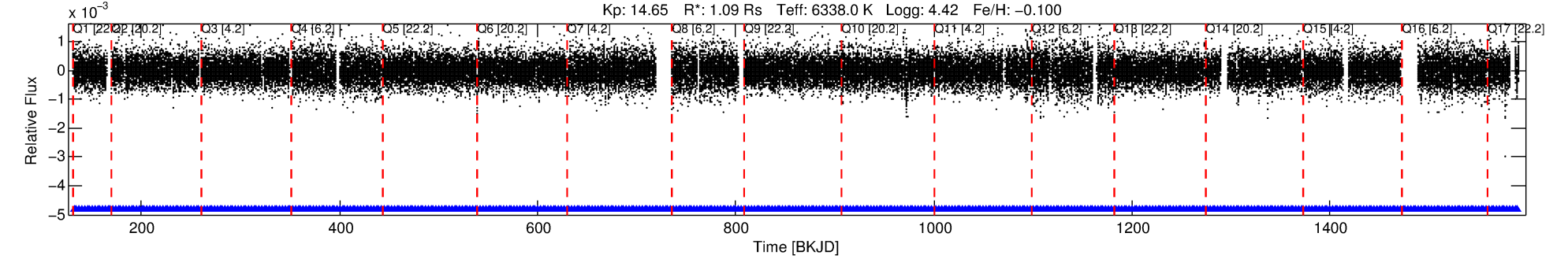
TCE (1)	KIC	Parent (2)	Parent KIC	P ₁ :P ₂	Dist (″)	Δ Row	Δ Col	m ₂	m ₁	D ₂ /D ₁	Mechanism	Flag	σ_P	σ_T
012164770-01	12164770	012164751-01	12164751	1:1	20.6	5	1	14.19	14.65	2178.60	Direct-PRF	0	2.14	0.47

Notes: P₁:P₂ 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. m₂ and m₁ are the magnitudes of the parent and child. D₂/D₁ 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: 12164770 Candidate: 1 of 2 Period: 2.630 d

KOI: K02088.01 Corr: 0.914



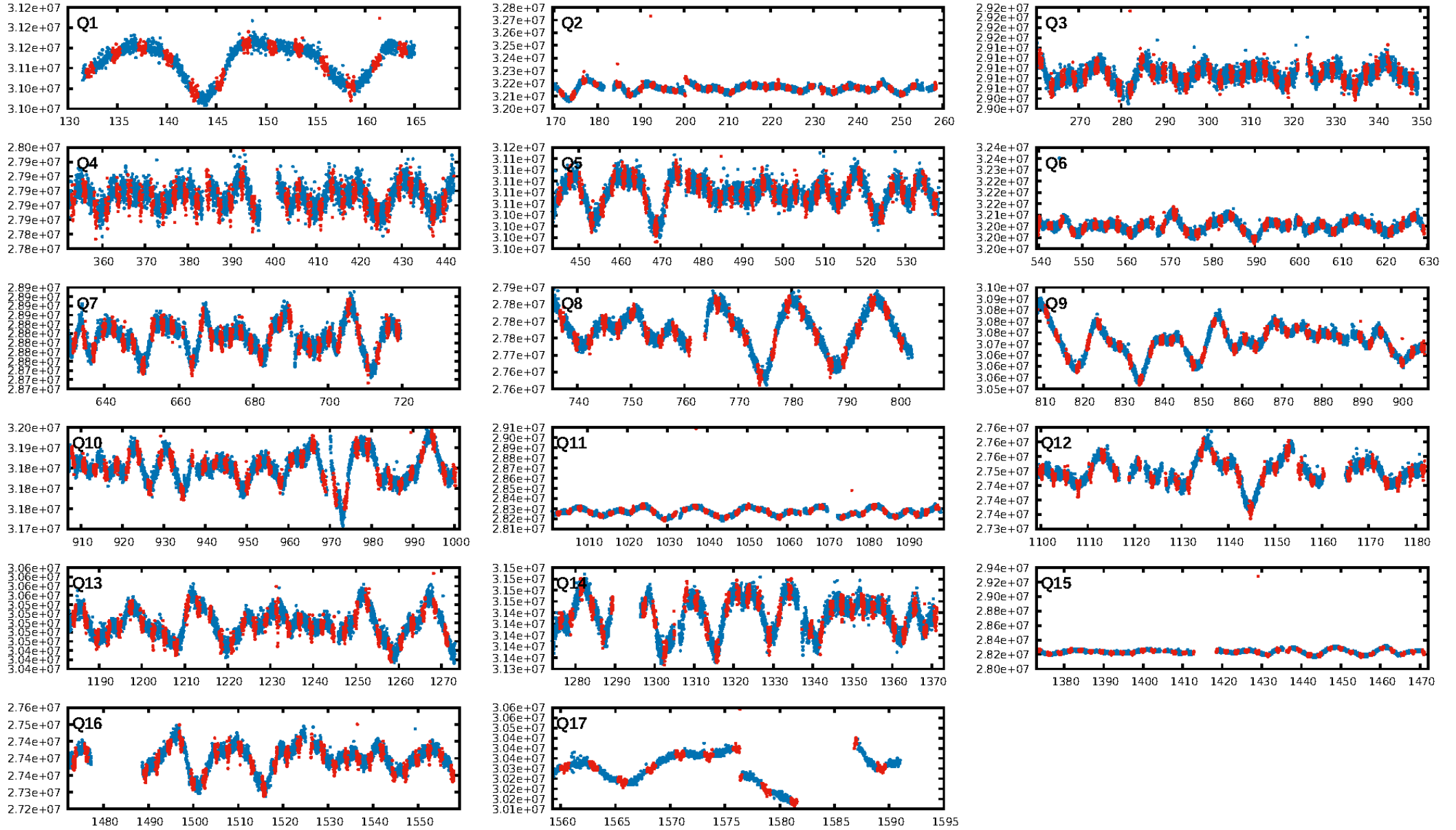
DV Fit Results:

Period = 2.63008 [0.00002] d
Epoch = 132.2307 [0.0047] BKJD
Rp/R* = 0.0292 [0.0213]
a/R* = 1.14 [0.02]
b = 1.00 [0.03]
Seff = 1135.78 [473.82]
Teq = 1480 [154] K
Rp = 3.47 [2.77] Re
a = 0.0389 [0.0106] AU
Ag = 1.02 [1.60] [0.01σ]
Teffp = 2298 [878] K [0.92σ]

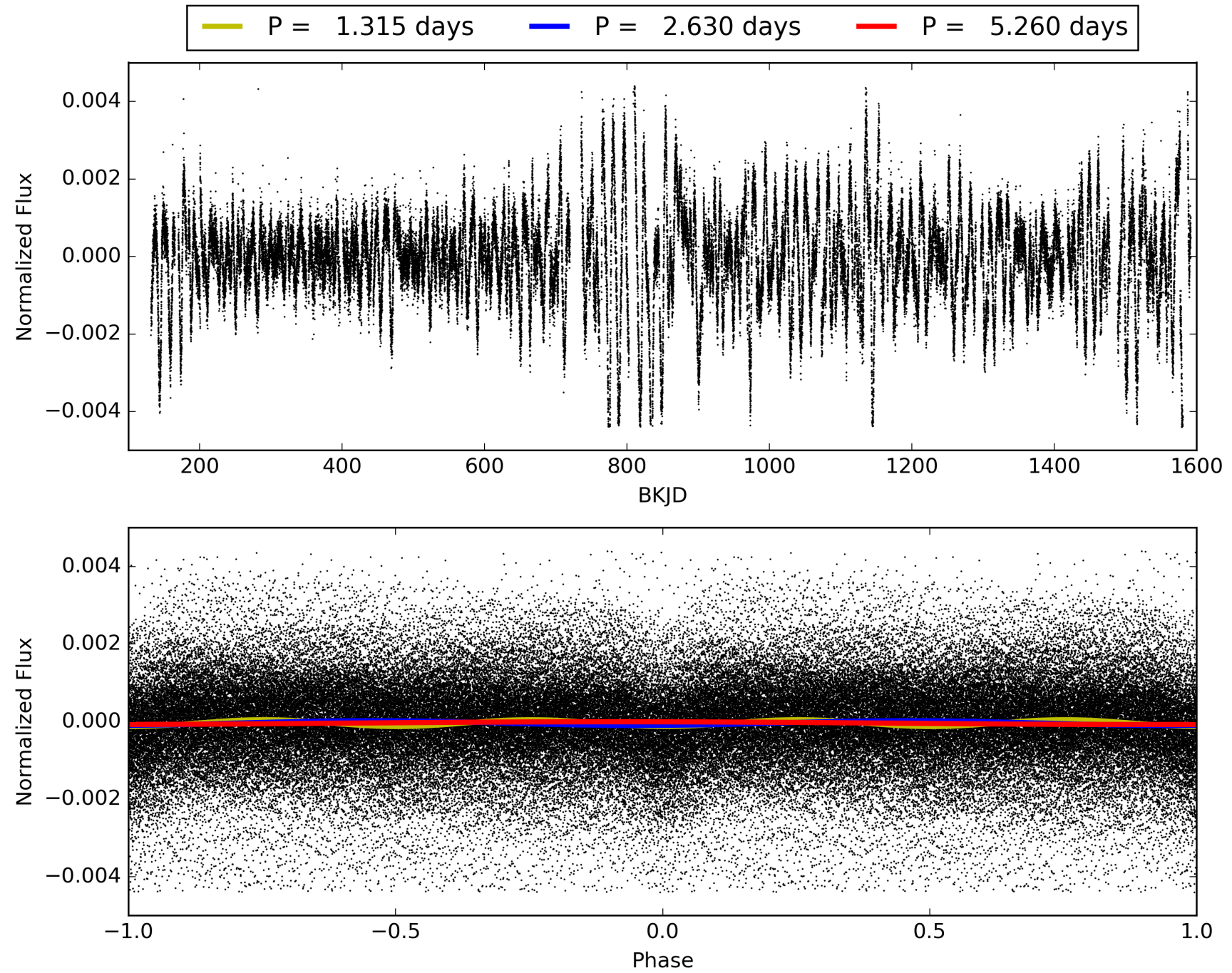
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [144.00σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 3.55e-157
RollingBand-fgt: 1.00 [494/494]
GhostDiagnostic-chr: -0.3411
Centroid-sig: 0.0%
Centroid-so: 5.403 arcsec [13.29σ]
OotOffset-rm: 5.223 arcsec [5.10σ]
KicOffset-rm: 5.326 arcsec [5.19σ]
OotOffset-st: 4/0/0/0 [4]
KicOffset-st: 4/0/0/0 [4]
DiffImageQuality-fgm: 0.75 [3/4]
DiffImageOverlap-fno: 1.00 [17/17]

TCE 012164770-01, PDC Light Curves

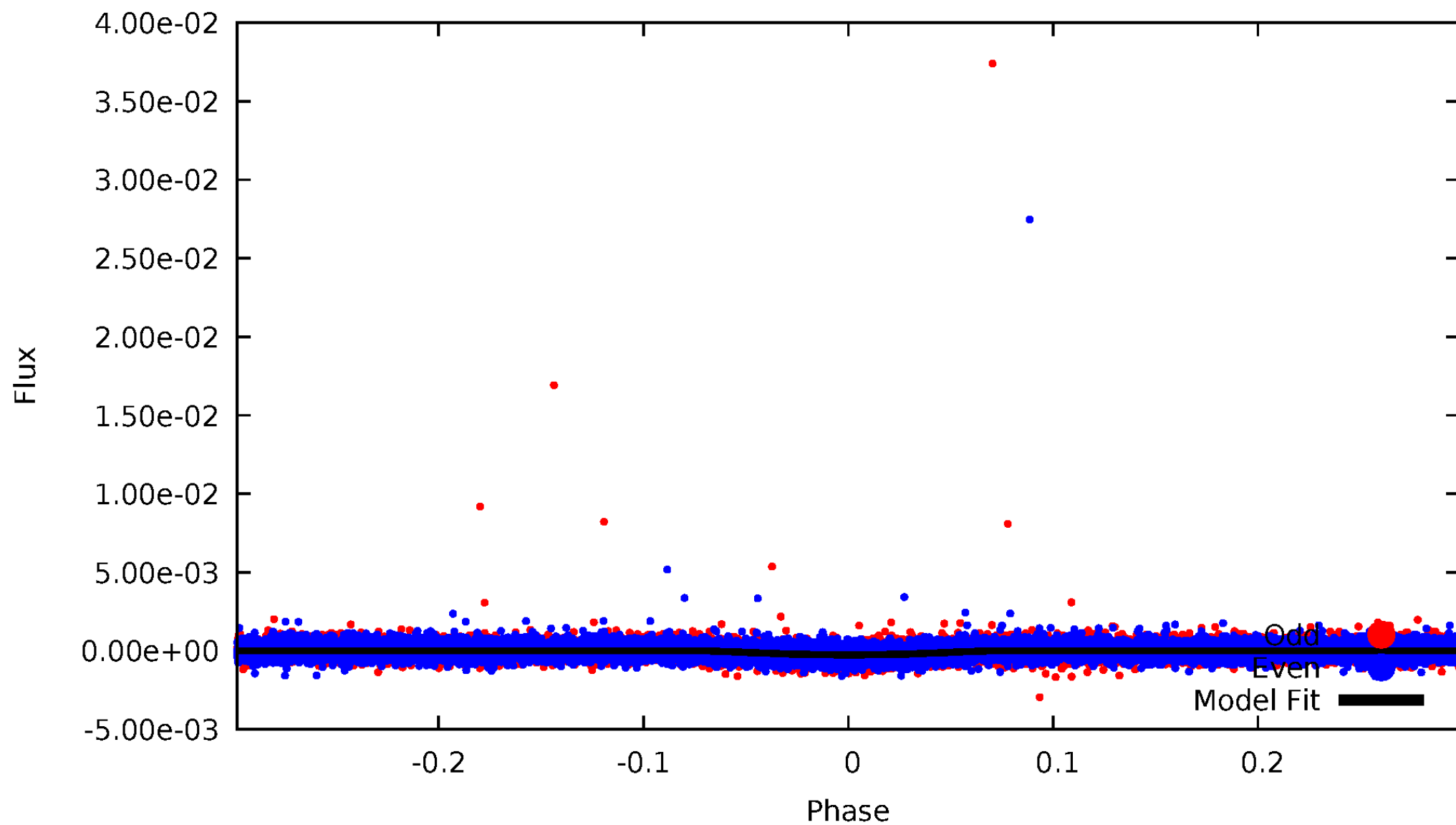


TCE 012164770-01



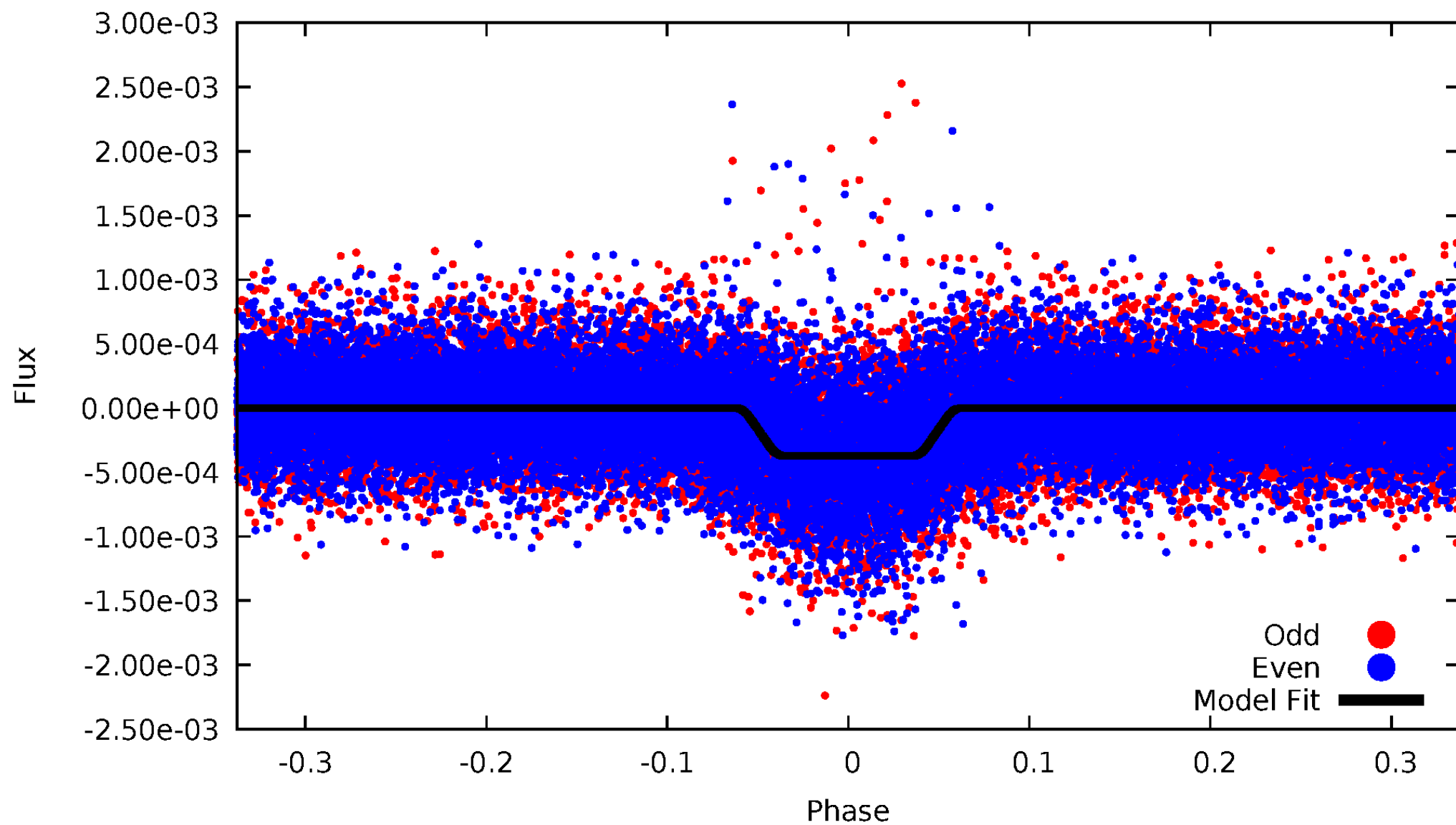
DV Odd/Even

TCE 012164770-01



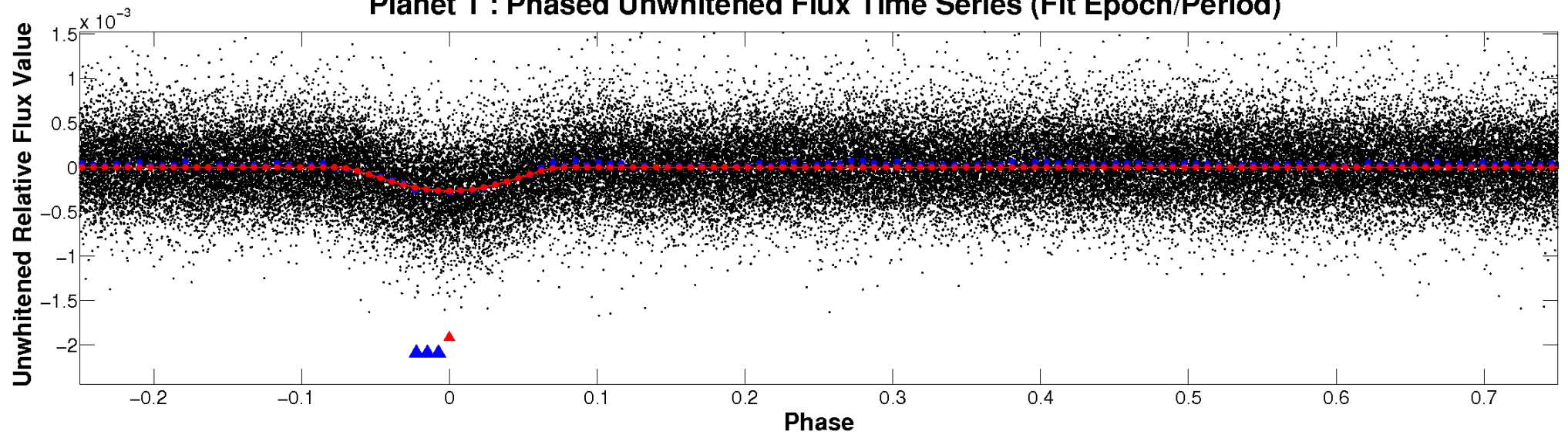
ALT Odd/Even

TCE 012164770-01

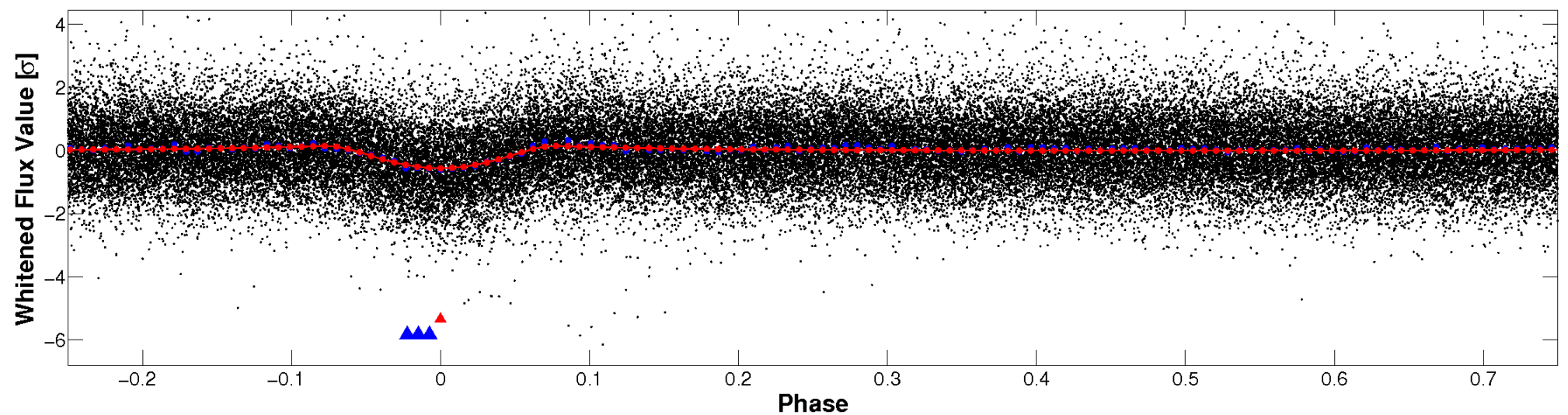


Non-Whitened Vs. Whitened Light Curve

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

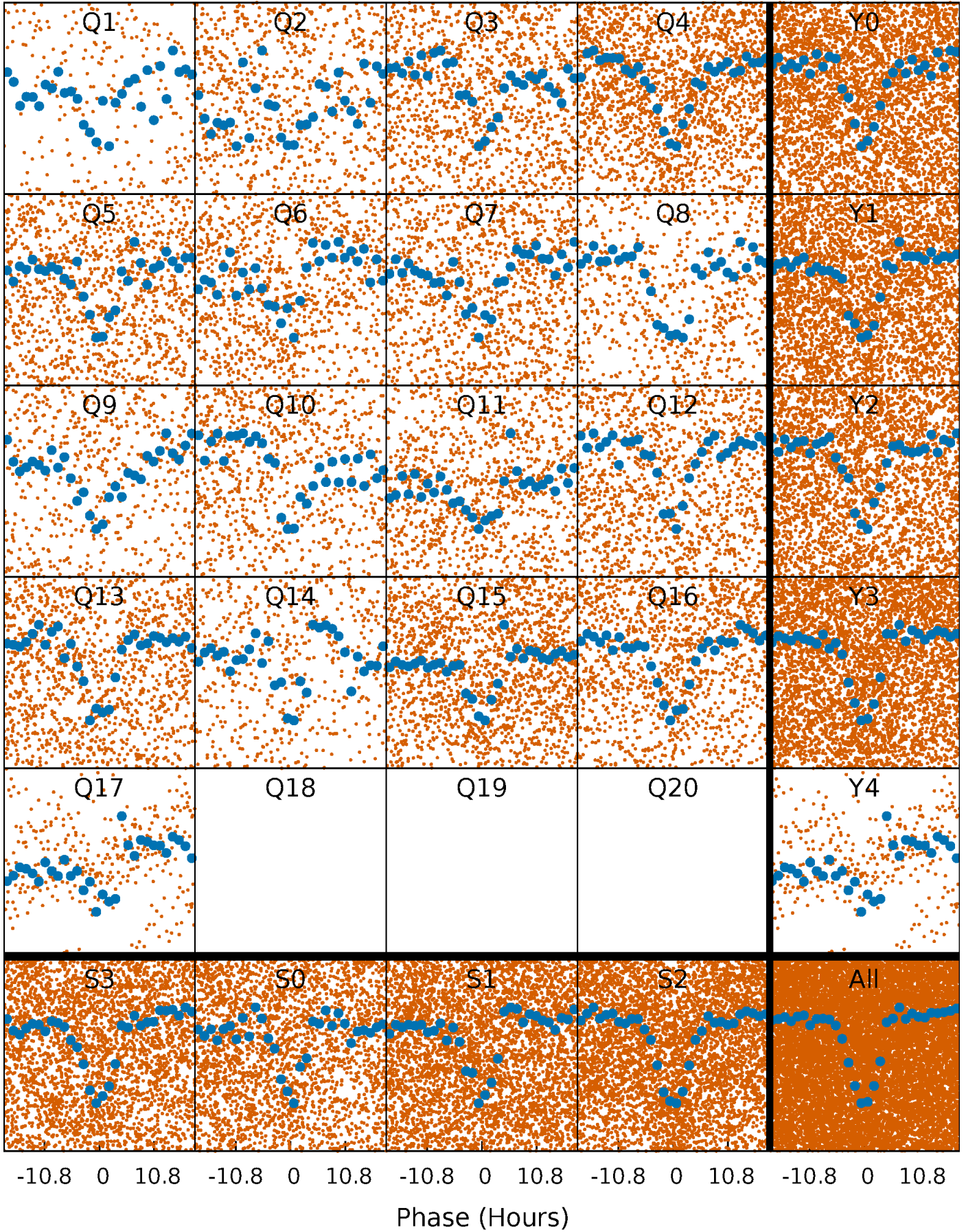


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



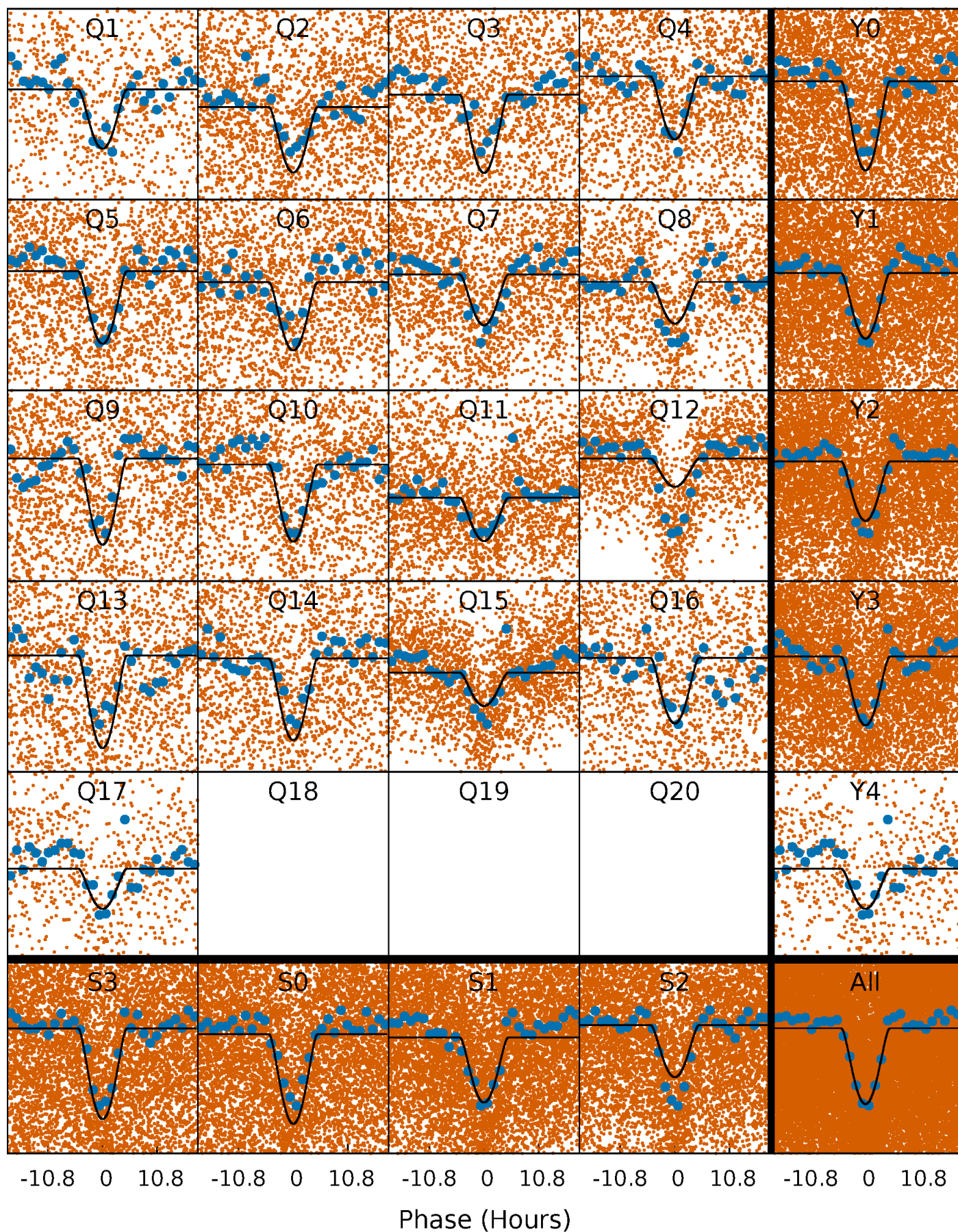
PDC Quarter-Phased Transit Curves

TCE 012164770-01 P= 2.630080 Days $T_0=132.230654$ (BKJD)



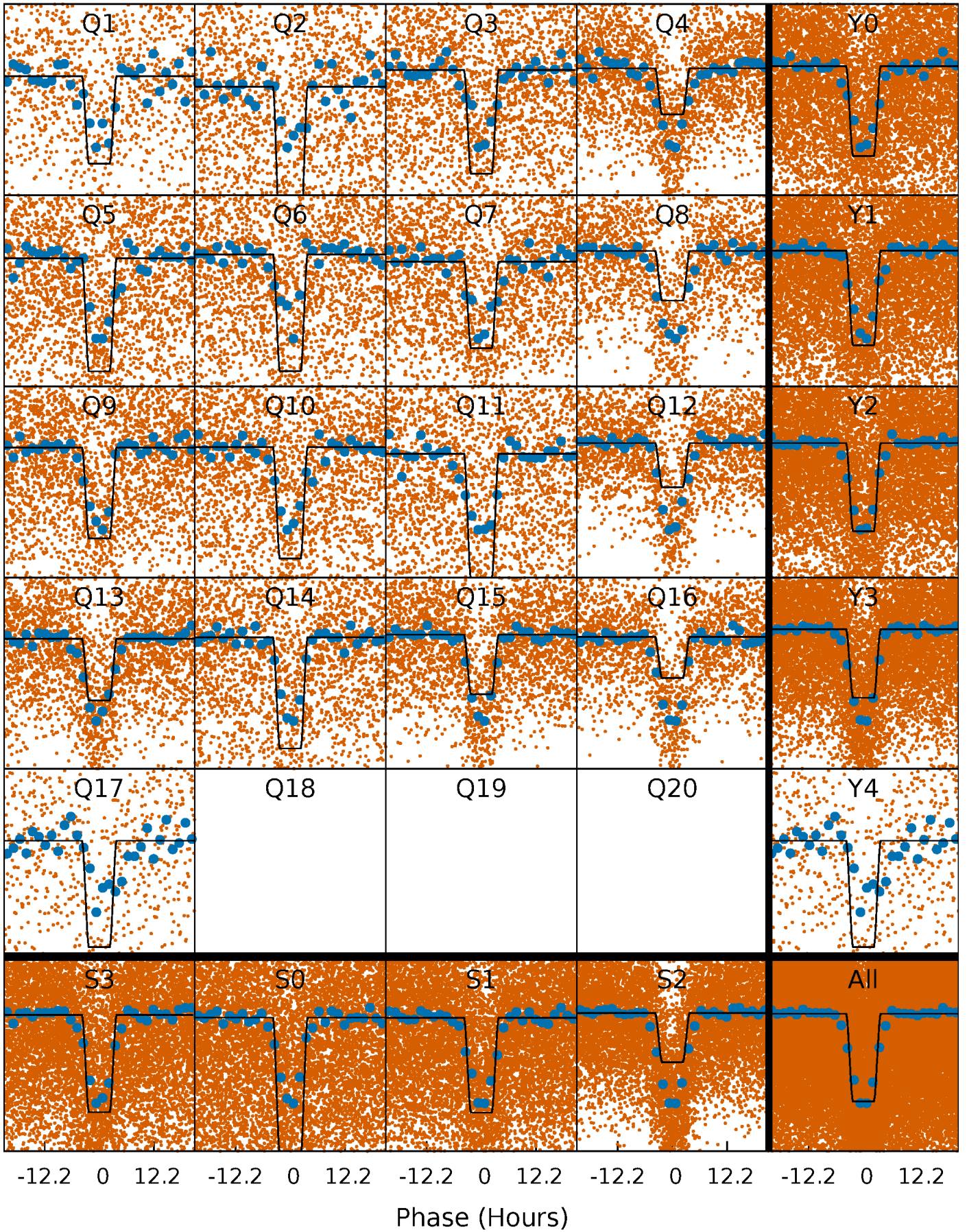
DV Quarter-Phased Transit Curves

TCE 012164770-01 P= 2.630080 Days $T_0=132.230654$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

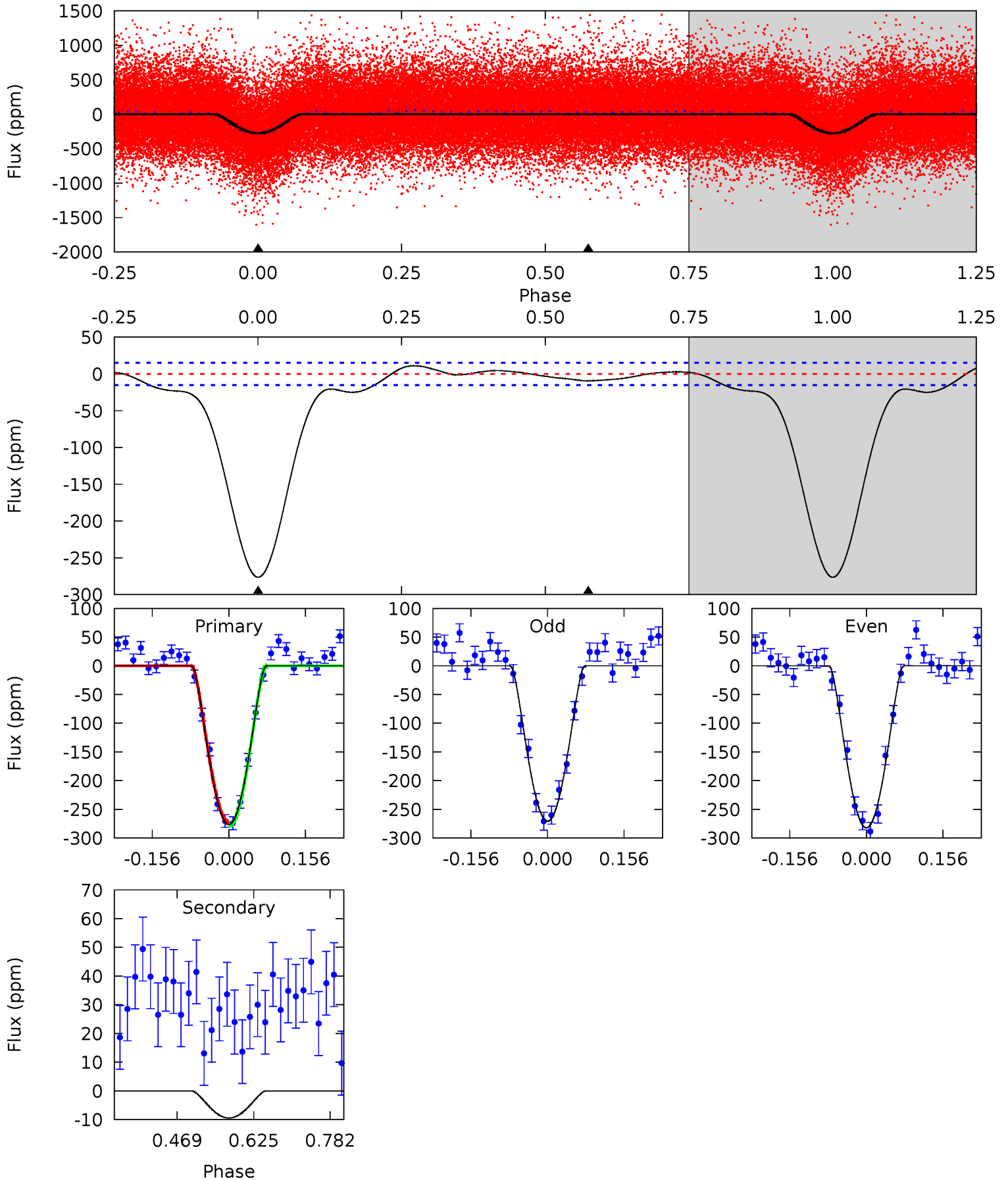
TCE 012164770-01 P= 2.630105 Days $T_0=132.222108$ (BKJD)



DV Model-Shift Uniqueness Test

012164770-01, P = 2.630080 Days, E = 129.600574 Days

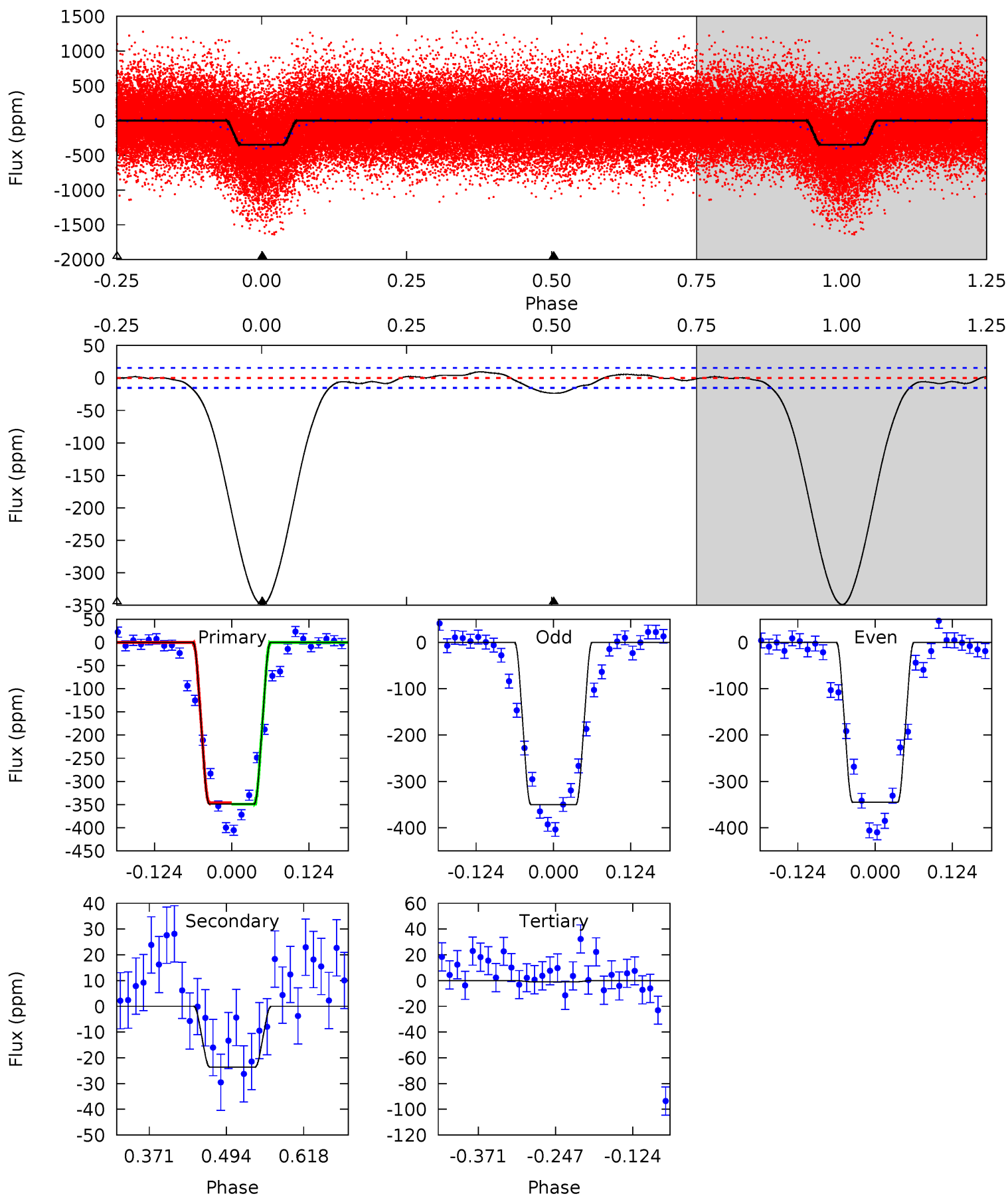
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
81.4	2.78	0	0	4.47	1.42	3.15	81.4	81.4	2.78	2.78	1.69	1.14	0.04	0.93



Alt Model-Shift Uniqueness Test

012164770-01, P = 2.630105 Days, E = 129.592003 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
102.2	6.92	0.27	0	4.52	1.54	1.37	101.9	102.2	6.65	6.92	0.74	1.07	0.03	0.53



Stellar Parameters For KIC 012164770

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6338^{+153}_{-210}	$4.418^{+0.067}_{-0.216}$	$-0.100^{+0.250}_{-0.300}$	$1.091^{+0.353}_{-0.118}$	$1.137^{+0.166}_{-0.149}$	$1.233^{+0.351}_{-0.648}$
	+2%/-3%	+2%/-5%	+250%/-300%	+32%/-11%	+15%/-13%	+28%/-53%
Source	PHO1	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 012164770-01 / KOI 2088.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-9 ± 3	$4.03^{+2.79}_{-2.32}$	2097^{+168}_{-104}	2384^{+1006}_{-4741}	$0.464^{+1.958}_{-0.314}$
Alt.	-24 ± 3	$2.95^{+2.35}_{-1.90}$	2103^{+157}_{-100}	3315^{+1566}_{-649}	$2.192^{+15.612}_{-1.514}$

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

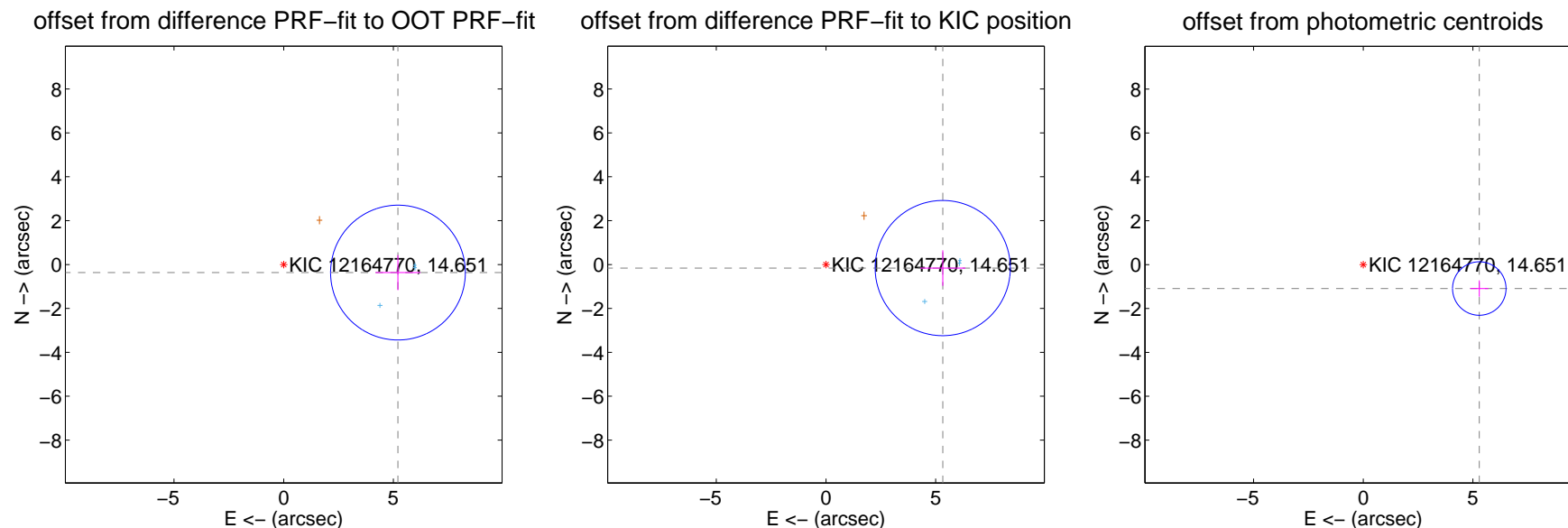
DV Centroid Data

Supplemental centroid analysis for 012164770-01. Kepler magnitude: 14.65. Transit SNR 35.87

There are 3 quarters with good PRF difference image offsets

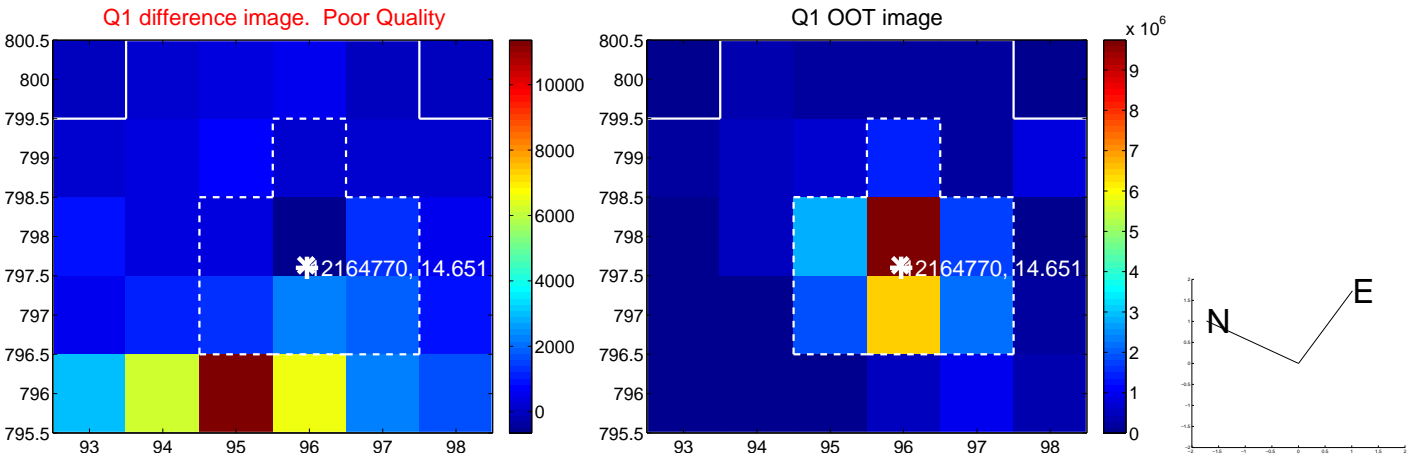
The direct PRF centroid is offset from the target star catalog position by about 0.23 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	5.223 ± 1.024	5.10	-5.210 ± 1.025	-0.366 ± 0.798
PRF-fit source offset from KIC position	5.326 ± 1.027	5.19	-5.324 ± 1.027	-0.161 ± 0.807
photometric centroid source offset	5.40 ± 0.41	13.29	-5.29 ± 0.41	-1.09 ± 0.37

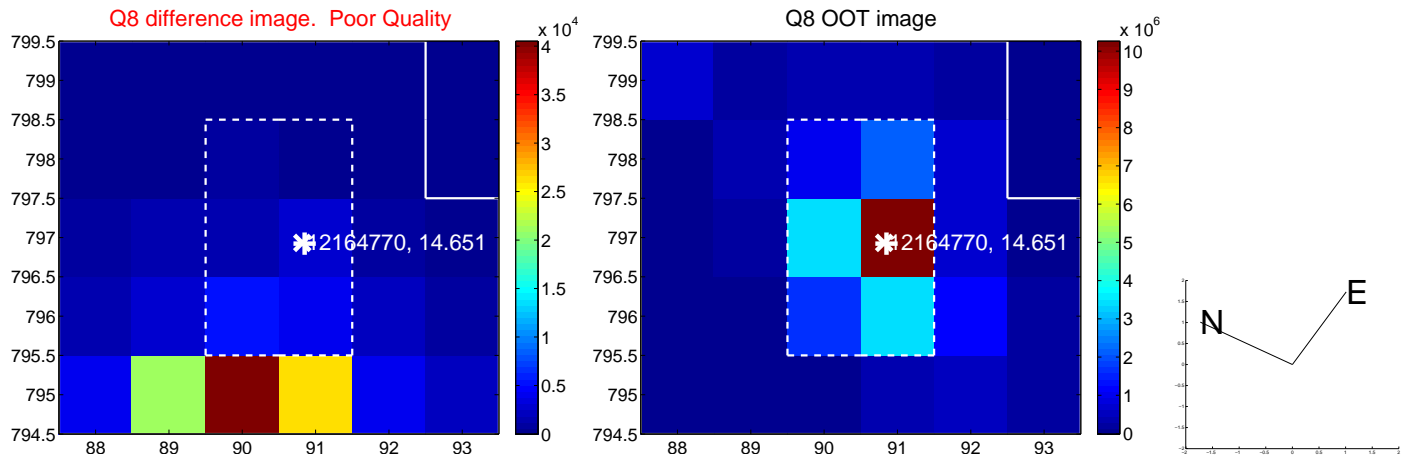
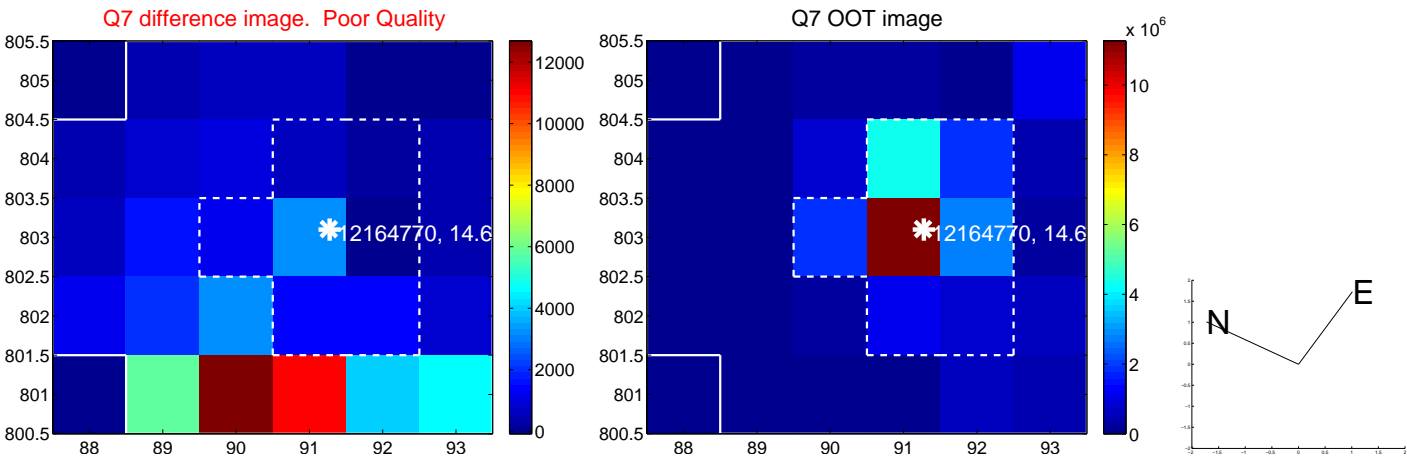
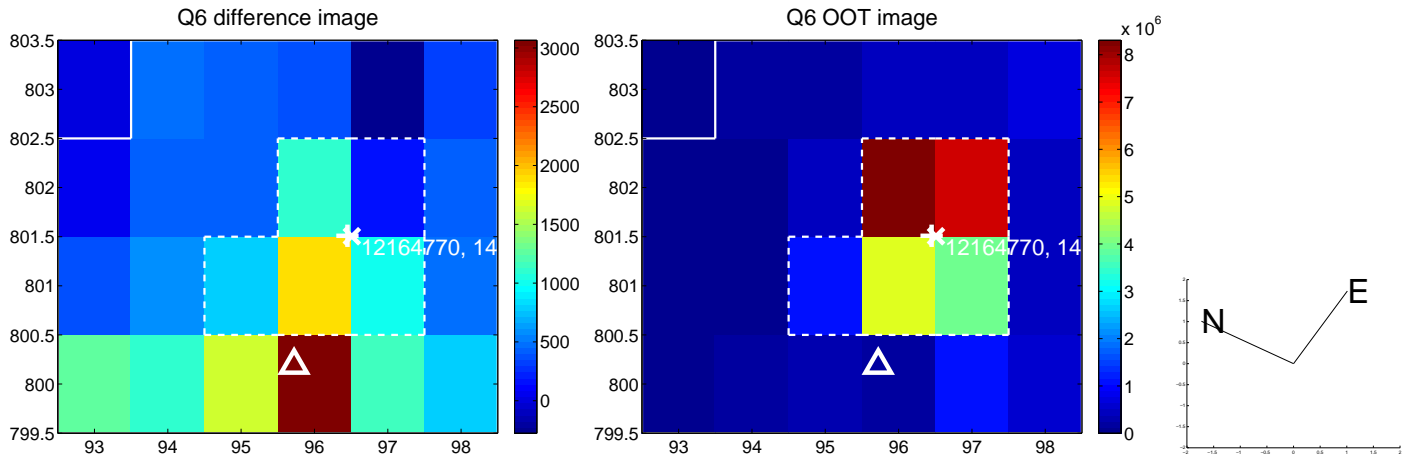
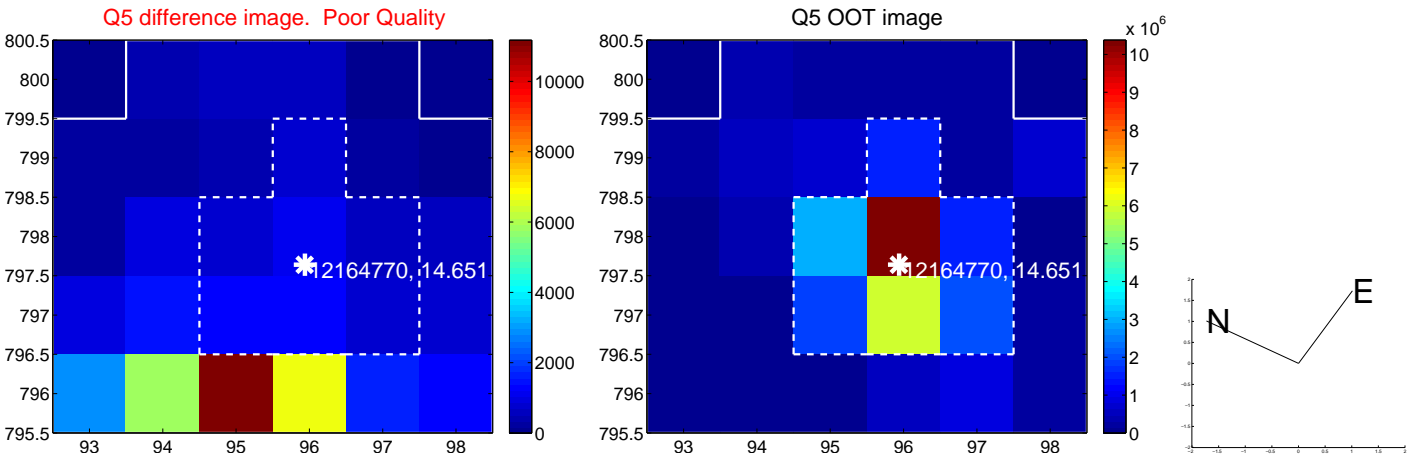


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

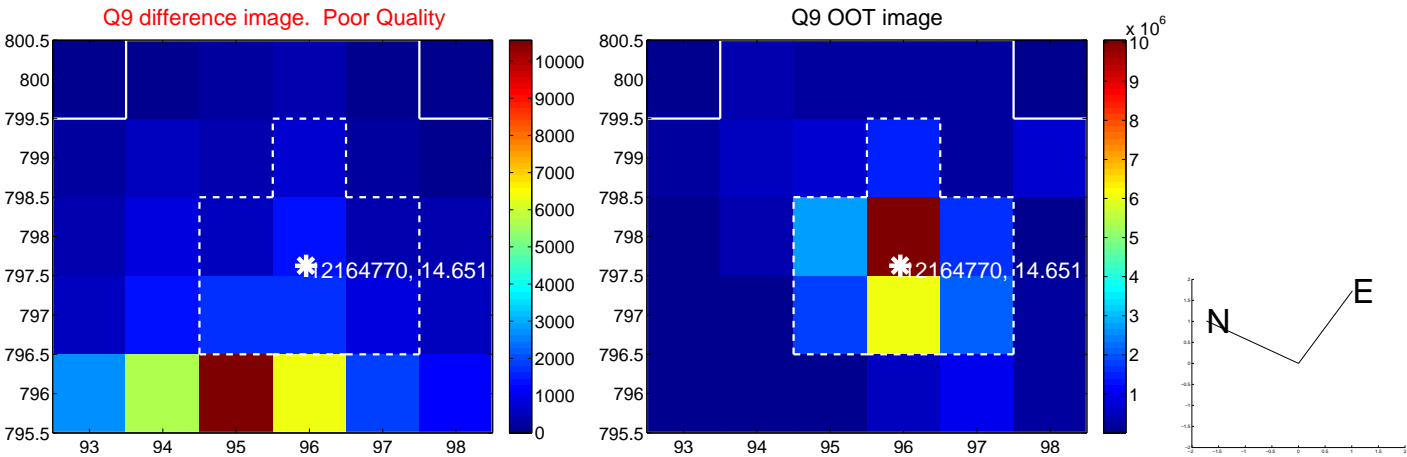
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



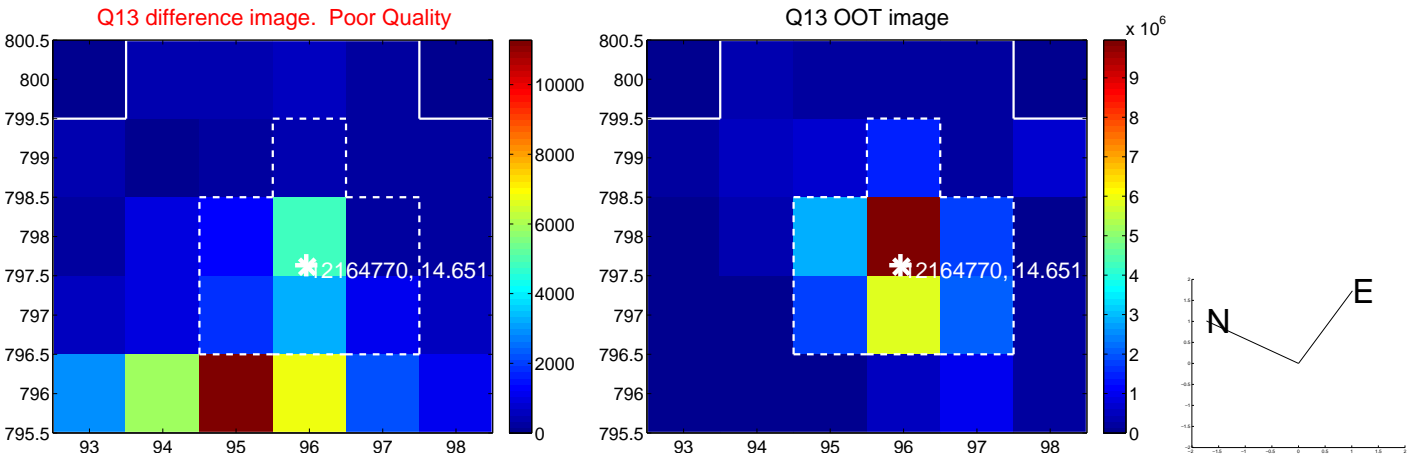
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



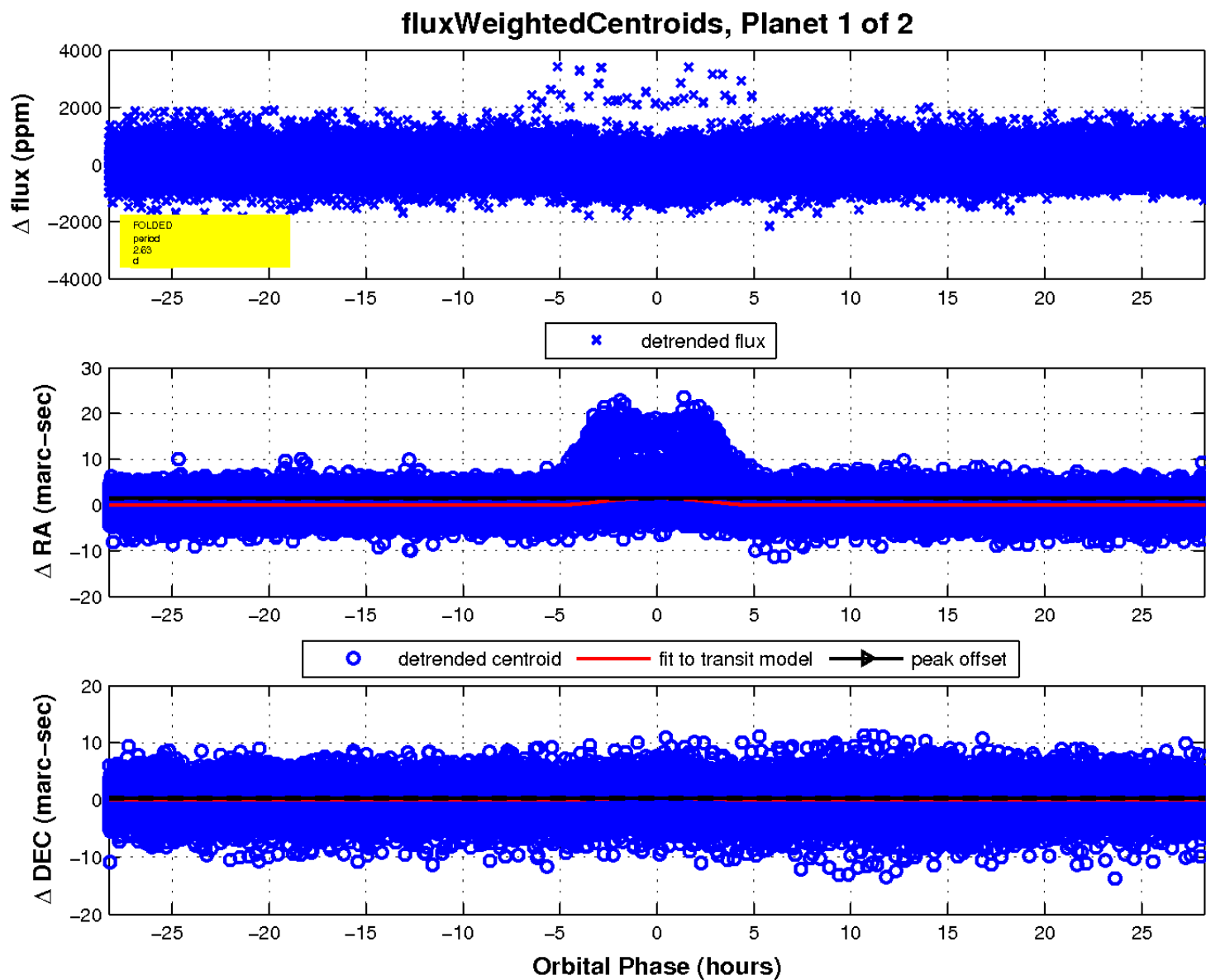
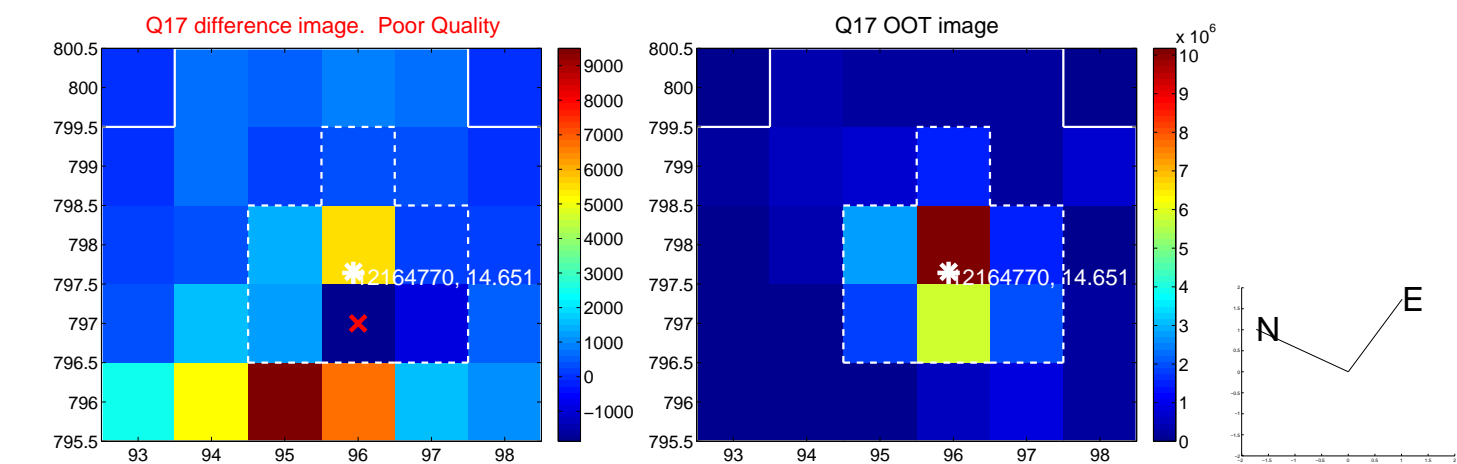
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

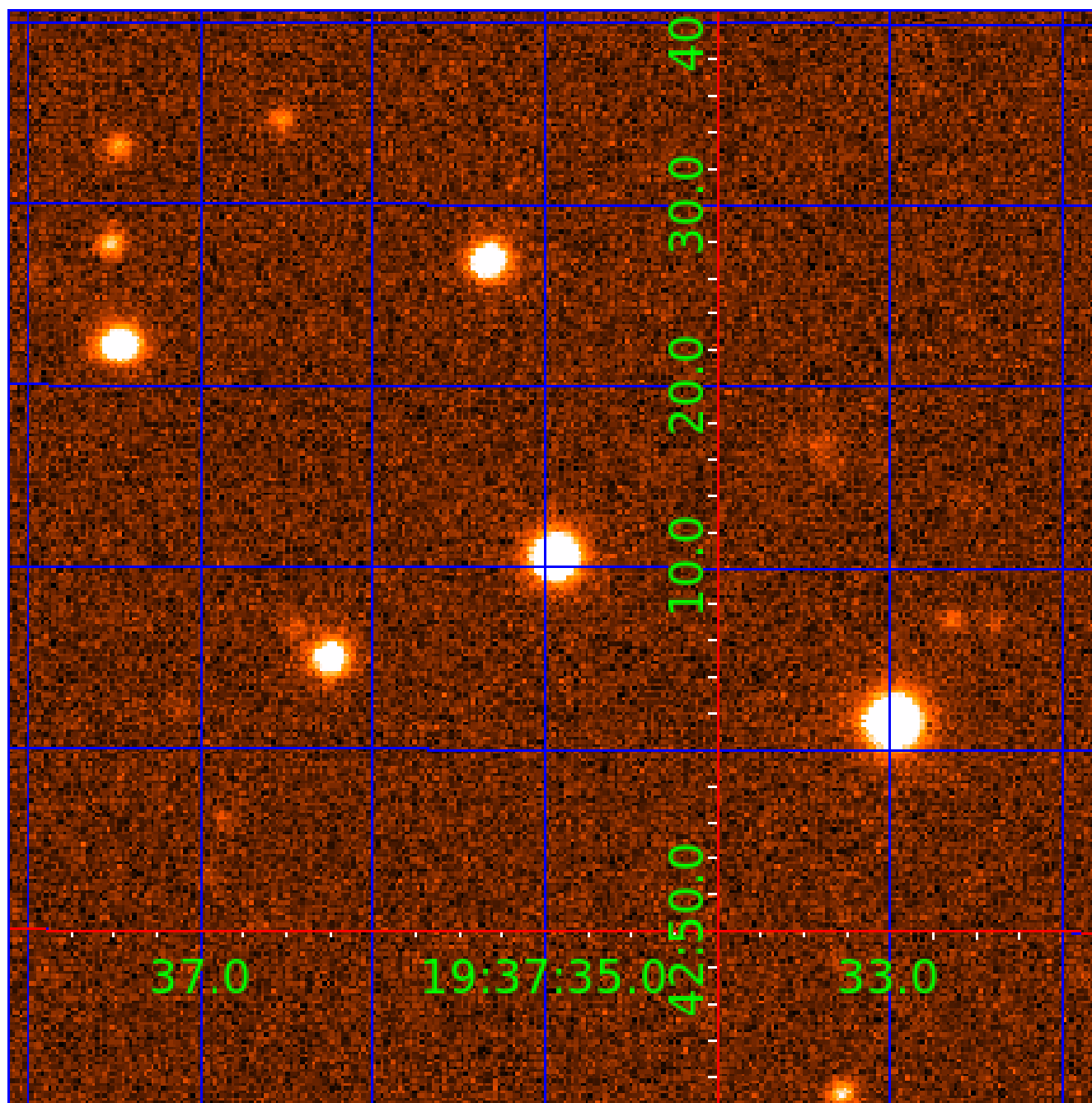


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 012164770

Q1-17 DR25 TCE Parameters

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012164770-01	OBS	2088.01	2.630080	132.230654	265.7	9.418	29.9	35.9	1.09	6338	3.47	1135.78
012164770-02	OBS	No	465.543852	463.562162	1059.7	76.578	17.5	9.8	1.09	6338	3.90	1.14

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012164770-01	OBS	FP	0.00	0	0	1	1	CENT_RESOLVED_OFFSET—EPHEM_MATCH
012164770-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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.

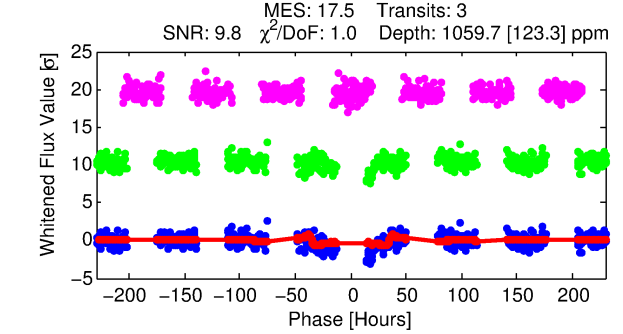
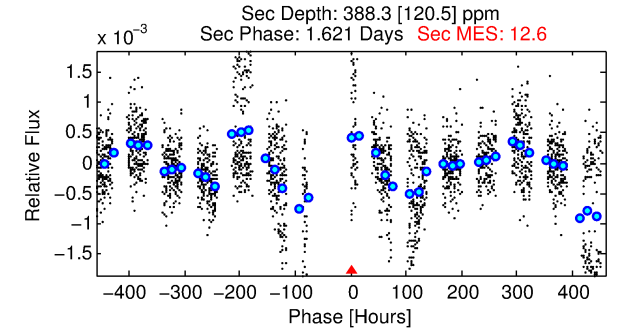
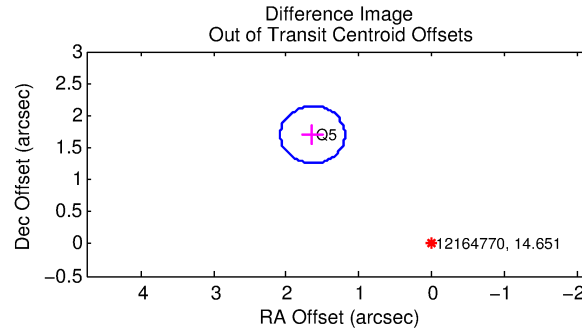
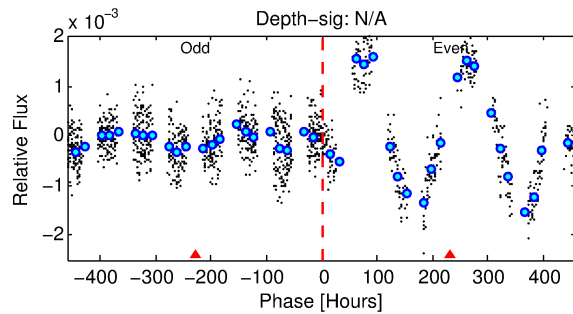
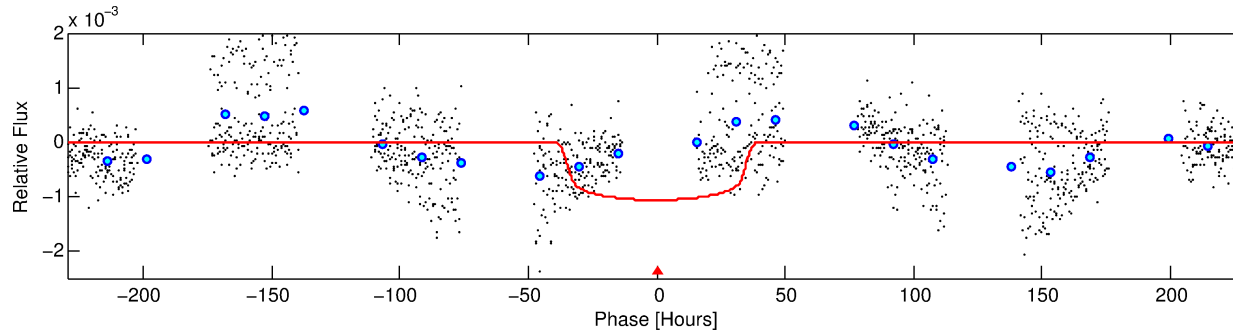
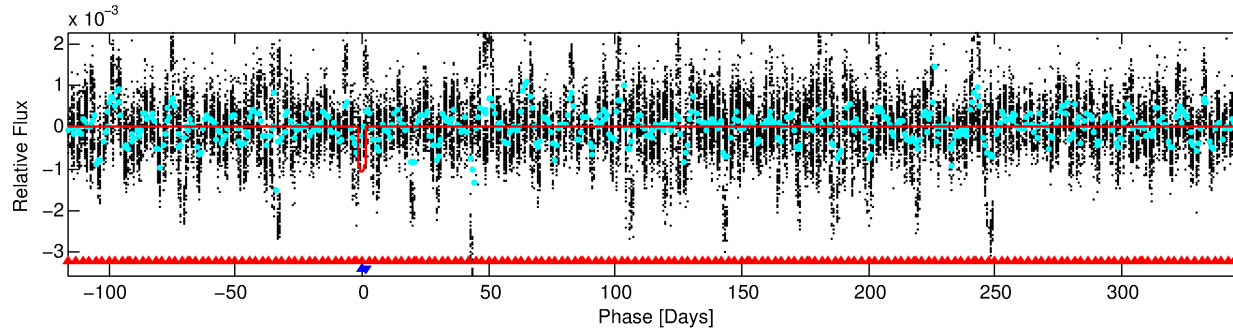
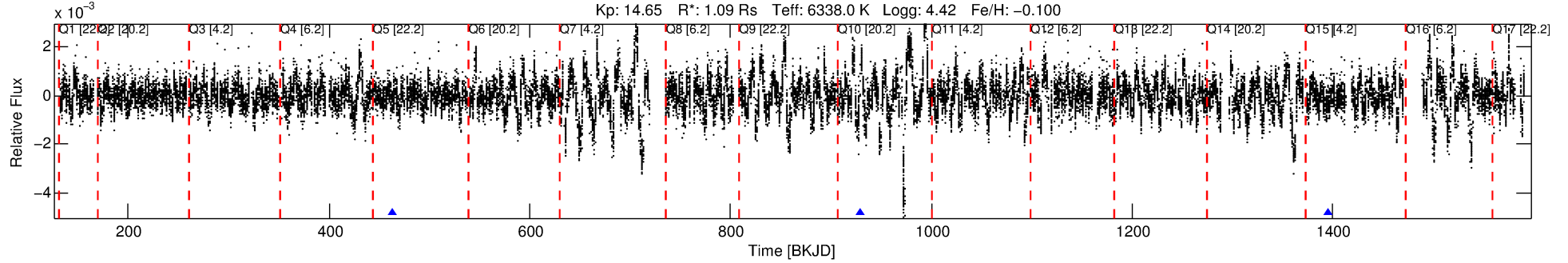
Ephemeris Match Information For 012164770-02

No Significant Match Found

DV One-Page Summary

KIC: 12164770 Candidate: 2 of 2 Period: 465.544 d
KOI: K02088 Corr: No Ephemeris Match

Kp: 14.65 R*: 1.09 Rs Teff: 6338.0 K Logg: 4.42 Fe/H: -0.100



DV Fit Results:

Period = 465.54385 [0.02253] d
Epoch = 463.5622 [0.0278] BKJD
Rp/R* = 0.0328 [0.0022]
a/R* = 31.23 [3.89]
b = 0.78 [0.06]
Seff = 1.14 [0.48]
Teq = 264 [27] K
Rp = 3.90 [1.29] Re
a = 1.2271 [0.3338] AU
Ag = 21140.21 [10992.66] [1.92σ]
Teff = 4915 [446] K [10.42σ]

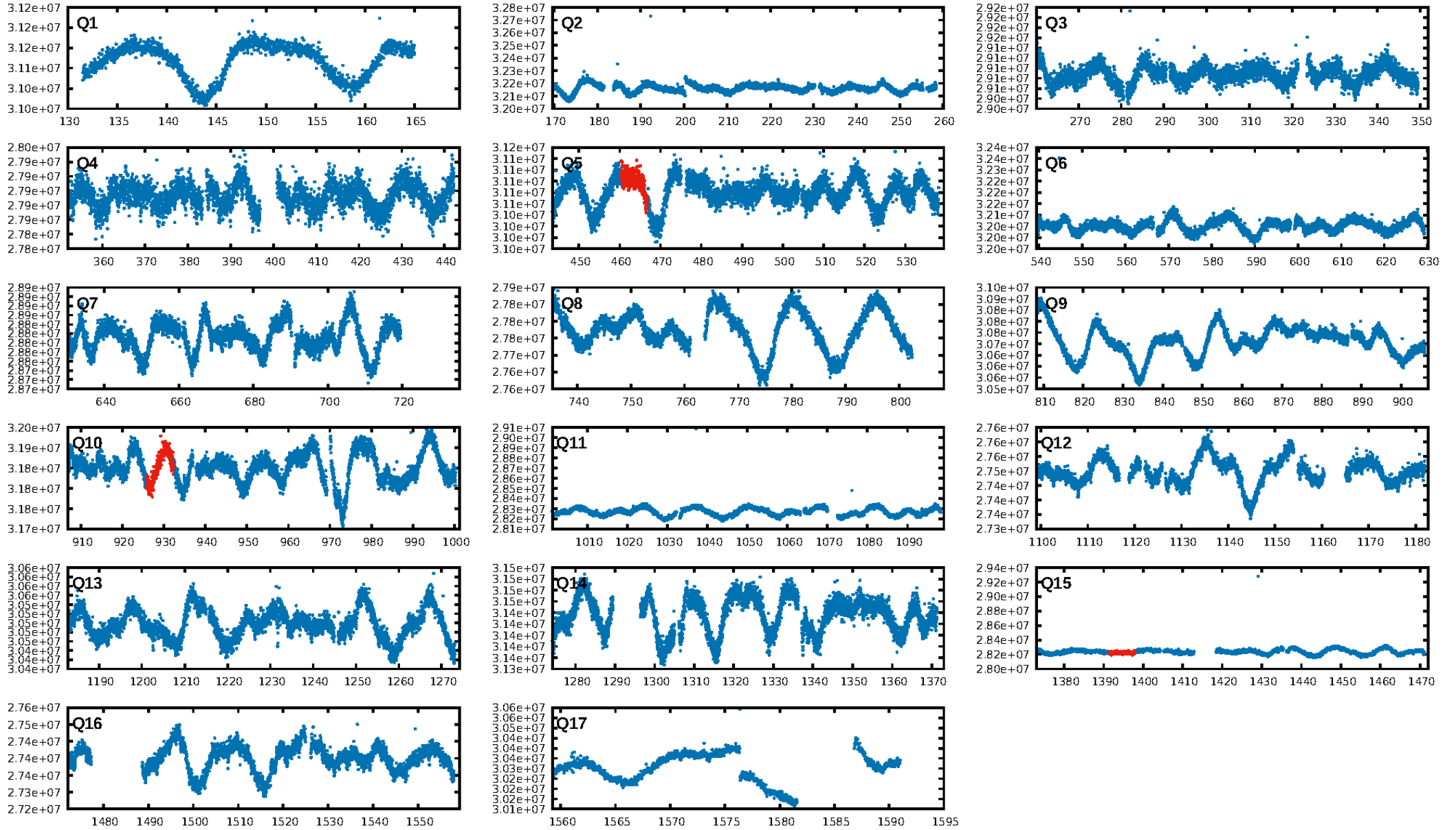
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [144.00σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 0.0%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 4.42e-25
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 0.8683
Centroid-sig: 0.9%
Centroid-so: 1.043 arcsec [2.03σ]
OotOffset-rm: 2.362 arcsec [15.93σ]
KicOffset-rm: 2.340 arcsec [15.78σ]
OotOffset-st: 0/0/0/1 [1]
KicOffset-st: 0/0/0/1 [1]
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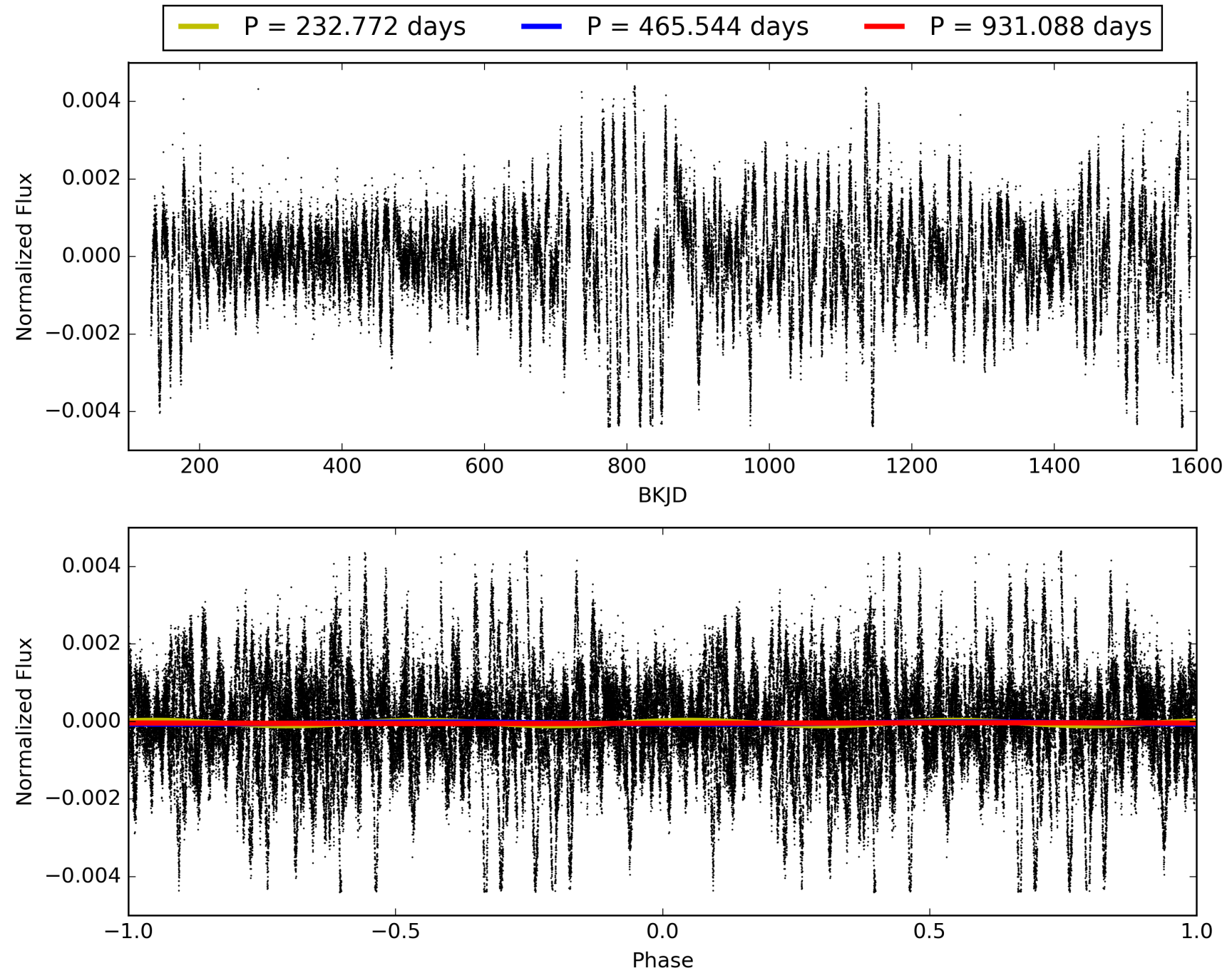
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 12:39:42 Z

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

TCE 012164770-02, PDC Light Curves

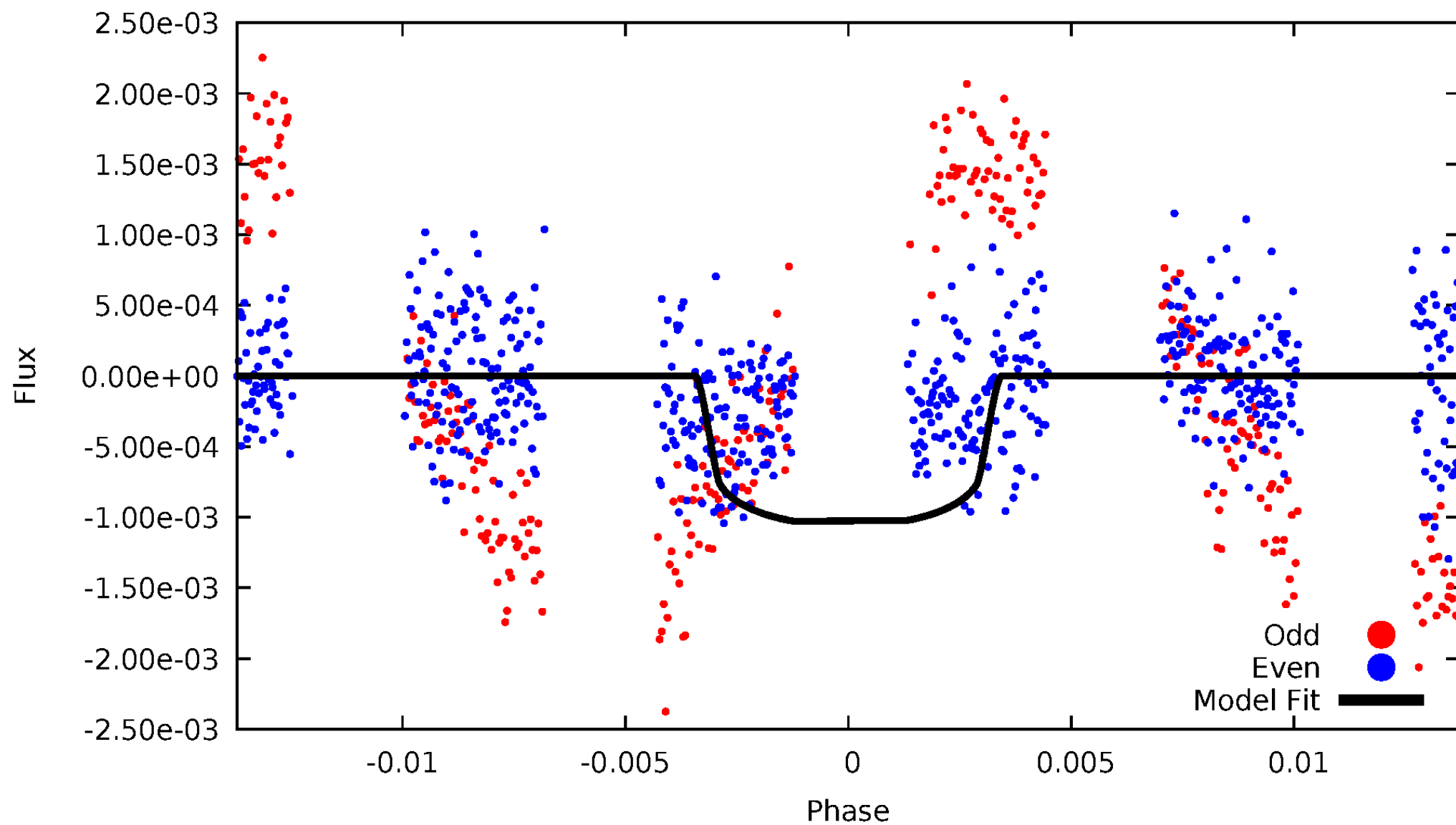


TCE 012164770-02



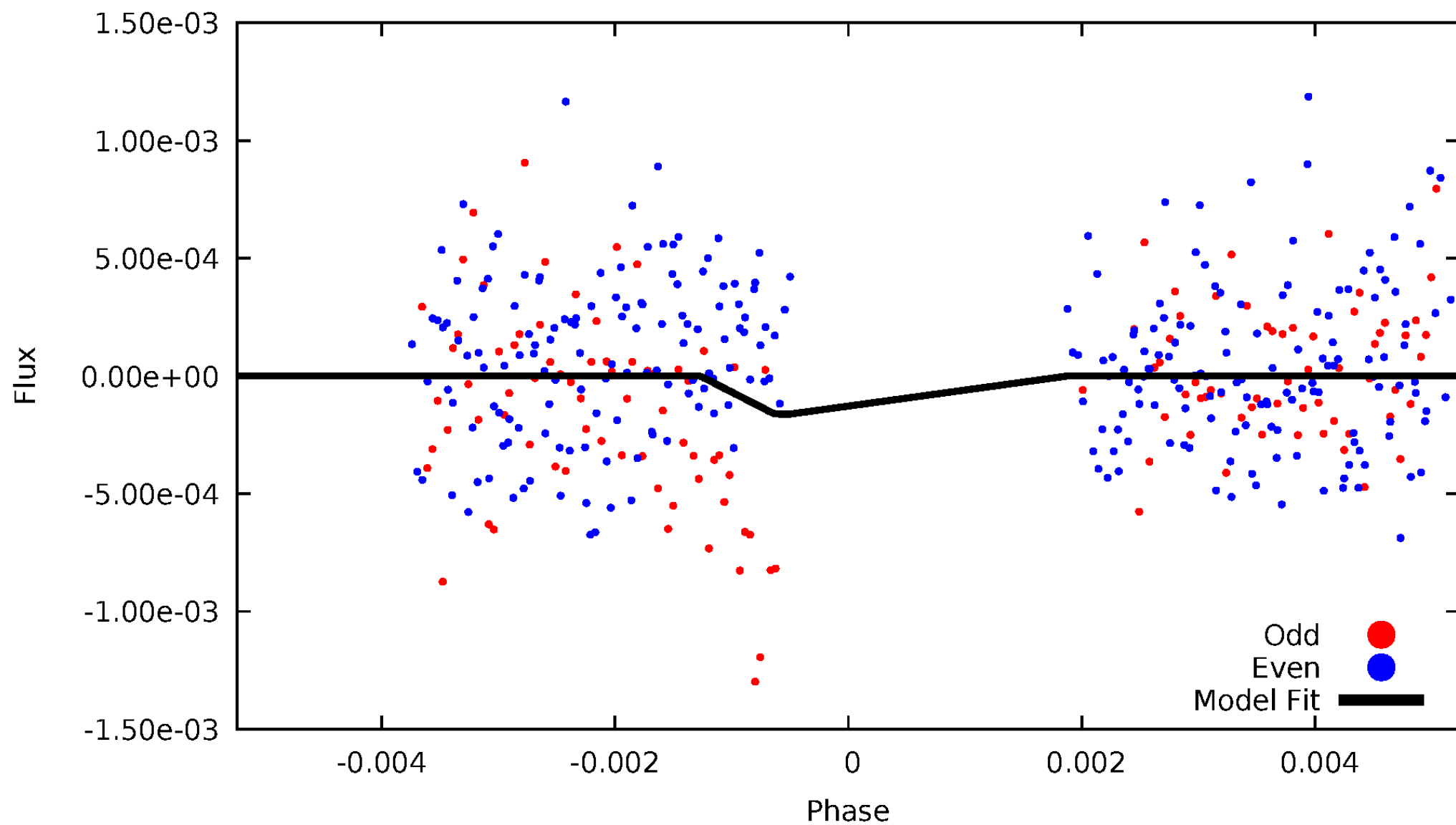
DV Odd/Even

TCE 012164770-02



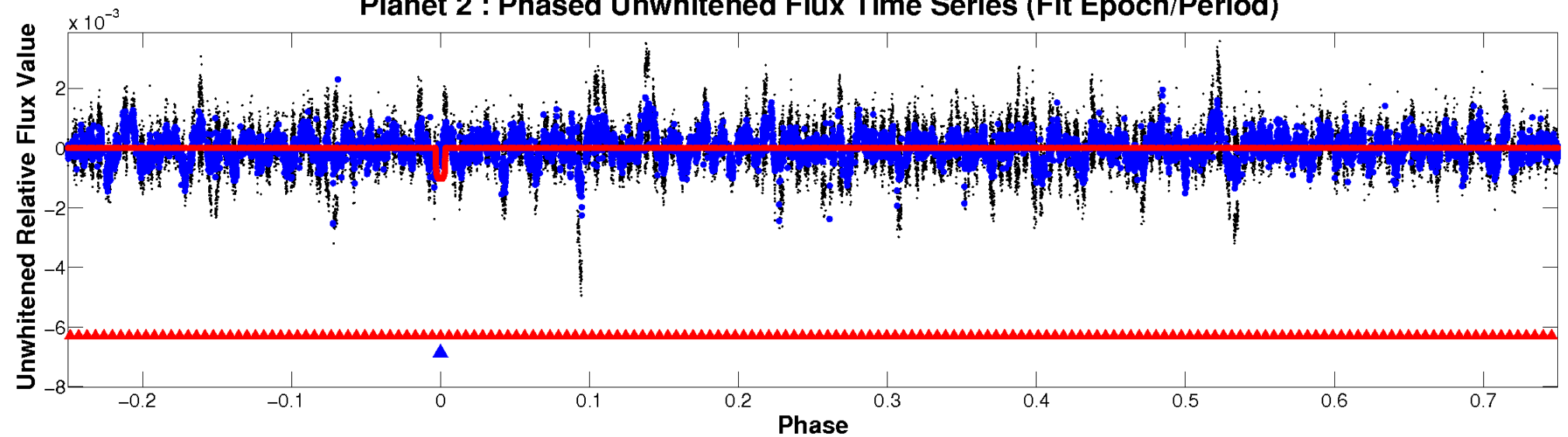
ALT Odd/Even

TCE 012164770-02

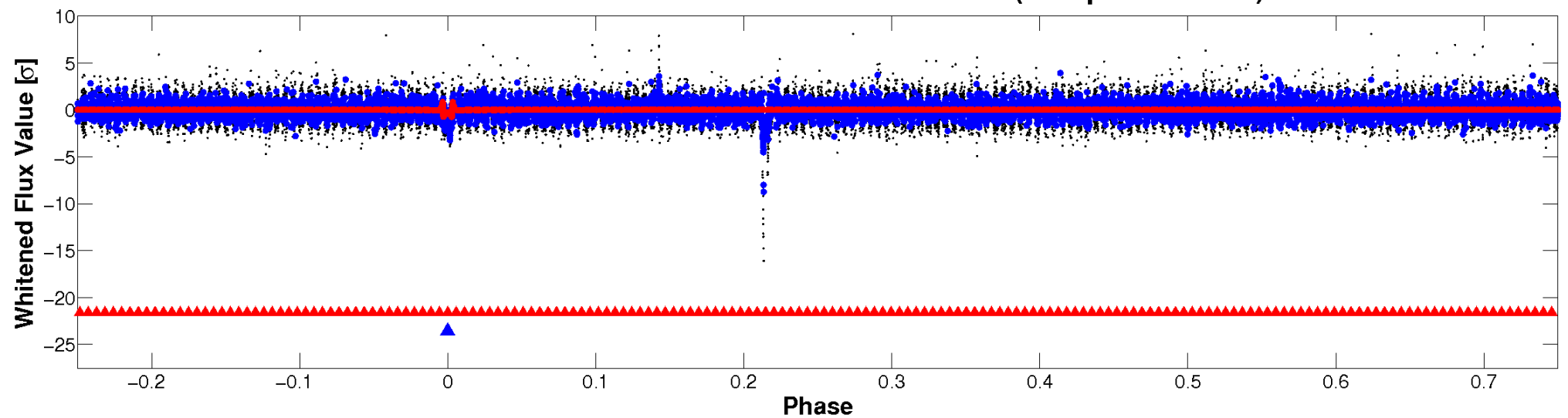


Non-Whitened Vs. Whitened Light Curve

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

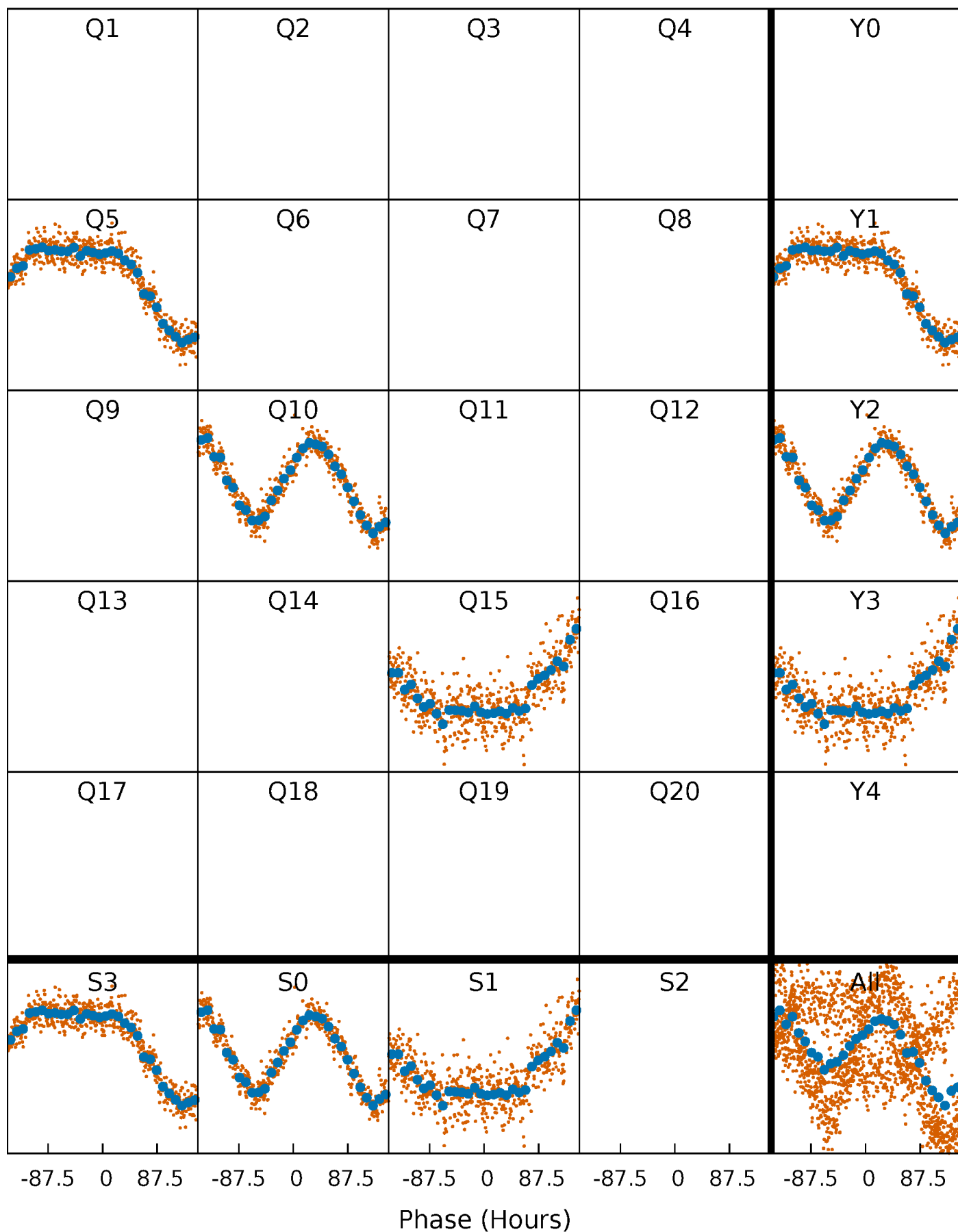


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



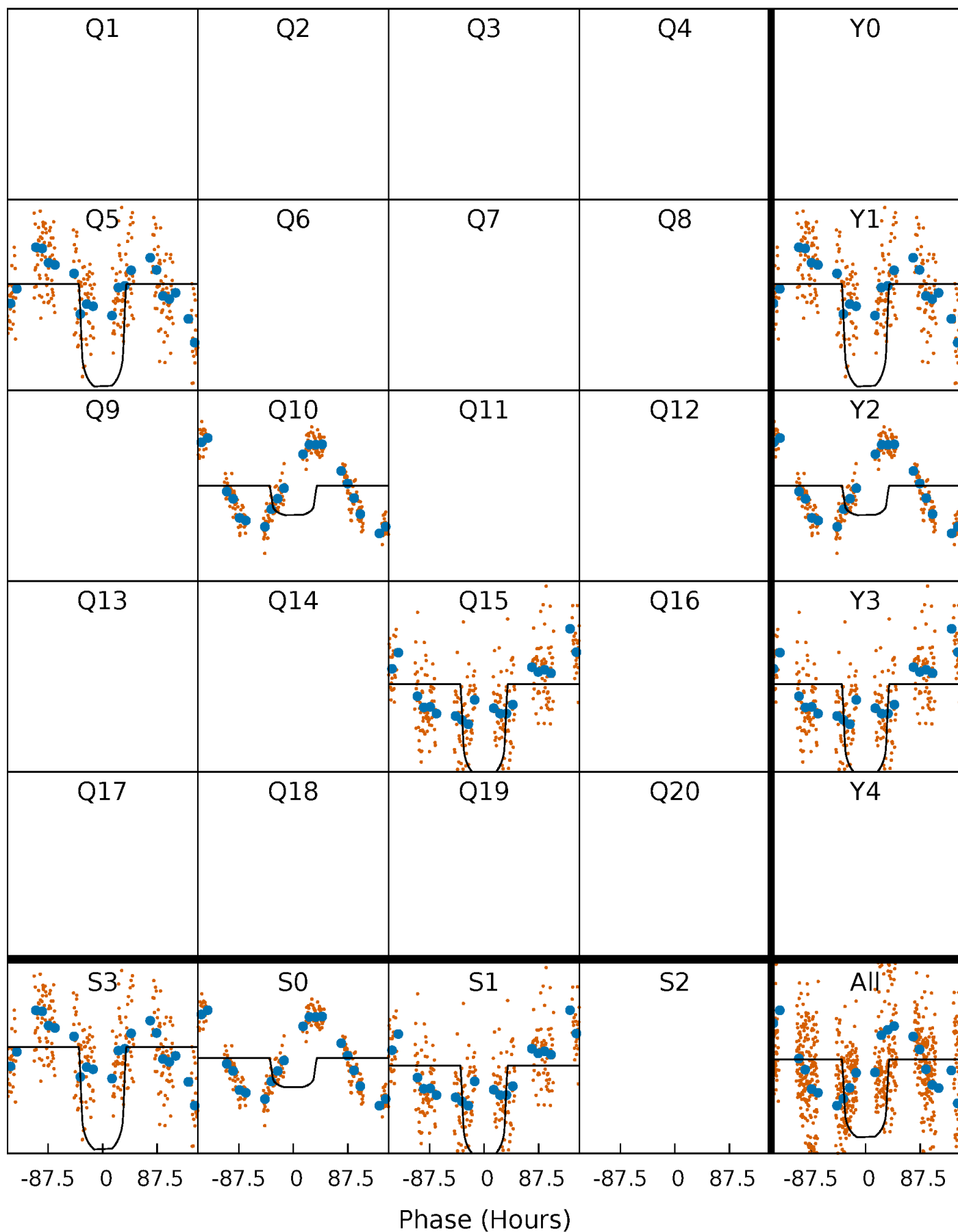
PDC Quarter-Phased Transit Curves

TCE 012164770-02 P=465.543852 Days $T_0=463.562162$ (BKJD)



DV Quarter-Phased Transit Curves

TCE 012164770-02 P=465.543852 Days $T_0=463.562162$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

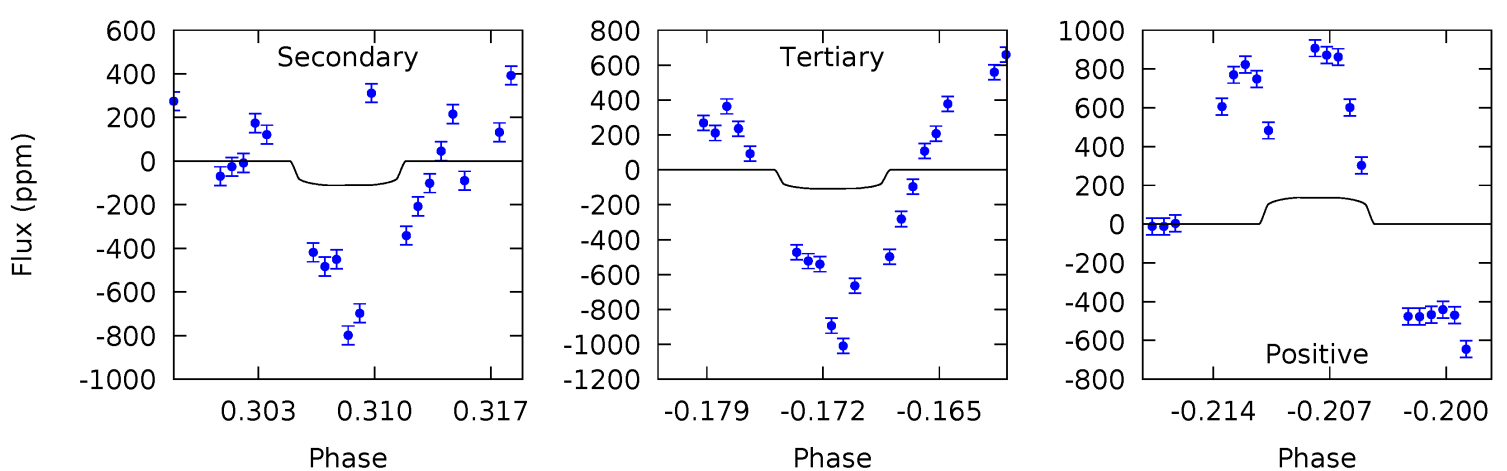
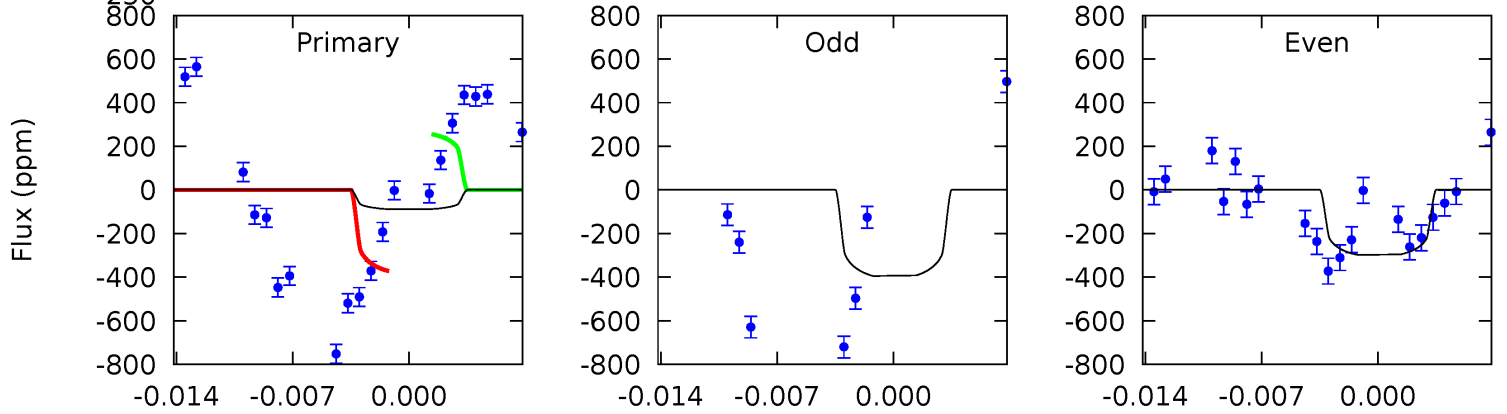
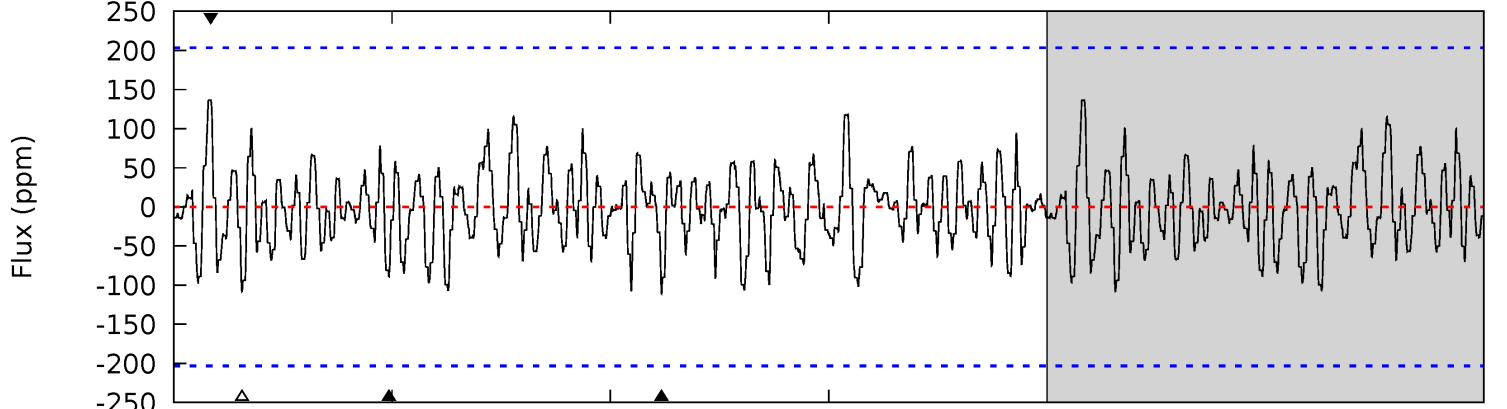
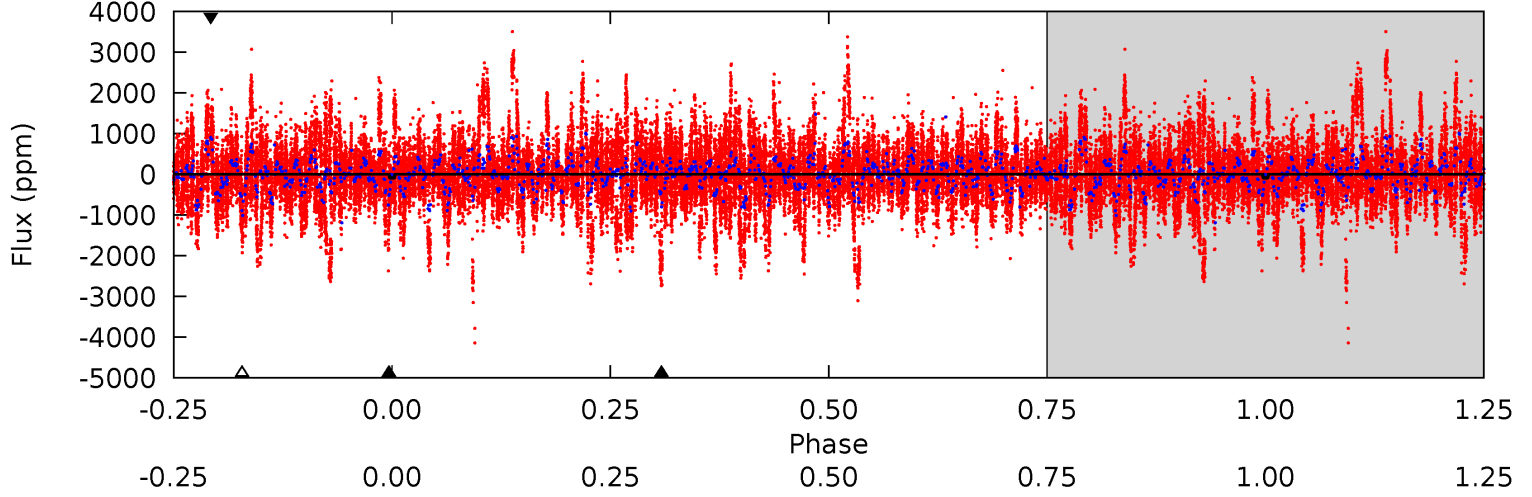
TCE 012164770-02 P=465.578665 Days $T_0=463.237465$ (BKJD)



DV Model-Shift Uniqueness Test

012164770-02, P = 465.543852 Days, E = 463.562162 Days

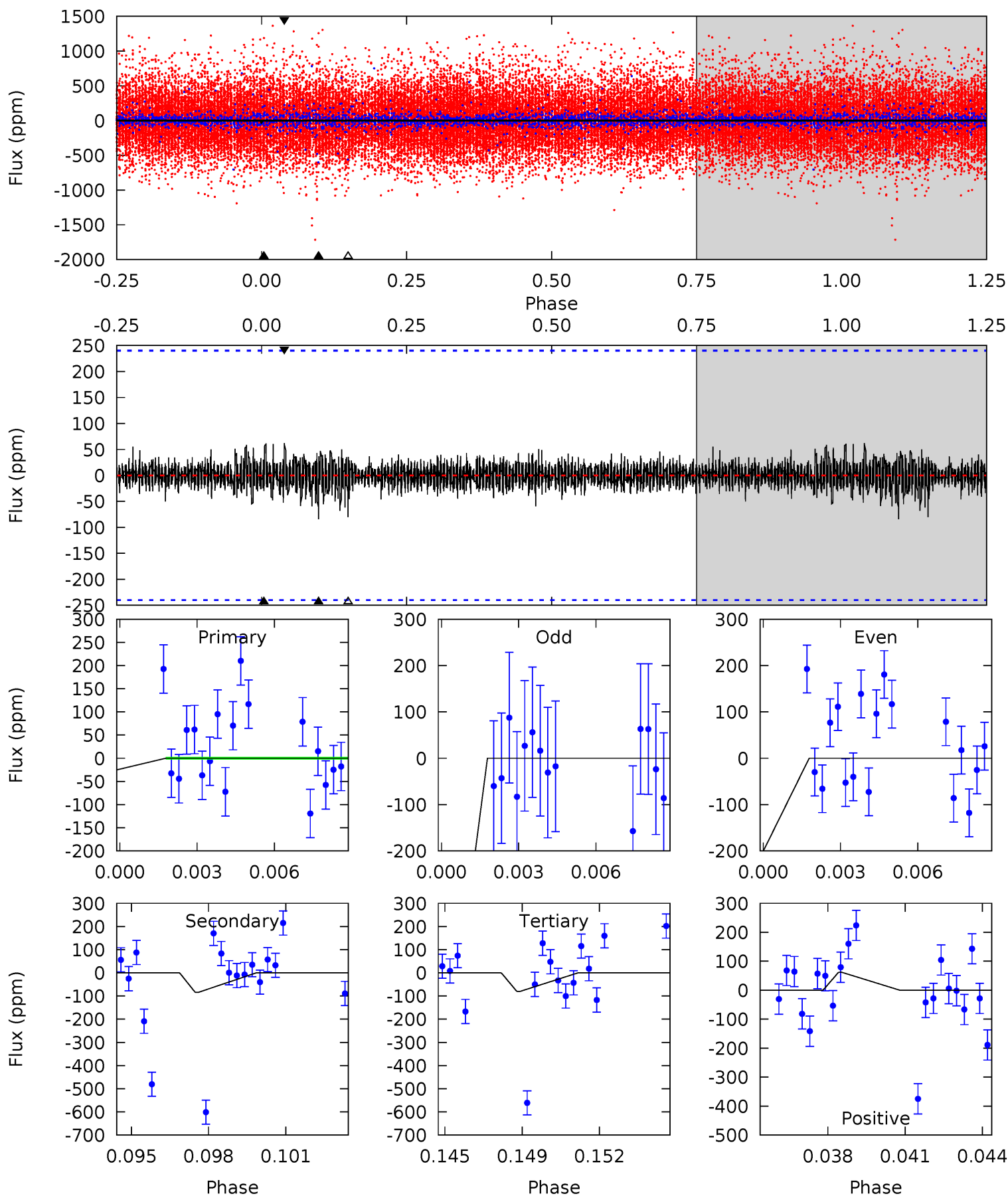
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2.22	2.79	2.71	3.43	5.10	2.70	1.10	-0.49	-1.21	0.07	-0.65	1.04	0.32	0.55	1.46



Alt Model-Shift Uniqueness Test

012164770-02, P = 465.578665 Days, E = 463.237465 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0.65	1.83	1.75	1.35	5.24	2.95	0.30	-1.10	-0.70	0.09	0.48	7.44	0	0.42	0



Stellar Parameters For KIC 012164770

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6338^{+153}_{-210}	$4.418^{+0.067}_{-0.216}$	$-0.100^{+0.250}_{-0.300}$	$1.091^{+0.353}_{-0.118}$	$1.137^{+0.166}_{-0.149}$	$1.233^{+0.351}_{-0.648}$
	+2%/-3%	+2%/-5%	+250%/-300%	+32%/-11%	+15%/-13%	+28%/-53%
Source	PHO1	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 012164770-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-111 ± 40	$4.05^{+0.69}_{-0.48}$	376^{+24}_{-20}	3908^{+280}_{-301}	5363^{+2631}_{-2206}
Alt.	-84 ± 46	$1.55^{+0.36}_{-0.29}$	374^{+26}_{-17}	5406^{+873}_{-974}	27529^{+24185}_{-17165}

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

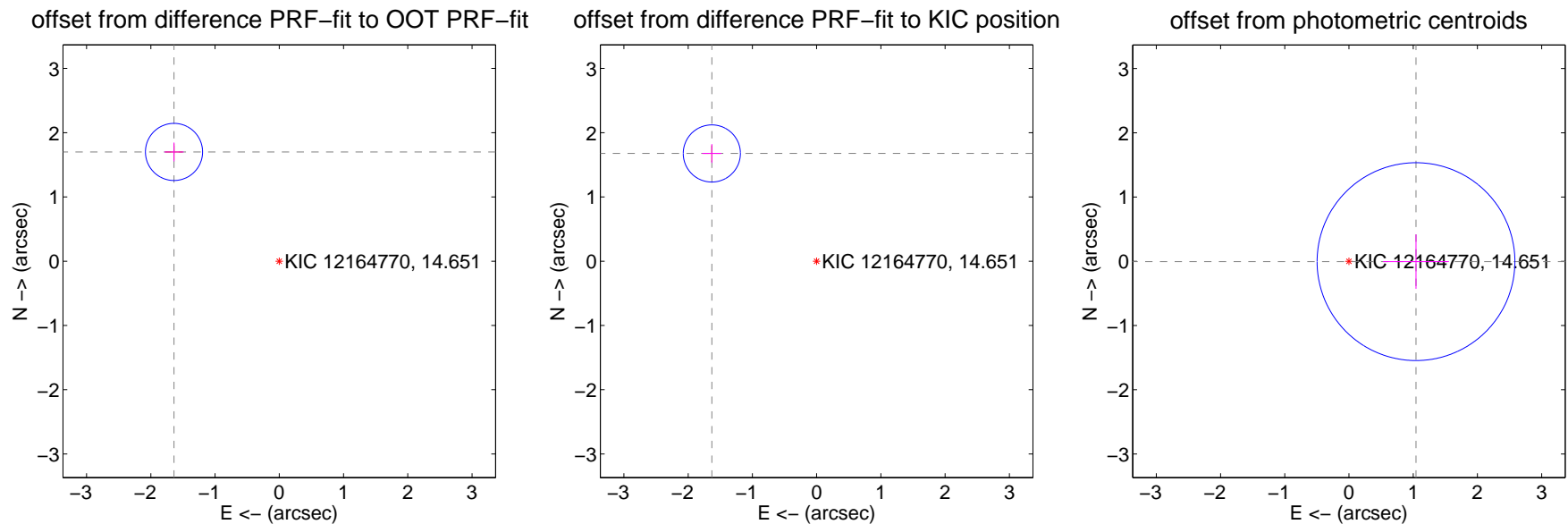
DV Centroid Data

Supplemental centroid analysis for 012164770-02. Kepler magnitude: 14.65. Transit SNR 9.85

There are 0 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.02 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	2.362 ± 0.148	15.93	1.639 ± 0.150	1.701 ± 0.147
PRF-fit source offset from KIC position	2.340 ± 0.148	15.78	1.632 ± 0.150	1.677 ± 0.147
photometric centroid source offset	1.04 ± 0.51	2.03	-1.04 ± 0.51	-0.01 ± 0.42

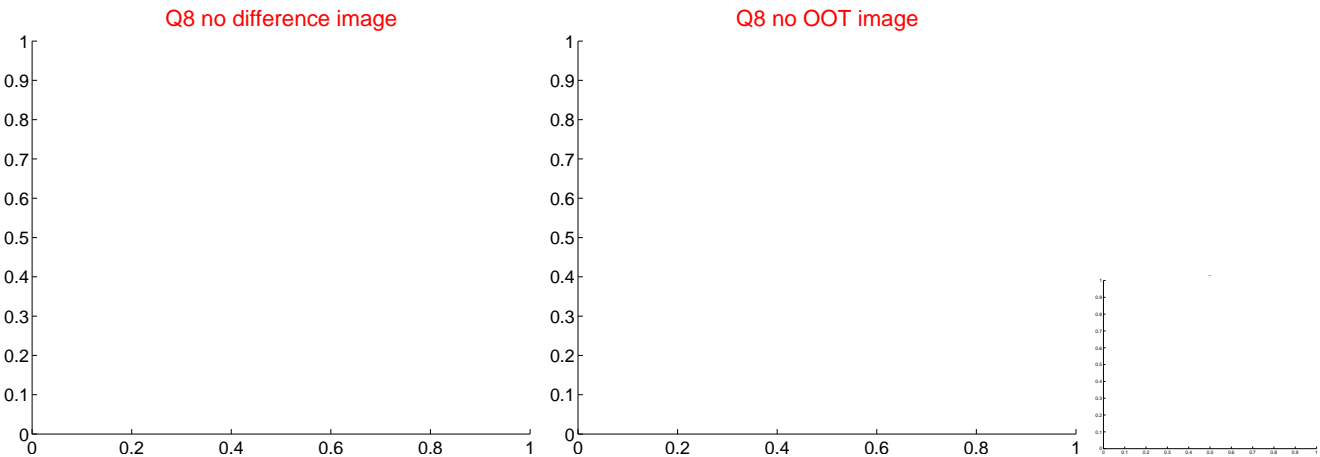
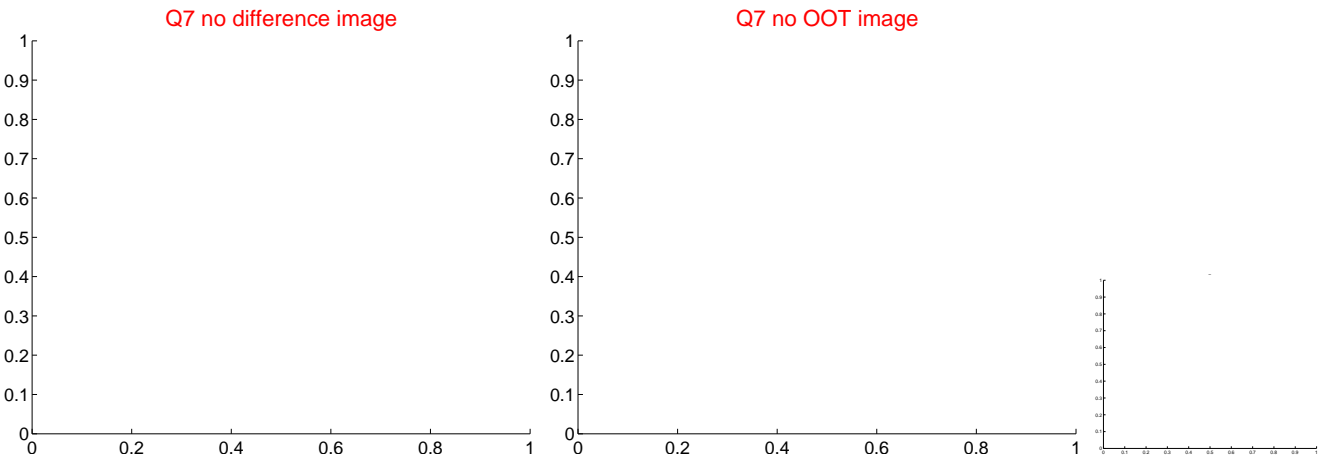
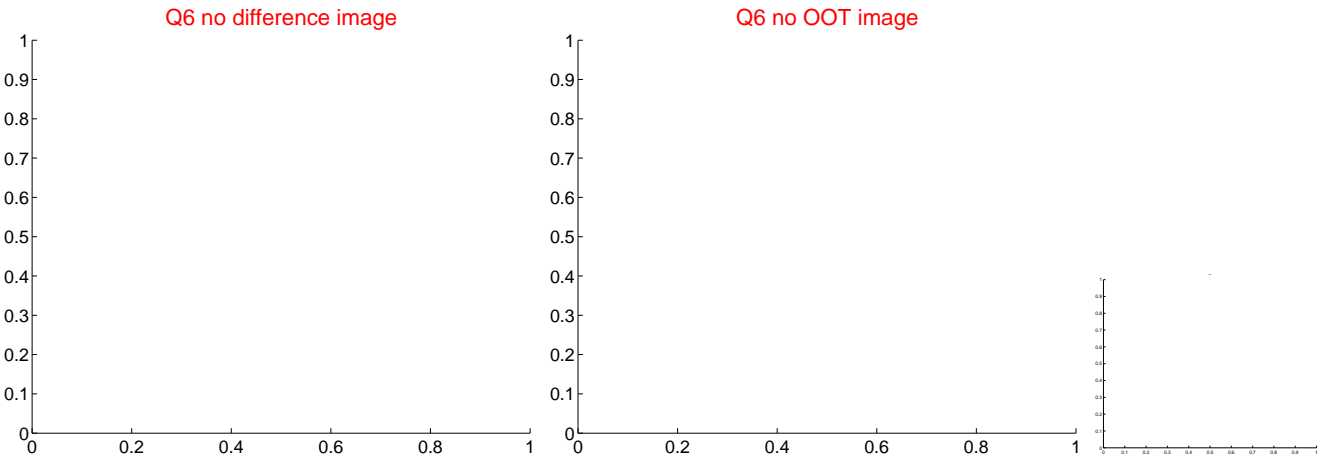
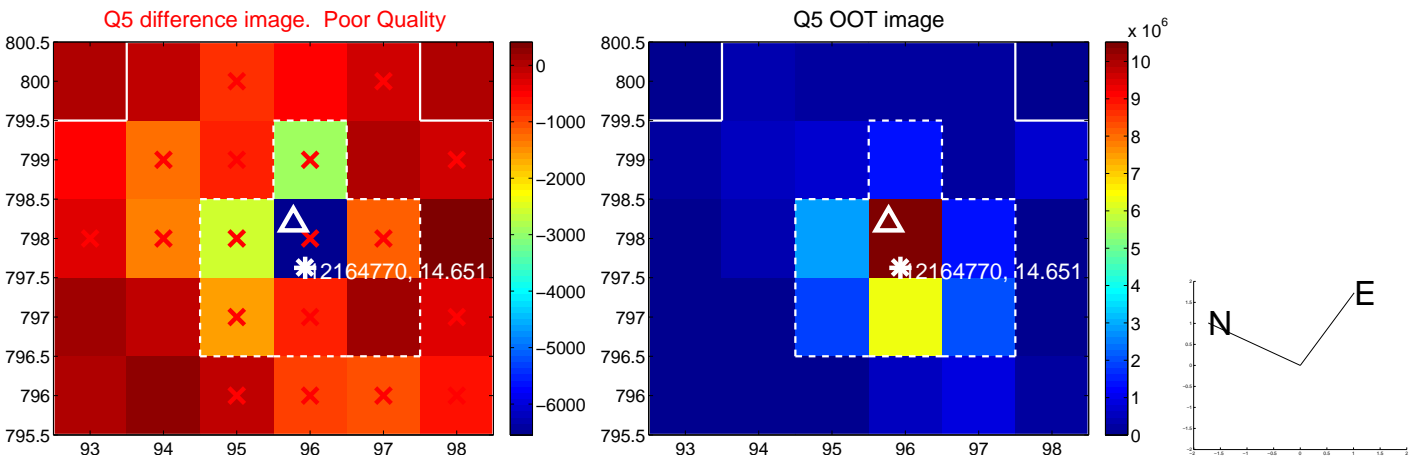


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

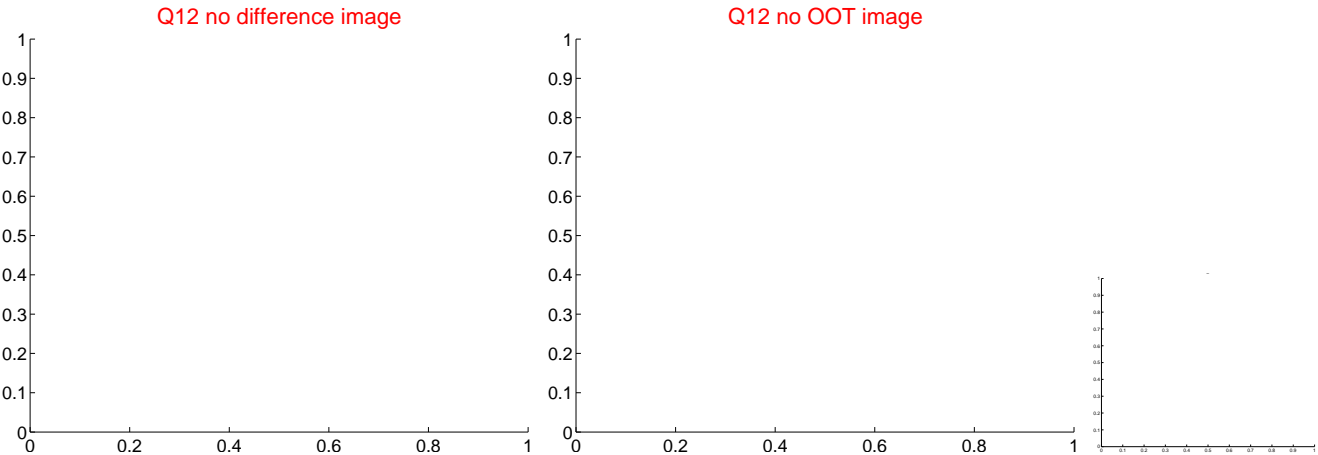
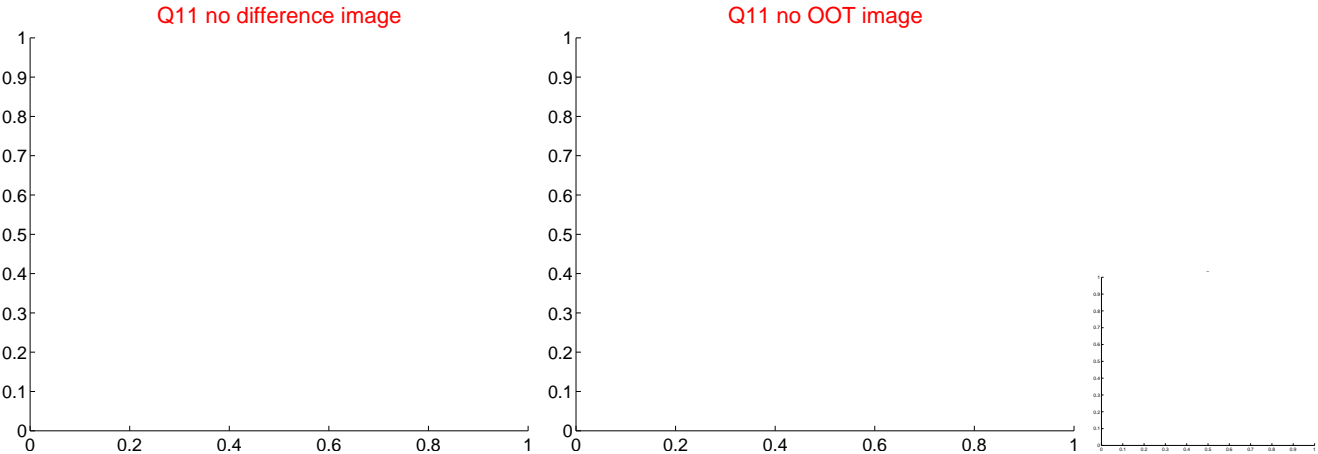
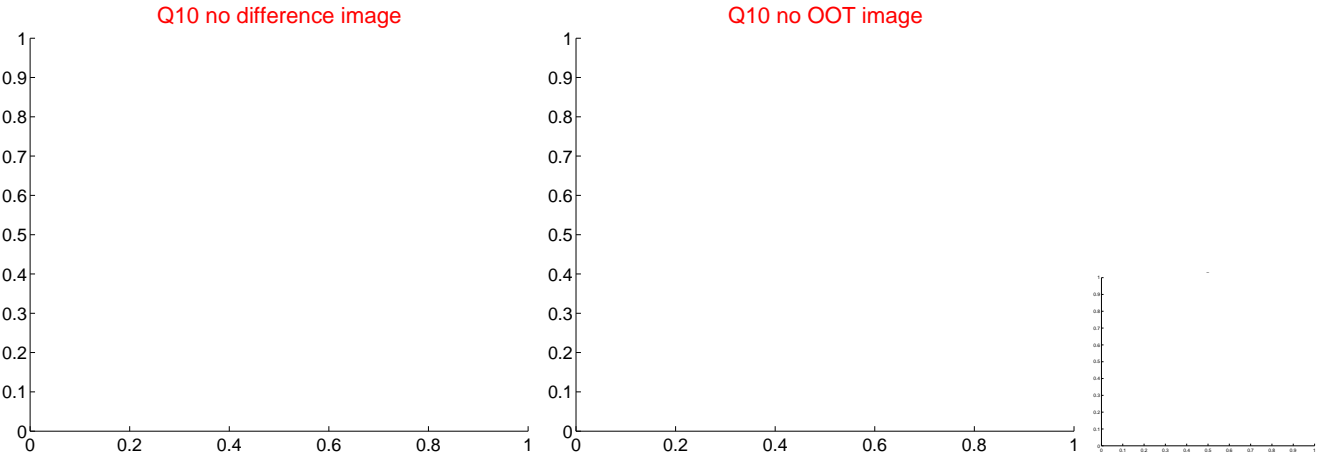
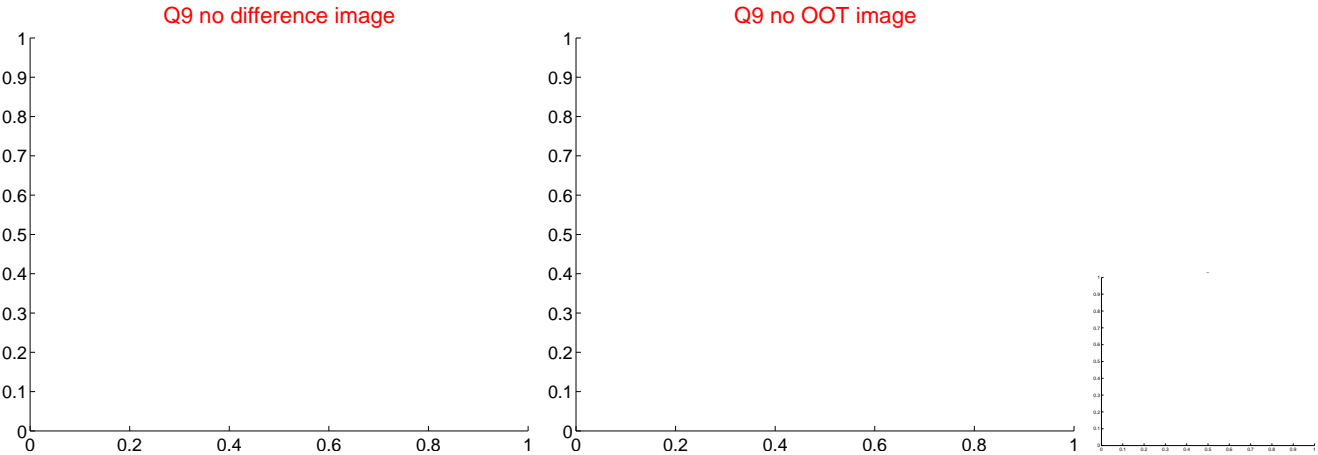
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



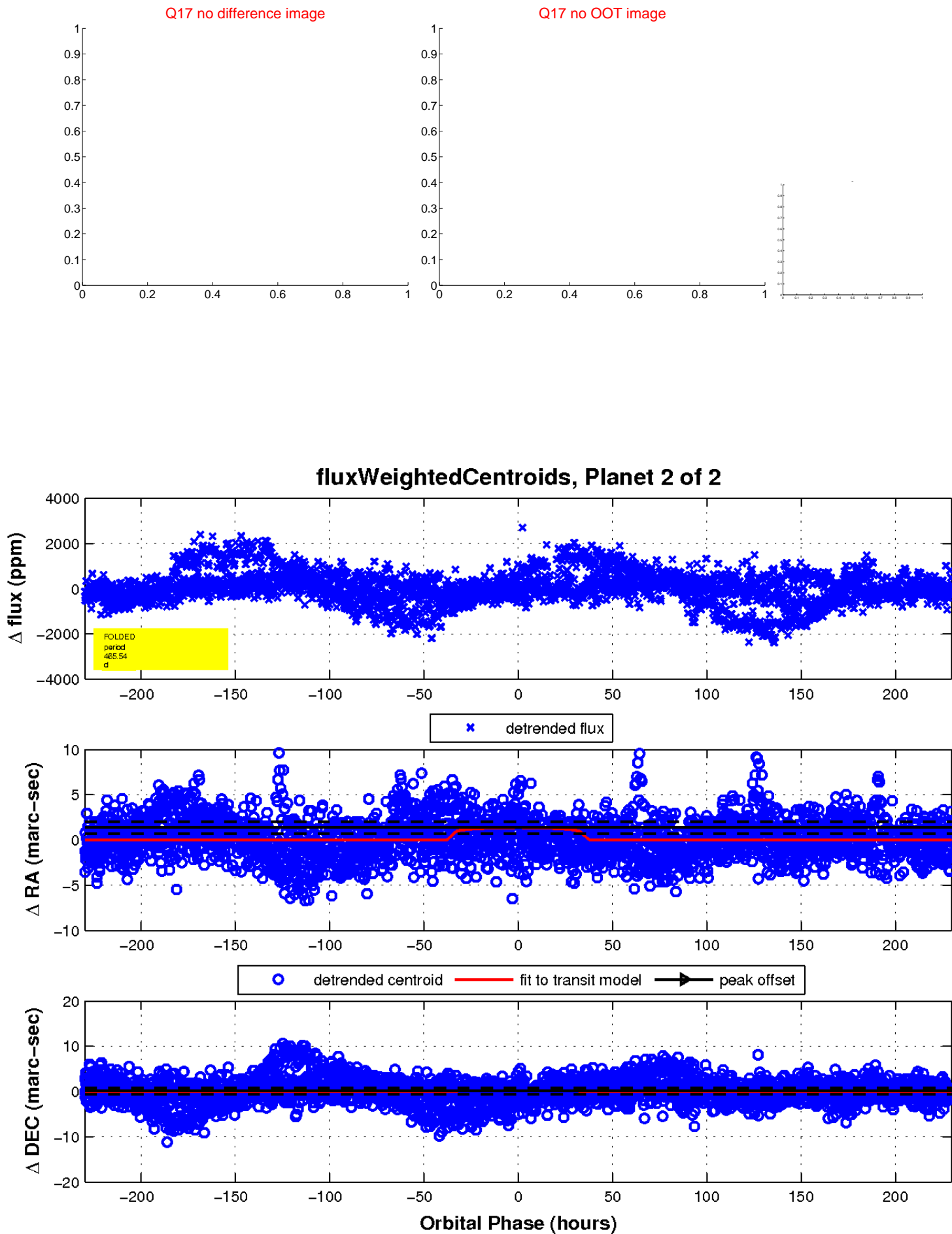
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

