

KIC 009784213

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})
009784213-01	OBS	No	468.306698	312.074600	1934.5	7.998	11.0	7.0	0.91	5280	4.04	0.47
009784213-02	OBS	No	291.263593	191.723706	1765.0	3.235	10.2	7.4	0.91	5280	3.83	0.88

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009784213-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_SKYE—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009784213-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—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.

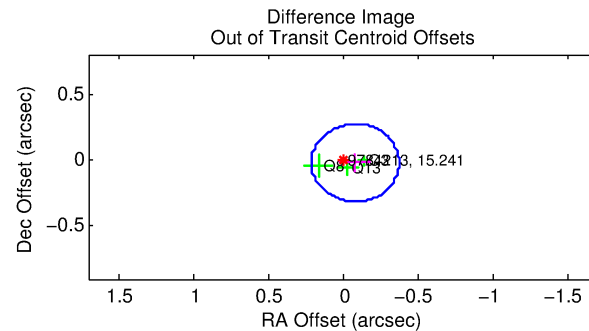
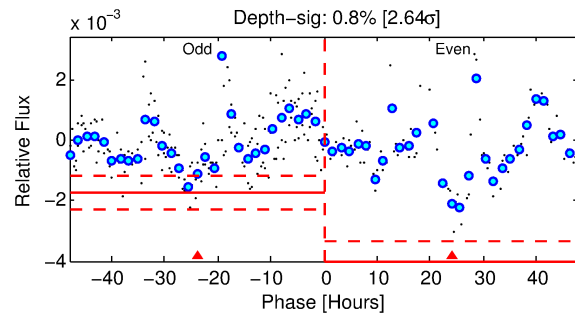
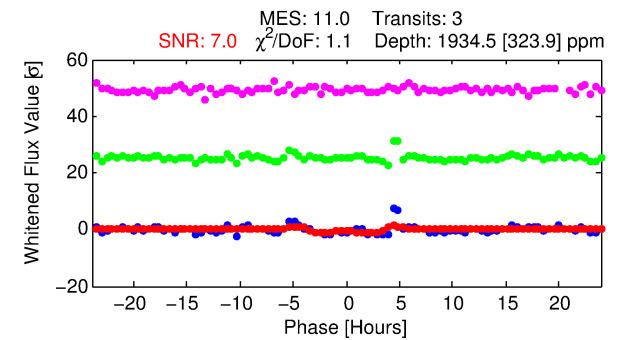
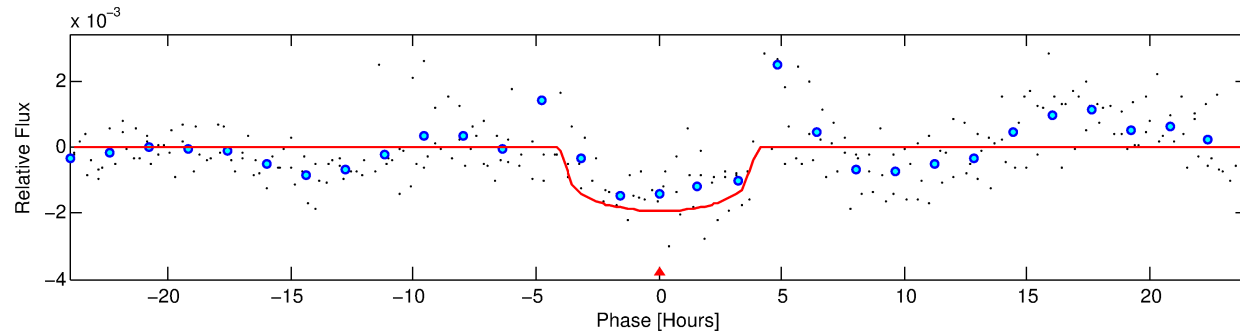
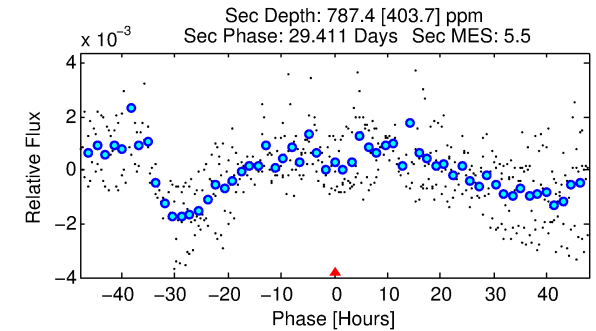
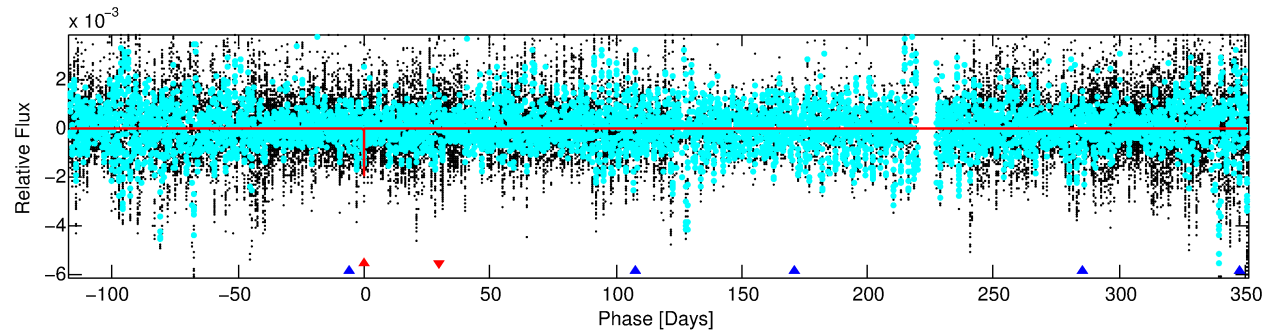
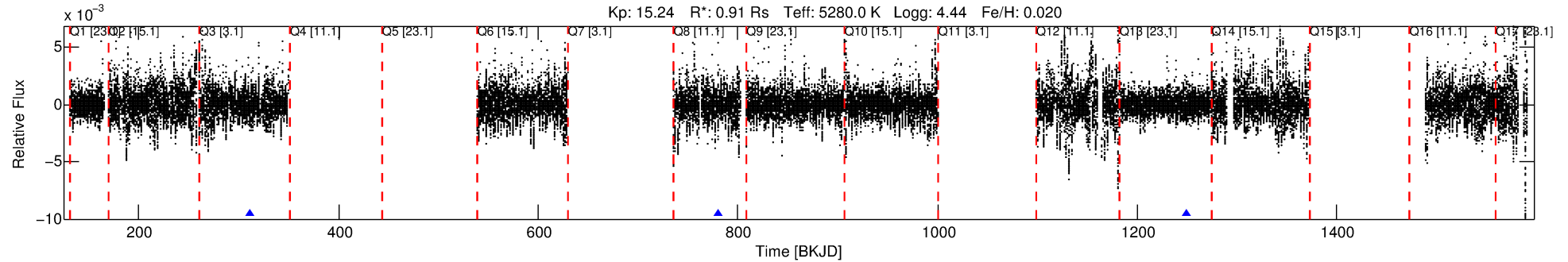
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009784213-01

No Significant Match Found

DV One-Page Summary

KIC: 9784213 Candidate: 1 of 2 Period: 468.307 d



DV Fit Results:

Period = 468.30670 [0.00540] d
Epoch = 312.0746 [0.0076] BKJD
Rp/R* = 0.0409 [0.0206]
a/R* = 406.38 [725.92]
b = 0.51 [2.63]
Seff = 0.47 [0.22]
Teff = 211 [25] K
Rp = 4.04 [2.33] Re
a = 1.1028 [0.3054] AU
Ag = 32301.13 [39286.50] [0.82 σ]
Teffp = 4374 [1244] K [3.34 σ]

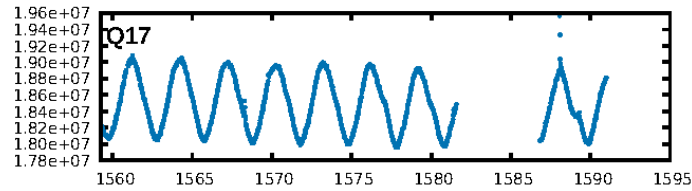
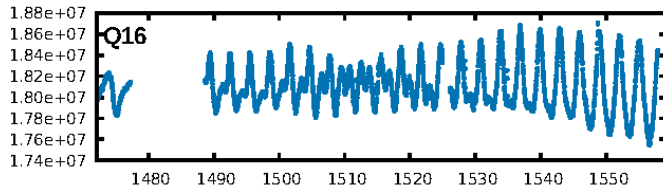
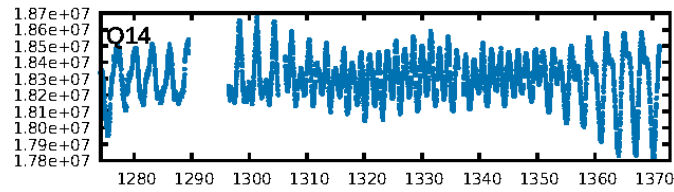
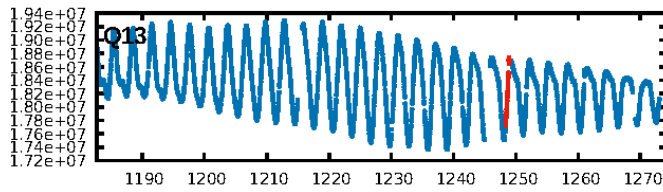
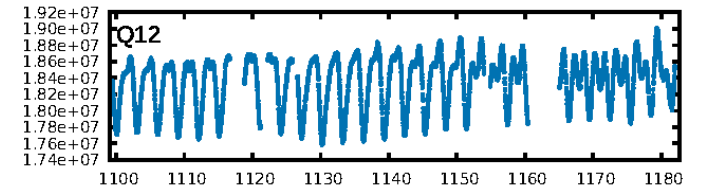
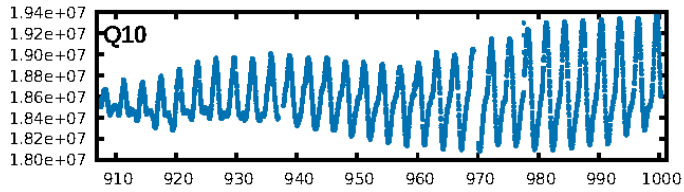
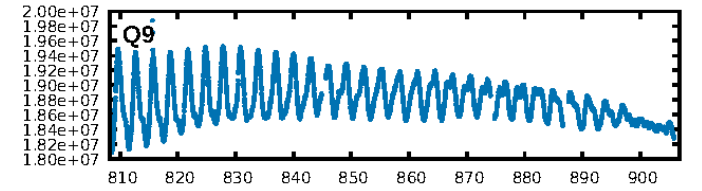
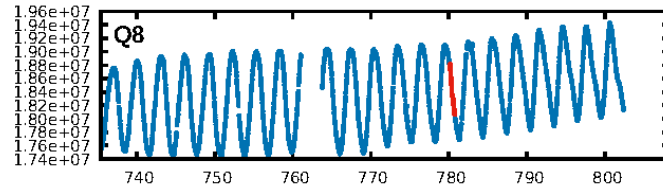
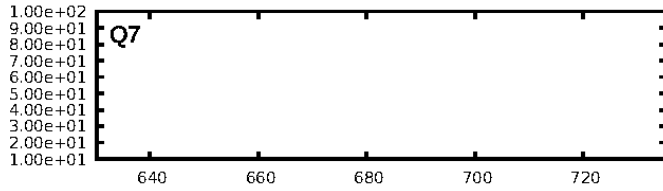
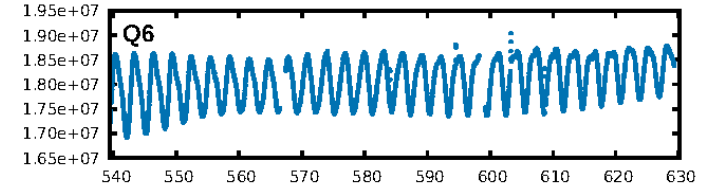
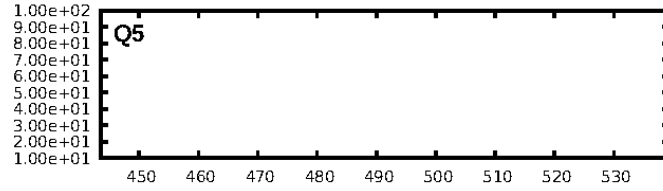
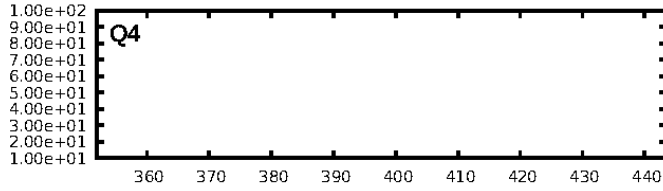
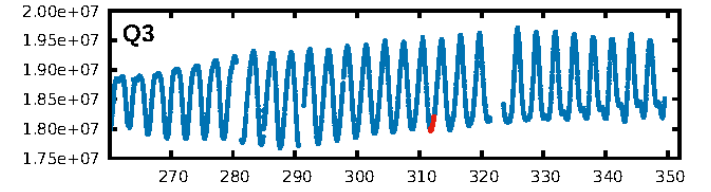
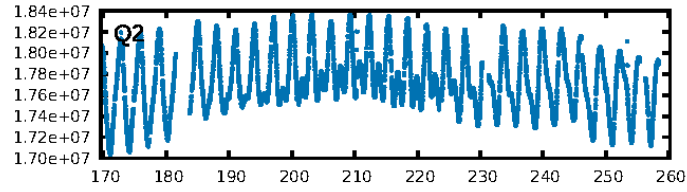
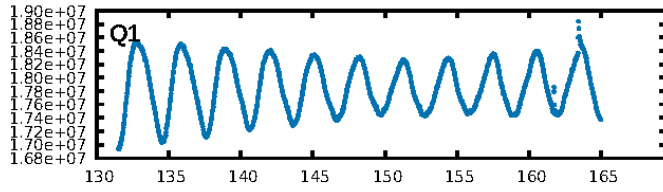
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [492.48 σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 2.5%
ModelChiSquareGof-sig: 97.6%
Bootstrap-pfa: 1.44e-10
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 1.312
Centroid-sig: 1.2%
Centroid-so: 0.860 arcsec [1.07 σ]
OotOffset-rm: 0.087 arcsec [0.89 σ]
OotOffset-st: 0/1/1/1 [3]
KicOffset-rm: 0.041 arcsec [0.36 σ]
KicOffset-st: 0/1/1/1 [3]
DiffImageQuality-fgm: 0.67 [2/3]
DiffImageOverlap-fno: 1.00 [3/3]

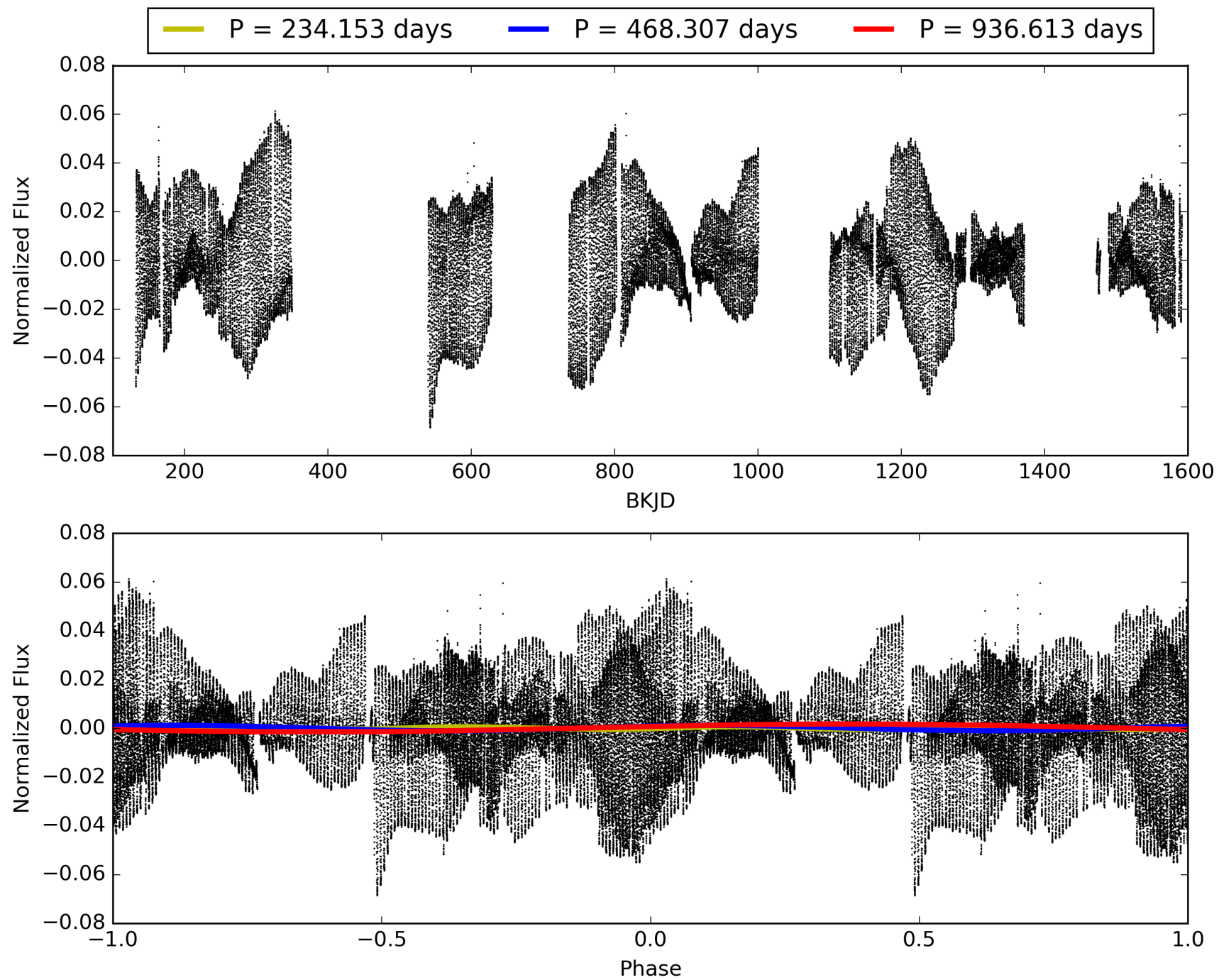
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 16:46:58 Z

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

TCE 009784213-01, PDC Light Curves

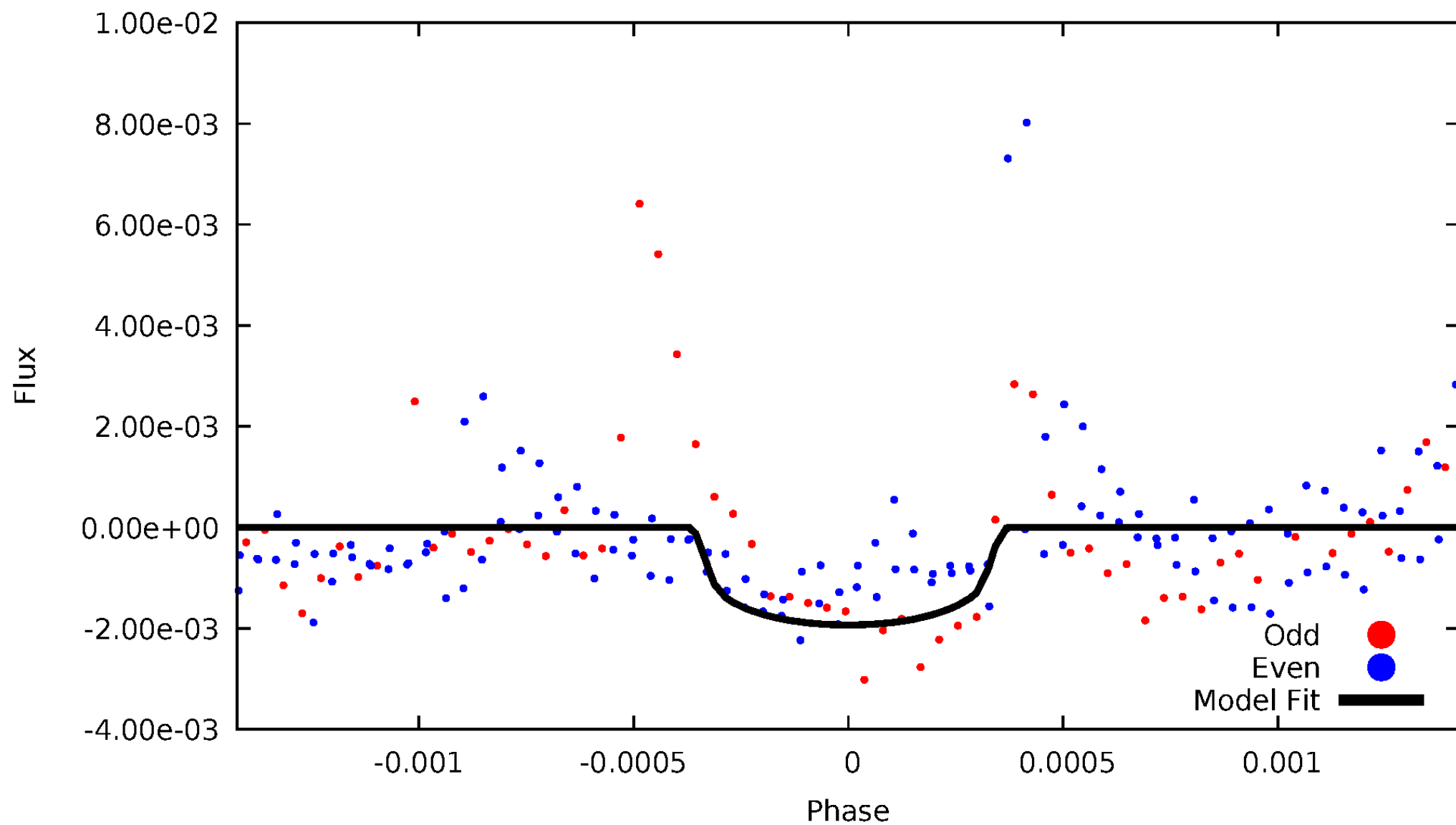


TCE 009784213-01



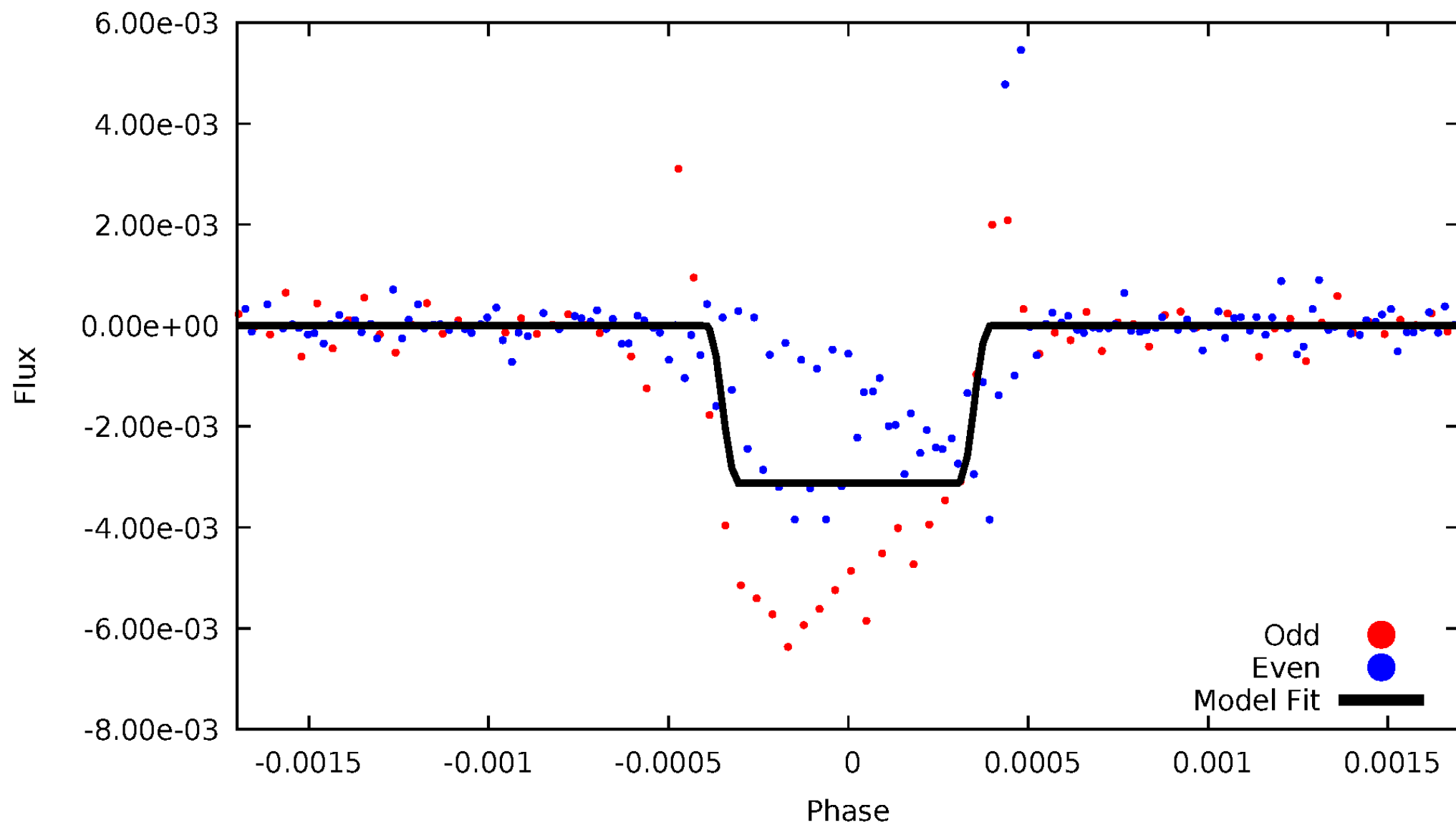
DV Odd/Even

TCE 009784213-01

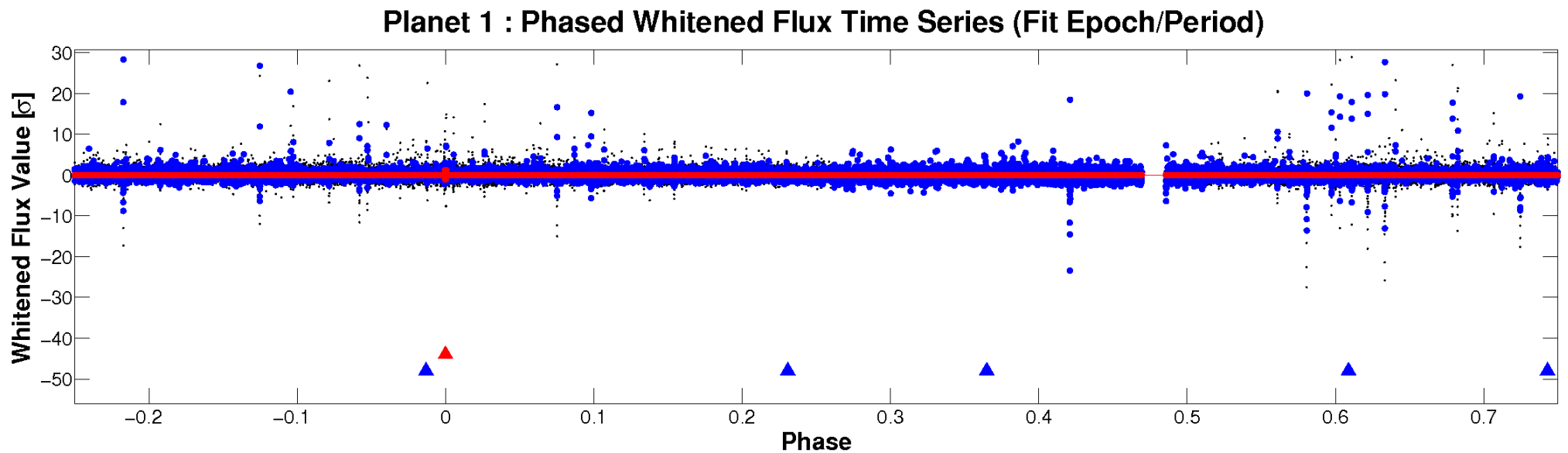
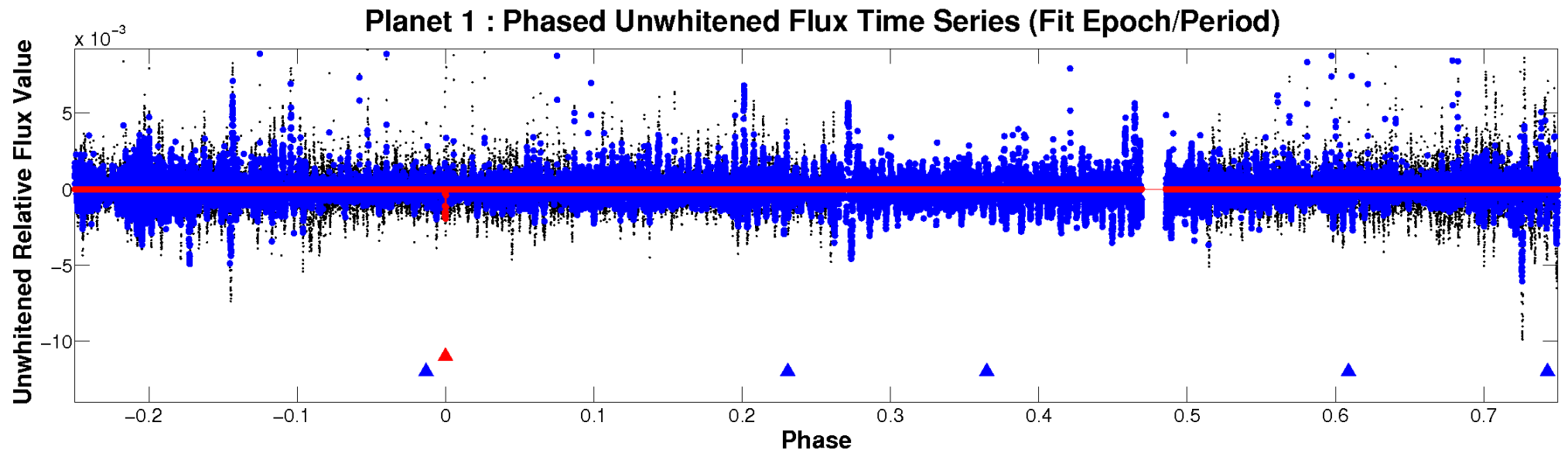


ALT Odd/Even

TCE 009784213-01

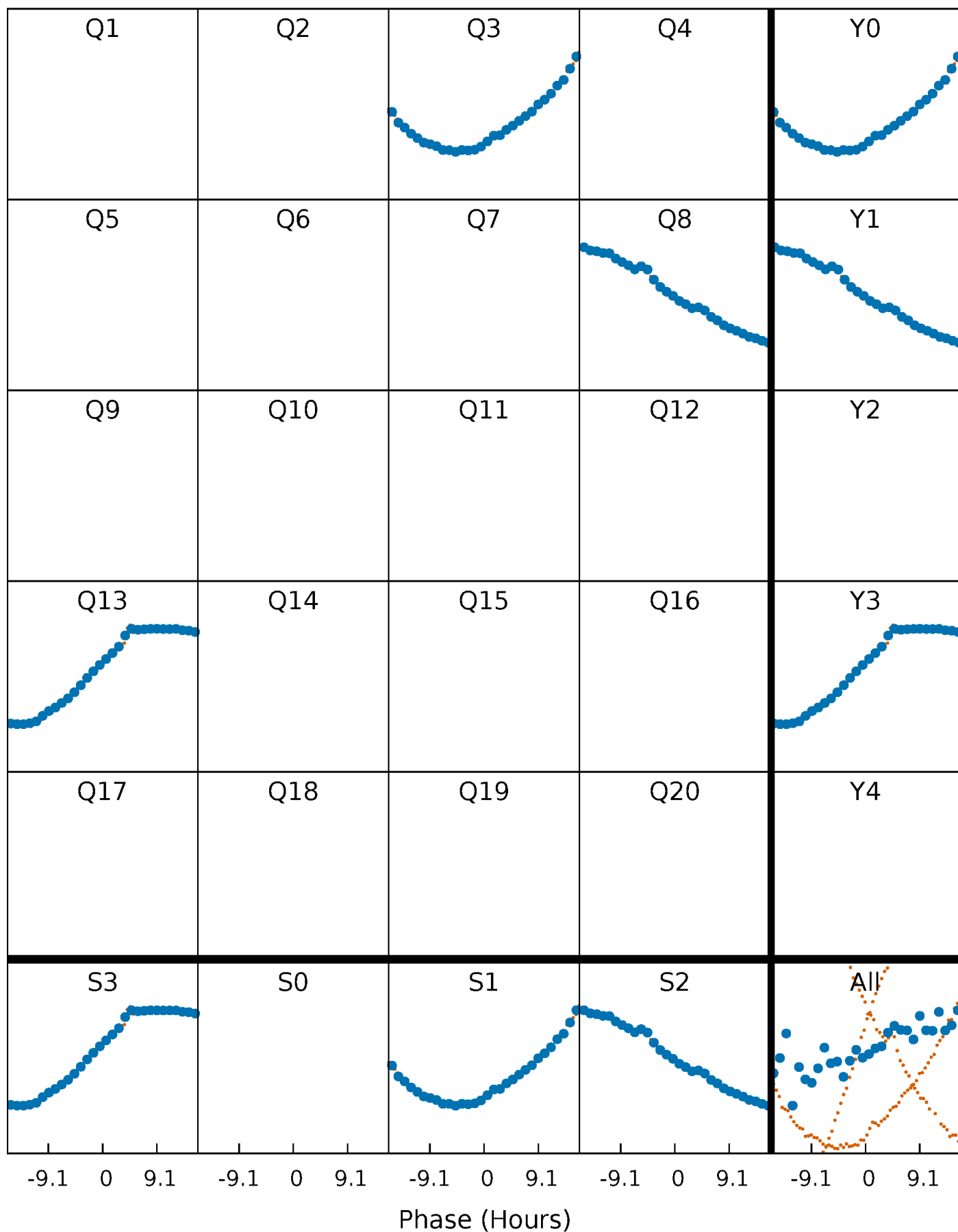


Non-Whitened Vs. Whitened Light Curve



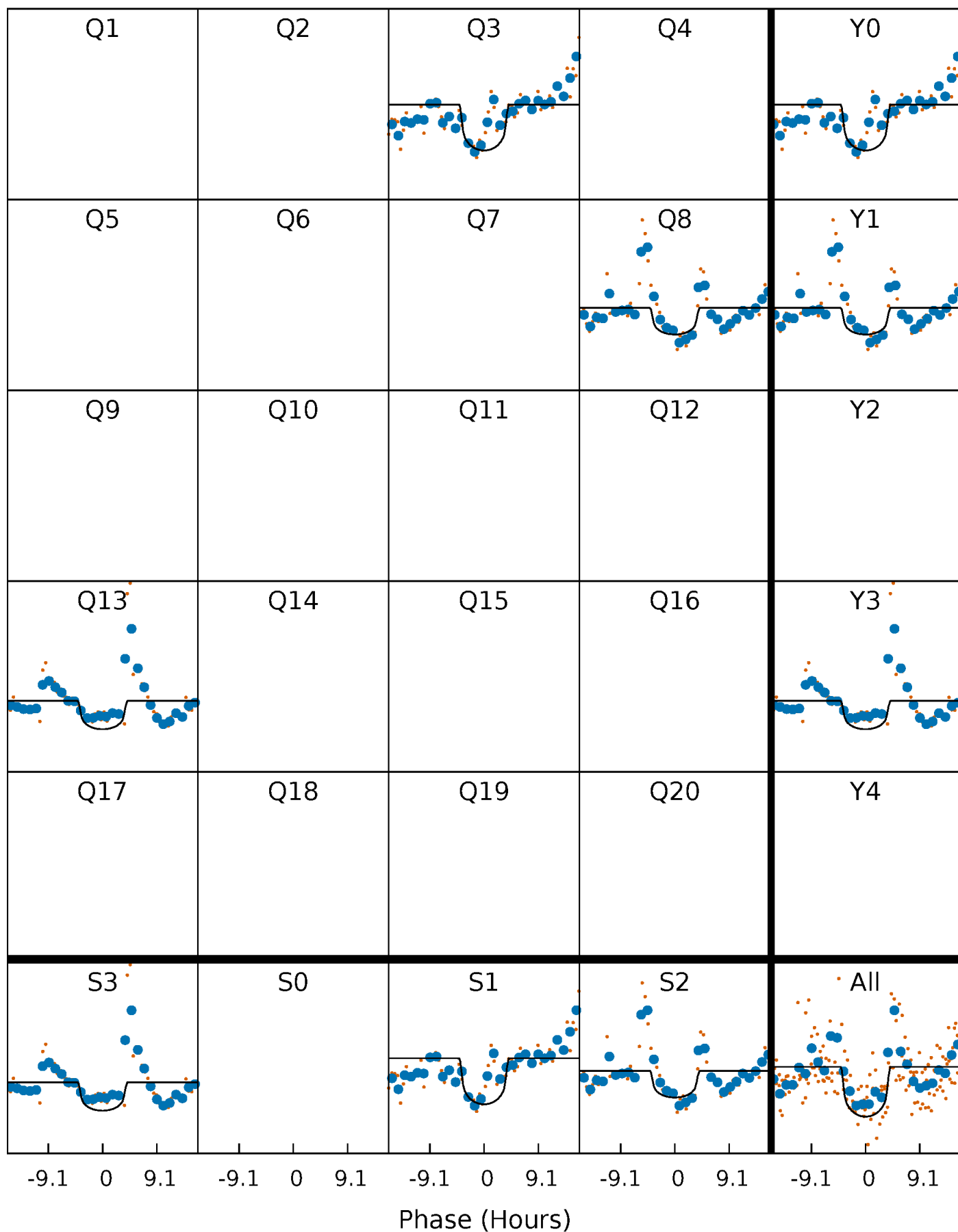
PDC Quarter-Phased Transit Curves

TCE 009784213-01 P=468.306698 Days $T_0=312.074600$ (BKJD)



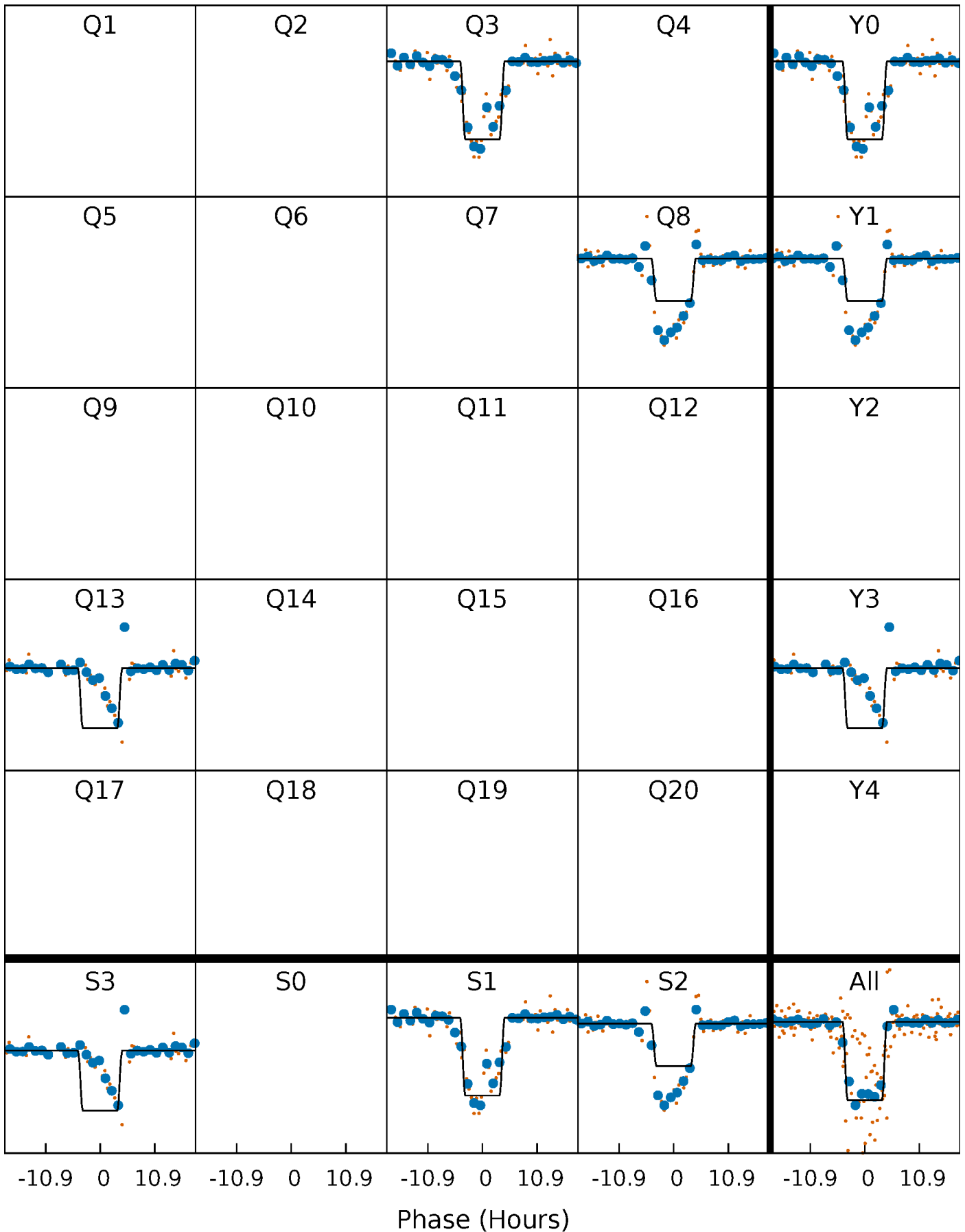
DV Quarter-Phased Transit Curves

TCE 009784213-01 P=468.306698 Days $T_0=312.074600$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

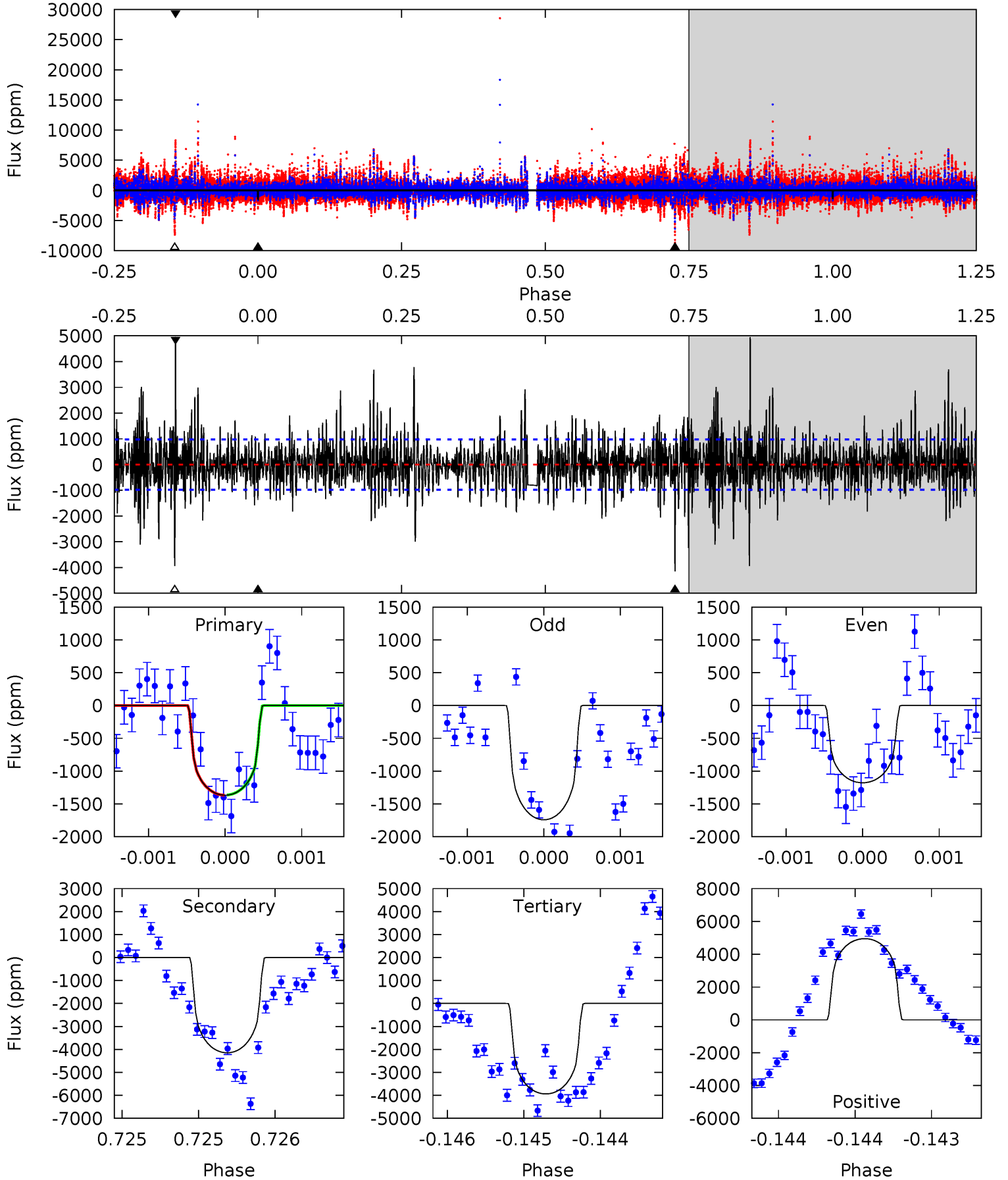
TCE 009784213-01 P=468.282706 Days $T_0=312.092326$ (BKJD)



DV Model-Shift Uniqueness Test

009784213-01, P = 468.306698 Days, E = 312.074600 Days

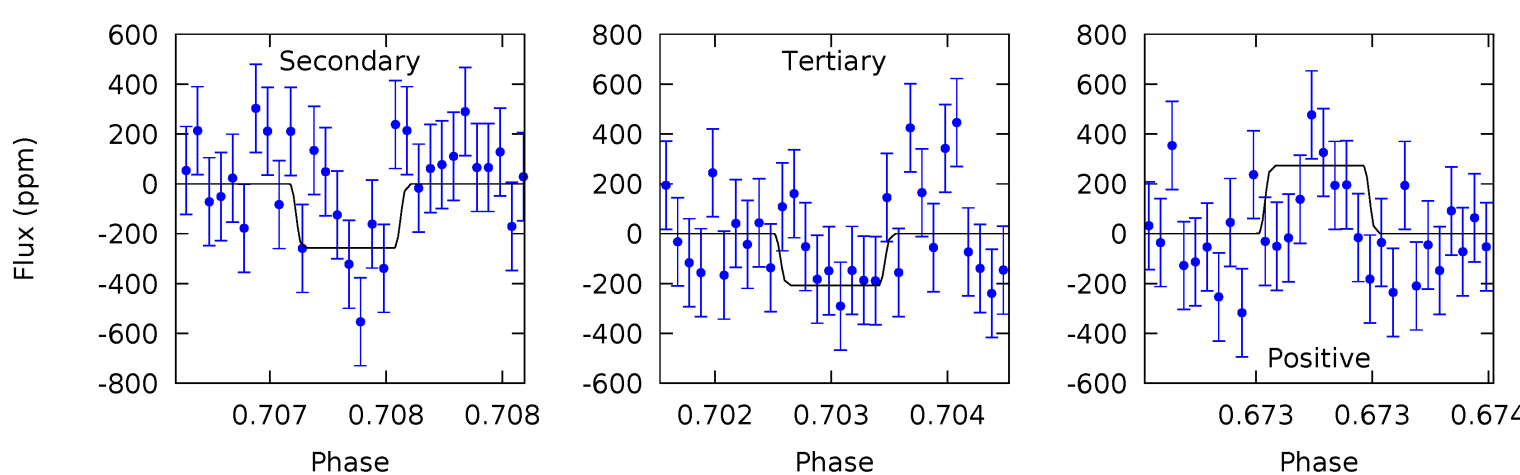
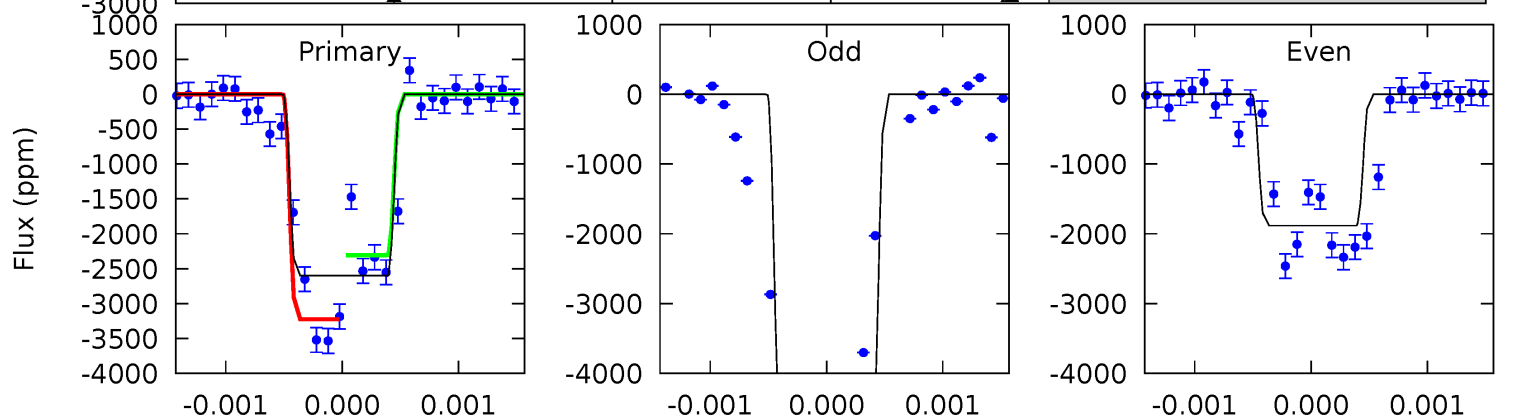
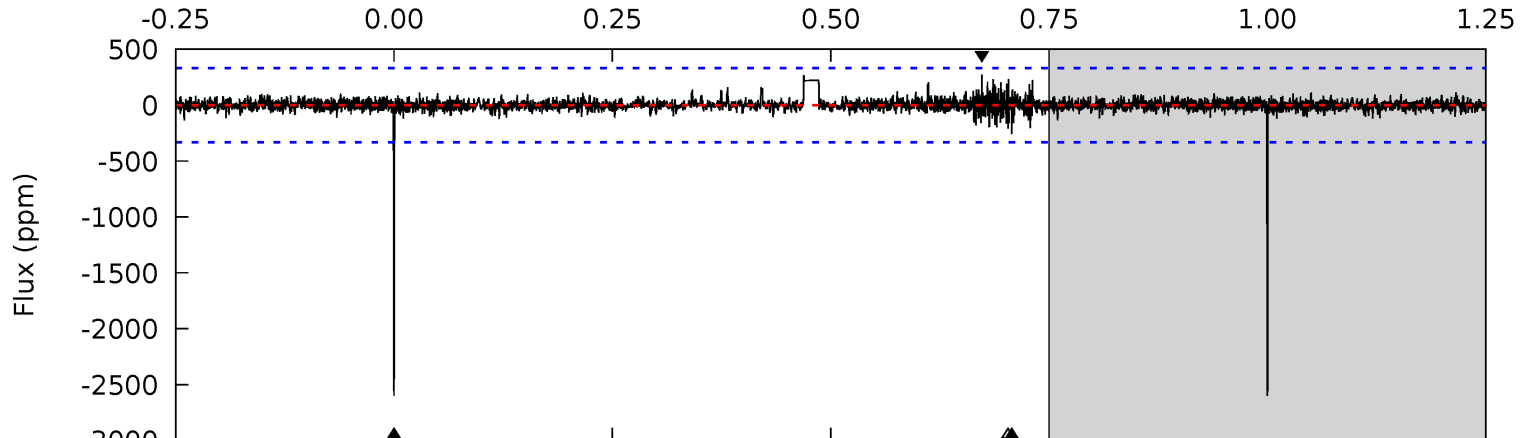
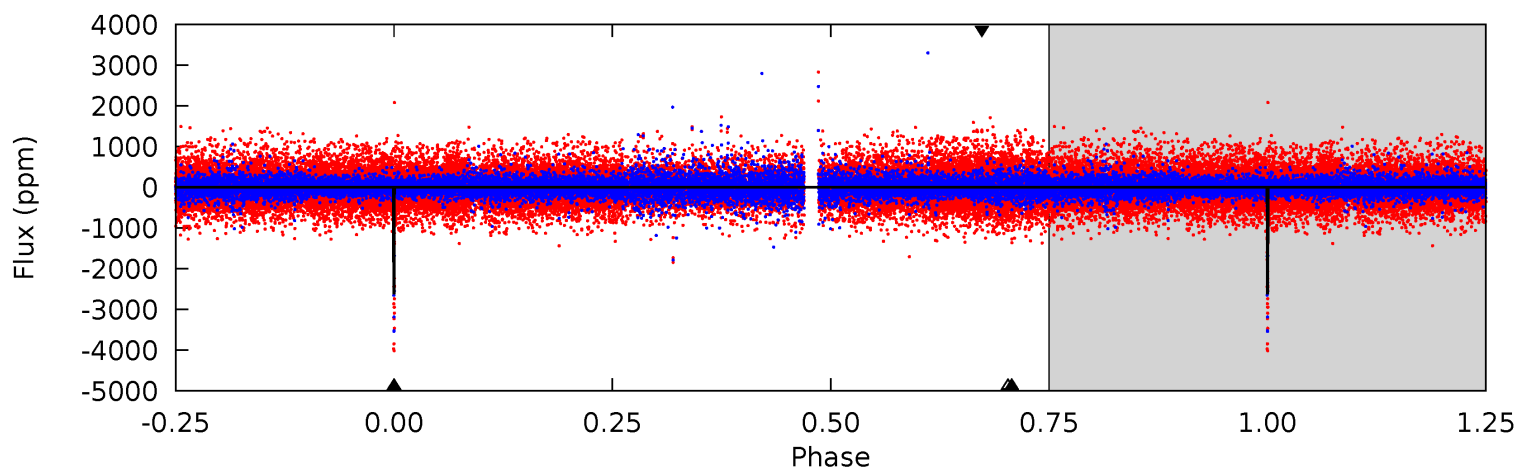
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.71	23.4	22.2	27.9	5.50	3.37	4.27	-14.5	-20.2	1.19	-4.53	1.47	1.14	0.54	0.01



Alt Model-Shift Uniqueness Test

009784213-01, P = 468.282706 Days, E = 312.092326 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
43.1	4.28	3.44	4.53	5.50	3.36	0.62	39.7	38.6	0.83	-0.25	29.7	1.11	0.10	0



Stellar Parameters For KIC 009784213

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5280^{+174}_{-158}	$4.436^{+0.123}_{-0.266}$	$0.020^{+0.300}_{-0.250}$	$0.905^{+0.254}_{-0.137}$	$0.816^{+0.114}_{-0.066}$	$1.550^{+0.768}_{-0.867}$
	+3%/-3%	+3%/-6%	+1500%/-1250%	+28%/-15%	+14%/-8%	+50%/-56%
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 009784213-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-4149 ± 177	$4.21^{+2.21}_{-1.89}$	300^{+26}_{-19}	6583^{+2935}_{-1159}	$157969^{+378998}_{-89667}$
Alt.	-258 ± 60	$5.72^{+2.43}_{-2.16}$	301^{+26}_{-19}	3352^{+608}_{-328}	5161^{+9049}_{-2658}

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

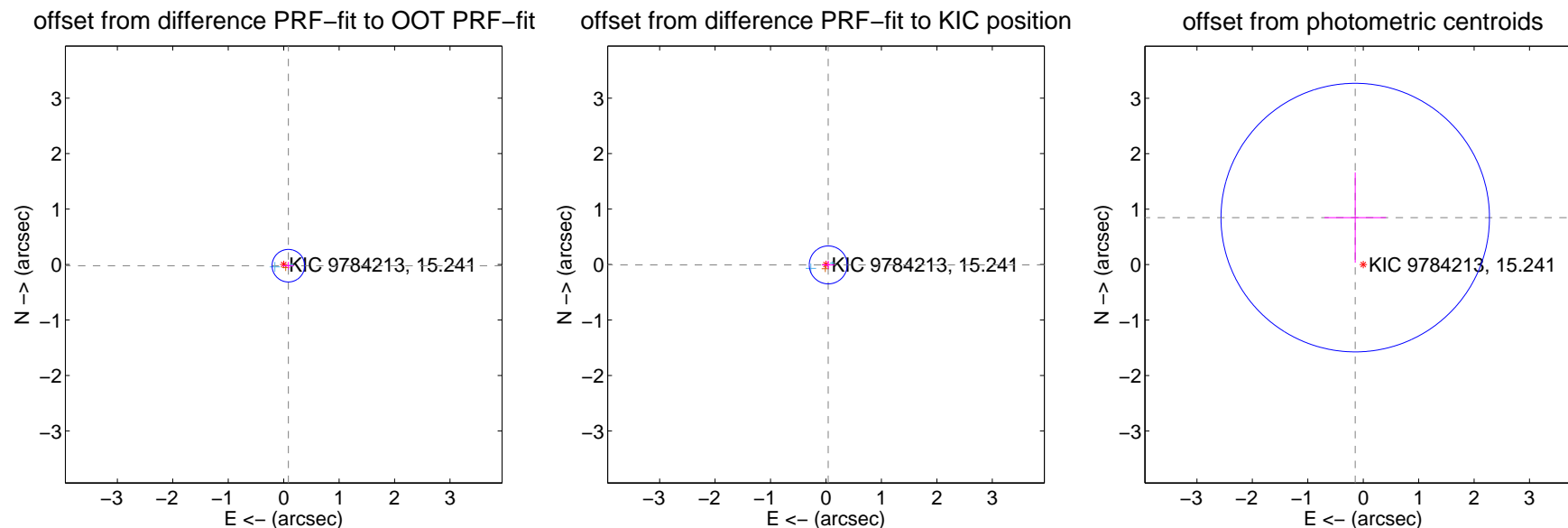
DV Centroid Data

Supplemental centroid analysis for 009784213-01. Kepler magnitude: 15.24. Transit SNR 6.97

There are 2 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.05 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.087 ± 0.098	0.89	-0.084 ± 0.099	-0.021 ± 0.069
PRF-fit source offset from KIC position	0.041 ± 0.114	0.36	-0.041 ± 0.115	-0.006 ± 0.076
photometric centroid source offset	0.86 ± 0.81	1.07	0.14 ± 0.55	0.85 ± 0.81



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.

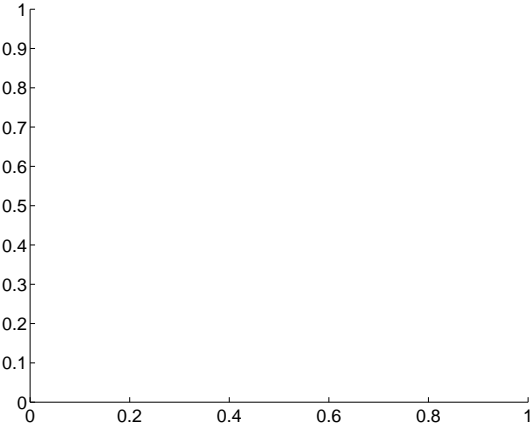
Q1 no difference image



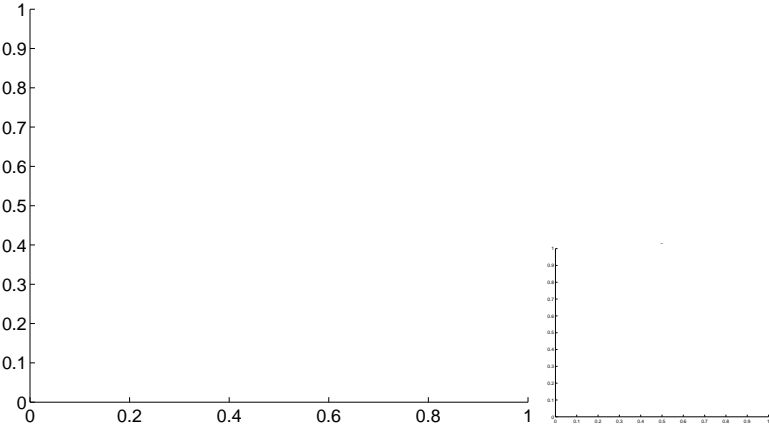
Q1 no OOT image



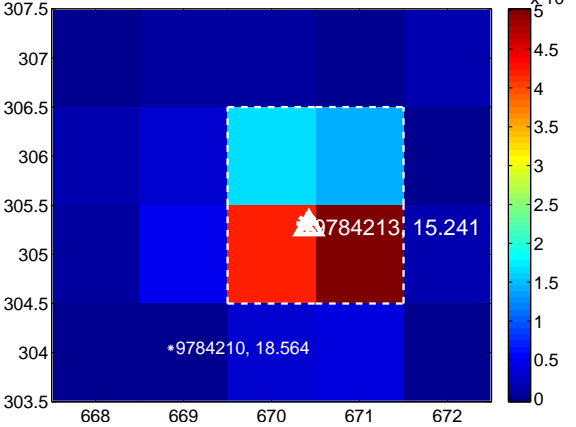
Q2 no difference image



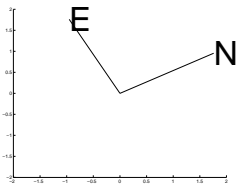
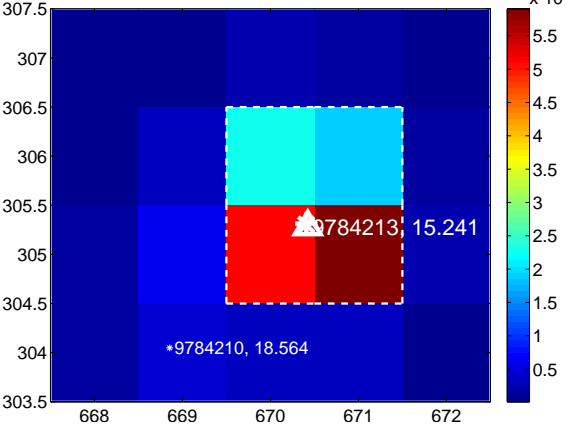
Q2 no OOT image



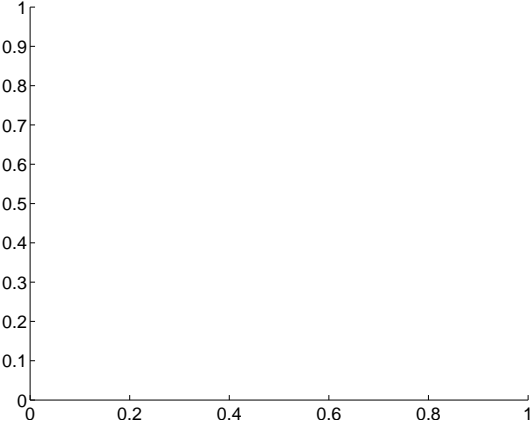
Q3 difference image



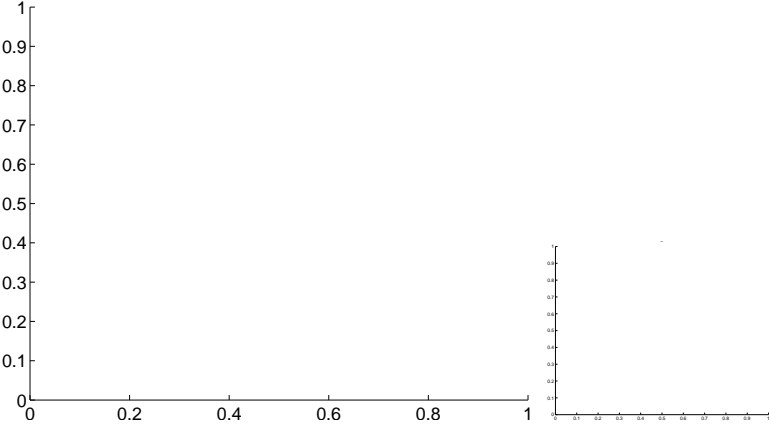
Q3 OOT image



Q4 no difference image



Q4 no OOT image



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



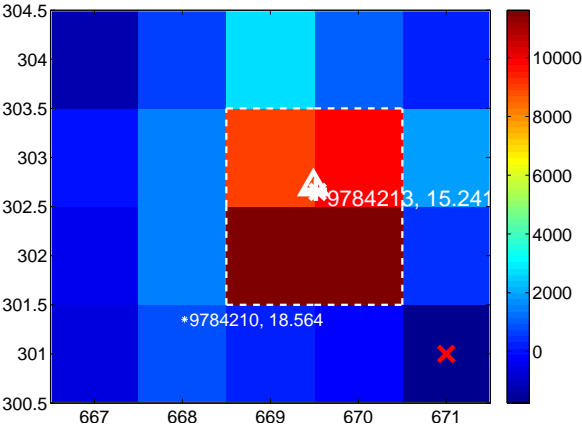
Q7 no difference image



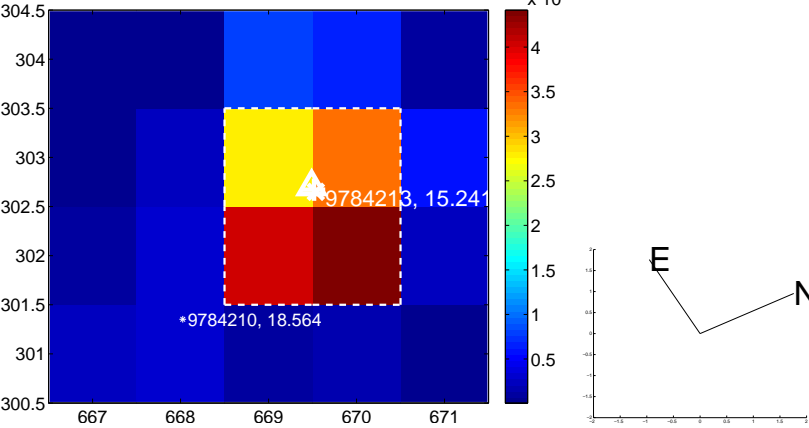
Q7 no OOT image



Q8 difference image



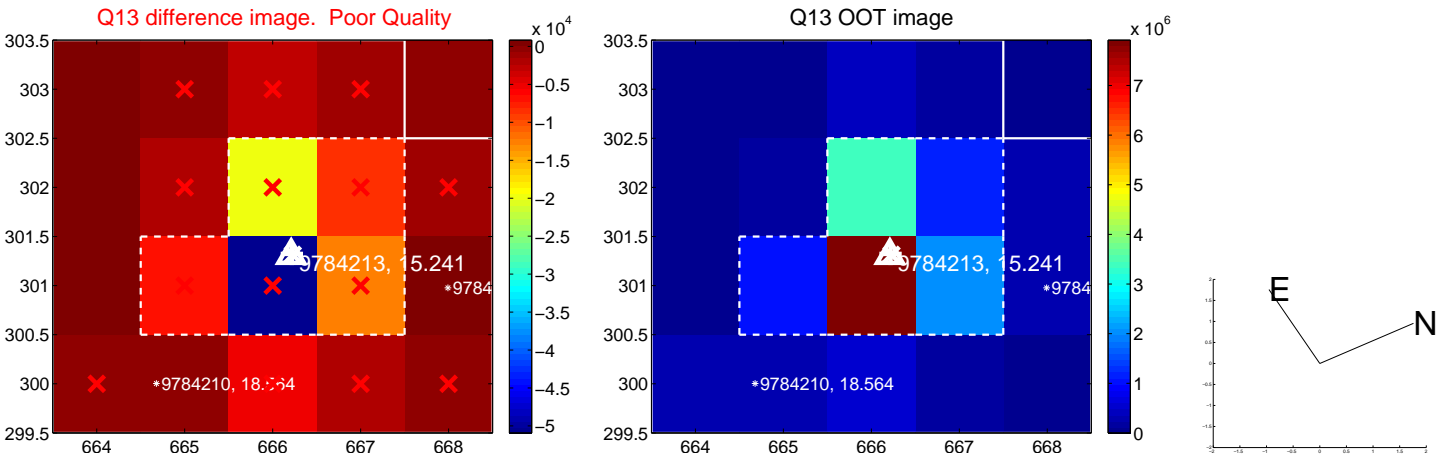
Q8 OOT image



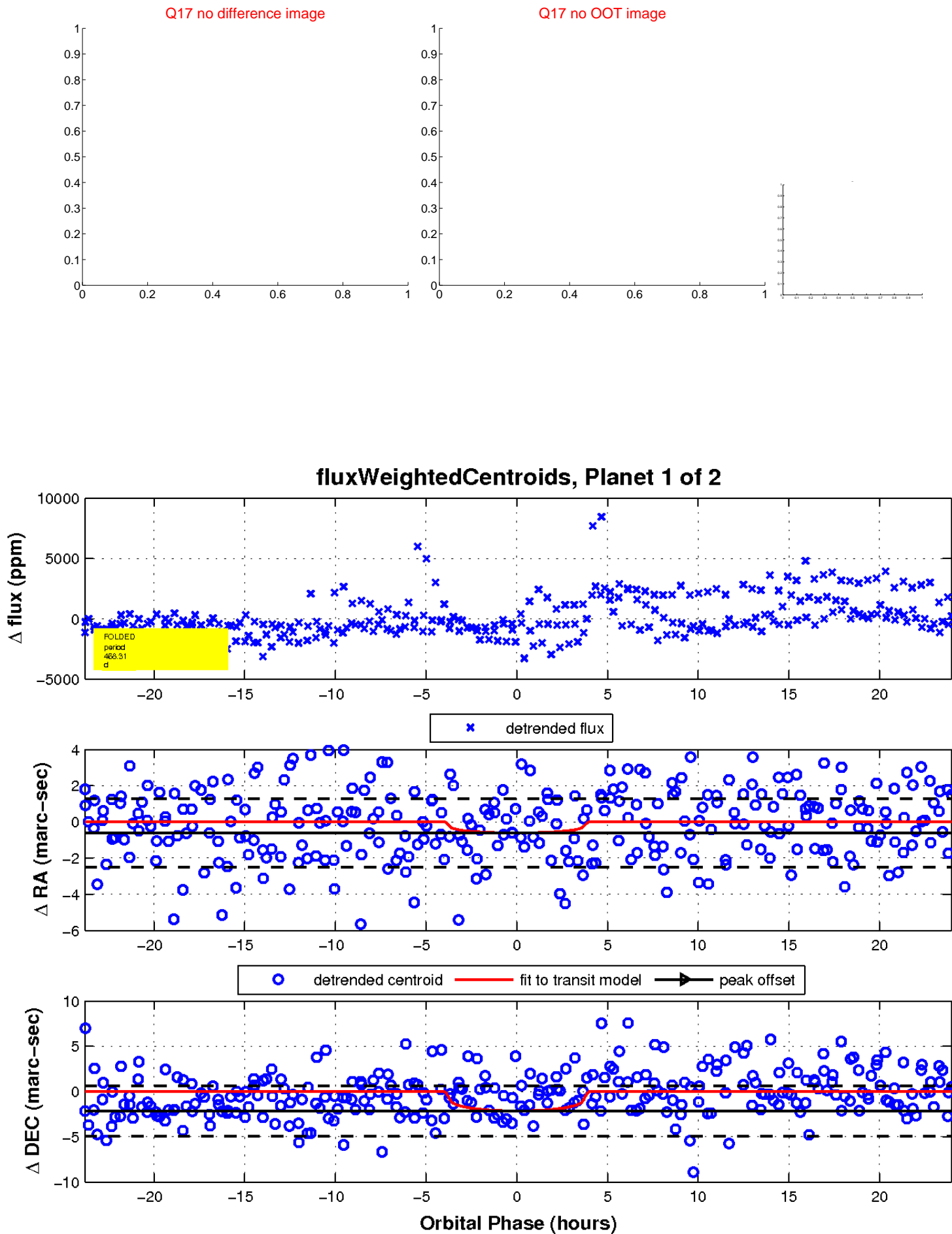
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

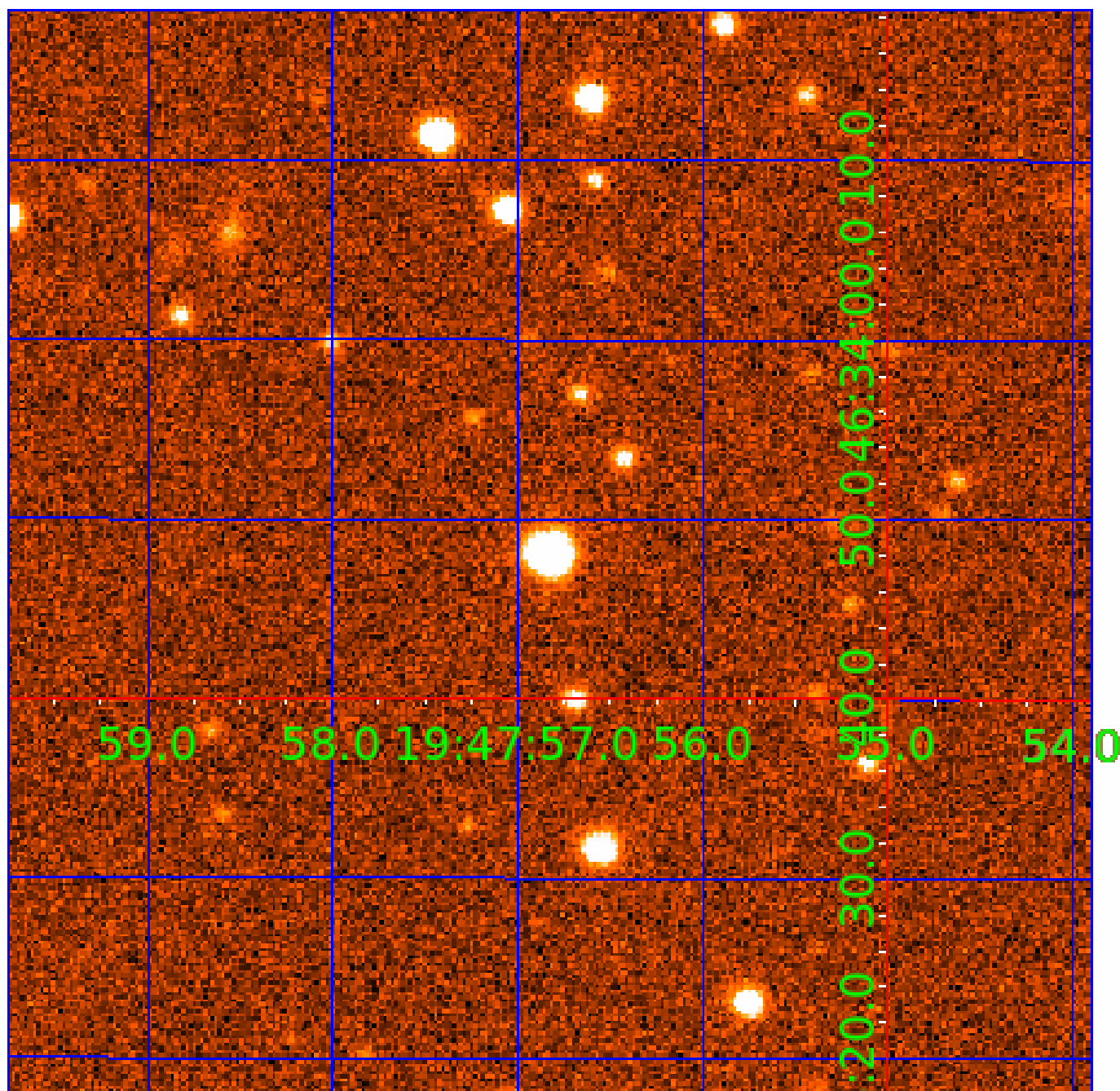


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009784213

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})
009784213-01	OBS	No	468.306698	312.074600	1934.5	7.998	11.0	7.0	0.91	5280	4.04	0.47
009784213-02	OBS	No	291.263593	191.723706	1765.0	3.235	10.2	7.4	0.91	5280	3.83	0.88

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009784213-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_SKYE—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009784213-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—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.

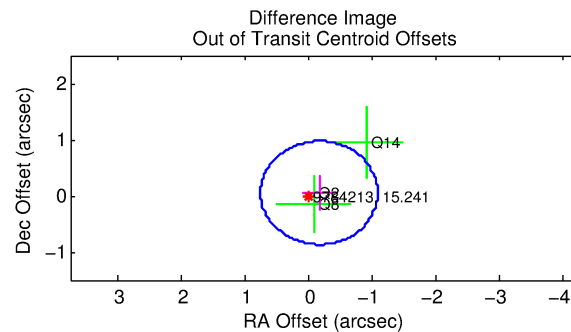
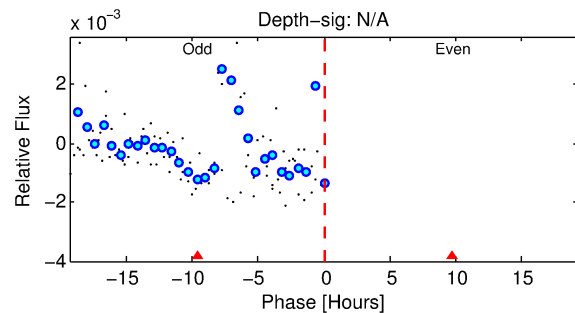
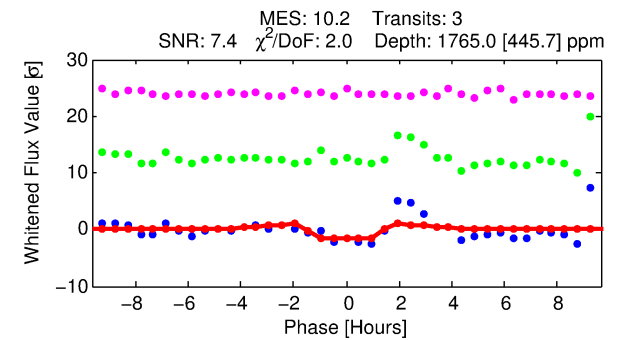
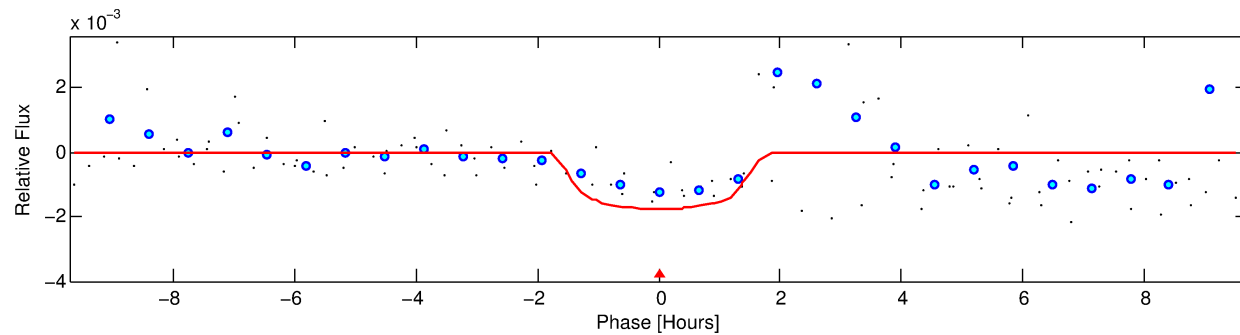
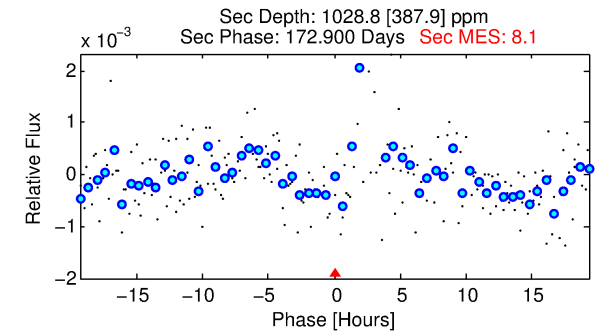
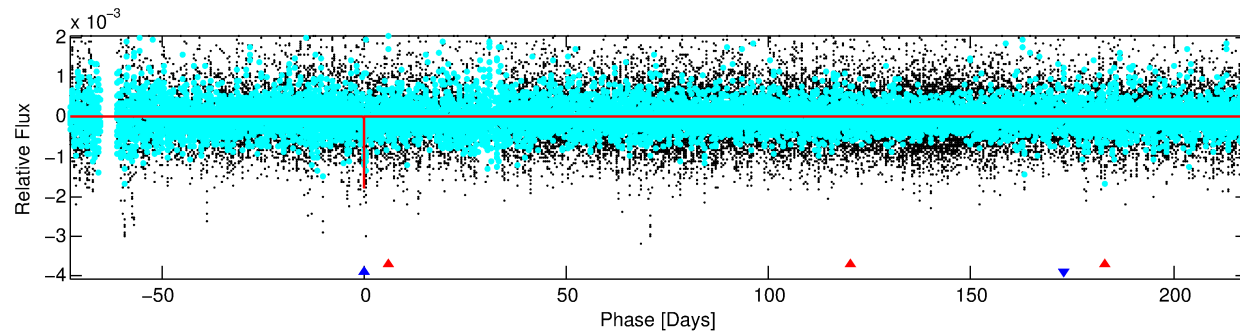
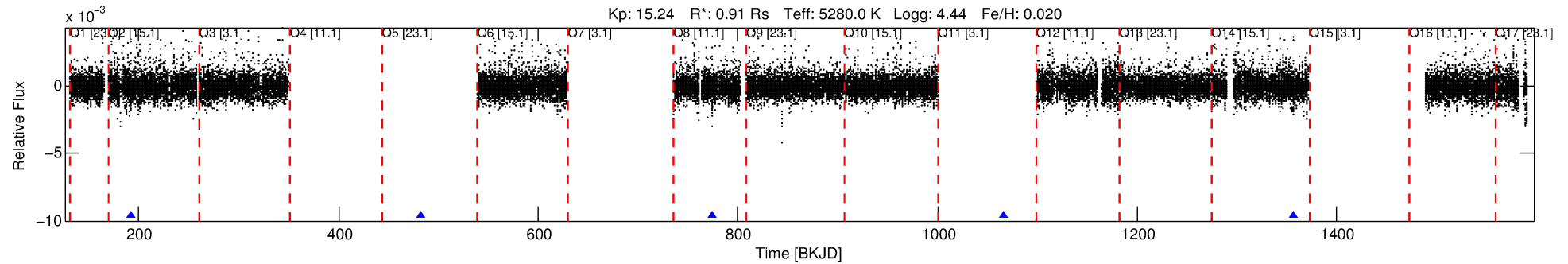
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009784213-02

No Significant Match Found

DV One-Page Summary

KIC: 9784213 Candidate: 2 of 2 Period: 291.264 d



DV Fit Results:

Period = 291.26359 [0.00350] d
Epoch = 191.7237 [0.0085] BKJD
Rp/R* = 0.0388 [0.1022]
a/R* = 637.79 [6133.88]
b = 0.47 [16.30]
Seff = 0.88 [0.41]
Teq = 247 [29] K
Rp = 3.84 [10.15] Re
a = 0.8035 [0.2225] AU
Ag = 24844.61 [131630.26] [0.19] σ
Teffp = 4799 [6335] K [0.72] σ

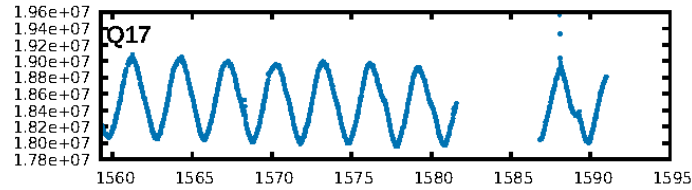
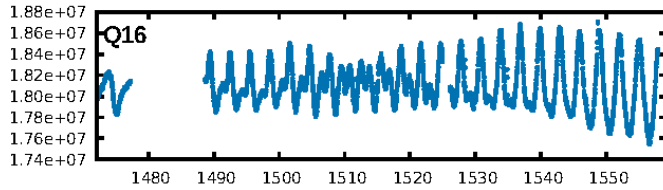
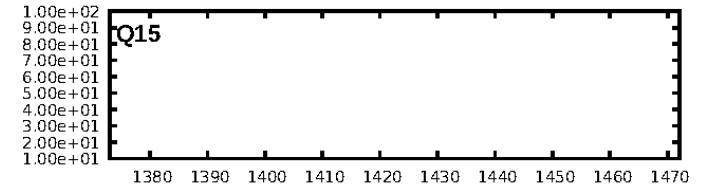
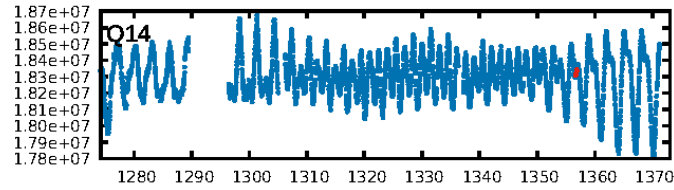
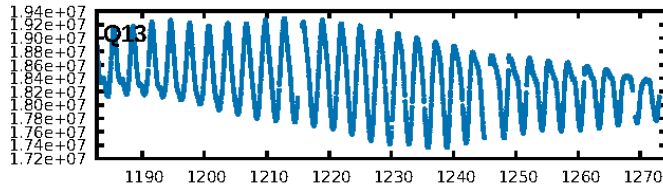
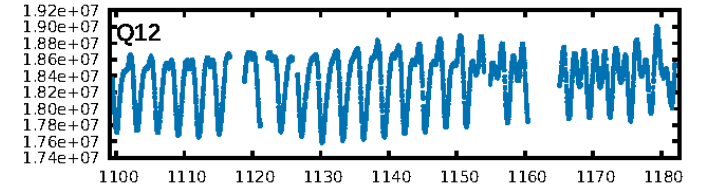
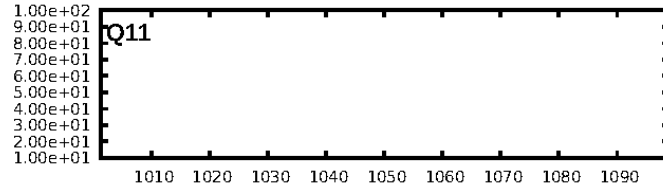
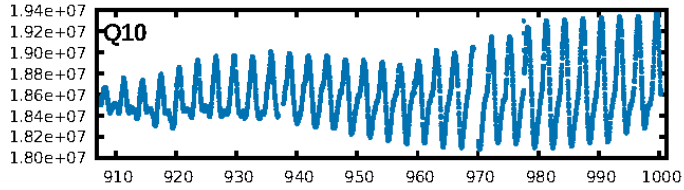
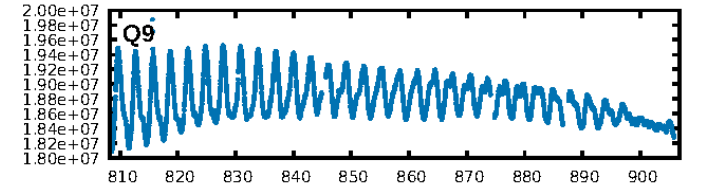
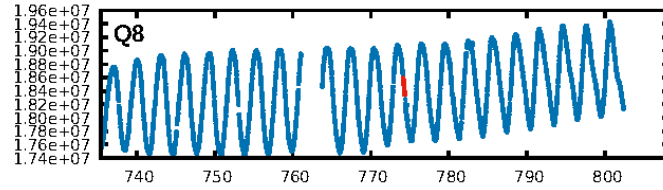
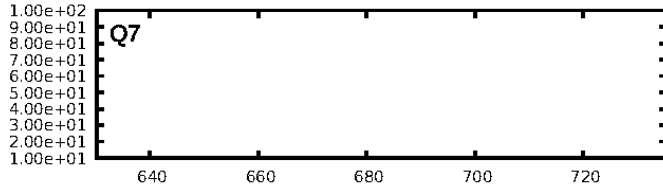
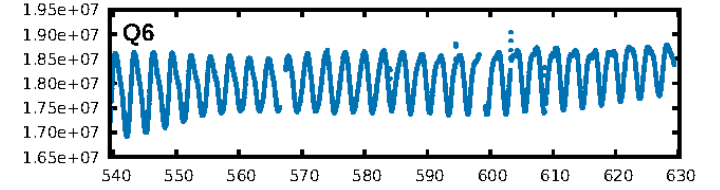
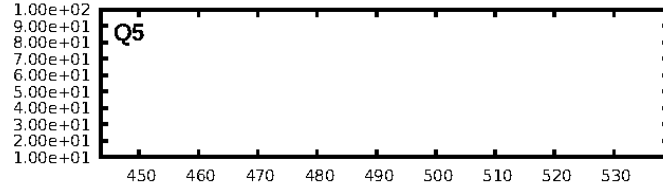
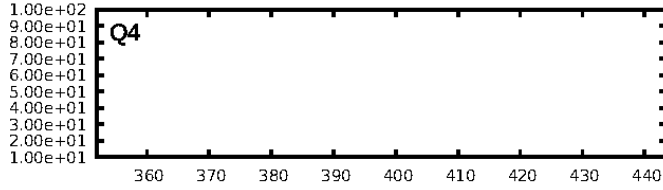
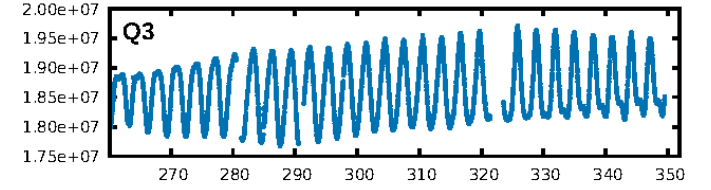
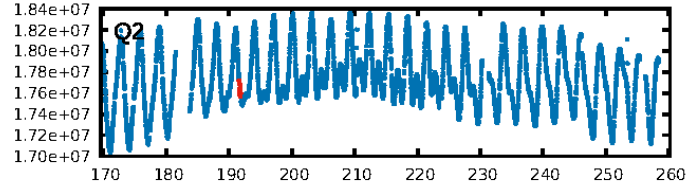
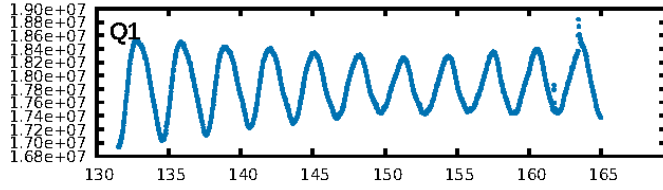
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [492.48] σ
ModelChiSquare2-sig: 2.8%
ModelChiSquareGof-sig: 15.1%
Bootstrap-pfa: 3.97e-10
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 0.6782
Centroid-sig: 58.3%
Centroid-so: 0.337 arcsec [0.44] σ
OotOffset-rm: 0.170 arcsec [0.55] σ
OotOffset-st: 2/0/1/0 [3]
KicOffset-rm: 0.243 arcsec [0.80] σ
KicOffset-st: 2/0/1/0 [3]
DiffImageQuality-fgm: 1.00 [3/3]
DiffImageOverlap-fno: 1.00 [3/3]

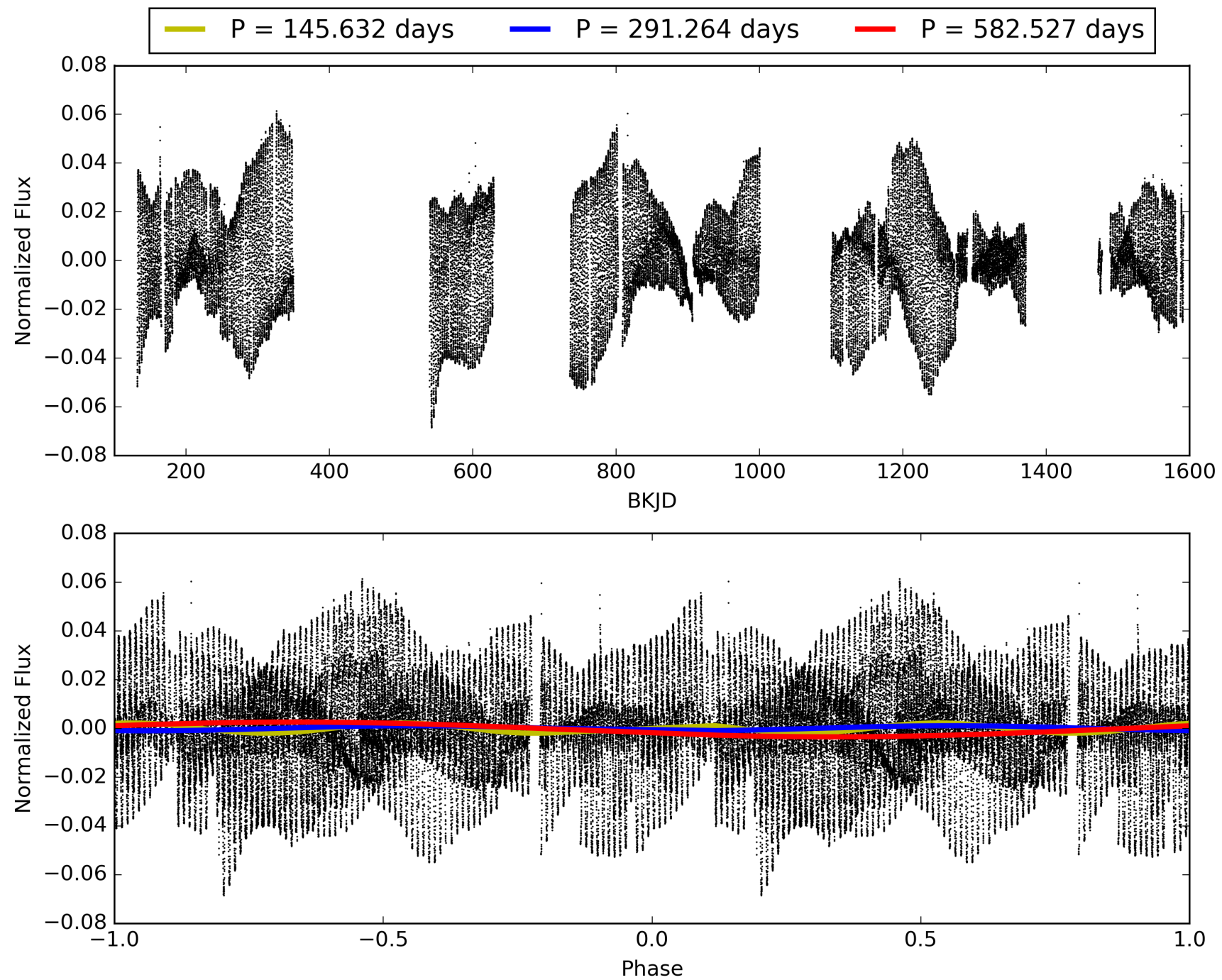
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 16:47:09 Z

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

TCE 009784213-02, PDC Light Curves

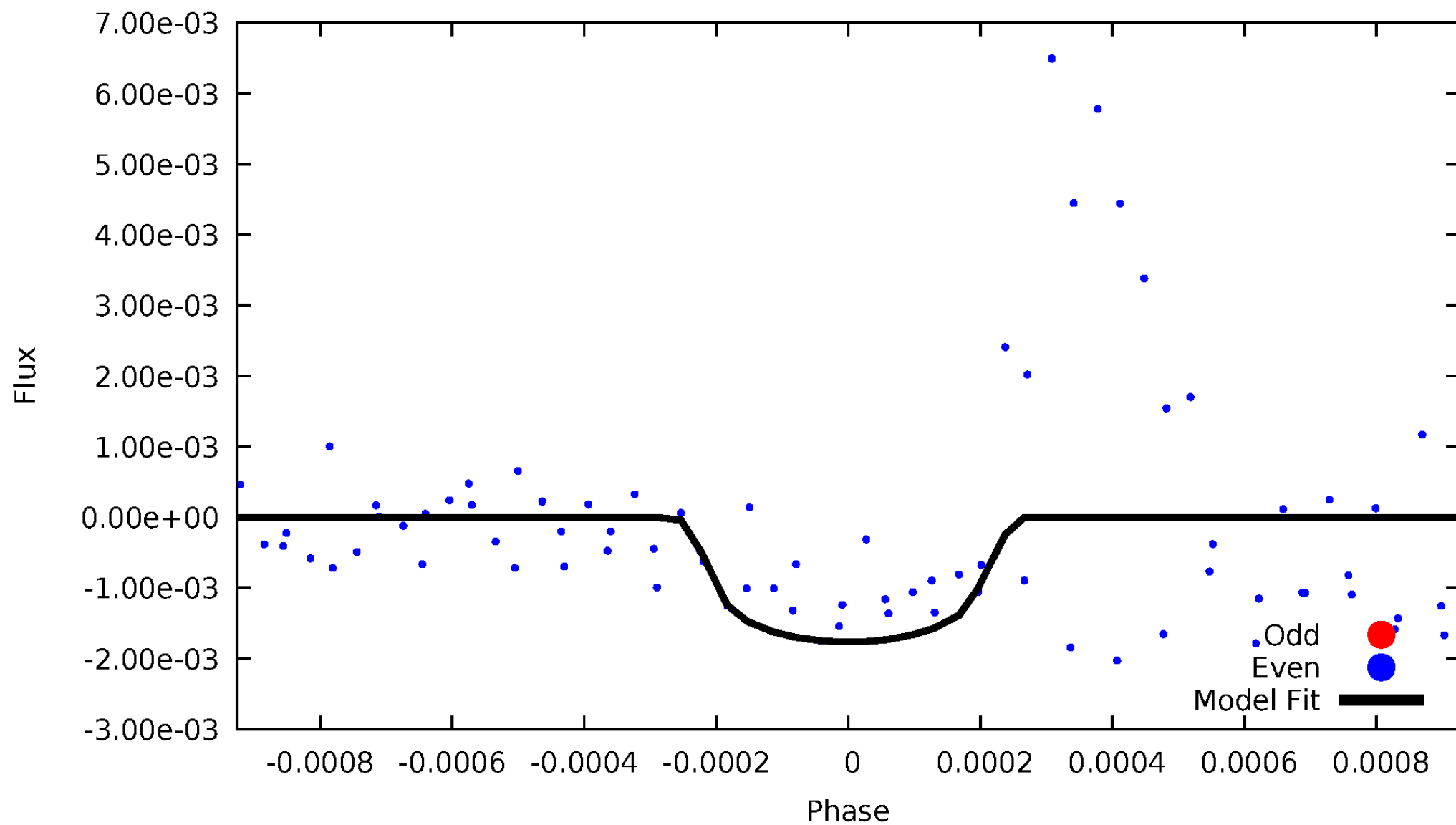


TCE 009784213-02



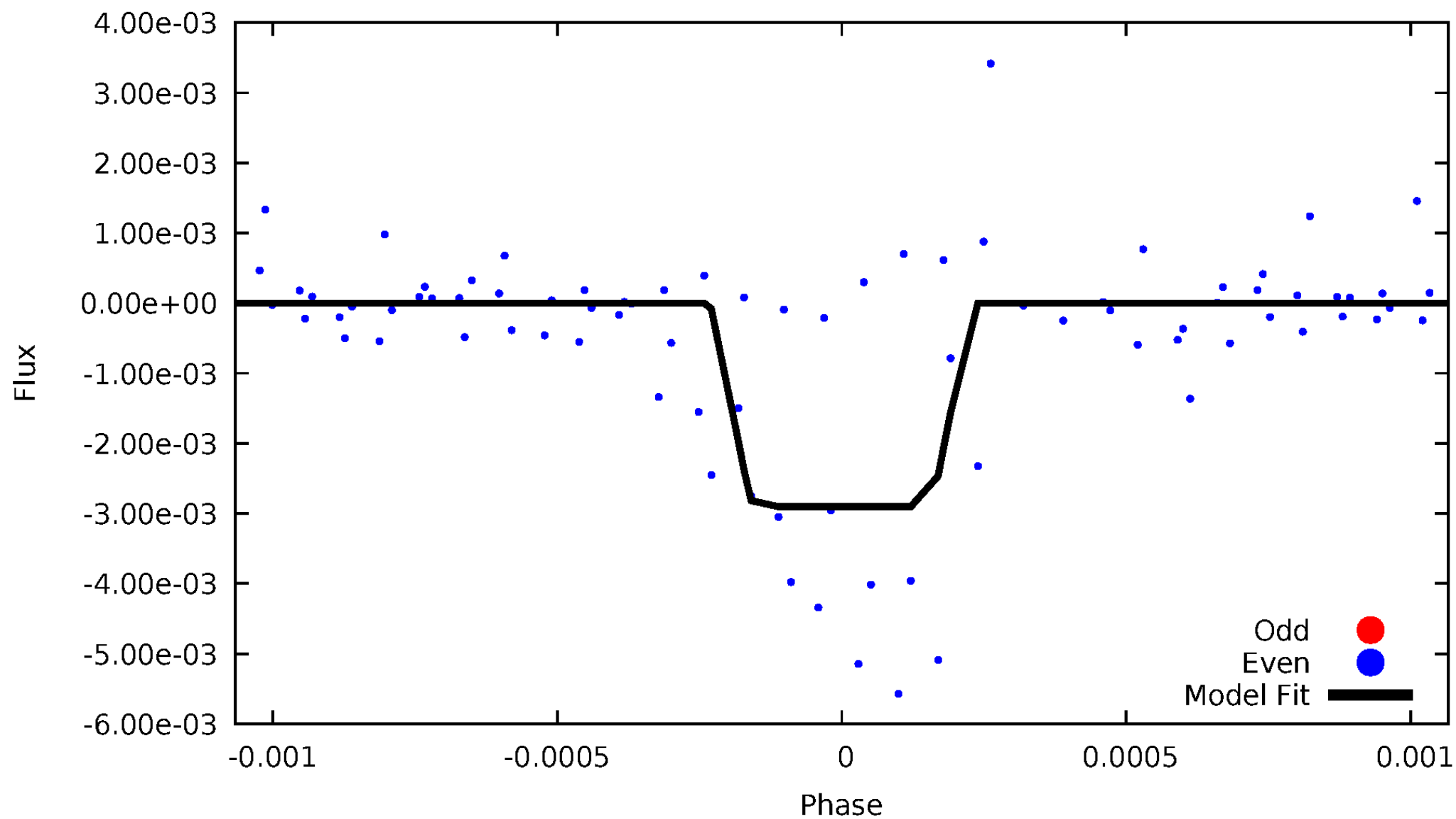
DV Odd/Even

TCE 009784213-02



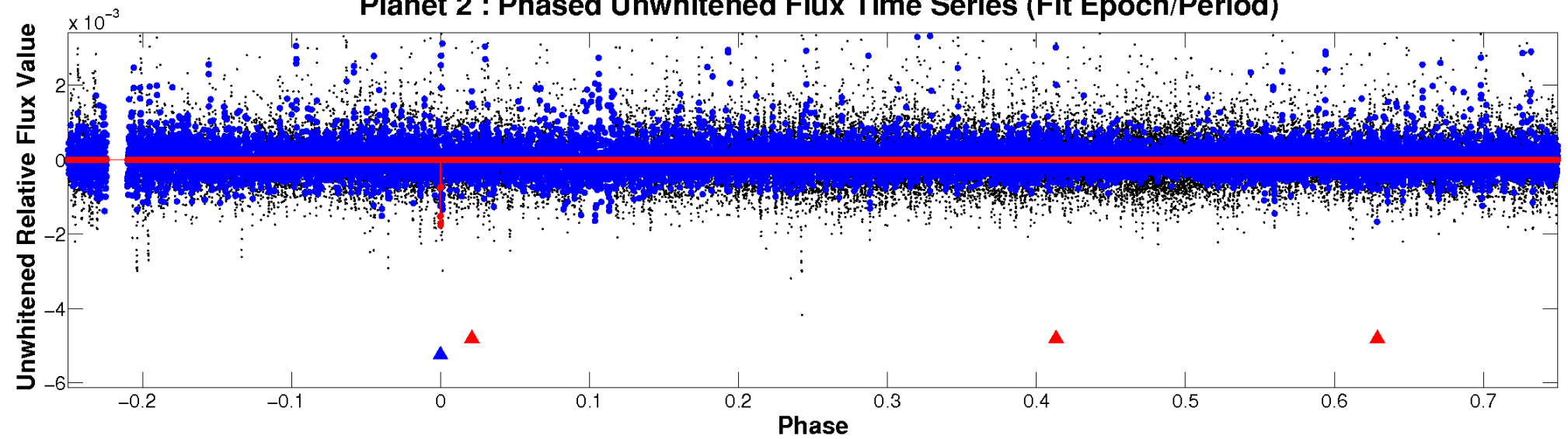
ALT Odd/Even

TCE 009784213-02

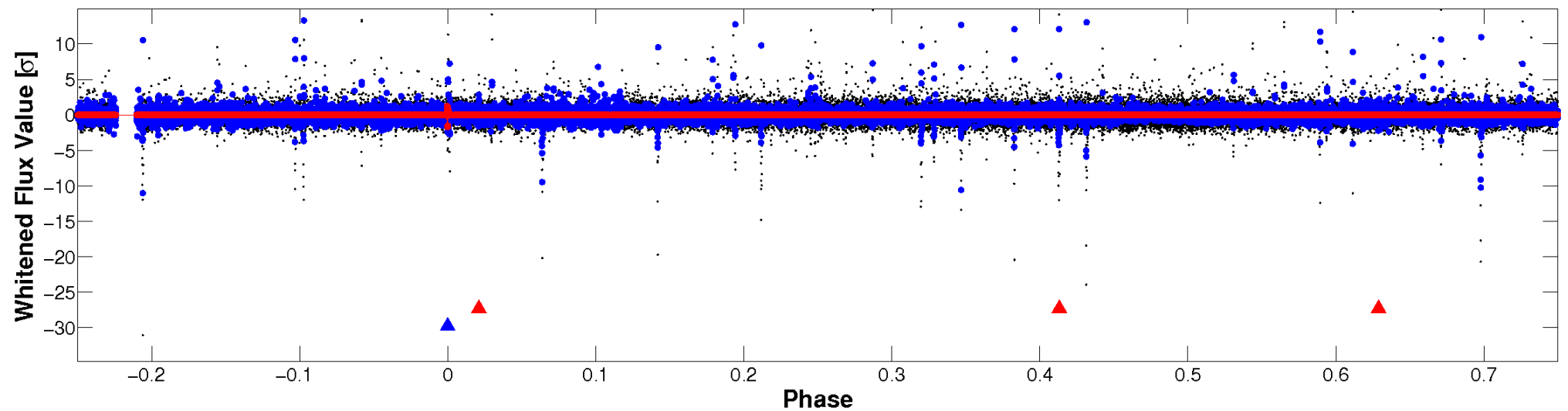


Non-Whitened Vs. Whitened Light Curve

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

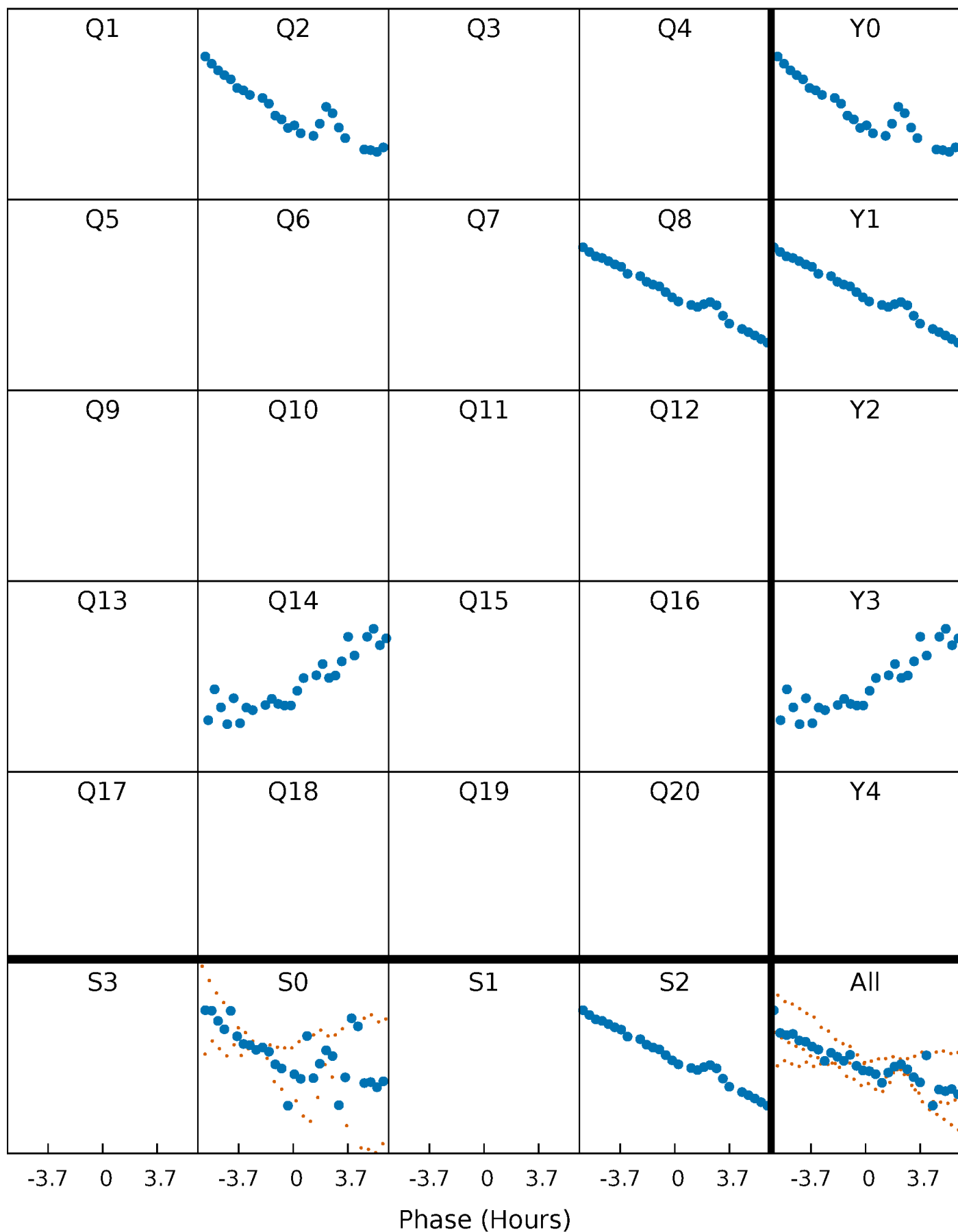


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



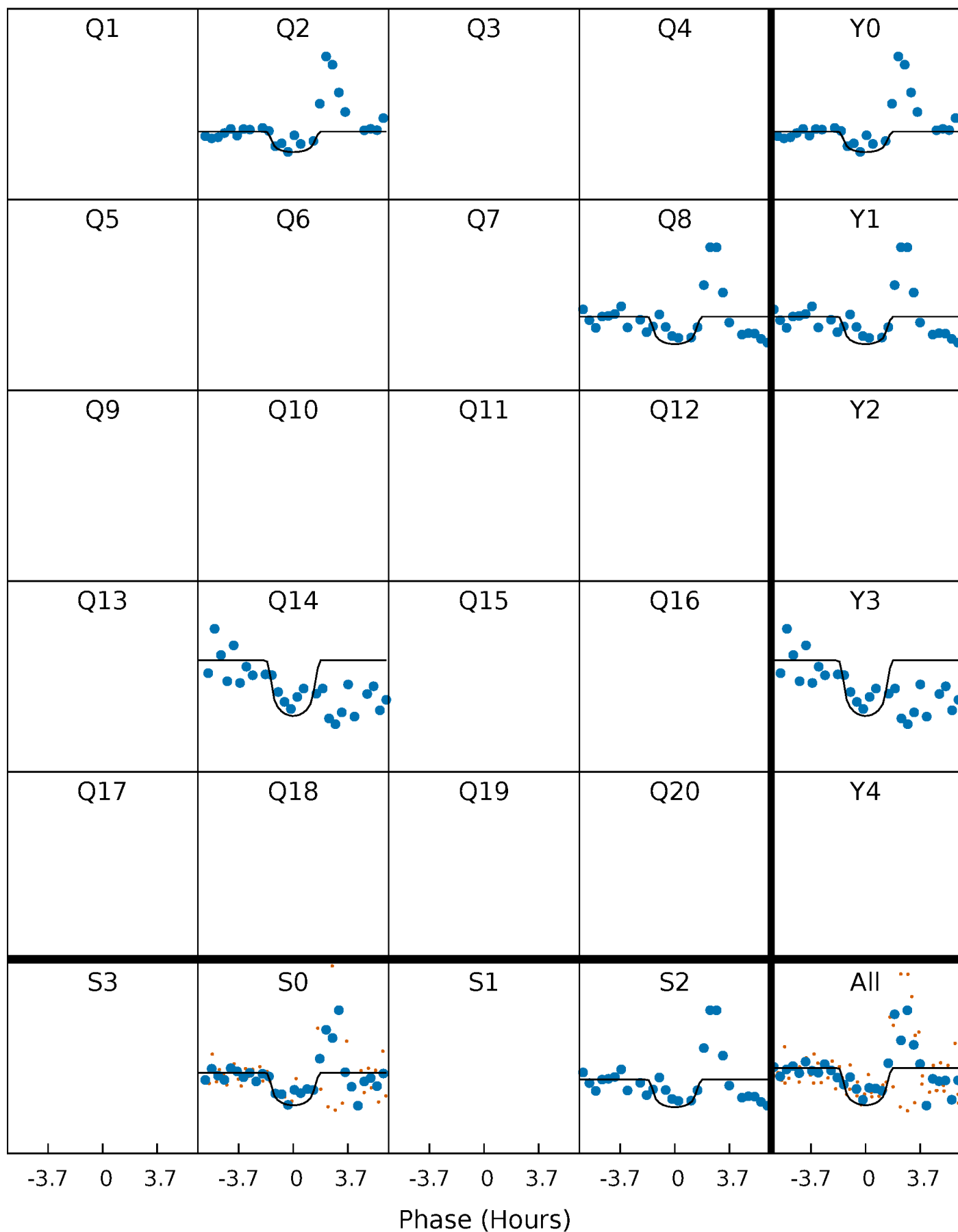
PDC Quarter-Phased Transit Curves

TCE 009784213-02 $P=291.263593$ Days $T_0=191.723706$ (BKJD)



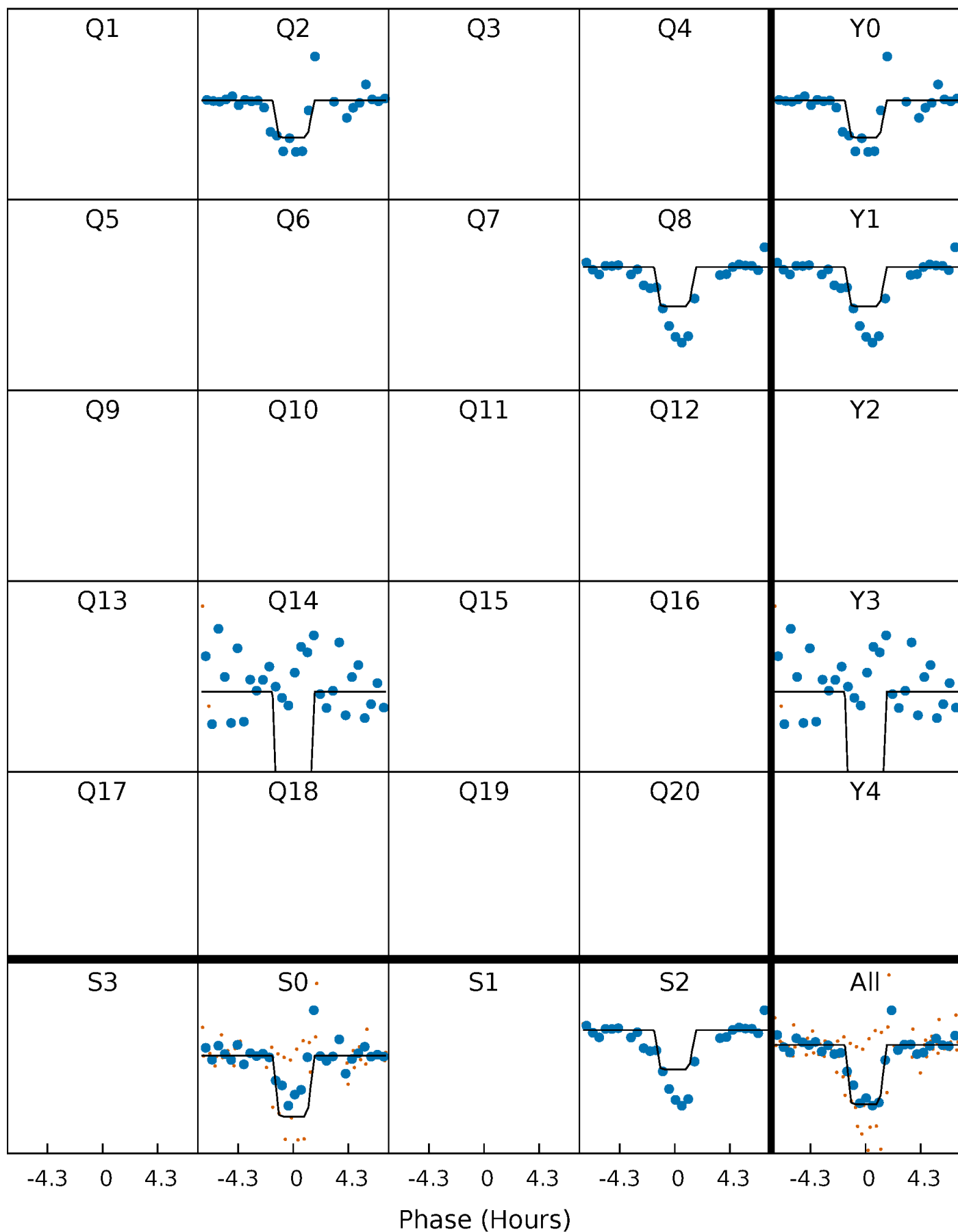
DV Quarter-Phased Transit Curves

TCE 009784213-02 P=291.263593 Days $T_0=191.723706$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

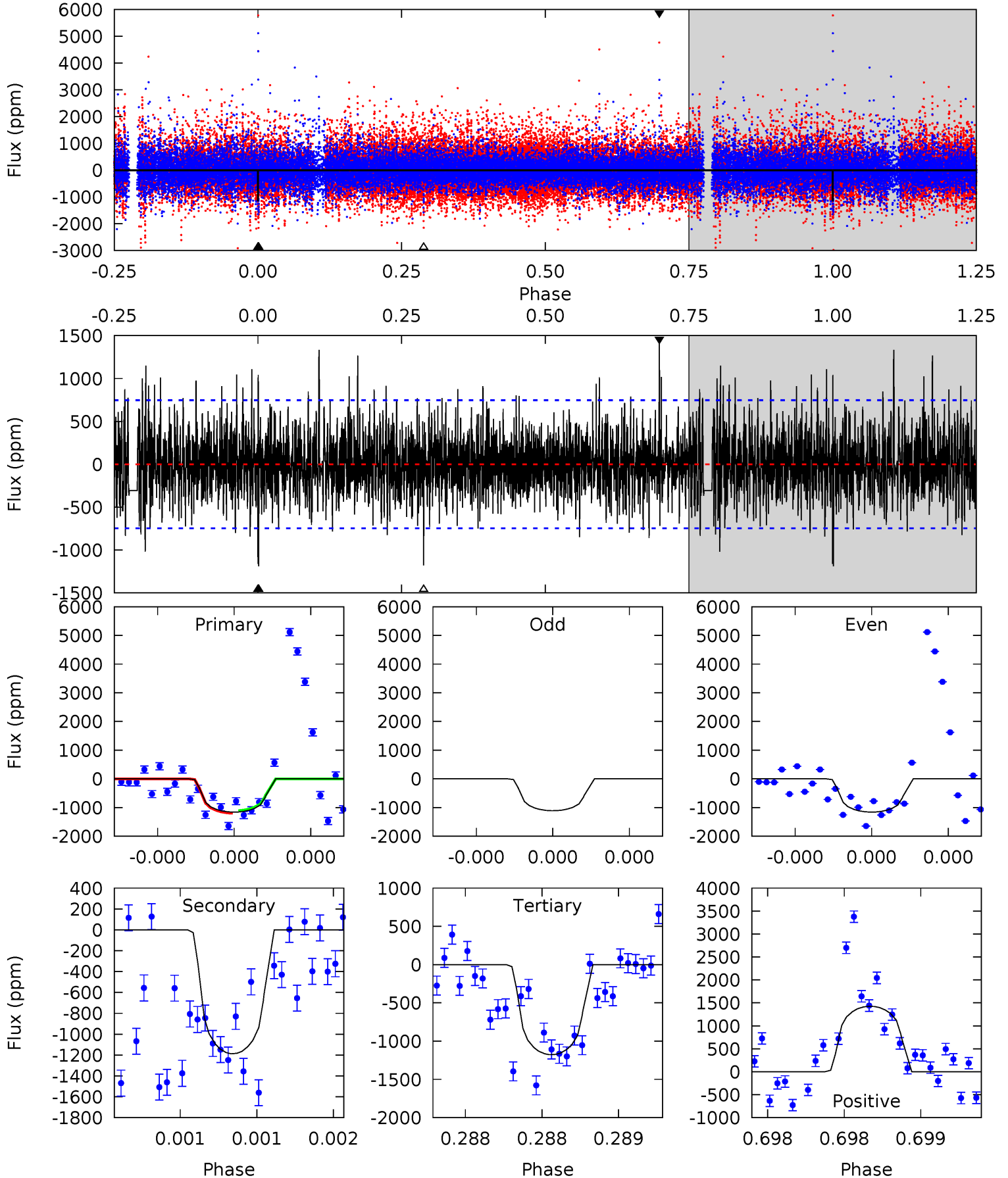
TCE 009784213-02 P=291.261503 Days $T_0=191.737126$ (BKJD)



DV Model-Shift Uniqueness Test

009784213-02, P = 291.263593 Days, E = 191.723706 Days

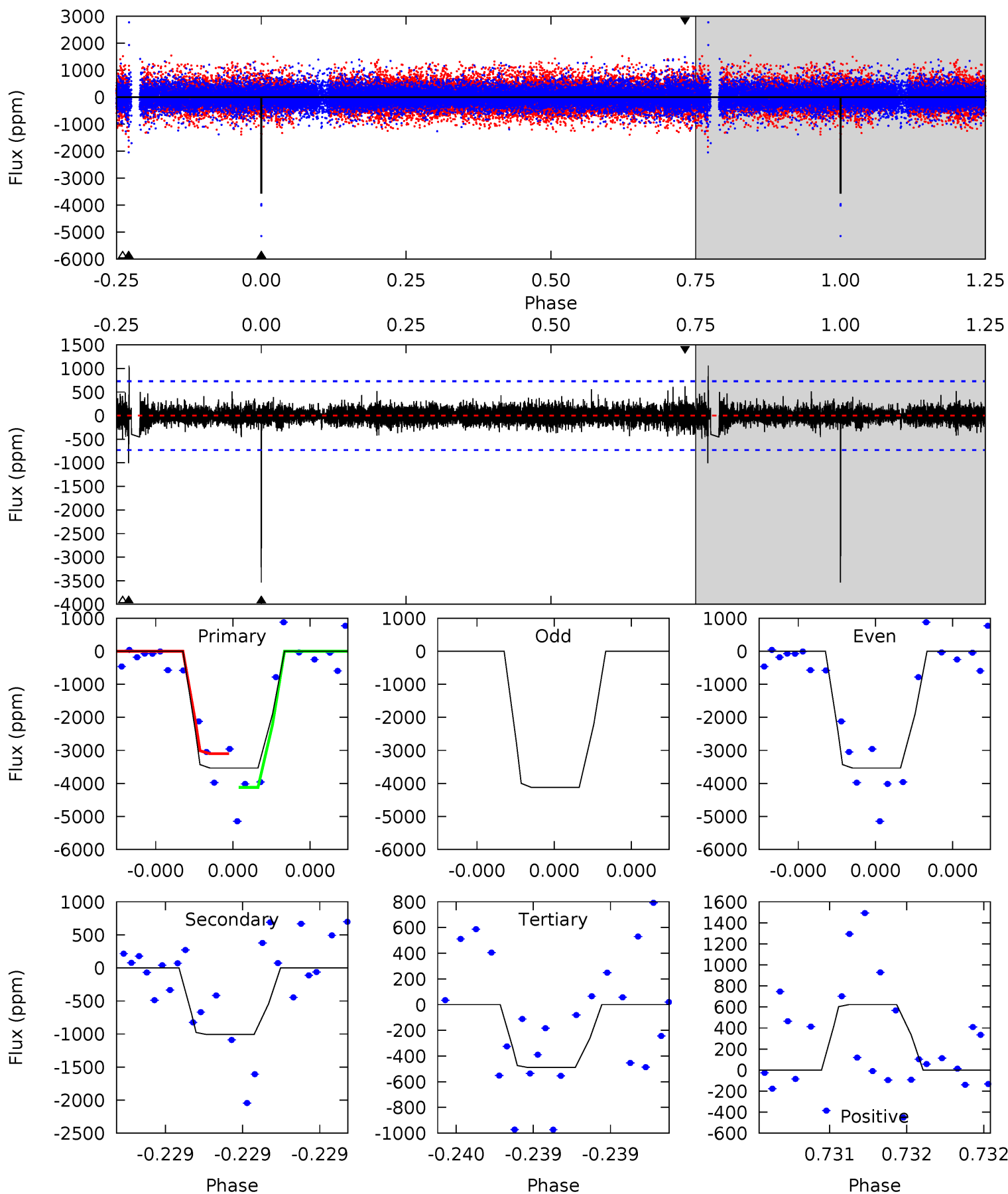
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.66	8.87	8.79	10.6	5.58	3.49	2.07	-0.13	-1.98	0.07	-1.78	0.20	1.07	0.55	0.32



Alt Model-Shift Uniqueness Test

009784213-02, P = 291.261503 Days, E = 191.737126 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
27.3	7.77	3.77	4.80	5.62	3.56	0.82	23.5	22.5	4.00	2.97	2.64	0.75	0.23	3.91



Stellar Parameters For KIC 009784213

	$T_{\text{eff}} (K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5280^{+174}_{-158}	$4.436^{+0.123}_{-0.266}$	$0.020^{+0.300}_{-0.250}$	$0.905^{+0.254}_{-0.137}$	$0.816^{+0.114}_{-0.066}$	$1.550^{+0.768}_{-0.867}$
	+3%/-3%	+3%/-6%	+1500%/-1250%	+28%/-15%	+14%/-8%	+50%/-56%
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 009784213-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-1188 ± 134	$8.44^{+8.95}_{-5.42}$	352^{+29}_{-21}	3785^{+1965}_{-746}	5876^{+38662}_{-4498}
Alt.	-1006 ± 130	$9.41^{+7.98}_{-6.33}$	350^{+27}_{-21}	3577^{+1871}_{-631}	4057^{+31920}_{-2878}

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

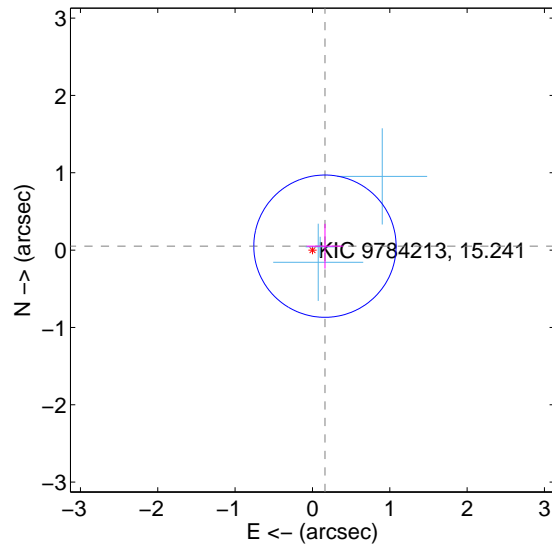
Supplemental centroid analysis for 009784213-02. Kepler magnitude: 15.24. Transit SNR 7.39

There are 3 quarters with good PRF difference image offsets

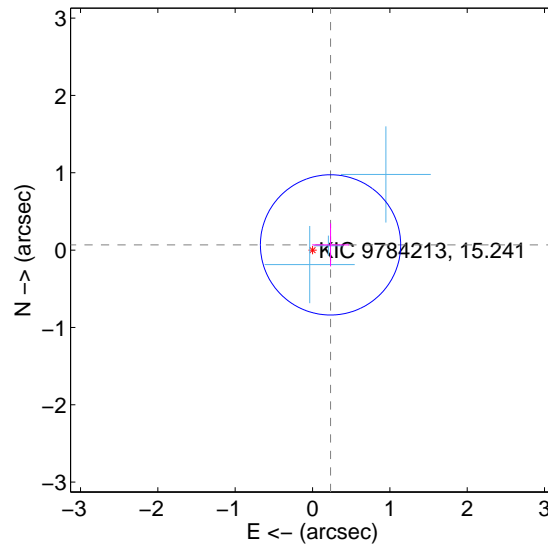
The direct PRF centroid is offset from the target star catalog position by about 0.05 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.170 ± 0.307	0.55	-0.162 ± 0.236	0.051 ± 0.290
PRF-fit source offset from KIC position	0.243 ± 0.302	0.80	-0.233 ± 0.238	0.067 ± 0.279
photometric centroid source offset	0.34 ± 0.76	0.44	-0.29 ± 0.69	0.18 ± 0.90

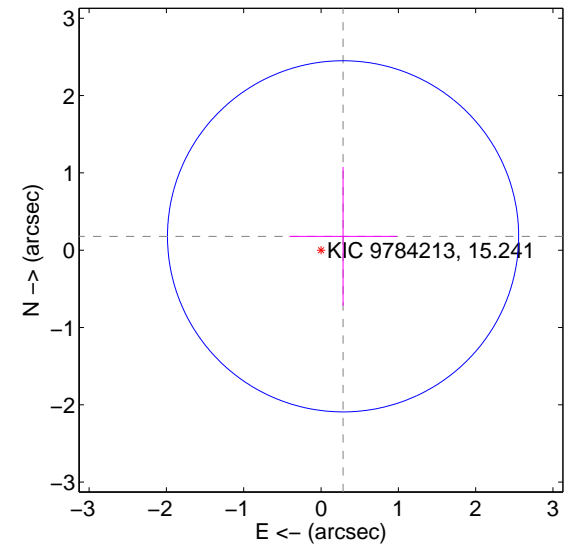
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

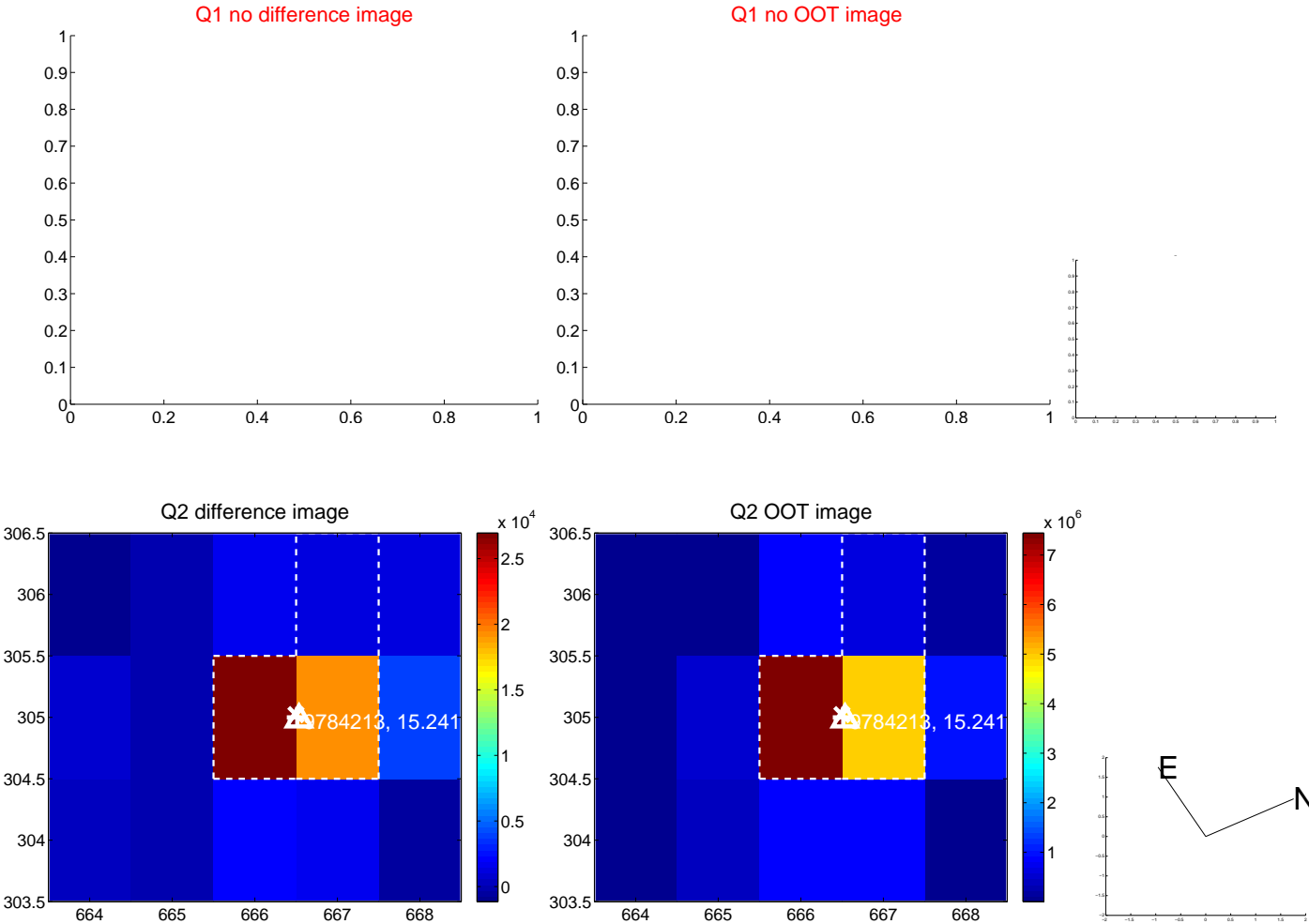


offset from photometric centroids

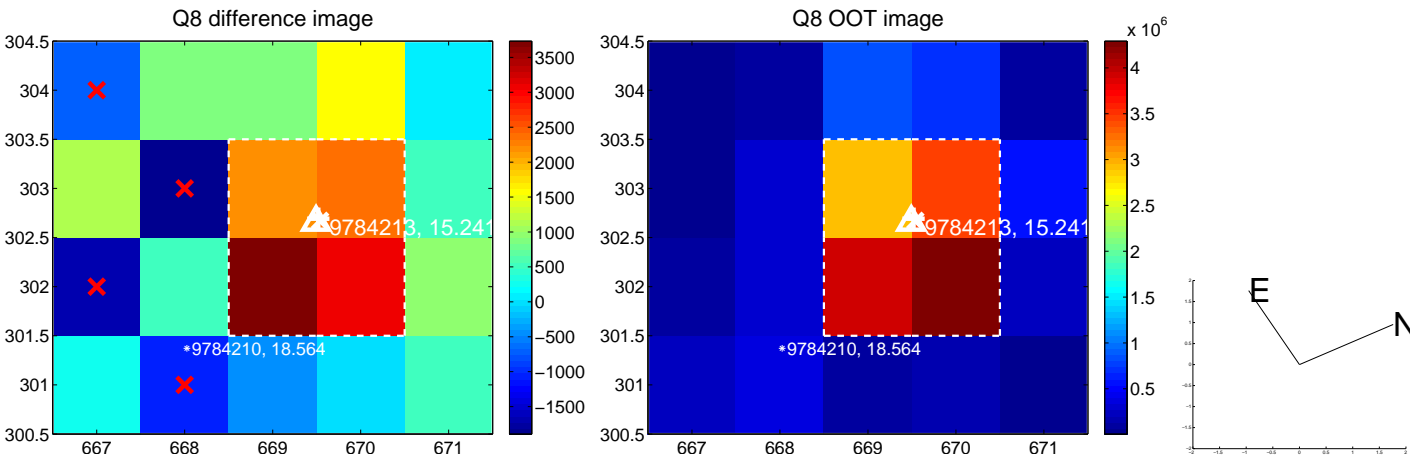


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ . Red *: target star. Blue *: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

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



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



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



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

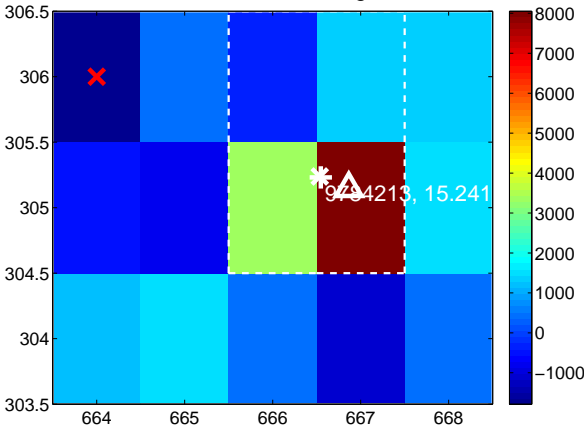
Q13 no difference image



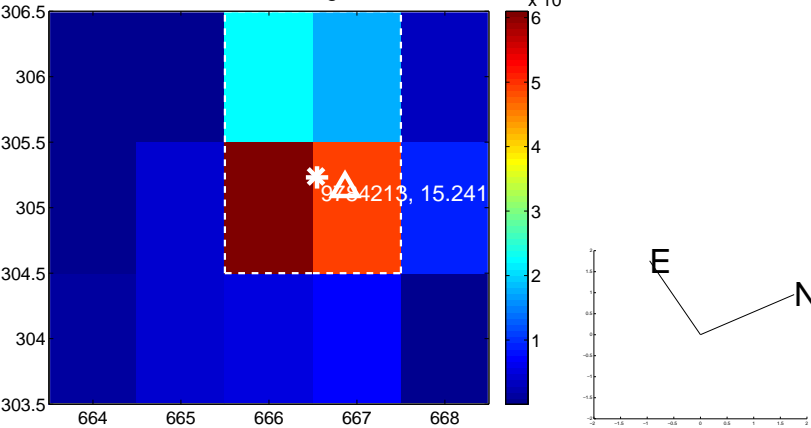
Q13 no OOT image



Q14 difference image



Q14 OOT image



Q15 no difference image



Q15 no OOT image



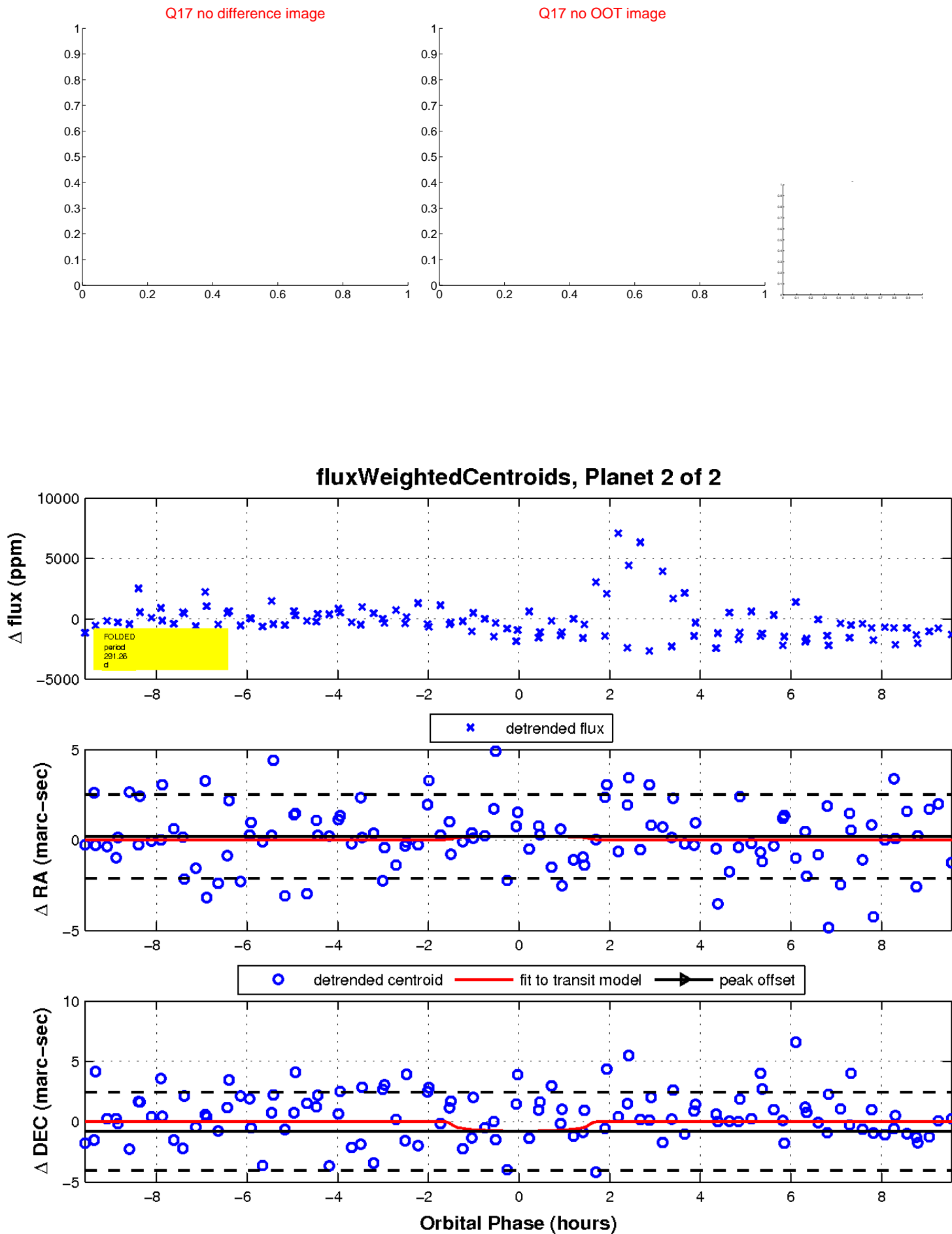
Q16 no difference image



Q16 no OOT image



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



UKIRT Image

Declination

