

KIC 009712736

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})
009712736-01	OBS	No	505.279183	336.238213	4250.8	5.423	15.4	8.1	0.84	5651	5.41	0.44
009712736-03	OBS	No	609.386087	149.646211	4028.9	5.170	12.6	8.0	0.84	5651	6.45	0.34

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009712736-01	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—HALO_GHOST
009712736-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

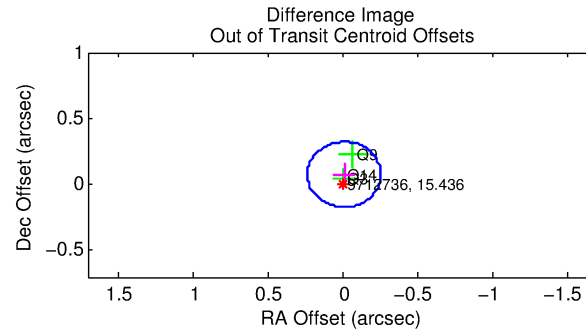
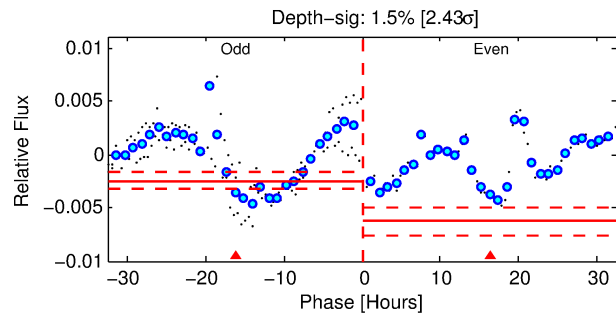
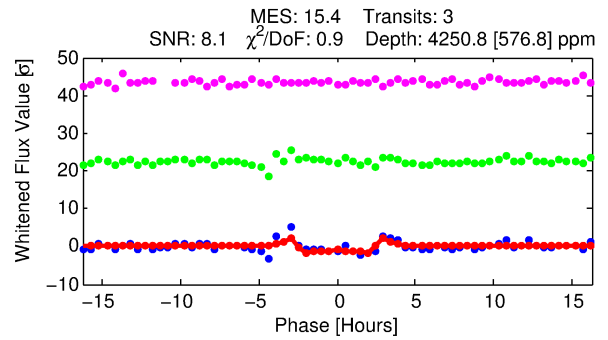
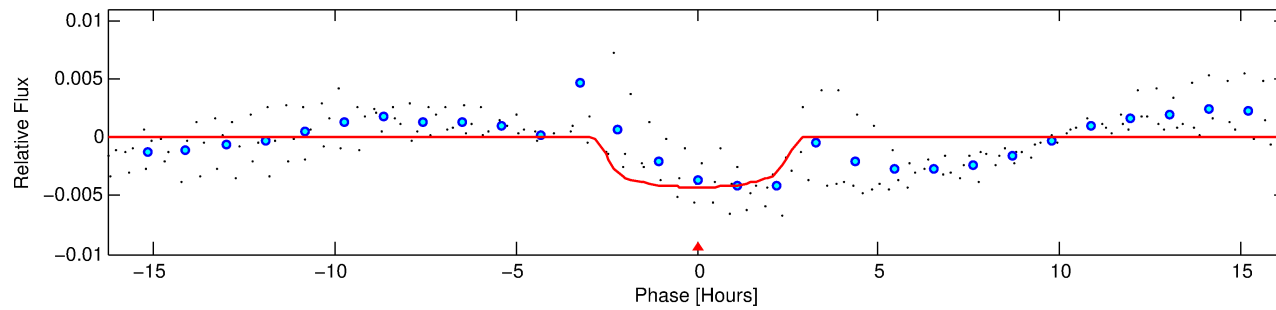
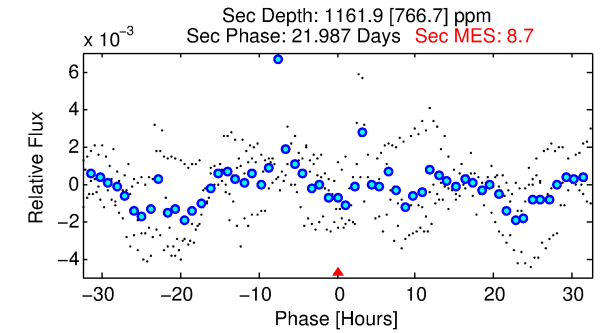
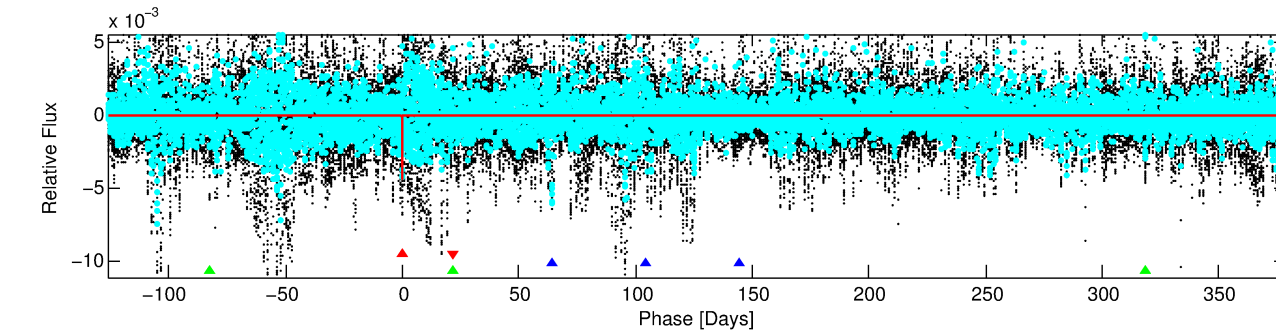
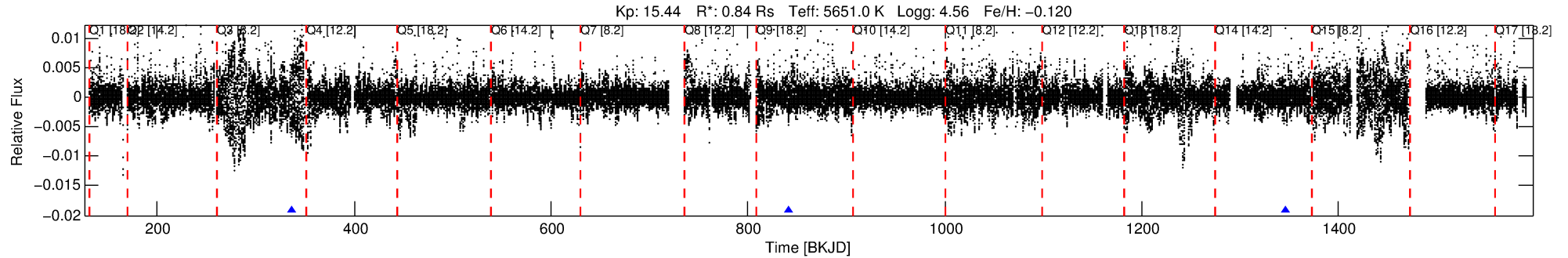
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009712736-01

No Significant Match Found

DV One-Page Summary

KIC: 9712736 Candidate: 1 of 3 Period: 505.279 d



DV Fit Results:

Period = 505.27918 [0.00396] d
Epoch = 336.2382 [0.0050] BKJD
Rp/R* = 0.0590 [0.0241]
a/R* = 753.74 [1231.34]
b = 0.00 [432.95]
Seff = 0.44 [0.16]
Teq = 208 [19] K
Rp = 5.41 [2.67] Re
a = 1.2103 [0.2816] AU
Ag = 32009.17 [35340.02] [0.91σ]
Teffp = 4295 [1136] K [3.60σ]

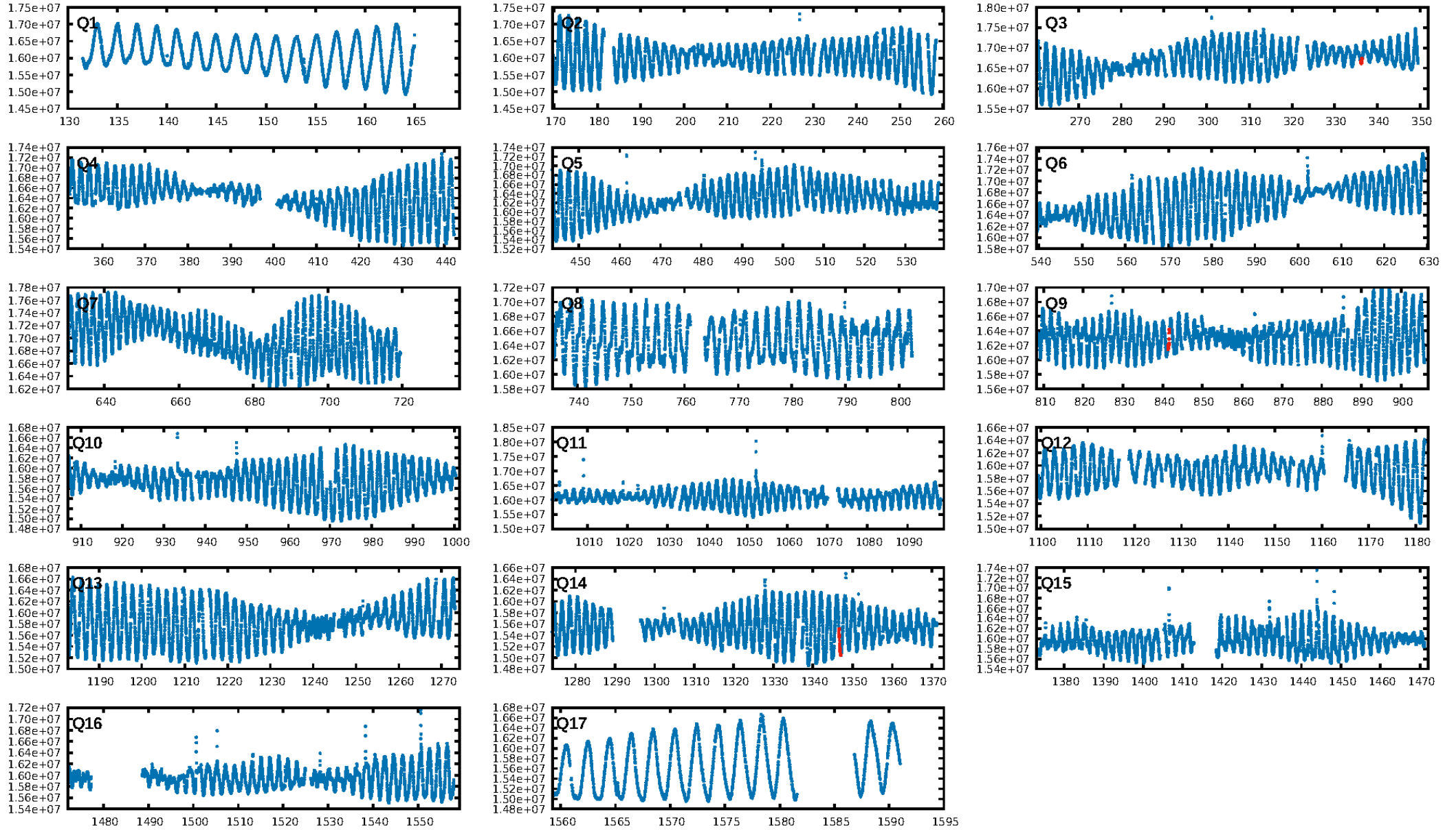
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [175.40σ]
LongPeriod-sig: 100.0% [333.45σ]
ModelChiSquare2-sig: 99.8%
ModelChiSquareGof-sig: 95.8%
Bootstrap-pfa: 1.16e-11
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 0.09682
Centroid-sig: 19.9%
Centroid-so: 0.525 arcsec [1.42σ]
OotOffset-rm: 0.077 arcsec [0.94σ]
KicOffset-rm: 0.040 arcsec [0.41σ]
OotOffset-st: 1/1/0/1 [3]
KicOffset-st: 1/1/0/1 [3]
DiffImageQuality-fgm: 1.00 [3/3]
DiffImageOverlap-fno: 1.00 [3/3]

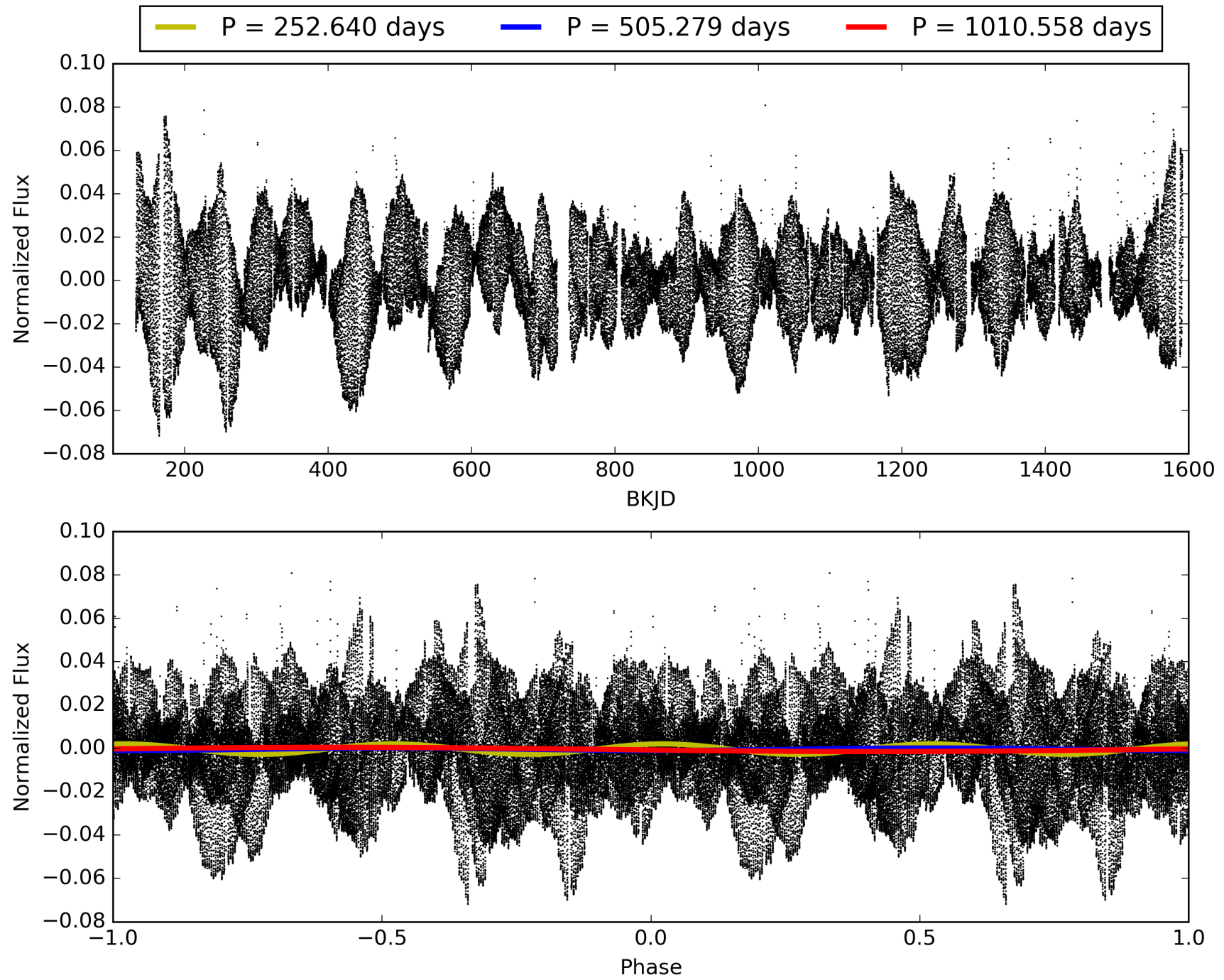
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 18:03:02 Z

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

TCE 009712736-01, PDC Light Curves

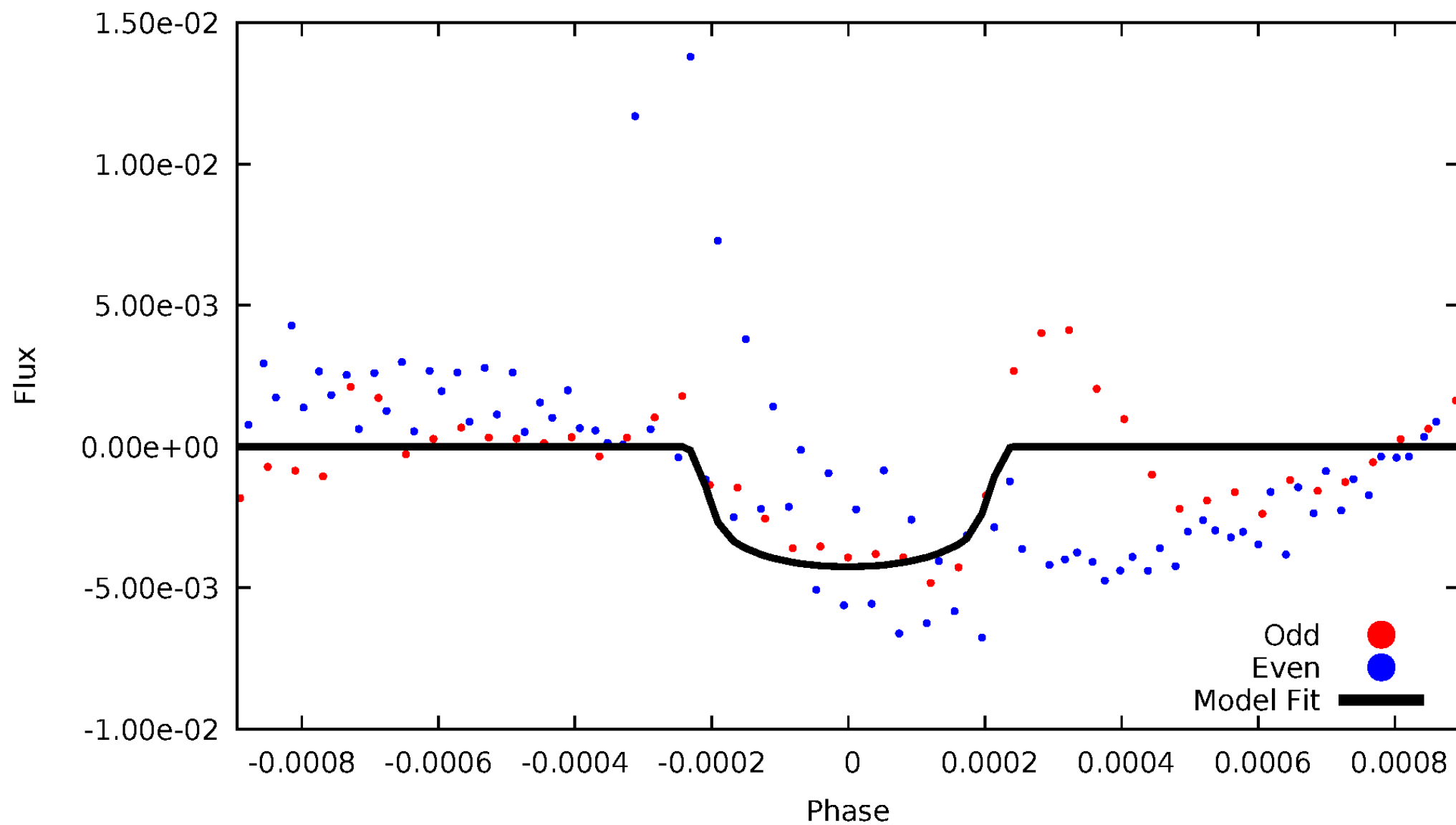


TCE 009712736-01



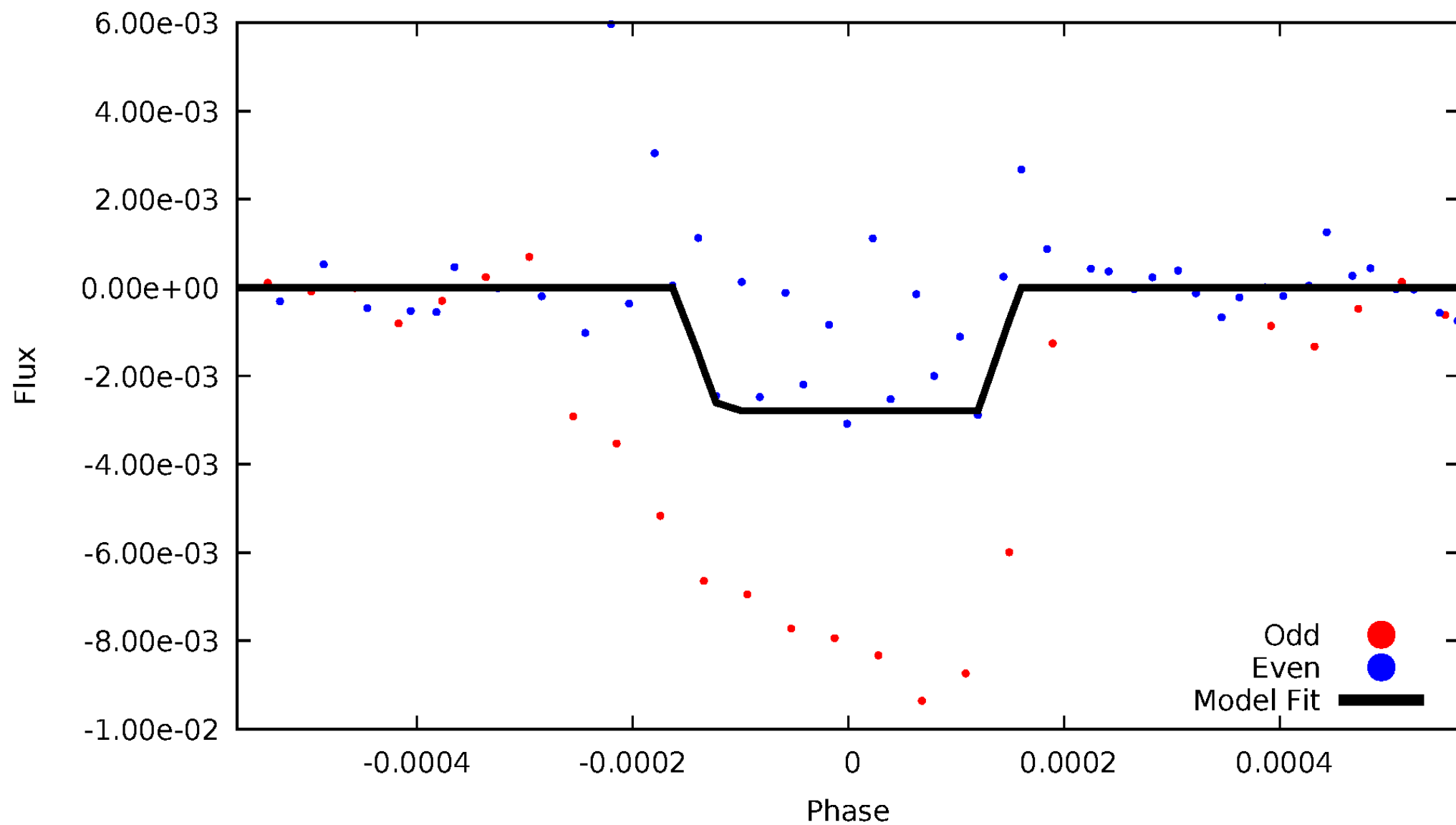
DV Odd/Even

TCE 009712736-01



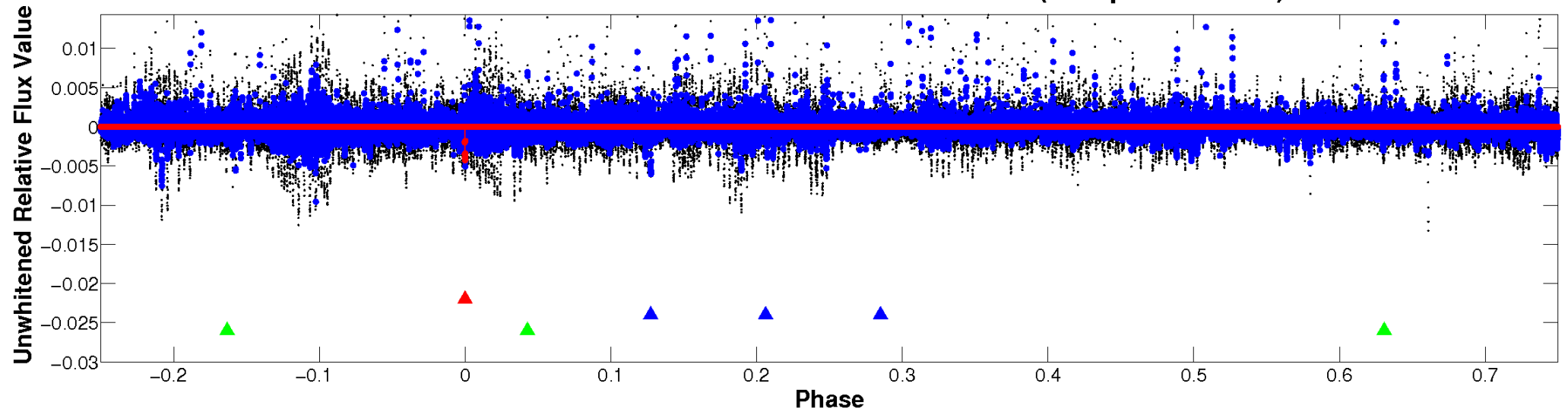
ALT Odd/Even

TCE 009712736-01

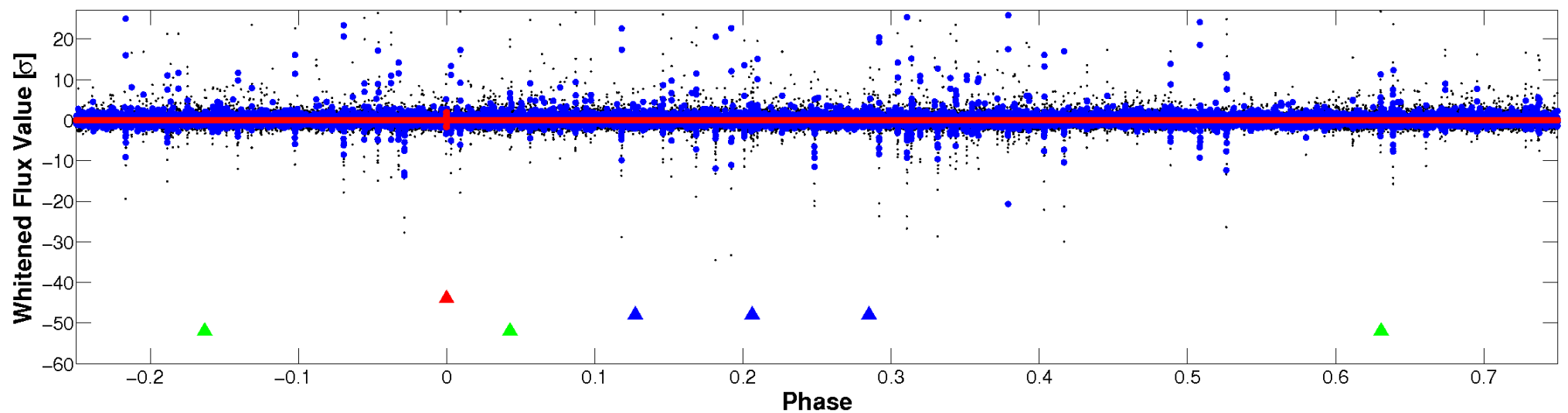


Non-Whitened Vs. Whitened Light Curve

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

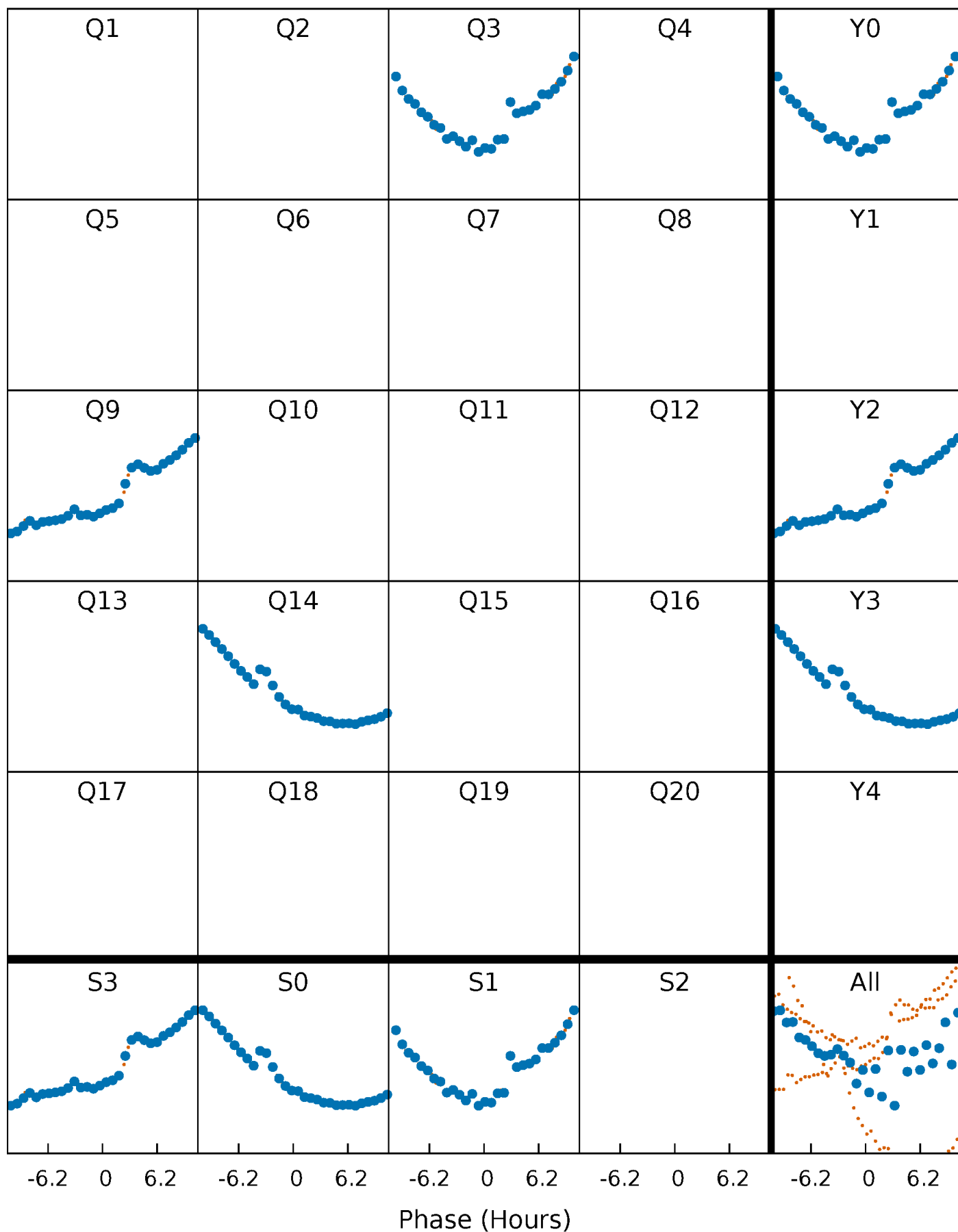


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



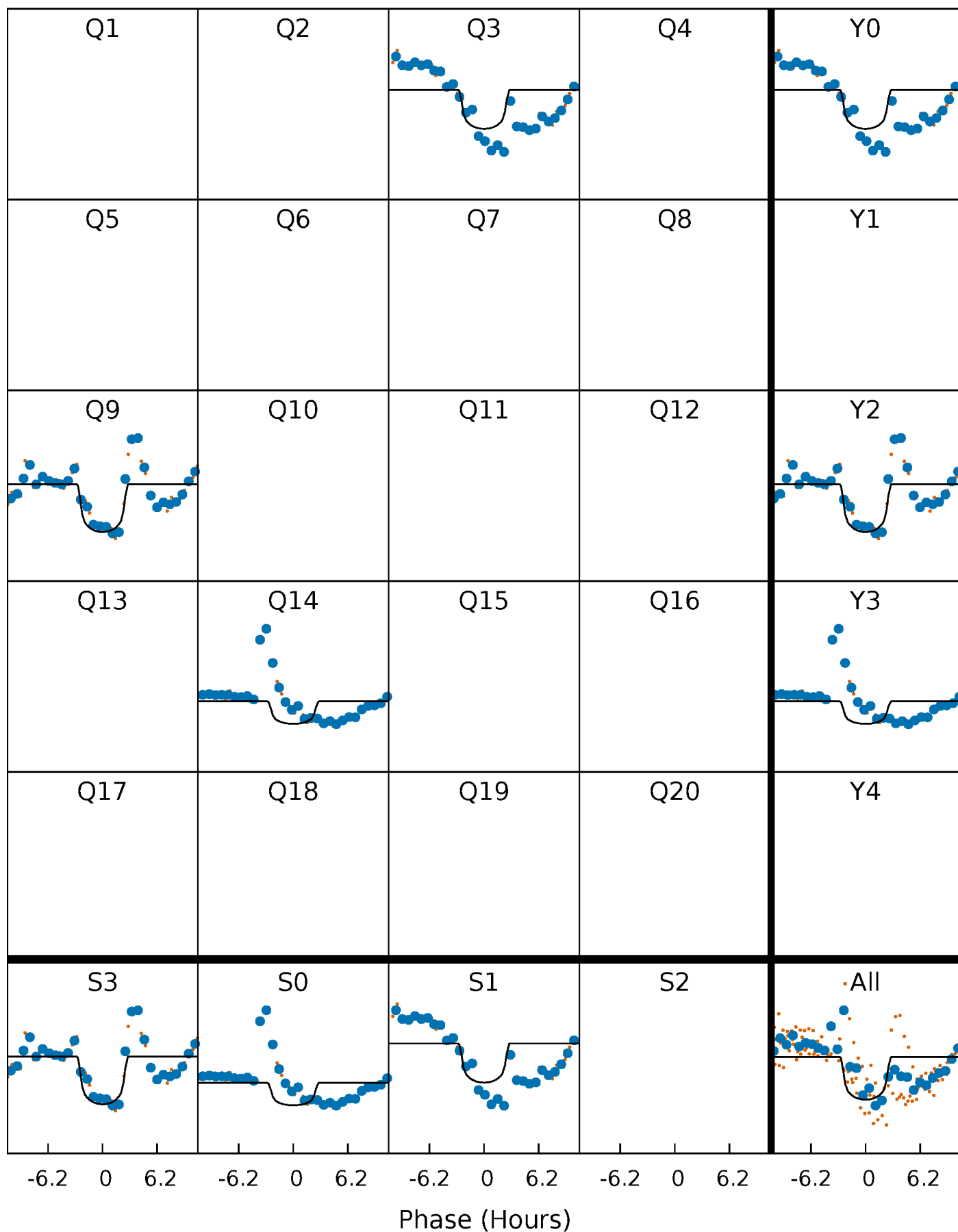
PDC Quarter-Phased Transit Curves

TCE 009712736-01 P=505.279183 Days $T_0=336.238213$ (BKJD)



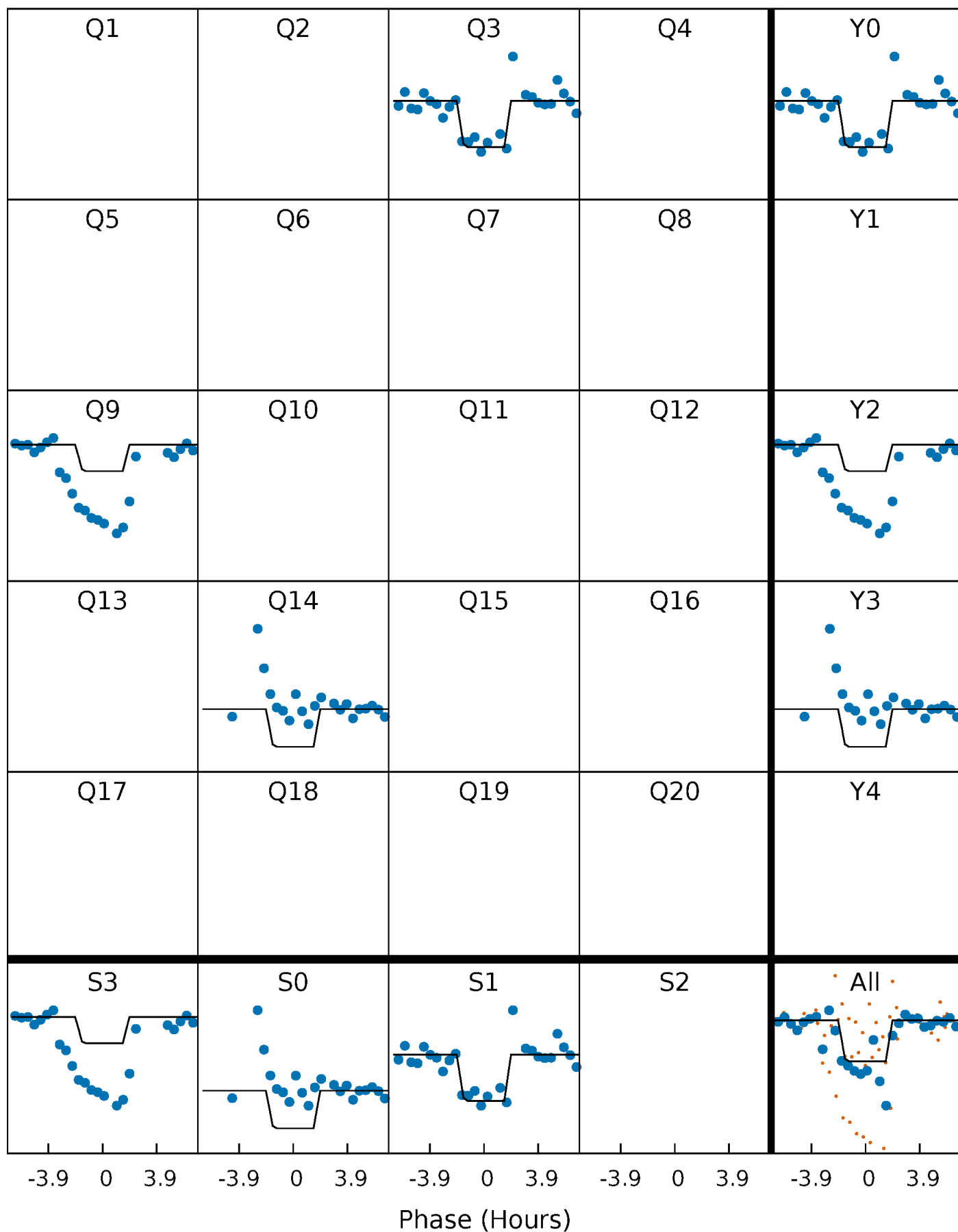
DV Quarter-Phased Transit Curves

TCE 009712736-01 P=505.279183 Days $T_0=336.238213$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

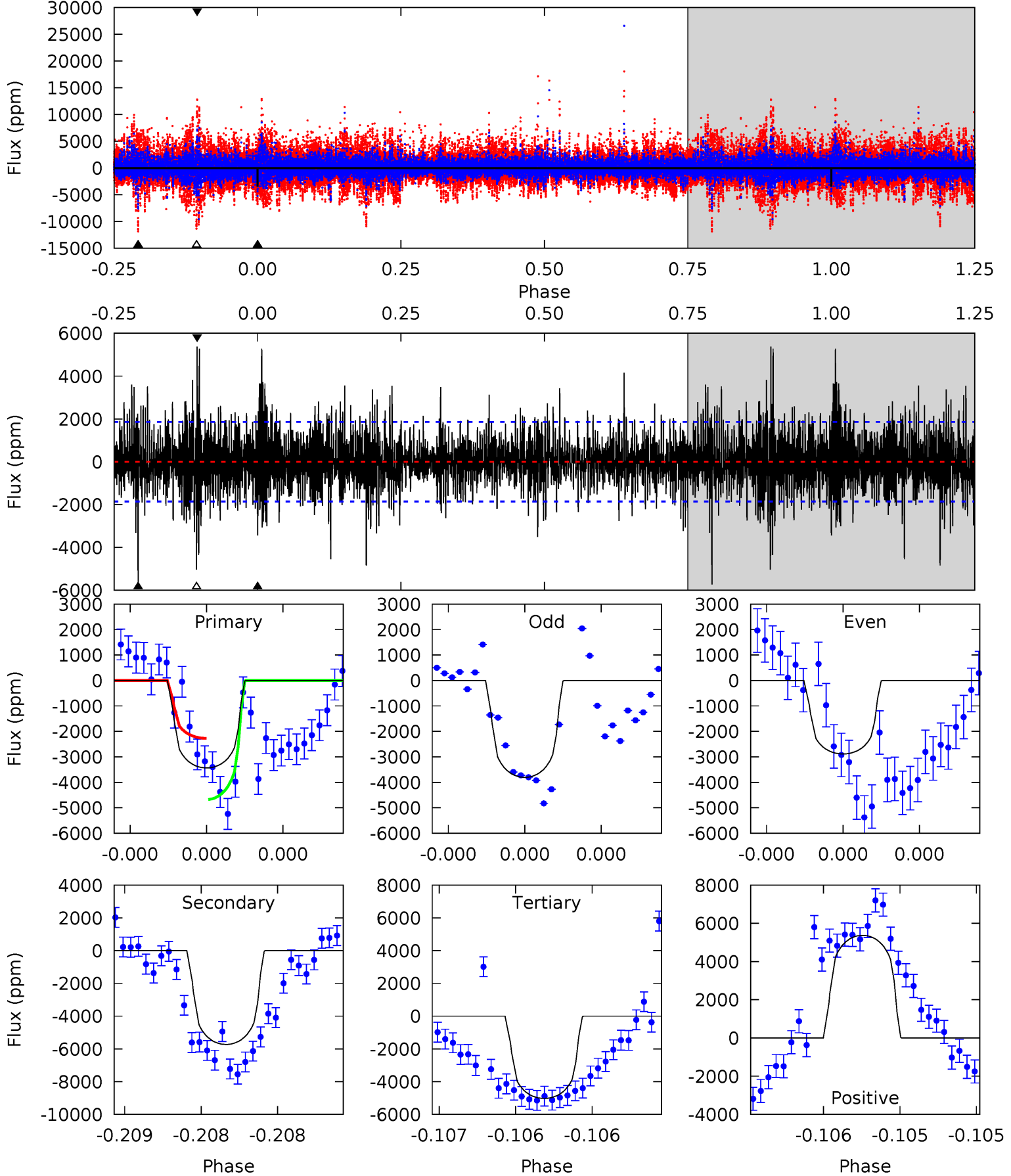
TCE 009712736-01 P=505.267449 Days $T_0=336.276495$ (BKJD)



DV Model-Shift Uniqueness Test

009712736-01, P = 505.279183 Days, E = 336.238213 Days

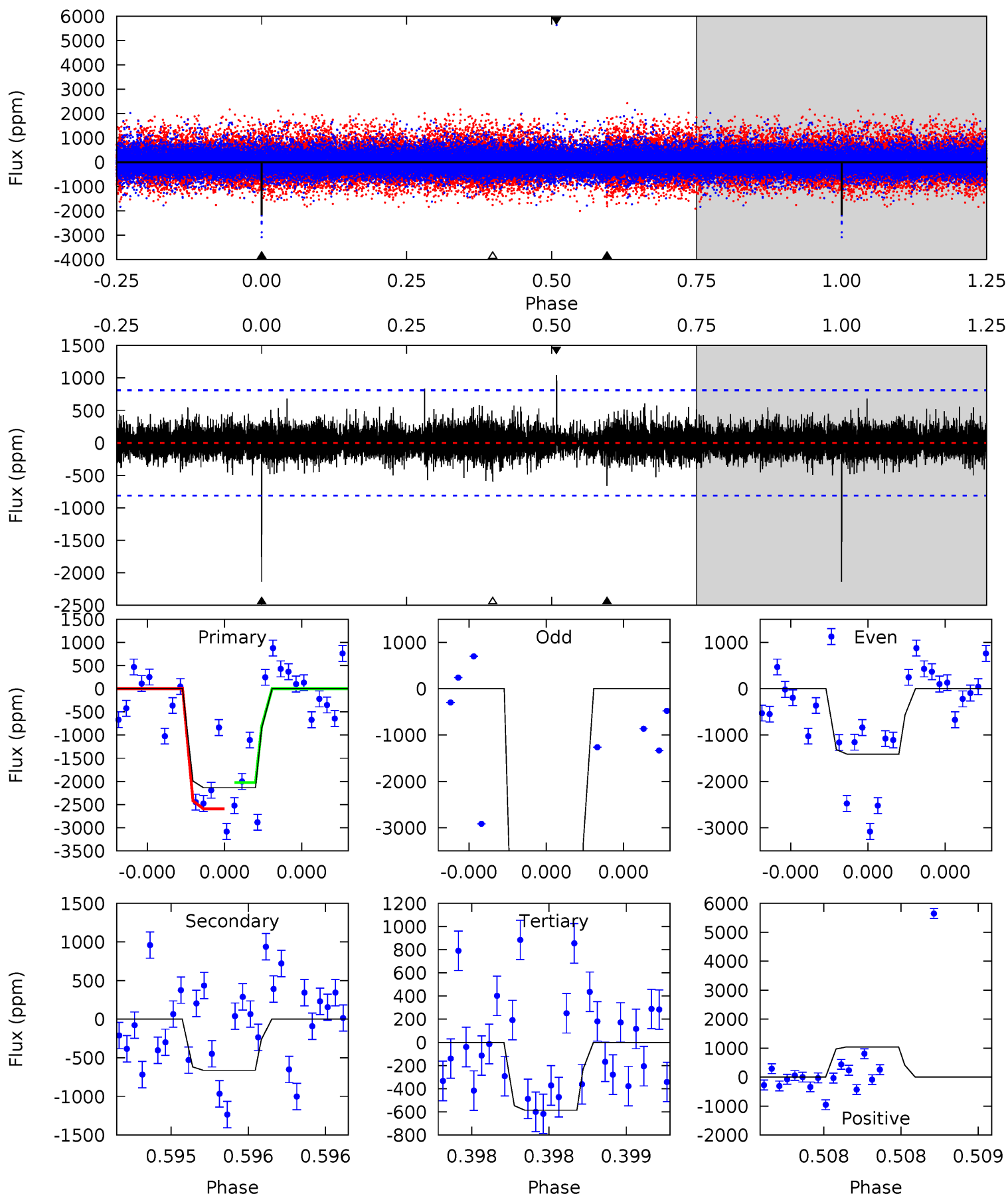
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.4	17.3	15.2	16.2	5.58	3.50	3.06	-4.80	-5.84	2.12	1.08	1.16	0.83	0.48	3.65



Alt Model-Shift Uniqueness Test

009712736-01, P = 505.267449 Days, E = 336.276495 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
14.9	4.62	4.09	7.27	5.66	3.62	0.88	10.8	7.65	0.53	-2.65	30.2	1.45	0.33	1.89



Stellar Parameters For KIC 009712736

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5651^{+152}_{-169}	$4.556^{+0.035}_{-0.184}$	$-0.120^{+0.300}_{-0.300}$	$0.840^{+0.233}_{-0.078}$	$0.925^{+0.094}_{-0.104}$	$2.199^{+0.412}_{-1.097}$
	+3%/-3%	+1%/-4%	+250%/-250%	+28%/-9%	+10%/-11%	+19%/-50%
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 009712736-01 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-5729 ± 332	$5.70^{+2.16}_{-2.31}$	296^{+17}_{-11}	6323^{+2181}_{-911}	$136954^{+256450}_{-64077}$
Alt.	-661 ± 143	$5.14^{+2.36}_{-2.27}$	297^{+18}_{-13}	4156^{+1042}_{-535}	19437^{+40700}_{-10843}

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

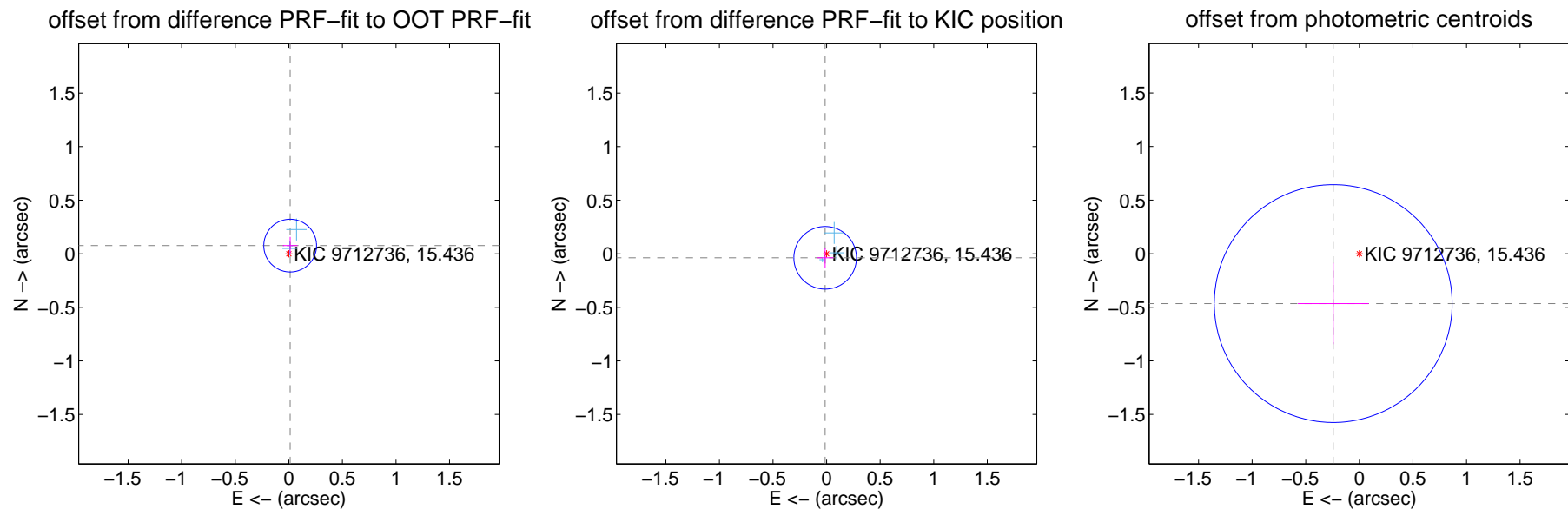
DV Centroid Data

Supplemental centroid analysis for 009712736-01. Kepler magnitude: 15.44. Transit SNR 8.05

There are 3 quarters with good PRF difference image offsets

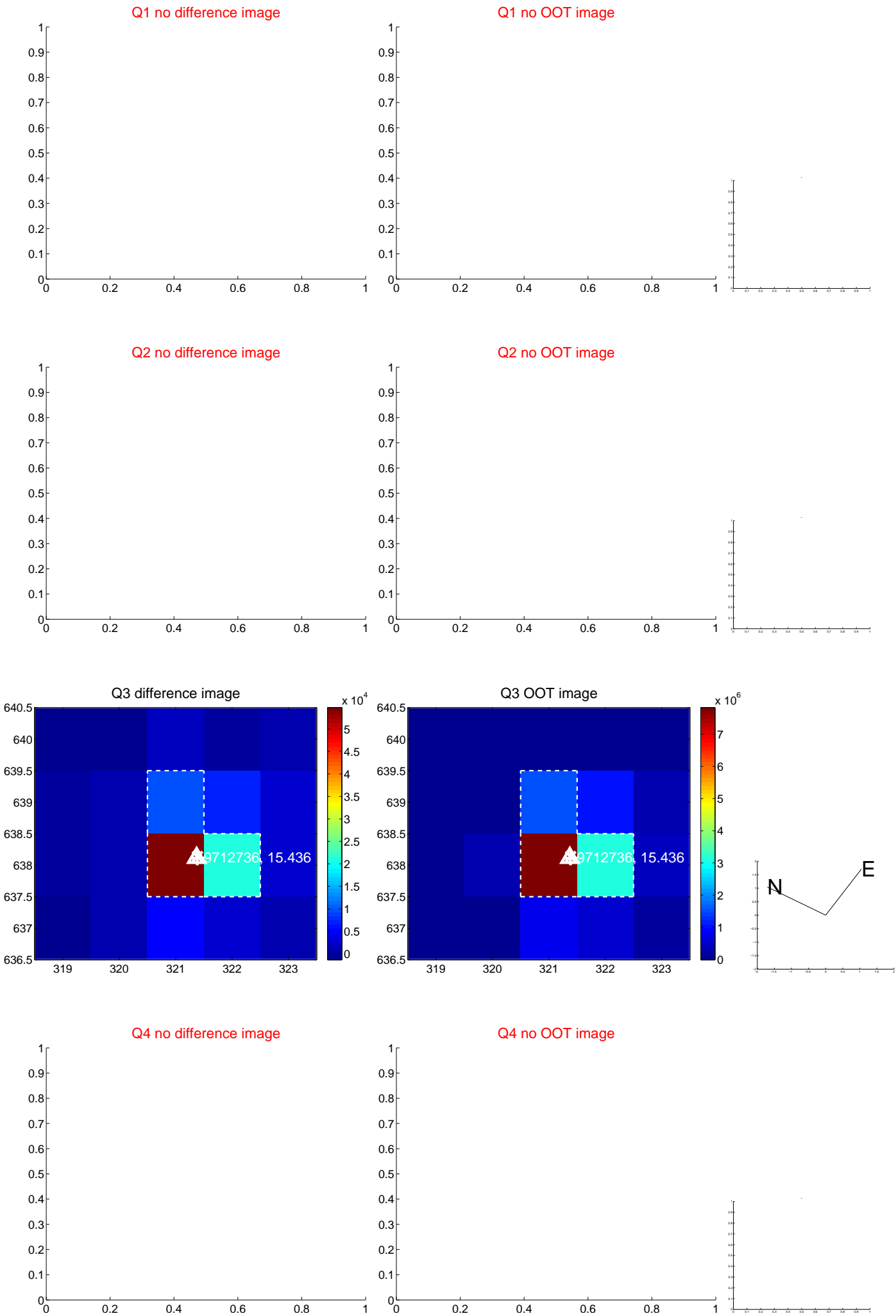
The direct PRF centroid is offset from the target star catalog position by about 0.14 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.077 ± 0.082	0.94	-0.013 ± 0.069	0.076 ± 0.081
PRF-fit source offset from KIC position	0.040 ± 0.097	0.41	0.013 ± 0.078	-0.038 ± 0.093
photometric centroid source offset	0.53 ± 0.37	1.42	0.24 ± 0.33	-0.47 ± 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.

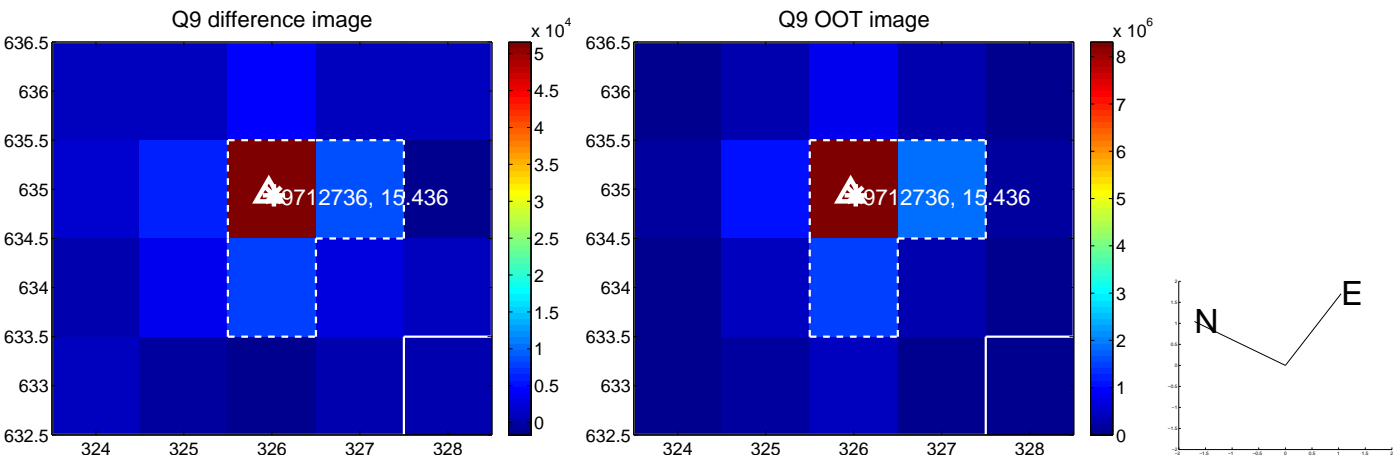
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

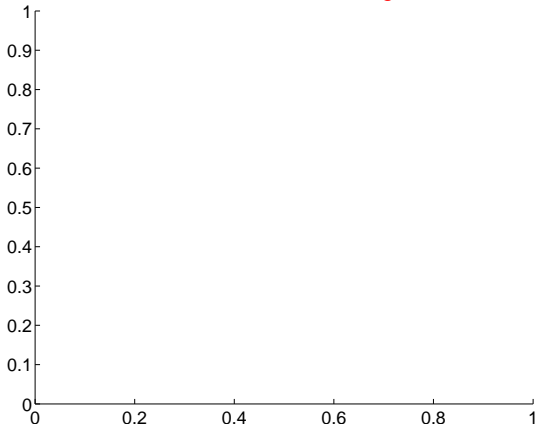


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

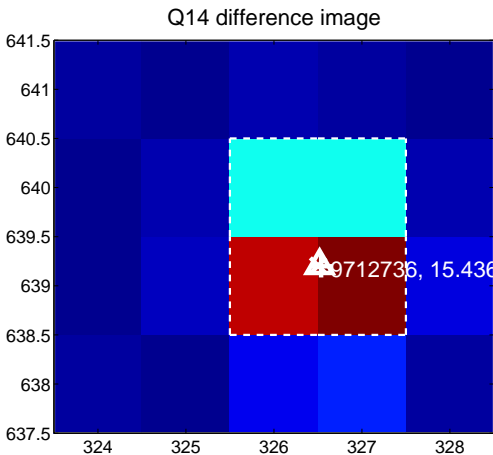
Q13 no difference image



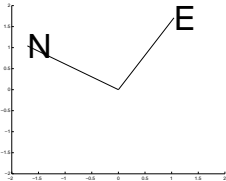
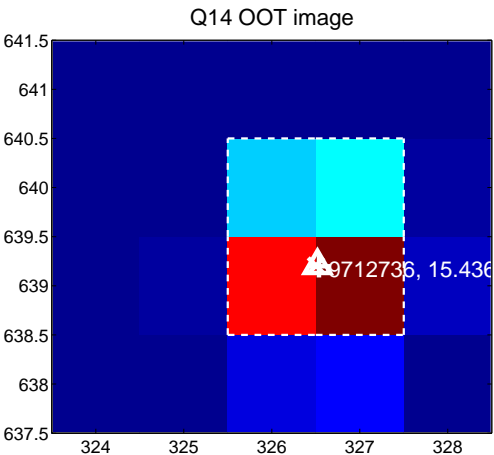
Q13 no OOT image



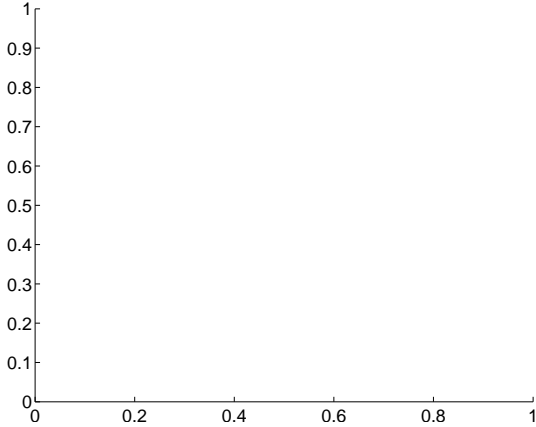
Q14 difference image



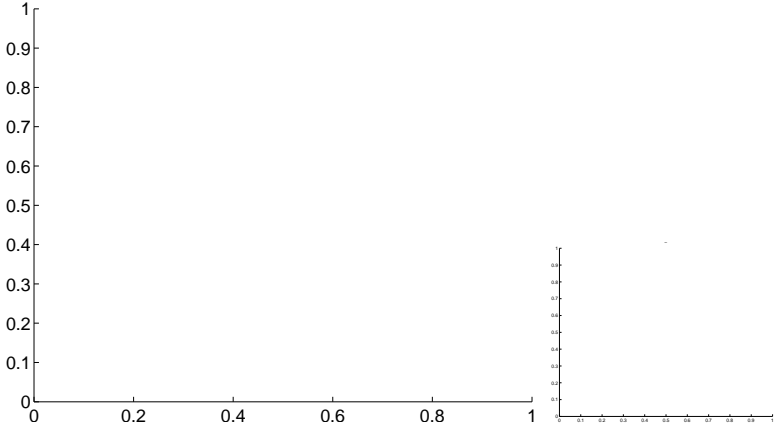
Q14 OOT image



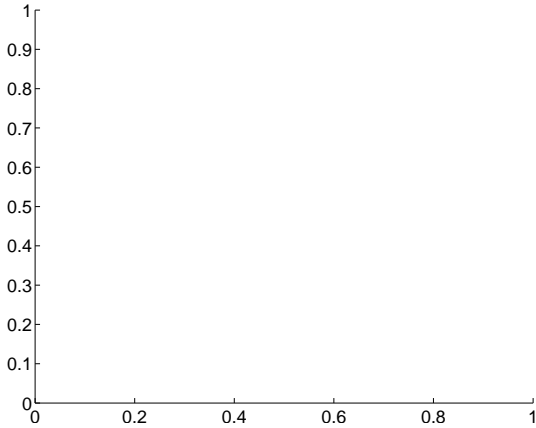
Q15 no difference image



Q15 no OOT image



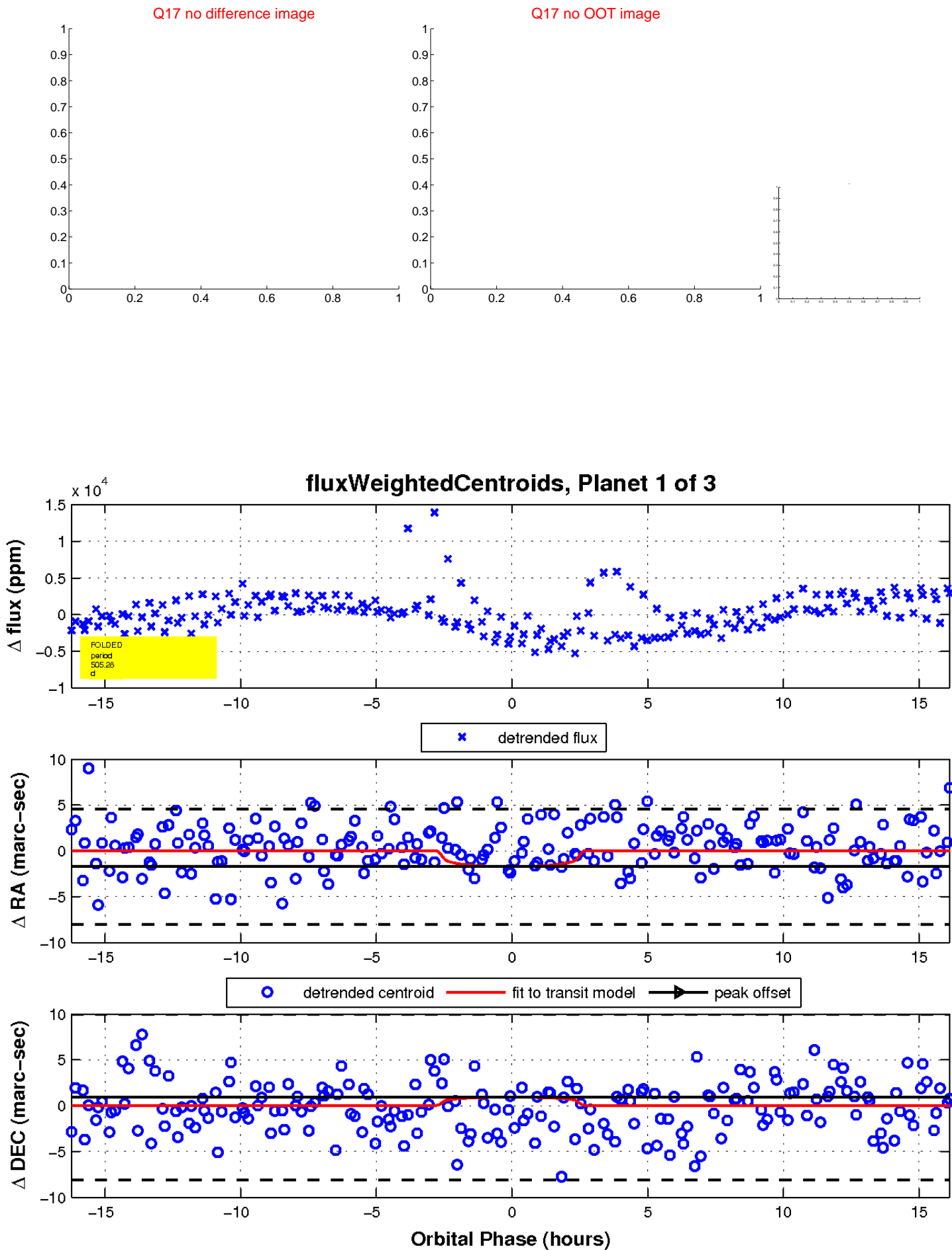
Q16 no difference image



Q16 no OOT image

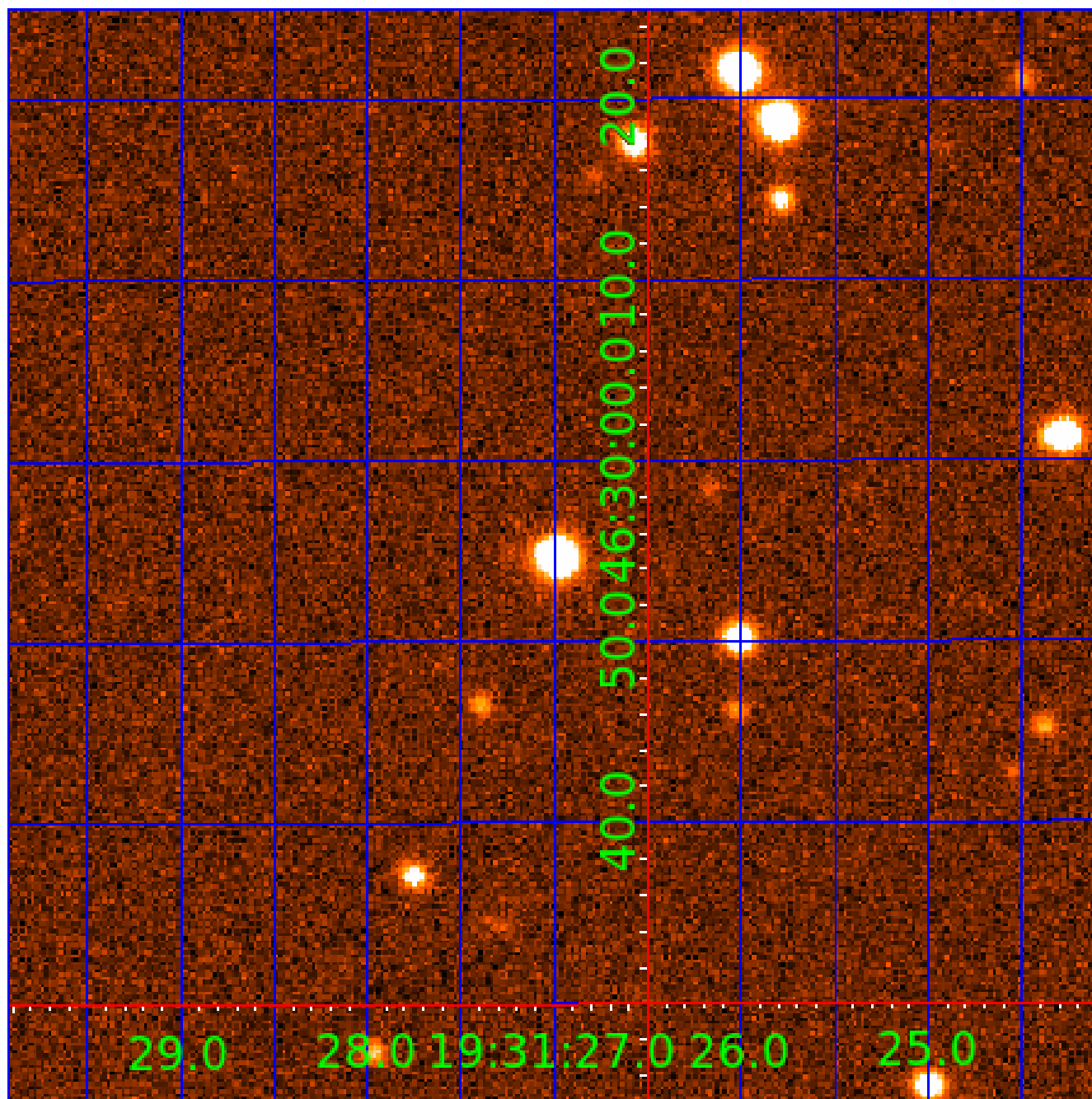


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009712736

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})
009712736-01	OBS	No	505.279183	336.238213	4250.8	5.423	15.4	8.1	0.84	5651	5.41	0.44
009712736-03	OBS	No	609.386087	149.646211	4028.9	5.170	12.6	8.0	0.84	5651	6.45	0.34

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009712736-01	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—HALO_GHOST
009712736-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

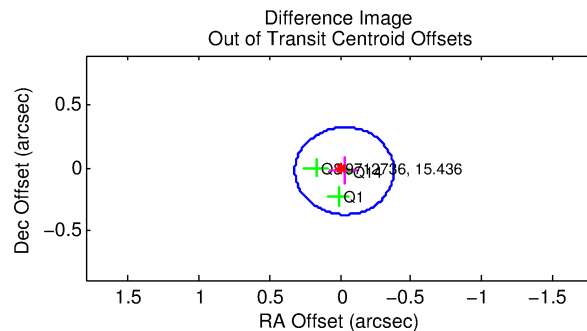
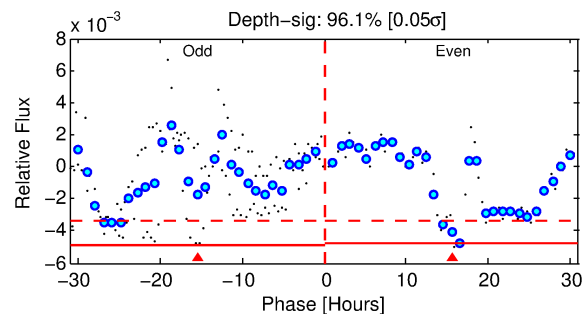
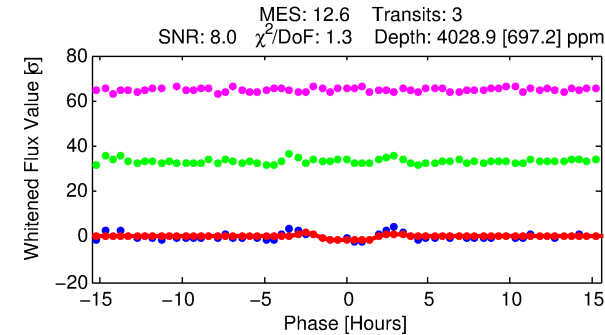
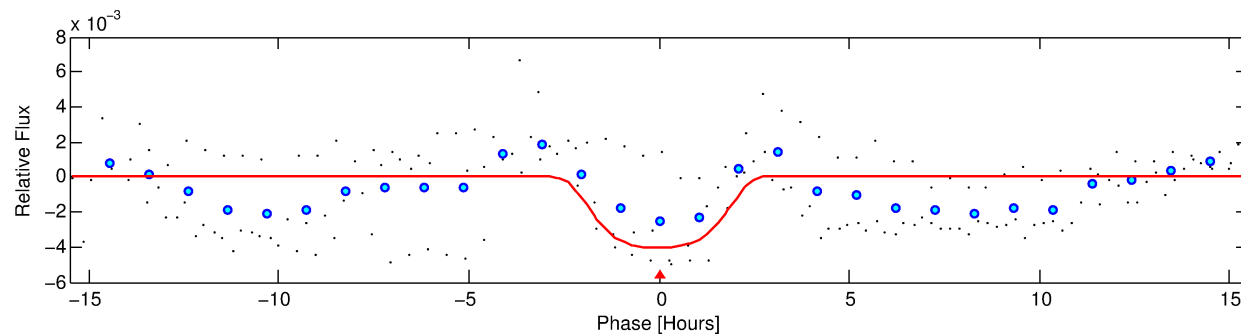
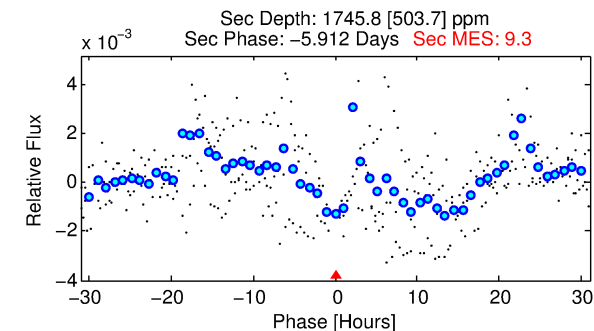
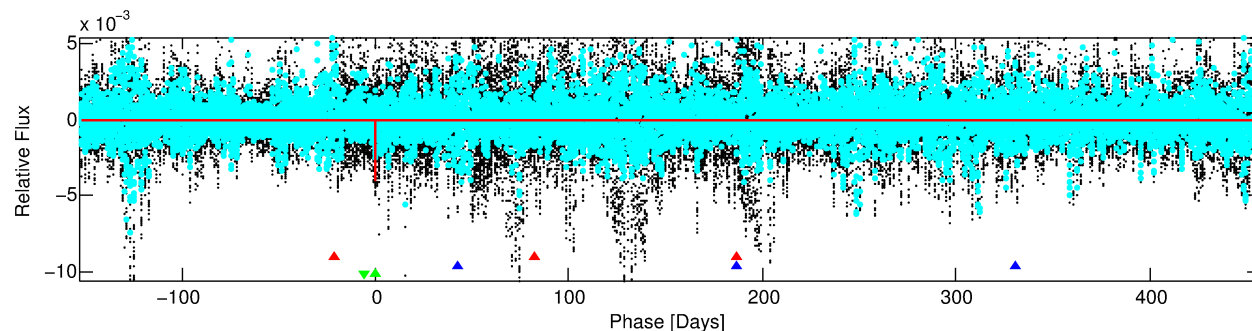
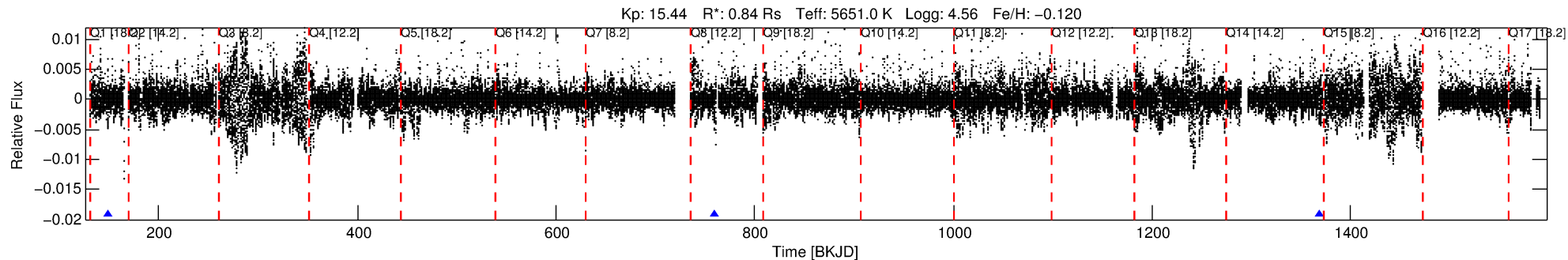
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009712736-03

No Significant Match Found

DV One-Page Summary

KIC: 9712736 Candidate: 3 of 3 Period: 609.386 d



DV Fit Results:

Period = 609.38609 [0.00620] d
Epoch = 149.6462 [0.0077] BKJD
Rp/R* = 0.0703 [0.0072]
a/R* = 510.21 [73.80]
b = 0.91 [0.03]
Seff = 0.34 [0.12]
Teq = 195 [17] K
Rp = 6.45 [1.91] Re
a = 1.3713 [0.3191] AU
Ag = 43470.02 [21284.03] [2.04σ]
Teffp = 4356 [408] K [10.20σ]

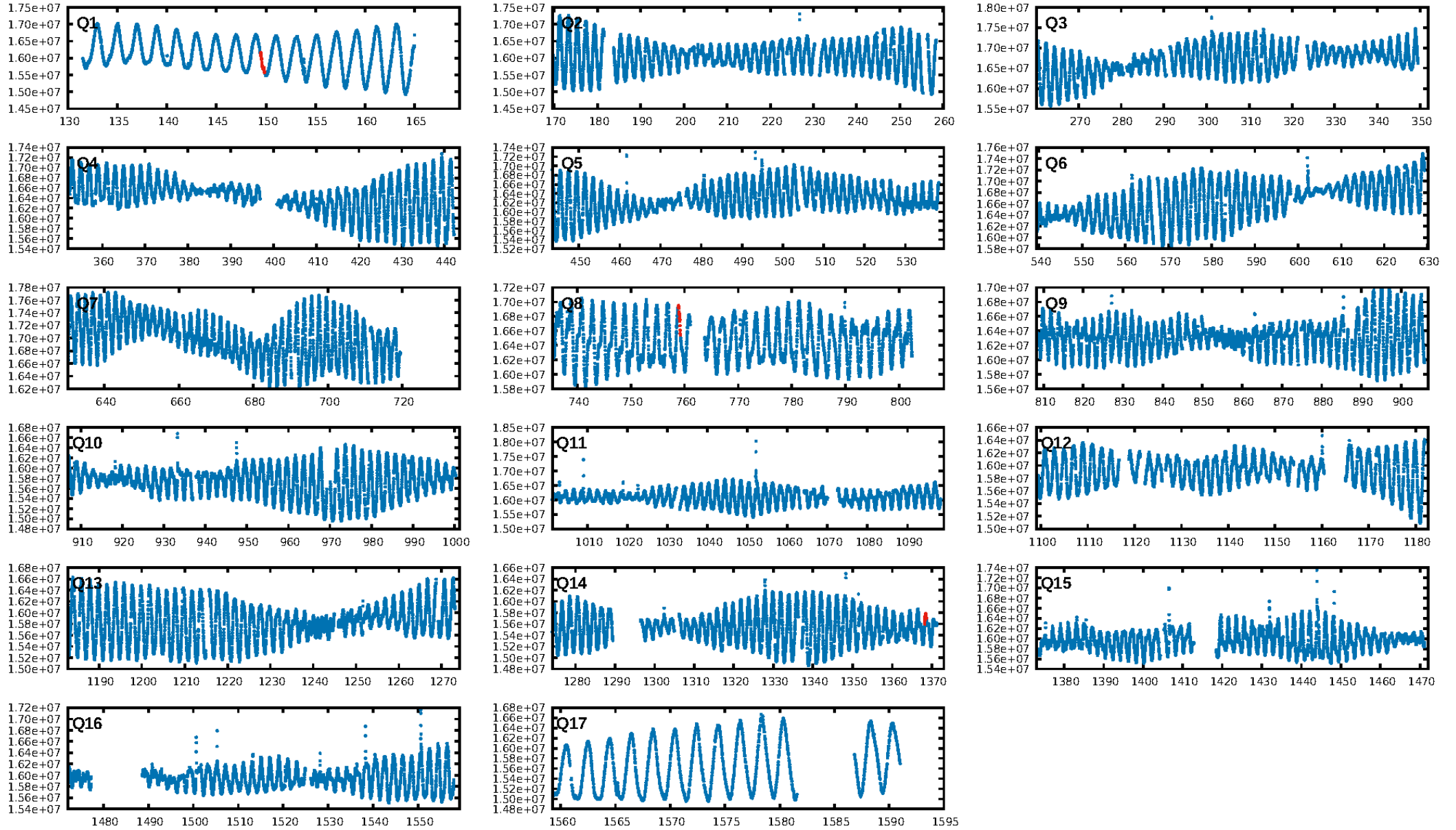
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [333.45σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 0.0%
ModelChiSquareGof-sig: 16.5%
Bootstrap-pfa: 1.94e-08
RollingBand-fgt: 1.00 [2/2]
GhostDiagnostic-chr: 1.912
Centroid-sig: 21.2%
Centroid-so: 0.615 arcsec [1.25σ]
OotOffset-rm: 0.040 arcsec [0.34σ]
KicOffset-rm: 0.178 arcsec [2.37σ]
OotOffset-st: 1/0/1/1 [3]
KicOffset-st: 1/0/1/1 [3]
DiffImageQuality-fgm: 0.33 [1/3]
DiffImageOverlap-fno: 1.00 [3/3]

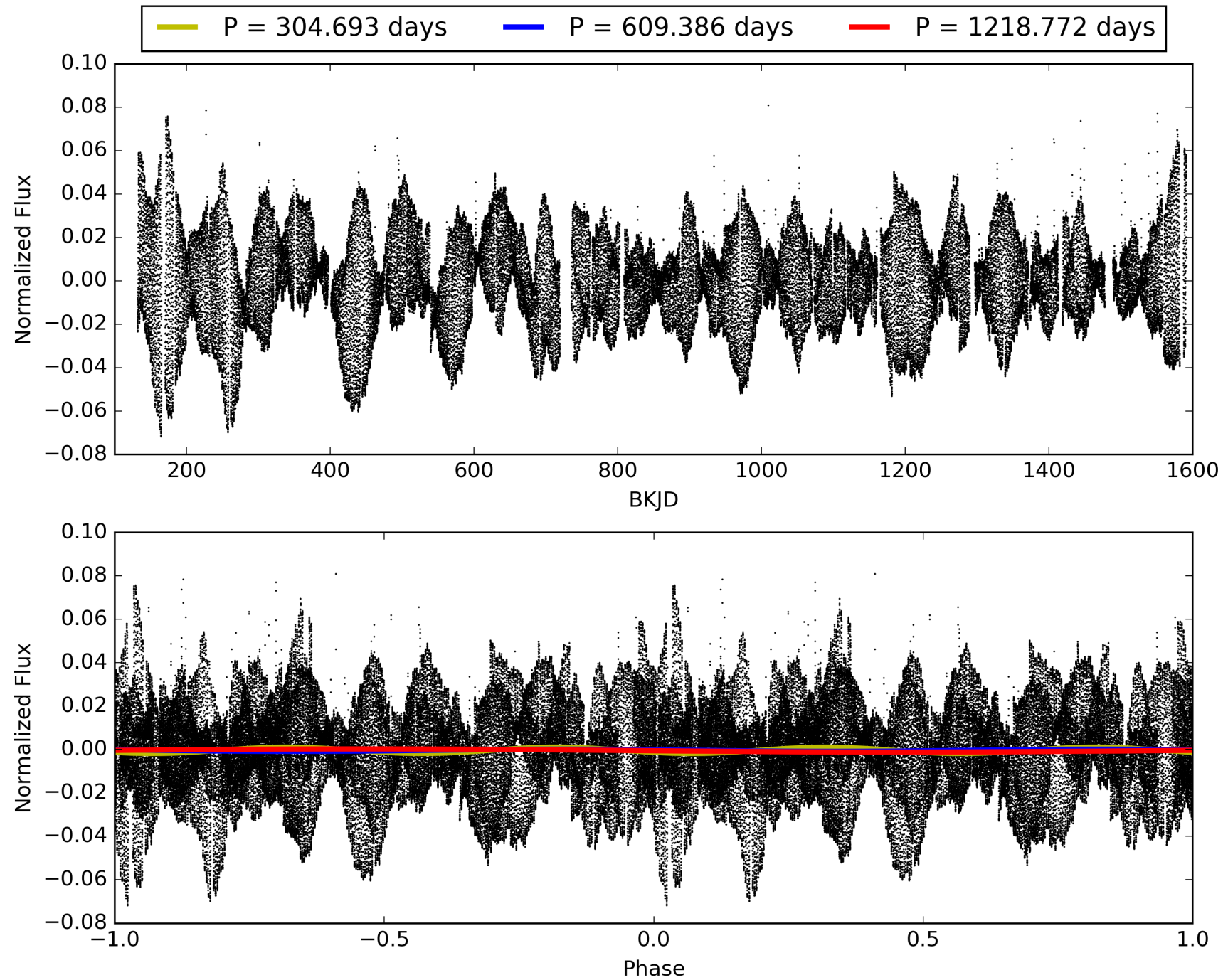
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 18:04:50 Z

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

TCE 009712736-03, PDC Light Curves

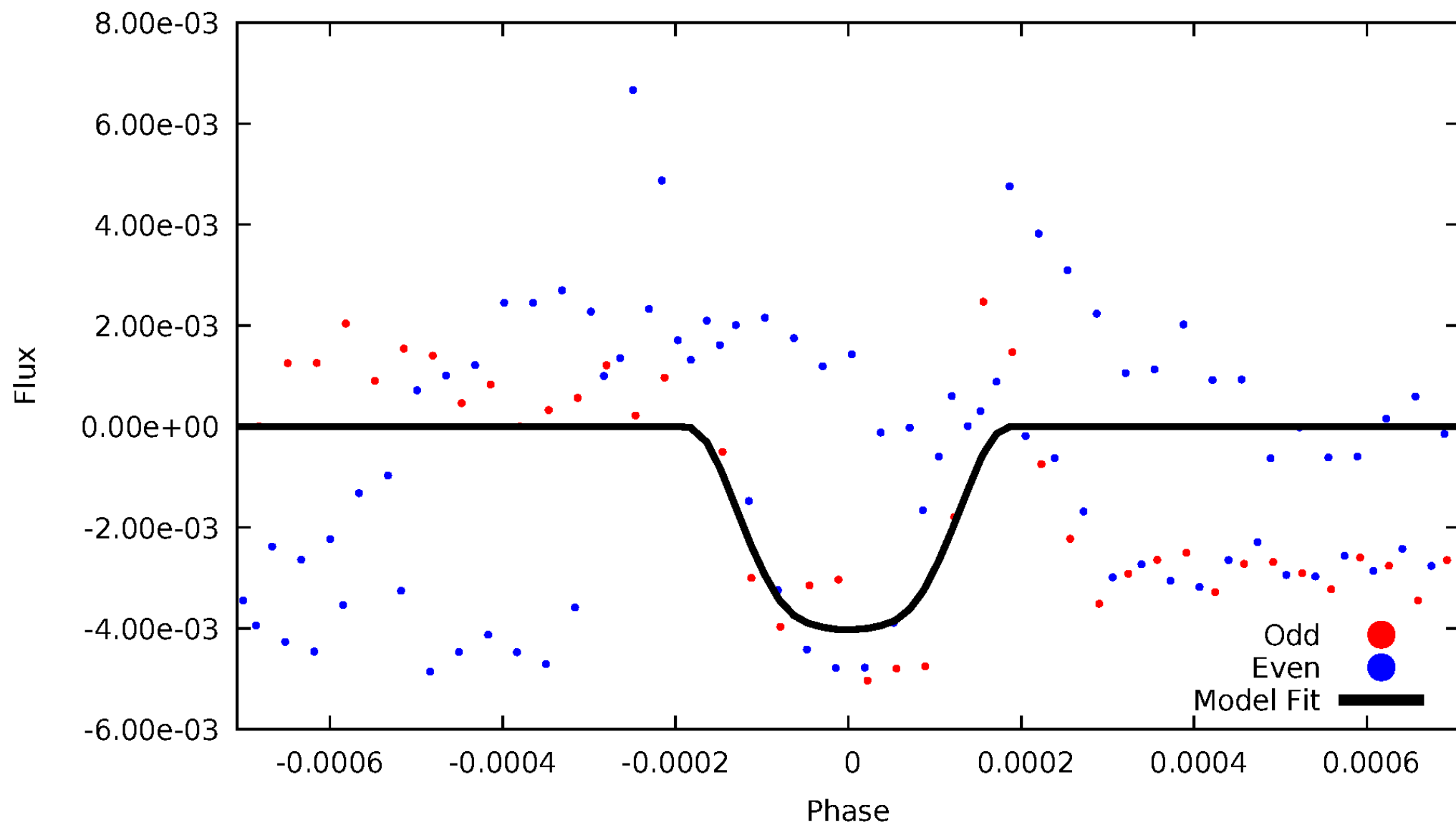


TCE 009712736-03



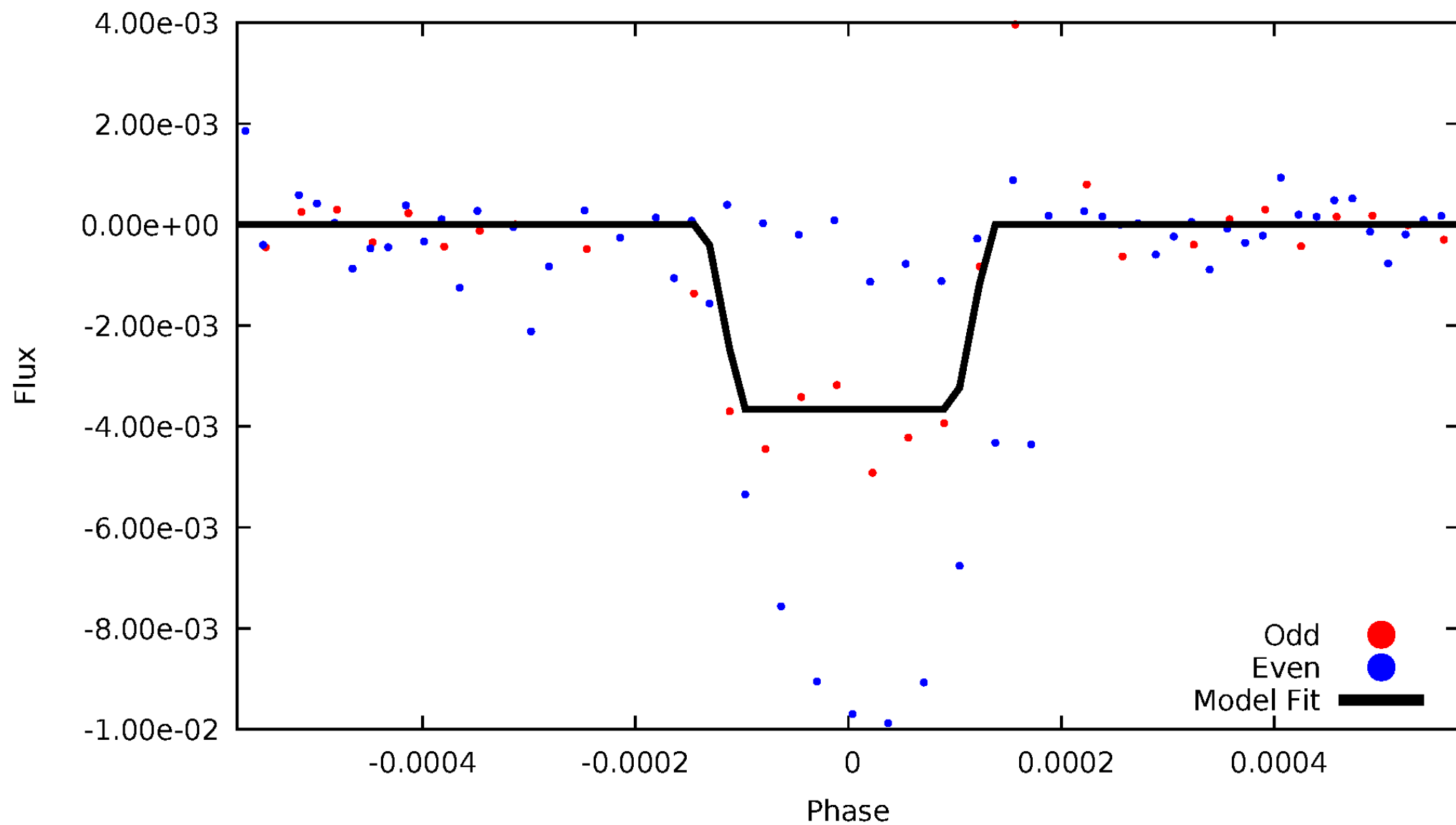
DV Odd/Even

TCE 009712736-03



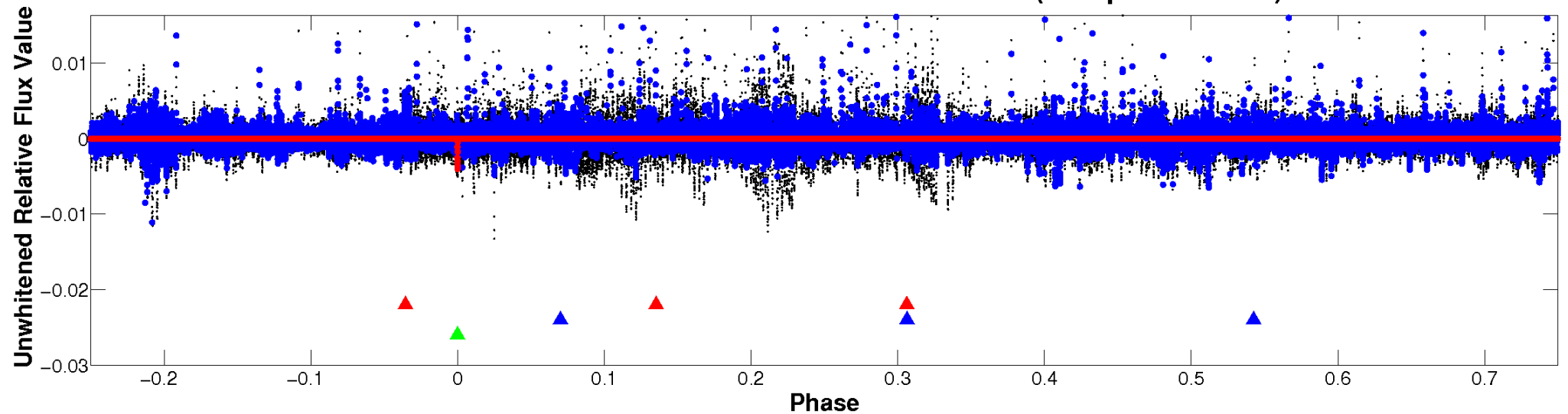
ALT Odd/Even

TCE 009712736-03

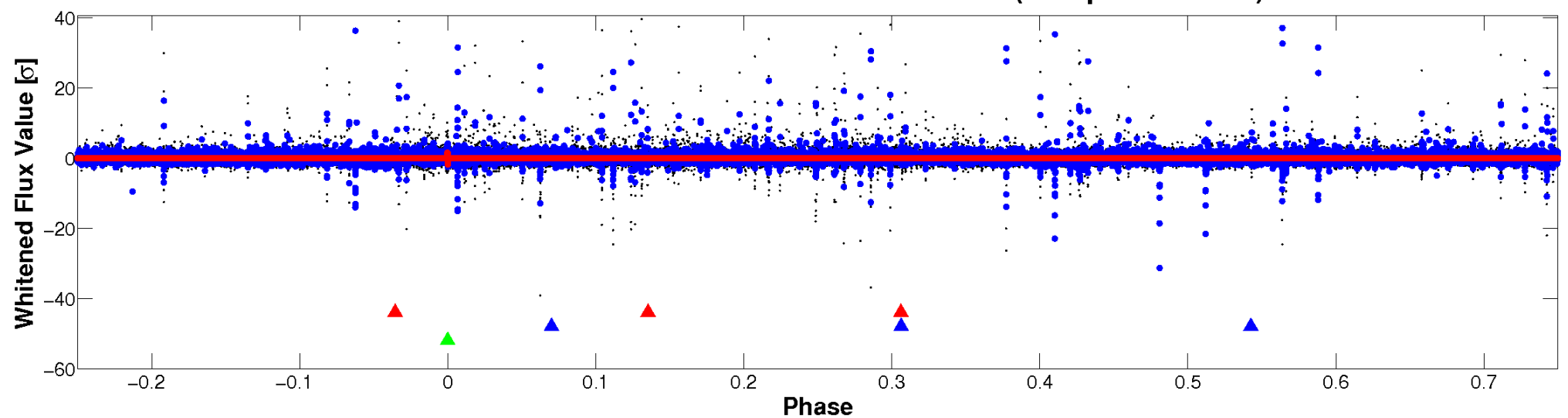


Non-Whitened Vs. Whitened Light Curve

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

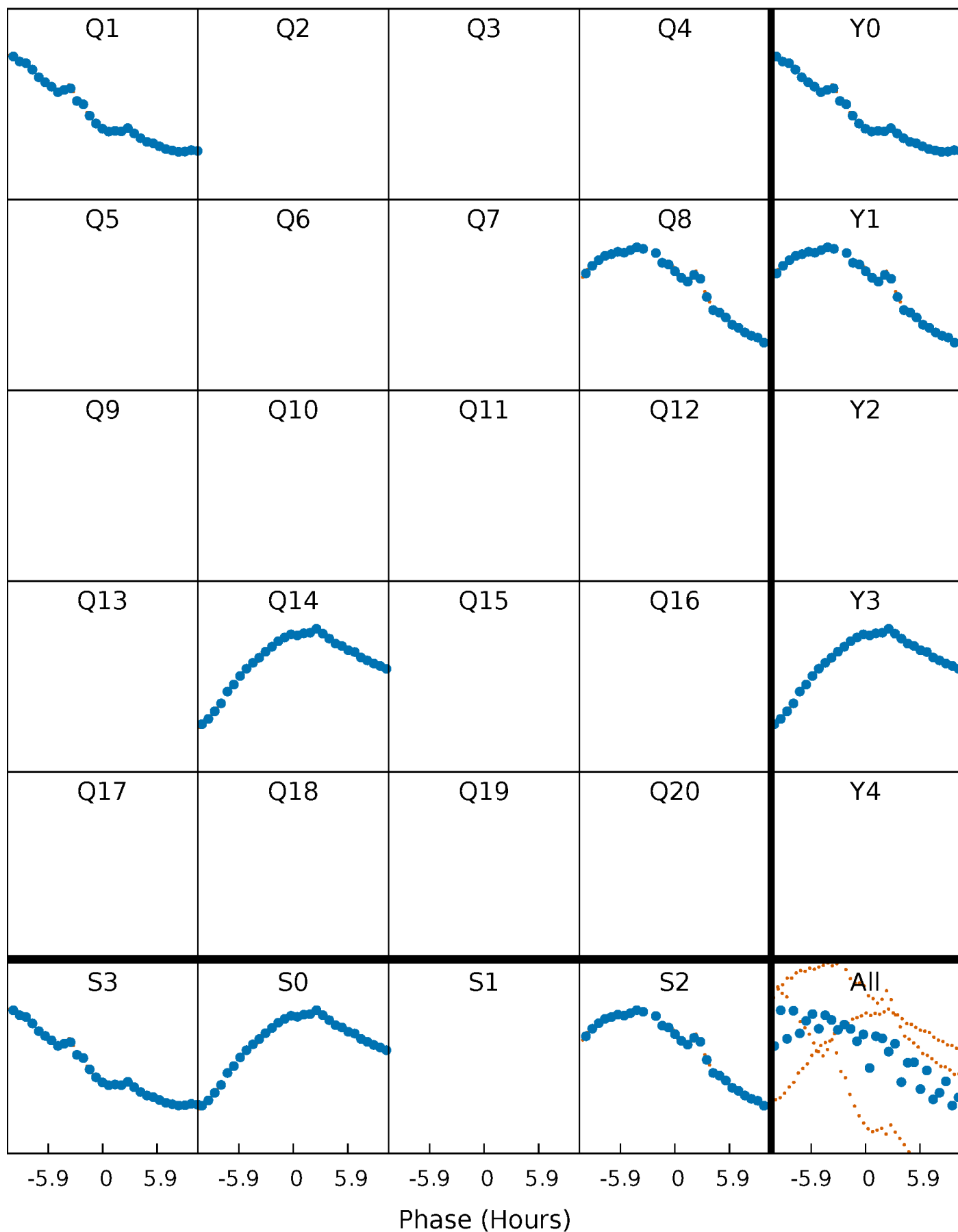


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



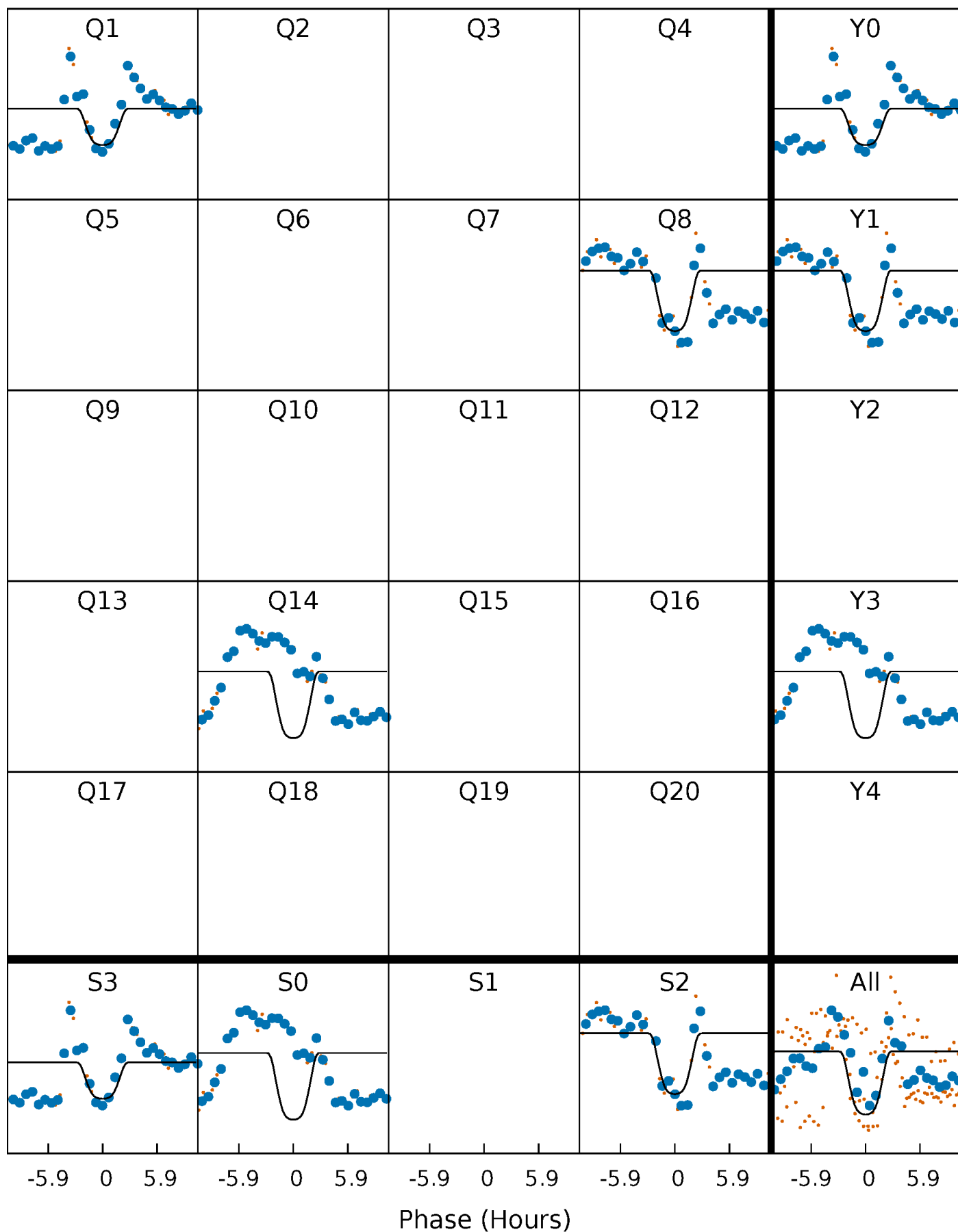
PDC Quarter-Phased Transit Curves

TCE 009712736-03 P=609.386087 Days $T_0=149.646211$ (BKJD)



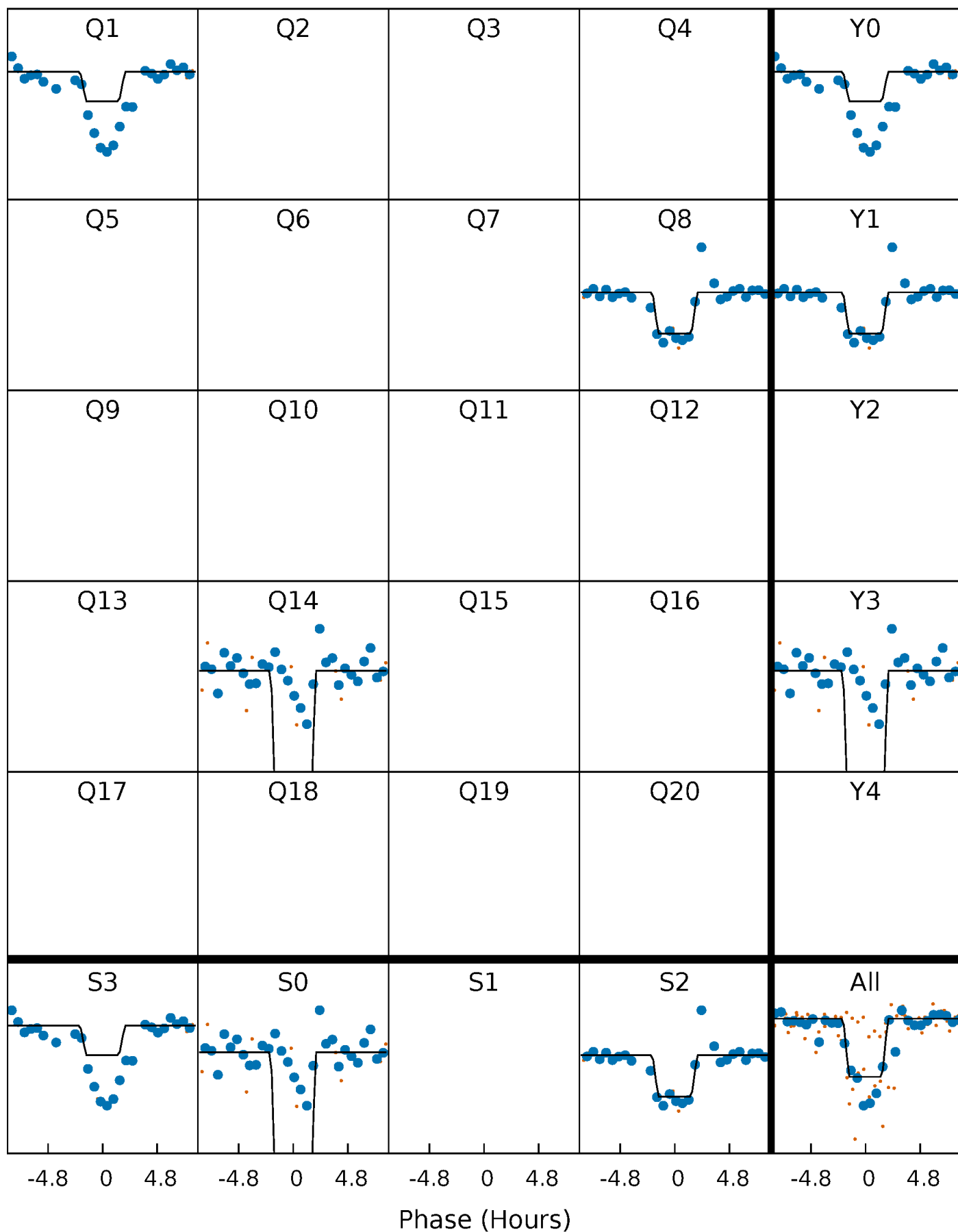
DV Quarter-Phased Transit Curves

TCE 009712736-03 $P=609.386087$ Days $T_0=149.646211$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

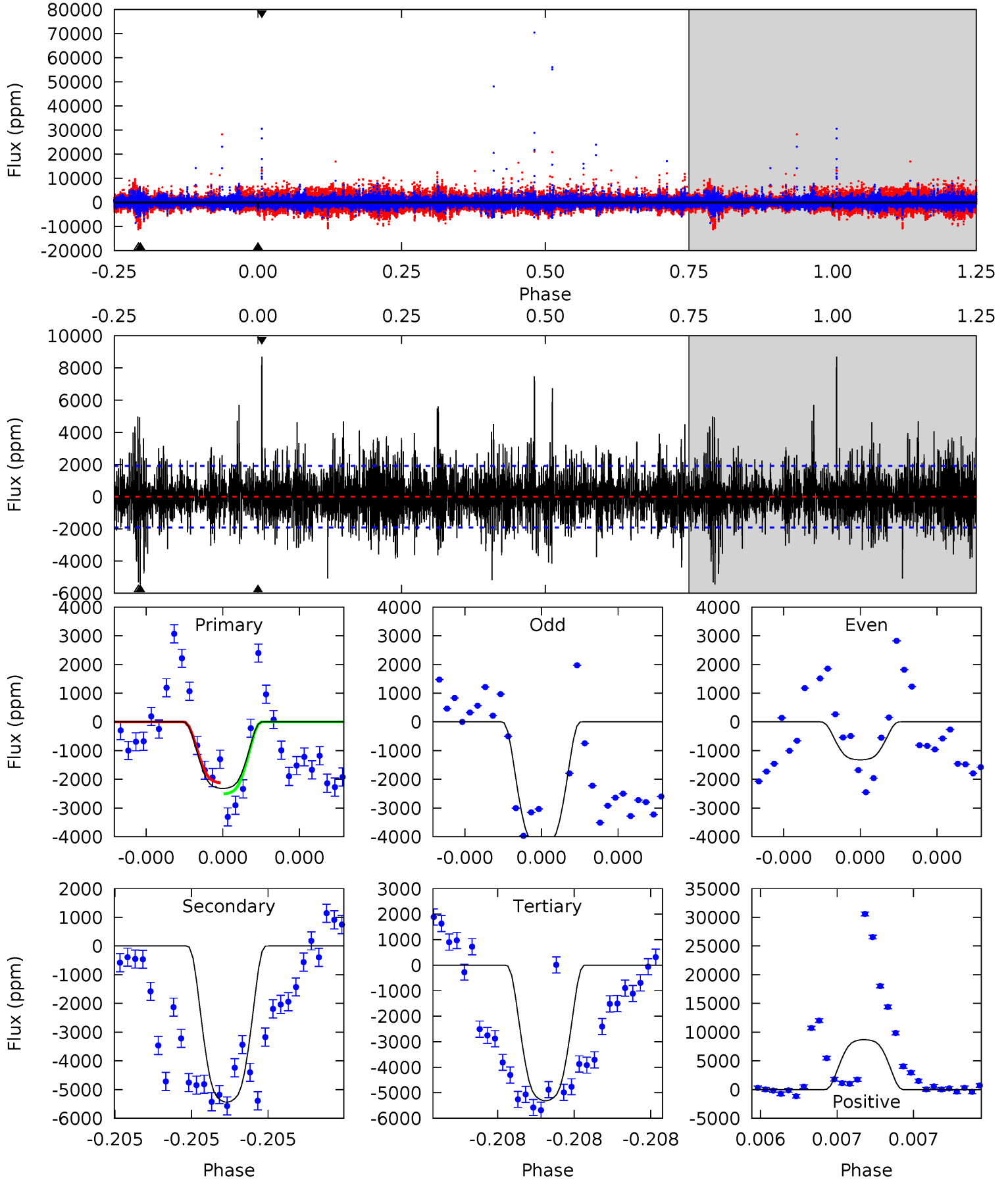
TCE 009712736-03 P=609.396871 Days $T_0=149.635016$ (BKJD)



DV Model-Shift Uniqueness Test

009712736-03, P = 609.386087 Days, E = 149.646211 Days

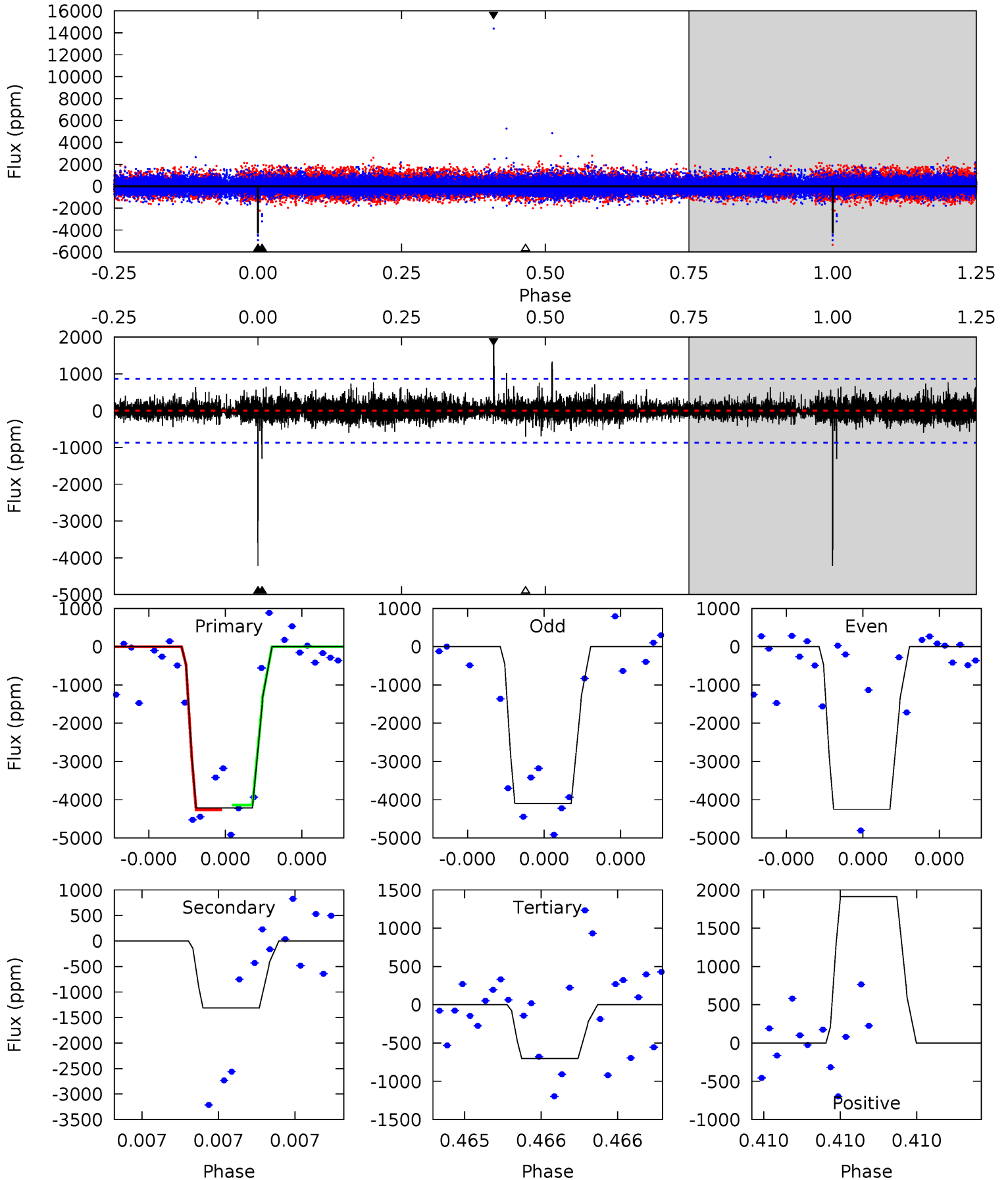
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.81	16.0	15.6	25.5	5.62	3.56	3.50	-8.78	-18.7	0.37	-9.57	3.69	0.62	0.62	0.57



Alt Model-Shift Uniqueness Test

009712736-03, P = 609.396871 Days, E = 149.635016 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
27.6	8.58	4.59	12.5	5.69	3.66	0.87	23.0	15.1	3.99	-3.94	0.65	1.05	0.31	0.42



Stellar Parameters For KIC 009712736

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5651^{+152}_{-169}	$4.556^{+0.035}_{-0.184}$	$-0.120^{+0.300}_{-0.300}$	$0.840^{+0.233}_{-0.078}$	$0.925^{+0.094}_{-0.104}$	$2.199^{+0.412}_{-1.097}$
	+3%/-3%	+1%/-4%	+250%/-250%	+28%/-9%	+10%/-11%	+19%/-50%
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 009712736-03 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-5438 ± 341	$6.72^{+1.21}_{-0.81}$	279^{+18}_{-12}	5775^{+371}_{-301}	122440^{+36712}_{-34000}
Alt.	-1311 ± 153	$5.78^{+1.07}_{-0.89}$	278^{+18}_{-12}	4544^{+278}_{-246}	40101^{+15437}_{-11704}

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 $A_{obs} \gg 1.0$

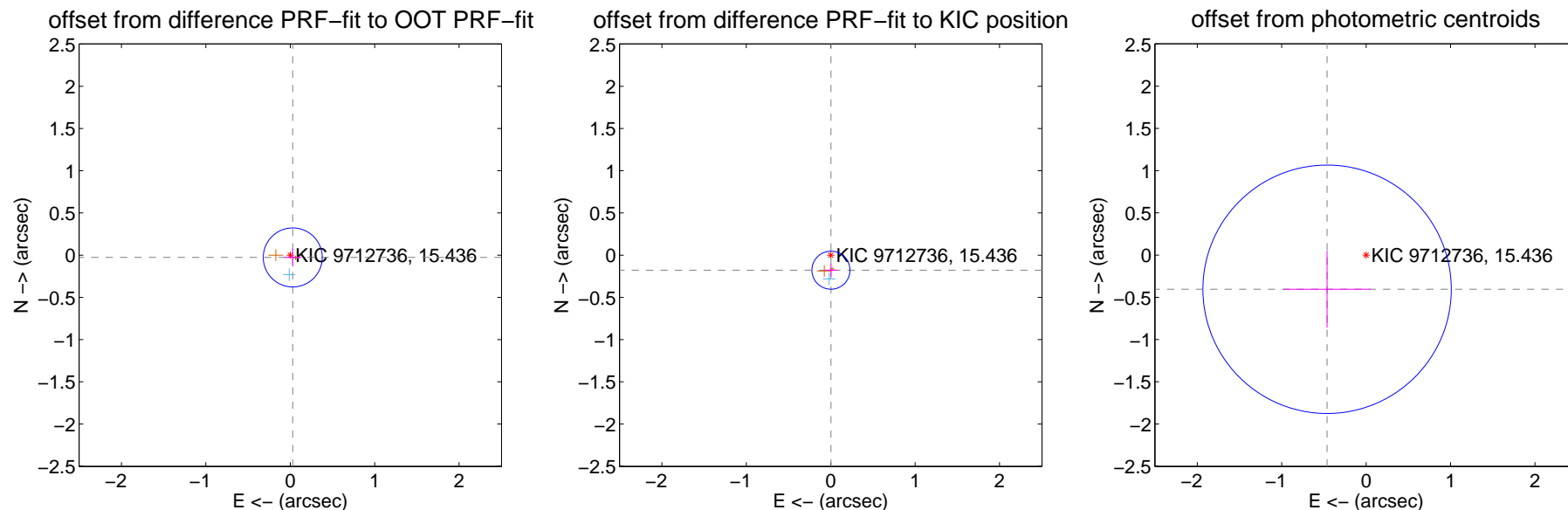
DV Centroid Data

Supplemental centroid analysis for 009712736-03. Kepler magnitude: 15.44. Transit SNR 8.04

There are 1 quarters with good PRF difference image offsets

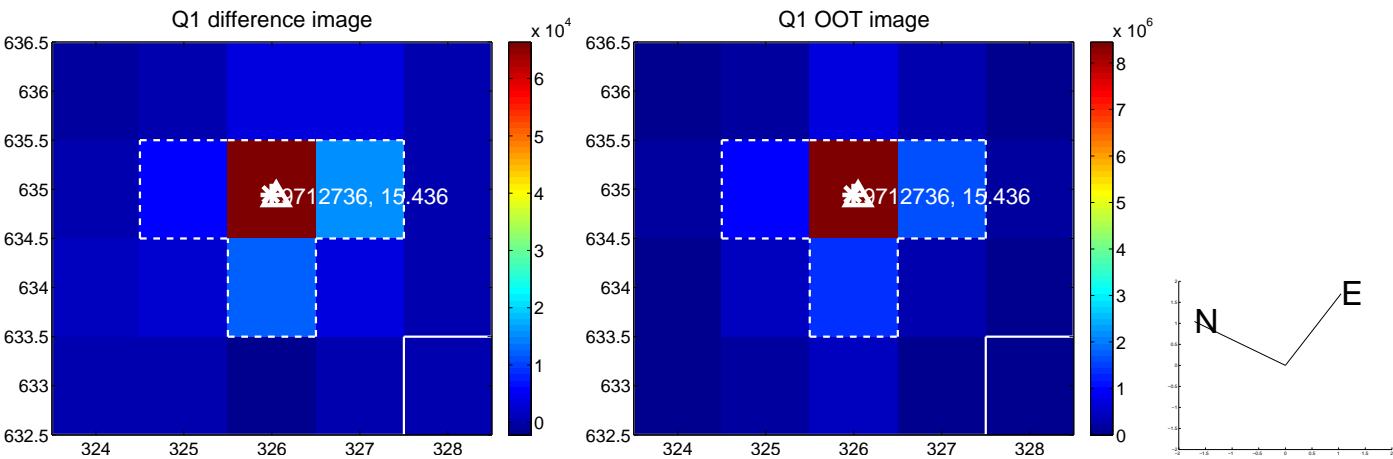
The direct PRF centroid is offset from the target star catalog position by about 0.14 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.040 ± 0.117	0.34	-0.030 ± 0.102	-0.027 ± 0.105
PRF-fit source offset from KIC position	0.178 ± 0.075	2.37	-0.003 ± 0.077	-0.178 ± 0.075
photometric centroid source offset	0.61 ± 0.49	1.25	0.46 ± 0.52	-0.41 ± 0.45

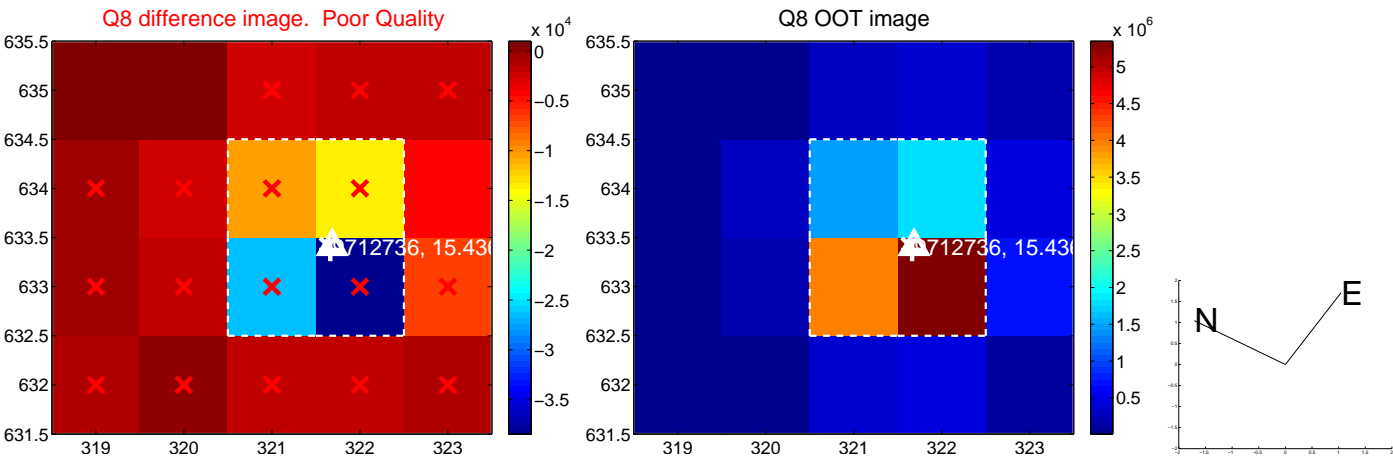


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

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



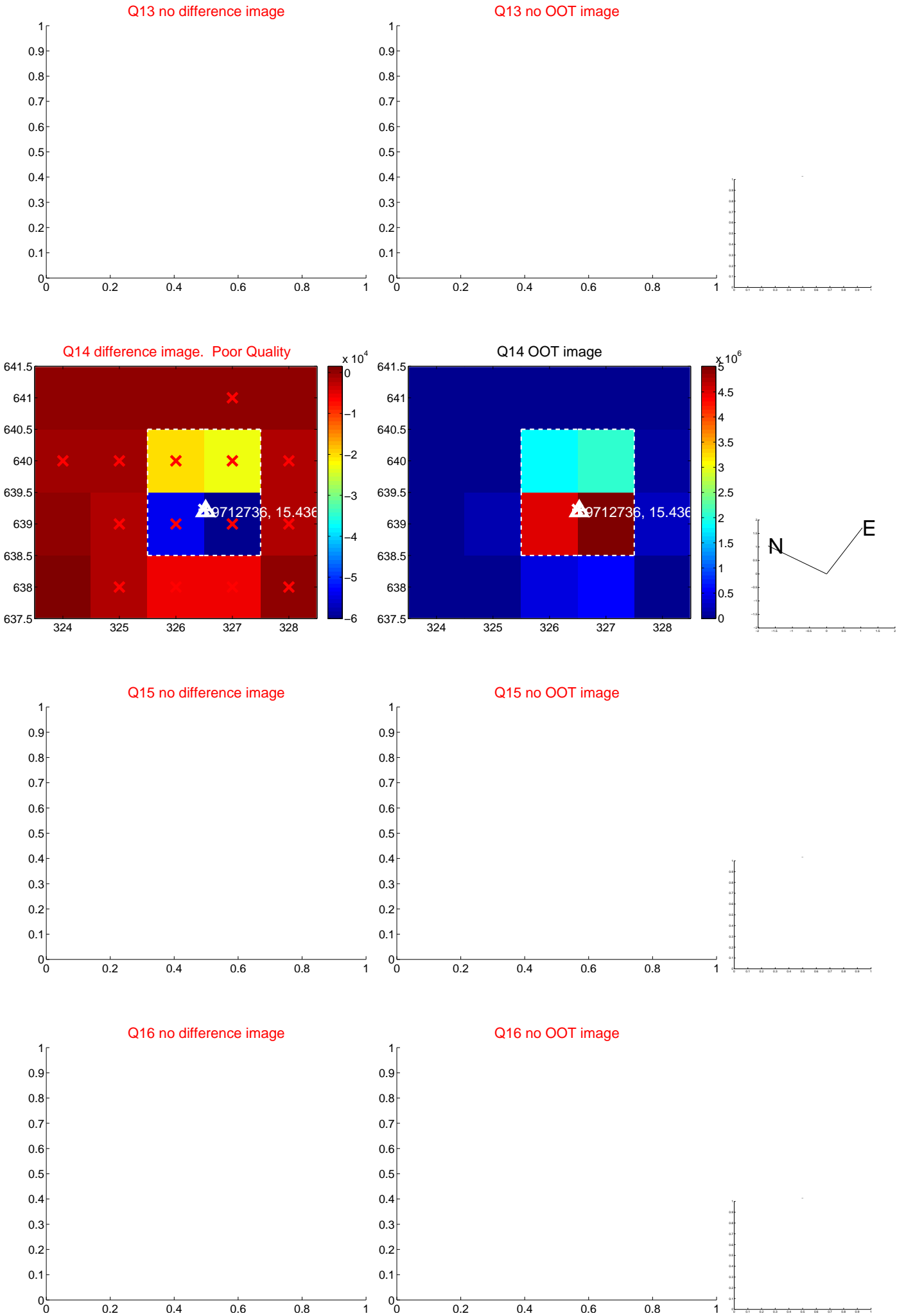
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



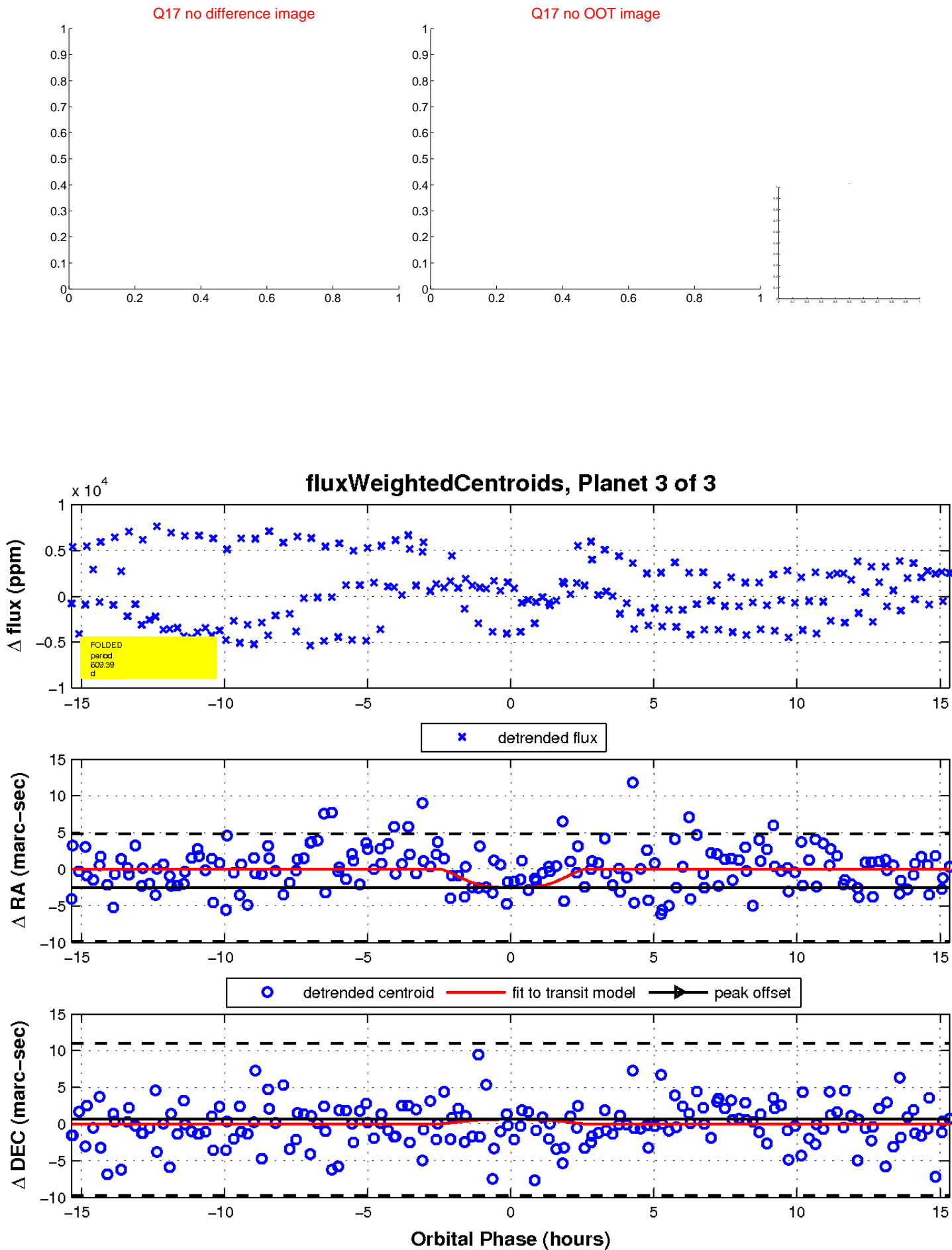
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



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



UKIRT Image

Declination

