

KIC 009401856

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})
009401856-01	OBS	No	690.871313	197.038265	6.4	4.611	17.8	0.0	0.97	5780	0.29	0.43
009401856-02	OBS	No	431.681890	481.132258	914.6	4.432	17.0	5.0	0.97	5780	2.90	0.80
009401856-03	OBS	No	381.839745	424.199217	705.2	5.613	15.4	3.6	0.97	5780	2.60	0.94
009401856-04	OBS	No	408.839111	506.646694	1233.9	3.342	13.7	7.3	0.97	5780	3.80	0.86
009401856-05	OBS	No	600.085979	178.603538	307.3	7.500	14.8	-1.0	0.97	5780	1.68	0.52

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009401856-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_SKYE_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009401856-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
009401856-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009401856-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009401856-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_NOFITS

Notes: OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.

N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

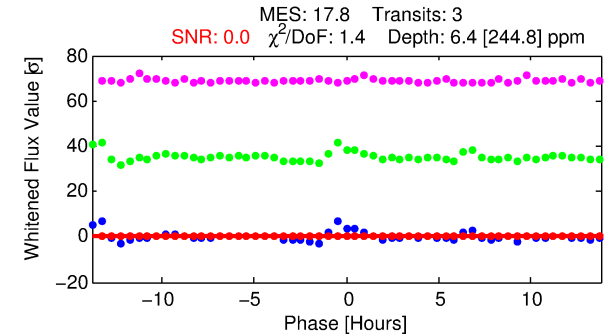
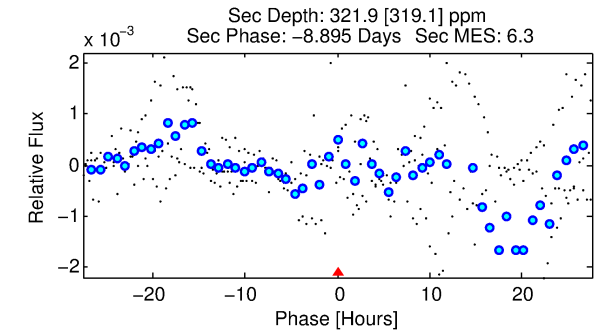
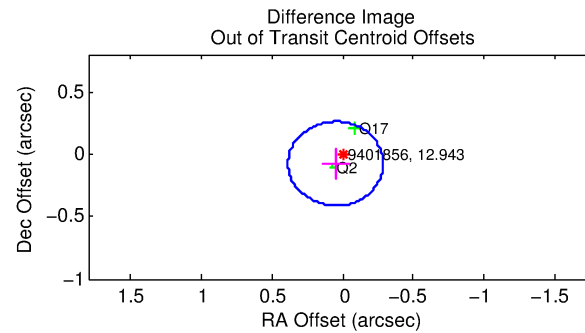
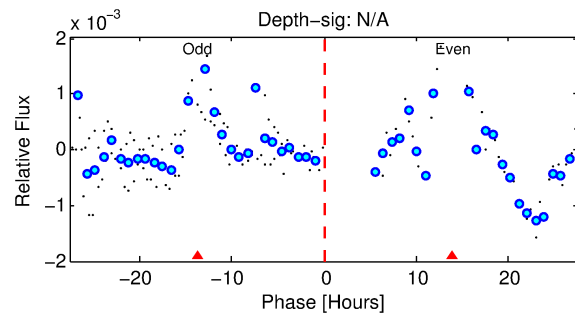
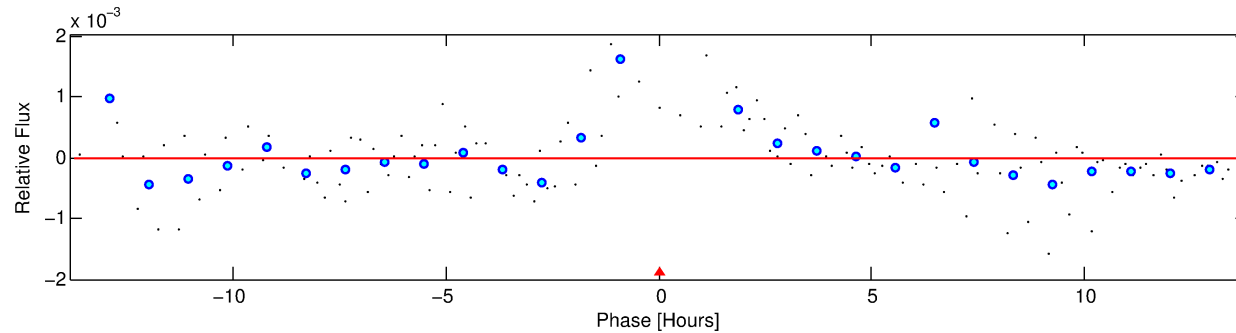
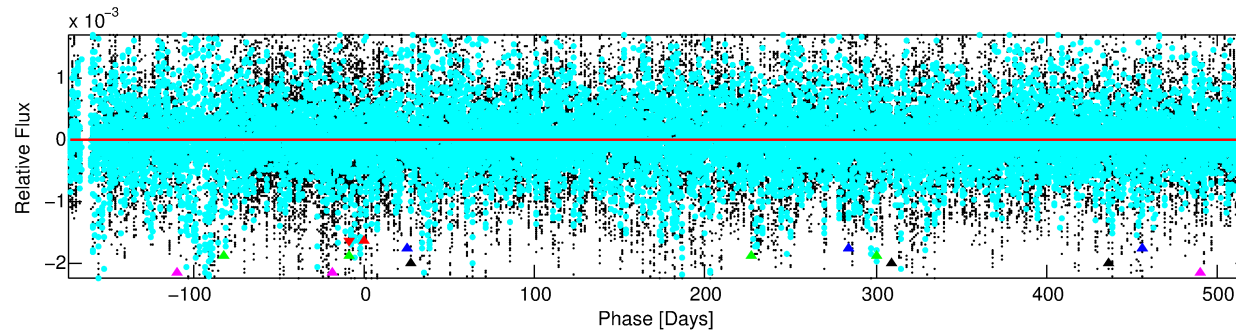
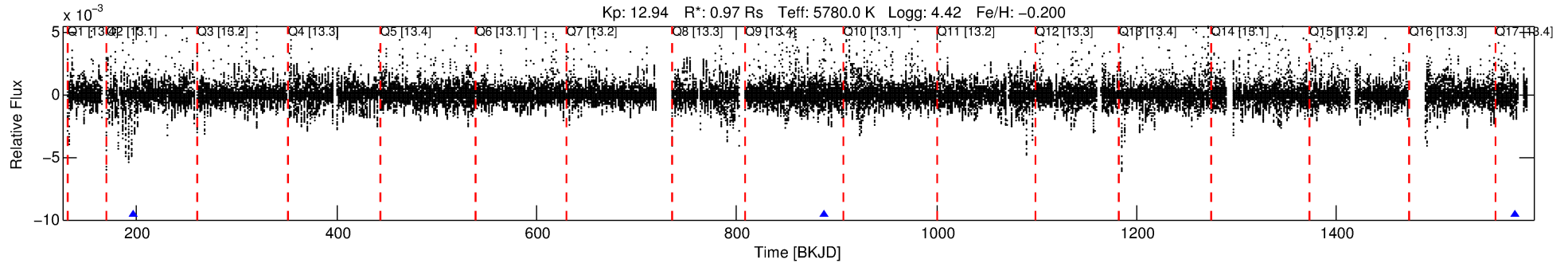
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009401856-01

No Significant Match Found

DV One-Page Summary

KIC: 9401856 Candidate: 1 of 5 Period: 690.871 d



DV Fit Results:

Period = 690.87131 [0.65695] d
Epoch = 197.0383 [0.9490] BKJD
Rp/R* = 0.0027 [0.0917]
a/R* = 514.04 [61885.36]
b = 0.90 [27.41]
Seff = 0.43 [0.15]
Teq = 206 [18] K
Rp = 0.29 [9.66] Re
a = 1.4755 [0.3390] AU
Ag = 4595012.92 [306638329.33] [0.016]
Teffp = 14769 [246392] K [0.06]

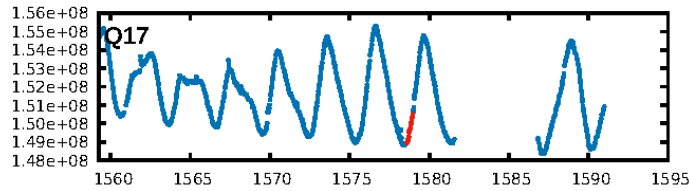
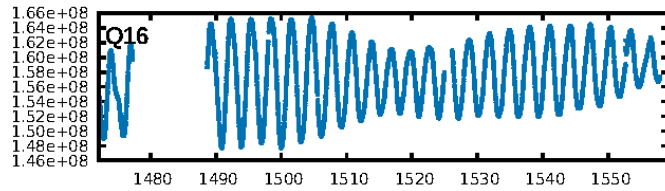
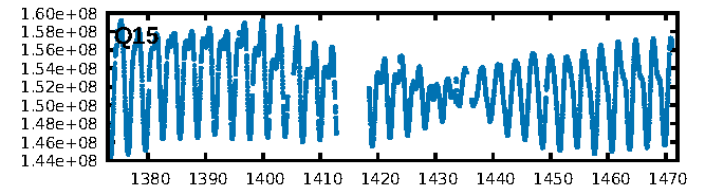
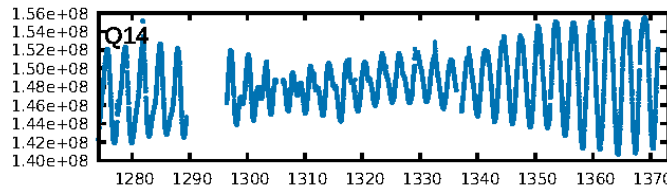
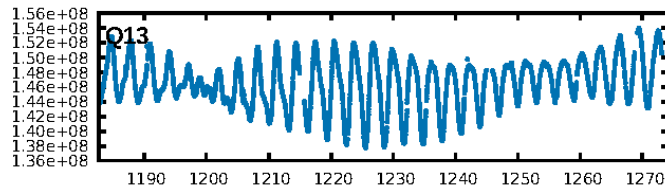
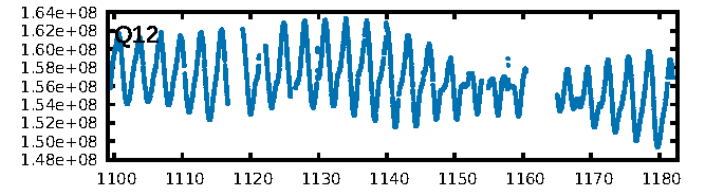
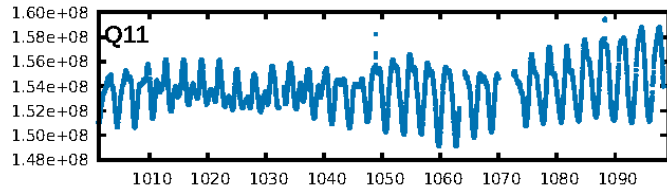
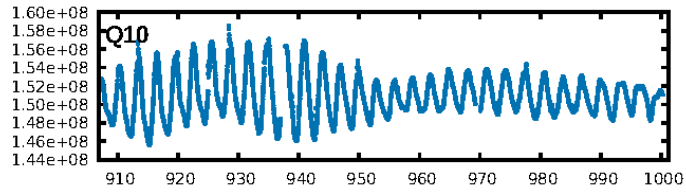
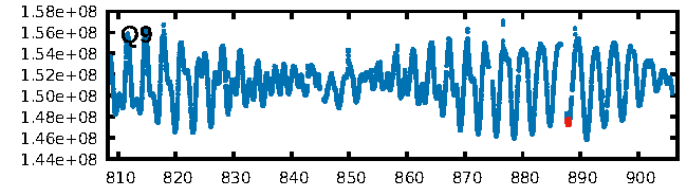
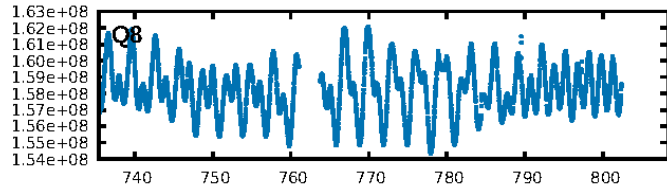
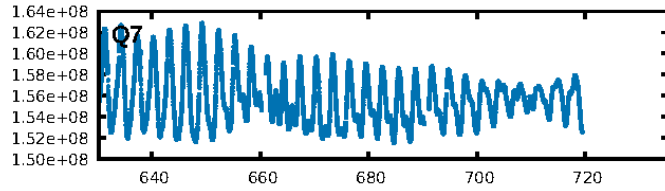
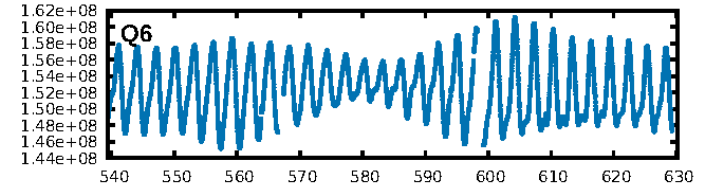
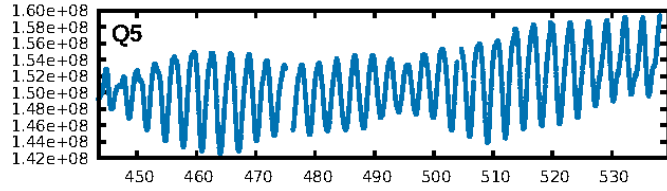
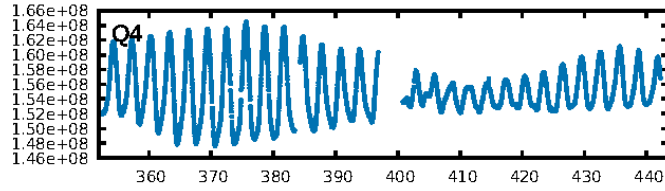
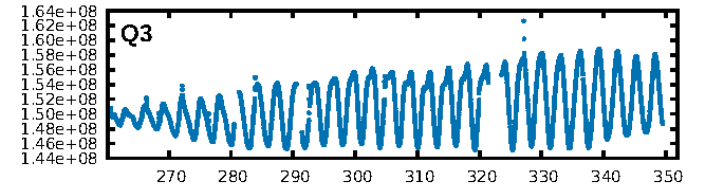
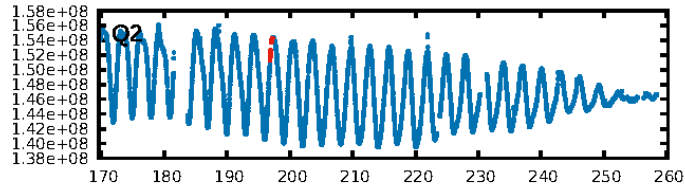
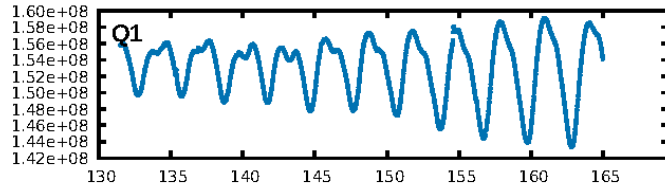
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [247.48]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 43.3%
ModelChiSquareGof-sig: 63.7%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [2/2]
GhostDiagnostic-chr: 1.87
Centroid-sig: 7.8%
Centroid-so: 91.345 arcsec [1.45]
OotOffset-rm: 0.091 arcsec [0.81]
KicOffset-rm: 0.232 arcsec [1.76]
OotOffset-st: 1/0/0/1 [2]
KicOffset-st: 1/0/0/1 [2]
DiffImageQuality-fgm: 0.50 [1/2]
DiffImageOverlap-fno: 1.00 [2/2]

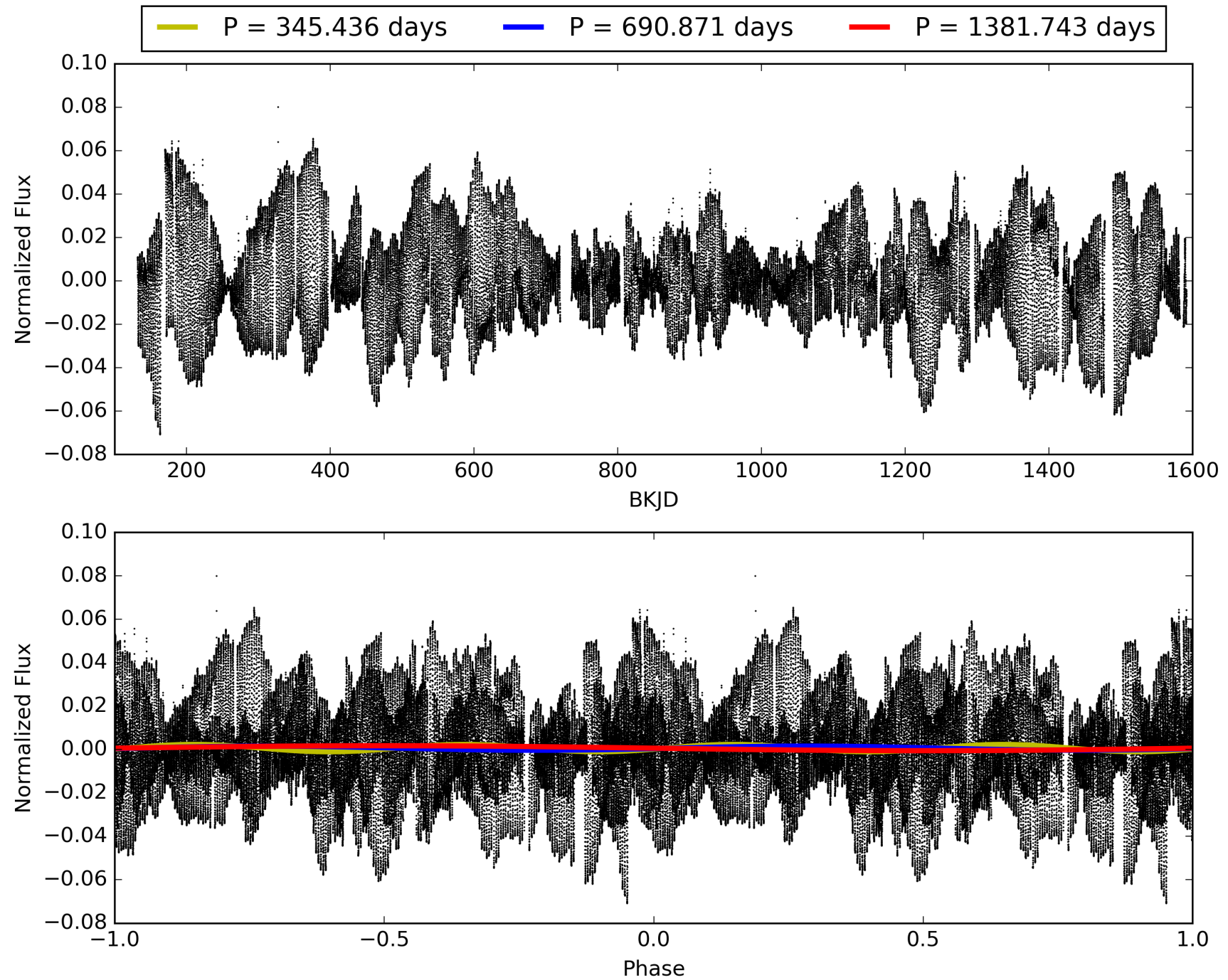
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 009401856-01, PDC Light Curves

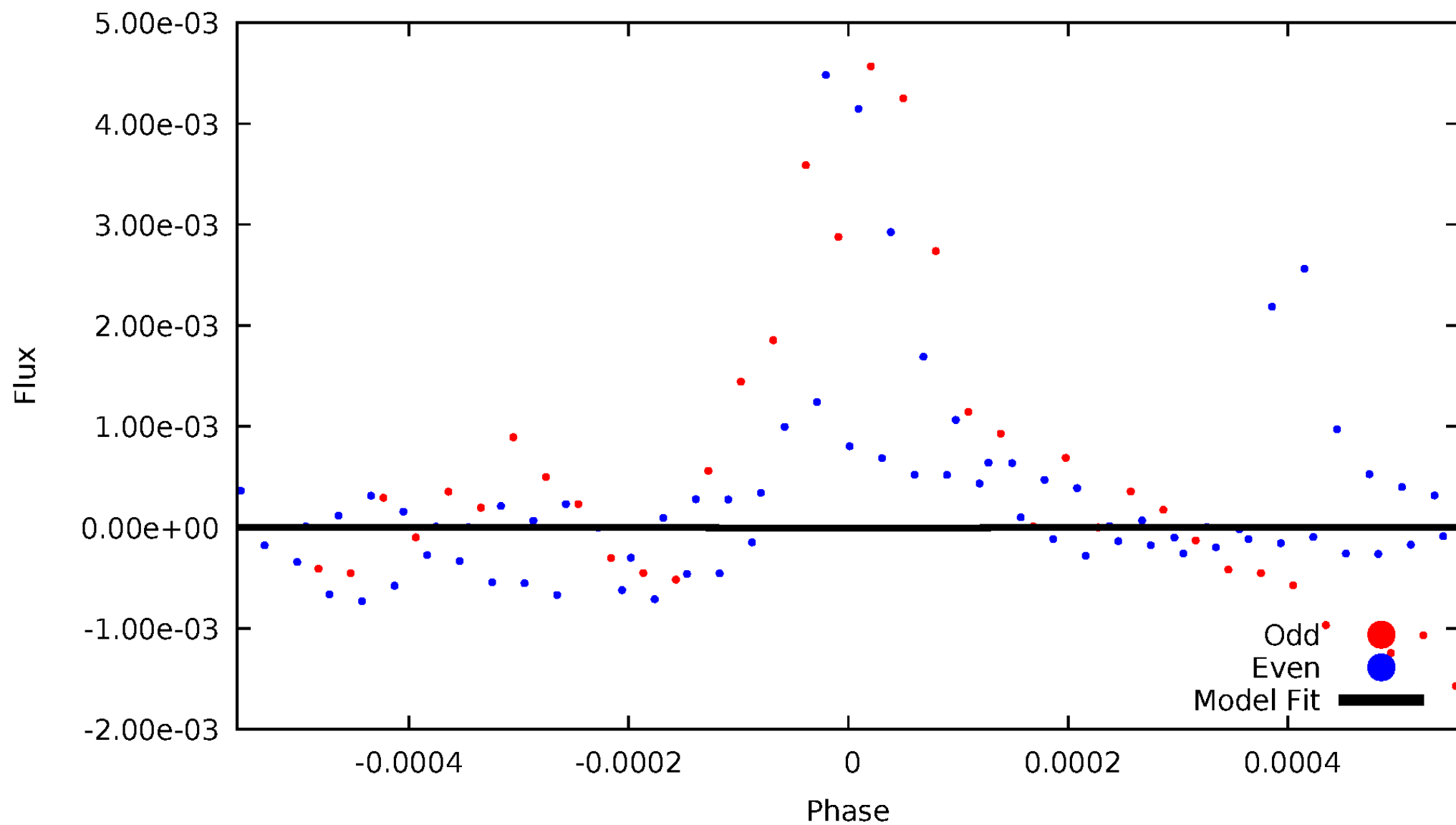


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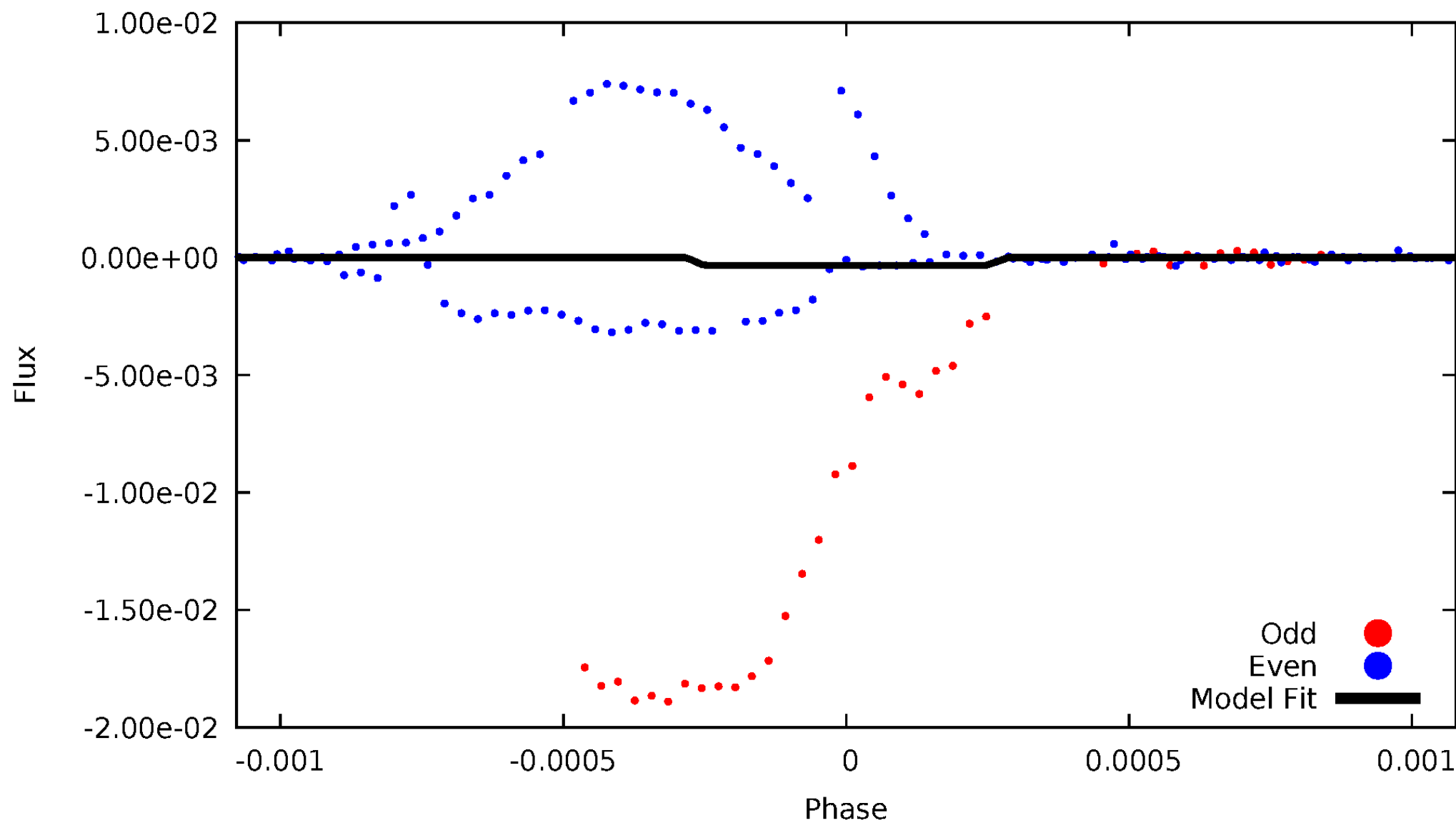
DV Odd/Even

TCE 009401856-01



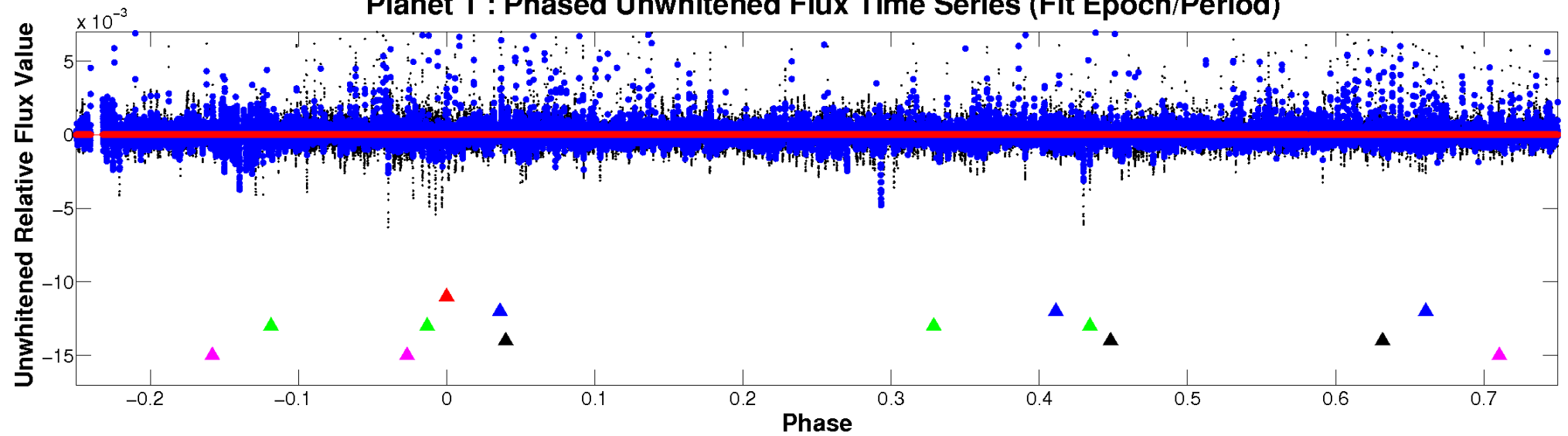
ALT Odd/Even

TCE 009401856-01

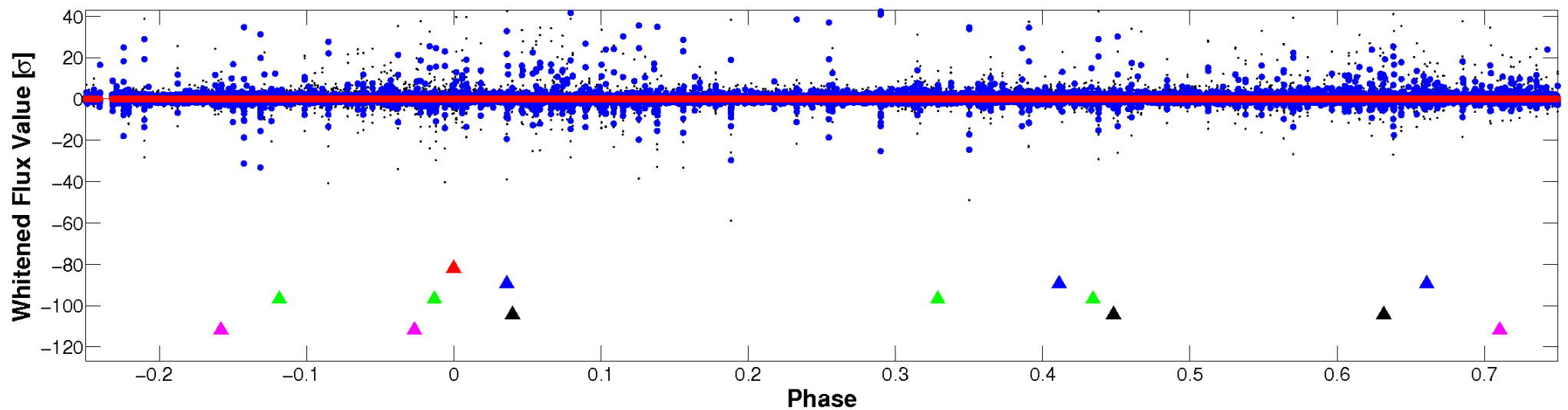


Non-Whitened Vs. Whitened Light Curve

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

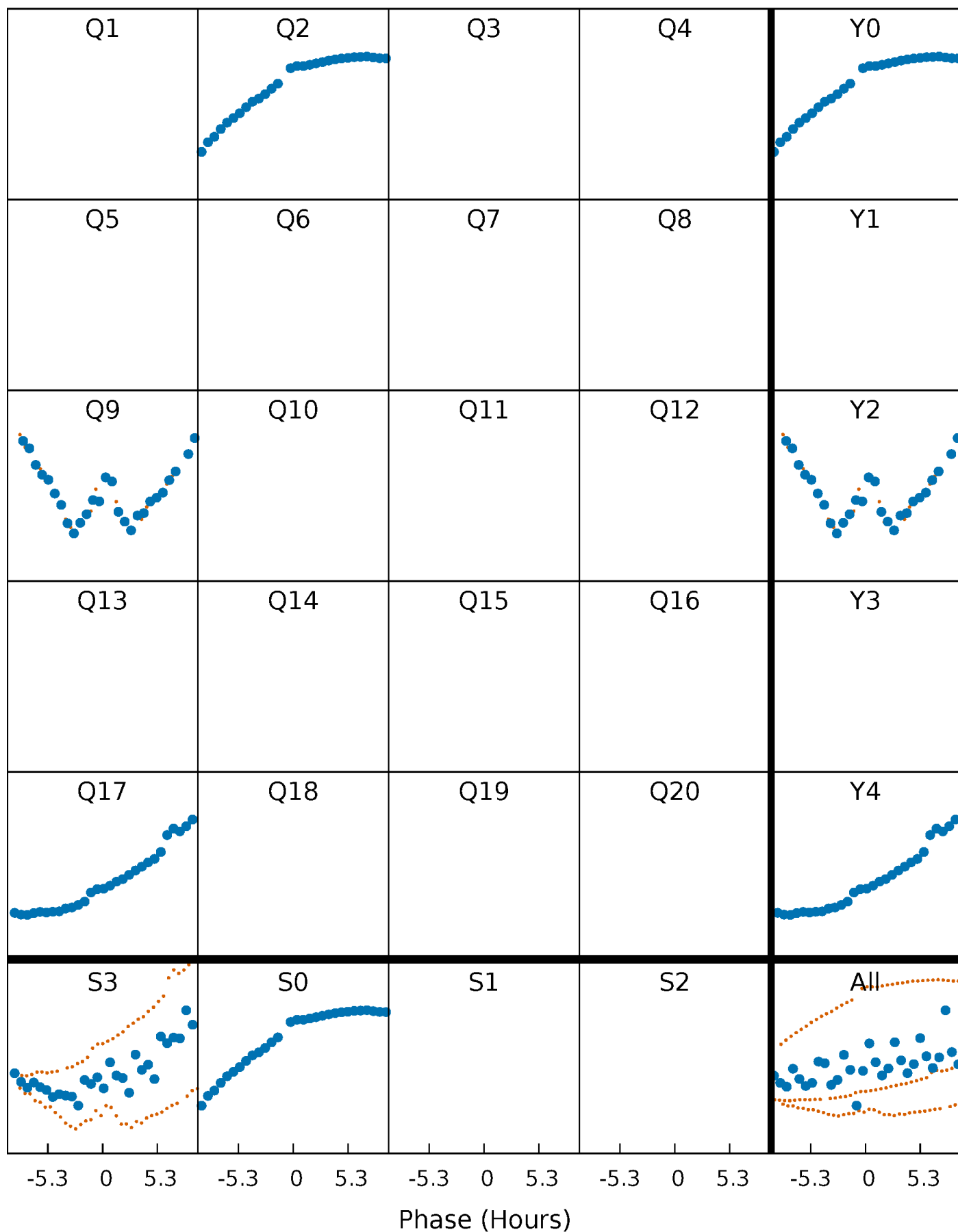


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



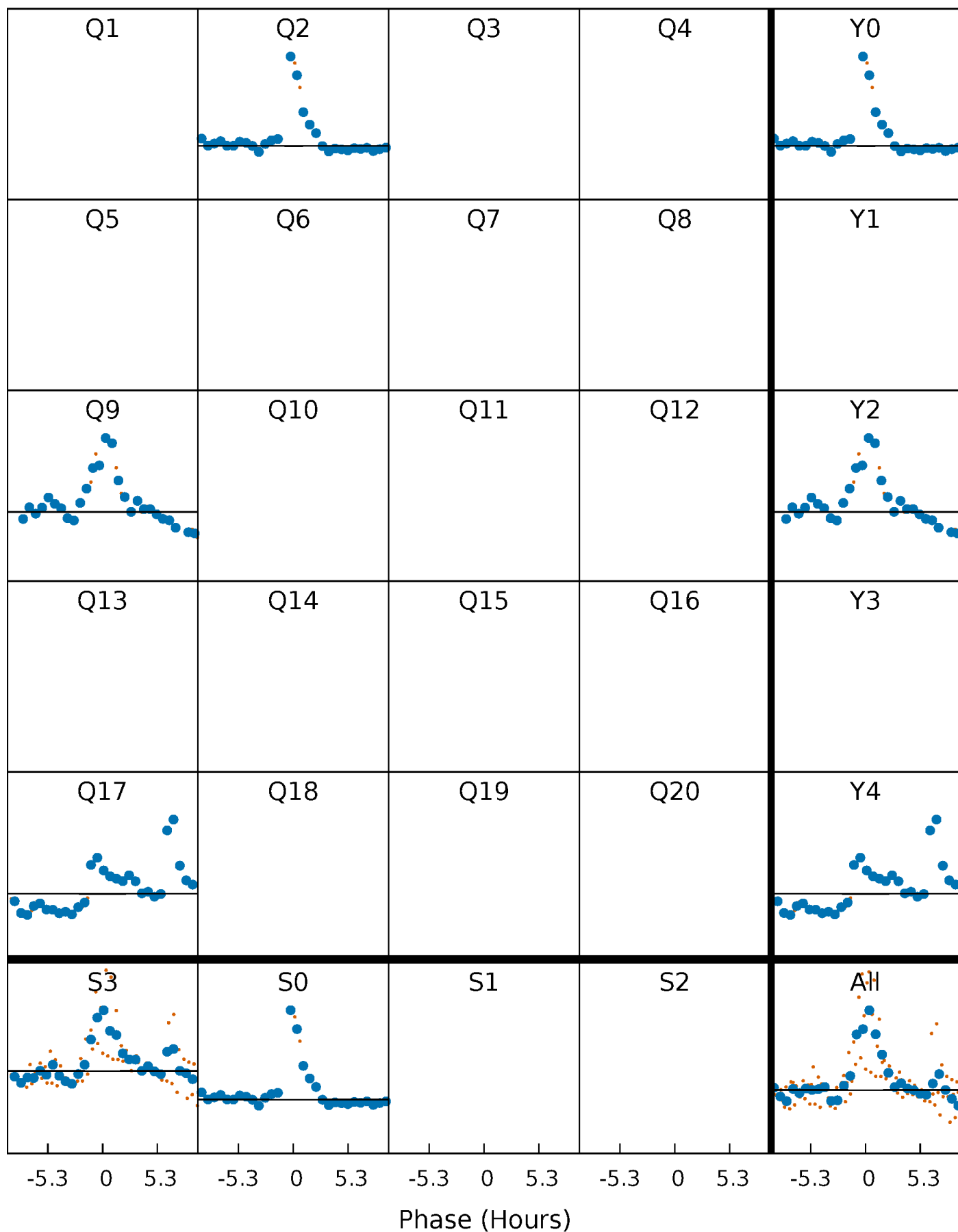
PDC Quarter-Phased Transit Curves

TCE 009401856-01 P=690.871313 Days $T_0=197.038264$ (BKJD)



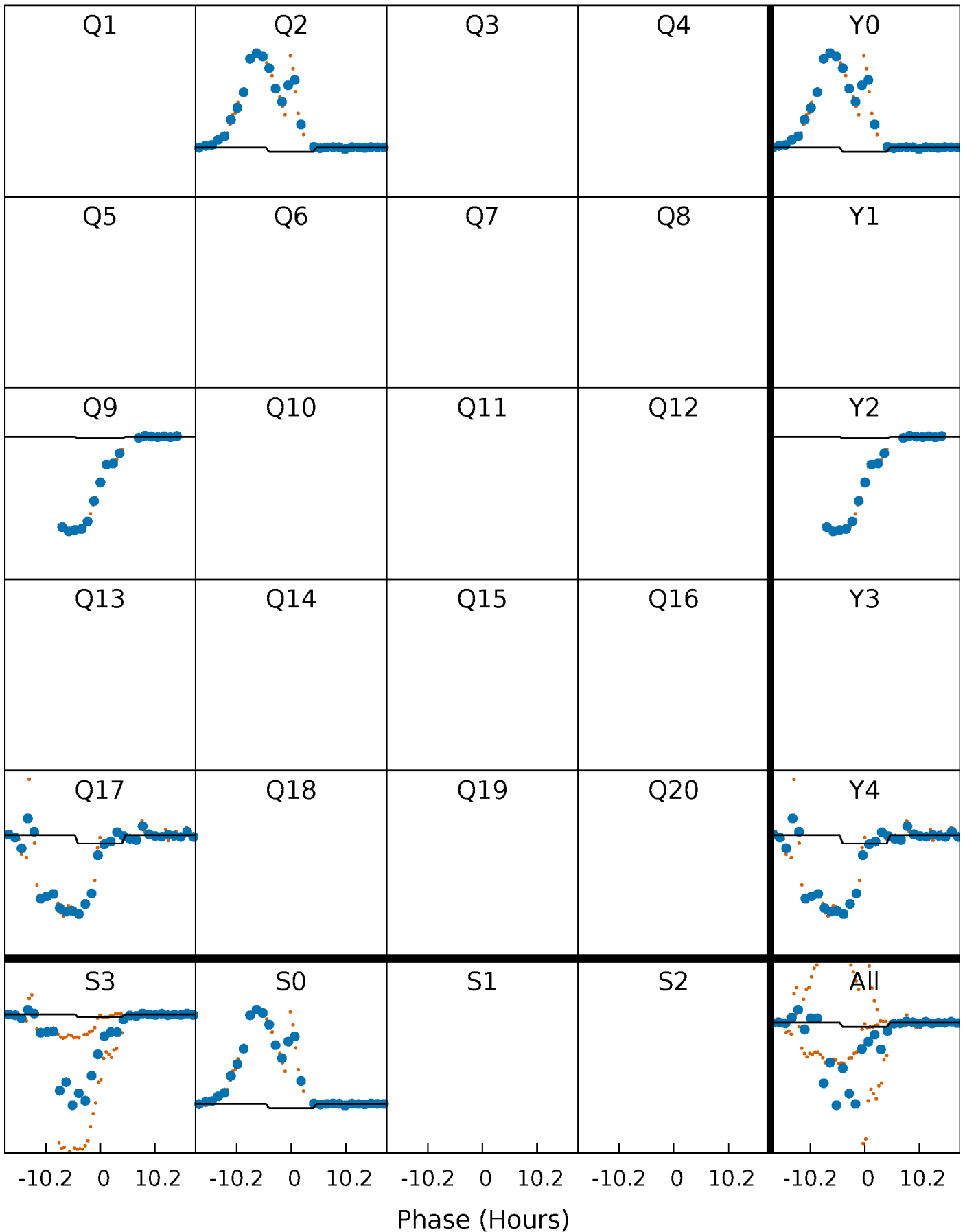
DV Quarter-Phased Transit Curves

TCE 009401856-01 P=690.871313 Days $T_0=197.038264$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

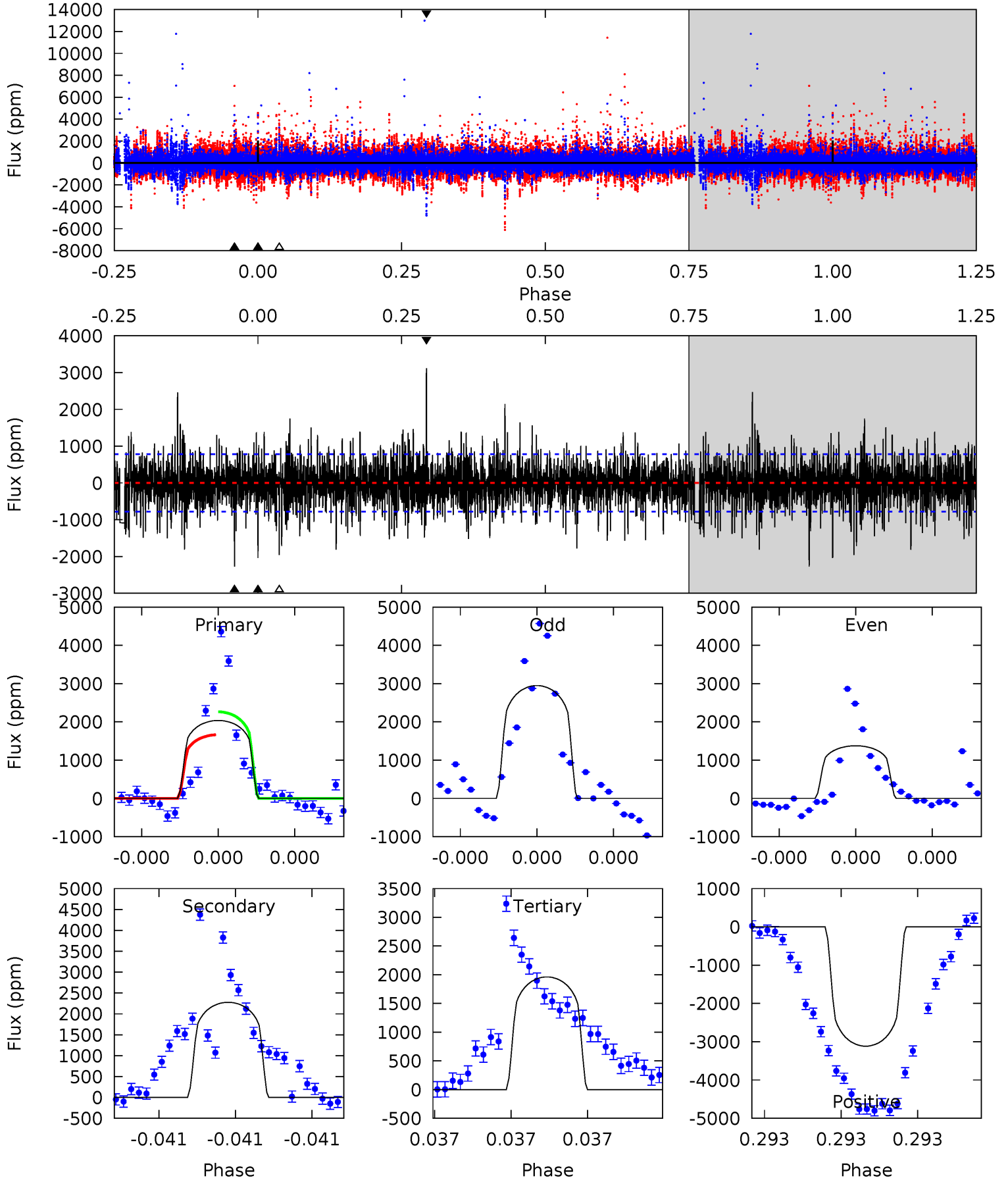
TCE 009401856-01 $P=690.865475$ Days $T_0=197.030379$ (BKJD)



DV Model-Shift Uniqueness Test

009401856-01, P = 690.871313 Days, E = 197.038264 Days

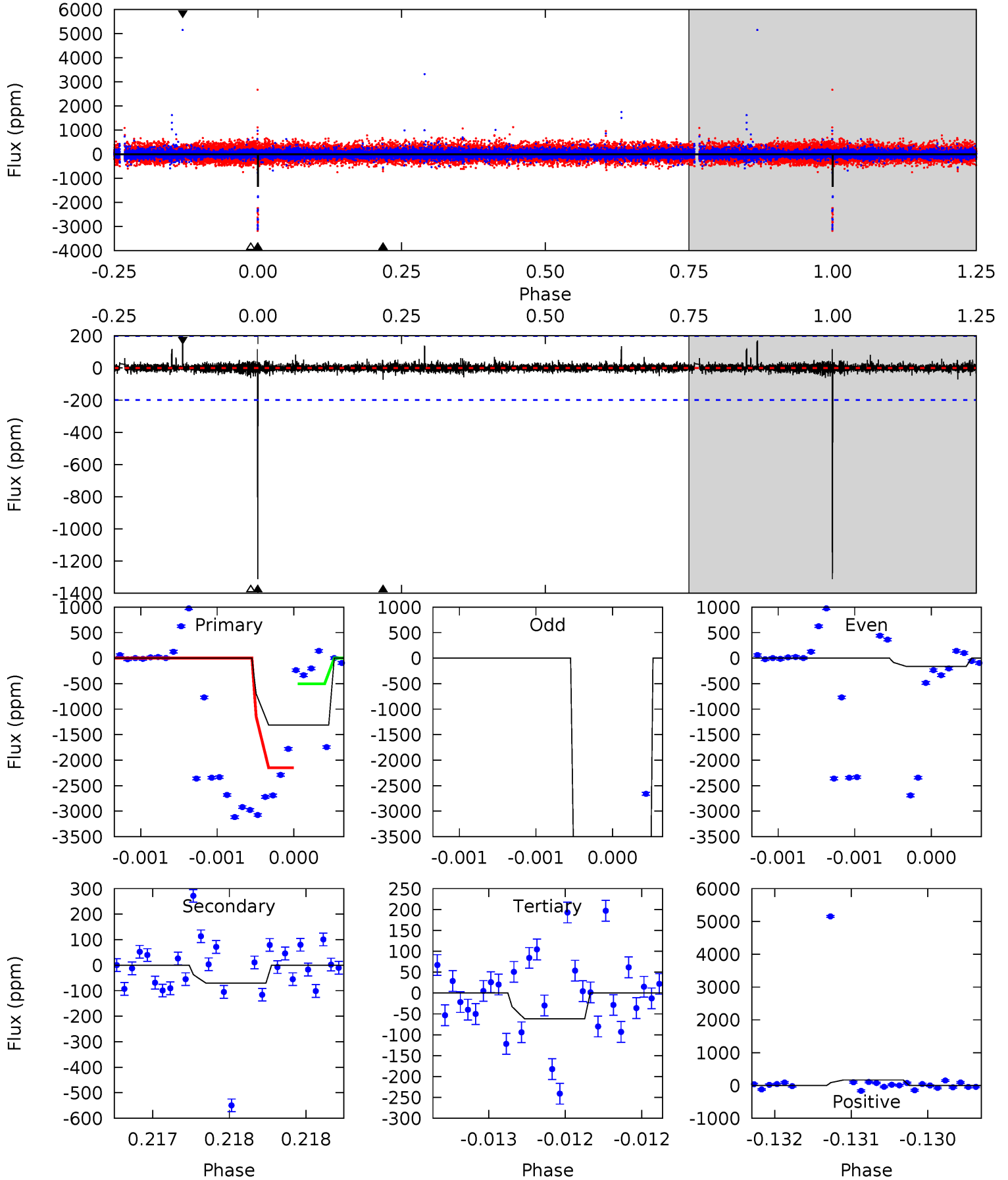
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
14.7	16.5	14.2	22.5	5.66	3.62	3.13	0.55	-7.81	2.28	-6.07	4.69	0.85	0.58	2.24



Alt Model-Shift Uniqueness Test

009401856-01, P = 690.865475 Days, E = 197.030379 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
36.6	1.96	1.73	4.67	5.56	3.46	0.34	34.9	32.0	0.23	-2.71	176.0	2.18	0.11	22.4



Stellar Parameters For KIC 009401856

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5780^{+138}_{-155}	$4.421^{+0.116}_{-0.188}$	$-0.200^{+0.300}_{-0.300}$	$0.966^{+0.259}_{-0.139}$	$0.899^{+0.120}_{-0.087}$	$1.404^{+0.660}_{-0.684}$
	+2%/-3%	+3%/-4%	+150%/-150%	+27%/-14%	+13%/-10%	+47%/-49%
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 009401856-01 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-2275 ± 138	$7.00^{+7.77}_{-4.88}$	290^{+20}_{-15}	5032^{+4532}_{-1263}	$56948^{+536588}_{-44623}$
Alt.	-70 ± 36	$7.35^{+6.93}_{-5.22}$	290^{+19}_{-16}	2732^{+1110}_{-470}	1333^{+12129}_{-1057}

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 $A_{obs} \gg 1.0$

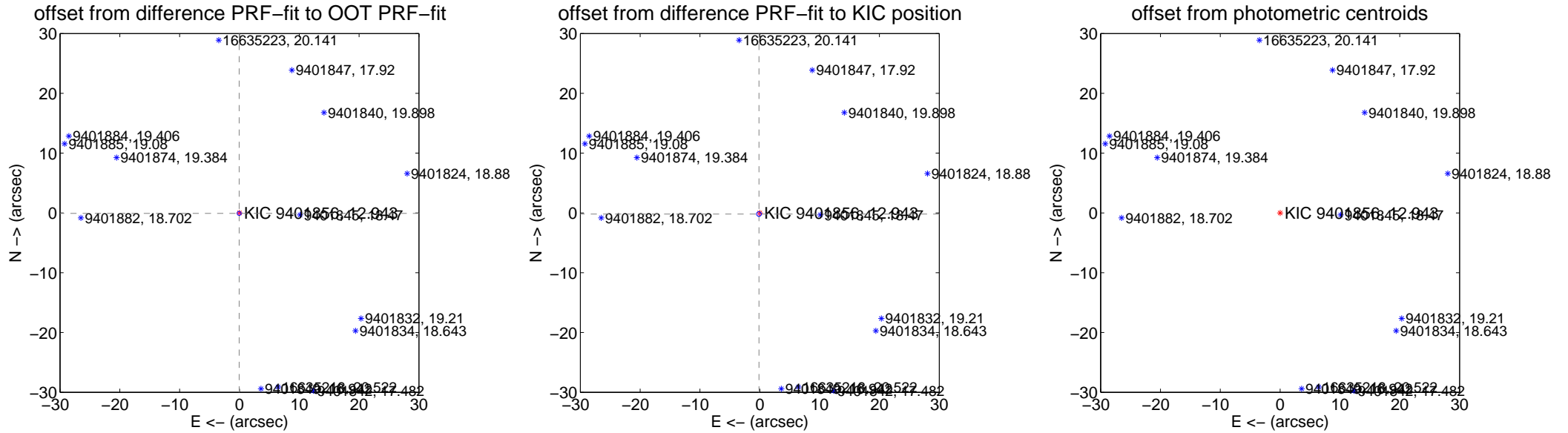
DV Centroid Data

Supplemental centroid analysis for 009401856-01. Kepler magnitude: 12.94. Transit SNR 0.04

There are 1 quarters with good PRF difference image offsets

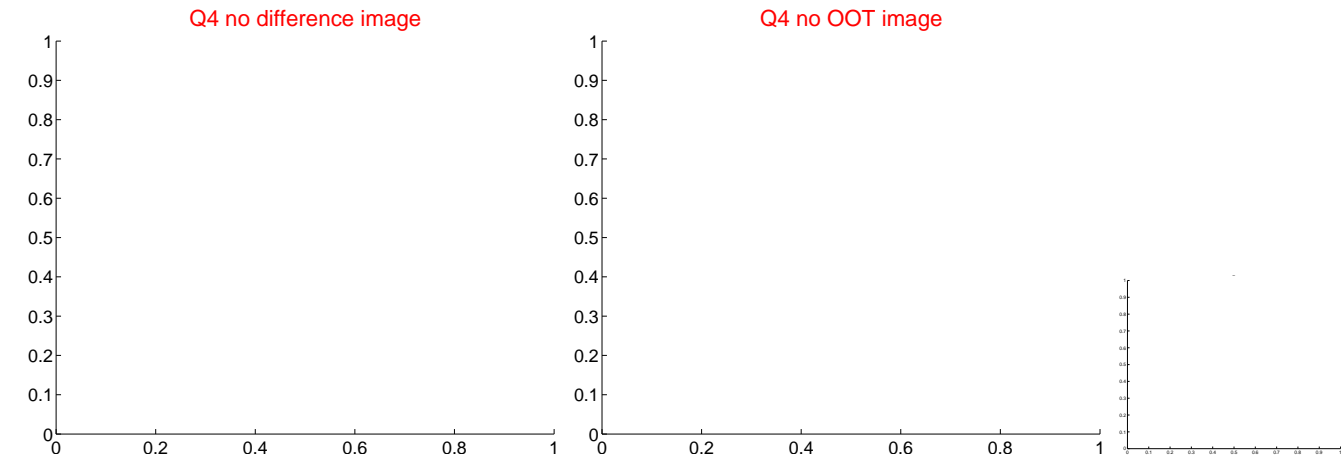
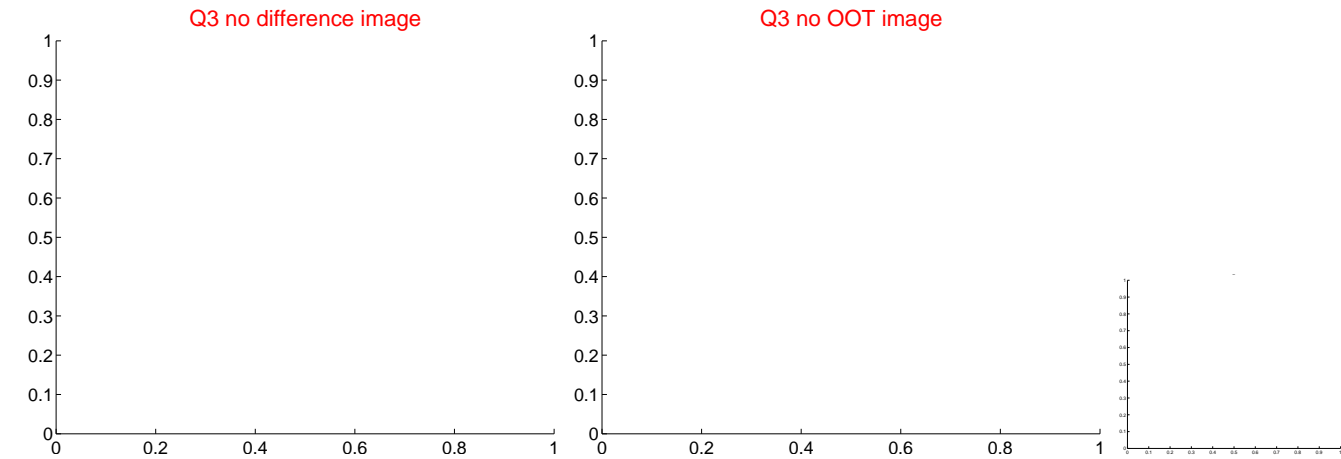
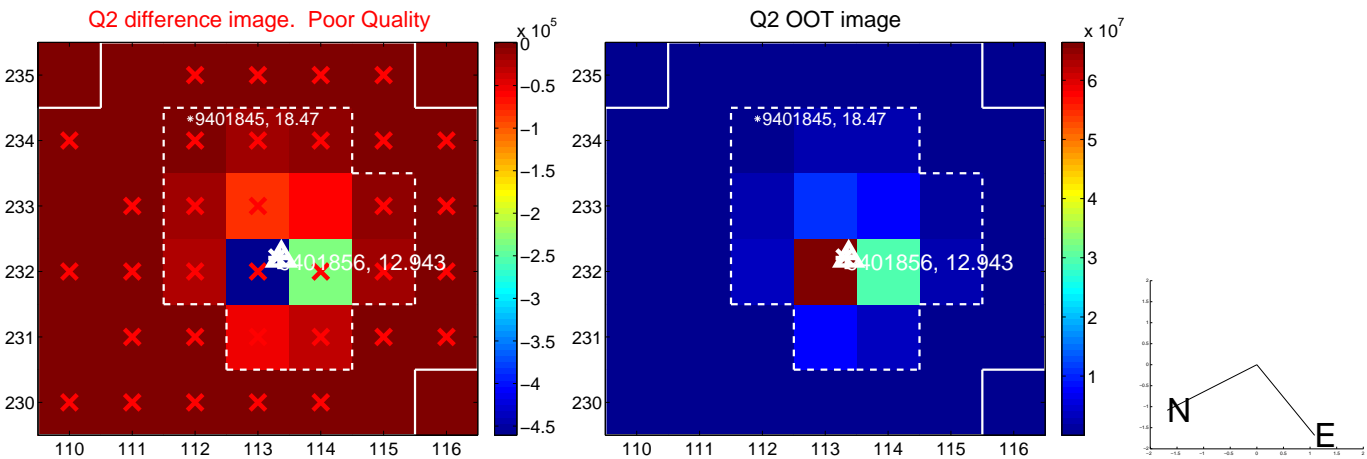
The direct PRF centroid is offset from the target star catalog position by about 0.23 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.091 ± 0.112	0.81	0.050 ± 0.091	-0.076 ± 0.120
PRF-fit source offset from KIC position	0.232 ± 0.132	1.76	0.136 ± 0.115	-0.188 ± 0.099
photometric centroid source offset	91.35 ± 62.79	1.45	41.03 ± 59.19	-81.62 ± 63.67



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.



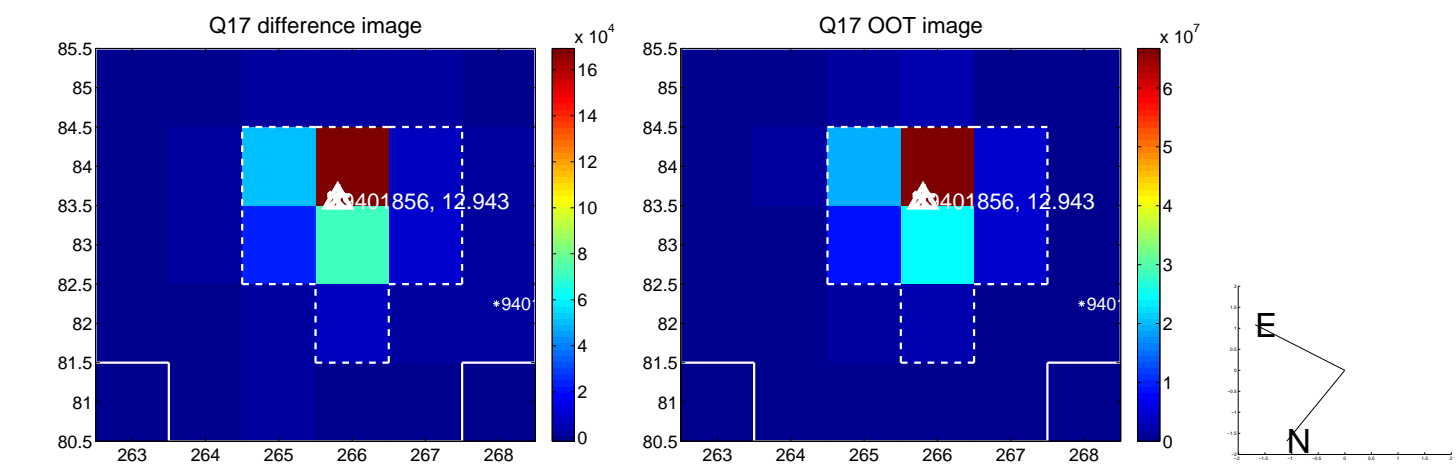
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



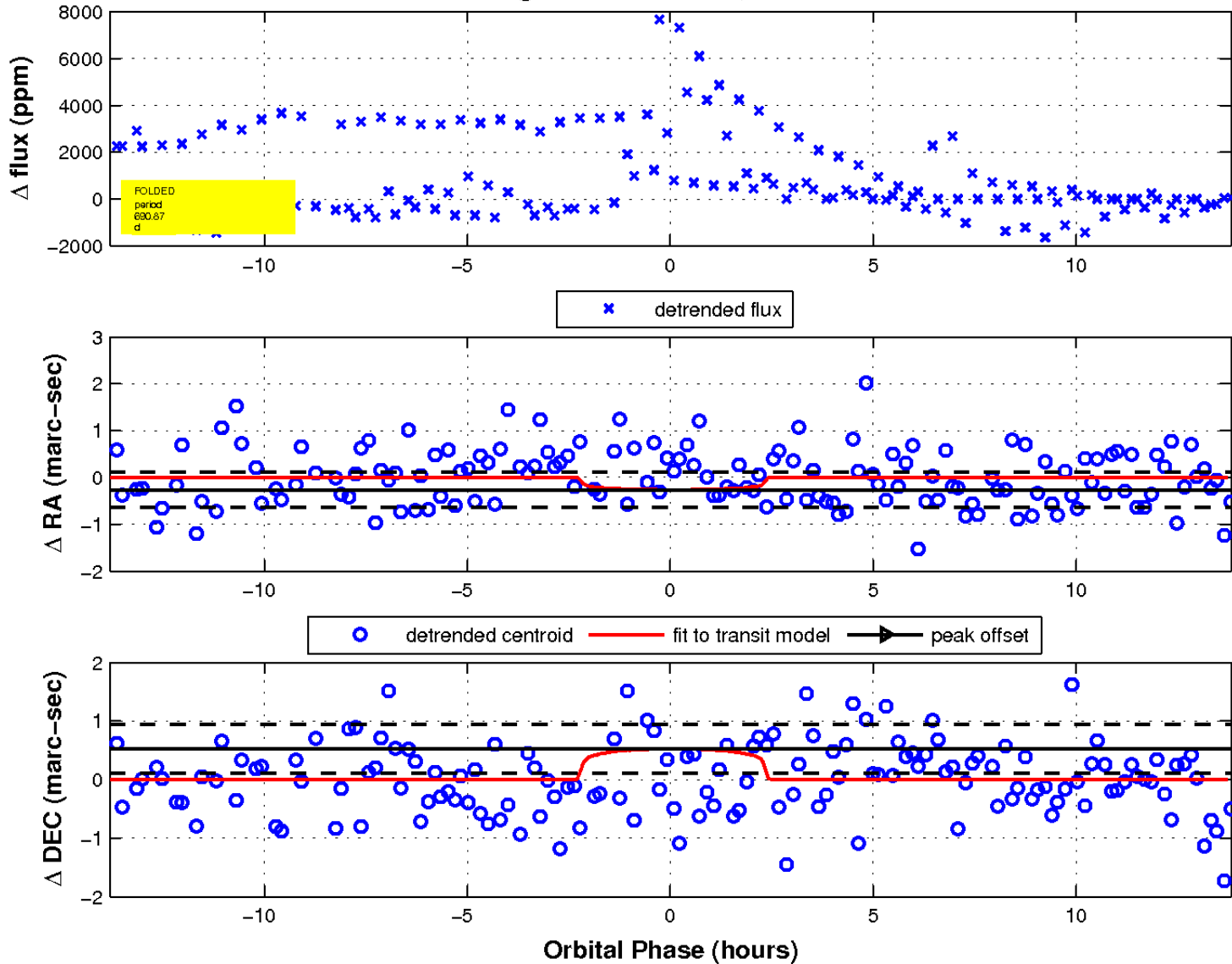
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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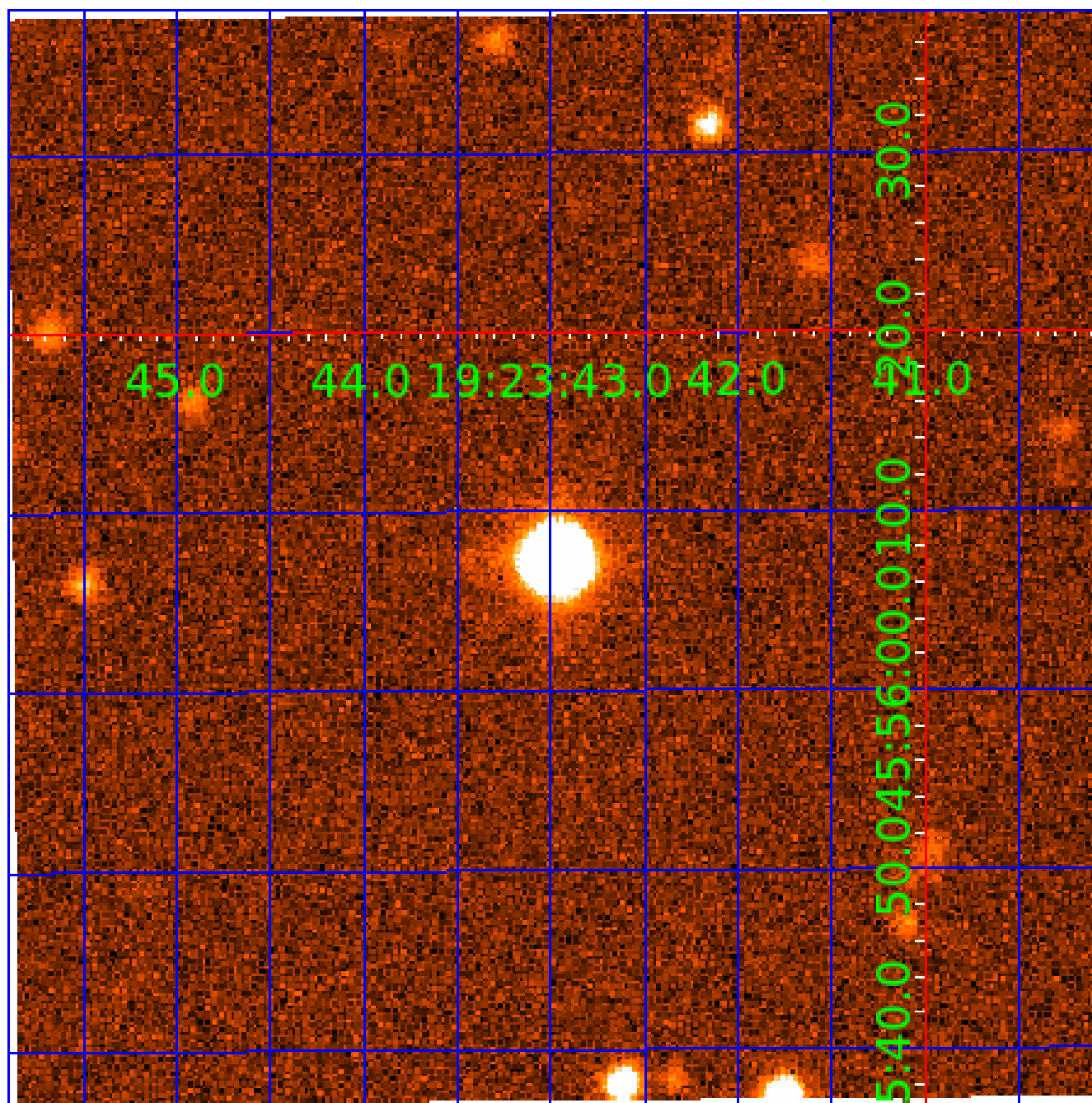


fluxWeightedCentroids, Planet 1 of 5



UKIRT Image

Declination



KIC 009401856

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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Robovetter Results

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009401856-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
009401856-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009401856-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009401856-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_NOFITS

Notes: OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.

N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

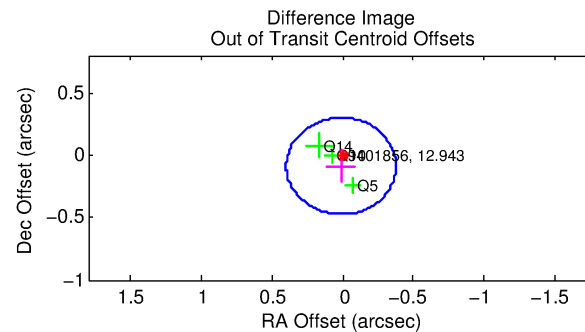
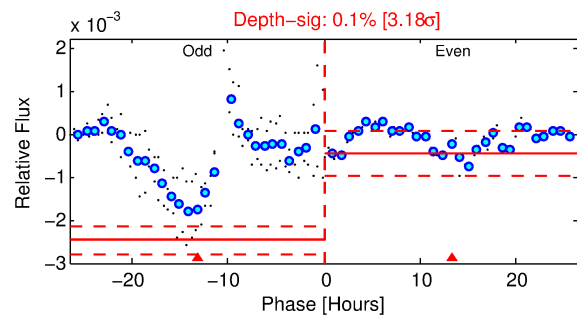
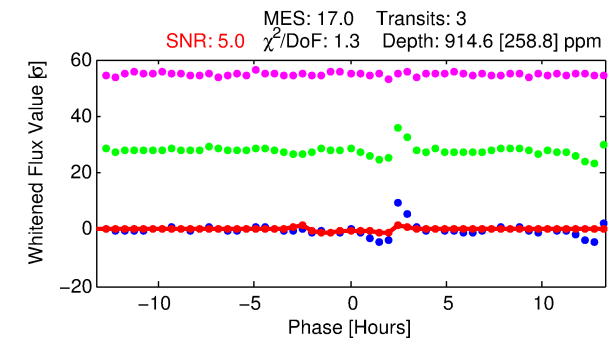
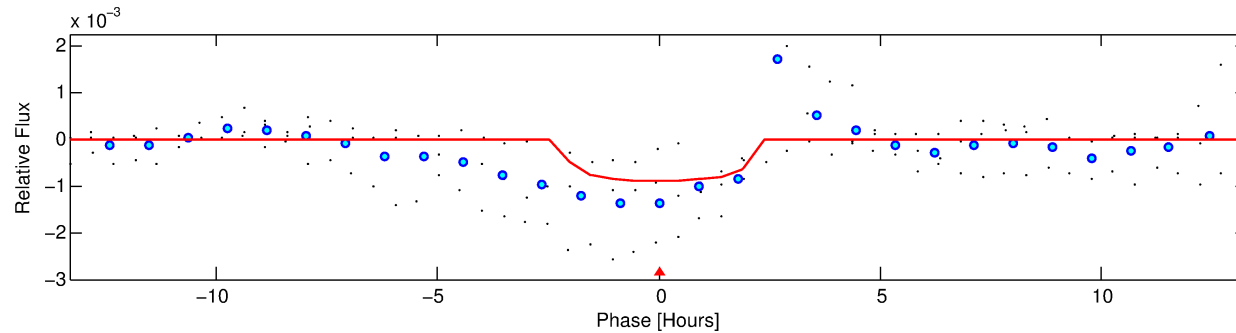
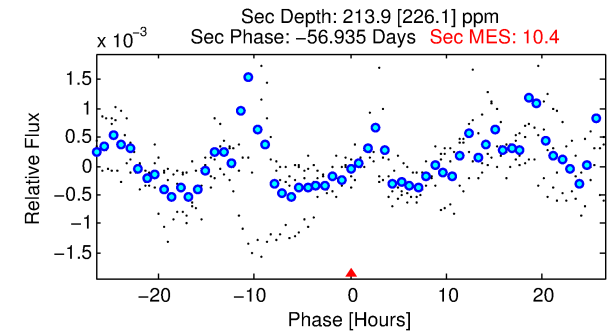
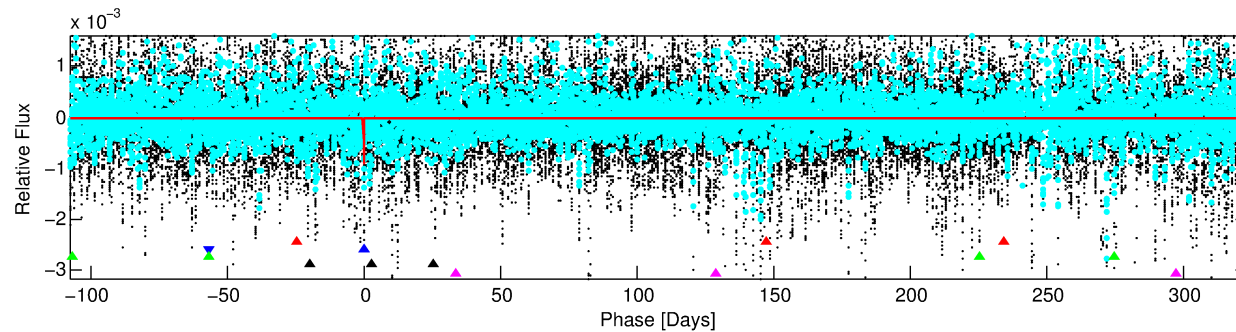
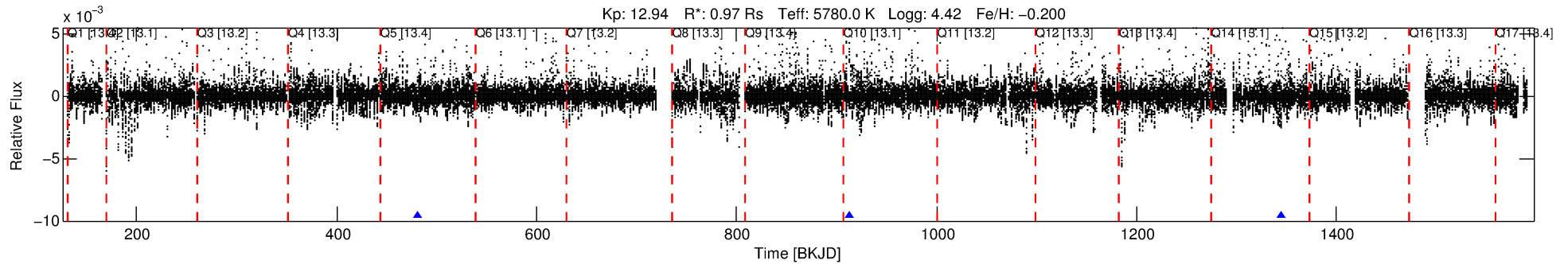
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009401856-02

No Significant Match Found

DV One-Page Summary

KIC: 9401856 Candidate: 2 of 5 Period: 431.682 d



DV Fit Results:

Period = 431.68189 [0.00482] d
Epoch = 481.1323 [0.0067] BKJD
Rp/R* = 0.0275 [0.0394]
a/R* = 764.52 [4705.18]
b = 0.00 [1659.45]
Seff = 0.80 [0.29]
Teq = 241 [21] K
Rp = 2.90 [4.22] Re
a = 1.0784 [0.2477] AU
Ag = 16299.00 [50081.01] [0.33 σ]
Teffp = 4216 [3221] K [1.23 σ]

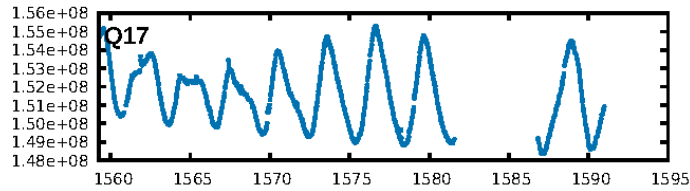
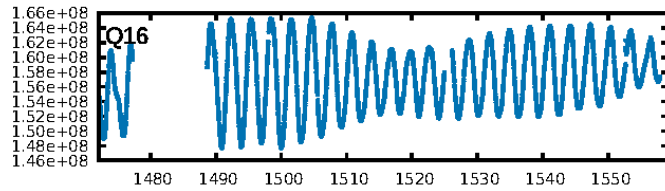
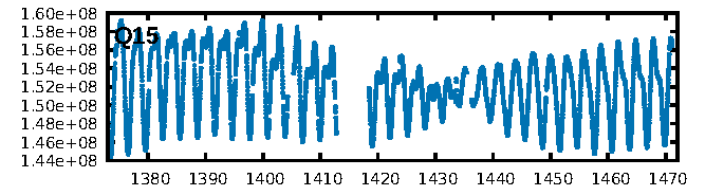
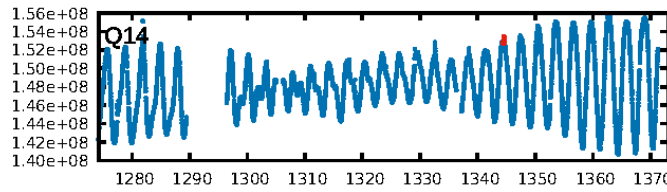
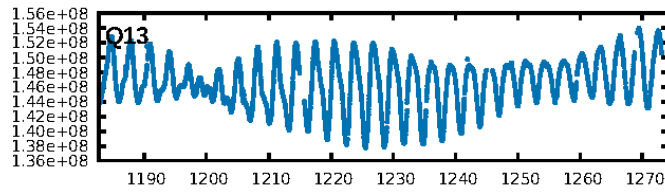
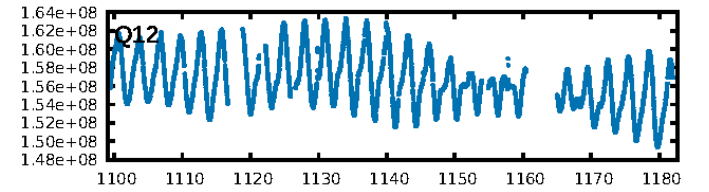
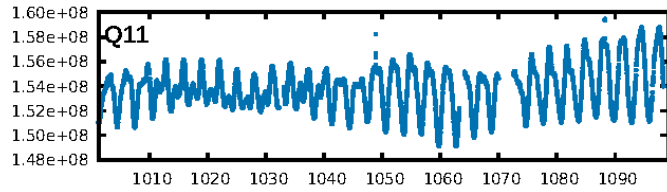
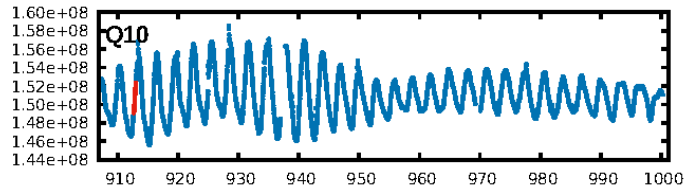
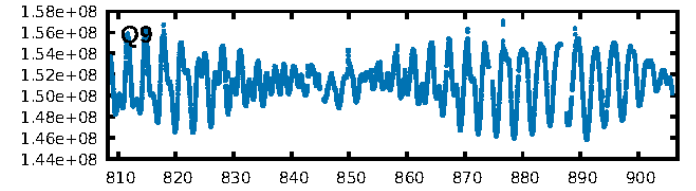
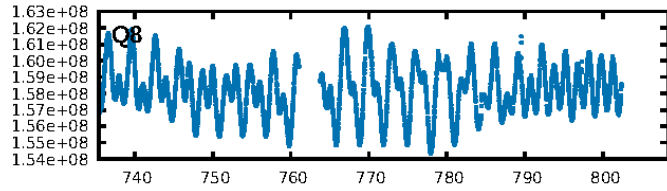
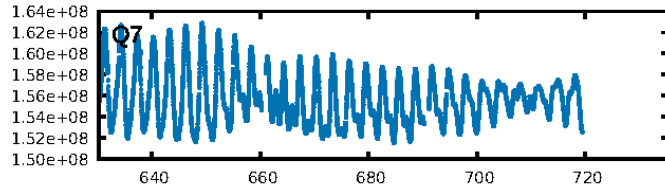
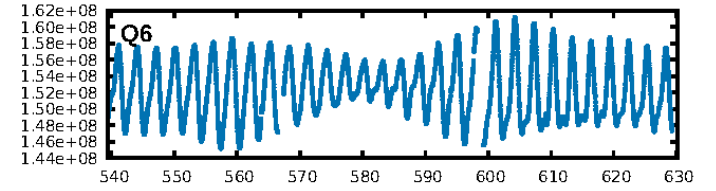
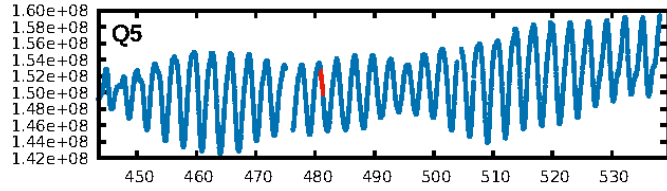
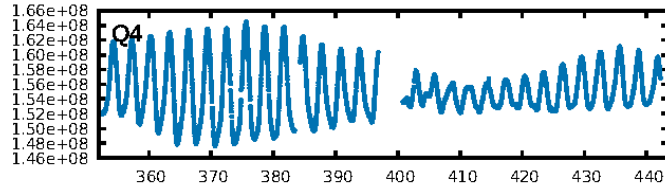
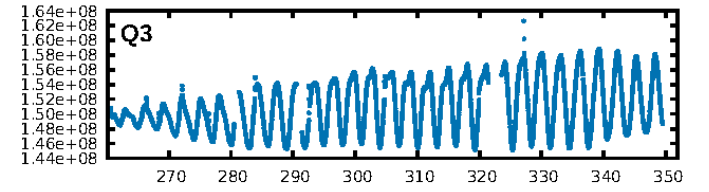
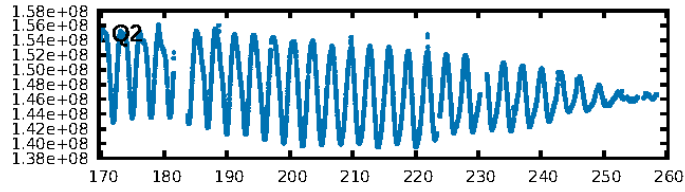
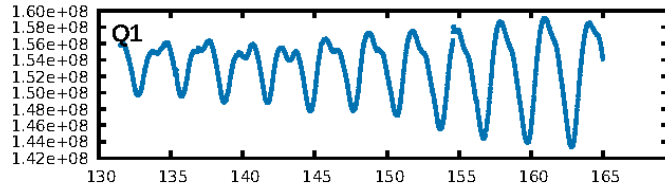
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [98.76 σ]
LongPeriod-sig: 100.0% [463.94 σ]
ModelChiSquare2-sig: 3.0%
ModelChiSquareGof-sig: 52.6%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 1.173
Centroid-sig: 9.0%
Centroid-so: 0.356 arcsec [0.87 σ]
OotOffset-rm: 0.088 arcsec [0.68 σ]
OotOffset-st: 2/0/0/1 [3]
KicOffset-rm: 0.258 arcsec [1.52 σ]
KicOffset-st: 2/0/0/1 [3]
DiffImageQuality-fgm: 0.33 [1/3]
DiffImageOverlap-fno: 1.00 [3/3]

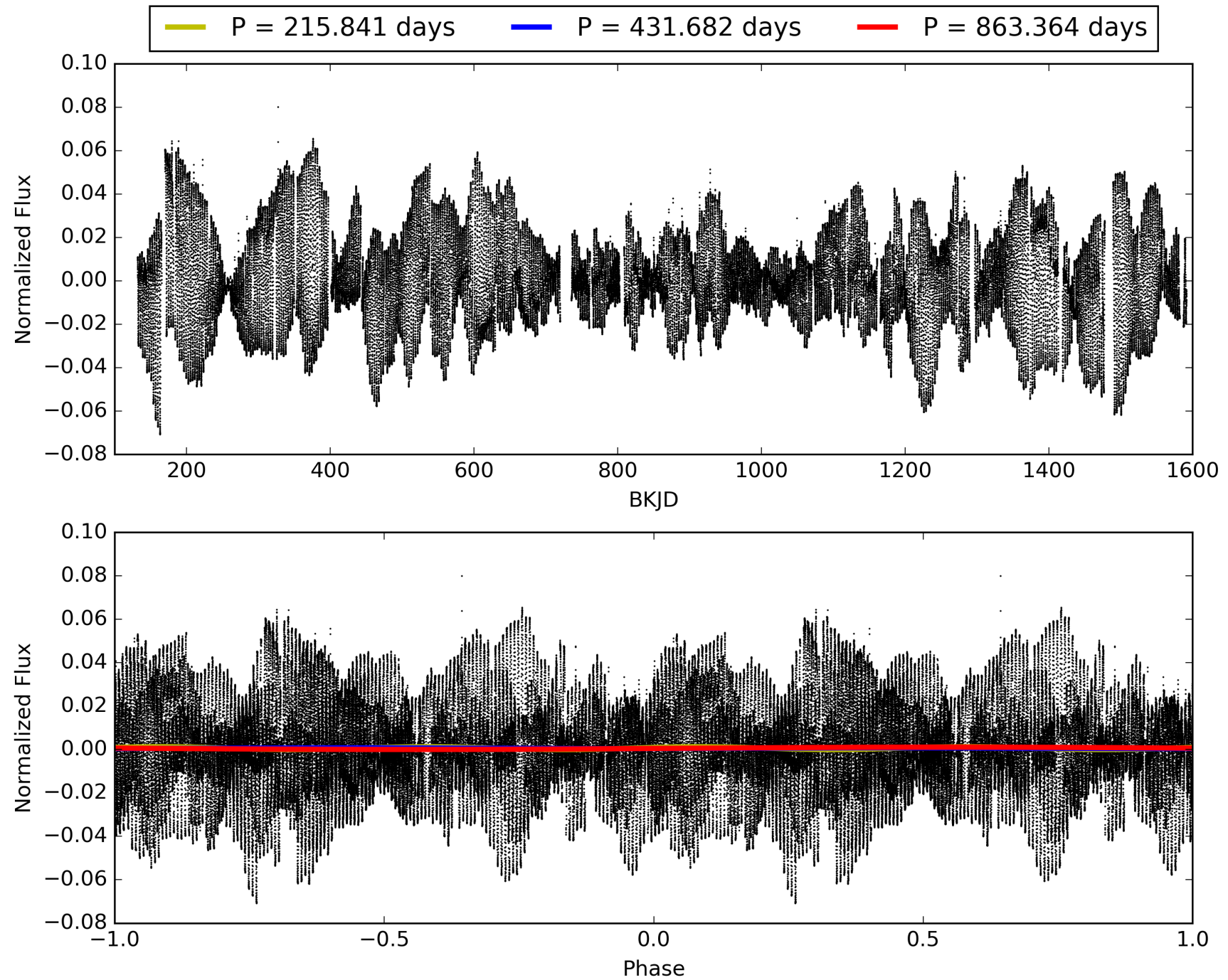
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 23:48:36 Z

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

TCE 009401856-02, PDC Light Curves

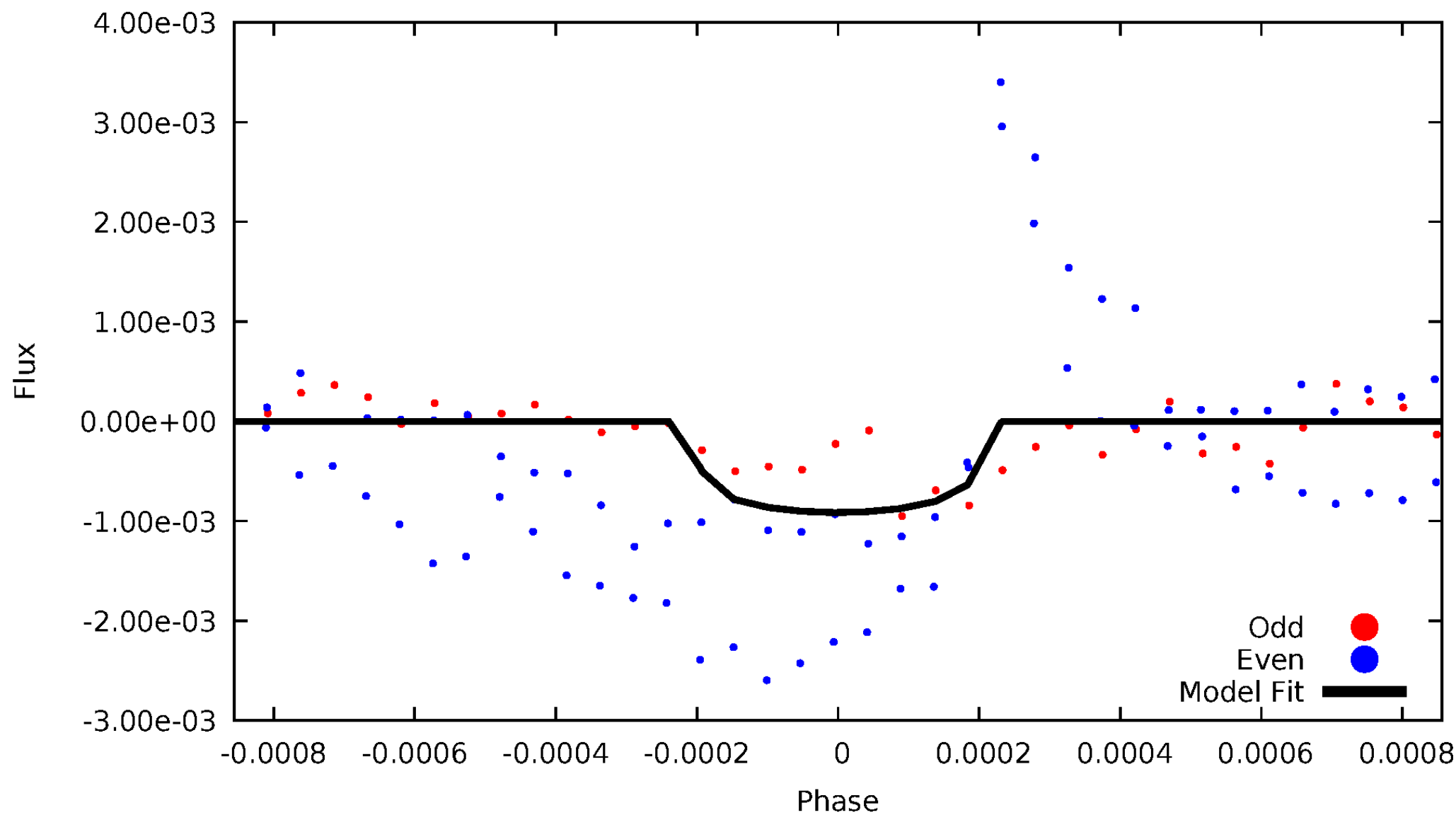


TCE 009401856-02



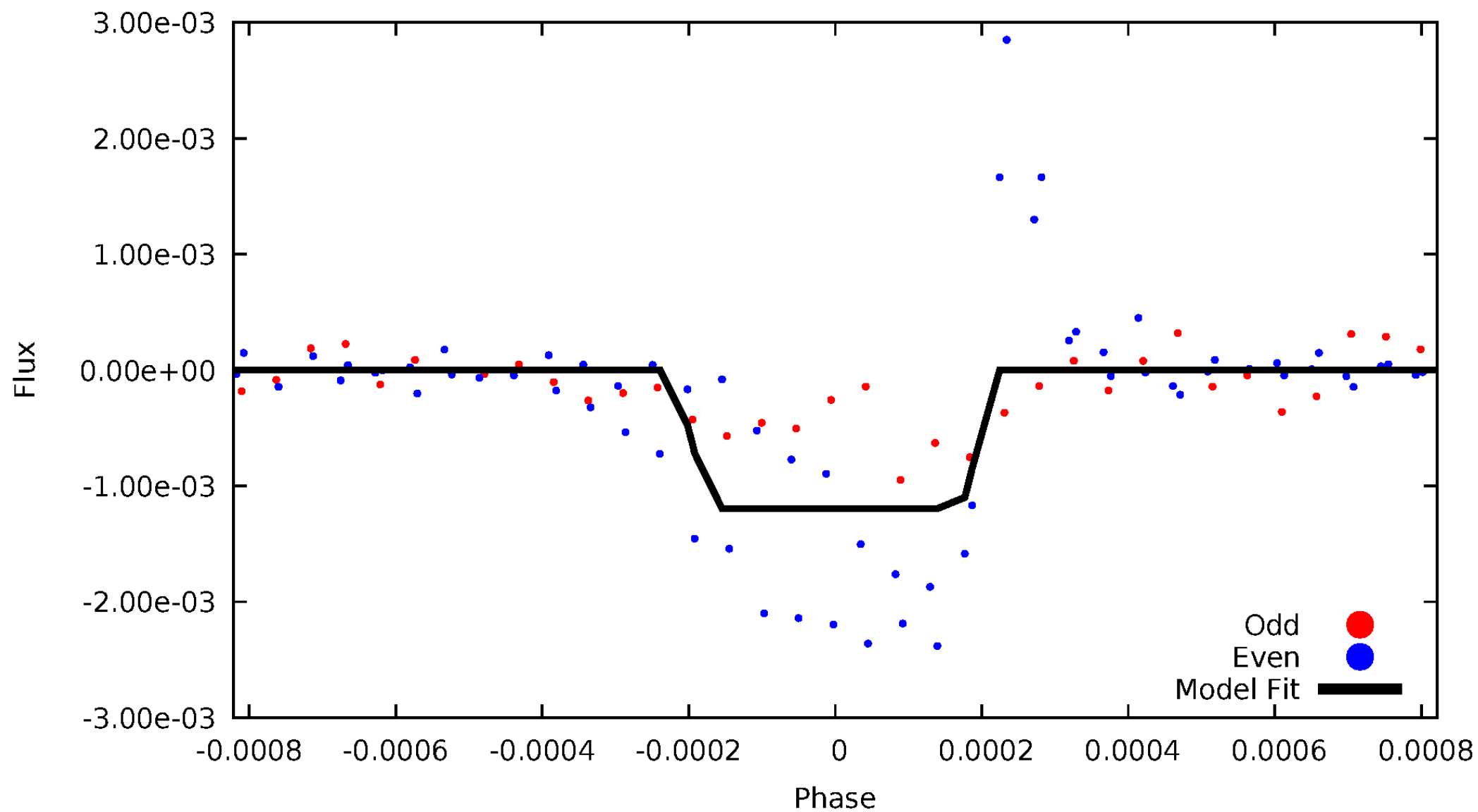
DV Odd/Even

TCE 009401856-02



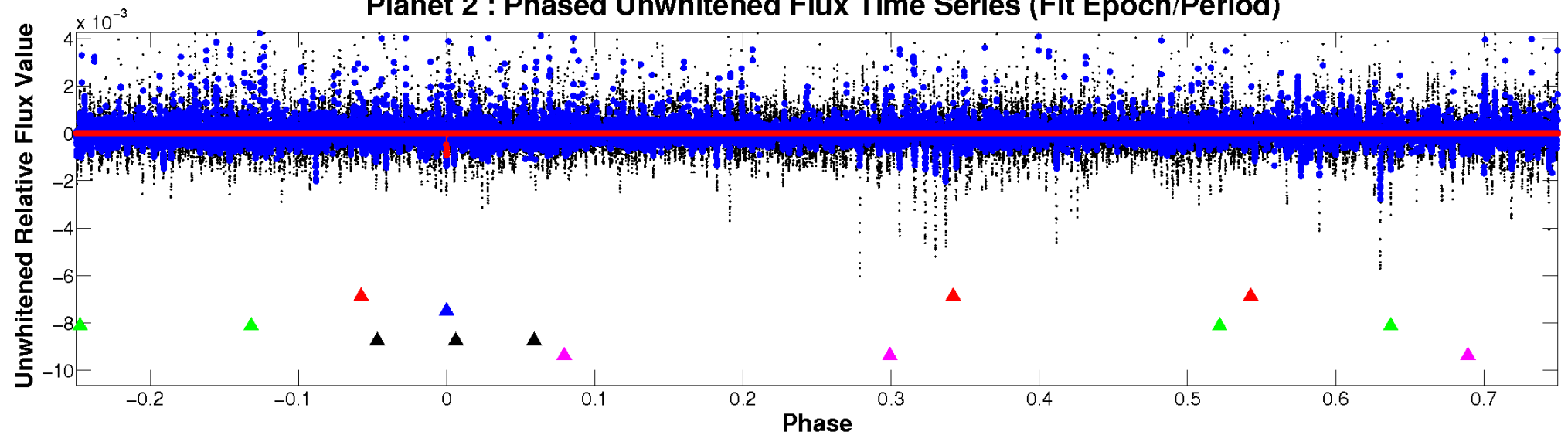
ALT Odd/Even

TCE 009401856-02

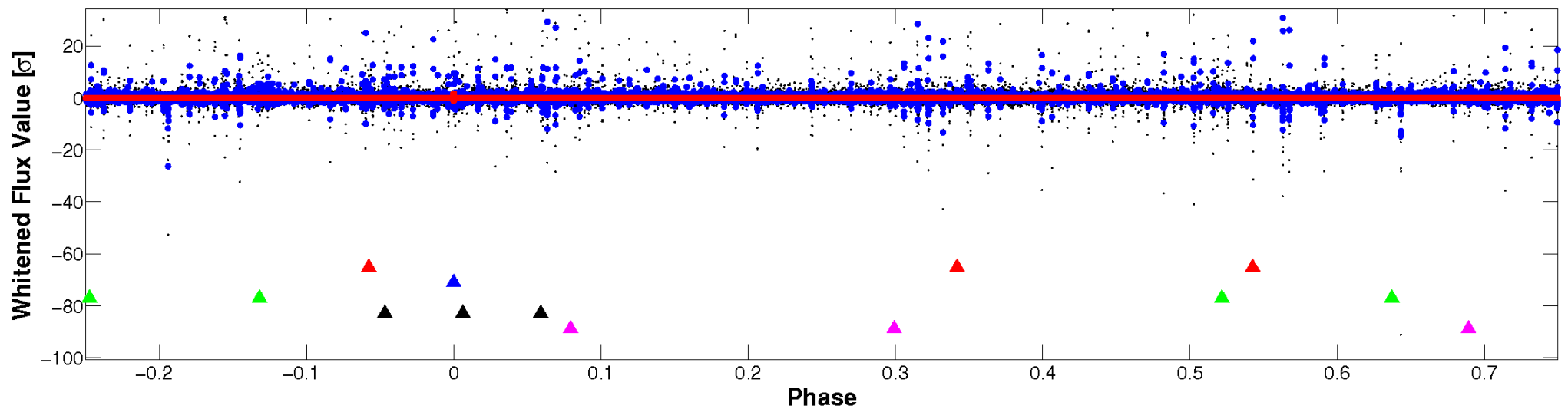


Non-Whitened Vs. Whitened Light Curve

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

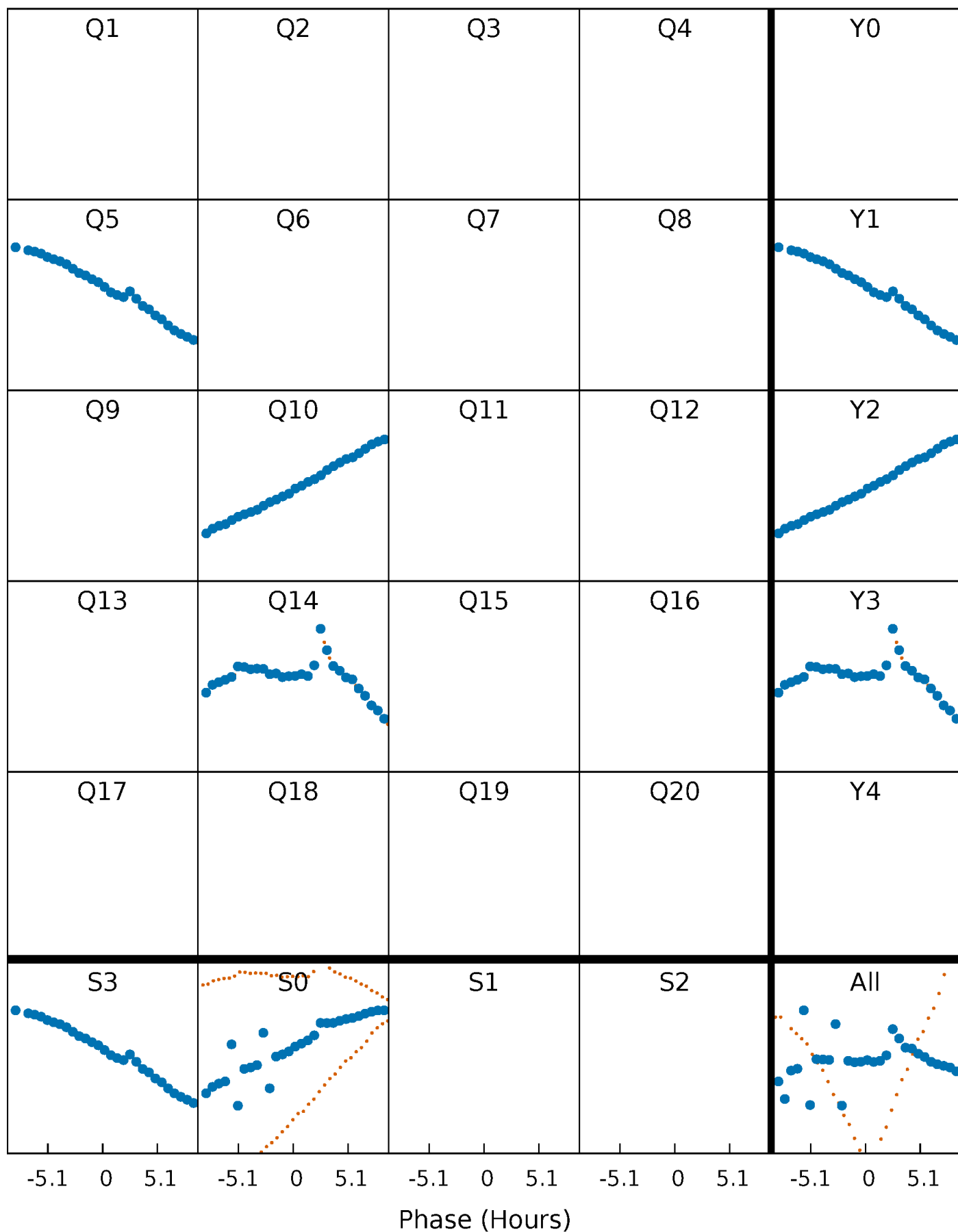


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



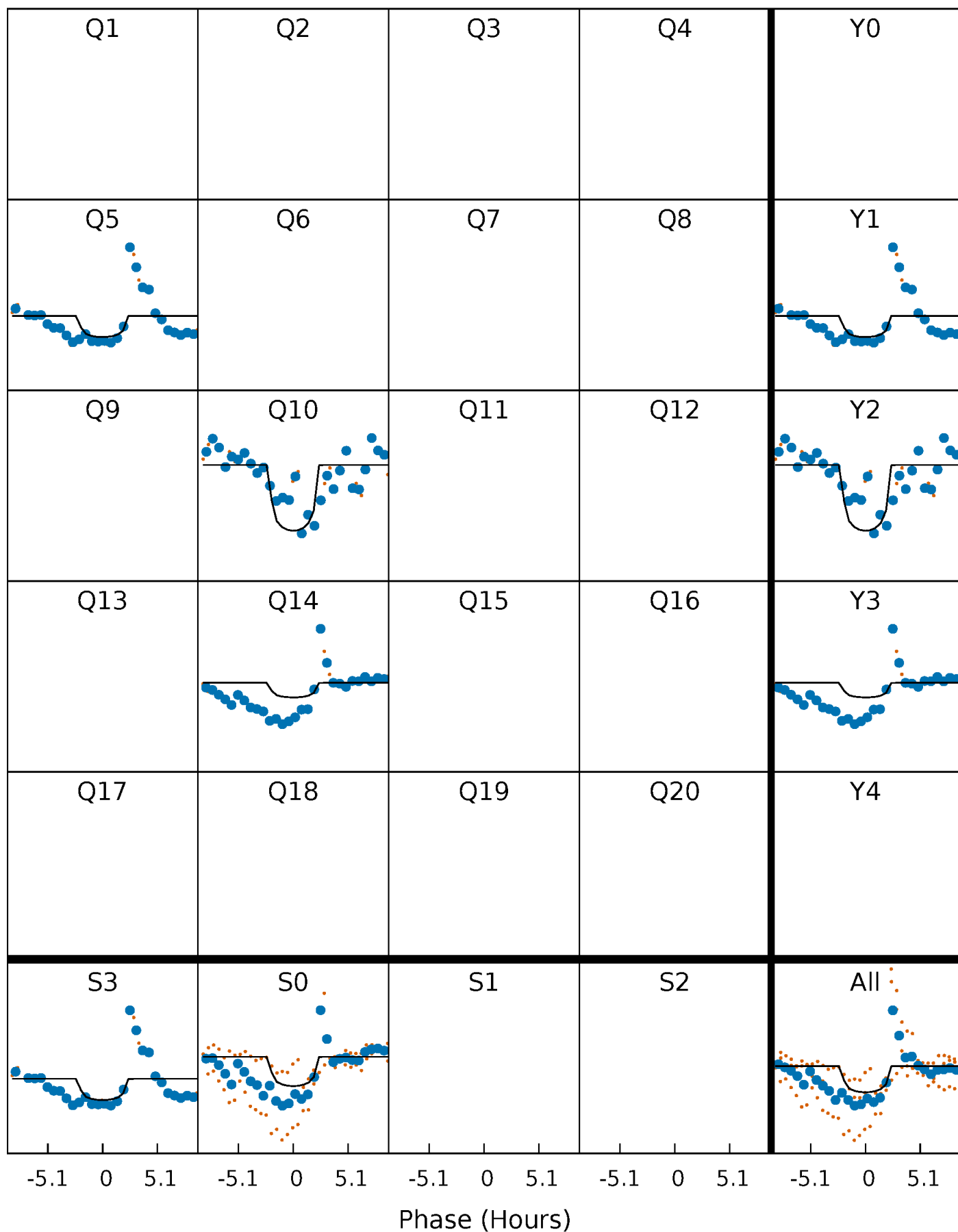
PDC Quarter-Phased Transit Curves

TCE 009401856-02 P=431.681890 Days $T_0=481.132258$ (BKJD)



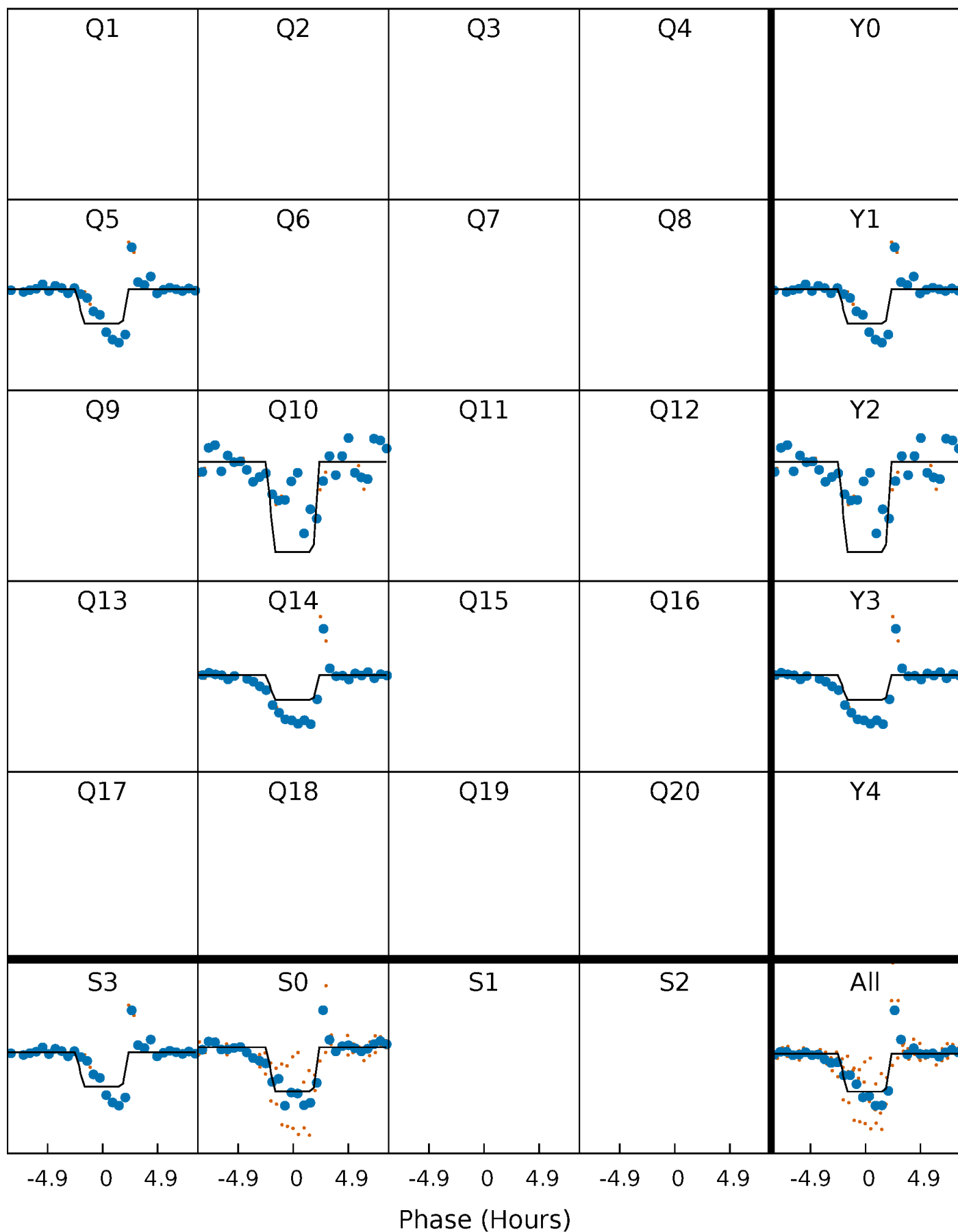
DV Quarter-Phased Transit Curves

TCE 009401856-02 $P=431.681890$ Days $T_0=481.132258$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

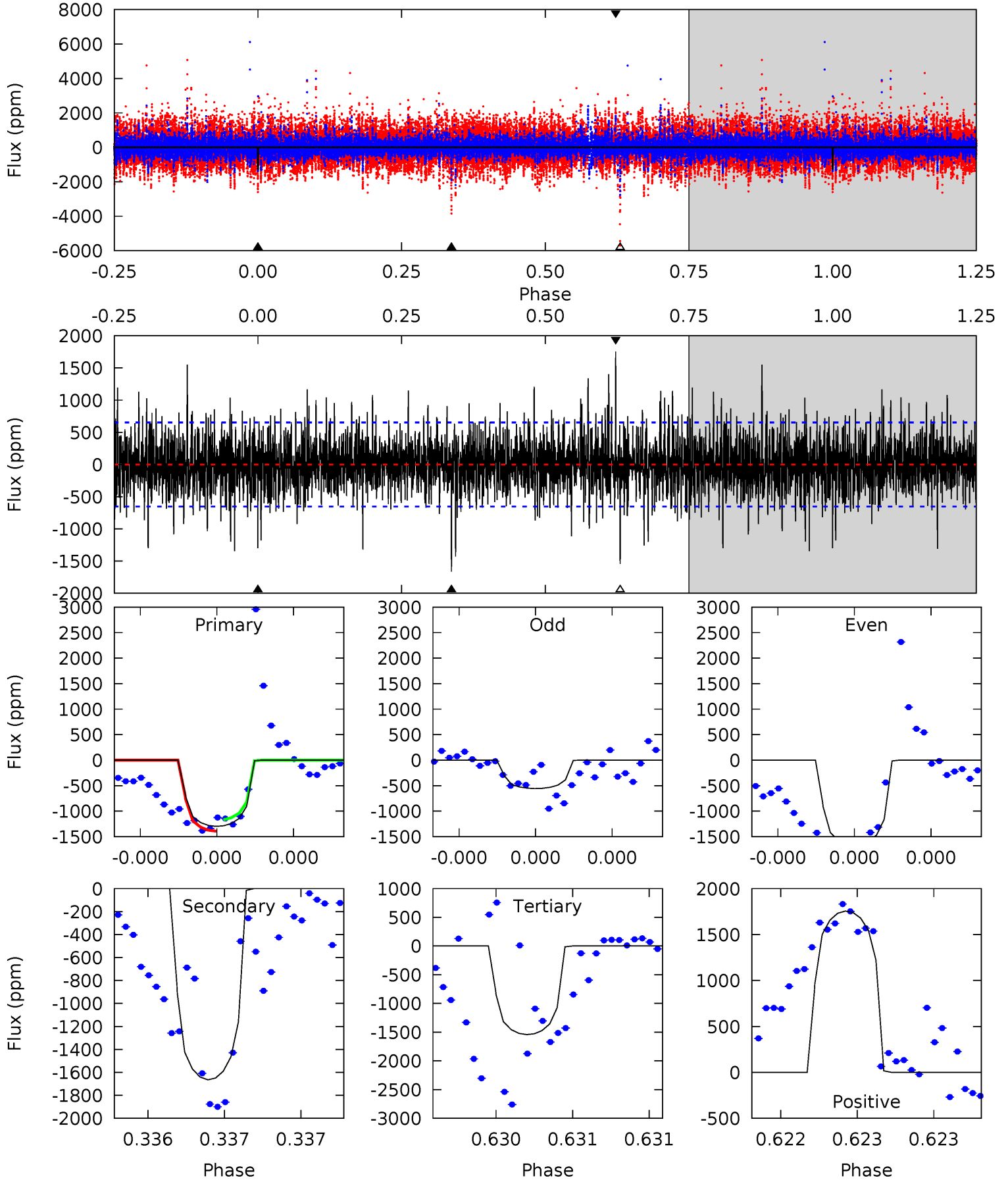
TCE 009401856-02 P=431.679389 Days $T_0=481.135683$ (BKJD)



DV Model-Shift Uniqueness Test

009401856-02, P = 431.681890 Days, E = 49.450368 Days

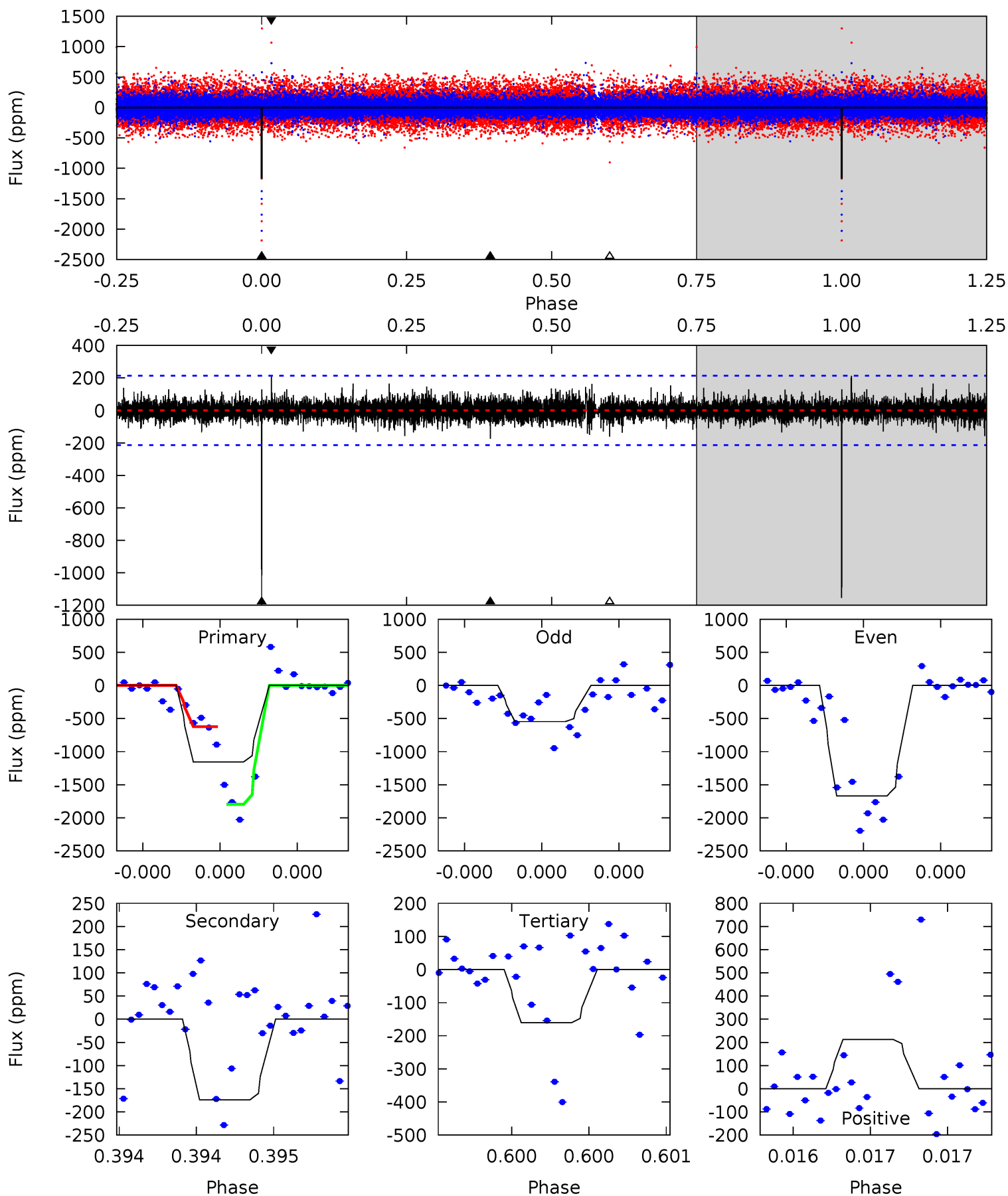
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.1	14.2	13.2	15.0	5.58	3.50	2.71	-2.10	-3.92	1.04	-0.78	3.58	1.17	0.51	0.96



Alt Model-Shift Uniqueness Test

009401856-02, P = 431.679389 Days, E = 49.456294 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
30.3	4.57	4.22	5.57	5.60	3.52	0.86	26.1	24.8	0.35	-1.00	17.3	1.13	0.16	0



Stellar Parameters For KIC 009401856

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5780^{+138}_{-155}	$4.421^{+0.116}_{-0.188}$	$-0.200^{+0.300}_{-0.300}$	$0.966^{+0.259}_{-0.139}$	$0.899^{+0.120}_{-0.087}$	$1.404^{+0.660}_{-0.684}$
	+2%/-3%	+3%/-4%	+150%/-150%	+27%/-14%	+13%/-10%	+47%/-49%
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 009401856-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-1664 ± 117	$4.40^{+3.62}_{-2.83}$	338^{+24}_{-18}	5766^{+4874}_{-1279}	$55970^{+358300}_{-39434}$
Alt.	-174 ± 38	$4.60^{+3.83}_{-2.91}$	339^{+21}_{-16}	3650^{+1766}_{-643}	5381^{+34980}_{-3896}

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

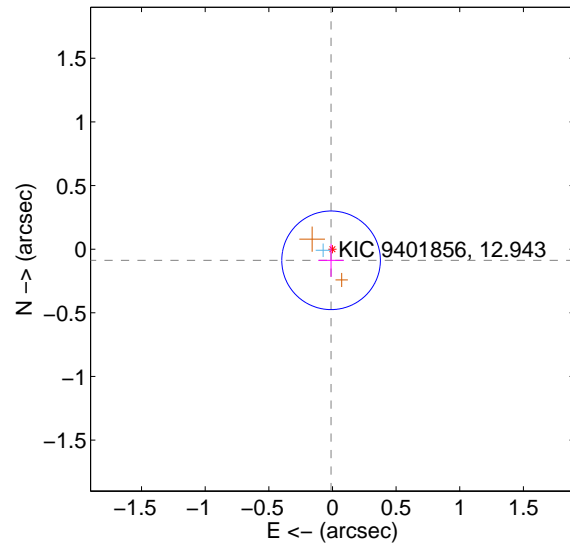
Supplemental centroid analysis for 009401856-02. Kepler magnitude: 12.94. Transit SNR 4.98

There are 1 quarters with good PRF difference image offsets

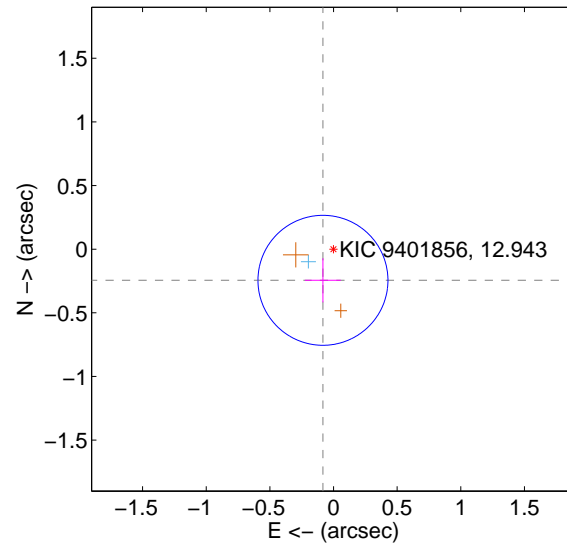
The direct PRF centroid is offset from the target star catalog position by about 0.18 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.088 ± 0.129	0.68	0.011 ± 0.100	-0.087 ± 0.130
PRF-fit source offset from KIC position	0.258 ± 0.170	1.52	0.083 ± 0.141	-0.245 ± 0.173
photometric centroid source offset	0.36 ± 0.41	0.87	0.27 ± 0.40	0.23 ± 0.42

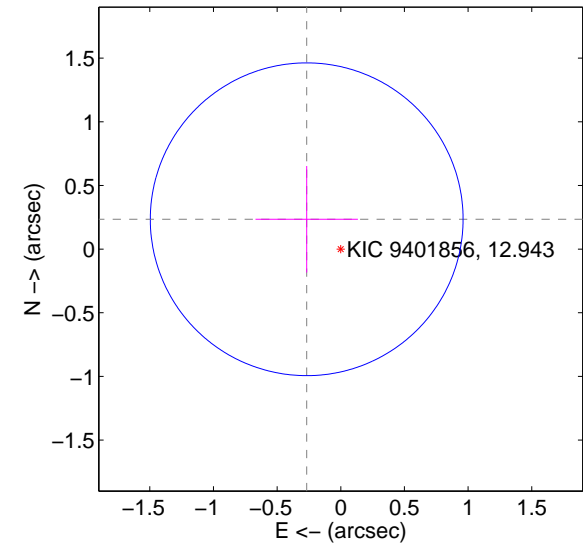
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



offset from photometric centroids

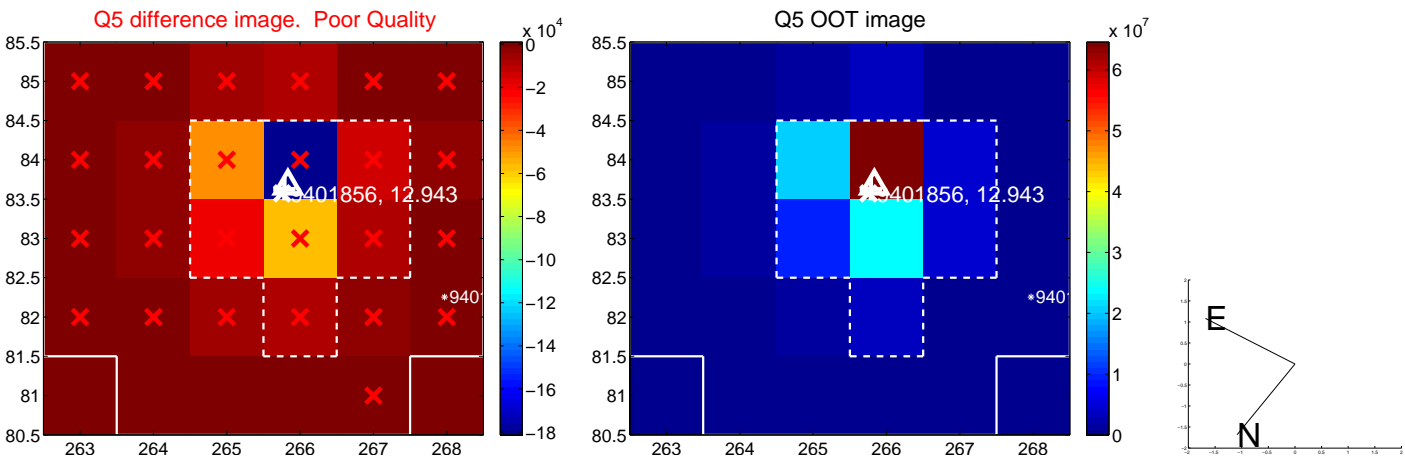


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

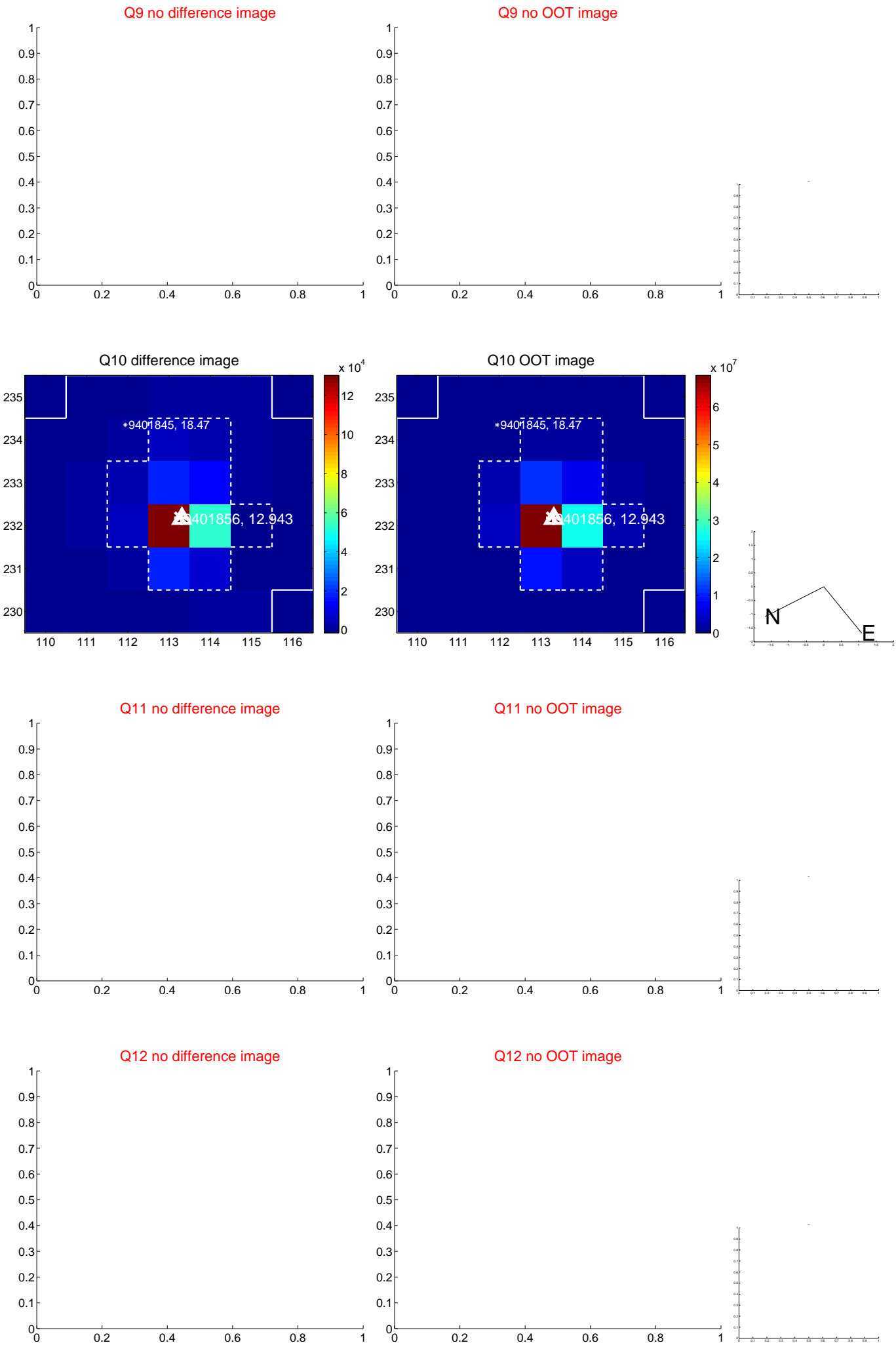
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



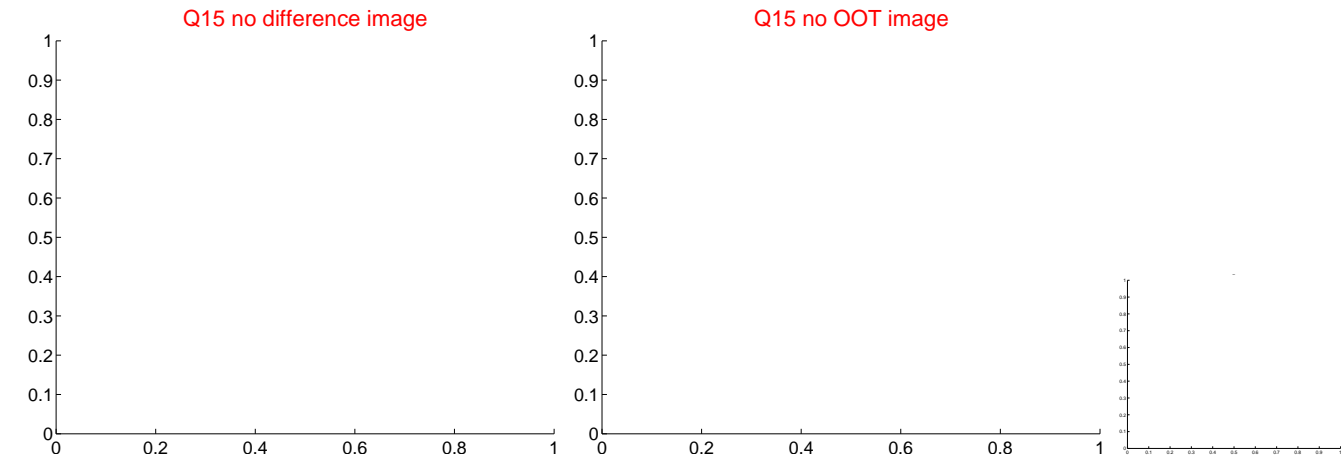
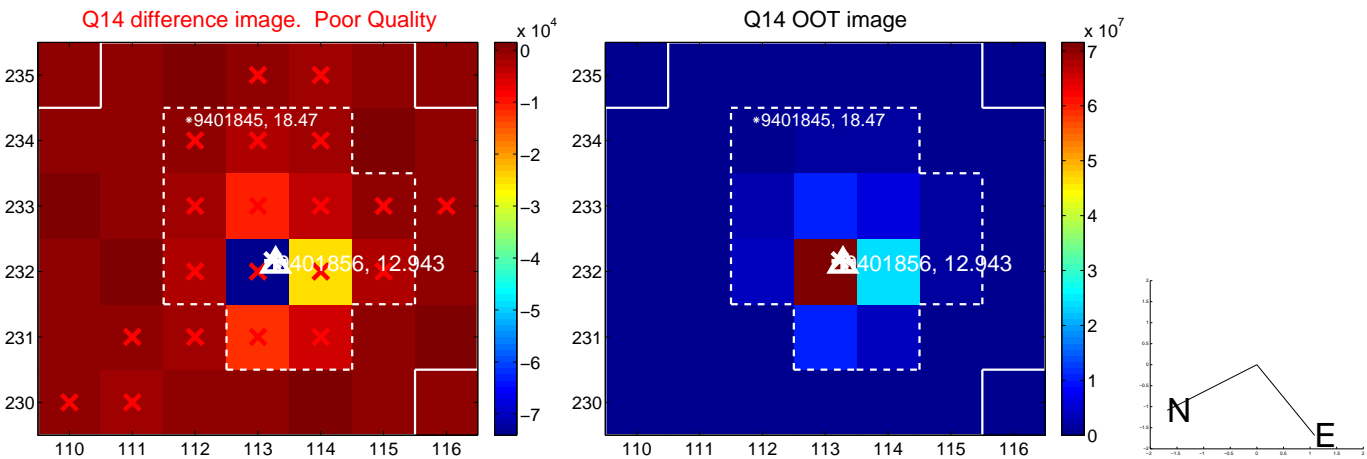
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



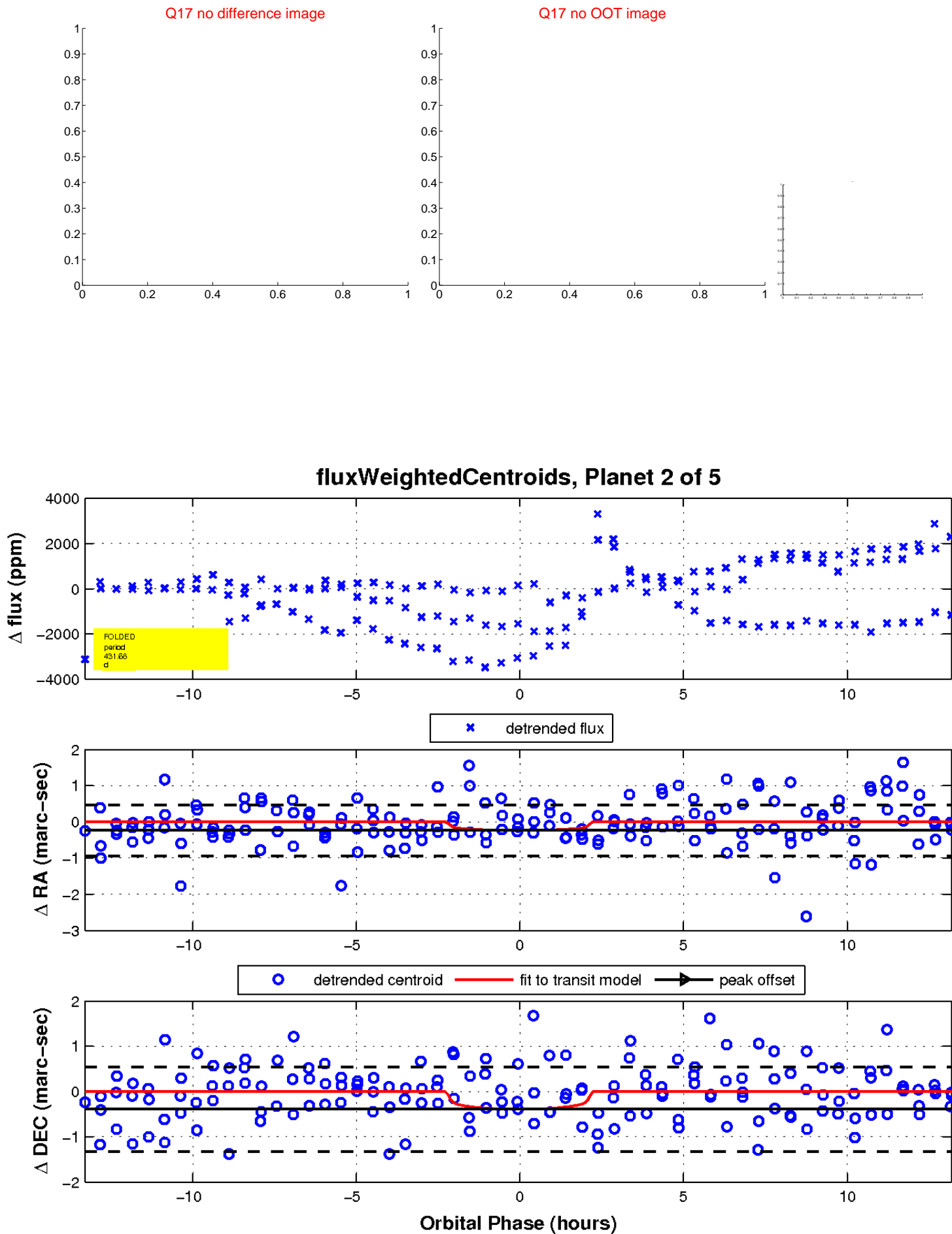
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

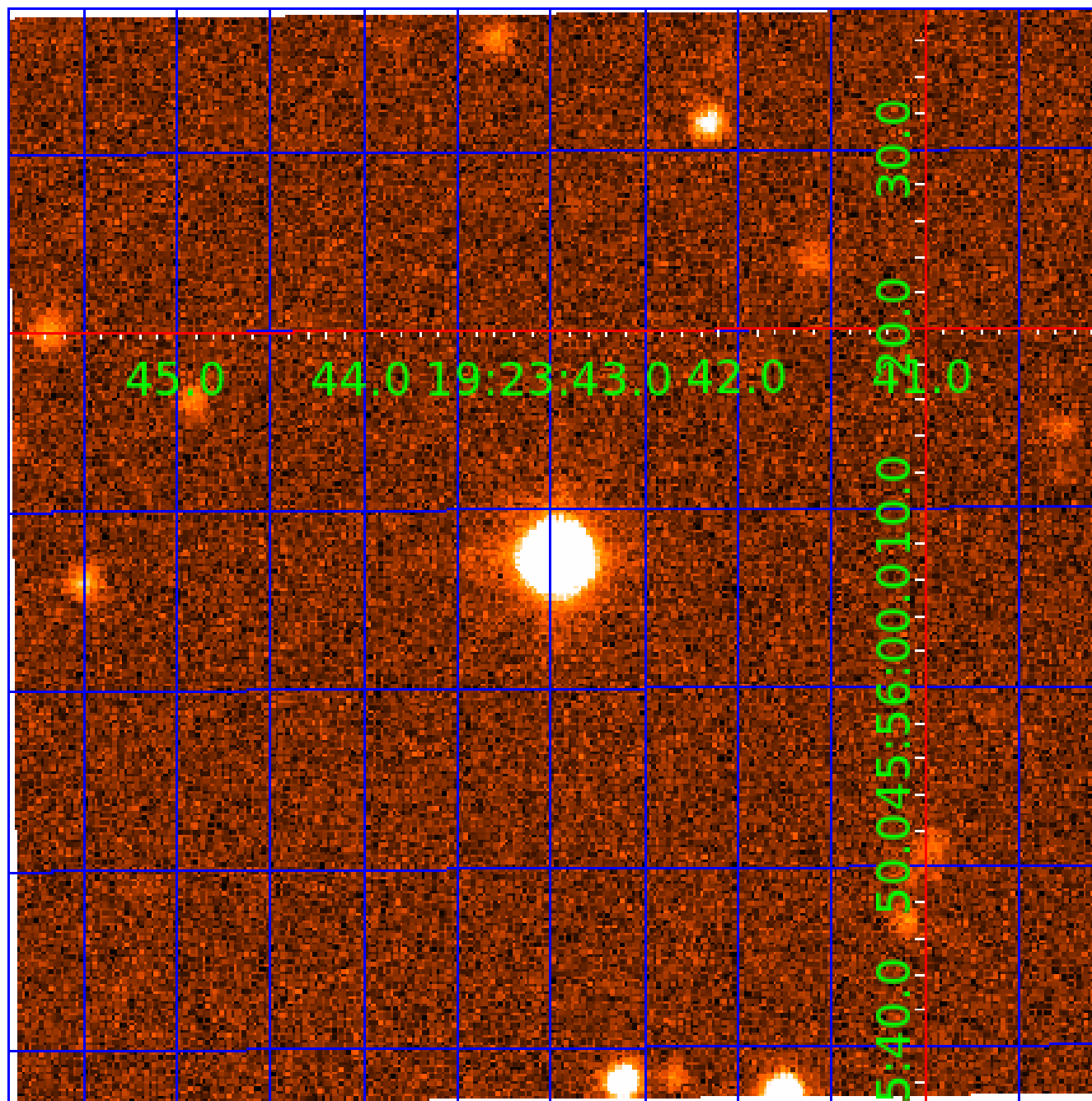


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009401856

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})
009401856-01	OBS	No	690.871313	197.038265	6.4	4.611	17.8	0.0	0.97	5780	0.29	0.43
009401856-02	OBS	No	431.681890	481.132258	914.6	4.432	17.0	5.0	0.97	5780	2.90	0.80
009401856-03	OBS	No	381.839745	424.199217	705.2	5.613	15.4	3.6	0.97	5780	2.60	0.94
009401856-04	OBS	No	408.839111	506.646694	1233.9	3.342	13.7	7.3	0.97	5780	3.80	0.86
009401856-05	OBS	No	600.085979	178.603538	307.3	7.500	14.8	-1.0	0.97	5780	1.68	0.52

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009401856-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_SKYE_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009401856-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
009401856-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009401856-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009401856-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_NOFITS

Notes: OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.

N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

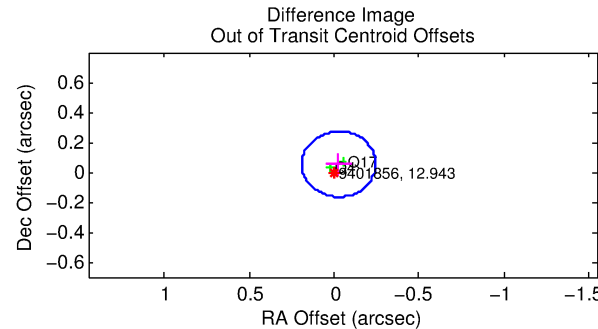
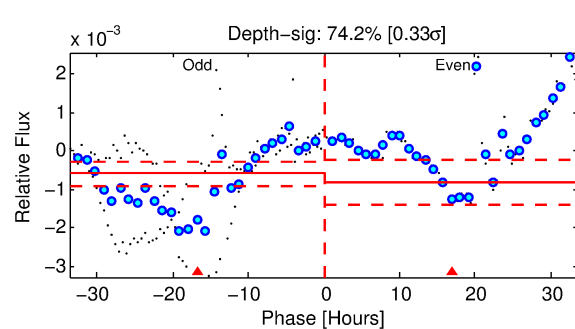
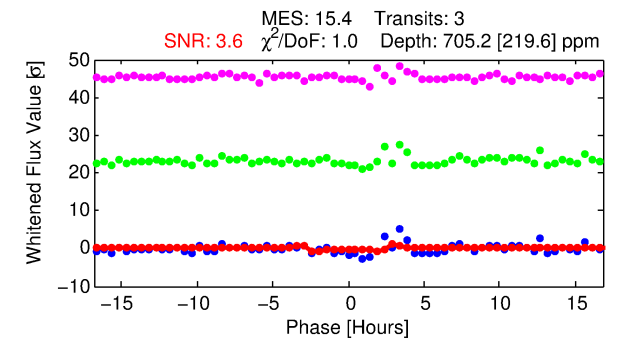
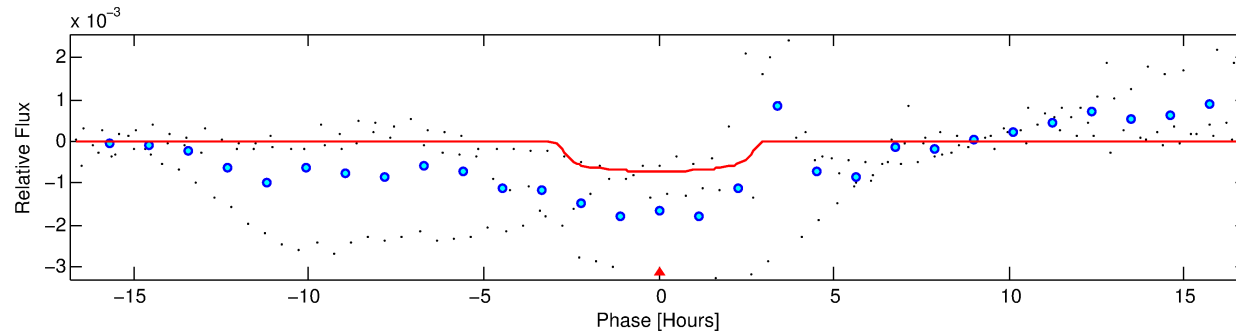
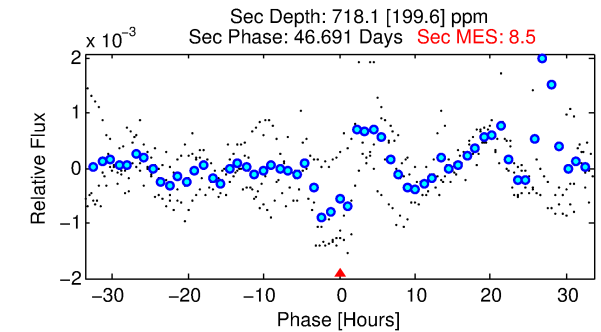
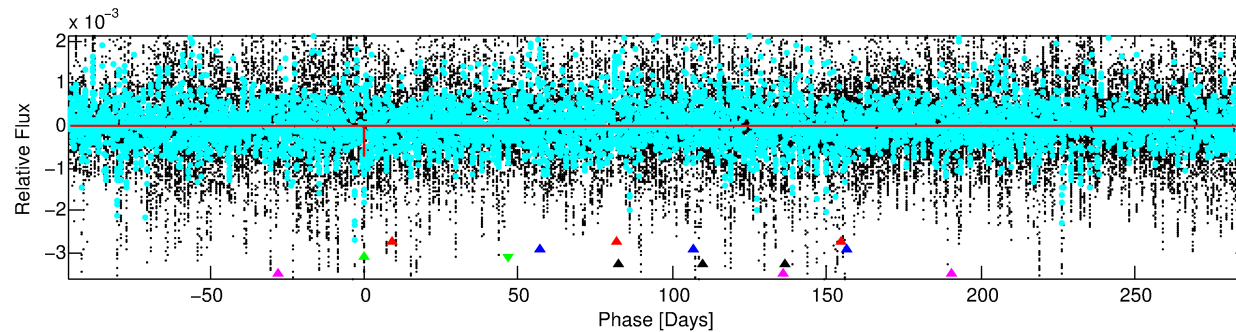
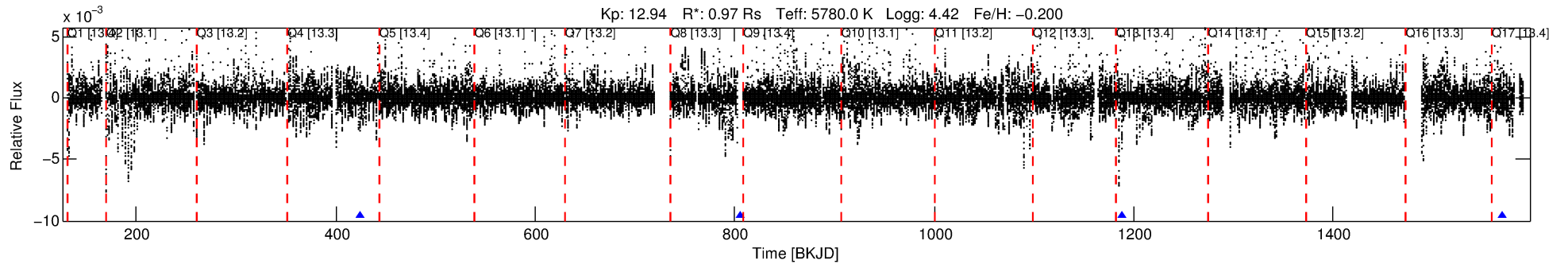
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009401856-03

No Significant Match Found

DV One-Page Summary

KIC: 9401856 Candidate: 3 of 5 Period: 381.840 d



DV Fit Results:

Period = 381.83974 [0.00446] d
Epoch = 424.1992 [0.0092] BKJD
Rp/R* = 0.0246 [0.0249]
a/R* = 488.12 [2121.64]
b = 0.41 [8.90]
Seff = 0.94 [0.34]
Teq = 251 [22] K
Rp = 2.60 [2.72] Re
a = 0.9937 [0.2283] AU
Ag = 57905.72 [120005.89] [0.48σ]
Teffp = 6030 [3086] K [1.87σ]

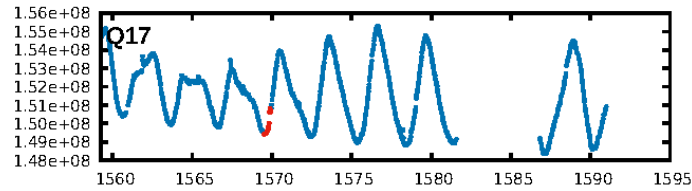
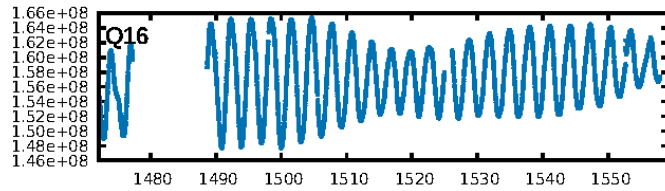
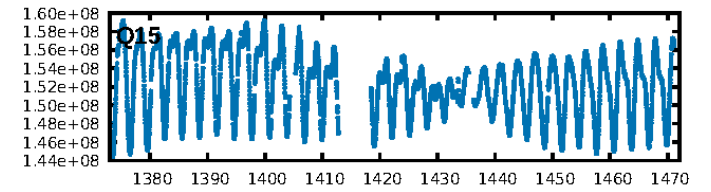
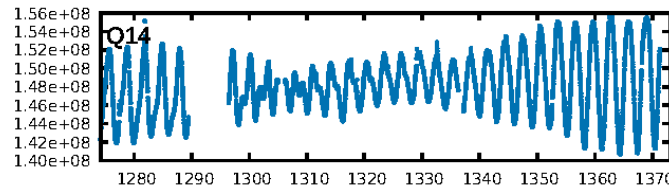
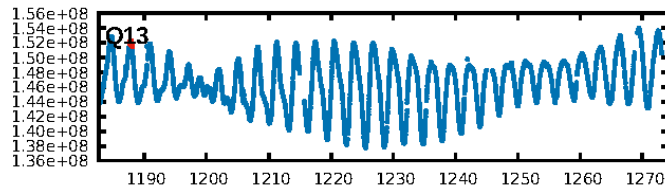
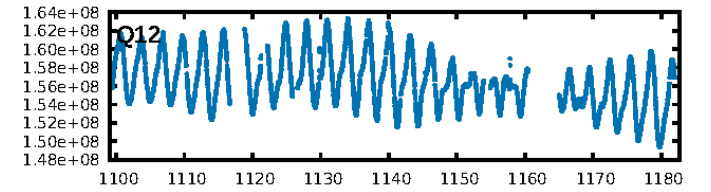
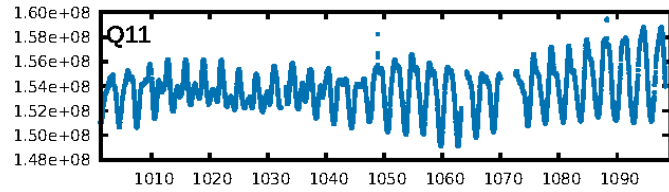
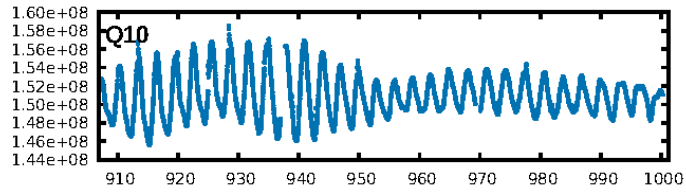
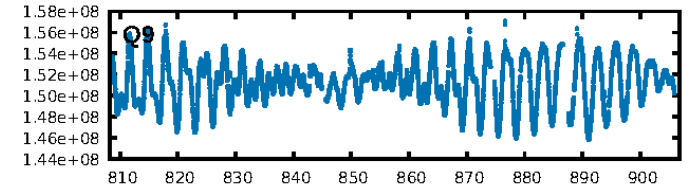
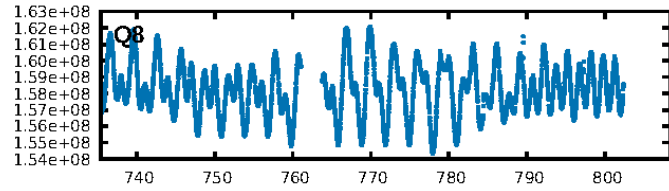
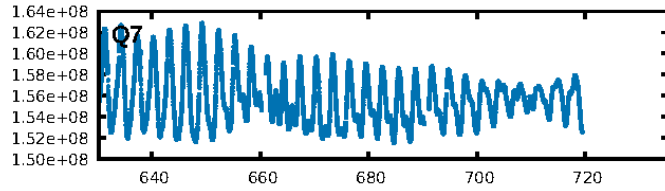
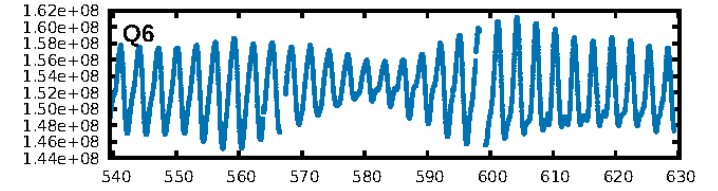
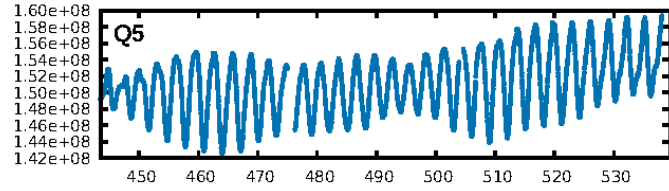
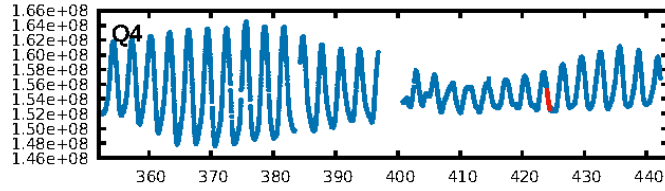
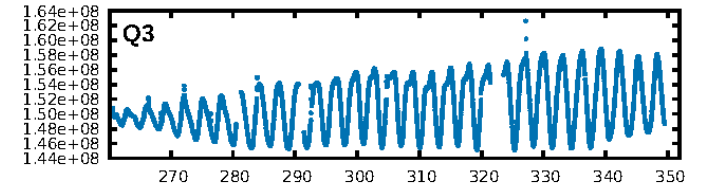
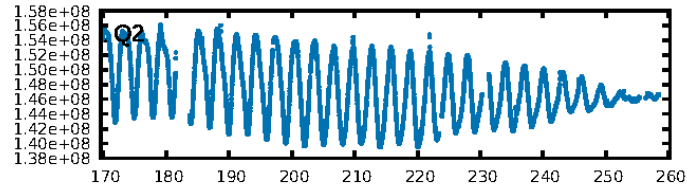
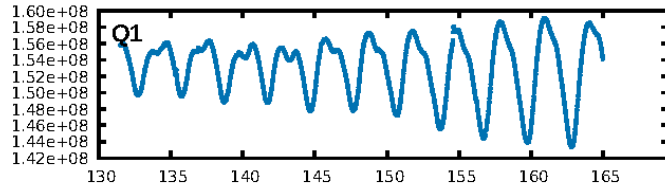
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [99.19σ]
ModelChiSquare2-sig: 62.6%
ModelChiSquareGof-sig: 99.7%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [2/2]
GhostDiagnostic-chr: 0.7702
Centroid-sig: 65.7%
Centroid-so: 0.541 arcsec [1.00σ]
OotOffset-rm: 0.059 arcsec [0.82σ]
OotOffset-st: 0/0/1/1 [2]
KicOffset-rm: 0.152 arcsec [2.15σ]
KicOffset-st: 0/0/1/1 [2]
DiffImageQuality-fgm: 1.00 [2/2]
DiffImageOverlap-fno: 1.00 [2/2]

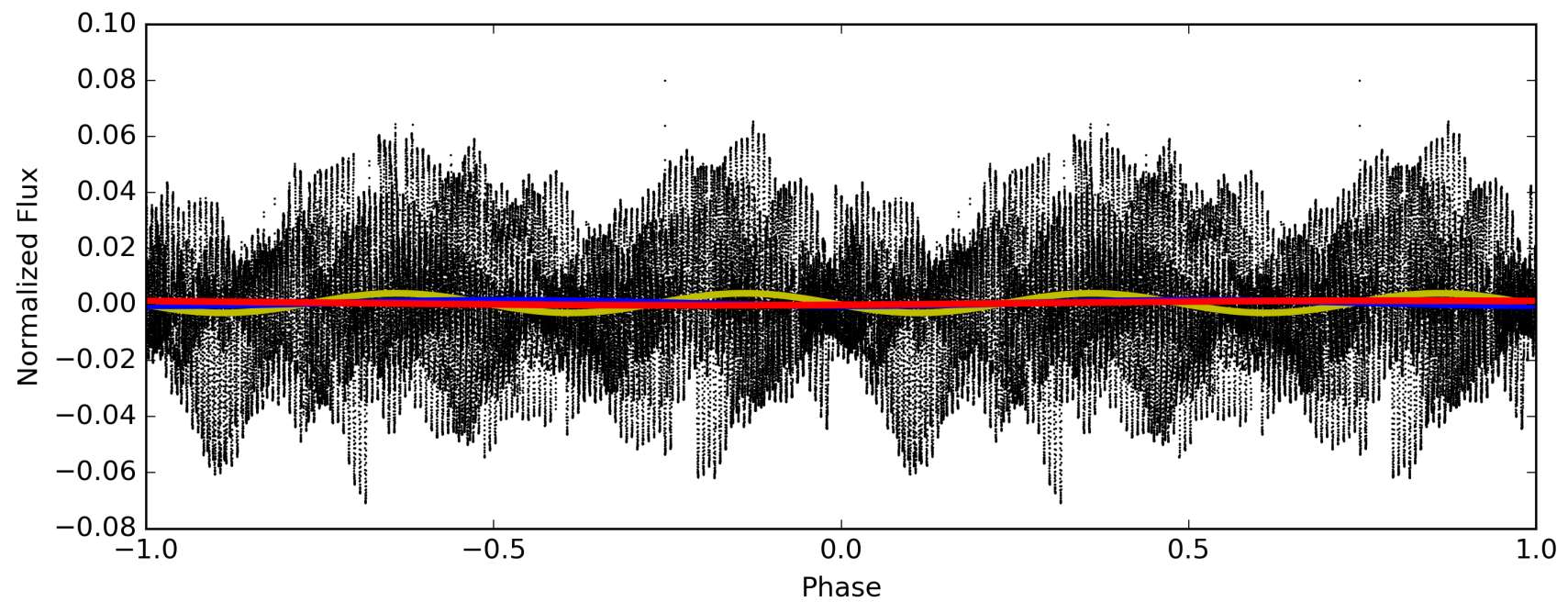
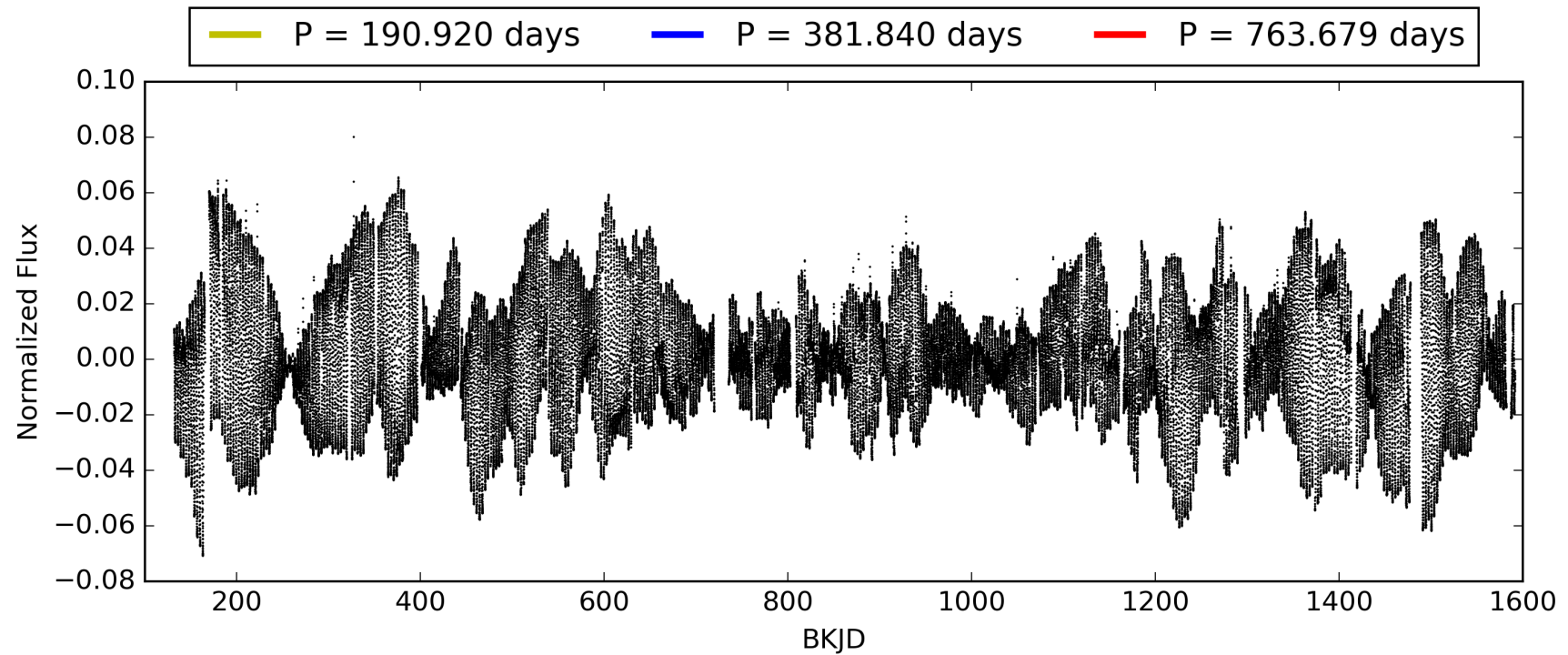
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 23:48:49 Z

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

TCE 009401856-03, PDC Light Curves

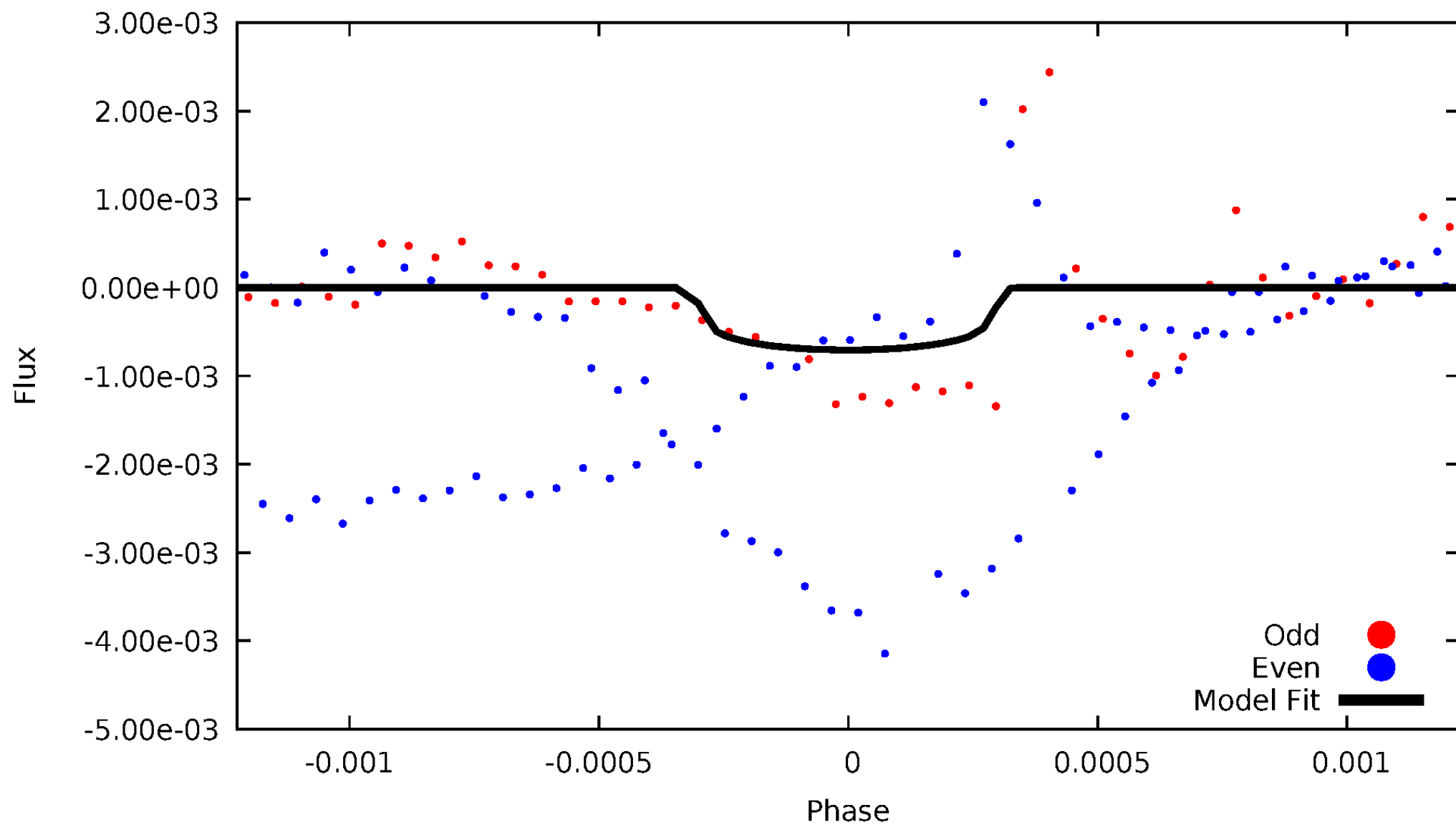


TCE 009401856-03



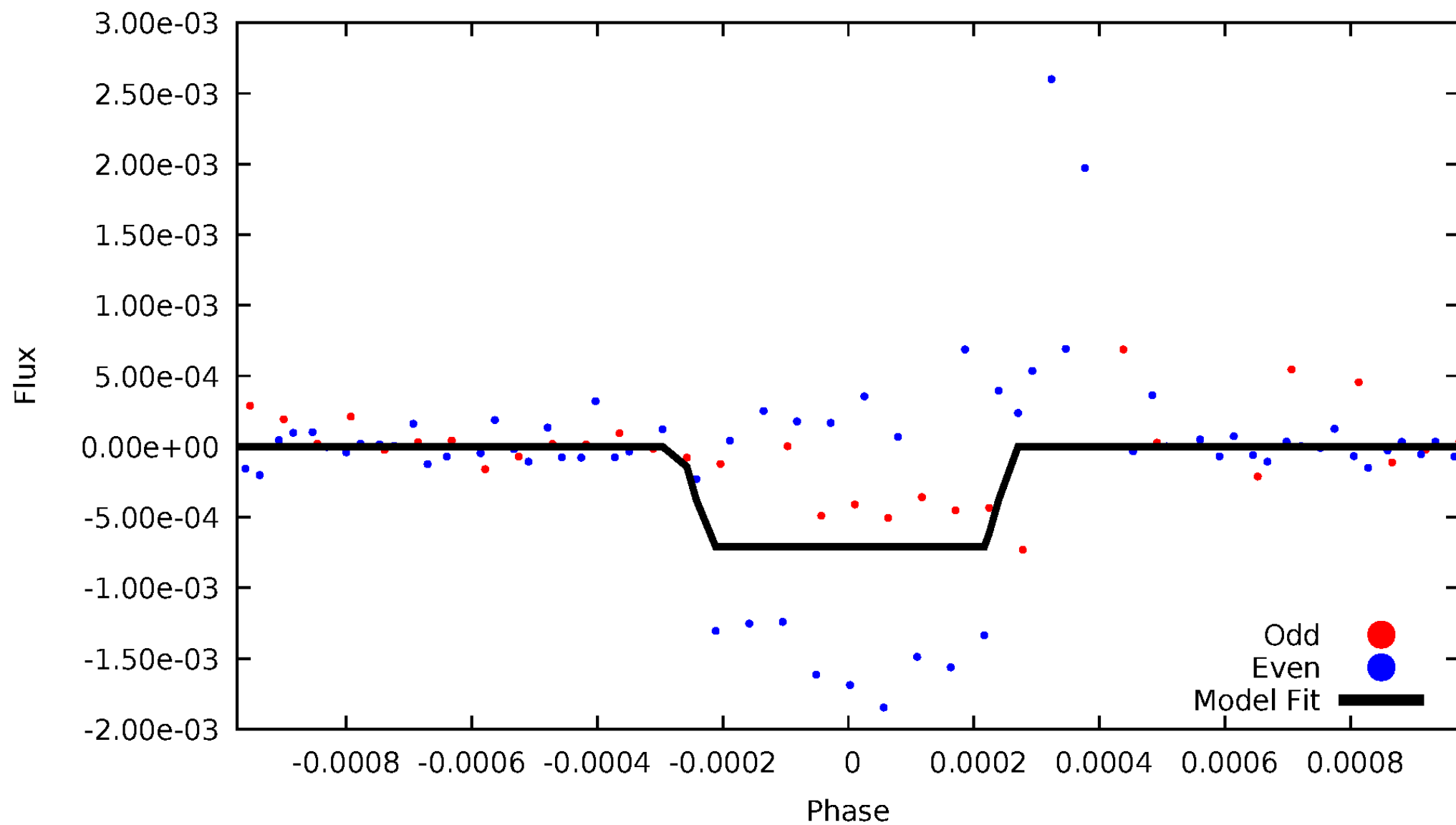
DV Odd/Even

TCE 009401856-03



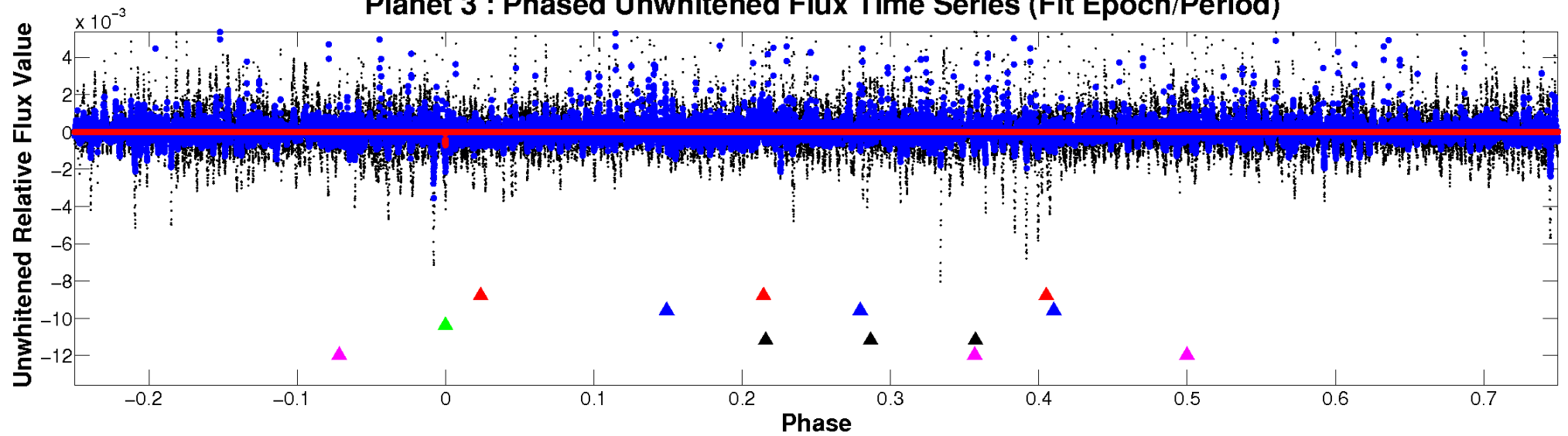
ALT Odd/Even

TCE 009401856-03

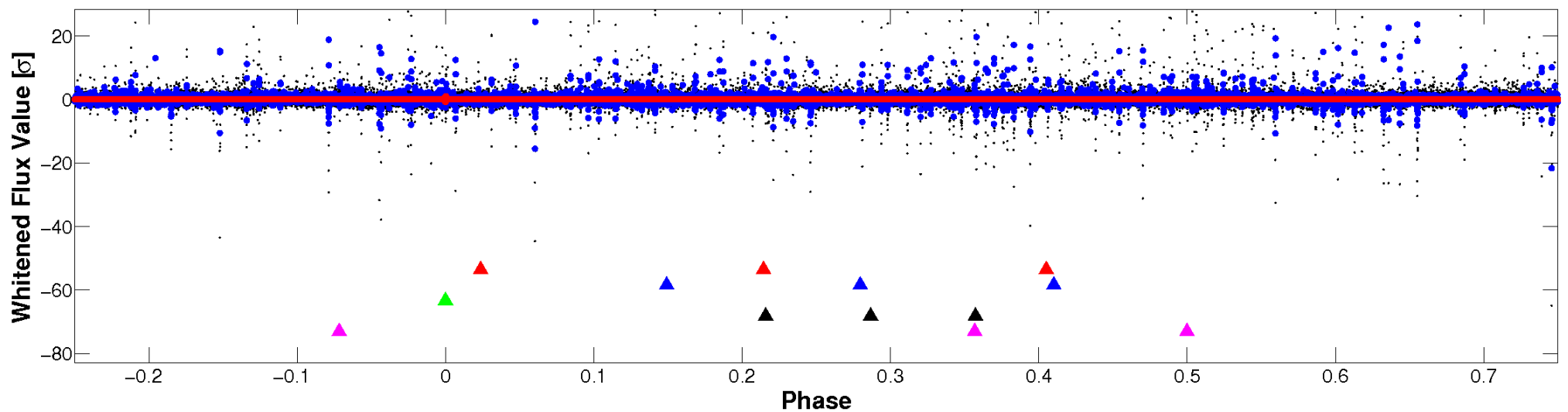


Non-Whitened Vs. Whitened Light Curve

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

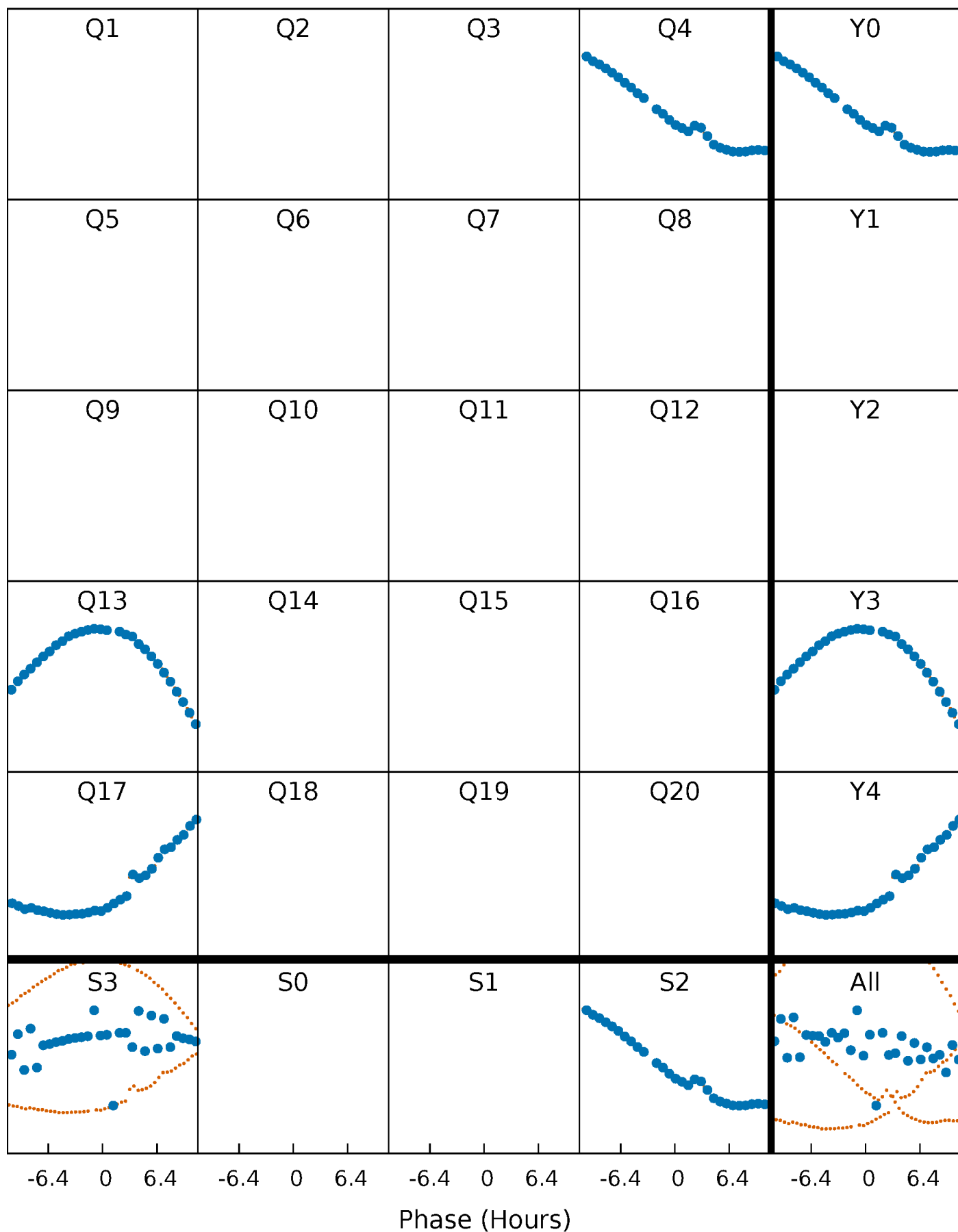


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



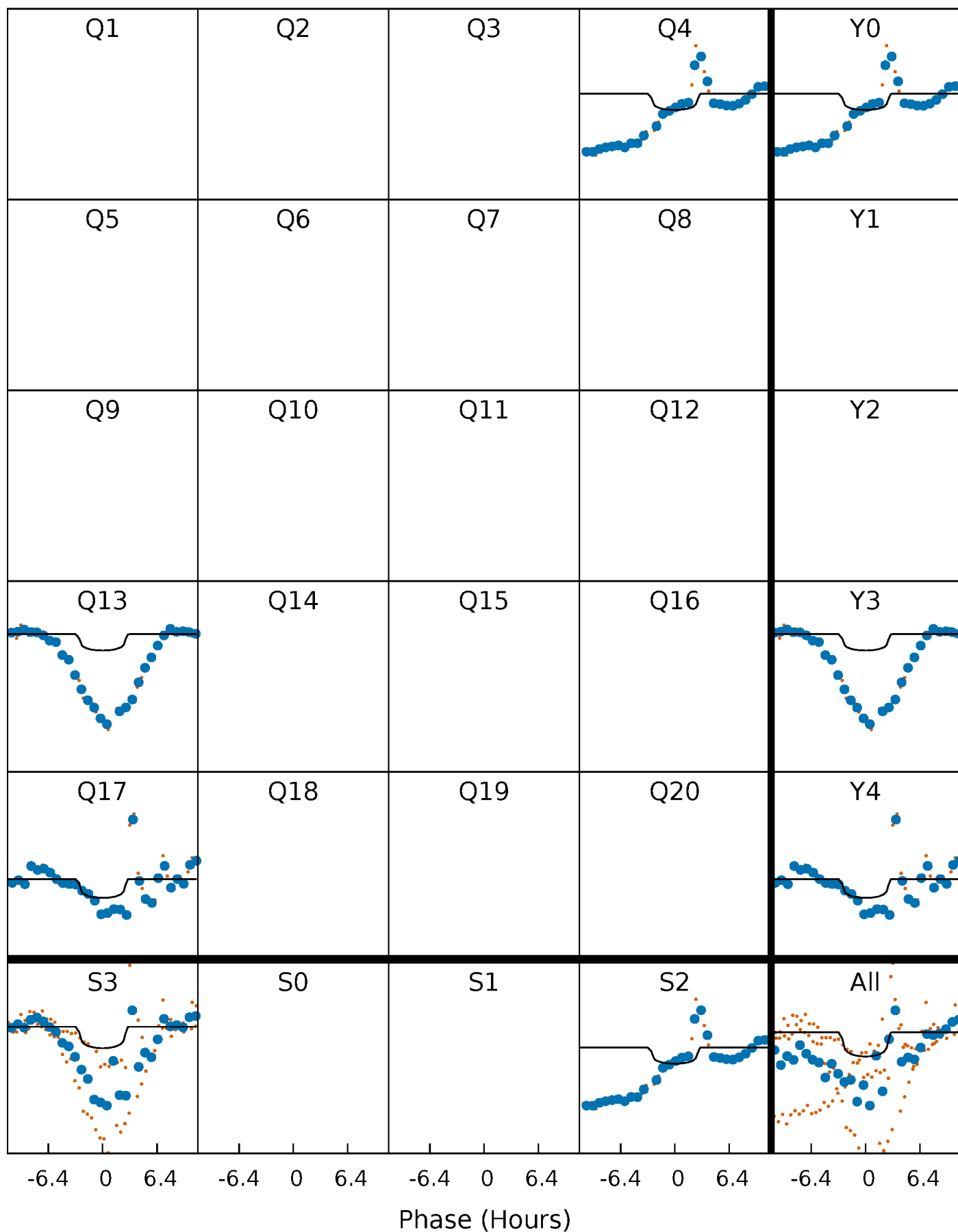
PDC Quarter-Phased Transit Curves

TCE 009401856-03 $P=381.839745$ Days $T_0=424.199217$ (BKJD)



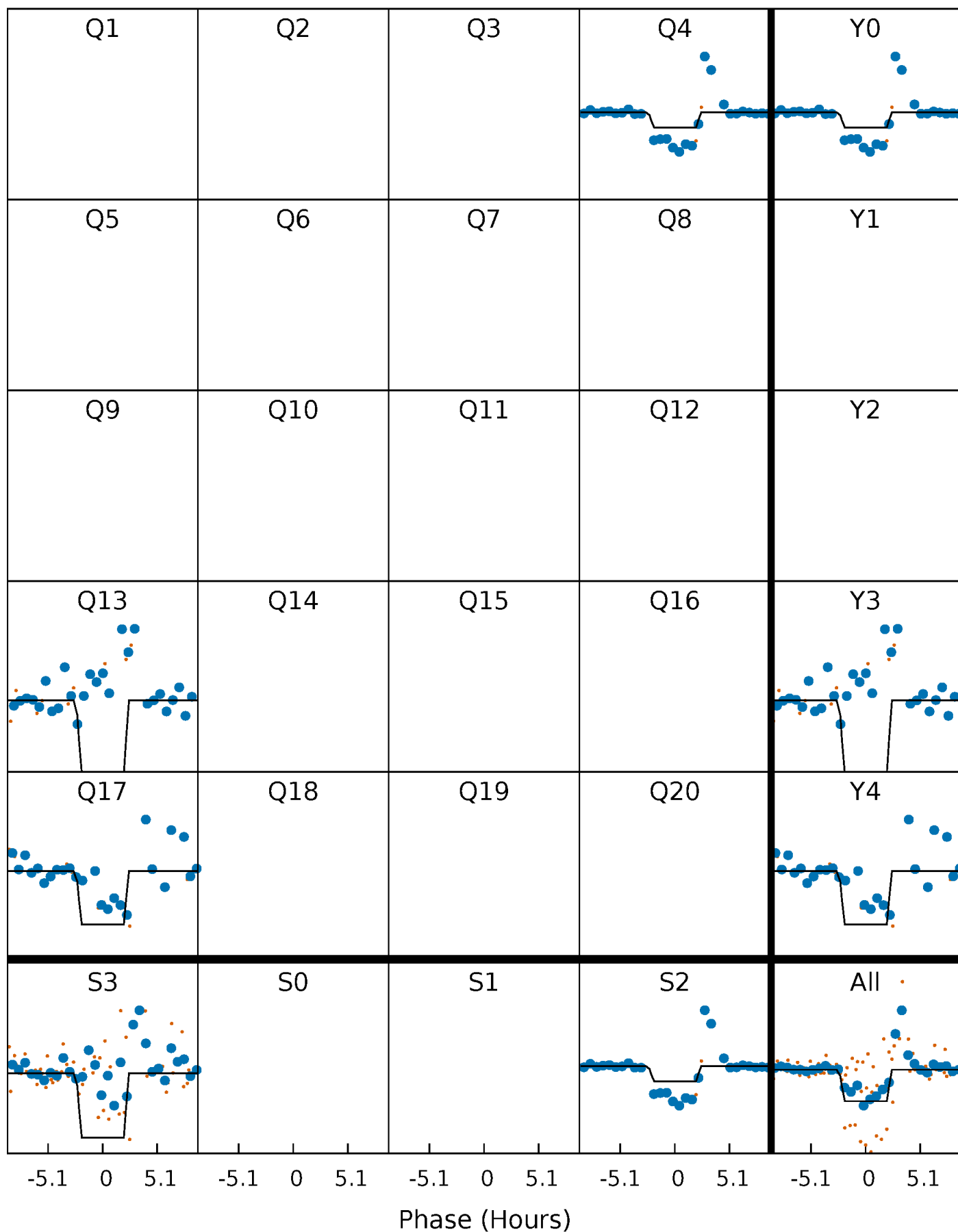
DV Quarter-Phased Transit Curves

TCE 009401856-03 $P=381.839745$ Days $T_0=424.199217$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

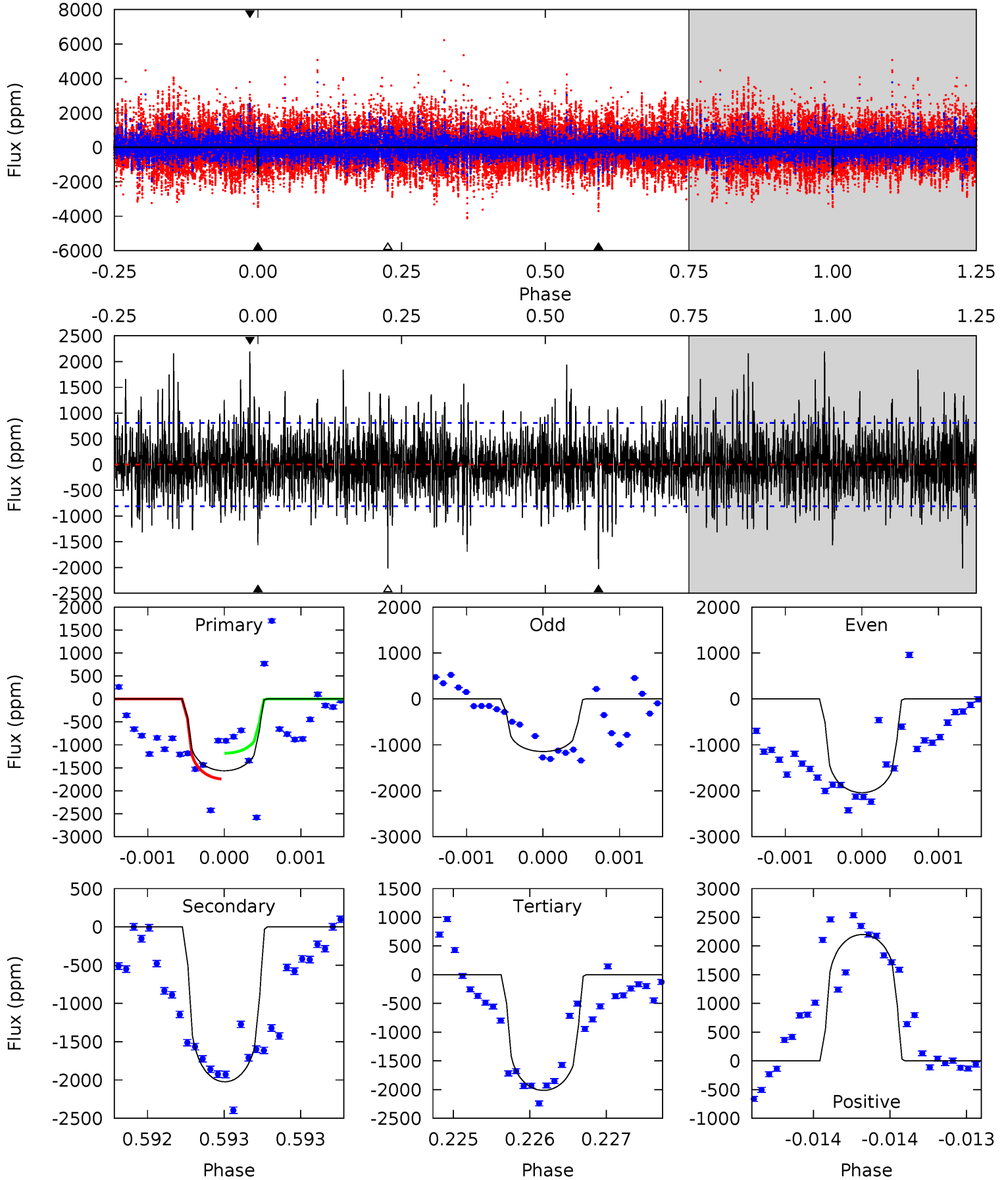
TCE 009401856-03 P=381.848747 Days $T_0=424.179116$ (BKJD)



DV Model-Shift Uniqueness Test

009401856-03, P = 381.839745 Days, E = 42.359472 Days

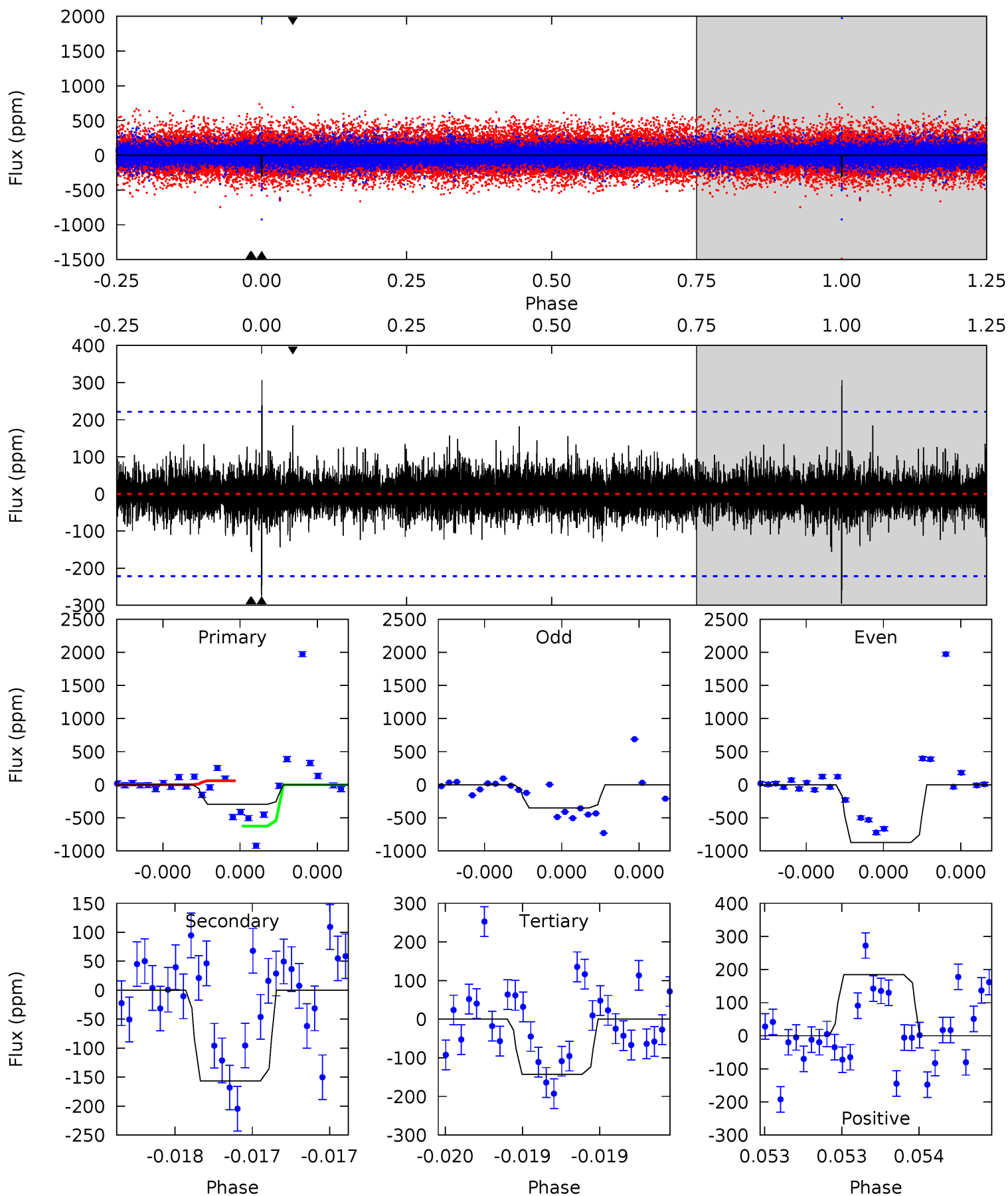
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.7	13.8	13.8	15.0	5.53	3.42	3.02	-3.07	-4.34	0.07	-1.21	2.63	1.58	0.52	1.90



Alt Model-Shift Uniqueness Test

009401856-03, P = 381.848747 Days, E = 42.330369 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.44	3.94	3.59	4.65	5.58	3.49	0.81	3.85	2.79	0.35	-0.71	7.66	1.51	0.51	7.15



Stellar Parameters For KIC 009401856

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5780^{+138}_{-155}	$4.421^{+0.116}_{-0.188}$	$-0.200^{+0.300}_{-0.300}$	$0.966^{+0.259}_{-0.139}$	$0.899^{+0.120}_{-0.087}$	$1.404^{+0.660}_{-0.684}$
	+2%/-3%	+3%/-4%	+150%/-150%	+27%/-14%	+13%/-10%	+47%/-49%
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 009401856-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-2024 ± 146	$3.16^{+2.52}_{-2.01}$	353^{+24}_{-19}	7142^{+8083}_{-1713}	$110026^{+719076}_{-75648}$
Alt.	-156 ± 40	$3.27^{+2.59}_{-2.15}$	353^{+23}_{-17}	3991^{+2298}_{-688}	7910^{+55835}_{-5472}

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

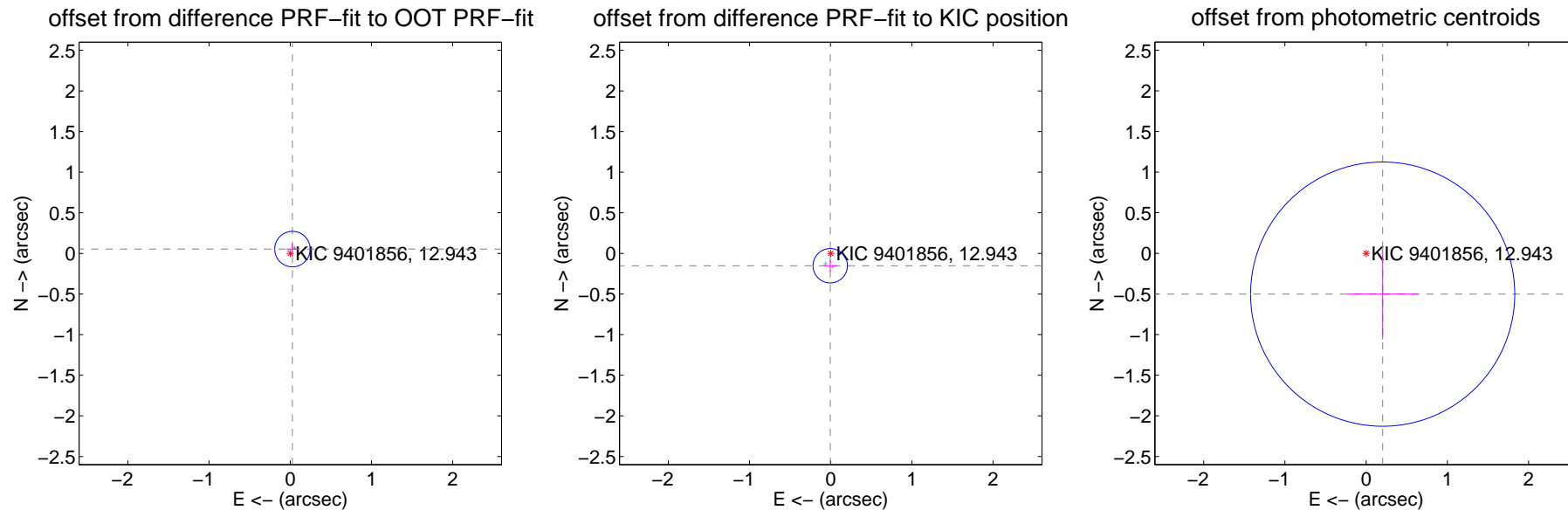
DV Centroid Data

Supplemental centroid analysis for 009401856-03. Kepler magnitude: 12.94. Transit SNR 3.61

There are 2 quarters with good PRF difference image offsets

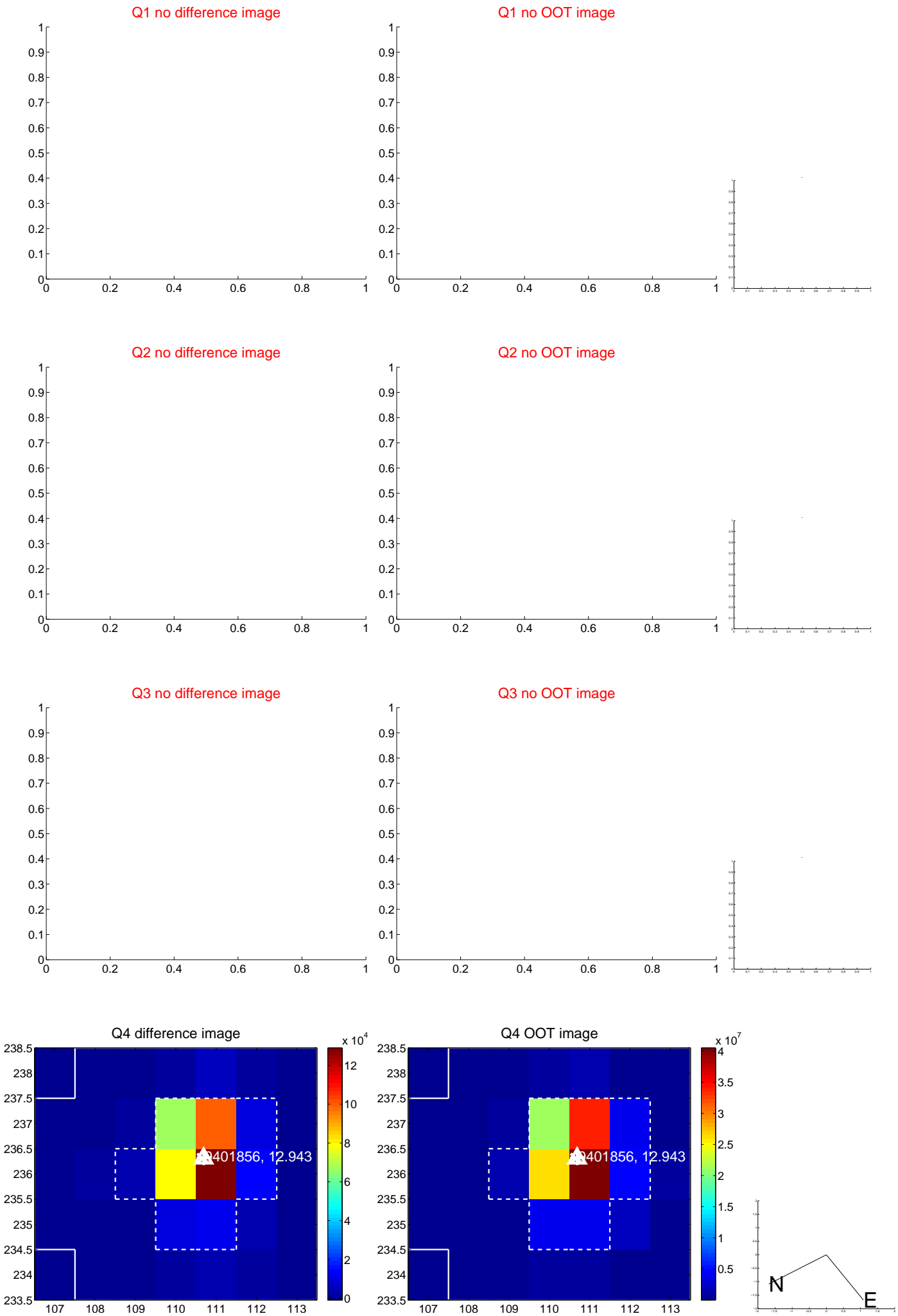
The direct PRF centroid is offset from the target star catalog position by about 0.24 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.059 ± 0.073	0.82	-0.027 ± 0.073	0.053 ± 0.069
PRF-fit source offset from KIC position	0.152 ± 0.071	2.15	0.006 ± 0.083	-0.152 ± 0.071
photometric centroid source offset	0.54 ± 0.54	1.00	-0.20 ± 0.44	-0.50 ± 0.56



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.



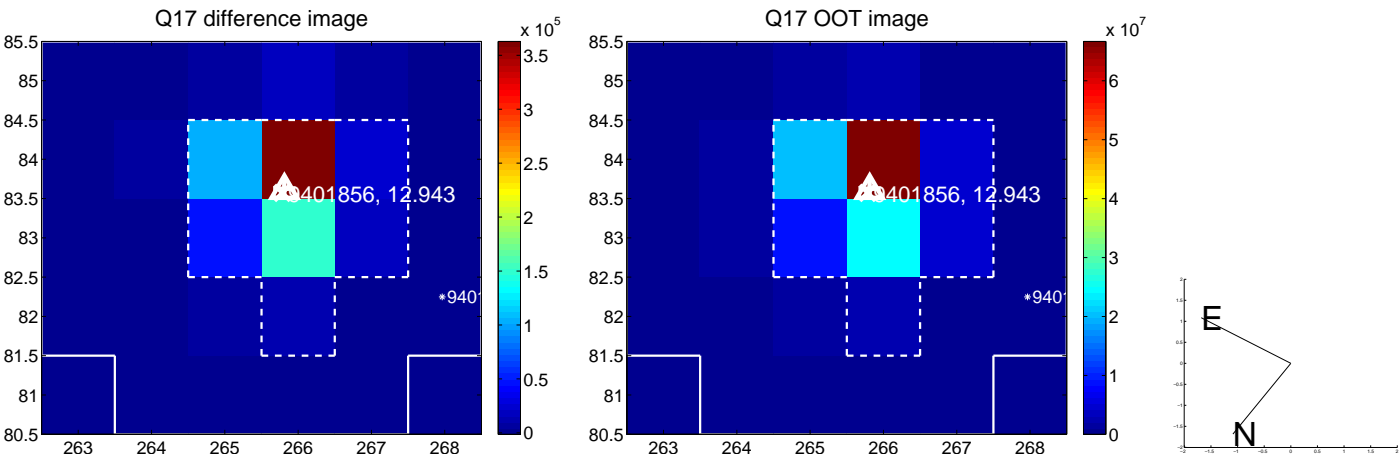
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



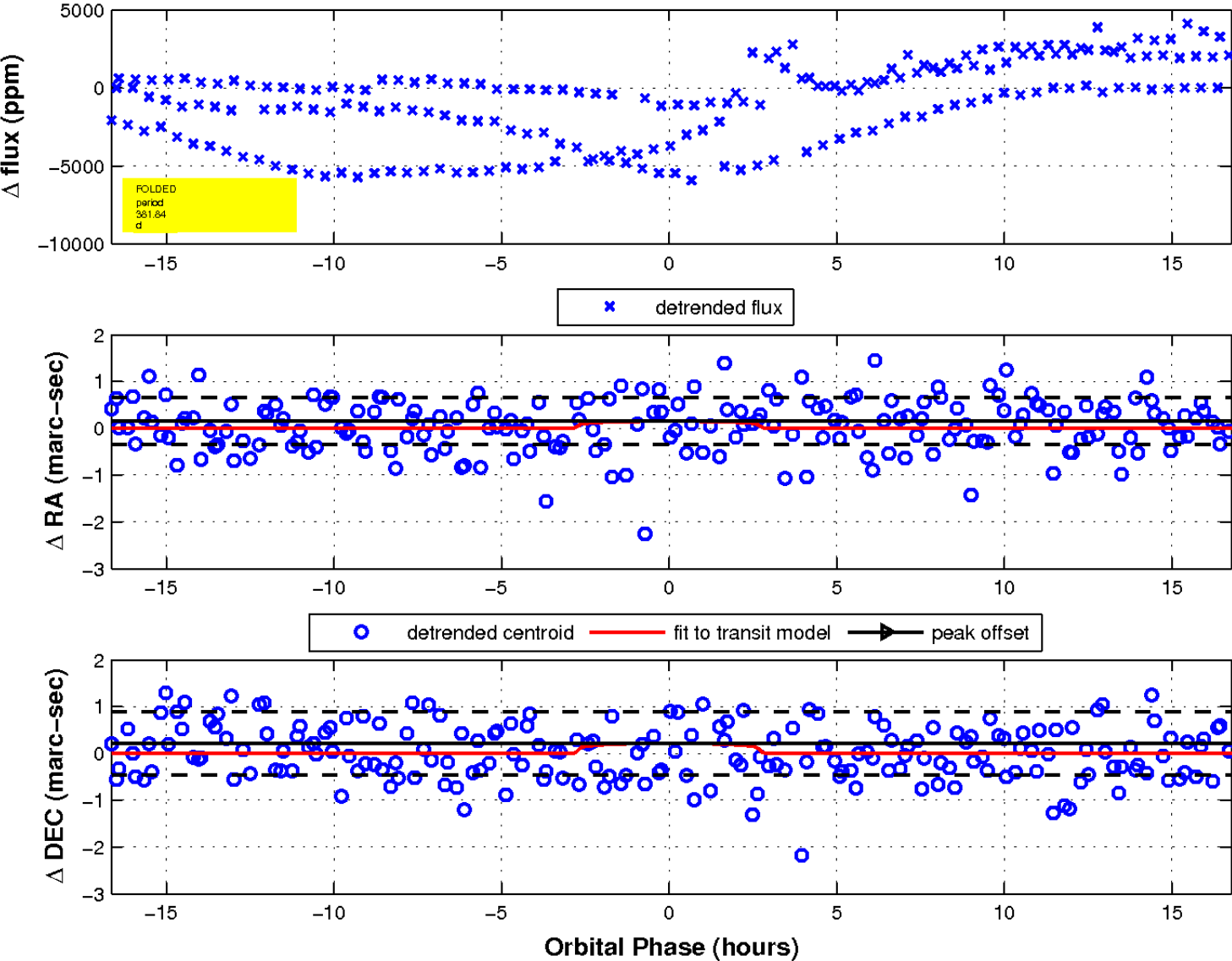
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

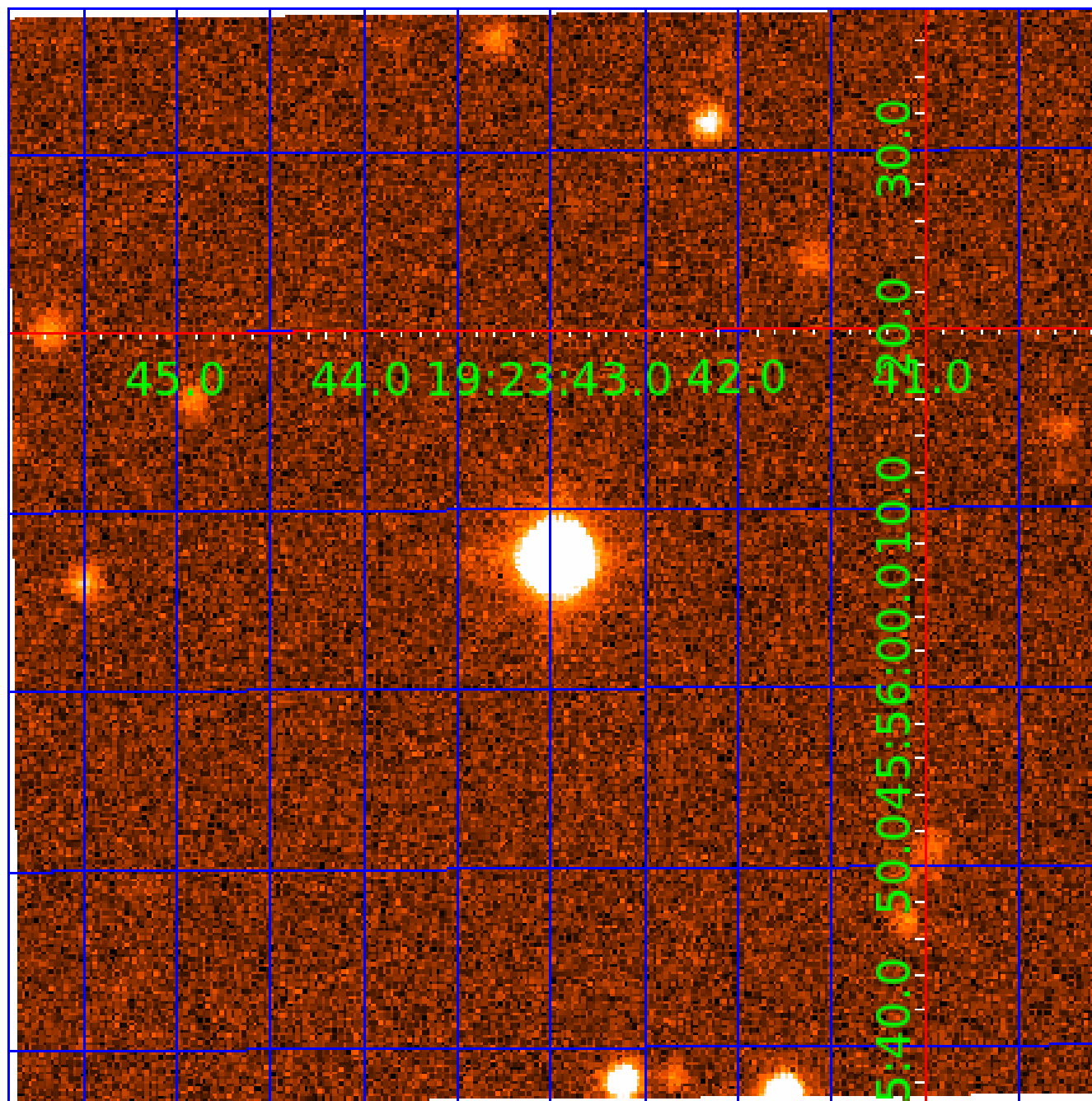


fluxWeightedCentroids, Planet 3 of 5



UKIRT Image

Declination



KIC 009401856

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})
009401856-01	OBS	No	690.871313	197.038265	6.4	4.611	17.8	0.0	0.97	5780	0.29	0.43
009401856-02	OBS	No	431.681890	481.132258	914.6	4.432	17.0	5.0	0.97	5780	2.90	0.80
009401856-03	OBS	No	381.839745	424.199217	705.2	5.613	15.4	3.6	0.97	5780	2.60	0.94
009401856-04	OBS	No	408.839111	506.646694	1233.9	3.342	13.7	7.3	0.97	5780	3.80	0.86
009401856-05	OBS	No	600.085979	178.603538	307.3	7.500	14.8	-1.0	0.97	5780	1.68	0.52

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009401856-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_SKYE_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009401856-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
009401856-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009401856-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009401856-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_NOFITS

Notes: OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.

N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

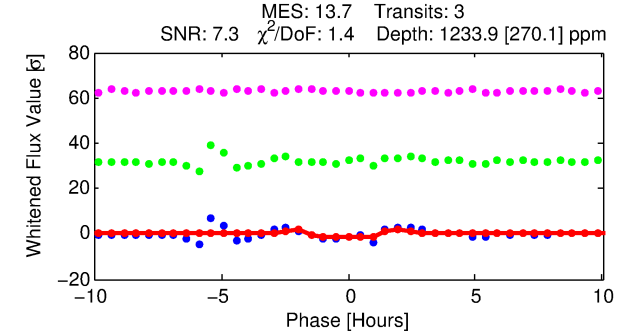
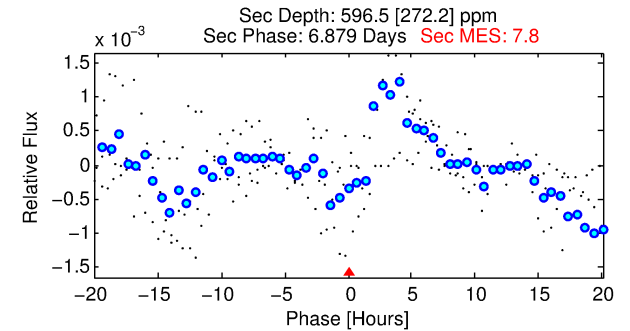
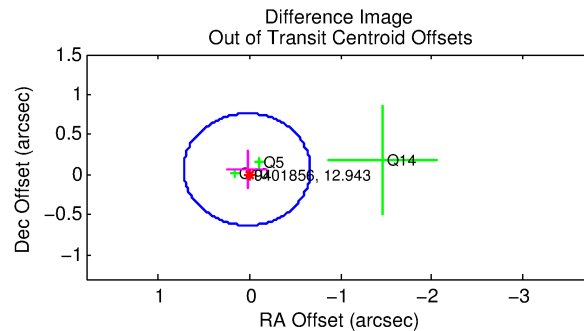
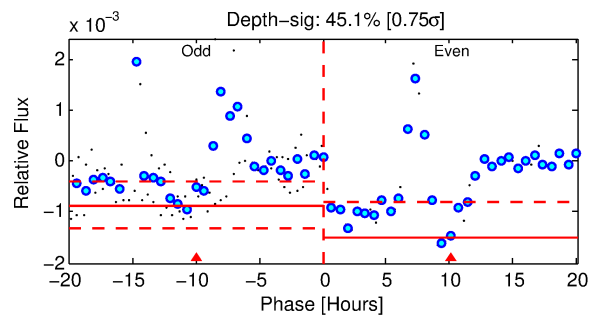
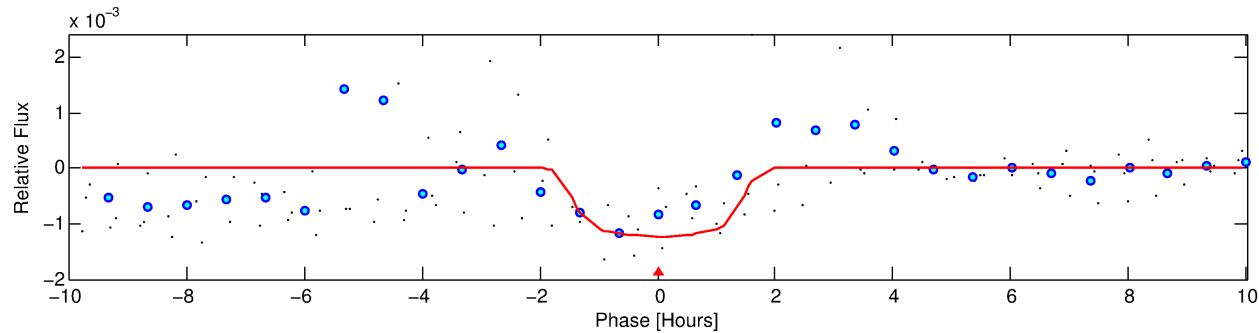
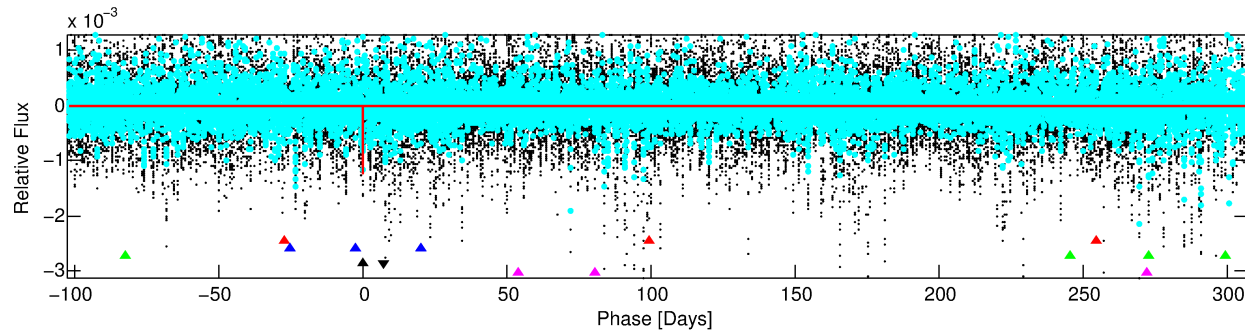
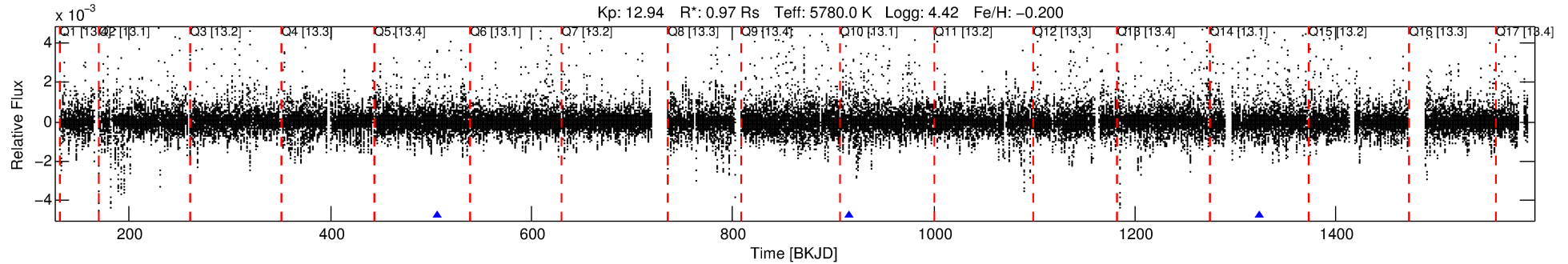
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009401856-04

No Significant Match Found

DV One-Page Summary

KIC: 9401856 Candidate: 4 of 5 Period: 408.839 d



DV Fit Results:

Period = 408.83911 [0.00480] d
Epoch = 506.6467 [0.0077] BKJD
Rp/R* = 0.0360 [0.0283]
a/R* = 595.67 [2069.82]
b = 0.82 [1.44]
Seff = 0.86 [0.31]
Teq = 246 [22] K
Rp = 3.80 [3.16] Re
a = 1.0400 [0.2389] AU
Ag = 24599.81 [41152.62] [0.60σ]
Teff = 4758 [1953] K [2.31σ]

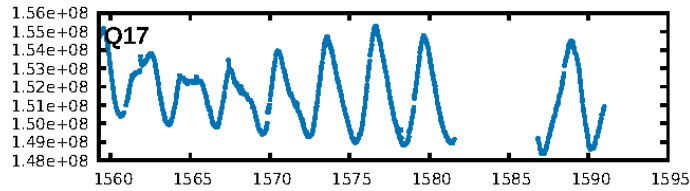
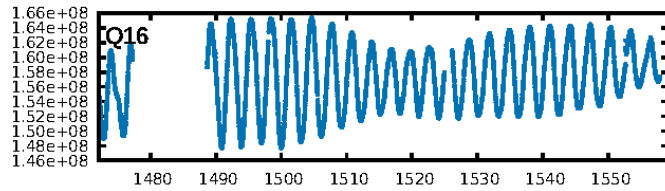
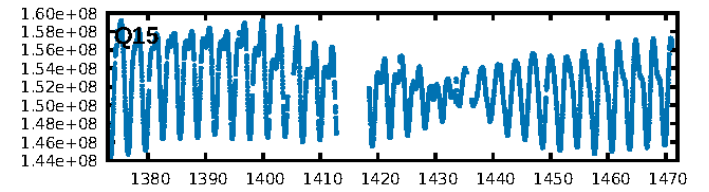
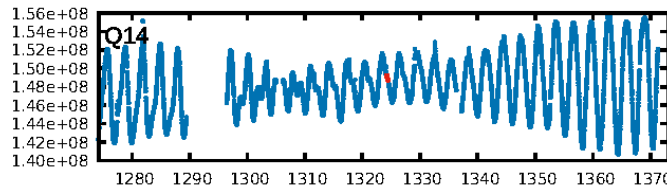
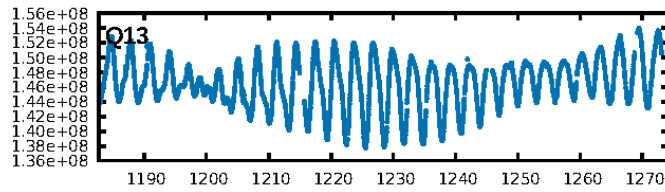
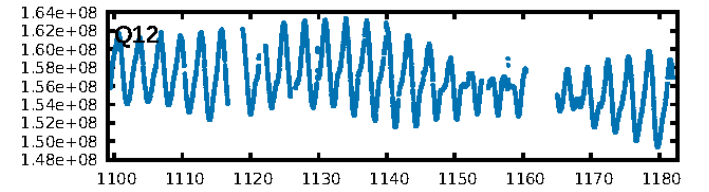
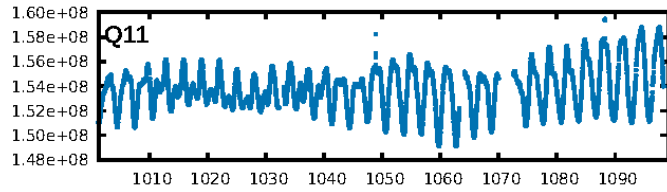
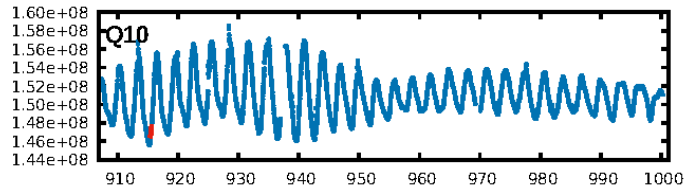
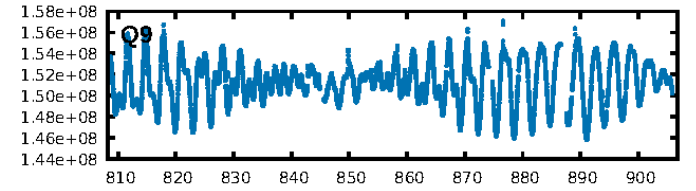
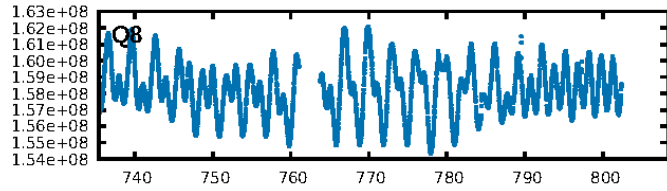
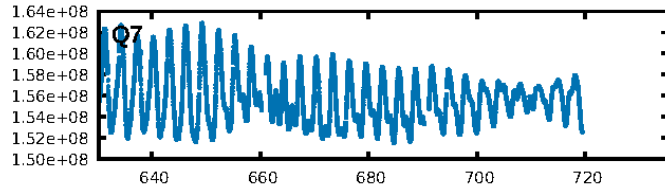
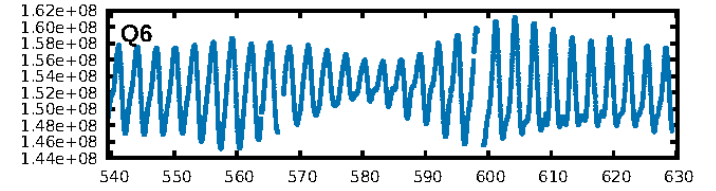
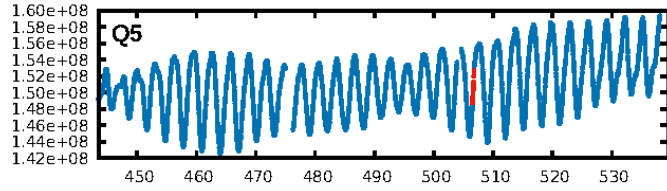
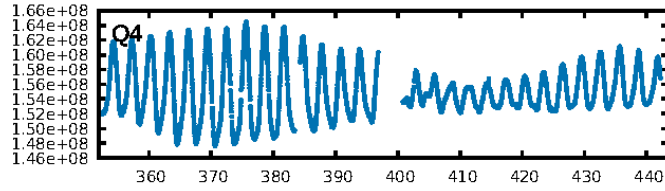
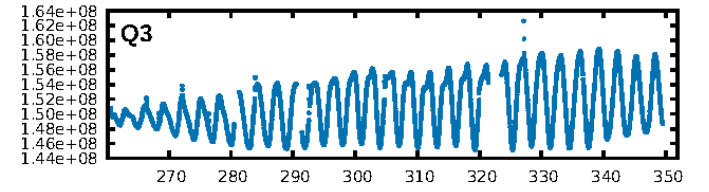
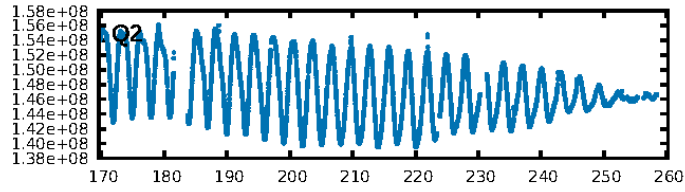
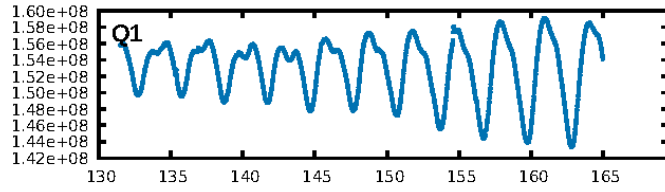
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [99.19σ]
LongPeriod-sig: 100.0% [98.76σ]
ModelChiSquare2-sig: 17.5%
ModelChiSquareGof-sig: 32.4%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: -0.4752
Centroid-sig: 6.2%
Centroid-so: 0.629 arcsec [1.66σ]
OotOffset-rm: 0.071 arcsec [0.31σ]
KicOffset-rm: 0.125 arcsec [0.44σ]
OotOffset-st: 2/0/0/1 [3]
KicOffset-st: 2/0/0/1 [3]
DiffImageQuality-fgm: 0.67 [2/3]
DiffImageOverlap-fno: 1.00 [3/3]

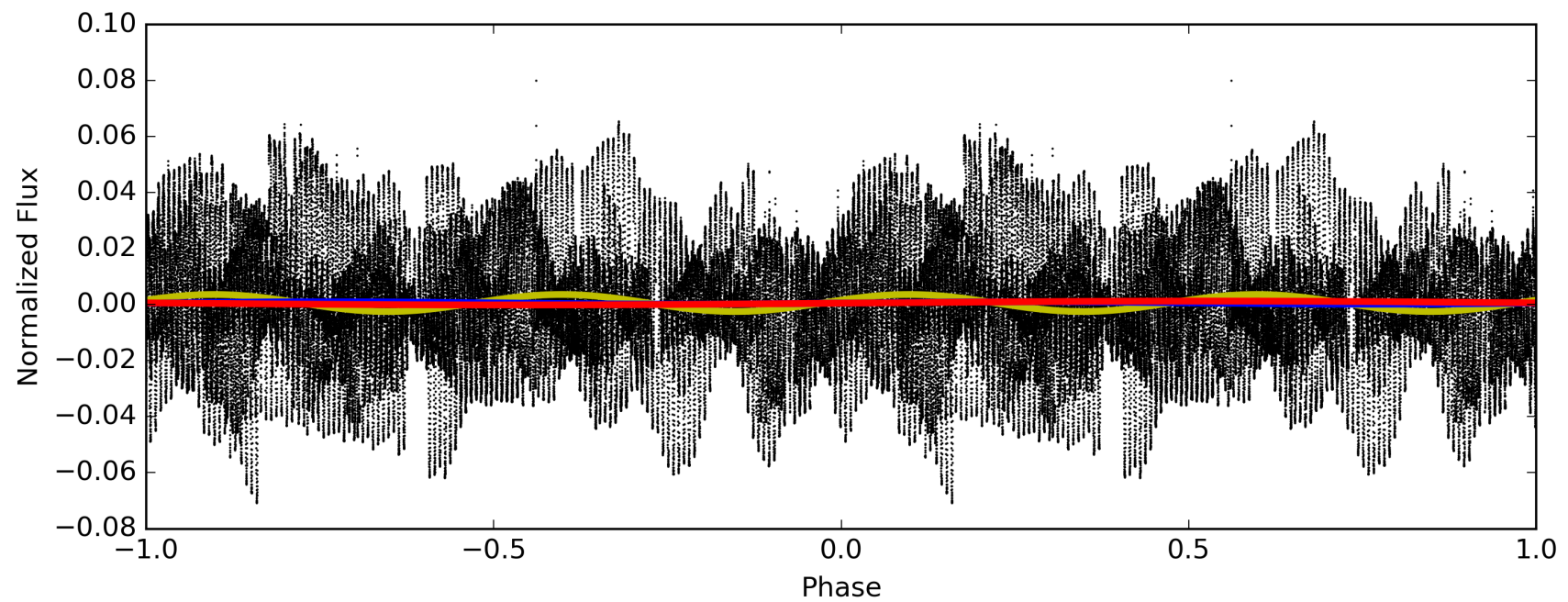
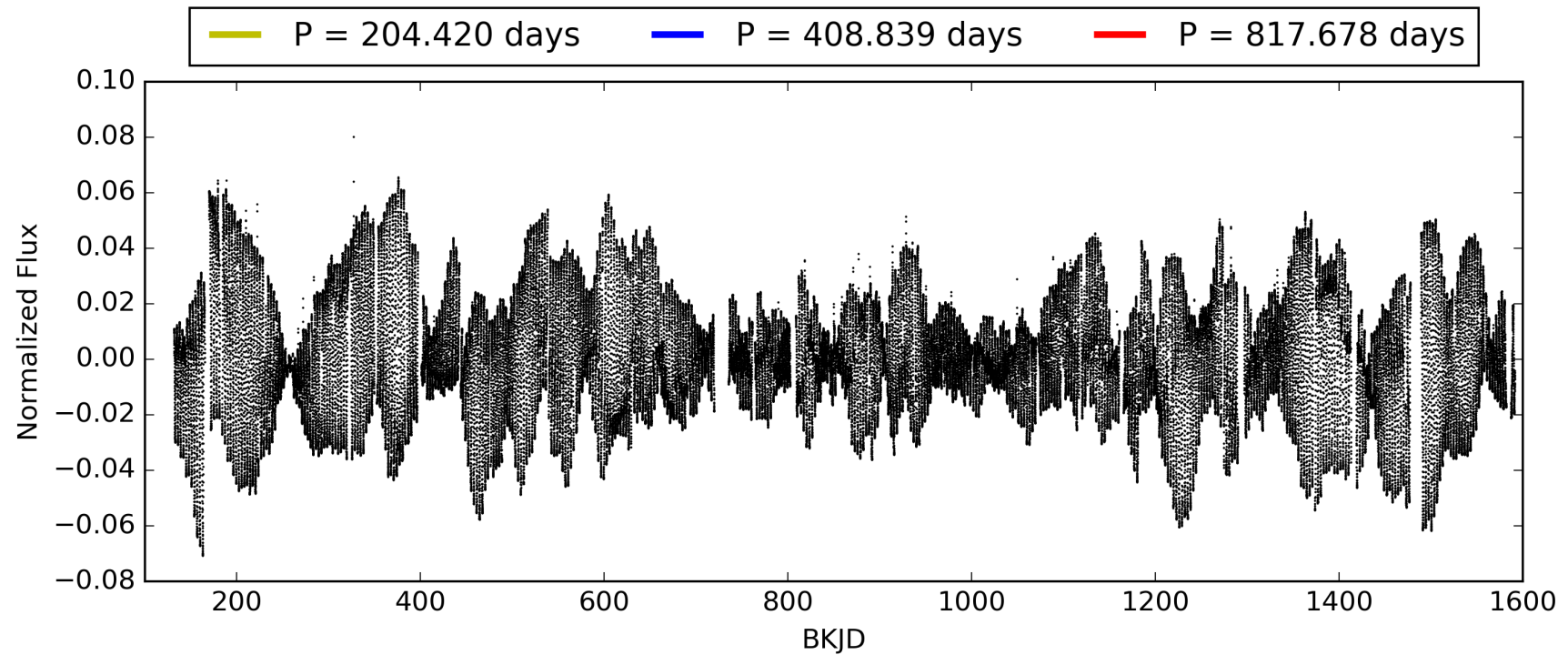
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 23:49:07 Z

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

TCE 009401856-04, PDC Light Curves

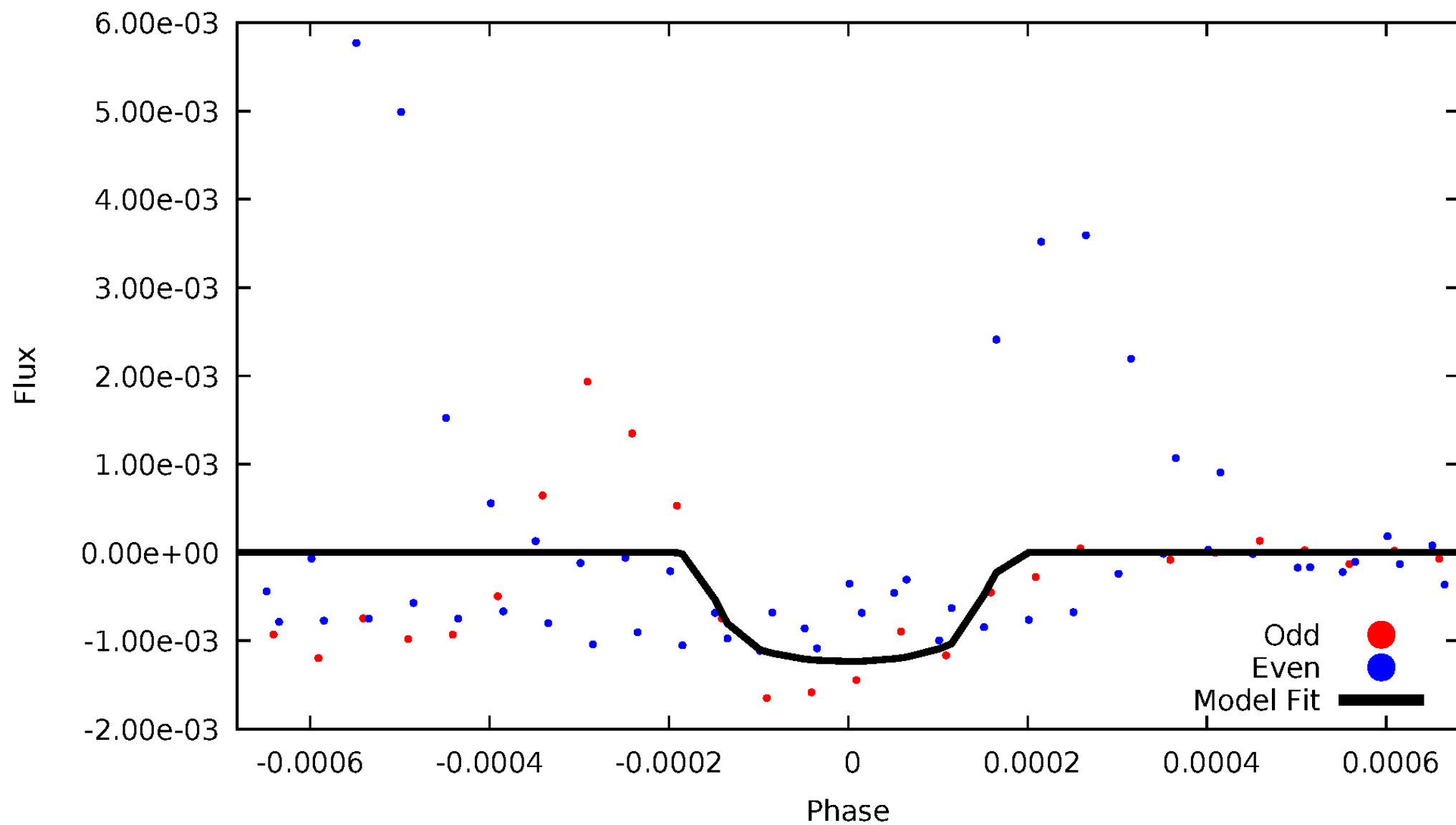


TCE 009401856-04



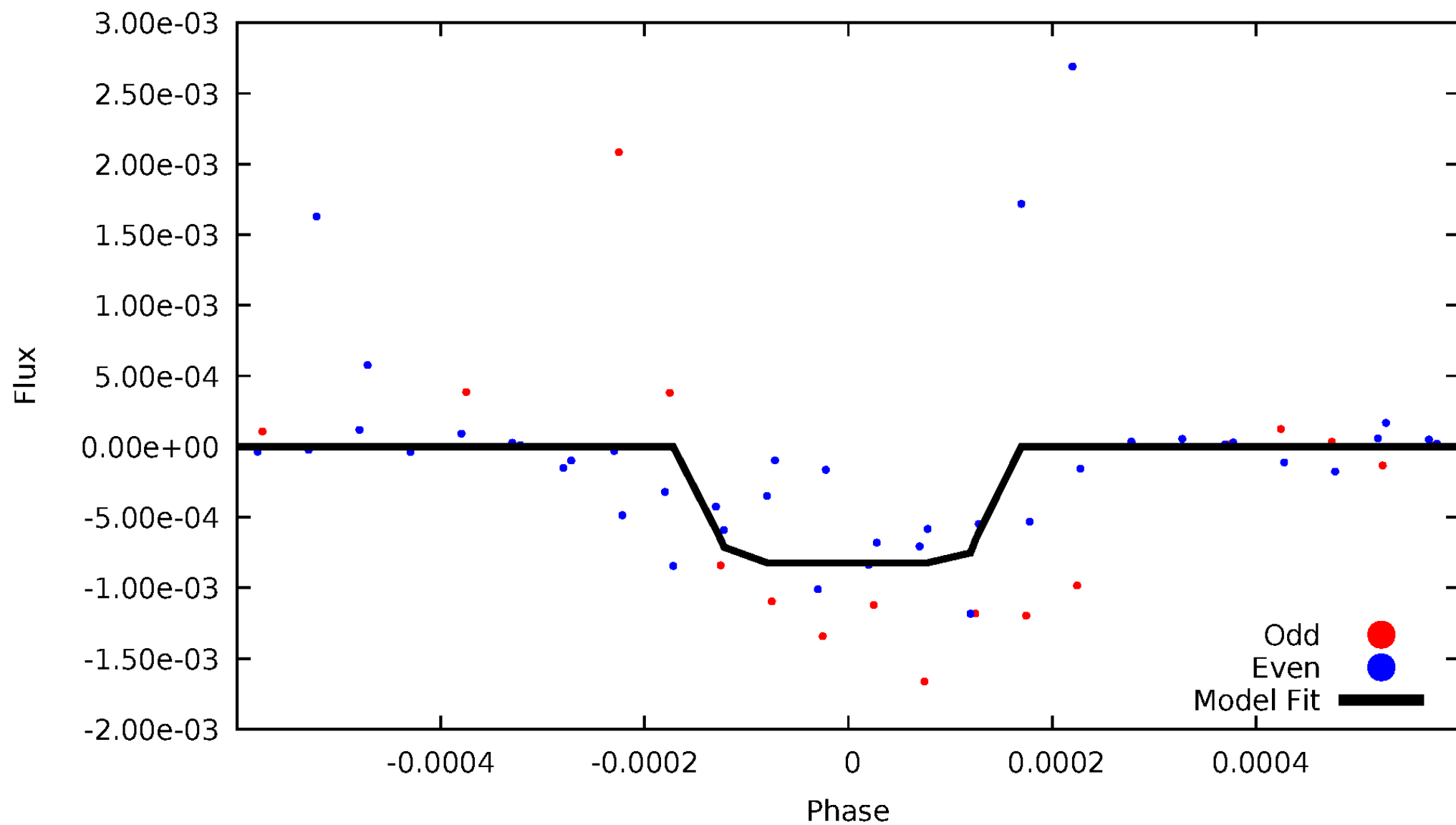
DV Odd/Even

TCE 009401856-04



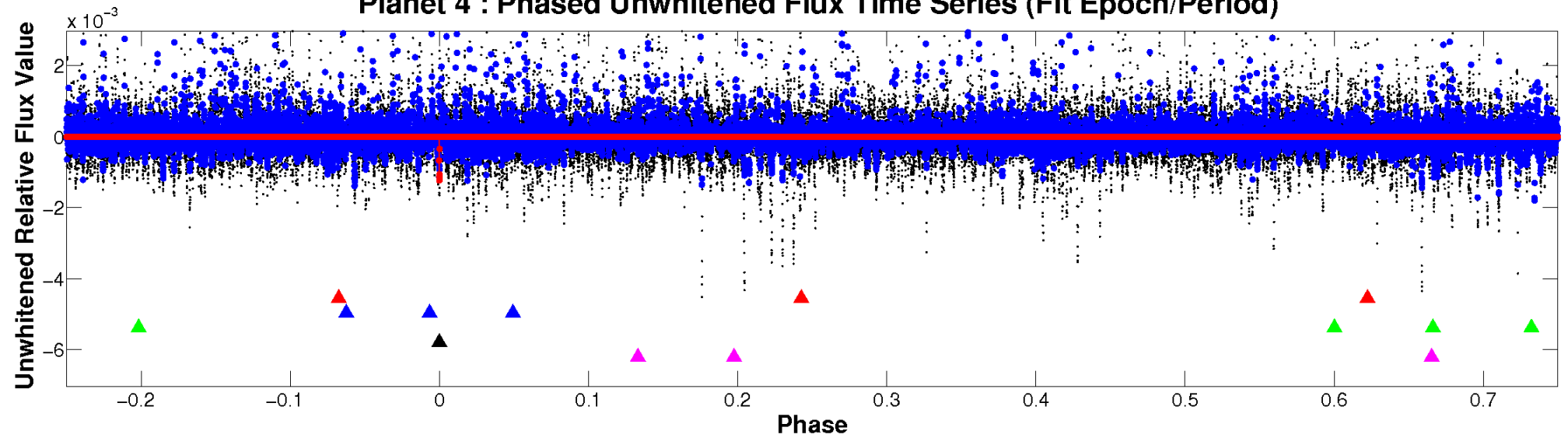
ALT Odd/Even

TCE 009401856-04

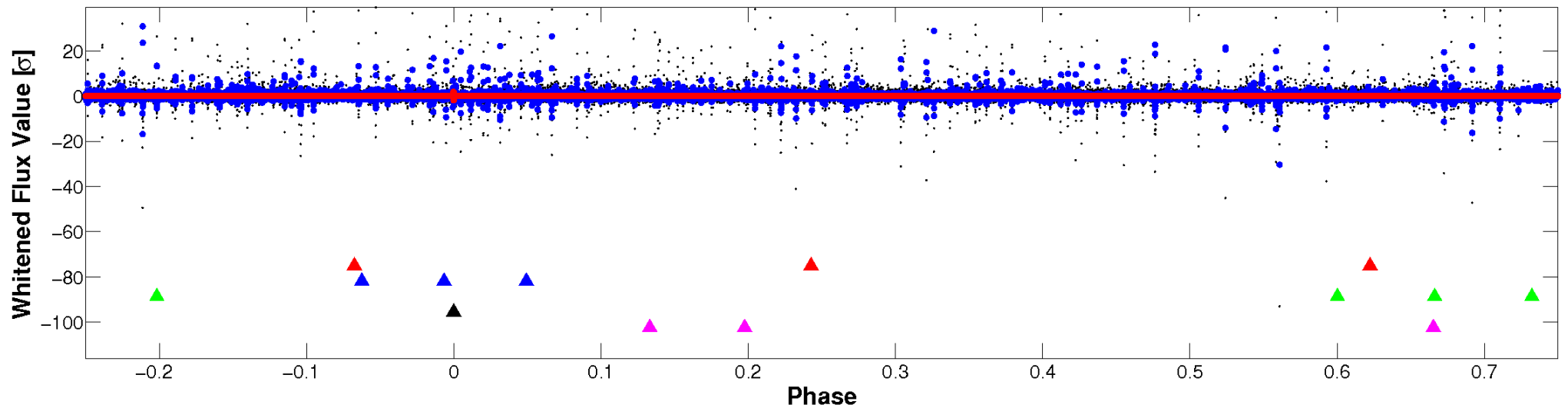


Non-Whitened Vs. Whitened Light Curve

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

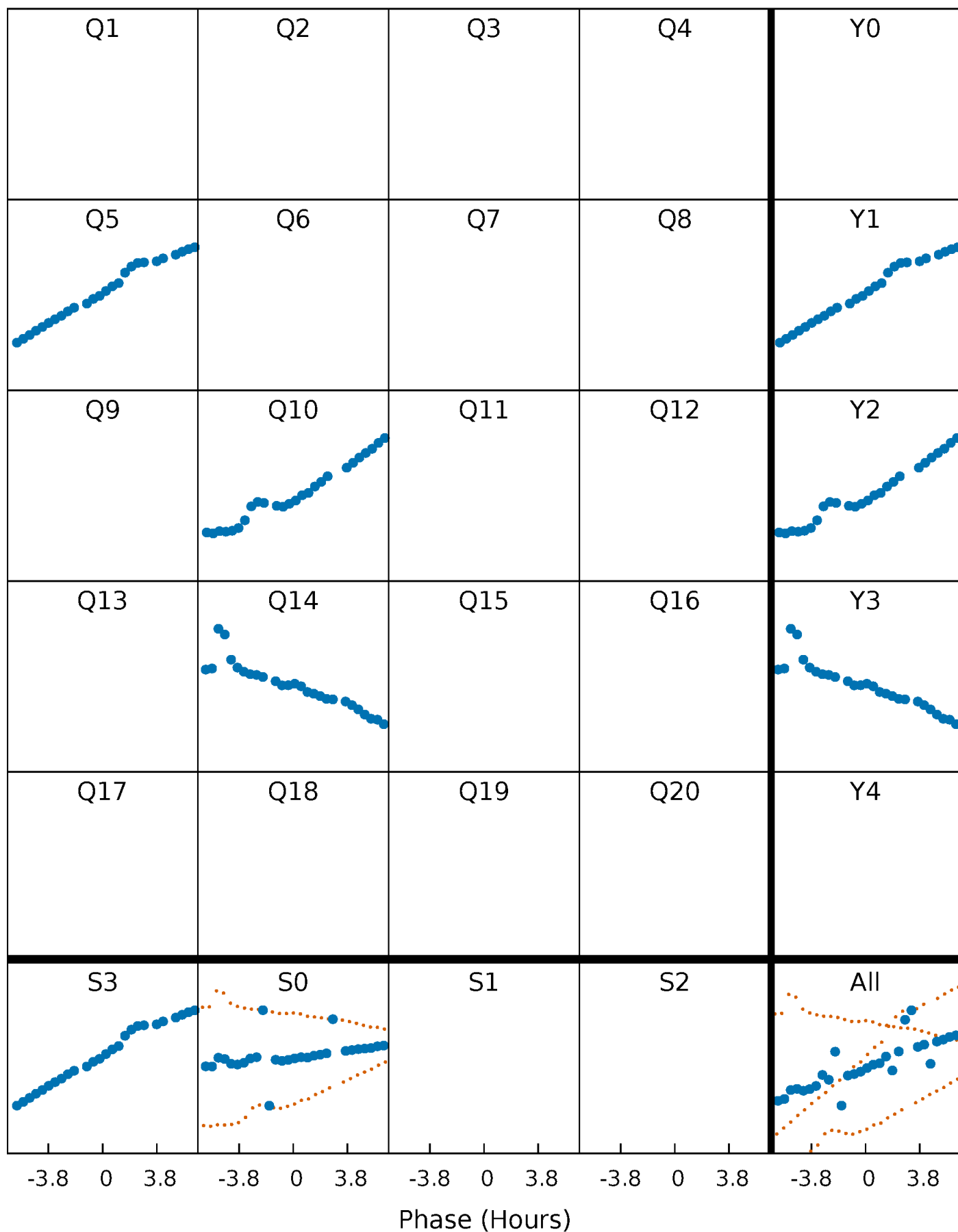


Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



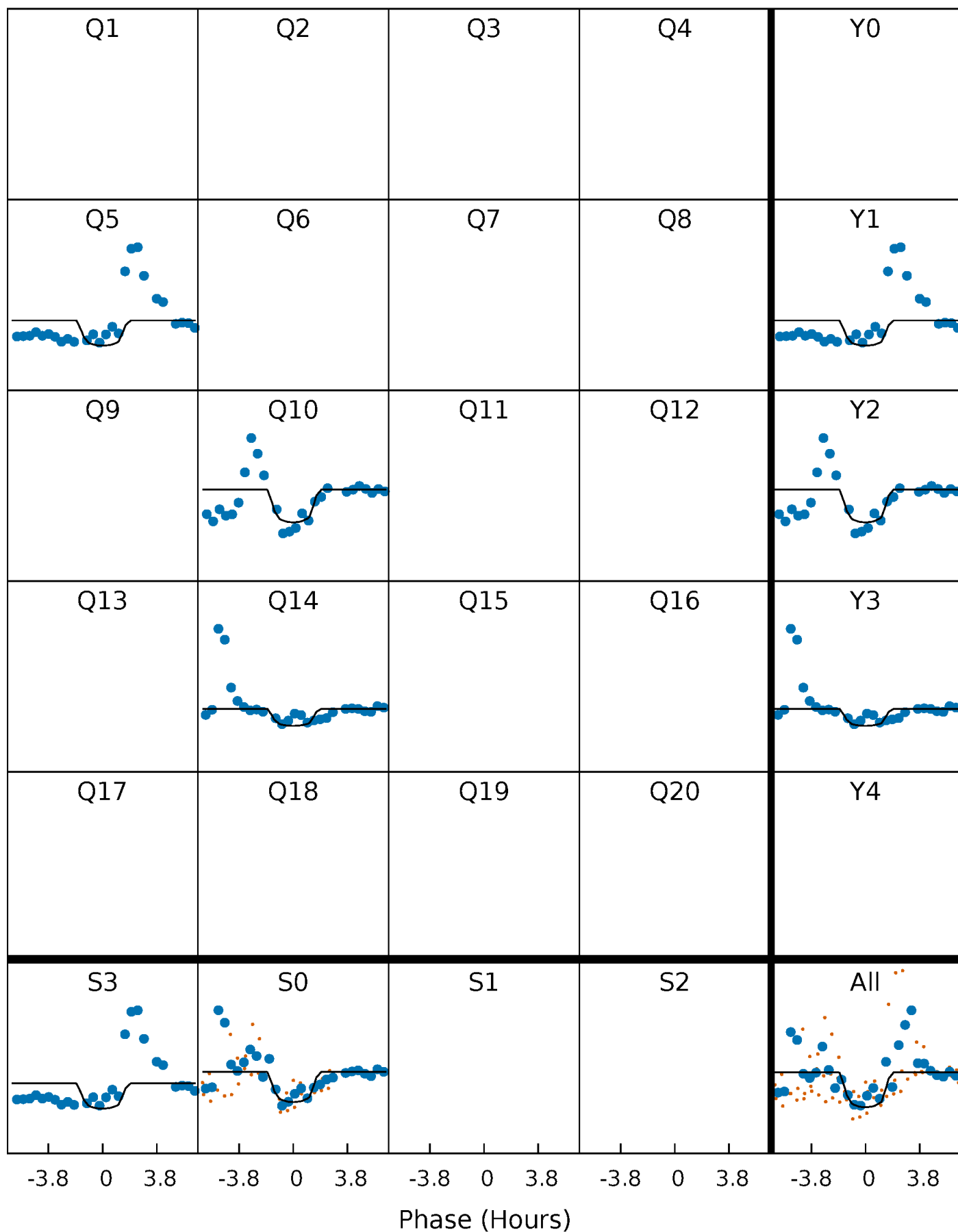
PDC Quarter-Phased Transit Curves

TCE 009401856-04 P=408.839111 Days $T_0=506.646694$ (BKJD)



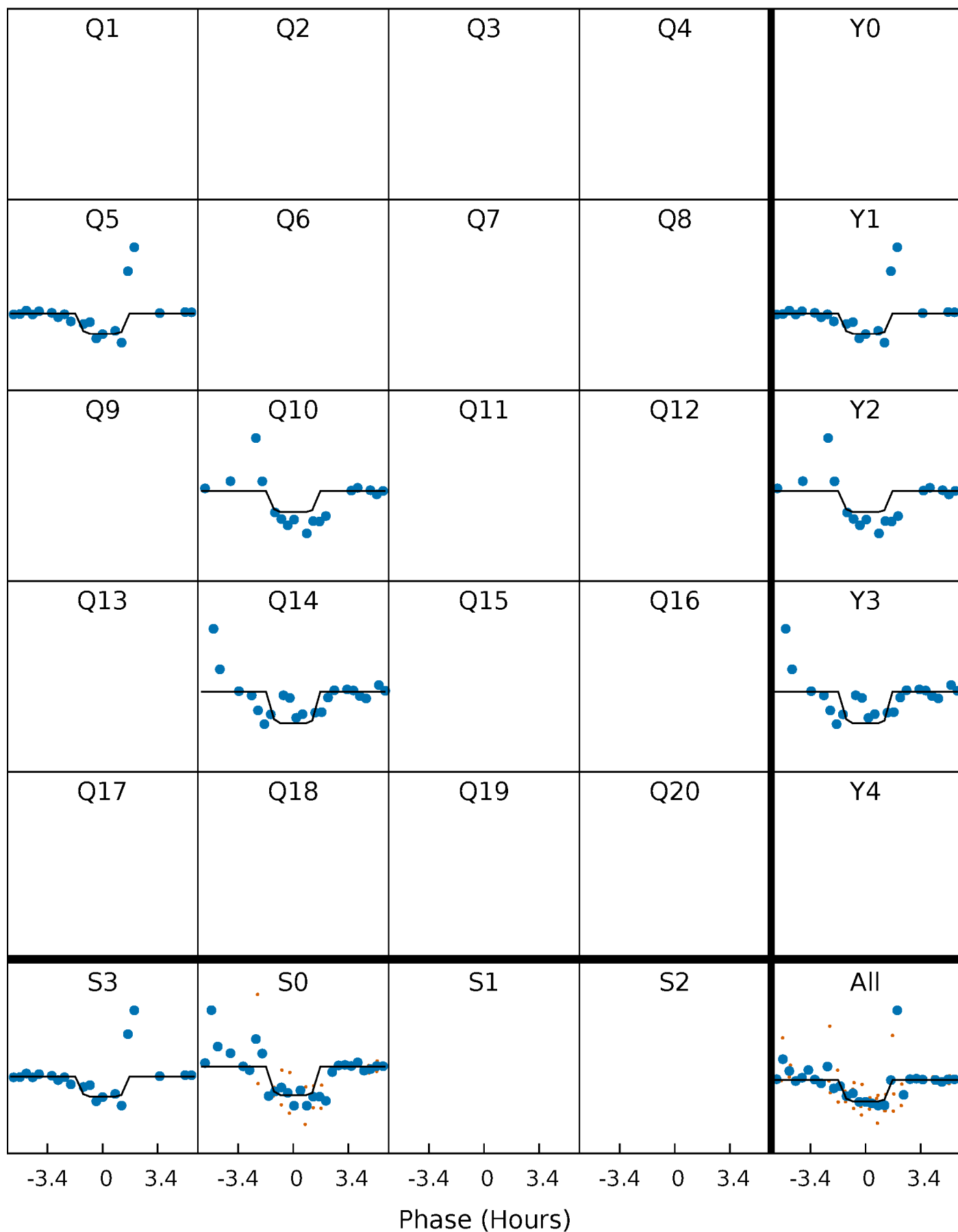
DV Quarter-Phased Transit Curves

TCE 009401856-04 P=408.839111 Days $T_0=506.646694$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

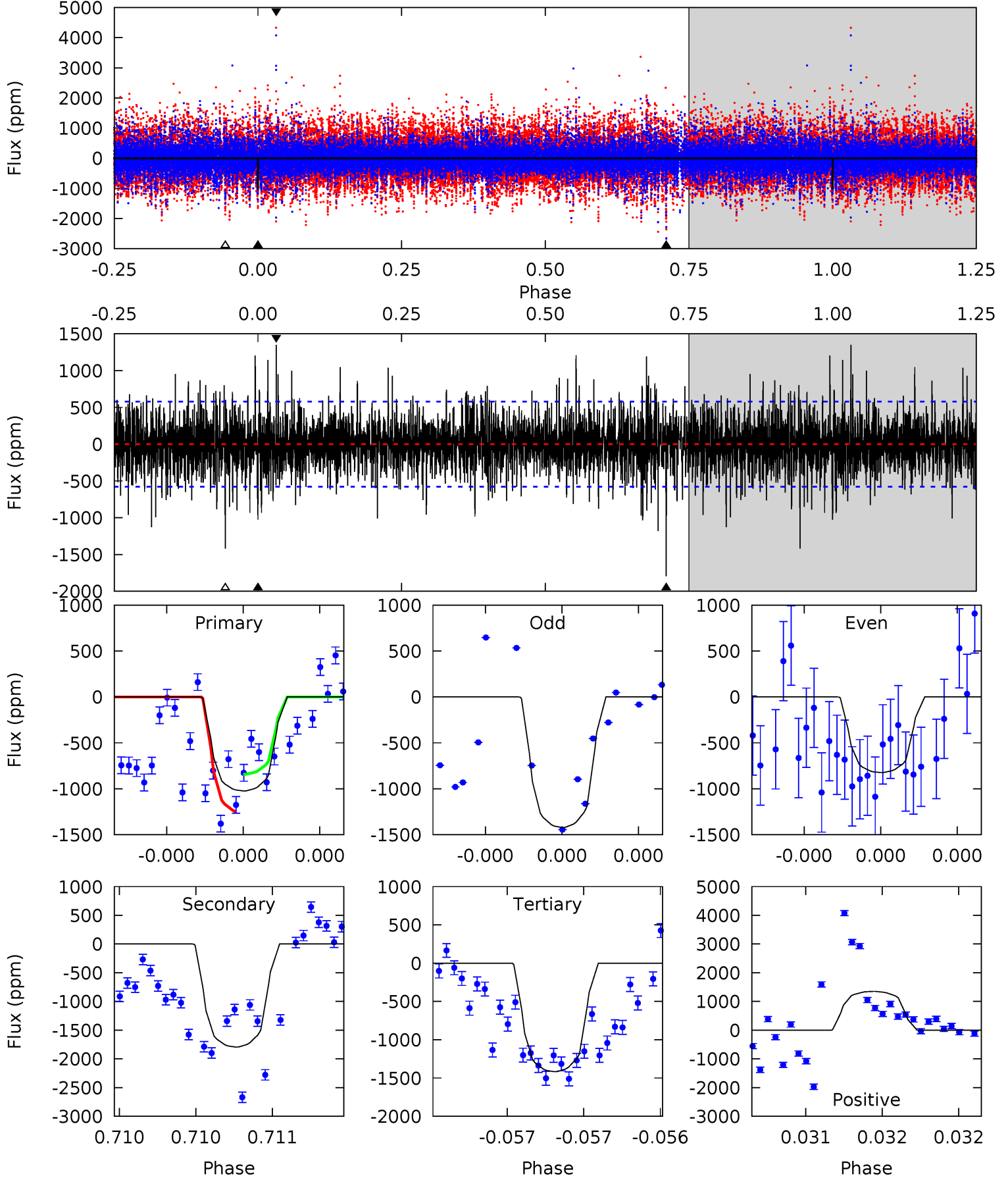
TCE 009401856-04 $P=408.855102$ Days $T_0=506.644680$ (BKJD)



DV Model-Shift Uniqueness Test

009401856-04, P = 408.839111 Days, E = 97.807583 Days

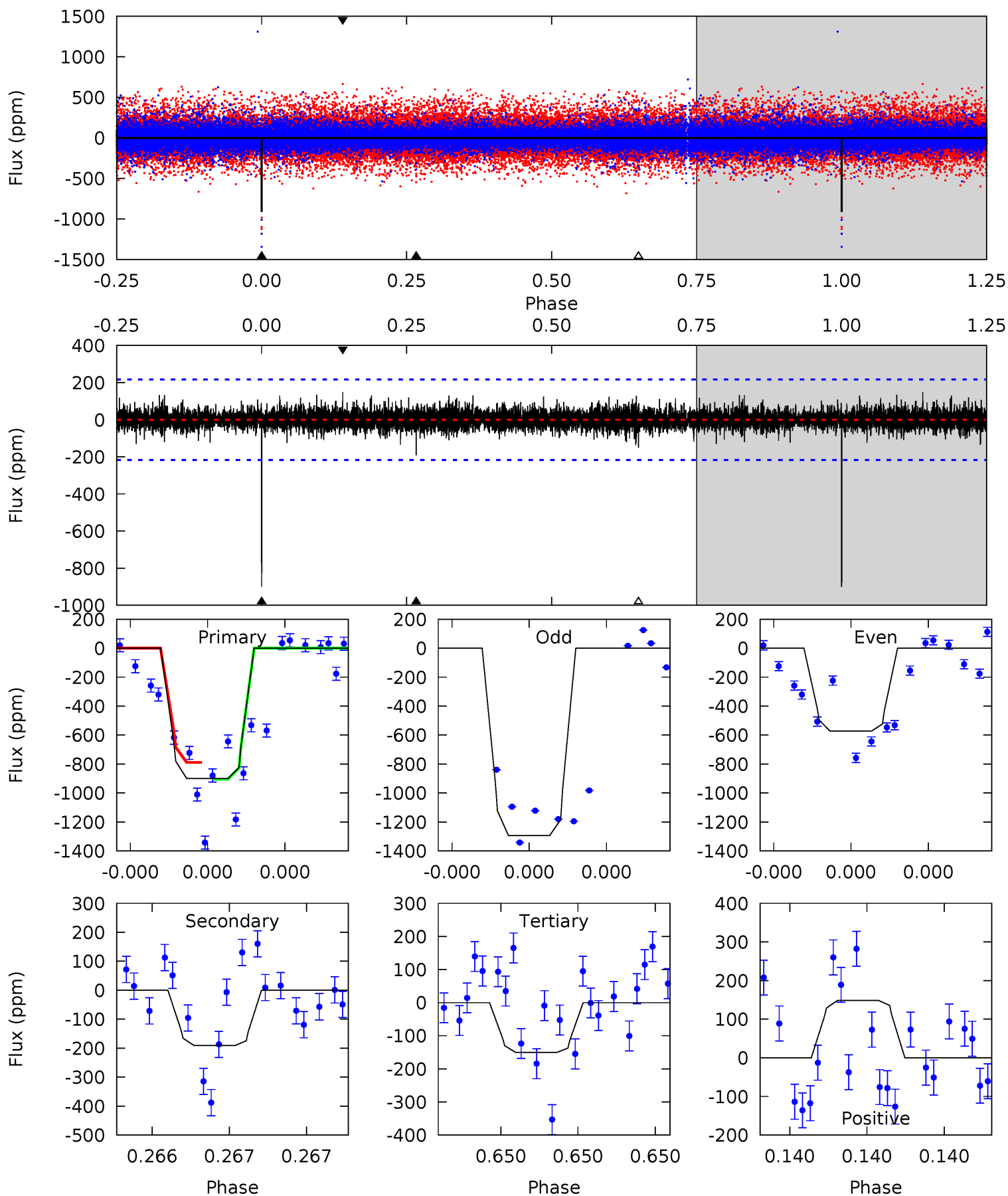
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.97	17.5	13.8	13.2	5.64	3.58	2.49	-3.83	-3.19	3.67	4.32	1.98	1.16	0.43	1.96



Alt Model-Shift Uniqueness Test

009401856-04, P = 408.855102 Days, E = 97.789578 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
23.5	4.98	3.92	3.88	5.66	3.62	0.78	19.6	19.6	1.06	1.10	8.25	1.06	0.14	1.55



Stellar Parameters For KIC 009401856

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5780^{+138}_{-155}	$4.421^{+0.116}_{-0.188}$	$-0.200^{+0.300}_{-0.300}$	$0.966^{+0.259}_{-0.139}$	$0.899^{+0.120}_{-0.087}$	$1.404^{+0.660}_{-0.684}$
	+2%/-3%	+3%/-4%	+150%/-150%	+27%/-14%	+13%/-10%	+47%/-49%
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 009401856-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-1795 ± 103	$4.19^{+3.06}_{-2.37}$	344^{+26}_{-17}	6010^{+3940}_{-1236}	$60439^{+263305}_{-40440}$
Alt.	-191 ± 38	$3.69^{+2.92}_{-2.29}$	346^{+24}_{-19}	3975^{+1901}_{-669}	8529^{+49107}_{-6011}

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 $A_{obs} \gg 1.0$

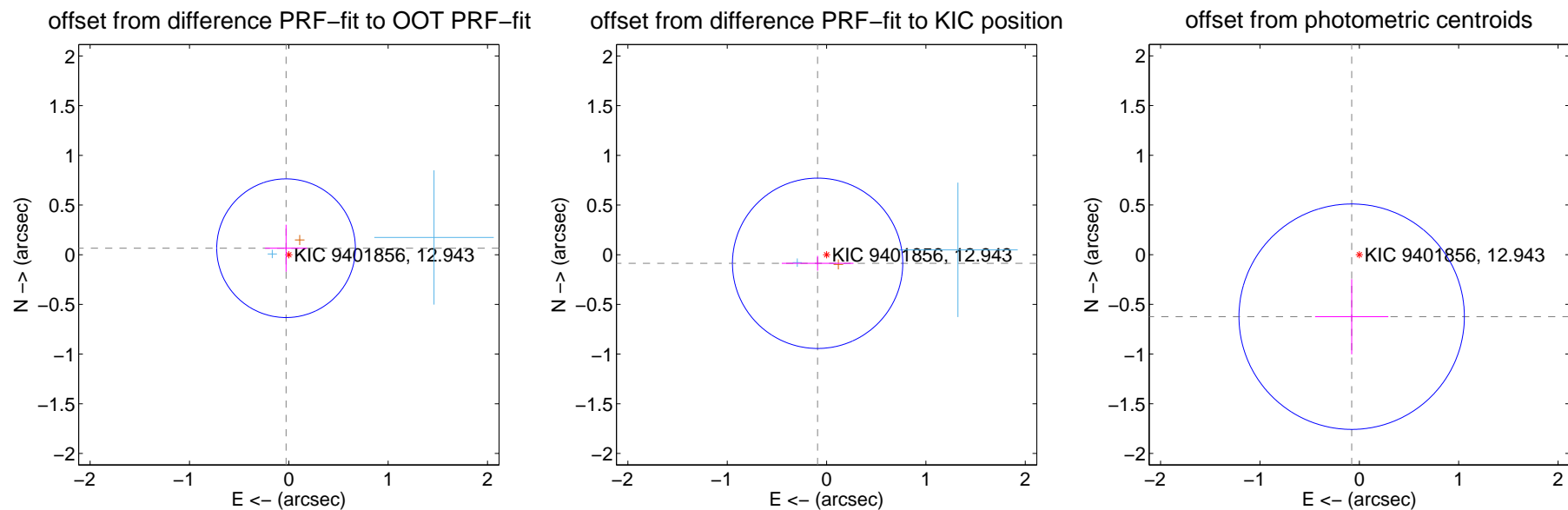
DV Centroid Data

Supplemental centroid analysis for 009401856-04. Kepler magnitude: 12.94. Transit SNR 7.33

There are 2 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.19 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.071 ± 0.233	0.31	0.028 ± 0.212	0.065 ± 0.236
PRF-fit source offset from KIC position	0.125 ± 0.286	0.44	0.090 ± 0.361	-0.086 ± 0.075
photometric centroid source offset	0.63 ± 0.38	1.66	0.08 ± 0.37	-0.62 ± 0.38

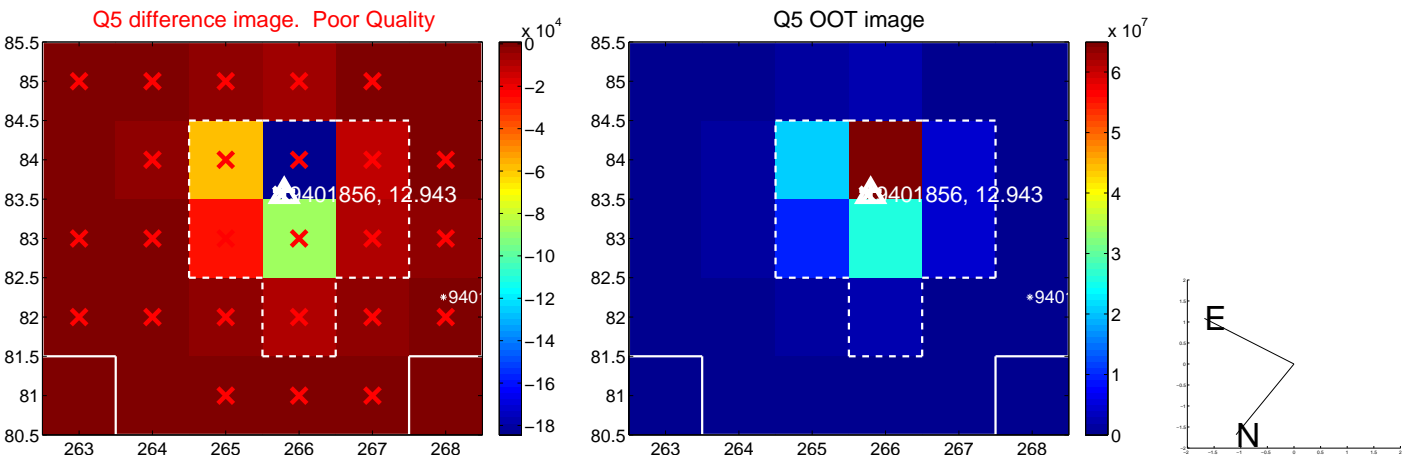


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

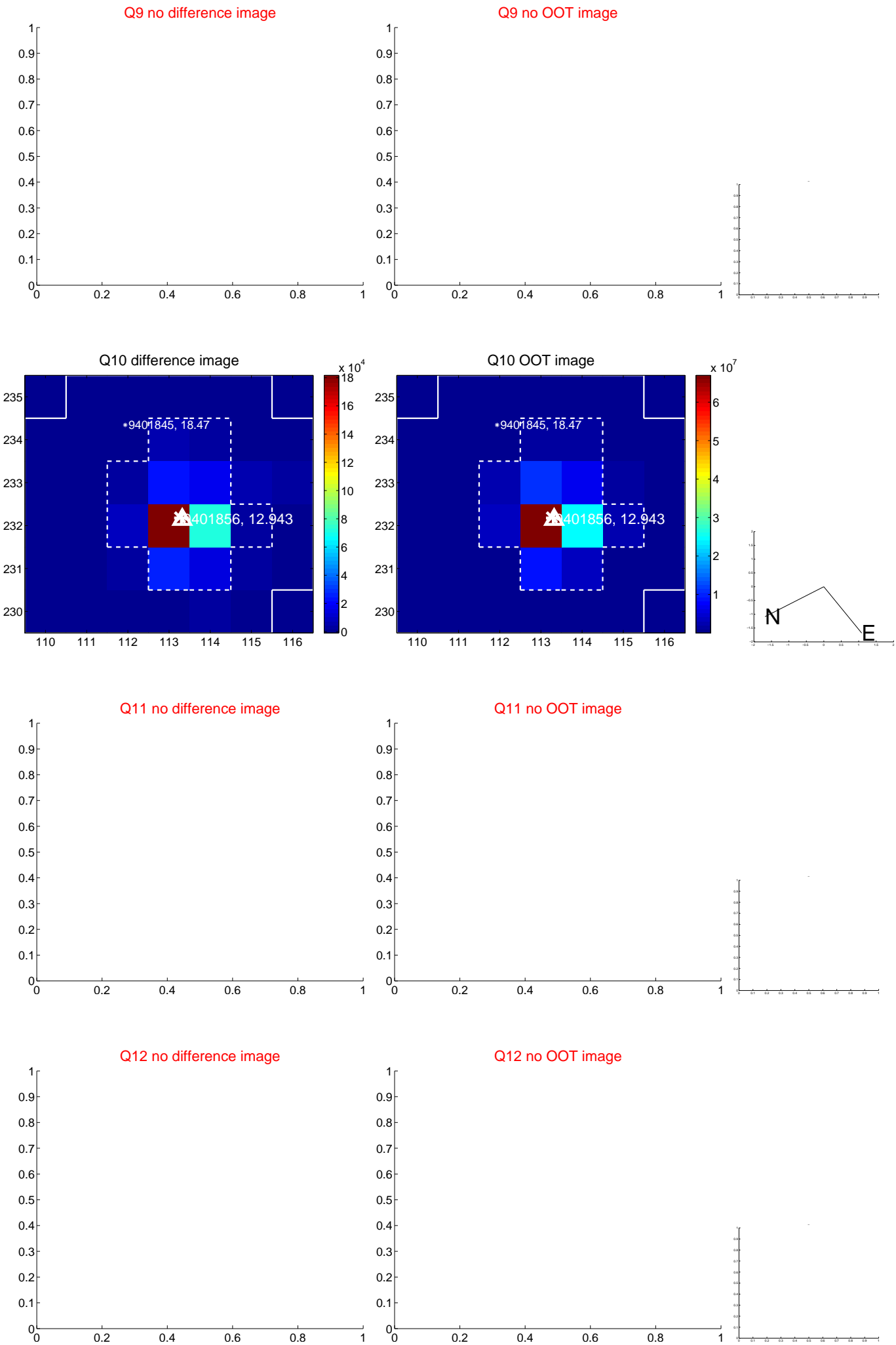
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



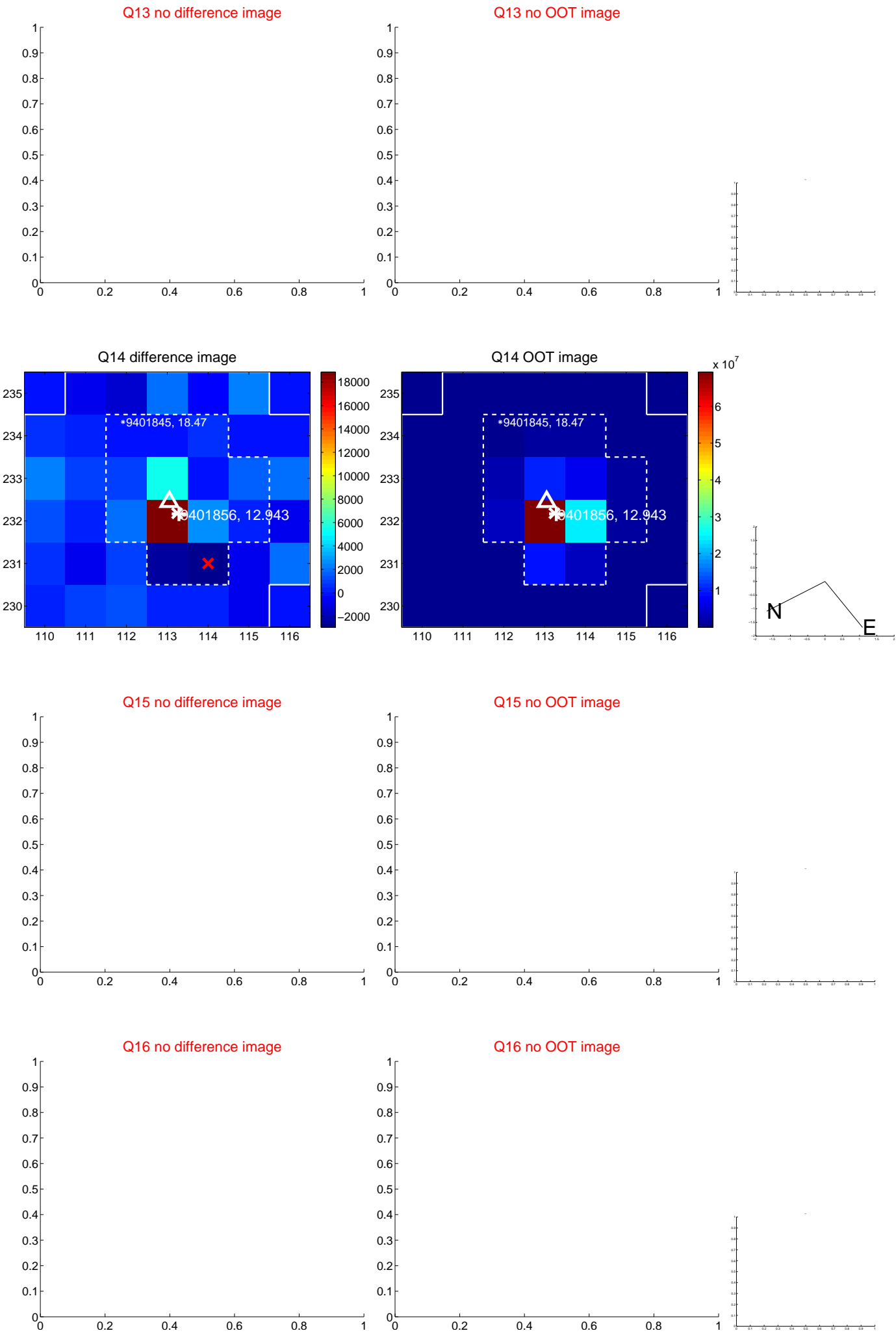
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



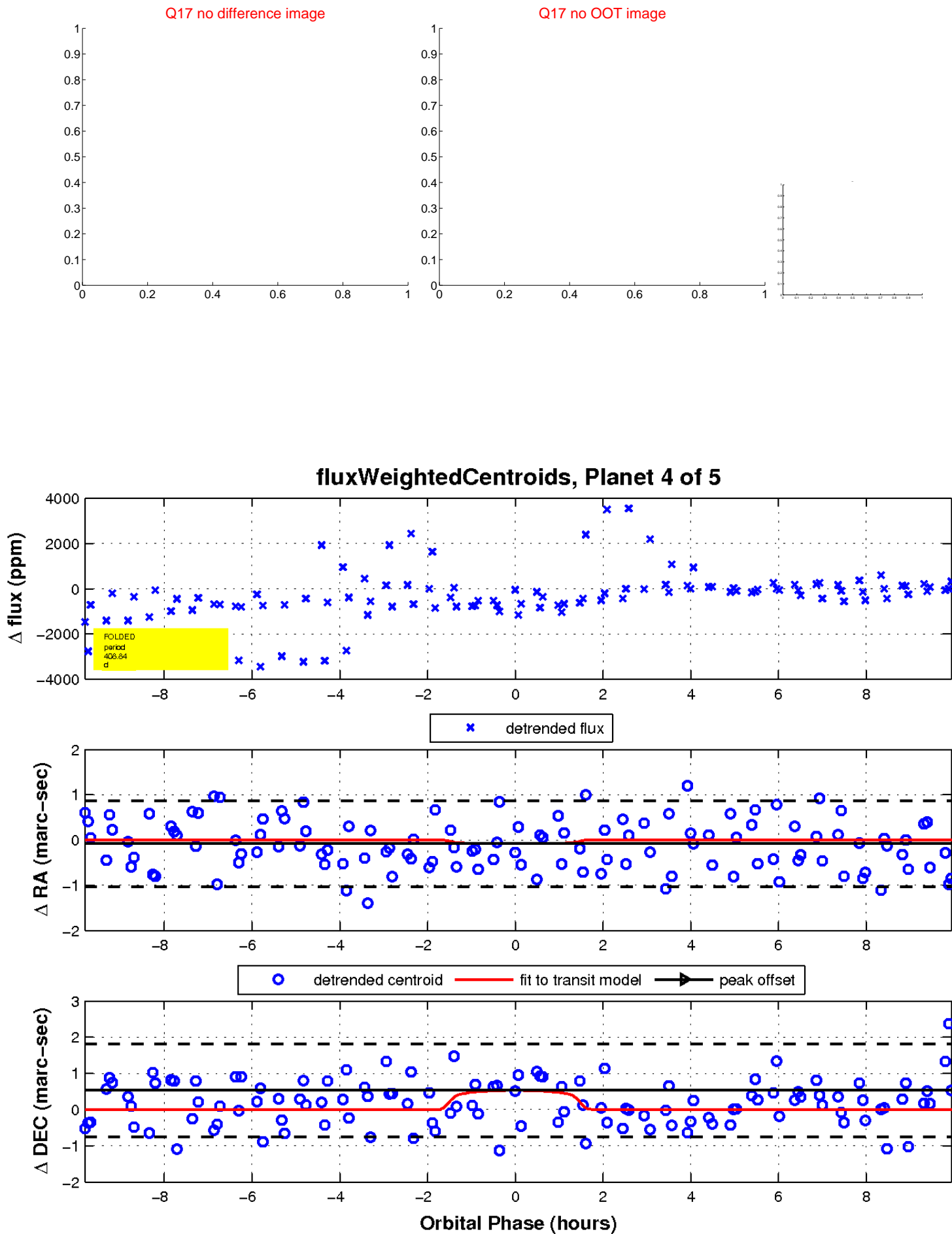
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

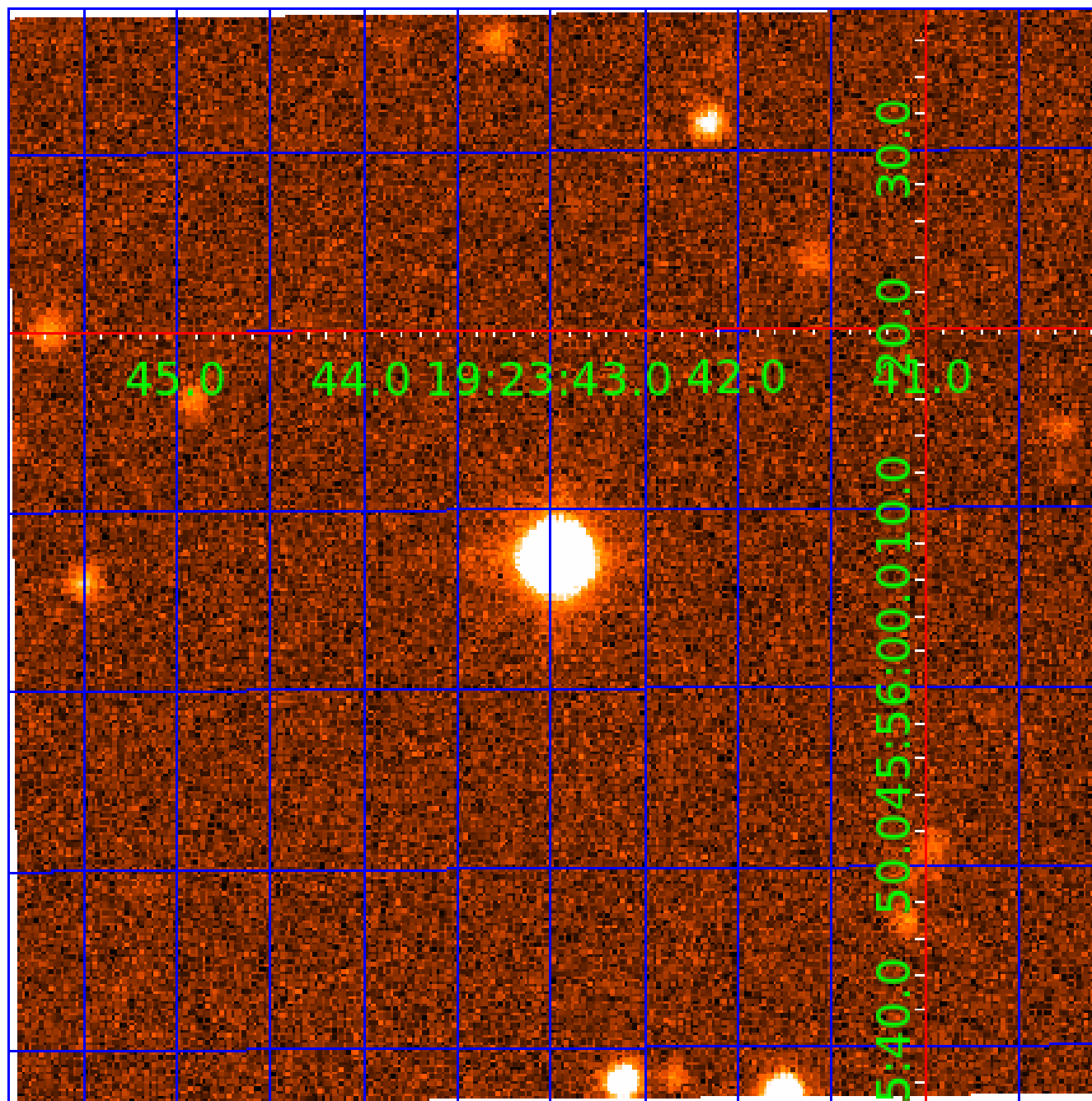


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009401856

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})
009401856-01	OBS	No	690.871313	197.038265	6.4	4.611	17.8	0.0	0.97	5780	0.29	0.43
009401856-02	OBS	No	431.681890	481.132258	914.6	4.432	17.0	5.0	0.97	5780	2.90	0.80
009401856-03	OBS	No	381.839745	424.199217	705.2	5.613	15.4	3.6	0.97	5780	2.60	0.94
009401856-04	OBS	No	408.839111	506.646694	1233.9	3.342	13.7	7.3	0.97	5780	3.80	0.86
009401856-05	OBS	No	600.085979	178.603538	307.3	7.500	14.8	-1.0	0.97	5780	1.68	0.52

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009401856-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_SKYE_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009401856-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
009401856-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009401856-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009401856-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_NOFITS

Notes: OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.

N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

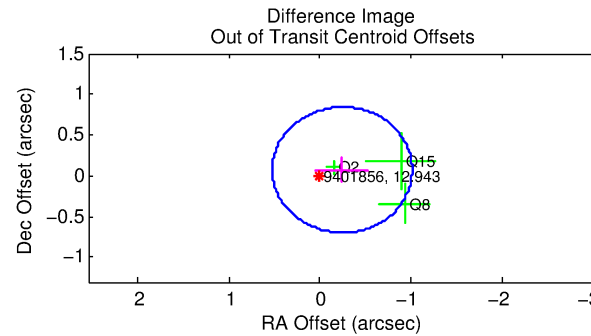
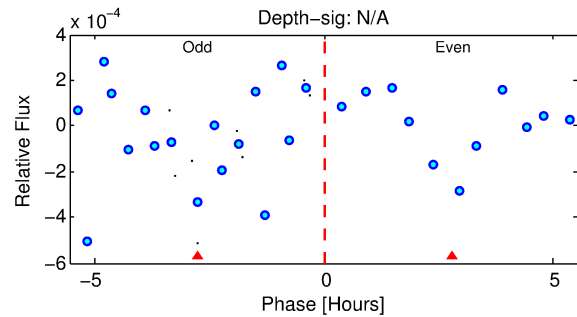
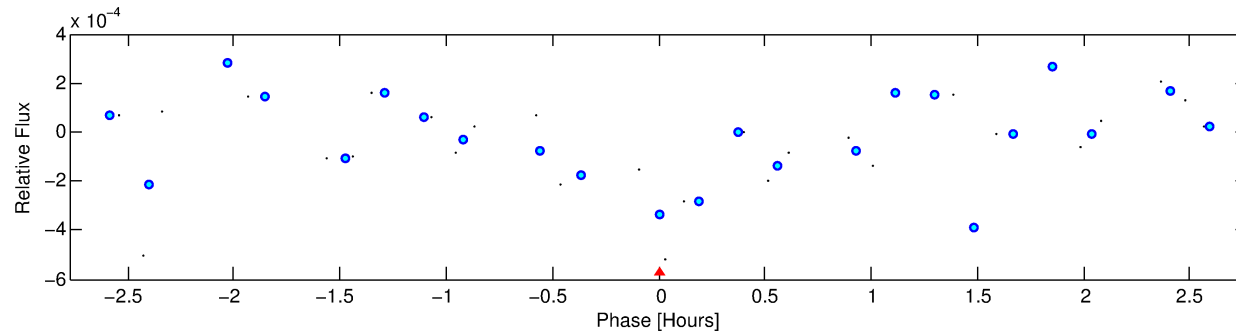
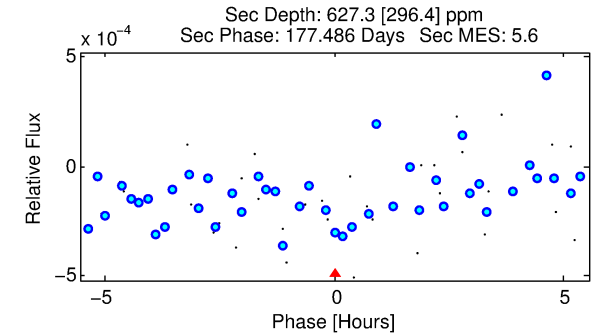
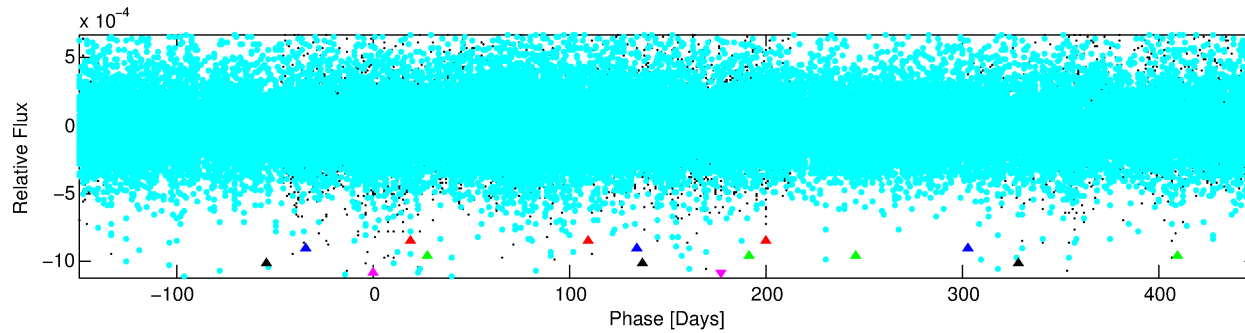
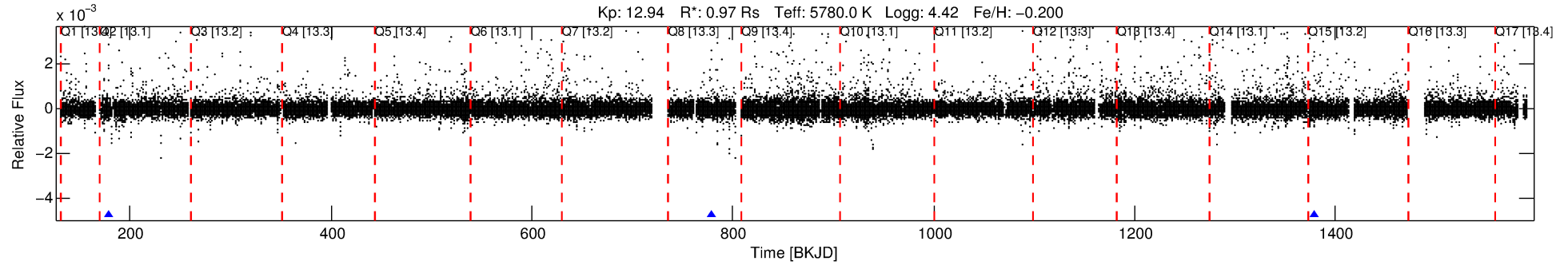
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009401856-05

No Significant Match Found

DV One-Page Summary

KIC: 9401856 Candidate: 5 of 5 Period: 600.086 d



TPS TCE Results:

Period = 600.08598 d
Epoch = 178.6035 BKJD

DV fit results are unavailable

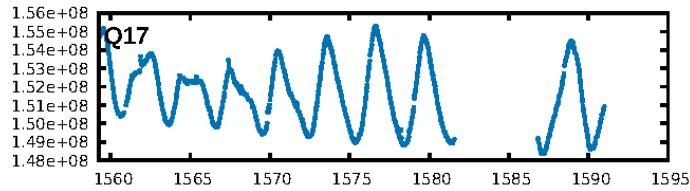
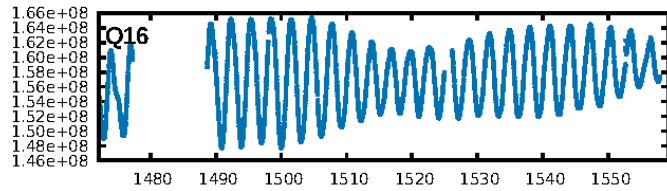
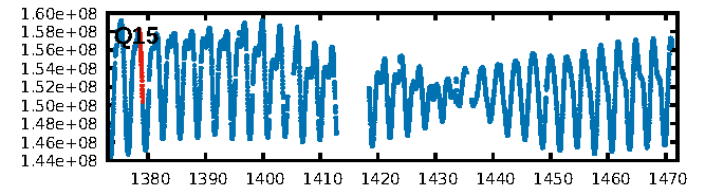
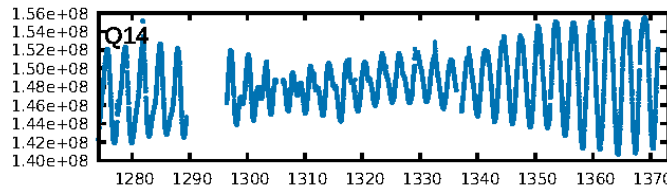
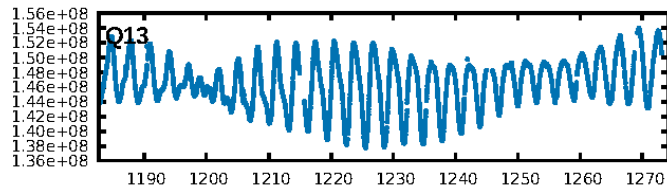
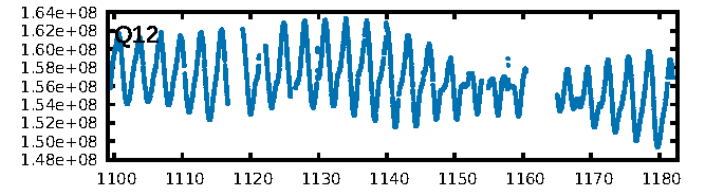
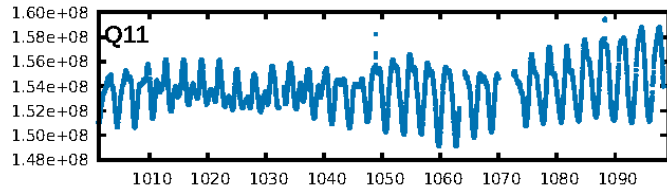
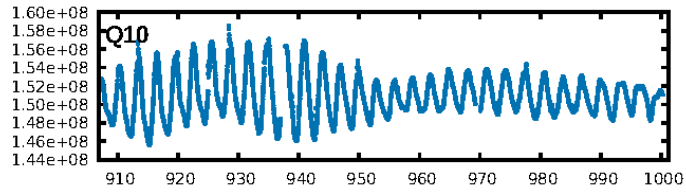
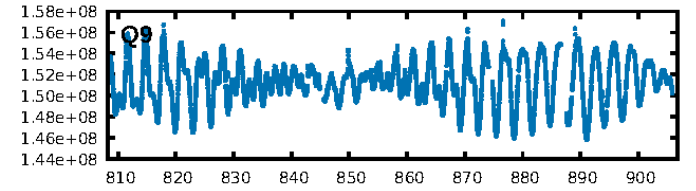
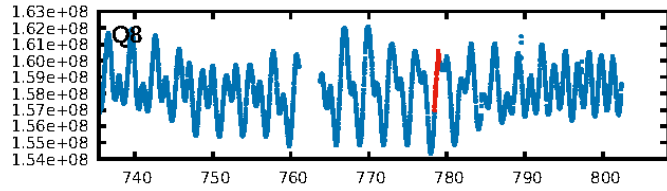
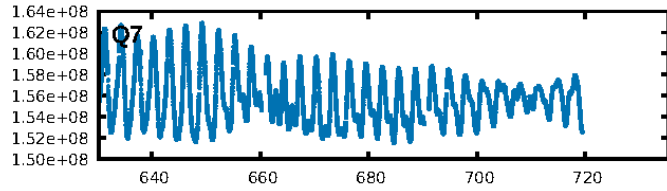
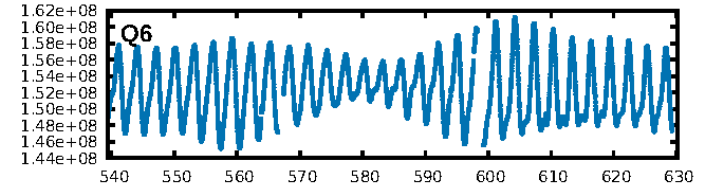
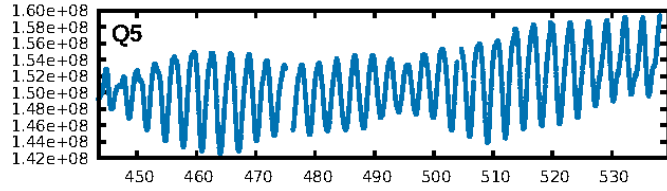
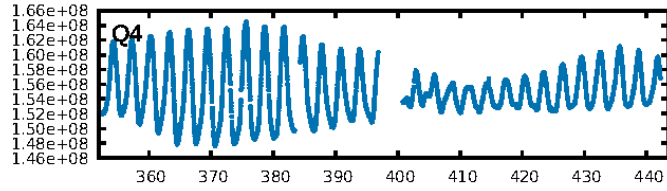
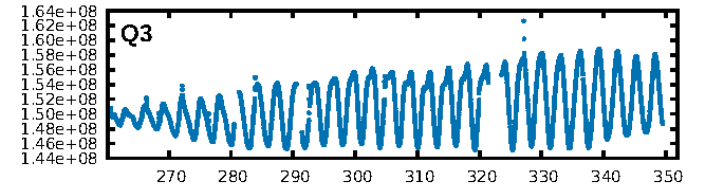
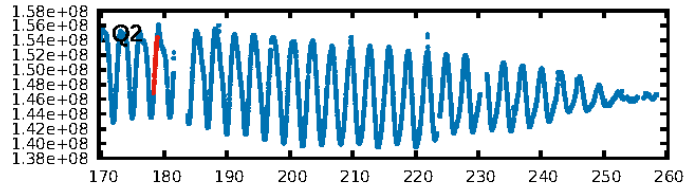
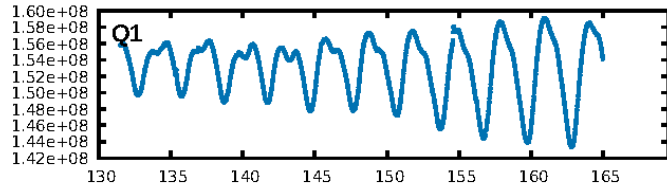
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [463.94 σ]
LongPeriod-sig: 100.0% [247.48 σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: -0.3239
Centroid-sig: 72.4%
Centroid-so: 1.905 arcsec [0.47 σ]
OotOffset-rm: 0.256 arcsec [1.00 σ]
KicOffset-rm: 0.167 arcsec [0.71 σ]
OotOffset-st: 1/1/1/0 [3]
KicOffset-st: 1/1/1/0 [3]
DiffImageQuality-fgm: 0.67 [2/3]
DiffImageOverlap-fno: 1.00 [3/3]

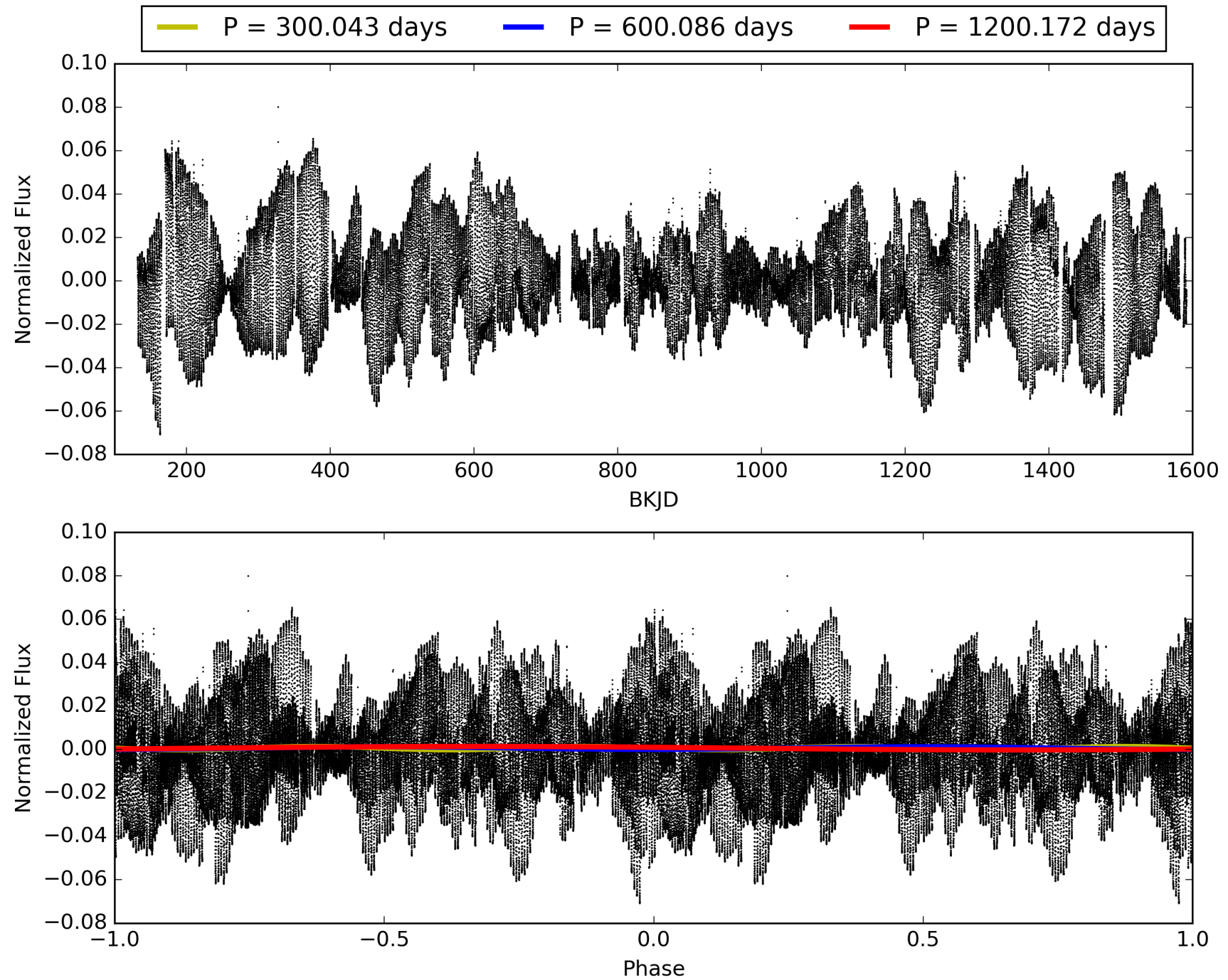
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 23:50:16 Z

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

TCE 009401856-05, PDC Light Curves

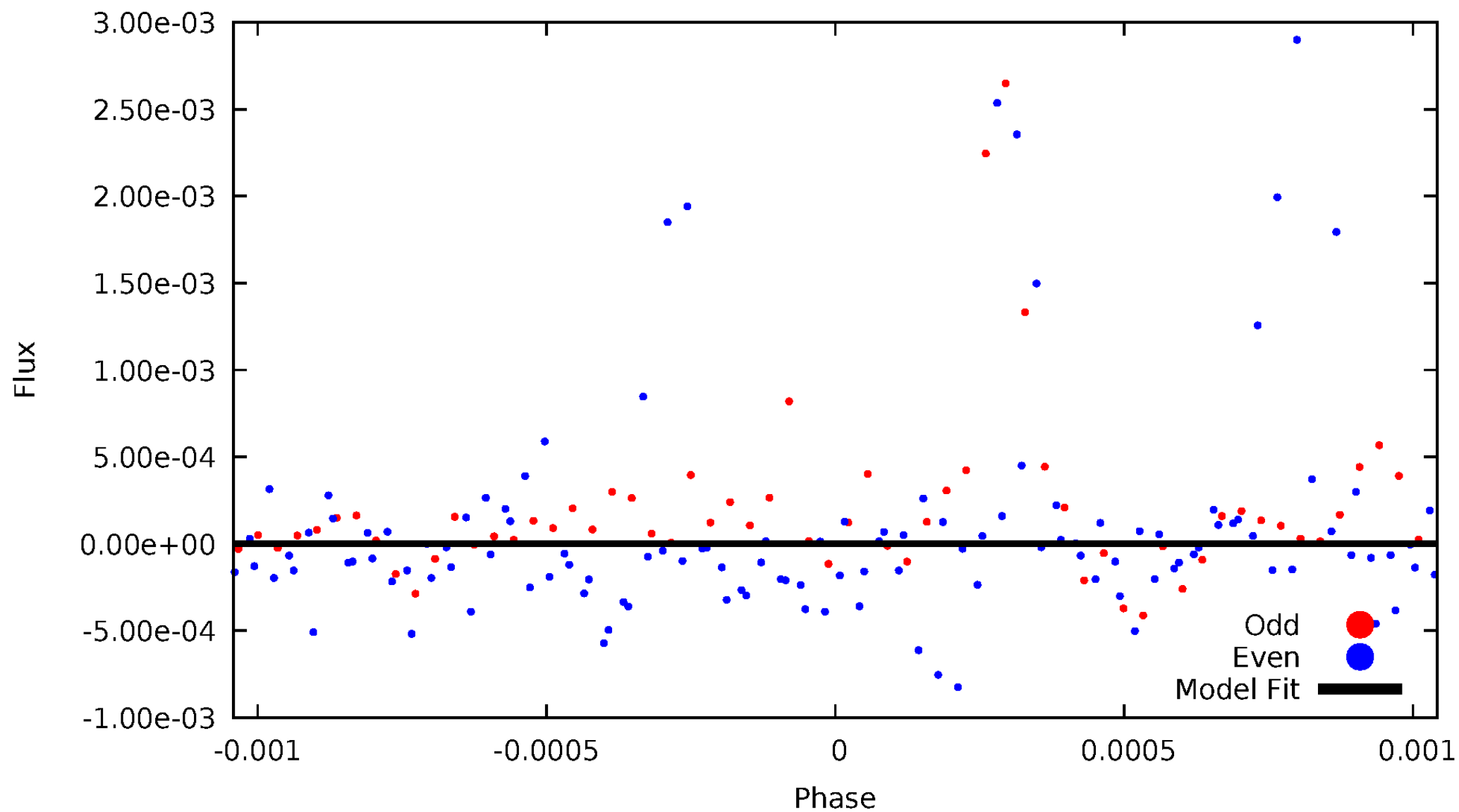


TCE 009401856-05



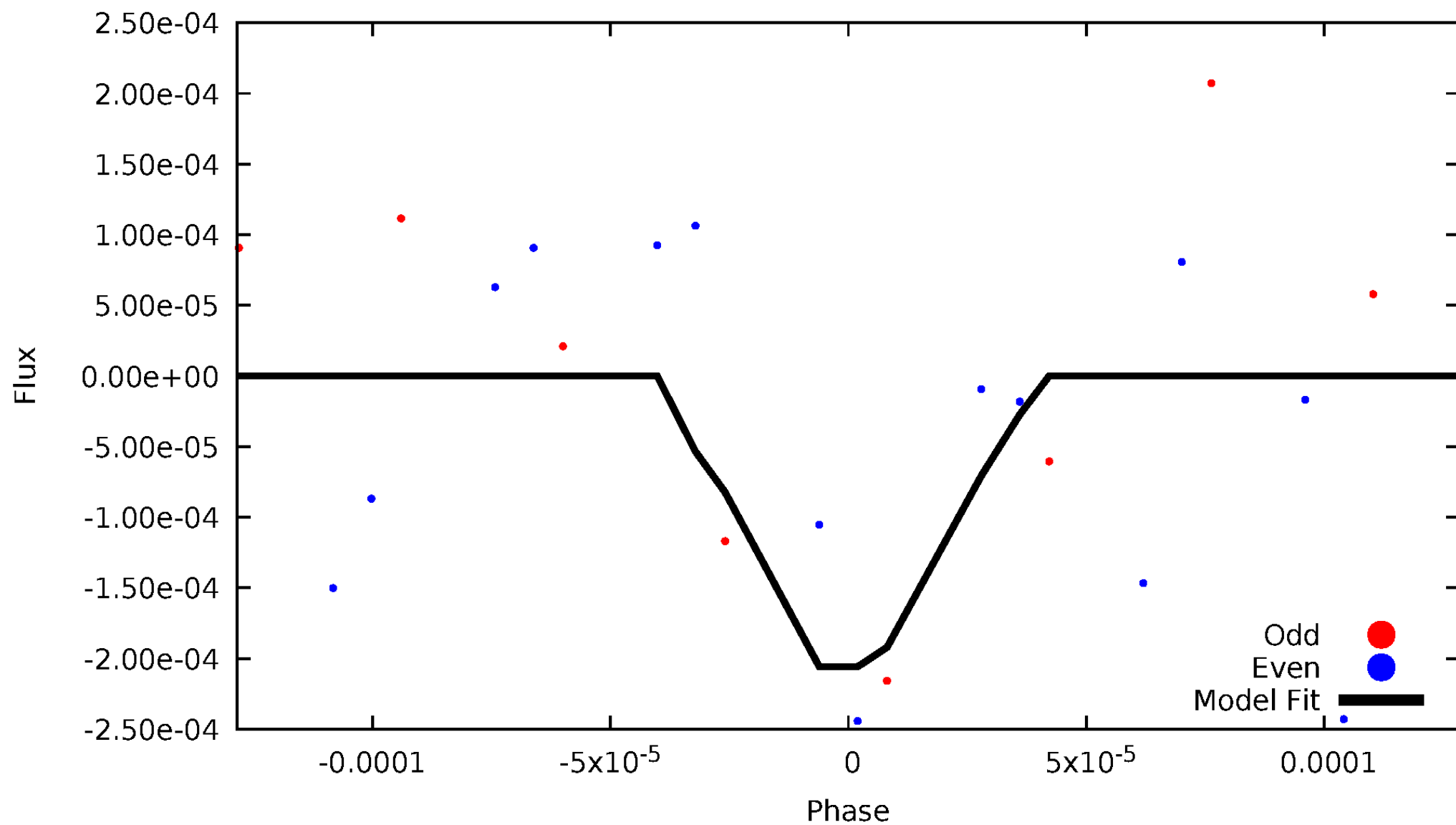
DV Odd/Even

TCE 009401856-05

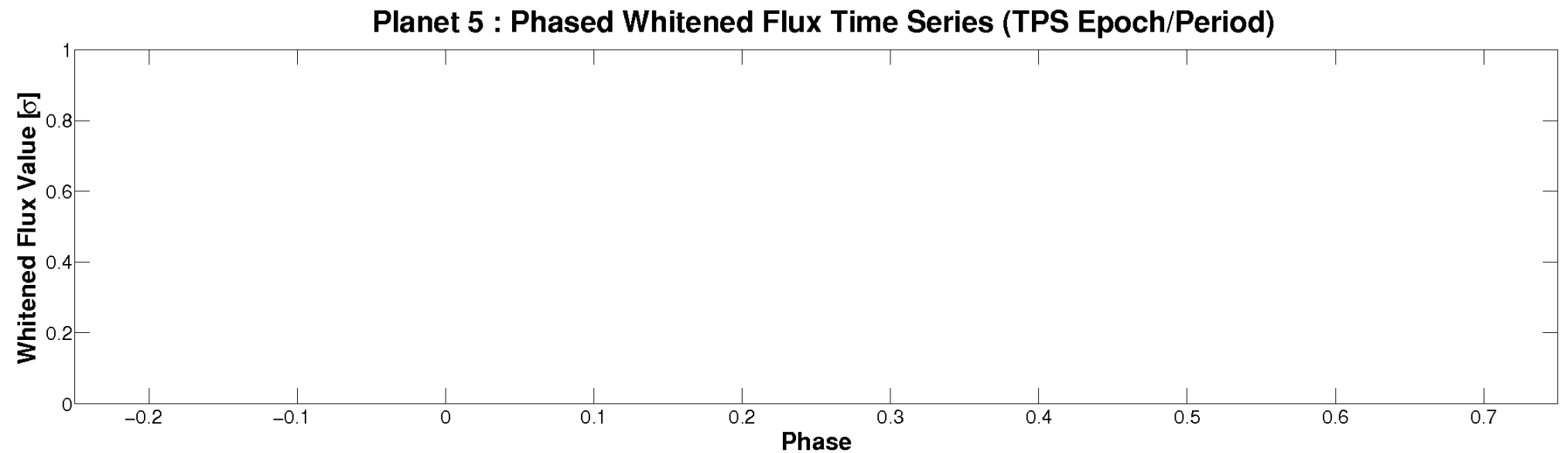
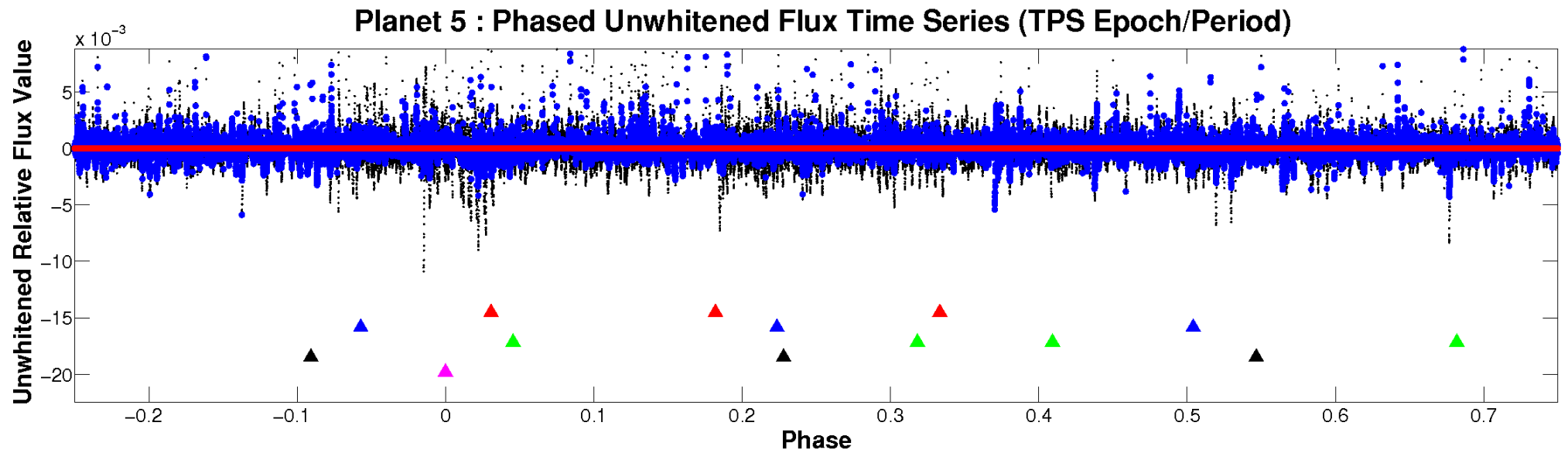


ALT Odd/Even

TCE 009401856-05

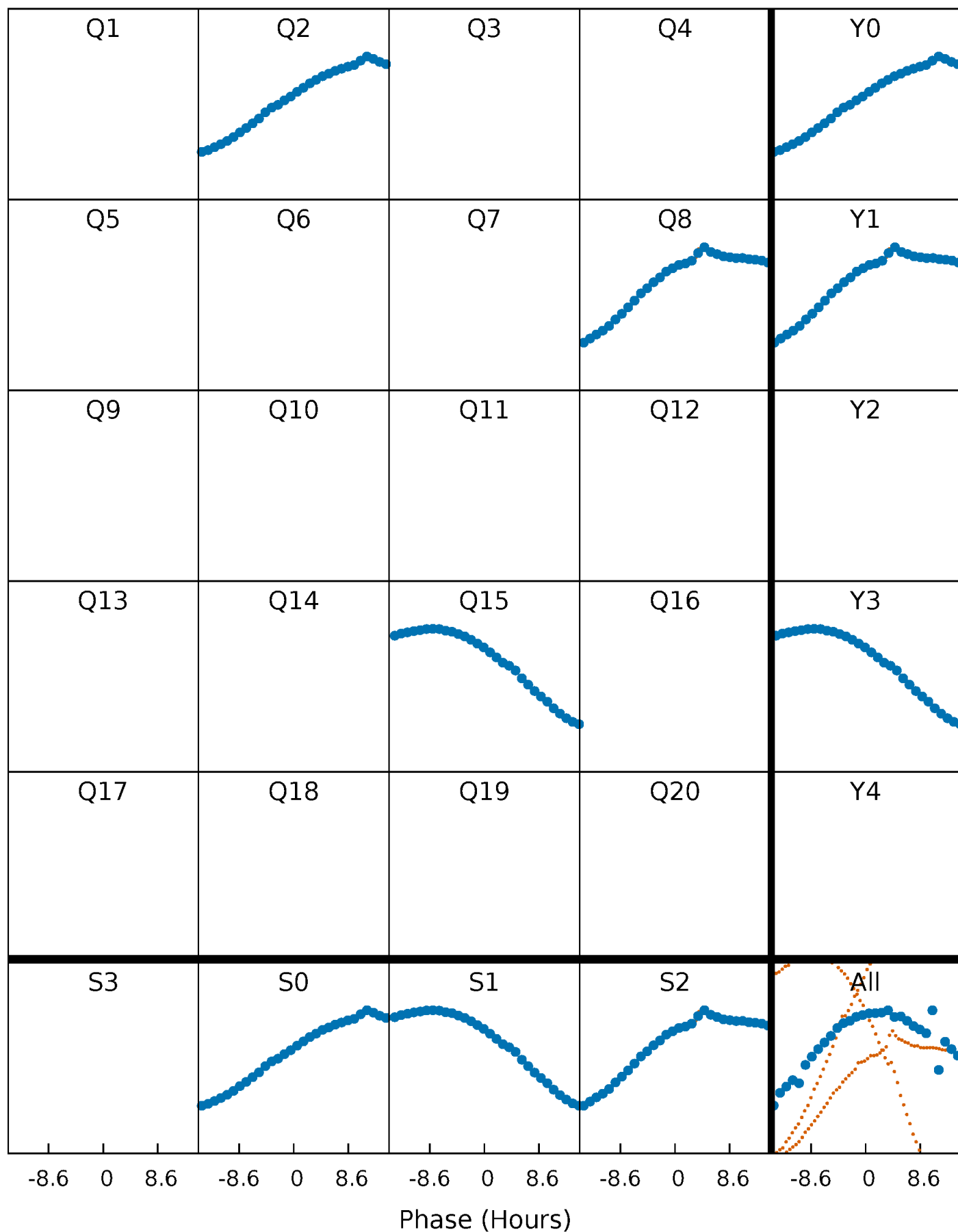


Non-Whitened Vs. Whitened Light Curve



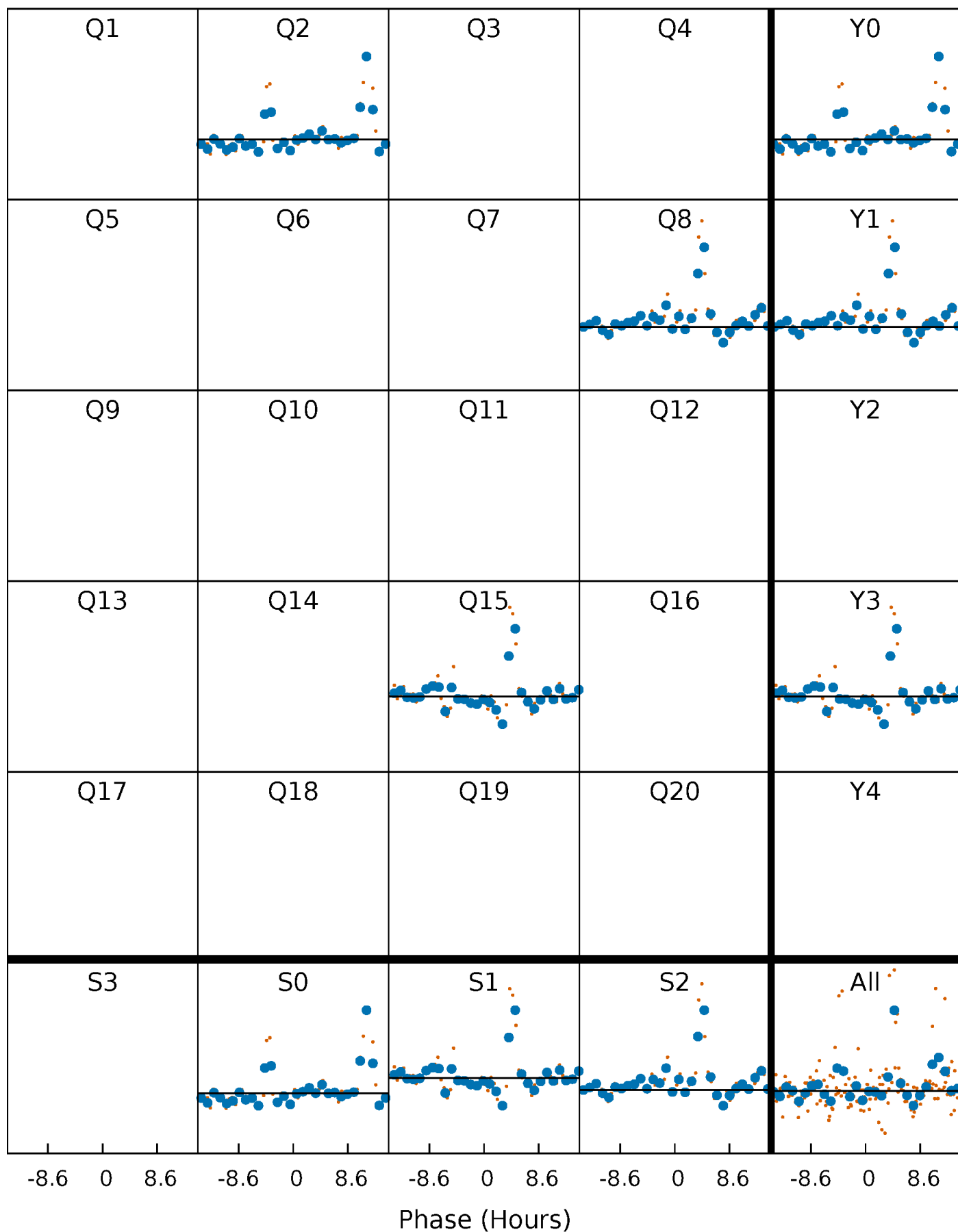
PDC Quarter-Phased Transit Curves

TCE 009401856-05 $P=600.085979$ Days $T_0=178.603538$ (BKJD)



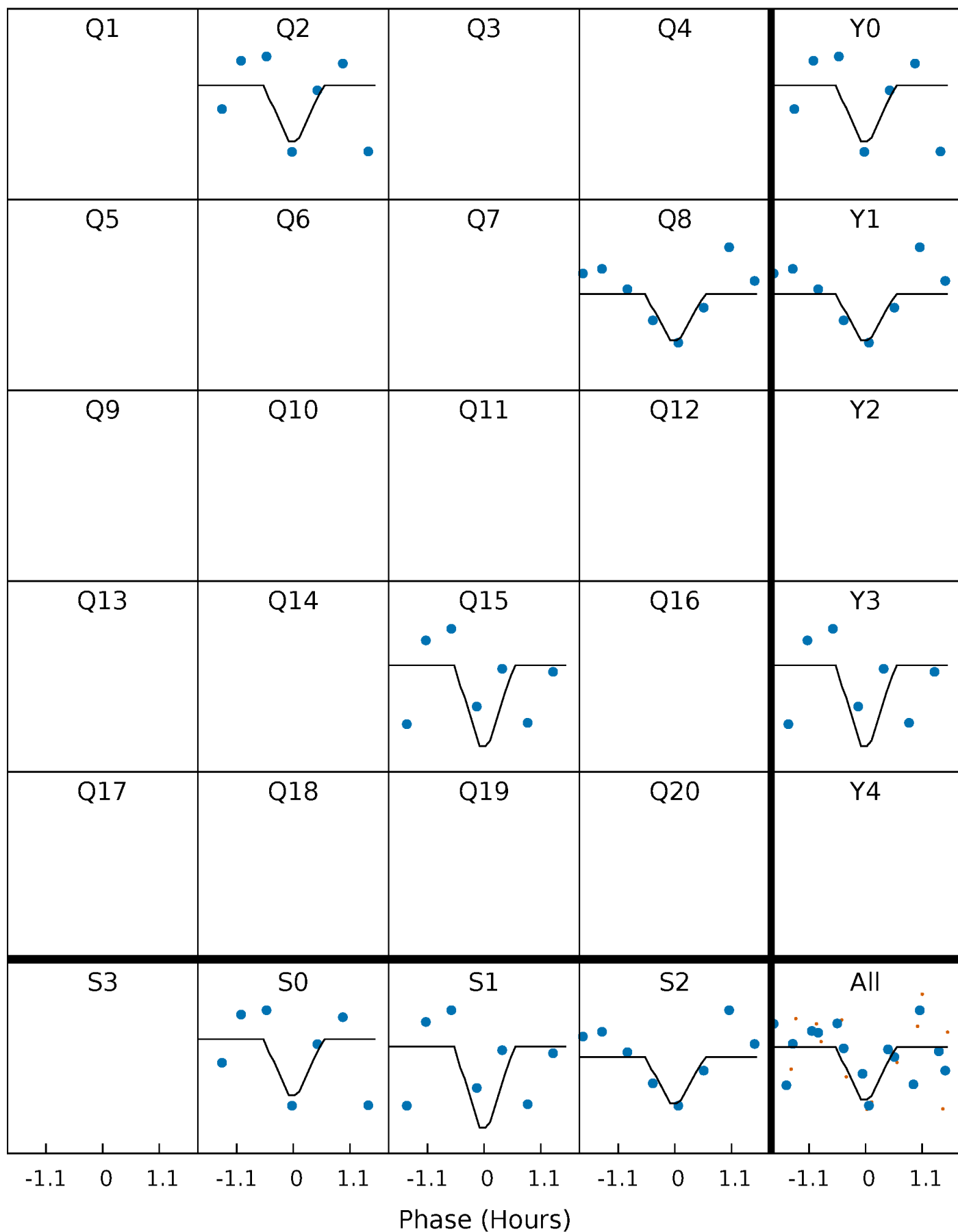
DV Quarter-Phased Transit Curves

TCE 009401856-05 $P=600.085979$ Days $T_0=178.603538$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

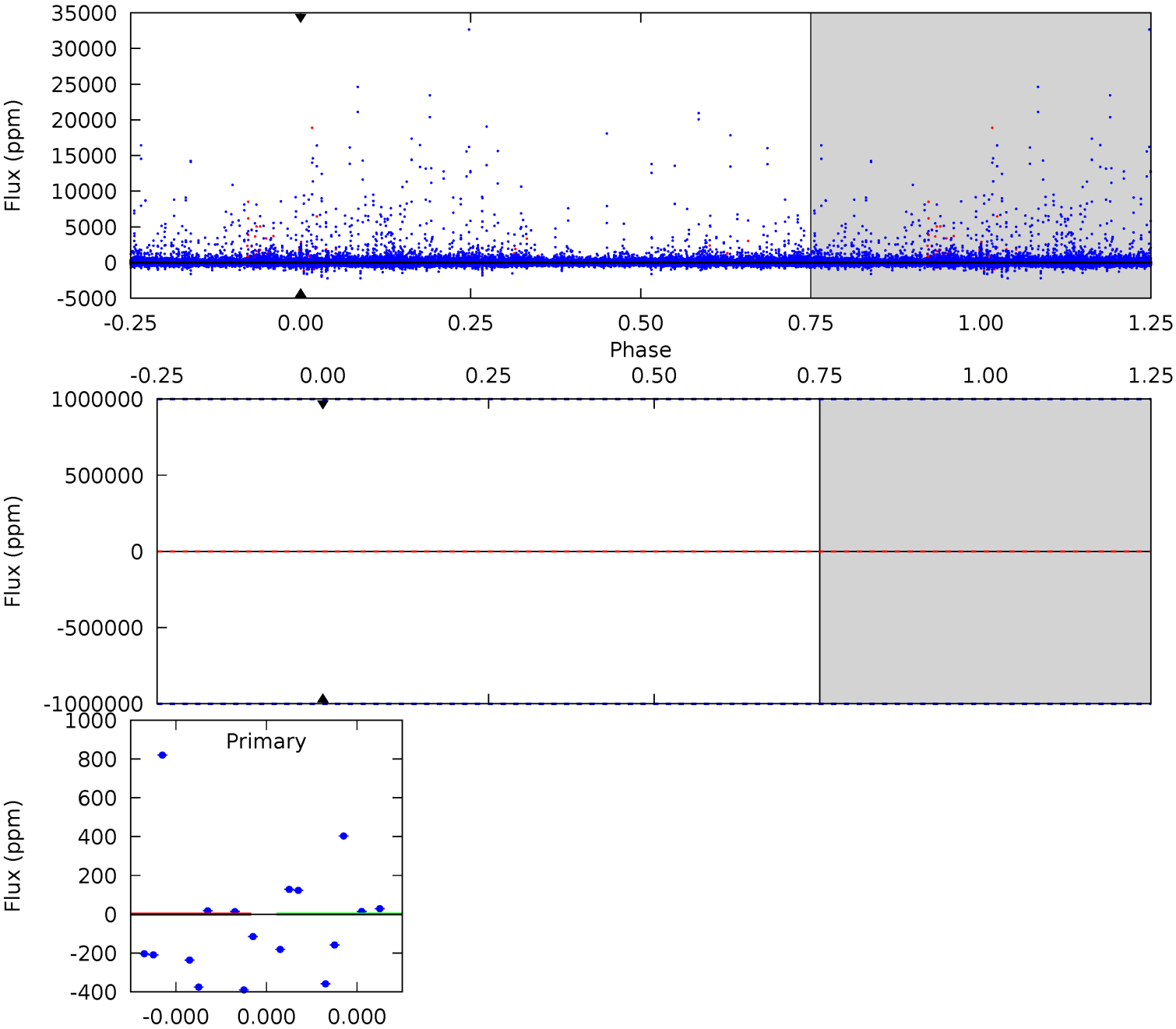
TCE 009401856-05 P=600.085979 Days $T_0=178.162433$ (BKJD)



DV Model-Shift Uniqueness Test

009401856-05, P = 600.085979 Days, E = 178.603538 Days

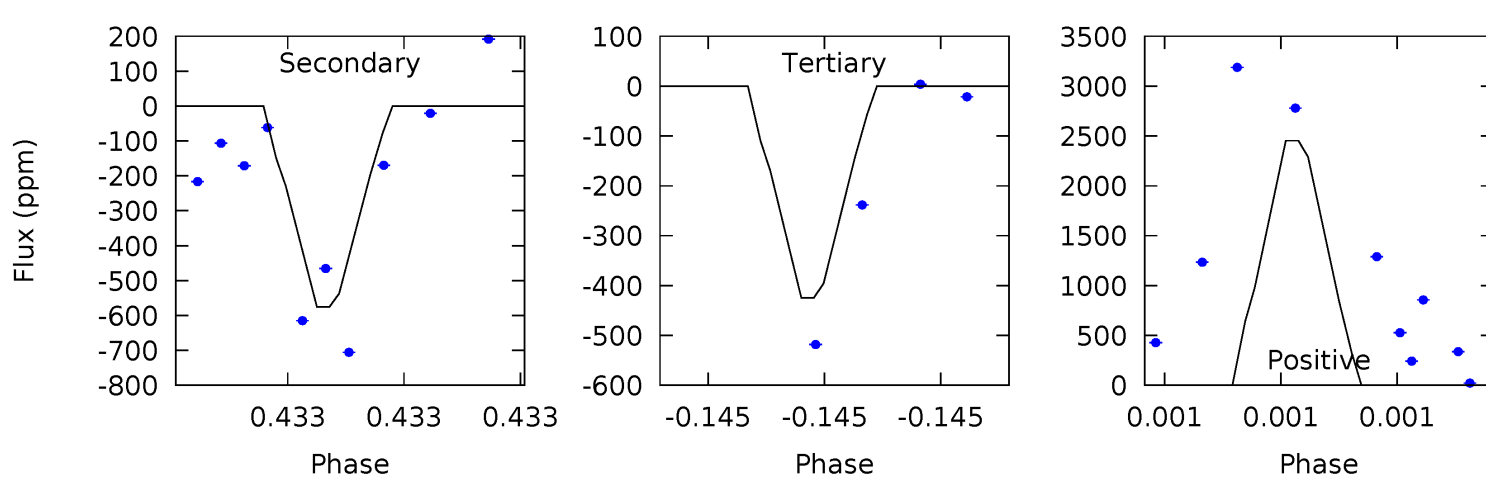
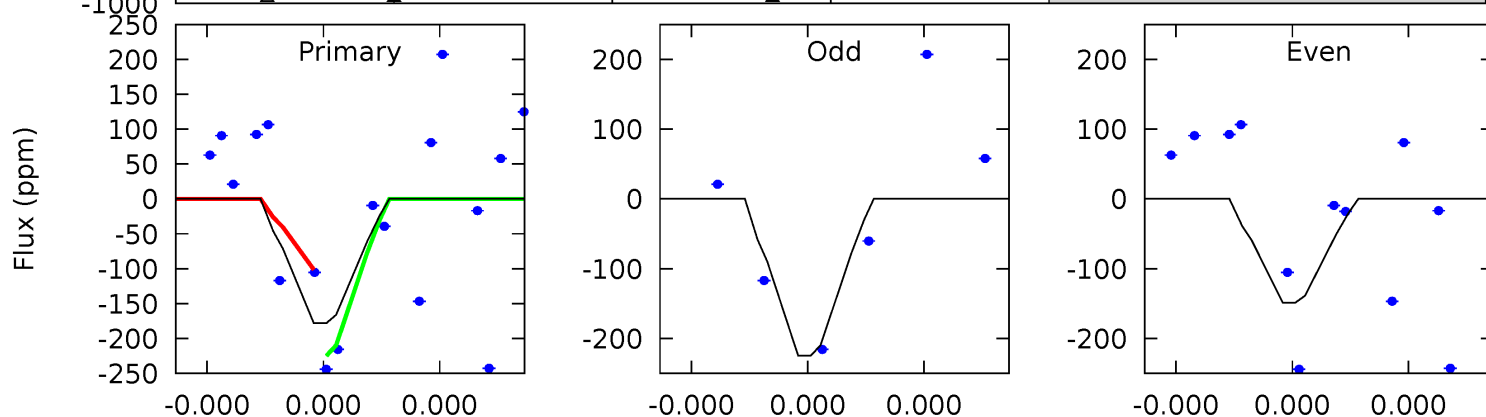
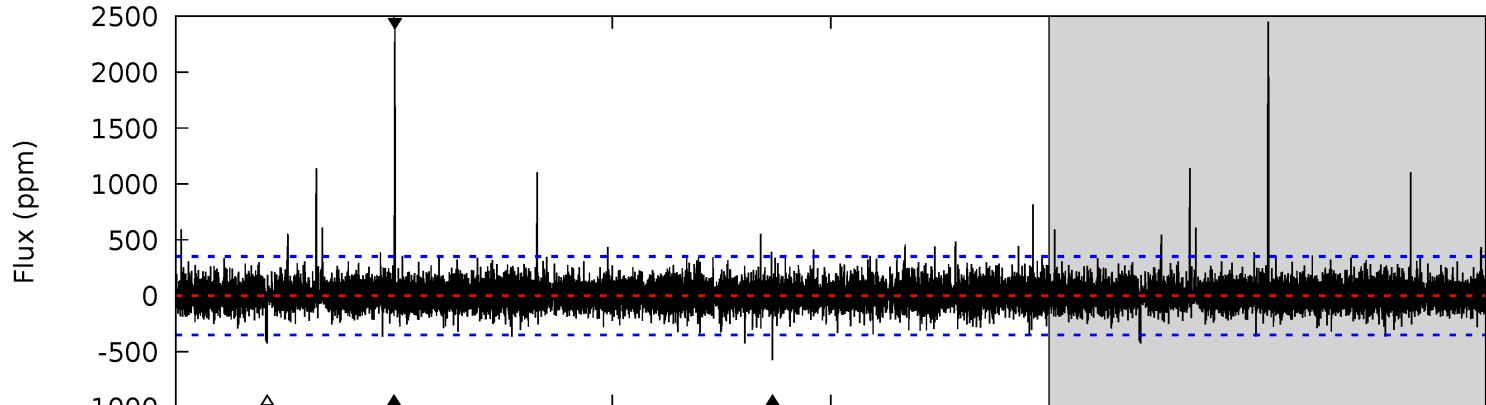
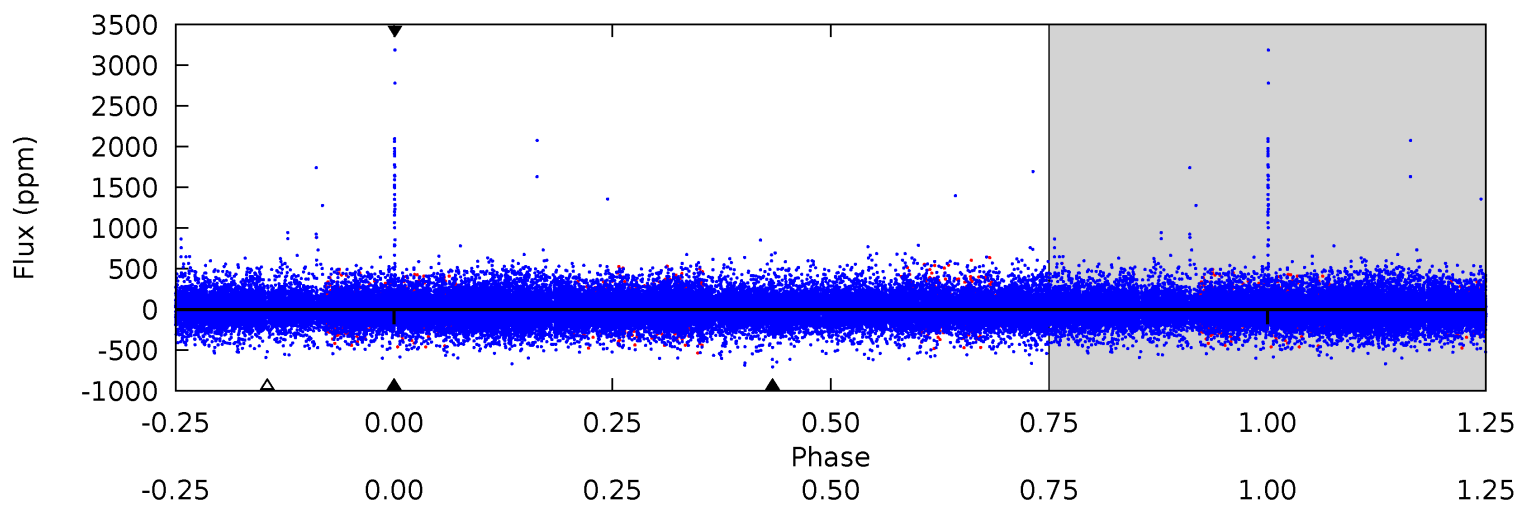
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



Alt Model-Shift Uniqueness Test

009401856-05, P = 600.085979 Days, E = 178.162433 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2.99	9.67	7.13	41.2	5.90	3.96	1.48	-4.14	-38.2	2.54	-31.6	0.54	0.89	0.81	0.99



Stellar Parameters For KIC 009401856

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5780^{+138}_{-155}	$4.421^{+0.116}_{-0.188}$	$-0.200^{+0.300}_{-0.300}$	$0.966^{+0.259}_{-0.139}$	$0.899^{+0.120}_{-0.087}$	$1.404^{+0.660}_{-0.684}$
	+2%/-3%	+3%/-4%	+150%/-150%	+27%/-14%	+13%/-10%	+47%/-49%
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 009401856-05 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	0 ± 1000000	$7.76^{+8.89}_{-5.31}$	304^{+22}_{-15}	-4096^{+26660}_{-15275}	$-16294.320^{+3121982.087}_{-2422384.658}$
Alt.	-576 ± 60	$7.81^{+7.74}_{-5.42}$	304^{+21}_{-16}	3765^{+2302}_{-720}	9576^{+96050}_{-7248}

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 $A_{obs} \gg 1.0$

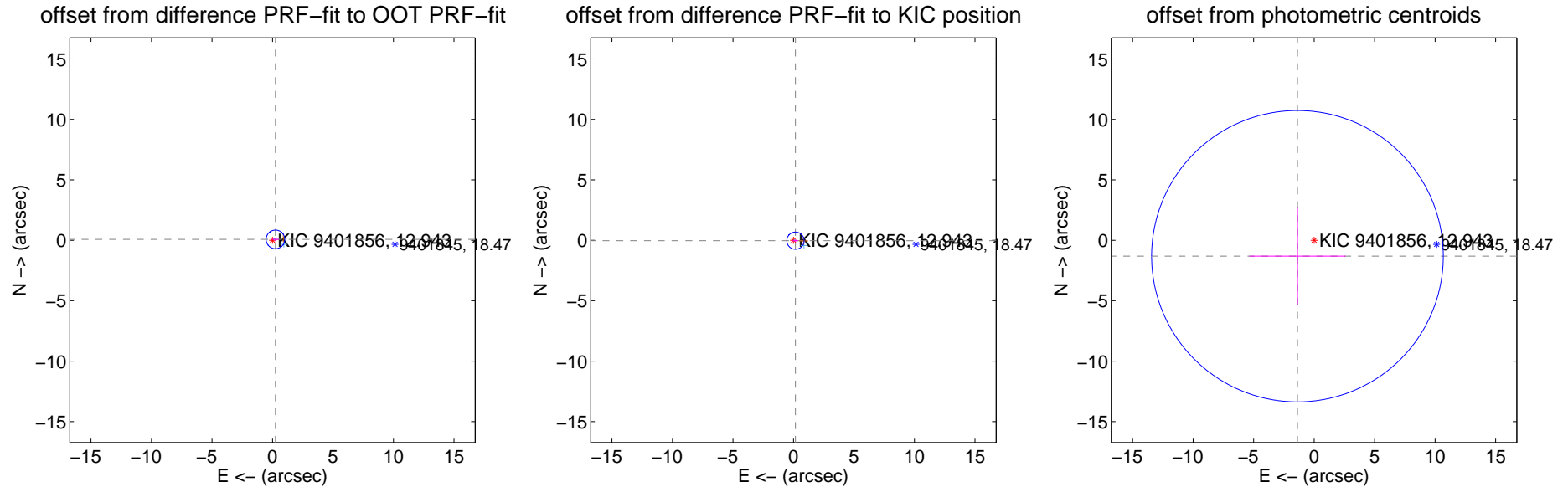
DV Centroid Data

Supplemental centroid analysis for 009401856-05. Kepler magnitude: 12.94. Transit SNR -1.00

There are 2 quarters with good PRF difference image offsets

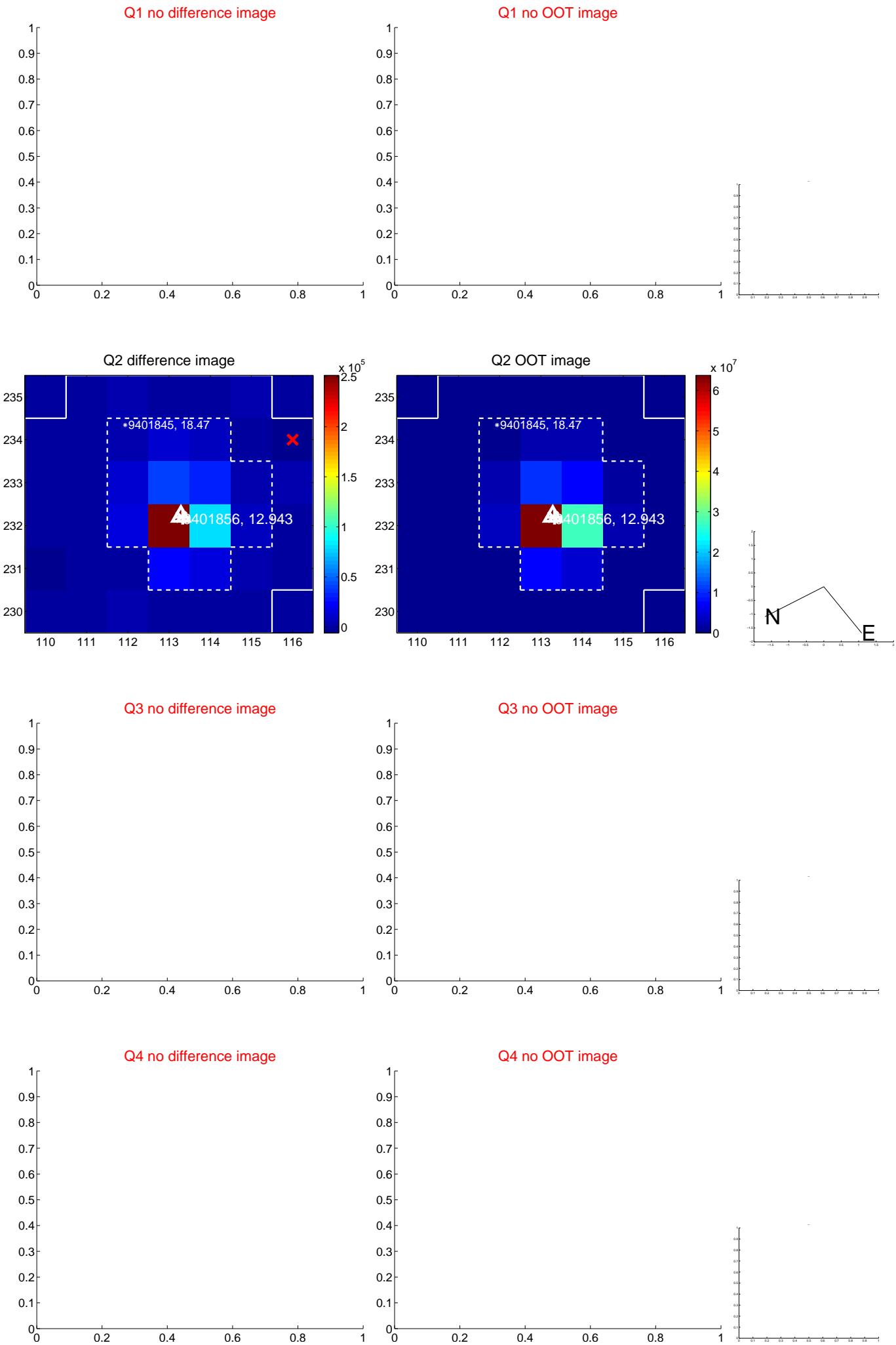
The direct PRF centroid is offset from the target star catalog position by about 0.24 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.256 ± 0.257	1.00	-0.245 ± 0.292	0.073 ± 0.145
PRF-fit source offset from KIC position	0.167 ± 0.237	0.71	-0.164 ± 0.232	-0.033 ± 0.100
photometric centroid source offset	1.91 ± 4.02	0.47	1.38 ± 3.97	-1.32 ± 4.07

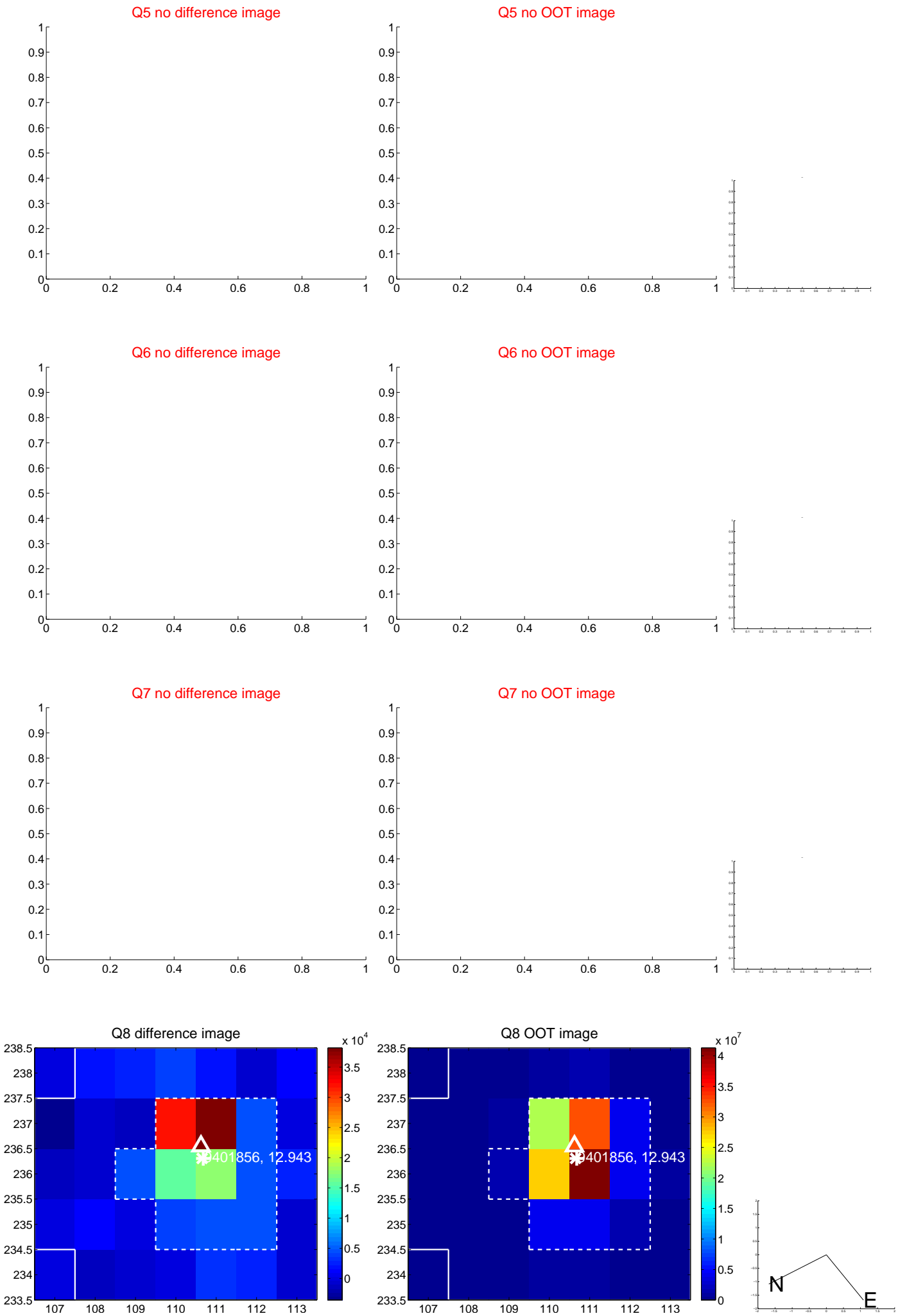


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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



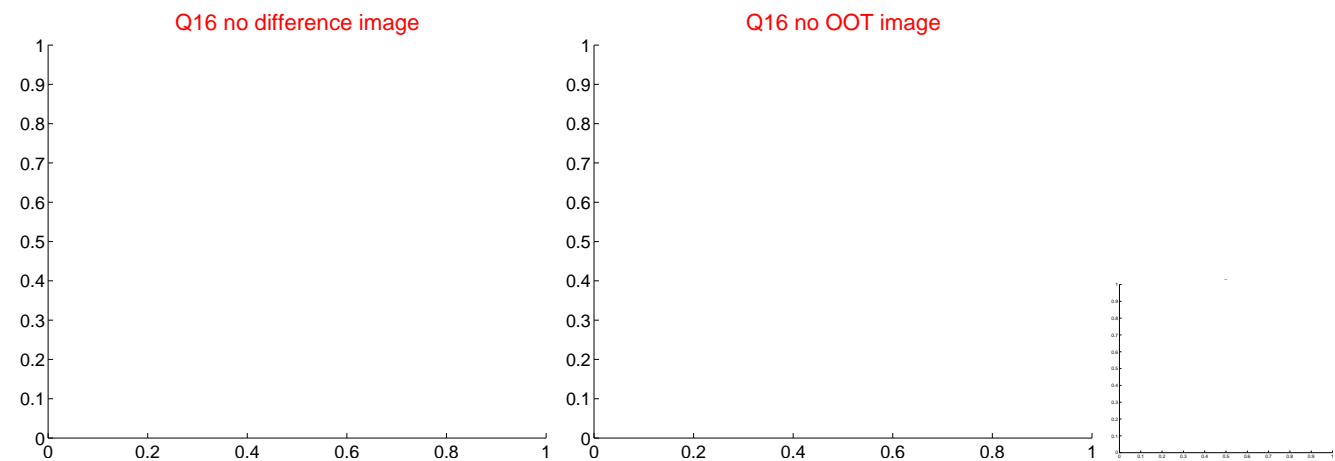
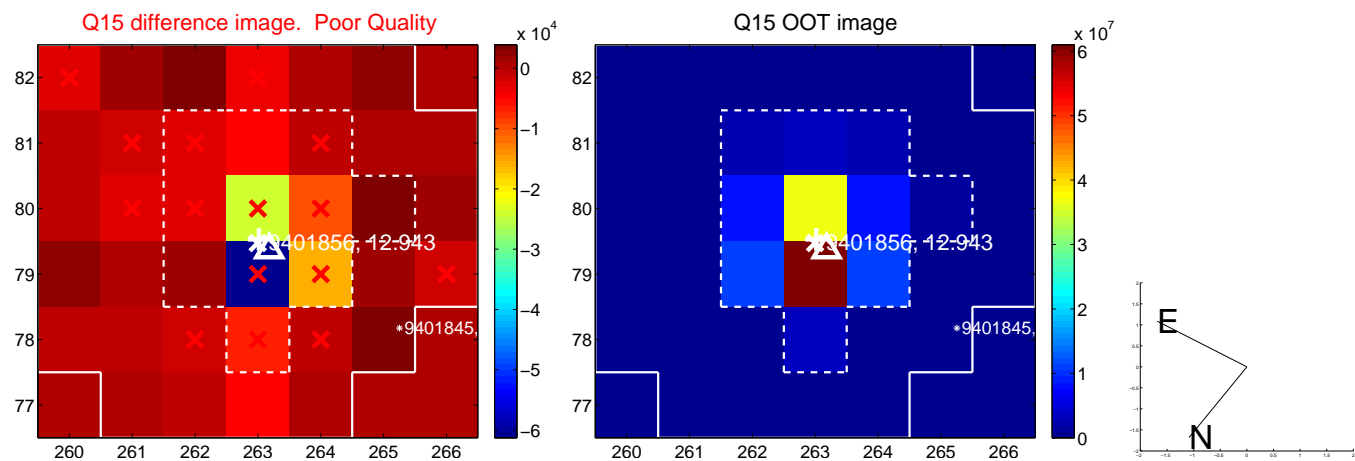
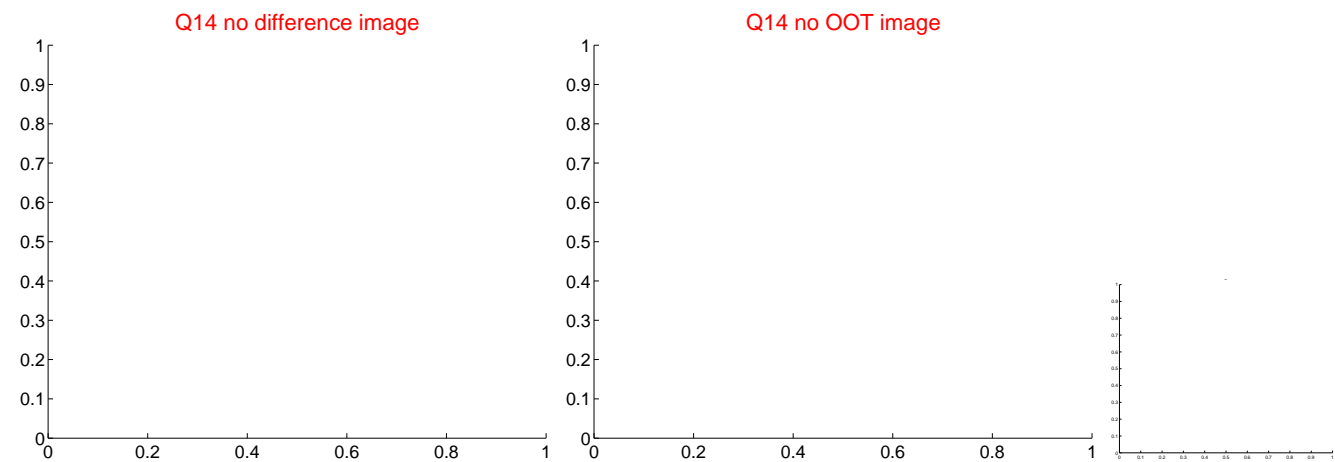
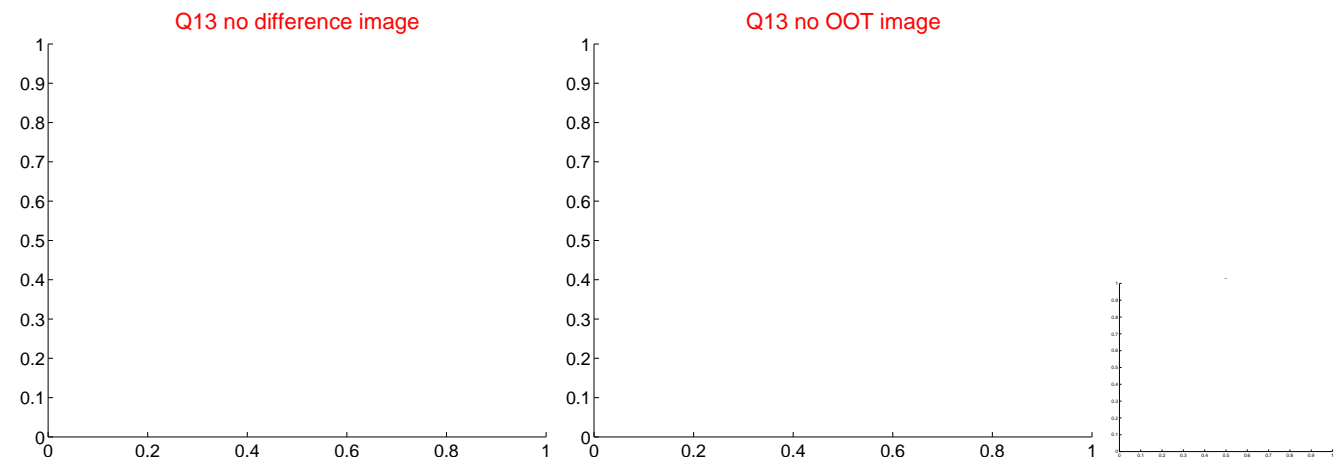
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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.

