

KIC 008776850

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})
008776850-01	OBS	No	453.520251	326.187617	188.3	2.426	14.4	2.0	4.42	5238	6.45	7.02
008776850-02	OBS	No	534.211315	152.509275	104.6	3.995	11.3	1.4	4.42	5238	5.45	5.64
008776850-03	OBS	No	413.457749	439.367404	537.5	4.265	12.7	6.0	4.42	5238	11.17	7.94
008776850-04	OBS	No	505.304021	555.628664	817.8	4.402	12.0	7.4	4.42	5238	12.36	6.08

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008776850-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
008776850-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
008776850-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—CENT_KIC_POS—HALO_GHOST
008776850-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—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.

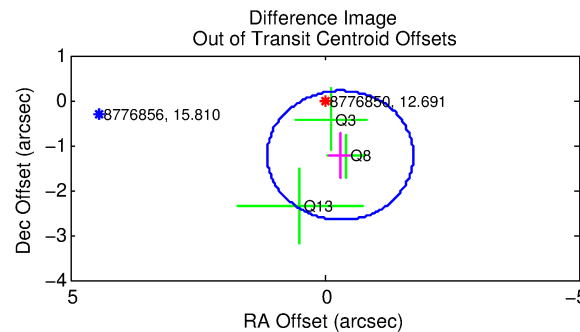
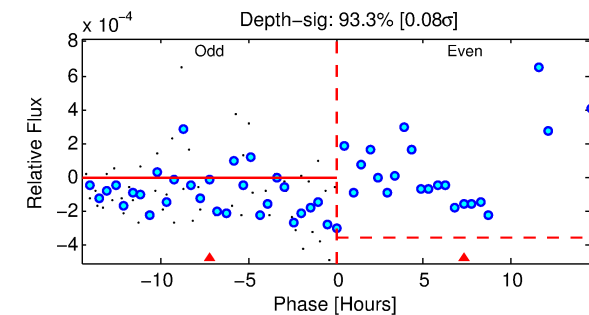
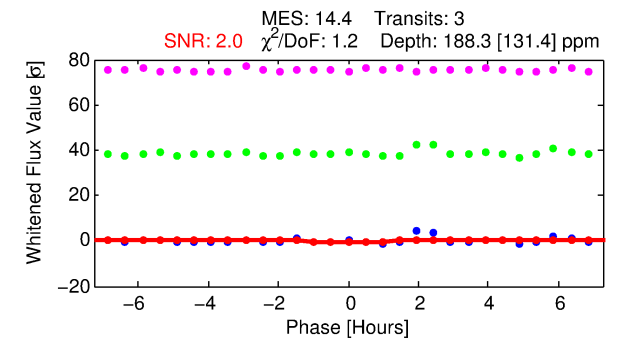
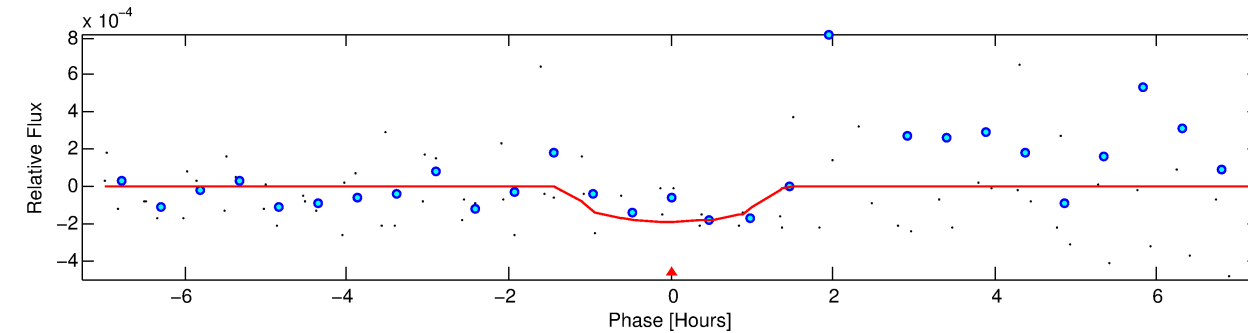
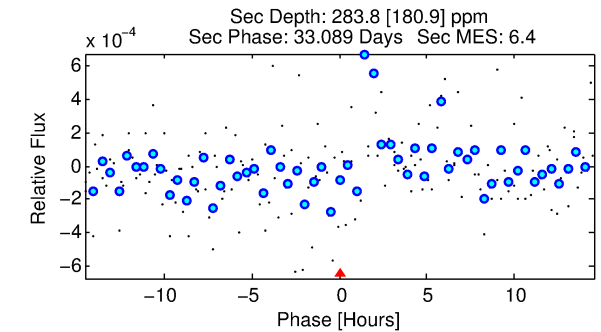
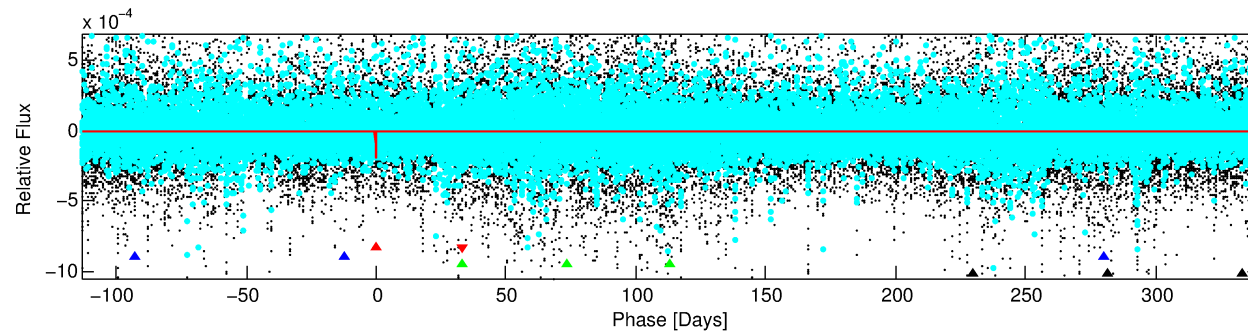
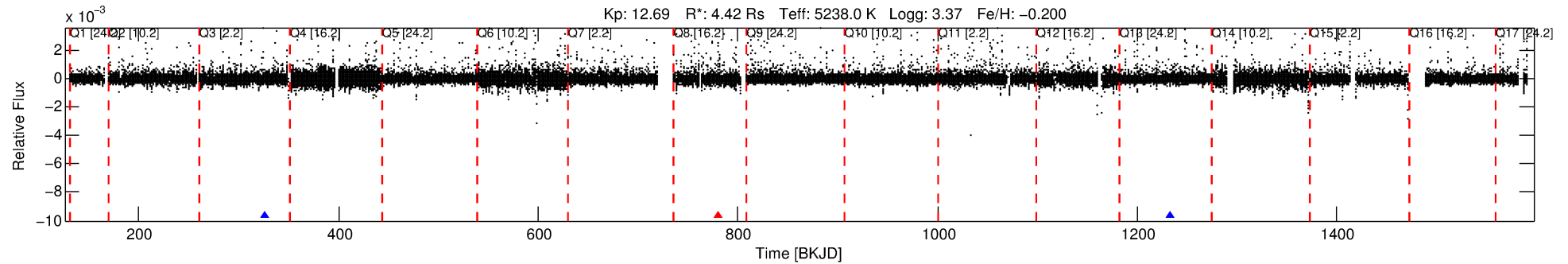
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 008776850-01

No Significant Match Found

DV One-Page Summary

KIC: 8776850 Candidate: 1 of 4 Period: 453.520 d



DV Fit Results:

Period = 453.52025 [0.02524] d
Epoch = 326.1876 [0.0263] BKJD
Rp/R* = 0.0134 [0.0951]
a/R* = 1062.28 [28750.36]
b = 0.69 [21.39]
Seff = 7.02 [5.67]
Teq = 415 [84] K
Rp = 6.45 [45.97] Re
a = 1.3698 [0.6807] AU
Ag = 7037.50 [100287.35] [0.07 σ]
Teffp = 5878 [20908] K [0.26 σ]

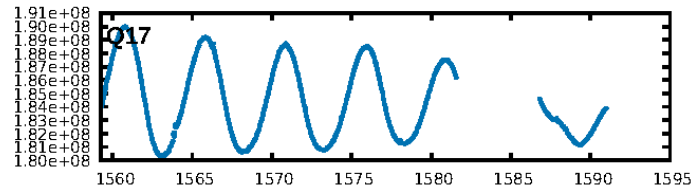
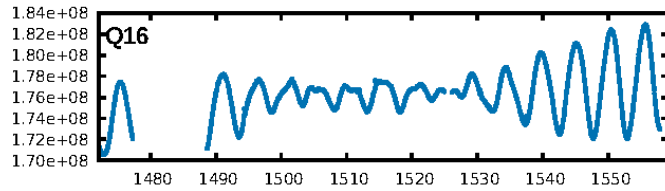
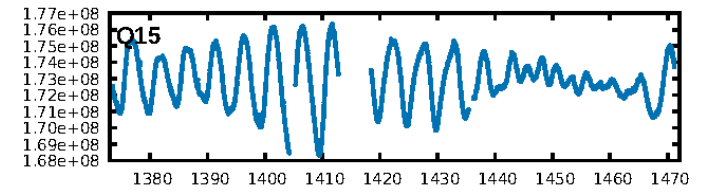
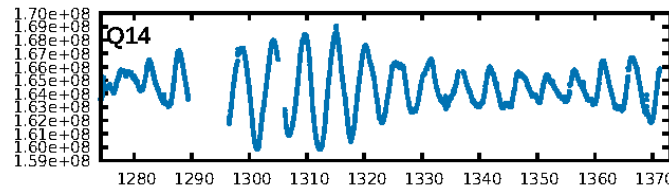
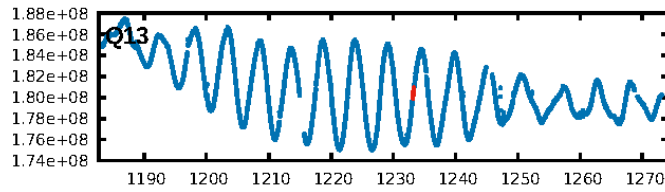
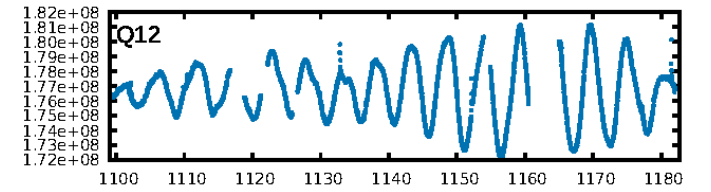
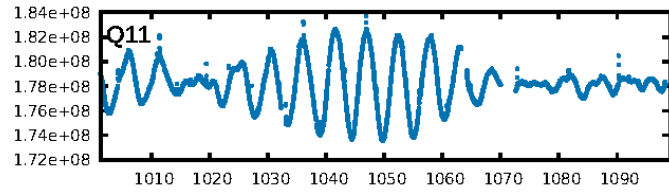
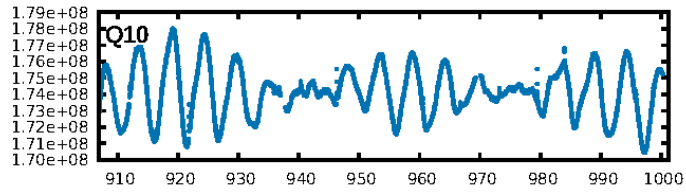
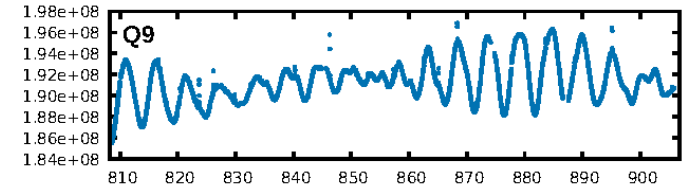
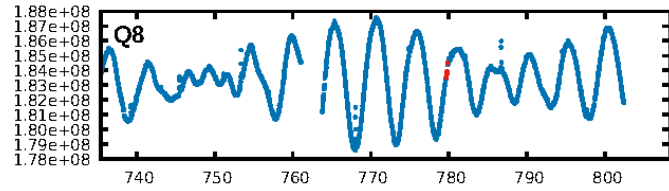
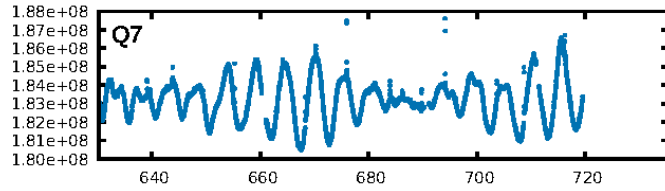
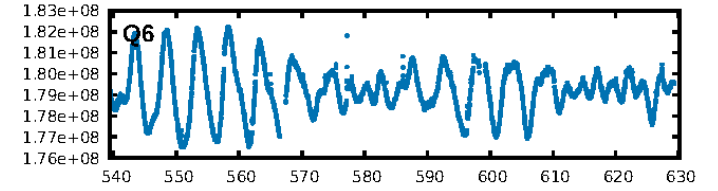
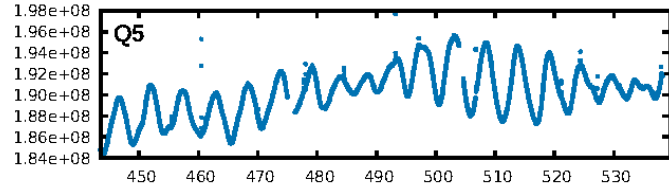
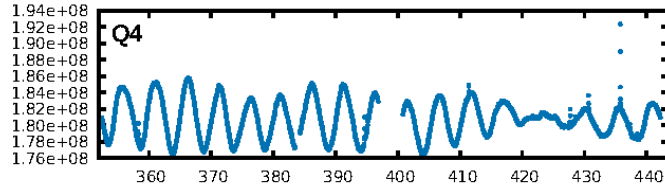
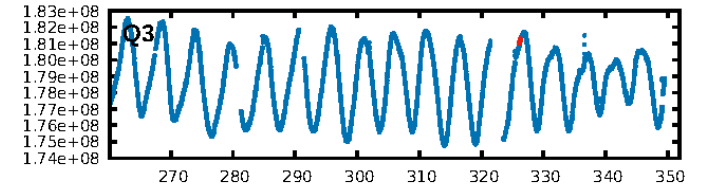
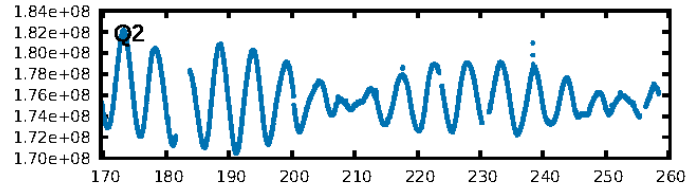
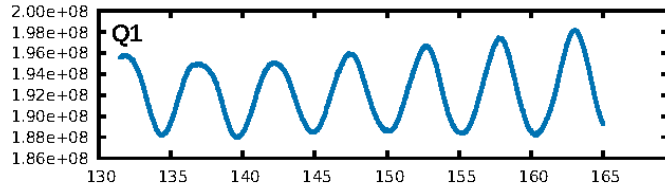
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [195.96 σ]
LongPeriod-sig: 100.0% [247.24 σ]
ModelChiSquare2-sig: 1.6%
ModelChiSquareGof-sig: 83.7%
Bootstrap-pfa: 6.90e-12
RollingBand-fgt: 0.67 [2/3]
GhostDiagnostic-chr: 3.81
Centroid-sig: 46.5%
Centroid-so: 1.726 arcsec [0.66 σ]
OotOffset-rm: 1.265 arcsec [2.64 σ]
KicOffset-rm: 1.138 arcsec [2.28 σ]
OotOffset-st: 0/1/1/1 [3]
KicOffset-st: 0/1/1/1 [3]
DiffImageQuality-fgm: 0.67 [2/3]
DiffImageOverlap-fno: 1.00 [3/3]

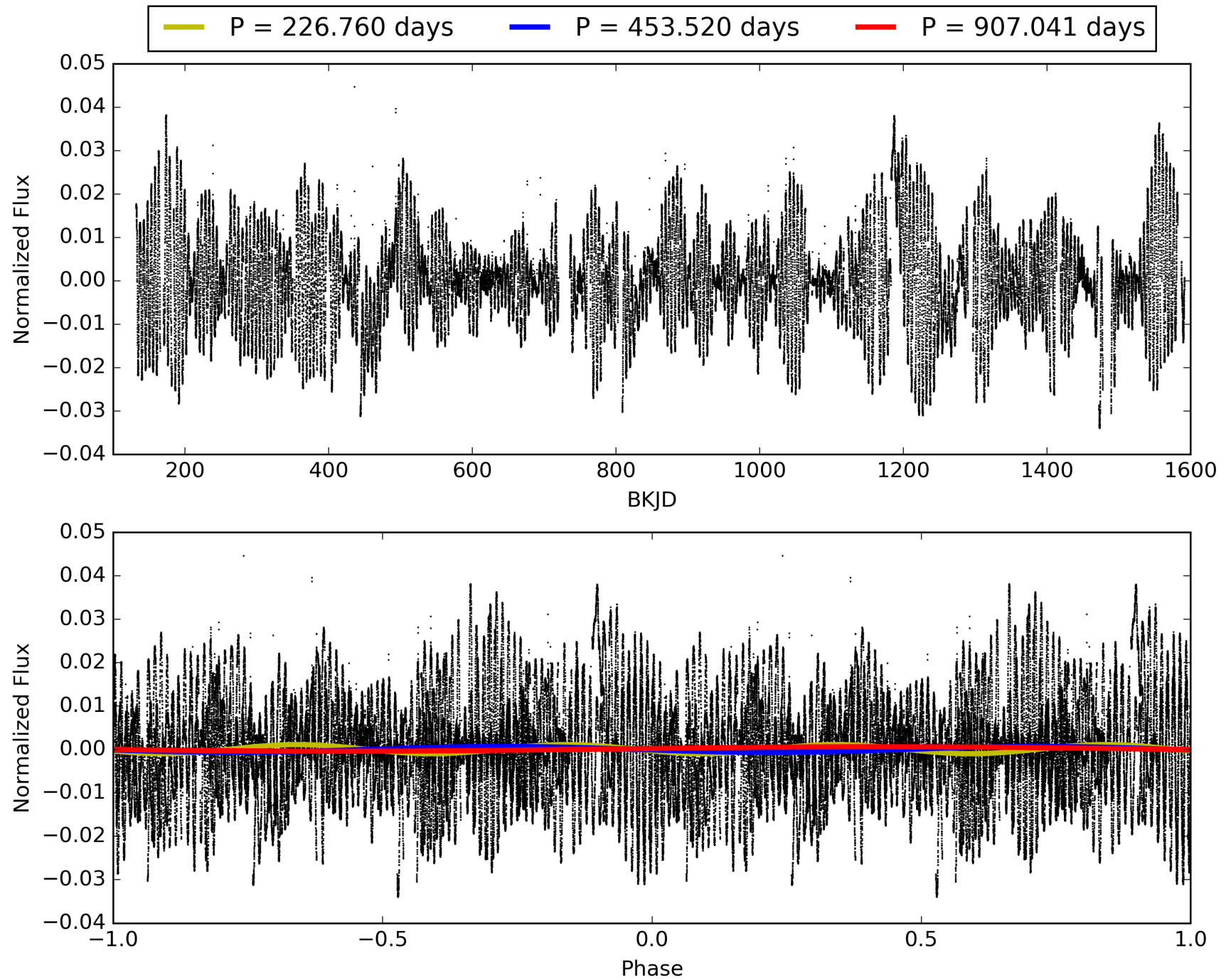
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 008776850-01, PDC Light Curves

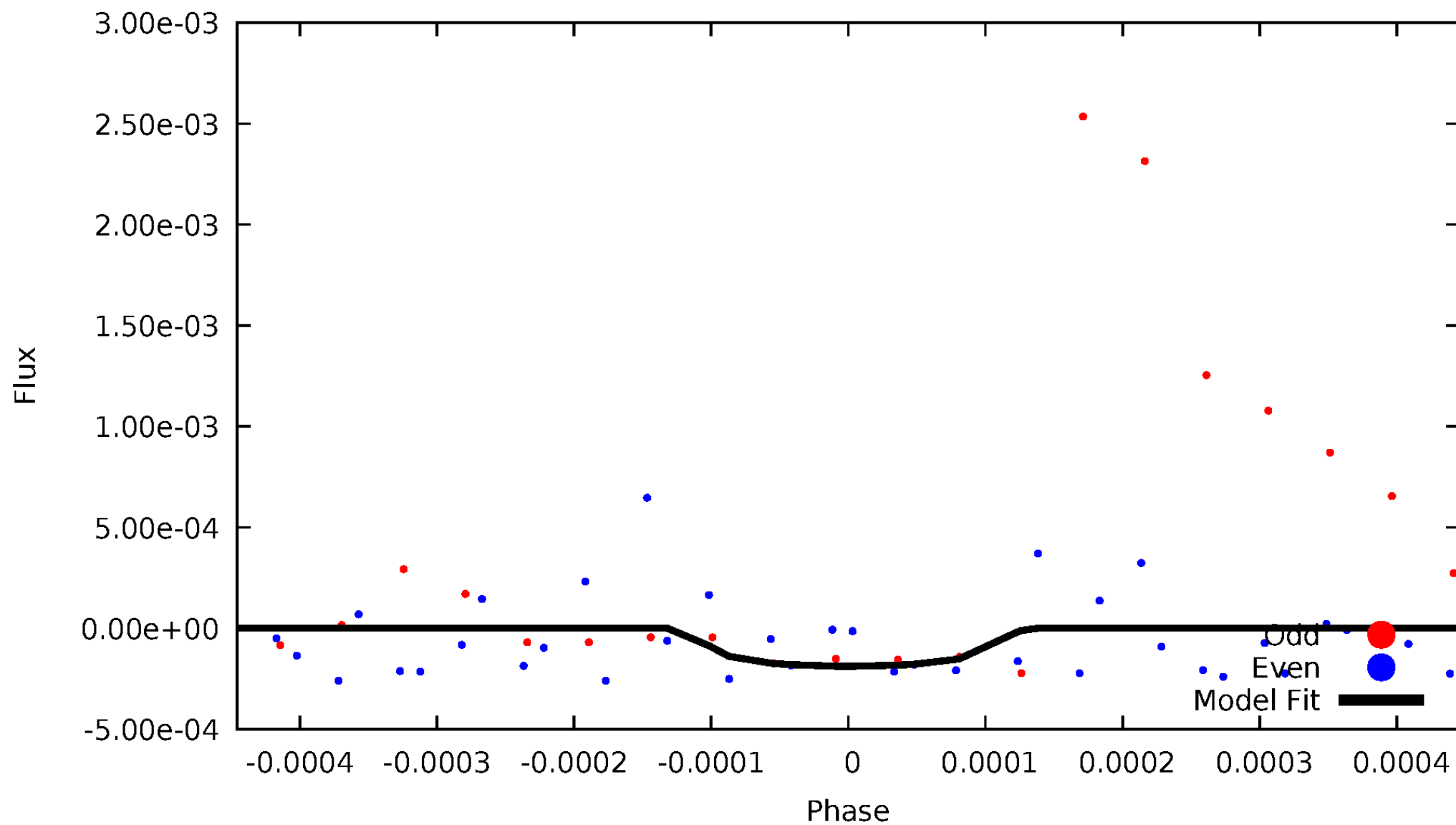


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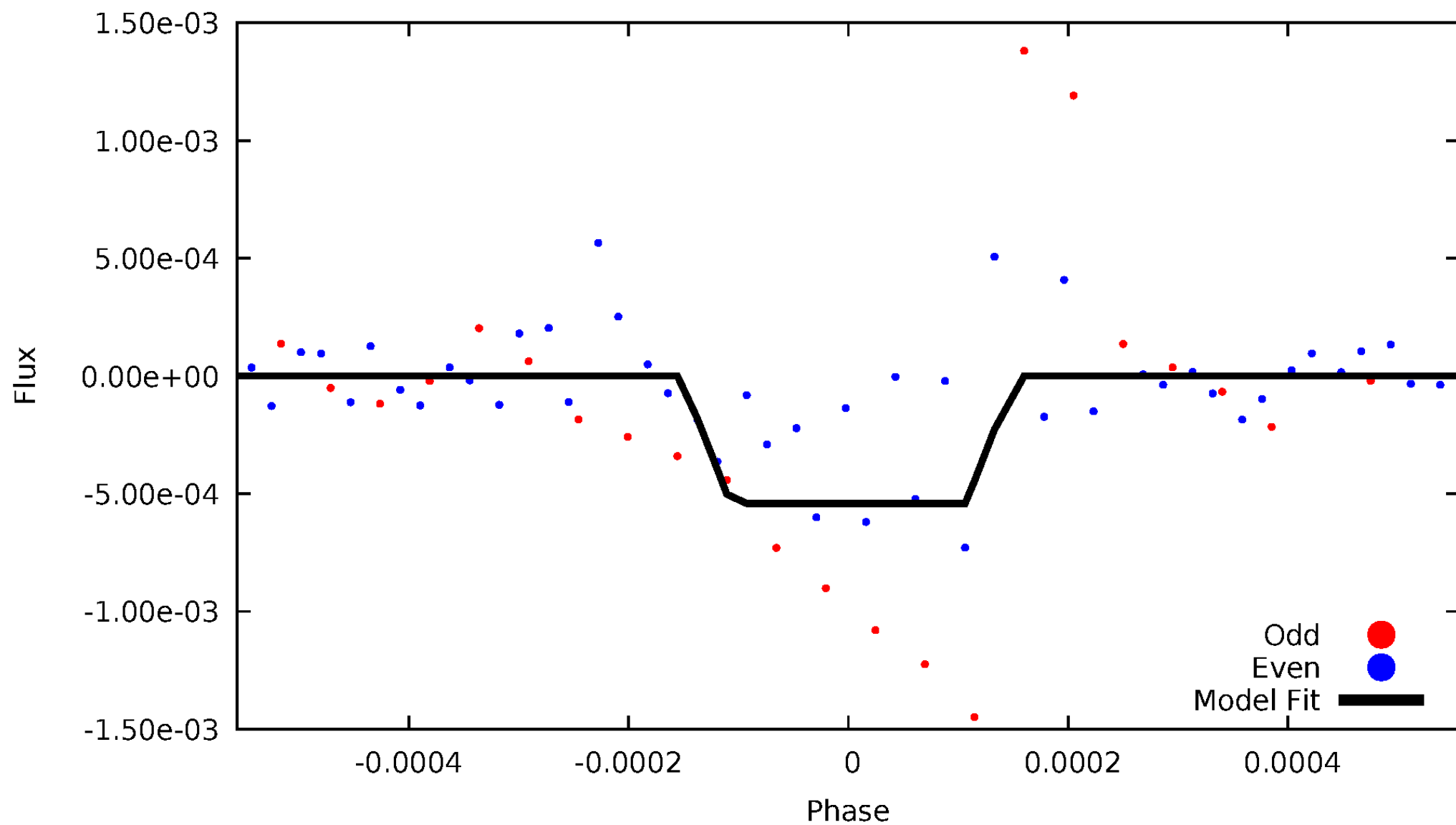
DV Odd/Even

TCE 008776850-01



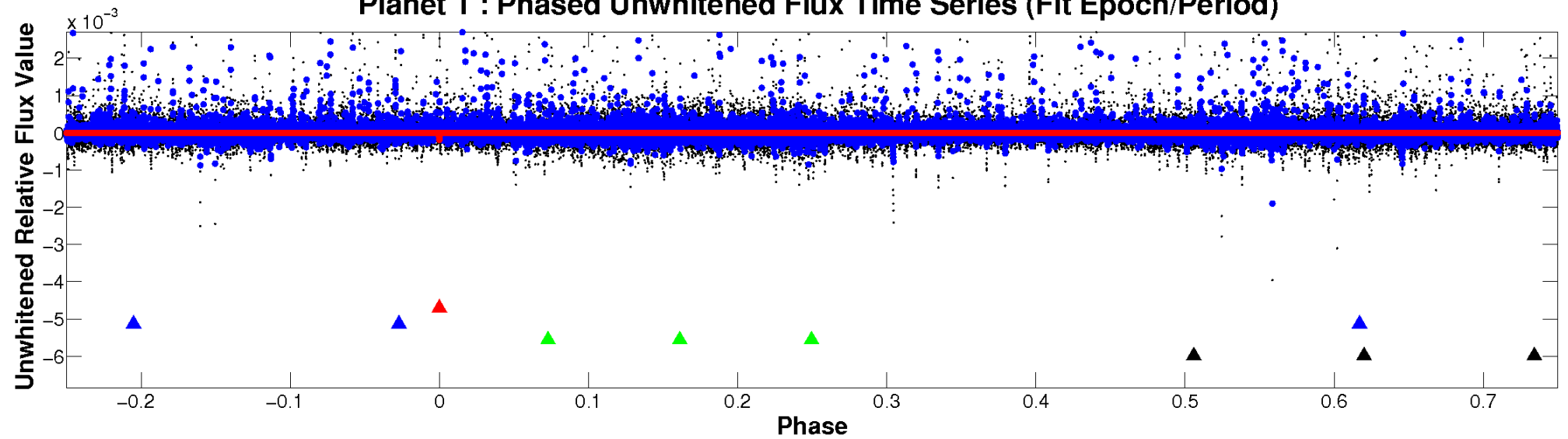
ALT Odd/Even

TCE 008776850-01

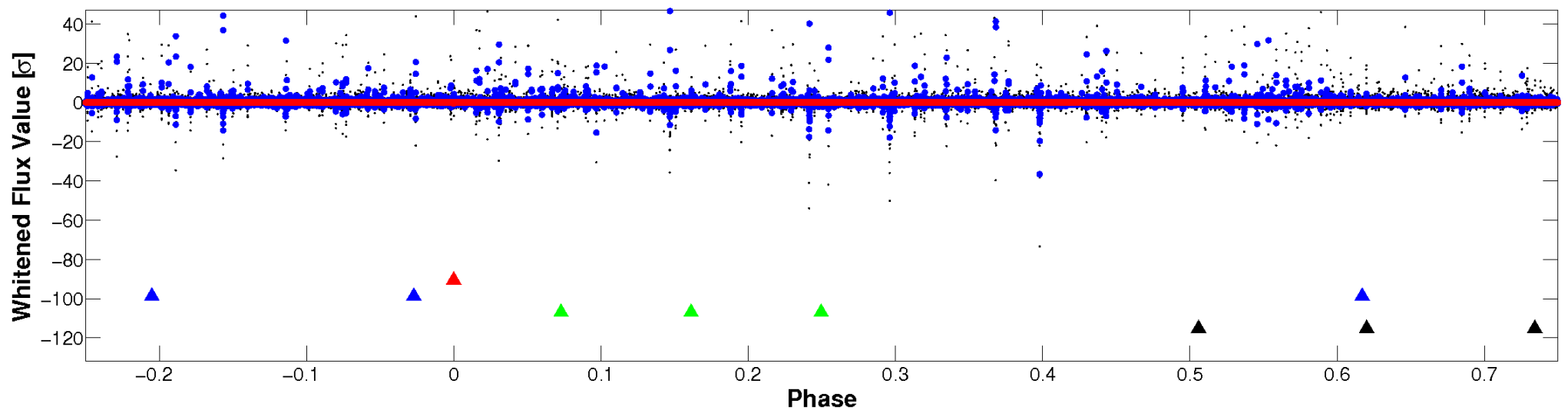


Non-Whitened Vs. Whitened Light Curve

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

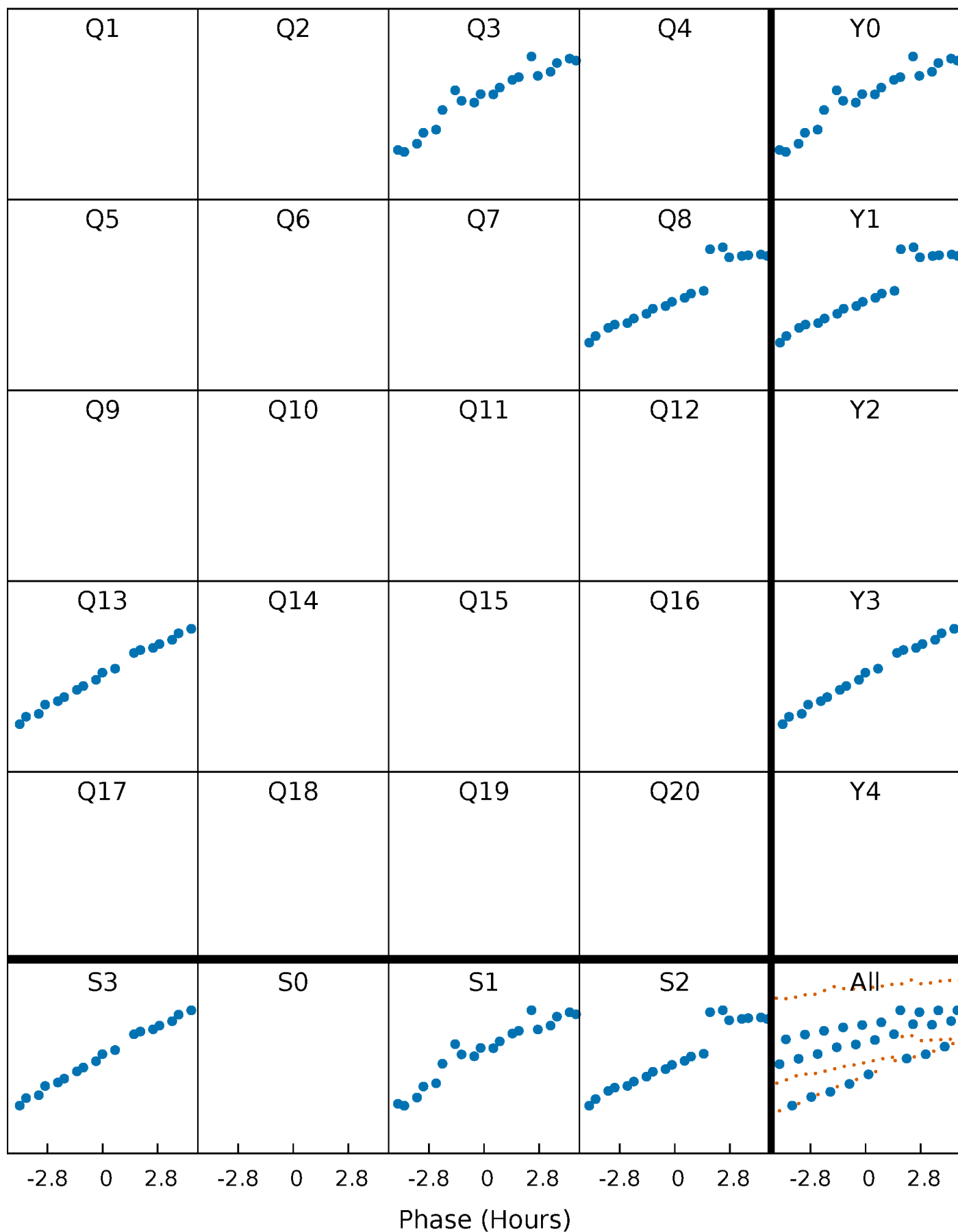


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



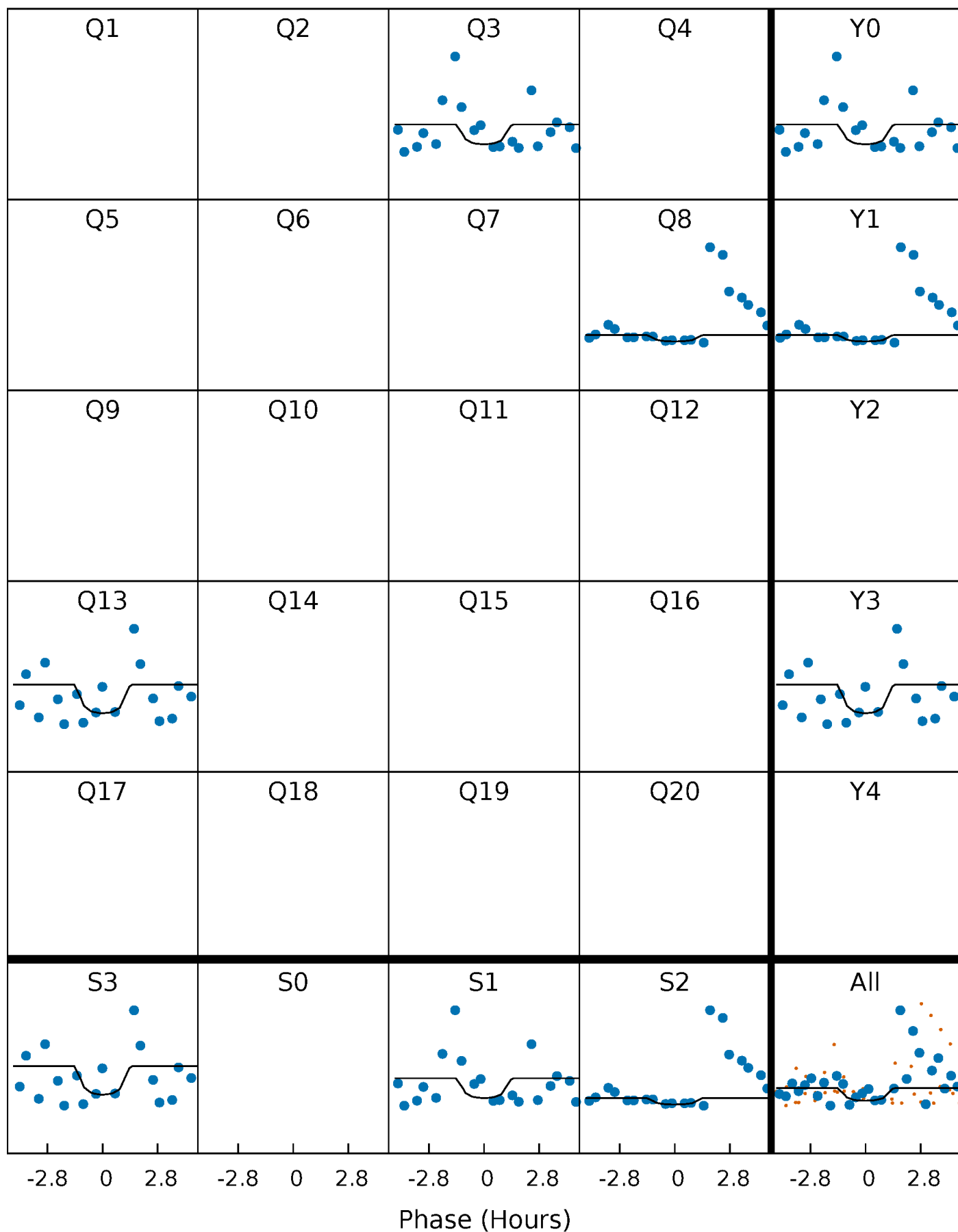
PDC Quarter-Phased Transit Curves

TCE 008776850-01 P=453.520251 Days $T_0=326.187617$ (BKJD)



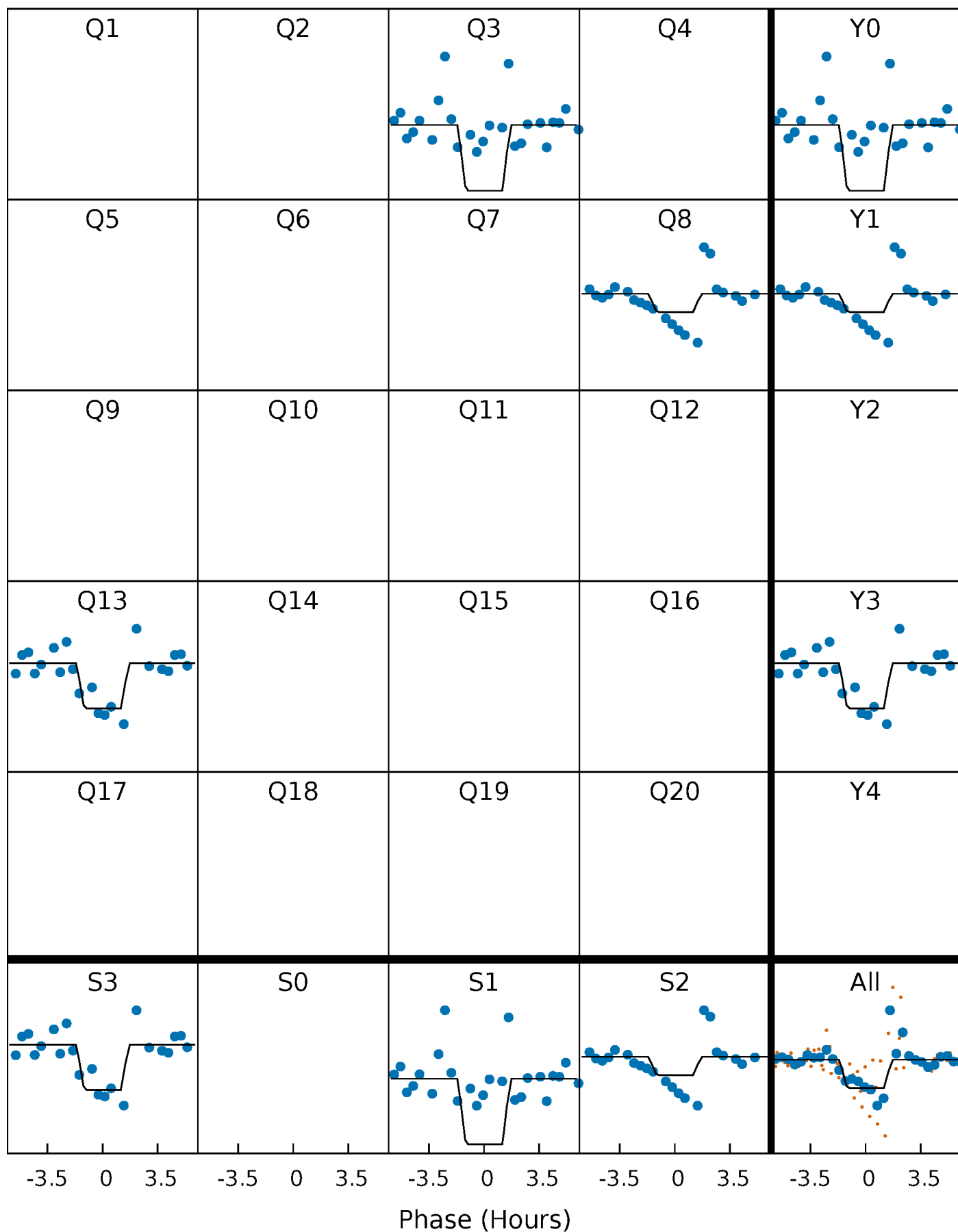
DV Quarter-Phased Transit Curves

TCE 008776850-01 $P=453.520251$ Days $T_0=326.187617$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

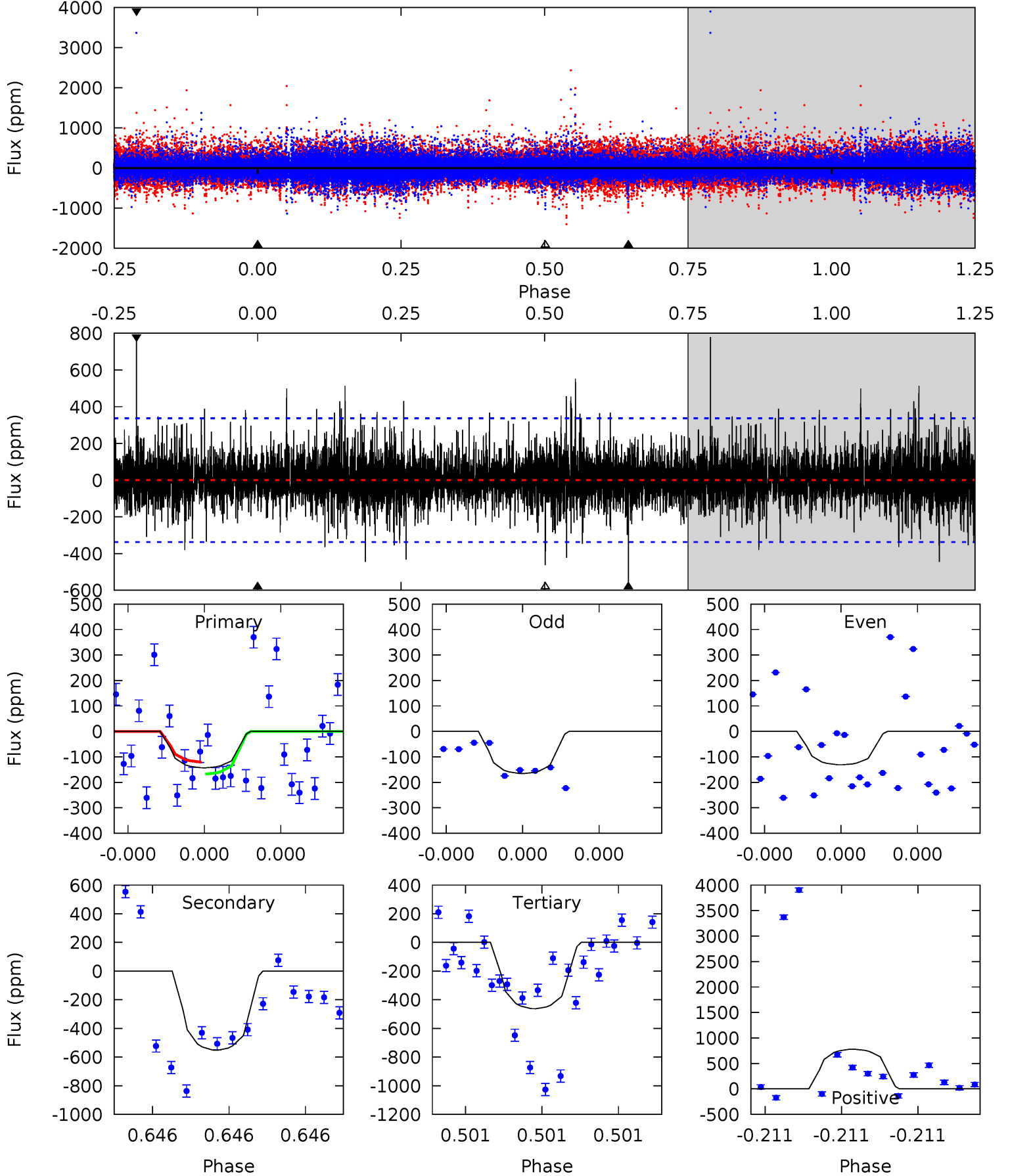
TCE 008776850-01 P=453.488808 Days $T_0=326.224223$ (BKJD)



DV Model-Shift Uniqueness Test

008776850-01, P = 453.520251 Days, E = 326.187617 Days

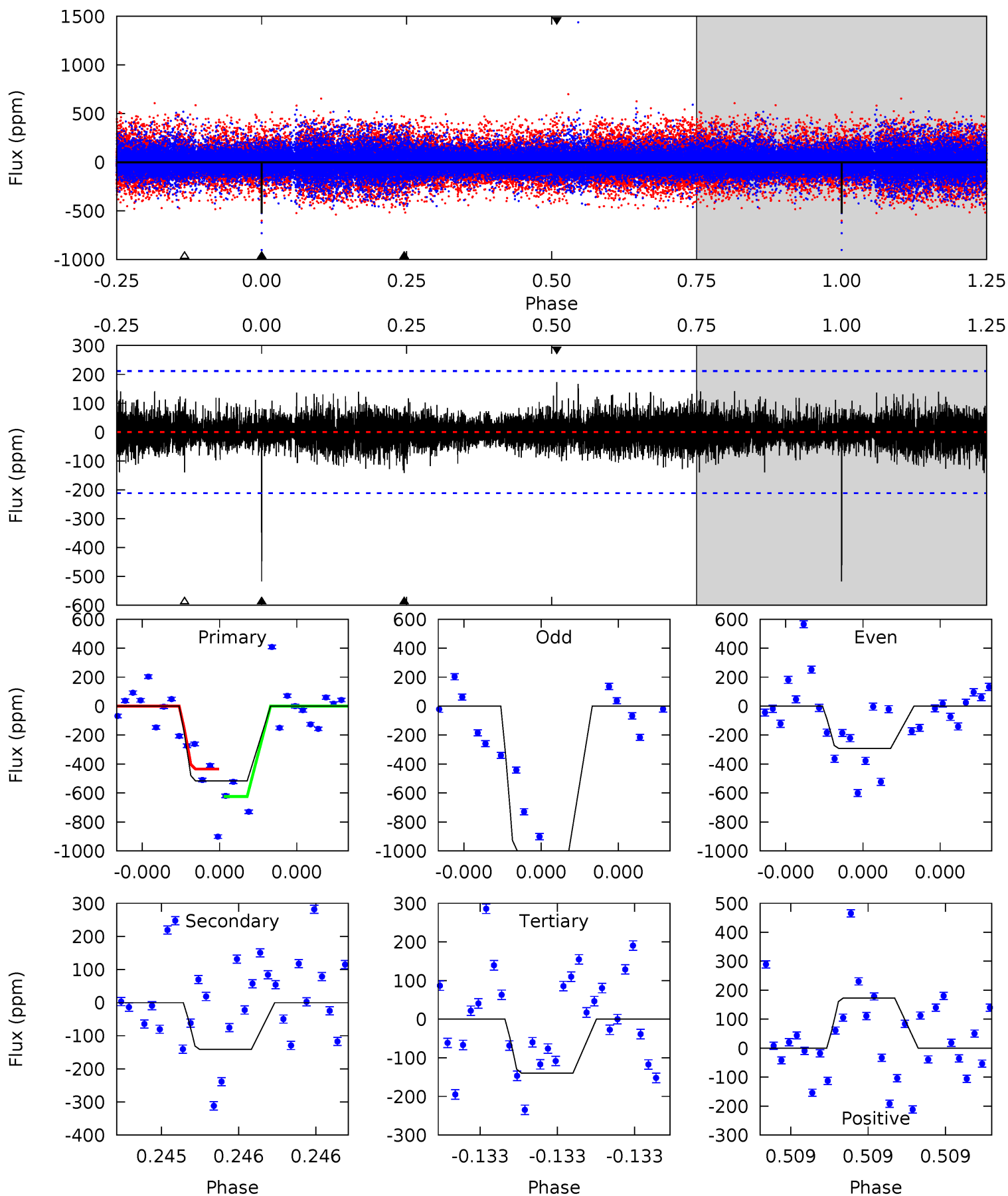
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2.42	9.36	7.84	13.2	5.71	3.69	1.45	-5.42	-10.8	1.52	-3.84	0.17	0.88	0.59	0.40



Alt Model-Shift Uniqueness Test

008776850-01, P = 453.488808 Days, E = 326.224223 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.8	3.79	3.74	4.63	5.66	3.62	0.84	10.1	9.21	0.05	-0.84	10.8	0.98	0.25	2.30



Stellar Parameters For KIC 008776850

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5238^{+157}_{-173}	$3.369^{+0.469}_{-0.201}$	$-0.200^{+0.300}_{-0.300}$	$4.419^{+1.223}_{-2.271}$	$1.666^{+0.231}_{-0.740}$	$0.027^{+0.123}_{-0.014}$
	+3%/-3%	+14%/-6%	+150%/-150%	+28%/-51%	+14%/-44%	+454%/-51%
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 008776850-01 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-553 ± 59	$30.56^{+36.06}_{-21.80}$	571^{+51}_{-74}	3477^{+1960}_{-648}	578^{+6059}_{-452}
Alt.	-141 ± 37	$33.40^{+35.33}_{-23.48}$	570^{+60}_{-75}	2780^{+1164}_{-449}	117^{+1117}_{-89}

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

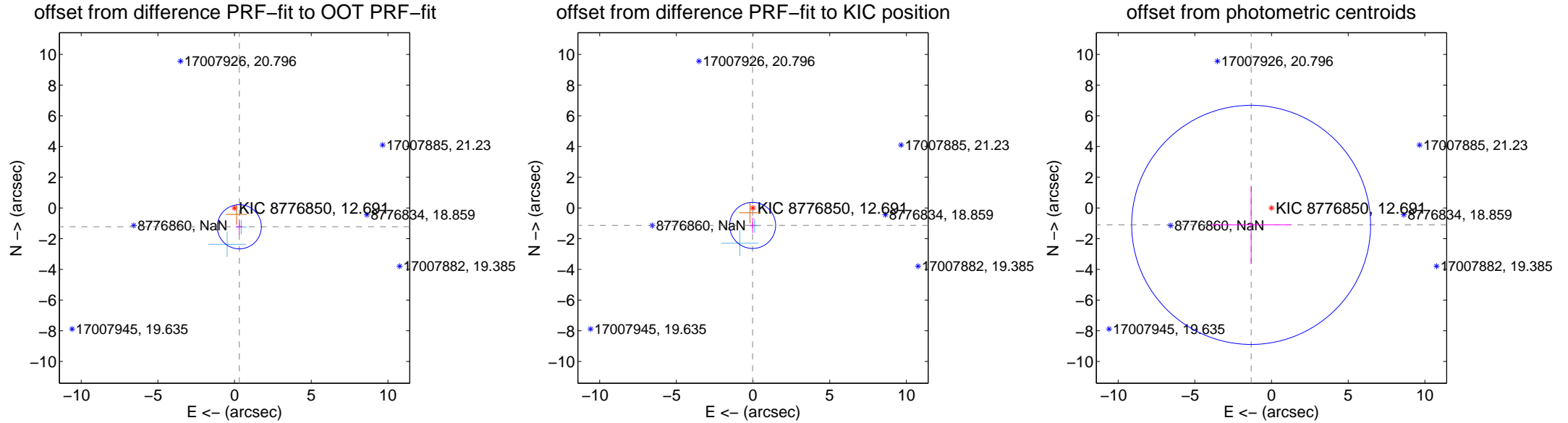
DV Centroid Data

Supplemental centroid analysis for 008776850-01. Kepler magnitude: 12.69. Transit SNR 1.98

There are 2 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.38 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.265 ± 0.479	2.64	-0.309 ± 0.201	-1.227 ± 0.492
PRF-fit source offset from KIC position	1.138 ± 0.500	2.28	0.028 ± 0.207	-1.137 ± 0.500
photometric centroid source offset	1.73 ± 2.60	0.66	1.33 ± 2.64	-1.10 ± 2.52



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



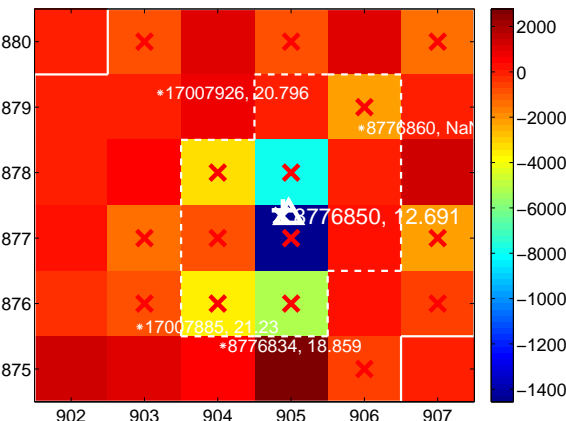
Q2 no difference image



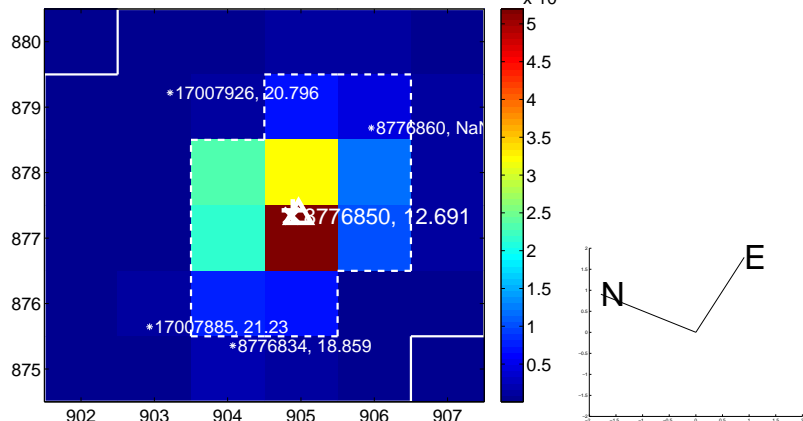
Q2 no OOT image



Q3 difference image. Poor Quality



Q3 OOT image



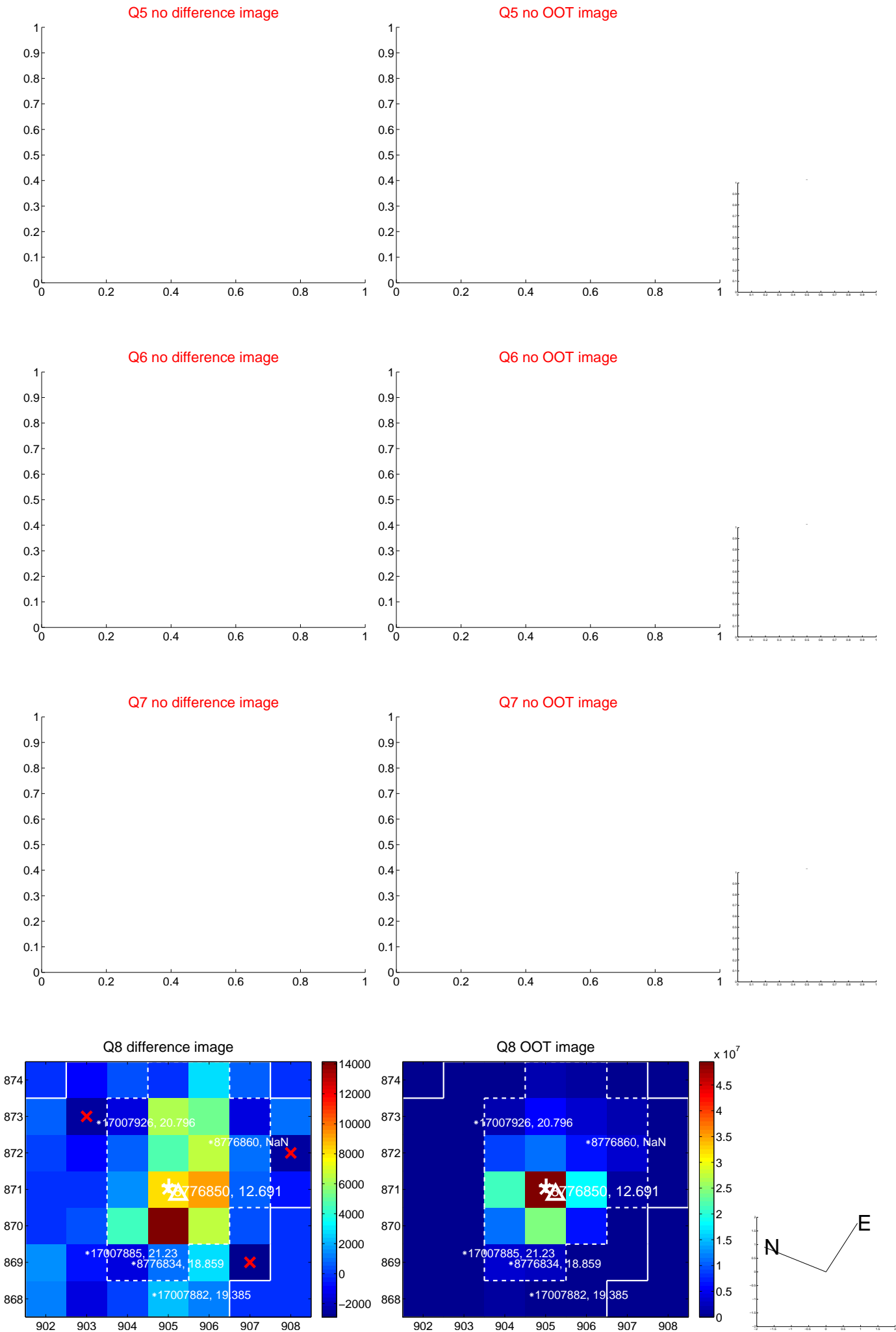
Q4 no difference image



Q4 no OOT image



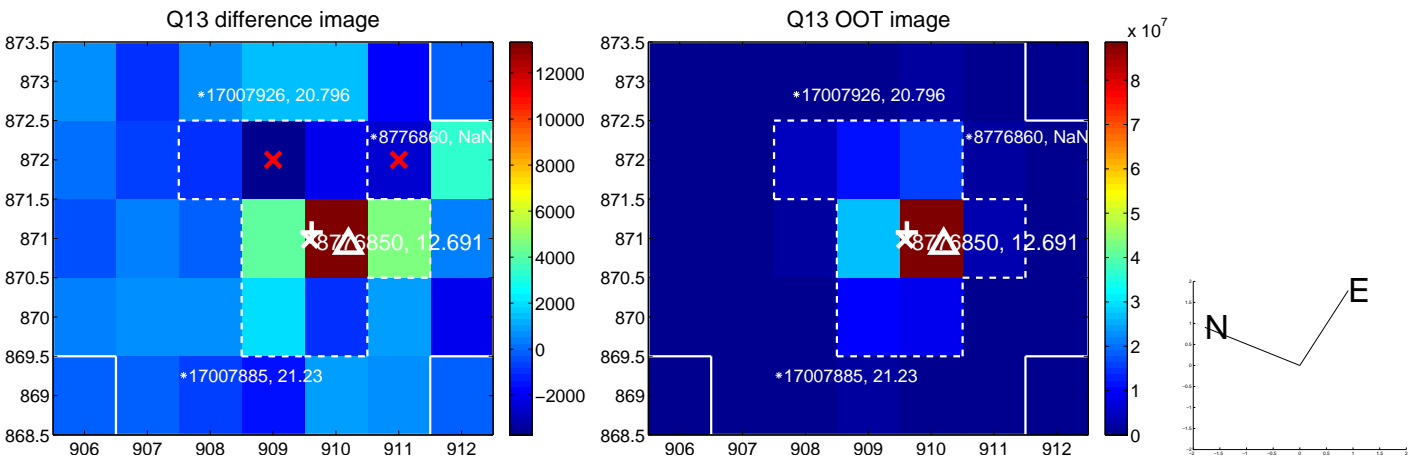
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



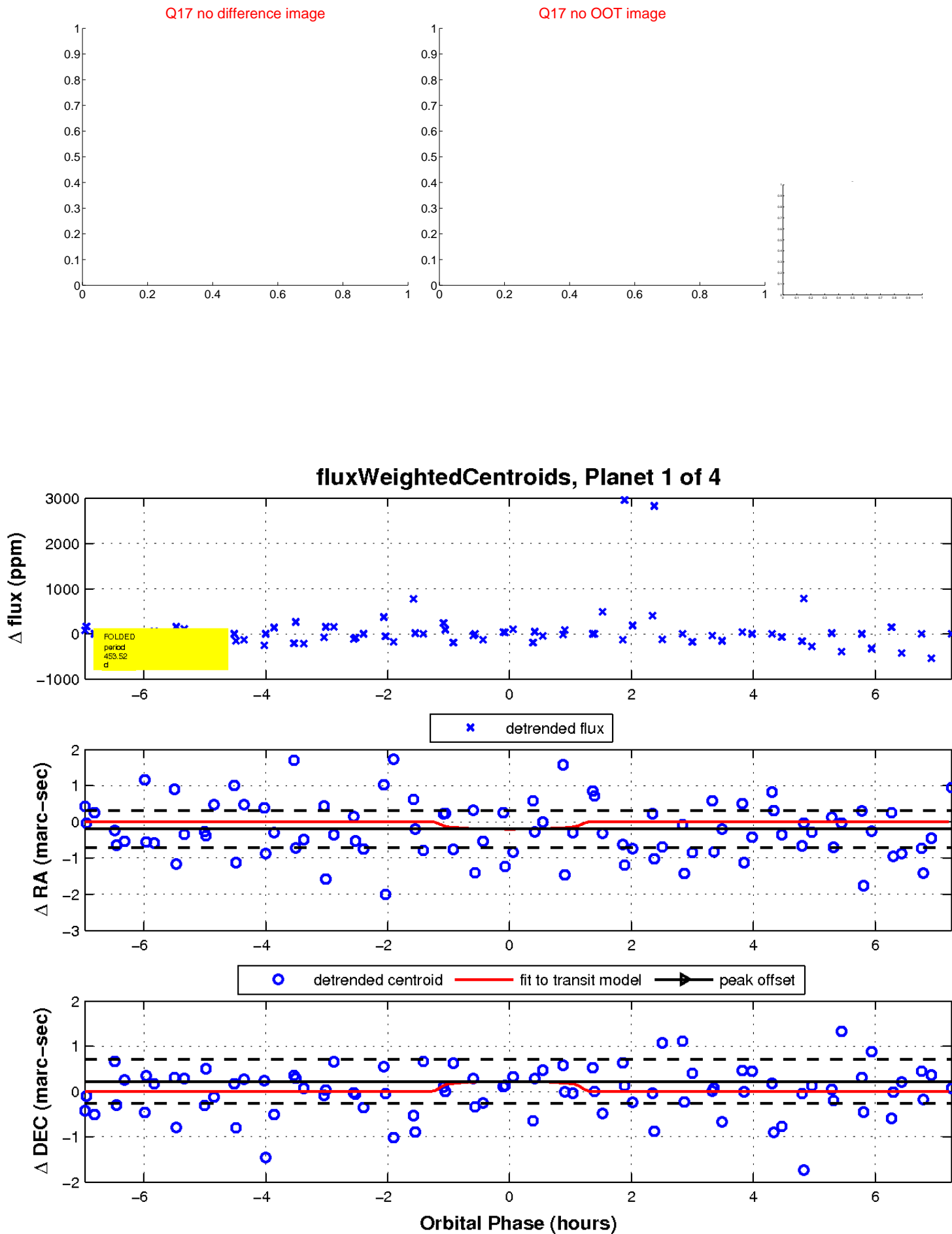
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

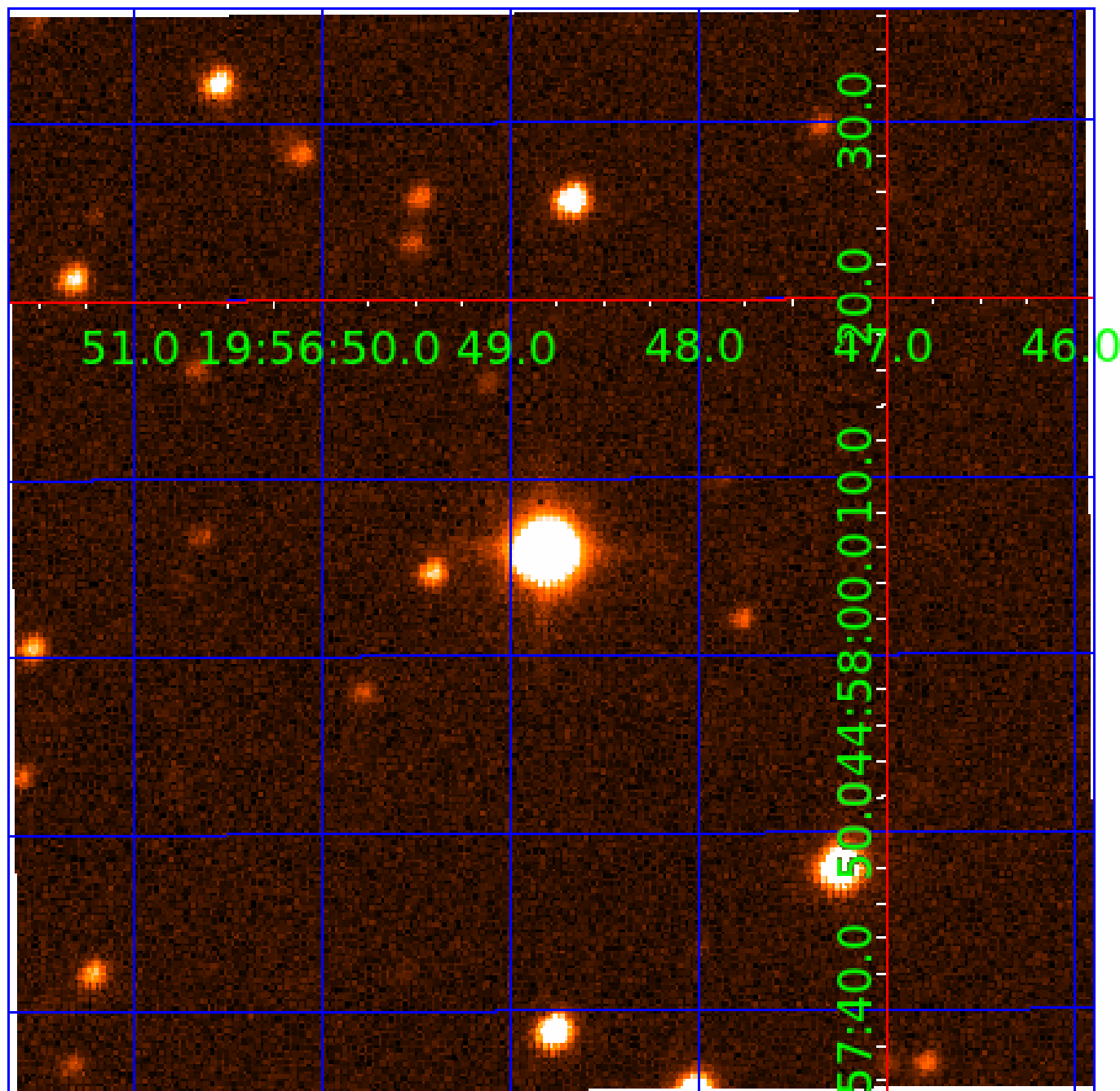


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 008776850

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})
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008776850-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
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008776850-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—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.

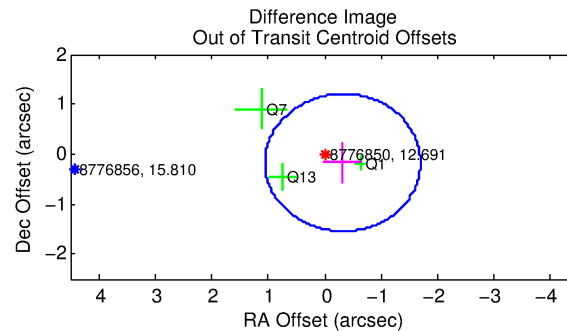
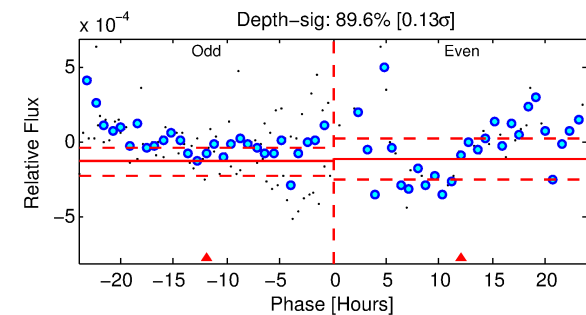
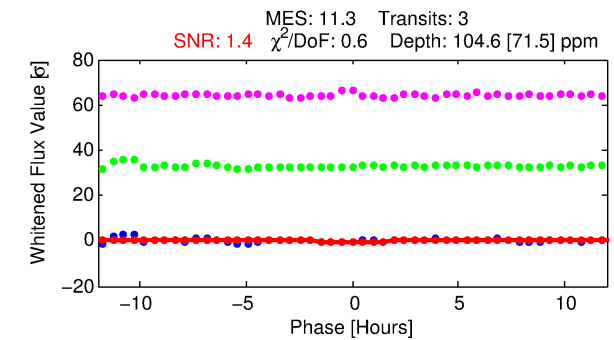
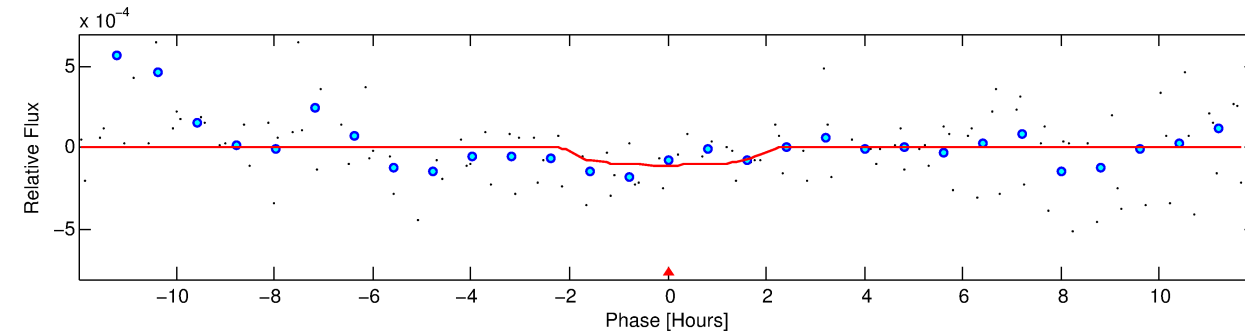
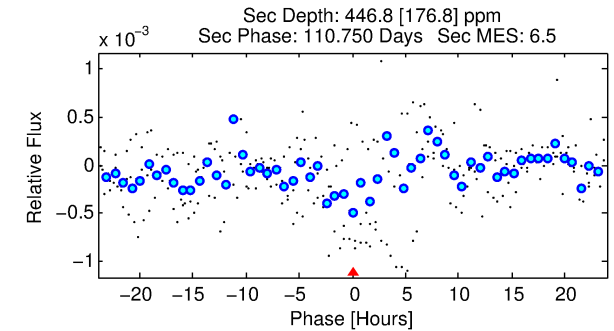
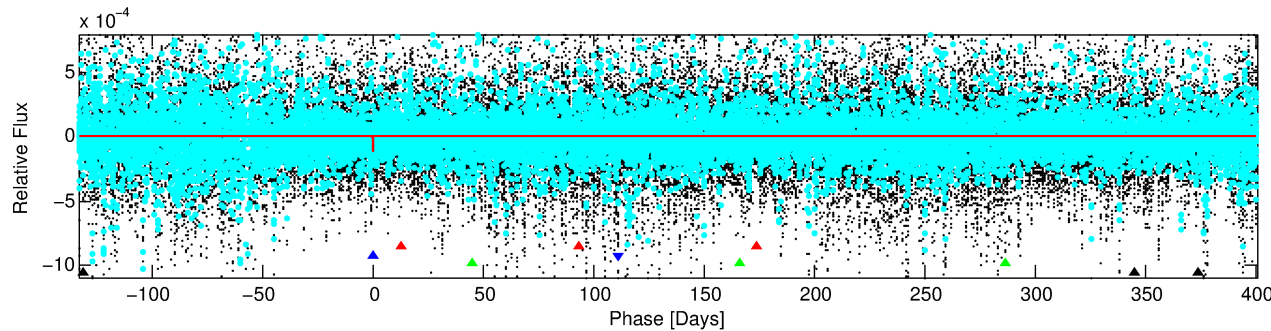
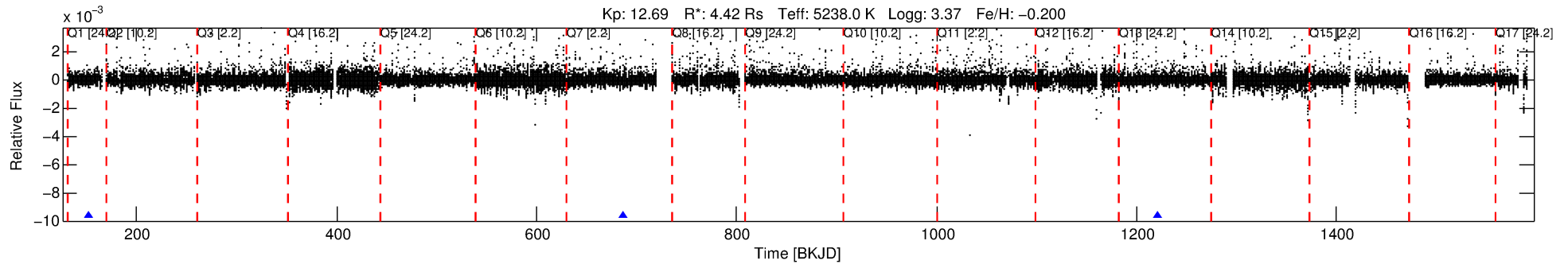
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 008776850-02

No Significant Match Found

DV One-Page Summary

KIC: 8776850 Candidate: 2 of 4 Period: 534.211 d



DV Fit Results:

Period = 534.21131 [0.01912] d
Epoch = 152.5093 [0.0253] BKJD
Rp/R* = 0.0113 [0.0240]
a/R* = 466.62 [4239.77]
b = 0.90 [1.90]
Seff = 5.64 [4.56]
Teq = 393 [79] K
Rp = 5.45 [11.92] Re
a = 1.5278 [0.7592] AU
Ag = 19306.96 [83822.36] [0.23 σ]
Teffp = 7163 [7646] K [0.89 σ]

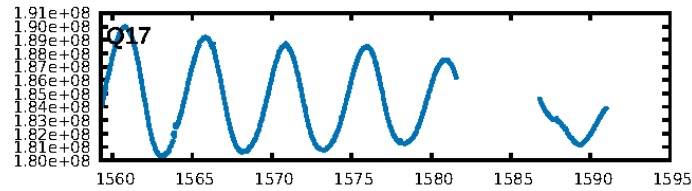
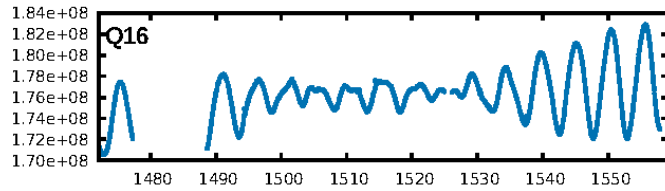
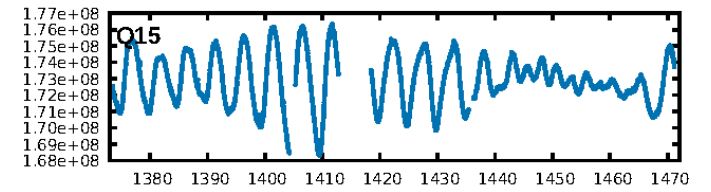
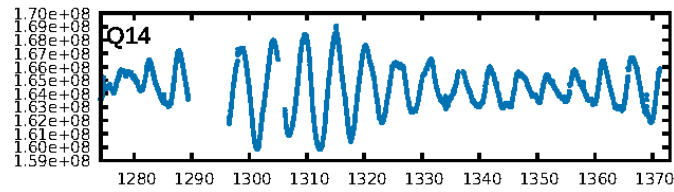
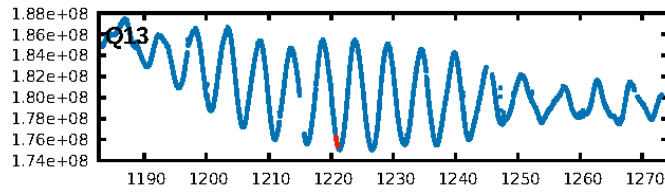
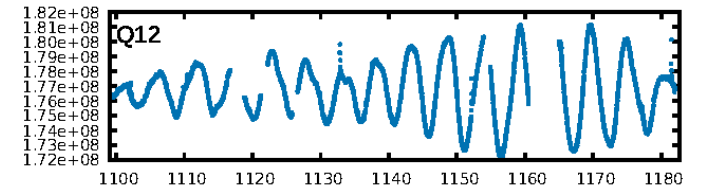
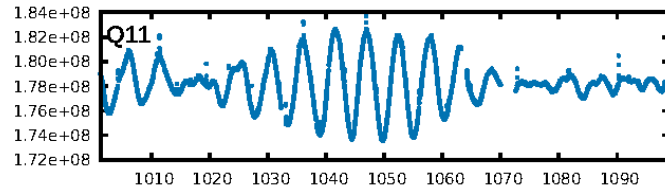
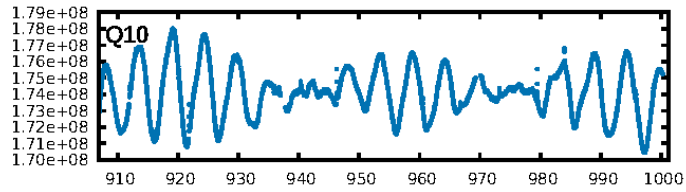
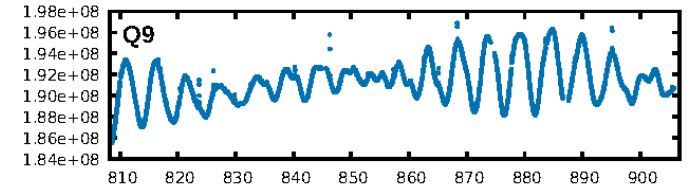
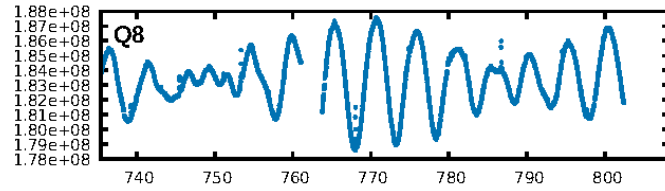
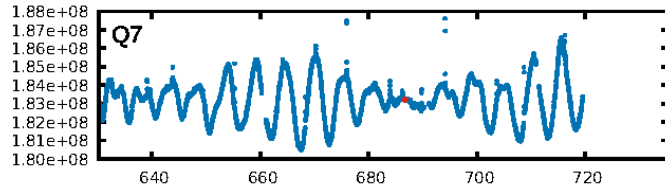
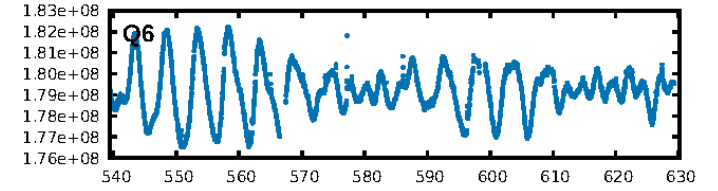
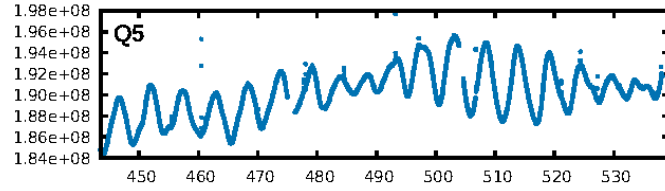
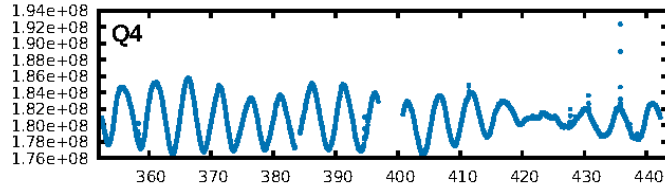
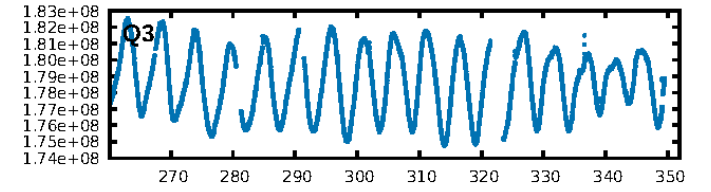
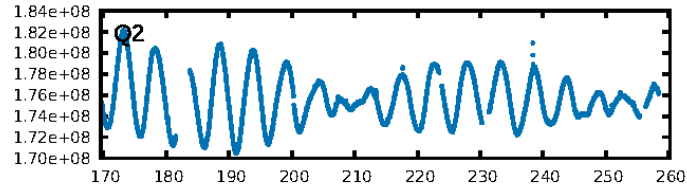
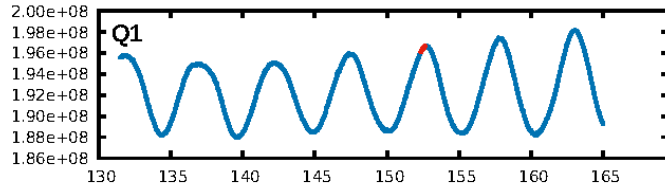
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [116.69 σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 98.3%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 4.58e-08
RollingBand-fgt: 1.00 [2/2]
GhostDiagnostic-chr: 1.439
Centroid-sig: 79.2%
Centroid-so: 1.273 arcsec [0.36 σ]
OotOffset-rm: 0.362 arcsec [0.79 σ]
OotOffset-st: 0/1/0/2 [3]
KicOffset-rm: 0.128 arcsec [0.23 σ]
KicOffset-st: 0/1/0/2 [3]
DiffImageQuality-fgm: 0.67 [2/3]
DiffImageOverlap-fno: 1.00 [3/3]

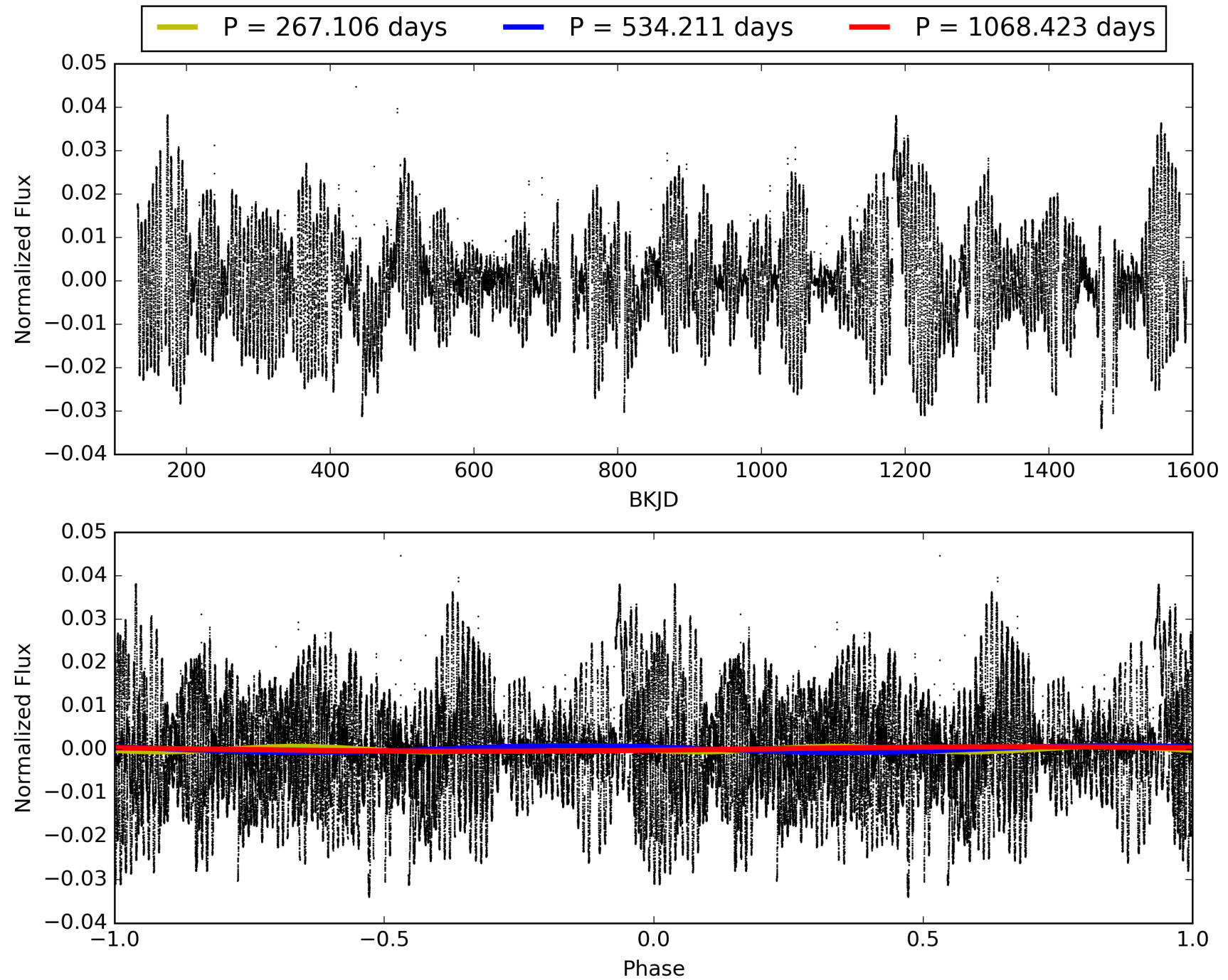
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 22:59:48 Z

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

TCE 008776850-02, PDC Light Curves

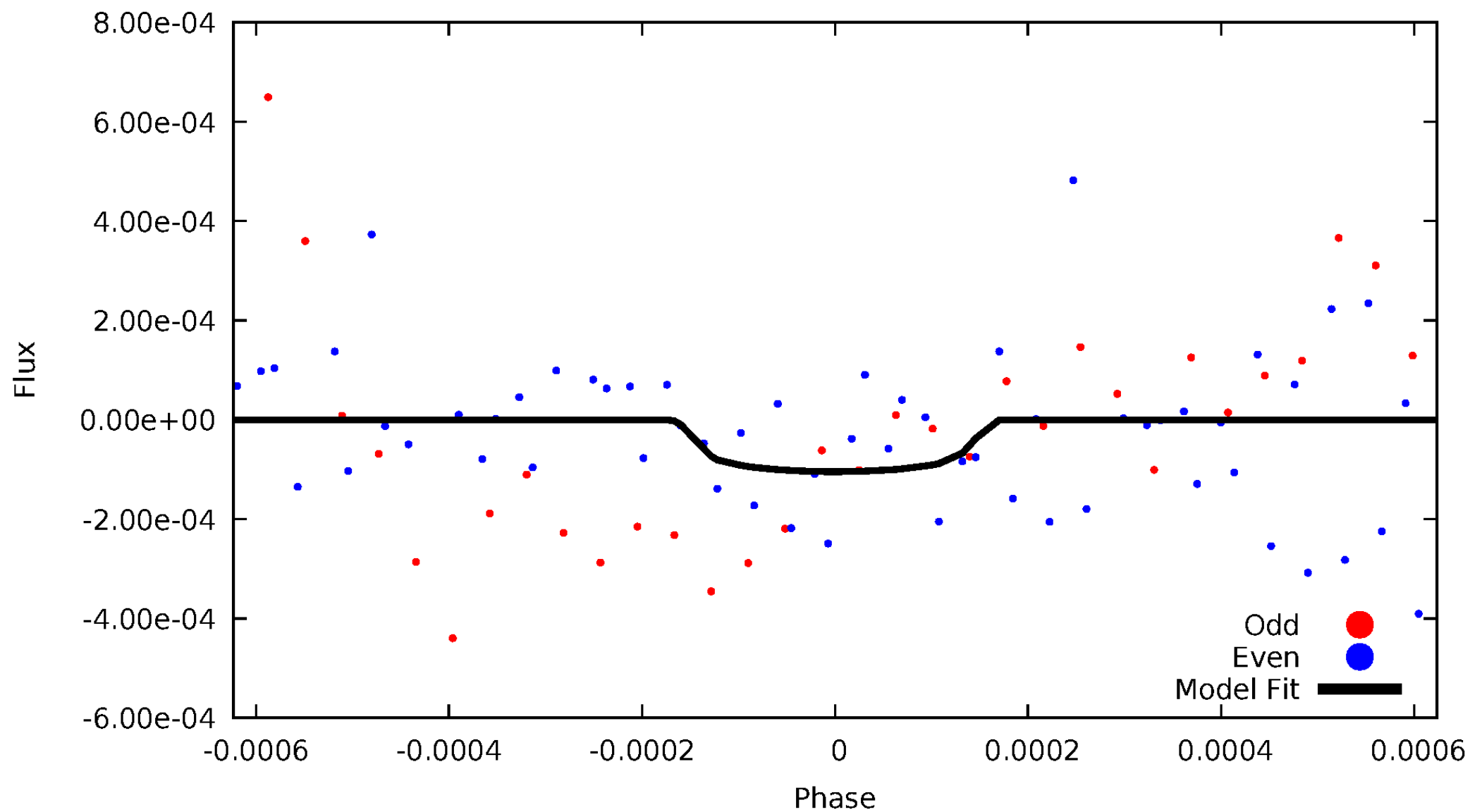


TCE 008776850-02



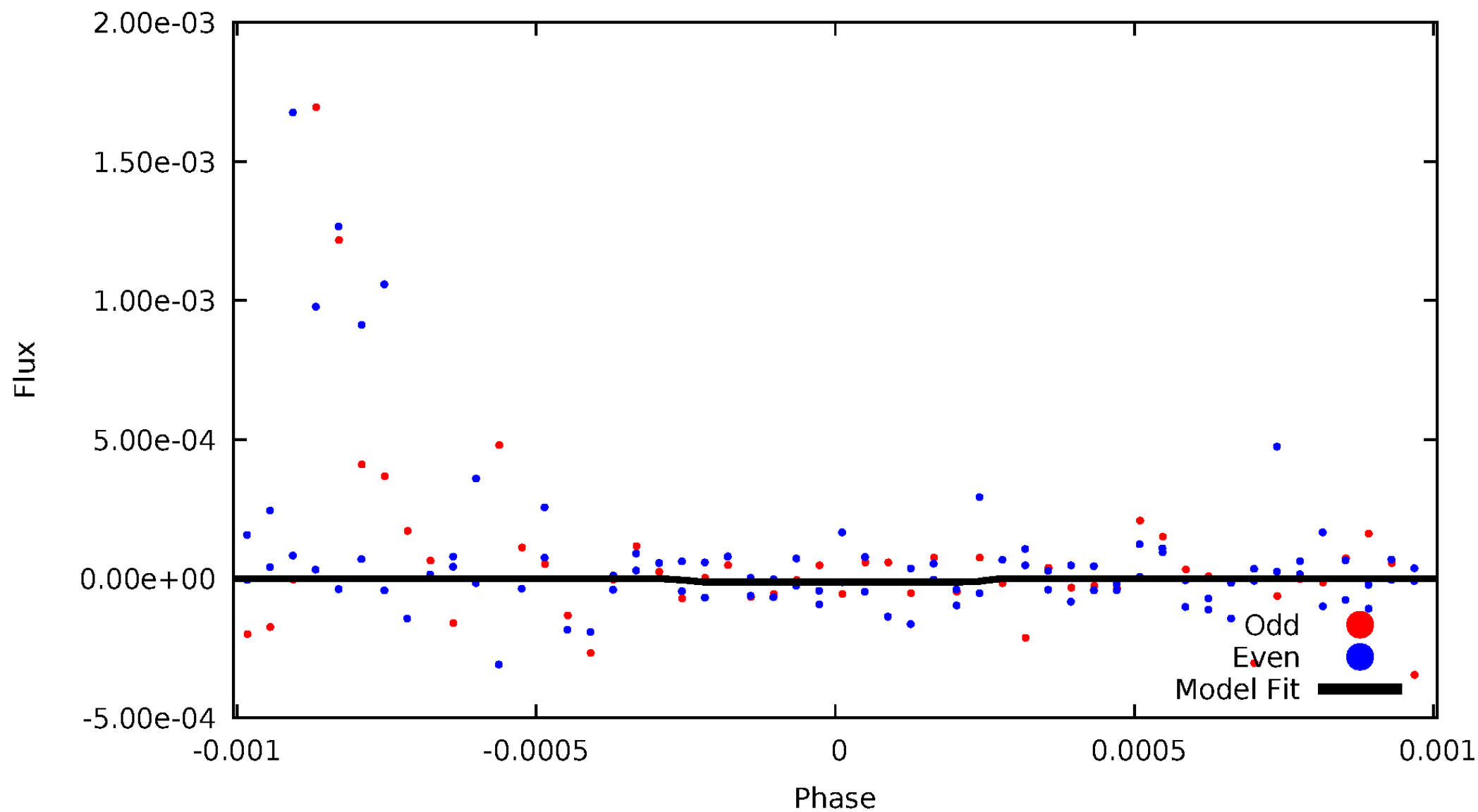
DV Odd/Even

TCE 008776850-02



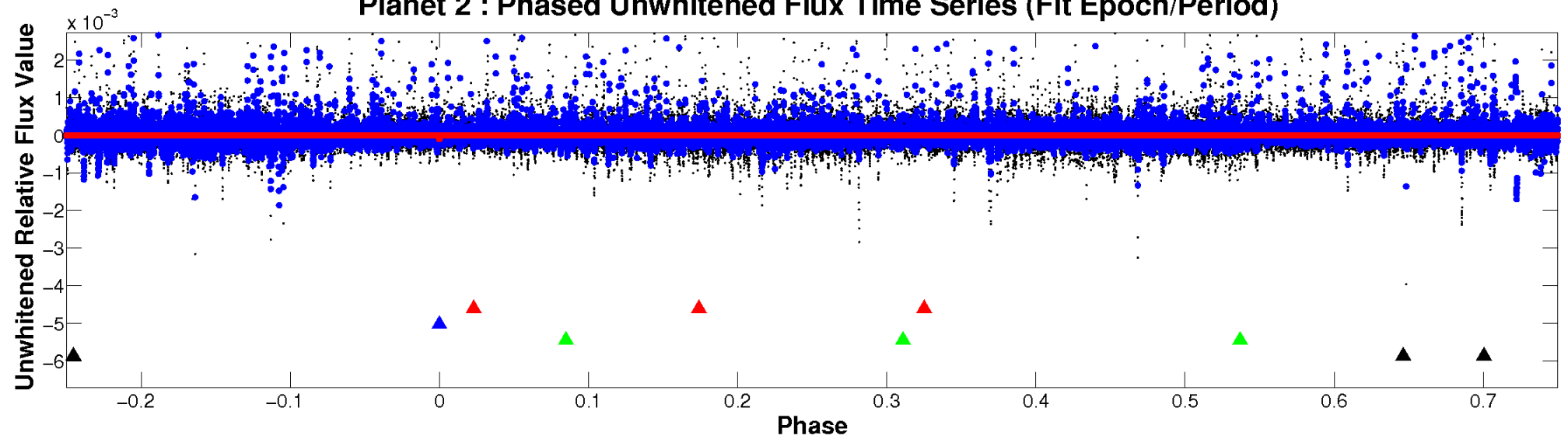
ALT Odd/Even

TCE 008776850-02

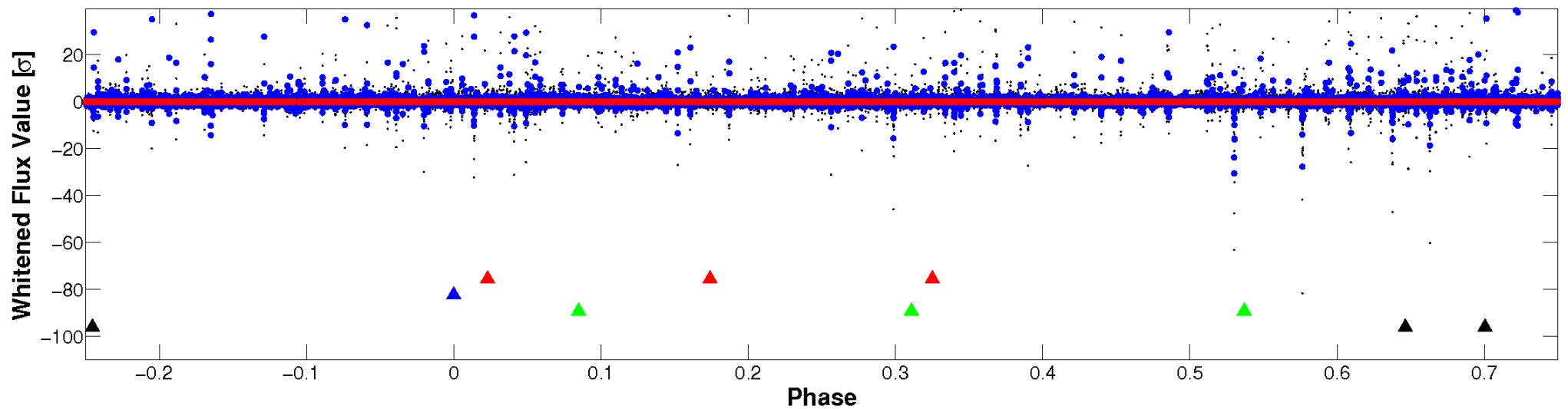


Non-Whitened Vs. Whitened Light Curve

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

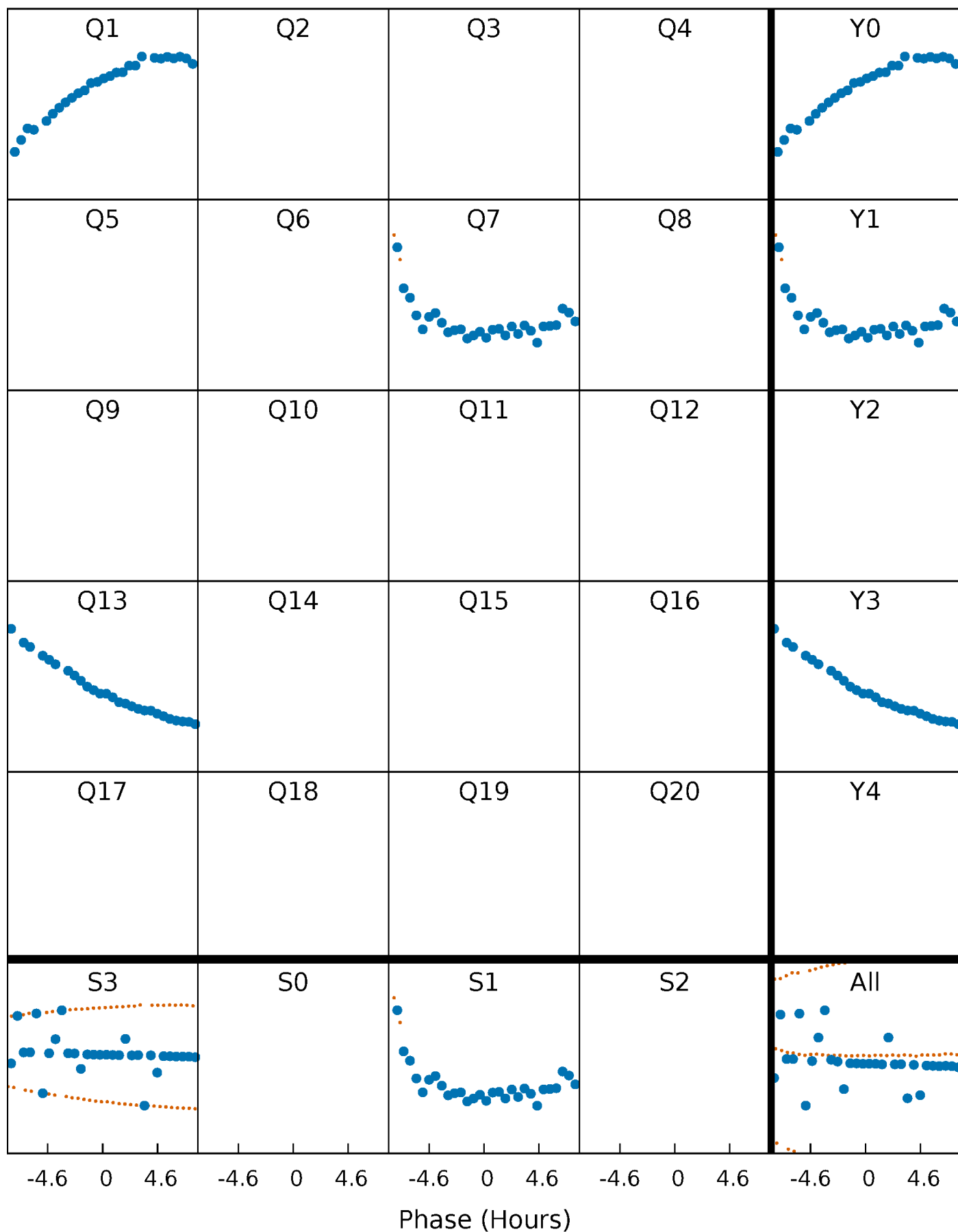


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



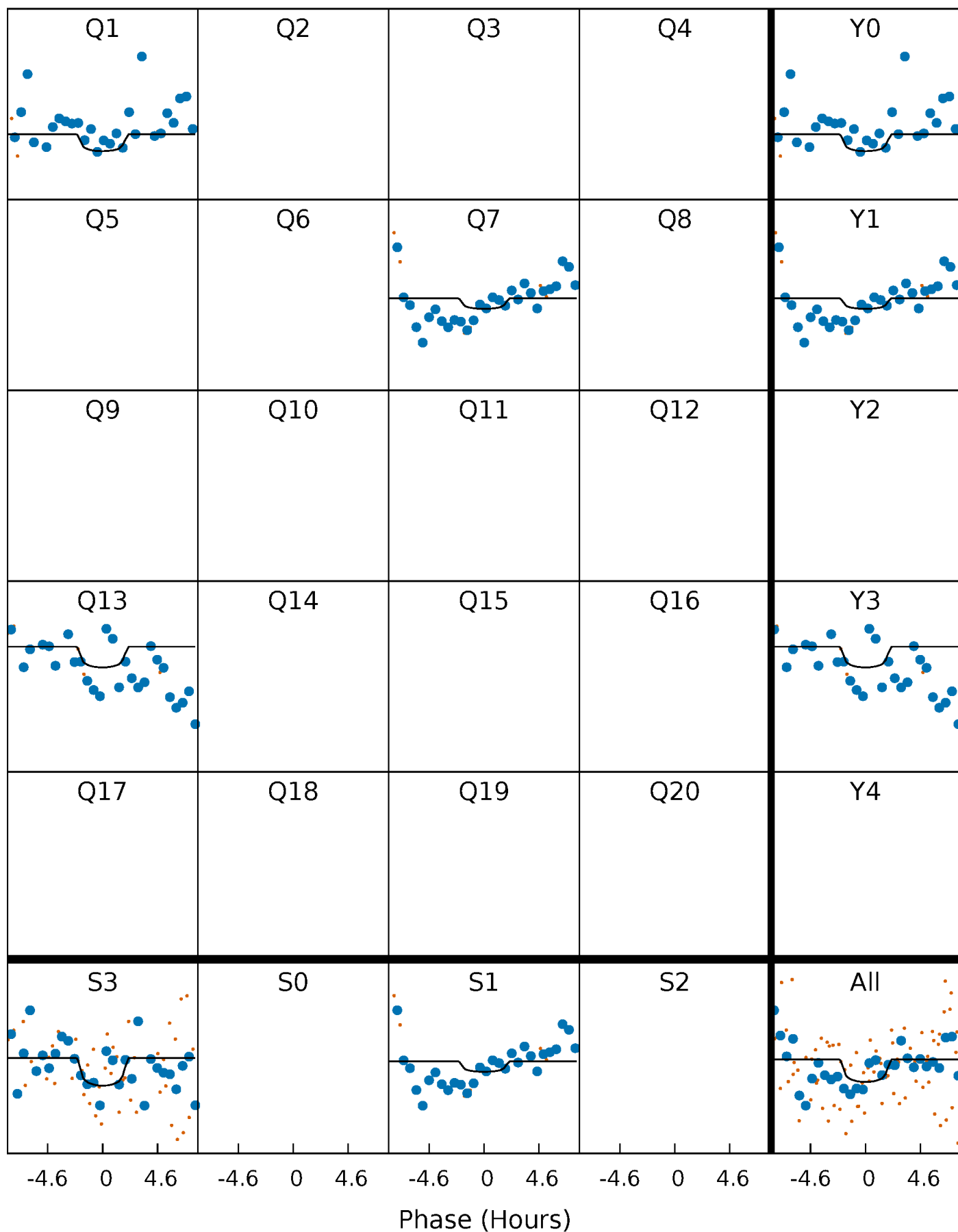
PDC Quarter-Phased Transit Curves

TCE 008776850-02 P=534.211315 Days $T_0=152.509275$ (BKJD)



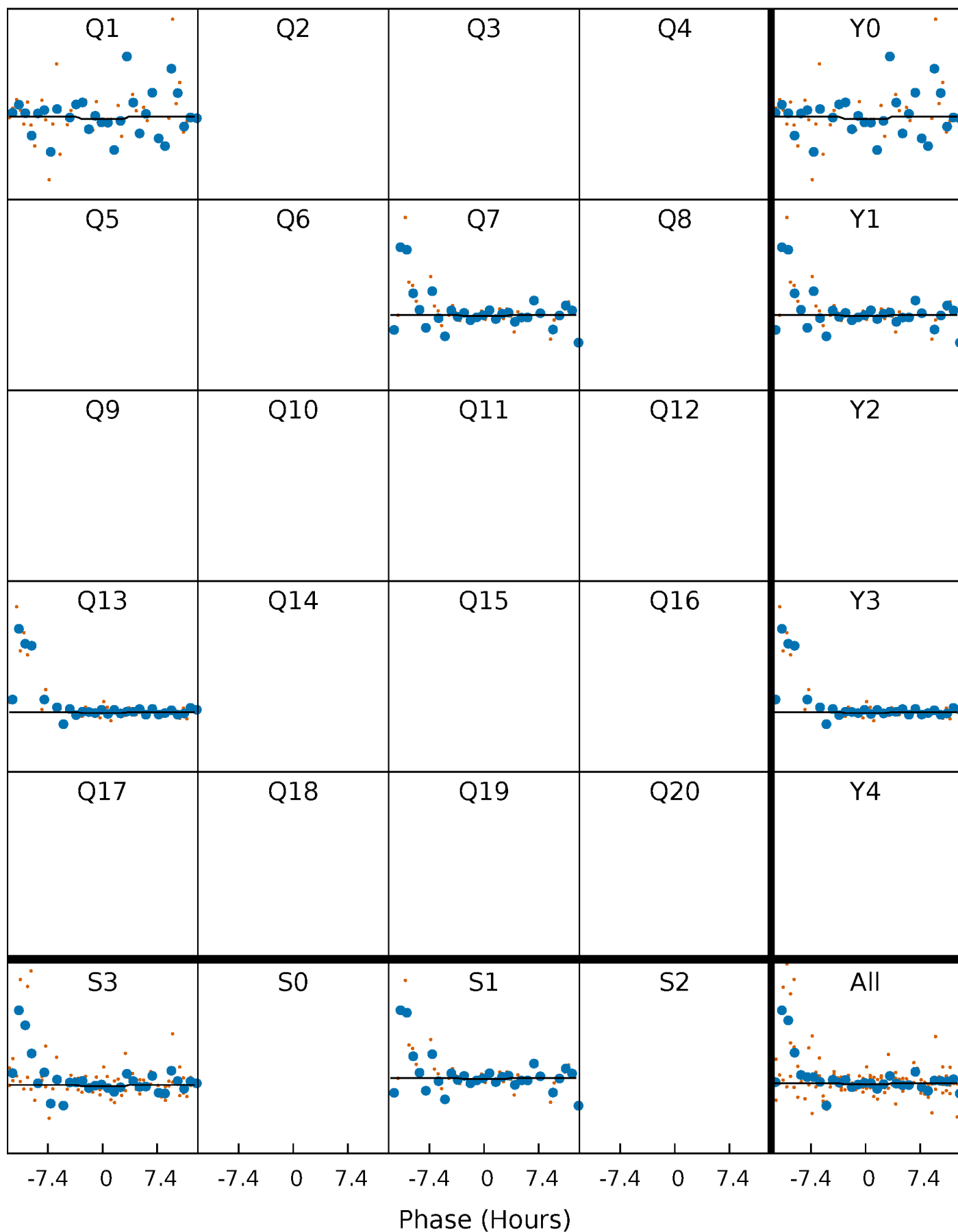
DV Quarter-Phased Transit Curves

TCE 008776850-02 $P=534.211315$ Days $T_0=152.509275$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

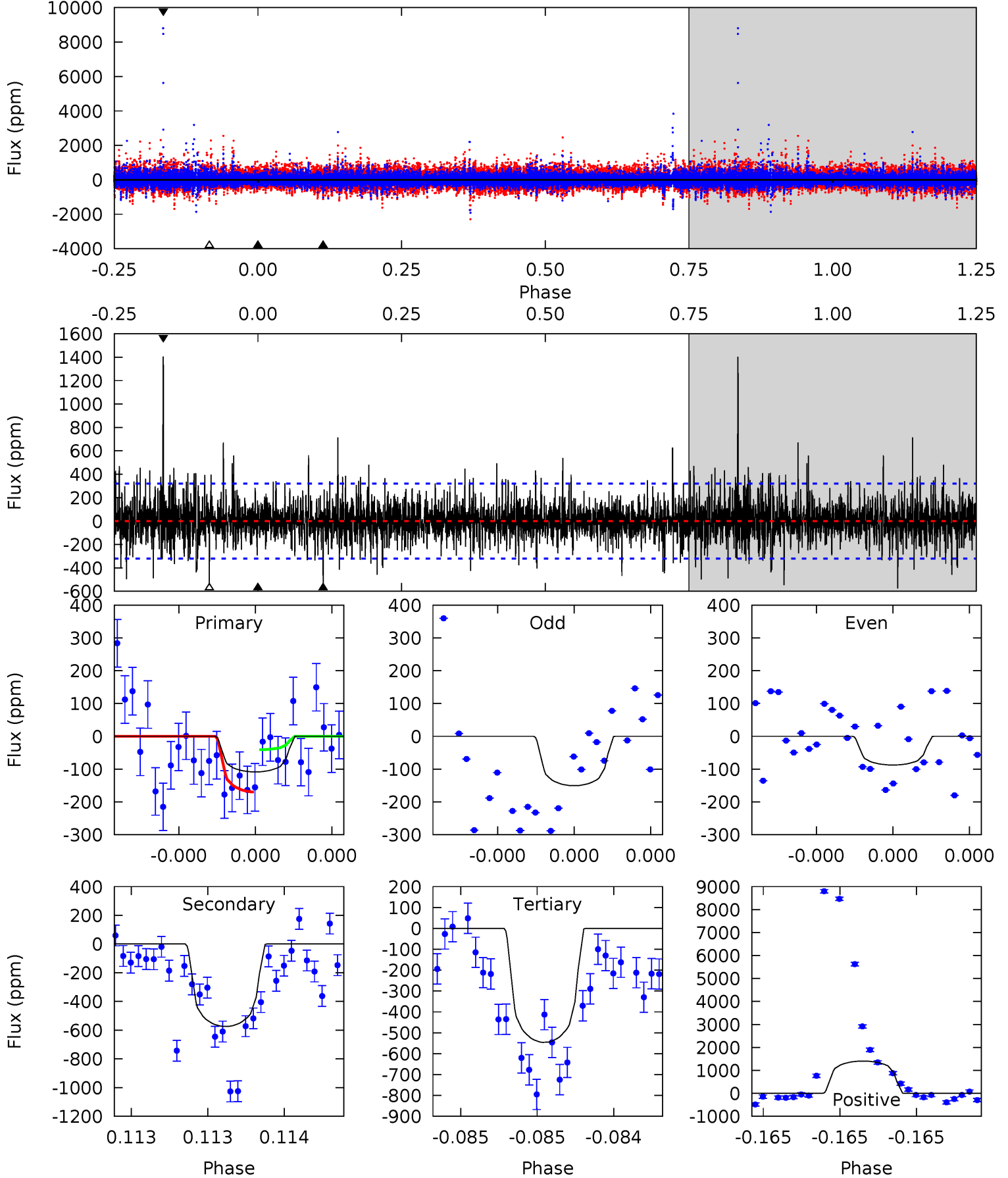
TCE 008776850-02 $P=534.214993$ Days $T_0=152.512310$ (BKJD)



DV Model-Shift Uniqueness Test

008776850-02, P = 534.211315 Days, E = 152.509275 Days

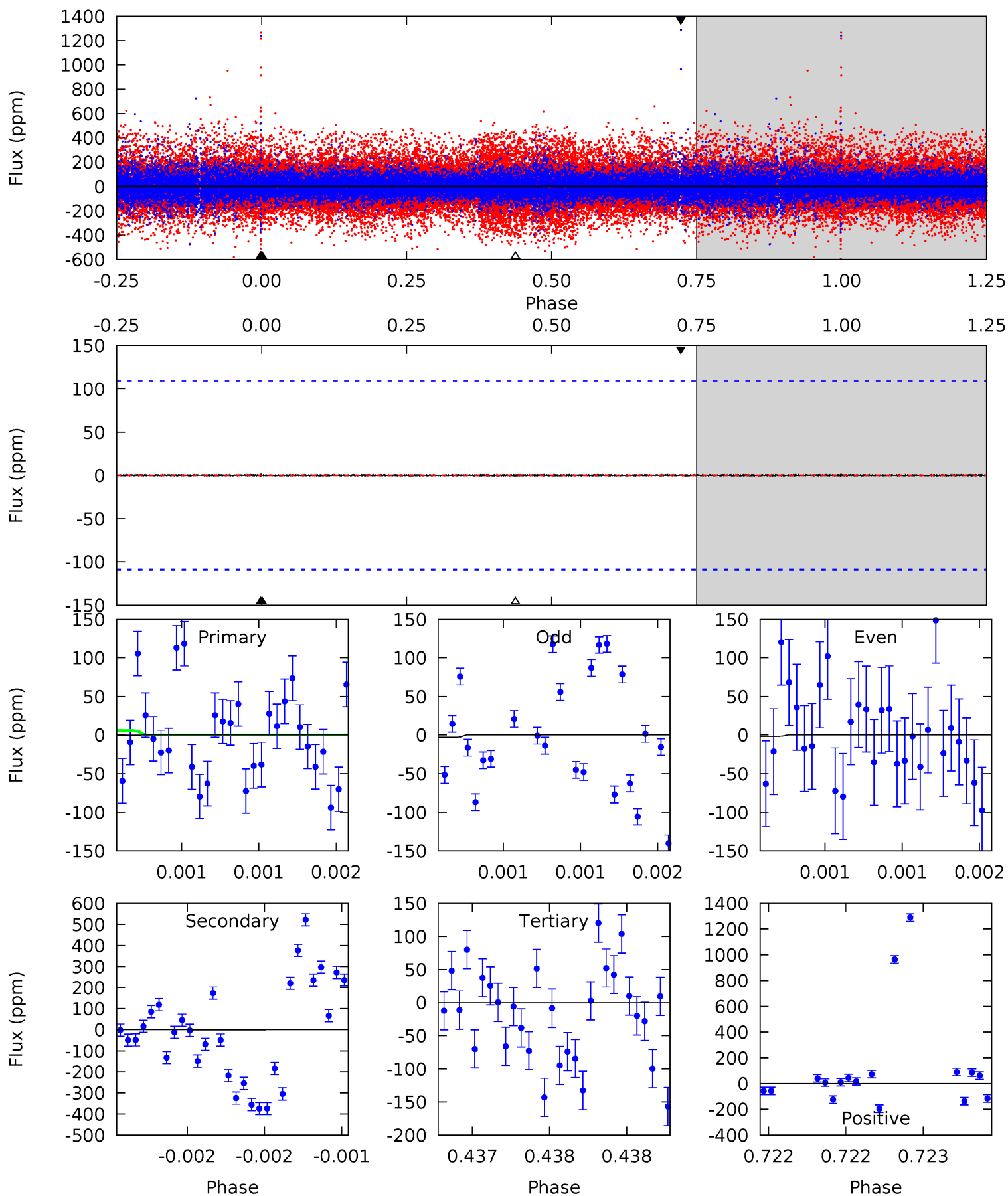
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1.91	10.1	9.62	24.8	5.64	3.59	1.99	-7.70	-22.8	0.50	-14.6	0.36	0.83	0.71	1.14



Alt Model-Shift Uniqueness Test

008776850-02, P = 534.214993 Days, E = 152.512310 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0.05	0.02	0.02	5.56	3.46	0.00	-0.02	-0.02	0.03	0.02	0.03	-0.11	0.64	0.02



Stellar Parameters For KIC 008776850

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5238^{+157}_{-173}	$3.369^{+0.469}_{-0.201}$	$-0.200^{+0.300}_{-0.300}$	$4.419^{+1.223}_{-2.271}$	$1.666^{+0.231}_{-0.740}$	$0.027^{+0.123}_{-0.014}$
	+3%/-3%	+14%/-6%	+150%/-150%	+28%/-51%	+14%/-44%	+454%/-51%
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 008776850-02 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-574 ± 57	$8.70^{+10.65}_{-6.15}$	544^{+45}_{-72}	5652^{+5976}_{-1470}	8970^{+87887}_{-7117}
Alt.	-1 ± 20	$7.71^{+9.17}_{-5.39}$	545^{+49}_{-72}	2122^{+1522}_{-5425}	13^{+1048}_{-561}

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

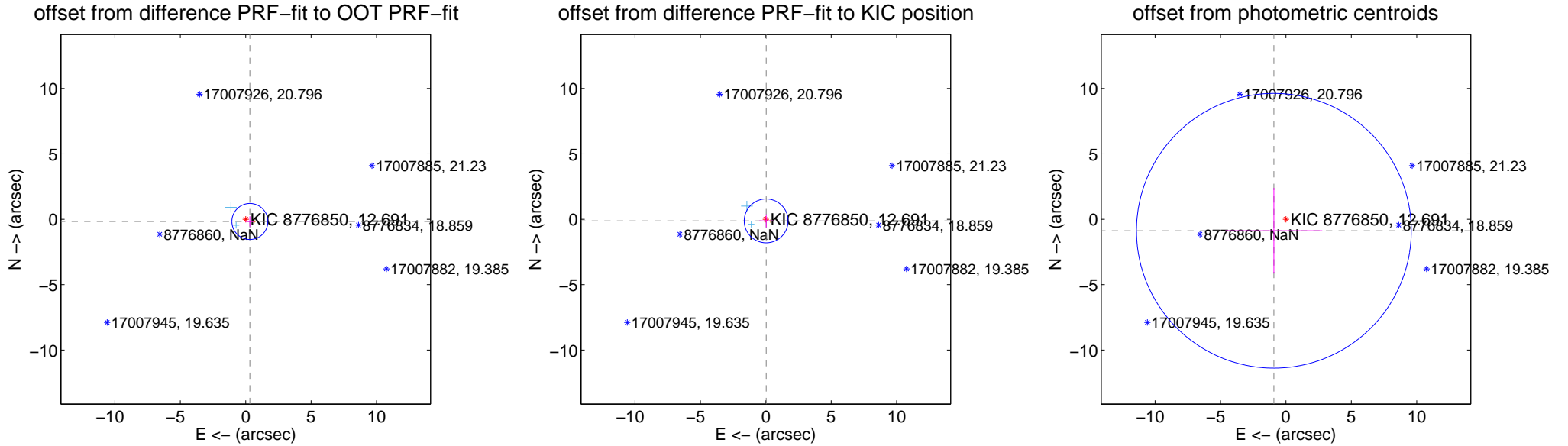
DV Centroid Data

Supplemental centroid analysis for 008776850-02. Kepler magnitude: 12.69. Transit SNR 1.36

There are 2 quarters with good PRF difference image offsets

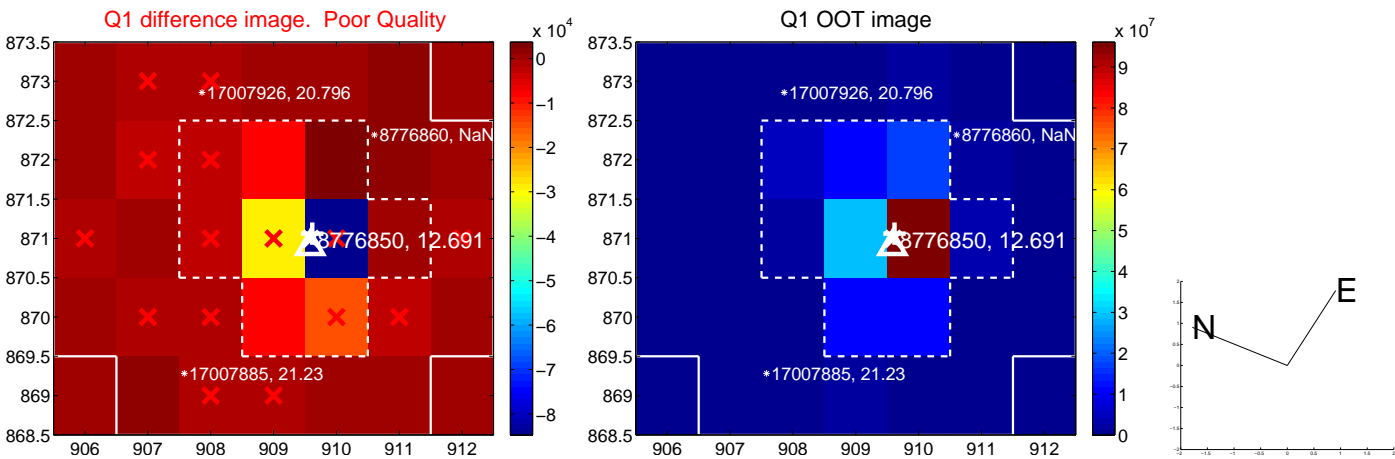
The direct PRF centroid is offset from the target star catalog position by about 0.38 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.362 ± 0.459	0.79	-0.319 ± 0.340	-0.170 ± 0.398
PRF-fit source offset from KIC position	0.128 ± 0.559	0.23	-0.027 ± 0.541	-0.125 ± 0.494
photometric centroid source offset	1.27 ± 3.50	0.36	0.92 ± 3.70	-0.88 ± 3.27



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

Q5 no difference image



Q5 no OOT image



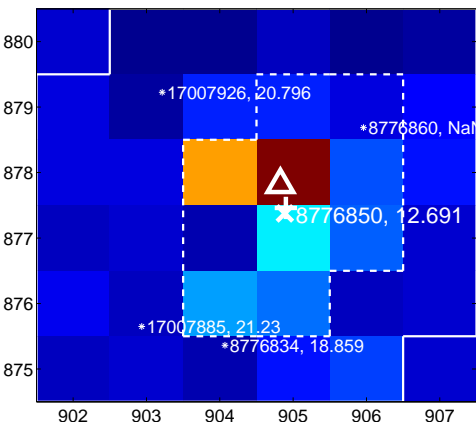
Q6 no difference image



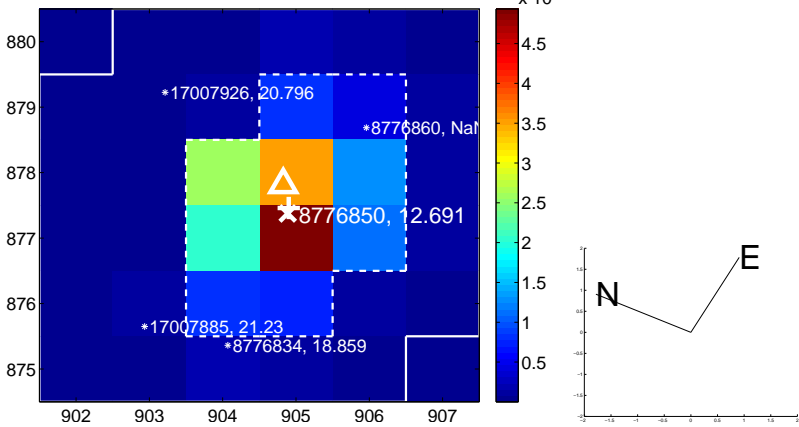
Q6 no OOT image



Q7 difference image



Q7 OOT image



Q8 no difference image



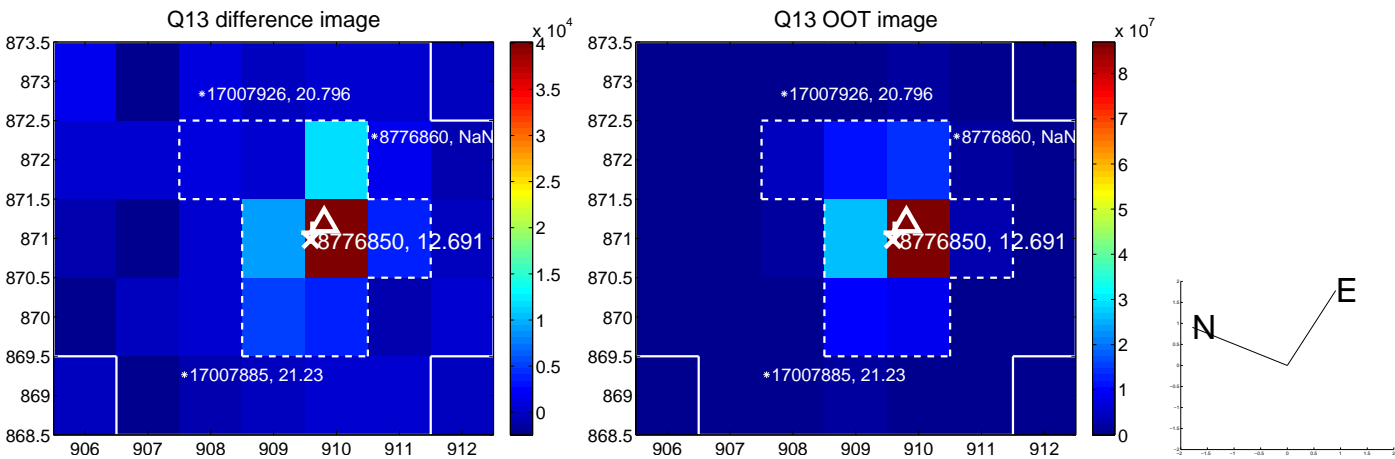
Q8 no OOT image



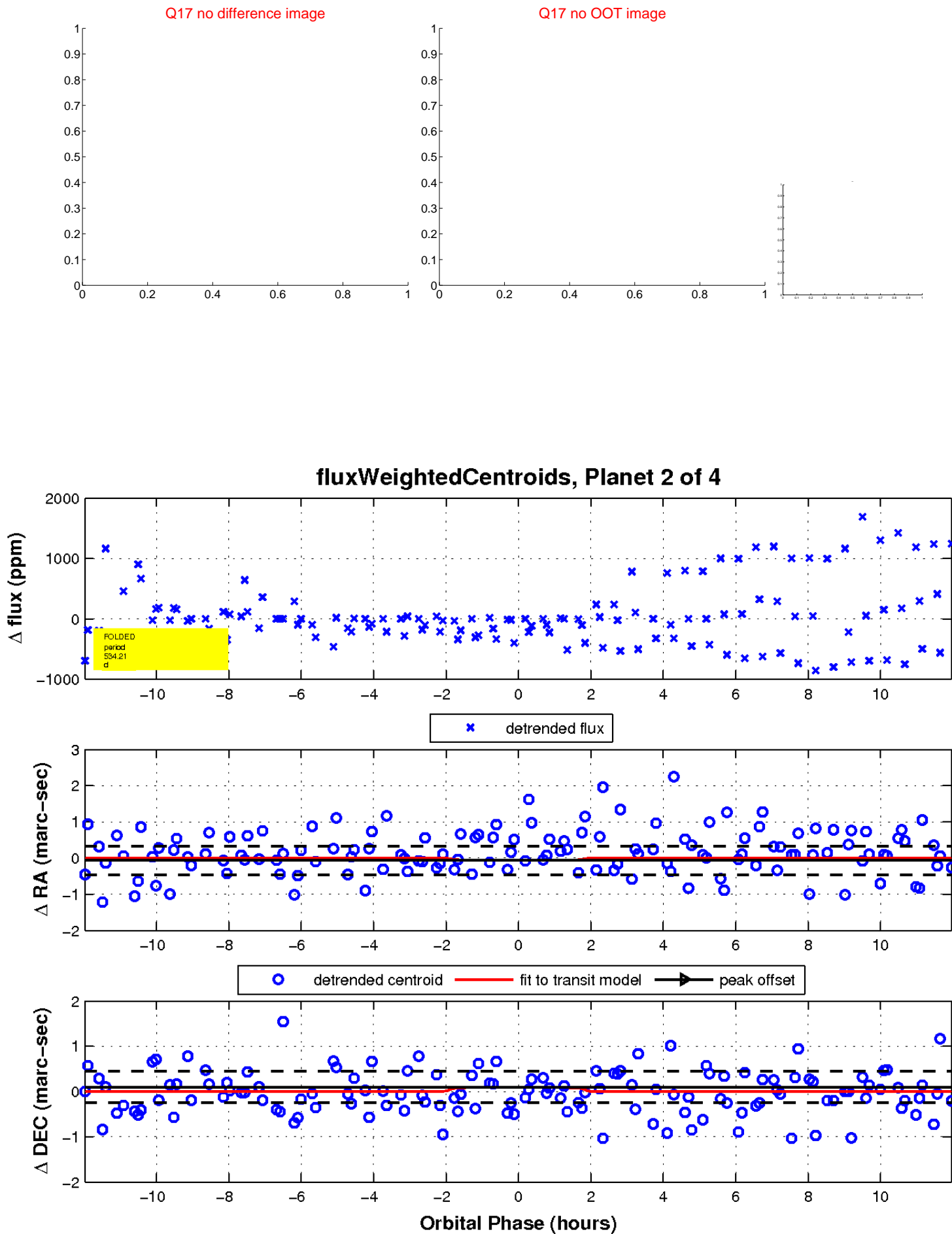
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

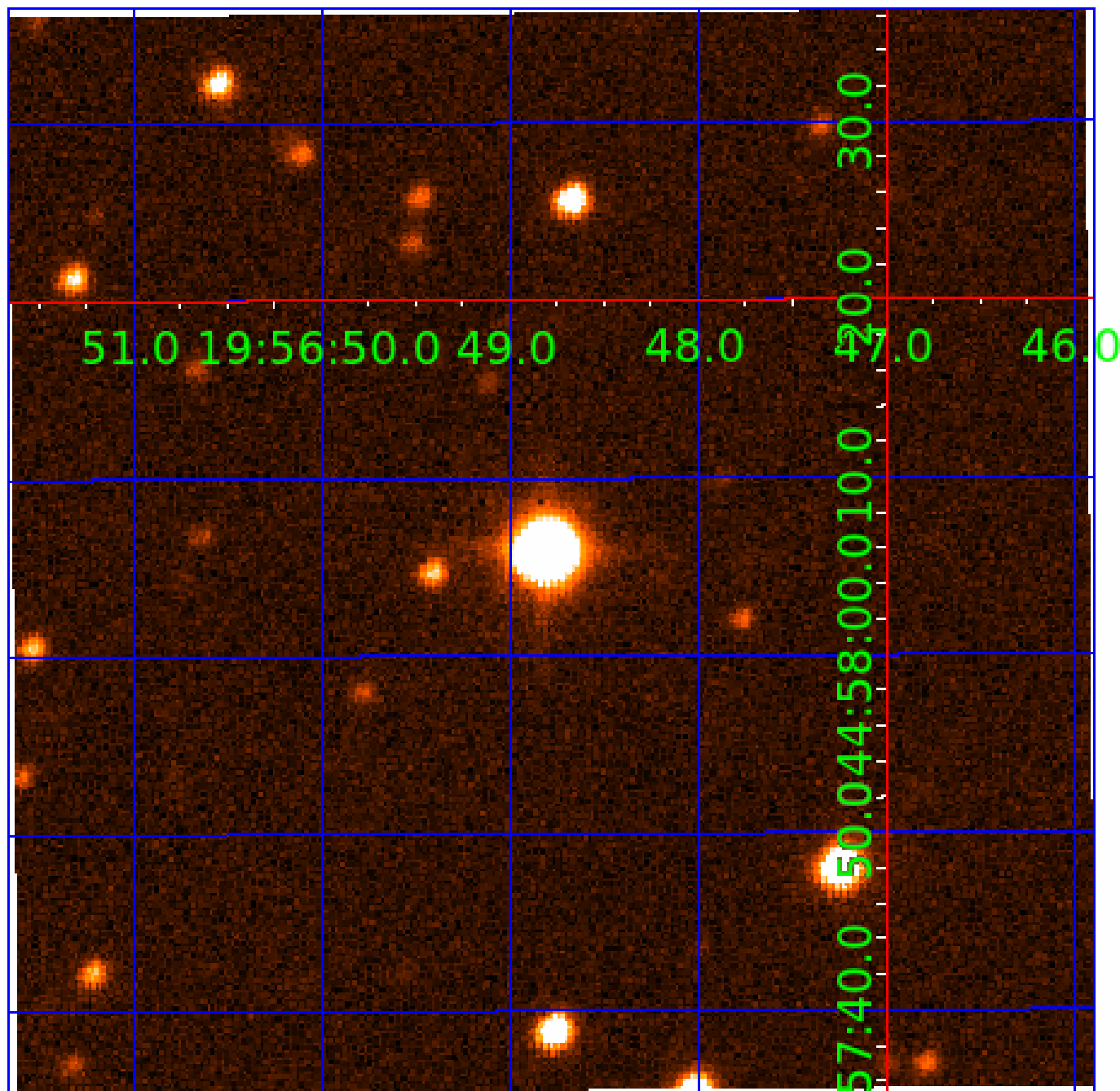


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 008776850

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})
008776850-01	OBS	No	453.520251	326.187617	188.3	2.426	14.4	2.0	4.42	5238	6.45	7.02
008776850-02	OBS	No	534.211315	152.509275	104.6	3.995	11.3	1.4	4.42	5238	5.45	5.64
008776850-03	OBS	No	413.457749	439.367404	537.5	4.265	12.7	6.0	4.42	5238	11.17	7.94
008776850-04	OBS	No	505.304021	555.628664	817.8	4.402	12.0	7.4	4.42	5238	12.36	6.08

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008776850-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
008776850-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
008776850-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—CENT_KIC_POS—HALO_GHOST
008776850-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—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.

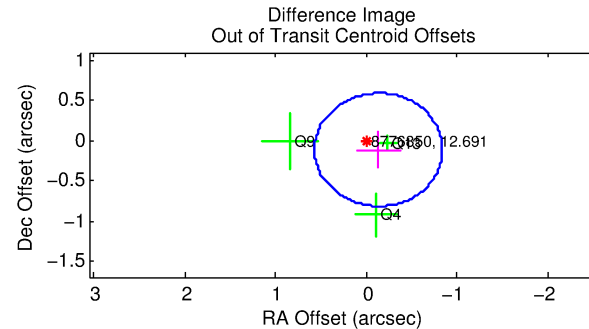
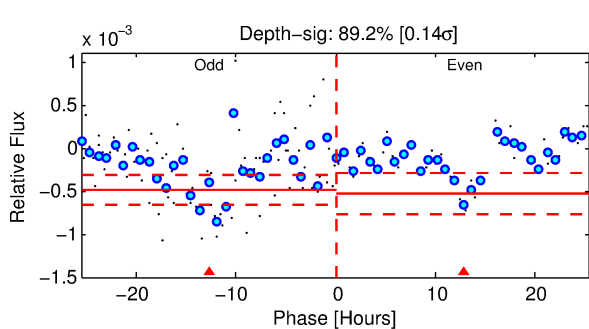
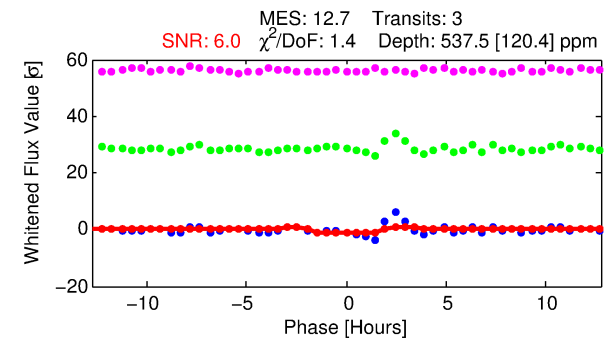
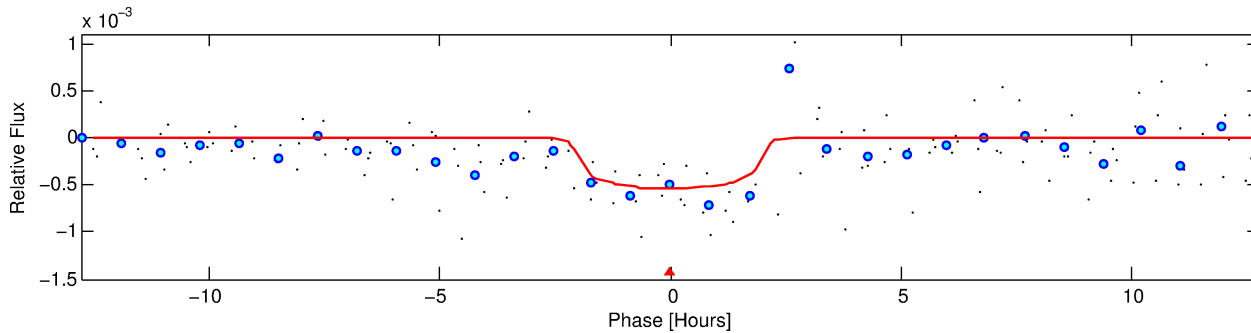
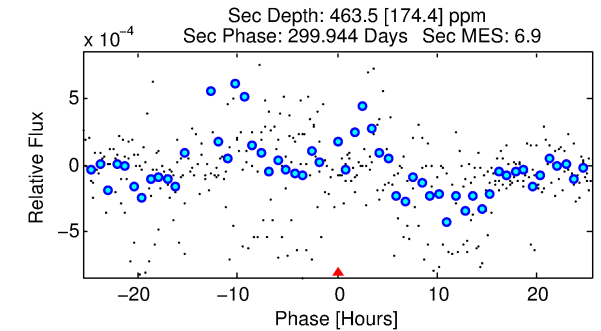
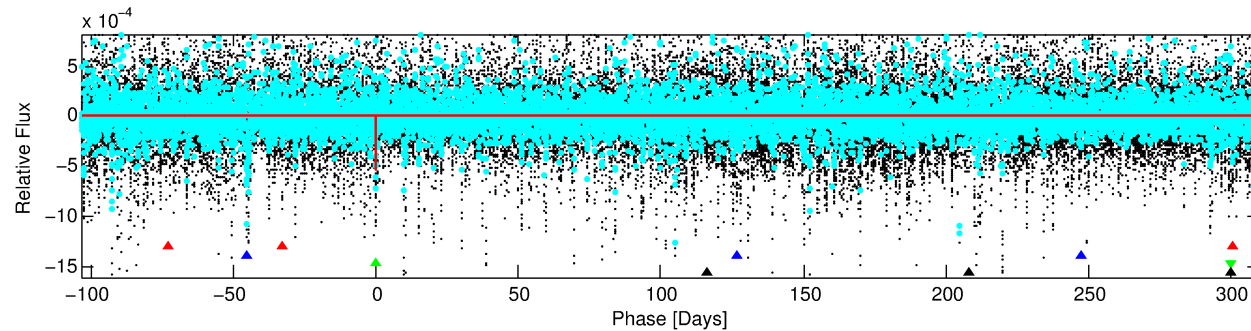
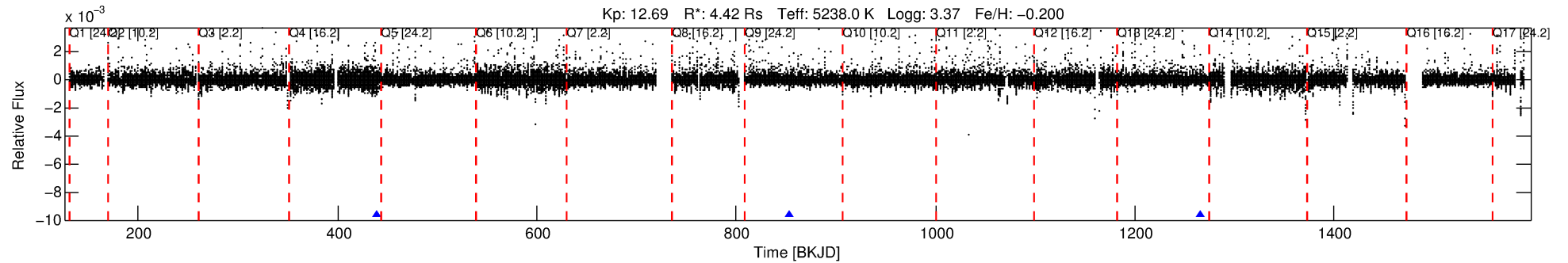
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 008776850-03

No Significant Match Found

DV One-Page Summary

KIC: 8776850 Candidate: 3 of 4 Period: 413.458 d



DV Fit Results:

Period = 413.45775 [0.01014] d
Epoch = 439.3674 [0.0143] BKJD
Rp/R* = 0.0232 [0.0231]
a/R* = 512.51 [1954.06]
b = 0.75 [2.23]
Seff = 7.94 [6.42]
Teq = 428 [86] K
Rp = 11.17 [12.51] Re
a = 1.2879 [0.6400] AU
Ag = 3390.37 [7381.87] [0.46σ]
Teffp = 5050 [2563] K [1.80σ]

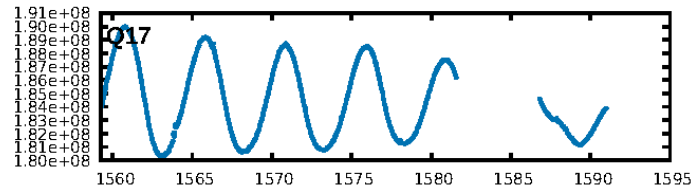
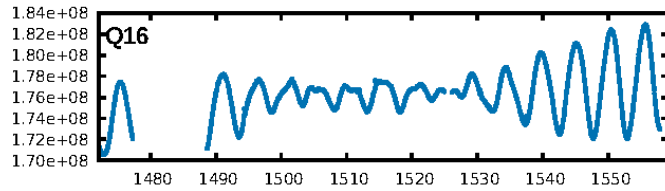
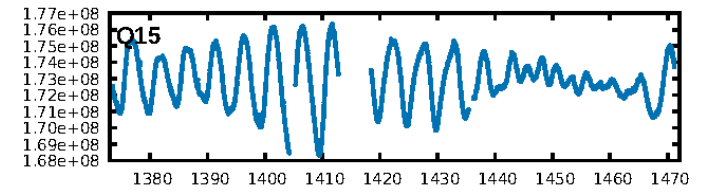
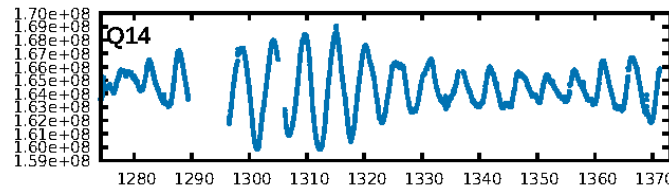
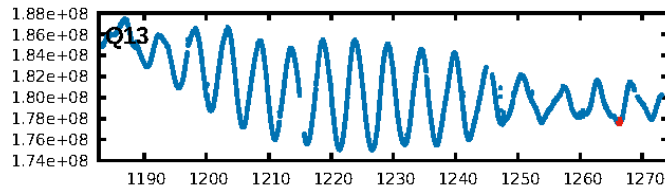
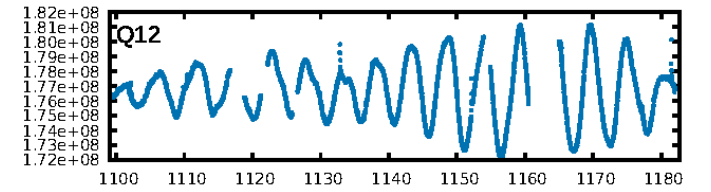
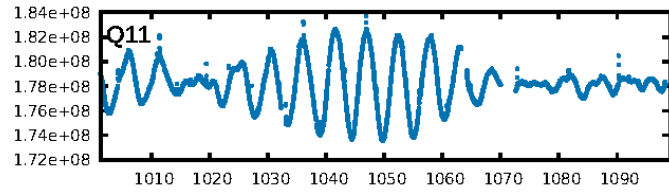
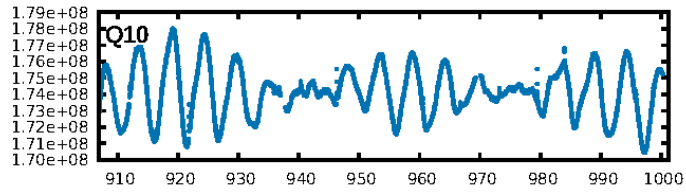
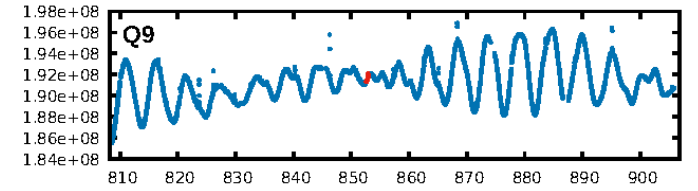
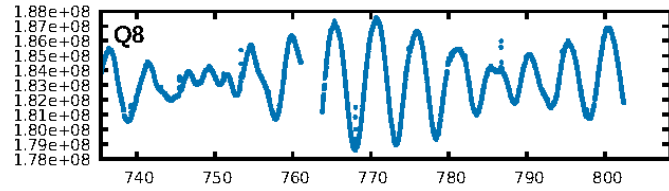
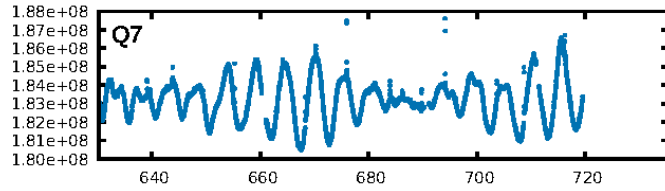
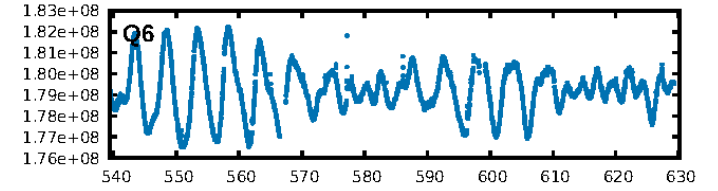
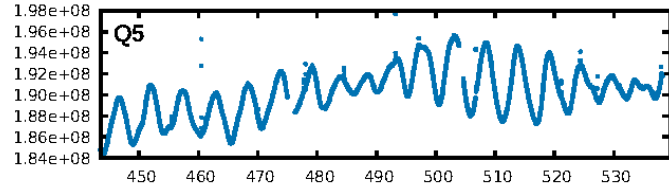
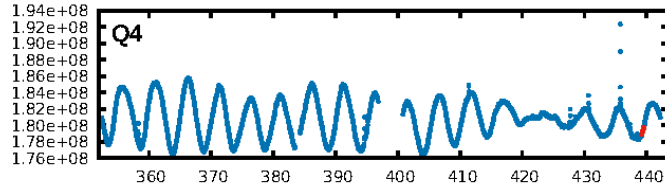
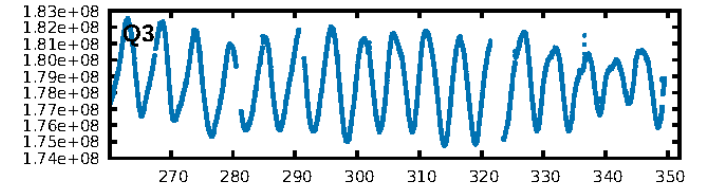
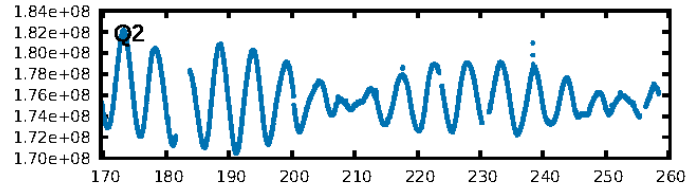
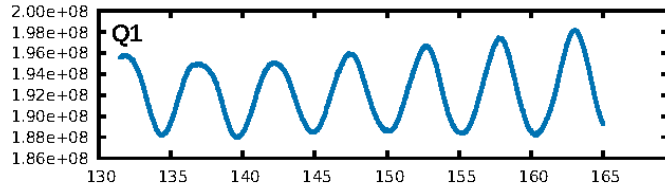
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [195.96σ]
ModelChiSquare2-sig: 16.5%
ModelChiSquareGof-sig: 57.1%
Bootstrap-pfa: 2.60e-10
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: -0.01381
Centroid-sig: 90.5%
Centroid-so: 0.242 arcsec [0.36σ]
OotOffset-rm: 0.177 arcsec [0.75σ]
OotOffset-st: 0/0/1/2 [3]
KicOffset-rm: 0.230 arcsec [0.87σ]
KicOffset-st: 0/0/1/2 [3]
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DiffImageOverlap-fno: 1.00 [3/3]

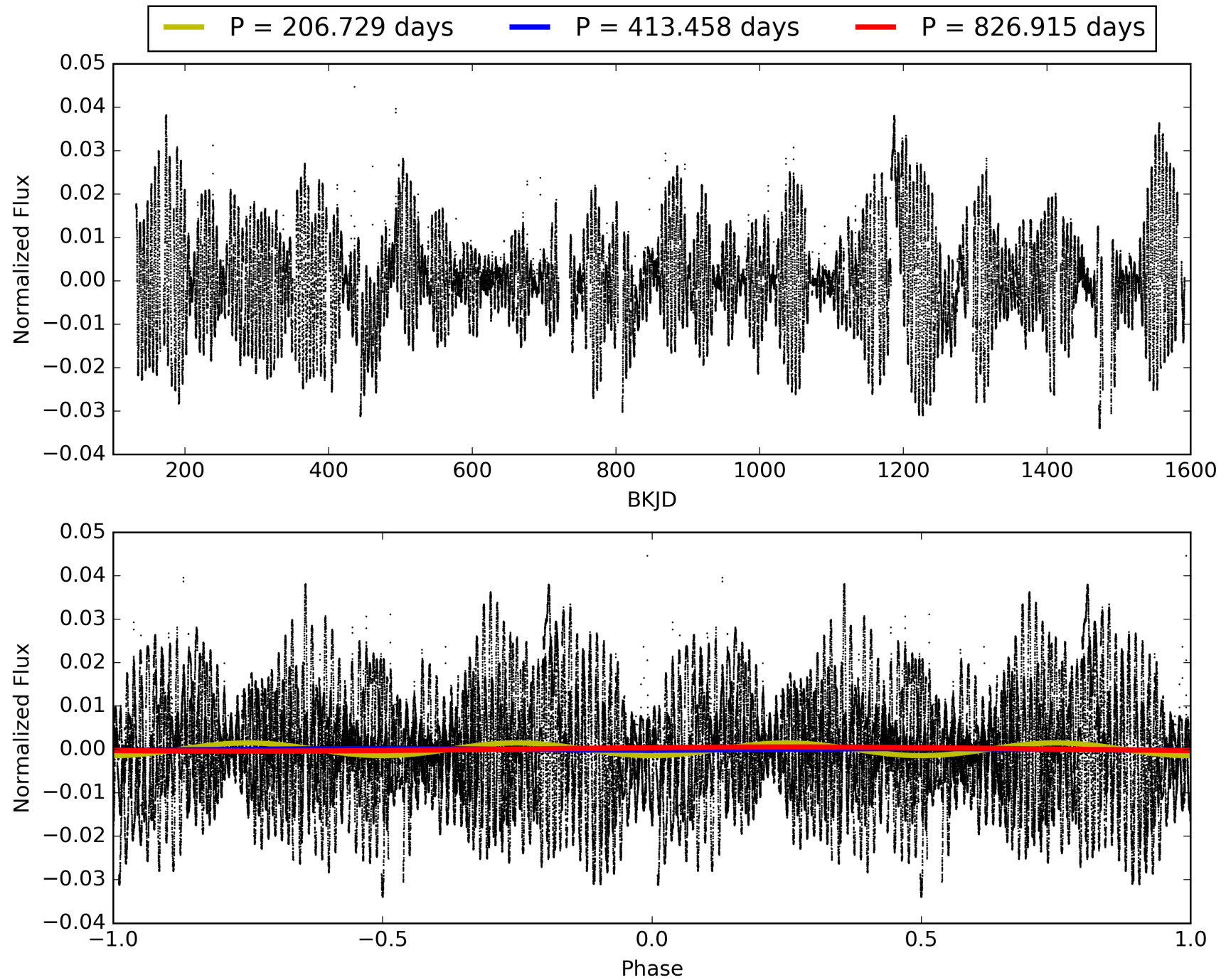
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 23:00:04 Z

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

TCE 008776850-03, PDC Light Curves

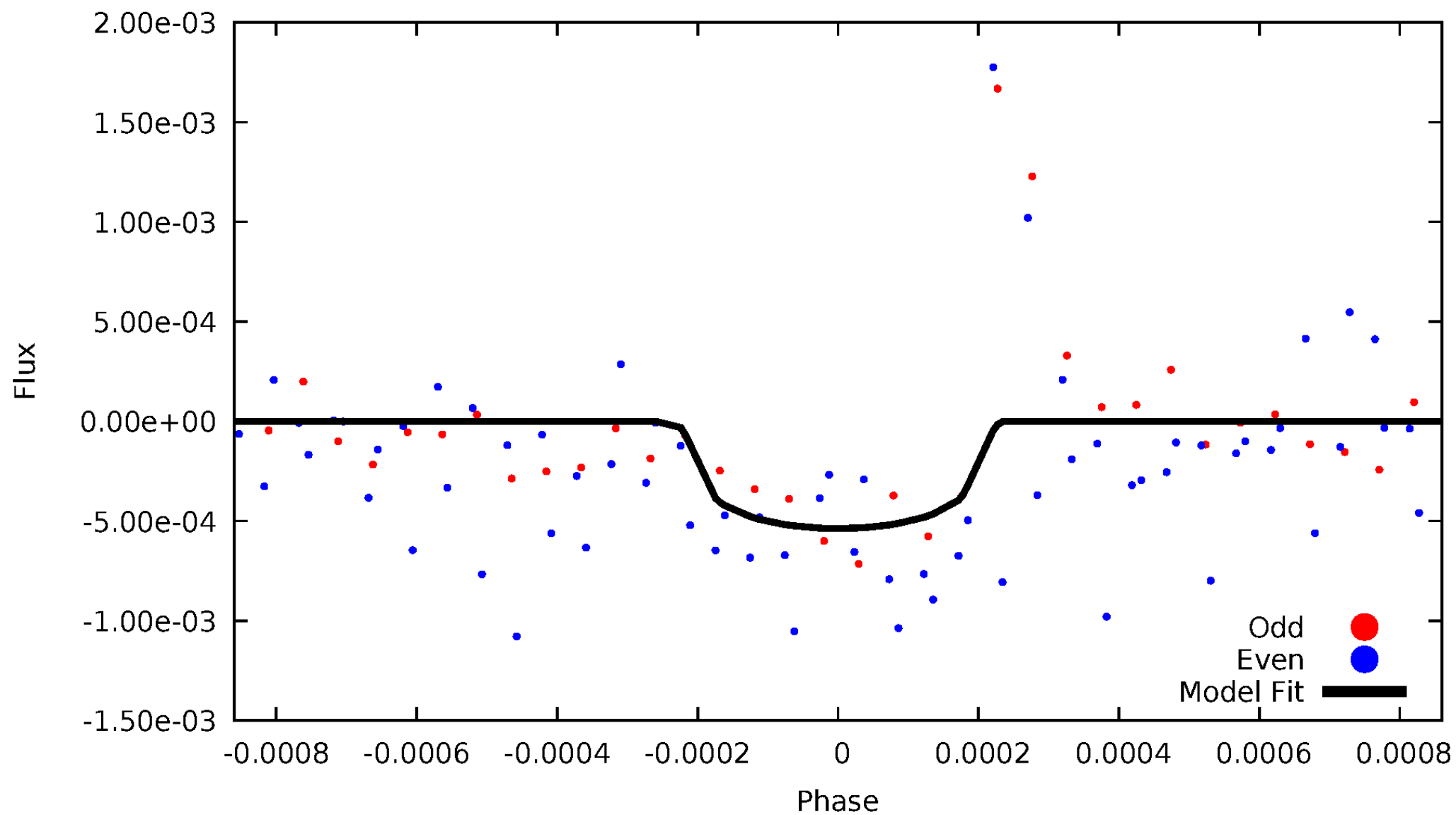


TCE 008776850-03



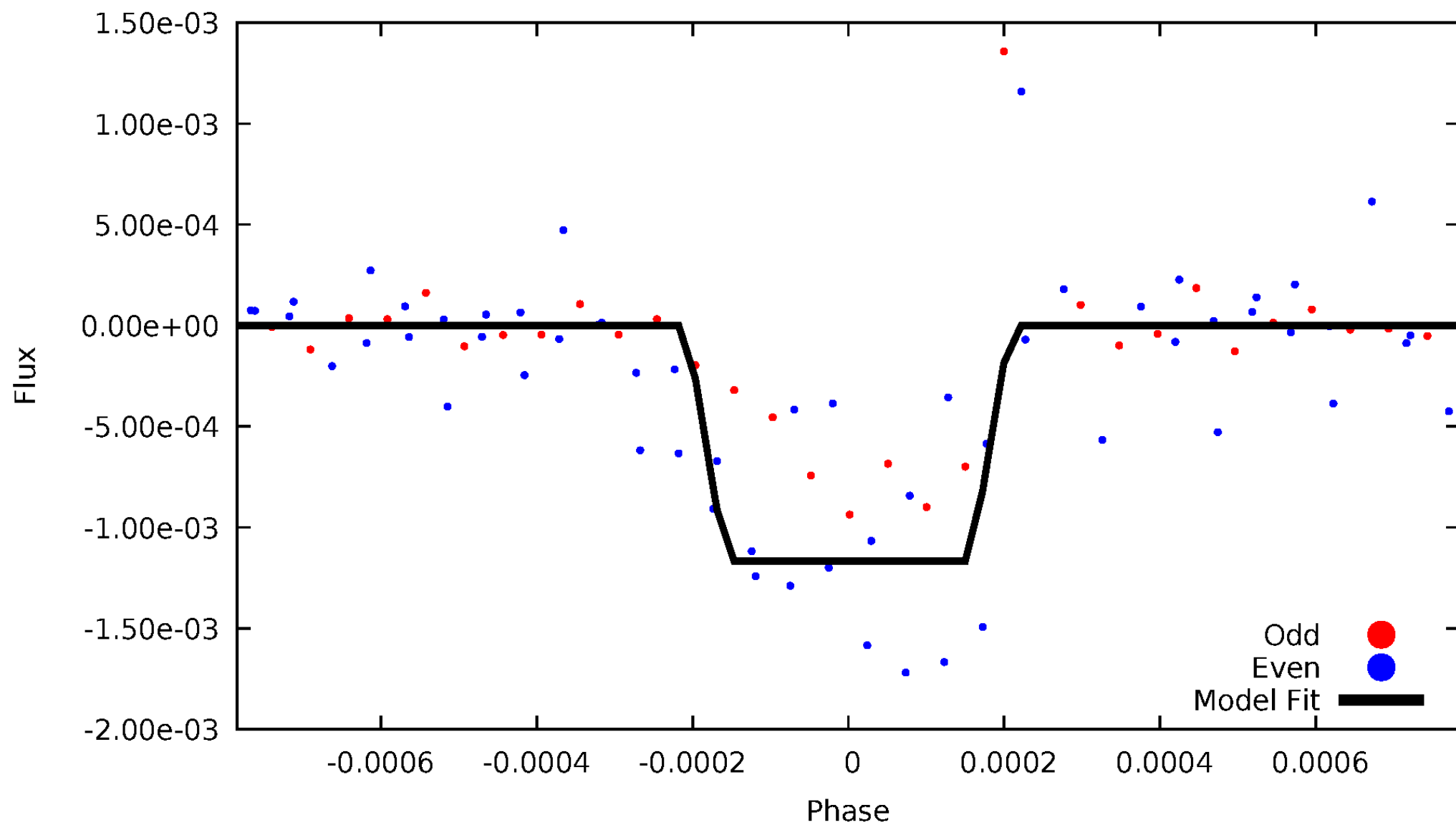
DV Odd/Even

TCE 008776850-03



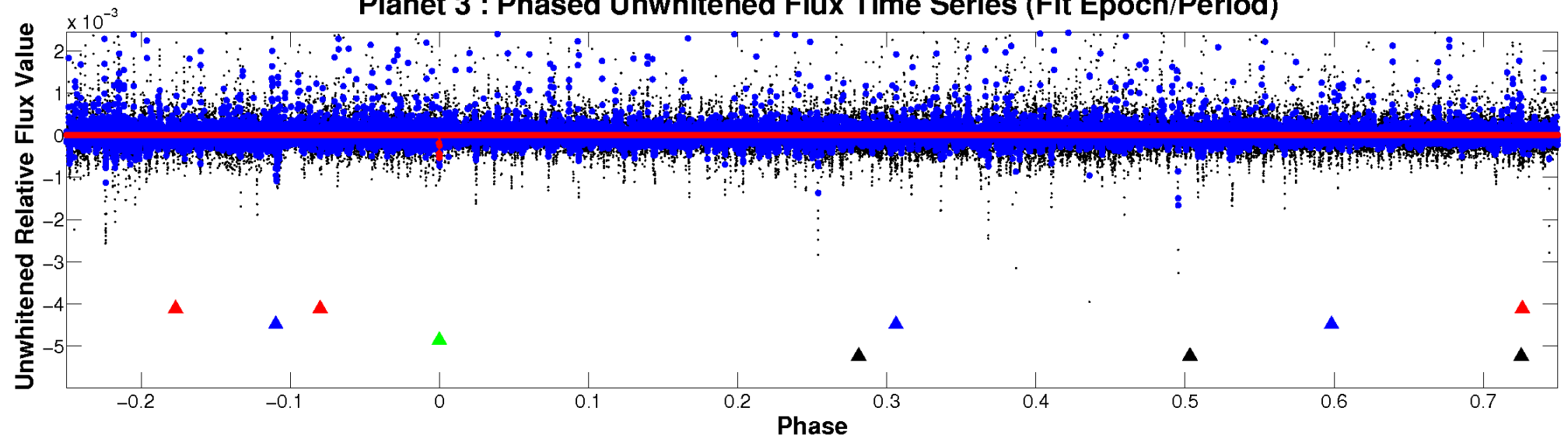
ALT Odd/Even

TCE 008776850-03

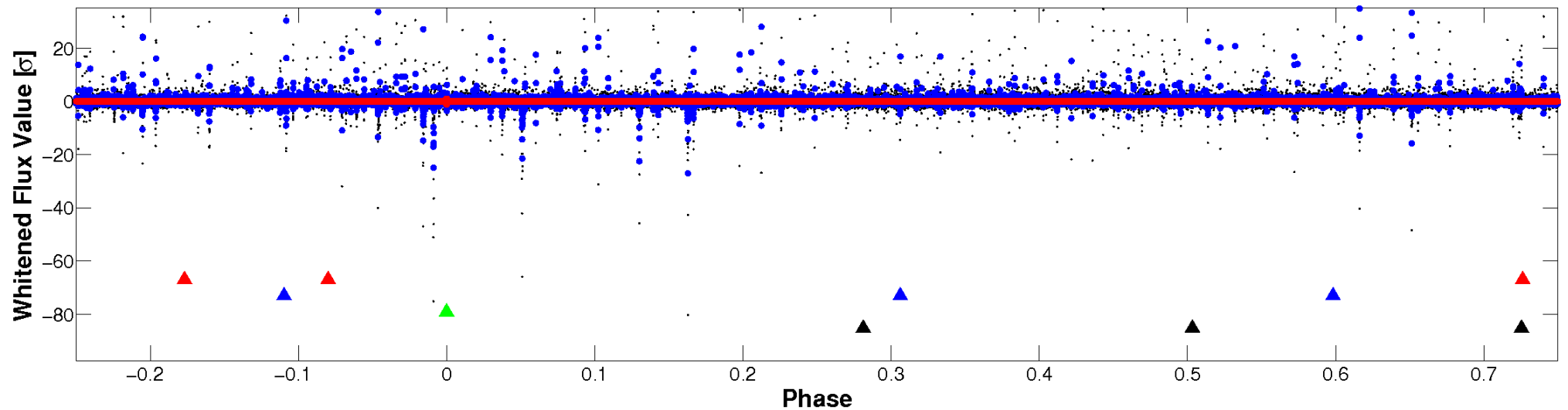


Non-Whitened Vs. Whitened Light Curve

Planet 3 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

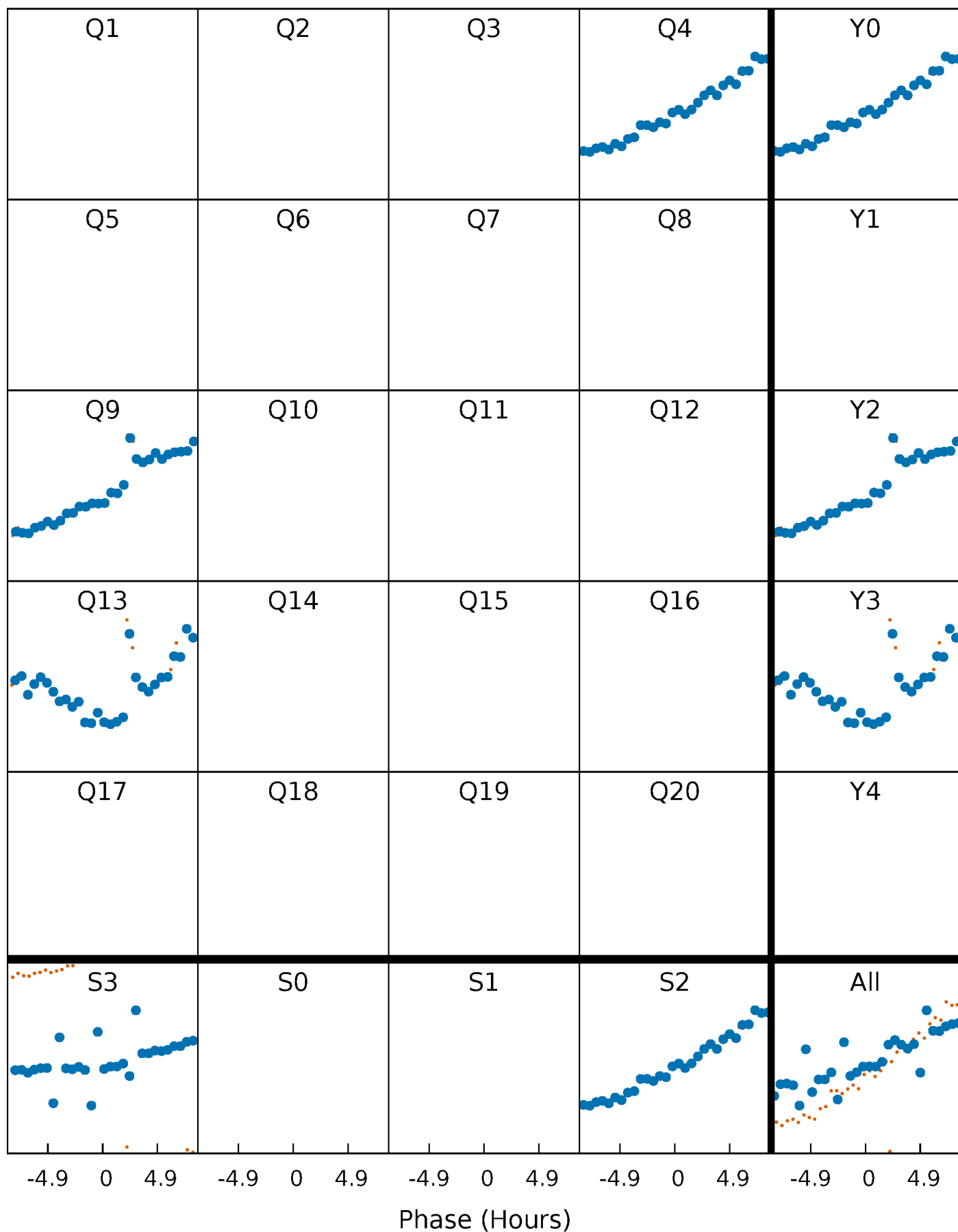


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



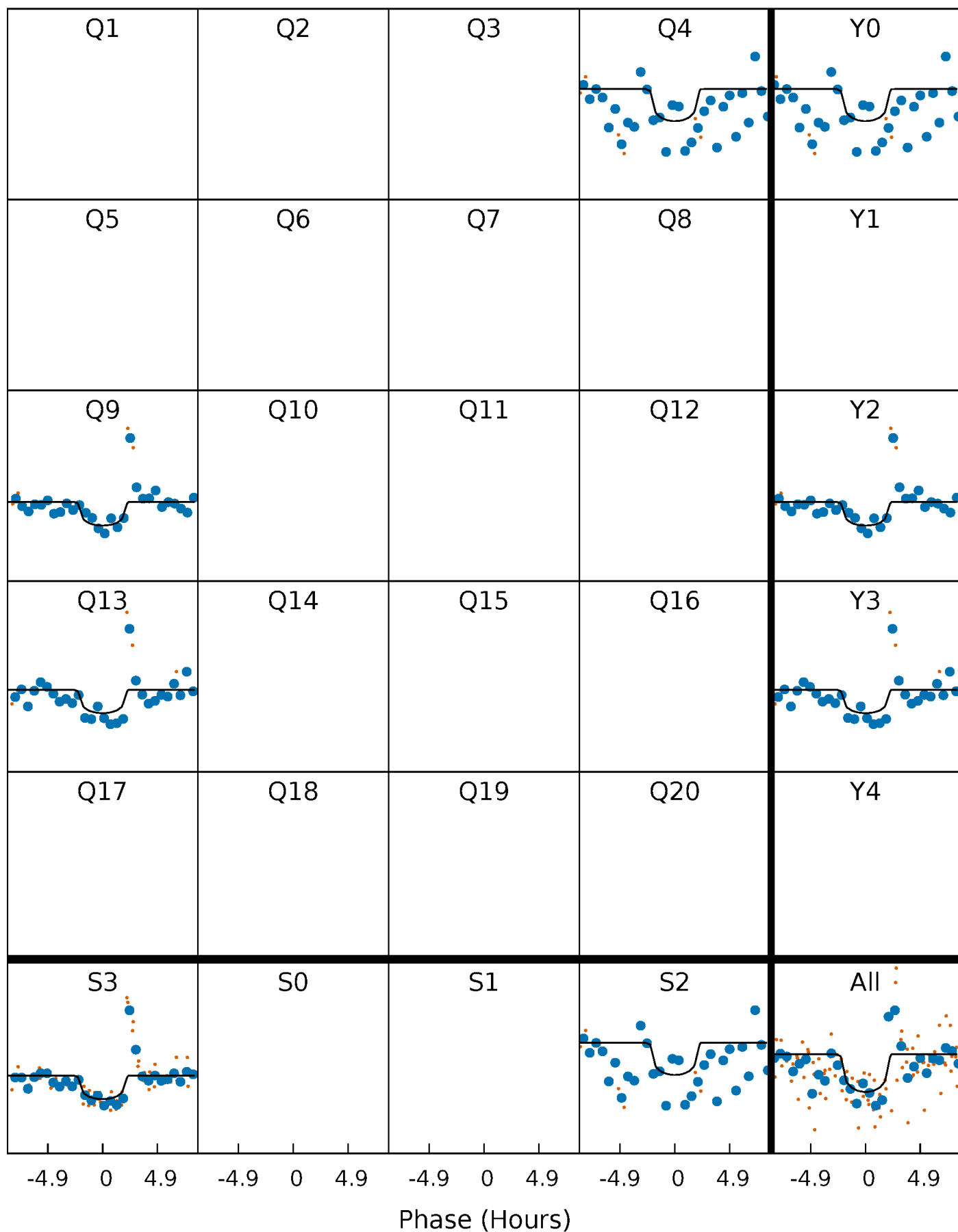
PDC Quarter-Phased Transit Curves

TCE 008776850-03 $P=413.457749$ Days $T_0=439.367404$ (BKJD)



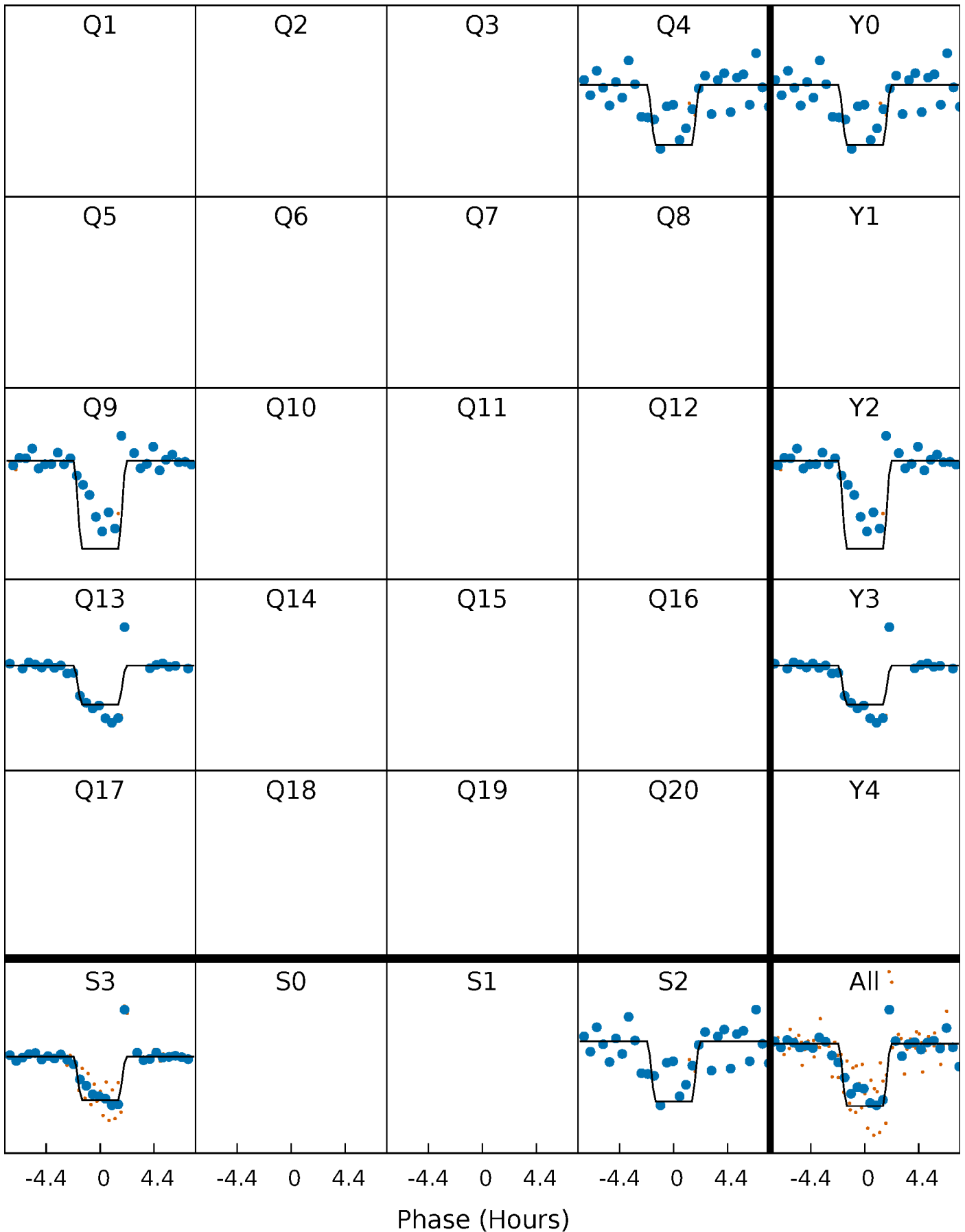
DV Quarter-Phased Transit Curves

TCE 008776850-03 $P=413.457749$ Days $T_0=439.367404$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

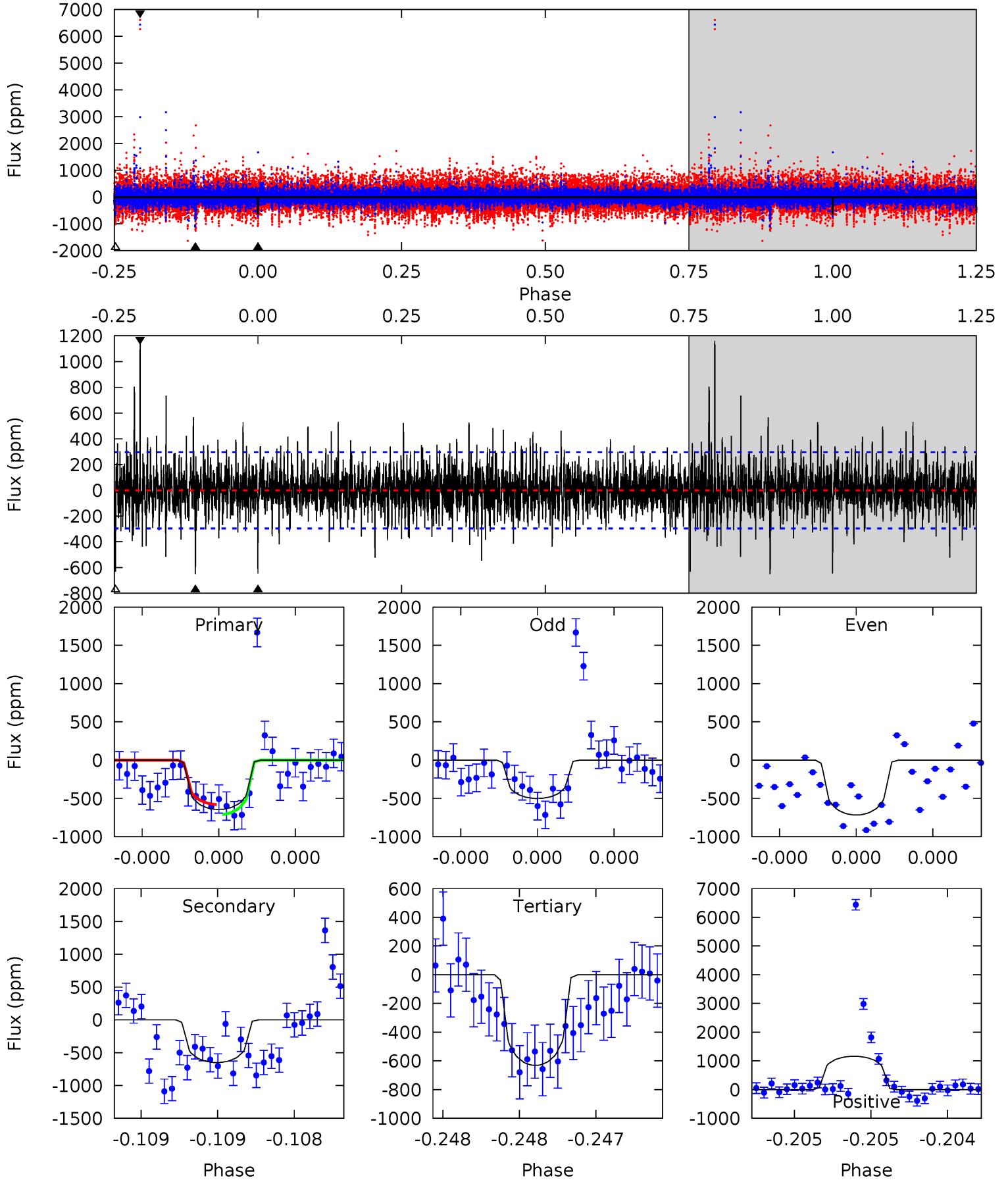
TCE 008776850-03 P=413.445842 Days $T_0=439.390816$ (BKJD)



DV Model-Shift Uniqueness Test

008776850-03, P = 413.457749 Days, E = 25.909655 Days

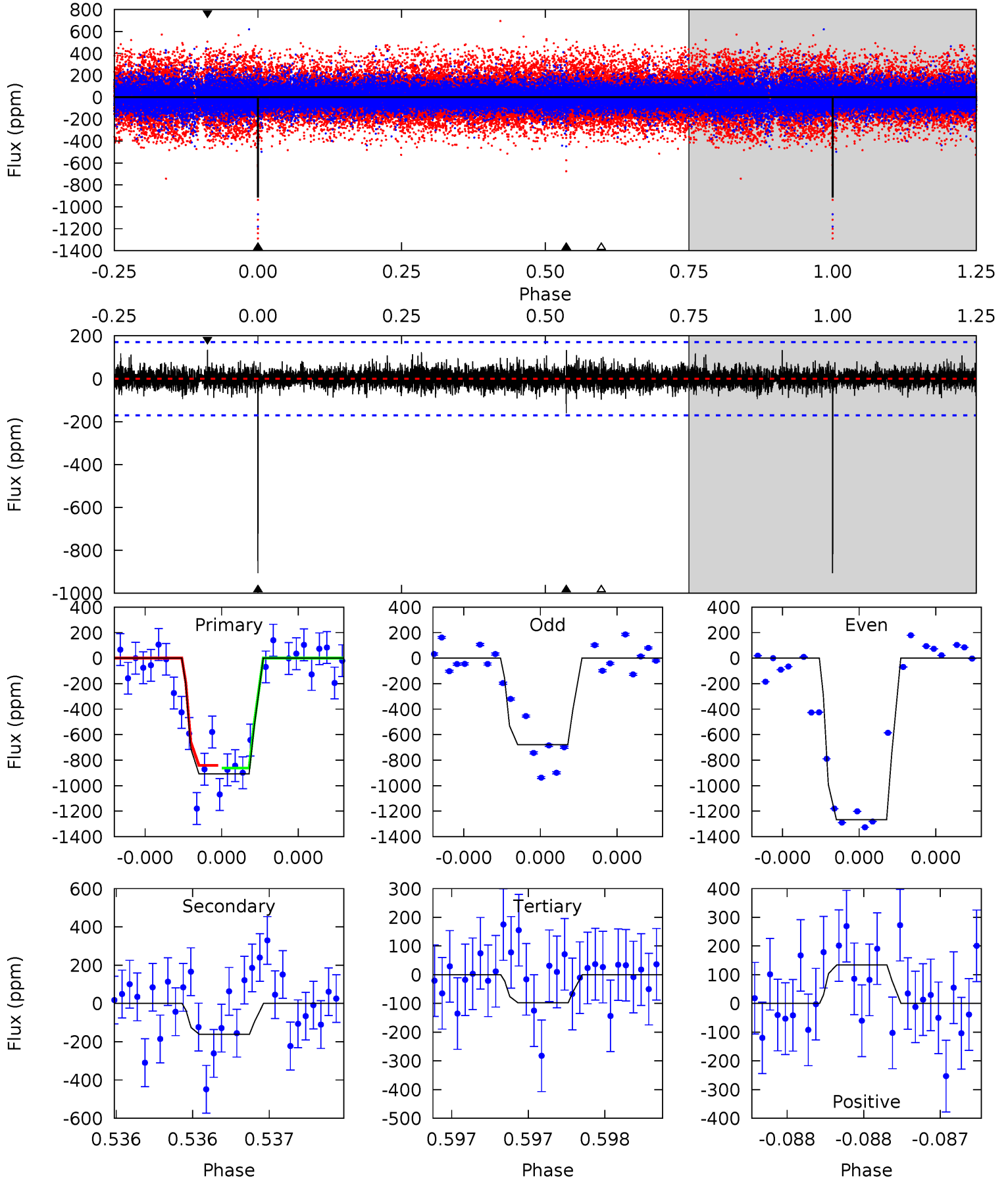
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.1	12.2	11.9	21.8	5.58	3.49	2.39	0.25	-9.70	0.36	-9.59	1.56	0.91	0.64	1.25



Alt Model-Shift Uniqueness Test

008776850-03, $P = 413.445842$ Days, $E = 25.944974$ Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
29.8	5.29	3.21	4.40	5.60	3.53	0.79	26.6	25.4	2.08	0.89	10.1	1.28	0.13	0.35



Stellar Parameters For KIC 008776850

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5238^{+157}_{-173}	$3.369^{+0.469}_{-0.201}$	$-0.200^{+0.300}_{-0.300}$	$4.419^{+1.223}_{-2.271}$	$1.666^{+0.231}_{-0.740}$	$0.027^{+0.123}_{-0.014}$
	+3%/-3%	+14%/-6%	+150%/-150%	+28%/-51%	+14%/-44%	+454%/-51%
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 008776850-03 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-650 ± 53	$11.95^{+10.36}_{-7.28}$	595^{+48}_{-78}	5076^{+2958}_{-1014}	4055^{+22497}_{-2872}
Alt.	-161 ± 30	$15.96^{+12.00}_{-9.78}$	593^{+54}_{-86}	3537^{+1300}_{-514}	557^{+2899}_{-381}

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 $A_{obs} \gg 1.0$

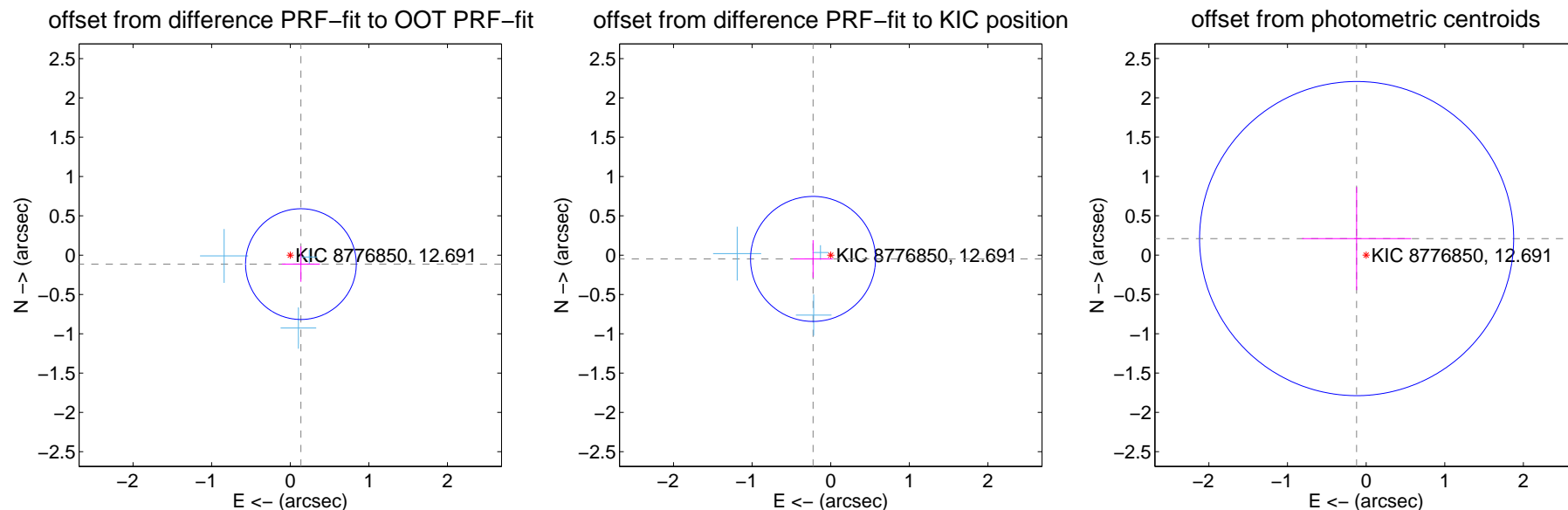
DV Centroid Data

Supplemental centroid analysis for 008776850-03. Kepler magnitude: 12.69. Transit SNR 5.98

There are 3 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.38 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.177 ± 0.235	0.75	-0.136 ± 0.241	-0.114 ± 0.225
PRF-fit source offset from KIC position	0.230 ± 0.265	0.87	0.225 ± 0.251	-0.048 ± 0.240
photometric centroid source offset	0.24 ± 0.67	0.36	0.12 ± 0.69	0.21 ± 0.66



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.

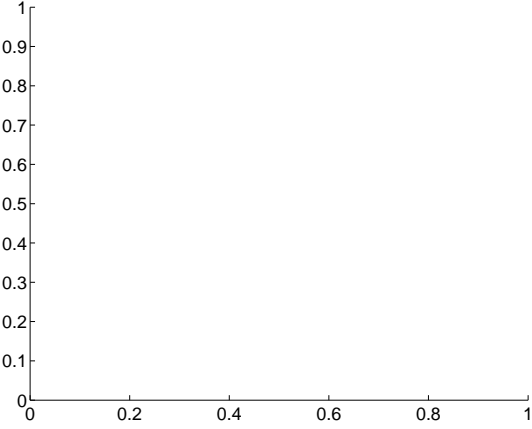
Q1 no difference image



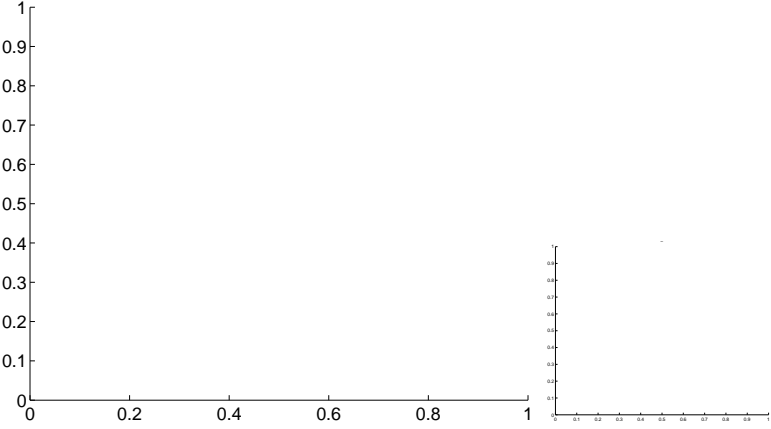
Q1 no OOT image



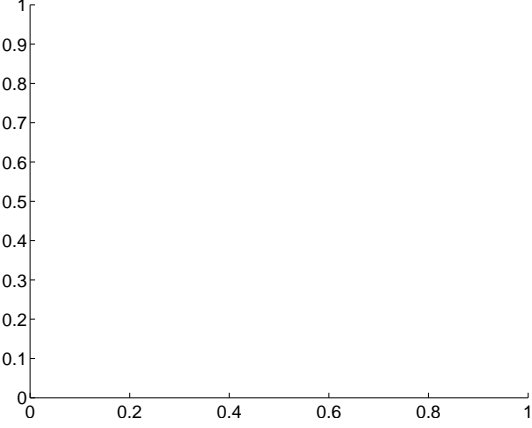
Q2 no difference image



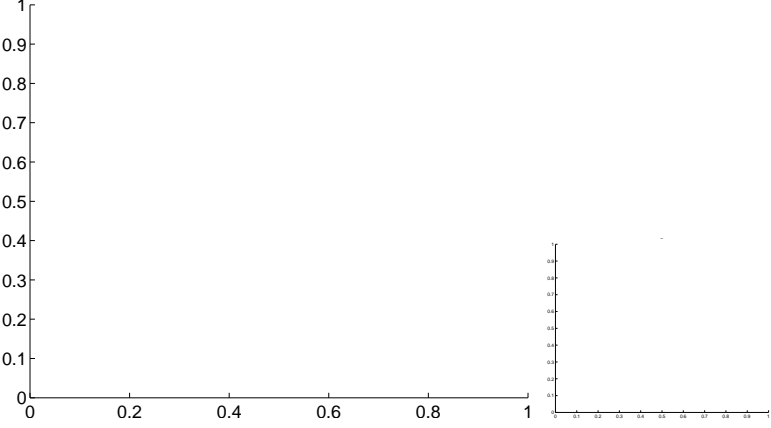
Q2 no OOT image



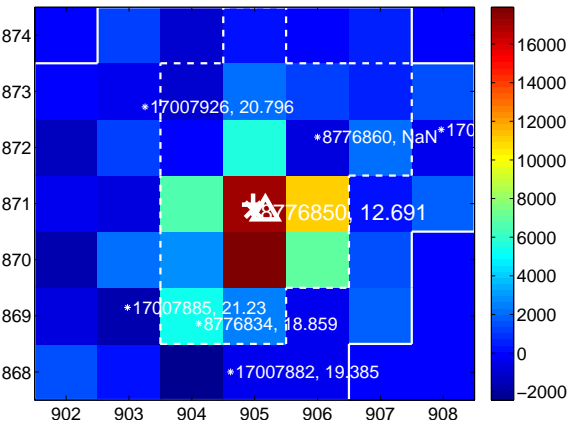
Q3 no difference image



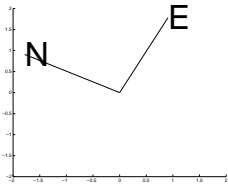
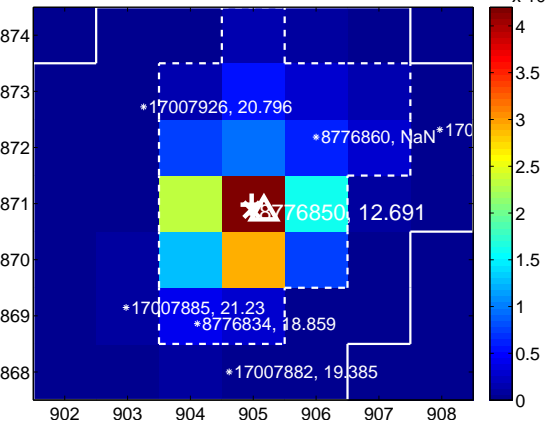
Q3 no OOT image



Q4 difference image



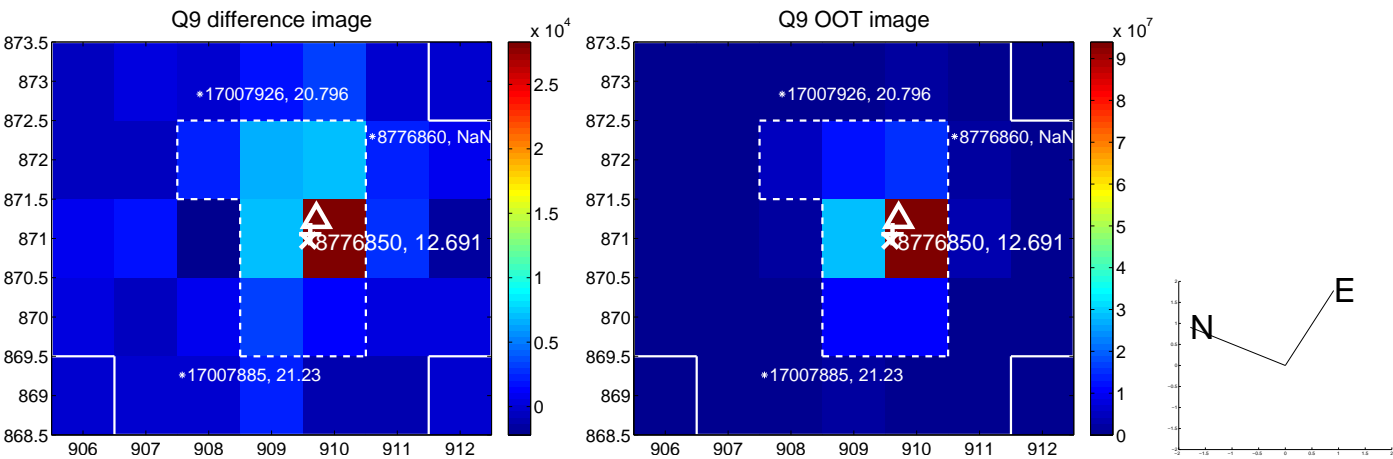
Q4 OOT image



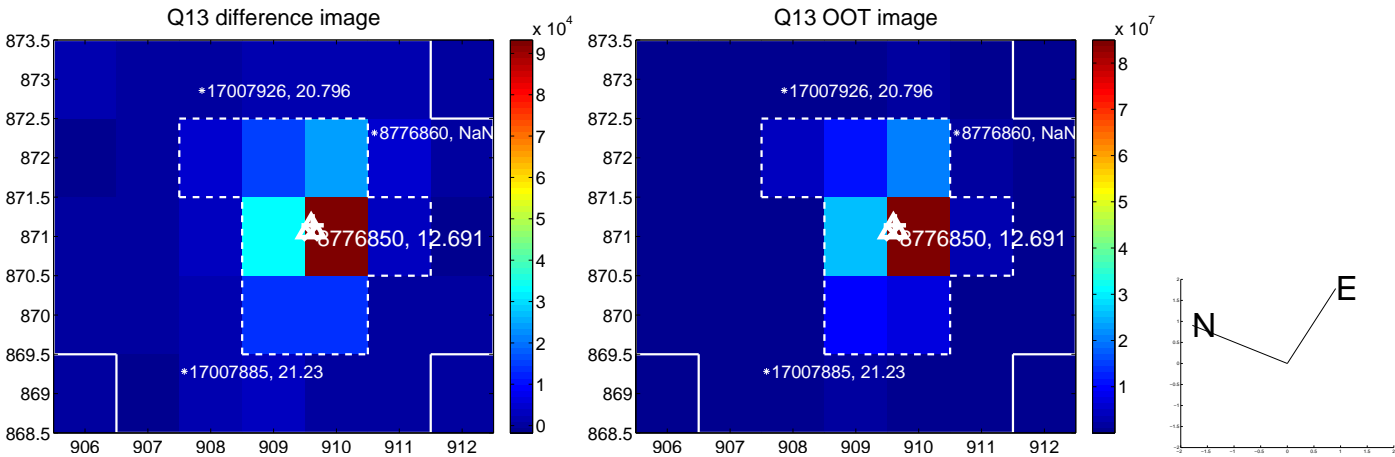
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



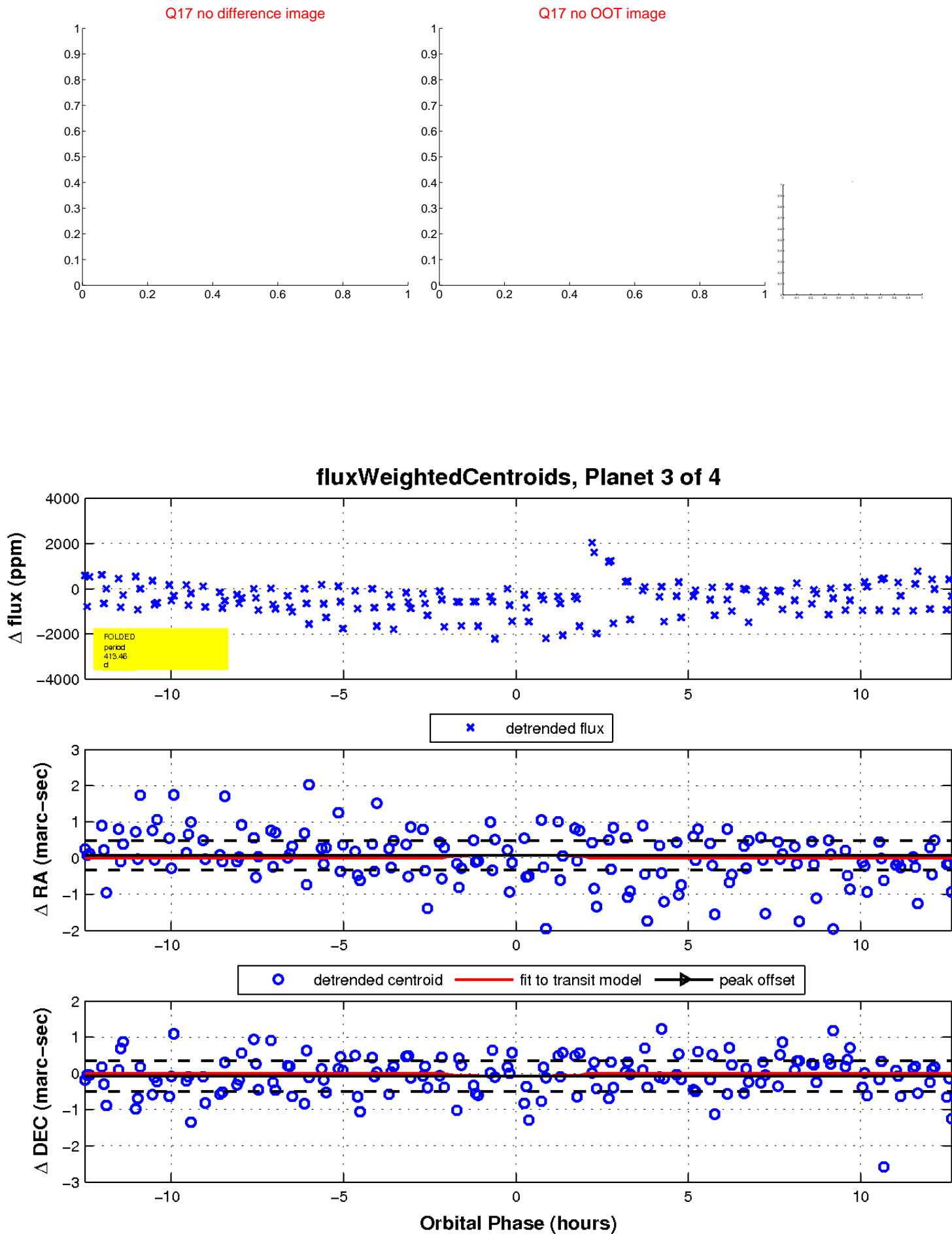
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



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

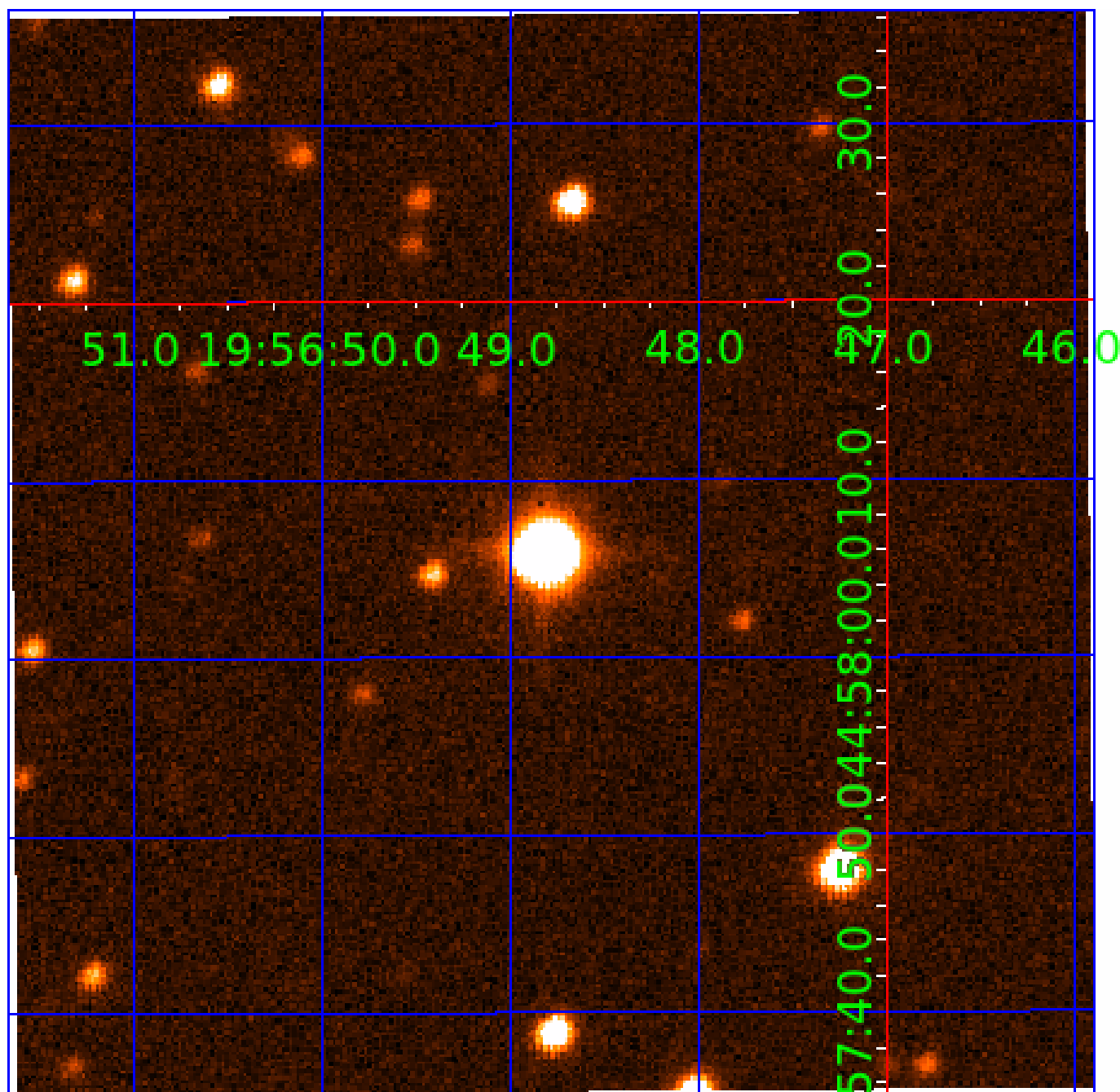


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 008776850

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})
008776850-01	OBS	No	453.520251	326.187617	188.3	2.426	14.4	2.0	4.42	5238	6.45	7.02
008776850-02	OBS	No	534.211315	152.509275	104.6	3.995	11.3	1.4	4.42	5238	5.45	5.64
008776850-03	OBS	No	413.457749	439.367404	537.5	4.265	12.7	6.0	4.42	5238	11.17	7.94
008776850-04	OBS	No	505.304021	555.628664	817.8	4.402	12.0	7.4	4.42	5238	12.36	6.08

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008776850-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
008776850-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
008776850-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—CENT_KIC_POS—HALO_GHOST
008776850-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—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.

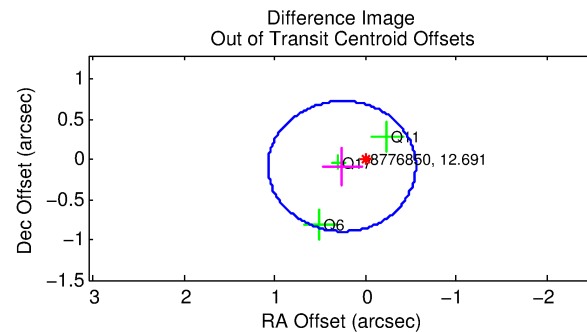
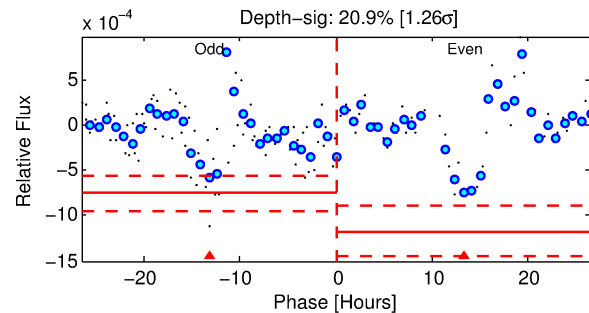
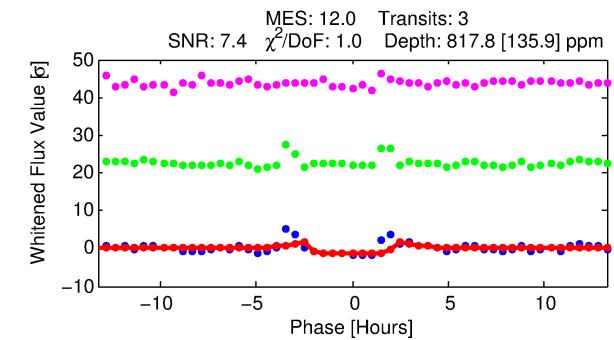
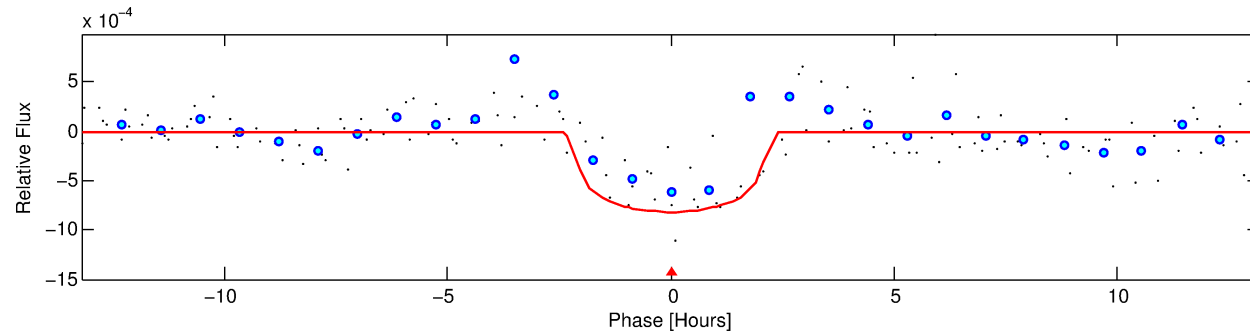
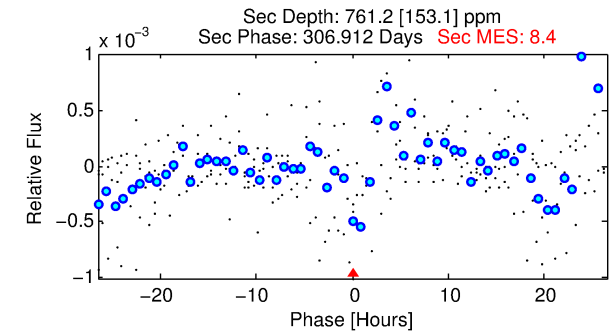
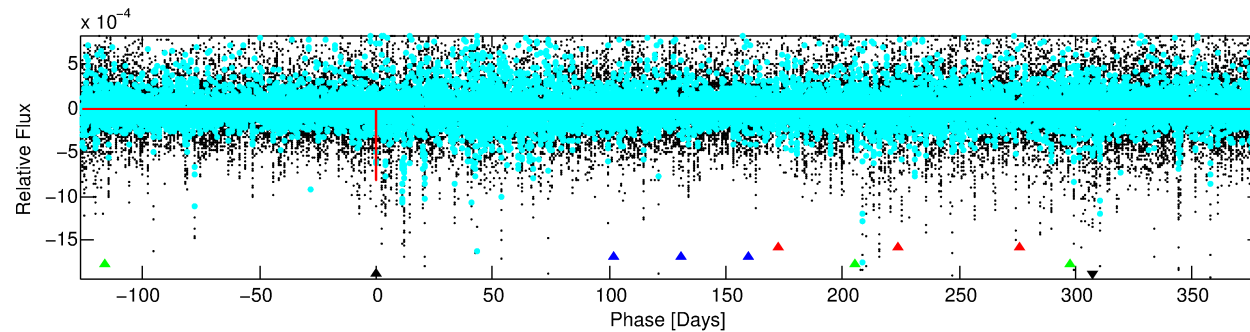
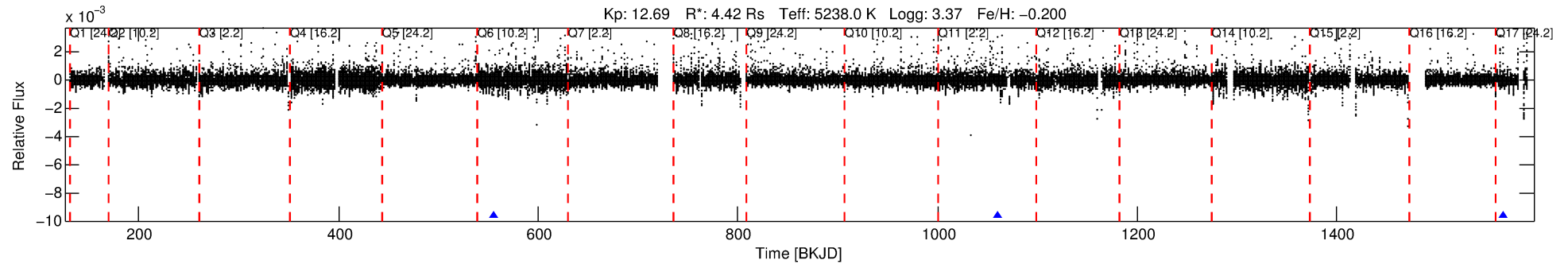
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 008776850-04

No Significant Match Found

DV One-Page Summary

KIC: 8776850 Candidate: 4 of 4 Period: 505.304 d



DV Fit Results:

Period = 505.30402 [0.00424] d
Epoch = 555.6287 [0.0068] BKJD
Rp/R* = 0.0256 [0.0467]
a/R* = 899.31 [6272.49]
b = 0.00 [6439.87]
Seff = 6.08 [4.91]
Teq = 400 [81] K
Rp = 12.36 [23.40] Re
a = 1.4721 [0.7316] AU
Ag = 5938.19 [22176.72] [0.27 σ]
Teffp = 5434 [4960] K [1.01 σ]

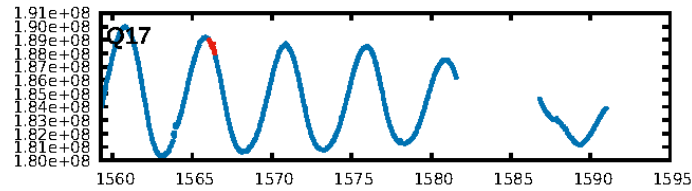
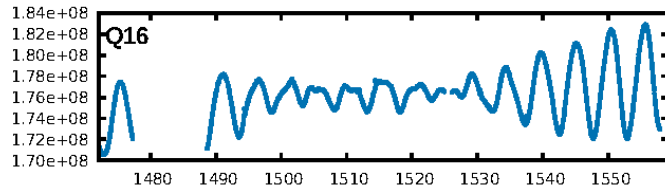
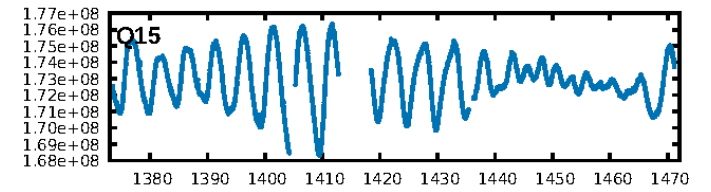
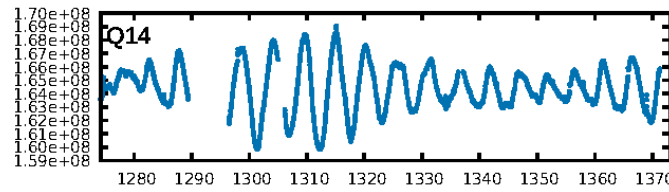
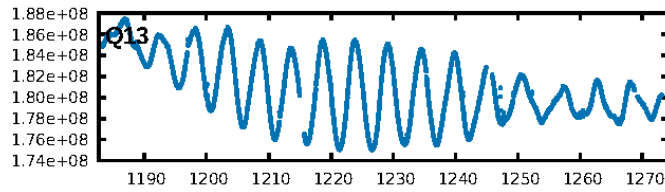
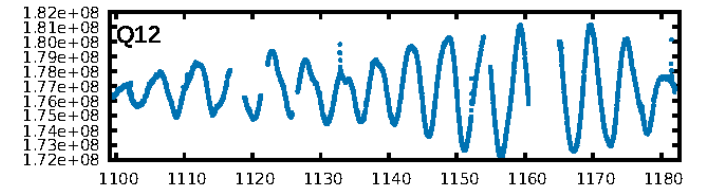
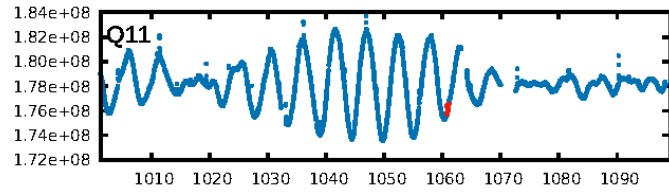
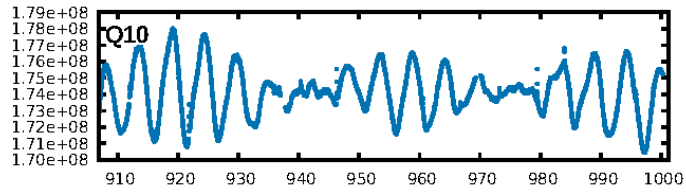
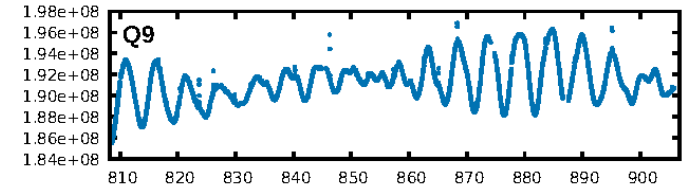
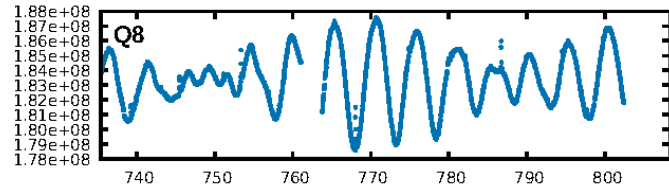
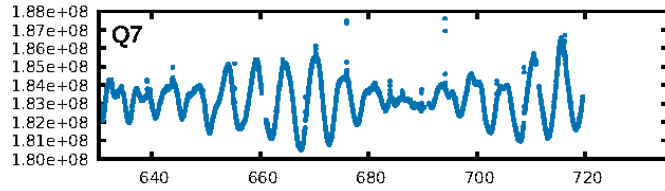
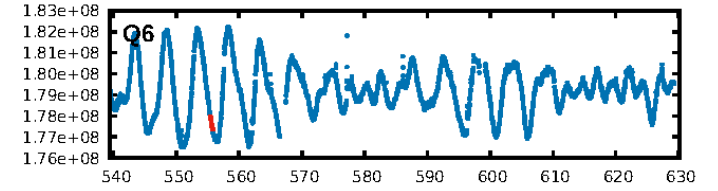
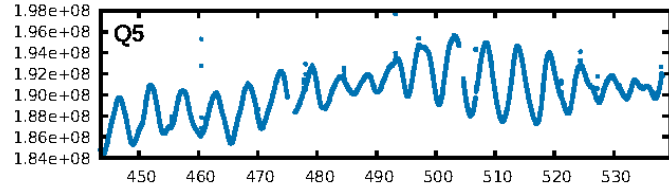
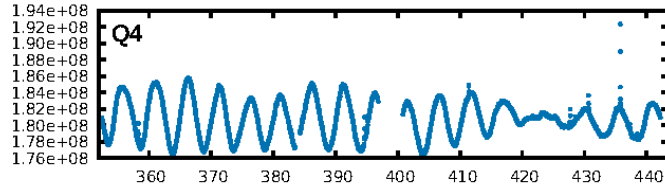
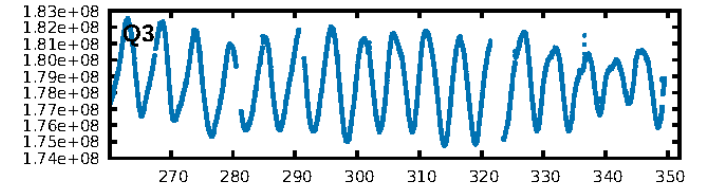
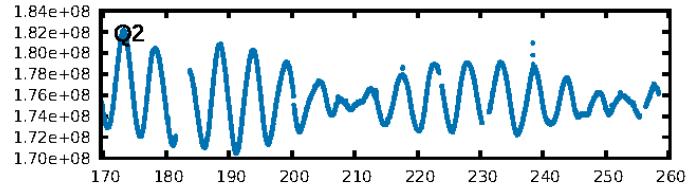
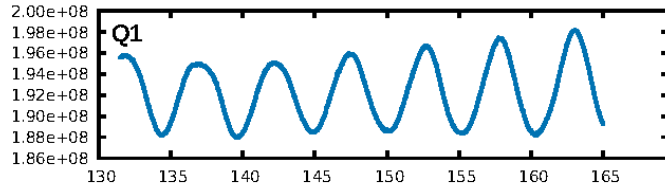
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [247.24 σ]
LongPeriod-sig: 100.0% [116.69 σ]
ModelChiSquare2-sig: 2.3%
ModelChiSquareGof-sig: 93.1%
Bootstrap-pfa: 1.35e-09
RollingBand-fgt: 1.00 [2/2]
GhostDiagnostic-chr: 0.4916
Centroid-sig: 45.0%
Centroid-so: 0.555 arcsec [1.06 σ]
OotOffset-rm: 0.270 arcsec [1.00 σ]
OotOffset-st: 1/1/0/1 [3]
KicOffset-rm: 0.629 arcsec [2.92 σ]
KicOffset-st: 1/1/0/1 [3]
DiffImageQuality-fgm: 0.67 [2/3]
DiffImageOverlap-fno: 1.00 [3/3]

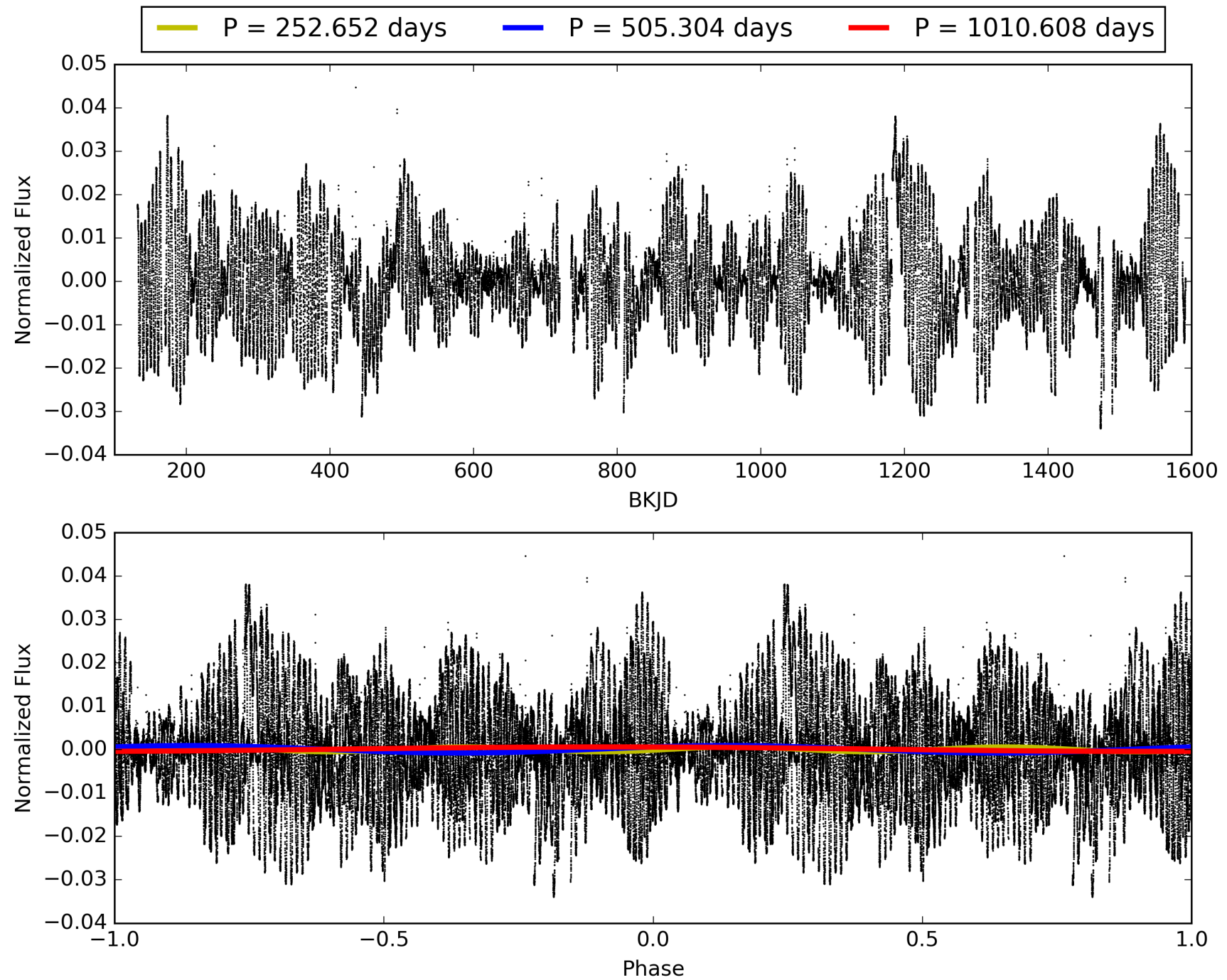
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 23:00:21 Z

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

TCE 008776850-04, PDC Light Curves

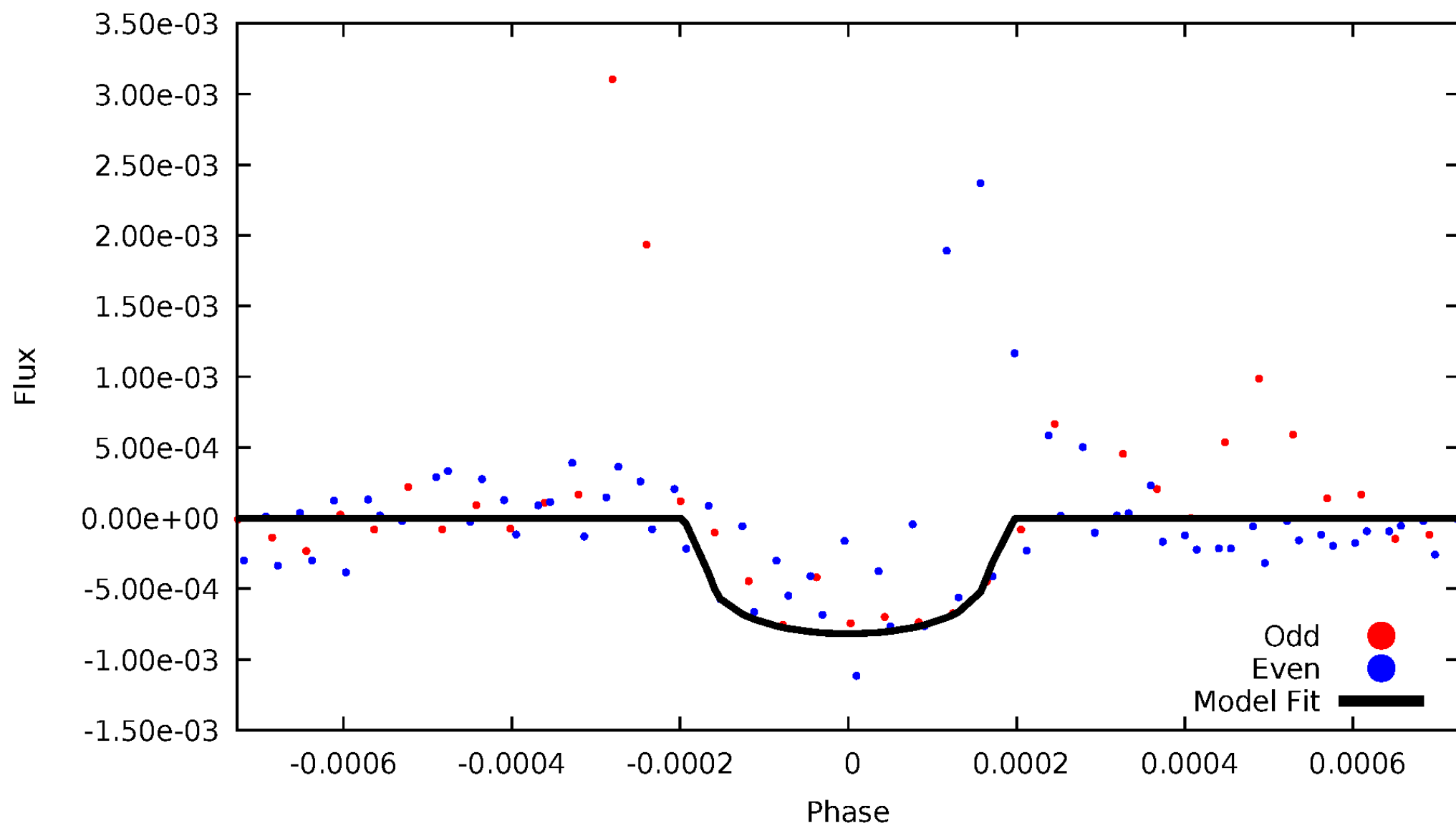


TCE 008776850-04



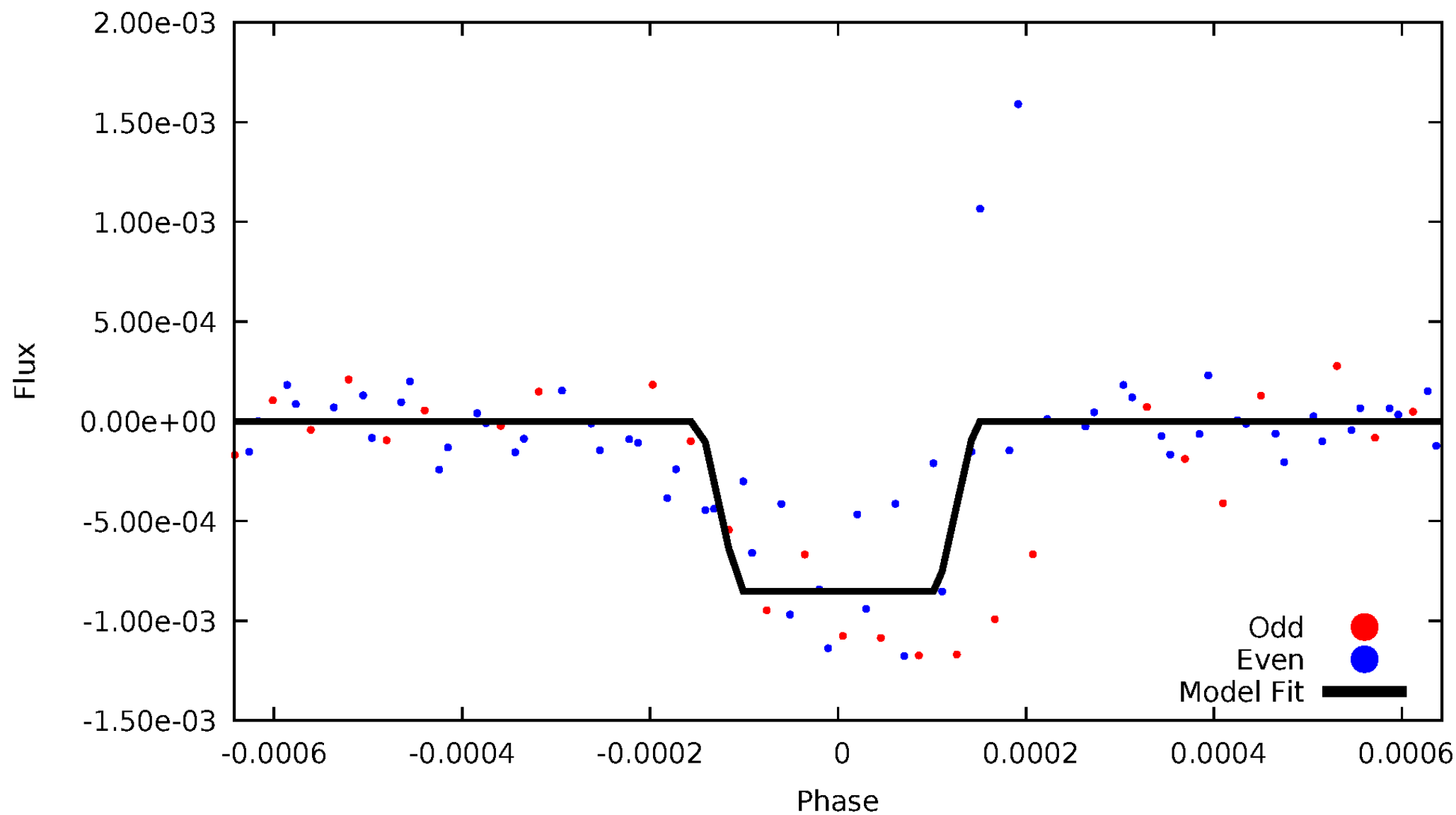
DV Odd/Even

TCE 008776850-04



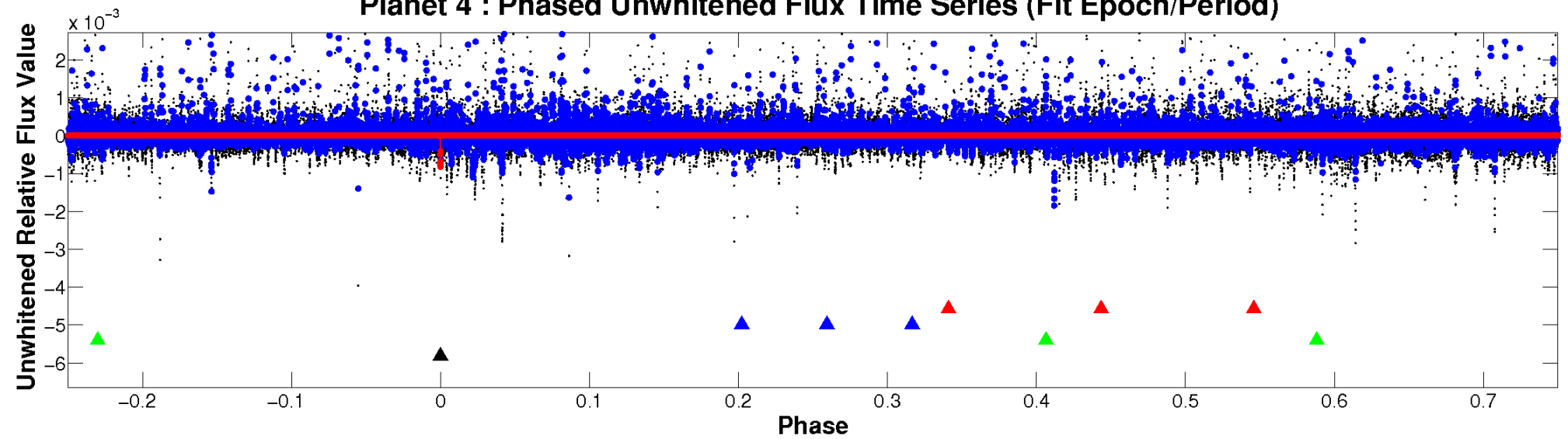
ALT Odd/Even

TCE 008776850-04

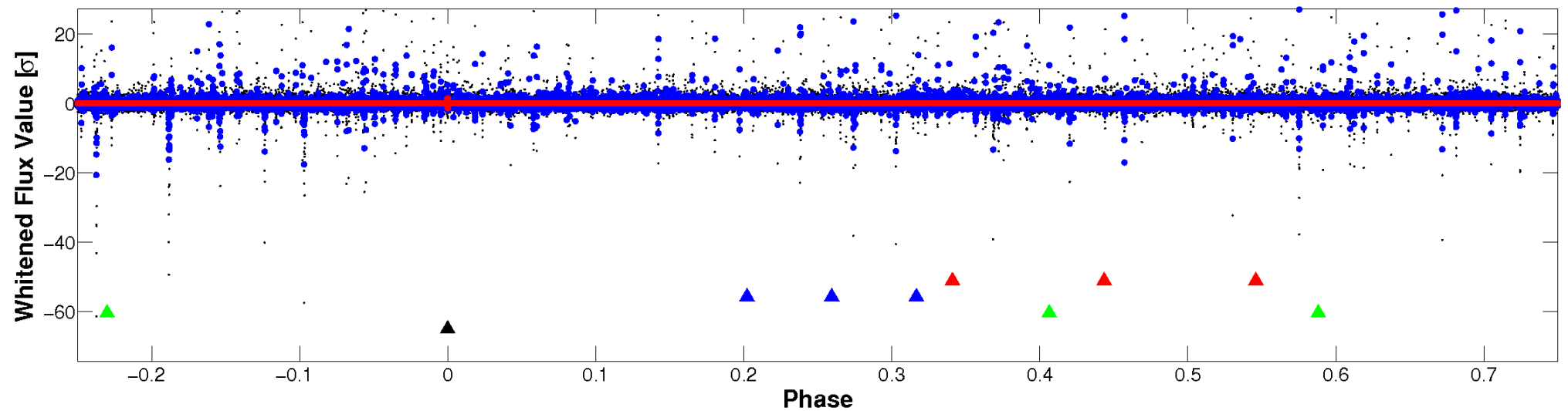


Non-Whitened Vs. Whitened Light Curve

Planet 4 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

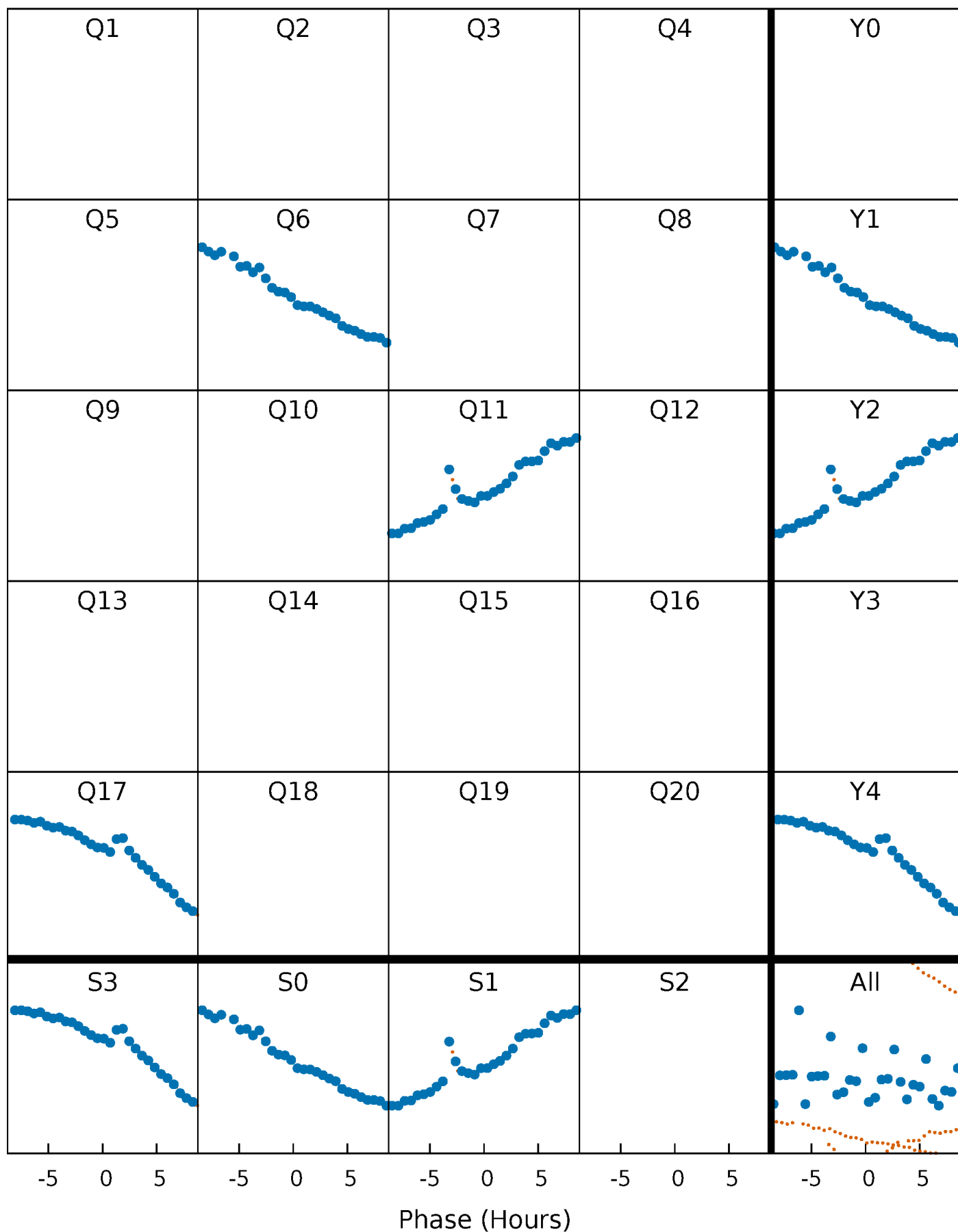


Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



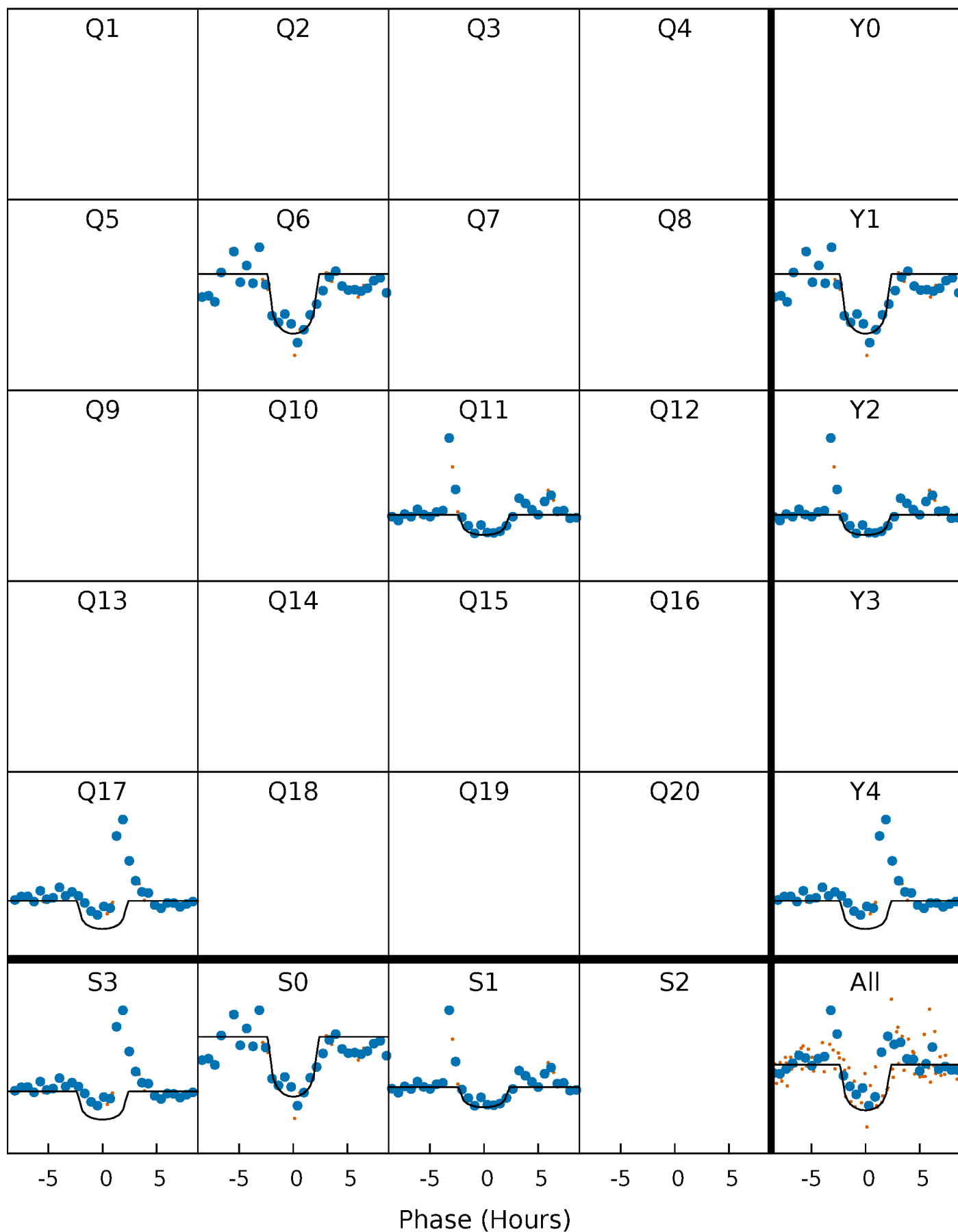
PDC Quarter-Phased Transit Curves

TCE 008776850-04 P=505.304021 Days $T_0=555.628664$ (BKJD)



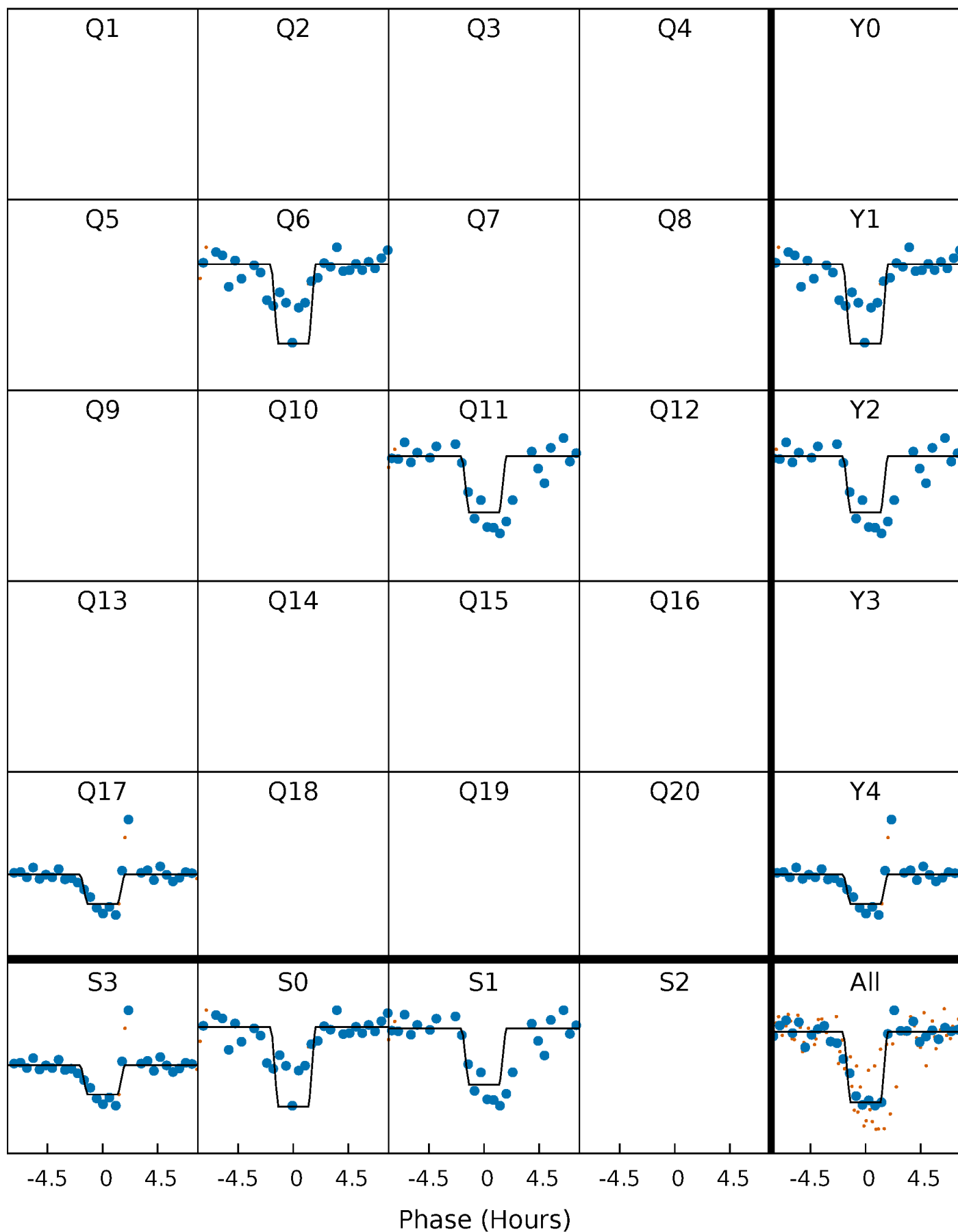
DV Quarter-Phased Transit Curves

TCE 008776850-04 P=505.304021 Days $T_0=555.628664$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

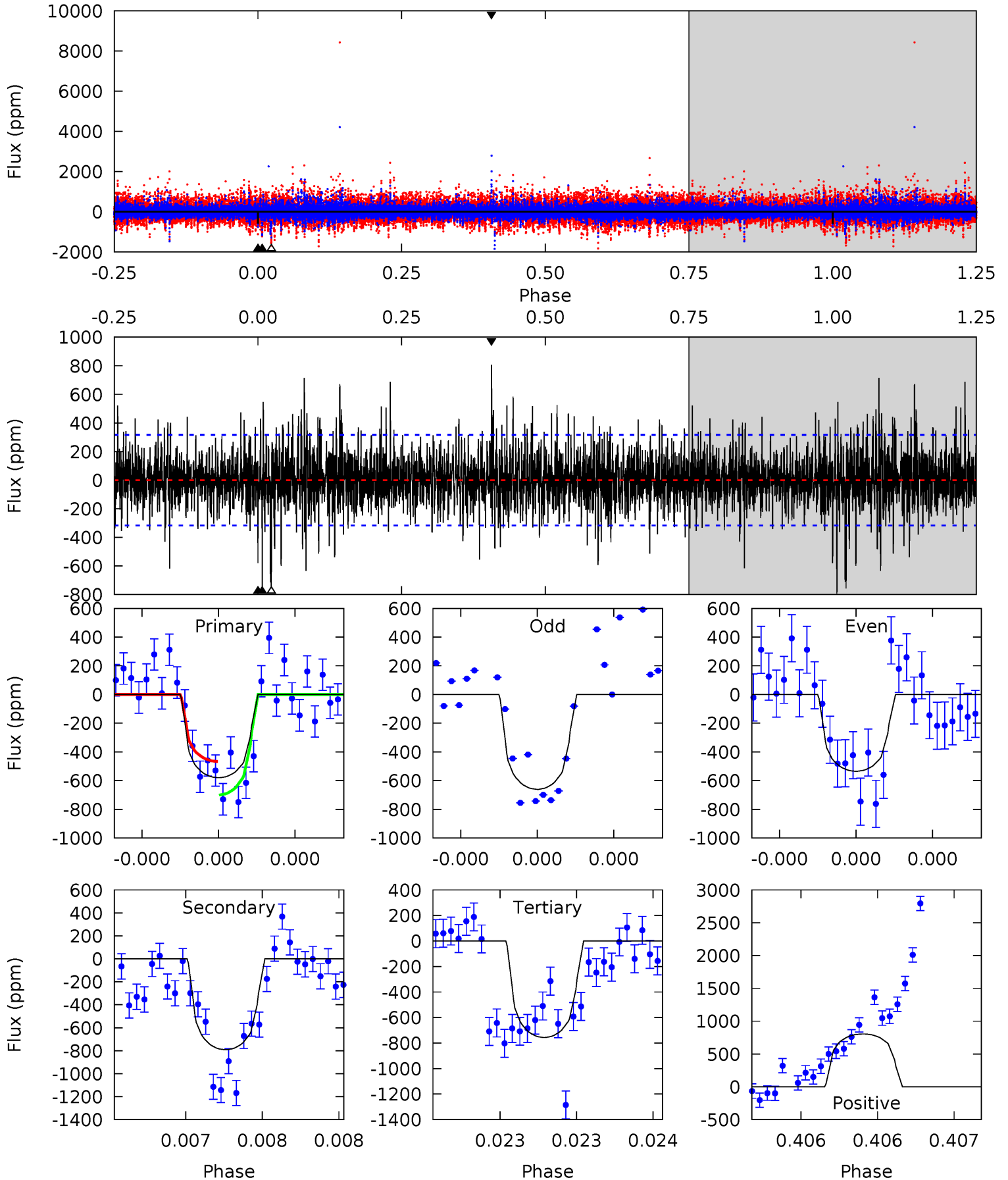
TCE 008776850-04 P=505.287883 Days $T_0=555.643629$ (BKJD)



DV Model-Shift Uniqueness Test

008776850-04, P = 505.304021 Days, E = 50.324643 Days

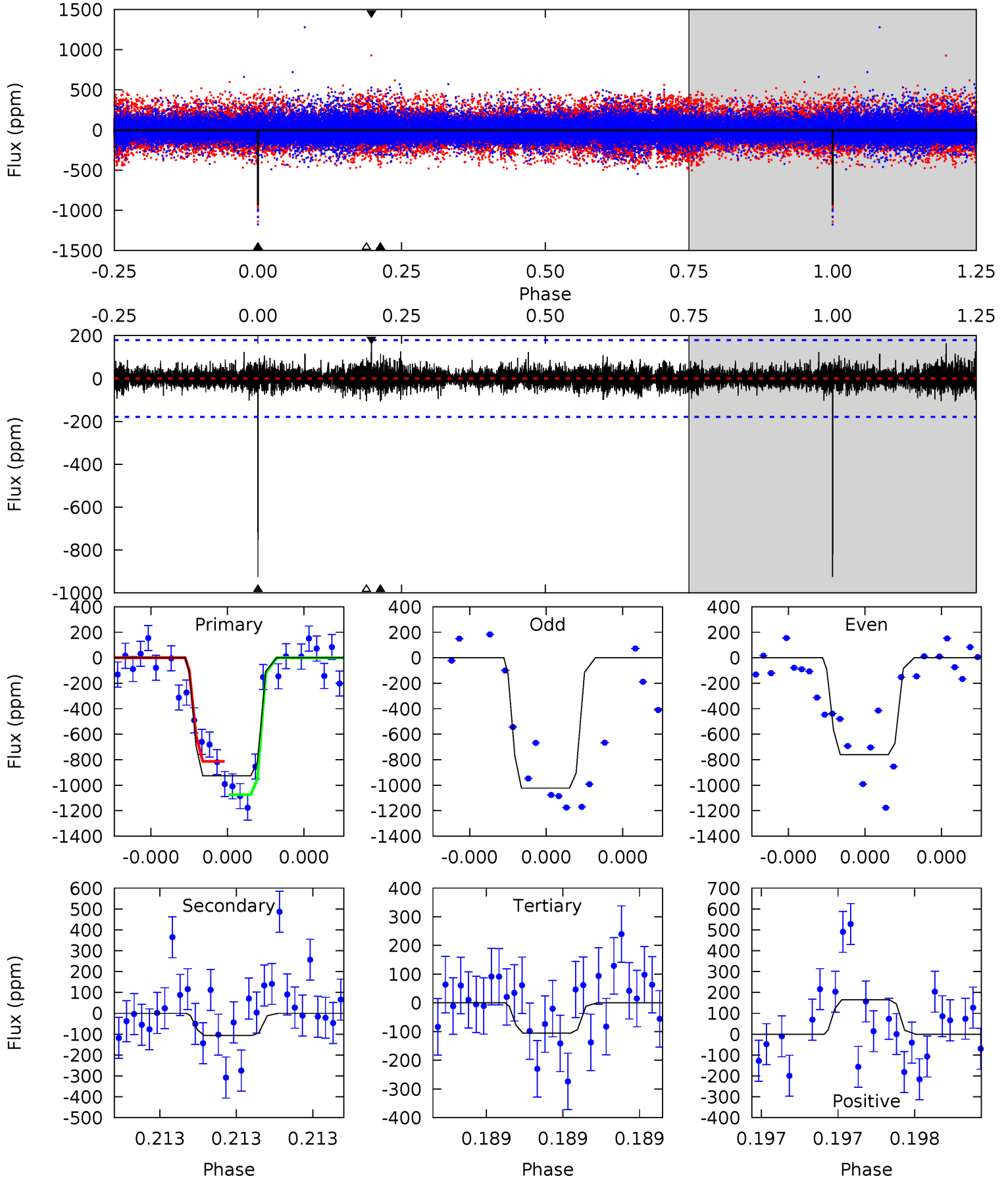
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.3	14.0	13.4	14.3	5.61	3.54	2.38	-3.13	-4.00	0.61	-0.26	0.79	0.59	0.50	2.07



Alt Model-Shift Uniqueness Test

008776850-04, P = 505.287883 Days, E = 50.355746 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
29.3	3.37	3.33	5.20	5.67	3.63	0.77	26.0	24.1	0.04	-1.83	4.41	0.83	0.15	4.10



Stellar Parameters For KIC 008776850

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5238^{+157}_{-173}	$3.369^{+0.469}_{-0.201}$	$-0.200^{+0.300}_{-0.300}$	$4.419^{+1.223}_{-2.271}$	$1.666^{+0.231}_{-0.740}$	$0.027^{+0.123}_{-0.014}$
	+3%/-3%	+14%/-6%	+150%/-150%	+28%/-51%	+14%/-44%	+454%/-51%
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 008776850-04 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-791 ± 56	$18.39^{+20.15}_{-12.80}$	551^{+57}_{-70}	4455^{+3234}_{-926}	2583^{+25903}_{-1950}
Alt.	-106 ± 32	$18.90^{+20.94}_{-12.67}$	553^{+51}_{-73}	3110^{+1267}_{-506}	319^{+2581}_{-242}

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 $A_{obs} \gg 1.0$

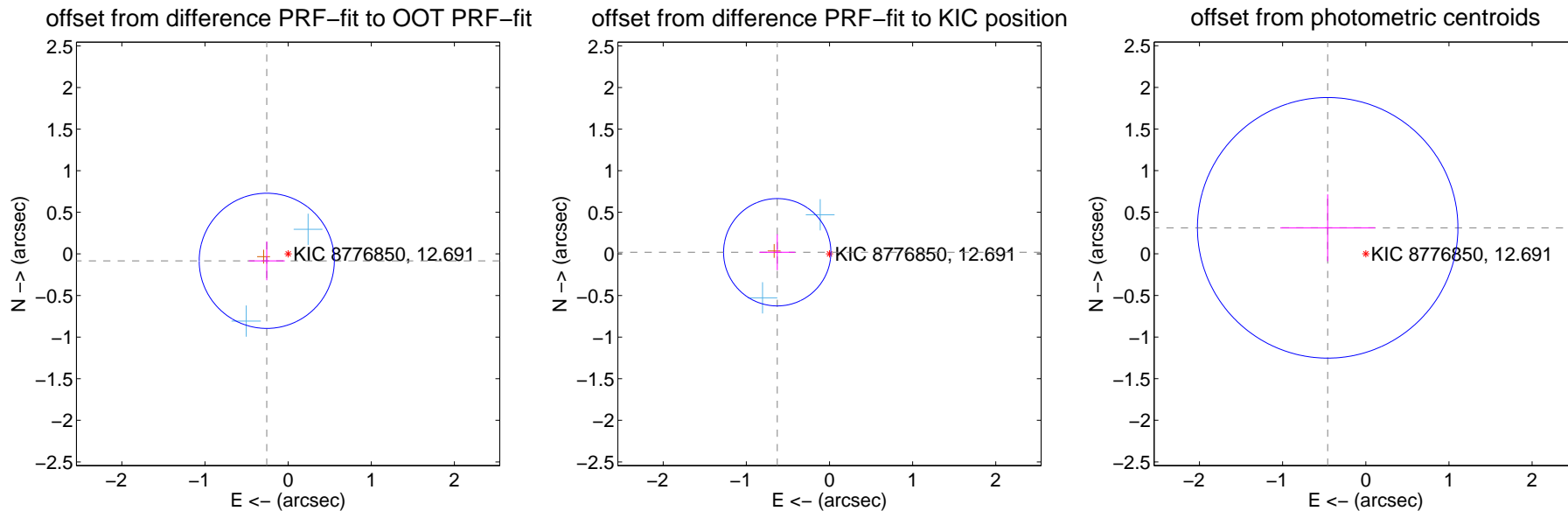
DV Centroid Data

Supplemental centroid analysis for 008776850-04. Kepler magnitude: 12.69. Transit SNR 7.36

There are 2 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.38 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.270 ± 0.271	1.00	0.257 ± 0.216	-0.083 ± 0.233
PRF-fit source offset from KIC position	0.629 ± 0.215	2.92	0.628 ± 0.215	0.020 ± 0.216
photometric centroid source offset	0.55 ± 0.52	1.06	0.46 ± 0.57	0.31 ± 0.40

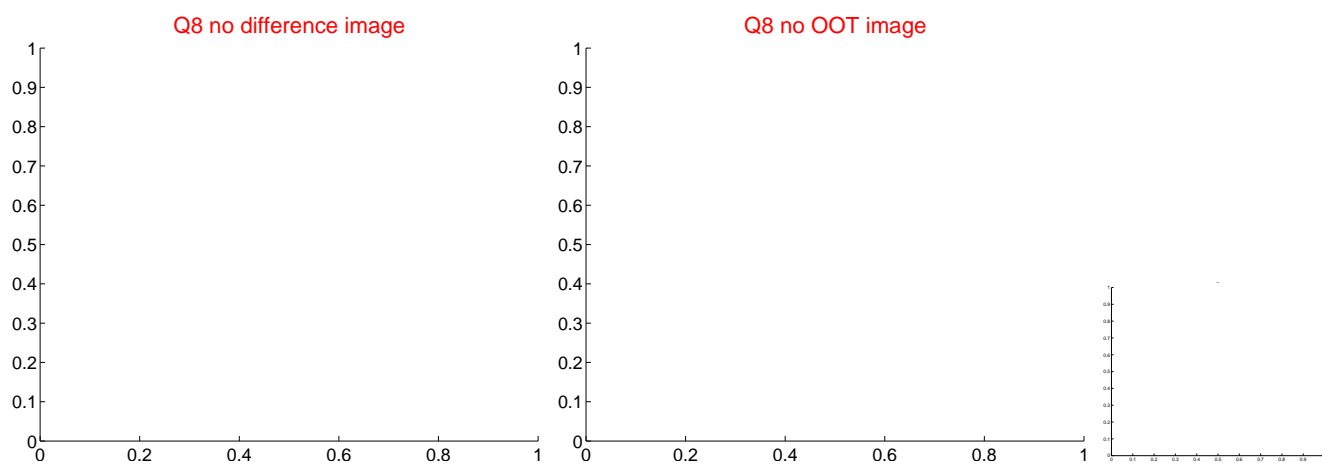
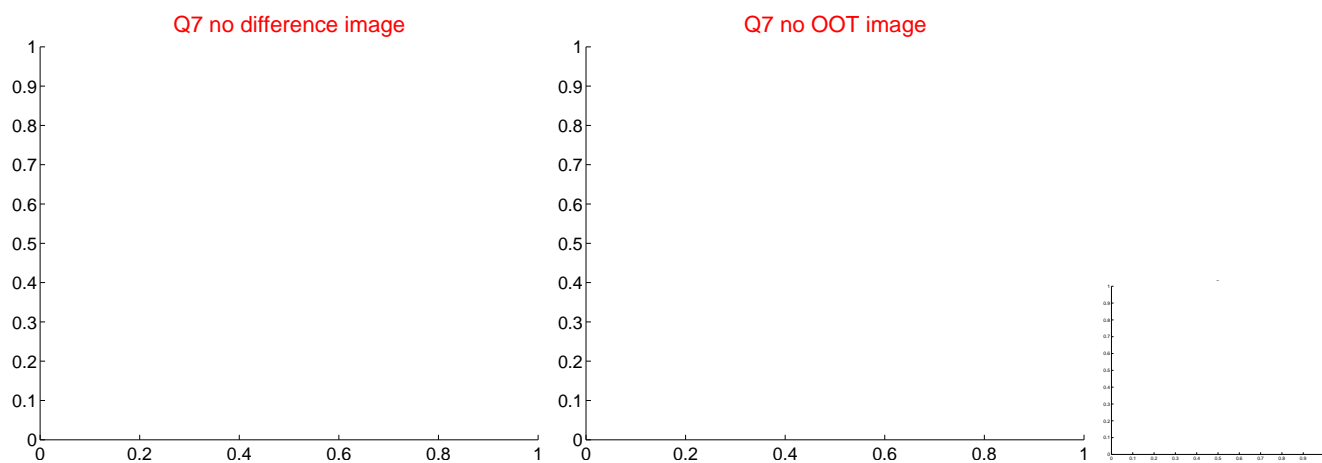
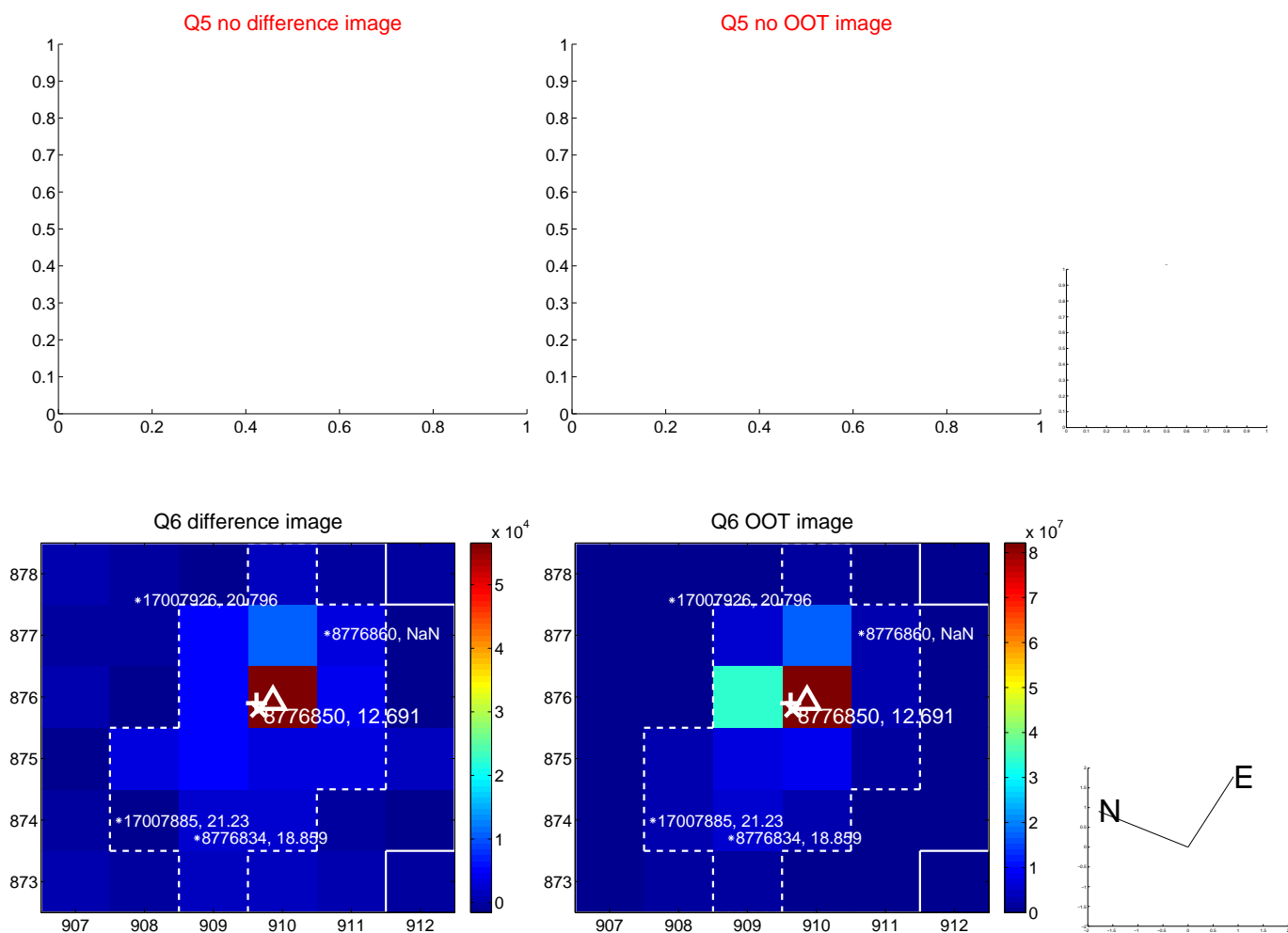


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

Q9 no difference image



Q9 no OOT image



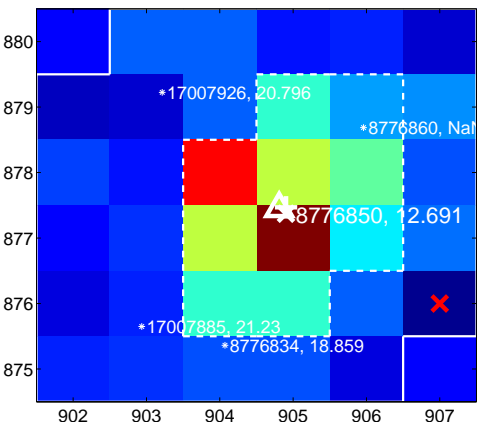
Q10 no difference image



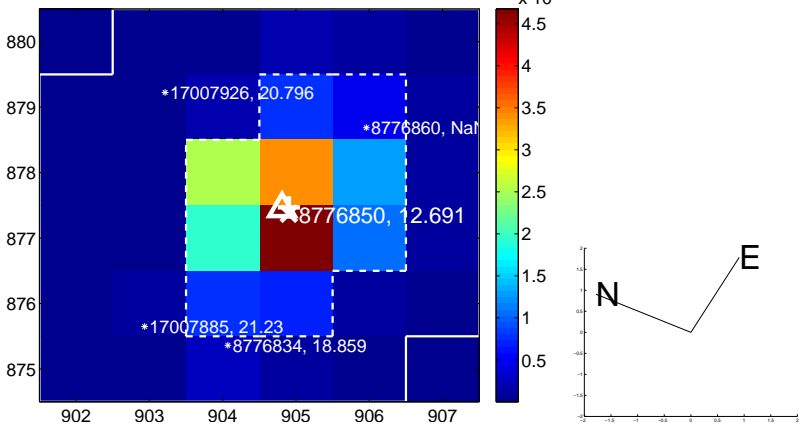
Q10 no OOT image



Q11 difference image



Q11 OOT image



Q12 no difference image



Q12 no OOT image



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



UKIRT Image

Declination

