

KIC 004578594

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})
004578594-01	OBS	6429.01	252.162777	191.475405	104436.0	23.932	657.6	633.2	0.74	5432	34.41	0.81
004578594-02	OBS	No	126.080909	219.749615	129065.0	21.479	580.0	690.1	0.74	5432	28.81	2.04

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004578594-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—DEEP_V_SHAPED—HAS_SEC_TCE—CENT_FEW_DIFFS
004578594-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE—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 004578594-01

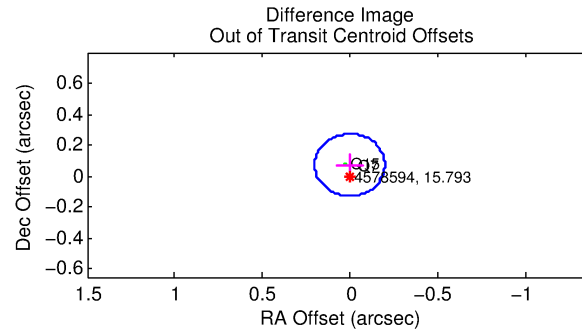
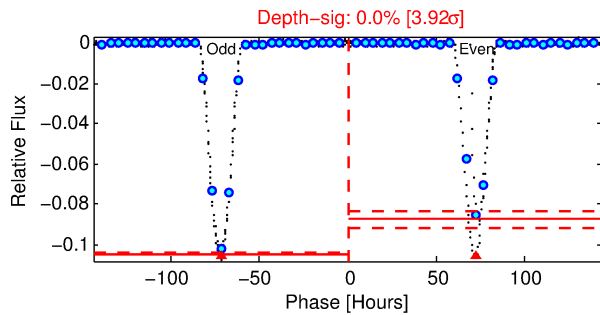
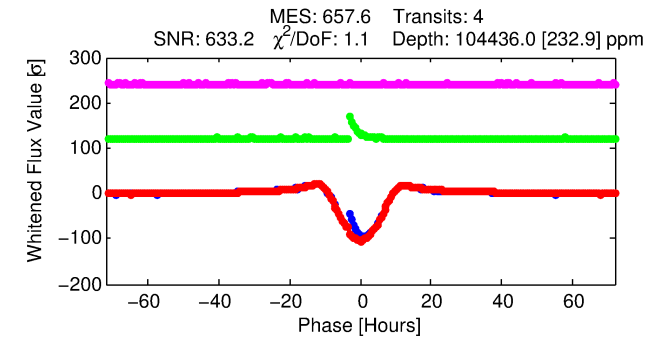
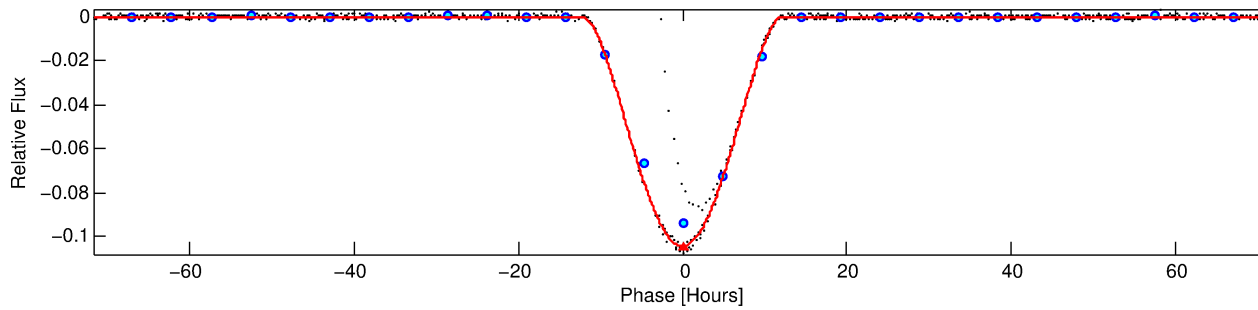
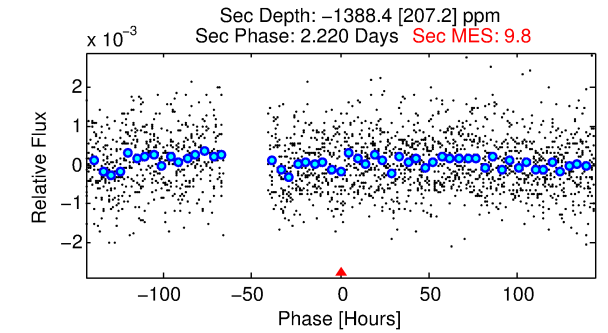
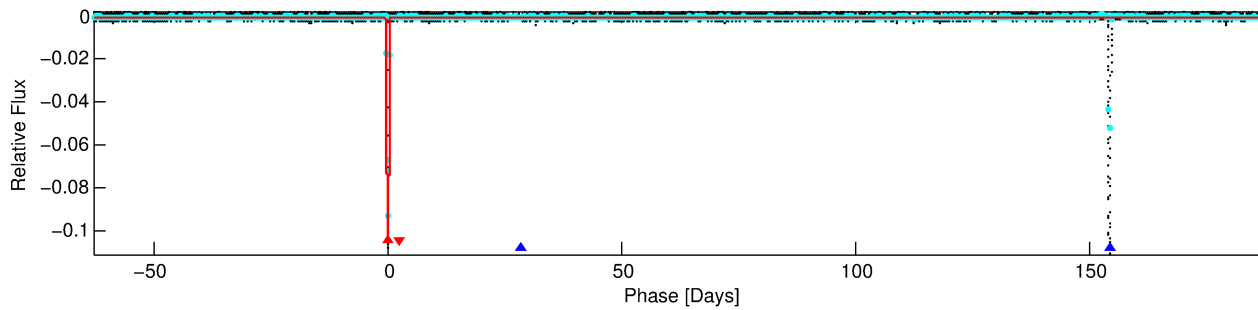
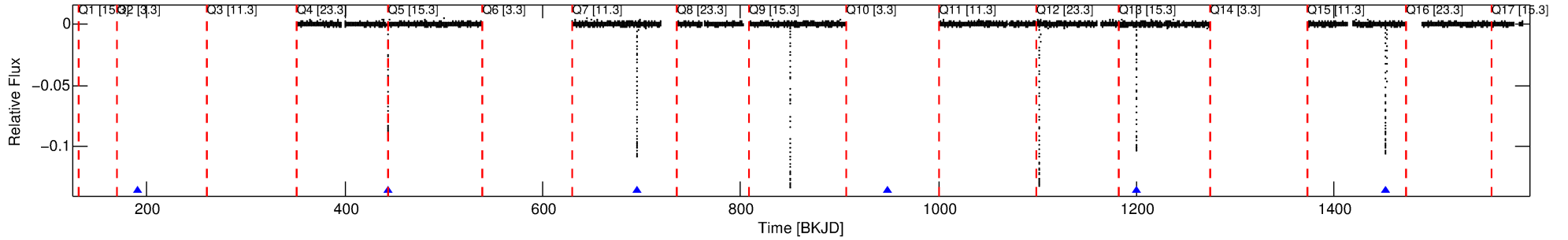
No Significant Match Found

DV One-Page Summary

KIC: 4578594 Candidate: 1 of 2 Period: 252.163 d

KOI: K06429.01 Corr: 0.997

Kp: 15.79 R*: 0.74 Rs Teff: 5432.0 K Logg: 4.61 Fe/H: -0.320



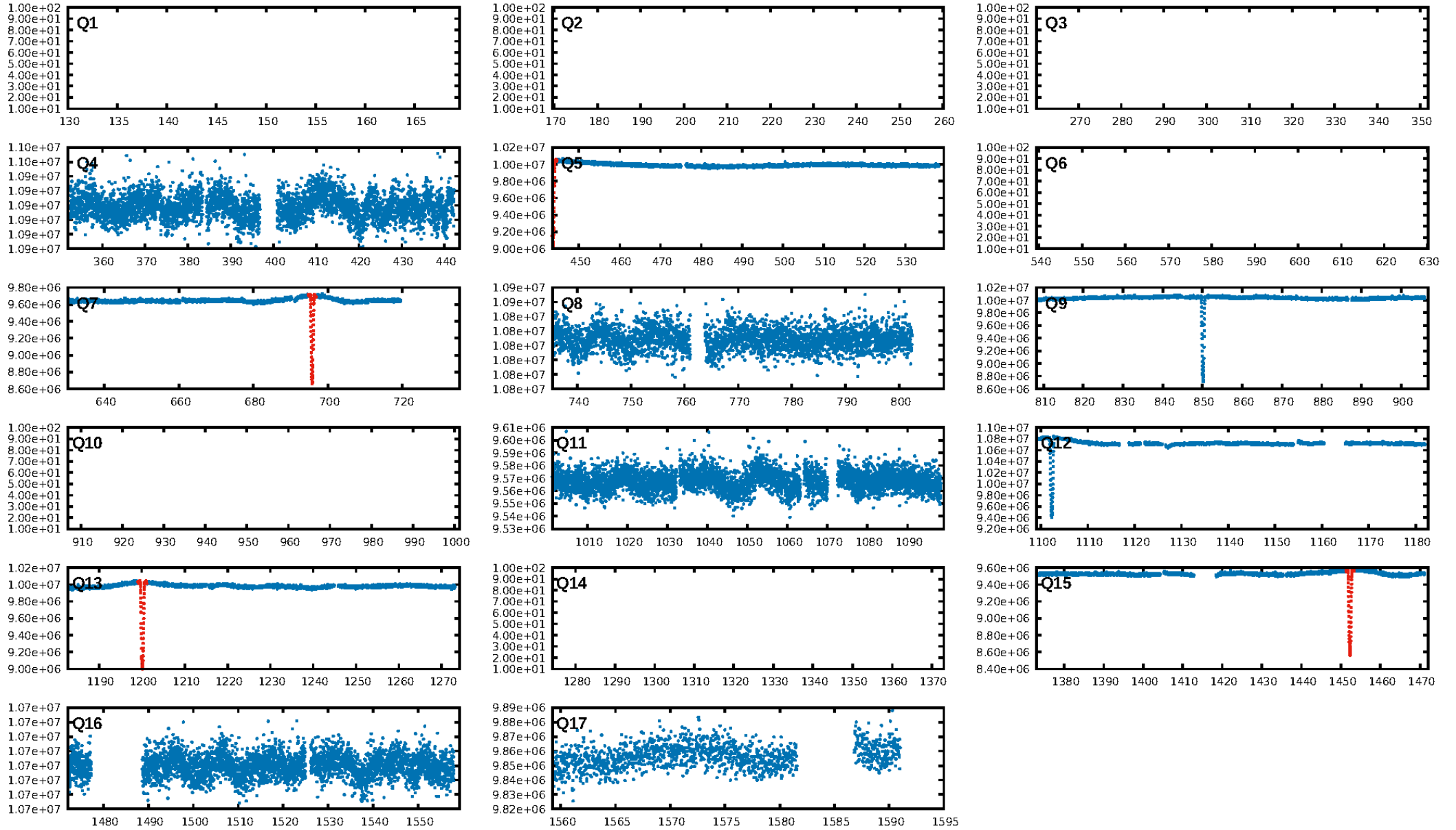
DV Fit Results:

Period = 252.16278 [0.00036] d
Epoch = 191.4754 [0.0013] BKJD
Rp/R* = 0.4233 [0.0668]
a/R* = 89.58 [0.38]
b = 0.89 [0.10]
Seff = 0.81 [0.20]
Teff = 242 [15] K
Rp = 34.41 [8.16] Re
a = 0.7316 [0.1069] AU
Ag = N/A
Teffp = N/A

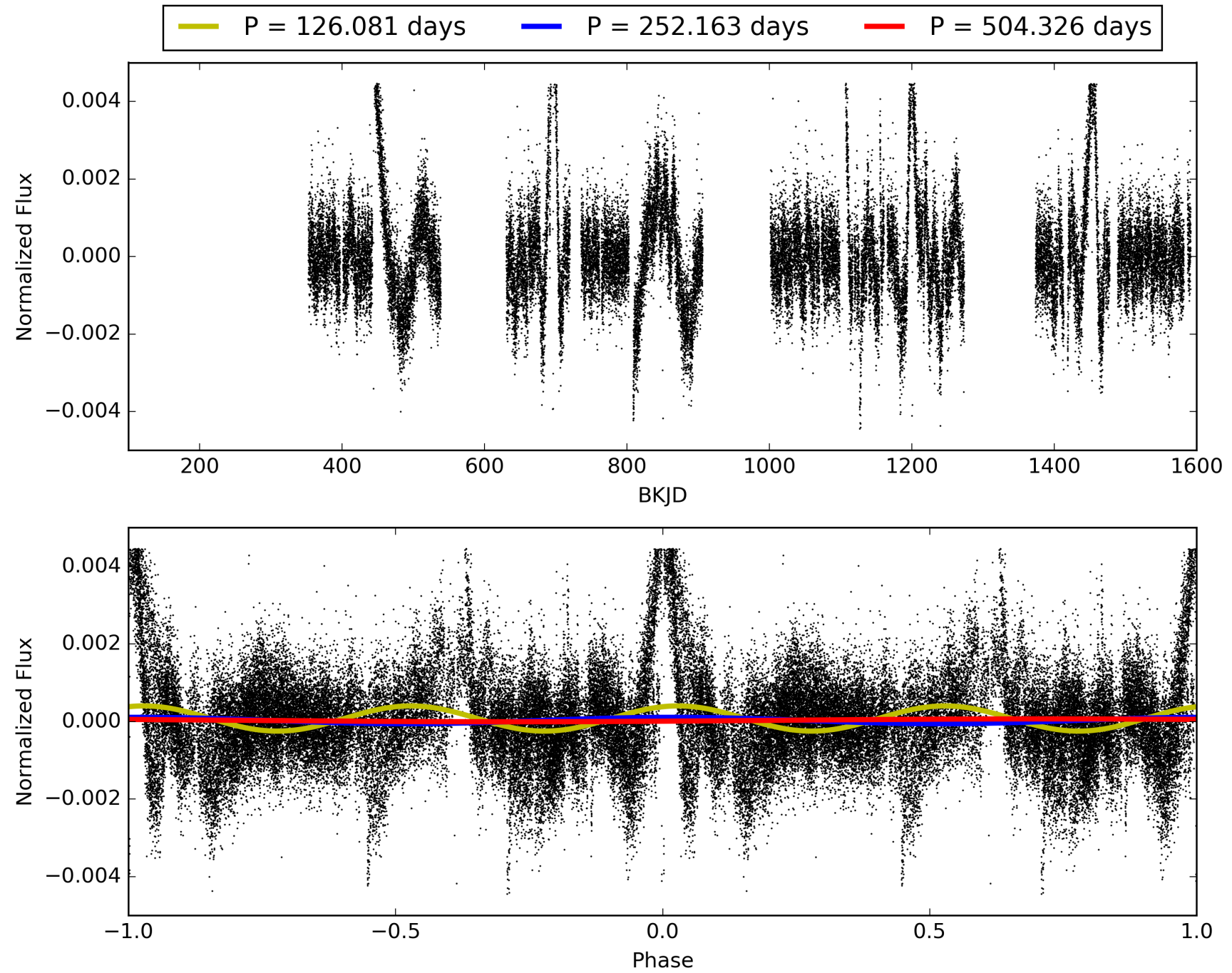
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [94.10σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 0.0%
ModelChiSquareGof-sig: 0.0%
Bootstrap-pfa: 0.00e+00
RollingBand-fgt: 1.00 [4/4]
GhostDiagnostic-chr: 2.305
Centroid-sig: 0.0%
Centroid-so: 0.185 arcsec [14.02σ]
OotOffset-rm: 0.073 arcsec [1.09σ]
KicOffset-rm: 0.052 arcsec [0.74σ]
OotOffset-st: 0/2/0/0 [2]
KicOffset-st: 0/2/0/0 [2]
DiffImageQuality-fgm: 1.00 [2/2]
DiffImageOverlap-fno: 1.00 [2/2]

TCE 004578594-01, PDC Light Curves

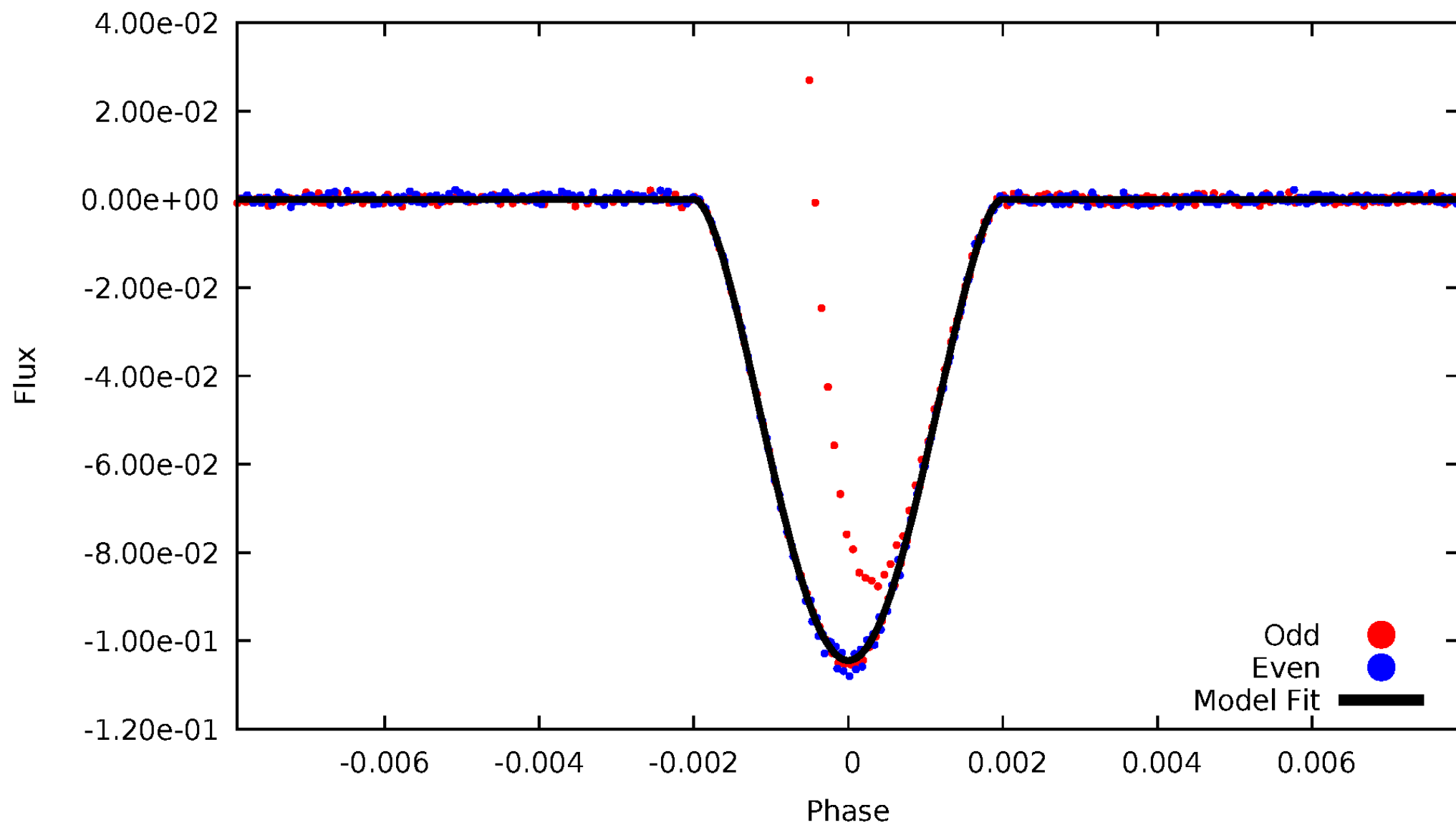


TCE 004578594-01



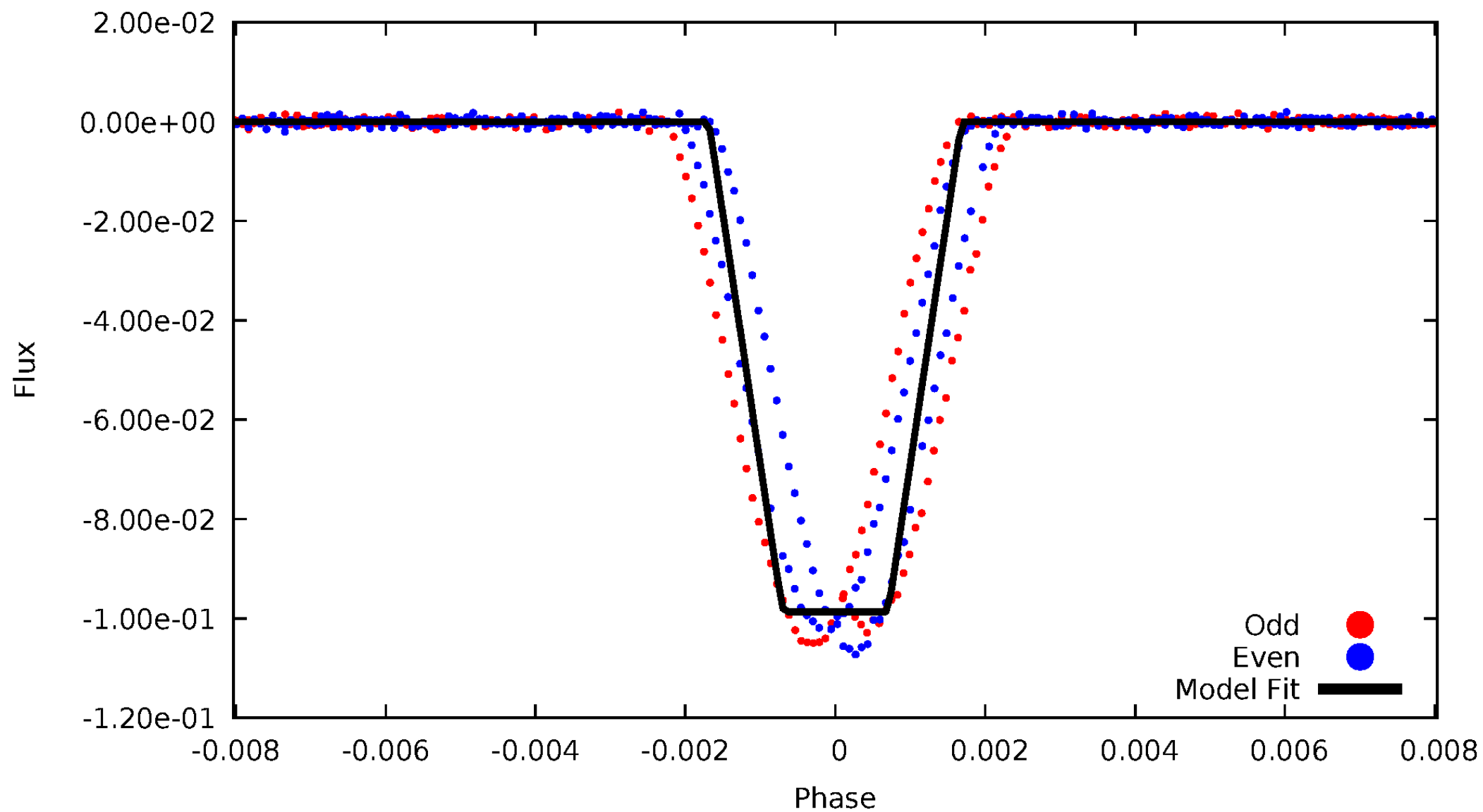
DV Odd/Even

TCE 004578594-01



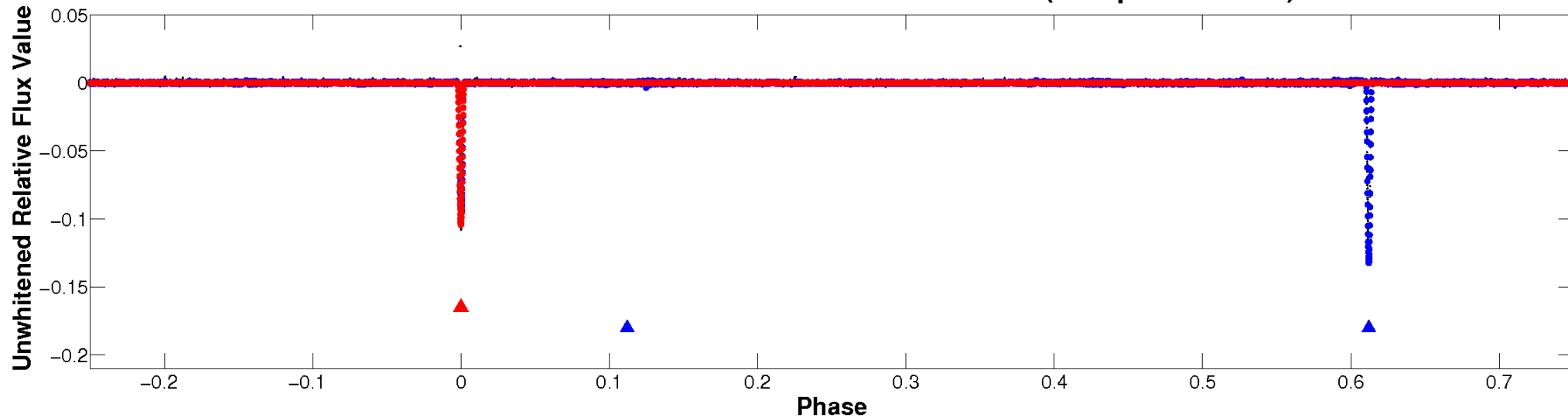
ALT Odd/Even

TCE 004578594-01

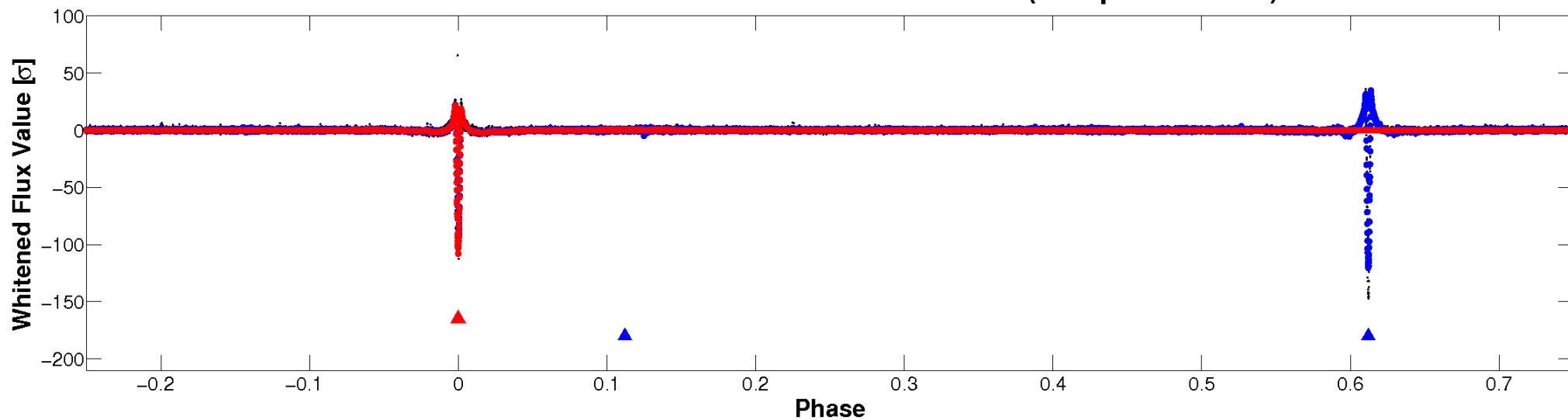


Non-Whitened Vs. Whitened Light Curve

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

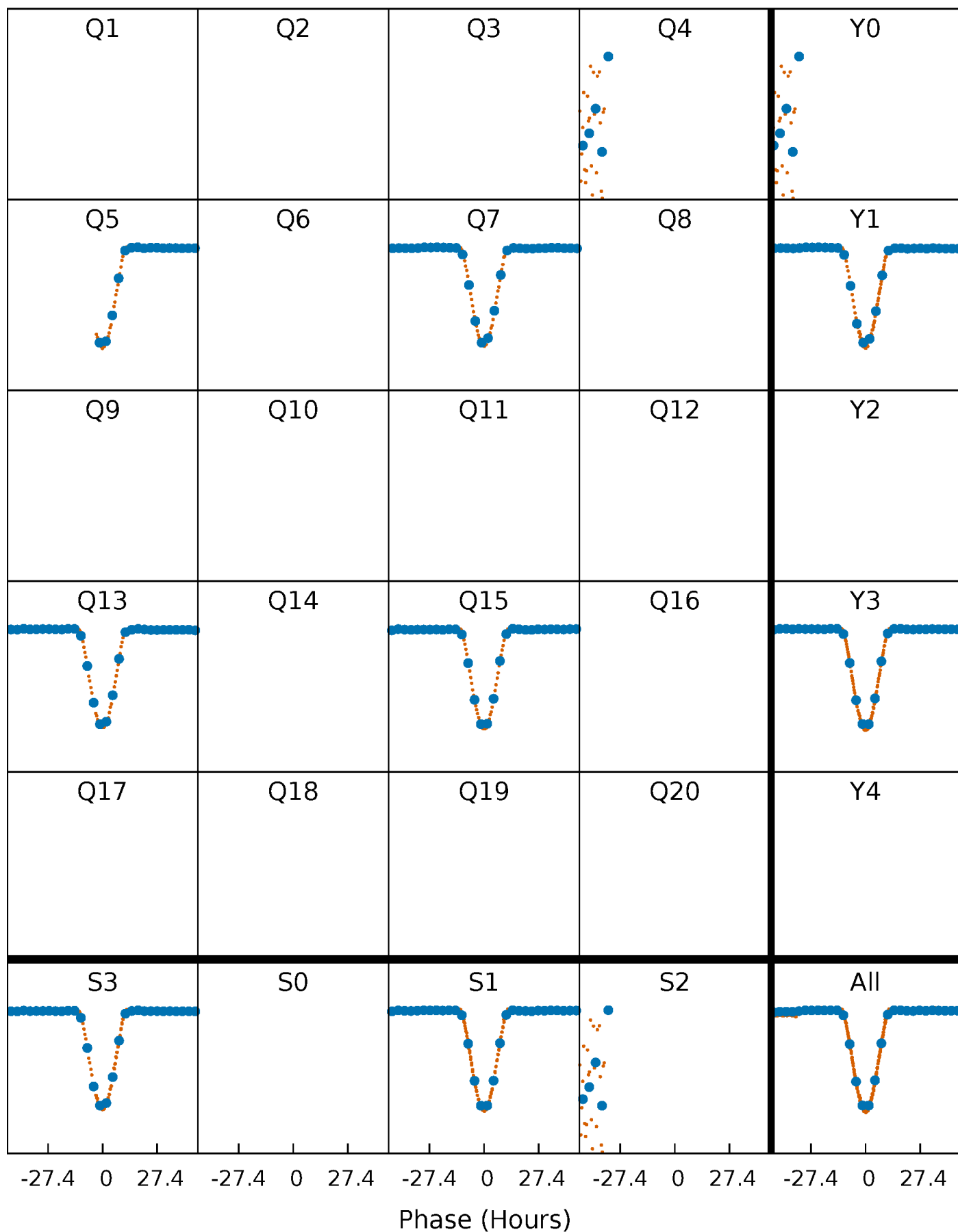


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



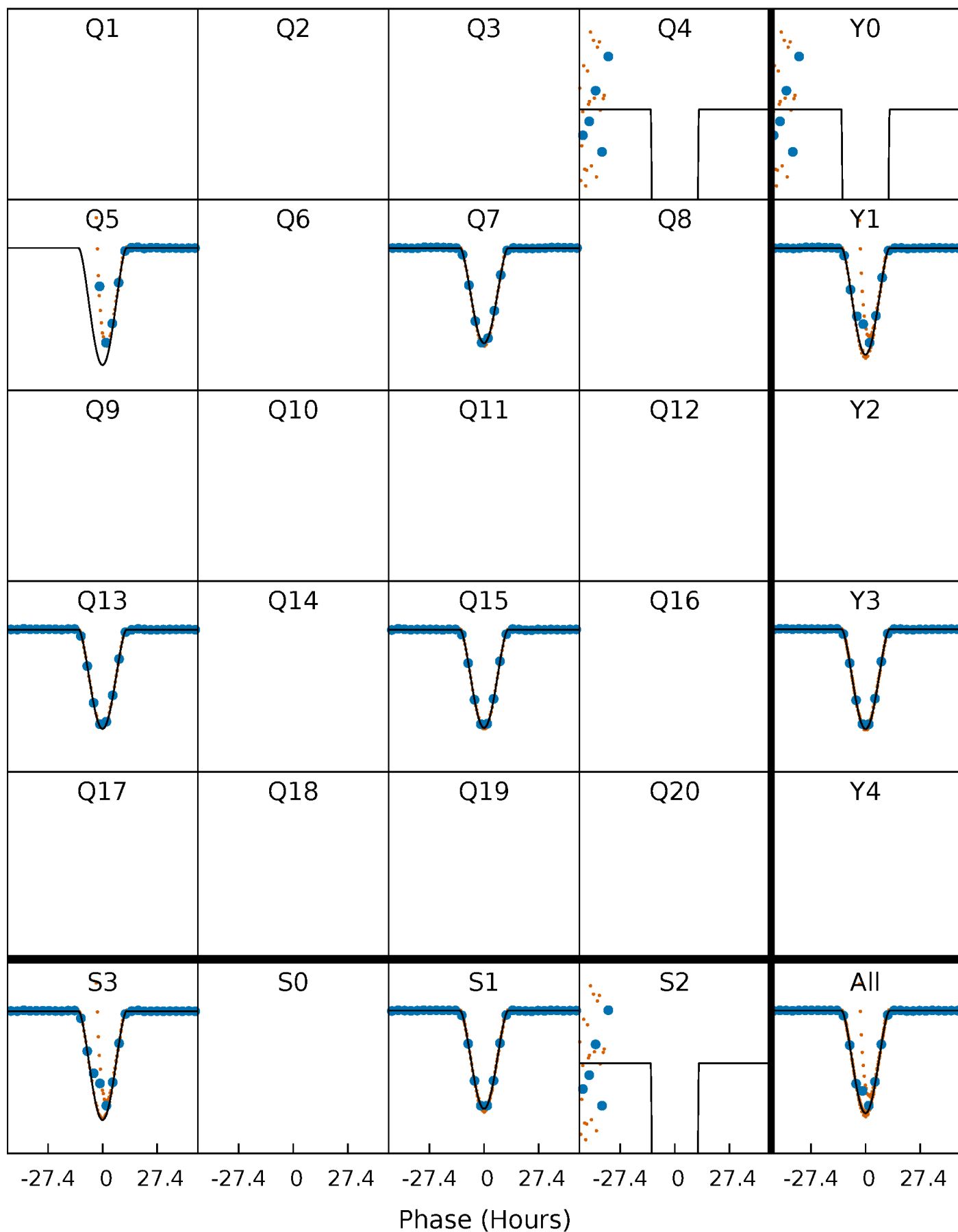
PDC Quarter-Phased Transit Curves

TCE 004578594-01 P=252.162778 Days $T_0=191.475405$ (BKJD)



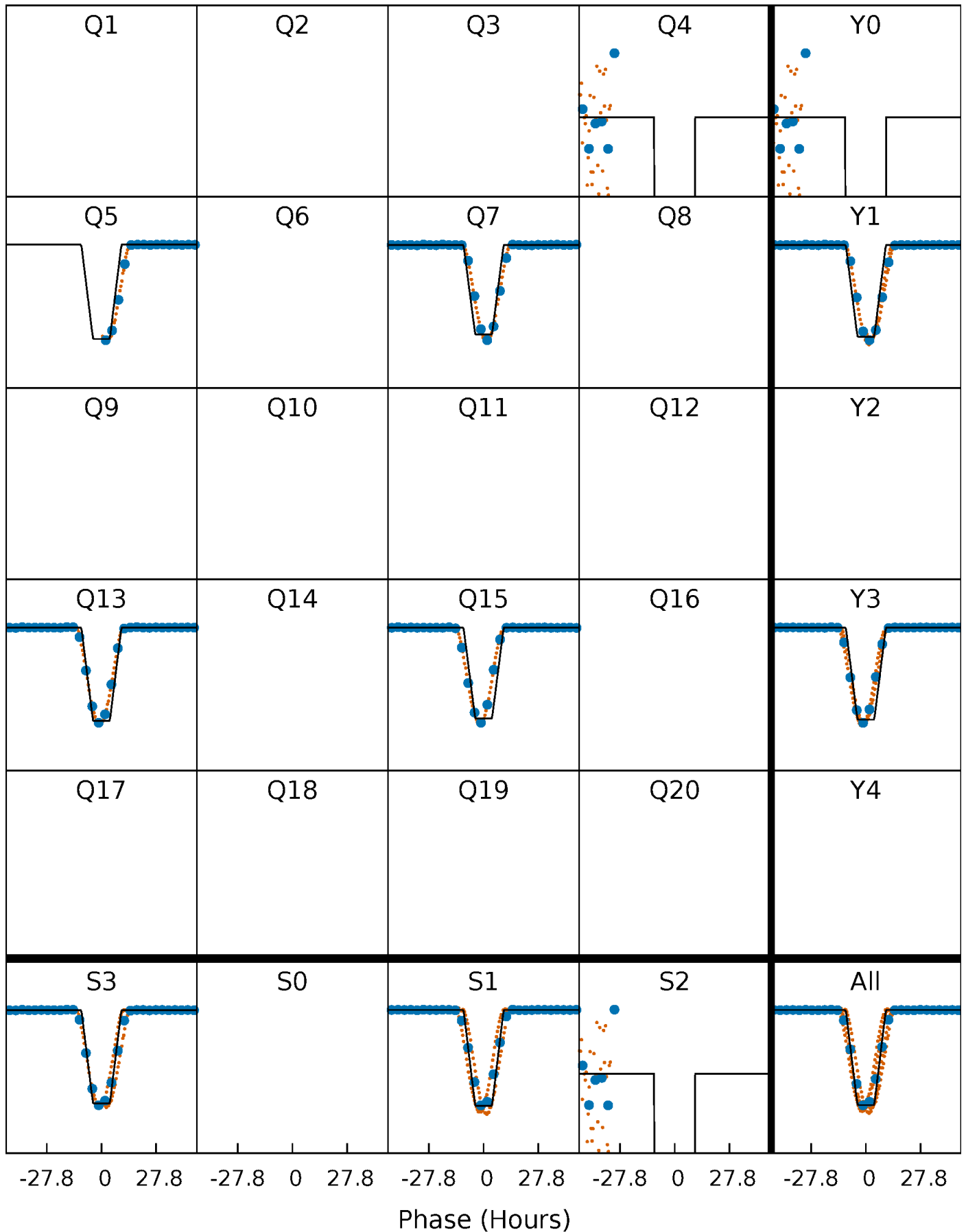
DV Quarter-Phased Transit Curves

TCE 004578594-01 P=252.162778 Days $T_0=191.475405$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

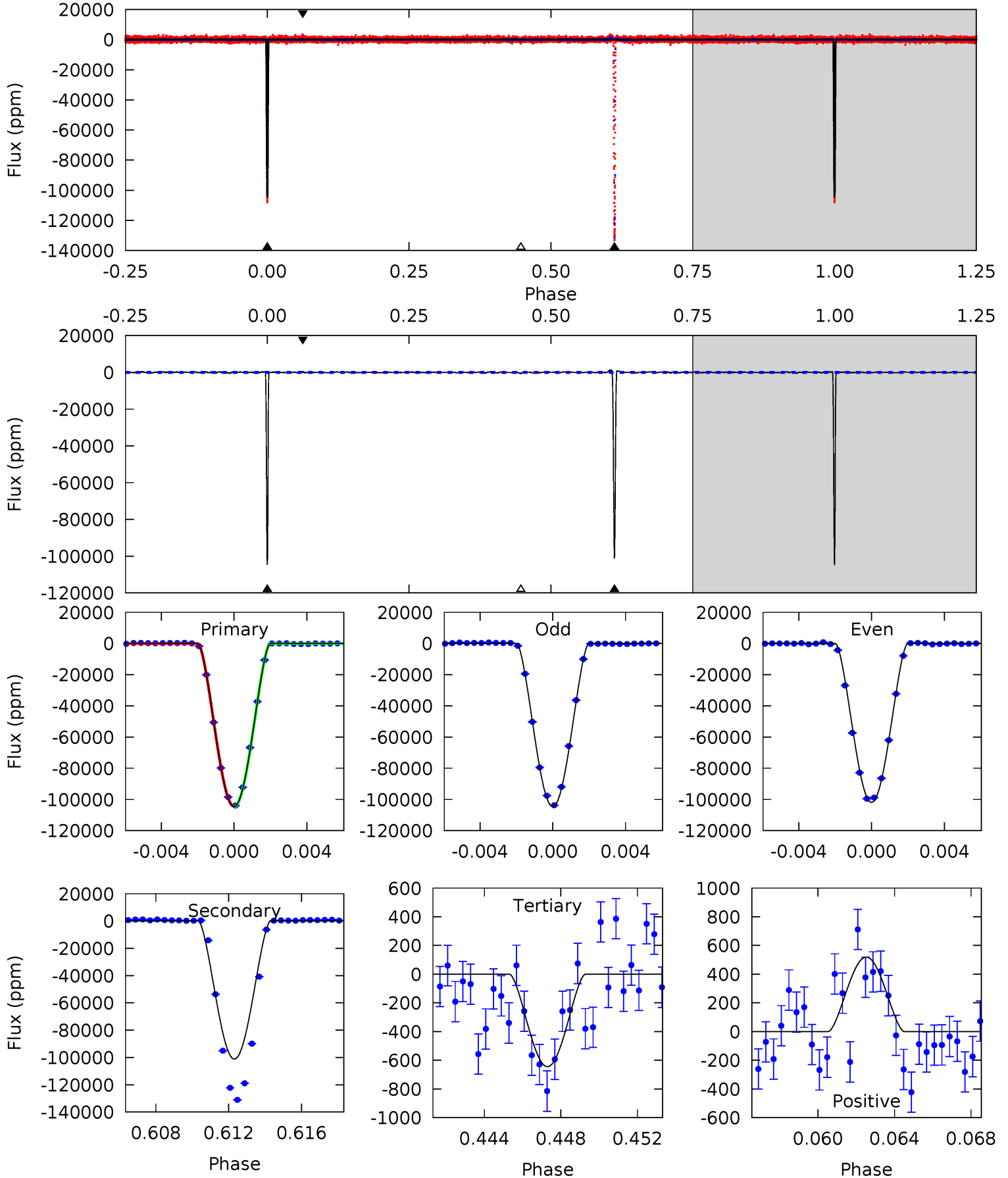
TCE 004578594-01 P=252.211431 Days $T_0=191.314431$ (BKJD)



DV Model-Shift Uniqueness Test

004578594-01, P = 252.162778 Days, E = 191.475405 Days

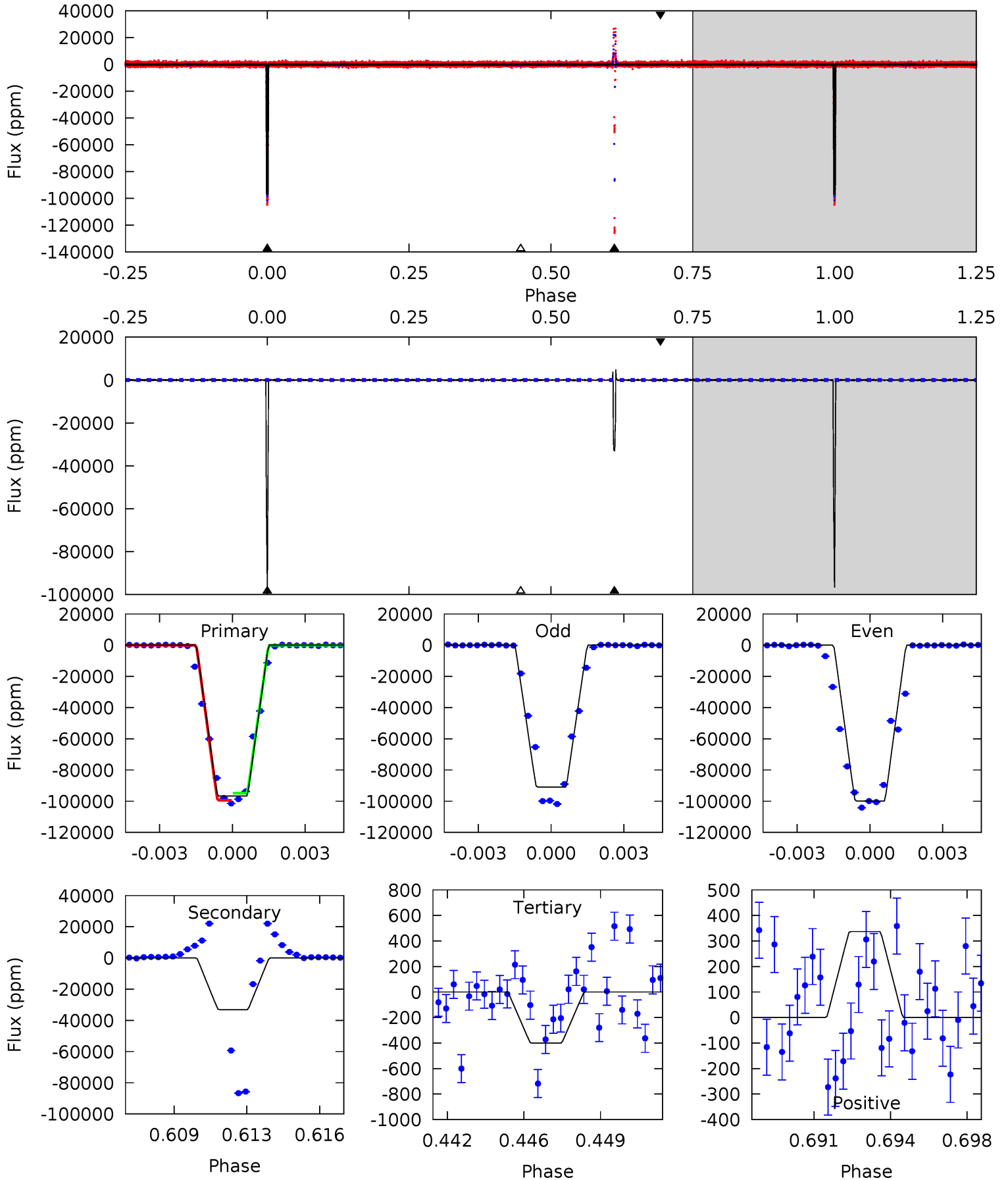
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1768	1711	10.9	8.77	5.20	2.88	2.75	1757	1759	1700	1702	23.7	0.93	0.01	0



Alt Model-Shift Uniqueness Test

004578594-01, P = 252.211431 Days, E = 191.314431 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1010	346.1	4.18	3.52	5.23	2.93	0.99	1006	1007	341.9	342.5	61.7	1.05	0.05	7.57



Stellar Parameters For KIC 004578594

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5432^{+187}_{-187}	$4.608^{+0.037}_{-0.112}$	$-0.320^{+0.300}_{-0.300}$	$0.745^{+0.132}_{-0.061}$	$0.834^{+0.076}_{-0.101}$	$2.838^{+0.458}_{-0.971}$
	+3%/-3%	+1%/-2%	+94%/-94%	+18%/-8%	+9%/-12%	+16%/-34%
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 004578594-01 / KOI 6429.01

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-101217 ± 59	$35.40^{+6.37}_{-5.36}$	344^{+16}_{-15}	4922^{+357}_{-339}	26223^{+10053}_{-7118}
Alt.	-33112 ± 96	$25.87^{+6.31}_{-6.02}$	342^{+17}_{-14}	4404^{+446}_{-359}	14976^{+9805}_{-5221}

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 $A_{obs} \gg 1.0$

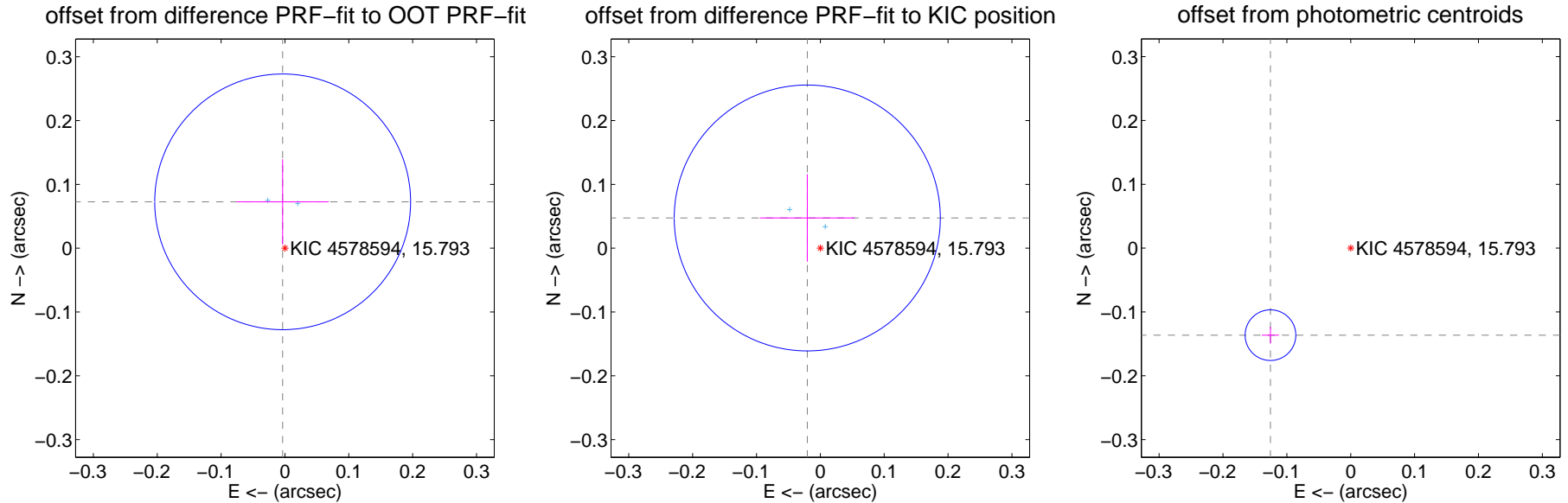
DV Centroid Data

Supplemental centroid analysis for 004578594-01. Kepler magnitude: 15.79. Transit SNR 633.18

There are 2 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.03 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.073 ± 0.067	1.09	0.004 ± 0.072	0.073 ± 0.067
PRF-fit source offset from KIC position	0.052 ± 0.069	0.74	0.020 ± 0.074	0.047 ± 0.069
photometric centroid source offset	0.19 ± 0.01	14.02	0.13 ± 0.01	-0.14 ± 0.01

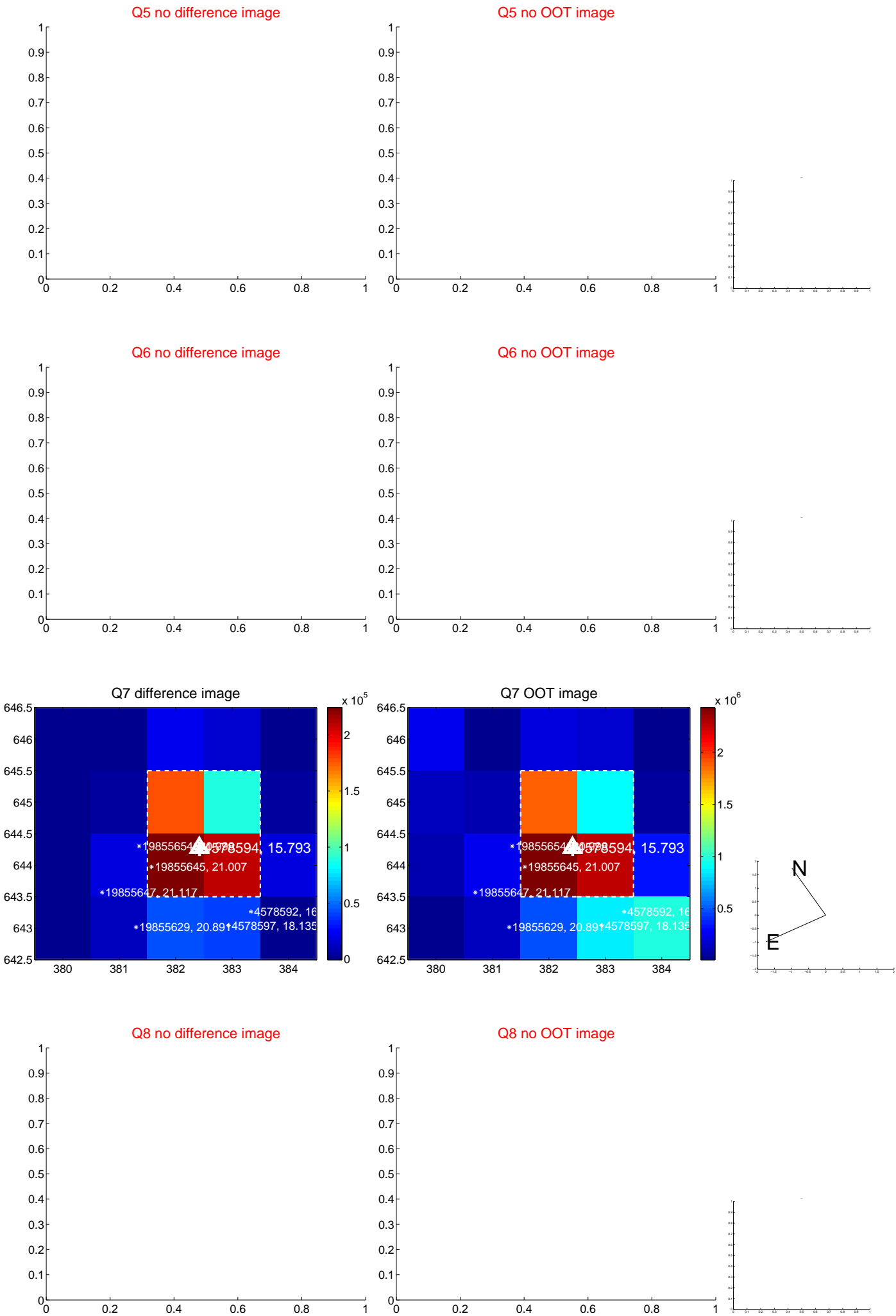


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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



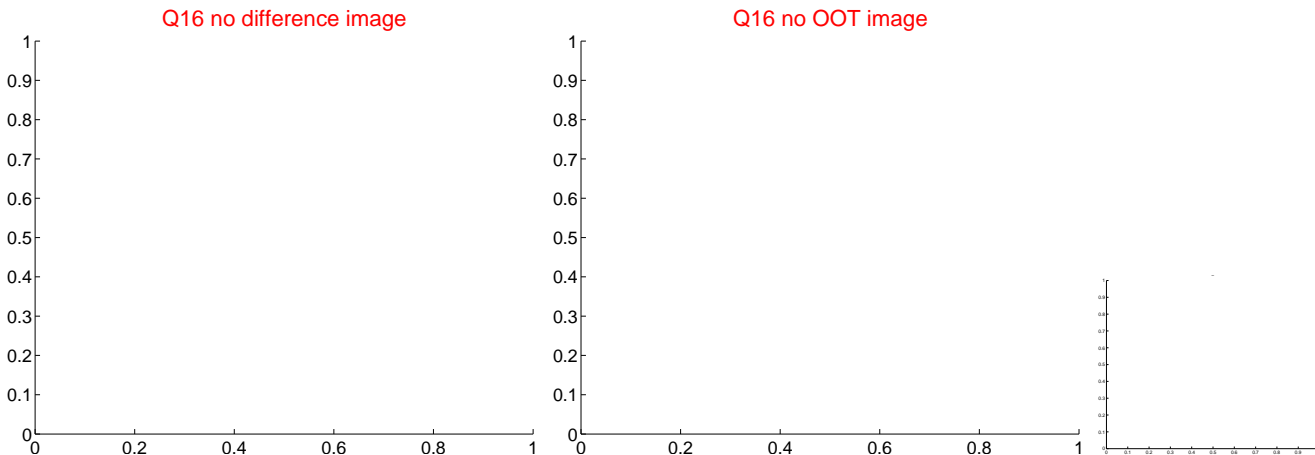
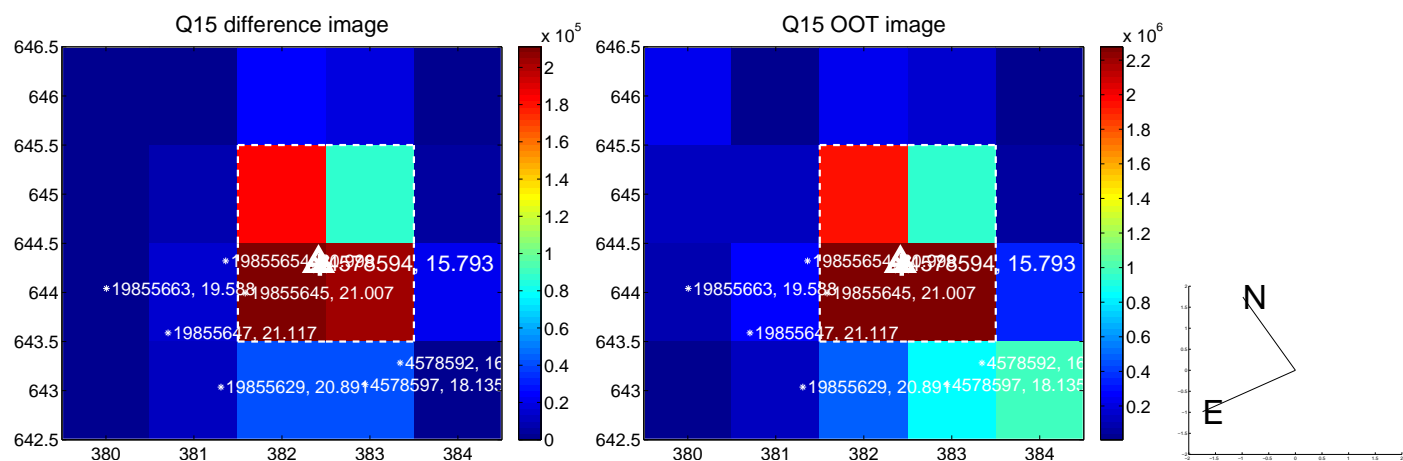
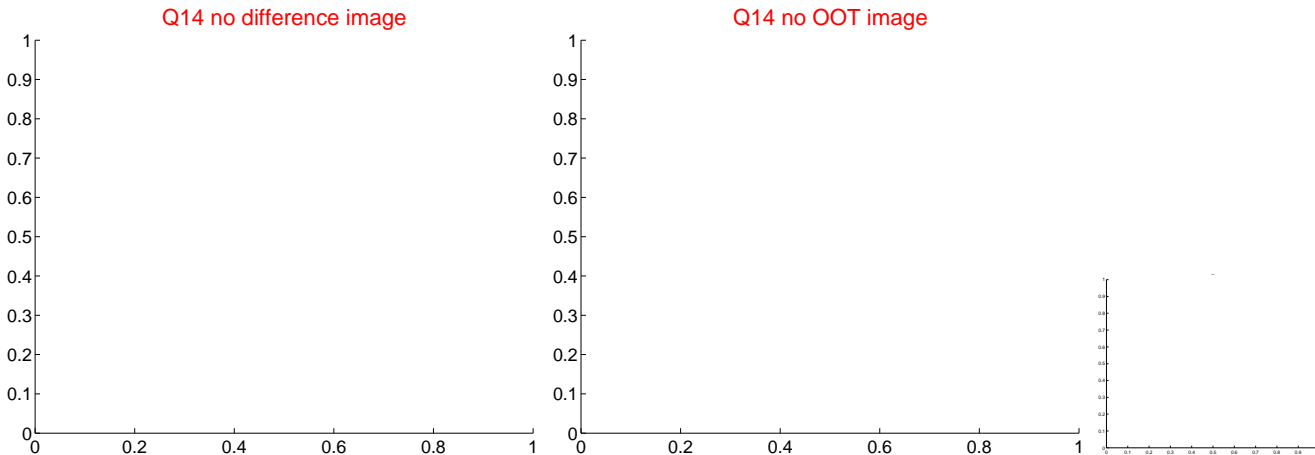
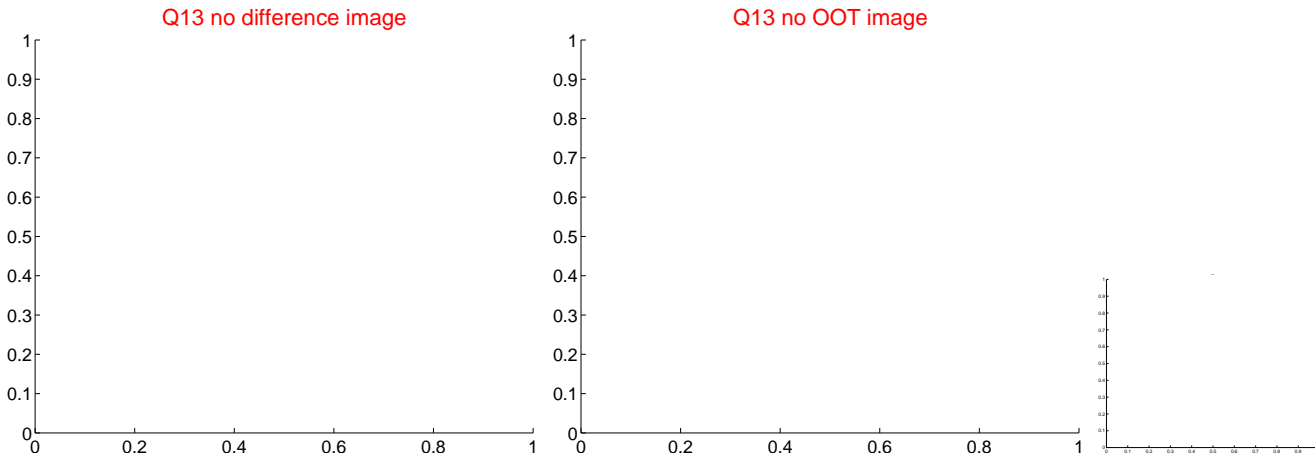
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



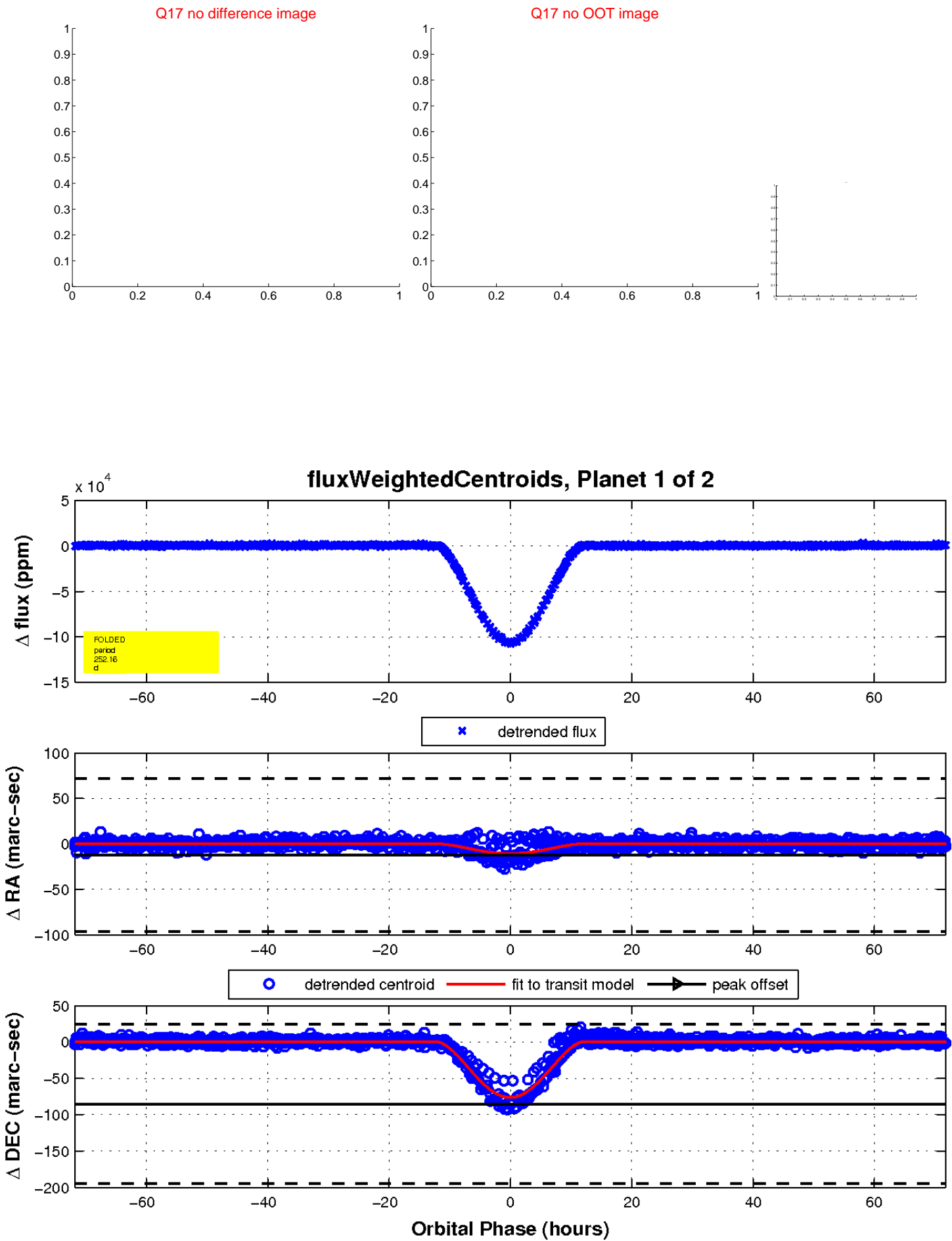
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

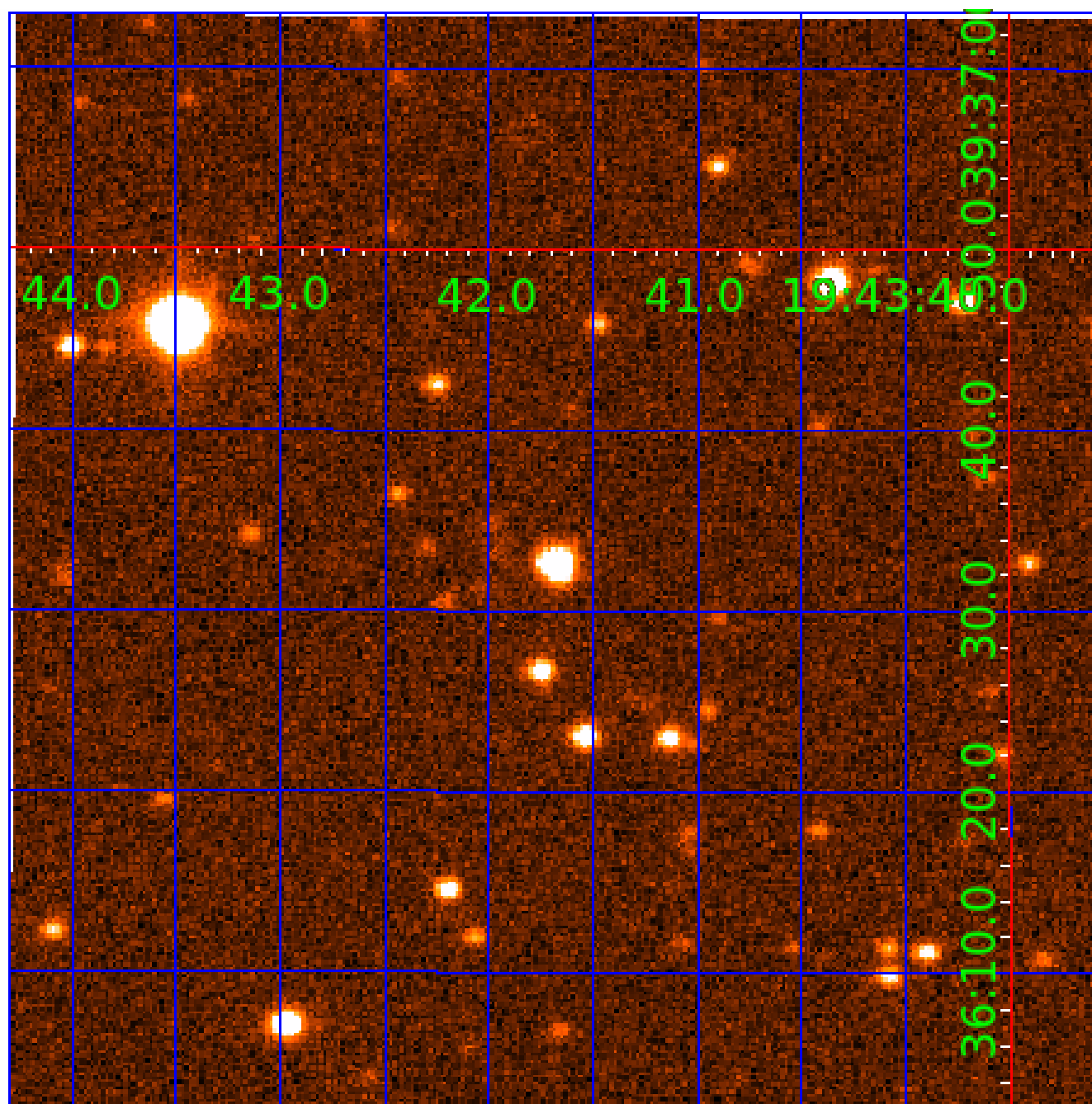


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 004578594

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})
004578594-01	OBS	6429.01	252.162777	191.475405	104436.0	23.932	657.6	633.2	0.74	5432	34.41	0.81
004578594-02	OBS	No	126.080909	219.749615	129065.0	21.479	580.0	690.1	0.74	5432	28.81	2.04

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004578594-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—DEEP_V_SHAPED—HAS_SEC_TCE—CENT_FEW_DIFFS
004578594-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE—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.

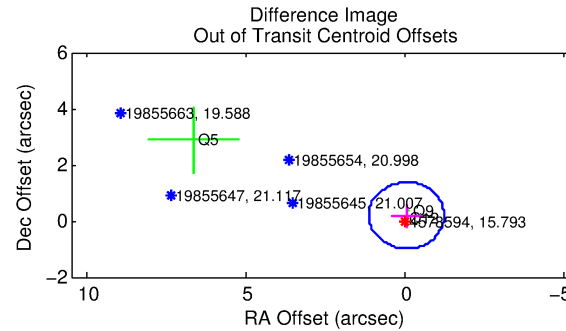
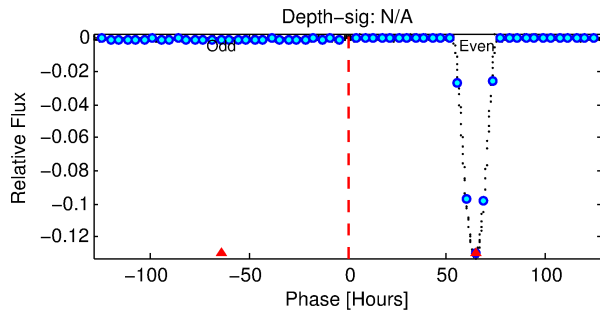
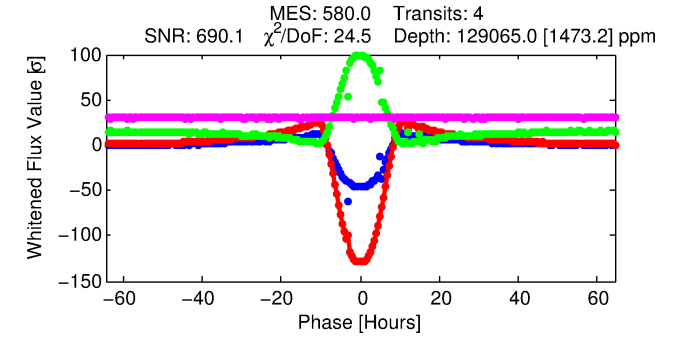
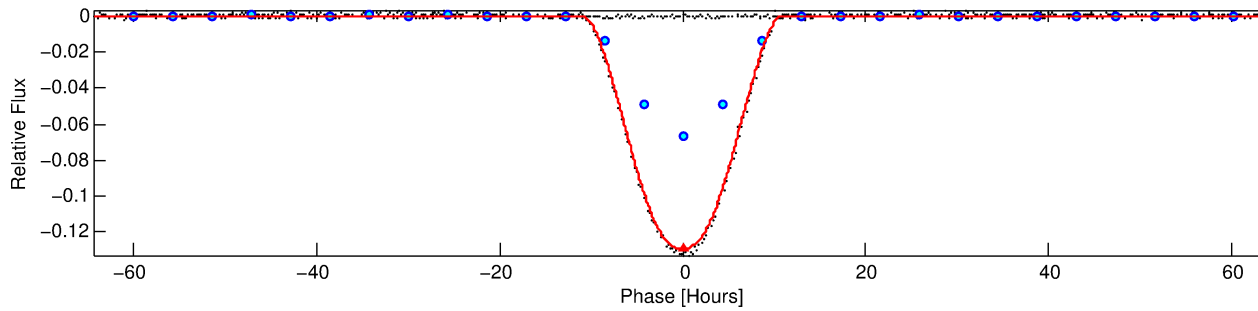
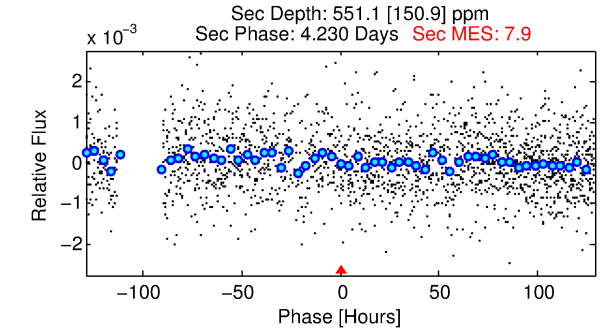
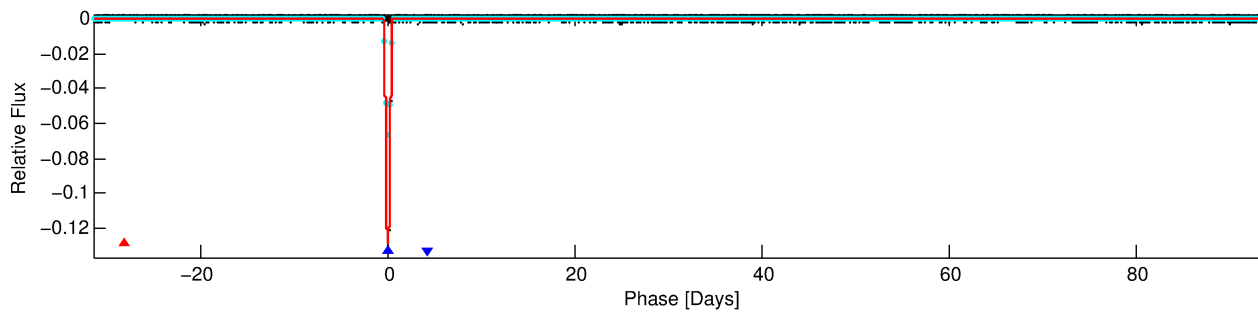
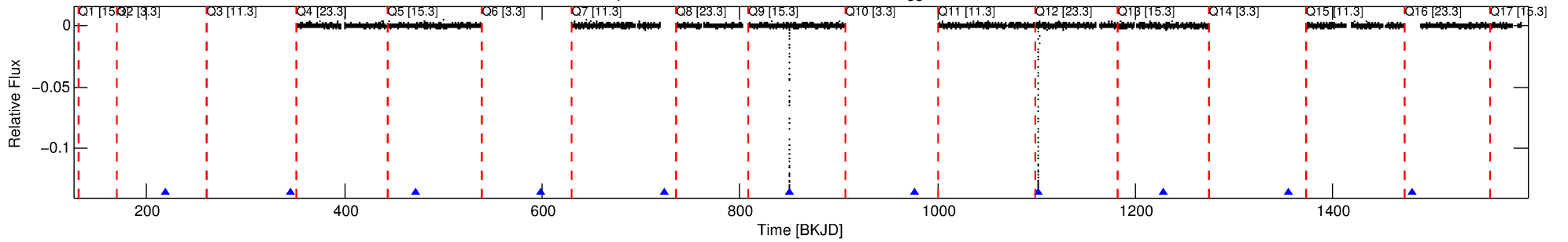
Ephemeris Match Information For 004578594-02

No Significant Match Found

DV One-Page Summary

KIC: 4578594 Candidate: 2 of 2 Period: 126.081 d
KOI: K06429 Corr: No Ephemeris Match

Kp: 15.79 R*: 0.74 Rs Teff: 5432.0 K Logg: 4.61 Fe/H: -0.320



DV Fit Results:

Period = 126.08091 [0.00057] d
Epoch = 219.7496 [0.0033] BKJD
Rp/R* = 0.3544 [0.0043]
a/R* = 53.40 [0.49]
b = 0.65 [0.01]
Seff = 2.04 [0.51]
Teq = 305 [19] K
Rp = 28.81 [5.12] Re
a = 0.4609 [0.0673] AU
Ag = 77.59 [26.77] [2.86σ]
Teffp = 1398 [107] K [10.02σ]

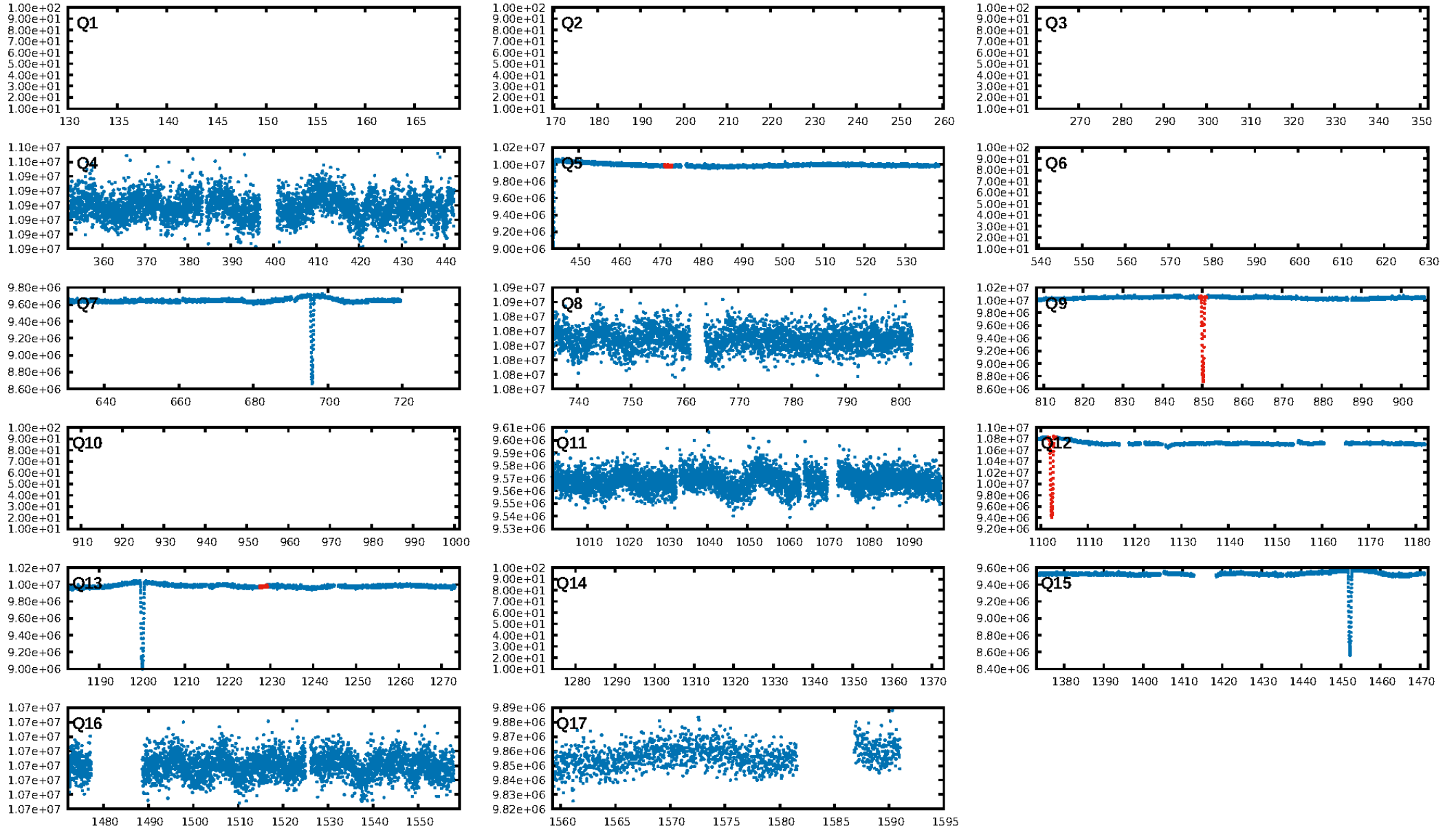
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [94.10σ]
ModelChiSquare2-sig: 0.0%
ModelChiSquareGof-sig: 0.0%
Bootstrap-pfa: 0.00e+00
RollingBand-fgt: 1.00 [4/4]
GhostDiagnostic-chr: 7.142
Centroid-sig: 0.0%
Centroid-so: 0.462 arcsec [45.09σ]
OotOffset-rm: 0.194 arcsec [0.49σ]
OotOffset-st: 0/0/1/2 [3]
KicOffset-rm: 0.058 arcsec [0.05σ]
KicOffset-st: 0/0/1/2 [3]
DiffImageQuality-fgm: 0.67 [2/3]
DiffImageOverlap-fno: 1.00 [3/3]

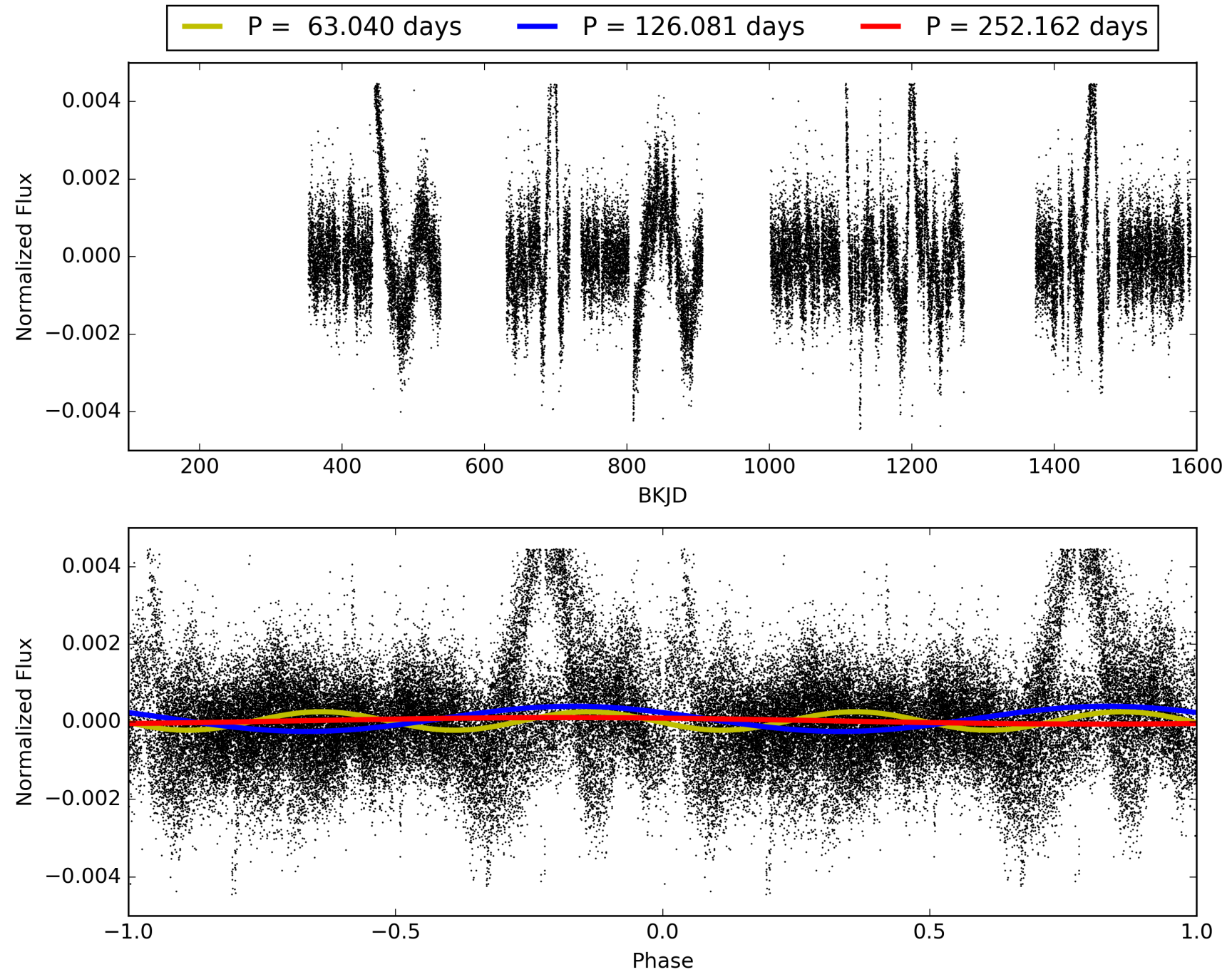
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 04:49:17 Z

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

TCE 004578594-02, PDC Light Curves

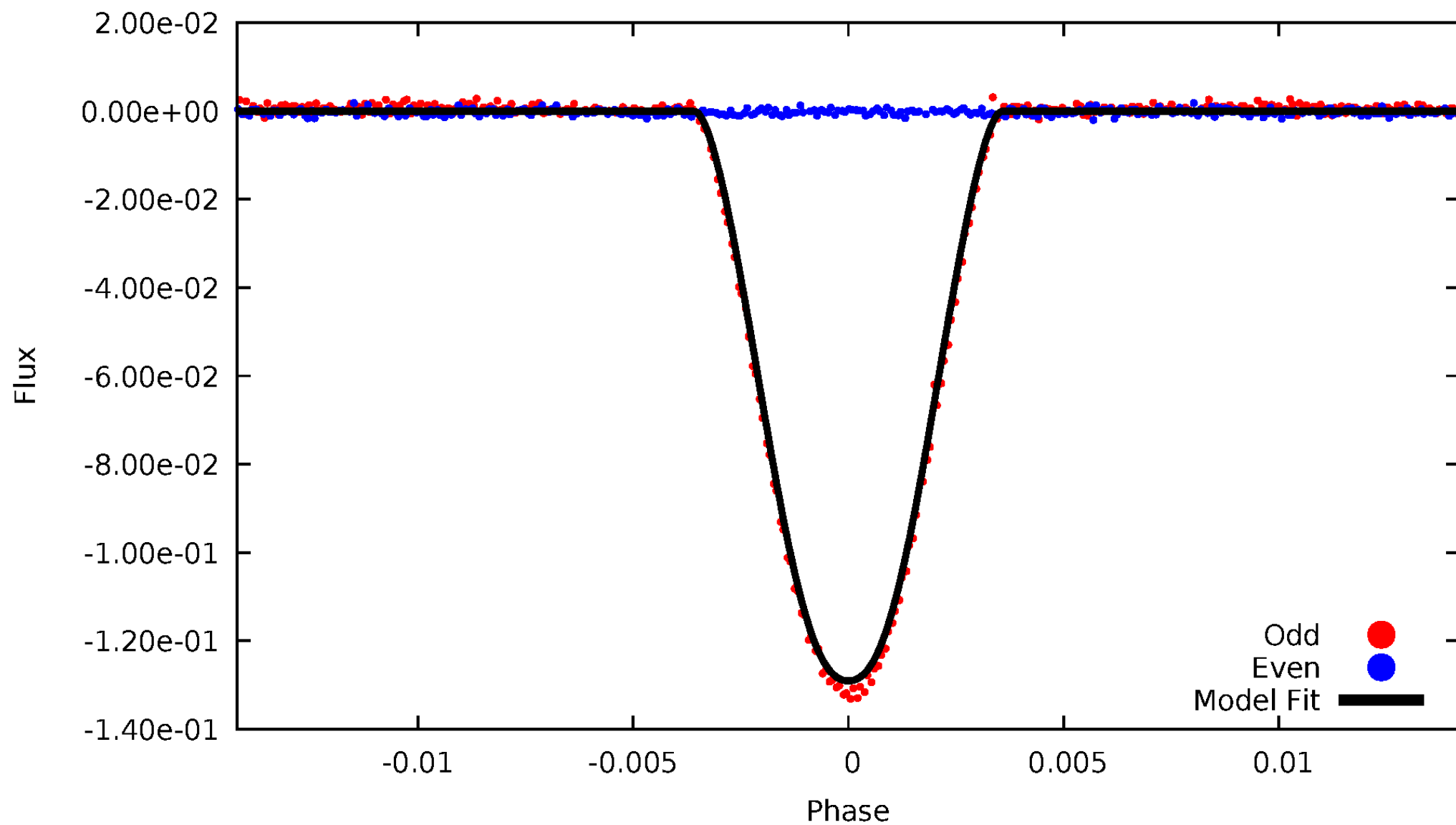


TCE 004578594-02



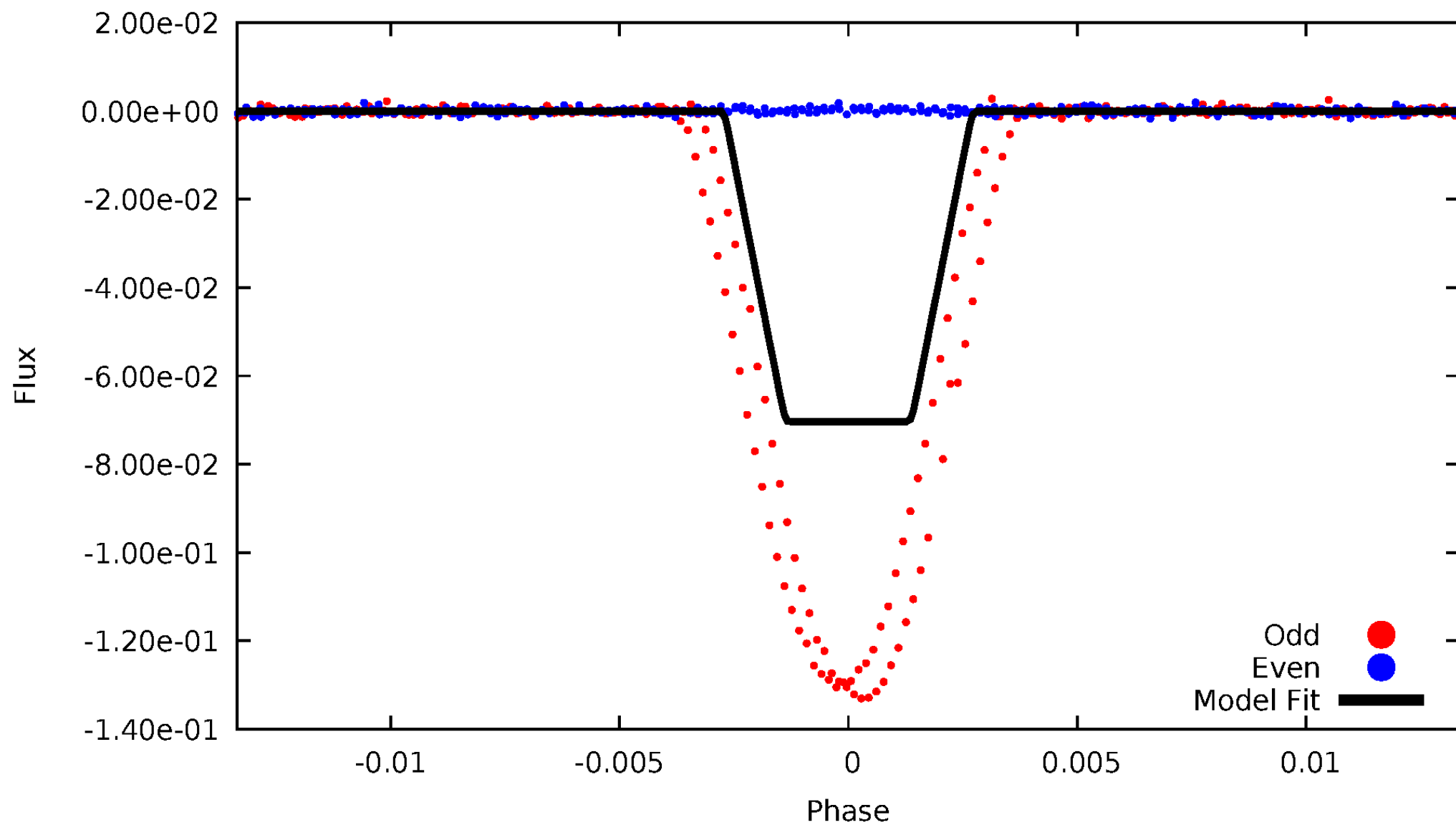
DV Odd/Even

TCE 004578594-02



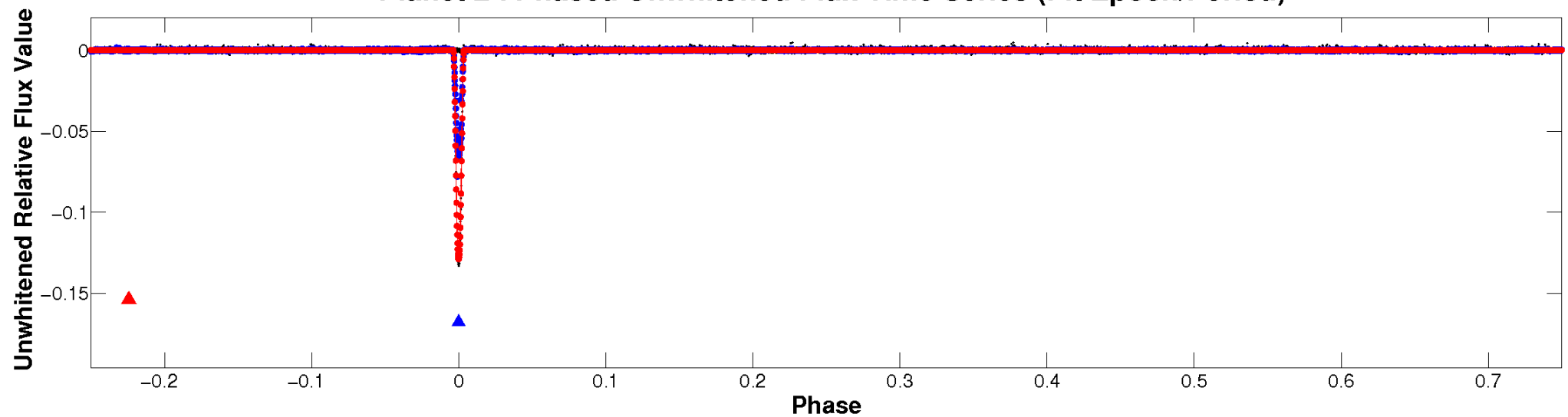
ALT Odd/Even

TCE 004578594-02

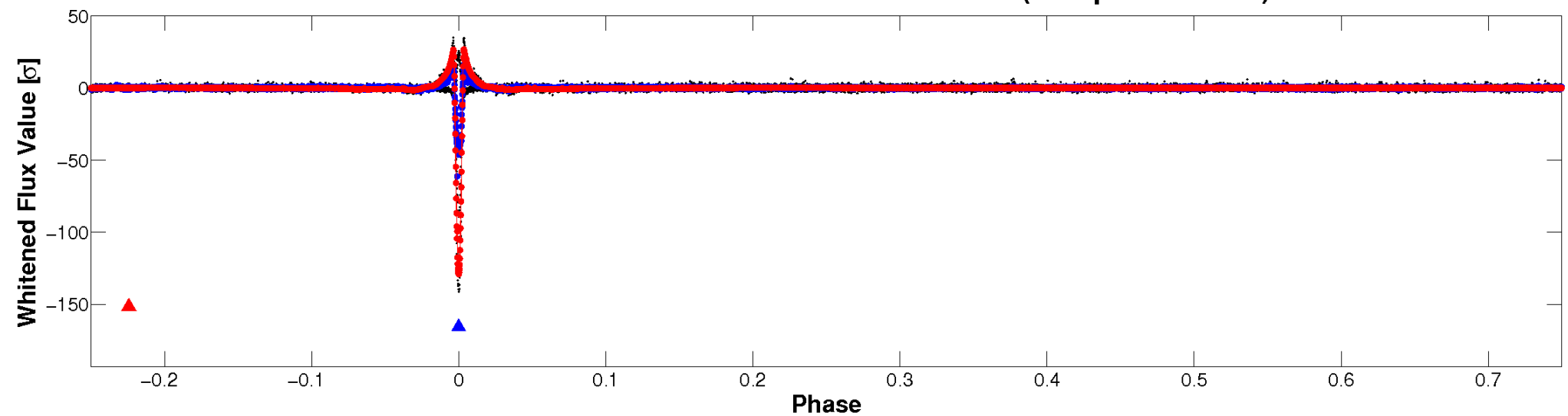


Non-Whitened Vs. Whitened Light Curve

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

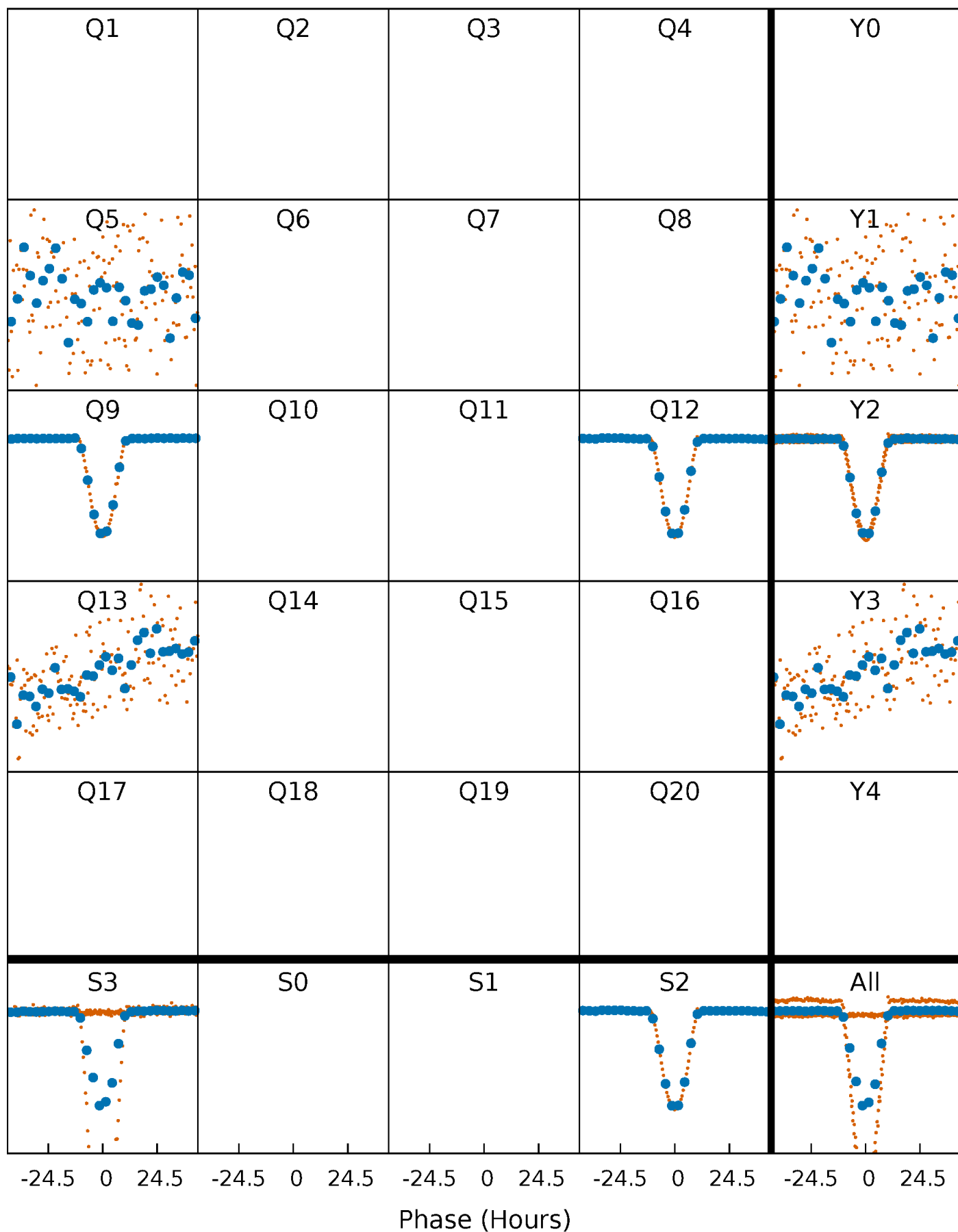


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



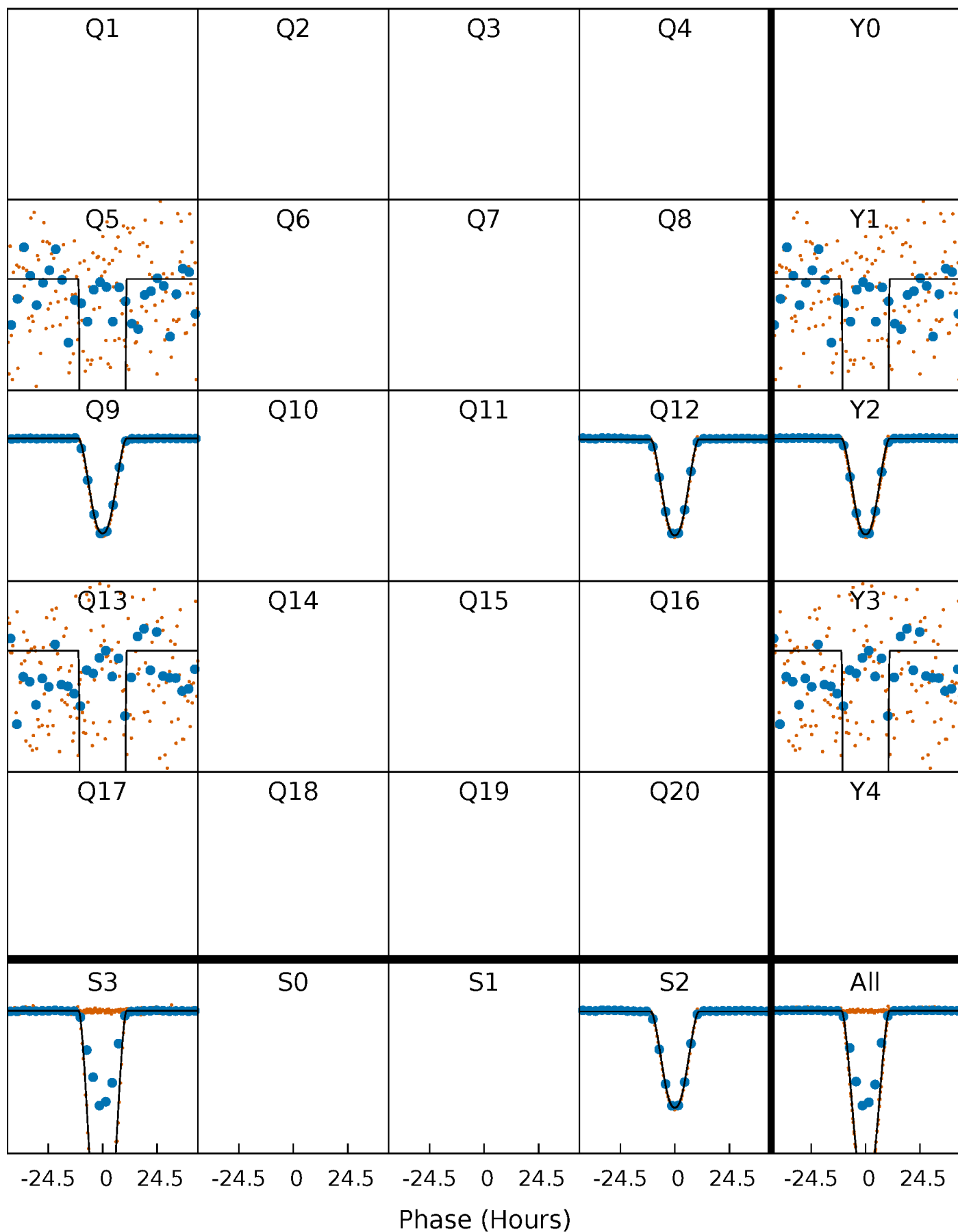
PDC Quarter-Phased Transit Curves

TCE 004578594-02 P=126.080909 Days $T_0=219.749615$ (BKJD)



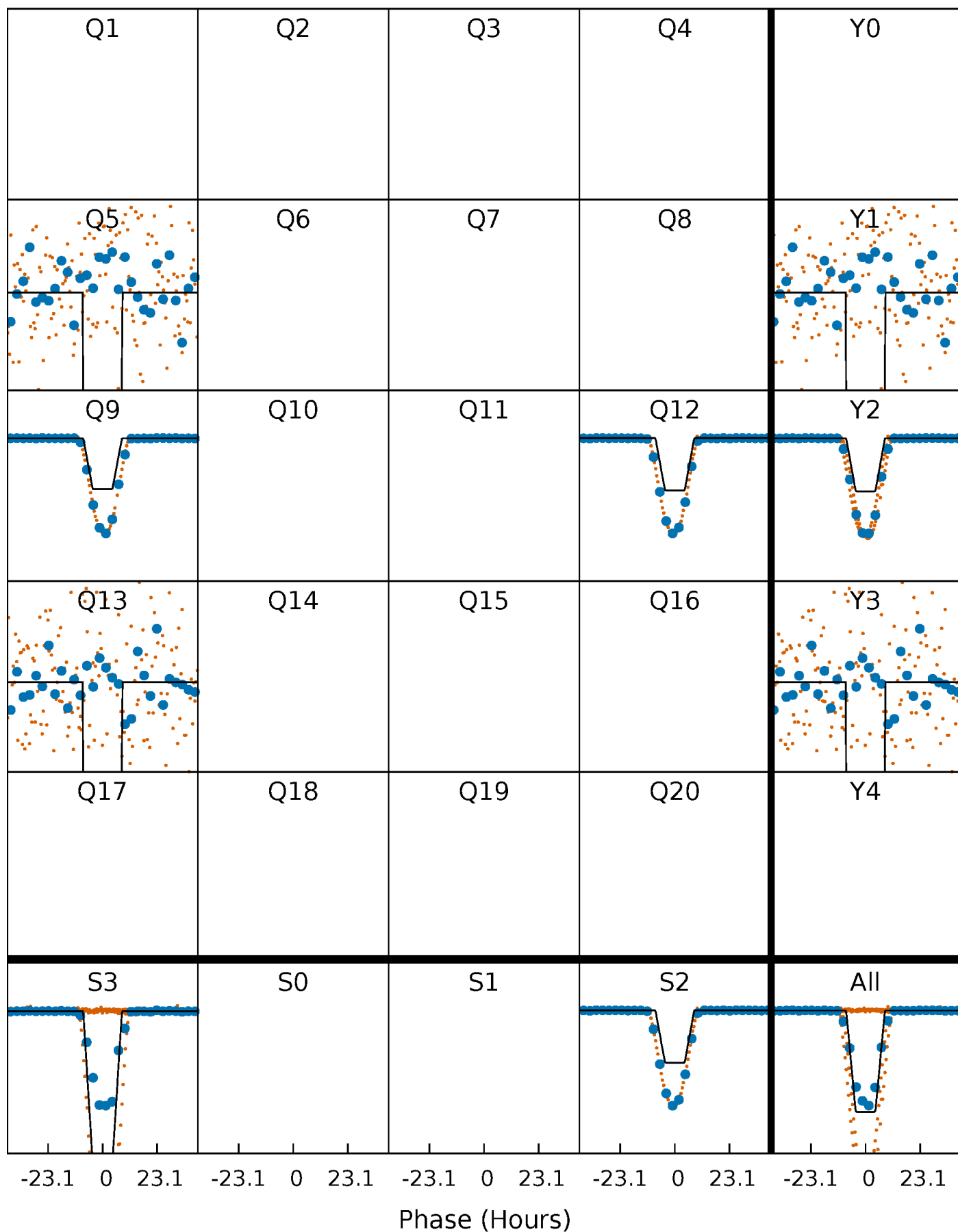
DV Quarter-Phased Transit Curves

TCE 004578594-02 P=126.080909 Days $T_0=219.749615$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

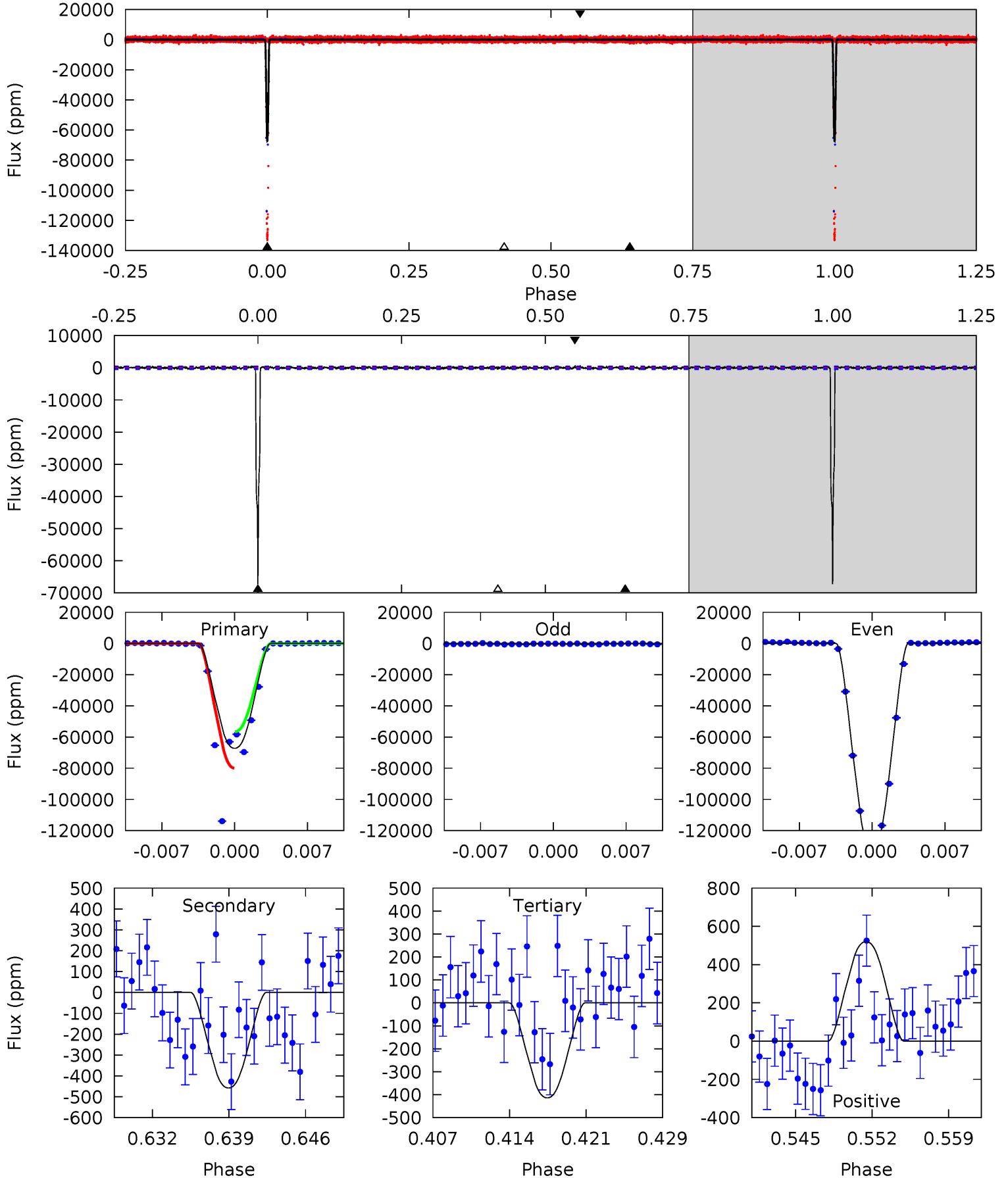
TCE 004578594-02 P=126.109121 Days $T_0=219.579153$ (BKJD)



DV Model-Shift Uniqueness Test

004578594-02, P = 126.080909 Days, E = 219.749615 Days

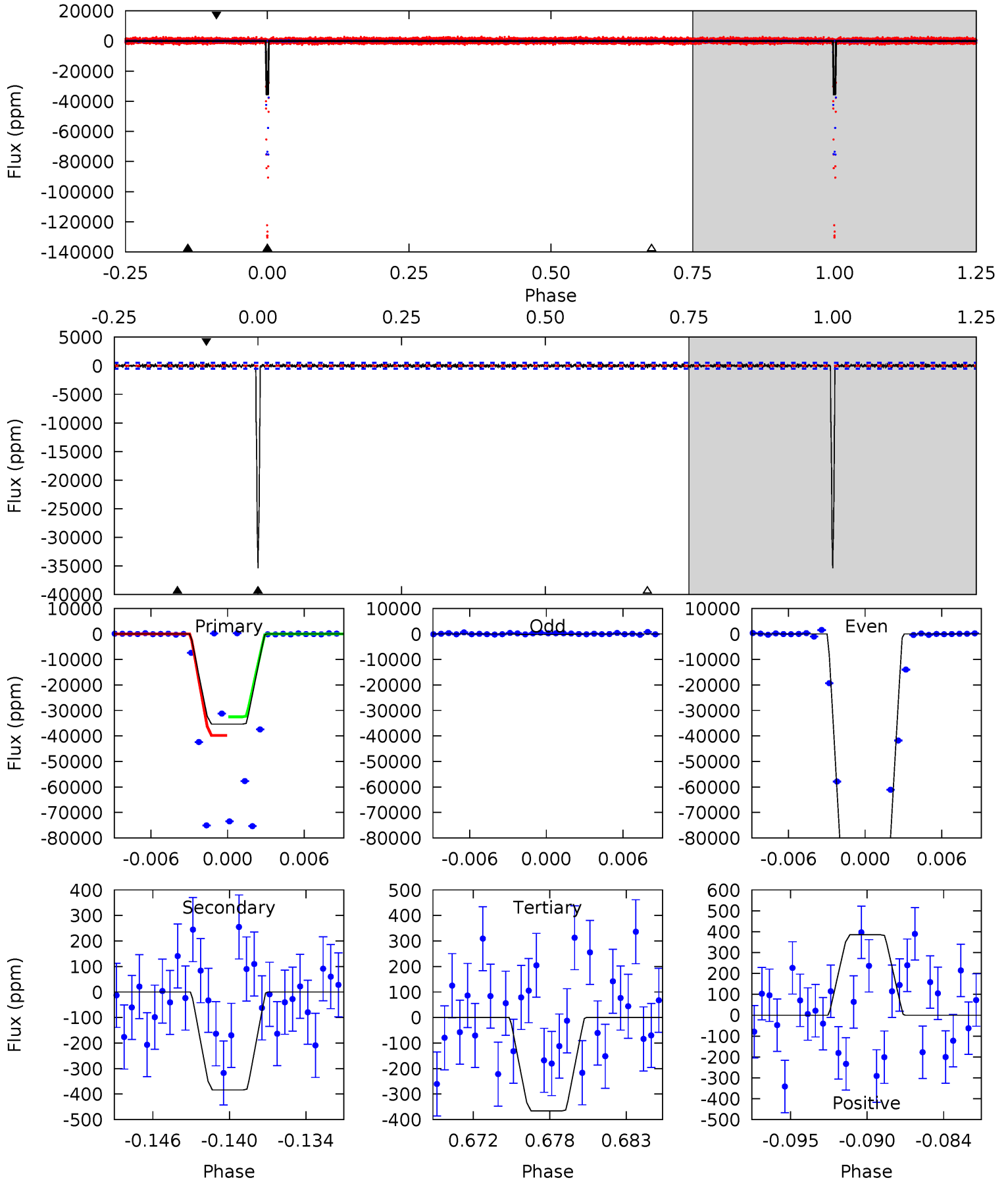
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
812.8	5.54	5.00	6.29	5.09	2.68	1.57	807.8	806.5	0.53	-0.75	1208	1.01	0.01	137.3



Alt Model-Shift Uniqueness Test

004578594-02, P = 126.109121 Days, E = 219.579153 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
349.9	3.79	3.62	3.81	5.14	2.77	1.05	346.2	346.1	0.18	-0.01	781.0	1.01	0.01	0



Stellar Parameters For KIC 004578594

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5432^{+187}_{-187}	$4.608^{+0.037}_{-0.112}$	$-0.320^{+0.300}_{-0.300}$	$0.745^{+0.132}_{-0.061}$	$0.834^{+0.076}_{-0.101}$	$2.838^{+0.458}_{-0.971}$
	+3%/-3%	+1%/-2%	+94%/-94%	+18%/-8%	+9%/-12%	+16%/-34%
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 004578594-02 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-458 ± 83	$29.39^{+2.48}_{-1.85}$	433^{+19}_{-20}	2262^{+62}_{-64}	61^{+13}_{-13}
Alt.	-384 ± 101	$21.89^{+2.37}_{-1.30}$	433^{+23}_{-20}	2369^{+79}_{-91}	90^{+26}_{-27}

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

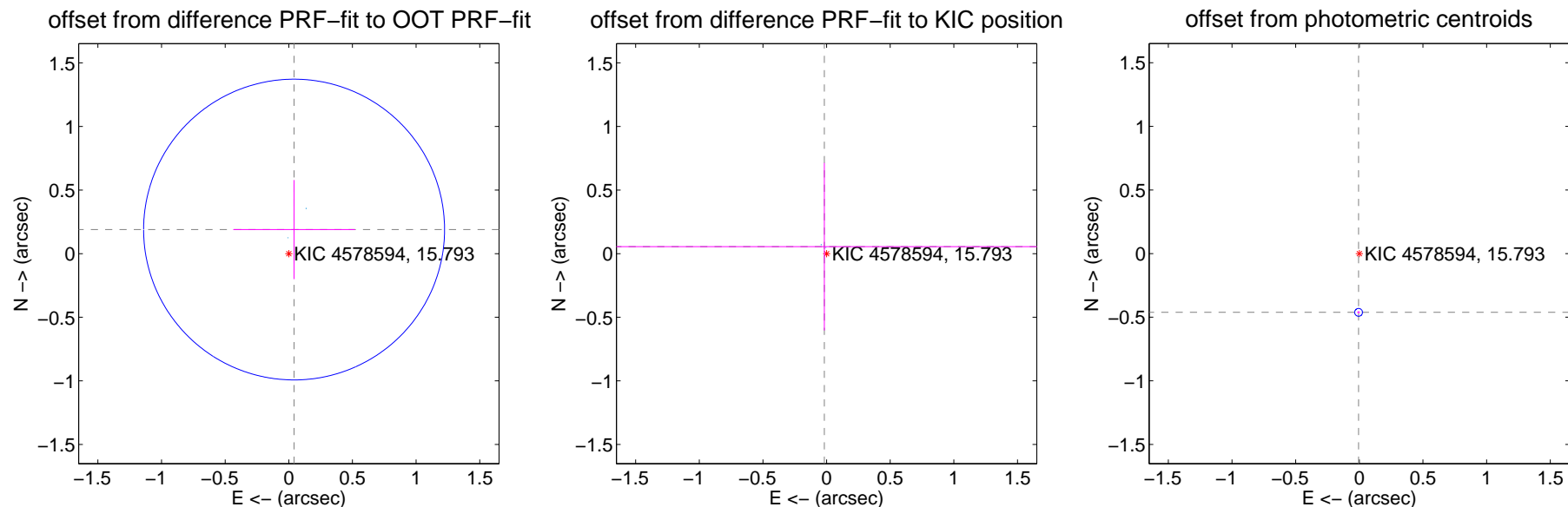
DV Centroid Data

Supplemental centroid analysis for 004578594-02. Kepler magnitude: 15.79. Transit SNR 690.07

There are 2 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.08 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.194 ± 0.394	0.49	-0.041 ± 0.478	0.189 ± 0.390
PRF-fit source offset from KIC position	0.058 ± 1.174	0.05	0.018 ± 1.781	0.055 ± 0.659
photometric centroid source offset	0.46 ± 0.01	45.09	0.01 ± 0.01	-0.46 ± 0.01

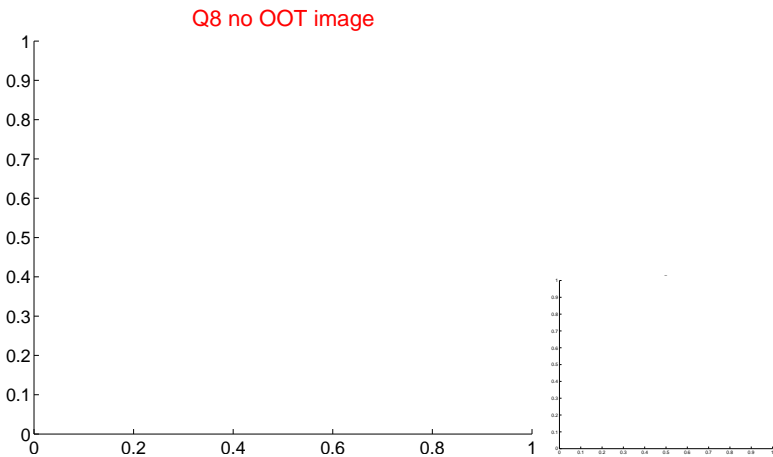
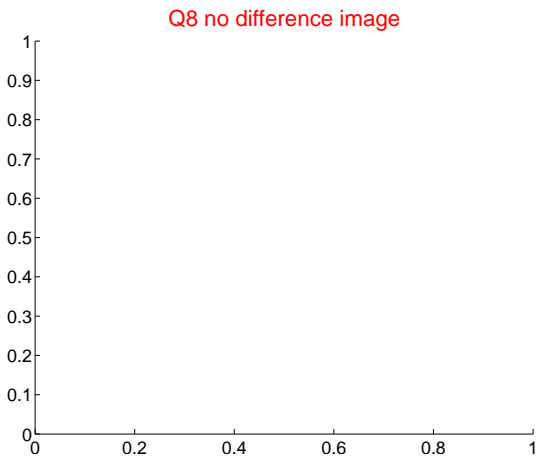
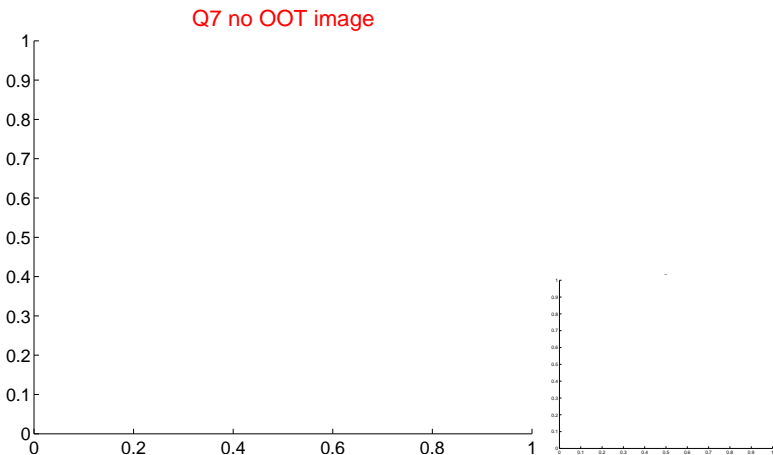
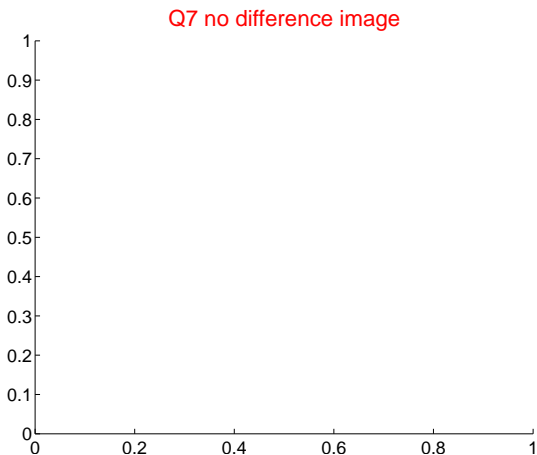
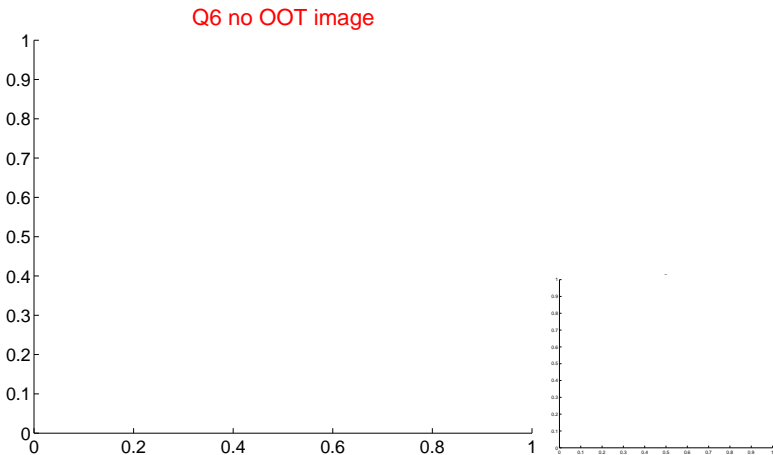
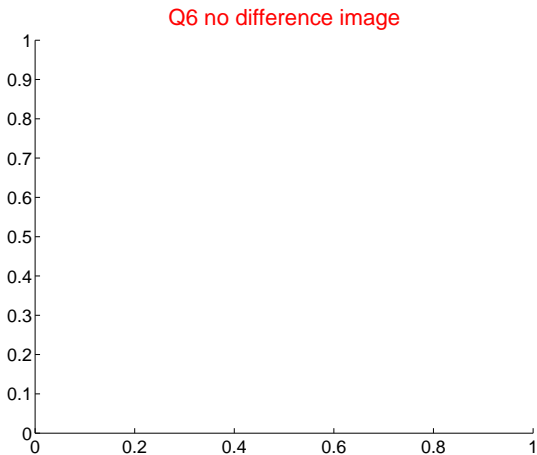
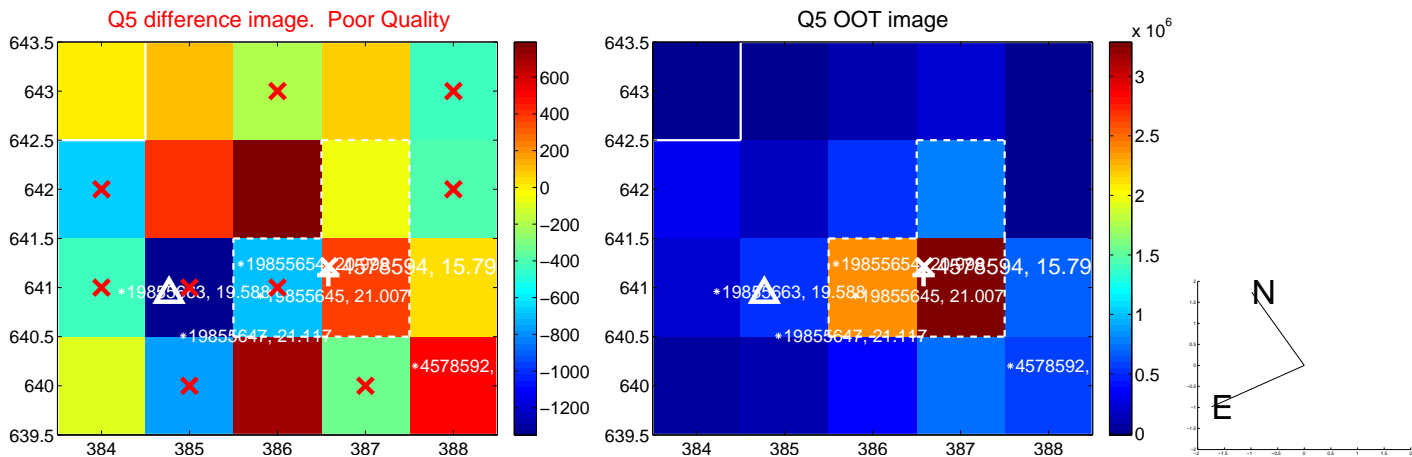


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

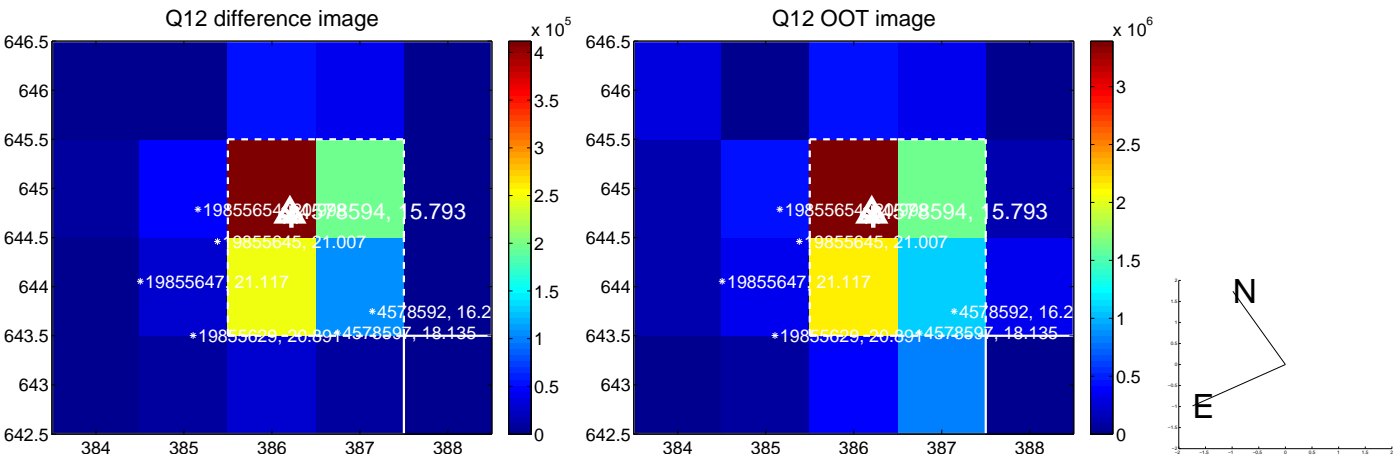
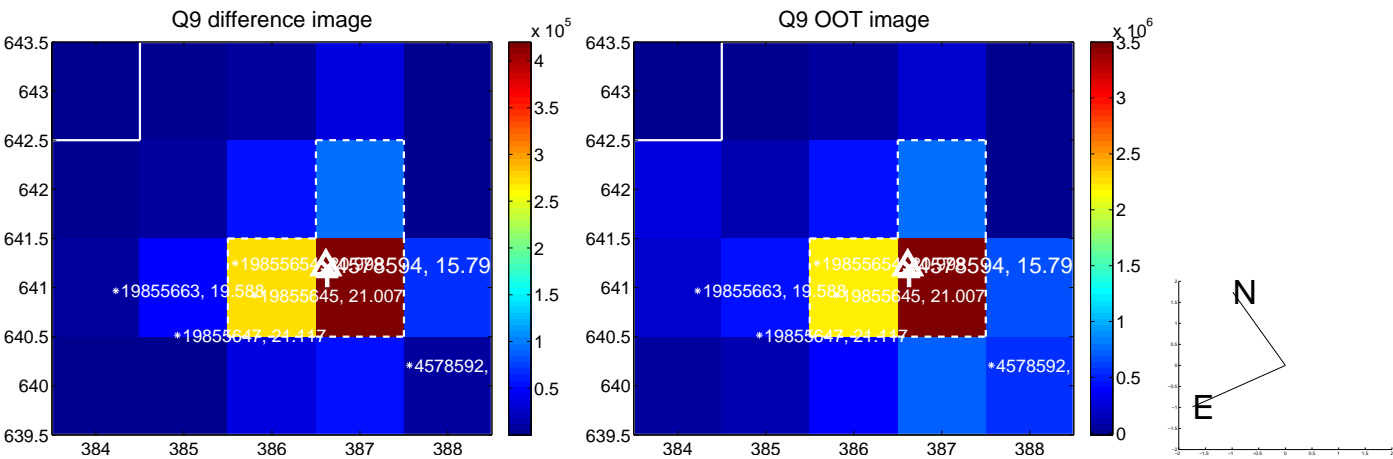
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



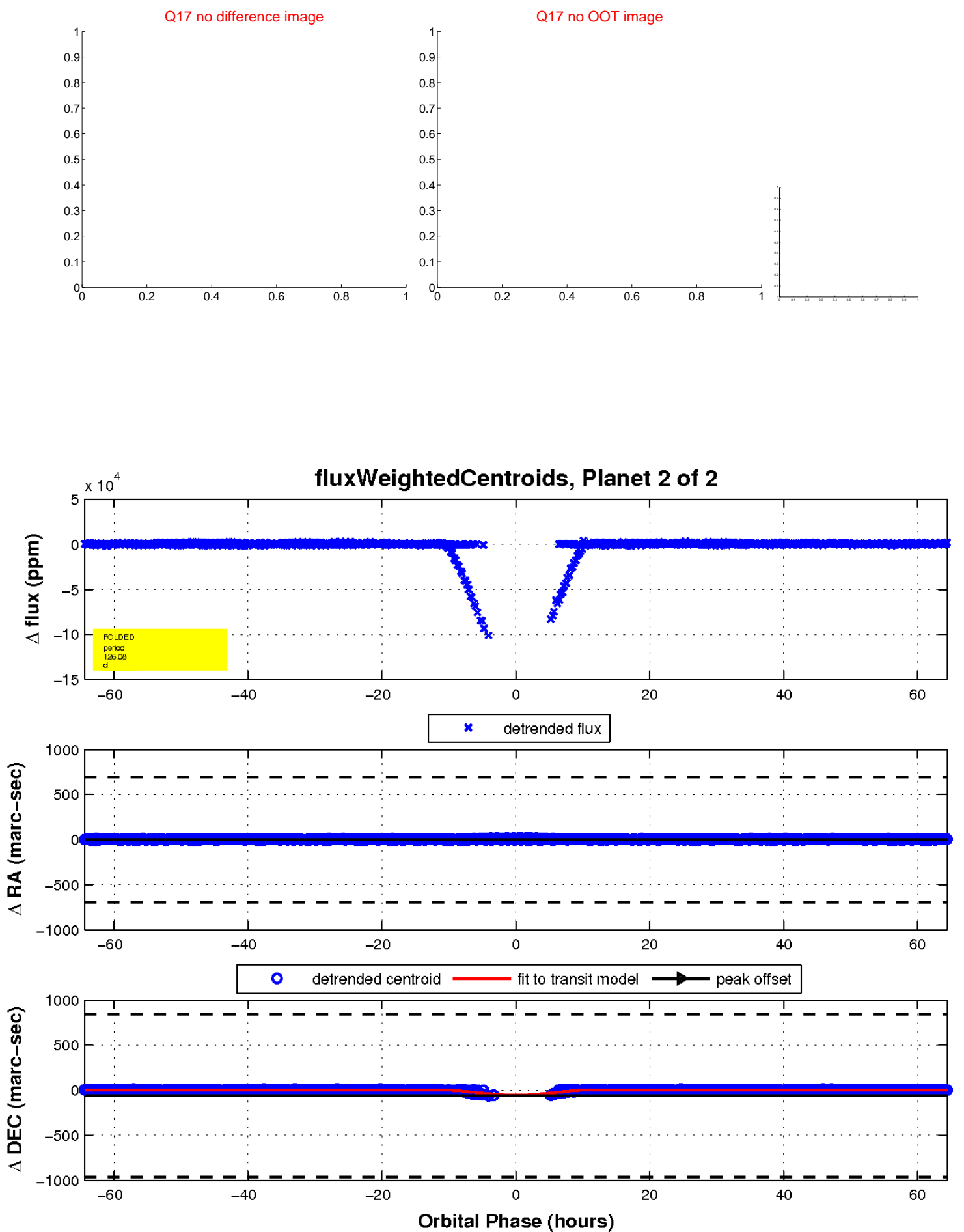
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

