

KIC 009356988

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})
009356988-01	OBS	No	255.870156	185.565794	5.6	0.928	21.4	0.4	150.65	3291	46.27	3353.38
009356988-02	OBS	No	287.055172	154.698983	304.7	14.614	30.8	16.9	150.65	3291	240.69	2876.66

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009356988-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
009356988-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—INCONSISTENT_TRANS—CENT_SATURATED

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

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

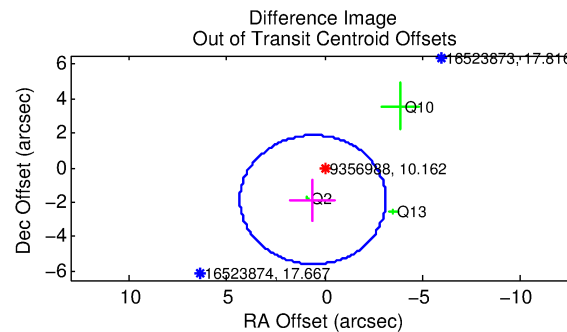
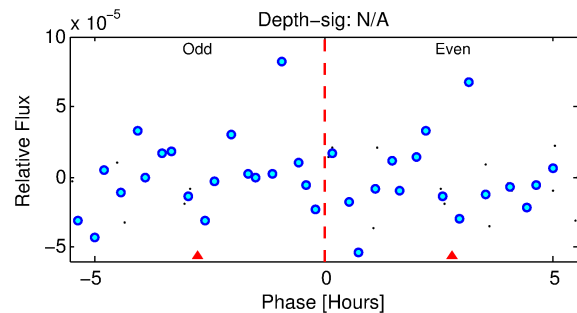
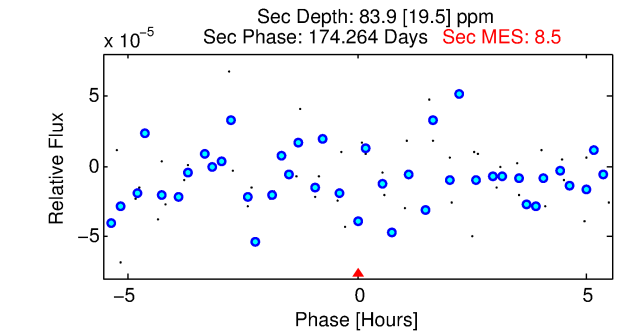
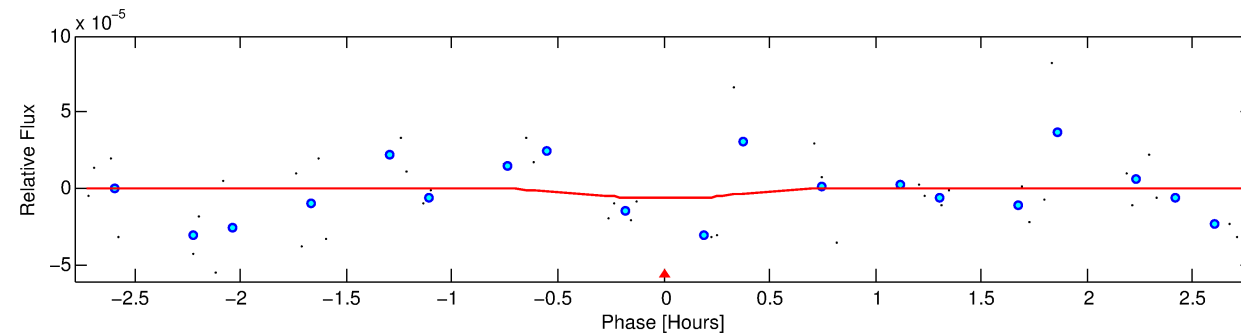
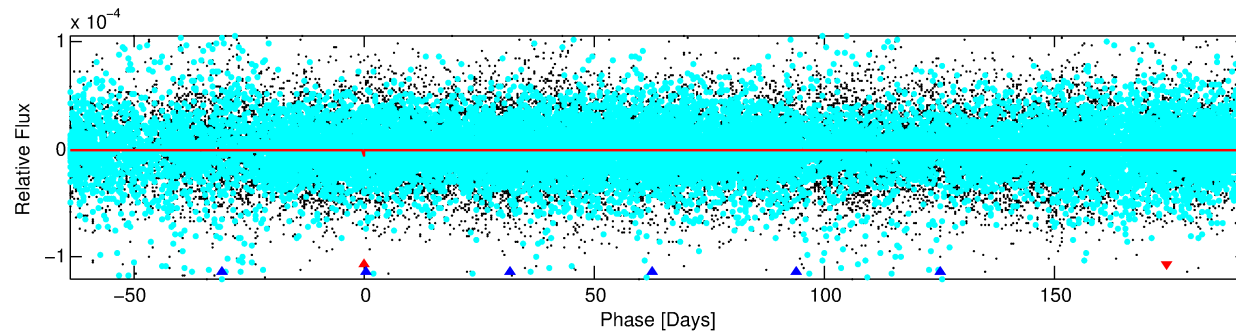
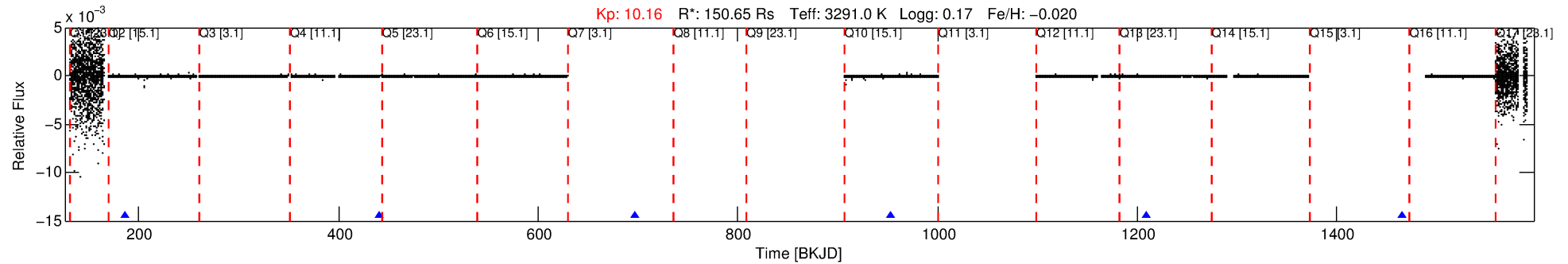
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009356988-01

No Significant Match Found

DV One-Page Summary

KIC: 9356988 Candidate: 1 of 2 Period: 255.870 d



DV Fit Results:

Period = 255.87016 [0.03468] d
Epoch = 185.5658 [0.1146] BKJD
Rp/R* = 0.0028 [0.0779]
a/R* = 993.27 [85775.25]
b = 0.88 [21.67]
Seff = 3353.38 [1249.09]
Teq = 1940 [181] K
Rp = 46.27 [1281.40] Re
a = 0.8434 [0.1796] AU
Ag = 15.34 [849.39] [0.02sigma]
Teffp = 5937 [82206] K [0.05sigma]

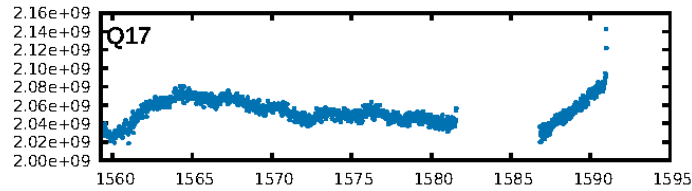
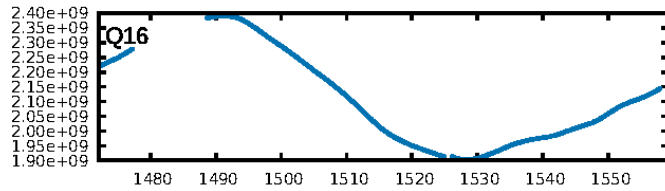
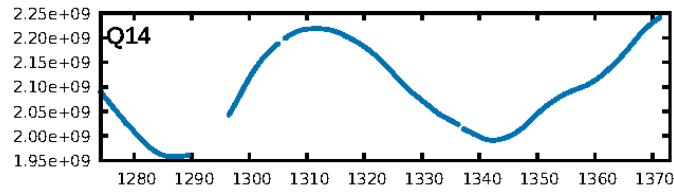
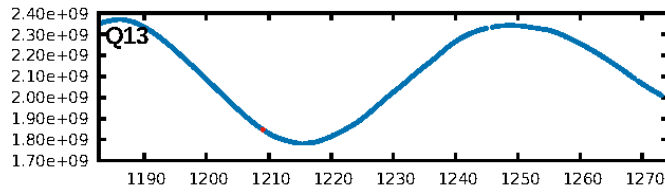
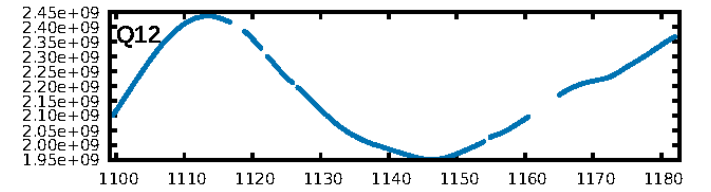
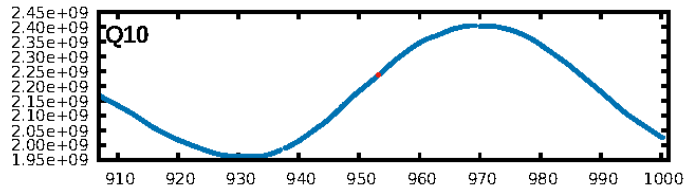
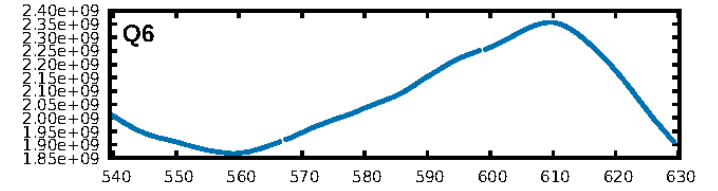
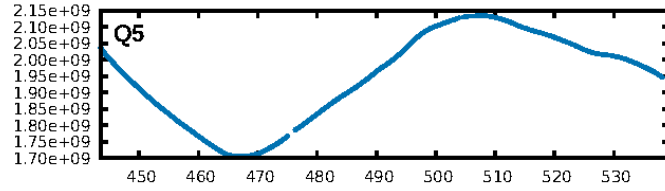
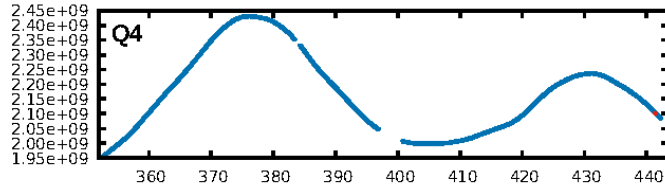
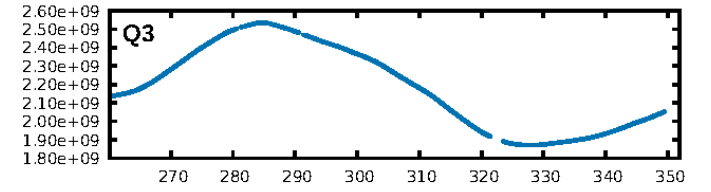
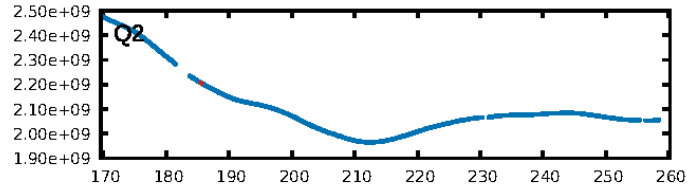
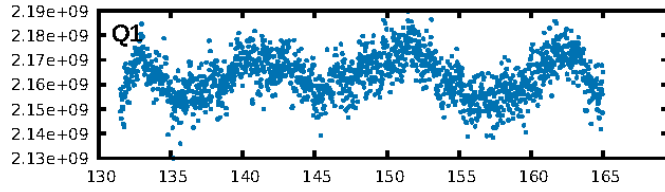
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [51.11sigma]
ModelChiSquare2-sig: 38.8%
ModelChiSquareGof-sig: 88.0%
Bootstrap-pfa: 1.73e-09
RollingBand-fgt: 1.00 [4/4]
GhostDiagnostic-chr: N/A
Centroid-sig: N/A
Centroid-so: 8.844 arcsec [0.11sigma]
OotOffset-rm: 1.947 arcsec [1.57sigma]
OotOffset-st: 2/0/0/1 [3]
KicOffset-rm: 2.449 arcsec [1.45sigma]
KicOffset-st: 2/0/0/1 [3]
DiffImageQuality-fgm: 0.00 [0/3]
DiffImageOverlap-fno: 0.75 [3/4]

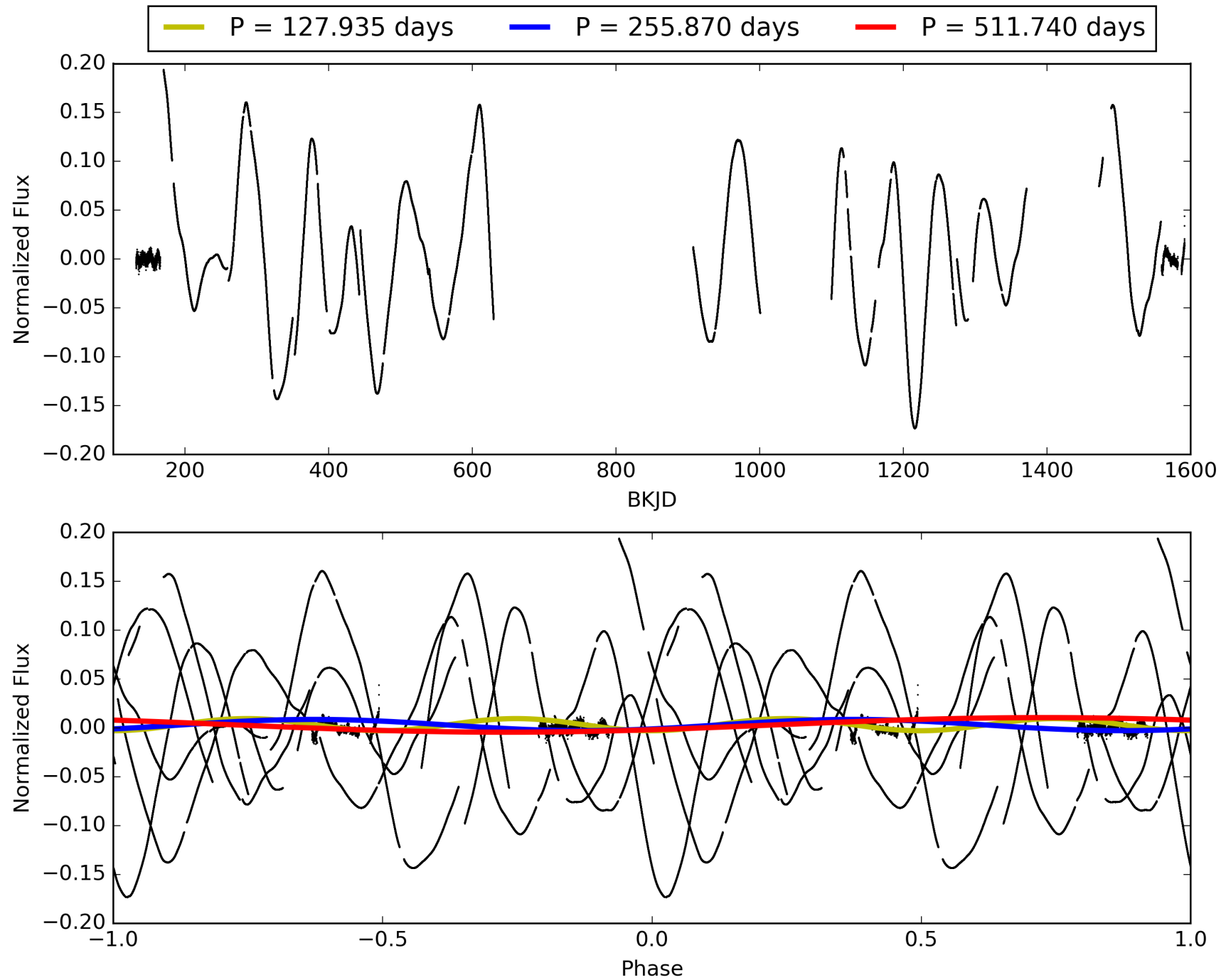
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 13:39:42 Z

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

TCE 009356988-01, PDC Light Curves

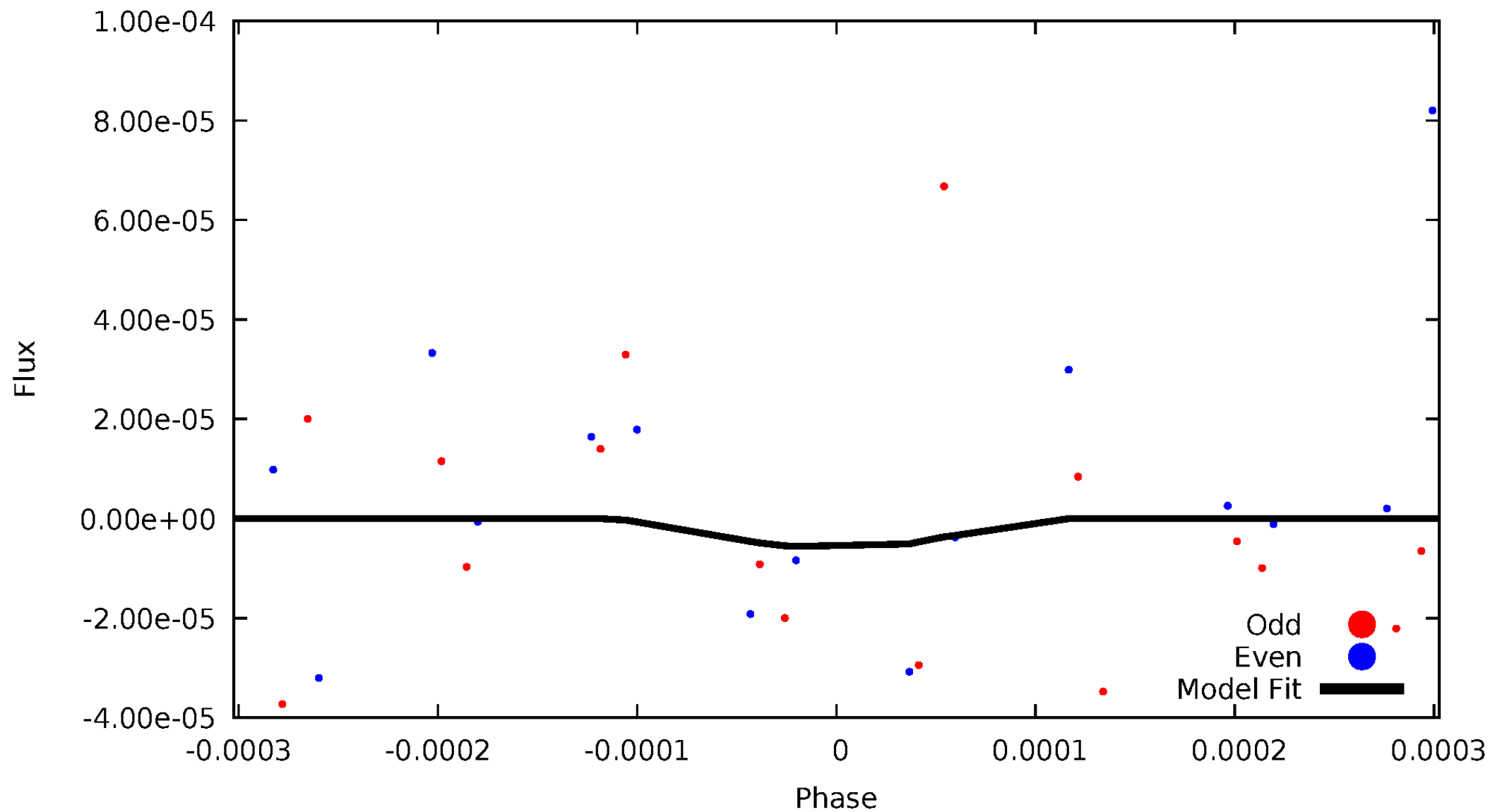


TCE 009356988-01



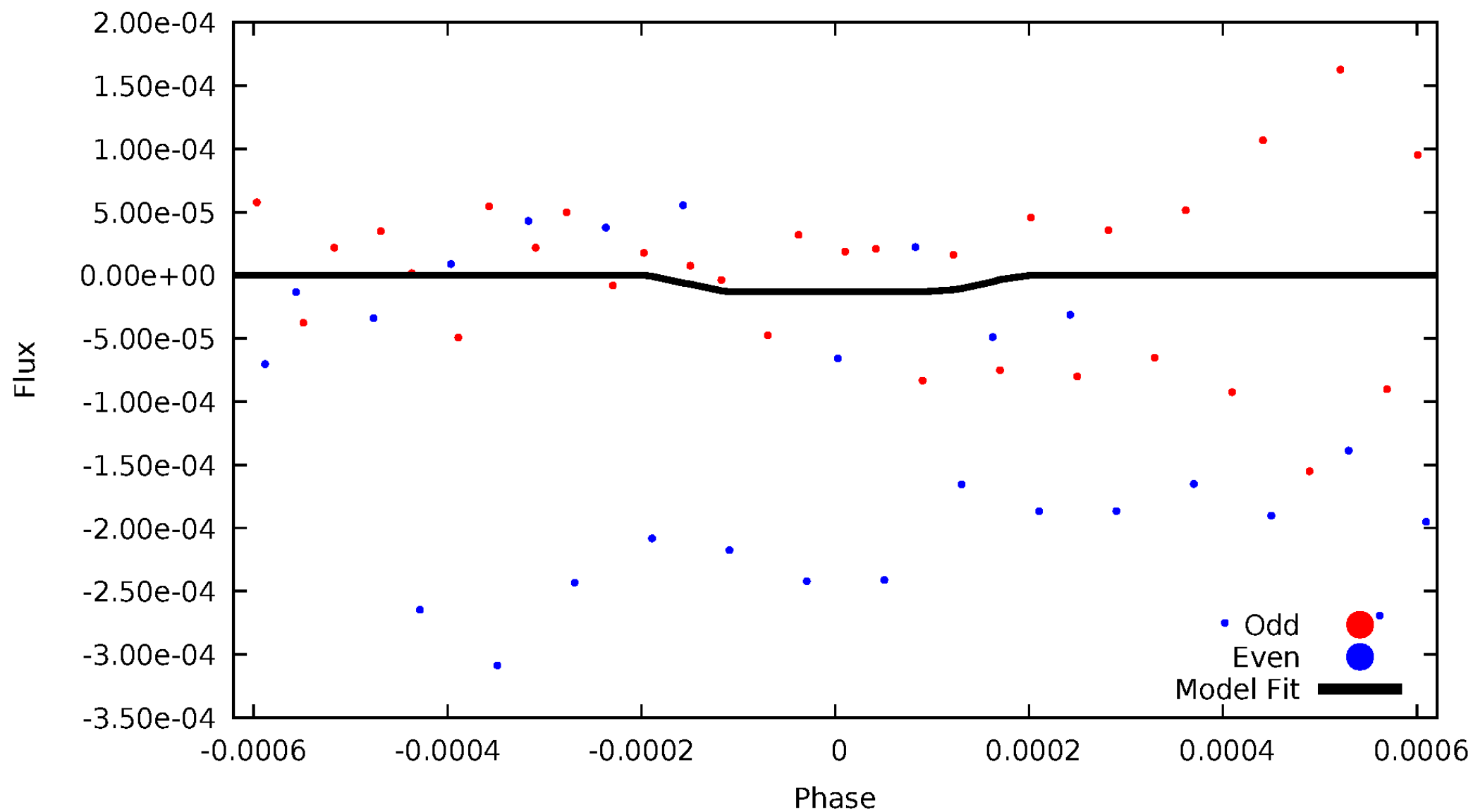
DV Odd/Even

TCE 009356988-01



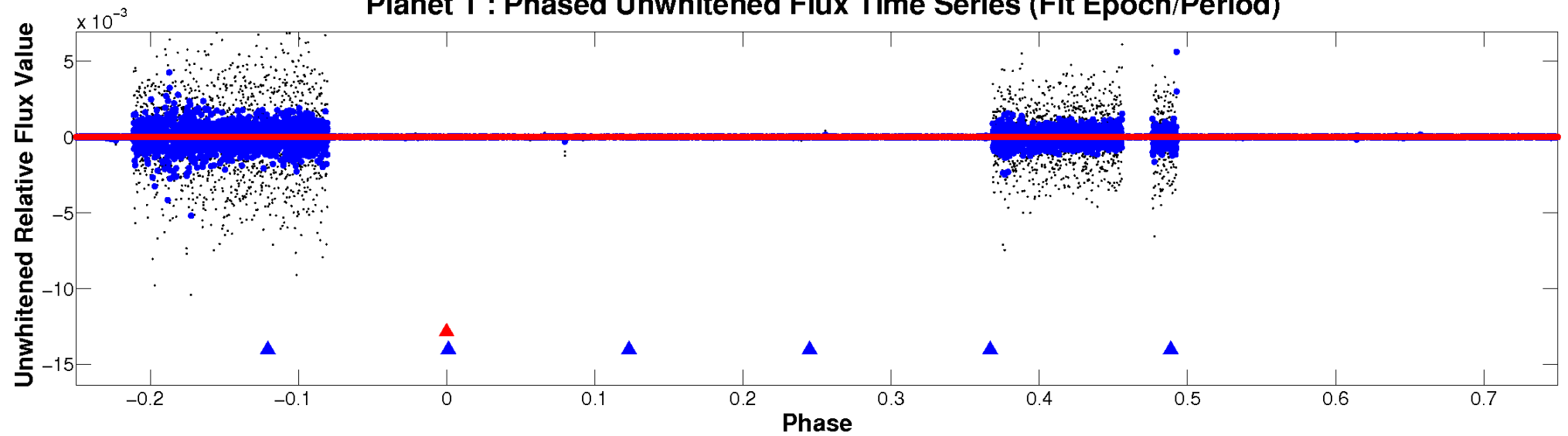
ALT Odd/Even

TCE 009356988-01

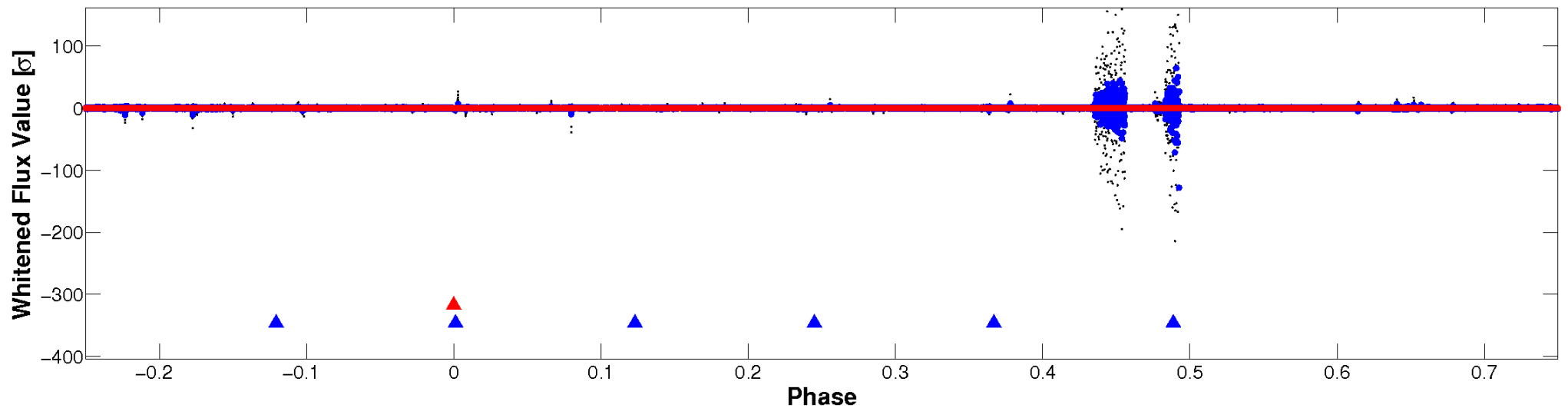


Non-Whitened Vs. Whitened Light Curve

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

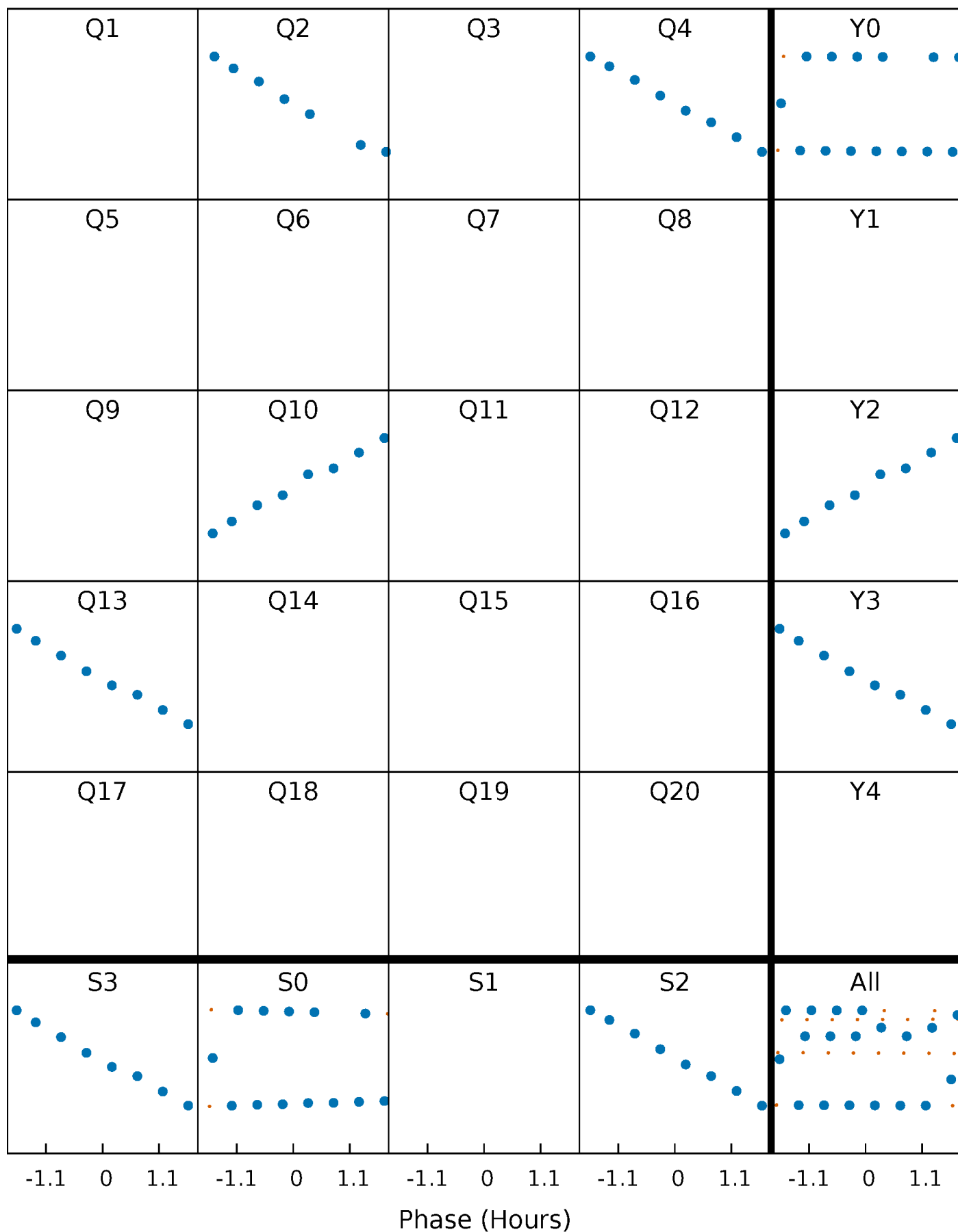


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



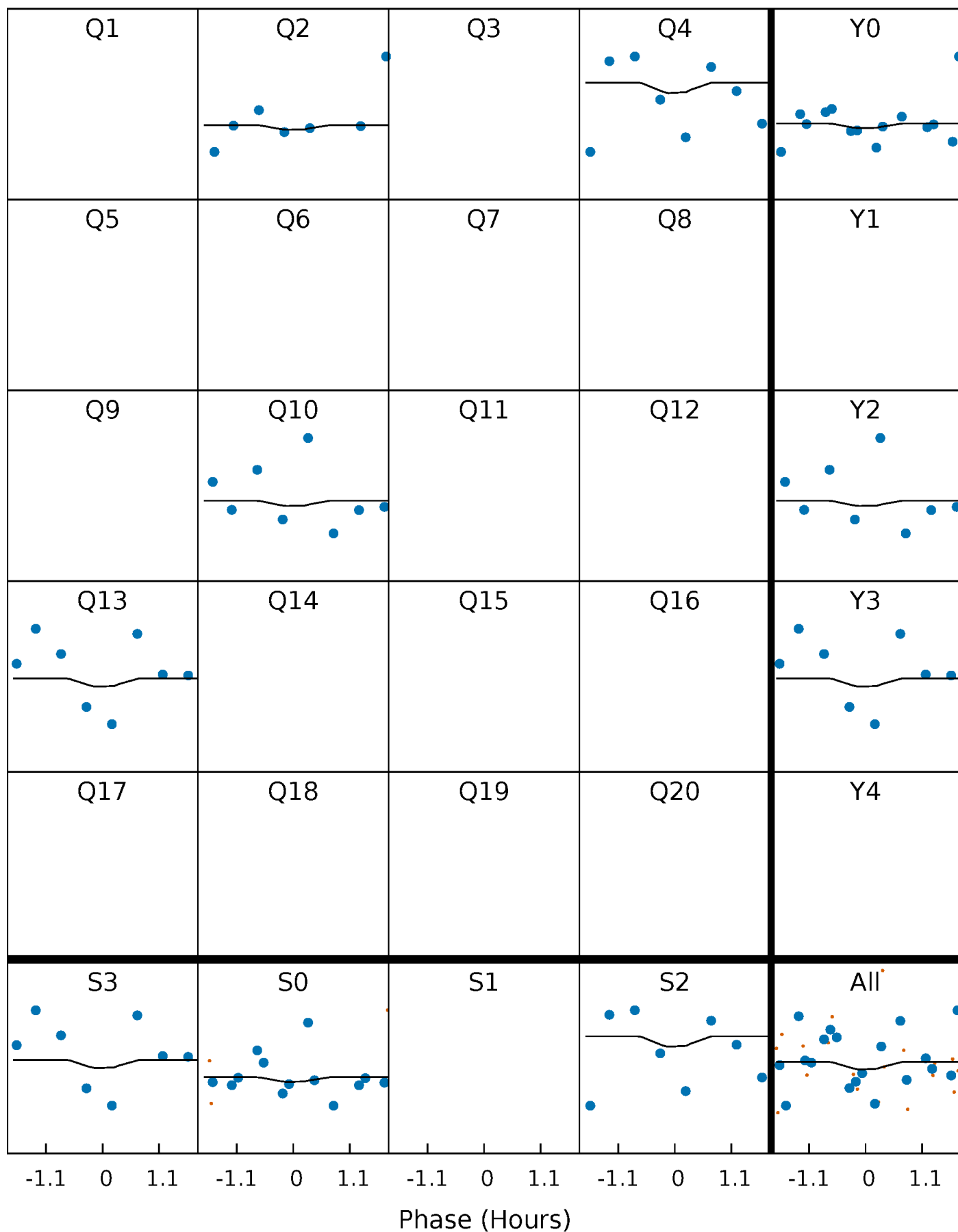
PDC Quarter-Phased Transit Curves

TCE 009356988-01 P=255.870156 Days $T_0=185.565794$ (BKJD)



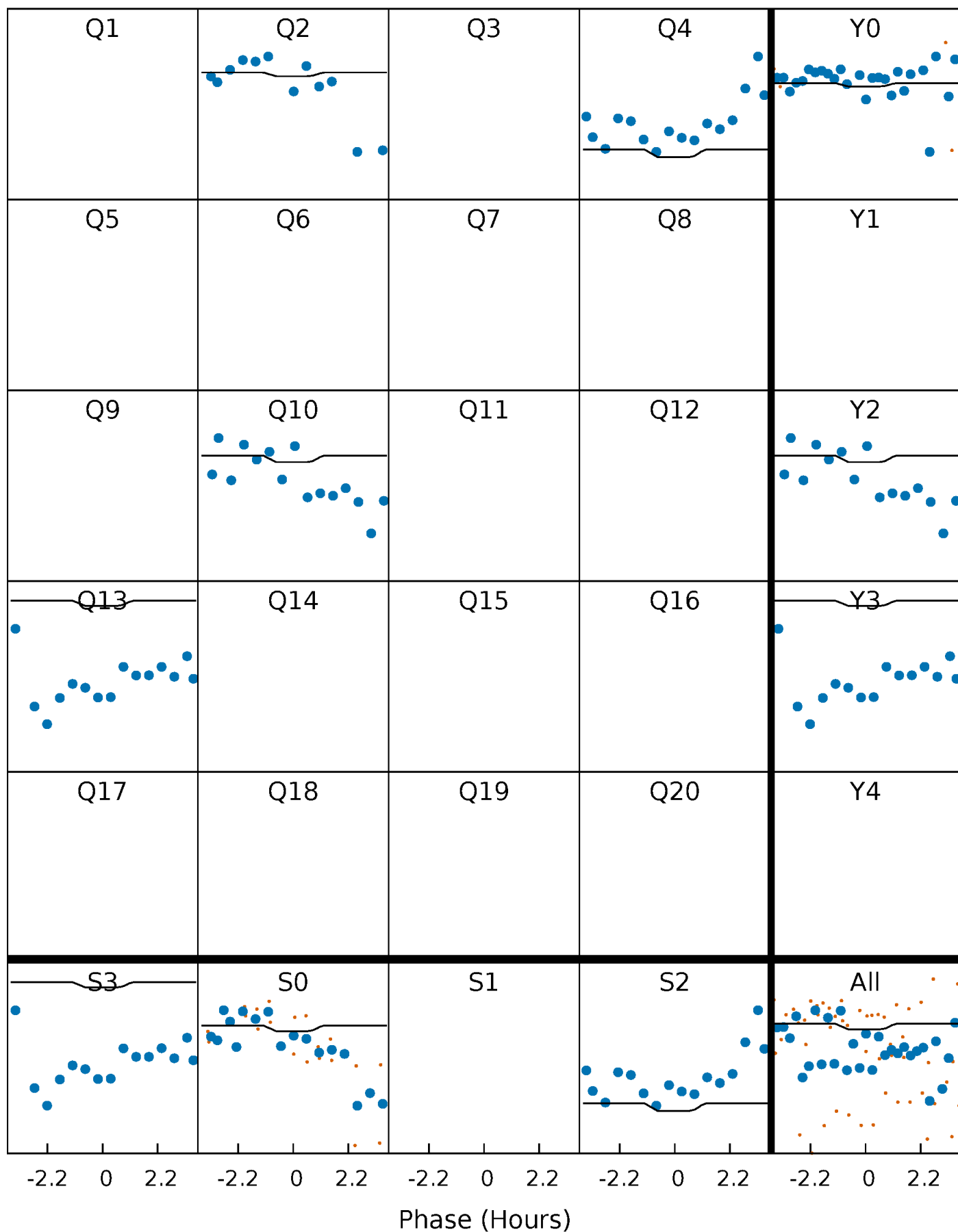
DV Quarter-Phased Transit Curves

TCE 009356988-01 P=255.870156 Days $T_0=185.565794$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

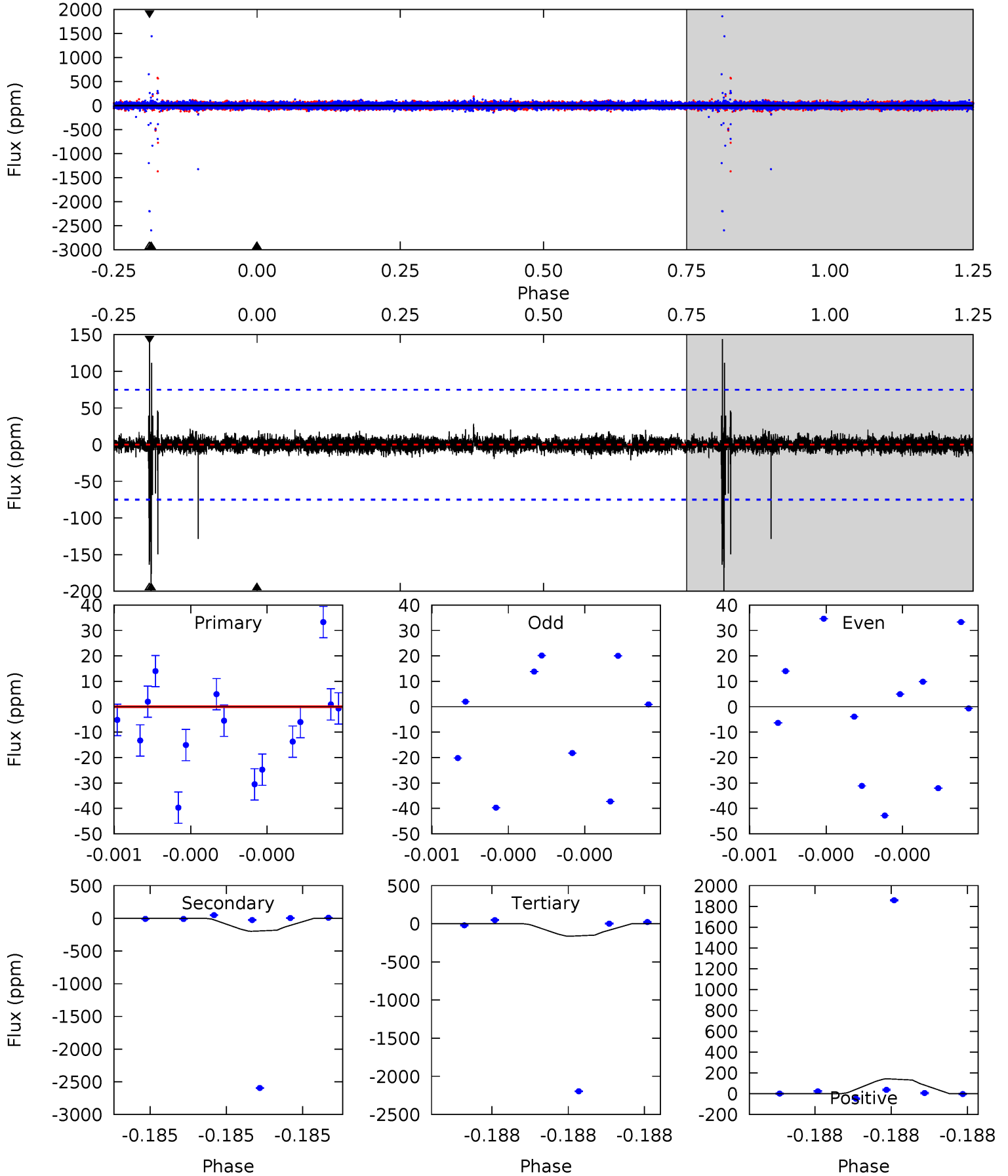
TCE 009356988-01 P=255.855416 Days $T_0=185.621199$ (BKJD)



DV Model-Shift Uniqueness Test

009356988-01, P = 255.870156 Days, E = 185.565794 Days

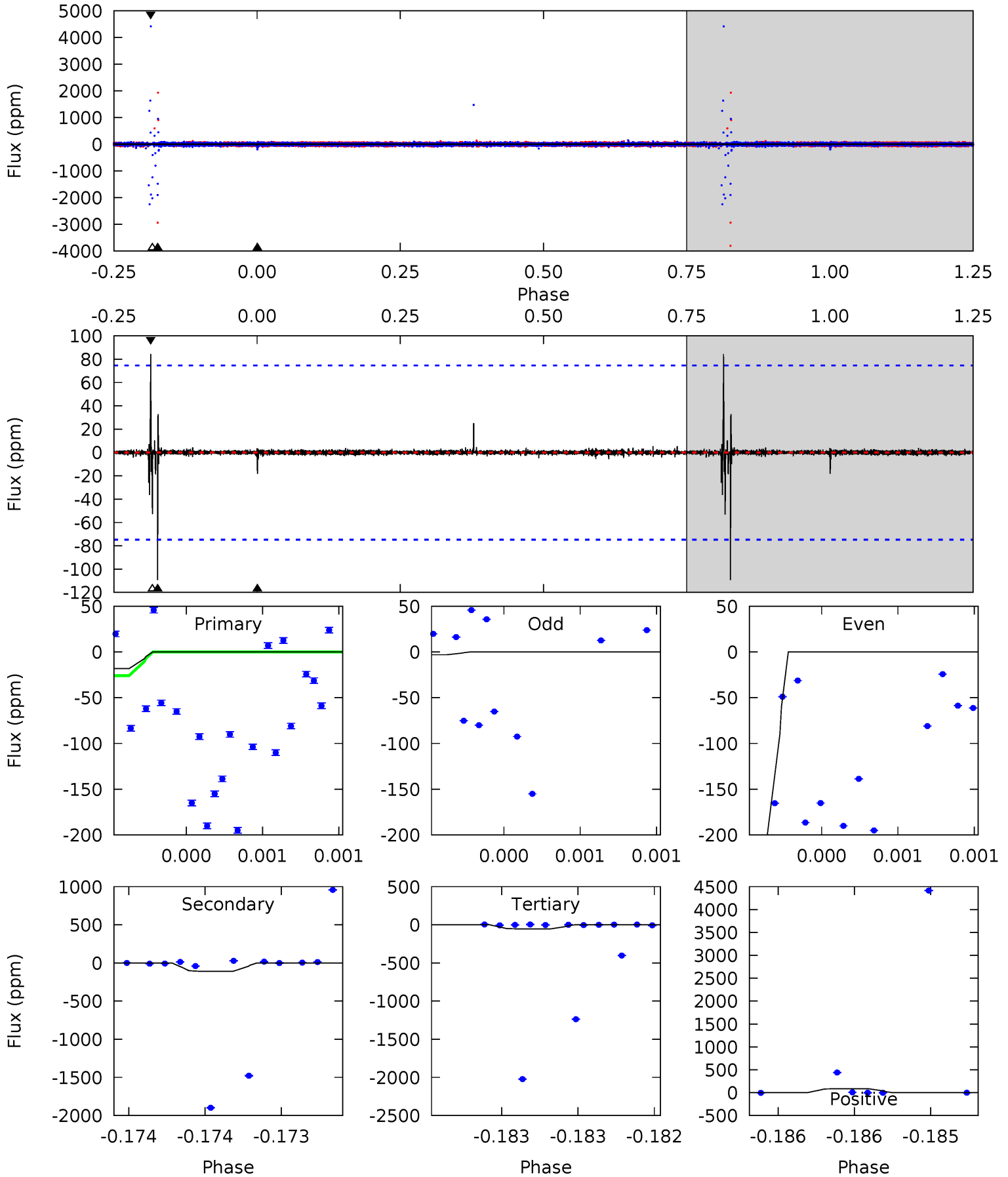
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0.79	15.3	12.6	11.1	5.76	3.77	0.49	-11.8	-10.3	2.74	4.28	0.22	0.68	0.42	0.37



Alt Model-Shift Uniqueness Test

009356988-01, P = 255.855416 Days, E = 185.621199 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1.37	8.24	3.97	6.36	5.63	3.57	0.13	-2.60	-4.99	4.26	1.88	2.42	2.49	0.44	0



Stellar Parameters For KIC 009356988

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	3291^{+107}_{-88}	$0.169^{+0.208}_{-0.052}$	$-0.020^{+0.250}_{-0.150}$	$150.645^{+9.958}_{-31.865}$	$1.221^{+0.202}_{-0.166}$	$0.000^{+0.000}_{-0.000}$
	+3%/-3%	+123%/-31%	+1250%/-750%	+7%/-21%	+17%/-14%	+103%/-16%
Source	KIC0	KIC0	KIC0	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

Secondary Eclipse Parameters for KIC 009356988-01 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-199±13	$898.65^{+928.20}_{-624.41}$	2673^{+122}_{-155}	-2451^{+5459}_{-175}	$0.099^{+1.027}_{-0.075}$
Alt.	-109±13	$839.24^{+997.90}_{-598.95}$	2677^{+113}_{-154}	-2519^{+5265}_{-132}	$0.060^{+0.703}_{-0.047}$

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 $A_{obs} \gg 1.0$

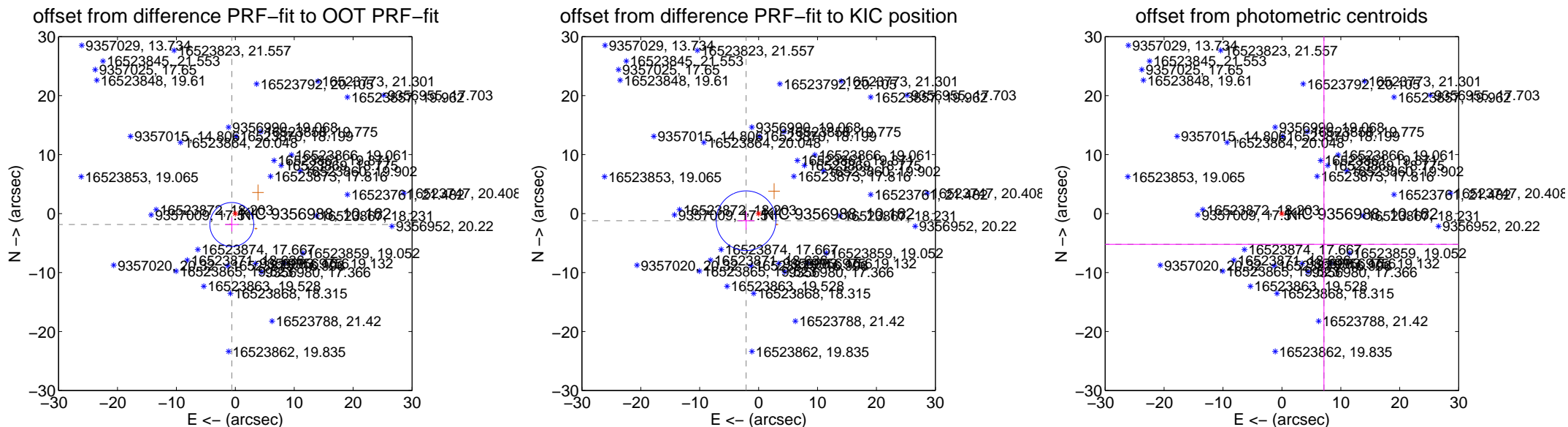
DV Centroid Data

Supplemental centroid analysis for 009356988-01. **Kepler magnitude: 10.16.** Transit SNR 0.40

There are 0 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.80 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.947 ± 1.243	1.57	0.593 ± 1.166	-1.855 ± 1.183
PRF-fit source offset from KIC position	2.449 ± 1.686	1.45	2.129 ± 1.379	-1.209 ± 1.522
photometric centroid source offset	8.84 ± 83.89	0.11	-7.14 ± 93.78	-5.22 ± 61.24



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

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

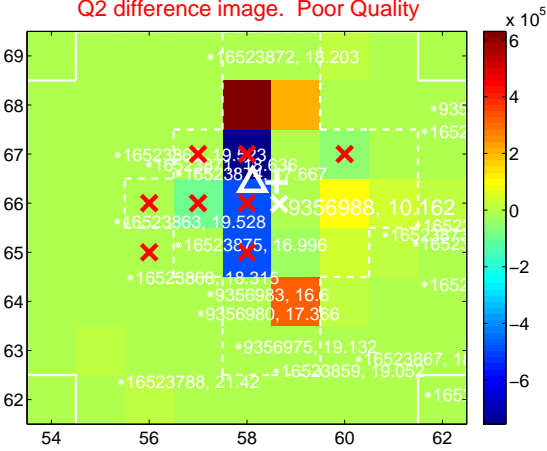
Q1 no difference image



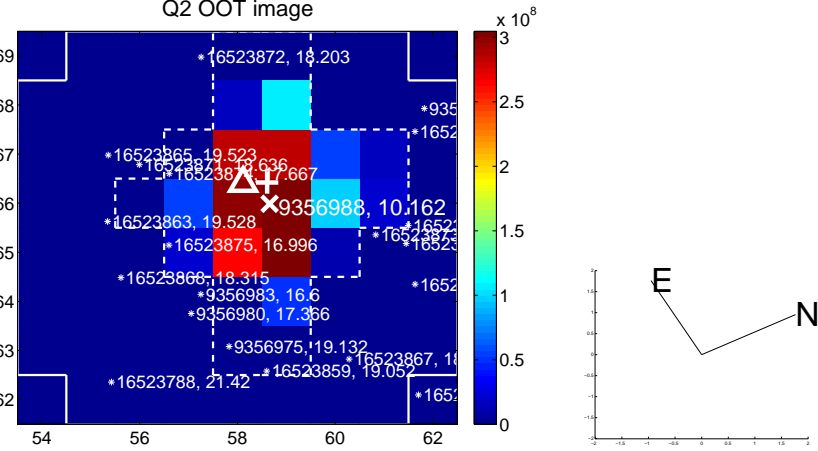
Q1 no OOT image



Q2 difference image. Poor Quality



Q2 OOT image



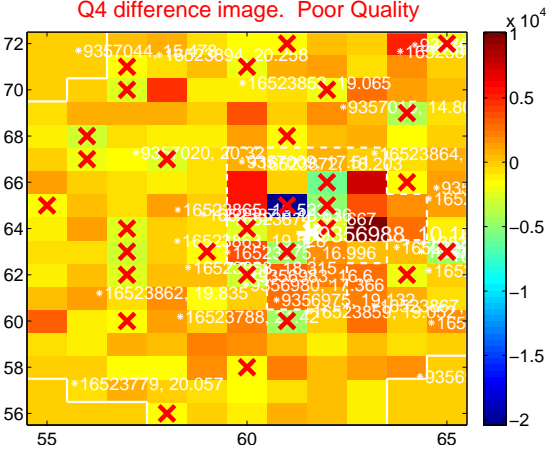
Q3 no difference image



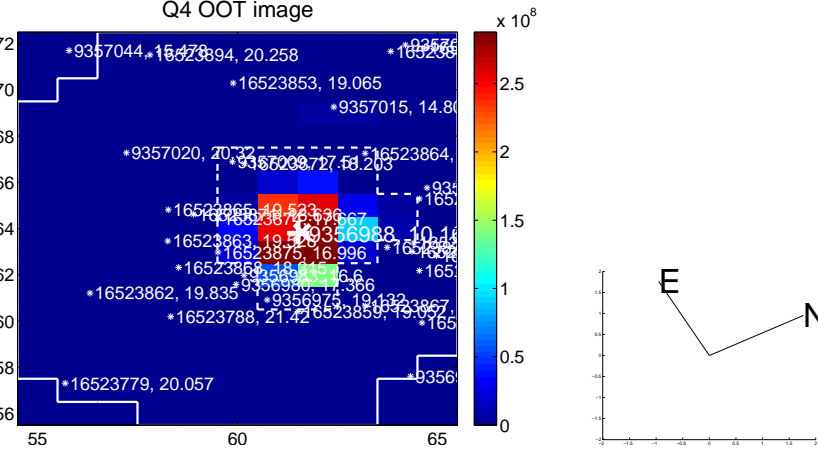
Q3 no OOT image



Q4 difference image. Poor Quality



Q4 OOT image



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



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

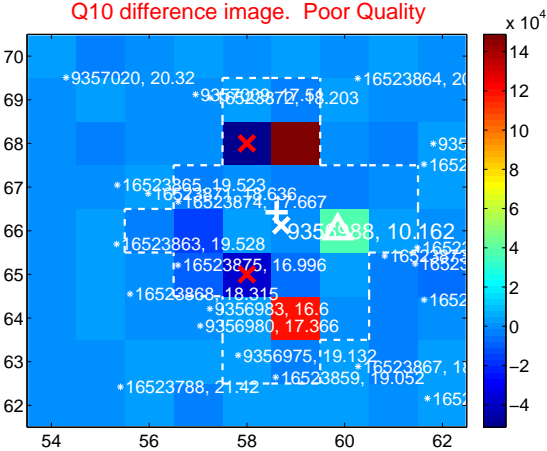
Q9 no difference image



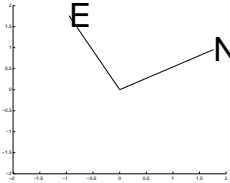
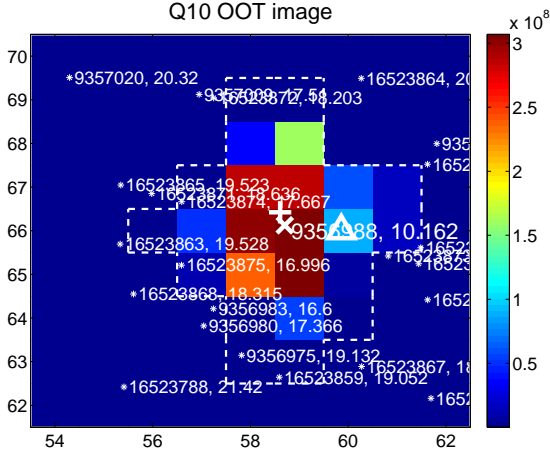
Q9 no OOT image



Q10 difference image. Poor Quality



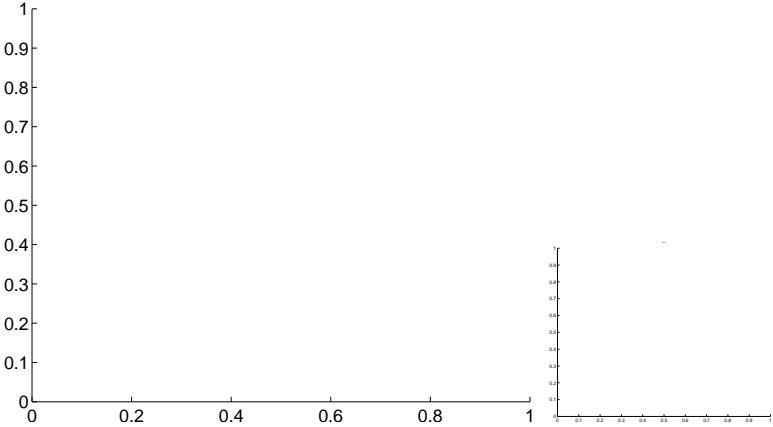
Q10 OOT image



Q11 no difference image



Q11 no OOT image



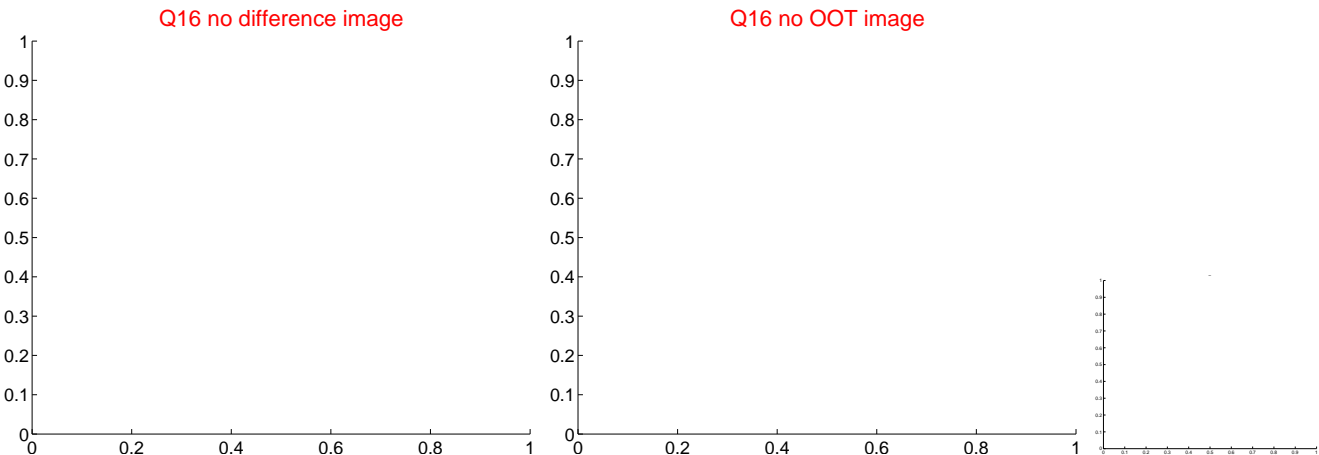
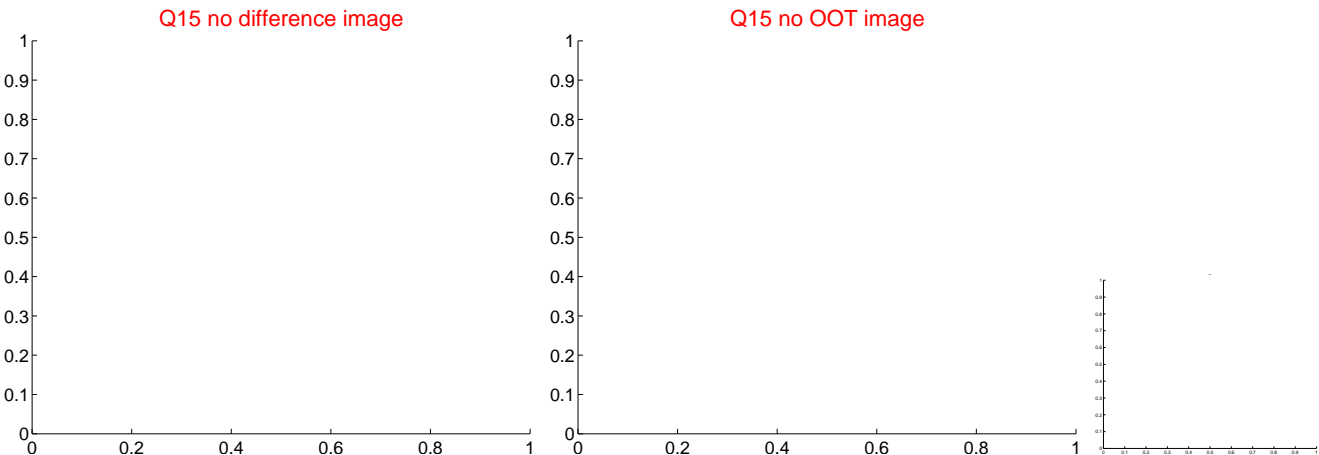
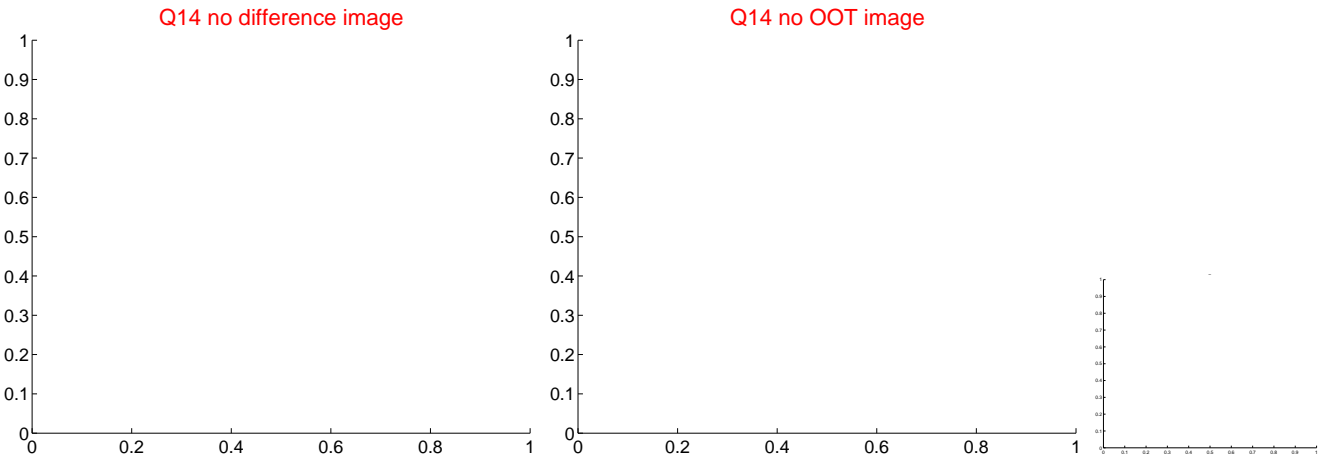
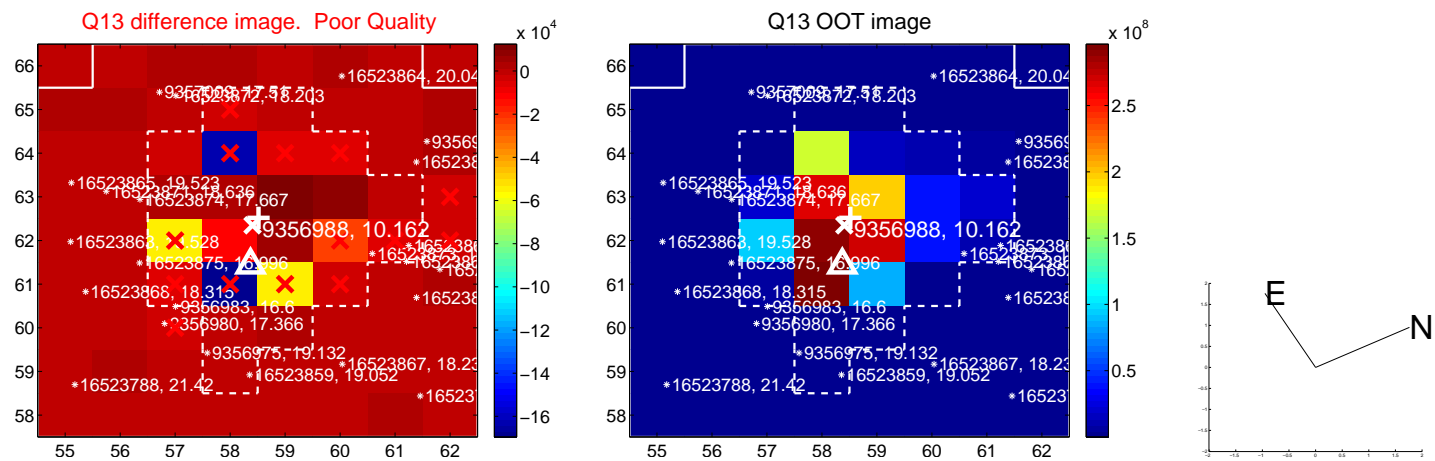
Q12 no difference image



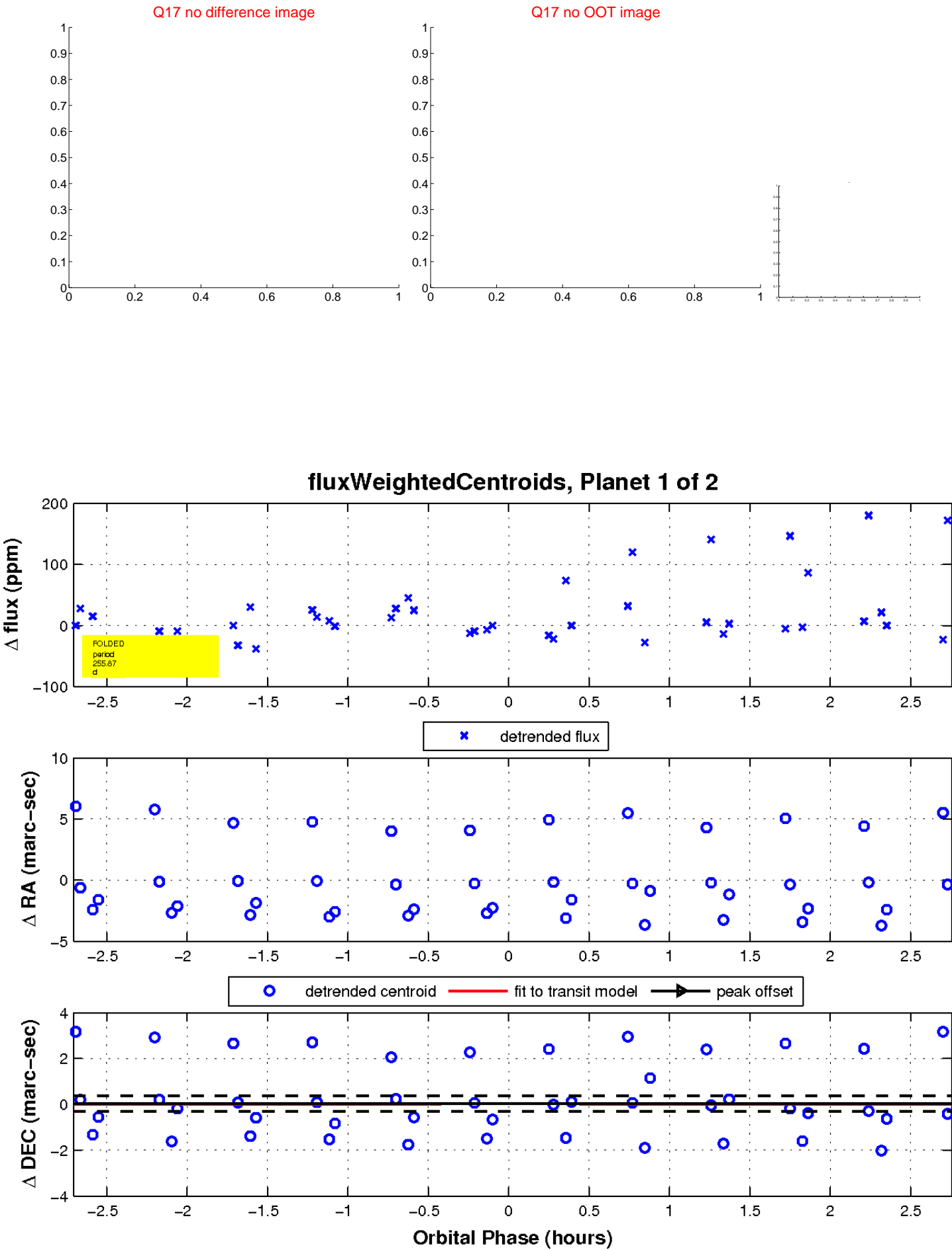
Q12 no OOT image



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



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



This astronomical image shows a ring-shaped galaxy, likely a ring galaxy, centered in the frame. The galaxy has a bright, glowing ring of light with a dark central region. The image is overlaid with a blue grid. The horizontal axis is labeled with green text at the top: 29.0, 28.0, 27.0, 26.0, 25.0. The vertical axis is labeled with green text on the right: 20.0, 10.0, 0.0, -10.0, -20.0. The background is black, and the grid lines are blue.

Declination

KIC 009356988

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})
009356988-01	OBS	No	255.870156	185.565794	5.6	0.928	21.4	0.4	150.65	3291	46.27	3353.38
009356988-02	OBS	No	287.055172	154.698983	304.7	14.614	30.8	16.9	150.65	3291	240.69	2876.66

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009356988-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
009356988-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—INCONSISTENT_TRANS—CENT_SATURATED

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

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

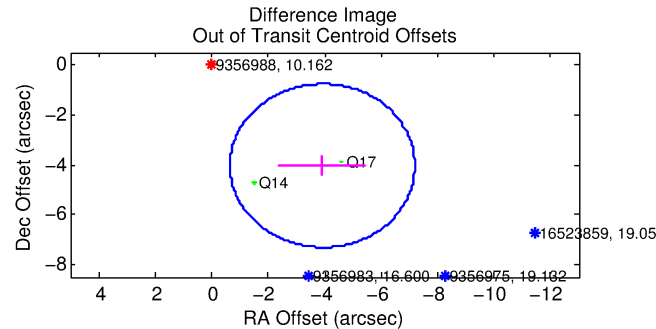
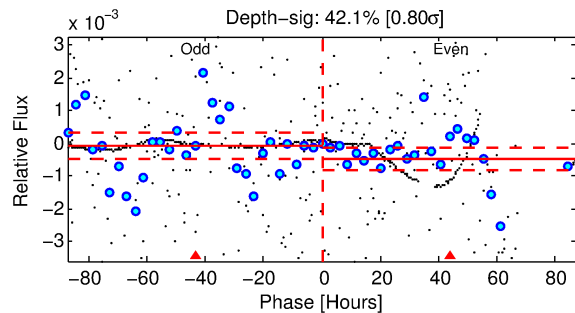
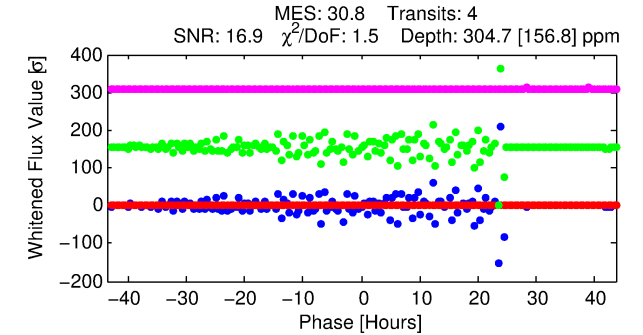
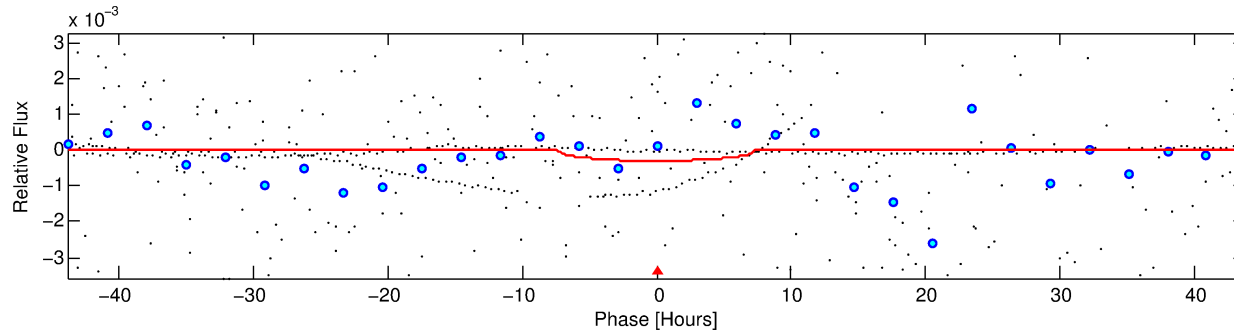
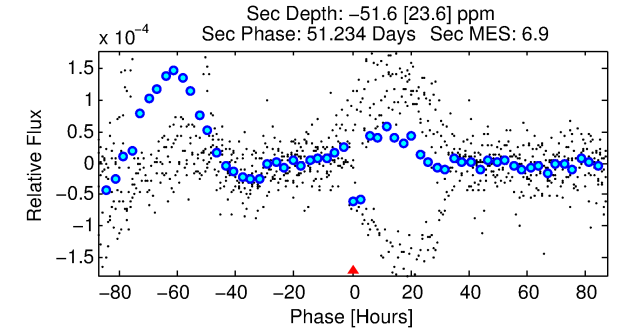
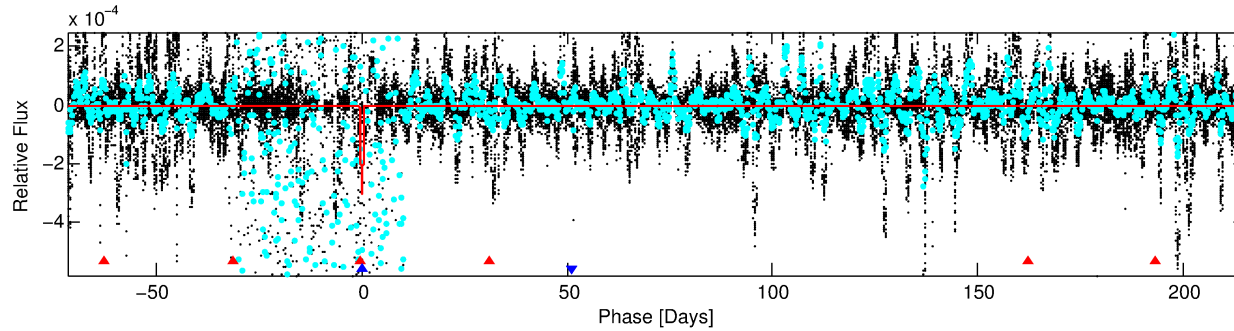
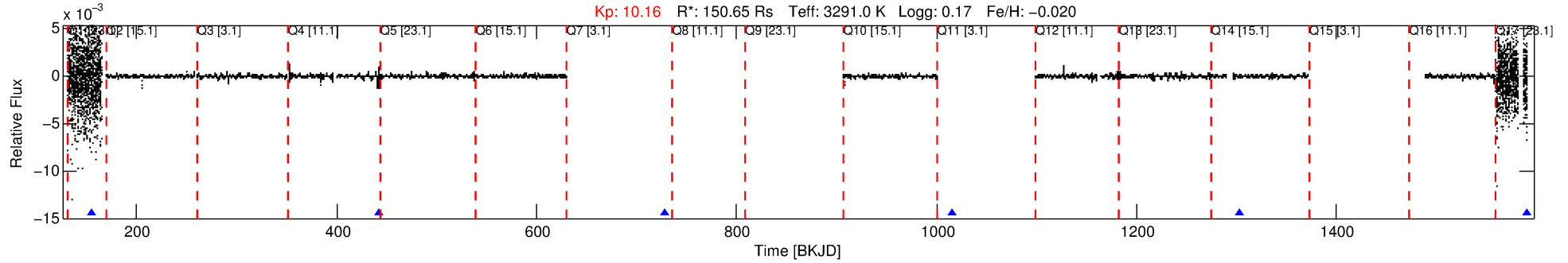
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009356988-02

No Significant Match Found

DV One-Page Summary

KIC: 9356988 Candidate: 2 of 2 Period: 287.055 d



DV Fit Results:

Period = 287.05517 [0.01273] d
Epoch = 154.6990 [0.0526] BKJD
Rp/R* = 0.0146 [0.0154]
a/R* = 152.17 [326.48]
b = 0.03 [67.44]
Seff = 2876.66 [1071.52]
Teq = 1867 [174] K
Rp = 240.69 [258.37] Re
a = 0.9106 [0.1940] AU
Ag = N/A
Teffp = N/A

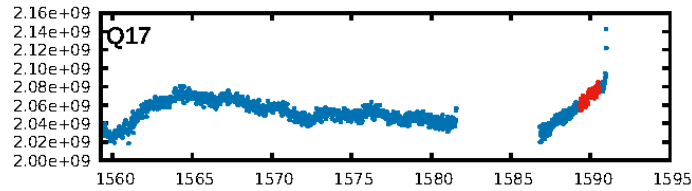
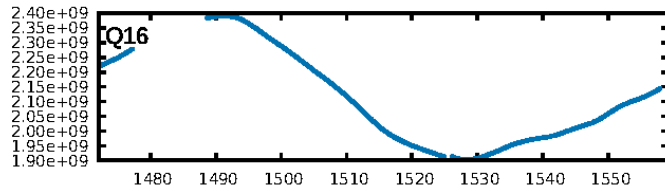
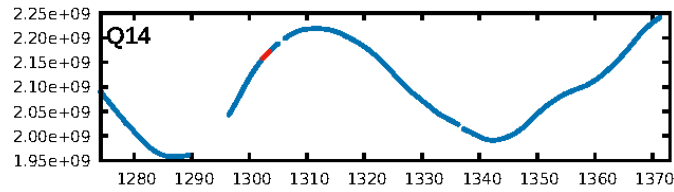
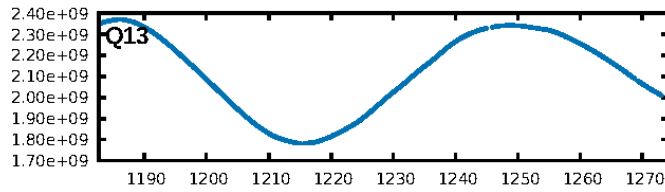
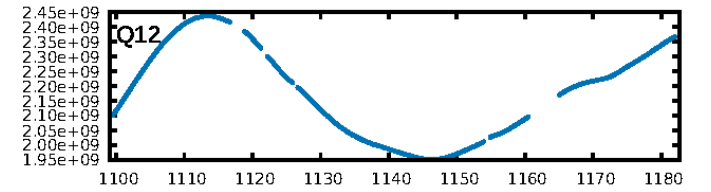
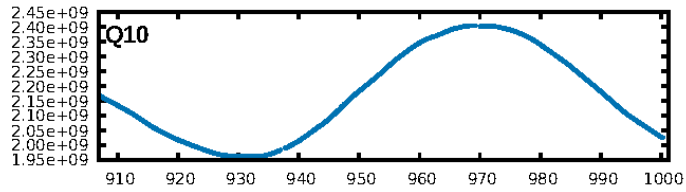
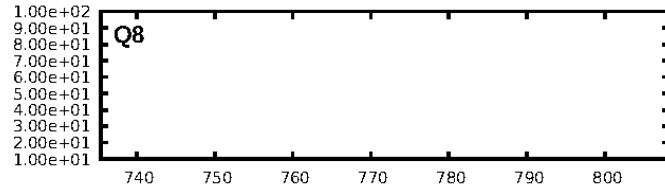
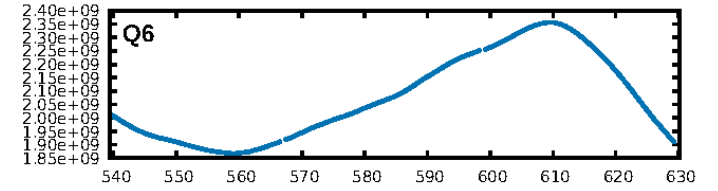
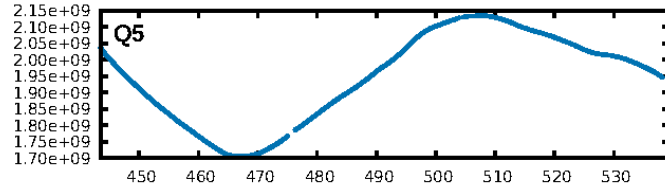
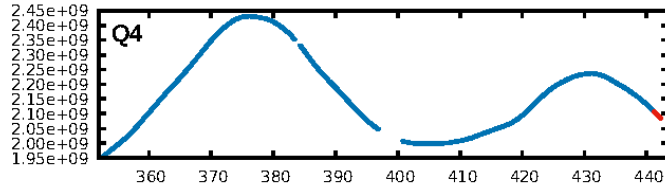
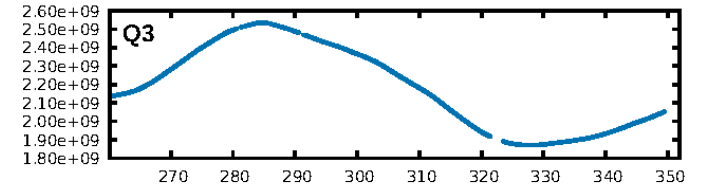
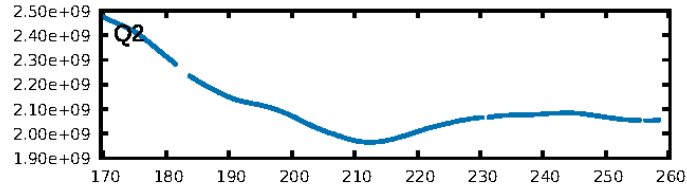
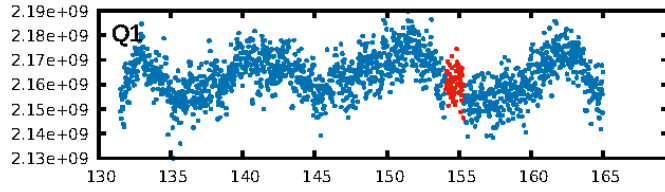
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [51.11σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 0.0%
ModelChiSquareGof-sig: 0.4%
Bootstrap-pfa: 2.14e-11
RollingBand-fgt: 1.00 [2/2]
GhostDiagnostic-chr: N/A
Centroid-sig: N/A
Centroid-so: 0.465 arcsec [0.38σ]
OotOffset-rm: 5.630 arcsec [5.16σ]
KicOffset-rm: 4.663 arcsec [3.37σ]
OotOffset-st: 1/0/0/1 [2]
KicOffset-st: 1/0/0/1 [2]
DiffImageQuality-fgm: 0.50 [1/2]
DiffImageOverlap-fno: 1.00 [3/3]

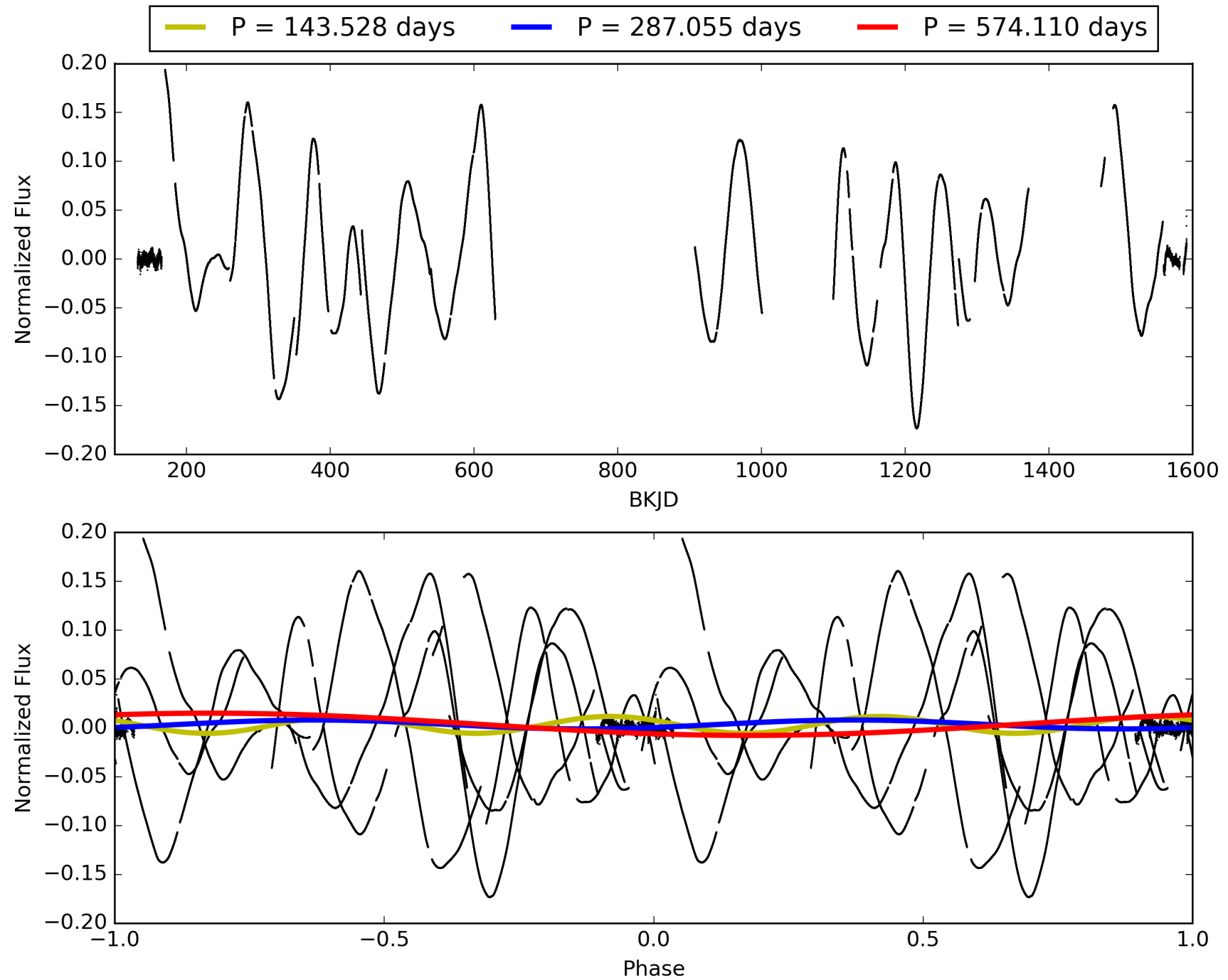
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 13:39:48 Z

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

TCE 009356988-02, PDC Light Curves

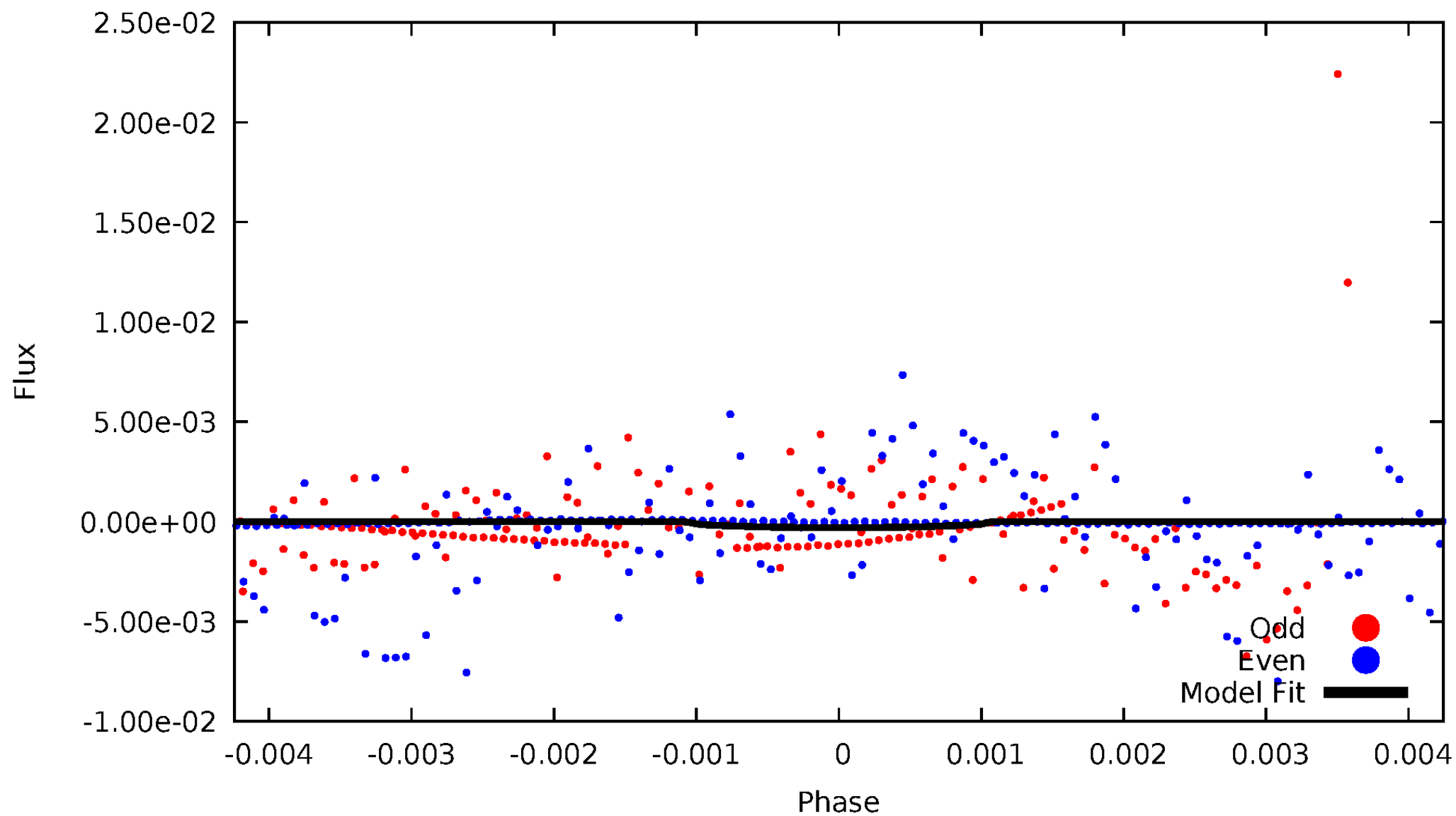


TCE 009356988-02



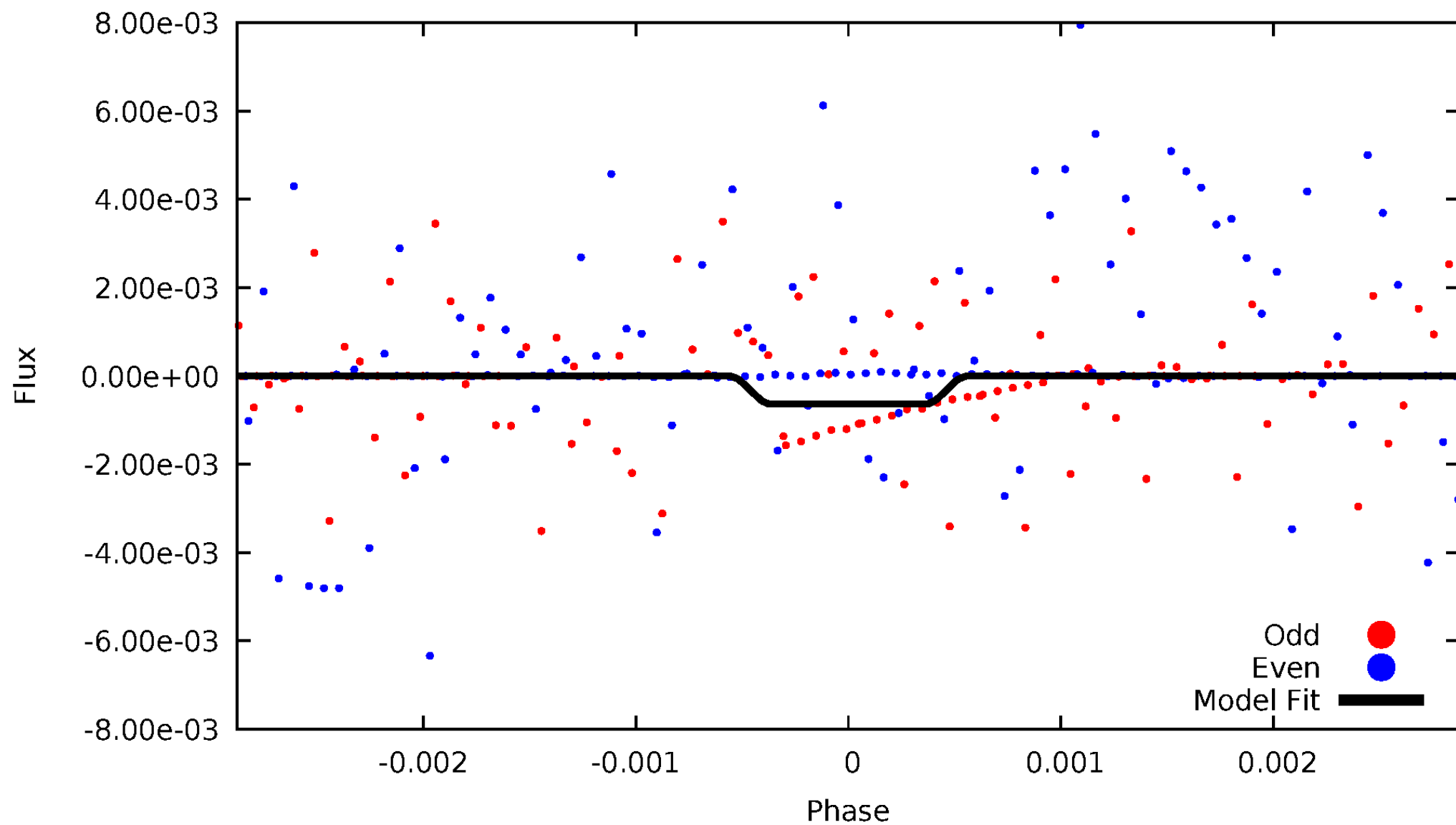
DV Odd/Even

TCE 009356988-02



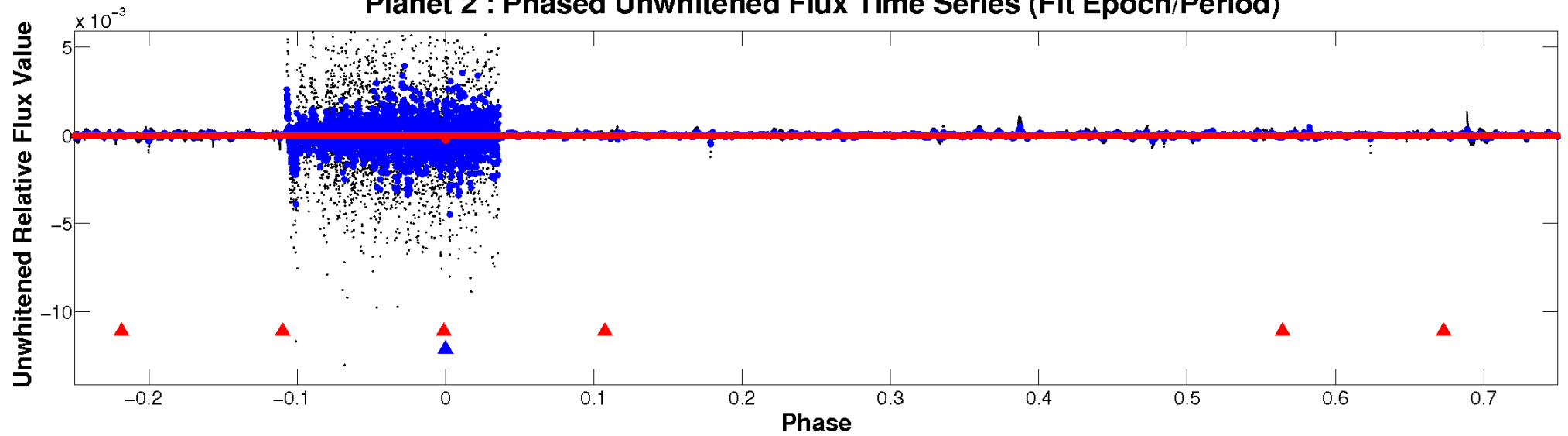
ALT Odd/Even

TCE 009356988-02

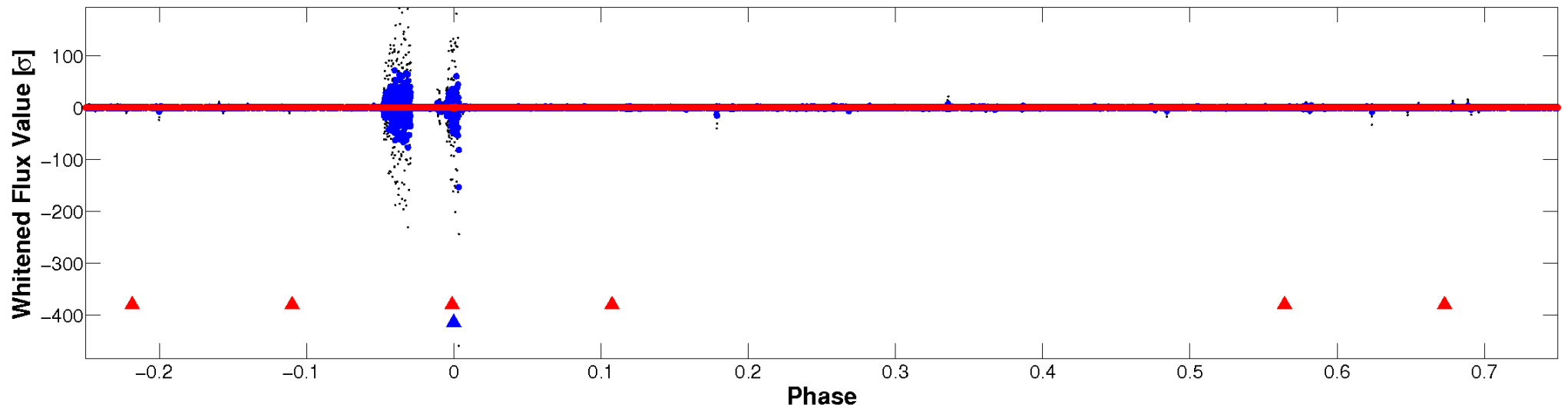


Non-Whitened Vs. Whitened Light Curve

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

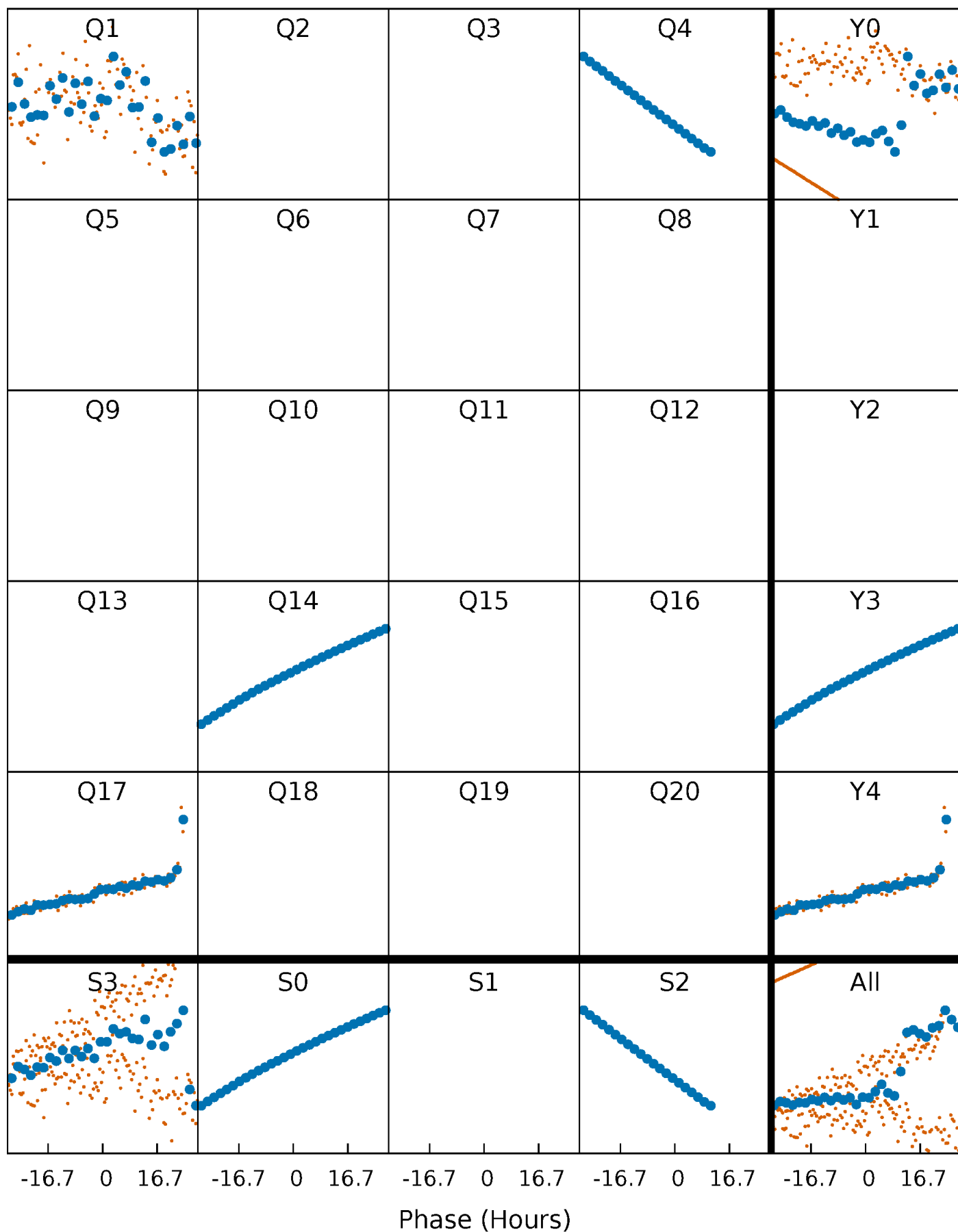


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



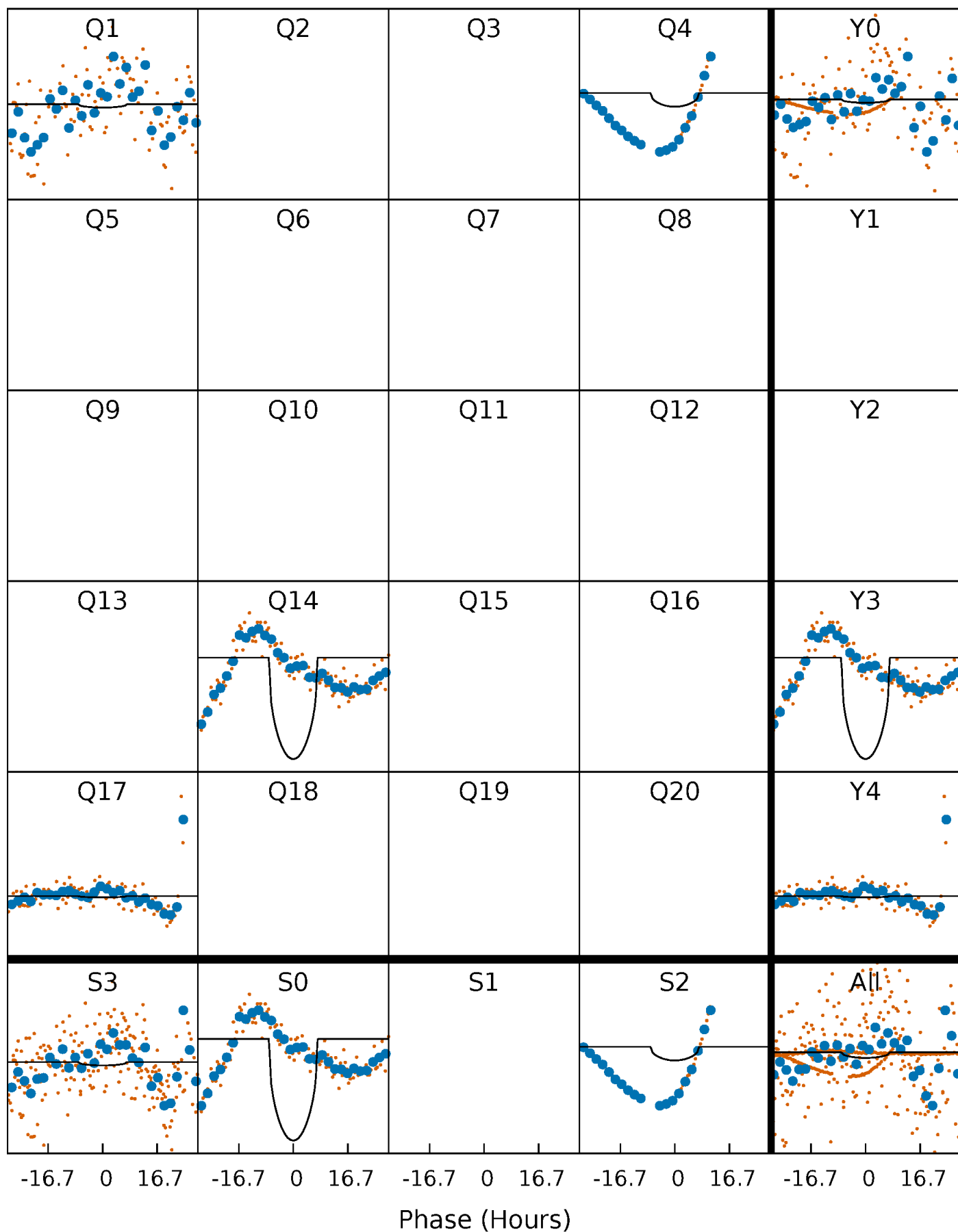
PDC Quarter-Phased Transit Curves

TCE 009356988-02 $P=287.055172$ Days $T_0=154.698983$ (BKJD)



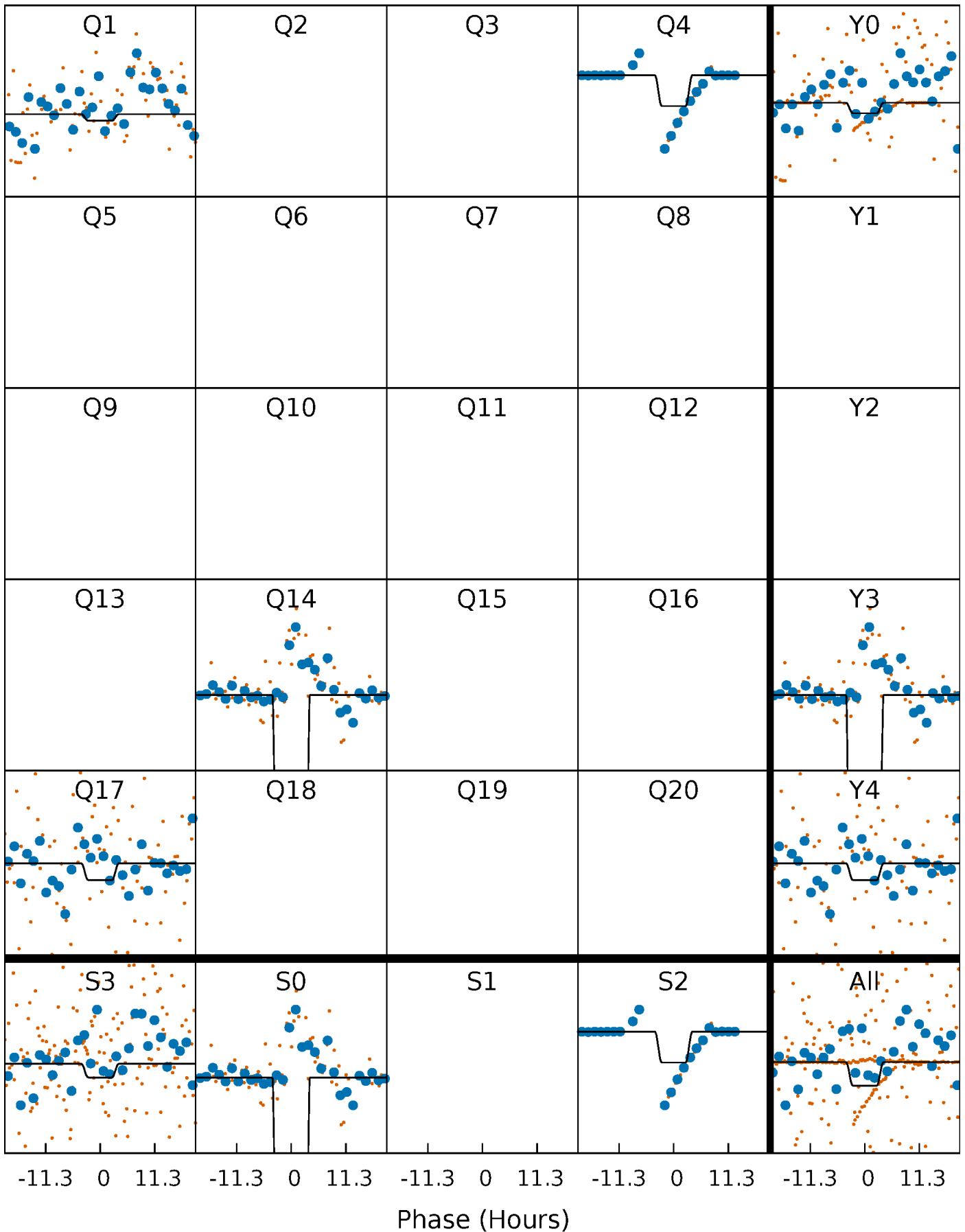
DV Quarter-Phased Transit Curves

TCE 009356988-02 $P=287.055172$ Days $T_0=154.698983$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

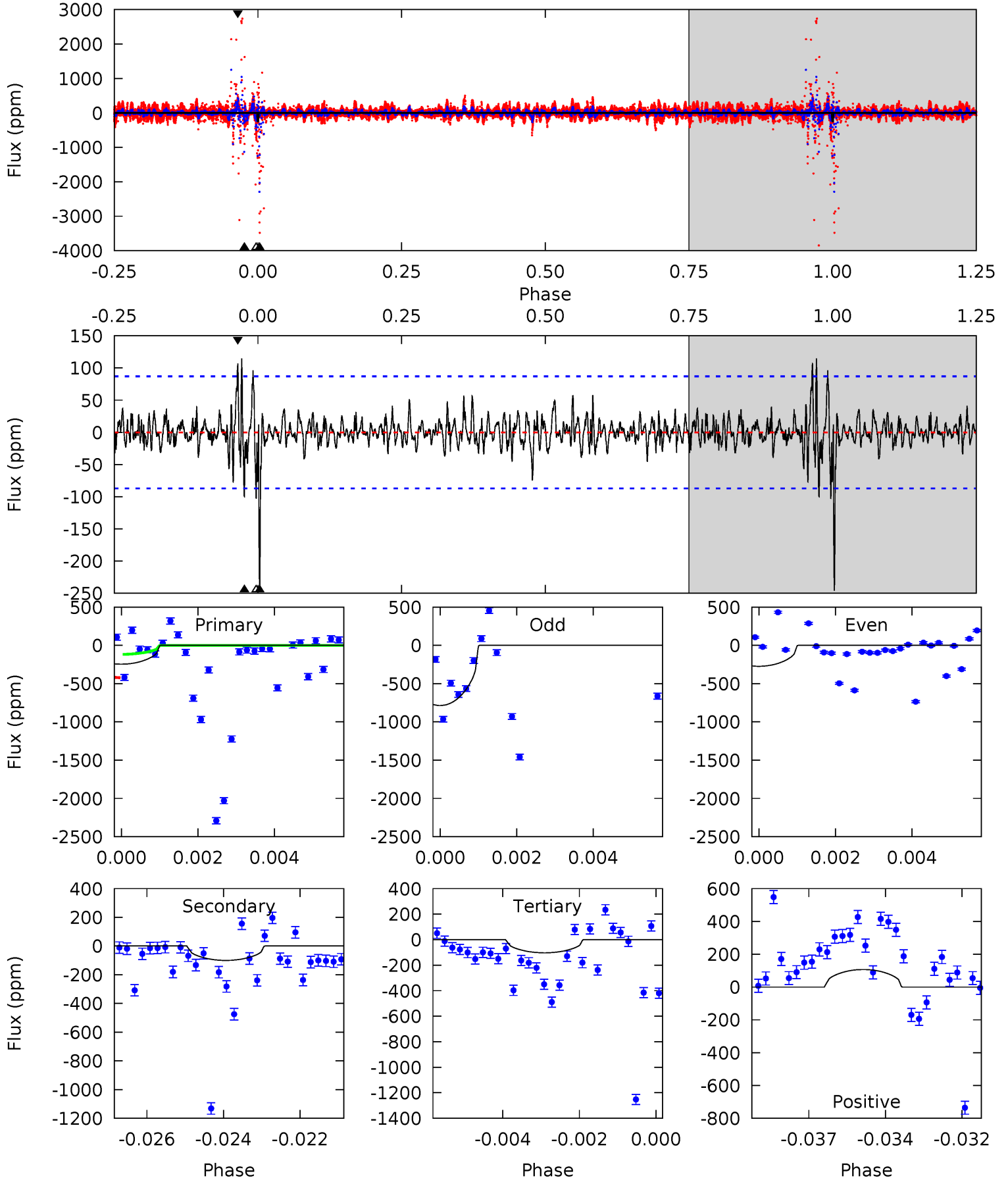
TCE 009356988-02 P=287.118763 Days $T_0=154.514189$ (BKJD)



DV Model-Shift Uniqueness Test

009356988-02, P = 287.055172 Days, E = 154.698983 Days

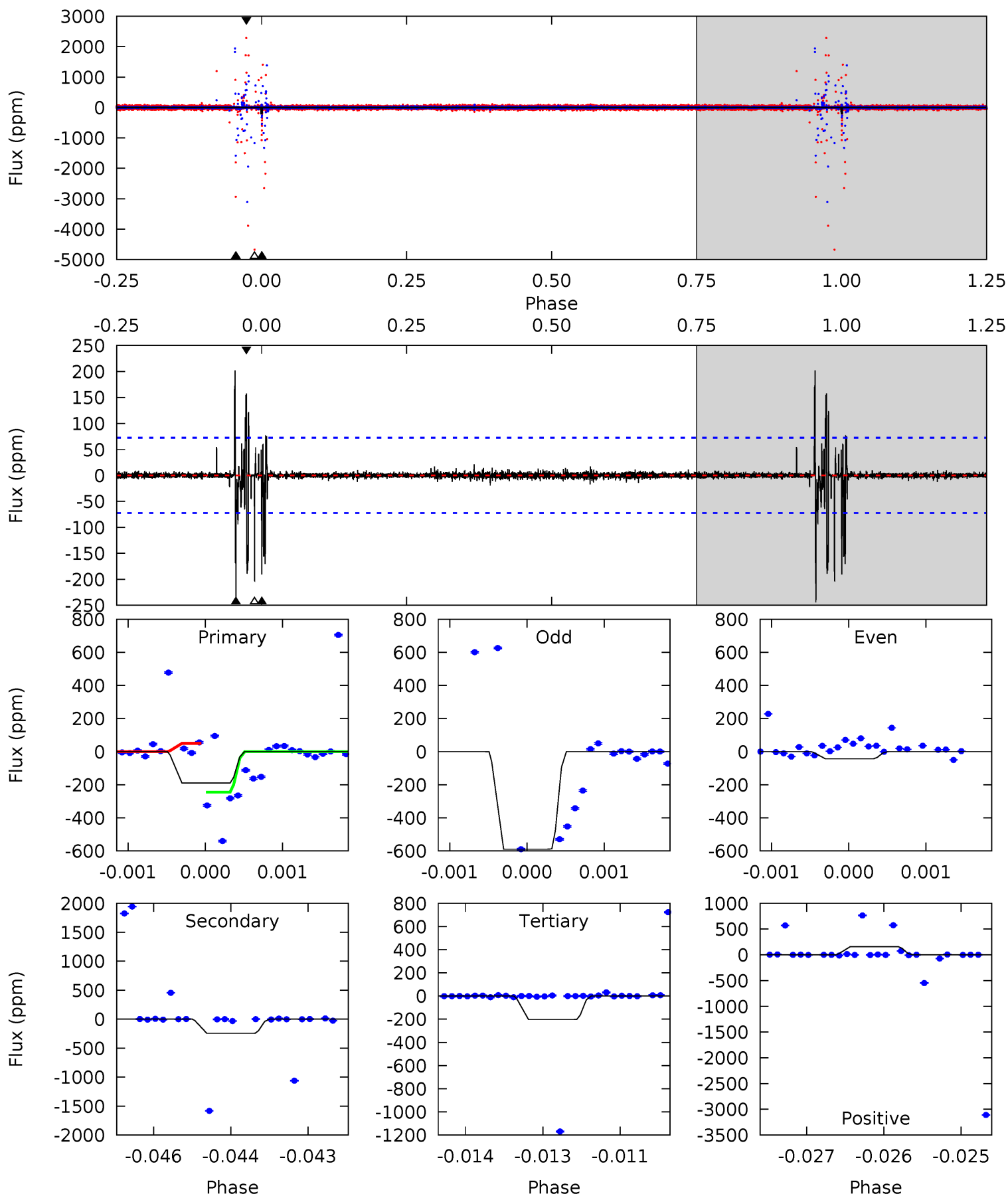
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.0	6.13	6.30	6.53	5.31	3.07	1.06	8.71	8.49	-0.18	-0.40	10.9	0.72	0.32	0



Alt Model-Shift Uniqueness Test

009356988-02, P = 287.118763 Days, E = 154.514189 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
14.3	18.3	15.2	11.8	5.43	3.25	0.74	-0.95	2.45	3.11	6.51	8.38	-0.23	0.45	0



Stellar Parameters For KIC 009356988

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	3291^{+107}_{-88}	$0.169^{+0.208}_{-0.052}$	$-0.020^{+0.250}_{-0.150}$	$150.645^{+9.958}_{-31.865}$	$1.221^{+0.202}_{-0.166}$	$0.000^{+0.000}_{-0.000}$
	+3%/-3%	+123%/-31%	+1250%/-750%	+7%/-21%	+17%/-14%	+103%/-16%
Source	KIC0	KIC0	KIC0	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

Secondary Eclipse Parameters for KIC 009356988-02 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-100 ± 16	$278.45^{+217.99}_{-174.18}$	2562^{+120}_{-135}	2569^{+1111}_{-4852}	$0.612^{+3.487}_{-0.424}$
Alt.	-244 ± 13	$416.97^{+250.55}_{-227.88}$	2566^{+124}_{-136}	2626^{+918}_{-4654}	$0.647^{+2.639}_{-0.385}$

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 $A_{obs} \gg 1.0$

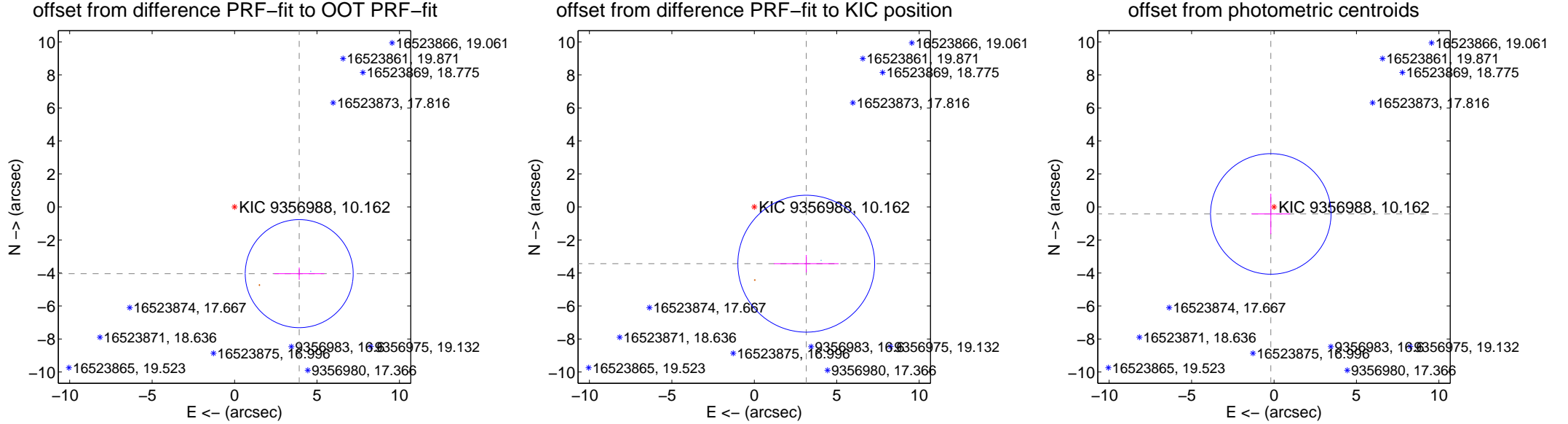
DV Centroid Data

Supplemental centroid analysis for 009356988-02. **Kepler magnitude: 10.16.** Transit SNR 16.92

There are 1 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.87 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	5.630 ± 1.091	5.16	-3.920 ± 1.519	-4.040 ± 0.372
PRF-fit source offset from KIC position	4.663 ± 1.383	3.37	-3.151 ± 1.963	-3.438 ± 0.529
photometric centroid source offset	0.47 ± 1.22	0.38	0.20 ± 1.18	-0.42 ± 1.23



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.

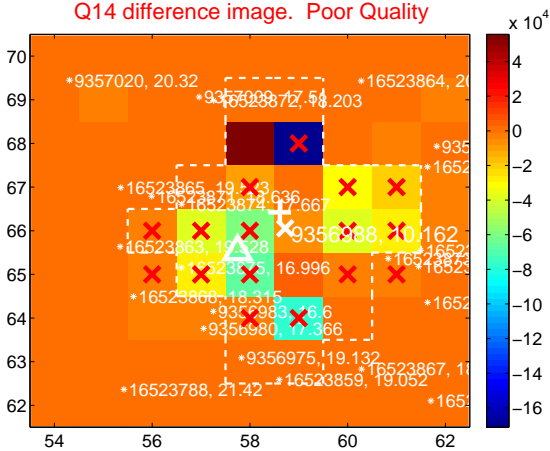
Q13 no difference image



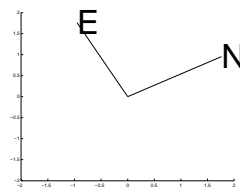
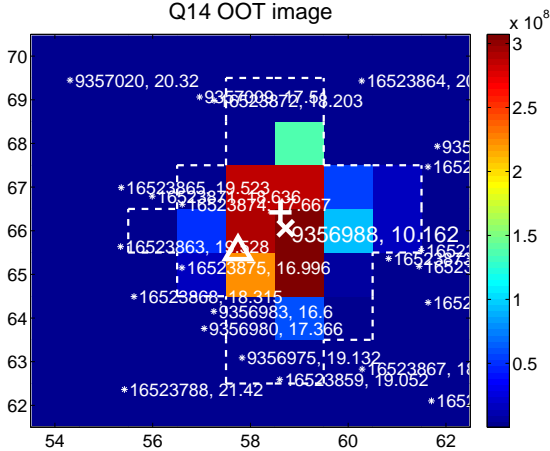
Q13 no OOT image



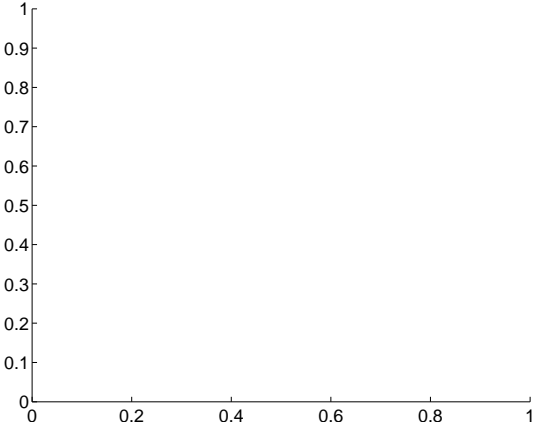
Q14 difference image. Poor Quality



Q14 OOT image



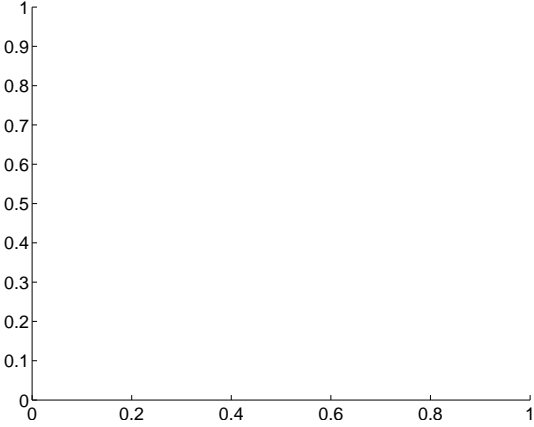
Q15 no difference image



Q15 no OOT image



Q16 no difference image



Q16 no OOT image



UKIRT Image

