

KIC 010780221

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})
010780221-01	OBS	No	339.480319	166.768750	3432.8	8.452	10.8	9.5	0.75	5069	4.34	0.44
010780221-02	OBS	No	387.396935	171.259680	11689.3	4.705	13.4	9.8	0.75	5069	13.77	0.37

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010780221-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_TER_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010780221-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_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.

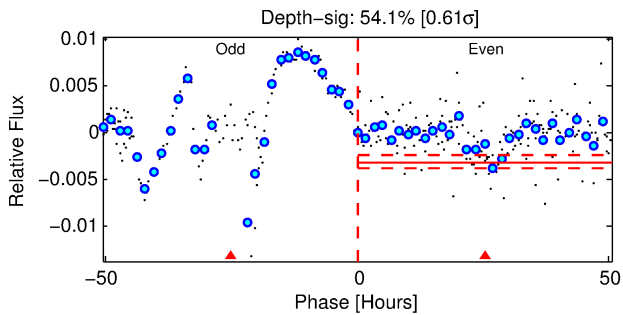
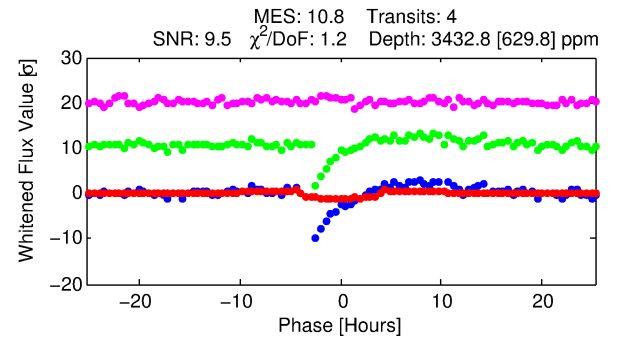
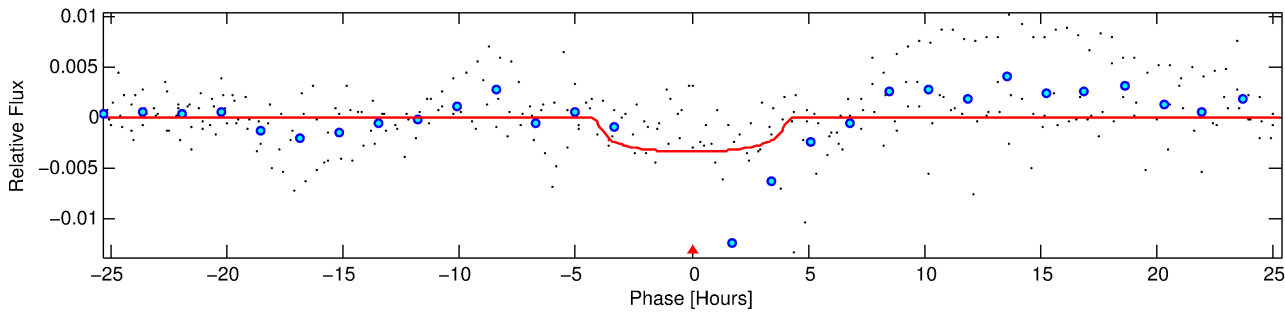
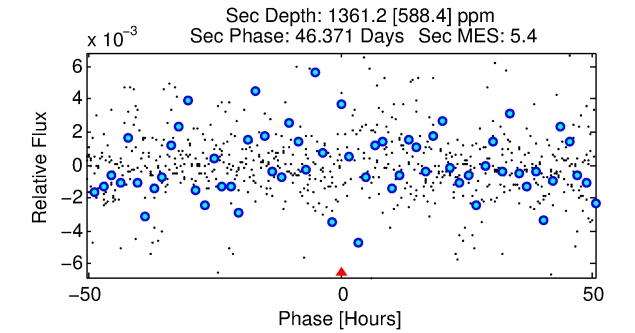
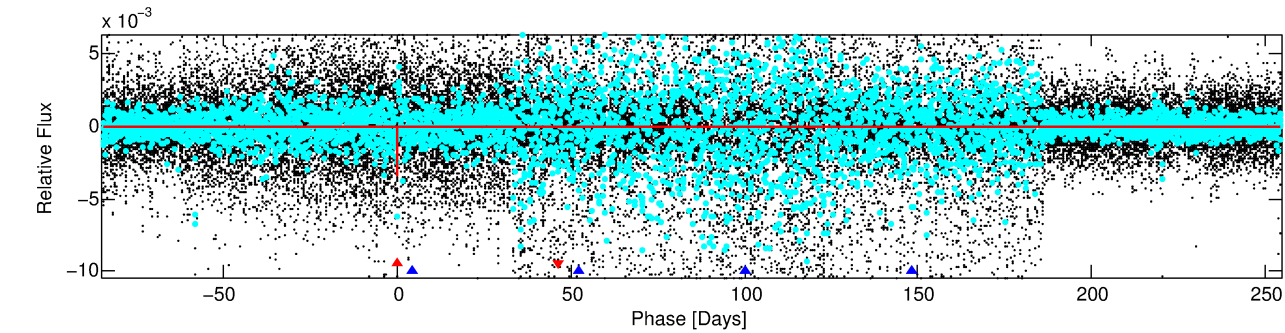
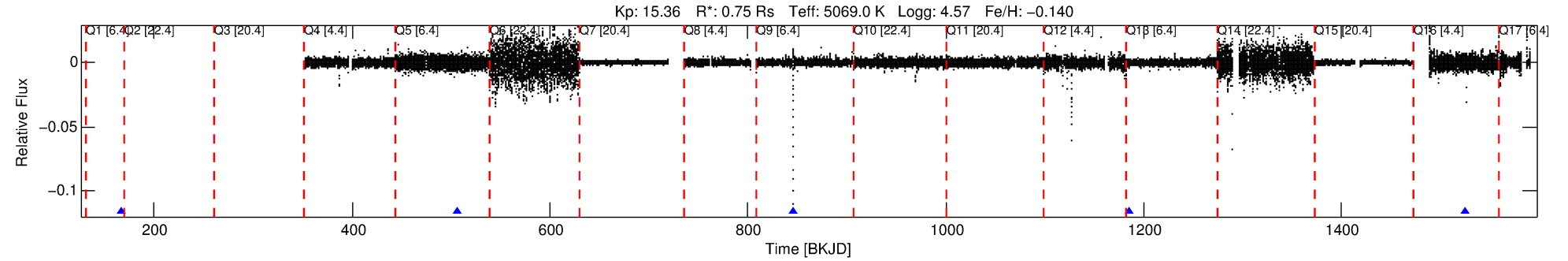
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010780221-01

No Significant Match Found

DV One-Page Summary

KIC: 10780221 Candidate: 1 of 2 Period: 339.480 d



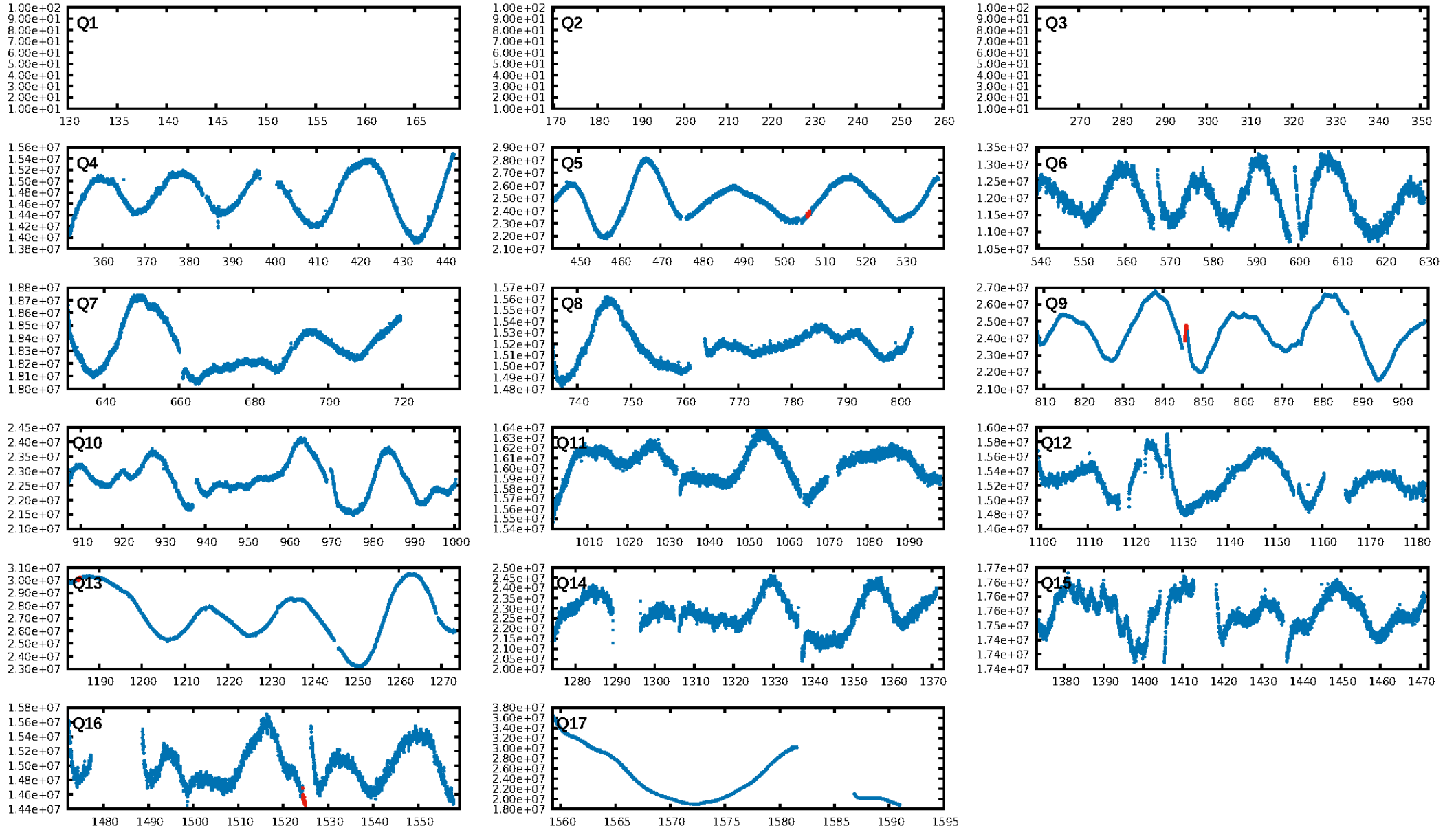
DV Fit Results:

Period = 339.48032 [0.01312] d
Epoch = 166.7688 [0.0416] BKJD
Rp/R* = 0.0530 [0.0711]
a/R* = 306.19 [1441.75]
b = 0.34 [12.47]
Seff = 0.44 [0.08]
Teq = 208 [10] K
Rp = 4.34 [5.84] Re
a = 0.8702 [0.0787] AU
Ag = 30146.57 [81974.97] [0.37σ]
Teff = 4230 [2876] K [1.40σ]

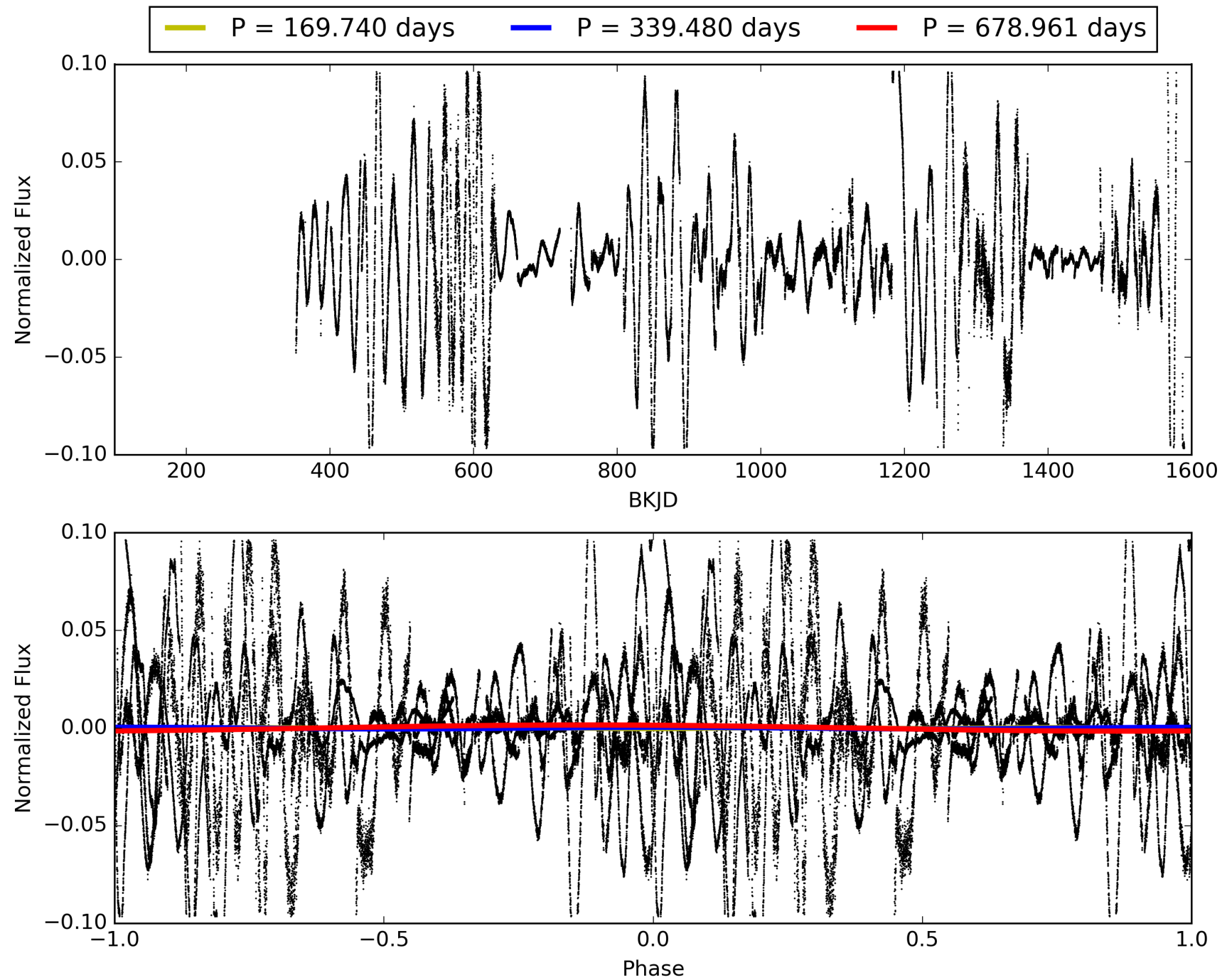
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [118.88σ]
ModelChiSquare2-sig: 45.9%
ModelChiSquareGof-sig: 99.9%
Bootstrap-pfa: 3.88e-08
RollingBand-fgt: 1.00 [4/4]
GhostDiagnostic-chr: -0.696
Centroid-sig: 13.0%
Centroid-so: 3.397 arcsec [7.09σ]
OotOffset-rm: N/A
KicOffset-rm: N/A
OotOffset-st: 0/0/0/0 [0]
KicOffset-st: 0/0/0/0 [0]
DiffImageQuality-fgm: N/A
DiffImageOverlap-fno: 1.00 [1/1]

TCE 010780221-01, PDC Light Curves

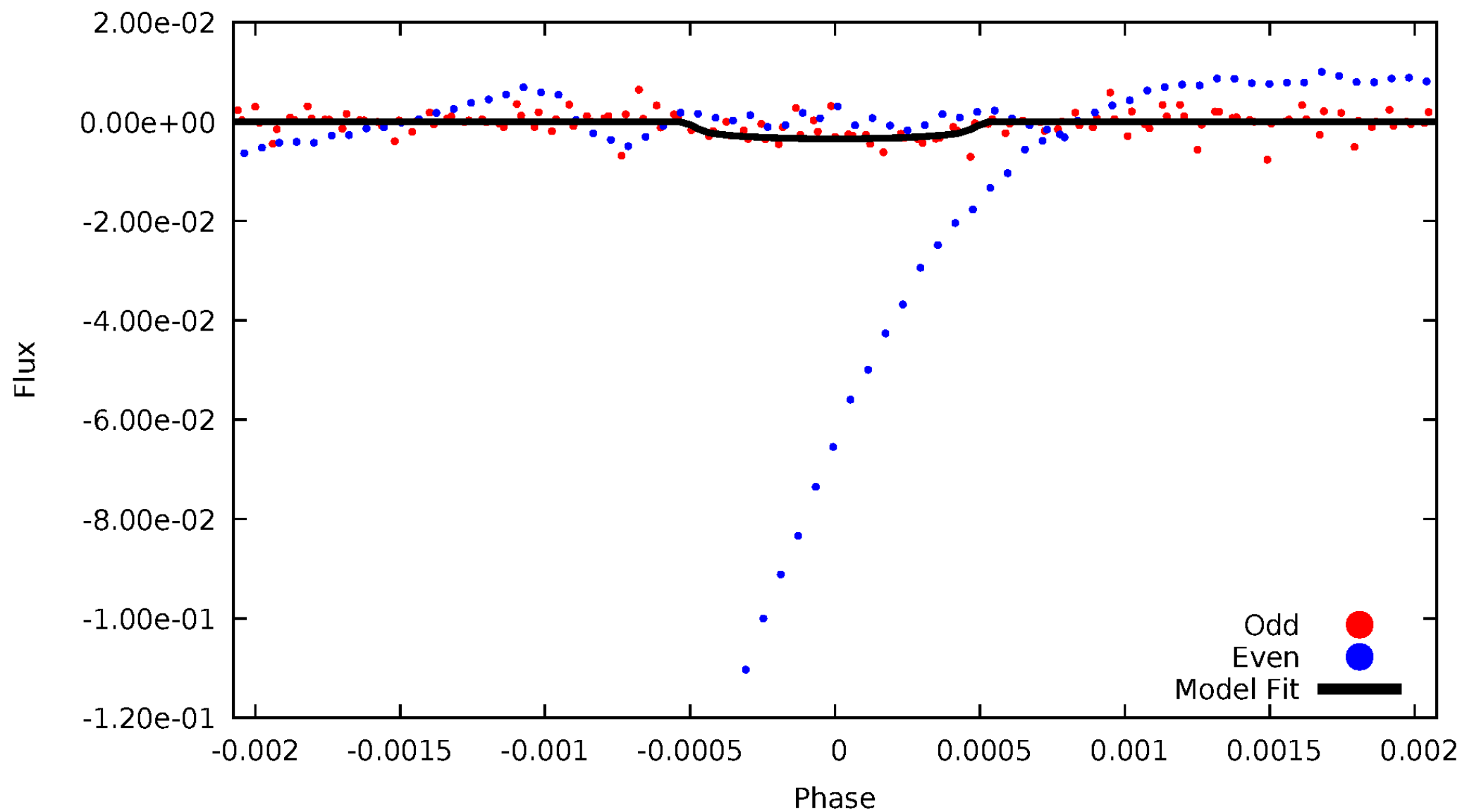


TCE 010780221-01



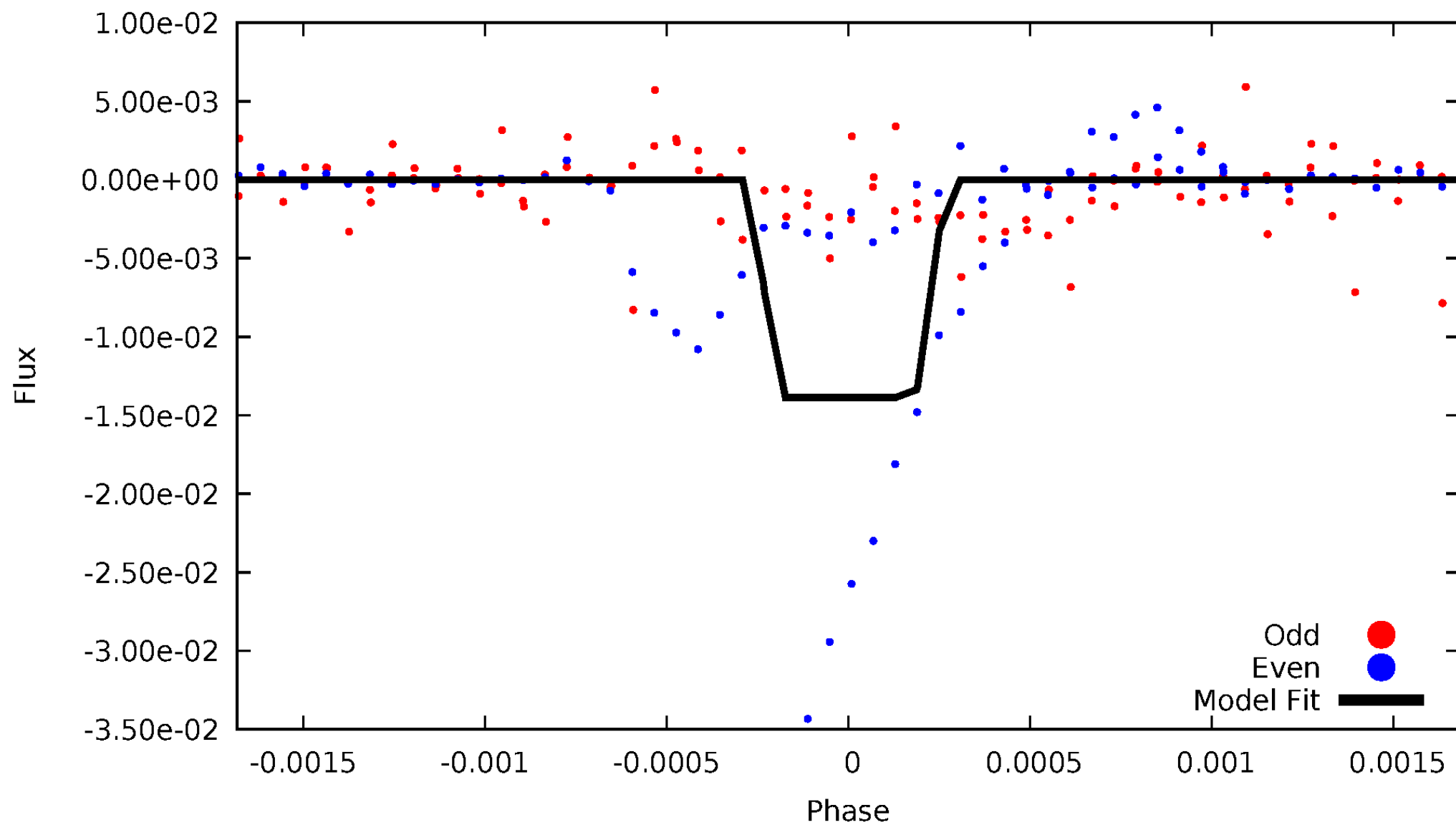
DV Odd/Even

TCE 010780221-01



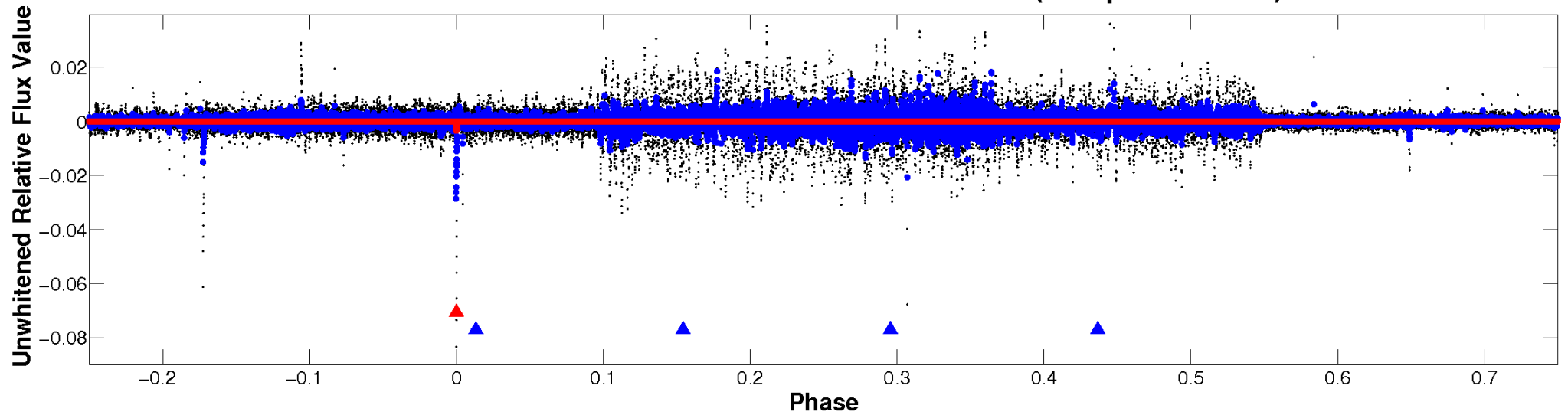
ALT Odd/Even

TCE 010780221-01

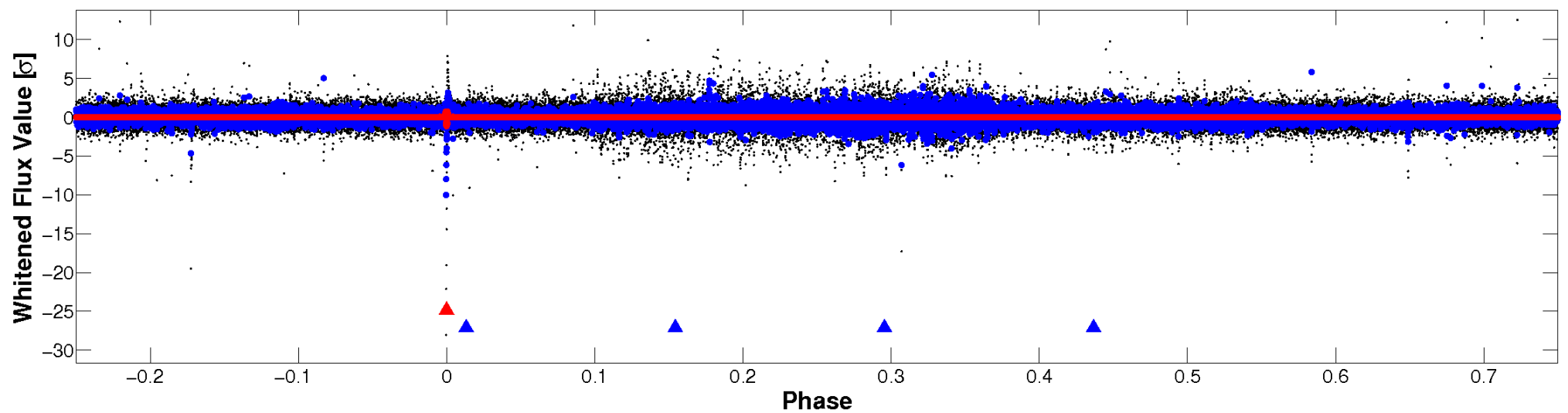


Non-Whitened Vs. Whitened Light Curve

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

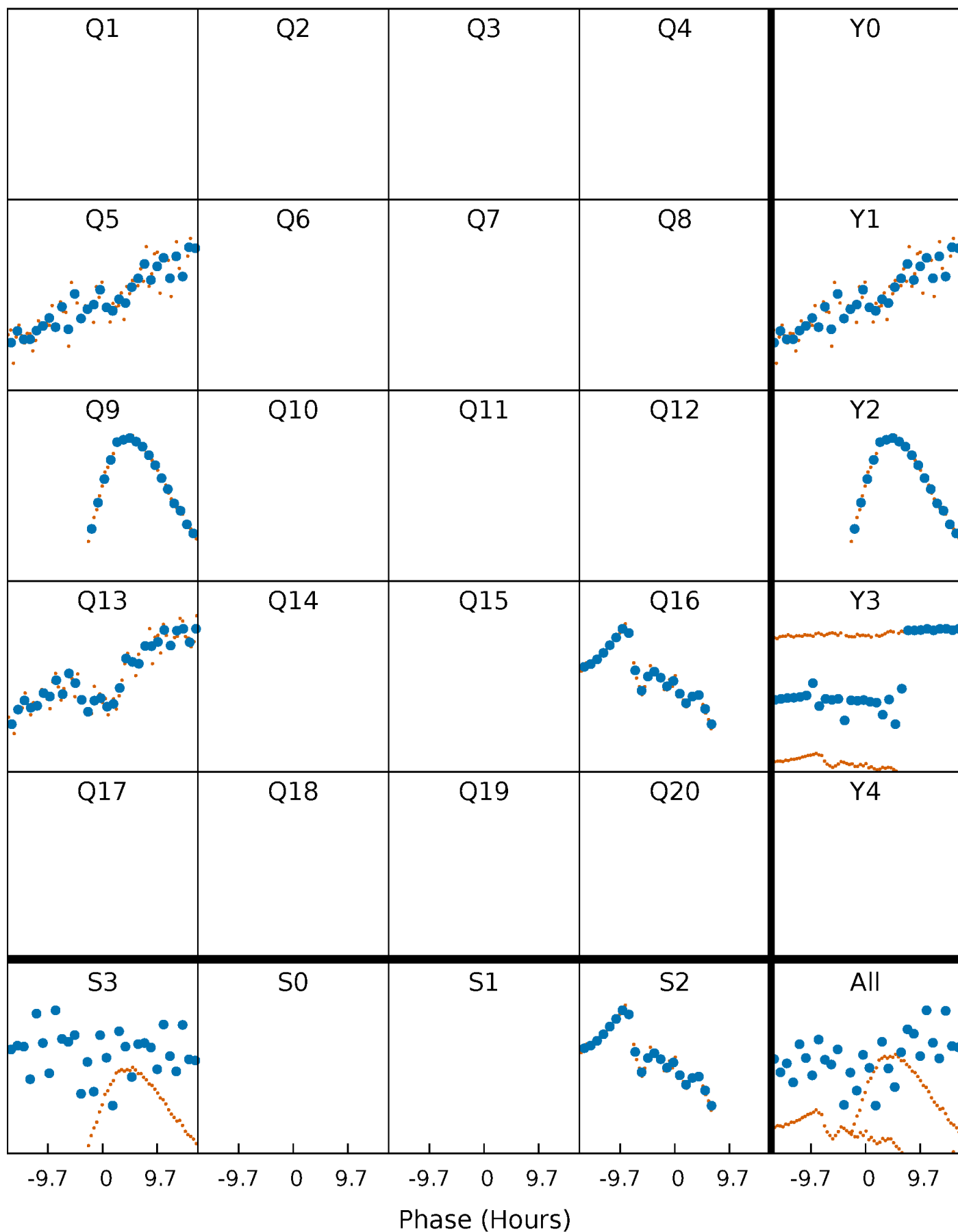


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



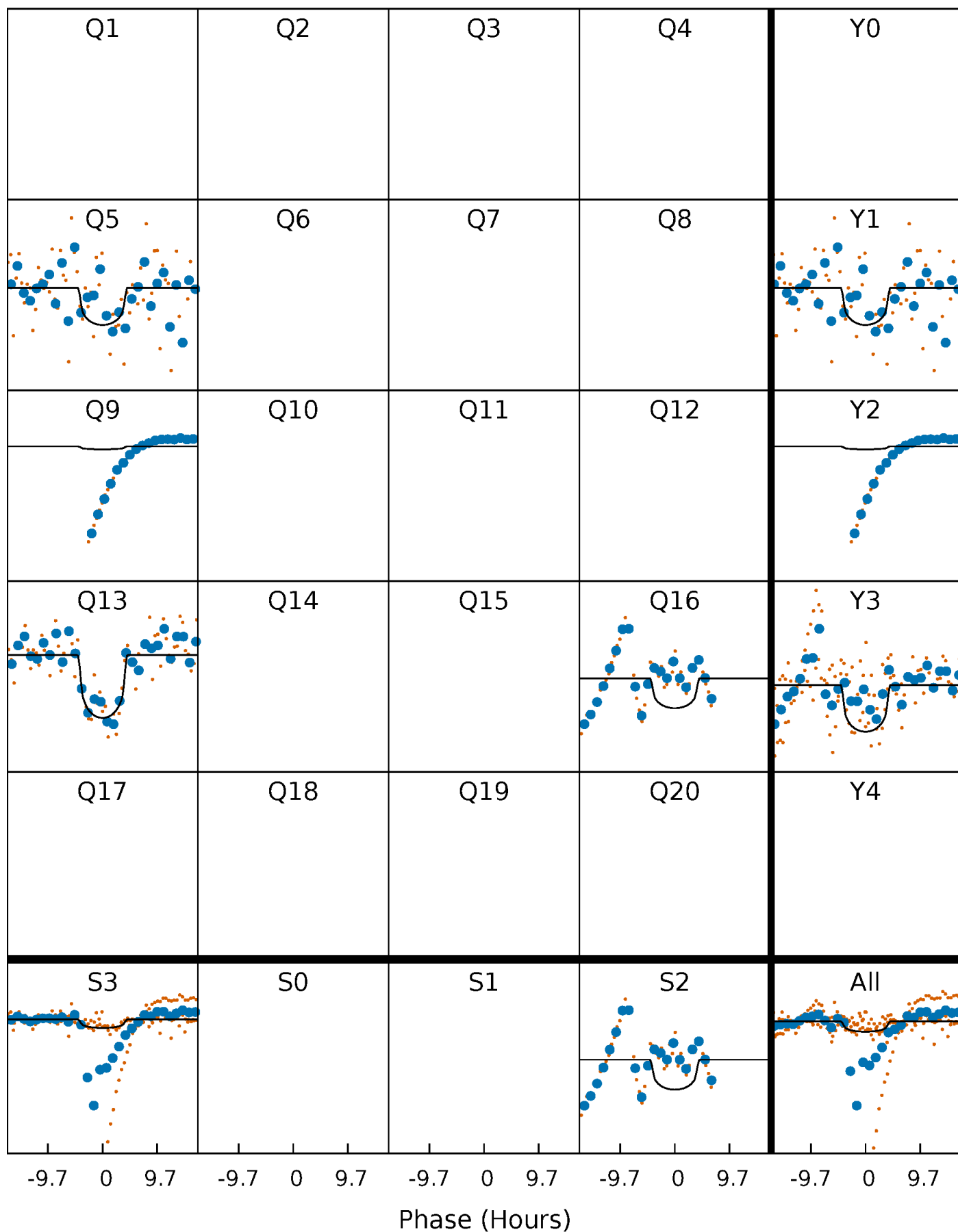
PDC Quarter-Phased Transit Curves

TCE 010780221-01 P=339.480319 Days $T_0=166.768750$ (BKJD)



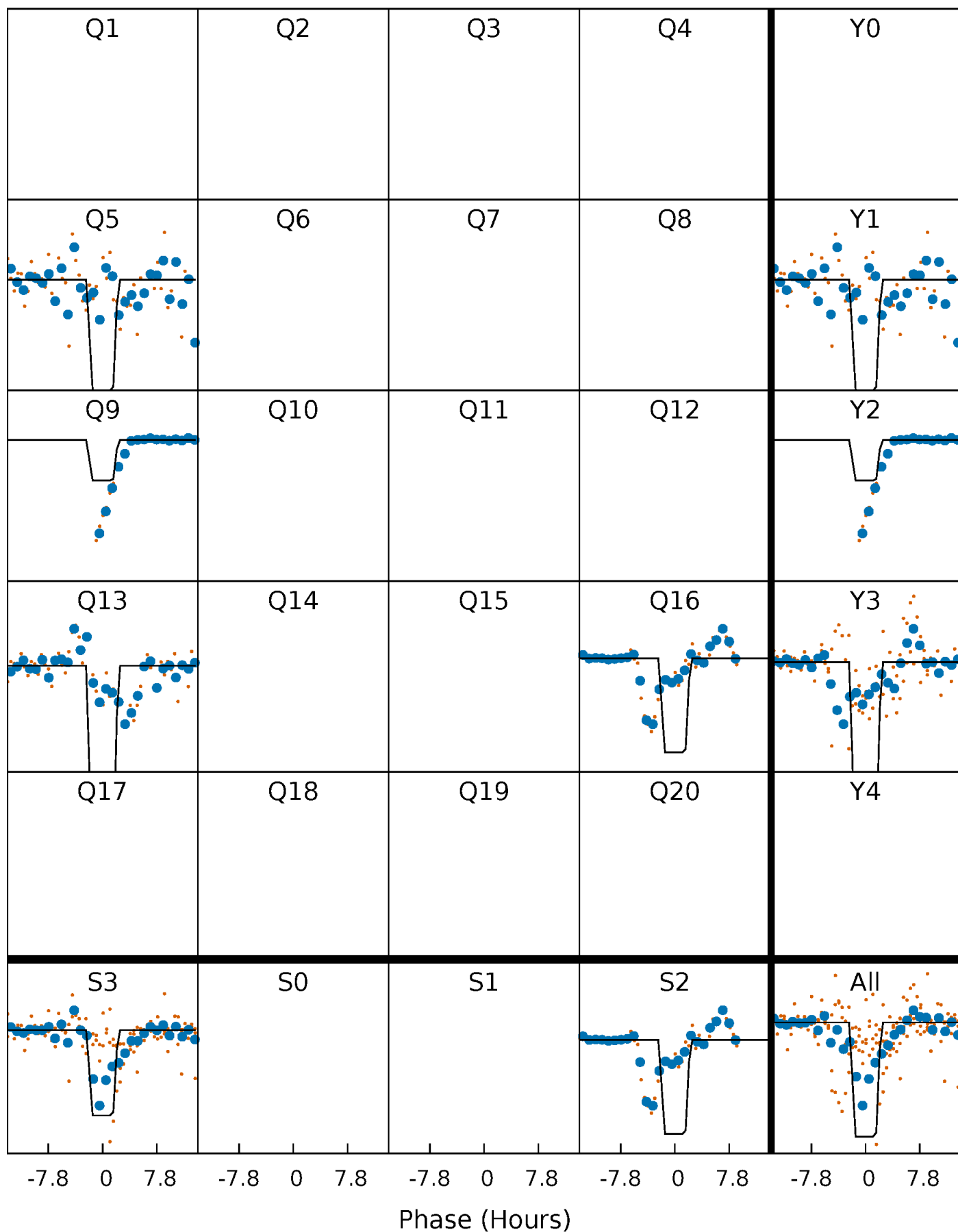
DV Quarter-Phased Transit Curves

TCE 010780221-01 $P=339.480319$ Days $T_0=166.768750$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

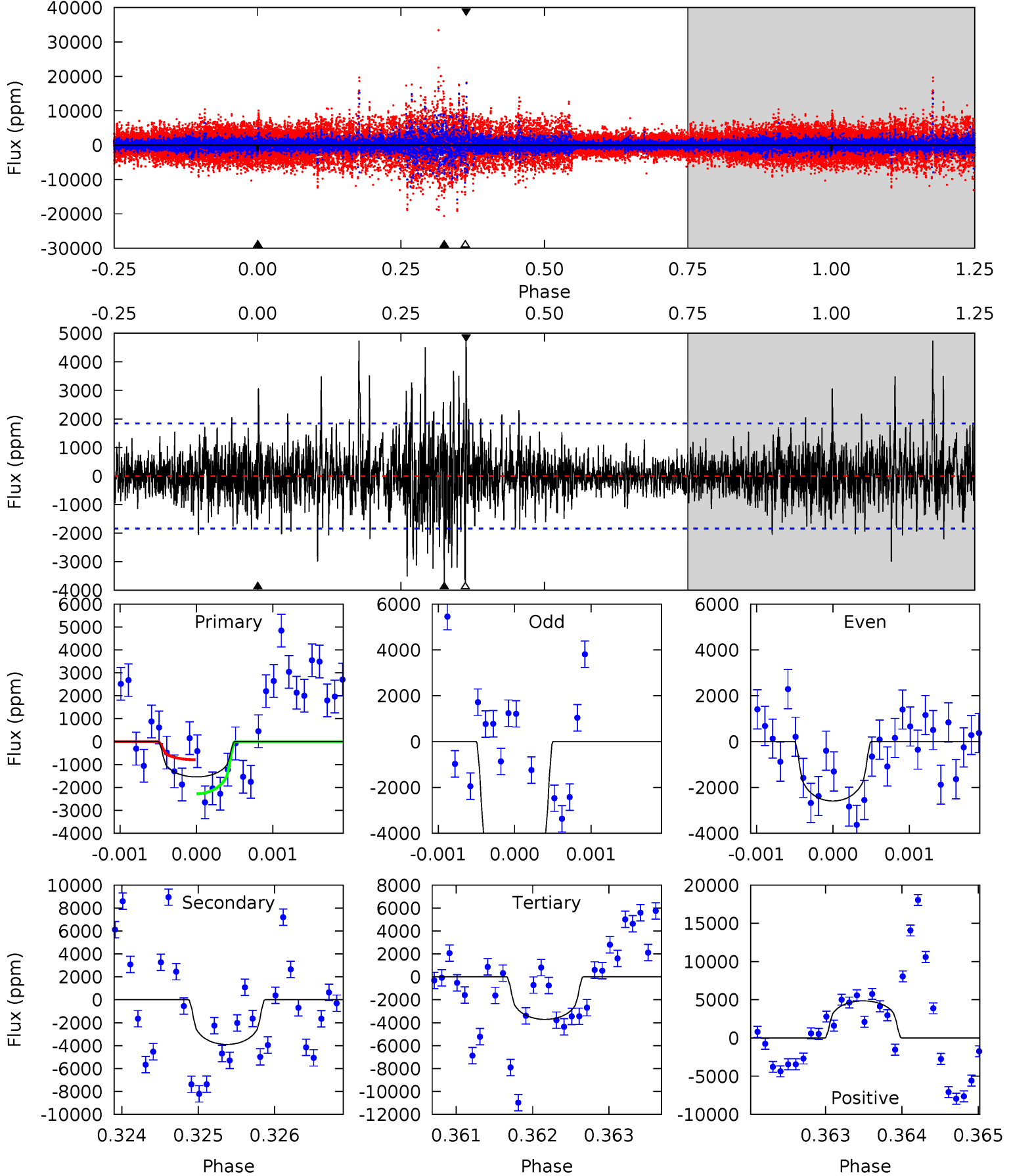
TCE 010780221-01 P=339.462732 Days $T_0=166.737429$ (BKJD)



DV Model-Shift Uniqueness Test

010780221-01, P = 339.480319 Days, E = 166.768750 Days

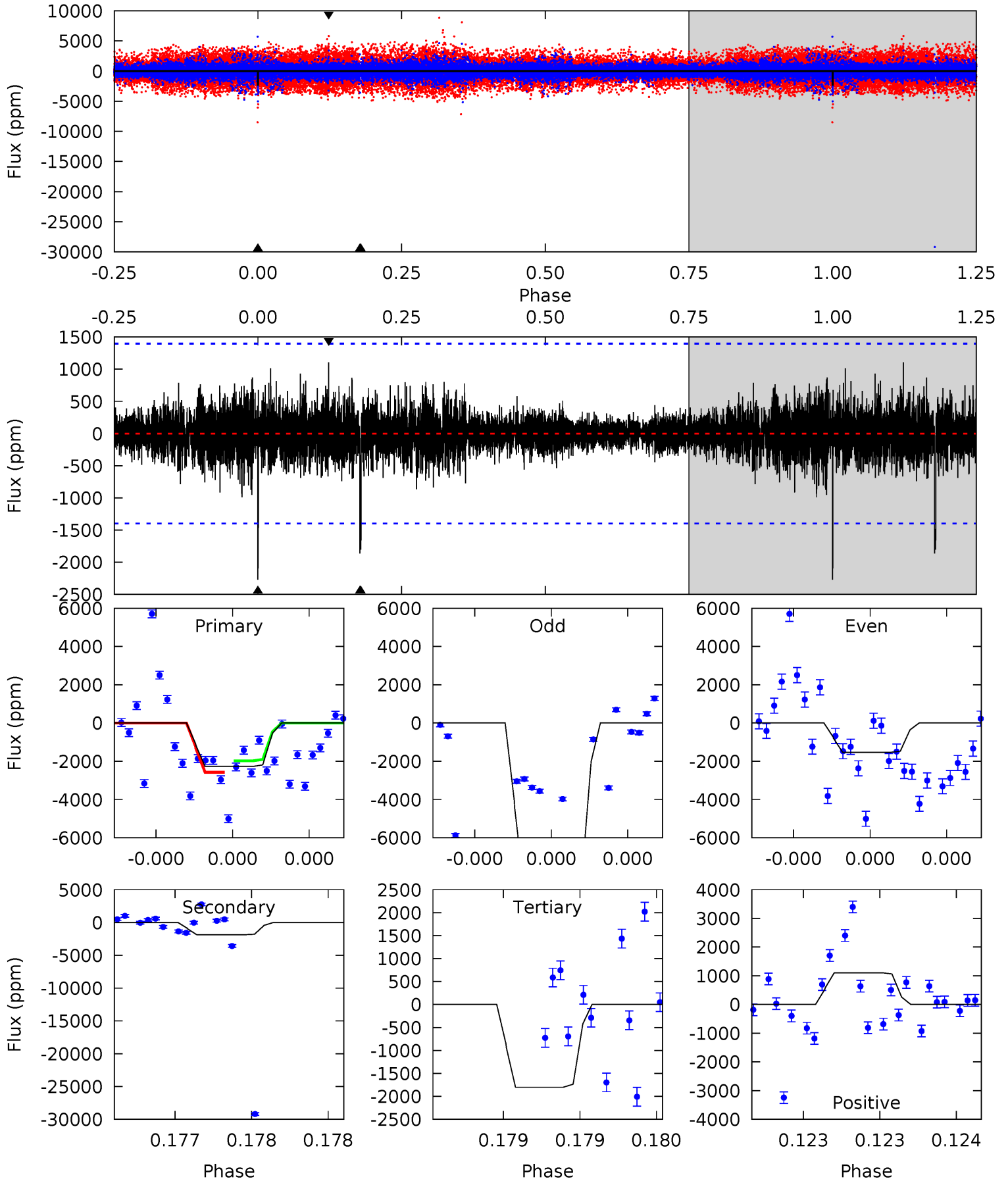
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
4.55	11.5	11.0	14.4	5.44	3.27	2.12	-6.43	-9.80	0.54	-2.83	4.32	6.74	0.55	0



Alt Model-Shift Uniqueness Test

010780221-01, P = 339.462732 Days, E = 166.737429 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.06	7.44	7.20	4.42	5.58	3.49	0.83	1.87	4.65	0.24	3.02	14.3	3.26	0.33	1.21



Stellar Parameters For KIC 010780221

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5069^{+176}_{-176}	$4.570^{+0.050}_{-0.061}$	$-0.140^{+0.300}_{-0.300}$	$0.750^{+0.087}_{-0.071}$	$0.764^{+0.087}_{-0.071}$	$2.545^{+0.590}_{-0.573}$
	+3%/-3%	+1%/-1%	+214%/-214%	+12%/-9%	+11%/-9%	+23%/-23%
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 010780221-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-3897 ± 338	$5.97^{+5.49}_{-3.87}$	291^{+13}_{-11}	4763^{+3451}_{-1002}	$46324^{+316345}_{-33805}$
Alt.	-1863 ± 250	$10.20^{+5.25}_{-4.88}$	291^{+12}_{-13}	3461^{+865}_{-445}	7509^{+19169}_{-4358}

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

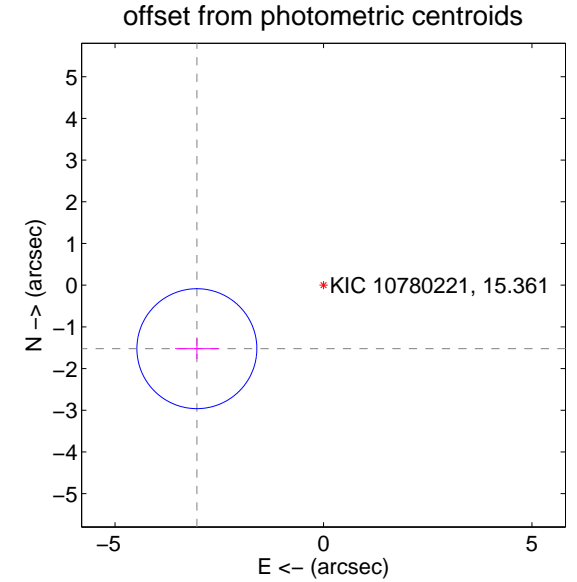
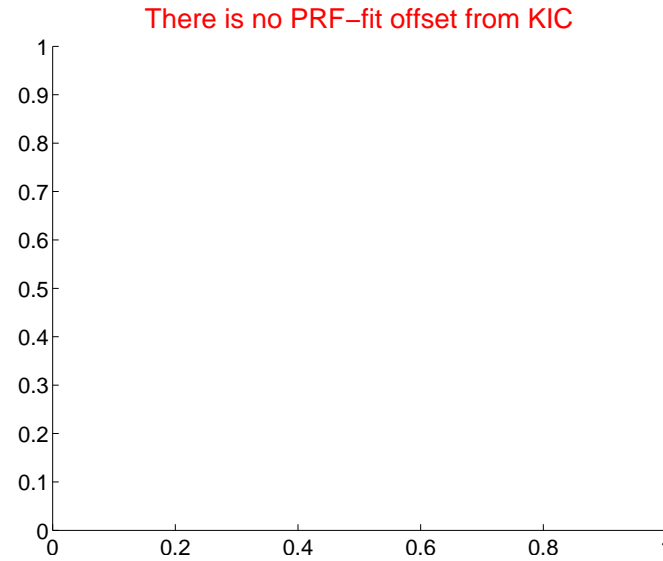
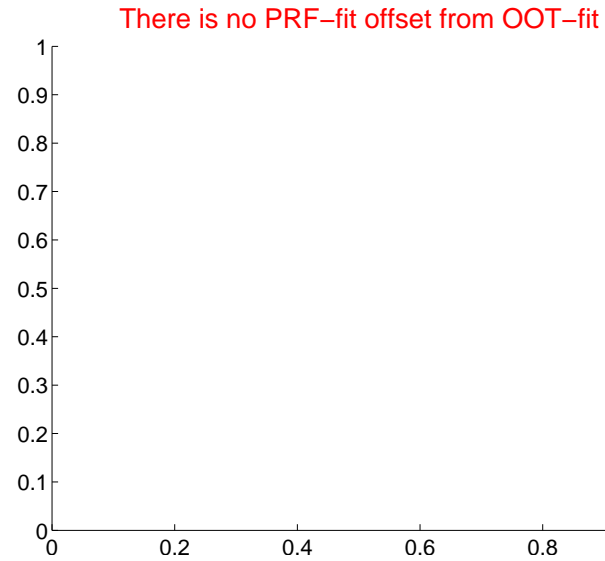
DV Centroid Data

Supplemental centroid analysis for 010780221-01. Kepler magnitude: 15.36. Transit SNR 9.46

There are 0 quarters with good PRF difference image offsets

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

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	—	—	—	—
PRF-fit source offset from KIC position	—	—	—	—
photometric centroid source offset	3.40 ± 0.48	7.09	3.04 ± 0.52	-1.52 ± 0.25

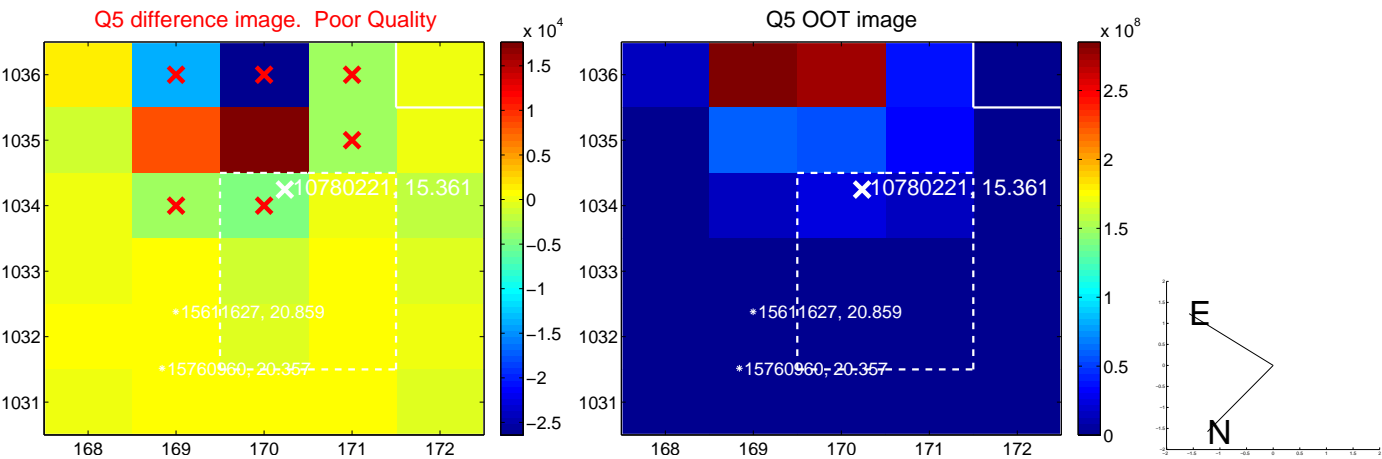


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

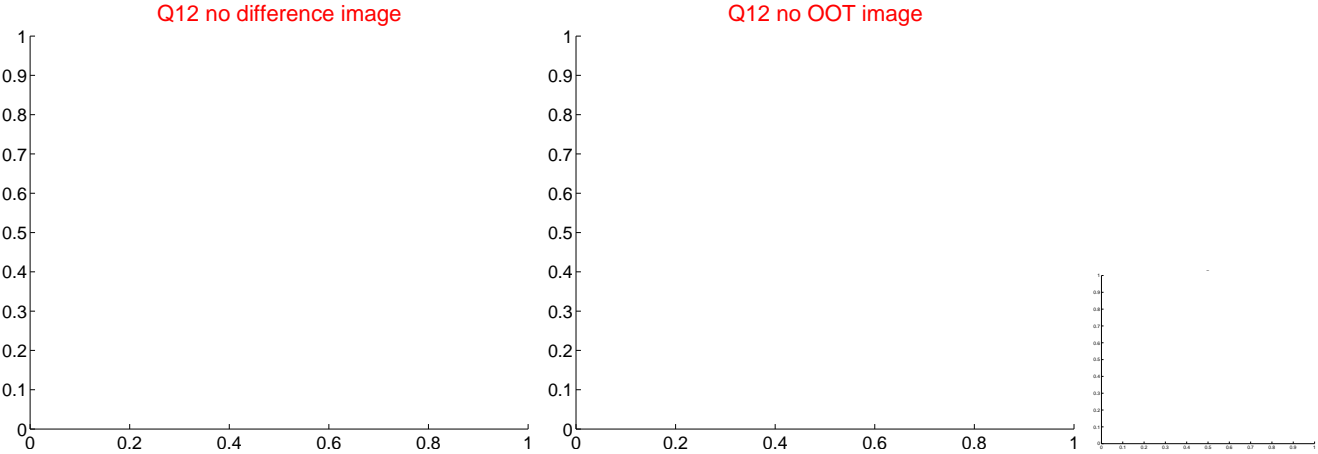
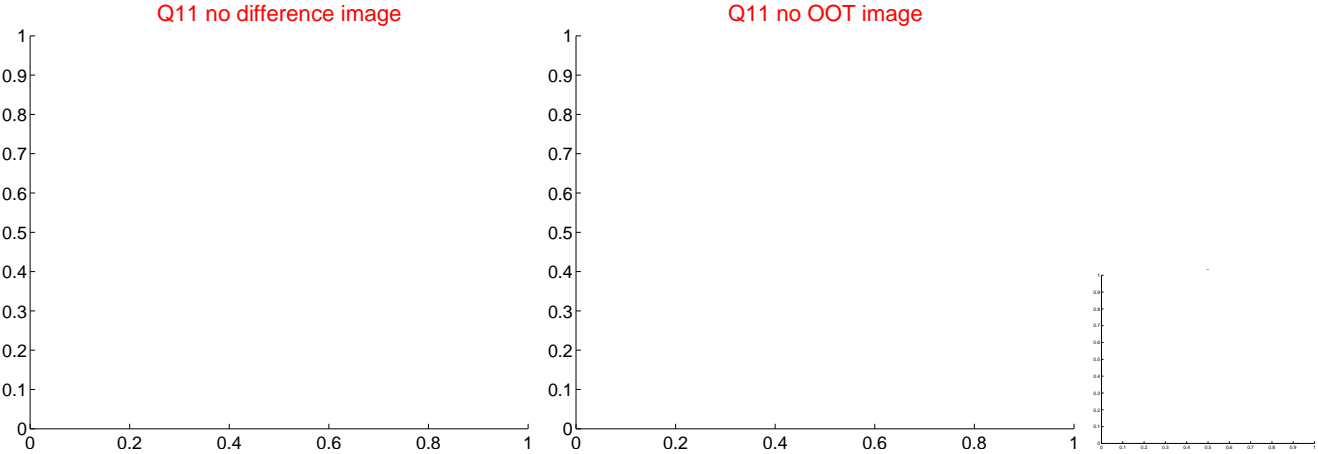
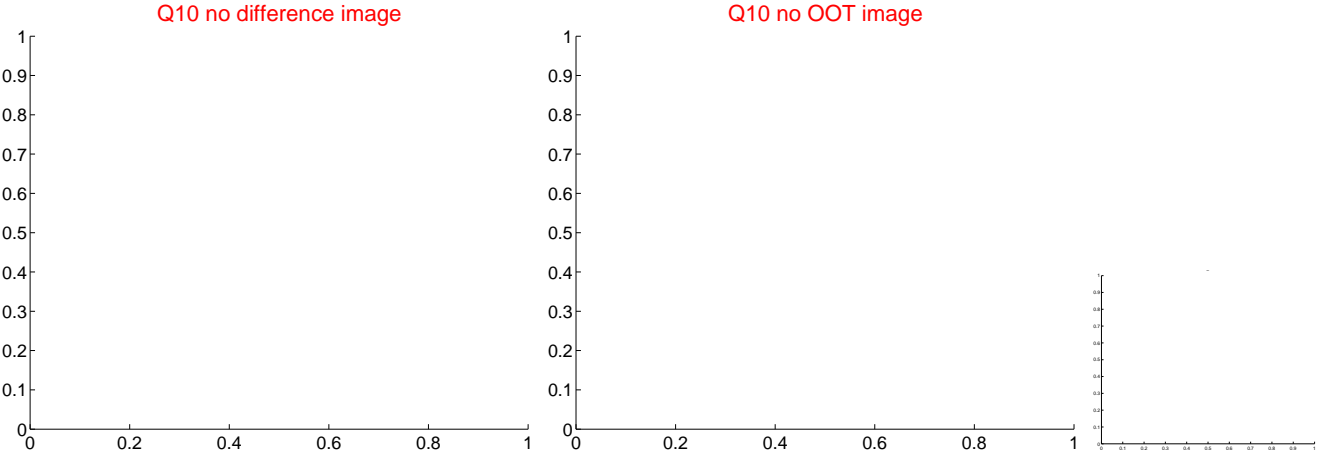
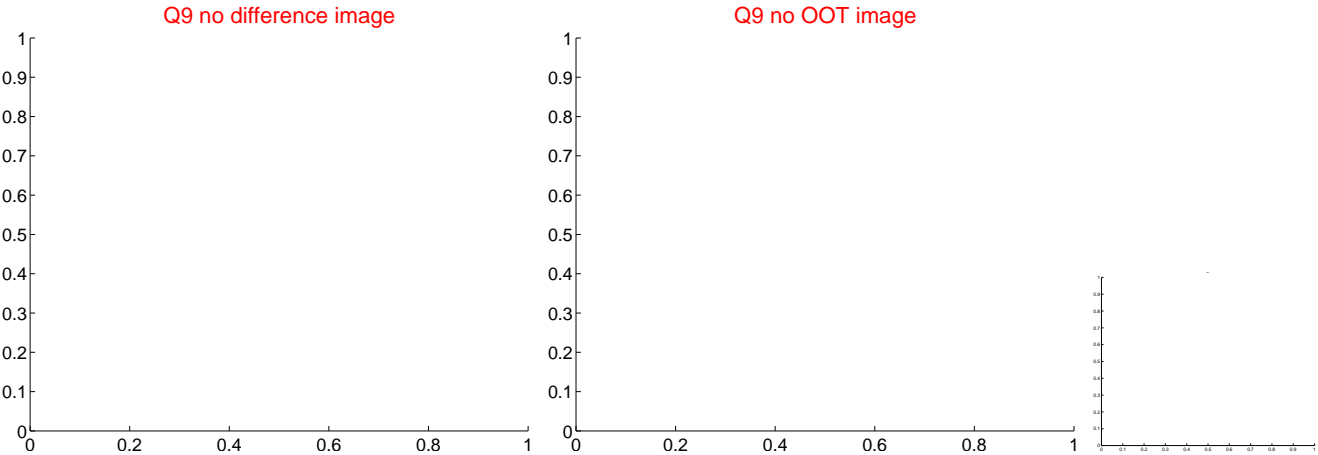
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



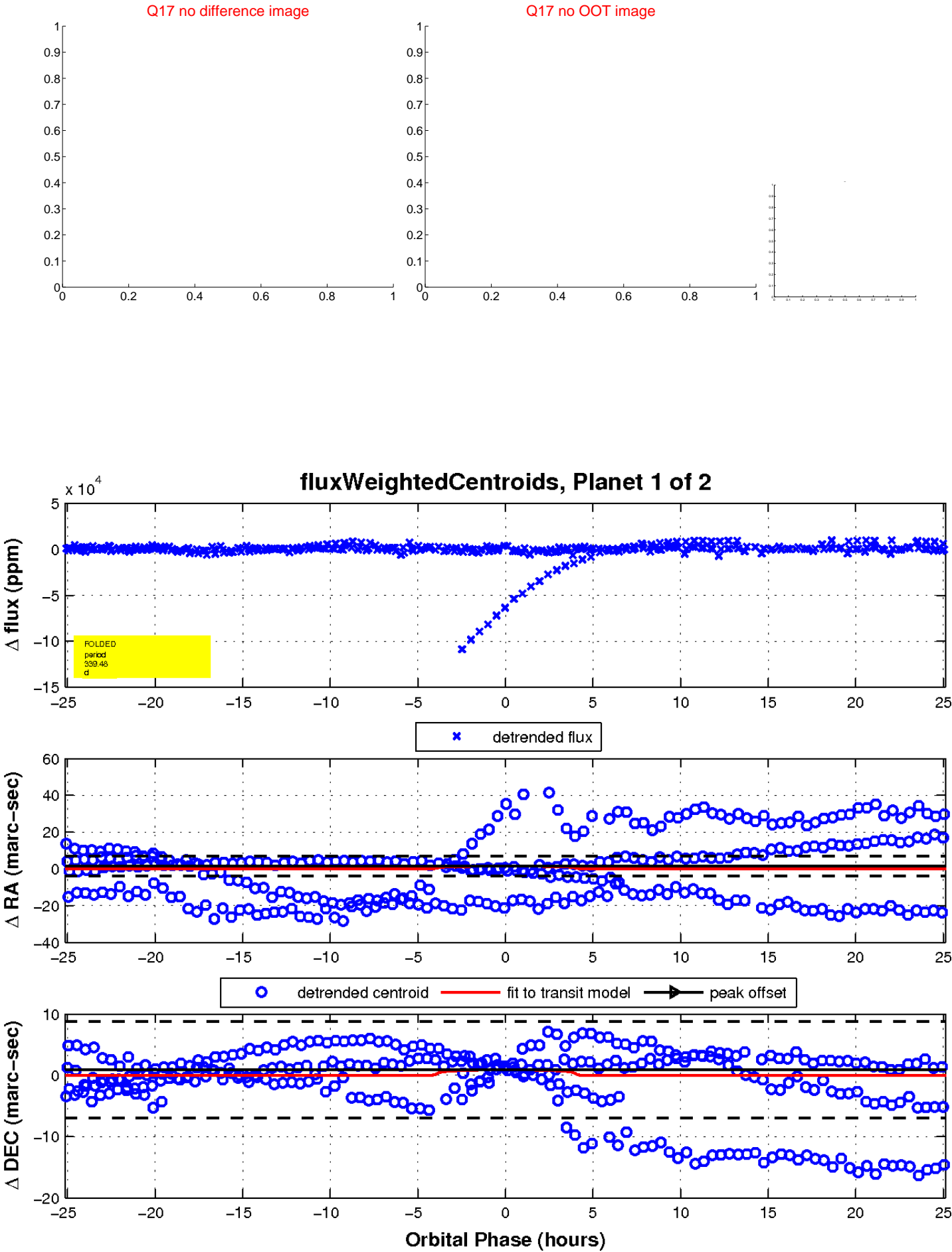
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



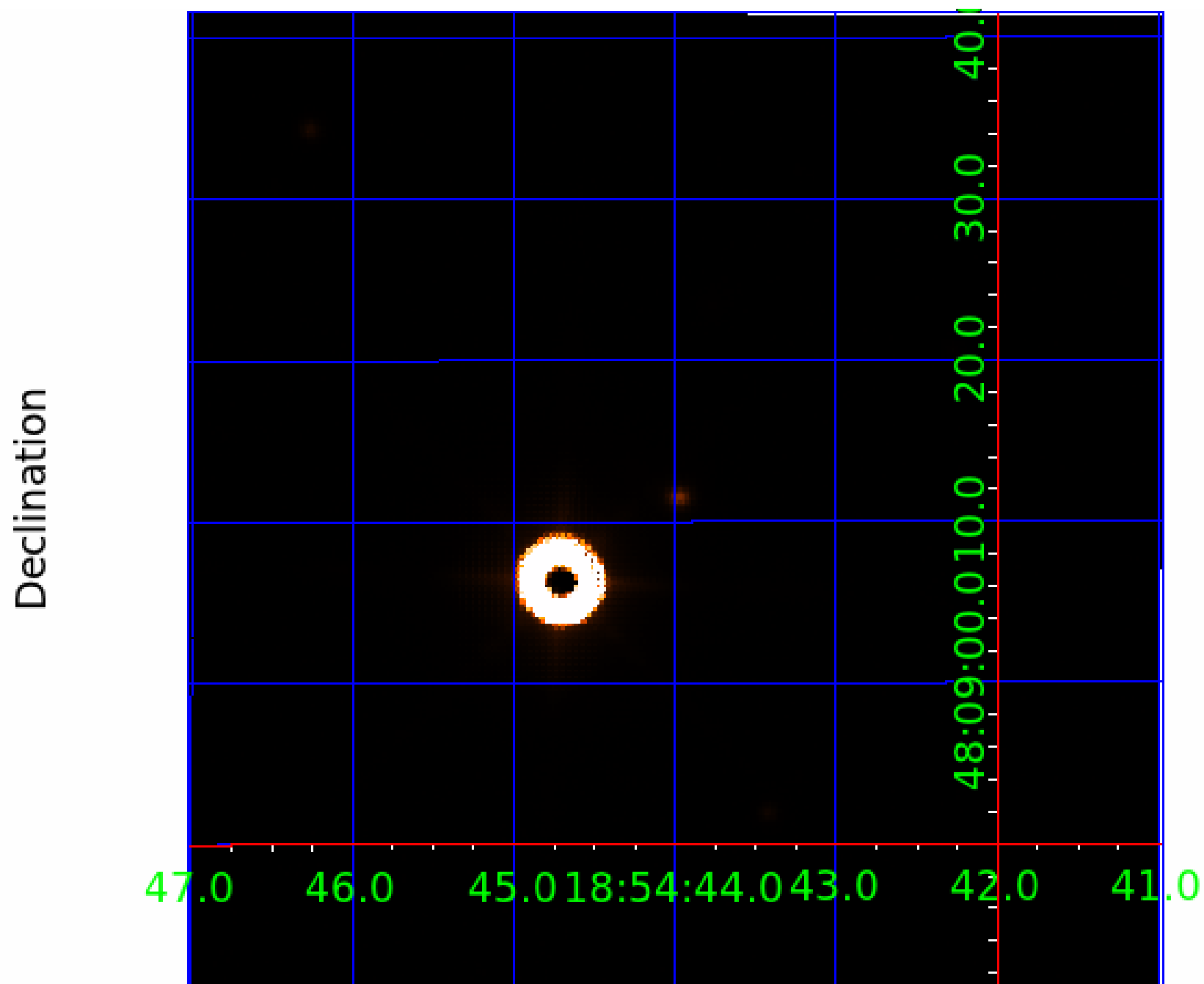
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



UKIRT Image



KIC 010780221

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})
010780221-01	OBS	No	339.480319	166.768750	3432.8	8.452	10.8	9.5	0.75	5069	4.34	0.44
010780221-02	OBS	No	387.396935	171.259680	11689.3	4.705	13.4	9.8	0.75	5069	13.77	0.37

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010780221-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_TER_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010780221-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_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.

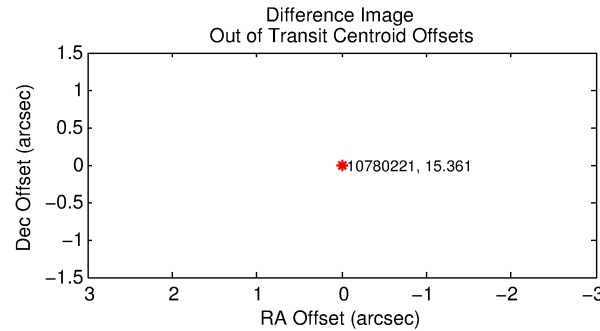
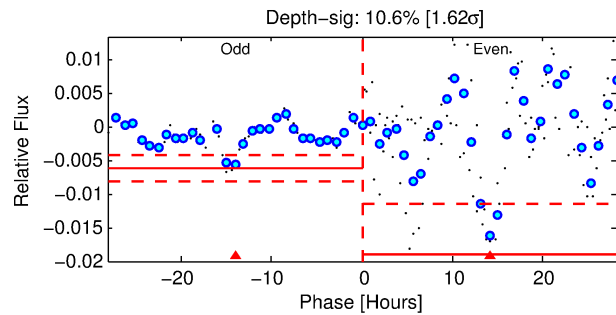
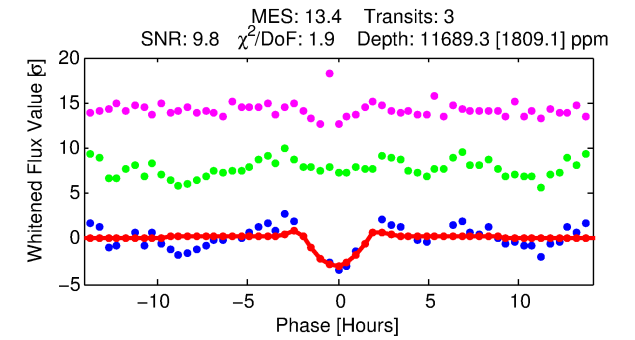
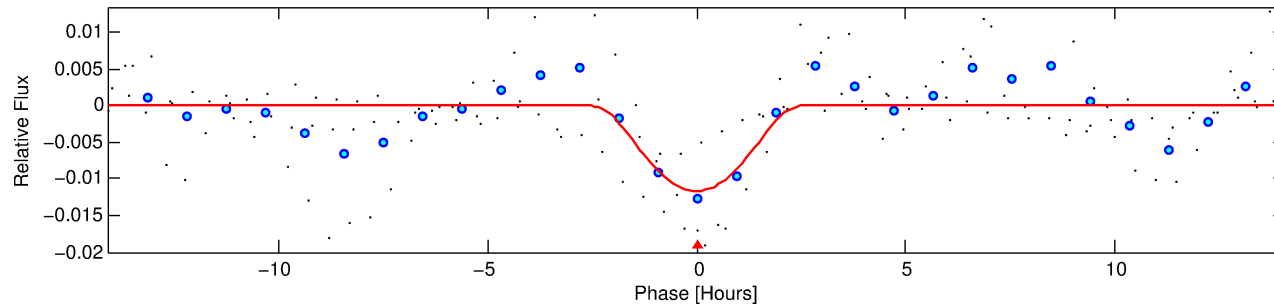
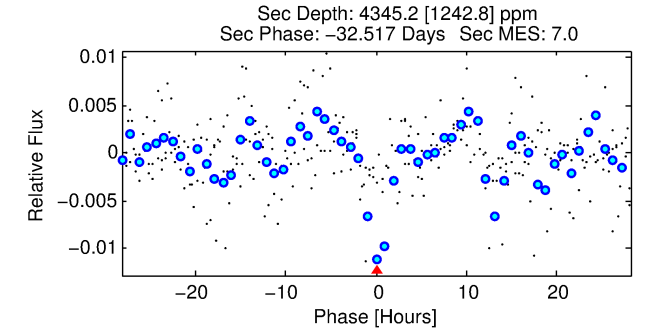
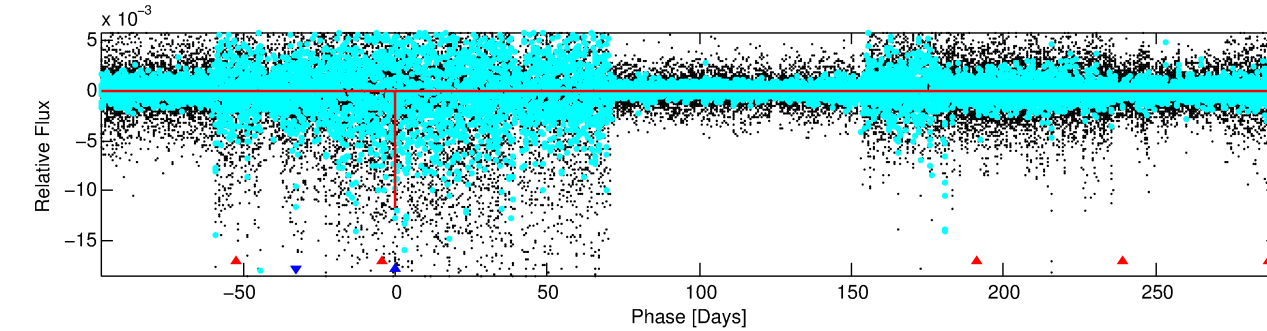
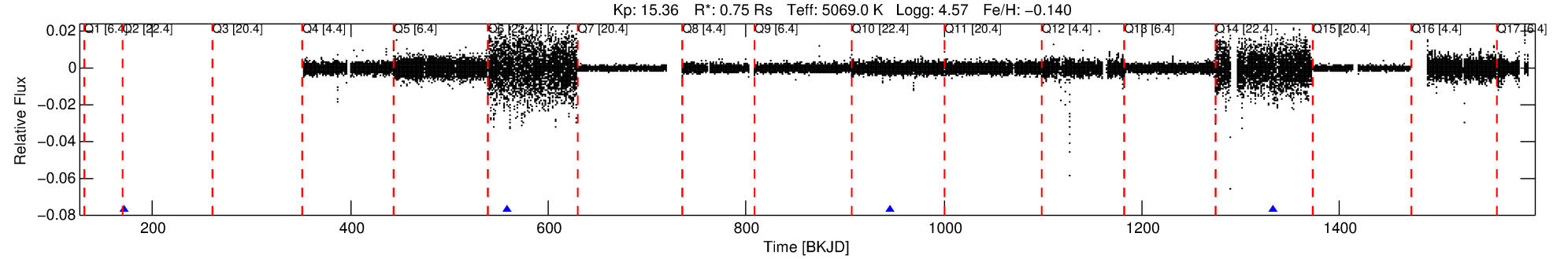
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010780221-02

No Significant Match Found

DV One-Page Summary

KIC: 10780221 Candidate: 2 of 2 Period: 387.397 d



DV Fit Results:

Period = 387.39694 [0.00978] d
Epoch = 171.2597 [0.0204] BKJD
Rp/R* = 0.1682 [0.5236]
a/R* = 400.65 [197.51]
b = 0.98 [0.78]
Seff = 0.37 [0.07]
Teq = 199 [9] K
Rp = 13.77 [42.88] Re
a = 0.9503 [0.0859] AU
Ag = 11391.04 [71005.39] [0.16σ]
Teffp = 3173 [4945] K [0.60σ]

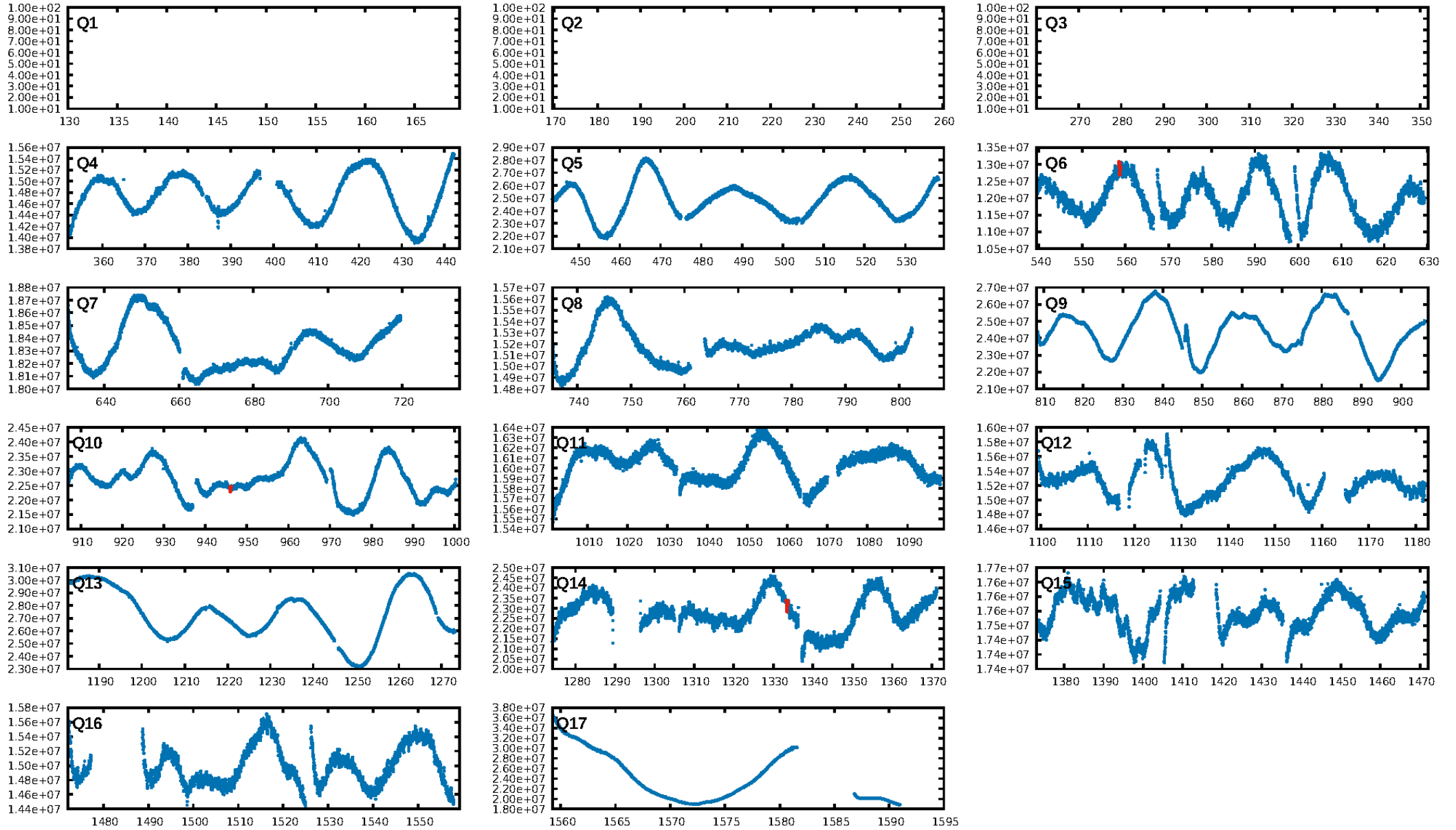
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [118.88σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 0.0%
ModelChiSquareGof-sig: 20.0%
Bootstrap-pfa: 8.74e-07
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: -27.89
Centroid-sig: 16.5%
Centroid-so: 3.605 arcsec [65.35σ]
OotOffset-rm: N/A
KicOffset-rm: 2.652 arcsec [3.02σ]
OotOffset-st: 0/0/0 [0]
KicOffset-st: 1/0/0 [1]
DiffImageQuality-fgm: 0.00 [0/1]
DiffImageOverlap-fno: 1.00 [3/3]

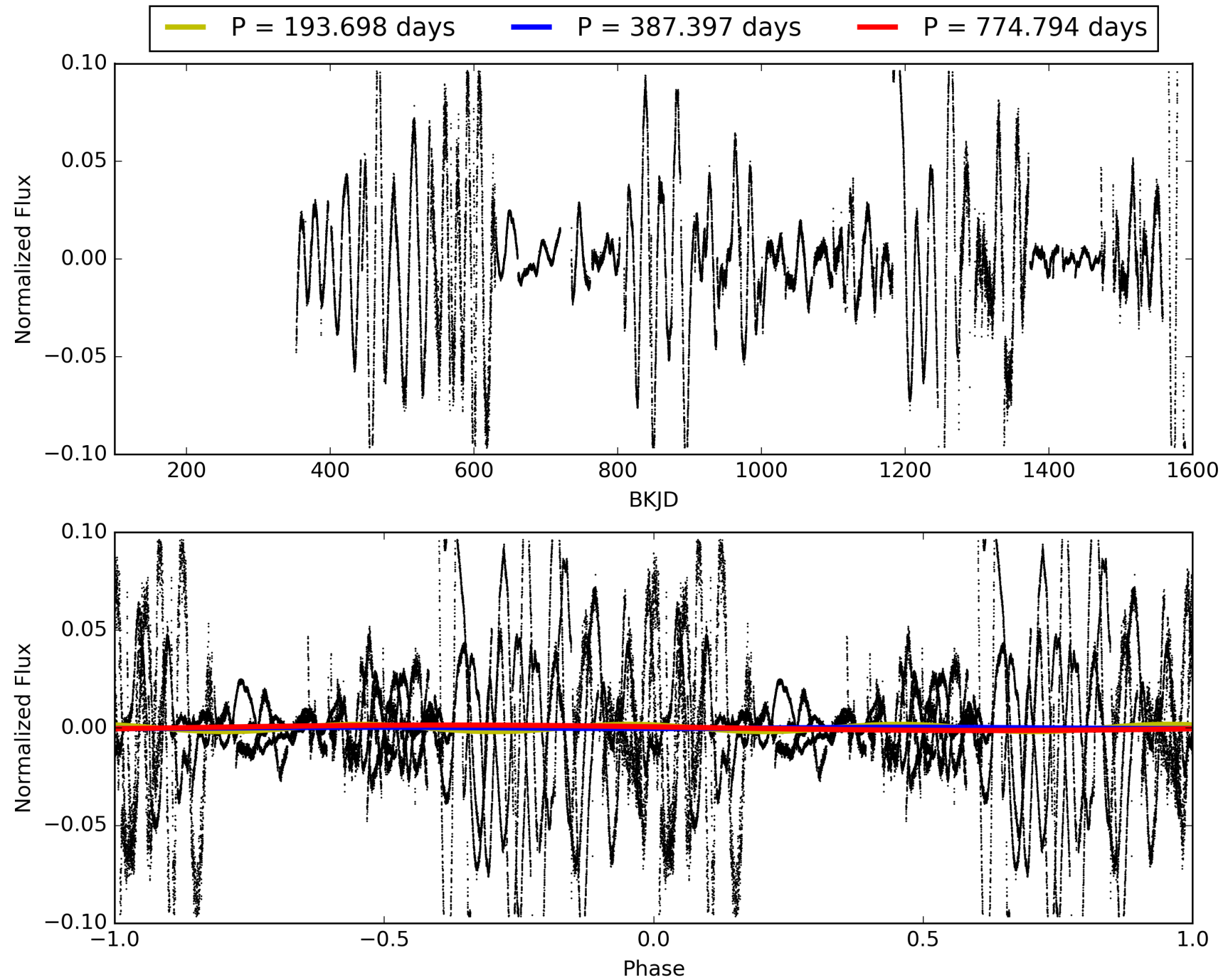
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 04:54:29 Z

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

TCE 010780221-02, PDC Light Curves

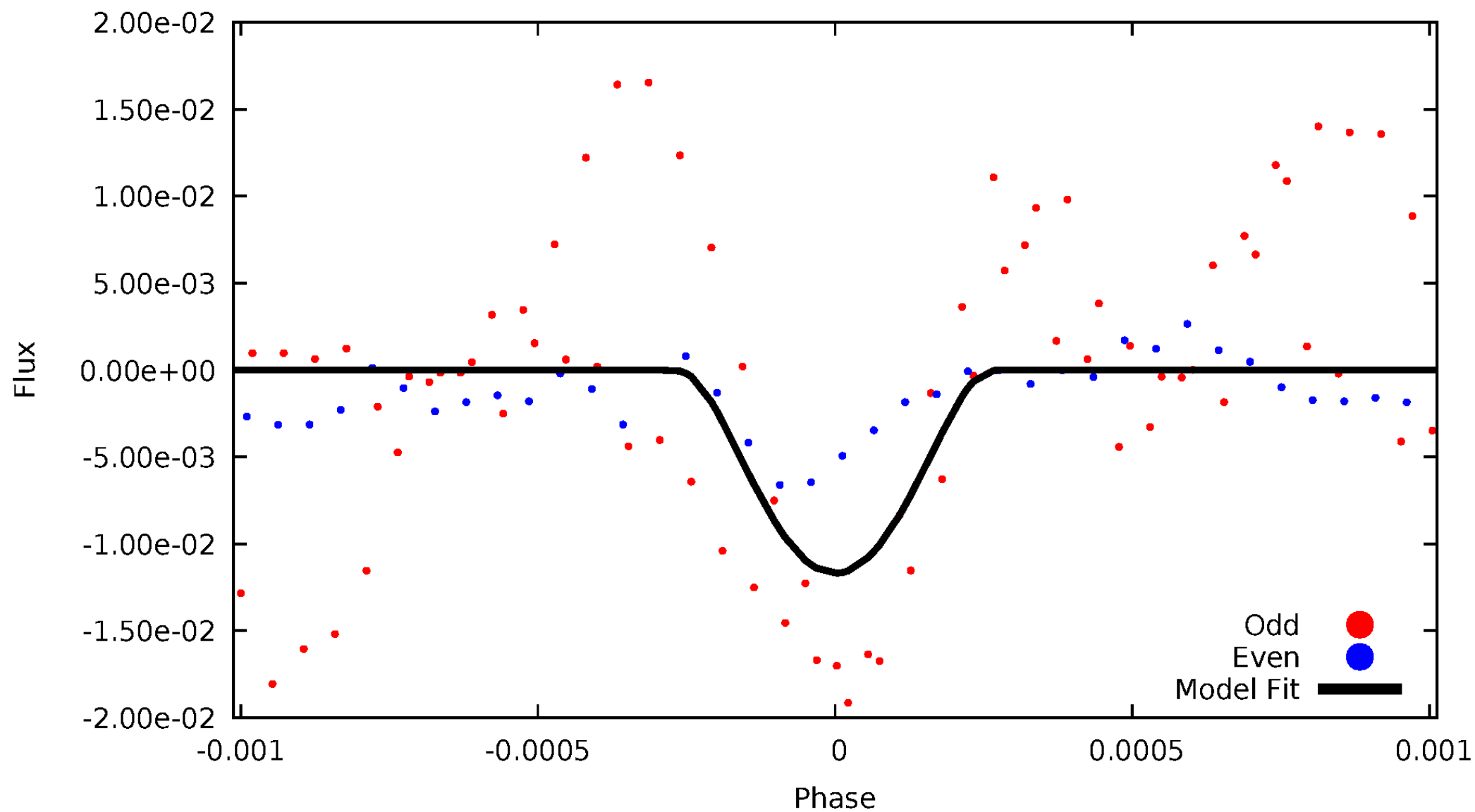


TCE 010780221-02



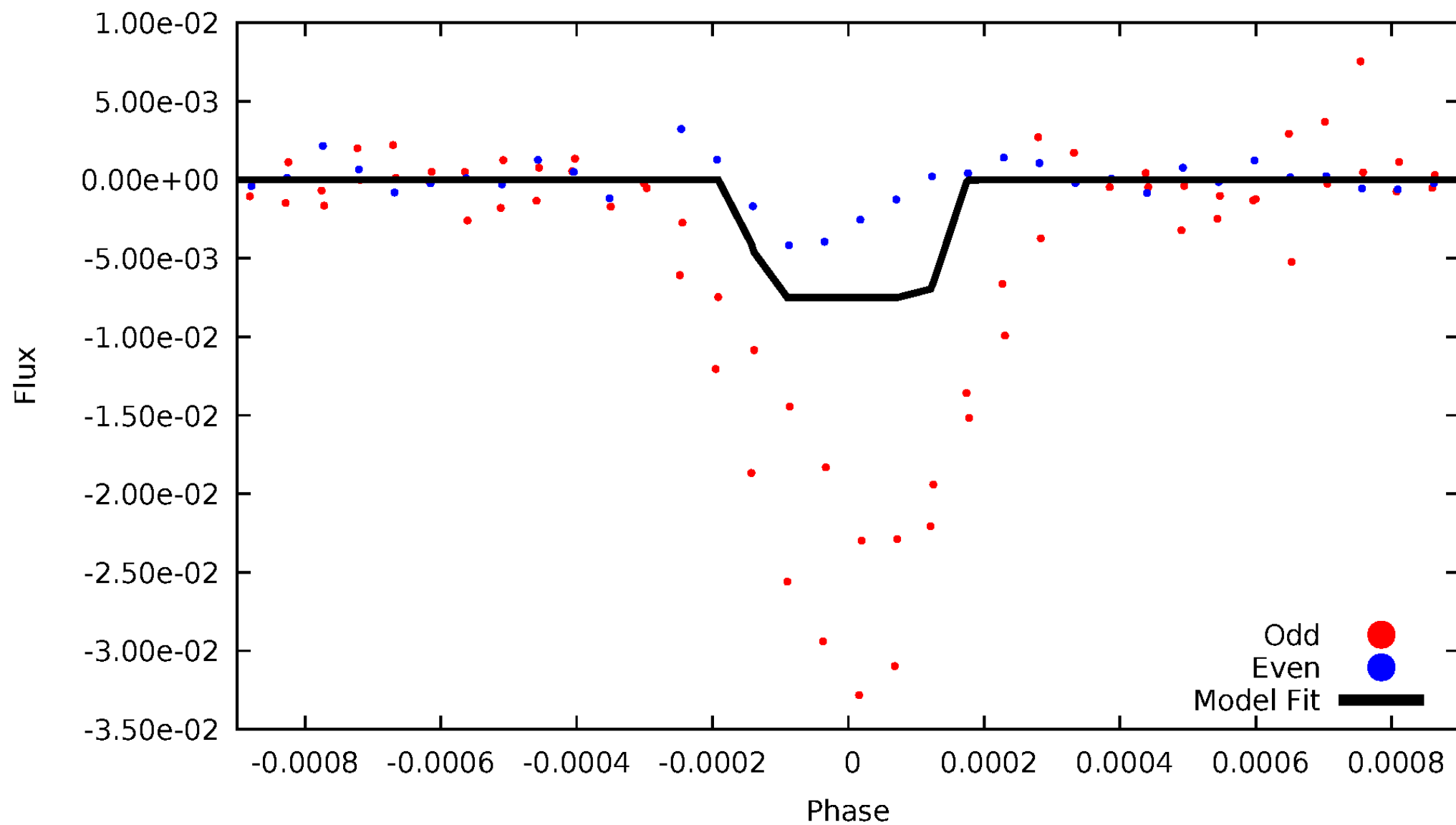
DV Odd/Even

TCE 010780221-02



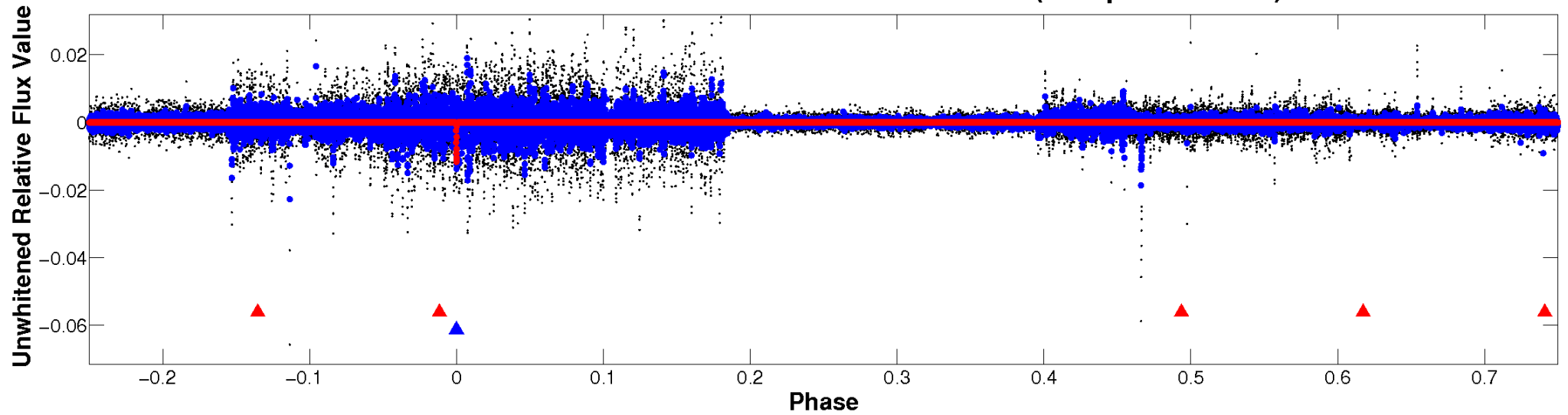
ALT Odd/Even

TCE 010780221-02

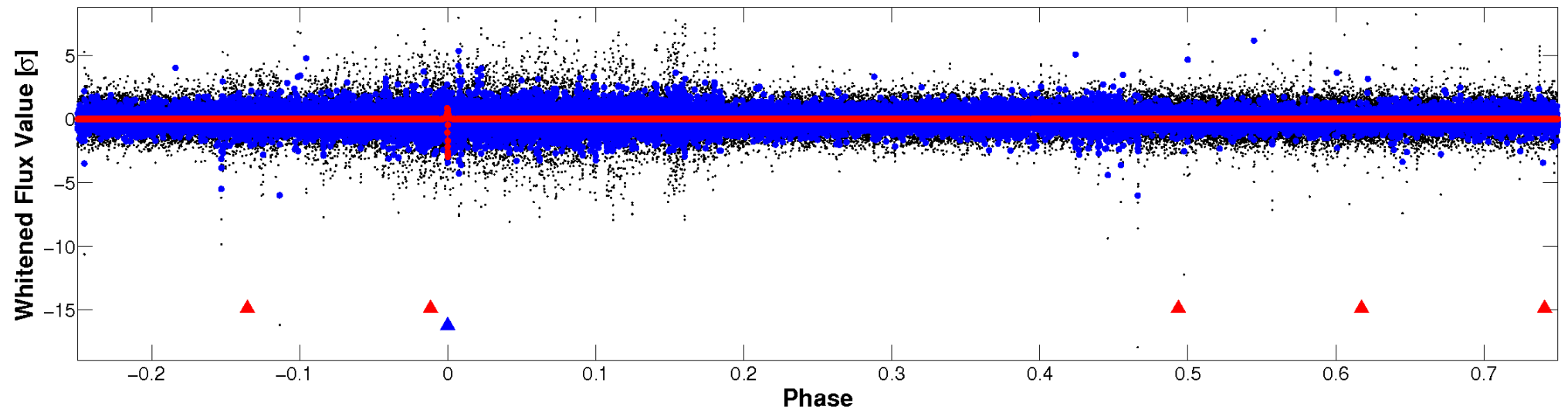


Non-Whitened Vs. Whitened Light Curve

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

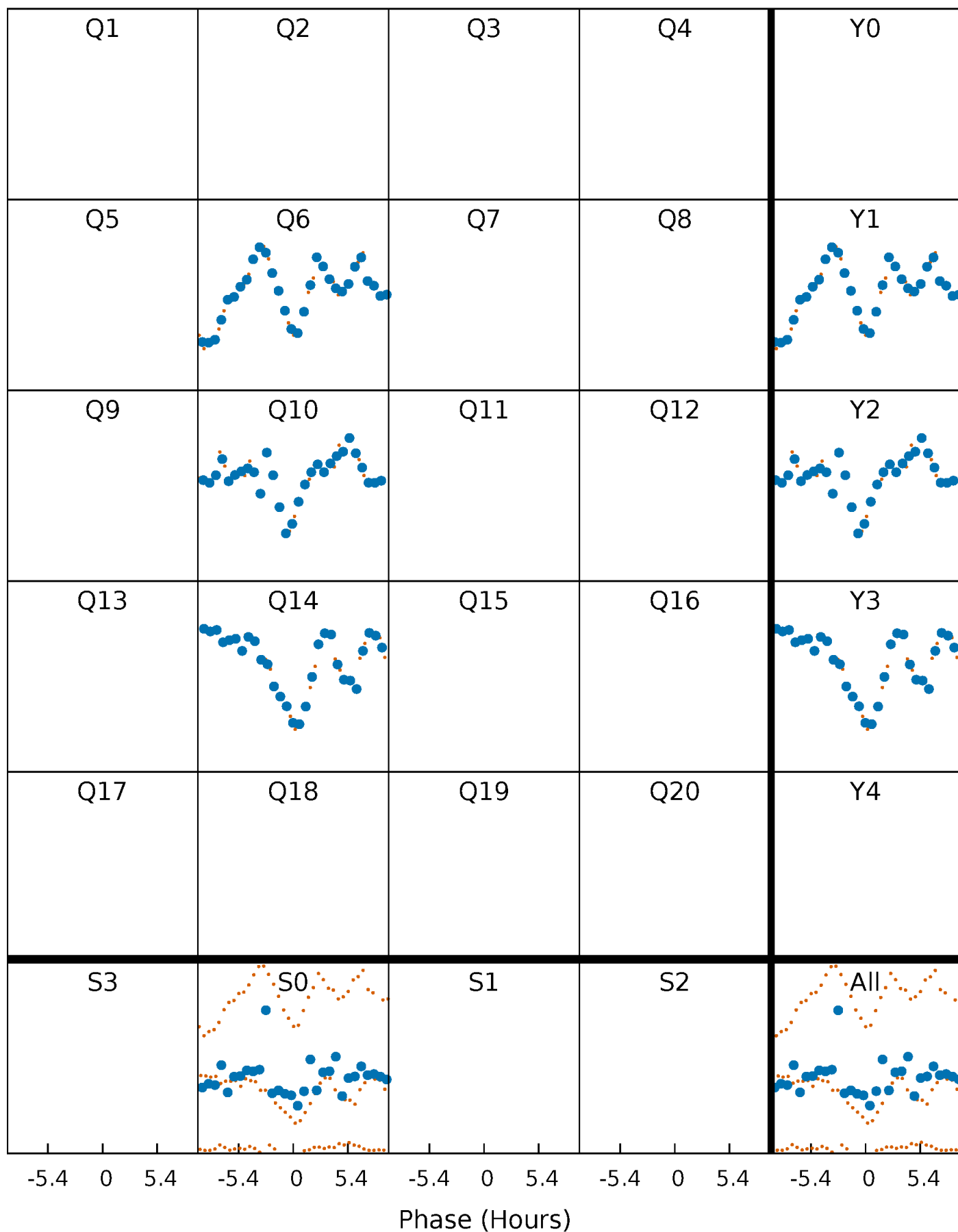


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



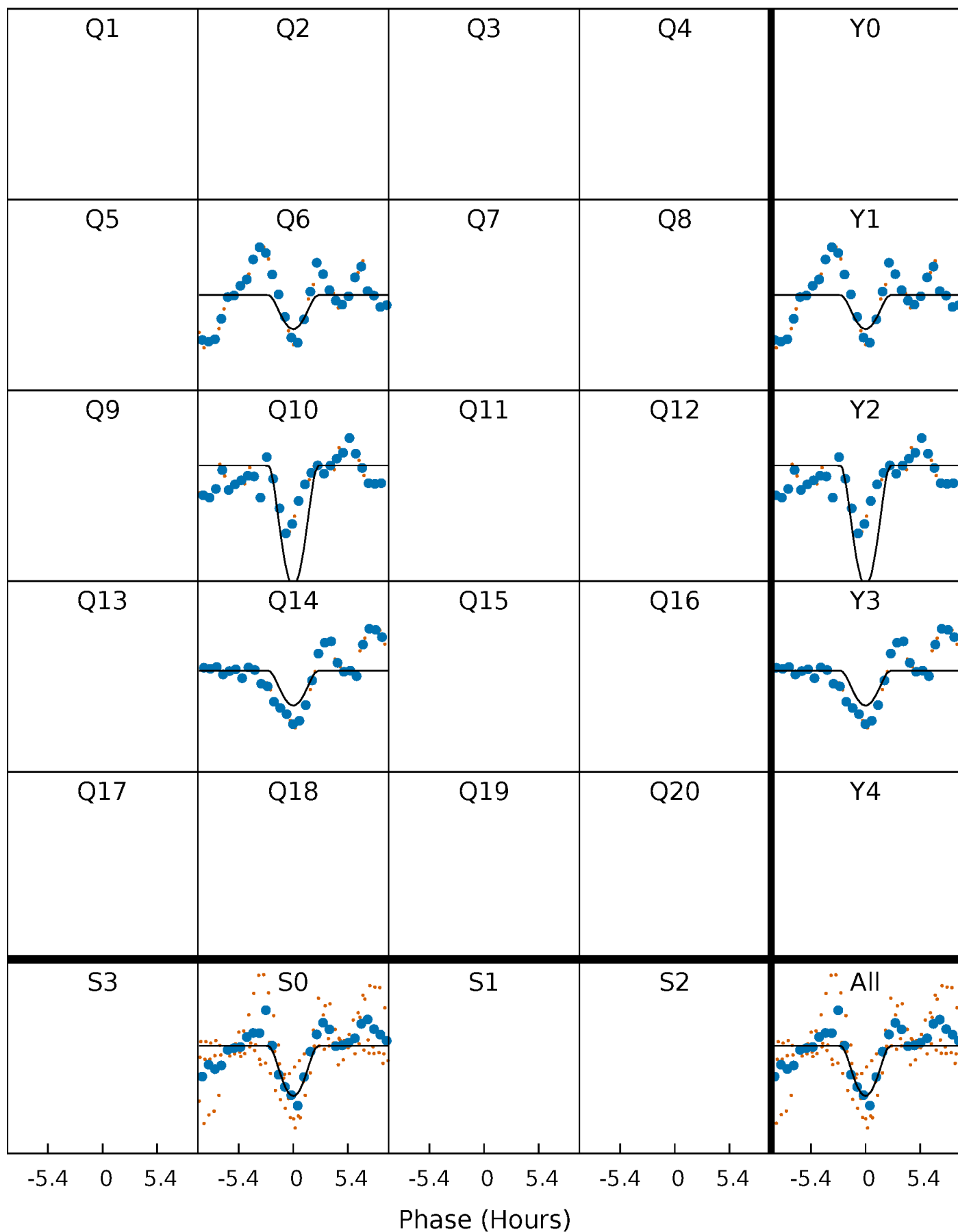
PDC Quarter-Phased Transit Curves

TCE 010780221-02 $P=387.396935$ Days $T_0=171.259680$ (BKJD)



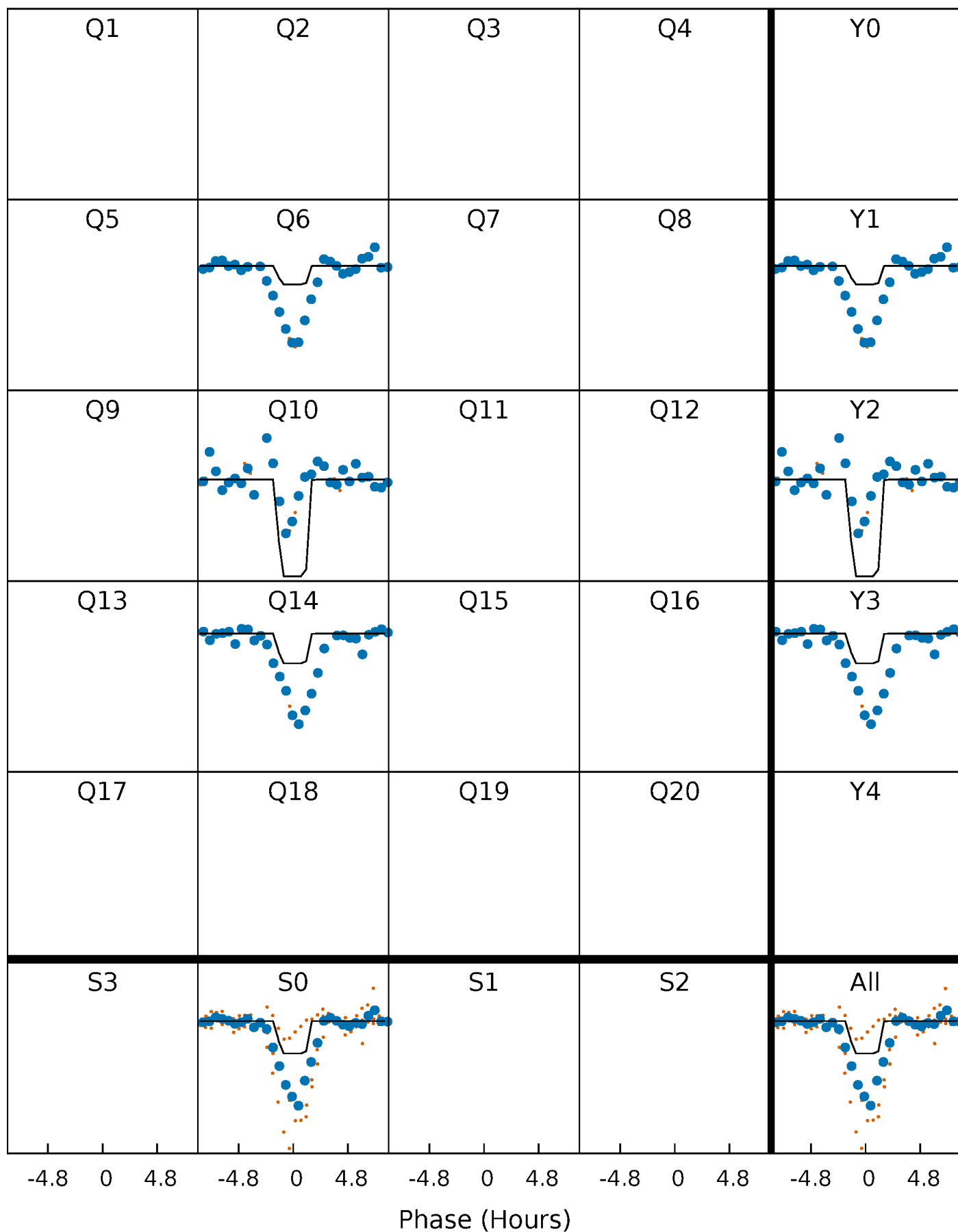
DV Quarter-Phased Transit Curves

TCE 010780221-02 $P=387.396935$ Days $T_0=171.259680$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

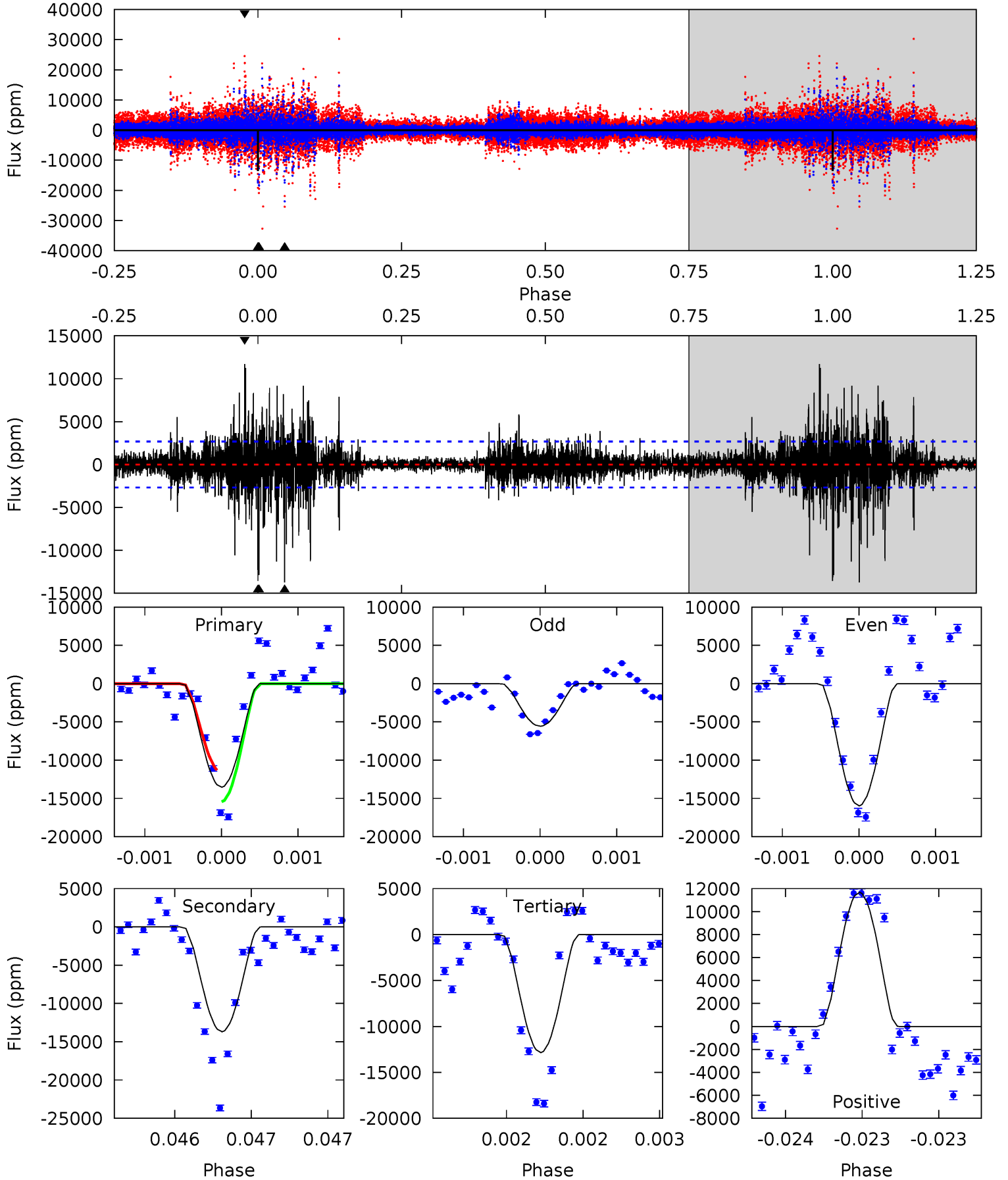
TCE 010780221-02 $P=387.399864$ Days $T_0=171.251725$ (BKJD)



DV Model-Shift Uniqueness Test

010780221-02, P = 387.396935 Days, E = 171.259680 Days

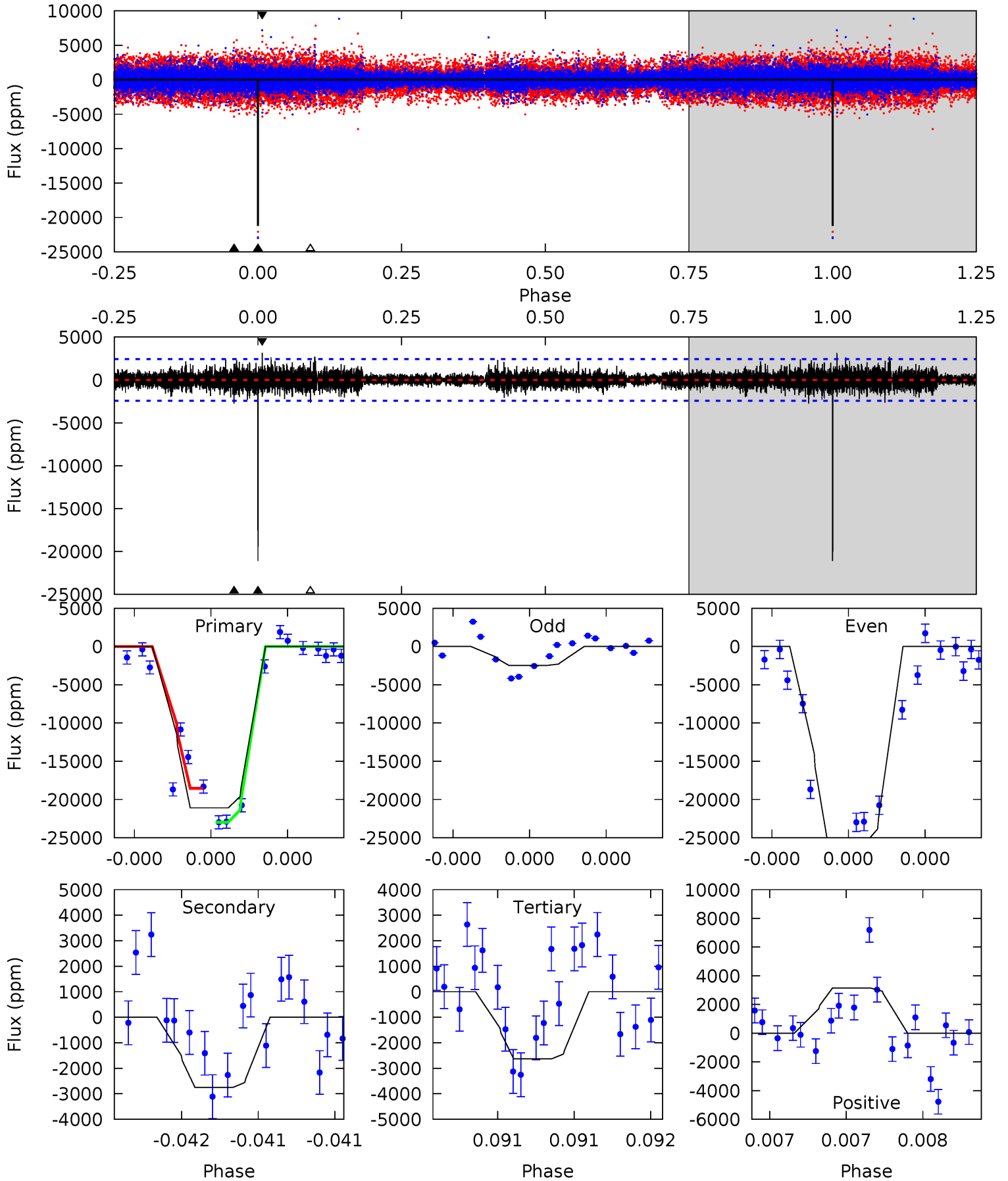
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
28.1	28.4	26.7	24.2	5.56	3.46	2.76	1.42	3.85	1.76	4.19	10.2	0.98	0.46	4.21



Alt Model-Shift Uniqueness Test

010780221-02, P = 387.399864 Days, E = 171.251725 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
49.0	6.39	6.11	7.32	5.65	3.60	1.11	42.9	41.7	0.29	-0.93	34.7	0.86	0.13	5.16



Stellar Parameters For KIC 010780221

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5069^{+176}_{-176}	$4.570^{+0.050}_{-0.061}$	$-0.140^{+0.300}_{-0.300}$	$0.750^{+0.087}_{-0.071}$	$0.764^{+0.087}_{-0.071}$	$2.545^{+0.590}_{-0.573}$
	+3%/-3%	+1%/-1%	+214%/-214%	+12%/-9%	+11%/-9%	+23%/-23%
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 010780221-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-13707 ± 482	$33.88^{+35.99}_{-23.32}$	278^{+11}_{-11}	3233^{+1640}_{-579}	6032^{+58345}_{-4634}
Alt.	-2751 ± 430	$32.17^{+32.83}_{-22.23}$	278^{+12}_{-11}	2617^{+1094}_{-399}	1248^{+12887}_{-939}

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

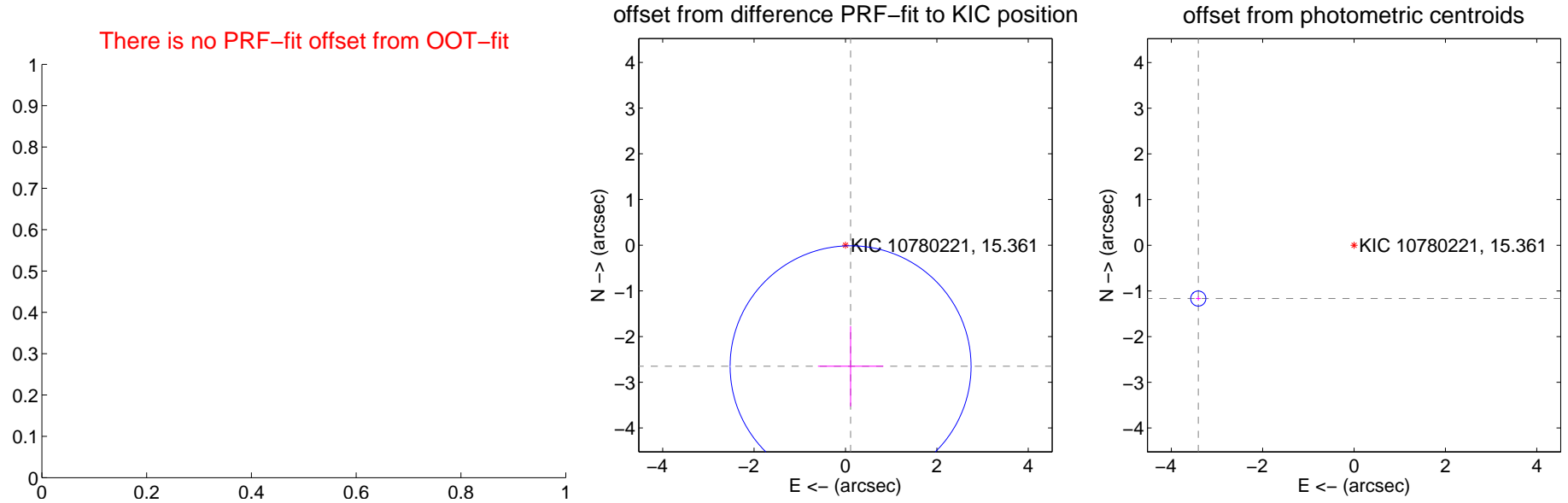
DV Centroid Data

Supplemental centroid analysis for 010780221-02. Kepler magnitude: 15.36. Transit SNR 9.80

There are 0 quarters with good PRF difference image offsets

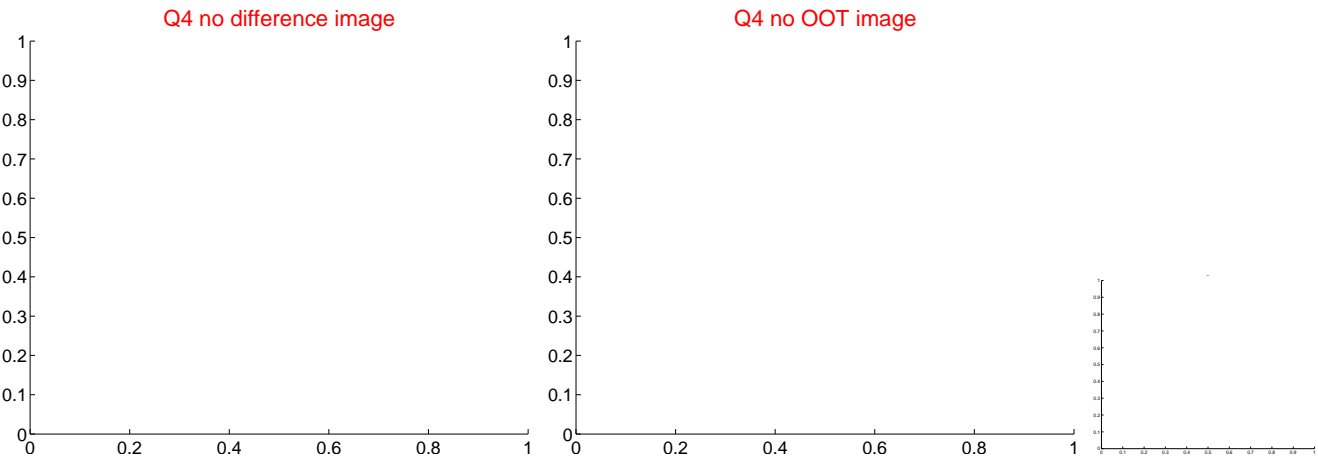
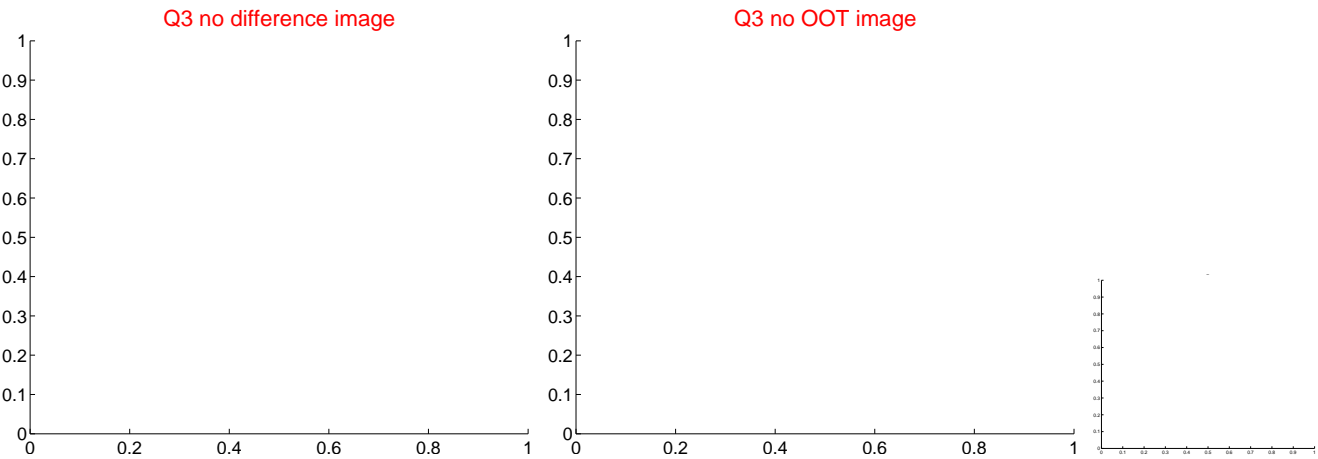
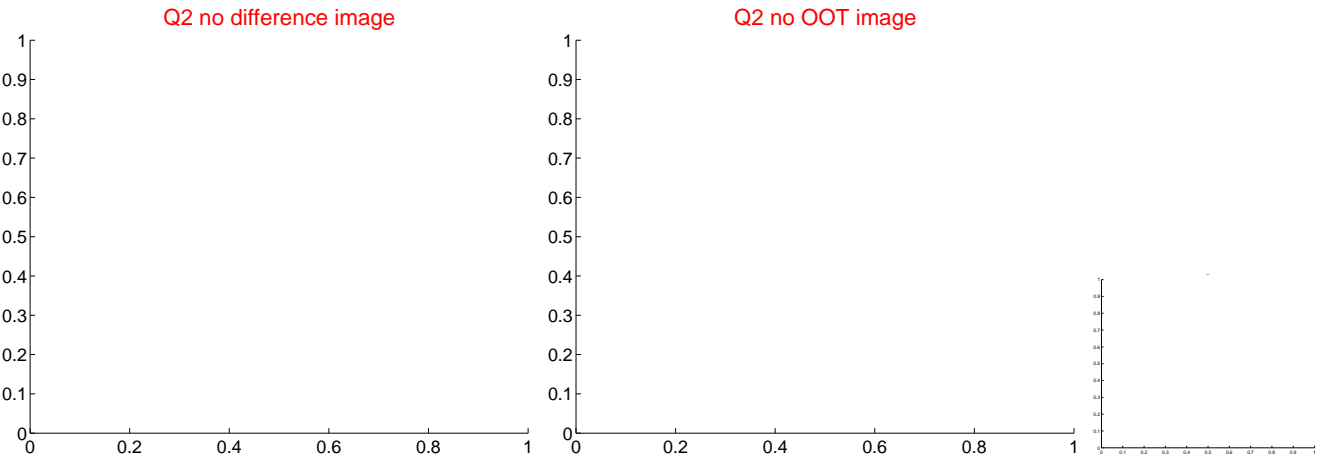
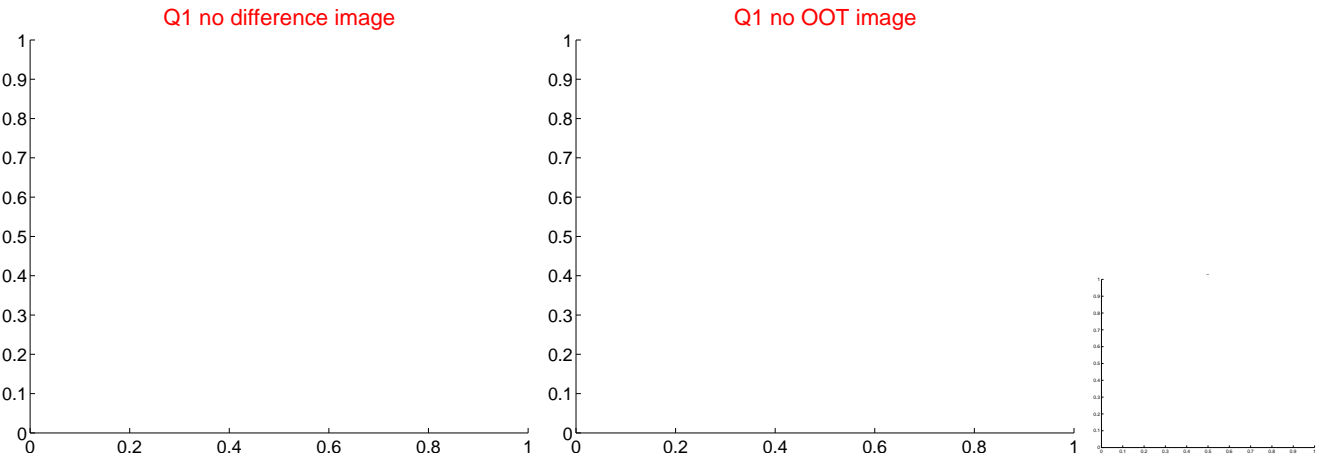
The direct PRF centroid is offset from the target star catalog position by about NaN arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	—	—	—	—
PRF-fit source offset from KIC position	2.652 ± 0.879	3.02	-0.112 ± 0.715	-2.650 ± 0.879
photometric centroid source offset	3.60 ± 0.06	65.35	3.41 ± 0.06	-1.17 ± 0.05

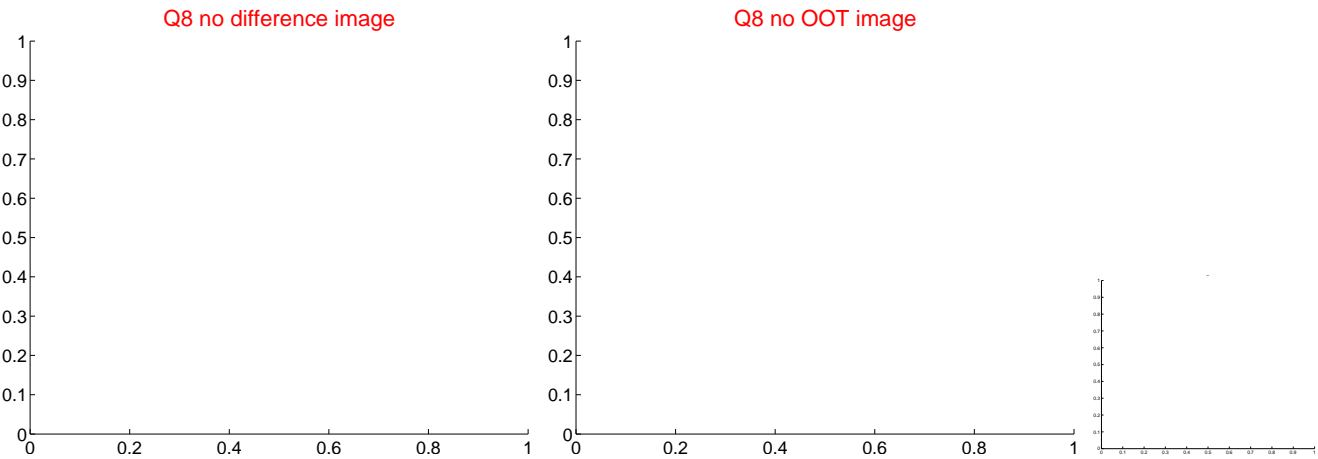
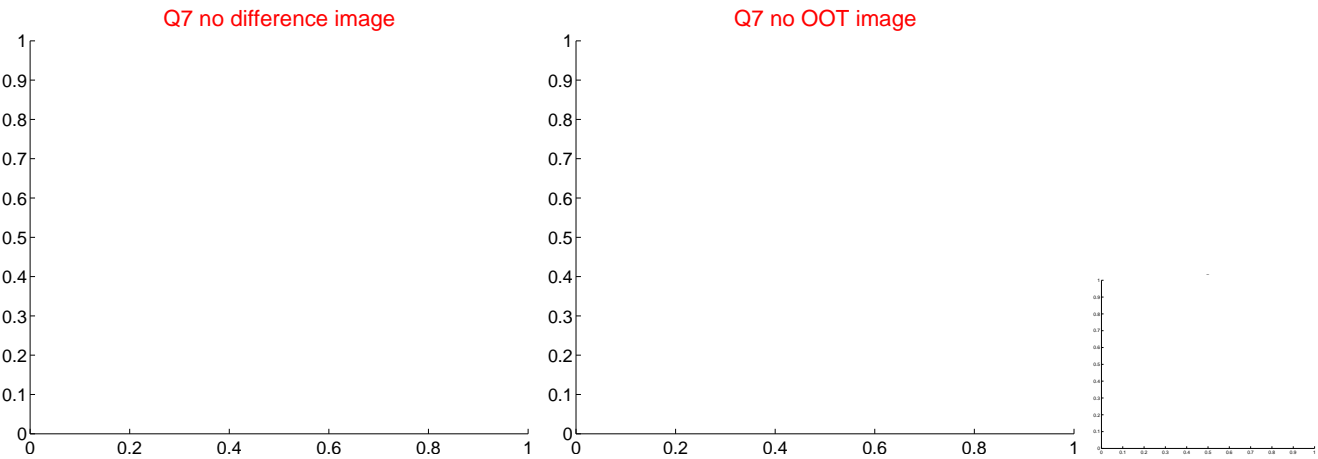
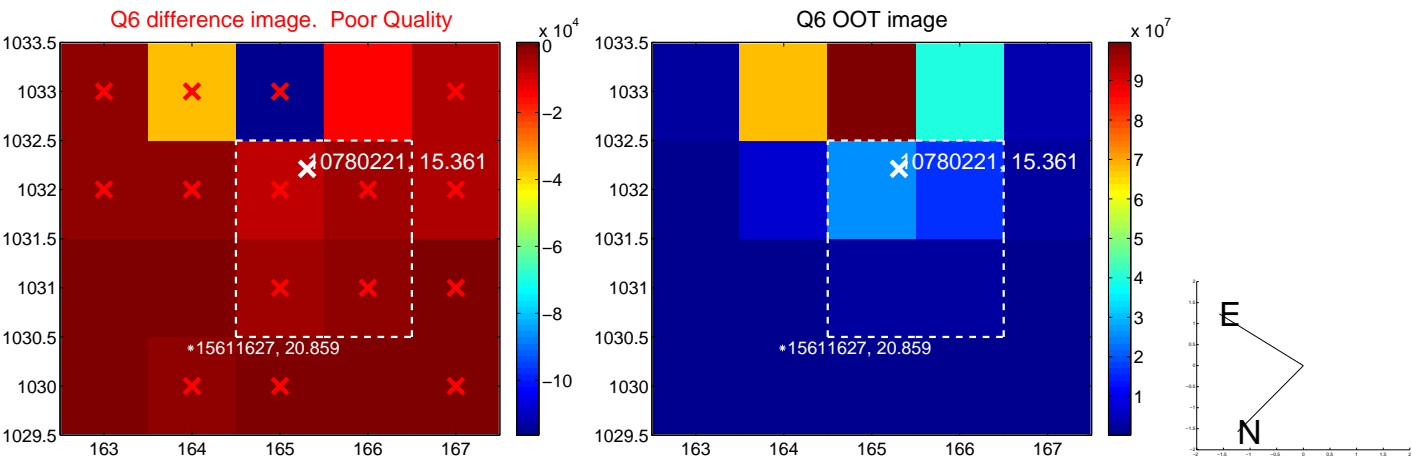
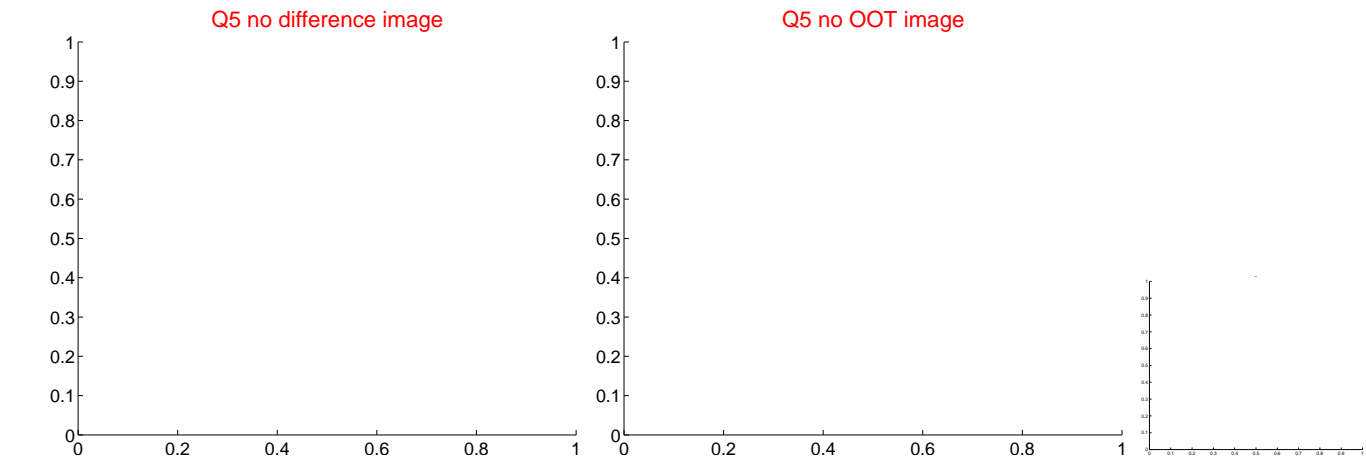


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

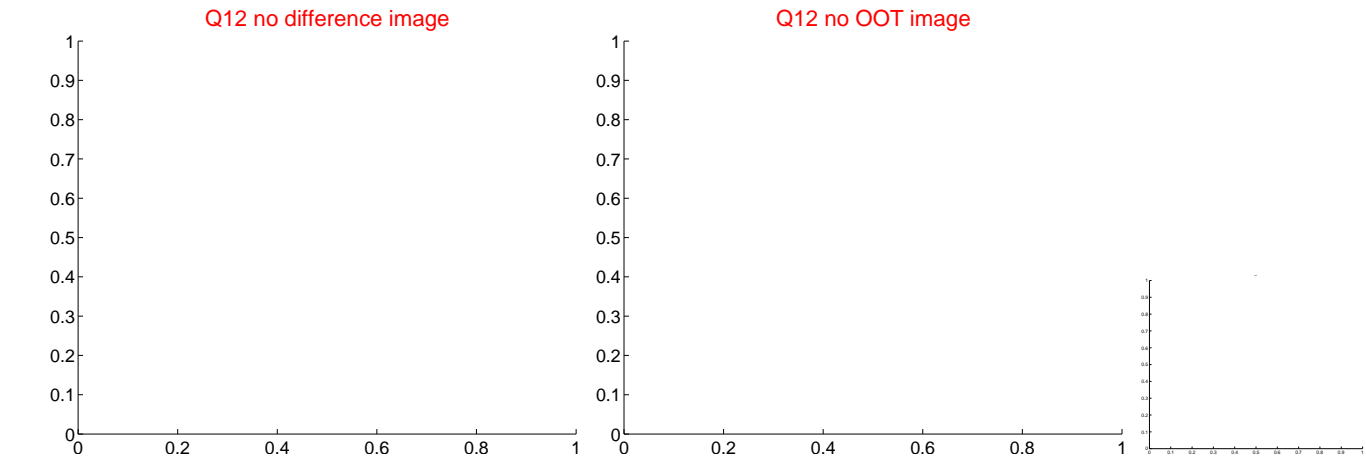
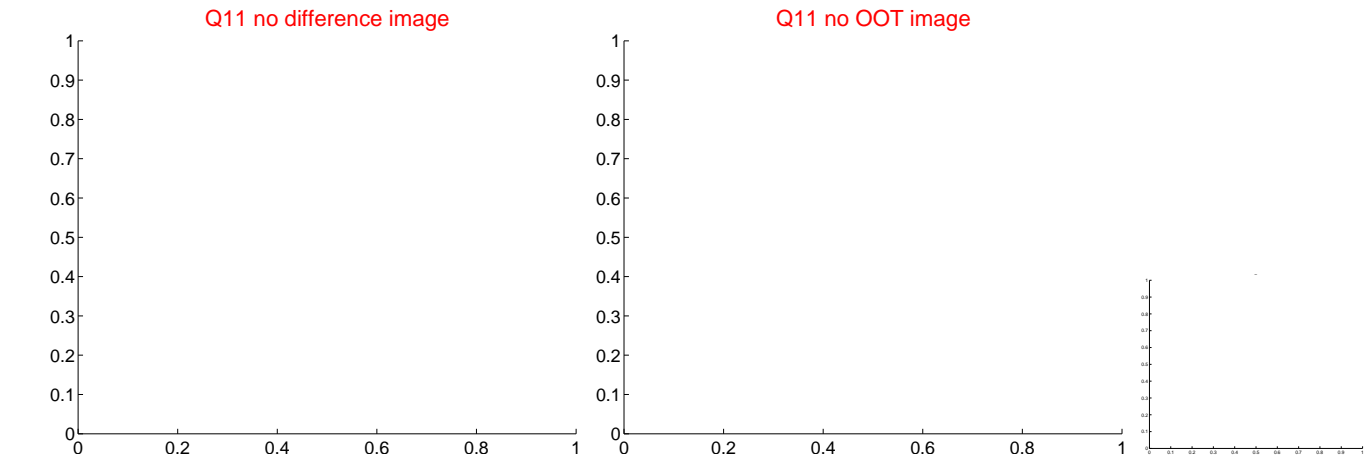
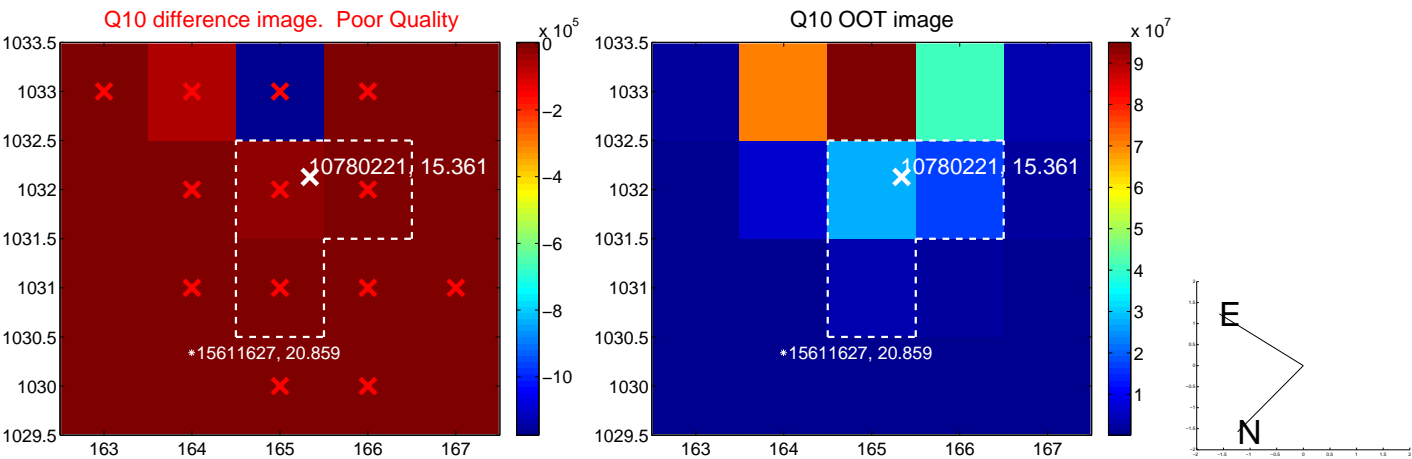
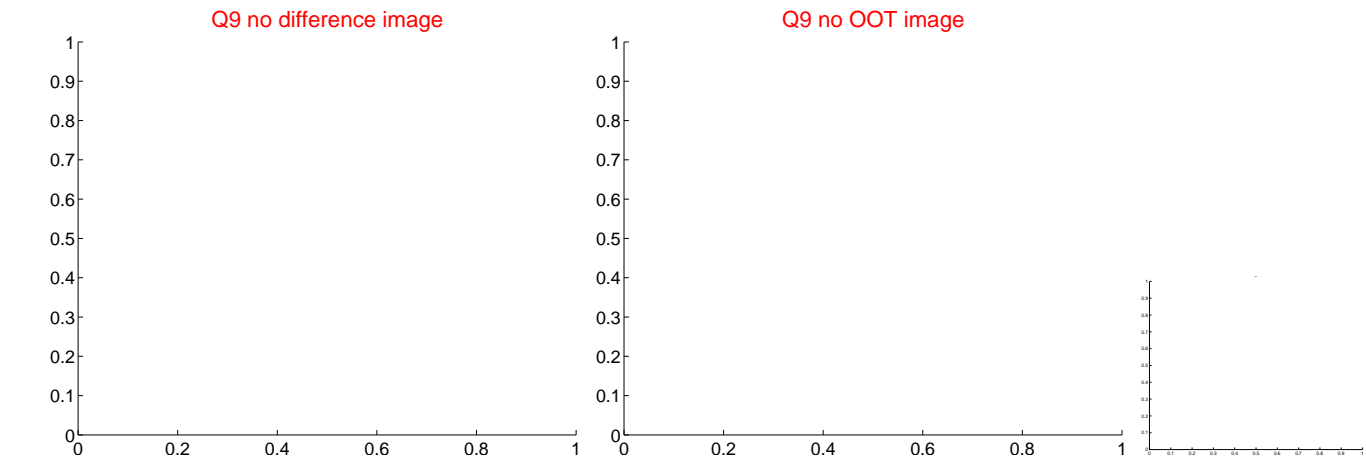
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

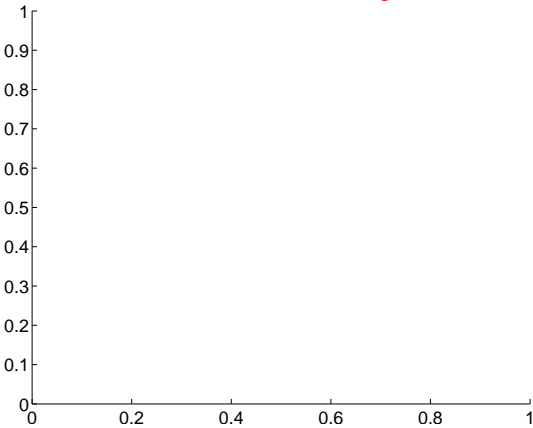


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.

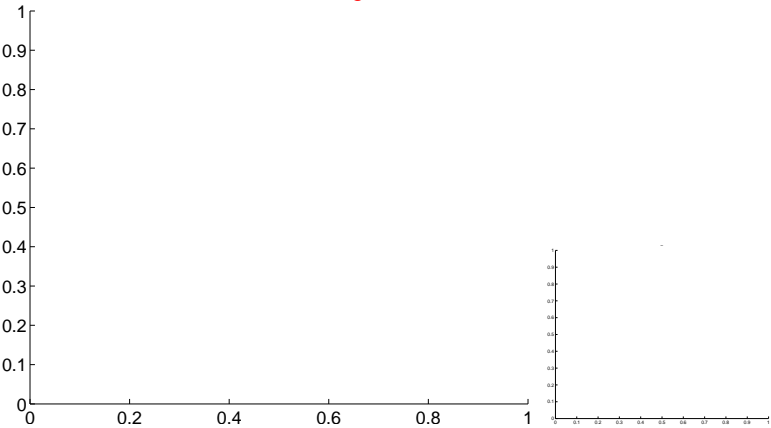


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.

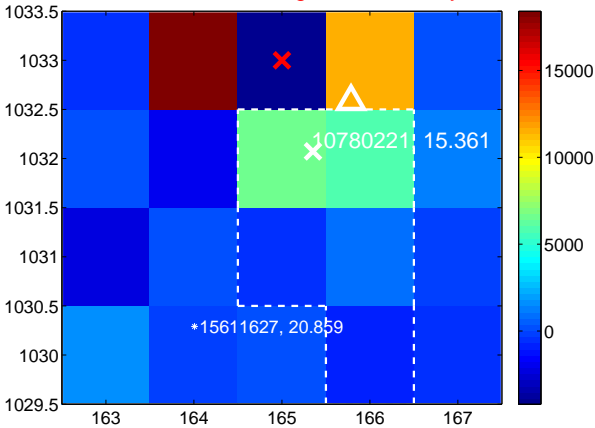
Q13 no difference image



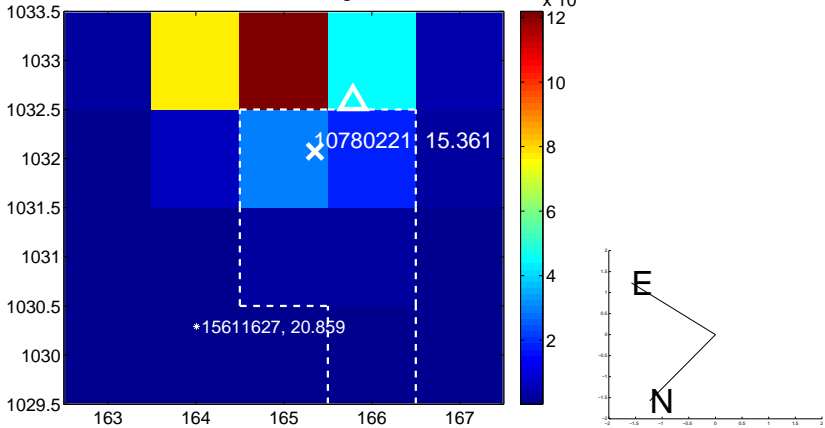
Q13 no OOT image



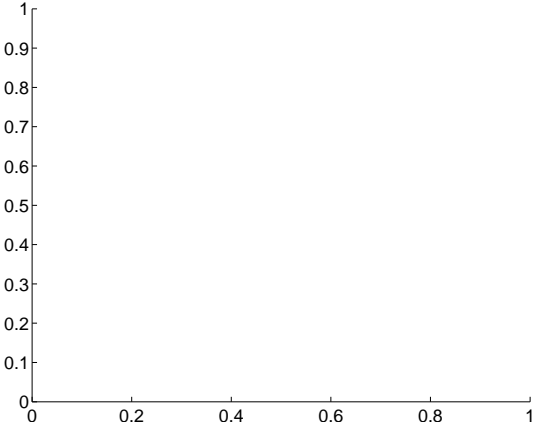
Q14 difference image. Poor Quality



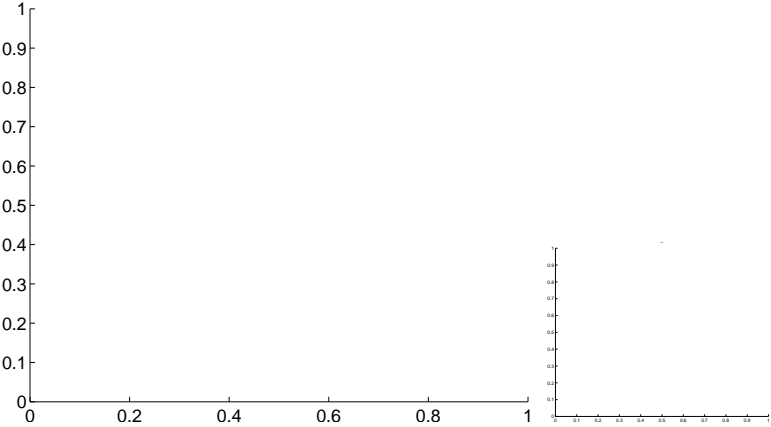
Q14 OOT image



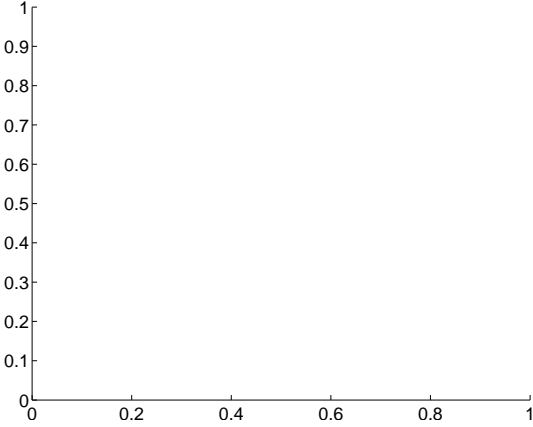
Q15 no difference image



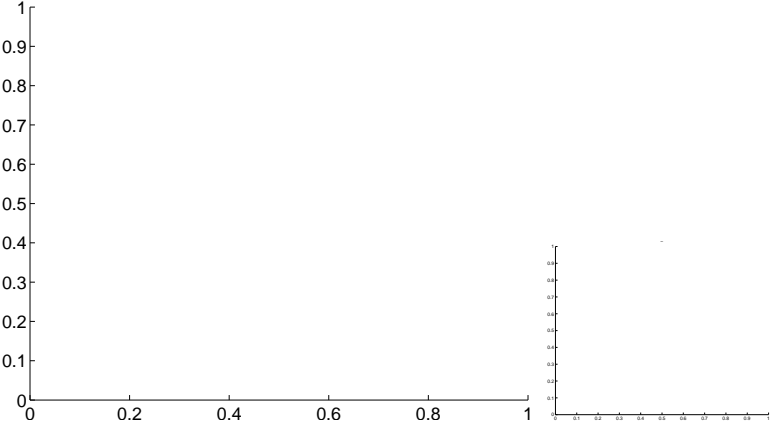
Q15 no OOT image



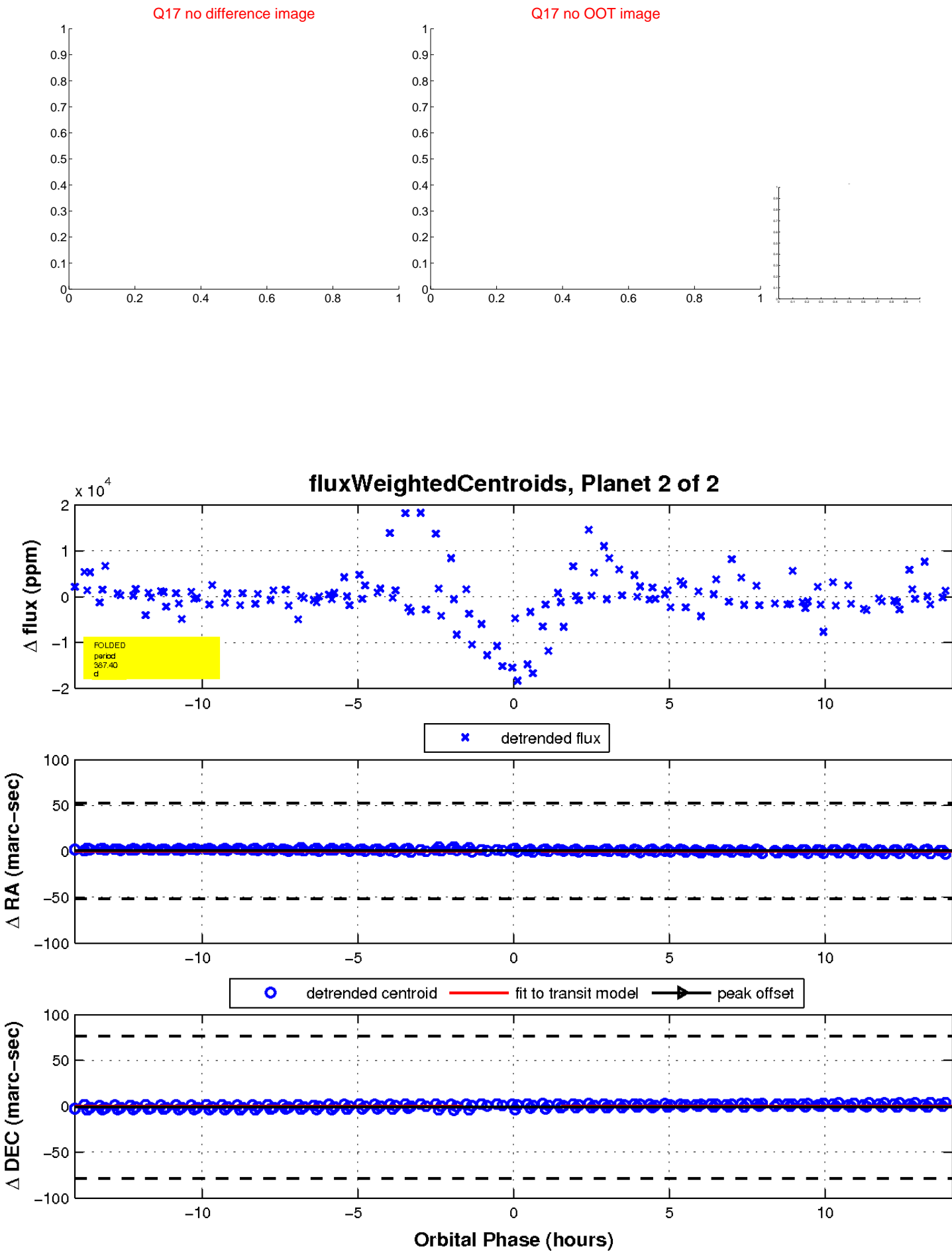
Q16 no difference image



Q16 no OOT image



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



UKIRT Image

