

KIC 006781548

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})
006781548-01	OBS	2944.01	9.121990	138.843981	908.8	4.163	20.6	22.6	0.96	5899	4.26	131.64
006781548-02	OBS	No	9.121774	135.755645	440.6	3.241	12.3	12.9	0.96	5899	2.29	131.65

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006781548-01	OBS	FP	0.00	0	1	1	1	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—CENT_RESOLVED_OFFSET—EPHEM_MATCH
006781548-02	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 006781548-01

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
006781548-01	6781548	6769.01	6781535	1:1	15.4	3	-1	13.67	15.68	64.99	Direct-PRF	0	0.43	0.29

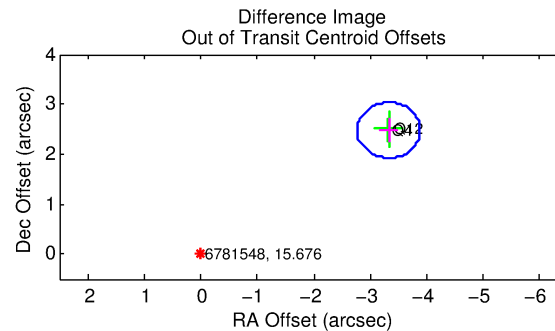
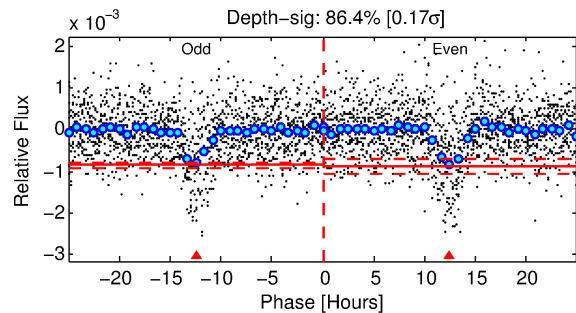
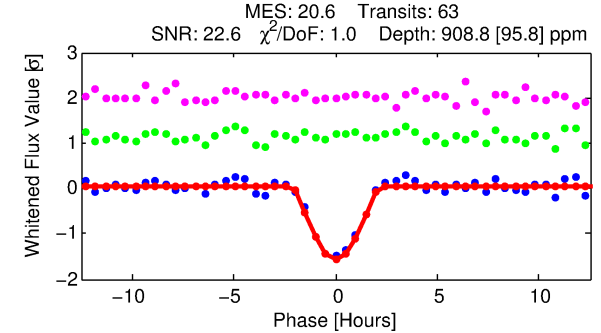
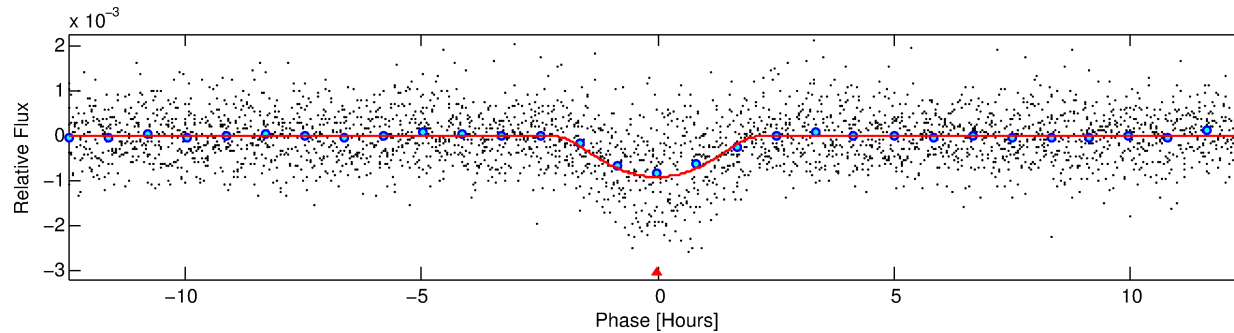
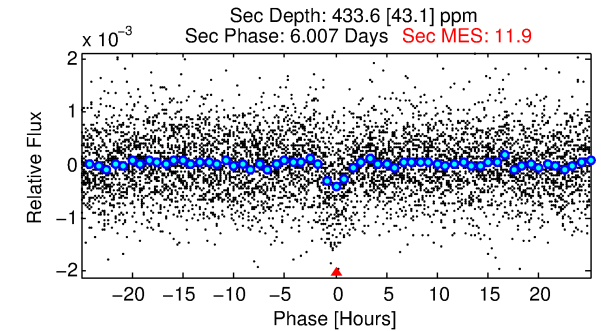
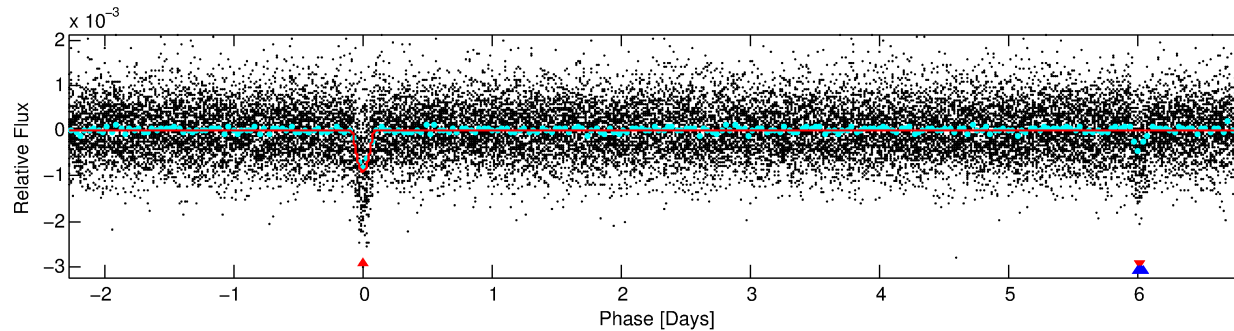
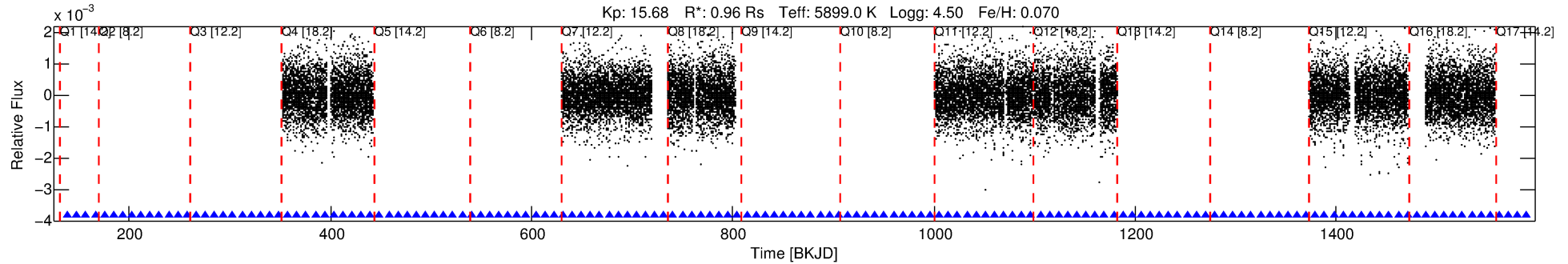
Notes: $P_1:P_2$ is the period ratio. Dist is the distance in arcseconds. Δ Row and Δ Col are the number of pixels apart in row and column. m_2 and m_1 are the magnitudes of the parent and child. D_2/D_1 is the parent's transit depth divided by the child's. σ_P and σ_T are the significance of the match 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: 6781548 Candidate: 1 of 2 Period: 9.122 d

KOI: K02944.01 Corr: 0.980

Kp: 15.68 R*: 0.96 Rs Teff: 5899.0 K Logg: 4.50 Fe/H: 0.070



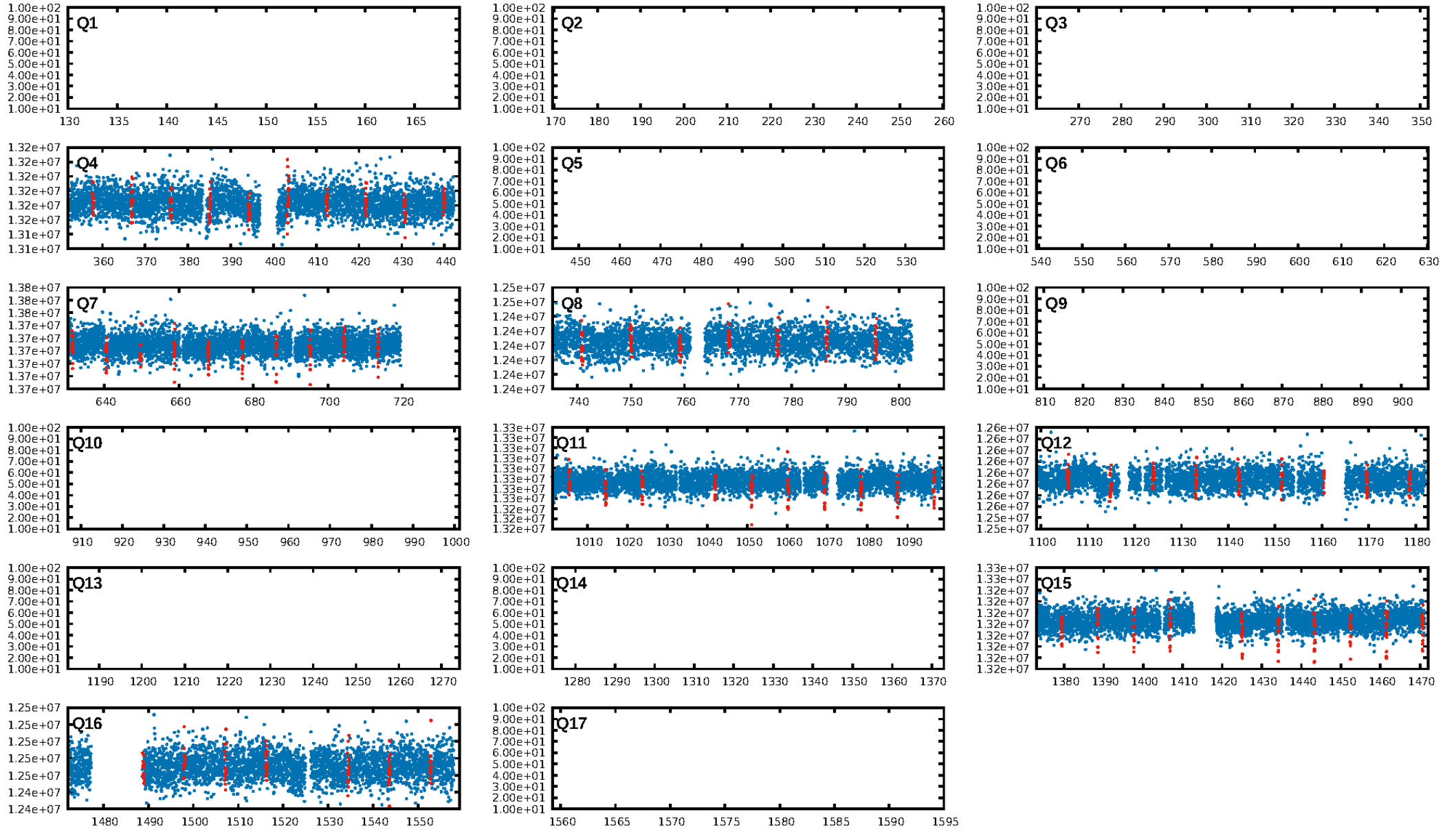
DV Fit Results:

Period = 9.12199 [0.00006] d
Epoch = 138.8440 [0.0055] BKJD
Rp/R* = 0.0407 [0.0210]
a/R* = 6.08 [1.41]
b = 0.98 [0.04]
Seff = 131.64 [57.36]
Teq = 864 [94] K
Rp = 4.26 [2.60] Re
a = 0.0872 [0.0243] AU
Ag = 99.71 [111.32] [0.89σ]
Teff = 4220 [1104] K [3.03σ]

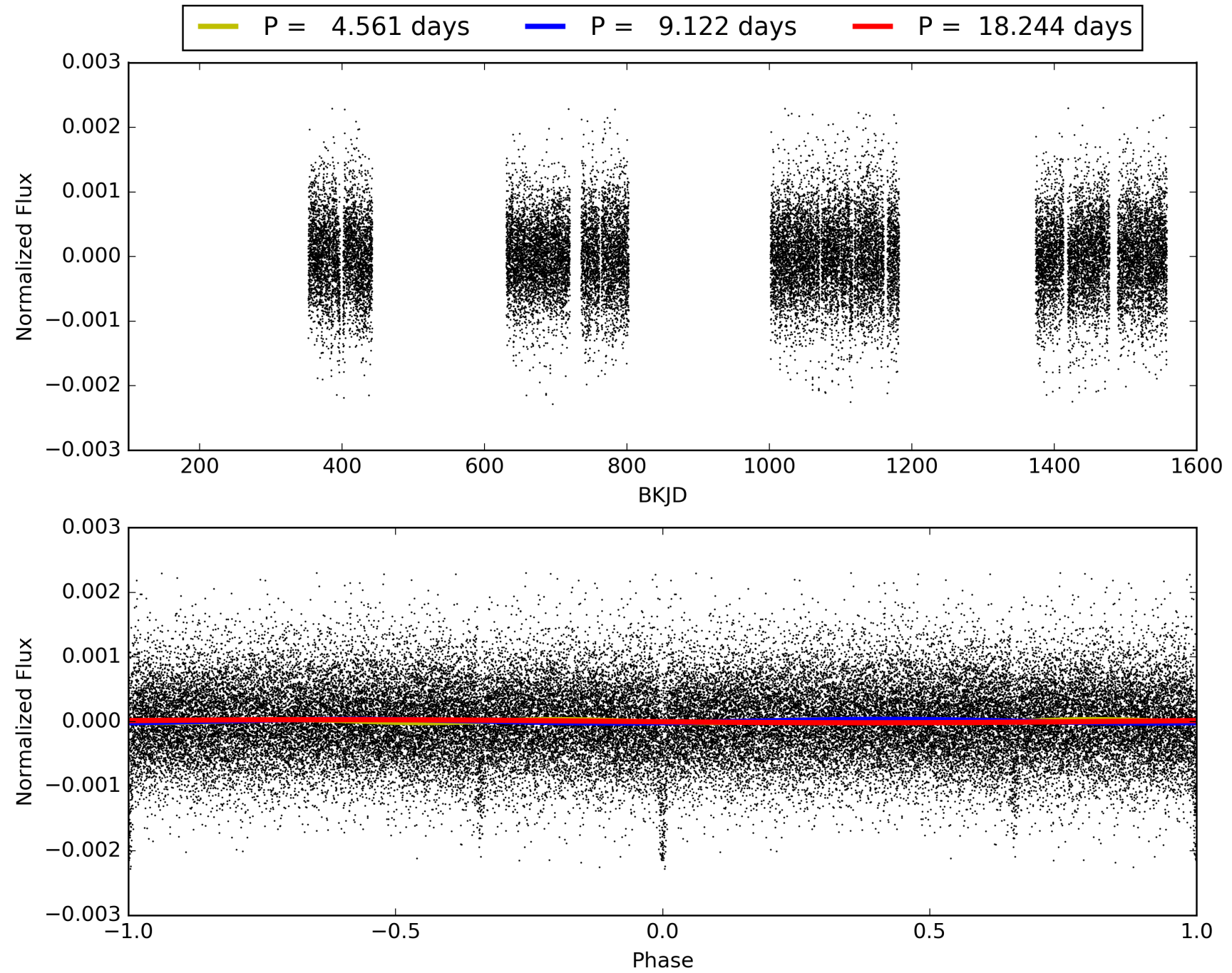
DV Diagnostic Results:

ShortPeriod-sig: 0.1% [0.00σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 0.0%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 2.10e-93
RollingBand-fgt: 1.00 [63/63]
GhostDiagnostic-chr: -0.3008
Centroid-sig: 0.0%
Centroid-so: 56.691 arcsec [100.58σ]
OotOffset-rm: 4.148 arcsec [22.33σ]
KicOffset-rm: 4.120 arcsec [21.90σ]
OotOffset-st: 0/0/2/0 [2]
KicOffset-st: 0/0/2/0 [2]
DiffImageQuality-fgm: 1.00 [2/2]
DiffImageOverlap-fno: 1.00 [7/7]

TCE 006781548-01, PDC Light Curves

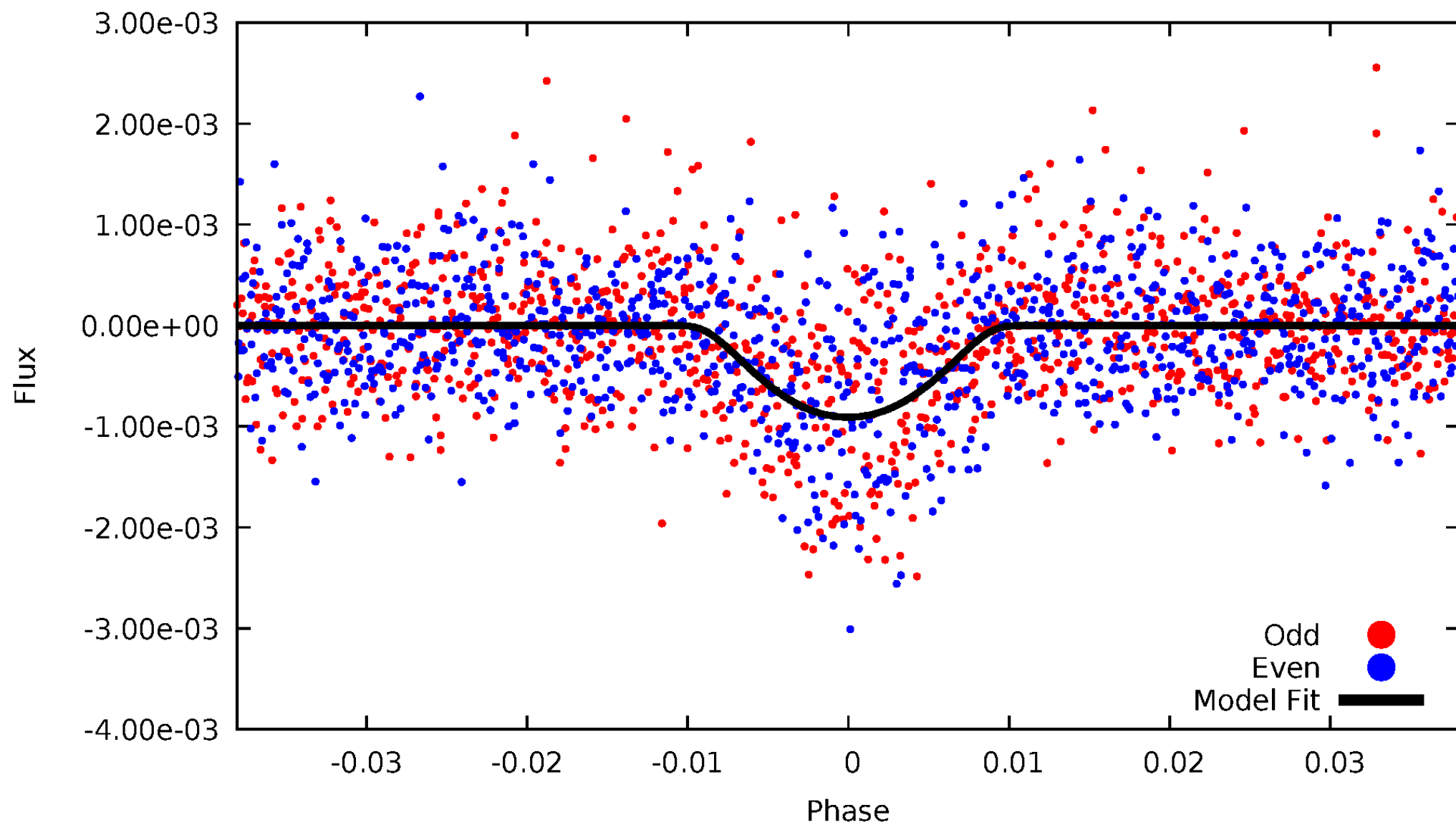


TCE 006781548-01



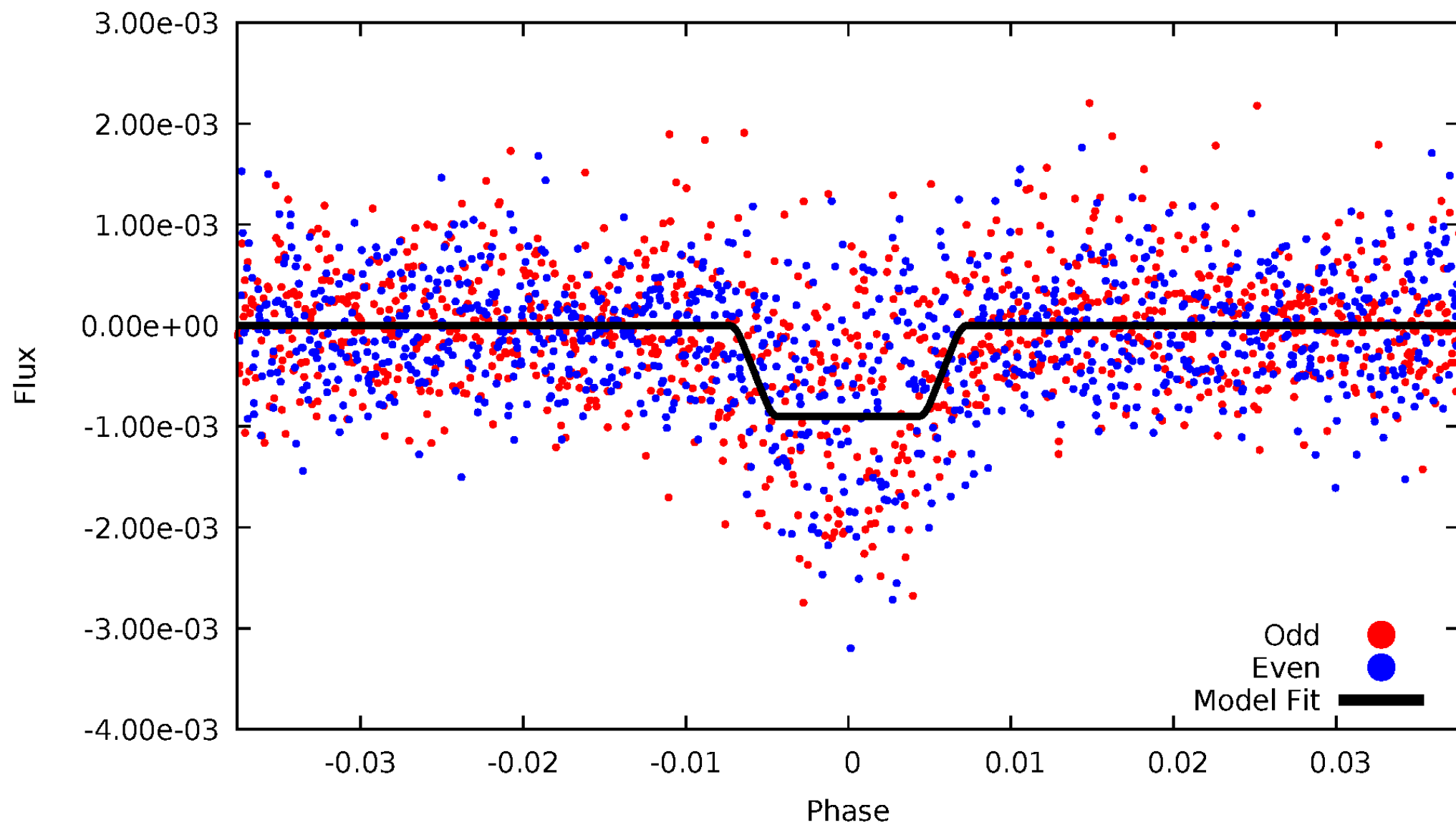
DV Odd/Even

TCE 006781548-01

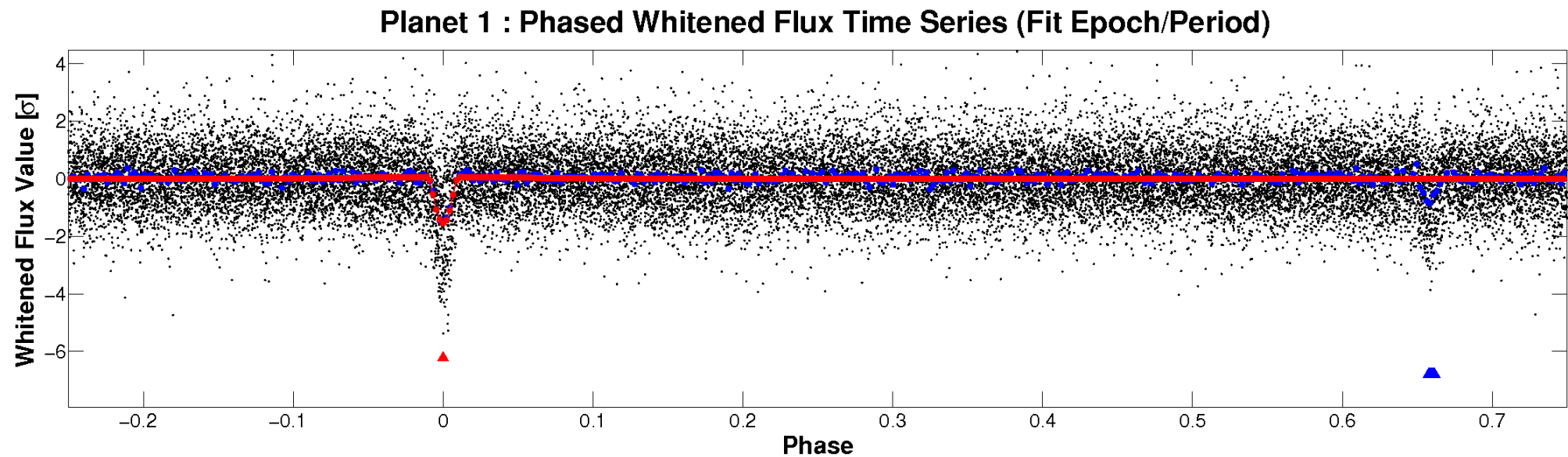
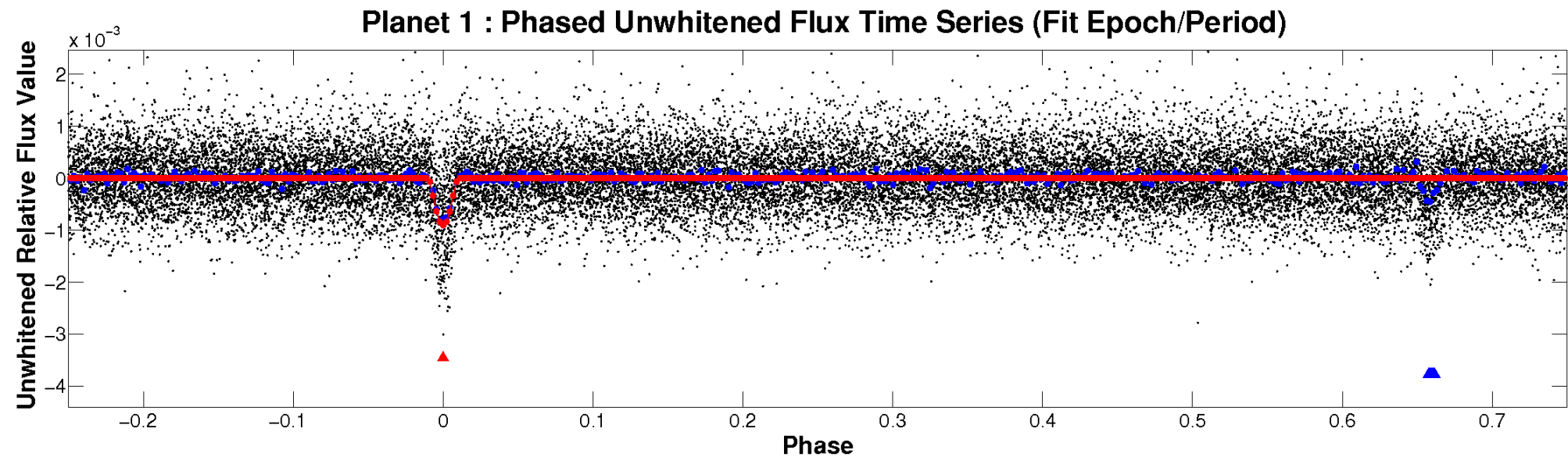


ALT Odd/Even

TCE 006781548-01

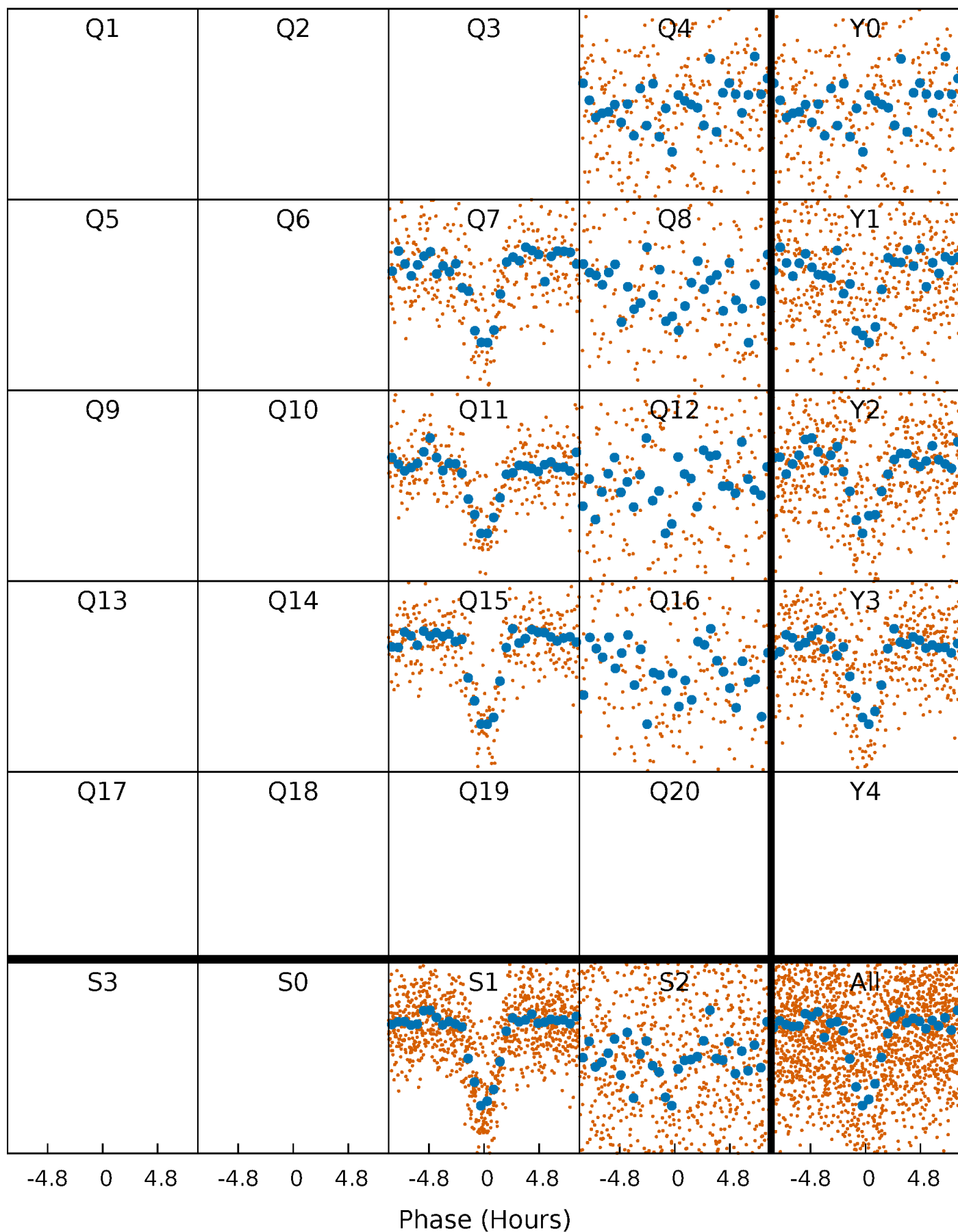


Non-Whitened Vs. Whitened Light Curve



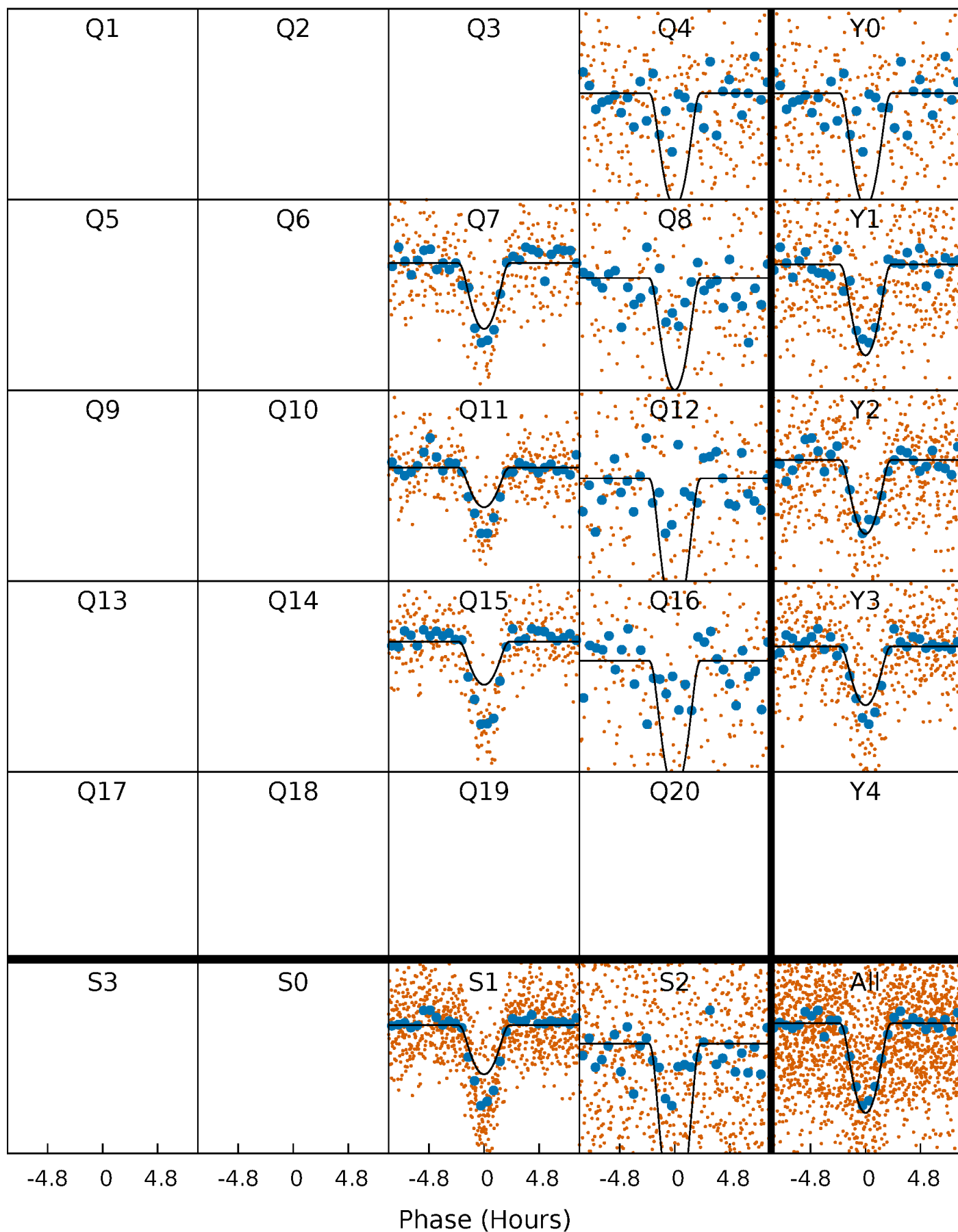
PDC Quarter-Phased Transit Curves

TCE 006781548-01 P= 9.121990 Days $T_0=138.843981$ (BKJD)



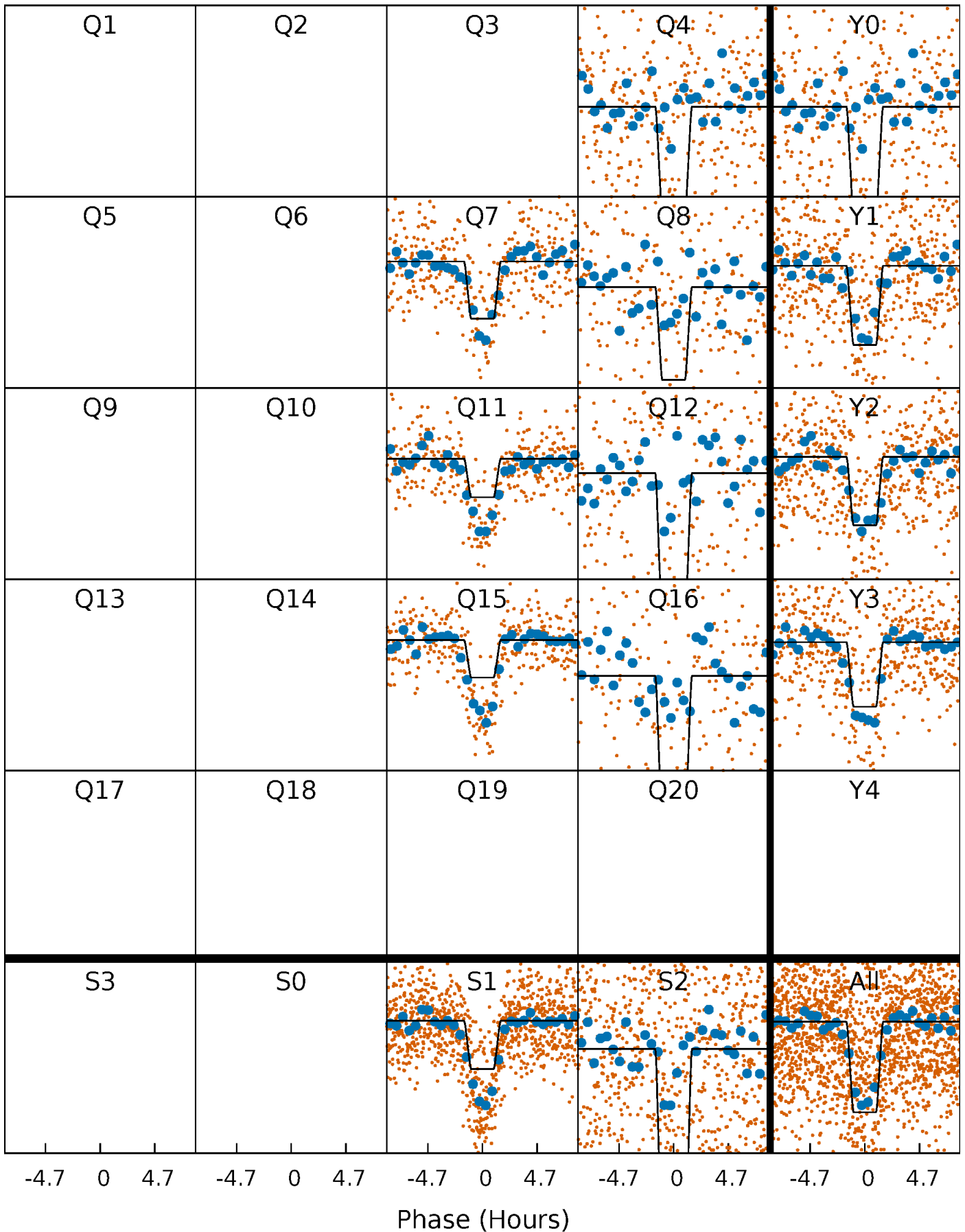
DV Quarter-Phased Transit Curves

TCE 006781548-01 P= 9.121990 Days $T_0=138.843981$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

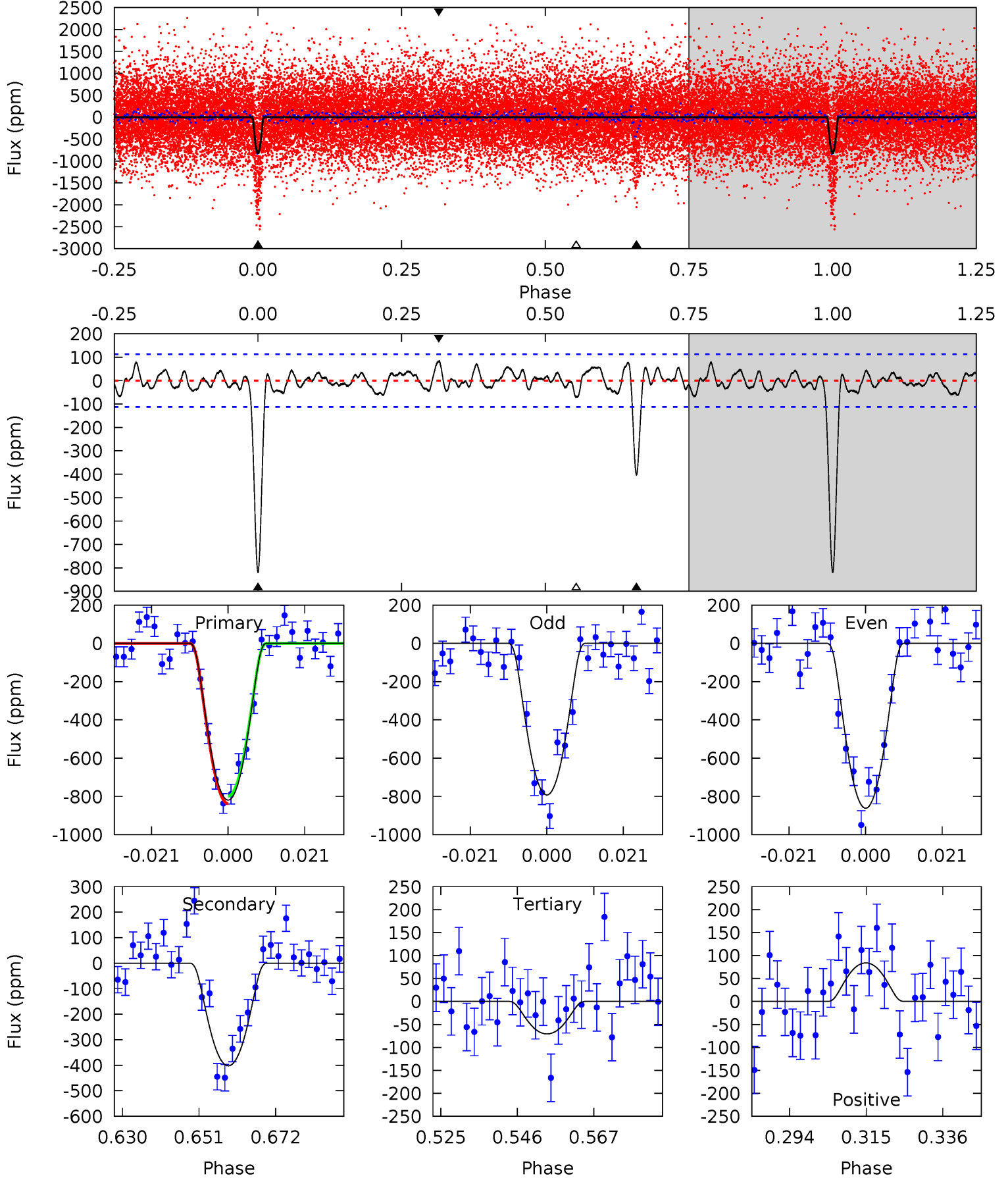
TCE 006781548-01 P= 9.122056 Days $T_0=138.837237$ (BKJD)



DV Model-Shift Uniqueness Test

006781548-01, P = 9.121990 Days, E = 138.843981 Days

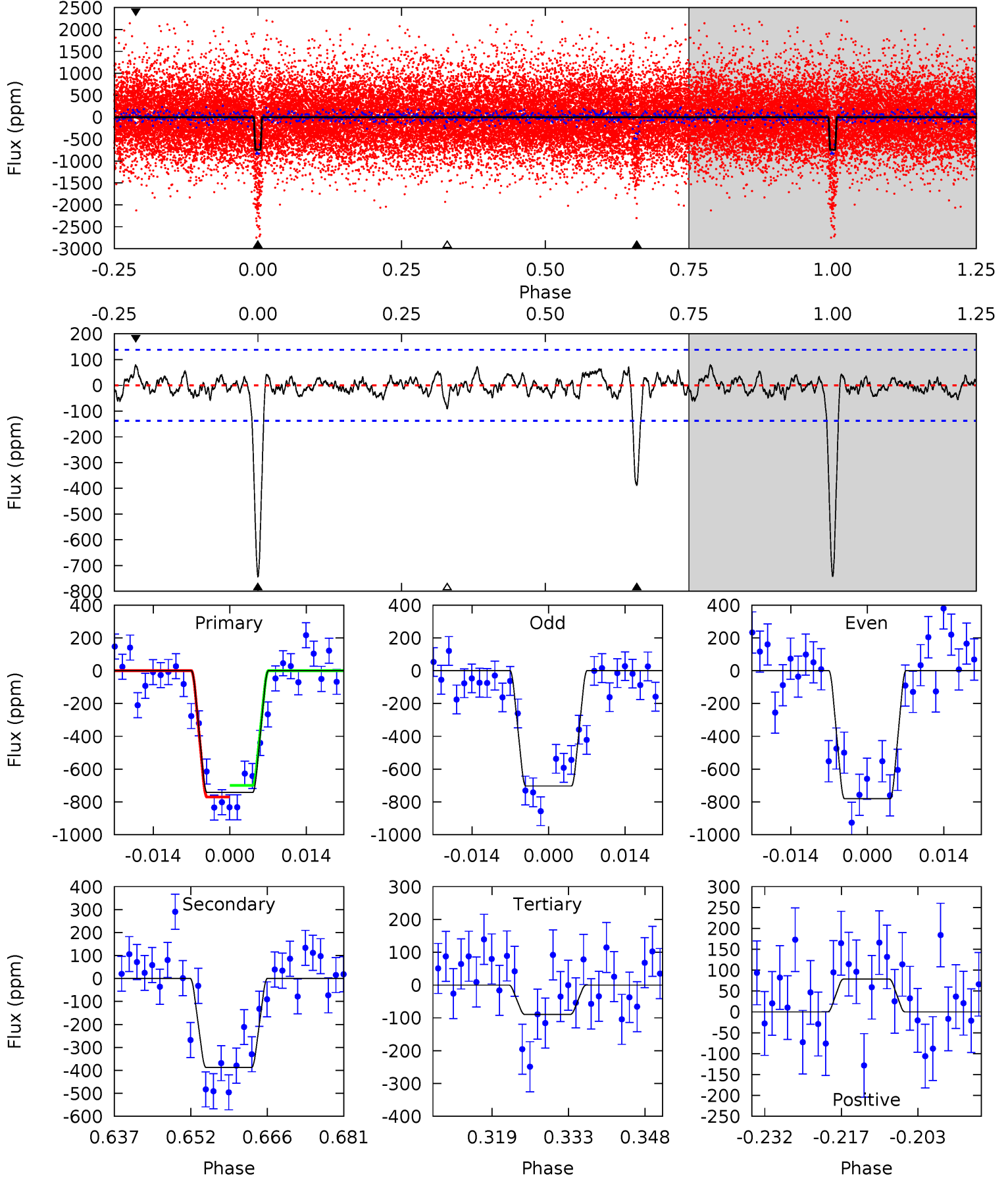
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
35.5	17.4	3.06	3.63	4.88	2.31	1.34	32.4	31.8	14.4	13.8	1.50	1.18	0.09	0.85



Alt Model-Shift Uniqueness Test

006781548-01, P = 9.122056 Days, E = 138.837237 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
26.7	13.9	3.21	2.82	4.95	2.44	0.99	23.4	23.8	10.7	11.1	1.38	1.23	0.10	1.27



Stellar Parameters For KIC 006781548

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5899^{+184}_{-205}	$4.499^{+0.040}_{-0.229}$	$0.070^{+0.250}_{-0.300}$	$0.960^{+0.312}_{-0.104}$	$1.060^{+0.124}_{-0.138}$	$1.687^{+0.372}_{-0.919}$
	+3%/-3%	+1%/-5%	+357%/-429%	+32%/-11%	+12%/-13%	+22%/-54%
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 006781548-01 / KOI 2944.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-402 ± 23	$4.53^{+2.42}_{-2.22}$	1244^{+93}_{-65}	4320^{+1399}_{-589}	80^{+222}_{-48}
Alt.	-387 ± 28	$3.70^{+2.30}_{-2.13}$	1245^{+101}_{-65}	4741^{+2383}_{-794}	118^{+510}_{-74}

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

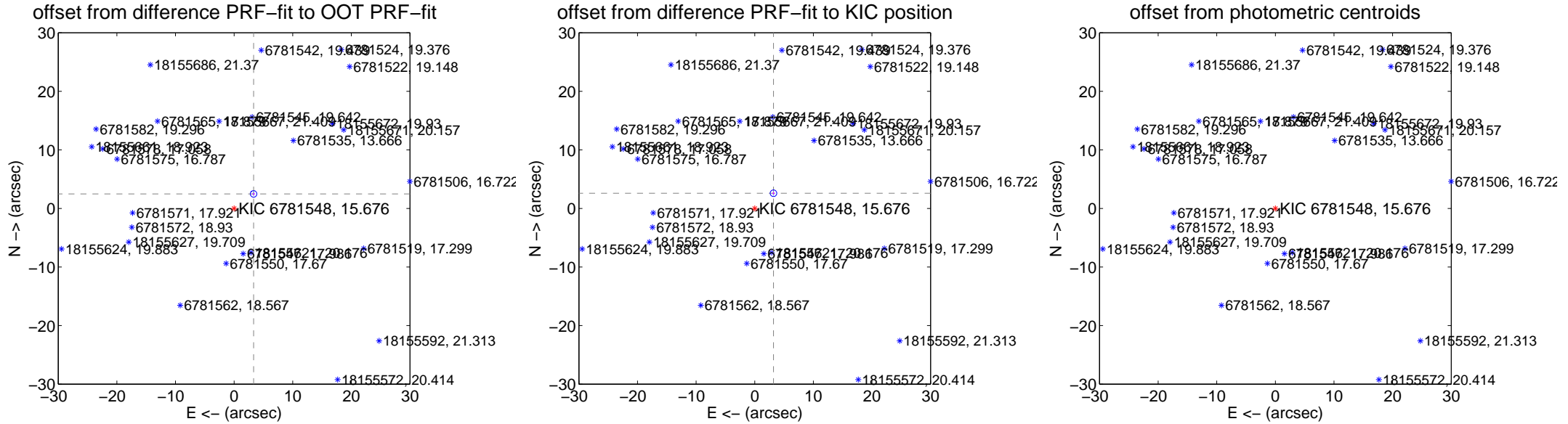
DV Centroid Data

Supplemental centroid analysis for 006781548-01. Kepler magnitude: 15.68. Transit SNR 22.57

There are 2 quarters with good PRF difference image offsets

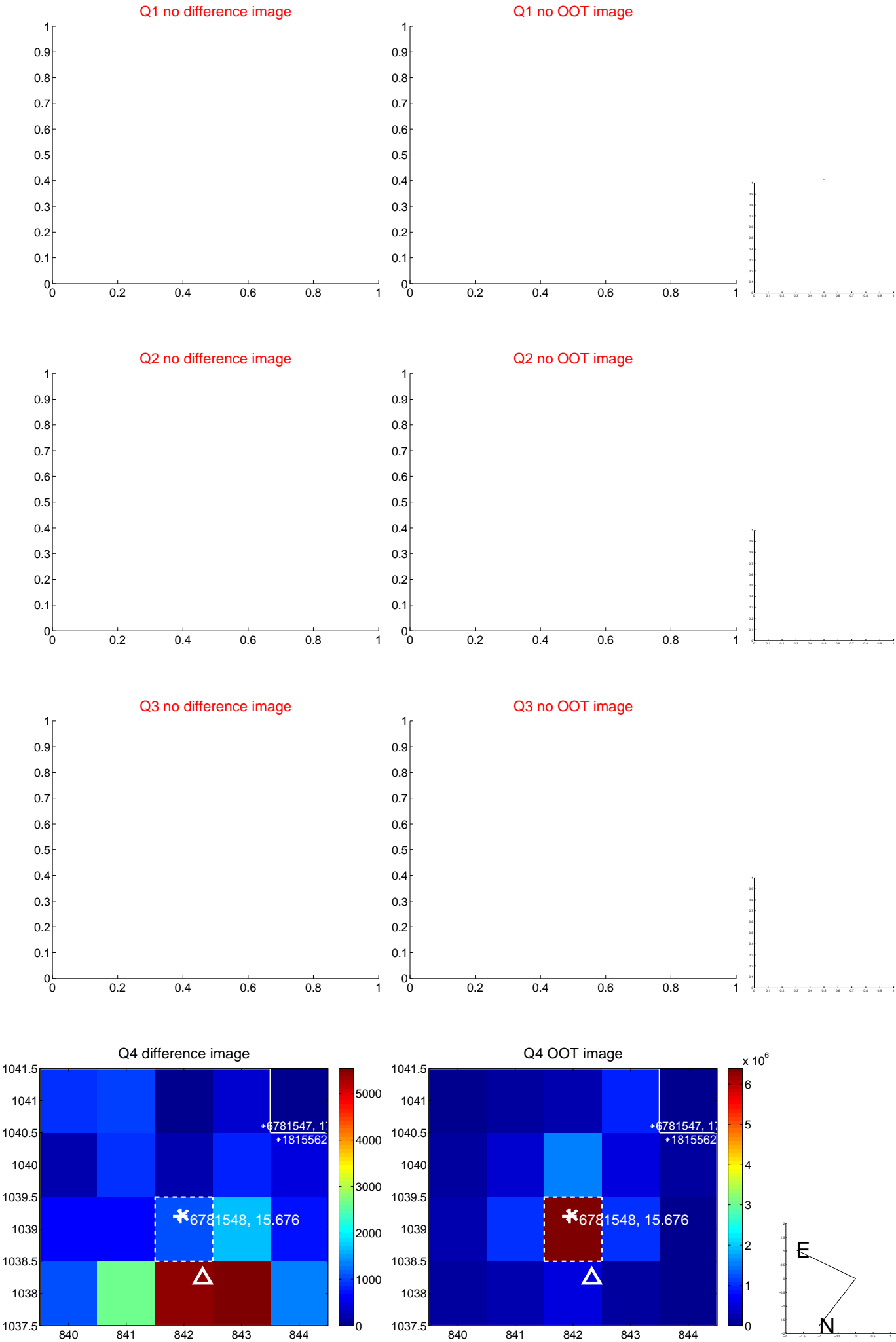
The direct PRF centroid is offset from the target star catalog position by about 0.14 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	4.148 \pm 0.186	22.33	-3.324 \pm 0.162	2.481 \pm 0.222
PRF-fit source offset from KIC position	4.120 \pm 0.188	21.90	-3.200 \pm 0.162	2.595 \pm 0.222
photometric centroid source offset	56.69 \pm 0.56	100.57	-40.70 \pm 0.53	39.46 \pm 0.60



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.

Q5 no difference image



Q5 no OOT image



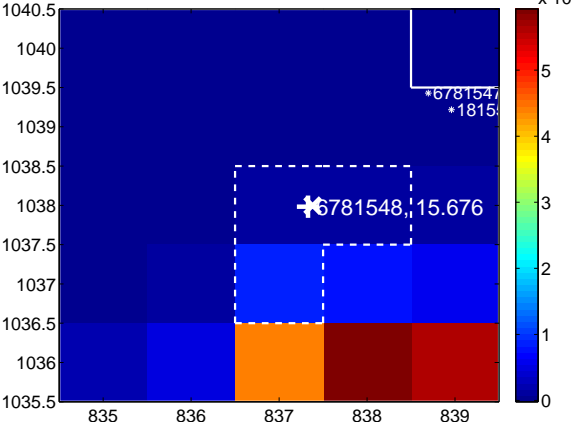
Q6 no difference image



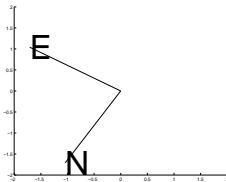
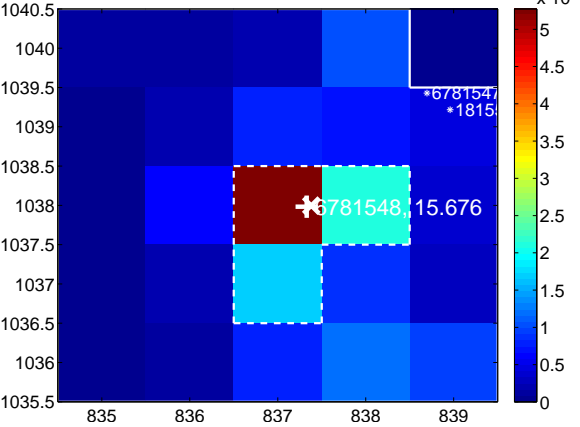
Q6 no OOT image



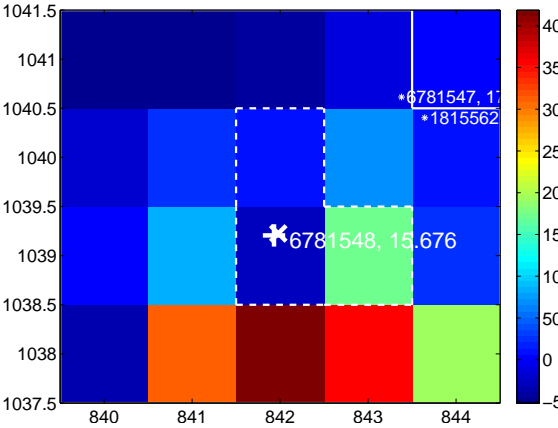
Q7 difference image. Poor Quality



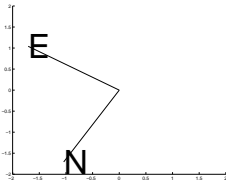
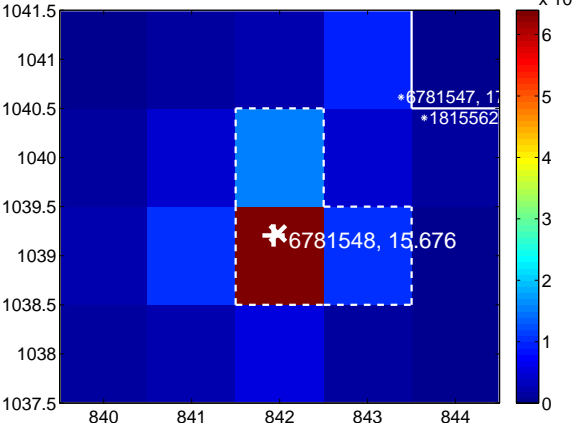
Q7 OOT image



Q8 difference image. Poor Quality



Q8 OOT image



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

Q9 no difference image



Q9 no OOT image



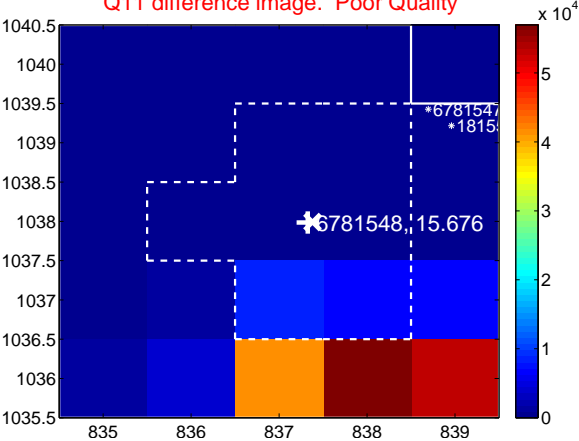
Q10 no difference image



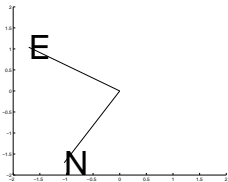
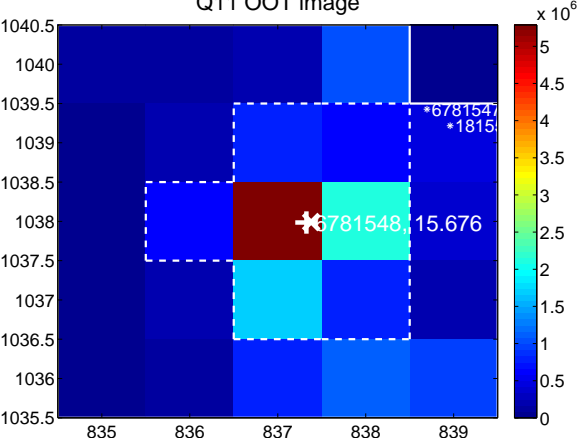
Q10 no OOT image



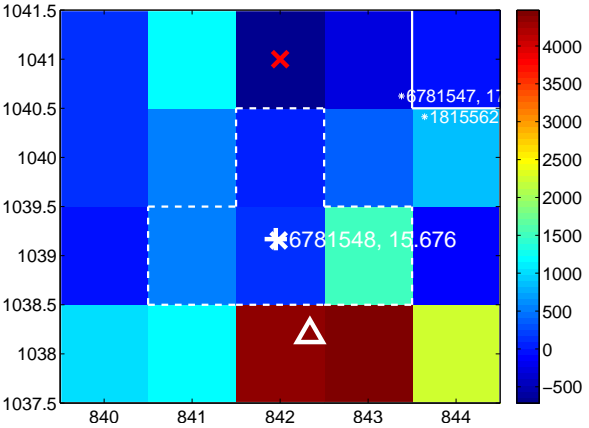
Q11 difference image. Poor Quality



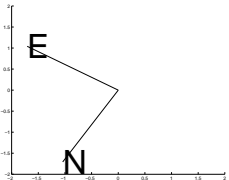
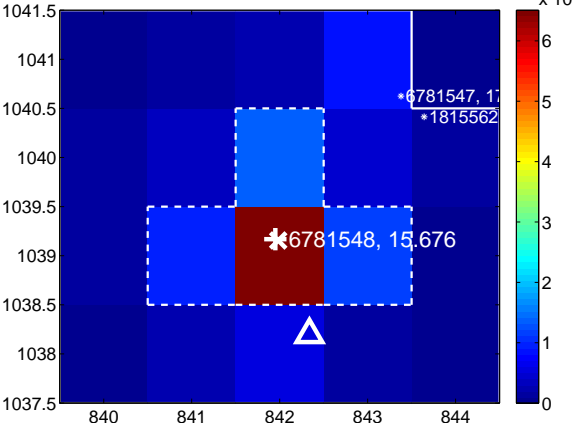
Q11 OOT image



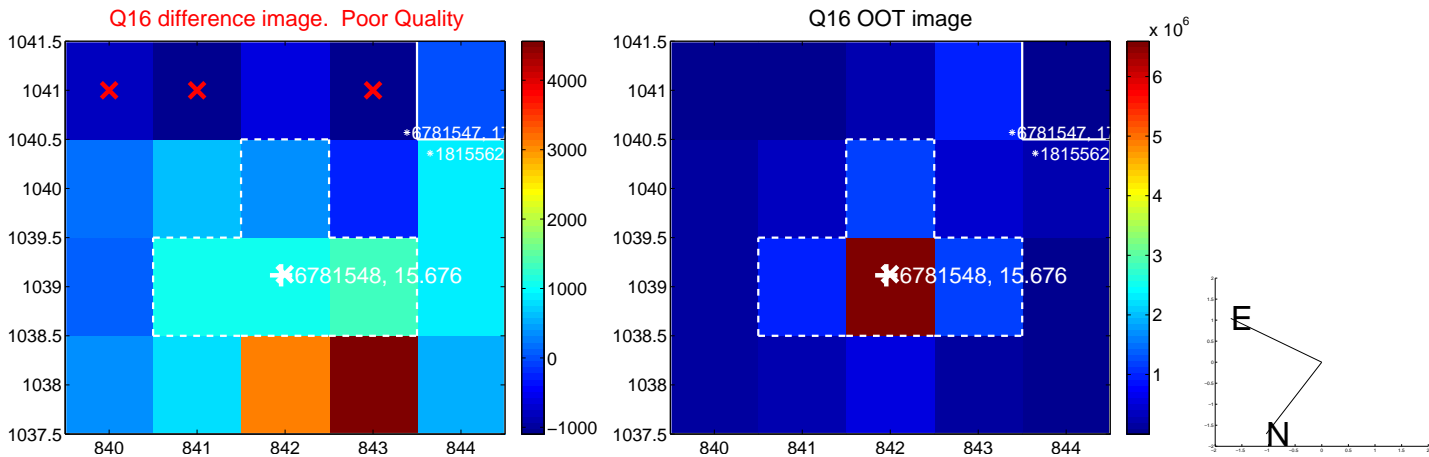
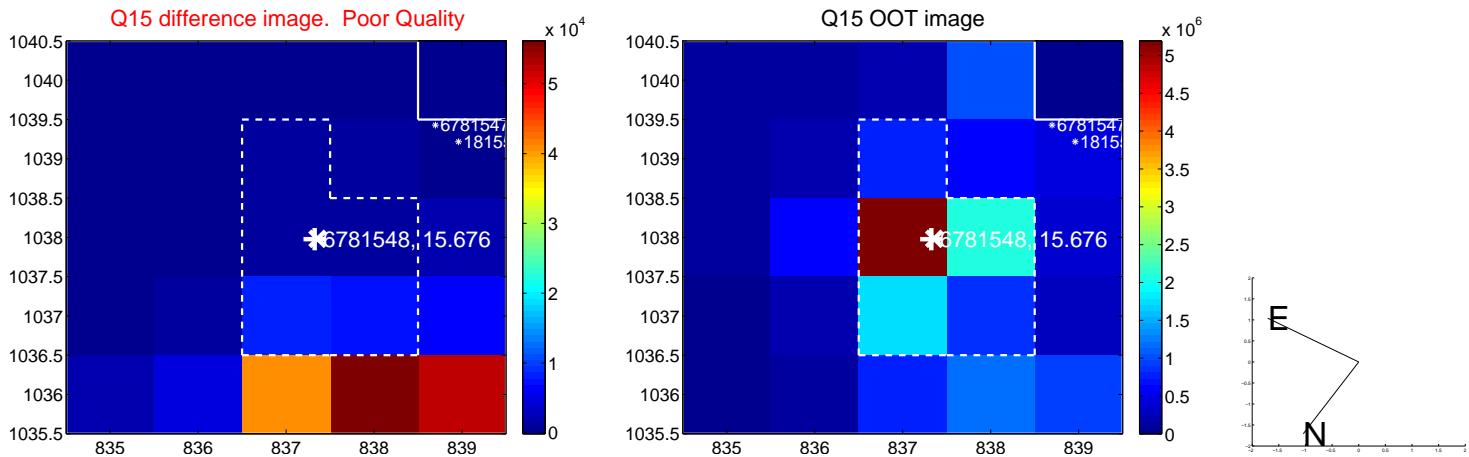
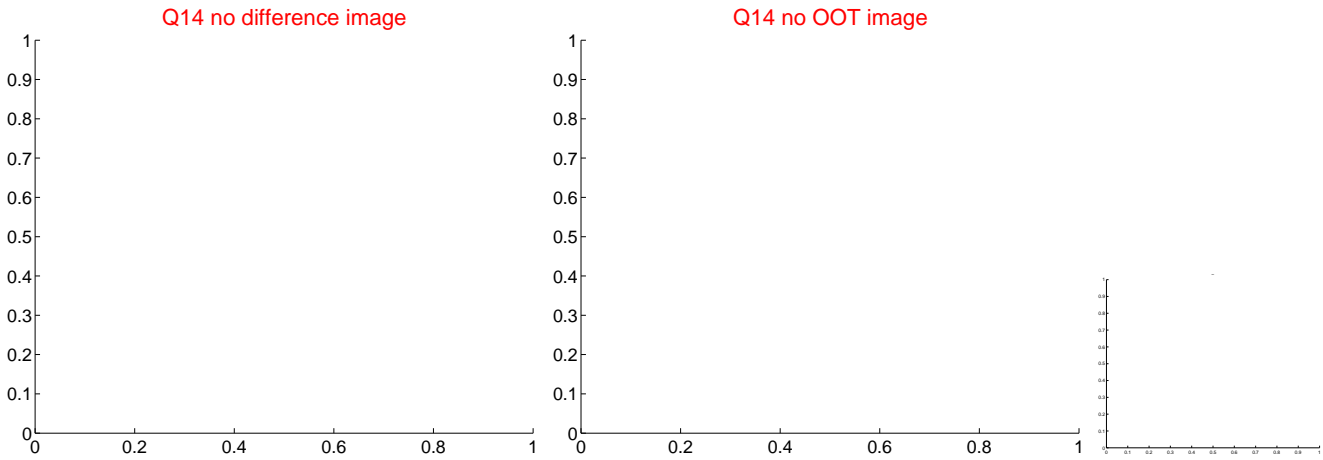
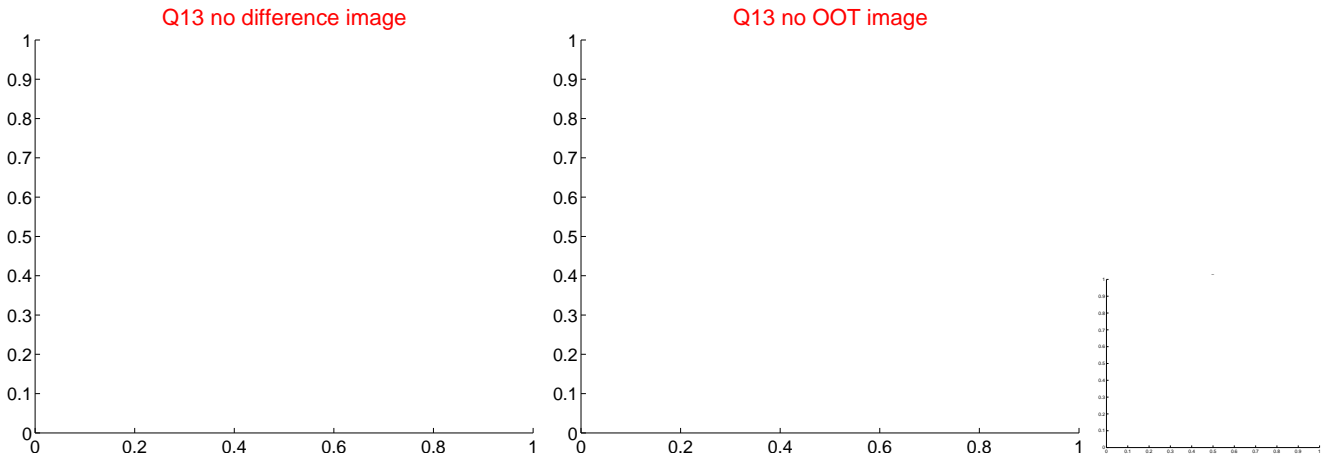
Q12 difference image



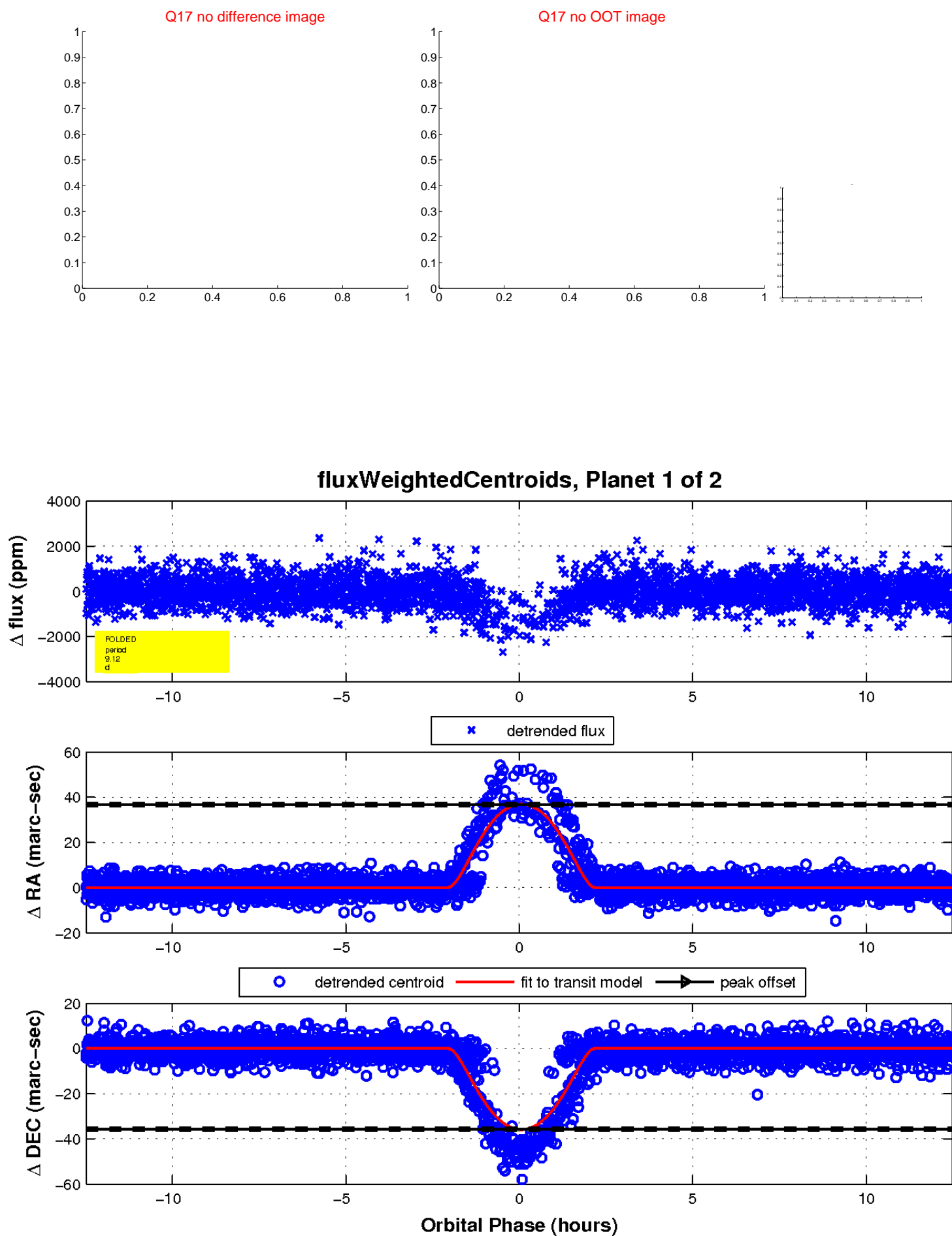
Q12 OOT image



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

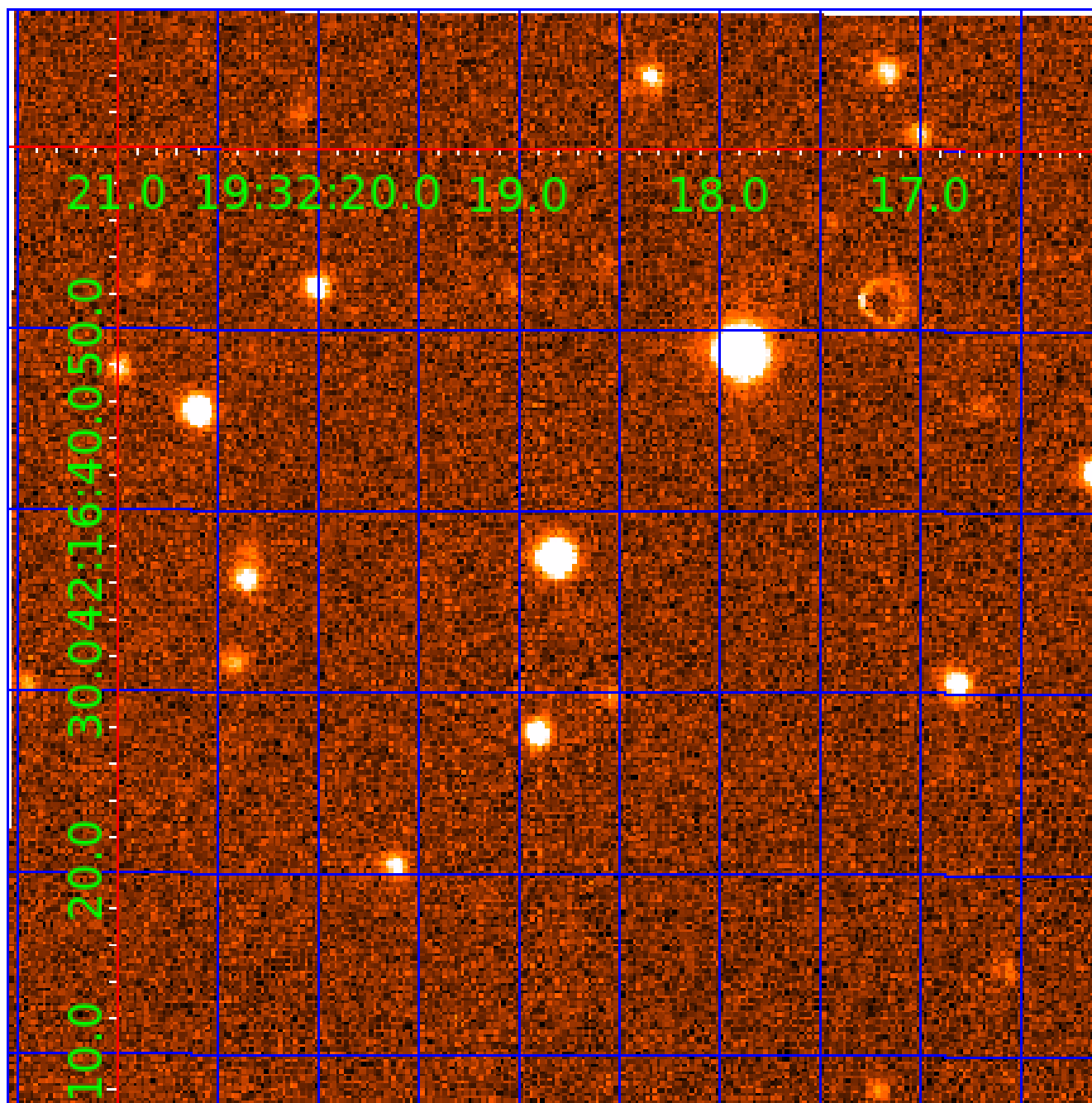


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 006781548

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})
006781548-01	OBS	2944.01	9.121990	138.843981	908.8	4.163	20.6	22.6	0.96	5899	4.26	131.64
006781548-02	OBS	No	9.121774	135.755645	440.6	3.241	12.3	12.9	0.96	5899	2.29	131.65

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006781548-01	OBS	FP	0.00	0	1	1	1	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—CENT_RESOLVED_OFFSET—EPHEM_MATCH
006781548-02	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 006781548-02

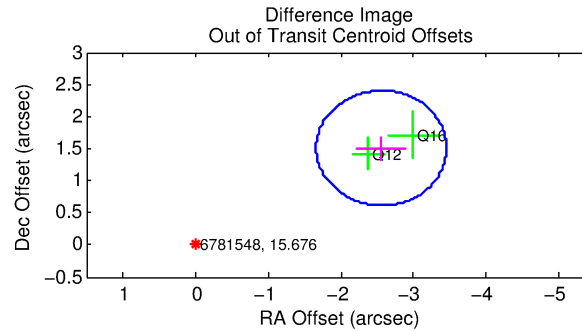
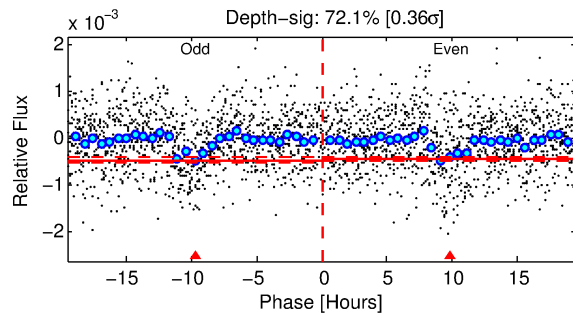
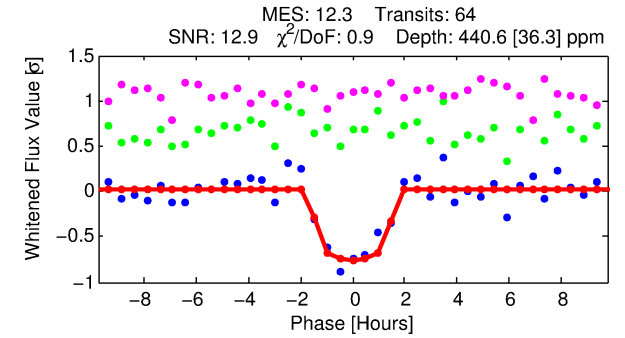
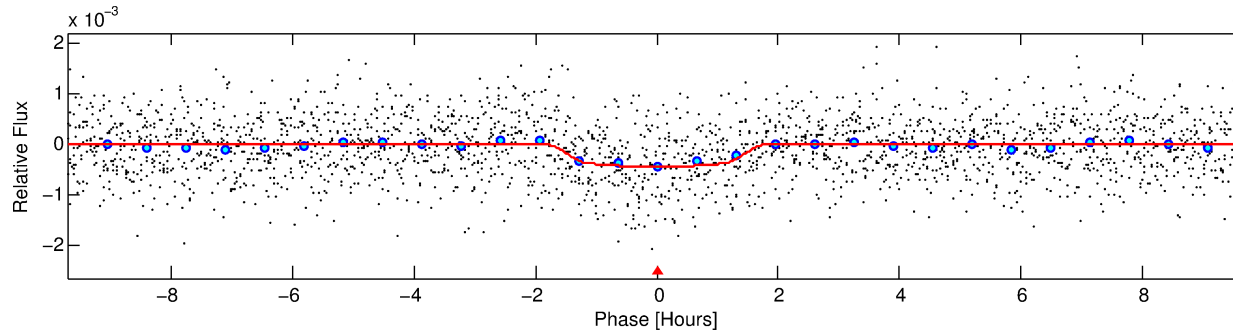
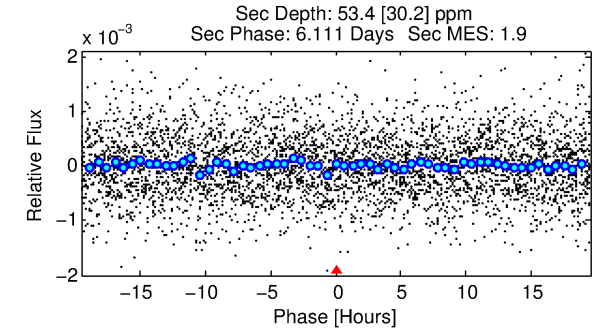
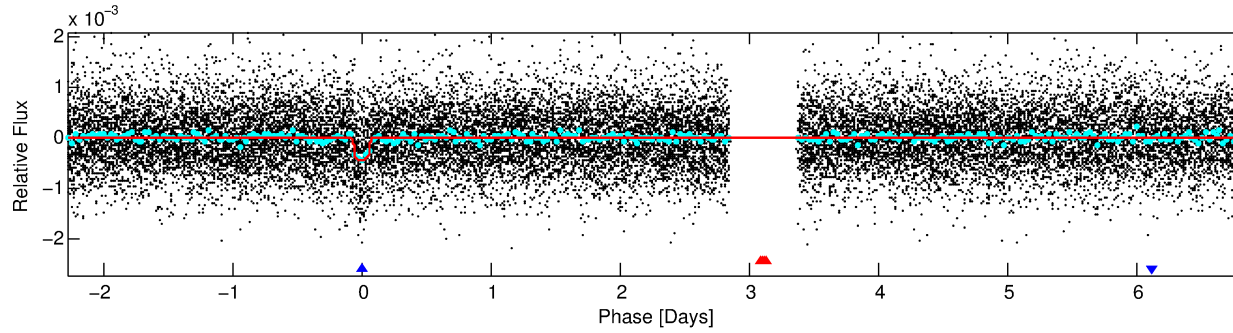
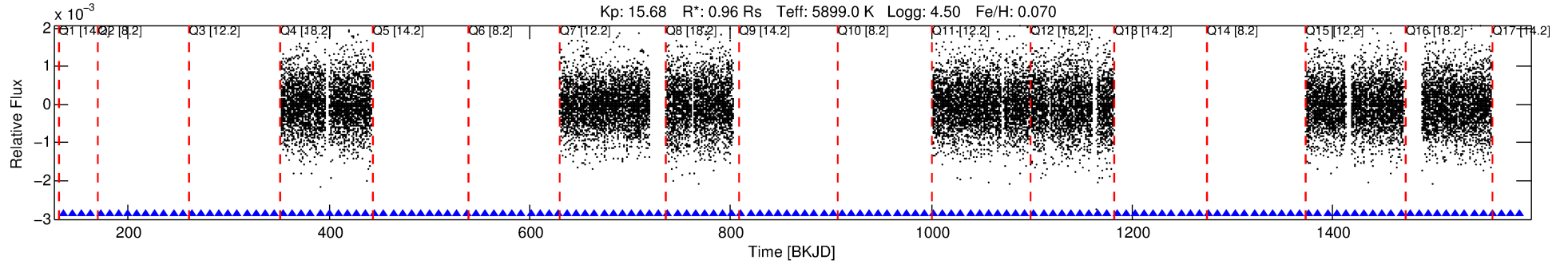
TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ($''$)	Δ Row	Δ Col	m_2	m_1	D_2/D_1	Mechanism	Flag	σ_P	σ_T
006781548-02	6781548	006781535-02	6781535	1:1	15.4	3	-1	13.67	15.68	72.77	Direct-PRF	0	1.37	1.24

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: 6781548 Candidate: 2 of 2 Period: 9.122 d
KOI: K02944 Corr: No Ephemeris Match

Kp: 15.68 R*: 0.96 Rs Teff: 5899.0 K Logg: 4.50 Fe/H: 0.070



DV Fit Results:

Period = 9.12177 [0.00007] d
Epoch = 135.7556 [0.0063] BKJD
Rp/R* = 0.0218 [0.0108]
a/R* = 12.47 [28.42]
b = 0.84 [0.80]
Seff = 131.65 [57.36]
Teq = 864 [94] K
Rp = 2.29 [1.35] Re
a = 0.0871 [0.0243] AU
Ag = 42.58 [51.52] [0.81 sigma]
Teff = 3411 [977] K [2.60 sigma]

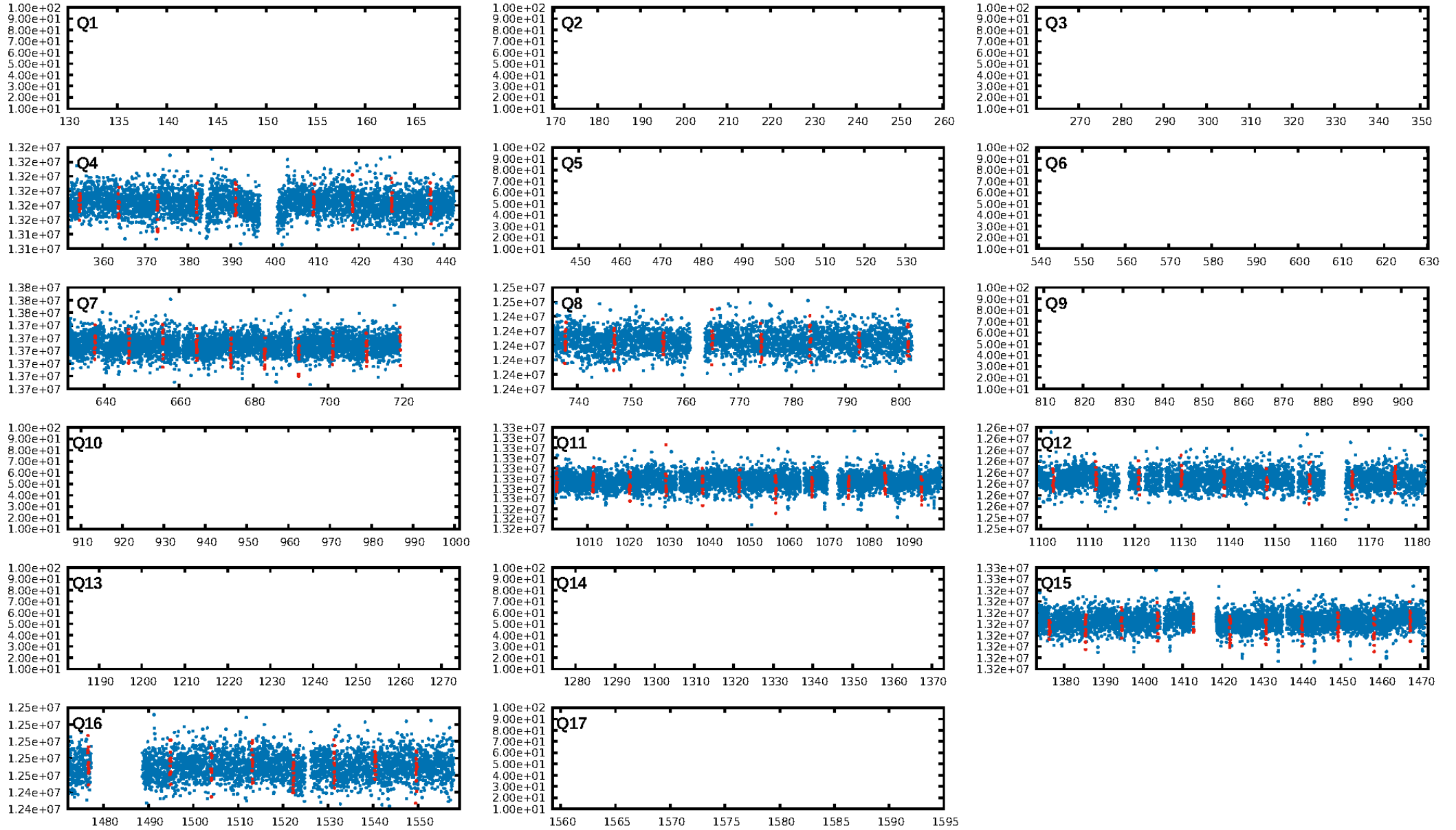
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 0.1% [0.00 sigma]
ModelChiSquare2-sig: 0.0%
ModelChiSquareGoF-sig: 100.0%
Bootstrap-pfa: 7.02e-35
RollingBand-fgt: 1.00 [64/64]
GhostDiagnostic-chr: -0.2636
Centroid-sig: 0.0%
Centroid-so: 49.068 arcsec [46.12 sigma]
OotOffset-rm: 2.968 arcsec [9.95 sigma]
KicOffset-rm: 2.891 arcsec [7.37 sigma]
OotOffset-st: 0/0/2/0 [2]
KicOffset-st: 0/0/2/0 [2]
DiffImageQuality-fgm: 1.00 [2/2]
DiffImageOverlap-fno: 1.00 [7/7]

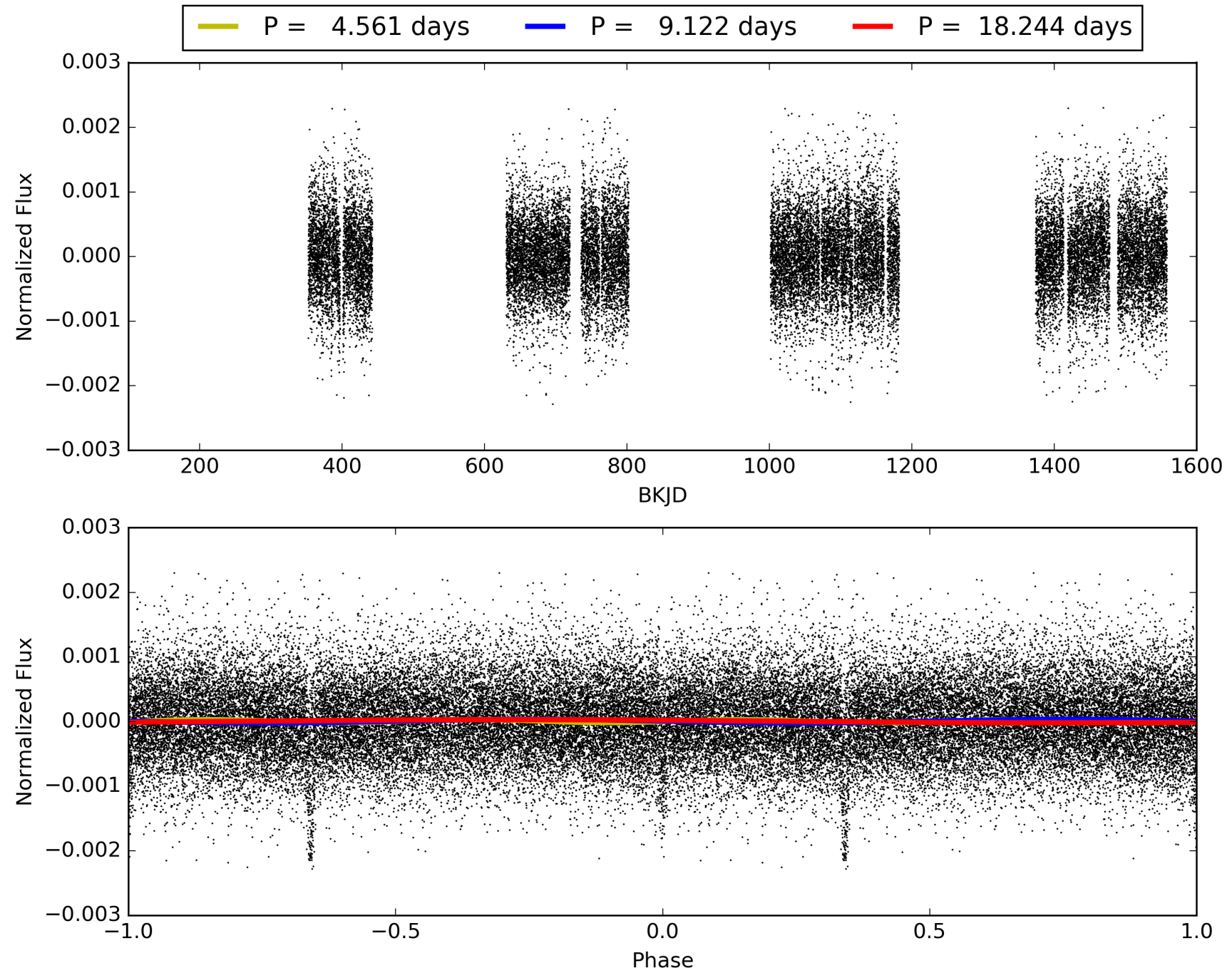
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 006781548-02, PDC Light Curves

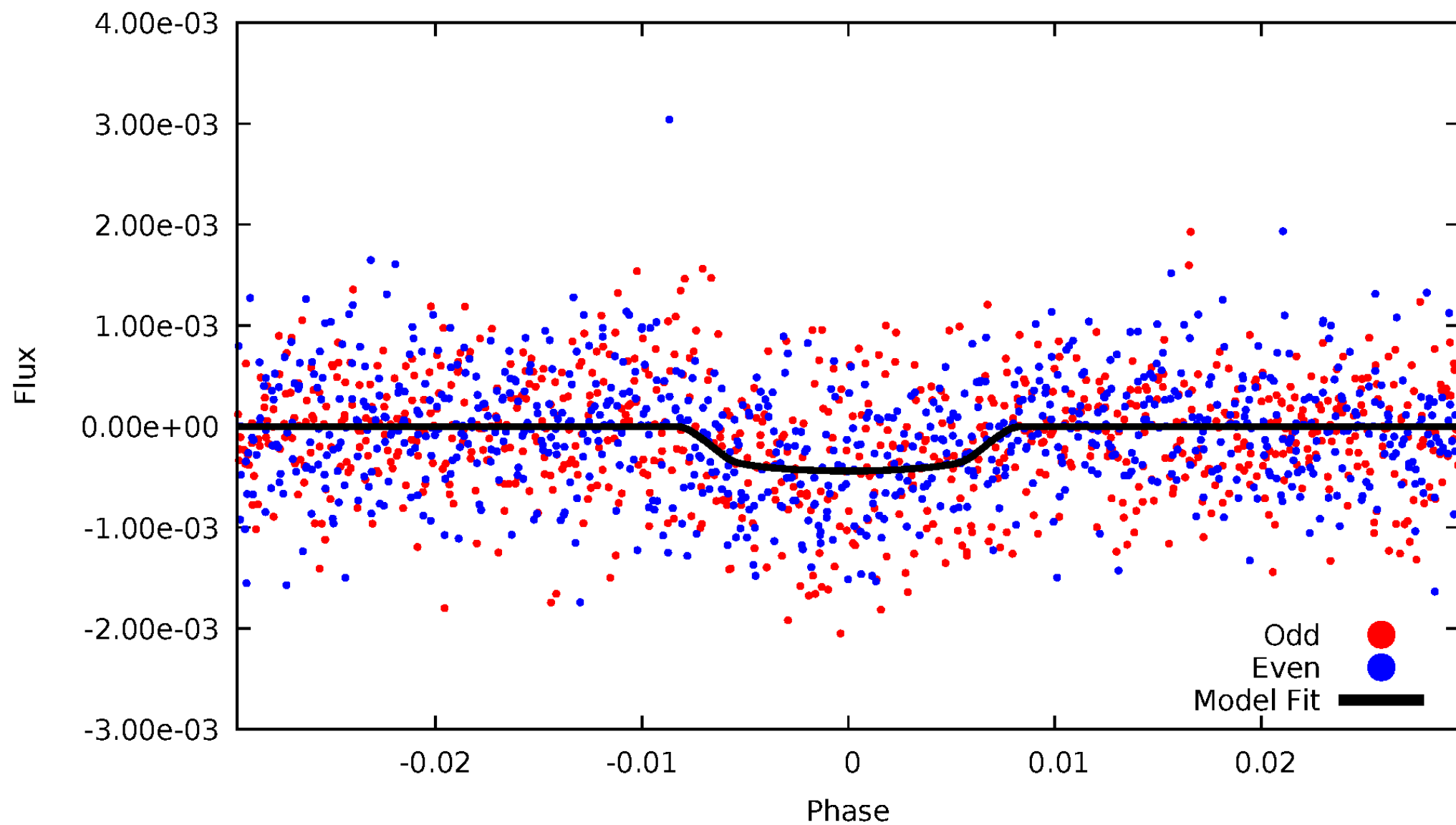


TCE 006781548-02



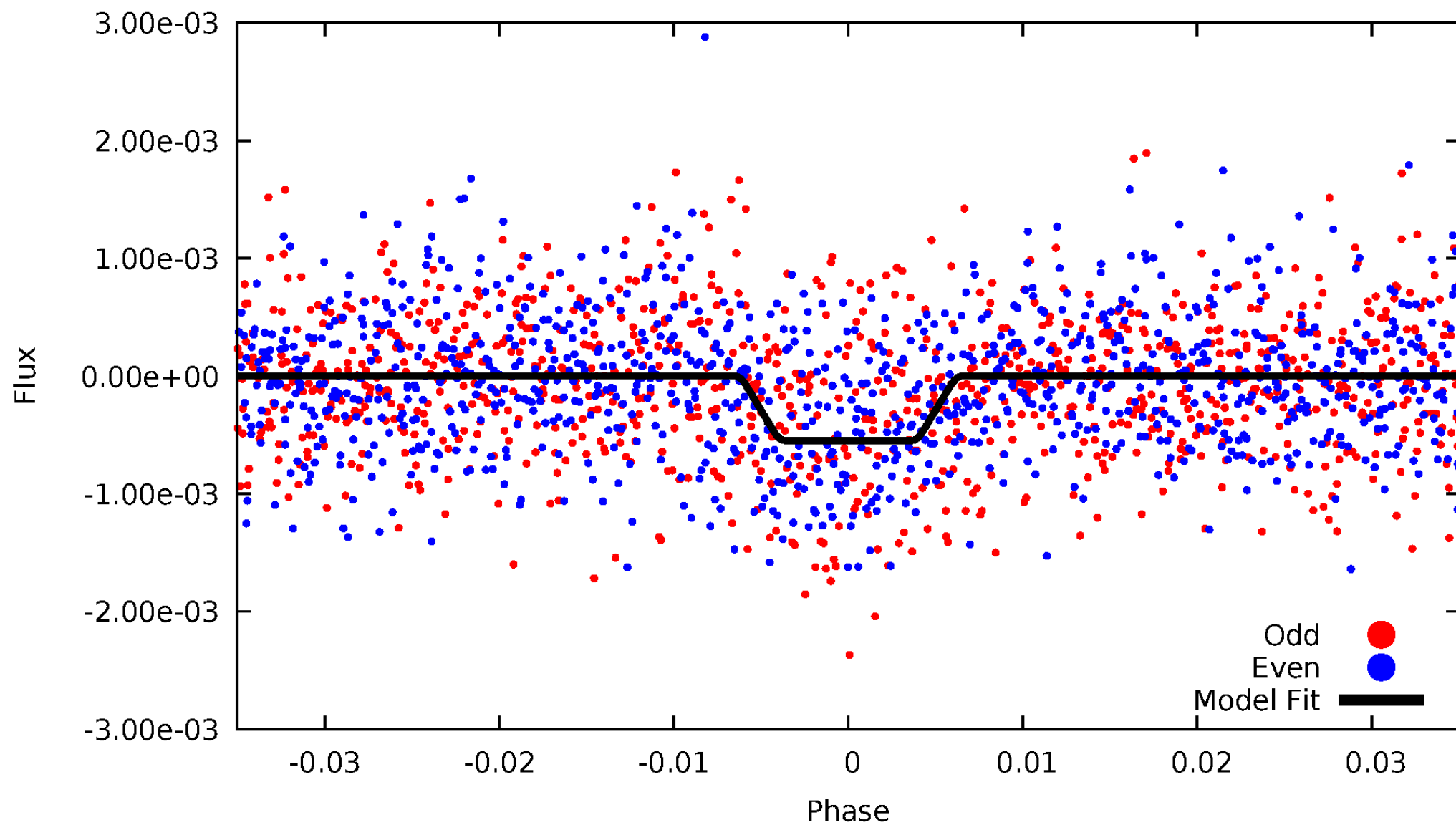
DV Odd/Even

TCE 006781548-02



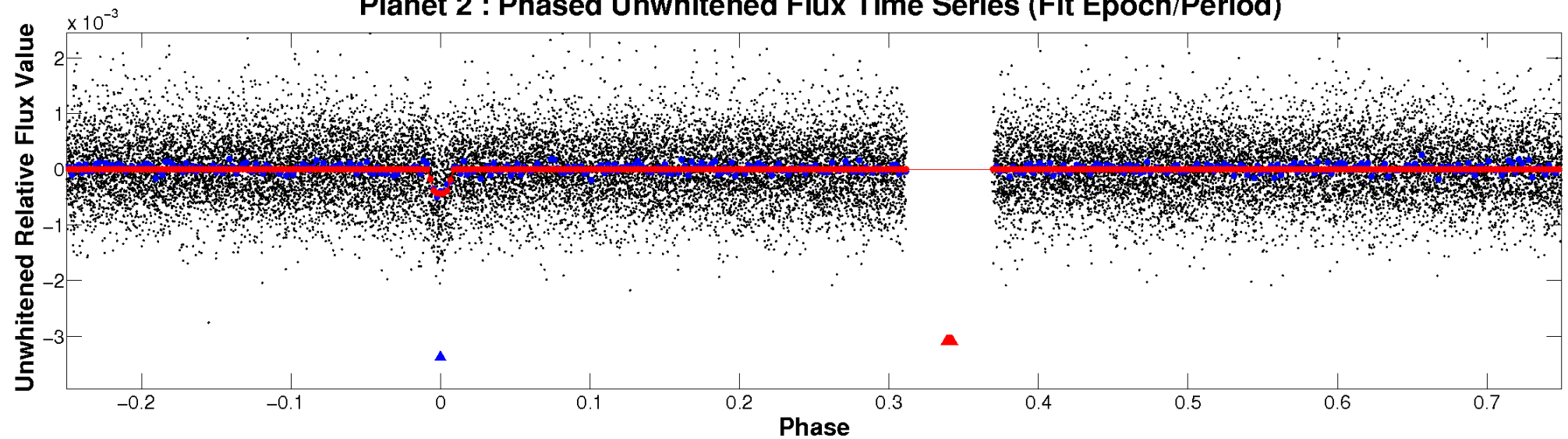
ALT Odd/Even

TCE 006781548-02

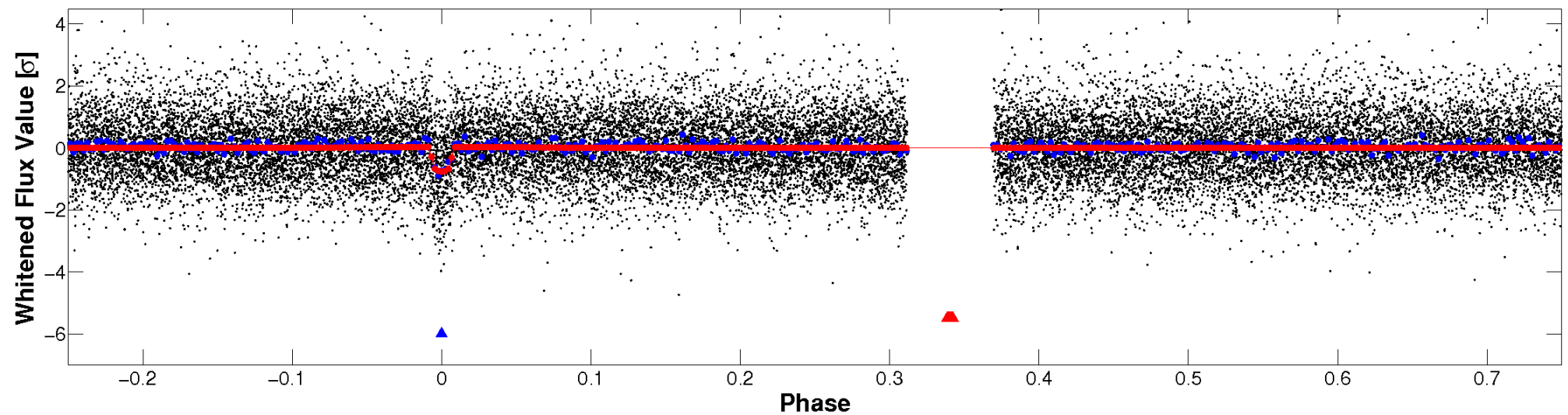


Non-Whitened Vs. Whitened Light Curve

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

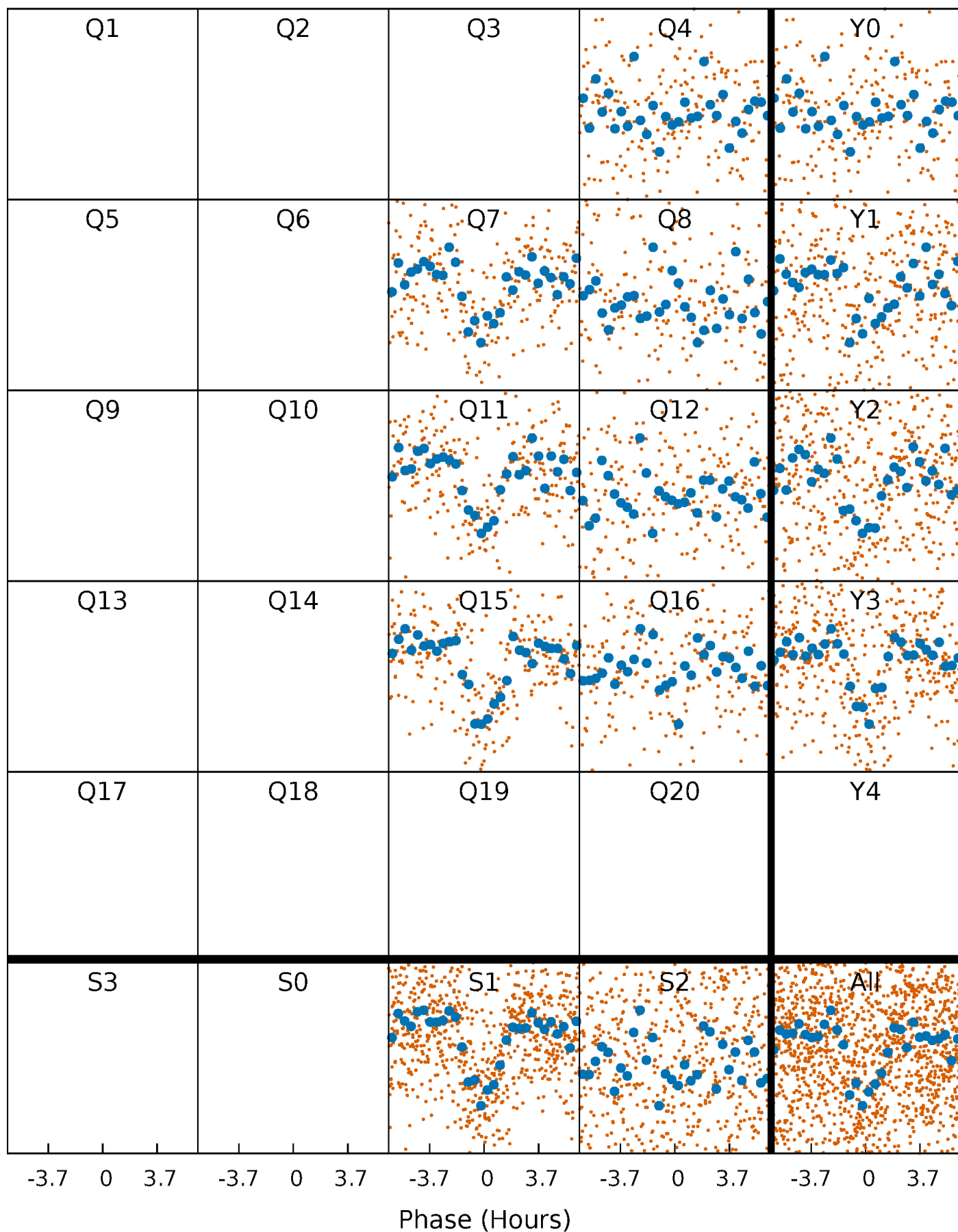


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



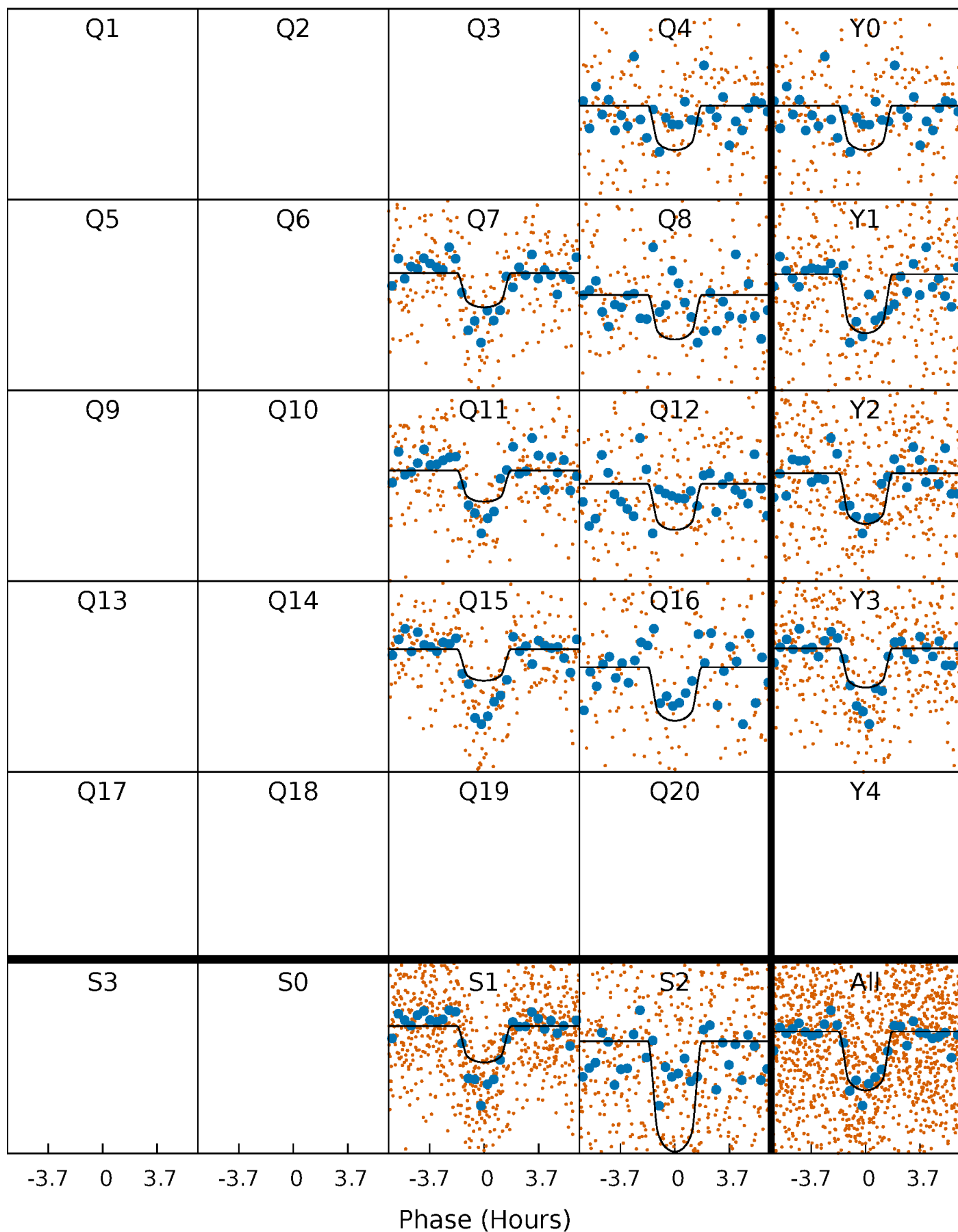
PDC Quarter-Phased Transit Curves

TCE 006781548-02 P= 9.121774 Days $T_0=135.755645$ (BKJD)



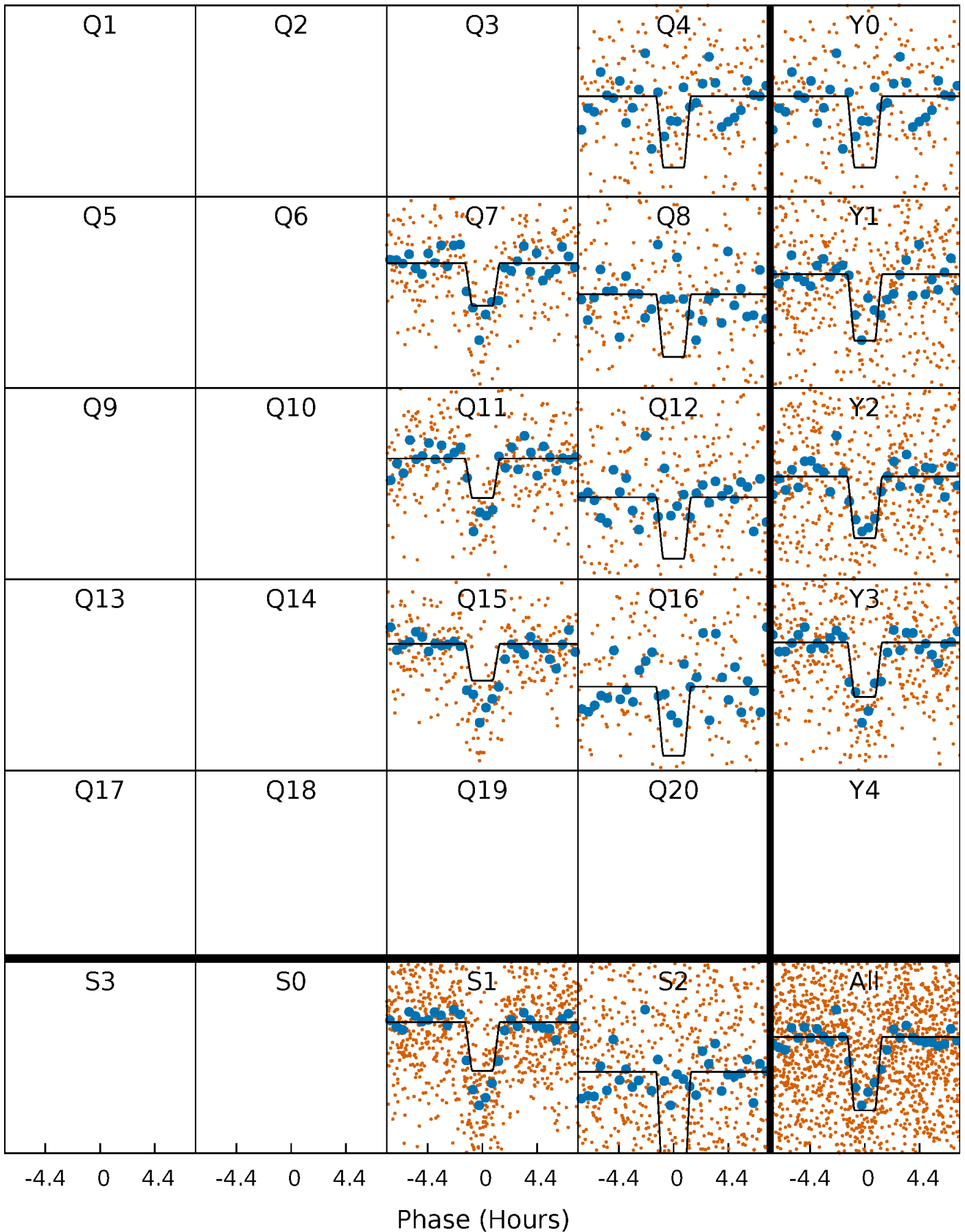
DV Quarter-Phased Transit Curves

TCE 006781548-02 P= 9.121774 Days $T_0=135.755645$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

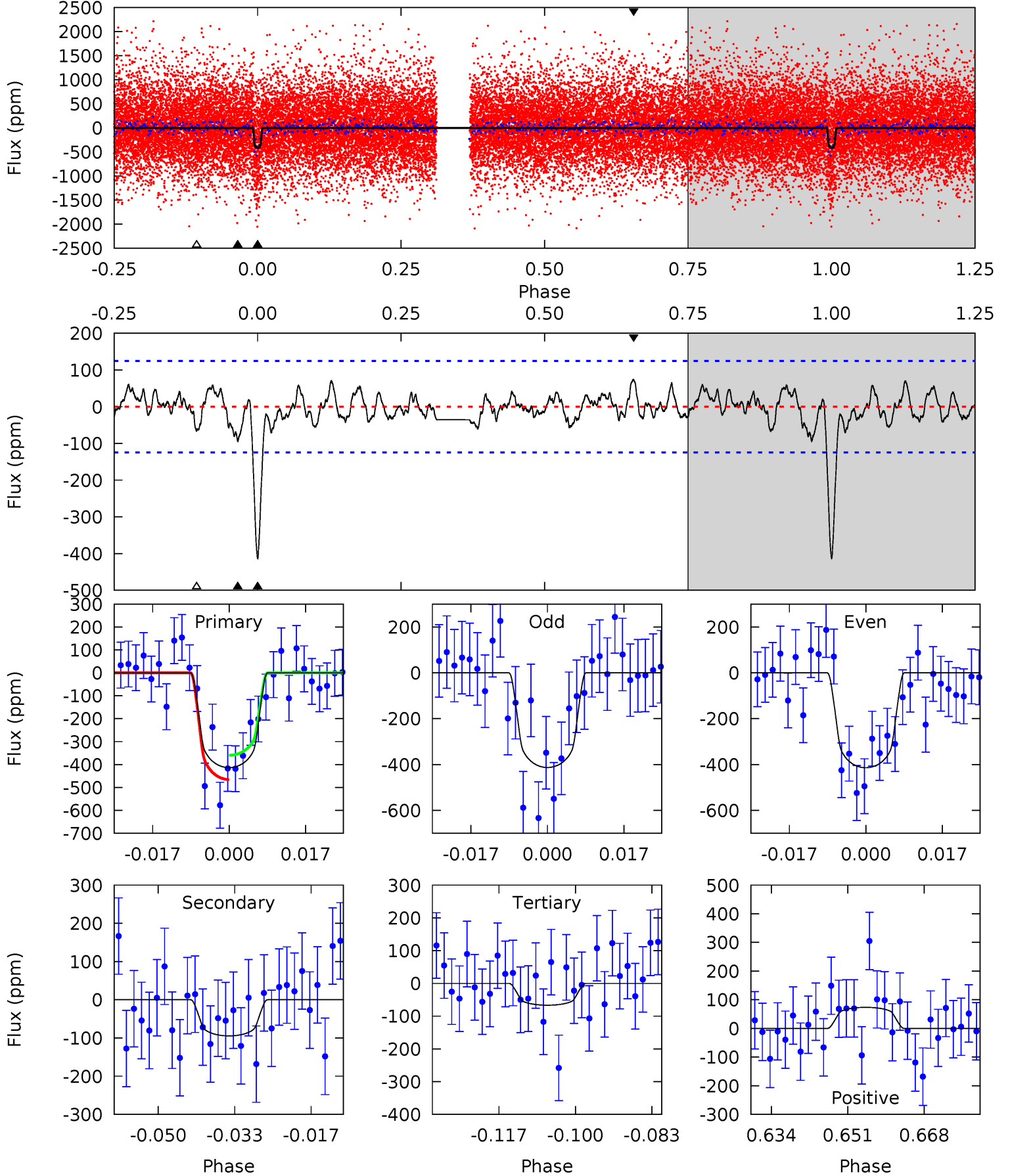
TCE 006781548-02 P= 9.121875 Days $T_0=135.741466$ (BKJD)



DV Model-Shift Uniqueness Test

006781548-02, P = 9.121774 Days, E = 135.755645 Days

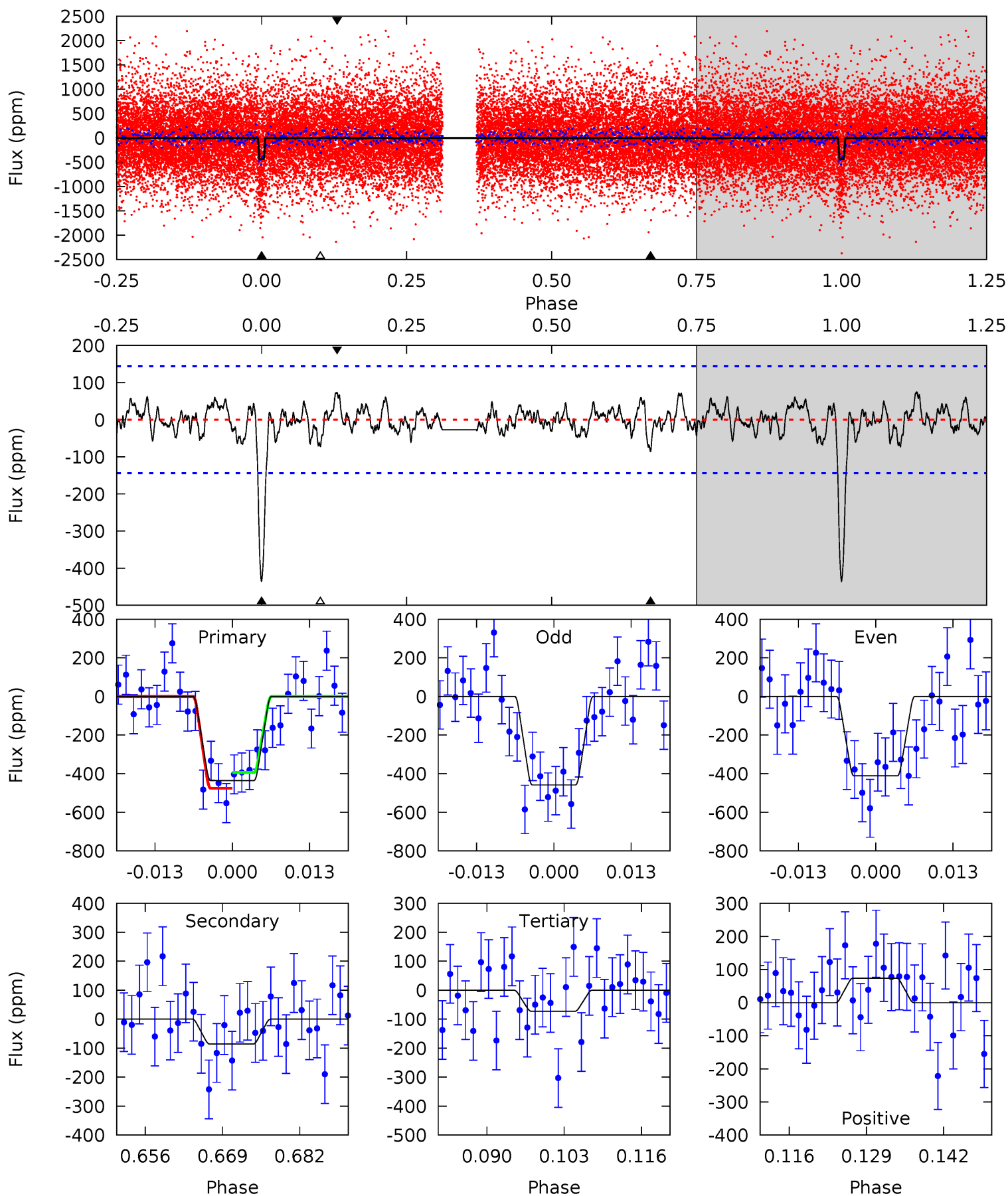
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
16.3	3.74	2.63	2.90	4.93	2.39	1.12	13.7	13.4	1.10	0.83	0.02	0.95	0.15	2.10



Alt Model-Shift Uniqueness Test

006781548-02, P = 9.121875 Days, E = 135.741466 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	2.96	2.52	2.56	4.98	2.49	0.96	12.5	12.5	0.45	0.41	0.81	1.00	0.15	1.42



Stellar Parameters For KIC 006781548

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5899^{+184}_{-205}	$4.499^{+0.040}_{-0.229}$	$0.070^{+0.250}_{-0.300}$	$0.960^{+0.312}_{-0.104}$	$1.060^{+0.124}_{-0.138}$	$1.687^{+0.372}_{-0.919}$
	+3%/-3%	+1%/-5%	+357%/-429%	+32%/-11%	+12%/-13%	+22%/-54%
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 006781548-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-95 ± 25	$2.46^{+1.23}_{-1.19}$	1243^{+92}_{-62}	4177^{+1230}_{-571}	63^{+169}_{-36}
Alt.	-86 ± 29	$2.52^{+1.37}_{-1.09}$	1242^{+91}_{-66}	4036^{+1078}_{-577}	55^{+112}_{-34}

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

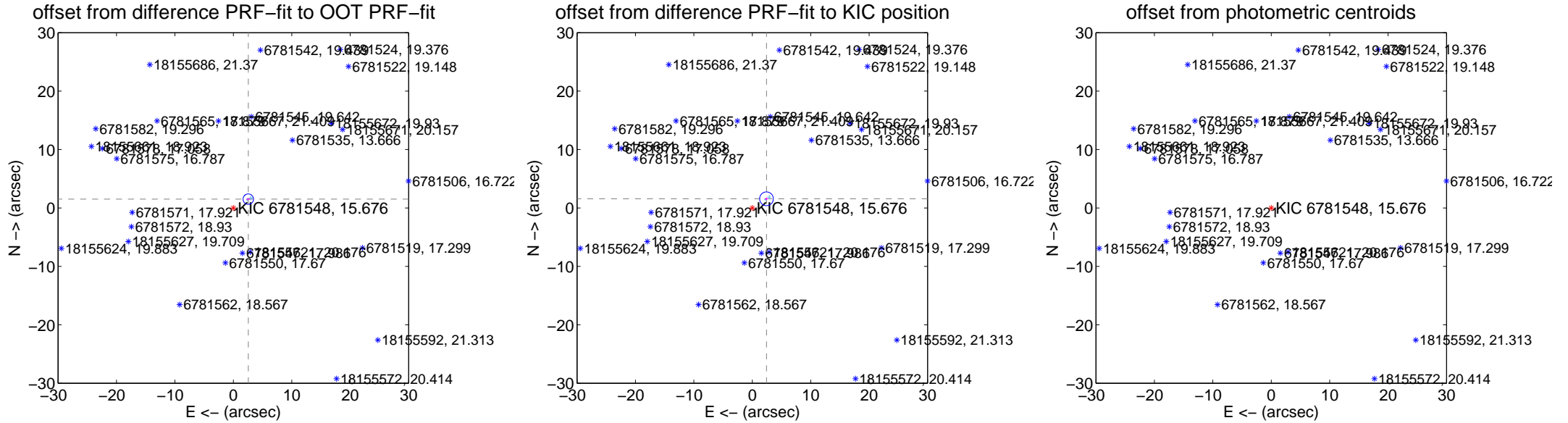
DV Centroid Data

Supplemental centroid analysis for 006781548-02. Kepler magnitude: 15.68. Transit SNR 12.86

There are 2 quarters with good PRF difference image offsets

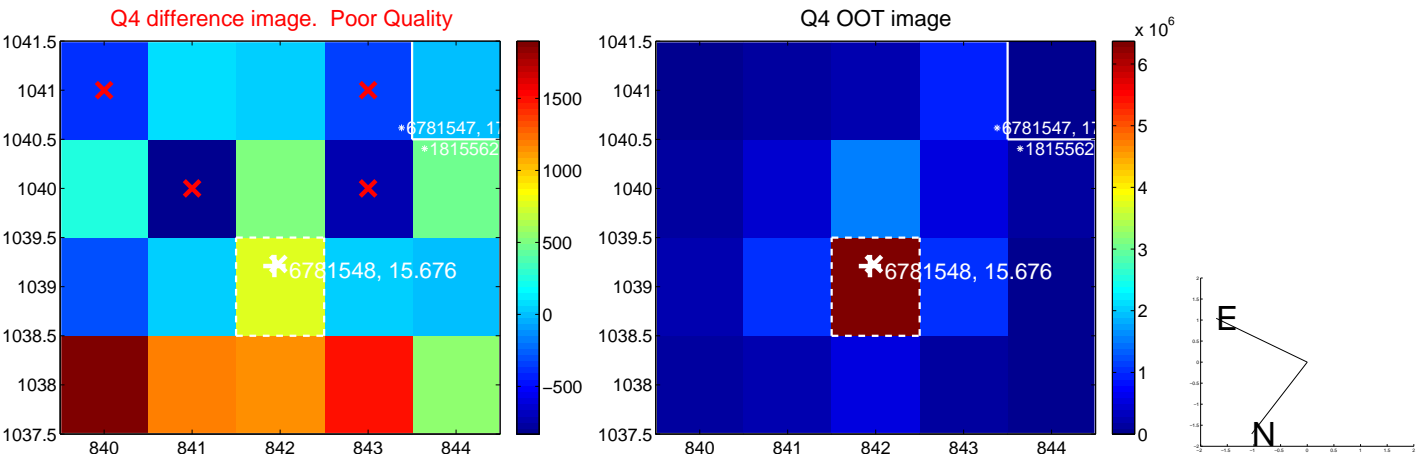
The direct PRF centroid is offset from the target star catalog position by about 0.18 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	2.968 ± 0.298	9.95	-2.557 ± 0.331	1.508 ± 0.173
PRF-fit source offset from KIC position	2.891 ± 0.392	7.37	-2.429 ± 0.331	1.568 ± 0.220
photometric centroid source offset	49.06 ± 1.06	46.12	-38.44 ± 1.01	30.49 ± 1.14



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.

Q5 no difference image



Q5 no OOT image



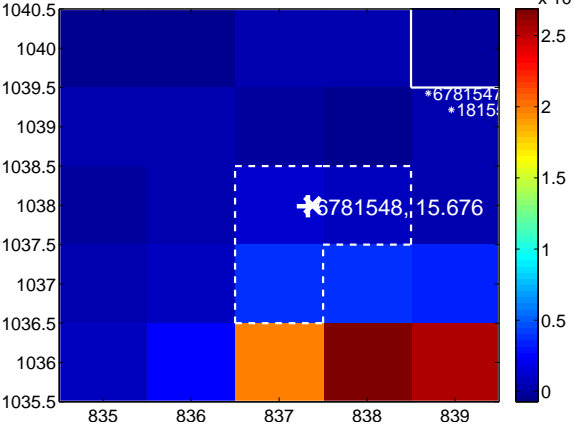
Q6 no difference image



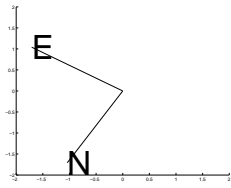
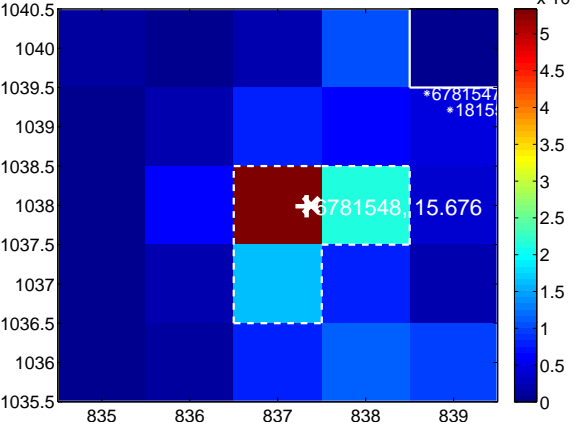
Q6 no OOT image



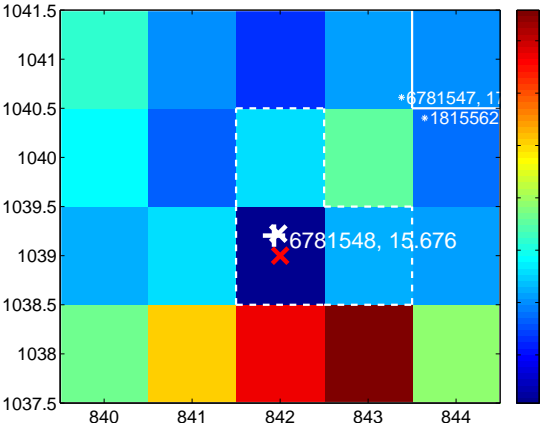
Q7 difference image. Poor Quality



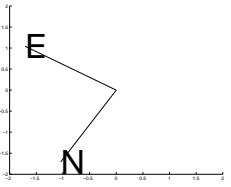
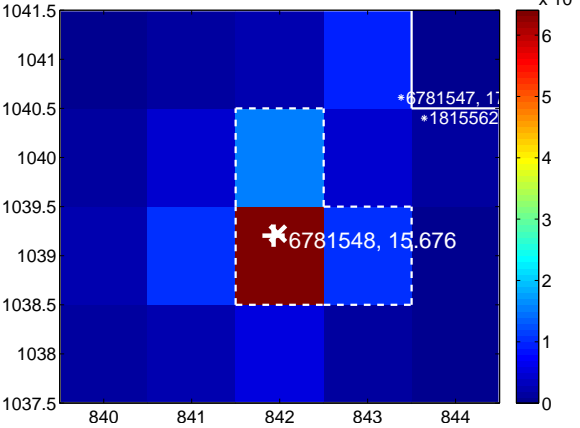
Q7 OOT image



Q8 difference image. Poor Quality



Q8 OOT image



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

Q9 no difference image



Q9 no OOT image



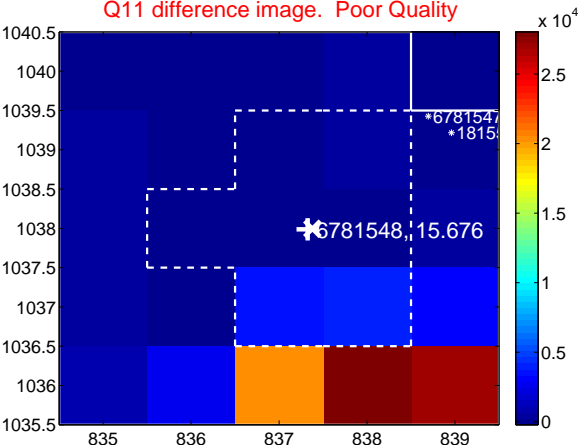
Q10 no difference image



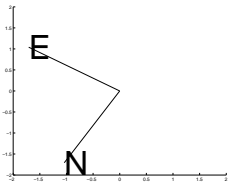
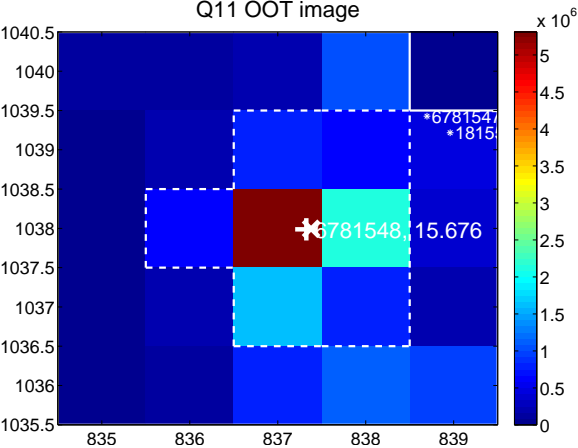
Q10 no OOT image



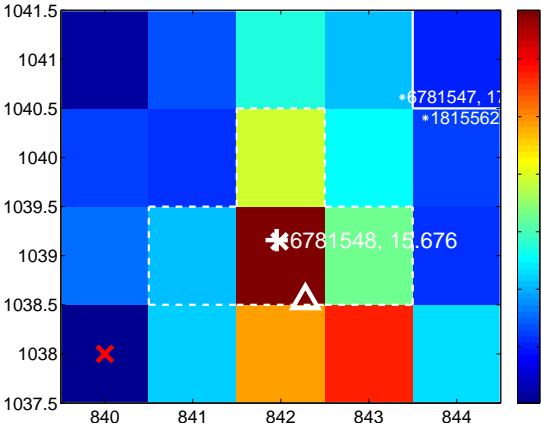
Q11 difference image. Poor Quality



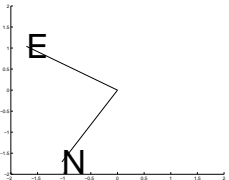
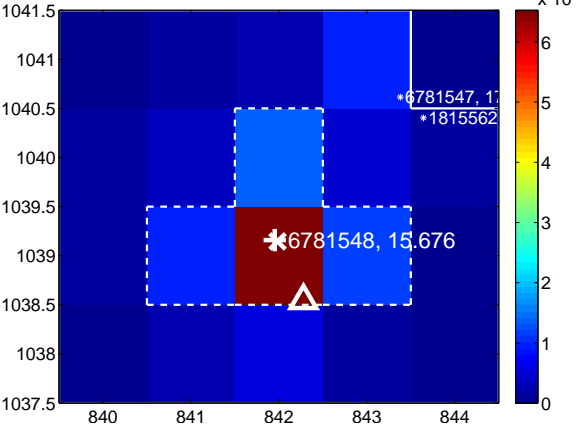
Q11 OOT image



Q12 difference image



Q12 OOT image



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

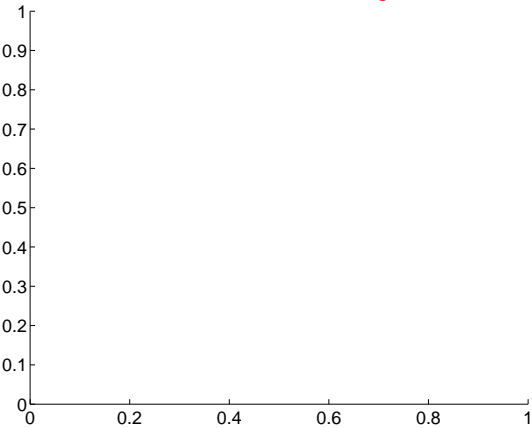
Q13 no difference image



Q13 no OOT image



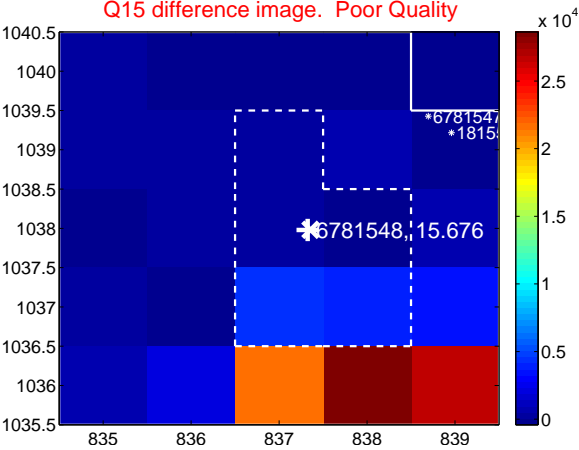
Q14 no difference image



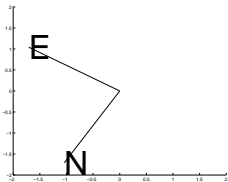
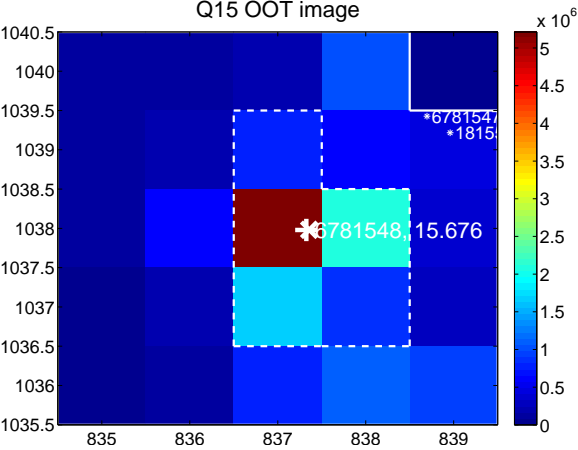
Q14 no OOT image



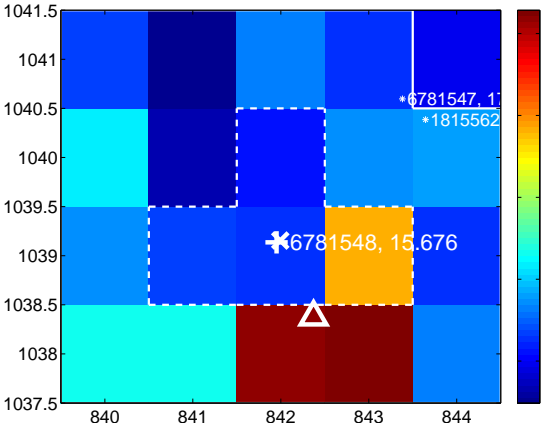
Q15 difference image. Poor Quality



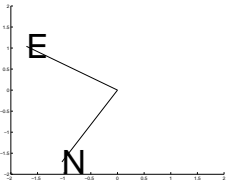
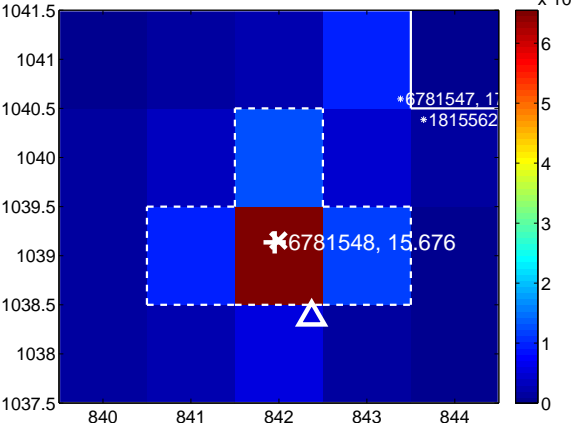
Q15 OOT image



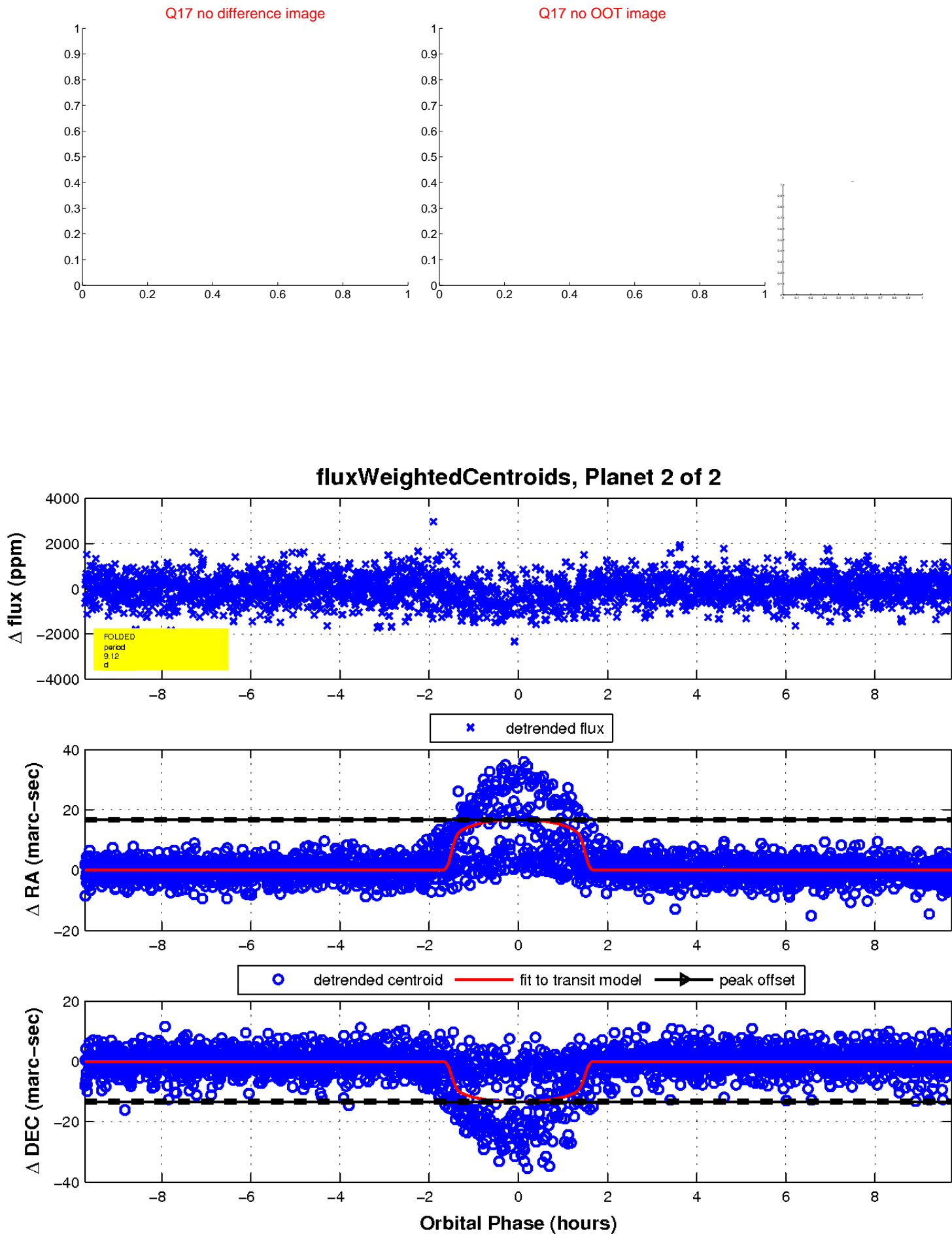
Q16 difference image



Q16 OOT image



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



UKIRT Image

Declination

